



File No.: PL-RZ-2025-0072 (Welsh
-FAEC)

DATE OF MEETING: September 2, 2025

TO: Thetis Island Local Trust Committee

FROM: Margot Thomaidis, Planner 2
Northern Team

SUBJECT: Rezoning Application – Nature-Based Shoreline Protection Proposal
Applicant: Doug Fenton, Fenton & Associates Environmental Consulting (FAEC)
Location: 83 and 84 Blue Heron Rd. and Adjacent Marine Area, Thetis Island

RECOMMENDATIONS

1. That the Thetis Island Local Trust Committee defer further consideration of application PL-RZ-2025-0072 (Welsh) and direct staff to share professional reports and information, and invite First Nations to a site visit in order to provide meaningful opportunities for involvement, discussion of concerns, and cooperation prior to the LTC proceeding with the application.
2. That the Thetis Island Local Trust Committee request that the applicant for PL-RZ-2025-0072 (Welsh – FAEC) provide planning staff with the following information, prior to further consideration of the application:
 - a) A final Construction Environmental Management Plan (CEMP), prepared by a Qualified Environmental Professional, including all construction and maintenance recommendations.
 - b) A list of specific mitigation, adaptation, and avoidance measures to protect identified species at risk, sensitive ecosystems, and archaeological sites during installation.
 - c) A site plan showing:
 - i. Shoreline access points for equipment;
 - ii. Extent of all work areas; and
 - iii. All site access and lay-down areas for the project.

REPORT SUMMARY

The purpose of this preliminary report is to provide information regarding rezoning application PL-RZ-2025-0072 (Welsh – FAEC) and to seek direction from the Thetis Island Local Trust Committee (LTC) on next steps.

The application as submitted would amend the Thetis Island Land Use Bylaw, 2011 (LUB) by rezoning portions of the **Rural Residential (R-1)** and **Water 4 (W4)** zones to site-specific shoreline protection zones to facilitate the future installation of a nature-based shoreline protection project to protect the land and existing buildings and structures on the upland property from shoreline erosion.

Staff recommend the LTC request the applicant provide additional information as per recommendation #2 on page one of this report. Staff also recommend additional involvement and staff to staff discussion with First Nations in order to facilitate informed decision making.

BACKGROUND

The project site is located north of the dredged channel called *The Cut*, connecting Clam Bay to the west side of Thetis Island and frequented by small vessels. The project location is relatively sheltered from the Salish Sea by Galiano and Valdes Islands and is southwest of a salt marsh wetland and coastal spit (Figure 1).

The subject properties at 83 and 84 Blue Heron Rd are 0.51 and 0.59 hectares in area respectively and have existing residential buildings which were constructed between the 1950s and 1970s (Figure 2). Both properties have had the same owners since 2016, who reside at number 83 Blue Heron Rd and rent out the second property. The owners intend to undertake renovations to the existing dwelling at 83 Blue Heron Rd in the future. The existing dwelling is approximately five metres from the natural boundary, hence the desire to protect the remaining bank from erosion. An existing 18 m concrete seawall (installed in approximately 1954) and a set of concrete beach access stairs are located along the southern shoreline adjacent to the dwelling (Figure 3).

The design is based on a partnership between Fenton and Associates Environmental Consulting (FAEC) and Northwest Hydraulic Consultants Ltd. (NHC) and incorporates a '*Green Shores*' approach to shoreline protection. The goal of this approach is to balance the protection of the structures from current and future impacts of shoreline erosion due to rising sea levels, increased storm surges, wave action and sea spray in balance with a 'soft' shores approach that integrates natural structures and plantings, with an overall ecological rehabilitation strategy.

If approved, the application would permit the installation of a nature-based shoreline protection project along the shore and up to 10 m seaward from the title boundary, including burying the existing concrete seawall. The total proposed shoreline protection area is 237.5 m² in the upland slope and 1,410 m² along the foreshore. Installation would involve depositing approximately 40-50 truckloads of materials including beach nourishment (sand and gravel); cobble structures; boulders; and large woody debris. The shoreline would then be replanted with a variety of native plants and trees and monitored for three years to ensure successful ecological rehabilitation.

The applicant has submitted the following letters, surveys, and professional reports in support of their application (see **Attachments 4-11**):

- Project Summary Narrative, prepared March 26, 2025 (Fenton & Associates Environmental Consulting (FAEC)) – **Attachment 4**;
- Site Plans of Existing Buildings and Structures, prepared December 2019 (Polaris Land Surveying) – **Attachment 5**;
- Registered Professional Biologist Approval Letter, prepared June 13, 2025 (Watershed Ecological Services, Ian Douglas Bruce, R.P.Bio) – **Attachment 6**;
- Nature Based Erosion Protection Coastal Processes Report, prepared October 4, 2024 (Northwest Hydraulic Consultants Ltd.) – **Attachment 7**;
- Nature Based Erosion Protection Design Basis Report, prepared October 22, 2024 (Northwest Hydraulic Consultants Ltd.) – **Attachment 8**;
- Native Foreshore Plant Planting Plan, prepared May 16, 2025 (FAEC and Christine Brophy (BNRP, R.B. Tech)) – **Attachment 9**.
- Marine Shoreline Assessment Report, prepared February 25, 2024 (FAEC) – **Attachment 10**; and

- Draft Construction Environmental Management Plan, prepared June 25, 2025 (FAEC) – **Attachment 11.**

APPLICANT AND OWNER RATIONALE:

The applicant and owners' rationale for the proposal is summarized as follows:

- The proposed works intend to address ongoing erosion at two sites along the southern and eastern shorelines, while restoring shoreline habitat.
- After purchasing the properties, the owners quickly became concerned about the erosion along the shoreline, especially during winter storms. Active erosion was noticeable along the eastern shoreline, with receding upland banks and heavily silted waters.
- Fenton & Associates Environmental Consulting (FAEC) was hired in 2023 to complete a Marine Shoreline Assessment Report that considered a *Green Shores for Homes* approach as well as a Remote Access to Archaeological Data Overview Report to identify any local First Nations archaeological and cultural heritage concerns. FAEC sees the project as an opportunity for Indigenous reconciliation.
- Northwest Hydraulic Consultants Ltd. (NHC) was hired to complete a Coastal Processes Report that confirmed that the shoreline erosion concerns were valid and used modelling and flood data to determine that flooding may become an issue on the southern shoreline over time. FAEC worked collaboratively with the owners and NHC to design a Nature Based Shoreline Protection installation to mitigate ocean influences.
- The properties suffer from severe degradation and disconnection of the foreshore and upland properties from decades of human activities. By incorporating large woody debris and native plants, the current upland properties are proposed to be reconnected to the foreshore.
- The owners and applicant have received financial support for their rezoning application through the *Green Shores for Homes Conservation Fiscal Incentive Pilot Project* and have met with staff from the Stewardship Centre BC and *Green Shores for Homes* while developing the proposal. They have concurrently applied for Crown tenure authorization with the province.
- The applicant and owners held a site visit on the proposed site in July 2025, inviting neighbours and community members to ask questions and comment on the proposed design. This was followed by a presentation by a *Green Shores for Homes* projects manager at the Community Hall.



Figure 1 – Subject Properties

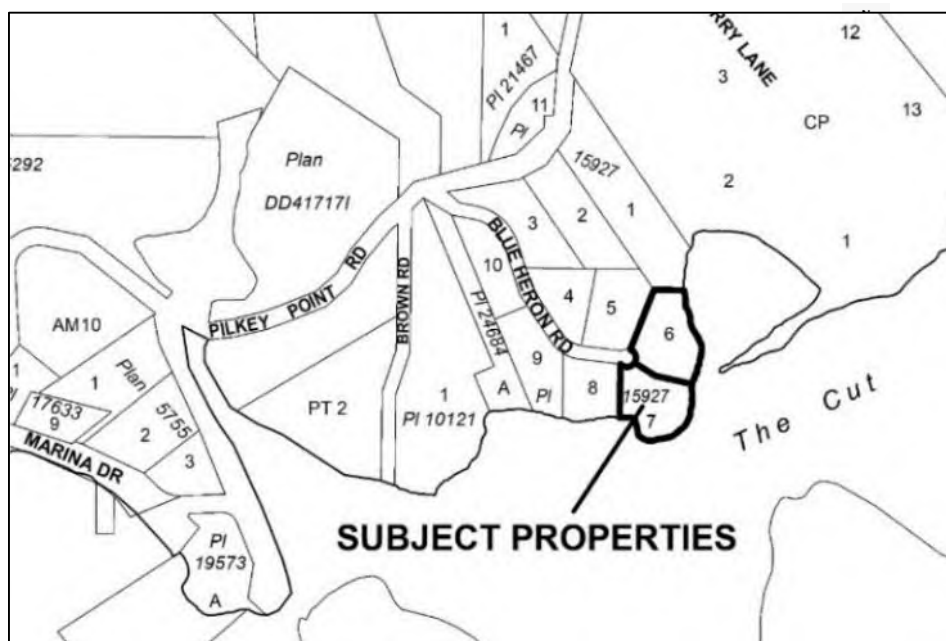
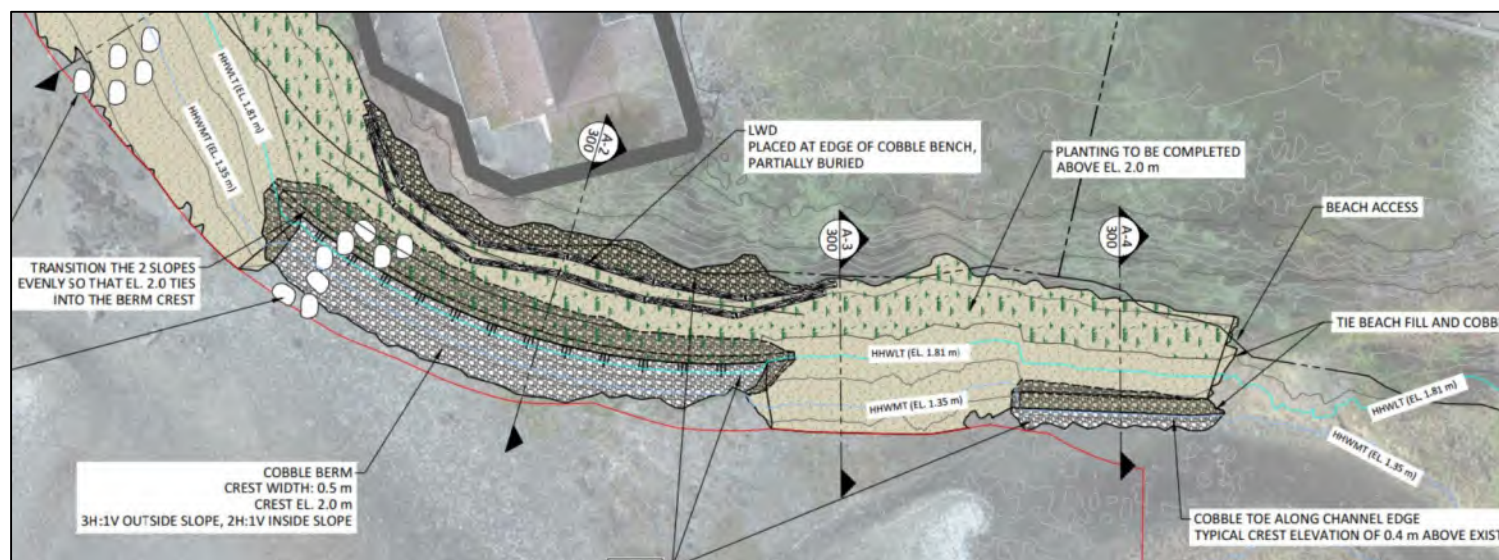
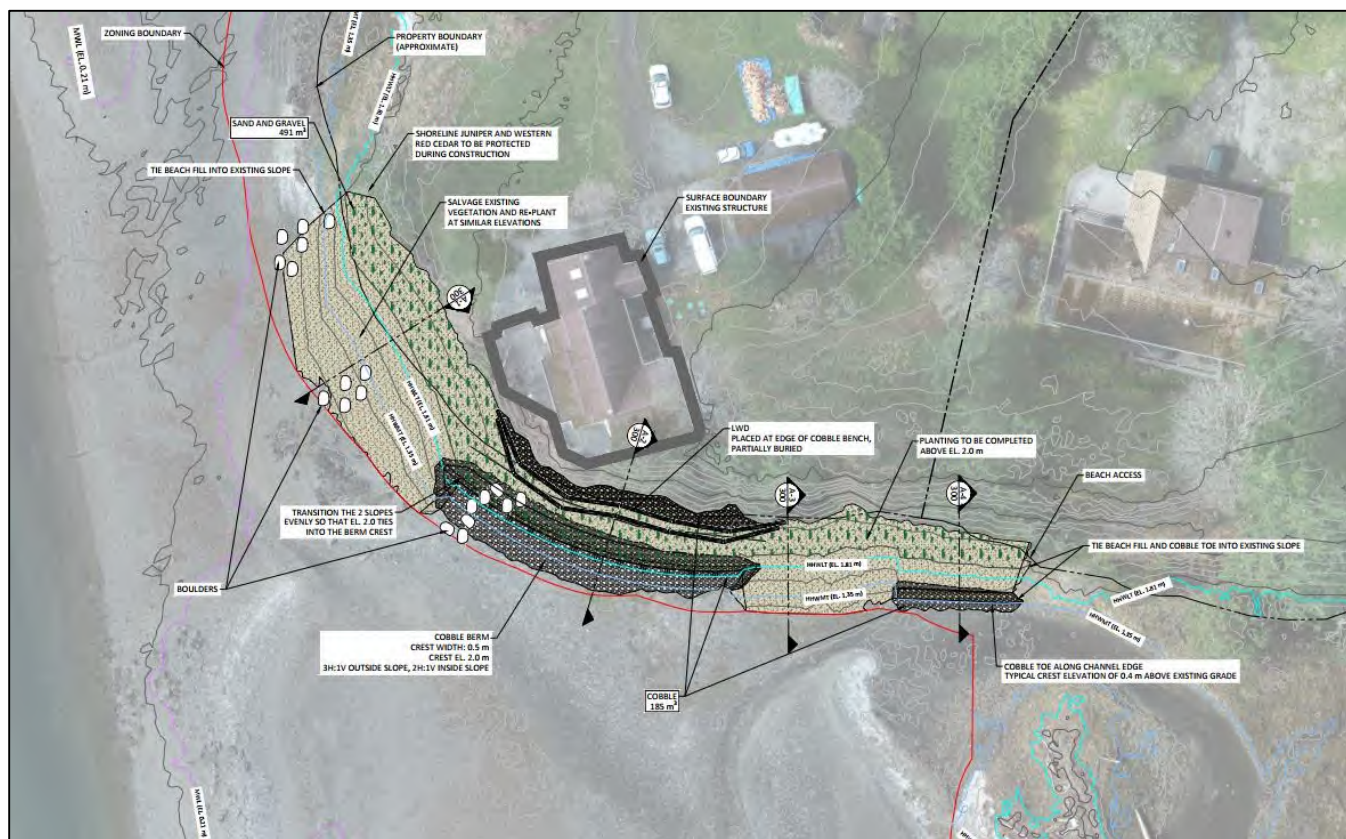


Figure 2 – Sites of Erosion



Source: Marine Shoreline Assessment Report, prepared February 2024, Page 27 (FAEC)

Figure 3 – Proposed Nature Based Erosion Protection Design



Source: Northwest Hydraulic Consultants Ltd. – Thetis Island Nature Based Erosion Protection Design Basis Final Report, Rev.0, prepared October 22, 2024.

ANALYSIS

Policy/Regulatory

A number of policies and regulations are pertinent to the consideration of this application, detailed in **Attachments 1-3** and summarized as follows.

Islands Trust Policy Statement:

Staff note that an ITPS Checklist (Directives Only) will be completed at the time the draft bylaw amendment is presented to the LTC. All applicable ITPS policies support this proposal in principle. The ITPS policies most relevant to this application are as follows:

3.4.4 Local trust committees and island municipalities shall, in their official community plans and regulatory bylaws, address the protection of sensitive coastal areas.

3.4.5 Local trust committees and island municipalities shall, in their official community plans and regulatory bylaws, address the planning for and regulation of development in coastal regions to protect natural coastal processes.

Official Community Plan:

The proposed location of the nature-based shoreline protection project is on a portion of the upland area designated Rural Residential (R-1) in the Thetis Island Official Community Plan, 2011, and a portion of the foreshore marine area on Crown land. The proposed site is not within a designated Development Permit Area or Heritage Conservation Area.

There are a number of Official Community Plan policies and objectives relevant to the consideration of this application, detailed in **Attachment 2**. The OCP supports proposals for Land Use Bylaw amendments that retain or enhance natural coastal processes.

Land Use Bylaw:

The proposal is located partly in the Rural Residential (R-1) zone and partly in the Water 4 (W-4) zone in the Thetis Island Land Use Bylaw, 2011 (LUB). It does not comply with Sections 5.4.b), 10.1, or 10.2 of the LUB; cobble berm structures are not permitted in any part of the Water 4 zone, or less than 6.0 m from a rear lot line on the upland property, hence the need for a bylaw amendment application. **Attachment 3** contains excerpts of the applicable Sections of the LUB.

Issues and Opportunities

Professional Reports

1. Coastal Processes Report

Prepared by Northwest Hydraulic Consultants Ltd. on October 4, 2024, this report provides a summary of the coastal assessment for the subject properties, including assessment of the design water levels, design wave conditions, and the coastal processes (sediment transport) at the shorelines for the subject properties. It concludes that the eastern and southern shoreline areas are experiencing erosion due to sea waves generated during easterly storm events and is likely exacerbated by vessel-generated waves travelling along The Cut. It also determines that the existing seawall placed along the shoreline adjacent to the house provides only limited erosion protection, and a nature-based erosion protection design including beach nourishment is a suitable option to protect the house and structures at 83 Blue Heron Rd.

2. Design Basis Final Report

Prepared by Northwest Hydraulic Consultants Ltd. on October 22, 2024 and informed by the Coastal Processes Report, this report provides a summary of the design basis for the nature-based shoreline design to mitigate erosion and restore habitat on the shoreline at the subject properties and includes detailed design plans in Appendix A. The report confirms that the design working life of the proposed project is 30 years; however, nature-based designs can have a longer useful design life than a traditional seawall as they can be adjusted through adaptive management in the long-term. The design constraints listed in this report include avoiding the Penelakut Tribe's shellfish aquaculture licence area 10 metres seaward from the title boundary; avoiding sensitive archaeological sites; and the cost and availability of a large volume of beach nourishment materials.

3. Native Foreshore Plant Planting Plan

Prepared by Christine Brophy, BNRP, R.B. Tech and submitted May 16, 2025, this report includes a site description of the historic and existing habitat on the subject property; the results of a visual vegetative species survey; a proposed planting plan; a budget estimate; recommendations for installation and maintenance; and environmental protection recommendations. The recommendations in the report support planting a belt of vegetation at or above the median high-water mark, increasing biodiversity that reconnects the shoreline ecology to the upland properties.

4. Marine Shoreline Assessment Report

Prepared by Fenton and Associates Environmental Consulting between October 2023 and February 2024, this report was completed prior to the Coastal Processes, Design Basis, or Native Foreshore Planting Plan reports listed above. It contains a general overview of the project site and assesses many of the same site characteristics and processes as the other reports listed above.

Although this report contains important information about the proposed project, including a project overview, the results of marine shoreline site visits and information about site vegetation, habitat, and species at risk; some of the information contradicts and/or duplicates the analysis addressed in other reports.

5. Construction Environmental Management Plan (CEMP) Draft

A version of this document was prepared by Fenton and Associates Environmental Consulting in June 2025; the applicant has advised staff that this is a living document and will continue to be updated as the proposal progresses. This is a guidance document for all involved for the project's pre-construction, construction and post-construction monitoring phases. The CEMP intends to include best management practices from the provincial, federal, and local governments, including those listed in the Marine Shoreline Design Guide and the *Green Shores for Homes* guidelines.

Environmental Management Plan Information

Staff find that the information submitted in support of the application provides a detailed overview of the proposal; however, there appear to be gaps in information in the draft Construction Environmental Management Plan (CEMP) that should be finalized and organized prior to proceeding with the application.

Staff recommend the applicant provide a clear list of all construction/installation and maintenance recommendations and a list of all environmental protection measures, including the specific best management practices and mitigation, adaptation, and avoidance measures to be used during installation to protect any identified species at risk, sensitive ecosystems, and archaeological sites. Staff also recommend requesting from the applicant a site plan indicating where equipment will access the shoreline, and the extent of any work areas including all site access and lay-down areas for the project. If the application proceeds, the LTC may consider adopting a Section 219 restrictive covenant for the upland property that includes installation and maintenance requirements, to ensure that best management practices are followed.

Environmental Impacts of Beach Nourishment

Beach nourishment is the practice of adding large quantities of sand, gravel, or sediment to the shoreline area to combat erosion. Often referred to as a “soft armouring” technique, it is sometimes viewed as a superior alternative to hard armouring because it avoids some of the major risks associated with hard structures like seawalls. Despite being the better option of the two, the negative consequences of beach nourishment have been studied and documented as follows:

- The sudden input of massive amounts of sand and gravel can harm or kill the organisms and animals along the shoreline;
- During nourishment, the beach becomes a major construction zone. The heavy machinery used to truck in and distribute new sand and gravel may disturb wildlife and natural habitat;
- The beach nourishment may not be the same grain size or chemical makeup of the natural beach materials, changing the habitat that shoreline animals rely upon;
- The resulting loss of intertidal prey resources for wildlife such as shorebirds means these birds have to travel to another beach to find food;
- The time needed for a beach ecosystem to recover from a single beach nourishment episode is not known, even when fill sand and gravel material is the right size and type. Repeated or frequent episodes of nourishment can impede recovery of the beach community and ecosystem;
- As the ocean starts eroding the introduced sand and gravel, the water offshore can become muddy, potentially smothering marine life and changing coastal water quality.

Staff requested the applicant provide information about the potential impacts of beach nourishment on the proposed site in the short and long-term and how these impacts will be mitigated, and they provided the following response:

Short-term impacts include:

- Disturbance to shoreline habitat within the footprint of the project due to placement of new beach nourishment. The disturbance is mitigated through keeping the footprint of the project as small as is practical, and through timing the work for the period of least risk for fish habitat.
- Initial reshaping of the beach nourishment as the beach adjusts to an equilibrium profile and local wave climate. A small fraction of sediment may move outside of the permitting zone due to cross shore sediment transport during storm events. However, this process mimics natural processes of sediment transport, such as that occurring east of the project site near the spit.

Long-term impacts and benefits include:

- Stabilization of the beach and protection of the bluff, preventing erosion and loss of shoreline adjacent trees and vegetation. Long-term benefit allows for the continued occupation of the property without more invasive shoreline protection structures being built.
- Re-nourishment of the project may be required in the long-term future (30-50 years) as relative sea level rise occurs.
- Project will provide additional upper inter-tidal habitat due to placement of sand and gravel, cobble, and large boulders, thereby improving shoreline complexity and habitat features in the long-term.

Archaeological and Cultural Heritage Materials

Desktop review indicates that there are recorded archaeological sites and areas of archaeological potential near the proposed project area. The applicant has submitted an Archaeological Information Request form to the Archaeology Branch. The Design Basis Report states that the project is designed to avoid the recorded archaeological site area and the Marine Shoreline Assessment Report contains an archaeological chance find procedure. In the event that archaeological features or materials are found, either intact or disturbed on the subject properties, work should stop immediately and the Archaeology Branch should be contacted at 250-953-3334 or archaeology@gov.bc.ca.

Staff recommend the LTC requests the applicant provide information about the specific mitigation, adaptation, and avoidance measures to be used during installation to protect any identified archaeological sites. If the application proceeds, the LTC may consider including these as requirements in a Section 219 restrictive covenant.

Consultation

Statutory Requirements

Option Not to Hold Public Hearing

Section 464(2) of the *Local Government Act (LGA)* states:

464 When public hearing is required

(2) Subject to this section, a local government is not required to hold a public hearing on a proposed zoning bylaw if

- (a) an official community plan is in effect for the area that is the subject of the zoning bylaw, and*
- (b) the bylaw is consistent with the official community plan.*

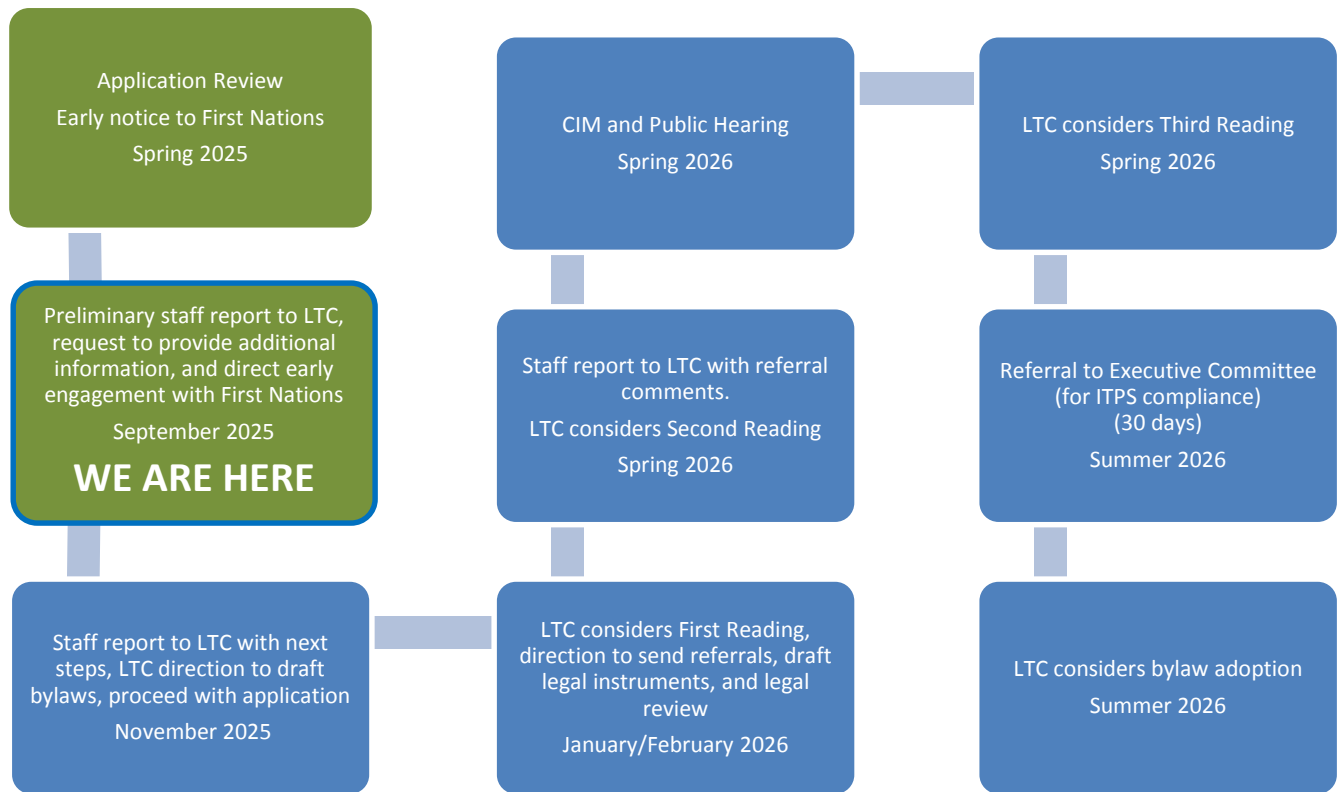
As the proposed amendment to the Thetis Island Land Use Bylaw is consistent with the Thetis Island Official Community Plan in accordance with Section 457(2) of the *LGA*, a public hearing on the proposed zoning bylaw is not required. If the LTC chooses not to hold a public hearing for this proposed zoning bylaw, notice must be given by the LTC in accordance with Section 467 of the *LGA*, after direction to draft a bylaw.

Despite the option to not hold a public hearing, staff recommend that the LTC holds one because of the scale and nature of the installation. Although the proposed project intends to mimic natural coastal processes and restore shoreline habitat over time, its scale, location, and impact during installation may warrant community input through a public hearing.

If the LTC believes that a public hearing is not an important part of this application's consideration, or that they would like to expedite consideration of the application due to strong community support and OCP consistency, the LTC should direct staff to give notice of First Reading after direction to proceed to bylaw drafting.

Timelines

The following process steps and approximate timelines may assist in managing applicant and community expectations in how the Land Use Bylaw amendment application may be processed if a public hearing is held:



The LTC should specify the format and frequency of community consultation during the draft bylaw review stage. The LTC may also specify any additional consultation requirements it wishes to be reflected in this timeline.

One piece of public correspondence in support of the proposal has been received at the time of preparing this report, and more may be received before or during the LTC meeting. Correspondence may be sent to northinfo@islandstrust.bc.ca.

Protocols

The applicant is seeking Crown intertidal lease with the province for the marine area. Section 6.2 of the *Letter of Understanding on Crown Land Administration within the Islands Trust Area* contains guidance for the detailed coordination of agency processes for LTC Amendments to Regulating Bylaws:

6.2 Amendments to Regulating Bylaws

- After First Reading and at least 20 working days prior to advertising for Public Hearing, bylaws affecting Crown lands are referred to the BC Lands Regional Director for comment.
- When BC Lands has a major concern over a proposed bylaw amendment, at least 10 days prior to advertising for Public Hearing, staff will consult directly to determine how concerns may be addressed.
- Comments received from BC Lands related to its mandate will be read out at Public Hearing.
- A certified copy of the adopted bylaw will be sent to the BC Lands Regional Director.

Agencies

Should the application proceed, staff have identified the following agencies for bylaw referral. LTC may direct staff to include additional agencies for referral:

- Ministry of Water, Land, and Resource Stewardship

- Cowichan Valley Regional District
- Ministry of Transportation and Infrastructure
- Island Health
- Gabriola Island Local Trust Committee
- Salt Spring Island Local Trust Committee
- Galiano Island Local Trust Committee

The applicant is also applying for Crown land authorization from the Ministry of Water, Land and Resource Stewardship for foreshore works, with the application timeline currently unknown.

First Nations

The project is located next to a recorded archaeological site, as well as the Pune'luxutth (Penelakut) Tribe's aquaculture licence area in The Cut. The applicant has been in contact with staff and Elders from the Penelakut Tribe about the proposed project throughout the design process and has shared the final consultant reports and designs. Staff have also reached out to Penelakut Tribe, sharing information and inviting discussion in spring 2025.

Staff shared information and invited discussion about the application with Lyackson First Nation in spring 2025 in accordance with the Lyackson First Nation/Islands Trust Council Protocol Agreement (**Attachment 12**). At the time of report writing, staff have not received responses from Lyackson First Nation or Penelakut Tribe, and will continue to reach out.

Staff recommend that the LTC defer further consideration of the application in order to provide early and meaningful opportunities for involvement, discussion of concerns, and cooperation with the following First Nations, prior to making a decision which may impact First Nations territory:

- Penelakut Tribe
- Lyackson First Nation
- Cowichan Tribes
- Halalt First Nation
- Semiahmoo First Nation
- Snuneymuxw First Nation
- Stz'uminus First Nation
- Ts'uubaa-asatx First Nation
- Tsawout First Nation

These early opportunities could include inviting First Nations to attend a site visit with the applicant, owners, and staff; and sharing project information as it is received from the applicant. The LTC may also specify any additional actions it wishes to be included in the early referral process.

Rationale for Recommendation

The recommendations on page one (1) to request additional information while proceeding with the application are supported for the following reasons:

- Meaningful engagement with First Nations should take place prior to the LTC's consideration to proceed; and
- Information gaps on environmental protection should also be resolved before proceeding.

ALTERNATIVES

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

1. Direct staff to prepare a draft bylaw

The LTC may decide to proceed with the application and bylaw drafting. Staff advise that while this would move the application forward, it would not follow the Islands Trust Council/The Lyackson First Nation Protocol Bylaw No. 64, 1999 which encourages meaningful consultative dialogue and cooperation prior to either of the parties making a decision which may impact the other party. Recommended wording for the resolution is as follows:

That the Thetis Island Local Trust Committee request staff to prepare a draft bylaw to amend the Thetis Island Land Use Bylaw No. 89, 2011 to rezone part of Lot 7 District Lot 12, Thetis Island, Cowichan District, Plan 15927 from Rural Residential – R-1 to a site-specific R-1 zone and part of the unsurveyed Crown Foreshore being part of the bed of Clam Bay, Cowichan District, containing .09 hectares, more or less, from Water 4 – W-4 to a site-specific W-4 zone, in order to proceed with application PL-RZ-2025-0072 (Welsh) to permit a nature-based shoreline protection project.

2. Deny the application

The LTC may deny the application. Staff would close the application, notify the applicant and refund them 50% of the application fees. Recommended wording for the resolution is as follows:

That the Thetis Island Local Trust Committee deny application PL-RZ-2025-0072.

NEXT STEPS

If the LTC concurs with the recommendations on page 1 of this report, staff will proceed to notify the applicant of the LTC's request for additional information and send early referral to First Nations. Staff would then prepare a staff report for the LTC's consideration to proceed at a future meeting.

Submitted By:	Margot Thomaidis, Planner 2	August 15, 2025
Concurrence:	Robert Kojima, Regional Planning Manager	August 15, 2025

ATTACHMENTS

1. Site Context
2. OCP Policies and Objectives
3. LUB Excerpts
4. Project Summary Narrative, March 26, 2025 (Fenton & Associates Environmental Consulting (FAEC))
5. Site Plans of Existing Buildings and Structures, December 2019 (Polaris Land Surveying)
6. Registered Professional Biologist Approval Letter, June 13, 2025 (Watershed Ecological Services, Ian Douglas Bruce, R.P.Bio)
7. Nature Based Erosion Protection Coastal Processes Report, October 4, 2024 (Northwest Hydraulic Consultants Ltd. (NHC))
8. Nature Based Erosion Protection Design Basis Report, October 22, 2024 (NHC)
9. Native Foreshore Plant Planting Plan, May 16, 2025 (FAEC and Christine Brophy (BNRP, R.B. Tech))
10. Marine Shoreline Assessment Report, February 25, 2024 (FAEC)
11. Draft Construction Environmental Management Plan, June 25, 2025 (FAEC)
12. Islands Trust Council/The Lyackson First Nation Protocol Bylaw No. 64, 1999

ATTACHMENT 1 – SITE CONTEXT – PL-RZ-2025-0072

LOCATION

Legal Descriptions	LOT 6, DISTRICT LOT 12, THETIS ISLAND, COWICHAN DISTRICT, PLAN 15927 AND LOT 7 DISTRICT LOT 12, THETIS ISLAND, COWICHAN DISTRICT, PLAN 15927
PIDs	Lot 6: 000-908-720; and Lot 7: 004-555-538
Civic Addresses	Lot 6: 84 Blue Heron Rd., Thetis Island, BC; and Lot 7: 83 Blue Heron Rd., Thetis Island, BC
Lot Sizes	Lot 6: 0.59 ha (1.45 acres); and Lot 7: 0.51 ha (1.27 acres)
Location	Waterfront adjacent to Lots 6 and 7, seaward up to 10 metres from the present natural boundary: 

LAND USE

Current Land Use	Residential
Surrounding Land Use	North – Residential East – Water, Altered Marine Shoreline, Estuary South – Water, Estuary, Mariculture West – Residential

POLICY/REGULATORY

Official Community Plan Designations	Rural Residential (R-1) Mariculture (M) Development Permit Area: None on subject property.
Land Use Bylaw	Rural Residential (R-1) Water 4 (W4) The applicant proposes to rezone parts of the Rural Residential (R-1) and Water 4 (W4) zones to a site-specific water zone to facilitate future installation of a Green Shores for Homes project.

Other Regulations	<i>Heritage Conservation Act</i> <i>Land Act</i> <i>Fisheries Act</i>
Covenants	Right of Way – 268742G – Hydro Easement – CA5014914 – appurtenant to Lot 7
Bylaw Enforcement	None.

SITE INFLUENCES

Islands Trust Conservancy	The proposal does not directly affect an Islands Trust Conservancy Board (ITCB) owned property or conservation covenant, nor directly affects a property adjacent to an ITC owned property or conservation covenant. Referral to ITC for comment is not required.
Regional Conservation Strategy	Appendix II of the Regional Conservation Plan 2018-2027 indicates the relative value for conservation is Medium on the subject property.
Species at Risk	Ecosystems at Risk: <i>Pseudotsuga menziesii</i> / <i>Mahonia nervosa</i> (Douglas-fir / dull Oregon-grape) Masked Species at Risk: applicant to provide project details to cdcddata@gov.bc.ca
Sensitive Ecosystems	SEM Primary Class: Freshwater (Solid Blue-Grey) SEM Secondary Class: Wetland (Diagonal Yellow) SEM Tertiary Class: Wetland (Diagonal Yellow) Sensitive Ecosystem Mapping indicates a wetland ecosystem (Solid Yellow). 
Hazard Areas	None mapped.
Archaeological Sites	Remote Access to Archaeological Data (RAAD) mapping indicates an archaeological site and archaeological potential on the subject properties and in the marine area. The applicant has submitted an Archaeological Information Request to the BC Archaeology Branch. They strongly recommended engaging an eligible consulting archaeologist prior to any land-altering activities.
Climate Change Adaptation and Mitigation	Greenhouse Gas Emissions can be expected to be commensurate with the levels associated with single family residential development patterns and use. Delivery of beach nourishment, gravel, and cobble berm materials is

	expected to require multiple trips by large delivery trucks, increasing greenhouse gas emissions. Consultant's (NHS) report indicates the possibility for coastal flooding and erosion on areas of the property at 83 Blue Heron Rd. as sea levels rise.
Shoreline Classification	Estuary, Altered Marine Shoreline, and Pebble Sand/Beach
Shoreline Data in TAPIS	Eelgrass meadows and forage fish potential spawning habitat are mapped in the marine area adjacent to the subject property: 

ATTACHMENT 2 – OCP POLICY REVIEW – PL-RZ-2025-0072

THETIS ISLAND OFFICIAL COMMUNITY PLAN BYLAW No. 88

	Does Not Comply		Unclear Whether Policy Met		Complies
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OCP Criteria, Objectives, Policies	Complies?	Planner Comments
Section 2: LAND USE AND DEVELOPMENT CRITERIA <i>The general policies and land use categories for the Thetis Island planning area were determined on the basis of the following criteria. These same criteria shall be considered paramount in the review and revision of the land use regulatory bylaws of any part or parcel of the planning area.</i>		See comments for each Criteria below.
2.A The preservation of a tranquil rural environment.		While the project supports the preservation of a tranquil coastal environment by restoring shoreline habitat, the project may cause temporary impact during delivery and installation of large volumes of cobble stones and beach nourishment materials. Further information may be required to fully assess environmental impacts, emphasizing the need for detailed environmental studies and recommendations to mitigate impact during construction.
2.B The existing and surrounding land use.		A <i>Green Shores for Homes</i> Pilot Project may have a positive impact on the existing residential land use by reducing erosion and increasing habitat diversity over time.
2.C. The soil conditions with special regard to: a) stability b) susceptibility to ponding c) drainage d) slope and topography e) fertility and suitability for farming, small holdings, and horticulture.		A Nature Based Erosion Protection Coastal Processes Report was prepared by Northwest Hydraulic Consultants Ltd. on October 4, 2024, and addresses coastal sediment transport, shoreline bank stability, drainage, slope and topography. It determines that a nature-based shoreline protection installation and beach nourishment is the appropriate

		intervention to reduce erosion and restore shoreline habitat.
<i>2.D. The availability of adequate potable groundwater.</i>		The proposed project would not increase groundwater use.
<i>2.E. The ability of the soil to absorb sewage treated by septic tank and field without danger of contaminating groundwater.</i>		The proposed project would reduce the erosion of soil from the upland property.
<i>2.F. The protection of reasonable privacy for residents and property owners.</i>		The proposed project may impact privacy for the residents of 83 and 84 Blue Heron Rd. by increasing accessibility from the beach to the upland properties.
<i>2.G. The provision of access to beaches and other natural features for residents and visitors.</i>		While the project will alter the topography of the shoreline, it will continue to allow for beach access to and along the foreshore and increase natural habitat in the shoreline area over time. The proposed cobble berms are not expected to impact public beach access. Applicant is concurrently applying for Crown authorization for installation on the foreshore.
<i>2.H. The protection of sensitive ecosystems and the preservation of the landscape from visual degradation.</i>		The project is expected to visually enhance the shoreline through replanting over time, in accordance with the Native Foreshore Plant Planting Plan. The project includes measures to mitigate environmental impacts; however, further environmental protection measures and monitoring are needed to ensure full compliance with this objective.
<i>2.1.3. To retain the rural character, protect indigenous flora and fauna, and protect sensitive ecosystems in residential areas.</i>		While the project supports protecting indigenous flora and fauna, and sensitive ecosystems, additional measures are needed to ensure minimal disruption during installation.
<i>2.1.4. To guide and regulate growth and development in a manner that protects sensitive ecosystems, encourages sustainability, and anticipates the potential effects of climate change.</i>		Nature-based shoreline protection is consistent with this policy.
<i>2.1.5. To manage development in a manner that avoids natural hazards and minimizes risks and damage to private property and the environment.</i>		While the proposed project supports this policy and avoids natural hazards and minimizes risks and damage to private property, additional measures

		are needed to ensure minimal damage to the environment during installation.
Policy 2.4.4. LANDSCAPE, OUTDOOR RECREATION AND PARKS POLICIES <i>Public access to the Crown land foreshore should remain unobstructed and the right to pass around shoreline structures, as provided for in Crown land foreshore tenures, should be observed.</i>		Applicant has concurrently applied for a Crown land foreshore authorization. The proposed berm structures and beach nourishment would be located in the foreshore, however public access to and along the foreshore would remain unobstructed.
<i>4.1.2. To identify and protect environmentally sensitive areas or features.</i>		While substantial information has been provided, ongoing assessments and reports may be required to ensure fully informed decision-making.
<i>4.1.5. To protect marine life and foreshore habitat.</i>		
<i>4.1.6. To protect the natural diversity of flora and fauna.</i>		
<u><i>Sensitive Ecosystem Policies</i></u> <i>4.1.2. Natural features and areas identified as environmentally sensitive to development may be protected by land use regulation and may be regulated by Development Permit.</i>		Further information may be required to address environmental impacts, emphasizing the need for detailed environmental protection measures and a final construction environmental management plan.
<i>4.1.3. Development detrimental to sensitive ecosystems and areas is not to be allowed.</i>		
<u><i>Marine and Coastal Resources Policies</i></u> <i>4.1.13. Foreshore and adjacent coastal water area land use regulations should place emphasis on retaining natural characteristics.</i>		While the project seeks to retain natural characteristics and improve natural shoreline habitat, care must be taken to minimize any environmental impacts that may occur during installation.
<i>4.1.14. Public access and the right to recreational use of the foreshore should be supported and protected, and such access and use should respect the interests of adjacent residents and tenure holders.</i>		Public access and the right to recreational use of the foreshore would be supported and protected by this proposal. The proposed berm structures and beach nourishment would be located in the foreshore, however public access to and along the foreshore would remain unobstructed. Staff have reached out to the Penelakut Tribe regarding their

		interests, as the proposal is adjacent to their aquaculture licence tenure in The Cut. At the time of report publishing, no response has been received.
<i>4.1.15. The integrity of foreshore features, shoreline features, and intertidal processes may be maintained by:</i> <i>a) Discouraging uses that disrupt natural features and processes and encouraging owners of shoreline properties to retain, wherever possible, natural vegetation and natural features on areas sloping towards the foreshore.</i>		The proposed installation discourages uses that disrupt natural features and processes. The design retains natural vegetation and features in the foreshore wherever possible.
<i>b) Supporting the prohibition of filling, deposit, excavation, or removal of foreshore and seabed materials, excepting maintenance of navigational channels and existing wharfage areas.</i>		Beach nourishment (sand and gravel) materials and cobble structures will be used to fill in the foreshore area, mimicking the existing foreshore ecosystem while raising the elevation of the foreshore from approximately 1.0 m to 3.0 m.
<i>c) Land use regulations should provide for upland waterfront developments to be setback sufficiently to allow for natural erosion and accretion processes, without endangering structures.</i>		While substantial information has been provided about the proposal, additional environmental protection measures are required to ensure fully informed decision-making.
<i>d) Where land use regulations provide for private docks, the use of communal docks is to be encouraged where feasible and breakwaters are to be prohibited.</i>		
<i>4.1.16. A marine conservation zone may be established, with adjacent upland owner consent, over foreshore and adjacent water areas in order to afford protection to specific foreshore and marine features.</i>		The proposal is located in part of the Water 4 zone, not the marine conservation zone.
<u>Advocacy Policy</u> <i>4.1.18. The Integrated Land Management Bureau shall be encouraged to continue the practice of respecting land use regulations of local government when authorizing uses of the foreshore and adjacent marine waters.</i>		Applicant has concurrently applied for a Crown land foreshore authorization.
<u>Wildlife and Vegetation Resource Policy</u> 4.1.19. <i>Residents and property owners are encouraged to retain areas of land and water in their natural state to ensure sufficient natural habitat is retained for maintenance of wildlife and bird populations or retention of rare or significant vegetation. Invasive</i>		The proposal's nature-based approach intends to improve the natural habitat of the foreshore for maintenance of wildlife and bird populations and retention of native vegetation and trees where possible.

<i>plants should be controlled through ecologically sensitive techniques.</i>		English Holly, Bull Thistle, English Ivy, and Himalayan Blackberry were found on the site area and are planned for careful removal before project installation.
<i><u>Wildlife and Vegetation Resource Advocacy Policy</u> 20. The Ministry of Environment is encouraged to assist interested landowners and the Thetis Island Local Trust Committee in furthering detailed identification and location of rare or endangered fauna and flora on the Island and to offer assistance in their protection</i>		Referral to the Ministry of Environment may support this advocacy policy. The Thetis Island Nature Conservancy has been monitoring the adjacent lagoon/salt marsh area for rare or endangered species.
<i>4.4.2. To protect archaeological sites from damage due to development, land alteration or human use.</i>		The project includes measures to mitigate archaeological impacts, such as avoiding ground disturbance in known/recorded archaeological site areas; however, further environmental management plans and monitoring are needed to ensure full compliance with this objective.
<i>4.4.3. The Local Trust Committee should, in cooperation with first nations and relevant agencies, develop improved methods of determining and assessing impacts on potential archaeological sites, or other first nations cultural sites, when it is considering land use applications and referrals.</i>		The applicant has engaged with staff and elders from Penelakut Tribe about avoiding impacts to archaeological sites and using traditional ecological knowledge to inform rehabilitation of the project area. Staff recommend early engagement with Penelakut Tribe and Lyackson First Nation.
<i>4.4.5. The use of voluntary conservation covenants to protect heritage resources should be encouraged.</i>		Staff recommend early engagement with Penelakut Tribe and Lyackson First Nation regarding protecting the existing heritage resources on the property.
<i>5.1. To give consideration to the impacts of climate change in all land use decisions;</i>		The Coastal Processes Report predicts increased sea level rise and ocean influence as a result of climate change, noting that the proposed nature-based designs would address the immediate impacts to buildings and structures and require monitoring over time.
<i>5.3. To support actions in land use, site planning, and construction that reduce greenhouse gas emissions;</i>		The proposed installation would require approximately 40-50 truckloads of materials to be delivered to the site from off-island, increasing greenhouse gas emissions.

PART 2. GENERAL REGULATIONS

ATTACHMENT 3

2.1. USES OF LAND, BUILDINGS AND STRUCTURES

- 2.1.1. Utility poles, wires, traffic controls and underground utility systems are permitted in all *zones*
- 2.1.2. Public shellfish reserves, are permitted in all of the water *zones* established by this Bylaw.
- 2.1.3. Without limiting the generality of Section 1.2.1 of this Bylaw, the following uses are prohibited in all *zones*:
 - a) campground;
 - b) disposal of waste that originates off Thetis Island;
 - c) the use of land for the wrecking or storage of derelict vehicles;
 - d) the use of a water area for the moorage or wharfage of *float homes*; and
 - e) the sale of or rental of *motorized personal watercraft*
- 2.1.4. A *dwelling unit* may contain a commercial kitchen in support of a *home occupation* in addition to the home kitchen if it is permitted under the *Food Premises Regulation* of the *Public Health Act*.

2.2. GENERAL SETBACK AND HEIGHT REGULATIONS

- 2.2.1. Chimneys, sills, bay-windows and ornamental architectural features projecting beyond the face of a *building* may project up to 0.6 metres into a required setback area.
- 2.2.2. Steps, eaves, awnings, canopies, balconies, decks or porches projecting beyond the face of a building, may project up to 0.6 metres into a required side setback area and 1.8 metres into any other setback area.
- 2.2.3. *Cisterns* and *buildings* or *structures* for the sole purpose of housing cisterns may project into the setback area up to one half of the setback distance for structures in the zone.
- 2.2.4. Fences, free-standing lighting poles, warning devices, antennas, masts, utility poles, wires, flagpoles, signs and sign structures may be sited on any portion of a *lot*.
- 2.2.5. The height regulations for *buildings* and *structures* specified in this Bylaw do not apply to radio and television antennas; fire hose towers; 9-1-1 system repeater towers, flag poles, and lighting poles.
- 2.2.6. No *building* other than a boathouse or pumphouse may be constructed:
 - a) within 7.6 metres of the *natural boundary* of the sea; or
 - b) within 30.5 metres of the *natural boundary* of any other natural watercourse or source of water supply.
- 2.2.7. All distances pertaining to the siting of *buildings* and *structures* shall be determined by measurements on a horizontal plane, excepting those pertaining to elevation which shall be on a vertical plane.

2.3. REGULATIONS FOR HOME OCCUPATION USE

Basic Home Occupations

- 2.3.1. Where permitted, in the R1 zone, a *home occupation* use is subject to the following regulations:
 - a) Must be operated by a resident of the *dwelling unit* to which the *home occupation* use is

PART 5. RESIDENTIAL ZONES

5.1. Permitted Uses	R-1	R-2
The following uses and no others are permitted in the <i>zones</i> indicated by checkmarks in the column to the right.		
Principal Uses		
a) residential	✓	✓
Accessory Uses		
b) <i>home occupation</i> ;	✓	✓
c) the keeping of livestock and poultry for the personal use of the owner;	✓	
d) <i>agriculture</i> ; and		✓
e) <i>guest cottages</i> on 0.8 hectares or more provided that, in the R1 zone on lots less than 1.6 hectares, the guest cottage is only used on an occasional basis meaning that the accommodation is not used as a residence.	✓	✓
5.2. Permitted Buildings and Structures	R-1	R-2
The following <i>buildings</i> and structures and no others are permitted in the <i>zones</i> indicated by checkmarks in the columns to the right:		
a) <i>Buildings</i> and <i>structures</i> for a permitted use; and	✓	✓
b) <i>Buildings</i> and <i>structures</i> accessory to a permitted use.	✓	✓
5.3. Density of Uses, Buildings and Structures	R-1	R-2
a) Maximum number of single family <i>dwelling units</i> per <i>lot</i>	1	n/a
b) Maximum number of <i>guest cottages</i> per <i>lot</i>	1	n/a
c) In the R-2 zone, only one <i>dwelling unit</i> is permitted on <i>lots</i> having an area of less than 8.0 hectares.		
d) In the R-2 zone on <i>lots</i> having an area of 8.0 hectares or more, one <i>dwelling unit</i> other than a <i>guest cottage</i> is permitted in respect to each full 4.0 hectares of <i>lot</i> area if the owner grants a covenant prohibiting subdivision of the <i>lot</i> . If the owner does not provide a covenant prohibiting subdivision of the <i>lot</i> , the maximum number of <i>dwelling units</i> is one.		
e) In the R-2 zone one <i>guest cottage</i> is permitted on <i>lots</i> having an area of between 0.8 and 8.0 hectares.		
f) In the R-2 zone on <i>lots</i> having an area of 8.0 hectares or more one <i>guest cottage</i> is permitted in respect of every <i>dwelling unit</i> permitted under article 5.1.3 (d).		
g) Maximum combined <i>lot coverage</i> of <i>buildings</i> and <i>structure</i>	35%	10%
5.4. Height, Setbacks, and Siting of Buildings, Structures and Uses	R-1	R-2
a) Maximum <i>height</i> of all <i>buildings</i> and <i>structures</i>	11.0 m	11.0 m
b) Minimum setback of <i>buildings</i> or <i>structures</i>		
• From the <i>front lot line</i> ;	7.5 m	7.5 m
• From an <i>interior side lot line</i> ;	3.0 m	3.0m
• From an <i>exterior side lot line</i> ; and	4.5m	4.5m
• From a <i>rear lot line</i> .	6.0m	6.0 m

PART 9. MARINE CONSERVATION ZONE

9.1. Permitted Uses

In the M-1 zone the use of land is restricted to ecological reserves, research and educational activities and marine navigational aids and no *buildings* or *structures* other than marine navigational aids are permitted.

PART 10. WATER ZONES

10.1. Permitted Uses

	W-1	W-2	W-3	W-4	W-5
The following uses and no others are permitted in the <i>zones</i> indicated by checkmarks in the columns to the right:					
a) marinas including boat sales, boat or vessel rentals excluding charters;	✓				
b) marine fuel sales	✓				
c) commercial boat, vessel or float plane <i>anchorage</i> and <i>wharfage</i>	✓				
d) non-commercial boat or vessel <i>anchorage</i>		✓	✓	✓	
e) non-commercial boat or vessel <i>wharfage</i>		✓	✓		✓
f) bottom culture mariculture.					✓
g) docks, which in the W-2, W-4 and W-5 zones must be accessory to the residential use of an abutting upland lot and may include gear lockers;	✓	✓		✓	✓
h) boat ramps, except on that portion of the W-4 zone lying between Water Lots 294 and 302 within 152.5 metres of the natural boundary of the sea, as shown in the shaded area of Map 2 below, known locally as Preedy Harbour;		✓		✓	
i) <i>swimming floats</i> ;			✓	✓	✓
j) stairways and walkways accessory to the residential use of an abutting upland <i>lot</i> ;			✓		✓
k) Public docks and ferry slips only on that portion of the W-4 zone lying between Water Lots 294 and 302 within 152.5 metres of the natural boundary of the sea, as shown in the shaded area of Map 2 below, known locally as Preedy Harbour				✓	
l) <i>floating breakwater</i>	✓	✓			

INFORMATION NOTE: Any structure or on the foreshore (ie below the high water mark which is the line between private property and Crown land), mariculture use requires a lease from the Integrated Land Management Bureau.

