QUEENSBORO MARINE EQUIPMENT LTD

Cultus Lake Marine Structure Assessment



Prepared for: Dave Driediger, Manager of Park Operations - Cultus Lake Park
Prepared by: Queensboro Marine Equipment
August 29, 2019

EXECUTIVE SUMMARY

OBJECTIVE

The purpose of this report is to provide an assessment of the current condition of the 37 docks, two foot bridges, and one boat launch included within Cultus Lake Park's authority. Each marine structure will be discussed in detail explaining the physical condition of the decks, stringers, pilings, and hardware, the estimated lifespan of each dock, recommendations on a prioritized maintenance plan, recommendations on the means of replacement and then cost associated with replacement.

GOALS

Through the completion of this report Cultus Lake Park staff will be provided a thorough understanding of what must be prioritized for the responsible maintenance of their marine structures. Queensboro Marine Equipment Ltd. will provide recommendations which consider the aquatic and foreshore species and follow Best Management Practices as defined by the Government of British Columbia. By providing such recommendations, any maintenance and replacement required will be in alignment with Cultus Lake Park's mandate of *Ours to Preserve and Protect.*

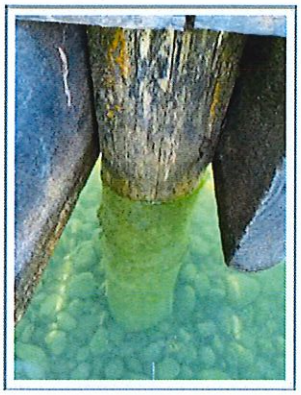
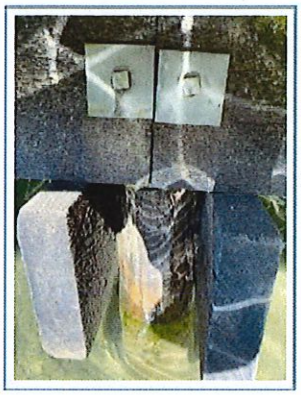
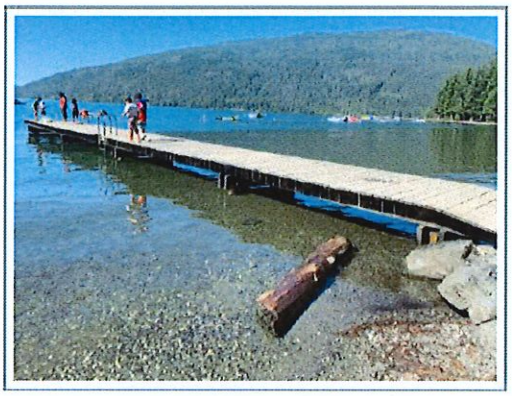
ASSESSMENT METHODOLOGY

The assessment was performed by Ralph Payment, Daniel Payment, and Ian Walker. Ralph payment has 40 years experience in the marine manufacturing, is a Journeyman steel fabricator and has been the owner of Queensboro Marine Equipment for the last 32 years fabricating fishing equipment, aluminum docks and custom fabricated products. Daniel Payment attended BCIT and received a Diploma in Architectural Building Engineering Technology with a major in building economics. He since has been the operations manager at Queensboro marine since 2009. Ian Walker is a Journeyman Welder and has 6 years experience welding and fabricating. The industry which Ian worked in demanded 100% Quality Control and has taught him to work with extreme care and taught him to have an eye for detail.

Our assessment was focused on the current condition and structural integrity of the components of the dock components including the decking, stringers, pilings, and hardware. A visual inspection was done of these components and we assessed each based on signs of wear and rot, as well as the materials used in the initial construction of the structure.

INDIVIDUAL DOCK EVALUATION

DOCK 1

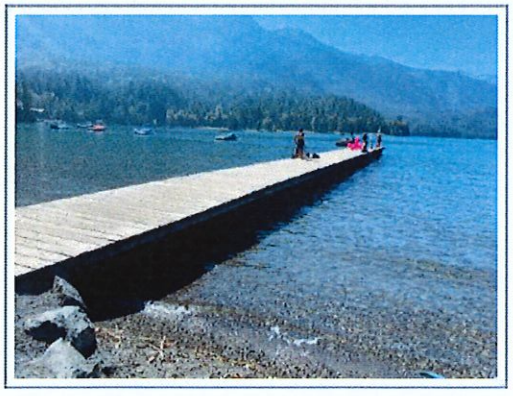




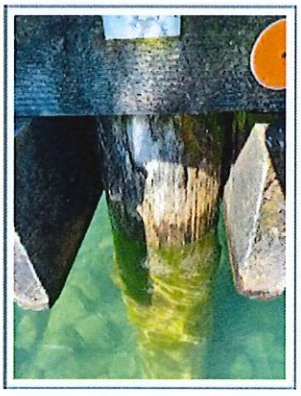
Dock 1 consists of 10 piles, 76 feet of dock and a wood abutment.

The stringers are in moderate shape, beginning signs of rot and wear but not of concern for approximately 7 years. The Decking is in good condition and is fairly new and presenting no concern at this time. The pilings are showing signs of rot above the water mark, a 5-10 year life span is estimated. All pilings appear plum and properly aligned. Cross caps are in good condition. The dock hardware is galvanized steel, all properly secure and presents no concern.

Based on our evaluation we estimate that this structure is in overall moderate condition and has a remaining lifespan of 5-10 years before significant repair or replacement is required.

DOCK 2





Dock 2 consists of 14 piles and 133 feet of dock with a rock and concrete abutment.

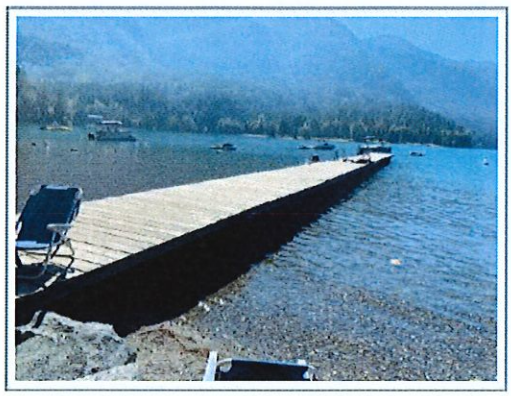
Stringers: The stringers are in moderate condition showing moderate signs of wear but no concern at this time.

Deck: All deck boards are in good condition and presented no concern.

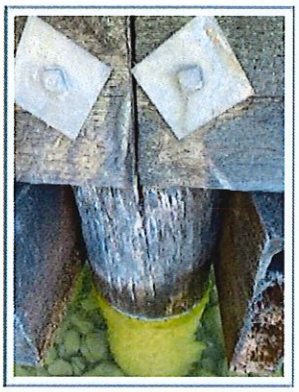
Pilings: The pilings are in moderate condition, showing minimal signs of rot. Cross caps in good condition and show no sign of concern.

Hardware: The hardware is galvanized and is in excellent condition

Based on our evaluation of dock 2, we estimate that this structure has a remaining lifespan of 5-10 years before significant repair or replacement is required.







DOCK 3

Dock 3 consists of 16 piles, 150 feet of dock and a rock abutment.

Stringers: The stringers are showing signs of rot but not presenting an immediate concern.

Decks: The deck boards are in good condition and appear to of been recently re-decked.

Pilings: The pilings are showing severe signs of rot and wear and are no longer providing sufficient structural support. The pilings require immediate replacement. The cross caps are also showing significant signs of rot.

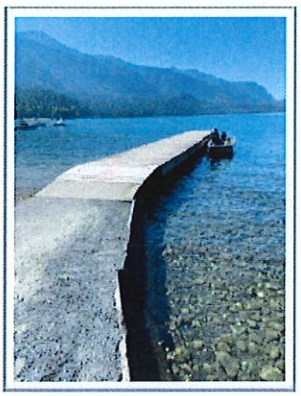
Hardware: The dock hardware is in good condition. The hardware is made of galvanized steel, and presents no concern at this time.

Based on our evaluation Dock 3 requires immediate attention and is no longer providing sufficient structural support.

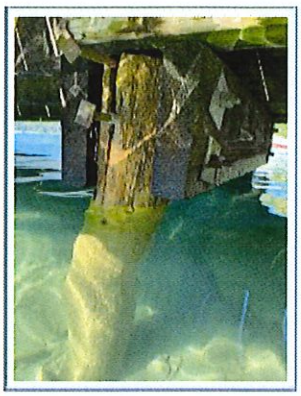
Estimated cost of repairs:

- Pilings - $60,000
- Dock - $40,000
- Installation - $5,000
- Removal and disposal - $25,000

DOCK 4







Dock 4 consists of 6 piles, 66 feet of dock and a concrete abutment.

Stringers: The stringers are in very poor condition and severely rotten.

Decks: The deck is in good condition, appears to of been recently de-decking but beginning to show first signs of wear. Deck height is uneven due to stringer placement.

Pilings: The pilings are in very poor condition, showing significant signs of rot and are no longer providing sufficient structural support. The pilings require immediate replacement. Cross caps are very rotten with minimal structural support still present.

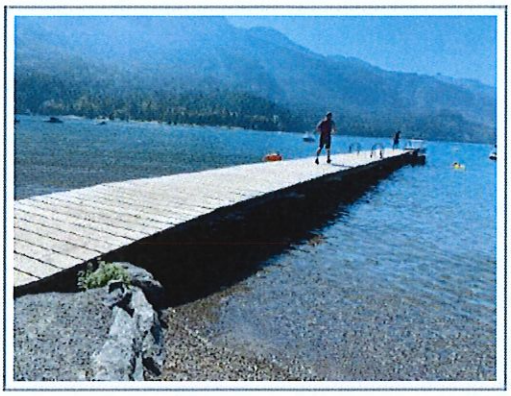
Hardware: The hardware is severely failing, in many areas it is pulling out of wood and no longer sufficiently fastened.

