



# Cowichan Lake Weir Final Design + Shoreline Assessment

November 29, 2021 CWB  
Leroy Van Wieren





# Introduction

## The Project – Cowichan River Salmon Restoration program – Sustainable Water Supply

- Supported by the Water Use Plan 2018
- Identified parameters for a new weir to be raised to support environmental (fish) flows and help mitigate effects of climate change
- Managed by CVRD

**Funding** – British Columbia Salmon Restoration and Innovation Fund (BCSRIF), which is jointly funded by the federal and provincial governments.

**Sponsors** – CVRD, Cowichan Tribes, Paper Excellence, Cowichan Watershed Board.

**Project has 2 Parts: Weir Design Part (completed) & Shoreline Impact Assessment Part (underway)**

[www.cowichanlakeweir.ca](http://www.cowichanlakeweir.ca)



Fisheries and Oceans  
Canada





# Final Design Concept

**Control Structure**  
Upgraded structure and refurbished structure with new mechanical and electrical equipment

**Overflow Weir**  
Replaced

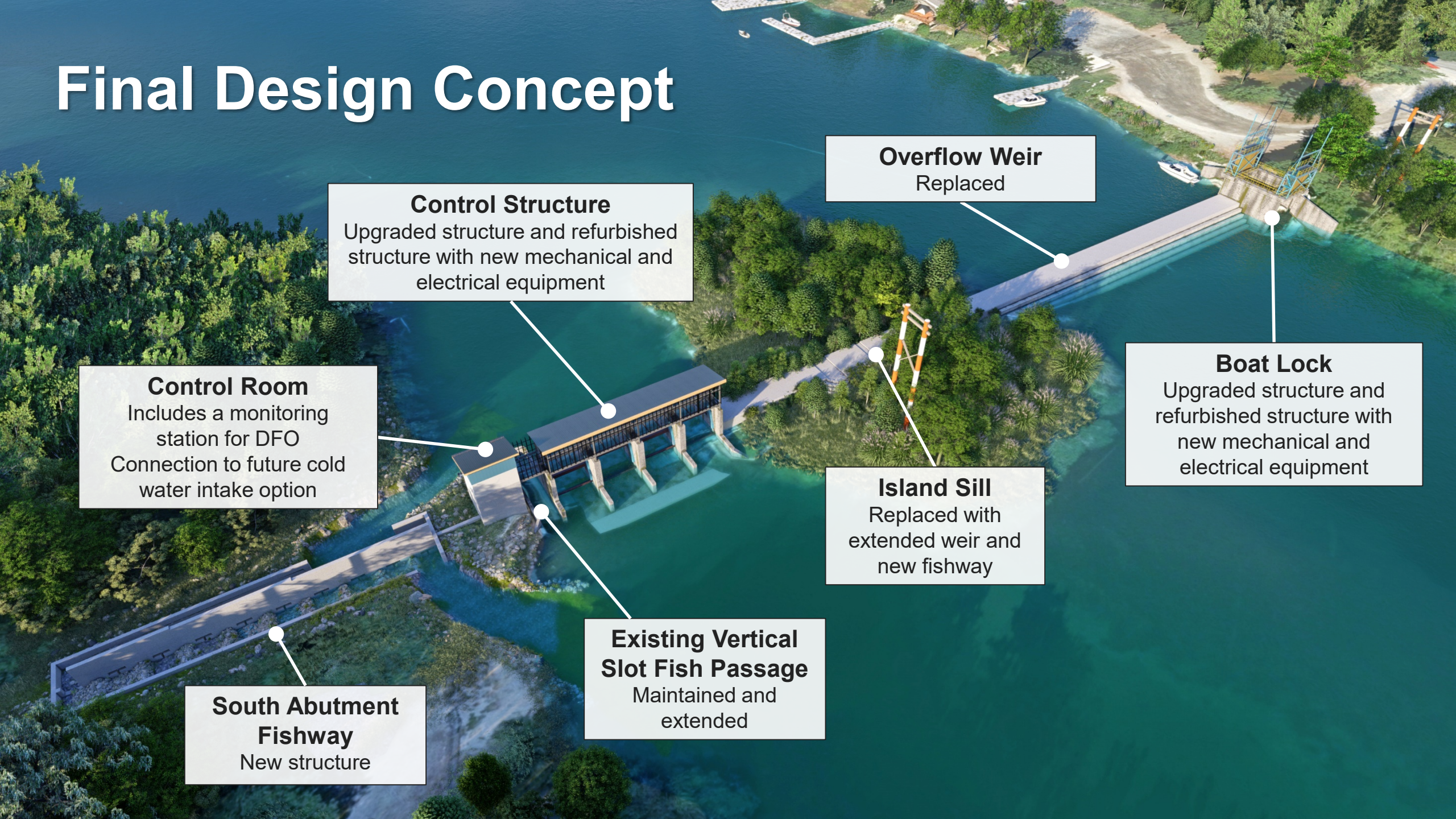
**Boat Lock**  
Upgraded structure and refurbished structure with new mechanical and electrical equipment

