

Don & Lee Kayne 37149 Schooner Way North Pender Island, BC

Updated April 10, 2025

# RE: Intertidal Sensitive Ecosystem Development Permit Area #6 – Review and Environmental Management Plan for Green Shores / Bioengineering Shoreline Stabilization at 37149 Schooner Way Road, Galiano Island

### Updates in red text.

Lehna Malmkvist, M.Sc., R.P. Bio. visited the site on May 23, 2024 with Nathan Polster, Polster Environmental Services to evaluate the existing condition of 37149 Schooner Way, North Pender Island (Figures 1-5) in reference to Green Shores / Bioengineering shoreline stabilization works proposed along the shoreline slope and within the Development Permit Area 6 – Intertidal Sensitive Ecosystem, which is the area shown on Schedule N of the Official Community Plan (OCP). This report summarizes the observations of the ecological conditions, potential impacts from development on the property, and recommendations for environmental protection and restoration following construction.

DPA #6 - Intertidal Sensitive Ecosystem

- The objective of this development permit area is as follows:
- 1. To preserve and protect remaining sensitive intertidal ecosystems.



Figure 1. Location of 37149 Schooner Way, North Pender Island.



Figure 2. DPA #6 – Intertidal Sensitive Ecosystem from OCP Schedule N, 37149 Schooner Way outlined in yellow.



Figure 3. Proposed Green Shores/Bioengineering stabilization work on the shoreline slope at 37149 Schooner Way, and proposed work in DPA #6 – Intertidal Sensitive Ecosystem from OCP Schedule N: anchored logs, willow wattles, and dune grass plantings; and temporary access and temporary disturbance area for small barge, heavy equipment and materials.



Figure 4. Proposed Green Shores/Bioengineering stabilization work on the shoreline slope at 37149 Schooner Way.



Figure 5. Proposed Green Shores and Bioengineering Shoreline Stabilization at 37149 Schooner Way.

27 March 2025



#### Overview of 2024 management measures to protect Southern Resident Killer Whales

Canada

Figure 6. Fisheries Notice for 2024 boating restrictions for Southern Resident Killer Whale Critical Habitat. Notices for 2025 (if any) have not yet been posted.



# 2024 Gulf Islands management measures

# Canada

Figure 7. Pender Island inset for Fisheries Notice for 2024 boating restrictions for Southern Resident Killer Whale Critical Habitat. Notices for 2025 (if any) have not yet been posted.

# **Existing Condition**

The property is on the southwestern shoreline of North Pender Island, located within Boat Nook. The proposed work will be on the southwestern side of the property, where soil is slipping on the shoreline slope, towards the marine shoreline (Photos 1-12).

The existing condition of the shoreline slope at 37149 Schooner Way is:

- Top of Bank: artificial turf yard area adjacent to the house
- Slope:

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- Soil slippage in sections along the bank
  - Additional soil slippage has occurred in winter 2024-2025 (photos 10-12), creating an urgent situation to treat before winter 2025-2026
- o Exposed drainage pipes
- o Existing staircase to shoreline
- Buried wooden retaining wall (failing)
- Vegetation dominated by: non-native agricultural grasses, invasive Himalayan blackberry (*Rubus armeniacus*), with a patch of native snowberry (*Symphoricarpos albus*), salmonberry (*Rubus spectabilis*), and horsetail (*Equisetum arvense*), with a small amount of shoreline

vegetation at the shoreline, primarily seashore saltgrass (*Distichilis spicata*). Additional nonnative, invasive species on the slope include: yellow archangel (*Lamiastrum galeobdolon*), tansy ragwort (*Senecio jacobeae*), St. John's Wort (*Hypericum perforatum*), and oxeye daisy (*Leucanthemum* sp.)

- Intertidal Sensitive Ecosystem (DPA #6): the beach adjacent to the property is a mix of sand, gravel and cobble (Photo16), with many beach logs (Photo 15), and has been identified as potential forage fish habitat (Sarah Cook, R.P.Bio, Coastal and Ocean Resources, 2018)
- Southern Resident Killer Whale critical habitat is located along the southwest coastline of North Pender Island. Figures 6 & 7 indicate special boating restrictions for 2024 adjacent to the project site, as per Fisheries Notice FN0469. Notices for the 2025 season (if any) are not posted.

# **Proposed Work**

The proposed Green Shores/Bioengineering Shoreline Stabilization is (Figures 3-5):

- Slope crest to be cut back approx. 1.5m to 3.0m horizontally and regraded to a stable angle (approx. 34°) as recommended by Ryzuk Geotechnical report (April 4, 2025). Final extent of cutback to be determined on-site based on achieving target slope angle, field fit (the actual conditions once exposed) and owner's desire to mitigate risk.
- Reinstate artificial turf at top of slope after regrading.
- Beach logs anchored by buried boulders, with dunegrass plantings (within DPA #6)
- Temporary heavy equipment access and materials storage on the beach during construction (within DPA #6)
- Willow wattles (on the marine shoreline slope outside DPA #6)
- Native riparian plantings (on the marine shoreline slope outside DPA #6)
  - Native shrubs (100 total: Nootka Rose, Snowberry, Thimbleberry, Ocean Spray, Red Flowering Currant) will be planted on the benches created by the wattle fencing.

The site is not accessible from the top of bank, therefore equipment will access the site via a small, selfpropelled barge (Photo 18). The barge will land on the beach (Photos 13-15) on a suitable tide, and an excavator and truck with materials will offload to the beach area, within the identified temporary disturbance footprint. This temporary disturbance area will have been surveyed for forage fish eggs and cleared to proceed, within 7 days prior to start up of the work.

The work process will be:

- Excavator and trucked in materials:
  - Excavator and trucks with materials will be brought to the location by a small self-propelled aluminum barge (12.3 m x 4.3 m x 0.9 m)
    - <u>https://www.nauticapedia.ca/dbase/Query/Shiplist4.php?&name=Moving%20Experienc</u>
       <u>e&id=43062</u>
       <u>Materials excavated soils imported logs rock and clean backfill material (eq. clean pit imported logs rock and clean backfill material (eq. clean pit imported logs)</u>

Materials – excavated soils, imported logs, rock, and clean backfill material (eg. clean pit run), to be stockpiled at the top of the slope or contained on the beach (e.g. on a tarp)

- o Remove vegetation and failing wooden retaining wall from the slope with the excavator
- Regrade slope and cut slope crest back 1.5 to 3.0m, slope materials will be removed from the top of slope, or via trucks on the barge.
- o Install rock anchors and logs along toe of the slope (within 1 m of the Present Natural Boundary)
- Backfill behind logs with pit run (for drainage)
- Maximum of 10 barge trips is expected for moving equipment and materials
- Heavy equipment work will occur during low tides, and the work is estimated to take 2-4 days
- The excavator and any other heavy equipment will be removed by barge at the end of each day, if needed (as determined by the Environmental Monitor). If tides and site conditions do not

permit removal, the excavator will remain on site overnight on log bunks above the high water level (example Photo 17)

- If remaining on site, it will be surrounded by a floating absorbent boom
- Manual installation:
  - o Install drainage on the slope
  - o Plant dune grasses within the logs
  - o Install willow wattles and riparian plantings on the slope to the top of bank

Detailed installation of the logs, willow wattles, and plantings is described in the Polster Environmental Services Report, March 2025 (Appendix 1).

If possible, work will proceed outside the reduced-risk fisheries window (July 1 to Oct 1), in May or early June (with permission from DFO and Islands Trust permit) to allow for installation of the willow wattles (they are less likely to be successful if installed during the hot summer months), and to allow growth of their roots through the summer to stabilize the bank during the following rainy season. It is essential to conduct the slope stabilisation as soon as possible, as additional soil slippage on the bank has progressed during the winter 2024/2025 season (Photos 10-12).

Environmental Protection Measures will be followed, including erosion and sediment control and spill prevention and response, to minimize the potential for release of deleterious substances to the marine environment.

Swell and Polster Environmental have developed a Green Shore/Bioengineering solution to the soil slippage on the bank, which will implement soft shoreline stabilization methods.

# **Potential Impact of Proposed Development on Shoreline**

The potential impacts of the project are:

- Approximately 110 m<sup>2</sup> of shoreline vegetation (mostly invasive, with some ornamental and nonnative, invasive species) will be cleared within the DPA to accommodate the construction
- Potential for sediment laden runoff from the site
- Potential for spills from equipment working on site
- Disruption to Southern Resident Killer Whales from barge

The work is proposed to be a maximum of 1 m beyond the present natural boundary, permissible by Crown Land Authorizations, Ministry of Water, Land and Resource Stewardship (Appendix 3).

