



File No.: PLDVP20240299 (Apps)

DATE OF MEETING: April 23, 2026
TO: Gabriola Island Local Trust Committee
FROM: Stephen Baugh, Island Planner
Northern Team
COPY: Renée Jamurat, Regional Planning Manager
SUBJECT: Development Variance Permit – PLDVP20240299 (Apps)
Applicant: Michael Apps
Location: 1140 The Strand, Gabriola Island

RECOMMENDATION

- 1. That the Gabriola Island Local Trust Committee deny Development Variance Permit application PLDVP20240299 (Apps).**

REPORT SUMMARY

The purpose of this report is to introduce a development variance permit application that proposes to reduce the setback to the natural boundary of the sea and the interior lot line to facilitate the construction of a shoreline erosion protection structure. The Gabriola Island Land Use Bylaw has a 15 metre setback from the natural boundary of the sea for buildings and structures and a 1.5 metre setback from interior lot lines. The applicant is proposing a rock revetment shoreline erosion protection structure within 0 metres of the natural boundary of the sea and within 0 metres of an interior side lot line.

Staff are recommending that the Local Trust Committee (LTC) deny the application, the rationale is summarized on page 4 of this report.

BACKGROUND

The applicant has submitted this application to reduce the setback to the natural boundary of the sea for a revetment structure in response to shoreline erosion that has occurred at this location. The objective is to construct a rock revetment that would tie in to the existing revetment at the neighbouring properties. In order to connect to the neighbouring rock revetment (which is currently under consideration by the LTC through DVP applications GB-DVP2022.3 and GB-DVP-2022.4), the interior side lot line setback is also proposed to be varied through this DVP application. A site visit was completed on January 20, 2025.

Although the natural boundary of the sea forms the property boundary, including where there is erosion or accretion which shift the location of the natural boundary, in instances where the boundary shifts abruptly (avulsion) the legal boundary of the lot does not change which is stated to be the case at the subject property.

The applicant has submitted a Geotechnical Report (Attachment 3) and Environmental Impact Assessment (Attachment 4). The applicant also submitted a referral to Snuneymuxw First Nation who did provide a response (Attachment 6).

RATIONALE FOR VARIANCE

The applicant has provided a rationale for their application which is included as Attachment 5.

ANALYSIS

Official Community Plan:

The subject property is not located within a development permit area. The following OCP policies are relevant to this DVP application:

- **6.1(e)** To protect against hazardous conditions and to protect environmentally sensitive areas a setback shall apply from the high water mark of the sea. In the case where a bluff or large land ridge is the prominent upland feature adjacent the sea, a setback from the upper edge of the bluff or ridge shall be applicable.
- **6.1(f)** The sandstone and conglomerate banks along Gabriola's shoreline shall be protected against the accelerated effects of erosion resulting from human activity by requiring the setback of buildings or structures and control of storm water runoff.
- **6.2(k)** Natural coastal processes shall be left undisturbed to the maximum extent possible and there shall be no deposition of material below the natural boundary of the sea unless a permit is issued by Ministry of Environment and DFO authorizing a breakwater or a seawall to be constructed.

The rock revetment structure is proposed to be located within the setback to the natural boundary of the sea, and it is unknown if the proposed structure would accelerate effects of erosion by creating an eddying effect. Although the structure is not proposed to be located below the natural boundary of the sea, replacing an eroding shoreline with an armoured shoreline can have impacts on natural coastal processes. The dwelling on the subject property is located more than 20 metres away from the surveyed extent of the bank erosion which is outside of the established setback to the natural boundary of the sea. OCP policies provide caution with regards to structures in the setback to the natural boundary of the sea, in particular with regards to erosion caused by human activity, protecting development from hazardous conditions, and minimizing disturbance to natural coastal processes.

The Gabriola OCP also contains the following policies related to archeological sites on Gabriola Island which are relevant to the consideration of this application as Snuneymuxw First Nation have identified that shoreline areas across Snuneymuxw territory consistently represent zones of high archaeological and cultural potential:

6.3(a) The Snuneymuxw First Nation and the Archaeology Branch should be consulted prior to the initiation of any future development which may impact on a known archaeological site on Gabriola, or an area exhibiting potential for the presence of unrecorded archaeological sites.

6.3(f) Development proponents are encouraged to consider archaeological resources during all phases of project planning, design and implementation.

Revetment Design and Environmental Impact Assessment

The rock revetment is intended to protect the property from further erosion in the least invasive and inexpensive means possible. It is proposed to be sloped at a ratio of 2H:1V and composed of large rocks in a tight two-layer matrix and infilled with smaller rocks to fill gaps. Plantings of native vegetation are also included

in the design and would be located above the natural boundary. These plantings can maintain or enhance the habitat diversity and function in the areas along the shoreline.

Although both the Environmental Impact Assessment (EIA) and Geotechnical Report state that the proposed revetment preserves coastal processes when compared to more intrusive structures, such as a seawall, other alternatives to protect from erosion are not considered in the reports.

The application was sent to Islands Trust professional biologist for comment. Their comments state that from an environmental perspective the information provided does not appear to provide justification for the proposed development. The application does not state the potential threats and impacts to the surrounding area, or include any mitigation measures to reduce risks. Specifically, the EIA report does not:

- indicate the Douglas-fir/dull Oregon grape ecosystem as a red-listed ecosystem at risk;
- provide an analysis of sediment transport and natural shoreline processes such as the movement of water and sediment essential for maintaining a healthy foreshore;
- assess the cumulative effects of shoreline armouring across the bay, including potential impacts on eelgrass beds and broader coastal habitat changes;
- acknowledge known potential harms from armouring shorelines;
- provide mitigation strategies for potential harms; or
- include rationale for why this design was chosen over a softer approach.

Staff have provided this feedback to the applicant and recommended additional information be provided to support the application, the applicant has declined to provide additional professional reporting under the stamp and seal of a qualified professional. However, the applicant has included a detailed document explaining their research and rationale for the proposed approach. Staff have included this for the LTC's information (Attachment 5), but note that it is not a report that has been prepared under the stamp and seal of a qualified professional.

Green Shores for Homes

The applicant and Geotechnical Report indicate that the rock revetment is designed to adhere to the intent of the guiding principals of Green Shores for Homes.

The application does not provide an analysis of the project with regards to the [Green Shores for Homes Credits and Ratings Guide](#) to show how the guidelines are achieved with this project. In particular, a high number of base points are available to projects that do not include shoreline protection structures or that remove hard armouring such as a rock revetment.

Intent of Regulations being Varied

The intent of setbacks to the natural boundary of the sea are to ensure that buildings and structures are located outside of environmentally sensitive areas, and are located a sufficient distance from the water to avoid impacts from changing shoreline and marine conditions. On the subject property, the principal dwelling is located more than 20 metres from the surveyed extent of the bank erosion. A wood deck is located 3.9 metres from the surveyed extent of bank erosion.

Interior side lot line setbacks promote a level of privacy between neighbouring properties and ensure a degree of separation between buildings on neighbouring properties.

Potential Impacts of Granting the Variance

Granting the variance to allow the shoreline armouring at this location does present risk to the natural environment. Rock revetments can impact the sediment migration along the shoreline, may result in scouring and increased erosion where the armouring transitions to the natural shoreline, and may result in other beach morphology impacts such as steepening of the beach.

Another consideration for the LTC is that there is an existing rock revetment on the adjacent property which is seeking variance retroactively. Plans for the rock revetment proposed at 1140 The Strand may be impacted pending a decision on the permit for adjacent properties, as this application proposes to tie into the existing structure.

Other impacts that form the basis of this proposal are protecting the existing vegetation along the shoreline, protecting existing structures from being subject to the impacts of the shoreline erosion, and providing opportunity to revegetate the eroded shoreline.

Circulation

DVP Notices were circulated to surrounding property owners and residents within 100 metres (Attachment 7). The notification period ends at 4:30 p.m. on April 22, 2026.

To date, no correspondence had been received and any submissions received following the preparation of this staff report will be forwarded to the LTC and reported at the meeting.

First Nations

The applicant submitted a referral to Snuneymuxw First Nation (SFN), and a response was received (Attachment 6). The response states that an Archaeological Impact Assessment should be conducted prior to ground disturbance.

The response from SFN also provides recommendations for consideration by the LTC related to education and outreach and compliance protocol.

Rationale for Recommendation

Staff are recommending the LTC deny the development variance permit for the following reasons:

- The dwelling unit is setback over 15 metres from the natural boundary of the sea;
- Professional information related to the risk to the environment associated with the installation of the shoreline armouring, mitigation of impacts, and suitability of alternatives have not been provided;
- The visual impact of the rock revetment; and
- An Archaeological Impact Assessment has not been conducted.

ALTERNATIVES

The LTC may consider the following alternatives to the staff recommendation:

1. Request further information

The LTC may request further information prior to making a decision. If selecting this alternative, the LTC should describe the specific information needed and the rationale for this request. Recommended wording for the resolution is as follows:

That the Gabriola Island Local Trust Committee request that the applicant submit to the Islands Trust [describe information].

2. Approve the application

The LTC may approve the application to facilitate the construction of the rock revetment. Staff advise that the implications of this alternative are that impacts from the proposed development and to the Snuneymuxw First Nations interests related to this application are not known. Recommended wording for the resolution is as follows:

That the Gabriola Island Local Trust Committee approve issuance of Development Variance Permit PLDVP20240299 (Apps).

3. Hold the application in abeyance

The LTC may choose to hold the application in abeyance.

NEXT STEPS

If the Staff recommendation is selected the applicant will be informed and the file will be closed.

Submitted By:	Stephen Baugh, Island Planner	April 9, 2025
Concurrence:	Renée Jamurat, RPP MCIP, Regional Planning Manager	April 13, 2026

ATTACHMENTS

1. Site Context
2. Maps, Plans, Photographs
3. Geotechnical Report
4. Environmental Impact Assessment
5. Applicant Rationale
6. Snuneymuxw First Nation Referral Response
7. Notice
8. Development Variance Permit

ATTACHMENT 1 – SITE CONTEXT

LOCATION

Legal Description	LOT 6, SECTION 18, GABRIOLA ISLAND, NANAIMO DISTRICT, PLAN 45781
PID	008-828-075
Civic Address	1140 The Strand, Gabriola Island
Lot Size	0.62 ha

LAND USE

Current Land Use	Residential
Surrounding Land Use	Waterfront (North), Sandwell Park (West), Residential (East and South)

HISTORICAL ACTIVITY

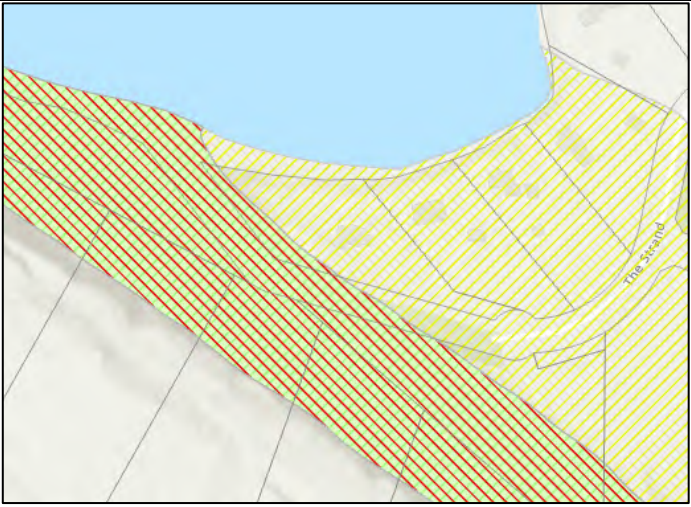
File No.	Purpose
GB-BOV-1993.2	Board of Variance order to reduce the lot line setback for a proposed garage.

POLICY/REGULATORY

Official Community Plan Designations	Small Rural Residential (SRR)
Land Use Bylaw	Small Rural Residential (SRR)
Other Regulations	
Covenants	None
Bylaw Enforcement	GB-BE-2015.19

SITE INFLUENCES

Islands Trust Conservancy	There are no ITC covenants or properties in the direct area. Referral to ITC is not required.
Regional Conservation Strategy	The Regional Conservation Plan 2018-2027 estimated importance of habitat composition in the area of the subject property is Medium. This application does not appear to be inconsistent or contrary to the goals and objectives set out in the ITC Regional Conservation Plan.
Species at Risk	None Mapped
Sensitive Ecosystems	SEM Secondary Class: Wetland (Yellow) SEM Primary Class: Mature Forest (Red) SEM Tertiary Class: Cliff (Green)

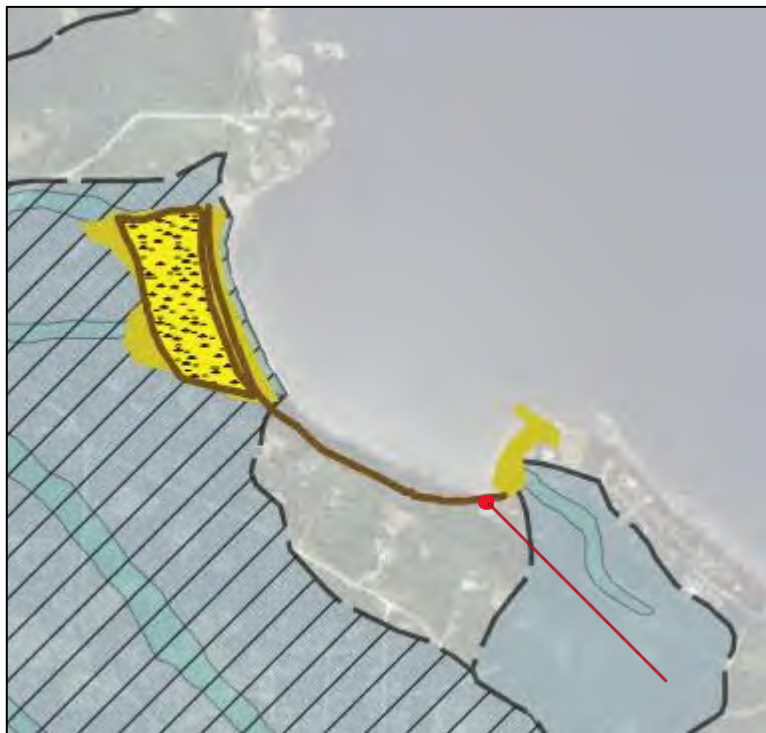
	
Hazard Areas	Areas of Low and Moderate risk steep slopes mapped within the subject property.
Archaeological Sites	<p>Mapping indicates areas of high archaeological potential on the subject property and known archaeological sites within 100m of the subject property.</p> <p>Notwithstanding the foregoing, and by copy of this report, the owners and applicant should be aware that there is a chance that the lot may contain previously unrecorded archaeological material that is protected under the <i>Heritage Conservation Act</i>. If such material is encountered during development, all work should cease and Archaeology Branch should be contacted immediately as a <i>Heritage Conservation Act</i> permit may be needed before further development is undertaken. This may involve the need to hire a qualified archaeologist to monitor the work.</p>
Climate Change Adaptation and Mitigation	In consideration of the existing development's proximity to the natural boundary of the sea, there may be potential for future impacts by sea level rise or other climate change induced hazards. Natural wave action has impacted and eroded parts of the shoreline in the past, and may continue to erode the bank in the future.
Shoreline Classification	Sediment Shoreline - Pebble/Sand
Shoreline Data in TAPIS	<i>Eelgrass meadow mapped approximately 120 metres from property boundary.</i>



Watershed Sediment Inputs to Shoreline System



Localized Sediment Movement Direction (Small Scale)



SOFT SHORELINES

- Sediment shorelines are typically associated with high recreational values and high ecological values (pocket beaches, estuaries, etc).

