

Xwu'Nekw Sea Dike and Park Development Project



THIS BEAUTIFUL DAY

Preliminary Concepts for Community Review -- June 2020

Outline

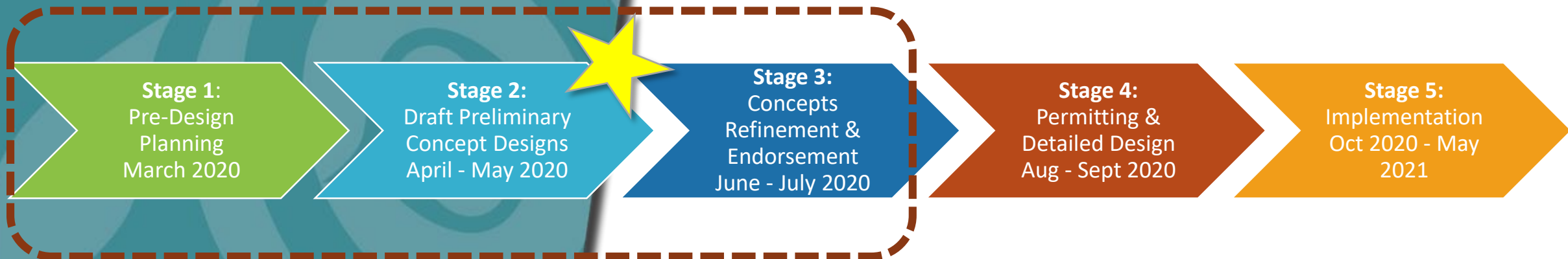
- Introduction to the Project + Team
- Objectives + Scope
- Project Background
- Preliminary Draft Concepts/Designs
- Habitat Enhancement Opportunities

Project Purpose + Stages

GOAL: To design and build Xwu'nekw Park and Sea Dike and interim park improvements, including recreational water access.



- Interdisciplinary design team
- Engagement Objective: To seek feedback from marine and park recreation interests, environment stakeholders, the general public, and governments including the Squamish Nation, Province of BC and Federal agencies



Objectives + Scope

- To seek input on the marine and park physical design and water access concept options which includes:
 - **Coastal protection** structural features / components (sheet pile wall) addressing coastal protection and recreational water access
 - **Marine habitat enhancement:** underwater / intertidal habitat enhancement concepts for key marine species that live/use this area.
 - **Public park realm/landscape** integration: top dressing /upland park and recreational water access components.