Provided the environmental protection measures are implemented, no permanent impacts are expected to the marine environment, and the terrestrial habitat will be restored with the native planting area increased over the existing condition, and will include invasive species removal. Temporary impacts will be minimized through the Environmental Protection Measures Described in the next section.

# **Environmental Protection Measures**

A DFO Project Review will be submitted for the project.

The following are recommended to meet the Fisheries and Oceans Canada requirement: Measures to Protect Fish & Fish Habitat (https://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html):

- Maintain riparian vegetation (note: shoreline slope will be replanted with native species)
- Carry out works, undertakings and activities on land (because of lack of land-based access, some works will be carried out by barge and beach access by excavator)
- Maintain fish passage
- Ensure proper sediment control

• Prevent entry of deleterious substances in water

### Environmental Protection Measures During Construction

The contractor must implement environmental protection measures to ensure that the project has the minimum impact and no contaminants, such as sediment-laden water or spills, enter the marine environment.

- The work is proposed to start in June, outside of the reduced risk fisheries window for marine shorelines (July 1 to October 1), to allow for installation of the willow wattles (with permission from DFO and Islands Trust permit). The live willow stakes are less likely to be successful if installed during the hot summer months, and earlier installation will allow growth of their roots through the summer to stabilize the bank during the following rainy season.
- Because of lack of land-based access, some works will be carried out by barge and beach access by excavator. Excavator time on the beach will be minimized as much as possible.
- If possible, salvage native plants for re-use in shoreline plantings.
- Remove invasive species (Himalayan blackberry, yellow archangel, tansy ragwort, St. John's wort, and oxeye daisy, grasses, etc.)
  - Most will be removed during construction
  - Any remaining should be removed prior to planting native species
  - Maintenance will be required to control invasive species
- Properly dispose of excavated soils (by barge)

To avoid and mitigate the potential for prohibited effects to fish and fish habitat:

- A Qualified Environmental Professional (QEP) will be onsite to conduct environmental monitoring during all project activities that may result in potential adverse effects to fish and fish habitat.
- Schedule work to avoid wet, windy and rainy periods (and heed weather advisories) that may result in increased erosion and sedimentation.
- Avoid conducting any works, undertakings and activities in water. The excavator and trucks will be located above the water level at all times.
- Conduct works during an appropriate tidal cycle to allow working in the dry (i.e., when the site is dewatered by a low or falling tide).
- Identify and clearly mark access corridors below the high water mark to minimize machinery disturbance in the intertidal zone.
- Avoid introducing sediments (e.g., silts, clays and sand) into the marine environment.
- Construction works, undertakings and activities are not to result in the trapping or stranding of fish. Smooth ruts generated from equipment access/operation before tidal inundation to remove areas that have the potential to trap or strand fish.
- Southern Resident Killer Whales
  - Check for 2025 updates to Fisheries Notice FN0469 boating restrictions
  - Barge operator must provide a spotter on board watching for Killer Whales, other whales and porpoises.
  - Stay more than 400m away from any Killer Whales and 100m away from any other whales or porpoises
  - Turn engines to neutral idle and allow animals to pass if your vessel is <400m from a Killer Whale or <100m from any other whale or porpoise.</li>
  - $\circ$  Do not position vessel in the path of any whales or porpoises.
  - Reduce speed to less than 7 knots when within 1,000 metres of a killer whale.
  - Reduce noise by turning echo sounders and fish finders off when not in use.
- Forage Fish: Retain a QEP to survey areas for the presence of forage fish spawning prior to construction. Use accepted methods for surveying for intertidal spawning forage fish.

- Survey to be conducted no more than 7 days prior to equipment presence on beach. Methodology as per Moulton & Penttila (2006) and Washington Coastal Training Program (2018).
- $\circ$  No intertidal works to be conducted without a clear survey (i.e. no eggs detected)
- If evidence of forage fish spawning is detected, temporarily suspend work until a subsequent survey indicates that no incubating embryos are present.
- Invasive Species: Inspect the project area for the presence of European green crab prior to starting work.
  - Immediately report any aquatic invasive species (AIS) to DFO at: AISPACIFIC@dfo23mpo.gc.ca. Take the following precautionary measures to avoid the introduction and/or transportation of AIS into other waters by:
    - Inspect and clean plants, animals, mud and sediment from all equipment used below the high water mark.
    - Drain all water from equipment used below the high water mark.
    - Dry all parts of equipment completely before leaving the site.
    - All organic matter and wash water generated during cleaning must be disposed of on land.

### Barge and Heavy Equipment, in addition to above:

- Ensure Proper Sediment Control (see Erosion & Sediment Control section)
- Prevent entry of deleterious substances into water (see Spill Prevention & Response section)
- Maintain all machinery in a clean condition and free of fluid leaks.
- Spill response kits (capable of addressing the volume of fuel/oils/chemicals on site) are on site when any heavy machinery is working, and operators are trained in their use.
- If tides and site conditions permit, the excavator will remain on site overnight on log bunks (example Photo 17), or it will be removed by barge each day if needed (as determined by the Environmental Monitor)
  - o If remaining on site, it will be surrounded by a floating absorbent boom
- Excavator activity on the beach should be limited to the clear path of beach below the log line, minimizing heavy equipment activity on the beach, and ensuring that the excavator pathway does not result in equipment being bogged down in the beach.
- Do not leave exposed soils or materials stockpiles on the beach to be subjected to tides or waves
- Wrap hydraulic line joints with adsorbent spill pads and zip ties or use environmentally friendly hydraulic fluid.

# Erosion & Sediment Control

- Minimize vegetation removal
- Schedule excavation and construction activities during dry weather if possible. Light rain acceptable for constrained timetable (forage fish sampling window and daytime low tide).
- Work below the High Water Mark will be conducted during low tide
- Sediment fence or curtain or other measures will be installed, as needed, to prevent sediment from migrating into the marine environment.
- Do not direct water runoff from the site or dewatering from excavations directly into the marine environment. If dewatering of excavations is required, the Environmental Monitor must be consulted to determine where runoff can be directed.
- Cover exposed soils, if needed (e.g. poly, tarps, mulch, seeding, 'rough and loose' treatment)
- Ensure soil and debris stockpiles are placed away from the shoreline and sediment-laden water cannot flow into the waterbodies.
- Immediate planting of exposed soils after project completion
- Contact Environmental Monitor immediately with any concerns.

### Spill Prevention and Response

- Equipment is inspected for leaks prior to beginning work.
- Spill response kits (capable of addressing the volume of fuel/oils/chemicals on site) are on site when any • heavy machinery is working, and operators are trained in their use.
- Equipment refueling is at a designated location and >30 m from marine ecosystems and stormdrain •
- Fuel generators must be placed in a spill-proof container capable of addressing the maximum volume of • fuel involved (e.g. plastic bin, or impermeable containment area, eg. poly-lined bermed depression).
- Store all fuel cans in spill-proof containers (e.g. as above). •
- No concrete work is proposed, if this is changes, the following environmental protection is required:
  - Concrete wash-water and wet concrete is highly alkaline and toxic to fish and other aquatic organisms. 0 If any concrete work is required (e.g. mortar), all concrete wash-water from equipment, trucks and/or hand tools needs to be directed to a settling area away from runoff paths to the waterbodies. Freshly poured concrete needs to be covered when rain is forecasted or runoff needs to be isolated from waterbodies and tides during the curing process.
- In case of spills, the following general steps are recommended: •
  - Stop source of spill/prevent further spillage (turn off valves, right overturned containers) 0
  - Block spill from reaching aquatic environment or pathways to waterbodies 0
  - Block spill from spreading 0
  - Call Environmental Monitors 0
  - Clean up spilled materials 0

### Site Restoration

- Following completion of construction, the beach will be raked of all ruts and impacts from the excavator • tracks. Beach logs (other than added anchored logs) will be placed back into as near their original position as possible.
- Shoreline slope will be revegetated with willow wattle fencing using native willows and native riparian • vegetation plantings. Vegetation to be maintained (irrigation, invasive species removal) as per the recommendations from Polster Environmental Services.
- Drainage to the shoreline will be re-installed to reduce soil moisture accumulation on the slope. •

# **Environmental Monitoring**

The following environmental monitoring protocol is recommended to ensure that environmental protection measures are properly implemented and maintained, and to meet regulatory reporting requirements:

- Owner must notify the Swell Environmental Consulting Ltd. a minimum of 4 weeks prior to the • initiation of the works.
- Pre-construction meeting with owner, contractor, Polster Environmental, Swell Environmental • Consulting Ltd., and Ryzuk Geotechnical to review Project Tasks, Environmental Protection Measures and Permit Requirements
- A QEP will survey areas for the presence of forage fish spawning prior to construction. Use accepted • methods for surveying for intertidal spawning forage fish.
- Barge operator must provide a spotter on board to watch for Killer Whales, other whales, and • porpoises. See cautions detailed in Figures 6 & 7, and listed previously.
- Site visits and/or monitoring communications and photographs periodically during key phases, as • determined by the RPBio, such as:
  - o Inspect Erosion & Sediment Control measures once they are installed
  - During excavation 0
  - During installation shoreline stabilization works 0
  - During excavation within the 15m shoreline area 0
  - During invasive species removal and native species planting 0
  - Heavy rainfall (>10mm/24 hours) until the QEP is satisfied that erosion and sediment control 0 measures are preventing sediment laden water from entering the marine environment

- Emergencies, such as spills
- To assess completion of the project
- Monitoring during construction will also consist of photos to be sent by the owner or contractor to the RPBio periodically throughout the construction period to show protection of native vegetation and functioning of ESC measures. If needed, due to uncertainty or changes to the construction process, the RPBio will schedule site visits as needed.
- Preparation of a completion report to be provided to Islands Trust and Fisheries & Oceans Canada to ensure all Variance Permit and DFO Project Review requirements are completed.

