An aerial photograph of the Mamquam Blind Channel. The channel is a large body of water with a greenish tint, winding through a landscape. To the left, there's a sandy area with some buildings and a small bridge. To the right, there's a large area of land with construction equipment and materials, including stacks of lumber. In the background, there's a town and a river. The sky is clear and blue.

Mamquam Blind Channel Long-Term Maintenance and Funding Strategy Update July 25 2023

📷 J Buchanan 2023

Outline

1. Purpose and Marine Planning Policy
2. Study Area + Project Stages
3. Discussion Draft Guiding Principles
4. Channel Maintenance Considerations & Options
5. Funding Tool Review
6. Preliminary Engagement Inputs
7. Next Steps for additional engagement
8. Discussion + Direction from Council



MASt Priority Actions



Marine Action Strategy

Prepared in collaboration with community
and the District of Squamish



July 17, 2018



OCP Policy 20.24 e

Develop a dredging strategy for the Mamquam Blind Channel as needed in order to address navigability for transportation, recreation and commerce, while minimizing impacts to marine habitats and biodiversity.

FOCUS AREA 3 Marine Economy

9. Initiate scoping, collaboration and engagement on an ecosystem based dredge program, priority navigation maintenance activities, and funding strategy. (3.1.3 A1). **DISTRICT LEAD**

Project Focus + Study Area

- Provide safe navigation
- Enhance coastal ecosystem function + limit environmental and cultural impacts

Study Area

- Based on navigational safety priority and Stawamus estuary enhancement area of interest
- Navigational Channel Area established with Transport Canada in 2017 (MOU)
- Bathymetric survey in 2020 (CHS) – significant areas do not meet design depth
- Upper MBC out of scope for now: limited available funding envelope and data, high sensitivity and future review through UMBC land and water use projects

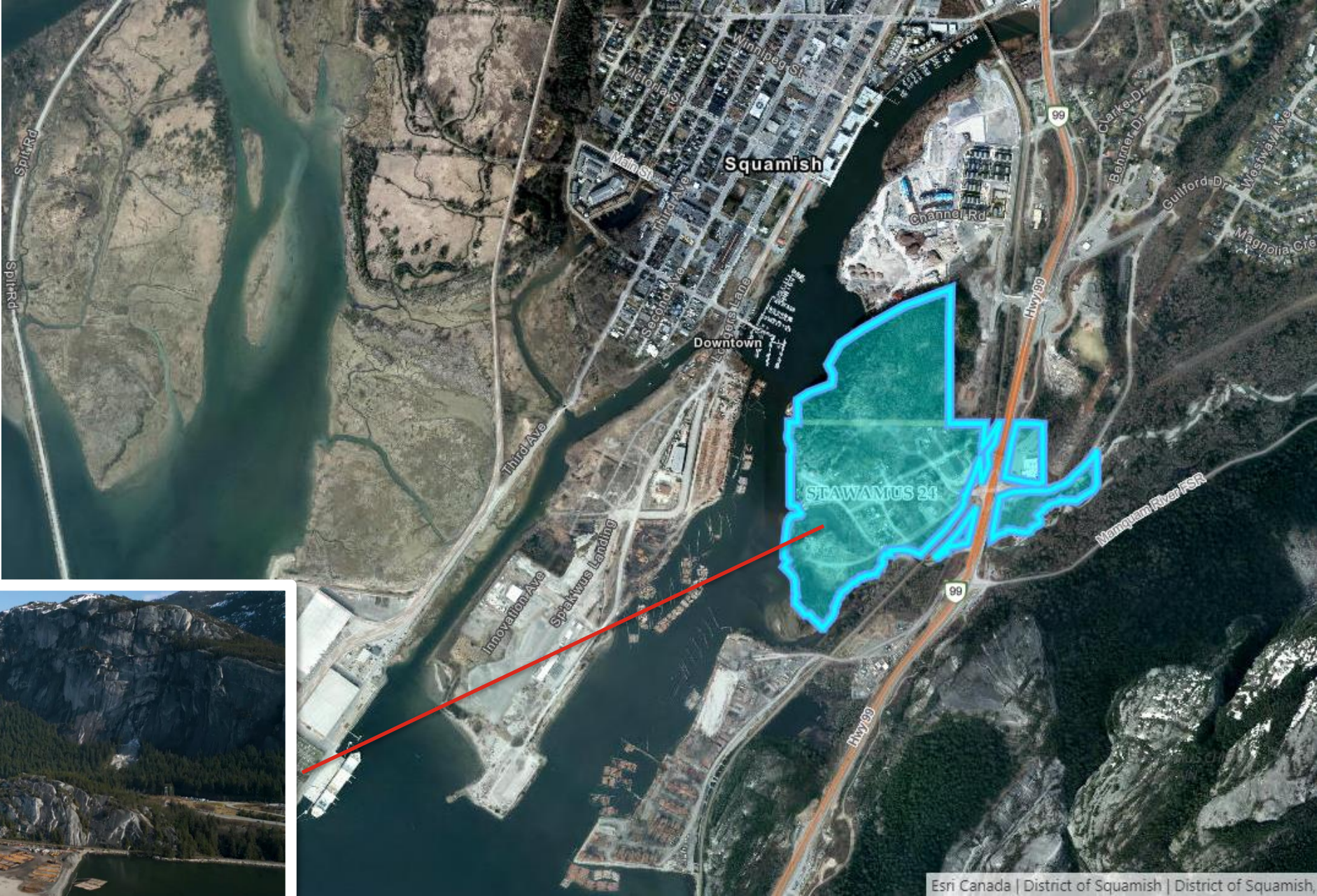


S7ulh Skwq7mesh nilh ti temixw ly ta sta7w wa nina7n cht yelgalhem. S7ulh lyá wa lh7na kwis cht ehút. Nilh wes tináswit ti syétsem lytsi kwekwín sels7icht.

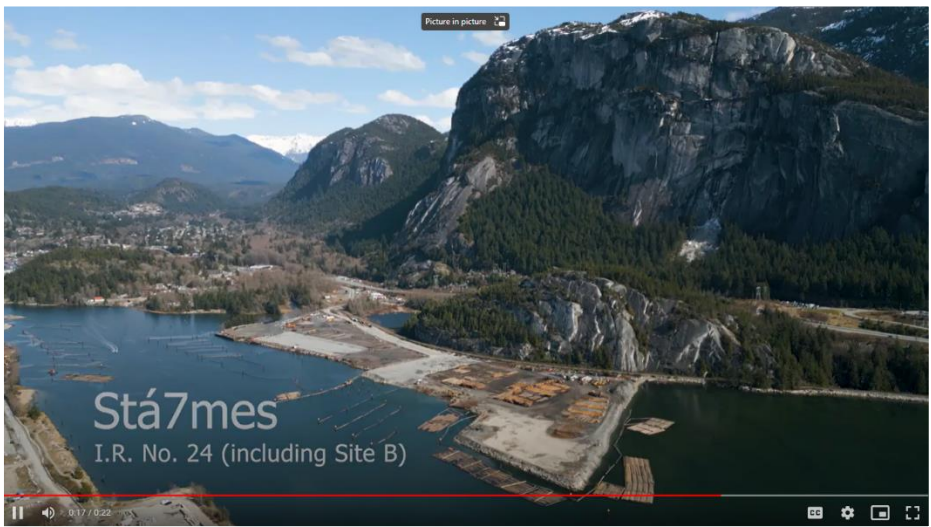
This land and water belong to the Squamish. We have our places we go to gather food. We have our places where we reside. That's the way the old people of long ago described this.

