



SOUTHERN LAKES SHORELINE EROSION MITIGATION EXAMPLES

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Presentation Overview

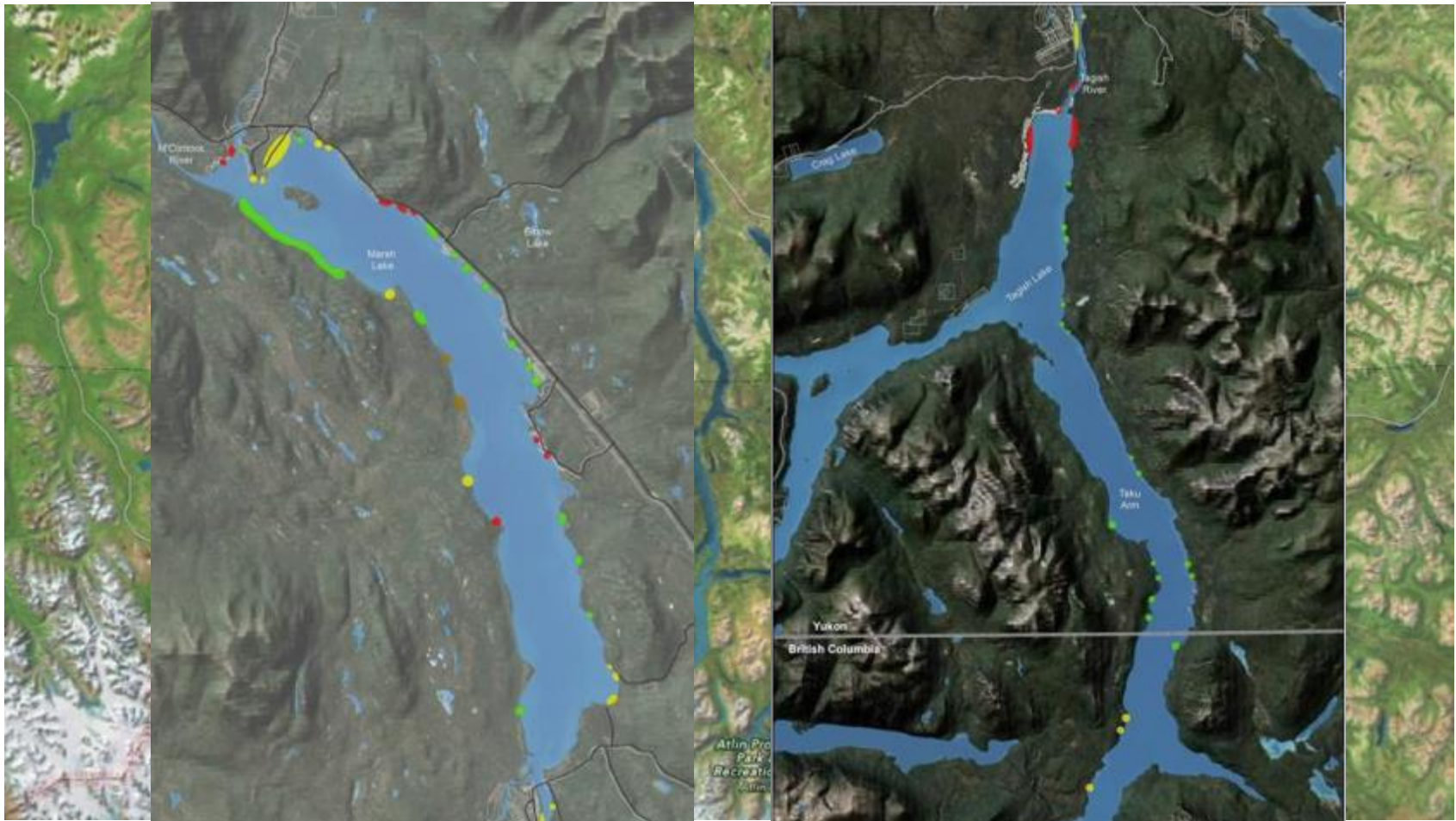
1. Erosion prone areas around Southern Lakes
2. Erosion mitigation options
3. Conceptual approach
4. Mitigation experience on Southern Lakes
5. Potential mitigation options and examples
6. Next steps



Identified erosion prone areas on Marsh and Tagish lakes



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Southern Lakes Enhanced Storage- Phase 1
Marsh Lake Erosion Analysis

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Legend
 region
 Waterbody
 Accretion
 High
 Low
 Moderate
 Roads
 Land Parcel
 Provincial Borders