# **Development Permit Guidelines**

From the North Pender Island Official Community Plan (OCP) Bylaw No. 171 (2007, consolidated December 14, 2023), the following guidelines are applicable to Development Permit Areas One, Two, Three, Four, Five and Six:

1. Where lots are not subject to further subdivision, applicable guidelines should be considered to the extent reasonable within the constraints of the site and the lot.

### • Not Applicable

2. Avoid locating development in areas containing important, rare or fragile sensitive ecosystems or habitat where reasonable alternative sites exist.

- Slope is eroding and soil slipping, and the site is not accessible for the equipment needed from the top of bank, therefore access is required to do the work in the intertidal area, DPA#6.
- 3. The area cleared and disturbed for development should be minimized.
  - The slope will be cleared to remove invasive species and failing retaining structures, will be replaced with native willow wattles and native riparian plantings.

### 4. Fewer, but larger, undisturbed areas should be retained, rather than small or isolated undisturbed areas.

• The slope will be will be replanted with native willow wattles and native riparian plantings.

5. Buildings and associated infrastructure should be sited with sufficient undisturbed space around significant mature or established trees to protect root systems.

### Not Applicable

6. Undeveloped buffer areas should be retained around sensitive ecosystems, features or habitat where feasible. Buffer areas should be of sufficient width to limit access by invasive plants.

• Not Applicable

7. Natural features should be retained through incorporation into the design of the development. In particular, unique or special natural features such as native grasses, rare plants, unique land forms, rock outcroppings, mature trees, spits and dunes should be protected.

• No rare species or special natural features were observed, the slope will be replanted with native willow wattles and native riparian plantings, replacing existing invasive species with some native plants.

8. Connections and corridors should be maintained to provide continuity between sensitive ecosystems and important habitat.

• The slope will be replanted with native willow wattles and native riparian plantings, replacing existing invasive species with some native plants.

9. Use of drought resistant and native plants in landscaping should be encouraged. The planting or introduction of non-native plants should be avoided.

- The slope will be replanted with native willow wattles and native riparian plantings, replacing existing invasive species with some native plants.
- 10. Soil removal and deposit within or adjacent to a sensitive ecosystems or habitat should be avoided.
  - No soil is proposed to be removed or deposited for the project, a small amount of clean pit run gravel will be used to backfill behind the logs, and soil will be moved on the slope to create the willow wattles.

11. Alteration of natural drainage systems in ways that increase or decrease the amount of water available to a sensitive ecosystem should be avoided.

• Current drainage system will be replaced to ensure that the slope is subject to excessive moisture that could cause soil movement.

12. Septic fields should be located in such a manner that the possibility of pollution of sensitive ecosystems or habitat is avoided.

• Not Applicable (no septic field on site)

13. Driveways and other accesses should be limited to the number required for safe access, with shared driveway access where feasible. Driveway lengths and widths should be limited to the minimum necessary. The use of impervious surfaces should be discouraged.

• Not Applicable

14. Shoreline structural modifications should be limited in number and extent and should be necessary to support or protect a permitted or existing use or structure.

• Shoreline slope stabilization to be implemented will be a Green Shores/Bioengineering solution to protect the bank and existing uses above, while improving shoreline habitat.

15. Preference should be given to shoreline structures that have a lesser impact or enhance ecological functions, including vegetation enhancement, drainage control, beach enhancement, anchor trees, gravel placement. Harder construction measures should be avoided where possible.

• Shoreline slope stabilization to be implemented will be a Green Shores/Bioengineering solution to protect the bank and existing uses above, while improving shoreline habitat.

16. Shoreline stabilization should not interrupt natural processes solely to reduce erosion of undeveloped land, except for agriculture. Vegetation which helps stabilise banks, reduce erosion and provides habitat should be retained or enhanced.

- Shoreline slope stabilization to be implemented will be a Green Shores/Bioengineering solution to protect the bank and existing uses above, while improving shoreline habitat.
- 17. The permit conditions may include:
  - a) the construction of permanent or temporary fencing around sensitive features;
  - b) fencing, flagging and posting of notices during construction;
  - c) limits on blasting in sensitive areas;
  - d) limits on construction timing;

e) provision of works to maintain or restore the quantity or quality of water reaching environmentally sensitive areas or habitat;

reaching environmentally sensitive areas or nabilat;

f) restoration or enhancement of disturbed sensitive ecosystems and habitat;

• Shoreline slope stabilization to be implemented will be a Green Shores/Bioengineering solution to protect the bank and existing uses above, while improving shoreline habitat. Temporary deer browse fencing will be implemented to allow establishment of the native vegetation.

18. The LTC may consider variances to siting or size regulations where the variance could result in enhanced protection of an environmentally sensitive area.

• Shoreline slope stabilization to be implemented will be a Green Shores/Bioengineering solution to protect the bank and existing uses above, while improving shoreline habitat.

### DPA #6 - Intertidal Sensitive Ecosystem

The objective of this development permit area is as follows:

1. To preserve and protect remaining sensitive intertidal ecosystems.

### 5.2.7.3 Intertidal Ecosystem Guidelines

In addition to the overall and subdivision guidelines, the following specific guidelines are applicable to Development Permit Area Six (Intertidal ecosystems):

1. Stairs, walkways and other access within a sensitive intertidal ecosystem should be limited to that required for safe access, with shared access where feasible. Stairs should incorporate landings, follow the existing contours of the site, utilize small concrete pilings and have gaps between boards.

• Existing stairs will be maintained and integrated into the shoreline slope stabilization. Which will be a Green Shores/Bioengineering solution to protect the bank and existing uses above, while improving shoreline habitat.

2. Docks should be sited to avoid impacts on sensitive ecosystems such as eelgrass beds, fish habitat and natural processes such as currents and littoral drift.

• Not Applicable

3. Docks should be constructed in a manner which allows free flow of water beneath the dock and supports should be located on a hard substrate.

• Not Applicable

4. Floating docks that do not rest on the bottom at any time and a minimal ramp should be utilized rather than fixed wharves.

Not Applicable

5. Piers on pilings and floating docks are preferred over solid-core piers.

• Not Applicable

6. Docks should not incorporate unenclosed plastic foam or other non-biodegradable materials and should be constructed of stable materials that will not degrade water quality.

• Not Applicable

7. Boat launch ramps should only be located on stable, non-erosional banks where a minimum amount of substrate disturbance or stabilization is required.

• Not Applicable

# SUMMARY

In summary, provided the environmental protection measures are implemented, no permanent impacts are expected to the marine environment, and the terrestrial habitat will be restored with the native planting area increased over the existing, and will include invasive species removal. Temporary impacts will be minimized through implementation of the Environmental Protection Measures.

Please do not hesitate to contact me with any questions you may have.

Sincerely,

Lehna Malmkvist, MSc, RPBio (#1613)

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Sara Stallard, BSc, AScT





Photo 1. Looking northeast from the beach at the shoreline and eroding slope of 37149 Schooner Way (May 2024). Additional soil slippage has occurred in winter 2024/2025 – see Photos 10-12.



Photo 2. Looking north along the beach at the shoreline and base of eroding slope (May 2024). Additional soil slippage has occurred in winter 2024/2025 – see Photos 10-12.



Photo 3. Looking south along the beach at the shoreline and base of eroding slope (May 2024). Additional soil slippage has occurred in winter 2024/2025 – see Photos 10-12.



Photo 4. Looking at the shoreline and base of eroding slope (May 2024). Additional soil slippage has occurred in winter 2024/2025 – see Photos 10-12.



Photo 5. Erosion at base slope (May 2024). Additional soil slippage has occurred in winter 2024/2025 – see Photos 10-12.



Photo 6. Historic wooden retaining wall on slope (May 2024).