10.2. Permitted Buildings and Structures

	W-1	W-2	W-3	W-4	W-5
The following <i>buildings</i> and <i>structures</i> and no others are permitted in the <i>zones</i> indicated by checkmarks in the columns to the right:					
a) <i>Buildings</i> and <i>structures</i> for a permitted use; and	✓	✓	✓	✓	✓
b) <i>Buildings</i> and <i>structures</i> accessory to a permitted use.	✓	✓	✓	✓	✓

The Project Summary Narrative: Welsh GSH Project, Thetis Island. Mar 26, 2025.

Created by: Completed by Doug Fenton, EP at FAEC. Thetis Island, BC

1. The existing uses of the land, buildings, and structures on the subject property/in the marine area are for residential use only as the owners of upland property/s and public accessible in the shared common space seaward of the NB (natural boundary) to the 10m mark, which then respects the PT (Penelakut Tribe's) aquaculture permit-the same use for Lot 84, as a rental property.
2. The proposed uses of the land, buildings, and structures on the subject property/in the marine area of the upland properties are unchanged. However, there would be an "integrated" NBSP (Nature-based Shoreline Protection) structure consisting of layers of sand, cobbles, and boulders (per NHC's (Northwest Hydraulic Consultants) NBSP design plan.
3. The existing uses of the land/marine area and buildings on adjacent properties residential properties (R1), an estuary part of the Hollyberry Lane residential development to the N of Lot 84 and W of Lot 83, are residential lots.
4. The proposed timing of the development or commencement of use in the marine area (i.e., seaward of the NB to 10m further) is Aug 2025 to meet the DFO timing window of Jun-Sept 1, 2025. However, the planting phase would start 1-2 tidal cycles after the completion of construction and the risk of drought has passed, in late Sept-mid Oct 2025.
 - The Crown Land expedited permit application has been submitted with an Aug 2025 construction.
 - The application has been accepted by FCBC and forwarded to Crown Lands for their review process, which is currently underway.
5. The main reasons/rationale in support of the bylaw amendment(s) are:
 - The owners purchased in 2016/17 and quickly became concerned about the erosion along the shoreline, esp. during the winter storms. Active erosion (receding upland banks and heavily silted waters) occurred along the E shoreline.
 - In the fall of 2023, FAEC (Fenton & Assoc. Environmental Consulting) was hired to complete a MSAR (Marine Shoreline Assessment Report) that considered a GSH-like approach as well as a RAAD Overview Report to identify any local FN's cultural issues. FAEC saw it as an opportunity for Indigenous reconciliation. The MSAR identified active erosion on the E shoreline (p3) and 1960's vintage hard armour on the S shoreline (p27). These properties (esp. lot 83) suffer from severe degradation and disconnection of the foreshore and upland properties from decades of human activities (see MSAR FAEC. Mar 2024).
 - FAEC worked with the landowners, consulted with SCBC (Stewardship Centre for BC) to find a coastal engineer and hired a NHC to complete a Coastal Processes Report that confirmed that these concerns were valid and using modelling and flood data, added flooding along the S shoreline would become an issue over time. FAEC worked collaboratively with the owners and NHC to design an NBSP to mitigate the problems identified.
 - The crucial element of the design is at the NB, and the upland portion of the design area has been designed to be above HHWM (High High Water Mark), thereby moving the wave energy away from the bank. The reconnection begins here by incorporating LWD (large woody debris) and native plants to reconnect the current upland properties suffering from decades of human development; it no longer nourishes the foreshore areas.

6. Briefly report on any consultation/engagement you have already undertaken, with residents, community groups, agencies, and First Nations, etc. Particularly with Lyackson and Penelakut.
 - ThINC (Thetis Island Nature Conservancy) – discussions with this NGO as the local conservation org, they have expressed interest in collaborating on-site before/after site tours;
 - SCBC – Green Shores program – due the landowners’ desire to be able to consider a GSH certification, we brought the GSH Project Manager into the discussion and has been to the site and advise the project to ensure that it would meet the GSH certification process;
 - Penelakut Tribe – provided ongoing updates and sharing of project info with PT business unit; no site visits yet;
 - Site visits by elder and knowledge holders and ongoing collaboration on the NHC’s NBSP design using the VECs (valued ecological components) identified in the assessments in an iterative and evolve over time. By using traditional knowledge/traditional ecological knowledge (TK/TEK), we Identified what the native plants were and how they fit into the landscape and marine shoreline ecologist who created an NFPPP (Native Foreshore Plant Planting Plan), who live and breathe TK/TEK to support the restoration of this shoreline. I.e., Indigenous-led restoration to reconnect upland and foreshore areas;
 - FN engagement has focused on the primary FN community, PT, as the province’s referral process will be reaching out to all the FN listed on their mapping system.
 - Neighbouring properties – will be engaged by email and phone. Some locals are aware/involved through other links to the project, i.e., pending GSH tours.
7. A summarized list of all other materials, assessments, technical reports, studies, and plans/designs submitted in support of your application, including the types of reports, who prepared them, and the date they were prepared.

- BC Contaminated Sites Regulation Site Disclosure Statement (Schedule 1) FAEC Dec 2024;

The following docs/reports have been created to satisfy the province’s expedited NBSP permit application process:

- **Construction Design Plan** – TINEP-DBR. NHC. Oct 2024;
- **Construction profile view Plan** – TINEP-DBR NHC. Oct 2024;
- **Draft CEMP_Welsh GSH Project.** FAEC 2024 -25. (Construction Environmental Management Plan);
- **Indigenous Engagement log** FAEC. Jan 2024-Jan 2025;
- **Lots 83 & 84 Existing Site Plan.**NHC.Oct2024;
- The creation of **Exiting Vegetation and Critical or Sensitive habitat Map/plan** - Lots 83 & 84, - an IE (Indigenous engagement) exercise Thetis.TINBEP-DBR.NBC/FAEC.Oct222024;
- **Marine Shoreline Assessment Report** (MSAR) FAEC.Mar 2024;
- **Native Foreshore Plant Planting Plan** (NFPPP). FAEC Associate. Dec 2024 – An existing plant assessment and ecological restoration strategy to restore the plant biodiversity as the foundation of the long-term marine foreshore recovery and stabilization strategy;
- **Surveys** – 1735-001-SK01R0 Lot 6, 1735-001-SK01R0 Lot 7, 1735-001-SK01R0 Lot 8, 1735-001-SK01R0 Lot 9;
- **Title searches** for Lots 83 &84;
- **Thetis Island Nature Based Erosion Protection - Coastal Processes Report** (NHC. Oct 2024) - “This document provides a summary of the coastal assessment for the property at 83 & 84 Blue Heron Rd, including assessment of the design wave conditions, and the coastal processes (sediment transport) at the shorelines for these properties.”
- **Thetis Island Nature Based Erosion Protection - Design Basis Report (TINBEP-DBR)** (NHC/FAEC. Oct 2024) - “This document provides a summary of the design basis for the nature-based shoreline design to mitigate erosion and restore habitat on the shoreline at the property 83 & 84 Blue Heron Rd. Plans found on p16-19;
- **Welsh GSH Project – Acronyms-Abbreviation**_FAEC.2024;
- **Welsh GSH Native Foreshore Plant Planting Plan.** FAEC Dec 2024; and
- **Welsh GSH CEMP** – FAEC Oct 2024.

SKETCH PLAN OF
LOT 6 DISTRICT LOT 12
THETIS ISLAND, PLAN VIP15927
COWICHAN DISTRICT

PID: 000-908-720



All distances are in metres and decimals thereof, unless otherwise noted.

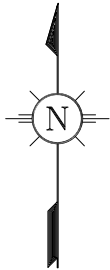
The intended plot size of this plan is 560mm in width by 432mm in height (C size landscape) when plotted at a scale of 1 : 250.

LOT 5
 PLAN
 VIP15927

164 + 91 = 255m²

ATTACHMENT 5

SLOUGH



BLUE HERON ROAD

EASEMENT
 PLAN EP53415

UTILITY
 POLE
 ANCHOR

NOTES:

See document 268742G, for BC Hydro and Power Authority blanket Right of Way.

See document CA5014914, for Easement.

This plan was prepared for design purposes and is for the exclusive use of our client.

This document shows the relative location of the surveyed structures and features with respect to the boundaries of the parcel described hereon. This document shall not be used to define property lines or property corners.

Property boundary dimensions are shown from Plan VIP15927.

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LOT 7
 PLAN
 VIP15927

OVERHEAD LINE

UTILITY
 POLE
 ANCHOR

TITLED
 NATURAL BOUNDARY
 FROM PLAN
 VIP15927



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 P.O. Box 21005
 Duncan, BC, V9L 0C2
 Toll Free: 1-877-603-7398
 Email: info@plsi.ca
 File: 1735-001
 Drawing: 1735-001-SK01R0-LOT 6
 Date: DECEMBER 17TH, 2019

This sketch lies within the Cowichan Valley Regional District.

The field survey represented by this sketch was completed on the 10th day of December, 2019.

Brent Taylor, BCLS 642.

SKETCH PLAN OF
LOT 7 DISTRICT LOT 12
THE ISLAND, PLAN VIP15927
COWICHAN DISTRICT

PID: 004-555-538

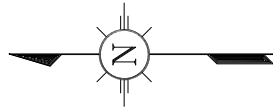


All distances are in metres and decimals thereof, unless otherwise noted.

The intended plot size of this plan is 560mm in width by 432mm in height (C size landscape) when plotted at a scale of 1 : 250.

LEGEND

- denotes standard iron post found
- ▲ denotes traverse hub found
- △ denotes traverse hub found
- Fd denotes found
- IP denotes iron post
- PI denotes placed
- TH denotes traverse hub



NOTES:

Grid bearings are derived from Plan EPP53415.
See document 288742G, for BC Hydro and Power Authority blanket Right of Way.
This plan was prepared for design purposes and is for the exclusive use of our client.

This document shows the relative location of the surveyed structures and features with respect to the boundaries of the parcel described hereon. This document shall not be used to define property lines or property corners.

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Drawing: 1735-001-SK01R0-LOT 7
Date: DECEMBER 17TH, 2019

Land Surveying Inc.

BLUE HERON ROAD

EASEMENT
PLAN EPP53415

UTILITY
POLE

ANCHOR

LOT 6
PLAN
VIP15927

OVERHEAD LINE

LOT 7
PLAN
VIP15927

UTILITY
POLE

ANCHOR

POND

SLOUGH

Existing
Septic_
est. 2022

APPROXIMATE
SEPTIC FIELD

MULTI-PURPOSE
ACCESSORY
BUILDING

GRAVEL
SPACE
ACCESS

PORTICO

DWELLING

DECK

CONCRETE
STAIRS

GARDEN

PARKING
AREA

CLAM BAY

+ 108m2 =

CENTRE LINE
2.5m WIDE
DRIVEWAY

Fd IP HAS BEEN
MOVED FROM
ORIGINAL
LOCATION

Fd IP
CALCULATES
TO BE
WITHIN
± 0.05
OF BOUNDARY

7.84

4.55

1.61

3.6

7.84

52.59 (Fd IP to Fd IP)

0° 34' 20" (PI TH to Fd TH)

53.74

18.50

27.73

44.3±

7.84

5.52

11.86

1.81

7.46

5.70

1.27

7.85

3.24

7.42

4.05

0.80

2.20

0.68

3.76

3.71

3.66

6.07

3.70

5.24

7.5±

TITLED
NATURAL BOUNDARY
FROM PLAN
VIP15927

CLAM BAY

This sketch lies within the
Cowichan Valley Regional District.

The field survey represented by this sketch
was completed on the 10th day of December, 2019.

Brent Taylor, BCL S 642.

ATTACHMENT 6

June 13, 2025.

To: Islands Trust, North Office Staff & Biologist.

Re: Welsh GSH/NBSP Project, Lots 83 & 84 at 83 and 84 Blue Heron Rd., Thetis Island, BC - RPBio approval sign off for a NBSP project in the foreshore areas of these adjoining properties as part of a Thetis LTC bylaw amendment process.

As the RPBio associate working with Doug Fenton and FAEC on this project since 2023, I have reviewed the following documents pertinent to the project:

FAEC (Fenton & Associates Environmental Consulting) MSAR, Mar. 2024;
FAEC NFPPP (Native Foreshore Plant Planting Plan), May 2025;
NHC (Northwest Hydraulic Consultants) DBR (Design Basis Report), Oct 2024[.]
"Draft_CEMP_Welsh GSH project_Lots 83n84_2024n26_live draft.FAEC.May292025"

The NHC – Nature Based Shoreline Protection design to be installed into the foreshore and at the 'natural boundary' intends to support the failing bank while protecting beach habitat and infrastructure, including buildings. This design has been enhanced by FAEC and their associates by augmenting NHC's 'inert materials design' with Green Shores principles using living material to re-connect the shoreline to the upland properties.

The Draft CEMP will evolve as a 'living' document as the project moves through the subsequent regulatory steps and a contractor is hired. This concept is regularly used in Restoration Practice as it allows for the best environmental outcomes as the project moves through overall approval process. It is understood that all applicable laws and statutes will be adhered to and the site monitored during and after the project for several years.

I understand that this project is going through the NBSP expedited permit with the province (Crown Lands), DFO, and TC (Transport Canada). They will have their own questions/comments/ concerns which will be shared with Islands Trust staff as they are responded to.

Watershed Ecological Services Ltd.

#11-2353 Harbour Road
Sidney BC, V8L 3X8
250-888-2191



The Welsh Shoreline Project is an excellent example of the application of Green Shores to historical problems at the natural boundary. In my decades of experience with similar shoreline issues, the vast majority of the responses have been 'hard armouring'. Although always designed as 'landward' of the natural boundary, in many cases these structures have 'crept' seaward during construction, with no penalty or redress. Partially this has to do with cost – a seawall/boulder stack is generally less expensive; and expediency - quicker to install. But seawalls have been proven to be temporary, unsightly and pejorative to marine ecology, including interrupting beach sediment recruitment, refractive energy erosion, impairment of important riparian habitat contributions to ecology such as bank stabilization, shading for forage fish and contribution of terrestrial insects to foraging juvenile salmon, etc.

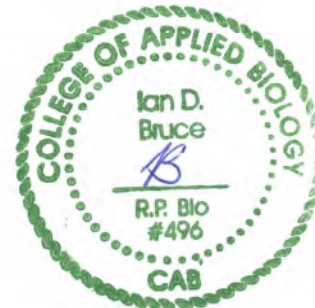
Given the above, it is my personal and professional opinion that the Islands Trust not only embrace this project by amending your its site specific bylaw. In doing so, it will provide an environmentally responsible example to Islands' residents of how similar issues throughout the Gulf Islands should be addressed. Alternatively, you could consider reducing barriers for others by introducing this approach as an Islands Trust-wide bylaw for all to consider.

Please get in touch with the undersigned if you have any questions or concerns.

Respectfully,

A handwritten signature in blue ink that reads "Ian Bruce".

Ian Douglas Bruce, R.P.Bio.#496, QEP
Dip. Restoration of Natural Systems
President, Watershed Ecological Services Ltd.





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Tel: (604) 980-6011
www.nhcweb.com

NHC Reference 3008882
October 4, 2024

Robert Welsh



Attention: Robert Welsh

Copy to: Doug Fenton

Via email: 
doug@fentonconsulting.ca

ATTACHMENT 7

**Re: Thetis Island Nature Based Erosion Protection
Coastal Processes Final Report, Rev. 1**

Dear Mr. Welsh:

This document provides a summary of the coastal assessment for the property at 83 and 84 Blue Heron Rd, including assessment of the design water levels, design wave conditions, and the coastal processes (sediment transport) at the shorelines for these properties.

1 Introduction

The properties at 83 and 84 Blue Heron Rd are experiencing erosion of the shoreline causing impact to existing structures including a concrete seawall and access stairs. NHC has been retained to complete a nature-based design to mitigate erosion and restore habitat on the beach at the property. NHC is working collaboratively with the Environmental Professional (EP), Fenton & Associates Environmental Consulting (FAEC), who is completing the expedited permit process. NHC is supporting the permit process by completing the coastal engineering reporting and design for the Green Shores for Homes (GSH) project.

The project site is located on Thetis Island to the west of Clam Bay as shown in Figure 1.1. Thetis Island is in the Gulf Islands between Trincomali Channel and Stuart Channel. The project location is relatively sheltered from the Strait of Georgia by Galiano Island and Valdes Island. There is a dredged channel called *The Cut* to the south of the property that connects Clam Bay to the west side of Thetis Island that is frequently used by small vessels.

This report summarises the coastal processes assessment completed to support the shoreline protection design for this project and includes:

- A summary of observations from the site visit (Section 2) completed on March 12, 2024 by NHC (Grant Lamont and Laura Ramsden);

- Analysis of water levels including statistical examination of joint probability of high tides and storm surges (Section 3.1);
- Analysis of wind-wave conditions at the project site from storms and vessel wake energy from nearby boat traffic (Section 3.2 and 3.3);
- Qualitative assessment of coastal sediment transport pathways and erosion potential (Section 4); and,
- An assessment of the suitability of the site for nature-based design.



Figure 1.1 Site location.

2 Site Visit

A site visit was completed on March 12, 2024 by NHC (Grant Lamont and Laura Ramsden) coinciding with the mid-day low tide (1.2 m above Chart Datum). The purpose of the site visit was to observe the property, the surrounding shoreline, and geomorphological features and beach characteristics. In addition, a drone survey was completed to capture orthoimagery and obtain elevations for the beach as shown in Figure 2.1 and Figure 2.2, respectively. During the site visit the project was discussed with the property owner and Doug Fenton (EP at FAEC). The following observations were made:

- The property is located on a low coastal bluff with a crest elevation between approximately 4.8 to 6.5 m CGVD2013; the elevation of the deck is approximately 5.4 m CGVD2013, or 3.6 m above Higher High Water Large Tide (HHWLT). The elevation of the concrete pad on the southeast corner of the property is approximately 4.8 m CGVD2013, or 3.0 m above HHWLT. (Photo 2.1)
- The property is located to the north of the dredged channel called The Cut. The sand and gravel removed from the dredge channel was deposited on the north and south banks of the channel. The shoreline of the property is exposed to wave action from vessel traffic travelling in the easterly and westerly directions. (Figure 2.1, Figure 2.2, Photo 2.2)
- The property is located to the southwest of a small lagoon. The lagoon is bounded by a sand spit extending from the northeast to the southwest. The lagoon outlet is located at the northeast boundary of the property. (Figure 2.1, Photo 2.3)
- There are small rocks (approximately 0.3 m) underneath the vegetation on the shoreline to the west of the stairs (Photo 2.4).
- There is a low concrete seawall located south of the house with concrete stairs serving as beach access (Photo 2.4, Photo 2.5).
- Large rocks are scattered along the shoreline from the eastern end of the concrete wall (Photo 2.4) around the point to approximately the location shown in Photo 2.8. The upper beach transitions from gravel and cobble to sand and gravel at this location. Large woody debris was present at the top of the beach at the time of the site visit.
- The existing upper beach slope is approximately 9H:1V. The lower intertidal primarily consists of fine sand and is relatively flat with a slope of approximately 120H:1V.
- Erosion of the bank was observed from approximately Photo 2.8 to Photo 2.10. The base of the bluff is being undercut by wave action during high water level events. The bluff appears to be composed of silty sand material, based on visual observations.



Figure 2.1 Drone orthoimagery captured by NHC on March 12, 2024 in the vicinity of the project location.

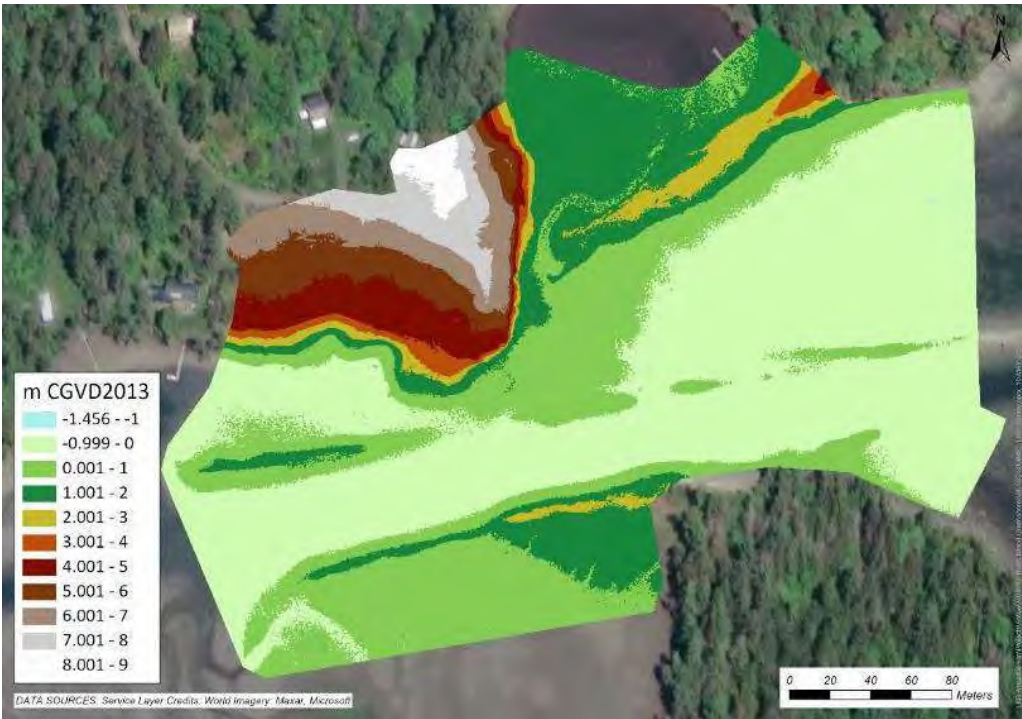


Figure 2.2 Drone survey elevations captured by NHC on March 12, 2024 in the vicinity of the project location.



Photo 2.1 The property viewed from the lower intertidal, looking to the north.

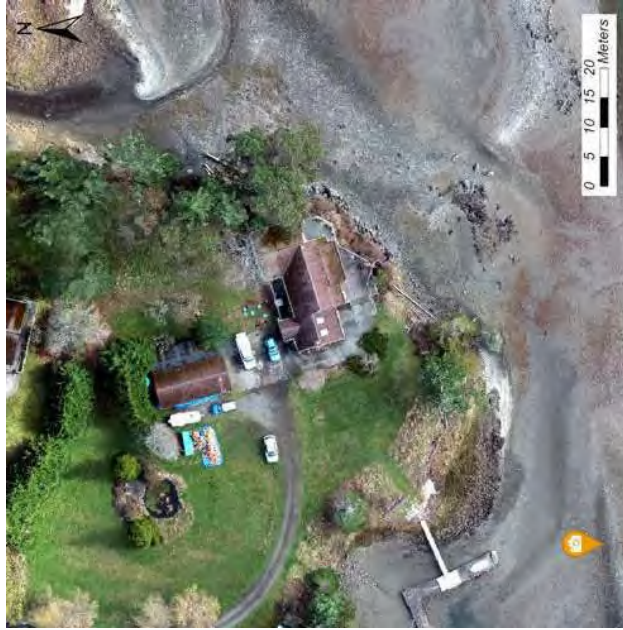


Photo 2.2 Lower intertidal to the south of the property, looking to the east towards Clam Bay. The Cut is located to the south of the property.



Photo 2.3 Lagoon outlet to the northeast of the property, looking to the east.



Photo 2.4 Southern shoreline of the property consisting of low concrete seawall and large rocks scattered along the upper beach. Beach access is from concrete stairs on the left, looking towards the north.



Photo 2.5 Low concrete seawall and concrete stairs.



Photo 2.6 Small rocks beneath vegetation on west extents of shoreline.



Photo 2.7 Large rocks along the upper beach, looking to the northwest. The upper beach consists of gravel and cobble.



Photo 2.8 Eastern shoreline of the property, looking to the west. The upper beach is unprotected along this section of the shoreline. Large-woody debris is present along the upper beach. The beach consists of sand and gravel and there is some vegetation on the mid to lower beach face.



Photo 2.9 Erosion of the low coastal bluff.



Photo 2.10 Erosion of the low coastal bluff. The bluff consists of fine silty sand material based on visual observations.

3 Metocean Analysis

The metocean analysis completed for developing the design of shoreline protection at 83 and 84 Blue Heron Rd is summarized in this section including water levels, wind analysis, and wave analysis.

3.1 Water Levels

The design water level in the study area is primarily governed by the sea level and incorporates the combined effects of tide, future sea level rise, and local vertical land movement. These processes are discussed in the following sections.

3.1.1 Astronomical Tides

The tidal conditions for Clam Bay are based on published information for Cardale Point (Station ID 7439), referencing the Fulford Harbour reference port (Station ID 7330), in the Canadian Hydrographic Service Canadian Tide and Current Tables (CHS, 2023). The tidal conditions are summarised in Table 3.1.

Table 3.1 Tide elevations at Cardale Point (CHS 2023).

Description	Elevation (m CD)	Elevation (m CGVD2013) ^{Note 1}
Higher High Water, Large Tide (HHWLT)	4.13	1.81
Higher High Water, Mean Tide (HHWMT)	3.67	1.35
Mean Water Level (MWL)	2.53	0.21
Lower Low Water, Mean Tide (LLWMT)	0.96	-1.36
Lower Low Water, Large Tide (LLWLT)	-0.01	-2.33

Notes:

1. Benchmark M12C9004 at Ladysmith (Station ID 7460) was used to calculate the conversion of 2.32 m between Chart Datum (CD) and CGVD2013.

3.1.2 Storm Surge

NHC previously estimated the joint probability of storm surge and tides for Point Atkinson by applying the Empirical Simulation Technique (EST) on the long-term tidal record (NHC and Triton, 2006). The joint tide and surge water level at Point Atkinson is transformed to 83 and 84 Blue Heron Rd using tidal datum information in Table 3.1. The joint probabilities of storm surge and tide for Clam Bay are provided in Table 3.2.

Table 3.2 Joint probabilities of tide and surge at Clam Bay.

AEP (%)	Joint Probability of tide and surge (m CGVD2013)
10.0	2.12
2.0	2.31
1.0	2.39
0.5	2.47

3.1.3 Recommendations for Climate Change Sea Level Rise

Global climate change is expected to result in increased sea levels resulting from melting of global ice and increased ocean volume due to rising water temperature. The BC Provincial Sea Dike Guidelines (BC Ministry of Environment, 2011) recommends that sea level rise (SLR) associated with global climate change will result in a base water level 1 m above that seen in the year 2000 by the year 2100. This translates to a SLR rate of 10 mm/year relative to the year 2000, or 0.5 m in the year 2050. The rate of SLR is projected to increase as the climate warms (Figure 3.1). In addition to global SLR, isostatic rebound, tectonic uplift, and/or sediment consolidation may influence the local relative sea level rise (RSLR). The total vertical land movement near 83 and 84 Blue Heron Rd is estimated at -0.7 mm/year based on the national-scale crustal velocity model published by Natural Resources Canada (2022).

However, the estimate of SLR from the BC Provincial Sea Dike Guidelines may be conservative for the purpose of erosion protection. The Canadian Extreme Water Level Adaptation Tool (Can-EWLAT) (Bedford Institute of Oceanography, n.d.) recommends a vertical allowance of 0.16 m by 2050 and 0.88 m by 2100 for SSP5-8.5¹ for. Vertical allowance includes local uplift rates for North Galliano and a factor for including the standard deviation of the sea level projections and a scale parameter². The magnitude and timing of SLR included in the design water level will influence the crest elevation of the design.

¹ Shared Socio-economic Pathway (SSP) from the IPCC AR6 (IPCC, 2023) report describing socio-economic and emissions scenarios in the future used to generate radiative forcing used to develop predictive climate models for estimating global sea level change.

² The scale parameter is estimated by fitting total water level (combination of CHS tidal predictions and storm surge calculated from 2D circulation model of the northeast Pacific) to the Gumbel distribution.(Zhai et al., 2023)

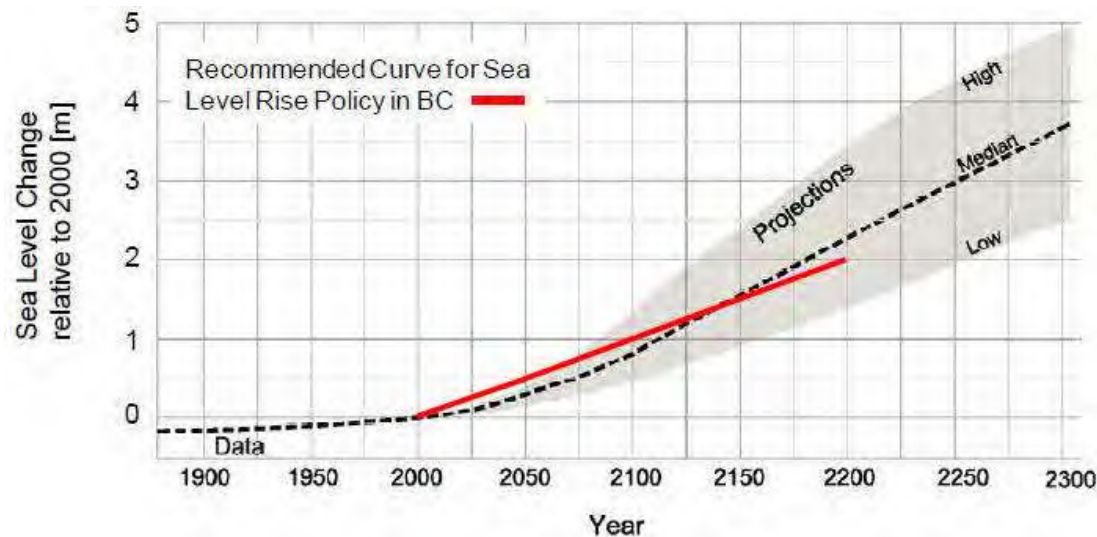


Figure 3.1 Sea level change projection (BC Ministry of Environment, 2011).

It should be noted that there is significant uncertainty in SLR estimates as can be seen by the wide grey area, and that the level of uncertainty in SLR estimates has generally increased upwards in the time since the SLR projection was published.

The local design RSLR is the magnitude of vertical land movement added to the projected SLR. The RSLR allowances are summarized in Table 3.3 for both the years 2050 and 2100. The vertical allowance recommended by the CAN-EWLAT tool is used for RSLR in the design of the erosion protection for 83 and 84 Blue Heron Rd.

Table 3.3 Projected RSLR at 83 and 84 Blue Heron Rd.

Year	Projected SLR - BC Provincial Sea Dike Guidelines (m)	Uplift - NRCan (m)	RSLR – BC Provincial Sea Dike Guidelines (m)	RSLR - Vertical Allowance from CAN-EWLAT (m)
2050	0.5	-0.04	0.46	0.16
2100	1.0	-0.07	0.93	0.88

3.1.4 Design Water Level (Still Water Level)

The design water level (DWL) for the project site includes the combined effect of astronomical, non-astronomical effects and RSLR. The design water levels presented in Table 3.4 for the project sites are based on the joint probabilities of tide and surge for Clam Bay (2% AEP, or 1-in-50) presented in Table 3.2 and RSLR values for the Year 2050 for the project location (Table 3.3). The DWL used for design of

the erosion protection for 83 and 84 Heron Rd is 2.47 m CGVD2013. The increase in water level due to RSLR could result in an increase in wave runup at the project location in the future.

Table 3.4 DWL (m CGVD 2013) based on joint probabilities of tide and surge and including RSLR.

AEP (%)	Design Water Level (m CGVD2013)		
	Present Day	Year 2050 - CAN-EWLAT RSLR Projections	Year 2050 - BC Provincial Sea Dike Guidelines (m)
10	2.12	2.28	2.58
2.0	2.31	2.47	2.77
1.0	2.39	2.55	2.85
0.5	2.47	2.63	2.93

Note that for flood protection, a 0.5% AEP (or 1-in-200) design flood level is commonly used. For this project, for the design of erosion protection, a lower probability event is used for design. This is deemed reasonable given the 30-year service life, and the tolerance built into the design for minor damage to the beach nourishment design over time.

3.2 Wind Analysis

Waves in Trincomali Channel and the surrounding Gulf Islands are predominantly wind generated, with vessel wake also generating waves from recreational and commercial vessels. Since there is no comprehensive measurement of waves near the sites of interest on Thetis Island, a metocean analysis was performed to determine the offshore wave climate.

Environment Canada (ECCC) operates several wind and wave buoy stations in the Strait of Georgia (Table 3.5 and Figure 3.2). The Halibut Bank and Sandheads CS wind stations have long data sets, however, they are far from the site and therefore not the best representation of local winds. The Nanaimo Airport wind station has a long wind record but is located inland and is not a good representation of windspeeds over open water in the Trincomali Channel. The Southern Georgia Strait wind buoy was deployed in 2021 and the dataset is too short (e.g., less than 3 years) to reliably derive extreme values for the expected design life. Wind events at Entrance Island were compared to those experienced at the Southern Georgia Strait buoy and both stations responded similarly to wind events; therefore, Entrance Island is a suitable station to use for this analysis and was used to determine design winds for the project sites.

Table 3.5 Wind station locations.

Station	Station ID	Period	Location
Entrance Island	1022689	1994-2023	49°12'31" N 123°48'38" W
Halibut Bank	46146	1992-2023	49°20'24" N 123°43'48" W

Station	Station ID	Period	Location
Nanaimo Airport	1025369	1954-2023	49°03'16" N 123°52'12" W
Sandheads CS	1107010	1994-2023	49°06'21" N 123°18'12" W
Southern Georgia Strait	46303	2021-2023	49°01'12" N 123°25'48" W



Figure 3.2 Map of the surrounding wind stations.

The local wind climate can be visualized using a wind rose – a graphic presentation of winds for specified areas, utilizing arrows at the cardinal and inter-cardinal compass points to show the direction from which the winds blow and the magnitude and frequency for a given interval of time. The wind rose showing the direction and magnitude of the winds from the Entrance Island wind station from 1994 to 2023 is shown in Figure 3.3 and the Southern Georgia Strait buoy from 2021 to 2023 is shown in Figure 3.4.

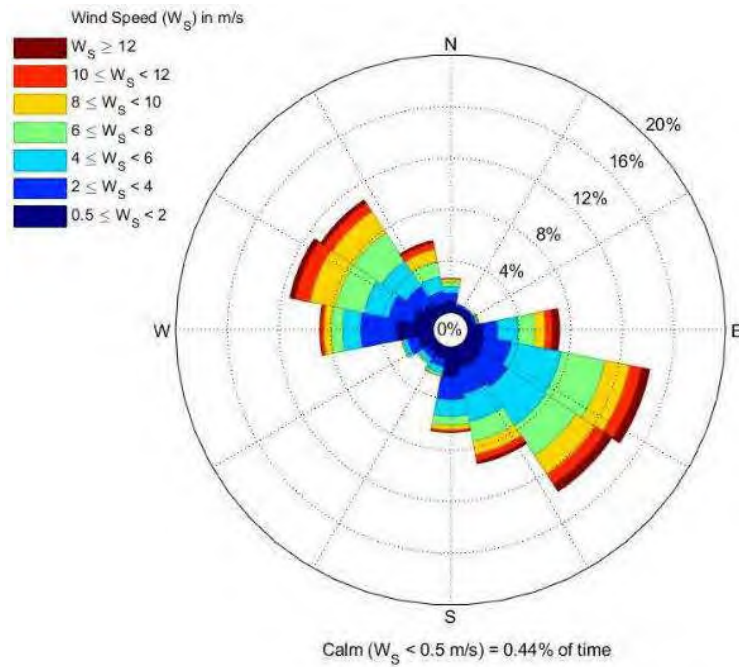


Figure 3.3 Entrance Island Windrose (1994 to 2023).

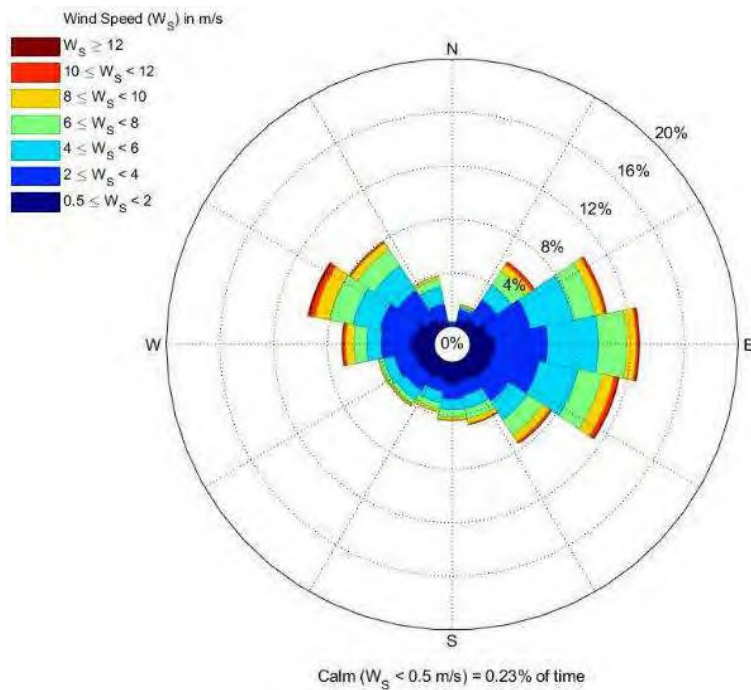


Figure 3.4 Southern Georgia Strait buoy (2021 to 2023).

The windrose shows that the strongest and most frequent winds are experienced from the northwest and southeast directions corresponding to the orientation of Trincomali Channel. The strongest winds on record occur from the northwest but occur less frequently in comparison to southeasterly events.

However, wind waves can also be generated along the fetch between Thetis Island and Galiano Island from easterly winds. Therefore, a frequency analysis was conducted on the Entrance Island wind data to obtain the design wind speed for the northwesterly (NW), southeasterly (SE), and easterly (E) events. The distribution that best fit the data is provided in Table 3.6. The distributions show the wind events from the northwest are stronger in comparison to the southeasterly and easterly events for a given AEP.

Table 3.6 Estimated return period design wind conditions at Entrance Island.

AEP (%)	Northwesterly (m/s)	Southeasterly (m/s)	Easterly (m/s)
100.0 (annual)	18.5	19.6	18.3
50.0 (1-in-2 yr)	20.2	20.4	19.4
20.0 (1-in-5 yr)	22.0	21.3	20.3
10.0 (1-in-10 yr)	23.3	22.0	21.0
5.0 (1-in-20 yr)	24.6	22.7	21.7
2.0 (1-in 50 yr)	26.2	23.5	22.5
1.0 (1-in-100 yr)	27.5	24.1	23.2
0.5 (1-in-200 yr)	28.7	24.8	23.8

3.3 Wave Analysis

Since there is no comprehensive measurement of waves at the site, a Simulating Waves Nearshore (SWAN) model was used to model wave generation and propagation from deep water into coastal areas and shorelines. SWAN incorporates physical processes such as wave propagation, wave generation by wind, white-capping, shoaling, wave breaking, bottom friction, sub-sea obstacles, wave setup and wave-wave interactions in its computations (Booij et al., 2004). SWAN version 41.31 was used for this study.

The model domain encompasses Trincomali Channel and the Gulf Islands between Thetis Island and Galiano Island and Valdes Island (Figure 3.5). It measures 17.1 km southwest-northeast by 48.9 km northwest-southeast and has a resolution of 20 m by 20 m. The model bathymetry was generated using CHS Non-Navigational (NONNA), Bathymetric Data and 2019 BC Lidar.



Figure 3.5 SWAN model domain.

The design easterly wind direction was modelled for 10% and 2% AEPs. The design water level in the SWAN model is the DWL, or 2.47 m CGVD2013.

The SWAN model results for the 2% AEP waves in the Clam Bay from the east are shown in Figure 3.6. Significant wave height (H_s) distributions are shown by coloured shading, and wave direction and relative heights are shown by vectors. The easterly event is shown because they resulted in the highest significant wave height values at Clam Bay.

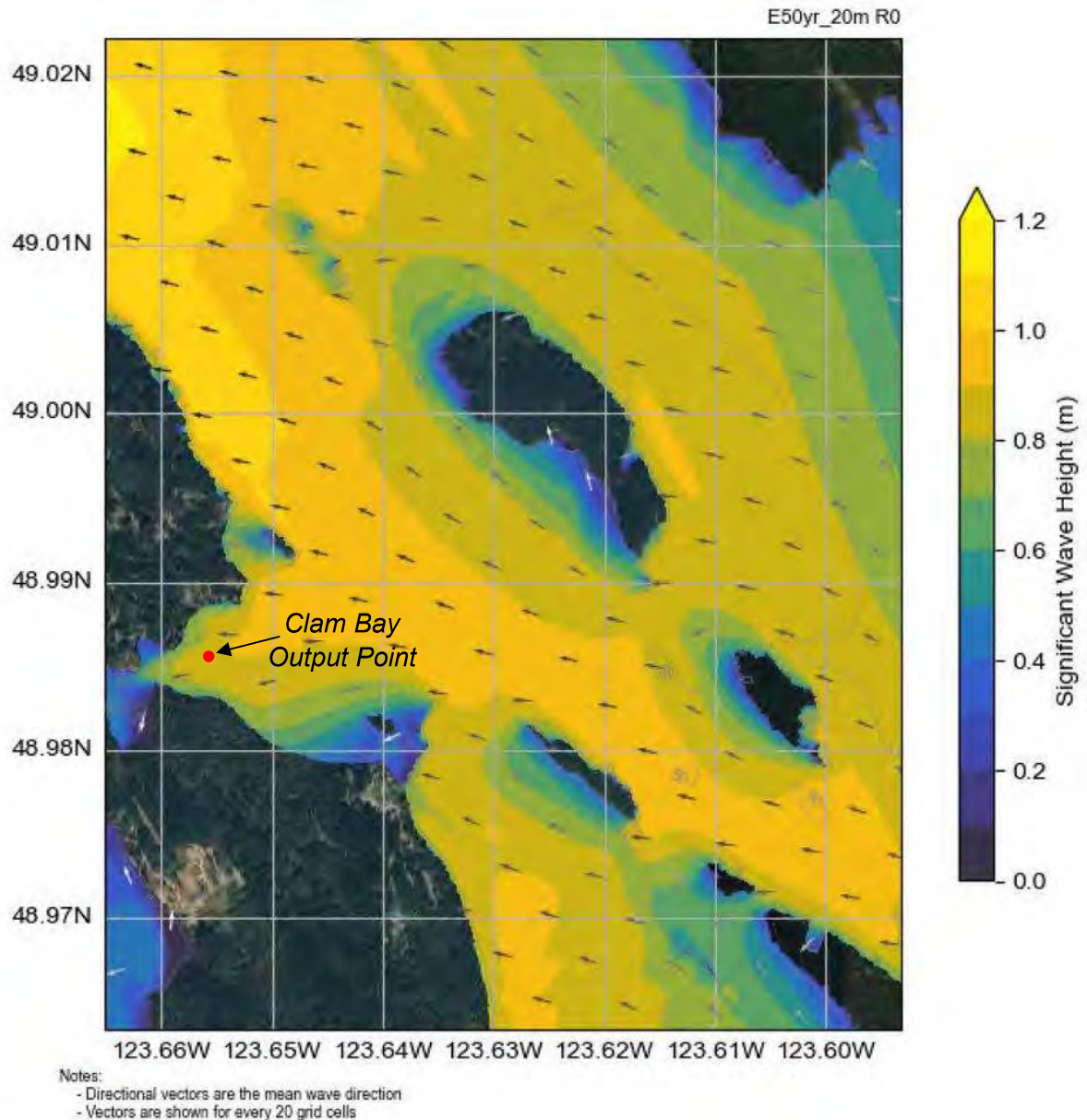


Figure 3.6 SWAN model results for 2% AEP wind event from the east in Clam Bay and Trincomali Channel.

Modelled significant wave height and peak period (T_p) values in Clam Bay for the design wind conditions are summarized in Table 3.7. Modelled wave heights are fetch-limited in Clam Bay for the design wind conditions and the 2% AEP significant wave height is approximately equal to the 10% AEP significant wave height.

Table 3.7 Design wave characteristics at Clam Bay.

AEP (%)	H_s (m)	T_p (sec)	Direction (degrees from North)
10 (1-in-10 yr)	0.9	3.3	85
2 (1-in-50 yr)	0.9	3.3	87

It is important to note that the significant wave height (H_s) is the average of the highest 1/3 of waves in a measurement period, and maximum wave heights can be 1.5 to 1.8 times higher than H_s .

3.4 Vessel-Generated Waves

In addition to wind generated waves, the project location will be exposed to wake from vessel traffic. It is expected that the project area is frequented by personal use vessels. Vessel induced waves of concern for this location are expected to occur due to small recreational boats.

Recreational vehicles typically operating in the region are expected to be between 15-25 ft most of the time. Research completed in Alaska which analysed new and previous measurements of vessel wake for a variety of vessels (Maynard, 2005) found no waves larger than 0.4 m for vessels less than 25 ft in length. The estimated maximum wave height (summarized in Table 3.8) are smaller in magnitude than the design wind-waves and thus will not govern at the site.

Table 3.8 Design vessel generated wave conditions.

Recreational Vessels	
H_s (m)	T_p (s)
0.4	3.2

It is noted that there are a newer generation of recreational vessels that are designed specifically to generate large wakes for the purpose of water ski type activities. Such 'wake' boats can generate larger waves than those above. However, The Cut is not an area of frequent water ski activity to our understanding.

4 Coastal Sediment Transport

This section provides a qualitative assessment of the coastal sediment transport and erosion potential for the project location. The following coastal process observations refer to Figure 4.1:

- The existing house on the property is located near the top of the low coastal bluff forming the shoreline for the eastern half of the property. A portion of the bluff is currently protected by large rocks and boulders along the upper beach as shown in the figure. However, the large rocks provide only limited erosion protection due to fines washing through the void spaces of the large rocks. There is also a low concrete seawall to the west of the large rocks. The top of the seawall is at an elevation of approximately 2.6 m CGVD2013.
- Erosion of the shoreline, caused by undercutting of the fine-grained sediment along the toe of the bluff, was visible during the site visit (Section 2), and is providing some sediment to the beach along the shoreline (Photo 2.8). However, the fine fraction of the sediment is likely washed away and not retained on the beach based upon our observation.
- The property is located to the west of Clam Bay and the dominant fetch direction for wave generation is to the east. Waves propagate across Trincomali Channel and over the lower intertidal sand flats to the east of the property during easterly storm events (Section 3.3) at high tide conditions.
- The property is located to the north of the dredged channel called The Cut which allows for small vessels to transit between Thetis and Penelakut Islands. These small vessels cause waves from the southwest and southeast depending on direction of vessel travel (Section 3.4).
- During dredging of The Cut, dredge material was deposited on the sides of the channel visible in the orthoimagery captured by the drone flight. This material is a mixture of sand, gravel, and cobbles. Over time, tidal currents and waves have eroded the fines from the surface of these deposits resulting in a coarse fraction of larger material on the surface of these deposits. The dredged sediment placed to the southeast of the property results in some wave dissipation of vessel generated waves travelling from the east to the west.
- There is a coastal lagoon located directly to the east of 84 Blue Heron Rd. The Lagoon is contained by a coastal spit comprised of sand and gravel. The dominant sediment transport direction along the shoreline of the spit is from the northeast to the southwest, as shown by the red arrows in the figure.
- The lagoon outlet is located just outside the eastern property boundary of 84 Blue Heron Rd. The lagoon has deposited material on the lower intertidal demonstrated by the small alluvial fan of coarser sediments in the vicinity of the lagoon outlet channel. As fine sediments are deposited at the western edge of the spit, the discharge from the lagoon results in redistribution of fines to the south. This reduces the fine sediment that would otherwise reach the property.
- The upper beach of the shoreline adjacent to the property consists primarily of gravel and sand with some cobbles. The sediment characteristics of the beach fronting the large rock and seawall was notably coarser (based on visual observation of sediment) in comparison to the beach further to the north where no structures are present. From observation and analysis of

wave modelling, this area is more susceptible to longshore sediment transport than further north on the property.

- The net sediment transport direction of the shoreline adjacent to the property is from the northeast to the southwest, and curves around the point of land past the beach access location. The beach area adjacent to the point of land has the highest sediment transport potential, as noted by the lack of fine sediment in this area. The coastal sediment transport, and erosion of the low coastal bluff, is driven by sea waves propagating over the lower intertidal sand flats from Clam Bay during easterly storm events.



5 Conclusion

In conclusion, the eastern and southeastern shoreline of the property are currently experiencing erosion due to sea waves generated during easterly storm events and is likely exacerbated by vessel generated waves travelling along The Cut. The sediment characteristics of the low coastal bluffs forming the shoreline of the property result in undercutting of the bank by waves during storm events occurring during high water levels. Erosion of the bluff was observed by NHC during the site visit and armour rock placed along the shoreline adjacent to the house likely provides only limited erosion protection due to the lack of a filter layer. However, despite easterly events causing erosion of the bluffs, the waves in this location are fetch-limited and are not likely to exceed 1.0 m even during a 0.5% AEP. The presence of sand on the upper beach below the unprotected eroding bluff indicates a beach nourishment option may be suitable for this location due to the relatively sheltered location of the property. In addition, the proximity of the property to the lagoon indicates the shoreline has the potential for high environmental and habitat value. Therefore, this project is highly suitable for a nature-based erosion protection design.

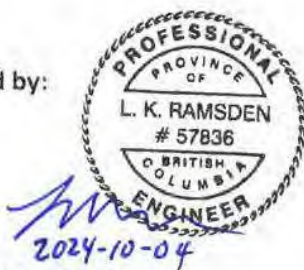
6 Closure

We trust this report meets your needs. If you have any questions or requests, please feel free to contact the undersigned.

Sincerely,

Northwest Hydraulic Consultants Ltd.

Report prepared by:



Laura Ramsden, MSc, PEng
Coastal Engineer

Report reviewed by:

A handwritten signature in blue ink, likely belonging to Grant Lamont.

Grant Lamont, MSc, PEng
Senior Coastal Engineer, Principal

EGBC Permit to Practice Number: 1003221

DISCLAIMER

This report has been prepared by **Northwest Hydraulic Consultants Ltd.** for the benefit of **Robert Welsh** for specific application to the **Thetis Island Nature Based Erosion Protection**. The information and data contained herein represent **Northwest Hydraulic Consultants Ltd.** best professional judgment in light of the knowledge and information available to **Northwest Hydraulic Consultants Ltd.** at the time of preparation and was prepared in accordance with generally accepted engineering and geoscience practices.

Except as required by law, this report and the information and data contained herein are to be treated as confidential and may be used and relied upon only by **Robert Welsh**, its officers and employees. **Northwest Hydraulic Consultants Ltd.** denies any liability whatsoever to other parties who may obtain access to this report for any injury, loss or damage suffered by such parties arising from their use of, or reliance upon, this report or any of its contents.

7 References

- BC Ministry of Environment (2011c). *Climate Change Adaption Guidelines for Sea Dikes and Coastal Flood Hazard Land Use – Sea Dike Guidelines*.
- Bedford Institute of Oceanography (n.d.). Canadian Extreme Water Level Adaptation Tool (CAN-EWLAT). [online] Available from: <https://www.bio.gc.ca/science/data-donnees/can-ewlat/index-en.php> (Accessed 23 August 2023).
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www.nhcweb.com

NHC Reference 3008882
October 22, 2024

ATTACHMENT 8

Robert Welsh



Attention: Robert Welsh

Copy to: Doug Fenton

Via email:  doug@fentonconsulting.ca

**Re: Thetis Island Nature Based Erosion Protection
Design Basis Final Report, Rev. 0**

Dear Mr. Welsh:

This document provides a summary of the design basis for the nature-based shoreline design to mitigate erosion and restore habitat on the shoreline at the property 83 and 84 Blue Heron Rd.

1 Introduction

The properties at 83 and 84 Blue Heron Rd are experiencing erosion of the shoreline causing impact to existing structures including a concrete seawall and access stairs. NHC has been retained to complete a nature-based design to mitigate erosion and restore habitat on the beach at the property. NHC is working collaboratively with the Environmental Professional (EP), Fenton & Associates Environmental Consulting (FAEC), who is completing the expedited permit process. NHC is supporting the permit process by completing the coastal engineering reporting and design for the Green Shores for Homes (GSH) project.

The project site is located on Thetis Island to the west of Clam Bay as shown in Figure 1.1. Thetis Island is in the Gulf Islands between Trincomali Channel and Stuart Channel. The project location is relatively sheltered from the Strait of Georgia by Galiano Island and Valdes Island. There is a dredged channel called *The Cut* to the south of the property between Thetis Island and Penelakut Island that connects Clam Bay to the west side of Thetis Island that is frequently used by small vessels. Indigenous ecological knowledge shared by two elders stated that *The Cut* was a rich and biodiverse saltmarsh, a special place of interconnectedness vital to the Indigenous people who shared this place. For millennia, it consisted of a simple muddy canoe path for canoes to traverse and at higher tides access the shorelines of this essential marine resource for the Penelakut and other Coast Salish Peoples. (EP Fenton's notes - Aug 2023, April 2024). As part of colonialization, it was dredged in the early 1900s, leading to salt marsh degradation. Currently, Penelakut/Pune'luxutth Tribes continue to use it for cultural, recreational, and commercial purposes and shares it with the public for marine transit and recreation. It remains a vital

resource to the Penelakut/Pune'luxutth Tribe, who retain unceded rights to this ancestral and traditional territory's cultural values and commercially permitted shellfish resources (FAEC 2024).



Figure 1.1 Site location.

