Wild Dunes Yacht Harbor Dock Study

Location:
Wild Dunes Resort
Isle of Palms, South Carolina

Dated:
December 14, 2014

Prepared for:
WDYH POA

Prepared by:

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JGT

Dock Inspections:

Wild Dunes Yacht Harbor Dock Study

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The purpose of the following engineering study on the Wild Dunes Yacht Harbor Docks A, B, C and D was to evaluate at the overall condition of the docks, piles and utility systems. This study is divided into six sections: **I. Purpose & Background, II. Report Investigation & Methodology, III. General Findings, IV. Recommendations, V. Underwater Inspection and VI. Electrical Study.**

I. PURPOSE & BACKGROUND

Jon Guerry Taylor and Associates, Inc. (JGT) was commissioned to perform an engineering study of the physical condition of the five (5) timber floating docks at the Wild Dunes Yacht Harbor. These docks were Dock A, Dock B, Dock C, Dock D and Dock E. An underwater investigation was conducted by Salmons Dredging Corporation of Charleston, SC. Salmons Dredging inspected the piles and underside of the timber floating docks on Docks C, D and E. The Electrical Study was conducted by Charleston Engineering of Charleston, SC. Charleston Engineering inspected the electrical system along all five (5) docks. The purpose of this study is to determine the issues, problems, repair costs and life expectancy of the five (5) timber floating docks.

Wild Dunes Yacht Harbor is a private marina located on the Morgan Creek on Isle of Palms, South Carolina. The Yacht Harbor is adjacent to the Dewees Island Marina and Ferry Dock and the City of Isle of Palms Marina. Much of the current Yacht Harbor was rebuilt following Hurricane Hugo, which occurred in September 1989. Dock B of the Yacht Harbor was replaced following Hurricane Floyd in September of 1999. The Bulkhead surrounding the Yacht Harbor was replaced in 2000. The Yacht Harbor docks are wood construction with poly (plastic) floats and are held in place with timber piling. There is an aluminum gangway to access each dock from the uplands. ***Figure 1*** shows the location and layout of the Yacht Harbor and subject Docks.

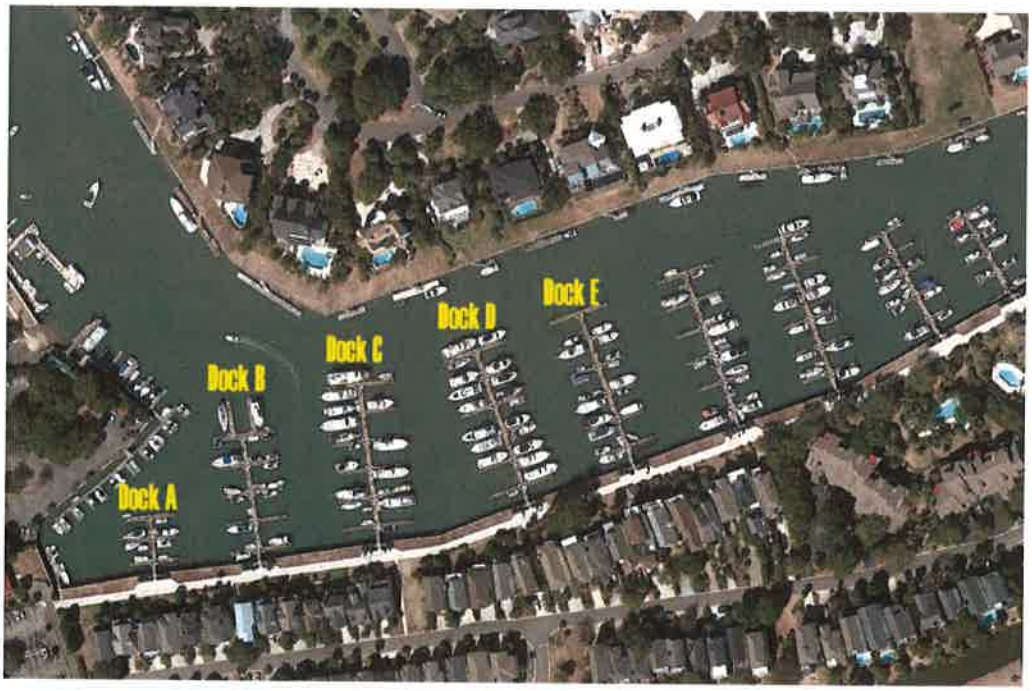

Figure 1

II. REPORT INVESTIGATION & METHODOLOGY

JGT conducted several site visits in the development of the information for the report. Over 400 photographs were taken along with notes outlining the condition of the dock structures. Each dock was walked, inspected, photographed and documented. The notes and photographs included in this report represent a summary of the existing conditions as they were observed in the field during this site visits.

III. GENERAL FINDINGS

The Docks are constructed out of pressure treated timber. The utilities run beneath the decking of the docks and the bottom of the docks are sealed with marine grade plywood. Beneath the plywood, 2"x6" timber members are mounted to the bottom of the docks and are used to bolt the poly (plastic) floats to the dock. The pile guides along the main docks are external hoop style with a single roller. The finger docks are held in place with internal four (4) roller pile guides, which are located at the end of each finger dock. All of the piles are round pressure treated timber piles. The intersection of the main dock and the finger docks are chamfered. These chamfered areas are where the utility connections and the dock boxes are placed.

DOCK A

Dock A is the smallest and the most protected of the docks inspected. It is located at the western end of the Morgan Creek Marina basin near the Dewees Island Marina docks. **Photo 1** shows the dock from the gangway.

Photo 1

The main issues found with Dock A are some rotten wood, missing or broken rub rails and damaged or broken rollers on the pile guides. Several of the pile guides have been replaced on the dock, in some cases with new aluminum pile guides. The new pile guides have upper and lower rollers with the lower rollers being below the deck surface. All of these pile guides are located at the ends of the finger docks and have rollers on all four (4) sides of the pile. The piles along the main dock use the hoop and single roller style of pile guide. **Photos 2, 3** and **4** show the three different styles of pile guides on Dock A. **Photo 2** and **Photo 4** are the original pile guides which are constructed of galvanized steel. **Photo 3** is the new pile guide style which is constructed of aluminum.

Photo 2

Photo 3

Photo 4

On several of the newer style aluminum pile guides, the lower rollers have been damaged from the movement of the dock. These pile guide rollers should be replaced and inspected on a frequent basis. **Photo 5** shows where there is a bolt missing from the pile guide

Photo 5

Photo 3 also shows areas of the timber decking that are rotten. Rotten wood can also be seen in **Photo 6**. There are several areas of rotten wood along the header board as well.

Photo 6

Photos 7, 8, 9 and **10** show where the rub rail is broken or has come loose from the timber header board of the dock. Some areas the rub rail has failed and in other areas the timber has failed from rot.

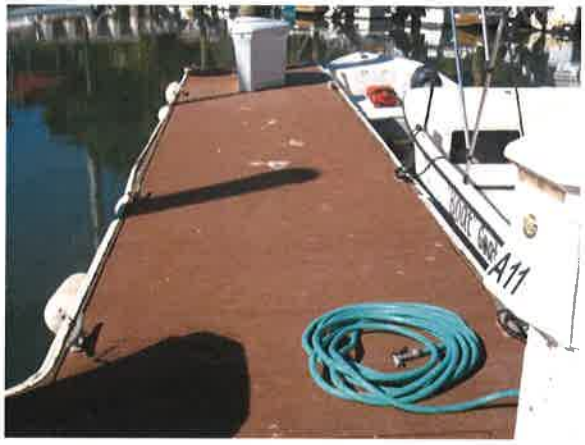

Photo 7

Photo 8

Photo 9

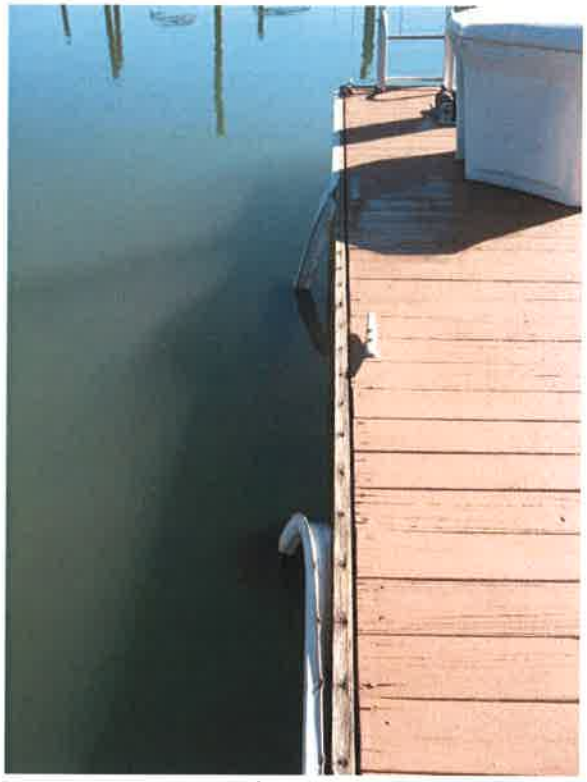

Photo 10

Photos 11 and **12** show where the utilities have been damaged. **Photo 11** shows where the conduit has been broken and exposed wires are visible. **Photo 12** shows a broken hose bib handle.

Photo 11

Photo 12

Photo 13 shows how the gangway sits on the dock. Based on the marking, the gangway has not moved nor has the dock shifted. **Photo 14** shows the emergency ladder at the end of the dock. The ladders on all of the docks are mounted securely and are in good shape. **Photo 15** and **Photo 16** show the fire hose and fire extinguisher box that is located on the dock. These are common on all of the docks and appear to be in good shape.

Photo 13

Photo 14

Photo 15

Photo 16

The timber decking on the dock has been painted and sealed. There are areas where rot has begun to take place on the timber decking. The sub-structure of the timber docks was not inspected as it would have required removing deck boards. There were also several areas in which the timber plywood on the bottom of the docks was rotten and had come loose from the structure.

DOCK B

Dock B is adjacent to and longer than Dock A. Dock B is the newest dock inspected. The dock was replaced following Hurricane Floyd in 1999. Much Like Dock A, Dock B is of timber construction with plastic floats. There are several different styles of pile guides located on the dock. The styles are much like the styles found on Dock A, though some are in worse shape.

Photo 17 and **Photo 18** show the main dock of Dock B. Unlike the other docks, Dock B has the piles along the main dock in pairs. On the other docks, the piles are staggered on either side along the

main dock. **Photo 19** shows the gangway which appears to be stable and properly positioned on the tread plate.

Photo 17

Photo 18

Photo 19

Much like Dock A, some of the pile guides have been replaced with newer pile guides. The main dock pile guides are hoop style with a single roller on the inboard portion of the pile guide. These guides appear to be in good condition and are functioning properly. The issue that is seen with many these main dock pile guides is the attachment to the dock. Several of the main dock pile guides are not mounted/bolted directly to the dock structure but instead they have been blocked outward to have proper alignment to the piles. It does not appear that the blocking has been thru-bolted to the dock structure as several are loose or move under little force. The pile guides are bolted to the blocking but the blocking does not appear to be securely fastened to the main dock structure. **Photo 20-22** show several of these pile guides that have been blocked outward. In

Photo 22 gaps can be seen between the pile guide and the blocking along with in between the blocking itself.

Photo 20

Photo 21

Photo 22

Several of the other hoop/single roller pile guides have been mounted properly to the main dock structure but several of these have experienced significant corrosion. Examples of these can be seen in **Photos 23** and **24**.

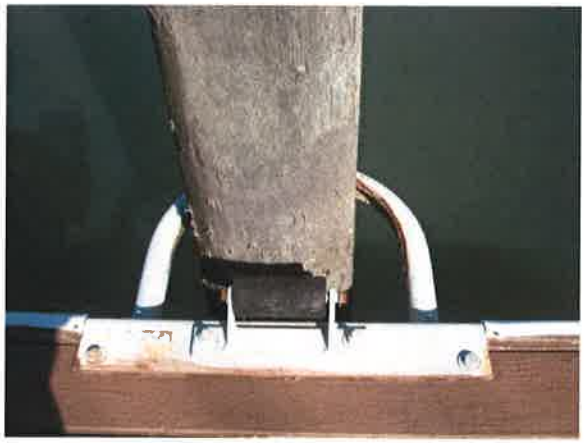

Photo 23

Photo 24

In both of these photos, severe corrosion of the hoop portion of the pile guide is evident. This is occurring from the movement of the pile against the galvanized metal hoop. The galvanizing treatment has been worn off exposing the unprotected metal.

The finger docks have several different styles of internal pile guides due to the replacement of the original guides. The original pile guides are galvanized while the newer pile guides are aluminum, similar to Dock A.

Photo 25

Photo 26

Photo 25 and **Photo 26** show the two different types of finger dock pile guides on Dock B. **Photo 25** is the aluminum replacement guide and **Photo 26** is the original galvanized steel style of pile guide.

Photo 27-29 shows the rusted, galvanized steel pile guides. The rusted pile guides are more common near the end of Dock B. The rusted or oxidized piles guides are structurally sound but should be monitored. Worn rollers can also be seen in **Photo 28** and **Photo 29**. These photos also show that the pile is not centered in the pile guide. This misalignment that has caused the rapid wear to the pile guide rollers.

Photo 30 shows the new aluminum pile guide. These pile guides had been cut to be installed. This can be seen in **Photo 30** where the lower pile guide roller is. A small section was cut out and then once installed the cutout section was bolted to the dock separately. This does not appear to be causing an issue but it does mean the pile guide assembly is not one unit.

Photo 27

Photo 28

Photo 29

Photo 30

On Dock B, the gusset plates at the chamfer between the main dock and the finger docks are beginning to signs of corrosion and the bolts holding the joints are corroded to a point where several need to be replaced. **Photo 31-33** show examples of where this corrosion is taking place and **Photo 32** shows where the bolts are in very bad shape.

Photo 31

Photo 32

Photo 33

Photo 34 is a view inside of one of the finger pile guide openings. It is apparent in this picture that the plywood layer under the dock structure has been pulled away or rotted away from the dock structure and is hanging down. This is exposing the inside of the dock structure to possible wave action.

Photo 34

Dock C

Dock C is much like Dock B but a little longer and has much of the same issues as the previously discussed docks.

Photo 35 and **Photo 36** show the main Dock C and the aluminum gangway. The gangway appears to be stable and properly positioned on the tread plate.

Photo 35

Photo 36

The pile guides along the main dock are galvanized steel, single roller hoop style. They appear to be in good condition with minor corrosion. The pile guides are mounted properly to the main dock structure with bolts and no blocking. **Photo 37** shows the main dock pile guides.

Photo 37

The pile guides at the ends of the finger docks are made up of two (2) different types of internal pile guides, a galvanized steel pile guide, and an aluminum pile guide. The aluminum internal pile

guides on Dock C are different than the other aluminum pile guides found on previously discussed Docks A and B. The galvanized steel internal pile guides are shown in **Photos 38-41.** All of these pile guides appear to be in good condition and functioning properly. In **Photo 39** it can be seen that this steel pile guide is slightly different than the other steel pile guides. The rollers on the pile guide in **Photo 39** are smaller. The pile guide functions properly.

Photo 38

Photo 39

Photo 40

Photo 41

The aluminum style of internal pile guide found on Dock C has upper and lower rollers on two sides of the guide and one smaller pile guide roller on just one or both of the other sides.

Photo 42

Photo 43

Photo 42 and **43** show this style of aluminum internal pile guide. **Photo 44-48** show the aluminum pile guides along with the roller assemblies. In **Photo 44**, the lower roller can be seen. In **Photo 45** and **Photo 46,** the other smaller rollers can be seen. It can also be seen that there are two different styles and mounting methods for these smaller rollers. **Photo 47** and **Photo 48** show that there are no smaller rollers on one side of the aluminum pile guides. This would allow the timber pile to impact or rub against the dock structure. It is unknown why these rollers were not installed at these internal pile guide locations.

Photo 44

Photo 45

Photo 46

Photo 47

Photo 48

Another concern with the aluminum internal piles guides is the lower roller system. Many of the lower rollers are broken, very badly worn or even completely missing. **Photo 49-51** show these lower rollers that have been damaged. These rollers are damaged because of the manner in which the docks rotate during wave action. The lower pile guide rollers restrict the movement and rotation of the dock. The location or depth of the rollers in the dock means these rollers are subjected to significant impacts and forces.

Photo 49

Photo 50

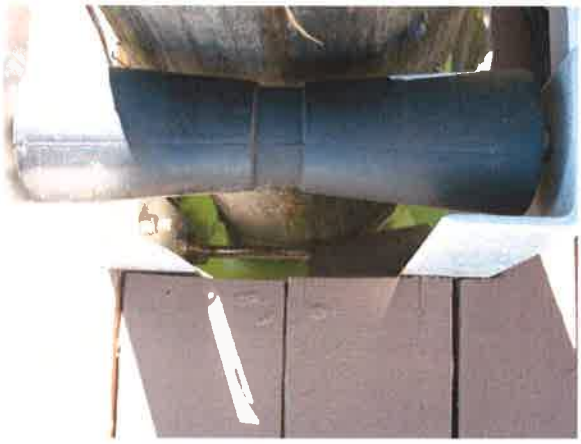

Photo 51

Along Dock C there are several areas where the timber is rotten or has come loose from the dock structure. **Photos 52-54** show a couple of these areas where the header boards are rotten or the fasteners have corroded away and the boards have come loose. These are representative of a condition that exists in several areas.

Photo 52

Photo 53

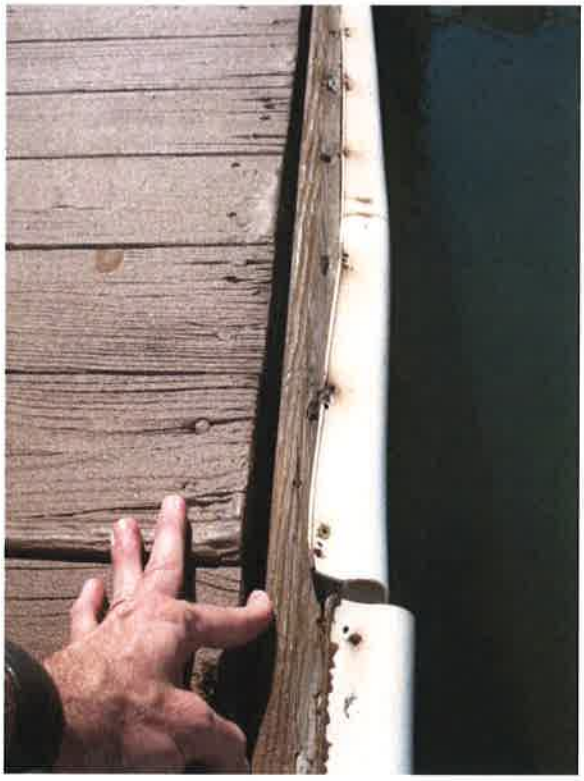

Photo 54

Photo 53 and **Photo 54** show that the rub rail molding is beginning to fail. **Photo 55** shows another area where the rub rail molding is loose and needs to be replaced. **Photo 55** and **Photo 56** show a sampling of the gusset plates along Dock C. They appear to be in good condition with little corrosion taking place.

Photo 55

Photo 56

One item that was noticed on Dock C is the finger dock at C17/C19 has a noticeable "bow" in the dock. **Photos 57-58** show the bow in this finger dock. In **Photo 57** the "bow" extends out toward the right of the picture. **Photo 58** is from the opposite end of the finger dock and the "bow" extends toward the left of the picture. This finger dock is also where **Photos 52** and **53** were taken and the spot can be seen approximately ½ of the way down the finger on the left-hand side.

Photo 57

Photo 58

The reason for the "bowing" of this finger dock is not known and could not be seen. The loose stringer boards from **Photo 52** and **53** give an indication that the bowing of the dock could be from the timber structure members warping. The finger dock does not appear to have been impacted or sustained any type of damage that would cause this bowing. The finger dock appears to be floating level and is stable.

Dock D

Dock D is approximately the same size and shape as Dock C. Dock D also has many of the same issues and problems as the previously discussed docks.

Photo 59 and **Photo 60** shows the gangway and its position on the tread plate. It appears that the dock has shifted approximately 6-8 inches to the right in **Photo 59**. In **Photo 60**, the gangway has shifted over to where it is beginning to impact the cleat on the side on the main dock. **Appendix A** includes a report dated *September 5, 2014,* Titled *"Morgan Creek Marina-Dock D Inspection"*. This report outlines the inspection and finding of why the gangway has moved to the right. This report finds that the main dock has a slight "bow" or bend in it. This has caused the portion of the main dock nearest to the gangway to shift. This September 5th report was conducted prior to the underwater inspection by Salmons Dredging Corp. of Dock D.

Photo 59

Photo 60

Following the Underwater inspection by Salmons Dredging Corp., it is believed that the movement dock and the bend is a result of an impact to the main dock. From the underwater inspection and looking at the gusset plates within the area of the bend, there appears there has been movement in some of the timber structural members beneath the decking. There was evidence that several of the bolts had pulled into the timber and the timber members had shifted. These items appear to have been caused by an impact to the main dock. The timber decking was not removed within this area to inspect the timber structure. It does not appear that the dock is broken or in danger of coming apart, only that a portion of the dock has shifted.

It is apparent that within this area where the main dock is "bowed", the main dock also dips (near the fire hose cabinet). **Photo 61, 62** and **63** shows this dip in the main dock as indicated by the leaning fire hose cabinet. It is unknown and could not be determined if the dip in the main dock and the bowing of the main dock are related. It could be caused by floatation issues or is simply a product of the "bowing" of the main dock.

Photo 61

Photo 62

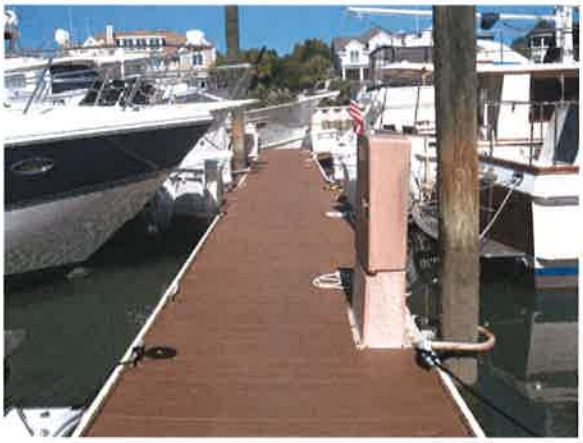

Photo 63

Much like the other docks, Dock D has several different types of pile guides. The external pile guides along the main dock are the same as the previous docks. The external pile guides along Dock D are experiencing significant corrosion of the galvanized metal. **Photos 64** and **65** show the single roller hoop style external pile guides and the corrosion that is occurring.

Photo 64

Photo 65

There are three (3) different types of internal pile guides at the ends of the finger docks. The original galvanized pile guides and two (2) other different types of aluminum pile guides. The two other types of aluminum pile guides are similar to the aluminum pile guides on the other docks and have the same problems. The original galvanized pile guides are in fair condition with mostly

surface corrosion. **Photos 66** and **67** show the typical galvanized internal pile guide and their typical condition on Dock D. The rollers on the galvanized internal pile guides appear to be in good condition.

Photo 66

Photo 67

Photos 68-71 are of one of the other types of aluminum internal pile guides. **Photos 70** and **71** show where the pile guides were cut for installation. Though this is not ideal, the pile guide functions properly. These pile guides have lower rollers and all appeared to be functioning properly.

Photo 68

Photo 69

Photo 70

Photo 71

Photos 72-77 show the second type of aluminum internal pile guide. These internal pile guides also have lower rollers on two sides, however; several of these rollers are broken as is seen in **Photo 75** and **76**. This internal pile guide also does not have rollers on the back side of the pile guide as seen in **Photo 77**. The damage to the timber pile can be seen from the dock rubbing against the pile.

Photo 72

Photo 73

Photo 74

Photo 75

Photo 76

Photo 77

Much like the other docks, the galvanized metal gussets at the corners of the main dock and the finger docks, are showing signs of corrosion. **Photos 78-82** show these galvanized metal gussets

along Dock D. In all of these photos, there are signs that the lower bolts are severely corroded and are beginning to break apart.

Photo 78

Photo 79

Photo 80

Photo 81

Photo 82

Dock E

Dock E is the last dock that was inspected. It is very similar to Dock C in terms of layout and issues. The main issues being: pile guide rollers, gusset place corrosion and rotten or deteriorating timber of the dock structure.

The main dock single roller hoop style external piles guides are in average to fair condition with signs of corrosion beginning. **Photos 83** and **84** show these external pile guides on Dock E.

Photo 83

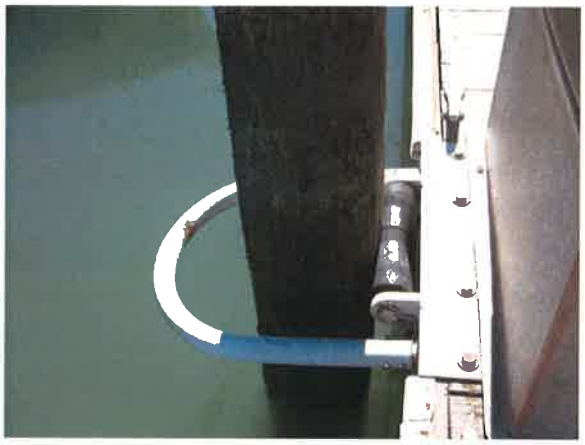

Photo 84

As with Dock C, Dock E has the same three (3) different types of internal pile guides on the finger docks. The galvanized steel internal pile guides are in average to fair condition with signs of minor corrosion. **Photos 85** and **86** show these pile guides and their typical condition on Dock E.

Photo 85

Photo 86

The two (2) different types of aluminum internal pile guides are the same styles as Dock C. **Photos 87-89** show one type of these internal pile guides.

Photo 87

Photo 88

Photo 89

Photo 89 shows where the pile guide bracket has been cut in order to fit around the piles. This installation method is typical for these internal aluminum pile guides on the other docks and Dock E.

The second type of aluminum internal pile guide is the same style that is on the other docks along with Dock E. As with the other docks, this style of internal pile guide has several broken lower pile guide rollers. **Photos 90-92** show these pile guides and **Photo 92** shows where the lower pile guide roller is broken and missing.

Photo 90

Photo 91

Photo 92

The galvanized gusset plates on Dock E at the intersections of the main dock and the finger docks are typical of the other docks inspected. **Photos 93-97** show these gusset plates along Dock E. In **Photo 94**, the corrosion is worse than the others photographed. The lower portion of the gusset plates and the lower bolts (closest to the waterline) are showing signs of significant corrosion.

Photo 93

Photo 94

Photo 95

Photo 96

Photo 97

There are a couple of timber header boards along the finger docks that are loose. **Photos 98** and **99** show two such areas. A combination of rotten wood and corroded fasteners appear to be the reason for the looseness of the boards.

Photo 98

Photo 99

The gangway on Dock E appears to rest on the main dock straight and level without signs of lateral movement. The gangway is seen in **Photo 100**.

Photo 100

Floatation

The dock floatation was inspected during the underwater inspection of the docks. It was noted in the underwater inspection and during the JGT surface inspection that the galvanized bolts that hold the floats to the docks are badly corroded. The plastic floats are bolted to a 2x timber member which is fastened to the dock structure.

Photo 101

Photo 102

Photo 103

Photos 101 and **102** show the timber 2x member that the float is attached to which is then attached to the bottom of the dock structure. **Photo 102** also shows where the timber 2x member is split. **Photo 103** is of a typical galvanized bolt that fastens the plastic float to the timber 2x member. Many of these bolts and nuts have corroded away to a point where they are basically a corroded stub holding the float. These will continue to get worse and the loss of movement of the plastic floats is possible during heavy wind or wave action. The plastic float appears to be in good condition with no signs of problems or damages.