Photo 7. Historic wooden retaining wall on slope (May 2024).



Photo 8. Mid-slope, primarily agricultural grasses and non-native species, top of slope gravel and artificial grass.



Photo 9. Mid-slope, primarily agricultural grasses and non-native species, top of slope gravel and artificial grass.



Photo 10. Eroding slope - additional soil slippage has occurred in winter 2024/2025 (March 2025).



Photo 11. Eroding slope - additional soil slippage has occurred in winter 2024/2025 (March 2025).



Photo 12. Eroding slope - additional soil slippage has occurred in winter 2024/2025 (March 2025), near Photo 5 location.



Photo 13. Beach access to the site for barge landing and equipment access.



Photo 14. Beach access to the site for barge landing and equipment access (stitched photo from 3 photos)



Photos 15a, b, c. Beach from north (top photo) to south (bottom photo)



Photos 16a and b. Beach substrates, potential for forage fish spawning.



Photo 17. Excavator to be stored above wave action, if needed, on bunked logs, with floating spill boom around.



Photo 18. Small self-propelled barge with ramp for bringing equiement and materials to the site.

# Appendix 1. Polster Environmental Services Ltd. – Site Reclamation Project Proposal

# Site Reclamation Project Proposal -Pender Island

**Green Shores Restoration for 37149 Schooner Way** 

UPDATED MARCH 2025

**ISSUED BY** Polster Environmental Services Ltd. Swell Environmental Consulting Ltd.

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# **Introduction & Background**

This document outlines the proposed plan and associated costs for the Green Shores reclamation project for 37149 Schooner Way, Pender Island, British Columbia. The project aims to address coastal erosion, remove invasive species, enhance ecological value, and improve shoreline stability using nature-based solutions. Located in the Salish Sea, Pender Island faces challenges common to many Gulf Islands, including sea-level rise and increased storm intensity due to climate change.

The proposed restoration encompasses several key components:

- Installation of large-diameter beach logs to create a natural barrier against wave action, utilizing heavy machinery for precise placement and securing them with rock anchors.
- Planting of native dune ryegrass (Leymus mollis) to stabilize the shoreline and enhance habitat.
- Implementation of wattle fencing on the slope to prevent erosion.
- Removal of invasive species to promote native plant growth.
- Extension of drainage pipes to manage water flow effectively.
- Installation of fencing to prevent herbivory browse.
- Slope crest to be cut back approx. 1.5m to 3.0m horizontally and regraded to a stable angle (approx. 34°) as recommended by Ryzuk Geotechnical report dated April 4, 2025. Final extent of cutback to be determined on-site based on achieving target slope angle.

This comprehensive approach aligns with Green Shores principles, emphasizing soft shore techniques to create a more resilient and ecologically valuable coastline. The project aims to protect the immediate shoreline and serve as a model for sustainable coastal management in the region.

# **Site Measurements**

### **Table 1: Site Dimensions**

Measurement	Value
Slope Width	17.4 m
Slope Height	4.5 m





Example of shoreline wattle fencing.

# **Project Components and Costs**

# **Green Shores Portion**

The Green Shores approach involves placing beach logs along the high-water mark to secure the slope toe, ensuring that no log extends more than 1 meter past the present natural boundary (to meet Crown Lands requirements) in compliance with recent regulatory changes. Installation will be performed using heavy-duty equipment to achieve precise placement. The logs will be laid horizontally and embedded approximately one-third in the sand to mimic naturally occurring beach logs on the shore. Appropriate anchoring methods—such as duckbill earth anchors or equivalent systems—will be used, and a 1-foot terrace will be created behind each log for planting native dune ryegrass (Leymus mollis) in 1-gallon pots at a density of one pot per 30 centimeters.

The contractor for the heavy equipment work is Braedon's Big Dig Em Trucking & Excavating from Pender Island. The excavator and trucks with materials will be brought to the location by a small self-propelled aluminum barge (12.3m x 4.3m x 0.9m), a maximum of 10 barge trips is expected for moving equipment and materials. The heavy equipment work will occur during low tides, and the work is estimated to take 2-4 days. https://www.nauticapedia.ca/dbase/Query/Shiplist4.php?&name=Moving%20Experience &id=43062

This method offers several benefits:

- Stabilizes the slope toe and reduces erosion
- Creates a natural barrier against wave action
- Provides a suitable environment for vegetation establishment
- Enhances the ecological value of the shoreline

# Table 2: Green Shores Costs

Item	Measurement	Total Cost
Green Shores Installation	17.4 Linear meters	\$6,960
Rye Grass Planting	100 pots	included

# Wattle Fencing

Wattle Fencing is proposed as an effective soil bioengineering technique for slope stabilization. The installation process involves driving willow stakes (approximately 1–1.5 m in length) vertically into the slope using an earth auger, with heavy-duty equipment ensuring precision. Long willow stems—trimmed of side branches—will be placed horizontally on the uphill side of the stakes and backfilled with soil to form a series of 30-cm terraces. This method reduces surface runoff velocity, traps sediment, and provides a stable platform for native vegetation establishment. To maintain the metabolic energy and viability of the live plant material for a summer installation, cold storage is required during the holding period. Additionally, the transportation of the live plant material to and from the designated cold storage facility and the construction site will be carefully managed to minimize handling stress and ensure optimal performance at the time of installation.



Furthermore, ornamental nursery stock will be strategically planted on the wattle fence benches to create an ecologically diverse display of native species. This integration will foster a robust environmental framework by attracting birds and pollinators, while also enhancing the aesthetic appeal of the willow wattle fencing. The nursery stock will include 25 Nootka Rose, 25 Snowberry, 25 Thimbleberry, 15 Ocean Spray, and 10 Red Flowering Currant.

Item	Measurement	Total Cost
Wattle Fencing	300 Linear meters	\$48,000
Nursery Stock	25 Nootka Rose, 25 Snowberry, 25 Thimbleberry, 15 Ocean Spray, 10 Red Flowering Currant.	Included

# Table 3: Wattle Fencing Costs

# **Invasive Species Removal and Pipe Extension**

This component involves the removal of invasive plant species from an area of approximately 65.25 m<sup>2</sup>, with safe disposal at an approved location. Additionally, the existing drainage system will be modified by replacing the current perforated pipe with a hard, non-perforated pipe. The new drainpipe will be securely installed and extended to the bottom of the slope, and a rock basin will be constructed to manage water runoff effectively, thereby preventing excess water from destabilizing the slope.

# Table 4: Invasive Removal and Pipe Extension Costs

Item	Measurement	Total Cost
Slope Preparation, Invasive Removal, and pipe extension	65.25 m <sup>2</sup>	\$3,262.50

# Safety considerations

The successful installation of the proposed soil bioengineering treatments is contingent on safe site access and working conditions. The Contractor shall maintain current liability insurance and Workers' Compensation Board (WCB) coverage, ensure a fully stocked first aid kit is available onsite, and implement a comprehensive safe work plan that includes regular tailgate meetings. If any unsafe conditions or practices are observed, work will immediately cease until the identified risks are mitigated.

# **Surveys and Permits**

- Swell Environmental will survey forage fish before the initiation of installation to prevent fish habitat loss on the beach
- Permits will be required before any work can be conducted.
- The costs for the survey and permits are additional and outside of these estimates.
- The permits required are:
  - DFO Project Review
  - DFO Forage fish sampling permit
  - Islands Trust Development Permit

# **Installation Cost Summary**

Item	Cost
Green Shores Portion	\$6,960
Wattle Fencing	\$48,000
Invasive Species Removal and Pipe Extension	\$3,262.50
Perimeter Fencing Installation	\$1,500
Total Estimated Installation Cost Before GST	\$59,722.50

All prices listed above represent a fixed-rate installation cost. The attached Independent Contractor Agreement from Polster Environmental Services (PES) constitutes the legally binding document that confirms these pricing terms. The installation cost shall not exceed the stated maximum except as modified through a formal Change Order process as provided in the attached contract.

# Consultation, Permitting, Forage Fish, and Monitoring Cost Summary

In addition to the primary installation costs, the following additional services are required and will be contracted separately: • Environmental Consulting and Permitting Support (Swell Environmental): This includes assistance with all necessary permit applications and documentation, as well as the coordination of forage fish surveys and site monitoring to ensure compliance with environmental regulations.

• Geotechnical Services: Professional assessments (e.g., by Ryzuk Geotechnical or equivalent) will be conducted to evaluate site conditions and fulfill regulatory requirements.

• Heavy Machinery and Barge Mobilization: Costs associated with the use of heavy-duty equipment, including transportation and mobilization for site preparation and other specialized tasks, are not included in the primary installation cost.

• Additional Specialized Services: Other services such as irrigation specialist input, detailed environmental monitoring, and any related disbursements will also be billed separately.