NHC previously completed a coastal processes assessment report summarizing the design water levels, design wave conditions and coastal processes (sediment transport) for the properties (NHC, 2024). The results of the coastal processes assessment are summarised in Section 2. Furthermore, this report summarises the coastal design basis for the shoreline protection design for this project and includes:

- Design life and design criteria
- Summary of the design water level
- Summary of the design wave conditions at the project site from storms and vessel wake energy from nearby boat traffic
- Beach nourishment design
- Cost estimate for proposed design

2 Coastal Processes

NHC previously completed a coastal processes assessment report summarizing the design water levels, design wave conditions and coastal processes (sediment transport) for the properties (NHC, 2024). The following observations summarize the coastal processes at 83 and 84 Blue Heron Rd:

- The shoreline primarily consists of a low coastal bluff along the eastern half of the property. A portion of the bluff is protected by large rocks and boulders located on the upper beach; however, these likely provide limited erosion protection due to the lack of a filter layer. In addition, there is a low concrete seawall to the west of the large rocks.
- Erosion of the bluff is caused by undercutting of the fine-grained sediment along the toe of the bluff during storm events coinciding with high water levels. The erosion of the bluff provides some sediment to the beach.
- The coastal lagoon to the northeast of the property is contained by a coastal spit comprised of sand and gravel; the spit indicates the direction of net sediment transport is from the east to the west and is driven by wind generated sea waves.
- The lagoon outlet tidal prism causes sediment from the spit to be transported and deposited on the lower intertidal to the east of the property and distributes sediment to the south, preventing sediment from the spit from reaching the property.
- The upper beach of the shoreline adjacent to the property consists primarily of gravel and sand with some cobbles. The sediment characteristics of the beach fronting the large rocks and seawall was notably coarser (based on visual observation of sediment) in comparison to the beach further to the north where no structures are present. From observation and analysis of wave modelling, this area is more susceptible to longshore sediment transport than further north on the property.
- The net sediment transport direction of the shoreline adjacent to the property is from the northeast to the southwest, and curves around the point of land past the beach access location. The beach area adjacent to the point of land has the highest sediment transport potential, as noted by the lack of fine sediment in this area. The coastal sediment transport, and erosion of the low coastal bluff, is driven by sea waves propagating over the lower intertidal sand flats from Clam Bay during easterly storm events at high water levels.

3 Coastal Design Basis

3.1 Design Criteria

The design working life of a structure is taken as “the specific period for which a structure is to be used for its intended purpose with planned maintenance” (British Standards Institution, 2013). This report considers a design working life of 30 years for the detailed design of shoreline protection at 83 and 84 Blue Heron Rd. The rationale for choosing this design working life is based on providing a design with a relatively low cost and considering that by year 2050 the science of sea level rise (SLR) will be better

informed as to predictions of SLR levels in year 2100 and beyond, and the design will be adaptable to accommodate for additional SLR in the future beyond 2050.

The project is designed for a 1-in-50 Annual Exceedance Probability (AEP) water level event (i.e., 2% probability of occurrence in any given year) in combination with a 1-in-10 AEP wave event (i.e., 10% probability of occurrence in any given year).

3.2 Water Levels

The design water level in the study area is primarily governed by the sea level and incorporates the combined effects of tide, future sea level rise, and local vertical land movement. These processes are discussed in the following sections.

3.2.1 Astronomical Tide

The tidal conditions for Clam Bay are based on published information for Cardale Point (Station ID 7439), referencing the Fulford Harbour reference port (Station ID 7330), in the Canadian Hydrographic Service Canadian Tide and Current Tables (CHS, 2023). The tidal conditions are summarised in Table 2.1.

Table 2.1 Tide elevations at Cardale Point (CHS, 2024).

Description	Elevation (m CD)	Elevation (m CGVD2013) ^{Note 1}
Higher High Water, Large Tide (HHWLT)	4.13	1.81
Higher High Water, Mean Tide (HHWMT)	3.67	1.35
Mean Water Level (MWL)	2.53	0.21
Lower Low Water, Mean Tide (LLWMT)	0.96	-1.36
Lower Low Water, Large Tide (LLWLT)	-0.01	-2.33

Notes:

1. Benchmark M12C9004 at Ladysmith (Station ID 7460) was used to calculate the conversion of 2.32 m between Chart Datum (CD) and CGVD2013.

3.2.2 Storm Surge

NHC previously estimated the joint probability of storm surge and tides for Point Atkinson by applying the Empirical Simulation Technique (EST) on the long-term tidal record (NHC and Triton, 2006). The joint tide and surge water level at Point Atkinson is transformed to 83 and 84 Blue Heron Rd using tidal datum information in Table 2.1. The joint probabilities of storm surge and tide for Clam Bay are provided in Table 2.2.

Table 2.2 Joint probabilities of tide and surge at Clam Bay.

AEP (%)	Joint Probability of tide and surge (m CGVD2013)
10.0	2.12
2.0	2.31
1.0	2.39
0.5	2.47

3.2.3 Recommendations for Climate Change Sea Level Rise

Global climate change is expected to result in increased sea levels resulting from melting of global ice and increased ocean volume due to rising water temperature. The BC Provincial Sea Dike Guidelines (BC Ministry of Environment, 2011) recommends that sea level rise (SLR) associated with global climate change will result in a base water level 1 m above that seen in the year 2000 by the year 2100 (Figure 2.1). This translates to a SLR rate of 10 mm/year relative to the year 2000, or 0.5 m in the year 2050. In the near term, the BC Guidelines over-estimate the expected SLR, as the rate of SLR is not constant but expected to increase over time.

In addition to global SLR, isostatic rebound, tectonic uplift, and/or sediment consolidation may influence the local relative sea level rise (RSLR). The total vertical land movement near 83 and 84 Blue Heron Rd is estimated at -0.7 mm/year based on the national-scale crustal velocity model published by Natural Resources Canada (2022).

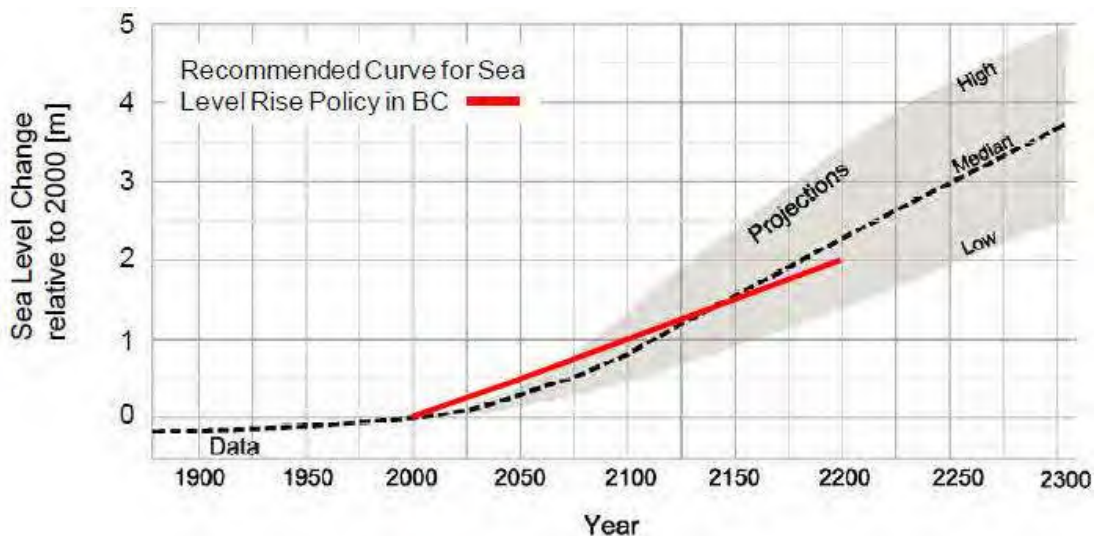


Figure 2.1 Sea level change projection (BC Ministry of Environment, 2011).

However, the estimate of SLR from the BC Provincial Sea Dike Guidelines are conservative for the purpose of erosion protection with a 20-40 year design life. The Canadian Extreme Water Level Adaptation Tool (Can-EWLAT) was developed for adaptation planning for DFO Small Craft Harbours

locations, however is also used for planning infrastructure along coastlines in Canada (Bedford Institute of Oceanography, n.d.). The Can-EWLAT tool recommends a vertical allowance of 0.16 m by 2050 and 0.88 m by 2100 for SSP5-8.5¹. Vertical allowance includes local uplift rates for North Galliano, a factor for including the standard deviation of the sea level projections, and a scale parameter². The magnitude and timing of SLR included in the design water level will influence the crest elevation of the design.

The local design RSLR is the magnitude of vertical land movement added to the projected SLR. The RSLR allowances are summarized in Table 2.3 for both the years 2050 and 2100. The vertical allowance recommended by the CAN-EWLAT tool is used for RSLR in the design of the erosion protection for 83 and 84 Blue Heron Rd.

Table 2.3 Projected RSLR at 83 and 84 Blue Heron Rd.

Year	Projected SLR - BC Provincial Sea Dike Guidelines (m)	Uplift - NRCan (m)	RSLR – BC Provincial Sea Dike Guidelines (m)	RSLR - Vertical Allowance from CAN-EWLAT (m)
2050	0.5	-0.04	0.46	0.16
2100	1.0	-0.07	0.93	0.88

3.2.4 Design Water Level

The design water level (DWL) for the project site includes the combined effect of astronomical, non-astronomical effects and RSLR. The design water levels presented in Table 2.4 for the project sites are based on the joint probabilities of tide and surge for Clam Bay (2% AEP) presented in Table 2.2 and RSLR (vertical allowance from CAN-EWLAT) values for the project location (Table 2.3). The DWL used for the design of the erosion protection structures is 2.47 m CGVD2013 for the 2.0% AEP occurring in Year 2050.

Table 2.4 DWL (m CGVD2013) based on joint probability of tide and surge and including RSLR.

AEP (%)	Design Water Level (m CGVD2013)			
	Present Day	Year 2050 – CAN-EWLAT Vertical Allowance for RSLR	Year 2100 – CAN-EWLAT Vertical Allowance for RSLR	Year 2050 – RSLR BC Provincial Sea Dike Guidelines (m)
10	2.12	2.28	3.04	2.58
2.0	2.31	2.47	3.23	2.77
1.0	2.39	2.55	3.31	2.85
0.5	2.47	2.63	3.39	2.93

¹ Shared Socio-Economic Pathway (SSP) from the IPCC AR6 (IPCC, 2023) report describing socio-economic and emissions scenarios in the future used to generate radiative forcing used to develop predictive climate models for estimating global sea level change.

² The scale parameter is estimated by fitting total water level (combination of CHS tidal predictions and storm surge calculated from 2D circulation model of the northeast Pacific) to the Gumbel distribution.(Zhai et al., 2023)

3.3 Wind and Wave Analysis

The wind and wave analysis conducted for the shoreline at 83 and 84 Blue Heron Rd is based on the 10% AEP event for wind generated waves. These events are calculated based on historical data and have a 10% probability of exceedance for any given year. The results of the analysis including significant wave height (Hs) and peak period (Tp) are provided in Table 2.5 for the design wave event from the east. A detailed summary of the analysis is provided in the Coastal Processes Report (NHC, 2024).

Table 2.5 Design wave characteristics at 83 and 84 Blue Heron Rd.

AEP (%)	Hs (m)	Tp (sec)	Direction (degrees from North)
10 (1-in-10 yr)	0.9	3.3	85

Recreational vessels typically operating in the region are expected to be between 15-25 ft most of the time. Research completed in Alaska which analysed new and previous measurements of vessel wake for a variety of vessels (Maynard, 2005) found no waves larger than 0.4 m for vessels less than 25 ft in length. The estimated maximum wave height is smaller in magnitude than the design wind-waves and thus will not govern at the site.

It is noted that there are a newer generation of recreational vessels that are designed specifically to generate large wakes for the purpose of water ski type activities. Such ‘wake’ boats can generate larger waves than those above. However, The Cut is not an area of frequent water ski activity to our understanding and for this reason the design wave does not consider wake boats.

4 Design

The design objectives, constraints, and beach nourishment design are provided in this section. The Issued for Permitting (IFP) design drawings are provided in Appendix A.

4.1 Design Objectives

The purpose and intent of the shoreline protection is to improve shoreline resistance to erosion. The property is located on a low coastal bluff with a crest elevation between approximately 4.8 to 6.5 m CGVD2013; the elevation of the house deck is approximately 5.4 m CGVD2013, or 3.6 m above Higher High Water Large Tide (HHWLT). The elevation of the concrete pad on the southeast corner of the property is approximately 4.8 m CGVD2013, or 3.0 m above present day HHWLT. In comparison, the DWL for the 0.5% AEP in 2100 is 3.39 m CGVD2013. The elevation of the concrete pad on the southeast corner of the property is approximately 1.4 m above the 2100 0.5% AEP DWL. The Flood Construction Level (FCL) for 2100 is 4.6 m CGVD2013, including a wave run up of 0.6 m on a sand and gravel beach and 0.6 m for freeboard. Therefore, the FCL is below the elevation of the concrete pad on the southeast corner of the property at an elevation of 4.8 m CGVD2013. As such, flood protection is not required for this property and the beach nourishment is designed to protect the existing bank from erosion.

It is noted that infrequent flooding of the lawn on the south and west side of the property may occur in the future, depending on the rate of future RSLR, however, erosion due to wave action on the southwest shoreline during these events will be mitigated by the shoreline upgrades.

In summary, functional requirements and design objectives for the project include the following:

- Functional Requirements:
 - a. Provide erosion protection for the shoreline.
 - b. Allow for expansion/modification to accommodate additional sea level rise in the future.
- Biological requirements:
 - a. Minimize the impact to the existing foreshore and intertidal habitat.
 - b. Enhance the natural values of the shoreline (e.g., using nature-based measures).
- Aesthetic and functional requirements:
 - a. Minimize impact to recreational usage at the shoreline and maintain accessibility of beach.
 - b. Provide a cost-effective and simple, constructible design using the type of materials typically found on site or in the near vicinity.

4.2 Design Constraints

The project shoreline is located near archaeological areas of significance and within the intertidal and upper beach zone. For this reason, there is the potential for any shoreline protection works to cause environmental impacts and potential disturbance to archaeological sites. The proposed shoreline protection option is designed to avoid damage and excavating into the bluff.

The design footprint is within the 10 m zone offset seaward from natural boundary for Penelakut Tribe's shellfish business and the Thetis LTC bylaw (2017). The upland stabilization and rehabilitation of the shoreline's ecosystems will enhance the local ecology by reducing bank erosion along the shoreline and preventing the upland infrastructure from becoming a hazard along the shoreline. The nourishment materials used are essentially inert and will be placed on the beach during the approved DFO timing window. Combined with the burial of the existing hard armour, this will re-connect the foreshore with the backshore, significantly enhancing the shoreline's ecological value.

Future adjustments to raise the shoreline could require the footprint of placed material to exceed the presently designed 10 m zone offset. However, exceeding the 10 m buffer with thin layer placement of beach materials is likely less harmful to the ecology of the site than to consider a seawall that could be built within the 10 m zone.

Additional design constraints include availability of materials, locating suitable borrow material from local sources, or to minimize transport of materials via ferry to Thetis Island. Sourcing materials locally would reduce the cost of materials and greenhouse gas emissions if there is a small quarry on Thetis

Island with appropriate materials. Another option may be to bring materials on a small barge at high tide to the site, otherwise material is expected to be transported via trucks on the ferry. The design options include materials ranging from rip rap to gravel and sand, and the cost and availability of materials has been taken into consideration during the design to minimize beach nourishment volumes.

4.3 Shoreline Design

The design includes beach nourishment (Appendix A) to incorporate nature-based solutions where appropriate. Beach nourishments have the advantage of providing recreational and cultural benefits in addition to protecting the shoreline from erosion. The beach nourishment design uses an integrated approach including large woody debris (LWD) and planting of native shoreline vegetation resulting in recreational, cultural, and ecological reconnection along the shoreline (Des Roches et al., 2022). The design median grain size diameter (D_{n50}) and beach slope for each beach material type is provided in Table 4.4. The Beach Manual (Rogers et al., 2010) provides typical beach slopes for D_{n50} of 10 mm to 35 mm is 1V:12H to 1V:4H, respectively.

In addition, cobble berms are placed at the toe of the beach nourishment to keep the beach design within the zoning boundaries and to protect against erosion from the lagoon outlet.

Table 4.1 Beach nourishment sediment type.

Sediment Type	Sediment Classification	Average Grain Size Diameter, D_{n50} (mm)	Beach Slope
1	Gravel	10 to 35	7H:1V, 8H:1V, 10H:1V
2	Cobble	100	3H:1V

The design also includes placement of oyster rocks, large sub-rounded boulders weighing between 2 to 3 tonnes, used to dissipate wave energy and reduce longshore sediment transport potential at the southeast corner of the property.

The design beach crest elevation on the northeast end of the shoreline is reduced to 2.3 m CGVD2013 (from 2.6 m CGVD2013 on southwest shoreline and 3.0 m CGVD2013 on east shoreline) to stop the beach footprint from exceeding the 10 m zoning boundary. In addition, this section of the shoreline is relatively protected from wave energy by the coastal spit and gravel bar at the lagoon outlet.

5 Cost Estimate

A cost estimate was calculated for the shoreline protection design. The cost estimate including quantities and unit costs are provided in Table 4.1. The cost estimate is based on the Issued for Permitting (IFP) drawings provided in Appendix A and includes engineering field services for construction support and record reporting. Unit costs are based on NHC's experience working on similar projects on Vancouver Island.

Table 4.1 Cost estimate.

Item		Description	Quantit y	Units	Unit Rate	Componen t Total	Total
A Engineering							\$13,785
1	Field Services						\$13,785
1.1	Pre and Post Construction Survey	Assumes 1 NHC staff, 2 visits	16	hrs	\$195	\$3,120	
1.2	Quarry Visit	1 visit	4	hrs	\$195	\$780	
1.3	Engineering Field Review – Labour	3 site visits (pre-construction and construction and post-construction) includes reporting	24	hrs	\$195	\$4,680	
1.4	Engineering Field Review – Disbursements	3 site visits (pre-construction and construction and post-construction)	3	LS	\$175	\$525	
1.5	Engineering Record Reporting	Post construction report + drawings	24	hrs	\$195	\$4,680	
B Construction and Field Services							\$89,764
1	Mobilization/Demobilization						\$9,000
1.1	Mobilization		1	Lump sum	\$4,500	\$4,500	
1.2	Demobilization		1	Lump sum	\$4,500	\$4,500	
2	Site Prep and Site Clean-up						\$10,000
2.1	Site Prep (including removal of LWD)		1	Lump sum	\$5,000	\$5,000	
2.2	Site clean-up		1	Lump sum	\$5,000	\$5,000	
3	Beach Placement						\$59,056
3.1	Supply and Install Armour Rock (including Oyster Rock)	Placed from shore using an excavator; includes 10% increase to volumes for overages	10	tonnes	\$150	\$1,500	



Item	Description	Quantity	Units	Unit Rate	Component Total	Total
3.2	Supply and Install Cobble	204	tonnes	\$100	\$20,350	
3.3	Supply and Install Beach Sand and Gravel	540	tonnes	\$60	\$32,406	
3.4	Install Large Woody Debris	12	Lump sum	\$400	\$4,800	
4	Construction Contingency					\$11,708
4.1	Cost Contingency Factor	1	%	15%	\$11,708	
Total Cost						\$103,549

6 Closure

We trust this report meets your needs. If you have any questions or requests, please feel free to contact the undersigned.

Sincerely,

Northwest Hydraulic Consultants Ltd.

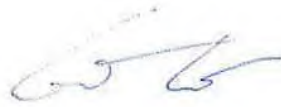
Report prepared by:


2024-10-22

Laura Ramsden, MSc, PEng
Coastal Engineer



Report reviewed by:



Grant Lamont, MAsC, PEng
Senior Coastal Engineer, Principal

EGBC Permit to Practice Number: 1003221

DISCLAIMER

This report has been prepared by **Northwest Hydraulic Consultants Ltd.** for the benefit of **Robert Welsh** for specific application to the **Thetis Island Nature Based Erosion Protection**. The information and data contained herein represent **Northwest Hydraulic Consultants Ltd.** best professional judgment in light of the knowledge and information available to **Northwest Hydraulic Consultants Ltd.** at the time of preparation and was prepared in accordance with generally accepted engineering and geoscience practices.

Except as required by law, this report and the information and data contained herein are to be treated as confidential and may be used and relied upon only by **Robert Welsh**, its officers and employees. **Northwest Hydraulic Consultants Ltd.** denies any liability whatsoever to other parties who may obtain access to this report for any injury, loss or damage suffered by such parties arising from their use of, or reliance upon, this report or any of its contents.

7 References

- BC Ministry of Environment (2011). *Climate Change Adaption Guidelines for Sea Dikes and Coastal Flood Hazard Land Use – Sea Dike Guidelines*.
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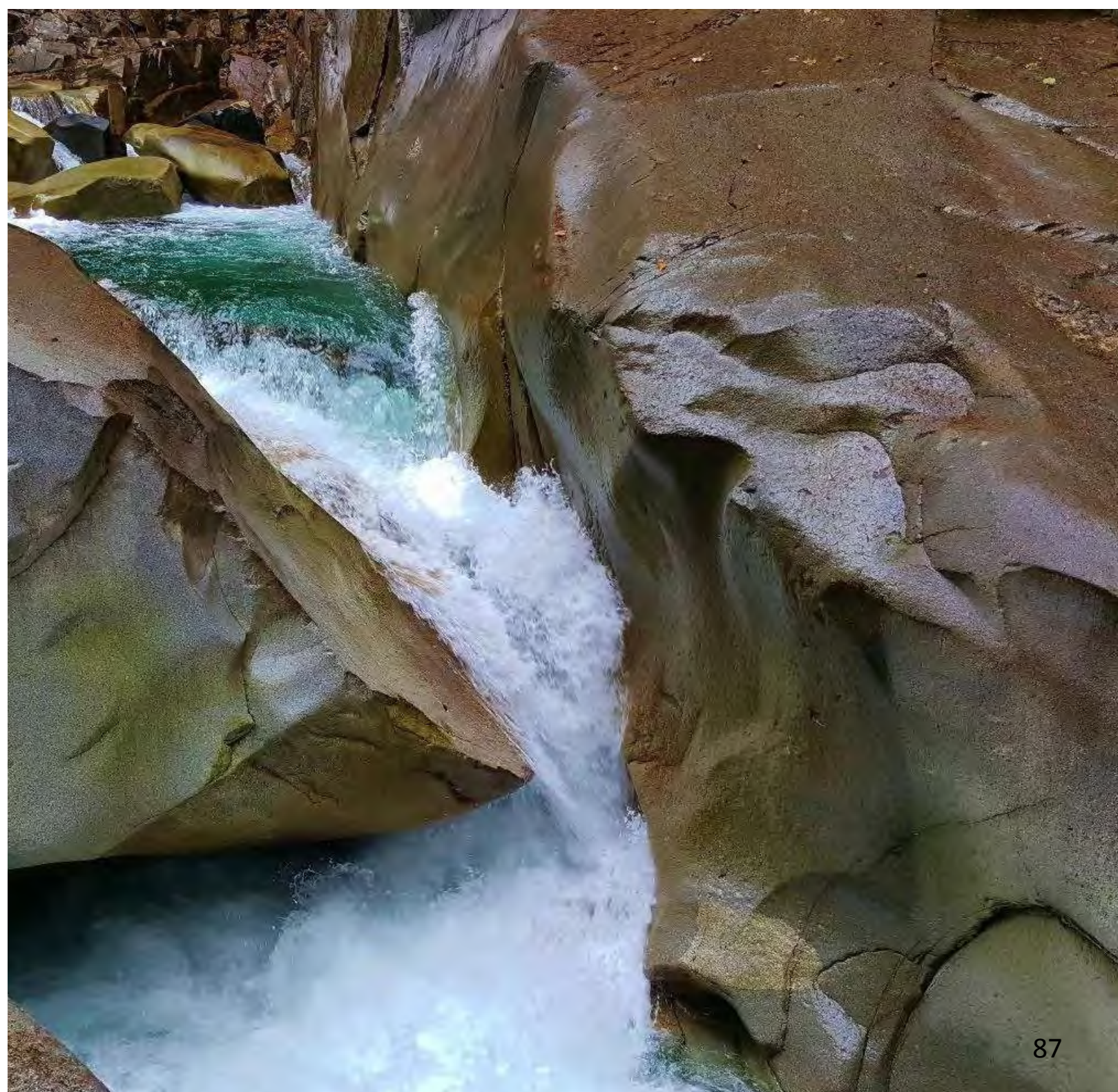
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The Canadian Geodetic Survey (2022). NAD83(CSRS) v7. Natural Resources Canada. [online] Available from: <https://webapp.csrscs.nrcan-rncan.gc.ca/geod/tools-outils/nad83-docs.php>.

Zhai, L., Greenan, J. W., and Perrie, W. (2023). *The Canadian Extreme Water Level Adaptation Tool (CAN-EWLAT)* (Canadian Technical Report of Hydrography and Ocean Sciences 348). Bedford Institute of Oceanography. 15 pp.

APPENDIX A

Issued for Permitting Design Drawings



THETIS ISLAND GREENSHORES

ISSUED FOR PERMITTING, OCTOBER, 2024

DRAWING INDEX		
SHEET NO.	TITLE SHEET, NOTES & SITE MAP	REVISION
001	TITLE SHEET, NOTES & SITE MAP	1
100	PLAN VIEW DESIGN	1
101	PLAN VIEW EXISTING VEGETATION	0
300	TYPICAL SECTIONS	1

- NOTES
1. GENERAL NOTES
- 1.1. DIMENSIONS AND DIMENSIONS ARE IN METERS UNLESS NOTED OTHERWISE.
- 1.1.1. COORDINATES ARE IN NAD83 (CRS), UTM ZONE 18 NORTH.
- 1.1.2. DIMENSIONS ARE TO CORNERS (CORNERS) UNLESS NOTED OTHERWISE.
- 1.2. DESIGN CRITERIA
- 1.2.1. DESIGN CRITERIA ARE TO CORRESPOND TO CORRESPONDING DESIGN CRITERIA.
- 1.2.2. DESIGN CRITERIA ARE TO CORRESPOND TO CORRESPONDING DESIGN CRITERIA.
- 1.2.3. DESIGN CRITERIA ARE TO CORRESPOND TO CORRESPONDING DESIGN CRITERIA.
- 1.3. STORM SURGE CAN OCCUR ELEVATING WATER LEVELS ABOVE THE PREDICTED TIDE BY 0.4 TO 0.8 m.
- 1.3.1. THIS DESIGN IS MEANT TO PREVENT AND MITIGATE EROSION OF THE SHORELINE USING A NATURE-BASED SOLUTION INCLUDING BEACH NOURISHMENT AND VEGETATION PLANTING. CONTRACTOR SHALL MONITOR WEATHER FORECASTS AND PLAN WORK ACCORDINGLY.
- 1.4. WORK AREA
- 1.4.1. PREDICTIONS CONTRACTOR SHALL MONITOR WEATHER FORECASTS AND PLAN WORK ACCORDINGLY.
- 1.4.2. AREAS OUTSIDE OF WORK SITE EXTENTS ARE NOT TO BE DISTURBED.

TABLE 1. DESIGN WATER LEVELS			
DESCRIPTIONS	ABBREVIATION	ELEVATION (IN CGD2023)	ELEVATION(M, CD)
HIGHER HIGH WATER LARGE TIDE	HHWLT	5.51	4.13
HIGHER HIGH WATER MEAN TIDE	HHWMT	5.35	3.67
MEAN WATER LEVEL	MWL	0.21	2.53
LOWER LOW WATER MEAN TIDE	LLWMT	-1.36	0.96
LOWER LOW WATER LARGE TIDE	LLWLT	-2.33	-0.01



SITE MAP
SCALE 1:500

1. IMAGE SOURCE: NHC DRONE FLIGHT (2024-09-12)



PERMIT TO PRACTICE

SEAL

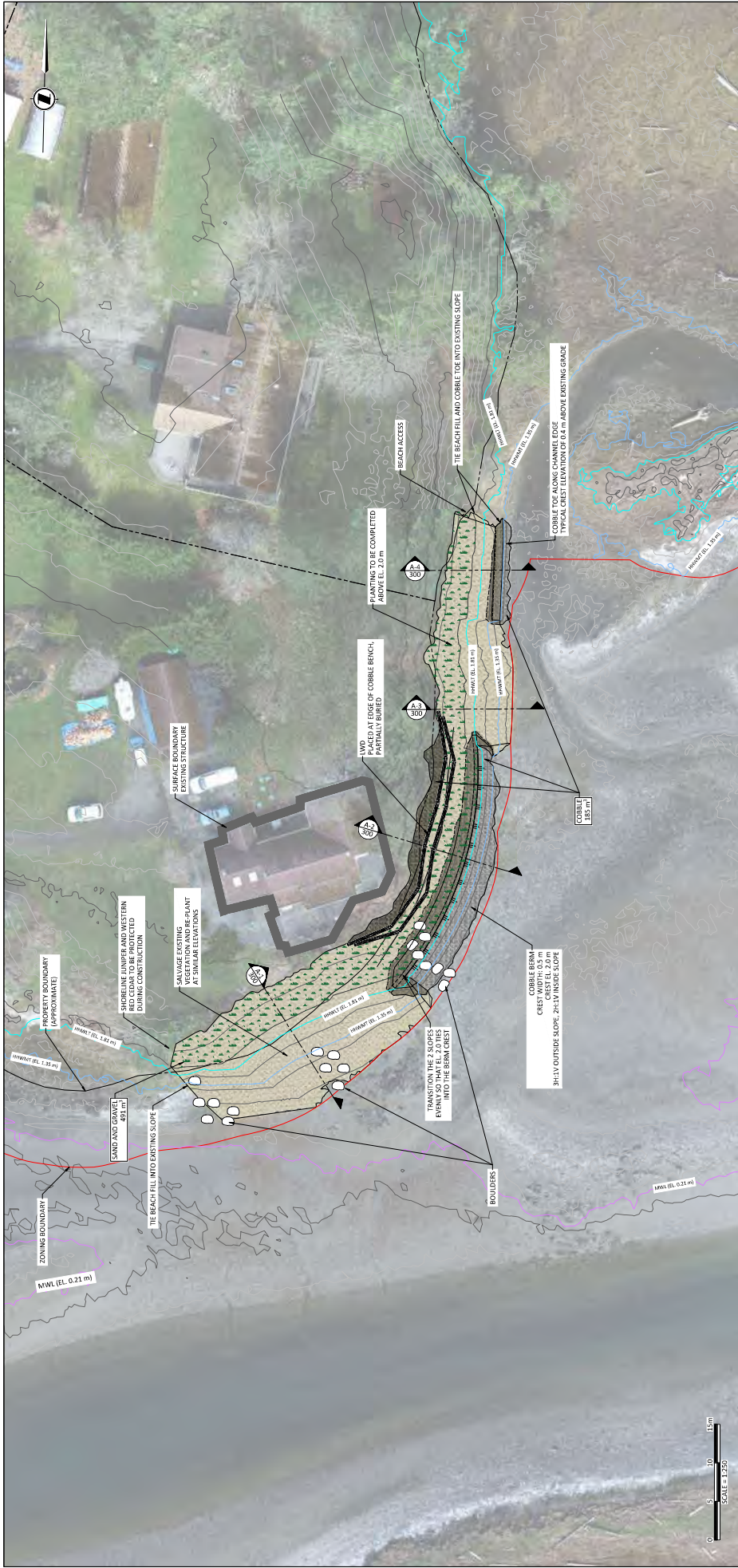
THETIS ISLAND GREENSHORES

NOT FOR CONSTRUCTION

TITLE SHEET, NOTES & SITE MAP

DESIGNED BY	I. RAMOS	SHEET NO.	001
DRAWN BY	S. CLARK	STATUS	ISSUED FOR PERMITTING
CHECKED BY	G. JAMONT	SCALE	AS SHOWN WHEN PLOTTED D SIZE
APPROVED BY	G. JAMONT	DATE	22 OCT 2024

SUPPRESSED ALL EXPOSURE WITH NAMED PRECEDENCE



GENERAL NOTES:

1. IMAGE SOURCES: NHC DRONE FLIES (2024-03-13)
2. IMAGE DATA PROVIDED FROM NHC PHOTOGRAMMETRY (2024-03-13)
3. CONTOUR INTERVAL:
 - 1. 1.0 m
 - 2. 0.5 m
 - 3. 0.2 m
 - 4. 0.1 m
4. COORDINATE SYSTEM:
 - 4.1. UTM ZONE 18 NORTH
 - 4.2. VERTICAL DATUM: CGVD2013, CGG2013A

LEGEND:

DESIGN LINEWORK

- 1. 1.0 m
- 2. 0.5 m
- 3. 0.2 m
- 4. 0.1 m

PROPERTY BOUNDARY (APPROX.)

- 1. 1.0 m
- 2. 0.5 m
- 3. 0.2 m
- 4. 0.1 m

ZONING BOUNDARY

- 1. 1.0 m
- 2. 0.5 m
- 3. 0.2 m
- 4. 0.1 m

COBBLE

- 1. 1.0 m
- 2. 0.5 m
- 3. 0.2 m
- 4. 0.1 m

SAND AND GRAVEL

- 1. 1.0 m
- 2. 0.5 m
- 3. 0.2 m
- 4. 0.1 m

PLANTING AREA

- 1. 1.0 m
- 2. 0.5 m
- 3. 0.2 m
- 4. 0.1 m

PLAN VIEW
SCALE 1:250

CLIENT	ROBERT WELSH 83 BLUE HERON RD THETIS ISLAND, BC V0A 2T0		SCALE	PRIME TO PRACTICE	THETIS ISLAND GREENSHORES	
	PLAN DESIGN					
SHEET NO.	DESIGNED BY	E. RAMSEY	SHEET NO.	NOT FOR CONSTRUCTION		
	DRAWN BY	E. CLARK				
	CHECKED BY	G. LAMONT				
	APPROVED BY	G. LAMONT				
DATE		22 OCT 2024	DATE		22 OCT 2024	
SHEET NO.		100	SHEET NO.		100	
SHEET NO.		81	SHEET NO.		81	



GENERAL NOTES:

- 1. EXISTING GRADE CONSTRUCTED FROM NHC DRONE PHOTOGRAMMETRY (2024-03-13)
- 2. CONTOUR INTERVAL
- 3.1. MAJOR: 2.0 m
- 3.2. MINOR: 0.2 m
- 4. COORDINATE SYSTEM
- 4.1. PROJECTION: NAD83 UTM ZONE 10 NORTH
- 4.2. VERTICAL DATUM: CGVD03 1a
- 5. VEGETATION
- 5.1.1. ALL VEGETATION EXCEPTING TREES MAY INCLUDE UP TO THREE TREES IN ANY POLYGON SHOWING EXISTING TREES MAY INCLUDE UP TO THREE TREES IN ANY

PLAN VIEW
SCALE 1:250

VEGETATION LEGEND		SPECIES BY QUANTUM NAME
NUMERIC DESCRIPTION	SPECIES BY COMMON NAME	
1	COSTAL COASTALINE	TEST
2	SHOREFLOWER	PTERIDULIP
3	WATER	SHOREFLOWER
4	WATER	SHOREFLOWER
5	WATER	SHOREFLOWER
6	SEA/SEA/SEA	SHOREFLOWER
7	OCEAN/SEA/SEA/SEA	SHOREFLOWER
8	TALL OCEAN/SEA	SHOREFLOWER
9	HAWT/ON WATERSIDE/SEA/SEA	SHOREFLOWER
10	SHOREFLOWER	SHOREFLOWER
11	SHOREFLOWER	SHOREFLOWER
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Fenton & Associates
Environmental Consultants

ROBERT WELSH
883 BLUE HERON RD
THETIS ISLAND, BC
V0R 2Y0



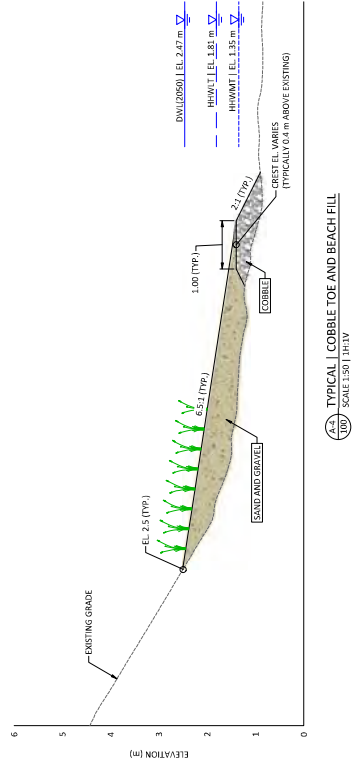
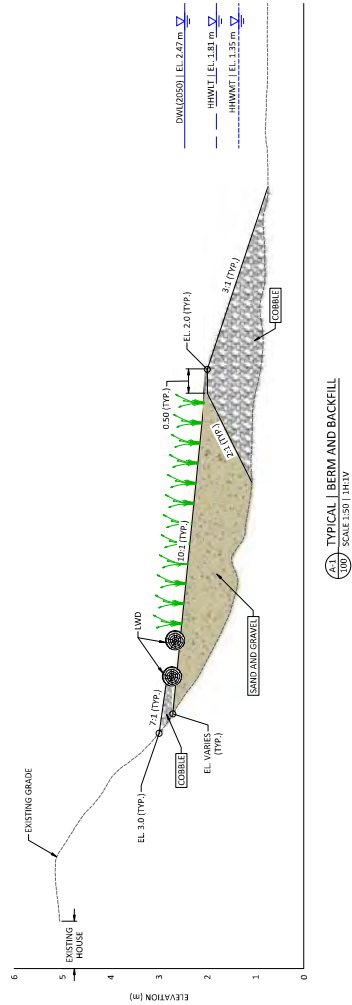
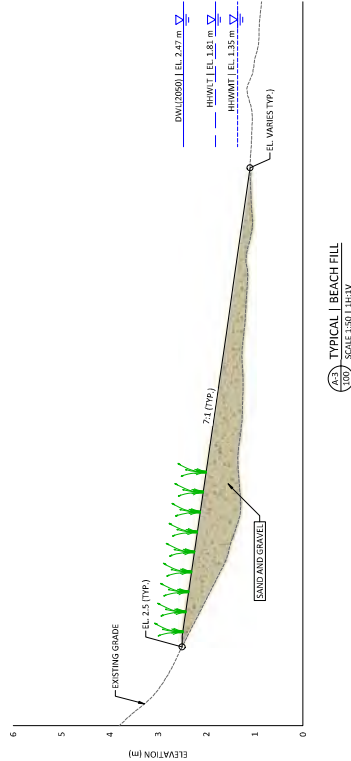
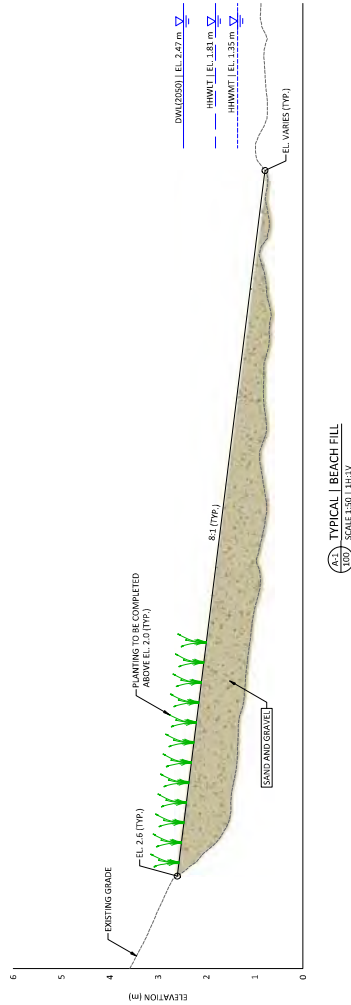
PERMIT TO PRACTICE:

THETIS ISLAND GREENSHORES

NOT FOR CONSTRUCTION

PLAN | EXISTING VEGETATION

DESIGNED: L. RAMSDEN	SHEET ID: 3008882_PROD_FP_THETISSLAND_PLT-101 R0	SHEET No:
DRAWN: R. CLARK	STATUS: ISSUED FOR PERMITTING	101
CHECKED: G. LAMONT	SCALE: AS SHOWN WHEN PLOTTED O SIZE	
APPROVED: G. LAMONT	DATE: 22 OCT 2024	
		REV No: R



LEGEND:

-----	EXISTING GRADE
————	DESIGN GRADE
————	DW(L2050) EL. 2.15
-----	HHW(L) EL. 1.81
-----	HHW(R) EL. 1.35

CLIENT

ROBERT WELSH
83 BLUE HERON RD
THETIS ISLAND, BC
V0N 1P0

DATE ISSUED	2024-05-16	ISSUED FOR REVIEW
1	2024-10-27	ISSUED FOR PERMITTING

SEAL

nhc

northwest
hydraulic
consultants

PERMIT TO PRACTICE

THETIS ISLAND GREENSHORES

NOT FOR CONSTRUCTION

TYPICAL SECTIONS

DESIGNED:

L. RANSDEN

SHEET No:

300 R1

STATUS:

ISSUED FOR PERMITTING

DRAWN:

R. CLARK

CHECKED:

G. LANDOLT

SCALE:

AS SHOWN WHEN PLOTTED D SIZE

APPROVED:

G. LANDOLT

DATE:

22 OCT 2024

REV No:

R-1

SUPPLEMENTAL REVISING WITH NUMBER PRECEDED BY

GSH Native Foreshore Plant ATTACHMENT 9 Plan_Final For 83/84 Blue Heron Rd., Thetis Island, BC

Prepared by: Christine Brophy, BNRP, R.B.Tech., contracted as an associate for FAEC.

As an associate for:

Fenton & Associates Environmental Consulting (FAEC)
Doug Fenton, EP, GSP (iT), Project Manager

Report prepared for: Welsh GSH Project.



Foreshore-view looking N from the beach. Lot 83. Taken by Christine Brophy. Aug 7, 2024.

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List of Acronym / Abbreviations

BNRP - Bachelor of Natural Resource Management
 CEMP - Construction Environmental Management Plan
 CVRD - Cowichan Valley Regional District
 EP - Environmental Professional
 FAEC - Fenton & Associates Environmental Consulting
 GIS - Geographic Information System
 GSH - Green Shores for Homes
 GSP (iT) - Green Shores Professional (in-Training)
 HCA - Heritage Conservation Act
 LTC - Local Trust Committee (Islands Trust)
 LUB - Land use bylaw
 LWD - Large Woody Debris
 MHWM - Median High Water Mark
 MSAR - Marine Shoreline Assessment Report
 NBEP - Nature Based Erosion Protection
 NFPPP - Native Foreshore Plant Planting Plan
 NHC - Northwest Hydraulic Consultants
 OC - On Centre
 PM - Project Manager/ment
 PWN - Pacific Northwest Plant Nursery
 PRN - as needed
 RBTech - Registered Biology Technician
 RWH - Rainwater Harvesting
 TEK - Traditional ecological knowledge
 TK - Traditional knowledge
 TYP - Tie point

November 16, 2024

83/84 Blue Heron Road,
Thetis Island, BC
V0R 2Y0

RE: Property Owners Name: Rob & Marcie Welsh

Greenshores for Homes (GSH) Native Foreshore Plant Planting Plan - Lots 83 & 84, Thetis Island, BC.

1.0 INTRODUCTION

Fenton & Associates Environmental Services retained Christine Brophy, BNRP, RBTech (Reg.# 76), services to complete a marine foreshore planting plan for 83 & 84 Blue Heron Rd. located on Thetis Island, BC. The subject parcel is zoned and is legally described as follows:

- LOT 6, DISTRICT LOT 12, THETIS ISLAND, COWICHAN DISTRICT, PLAN 15927
 - PID: 000-908-720; and
- LOT 7, DISTRICT LOT 12, THETIS ISLAND, COWICHAN DISTRICT, PLAN 15927
 - PID: 004-555-538.

The subject parcel is located within the rural residential R1 zoning of the land use bylaw (LUB) authority of the Thetis Local Trust Committee (LTC), Islands Trust, Thetis Island, BC and in the Cowichan Valley Regional District (CVRD) - Area G (Roads & municipal services - garbage, FD, assets like the community dock).

A site location map of the parcel in relation to the surrounding area is included as Figure 2. A. And on 2b.(p4) the google pic of the site location site plan of the property is included as Figure 1 (cover page). Thetis Island planting plan is included as Figure 3 below. Site photographs have been included as Appendix B (p19).

2.0 SITE DESCRIPTION

The area of interest within the subject property is located on the southeast section of a salt marsh wetland that runs east through Clam Bay and into the Trincomali Channel. A review of the provincial Habitat Wizard Report indicates that fish populations are identified as supported by the wetland. The wetland is designated as a Glasswort- Sea Milkwort Estuarine Site Association (EM02) (Wetlands of British Columbia 2004¹).

The parcel is irregular in shape and is accessed from the northwest from Pilkey Point Road and onto Blue Heron Road. The land parcel is situated on a marine foreshore; according to FAEC's

¹ Glasswort- Sea Milkwort Estuarine Site Association (EM02) (Wetlands of British Columbia 2004. Accessed Nov 16, 2024. Found at. <https://www.for.gov.bc.ca/hfd/pubs/Docs/Lmh/Lmh52.htm>;

MSAR (2024) and NHC's Thetis Island Erosion Protection Design Basis Report (Oct 2024), pre-contact was an ecosystem biodiversity-rich saltmarsh that was used by Pune'luxutth tribe for millennia using canoes on the silt until it was dredged in the early 1900s to facilitate the easier passage of settler watercraft. According to local TEK² (traditional ecological knowledge), this led to the end of the salt marsh ecosystem biodiversity. The man-made channel directs water from the wetland downstream into Clam Bay. Water velocity is considered low, and water is stagnant throughout the channels. The site was visited on August 7th, 2024, to document the existing conditions of the subject parcel, to identify vegetation in the Riparian Area and to collect observations of the native vegetation composition of the surrounding forest.

A visual vegetative species survey took place on the day of the site visit. Existing trees are concentrated along the parcel's east side and along the hill's mid-crest on the southeastern edge. The tree canopy includes second-growth trees dominated by Douglas fir (*Pseudotsuga menziesii*), Grand fir (*Abies grandis*), Arbutus (*Arbutus menziesii*) and Western Red Cedar (*Thuja plicata*) and localized areas of Yellow Cypress (*Callitropsis nootkatensis*). Adjacent understory growth includes Oceanspray (*Holodiscus discolor*), Tall Oregon Grape (*Mahonia aquifolium*), Honeysuckle (*Lonicera japonica*), Trailing blackberry (*Rubus ursinus*), Saskatoon berry (*Amelanchier alnifolia*), Nootka rose (*Rosa nootkana*) Snowberry (*Symphoricarpos albus*) and American dunegrass (*Leymus mollis*). Saltmarsh species present include Sea plantain (*Plantago maritima*), Glasswort species (*Salicornia*) and Sea Arrowgrass (*Triglochin maritimum*). Invasive plant species are throughout the parcel and include Himalayan blackberry (*Rubus armeniacus*), English ivy (*Llex aquifolium*) and Canada thistle (*Cirsium arvense*).

The proposed shoreline protection area is 237.5 m² in the upland slope area and 1,410 m² along the foreshore extent.

Northwest Hydraulic Consultants Ltd. completed a coastal processes report summarizing the design water levels, design wave conditions and coastal processes (sediment transport) for the properties (NHC, 2024) and includes a beach nourishment design that will incorporate the proposed planting plan in this report. The NHC nature-based erosion protection shoreline design is to mitigate erosion and restore habitat on the shoreline. The shoreline protection intends to improve shoreline resistance to erosion. The subject property is located on a low coastal bluff with a crest elevation between approximately 4.8 to 6.5 m. It has an average slope grade of 60% along the eastern section and a slope grade of 27% along the western section at the existing retaining wall. See the foreshore planting to be completed below; see 3.0 Planting Plan (TYP.) (Figure 3.0).

The design footprint is within the 10m zone offset seaward from the natural boundary for Penelakut Tribe's shellfish business and Thetis LTC bylaw. The project shoreline is located near archaeological areas of significance and within the intertidal and upper beach zones. The proposed natural-based shoreline protection by NHC has been purposely designed to avoid damage and excavation into the bluff.

² P1. Thetis Island Nature Based Erosion Protection Design Basis, NCH Oct 2024.

No obvious raptor nests were identified during the site survey. According to a search of the provincial Wildlife Tree Stewardship Atlas and the Great Blue Heron Atlas databases³, no mapped bald eagle, osprey or great blue heron nests are located in the vicinity of the subject property⁴.

Figure 2a. - Overview.



Figure 2b. - Closeup.



³ The Great Blue Heron Atlas database. Accessed on Nov 16, 2024. Found at <https://www.cmnbc.ca/the-great-blue-heron-atlas/>;

⁴ Provincial Wildlife Tree Stewardship Atlas. Accessed on Nov 16, 2024. Found at https://cmnmaps.ca/WITS_gomap/.

3.0 PLANTING PLAN

6

Native plant species were selected for the site conditions (Table 1). The overall planting density to be achieved is based on one tree per 5m to 7m on center (OC) spacing, one shrub per 1m², and four groundcover plants per 1m², with the goal of 100% cover within 2-3 years. Planting densities and spacing are calculated using standard guidelines from landscape architect design BC and ecological restoration designs from R.P.Bio Dave Polster of Polster Environmental Services.

The purpose of planting is to augment and jump-start the natural succession of the site, not to try and replicate or replace what previously existed in one season. This is accomplished by:

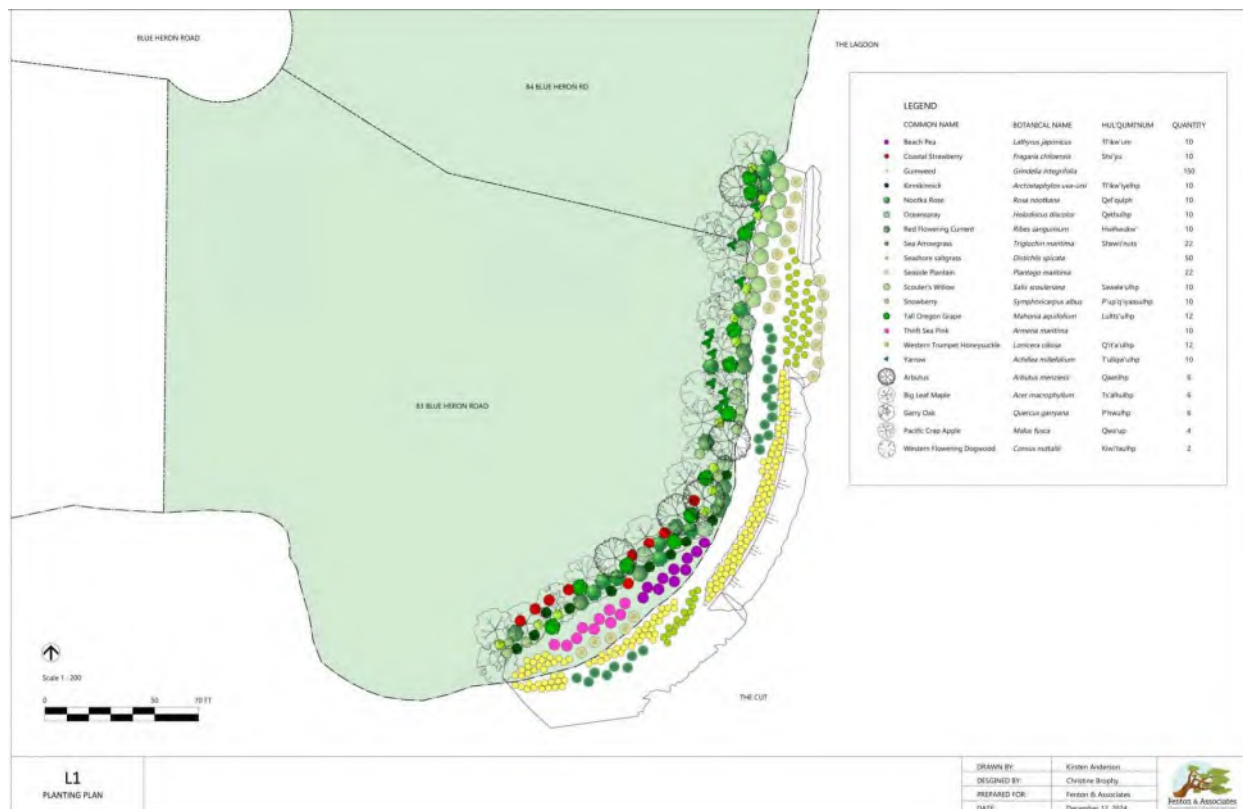
1. Preparing the area for planting by carefully taking care not to disturb any volunteer native plants that may be returning and removing invasive species that are attempting to colonize.
2. Documenting the existing native plants (volunteers) that are attempting to recolonize the site and protecting them.
3. Plant native species suitable for the site in appropriate initial densities, leaving room for natural re-colonization between planted plants.
4. Monitoring at least three times per year to: a) remove invasives as soon as they appear, b) check the survival of planted plants and volunteers, and c) Prepare a plan for next year's invasive species control.

Scale Planting Plan⁵.



⁵ The planting plan was created by Christine Brophy and given to Kirsten Anderson, GIS Tech, who created the scale map above and in the appendices/Figures #3.

Scale Planting Plan - No Canopy



Wet-tolerant species will be located along the northeast section of the marine foreshores high-water mark and will include Scouler's willow, Big leaf maple and Pacific crab apple. Red-flowering current, Oceanspray, Nootka rose, Tall oregon grape, Yarrow, Kinnikinnick, Western trumpet honeysuckle, Pink sea thrift and Snowberry are to be planted in the upper portions along the marine foreshore west end of top of bank where drainage is greatest and slope is steepest. Coastal strawberry and Beach pea are to be planted directly below the west slope above the high water mark above the intertidal transition within placed/anchored large woody debris. Garry oak, Arbutus, Seaside plantain, Seashore saltgrass, Sea arrowgrass and Hairy gumweed are to be planted in clusters along the upper margins of the foreshore along the highwater mark and proposed beach nourishment design areas. All potted plants will first be placed in the designated area of the proposed planting plan and guided by the direction of a biologist during the time of planting. Proposed plant species match the existing vegetation community and are compatible with the sand/silt/clay soil type of the CDFmm zone. The existing sensitive ecosystems both on site and in the vicinity will be protected from damage to roots systems and foliage during the enhancement restoration plantings by direction of a biologist and fencing off areas where the potential for plant damage could occur. The CDFmm zone of the subject property does not consists of the typical plant communities of the Douglas-fir/dull oregon grape subzone due to historical clearing and disturbance of the land and the loss of all Mahonia nervosa (Dull oregon grape). The remaining Mahonia species existing at the subject property consist of Mahonia aquifolium (Tall oregon grape) and occurs in one patch in the west slope above the existing retaining wall (Photo 5). The subject property has historical Garry oak and associated ecosystems plant species present and the proposed planting plan (phase 1 of 3) reflects the plant communities of the CDFmm and Gary oak subzones. No eel grass beds were observed to be present in the vicinity of the subject foreshore and proposed enhancement restoration area during a visual assessment of the intertidal zone during an ebbing tide in Clam Bay.