Based on our evaluation, dock 4 requires immediate attention and is no longer providing sufficient structural support.

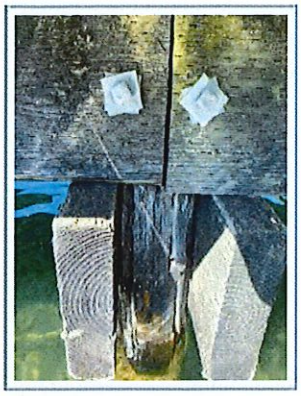
Estimated cost of repairs:

- Pilings - $20,000
- Dock - $20,000
- Installation - $5,000
- Removal and disposal - $10,000

DOCK 5







Dock 5 consists of 12 piles, 127 feet of dock and a concrete abutment.

Stringers: The stringers are in fair condition, minimal signs up rot and showing no concern at this time.

Decks: The deck is in good condition, appears to have been recently re-decked.

Pilings: The pilings are in very poor condition, showing significant signs of rot and are no longer providing sufficient structural support. Previous repair work has been done with the addition of newer pilings but they too are beginning to fail.

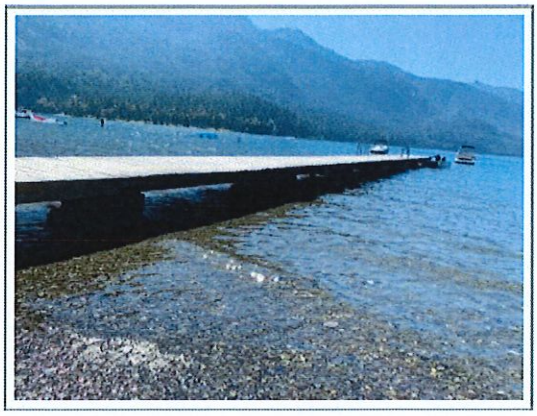
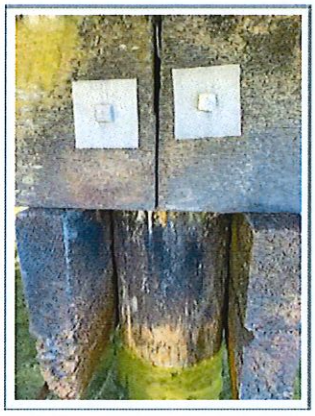
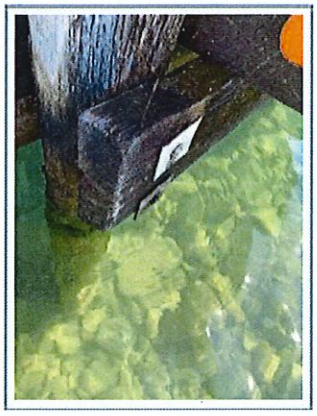
Hardware: Hardware is galvanized and appears to be relatively new, presents no concern at this time.

Based on our evaluation we estimate that this structure has a remaining lifespan of 1-3 years due to the severe rot and failing of the piles.

Estimated cost of repairs:

- Pilings - $40,000
- Dock - $35,000
- Installation - $6.000
- Removal and disposal - $20,000

DOCK 6

Dock 6 consists of 14 piles, 137 feet of dock and a rock abutment.

Stringers: The stringers are in fair condition, minimal signs up rot and showing no concern at this time.

Decks: The deck is in good condition, appears to have been recently re-decked.

Pilings: The 12 piles closest to the shore are beginning to show signs of rot but are providing no significant concern at this time. The two piles furthest from shore are extremely rotten and require immediate attention.

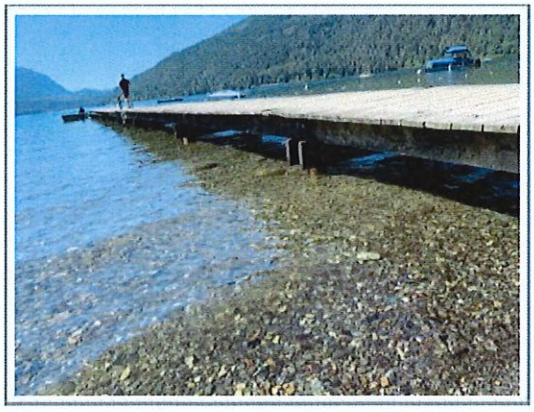
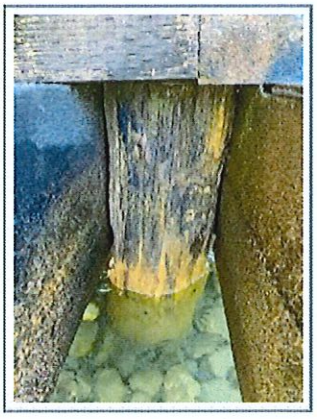
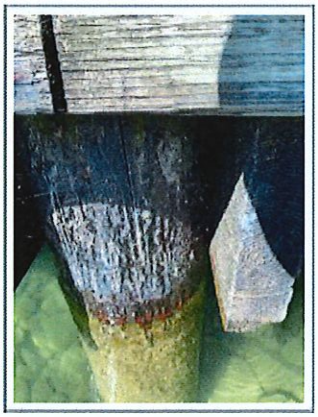
Hardware: The hardware is galvanized, is in fair condition and remains securely fastened

Based on our evaluation we estimate that this structure has a remaining lifespan of 5-10 years with the exception of the recommended immediate replacement of the two end pilings.

Estimated cost of repairs:

- Removal and replacement of two end pilings - $10,000

DOCK 7

Dock 7 consists of 16 piles, 151 feet of dock.

Stringers: The strainers are in moderate condition, with some being recently replaced. Minimal signs of rot and wear.

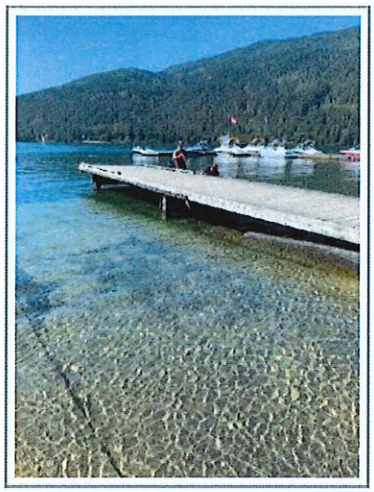
Decks: The deck is in good condition, appears to have been recently re-decked.

Pilings: The piles are beginning to show signs of rot but continue to provide sufficient structural support. There is no immediate concern at this time.

Hardware: The hardware is galvanized steel, is in fair condition and remains securely fastened

Based on our evaluation we estimate that this structure has a remaining lifespan of 7-10 years. There is no immediate action required but the condition of rot on the stringers and piles should be monitored.

DOCK 8



Dock 8 consists of 6 piles and 46 feet of dock.

Stringers: The stringers are in very poor condition and are displaying significant signs of rot.

Decks: The deck is in fair condition, beginning to show signs of wear and rot but presenting no concern at this time.

Pilings: The pilings are in very poor condition, showing rot and a severe lean. The piles are no longer providing sufficient structural support and require the immediate replacement.

Hardware:

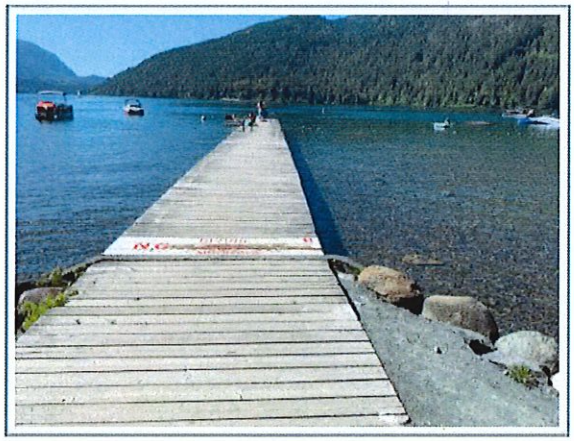
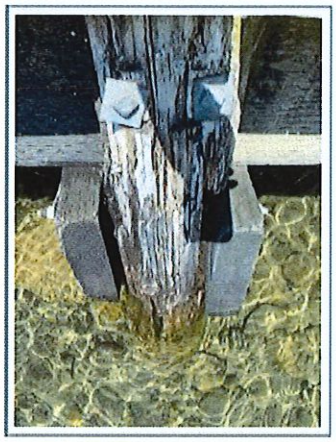
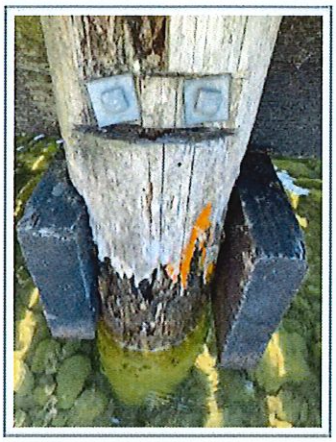
Based on our evaluation this structure requires immediate replacement.

Estimated cost of repairs:

- Pilings - $20,000
- Dock - $14,000

- Installation - $5,000
- Removal and disposal - $10,000

DOCK 9

Dock 9 consists of 12 piles and 110 feet of dock.

Stringers: The stringers are in moderate condition but are beginning to separate at a 3 joints.

Decks: The deck is in moderate condition, and is showing no significant damage or wear.

Pilings: The pilings are severely rotten, they no longer are providing significant structural support. Cross caps beginning to rot.

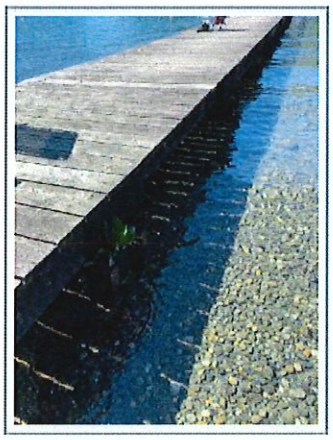
Hardware: The hardware is galvanized and in fair condition, but beginning to pull out from rotten pilings.