IV. RECOMMENDATIONS

The timber docks at the Wild Dunes Yacht Harbor are approximately 25 years old except for Dock B which is approximately 16 years old. Given the age of the dock structure, the docks are in good condition. Many of the issues that have been outlined in this report, the electrical report and the underwater inspection are common on a dock structure of this age. JGT estimates that the remaining life expectancy of the timber floating dock system at the Wild Dunes Yacht Harbor is approximately 7-10 years depending on future maintenance.

For this JGT report, the main issues present through out all of the docks are the following:

- Loose or rotten timber boards through out the dock. This is mostly the header boards
- Missing or broken rollers on the internal pile guides.
- Corrosion of the external single roller hoop pile guides.
- Corrosion of the galvanized gusset plates
- Corrosion of the bolts holding the plastic floats to the dock structure.

The docks are not in danger of coming apart, nor is there any danger to the Owners or public using the docks. Though these issues should be addressed or fixed in order to extend the life of the docks.

Many of the timber header boards along the main docks and finger docks can be re-fastened using new galvanized or stainless steel fasteners. None of the timber members on the dock are rotten to the point of requiring replacement but most need to be re-fastened or secured to the dock.

There are some rollers on the pile guides that are worn and some that are broken. Many of the broken pile guide rollers are the lower rollers within the dock on the aluminum pile guides. Many of these lower rollers are broken because the lower rollers have restricted the rolling movement of the docks. This has caused the lower rollers to experience higher loads thus breaking many of them. There could be an argument made whether to replace the lower rollers, leave the pile guides and broken rollers as is or remove the lower rollers and allow the dock to rotate and move without the rollers. The original galvanized rollers did not have lower rollers.

Though the external single roller hoop style pile guides are experiencing corrosion of the galvanized metal, they are still functioning property. They should be monitored for further deterioration. The external pile guides along the main dock of Dock B should be re-fastened more securely as mentions in the Dock B section of this report. JGT recommends the external pile guides should be inspected annually or after a significant storm (or wave) event in order to monitor their condition and the corrosion.

The galvanized gusset plates are in average to fair condition along all of the docks inspected. Most of the corrosion is surface rust except for a few plates. Many of the bolts holding the gusset plates are corroded to the point where they will not be able to be removed. JGT recommends that the gusset plates should be inspected on an annual basis or after a significant storm (or wave) event in order to monitor the corrosion and their condition.

The plastic floats supporting the timber dock structure are in good condition. The issue is the galvanized bolts that attach the plastic floats to the timber dock structure. These bolts are approximately 50% corroded away. Should a significant storm or wave event occur it is possible that these plastic floats may come loose, move or become unattached from underneath the docks. Given the estimated life expectancy of the entire dock system, JGT would recommend securing with stainless steel lag bolts. It is recommended that new stainless steel lag bolts be installed on the four (4) corners of each float on all of the floating docks. The new lag bolts would be installed adjacent to the existing bolts. It is estimated that for all five (5) docks, this would cost approximately $60,000.00. This work must be done by a diver from underneath the structures. JGT recommends that plastic floats should be inspected annually or after a significant storm (or wave) event in order to monitor their condition and attachment to the dock structure.

It is estimated that the total costs of repairs (not including the electrical) is approximately $65,000-$70,000.00 for the items listed above. JGT recommends an annual inspection of the docks in order to monitor their condition and assess future issues.

Appendix A:

Morgan Creek Marina-Dock D Inspection
Dated: *September 5, 2014*

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September 5, 2014

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RE: Morgan Creek Marina
Dock D Inspection

The purpose of the inspection of Dock D at the Morgan Creek HOA Marina was to determine the cause of the dock/gangway shift of the dock. Based on a site visit conducted on August 27th, 2014 during low tide, it appears that the timber dock has shifted approximately 6 inches laterally. This is gauged from the position of the gangway on the dock and the rub marks of the gangway on the tread plate. **Photo 1** shows where the gangway has rubbed in the past and its new location. **Photo 2** shows that the gangway has moved over enough to hit and damage the existing cleat.

Photo 1

Photo 2

JGT inspected the entire dock along with the finger docks and pile guide/pile systems. There are 17 timber piles and pile guides on Dock D. Each pile and pile guide was inspected to determine where each pile was rubbing and the amount of pressure on each pile guide roller. Based on the inspection of Dock D, there was not a defined pattern to the pile guide pressure to this was the cause of the dock movement.

The finger docks were straight, though there was twisting occurring in several of the docks, and the intermediate piles along the main dock did not appear to be bound up or under pressure. There was not increased wearing of the pile guide rollers based on the estimated age of the rollers. The timber piles did not look worn or splintered from aggressive wear or pressure. There are several piles that are worn and several pile guide rollers that are worn but based on the wear pattern and location, they do not correspond to moving the main dock in the direction it has moved.

Photos 3 and **4** show typical piles and pile guides.

Photo 3

Photo 4

Photo 5 shows a pile and pile guide roller under pressure at the end of a finger dock. This pressure does not correspond to the movement of the dock and the finger dock is straight.

Photo 5

Based off the inspection of Dock D, JGT feels that the something has come loose or broken within the structure of the main dock. Through the inspection and pictures it can be seen where the break or bend occurs along the main dock. **Photo 6** shows the Dock D main dock.

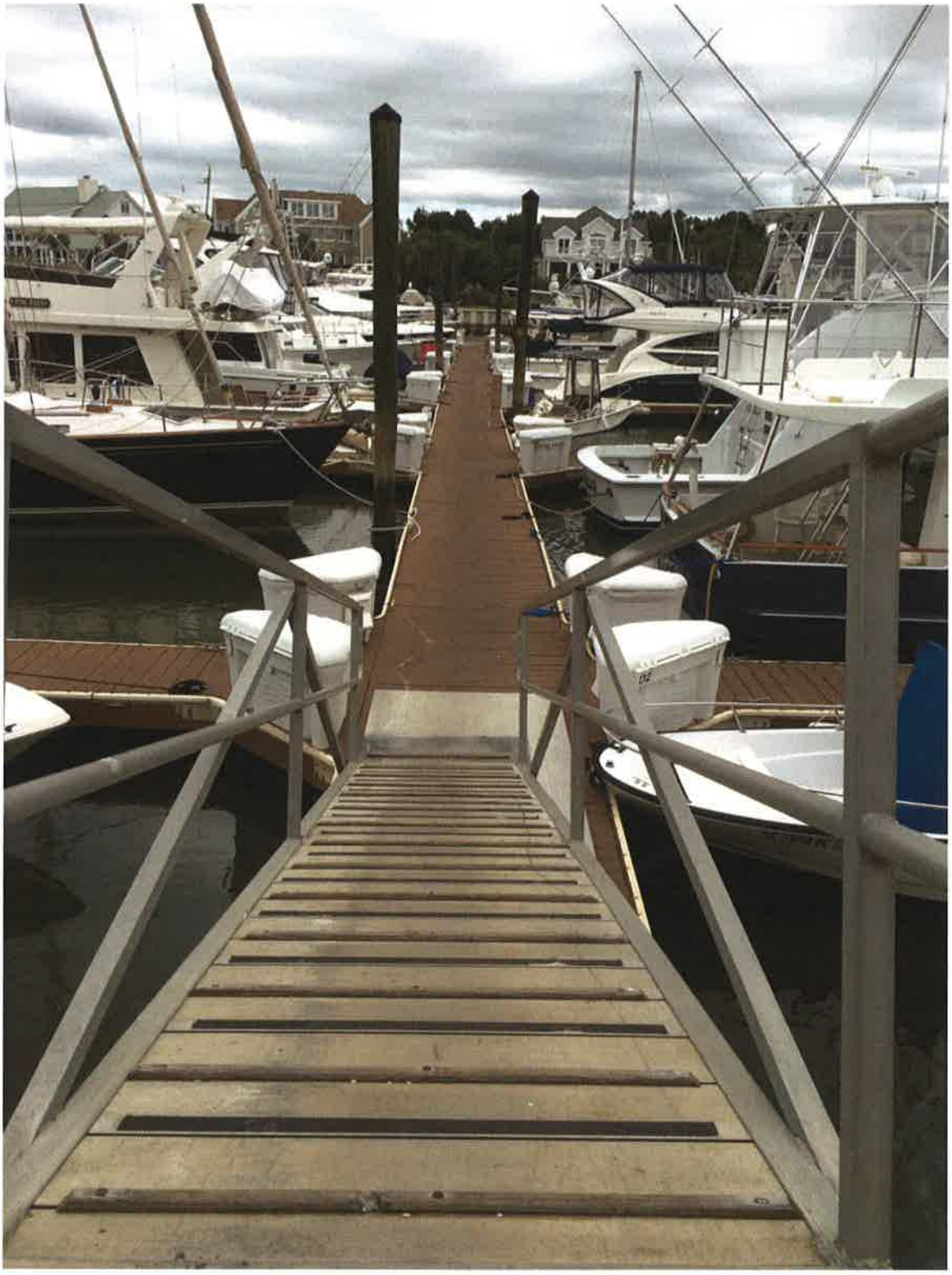


Photo 6

Photo 7 shows the Dock D main dock with the bending point labeled. The nearest main dock pile is labeled and it can be seen that the pile guide is not centered. Though not binding or under pressure it does indicate the dock has moved to the right of the picture.

Photo 7

As noted, JGT could not find the cause of the movement during the inspection but the findings point to an internal structural problem. Further investigation would be needed to find the exact cause. This would entail removing deck boards on the main dock to expose the timber substructure of the dock. There is no external evidence of breakage or damage; though in **Photo 7**, the label indicates the approximate location of the problem area. Given the age of the timber dock structure, an internal structural problem from soft or rotten un-maintained, unseen timbers is possible.

JGT would recommend working with a contractor to further investigate the problem by removing dock boards so the internal substructure can been inspected.

JGT

Underwater Inspections:

Underwater Inspection
Docks "C", "D" & "E"

Of

Morgan Creek Marina
Isle of Palms, South Carolina

For

Jon Guerry Taylor and Associates, Inc.
Mount Pleasant, South Carolina

By

Salmons Dredging Corporation
P. O. Box 42
Charleston, SC 29402
SDC Job No. 14-D-73

Layout Drawing

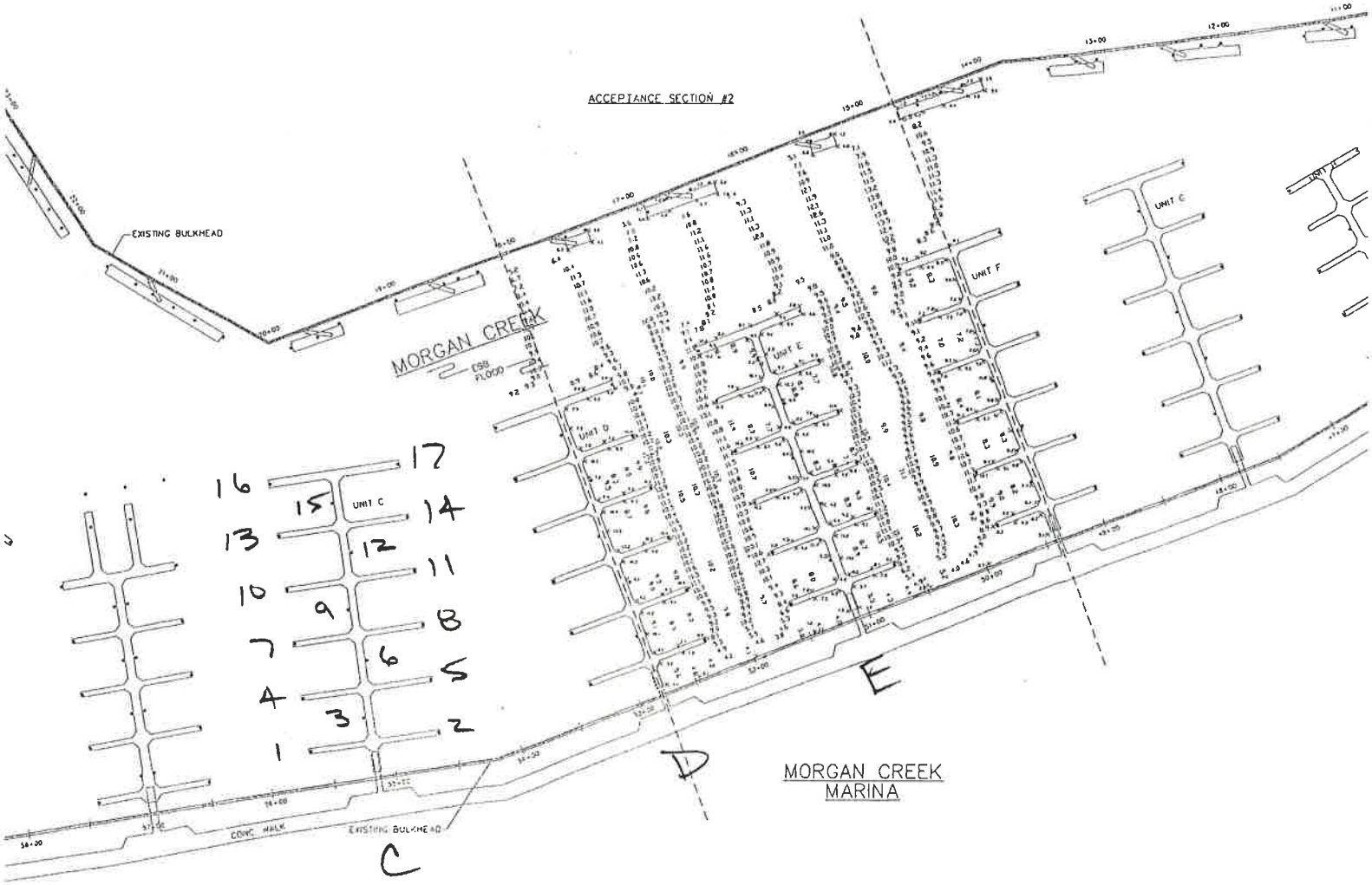
3	4	5	6	7	8	9	10	11

NOTES

1. Soundings were taken by ... obtaining high frequency soundings and are expressed in feet and tenths below mean low water
2. Proposed dredge depth ... N/A
3. Mean tidal range ... 5.2
4. The area shown by this chart is subject to silting. The actual depth following the date of this survey may be less than the depths shown. These depths were found on ... 7-25-13 & 7-26-13
5. Horizontal Coordinates System: Reference to South Carolina State Grid (NAD 83)
6. Vertical datum based on mean low water (mlw)
7. Some depths may have been omitted for clarity
8. All information shown outside of survey area is for informational purposes only.

SURVEY NOTES

1. HORIZONTAL COORDINATES SYSTEM: REFERENCED TO SOUTH CAROLINA STATE GRID (NAD 83)



Pile Numbering Typical on Docks "C", "D", & "E".

KNOWLEDGE INFORMATION AND ADE IN ACCORDANCE WITH THE DTICE MANUAL FOR SURVEYING

5/3/13

SC REG # 15513
1407 (843) 769-7378

Dock "C"

Date: September 22, 2014 Project: Morgan Creek Marina

Job #: 14-D-73 Structure: Dock "C"

INSP. Diver: J. Turner Floating Dock Section: General

Section Length: Continuous

INSP Level: I Direction: _____ to _____

Polyethylene Floatation Units:	Good X	Fair _____	Poor _____
Float Attachment Hardware:	Good _____	Fair _____	Poor X
Outboard Timber Stringers:	Good _____	Fair X	Poor _____
Inboard Timber Stringers:	Good No Access	Fair _____	Poor _____
Floating Dock Connection Hardware: Bolts / Clips	Good No Access	Fair _____	Poor _____
Junction of Fingers Piers to Main Dock: (Steel Angle Brace & Fasteners)	Good _____	Fair X	Poor _____

Notes: The polyethylene floatation units appeared in good condition with exception of the fasteners that secure the units to the 2x6 timber sleepers mounted transverse of the typical floating dock section. The once galvanized fasteners (mild steel lag bolts w/ flat washers) were found to be 50% failed or missing. Soft marine growth ("Sea Grass") was heavy (8" - 12" typ.) on all float units. Bottom plywood was noted to sag onto the floatation units in random areas. Steel angle braces and misc fasteners typically showed signs of mild to moderate rust and corrosion. No visible sign of broken or damaged timber stringers or timber bracing was noted.

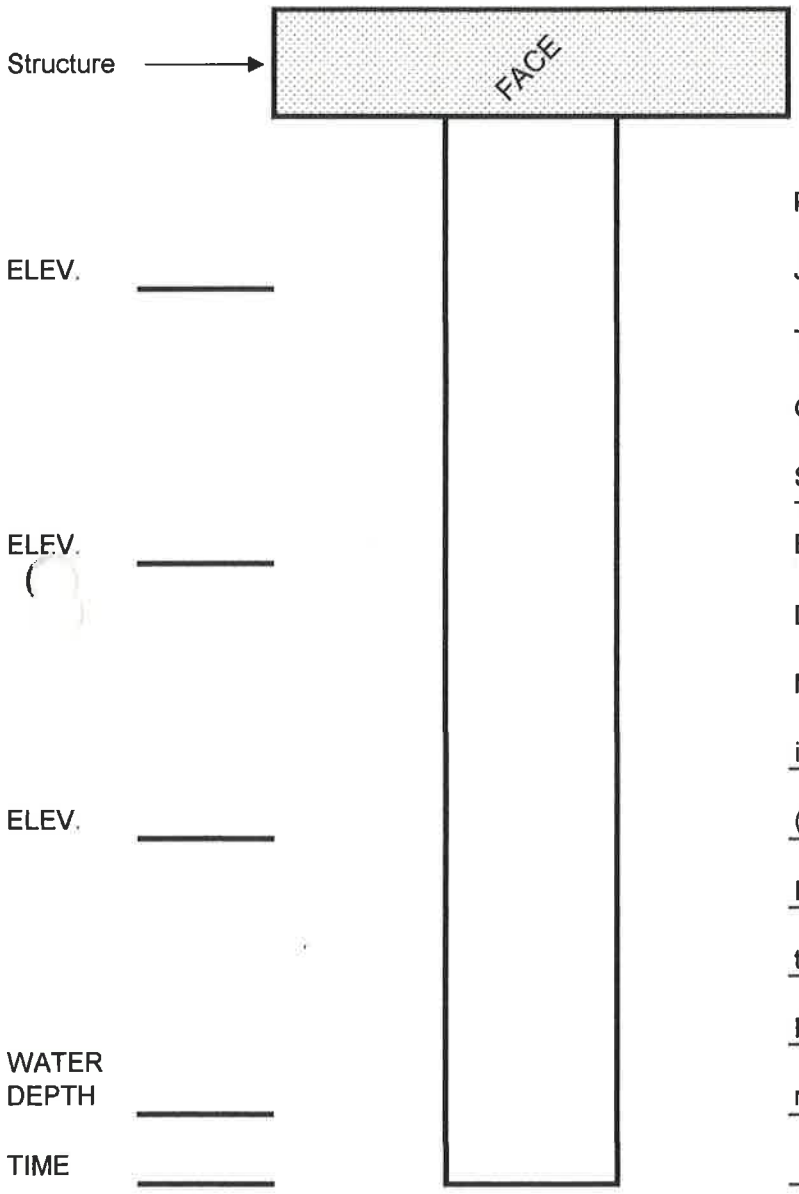
DATE: Sept. 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

IN DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "C"



Timber H Pile PSC

PILE # C1 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-095745-100428

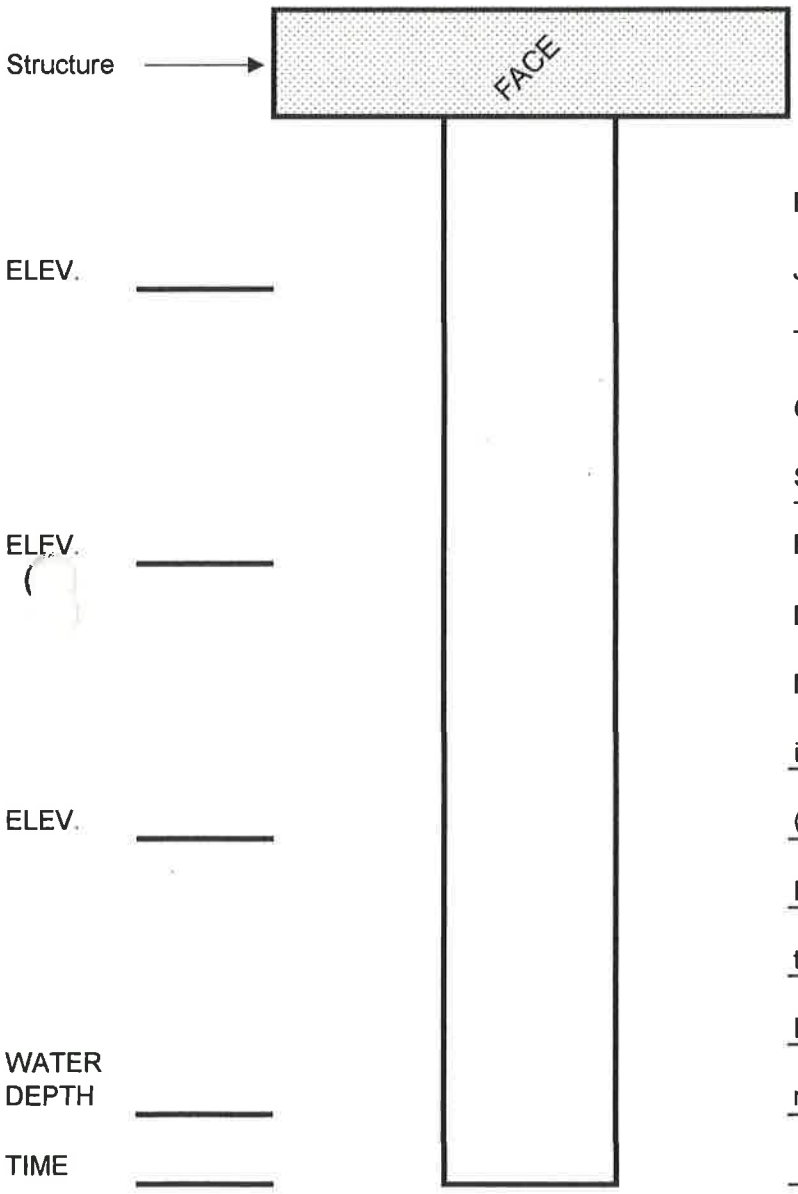
DATE: Sept. 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

IN DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "C"



✓ Timber H H Pile ☐ PSC

PILE # C2 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH:		HARD GROWTH:	
TZ:	%	TZ:	%
BTZ:	100 %	BTZ:	50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-095745-100428

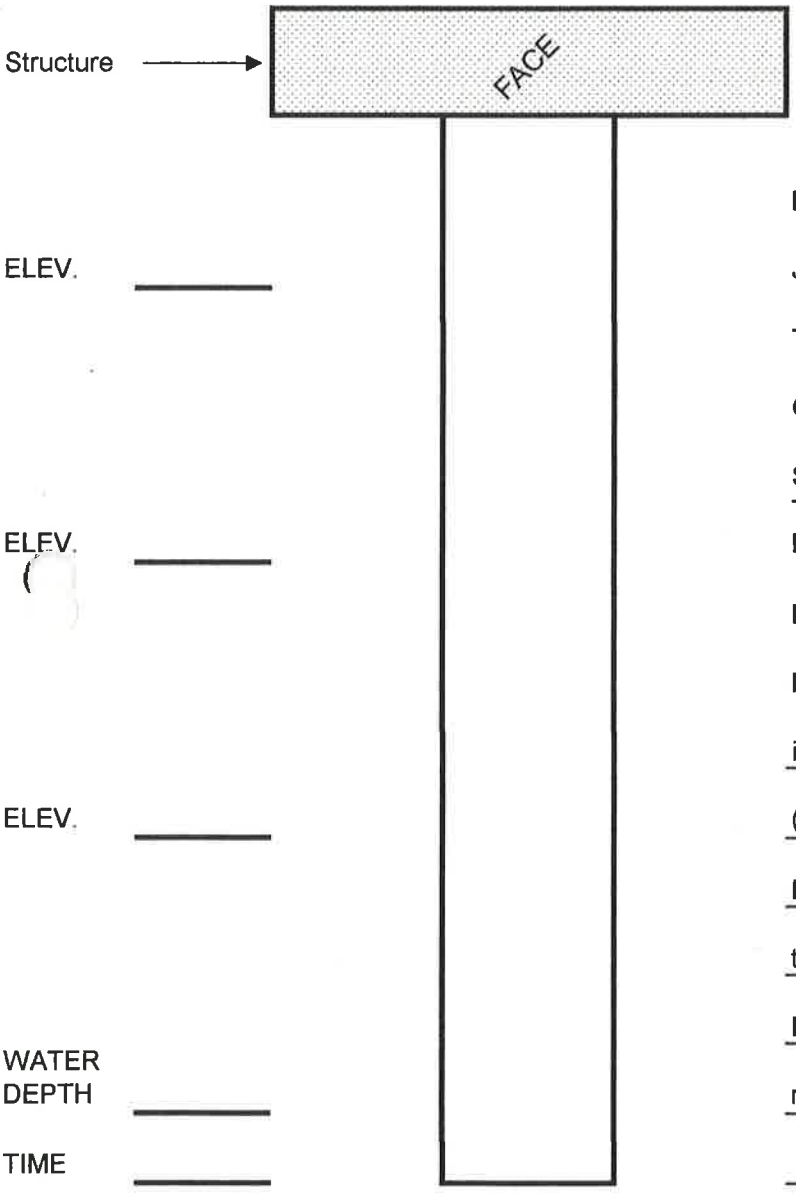
DATE: Sept. 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

IN DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "C"



PILE # C3 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 75 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-095745-100428

Page 1

DATE: Sept. 22, 2014

TERMINAL: Morgan Creek Marina

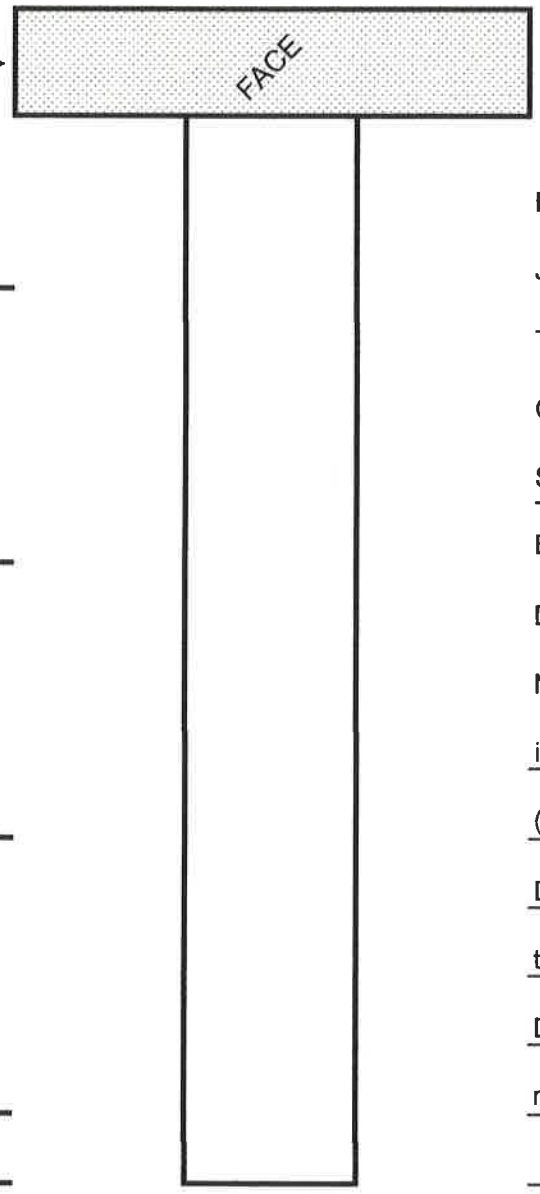
JOB # 14-D-73

IN DIVER: J. Turner

Underwater Piling Inspection

TIME: _____

STRUCTURE Dock "C"