Aerial Photo - 1999

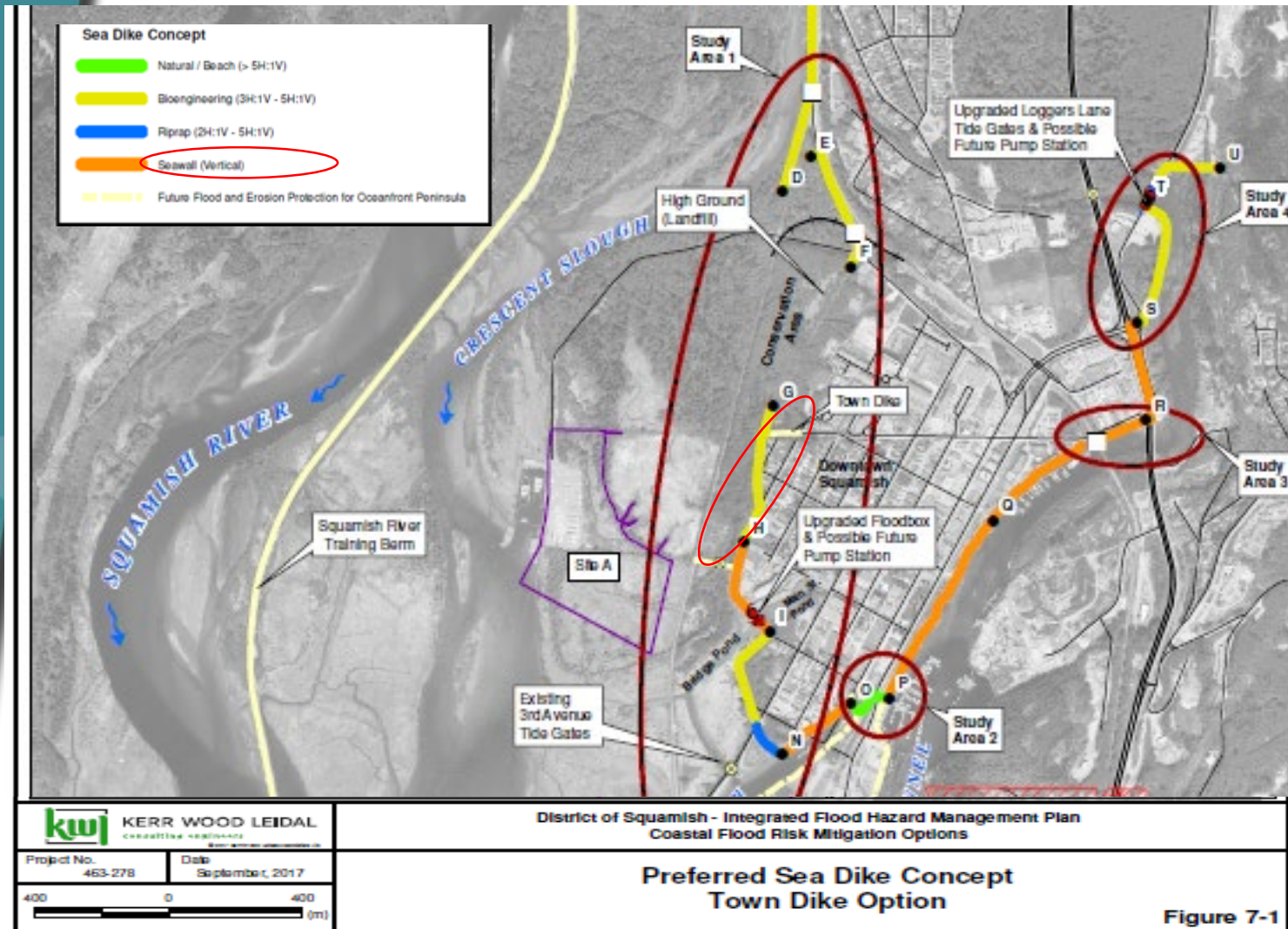
Background - Xwu'nekw Park

- **Pre-western settlement** – MBC was former mouth of Mamquam River until 1921 flood. Shores of MBC known by Squamish Nation as Xwu'nekw (whoo-nay-oak) meaning “where large war canoes are beached”.
- **1890 - The first steamer dock**, hotel and trading post – Mashiter's Landing – built on the shoreline immediately north of Xwu'nekw Park
- **1913 – PGE Railway** established shops, offices and railway station which remained for several decades. Area also used as railway log dumping site.
- **1974-1999 – Royal Hudson steam train** terminal station
- **District** acquired land in ~2014
- **Canoe Shelter, Squamish Paddling Club Storage and slack lines**
- **Land zoned as P-3** (Park Recreational and Institutional Use)

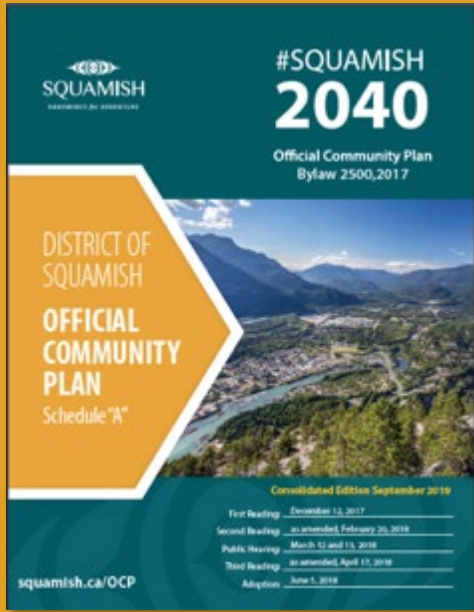
Background

- **IFHMP** completed in 2017 following a 3 year process
- IFHMP included **Coastal Flood Protection Strategy** including conceptual sea dike design (type, alignment)
- Concept design indicated **sheet pile** along foreshore for the west side of MBC
- **Different dike types** are proposed in different areas based on site characteristics

Flood Management



Background - Policy



OCP – Environment / DPA1

- Infill of marine areas discouraged.
- Dikes should follow HWM to maintain marine channel area wherever possible.
- Restore +enhance ecological features and functions of coastal and near shore areas.
- Apply 'Green Shores' principles for dike planning/design wherever possible.
- Development Permit Area 1 – Public Works projects exempt but should be considered

OCP/IFHMP - Coastal Flood Hazards

- Upgrade existing sea dikes in accordance with IFHMP
- Plan for 1m SLR by year 2100, 2m by year 2200

Background

Existing Conditions

- **Existing shoreline** = decaying timber crib walls, substandard riprap and vegetated / eroding shoreline
- **South boundary** continuation of similar shoreline
- **North boundary** abuts Sirocco sheet pile wall (4.7m elevation, ~8m from ex. shoreline)