SALT MARSH

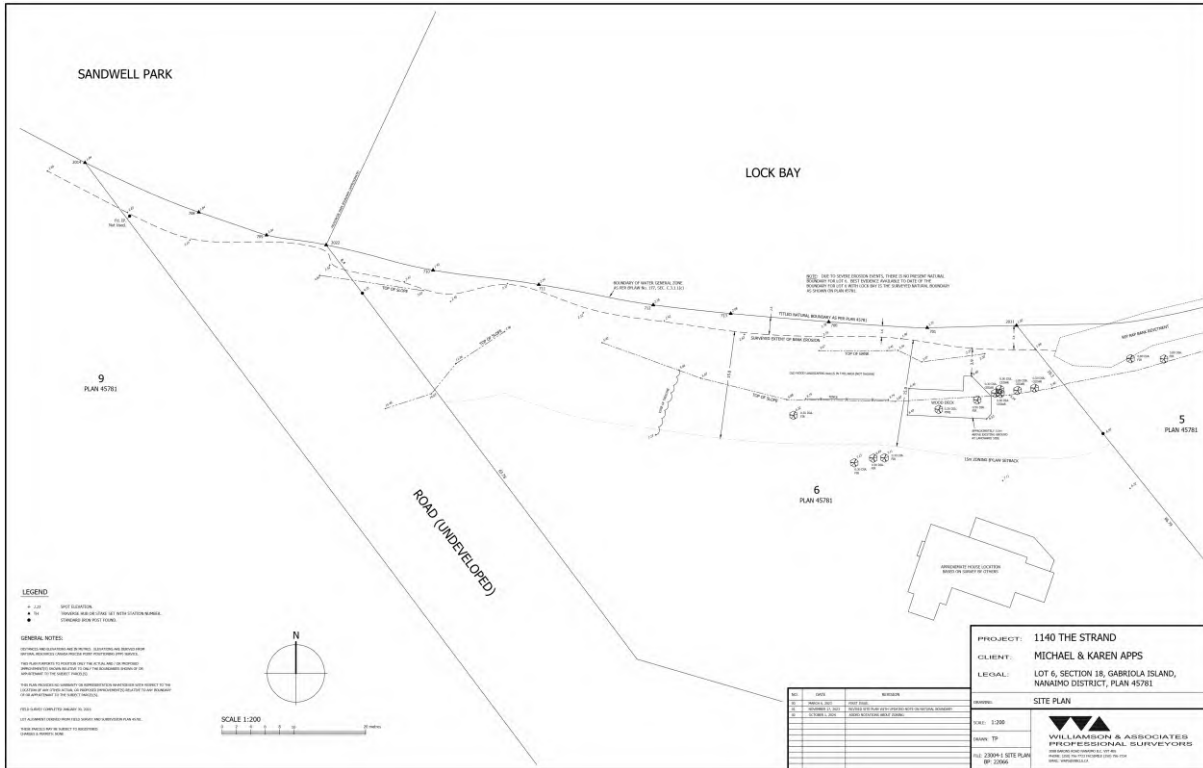
- Valued ecological features
- Vulnerable to pollution from land-based activities

LOW LYING AREAS

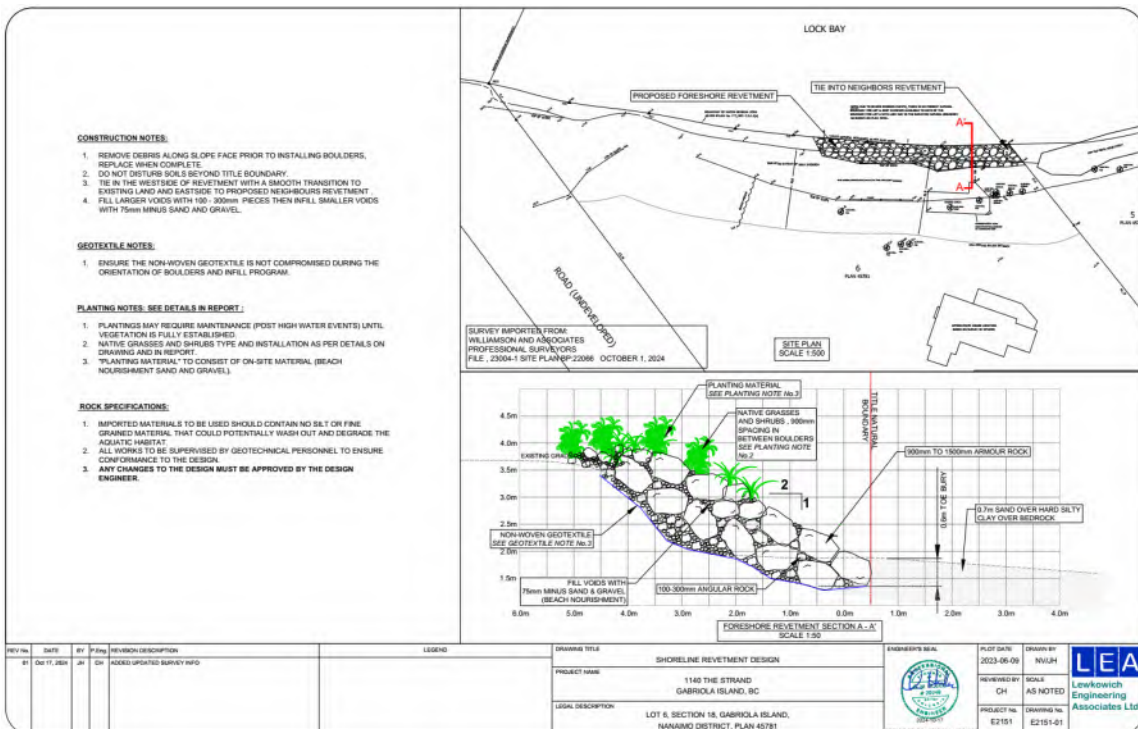
- Areas 0-4 m in elevation above existing Mean Sea Level and greater than 50 m. of width from the shore are mapped as 'vulnerable' to sea level rise.

ATTACHMENT 2 – MAPS, PLANS, PHOTOS

2.1 SITE SURVEY



2.3 ROCK WALL REVETMENT PLAN



2.4 SITE VISIT PHOTOS





GEOTECHNICAL REPORT

Mike Apps
1140 The Strand
Gabriola Island, BC
VOR 1X3

File: E2151.01Rev 2
Revision: 02
Date: October 17, 2024

ATTENTION: Mike Apps

PROJECT: FORESHORE REVETMENT
1140 THE STRAND, GABRIOLA ISLAND, BC
LOT 6, PLAN VIP45781, SECTION 18, NANAIMO DISTRICT, GABRIOLA ISLAND, PID 008-828-075

SUBJECT: FORESHORE REVETMENT ASSESSMENT AND DESIGN

1.0 INTRODUCTION

- a. The owner of the property, located at 1140 the Strand, Gabriola Island, BC has requested Lewkowich Engineering Associates Lt. (LEA) to assess the damage to this property’s foreshore by recent erosion events and to proposes non-structural measures to rehabilitate and protect the property from further degradation.
- b. This letter summarizes the results of our assessment, observations and design and provides our comments, recommendations, and conclusions regarding the proposed construction of a foreshore revetment. LEA will be working in concert with a qualified BC Land Surveyor for the legal boundary component of the work.

2.0 OBJECTIVES

- a. The objectives of this report are to provide recommendations and designs regarding foreshore protection while adhering to Coastal Slope guidelines and the intent of the Green Shores for Homes Guiding Principles (GSH)¹. These “Guiding Principles” consist of the following:
 - i. Preserve or restore physical processes to maintain healthy shorelines.
 - ii. Maintain or enhance habitat function and diversity along the shoreline.
 - iii. Prevent or reduce pollutants from entering the aquatic environment.
 - iv. Avoid or reduce cumulative impacts on the shoreline environments.

3.0 SITE CONDITIONS

- a. The property is currently developed with an existing single-family residence, existing carriage house, and established landscaping/lawn areas. The subject site is located along the northern shore of Gabriola Island.



Figure 3.1– Location Plan of Subject Property²

- b. In general, the foreshore can be characterized as a low-bank shoreline with a gently sloping intertidal zone facing the open waters of the Strait of Georgia / Salish Sea to the north. The total height of the shoreline bank ranged from approximately 2.4m to 5.9m at the time of our assessment. The crest is defined by the rear yard extent of lawn and organic soil cap with a detached wooden deck and fencing which transitions to a naturally forested area further to the west along the foreshore. Widely spaced coniferous trees exist at or near the slope crest. The present natural boundary is defined by an approximately 1.5m tall, near-vertical soil exposure located at the toe of the foreshore slope. See photos below.



Photo 1: Western foreshore conditions where they meet neighboring revetment.



Photo 2: Conditions at the central foreshore area.

- c. There is considerable length of inter-tidal zone along this section of shoreline. The very gently sloping sea floor extends into the Strait of Georgia. This very gently sloping beach is covered by sand to cobbles and small boulder sized material.
- d. The property owner is looking to remediate foreshore areas impacted by erosion and to protect the foreshore from future erosion in the least invasive and inexpensive means possible. A revetment to the title natural boundary is proposed. This filling (revetment) is justified as it will help ensure the protection of the mature trees and provide the necessary safe distance to buildings from storm events. These recent storms have a much greater intensity with varying wave directions. The frequency and intensity of such storm events is partly due to impacts of climate change, causing severe erosion of this area (any many others) over the last few years. Erosion has destroyed the shoreline habitat and reduced the set back to buildings and mature trees, which had remained intact for decades. As the trend of severe weather events with increasing frequency and intensity is expected to continue, remediating and mitigating the foreshore erosion is the recommended approach.
- e. A similar shoreline revetment has been completed for the two neighbouring properties to the east of the subject property and it is our intent to install this revetment to be coincident with the neighbours' installations, providing a smooth shoreline alignment without any abrupt protrusions.
- f. Survey data for the present natural boundary was provided by the attached survey from Williamson and Associates Professional Surveyors.

4.0 FORESHORE REVETMENT DESIGN

- a. The wave climate at the site is influenced by several factors including bathymetry, tidal level, storm surge, wind speed and direction, as well as future sea level rise. A foreshore revetment following the GSH and Coastal Slopes principles was considered the most suitable design for this site. To conform to the design criteria, the following design principles shall be included:
 - i. The finished gravel slope shall not exceed 2H:1V (Horizontal, Vertical). The revetment shall be constructed by utilizing a minimum two layers of large angular 900mm to 1500mm boulders, smaller 100mm to 300mm fractured rock infill with smaller voids filled completely with on-site well graded sand and gravel. The smaller materials are considered vital for the root zone of plantings and are part of the beach nourishment component of the design.
 - ii. This will provide a gentle transition from the shoreline to the subject property rear yard level and suitable growth medium for native shoreline species which will aid in reducing erosion of the finer

soils. See Following Table 4.0 for typical gradation of revetment materials.

Revetment Materials	
Material Type	Diameter (mm)
Sand	0.125 to 4.75
Gravel	4.76 to 75
Cobble	76 to 256

Table 4.0 – Foreshore Revetment Materials

- iii. The proposed revetment should be keyed into the natural substrate material a minimum of 1.0m depth. Prior to the placement of the underlying rock structure, a layer of geotextile (Armtec Type 250 non-woven geotextile or equivalent) is required to provide a barrier to the migration of fine-grained material from wave and tidal action.
- iv. The planting plan should include plug planting at 900mm spacing in the sandy infill soils between the large boulders. Plantings should be located at and above the NB elevation. These plantings should consist of pre-existing native vegetation (as found in other areas of the property foreshore) and other native species which may include:
 - i. Dune and Oak Grasses
 - ii. Nootka or Baldhip Roses
 - iii. Ocean Spray
 - iv. Oregon grape
 - v. Evergreen huckleberry, snow berry, kinnikinnick, salal

These plantings should be installed in the spring / summer and watered periodically to establish root mats into the interstitial spaces between boulders.

- v. See attached LEA Drawing E2151-01 - Foreshore Revetment Design, for further details.

5.0 CONSTRUCTION RECOMMENDATIONS

- a. A trench should be excavated along the Title Natural Boundary, which will provide the position of the foreshore revetment area and for the underlying rock structure to be keyed into the foreshore floor. This trench should be 1.2m in width and minimum 0.6m in depth.
- b. A layer of non-woven geotextile filter fabric (Armtec-250 or equivalent) should be placed on the prepared

base and extend to the top of the revetment against the slope facing.

- c. The 900mm to 1500mm underlying rock structure should then be installed by placing them in a “tight” two-layer matrix, beginning with the largest rocks placed in the toe trench, then continuing to construct the revetment in a bottom-up sequence (i.e. from toe to crest), while being mindful of the maximum 2H:1V slope requirement.
- d. Smaller sized rocks (100mm to 300mm) shall be used to infill any larger gaps within the rock structure and the onsite sand and gravel should be used to infill smaller gaps throughout construction.
- e. The overall slope of the revetment shall not exceed 2H:1V.
- f. The revetment at the east end should smoothly transition to neighboring (1160 The Strand) revetment already installed. Abrupt protrusions should be avoided to prevent the effects of eddying during hightide/storm events.

6.0 CONCLUSIONS AND RECOMMENDATIONS

- a. Based on our foreshore assessment and recommendations outlined below, we conclude the designed foreshore revetment will help protect the foreshore from marine erosion by dissipating wave energy and providing stability to the foreshore bank.
- b. The proposed gently sloping (2H:1V) revetment should effectively dissipate wave energy without significant effect on the neighbouring properties. The gentle transition to the foreshore revetment at the neighbouring property should reduce eddying effects from the revetment installation.
- c. The effects of sea level rise could reduce the effectiveness of the revetment in the long term. The design has incorporated a stable matrix of boulders that will provide a stable base for the future expansion of the revetment both in height and depth if warranted to protect habitat, life, and property.
- d. The benefits of the design principles from the perspective of the Regional District of Nanaimo and GSH are:
 - i. The proposed revetment preserves the physical processes required to maintain healthy shorelines, compared to more obtrusive concrete structures (i.e., concrete walls).
 - ii. The proposed design will maintain or enhance habitat diversity and function in areas along the shoreline.
 - iii. The proposed revetment will prevent and/or reduce pollutants entering the aquatic environment.
 - iv. The design will reduce the cumulative impacts to the costal environment by reducing erosion and by providing a more stable growth medium for native species.

- v. We have added beach nourishment sand and gravel to ensure there is a suitable growth medium for the native vegetation planting plan. This component of work may require maintenance to ensure this medium is re-established if damaged by storm events until the vegetation has taken hold. See Toth and Associates report⁴ for details on plantings and beach nourishment maintenance.

7.0 CLOSURE

- a. Lewkowich Engineering Associates Ltd. appreciates the opportunity to be of service on this project. If you have any comments, or if we can be of further service, please contact us at your convenience.

Respectfully Submitted,
Lewkowich Engineering Associates Ltd.



Tennes Hamre, P.Ge
Geoscientist



Chris Hudec, M.A.Sc., P.Eng.
Senior Project Engineer

8.0 ATTACHMENTS

1. Williamson and Associates Professional Surveyors, British Columbia Land Surveyor, File: 23004-1 SITE PLAN, dated October 1, 2024
2. LEA Drawing No. E2151-01Rev 1 – Foreshore Revetment Design.

9.0 REFERENCE:

1. Green Shores for Homes. December 2015.
2. Regional District of Nanaimo – RNDMAP, Online GIS Database, accessed June, 2023.
3. Islands Trust – Gabriola Island Official Community Plan, Bylaw No. 166, 167, dates September 2, 2019.
4. Gabriola Land and Trails Trust, Native plants and shoreline erosion, published February 5, 2023.
<https://galtt.ca/native-plants-and-shoreline-erosion/>.