**Island Sill**  
Replaced with extended weir and new fishway

**Control Room**  
Includes a monitoring station for DFO  
Connection to future cold water intake option

**Existing Vertical Slot Fish Passage**  
Maintained and extended

**South Abutment Fishway**  
New structure





# Fishways

An aerial photograph of a dam and fishways. The dam is a long concrete structure with a central spillway. To the left, there is a smaller structure with a crane. The water is a deep blue-green. The surrounding area is lush with green trees and vegetation. Three callout boxes are present: one on the left pointing to the Island Sill Fishway, one on the top right pointing to the South Abutment Fishway, and one on the bottom right pointing to the Existing Vertical Slot Fish Passage.

## South Abutment Fishway

- “Naturalized” design
- Primary fishway
- Serviceable ‘year-round’ at all water elevations
- Fishway will have 10 gates (2 gates in operation at one time)

## Island Sill Fishway

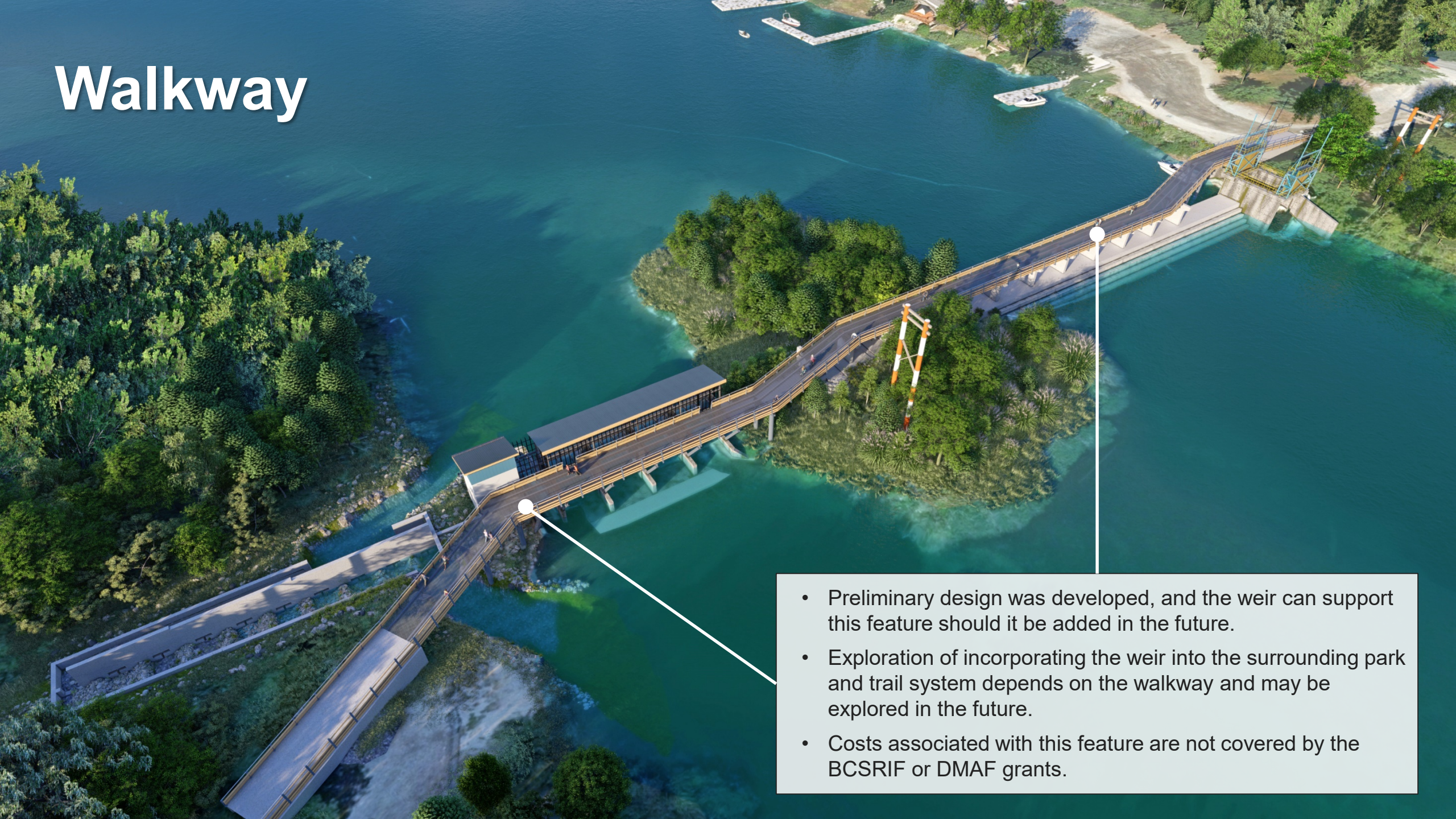
- Used during high flow periods
- Island sill will be notched (multiple)
- Island sill will have a baffled step structure to reduce velocities
- Channels to be excavated and revegetated
- Vegetated, rocky ramp on the downstream side of the island

