



Washington State
Department of Transportation
Bridge Preservation Dive Team

UNDERWATER INSPECTION REPORT
FOR THE
MCNEIL IS. STILL HARBOR DOCK
BRIDGE NO. DOC-6
STRUCTURE ID 00200441



Prepared For WA State Dept. of Corrections (DOC)

Inspection Date April 26, 2017

Lead Inspector/Diver Darren O. Nebergall
Cert. # G0314

Inspector/Diver Michael B. Smith

Report Status Released



UNDERWATER INSPECTION REPORT
FOR THE
MCNEIL IS. STILL HARBOR DOCK

BRIDGE NO. DOC-6
STRUCTURE ID 00200441

EXECUTIVE SUMMARY

The WSDOT Bridge Preservation Dive Team performed an underwater inspection of the subject facility on April 26, 2017. A total of 37 steel pipe piles and the concrete floats exteriors were inspected by diving.

In general, the steel pipe piles that position the floating docks (spud piles) are in fair to poor condition. The zinc paint coating on the piles is failing in large areas from the splash zone down to mudline. Missing areas of coating have exposed the steel substrate which now has large areas of surface corrosion and section loss. The overall pitting of the metal made it difficult to obtain accurate thickness readings with the ultrasonic thickness meter. Some pits are 0.25" deep and plans indicate a 0.5" nominal wall thickness. Twelve of the piles had holes through the full thickness of the pile caused by constant mechanical abrasion of several UHMW "log" booms tethered to the piles. These holes have increased in size and number since the previous underwater inspection. Since these piles do not carry vertical loads, this condition does not warrant immediate repair, but from a serviceability standpoint should be closely monitored during future inspections. The concrete floating pontoons had thick marine growth covering nearly 100% of the surface area. Spot cleaning revealed no defects.

No underwater repairs are required at this time. Recommend retaining the 48-month frequency for underwater inspections.

Inspector	Darren O. Nebergall	Date	4/26/2017
Bridge No.	DOC-6	Bridge Name	MCNEIL IS. STILL HARBOR DOCK
Bridge Type		Waterway Name	STILL HARBOR (P. SOUND)
Dive Objective	Inspection of submerged substructure elements.		

Diving Operation

Type of Operation SCUBA Surface Supplied Air Snorkel ROV Other _____

Equipment

Suit Dry suit

Air Supply LP95 + Pony

Site Access Duckworth boat - launched from Zittle's Marina

Inspection Tools Hammer/scrapper, probe, u/w light, GoPro camera

Conditions

Water Salt Fresh Brackish Temperature 48 °F Visibility 10-15 ft

Surface Calm Choppy Rough

Tide High Low Flood Ebb N/A

Current Fast Moderate Slow Velocity < 1 ft/sec

Weather Clear Cloudy Overcast Rain Windy Air Temp 48 °F

Diver Checks

<input checked="" type="checkbox"/> First Aid Equipment on Site	<input checked="" type="checkbox"/> Physical Condition of Diver(s) Checked
<input checked="" type="checkbox"/> Communication for EMS	<input checked="" type="checkbox"/> Communications for Diver(s) Checked
<input checked="" type="checkbox"/> Dive Gear Inspected	<input checked="" type="checkbox"/> Team Briefed and Understands Dive Plan
<input checked="" type="checkbox"/> Air Source Checked	<input checked="" type="checkbox"/> Special Site Hazards Noted
<input checked="" type="checkbox"/> Pre-Activity Safety Plan Reviewed	<input checked="" type="checkbox"/> Line-Tending Procedures Reviewed
<input type="checkbox"/> _____	<input type="checkbox"/> _____

Dive Plan and Dive Team Procedures

Assess site conditions and determine type of dive operation. Hold on-site pre-dive safety meeting to discuss and plan dive operation, determine roles and responsibilities, review emergency procedures, and check physical condition of diver(s). Assemble and check dive gear. Check communication for diver(s). After completion of dive, review notes, check condition of diver(s), take soundings and photos as required.

Dive Schedule

Dive No.	Entry Time	Exit Time	Total Time in Water	Maximum Depth	Remarks
1	12:09:00	13:05:00	00:56:00	13 fsw *	MBS dive T-dock piles A-Y and 1-12.

