File: 2022.68

Via: email

Date: June 23, 2025

Attention: Celine Coschizza, Authorizations Specialist, Ministry of Water, Land and Resource Stewardship
Michael Freer, Senior Authorizations Officer, West Coast Region, Permitting Transformation Division, Ministry of Water, Land and Resource Stewardship

Re: Crown Land Tenure Application (Tracking Number 100439391)
Land / Foreshore Use Application: Shoreline Erosion Mitigation
Information Request IR-005 (Response)

This document package is submitted on behalf of the Applicants detailed in Table 1 ("the Owner Group") who seek approval for a shoreline erosion mitigation project ("the Project") concerning their properties as indicated ("the Subject Parcels.")

Table 1: Owner Group and Subject Parcels

Address	PID	Legal Description	Owners
235 Quarry Dr, Salt Spring Island	009-555-706	LOT 1 SECTIONS 6 AND 7 RANGE 1 WEST NORTH SALT SPRING ISLAND COWICHAN DISTRICT PLAN 46155	HEIDI KUHRT AND DAVID DEMNER
239 Quarry Dr, Salt Spring Island	009-555-731	LOT 3, SECTIONS 6 AND 7, RANGE 1 WEST, NORTH SALT SPRING ISLAND, COWICHAN DISTRICT, PLAN 4615	PAT AND BRUCE SANDERS
434 Baker Rd, Salt Spring Island	009-555-781	LOT 5, SECTION 6, RANGE 1 WEST, NORTH SALT SPRING ISLAND, COWICHAN DISTRICT, PLAN 46155	ETHAN WILDING

A Crown Land Tenure Application (the "Application") was submitted on behalf of the Owner Group on March 12, 2024, by their Agent, Aurora Professional Group Inc. In preparation for the Application, the Owner Group engaged qualified professionals to oversee application scopes, as detailed in Table 2, herein referred to as the "Consultant Team."

Table 2: Project Team and Related Scope

Consultant	Lead Contact	Scope
Aurora Professional Group Inc. ("ENG")	Bradley Fossen P.Eng.,QP t. 778.400.3375 e. brad@thinkapg.com	Coordinating Qualified Professional (QP)
CORVIDAE Environmental Consulting Inc. ("RPBIO")	Julie Bugden BSc, RPBio, QEP m. 250.415.8553 e. julieb@corvid.pro	Habitat Assessments QEP, Vegetation Enhancements Design
Millennia Research Ltd. ("ARCH")	Thea Sawin MA	Archeological Permitting and Monitoring

Consultant	Lead Contact	Scope
	t. 250.360.0919 e. thea@millennia-research.com	
Polaris Land Surveying Inc. ("SURVEY")	Jordan Litke P.Surv, BCLS m. 250.686.0278 e. jlitke@plsi.ca	Property Survey, Topography
TRE Environmental Services ("GEO")	Thomas R Elliot PhD P.Geo P.Ag, QEP m. 250.732.9004 e. tom@elliot.org	Geo-assessments, Coastal Processes QP, and Design Bases
Klaver Strategic Planning ("RPP")	Serena Klaver, MA, RPP, MCIP m. 250.951.6494 e. serenaklaver@gmail.com	Planning Consultancy – Land Use Best Practices, Regulatory Review, and Gap Analyses

INFORMATION REQUEST RESPONSES

Ministry of Water, Land and Resource Stewardship (WLRS), via the FrontCounter BC Crown Land Tenure Application, has requested information to support the Application. The Consultant Team has prepared this submission in response to the request.

Information Request No. 5 (IR-05): WLRS Letter dated 08-May-2025, file 1415573.

Note: An interim response to IR-05 was submitted on 22-May-2025. Part of the response was a deadline extension request to 23-June-2025, which WLRS approved in their letter dated 27-May-2025. This submission represents the balance of IR-05 responses and information.

The 02-May-2025 WLRS letter, IR-05, is itemized here to facilitate item-by-item responses.