## Existing Vertical Slot Fish Passage

- Preserved and number of pools extended to allow for increase in water elevation of stored water



# Walkway



- Preliminary design was developed, and the weir can support this feature should it be added in the future.
- Exploration of incorporating the weir into the surrounding park and trail system depends on the walkway and may be explored in the future.
- Costs associated with this feature are not covered by the BCSRIF or DMAF grants.





# Design Status

- Final design of new weir is complete. Wrapping up documentation.
- Incorporating a walkway design that is compatible with the weir is complete. Considered an important social component to proceed with the weir. It will require new owners support and funding.
- Cold Water system. The final design can accommodate a future cold water system if desired. Improves temperatures for fish survival.
- Final Design is used to model impacts on the natural boundary and full storage water elevation for the Shoreline Assessment project.



# Cost Estimates

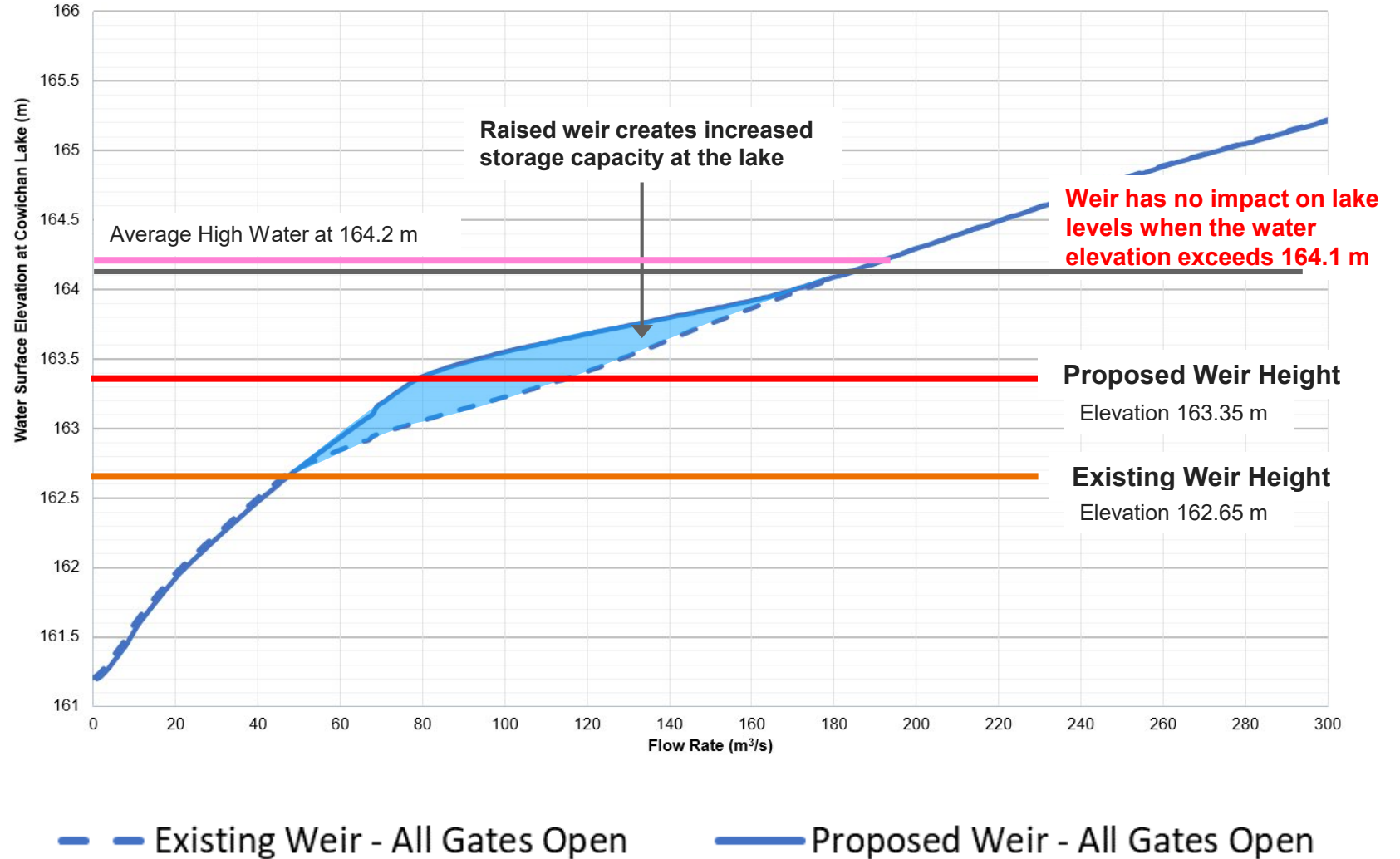
Weir	→	<b>\$18M – \$21M</b>
Basic Walkway	→	<b>\$3M – \$3.2M</b>
Coldwater Release System (preliminary estimate)	→	<b>\$20M – \$30M</b>