<https://www.for.gov.bc.ca/hre/becweb/>

Biogeoclimatic Ecosystem Classification (BEC) Zone/Subzone/Variant/Phase map (version 12, September 2, 2021).

https://www.env.gov.bc.ca/wld/frpa/iwms/documents/Plant%20Communities/pc_douglasfiriregongrape.pdf

https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/conservation-data-centre/publications/erickson_garry_oak.pdf

<https://goert.ca/wp/wp-content/uploads/GOERT-Restoring-BC-GOE-2011.pdf>

<https://www2.gov.bc.ca/gov/content/transportation/transportation-infrastructure/engineering-standards-guidelines/environmental-management/reference-documents/landscape-design-management>

Table 1. - Native plant selection.⁶83 & 84 Blue Heron Road,
Thetis Island, BC

Oct. 29, 2024

Upland Species:	Hul'qumi'nun	Quantity	Size	Cost Estimate	
				Per Plant	Cost Estimate
Oceanspray <i>Holodiscus discolor</i>	Qadimlip	10	3 Gallon	\$18	\$180
Pacific Crab Apple <i>Malus fusca</i>	Qwaup	4	3 Gallon	\$25	\$100
Tall Oregon Grape <i>Mahonia aquifolium</i>	Lulim'ulip	12	1 Gallon	\$15	\$180
Arbutus <i>Arbutus Menziesii</i>	Qaanlip	6	1 Gallon	\$25	\$150
Beach Pea <i>Lathyrus japonicus</i>	Tiluw'un	10	1 Gallon	\$12	\$120
Garry Oak <i>Quercus garryana</i>	Plawulip	6	1 Gallon	\$25	\$150
Noddy Rose <i>Rosa nudiflora</i>	Qal'qulip	10	1 Gallon	\$12	\$120
Pacific Dogwood <i>Cornus nuttallii</i>	Kw'wulip	2	5 Gallon	\$45	\$90
Snowberry <i>Symphoricarpos alba</i>	Pup'q'yaan'ulip - whole bush, pup'q'yaan - berries	10	1 Gallon	\$12	\$120
Western Trumpet Honeysuckle <i>Lonicera chrysantha</i>	Q'ifa'ulip	12	10cm	\$12	\$144
Red Flowering Currant <i>Ribes sanguineum</i>	Hwilmwun' - berry bearing, non-bearing squawhins	10	1 Gallon	\$15	\$150
Big Leaf Maple <i>Acer macrophyllum</i>	Ti'ulip	6	3 Gallon	\$12	\$72
Kinnikinnick <i>Arctostaphylos uva-ursi</i>	Tiluw'iyulip	10	1 Gallon	\$15	\$150
Narrow <i>Achillea millefolium</i>	Tiluw'iyulip	10	1 Gallon	\$15	\$150
Coastal Strawberry <i>Fragaria chiloensis</i>	Str'yu	10	1 Gallon	\$15	\$150
Thrift Sea Pink <i>Armeria maritima</i>		10	1 Gallon	\$15	\$150
Total Upland Species:		138		Cost Estimate Total	\$2,176
Foreshore Species:	Hul'qumi'nun	Quantity	Size	Cost Estimate	
				Per Plant	Cost Estimate
Emerald-Leaved Gumweed <i>Grisebchia integrifolia</i>		150	Plug tray	\$1.50	\$150
Sea Arrowgrass <i>Fragochloa maritima</i>	Shaww'ants or Saww'ants	22	10cm	\$12	\$264
Seashore Saltgrass <i>Distichlis spicata spicata</i>		50	Plug tray	\$80	\$80
Seaside Plantain <i>Plantago maritima</i>		22	10cm	\$12	\$264
Scribner's Willow <i>Salix scouleriana</i>	Saww'ulip (species mainly Pacific)	10	3 Gallon	\$15	\$150
Total Foreshore Species:		254		Cost Estimate Total	\$908
Total Plant Quantity		392			
Based on approx. upland and foreshore land area suited for plantings:		750m ²		Combined Total Cost Estimate (tax not incl.)	\$3,084

Reference: Luschiim's Plants - traditional Indigenous Foods, Materials and Medicines, Drs. Luschiim's and Turner, 2021.

⁶ Hul'qumi'nun names reference for Native Plant Selection above: Luschiim's Plants - Traditional Indigenous Foods, Materials and Medicines, Drs. Luschiim's and Turner, 2021;

3.1 BUDGET ESTIMATE

A comprehensive budget estimate includes a full breakdown of costs associated with the recommended restoration measures (including plants, encroachment fence materials, installation, monitoring costs, etc.). Irrigation will be required to maintain the plantings during the summer months. No irrigation costs have been provided as the method will determine the cost. According to FAEC's PM, this has been accounted for in FAEC's master budget (not detailed yet) and integrated into the upland Lot 84's RWH (Rainwater Harvesting) project. Pocket planting is recommended. This involves adding topsoil and a handful of bone meal to the planting hole.

Table 2. - Budget Estimate.

Item	Cost	Comments
Plants	\$3,084	Six of the species are available in plug trays that PNW can order and incorporate into the order. The nursery would grow them into appropriate sized plants for planting in the fall 2025. The advantages are: 1. Approx \$225 less using plugs; 2. Add'l plants from the species in the plug trays for future planting for yrs 2 & 3, post-construction. 3. The only add'l cost would be the txs each for the plants planted.
Labour - Christine's time	\$1,200	Based on an estimated 3 x 8h days of planting.
Stipend for FN participation.	\$175/person \$525 for 3 days.	This is something that the author sees as an opportunity for the client to further engage the Pune'luxutth community at whatever level of engagement they are willing to do. See more in Indigenous Engagement.
EPs - PM, id watering system & fencing needs.	\$1,200	Based on an estimated 3 x 8hr days of PM, assessing future watering needs, assisting with fencing, and plant anchoring systems.
Fencing/silt fencing	\$250-500	Deer fence as well as, silt fencing along the seaward edge of the planting area (pm).
GIS mapping - would replace the plan on pg 5 and 13.	\$250	Done separately by a GIS tech. This is not necessary for the GSH project. However, FAEC supports the shoreline ecologist's recommendation to take this step, as it provides a clean and accurate representation of the recommended work and would better support any funding opportunities that may come along.
Total	\$6,759 (only est. + applic txs)	

3.2 PLANT SOURCES

Naturally Grown Native Plant Nursery

3900 Shell Beach Road
Ladysmith, BC
250-668-7859

NATS Nursery Ltd.

24555 32nd Avenue
Langley, BC V2Z 2J5

Satin Flower Nurseries

741 Haliburton Road
Saanich, BC
V8Y 1H7

4.0 RECOMMENDATIONS FOR INSTALLATION & MAINTENANCE

The following plant installation and maintenance methods are recommended for the restoration:

- Installation of vegetation will be completed preferably in the early spring or fall and should be maintained and irrigated as necessary through at least the first two summer seasons to optimize survival.
- Remove invasive English ivy throughout the entire parcel by hand clipping and root removal by staking bar.
- Leave a few pieces of large woody debris within the riparian area to provide habitat complexity and cover. Retain stumps within the riparian area.
- Overall plant density should be a minimum of one plant per one m² for shrubs and one tree per 5m to 7m on center spacing. Plant placement should mimic a natural growth pattern i.e. clusters of same species and be interspersed with existing native vegetation retained. Upland species should be planted in driest areas followed by foreshore species. Shade-tolerant plant species and can be planted around the base of trees. Ensure species that prefer wetter soils are places within lower topographic depressions with wet soils.
- For tree and shrub plantings, add a handful of bone meal (reduces transplant shock) mixed with topsoil to the planting hole. Water plantings immediately and as necessary until established. Planting in cool wet weather will reduce transplant shock and allow the plants to establish root systems without drought stress. <1m wide permeable surface footpath through the riparian area can be left clear of vegetation to allow for access through the parcel.

5.0 ENVIRONMENTAL PROTECTION RECOMMENDATIONS

Environmental protection measures are to be in place before riparian restoration activities, and the recommendations in this report should be reviewed with the planting crew before the start of the project. If additional environmental support is necessary due to an unforeseen event, Fenton & Associates (FAEC) will be available upon request. FAEC recommends the following Environmental Protection Measures for this project based on the project information provided:

- No future encroachment on the riparian area of the wetland is to be allowed. After restoration is complete, the riparian area is to be considered a no-development area with no soil or vegetation disturbance.
- Ensure that the project's CEMP (Construction Environmental Protection Plan) uses silt fences to be installed in the upland of the riparian area boundary. See the Draft CEMP. FAEC.Oct 2024 for BMPs for installation and maintenance.
- Do not stockpile waste materials on site – remove them as soon as possible.
- All heavy equipment should be clean and leak-free, and a fully stocked spill kit should be on board. Again, referring to the project's CEMP, ensure it outlines this in its BMPs.

Archaeological considerations

All archaeological sites, recorded or not, are protected under the Heritage Conservation Act (HCA) and must not be altered or damaged without a site alteration permit from the Archaeology Branch. See the FAEC's MSAR (p.16 & 17) for details on the cultural consideration and HCA and p59 for this project's "Chance Find procedure." Note: this has also been included in the project's draft CEMP.

Indigenous Engagement - Observations/opportunities.

Pune'luxutth Tribe's (PT) relationship to this land - FAEC's MSAR/Cultural Resources (p16&17), outlines the depth of interconnection PT has with the surrounding lands and territories, and how the post-contact colonial laws have forced them off the land for more than a 100 years. It was good to learn that PT was able to negotiate under colonial laws, access to these shorelines along this project and Canoe Pass.

FAEC collaborated with NHC in the design of NBEP (Nature based Erosion Protection) and evidence-based design solution/s that have integrated a crucial piece of the puzzle, a belt, at/above the MHWL, that supports increased biodiversity that re-connections the shoreline ecologies to the heavily impacted upland properties. The design prevents erosion by adding beach nourishment and furthering this restoration through the use of LWD (large woody debris) and the planting native plants, which is the focus of this report.

The list has been shared with a traditional ecological knowledge holder on Pune'luxutth Island, and we asked them to look at it through a cultural lens, any input on it would be appreciated, and they fully supported this list (shared by EP Fenton by mgr note to author, Dec 7, 2024), with some insights on plant-specific micro habitat considerations.

This is something that the author sees as an opportunity for the client to further engage the Pune'luxutth community, at whatever level of engagement they are willing to do. From simply working with the shoreline ecologist during the planting, to a more elaborate engagement, of selection of plant species, ceremony pre-planting, monitoring, and seasonal harvesting opportunities.

6.0 CLOSURE/Signature Page.

This report has been completed in accordance with generally accepted biological practices. No other warranty is made, either expressed or implied. Fenton & Associates Environmental Consulting, trusts that the information provided in the report meets your requirements. Any questions regarding information provided in this document, please contact the undersigned at (250) 668- 7859.

Prepared by:



Christine Brophy, BNRP, R.B.Tech.

Prepared by:

EP Consultants Signature

Date: May 16, 2026

Doug Fenton, MEP, EP-H&S, EM-#22432, GSP(iT), BC-CESCL, CAMP. FAEC

APPENDIX A - FIGURES

Figure 1. - Site Description - Site plan with local boundaries visible.

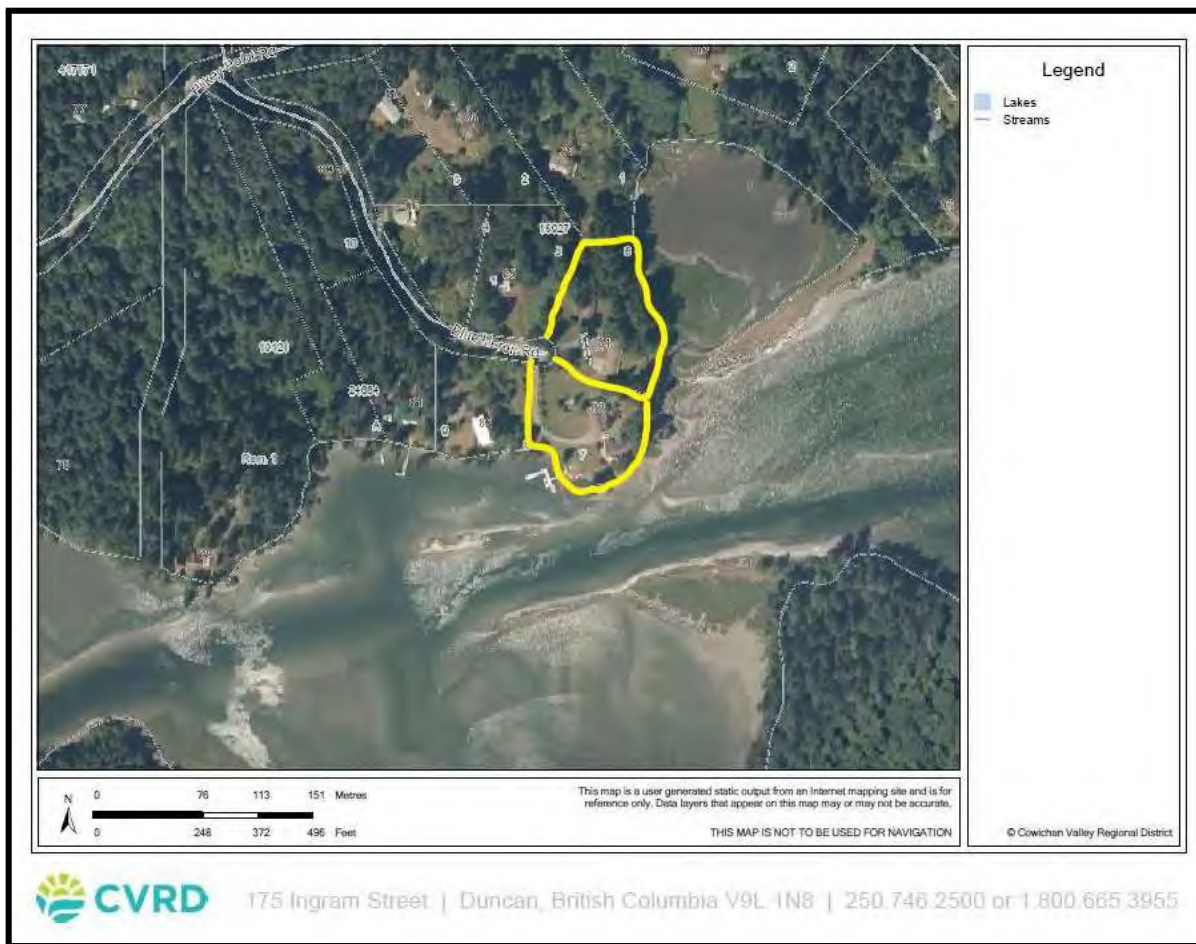


Figure 2. General Location Map - 83 & 84 Blue Heron Road, Thetis Island, BC

Figure 2a. - Overview location of the project.

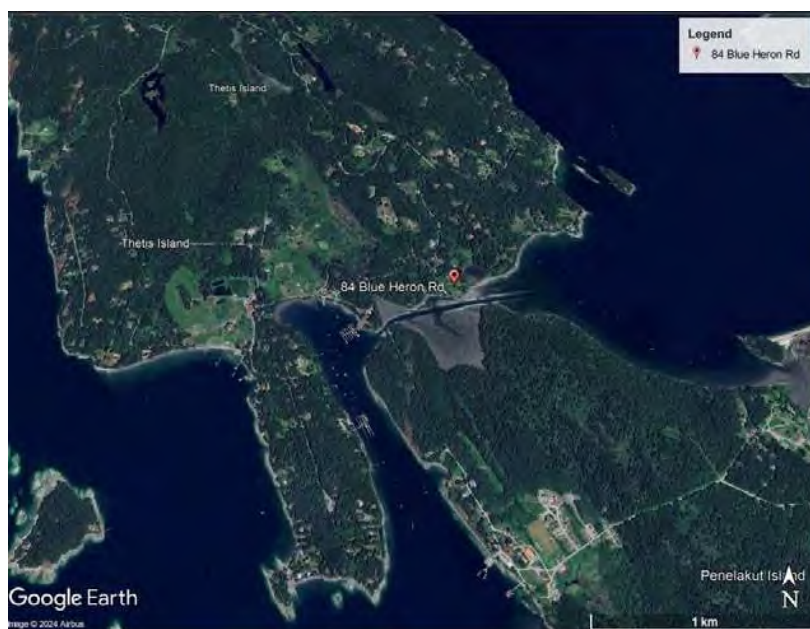


Figure 2b. - Close-up of the project location.



Figure 3. - Scale Planting Plan



Figure 4. - Scale Planting Plan - No Canopy

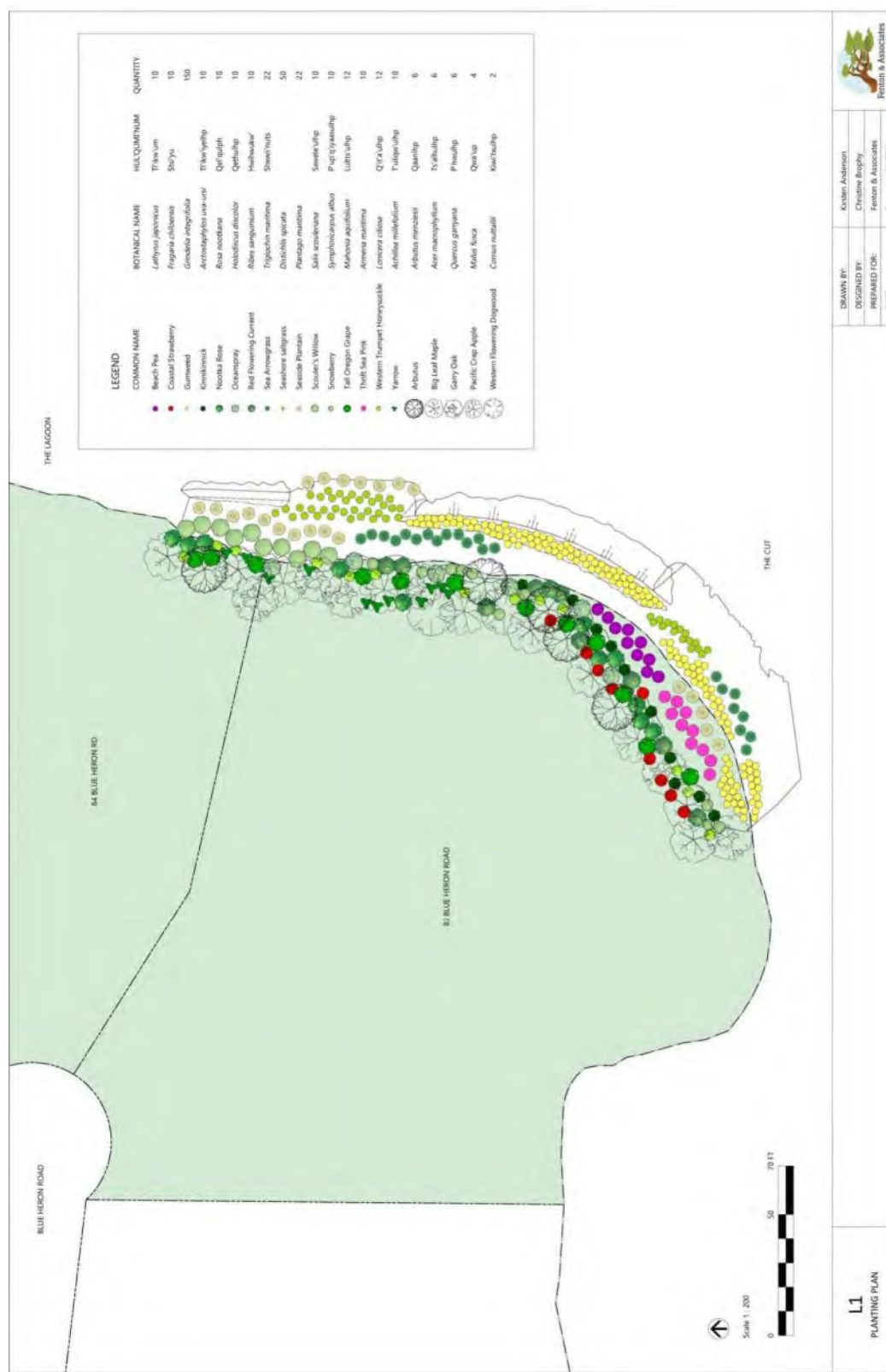


Figure 5. - Site Plan - Existing Vegetation



Note: FAEC collaborated with NHC (Northwest Hydraulic Consultation) for their survey + mapping skills to complete a high-level existing vegetation map per the GSH project permitting requirement for Critical or Sensitive Habitats impacted by the project. The project area was visited on Aug 7th, 2024, and considered while creating the design of this Native Plant Restoration Plan for this project.





Figure 6. - Aquatic Species at Risk Report

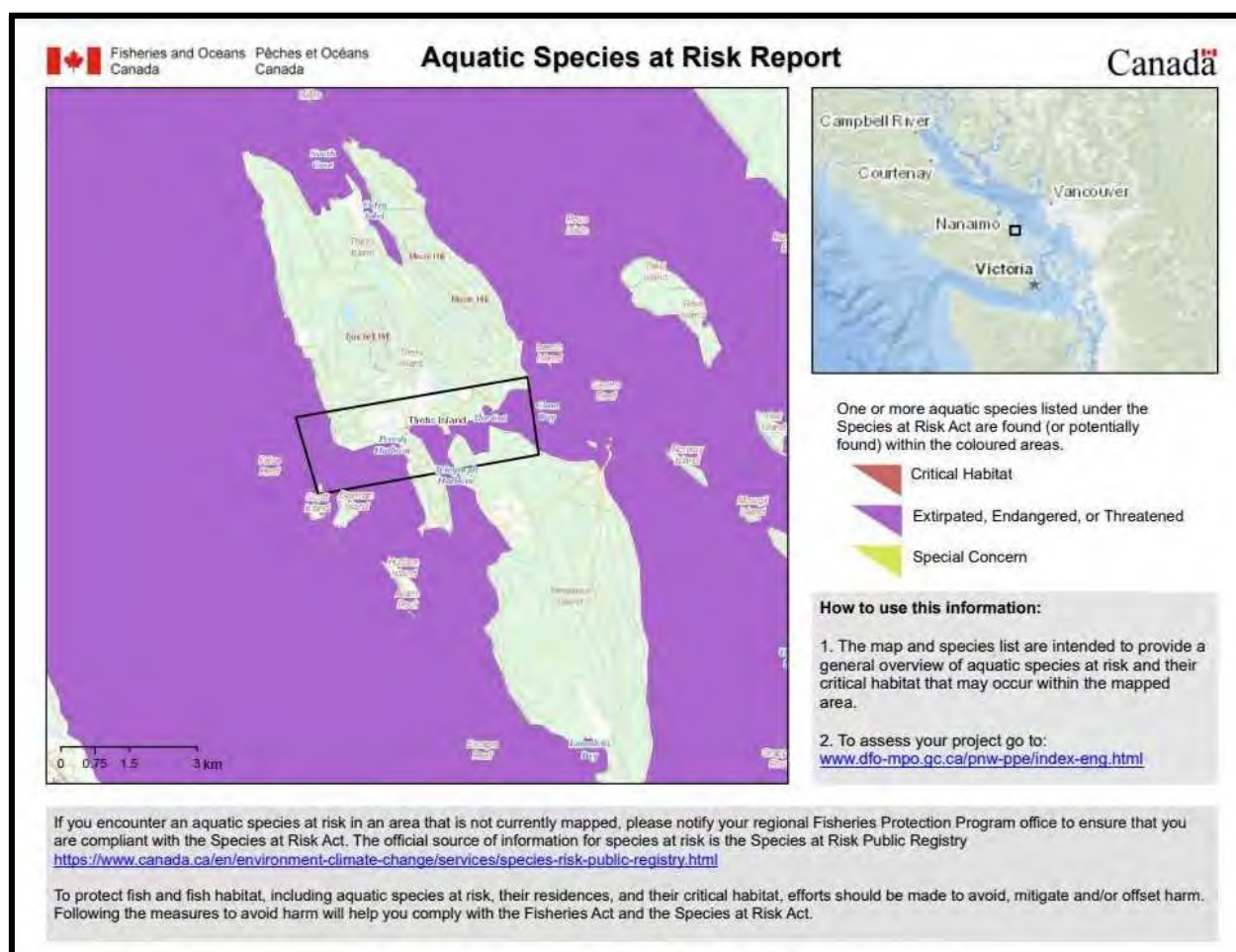


Figure 7. - Critical habitat for these species.

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

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7

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

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⁷ Canadian Species at Risk - Aquatic species at risk map. DFO. Government of Canada. Visited on Nov 16, 2024. Found at.

<https://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html>.

APPENDIX B - SITE PHOTOGRAPHS
83 & 84 Blue Heron Road, Thetis Island, BC

Photo Sheet 1



Photo 1. The subject property 83 Blue Heron Road, Thetis Island, BC, shows the subject property's western extent of foreshore.



Photo 2. Facing north towards the existing retaining wall.

Photo Sheet 2



Photo 3. Facing south towards Penelakut Island at “the cut” passage separating Thetis Island sp.) at 83 Blue Heron Road.



Photo 4. Facing west at Glasswort (*Salicornia* established along the foreshore of 83 Blue Heron Road.



Photo 5. Tall Oregon Grape (*Mahonia aquafolium*) established along the top of existing retaining wall



Photo location - lot 83.

Photo Sheet 3



Photo 6. Facing northeast towards Arbutus Trees established along the crest of the the east slope.



Photo 7. English Ivy growing underneath Arbutus trees - to be removed during planting of native species.



Photo 8. Douglas fir (*Pseudotsuga menziesii*) volunteers growing on the west slope.



Photo location.

Photo Sheet 4



Photo 9 & 10. Facing west at subject properties west slope and salt marsh vegetation in Clam Bay. Established colonies of Sea Arrowgrass (*Triglochin maritimum*) and Entired-leaved Gumweed (*Grindellia integrifolia*).



Photo 11 & 12. Upland forested area with second-growth Douglas fir (*Pseudotsuga menziesii*).



Photo location.

Photo Sheet 5



Photo 13. Lawn grass area behind subject house (Lot 84 residence).



Photo 14. Facing south along the crest of the Western slope showing established Coastal Douglas fir (*Pseudotsuga menziesii*).



Photo 15. Looking at a patch of *Daphne* (*Daphne laureola*) invasive plant species to be removed.

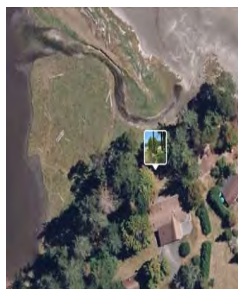


Photo location - subject home on Lot 84.

Endnotes:

1. Glasswort- Sea Milkwort Estuarine Site Association (EM02) (Wetlands of British Columbia 2004. Accessed Nov 16, 2024. Found at. <https://www.for.gov.bc.ca/hfd/pubs/Docs/Lmh/Lmh52.htm>;
2. P1. Thetis Island Nature Based Erosion Protection Design Basis, NCH Oct 2024;
3. The Great Blue Heron Atlas database. Accessed on Nov 16, 2024. Found at. The Great Blue Heron Atlas database. Accessed on Nov 16, 2024. Found at <https://www.cmnbc.ca/the-great-blue-heron-atlas/>;
4. Provincial Wildlife Tree Stewardship Atlas. Accessed on Nov 16, 2024. Found at. https://cmnmaps.ca/WITS_gomap/; and
5. Hul'qumi'num names reference for Native Plant Selection above: Luschiim's Plants - traditional Indigenous Foods, Materials and medicines, Drs. Luschiim's and Turner. 2021.

Marine Shoreline Site Assessment Report (MSAR) GSH_Welsh/83 & 84 Blue Heron Rd., Thetis Island, BC



The diagram was created by R. Welsh (2020), D. Fenton added labels for areas reflected in the MSAR – Orange circle is South Shoreline (SS or S Shoreline) and blue circle is the East Shoreline or ES/E Shoreline.

Prepared for Rob & Marcie Welsh, Oct 26, 2023 – Feb 25, 2024

Site Visit dates: Sept 30, 2023, Oct 26, 2023, and Feb 5th, 2024.

Prepared by: Fenton & Associates Environmental Consulting

Intro

The clients bought these properties in 2016 as they retired and moved back to the coast from the Kootenays. They have spent the last years living and learning about and from the place. The project's underlying theme is to successfully apply for an expedited permit process for NBSP (Nature-based Shoreline Projects) in SW BC, West Coast Pilot, following the Green Shores (GS) guides.

Lots 83 and 84 are privately owned by the same people, who use Lot 83 as their residence and rent the other out to a long-term tenant. Per Nov 15, 2023, the email direction from FCBC (FrontCounterBC) was to apply as co-applicants in this process. Their goal is two-fold: first, to complete shoreline restoration at two sites of concern on Lot 83 while sharing the shoreline and NBSP regimen with Lot 84. The second accomplishment would be to achieve the GSH (Green Shores for Homes) through the Stewardship Centre for BC's Green Shores program.

The timeframe shown in the Project's Gantt Chart below is estimated to be Sept 2023 – Spring 2024 (planning/studies/reports/restoration plans/permitting), then Summer Jun – Sept/Oct for construction phase 2024, followed by three years of GSH Monitoring.

The goals are multifaceted and rooted in the broad and long-term benefits of increasing shoreline resiliency to CC, SLR, and the local coastline's associated impacts. They will also take this as an opportunity for relationship building with the Penelakut/Pune'luxutth Tribe by continuing or enhancing their annual use of the shoreline impacted by these projects. They hope to respect the rich Indigenous history and cultural ties to the land. To learn from and to foster greater access for their community over time.

The priority for them is to meet or surpass the criteria outlined in the GSH project criteria, opening the door to long-term shoreline resilience; these values align with FAEC and the services it offers and are uniquely timed in that FAEC has been searching for a GSH project for it's resume.

Company profile and brief history

FAEC is a sole proprietorship established in 2016. For the past 10+ years, the consultant has advised on environmental management matters, starting in Northern BC. Since moving back to the SW Coast of BC in 2017, the focus has been developing skills in the use and implementation of techniques, including:

- Focusing on local projects (restoration and research-focused projects) on Thetis or other coastal marine areas extending from Nanaimo to Saanichton Islet;
- Low Impact design, Marine Shorelines Assess & Design, ecological management/protection plans/construction monitoring; and
- Conducting marine shoreline restoration, site assessments, navigating permitting requests for clients, and advising local governments on mindful protecting, preserving, and restoring shoreline habitat health for the Coastal Salish People and the Salish Sea as a whole.

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Acronyms/Abbreviations

Acronyms/Abbreviations (updated Feb28, 2024)

AIA – Archaeological Impact Assessment

AOA - Arch Overview Assessment - in general use as well as at the Arch Branch itself

AS – Accretion shoreform

BCBC - BC Building Code

BMP - Best Management Practice

BP - Building Permit (CVRD)

CAPM - Certified Associate of Project Management, PMI

CC – Climate Change

CDC – Conservation Data Centre

CDF zone – Coast Douglas-fir zone

CDFmm – CDF moist marine

CE - Coastal Engineers

CECAB - Canadian Environmental Certification Approvals Board - <https://eco.ca/environmental-employers/memberships-and-designations/member-roster/>.

CEMP - Construction Environmental Management Plan

CEPA – Canadian Environmental Protection Act

CESCL - Certified Erosion Sediment Control Lead, - Erosion & Sediment Control Association of BC

CIA/CEA - Cumulative Impact Assessment / Cumulative effects assessment

CLAMP - Crown Land Application Management Plan

CMT – Culturally modified trees

CPR – Coastal Processes Report

CRDT – Cumulative Risk Determination Tool

CSP – Coast Salish People

CVRD - Cowichan Valley Regional District

DFO - Department of Fisheries

DRIPA – Declaration of the Rights of Indigenous People Act

EBM - Ecosystem-based Management

ECO Canada - Environmental Careers of Canada

EM – Environmental Monitor

EMA – Environmental Management Act

EMP - Environmental Management Plan

EP - Environmental Professional

EPP - Ecosystem Protection Plan

ESC – Erosion and Sediment Control

FAEC - Fenton & Assoc. Environmental Consulting

FF – Forage Fish

FN – First Nations

GS - Green Shores

GSH – Green Shores for Home

GSHM – Green Shores for Home Monitoring

GSP - Green Shores Professional

GSP(it) - Green Shores Professional (in Training)
HCA - Heritage Conservation Act
HHW – Higher High Water
IE – Indigenous Engagement
IT - Islands Trust
ITA - Islands Trust Act
ITC - Islands Trust Conservancy
LID – Low Impact Design
LTC – Local Trust Committee
LWD - Large woody debris
MABRRI - Mount Arrowsmith Biosphere Region Research Institute
MBCA – Migratory Birds Conservation Act
MSAPGINPRC - The Multi-species Action Plan for Gulf Islands National Park Reserve of Canada
MSAR - Marine Shoreline Assessment Report
MSDG – Marine Shoreline Design Guide (2014)
MEP - Master of Environmental Practice
MHW – Mean High Water
MHWL – Mean High Water Mark
MLLW – Mean Low Low Water
NBS - Nature Based Solution
NBSP - Nature-based Shoreline Protection - is the name of the program that is partnering with GS to implement the trial the expedited permitting process.
Net Zero Carbon home - NZC
Net Zero Home - NZH
NR - Natural Resources online Portal - the BC govs crown land information/permitting portal
OCP - Official Community Plan
OHWM – Ordinary High Water Mark
OM – Organic material
OSH - Occupational Health & Safety
PAH – Polyaromatic Hydrocarbons
PC – Project Coordinator
PCOC – Potential Contaminate of Concern
PH - Passive Home - as an existing standard
PI – Pune’luxutth/Penelakut Island
PID – Parcel Identifier
PM - Project Manager
QEP – Qualified Environment Professional
RA/RM - Risk Assessment/Management
RAAD - Remote Arch Assessment Database - Arch Branch of BC
RAD - Right angle drive - ;)
RBTech – Registered Biological Technician
RPBio. – Register Professional Biologist
RWC – Rainwater capture
RWH – Rainwater harvest

R&R - Roles & Responsibilities - in my world ;)
SARA – Species at Risk Act
SLR - Shoreline Restoration
SLR - Sea Level Rise
SMP - Soil/Substrate Management Plan
SPERNP – Spill Prevention and Emergency Response Notification Plan
SPERP – Spill Prevention and Emergency Response Plan
SWM – Storm Water Management
TBD – To be determined (CEMP will be updated as the project evolves)
TDGA – Transport of Dangerous Goods Act
TEK – Traditional ecological knowledge
TEM – Terrestrial Ecosystem Mapping
TK – Traditional knowledge
WQMP – Water Quality Management Plan
Yo – years old

Table 1.- The primary author and other Associates contributed to the MSAR.

Name	Position/Affiliation	Professional Accreditation or subject expertise	Contribution
Doug Fenton	Primary Consultant, Fenton & Assoc. Environmental Consulting	MEP, EP - EM, HS, Reg#: 22432 CESCL – ID#: 220367 PMI - Associate Green Shores Professional (iT),	Author - MSAR Indigenous Engagement, PM, PC.
Ian Bruce	Associate Consultant working with FAEC. Pres., Watershed Ecological Services Ltd.	B.Sc. (Mar. Bio), R.P. Bio, QEP Dip. Restoration of Natural Systems Reg #: 496	Reviewer & Contributing Consultant.
Augie Sylvester	Pune'luxutth Elder - Traditional Consultant / Indian Medicine.	Pune'luxutth Elder – Traditional Consultant Cultural foods and medicinal plants.	Site visit pre-design with consultation on identifying traditional values (significant &/or sensitive) - food, medicine, and ancestors.
Marya Luby	Pune'luxutth Traditional Elder Consultant/Medicine Woman. Elder support person.	Pune'luxutth Traditional Elder Consultant/Medicine Woman.	Site visit pre-design with consultation on identifying traditional values (significant &/or sensitive) - food, medicine, and ancestors.
Christine Brophy	Brophy	BNRP, RBTech	Pending greenlight of construction - creating the NR shoreline plant restoration Plan
tba	Archaeologist		Oversight and guidance/assist with Chance Find Procedure

Project Overview

Project title

GSH (Green Shores for Homes) at the Welsh properties 83 & 84 Blue Heron Rd., Thetis Island, BC

Project location

Table 2.- Description of Land of the main residence.

Physical Address	83 Blue Heron Rd., Thetis Island, VOR 2Y0.	
Parcel Identifier (PID)	004-555-538	
Legal Description	Lot 7 District Lot 12 Thetis Island, Plan VIP15927 Cowichan District	
Area	1.29ac/0.52ha/5222.67m ²	
Shoreline length¹	137.89m	

Table 3.- Description of land of the rental home.

Physical Address	84 Blue Heron Rd., Thetis Island, VOR 2Y0.	
Parcel Identifier (PID)	000-908-720	
Legal Description	Lot 6 District Lot 12 Thetis Island, Plan VIP15927 Cowichan District	
Area	Area: 1.5ac/0.61ha/6072.87m ²	
Shoreline length	107.7m	

Project dates

The project is being considered for construct summer 2024 with monitoring based on the GSH Monitoring framework, starting immediately post construction through summer 2027.

Gantt Chart of Project.

Activity	Fall 2023	Winter 2024	Spring 2024	Summer 2024	Fall 2024	Winter 2025	Remaining 2025	2026	2027 Fall
DFO timing window Area 17 - Nanaimo			Jun 1-	Sept 1		Dec 1- Feb 15			
Planning/Permitting									
Construction phase									
GSH Monitoring									

Note: A Planning-phase Construction Environmental Management Plan (CEMP) for Gantt chart that highlights the windows of least impact. During the construction phase, the CEMP (Construction Environmental Plan) will reflect the most current and design-specific amendments and take precedence over this project's Gantt chart.

Scope of Work being considered in the Marine Shoreline Assessment Report

1. There is a need to protect this structure from shoreline erosion and sea-level rise using the Green Shores (GSH) approach and nature-based solutions.
2. Build a new house or significantly renovate our present home.
3. Establish a naturescape landscape to replace the acre of mowed grass incorporating LID (Low Impact Design) and native vegetation.
4. Build/renovate the garage/shop to house the battery system and more solar panels.
5. Establish a Rainwater Harvest (RWH) plan to source, distribute, and position the water storage structures.

¹ Property Survey. GW Lindberg Land Surveying Inc., File No. GWL015-761-3qw32-Epp52414 – July 5, 2015. See Appendices #9a & 9b– registered surveys.

Project Site Assessment Area Overview

The property is in a Biogeoclimatic subzone CDFmm (Coastal Douglas-fir moist marine). “The Coastal Douglas-fir biogeoclimatic zone (CDF zone) is the smallest and most at-risk zone in British Columbia (B.C.). As home to the highest number of species and ecosystems at risk in B.C., many of which are ranked globally as imperiled or critically imperiled, it is of great conservation concern².” See Appendices #9 – CDF Zone TEM.

S-face – concrete stairs to the beach set in a short bank made of glacial till (possibly disturbed when stairs were installed as this layer isn’t as hard as other areas around Thetis—active erosion along the stairs (wave action or water from above??). The access point above is a flat area that appears to have been wet++ during the winter. A steep but short bank (2-3.0m) with concrete stairs set into an existing bulkhead was installed possibly in 1954 (see Photo #15, on p.27). It’s a concrete structure approx. 1-1.5m height. This ends in a set of large boulders, a mix of sandstone and granite (.5m x -1.5m in size).

E-face – accessible from the S-facing stairs; there is no human access, only signs of deer trails. It is difficult to say without digging/cutting the brush back; it appears to be signs of possibly a combination of planar and overhanging slide activity. It has its own modified assessment following the S Shoreline Assessment, below on p.28.

Boat dock area – To the west of the S Shoreline project. It is not part of this assessment process, nor is it part of the GSH Project. However, the owner states that its management in the future will be dictated by the GSH monitoring and upkeep protocols that support the GSH approach.

Methodology

Follows the MSDG (Marine Shoreline Design Guide. 2015) framework with the outcome informing the client, and solely the client, about the two areas of concern that the client has identified and is seeking to find a resolve using nature-based shoreline protection (NBSP) techniques. The client has taken his Green Shores Level 1 to learn more about their approach and how it might apply to their situation.

Given the long delays in the BC Gov permitting process, it is recommended to explore and submit via the expedited permitting process West Coast Pilot that the Stewardship Centre of BC has joined forces with the Prov to create a guide and support to their getting a GSH (Green Shores for Homes) certification. Given that the Species at Risk Act (SARA)/Critical and Sensitive Habitat) has been expanded for this report to meet the needs listed under the NBSP (Nature-based Shoreline Projects) checklist criteria, FAEC has added more emphasis to this aspect of the MSAR and has added CEMP that ties to any SARA-related findings and the prevention of harm and the potential augmentation of habitat where applicable. A final note regarding the site surveys are purposefully done perpendicular transect off the shoreline of concern, completed in

²P5. Terrestrial Ecosystem Mapping of the Coastal Douglas-Fir Biogeoclimatic zone. Madrone Environmental Services Ltd. 2008.

a cursory/surface survey fashion, with no secondary samples involving turning of stones or digging into soils/beaches at pertinent transition points along each transect.

The principles and priorities rooted in this MSAR are:

- Prioritize reconciliation as part of effectively working with the Indigenous engagement.
- Complete a review of all applicable acts and regulations to see how they would impact the project -see Appendices #7 - The Welsh GSH Project-specific Environmental Laws Table.
- Follow an environmental management approach of identifying the associated best management practices, mitigations, DFO standards and codes of practice necessary for federal, provincial, and local government statutes.
- This MSAR is not an engineering document; its focus is the many facets of shorelines and their interconnectedness to the local ecology, unique to this place/these properties, and the anthropocentric impacts on the natural ecological systems over time.
- The MSAR informs us of the critical/sensitive hab that the CEMP (Construction Environmental Management Plan) will need to guide the protection of the local/regional environment during the construction and monitoring phases of the shoreline restoration phase; which will be a multiple effort in itself.
- The last component is the SARA (Species at Risk Act) framework and how it applies to the project and habitat restoration for migratory birds, transient species, and native species. This insight will be blended into the CEMP to ensure these species and their habitats are considered and protected throughout the project.

Fortunately, the client has engaged a CE (Coastal Engineer); many projects do not, so the MSAR covers the standard MSDG framework for shoreline restoration, and recommendations are in preparation for the discussions with CE and is not an engineering document, it is designed to complement the CE's design work, Coastal Process Report, and the client's pursuit of their GSH/Monitoring project.

All previous projects completed by FAEC using the MSAR framework have used the GSH credits as recommendations or strategies for the client to consider, as it makes good sense. After completing the MSAR, it has been designed to feed into these appropriate techniques and opportunities to reduce erosion and restore shorelines mindful of the ecosystems. So, it is exciting that the client is keen to pursue his GSH accreditation as part of the overarching approach to the shoreline restoration work.

Marine Shoreline Checklists and Tools

CULTURAL RESOURCES

Historical overview of indigenous cultural values/asset

The local FN community is the Pune'luxutth/Penelakut Tribe (PT); before colonial contact, there is endless historical use all over Thetis, as this has been the home of the Pune'luxutth and other Coast Salish people since time immemorial.

According to stories shared by Pune'luxutth Elders Florence James and Augie Sylvester, this property was the E edge of a large salt marsh that connected the two land masses; it was full of life's bounty, on low tides passable on foot, with a shallow canoe passage that allowed for the movement for the Pune'luxutth people across Canoe Pass from side to side, and into Clam Bay on the N end of Pune'luxutth for harvesting food³.

Site Visit by Elder Augie Sylvester – Feb 16, 2024.

Points shared by Elder Augie Sylvester were:

- He stated that the dredging in the early 1900s by the Hunter family led to a steady decrease in the health of the salt marsh and the types of vegetation that grew in it. He also pointed out that potential archaeological features virtually cover the entire property, finding midden along both shorelines.
- The owner of this property (of the era) hired a crew of men to hand dig the dock area out in the early years of living here. Another permanent change to the local vegetation. Sadly, this is true for much of the shoreline properties around Thetis.

Cultural values identified on the site visit were:

- ✓ There are medicinal plants/trees along the E Shoreline cultural foods on the foreshore areas – both sides.
- ✓ Elder Augie shared that he has been using this shoreline for as long as he can remember; this area has provided for him, his family and the indigenous community in the form of clams ("butters"/S-axwa' or butter clams, littlenecks/Skw'lhey, Pacific oysters/Tl'uxwtl'uxw, and fish from smelt forage fish/Stsa'kwum such as herring/Slhewut' as they travel through these waters, perch/Wiitsi' (food/bait), vegetation foods as well such as sea asparagus, trailing blackberry/Sqw'iil'muhw for tea and other medicinal plants from the trees along the backshore⁴.
- ✓ This shoreline has been part of the Pune'luxutth community for millennia, and the proposed work will only enhance the long-term benefits of the area.
- ✓ The midden seen is from supporting a life of eating/harvesting from the Canoe Pass shorelines and there are no signs or history that they are aware of sensitive use such as burial sites, cultural protocols, nor any messaging for the ancestor (Marya – a cultural burial person on her mom's side) that this restoration would not be impacted by this restoration effort.

³ Personal notes – Doug Fenton, EP, and resident of Thetis Island. Aug Summer 2023.

⁴ All Hul'qumi'num spelling for the references used in the IE site visit (Feb 2024) taken from Ecosystem Guide – A Hul'qumi'num language guide to plants and animals of southern Vancouver Island, the Gulf Islands, and the Salish Sea. Parks Canada, Hul'qumi'num Treaty Group, Ladysmith BC. 2011.

- ✓ Both Augie and his daughter (cultural medicine person) supported the idea of indigenous monitors, and the restoring these shorelines to native vegetation would enhance the health, and increase the cultural foods and medicines found in the area.

Another cultural asset/contemporary connection identified was the vast cultural food source these intertidal areas are for the Pune'luxutth people. Part of the tribe's economic development activities was to start up Penelakut Seafood Ltd., which holds a few commercial licenses around Thetis Island. One is in Canoe Pass, and the other is on the N end of Thetis. In the fall of 2016, the existing license of occupation held by Penelakut Community and Penelakut Seafood Ltd negotiated access to the foreshore along Canoe Pass/"the cut" for clam harvesting (cultural and commercial) through Thetis Local Trust Committee (Thetis LTC) and the province. The landowner will continue this activity post-shoreline restoration project, hoping to enhance the relationship with the Pune'luxutth community.

[The strategy to address the HCA \(Heritage Conservation Act\)](#)

The indigenous history of these properties was the client's first concern, and hence, the first task on the project's task list was completing the following process so it could inform the entire project/s:

- ✓ The Expedited Permit for NBSP requires applicants to request archaeological information about the project site through a BC Archaeological Information Request Form before submitting their project application. So, on Aug 16, 2023, FAEC completed on behalf of the client an RAAD AOA request form – via BC Arch Branch and the Heritage Conservation Act and, on Aug 18, 2023, received an Archaeological Overview Assessment (AOA) via BC Arch Branch/Min of Forests, including a map and advice BC Arch Branch permit #: DfRv-73. See Appendices #1.
- ✓ This project/s can adhere to the restoration work and must not disturb the red permit area. For the details of how to accomplish this, refer to page 28 of the MSAR E Shoreline Assessment - Determining site-based causes of erosion, where there is more detailed discussion about the justification and arguments that support proceeding without further AOA expense and delay for permitting, as well as the outcomes that may surpass the recognition of indigenous traditional territories, the need to preserve and protect this project under the HCA. Acting on this project through a reconciliatory lens and engaging collaboratively with the Pune'luxutth Tribe fosters/embraces a new beginning of a severely tarnished relationship with the FN community whose territory it belongs.
- ✓ See **Appendix #2** Welsh_GSH Project Tracking FN Consultation_FAEC Jan 2024.
- ✓ A Chance-finding protocol must be in place for the duration of this project. See **Appendices #3**; and
- ✓ FAEC is in the process of finding to an Archaeologist/local consultancy that can familiarize themselves with the Arch Branch RAAD AOA to respond if culturally significant/sensitive material is discovered.

Marine Shoreline Site Visit- Assessment of the South-facing Shoreline Area

Geological and Geomorphology



Photo #1

S Shoreline is one of two sites of concern, stairs on the left and the hard armour/concrete on the right. Photo credit D. Fenton, Oct 26, 2023.



Photo #2 - on the right is the stairs of the same concrete seawall/hard armour. Photo credit D. Fenton, Oct 26, 2023.

Evidence of slope character

- **Soil Types / Layers:** Sedimentary sandstone with glacial till and thin layer of OM (5-16cms), pockets of large boulders randomly distributed along the shoreline, as well as patches of blue clay. At time of construction (1954+), and insight from the indigenous engagement site visit (Feb 16, 2024, this location was already level with a base of glacial till, with boulders and a thin layer of OM.
- To the left of the staircase the material that goes out the short point, where the yellow cedar and Nootka rose are growing, if you lift the cedar bows, there is a mix of materials, old concrete walls, creosote treated timbers, rocks, and a thin layer of soil over top.

Evidence of landslide activity: (slope stability)

- **Yr. and type:** There is no evidence of land slide, there is erosion around concrete stairs to the W of the hard armour. The bank has existing hard armour consisting of approx. 7m long concrete wall that is 1.2m high. The backshore above is a repose >45 degrees, 2 meters consisting of graded glacial till with a variety of vegetation growing on it.
- **Cause of landslide activity:** Repose is too steep and unmanaged Stormwater from the upland property.

Evidence of Groundwater

Relative Sediment permeability: At or below the MHWL, water is observed running out onto

beach on what appears to be a layer of blue clay. Winter months, the water is seen saturating the ground above at the level of the home and driveway.

Hydroponic vegetation: Salt tolerant grasses, Willow dock (*Rumex salicifolius*), sea asparagus (*Sarcocornia pacifica*).

Shoretype (list)

- Accretion Shoreform localized beach features - accretion from upland creek and estuary. The local conservancy is involved in a Citizen Science Forage fish monitoring for past 5-6yrs, this beach was consistently too silty and is no longer being tested. S facing beach sediment flow is a modified do to being partially armored.

Localized beach features: sand, small to larger cobble.

Evidence of wave climate

- **Fetch:** Based Google Earth the fetch is 0.5kms.

Evidence of coastal flooding

- Not now at this upland location but with SLR in 50-100 years, this area will be at risk.

Evidence of coast erosion: None observed.

Beach sediment & grain size and type:

- Based on the GSH (Green Shore for Homes): Using Wentworth Scale⁵ there is:
- Backshore – sparse pebble gravel, shell with a sand base with very sparse boulders 40-6000mm+

Backshore features: **Existence? Yes: Dimensions:** 2.5m below toe of bank/bottom of the wall and 2m above armour wall 20m+W.

Evidence of Large woody debris? Yes, a limited amount along this portion of the shoreline. Approx. 25cms in diameter x 18m long.

Evidence of vegetation? – Yes

Type: Salt tolerant grass along base of seawall, Sea asparagus⁶/*Salicornia virginica*/, Dune⁷ / *Elymus mollis* or European beach grass /*Ammophila arenaria*, and Willow Dock⁸/*Rumex salicifolius*.

⁵ US Geological Survey. Nomenclature/Wentworth grade scale. Accessed Oct 30, 2023. Found at. <https://pubs.usgs.gov/of/2006/1195/html/docs/nomenclature.htm>

⁶ A Field Guide to Marine Life of the Protected Waters of the Salish Sea. Harbo, R. 2019.

⁷ Plants of Coastal British Columbia, Pojar & MacKinnon, 1994.

⁸ Willow dock. iNaturalist.ca. Found at. <https://inaturalist.ca/taxa/60233-Rumex-salicifolius>



Photos #3, #4 & #5. Note: Left to right – Sea asparagus, Willow dock, and Dune grass. Photos – D. Fenton. Oct 2023.

- **Invasives** – Himalayan blackberry/*Rubus armeniacus*, Bull thistle/*Cirsium vulgare*, and possibly others.
- Marine Vegetation found in the wrack: Green seaweed (*Ulva linza*)⁹.

Beach type for site segments

- Upper intertidal – very sparse cobble gravel with sand base (left photo below) and a very sparse line of sandstone and granite boulders (right photo below).



Photos #6 - Left: Cobble gravel with a sand base. Photo – D. Fenton. Oct 2023.



Photos #7 - Sparse cobble gravel on a sand, shell base. Photo – D. Fenton. Oct 2023

- Vegetation: Green seaweed (*Ulva linza*).
- Marine life: Acorn barnacles¹⁰, Littleneck clams (*Protothaca staminea*)/Skw'lhey shells observed¹¹, and a Plate limpet¹² (*Notoacmea scutum*).
- A culturally important food for FN (steamed) and medicinal uses for the juices.
- Mid intertidal – cobble gravel with a sand base and very spare boulders.

⁹ A Field Guide to Seaweeds of the Pacific Northwest, Clarkston, B. 2015.

¹⁰ A Field Guide to Marine Life of the Protected Waters of the Salish Sea.

¹¹ Ecosystem Guide – A Hul'q'umi'num language guide to plants and animals of southern Vancouver Island, the Gulf Islands, and the Salish Sea. Parks Canada, Hul'q'umi'num Treaty Group, Ladysmith BC. 2011.

¹² Pacific Reef and Shore – A Photo Guide to NW Marine life. Rev. 2nd ed. Harbo, R. 1949

- Marine Vegetation: *Ulva linza*¹³
- Lower intertidal – sand and silt; hence more features of a low-energy beach.



Photo #8 - Located in the upper tidal zone, Cobble gravel with Sand base. Acorn barnacles, Littleneck clams (*Protothaca staminea*)/Skw'lhay shells observed, and a Plate limpet (*Notoacmea scutum*). *Ulva linza*, barnacles. Photo credits – D. Fenton. Oct 2023.



Photo #9

A view of the intertidal area, starting with mod-dense cobble gravel, very sparse boulder gravel, on a sand base to pure sand. Photo – D. Fenton. Oct 2023.