Dive Narrative

The team arrived at the boat ramp at Zittle's Marina and proceeded to discuss the pre-activity safety plan (PASP) and determine team member roles for the operation. A single line-tended diver operation as decided upon due to only having three team members for the day. Gear was loaded into the boat and it was launched. After a short boat ride, the team arrived at the facility on the northeast side of McNeil Island. The diving inspection began offshore at the west end of the T-dock and proceeded east to the end of the dock. The inshore side of the dock was also inspected. The diver performed a thorough visual/tactile inspection of the piling and relayed notes and findings to support personnel via hardwired communications. Depths and photos were taken as necessary. At the completion of the diving operations, the diver's condition was checked. Notes and photos were reviewed for completeness prior to leaving the site.

Air IN / OUT
MBS 2200 / 1000

* fsw = feet sea water

Dive Team Members

Darren Nebergall, P.E. (DON)

(Name)

DPIC / notes

(Role)

Richard Pawelka, P.E. (RMP)

(Name)

Stand-by diver

(Role)

Michael Smith, P.E. (MBS)

(Name)

Diver

(Role)

Inspector	Darren O. Nebergall	Agency/Owner	WA State Dept. of Corrections (DOC)	Date	4/26/2017
Bridge No.	DOC-6	Bridge Name	MCNEIL IS. STILL HARBOR DOCK		
Bridge Type		Waterway Name	STILL HARBOR (P. SOUND)		
Substructure	Steel Pipe Piles	Foundation	Steel Pipe Piles		
No. Spans	1	No. Piers Dived	2	Inspection Hours	2.5

5	<input type="checkbox"/>	Substructure Condition (1676)	8	<input type="checkbox"/>	Chan/Protection (1677)	U	<input type="checkbox"/>	T	Scour Code (1680)
---	--------------------------	-------------------------------	---	--------------------------	------------------------	---	--------------------------	---	-------------------

BMS Elements							
Element	Element Description	Total	Units	State 1	State 2	State 3	State 4
8361	Scour	2	EA	2	0	0	0
8701	Ferry Concrete Floating Pontoon	38	CELL	31	7	0	0
8703	Spud Piling & Wells	37	EA	21	4	12	0
8902	Inorganic Zinc Vinyl Paint	7400	SF	6525	200	675	0

Notes	
0	<p>ORIENTATION: The McNeil Island Still Harbor Dock includes the concrete floats, gangplank, and the steel spud piles. For location reference: Offshore is north, shore is south, left side is west, and right side is east. See the attached layout drawing for reference and additional findings.</p>
1676	<p>SUBSTRUCTURE: Substructure coded to '5' due to holes in steel piling.</p>
1677	<p>CHANNEL: This structure abuts another structure and does not connect to the shoreline directly. No bank issues noted. No restrictions to water flow past the structure.</p>
1680	<p>SCOUR: Structure is in tidal waters with weak and variable tidal currents. Scour code set to "T - tidal" and is considered a low risk for scour. See note 8361.</p>
8361	<p>SCOUR (Field): There are two lines of spud piles, 1 - 12 and A - Y.</p> <p>Underwater Inspection Findings: Water flow in the vicinity is tidal. No scour patterns or scour countermeasures were observed.</p>
8701	<p>CONCRETE FLOATING PONTOON: The previous inspections found dock float A listing upwards of 5" was measured close to level in 2017 due to timber water repairs. Trip hazards between floats have been reduced greatly. Prior to the repair, the listing of the pontoon segments indicates the pontoon polystyrene has degraded and taken on water through the water bolt holes. There is a serviceability issue which may reappear after a significant storm from the north. Seven of the dock segments have been repaired since the 2013 inspection, Condition State 2.</p> <p>Underwater Inspection Findings: The submerged surfaces of the pontoons are covered in heavy marine growth, making a detailed inspection very difficult. Spot cleaning revealed no defects. See Photo #UW-1.</p>

Inspector	Darren O. Nebergall	Agency/Owner	WA State Dept. of Corrections (DOC)	Date	4/26/2017
Bridge No.	DOC-6	Bridge Name	MCNEIL IS. STILL HARBOR DOCK		
Bridge Type		Waterway Name	STILL HARBOR (P. SOUND)		
Substructure	Steel Pipe Piles	Foundation	Steel Pipe Piles		
No. Spans	1	No. Piers Dived	2	Inspection Hours	2.5

Notes (Continued)