\*NOTE: Costs are an estimate range and are subject to change due to volatility of material pricing and labour availability



# Raised Weir and Lake Levels

- At water elevation of 164.1 m, the weir is completely submerged, and the weir no longer has an impact on water levels in the lake
- Raised weir creates increased storage capacity of the lake





# Cowichan Lake Weir Shoreline Assessment Project Update

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COWICHAN  
RIVER  
WATER  
SUPPLY





# Objectives

- ➔ Assess & map current shoreline conditions (*110 km of shoreline*). Create an 'AS IS' picture.
- ➔ Forecast changes to the shoreline based on:
  1. a raised weir
  2. climate change
- ➔ Identify impacts to riparian access rights and use of property (*approximately 900 properties*).
- ➔ Provide supporting documentation for the Future Water License Process.





# Project Update

- There is no anticipated change to the Average Annual High Water Level. The new weir was designed to not impact this. There may be changes due to climate change increasing natural flood levels.
  - **+ 8.3%** average annual **inflow** by 2080. More rain, less snow.
  - **- 40.4%** average **summer** inflow by 2080
- In order to store water, it means that water will remain at higher levels than previously maintained during the control period (March – October).
- The impact of water being present at different elevations for longer and the action of the water at those elevations is what is being evaluated.
- Water will be within existing lake level ranges, but it will be at higher levels for longer periods in the spring and summer. Exposure to wind/wave energy and shoreline characteristics impact what this means for different properties.
- We are continuing to study this and an assessment of those results will be worked on over the next 4 months.



# Potential Impacts

## Flooding

Related to Average Annual High Water Level.

There is no anticipated change to the Average Annual High Water Level. The new weir was designed to not impact this.

## Inundation

Beach covered in water more time out of the year within property title area

## Erosion

Potential for change of the natural boundary

## Beach Access

Loss of useable beach days.