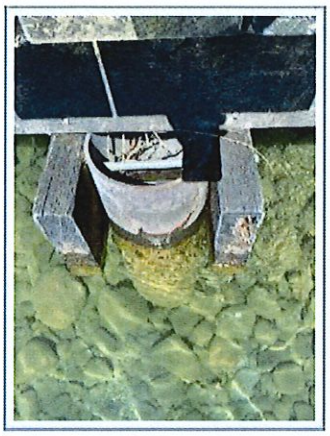
Based on our evaluation this structure requires immediate replacement due to the failed piles.

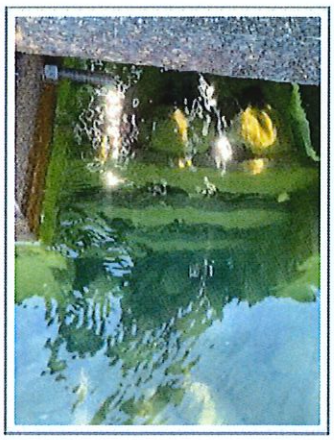
Estimated cost of repairs:

- Pilings - $40,000
- Dock - $30,000
- Installation - $8,000
- Removal and disposal - $25,000

DOCK 10







Dock 10 consists of 20 piles and 126' 5" of dock.

Stringers: The stringers are in moderate condition, no immediate action is required.

Decks: The deck is in moderate condition and is presenting no concern at this time.

Pilings: This structure has newer, steel pilings. There are some cross caps beginning to show signs of rot, two at end of dock require replacement. Facia at end of dock is missing, requires replacement.

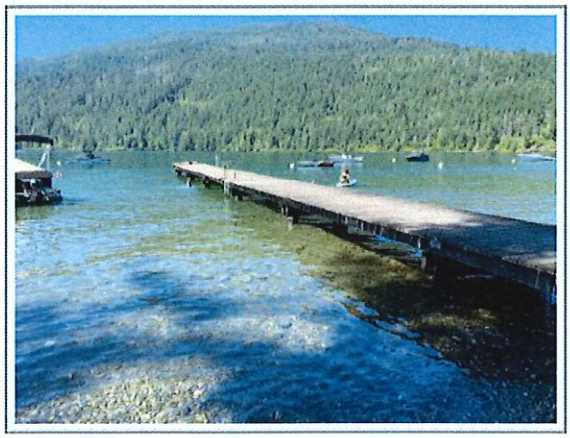
Hardware: Galvanized, good condition.

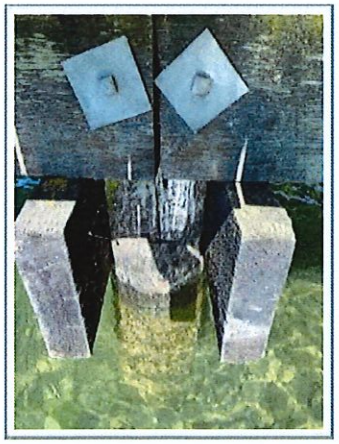
Based on our evaluation we estimate that this structure has a remaining lifespan of 10 or more years with the possible sooner attention to worn cross caps.

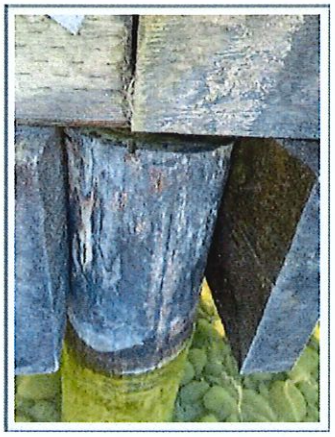
Estimated cost of repairs:

- Replace 2 end pilings - $10,000
- End Boards - $8,000

DOCK 11







Dock 11 consists of 12 piles and 116 feet of dock.

Stringers: The stringers are in good condition, currently presenting no immediate signs of concern.

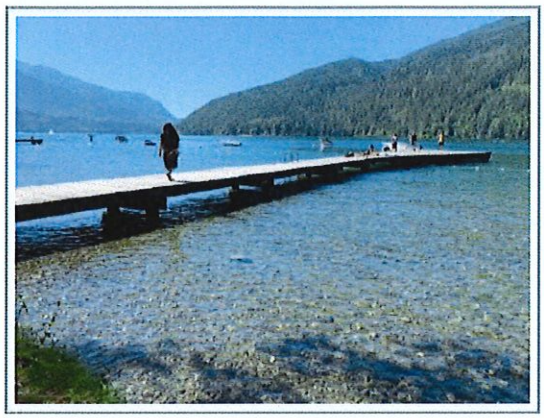
Decks: The deck is in moderate condition, there is no significant damage or wear.

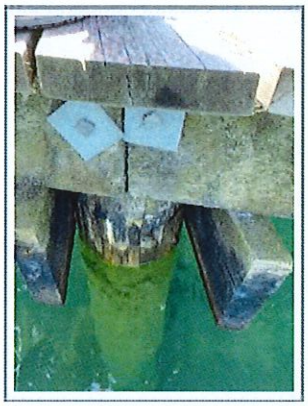
Pilings: The pilings are beginning to show signs of rot but no loss or structural support.

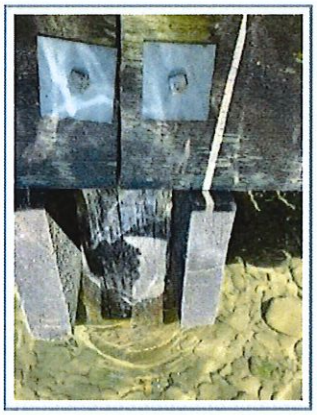
Hardware: The hardware is galvanized, appears to be in good condition and fully secure.

Based on our evaluation we estimate that this structure has a remaining lifespan of 5-10 years.

DOCK 12







Dock 12 consists of 25 piles and 135 feet of dock

Stringers: The stringers are in moderate condition, beginning to show signs of rot but no loss or structural support.

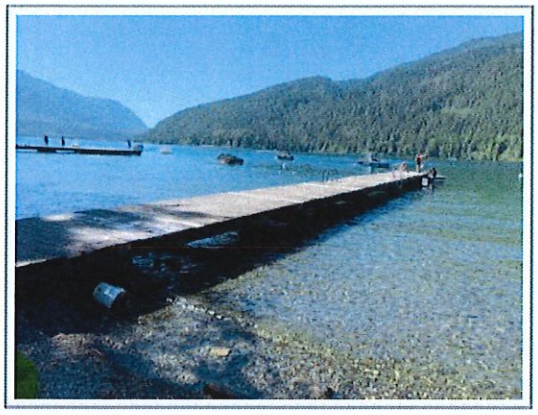
Decks: The deck is in good condition. Currently presenting no immediate signs of concern.

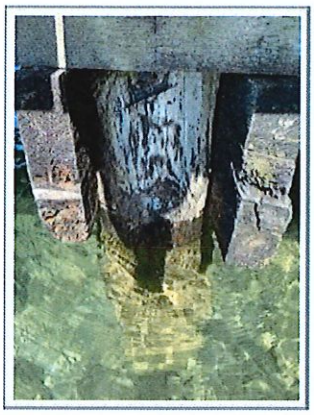
Pilings: Wood pilings are in moderate condition, beginning to show signs of rot but no loss or structural support.

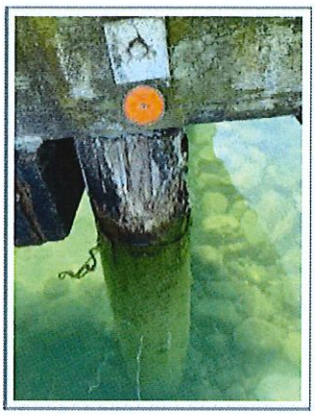
Hardware: Hardware is galvanized, appears to be in good condition and fully secure.

Based on our evaluation we estimate that this structure has a remaining lifespan of 5-10 years.

DOCK 13







Dock 13 consists of 12 piles and 110 feet of dock.

Stringers: Fair condition, currently no signs of rot.

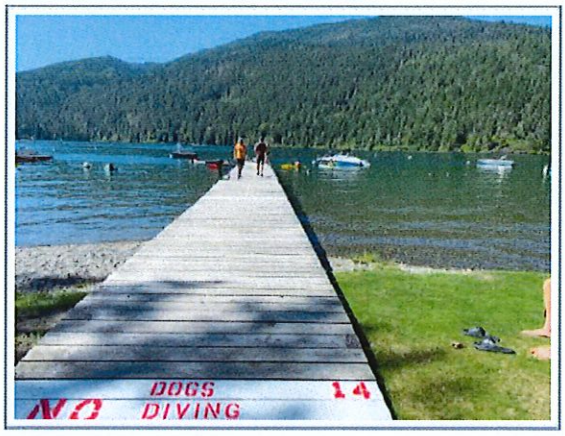
Decks: Good condition. Currently presenting to immediate signs of concern. Some recently replaced deck boards

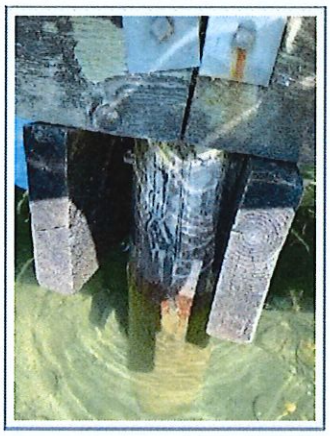
Pilings: Moderate condition, beginning to show signs of rot but no loss or structural support. Some cross caps beginning to show signs of rot.