Southern Lakes Enhanced Storage- Phase 1
Tagish Erosion Analysis

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Legend
 region
 Waterbody
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Shoreline Erosion Mitigation Objectives of Conceptual Options

- Limit wave heights approaching the beach
- Break waves before the swash zone to limit run-up
- Protect the swash zone from wave erosion
- Stabilize and protect the backshore
- Promote development of riparian vegetation
- Allow for flexible adaptive design
- Accommodate incremental construction and limited access
- Be cost-effective and utilize natural materials



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Shoreline Erosion Mitigation Conceptual Options

- A range of erosion mitigation works are applicable to Southern Lakes sites based on shoreline, foreshore and backshore characteristics
- Key Issues:
 - Fine-grained sediment exposures require protection so they stabilize and revegetate
 - Bank toe require protection to prevent further bank collapse
 - Wave energy needs to be reduced without additional erosion



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Shoreline Erosion Mitigation Suggested Approach

Mitigation by “Shoreline Unit”

Identify adjacent lengths of shoreline based on the processes that result in erosion

- Multi-property approach
- Designed/engineered to address needs of that shoreline
- Can address natural historic and possible future erosion
- Consistent approach across a beachscape (function and aesthetics)
- Decreases the likelihood that mitigations in an area result in undesirable effects in adjacent areas



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Shoreline Erosion Mitigation Previous Work

- A range of shoreline erosion protection approaches have been used on Marsh Lake as well as other lakes and reservoirs in North America
- Examples:
 - Lake Winnipeg
 - Great Lakes
 - Lake of the Woods
- Erosion due to Sea Level Rise (SLR) and wave climate changes in coastal environments



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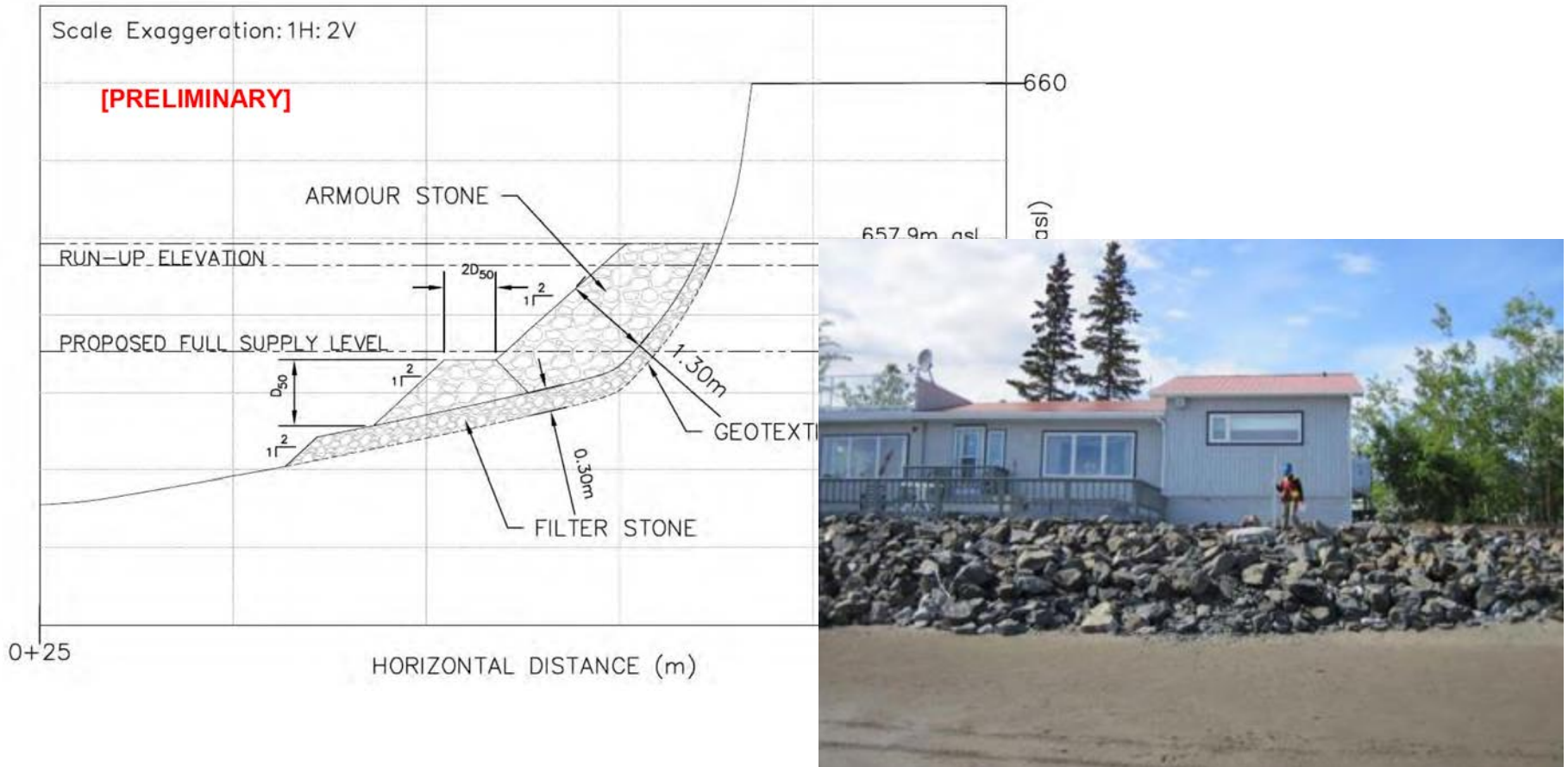
Shoreline Erosion Mitigation Previous Work