## Structure Access

Loss of access to man made structures

## Riparian Access

Access to water

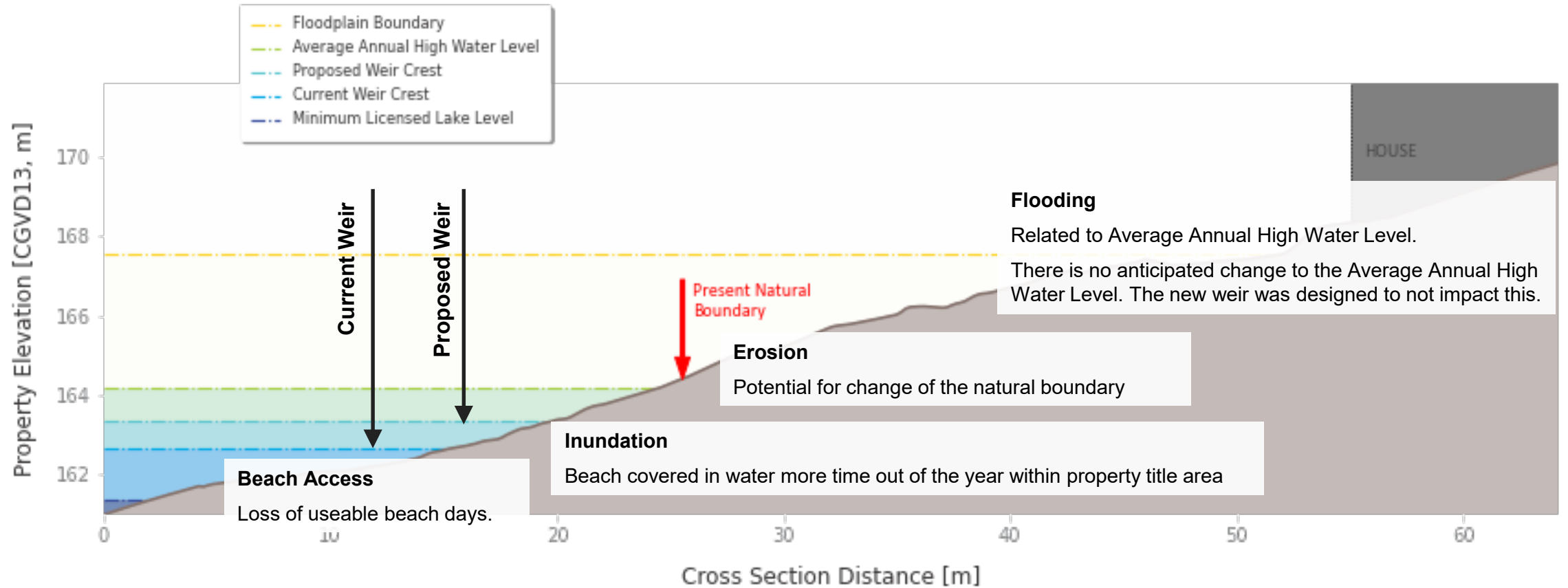
Low Water Mark





# Cross Sections in Property View Tool

## Shoreline Cross Section







# Potential Impact Assessment (Draft)

Property Address

Potential Impact		Index	Value	Analysis
Flooding		Change in water level at the principal residence structure from historical	0.02 m	
Inundation		Time-Weighted inundated area loss. Within property title area	0.0 sq.m	
Erosion	<i>Potential for change of the natural boundary</i>	Change in total wave energy at present natural boundary + Shoreline Character + Slope + water level frequency	Likely	
	<i>Erosion/Damage to Shoreline Structures. Retaining Walls.</i>	Change in present natural boundary location + location of structures	Highly Likely	
	<i>Impact of changes in vegetation</i>	Change in total wave energy at present natural boundary + Shoreline Character	Same	
Riparian Access	<i>Loss of access to water</i>	Change in water level frequency at present natural boundary + Slope	No	
Structures Access	<i>Loss of access to man made structures</i>	Change in number of days when water level at or above the dock access elevation	2	
Beach Access	<i>Loss of useable beach days</i>	Change in the number of days where beach is less than 2 m	7	