• Slope crest to be cut back approx. 1.5m to 3.0m horizontally and regraded to a stable angle (approx. 34°) as recommended by Ryzuk Geotechnical report (April 4, 2025). Final extent of cutback to be determined on-site based on achieving target slope angle.

Detailed estimates for these supplemental services—including supporting spreadsheets and a complete scope breakdown—will be provided for the Client's review and final approval by the respective contractors. Any additional costs will be communicated in advance by the contractors. This document, along with the attached contract, outlines the agreed relationship and terms between Polster Environmental Services (PES) and the Client.



**Review and Approval** 

- 1. Review this proposal document thoroughly.
- If the proposed costs and project scope are acceptable, proceed to the next phases.

# 2. Surveys and Consultations

- Consult with Swell Environmental regarding all permit application requirements, including discussions with Islands Trust staff and BC Crown Lands officials regarding the necessary permits.
- Engage with geotechnical engineers (e.g., Ryzuk Geotechnical) to assess the site and prepare any required technical reports.
- Schedule discussions with heavy machinery and specialized service providers as needed to confirm mobilization logistics and additional service requirements.

# 3. Permit Acquisition

- Work with Swell Environmental to secure all required permits, including, but not limited to:
- DFO Project Review
- Islands Trust Development Permit or Development Variance Permit
- Green Shores Certification Application (if desired)
- Any additional permits identified during consultations (e.g., regarding heavy machinery operations)

# 4. Project Initiation

• Once all necessary permits are secured and the forage fish survey is completed by Swell Environmental, Polster Environmental Services will be notified to proceed with the installation phase of the project.

# Conclusion

This proposal outlines a comprehensive approach to shoreline restoration, integrating multiple ecological engineering techniques—including the strategic use of heavy machinery for the precise placement of large logs and anchor rocks—to create a more resilient and biodiverse coastal environment.

The Green Shores approach, combining beach log installation with native plantings, offers a sustainable solution that mimics natural coastal processes. This method is environmentally beneficial and often required to obtain the necessary permits for work in ecologically sensitive shoreline regions. The extensive use of wattle fencing provides crucial slope stabilization, while the removal of invasive species and improved drainage further support the long-term health of the restored ecosystem.

It is important to note that while this estimate is comprehensive, it does not include the costs for the forage fish survey or required permits, which will need to be factored into the overall project budget. Furthermore, ongoing monitoring and potential maintenance should be considered to ensure the long-term success of the restoration efforts.

By implementing this project, the property owner will be contributing to the broader ecological health of Pender Island and the Gulf Islands region. This initiative demonstrates the effectiveness of nature-based solutions in addressing climate change impacts on our shorelines. It not only protects valuable coastal property but also enhances habitat for marine and terrestrial species, thereby contributing to the overall ecological integrity of the Salish Sea.

Choosing to proceed with this Green Shores project aligns with best practices for coastal management and facilitates the permitting process. It represents a commitment to responsible stewardship of the shoreline—balancing the protection of property with environmental conservation—and serves as a model for other coastal property owners, showcasing how individual actions can lead to significant environmental benefits throughout sensitive coastal areas.

# Appendix 2. Ryzuk Geotechnical Report



April 4, 2025 Project #: 10065-1

Don & Lee Kayne 37149 Schooner Way – Pender, Island, BC Attention: Don Kayne (don.kayne@canfor.com)

#### PROPOSED SHORELINE RESTORATION

37149 Schooner Way - Pender Island, BC

# **1. PROJECT DESCRIPTION**

As requested, we have completed a geotechnical review of the site and proposed foreshore restoration. Our associated observations, comments, and recommendations are summarized herein. Our work has been completed in accordance with and is subject to the previously accepted proposal submitted by Polster Environmental Service Ltd. and Swell Environmental Consulting Ltd. dated July 2024, as well as the attached Terms of Engagement.

The project site is a waterfront residential property located along the southwest shoreline of North Pender Island. The property is bounded to the northwest and southeast by neighbouring residential lots, to the northeast by Schooner Way, and to the southwest by Swanson Channel and the active marine intertidal foreshore area of Boat Nook.

The seaward facing slope is approximately 4.5 to 6 m in height and is inclined around 40 to 50 degrees, with some steeper and flatter sections. An existing metal staircase provides access to the beach. Upon the slope are vegetation, exposed soils from past and recent slippage, an older wooden retaining wall, and miscellaneous debris. The toe of slope is unprotected over a majority of the width except where a large log is present.

We previously visited the site in 2020 and provided a geotechnical report dated December 14, 2020, outlining recommendations for engineered armouring solutions. We understand that hard armouring is not permitted in this location and that a nature-based solution aligning with Green Shores principles is instead proposed. Green Shores is an initiative of the Stewardship Centre of BC focused on minimizing impacts of development to the foreshore and restoring the natural shoreline ecosystem.

We have reviewed the recent report of March 27, 2025, by Swell Environmental Consulting which describes the project and has been submitted to Islands Trust for permitting in accordance with the requirements of Development Permit Area 6 – Intertidal Sensitive Ecosystem (reference: North Pender Island OCP Bylaw No. 171, 2007, Schedule N). The report describes that the proposed work will consist of construction of a base course of beach logs anchored to buried boulders, with dune grass plantings, above which willow wattles will be constructed in a tiered manner to the crest of slope.



Native riparian plantings will be planted on the benches created by the wattle fencing. Prior to the installation, existing sloughed soil, vegetation, and failing wooden retaining wall(s) will be removed from the slope by excavator.

# 2. GEOTECHNICAL REVIEW

# 2.1 GEOTECHNICAL CONDITIONS

At the time of our recent site visit of March 31, 2025, we observed the soil stratigraphy on the slope (where visible due to erosion and slippage) to consist of a surficial layer of organic soil and vegetation over historical fill. The fill consisted of predominantly clay, sand, and organic soil with some gravel and debris such as a tire, bricks, and broken rock. Potentially native soils were observed in one area of the erosional scarp approximately halfway up the bank next to the stairs, and consisted of saturated, loosened grey/mottled brown sandy clay. A shallow hole approximately 0.2 m deep was advanced by hand auger in these soils and encountered firmer soils with depth. Select photos taken during our site visit are attached at the end of this report for reference.

The recent slip is located beneath and south of the stairs. A white perforated PVC pipe with a capped end was exposed within the slough area and no water was observed to be exiting the perforations. An older-looking black corrugated pipe was also visible. PVC pipes are also located north of the stairs (dry at the time of our attendance) and south of the stairs (two, both conveying water at the time of our attendance). The top of the sloughed soil, located half way up the slope south of the stairs, forms an area where water can pond, and it appears either slow seepage or runoff is originating from the slope above in this area.

Based on our previous visit in 2020 it is anticipated that native undisturbed very dense silty sand and gravel is present beneath the slope fills, atop an erratic bedrock profile. The bedrock does not outcrop along the shoreline of the subject property but is visible along the shoreline approximately 2 properties away either direction.

Atop the slope, an artificial turf putting green is present which we understand was installed approximately 2 years ago. Such was constructed atop imported road base fill, which is visible beyond the edge of the green and fence, forming the crest of slope. We understand the fill was compacted at the time of placement. Toward the south end of the yard, separation of approximately 25 to 50 mm (horizontal) has occurred between the main turf and border piece, as well as some subsidence near the slope crest resulting in a slanted surface. Probing with a steel rod through the exposed road base fill between turf pieces indicated tension cracks or loose soil extend a depth of 0.3 m, 0.6 m, and 0.9 m at 3 locations advancing south.

# 2.2 GEOTECHNICAL ASSESSMENT

Based on our observations we consider several factors have contributed to the erosion and sloughing observed on the slope. These include wave impacts and sea spray, particularly during winter storm



events in combination with high tide, which act to remove soil from the toe of the slope; presence of unconsolidated fills upon the slope; precipitation events and associated saturation of the surficial slope soils due to runoff, including drainage discharge; and oversteepened slope angle at the toe and above.

With regard to the horizontal movement atop the slope near the crest, such is indicative of soil movement below the surface in a horizontal direction. Such may be due to movement of the road base down the crest of the slope, alone or in combination with movement of older slope fills below.

# 3. RECOMMENDATIONS AND COMMENTARY

Based on our review and observations, we have recommended that remedial works be carried out to mitigate the potential for ongoing erosion and slope movement. From a geotechnical perspective, key aspects of protection include toe protection, and overall slope angle with regard to stable angle of repose of the soils. The proposed works have been designed by the environmental consultants and contractor with regard for regulatory guidelines and our commentary is provided as follows.