1. **Establishing the Need Based on Slope Instability and Toe Erosion:** Toe erosion as a cause for slope instability requires further information. WLRS requests additional information regarding toe-erosion conditions, including but not limited to, consideration given to:

    a. Backshore material type

    b. Vegetation density

    c. Historical slope failures

2. **Demonstrating the Need to Protect Existing Permanent Structures and/or Enhance Degraded Habitat:** WLRS requests additional information regarding:

a. The demonstrated need for foreshore erosion mitigation measures (e.g., beach nourishment and "wave deflection boulders") to protect existing permanent structures

b. If only upland mitigation measures, such as water management, bioengineering, or others, are employed, could they address the erosion concern?

c. The WLRS assessment that foreshore measures may not enhance the marine and intertidal habitat.

3. **Alignment with Nature-Based Shoreline Project Checklist Section 5.0:** WLRS requests additional information regarding justification of using beach nourishment and "wave deflection boulders", including, but not limited to:

a. The presence of existing cobble and boulder along the intertidal zone, as an indicator that additional material placed there could be mobilized.

b. Whether placed sediments could travel into lower intertidal areas during storm events.

c. Whether these erosion mitigation measures could potentially damage habitat, such as for forage fish habitats, such as the plain fin midshipman, and eelgrass beds.

Information Requestion Response 5

Prior to the item-by-item response for the WLRS considerations listed above, the Consultant Team has prepared a contextual response, "Contextual considerations of proposed erosion mitigation works." Following the contextual response, the item-by-item responses are then cross-referenced.

The contextual response refers to further field activities that have taken place since 22-May-2025. These activities include:

- Submarine inspection (diver) of the tidal ecosystem near and within eelgrass beds and clam beds. [video, stills, demarcation/wayfinding of dive activities]
- Low-tide shore walk [photos]
- Low-tide overhead drone footage [photos]

These activities have been described as "novel data" and have been compiled and attached to this submission as Attachment 1 "Site Field Report" (Aurora Professional Group, Created 23-June-2025).

Contextual considerations of proposed erosion mitigation works [GEO, with support from RPBIO]

Following review of pre-existing and novel data, the QEP team provides the following contextual considerations for each of the Statutory Decision Makers (SDM) considerations from their 08-May-2025 letter.

1. *WLRS 02-MAY-2025: [The proposed measures are meant to mitigate a high risk of slope failure.]*

I. [General Comment] The presented SDM perspective on the geophysical context may not take into account human-induced eustatic sea level rise as an unprecedented process occurring on a timescale that will result in dramatic change within the proponent's lifetimes. With the weight of evidence and a consensus of subject matter expert perspectives on impacts of human-induced eustatic sea level rise, which include higher rates of coastal erosion, we suggest that 'more monitoring to demonstrate need' is no longer an effective mitigation activity or precautionary principle.

II. [Specific Comment] We acknowledge that the highly fractured fissile shale bedrock comprising the majority of the backshore is 'mainly bedrock'. We also recognize that the previously estimated 10^{-2} m/year generalized erosion rate would only be enhanced in shear-zones or fractures within the bedrock. Such areas are often co-local to vegetation, due to greater availability of water and root-penetrable subgrade. Collectively, the decomposition-weathering of erodible bedrock surface and biomechanical degradation of fractured fissile bedrock results in areas of coastal bluff with increased susceptibility to wave-action toe erosion. Wave action was first identified as the erosion mechanism for Baker Beach 45 years ago[1]. This could relate to the history of hard-armour installation to this specific length of coastline during the interim years.

Consequently, we appreciate that the SDM statement about bedrock being a slow-eroding backshore material, while recognizing that slow geologic processes such as this, are typically punctuated by periods of rapid evolution. Such periods of rapid erosion have occurred within the Baker Beach backshore, creating small gully-like coastal features, which are likely the reason for the historic use of these features as coastline access and resulting hard armouring thereof.