Timber ✓ H Pile ☐ PSC

PILE # C4 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-100626-101213

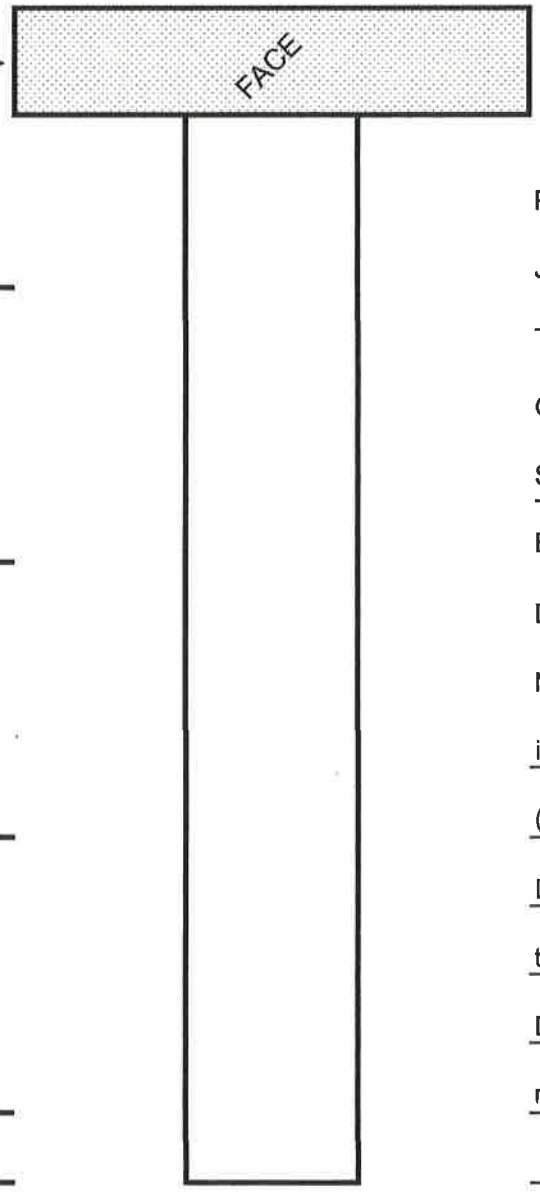
DATE: Sept. 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

IN DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "C"



✓ Timber H H Pile ☐ PSC

PILE # C5 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-100626-101213

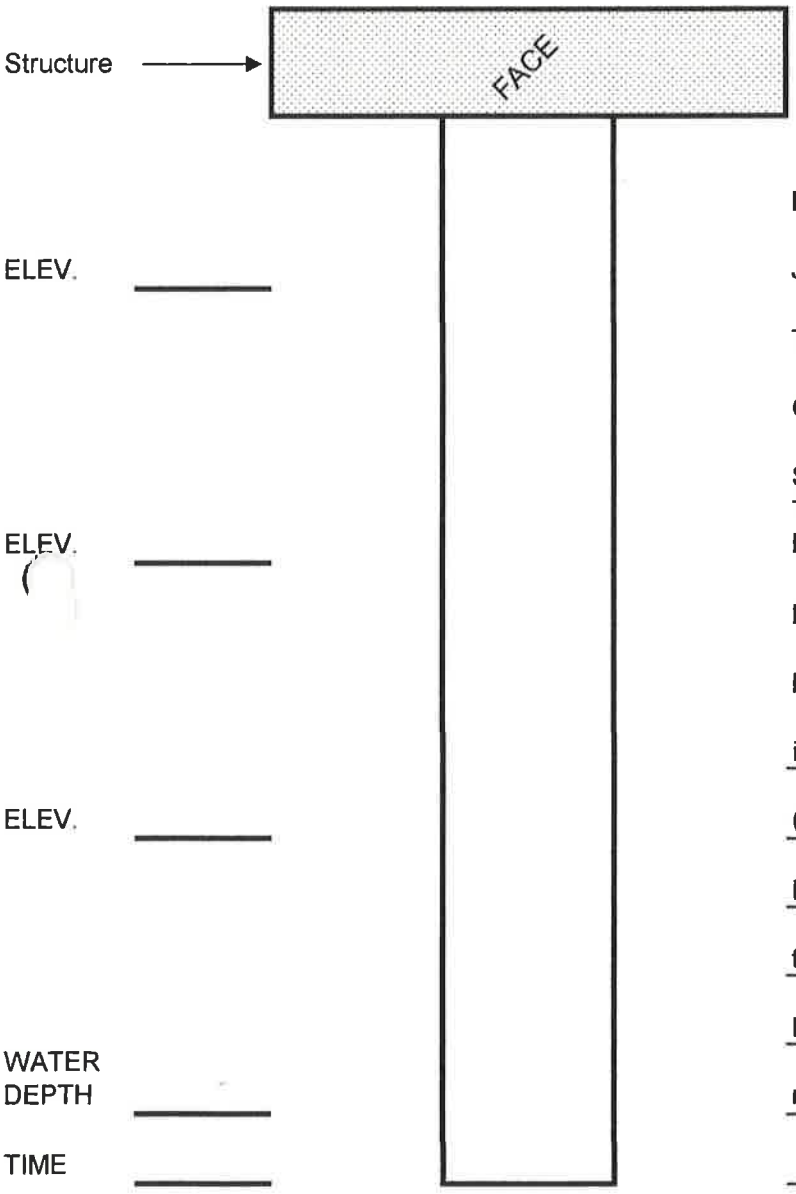
DATE: Sept. 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

IN DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "C"



PILE # C6 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-101516-101600

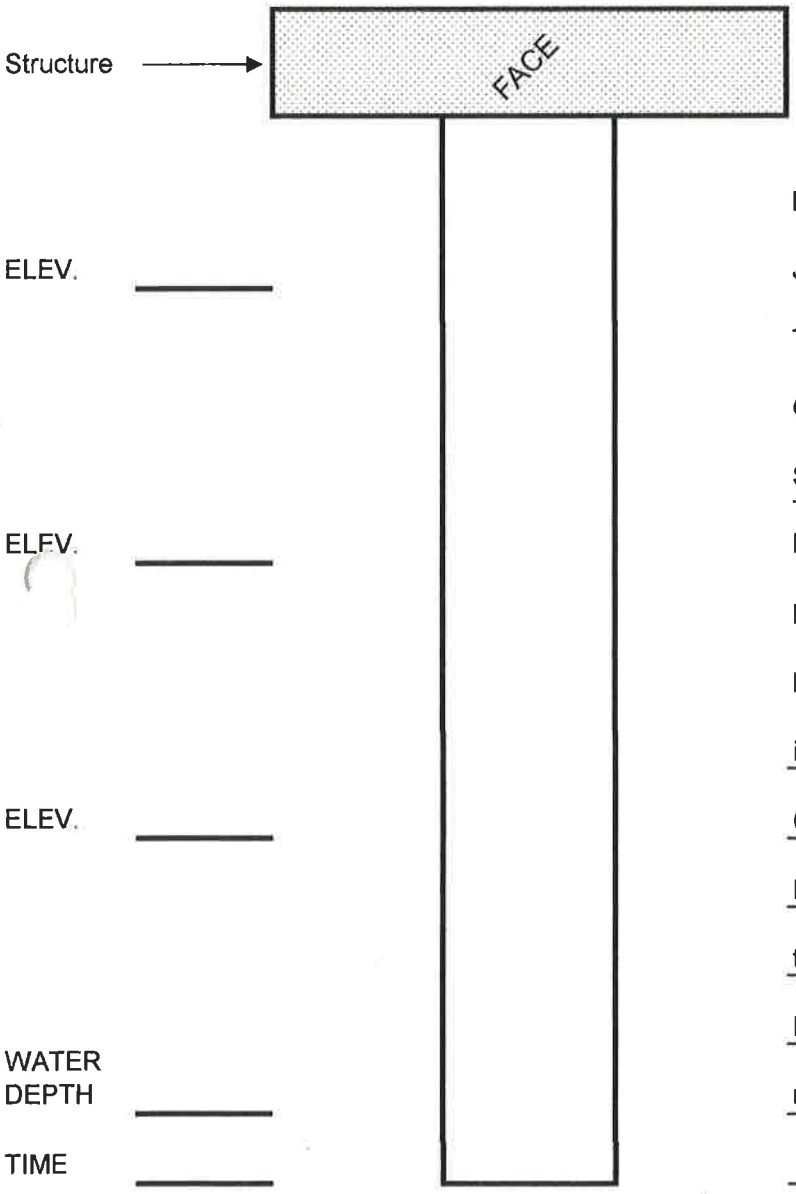
DATE: Sept. 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

IN DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "C"



PILE # C7 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH:		HARD GROWTH:	
TZ:	%	TZ:	%
BTZ:	100 %	BTZ:	50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-103541-104440

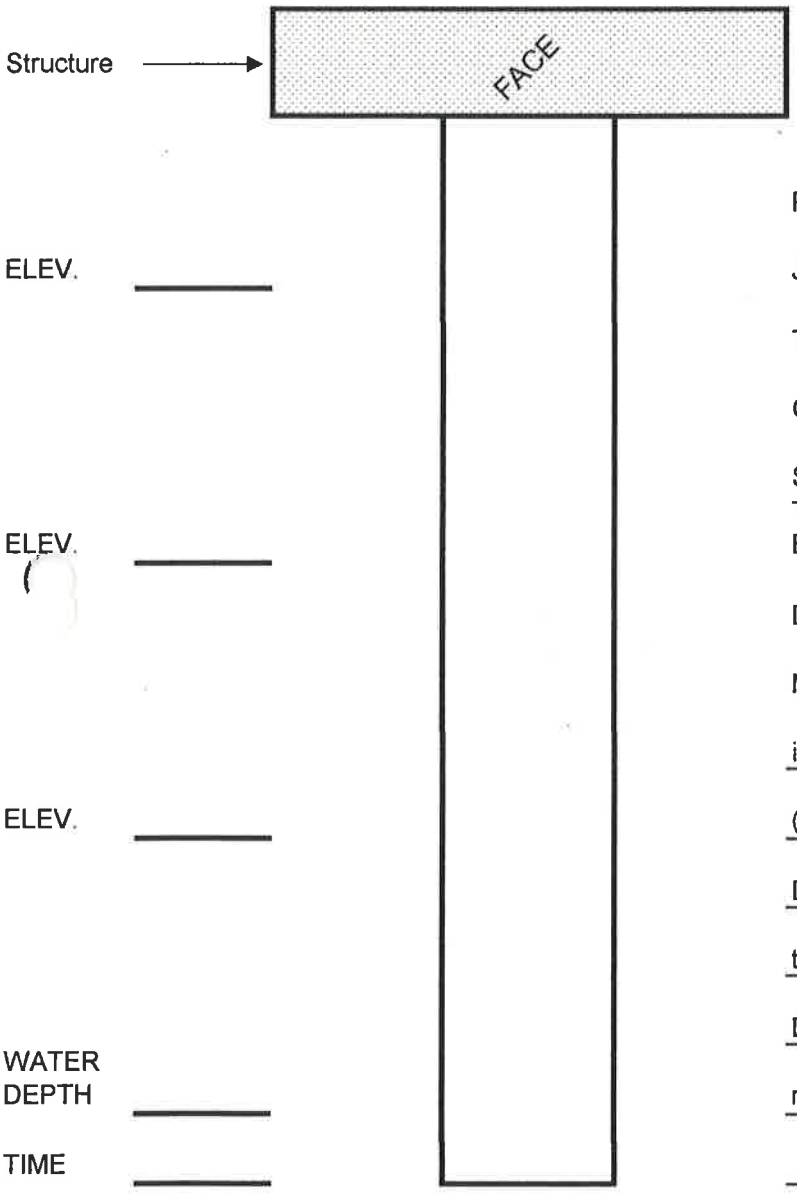
DATE: Sept. 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

IN DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "C"



✓ Timber H H Pile ☐ PSC

PILE # C8 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-103541-104440

Page 1

DATE: Sept. 22, 2014

TERMINAL: Morgan Creek Marina

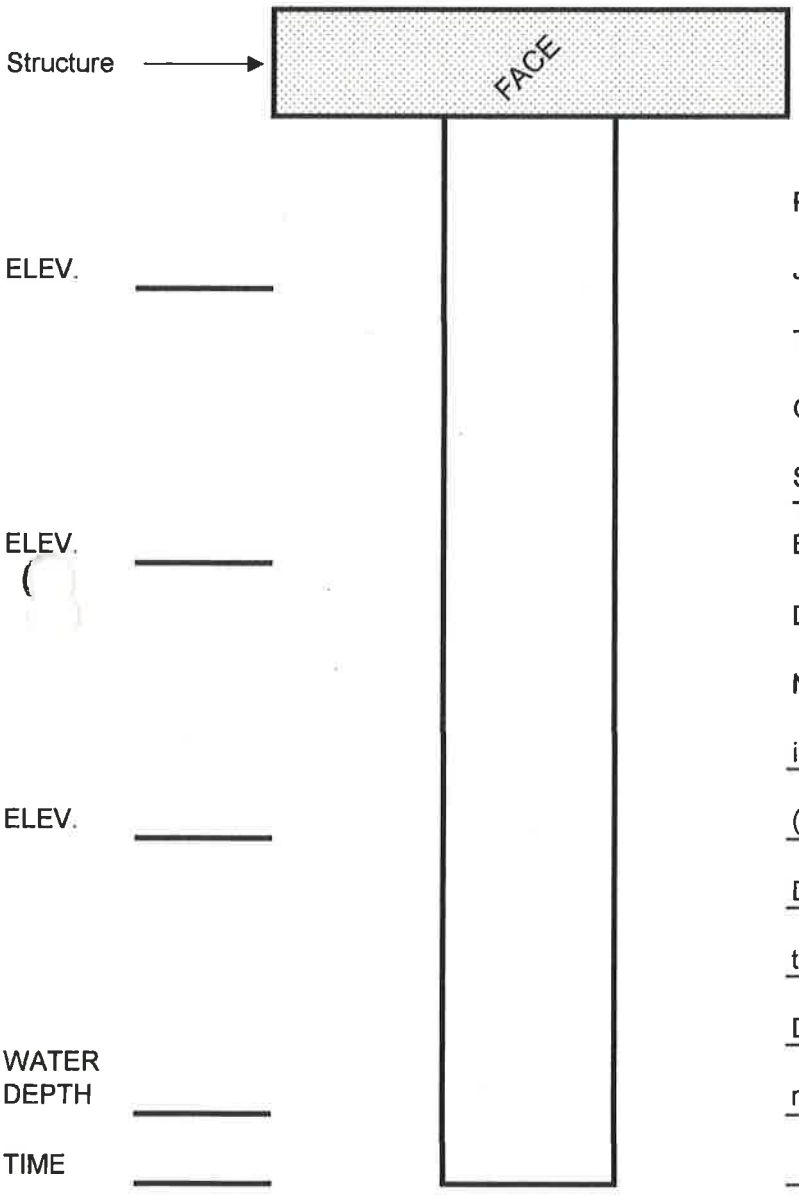
JOB # 14-D-73

DIVER: J. Turner

Underwater Piling Inspection

TIME: _____

STRUCTURE Dock "C"



Timber ✓ H Pile ☐ PSC

PILE # C9 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-103541-104440

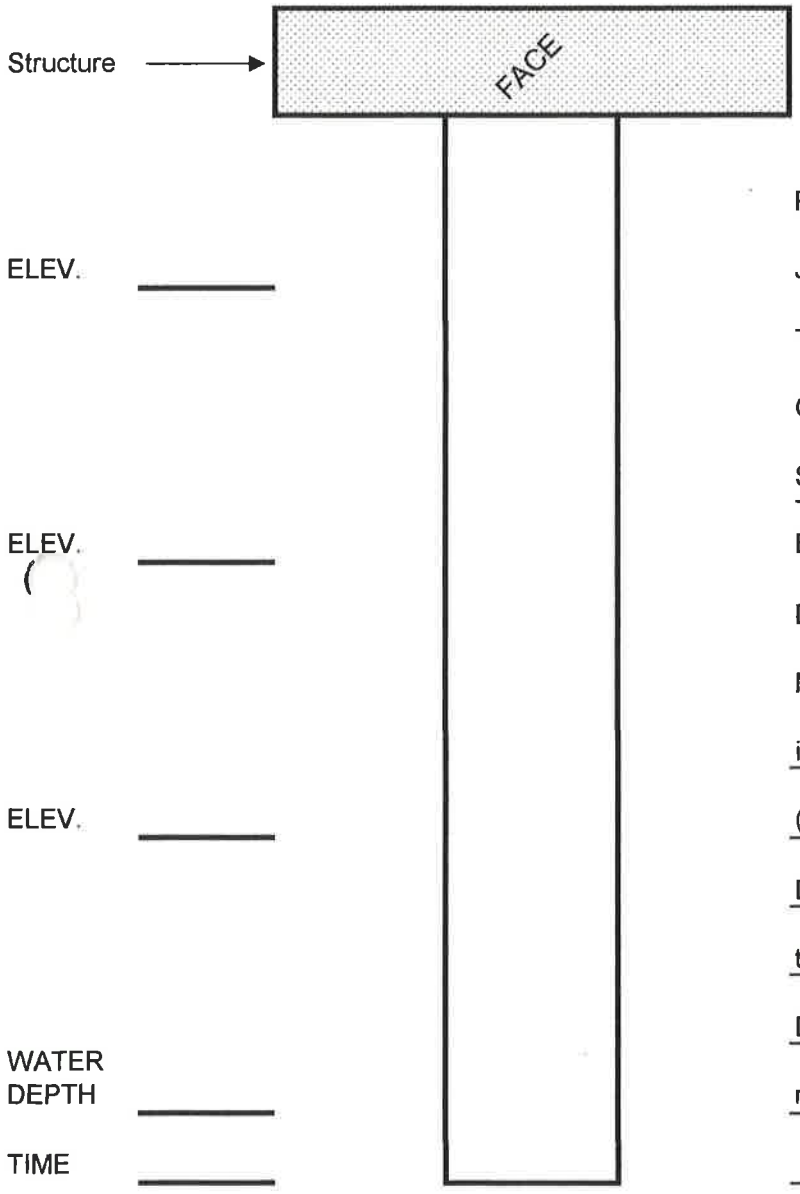
DATE: Sept. 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

IN DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "C"



Timber H Pile PSC

PILE # C10 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH:		HARD GROWTH:	
TZ:	%	TZ:	%
BTZ:	100 %	BTZ:	50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-104814-104841

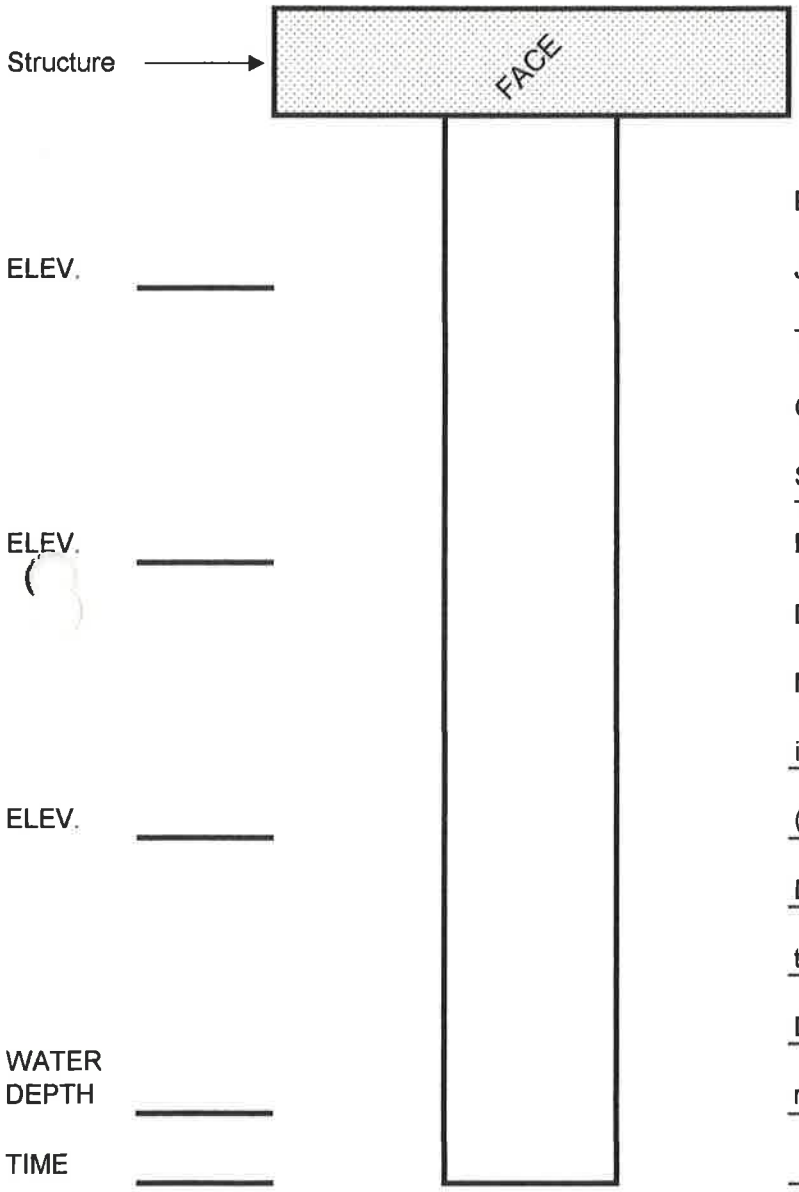
DATE: Sept. 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

IN DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "C"



✓ Timber H Pile ☐ PSC

PILE # C11 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-104814-104841

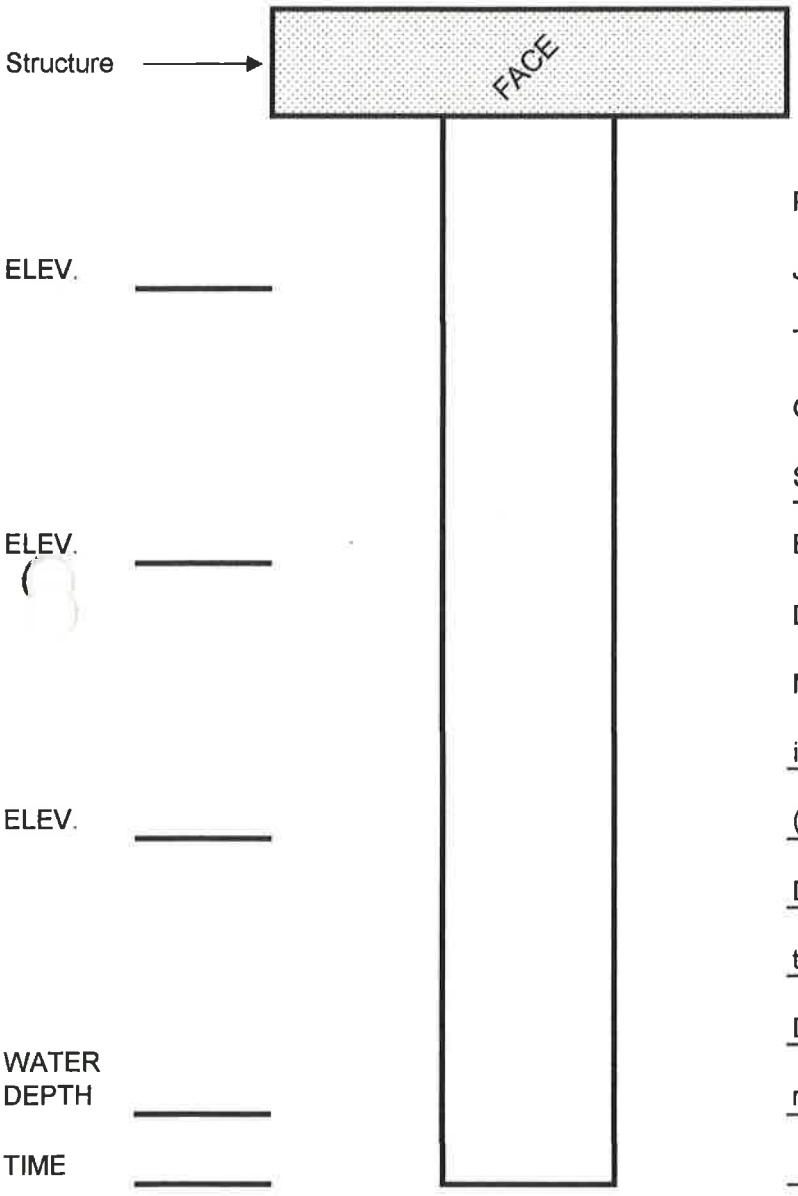
DATE: Sept. 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

IN DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "C"



Timber H Pile PSC

PILE # C12 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-104814-104841

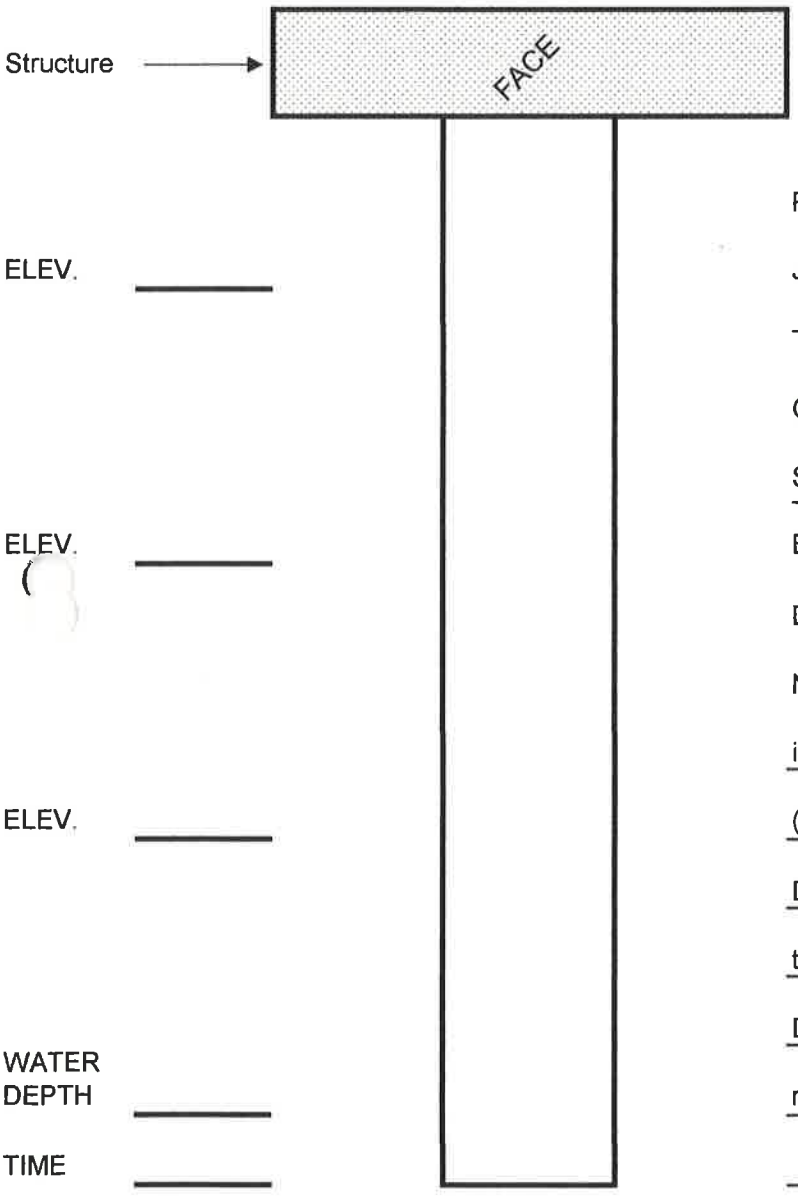
DATE: Sept. 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "C"