8703	<p>SPUD PILING & WELLS: Spud pile rollers are all intact, some are bent from storm events, see photo #27.</p> <p>Underwater Inspection Findings: The spud piles that position the floats are in generally fair condition underwater. The coating has generally failed from the intertidal zone (ITZ) down to mudline, exposing the steel underneath (Photo #UW-2). These exposed areas have surface corrosion with pitting and section losses of up to 0.25" in localized areas (plans indicate 0.5" nominal wall thickness). Moderate marine growth is present but attempts to clean for inspection also removed any coating left as well. Twelve of the spud piling have holed through in the lower ITZ due to mechanical abrasion damage from the UHMW plastic "log" booms that contact the piles (Photos #UW-3 thru #UW-7). These holes have grown significantly larger in size since the previous underwater inspection and new holes were observed where only flat spots were seen before. Since these piles do not bear vertical loads, this condition does not warrant immediate repair, but from a serviceability standpoint should be closely monitored during future inspections. See attached Layout and Pile Data Sheets for more detailed defect descriptions and locations.</p>
8902	<p>INORGANIC ZINC VINYL PAINT: Many of the spud piles have rust blisters and seam rust, see photo #3.</p> <p>Underwater Inspection Findings: Much of the spud pile coating has failed underwater. Pile metal substrate is exposed between 25% and 50% of the pile surface area underwater. See Photos #UW-2 and #UW-8 for typical underwater coating condition.</p>

Repairs

Repair No	Pr	R	Repair Description	Noted	Maint	Verified
			(No repairs for this structure)			

Inspections Performed and Resources Required

Report Type	Date	Freq	Hrs	Insp	CertNo	Coinsp	Note	
Underwater	4/26/2017	48	2.5	DON	G0314	MBS	Underwater inspection by WSDOT Dive Team. Frequency set at 48 months to correspond with every-other routine inspection. (Set values for codes 1232, 1533, 1538 & 1541 in an effort to populate blank fields in the UW Report – NAF)	
Resources	Hours	Min	Pref	Max	Freq Date	Need Date	Override	Notes
Boat		D	D	D				Used Duckworth boat for access during 2017 inspections.
Safety	4/26/2017	24	1.5	JHL	D2016	KGH		
Resources	Hours	Min	Pref	Max	Freq Date	Need Date	Override	Notes



Underwater Inspection Report

Inspector	Darren O. Nebergall	Agency/Owner	WA State Dept. of Corrections (DOC)	Date	4/26/2017
Bridge No.	DOC-6	Bridge Name	MCNEIL IS. STILL HARBOR DOCK		
Bridge Type		Waterway Name	STILL HARBOR (P. SOUND)		
Substructure	Steel Pipe Piles	Foundation	Steel Pipe Piles		
No. Spans	1	No. Piers Dived	2	Inspection Hours	2.5

Third Party
Notification

Schedule inspection with Greg Bukeima (DOC) 253-328-3229 or 253-588-5281 (cell).
A security clearance must be done for all inspectors prior to landing on the island. This can be done via Greg, provide full name, SS#, and date of birth (DOB).

BRIDGE INSPECTION REPORT

Status: Released
CD Guid: fb60ddab-1c9e-4b44-936b-114a7713500f

Printed On: 7/26/2017
CD Date: 7/25/2017

Agency: Other State Agencies
Program Mgr: Harvey L. Coffman

Br. No. DOC-6 **SID** 00200441
Carrying
Intersecting STILL HARBOR (P. SOUND)

Br. Name MCNEIL IS. STILL HARBOR DOCK

Route On **Mile Post**
Route Under **Mile Post**

UW-1

8701 Ferry Concrete Floating Pontoon
Photo Type: G - General
Orientation:
Date: 5/23/2013
Repairs:
Typical heavy marine growth on floating dock sections.



SI-27

8703 Spud Piling & Wells
Photo Type: G - General
Orientation:
Date: 4/26/2017
Repairs:
Spud pile rollers are all intact, some are bent from storm events.



BRIDGE INSPECTION REPORT

Status: Released
CD Guid: fb60ddab-1c9e-4b44-936b-114a7713500f

Printed On: 7/26/2017
CD Date: 7/25/2017

Agency: Other State Agencies
Program Mgr: Harvey L. Coffman

Br. No. DOC-6 **SID** 00200441
Carrying
Intersecting STILL HARBOR (P. SOUND)

Br. Name MCNEIL IS. STILL HARBOR DOCK

Route On **Mile Post**
Route Under **Mile Post**

UW-2

8703 Spud Piling & Wells
Photo Type: I - In Depth
Orientation:
Date: 5/23/2013
Repairs:
T-dock Pile S; general coating failure and rusting with section loss. Typical of T-dock piles.