Therefore, we request that the SDM consider the risk of significant vegetation (tree) topple as a compounding risk with the subsequent slope failure, which proceeds to retrogress the coastline. The proponents have few practicable mitigation options for this compound risk, outside of regularly limbing and topping trees; one of which is the proposed beach nourishment.

III. [Specific Comment] The QEP acknowledge that 'significant vegetation', likely being a reference to trees along the coastal bluff, can be an indicator of slope stability over the preceding ~80 years. At the same time, trees, due to shoreline erosion, have been identified as Dangerous[2], and are in locations predicted to experience increased erosion due to human-

[1] E.H. Owens and Woodward-Clyde Consultants, "Final Report Physical Shore-Zone Analysis, Saltspring Island, B.C.," 1980.

[2] As per OHSR S26.1, a tree that is a hazard to a worker due to: a) location or lean; b) physical damage; c) overhead conditions; d) deterioration of it limbs, stem or root system; or e) any combination of a) to d).

Also, see attachment 2 "SALT SPRING ISLAND LTC DEVELOPMENT PERMIT SS-DP-2005.5". This development permit, in our discussions with the land owner, relates to legacy approvals for the replacement of shore access stairs (affected by erosion) and the removal of trees for shoreline erosion protection.

induced eustatic sea level rise. Retention of these trees is a personalized risk-of-harm-to-individual vs risk-of-enhanced-erosion decision that landowners have to make when assessing retention of coastal trees under threat of a changing climate. Unfortunately, there is no mechanism available to the QEPs awareness by which regulators can define a natural hazard 'high risk zone' for private property to ensure that the Probability of Death of an Individual (PDI) per year meets the maximum B.C. landslide standard and MOTT Subdivision Preliminary Layout Review – Natural Hazard Risk of 1:10,000 years. A PDI for all natural hazards differs from the PDI for geotechnical hazards (e.g. landslide failure), which has already been applied to the Site through local government and B.C. building standards to set-back dwellings from the coastal bluff crest. Not all of the Site's natural hazards consequent to our changing climate fall under the application envelope of existing professional guidance, such as the Engineers and Geoscientists of B.C. (EGBC) Guidelines for Legislated Flood Assessments in a Changing Climate in BC, or the Guidelines for Landslide Assessments in British Columbia, which limits the options available to address the coastal bluff tree topple risk factor.

Therefore, should the Province of B.C. be looking to provide consistent application of maximum acceptable PDI for natural hazards across government agencies, the potential for tree topple consequent to toe erosion on the Site should be considered a risk factor for PDI on the Site.

The role of erosion mitigation in this context is to reduce the likelihood of harm by mitigating a causative factor (toe erosion) of tree topple along the coastal bluff.

IV. [Specific Comment] '*no major historic failures of the coastal slope were identified*' The slope composition does not lend itself to major failures, instead it has a higher rate of landward erosion at the coastal bluff. The proposed nature-based shoreline protection approach to erosion mitigation is supported by government guidance on shoreline protection, which does not indicate that such projects are contingent upon a history of major slope failure. We bring attention to the increased and rising risk of progressive, accelerating coastal erosion consequent to unprecedented human-induced climate change.

2. *WLRS 02-MAY-2025: [Project does not align with […] regards to demonstrating a need to protect existing permanent structures…]*

I. [General Comment] The proponents acknowledge that the respective geotechnical (coastal erosion-induced landslide) risk to dwellings (structures) on the Site does not exceed the current B.C. standard for PDI of 1:10,000 years. The Nature-based Shoreline Project Checklist[3] specifies that a need to enhance the degraded shore habitat that nature-based shoreline measures can address is an equally suitable demonstration.

II. [Specific Comment] The proponents request that the SDM consider that the application also proposes to maintain the historic coastal bluff integrity through nature-based shoreline

[3] Nature-based shoreline project checklist adopted by B.C. WLRS.
https://stewardshipcentrebc.ca/PDF_docs/greenshores/Resources/NBSPchecklist2021.pdf

protection from sea-level rise. By doing so, the proposal would enhance the degrading coastal habitat that is exposed to unprecedented impacts of human-induced climate change.