This map shows the territory where the Squamish People originate. Our ancestors, culture, language, and history are all part of this land. We have always practiced our inherent rights and respected our home.

Strategic Plan 2022-2026 v1.3



Esri Canada | District of Squamish | District of Squamish,



Project Stages + Key Tasks

1. **Project Scoping+ Engagement Planning** (Fall 2021)
2. **Data Gathering/Prelim Technical Review** (Spring-Fall '22)

Council Workshop April 2022; Intergov Engagement + Working Group Establishment

**Ongoing
Intergovernmental +
WG consultation
and community
engagement*

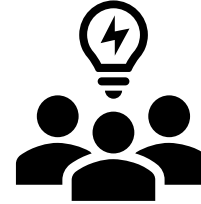
3. **Draft Strategy Development** (Winter 2023)
**Channel Maintenance/Dredge Options Development + Evaluation*
4. **Strategy Review + Refinement** (Spring/Summer 2023)

Council Workshop July 2023; broader community engagement

5. **Strategy Endorsement** (~~Year-End 2022~~ Fall 2023)



Working Group Engagement



- 17 members
- 3 hybrid group meetings held (October 2022- March 2023)
- + additional one on one meetings

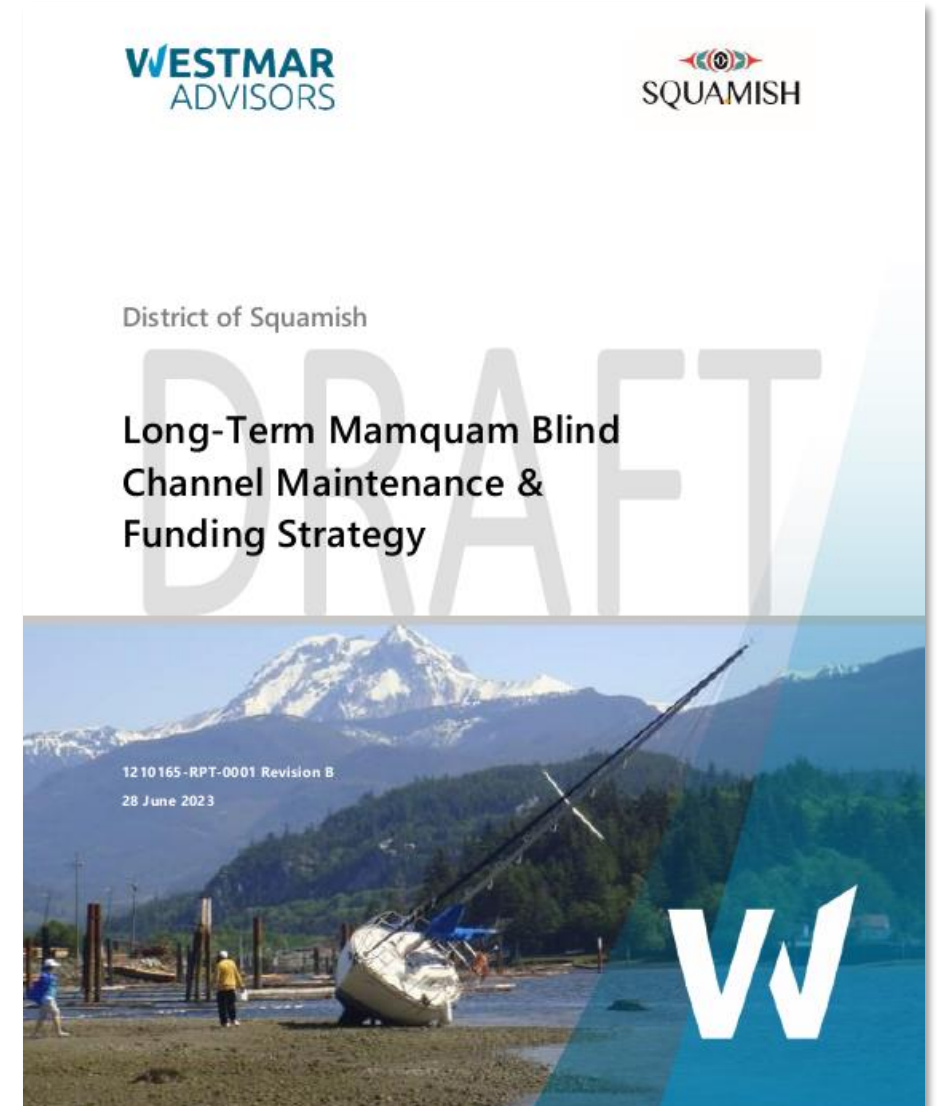


Table 1 – Working Group Meetings Summary

Meeting 1 (October 2022)	Meeting 2 (November 2022)	Meeting 3 (March 2023)
<p>Purpose:</p> <ul style="list-style-type: none">• Review scope, objectives and desired outcomes• Review and discuss baseline information about the channel, historic dredging, current bathymetry and observations, as well as to discuss regulatory requirements for maintenance activities	<p>Purpose:</p> <ul style="list-style-type: none">• Discuss Guiding Principles for maintenance activities• Preliminary Options Review (per Matrix shown in Section 8)	<p>Purpose:</p> <ul style="list-style-type: none">• Share inputs from Squamish Nation• Review additional sediment testing information and costing assumptions for the options review• Review and discuss funding tools and potential scenarios for future consideration

Discussion Draft Content

- Introduction, Reasons for Maintenance
- Objectives and Guiding Principles
- Engagement – Discussions, themes, and priorities
- Channel context – Importance to Squamish Nation, Ecological and Fluvial snapshot
- Historic channel maintenance; current channel uses and activities and maintenance needs
- Design parameters, channel maintenance means and methods
- Sediment characterization and permitting
- Beneficial reuse considerations and case studies
- Capital dredging options and costing
- Funding (municipal context, financial tools, case studies and future scenarios)



MBC Context – Marine Gateway



Figure 6 – Blind Channel dredging operations, March 1986 (Squamish Historical Society)