Cross section elevations

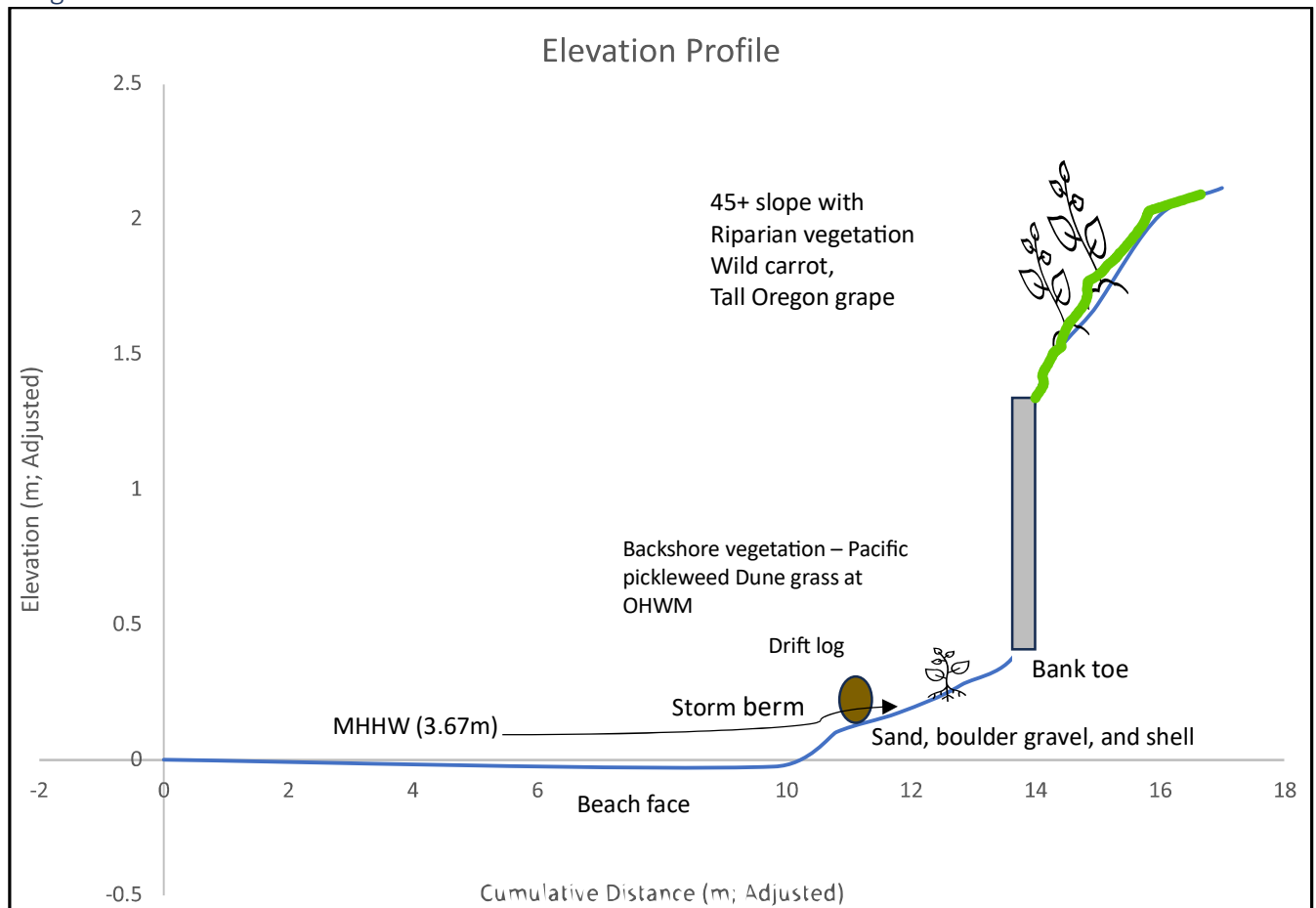
- **Bluff top:** approx. 2m above/upland from top of seawall – 6.3m wide **distance:** 4.5m
- **Bluff toe:** 6.3m w **distance:** 4.5m
- **Width of backshore:** approx. 6m
- **MHHW Elevation:** 3.7m¹⁴

¹³ A Field Guide to Seaweeds of the Pacific Northwest, Clarkston, B. 2015.

¹⁴ Preedy Harbour – 07471. Canadian Hydrographic Service. Gov of Canada. Accessed Dec 3, 2023

- **Beach Top:** 20+m **distance:** 3m
- **Beach toe:** **distance:** 25m
- **Water line elevation:** 2.2m **time:** 1140h
- **Note:** the tape roller mechanism broke on the and day and was unable to roll it out beyond 6m. Paced. Then the beach profile data was collected on a separate date, Dec 3, 2023, and tape measure issue had been resolved and the measurements were accurate to 0.00m.

Diagram #1 – S Shoreline Beach Profile



Graph: Beach Profile of S Shoreline on Lot 83. created using the Welsh GSH Project Submittal xls Binder. MHHW - (Mean Higher High Water).

Upland Surface Water Drainage: of the S Shoreline

Surrounding land use

- **Streams? (Yes):** 500m NE
- **Wetlands (Yes):** 500m NE
- **Seeps and springs (y/n):** No seeps or springs observed. Though upland SWM is nonexistent that leads to seasonal flooding in the upland area above and NW of the crest of the bank.

Drainage control

- **Stormwater systems (y/N):** No SWM systems observed.
- **Impervious surfaces Y/n):** concrete along W side of home and over to the multiuse shed to

the N.

- **Discharge points:** home gutters empty at level of home. No discharge points to shorelines observed.

Site Vegetation, habitat, and species

- Method or Approach to assessing these sites are Desktop and Field survey of the shoreline (backshore and intertidal) and the Upland (Google earth to understand the hydrology and development over time + 60-100m inland of the Natural Boundary).
- Located in a CDFmm biogeoclimatic zone.

Invasive vegetation¹⁵ (Yes): Himalayan blackberry/*Rubus armeniacus*. Holly.



Photo #10 Himalayan Blackberry. Photo
- D. Fenton. Aug 22, 2023.

Native Plants Present¹⁶¹⁷: Yellow cedar¹⁸/*Callitropsis nootkatensis*/Pashaluqw, Western Red Cedar/*Thuja plicata*/Xpey', Coastal Douglas fir (CDF)/*Pseudotsuga menziesii*/Ts'sey, Arbutus/*Arbutus menziesii*/Qaanlhp. Nootka rose/*Rosa nutkana*/Qel'qulph, Tall Oregon grape/*Mahonia nervosa*/Lulutth'sulhp, Hairy honeysuckle/*Lonicera hispidula*/, Wild carrot¹⁹/*Daucus pusillus*/Shewq, Moss/Bryophytes on the concrete wall and stairs.

¹⁵ Plants of Coastal British Columbia, Pojar & MacKinnon, 1994.

¹⁶ Plants of Coastal British Columbia, Pojar & MacKinnon, 1994.

¹⁷ Ecosystem Guide – A Hul'q'umi'num language guide to plants and animals of southern Vancouver Island, the Gulf Islands, and the Salish Sea. Parks Canada, Hul'q'umi'num Treaty Group, Ladysmith BC. 2011.

¹⁸ A Field Guide to Trees of the Pacific Northwest. Hudson, P. 2012.

¹⁹ Wild carrot. iNaturalist.ca. Accessed Oct 30, 2023. Found at. <https://inaturalist.ca/taxa/56726-Daucus-pusillus>



Photo #11 & #12 – Yellow cedar, CDF behind n, Nootka rose – left A & Hairy honeysuckle on the right. Photo - D. Fenton. Aug 22, 2023.



Photo #13 & #14 – Yellow cedar, CDF behind n, Nootka rose, Tall Oregon grape, Hairy honeysuckle. Photo - D. Fenton. Aug 22, 2023.

Shoreline vegetation

- Sea asparagus/*Salicornia virginica*/, Dune / *Elymus mollis* or European beach grass / *Ammophila arenaria*, see picture #: 3, 4 & 5 above.

Forbes - Dandelions²⁰/*Taraxacum officinale* (introduced by settlers).

Domestic/Imported: Japanese maple²¹/*Acer palmatum*, Creeping juniper (*Juniperus horizontalis*).

Invasives - Himalayan blackberry/*Rubus armeniacus*, Bull thistle/*Cirsium vulgare*, and possibly others.

²⁰ Plants of Coastal British Columbia, Pojar & MacKinnon, 1994

²¹ Japanese Maple. iNaturalist.ca. Accessed Oct 30, 2023. Found at. <https://inaturalist.ca/taxa/63512-Acer-palmatum>

Vegetation condition – healthy (Yes): the local foliage varies based on location and drought tolerance. What was observed varied from recently dead arbutus to healthy yellow and Western red cedars along this section of shoreline. See Pic #15 – below to see the native vegetation along S Shoreline.

Juvenile salmon: forage fish habitat (Y/n):

- Yes, the area was assessed as part of a larger FF study completed by SeaChange/ITC 2012²², technically yes, but after several years of sampling through the Thetis Island Forage Fish Sample Stn found it to be too silty²³.
- **No juvenile salmon/salmonids observed.**

Wildlife species present

- ✓ Ducks observed though too far away to id, Blue Herons/Smuqw'a'/Ardea herodias fannini, Belted King fisher/Megaceryle alcyon, Pacific wren/Troglodytes pacificus, Song sparrows/Melospiza melodia, and other songbirds.
- ✓ DFO Management Area – 17.8

Vegetation & Wildlife with Cultural Significance to Coast Salish People (CSP)²²:

- ✓ Arbutus/Qaanlhp – very drought tolerant in the rocky bluffs, used as a flavour additive and preservative for wild game.
- ✓ Cedar/X'pey – Grows in moist areas of the forest – shade to full sun. They're considered the eldest of the trees; every part is used. Hence, it is culturally and spiritually significant and irreplaceable value to the CSP.
- ✓ Coastal Douglas-fir (CDF)/Ts'sey – commonly found in dry to moist conditions along the coastal shorelines. They use the CDF for two different types of use that are essential to the CSP and be careful when harvesting bark not to kill the tree.
- ✓ Nootka rose/Qel'qulph (the flower) is edible, and the rose hips have medicinal and spiritual significance.
- ✓ Ocean spray/Qethulhp – typically found in dry to moderately dry areas, including rocky bluffs, it is the hardest of wood in the Gulf Islands area. CSP refer to this as "ironwood." Many uses when there is a need for solid tools, points, or hoops for cooking are needed.
- ✓ Pacific Great Blue Heron/Smuqwa' – found in the shallow waters along shorelines and estuaries, have excellent night-vision. Its name is pronounced just as its heard, when they make their call. They are sentry warning you when someone is coming.
- ✓ Yellow cedar (Nootka Cypress)/Pashaluqw – it prefers rocky moist areas. It is considered a finer fibred material, used for making wooly fabric and a preferred choice carving.

****Note** this list is not meant to be comprehensive list it merely highlights interconnectedness of the CSP to the land and sea around them.

Species at risk

- Given priority in the GSH Projects, and it will be inclusive of both co-applicant properties go to Appendix 6 on p.66 to See Species at Risk in its own separate document.

²² 4a: Eelgrass Presence Thetis Island Local Trust Area, excluding Valdes Island. SeaChange Marine Conservation Society/IT Conservancy. July 2012

²³ MARRI (Mt. Arrowsmith Biosphere Reg. Research Institute)), VIU/Citizen science FF monitoring project (Jun 21, 2018). For more info see. <https://mabrri.viu.ca/>.

Site development features

Primary structures and locations

- House (distance to beach): approx. 11.8m and Seaward edge of deck is **7.5m**
- Roads (distance to beach): 21.0m
- Septic (distance to beach): 25.4m (as the crow flies).

Required setbacks:

- 7.6m from the natural boundary of the sea. Found on pg. 11, Thetis LTC Land Use Bylaw 89²⁴.

Opportunity to relocate (No):

- The owner has mindfully considered this as a potential. After much consideration, they op'd to go with a renovation as they were worried about the unseen costs and other issues, such as the archaeological relevance of this property/location; keeping to the existing footprint would reduce those potentials (cost/delays). The relocation of the home is discussed in more detail in the CRDT (Cumulative Risk Assessment Determination Tool) section.

Secondary features:

- Sheds, garages, driveways (Yes): Multiuse shed to the N of the home.

Unattached patios: (None observed).

- Potential to relocate (N): None.

Animal usage (N):

- No farm animals.

Irrigation, ponds, fountains (Y): Man-made Pond feature to NW of the home.

Potential for contamination sediment or debris (Y/n): Yes, both during the construction phase of the S Shoreline restoration project and the pending renovation project.

- See CEMP (Construction Environmental Management Plan). The CEMP must ensure it accounts for this potential impact of the work in the design/planning phase of the GSH project.

Erosion Control Structures

Type of structure and material used.

An existing hard armour wall installed as far back as 1954 is the date painted on the rock on the point just to the E of the wall. Local knowledge elder Dickie remembers his family using this painted rock as a marker to navigate through Canoe pass in the 1950-70s.

Condition of Structure

- The wall itself is vertical, and the stairs are set back at a greater angle, but >45.

Structure elevation: 1.2m

Presence of fill or excavated areas (Yes).

- Yes, to the W of this shoreline's bay. Broken concrete and old creosote planks.

²⁴ Islands Trust/Thetis LTC - LUBs - <https://islandstrust.bc.ca/document/thetis-island-land-use-bylaw-no-2023/#page11>

Determining site-based causes of erosion

Where on the site is erosion occurring?

- The erosion is around the concrete stairs and appears to be rills along the upland area above the stairs. See photo #15, below.



Photo #15. - S Shoreline: See labels that identify the stairs, concrete wall, granite boulder with a est. date, some of the native vegetation. Photo – D. Fenton. Aug 22, 2023.



Photo #16. Stormwater direction of flow, evidence of water rills and erosion, concrete wall cracked along bottom of wall. Photo - D. Fenton. Aug 22, 2023.

What type of erosion and scale is occurring?

- **Slow but progressive scale**, impacting the S Shoreline by restricting access and future flooding, making this area less and less useable. Moreover, if considering the extended 50-100 yr. vision, then CC/SLR will render this side of the property and its shoreline unusable for humans but also less and less usable by nature as well, with intermittent/seasonal erosion that will lead to silt and sediment at a scale that will be harmful to the local ecosystems along the Canoe Pass.

Why is erosion occurring?

- **Wave attack:** The fetch is >500m, and PI to the S, so it is a low-energy shoreline, so No wave attack.
- **Historical beach gravel mining (on site):** Nothing the owner is aware of.
- **Bluff geology:** Glacial till on sandstone sediment bank, and David Polster²⁵ describes the patches of large granite boulders as remnants of the glacial flow as the glaciers melted leaving them in patches along the coastline.
- **Adjacent coastal structures:** Nothing along this shoreline.
- **Surface/ground water management:** There is no SWM.
- **Vegetation clearing:** This property was cleared a long time ago or probably material was moved and leveled post construction many years ago. Current grasses on upland area, vegetation along backshore consists of many weed-like species and there are no shrubs or trees to speak of.
- **Site excavation or other modifications:** Not confirmed, but most likely backfilled with material from around the home.

How fast is erosion occurring?

- **Onsite evidence:** It is difficult to define, as there are no points of reference to refer to, and the owner has been here for less than 5 years. Given seasonal water, tracts from yard tractor getting stuck and visible erosion around stairs at the seawall, it is starting to progress to a point where the SW will have ever-increasing erosive impacts. No, from an SLR/CC perspective/lens, the resilience of this shoreline will be impacted by future higher tide scenarios of 50+ years, which will make this wall and stairs unusable, potentially flooding this area of the yard in time.
- **History and types of landslides:** Nothing noted.
- **Aerial photograph measures:** Nothing legible at the scale needed to observe changes. Check with CE.
- **Local knowledge:** Local history of use, but nothing about the shoreline conditions.

Is erosion short-term or cyclical?

- **Temporary storm damage:** See below.
- **Seasonal erosion/accretion:** It appears seasonal, especially with the past few years of atmospheric rainstorms, with the massive volume of precipitation over sustained days. Only compounded by the king tide event, when they occur at identical/similar times, exacerbates this erosion from multiple aspects.

²⁵ Natural Processes: Restoration of Drastically Disturbed Sites. Polster, D. June 2017, Polster Environmental Services Ltd.

What development or improvement is at risk?

- **Substantial, such as a house or septic system:** The surrounding area around the home to the W.
- **Roads or utilities:** The driveway is **maybe** high enough to avoid future extreme king tide events. A technical survey is *recommended* to assess this to allow for flood modelling, test these theories, and design the restoration with this in mind.
- **Other unsubstantial improvements:** Multiuse shed will be impacted along this aspect/area of the property. So, part of the design of the S Shoreline restoration needs to be assessed and accounted for to ensure that this structure will be functional year-round long into the future. As part of the homeowner's strategy to increase resilience for those who reside in the home, the multiuse building may support the home by supporting the RWC system, solar PV, and batteries for the home.
 - **Other descriptions:**
 - ✓ evidence of ground water and staircase sinking into bank.

The Interrogation of the Geotechnical Report – South Shoreline

So, there is no geotechnical report that we are aware of for any location on this property. So, when that is the case, FAEC consultants are not from an engineering background, so it finds that this section does a critical review of the site assessment findings, and then that is shared with the clients/landowners GSH team members while looking at the site and shoreline as these questions are thought-provoking and may help the team better understand what is happening uniquely on this site while considering the appropriate techniques and the interconnections of the issues.

See Appendix #4 MSDG Decision Tree and critical analysis of the Geotech related findings.

GEOLOGY AND GEOMORPHOLOGY – E facing Shoreline Area



Photo #1 & #2 - E Shoreline steep repose to level of home (behind tree on left) and new septic (directly behind bank). Orange arrow points to the detritus falling from bank onto backshore area. Photo credit to D. Fenton. Oct 11, 2023.

Evidence of Slope Character:

- **Soil Types:** Glacial till with a thin layer of organic material.
- **Layers:** Sandstone sediment/glacial till, mix large boulders (granite, sandstone), thin layer (100-150mm) of OM on the top. Though it appears on this face that there is a sandwich layer of disturbed or moved material, possibly occurred at time of building (1960s). So, there has been significant tree growth of a variety of indigenous trees.

Evidence of landslide activity: (slope stability)

- **Yr. and type:** A small amount of material is falling and collecting along or behind a log that parallels the shoreline (see above photo).
- **Cause of landslide activity:** There is almost vertical (0.5:1) for the first 2m, and over 50% thereafter to the top edge that is approx. 2-2.5m above (6.0+m in total).

Evidence of Groundwater

- Relative Sediment permeability: The top layer is relatively permeable.
- Hydroponic vegetation: Sea asparagus and Coastal Salt grass along shoreline.

Shoretype (list): Feeder beach.

- Localized beach features: sand/shell, pebble gravel, shell, boulder gravel.

Evidence of wave climate

- **Fetch:** Due E winds a fetch of >8kms. The primary SE winter storm winds are buffered by PI (Penelakut spit) (<1kms). The client's stated concern is wind from due E in the winter months associated with a king tide event.

Evidence of coastal flooding

- Not at this location of the property.

EVIDENCE OF COAST EROSION: YES, ALONG THIS PART OF THE SHORELINE, ESPECIALLY AT KING TIDE + STRONG E WINDS.

Beach sediment & grain size and type²⁶: Upper intertidal – sand + sparse pebble gravel.

Cobble: A specific size class of gravel sediment 64-256 mm (2.5-10.1 in) in median diameter.

Common on coarse gravel beaches in and around Thetis and the gulf islands.

Gravel: Unconsolidated rock fragments (sediment) greater than 2 mm (0.08 in) in median diameter. Consisting of, in order or increasing grain sizes, granule, pebble, cobble, and boulder.

Pebble: A specific size class of gravel sediment with 4-64 mm (0.17-2.5 in) median diameter.

Common on gravel and mixed gravel and sand beaches in the SGIs (Southern Gulf Islands).

Backshore features

- **Existence? (Yes):**
- **Dimensions:** 24mW x 2-2.5m D
- **Evidence of Large woody debris? (Yes):** Sparsely spread along the shoreline.
- **Evidence of vegetation? (Yes) – Yes.**
- **Type:** A mix of native vegetation including Ocean Spray²⁷ and tall Oregon grape. Along the shoreline itself is Sea asparagus/*Salicornia depressa*²⁸ as band above the Coastal Saltgrass/*Distichlis spicata*, covered with brown &/or dying leaf detritus.
- For a more complete list see Site Vegetation, habitat, and species below.

Beach type for site segments

- Based on the GSH (Green Shore for Homes): Using Wentworth Scale there is:
- A feeder bank for 24m across, then a shallow roadway heading up into the neighbouring lot 84 and then the estuary starts.

Upper intertidal

- Vegetation: Sea asparagus and Coastal Saltgrass.
- Marine life: nothing observed.



Photo #3: This is the N corner of the shoreline at the property line of lot 84. It is a good example of the upper intertidal area. Note the vegetation at the toe of the bank is less steep, with larger trees at the beach level. Photo credits – D. Fenton. Oct 26, 2023.

²⁶ US Geological Survey. Nomenclature/Wentworth grade scale. Accessed Oct 30, 2023. Found at. <https://pubs.usgs.gov/of/2006/1195/html/docs/nomenclature.htm>

²⁷ Shore Plants, Sound Water Stewards. Accessed on Oct 30, 2023. Found at.

<https://soundwaterstewards.org/education-center/marine-species-identification/shore-plants/>

²⁸ Whelks to Whales – Coastal Marine life of the Pacific Northwest. R. Harbo, 2nd Ed. 2011.



Photo #4: above – Sea asparagus in the upper intertidal area. Photo credits – D. Fenton. Oct 26, 2023.

Mid intertidal – pea gravel/sand

- Marine vegetation - Sea asparagus.

Lower intertidal – sand and silt.

- Marine life: Western grebe in the nearshore waters to the east.



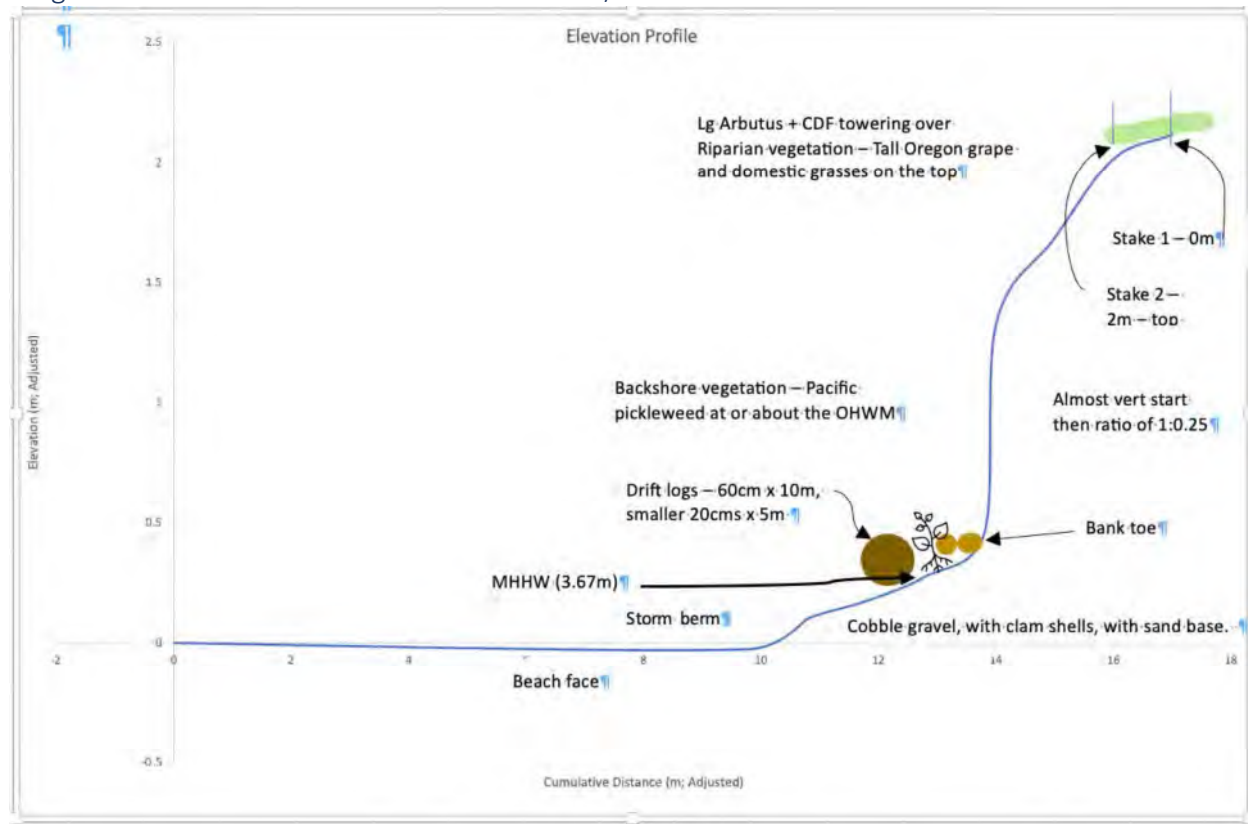
Photo #5: Sea asparagus on the higher sandbars extending out into the mid-foreshore sediment pebble gravel/sand base to pea gravel with sand base to sand/silt. Photo credits – D. Fenton. Oct 26, 2023.

Cross section elevations:

- **Bluff top:** 24.0m W **distance:** 6.0mH
- **Bluff toe:** 3.0m **distance:** 12.0m
- **Width of backshore:** 2.0-2.5m
- **MHHW Elevation:** 3.7m ish
- **Beach Top:** **distance:** 1m
- **Beach toe:** **distance:** 12m
- **Water line elevation**²⁹: 3.7m **time:** 1220h

²⁹ Preedy Harbour – 07471. Canadian Hydrographic Service. Gov of Canada. Accessed Oct 26, 2023. Found at. <https://tides.gc.ca/en/stations/07471>.

Diagram 1. - Beach Profile E Shoreline of lot 83/84.



Note: Beach profile graph of E Shoreline on Lot 83/84 – created using the Welsh GSH Project Submittal xls Binder.

Upland Surface Water Drainage:

Surrounding land use

- **Streams? (Yes):** A small creek enters the back of the estuary approx. 300m to the N.
- **Wetlands (Yes):** This property borders on an estuary, to the N of Lot 84.
- **Seeps and springs (No):** Not observed.

Drainage control

- **Stormwater systems (Yes):** The home has gutters that are connected to a perimeter drain and rainwater tank (45gal). The client states the perimeter drain is not working properly and basement has water issues. There is a 6/8" big o drainage pipe crossing the face of the upland from N to S that is part of the new septic system SWM system.
- **Impervious surfaces (Yes):** Roof of home above this shoreline.
- **Discharge points:** into the cobble boulders the S of the end of the bank.



Photo #6: Big-O perforated flexible pipe to beach, end is behind a boulder. Photo credits to D. Fenton. Oct 26, 2023.

Site Vegetation, habitat, and species

Method or Approach to assessing these sites are Desktop and Field survey of the shoreline (backshore and intertidal) and the Upland (Google Earth to understand the hydrology and development overtime + 100m inland of the Natural Boundary, features that impact/influence water or nutrient flow to this shoreline.

Invasive vegetation (Yes): Himalayan black berry/*Rubus armeniacus*³⁰, English ivy/*Hedera helix*³¹, English Holly/*Ilex aquifolium*³², and Bull thistle/*Cirsium vulgare*³³.



Photo #7 - Himalayan blackberry and Hairy honeysuckle on the left photo and English ivy that looked like a tree in the right photo. Photo credits to D. Fenton. Oct 26, 2023.



Native Plants Present^{34,35}: Tree canopy along bank- *Arbutus*/*Arbutus menziesii*/Qaanlhp, Coastal Douglas fir (CDF)/*Pseudotsuga menziesii*/Ts'sey, Red Cedar/*Thuja plicata*/X'pey, Big-leafed Maple/*Acer macrophyllum*/Ts'alhulhp, Q;um'-unulhp in the background 50-100ms from the shoreline.

³⁰ Himalayan blackberry. Invasive Species Council of BC. Accessed Feb 1, 2024. Found at: Himalayan blackberry - Invasive Species Council of British Columbia

³¹ English Holly. Invasives Species Council of BC. Found at: English holly - Invasive Species Council of British Columbia

³² English ivy – Invasive Species Council of British Columbia. Accessed Feb 1, 2024. Found at: English ivy - Invasive Species Council of British Columbia

³³ Bull thistle. Invasive Species Council of BC. Accessed Feb 2, 2024. Found at: <https://bcinvasives.ca/wp-content/uploads/2024/01/Bull-thistle-Teaching-Card-Invasive.pdf> & https://bcinvasives.ca/wp-content/uploads/2021/01/Canada-Thistle_Factsheet_26032019.pdf

³⁴ Ecosystem Guide – A Hul'q'umi'num language guide to plants and animals of southern Vancouver Island, the Gulf Islands, and the Salish Sea. Parks Canada, Hul'q'umi'num Treaty Group, Ladysmith BC. 2011.

³⁵ Plants of Coastal British Columbia, Pojar & MacKinnon, 1994.



Photo #9: Big-leaf maple along the back of the upland area that influences this shoreline. Photo credits to D. Fenton. Oct 26, 2023.

Photo #8: CDF (left) and Arbutus (Right) towering over the shoreline. Photo credits to D. Fenton. Oct 26, 2023.

Shrub level: Ocean spray/Holodiscus discolor/Qethulhp, Nootka rose/Rosa nutkana/Qel'qulph, Tall Oregon grape/Mahonia nervosa/Lulutth'sulhp, Hairy honeysuckle/Lonicera hispidula.

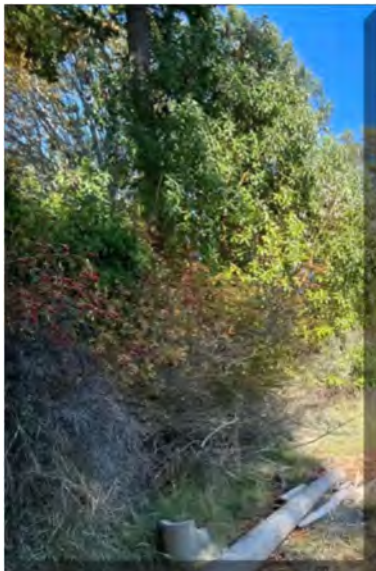
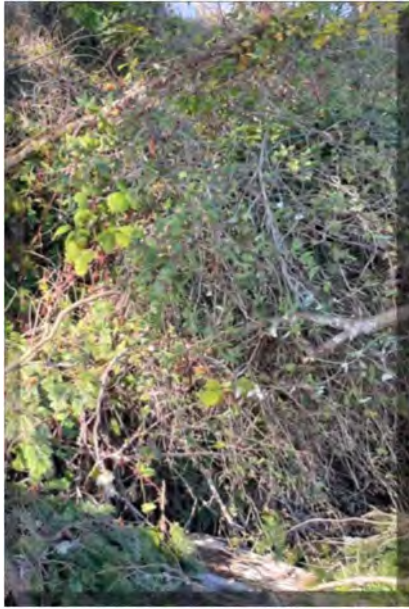


Photo #10: The photo on the left is a Nootka rose and Arbutus. Photo credits – D. Fenton. Oct 26, 2023.



Photo #11: Common Holly, a Tall Oregon grape in the middle and Ocean Spray above and to the right. Photo credits – D. Fenton. Oct 26, 2023.

Photo #12: Hairy honeysuckle. Photo credits – D. Fenton. Oct 26, 2023.



Ground cover backshore & foreshore – Across the backshore area, Sea asparagus/*Salicornia depressa*, a band above the Coastal Saltgrass/*Distichlis spicata*, and Creeping saltbush/*Atriplex prostrata* share this backshore extending into the estuary area to the N. At the toe of the bank, there is a steep 2m bank consisting of large boulders, glacial till, and a small amount of OM, with the CDF and *Arbutus* growing right out of the bank at this level. The slope at this point reduces its angle 1:0.5-0.3, so it is less than vertical but too steep to walk and runs up to the top of the bluff, which is a line layer of OM (organic matter) with tall domestic grasses/*Poaceae* (Grass Family) growing.

Forbes Present: tall yellow flowered dandelion - like, that may fit into this category.

Vegetation condition – healthy (Yes): The brush and plant life are healthy including the invasives. Though it might be even better when the invasive plants are controlled.

Juvenile salmon

- No juvenile salmon/salmonids observed.

Forage fish habitat (No)

- No forage fish observed.

Wildlife species present

- ✓ Dark-eyed Junco/*Junco hyemalis*³⁶, Western Grebe/*Aechmophorus occidentalis*/Skwulkwulth, swimming at 50m offshore, numerous sea gulls passing but not stopping.
- ✓ DFO Management Area – 17.8

Vegetation & Wildlife with Cultural Significance to Coast Salish People (CSP)³⁷:

- ✓ *Arbutus*/*Qaanhlp* – very drought tolerant in the rocky bluffs, used as a flavour additive and preservative for wild game.
- ✓ Big-leafed-Maple/*Ts'alhulhp*, *Q'um'-unulhp* – prefers wet or moist areas, one of the first to regenerate after logging. A flexible wood used for paddles and toys, it has medicinal properties and is used for cooking large wild game.
- ✓ Cedar/*X'pey* – Grows in moist areas of the forest – shade to full sun. They're considered the eldest of the trees; every part is used. Hence, it is culturally and spiritually significant and has irreplaceable value to the CSP.
- ✓ Coastal Douglas-fir (CDF)/*Ts'sey* – commonly found in dry to moist conditions along the coastal shorelines. They use the CDF for two different types of use that are essential to the CSP and be careful when harvesting bark not to kill the tree.

³⁶ Bird of Southwestern British Columbia, Cannings, Aversa, Opperman. 2005

- ✓ Ocean spray/Qethulhp – typically found in dry to moderately dry areas, including rocky bluffs, it is the hardest of wood in the Gulf Islands area. CSP refer to this as “ironwood.” Many uses when there is a need for solid tools, points, or hoops for cooking are needed.
- ✓ Nootka rose/Qel’qulph (the flower) is edible, and the rose hips have medicinal and spiritual significance.
- ✓ Western Grebe/Skwulkwulth – a preferred waterfowl for eating. They are hard to catch, as they are good divers. Their calls sound just like when the Hul’qumi’num people speak their CS name.

**Note this list is not meant to be comprehensive list it merely highlights interconnectedness of the CSP to the land and sea around them.

Species at risk

- Given priority in the GSH Projects and it will be inclusive of both co-applicant properties, so it’s been captured in its own separate document and is Appendices #6 of this MSAR.

Site development features

Primary structures and locations

- **House (distance to beach):** 5.5+m;
- **Roads (distance to beach):** laneway path to beach from Lot 84;
- **Septic (distance to beach):** 5m from edge of bank.

Required setbacks.

- Building setback 7.6m from NB.

Opportunity to relocate (No)

- See the Erosions Potential/CDRT analysis for details and discussion on this matter.

Secondary features

- **Sheds, garages, driveways (Yes):** Again, they are present, but topography limits their impact.

Unattached patios (No)

- **Potential to relocate (No):** None observed.
- **Animal usage (No):** No farm animals observed or planned.

Irrigation and water features

Irrigation, ponds, fountains (Yes).

- Located 150m from shoreline, the local topography prevents impact/influence, just impacts the S Shoreline aspect.

Potential for contamination sediment or debris (Yes)

- Yes, the slow erosion from centre of the slope of the steep repose of the E shoreline has loose material from bank centre of the length of the shoreline.

Erosion Control Structures

Type of structure and material used.

- There currently no erosion control structures in place.

Condition of Structure: n/a.

Structure elevation: n/a.

Presence of fill or excavated areas (Maybe)

- The material from the days when the home was originally built (1960s) may have been pushed around and over the bank onto the sandstone boulders below.

Determining site-based causes of erosion

Where on the site is erosion occurring?

- Current erosion is small but ongoing from the mid bank area, exacerbated with winter E outflow winds and king tide events.

What type of erosion and scale is occurring?

- The slope is most likely slide or wedge failure, winter storm events leading to overhanging slope failure, all complicated by the lack of deep-rooted vegetation on a bank that is too steep. Currently, conventional testing/assessment without going through an arch branch/HCA that clearly articulates there is to be no digging of assessment/test without the appropriate permits in place put a number on it. If the coastal engineer designs and installs a remedy that can increase the long-term resilience to coastal impacts of concerns without breaching the "no improvement (Builders Lien Act³⁷)" limitations, the ordinary privately funded citizen client who is on their own attempting to prepare for the future impacts of CC/SLR would like to avoid this process as the additional arch assessments are expensive and will take 6-18 months to complete to what end? As we argue, this study will not inform nor change any of the proposed work, that the solutions proposed are nature-based remedies, not conventional anthropocentric civil engineering solutions of the past and are fully supported and monitored by the indigenous community whose traditional territory it belongs to. Could we ask for a better outcome?

Why is erosion occurring?

- **Wave attack:** Moderate at best due to topography of the nearshore and intertidal shore areas.
- **Historical beach gravel mining (on site):** None recorded.
- **Bluff geology** – Steep repose that may have a mix of cohesive and non-cohesive basal layer that is eroding with wave attacks.
- **Adjacent coastal structures** – None observed.

³⁷ The Builders Lien Act's definition of "improvement" includes anything made, constructed, erected, built, altered, repaired, or added to, in, on or under land, and attached to it or intended to become a part of it, and includes any clearing, excavating, digging, drilling, tunnelling, filling, grading, or ditching of, in, on or under land. Accessed Jan 25, 2024. Found at. <https://ltpm.ltsa.ca/1-definitions-and-interpretation>.

- **Surface/ground water management:** House roof gutter drainage goes to the ground and some rain barrels, and can be reconciled during the home's renovation (2024/25), directed to the LID stormwater system that finishes at the beach by pipe.
- **Vegetation clearing:** Nothing recently.
- **Site excavation or other modifications:** The current owner (2016) is aware of nothing since the original construction. In 2022, the owner/client had an above-ground engineered septic field installed 5m back from the bank's top and to the home's N.

How fast is erosion occurring?

- **Onsite evidence:** Small amounts daily – see Photo # at the beginning of this section.
- **History and types of landslides:** During the IE site visit the elder's daughter now in her late 50's to early 60s, shared a story about the swing that hangs from the large Arbutus on the S end of the E Shoreline bank. A story about her recollection of using swing as a child while over with her dad working at this property, and the fact that she used to run along under the tree on ground that stuck out past the tree and jump onto the swing from the path above the shoreline.
- **Aerial photograph measures:** none available.
- **Local knowledge:** No history of slides.



Photo #13. – The Arbutus and swing with the path of large boulders between the white arrows are situated along the E bank in question. 1-3ms between the rocks the existing bank now, so possibly 50 yrs. of erosion?? Photo credit – D. Fenton, Feb 16, 2024.

Is erosion short-term or cyclical?

- **Temporary storm damage:** The winter outflow winds + HHWM events.
- **Seasonal erosion/accretion:** Seasonal erosion.

What development or improvement is at risk?

- **Substantial, such as a house or septic system:** Septic installed 2022.
- **Roads or utilities:** Driveway to home and shop are exists but to W of the home and not impacting or influencing the E Shoreline.

- **Other unsubstantial improvements** – Nothing observed.
- **Other descriptions:** No.

Interrogation of the Geotechnical Report – E Shoreline

So, there is no geotechnical report that we are aware of for any location on this property. So, when that is the case, what this section does is, do a critical review of the site being assessed, and that is shared with the other GSH team members and the clients/landowners while looking at the site and shoreline reviewing the following questions to see if it leads anywhere and helps us better understand what is happening uniquely on this site?

See Appendix #5 below MSDG Decision Tree and critical analysis of the Geotech related findings.

Coastal Processes

Long term rate of erosion

Result of many factors – wave energy a factor of prevailing winds and the fetch against the shore type, plus the many anthropogenic factors such as human activities (vegetation, backfilling, impacts on the local & regional hydrology and their cumulative impacts on the local environment, placement of the home and as a notion stated of David Polster³⁸, of Summer 2017, was that our society while in search of a view often results in the loss of coastal trees and the placement of the home right at cliffs edge.

Table 1.- Cumulative Risk Determination Model³⁹

Applied to 83 & 84 Blue Heron Rd., Thetis Island BC.			
Part 1 EROSION POTENTIAL			
Shoretype	Score	Fetch	Score
No Appreciable Drift (NAD)-Bedrock/Low Energy	0	0 -1 mile (0.6km0	1
Modified, Accretion Shoreform, NAD-Delta	1	1 – 5 miles (1.6-8kms)	2
Pocket Beach, Transport zone, NAD- Artificial	2	5- 15 miles (8-24.1kms)	3
Feeder Bluff	3	15 + miles (24.1+kms)	4
Feeder Bluff Exceptional	4	0 -1 mile (0.6km0	4
Erosion Potential Score = Shoretype Score + Fetch Score			3
Part 2: INFRASTRUCTURE THREAT			
Setback	Score	Infrastructure type	Score
>60 ft/18.5m	1	Property without structures	1
36–60 ft /11m – 18.5m	2	Septic drain field, unattached residential	2
21–35 ft/6.5m -10.77m	3	Home or residential building	3
0–20 ft / 6.15m	4	Major infrastructure	4
Infrastructure Threat Score = Setback Score + Infrastructure Type Score			6
CUMULATIVE RISK TOTAL (product):		Erosion Potential x Infrastructure	24

Note the legend below.

³⁸ Comment by David Polster of Polster Environmental Consulting Ltd. Natural restoration techniques workshop, Thetis Island, Summer 2017.

³⁹ The cumulative Risk Model found in the MSDG considers a combination of factors. Found in the MSDG, Chp 3 – Site Assessment, p.3-19.

Legend– Cumulative Risk Model:

- **Fetch** = whichever is greater: maximum fetch from southern quadrant or half of maximum.
- **Setback distance** = measured distance from bluff crest (or OHWM for no-bank) to most waterward infrastructure.
- Examination of the cumulative risk model results (Appendix A) allowed for determination of different risk classes. from other aspects (e.g., low, medium, high) as follows: " Low risk scores between 0–15 / Moderate risk scores between 16-36 / High risk scores greater than 36.

Backshore width categories are measured from MHHW landward in ft/(m) to assist with selection of appropriate design alternatives for the site conditions.

Categories for Wave Energy and Backshore Width			
Backshore width	Wave Energy Categories		
	Low	Moderate	High and Very High
Low	<5 (1.54m)	<15 (4.64m)	<25 (7.69m)
Moderate	5-10 (1.54 –	15-25 (4.64-7.69m)	25-35 (7.69-10.77m)
High	10+ (3.08m+)	25+ (7.69m+)	35+ (10.77m+)

Wave Energy Categories	
Wave Energy	Greatest Fetch
Low	0–1 mile (0- 0.6m)
Moderate	1–5 miles (1.6-8kms)
High	5–15 miles (8-24kms)
Very High	15+ miles (24+kms)

Table 2.- Quick reference tables for using the MSDG (2014)

Risk	Wave Energy*	Shoretype	Backshore Width	Appropriate Technique
All	All	All	N/A	Relocation and BMPs
Low	Low to Very High	All	N/A	No Action
Low	Low to Very High	All	Low to High	Bulkhead removal**
Low to Moderate	Low to Moderate	All**	Moderate to High	Large Wood
Low to Moderate	Low to Moderate (drift aligned)	All**	Low to High	Beach Nourishment
	Low to very high (swash aligned)	All**	Moderate to High	
Low to Moderate	Low to Moderate	Bluff	Moderate to High	Reslope and revegetation
High	High or very high	All	Moderate to High	Hard Armor (revetment)
High	Moderate to very high	All	Low	Hard Armor (Vertical)

*See definitions in tables below.

**If not armored then NO ACTION.

***Beach nourishment is only appropriately applied at bluff sites when integrated with other measures including backshore vegetation and an evaluation of littoral drift OR on shores with low wave energy.

Erosion Potential/Cumulative Risk Determination Tool and the selection of appropriate techniques.

Given that 83 Blue Heron Rd., Thetis Island, BC: scored $(1+3) \times (3+3) = 4 \times 6 = 24$ middle of Moderate risk of the Cumulative Risk Model. What does this tell us? And how does it impact/inform the design process?

The following is a short discussion on erosion potential and cumulative risk and how it impacts the options for selecting the appropriate techniques. The MSDG Decision Tree was also considered for each site – see Appendix 4.

Relocating home: The owner recognizes that the home is too close to the water/NB itself and has discussed with the IT Planner that they apply for legal-nonconforming because it was built in the 1960s before Islands Trust (IT) bylaws existed. The client has considered the notion of moving the home back from the NB and considerations of the work involved; the cost-benefit analysis was it would be best to leave home where it is and work around the issues, further compounded by the arch branches RAAD AOA concerns being what they are, the less disturbing of the ground, the better. Renovate by updating the building envelope and systems on its current footprint so that the home meets the needs of retired people who plan to age in place.

Using the renovation of the home to mitigate any conflicts with the local bylaw states a 7.6m from NB – the NE corner of the building footprint is maybe .5m into the setback. The railings on the deck will be remediated in the upcoming renovation project 2024, bringing all railings into compliance. During the design phase, they reduced the new deck rail to ensure they were within the allowance, and the building footprint remained the same.

To summarize the appropriate NBSP techniques to consider for:

S Shoreline – considerations for the S Shoreline are - relocating a home, upland stormwater management system, and removing an existing concrete seawall.

The S Shoreline is a low wave energy shoreline that allows for many options to be considered, including relocating home, BMPs (best management practices) in the upland/backshore areas that feed into this shoreline, and the removal of the concrete wall as well as any concrete or creosote detritus.

SWM (Stormwater Management) / Concrete Seawall - Somebody cleared the yard area around the home to the W during the original build in the 1960s/70s. There is domestic grass, a couple of domestic hedges and fruit trees, a gravel driveway, and concrete around the home along this side. SWM systems or vegetation can only manage the water it collects or travels over, not into the ground. Hence, it collects above the seawall (est. 1950s? – date painted on a large boulder). The stairs are eroding with upland water, and there is safe access to the beach seasonally. The W side of the seawall is littered with detritus of old concrete slabs and creosote-treated boards.

Given that this is low wave energy, the appropriate technique will support the removal of the seawall, grading to a 45-degree backshore and providing an access area point and revegetated with native plants/trees. The key will be to restore the upland areas between the driveway and shoreline with native vegetation, including CDF and its associated ecosystems. Create a plan using LID (Low-impact design) techniques enhanced by revegetation of the shoreline and upland areas. It appears on the contour maps to be approximately 2m above the HHWM. I strongly recommend that the tech survey done by the CE capture this area accurately, such that the flood modelling is done and designed to meet the CC/SLR issues destined for the future.

The E Shoreline

The E Shoreline is a steep shoreline facing E. However, due to its low-medium wave energy state due to its geomorphology, the erosion will likely be slow but steadily exacerbated by SLR. The shoreline impact will increase over time such that it may threaten the home and new septic system infrastructure above it.

At the toe of the bluff, a 2m+ almost vertical repose leads to a several meter steep bank up to the top of the bluff whose geomorphological makeup along the shoreline is of unknown origin—given the restrictions surrounding the archaeological constraints, i.e., no disturbing the ground without a permit/full AOA done prior, digging a test hole to see if it is sandstone sediment or layer of disturbed glacial till from the home excavation 50+ years ago.

It would be best to consider aggressive management of the invasive vegetation and design an NBSP along the shoreline that reduces the angle and supports the growth of native vegetation along the E Shoreline up to the N property line. The appropriate techniques may be LWD (large woody debris), boulders, beach nourishment, and reducing the repose by creating a new backshore line supporting revegetation.

GSH Credit Summary & Opportunities as of Feb 2024

GREEN SHORES FOR HOMES CREDIT SUMMARY						
REVISED JAN 2023						
	Credit	Link to Submittal Requirements	Points Available	Points Applied for by Applicant	Points Confirmed by Verifier	MSAR sees opportunities for credits in GSH design.
Application Requirements						
	Existing Conditions Plan	Existing Conditions Plan	Required	—	—	Completed by FAEC and NHC
	Site Design Plan	Site Design Plan	Required	—	—	Completed by FAEC and NHC
	Environmental Management Plan for Construction	Env Mgmt Plan	Required	—	—	Completed by FAEC
	Critical or Sensitive Habitats	Critical Habitats	Required	—	—	Completed by FAEC and map by NHC
Shoreline Processes						
1.1	No Shoreline Protection Structures	1.1 No SPS	15	0	0	n/a
1.2	Setback/Impact Avoidance	1.2 Setback	10	7	0	??3 +4= 1FB How this will work - check with NHC tech survey to confirm home to NB - then do math on design
1.3	Hard Armour Removal	1.3 Hard Armour Removal	20	17	0	15+2+1 - currently plan on removal of hard armour along SS
1.4	Groin Removal	1.4 Groin Removal	7	0	0	n/a
1.5	Nature-Based Erosion & Flood Management	1.5 Nature-Based Erosion & Flood Management	16	10	0	9 + 1 for mon - SS is applicable, may be get used in 1.3 - because there 2 actual areas it may qualify.
1.6	Managed Retreat	1.6 Managed Retreat	12	0	0	n/a
	SUB-TOTAL:		80	34	0	
Shoreline Habitats						
2.1	Enhanced Critical, Sensitive, or Migratory Bird Habitat Stewardship	2.1 Enhanced Critical, Sensitive, or Migratory Bird Habitat Stewardship	8	5	0	60m upland from NB.potential 3 + 1 + 1 as the design can work around the sensitive areas or those areas are replanted to recreate the same or better hab.
2.2	Riparian and Emergent Vegetation	2.2 Riparian and Emergent Vegetation	13	9	0	7 + 1 + 1? SS and ES - has great potential for this credit.
2.3	Trees and Snags	2.3 Trees and Snags	5	5	0	4 + 1 existing snags + tree on both sites + planti new;
2.4	Invasive Plants	2.4 Invasive Plants	4	4	0	4+2 >1/2ac and replant with native in the RB
2.5	Organic Material	2.5 Organic Material	6	5	0	3+1+1 both sides and lwd and monitoring
2.6	Overwater Structures	2.6 Overwater Structures	7	2	0	1+1existing dock staying, sharing should be considered (1 existing), no lighting. Cosider replacing deck with grated panels.
2.7	Access Design	2.7 Access Design	3	3	0	3 SS - removing wall and stairs so access design to encorp the access via planted path to shore.
	SUB-TOTAL:		46	33	0	
Water Quality						
3.1	Site Disturbance	3.1 Site Disturbance	3	1	0	1 - I wonder if it is applicable for reno at the total % area of the home+Mub? of property will be restored over 3-10 yrs.
3.2	Reduce and Treat Runoff	3.2 Reduce and Treat Runoff	9	7	0	2+2+1+1+1 - need to do calc but 1.5ac, isa, eia, , rwc, use of rwc, and monitoring for 3yrs. LID thru/o property.
3.3	Environmentally Friendly Building Products	3.3 Env. Products	4	0	0	7+7+7? - dock area exists but no stains etc. and will replace with Cedar + metal grates.
3.4	Creosote Materials Removal	3.4 Creosote Removal	6	1	0	1 - for creosote material to the w of the SS hard armour.
3.5	Herbicides, Pesticides and Fertilizers	3.5 Herbicides Pesticides	3	3	0	2+1 client doesn't use toxic products. And could complete the LSM checklist.
3.6	Onsite Sewage Treatment	3.6 Sewage Treatment	4	3	0	2+1 provide plan for septic system.+ complete the checklist.
	SUB-TOTAL:		29	15	0	
Shore Stewardship						
4.1	Shoreline Collaboration	4.1 Collaboration	8	4	0	4 collaborate with lot 84 should work, but needs to be documented.
4.2	Public Information and Education	4.2 Education	3	3	0	3 - Tours during project, signage post project, a 1/4ly art, invite the TES & PIE for a tour, links with IT for them to use this as the poster child in their LTCs.
4.3	Conservation Easement or Covenant	4.3 Covenant	6	0	0	n/a
4.4	Shoreline Stewardship Participation	4.4 Stewardship	2	2	0	2- share with ThINC as one of their summer programing opportunities.
	SUB-TOTAL:		19	9	0	0
TOTALS			174	91	0	

Critical / Sensitive Habitat Map/Plan



Note to user: If you zoom into the areas of interest, you will be able to see more detail of both the Google Earth map but also areas identified in the legend. Google Earth map itself has all pertinent information regarding the data displayed.

Signature page

Client:

Report written for: **Rob & Marcie Welsh**

Address: 83 Blue Heron Rd., Thetis Island, BC V0R 2Y0

Project Name and brief description: **GSH Shoreline Restoration Project**

Location/s: 83 & 84 Blue Heron Rd., Thetis Island, BC V0R 2Y0

Marine Shoreline Assessment Report written by: **Fenton & Associates Environmental Consulting/Doug Fenton**

Consultant Address: 195 Pilkey Pt. Rd., Thetis Island BC V0R 2Y0



EP Consultant Signature

Mar 8, 2024

Date

Date Received by Client on: **Feb 25, 2024**

Statements of Qualifications

- Credentials: **Doug Fenton**, MEP, EP-H&S, EM-#22432, GSP (IT), BC-CESCL, CAPM. (fentonconsulting.ca).
- EP's work under an EP Code of Ethics – A national credentialing process established by ECO Canada and board approved by CECAB (Canadian Environmental Certification Approvals Board).
- Company References & Team member CVs available upon request.