SANDWELL PARK

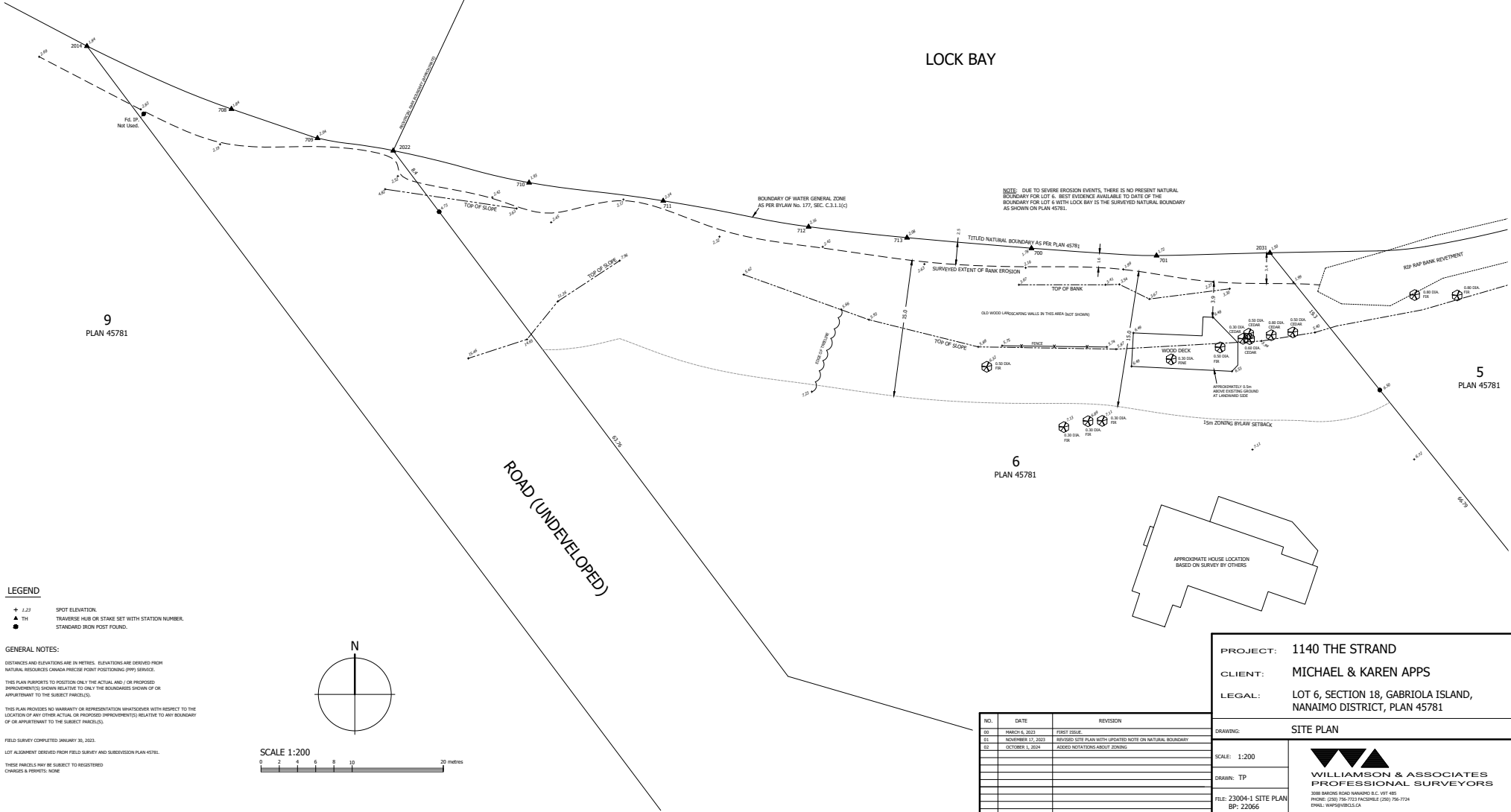
LOCK BAY

9
PLAN 45781

5
PLAN 45781

6
PLAN 45781

ROAD (UNDEVELOPED)

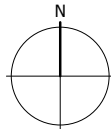


LEGEND

- + 1.23 SPOT ELEVATION.
- ▲ TRANSVERSE HUB OR STATE SET WITH STATION NUMBER.
- STANDARD BORN POST FOUND.

GENERAL NOTES:

DISTANCES AND ELEVATIONS ARE IN METRES. ELEVATIONS ARE DERIVED FROM NATURAL RESOURCES CANADA PRECISE POINT POSITIONING (PPP) SERVICE.
 THIS PLAN REPORTS TO POSITION ONLY THE ACTUAL AND/OR PROPOSED IMPROVEMENTS/DESIGN RELATIVE TO ONLY THE BOUNDARIES SHOWN OF OR APPURTENANT TO THE SUBJECT PARCELS.
 THIS PLAN PROVIDES NO WARRANTY OR REPRESENTATION WHATSOEVER WITH RESPECT TO THE LOCATION OF ANY OTHER ACTUAL OR PROPOSED IMPROVEMENTS/RELATIVE TO ANY BOUNDARY OF OR APPURTENANT TO THE SUBJECT PARCELS.
 FIELD SURVEY COMPLETED JANUARY 30, 2023.
 LOT ALIGNMENT DERIVED FROM FIELD SURVEY AND SUBDIVISION PLAN 45781.
 THESE PARCELS MAY BE SUBJECT TO REGISTERED CHARGES & INTERESTS. NONE



PROJECT: 1140 THE STRAND
CLIENT: MICHAEL & KAREN APPS
LEGAL: LOT 6, SECTION 18, GABRIOLA ISLAND, NANAIMO DISTRICT, PLAN 45781

DRAWING: SITE PLAN
SCALE: 1:200
DRAWN: TP
FILE: 23004-1 SITE PLAN
BP: 22066

NO.	DATE	REVISION
01	MARCH 6, 2023	FIRST ISSUE
02	NOVEMBER 17, 2023	REVISED SITE PLAN WITH UPDATED NOTE ON NATURAL BOUNDARY
03	OCTOBER 1, 2024	ADDED NOTIFICATION ABOUT ZONING

WILLIAMSON & ASSOCIATES
PROFESSIONAL SURVEYORS
 3088 BARBOUR ROAD NANAIMO B.C. V9T 4B5
 PHONE: (250) 756-7722 FACSIMILE: (250) 756-7724
 EMAIL: W&A@WILLIAMSON.CA

CONSTRUCTION NOTES:

1. REMOVE DEBRIS ALONG SLOPE FACE PRIOR TO INSTALLING BOULDERS, REPLACE WHEN COMPLETE.
2. DO NOT DISTURB SOILS BEYOND TITLE BOUNDARY.
3. TIE IN THE WESTSIDE OF REVETMENT WITH A SMOOTH TRANSITION TO EXISTING LAND AND EASTSIDE TO PROPOSED NEIGHBOURS REVETMENT .
4. FILL LARGER VOIDS WITH 100 - 300mm PIECES THEN INFILL SMALLER VOIDS WITH 75mm MINUS SAND AND GRAVEL.

GEOTEXTILE NOTES:

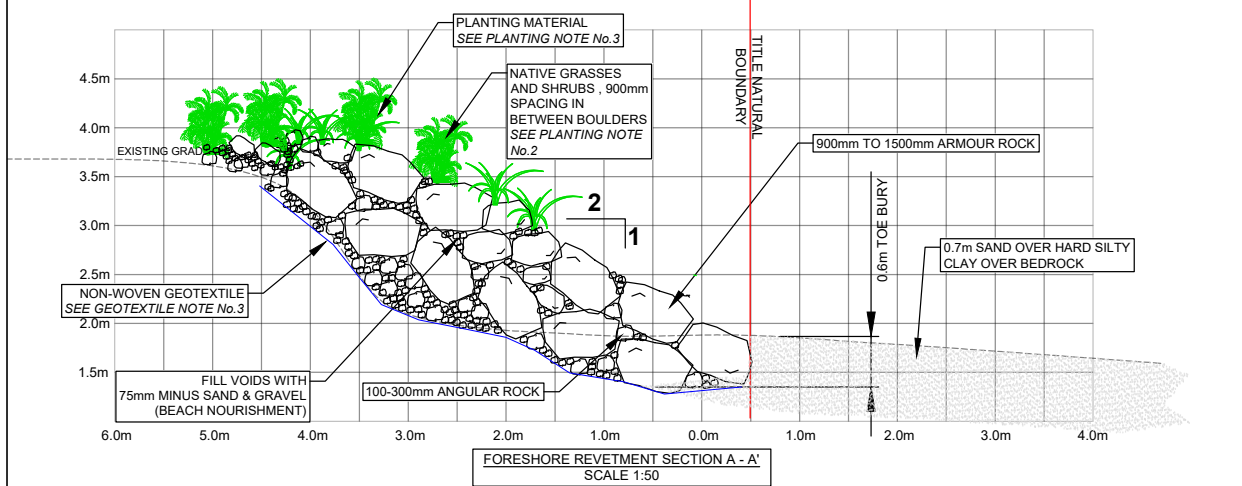
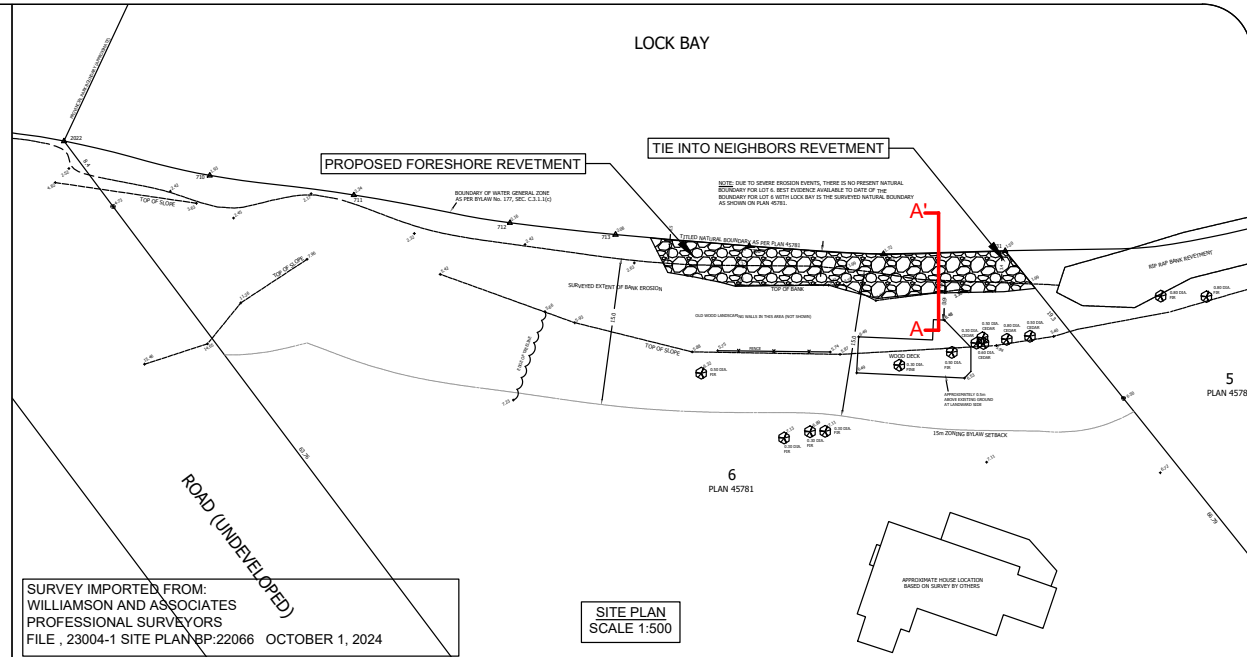
1. ENSURE THE NON-WOVEN GEOTEXTILE IS NOT COMPROMISED DURING THE ORIENTATION OF BOULDERS AND INFILL PROGRAM.

PLANTING NOTES: SEE DETAILS IN REPORT :

1. PLANTINGS MAY REQUIRE MAINTENANCE (POST HIGH WATER EVENTS) UNTIL VEGETATION IS FULLY ESTABLISHED.
2. NATIVE GRASSES AND SHRUBS TYPE AND INSTALLATION AS PER DETAILS ON DRAWING AND IN REPORT.
3. "PLANTING MATERIAL" TO CONSIST OF ON-SITE MATERIAL (BEACH NOURISHMENT SAND AND GRAVEL).

ROCK SPECIFICATIONS:

1. IMPORTED MATERIALS TO BE USED SHOULD CONTAIN NO SILT OR FINE GRAINED MATERIAL THAT COULD POTENTIALLY WASH OUT AND DEGRADE THE AQUATIC HABITAT.
2. ALL WORKS TO BE SUPERVISED BY GEOTECHNICAL PERSONNEL TO ENSURE CONFORMANCE TO THE DESIGN.
3. **ANY CHANGES TO THE DESIGN MUST BE APPROVED BY THE DESIGN ENGINEER.**



REV No.	DATE	BY	P.Eng.	REVISION DESCRIPTION	LEGEND	DRAWING TITLE	ENGINEER'S SEAL	PLOT DATE	DRAWN BY	
01	Oct 17, 2024	JH	CH	ADDED UPDATED SURVEY INFO		SHORELINE REVETMENT DESIGN		2023-06-09	NV/JH	
						PROJECT NAME		1140 THE STRAND GABRIOLA ISLAND, BC	REVIEWED BY	SCALE
						LEGAL DESCRIPTION		LOT 6, SECTION 18, GABRIOLA ISLAND, NANAIMO DISTRICT, PLAN 45781	PROJECT No.	DRAWING No.
								E2151	E2151-01	

Environmental Impact Assessment,
1140 The Strand
Gabriola Island, BC

By

D. R. Clough Consulting
Fisheries Resource Consultants
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1.0) General Project Description

The purpose of this report is to review the environmental aspects of a foreshore property that experiences reoccurring erosion events. A record high tide and storm event in spring 2022 resulted in the initial avulsion of the properties foreshore slope. The impact assessment includes recommendations to improve natural function with plantings.

Location: The property is located at 1140 The Strand on in the eastern corner of Lock Bay Gabriola Island (Fig.1) The adjoining properties to the east each have a residential dwelling with revetments previously constructed. The western property is parkland. The property encompasses approximately 95m of lineal foreshore.

2.0) Project Objectives

The purpose of this environmental assessment is to determine the environmental impacts associated with mitigating damages and protecting the property from further degradation by;

1. Assessing the aquatic and terrestrial resources within the property area;
2. Determine the potential impacts of the proposed structures;
3. Discuss potential mitigative measures to avoid causing negative impacts caused from the proposed work.

3.0) Methods

The methodology for this assessment included;

1. An assessment of potential environmental impacts
2. Preparation of a mitigation plan (if required);
3. An assessment of cumulative effects and future requirements;

The method and presentation of this assessment follows the Environmental Impact Assessment Act (IAA) guidelines that allow a complete coverage of all potential environmental attributes. This assessment focused primarily on the aquatic resources of the foreshore directly in the vicinity of the proposed work area as these resources are the potential for most impacted.

3.1) Background Review

The report was prepared using the following references to describe the environmental resources and to identify any potential environmental issues within the work area.

1. ImapBC (<http://maps.gov.bc.ca/ess/sv/imapbc/>)
2. Community Mapping Network B.C. (<http://cmnmaps.ca/EELGRASS/>)
3. Committee on the Status of Endangered Wildlife in Canada (Cosewic) database reports. (www.cosewic.gc.ca)
4. Aquatic Species at Risk Mapping (<https://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html>)

Figure 1.) Site Location



3.2) Survey Information

Land survey information was provided by Williamson and Associates Professional Surveyors (Appendix 1).

3.3) Terrestrial Habitats

The foreshore riparian and surrounding areas were captured within the inventory. The assessment identifies vegetation types, depth, and topographical characteristics. It also identifies features such as bedrock or alterations such as riprap. The terrestrial habitat was identified using methodologies within “A Field Manual for Describing Terrestrial Habitats (MOE 1998)”.

3.4) Aquatic Habitats

The aquatic habitat assessment includes a detailed inspection of:

1. Substrates
2. Functional LWD
3. Alterations
4. Bank Erosion
5. Vegetation Depth and type
6. Riparian Slopes and Bank Stability

3.5) Rare and Endangered Species

The province of B.C. and the federal government use separate systems to classify rare or endangered species. Background information was collected prior to the habitat inventory and was used to compile a list of potential species, which may inhabit the site (Appendix 2). The work site was assessed for potential rare species by determining the available habitat based on the individual species requirements.

4.0) Environmental Impact Assessment

The quantity and quality of potential habitats (terrestrial and aquatic) in relation to the magnitude of the proposed project, was assessed to determine the potential impacts associated works. The assessment

included the current site condition and anticipation effects of proposed work and associated mitigation. The anticipated effects were assessed based on the length of exposure, quality of habitat and features such as large woody debris or significant trees. The anticipated impacts were scored on the following:

1. Negligible: no expected disturbance or impact
2. Low: minimal or short length disturbance to important habitat
3. Medium: moderate or potentially long-term alteration or important habitat used by a species of management concern (ie Red Listed)
4. High: Significant, permanent alteration of habitat

4.1) Mitigation and Residual Effects

The mitigative actions are advised to reduce, offset, or avoid the projects related negative effects. Mitigation strategies which limit additional negative effects are advised. This advice is based on accepted practices from both Federal and Provincial Authorities.

4.2) Cumulative Effects

Cumulative effects are changes to the environment that are caused by an action in combination with other past, present, and future human actions. The methodology for assessing the potential cumulative effects is the same as the residual effects.

5.0) Results - Environmental Setting

5.1) Ecological Area

The subject property is located in the southeast corner of Lock Bay which has significant southeast exposure to wind and as well as wave/log action during winter storm events (Figure 1).