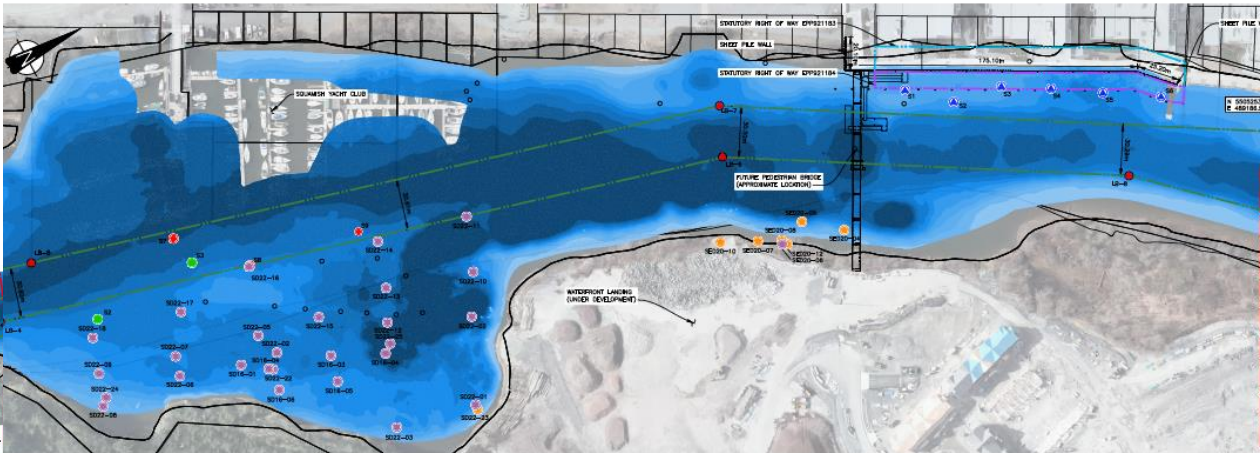
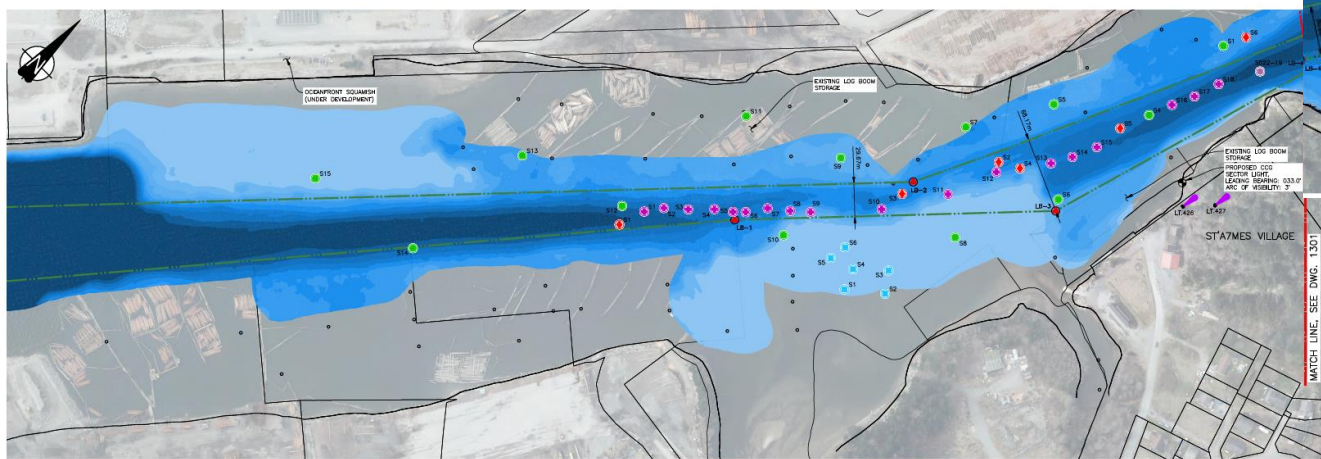
Figure 7 – Blind Channel dredging operations 2013 (Squamish Streamkeepers)

Draft Guiding Principles










- Acknowledge the **cultural and ecological importance of these lands and waters** and Skwxwú7mesh Úxwumixw's relationships with them.
- **Respect Skwxwú7mesh Úxwumixw rights & title and advance reconciliation.**
- **Progressively remediate, restore and enhance the environmental health** of the MBC (ecological and social foundation for all).
- **Preserve safe access for the community's marine gateway** and balance needs of diverse marine users in the MBC while respecting core needs and values of the Sta'7mes community.
- **Prioritize waterway safety** and channel maintenance for navigational purposes and minimize impacts.
- Adopt a long-term channel maintenance program that is **sustainable, practical and financially viable.**
- **Design for future needs, climate adaptation and marine opportunities.**
- **Ensure benefits and costs are shared** amongst the broadest group of beneficiaries. **Explore partnerships and cost-sharing opportunities wherever possible.**
- Look at secondary dredging (ie. private water lots) as a cost and responsibility for specific beneficiaries.



Channel Bathymetry (2020) and Design Depths



- Significant extents of the navigation channel do not meet standard depth and width for 2-way small boat traffic in protected waterway

ELEVATIONS TABLE		
COLOUR	MINIMUM ELEVATION	MAXIMUM ELEVATION
	—	−3.50m
	−3.50m	−3.00m
	−3.00m	−2.50m
	−2.50m	−2.00m
	−2.00m	−1.50m
	−1.50m	−1.00m
	−1.00m	−0.50m
	−0.50m	0.00m
	0.00m	0.50m
	0.50m	—