UW-3

8703 Spud Piling & Wells
Photo Type: I - In Depth
Orientation:
Date: 4/27/2017
Repairs:
T-dock, Pile A: 18" H x 4" W hole from mechanical damage.



Status: Released
CD Guid: fb60ddab-1c9e-4b44-936b-114a7713500f

Printed On: 7/26/2017
CD Date: 7/25/2017

Agency: Other State Agencies
Program Mgr: Harvey L. Coffman

Br. No. DOC-6	SID 00200441	Br. Name MCNEIL IS. STILL HARBOR DOCK	Route On	Mile Post
Carrying			Route Under	Mile Post
Intersecting STILL HARBOR (P. SOUND)				

UW-4

8703 Spud Piling & Wells
 Photo Type: I - In Depth
 Orientation:
 Date: 5/23/2013
 Repairs:
 T-dock Pile J; 4" wide mechanical damage (flat spot). 2013 photo; compare to UW-5 for 2017 photo to see progression.



UW-5

8703 Spud Piling & Wells
 Photo Type: I - In Depth
 Orientation:
 Date: 4/27/2017
 Repairs:
 T-dock Pile J: 12" H x 2.5" W hole (was just a flat spot in 2013, see UW-4).



Status: Released
CD Guid: fb60ddab-1c9e-4b44-936b-114a7713500f

Printed On: 7/26/2017
CD Date: 7/25/2017

Agency: Other State Agencies
Program Mgr: Harvey L. Coffman

Br. No. DOC-6 **SID** 00200441
Carrying
Intersecting STILL HARBOR (P. SOUND)

Br. Name MCNEIL IS. STILL HARBOR DOCK

Route On **Mile Post**
Route Under **Mile Post**

UW-6

8703 Spud Piling & Wells
Photo Type: I - In Depth
Orientation:
Date: 4/27/2017
Repairs:
T-dock Pile O: 18" H x 4" W (up to) hole from mechanical damage.



UW-7

8703 Spud Piling & Wells
Photo Type: I - In Depth
Orientation:
Date: 4/27/2017
Repairs:
T-dock Pile P: Large 3-ft. vertical hole from mechanical damage.



Status: Released
CD Guid: fb60ddab-1c9e-4b44-936b-114a7713500f

Printed On: 7/26/2017
CD Date: 7/25/2017

Agency: Other State Agencies
Program Mgr: Harvey L. Coffman

Br. No. DOC-6 **SID** 00200441
Carrying
Intersecting STILL HARBOR (P. SOUND)

Br. Name MCNEIL IS. STILL HARBOR DOCK

Route On **Mile Post**
Route Under **Mile Post**

SI-3

8902 Inorganic Zinc Vinyl Paint

Photo Type: G - General

Orientation: Right

Date: 5/23/2013

Repairs:

Typical shot of spud piles. Seam rust on welds are breaking through the paint.



UW-8

8902 Inorganic Zinc Vinyl Paint

Photo Type: I - In Depth

Orientation:

Date: 4/27/2017

Repairs:

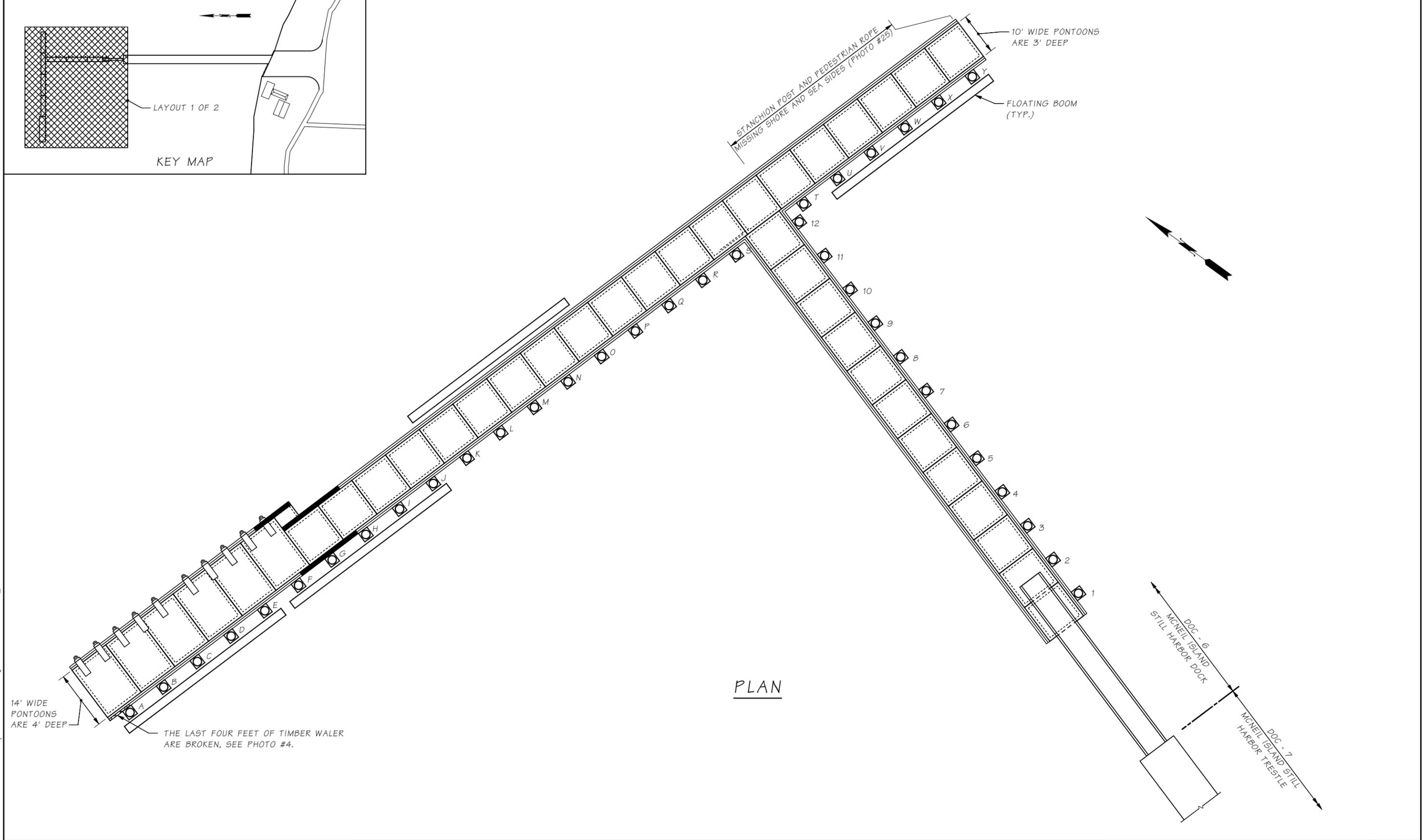
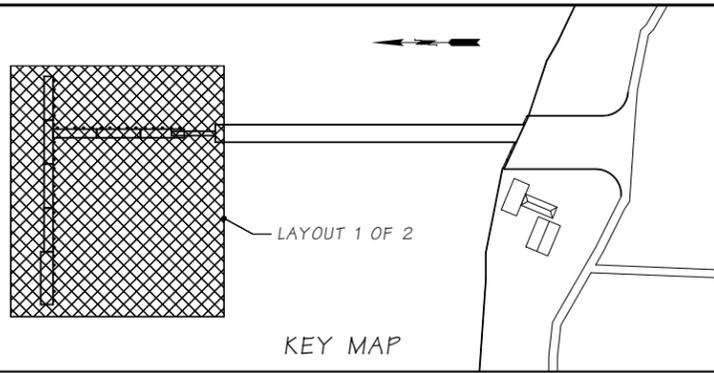
Typical pile condition underwater. Coating has failed over 25%-50% of the surface area on the piles below water. Example of ~25% exposed metal shown.