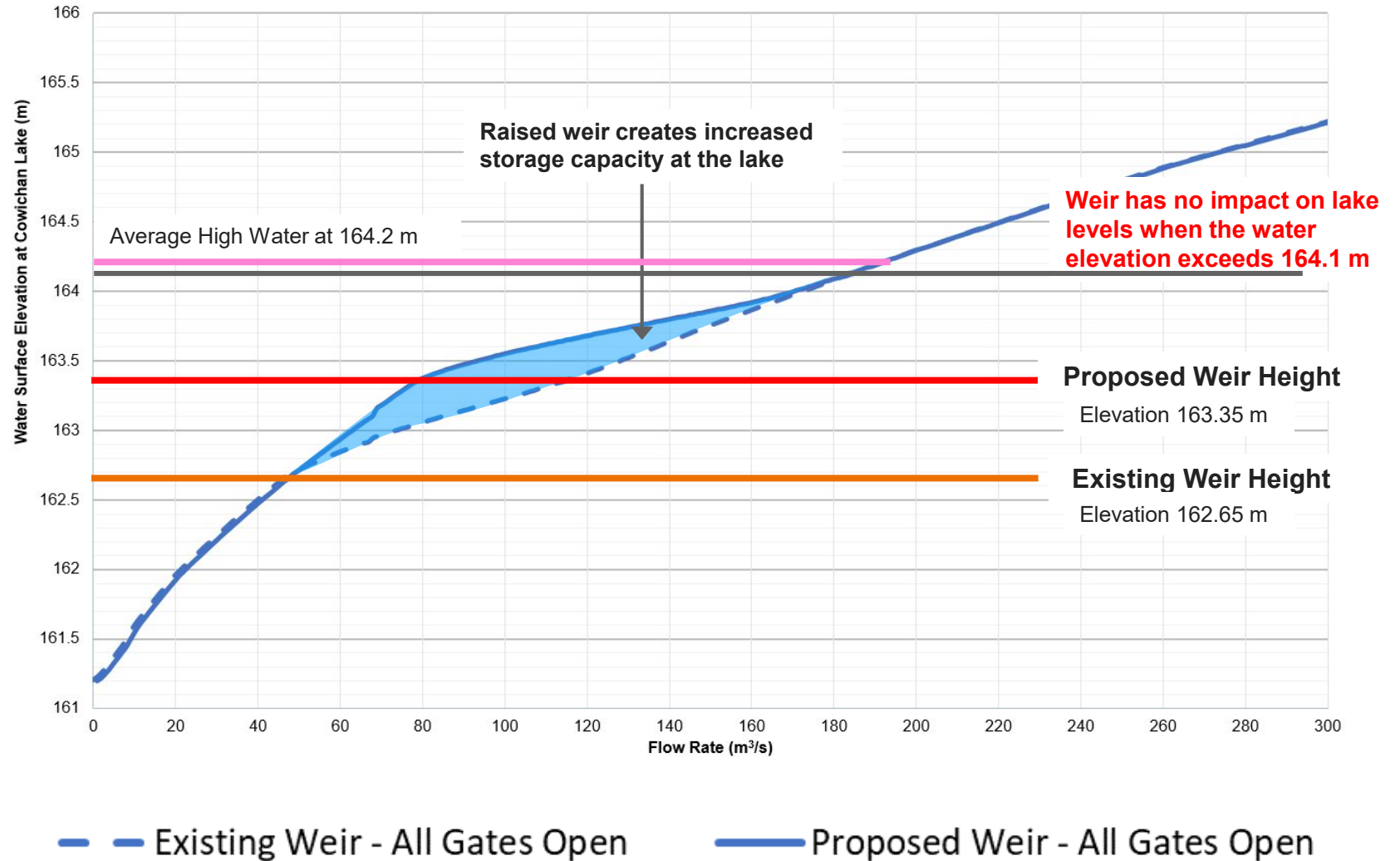
How the impact is measured	
0 – 0.x m	
0.x m – 0.x m	
0.x m and greater	
0 – xxx sq.m	
xxx – xxx sq.m.	
> xxx sq. m	
Unlikely	
Likely	
Highly likely	
Same or Improve	
Worsen	
Loss of access – No	
Loss of access – Yes	
Change in days 0 – x	
Change in days x – xx	
Change in days > xx	
Change in days 0 – x	
Change in days x – xx	
Change in days > xx	





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# Next Steps for the Shoreline Assessment Project

- ➔ Public Presentation November 17, 2021 and make the Property View Tool available to the public – November 18, 2021 - **COMPLETE**
- ➔ Complete the assessment of impacts – Feb/March 2022.
- ➔ Complete the Final Shoreline Assessment Report and make it available April 2022
- ➔ Hand off to partners for use in the Water License application.

Project Website [www.cowichanlakeweir.ca](http://www.cowichanlakeweir.ca)