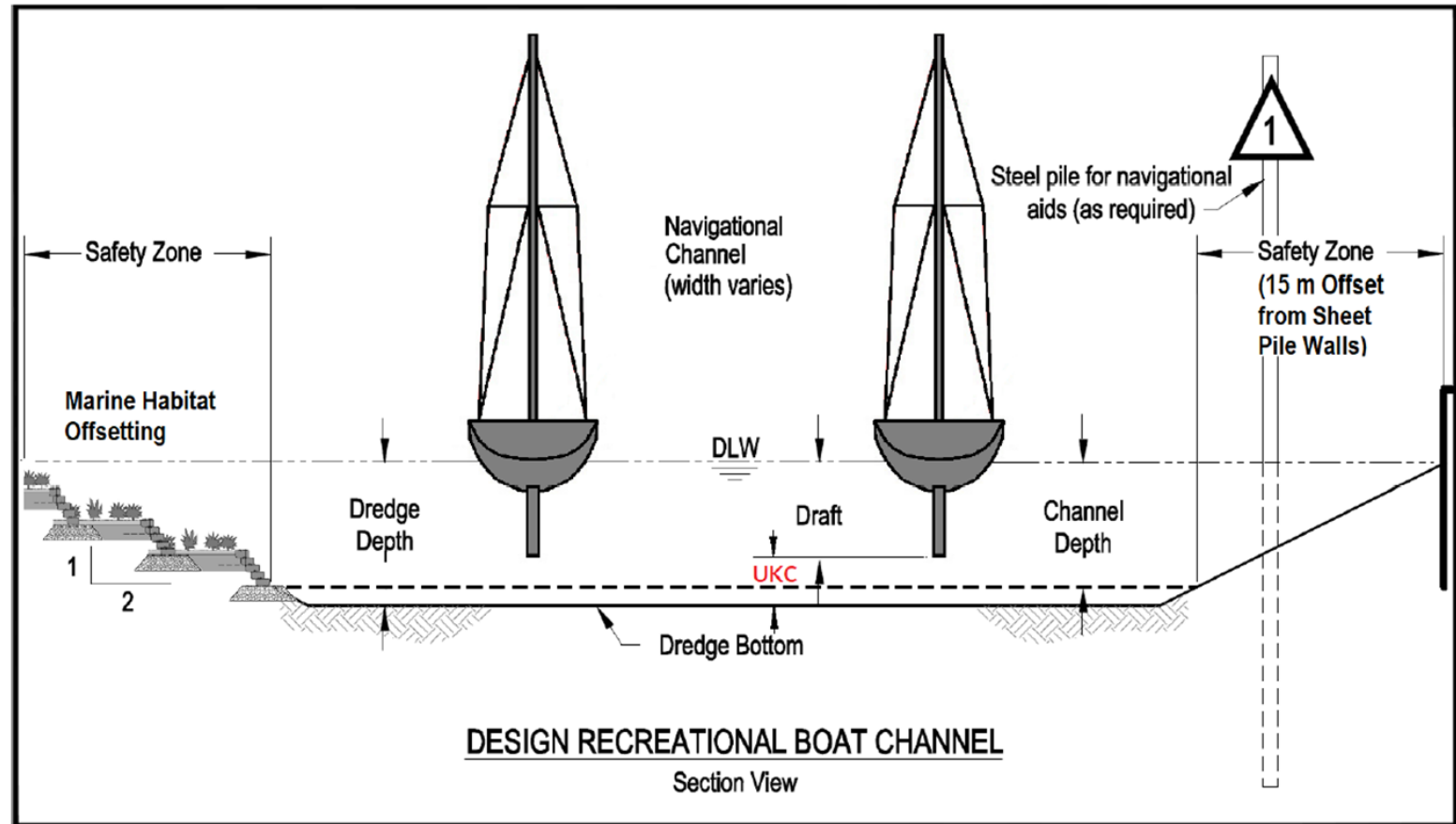
Note: Bar extending over chan



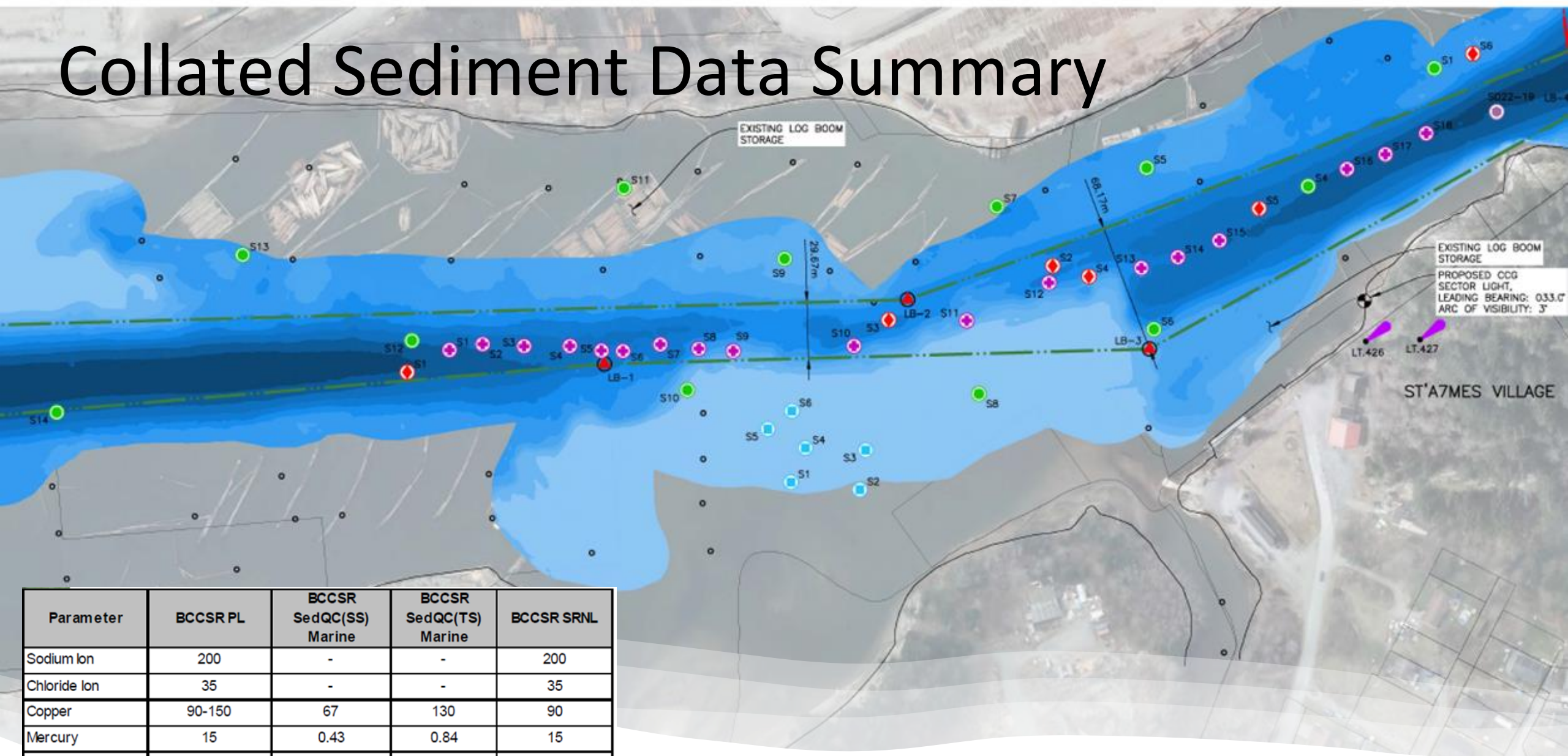
Channel Design Considerations

- Reviewed design vessels, Under Keel Clearance (UKC) and % of vessels that can pass at various water levels
- Recommended design depth of - 2.6 CD (Chart Datum) allows most recreational and industrial vessels to navigate at average low water level