- Previous studies provided two alternative conceptual shoreline protection designs:
 1. Rock Protection:
armoured riprap shoreline similar to existing rock protection installed on Marsh Lake properties
 2. Bioengineered Protection:
a combination of structural and vegetation-based erosion protection



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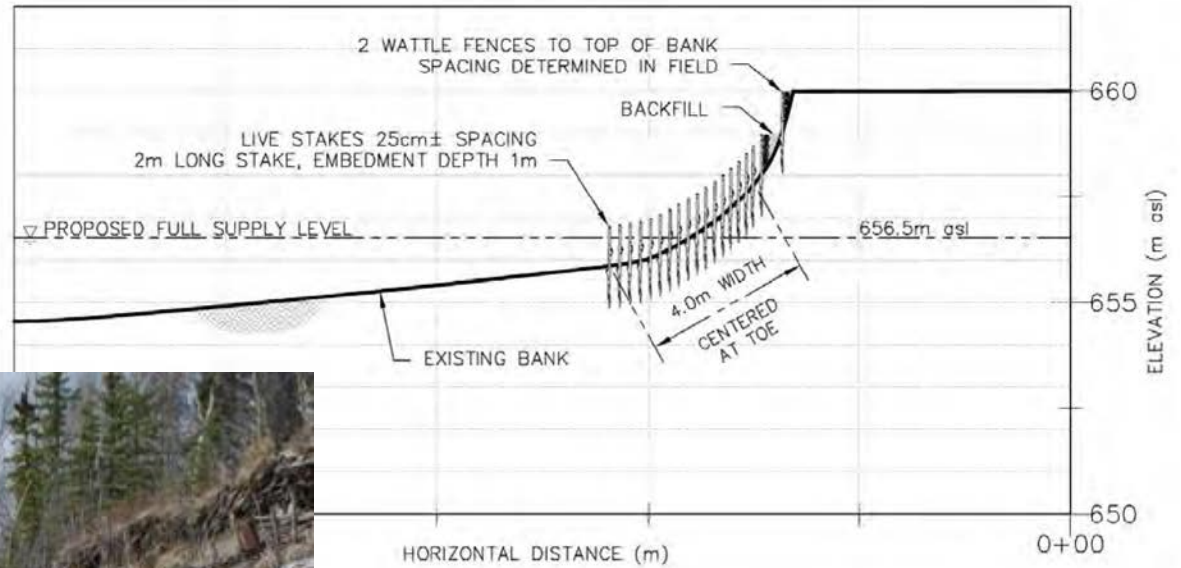
Shoreline Erosion Mitigation Previous Work





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Shoreline Erosion Mitigation Previous Work





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Shoreline Erosion Mitigation Conceptual Options