III. [Specific Comment] 'Significantly Enhance Marine And Intertidal Habitat'

Beach nourishment and wave-deflecting boulder installations can significantly enhance shoreline, eelgrass, and plain fin midshipman (a shoreline fish species) habitats by following the marine shoreline design guidelines decision tree.[4] This technique involves the strategic placement of material (e.g., sand, gravel) to reduce erosion of upper beach and backshore areas. Placement of gravel and limited fines creates porosity and air space to decrease wave energy along the shoreline. Materials sourced for the proposed beach nourishment would be brought in via barge and applied to specific areas at the Site, as directed by a QEP. The results include:

a. Beach Nourishment

i. Creating wider, more gently sloping beaches – This broadens the intertidal zones where eelgrass can take root and where plain midshipman breed. Wider beaches absorb wave energy, reducing erosion and providing calm conditions favorable to habitat formation.

ii. Supporting eelgrass establishment – As sand spreads naturally, it can help stabilize sediments. Once eelgrass meadows establish, their roots and rhizomes further lock down sediment and prevent the new beach from eroding.

iii. Buffers against storms – Nourished beaches provide a protective buffer, which indirectly helps maintain eelgrass health by lessening the frequency and intensity of wave disturbance.

b. Wave-Deflection Boulders of Specific Sizes to Match the Existing Habitat

i. Reduce wave energy reaching the shore – Strategically placed boulder clusters or cobble berms dissipate wave energy offshore, making nearshore waters calmer for eelgrass survival.

ii. Encourage sediment deposition – Lower-energy water allows fine particles to settle, stabilizing the seabed and improving conditions for eelgrass to anchor and spread.

[4] Johannessen, et al. 2014. Marine Shoreline Design Guidelines. Washington Department of Fish and Wildlife, Olympia, Washington. Available at: https://wdfw.wa.gov/sites/default/files/publications/01583/wdfw01583.pdf

iii. Mimic natural coastal features – When designed, these boulder areas include vegetation and structure gaps, encouraging biodiversity, including forage-and-nursery habitat for plain midshipman.

IV. [Specific Comment] The QEP believe that the cumulative impact of the proposed nature-based shoreline protection upland and foreshore mitigation measures is a suitable means to address ongoing and increasing coastal erosion caused by eustatic sea level rise consequent to human-induced climate change.

3. *WLRS 02-MAY-2025: [..Project does not… demonstrate continuation of natural processes along the beach, especially with regards to plain fin midshipman spawning habitat and eelgrass beds.]*

I. [General Comment] The coastal processes QEP requests that the SDM evaluate the perceived temporal and physical scale of motivating events and proposed works within the foreshore, respectively. Existing submitted reporting[5] demonstrates a historically sediment-constrained system, which has and will continue to have tree topple events.

The QEP considers such tree topple a natural process when it occurs at a rate contemporaneous with the adapted growth conditions. Unfortunately, acceleration of coastal bluff tree topple consequent to degraded coastal bluff habitat resulting from human induced climate change (e.g. drought, coastal erosion, rain-event intensifying, etc.) is forcing the occurrence rate beyond what can be reasonably considered a 'natural process' when compared to historic baseline.

The QEP suggests that the recent medium-sized tree-topple event is a prime example of how an estimated 24m3 volume of sediment [~1m depth isosoles triangle with ~5m base and ~8m height], ranging from clay to boulders (see photos at end of this document) was deposited consequent to the degraded coastal bluff habitat. This sediment contribution is ~4% of the total volume of washed gravel which is being sought for deposit. [Specific Comment] The SDM indicates that 'the current presence of cobble and boulders along the intertidal zone indicates that there is enough energy within the intertidal and upper swash zone to move both the beach nourishment and the boulder materials…' and that '…sediments may travel into lower intertidal areas, potentially damaging spawning habitat and eelgrass beds.'