5.2) Vegetation

5.2.1) Vegetation Communities

Vegetation communities within the proposed work site were grouped into one of the two types:

1. Marine foreshore
2. Coastal Forest

Marine Foreshore

The property is located on the shoreline of the Lock Bay with the closest freshwater drainage over 600m away to the west. The site is in a residential setting with single family residences on each lot. The property has approximately 95m of shore frontage.

There are marine grasses in the area but not near the structure. Eel grass is located approximately 170-220m offshore from the subject properties in the lower intertidal area (Figure 2). The beach slope is gentle with the steepest portion at the wrack line where it drops away for 5-10 m (0.5m) and then to a relatively flat to the sub-tidal areas approximately 200m away. The upper beach area has a cobble/gravel substrate with small sand deposits that tend to move around with seasonal weather patterns. The lower beach is mostly gravel with sand flats at the outer tide line set on sandstone base. The eel-grass bed is extensive following the foreshore in a broad band (as recorded by CMNBC.ca). It is located approximately 200m from the foreshore and continuing into the deeper waters.

Figure 2: Eel Grass mapping in relation to subject property



The foreshore also supports the common species of invertebrates (i.e. Littleneck, Manila Clams, Mussels, Oysters) as well as potential spawning habitat for shoreline forage fish such as Surf Smelt and Sandlance. The offshore eel grass offers herring spawning habitat. The shoreline offers tidal feeding opportunities preferred by salmonids such as Chinook, Coho, Chum Salmon, and Sea Run Cutthroat Trout.

Coastal Forest

The Coastal Douglas-fir (CDF) is the dry, well-drained south aspect areas and rain shadow zones primarily of southeastern Vancouver Island and the Gulf Islands. This coastal forest community is one of the most imperilled due to historic logging and human development. Few old-growth stands remain throughout the community's distribution and existing patches are highly fragmented with less. This ecological community, where it does persist supports a diverse range of at-risk flora and fauna, including Northern Goshawk, Marbled Murrelet, Garry Oak as well as species such as Salal, Dull Oregon Grape and Ocean Spray, Oregon Beaked Moss and electrified cats-tail moss. The significant trees on the subject properties are shown on Table 1 as well as the site plan.

Table 1: Significant Trees along foreshore

Species	Tree Diameter (m)
Shore Pine <i>Pinus contorta</i>	0.3
Douglas Fir <i>Pseudotsuga menziesii</i>	0.5/0.5/0.3/0.3/0.3
Western Red Cedar <i>Thuja plicata</i>	0.5/0.6/0.3/0.8/0.5

5.3) Wildlife

Common terrestrial wildlife of the ecological zone such as Black Bear, Black Tail Deer, Mountain Lion and Roosevelt Elk are not likely to be found in the disturbed area. Marine mammals are very common due to the productivity of Herring and Salmon in the area and the following have been routinely

observed: California Sea Lion, Harbour Seal, River Otter and Mink. According to the aquatic species at risk map (Appendix 2) there are 14 Species at Risk that have the potential to use Lock Bay. No species habitats were changed in relation to this site.

5.3.1) Birds

Migrating waterfowl and other associated birds are likely to use the foreshore for foraging and rest. There are numerous common wildlife species found in the area with migratory bird species such as Black Brant a vulnerable species known for reliance on eelgrass beaches. There are Bald Eagles and Blue herons observed routinely in the area. Bald eagles routinely perch on the large fir trees along the foreshore on the property. No nests were observed on the subject property (there was a documented Bald Eagle nest (BAEA-101-016) that is no longer functional located approximately 150m to the south (CMNBC.ca/WiTS).

5.4) Aquatic Resources

There are no freshwater features on or within 30m of the subject property. The marine foreshore is located primarily within the supra-littoral and intertidal zones, which due to wave action are extremely unstable limiting biological production.

6.0) Environmental Effects

6.1) Wildlife

Revetment is not expected to result in any habitat lost to wildlife, some will be gained by stabilizing the uppermost intertidal zone, removing the rock off the beach and increasing the repose of the rock and installing the plants in the interstices.

The expected habitat impacts of development on wildlife are summarized below:

1. Temporary habitat avoidance by wildlife can be expected during the work period due to increased noise and other building activities.

Table 2) Anticipated impacts on local wildlife and habitat

	Habitat Effects	Anticipated Environment Effects		
	Mammalian habitat	Reptile and amphibian habitat	Bird Habitat	Species at Risk
Habitat Risk	Low	Low	low	Low

The impacts on potential wildlife habitat and populations are expected to have minimal effects on any protected wildlife.

6.2) Vegetation

There will be no removal of any native plants as most was lost during the avulsion. Inspection of the beach line for transport of materials found no plants in the route. The remaining trees are identified on the site plan.

Table 3) Anticipated impacts on local vegetation

		Coastal Rain Forest	Rare Plant Species at Risk	Rare or endangered ecosystems
	Marine Foreshore			
Habitat Risk	Low	Nil	Nil	Nil

Planting Plan: The proposed revetment will be constructed at approximately 2:1 sloping rock creating a 2-3m wide face across the 45m width. The rock diameter will be 900 to 1500mm with 100-300mm fractured rock to infill smaller voids filled completely with on-site (or imported) well graded sand and gravel. Sea Grass plugs and other native plants sourced from local nurseries will then be planted in the gravel voids at approximately 900mm spacing (Appendix 5). This will result in approximately 100m² of planted shoreline above 3m elevation. This will help to restore habitats on the foreshore which serves a vital function as a primary nutrient producer to marine invertebrates as well as cover habitat for shorebirds and reptiles.

6.3) Aquatic Resources

The proposed construction site is located at the high watermark of the foreshore. There is no eel grass nearby (170m away). Experience using a similar construction method on similar properties indicates there is little impact (i.e. none/little compression, rutting, movement of substrates, logs or grasses). The expected habitat impacts are summarized below:

Table 4) Anticipated impacts on aquatic resources

	Habitat Effects	Anticipated Environment Effects			
	Marine Aquatic Invertebrates	Marine Pelagic Fishes	Saltwater Salmonid Rearing	Fresh Water Salmonid rearing	Fresh Water Salmonid migration
Habitat Risk	Low	Low	Low	Na	Na

7.0) Applicable Legislation

7.1) Provincial Legislation

Wildlife Act: The Wildlife Act protects all wildlife and endangered species from human related disturbance. The Act covers amphibians, birds, mammals, reptiles including nesting habitat. The act also identifies the seasonal window in which certain vegetation can be removed (i.e. Mar 15- Aug 15) to protect surrounding bird nests.

Water Act: Section 11 of the Water Sustainability Act covers work around water in non-tidal environments. The project is in a marine tidal area and not covered under the Water Act.

7.2) Federal Legislation

Fisheries Act: The fisheries act protects all fisheries resources in Canada including fish habitat and migration. In a current review using the DFO self assessment tool (<http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html>) we find the design, protective measures and marine timing window (Area 17 Summer; June 1-September 1, Winter; Dec. 1- Feb. 15)) will result in no harm to fish habitat. A DFO Avoid and Mitigate Letter is included in Appendix 6.

Migratory Bird Convention Act:

The Migratory Bird Convention Act protects all migratory bird nesting habitat from disturbance. The act also identifies the window which certain vegetation can be removed (Mar 15- August 15) to protect surrounding bird nests.

8.) Residual Effects

Residual impacts refer to those environmental effects predicted to remain after the application of mitigation outlined in this assessment. After review of the site and accompanying professional report/letters it is anticipated that the long-term impacts of this project will have no net loss of habitat with respect to the function of the foreshore. The valued components of the foreshore habitats will be

protected or enhanced by stabilizing the failed bank and revegetating it. The most sensitive habitats water course and eel grass beds are located over 170m away from the project and will show no anticipated impact. There is expected to be a reduction of sediment from the lot onto the foreshore no impact to public spaces. The Residual Effects are, therefore, not significant.

9.) Cumulative Effects

Cumulative effects are changes to the environment that are caused by an action in combination with other past, present, and future human actions. Upon a review of the BC Environmental Assessment Office registry there are no active projects within 1km of the proposed site. This site will have a net improvement as designed as it is being moved off the beach and will also receive a shore grass planting treatment which is expected to result in net positive cumulative effect.

It is known that the adjoining properties 1160 & 1170 of The Strand have a similar revetment which will allow for a uniform shoreline. Based on preliminary observations a large proportion of the other properties in the bay have previously altered the foreshore ranging from rip rap to a vertical concrete wall. In comparison to the vertical concrete wall this 2:1 style revetment is the preferred biological option.

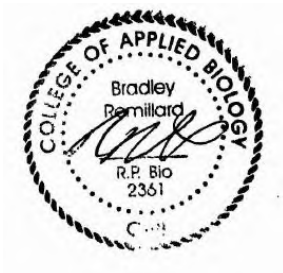
10.) Conclusions

Based on this assessment and the recommendations of other professionals including the land surveyor, engineer, and biologist, are confident the proposed structure will be structurally and environmentally conforming with more benefit than the previous bank.

11.) Closure

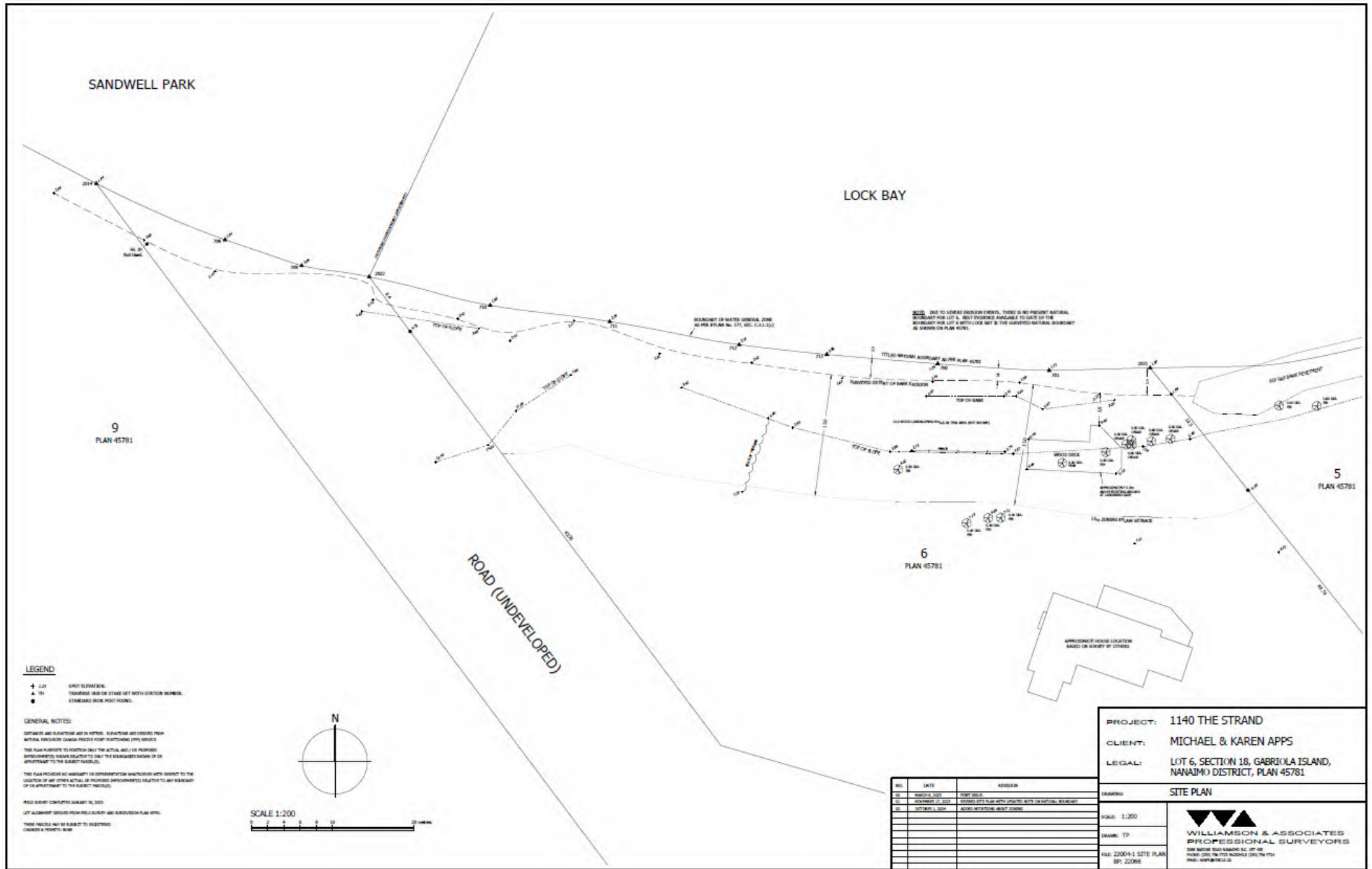
This document was written by Brad Remillard, RPBio of D.R. Clough Consulting. It is for the sole use of the owner of 1140 The Strand.

Report prepared by:

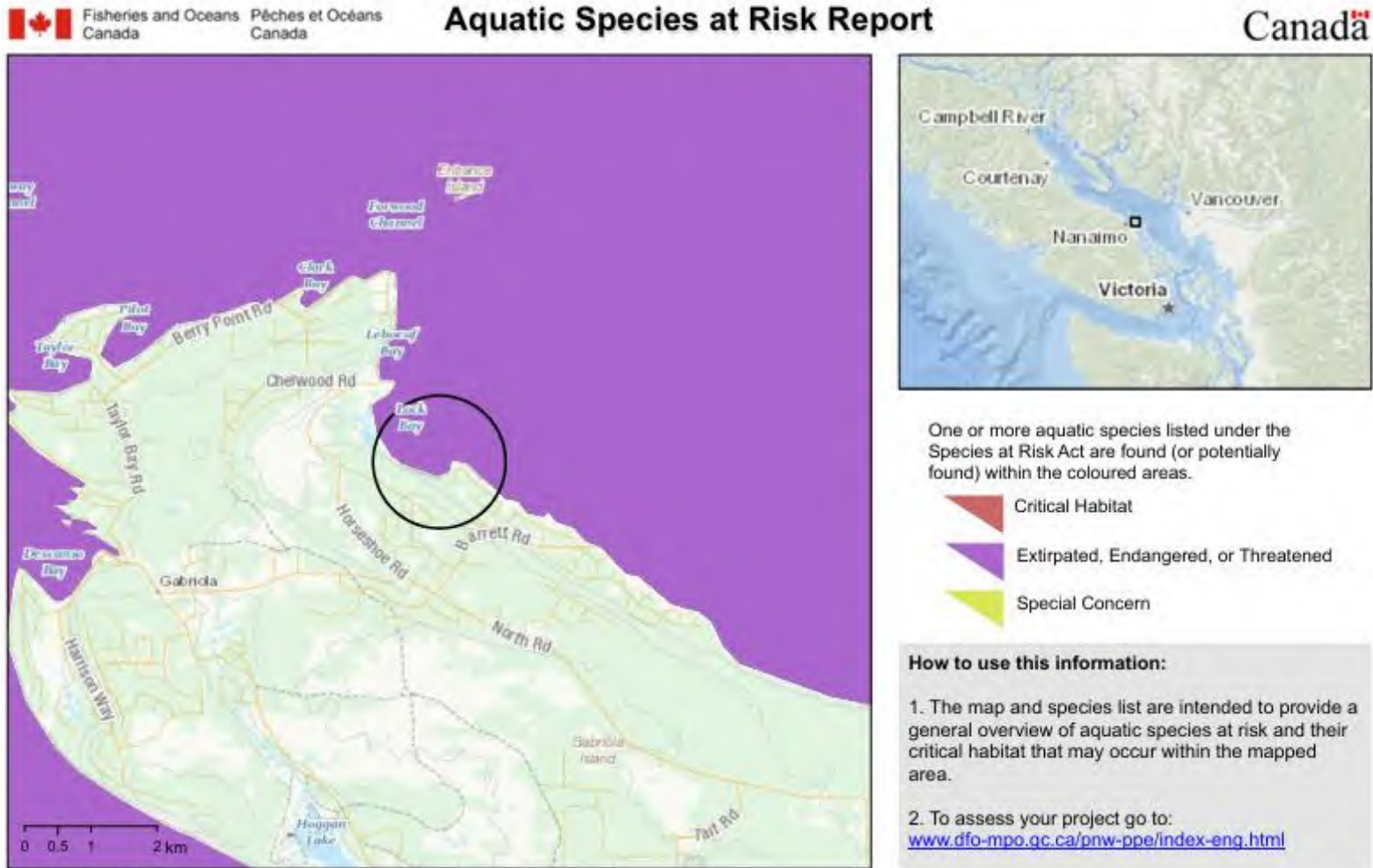


Brad Remillard, RPBio

Appendix 1 - Property Land Survey



Appendix 2: Aquatic Species at Risk Map



If you encounter an aquatic species at risk in an area that is not currently mapped, please notify your regional Fisheries Protection Program office to ensure that you are compliant with the Species at Risk Act. The official source of information for species at risk is the Species at Risk Public Registry <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>

To protect fish and fish habitat, including aquatic species at risk, their residences, and their critical habitat, efforts should be made to avoid, mitigate and/or offset harm. Following the measures to avoid harm will help you comply with the Fisheries Act and the Species at Risk Act.