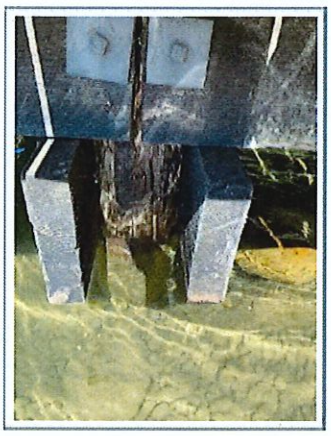
Hardware: Galvanized, good condition and fully secure

Based on our evaluation we estimate that this structure has a remaining lifespan of 5-10 years

DOCK 14







Dock 14 consists of 10 piles and 111 feet of dock. This structure is in fair condition and requires

Stringers: Beginning to separate but in fair condition.

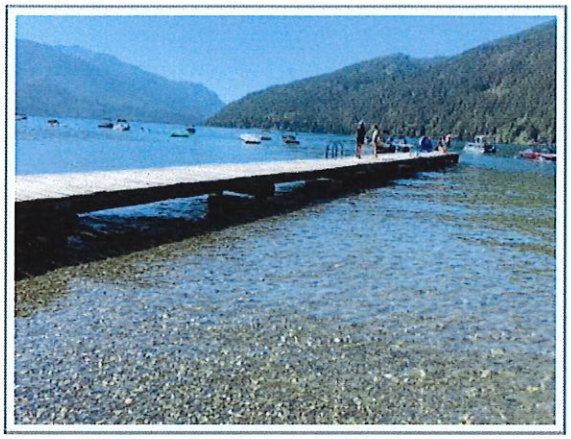
Decks: Good condition. Currently presenting no immediate signs of concern

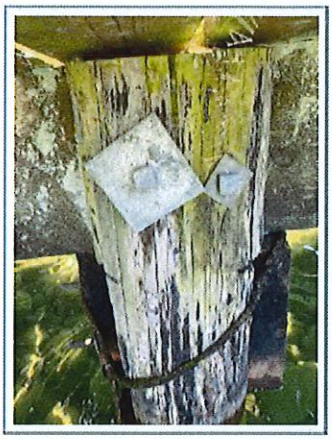
Pilings: Moderate condition, beginning to show signs of rot but minimal loss structural support.

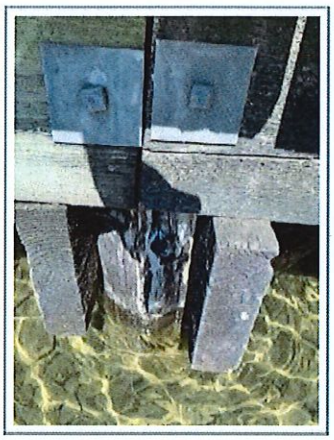
Hardware: Some hardware beginning to pull away from pilings and wood.

Based on our evaluation we estimate that this structure has a remaining lifespan of 5-10 years

DOCK 15







Dock 15 consists of 14 piles and 127 feet of dock.

Stringers: The stringers are in moderate condition but beginning to show signs of rot.

Decks: The deck in is in fair condition and presents no concern at this time.

Pilings: The pilings are rotting from inside-out and no longer structurally supportive. Some cross caps require replacement due to sever rot.

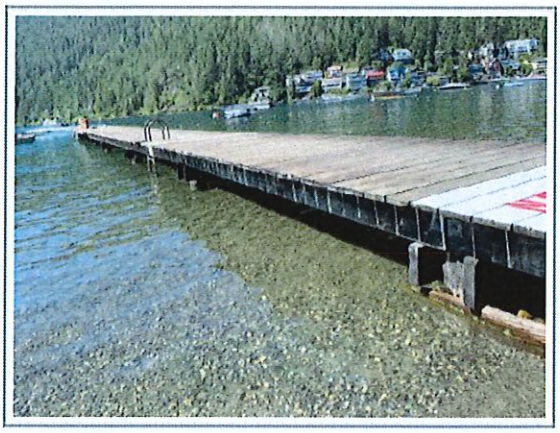
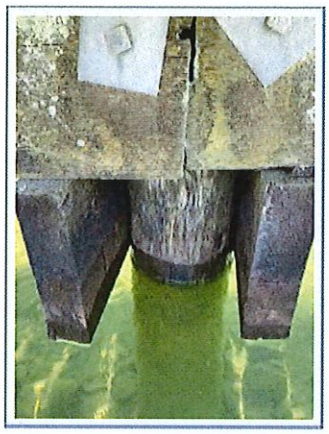
Hardware: The hardware is galvanized and appears to be securely fastened.

Based on our evaluation this structure requires immediate replacement due to the failing of pilings.

Estimated cost of repairs:

- Pilings - $50,000
- Dock - $36,000
- Installation - $8,000
- Removal and disposal - $25,000

DOCK 16


Dock 16 consists of 14 piles and 128' 6" of dock.

Stringers: The stringers are in fair condition

Decks: End boards of dock require replacement

Pilings: End piling and cross cap of dock requires replacement. Remaining piles beginning to rot from inside out.

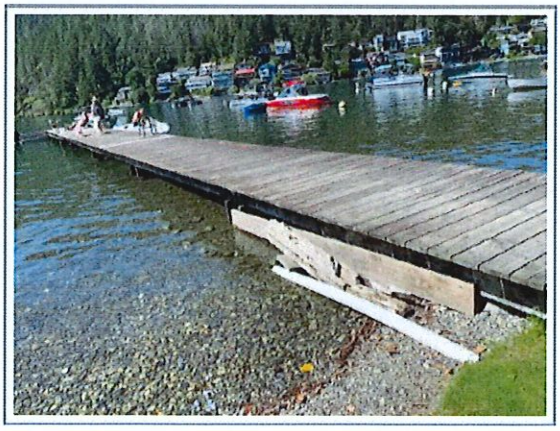
Hardware: Galvanized.

Based on our evaluation we estimate that this structure has a remaining lifespan of 2-5 years. Lifespan can be extended with the selective replacement of rotten pilings and cross caps.

Estimated cost of repairs:

- Pilings - $10,000
- Fascia Boards - $800.00

DOCK 17





Dock 17 consists of 12 piles and 110' 3" of dock.

Stringers: The strings are starting to show movement at joints and beginning stage of rot.

Decks: The deck is in moderate condition, some of the boards appear to of been recently replaced. Overall it is structurally sound and of no concern at this time.

Pilings: Four pilings and cross caps require immediate attention due to sever rot. Remaining 13 are in fair condition.

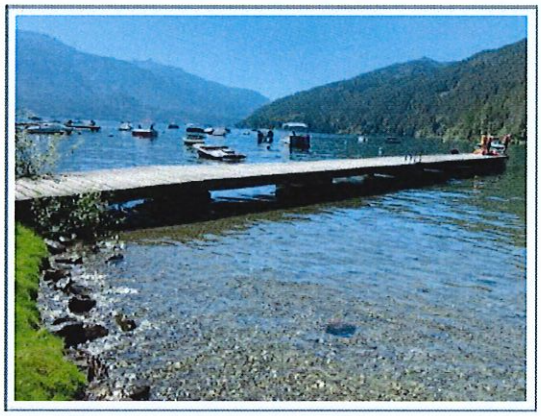
Hardware: The hardware is galvanized, remains securely fastened.

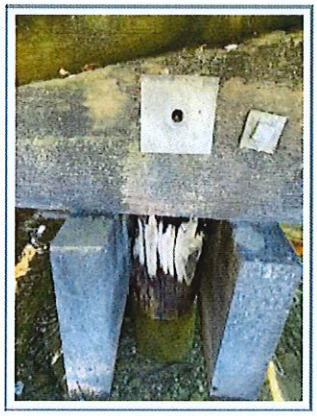
Based on our evaluation we estimate that this structure has a remaining lifespan of 5-10 years with immediate replacement of previously notes piles or with the removal of the end section of the dock which includes the four failed pilings.

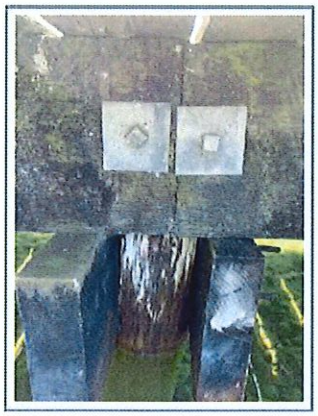
Estimated cost of repairs:

- Replace 4 required Pilings - $16,000
- Re-deck required section of dock - $5,000

DOCK 18







Dock 18 consists of 12 piles and 110 feet of dock. This structure is in fair condition and requires

Stringers: There was some movement noticed in the stringers, beginning stage of rot visible but not at a level of concern.

Decks: The deck appears to of been recently re-decked. It is structurally sound and presents no concern.

Pilings: The pilings are in fair condition, with the exception of one severely rotten pile. There are signs of rot in remaining piles but they remain structurally supportive.

Hardware: Hardware is galvanized. There is some hardware missing from stringers, remaining hardware is in good condition.

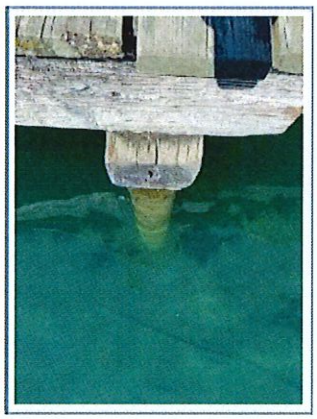
Based on our evaluation we estimate that this structure has a remaining lifespan of 5-10 years with the immediate replacement of noted pile and the replacement of missing hardware.

Estimated cost of repairs:

- Replace 1 Piling and milling hardware - $5,000

DOCK 19





Dock 19, the swim dock, consists of 26 piles and 285 feet of dock.

Stringers: The stringers are in good condition, minimal signs of rot presents.