✓ Timber H Pile ☐ PSC

PILE # C13 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-105724-110230

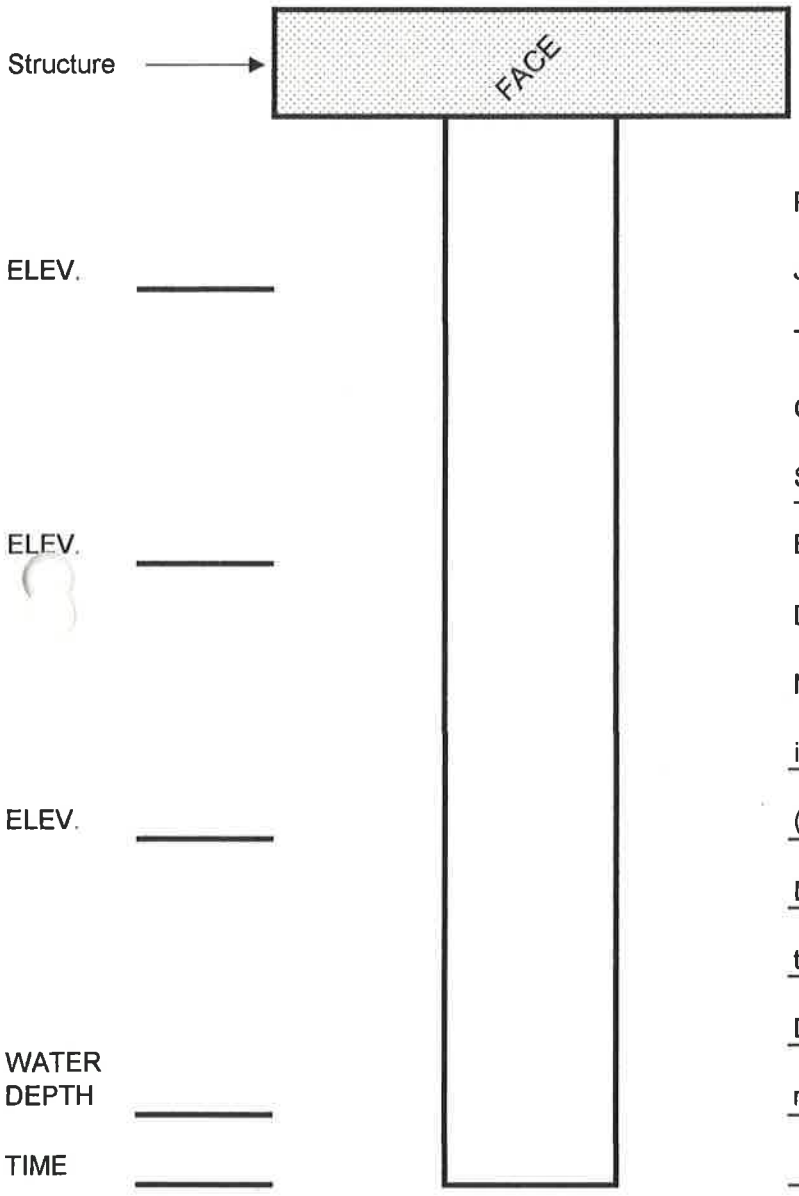
DATE: Sept. 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "C"



✓ Timber H Pile ☐ PSC

PILE # C14 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-105724-110230

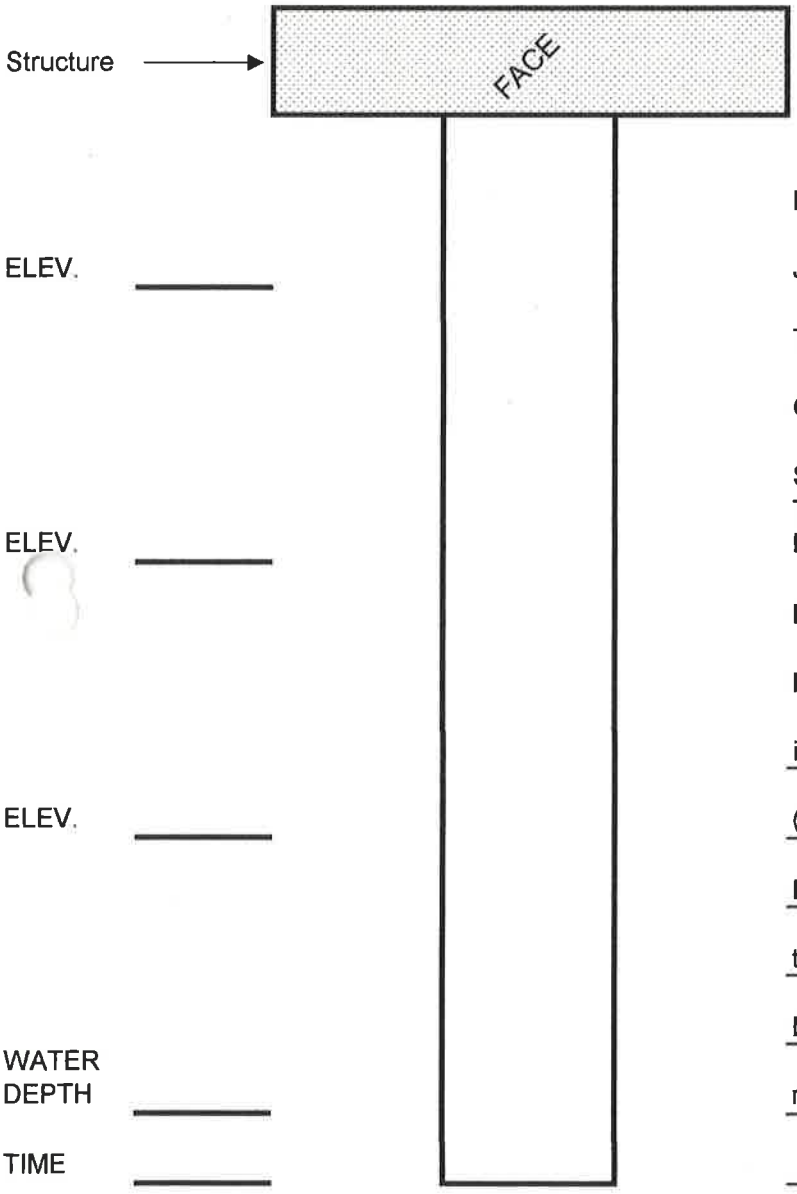
DATE: Sept. 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

IN DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "C"



✓ Timber H Pile ☐ PSC

PILE # C15 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-110611-110926

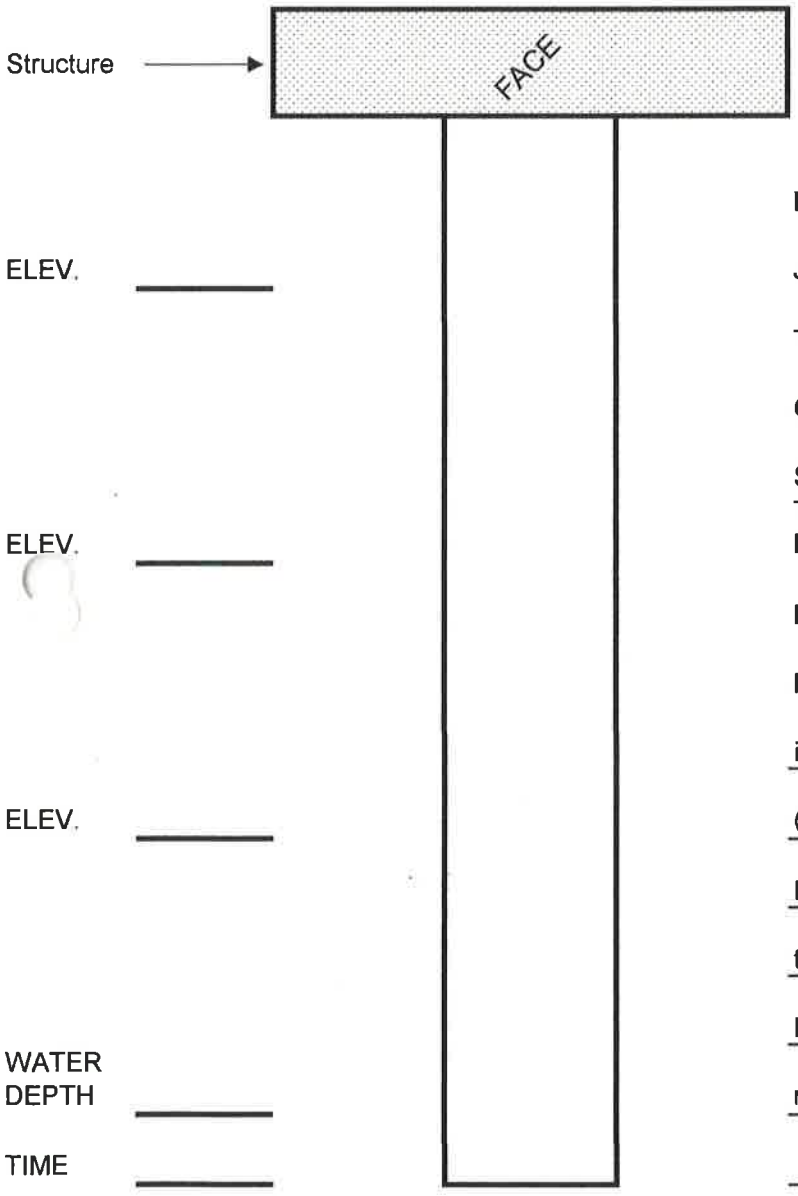
DATE: Sept. 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

IN DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "C"



✓ Timber H Pile ☐ PSC

PILE # C16 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 20 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-110611-110926

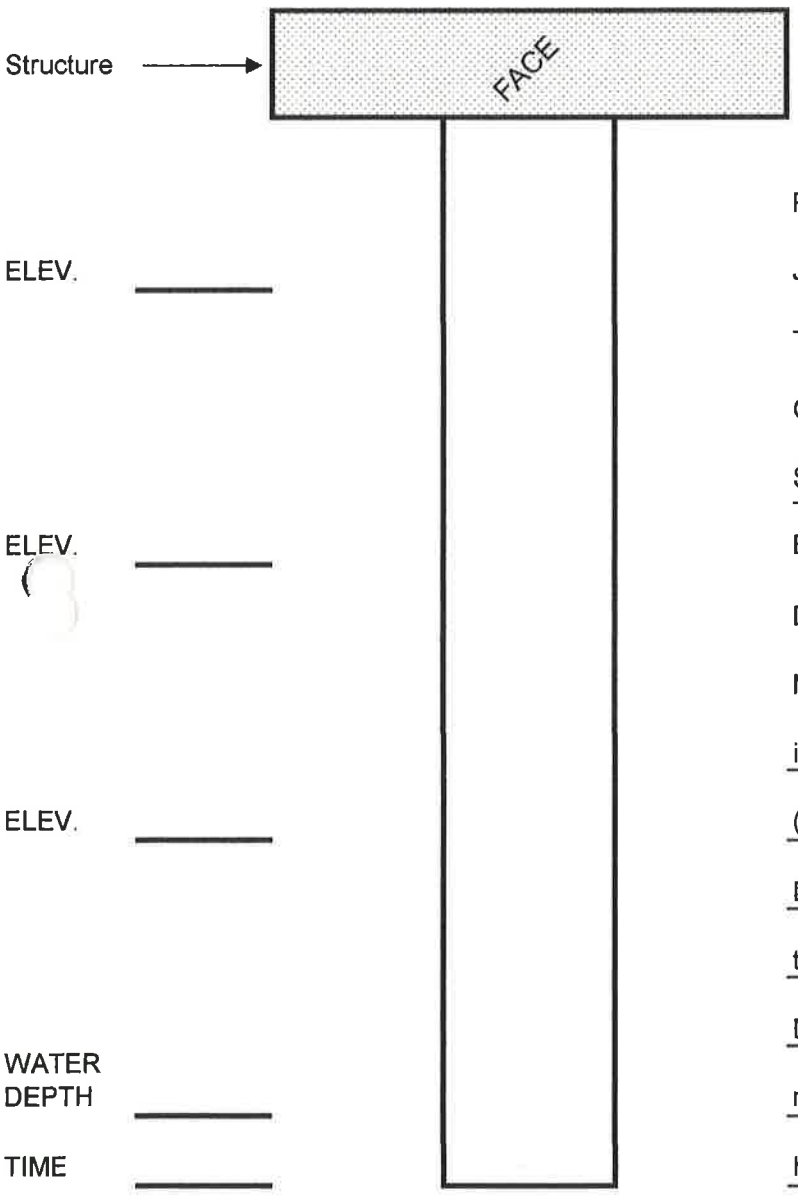
DATE: Sept. 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "C"



PILE # C17 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 40 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter. Diver located a 1/2" diameter hole less than 1" deep a couple of feet below the waterline. The hole was solid all around, without rot.

Video File 140918-111319-111444

Dock “D”

Date: September 18, 2014 Project: Morgan Creek Marina

Job #: 14-D-73 Structure: Dock "D"

INSP. Diver: J. Turner Floating Dock Section: General

Section Length: Continuous

INSP Level: I Direction: _____ to _____

Polyethylene Floatation Units:	Good X	Fair _____	Poor _____
Float Attachment Hardware:	Good _____	Fair _____	Poor X
Outboard Timber Stringers:	Good X	Fair _____	Poor _____
Inboard Timber Stringers:	Good No Access	Fair _____	Poor _____
Floating Dock Connection Hardware: Bolts / Clips	Good No Access	Fair _____	Poor _____
Junction of Fingers Piers to Main Dock: (Steel Angle Brace & Fasteners)	Good _____	Fair X	Poor _____

Notes: The polyethylene floatation units appeared in good condition with exception of the fasteners that secure the units to the 2x6 timber sleepers mounted transverse of the typical floating dock section. The once galvanized fasteners (mild steel lag bolts w/ flat washers) were found to be 50% failed or missing. Examination of the angle frames reinforcing the junction of fingers 7 & 8 and 10 & 11 with the main dock, revealed stress and mis-alignment of the connections, as well as slight deflection or bending of several of the steel reinforcing angle braces. Timbers components appeared in fair to good condition w/ only minor splits or cracks. Mild rust/corrosion of the steel angle braces and fasteners was noted throughout. The bottom plywood was noted to be sagging onto the float units in random areas. Soft marine growth was typ. 8"-12" on float units. End of finger pier near pile D11, (2) 2x6 bottom sleepers had worm damage. (Ref. video file 140918-112403-115402 to view). The finger piers adjacent to the channel had gaps of 1/2" - 1" where the angle frames connected to the main dock. The steel angle braces appeared slightly bent and

the connection looked as through it had been "teaked"slightly. A leak in the plumbing lines was noted in the southwest angle frame between piles D-13 and D14. Also, worm damage was noted in (1) 2x6 sleeper near pile D14.

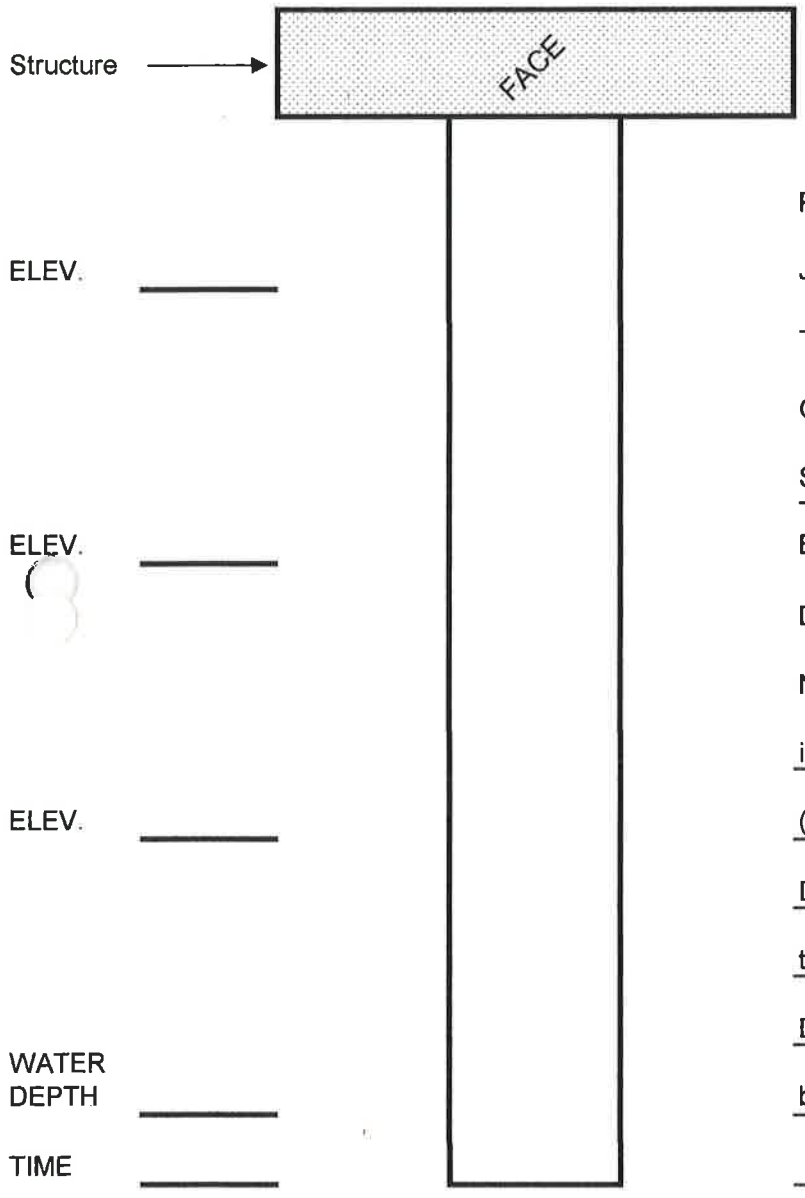
DATE: Sept. 18, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "D"



✓ Timber H Pile ☐ PSC

PILE # D1 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH:		HARD GROWTH:	
TZ:	%	TZ:	%
BTZ:	100 %	BTZ:	50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-094158-100022

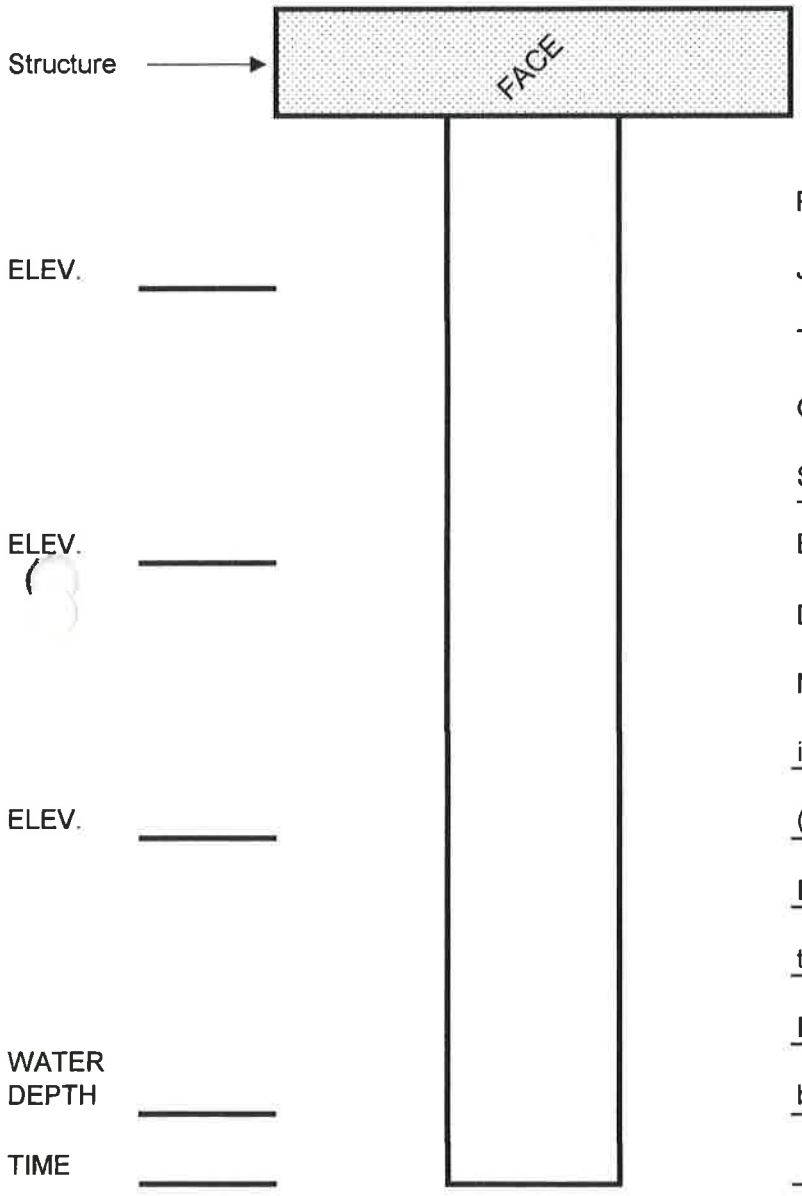
DATE: Sept. 18, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

IN DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "D"



✓ Timber H H Pile ☐ PSC

PILE # D2 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH:		HARD GROWTH:	
TZ:	%	TZ:	%
BTZ:	100 %	BTZ:	50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-094158-100022

Page 1

DATE: Sept. 18, 2014

TERMINAL: Morgan Creek Marina

JOB # 14-D-73

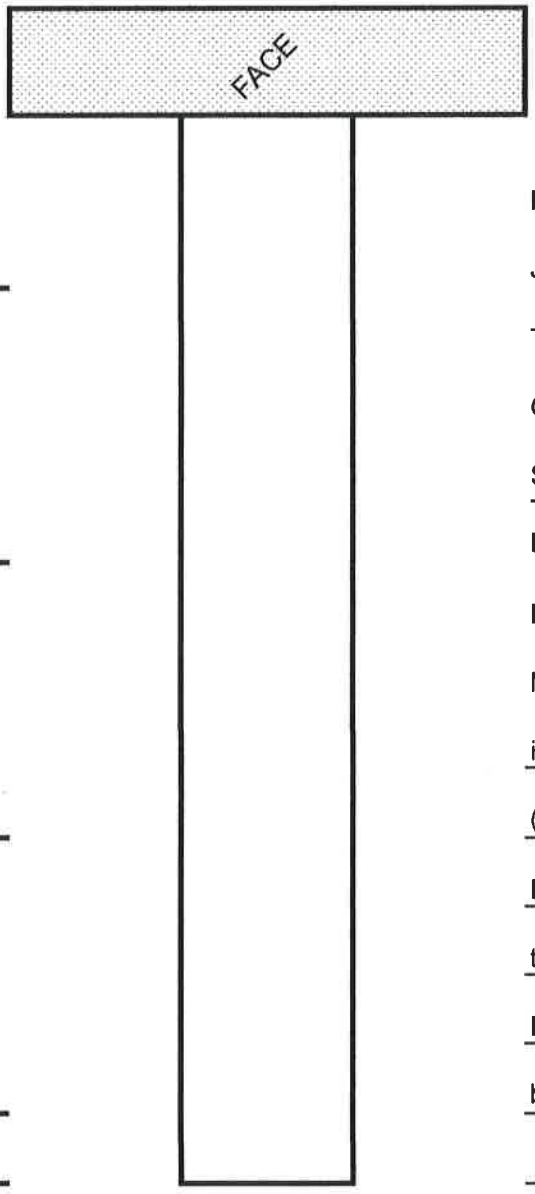
DIVER: J. Turner

Underwater Piling Inspection

TIME: _____

STRUCTURE Dock "D"

Structure →



ELEV. _____

ELEV. _____

ELEV. _____

WATER DEPTH _____

TIME _____

✓ Timber H H Pile ☐ PSC

PILE # D3 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH:		HARD GROWTH:	
TZ:	%	TZ:	%
BTZ:	100 %	BTZ:	50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-094158-100022

Page 1

DATE: Sept. 18, 2014

TERMINAL: Morgan Creek Marina

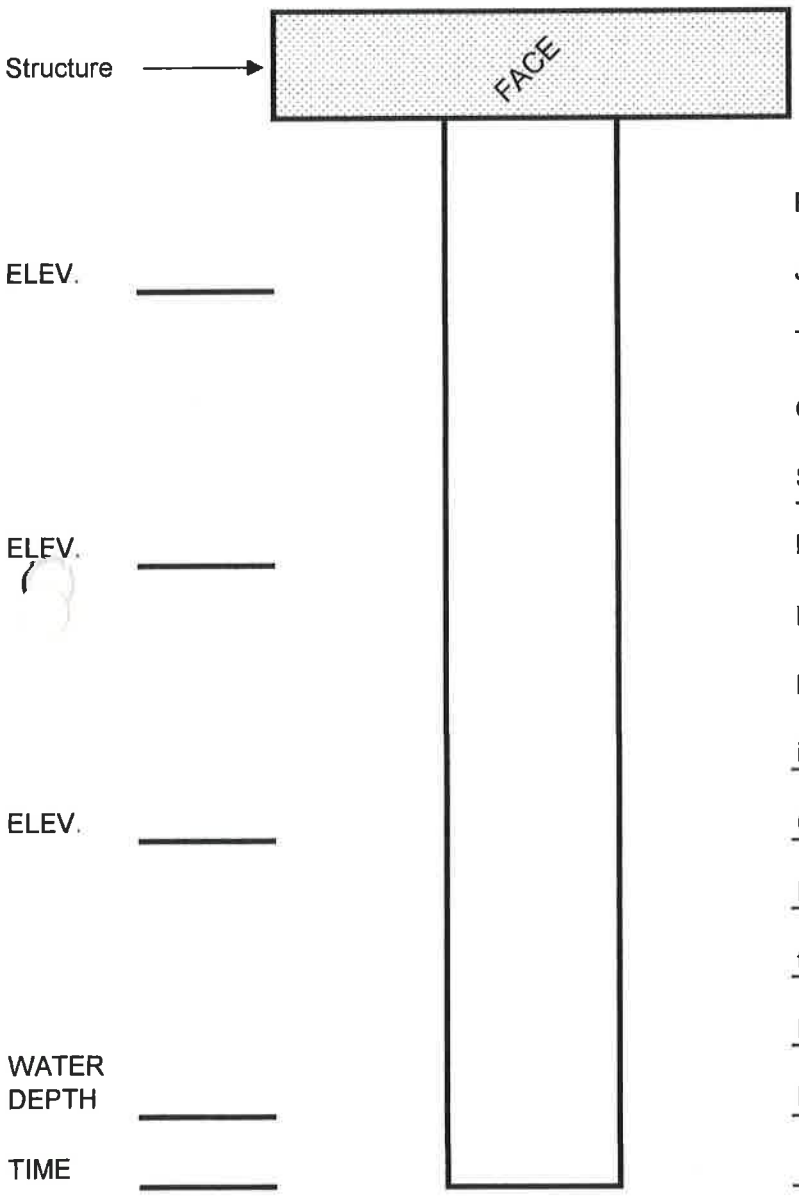
JOB # 14-D-73

DIVER: J. Turner

Underwater Piling Inspection

TIME: _____

STRUCTURE Dock "D"