Regarding toe protection, this will be addressed by the anchored logs, which are intended to function as a barrier to wave impacts and direct erosion from wave action. Regarding overall slope angle, a stable angle for the existing fills has not been confirmed but is likely in the range of 27 to 34 degrees. The current slope angle from toe to crest is approximately 40 to 50 degrees. Where willow wattle stabilization will be installed into fills, we recommend considering flattening the overall slope angle to increase the likelihood of long-term success of the proposed remediation. Where the slope is approximately 40 degrees and 4.5 m high, a reduction to 34 degree angle would involve cutting the crest of slope back approximately 1.5 m. Where the slope is higher/steeper, this could involve taking the crest up to 3 m back. The selected approach and location of final slope crest could be determined on site with the clients, consultants and contractor on a risk tolerance basis.

Regardless of whether the slope inclination is flattened, the presence of fills on the slope and the dynamic nature of the coastal foreshore environment pose ongoing risk that additional slope movements could occur in the future. It is our opinion that the proposed restoration will provide stabilizing benefit to the slope; however, such will not entirely mitigate potential future slope instability.

We recommend that the 'posts' of the proposed wattle fencing be partially embedded into the slope soils and ideally into native, undisturbed soils for best support. Following willow wattle installation, slope stability will be promoted by the soil retaining properties of the terraces. Plantings on the terraces will have a permeable matrix and the terraced surface will aid in mitigating surface water runoff and associated erosion.

We recommend that the twinned drainage pipes be extended as necessary such that they do not discharge water on the slope itself, and consideration be given to replacing them with tight pipe rather than perforated pipe. The capped PVC pipe below the stairs should be scoped and repaired/replaced as necessary to convey drainage beyond the slope and the black corrugated pipe should be investigated for any upslope drainage connection before being repaired or removed. All drainage pipes should discharge onto a non-erodible surface such as a splash pad. Grading should be such that surface water runoff is not directed onto adjacent lots.

We note that the coastal sea level rise scenario for BC (Flood Hazard Area Land Use Management Guidelines, January 2018) considers 0.5 m by 2050 and 1.0 m by 2100. Sea level rise is anticipated



to be accompanied by more frequent and potentially larger storms. These changes have the potential to impact the slope and proposed works in the future.

Given the above and the biological nature of the project materials, we cannot confirm or provide assurance regarding the effective lifespan of the proposed remediation methods, nor give metrics of performance. Future maintenance will be required and should be anticipated in order to replant any unsuccessful vegetation, reinstall/repair any areas of willow wattle that may shift in the future and potentially to replace beach logs in the longer term.

# 4. CLOSURE

In summary, we consider the proposed restoration measures to be appropriate provided our commentary herein is considered. We do not expect that the proposed remediation measures will have any negative physical effect (i.e. erosion) to the intertidal area of Boat Nook, nor to that of the surrounding properties.

We trust the preceding is suitable for your purposes at present. If you have any questions, or require anything further, please contact us.

We look forward to working with you on your project and appreciate the opportunity to be of service to you.

Sincerely,

Ryzuk Geotechnical

Laura Lessingham, P.Geo. Lead Geoscientist

Permit to Practice Number: 1002996

#### Attachment(s):

- Terms of Engagement
- Site Photos, March 31, 2025

#### Distribution:

Owner - Lee Kayne – lee.kayne@telus.net Swell Environmental – Lehna Malmkvist – lehna@swell.ca Current Environmental – Jeremiah Bain – jeremiah@currentenv.ca Polster Environmental – Nathan Polster – nathan@polsterenvironmental.com Swell Environmental – Sara Stallard – sara@swell.ca Big Dig-Em Trucking & Excavating – Braedon Bigham – bdeltd@shaw.ca

GINU

# 51769 BRITISH

SCIEN



Scott Currie, P.Eng. Senior Geotechnical Engineer

# RYZUK

## **PROPOSED SHORELINE RESTORATION**



Photo 1. Overall view of shoreline, house above.



37149 Schooner Way - Pender Island, BC



Photo 2. Twinned perforated drainage pipes south of stairs.



37149 Schooner Way - Pender Island, BC



Photo 3. Stairs and recent slipped soil material and scarp.



37149 Schooner Way - Pender Island, BC



Photo 4. Soil scarp and slipped soil next to stairs. Hand auger at right indicating location of potential native sandy clay soil.





Photo 5. Looking south along crest of slope. Curvature at crest visible in distance.





Photo 6. Probe embedded approximately 0.3 m into road base at separation.





Photo 7. Probe embedded nearly 0.9 m into road base at separation.



#### **TERMS OF ENGAGEMENT**

#### 1. GENERAL

- 1.1. Ryzuk Geotechnical Ltd., its principals and employees (collectively the "Consultant") shall render the Services to the Client for the Project in accordance with the following terms of engagement (the "Engagement").
- 1.2. The Services, and any other associated documents, records or data, shall be carried out and/or prepared in accordance with generally accepted engineering practices commensurate with the timing and location in which the Services are performed. No other representations or warranties, expressed or implied, are made by the Consultant.
- 1.3. The Consultant may, at its discretion and at any stage, engage sub-consultants to perform all or any part of the Services.

#### 2. COMPENSATION

- 2.1. The Consultant's rates and fees are generally based on the hourly rates of our employees. The Consultant maintains accurate records of the time we devote to the Engagement. For certain well-defined services we will be able to quote a fixed fee.
- 2.2. The Consultant's rates and fees are adjusted annually to reflect current levels of geotechnical experience, changes in market conditions and other factors.
- 2.3. All fees billed to the Client by the Consultant are payable in Canadian dollars. Invoices are due and payable by the Client on receipt of the invoice, without holdback. Interest on overdue accounts is 24% per annum.

#### 3. REPRESENTATIVES

3.1. Each party must designate a representative who is authorized to act on behalf of that party and receive notices under this Engagement.

#### 4. TERMINATION

- 4.1. Either party may terminate this Engagement without cause upon providing 30 days' written notice to the other party. On termination by either party under this section, the Client shall forthwith pay to the Consultantall fees invoiced by the Consultant for the Services performed, including all expenses and other charges incurred by the Consultant in respect of the Consultant's Engagement by the Client.
- 4.2. If either party is in breach of any term of this Engagement, the non-defaulting party may give written notice of the breach to the other party and thereafter terminate this Engagement forthwith if the defaulting party does not remedy said breach within 7 days' of being provided written notice of the breach. On termination bythe Consultant under this section, the Client shall forthwith pay to the Consultant all fees invoiced for the Services performed to the date of termination, including all expenses and other charges incurred by the Consultant in respect of the Consultant's Engagement by the Client.



#### 5. ENVIRONMENTAL

- 5.1. The Consultant's field investigation, laboratory testing and engineering recommendations will not address or evaluate contamination or pollution of soil or groundwater. The Consultant will cooperate with any environmental consultant retained by the Client during the field work phase of the investigation.
- 6. PROFESSIONAL RESPONSIBILITY
- 6.1. The Consultant will provide the Services in accordance with the standard of care, skill and diligence required of a geotechnical consulting firm providing similar services at the same time in the same geographic location and circumstances in British Columbia. The Services will be provided in accordance with procedures customarily provided in similar circumstances by similar professionals.
- 7. INSURANCE
- 7.1 Ryzuk Geotechnical maintains Professional Indemnity Insurance as follows:
  - 7.1.1 \$2,000,000 each and every claim
  - 7.1.2 \$2,000,000 in the aggregate
  - 7.1.3 \$5,000,000 commercial/general liability coverage.
- 8. LIMITATION OF LIABILITY
- 8.1. The Consultant shall not be responsible for:
  - 8.1.1. the negligence or failure of any contractor or other professional retained by the Client to perform work or provide services in respect of the Project in accordance with the applicable contract documents and/or advice provided by the Consultant;
  - 8.1.2. the design of or defects in equipment or materials supplied or provided by the Client or its contractors for incorporation into the Project;
  - 8.1.3. any cross-contamination resulting from subsurface investigations;
  - 8.1.4. any Project decisions made by the Client if such decisions are made without the Client first seeking advice from the Consultant and/or decisions contrary to or inconsistent with advice provided by the Consultant;
  - 8.1.5. any consequential loss, injury or damages suffered by the Client or its agents and contractors, including but not limited to loss of use, earnings and business interruption;
  - 8.1.6. the unauthorized distribution of any confidential document or reports prepared by or on behalf of the Consultant for the exclusive use of the Client;
  - 8.1.7. damage to subsurface structures and utilities.
- 8.2. The Consultant will make all reasonable efforts prior to and during subsurface site investigations to minimize the risk of damaging any subsurface utilities/mains. If, in the unlikely event that damage is incurred where utilities are unmarked and/or undetected, the Consultant will not be held responsible for damages to the Project site or surrounding areas, utilities/mains or drilling equipment or the cost of any repairs thereto.