Recognizing the SDM's perspective that there is a lack of data about sediment transport within this Drift Cell, the Proponents understand the precautionary principle and therefore pursued novel investigation of foreshore and near-shore sediment (see novel data, attached). The investigation clearly demonstrates that there are no rounded beach-gravel or boulders present on the foreshore slope, reef-islands at the clam beds, or at the landward periphery or within the field of eelgrass, which exist most proximal to the proposed works.

Consequently, the QEP suggest that there is limited evacuation of rounded beach gravel during storm events in a manner that would impact the most proximal sensitive

[5] See the Application, Attachment 3 2022.68-460-EFR-001 tree topple photos.

environmental receptors (i.e. clam beds and eelgrass beds). As such, the QEP requests that the SDM consider the novel evidence of Drift Cell sediment movement in their assessment of natural processes occurring post-application of beach nourishment as a nature-based shoreline protection.

4. *WLRS 27-MAY-2025: [Please ensure these responses clearly demonstrate a need for foreshore mitigation measures and that they clearly describe how the potential impacts to eelgrass beds and plain fin midshipman habitat will be mitigated.]*

I. [General Comment] The novel field report and associated clastic fragment data demonstrates there is no significant transport of rounded gravel to the eelgrass beds.

II. [Specific Comment] Plain fin midshipman spawn in shallow, sandy/muddy habitats near eelgrass. The beach nourishment (strategically placed) reduces current and wave energy, creating nursery zones sheltered by eelgrass. Beach nourishment and strategic boulder placement offshore boulder clusters) provide ecological benefits that directly support plain fin midshipman for spawning, foraging, and protection. This includes enhancing the habitat needs for the plain fin midshipman that depend on shallow subtidal and intertidal habitats. It is understood that plain fin midshipman occur and spawn in the area and will be mitigated for during the construction process. A survey for spawning locations of plain fin midshipman at low tide prior to construction will be undertaken, with identified areas being flagged and avoided.

   a. A DFO advice extension is currently in progress. As part of that process additional measures for forage fish mitigation are being implemented. This updated DFO advice will be forwarded to WLRS.

III. Key Habitat Needs of Plain Fin Midshipman

- Spawning substrate: They spawn in shallow subtidal zones (0–15 m) under rocks or hard surfaces.
- Calm waters: Males “sing” to attract mates and guard eggs under rocks. Too much wave energy disturbs mating and egg development.
- Predator protection: Juveniles and eggs are vulnerable to predation; shelter and camouflage are vital.
- Eelgrass association: Often found in or near eelgrass beds, which offer structure and food.

IV. Beach Nourishment and Habitat Features[6]

   a. Increased Suitable Spawning Habitat
      - Restores gently sloped beaches where plain fin midshipman can nest in low-energy, subtidal zones.

[6] Orth RJ, Lefcheck JS, McGlathery KS, Aoki L, Luckenbach MW, Moore KA, Oreska MPJ, Snyder R, Wilcox DJ, Lusk B. Restoration of seagrass habitat leads to rapid recovery of coastal ecosystem services. Sci Adv. 2020 Oct 7;6(41):eabc6434. doi: 10.1126/sciadv.abc6434. PMID: 33028530; PMCID: PMC7541073. https://pmc.ncbi.nlm.nih.gov/articles/PMC7541073/

- Provides a mix of fine sand and small cobbles or gravel, enhancing substrate complexity for egg attachment and nest creation.

b. Reduced Wave Disturbance
   - Nourished beaches have broader intertidal zones that dissipate wave energy, creating calmer spawning zones.
   - Calmer waters are essential for successful courtship vocalizations and egg survival.

c. Indirect Benefits via Eelgrass Recovery
   - Stabilized sediments support eelgrass reestablishment, which shelters young midshipman and supports the food web.

d. Artificial Nesting Structures
   - Boulders (placed at subtidal depths) mimic natural nesting sites—males guard eggs beneath these rocks.
   - Enhances availability of hard surfaces in low-energy zones, especially where natural rocks are scarce or buried.

e. Wave Attenuation
   - Boulder clusters or "reef balls" break wave energy offshore, protecting the shoreline and spawning habitats.
   - Reduced wave stress benefits egg incubation success and larval development.

f. Predator Refuge for Juveniles
   - Rock clusters and nearby vegetation (e.g., eelgrass) provide microhabitats and escape zones for young midshipman.