Critical habitat for these species is found within the outlined area

Critical habitat is identified in recovery strategies or action plans for species listed under Schedule 1 of the Species at Risk Act as extirpated, endangered or threatened.

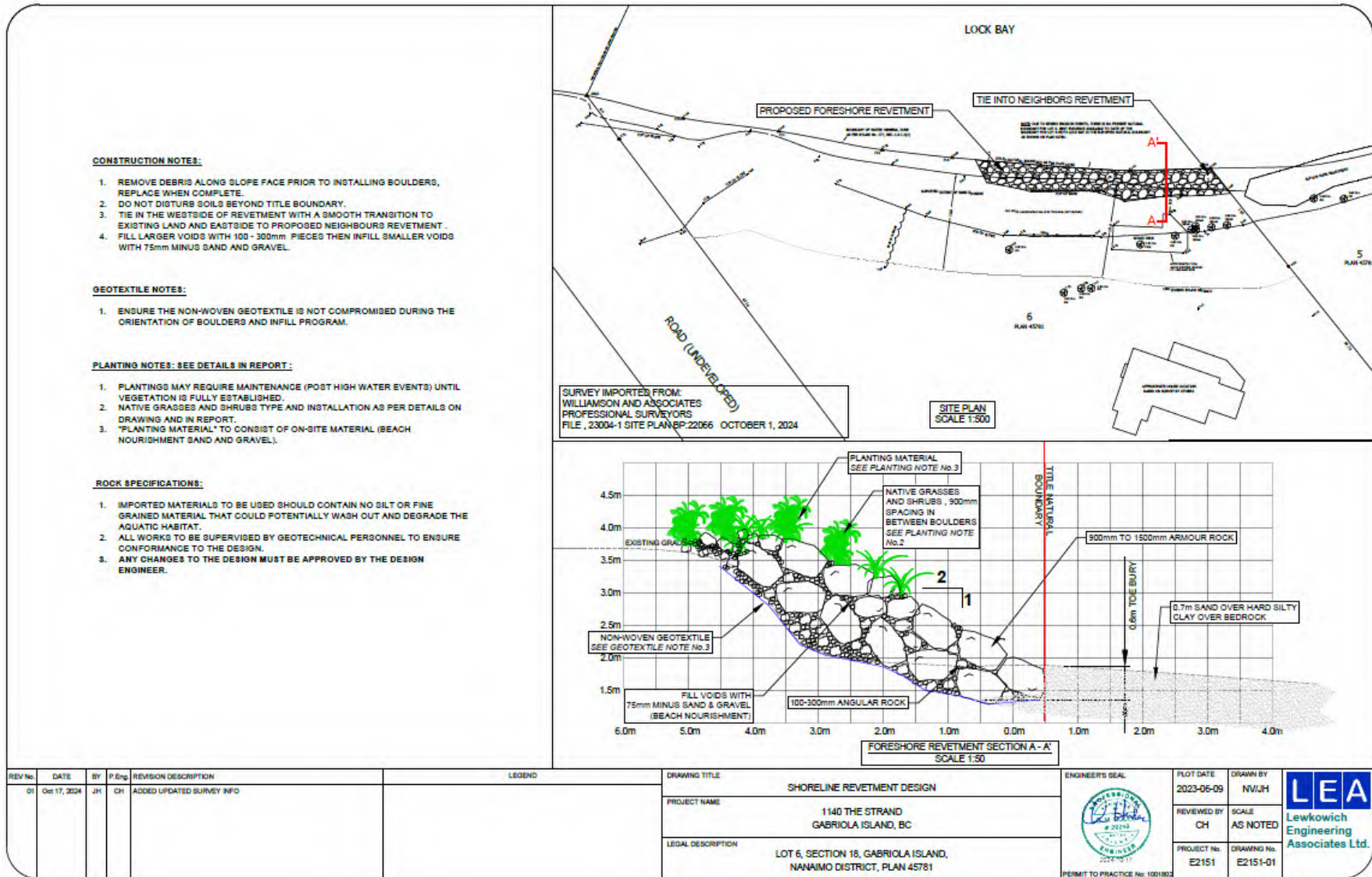
Name	Where Found	Species Status
	No critical habitat	

Species found (or potentially found) within the outlined area

Name	Where Found	Species Status
Basking Shark - Pacific	Pacific Ocean/Océan Pacifique	Endangered
Bluntnose Sixgill Shark	Pacific Ocean/Océan Pacifique	Special Concern
Green Sturgeon	Pacific Ocean/Océan Pacifique	Special Concern
Grey Whale - Eastern North Pacific	Pacific Ocean/Océan Pacifique	Special Concern
Harbour Porpoise - Pacific Ocean	Pacific Ocean/Océan Pacifique	Special Concern
Humpback Whale - North Pacific	Pacific Ocean/Océan Pacifique	Special Concern
Killer Whale - Northeast Pacific Offshore	Pacific Ocean/Océan Pacifique	Threatened
Killer Whale - Northeast Pacific Southern Resident	Pacific Ocean/Océan Pacifique	Endangered
Killer Whale - Northeast Pacific Transient	Pacific Ocean/Océan Pacifique	Threatened
Leatherback Sea Turtle - Pacific	Pacific Ocean/Océan Pacifique	Endangered
Longspine Thornyhead	Pacific Ocean/Océan Pacifique	Special Concern

Northern Abalone	Pacific Ocean/Océan Pacifique	Endangered
Rougheye Rockfish type I	Pacific Ocean/Océan Pacifique	Special Concern
Rougheye Rockfish type II	Pacific Ocean/Océan Pacifique	Special Concern
Steller Sea Lion	Pacific Ocean/Océan Pacifique	Special Concern
Tope	Pacific Ocean/Océan Pacifique	Special Concern
Yelloweye Rockfish - Pacific Ocean Inside Waters	Pacific Ocean/Océan Pacifique	Special Concern
Yelloweye Rockfish - Pacific Ocean Outside Waters	Pacific Ocean/Océan Pacifique	Special Concern

Appendix 3-Revetment Design (LEA Ltd)



Appendix 4-Site Photos



1.) Shore looking east along property line



2.) Looking west from NE corner at eroding bank



3.) Looking north toward the Salish Sea at beach characteristics



4.) Looking south toward subject property

Appendix 5-Revegetation Plan

Estimated Landscaping Fees

Item	Cost	# items	Total
Dune Grass 10cm -plug	\$4.00	60	\$240.00
Nootka Rose	\$9.00	5	\$45.00
Ocean Spray	\$9.00	5	\$45.00
Evergreen Huckleberry	\$9.00	5	\$45.00
Snowberry	\$9.00	5	\$45.00
Kinnicinick	\$9.00	5	\$45.00
Salal	\$9.00	5	\$45.00
Feature trees (7 gal confiner)	\$60.00	2	\$120.00
Planting Medium with delivery	\$100	2	\$200.00
Landscape Labour – planting and irrigation		Lump sum	\$480.00
Contingency	10%		\$131.00
Total			\$1441.00

Appendix 6-DFO Avoid and Mitigate Letter



Fisheries and Oceans
Canada

Pacific Region
Ecosystem Management Branch
417 2nd Avenue W
Prince Rupert, BC
V8J 1G8

Pêches et Océans
Canada

Région du Pacifique
Direction de la gestion des écosystèmes
417, 2^e Avenue Ouest
Prince Rupert, (C.-B.)
V8J 1G8

August 28, 2024

Our file Notre référence
23-HPAC-00980

Michael & Karen Apps
1140 The Strand
Gabriola, BC
VOR 1X3

Via email: mjapps2@gmail.com

Dear Michael & Karen Apps:

Subject: Foreshore Revetment, Lock Bay, Gabriola – Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat

The Fish and Fish Habitat Protection Program (the Program) of Fisheries and Oceans Canada (DFO) received your proposal on September 28, 2023. We understand that you propose to:

- Construct a riprap revetment along the eastern portion of the marine shoreline along your property to prevent further erosion. The revetment will extend (seaward) approximately 3 m beyond the high water mark. It will be constructed using machinery operating from above the high water mark.

Our review considered the following information:

- *Request for Review* form submitted by email on September 28, 2023;
- *Foreshore Revetment Assessment and Design* report prepared by Lewkowich Engineering Associates Ltd., submitted by email on September 28, 2023;
- Information provided through email and telephone communication between Michael Apps and Mike Gillespie (the Program) from November 2023 to August 2024; and
- Site visits completed by the Program in November 2023 and March 2024.

Your proposal has been reviewed to determine whether it is likely to result in:

- the death of fish by means other than fishing and the harmful alteration, disruption or destruction of fish habitat which are prohibited under subsections 34.4(1) and 35(1) of the *Fisheries Act*; and
- effects to listed aquatic species at risk, any part of their critical habitat or the residences of their individuals in a manner which is prohibited under sections 32, 33 and subsection 58(1) of the *Species at Risk Act*.

Canada

1/3

The aforementioned outcomes are prohibited unless authorized under their respective legislation and regulations. As of the date of this letter, aquatic species listed under the *Species at Risk Act* may be found in the greater vicinity of your proposal but are unlikely to be affected by the project activities.

To avoid and mitigate the potential for prohibited effects to fish and fish habitat (as listed above), and in addition to what you have proposed, we recommend you implement the additional measures as listed below:

- Retain a Qualified Environmental Professional (QEP) to conduct environmental monitoring during all project activities that may result in potential negative effects to fish and fish habitat.
 - Survey work zone areas for the presence of forage fish spawning prior to construction. Use accepted methods for surveying for intertidal spawning forage fish. If evidence of forage fish spawning is detected, temporarily suspend work until a subsequent survey indicates that no incubating embryos are present.
- Limit the footprint of the works, undertakings and activities below the high water mark to the extent possible.
- Limit the duration of the works, undertakings and activities.
- Complete works in the dry and during falling or low tide conditions.
- Schedule work to avoid wet, windy and rainy periods (and heed weather advisories) that may result in high runoff volumes and increased erosion and sedimentation. Implement shut down procedures as required.
- Construction is not to result in the trapping or stranding of fish.
- Operate machinery from land in stable dry areas.
- Develop, implement, monitor, and maintain an effective Erosion and Sediment Control plan to avoid the introduction of sediment into nearby aquatic habitat during all phases of the work, undertaking or activity.
- Adhere to BC water quality guidelines at all times.
- All rock used for the project is to be non-acid generating, clean and free of debris.
- Limit impacts to native riparian vegetation to the extent possible.
- Re-vegetate disturbed areas with native species suitable for the site.
- Develop and implement an emergency spill response plan as required. Ensure sufficient spill response supplies are on-site and readily available.
- Machinery is to be in good working condition and free of leaks or debris. It should be inspected before initiating works, and regularly throughout construction.

Provided that you incorporate these measures into your plans, the Program is of the view that your proposal is not likely to result in the contravention of the above mentioned prohibitions and requirements.

Should your plans change or if you have omitted some information in your proposal, further review by the Program may be required. Consult our website (<http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html>) or consult with a qualified environmental consultant to determine if

further review may be necessary. It remains your responsibility to remain in compliance with the *Fisheries Act* and the *Species at Risk Act*.

It is also your Duty to Notify DFO if you have caused, or are about to cause, the death of fish by means other than fishing and/or the harmful alteration, disruption or destruction of fish habitat. Such notifications should be directed to the DFO-Pacific Observe, Record and Report phone line at 1-800-465-4336 or by email at DFO.ORR-ONS.MPO@dfo-mpo.gc.ca.


Please notify the Program by email at Michael.Gillespie@dfo-mpo.gc.ca at least 10 days before starting your project, ensuring your file number and appropriate on-site contact information is included. We recommend that a copy of this letter be kept on site while the work is in progress.

It remains your responsibility to meet all other federal, provincial and municipal requirements that apply to your proposal, including possible Crown Land tenure considerations.

Please note that the advice provided in this letter will remain valid for a period of one year from the date of issuance. If you plan to execute your proposal after the expiry of this letter, we recommend that you contact the Program to ensure that the advice remains up-to-date and accurate. Furthermore, the validity of the advice is also subject to there being no change in the relevant aquatic environment, including any legal protection orders or designations, during the one year period.

If you have any questions with the content of this letter, please contact Mike Gillespie at 236-464-7819 or by email. Please refer to the file number referenced above when corresponding with the Program.

Yours sincerely,

Bergsma, Ian  Digitally signed by Bergsma, Ian
Date: 2024.08.28 11:40:35
-0700'

Ian Bergsma
Senior Biologist, Coastal Watershed Regulatory Operations
Fish and Fish Habitat Protection Program

Shoreline Stabilization Alternatives & Rationale

In this document¹ a brief review of the various approaches to shoreline stabilization is provided. The article:

“Natural and Structural Measures for Shoreline Stabilization”^{RefB}

produced by the US National Ocean and Atmospheric Administration (NOAA) and the US Army Corps of Engineers is used as a template for this review as it gives a comprehensive summary of the various shoreline stabilization techniques. It is particularly relevant because it focusses on Living Shorelines which use nature-based approaches and lists the various approaches ranging from green/softer techniques to full-on hard armouring designs such as sea walls and breakwaters. This focus on living shorelines techniques is amplified in the context of climate change in the related reference:

“Adaptation Strategies and Actions. Restore and Protect Natural Shorelines: Use living Shoreline Techniques”^{RefC}

In Part 1 below, the various options for shoreline stabilization are first summarised using the names given by, and directly quoting from the source documents^{RefB, RefC}. More details including illustrations are in the cited references. An evaluation of the suitability of these options for our site² is provided in Part 2. In Part 3, a detailed rationale for the proposed mitigation is provided, in response to the Staff Biologist conclusion^{RefD} that *“from an environmental perspective the information provided does not appear to provide justification for the proposed development.”*

The review of the literature found many variations and combinations of these general methods (confusingly using different names or names with different meanings), but in my best professional judgment as a retired senior environmental research scientist, they all broadly fall into one of the categories described in the NOAA reference^{RefB}.

NB: After preparing this review, several additional articles (especially regarding climate change impacts on our coastal resources) were discovered. Some of these introduce what at first sight appear to be different classifications of shoreline stabilization and different names (grey vs green, hard vs soft, nature-based solutions vs engineered, etc.). However, when these alternatives are examined closely, they can generally be aligned with one of the approaches summarized below in Part 1 or are a combination (hybrid) of more than one.

PART 1: GENERAL APPROACHES TO SHORELINE STABILIZATION

This section presents the range of shoreline stabilization types to be found in the literature^{RefB, RefC} and range from the very soft (Type A “Vegetation only”) to the very hard (Type J “Seawall”). Assessment of

¹ The present document is included in the Reference list as RefA.

² “Our site” refers to our waterfront location on Lock Bay. The changing site conditions are briefly summarized in Part 2.

the applicability to our site is provided in Part 2. The notes attached to each type are directly copied from the cited reference. More detailed information can be found in both RefB and RefC and in the literature cited therein. It is to be noted that the references originate from a Greenshores perspective^{RefM} and strongly advocate living shorelines^{RefM, RefN, RefO, RefP, RefQ}, using, where applicable, hybrid or mixed approaches to soften the protection.