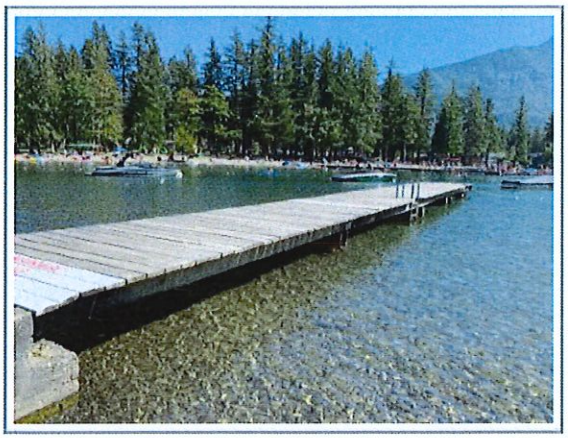
Decks: The deck boards are showing some rot with sections of deck boards requiring replacement, additionally some facia is missing.

Pilings: The pilings are in overall good condition. We would urgently recommend strapping piles to cross caps to ensure a secure connection between piles and deck.

Hardware: The hardware is galvanized, in good shape and fully secure.

Based on our evaluation we estimate that this structure has a remaining lifespan of 10 years with the addition of strapping to prevent failure in high water.

DOCK 20





Dock 20 consists of 8 piles and 78' of dock.

Stringers: The stringers are in moderate condition, with minimal signs of rot

Decks: The deck is in good condition and appears to be recently re-decked.

Pilings: The pilings are in poor condition and the cross caps beginning to show rot.

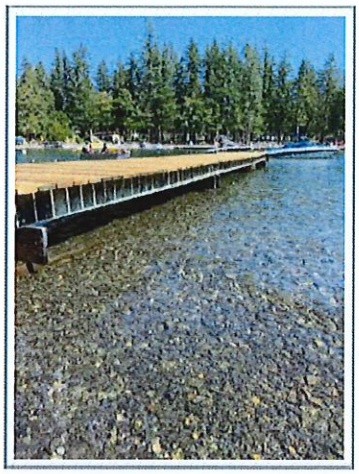
Hardware: The hardware is galvanized, the hardware is pulling from piles but secure in the stringers

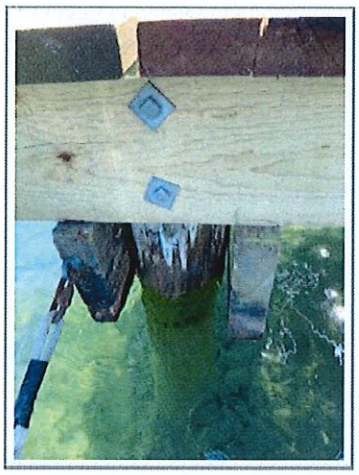
Based on our evaluation we estimate that this structure has a remaining lifespan of 1-3 years due to the current condition of pilings.

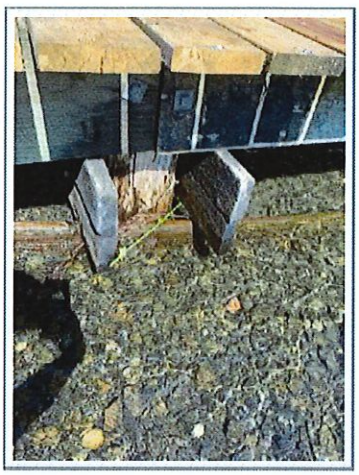
Estimated cost of repairs:

- Replace 8 pilings & cross beams - $30,000
- Replace deck with QME 78' deck- $22,000
- Installation - $ 5,000
- Removal and disposal - $16,000

DOCK 21







Dock 21 consists of 8 piles and 57' 6" of dock.

Stringers: The stringers are in good condition, showing minimal signs of rot. Some stringers appears to be recently replaced.

Decks: The deck is in excellent condition, appears to of been recently re-decked.

Pilings: The pilings are beginning to show signs of rot. The end piles and end cross cap require replacement as they are no longer sufficiently supportive.

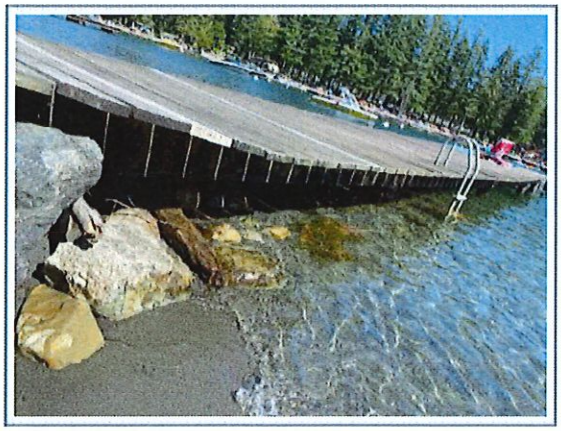
Hardware: The hardware is galvanized and is properly secure.

Based on our evaluation we estimate that this structure has a remaining lifespan of 5-7 years with the immediate replacement of the end piles or the removal of the end section.

Estimated cost of repairs:

- Replace 2 pilings & cross beams - $8,000
- Wood end-section - $ 3000

DOCK 22



Dock 22 consists of 8 steel piles and 75' of dock.

Stringers: The stringers are in good condition, there are minimal signs of rot present.

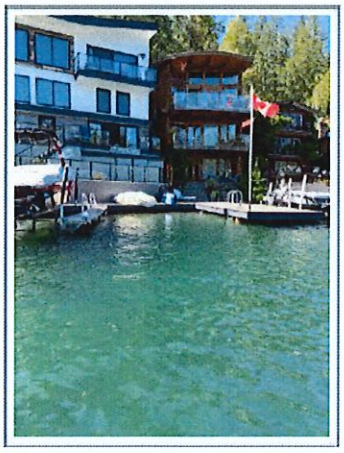
Decks: The deck is in good condition, some of the deck boards have been recently replaced.

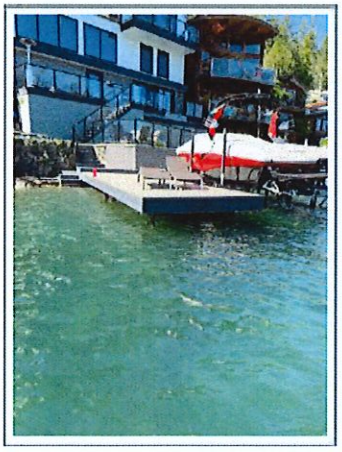
Pilings: The pilings are steel piles, they are plum and secure and are presenting no concern.

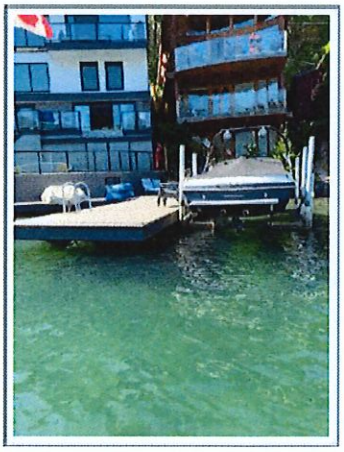
Hardware: The hardware is galvanized and is properly secure.

Based on our evaluation we estimate that this structure has a remaining lifespan of 10 or more years with maintenance to decks and stringers.

DOCK 23 & 24 (PRIVATE DOCK)







Dock 23 & 24 is a private residential dock structure.

Decks: Relatively new decking and it is in good condition.

Pilings: The pilings are comprised of various materials, each with various structural conditions. These pilings are a major concern due to the lack of structural integrity they provide.

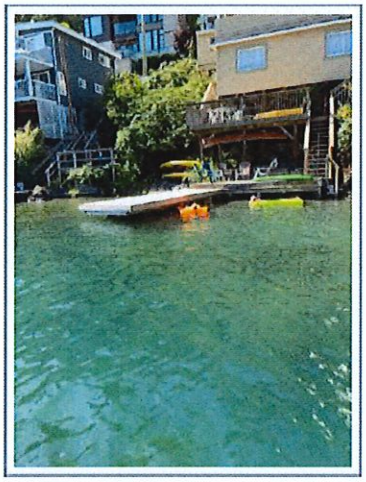
Hardware: The hardware is galvanized and in good condition.

Based on our evaluation we recommend the immediate replacement of this structure due to the lack of integrity of the supporting pilings.

Estimated cost of repairs:

- Due to the depth of water at the end of these docks, long-lengths of piles is required.
- Replace 4-6 pilings & new QME decks - $40,000-$60,000
- If the top decks can be salvaged and reinstalled after driving pilings the cost will be $20,000 less

DOCK 25 (PRIVATE DOCK)



Dock 25 is a private residential dock structure.

Stringers: The stringers are in good condition, no signs of rot and presenting no concern at this time. Facia is in good condition

Decks: Fairly new decking, appears to be in good condition.

Pilings: The pilings are presenting a concern due to the abnormal pilings used.

Hardware: The hardware is galvanized and is properly secured.

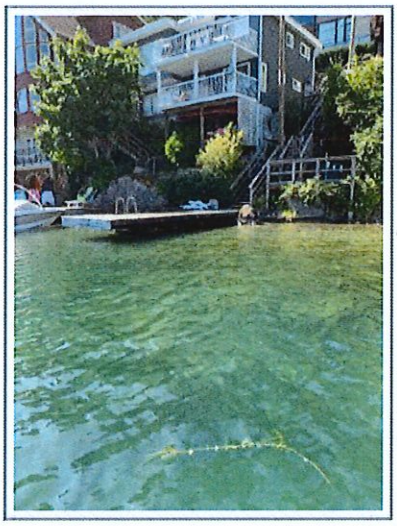
Based on our evaluation we recommend the immediate replacement of this structure due to the instability of the supporting structures used in replacement of traditional pilings.