Item by Item Response [GEO, with support from RPBIO] – Cross-referenced with earlier itemization.

1. **Establishing the Need Based on Slope Instability and Toe Erosion:**

   a. The QEP recognize that the majority of the sites have a bedrock coastal bluff at elevations impacted by wave activity. However, backshore material is not homogenous bedrock, nor is the same type of bedrock present self-similar in both susceptibility to erosion and inherent resistance to weathering. Consequently, the existent wave action continues to undermine sections of the coastal bluff and induce localized slip-failure (i.e. toe erosion) of the overlying overburden and soil column that has a disproportional erosive effect.

   Therefore, in a semi-quantitative risk matrix for geohazard risk assessments, consideration of the need for erosion mitigation should include evaluating 'slow eroding'

bedrock as having moderate frequency (1:10 to 1:100 annual)[7] and moderate impact (Environment: Localized long-term impact; recoverable within lifetime of the project)[8] to coastal bluff habitat.

These geohazard risk assessment considerations result in a Moderate risk to the environment being identified, for which the recommendation is to review (which has been done through this application) and reduce Risk to As Low As Reasonably Practicable (ALARP).

To proceed with ALARP risk mitigation to the coastal bluff environment, the proponents are requesting approval to mitigate toe erosion through beach nourishment.

The QEP note that the coastal bluff demonstrates a relatively rapid rate of erosion for bedrock at an estimated 10^{-2} m/year – in part due to mechanical weathering from wave action, tree topple/toe failure, full sun exposure, and inherent quality of fissile shale/mudstone subject to internal shear stress; and chemical weathering resulting from the acidifying marine environment and calcareous bedrock. These erosive factors are difficult to mitigate, with the practicable option being to reduce wave action energetics through beach nourishment.

b. Vegetation density on the coastal bluff is common trending toward sparse, with incomplete canopy coverage on the leading forest edge. Revegetating the coastal bluff will increase the root reinforcement, decrease the direct sun exposure to fragile soils and bedrock at the bluff-face, and manage rainwater and drainage. These revegetation efforts are a component of the proposed work which would be supported by beach nourishment so as to mitigate potential loss of revegetation installation consequent to toe-erosion and localized landslip failure.

c. Historical slope failures for the uplands above the coastal bluff are recognized as being a low geohazard risk. Due to the localized landslip/toe erosion process resulting in deposition to the tidal environment, it is difficult to map out the historic frequency of occurrence. Historic frequency of landslip/toe erosion was unavailable, and due to a deposition environment which is re-worked with every tide, there is limited opportunity to review previous landslip deposits. However, we respectfully submit that the proponents have been long-time residents whose lived experience has consistently been conveyed as a real/perceived increase in the occurrence of landslip failures in the last two decades, with the last decade being noted as having an increasing frequency of tree topple

[7] APEGBC "Guidelines for Legislated Landslide Assessments for Proposed Residential Development in British Columbia" (May 2010). https://tools.egbc.ca/Registrants/Practice-Resources/Guidelines-Advisories/Document/01525AMW2FC5GZAROI4ZBZ7KMIRPIFG7JN/Landslide%20Assessments%20in%20British%20Columbia Accessed June 05, 2025.
[8] Ibid.

landslips, which prior land use applications have evidenced.[9] This is further illustrated by existing hard-armouring that has already been installed on the shoreline.