Type A “Vegetation only” (Vegetated uplands³ extends to the shoreline)

- Suitable only for low wave energy environments.
- No high water protection

Type B “Edging” (structures such as logs to hold the toe of existing slope or vegetation in place)

- Not suitable in high wave energy environments
- No high water protection
- Uncertainty of successful vegetation growth and competition with invasive species

Type C “Sills” (submerged shore-parallel structure, often used in marsh or wetland environments)

- Not suitable for high wave energy environments
- Requires more land (foreshore) or tidal zone area (usually used in long sloping environments)
- No high water protection
- Uncertainty of successful vegetation growth and competition with invasive species

Type D “Beach Nourishment only” (large volumes of sand added from outside source to an eroding beach to widen the beach and move the shoreline seaward)

- Only suitable for low-lying oceanfront areas with existing sources of sand and sediment
- Requires periodic re-nourishment sand resources
- No high water protection
- Appropriate in limited situations
- Possible impacts to regional sediment transport

Type E “Beach Nourishment & Vegetation on Dune” (same as Beach Nourishment with added vegetation)

- Only suitable for low lying oceanfront areas with existing sources of sand and sediment
- Requires continual sand resources for renourishment
- No high water protection
- Appropriate in limited situations
- Possible impacts to regional sediment transport

Type F “Breakwater” (offshore structure of rock concrete or metal to divert wave energy)

- Expensive in deep water
- Can reduce water circulation (minimized if floating breakwater is applied)
- Can create navigational hazard
- Require more land area

³ Technically, this is the backshore and foreshore, the land zone above the intertidal zone

- Uncertainty of successful vegetation growth and competition with invasive
- No high water protection

Type G “Groin” (Concrete, stonework or metal structure poking out into bay perpendicular to shore to prevent lateral transport)

- Erosion of adjacent sites
- Can be detrimental to shoreline ecosystem (e.g. replaces native substrate with rock and reduces natural habitat availability)
- No high water protection

Type H “Revetment” (stone rubble, rip rap, or even gabion baskets in an open interlocking or percolated pattern)

- Lays over the slope of a shoreline⁴ to protect the slope from erosion and waves
- Mitigates wave action
- Little maintenance
- Indefinite lifespan
- Minimizes adjacent site impact

Type I “Bulkhead” (vertical retaining wall to hold soil in place)

- Suitable for high energy settings and sites with pre-existing hardened shoreline structures
- Accommodates working water fronts (eg: docking for ships)
- No major flood protection
- Erosion of seaward seabed
- Erosion of adjacent unreinforced sites
- Loss of intertidal habitat
- May be damaged from overtopping oceanfront storm waves
- Prevents upland from being a sediment source to the system
- Induces wave reflection

Type J “Seawall” (vertical or sloped wall of concrete, stonework or metal with soil on one side of wall at the same elevation as water on the other)⁵.

- Absorbs and limits impacts of large waves
- Suitable for areas highly vulnerable to storm surge and wave forces.
- Erosion of seaward seabed
- Disrupts sediment transport leading to beach erosion
- High up-front costs
- Visually obstructive
- Loss of intertidal zone
- Prevents upland from being a sediment source to the system
- May be damaged from overtopping oceanfront storm waves

⁴ In other words, the revetment is typically sloped, not a vertical wall. In our case, it lies above the high water mark, not in the intertidal zone.

⁵ Note that typically the Seawall is a vertical structure located below the high water mark, in the intertidal zone, and in contact with the sea throughout much of the tidal cycle.

PART 2: ASSESSMENT OF SUITABILITY OF THESE APPROACHES TO OUR SITE

None of the above approaches are ideally suited as stand-alone solutions to our situation (see Part 3). A combination of them (a “hybrid” approach) is required. Prior to the Avulsion events of January 2022, the shoreline was *de facto* best described as **Type B “Edging.”** Exceptionally large logs (presumably) washed in on earlier high tides, provided some protection at the toe of the embankment. These partially buried logs seemed to have been a relatively stable feature and remained in place from 2011 when we purchased the property until at least 2021. During the abnormally high tides and extreme winter storm surges of 2022, however, these logs were floated away by the violence of the storms, thereby removing any ongoing protection.

The violent storms causing damage occur almost exclusively in the winter months when the highest tides (king tides) happen. During these months the strongest winds are often from NE to SE where the fetch across Georgia Strait into Lock Bay is at its greatest. (During the summer months the tides are generally lower, and the prevailing winds from the NW, for which Orlebar Point provides protection.) The extensive shallow sea bed in the NE direction contributes to the steepening of the storm waves, adding to their energy when they reach the shore.

The exceptionally violent storms that caused the January 2022 avulsion events, and their reappearance in 2022/2023, are part of a changing shoreline dynamic driven by climate change. Along with sea level rise (of the order of 1 m in 100 years)⁶, this changing dynamic is expected to increase exponentially. As a result, there are two components to the erosion processes on our shoreline. The first of these are the normal, gradual erosion processes that occurred prior to these storm events. For these (previous) conditions, the Type B “Edging” provided adequate shoreline stabilization. The second type of erosion process is that associated with the increasingly violent winter storms (such as the January 2022 storms), extremely high tides (associated with storm surges), and the presence of numerous log battering rams. These storms, when they occur in the winter months coinciding with the highest tides, are increasing in both intensity and frequency. These avulsion forces are not normal gradual erosion processes but instead cause massive shoreline changes in brief, but intense, events. As the events of January 2022 show, Type B “Edging” shoreline stabilization is inadequate to withstand this changing dynamic.

Type A “Vegetation only”? NOT ADEQUATE

This option is only suitable in low wave energy environments (as stated in the source literature^{RefB, RefC}.) During storm surges and extreme high water, the roots of vegetation are swept away and the low-lying bank undercut. Over the past couple of years, we have viewed this process every winter with disturbing results. The net result has been severe undercutting of the low embankment and a land loss of several meters since January 2022. Our concern now is that if action is not taken soon, the root system of the large mature trees now just meters from high water will be undercut and the trees toppled. This event when it occurs will be both devastating and dangerous.

⁶ Although sea level rise of 1 m over the next 100 years is not insignificant, it is still less than 20% of the full tidal cycle. Hence, the revetment would not need to be modified (elevated) in the future because of sea level rise.

Type B “Edging”? NOT VIABLE

This was essentially the *de facto* state of shoreline protection prior to of January 2022. Very large logs presumably washed in and partially buried at the high tide mark by earlier high tides, provided some protection at the toe of the embankment. The size of these logs evidently prevented their displacement until the abnormally high tides and extreme storm surges – avulsion events – occurred in January 2022. During these avulsion events, the logs were violently swept away, exposing the toe of the low-lying soft embankment. This reduced the shoreline protection to Type A “vegetation only” so now even the weakest of storms at high tide cause accelerated erosion. More significantly, as extreme winter storms associated with the changing shoreline dynamic occur, the exposed and unprotected embankment is abruptly swept away even faster in repeating avulsion events.

I repeat: The avulsion events since January 2022 have reduced shoreline protection to Type A “vegetation only.” The shoreline is now subjected to accelerated erosion at high tides and weak storms. This accelerated erosion is greatly magnified by the presence of large numbers of errant logs in the bay caused by the recent reduction in salvage logging. The changing shoreline dynamics (intensifying winter storm season) will result in the avulsion events of January 2022 being repeated with even greater impact and with greater frequency.

Can we restore Type B Edging protection?

- The changing shoreline dynamic and the loss of the Type B Edging in January 2022 means that simple burying of logs will not suffice. Any Edging would need to be much more securely fixed in place to avoid being floated away.
- Options suggested in the literature^{RefA} include the use of salvage logs and/or biologs as biological protection, or artificial barriers such as floating barriers, gabion baskets, concrete blocks or steel pylons. Because logs or (salvage or bio logs) float, they would require secure anchoring with chain or pylons driven into the shore. Neither of these are considered acceptable because they would a) require the forbidden use of machinery on the beach and b) introduce non-natural materials into the upper tidal zone. In addition, the depth to which anchors or pylons could be driven would be limited and thus provide uncertain holding. This same concern applies to the option of a floating breakwater barrier.
- The conclusion is that restoring an edging protection is neither a viable engineering option nor an environmentally suitable one.

Type C “Sills”? INAPPROPRIATE

A submerged shelf can be effective for low-lying marsh or wetlands where the wave action is low. It also requires building structures into the bay. It is inappropriate for our site because it would require disruptive extension into the inter-tidal zone yet still fail to provide protection against the high wave energies of storm surges.

Type D “Beach Nourishment only”? INAPPROPRIATE/IRRELEVANT

This approach of adding sand to extend the beach is inappropriate for our site. This approach is used to protect and preserve low-lying oceanfront beaches, not uplands. In addition, this approach would require importing large volumes of sand and/or unacceptably disturbing the existing intertidal zone beyond our Titled boundary.

Type E “Beach Nourishment & Vegetation on Dune”? INAPPROPRIATE

This approach is totally inappropriate for our site for the same reasons as Type D “Beach Nourishment only”. In addition, the uplands on our site are not dunes but loose conglomerates.

Type F “Breakwater”? INAPPROPRIATE

This offshore structure is deemed inappropriate for several reasons. Most significantly it would require building a structure not within our titled boundary but in the intertidal zone. Obtaining regulatory permission (Fisheries & Oceans, Islands Trust) would be exceedingly difficult. In addition, all the environmental risks and aesthetic concerns associated with seawall structures would come into play. Fortunately, it is not necessary because alternative measures are available.

Interestingly, this approach^{RefU} appears to have been approved by municipal authorities and put into practice at a residential site in Qualicum Beach^{RefU}. It was suggested as a possible strategy for our site^{RefU} but would involve construction in the intertidal zone. I have been unable to determine how effective the barrier has been at protecting the shoreline, but satellite images show many errant logs have passed the artificial barrier and piled up on the beach.

Type G “Groin” INAPPROPRIATE

This concrete, stonework or metal structure poking out into bay perpendicular to the shore is meant to prevent lateral transport of material. This transverse current is not the issue at our location (and would only come into play at extreme high tides) so this structure is not only inappropriate, but suffers all the same environmental problems as Breakwaters, Bulkheads and Seawalls^{RefR}.

Type H “Revetment”? HAS POTENTIAL IF MODIFIED TO BECOME LIVING SHORELINE^{RefN}.

Revetments can be either solid (concrete, consolidated, or metal slabs) or percolated⁷ structures. The percolated style is the one proposed for our site. A (percolated) revetment is a sloped surface comprised of large, interlocking rocks infilled with smaller fractured boulders the purpose of which is to disperse and absorb wave energy (as acoustic tile absorbs sound waves). In our case, it would lie over the slope of the uplands at the shoreline. Only its toe is ever exposed to the sea, and then only at very high tides and/or during storm surges. Note that this is not like some revetment designs which extend deeply into the intertidal zone. The revetment protects the slope from erosion and mitigates wave action. It requires little maintenance and has an Indefinite lifespan. As stated in the literature^{RefM, RefN, RefO}, a properly designed revetment minimizes adjacent site impact. At our site, the revetment would be sited above the high water mark^{RefJ, RefL} with only infrequent exposure to wave activity, providing shoreline stabilization during the infrequent (but increasing) and intense (and increasing) winter storms associated with the changing shoreline dynamic. Because of this adjacent site disturbance is even further reduced and likely fully eliminated.

⁷ Other terms for percolated are interlocking or matrix. The defining characteristic is that the surface is multi faceted so that impinging waves are absorbed or dispersed rather than reflected or diverted. A good analogy is the comparison between a wall panelled in Gyproc vs one panelled in acoustic tile: the one generates echoes, the other a dead zone.

NB: Note that in some of the literature, the term “revetment” is also used to describe hard sloped surfaces of metal or in which the rock voids are filled with concrete^{RefR}. However, the revetment proposed^{RefJ} here **has a percolated, interlocking surface, distinctly different from the solid face of a seawall**. This is an important distinction because the sloped, percolated revetment is designed to absorb and diffuse wave energy rather than reflect and redirect it as occurs with SeaWalls^{RefR}.

For our site, a modified (hybrid) design is proposed^{RefJ}, in which the rock revetment acts a stable base, but is buried with sand and beach nourishment (soil) to support the inplanting of indigenous vegetation. This **hybrid design is described in the literature as a Living Shoreline**^{RefM, RefN, RefO, RefP}. **It is the closest of all the mitigation options identified in the literature to a full restoration of the original conditions prior to January 2022.**

This hybrid design is a method for providing both hard protection against wave action (changing shoreline dynamics) and the ecological benefits of a vegetated Living Shoreline as described in the (Canadian) RossHaven study^{RefO}. The approach used at RossHaven combines “Hard armouring” (percolated, sloped rock rip rap) to provide a stable protective base and “Soft armouring” (burying the rip rap with beach nourishment and soil) to restore native vegetation and mimic nature’s own design. I recently also became aware of an example of a buried revetment (almost identical to our proposed design) in a Green Shores for Homes document^{RefM} and became an exemplary case study for Green Shores^{RefZ1}.

Type I “Bulkhead”? INAPPROPRIATE

This vertical retaining wall to hold soil in place is generally used with pre-existing hard shoreline structures such as working waterfronts and docking facilities. Often constructed with artificial materials such as concrete or steel and extending far into the intertidal zone or even deeper water, it has numerous potential environmental consequences and inappropriate for our site.

Type J “Seawall”? INAPPROPRIATE

This vertical or sloped wall of concrete, stonework or metal, with soil on one side of the wall at the same elevation as water on the other⁸, is different than a revetment. First, the solid nature of the seawall surface reflects and redirects wave energy. As described in the NOAA reference^{RefB}, while such a solid wall can protect the upland soil, it can also cause erosion of the seaward seabed and disrupt sediment transport. This can also result in sculpting at the toe of the seawall and at adjacent sites. Second, in virtually every case, the seawall is located in the intertidal zone and therefore interferes with these flow patterns over most tidal conditions. Third, a seawall is generally constructed^{RefM, RefR} with concrete, steel or other artificial materials to bind the hard surface of the wall. A seawall is not the same as a revetment.

A seawall is neither appropriate nor necessary for our site.

⁸ I.e., located below the high water mark and in the intertidal zone, in contact with the water over much or all of the tidal cycle

This review of the literature leads to the conclusion that a combination of Hard and Soft Armouring is required to mitigate against the human caused avulsion impacts (changing shoreline dynamics) at our site and also allow stable restoration of the natural shoreline. In particular, descriptions of this hybrid approach provided at Ross Haven^{RefO} and by the St Clair Conservation Society^{RefN} are germane examples. I will close by paraphrasing from these references:

It might seem strange to say soft shorelines and armour stone in the same sentence but as the cited references point out, armour stone in the form of rip rap provides the stable base to protect against increasingly high energy waves while the soft material burying the rip rap provides the nourishing base for indigenous vegetation, healthy ecological conditions and a natural aesthetic. The hybrid revetment is designed to protect against the changing shoreline dynamics and impacts caused by human driven storm surges, errant logs and extreme high tides while restoring a stable living shoreline where natural processes continue to function. Successful implementation would restore our waterfront to as close as possible to the pristine conditions that existed prior to January 2022 and protect it from the increasingly violent, but infrequent (though increasing) winter storms.

PART 3: RATIONALE FOR MITIGATION

This section addresses the question: “Is shoreline protection required: what is the rationale for providing Shoreline Stabilization in the first place?” It also addresses the question of the consequences of not providing shoreline protection. It has been added as a direct response to the Islands Trust professional biologist’s conclusion that *“from an environmental perspective the information provided does not appear to provide justification for the proposed development.”* This was a surprising statement. Either the professional biologist did not read the “Applicant Rationale” that formed part of the DVP application, or she dismisses (without explanation) the statements I make therein. As a Senior research Scientist with many years of experience in Climate Change and global change impacts, and a member to the IPCC team awarded a 2007 Nobel Prize for that work, I believe I have earned the right to have my statements respected. In the material below I address this issue in more detail, drawing upon the scientific literature from world, Canada, BC and even Nanaimo.

Character of the bay and our site conditions

- Our property is located in the southeast corner of Lock Bay which has significant exposure to N and NE winds. Although it is relatively sheltered by Orlebar point to the N and NW from NW winds, because of its fetch, the property is also exposed to the strong E and SE winds that predominate in the winter season^{RefG, RefH}.
- The intertidal zone is characterized by an extensive, gentle slope which drops away below the wrack line (approximately at the Titled boundary) by about 0.5m for the first 5-10 m, and then remains relatively flat to the sub-tidal areas approximately 200m away^{RefI}. Facing directly into the open waters of the Strait of Georgia/Salish Sea to the north and north east^{RefJ, RefL}, this extended shallow fetch results in steep waves during winter storm events, thus exacerbating their destructive force.

- A unique local factor is the presence of numerous unsalvaged logs in the bay. During the high winter tides, Lock Bay often contains numerous logs^{RefJ} that have escaped from the transport of logs on the strait of Georgia. The number of these logs has noticeably increased in recent years: whether this is due to an increase in log boom breakup (commensurate with increased storm frequency and intensity), due to a reduction in salvage logging or a combination of these factors is not known. These logs greatly exacerbate the destructive power of the storms by acting as multi-ton battering rams.