Subcontractors:

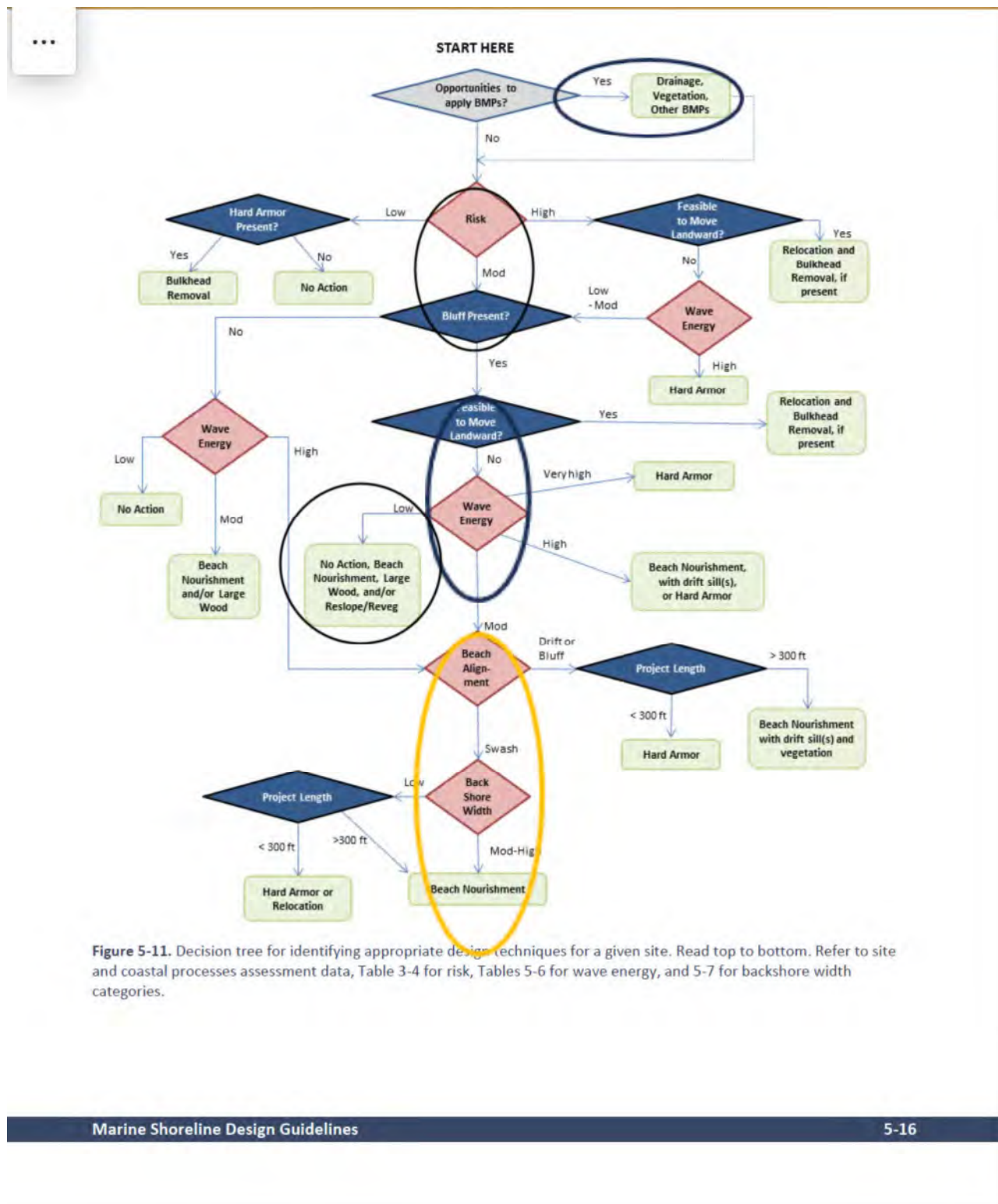
- Ian Bruce, RPBio., B.Sc. (Mar. Bio), R.P. Bio. Reg #: 496, QEP, Dip. Restoration of Natural Systems, Pres., Watershed Ecological Services Ltd., brought in as an Associate Consultant with FAEC to bring his years of shoreline restoration to this project.
 - Engaged as reviewer. Associate Consultant with FAEC
 - Pres., Watershed Ecological Services Ltd.
- Christine Brophy, BNRP, RBTech. - pending green lighting of construction phase of project.
- Table of Contributors p.10 for others not listed – FN Elder and Knowledgeholders engaged at time of report published.

Appendices

Appendices #1: Cultural / RAAD Report **Redacted**



Appendices #4a: MSDG Decision Tree – S Shoreline



Appendices #4b: The Interrogation of the Geotechnical Report – South Shoreline

So, there is no geotechnical report that we are aware of for any location on this property. So, when that is the case, FAEC consultants are not from an engineering background, so it finds that this section does a critical review of the site assessment findings, and then that is shared with the clients/landowners GSH team members while looking at the site and shoreline as these questions are thought-provoking and may help the team better understand what is happening uniquely on this site while considering the appropriate techniques and the interconnections of the issues.

Is the slope eroding actively?

- **Are there bare/raw banks?** Not really.
 - S – yes, above the existing armour.
- **Is there loose bluff material on the beach?** Not yet, but leaking around staircase.
- **Are there live or recently dead plants on the beach?** No.

Is there a history of landslide or unstable slopes?

- **Are there any signs of historic landslides?** No.
- **Are there any signs of slope of continued mobility?** No.
- **Has there been mappings or historic documentation of landslides?** No.

What are the surface conditions?

- **What is the shore type?** Accretion.
- **Is the site within a drift cell or if so, what direction is it moving?** No.
- **Are slopes steeper than 25% (4:1)?** Yes.
- **Are the slopes steeper than 50% (1:1)?** Yes, at wall and behind the wall is approx. 45°+.
- **Is there evidence of the following types of vegetation being removed?**
 - **Brush?** Noting since the owner bought in 2016.
 - **Larger trees?** Shrubs and potentially large trees to the W.
 - **Ground cover?** Grass + weed-like above the wall.
 - **Invasives?** Yes, in the form Himalayan blackberry.
- **Any springs or natural sources of water on the surface?** No, only post rain event – SW.
- **Any sources of unnatural water, particularly concentrated (pipe outlets, roof drains, etc.)?**
 - Potentially, as the roof drainage above is yet to be defined.
 - It should be considered and incorporated into the RWC (rainwater capture) system and LID (Low impact design) (i.e., slowed, pooled, and allowed to return to the ground, increased vegetation of a variety of size (low, mid, to large) native shrubs/trees, then at the last phase of the system, overflow stormwater piped to the shoreline per the GSH approach.
- **Relic bank protections?** Yes, to the W, there appears to be old broken concrete and creosote boards.

What are the subsurface conditions?

- **Were soil samples taken?** No. But we discussed the value in this process and may during site assessment phase with the CE.
- The potential of sampling the beach areas near current, FF habitat.
- Could sample the area above the S shoreline area to get information that would allow for

diagnosis of the needs for future plantings.

- **Where was the ground water observed?** Yes, observed running out onto the beach over a layer of blue clay.
- **Were there porous soils (gravel/sand) over top of non-porous soils (clay/silt/cemented till/bedrock)?** Potentially, just no area where the layers can be examined without disturbing the ground.
- **Is there information about how erodible are the soils?** The surface rills above the stairs are a sign that it has potential, especially if the existing weed/grass was removed or disturbed.

What is the proximity of structures?

- **What is being protected?** Home, septic field and a multiuse building. See Coastal Processes section on p.38 above that takes these risk factors into consideration.
- **How close horizontally and vertically is the subject structure?**
 - Home is 5.5m from MHW;M;
 - New septic field (est. 2022); and
 - Multi use shed behind home and W of septic field.

What is driving the slope instability?

- **Any of these identified?**
- ✓ **Upland water?** – S shoreline
- ✓ **Upland loading?** – on S shoreline it may be loading while wet and adding downslope pressure overtime.
- ✓ **Bank repose too steep?** – Yes, S shoreline.

Estimated rate of erosion?

- **How fast has the bluff been receding?** n/a
 - Unsafe now, and with each year will become more and more at risk, tipping point will be reached in 5-10 yrs. Where it won't be resilient will be a HH tidal event + Atmospheric river event leading to unusable space and increasing downstream erosion and silt events which will kill fish especially along the shoreline habitat areas.
- **How fast is the estimated future bluff recession?** – see comments above.
- **How does this compare with the adjacent slopes?** No other similar heights / slope banks
- **How does this compare with average rates throughout the Thetis and surrounding islands?**
 - This is a good question for the CEs.
- **When will erosion impact structure or infrastructure or users of the site?**
 - Yes, but it is the assessor's opinion that it is probably years away. The plan is to proactively prevent this issue by restoring no issues for 100+ years. Family and the local ecosystems are all in harmony.
 - Currently, an elective restoration will be reaching maturity when the SLR and CC are becoming an issue.
 - + With the upland restored to a more natural state and SWM designed to complement the shoreline restoration in 15-25 years, the native trees, and the local

ecosystem composition⁴¹ recover from the past decades of neglect from anthropocentric activities. If the planning considers other opportunities that would complement the human other species such as food forests, rain gardens and holistic gardening approaches such as permaculture.

Again, refer to the CRDT (Cumulative Risk Determination Tool) and the NBSP (Nature-based Shoreline Projects) in the Coastal Processes section above on p. 38, for appropriate techniques that should be considered that follows the E Shoreline Assessment.

⁴¹Natural Processes: Restoration of Drastically Disturbed Sites Manual. Ch 2. Polster, D., Polster Environmental Services. June 2017.

Appendix #5a: MSDG Decision Tree – E Shoreline

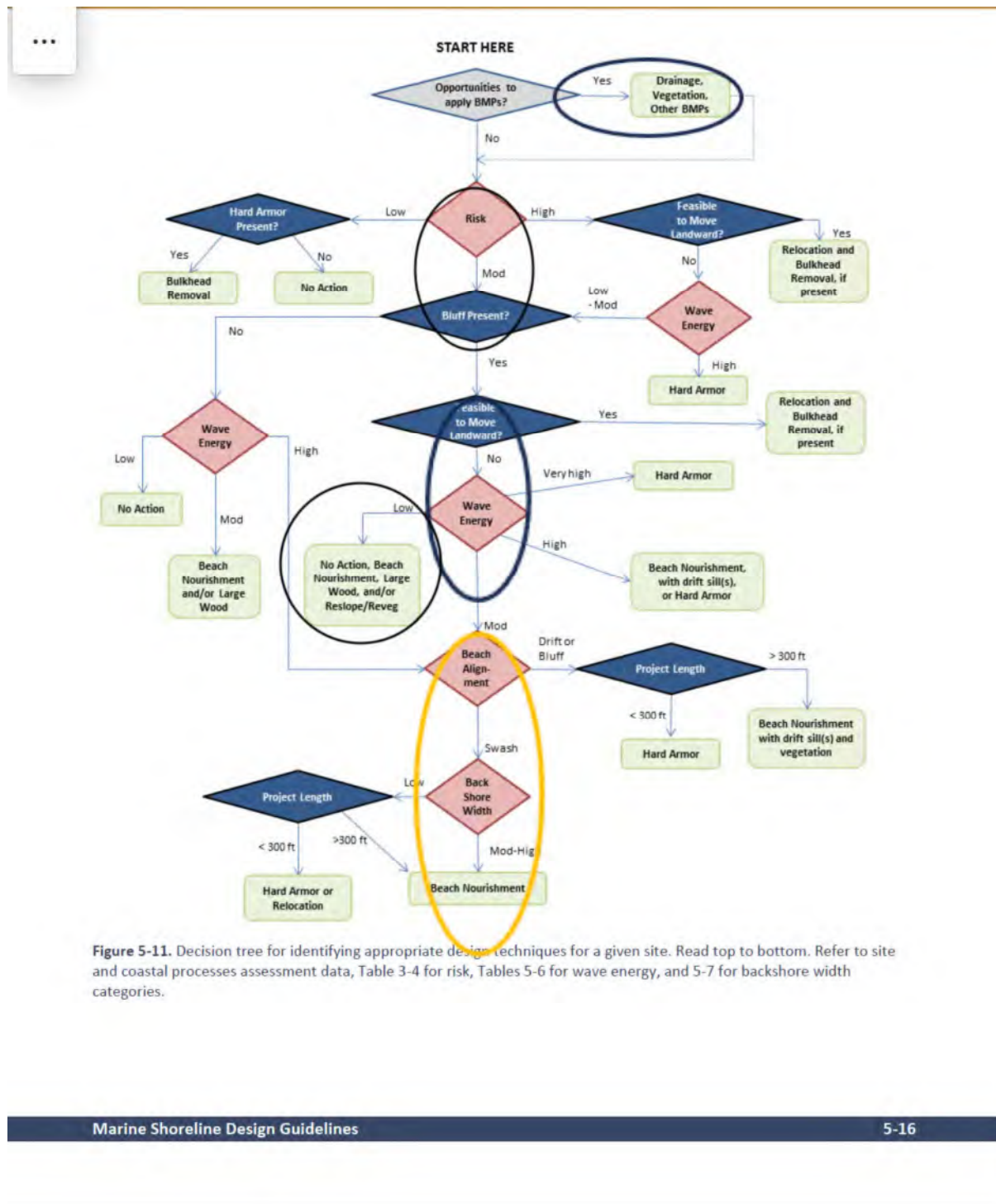


Figure 5-11. Decision tree for identifying appropriate design techniques for a given site. Read top to bottom. Refer to site and coastal processes assessment data, Table 3-4 for risk, Tables 5-6 for wave energy, and 5-7 for backshore width categories.

Appendices #5b: Interrogation of the Geotechnical Report – E Shoreline

There is no geotechnical report that we are aware of for any location on this property. So, when that is the case, what this section does is, do this critical review of the site being assessed, and that is shared with the other GSH team members and the clients/landowners while looking at the site and shoreline considers the following questions to see if it leads anywhere and helps us better understand what is happening uniquely on this site?

The MSA Report for the E Shoreline can be found above starting on p30.

Is the slope eroding actively?

- **Are there bare/raw banks?** Yes, the midsection of the bank.
- **Is there loose bluff material the beach?**
 - Yes. – see picture #2 on (pg. 30)
 - Post Feb 16th, 2024 IE (Indigenous Engagement) site visit – the elder's daughter made a comment to the fact that she remembers as a child (6-8 yo) running under the Arbutus that holds the swing. Yes, the very swing that exists today, but over the past 50 or so years, the bank has eroded back leaving a couple of large granite boulders and no surface to run on.

- **Are there live or recently dead plants on the beach?** No.

Is there a history of landslide or unstable slopes?

- **Are there any signs of historic landslides?**
 - No sign of historic landslides.
- **Are there any signs of slope of continued mobility?**
 - Nothing apparent.
- **Has there been mappings or historic documentation of landslides?**
 - Nothing available.

What are the surface conditions?

- **What is the shore type?** *Accretion – it will be interesting to see what the CE Coastal Processes Report says on this matter. How much and how fast?*
- **Is the site within a drift cell or if so, what direction is it moving?** No, it's not.
- **Are slopes steeper than 25% (4:1)?** – yes.
- **Are the slopes steeper than 50% (2:1)?** – yes A vertical bank at toe of bank then at 2ms a 1:0.50. This is the current steep repose, that not overly tall, too steep for many vegetation and inherently leads to instability.
- **Is there evidence of the following types of vegetation?**
 - **Brush?** – some varies of native bushes such as Ocean Spray/iron wood,
 - **Larger trees?** – Native CDF, Arbutus, and Big-leaf Maple
 - **Ground cover?** – Yes, salt phallic vegetation along toe of bank/backshore and domestic grasses up top of the bank at the level of the home.
 - **Invasives?** – English ivy on steroids, English holly and Himalayan blackberry which all are more impactful on the slopes stability as these species consume water, shallow rooted and out compete the native plants. Leaving the area unable to effectively grow native and deeper-rooted shrubs and ground cover.

- **Any springs or natural sources of water on the surface?** - Nothing observed.
- **Any sources of unnatural water, particularly concentrated (pipe outlets, roof drains, etc.)?**
– there is one 6-8" Big-O coming from above and across from Rt to left as you look up to the bank from the beach. It does and makes it to the shoreline in 2 locations behind boulders, that carries any water from the new septic field area above it. Currently, the SWM from the roof water is not managed effectively and have water in the basement during big storm events.
- **Relic bank protections?** Nothing observed on the E shoreline.

What are the subsurface conditions?

- **Were soil samples taken?** No soil samples taken.
- **Where was the ground water observed?** No ground water observed along the E Shoreline.
- **Were there porous soils (gravel/sand) over top of non-porous soils (clay/silt/cemented till/bedrock)?** At this time, this is a mystery, and because of the Heritage Permitting restrictions on this area, no test holes have been dug or drilled. It could be sandstone bedrock, or layers of various materials that create layers of instability, that is something that needs to be considered passed onto the CE involved for their expert opinion.
- **Is there information about how erodible are the soils?** There are none available currently. Another part of the CE assessment that may provide more information to this situation.

What is the proximity of structures?

- **What is being protected?** The main residence is located within 10m of the top of the slope + a newly installed septic system (est. 2022) that now are part of this infrastructure risk determination calculation.
- **How close horizontally and vertically is the subject structure?** As above approx. - 10 & 15ms

What is driving the slope instability?

- **Any of these identified?**
 - **Upland water?** – Yes, potentially unmanaged stormwater from the roof of the home + seasonal stormwater in the form of rain.
 - **Upland loading?** – The home itself is what is currently relatively flat area that is supported by two shorelines that wrap around the structure and its decks + the new septic field according to client, constructed of 11 truckloads of sand that runs parallel to the E Shoreline. – see blueprint for more details.
 - **Wave action?** - Low to moderate wave action and have use the higher for the CRDT calculation to ensure that the max potential has been considered when assessing the CRDT Values and the consideration of the appropriate techniques to use.
 - **Other?**

Estimated rate of erosion?

- **How fast has the bluff been receding? Slowly.** – The author assesses that this will be slow and insidious recession. Using the elder's daughter commented that she remembers as a child (6-8) running under the Arbutus tree that holds the swing as marker in time to guestimate erosion. Yes, the very swing exists today, but over the past 50 years, the bank has eroded back, leaving a few granite boulders and no surface to run on. There is potential

for 2-3m of loss since that time.

- **How fast is the estimated future bluff recession?** - The native CDF and Arbutus are at the edge of the slope now; potentially, the large Arbutus to the E of the home, the feature tree on the S end of the bank of concern, is already losing material it's sitting on. It could see the same or more loss over the next 50 years. I think it may be contributing to a change in the overall health status of the Arbutus, which this fall/winter has changed the colour of its top to less vibrant than the other leaves lower down. However, given that this is the 50–100-year window the accelerated impacts of CC and SLR seen over the past decade, and how slow vegetation grows before it has reached its full strength and ability to mitigate erosion.
- **How does this compare with the adjacent slopes?** - It varies dramatically around the Thetis.
- **How does this compare with average rates throughout the gulf islands?** – And it will be interesting to see what the CE and Coastal Morphologist come up with in their assessment and the CPR that will consider this place and the surrounding gulf islands.
- **When will erosion impact structure or infrastructure or users of the site?** – Potentially, yes. I believe the timing is good for designing and implementing a nature-based solution that will be successful in its long-term effectiveness to create a resilient protection of the major infrastructure above.

APPENDICE #6: SARA / Critical or Sensitive Habitat

Introduction

This project is associated with work along a shoreline, so it must go through an expedited permit for an NBSP (Nature-based Shoreline Projects) for a GSH (Green Shores for Homes) Project. It must meet the criteria for their checklist, the SARA/Critical/Sensitive Habitats. Hence, this is an additional element to the MSAR. This project will be on private land that shares the foreshore with the province and is subject to all applicable bylaws, provincial and federal laws, and regulations, including SARA and the provincial wildlife and conservation. As such, numerous species fall under the SARA / Critical habit. at categories. These are listed below in the Table Multi-species Federal/Provincially listed Species at Risk that could use this proposed project site.

Scope of Proposed Project

S Shoreline – the removal of the existing 20+m of concrete hard armour as well as the careful removal of the creosote boards and pieces of concrete to the W. Regrading of the bank back per CE (Coastal Engineer) design specs, plus possible use of beach nourishment, again per CE design specs.

E Shoreline – Hypothetically, the use of beach nourishment to raise the beach enough to reduce the low to moderate wave energy +/- LWD (large woody debris) along the East aspect of the property per CE design specs. Removal of invasive vegetation and an additional layer of soil medium to plant the additional/new native vegetation.

Approach

Assessment involved:

- Desktop exercise – the BC Species & Ecosystem Explorer - SARA/Provincially listed search;
- Thetis Is. Forage Fish Sample Stations, MABRRI (Mt. Arrowsmith Biosphere Region Research Institute)⁴²;
- Thetis Island Nature Conservancy.org – assist assessing pertinent species of concern and invasives (plants & animals);
- Terrestrial and marine shoreline (foreshore/intertidal) area site assessment; and
- TEK/TK - Pune'luxutth Tribe.

Discussion

Using the Thetis LTC (Local Trust Area) to define the area to search for the completion of the BC Species & Ecosystem Explorer CDC search which defines the area as the Thetis LTC, Islands Trust. It identified hundreds of potential species. Then, the refining to those species that would use the project site and, secondly, be impacted by the proposed work at these locations along the shorelines.

⁴² P 2. Clam Bay, Thetis Is. Forage Fish Sample Stns, MABRRI (Mt. Arrowsmith Biosphere Region Research Institute).

And, then put the proposed work against what is defined by BC Gov's Recovery Planning for Critical Habitat ID and Protection, which states that "SARA prohibits the killing, harming, harassing, capturing, and taking of extirpated, endangered or threatened aquatic species at risk. Activities that destroy critical habitat are also likely to kill, harm or harass individuals..." Unfortunately, that occurred when Thetis was developed by its colonial settlers in the 1950s-70s.

There was one specific species at risk directly impacted by these projects. That stated, the work associated with the work is not without risk during the construction phase and the following few years as the new vegetation takes hold and gets rooted. The key to the safety of all species and sensitive/critical habitats is a substantial project-specific CEMP_Welsh – Lots 83/84 Thetis Island (Construction Environmental Management Plan) that is currently being created and will accompany the project. It is rooted in a table called the Proposed Multi-Species Action Plan for Lots 83 & 84 Blue Heron Rd. (below), Thetis Island, BC. The CEMP is a separate document under separate cover and will go into much more detail on all aspects of completing a safe coastal marine shoreline project. This table is at a high-level approach that links to the parallel implementation of the GSH Monitoring Guide document, which complements this project with a three-year post-construction monitoring framework.

Indigenous Engagement (IE)

As part of the project's reconciliation / IE pathway, cultural values are considered by the early engagement of our Indigenous knowledge holders and elders in this project's planning/design stage. By embracing traditional knowledge-holders, there is an opportunity, and if they choose to share, the project gains insight into approaches that have stewarded this water since time immemorial. The incentive for the Pune'luxutth Tribe will be building new relationships and increasing trust as regaining access to these beaches increases.

Critical or Sensitive Habitats

Both properties involved are situated in CDFmm biogeoclimatic zone (01-06) and within the Coastal Douglas-fir and Associated Ecosystems Conversation Partnership (CDFCP) – the Madrone TEM Report states on p.5 (2008)' the considered critically imperiled (globally) and an at-risk ecosystem community (see Ecological Communities table below). From a restoration strategy perspective, it makes sense to find ways to restore these plant species holistically, increasing as much biodiversity as possible.

- The entire area is considered at risk and should be managed as such. Especially with tree removal and while managing invasive plants, ivy/blackberry on the E Shoreline;
- Potential raptor trees should be left/created with any dead or dying trees (fir or arbutus); and
- Beach nourishment - an appropriate nature-based technique, but it has its associated risks and time needed for ecosystems to re-establish, from forage fish to crabs and many other creatures to sea asparagus and Coastal Saltgrass or replanting would speed that process up.

Conservation and Recovery Measures

Exploring ways to further connect with the Penelakut/Pune'luxutth and other Coast Salish people who had stewarded the area since time immemorial, and traditional knowledge speaks to abundant biodiversity until colonization. Since the late 1800s, the development of Thetis has been by the settler population, who all need guidance or even an awareness of indigenous cultural practices.

Given that until now, there has been no baseline assessment of the existing species on these properties, essentially, they will be starting from scratch and can use this report to purposefully align with the GSH Monitoring guide (2023) so if the client desires, it can be a starting point as the tool for collecting local ecological data of both critical habitats, as well as species of interest.

Summary

These small shoreline projects will not put any species at risk over the mid-long term. With a careful implementation phase combined with long-term monitoring (3+ years), this project will open the doors to the opportunity to restore these shorelines to their former habitats. It will take decades for this to come to fruition, but it would take a similar holistic and long-term vision on the timeline as the coastal engineering elements of this project-75-100 years, which is when a CDF transitions from young to mature forests⁴³.

It is important to state that the SARA/Critical habitats are not at long term risk and that this project is not going to directly impact any SARA species or critical habitat or local or migratory birds or marine mammals.

Action plan:

1. The CEMP will protect the existing critical habitat and the restoration areas augmented with more native vegetation (considering the plant species on the CDF Ecological Communities listed below and watering over a multi-year shoreline vegetation restoration/monitoring plan.
2. One of the owner's priority actions will be to restore the upland property to a native species across all layers of vegetation (canopy, mid-level, shrub, and ground cover) to create more shoreline habitat for the birds, bats, and other species listed.
3. This plan will open the door to the engagement of the traditional cultural knowledge of the local Pune'luxutth Tribe into the upland shoreline from the NB to the upper-mid intertidal areas vegetation planting plan. The existing aquaculture license held by PT would constrain anything more seaward. An additional note to support these activities is that the tech survey done by the CE will be able to clearly define this border to ensure that the restoration plans (beach nourishment or aquatic plants are kept within these constraints).

⁴³ CDFmm Map and Ecosystem Legend, N Cowichan and SGIs Map 7 of 9. P115. TEM Report. Madrone, 2008.

Table 1.- Multi-species SARA_Federal⁴⁴/Provincially listed Species at Risk that could potentially use this site.

English name	Sc. Name	SARA sched ¹ designation	COSEWIC	BC List	SARA Recovery plan	Nature Serve Explorer ⁴⁵
Barn swallows ⁱⁱ	Hirundo rustica	Special concern/No status	Threatened	Yellow	Yes	BC - S4 – apparently secure
Great Blue Heron ⁱⁱⁱ	Andrea herodias fannini	Special concern		Blue	None	S3 - Vulnerable
Harbour Seal	Phoca vitulina mellonae	Endangered			none	G4: Apparently secure
Humpback Whale ^{iv}	Megaptera novaeangliae	Special concern		Blue	None	No status Rank Pop
Killer Whale (Resident) ^v	Orcinus orca	Endangered		Red	yes	T1 (critically imperiled)
Killer Whale (Transient) ^{vi}	Orcinus orca	Threatened		Red	yes	T3 Vulnerable Population
Little Brown Myotis ^{vii}	Myotis lucifugus	Endangered		Blue	(MSAPGINPRC) ^{viii}	G3: Vulnerable
Monarch (ref below in Action Plan	Danaus plexippus	Special Concern (Jun 2003)		Red	Yes	Prov- S1 Critically imperiled.
Northern Elephant Seal ^{ix}	Mirouga angustirostris			Blue	G5 secure, but note the Prov stat. -	Prov- S1- Critically imperiled.
Northern Red- legged Frog ^x	Rana aurora	Special concern		blue	(MSAPGINPRC)	G4/prov S3 Vulnerable
Olive-sided Flycatcher ^{xi}	Contopus cooper	1-SC (2023)			Yes	

⁴⁴ Wildlife species eligible for amendments to list: SARA, sched 1. Accessed Feb 6, 2024. Found at: <https://www.canada.ca/en/environment-climate-change/services/species-risk-act-accord-funding/listing-process/wildlife-species-amendment-list-schedule-1.html>

⁴⁵ Nature Serve Explorer. Accessed on Feb 5th. Found at: <https://explorer.natureserve.org/Search>

Pacific Harbour Porpoise ^{xii}	Phocoena phocoena vomerina	Special concern		Blue	None	G5: Secure
Pileated Woodpecker ^{xiii}	Dryocopus pileatus	Nil	Nil	Yellow	No	S5 Secure (Mar 2015)
Purple Martin	Progne subis			Blue	n/a	G5, Canada secure
Sharp-tailed snake (Pacific Coast Pop) ^{xiv}	Contia tentia pop1		Threatened	SNR		
Stellar Sea Lion ^{xv}	Eumetopias jubatus	Special concern		Blue	no	Prov – vulnerable
Surf Scoter	Melanitta perspicillata	No Status		Blue	(MSAPGINPRC)	Prov – S3 vuln erable
Western Screech-Owl ^{xvi}	Megascops kennicottii	Threatened	Special concern	Blue	(MSAPGINPRC)	S4 Apparently secure
Western grebe ^{xvii}	Aechmophorus occidentalis	Special concern		Yellow	(MSAPGINPRC)	G4/Prov - S1 Critically imperiled.
Yelloweye Rockfish ^{xviii}	Sebastes ruberrimus	Special concern		Not reviewed	(MSAPGINPRC)	Not listed

Table 3. - Proposed Multi-Species Action Plan for Lots 83 & 84 Blue Heron Rd., Thetis Island BC

Species English name	Site-based pops and distribution	Site-based populations	Pop trends	Population Monitoring	General site Actions	Action
Barn swallows		n/avail		Employ opportunistic monitoring when sighted. Add to the GSHM program.		No action, as it is beyond the scope of the project.
Great Blue Heron ^{xix}		n/avail	Any insight gathered from the GSHM program.	GSH Monitoring candidate	Any enhancement of the shoreline ecosystem including shade will improve their	Not near rookery, so not issue. So, the restored habitat will benefit the species.

						habitat.	
Harbour Seal ^{xx}	n/a	n/avail				n/a	No action
Humpback Whale	n/a	n/a				n/a	No action
Killer Whale (Resident)	n/a	n/a			Employ opportunistic monitoring when sighted. Add to the GSHM program.	n/a	Not their normal habitat – if seen transiting by stop work and doc sighting.
Killer Whale (Transient)	n/a	n/a	Any insight gathered from the GSHM program.		Employ opportunistic monitoring when sighted. Add to the GSHM program.	n/a	Same as SRKW's
Little Brown Myotis	ThINC/Bat program	n/avail			GSH Monitoring candidate	Trees for night roosts. Healthy bug populations will enhance their habitat.	Not impacted by either project. Will benefit for improved ecosystem health.
Monarch (butterfly) ^{xxi}		n/a	Any insight gathered from the GSHM program.		Employ opportunistic monitoring when sighted. Add to the GSHM program.		Terrestrial hab – Not impacted by projects. Will benefit from upland restoration.
Northern Elephant Seal		n/a			Employ opportunistic monitoring when sighted. Add to the GSHM program.	n/a	Not their hab – they follow herring around Thetis, so transient and No impact.
Northern Red-legged Frog		n/avail	Any insight gathered from the		Employ opportunistic monitoring when sighted. Add to the	Increased biodiversity and tree/shrub/herb	Wetland habitats, marine so not impacted by

			GSHM program.	GSHM program.	layers will enhance their habitat.	project.
Olive-sided Flycatcher		n/avail		Employ opportunistic monitoring when sighted. Add to the GSHM program.		
Pacific Harbour Porpoise ^{xxii}	n/a	n/a			n/a	No action needed.
Pileated woodpecker	n/a	n/avail	Any insight gathered from the GSHM program.			
Purple Martin ^{xxiii}		n/avail	BC blue, Canada stable, Mig -Y	GSH Monitoring candidate		It is our understanding that the client has saved a tall arbutus stump to provide roosts for the existing Purple Martin pop in the area.
Sharp-tailed Snake		n/a	Any insight gathered from the GSHM program.	Employ opportunistic monitoring when sighted. Add to the GSHM program.		Not their hab so no impacting the species. The enhancement of the upland properties will benefit the species.
Stellar Sea Lion	n/a	n/a	Any insight gathered	Employ opportunistic monitoring when		Not their hab – they follow herring

			from the GSHM program.	sighted. Add to the GSHM program.		around Thetis, so transient and No impact.
Surf Scoter ^{xxiv}	n/a	n/a	Any insight gathered from the GSHM program.	GSH Monitoring candidate		Out in the nearshore water – transient in nature and not impacted by project.
Western grebe ^{xxv}	Oct 2023 - East nearshore area at the E entrance into Canoe pass.	n/a	Any insight gathered from the GSHM program.	GSH Monitoring candidate		Winter in the islands but breed in the of the interior of BC lake waters.
Western Screech - Owl	Checked with client re: states he does have owl nest boxes, in the W of 84 of due to size of trees. So when restoration is 20-30 old?	n/avail		GSH Monitoring		No action needed candidate – possibly there might be more habitat 5-10 yrs when the habitat is more compatible.
Yelloweye Rockfish	n/a	n/a				Juvenile rockfish use nearshore eelgrass to the east for habitat which is further out and not

- viii The Multi-species Action Plan for Gulf Islands National Park Reserve of Canada applies to lands and waters occurring within the boundaries of Gulf Islands National Park Res (MSAPGINPRC).
- ix Northern Elephant Sea. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at: <https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=19202>
- x Northern Red-legged Frog. BC Species & Ecosystem Explore. Accessed Dec 23, 2023. Found at: <https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=19586>
- xi Olive-sided Flycatcher. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at: <https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=16111>
- xii Harbour Porpoise. BC Species & Ecosystem Explore. Accessed Dec 23, 2023. Found at: <https://a100.gov.bc.ca/pub/eswp/reports.do?elcode=AMAGF01010>
- xiii Pileated Woodpecker. Nature Serve Explorer. Accessed Feb 1, 2024. Found at: https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.102132/Dryocopus_pileatus;
- xiv Sharp-tailed snake. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at: <https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=380904>
- xviii Purple Martin. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at: [https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?elcode=AMAJC03010;](file:///Users/iMac27/Library/Mobile%20Documents/com~apple~CloudDocs/Fenton%20&%20Associates%20Consulting/FAEC%20-%20Projects/Thetis%20-%20Lot%2083-84%20Welsh%20project_Aug%202023/Reports%20and%20studies/MSAR_FAEC_Sept%202023/Lot%2083%20Regs_SARA%20research%20/Species%20at%20risk_Thetis%20LTC_BCCDC_Oct%206,%202023/Species%20at%20risk%20data%20/PM_Species%20Summary_Feb%2010,%202024.html)
- xvi Stellar Sea Lion. BC Species & Ecosystem Explore. Accessed Dec 23, 2023. Found at: <https://a100.gov.bc.ca/pub/eswp/reports.do?elcode=AMAGF01010>
- xvii Western Screech-owl. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at: <https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=19173>
- xviii Western grebe. BC Species & Ecosystem Explore. Accessed Dec 23, 2023. Found at: <https://a100.gov.bc.ca/pub/eswp/reports.do?elcode=ABNCA04010>
- xix Yelloweye Rockfish. BC Species & Ecosystem Explore. Accessed Dec 23, 2023. Found at: <https://a100.gov.bc.ca/pub/eswp/reports.do?elcode=AFC4A06530>
- xxi Harbour Seal. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at: <https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=14853>
- xxvii Pacific Harbour Porpoise. Accessed Dec 23, 2023. Found at: <https://a100.gov.bc.ca/pub/eswp/reports.do?elcode=AMAGF01010>
- xxiii Monarch. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at: <https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=14853>
- xxiii Surf Scoter. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at: <https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=14699>
- xxiii¹ Purple Martin. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at: file:///Users/iMac27/Library/Mobile%20Documents/com~apple~CloudDocs/Fenton%20&%20Associates%20Consulting/FAEC%20-%20Projects/Thetis%20-%20Lot%2083-84%20Welsh%20project_Aug%202023/Reports%20and%20studies/MSAR_FAEC_Sept%202023/Lot%2083%20Regs_SARA%20research%20/Species%20at%20risk_Thetis%20LTC_BCCDC_Oct%206,%202023/Species%20at%20risk%20data%20/PM_Species%20Summary_Feb%2010,%202024.html
- xxv Douglas-fir / dull Oregon grape (CDFmm01). BC Species & Ecosystem Explore. Accessed Dec 23, 2023. Found at: <https://a100.gov.bc.ca/pub/eswp/reports.do?elcode=C1A9CPMGS1>.
- xxvi Douglas-fir / Alaska oniongrass. BC Species & Ecosystem Explore. Accessed Dec 2023. Found at: <https://a100.gov.bc.ca/pub/eswp/reports.do?elcode=C1A9CPMMS1>
- xxvii Douglas-fir / Arbutus. BC Species & Ecosystem Explore - not found on Feb 10, 2024. Though reported in ITC Fairyslipper Management Plan, Thetis Island.2021
- xxviii Garry oak / Oceanspray. BC Species & Ecosystem Explore – Accessed on Feb 10, 2024. Found at: <https://a100.gov.bc.ca/pub/eswp/reports.do?elcode=C1B3AQQGHD1>
- xxviii Western grebe. Nesting migration and habitat. Accessed Dec 23, 2023. Found at: [www.birdatlas.bc.ca/accounts/speciesaccount.jsp?sp=WEGR&lang=en&~:text=Nesting%20occurs%20amongst%20Reed%20Canary,flooded%20willows%20\(Salix%20species\).](http://www.birdatlas.bc.ca/accounts/speciesaccount.jsp?sp=WEGR&lang=en&~:text=Nesting%20occurs%20amongst%20Reed%20Canary,flooded%20willows%20(Salix%20species).)

Appendices #7: The Welsh GSH Project-specific Environmental Law Table. FAEC. Sept. 2023 – Fall 2024

Government	Legislation Description	Permits/Authorizations	Comments/links
Federal Modernized Fisheries Act (Aug 2019) and Fed – DFO General regs under the FA.	“The purpose of this act is to provide a framework for the conservation and protection of fish and fish habitat, including by preventing pollution. The act prohibits what’s known as HADD – the harmful alteration, disruption, or destruction of fish habitat.” ⁴⁶ ”	Projects near water. Following a CEMP that follows the stated BMP, standards and codes of practices to ensure the protection of fish and fish habitat.	Found at: https://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html (visited on Oct 11, 2023) Completion of a DFO – Fisheries & SAR Acts Disclosure.
Federal - Species at Risk Act (SARA)	“Protects federally listed species at risk from becoming extinct or lost from the wild. The Act covers all species that are listed as being at risk nationally and federally identified critical habitat). See the Species at Risk Public Registry for a list of species and documents.” ⁴⁹ ”	“Protection of species under Schedule 1 of SARA. Under sections 32 and 33 the listed offences.	Found at: https://www.dfo-mpo.gc.ca/species-especes/sara-lep/permits-permis/index-eng.html#water Note that SARA prohibitions don’t apply to species listed as special concern.
Federal - Migratory Bird Conservation Act (MCBA)	The purpose of this Act is to implement the Convention by protecting and conserving migratory birds — as populations and individual birds — and their nests. Migratory birds are jointly managed by the province, primarily federal. They include such species as: Ducks, Geese, Brant, Coots, Snipe, Mourning Doves and Band-tailed Pigeons and more. Ducks, geese, and all other migratory birds	Nothing needed though projects overarching goals of increased biodiversity through restoration of native plants etc., will only enhance the migratory birds	Found at: https://www.canada.ca/en/environment-climate-change/services/migratory-birds-legal-protection/convention-act-regulations.html

⁴⁶ Fisheries Act, The Lands Act, Migratory Birds Conservation Act (MBCA) and SARA were accessed on Dec 23, 2023. Found at: <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/species-ecosystems-at-risk/legislation>.

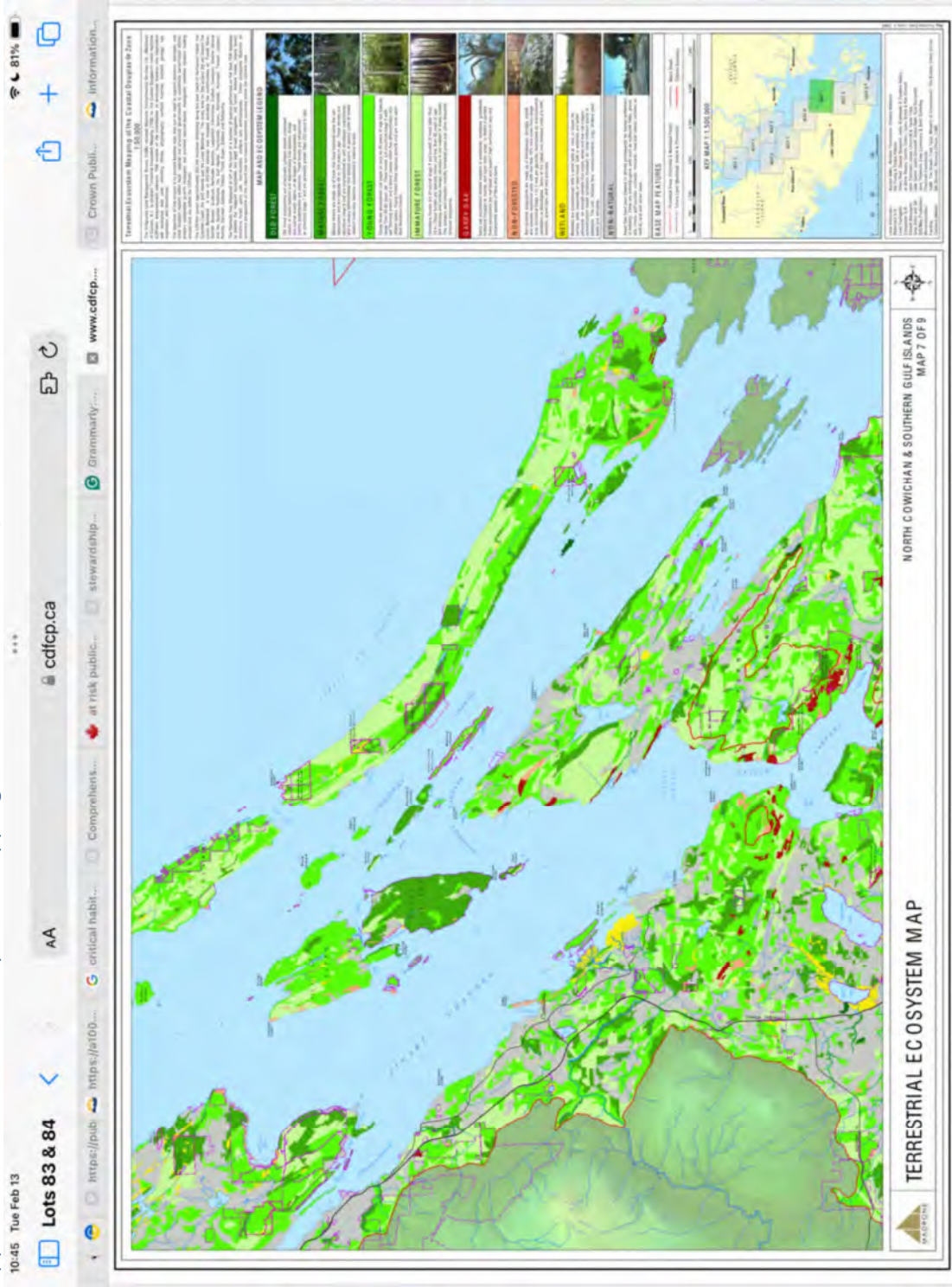
	are under the mandate of the Canadian Wildlife Service (CWS). The CWS is the agency that issues crop damage and scare permits for waterfowl. Additional information on migratory bird sanctuary regulations, hunting regulations, or hunting permits are also available ⁴⁹ .	encountering the area.	
Fed – End Environmental Protection Act (CEPA, 2017, 2023)	CEPA protect the right to a healthy environment and the most recent amendment (2023) have taken this even further + embracing UNDRIP with its own chapter that will further respect the right of the indigenous peoples in Canada.	Not specifically applicable, though it speaks to the core of reconciliation. So, this project has seen early Indigenous engagement as a priority for this project.	This summary of the new 2023 amendments to CEPA 1999 was found at. https://www.intertek.com/blog/2023/08-25-cepa-reform/
Fed – Transportation of Dangerous Goods Act (TDGA)		Not for this project.	
Provincial			
Province – BC Wildlife Act	“The Wildlife Act protects most all vertebrate animals from direct harm, except as allowed by regulation (e.g., hunting or trapping). Under this legislation, vertebrate species, other than fish, can be legally designated as endangered or threatened – enabling the following additional protections: Anyone who kills or harms an endangered or threatened species will receive penalties – conviction could mean a fine of \$500,000 and three years in jail.	Nothing needed though projects overarching goals of increased biodiversity through restoration of native plants etc., will only enhance all wildlife that use this area.	Found at. https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/26_34_0_82

	Habitats for endangered or threatened species can be designated as Critical Wildlife Habitats in Wildlife Management Areas The Wildlife Act also authorizes direct management of wildlife (e.g., translocation, predator control) or human activities (e.g., recreational vehicle closures) where it is necessary to achieve recovery objectives.”			
Provincial – BC Environmental Management Act (EMA), and its associated regs	“The Environmental Management Act (EMA) regulates industrial and municipal waste discharge, pollution, hazardous waste and contaminated site remediation.”	No permits needed. It mandates the appropriate disposal of waste materials such as creosote coated boards.	Found at. https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/03053_01	
Provincial - Water Sustainability Act	“The Water Sustainability Act (WSA) was brought into force on February 29, 2016, to ensure a sustainable supply of fresh, clean water that meets the needs of B.C. residents today and in the future. The WSA is the principal law for managing the diversion and use of water resources. The WSA provides important new tools and updates B.C.'s strategy for protecting, managing, and using water efficiently throughout the province.”	Nothing for this project.	Found at. https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/laws-rules/water-sustainability-act	
Provincial - BC DRIPA (2017) (Declaration of Rights for Indigenous Peoples	“The Declaration Act Action Plan, released on March 30, 2022, includes collectively identified goals and outcomes that form the long-term vision for implementing the UN Declaration in B.C. It also has 89 priority actions - tangible steps that will advance this work in key areas over the next five years.”	No permits, though early Indigenous engagement has been recognized as a priority for this project.	Found at. https://www2.gov.bc.ca/gov/content/governments/indigenous-people/new-relationship/united-nations-declaration-on-the-rights-of-indigenous-peoples/implementation#	
BC Weed Control Act and associated regulations.	“The BC Weed Control Act (BCWCA) designates a list of invasive plants as ‘noxious weeds’ at the	No permitting needs.	Found at. https://www.bclaws.gov.bc.ca/civix/d	

	regional and provincial level. Private property owners and government agencies are mandated by law to control these species that occur on their property or jurisdiction.”	Restoration strategy is using management of invasive weeds as tool among many to restore the foreshore areas.	ocument/id/complete/statreg/00_96 487_01
BC Land Act	“The Land Act can be used to establish map reserves to manage habitat or restrict activities that may be harmful to a species’ habitat. Land use orders or permits can be included as part of land use planning and strategic agreements. ”	A shared private/crown land partnership for the restoration of the foreshore. So, working through the FrontCounterBC/ Natural Resource Online Services for an Expedited Permit for NBSP. Completion a Management Plan submitted through the NS online portal.	Found at. https://www2.gov.bc.ca/gov/content/industry/crown-land-water/land-use-planning and the NBSP (Nature-base Shoreline Protection) found at. https://www2.gov.bc.ca/gov/content/industry/crown-land-water/crown-land/crown-land-uses/residential-uses/nature-based-erosion-protection .
Local Government	BCBC (BC Building Code)	No permit needed the shoreline work. Dealing with Building Code Bylaw that oversees the building of homes and other buildings on properties within the CVRD – Area G (Saltair & Thetis	

Islands Trust	A special-purpose government with the unique mandate to preserve and protect. Islands Trust Act (ITA est. 1974) through the: • Thetis Local Trust Committee • Thetis Island OCP (2011) – Bylaw No... 88 • Thetis Island Regulatory Bylaw No. 89	Island). Roads and Services such as waste management Special purpose government that is the land use authority under ITA including Thetis Island. The IT's N Planning office has been part of the conversation and will be part of the design phase signoff prior to the construction phase commencing.	Found at: https://islandstrust.bc.ca/location/thetis/ ✓ Note: there are no DPA's on Thetis, just the OCP and Land use regulation. The land use reg covers terrestrial land out the NB (Natural Boundary/OHWM) the marine land use for residential considerations out to the LWM of the foreshore. As well as the commercial out to 1000m seaward or shared equitably with the neighbouring jurisdiction if under 1000m. The planners are mindful of each island's bylaws that regulate the use, it's docks, building size/ht/footprint and <i>has advised this project to consult and share the plans for the project with their office for input before any work begins.</i> The marine waters are shared with the prov and feds; The benthic surface falls under provincial jurisdiction.
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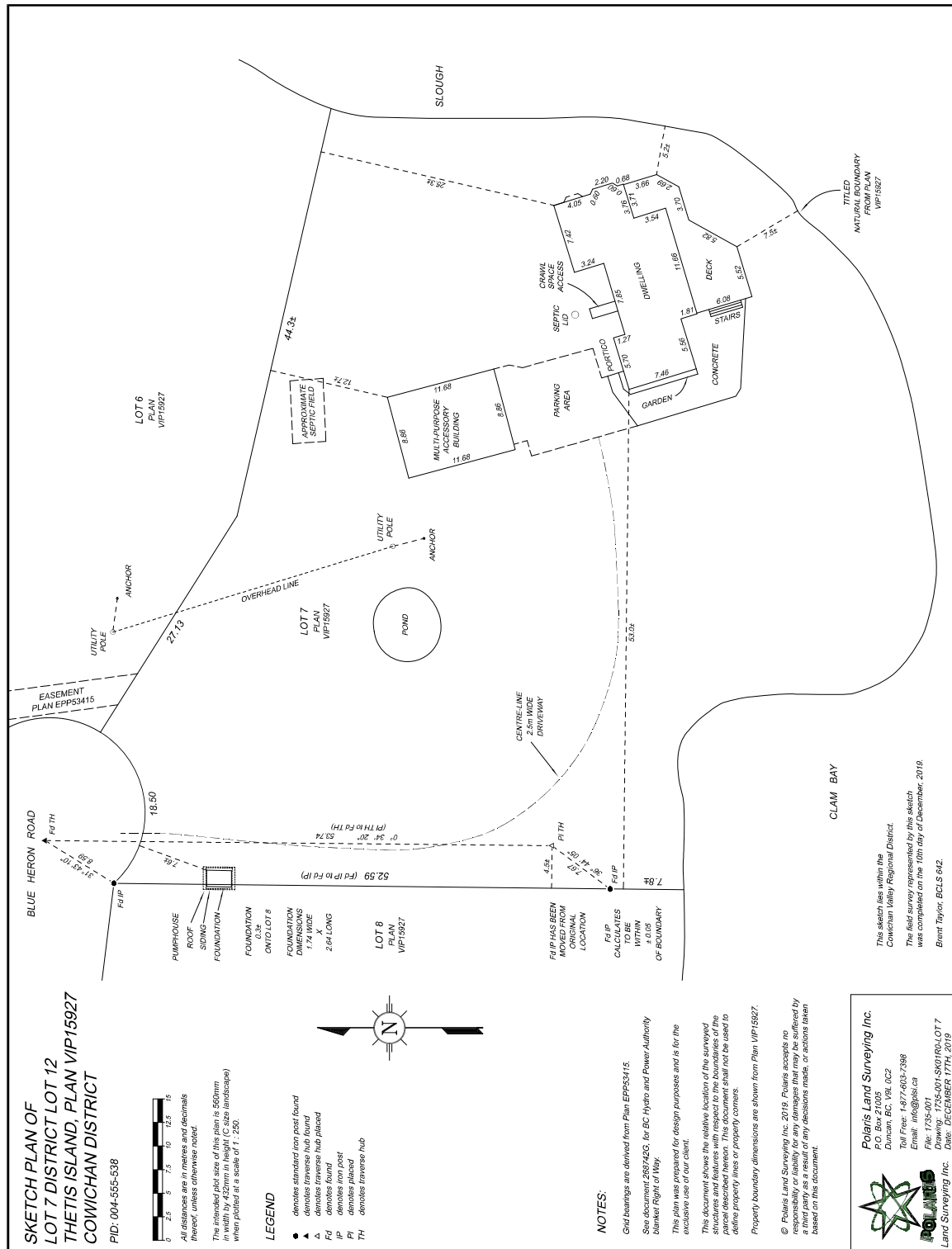
Appendix #8: Terrestrial Ecosystem Mapping of the Cdfir Zone- 1:50,000



I am humbled and grateful to live and work in the ancestral, and unceded traditional territories of the Puv'luxuth & Lyackson Peoples.

Disclaimer: Territorial acknowledgements are just one small part of reconciliation. Please take a moment to think of other ways you can enact reconciliation.

Appendices #9a: Survey 83 Blue Heron Rd. showing Natural Boundary from Plan VIP15927

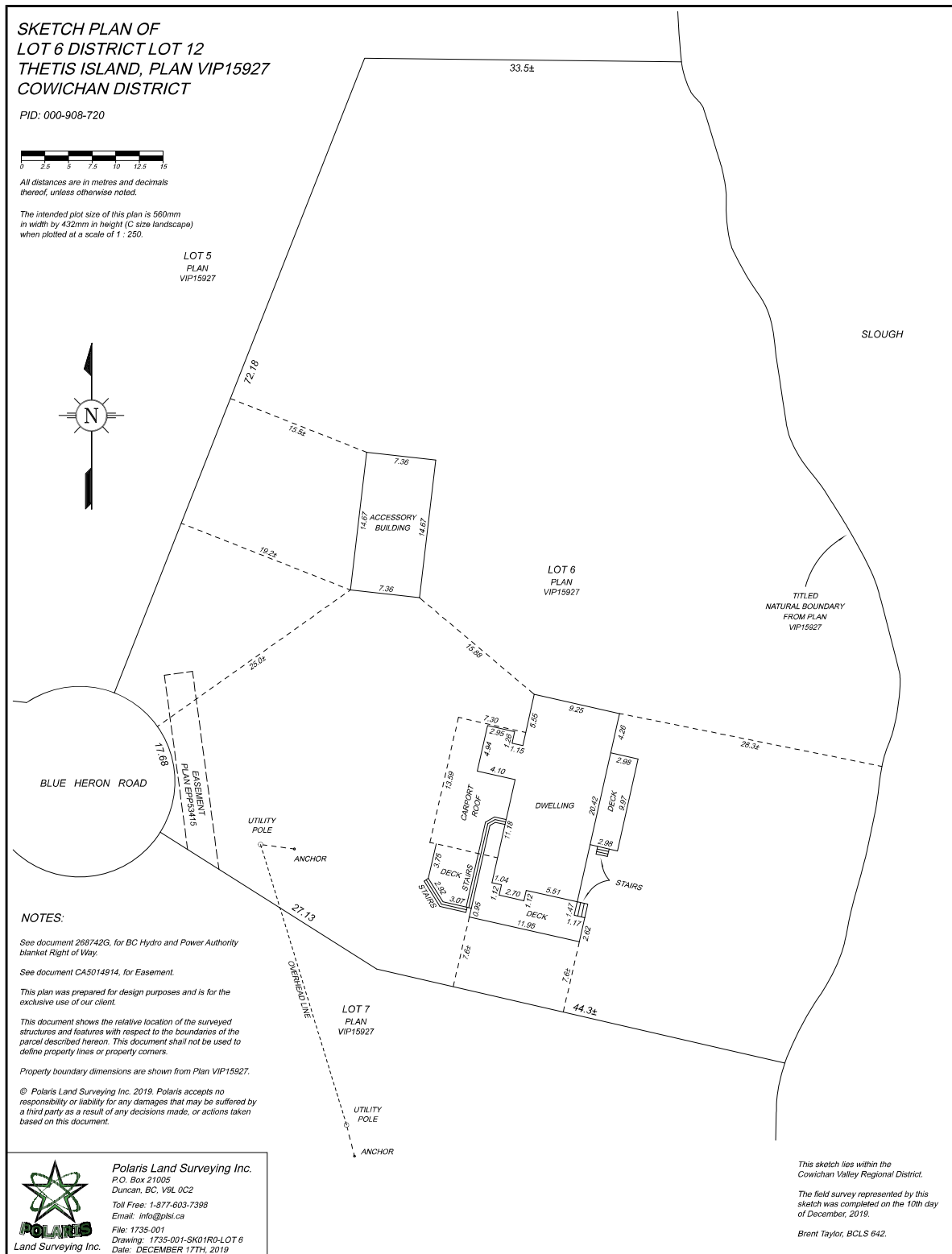


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Appendices #9b: Survey 84 Blue Heron Rd. showing Natural Boundary from Plan VIP15927



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Appendix #10: Doug Fenton Resume

DOUG FENTON

MEP, EP, CERT. EOH, CAPM

INDIGENOUS PEOPLES' SUSTAINABILITY CHAMPION

(250) 804-6480 | doug@fentonconsulting.ca | Gulf Islands - Cowichan Valley, BC | linkedin.com/in/dougfenton

CAREER SUMMARY

Indigenous People's Sustainability Champion with over 40 years of experience, offering expertise in developing environment monitoring/management practices to bridge the gap between biocentric and business practices and drive sustainability/sustainable development. Proven record of designing and implementing strategically critical environmental initiatives, including green shoring, marine protection, soil conservation, stormwater management and green building construction. From a settler's perspective, demonstrate a solid, growing/ever-increasing understanding of First Nations' traditional/ecological knowledge to facilitate Indigenous reconciliations, advocate Indigenous rights, restore Coast Salish people, and execute capacity-building initiatives/strategic educational programs to enhance organizational knowledge while mitigating risks. Long-term interests in understanding and deriving the spatial and temporal benefits of the Indigenous People's Sustainable approaches.