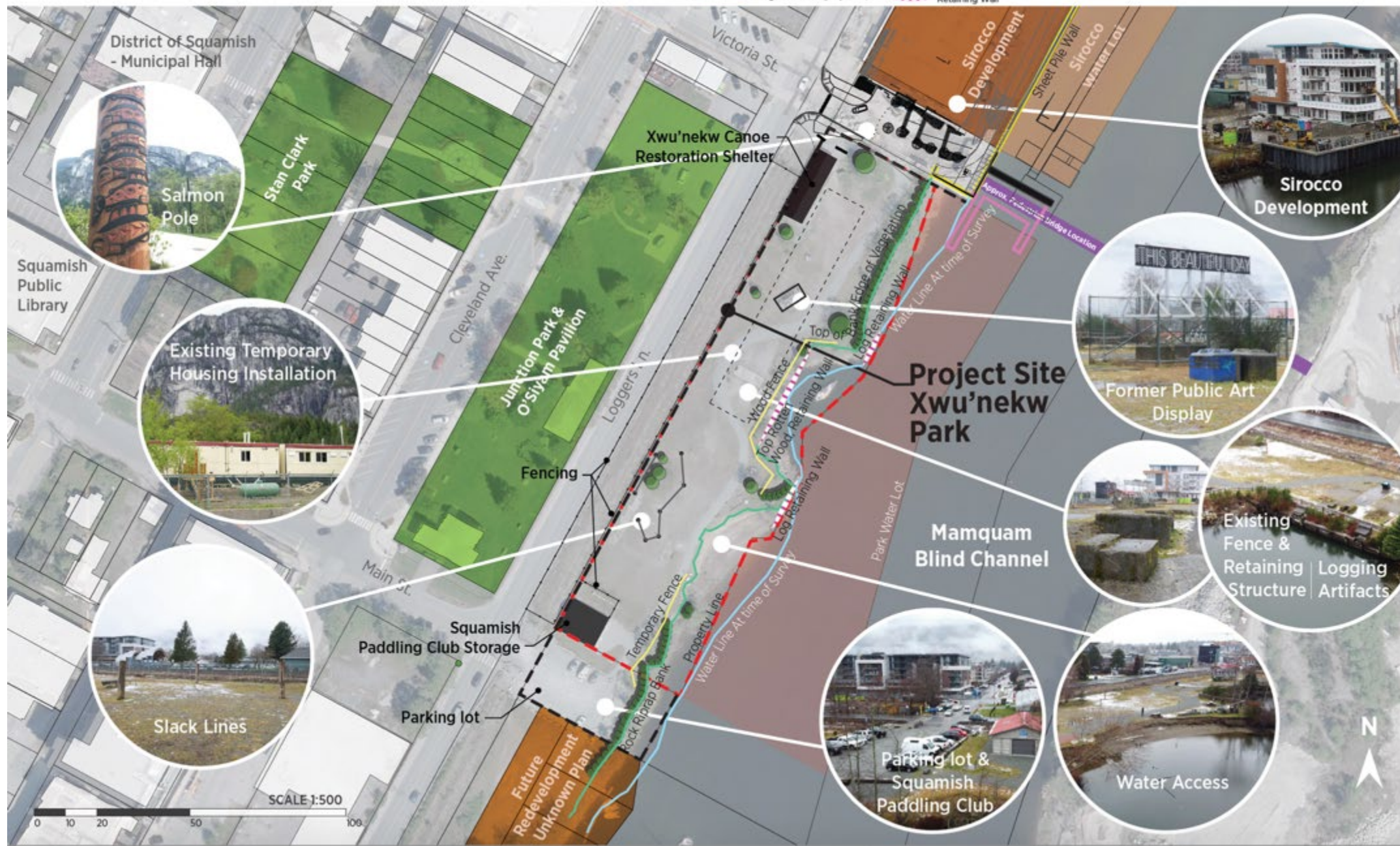


Existing shoreline

Existing Conditions & Features

LEGEND

- Project Site
- New Development Sites
- Existing Park
- Sheet Pile Wall
- Approx. Pedestrian Bridge Location (proposed)
- Proposed Ramp
- Design Area
- Water Line
- Existing Fence on Site
- Top of Bank/Edge of
- Retaining Wall



Xwu'nekw Park
Existing Topography

LEGEND

- Project Site
- New Development Sites
- Existing Park
- Sheet Pile Wall
- Top of Bank
- Retaining Wall

LEGEND
ELEVATION (m)

min max		min max		min max	
-6	-5	-2	-1	2	3
-5	-4	-1	0	3	4
-4	-3	0	1	4	5
-3	-2	1	2	5	6



Ongoing/Future Plans

- **Pedestrian bridge** proposed to land on sea dike at Victoria St. end
- **Sirocco (North)**
 - Float homes + commercial on water lot, accessed by ramps and dock at Victoria St. end
 - Need to coordinate ped bridge & Sirocco ramps/dock. Possible to locate docks/ramp on Xwu'nekw Park water lot
- **Upland Development + SYC (South)**
 - Unknown plans; designated for mixed use waterfront development
 - Sheet pile required to be built during development
- **Potential Xwu'nekw future uses**
 - Future District/Community Facilities
 - Continued use as Park