Underwater		4/26/2017	Lead: DON			Co: MBS		
Routine		4/27/2017	Lead: JHL			Co: LAW		
Pile Location			Condition/Damage				Inspection Type	
Bent	Pile	% Area Remaining	RT or YT	RT Pile Circum. (in)	Elevation	Details/Remarks	Routine/UW	Date
PILE INSPECTION DATA - Dock Spud Piles								
	1	90		Steel	MDL - ITZ	50% area surface rust / 50% area marine growth (typical). Corrosion with pitting 0.25" deep. Thickness 0.395" (2013)	UW	4/26/2017
	2	95		Steel	MDL - ITZ	25% area surface rust / 75% area marine growth coverage.	UW	4/26/2017
	3	95		Steel	MDL - ITZ	25% area surface rust / 75% area marine growth coverage. Thickness 0.370" (2013)		4/26/2017
	4	95		Steel	MDL - ITZ	25% area surface corrosion with pitting up to 0.25" deep.	UW	4/26/2017
	5	90		Steel	MDL - ITZ	50% area surface rust / 50% area marine growth (typical).	UW	4/26/2017
	6	95		Steel	MDL - ITZ	25% area surface rust / 75% area marine growth (typical).	UW	4/26/2017
	7	95		Steel	MDL - ITZ	25% area surface rust / 75% area marine growth (typical).	UW	4/26/2017
	8	95		Steel	MDL - ITZ	25% area surface rust / 75% area marine growth (typical). Localized pitting. Thickness 0.375" (2013)		4/26/2017
	9	95		Steel	MDL - ITZ	25% area surface rust / 75% area marine growth (typical).	UW	4/26/2017
	10	95		Steel	MDL - ITZ	25% area surface rust / 75% area marine growth (typical).	UW	4/26/2017
	11	90		Steel	MDL - ITZ	50% area surface rust / 50% area marine growth (typical).	UW	4/26/2017
	12	90		Steel	MDL - ITZ	50% area surface rust / 50% area marine growth (typical). Thickness 0.270" in localized deep pit. (2013)	UW	4/26/2017
T	A	75		Steel	MDL - ITZ MDL+9	25% area surface rust / 75% area marine growth (typical). 18" H x 4" W hole from mechanical abrasion (log boom). See Photo #UW-3	UW	4/26/2017
	B	90		Steel	MDL - ITZ	50% area surface rust / 50% area marine growth (typical). 0.375" deep localized pit (2013),	UW	4/26/2017
	C	90		Steel	MDL - ITZ MDL+10 to +12	50% area surface rust / 50% area marine growth (typical). 4" wide flat spot (mech abrasion; log boom); no holes.	UW	4/26/2017
	D	75		Steel	MDL - ITZ MDL+8 MDL+9 MDL+10	50% area surface rust / 50% area marine growth (typical). 1" dia. hole from mechanical abrasion (log boom). 12" H x 3" W hole from mechanical abrasion (log boom). 18" H x 4" W hole from mechanical abrasion (log boom).	UW	4/26/2017
	E	75		Steel	MDL - ITZ MDL+8 to +12 MDL+9 MDL+10	25% area surface rust / 75% area marine growth (typical). 4" wide flat spot (mech abrasion; log boom). 1/2" diam. hole from mech. abrasion (log boom). 3" H x 1" W hole from mech. abrasion (log boom).	UW	4/26/2017