➡ 68,000m³ dredge volume



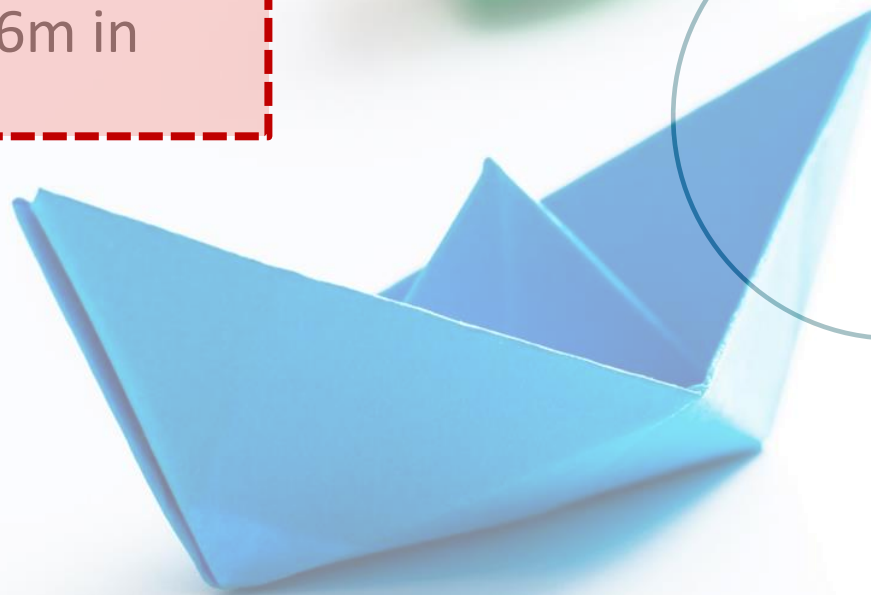
Collated Sediment Data Summary



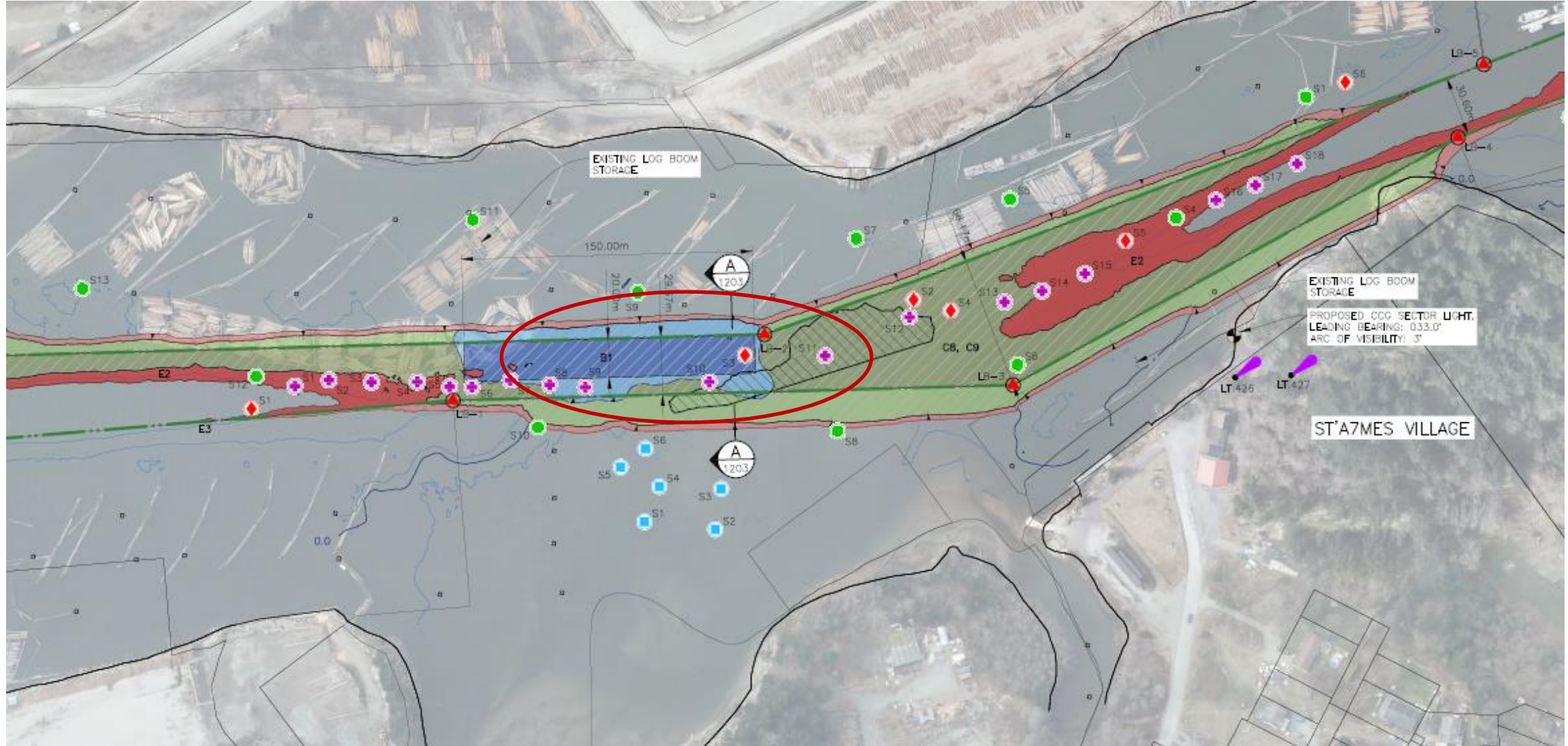
Parameter	BCCSR PL	BCCSR SedQC(SS) Marine	BCCSR SedQC(TS) Marine	BCCSR SRNL
Sodium Ion	200	-	-	200
Chloride Ion	35	-	-	35
Copper	90-150	67	130	90
Mercury	15	0.43	0.84	15
Acenaphthene	-	0.055	0.11	-
Anthracene	-	0.15	0.29	-
Fluoranthene	-	0.93	1.8	-
Fluorene	-	0.089	0.17	-

Preliminary Options Matrix

- A. Do Nothing (Status Quo)
- B. Another 'Stop Gap' (@Sta'7mes River)
- C. Focused Dredging in South Channel -2.6m CD and -1.6m in North Channel
- D. Dredge All to -2.6m CD
- E. Dredge All to -3.2m CD



Option B – Stop Gap @ Sta'7mes River



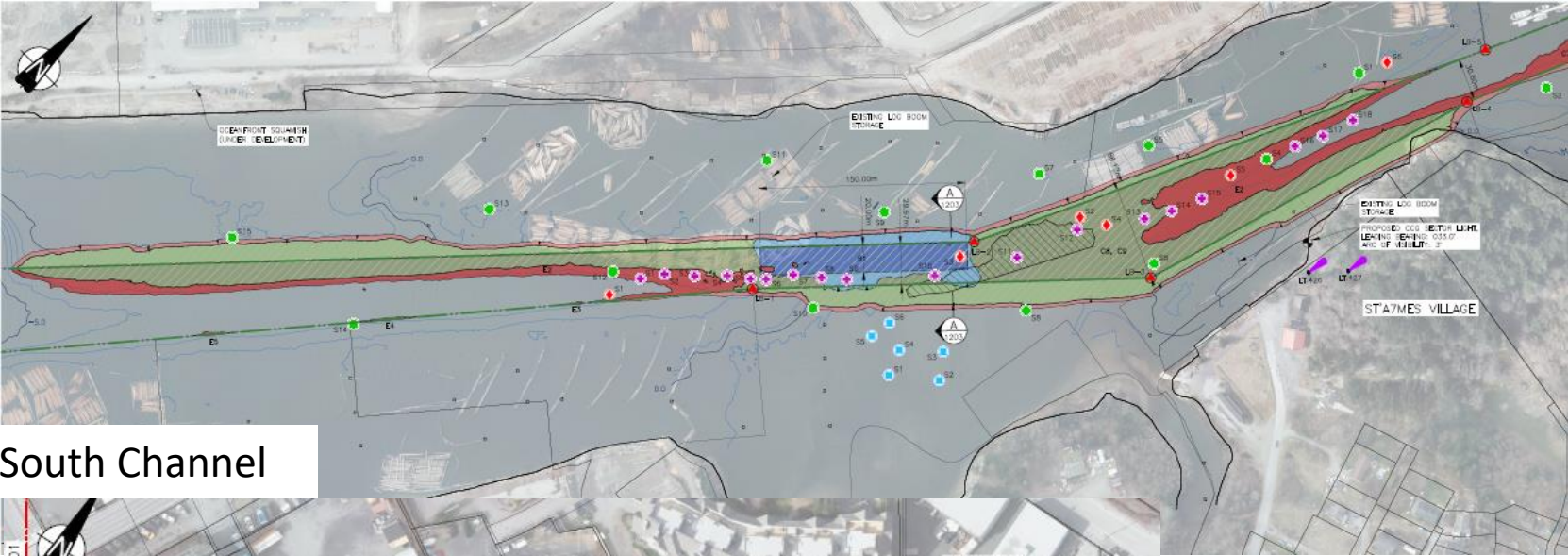
Option B – Stop Gap @ Sta'7mes River

What and Where?