Ongoing/Future Plans

- Xwu nekw Park site is connected to larger public space plan for Downtown

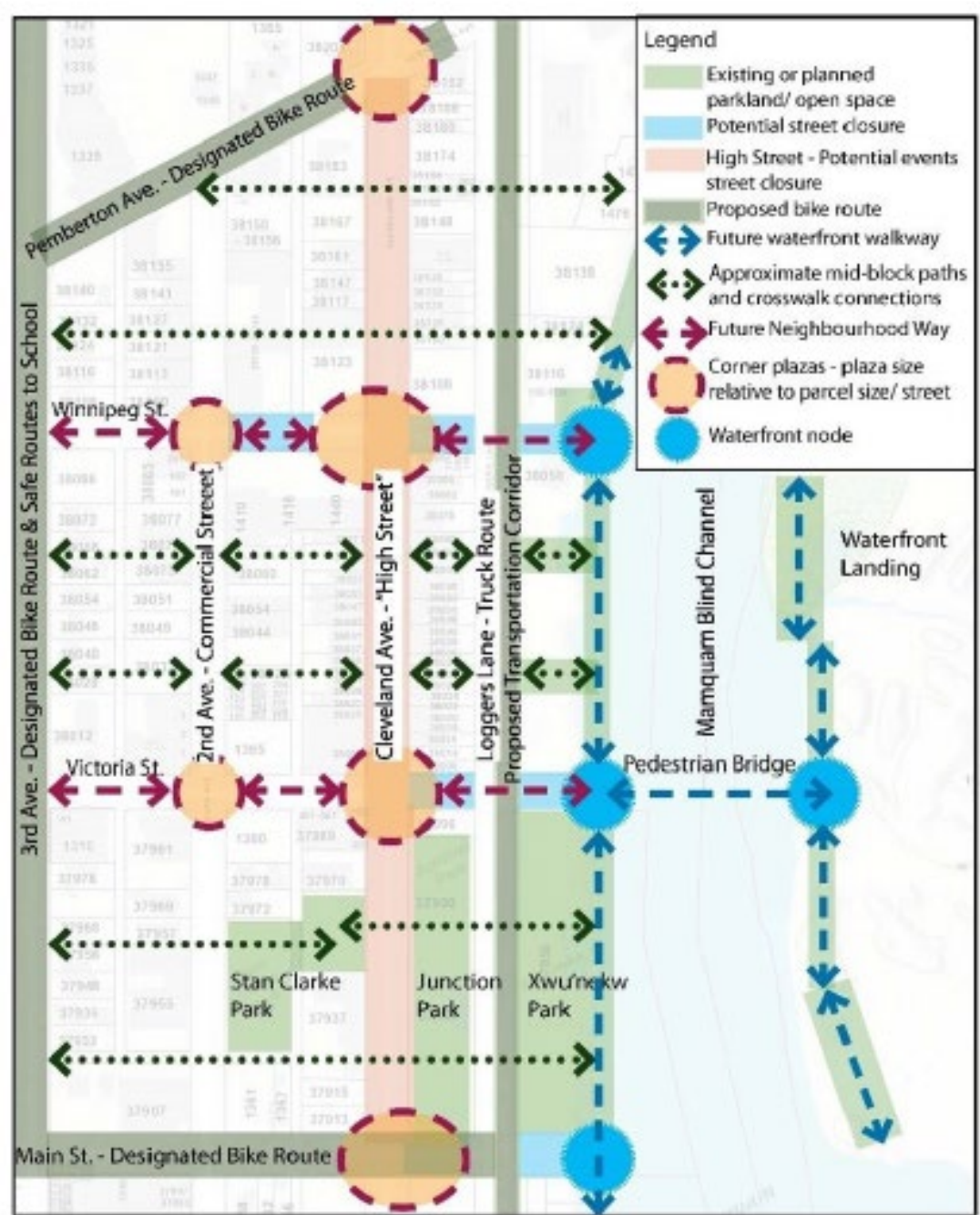


Figure 38-1. Downtown Open Spaces Plan



Council Motion

- THAT the District of Squamish proceed with detailed design and implementation items for the Xwu'nekw Park Sea Dike utilizing Option 1: Sheet Pile at High Water Mark as described in the report from Community Planning & Infrastructure dated November 12, 2019.

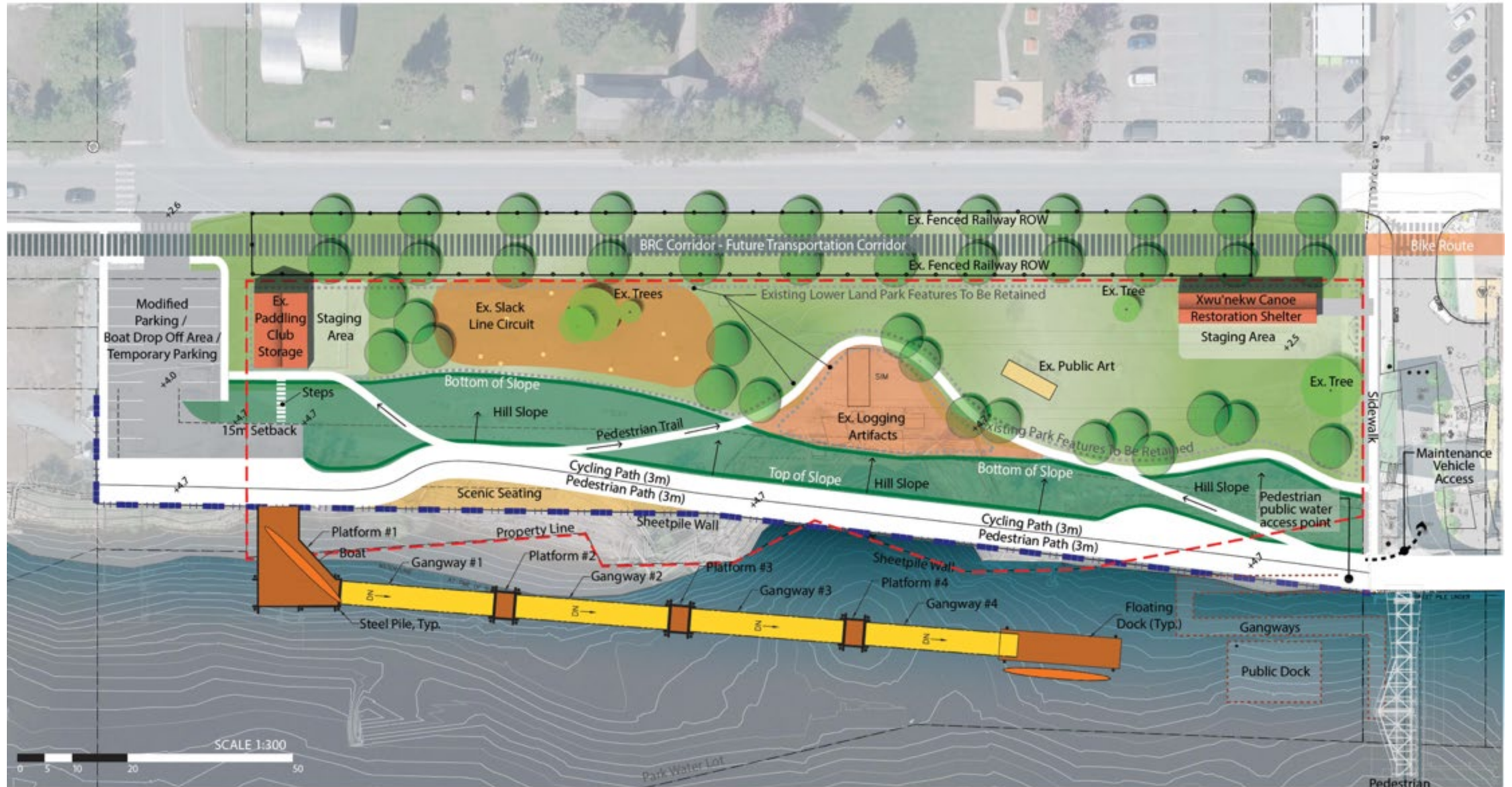
Sheet Pile Wall - Option 1

Proposed - Initial Build

LEGEND

- Park Property Line
- Fence - Railway right of way
- Existing Condition
- Sheet Pile Wall (SNC Option 1)
- Top & Bottom of Slope