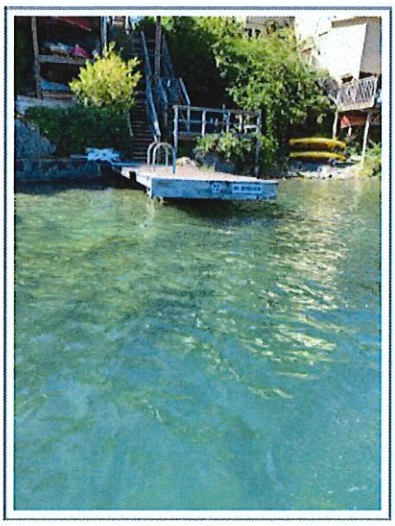
Estimated cost of repairs:

- Replace 4-6 pilings - $30,000

- New QME deck- $20,000

DOCK 26 (PRIVATE DOCK - LABELED AS "22")





Dock 26 is a private residential dock structure.

Stringers: The stringers are in fair condition but beginning to show signs of rot.

Decks: The deck boards in fair condition.

Pilings: Wood cribbing in place of pilings, cribbing is providing minimal structural support.

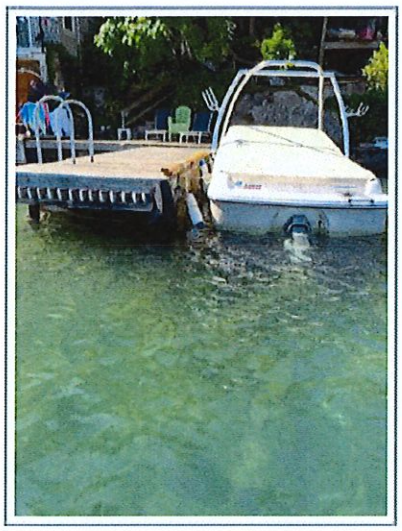
Hardware: Hardware is galvanized and is properly secured.

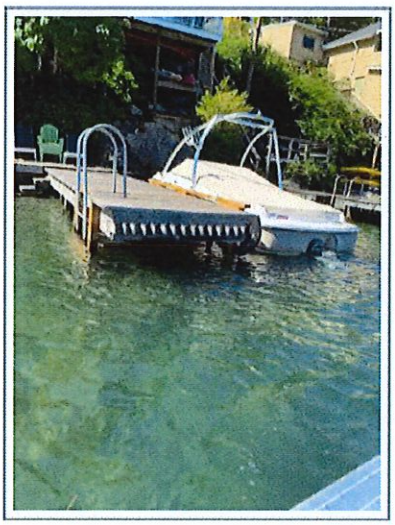
This dock is cantilevered roughly 10' from the wood cribbing, presenting a major concern for the structural support provided towards the end of the dock. Based on our evaluation we recommend the immediate replacement of this structure.

Estimated cost of repairs:

- Replace 4-6 pilings - $30,000
- New QME deck if required- $20,000

DOCK 27 (PRIVATE DOCK)





Dock 27 is a private residential dock structure.

Stringers: The stringers are in good condition with minimal rot present.

Decks: The deck is in fair condition, providing no structural concern.

Pilings: The wood pilings are in poor condition and showing significant signs of rot.

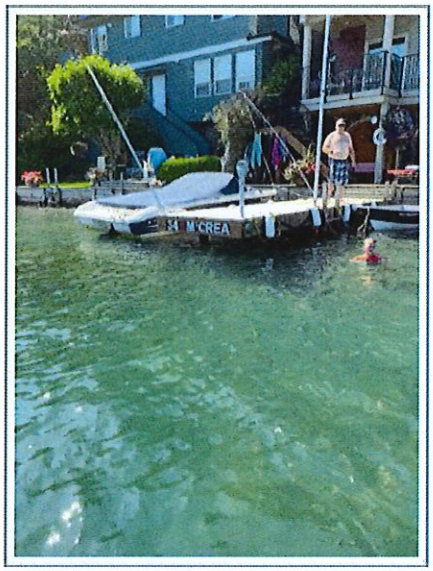
Hardware: The hardware is galvanized and in good condition but it is pulling away from pilings where rot is very severe.

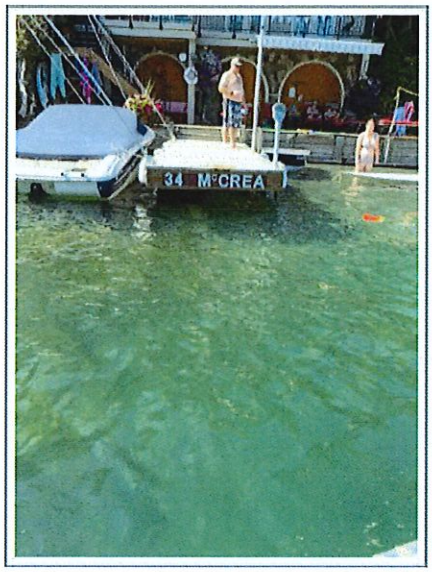
Based on our evaluation we estimate that this structure has a remaining lifespan of 1-3 years due to the current condition of the piles.

Estimated cost of repairs:

- Replace 4-6 pilings - $30,000
- New QME deck if required- $20,000

DOCK 28 (PRIVATE DOCK)





Dock 28 is a private home dock supported by wood cribbing with a concrete abutment.

Decks: The decks are in fair condition, the decking is presenting no structural concern at this time.

Pilings: Wood cribbing used as supporting structure. The cribbing is showing severe signs of rot and is failing. The cribbing is no longer providing structural support.

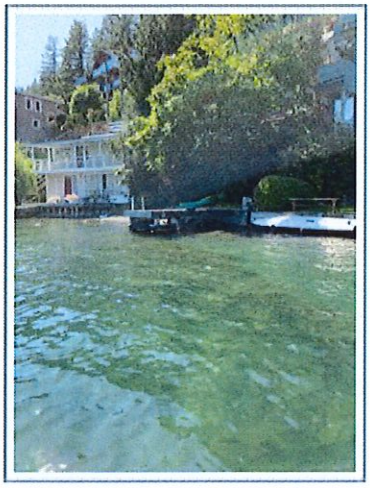
Hardware: The hardwire is galvanized, it is in fair condition but is lacking integrity where wood structure is rotting and failing.

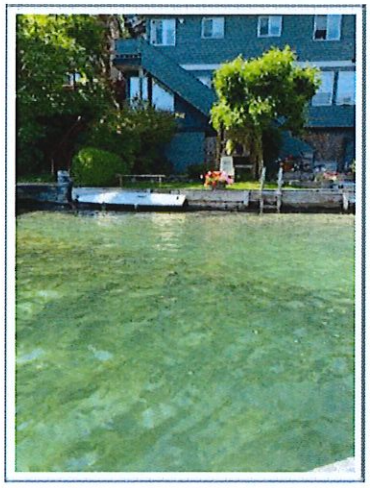
Based on our evaluation we do not recommend the continued use of this structure due to the support structures failing. The immediate replacement of this structure is recommended.

Estimated cost of repairs:

- Replace 4-6 pilings - $30,000
- New QME deck- $20,000

DOCK 29 (PRIVATE DOCK)





Dock 29 is a private home dock supported by wood cribbing with a concrete abutment.

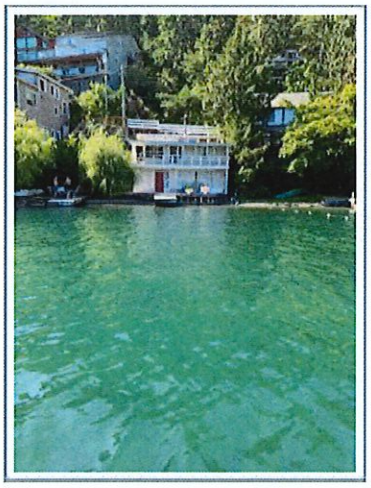
Decks: The decks are in fair condition. The decking is presenting no structural concern at this time.

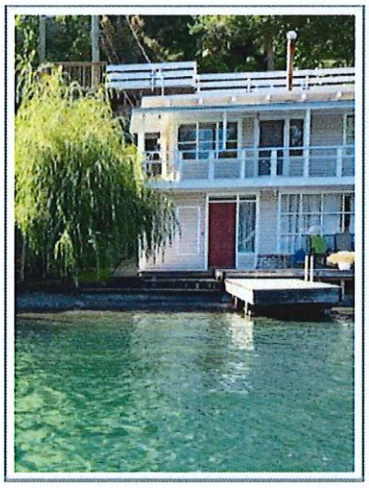
Pilings: Wood cribbing is used as the supporting structure. The cribbing is showing severe signs of rot and is failing. The cribbing is no longer providing structural support.

Hardware: The hardware is galvanized, it is in fair condition but is lacking integrity where wood structure is rotting and failing.

Based on our evaluation we do not recommend the continued use of this structure due to the support structures severely failing. The immediate replacement of this structure is recommended.

DOCK 30 (PRIVATE DOCK)





Dock 30 is a private home dock. Minimal inspection was possible at time of evaluation due to limited access to dock.

Stringers: The stringers are in fair condition and present minimal signs of rot.

Decks: The deck structure is relatively new and presents no concern at this time.

Pilings: This structure is supported by wood cribbing, which severely lacks structural integrity.

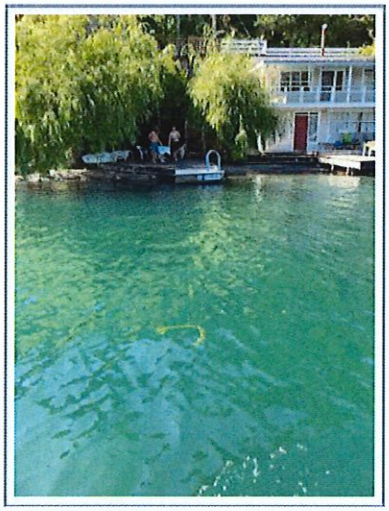
Hardware: The hardware is galvanized and in fair condition but is lacking integrity where the wood structure if failing.