Abrupt onset of Extreme Events in ca 2021/22

- Prior to January 2022 the shoreline was a relatively stable, heavily vegetated (native species, not planted) ecosystem. The foreshore is characterized as a low-bank shoreline^{RefJ,L} with the measured height of the shoreline bank ranging from approximately 2.4m at the lower plateau to 5.9m^{RefJ,L} at an upper one in two steps. The margin (or toe) of the foreshore slope was located approximately at the Titled boundary^{RefJ,L}. Above this toe, the foreshore margin extended several meters landward and this lower terrace was heavily vegetated with salmonberry, blackberry, several small trees, and other native species before rising to a second terrace at an approximate elevation of 5-6m^{RefJ,L}.
- The shoreline toe and the low-lying embankment were protected until January 2022 by several unusually large logs which provided Type B “Edging” shoreline protection^{RefA}. These logs had been partially buried in place since at least 2011 when we purchased the property. The previous owners had carved crude steps across them to facilitate beach access.
- After January 2022, by the time of the Geotech site visit (2023), the foreshore was heavily disturbed by the winter avulsion events. The toe of the foreshore was now “*defined by an approximately 1.5 m tall, near-vertical soil exposure located at the toe of the foreshore slope*”^{RefJ,L} and had shifted landward by several meters (see photos in the Geotech report^{RefJ}). Most significantly, the large logs providing Type B “Edging”^{RefA} protection had been swept away, leaving the soil embankment completely exposed.

Type B “Edging” shoreline protection is inadequate for the new site conditions at our location as the events of January 2022 conclusively prove. Natural edging materials such as logs or “biologs” float, and even if they are not swept away⁹ the violent vertical motion caused by high energy waves contributes to the impact damage of the waves.

- The rapid shift of the foreshore toe caused by the violent storm surges and extreme high tides in the 2021/22 period was classified as avulsion by the Professional Surveyor. After consultation with the Surveyor General for BC, he emphatically stated that the Titled boundary remains as it was prior to 2022^{RefL, RefT}. He told us, again after consulting with the Surveyor

⁹ It has been suggested that perhaps the edging barrier could somehow be anchored to the sea bed. Such anchors may prevent them from being swept away but unless the edging barrier is very tightly secured, the violent vertical motion would still occur. In addition, such anchoring would require heavy machinery on the beach to drive pilings/anchors and/or the use of heavy metal chains or concrete blocks. None of these are acceptable when better solutions exist.

General that the determination of the so-called Natural Boundary of the Sea following the avulsion events has no meaning. Although this has been a point of debate with Islands Trust (prior to our formal submission of the DVP application) with respect to our neighbours' property¹⁰, this determination is relevant to our situation. The elevation difference between the current extreme high tide and the titled boundary is a matter of a couple of centimeters, but the lateral shift is now several meters and increasing yearly.

I emphasize that our revetment will be entirely located within our titled boundary and above the highest tide mark prior to January 2022.

- After January 2022 and until time of writing (July 2025), the only shoreline "protection" has been Type A "vegetation only"^{RefA}. This has proved to be **totally inadequate at high tides, even in the gentlest of storm conditions**: greatly accelerated rates of erosion have shifted the margin landward at high tides in even mild storm conditions. More significantly, the repeat occurrence of unusually intense storms and extreme tides in the winter season, exacerbated by wave-driven logs has continued to smash away at any protection provided by the imbedded roots of the remaining vegetation. These abrupt avulsion events are expected to increase in frequency and intensity in the future, a new unprecedented shoreline dynamic caused by climate change.

A large, tangled root ball that previously provided some protection near the beach access steps completely disappeared in one of these storms, as did a smaller log that had washed up onto the plateau just outside our beach gate. When this smaller log was swept away, so was the entire beach access steps and the gate post. The gate and its attached deer fence slid over onto the beach totally blocking any access to the beach. The subsequent undercutting of the beach path now presents a dangerous hazard.

Further west along our shoreline, the embankment has been similarly undercut and swept away with rapid loss of the vegetation that characterized the foreshore margin. Last winter we watched in consternation as several small trees that were attempting to grow on this margin were totally destroyed as errant logs smashed into them.

These post-2022 events provide dramatic proof that Type A "vegetation only" and Type B "Edging" shoreline measures^{RefA} cannot stabilize the shoreline under the emerging conditions.

Type A "vegetation only" and Type B "edging" shoreline protection is totally inadequate for the new site conditions at our location, as the events since 2022 conclusively prove.

- The loss of our beach access may have life and death consequences for us. The beach is one of only two evacuation routes from our property in case of an environmental catastrophe (wild fire, earthquake, tsunami, etc.) or medical emergency. The importance of beach access was proven when Karen required a helicopter ambulance from the beach to Nanaimo in June 2025: access

¹⁰ Islands Trust staff appears to have acknowledged^{RefT} that our legal ownership extends to the Titled boundary and not the extreme highwater level of the avulsion events of January 2022.

from our beach was impossible and the paramedics were forced to trespass using the intact steps over the neighbors' revetment (deemed unlawful by Islands Trust). Fortunately, the airlift was accomplished and Karen is now ok.

Will we have this emergency evacuation route in the future? No, not if the DVP applications for the three Strand properties continues to be denied and Islands Trust succeeds in their demand that the neighbours' revetments be removed.

How will the extreme events change in future? Were the avulsion events of 2021/22 a one-time, freak occurrence?

- To some extent, the negative answer to this question has already been demonstrated by the intensity of storms and extreme tides that have occurred since January 2022. We have witnessed the ferocity of these winter storms and the devastation they have caused on our unprotected shoreline. Similar storms have been reported in the news and in the scientific literature^{RefG, RefH} all up and down BC's coast.
- As a senior Climate Change Scientist, I am convinced that the changes in the shoreline dynamics—storm patterns and extreme high tides—are largely the result of human-driven changes to the global climate system. This is supported by the scientific literature^{RefG, RefH}. In addition, the presence of numerous logs in Lock Bay which magnify the destructive force of the storms is also the result of human activity (logging) and possibly changes in regulations (reducing salvage logging). These impacts are expected to increase, not decrease, in future. In a peer-reviewed assessment of climate change impacts to Canada's coasts, the Intact Centre on Climate Adaptation (University of Waterloo) reports^{RefK} that

"Canada's climate is warming twice as fast as the global average and this warming is effectively irreversible. The changing climate is having widespread and worsening effects on both human and natural systems along the coastline. In 2019, coastal communities were identified as one of the top six areas of climate risk facing Canada."

and goes on to emphasize that:

*"... coastal communities are exposed to hazards, **including flooding and coastal erosion, that will become more frequent and intense as a result of climate change. These hazards pose a direct threat to the health and safety of people, and may cause damage to coastal infrastructure and property. Action is urgently required to manage the growing risks***

*"Extreme water levels along the marine coast are a result of a combination of different processes, including **storm surge, tides, and ocean waves**. Future projections indicate that rising global sea levels and retreating sea ice will continue to cause **changes in the frequency and magnitude of extreme water levels, which will impact Canada's coastlines.**"*

- The literature^{RefG, RefH, RefK} makes it very clear that the avulsion events of 2021/22 are not freak, one-off events: they are indicators of a pattern of changing shoreline dynamics being driven by human-caused climate change. The outlook is that the

frequency and magnitude of extreme high water-level events will increase, resulting in accelerated coastal erosion, and placing coastal communities at increased risk^{RefK}.

To this bleak outlook for our site must be added the existence of errant unsalvaged logging debris (again of human origin) which act as multi-ton battering rams when driven by these storm surges in Lock Bay.

- Soberingly, and very apropos to our attempts to protect our shoreline, the Canadian review^{RefK} cited above notes that:

“the greatest challenge in Canada, and globally, in preparing for climate change and sea-level rise along the coast, is a limited sense of urgency to act.”

Mitigative action to protect our shoreline for the new shoreline dynamics is urgently needed but continues to be thwarted.

What are the projected impacts for our shoreline?

- Many of the negative changes that will result from the increasing frequency and intensity of storm events, rising sea levels and logging debris have already been given or will be further listed throughout this document and will not be repeated here.
- If no action is taken, the shoreline values that we cherish and are articulated in the OCP policies will continue to be negatively impacted at an increasing rate. The relatively undisturbed, pristine shoreline ecosystem prior to January 2022— a wide barrier of indigenous vegetation – has already been largely destroyed. The natural processes that operated prior to 2022 are rapidly being replaced through greatly accelerated rates of erosion and loss of habitat, as all pre-existing forms of shoreline stabilization are swept away in the winter avulsion events.

The consequent impacts to the marine environment are visually evident and are escalating with every winter storm. The pre-existing shoreline vista of indigenous vegetation is rapidly being lost to one of exposed bare soil and open to invasive species. Access to the beach, essential for emergency evacuation, has become impossible. Passage along the foreshore has become hazardous due to the undercutting and destabilization of the embankment.

All these impacts will only get worse if action is not taken to stabilize the shoreline^{RefG, RefH, RefK}. Within a few short years, the damage will move further landward and introduce a whole new suite of irreversible changes and impacts when it reaches the root systems of large heritage trees on the upper terrace (approximately 7 m inside the titled boundary^{RefI, RefL}). When this

happens, these very large trees will topple as they become undercut, creating both property damage and distinct hazards for people¹¹.

- Many of the negative changes that will result from the increasing frequency and intensity of storm events, rising sea levels and logging debris have already been given or will be further listed throughout this document and will not be repeated here.

Will it be necessary to add additional Shoreline protection in the future?

Although this concern did not appear in the Staff Report for DVP application, the staff Report^{RefT} for the neighbours' DVP application seems to assert that rising sea levels will eventually overtop the revetment and require the owners to request an additional variance permit in the future when upgrades or a replacement are required. This is simply a false assertion. The recently discovered study of sea level rise performed for the City of Nanaimo^{RefV} to assess flooding risks due to climate change, storm surge, iso-elastic rebound and other factors, indicates that the sea level rise (SLR) from its 2018 reference level will be less than 33 cm by 2050 and less than 82 cm by 2100. This is significantly less than the 2.4m height of the first embankment^{RefJ, RefI, RefL} and the proposed hybrid revetment^{RefJ}, whose base is at the present highest tide level. **Contrary to assertions to the contrary, sea level rise will not cause the sea to overtop the revetment** in the next 100 years.

The assertion in the Staff Report^{RefT} for the neighbour's revetment, that SLR "may result in scouring and increased erosion where the armouring transitions to the natural shoreline near adjacent properties" is similarly not valid. Even by 2100, the height of the highest tide will not rise more than 1/3 of the height of the revetment. For most of the tidal cycle, altered sea water transport and the potential for scouring (or sculpting) simply cannot occur. In addition, during those brief periods where the revetment is actively interacting (and providing protection from) the most extreme high tides and storm surges, the sloped and percolated nature of the revetment has been designed to absorb and diffuse wave action, not redirect that energy to cause such scouring (or sculpting). This point has also been made by the professional and experienced authors of the proposed revetment^{RefI,J} and in the scientific literature cited throughout this response document.

On the other hand, other environmental or human-caused catastrophes may occur, such as a tsunami or an earthquake, that could destroy or damage the revetment. In such circumstances, however, possible damage to the revetment would be the least of our concerns and, in any case, the revetment would to some extent reduce the damage that would result in its absence.

The words of Canada's Intact Centre on Climate Adaptation provide an apropos close to this section before turning to the specific concerns enumerated in the summary of the Staff report^{RefF}:

Action is urgently required to manage the growing risks

¹¹ The near miss when such an undercut tree fell on the neighbour's property, narrowly missing a hot tub with potentially fatal consequences, has been pointed out elsewhere in these documents.

References

This document lists the references used in “Shoreline Stabilization Alternatives^{RefA}” and “Responses to Staff Concerns on Apps DVP Application^{RefA1}”. Not all the references are necessarily directly cited in the two documents, but all have been reviewed. Note that different references use somewhat different names and labels, some of which are in direct conflict with others. Also note that many deal exclusively with freshwater systems or focus on beach/dune ecosystems where different factors are at play. Care, judgement and interpretation is therefor needed when synthesizing and comparing conclusions from different reports to avoid conflation and other errors.

- RefA Shoreline Stabilization Alternatives, MJ Apps, July 2025. Copy submitted to S Baugh, Islands Trust, July 2025.
- RefA1 Responses to Staff Concerns on Apps DVP Application MJ Apps, July 2025. Copy submitted to S Baugh, Islands Trust Gabriola, July 2025.
- RefB Natural and Structural Measures for Shoreline Stabilization. National Ocean and Atmospheric Administration and US Army Corps of Engineers. 2015. 7 Pgs.
<https://coast.noaa.gov/data/digitalcoast/pdf/living-shoreline.pdf>
- RefC Adaptation Strategies and Actions. Restore and Protect Natural Shorelines: Use living Shoreline Techniques, Massachusetts Wildlife Climate Action Tool
<https://climateactiontool.org/content/restore-and-protect-natural-shorelines-use-living-shoreline-techniques>
- RefD Staff Report. File PL-DVP-2024-2099 (Apps). Islands Trust. Excerpt from Gabriola Island Local Trust Committee meeting documents, 17 April 2025. 41 Pages
- RefE Application package submitted for Apps DVP (Project # PLDVP20240299) via the Islands Trust Portal, 11/07/2024. An earlier draft version was submitted to Islands Trust Planner Margo Thomaidis 06/12/2023 but withheld for a year until the requested DFO report^{RefS} was completed
- RefF Email from S Baugh to MJ Apps summarizing the Islands Trust Staff Review^{RefF}, 17 June2025. Copy available on request.
- RefG Oceanography of Inshore Waters, Chapter 10: Strait of Georgia, Environment Canada
<https://waves-vagues.dfo-mpo.gc.ca/Library/487-14.pdf>
- RefH Wind Waves in the Strait of Georgia. K. Gemmish and R. Pawlich, May 2020. Atmosphere-Ocean, Vol 58(2), 79-97.

- RefI Environmental Impact Assessment, 1140 the Strand. DR Clough Consulting. Fisheries Resource Consultants, 18 pages
- RefJ Foreshore Revetment Assessment and Design, Geotechnical Report E2151.01 Rev2, Lewkowich Engineering Associates, 10 Pages. 2024
- RefK Rising Seas and Shifting Sands: Combining Natural and Grey Infrastructure to Protect Canada’s Eastern and Western Coastal Communities. Intact Centre on Climate Adaptation, University of Waterloo. Dec 2021. 95 Pages.
https://www.intactcentreclimateadaptation.ca/wp-content/uploads/2022/02/UoW_ICCA_2021_12_Coastal_Protection_Grey_NbS.pdf

RefL Survey. 23004-1 SITE PLAN REV 1. Williamson and Associates, Professional Surveyors, Digital document. Feb 2023

RefM Green Shores for Homes, A reference for homeowners, landscape designers, construction professionals, and shoreline practitioners to help minimize the environmental impact of waterfront property development. StewardShip Centre for BC. 2023. 174 pages.
https://stewardshipcentrebc.ca/PDF_docs/greenshores/Resources/GSHCreditsandRatingsGuide.pdf
Note Appendix D: Nature-based Shoreline Protection Options. The options outlined are very similar to those presented in ref 1 and 1a (but sometimes with different names). In particular “Buried bulkheads or revetments” are discussed on page 148: In this approach the hard elements which provide protection are buried below a substantial sloped soft surface of smaller diameter materials, that mimic the surrounding soft beach environment. In our case, the buried revetment is not on the beach but rather lies completely above it. It is designed to protect the existing soft conglomerate material above the intertidal zone during the infrequent but devastating storm surges and extreme high tide. The beach nourishment and existing backshore soil is overplanted with native vegetation to restore prior ecosystem functions and values.
NB Page 149 has diagram that is almost identical to our proposed hybrid revetment

148

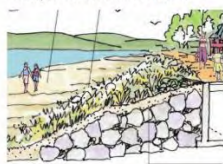
Green Shores for Homes: Credits and Ratings Guide



Appendices

2. The soft shore should be designed to cover hard elements for a minimum of ten (10) years without anticipated re-nourishment or maintenance for typical seasonal conditions.

Examples of buried revetments



Adapted from Town of Qualicum Beach Waterfront Master Plan, 2016. P.6.