Dredge functional navigation channel (~10m width) at mouth of Stawamus to -2.6m.
Similar to work completed in 2013.

Volume (m3)	Estimated Cost \$ M	Benefiting Areas/Uses/Users (existing + future)	Opportunity Costs (Foregone Benefits)	Impacts and Risks
5,000m ³	\$650,000	<ul style="list-style-type: none">• All existing MBC uses/users• Shorter-term benefit (stop gap)	<ul style="list-style-type: none">• Reduced capacity of MBC due to width restrictions• Reduced marine access/navigation window for MBC users upstream of future pedestrian bridge• Reduced economic/development potential in the upper MBC	<ul style="list-style-type: none">• Potential for accidents due to reduced width with smaller dredge project

Option C – Focused Dredge



 OPTION C

Option C – Focused Dredge

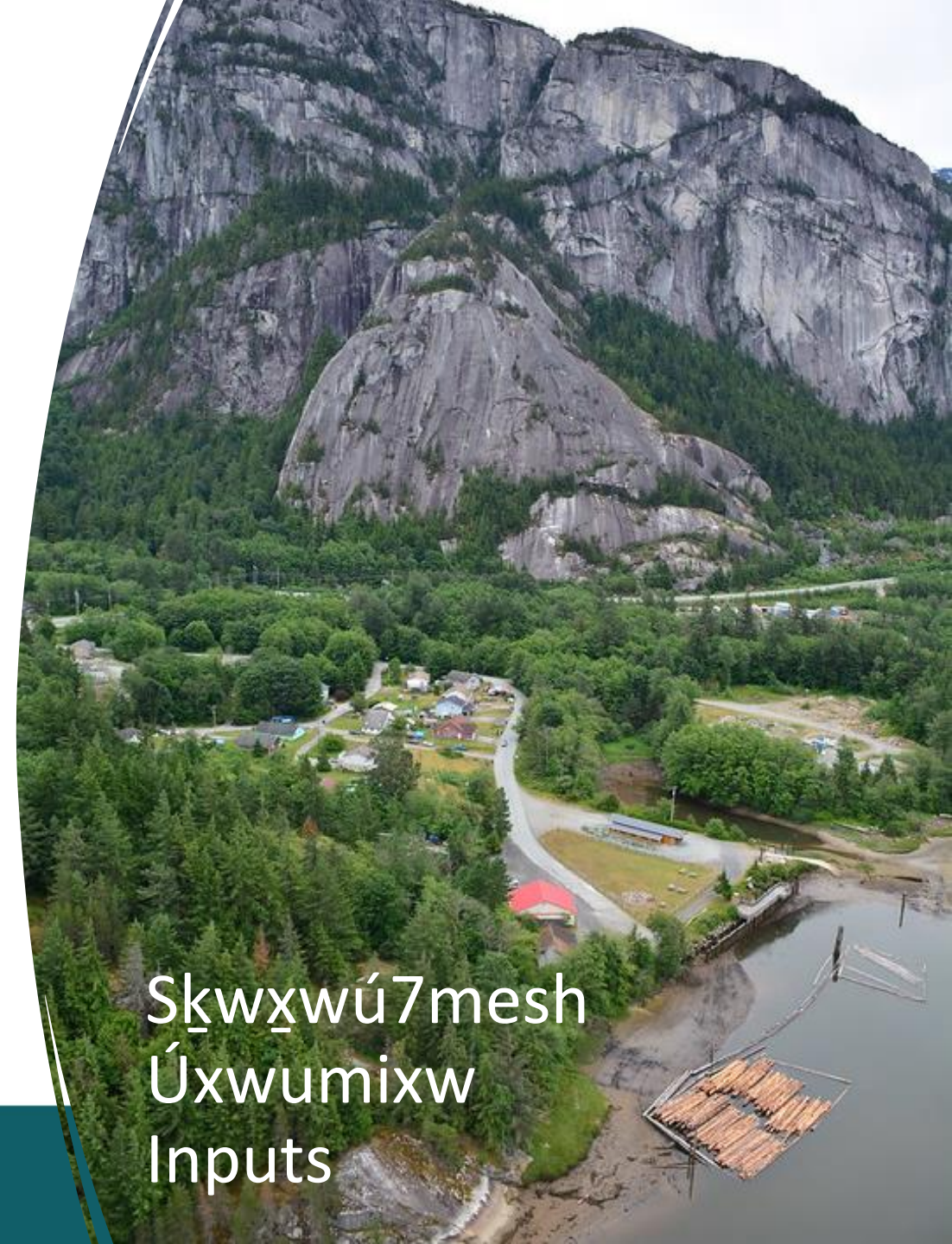
What and Where?

Dredge full Navigation Channel width to -2.6m CD south of pedestrian bridge, -1.6m north of pedestrian bridge.

Volume (m3)	Estimated Cost \$ M	Benefiting Areas/Uses/Users (existing + future)	Opportunity Costs (Foregone Benefits)	Impacts and Risks
~55,000m ³	\$3,500,000	<ul style="list-style-type: none">Existing and future marinas south of future pedestrian BridgePublic recreational usersMarine Industrial (refit + repair, shipping /barging, forestry/Log handling)	<ul style="list-style-type: none">Reduced marine access/navigation window for MBC users upstream of future pedestrian bridgeReduced economic/development potential in the upper MBC	<ul style="list-style-type: none">Navigational safety risks; potential for more incidents requiring emergency response and reduced emergency access/egress.