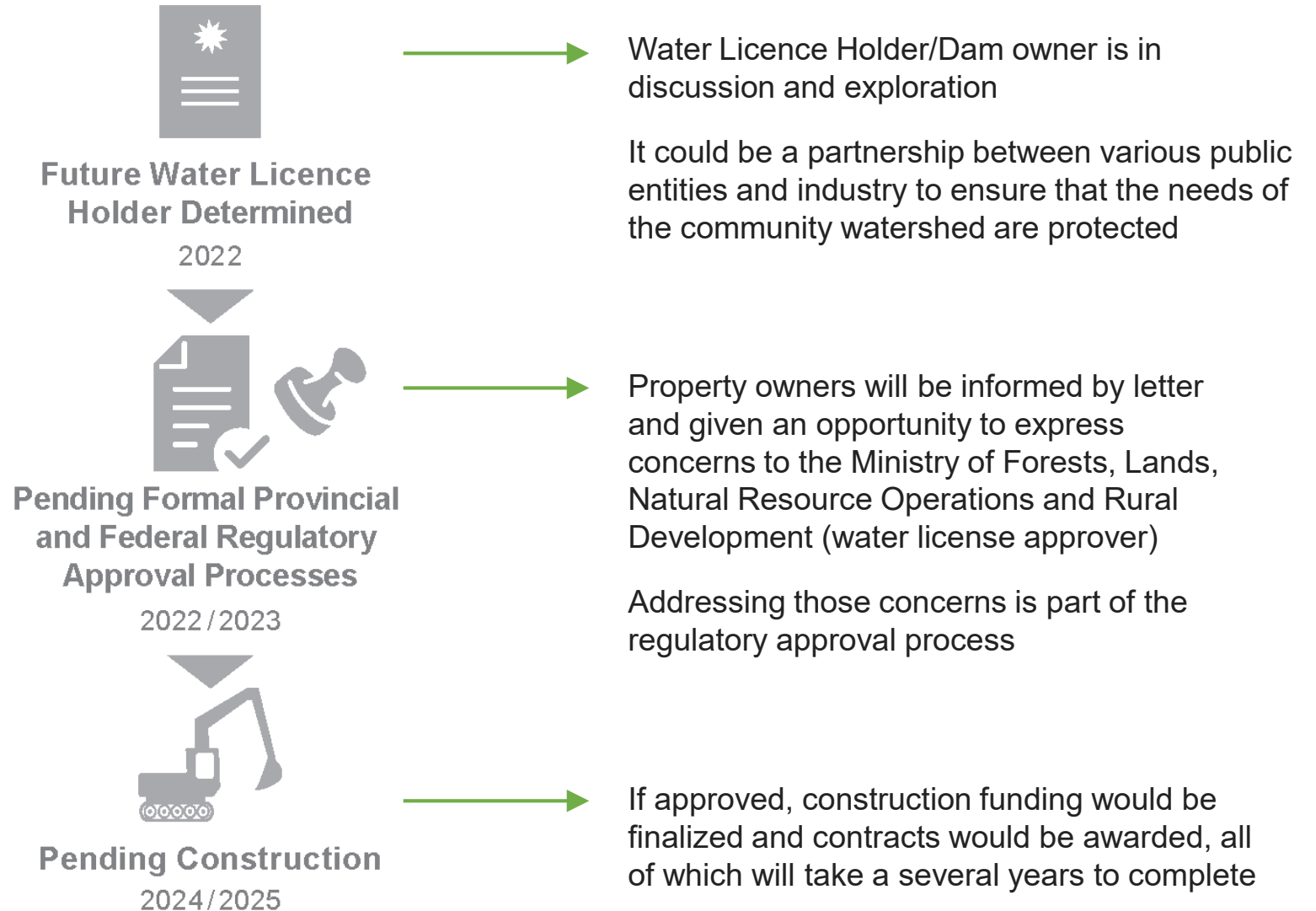




# Next Steps for the New Weir

## Steps Towards Construction of a New Weir

- ▶ **New Weir Design** ✓
- ▶ **Shoreline Assessment Project** ✓





123 Main Street



# Property View Tool



## Legend

Cross Section (Samples)



Point of Interest



Existing Weir Crest at 162.65 m



Proposed Weir Crest at 163.35 m



Average Annual High Water Mark (164.2 m)



Cowichan Lake Floodplain Boundary (167.2 m)



Present Natural Boundary - 2020 (Elevation Varies)



Shoreline Photos (Bazett Land Surveying)



Digital Road Atlas



Parcels





# Shoreline Assessment Property View Tool

➔ Link is available online at [cowichanlakeweir.ca](http://cowichanlakeweir.ca)

## Property View Tool includes:

- Definitions
- Ability to enter address and zoom to property
- View lake elevation information relative to property
- Photos of survey work done in 2020
- Cross sections that show side view of property with slope, location of house, and lake elevation information
- Legend for information shown and the option to turn on and off information in layers panel
- Bookmark and print
- Instructional video on website

