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Village of Slocan Public Works Waterfront Breakwater Steel Pontoon Inspection Report

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Date: Date of Inspection August 9th, 2022
Scope: Inspection Services – Slocan Waterfront Breakwater Inspection
Report Number: 08.09.2022.VOS – Rev 1.1

Lachlan McGreal,

This inspection report has been submitted in support of the Village of Slocan requirement for a detailed inspection of the breakwater steel pontoons. The outcome of the inspection is to provide a report that will look at the service life of the breakwater, pontoons, deck, deck support beams, repair options & procedures.

Health & Safety Compliance

Diving Dynamics operates in strict accordance with the CSA Z275.2-20 Occupational Safety Code for diving operations WorkSafe BC Section 24 OHSR, & CSA Z275.4-22 Competency Code.

Scope of Inspection Services

- . identify the compromised location of the pontoon
- . breakwater steel pontoon inspection
- . inspection of decking and deck support beams
- . identifying repair options & procedures
- . service life of the breakwater
- . technical inspection report & u/w digital images



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Inspection Details

1.1 Compromised Ponton – south shoreside

The shoreside pontoon is compromised at the end cap weld on the pipes invert. The failed weld is open approximately 30% on either side of the invert rising towards the mid-height of the vertical wall. The maximum opening at the invert is approximately 10mm, narrowing off to about 2mm on the vertical wall. It is apparent that the weld failed due to the pontoon load bearing weight encountering the rock substrate over extended time.

It is noted that the overall condition of the steel pontoon was excellent with no other signs of metal fatigue or critical failure.

End Cap Invert – Failed Weld – 10mm



1.1 Pontoon End Cap Fracture . Shore Side August 2022 DD

Photo 1.1



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End Cap Vertical Wall Left – Failed Weld – 2mm - 5mm Opening



Photo 1.2

End Cap Vertical Wall Right – Failed Weld – 2mm - 5mm Opening



Photo 1.3



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1.2 Ponton Repairs Required – Failed Weld

- . Pick the shoreside pontoons with a spreader bar – load distribution recommended
- . Place the pontoons on support cribbing at an elevation to facilitate the pontoon repair
- . Repair the end cap as per industry standard procedures
- . Pressure test pontoon

1.3 Infrastructure Upgrades Required – Pontoon Water Management & Positioning

A. Water Venting Standpipe – Current Industry Standard Practice

Water venting standpipes will ensure that any water in the pontoons can be removed by introducing air through the air inlet nipples. This air will pressurize the pontoon and discharge nearly all the water out of the pontoon through the discharge standpipes.

- . **Pontoon Water Venting Steel Standpipes – 2 Units Per Pontoon Section**
- . Install 1” diameter venting standpipes from the center of the obvert to 0.5” off the invert
- . 90 Degree Elbow for water discharge
- . Threaded vent with NPT cap
- . **Pontoon Air Inlet Steel Nipples – 1 Per Pontoon Section**
- . Install 1” diameter air inlet nipple next to a venting standpipe
- . Can be flush with the internal obvert wall
- . Threaded with NPT cap

B. Breakwater Re-Positioning

Re-Positioning of the breakwater to ensure the shoreside pontoon floats in approximately 2m of water. This will reduce the risk of the pontoon striking the substrate during wind events.

- . The divers and ROV inspection found significant anchor chain scope on all the anchors
- . The current scope in the chains will facilitate adjusting the breakwater position



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2.0 Anchor Chain & Ballast Block Inspections

The anchor chains were inspected visually with no signs of compromise.

- . ½" Long Link Chain
- . Inspection at areas of high dynamic movement showed no signs of hardware wear
- . Significant chain 'scope' was on bottom
- . No signs of chain movement on the substrate from wind events

Deep Anchor Chain – Dynamic Location – Depth 67ffw



4.1 Anchor Chains and Blocks Offshore

Photo 1.4



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Ballast Block Inspections – Visually inspected with no signs of compromise

- . Full Size Loc-blocks - Sleeved PVC for wire rope pass
- . Chain to Cable connections were tight *Shackle
- . No visual signs of compromise on the wire ropes
- . No signs of ballast block movement due to wind events