Timber ✓ H Pile ☐ PSC

PILE # D4 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-094158-100022

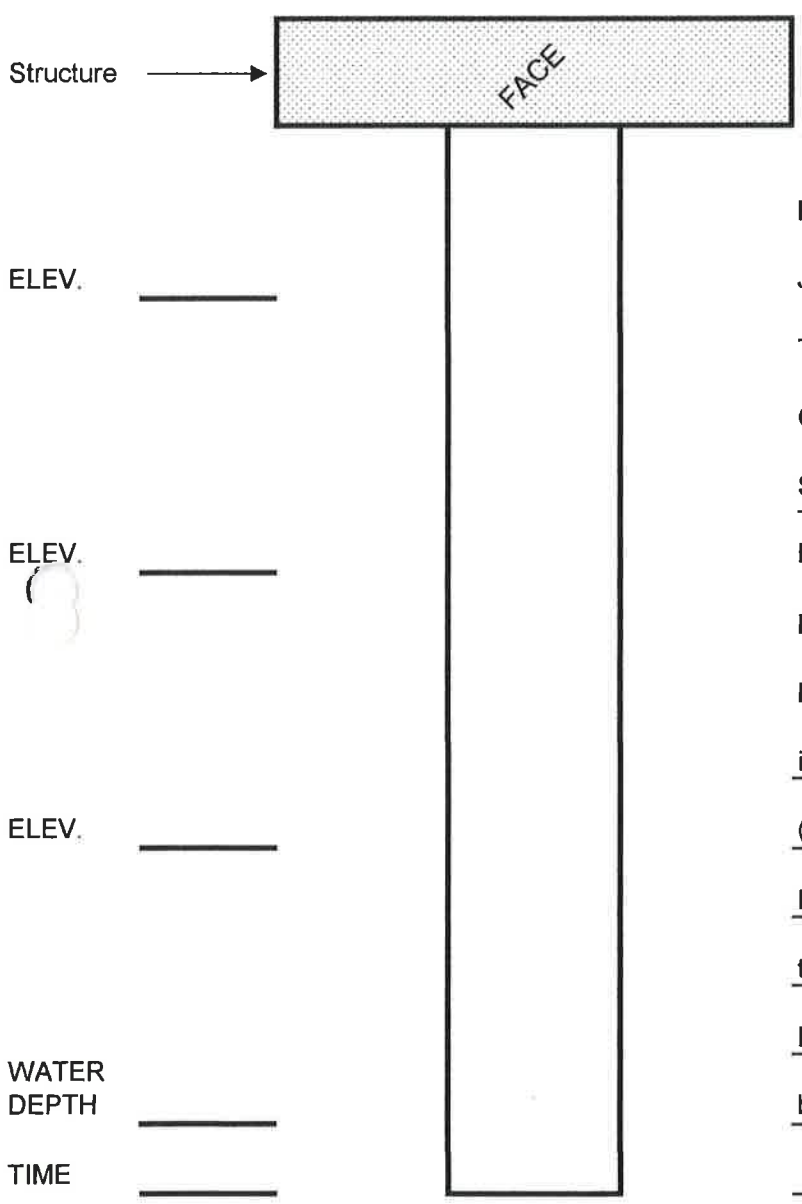
DATE: Sept. 18, 2014

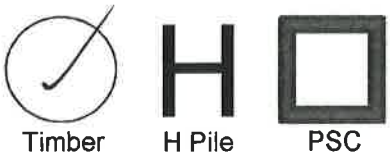
Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

IN DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "D"





PILE # D5 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH:		HARD GROWTH:	
TZ:	%	TZ:	%
BTZ:	100 %	BTZ:	50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-100100-101638

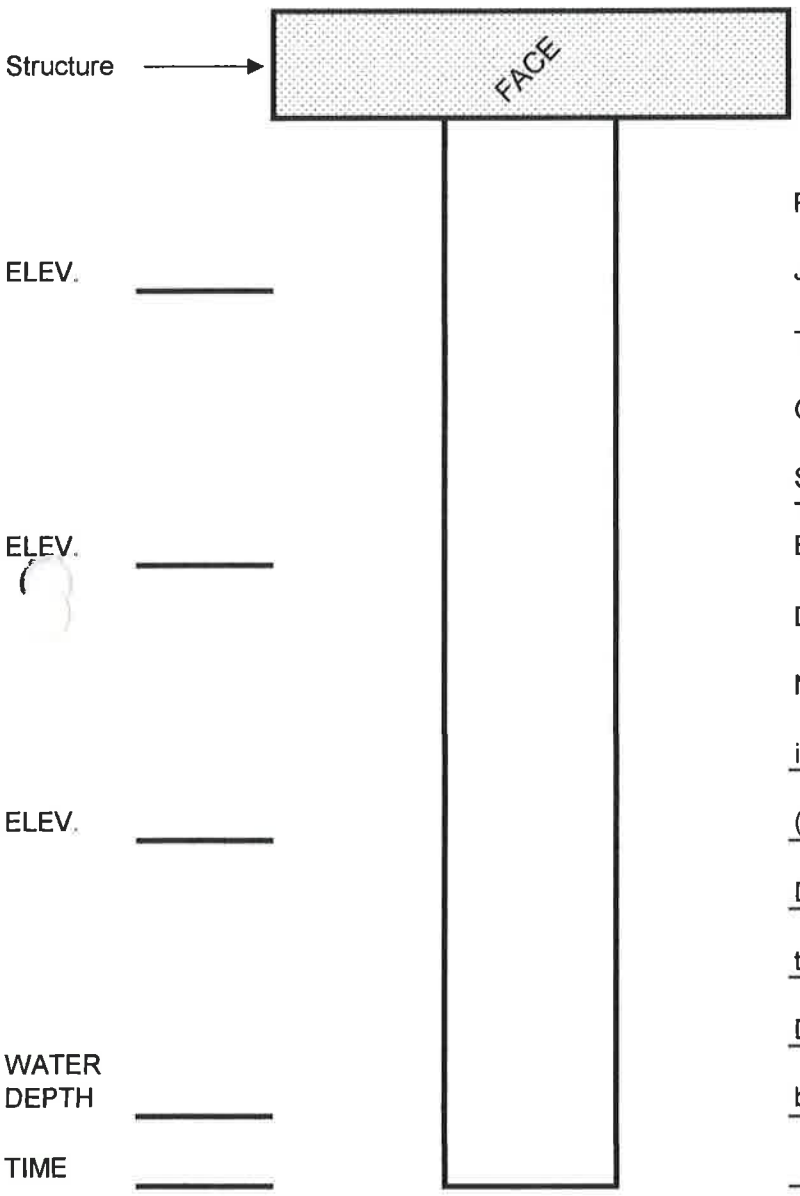
DATE: Sept. 18, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "D"



✓ Timber H H Pile ☐ PSC

PILE # D6 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-100100-101638

DATE: Sept. 18, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "D"

Structure → FACE

ELEV. _____

ELEV. _____

ELEV. _____

WATER DEPTH _____

TIME _____

Timber H Pile PSC

PILE # D7 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter. 2' above the mudline on the east face of the pile, the diver located a hole or depression approx. 1" Diameter x 1" deep. No rot was present and the area was solid when sounded.

Video File 140918-101733-102645

Page 1

DATE: Sept. 18, 2014

TERMINAL: Morgan Creek Marina

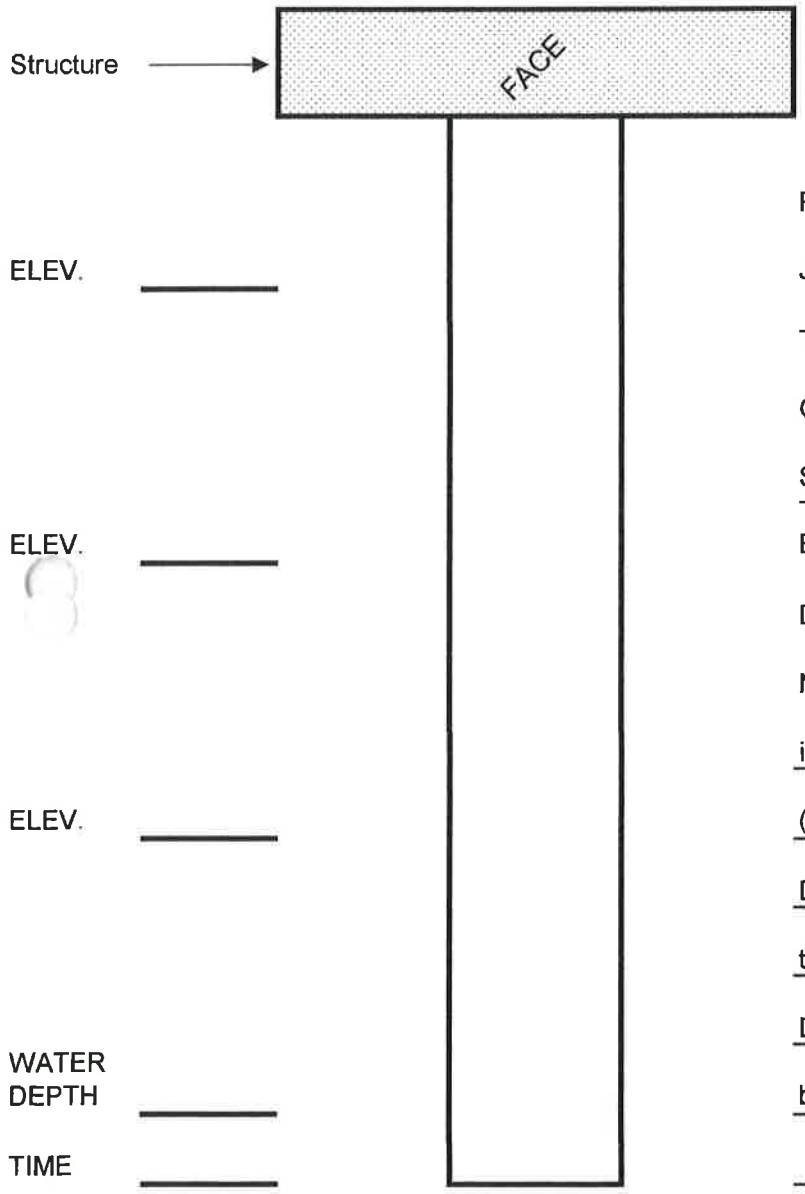
JOB # 14-D-73

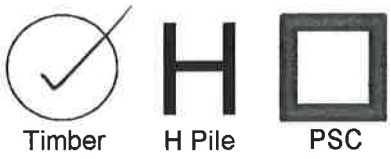
DIVER: J. Turner

Underwater Piling Inspection

TIME: _____

STRUCTURE Dock "D"





PILE # D8 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH:		HARD GROWTH:	
TZ:	%	TZ:	%
BTZ:	100 %	BTZ:	50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-101733-102645

Page 1

DATE: Sept. 18, 2014

TERMINAL: Morgan Creek Marina

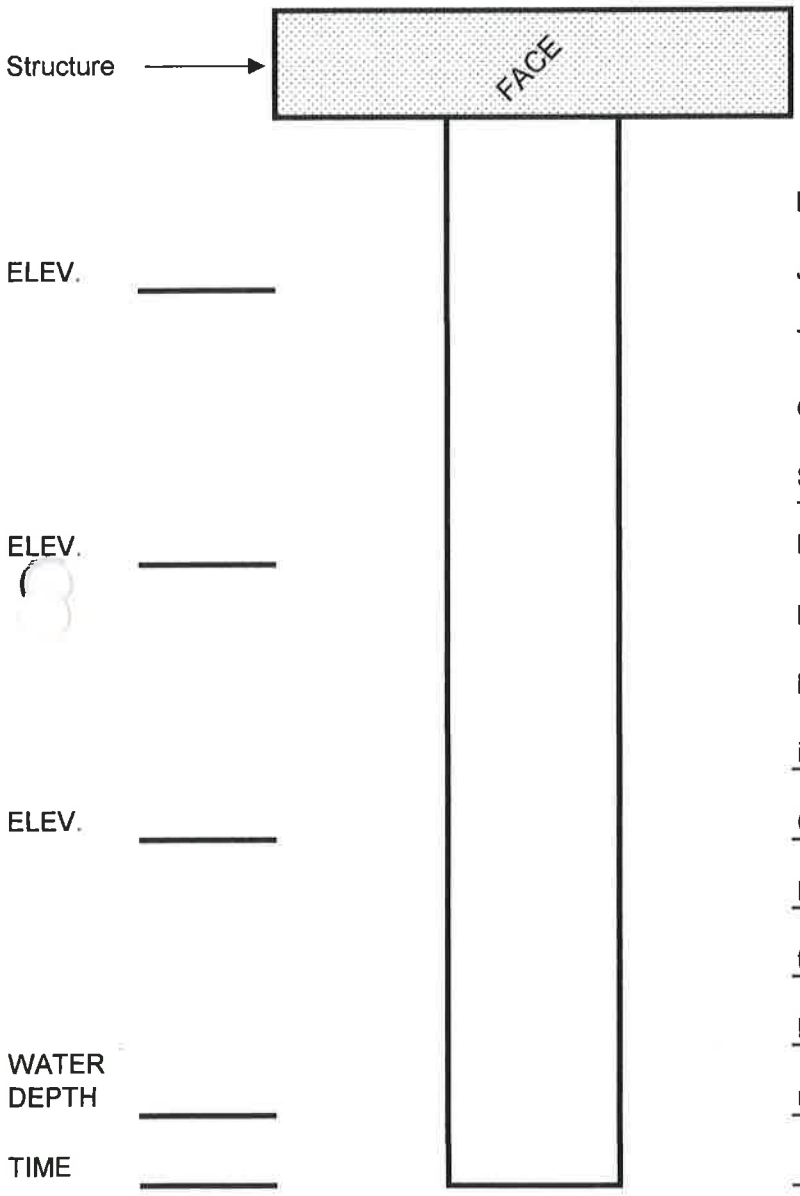
JOB # 14-D-73

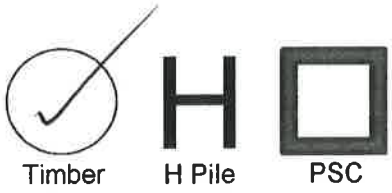
I. DIVER: J. Turner

Underwater Piling Inspection

TIME: _____

STRUCTURE Dock "D"





PILE # D9 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-102748-102927

Page 1

DATE: Sept. 18, 2014

TERMINAL: Morgan Creek Marina

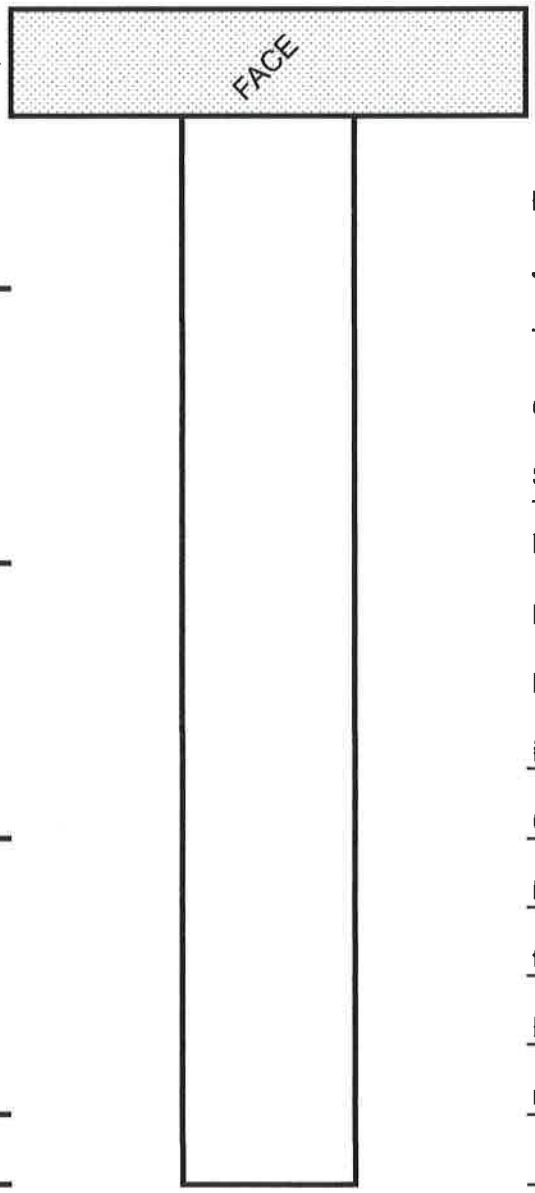
JOB # 14-D-73

DIVER: J. Turner

Underwater Piling Inspection

TIME: _____

STRUCTURE Dock "D"



Timber ☑ H Pile ☐ PSC

PILE # D10 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

	SOFT GROWTH:	HARD GROWTH:
TZ:	%	%
BTZ:	100 %	50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-105445-110111

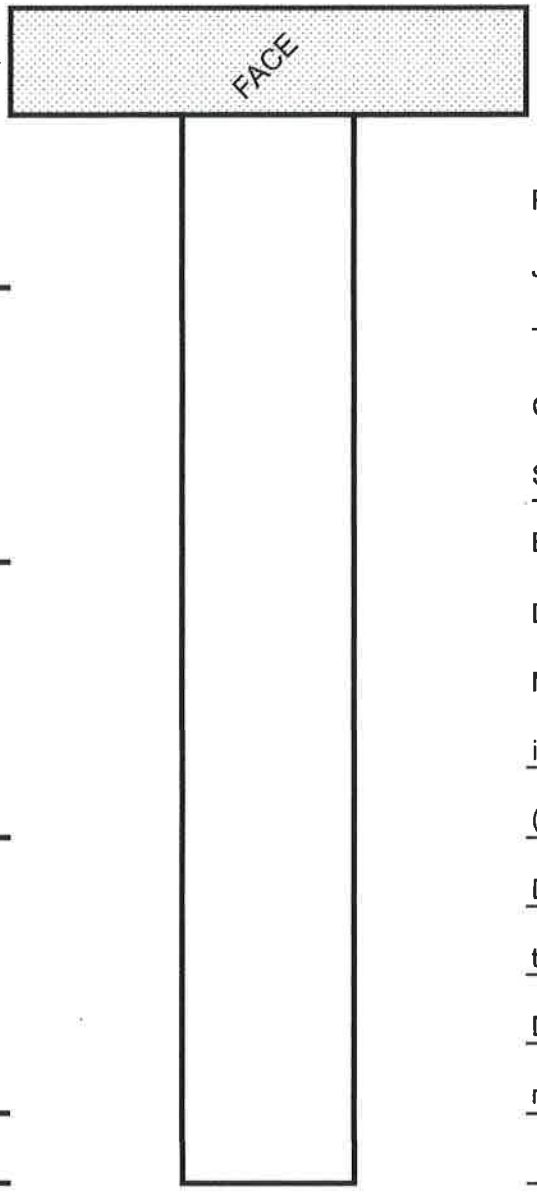
DATE: Sept. 18, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "D"



✓ Timber H H Pile ☐ PSC

PILE # D11 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 20 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-112403-115402

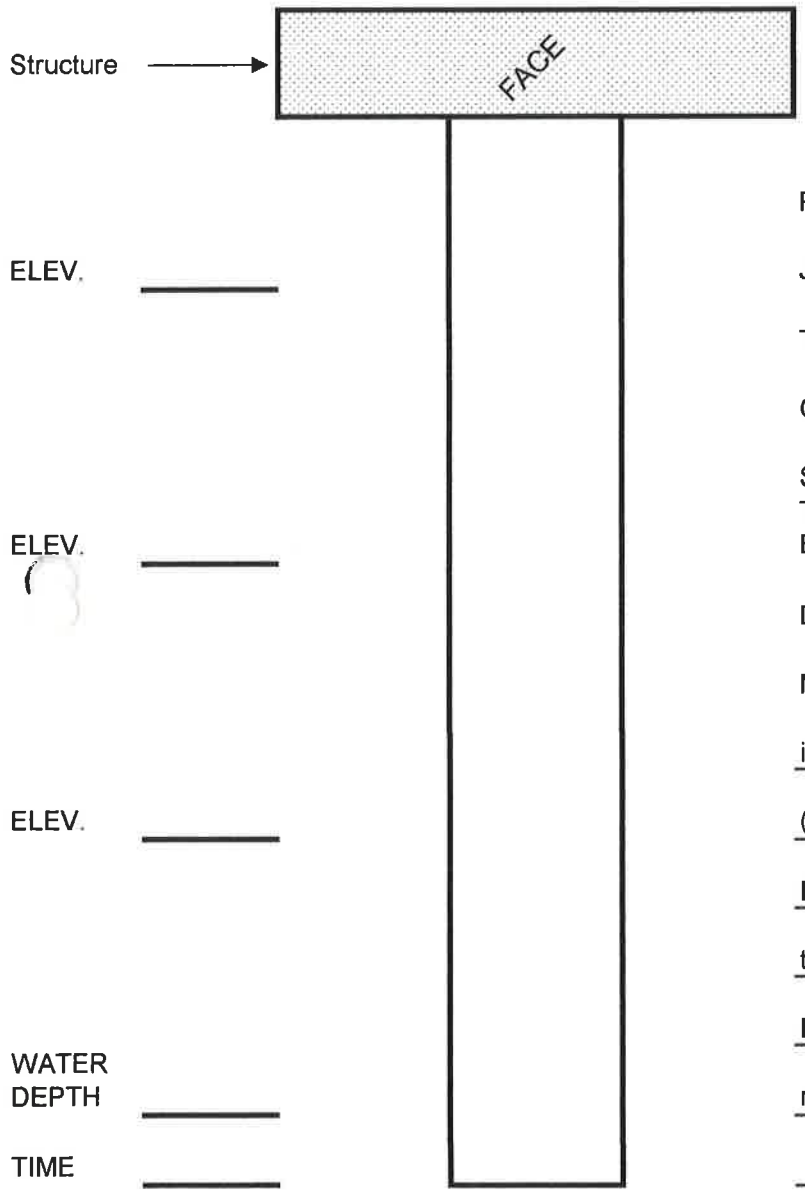
DATE: Sept. 18, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "D"



✓ Timber H Pile ☐ PSC

PILE # D12 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

	SOFT GROWTH:	HARD GROWTH:
TZ:	%	%
BTZ:	100 %	50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-112403-115402

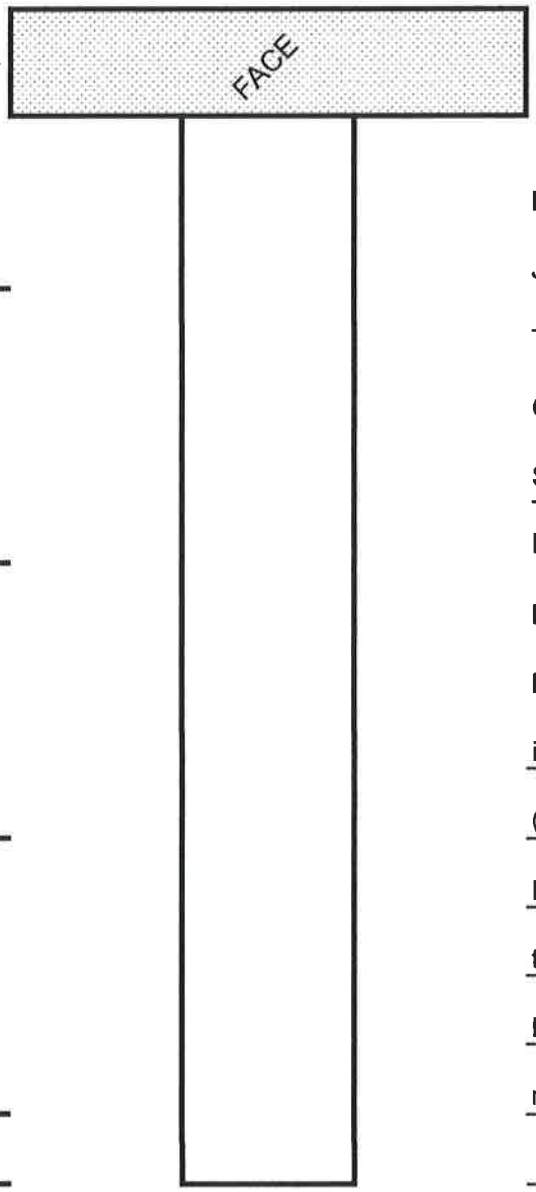
DATE: Sept. 18, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "D"



Timber H Pile PSC

PILE # D13 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-112403-115402

Page 1

DATE: Sept. 18, 2014

TERMINAL: Morgan Creek Marina

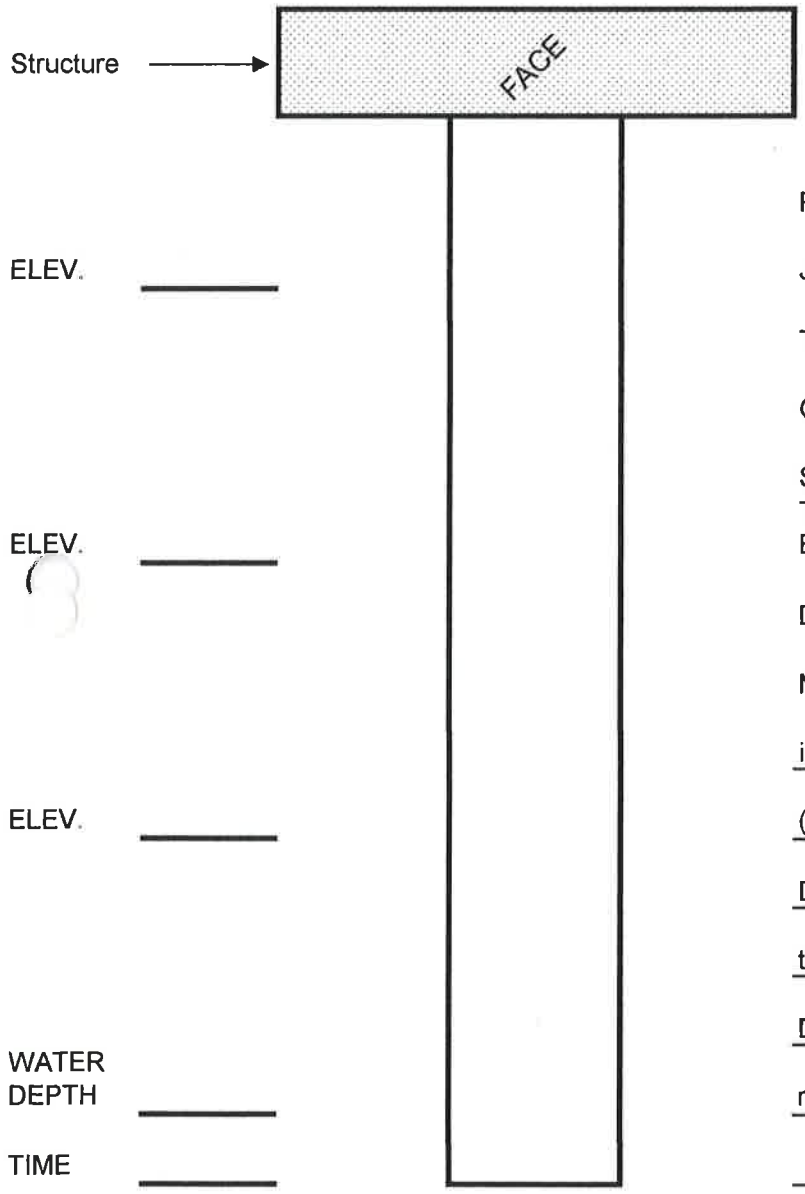
JOB # 14-D-73

DIVER: J. Turner

Underwater Piling Inspection

TIME: _____

STRUCTURE Dock "D"