Inputs from Sk̓wx̓wú7mesh Úxwumixw

- Importance and protection of Sk̓wx̓wú7mesh lands and waters, Sta7mes community and rights and title
- Option C viewed as ‘middle ground’ balancing environmental needs with other considerations
- Encourages beneficial reuse of uncontaminated dredge material rather than disposal at sea
- Habitat enhancement focus and Stawamus estuary restoration – opportunity to keep materials close; also general fill potential for various sites to be evaluated
- Archeological assessment prior to any works on shorelines and mitigations to reduce turbidity (silt curtains), avoiding impacts to fisheries and eelgrass recommended
- ACE monitoring (SN archeology, culture and environment)



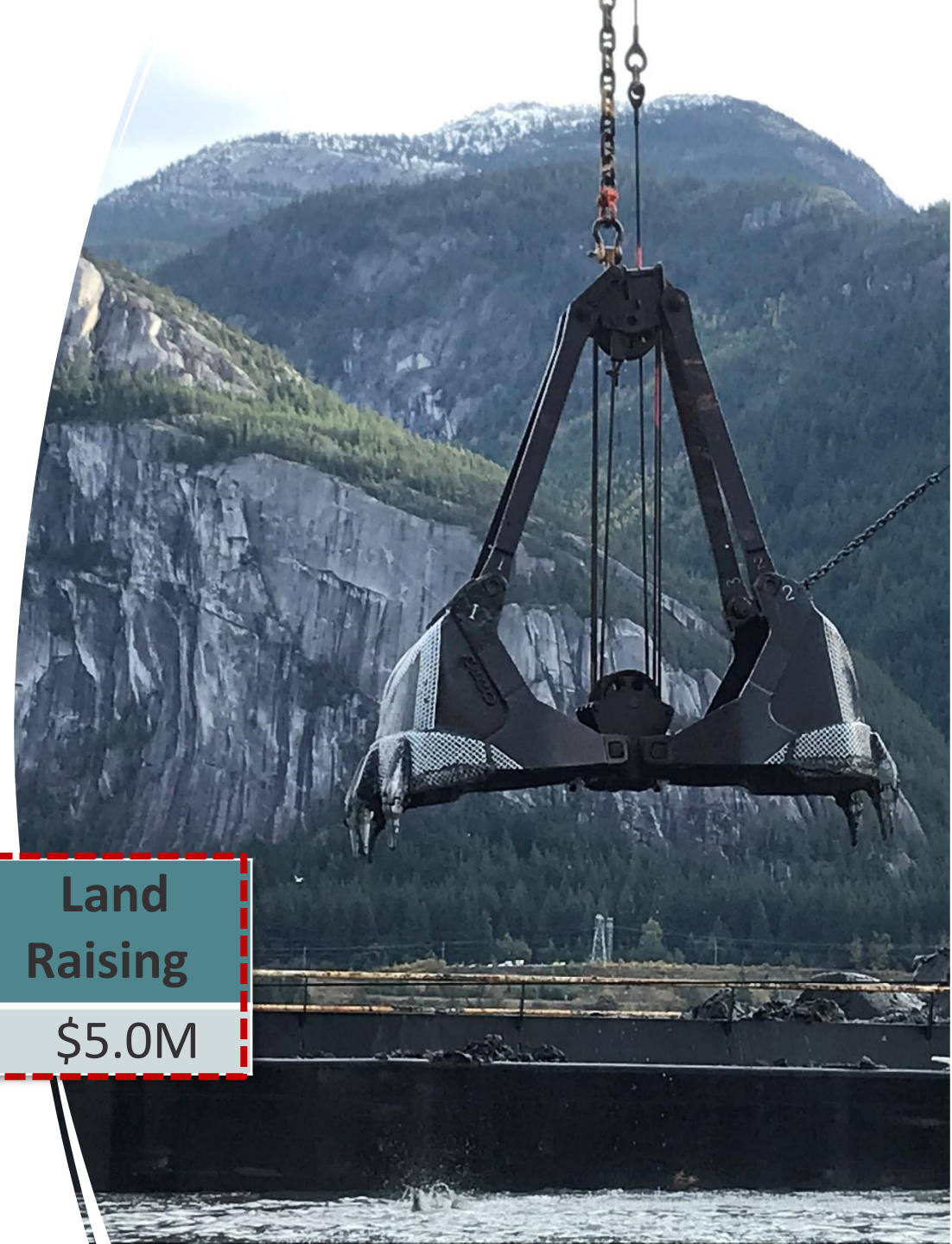
Sk̓wx̓wú7mesh
Úxwumixw
Inputs

Costing Assumptions

- Costing includes engineering design + contingency for permitting etc.
- Volume splits of contaminated/ uncontaminated soils based on available historic test data
- Allowances for habitat offsetting to be confirmed with environmental regulators
- One mob/demobilization assumed
- Unit cost of dredging reduces with increased dredge depth (less barge repositions)
- Upland disposal costs for contaminated dredge can vary widely, based on disposal location and trucking routes

Disposal at Sea	Habitat Enhancement	Land Creation	Land Raising
\$3.5M	\$4.4M	\$8.7M	\$5.0M

- Additional maintenance dredging

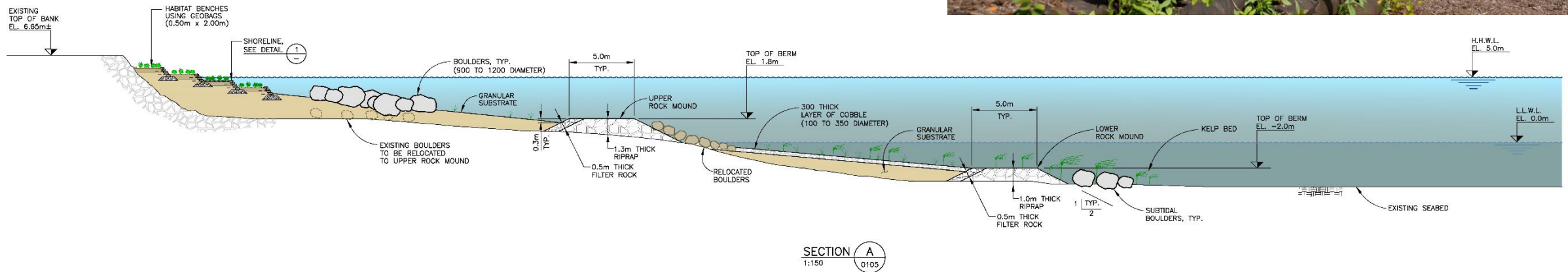


Disposal Options and Beneficial Reuse Examples

- Habitat restoration
- Land reclamation
- Construction and landscaping
- Coastal nourishment
- Site remediation



Figure 13 – Beach Nourishment in Victoria (<https://www.archipelago.ca/halting-erosion-and-monitoring-habitat-restoration-along-victorias-ross-bay-seawall>).