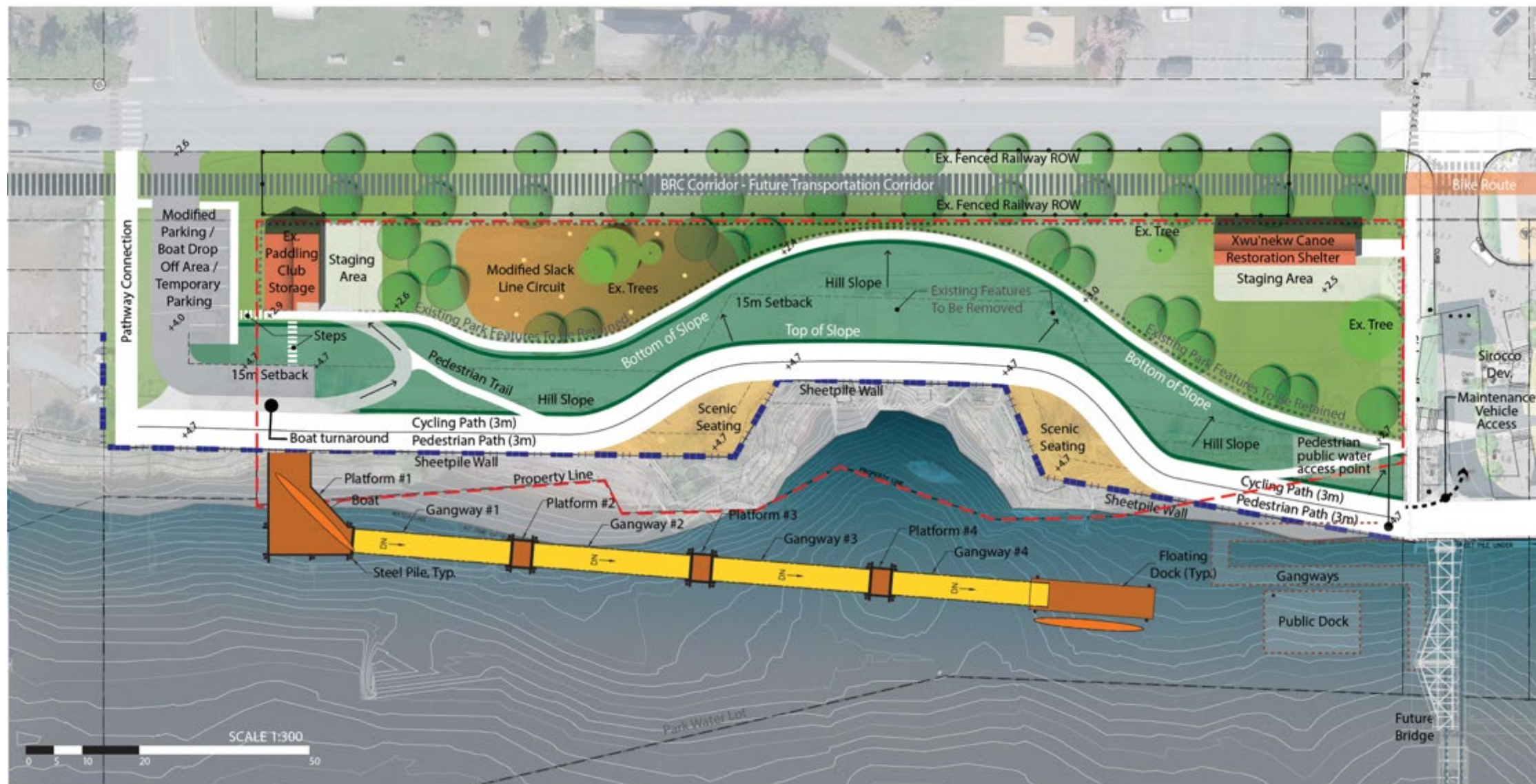
- Ex. Existing feature
- Proposed Tree
- Existing Tree



Proposed - Initial Build

 Park Property Line
 Fence - Railway right of way
 Existing Condition
 Sheet Pile Wall (SNC Option 2)
 Top & Bottom of Slope

Ex. Existing feature
Proposed Tree
Existing Tree



Sheet Pile Wall - Sheet Pile Option 1 & Option 2

Precedent Images - Potential Future Park Elements

Public Open Space /
Student Gathering



Modified Slack
Line Course



Scenic Seating



Multi-use Path



Lookout / Hillside



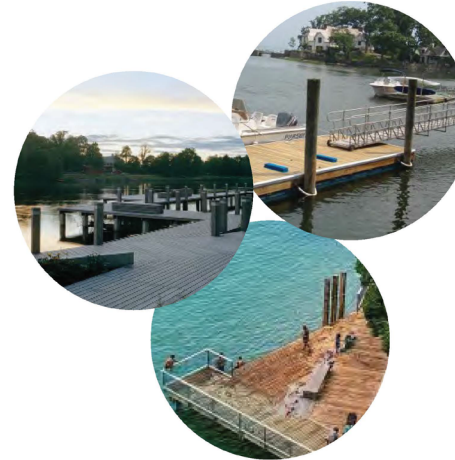
Playground Integrated
with Slope



Pedestrian Trail



Gangway / Water Access



Picnic Shelter



Water Access

Overall aim to integrate water access with ramps and dock for public and recreational water use.