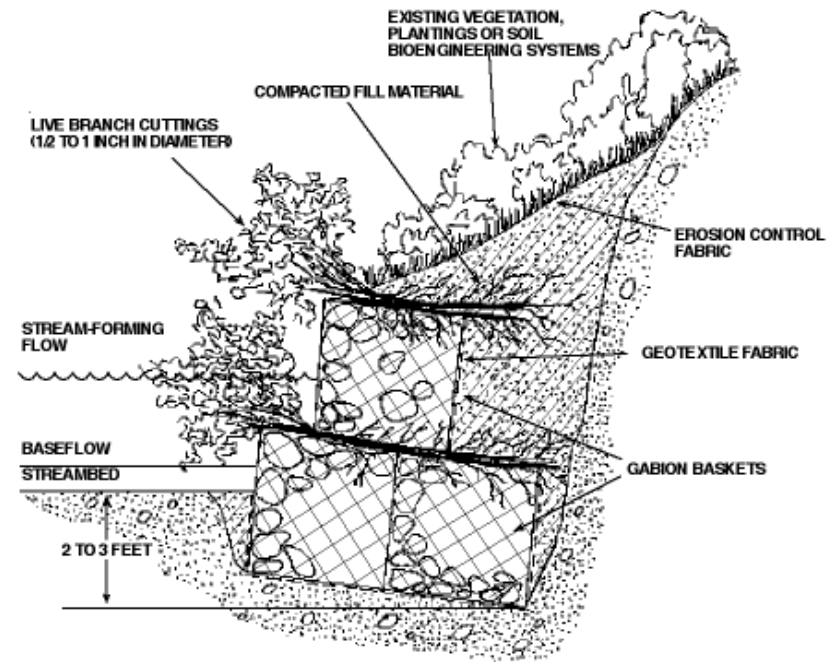


Armour Rock



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Shoreline Erosion Mitigation Conceptual Options

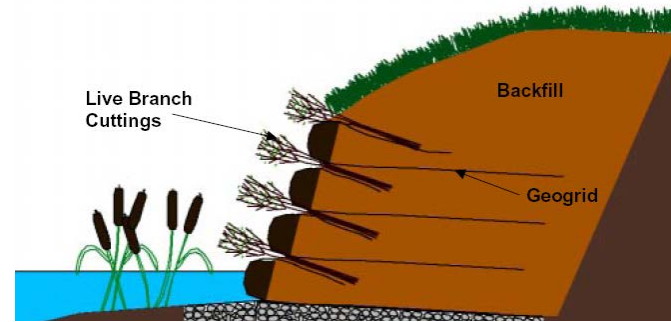
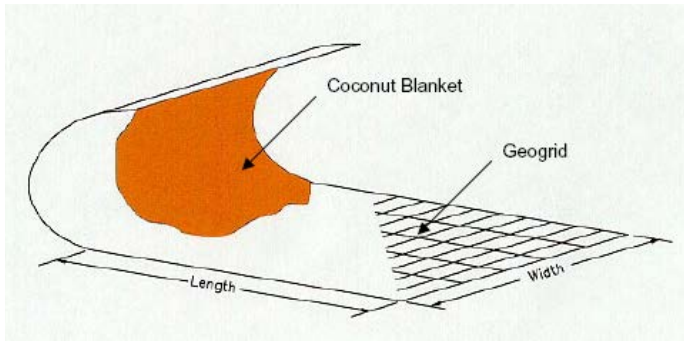


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Shoreline Erosion Mitigation Conceptual Options

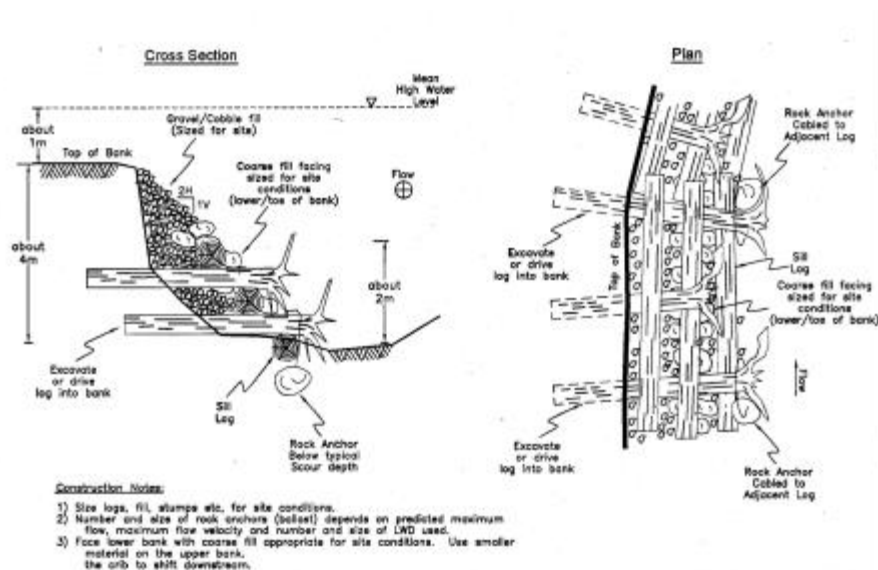


Soil Wraps and Geotextiles



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Shoreline Erosion Mitigation Conceptual Options