RefN Creating Soft Shorelines, St. Clair Region Conservation Authority, case studies conducted by the St. Clair Region Conservation Authority, April 2006, 92 pages
<https://www.scrca.on.ca/wp-content/uploads/2013/11/Pub-St-Clair-River-Shoreline-Restorative-Works-2006.pdf>

<https://www.scrca.on.ca/great-lakes-and-connecting-channels/creating-soft-shorelines/>

- RefO Shoreline Stabilization Techniques: Soft vs. Hard Armoring. A review of softening approaches for Ross Haven, Alberta. 4 Pgs, 2016.
<https://rosshaven.ca/wp-content/uploads/2018/01/Shoreline-Stabilization-Techniques.pdf>
- RefP Your Marine Waterfront. A Guide to protecting your property while promoting healthy shorelines. Canadian Edition. Washington Department of Fish and Wildlife. Recommended by GreenShores for Homes. Oct 2016. 48 Pages.
https://stewardshipcentrebc.ca/PDF_docs/greenshores/Resources/YourMarineWaterfront_CanadianEdition.pdf
Note 1. Page 3: "ONE SIZE DOESN'T FIT ALL Hard structures (walls, rip rap) along the shoreline may be appropriate in select circumstances"
Note 2. Page 27 explicitly shows a revetment placement in the backshore as a Good Design Practice. The specific example picture shows a gravel revetment, but the article points out that choosing the appropriate sediment size for the site specific conditions is important: too small and the sediment will wash away; too coarse and it will provide little protection. In our case, a percolated matrix of rock sizes was specified (based on the Geotech's extensive professional experience with BC's coast).
- RefQ Shoreline Stabilization Guidelines, US Environmental Protection Agency. A review of various approaches and recommended practices, 18 Pgs, 20,
<https://archive.epa.gov/water/archive/web/pdf/shorelinestabilization.pdf>
- RefR Seawalls Bulkheads and Revetments
<https://www.nps.gov/articles/seawalls-bulkheads-and-revetments.htm>
- RefS DFO File 23HPAC-0980. Foreshore Revetment Loch Bay. Letter from Department of Fisheries and Oceans to Michael and Karen Apps summarizing their findings following their review. 28 Aug 2024. 3 pages. Copy available on request
- RefT Staff Report. File PL-DVP-2024-2099 (Pink). Islands Trust. Excerpt from Gabriola Island Local Trust Committee meeting documents, 17 April 2025. 107 pages
- RefT1 Staff Report. File PL-DVP-2024-2099 (Woodside). Islands Trust. Excerpt from Gabriola Island Local Trust Committee meeting documents, 17 April 2025. 70pages
- RefU Email from Kelly Loch, MSc Green Shores Projects Manager to MJ Apps, 3 June 2025. Copy of correspondence available upon request.
- RefV Sea Level Rise Study, City of Nanaimo. Prepared by Associated Engineering, 2018, 138 Pages
[https://www.nanaimo.ca/docs/departments/environmental-documents/sea-level-rise-study-\(2019\).pdf](https://www.nanaimo.ca/docs/departments/environmental-documents/sea-level-rise-study-(2019).pdf)
- ADDED AFTER 20July2025
- RefW B.C. Coastal Marine Strategy, Government of BC, 64 pages, ca 2024

https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/coastal-marine-strategy/coastal_marine_strategy.pdf

- Very little about residential properties, however, note pg 38: incentives to homeowners in form of tax benefits
- Strong emphasis on First Nations, Wealth generation (marine industry, tourism, recreation), Climate change adaptation and mitigation.
- Recommends Greenshores
- For parks and public places, recommends “*replacing hard armoured approaches with soft shoreline stabilization techniques in coastal marine parks and protected areas managed by the provincial government, where appropriate*”

RefX IslandsTrust Stewardship TipsGuide 2023. Islands Trust brochure, 12 pages, ca 2024

<https://islandstrust.bc.ca/document/trust-area-stewardship-tips-guide-2023/>

- Very little specificity. Surprising that IT staff did not direct us to this when we asked for advice!
- “Minimize tree cutting and soil disturbance. The islands’ trees and soils have vital ecological and climate values...”
- “Locate residences and infrastructure further inland to reduce the need for shoreline protection. Avoid hard shoreline structures, such as seawalls, riprap and retaining walls, that can harm fish and wildlife, and which may not prevent erosion.”
- “Consider ‘soft’ shoreline designs to reduce erosion, which use natural vegetation, logs, and low slopes to stabilize soils and provide upland drainage and habitat.”

RefY Notice PLDVP20240299. Gabriola Island Local Trust Committee. 4 pages. Signed Nadine Nourao, Deputy Secretary. Notice undated, but postmarked 2 April 2025.
Notice PLDVP20240299.pdf (Copy available on request)

RefZ Revetments. Climate Change Adaptation Technologies for Water: A practitioner’s guide to adaptation technologies for increased water sector resilience. UN-Environment DHI Cente, Nov 2024, 3 pages. (part of a much larger document)

<https://www.ctc-n.org/sites/default/files/resources/revetments.pdf>

RefZ1 GreenShores Case Studies, Island Highway West, Qualicum Beach BC.

<https://stewardshipcentrebc.ca/island-highway/>

- Case study of buried revetment that replaced a failing seawall. First project in BC to receive Green Shores for Homes Accreditation. Designed by Hessels, EIA by Clough.



Snuneymuxw

First Nation

www.snuneymuxw.ca

November 7, 2025

Stephen Baugh
Island Planner
Gabriola Local Islands Trust
700 N Rd, Gabriola, BC V0R 1X3
250-247-2201
sbaugh@islandstrust.bc.ca

Delivered by Email

RE: Development Variance Permit Application DB- DVP-2024-0299 (Apps).

Thank you for your patience as we completed our review of Development Variance Permit (DVP) Application DB-DVP-2024-0299, submitted to the Gabriola Local Islands Trust Committee (GLTC) and referred to the Snuneymuxw First Nation (SFN). This application concerns the proposed revetment at 1140 The Strand, a property owned by Mike Apps (the "Subject Property").

We appreciate your willingness to become more familiar with the Snuneymuxw Sarlequun Treaty of 1854, a trade and commerce treaty that, among other things, preserves and protects Snuneymuxw lands, waters, and resources, villages and fields, harvesting and gathering, and the right to hunt and carry-on fisheries as formerly.

In addition to the current application, SFN has received other DVP applications in the vicinity, including GB-DVP-2022.4 (Woodside) and GB-DVP-2022.3 (Pink), both related to revetment developments. While this response addresses DB-DVP-2024-0299 (Apps) specifically, it reflects the findings of our broader review process - conducted by SFN staff in collaboration with our technical consultants - and is informed by the understanding that revetment development along sensitive shorelines inherently intersects with areas of high archaeological and cultural potential.

The proposed revetment at 1140 The Strand is within 100 metres of two recorded archaeological sites, DhRw-1 and DhRw-2, and lies along a shoreline with clam beds. These sites are of high cultural and archaeological sensitivity, and have been documented to contain ancestral remains, petroglyphs, shell midden deposits, and fire-altered rock, all of which reflect longstanding Snuneymuxw presence and use of the area.

Generally, revetment projects occur within areas of high archaeological potential. It is important to note that shoreline areas across Snuneymuxw territory consistently represent zones of high archaeological and cultural potential. These areas have supported generations of Snuneymuxw. Proposed seawall development areas that have not been surveyed for archaeological resources by a qualified archaeologist are at risk of impacting archaeological materials, particularly below ground.

Due to the combination of these factors and given that much of the shoreline in question has not been subject to formal archaeological investigation, there is a risk that unrecorded cultural materials may be impacted by development activities associated with the proposed DVP.

In correspondence with the applicant, they referenced a June 2022 site visit and subsequent inspection report by Joel Kinzie. Quoting the report, *"our search found no evidence that your shoreline armoring development impacted a protected archaeological site,"* Apps asked if SFN would *"require us to repeat this site-specific study? Given the expenses we have already incurred, and the site-specific results already obtained, this seems totally unnecessary and an unjustified expense."*

However, it was clarified that this site visit was a contravention inspection for 1160 The Strand, not the property in question (1140 The Strand). The site visit was a surface inspection only and did not include subsurface testing. The relocation of site DhRw-2 was based on surface observations only and therefore, the site boundaries are an estimation. The site may extend underground in any direction. Therefore, prior conclusions drawn about impacts at 1160 The Strand do not apply to the current application.

Considering these findings, our formal response is that no ground disturbance should occur in relation to these DVPs unless appropriate cultural heritage assessments and safeguards are in place, including the following:

1. SFN requires that an Archaeological Impact Assessment (AIA) be conducted prior to any ground disturbance.
 - a. An AIA is conducted under a Heritage Conservation Act (HCA) Section 12.2 heritage inspection permit (HIP). This study includes systematic subsurface testing to determine the presence of archaeological materials and the extent of these deposits.
 - b. Once the AIA is complete, the development can proceed if nothing is found, or if archaeological remains are encountered, it may proceed under the conditions outlined in a section 12.4 site alteration permit (SAP).
 - c. Please note, these permits are currently taking 8 to 10 months from application to approval by the Archaeology Branch of BC. The project must remain on hold until these permits are in hand.
2. At a minimum, archaeological monitoring during construction must be carried out by an SFN site monitor.

- a. If the applicant opts not to undertake an AIA in advance, archaeological monitoring must be conducted during construction. However, this is a higher-risk approach. Should any archaeological remains be encountered, all work must immediately cease, and the required HIP and SAP must be obtained before further development.

These requirements are consistent with provincial legislation and best practices.

We also note a pattern of unauthorized revetment construction on Gabriola Island—often proceeding without required permits from the Local Trust Committee. This underscores the need for stronger oversight, regulatory awareness, and proactive shoreline protection.

As part of our response, we respectfully offer the following recommendations for consideration by GLTC,

- **Education and Outreach**
Develop and implement broader public education initiatives to ensure property owners understand shoreline permitting requirements and the potential archaeological and environmental impacts of unregulated development.
- **Compliance Protocol**
Establish a clear and consistent protocol outlining the steps to be taken when a seawall or shoreline structure is found to be non-compliant. This should include processes for investigation, enforcement, and appropriate remediation or post-construction permitting pathways.

Should you have any questions or require additional information, please do not hesitate to contact our office.

Hay ch q'a,



Hilda Paige
Director, Rights and Title

Cc:

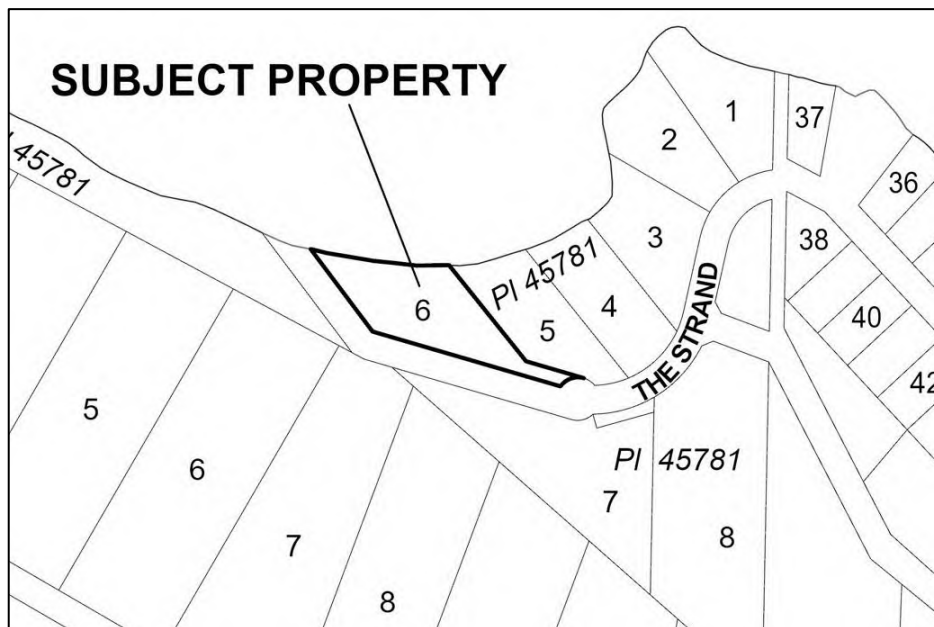
Mike Apps, Applicant
Hannah Paulson, SFN Referrals Analyst

NOTICE
PLDVP20240299
GABRIOLA ISLAND LOCAL TRUST COMMITTEE

NOTICE is hereby given pursuant to Section 499 of the *Local Government Act* that the Gabriola Island Local Trust Committee will be considering a resolution allowing for the issuance of a Development Variance Permit, the proposed permit would vary the Gabriola Island Land Use Bylaw, 1999 by **permitting the siting of proposed rock wall revetment structure within 0 metres of the interior side lot line setback and 0 metres from the setback to the natural boundary of the sea.**

The property is located at **1140 The Strand** and is legally described as LOT 6, SECTION 18, GABRIOLA ISLAND, NANAIMO DISTRICT, PLAN 45781 (PID: 008-828-075).

The general location of the subject property is shown on the following sketch:



A copy of the proposed permit may be inspected at the Islands Trust Office, 700 North Road, Gabriola Island, BC V0R between the hours of 8:30 a.m. to 4:30 p.m. Monday to Friday inclusive, excluding statutory holidays, commencing **April 9, 2026** and continuing up to and including **April 22, 2026**.

For the convenience of the public only, and not to satisfy Section 499 (2) (c) of the *Local Government Act*, additional copies of the Proposed Permit may be inspected at the Notice Board on Gabriola Island.

Enquiries or comments should be directed Stephen Baugh, Island Planner, at (250) 247-2201, for Toll Free Access, request a transfer via Enquiry BC: In Vancouver 660-2421 and elsewhere in BC 1-800-663-7867; or by fax (250) 405-5155; or by email to: northinfo@islandstrust.bc.ca before **4:30 pm, April 22, 2026**.

The Gabriola Island Local Trust Committee may consider a resolution allowing for the issuance of the permit during the regular business meeting starting at **10:30 a.m. on April 23, 2026 at Gabriola Arts & Heritage Centre, 476 South Road, Gabriola, BC.**

All applications are available for review by the public with prior appointment. Written comments made in response to this notice will also be available for public review.

Nadine Mourao, Deputy Secretary



Islands Trust

PROPOSED

GABRIOLA ISLAND LOCAL TRUST COMMITTEE DEVELOPMENT VARIANCE PERMIT PLDVP20240299

To: Michael and Karen Apps

1. This Development Variance Permit applies to the land described below:

LOT 6, SECTION 18, GABRIOLA ISLAND, NANAIMO DISTRICT, PLAN 45781
(PID: 008-828-075)

2. Gabriola Island Land Use Bylaw, 1999 is varied as follows:

- a) Article **B.2.1.1 Setbacks and Elevations from Watercourses and the Sea** which states: “...retaining walls, ground level decks, *structures* and *buildings*, excepting *boathouses*, must be sited a minimum of 7.5 metres (24.6 feet) from and 1.5 metres (4.9 feet) above the *natural boundary* of the sea” is varied to permit a rock revetment within 0 metres of the natural boundary of the sea.
- b) Article **D.1.1.3 Regulations**, Clause **(a) Buildings and Structures Siting Requirements**, Item (i) which states: “On *lots* less than 1.0 hectares (2.47 acres), except for a sign, *fence*, or *pump/utility house*, the minimum *setback* of *buildings* or *structures* is: ...1.5 metres (4.9 feet) from any *interior lot line*.” is varied to permit a rock revetment within 0 metres of the interior side lot line.

The development shall be consistent with Schedules ‘A’ and ‘B’ which are attached to and form part of this permit.

3. This permit is not a building permit and does not remove any obligation on the part of the permittee to comply with all other requirements of "Gabriola Island Land Use Bylaw, 1999" and to obtain other approvals necessary for completion of the proposed development, including approval of the Nanaimo Regional District and Ministry of Transportation and Infrastructure.

AUTHORIZING RESOLUTION PASSED BY THE GABRIOLA ISLAND LOCAL TRUST COMMITTEE THIS ##th DAY OF [MONTH], [YEAR].

Deputy Secretary, Islands Trust

Date of Issuance

IF THE DEVELOPMENT DESCRIBED HEREIN IS NOT COMMENCED BY THE ##th DAY OF [MONTH], [YEAR] (2 YEARS FROM DATE OF ISSUANCE)] THIS PERMIT AUTOMATICALLY LAPSES.

PROPOSED

GABRIOLA ISLAND LOCAL TRUST COMMITTEE

PLDVP20240299

SCHEDULE 'B'

Shoreline Revetment Design