Timber ☑ H Pile ☐ PSC

PILE # D14 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-112403-115402

Page 1

DATE: Sept. 18, 2014

TERMINAL: Morgan Creek Marina

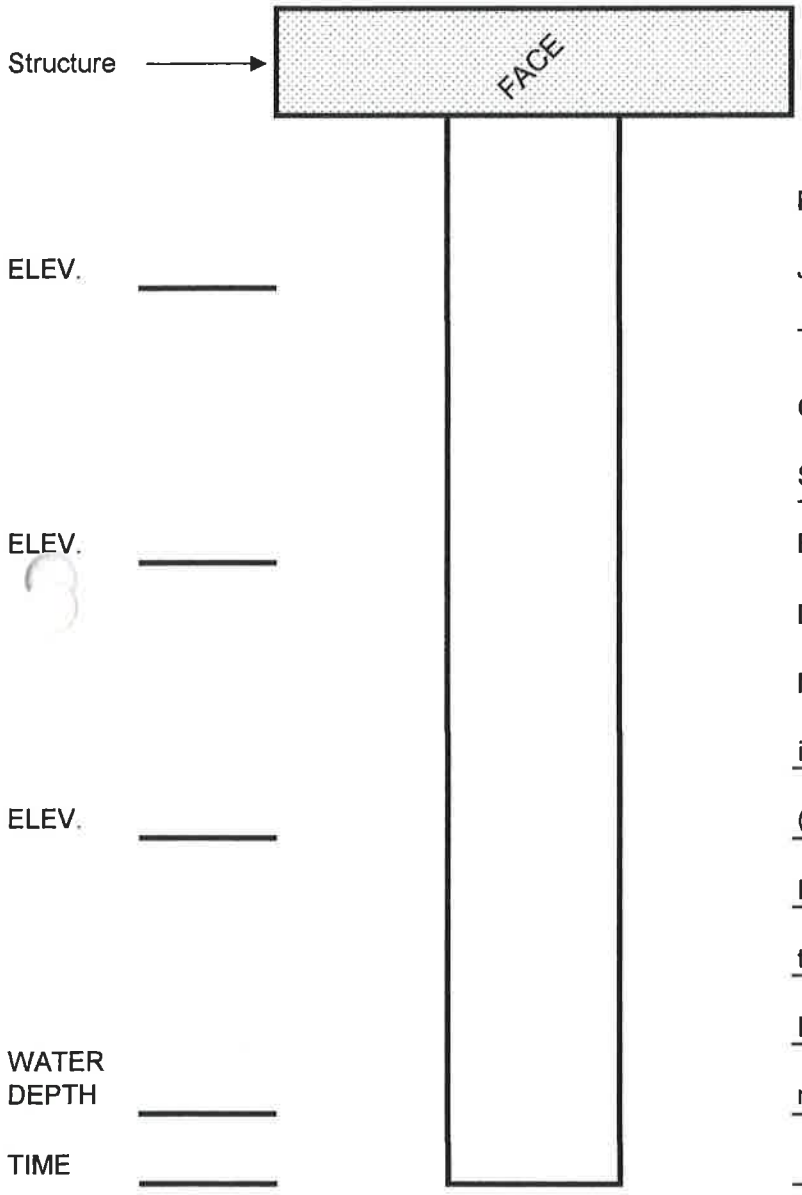
JOB # 14-D-73

DIVER: J. Turner

Underwater Piling Inspection

TIME: _____

STRUCTURE Dock "D"



Timber H Pile PSC

PILE # D15 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

	SOFT GROWTH:	HARD GROWTH:
TZ:	%	%
BTZ:	100 %	10 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-112403-115402

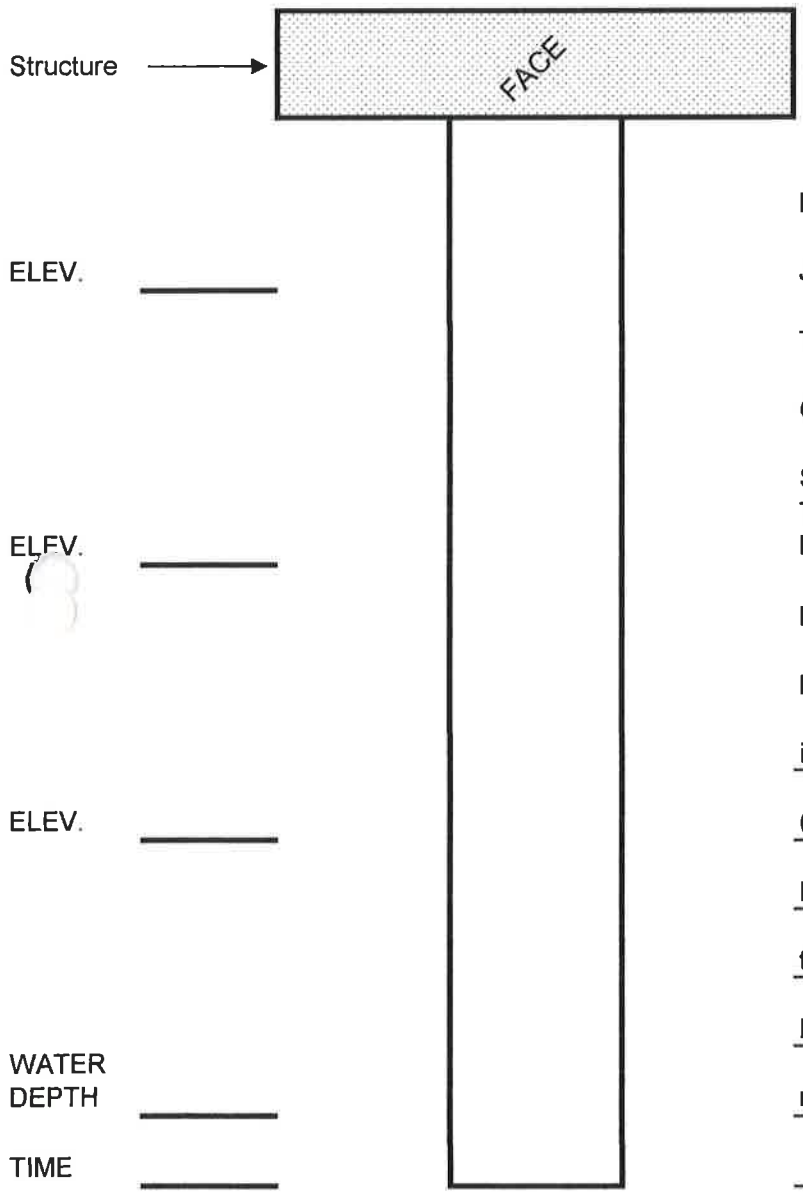
DATE: Sept. 18, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "D"



Timber H Pile PSC

PILE # D16 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH:		HARD GROWTH:	
TZ:	%	TZ:	%
BTZ:	100 %	BTZ:	20 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-112403-115402

Page 1

DATE: Sept. 18, 2014

TERMINAL: Morgan Creek Marina

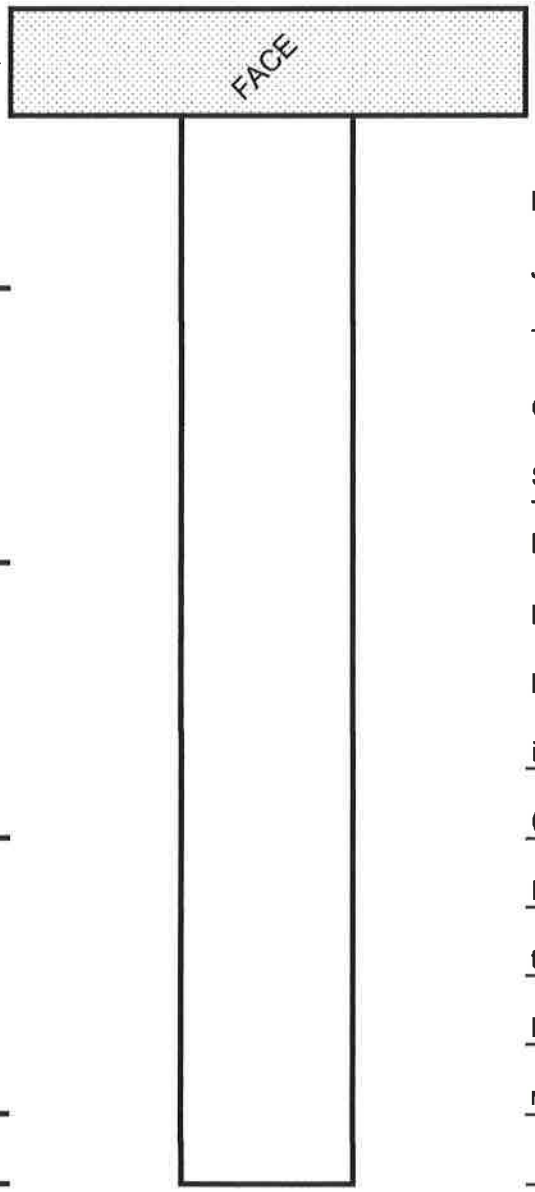
JOB # 14-D-73

DIVER: J. Turner

Underwater Piling Inspection

TIME: _____

STRUCTURE Dock "D"



Timber ☑ H Pile ☐ PSC

PILE # D17 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH:		HARD GROWTH:	
TZ:	%	TZ:	%
BTZ:	100 %	BTZ:	20 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-115403-115627

Dock “E”

Date: 9/18-22/2014 Project: Morgan Creek Marina

Job #: 14-D-73 Structure: Dock "E"

INSP. Diver: J. Turner Floating Dock Section: General

Section Length: Continuous

INSP Level: I Direction: _____ to _____

Polyethylene Floatation Units:	Good X	Fair	Poor
Float Attachment Hardware:	Good	Fair	Poor X
Outboard Timber Stringers:	Good	Fair X	Poor
Inboard Timber Stringers:	Good No Access	Fair	Poor
Floating Dock Connection Hardware: Bolts / Clips	Good No Access	Fair	Poor
Junction of Fingers Piers to Main Dock: (Steel Angle Brace & Fasteners)	Good	Fair X	Poor

Notes: The polyethylene floatation units appeared in good condition with exception of the fasteners that secure the units to the 2x6 timber sleepers mounted transverse of the typical floating dock section. The once galvanized fasteners (mild steel lag bolts w/ flat washers) were found to be 50% failed or missing. Soft marine growth ("Sea Grass") was heavy (8" - 20" typ.) on all float units. Bottom plywood was noted to sag onto the floatation units in random areas. Steel angle braces and misc fasteners typically showed signs of mild to moderate rust and corrosion. No visible sign of broken or damaged timber stringers or timber bracing was noted.

Page 1

DATE: Sept. 18, 2014

TERMINAL: Morgan Creek Marina

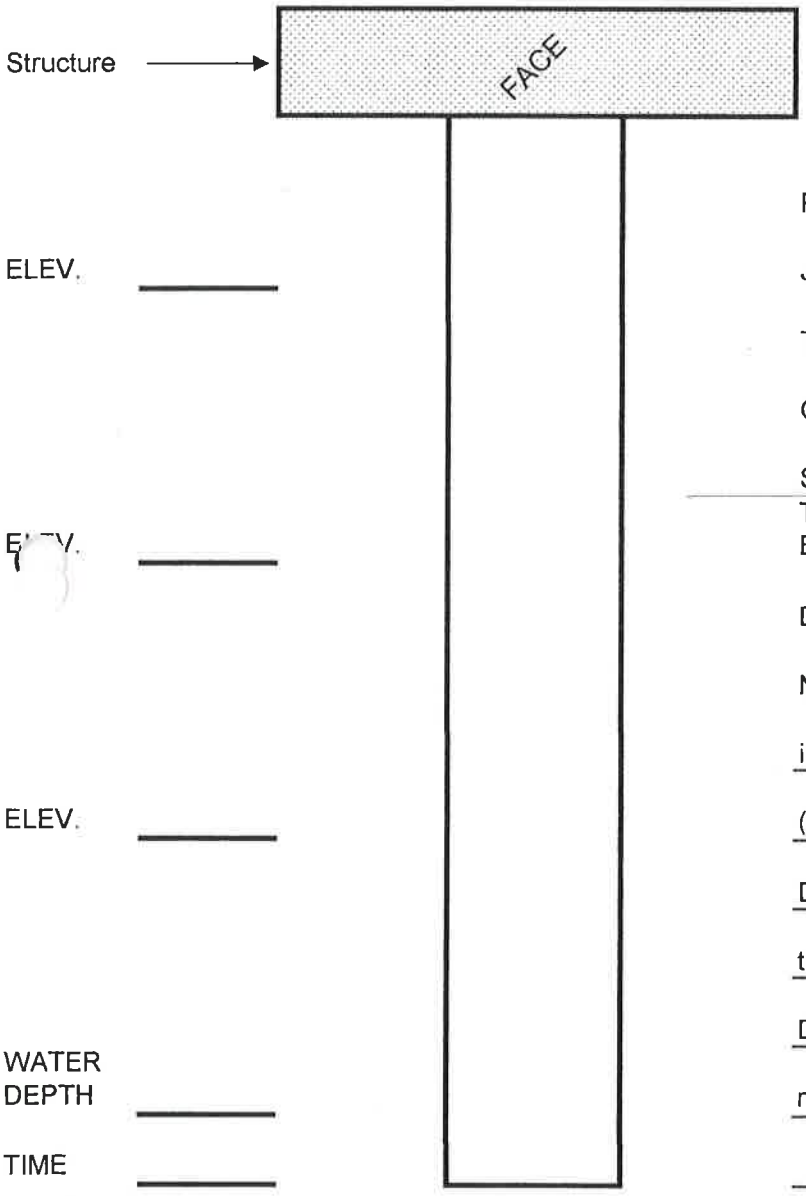
JOB # 14-D-73

I. P. DIVER: J. Turner

Underwater Piling Inspection

TIME: _____

STRUCTURE Dock "E"



Timber ✓ H Pile H PSC

PILE # E1 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-121117-122522

Page 1

DATE: Sept. 18, 2014

TERMINAL: Morgan Creek Marina

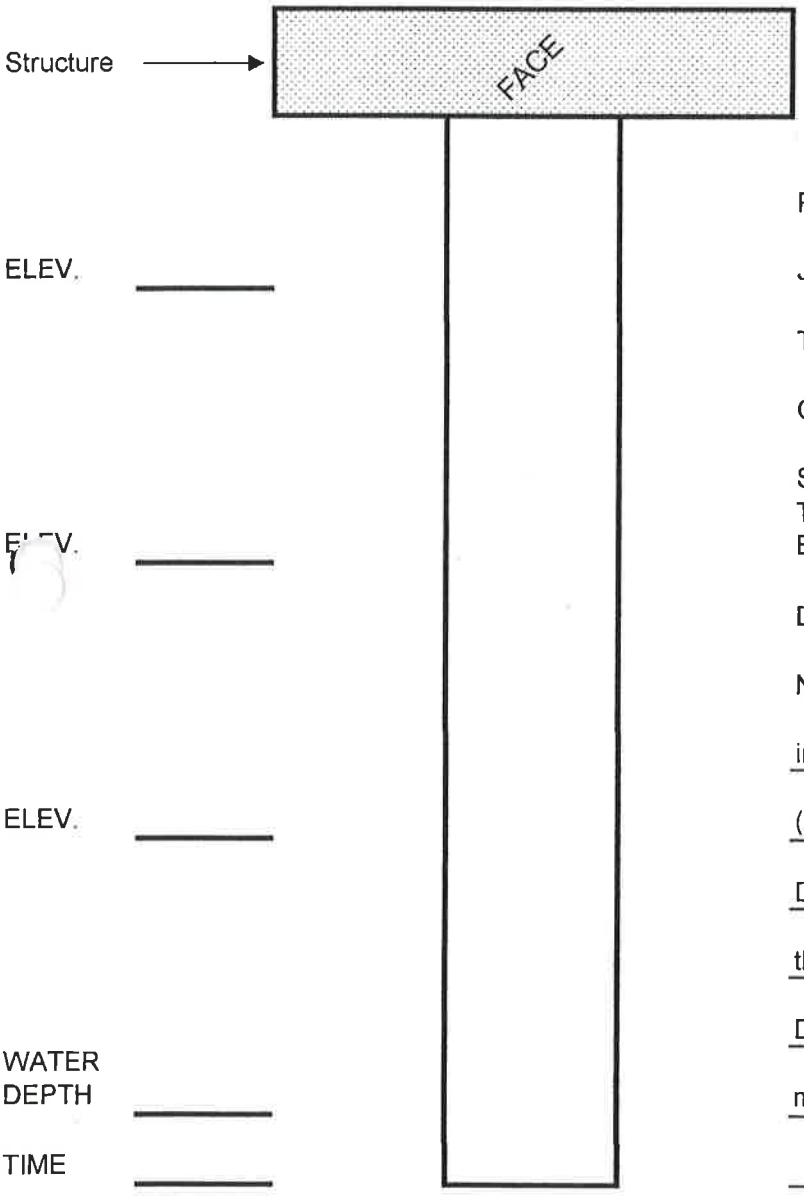
JOB # 14-D-73

I. P. DIVER: J. Turner

Underwater Piling Inspection

TIME: _____

STRUCTURE Dock "E"



PILE # E2 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-121117-122522

Page 1

DATE: Sept. 18, 2014

TERMINAL: Morgan Creek Marina

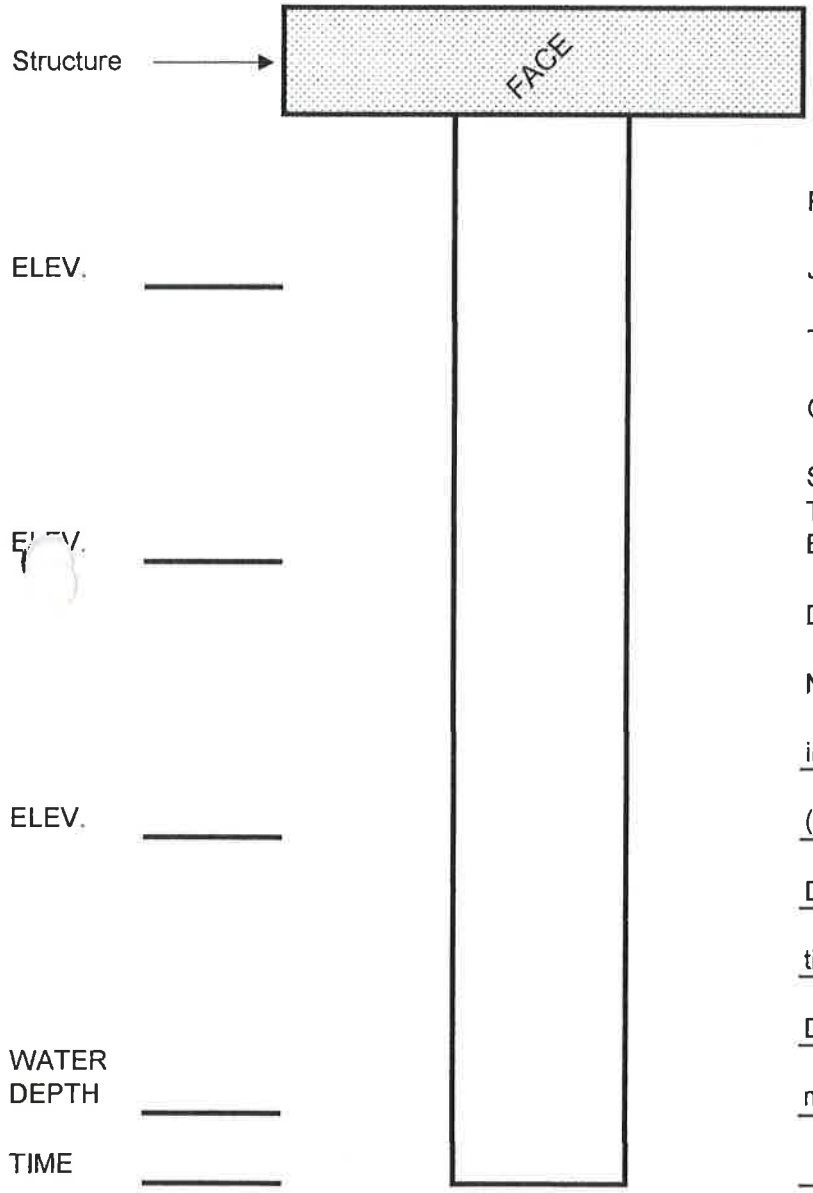
JOB # 14-D-73

DIVER: J. Turner

Underwater Piling Inspection

TIME: _____

STRUCTURE Dock "E"



Timber ✓ H Pile ☐ PSC

PILE # E3 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-121117-122522

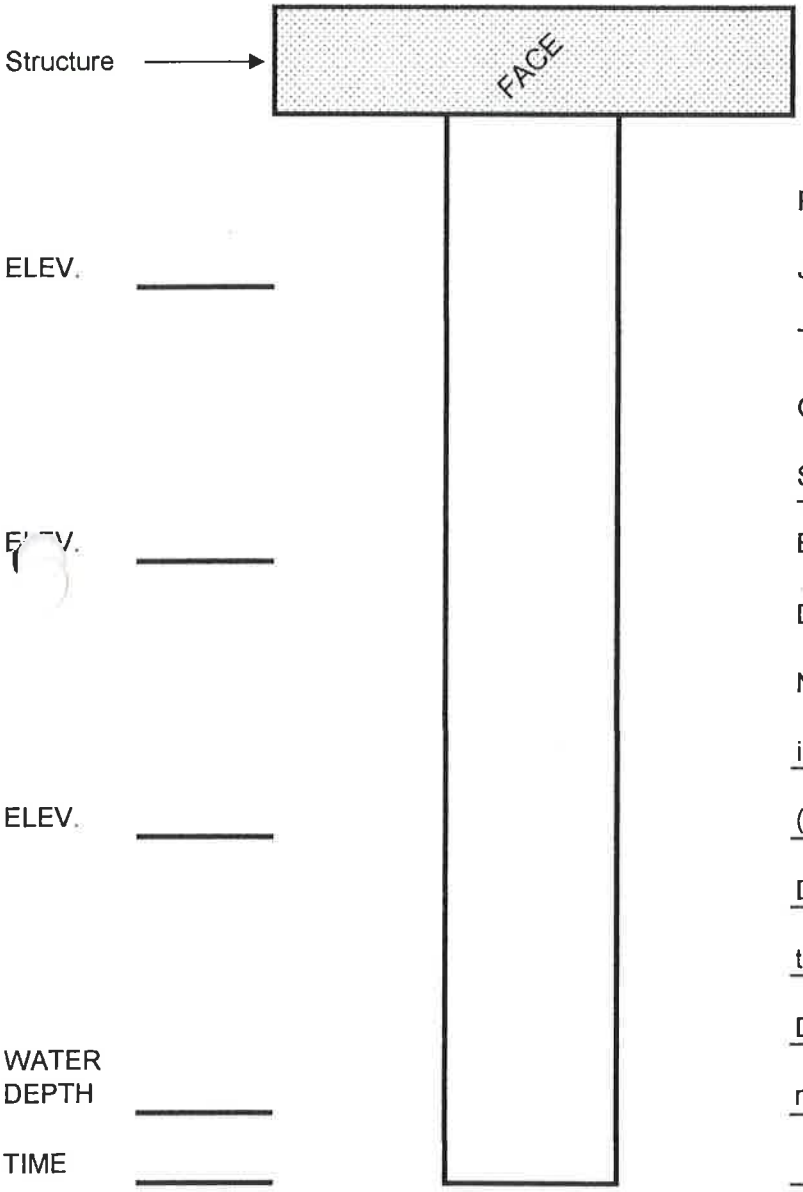
DATE: Sept. 18, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

INSP. DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "E"



Timber H Pile PSC

PILE # E4 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-121117-122522

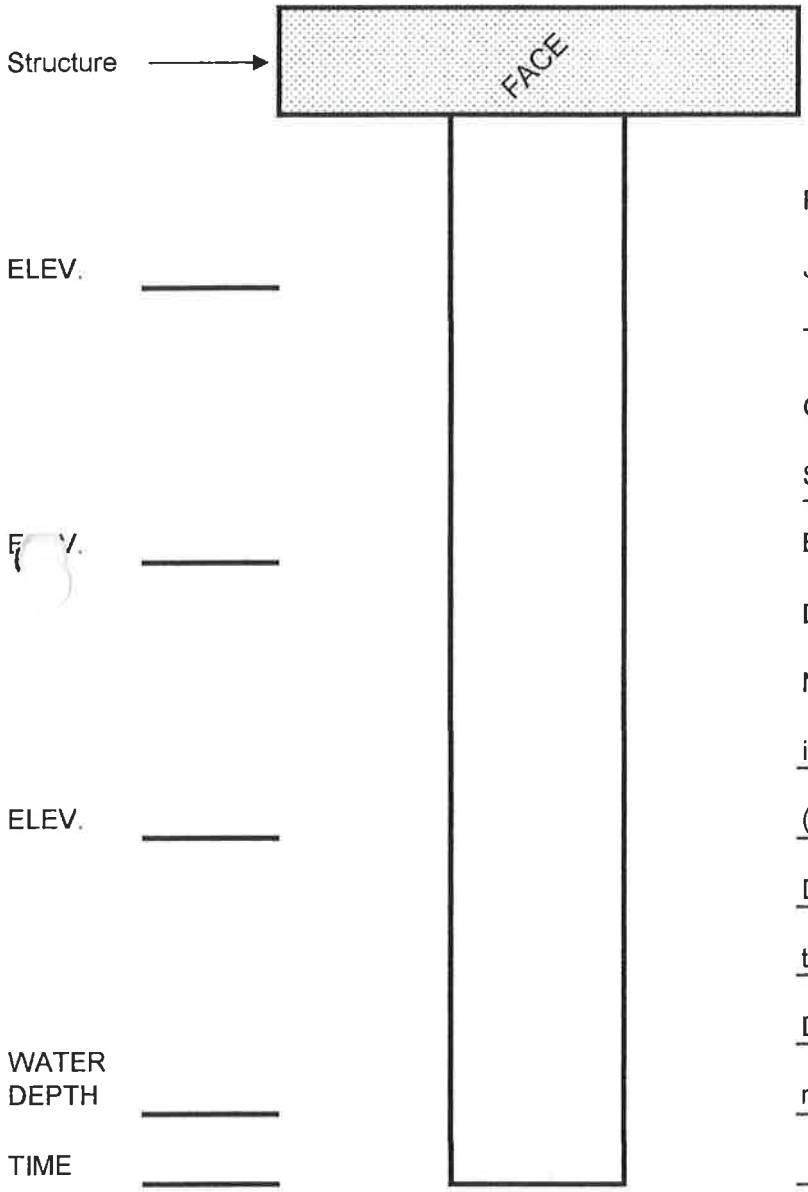
DATE: Sept. 18, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

INSP. DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "E"



PILE # E5 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-121117-122522

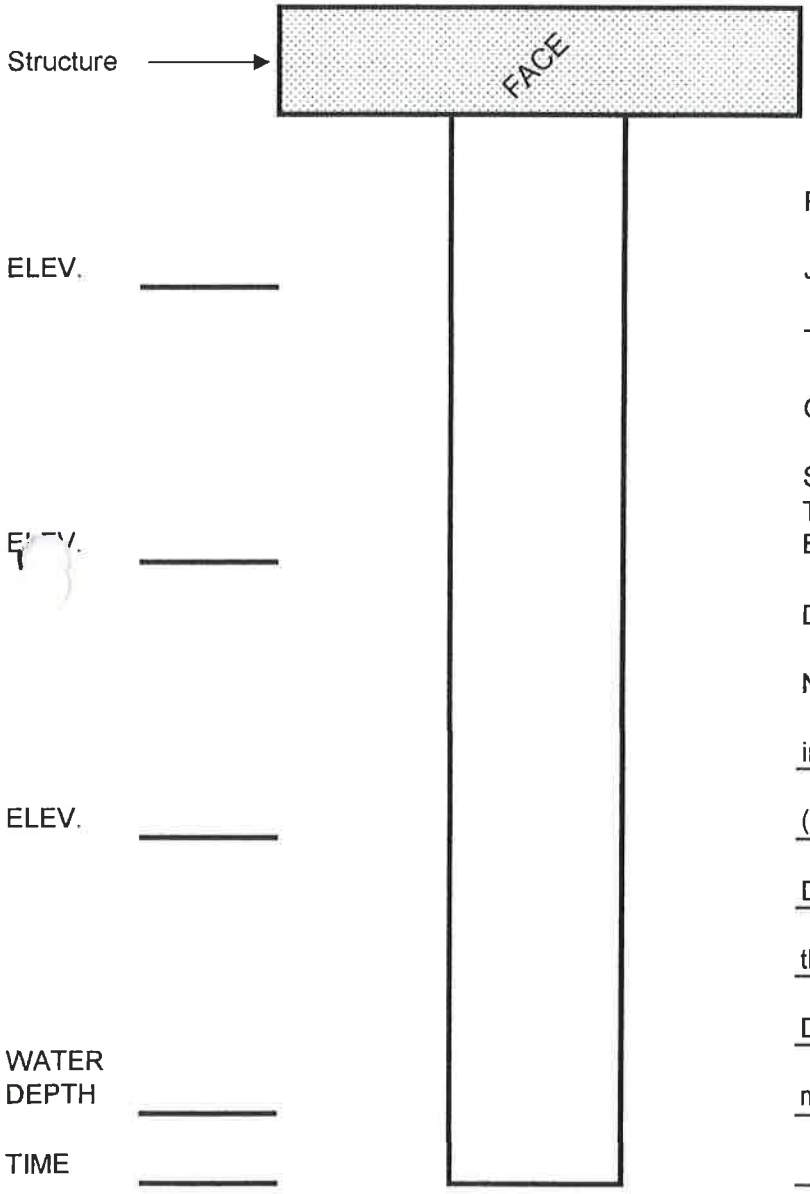
DATE: Sept. ~~18~~ 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

I. DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "E"



Timber H Pile PSC

PILE # E6 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-090143-090441

DATE: Sept. ~~18~~ 22, 2014

Page 1

TERMINAL: Morgan Creek Marina

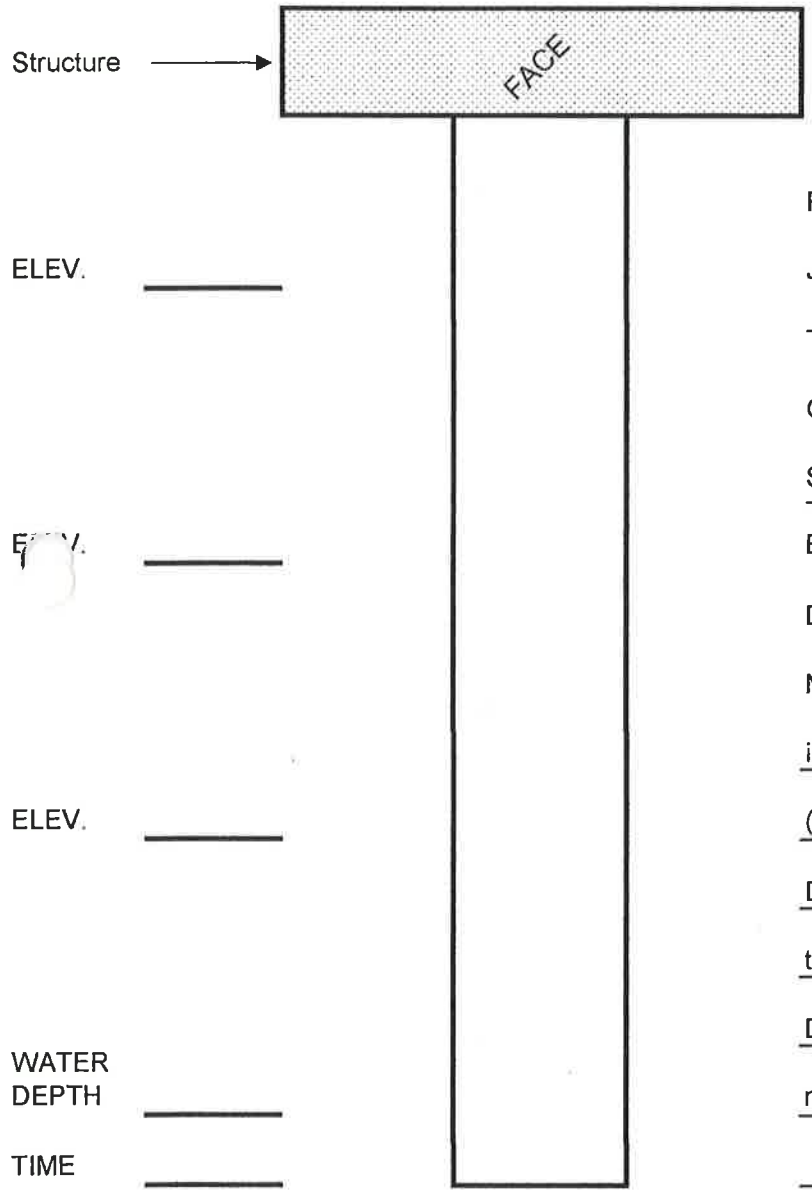
JOB # 14-D-73

INSP. DIVER: J. Turner

Underwater Piling Inspection

TIME: _____

STRUCTURE Dock "E"



Timber ✓ H Pile ☐ PSC

PILE # E7 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

	SOFT GROWTH:	HARD GROWTH:
TZ:	%	%
BTZ:	100 %	50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-090143-090441

Page 1

DATE: Sept. ~~18~~ 22, 2014

TERMINAL: Morgan Creek Marina

JOB # 14-D-73

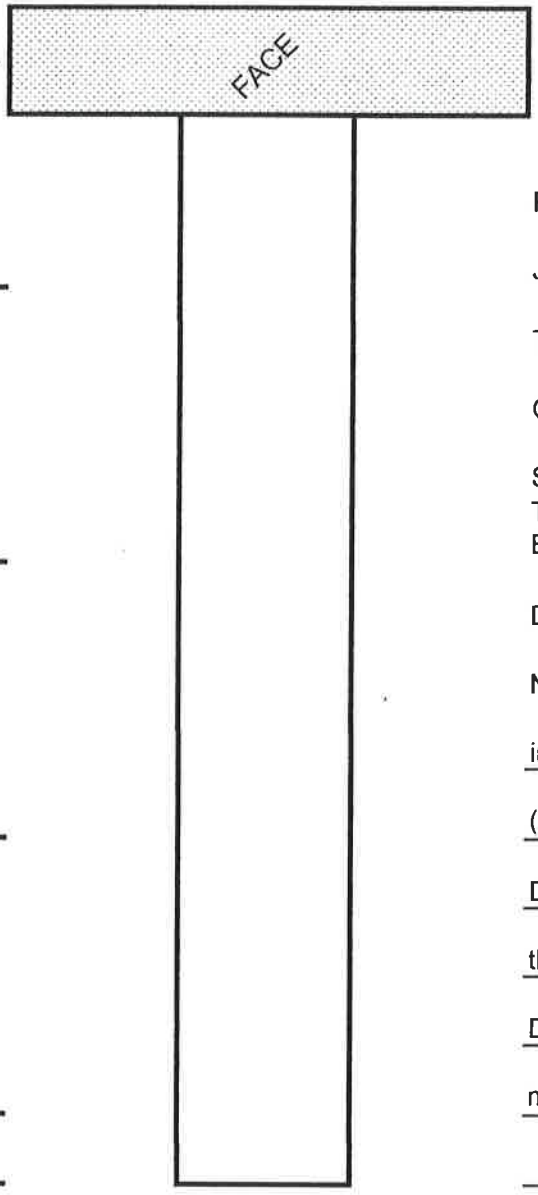
DIVER: J. Turner

Underwater Piling Inspection

TIME: _____

STRUCTURE Dock "E"

Structure →



ELEV. _____

ELEV. _____

ELEV. _____

WATER DEPTH _____

TIME _____

✓ Timber H H Pile ☐ PSC

PILE # E8 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH:		HARD GROWTH:	
TZ:	%	TZ:	%
BTZ:	100 %	BTZ:	50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-090700-091239

Page 1

DATE: Sept. ~~18~~ 22, 2014

TERMINAL: Morgan Creek Marina

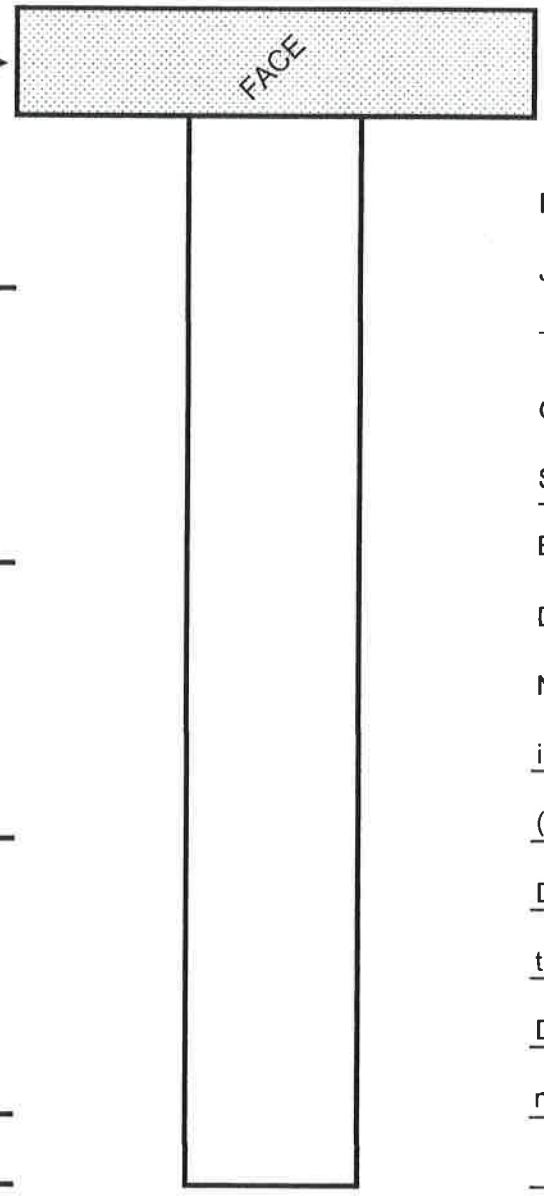
JOB # 14-D-73

I. DIVER: J. Turner

Underwater Piling Inspection

TIME: _____

STRUCTURE Dock "E"



Timber ✓ H Pile H PSC ☐

PILE # E9 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-090700-091239

Page 1

DATE: Sept. ~~18~~ 22, 2014

TERMINAL: Morgan Creek Marina

JOB # 14-D-73

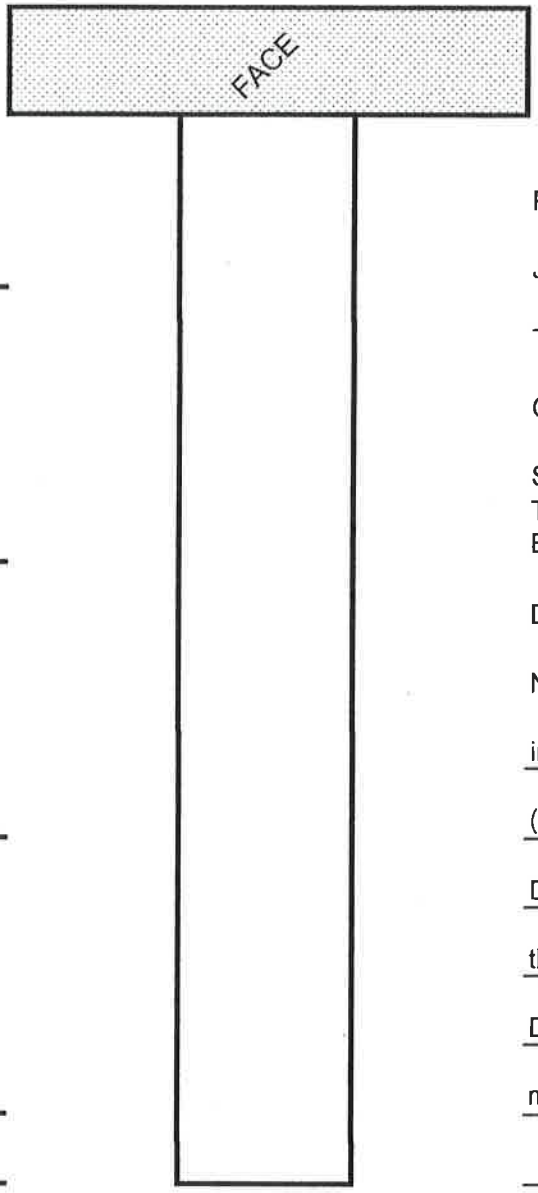
DIVER: J. Turner

Underwater Piling Inspection

TIME: _____

STRUCTURE Dock "E"

Structure →



ELEV. _____

ELEV. _____

ELEV. _____

WATER DEPTH _____

TIME _____

Timber ✓ H Pile PSC

PILE # E10 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH:		HARD GROWTH:	
TZ:	%	TZ:	%
BTZ:	100 %	BTZ:	50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-090700-091239

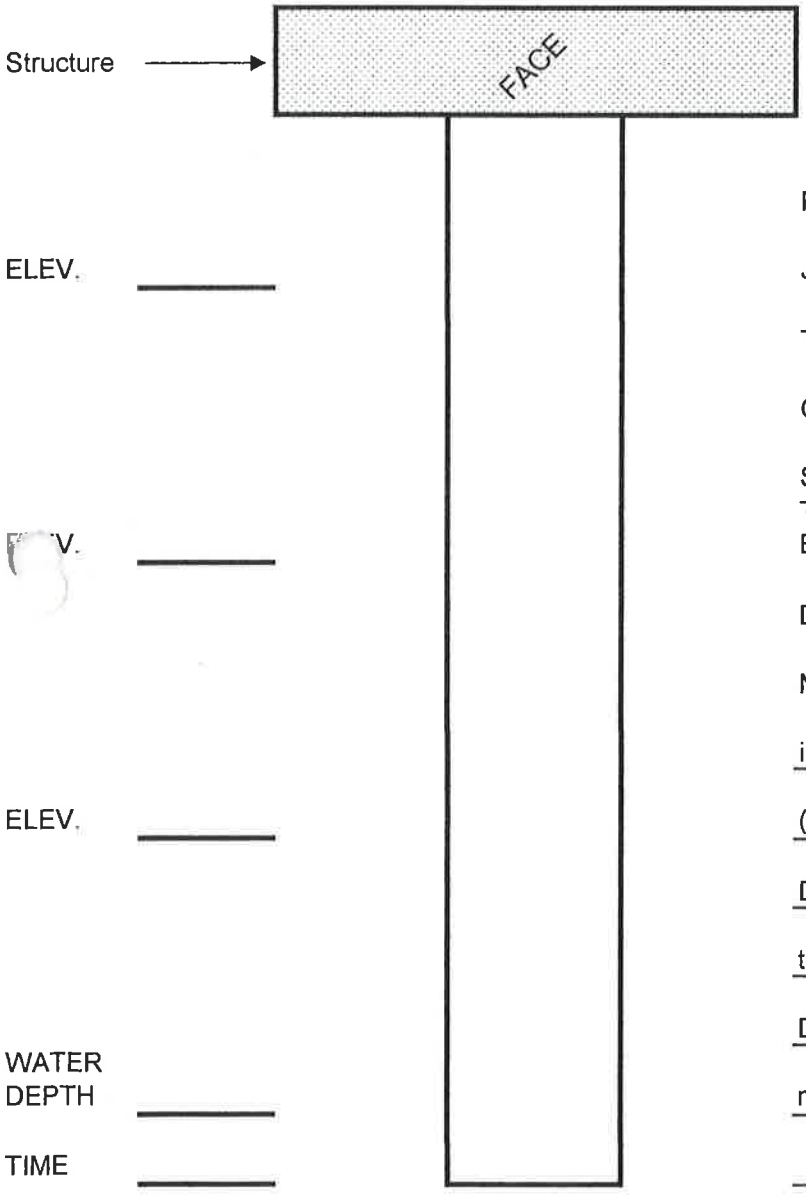
DATE: Sept. ~~18~~ 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

II . DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "E"



Timber ✓ H Pile PSC

PILE # E11 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH:		HARD GROWTH:	
TZ:	%	TZ:	%
BTZ:	100 %	BTZ:	50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-091527-091854

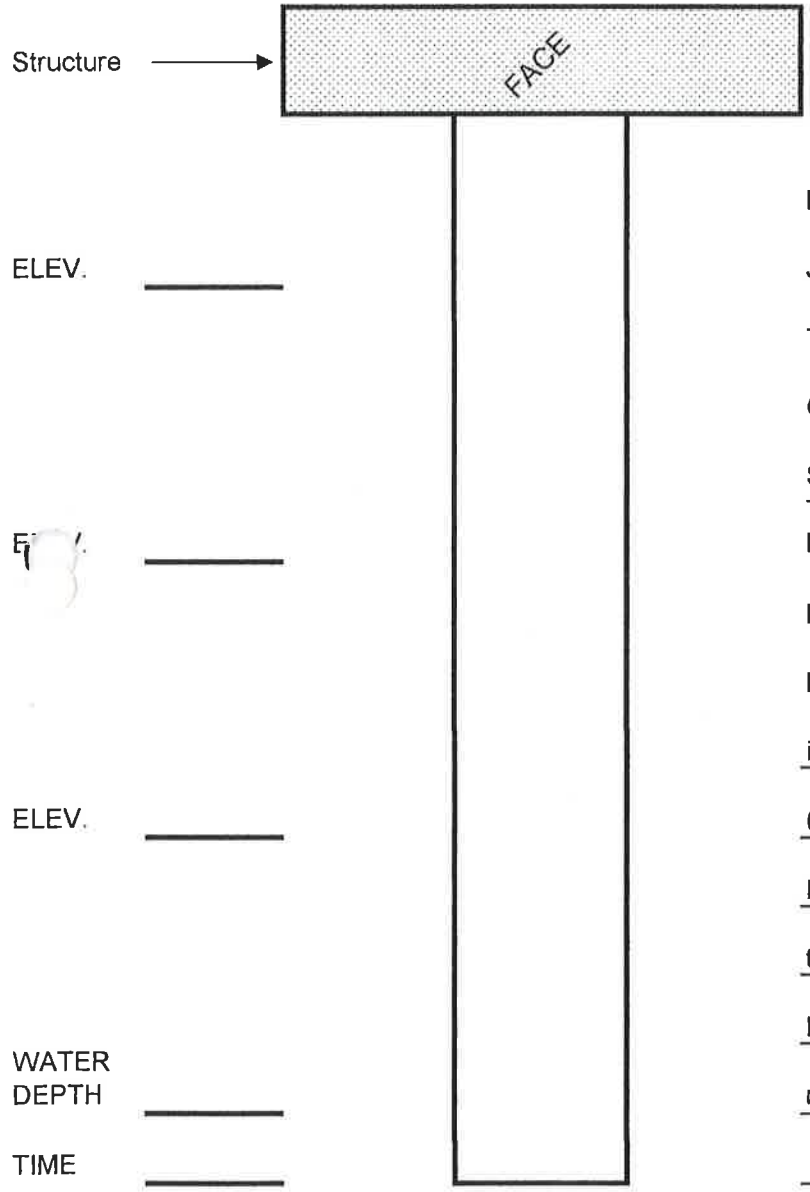
DATE: Sept. ~~18~~ 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

II. DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "E"



Timber ✓ H Pile PSC

PILE # E12 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-091527-091854

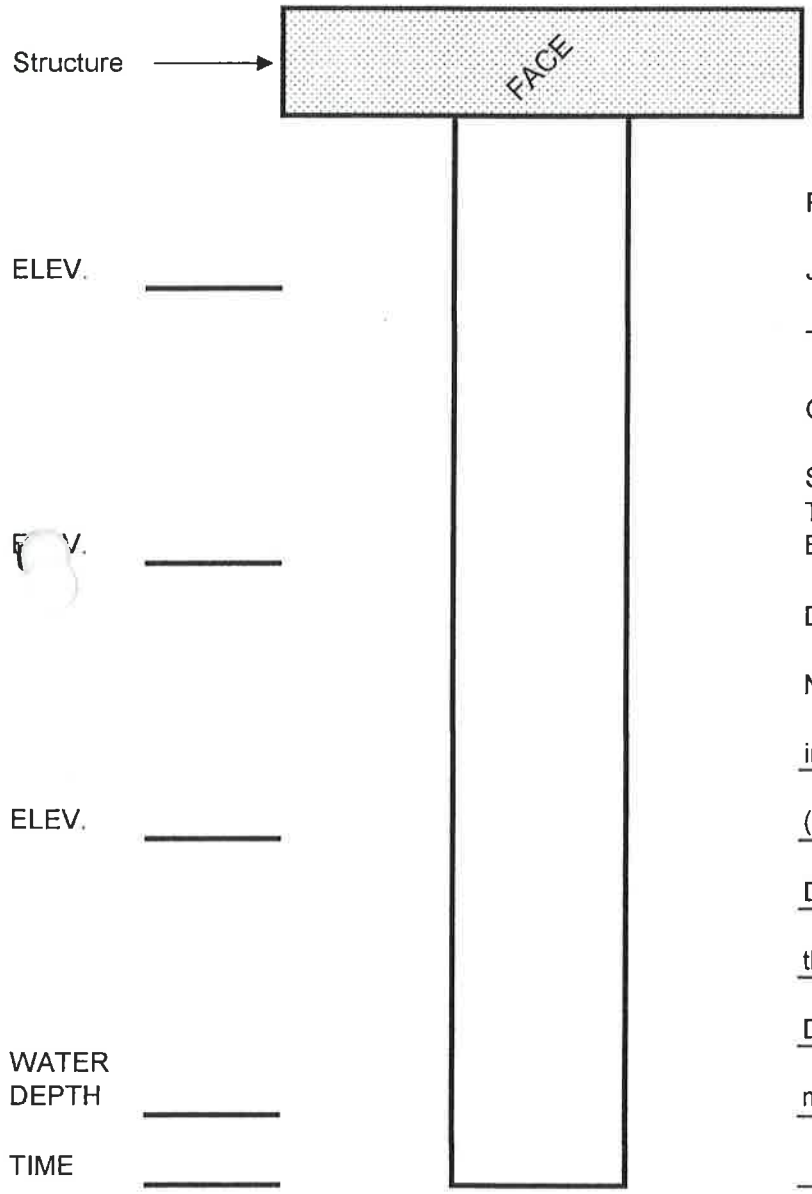
DATE: Sept. ~~18~~ 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

IN: DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "E"



Timber H Pile PSC

PILE # E13 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-090550-093001

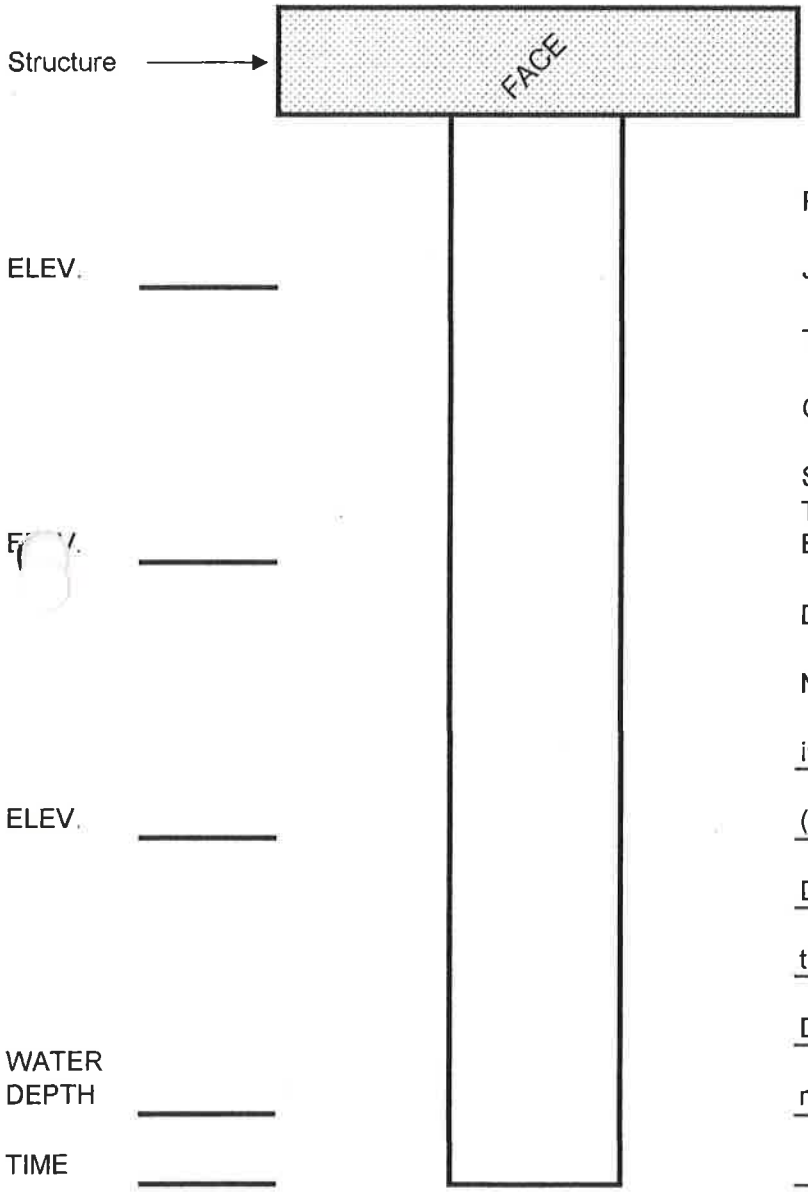
DATE: Sept. ~~18~~ 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

II. DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "E"



Timber H Pile PSC

PILE # E14 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-090550-093001

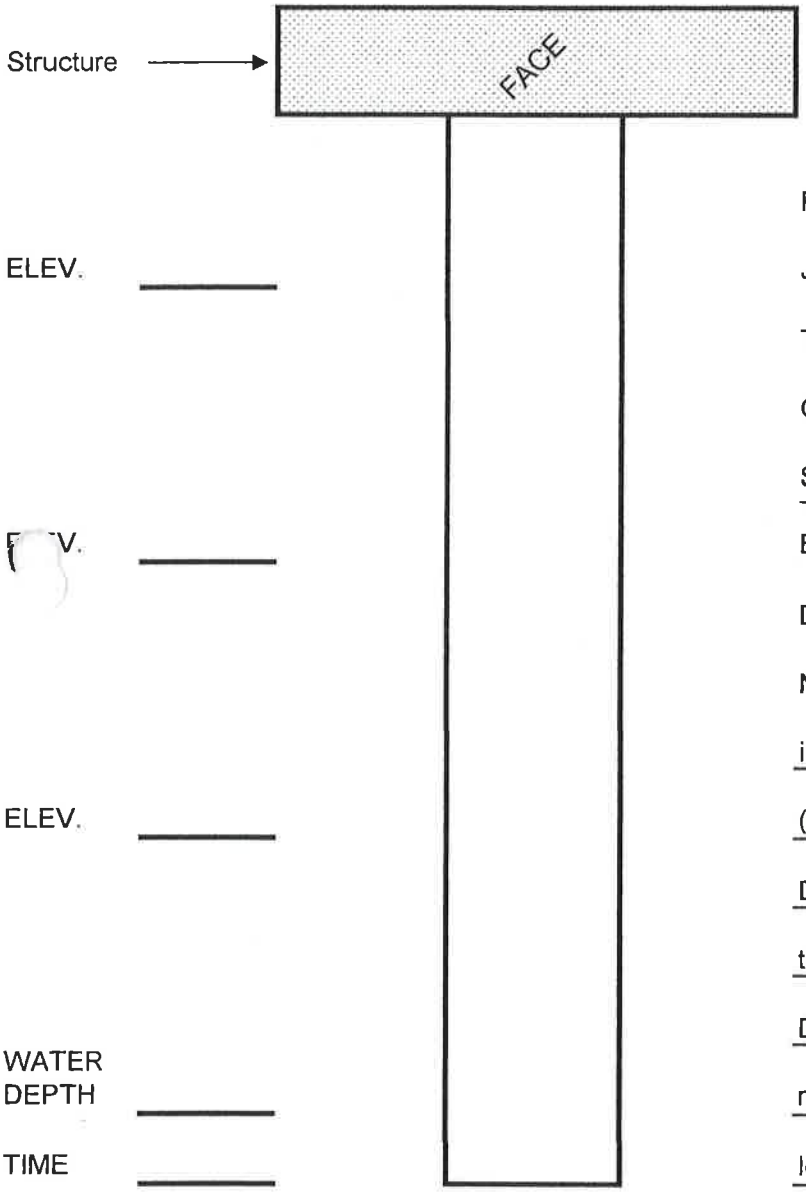
DATE: Sept. ~~18~~ 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

II. DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "E"



Timber H Pile PSC

PILE # E15 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter. 4' above the mudline diver located a hole or depression in the piling measuring 1" in diameter x 1-1/2" deep. The area was solid all around and was without rot.