Anchor Chain to Loc-Block Cable – Depth 67ffw

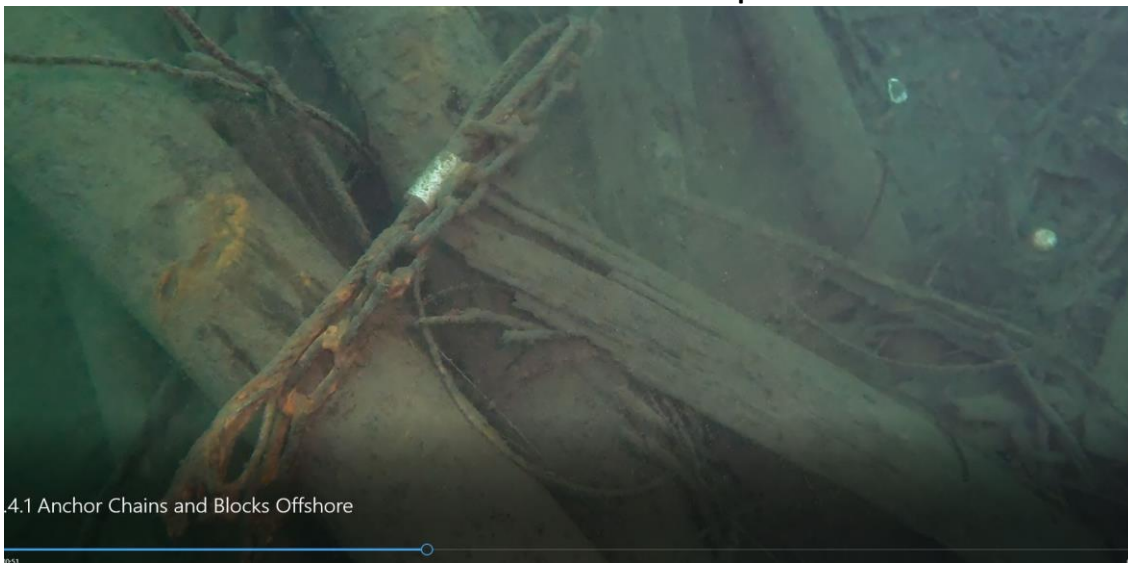


Photo 1.5

Deep Anchor Block





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Photo 1.6

3.0 Anchor Chain to Pontoon Attachments

- . All hardware was tight with no signs of compromise

Anchor Chain to Pontoon Attachment - General



Photo 1.7

Anchor Chain Attachment Under Pontoon - General



Photo 1.8



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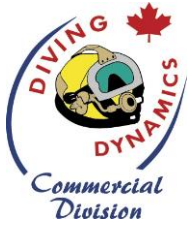
4.0 Breakwater Decking & Support Beams

- . General top decking is in reasonable condition with some evidence of mild wood rot
- . The deck fascia boards have significant evidence of wood rot due to water exposure
- . Timber cross beams have evidence of wood rot due to water exposure

General Top Decking



Photo 1.9



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Top Decking – General



Photo 2.0

Breakwater Fascia Boards – General

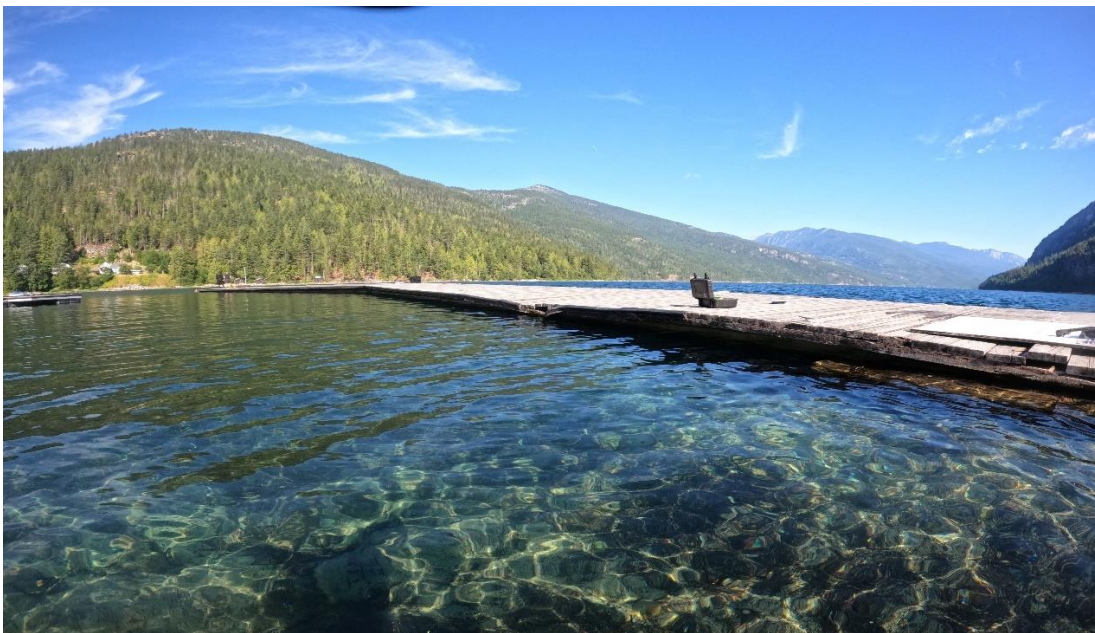


Photo 2.1



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Recommendations for the Village of Slocan Marine Breakwater Repairs

The repairs have been classified into two principal categories. The first Category is *critical repairs & upgrades* that require immediate attention. The second category is *highly recommended repairs* that will extend the service life of the marine asset.

Critical Repairs & Upgrades

Critical repairs will ensure the integrity of the steel pontoons and the long-term management of an essential marine asset. Most important that the breakwater is watertight, floating in a secure and measured location and that water can be managed in the pontoons if required. It is recommended that a Cygnus 1 Echo-Sounder be utilized to map the pontoons metal thickness on select transect lines. The data collected will assist on managing the steel pontoons service life.

- . **1.2 Ponton Repairs Required – Failed Weld**
- . **1.3 Infrastructure Upgrades Required – Pontoon Water Management & Positioning**

Highly Recommended Repairs

Highly recommended repairs will enhance the breakwaters performance, extend the overall service life of the asset, reduce public liability, and will visually enhance the look and feel of the waterfront.

- . **4.0 Breakwater Decking & Support Beams**

It is recommended that the decking and support beam infrastructure consider being replaced over the next two years.

Budget Proposals

The repair budget will be separated into the two key categories. The highly recommended repairs will also be scheduled with options, including traditional wood product and composite materials.

The budget proposal will follow the submission of this report and consultation with the representative from the Village of Slocan.



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All questions or comments regarding this report should be directed to the undersigned authority.

Kind Regards,

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 Director of Operations
 Commercial Division

Copied

Rick Andrews, DCBC Supervisor
 Commercial Division
 Diving Dynamics

Distribution List and Authorities

Report 08.09.2022.VOS – Rev 1.1	Marine Breakwater Inspection Village of Slocan	24 August 2022
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