Boat Type	Length	Paddle Ready width
6 person outrigger canoe (OC6)	45ft	9ft
4 person outrigger canoe (OC4)	23ft	7ft 6"
2 person outrigger canoe (OC2)	23ft	3ft 6"
1 person outrigger canoe (OC1)	21ft	3ft 6"
Double Surfski	25ft	23"
Single Surfski	21ft	21"
Double Sea Kayak	22ft	32"
Single Sea Kayak	18ft	22"
10ft coach boat on hand dolly	10ft	5ft
K4	36ft	20"
K2	21ft	16"
K1	17ft	16"
C4	30ft	16"
C2	21ft	16"
C1	17ft	16"

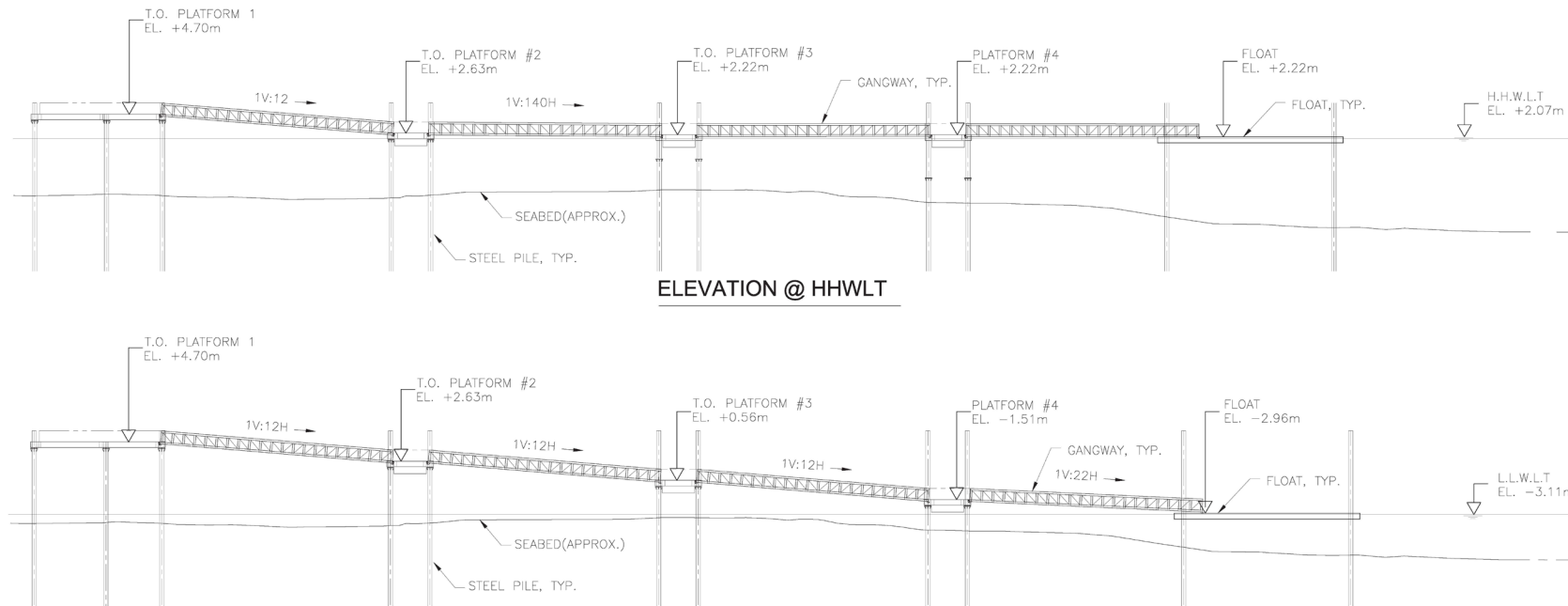


Considerations

- Design watercraft: non-motorized hand-launched canoes, kayaks, surf-ski, paddle boards, dragon boats, OCs etc
- Watercraft specifications (length, width, weight and 'turning radius' for hand carrying)
- Comfortable distances for hand carrying to launch points (<50m ideal)
- Accessibility for safely entering or exiting the water (all-ages)
- Max Grade (ramps): 15:1 ideal, building code is 12:1
 - Long straight over series of platforms or turns
- Preferred design/structures for water entry (ramps, platforms, low steps) and materials
 - Wide low profile float, 125-150mm freeboard
 - 4 metre width min desired
 - Non-abrasive surfaces

Sheet Pile Wall

South Water Access Elevations





Xwu newk Park Sea Dike

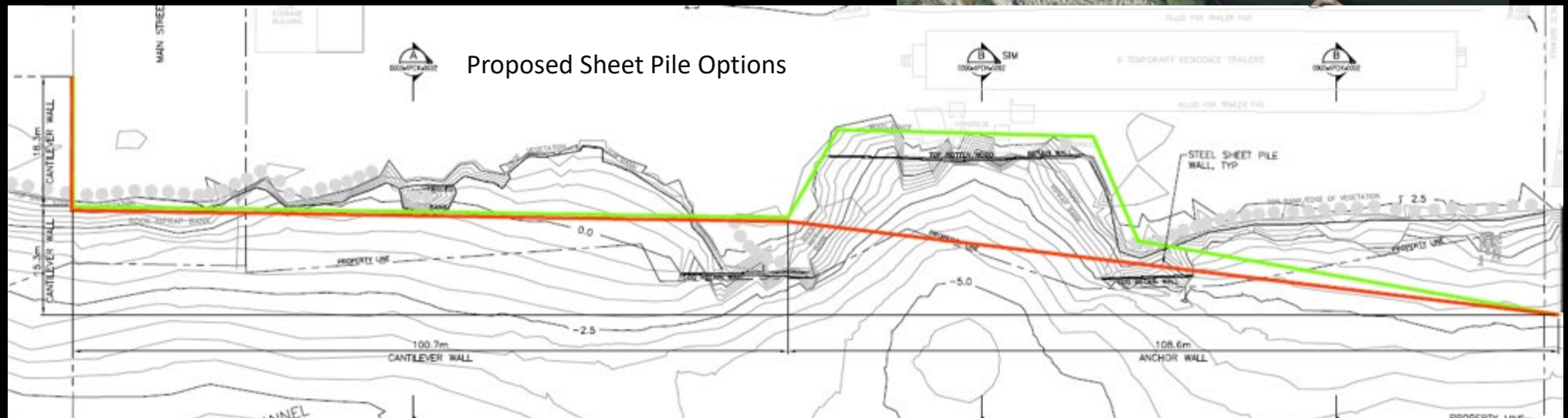
Sheet Pile Wall – Local Conditions

Two Options for Sheet Pile Wall Alignment
Inset (Green) and Linear (Red)