SKILLS

- Environmental Management
- Sustainable Development
- UNDRIP/TRC Reconciliation
- Indigenous Rights Advocacy
- Environmental Health
- Environmental Monitoring
- Environmental Impact Assessment (EIA)
- Environmental Stewardship
- Fundraising
- Emergency Medical Service
- Capacity Building
- Proposal Development
- Marine Shoreline Assessment
- Cumulative Impact Assessment (CIA)
- Cumulative Effects of Marine Shipping (CEMS)
- Green Shore Approaches
- Stormwater Management
- Sustainable Agriculture
- Policymaking
- Forecast Budgets
- Community Development
- Soil Conservation
- Strategic Management
- Green Building Concept

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KEY AREAS OF EXPERIENCE

LEADERSHIP AND STRATEGIC MANAGEMENT

- Develop the environmental strategy and programs based on First Nations community requirements, global insights, and government regulations.
- Examine and build analytical frameworks to assess environmental regulations, risks and opportunities potentially impacting the organization's strategic objectives and First Nations communities.
- Conceptualize rigorous competitive benchmarking capabilities to address community issues and construct high-level frameworks for long and short-term environmental protection planning.
- Direct the organization's overall operations, forecasting budgets, preparing funding proposals, raising funds, and controlling expenses to deploy environmental protection practices within the allocated budget.
- Consult with First Nations communities, local governments and internal staff on environmental management, conservation, and Indigenous reconciliation matters.
- Partner with internal and external stakeholders to define the critical elements of the environmental strategy and manage diverse ecological projects.

ENVIRONMENTAL MANAGEMENT

- Formulate environmental policies aligned to local, provincial, and federal regulations to promote sustainable practices within the community.
- Steer the development of environmental assessments to advise critical stakeholders and draft assessment reports backed by Indigenous knowledge and western science.
- Coordinate, create and implement an environmental management system and associated procedures to promote awareness and target improvements throughout the organization.
- Analyze existing climate change legislation, including Indigenous Rights, Consultation law and best practices to recommend modifications to current environmental management processes.
- Enrich public/community engagements to deliver marine protection plans, environmental monitoring, green shores approaches and stormwater management to safeguard natural resources.
- Synthesize traditional ecological knowledge into environmental management and protection plans (EMP/EPP) to generate erosion prevention, sediment control and low-impact agriculture programs.
- Foster environmental stewardship to apply green building concepts and project management approaches to construct new buildings, renovate existing structures and assess the restoration needs of foreshores.
- Coordinate with qualified biologists, EOH consultants and First Nations specialists to employ a transdisciplinary approach and assist critical stakeholders in achieving sustainability goals.
- Facilitate the development of environmental policies, procedures, and practice guidelines through research to ensure compliance with ISO 14001 EMS and OSHAS 18001 OH&S standards.

HEALTH AND SAFETY

- Establish, monitor, and foster a safety-oriented culture at the environmental conservation sites across marine/coastal regions, intertidal work areas, green shores, and terrestrial zones.
- Define the safety management system's objectives to enhance safety awareness and guarantee the safety of the local communities and population.
- Draft and ensure the organization-wide adoption of the EHS policies aligned to provincial and federal legislation to minimize the risk of accidents/incidents.
- Maintain the safety of the environmental protection sites by deploying emergency medical services to rescue and enable the timely treatment of people in alpine, river, marine and confined space settings.
- Investigate incidents, and draft investigation reports to identify root causes of accidents and apply appropriate measures to prevent repetition.
- Conduct daily safety meetings and walk-around to evaluate the appropriateness of the safety measures, recommend remedial initiatives and enrich the overall work atmosphere of the sites.

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PROFESSIONAL EXPERIENCE

PRACTICUM – MARINE PROTECTION PLANNING

2017 – 2018

Lyackson First Nations and Penelakut Tribe / BC

- MEP Capstone project collaborating with First Nation Groups to assess the potential use of TEK/TK as an EA tool instead of WS, supporting marine protection planning initiatives, Royal Roads University.

Key Achievements and Projects:

- Developed high-level frameworks to implement short and long-term marine protection plans.
- Consulted First Nation communities and the Haida Gwaii Coastal Guardian representatives to incorporate insights gathered from CEMS, EIA and CIA into the environmental and strategic plans.

ELECTED TRUSTEE AND BOARD MEMBER - CONSERVANCY

2017 – 2022

Islands Trust / BC

- Sat on Islands Trust Council, Local Trust Committee, and the IT Conservancy board advocating for progressive environmental management of the trust area.
- Facilitated the inaugural acknowledgment that the LTC was the traditional territories of the Penelakut and Lyackson Peoples through the adoption of a Reconciliation Declaration and completion of a shoreline tour that allowed the trustees and staff to learn about each nation's concerns and priorities.
- Member, Wa ljtima (Cultural) Working Group.

FOUNDER AND ENVIRONMENTAL CONSULTANT

2016 – Present

Fenton and Associates Environmental Consulting / BC

- Deliver environmental and sustainability practice expertise for the heavy industry, construction sector, local governments, community organizations, First Nations organizations, and local gulf island residents.

Key Achievements and Projects:

- Marine Shoreline Assessment and design of EMP, EPP for upstream/shoreline construction projects.
- Marine Riparian Restoration Workshop.
- Advisory Committee - Nearshore Habitat Restoration Project, Salish Sea.

SENIOR MANAGER AND CONSULTANT

1989 – 2017

Airevac Consultation and Education Ltd / BC

- Established and grew a high-performing interprofessional team of medical experts, mountaineering professionals, and water specialists to ensure project site safety and support aeromedical rescue.
- Leveraged intercultural communication to coordinate and build healthy relationships with global Indigenous people in remote areas with limited development and contact with Western societies.

Key Achievements and Projects:

- Numerous heavy industry projects. 2012 – 2015. Responsible for running the medical clinic and the provision of various OH&S services.
- Assessed the remote working environments of 15 feature film production houses, accessible by only helicopters or boats, to design and implement customized EMS plans for each global production unit.

CRITICAL CARE PARAMEDIC (PT)

1981 – 2011

BC Ambulance Service / BC

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VOLUNTEER AND COMMUNITY SERVICE

LOW-IMPACT DESIGN – TRAIL SYSTEMS AND SDG RECYCLING OPPORTUNITIES 2018 – *Present*
Thetis Island Residents and Rate Players Association (TIRRA) / BC
LOW-IMPACT SHORELINE WORKSHOPS, PRESENTATIONS/KIDS SUMMER CAMPS 2017– *Present*
Thetis Island Nature Conservancy / BC
PADDLE JOURNEY – PADDLER 2019 – *Present*
Penelakut Canoe Family / BC
Past TRUSTEE – THETIS LOCAL COMMITTEE 2017 – 2022
Islands Trust / BC
ELECTED TRUSTEE – BOARD MEMBER – ISLANDS TRUST CONSERVANCY 2017 – 2022
Islands Trust / BC
Anchorage Concerns Thetis / BC 2017 – *Present*

LICENSES AND CERTIFICATIONS

Environmental Professional / ECO Canada
BC Certified Erosion and Sediment Control Lead / BC CESCL
Green Shores Level 2
CSO Training / BCIT
Certified Associate of Project Management (CAPM) / Project Management Institute

EDUCATION

Working Effectively with Indigenous People / Indigenous Training Corporate Inc. 2023
Marine Shoreline Design Guide / Coastal Training Program 2020
Construction Activities in Sensitive Areas / University of Northern British Columbia 2018
Master of Environmental Practice / Royal Roads University 2018
Certificate, Environmental and Occupational Health / University of Victoria 2015
Construction Safety Officer Training / BC Institute of Technology 2015
Certificate, Practice Education for Health and Human Services / University of British Columbia
Advanced Diploma in Advanced Care Paramedic (ACP) / Justice Institute of BC

MEMBERSHIPS AND AFFILIATIONS

Member / ECO Canada – current
Green Shores Community of Practice - current
Erosion and Sediment Association of BC - current
Former Member / Project Management Institute – Vancouver Island Chapter

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Appendix #11: Professional Pledge of Indigenous Reconciliation

Professional Pledge of Reconciliation

In the spirit of reconciliation with Indigenous Peoples in Canada,
I, **Doug Fenton, EP and Primary Consultant at FAEC**, solemnly pledge to:

1. Commit to honouring #92 of the Truth and Reconciliation Commission of Canada's calls to action for reconciliation, Business and Reconciliation.
2. Support progressive improvement in our Indigenous relations by encouraging my organization to participate in the Progressive Aboriginal Relations (PAR) program of the Canadian Council for Aboriginal Business.
3. Commit to an in-house community investment strategy that is developed through joint planning with the Indigenous communities involved and aligns with the goals and interest of those communities.
4. Support my organization in ensuring employment opportunities are open to Indigenous candidates and making career development opportunities available.
5. Support my organization in creating a working environment that is inclusive and welcoming for Indigenous employees.
6. Identify contracting or procurement opportunities for Indigenous businesses and economic development corporations.
7. Commit to generating positive and lasting change in my professional and personal life.

Signature:  Date: March 29, 2023

Powered by Indigenous Corporate Training Inc. www.ictinc.ca

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ⁱ Terrestrial Ecosystem Mapping of the Coastal Douglas-Fir Biogeoclimatic zone. Madrone Environmental Services Ltd. 2008.

ⁱⁱ Barn swallows. BC Species & Ecosystem Explore. Accessed Dec 23, 2023. Found at.
<https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=17978>

ⁱⁱⁱ Great Blue Heron. BC Species & Ecosystem Explore. Accessed Dec 23, 2023. Found at.
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^{iv} Humpback Whale. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at.
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^v Southern Resident Killer Whale. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at.
<https://a100.gov.bc.ca/pub/eswp/esr.do?id=24242>

^{vi} Northeast Pacific Transient Pop. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at.
<https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=18678>

^{vii} Little Brown Myotis. BC Species & Ecosystem Explore. Accessed Dec 23, 2023. Found at.
<https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=14375>

^{viii} The Multi-species Action Plan for Gulf Islands National Park Reserve of Canada applies to lands and waters occurring within the boundaries of Gulf Islands National Park Res (MSAPGINPRC).

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^{xi} Olive-sided Flycatcher. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at.
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^{xiv} Sharp-tailed snake. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at.
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^{xxi} Harbour Seal. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at.
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<file:///Users/iMac27/Library/Mobile%20Documents/com~apple~CloudDocs/Fenton%20&%20Associates%20Consu>

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High-level site map (FAEC, Oct 2023 – Nov 2024).

Existing Site Plan

Site safety plan by section by creating enlarged sections of the Existing Site Plan. Created by NHC Oct 2024.

Signature Page:

Note regarding the signatures on this page being pending. FAEC's RPBio has completed and signed a separate sign off letter that includes this CEMP live edition. A copy has been sent to Island Trust – North Office and will be part of the Welsh GSH/NBSP—project bylaw amendment process for their July 2025 LTC report and will be added to the CEMP asap.

*Prepared by:**Doug Fenton**tbd**Reviewed by:*

Ian Bruce BSc. (Marine Bio); RPBio #496, QEP Dip. Restoration of Natural Systems, QEP(Reg #496)

*And**Christine Brophy- tbd*

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Acronyms/Abbreviations (updated May 21, 2025)

AEMP – Adaptive Ecological Monitoring Plan

AIA – Archaeological Impact Assessment

AOA - Arch Overview Assessment - in general use as well as at the Arch Branch itself

AS – Accretion shoreform

BCBC - BC Building Code

BMP - Best Management Practice

BP - Building Permit (CVRD)

CAPM - Certified Associate of Project Management, PMI

CC – Climate Change

CDC – Conservation Data Centre

CDF zone – Coast Douglas-fir zone

CDFmm – CDF moist marine

CE - Coastal Engineers

CECAB - Canadian Environmental Certification Approvals Board - <https://eco.ca/environmental-employers/memberships-and-designations/member-roster/>.

CEMP - Construction Environmental Management Plan

CEPA – Canadian Environmental Protection Act

CESCL - Certified Erosion Sediment Control Lead, - Erosion & Sediment Control Association of BC

CIA/CEA - Cumulative Impact Assessment / Cumulative effects assessment

CLAMP - Crown Land Application Management Plan

CMT – Culturally modified trees

CPR – Coastal Processes Report

CRDT – Cumulative Risk Determination Tool

Fenton & Associates Environmental Consulting (FAEC)

CSP – Coast Salish People

CVRD - Cowichan Valley Regional District

DFO - Department of Fisheries

DRIPA – Declaration of the Rights of Indigenous People Act

EBM - Ecosystem-based Management

ECO Canada - Environmental Careers of Canada

EM – Environmental Monitor

EMA – Environmental Management Act

EMP - Environmental Management Plan

EP - Environmental Professional

EPP - Ecosystem Protection Plan

ESC – Erosion and Sediment Control

FAEC - Fenton & Assoc. Environmental Consulting

FF – Forage Fish

FN – First Nations

GS - Green Shores

GSH – Green Shores for Home

GSHM – Green Shores for Home Monitoring

GSP - Green Shores Professional

GSP(it) - Green Shores Professional (in Training)

HCA - Heritage Conservation Act

HF – Hydraulic fluids

HE – Heavy Equipment

HHW – High High Water

IE – Indigenous Engagement

IT - Islands Trust

ITA - Islands Trust Act

ITC - Islands Trust Conservancy

LID – Low Impact Design

LTC – Local Trust Committee

LWD - Large woody debris

MABRRI - Mount Arrowsmith Biosphere Region Research Institute

MBCA – Migratory Birds Conservation Act

MSAPGINPRC - The Multi-species Action Plan for Gulf Islands National Park Reserve of Canada

MSAR - Marine Shoreline Assessment Report

MSDG – Marine Shoreline Design Guide (2014)

MEP - Master of Environmental Practice

MHW – Mean High Water

MHWM – Mean High Water Mark

MLLW – Mean Low Low Water

NBS - Nature Based Solution

NBSP - Nature-based Shoreline Protection - is the name of the program that is partnering with GS to implement the trial the expedited permitting process.

Net Zero Carbon home - NZC

Net Zero Home - NZH

NR - Natural Resources online Portal - the BC govs crown land information/permitting portal

OCP - Official Community Plan

OHWM – Ordinary High Water Mark

OM – Organic material

OSH - Occupational Health & Safety

PAH – Polyaromatic Hydrocarbons

PC – Project Coordinator

PCOC – Potential Contaminate of Concern

PH - Passive Home - as an existing standard

PI – Pune’luxutth/Penelakut Island

PID – Parcel Identifier

PM - Project Manager

QEP – Qualified Environment Professional

RA/RM - Risk Assessment/Management

RAAD - Remote Arch Assessment Database - Arch Branch of BC

RAD - Right angle drive - ;)

RBTech – Registered Biological Technician

RPBio. – Register Professional Biologist

RWC – Rainwater capture

RWH – Rainwater harvest

R&R - Roles & Responsibilities - in my world ;)

SARA – Species at Risk Act

SLR - Shoreline Restoration

SLR - Sea Level Rise

SMP - Soil/Substrate Management Plan

SPERNP – Spill Prevention and Emergency Response Notification Plan

SPERP – Spill Prevention and Emergency Response Plan

SWM – Storm Water Management

TBD – To be determined (CEMP will be updated as the project evolves)

TDGA – Transport of Dangerous Goods Act

TEK – Traditional ecological knowledge

TK – Traditional knowledge

WQMP – Water Quality Management Plan

Yo – years old

DRAFT

Environmental Sensitivities

The following table discusses the known relevant issues associated with construction activities of the project, relate to the sections within the Construction Environmental Management Plan (CEMP).

List of defined areas involved;

Table: #1: Discussion of the Potential Environmental issues.

Environmental Concerns	Potential Impact	Relevant CEMP Sections
Archaeology	◇ The entire property has strong connections to cultural activities of the past; ◇ Using a multi-pronged strategy that involves careful consideration of the RAAD Overview; ◇ Early engagement of the Pune'luxtth Tribe elders and NR Manager; ◇ Indigenous monitoring during construction; and ◇ Chance finds Procedure in place.	tbd
Erosion and Sediment control	◇ HE will travel on existing roadway to beach; ◇ Foreshore – during beach nourishment, HE on the foreshore working on stable natural substrate or cobble-enhanced substrate to prevent 'rutting'; ◇ Given that this project intends to stabilize the soil/clay backshore with clean beach materials, there should be little impact the local foreshore waters; ◇ Sand and gravel will be source from a clean gravel pit, however, floating sediment curtains will available if necessary to mitigate any signs of silt upon first tidal event; ◇ Silt curtains will be deployed where necessary on upland areas or at interface of beach and backshore. we will deploy curtains; ◇ Other sediment control measures will be described in later versions of this CEMP document as per senior government input, contractors' input, time/strategy of the project, and directives from the environmental monitor; e.g. Silt fencing, coffer dams.	

Soil and Water Management	◇ <i>Rain events have the potential to lead to the discharge of sediment into the local marine waters;</i> ◇ <i>Soil for planting along the shoreline area will be brought in after the sand and cobble has been laid.</i> ◇ <i>Spill pile management of the planting soil only and amendment is a must. 30m from storage of bulks soils, amendments, and mulches;</i> ◇ <i>Tops covered with tarps for rain events;</i> ◇ <i>Strategically place on the upland properties such to mitigate any concern of leachate getting to the foreshore area.</i>	
Fish and Wildlife	◇ <i>No invertebrate crab species at risk.</i> ◇ <i>This project impacts at risk. However, the immediate and short-term effects on the local invertebrates living on this site's footprint will be affected by HE (Heavy Equipment) and sand/gravel materials. Given that many species spawn in the local waters, their ability to regenerate naturally is good, from a month to a year.</i> ◇ <i>A note of concern is that invasive species could impact the local native crab populations. The Penelakut tribe recently reported that they caught a European green crab (Carcinus maenas) located in one of their monitoring traps along the foreshore of the Penelakut Spit.</i> ◇ <i>Sampling will occur prior to construction. Any forage fish eggs laid in the past 1- 4 weeks. Local Citizen Science has not detected any FF eggs to date. However, this site has historically tested as too silty and removed from the MABRI, VIU Forage Fish Spawning Habitat Beach Survey (2021) because of this factor;</i> ◇ <i>The goal will be to source the correct substrate size so that the next time the FF are in these waters, they like and lay eggs in the next cycle. So, it is hopeful that the Rx for NB EP design will lead to shoreline restoration, reconnecting the ecology upland and foreshore and setting the local habitat up for more FF activities.</i>	
Vegetation	◇ <i>Where possible, transplant of foreshore vegetation;</i> ◇ <i>Management of Invasive plants;</i>	

	◇ Careful/mindful working on the upland slope as it supports many native plant volunteers. ◇ Both will need a strategy for erosion and silt prevention; ◇ EC with Jute or Coconut blankets short-term and mulch for longer term; ◇ Watering system – designed prior and built as you go. ◇ Trees (Y/cedar, Nootka rose, Tall Oregon grape, other (Ironwood) existing on the foreshore are being kept, so careful removal of the creosote boards needs to accomplish such that this process doesn't harm them.	
Waste Management	◇ No waste should be left on site; ◇ Bins setup ahead of time and removed as full on the foreshore projects, or if room in the bins, wait for the Shed/Home Reno, and remove them once full or post project.	
Spill prevention and Emergency Response	◇ Machinery and equipment such as nourishment spread/conveyor? ◇ HQ – hydraulic fluids should be biodegradable il No HC; ◇ The project is considered a Zero spill approach for all construction activities.	
Air Quality	◇ Dust; ◇ Machinery fumes; ◇ Driveway – for heavy trucks – not an issue;	

Sensitive Areas

The following sensitive area existing starting at the N end of the project:

- The estuary area N of the project, starting at the N access point off lot 84.
- All aquatic plant life and marine life along the shorelines;
- All shrubbery along E shoreline around to the lot 83 home and to the W end of the project
WRC/shoreline pine, may have nesting of songbirds, forage for bats at night;
- There are no known eagle nesting trees;

Introduction

This CEMP (Construction Environment Management Plan) was prepared by FAEC (Fenton & Associates Environment Consulting) for the Welsh GSH/NBSP Project, located on Thetis Island, BC.as, as a guidance document for all involved for the project's pre-construction phase, construction and post-construction monitoring phases of the project. The CEMP reflects many BMPs (prov, federal, and local bylaws, MSDG (Marine Shoreline Design Guide), and GSH (Green Shores for Homes) and has consulted the FNs TK/TEK holders) to advise how to work on these sensitive shorelines and culturally significant areas.

The project is located on Thetis Island and is under the use authority of the Islands Trust's Thetis Local Trust Committees (LTC); however, given the project is in the foreshore area (NB to 10m seaward), the Province's Crownland, DFO and TC are part of the expedited permitting process.

All contractors and subcontractors must comply with the CEMP.

The CEMP will be available for all contractors on site. Mindful that it is a living document that will change based on the time and phases of the project. It feeds the Monitoring phase, and upon completion, it serves as the ongoing maintenance for the landowner's post-project. Project Information

Project Location:

Table #2: Description of Land of main residence.

Physical Address	83 Blue Heron Rd., Thetis Island, V0R 2Y0.	
Parcel Identifier (PID)	004-555-538	
Legal Description	Lot 7 District Lot 12 Thetis Island, Plan VIP15927 Cowichan District	
Area	1.29ac/0.52ha/5222.67m ²	
Shoreline length¹	137.89m	
GPS location of S Shoreline	Latitude: 48° 59' 4.488" N Longitude: 123° 39' 43.902" W Map Datum: NORTH AMERICAN 1983, Canada	

¹ Property Survey. GW Lindberg Land Surveying Inc., File No. GWL015-761-

3qw32-Epp52414 – July 5, 2015. See

Table #3: Description of land of rental home.

Physical Address	84 Blue Heron Rd., Thetis Island, V0R 2Y0.	
Parcel Identifier (PID)	000-908-720	
Legal Description	Lot 6 District Lot 12 Thetis Island, Plan VIP15927 Cowichan District	
Area	Area: 1.5ac/0.61ha/6072.87m ²	
Shoreline length	107.7m	
GPS location of E Shoreline:	Latitude: 048°59'5.34 N Longitude: 123°39'42.55" W Map Datum: NORTH AMERICAN 1983, Canada	

Table #4: Green Shores Team

Name	Cred or title	Role
Rob & Marcie Welsh	Retired soles who want to leave a legacy	Owners of both properties
Doug Fenton	MEP - EP, GSP (iT), CESEL, EM, (ECO.ca-22432)	EP/PM, FAEC - Primary Consultant
Ian Bruce	BSc. (Marine Bio); RPBio #496, QEP Dip. Restoration of Natural Systems, QEP(Reg #496)	Project's RPBio - FAEC Associate.
August Sylvester	Penelakut Elder	Cultural advisor
Marya Sylvester	Penelakut knowledge Holder/ Elder support	Cultural Advisor
Christine Brophy	BNRP, RBTech (Reg #5400)	FAEC Associate – Author of the GSH Native Foreshore Plants Planting Plan
Kelly Loch	MSc, RPF	GS PM
Grant Lamont	MSc/PEng/Senior Coastal Engineer	NHC consultant
Laura Ramsden	MSc/PEng/Coastal Engineer	NHC Consultant
Ann Eriksson	Biologist/Author	Founding Director, ThINC.

Features and neighbouring properties

There is a creek and estuary ecological valued asset to the N, while sharing the shoreline restoration with 84 Blue Heron Rd., to the N, that lies between the main residence and the ecological assets. To the W is a standard sized lot with a home with smaller home on subsequent lots the W. Upland properties around the cul-de-sac are all on small acreages with single homes built in the 1970 or 80s.

Project Description Site Access map

- *Traffic patterns and volume;*
- *Accessible via BCF Route 11 out of Chemainus where the Penelakut/Pune'luxutth/Thetis Island ferry is located; and*
- *Parking – It is a private lot with lots of parking within the property itself, and as it is zoned R1, there is an expectation that the homeowners will provide adequate parking for the normal residential use.*

Project Background and Scope

The project will provide a nature-based shoreline protection (NBSP) technique to restore shoreline of Lots 83 & 84 on Thetis Island, on the E end of the Cut. The work done is in the foreshore area, so it is intertidal. The goals of the design are to stop active erosion along the E shoreline and slow the degradation of the existing seawall on the S shoreline. The project scope involves adding beach nourishment, cobble and boulders + LWD along at MHWL elevation and re-planting the site per the NFPPP. The post-construction planting process is multi-year with AEMP monitoring per the NFPPP.

The following tasks will be considered for the sites:

- ◇ *Access to both sides (S – via lot 83 driveway & E – via Lot 84);*
- ◇ *Laydown area established;*
- ◇ *Waste or recycle bins site strategically for this;*
- ◇ *Fueling area established;*
- ◇ *Spill kits and signage stationed; and*
- ◇ *Materials and machinery mobilized to site by contractor/s;*

Turnaround and up area:

- *Identified below house on Lot 84;*
- *12" minus as a road base, down to the beach;*
- *Potentially along beach from N access point/Lot 84; and*
- *This will be cleaned up on the out, as the last dump loads arrive.*

S Shoreline

- ◇ *Burying the existing concrete seawall;*
- ◇ *Preserving the existing native trees on the point – per NHC/FAEC-Existing Vegetation Plan. Oct 2024;*
- ◇ *Removal of old lumber detritus along W side of the S shoreline seawall, but constrained to that area; and*

- ◇ Removal of toxic or materials such as creosote boards, posts or like materials –under trees on the W end of project footprint.

E shoreline

- ◇ Where possible remove old tarp and plastic detritus from bank along entire length of this side of the project;
- ◇ Sediment Remediation – upland side of bank in several locations;
 - EC netting, willow live staking + fascicles where possible;
 - Other native plants per the NFPPP;
- ◇ Invasive Plant management – see Invasive Plant Management Action Plan;
- ◇ Beach nourishment / cobble sized end caps per the NHC cross section detail plans;
- ◇ Backfilling and grading – potentially both sites;
- ◇ Installing of LWD – per details in NHC;
 - Polster Polster-aged logs (i.e., retired boom logs that are ready to become nature logs; and
- ◇ Post construction planting per FAEC NFPPP.

Project Schedule

Table #5: Project. Least Risk Timing Windows

Least-Risk Period	Start date	End Date
2025 -26	Jun 1	Sept 1

Table #6 - Gantt Chart for least-risk Project Construction Periods

Period	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov
DFO least-risk window – Area 17 ²	1st		15th				1			1st		
General Bird Nesting period ³												
Raptor Nesting Season												

** Refer to Endnote the references for the bird local bird and raptor nesting for this area. Note that the winter timing window doesn't work, as FF are still active during the winter window.

² British Columbia Marine/Estuarine Timing Windows for the Protection of Fish and Fish Habitat - South Coast and Lower Fraser Areas. Government of Canada. Accessed Oct 24, 2024. Found at. <https://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/bc-s-eng.html#area-17>.

³ Nesting Periods/nesting calendar. Government of Canada. Accessed Oct 24, 2024. Found at. <https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods/nesting-periods.html#toc1>

Site Description

The site is located on the seaward shorelines of Lots 83 & 84 Blue Heron Rd, on Thetis Island BC. Much of the site/s is a relatively flat residential properties with a mix of native vegetation and some domestic foliage. Lot 83 is the home of the owner of both lots, and the Lot 84 is currently a rental home.

Shorelines are mix of fine sand to cobbles and boulders. Large woody debris move in and out with the season and storm events.

Contact and Responsibilities**Key Project Personnel****Table #7: Key Project Personnel and Contacts**

Name	Organization	Role	Contact Information
Doug Fenton	FAEC)	Environmental Professional (EP) – PM, EM, FN liaison	C: 250.804.6480 E: doug@fentonconsulting.ca
Ian Bruce	FAEC Assoc.	RPBio, FAEC Associate.	C: 250.888.2191
Augie Sylvester	Penelakut Tribe	Elder Advisor	Contact via D Fenton
Kelly Loche	Stewardship Centre	Green Shores Project Manager	C: 250.715.6049
TBD	Contractor Representative	Physical construction	tba

Facility/Property Owner (s):
Name: <i>Rob & Marcie Welsh</i>
Address: <i>83 & 84 Blue Heron Rd.</i>
City, State, Zip Code: <i>Thetis Island, BC V0R 2Y0</i>
Telephone Number: <i>250.246.1547/c: 604.838.2575</i>
Email address: <i>rmwelsh@telus.net</i>
Fax number: <i>Insert fax number (optional)</i>

SWPPP Contact:
Name: <i>Doug Fenton</i>
Telephone number: <i>250.804.6480</i> Cell Phone Number: <i>250.804.6480</i>
Email address: <i>doug@fentonconsulting.ca</i>

Contractor
Name: <i>Insert Name</i>
Address: <i>Insert Address</i>
City, State, Zip Code: <i>Insert City, State, Zip Code</i>
Telephone Number: <i>Insert Telephone Number</i> Cell Phone Number: <i>Insert Telephone Number (optional)</i>
Email address: <i>Insert email address</i>
Fax number:

Roles and Responsibilities

Environmental Monitors (EM) for the project will be the EP who will serve as the EM and will be the liaison for the Indigenous monitors.

Table #8: Project Environmental Monitors

Role	Provide by	Description	Comments
Site Monitoring – 24/7	<i>Homeowner/other</i>		
Site monitor – during construction	<i>Doug Fenton, EP, EM, CISCL</i>	<i>Lead/CEMP management/EM for project.</i>	
Indigenous Monitor	<i>Marya Luby</i>	<i>On site during construction/prn</i>	<i>Pending</i>
Indigenous Monitor	<i>Augie Sylvester</i>	<i>Onsite monitor during construction</i>	<i>Pending</i>
Coastal Engineer	<i>NHC</i>	<i>Engineer Design Consultant</i>	<i>Pre/during/post completion.</i>
RPBio	<i>FAEC Assoc.</i>	<i>RPBio – available to EP for duration of project. Planned site visits -</i>	<i>Once project contractor and material sourced, a site visit schedule determined.</i>
Construction contractor	<i>tba</i>	<i>Construction Contractor</i>	<i>Pending</i>

Project EM/EP

- ✓ *The project EM will be aiding Contractors to be compliant with the CEMP and regs applicable to the project;*
- ✓ *Due diligence with EM and reporting;*
- ✓ *Will maintain the authority to halt the project if unwanted or acceptable activities leading to risks or damage;*
- ✓ *Communicate all environmental requirements to contractors and subcontractors;*
- ✓ *Preparing and review environment orientation with Contract staff;*
- ✓ *Routine inspections of site, equipment used, fueling processes, laydown area;*
- ✓ *Anticipate issues and Work with the contractors to mitigate or remedy issues found during inspections, especially while working in sensitive areas;*
- ✓ *Remember to enforce the “No-Dig,” policy on this design due to the cultural sensitivity;*
- ✓ *AEMP – assess and advise on as needed;*
- ✓ *EP will define a location to either store it on the HE itself, &/or have a marked location/s.*
 - *Under development is a site safety map/plan – posted at or near the gate.*
- ✓ *Trained and expected to prevent erosion/sediment production;*
 - *Advise on ESC and TDG issues as they come up;*

- ✓ Provide expertise in E/S reduction, there is expected to advise the construction team on how to prevent E/S;
- ✓ Spill prevention and response measures;
- ✓ Routine inspections of the trees and roots on truck route into site;
- ✓ The liaison for the regulators or authorization and approval processes;
- ✓ Monitor and record the site conditions during daily activities;
- ✓ Inform the contractor follows the CEMP;
- ✓ Provide existing CEMP procedures;
- ✓ Ensure comms with contractor and their schedule, such that one can anticipate any work in sensitive areas;
- ✓ Exercise the no work order/halt activities if there is unreasonable risk/damage to the environment;
- ✓ Provide and use BMP for mitigation of E/S, including the marine waters along the shoreline.

Applicant responsibilities

- Homeowner lives on property and can provide 24/7 monitoring and flag and notify EM of issues;
- Collaborate with EP/EM to Coordinate, plan and schedule construction activities;
- Inform the rental tenants of the scheduled activities; and
- Assist with collecting weather data before, during and post construction.

Indigenous Monitor

- On site during construction work along shoreline;
- Watching for culturally sensitive impacts to water quality or surrounding area;
- Advise and collaborate with EM and constructor/s to prevent erosion and sediment available to the local ecosystem.

Contractor Responsibilities

- ✓ As an introductory conversation about CEMP compliance the Contractor awarded the contract will be given the Draft CEMP to review and asked to identify any gap in their existing SOPs and any BMPs they plan to use on this project;
 - The contractor will review with the EP any gaps they've determined and what is needed to get them to align with the expectations of the project's CEMP;
- ✓ Once the review is complete, sign off on a performance agreement that they will use and meet these guidelines;
- ✓ If not, constructive feedback will be given to align their policies with this CEMP;
- ✓ The contractor will follow all contract specifications;
- ✓ Adherence to all permitting and approval requirements;
- ✓ Will implement the mitigations and procedures outlined in this CEMP;
- ✓ Will be compliant with all requests, recommendations and stop-orders of the EM/EP or their designate;

- ✓ Follow and comply with the Chance find Procedure – found in the Appendices of this CEMP;
- ✓ The contractor is to identify any stages of work that are considered a risk sensitive or might put the environment at risk;
- ✓ Report and document all environmental incidents;
- ✓ ID and report any work deficiencies to EM/EP promptly;
- ✓ Have all ESC and spill response materials on-site before starting constructions;
 - Including a secondary silt curtain is present for the duration of the project;
- ✓ Provide photos or docs to EM upon request;
- ✓ Routine inspection and maintenance of all vehicles and equipment;
- ✓ Ensure all personnel have adequate spill response training and are familiar with the emergency response/contacts for the projects;
- ✓ Practice Due diligence during construction activities – golden rule is to prevent not mitigate;
- ✓ Handle all wastes, surplus materials and contaminated materials appropriately and transport and dispose of them by following all laws/regs;
- ✓ Update the EM/EP on any changes to project design, specs or work plan;
- ✓ Collaborate by notifying the EP regarding changes needed within the CEMP;
- ✓ Before demob, ensure the site is clean, stable and safe;
- ✓ Consult with the EP regarding the various stages that require a joint inspection/s with the EM, CEs or others;
- ✓ Develop and implement the following EPPs (Environmental Protection Plans):
 - Soil/substrate management plan;
 - Spill Prevention and Emergency Response Notification Plan;
 - Contractor and subcontractors will need to develop and implement Spill Prevention, ER notification/regulatory notification and provide a spill response kit with each piece of heavy equipment.

Selection Process

The selection of the contractor is underway, however there are constraints or potential barriers to when the work could start, so, the project is discussing this with those submitting an RFP for the project.

- Contractor selection based on their response to the following:
 - **The GSH Project in the gulf Islands of the Islands Trust, Trust Area - Values and Construction BMPs practices questionnaire.**

Date: Apr 10, 2025

Re: The GSH Project in the gulf Islands of the Islands Trust, Trust Area - Values and Construction BMPs practices questionnaire.

Given that these goals and values are crucial to this project's success, I submit this high-level value questionnaire to see if our values and construction BMPs practices align. Please be honest; as a registered professional EP, what is shared is confidential and stays within Fenton & Associates Environmental Consulting (FAEC). Please answer these questions as honestly and succinctly as possible:

1. **GSH** (Green Shores for Homes), **GSSD** (Green Shores Shoreline Developments) **GSH-like** - Please list. References may be requested for the shortlisted companies.
2. **Indigenous Reconciliation** - Given that this project is on the unceded, ancestral and traditional territories of the Penelakut and other Coast Salish Peoples. Are you an Indigenous business? Have you worked with any other Coast Salish communities, taken training or participated in cultural events?
3. **Projects near water** - and on culturally significant lands. Are you prepared to work with a zero-spill approach while working on this project?
4. **Zero-impact approach** - Are you using biodegradable HF in your equipment? If not, are you opposed to changing over to an appropriate eco-friendly product?
5. **Corporate social responsibilities** - Is your company supportive and inclusive of equity issues such as Indigenous peoples, minority communities, immigrants, persons with disabilities and the 2LGBTQ+ communities in your workplace?
6. **CEMP** (Construction Environmental Management Plan) - As part of the NBSP (Nature-based Shoreline Protection) expedited permitting process, this project must submit and work under a CEMP. Is your company comfortable collaborating with FAEC on the project's final version of the construction phase, which will list the facets of the tasks/services and their BMP for mitigations? So, as the prime contractor, you ensure that all contractors on the project will operate proactively and safely in this shoreline environment.
7. **An island environment** – So, it has regular ferry access, however it does put a unique element on the project; however, we are exploring the cost vs time savings of a barge to move materials. We have not committed to anything, but we are considering the options available.
8. **Collaboration and adaptation** are this project's themes- Can you work with other companies on these types of projects where there are tight timelines, weather or tide windows to cope with? Potentially, materials will be delivered by truck on land and barge-based delivery along to the project at the shoreline. So that there will be a need to work efficiently together, aiming for problem-solving, leadership and synergistic outcomes, not conflict.

Once you complete these survey questions, please submit them to me, and we will review them. In a subsequent email, we will review and consider your responses, and if there is enough alignment between you and our project, we will send you the project design and supporting reports for your consideration and RFP submission.

We appreciate you taking the time to consider this exciting GSH project on Thetis, and we look forward to your reply.

Huy ch q'a,

Relevant Environmental Legislation

Table #9: The Welsh GSH Project-specific Environmental Law. FAEC. Sept. 2023 – Fall 2024

Government	Legislation Description	Permits/Authorizations	Comments/links
Federal Modernized Fisheries Act (Aug 2019) and Fed – DFO General regs under the FA.	"The purpose of this act is to provide a framework for the conservation and protection of fish and fish habitat, including by preventing pollution. The act prohibits what's known as HADD – the harmful alteration, disruption, or destruction of fish habitat." ⁴	Projects near water. Following a CEMP that follows the stated BMP, standards and codes of practices to ensure the protection of fish and fish habitat.	Found at: https://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html (visited on Oct 11, 2023) Completion of a DFO – Fisheries & SAR Acts Disclosure.
Federal - Species at Risk Act (SARA)	"Protects federally listed species at risk from becoming extinct or lost from the wild. The Act covers all species that are listed as being at risk nationally and federally identified critical habitat). See the Species at Risk Public Registry for a list of species and documents" ⁴⁹ ."	"Protection of species under Schedule 1 of SARA. Under sections 32 and 33 the listed offences.	Found at: https://www.dfo-mpo.gc.ca/species-especies/sara-lep/permits-permis/index-eng.html#water Note that SARA prohibitions don't apply to species listed as special concern.
Federal - Migratory Bird Conservation Act (MCBA)	The purpose of this Act is to implement the Convention by protecting and conserving migratory birds — as populations and individual birds — and their nests.	Nothing needed though projects overarching goals of increased biodiversity through restoration of native	Found at: https://www.canada.ca/en/environ-ment-climate-change/services/migratory-birds-

⁴ Fisheries Act, The Lands Act, Migratory Birds Conservation Act (MBCA) and SARA were accessed on Dec 23, 2023. Found at: <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/species-ecosystems-at-risk/legislation>.

	Migratory birds are jointly managed by the province, primarily federal. They include such species as: Ducks, Geese, Brant, Coots, Snipe, Mourning Doves and Band-tailed Pigeons and more. Ducks, geese, and all other migratory birds are under the mandate of the Canadian Wildlife Service (CWS). The CWS is the agency that issues crop damage and scare permits for waterfowl. Additional information on migratory bird sanctuary regulations, hunting regulations, or hunting permits are also available⁴⁹.”	plants etc., will only enhance the migratory birds encountering the area.	legal-protection/convention-act-regulations.html
Fed – Cdn Environmental Protection Act (CEPA, 2017, 2023)	CEPA protect the right to a healthy environment and the most recent amendment (2023) have taken this even further + embracing UNDRIP with its own chapter that will further respect the right of the indigenous peoples in Canada.	Not specifically applicable, though it speaks to the core of reconciliation. So, this project has seen early Indigenous engagement as a priority for this project.	This summary of the new 2023 amendments to CEPA 1999 was found at. https://www.intertek.com/blog/2023/08-25-cepa-reform/
Fed – Transportation of Dangerous Goods Act (TDGA)		Not for this project.	
Provincial			
Province – BC Wildlife Act	“The Wildlife Act protects most all vertebrate animals from direct harm, except as allowed by regulation (e.g., hunting or trapping).	Nothing needed though projects overarching goals of increased	Found at. https://www.bclaws.gov.bc.ca/civix/

Fenton & Associates Environmental Consulting (FAEC)

	Under this legislation, vertebrate species, other than fish, can be legally designated as endangered or threatened – enabling the following additional protections: • Anyone who kills or harms an endangered or threatened species will receive penalties – conviction could mean a fine of \$500,000 and three years in jail. • Habitats for endangered or threatened species can be designated as Critical Wildlife Habitats in Wildlife Management Areas The Wildlife Act also authorizes direct management of wildlife (e.g., translocation, predator control) or human activities (e.g., recreational vehicle closures) where it is necessary to achieve recovery objectives.”	biodiversity through restoration of native plants etc., will only enhance all wildlife that use this area.	document/id/complete/statreg/26_3_40_82
Provincial – BC Environmental Management Act (EMA), and its associated regs	“The Environmental Management Act (EMA) regulates industrial and municipal waste discharge, pollution, hazardous waste and contaminated site remediation.”	No permits needed. It mandates the appropriate disposal of waste materials such as creosote coated boards.	Found at. https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/03053_01
Provincial - Water Sustainability Act	“The Water Sustainability Act (WSA) was brought into force on February 29, 2016, to ensure a sustainable supply of fresh, clean	Nothing for this project.	Found at. https://www2.gov.bc.ca/gov/content/environment/air-land-

	water that meets the needs of B.C. residents today and in the future. The WSA is the principal law for managing the diversion and use of water resources. The WSA provides important new tools and updates B.C.'s strategy for protecting, managing, and using water efficiently throughout the province."		water/water/laws-rules/water-sustainability-act
Provincial - BC DRIPA (2017) (Declaration of Rights for Indigenous Peoples)	"The Declaration Act Action Plan, released on March 30, 2022, includes collectively identified goals and outcomes that form the long-term vision for implementing the UN Declaration in B.C. It also has 89 priority actions - tangible steps that will advance this work in key areas over the next five years."	No permits, though early Indigenous engagement has been recognized as a priority for this project.	Found at. https://www2.gov.bc.ca/gov/content/government/new-relationships/united-nations-declaration-on-the-rights-of-indigenous-peoples/implementation#
BC Weed Control Act and associated regulations.	"The BC Weed Control Act (BCWCA) designates a list of invasive plants as 'noxious weeds' at the regional and provincial level. Private property owners and government agencies are mandated by law to control these species that occur on their property or jurisdiction."	No permitting needs. Restoration strategy is using management of invasive weeds as tool among many to restore the foreshore areas.	Found at. https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/00_96487_01
BC Land Act	"The Land Act can be used to establish map reserves to manage habitat or restrict activities that may be harmful to a species' habitat. Land use orders or permits can be	A shared private/crown land partnership for the restoration of the foreshore. So, working through the FrontCounterBC/Natural	Found at. https://www2.gov.bc.ca/gov/content/industry/crown-land-water/land-use-planning and the NBSP (Nature-base Shoreline Protection) found at.

	included as part of land use planning and strategic agreements. "	Resource Online Services for an Expedited Permit for NBSP. Completion a Management Plan submitted through the NS online portal.	https://www2.gov.bc.ca/gov/content/industry/crown-land-uses/residential-uses/nature-based-erosion-protection .
Local Government	BCBC (BC Building Code)	No permit needed the shoreline work. Dealing with Building Code Bylaw that oversees the building of homes and other buildings on properties within the CVRD – Area G (Saltair & Thetis Island). Roads and Services such waste management	
Islands Trust	A special-purpose government with the unique mandate to preserve and protect. Islands Trust Act (ITA est. 1974) through the: - Thetis Local Trust Committee - Thetis Island OCP (2011) – Bylaw No... 88	Special purpose government that is the land use authority under ITA including Thetis Island. The IT's N Planning office has been part of the conversation and will be part of the design phase signoff	Found at. https://islandstrust.bc.ca/location/thetis/ ➤ Note: there are no DPA's on Thetis, just the OCP and Land use regulation.

	Thetis Island Regulatory Bylaw No. 89	prior to the construction phase commencing.	The land use reg covers terrestrial land out the NB (Natural Boundary/OHWM) the marine land use for residential considerations out to the LWM of the foreshore. As well as the commercial out to 1000m seaward or shared equitably with the neighbouring jurisdiction if under 1000m. The planners are mindful of each island's bylaws that regulate the use, it's docks, building size/ht/footprint and has advised this project to consult and share the plans for the project with their office for input before any work begins. The marine waters are shared with the prov and feds; The benthic surface falls under provincial jurisdiction.
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Project Mitigation Measures

The section provides guidance to a zero-spill project. The crucial element to anticipate and prepare to be hyper-vigilant while using any equipment or machinery in the shoreline area/s. The contractor must follow these guidelines.

General Practices

The follow section of the CEMP outline the measures that will be expected, monitored and measured all activities on this project and the contractor is responsible to ensure that they are.

Erosion and Sediment Control

General ESC Mitigations

- 30m boundary for all HE storage/lay down – applicable to both properties;
 - ◇ Bank along lots 83 & 84:
- Pre- Construction - Erosion Control Assessment of existing conditions & needs
 - ✓ Prioritize these needs;
 - ✓ Mitigation pre-construction include but not limited to:
 - ✓ blankets or Jute netting over E bank along shoreline as it's activity eroding;
 - ✓ Live staked with willows + fascines – as needed;
 - A few this spring + more in the fall;
- Construction phase:
 - ✓ Setup for shoreline work and receiving of gravel/sand materials;
 - ✓ Materials storage and Spill piles;
 - ✓ Silt fencing – ready to deploy;
 - ✓ +/- floating silt fencing;
 - ✓ Straw waddles as needed; and
 - ✓ Where possible, purchase locally produced, natural products from the closest supplier/s.
- Post construction pre-planting:
 - ✓ Silt fencing for length of project footprint along the NB as the area of concern for ESC mitigation controls; and
 - ✓ +/- Straw waddles – once construction completed and the lay of the land is visible, the risks of downstream silt & sediment was reassessed and mitigations put in place.

Canoe Pass ESC Mitigations

- ✓ Sand and gravel – so less concern, however in preparation for planting:
 - ✓ Silt fencing ready to deploy along the NB for length of project footprint;
 - ✓ +/- Straw waddles – once construction completed and the lay of the land is visible, the risks of downstream silt & sediment was reassessed and mitigations field fit as they are put in place; and
 - Note that all installations will follow or surpass the manufacturer's recommended BMP.

Upland Area

- ✓ No sediment issues in the upland areas; and
- ✓ However, the contractor is expected to station any Spill kit near fueling station near the HE lay down areas.

Documents to be completed once contractor and gravel/sand material are finalized:

- ✓ Spill Prevention and Emergency Cleanup;
- ✓ Emerg contact sheet;
- ✓ CEMP related activities Inspections, Reporting, and Record-keeping;
- ✓ Erosion of Soil and Sediment control BMPs; and
- ✓ WQ Sampling plan/benchmarks and Sampling Requirements Applicable to this project.

Stockpiling

Sand and cobble aggregate only.

- Soil for planting will be delayed until project is completed and then 3-5m³ load of appropriate amendment will be purchased. Stored under cover and on level ground that approx. 30m from NB of Lot 84 and the estuary.

General Mitigations

- The project materials will be a mix of gravel/cobble substrates. So, unless there is any sign of silty waters observed, there will be no need for silt fencing used in the main design;
- The contractor will have to monitor for issues or inconsistencies in the product brought to the site, the monitors during construction and post initial tide events in the evening monitoring by landowner for any signs of silty water (during;
- Per the shoreline ecologist's native foreshore plants planting plan, and before the planting starts a Silt fence will be installed along/upland of the HWM, using BMP as per the manufacturer's specs;
- Post construction – 2-4wks monitored by owner and their EM/EP; and
- EP will work with owner/client to create a monitoring routine and doc process.

Vehicles and Machinery

- ◇ Exhaust from operating HE may temporarily impact local AQ.
- ✓ No idling of trucks or HE unless needed to run the equipment, i.e., hydraulics;
- ✓ All equipment used below the NB seaward will request the use of biodegradable HF (hydraulic fluids), carry spill response kits, skirts which will be checked and maintained on a daily basis;
- ◇ Remember that the measure of success will be a zero-spill project;
- ✓ All equipment will have appropriate mufflers;
- ✓ Automatic fuel transfer shut-off nozzles; and
- ◇ Daylight hours of operations, so lighting at the fueling should not be a problem. An adequate lighting system at the filling point.

Soil and Sediment

- ✓ Prevent air quality issue by proactively managing fugitive dust;
- ✓ Avoid double handling of soils, aggregates and beach nourishments; and
- ✓ Cover trucks during transport of fine-grained materials;

Air Quality

- Should not be an issue. However, if there is a regional or province wide wildfire or other AQ concerns there is an AQHI (Air Quality Health Index) available online and NA airport being the closest stn. That would allow us to monitor PM2.5 concerns and mitigate these matters as they arise; and
- Dust shouldn't be a problem.

Water Quality (WQ)

- ◇ Prevent water quality issues, by preventing erosion and sediment by employing BMPs;
- ◇ This project for the most part won't cause issues with WQ, and once complete will almost eliminate the active release of sediment and silt along the E shoreline;
- ◇ Active monitoring during the adding of nourishment, watching for silt or sediments from the source materials added;
- ◇ ESC BMPs will be employed; and
- ◇ The EM/EP has the right to stop work and make recommendations for mitigation or reconsidering the sources materials received.

Water Quality Management Plan (WQMP)

The contractor for providing water quality monitoring capacity for the project. The WQMP will manage by the EP/EM to ensure the safety of the waters of Clam Bay and Cut.

- ✓ The ability to test on site and identify the following parameters (e.g., total suspended solids and turbidity);
- ✓ EM Water quality Sampling Requirements;
- ✓ All parameters will follow the BC Approved Water Quality Guidelines Series No. WQG-01, p35⁵.

the BC Approved Water Quality Guidelines Series No. WQG-01⁵

https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/wqg_summary_aquaticlife_wildlife_agri.pdf

Table #10: Turbidity table.

Parameter	Criteria for Aquatic Life, (Fresh, Marine, Estuarine)
Turbidity	- Change from background of 8 NTU at any one time or a duration of 24 h in all waters during clear flows or in clear waters; - Change from background of 2 NTU at any one time for a duration of 30 d in all waters during clear flows or in clear waters; - Change from background of 5 NTU at any time when background is 8 - 50 NTU during high flows or in turbid waters; - Change from background of 10% when background is > 50 NTU at any time during high flows or in turbid waters

Noise & Vibration

- ◇ *This is a residential area, and the continuous work will be an excavator along the shoreline and intermittent dump truck traffic. The excavator will cause vibration and noise as it works. The magnitude will depend on whether it's on sand vs rock;*
- ◇ *The impacts will on local songbirds, and other wildlife and local marine life on the shorelines; and*
- ◇ *The neighbours will be most impacted and will be advised of the construction schedule and encouraged to seek refuge in their home.*

SWM strategy

Surface water map – Insert draft RWH plan map –

- ◇ *See Appendix xx*

LID (Low Impact Design) – Rain Gardens, berms & swales

The landowners are considering having an upland version of the NFPPP completed. As this comes with more cost and time needed to complete this. So, at this point and time, their focus is the foreshore GSH NBSP Project.

Community notices

The community has engaged ThINC, the local conservation NGO and they have this NBSP project on their 2025 summer schedule to host a site visit in collaboration with the GSH program. The GS/GSH program has offered to hold a presentation at the local community hall for the residents.

Marine Works

The Project may involve marine works for the following components:

- *The transport of nourishment materials (sand, gravels, cobble, possibly boulders);*
- *These materials offloaded using an excavator, slinger, or conveyor belt-like equipment;*
- *It is shallow, however, most accessible from the E Clam Bay; and*
- *The intertidal area impacted is a far away from the nearshore eelgrasses and even the clamming areas are seaward of the intertidal area where these materials, need to get to.*

The potential impacts of this approach of work is the water quality and marine life in the area:

- *Harm to crabs, mollusks, and benthic organisms from bottom of barge crushing them;*

Fenton & Associates Environmental Consulting (FAEC)

- *Potential release of toxic fluids into the water;*
- *Noise from tug motor while moving barge in and out; and*
- *Sediment disturbance while working.*

Barge-based work

The following equipment maybe working in the water:

- ✓ *Excavator or loader on board to offload materials, load in slinger or conveyor.*

Marine Works Mitigation Measures:

The contractors will implement the following to protect the marine waters:

- ✓ *Clean gravel products from source;*
- ✓ *The EM/EP will be on site to observe, record and document any issues;*
- ✓ *Barge spudding is unlikely, however if needed, minimize this where possible and not in sensitive areas such as the clamming areas &/or eelgrass;*
- ✓ *Function within the DFO timing window; and*
- ✓ *Add'l measures – survey for fish in the area, however it will outside of FF spawning and schools of salmonoids mover around the island in the shoreline waters will have room or avoid these activities.*

Additional measures to protect water quality in the Clam Bay and Cut:

- ✓ *Refer to water quality monitoring;*
- ✓ *Refer to erosion and sediment control;*
- ✓ *Refer to HE preparation to work in sensitive areas;*
- ✓ *Refer to hazardous materials spill prevention, and emergency response; and*
- ✓ *The contractor will create and implement an EPP to monitor and protect water quality.*

Land based work Seaward of NB

The following equipment may be working from land in this area of the project.