Video File 140918-090550-093001

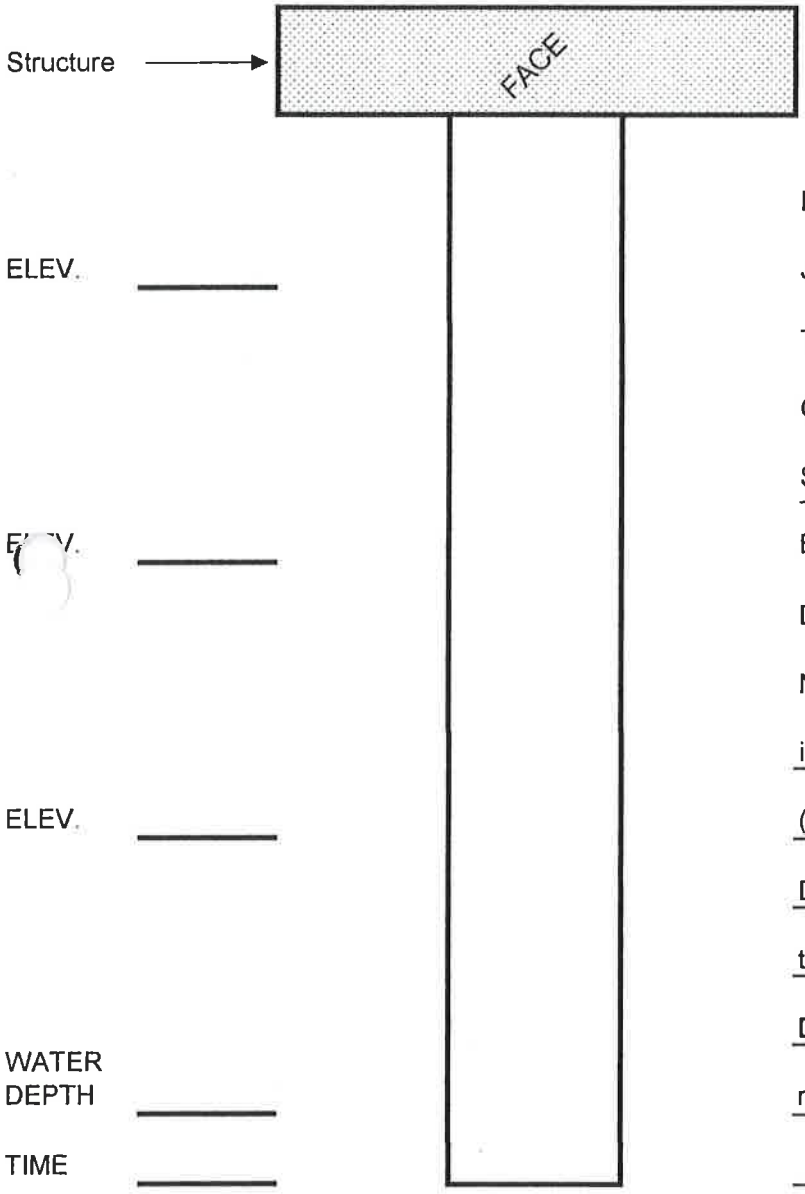
DATE: Sept. ~~18~~ 22, 2014

Page 1 TERMINAL: Morgan Creek Marina

JOB # 14-D-73

II . DIVER: J. Turner Underwater Piling Inspection

TIME: _____ STRUCTURE Dock "E"



Timber ✓ H Pile H PSC

PILE # E16 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-093220-093702

Page 1

DATE: Sept. ~~18~~ 22, 2014

TERMINAL: Morgan Creek Marina

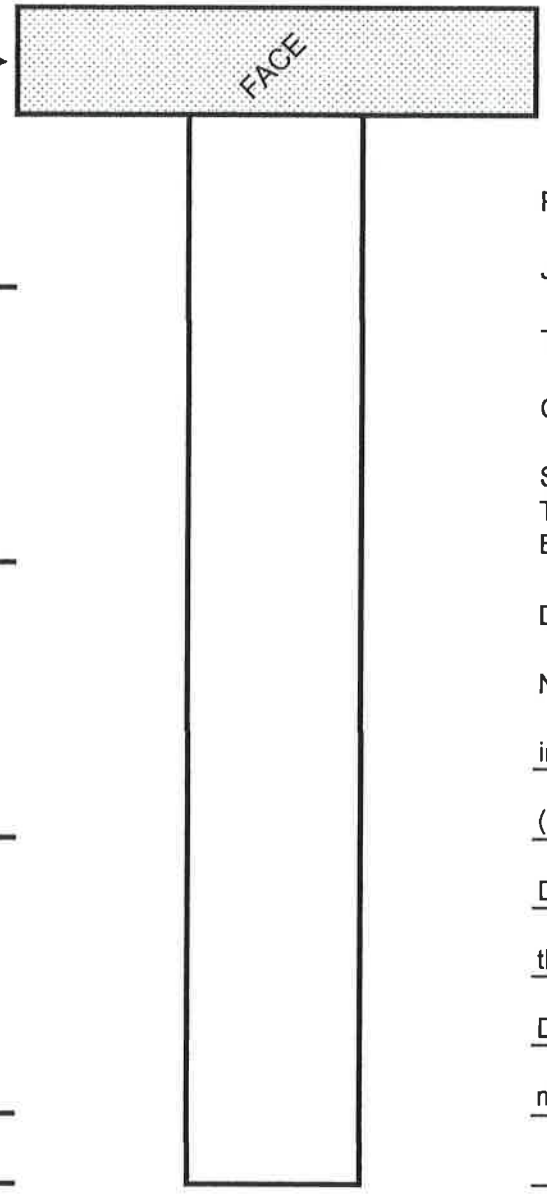
JOB # 14-D-73

I. DIVER: J. Turner

Underwater Piling Inspection

TIME: _____

STRUCTURE Dock "E"



Timber ✓ H Pile ☐ PSC

PILE # E17 Attitude: Plumb

JACKET: N/A LENGTH: N/A

TYPE: H. FORM N/A B. BAG N/A

GENERAL COND: Good EXP. STEEL: N/A

SOFT GROWTH: HARD GROWTH:

TZ: % TZ: %

BTZ: 100 % BTZ: 50 %

Defects: Cracks Spalls Breaks Rust

NOTES: Divers performed a Level I (swim-by) inspection on this pile. The piling was covered in both (soft) marine and (hard) shell growth as described above. Divers saw no evidence of marine boer activity and the piling was solid when sounded with a hammer. Divers saw other visible signs of defects, except as may be noted hereafter.

Video File 140918-093220-093702

JGT

Electrical Inspections:

CHARLESTON ENGINEERING

Wild Dunes Marina Engineering Study

Scope of Work

This electrical engineering study will include the following items:

1. Existing conditions assessment – The electrical system was visually reviewed to determine the general conditions of the marina. Sample electrical panels pedestals were opened to determine condition of wiring and look for corrosion. Existing splice boxes in the docks have been painted over and were not accessible. No electrical testing was done.
2. Code compliance – The electrical system was reviewed to current (2011) editions of the National Electrical Code (NFPA 70) and Fire Protection Standard for Marinas and Boatyards (NFPA 303).
3. Repair recommendations – Repair recommendations will be made to include immediate safety concerns and to update the system to current codes.
4. Cost estimates – Cost estimates will be given for repair recommendations to the current system.
5. Preventative maintenance program – The report will make recommendations for electrical system maintenance.
6. Enhancement recommendations – The report will make recommendations for up-grading the electrical system to current codes.
7. Water system – The report will visually review the water system, fire and potable, on the docks.

Description of the marina electrical system

Docks A, B, C, D and E are each fed from a single 120/208 volt SCE&G pad mount transformer to a main lug only panel at the head of each dock. The main panel on Dock A feeds the pedestals with three feeders using type G cable to floating docks and Docks B, C, D and E feeds the pedestals with six feeders using type G cable to the floating docks The Wild Dunes Marina is fed with a 100 KVA utility pad mount transformer at 120/ 240 volts to a 600 amp main disconnect switch on shore near the transformer. The main disconnect feeds a 600 amp panel at the end of the fixed pier. All of the pedestals and the Harbor Master building are fed from this panel.

A list of pedestal receptacle sizes for each dock is attached.

Inspection of docks

The docks were inspected on October 19th and the 23rd, 2014. All of the docks have similar electrical layouts and the comments apply to all of the docks except as specifically stated.

The following are the existing conditions of the system:

125B Wappoo Creek Dr., Charleston, SC 29412 Phone: (843)762-4242 Fax: (843)762-4239 Email: johnny@charlestonengineering.com

The voltage supplied to the docks is 120/ 208 volts, three phase. This results in a voltage of 208 volts on the 50 amp 125/250 volt receptacles. NFPA 303 paragraph 5.12.5 requires the shore power to the receptacle match the voltage class of the receptacle. 50 amp receptacles must be supplied with a shore power voltage of 120/ 240 volt single phase.

The main electrical panel at dock A faces the fence, cannot be fully opened and does not have the proper 36" minimum clearance from of the panel per NEC (National Electric Code).

Dock A main panel is missing the inner cover allowing live parts exposed and the panel bus is badly corroded.

Dock A main panel

125B Wappoo Creek Dr., Charleston, SC 29412 Phone: (843)762-4242 Fax: (843)762-4239 Email: rob@charlestonengineering.com

Corrosion at dock A main panel

In general, the dock pedestals are in good condition with only minor corrosion on terminals. The only damaged pedestal was pedestal A11 which has a broken base. There were wasps in pedestal A12.

All of the pedestals have 120 volt 20 amp GFI receptacles. A 20 amp receptacle is not a listed shore power receptacle per NFPA 303 article 5.12.2. NFPA 303 article 5.12.7 states 15 and 20 amp 125V receptacles shall not be housed in marine power outlets with shore power unless the receptacle is clearly marked not to be used for shore power. Most of the receptacles have a label next to them indicating "Not for Shore Power" but it cannot be read unless laying on the deck. There were several boats with extension cords using these receptacles.

Most of the pedestals have two 50 amp receptacles. Most of the boats presently at the marina do not require two 50 amp receptacles and many had 50 amp to 30 amp adapters.

Broken pedestal base and wasps

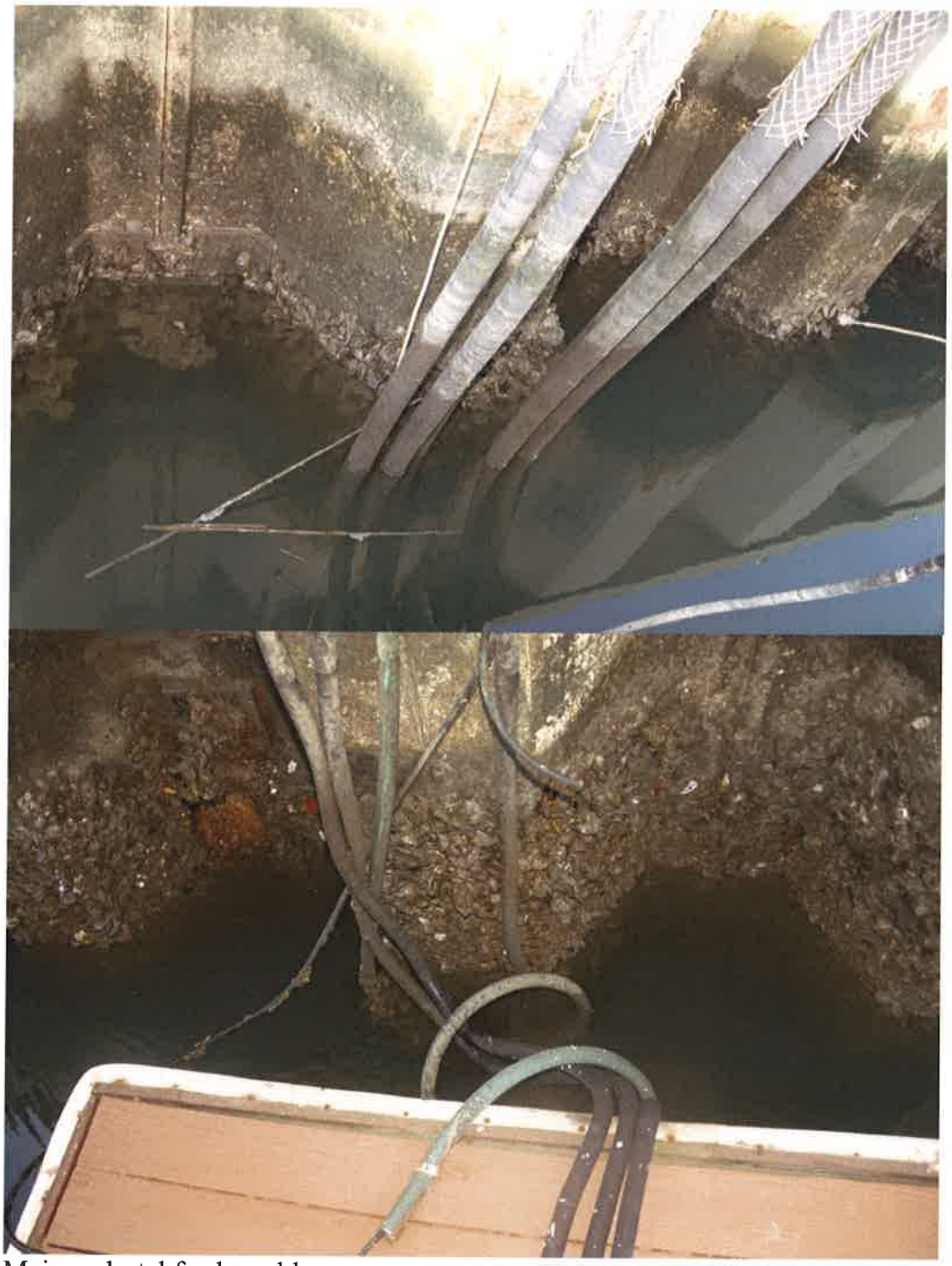
The pedestals mounted on the dock boxes are below the 12" minimum per NFPA 303 article 5.12.1.3.


Dock box mounted pedestals

125B Wappoo Creek Dr., Charleston, SC 29412 Phone: (843)762-4242 Fax: (843)762-4239 Email: rob@charlestonengineering.com

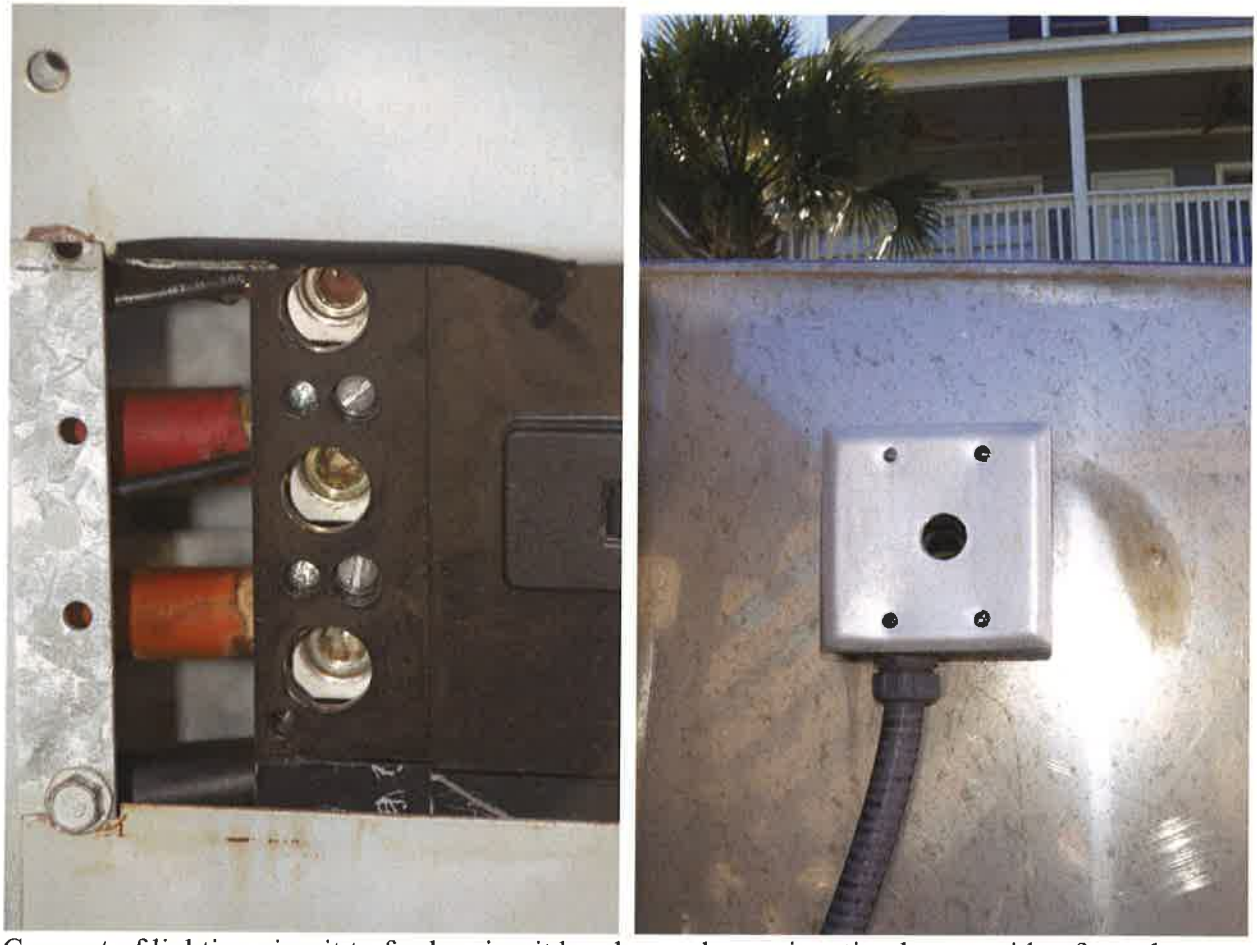
NFPA 303 article 5.3.3 also states that all electrical connections shall be located at least 12 inches above the deck. The main feeder cables are run to splice boxes below the deck and are tapped to the pedestals. These slice boxes were not accessible and the splices could not be inspected.

The main feeder cables appear to hang very close to the seawall and may be subject to damage from oyster shells. I recommend the cables be secured to the underside of the walkway to allow more distance from the seawall.



Main pedestal feeder cables

The lighting for the main seawall and dock ramp is connected to a 225 amp circuit breaker at each of the main electrical panels. This connection is allowed per NEC tap rule but is not a good practice as there is no protection of the 20 amp circuit from the 225 amp circuit breaker. The lighting circuit does not have its own protection as the panels are only allowed six circuit breakers without using a main circuit breaker. This lighting circuit originally had a junction box with a photoswitch. The photoswitches have been relocated and the junction box covers were left with an open hole.



Connect of lighting circuit to feeder circuit breaker and open junction box on side of panel.

The lighting along the main walk and dock ramps are low voltage incandescent. These lamps are high maintenance. All of the pedestals have screw in fluorescent. LED lamps would provide lower operating cost and less maintenance. The lighting was not observed at night. There is not a specific light level required for the area but pole mounted LED cutoff lighting fixture could be used to increase the lighting levels without spilling light into the residential units.

As stated earlier, the electrical load on the docks is very light and the docks are short. The short feeders allows for a very minimal voltage drop on the feeders. The feeders were checked for ampacity per demand loading based on NEC Table 555.12. All of the feeders are properly sized. See attached spread sheet.

Water System on the Docks

Each of the floating docks is fed with a 2" line to the docks which feeds hose bibbs in the docks and fire hose cabinets. The water systems appears to be in good condition and the fire hose cabinets have be inspected. The piping from the seawall is PVC. PVC is not rated for sunlight and will become brittle with UV exposure, causing a failure.

The fire hose cabinets were properly spaced and are in good condition. There is no freeze protection on the piping.

Recommendations

In order to comply with the NEC and NFPA 303, the entire electrical system would have to be replaced. The main transformer from SCE&G would need to be replaced with 120/240 volt single phase transformer. Multiple residential style transformer at each dock would reduce the main feeder lengths to each dock.

The dock main panels would need to be replaced with single phase panels with ground fault protection. There panels would also need a main circuit breaker.

The number of power feeders to the docks would need to be increased. As splices are not allowed below 12" from the deck, these feeders need to terminate into a pedestal. This only allows two double 50 amp power pedestals per a 200 amp feeder. Reducing the pedestal receptacle capacity would greatly reduce the number of feeders in the docks.

The existing pedestals need to be raised above 12" or replaced with a different style pedestal.

This entire replacement of the system is beyond the scope of this report to provide a budget price without a new design of the system.

In order to use the existing electrical system as is I recommend the following to increase the safety of the system. The following are also listed with the highest priority to the lowest priority.

1. Conduct a maintenance inspection with particular attention of the grounding. This would involve opening all junction boxes in the docks. Budget cost - $2,000
2. Replace dock A main panel. The new panel needs to have a main circuit breaker and be located for proper working clearance. Budget cost - $2,500
3. Fix broken pedestals, provide proper covers on lighting junction boxes and support cables from seawall. Budget cost $2,000.
4. Install ground fault monitoring at the main panels on all docks. Budget cost $17,500
5. Disconnect all 20 amp GFI receptacles in the pedestals. Budget cost $1,020

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Dock A Pedistal #		Receptacles					Loads	
A1	50	50	20 GFI				8.32	8.32
A2	50	50	20 GFI				8.32	8.32
A3	50	50	20 GFI				8.32	8.32
A4	50	50	20 GFI				8.32	8.32
A5	50	50	20 GFI				8.32	8.32
A6	50	30	20 GFI				8.32	2.88
A7	30	30	20 GFI				8.32	2.88
A8	50	30	20 GFI				8.32	2.88
A9	50	50	20 GFI				8.32	8.32
A10	50	30	20 GFI				8.32	2.88
A11	50	30	20 GFI	Broken base			8.32	2.88
A12	50	50	20 GFI				8.32	8.32
						Total load	172.48	kw
						Total demand	108.66	kw
						Total demand amps	301.97	amps

Dock B Pedistal #		Receptacles				
B1A	50	50	20 GFI		8.32	8.32
B2A	50	30	20 GFI		8.32	2.88
B1	50	50	20 GFI		8.32	8.32
B2	50	30	20 GFI		8.32	2.88
B3	50	50	20 GFI		8.32	8.32
B4	50	30	20 GFI		8.32	2.88
B5	50	50	20 GFI		8.32	8.32
B6	50	30	20 GFI		8.32	2.88
B7	50	50	20 GFI		8.32	8.32
B8	?	?	?	Pad locked	8.32	8.32
B9	50	50	20 GFI		8.32	8.32
B10	50	50	20 GFI		8.32	8.32
B11	50	30	20 GFI		8.32	2.88
B12	50	30	20 GFI	Extension cord to boat	8.32	2.88
B13	50	50	20 GFI		8.32	8.32
B14	50	30	20 GFI		8.32	2.88
B15	50	30	20 GFI		8.32	2.88
B16	50	30	20 GFI		8.32	2.88
B17	50	30	20 GFI		8.32	2.88
B18	30	30	20 GFI		2.88	2.88
B19	50	50	20 GFI	Extension cord to boat	8.32	8.32
				Total load	284.16	kw
				Total demand	127.87	kw
				Total demand amps	355.36	amps

Dock C Pedistal #		Receptacles					
C1	50	50	20 GFI			8.32	8.32
C2	50	50	20 GFI			8.32	8.32
C3	50	50	20 GFI			8.32	8.32
C4	50	50	20 GFI			8.32	8.32
C5	50	50	20 GFI			8.32	8.32
C6	50	50	20 GFI			8.32	8.32
C7	50	50	20 GFI			8.32	8.32
C8	50	30	20 GFI			8.32	2.88
C9	50	30	20 GFI			8.32	2.88
C10	50	50	20 GFI			8.32	8.32
C11	50	30	20 GFI			8.32	2.88
C12	50	50	20 GFI			8.32	8.32
C13	50	50	20 GFI			8.32	8.32
C14	50	50	20 GFI			8.32	8.32
C15	50	50	20 GFI			8.32	8.32
C16	50	50	20 GFI			8.32	8.32
C17	50	50	20 GFI			8.32	8.32
C18	50	30	20 GFI			8.32	2.88
C19	50	50	20 GFI			8.32	8.32
C20	50	50	20 GFI			8.32	8.32
C21	50	50	20 GFI	No cover		8.32	8.32
C22	50	50	20 GFI			8.32	8.32
C23	50	50	20 GFI			8.32	8.32
					Total load	360.96	kw
					Total demand	162.43	kw
					Total demand amps	451.40	amps

Dock D Pedistal #		Receptacles				
D1	50	50	20 GFI		8.32	8.32
D2	50	30	20 GFI		8.32	8.32
D3	50	50	20 GFI		8.32	8.32
D4	50	30	20 GFI	30 Amp marked as 50 amp	8.32	8.32
D5	50	30	20 GFI		8.32	8.32
D6	50	50	20 GFI		8.32	8.32
D7	50	50	20 GFI		8.32	8.32
D8	50	50	20 GFI		8.32	2.88
D9	50	50	20 GFI		8.32	2.88
D10	50	50	20 GFI	Extension cord to boat	8.32	8.32
D11	50	50	20 GFI		8.32	2.88
D12	50	30	20 GFI		8.32	8.32
D13	50	50	20 GFI		8.32	8.32
D14	50	50	20 GFI		8.32	8.32
D15	50	50	20 GFI		8.32	8.32
D16	50	50	20 GFI		8.32	8.32
D17	50	50	20 GFI		8.32	8.32
D18	50	50	20 GFI	light on	8.32	2.88
D19	50	50	20 GFI		8.32	8.32
D20	50	50	20 GFI		8.32	8.32
D21	50	50	20 GFI		8.32	8.32
D22	50	50	20 GFI		8.32	8.32
D23	50	50	20 GFI		8.32	8.32
D23	50	50	20 GFI		8.32	8.32
D24	50	50	20 GFI		8.32	8.32
				Total load	360.96	kw
				Total demand	162.43	kw
				Total demand amps	451.40	amps

Dock E Pedistal #		Receptacles			
E1	50	50	20 GFI	8.32	8.32
E2	50	30	20 GFI	8.32	2.88
E3	50	50	20 GFI	8.32	8.32
E4	50	50	20 GFI	8.32	8.32
E5	50	50	20 GFI	8.32	8.32
E6	30	30	20 GFI	8.32	2.88
E7	50	50	20 GFI	8.32	8.32
E8	50	30	20 GFI	8.32	2.88
E9	50	50	20 GFI	8.32	8.32
E10	50	50	20 GFI	8.32	8.32
E11	50	50	20 GFI	8.32	8.32
E12	50	50	20 GFI	8.32	8.32
E13	50	50	20 GFI	8.32	8.32
E14	50	50	20 GFI	8.32	8.32
E15	50	50	20 GFI	8.32	8.32
E16	50	50	20 GFI	8.32	8.32
E17	50	50	20 GFI	8.32	8.32
E18	50	50	20 GFI	8.32	8.32
E19	50	50	20 GFI	8.32	8.32
E20	50	50	20 GFI	8.32	8.32
E21	50	50	20 GFI	8.32	8.32
E22	50	50	20 GFI	8.32	8.32
E23	50	50	20 GFI	8.32	8.32
E24	50	50	20 GFI	8.32	8.32
				Total load	366.40 kw
				Total demand	164.88 kw
				Total demand amps	458.20 amps

All demand ratings are based on NEC Table 555.12 demand factors plus 10% for metering