Funding Options (Tools)

- Local Service Area (specific properties with nav channel users that benefit from maintenance)
- User Fees and Charges
- Voluntary contributions
- Partnerships and pursuing Federal/Provincial Grants
- Annual Budget Allocation (maintenance dredging only)

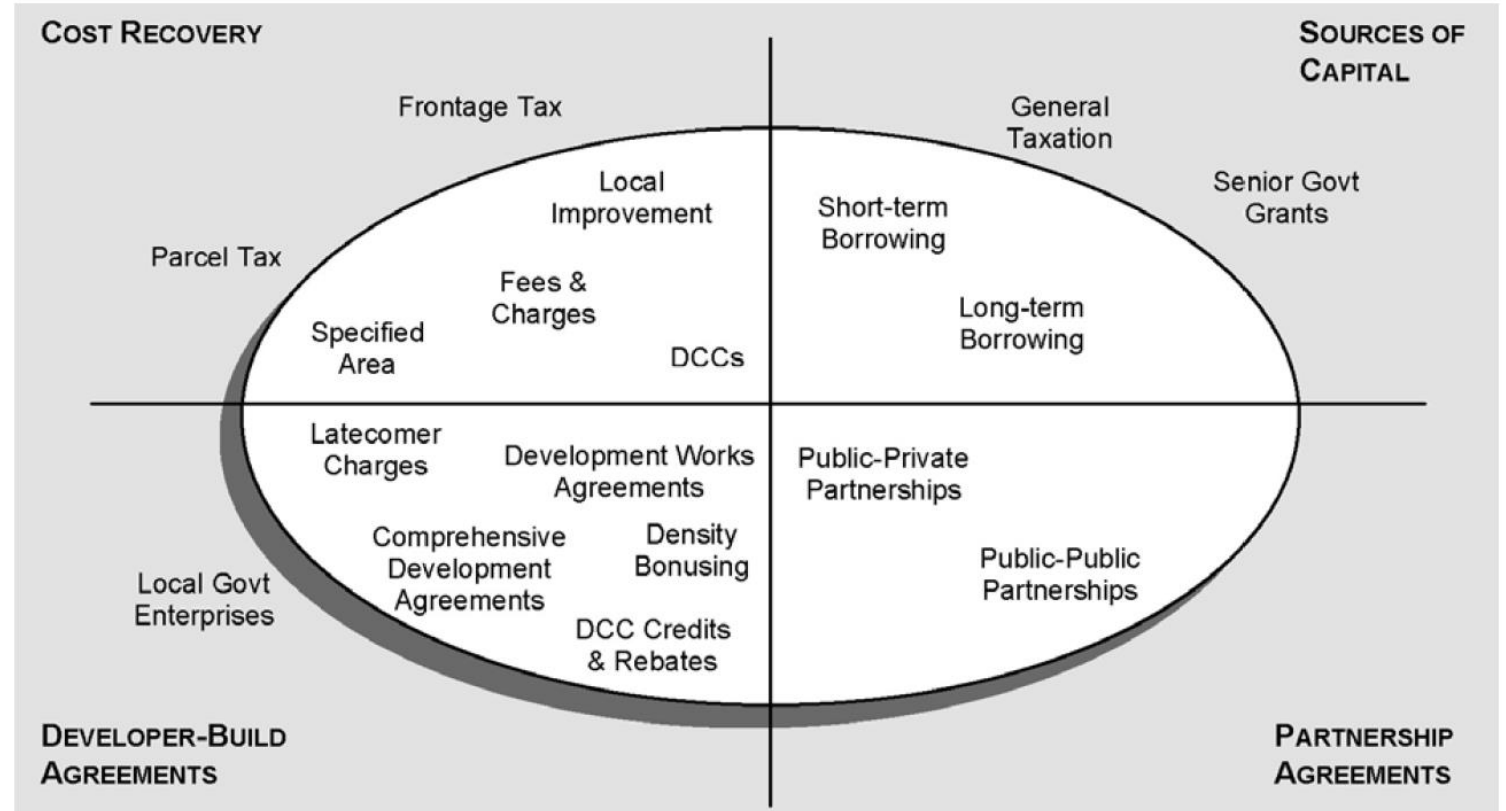
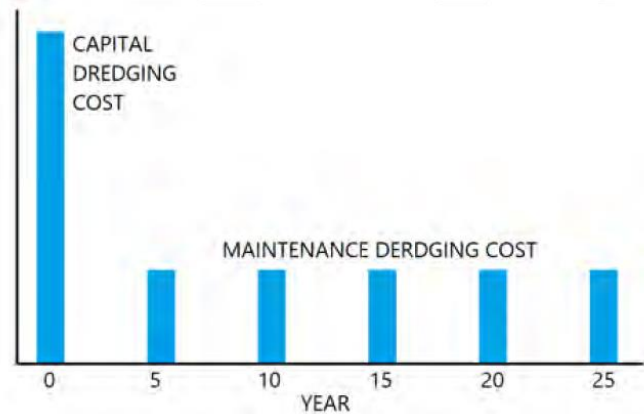


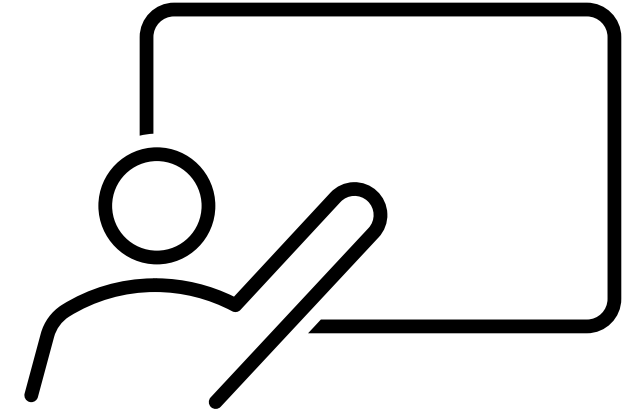
Figure 1 – Potential funding options¹

Future Funding Scenarios for Examination

	STOP GAP DREDGE OPTION	FOCUSED DREDGE OPTION
GRANT FUNDING?	TBD	TBD
LOCAL AREA SERVICE (BYLAW)	0-100 %	0-100 %
GENERAL TAXATION	0-100 %	0-100 %
OTHER FUNDING SOURCES (user fees, voluntary etc...)	?	?

Public Engagement + Next Steps

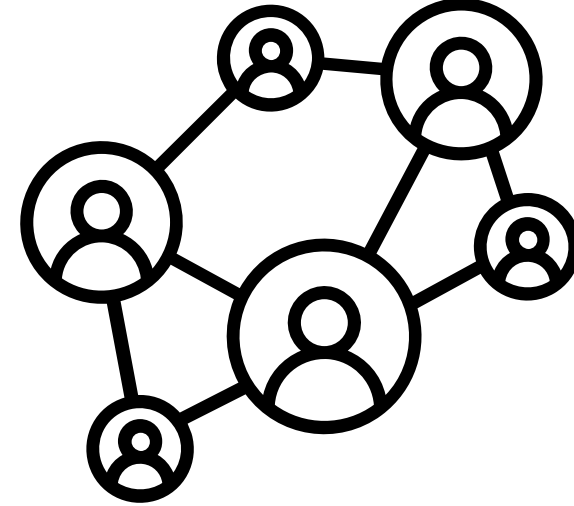
- Broader public input gathering Late Summer 2023
 - Additional marine stakeholder outreach
 - Poster series for project website (August)
 - Public Survey + Drop-in Info sessions (Aug/September)
 - Intergovernmental follow-up sessions
- Report back to Council Fall 2023 (Endorsement)



Discussion, Council Direction

July 25, 2023 Recommendations

- **THAT** the District of Squamish receive the Mamquam Blind Channel Maintenance and Funding Strategy Discussion Draft document and provide feedback on the draft principles, options and funding considerations presented in the July 25, 2023 Staff Report, as follows:
 - ;
- **AND THAT** the District of Squamish direct Staff to solicit comment from the community on the Discussion Draft prior to bringing the strategy back to Council for further discussion.



Thank you