2. **Demonstrating the Need to Protect Existing Permanent Structures and/or Enhance Degraded Habitat:**
    a. The QEP recognize there is no demonstrated imminent need for foreshore erosion mitigation measures (e.g., beach nourishment and "wave deflection boulders") to protect existing permanent structures. However, the proposed works aim to enhance a degraded environment (i.e., coastal bluffs) and supplement a degraded natural process (i.e., sediment supply), thereby prolonging and mitigating the time until the need to protect existing permanent structures could become imminent.
    b. Upland mitigation measures, such as water management, bioengineering, or others, are unable to adequately address the erosion concern due to the reliance of these works on a coastal bluff that remains stable in the mid-term (5–20 years). Currently, upland erosion mitigation at or near the coastal bluff crest is at a perpetual and accumulating risk of landslip consequent to toe erosion, primarily driven by wave erosion. As such, the QEP strongly encourage both upland and foreshore erosion mitigation options to be pursued concurrently.
    c. The QEP suggest that the natural state of Baker Beach has been disrupted by historic activity in the Drift Cell upland and foreshore, which has degraded both habitats. Our carefully considered recommendation for nature-based shoreline protection using Beach Nourishment is the means by which the Drift Cell sediment supply can be restored in part. Consequently, the Drift Cell sediment transport processes can restore the natural conditions with a restored sediment supply – thus enhancing degraded habitat.
3. **Alignment with Nature-Based Shoreline Project Checklist Section 5.0:**
    a. We respectfully suggest that the presence of boulders on the intertidal terrace do not suggest a rapid rate of movement thereof. Existing non-uniform rock clusters are well evidenced in the novel data; rapid mobilization would more likely be the result of human intervention.
    b. The QEP provide the following interpretation of the novel data to address whether placed sediments could travel beyond intertidal areas during storm events. We specifically restrict our commentary to the assessment of novel data acquired beyond the intertidal areas, since two (clam bed, eelgrass) of three (plan fin midshipman) habitats identified by WLRS as potentially being impacted by the proposed Beach Nourishment are outside the intertidal area.
        i. The video, imagery, and GPS coordinates acquired during recent Diving investigations in the near-shore areas delineate eelgrass beds and clam beds while providing location of surficial sediment samples.
        ii. 'Rock Size' pin #1763 & #1764 imagery demonstrates subangular clastic fragments in the gravel to stone size range located between the clam beds and eel grass. The appearance of these clastic fragments are different from the rounded

[9] See attachment 2 "SALT SPRING ISLAND LTC DEVELOPMENT PERMIT SS-DP-2005.5".

to subrounded fine gravel to cobble found largely found on the intertidal terrace, suggesting a different origin – likely derived from local bedrock instead of being glaciofluvial overburden delivered to the marine environment by the current Drift Cell which is the predominant natural sediment supply of Baker Beach.

iii. The corresponding 'sample 3' surface grab analysis demonstrated ~64% of the sample is above the gravel size fraction. The clastic fragments have a platy structure, suggesting delamination from fissile bedrock. Deposits of similar clastic fragments have been observed above the wrack line adjacent to the weathering fissile shale on Site. Generally the sampled clastic fragments are subangular in form, which indicates a low amount of rounding after the initial fracture which generated the fragment. Collectively, the clastic fragment morphology from novel data grab samples suggests an origin unlikely to have been shaped by colluvial, glaciofluvial processes. Nor do the novel samples suggest the clasts have resided for a significant period of time in the Baker swash-beach system – which typically generate rounded clastic fragments, as evidenced from previous sampling of the lower intertidal beach compared with novel data photograph in pin #1753 'Low tide shore walk'. This suggests that the sample contains clastic fragments likely derived and weathered in the submarine environment, or if they originate from the coastal bluff, that there was relatively rapid evacuation due to the platy structure providing 'loft' in the swash.