- 8.3. The Consultant's total liability to the Client for any errors, omissions, breaches of contract and/or negligence arising in connection with the Services is limited to the amount of the Consultant's fees for the Services and shall not exceed that amount under any circumstances. For greater clarity, this means that if the Client makes any claim, including any claim for contribution or indemnity, or brings any claims against the Consultant, then any damages for which the Consultant may be liable cannot exceed the total amount of fees paid to the Consultant by the Client.
- 8.4. The Client agrees to indemnify and to save and hold harmless the Consultant from any claim, demand, litigation, expense, legal fees, liability, damage, award or cost, of any form or type whatsoever, in respect of any claim for property damage, loss, or personal injury brought by any party including the Client's contractors, other professionals, or any third party, resulting from the Consultant's provision of the Services, except for such property damage, loss or personal injury that results directly from the gross negligence of the Consultant or its employees.
- 8.5. No claim may be brought against the Consultant in respect of the Consultant's provision of the Services, in contract, negligence or other civil wrong more than 2 years after any claim is discoverable.

#### 9. DOCUMENTS AND REPORTING

- 9.1. All of the documents prepared by or on behalf of the Consultant in connection with the Project are instruments of service for execution of the Project and the Services. The Consultant retains the property and copyright in these documents, whether the Project is executed or not. These documents may not be used on any other project without the prior written agreement of the Consultant.
- 9.2. Documents that have been prepared specifically for the Project are applicable and may be relied upon onlyin the case where there has been no physical alteration to, or deviation from any of the information or plans provided to the Consultant by the Client or the Client's agents. If the Client makes any changes or deviations from original plans for the Project, the Client may request that the Consultant review and revise Project documents accordingly.
- 9.3. Identification and classification in respect of the extent, properties, or type of soils or other materials at the Project site will be based upon investigation and interpretation of results in a manner consistent with customarily accepted standard geotechnical consulting practices in the location where the Services were performed. Due to the nature of geotechnical consulting, there is an inherent risk that all potential conditions will not be detected at the Project site and that actual subsurface conditions may vary considerably from investigation points. The Client and any other party making use of any documents prepared by the Consultant in respect of the Project acknowledges and accepts this risk.
- 9.4. Any conclusions and recommendations provided within any document prepared by the Consultant for the Client will be based on the scope of investigation by the Consultant and any additional information provided to the Consultant by the Client or the Client's agents. The Consultant disclaims responsibility for any deficiency or inaccuracy resulting from the Consultant being provided with inaccurate or fraudulent information by the Client or the Client's agents.

#### 10. JOBSITE SAFETY AND CONTROL

10.1. The Client acknowledges that control of the Project site remains solely with the Client, and/or the Client's agents and/or contractors. The presence of the Consultant's personnel on the Project site does not relieve the Client, the Client's agents and/or contractors from their responsibilities for Project site safety. The Client must inform the Consultant of all hazardous or otherwise dangerous conditions at the Project site of which the Client, its agents, and/or contractors are aware.



10.2. The Client acknowledges that during the course of a geotechnical investigation a previously unknown hazard or contaminant may be discovered. Discovery and/or identification of a hazard/contaminant may necessitate procedures to ensure the safety and protection of persons and/or the environment being undertaken. The Client shall be responsible for payment of any additional expenses incurred as a result of discovery of a hazard/contaminant. The Client acknowledges that certain circumstances require governmentand/or regulatory authorities to be notified of hazardous conditions and/or contaminants. The Client shall not make any claim or bring any action against the Consultant in the event the Consultant provides any required notification of a hazard and/or contaminant to a government and/or regulatory authority.

#### 11. FIELD SERVICES

11.1. If the Consultant is requested or required to provide field review Services for the Project and the Client declines to authorize or otherwise limits the scope of same in a manner inconsistent with the Consultant's

advice or recommendations, the Consultant may provide qualified certifications in respect of any work completed by the Client and/or its contractors that was not overseen by the Consultant.

#### 12. DISPUTE RESOLUTION

12.1. If requested in writing by either the Client or the Consultant, the Client and the Consultant shall attempt to resolve any dispute between them arising out of or in connection with this Engagement by entering into structured non-binding negotiations with the assistance of a mediator on a without prejudice basis. The mediator shall be appointed by agreement of the parties. If a dispute cannot be settled within a period of thirty (30) calendar days with assistance of a mediator, the dispute shall be referred to and finally resolved by a British Columbia Court.

#### 13. CONFIDENTIALITY

13.1. During the term of the Engagement, the Consultant shall not use or disclose any of the Client's confidential information to any third party other than the Consultants legal and/or financial advisors without authorization from the Client. The Consultant will use any confidential information for the sole purpose of carrying out the Services. The Consultant may share photos of the Project so long as such photos do not disclose any information not otherwise available or readily visible by the public. Unless already made public, the Consultant will not share Client or Project site address information on social media or with third parties.

# **Appendix 3. Crown Authorizations Email Discussion**

From: Engels, Simone WLRS:EX
Sent: Thursday, March 20, 2025 9:14 AM
To: Thompson, Kimberly WLRS:EX <<u>Kimberly.Thompson@gov.bc.ca</u>>; Swell Environmental Consulting Ltd.
<<u>lehna@swell.ca</u>>
Subject: RE: Green Shores Project Enquiry - 37149 Schooner Way

Thank you for providing a response to Lehna, Kim.

Lehna, I can confirm what Kim mentioned in her email to you.

Regards, Simone

Simone Engels, M.Sc., P.Ag. Section Head Crown Land Authorizations Ministry of Water, Land and Resource Stewardship Phone: 250-739-8383 Email: <u>simone.engels@gov.bc.ca</u> From: Thompson, Kimberly WLRS:EX <<u>Kimberly.Thompson@gov.bc.ca</u>> Sent: Thursday, March 20, 2025 8:12 AM To: Swell Environmental Consulting Ltd. <<u>lehna@swell.ca</u>>; Engels, Simone WLRS:EX <<u>Simone.Engels@gov.bc.ca</u>> Subject: RE: Green Shores Project Enquiry - 37149 Schooner Way

Hi Lehna,

I see that you copied Simone on this message so I will let her weigh in if she wants, but that's correct, Simone stated that "Crown Lands will not require an application for Crown land authorization to be submitted, as long as the extend of the work will be contained within 1m from the present natural boundary".

Based on the revised plans that you provided, the infrastructure will remain within approximately one metre of the present natural boundary and therefore no application for Crown land authorization is needed. We understand that the project would still meet any applicable requirements from Islands Trust and DFO.

Thank you,

Kim Thompson (she/her) Natural Resource Specialist FrontCounter BC Ministry of Water, Land & Resource Stewardship 2080 Labieux Road | Nanaimo, BC Tel: 250-739-8612 | Fax: 250-751-7234

Contact Us: <u>FrontCounter BC</u> <u>Tell us</u> about your experience with FrontCounter BC. We welcome feedback! <u>Freedom of Information Disclaimer</u> From: Swell Environmental Consulting Ltd. <<u>lehna@swell.ca</u>>
Sent: Wednesday, March 19, 2025 5:57 PM
To: Engels, Simone WLRS:EX <<u>Simone.Engels@gov.bc.ca</u>>
Cc: Thompson, Kimberly WLRS:EX <<u>Kimberly.Thompson@gov.bc.ca</u>>
Subject: Re: Green Shores Project Enquiry - 37149 Schooner Way

Hi Simon and Kimberly, we are in the process of moving forward with the applications for this Green Shores bioengineering shoreline stabilization project, and the contractor recommends buried rock for anchors rather than duckbill earth anchors that were included in my previous email.

I have attached a mark up with the concept. The work would still appear the same (logs with buried anchors), and I wanted to confirm with you that Crown Lands will not require an application for Crown land authorization to be submitted, as long as the extend of the work will be contained within 1m from the present natural boundary?

Thank you, Lehna

Lehna Malmkvist, M.Sc., R.P. Bio. She/Her Swell Environmental Consulting Ltd. Victoria, BC | ləkʷəŋən Traditional Territory

p: (250) 217-9190 e: <u>lehna@swell.ca</u>

On Oct 16, 2024, at 8:53 AM, Engels, Simone WLRS:EX < Simone.Engels@gov.bc.ca > wrote:

Hi Lehna,

Thank you for forwarding your proposal to us for review and comment.

I echo Kim's comments and can confirm that at this time, Crown Lands will not require an application for Crown land authorization to be submitted, as long as the extend of the work will be contained within 1m from the present natural boundary, as per the submitted proposal. We may still require an authorization for any works placed on the foreshore in the future though.

I hope this answers your question.