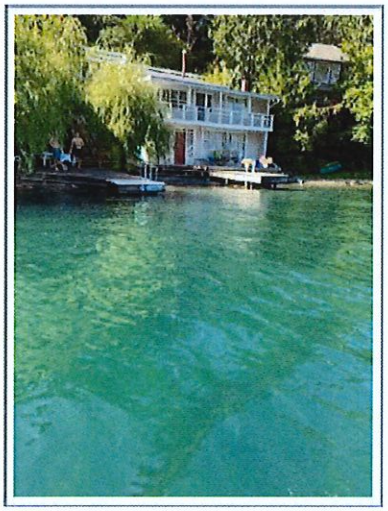
Based on our evaluation we do not recommend the continued use of this structure due to the support structures severely failing. The immediate replacement of this structure is recommended.

Estimated cost of repairs:

- Replace 4-6 pilings - $30,000
- New QME deck- $20,000

DOCK 31 (PRIVATE DOCK)





Dock 31 is a private residential dock structure.

Stringers: The stringers are in fair condition. No concern present at this time.

Decks: The deck is in good condition, deck boards are fairly new and structurally sound.

Pilings: Wood cribbing at shore side of dock, with small pilings at the far end to provide additional support. Structure is in fair condition but is not a recommended support system.

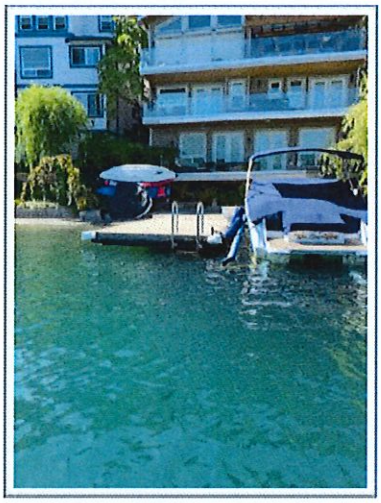
Hardware: The hardware is galvanized and appears to be properly secure.

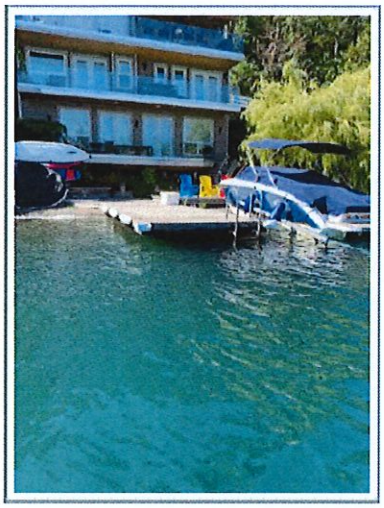
Based on our evaluation the deck structure is in good condition but we recommend proper piling foundation to maximize the life of deck.

Estimated cost of repairs:

- Replace 4-6 pilings - $30,000
- New QME deck- $20,000

DOCK 32 (PRIVATE DOCK)





Dock 32 is a private residential dock structure on galvanized steel posts.

Stringers: The stringers are in good condition, cross caps are in good condition.

Decks: The decks are in good condition. Treated wood is used for decking which is not approved within regulations.

Pilings: The pilings are made of galvanized steel posts and and are providing sufficient structural support.

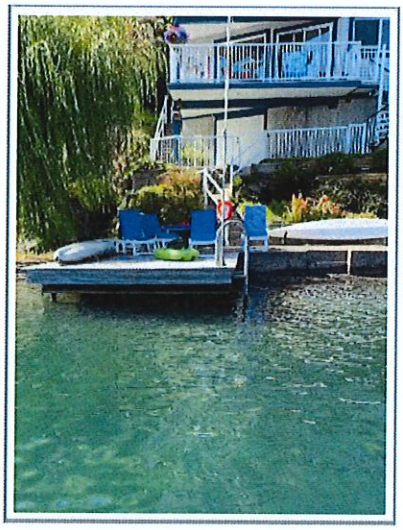
Hardware: Hardware is galvanized, and appears to be in good condition and is properly secure.

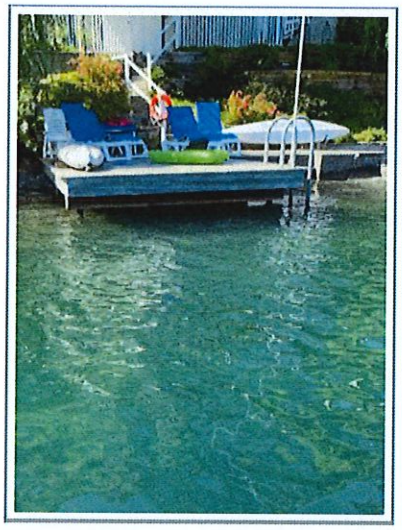
Based on our evaluation the treated wood should be replaced immediately. Supporting structure is providing sufficient support and has a lifespan of 10 or more years.

Estimated cost of repairs:

- Replace pressure treated decking with Sunwalk Decking - $6000

DOCK 33 (PRIVATE DOCK)





Dock 33 is a private dock on galvanized steel posts.

Stringers: The stringers are in good condition, presenting no concern at this time.

Decks: The decks are in good condition. Treated wood is used for the decks which is not approved within regulation.

Pilings: The piling are galvanized steel posts and are providing sufficient structural support.

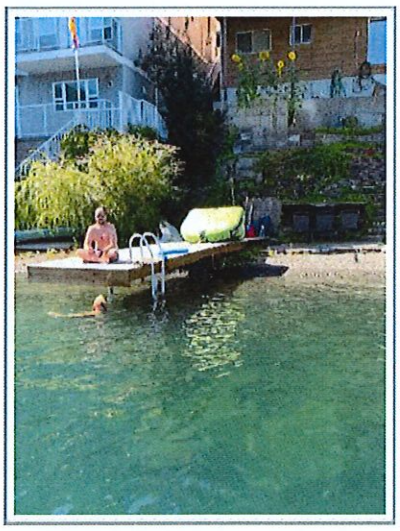
Hardware: The hardware is galvanized, and appears to be in good condition and is properly secure.

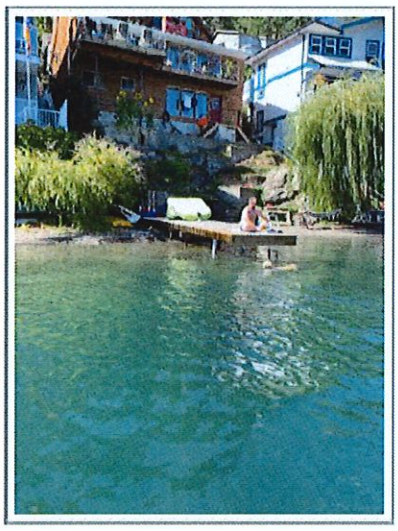
Based on our evaluation the supporting structure is providing sufficient support and has a lifespan of 10 or more years. In order to be compliant with government regulation the pressure treated wood should be replaced immediately.

Estimated cost of repairs:

- Replace pressure treated decking with Sunwalk Decking - $6000

DOCK 34 (PRIVATE DOCK)





Dock 34 is a private residential dock structure.

Stringers: The stringers are in good condition and present no concern at this time.

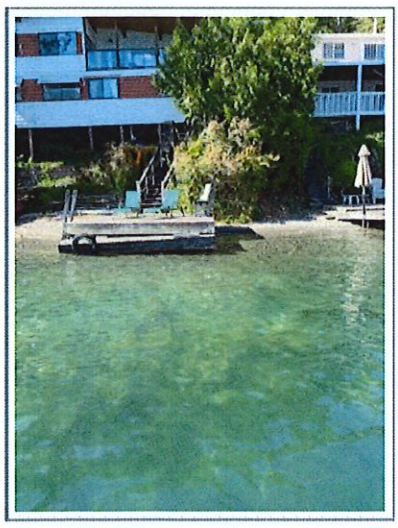
Decks: The deck is in good condition and is showing no signs of concern.

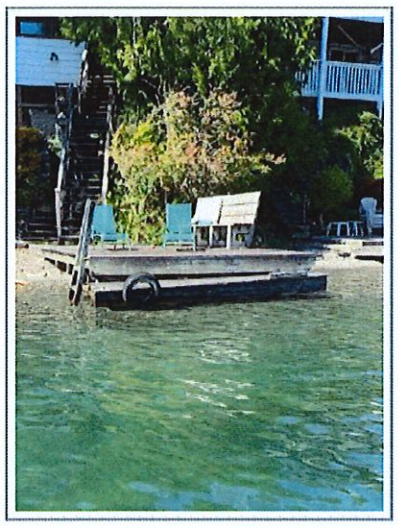
Pilings: Wood pilings are used as support structure. The pilings are showing significant signs of rot causing the dock to be listing to the North-west.

Hardware: The hardware is galvanized and is fair condition but it is pulling away where wood is rotting.

Based on our evaluation this structure requires the immediate replacement of piles on North finger of the dock. With the recommended piling replacement the overall structure has an estimated lifespan of 3-5 years.

DOCK 35 (PRIVATE DOCK)





Dock 35 is a private residential dock structure.

Stringers: The stringers are in fair condition but the cross caps are in very poor condition and showing severe signs of rot.

Decks: The deck is in good condition and presenting no concern at this time.

Pilings: The wood pilings are showing significant signs of rot. The front lower portion of dock is severely rotten and no longer securely fastened.

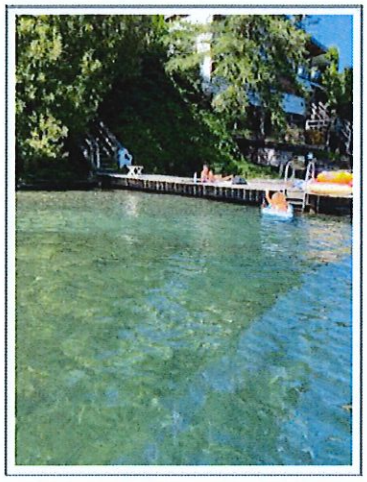
Hardware: The hardware is galvanized but loosing integrity and pulling away where the wood is rotting.