Wood Revetment



Shoreline Erosion Mitigation Conceptual Options



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Shoreline Erosion Mitigation Conceptual Options

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Shoreline Erosion Mitigation Issues

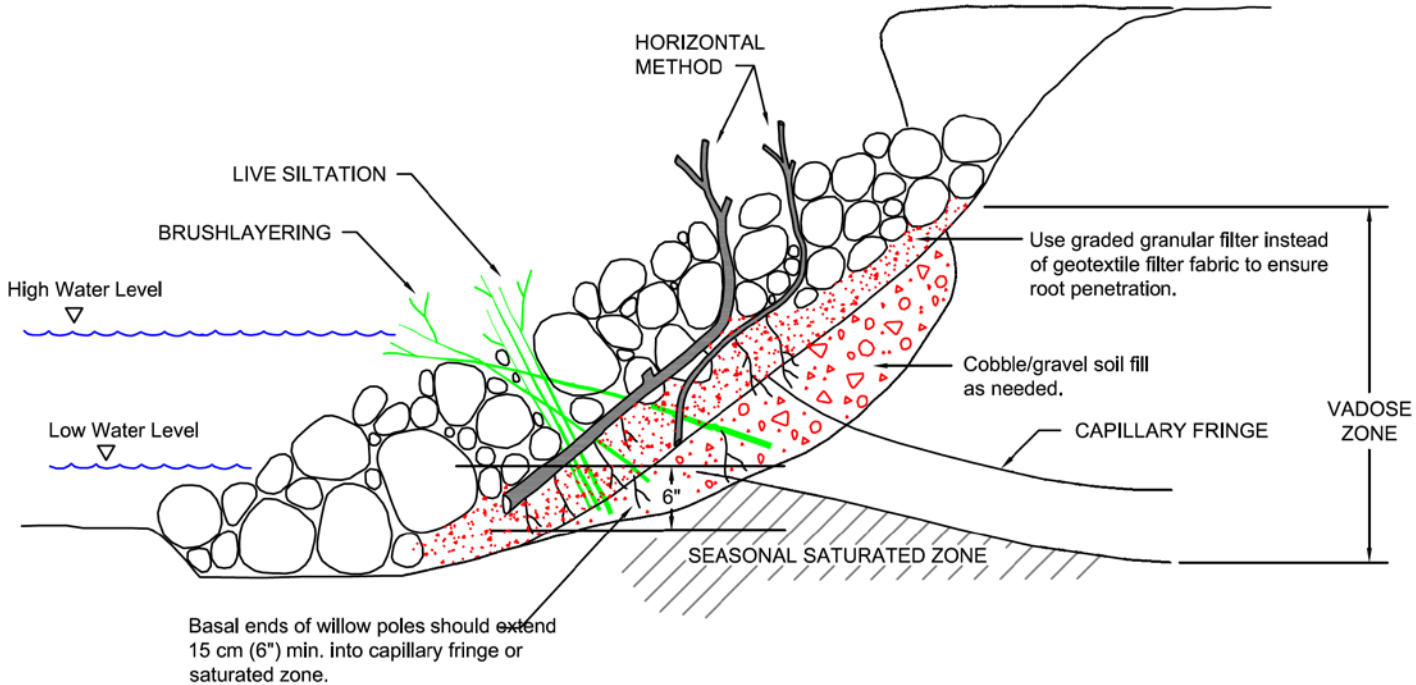


Vegetation-only Approach



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Shoreline Erosion Mitigation Conceptual Options



Bioengineering Hybrid Beach



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Southern Lakes Erosion Mitigation by Shoreline Unit - Suggested Next Steps

1. Confirm approach to resolve information gaps
2. Inspect existing shoreline erosion sites and review stabilization works
3. Identify shoreline units – based on physical processes
 - Site specific issues
 - Different mitigation requirements
 - Land owner issues and concerns
 - Includes foreshore and backshore areas



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Southern Lakes Erosion Mitigation by Shoreline Unit - Suggested Next Steps

4. Develop shoreline unit-specific protection concepts
 - Comprehensive shoreline sediment management approach
 - Toolbox of options based on best science and engineering
 - Use community-based approach to provide rationale and basis for preliminary design
5. Implementation – Post Assessment & Permitting
 - Design, assessment and funding of shoreline erosion protection projects by YEC
 - Installation and construction of the works by local contractors