The proposed Beach Nourishment will be granular in structure and rounded in form to match the existing majority of gravel found on the Site. The structure and form of rounded beach clastic fragments demonstrate a long residency time on Baker Beach, with no evidence of rounded clastic fragments being transported to the near-shore environment where sensitive environmental receptors exist. Therefore, the rounded-clast Beach Nourishment that is being considered for Nature-based Shoreline Protection will have a long residence time on Baker Beach, and should it be evacuated from the intertidal terrace, there is no evidence that rounded clastic fragments are transported to the eelgrass beds or clam beds.

iv. All other grab samples and imagery displays a submarine habitat with fine-texture surficial materials, which clearly demonstrates that beach clastic fragments are not being evacuated to the clam beds and eelgrass bed sensitive environmental receptors.

c. The novel data, which includes clastic fragment morphology and particle size distribution from grab samples, indicates there is insufficient evacuation of rounded to subrounded gravels from Baker Beach to significantly impact the existing eelgrass beds and clam beds.

DISCLAIMERS

This document, prepared by Aurora Professional Group Inc., represents a technical submission for the Project. The information contained herein is based on the best available data, expertise of engaged

professionals, and adherence to applicable standards and regulatory requirements at the time of preparation.

It is important to note that engineering, environmental science, and regulatory landscapes are subject to change. Therefore, while every effort has been made to ensure the accuracy and relevance of the information provided, Aurora Professional Group Inc. does not warrant the completeness or accuracy of the information, nor does it assume any liability for errors or omissions. Decisions based on information contained in this document are the sole responsibility of the user.

Furthermore, this document does not constitute an exhaustive treatment of the subject matter and should be used in conjunction with professional judgement and after consultation with appropriate regulatory authorities. The recommendations and findings presented are specific to the conditions encountered at the project site at the time of assessment and are intended for use by qualified professionals familiar with the nuances of shoreline erosion mitigation.

Any use of this document by third parties, or for purposes other than those for which it is specifically intended, is prohibited without the express written permission of Aurora Professional Group Inc. Modifications to the project design or deviations from the recommendations contained herein should only be made by qualified professionals with full knowledge of the specific conditions and requirements of the project site.

ATTACHMENTS

1. **ATTACHMENT 1 “SITE FIELD REPORT” (AURORA PROFESSIONAL GROUP, CREATED 23-JUNE-2025)**
2. **SALT SPRING ISLAND LTC DEVELOPMENT PERMIT SS-DP-2005.5**

SIGN OFF

By this submission, the Applicants have attempted to provide all relevant information to the approving authority to support the expedited permit process.

Please feel free to contact the undersigned or Consultant Team directly if you have any questions or concerns.

Bradley Fossen, P.Eng., Agent, and on behalf of the Consultant Team

Managing Director | Aurora Professional Group Inc.

E: brad@thinkapg.com | T: 778-400-3375

CC: CORVIDAE, TRE, OWNERS, FILE

SITE FIELD REPORT

Created: 06-23-2025
Creator: Bradley Fossen (@BFO)
Status:
Dates: 04-13-2021 - 06-23-2025

Recipients

brad@thinkapg.com

Description

2022.68 BAKER/QUARRY BEACH, BOOTH CANAL
Site Field Report - Including Diver Data, Low-Tide Shore Walk, Overhead Drone Footage

Sheets

2022.68 Quarry - Baker Rd
Erosion
2022.68 DIVER MAP

Table of contents

0.0 Field Inspection

0.1.1 VIDEO

0.1.2 Sampling and Testing

0.2 Site Assessments


2022.68 BAKER BEACH - DIVER ROUTE AND POINTS OF INTEREST
DIVER: RHYS HARDY
DIVES: JUNE 18, JUNE 20, JUNE 21 (2025)
1754
Legend
Feature 1
Video (Approx)
1769
Entry point
1756
Eel Grass
1761
1760
Eel Grass
1757
1767
mple 1
Eel Grass
1764
Rock Size
1759
1763
Size
Sample 2
Sample
1755
Clam Bed
1766
Slope st
Sample 4
1758
1762
Marine Life @ Slope
Sample 5
Mooring Block
Google Earth
Image © 2025 Airbus
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