- ✓ *Excavator; and*
- ✓ *Dump trucks and slingers/conveyors from above NB;.*

Vegetation Management

General vegetation

As part of the BC's Crown lands expedited permit process, there was a need to document the existing vegetation. So, an Existing Vegetation (See Existing Sensitive/critical Vegetation Plan. NHC/FAEC. Oct 2024), and the goal was to protect the native vegetation throughout project. Along the shoreline there is a thin band of native plants and trees.

- *Mindful not damage the native volunteers growing while working while working in these areas on the E and S shorelines. Speak to EM/EP for insights on what to look for;*
- *During planting phase, augment with mulch/augmented soils as needed; and*

- *Local branches from non-cedar limbing will be chipped into chip/bark mulch.*

Native plant planting – Mitigation for post planting silt and sediments

After construction is done, the planting phase will begin.

- *The timing per the NFPPP is after at least one full tidal cycle, and risk of heat/drought has passed;*
- *Using the Planting plan, created for this project, a crew organized mentored by the Shoreline plant ecologist and EP will plant the various species;*
- *This will be a cyclic process, the fall after construction and then monitored and assessed and plants will be added as needed.*
- *So, seasonally, each time there is any new planting is done there will be a need to follow the ESC guidelines outlined in the CEMP. The EM/EP will monitor the installation of any EC mitigation measures; and*
- *The EM/EP will record the outcomes of these actions using an AEMP approach (see AEMP framework under monitoring section, the efficacy measured, and mitigations assess and adjusted in real-time.*

LVWS (Low Volume Watering System)

There is a real potential for drought promoting conditions i.e., wind and prolonged dry periods. To mitigate this as LVWS has been designed to augment the plants resilience during their early and vulnerable times (species dependant 1-3 yrs);

- *Portable 1000L tanks with e-valves and lvws connected to water and maintain the vegetation being planted; and*
- *3 stations currently.*

Aquatic Vegetation

Pre-construction Harvesting process

- *Prior to harvesting there is need to capture elevation for locating during the replanting process.*
- *Once harvested, a spot for storage along the shoreline off Lot 84 in the estuary area. – yet determined.*
- ✓ *Monitored for needs such as watering.*

Replanting process

- *Using EC blanket staples to replant these harvested plants on the new beach area.*

Invasive vegetation

- ◇ *There are several invasive plants have been identified that will need to be dealt with properly to ensure that they don't impede the regeneration of the new or existing vegetation as not becoming an issue for surrounding areas/neighbours, etc.*
- ◇ *See a general invasive plants section, and a short piece for each of these identified invasive plants.*

Table #11: Invasive Vegetation Action Plan

Invasives found on Properties	Location	Actions	Disposal method	Reference page.
<i>Bull thistle</i>		<i>Pull before seedhead is produced.</i>		<i>P44.</i>
<i>English holly</i>	<i>E shorelines</i>	<i>Pull dia <1" and girth at 1m off ground and monitor for regrowth.</i>	<i>chip without berries, hang to dry,</i>	<i>P40.</i>
<i>English Ivy</i>	<i>E shoreline and trees</i>	<i>Cut and leave on trees.</i>	<i>Chip,</i>	<i>P41.</i>
<i>Himalayan blackberry</i>	<i>S Shoreline E shoreline</i>		<i>Dig out, if possible, Cut Chip</i>	<i>P42.</i>
<i>Domestic fruit tree on</i>	<i>Mid foreshore along E shoreline.</i>			

English holly / *Ilex aquifolium*⁶**WARNING****English holly berries are toxic to humans and pets.****ABOUT THIS SPECIES**

English holly (European holly, Common holly) is known for its shiny red berries and dark green, spiny evergreen leaves. It is commonly used landscape ornamental often used for holiday decorations and floral arrangements and intentionally introduced from its native range of Europe. English holly has become a serious invasive because of its adaptability to grow in shade or sun, and how easy its seeds are spread by birds. It will crowd out native species as well as monopolize groundwater.

Credit: M Syvenky

**HOW TO IDENTIFY**

English holly can range from 7-10 m tall at maturity but is typically found at smaller heights of 1-3 m. It can also grow as creeping vines.

Flowers are small, white and sweetly scented. Female trees produce bunches of red, yellow or orange berries in winter that are poisonous to people but not to birds.

Leaves are thick, glossy, dark green and wavy, and 1-3 in long, appearing alternately. They have sharp, stout spines along the edges, although leaves may be smooth on older branches.

**TAKE ACTION**

To remove small seedlings, pull them out by hand. To remove larger specimens, cut the tree at ground level and monitor for re-sprouting. If any suckers appear on or around the stump, cut them at the base immediately.

- If you need advice about invasive species on your property or you are concerned about reported invasives in your local area, [contact your local government or regional invasive species organization.](https://bcinvasives.ca/play-your-part/plantwise/grow-me-instead/holly-leaf-osmanthus/)

PLANTWISE

Learn about best practices

A few non-invasive alternatives to plant instead of English holly include:

- [Holly-leaf osmanthus](#) (Osmanthus heterophyllus)
- [Meserve holly](#) (Ilex x meservae)
- [Oregon grape](#) (Berberis nervosa)
- [San Jose holly](#) (Ilex x aquipernyi 'San Jose')

⁶ Invasives Species Council of BC. Accessed Feb 1, 2024. The information from this layout used in this project. Found at. <https://bcinvasives.ca/play-your-part/plantwise/grow-me-instead/holly-leaf-osmanthus/>

English ivy⁷ / Hedera helix**ABOUT THIS SPECIES**

English ivy (European ivy, Common ivy) was commonly planted to provide quick cover for walls and buildings, and as ground cover in commercial landscapes. It was intentionally introduced from its native range of Europe. It has since spread throughout rainforest understories where it can grow as a dense mat that suppresses native plants or climbing up trees, reducing their lifespan and leaving them more susceptible to wind damage. English ivy grows rapidly and needs very little light or water once it has established and even grows during the winter. It reproduces through seed and vegetatively and its berries are preferred and spread by birds. There is another ivy species present in British Columbia that is difficult to distinguish from English ivy, Atlantic ivy (*Hedera hibernica*).



Photo Credit. J. Leckie

HOW TO IDENTIFY

English ivy is an evergreen vine that will be found growing as dense groundcover or climbing up trees.

Clusters of small white to yellow-green flowers bloom in late summer and early fall and are followed by clusters of black shiny fruit.

Leaves are star-shaped with 3-5 points, waxy and leathery. Leaves on the fruiting stems will be egg-shaped without points or lobes. Both sets of leaves can range from 5-10 cm long and 6-12 cm wide and can be a range of different colors: dark green, silver-green, yellow, white.

Short but useful message on this YouTube. Found at.
<https://youtu.be/JTGEASI4aU>

⁷ English ivy Invasive Species Council of BC. Accessed Feb 1, 2024. Found at.
<https://bcinvasives.ca/invasives/english-ivy/>

*Himalayan Blackberry / Rubus armeniacus***ABOUT THIS SPECIES**

*Himalayan blackberry (Armenian blackberry) is valued by humans for its delicious berries and was introduced from its native range of Armenia and Northern Iran. However, it easily invades disturbed sites, pastures, roadsides, streambanks, and forest edges. This plant crowds out low-growing vegetation and can create thickets so dense it limits the movement of large animals. Thickets can produce 7,000-13,000 seeds per m². Himalayan blackberry also spreads by roots and stem fragments, as well as by birds and animals that eat the berries and disperse them. There is another invasive blackberry species present in British Columbia that is part of the same species complex and difficult to distinguish, *Rubus bifrons*. Himalayan blackberry is designated as a Regional Containment/Control species by the BC Provincial Priority Invasive Species List.*



Credit: M Syvenky



Credit: M Syvenky



Credit: C Guidos



Credit: K Spence

Himalayan Blackberry - right out of the BC Invasives⁸**HOW TO IDENTIFY**

Himalayan blackberry can grow up to 5 m tall, with canes up to 12 m long that root wherever they touch the ground.

Flowers are small, white to pinkish with 5 petals each. Berries grow to 2 cm long and are round, black, shiny and hairless.

Leaves are large, rounded and generally grouped in fives on first-year canes, and threes on second-year canes.

TAKE ACTION

Prevention is the best approach.

- [Himalayan blackberry Factsheet PDF](#) See Appendices #xx
- If you need advice about invasive species on your property or you are concerned about reported invasives in your local area, [contact your local government or regional invasive species organization.](#)

**PLANTWISE**

Learn about best practices

A few non-invasive alternatives to plant instead of Himalayan blackberry include:

- **Nootka rose** (*Rosa nutkana*)
- **Thimbleberry** (*Rubus parviflorus*)
- **Marionberry or Boysenberry** (*Rubus* 'Marion' or 'Boysen')

⁸ BC Invasives.ca. Accessed Feb 1, 2024. Found at. https://bcinvasives.ca/wp-content/uploads/2021/01/Himalayan_Blackberry_Factsheet_20190220.pdf

- **Red raspberry** (*Rubus idaeus* hybrids)
- **Black huckleberry** (*Vaccinium membranaceum*)

Bull Thistle

BE PLANTWISE

GROW ME INSTEAD GUIDE



Bull Thistle⁹

Photo credit. S. Haight, iNaturalist.ca

INVASIVE

Bull thistle

Cirsium vulgare

- My purple flowers are a source of nectar for pollinators, but my spiky stem and leaves prevent animals from eating me.
- Because my seedheads are so light, the wind can blow them kilometres away.
- I soak up so much water that the soil around me dries up, causing erosion.



⁹ BC Invasives Council Accessed Feb 12, 2024. Found at.

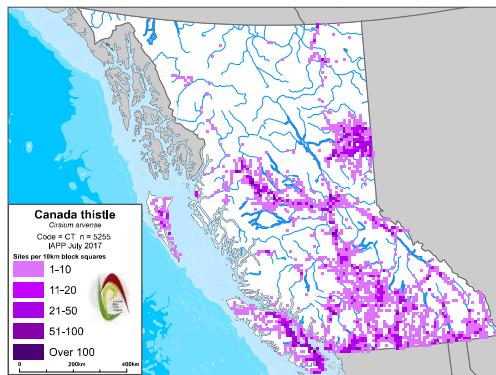


About Canada Thistle

Despite its common name, this invasive thistle is not native to Canada, but actually native throughout Europe and Northern Asia. It was likely one of the first weeds introduced by North American settlers in the 1600s as a contaminant in seeds. It grows in circular patches by spreading vegetatively through roots and once established, it spreads quickly replacing native plant.

Legal Status

Invasive Plants Regulation, Forest and Range Practices Act; Noxious Weed (Provincial), Weed Control Act.



Distribution

Canada thistle is widespread in all areas of BC. It is commonly found on roadsides, cultivated fields and pastures, logged forests, and other disturbed areas. It is considered to be a major concern in the Peace River, Omineca, and Skeena areas.

Identification

Flowers: Flower heads are white to purple, about 1 cm in diameter, borne on clusters of 1-5 at branch tips, and have a sweet vanilla scent. Flower bracts are spineless.

Stems: Mature plants range from 0.3-2.0 m in height.

Leaves: 5-17 cm long, narrow, and alternate on the stem with crinkled, deeply lobed, and spiny edges. Base leaves are stalkless and clasping, or extended down the stem.

Fruits: One-seeded, pale yellow (straw) or light brown in colour; straight or slightly curved.

Similar Native Species: Wavy leaf thistle (*Cirsium undulatum*). See non-native species for distinguishing characteristics of Canada thistle.

Similar Non-Native Species:

(i) Bull thistle (*Cirsium vulgare*); (ii) Scotch thistle (*Onopordum acanthium*); (iii) plumeless thistle (*Carduus acanthoides*); (iv) musk thistle (*Carduus nutans*); and (v) marsh thistle (*Cirsium palustre*). Canada thistle can be differentiated from all similar species by the lack of spines on the main stem, small flowers, and height (less than 2 m tall).

Ecological Characteristics

Habitat: Canada thistle is found in almost every plant community over a wide range of elevations where there is soil disturbance or bare ground including roadsides, railway embankments, lawns, gardens, cultivated and noncultivated fields, margins of forests, meadows, wetlands, and native plant communities. Best adapted to rich, heavy loam, clay loam, and sandy loam. Grows poorly in shaded conditions. Can tolerate saline, wet, or dry soils, but does not tolerate waterlogged or poorly aerated soils.

Reproduction: Perennial that reproduces by seed and vegetatively through creeping, horizontal roots, the fragments of which are capable of forming new plants. Seed viability may be low; mature seeds germinate most readily in mid-spring. Non-germinated seeds may remain dormant for up to 3 years.

Dispersal: Plants are male or female (dioecious) and grow in circular patches that are often one clone and sex. Canada thistle develops seed sparingly and may produce 1,000 to 1,500 seeds per flowering shoot. Dispersed primarily by wind, seeds can also be dispersed by water, animals, clothing, equipment, and vehicles. Generally, vegetative reproduction from its root system contributes to local spread and seed to long distance dispersal.



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¹⁰ BC Invasives Council. Accessed Feb 1, 2024. Found at.

Wildlife

Wildlife Management – general

A high-level project habitat assessment was done in the FAEC's MSAR, 2024. During the assessment, the animal observed were limited, by time of day and the amount of time spent on site, so it was augmented by the owners who are keen observers of birds and bats. Also stated that deer frequent both lots. So, songbirds and waterfowl are observed year-round. The state desertification of much of lot 83, has led to little forage or cover for birds or animals of any kind. However, the band of native trees along the shoreline are places where these animals will pass through, forage, nest or live. There were no Bald eagle or Great blue heron nests noted. There won't be any loss of the CDF, Arbutus, or Large-leaf maples, so, these places may be temporarily impacted noise during the construction phase, and invasive plant strategy is limited, and mindful of songbird nesting while engaged in that work.

Wildlife Management – SARA

✓ See Actions list on Table #12: The Welsh GSH Project-Bird Species and other terrestrial species at Risk with the Potential to Occur on the site

- Songbirds – At risk for the whole

Invertebrates - crabs

- No invertebrate species at risk or impacted long term with this project. However, a note of concern that invasive species that could impact the local native crab populations. Penelakut tribe recently reported that they caught a European green crab¹¹ (*Carcinus maenas*) located in one of their monitoring traps along the foreshore of the Penelakut Spit.

¹¹ European green crab, Invasive Species Council of BC. Accessed Dec 25, 2023. Found at. <https://bcinvasives.ca/invasives/european-green-crab/>;

Terrestrial Wildlife Management

Table #12: The Welsh GSH Project-Bird Species and other terrestrial species at Risk with the Potential to Occur on the site

English Name	Scientific name	SARA sched1 designation	BC List	SARA Recovery plan	Nature Serve Explorer ^[1]	Action
Barn swallows ¹²	<i>Hirundo rustica</i>	Special concern/No status	Yellow	Yes	BC - S4 – apparently secure	No action, as it is beyond the scope of the project.
Eagle ¹³						Retain any coastal stags if possible. Do not cut trees with nests.
Great Blue Heron ^{14]}	<i>Andrea herodias fannini</i>	Special concern	Blue	None	S3 - Vulnerable	Have been seen on multiple of times day and night. There are no known nesting areas ¹⁵ on Thetis though their Forage areas within 10-15kms of their rookeries ^[1] . So, this puts known rookeries at mouth of the Chemainus River &/or Saltair areas are well within this location; So, monitor, no other actions needed.

¹² Barn swallows. BC Species & Ecosystem Explore. Accessed Dec 23, 2023. Found at. <https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=17978>¹³ Guidelines for Raptor Conservation during Urban and Rural Land Development in BC (2013). Found at. https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/best-management-practices/raptor_conservation_guidelines_2013.pdf¹⁴ Great Blue Heron. BC Species & Ecosystem Explore. Accessed Dec 23, 2023. Found at. <https://a100.gov.bc.ca/pub/eswp/reports.do?elcode=ABNGA04011>¹⁵ Community Mapping Network. Accessed on Dec 23, 2023. Found at. <https://www.cmnbc.ca/wp-content/uploads/2018/11/Heron-Foraging-Nesting-Areas.pdf>

Harbour Seal ¹⁶	<i>Phoca vitulina mellonae</i>	Endangered			none	G4: Apparently secure	No action	
Killer Whale (Resident) ¹⁷	Orcinus orca	Endangered	Red	yes	T1 (critically imperiled)	Not impacted by either project. Will benefit for improved ecosystem health.		
Killer Whale (Transient) ¹⁸	Orcinus orca	Threatened	Red	yes	T3 Vulnerable Population	Not impacted by either project. Will benefit for improved ecosystem health.		
Little Brown Myotis ¹⁹	<i>Myotis lucifugus</i>	Endangered	Blue	(MSAPGINPR C) ⁱⁱⁱ	G3: Vulnerable	Terrestrial hab – Not impacted by projects. Will benefit from upland restoration.		
Olive-sided Flycatcher ²⁰	<i>Contopus cooper</i>	1-SC(2023)		Yes		Not enough data yet to know. Given the projects impacts - No action needed.		
Purple Martin ²¹	<i>Progne subis</i>			GSH Monitoring candidate	Prov blue, G5, Canada secure.	It is our understanding that the client has save a tall arbutus stump to provide roosts for the existing Purple Martin pop in the area.		

¹⁶ Harbour Seal. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at: <https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=14853>

¹⁷ Southern Resident Killer Whale. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at: <https://a100.gov.bc.ca/pub/eswp/esr.do?id=24242>

¹⁸ Northeast Pacific Transient Pop. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at: <https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=18678>

¹⁹ Licle Brown MyoZs. BC Species & Ecosystem Explore. Accessed Dec 23, 2023. Found at: <https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=14375>

²⁰ Olive-sided Flycatcher. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at: <https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=16111>

²¹ BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at: <https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=16111>

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xv Stellar Sea Lion. BC Species & Ecosystem Explore. Accessed Dec 23, 2023. Found at: <https://a100.gov.bc.ca/pub/eswp/reports.do?elcode=AMAJC03010;>

Pileated Woodpecker ²²	<i>Dryocopus pileatus</i>	Nil	Yellow	No	S5 Secure (Mar 2015)	No action specific actions. Though any chance that is mature coniferous trees to left as live or nature trees would be beneficial.
Northern Red-legged Frog ^[1]	<i>Rana aurora</i>	Special concern	blue	(MSAPGINPR C) ²³	G4/prov S3 Vulnerable	Wetland habitats, marine so not impacted by project.
Sharp-tailed snake (Pacific Coast Pop) ²⁴	<i>Contia tentia pop1</i>		SNR /Threatened	No		Project are marine shorelines, so no impacting the species. The enhancement of the upland properties will benefit the species.
Surf Scoter ²⁵	<i>Melanitta perspicillata</i>	No Status	Blue	(MSAPGINPR RC)	Prov – S3 Venerable	No action - This species migrates to the inland water of BC for breeding in the summer. return in the fall, but there are few around year-round, so, maybe seen in the shallow coastal waters around the island.
Western Screech-Ow ^{26]}	<i>Megascops kennicottii</i>	Threatened	Blue	(MSAPGINPR C)	S4 Apparently secure	No action needed candidate – possibly there might be more habitat 5-10 yrs when the habitat is more compatible. Owl-nest program.

²² Pileated Woodpecker. Nature Serve Explorer. Accessed Feb 1, 2024. Found at.

https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.102132/Dryocopus_pileatus;

²³ The Multi-species Action Plan for Gulf Islands National Park Reserve of Canada applies to lands and waters occurring within the boundaries of Gulf Islands National Park Res (MSAPGINPRC).

²⁴ Sharp-tailed snake. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at: <https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=380904>

²⁵ Surf Scoter. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at: <https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=14699>

²⁶ Western Screech-owl. BC Species & Ecosystem Explore. Accessed on Feb 12, 2024. Found at: <https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=19173>

Western grebe ²⁷	<i>Aechmophorus occidentalis</i>	Special concern	Yellow	(MSAPGINPR C)	G4/Prov - S1 Critically imperiled.	Winter in the marine coastal islands' waters but breed in the interior of BC lake waters for summer months.
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Notes:

- In general, the birds the shoreline construction activities of laying sand and gravel product will not impact birds directly; however it will impact any shoreline insects/invertebrates. Fortunately, there is plenty of other shorelines nearby that will provide food for birds who normally forage along the shores;
- Little Brown Myotis – this property's owner is actively monitoring bats across Thetis Island residents. And is very aware of their habitat. The restoration projects won't impact their habitat;
- *The Raptor nesting season is January and Aug 31;*
- *Osprey – raptor precautions below;*
- *The vegetation removal has been limited to cutting ivy at the root;*

Mitigation Measures - All animals

- ✓ Secure all food;
- ✓ Zero waste
- ✓ No disturbance of terrestrial or marine wildlife;
- ✓ Bats – are present and will not be impacted by the project. If one is found during daytime hours, don't touch, contact owner as he is the island's batman.
- ✓ Deer injured by vehicle – **move off road and contact the RAPP Line at: 1.877.952.RAPP (7277).**

Mitigation – Songbirds and Raptors

- ✓ This is a gulf island so, birds are everywhere, so follow All animals' mitigation measures.

²⁷ Western grebe. BC Species & Ecosystem Explore. Accessed Dec 23, 2023. Found at: <https://a100.gov.bc.ca/pub/eswp/reports.do?elcode=ABNCA04010>

- ✓ If possible, work outside the nesting season and it will be late summer, so it is less of an issue.
- ✓ Contact EP if anyone has issues, or concerns about any vegetation removal that may be of concern;

DRAFT

Aquatic Wildlife Management

Fish and Aquatic Life Management

Survey methodology used

- ✓ A simple marine shoreline survey was done in Oct and Feb.
- ✓ A single quadrant 90 degrees off shoreline (E & S sides of project);

Table #13: The Welsh GSH Project-Fish Species at Risk & other species with the Potential to Occur on the site

English Name	Scientific Name	Hul'qumi'num language	SARA sched1 designation	BC List	SARA Recovery plan	Nature Serve Explorer ^[1]	Action
Yelloweye Rockfish ^[1]		Sebastes ruberrimus	Special concern	Not reviewed	(MSAPGINPRC)	Not listed	Juvenile rockfish use nearshore eelgrass to the east for habitat which is further out and <u>not</u> impacted by the projects.
Herring					Not listed		No action needed, as they not spawning at this time. However, DFO's winter window has been eliminated due it conflicting with FF spawning time.

- ²⁸¹ Yelloweye Rockfish. BC Species & Ecosystem Explore. Accessed Dec 23, 2023. Found at. <https://a100.gov.bc.ca/pub/eswp/reports.do?elcode=AFC4A06530>.

Table 11 - Marine Shoreline Assessment – Marine life inventory – Lot 83

Date: Oct 2023 Location: 83 Blue Heron Rd., Thetis Island					
	Tide: Oct 2023 Low: 2.2m 1140h High:3.8m 19:39	Beach composition: Cobble gravel with Sand base	Mid intertidal composition: Mod-dense cobble gravel/very spare boulder gravel on a pure sand base to pure sand	Lower intertidal / high subtidal – nearshore: Silt, sand and mud.	Reference:^[1] ▪ Marine life of the Pacific Northwest, Lamb and Handy. N.d.
	Ambient temp: 21c Water temp: n/a		Mid Intertidal	Lower Intertidal/High subtidal - nearshore	Notes
Phylum	Common				
Porifera	Sponges	Common Name (Scientific name)			
Cnidaria	Hydroids, coral, sea anemones, jellyfish, comb jellies				
Annelida	Segmented worms				

Bryozoa	Moss animals					
Arthropoda	Crabs, shrimp, Isopods, amphipods, barnacles	Common acorn barnacle (<i>Balanus glandula</i>); Splash zone beach hopper (<i>Orchestia traskiana</i>) ⁱⁱⁱ .	Common acorn barnacle (<i>Balanus glandula</i>); "Purple" Shore crab (<i>Hemigrapsus nudus</i>).	"Green" Shore crab (<i>Hemigrapsus nudus</i>).		
Mollusca	Bivalves, snails, limpets, nudibranchs, octopus, squid, chitons and lampshells	Little neck clams (<i>Protothaca staminea</i>)/Skw'lhay shells Plalet limpet (<i>Notoacmea scutum</i>)/				
Phylum		Upper Intertidal	Mid Intertidal	Lower Intertidal	Notes	
Echinodermata	Sea stars, brittle stars, sea cucumber, sea urchins, sand dollars, feather stars					
Crustacean						
Chordata	Tunicates, sea squirts, ascidians					

Subphylum <i>tunicata</i>							
Chordata	Fishes						
Chordata	Class Mammalia						
	Seaweed & Seagrasses						
Ochrophyta	Algae (Brown & Red)	Little rockweed (<i>Pelvetiopsis limitata</i>);	Rock weed (<i>Fucus gardneri</i>) ^[1] ; Wire weed (<i>Sargassum muticum</i>).				
Chlorophyta	Green algae	Sea lettuce (<i>Ulva lactuca</i>);	Sea lettuce (<i>Ulva spp.</i>)	Sea lettuce (<i>Ulva spp.</i>)			
Streptophyta	Flowering Marine Plants	Sea asparagus (<i>Salicornia depressa</i>).					
		Dunegrass (<i>Elymus molis</i>) ^[2] ; Gum weed (<i>Grindelia intergrifolia</i>) ^[4]					
Marine Wildlife							

	Marine birds			Great Blue heron (	Fishing in S end of nearshore area.
		Sea gulls			Flying by.

Notes:

- Herring out of season – late Mar or early April;
- Too far from nearshore/eelgrass for groundfish, - Lambs/TEK
- Surf smelt, Sand Lance - MARBRI/TEK – move the FF note from the MSAR to here and reference the CEMP here.

Table 14: Marine Shoreline Assessment – Marine life inventory – Lot 84

Date: Oct 2023 + Feb 2024 Location: 84 Blue Heron Rd., Thetis Island						
	Tide: Oct 2023 Low: 1140h High: 3.7m Time: 1140h	Beach composition: Sparse pea. gravel / boulders/sand	Mid intertidal composition: Sparse boulders/pea gravel / Mud	Lower intertidal / high subtidal – nearshore: sand / mud		
	Ambient temp: 17c Water temp:			Lower Intertidal/High subtidal - nearshore		Notes
Phylum	Common					
Porifera	Sponges					
Cnidaria	Hydroids, coral, sea anemones, jellyfish, comb jellies					
Annelida	Segmented worms					
Bryozoa	Moss animals					

<i>Arthropoda</i>	Crabs, shrimp, isopods, amphipods, barnacles	Common acorn barnacle (<i>Balanus glandula</i>); Rockweed isopod (<i>Idotea wosnesenskii</i>) ^{vi} ; Splash zone beach hopper (<i>Orchestia traskiana</i>) ^{vi} .	Common acorn barnacle (<i>Balanus glandula</i>);		
<i>Mollusca</i>	Bivalves, snails, limpets, nudibranchs, octopus, squid, chitons and lampshells	Mudflat snails (<i>Battilaria attramentaria</i>);	Pacific Oyster (<i>Crassostrea gigas</i>) Varnish clam (<i>Nuttallia obscurata</i>) Butter clam (<i>Saxidomus gigantea</i>) Manila clam (<i>Venerupis philippinarum</i>)	The shells of the Manila clam (<i>Venerupis philippinarum</i>) ^[1] , varnish clam (<i>Nuttallia obscurata</i>) observed plentifully along the upper intertidal zone area.	
<i>Phylum</i>		<i>Upper Intertidal</i>	<i>Mid Intertidal</i>	<i>Lower Intertidal</i>	<i>Notes</i>
<i>Echinodermata</i>	Sea stars, brittle stars, sea cucumber, sea urchins, sand dollars, feather stars				
<i>Crustacean</i>					

Chordata	Tunicates, sea squirts, ascidians					
Subphylum tunicata						
Chordata	Fishes					
Chordata	Class Mammalia					
	Seaweed & Seagrasses					
Ochrophyta	Algae (Brown & Red)					
Chlorophyta	Green algae	Sea lettuce (Ulva lactuca);	Sea lettuce (Ulva spp. ^{viii})			
Streptophyta	Flowering Marine Plants	Sea asparagus (Salicornia depressa) ^{ix} . Coastal Saltgrass (Distichlis spicata) ^x ; Entire-leaved Gumweed (Grindelia intergrifolia) ^{xi}				
Marine Wildlife	Marine birds					

		Sea gulls – fly overhead.		Western grebe/Skwulkwulth	App: Fishing in S end of nearshore area.
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REFERENCE OF ALL SEaweeds AND SHELLFISH:

- A *Field Guide to Seaweeds of the Pacific Northwest*. Clarkston, B. 2015
- Green Shores for Homes: Monitoring Guide²⁹ –framework for the ongoing monitoring for the project.
- *Marine life of the Pacific Northwest., Lamb and Handy. N.d.*
- PACIFIC REEF AND SHORE - A PHOTO GUIDE OF NORTHWEST MARINE LIFE. HARBO, R, REV 2ND ED.
- ^{11.1} *Plants of Coastal British Columbia, Pojar & MacKinnon, 1994*

²⁹ Green Shores for Homes: Monitoring Guide²⁹. Found at. https://stewardshipcentrebc.ca/PDF_docs/greenshores/Resources/Green_Shores_for_Homes_Monitoring_Guide_2023.pdf

Table 15: The Welsh GSH Project- Mammalian Species and other terrestrial species at Risk with the Potential to Occur on the site.

Common Name	Scientific Name	SARA sched1 designation	BC List	SARA Recovery plan	Nature Serve Explorer	Action
Killer Whale (Resident)	Orcinus orca	Endangered	Red	yes	T1 (critically imperiled)	Not impacted by either project. Will benefit for improved ecosystem health.
Killer Whale (Transient)	Orcinus orca	Threatened	Red	yes	T3 Vulnerable Population	Not impacted by either project. Will benefit for improved ecosystem health.
Little Brown Myotis ³⁰	Myotis lucifugus	Endangered	Blue	(MSAPGINPRC)iv	G3: Vulnerable	Terrestrial hab – Not impacted by projects. Will benefit from upland restoration.
Northern Elephant Seal ³¹	Mirounga angustirostris		Blue	G5 secure, but note the Prov stat. -	Prov- S1- Critically imperiled.	Not its habitat nor region, though the owner witnessed a single transiting through Canoe Pass last year (n.d.).
Stellar Sealion ³²	Eumetopias jubatus	Special concern		Broad conservation strategies.		No action needed. The main time for concern is during the herring spawn in April/March. This is not a breeding area.

³⁰ Little Brown Myotis. BC Species & Ecosystem Explore. Accessed Dec 23, 2023. Found at. <https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=14375>

³² Stellar Sea Lion. BC Species & Ecosystem Explore. Accessed Dec 23, 2023. Found at. <https://a100.gov.bc.ca/pub/eswp/reports.do?elcode=AMAJC03010;>

Surf Scoter	<i>Melanitta perspicillata</i>	No Status	Blue	(MSAPGINPRC)	Prov – S3 Venerable	No action - This species migrates to the inland water of BC for breeding in the summer.
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Environmental Monitoring & Reporting - tbd

- The EM/EP will monitor the project from start to finish of the construction phase;
- Will create a comprehensive monitoring process that is rooted in the AEMP; and
- Incorporated in an EM report.

Outline the responsibilities & Schedule

- ✓ No impact on nesting birds or fish;
- ✓ Initial site tour will identify ESC issues and provide any recommendations to contractor;
- ✓ During installation walk through and consider or provide any needed ESC recommendations;
- ✓ During initial project stages;
- ✓ During new activities;
- ✓ During any in-water works;
- ✓ Periodic monitoring of sensitive areas;
- ✓ The frequency isn't relevant, as the EM will be present for all work completed; and
- ✓ Any changes to project monitoring will update to CEMP.

On-site Construction Monitoring and Inspection – See EM/EP R&R.

- ✓ Creating an AEMP which will be used to ensure that the monitoring is effective;

EM Schedule

- ◇ Given that the project concentrated timeline the EP/EM will be on site for all construction activities;
 - During all construction near water and especially when below the NB seaward;
- ◇ While working in or around sensitive areas;
- ◇ +/- Installation silt curtains may trigger EM schedule; and
- ◇ Timing monitoring during bird nesting cycles.

Weekly Reporting

Will reflect the input from senior levels of government.

Post construction

- ◇ Reports to whom?

EP

The EP/EM will complete the various levels of reporting needed.

EP Fieldnotes**Contractor**

- ✓ The contractor will notify the EP for any EM related issues;

Indigenous

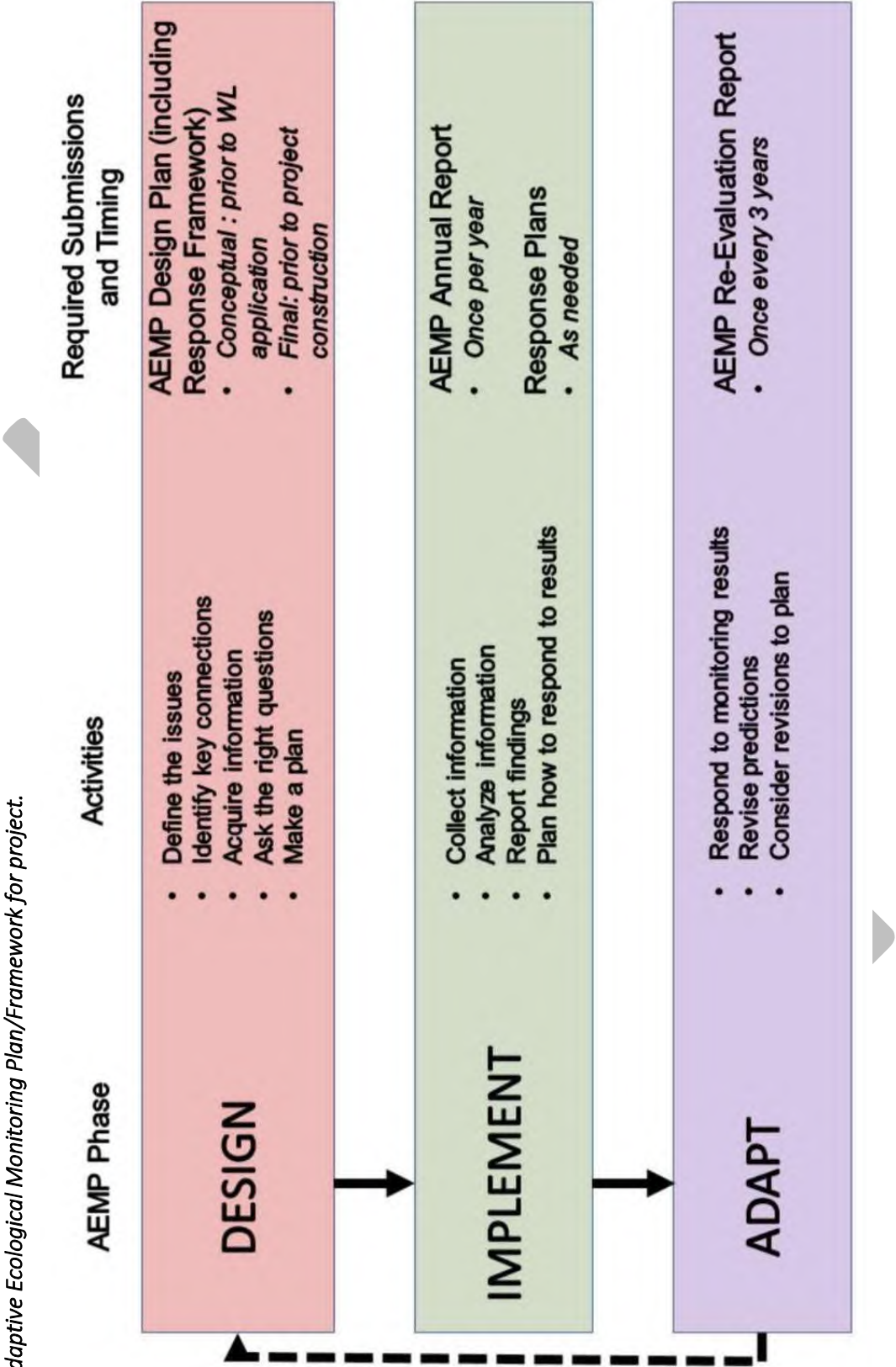
- *The goal is to have a Indigenous monitor (IM) during all construction activities. However, the final schedule will be based on their availability;*
- *All work with stop if there is any discovery of any cultural artifact that PT feels is outside or beyond of their prior assessment, and discussions with the project team to date; and*
- *If the IM flags it as a concern, then work stops, and the Chance Find Procedure (see appendices) will be followed.*

Environmental Site Monitoring Orientation
GSH Green Shores for Homes: Monitoring Guide³³

- ◇ *Project has access to and has decided to utilize this framework as its post-construction monitoring process.*

³³ Green Shores for Homes: Monitoring Guide³³. Found at.
https://stewardshipcentrebc.ca/PDF_docs/greenshores/Resources/Green_Shores_for_Homes_Monitoring_Guide_2023.pdf

Adaptive Ecological Monitoring Plan/Framework for project.



Appendices

Archaeological Procedures

Project location: 83 & 84 Blue Heron Rd, Thetis Island BC

There are more than 32,000 archaeological sites currently recorded in British Columbia with many more being added to the provincial inventory every year. For this reason, it is very likely that you will encounter an archaeological site during your lifetime either knowingly or unknowingly. This protocol has been established to increase awareness of this important resource and to assist in planning future developments.

The remnants of British Columbia's earliest cultures are represented in today's landscape by a wide variety of site types, most of which are related to art, habitations, resource gathering and production, tool making, and traditional ceremonial or ritual activities. Some sites that may be immediately visible to a non-archaeologist include:

- *Rock art, including pictographs and petroglyphs.*
- *Tree art and Culturally Modified Trees (CMT'S) such as bark stripping and planks.*
- *Surface features such as depressions created by former habitations, earthen fortifications, rock cairns, fish traps, clam gardens, burned rock and middens.*
- *Artifacts that have become visible on the land surface owing to erosion or recent land altering activity. These may be produced in a variety of materials such as stone, bone, antler, wood, or shell.*
- *Buried cultural remains that may be sighted in a cut-bank, excavation, eroded shoreline, or other exposed deposit.*

Chance find procedures: Project location: 83 & 84 Blue Heron Rd, Thetis Island BC

If you discover what you suspect may be a possible archaeological site:

- Stop all work in the area to avoid damaging the site.
- **Do not disturb any archaeological remains that you may encounter.**

Report your discovery to your supervisor or if the project EP (Environmental Professional)/Monitor:

- Doug Fenton, EP: 250.804.6480 – douq@fentonconsultin.ca; and if unavailable,
- The Property Owner: Rob Welsh 250.246.1547/c: 604.838.2575, who will provide further instructions.
- If you are unable to contact the Property Owner/representative, please contact both of the following:
 - Pune'luxutth Tribe: 250.246.2321 (Admin Assist.) ask to Josh James A/Band Manager.
 - Archaeology Branch by telephone at (250) 953-3334.
 - Our pre-established archaeologist: **tba**

If you discover what you suspect may be possible human remains:

- Stop all work in the area to avoid damaging the site.
- **Do not disturb any possible human remains that you may encounter.**
- Report your discovery to your supervisor/EP above or if they are unavailable,
- the Property Owner: Rob Welsh 250.246.1547/c: 604.838.2575 who will contact the local RCMP and the Archaeology Branch.

Homeowner will contact the local Police/RCMP 250.245.2215 (non-emergency).

- If you are unable to contact the Homeowner: Rob Welsh, and the suspected human remains appear to be current, contact the RCMP at [phone#: 250.245. 2215 \(non-emergency\)](tel:250.245.2215).
- The homeowner will contact the Archaeology Branch by telephone at (250) 953-3334.
- If you are unable to contact the Homeowner representative, please contact the Archaeology Branch by telephone at [250.953.3334](tel:250.953.3334).

...more on back.

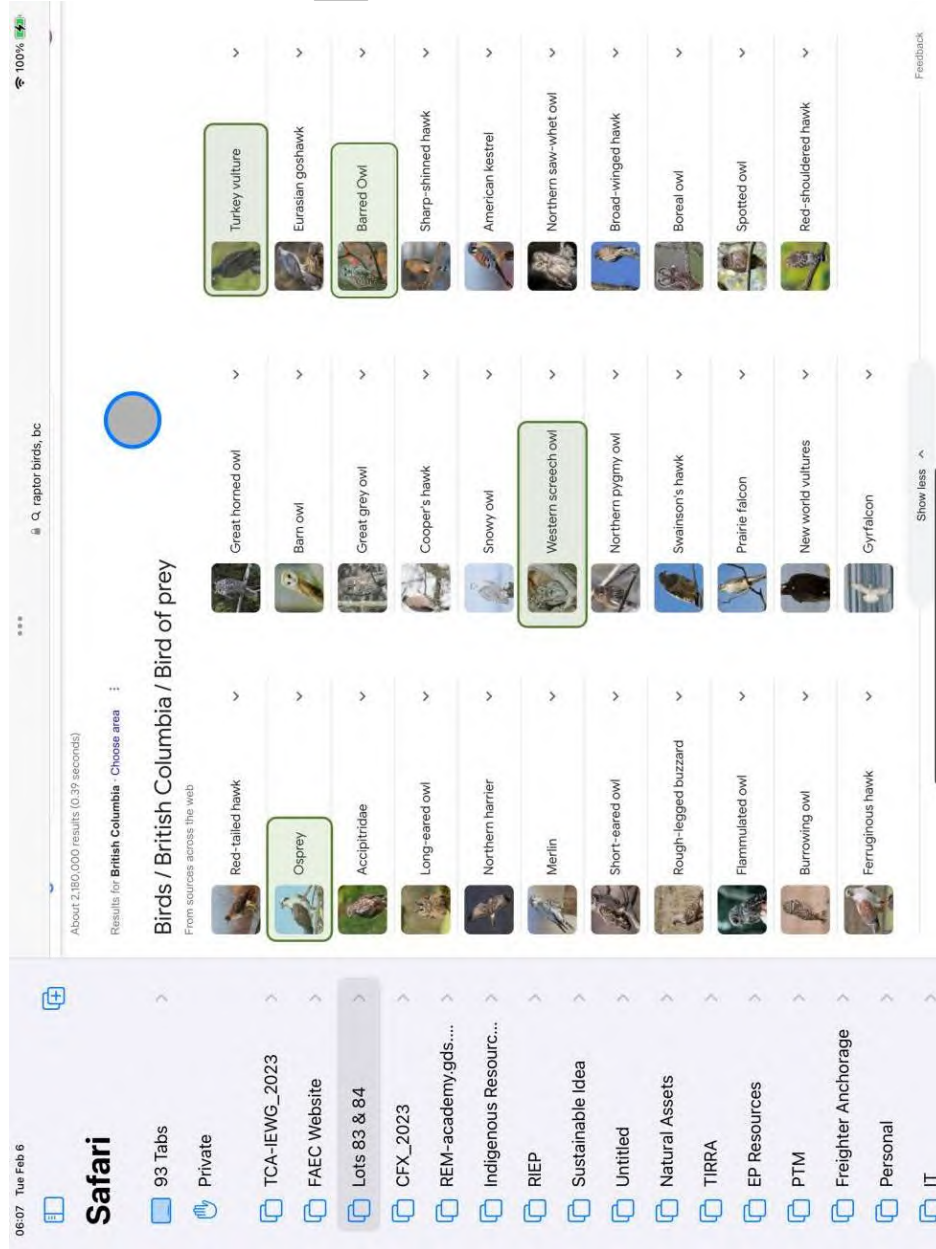
The following steps will generally be followed:

- The Coroner's Office and local policing authority are notified, and the Coroner's Office determines whether the matter is of contemporary forensic concern.
- If the remains are not of forensic concern, the branch will attempt to facilitate disposition of the remains.

- *If a cultural affiliation for the remains can be determined, the branch will contact an organization representing that cultural group. If the remains are of aboriginal ancestry, the branch will attempt to contact the relevant First Nation(s). Penelakut Tribe.*
- *Generally, if remains are still buried and are under no immediate threat of further disturbance, they will not be excavated or removed. If the remains have been partially or completely removed, the branch will facilitate disposition.*
- *The branch may arrange for a qualified anthropologist or archaeologist to provide an assessment of the remains.*

Valuable archaeological resources to review:

- *The Standards & Guidelines for the Conservation of Historic Places in Canada, 2nd Ed. Canada's Historical places. A pan-Canadian collaboration (BC, Canada, Nfld/Lb, PEI, QB). Accessed Oct 2023. Found at. <https://www.historicplaces.ca/en/pages/standards-normes>.*



Bald eagle

Note: Google search of BC's Birds of Prey.

FAEC RPBio sign off letter – covering MSAR, FNPPP, and CEMP. May 2025.

DRAFT

Endnotes

ⁱ Little Brown Myotis. BC Species & Ecosystem Explore. Accessed Dec 23, 2023. Found at. <https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=14375>

ⁱⁱ The Multi-species Action Plan for Gulf Islands National Park Reserve of Canada applies to lands and waters occurring within the boundaries of Gulf Islands National Park Res (MSAPGINPRC).

^{vv} Marine life of the Pacific Northwest., Lamb and Handy. N.d.

^{viii} ^{viii} A Field Guide to Seaweeds of the Pacific Northwest. Clarkston, B. 2015

^{ix} ^{ix} Plants of Coastal British Columbia, Pojar & Mackinnon, 1994

ISLANDS TRUST COUNCIL

BYLAW NO. 64

ATTACHMENT 12

A bylaw to adopt a Protocol with the Lyackson First Nation

WHEREAS pursuant to Section 9(1) of the *Islands Trust Act* the Trust Council may, for the purpose of carrying out the object of the Trust, on behalf of one or more local trust committees, enter into agreements with First Nations, respecting the coordination of activities within the Trust Area;

NOW THEREFORE the Islands Trust Council, in open meeting assembled, enacts as follows:

Citation

1. This bylaw may be cited for all purposes as "Islands Trust Council/The Lyackson First Nation Protocol Bylaw No. 64, 1999."

Protocol

2. The protocol agreement attached as Schedule "A" and entitled "Protocol For Cooperation in the Thetis Island Local Trust Area and Lyackson Traditional Territory" is approved pursuant to Section 9(1) of the *Islands Trust Act*.

Severability

3. If any section, subsection, sentence, clause or phrase of this bylaw is for any reason held to be invalid by a decision of a court of competent jurisdiction, the decision shall not affect the validity of the remaining portions of the bylaw.

READ A FIRST TIME THIS 17TH DAY OF JUNE , 2000

READ A SECOND TIME THIS 17TH DAY OF JUNE , 2000

READ A THIRD TIME THIS 17TH DAY OF JUNE , 2000

APPROVED BY THE MINISTER OF MUNICIPAL AFFAIRS THIS
14TH DAY OF SEPTEMBER , 2000

ADOPTED THIS 8TH DAY OF DECEMBER , 2000

SECRETARY

CHAIR

SCHEDULE A

PROTOCOL FOR COOPERATION

In the Thetis Island Local Trust Area and Lyackson Traditional Territory

BETWEEN:

THE ISLANDS TRUST COUNCIL

(on behalf of the Thetis Island Local Trust Committee)

AND:

THE LYACKSON FIRST NATION

(referred to as the "Parties")

WHEREAS the Islands Trust Council:

- Is authorized to enter into interagency agreements on behalf of the Thetis Island Local Trust Committee respecting the coordination of activities within the Thetis Island Local Trust Area;
- On behalf of the Thetis Island Local Trust Committee is the local government responsible for land use planning and regulation for lands under its jurisdiction with the Thetis Island Local Trust Area; and
- Is responsible for achieving the legislation of *the Islands Trust Act* "to preserve the Trust Area and its unique amenities and environment for the benefit of the residents of the trust area and of the Province generally, in cooperation with the municipalities, regional districts, improvement districts, other persons and organizations, and the government of British Columbia."

WHEREAS the Lyackson First Nation:

- Is responsible for the coordination of activities for lands under its jurisdiction with the Lyackson First Nation's traditional territory that coincide with the Thetis Island local Trust Area; and
- Is attempting to resolve outstanding land issues in the Thetis Island Local Trust Area through the Federal and Provincial governments which acknowledge that this area has been part of the Lyackson First Nation's traditional territory.

Now, therefore, the Islands Trust Council, on behalf of the Thetis Island Local Trust Committee and the Lyackson First Nation wish to recognize mutual interests and their spirit of cooperation by entering into a Protocol for Cooperation within the Protocol Area which includes the Lyackson traditional territory and the Thetis Island Local Trust Area, with the following consideration on behalf of the citizens of each:

1.0 PRINCIPLES

The parties agree to the following principles of inter agency relations:

- 1.1 To pursue a renewed and lasting relationship based on trust and cooperation;
- 1.2 To respect the jurisdictional authority and interests asserted by each other; and
- 1.3 To seek areas of mutual interest for the sharing of information and possible collaboration.

2.0 SHARED VALUES

Both parties share the following values:

- 2.1 The protection of significant terrestrial and marine environmental features and ecosystems;
- 2.2 The celebration and protection of cultural and traditional values;
- 2.3 The encouragement of sustainable island communities which harmonize economic, social and environmental needs; and
- 2.4 The enhancement of the quality of life for all citizens.

3.0 AREAS FOR COOPERATION

The parties wish to pursue the following areas for cooperation:

- 3.1 Sharing of information which affects either party's jurisdiction and areas of mutual interest;
- 3.2 Promoting good relations with other levels of government to effectively deal with issues and coordinate activities;
- 3.3 Creating enhanced awareness and appreciation of the area's cultural heritage and the different needs of its communities;
- 3.4 Developing consultative processes to ensure effective communication in areas of overlapping jurisdiction;
- 3.5 Ensuring opportunities for dialogue to encourage understanding, cooperation and problem solving; and
- 3.6 Identifying areas of mutual interest for the interagency coordination of activities and/or resources among citizens and organizations.

4.0 SCOPE OF ACTIVITIES

- 4.1 Notice of **land use planning processes** with opportunities for the involvement of the other party;
- 4.2 Referral of **land use planning or land use change documents or contents** with opportunities for discussion of concerns before consideration by the respective party provided that this is not considered formal consultation;
- 4.3 Notice in writing of initiatives to establish agreements or projects with **other levels of government** to determine the interests and/or potential involvement of the other party;
- 4.4 Arrange **meetings as required** between the parties to discuss matters of concern as they arise; and
- 4.5 Notice of initiatives related to the **acquisition of Crown lands** for the use and benefit of either party's community.

5.0 COMMUNICATION EFFORTS

- 5.1 This protocol may be further defined by way of further agency agreements on specific areas for cooperation;
- 5.2 The purpose of notices is to provide parties with timely and sufficient information to facilitate meaningful opportunities for cooperation;
- 5.3 The purpose of referrals is to provide parties with timely and sufficient information for meaningful consultative dialogue prior to either of the Parties make a decision which may impact the other Party; and
- 5.4 The Executive Director of the Islands Trust is responsible to schedule an annual meeting to review the terms of the Protocol, discuss areas of interest and determine areas for cooperation.

6.0 CONDITIONS

- 6.1 Administration of this agreement will involve
 - a. The officials responsible for the notices and referrals referred to in this agreement:
 - Regional Planning Coordinator responsible for the Thetis Island Local Trust Area and
 - Chief of the Lyackson First Nation

b. The officials responsible for organizing meetings and facilitating cooperative efforts:

- Executive Director, Islands Trust; and
- Chief of the Lyackson First Nation

6.2 Notices and referrals referred to in the Agreement shall be delivered to:

Thetis Island Local Trust Committee
c/o Islands Trust Council

200 – 1627 Fort Street
Victoria, BC V8R 1H8
Email: gmcintosh@islandstrust.bc.ca
Telephone: (250) 405-5151
Facsimile: (250) 405-5155

Lyackson First Nation

RR #1
9137 Chemainus Road
Chemainus BC V0R 1K0
Telephone: (250) 246-5019
Facsimile: (250) 246-5049

6.3 Either party may terminate this agreement with thirty (30) days notice to the other party;

6.4 Nothing in this Protocol shall be construed as to fetter the legislative discretion of either of the Parties within their respective jurisdiction or to oblige either party to pursue an action, the application of any laws, statutory or otherwise; and/or

6.5 It is acknowledged that the spirit of this Protocol will be reflected in each of the Party's best efforts rather than any enforceable obligations to implement its terms and conditions.

From: Ann Eriksson <ann@thetislandnatureconservancy.org>
Sent: Tuesday, March 18, 2025 8:24 PM
To: Peter Luckham; Ken Hunter; Tobi Elliott
Cc: kelly@stewardshipcentrebc.ca; Sarah@stewardshipcentrebc.ca; Margot Thomaidis; Thetis Island Nature Conservancy
Subject: Letter of Support for Welsh Bylaw Amendment Application
Attachments: ThINC Letter of Support for Welsh Bylaw Amendment Application_March 15, 2025.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Dear Trustee Elliott, Trustee Luckham and Trustee Hunter;

Please find attached our letter of support for Marcie and Rob Welsh's Bylaw Amendment application.

Best wishes,

Ann Eriksson
Executive Director, Thetis Island Nature Conservancy

March 15, 2025



To: Thetis Island Local Trust Committee

Re: Letter of Support for Welsh Green Shores Bylaw Amendment Application

Dear Trustee Hunter, Trustee Luckham and Trustee Elliot:

We are writing to encourage you to approve the Thetis Island Bylaw amendment minor rezoning application submitted by Rob and Marcie Welsh, to allow them to undertake their Green Shores project at 83 and 84 Blue Heron Road. This project will protect the shoreline from erosion, in a manner consistent with ecological principles and in light of projected sea level rise and increased storm energy from the changing climate. The project will serve as an example of a soft shoreline restoration approach for other residents of Thetis Island and beyond.

In full disclosure, Rob and Marcie Welsh are directors on the Thetis Island Nature Conservancy board. However the decision to submit this letter of support was made independent of them and they recused themselves during the vote to support their application, taken at our meeting on March 12, 2025.

We trust that you will take the right decision to allow this Green Shores project to be carried out along the shorelines of the Local Trust Area.

Sincerely,

Jim Moloney,

Chairperson, Thetis Island Nature Conservancy

cc. Sarah Primeau, Stewardship Centre of BC
Kelly Loch, Stewardship Centre of BC
Margo Thimaidis, Islands Trust

P. 250.246.8176 E. ThINC@thetisisland.net
PO Box 13-3, Thetis Island, BC, V0R 2Y0
thetislandnatureconservancy.org