Previous project at Sirocco resulted in ~ 2853 m² of habitat loss and required local offsetting with reef balls and intertidal planting

Inset design (Green) will incur habitat loss ~ 890m²
Linear design (Red) will incur habitat loss ~ 1103 m²

Existing Conditions



Habitat Offsetting Opportunities

SEAWALL ENHANCEMENTS

- Installation textured seawall face wall panels (Costly)
- Habitat Skirts (Costly)
- Incorporate benches and steps along seawall face, and water-retaining pool at low tide mark
- Incorporate niches that provide cavities and pools that retain water at low tide
- Incorporate rubble mound and reef balls toe at the foot of the proposed seawall





Xwu newk Park Sea Dike

Habitat Offsetting Opportunities

HABITAT SHELVES

Habitat shelves result in habitation of mussels and algae, which provide refuge and food for marine invertebrates

Likely cost prohibitive for Xwu newk Park Sea Dike project

e.g. Vancouver Convention Centre





Xwunewk Park Sea Dike

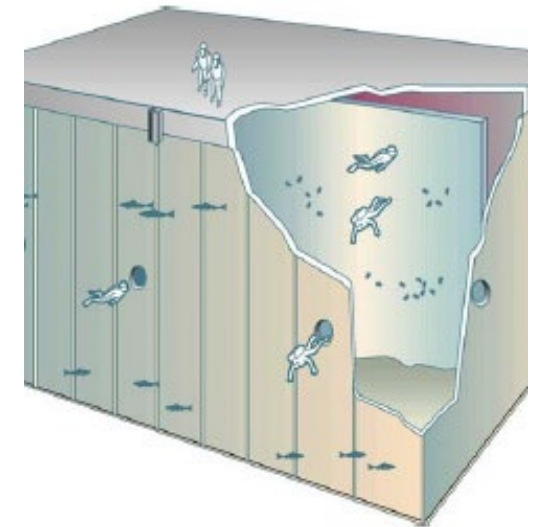
Habitat Offsetting Opportunities

3-D NICHE HABITATS

CAISSON VOIDS - Delta Port for large fish species

REEF BALLS - Sirocco (local) Ogden Point (Victoria)

TIDAL POOLS – water retaining elements





Xwu newk Park Sea Dike

Previous Habitat Offsetting

SIROCCO REEF BALLS

230 reef balls placed along toe of wall to offset habitat loss from infilling

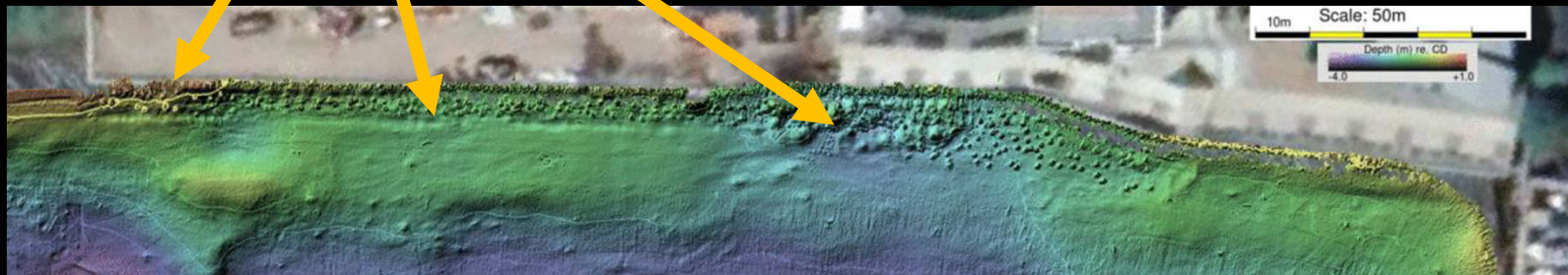


Photo 11: Looking at reef ball colonized by brown algae at the offsetting area, September 22, 2019.



Photo 12: Looking at reef ball showing barnacle growth at the offsetting area, September 22, 2019.



Photo 13: Looking at reef ball showing green algae growth at the offsetting area, September 22, 2019.



Photo 7: Looking at reef ball showing barnacle and brown algae growth at the offsetting area, September 22, 2019.