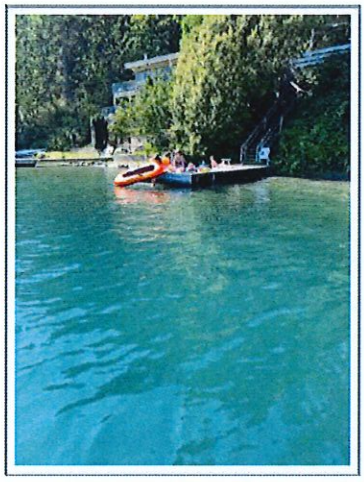
Based on our evaluation this structure requires the replacement within 1-3 years and the front portion of dock must be immediately removed.

Estimated cost of repairs:

- Replacement of total structure - $ 40,000 - $50,000

DOCK 36 (PRIVATE DOCK)





Dock 36 is a private residential dock structure.

Stringers: The stringers are in fair condition and not of any concern at this time.

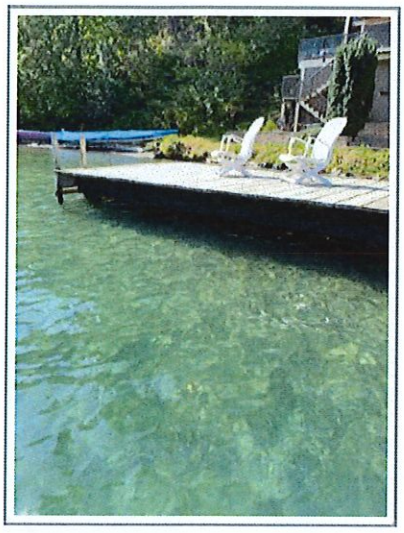
Decks: The deck is in fair condition but listing due to pile movement.

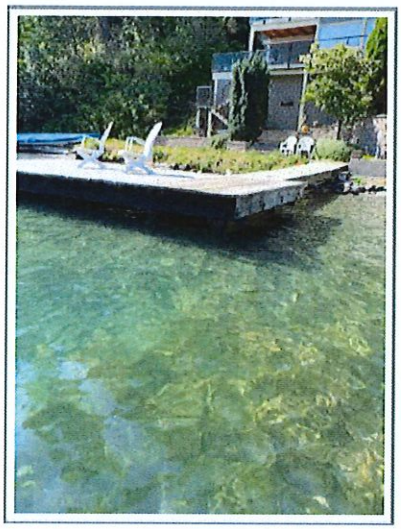
Pilings: Wood pilings beginning to show signs of rot and no longer level to one another.

Hardware: Galvanized, pulling away where wood is rotting.

Based on our evaluation this structure has a remaining life span of 5-7 years with the correction or replacement to the two north most piles.

DOCK 37 (PRIVATE DOCK)





Dock 37 is a private residential dock structure.

Stringers: The stringers are in good condition and of no concern at this time.

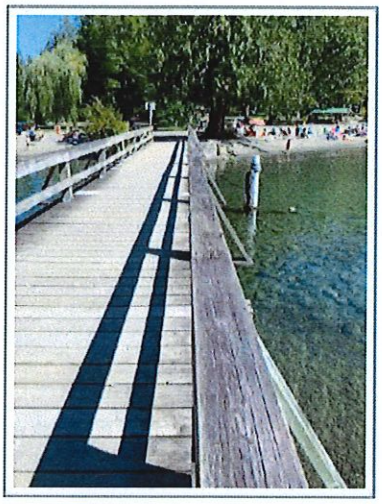
Decks: The deck is in good condition and of no concern at this time.

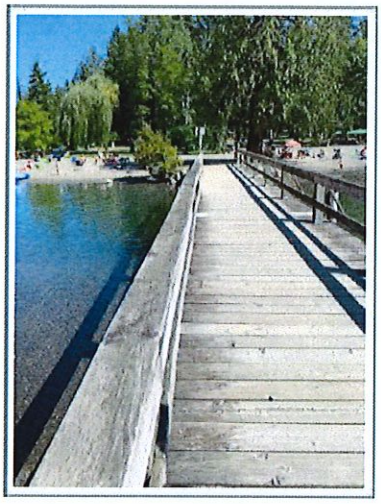
Pilings: The deck is supported by wood cribbing which is providing minimal structural support.

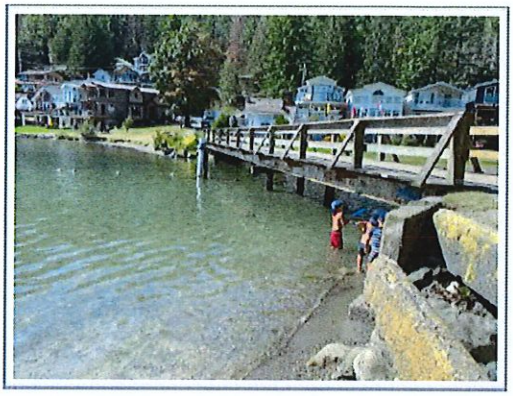
Hardware: The hardware is galvanized, appears to be securely fastened.

Based on our evaluation this structure has a remaining life span of 7-10 years with the replacement of the wood cribbing to pilings. Without this replacement significant wind or wave action may likely causes failure to the cribbing structure.

WALKING BRIDGE - LARGE







The large walking bridge consists of 6 piles and is 95' long and 10' wide.

Stringers: The stringers are steel and presenting no concern at this time.

Decks: The deck boards are in fair condition and are presenting no immediate concern. Railings appear crooked, but remain secure.

Pilings: The wood piles are showing severe rot. The piles are leaning and no longer sufficiently supporting the structure.

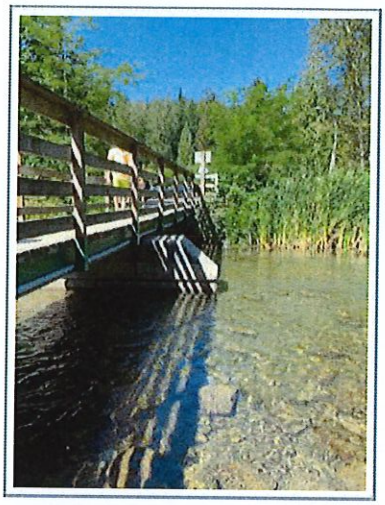
Hardware: Bridge connection hardware is in fair condition.

Based on our evaluation this structure requires immediate replacement of pilings.

Estimated cost of repairs:

- Replace pilings - $30,000 - $40,000

WALKING BRIDGE - SMALL





The walking bridge consists of 6 piles and is 95' long and 10' wide. The walking bridge is in good overall condition.

Stringers: Steel stringers showing no concern

Decks: Deck is in good condition, the railings are safe and secure.

Pilings: The bridge is supported by concrete blocks which are at risk of failing due to sediment washout.

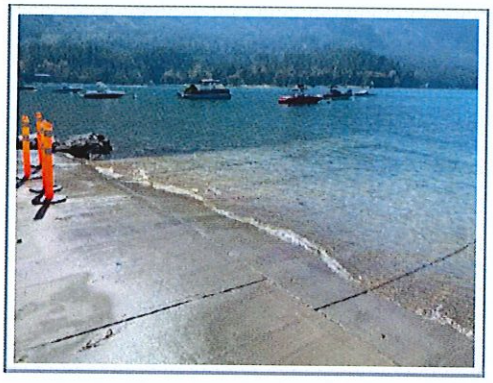
Hardware: Bridge connection hardware is in good condition

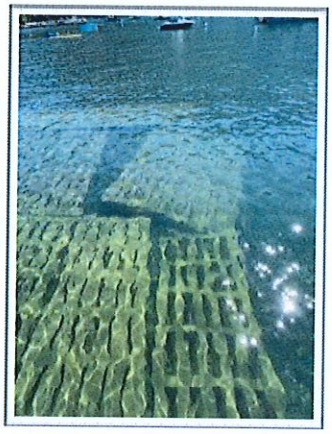
Based on our evaluation we recommend replacing the concrete blocks with steel piles with wide-flange cross caps in order to avoid failure caused by sediment washout.

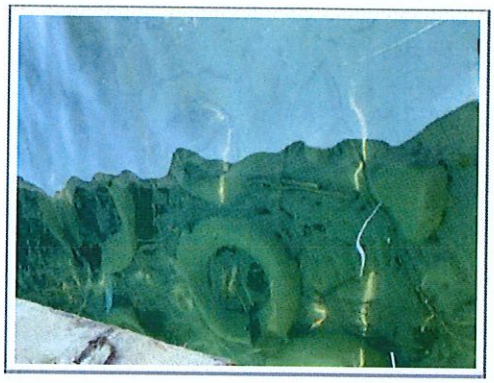
Estimated cost of repairs:

- Replace concrete blocks with pilings and wide-flange cross caps - $30,000 - $40,000

BOAT LAUNCH AT DOCK 4







This boat launch is located adjacent to dock 4. Launch is 31' wide by 38' long.

Concrete pad has failed at end portion of boat launch due to gravel washout. Concrete mats are slipping out Beginning portion of launch at the shore is in good condition. Boat lunch should be closed to use until repairs are made to avoid further damage to the launch and possible damage to user's equipment.

At time of repair, significant debris found in proximity to the boat launch should be removed.

Estimated cost of repairs:

- Repairs to boat launch can drastically vary based on the extent of repairs desired. We recommend the use of sheet-pilings to properly retain the sediment which is supporting the concrete, in order to prevent sediment washout. The cost of this is to be determined based on the scope of work desired and the materials used.