Regards, Simone

Simone Engels, M.Sc., P.Ag. Section Head Crown Land Authorizations Ministry of Water, Land and Resource Stewardship Phone: 250-739-8383 Email: simone.engels@gov.bc.ca From: Swell Environmental Consulting Ltd. <<u>lehna@swell.ca</u>>
Sent: October 15, 2024 10:03 PM
To: Thompson, Kimberly WLRS:EX <<u>Kimberly.Thompson@gov.bc.ca</u>>
Cc: Sara Stallard <<u>sara@swell.ca</u>>; Engels, Simone WLRS:EX <<u>Simone.Engels@gov.bc.ca</u>>
Subject: Re: Green Shores Project Enquiry - 37149 Schooner Way

Hi Kim, thank you very much, we look forward to hearing back from the Crown Land Authorizations staff after their review. Please let me know if they have any questions.

I will also let the owner and contractor know that as-built drawings and information may be required to ensure the works are completed as described.

Thanks, Lehna Lehna Malmkvist, M.Sc., R.P. Bio. She/Her Swell Environmental Consulting Ltd. Victoria, BC | lək<sup>w</sup>əŋən Traditional Territory

p: (250) 217-9190 e: <u>lehna@swell.ca</u>

On Oct 15, 2024, at 5:35 PM, Thompson, Kimberly WLRS:EX <<u>Kimberly.Thompson@gov.bc.ca</u>> wrote: Hello Lehna,

Thank you for the additional information – I will run this by Crown Land Authorizations to confirm the approach for this project.

Yes, it is possible to have Crown Land Authorizations review erosion protection projects with minor foreshore encroachments ( $\leq 1m$ ) to determine whether or not a Crown land tenure application is required. This is done on a case-by-case basis and is not mentioned on the public-facing website.

For projects where a Crown land tenure is not required, we request that you keep the encroachment of any improvements onto Crown foreshore as minimal as possible and that you proceed with the DFO Project Review.

We may request as-built drawings and information once the works have been completed to ensure the placement of improvements did occur according to the submitted drawing.

Thanks,

	Kim Thompson (she/her)
	Natural Resource Specialist
	FrontCounter BC
	Ministry of Water, Land & Resource Stewardship
<image002 nng=""></image002>	2080 Labieux Road   Nanaimo, BC
	Tel: 250-739-8612   Fax: 250-751-7234
	Contact Us: <u>FrontCounter BC</u>
	Tell us about your experience with FrontCounter BC. We welcome feedback!
	Freedom of Information Disclaimer

From: Swell Environmental Consulting Ltd. <<u>lehna@swell.ca</u>>
Sent: Friday, October 11, 2024 9:59 PM
To: Thompson, Kimberly WLRS:EX <<u>Kimberly.Thompson@gov.bc.ca</u>>
Cc: Sara Stallard <<u>sara@swell.ca</u>>; Engels, Simone WLRS:EX <<u>Simone.Engels@gov.bc.ca</u>>
Subject: Re: Green Shores Project Enquiry - 37149 Schooner Way

Hi Kimberly, thank you for your email to Sara about the project on Pender Island. We have discussed the project with Polster Environmental Services, the bioengineering designer and installer, and they have confirmed they can complete the work within 1m of the Present Natural Boundary. I have attached the updated report and a site plan with the proposed extent of the proposed Green Shores work.

Is it possible to have Crown Land Authorizations review erosion protection projects, with a minor encroachments and determine if the project can go ahead under a "risk management" approach, keeping the encroachment to ≤1m (with natural materials - relocating logs on the beach and dune grass). Attached is a plan showing the Present Natural Boundary (PNB) with the footprint of the erosion protection works superimposed along the PNB.

Once we know how to proceed with Crown Lands portion, we will be submitting for a DFO Project Review and Islands Trust Development Permit, we would be happy to provide those as well for Crown Lands records when we receive the responses.

Thank you, Lehna

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Lehna Malmkvist, M.Sc., R.P. Bio. She/Her Swell Environmental Consulting Ltd. Victoria, BC | ləkʷəŋən Traditional Territory

p: (250) 217-9190 e: <u>lehna@swell.ca</u>

On Sep 16, 2024, at 6:05 PM, Thompson, Kimberly WLRS:EX <<u>Kimberly.Thompson@gov.bc.ca</u>> wrote: Hi Sara,

Thank you for forwarding the information about the proposed Green Shores project on Pender Island.

Crown Land Authorizations can review erosion protection projects with minor encroachments (up to about one metre) on a case-by-case basis and determine if the project can go ahead under a "risk management" approach. If you are able to keep the encroachment to ≤1m and want to pursue this option, please provide a plan showing the Present Natural Boundary (PNB) with the footprint of the erosion protection works superimposed over the PNB and the encroachment distance indicated at several intervals along the shoreline.

Based on the information that the encroachment distance for this project is up to approximately three metres, this project would require an application. The usual form of tenure for erosion protection projects is a Licence of Occupation rather than a Lease.

Although Green Shores projects are a priority, the approval process still takes several months (it's difficult to provide a precise timeline). The application needs to be received by FrontCounter and assigned to a Natural Resource Specialist for preliminary review. After being accepted by FrontCounter, it will be assigned to someone in Crown Land Authorizations for technical review and decision-making. The approval process includes referrals to local government and other agencies, consultation with First Nations, advertising and staking, and a public comment period. All of these take time.

The review process can be sped up by:

- Ensuring that the application includes all items on the Green Shores Checklist
- Confirming with Islands Trust that the proposed project is allowed under local zoning and bylaws, and applying for a permit from Islands Trust if required
- Consulting with local First Nations and keeping a communication log
- Submitting a Request for Review to Fisheries & Oceans Canada

Please let me know if you have any other questions.

Thank you,

2	Kim Thompson (she/her)
	Natural Resource Specialist
	FrontCounter BC
	Ministry of Water, Land & Resource Stewardship
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anagoooo.phg.	Tel: 250-739-8612   Fax: 250-751-7234
	Contact Us: <u>FrontCounter BC</u>
	Tell us about your experience with FrontCounter BC. We welcome feedback!
	Freedom of Information Disclaimer

From: Sara Stallard <<u>sara@swell.ca</u>> Sent: Friday, September 13, 2024 3:51 PM To: Thompson, Kimberly WLRS:EX <<u>Kimberly.Thompson@gov.bc.ca</u>> Cc: Lehna Malmkvist <<u>lehna@swell.ca</u>> Subject: Re: Green Shores Project Enquiry

Hi Kimberly,

Thank you for your email. I am copying Lehna's email to Simone, with the attachment below.

Is this something you can assist us with? I am available at the numbers below or by email.

Thank you! Sara

Sara Stallard, BSc, AScT, Envr. Tech. Swell Environmental Consulting Ltd.

250.480.7272 home office 250.885.7275 mobile <u>sara@swell.ca</u>

From: "Swell Environmental Consulting Ltd." <lehna@swell.ca>

Subject: Question re: Natural Shore Expedited Permit - Crown Foreshore Lease - Pender Island - 37149 Schooner Way Date: September 6, 2024 at 1:05:26 AM GMT+2 To: Simone.Engels@gov.bc.ca

Hi Simone, to follow up on my phone call, I am reaching out to determine if this green shores project would require a Natural Shore Expedited Permit - Crown Foreshore Lease? I have attached the a document with the proposed work.

The work in the crown land area will entail moving existing beach logs up towards the toe of the slope, anchoring them, and planting with dune grass between them.

The work will be approximately 1-3m beyond the Present Natural Boundary (into the foreshore) at the property - 37149 Schooner Way.

And, if it does require a Natural Shore Expedited Permit - Crown Foreshore Lease - approximately how long does it take for the approval once an application is received?

Thank you, Lehna

Lehna Malmkvist, M.Sc., R.P. Bio. She/Her Swell Environmental Consulting Ltd. Victoria, BC | ləkʷəŋən Traditional Territory

p: (250) 217-9190 e: <u>lehna@swell.ca</u>

On Sep 11, 2024, at 10:57 AM, Thompson, Kimberly WLRS:EX <<u>Kimberly.Thompson@gov.bc.ca</u>> wrote:

Hello Lehna,

I'm responding to the voice mail that you left for Simone Engels regarding provincial requirements for a Green Shores project. Apologies for the delayed response as Simone has been out of office. I called back but I understand that you will be away until early November.

I've copied Sara on this message in case this is a time-sensitive project. Sara, please feel free to contact me with any questions about Green Shores project.

Thank you,

<image002.png> Kim Thompson (she/her) Natural Resource Specialist FrontCounter BC Ministry of Water, Land & Resource Stewardship 2080 Labieux Road | Nanaimo, BC Tel: 250-739-8612 | Fax: 250-751-7234 Contact Us: <u>FrontCounter BC</u> <u>Tell us</u> about your experience with FrontCounter BC. We welcome feedback! <u>Freedom of Information Disclaimer</u>