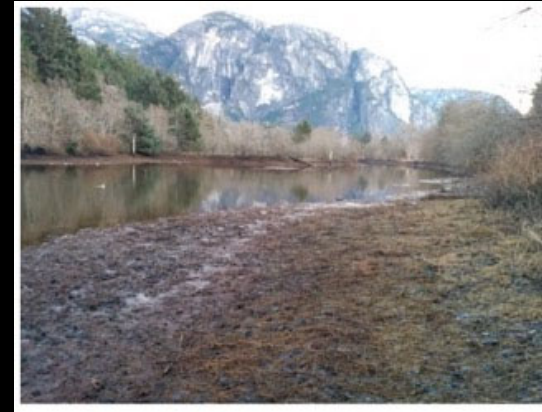


Xwu newk Park Sea Dike

Previous Local Habitat Offsetting

Offsite Intertidal Plantings (220 m² sedges and
rushes)

Upper Mamquam Blind Channel (West shore)

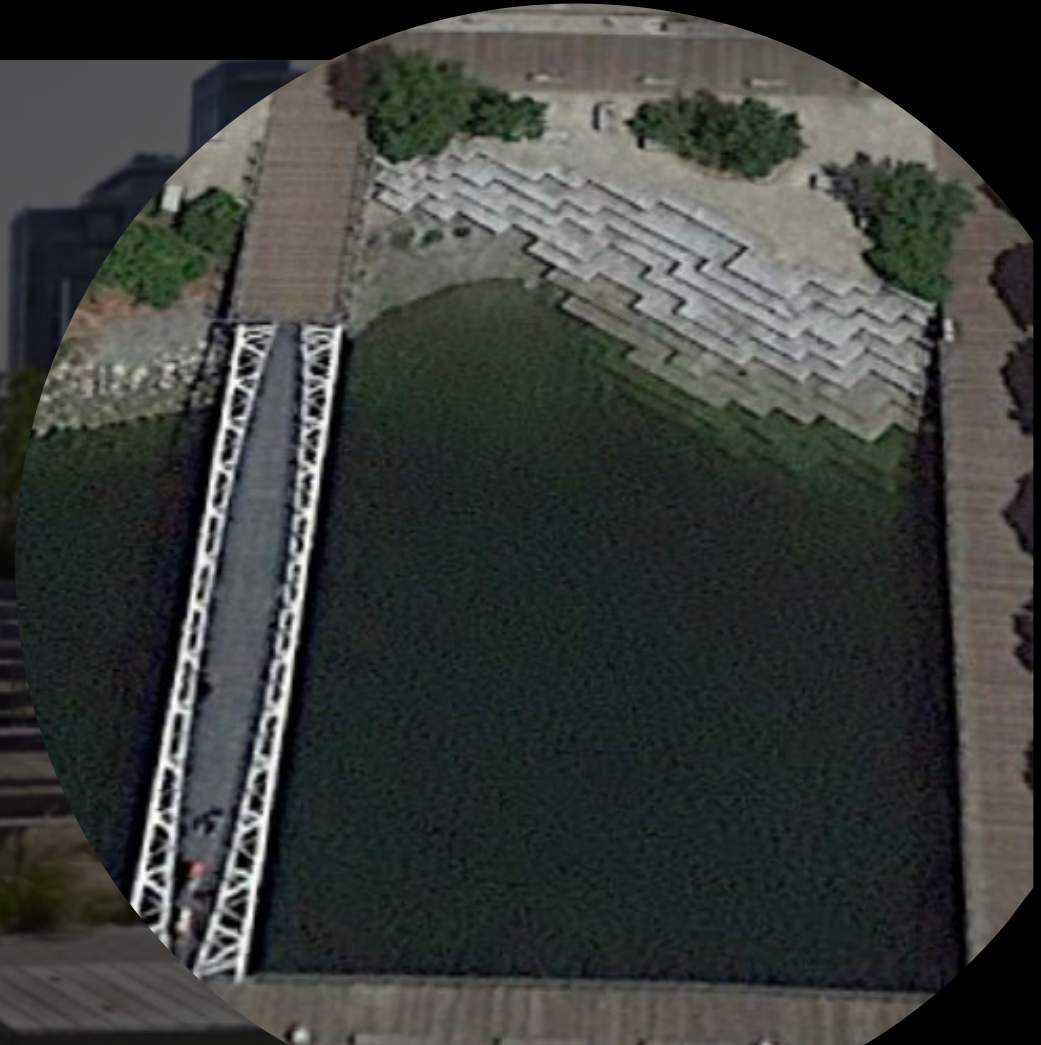


EXAMPLE OF STEPPED FORESHORE

Balance site access and marine offsetting
features

Incorporate tidal pools, niche habitats into
notched area for the inset dike option

e.g. Canoe Cove, False Creek





Xwu newk Park Sea Dike

Habitat Offsetting Summary

To consider :

Habitat Areas (loss of ~890-1103 m²

Future Maintenance – Sheet Pile Inspection, Dredge Limitations etc.

Cost – Installation, Effectiveness Monitoring

Mix of planning and physical habitat structure with niches may be best and most cost effective

Option	Cost and Maintenance	Effectiveness	Location
Reef balls or other 3-D niche habitats	Low /Moderate	Moderate / Good	Onsite
Seawall Enhancements Habitat Skirts	High	Low	Onsite
Seawall Enhancements Intertidal Tidal Pools	Moderate	Moderate	Onsite
Seawall Enhancements Stepped Access	Moderate / Hight	Moderate	Onsite
Intertidal planting	Moderate	Moderate	Off Site, Upper Channel

Call out for feedback!

- Respecting the following components:
 - Dike alignment (two options)
 - Land / park features (e.g., trails, seating, recreation, club house)
 - Water access (e.g., ramping, dock)
 - Marine environment habitat features
- ***What do you like/dislike about the preliminary concepts proposed?***
- ***What option if any do you prefer?***
- ***What changes do you feel are needed?***

The background image shows a coastal scene with a body of water in the foreground. In the middle ground, there is a shoreline with several large, stacked logs and some greenery. To the right, a red boat is partially visible. In the background, there are large, forested mountains under a cloudy sky.

Thank you!

For more Info:

www.squamish.ca/yourgovernment/projects-and-initiatives/xwunekw-park-sea-dike/

Sandra Bicego, Project Engagement Lead: sandra@pacificablue.net

To submit feedback:

District of Squamish Project Team

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