Underwater		4/26/2017	Lead: DON	Co: MBS				
Routine		4/27/2017	Lead: JHL	Co: LAW				
Pile Location			Condition/Damage				Inspection Type	
Bent	Pile	% Area Remaining	RT or YT	RT Pile Circum. (in)	Elevation	Details/Remarks	Routine/UW	Date
	F	75		Steel	MDL - ITZ MDL+8 to +12 MDL+9 MDL+10	25% area surface rust / 75% area marine growth (typical). 4" wide flat spot (mech abrasion; log boom). 12" H x 3" W hole from mech. abrasion (log boom). 3/4" diam. hole from mech. abrasion (log boom).	UW	4/26/2017
	G	95		Steel	MDL - ITZ	25% area surface rust / 75% area marine growth (typical).	UW	4/26/2017
	H	95		Steel	MDL - ITZ	25% area surface rust / 75% area marine growth (typical).	UW	4/26/2017
	I	95		Steel	MDL - ITZ	25% area surface rust / 75% area marine growth (typical).	UW	4/26/2017
	J	75		Steel	MDL - ITZ MDL+7 to +11 MDL+7 MDL+11	25% area surface rust / 75% area marine growth (typical). 4" wide flat spot (mech abrasion; log boom). 3" H x 1" W hole from mech. abrasion (log boom). 12" H x 2.5" W hole from mech. abrasion (log boom). See Photos #UW-4 (2013) and #UW-5 (2017)	UW	4/26/2017
	K	95		Steel	MDL - ITZ MDL+9 - ITZ	25% area surface rust / 75% area marine growth (typical). 4" wide flat spot (mech abrasion; log boom); no holes.	UW	4/26/2017
	L	75		Steel	MDL - ITZ MDL+6 - ITZ MDL+8	25% area surface rust / 75% area marine growth (typical). 5" wide flat spot (mech abrasion; log boom). 18" H x 2.5" W hole from mech. abrasion (log boom).	UW	4/26/2017
	M	75		Steel	MDL - ITZ MDL+8 - ITZ MDL+9	25% area surface rust / 75% area marine growth (typical). 3" - 4" wide flat spot (mech damage; log boom). 1" diam. hole from mech. abrasion (log boom).	UW	4/26/2017
	N	90		Steel	MDL - ITZ	50% area surface rust / 50% area marine growth (typical).	UW	4/26/2017
	O	75		Steel	MDL - ITZ MDL+5 to +9 MDL+6	25% area surface rust / 75% area marine growth (typical). 4" wide flat spot (mech damage; log boom). 18" H x 4" W hole from mech. abrasion (log boom). See Photo #UW-6	UW	4/26/2017
	P	75		Steel	MDL - ITZ MDL+4 MDL+5	25% area surface rust / 75% area marine growth (typical). 4" H x 2" W hole from mech. abrasion (log boom). 36" H x 5" W large hole from mech. abrasion (log boom). See Photo #UW-7	UW	4/26/2017
	Q	95		Steel	MDL - ITZ	25% area surface rust / 75% area marine growth (typical).	UW	4/26/2017
	R	95		Steel	MDL - ITZ	25% area surface rust / 75% area marine growth (typical).	UW	4/26/2017
	S	90		Steel	MDL - ITZ	50% area surface rust / 50% area marine growth (typical) Photo #UW-2 shows typical pile condition underwater.	UW	4/26/2017

Underwater		4/26/2017	Lead: DON	Co: MBS				
Routine		4/27/2017	Lead: JHL	Co: LAW				
Pile Location			Condition/Damage				Inspection Type	
Bent	Pile	% Area Remaining	RT or YT	RT Pile Circum. (in)	Elevation	Details/Remarks	Routine/UW	Date
	T	90		Steel	MDL - ITZ	50% area surface rust / 50% area marine growth (typical).	UW	4/26/2017
	U	90		Steel	MDL - ITZ	50% area surface rust / 50% area marine growth (typical).	UW	4/26/2017
	V	75		Steel	MDL - ITZ	50% area surface rust / 50% area marine growth (typical).	UW	4/26/2017
					MDL+4	10" H x 3" W hole from mech. abrasion (log boom).		
					MDL+6	18" H x 3" W hole from mech. abrasion (log boom).		
	W	75		Steel	MDL - ITZ	50% area surface rust / 50% area marine growth (typical).	UW	4/26/2017
					MDL+3	8" H x 3" W hole from mech. abrasion (log boom).		
					MDL+4	4" H x 2" W hole from mech. abrasion (log boom).		
					MDL+5	18" H x 4" W hole from mech. abrasion (log boom).		
	X	90		Steel	MDL - ITZ	50% area surface rust / 50% area marine growth (typical).	UW	4/26/2017
	Y	75		Steel	MDL - ITZ	50% area surface rust / 50% area marine growth (typical).	UW	4/26/2017
					MDL+3	6" H x 3" W hole from mech. abrasion (log boom).		
					MDL+5	9" H x 3" W hole from mech. abrasion (log boom).		
					MDL+6	6" H x 3" W hole from mech. abrasion (log boom).		
	counts	steel	37					



LEGEND:

○ VERTICAL ROUND STEEL PILE

▬ STEEL CHANNEL WALER REPAIR

ROUTINE INSPECTION	UNDERWATER INSPECTION
Date: 4/26/2017	Date: 4/26/2017
Scale: NA	Scale: NA
Inspected by: JHL/JSW	Inspected by: DON/MBS



DOC - 6
MCNEIL ISLAND STILL HARBOR DOCK

LAYOUT

SHEET NO.
1
OF
SHEETS

G:\Ferry Terminals\McNEIL ISLAND\2017 Inspection\2017 Layouts\2017 McNeil_Still_Harbor Dock.MAN