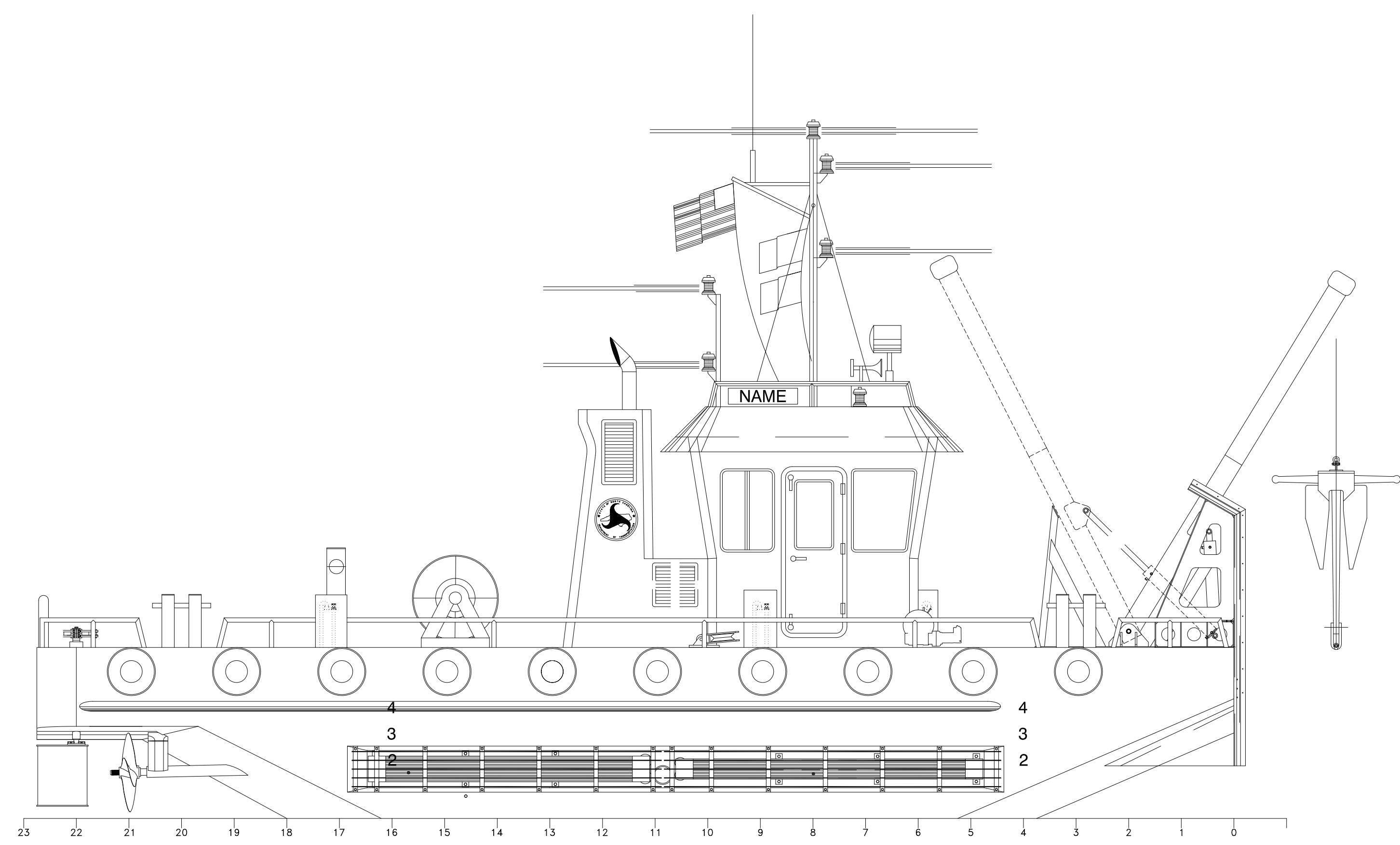


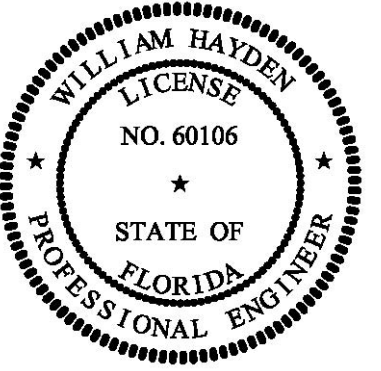
VESSEL NAME: 45.5 FT SUPPORT TUG
 CONTRACT NO.:
 TIP NUMBER: F-5703B
 WBS NUMBER: 47256.3.2
 PROJECT: 45'-6" SUPPORT TUG

VESSEL PARTICULARS
 LENGTH OVERALL HULL 45'-6"
 BEAM - MOLDED 20'-0"
 DEPTH AT SIDE 6'-6"
 LIGHTSHIP DISPLACEMENT 51 LT
 FULL LOAD DISPLACEMENT 85 LT



LIST OF DRAWINGS:

DRAWING NUMBER:	DRAWING TITLE:	DRAWING NUMBER:	DRAWING TITLE:
1. 1393-100	GENERAL ARRANGEMENTS	22. 1393-320	ELECTRICAL ONE-LINE DIAGRAM
2. 1393-100-3	OUTBOARD PROFILE	23. 1393-422	NAVIGATION LIGHTS DETAILS
3. 1393-101	LINESPLAN	24. 1393-423	ELECTRICAL WIRING DIAGRAM
4. 1393-110	BOTTOM & SIDESHELL STRUCTURAL DETAILS	25. 1393-506	VENTS & FILLS DETAILS
5. 1393-117	TRANSVERSE FRAME STRUCTURAL DETAILS	26. 1393-625	WINDOWS & DOORS SCHEDULE
6. 1393-120	LONGITUDINAL SECTIONS	27. 1393-680	SAFETY PLAN
7. 1393-130	MAIN DECK STRUCTURAL DETAILS	28. 1393-684	PUSH KNEE & FENDERING DETAILS
8. 1393-152	PILOTHOUSE & STACK STRUCTURAL DETAILS	29. 1393-685	DECK CAPSTAN & HAWSER REEL DETAILS
9. 1393-167	HATCHES & MANHOLES SCHEDULE		
10. 1393-171	MAST DETAILS		
11. 1393-182	SHAFTING PLAN		
12. 1393-185	A-FRAME DETAILS		
13. 1393-200	MACHINERY ARRANGEMENTS		
14. 1393-201	MAIN DECK OUTFITTING		
15. 1393-253	STEERING SYSTEM DETAILS		
16. 1393-255	COOLING SYSTEM DETAILS		
17. 1393-259	ENGINE EXHAUST DETAILS		
18. 1393-261	FUEL OIL PIPING DETAILS		
19. 1393-263	BILGE, BALLAST & FIRE PIPING DETAILS		
20. 1393-264	SHAFT FLUSHING PIPING DETAILS		
21. 1393-265	HYDRAULIC SYSTEM DETAILS		



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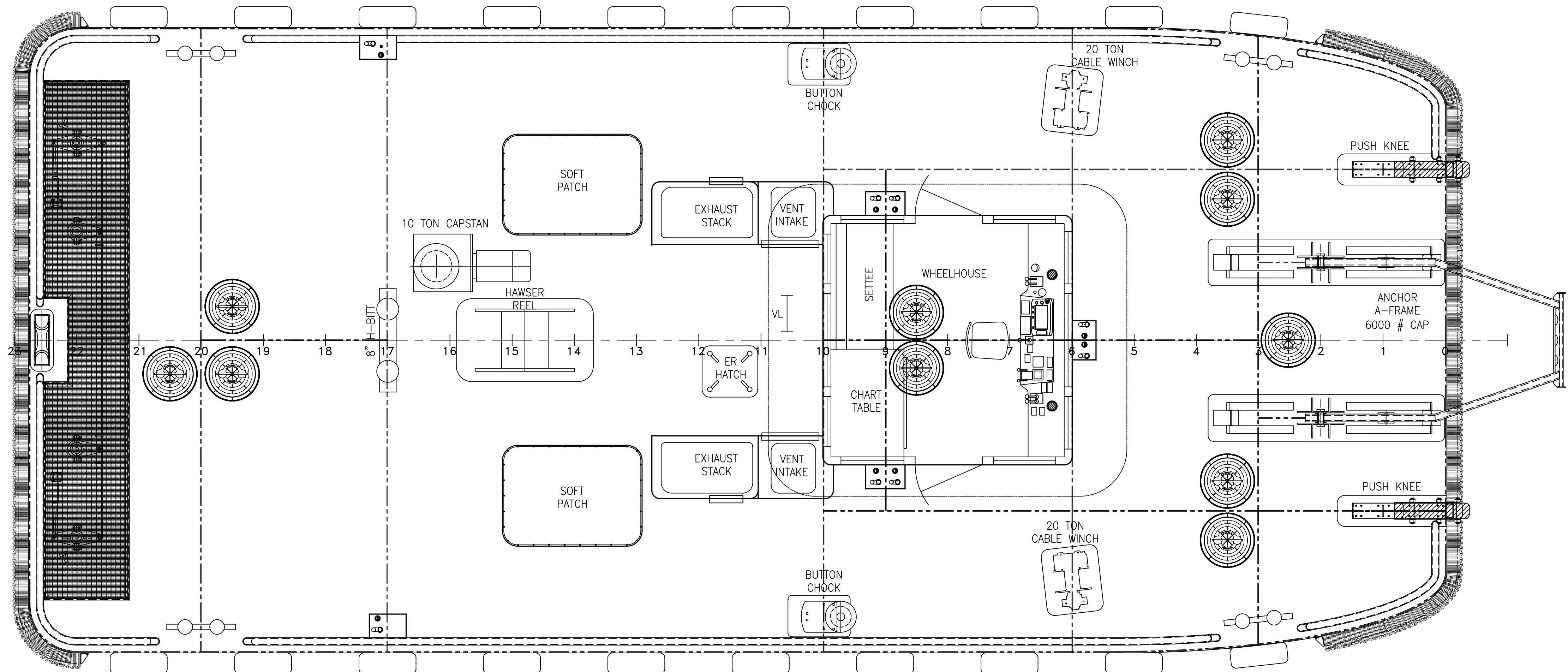
Phone: (904) 599-3673
 Fax: (904) 599-1522
 info@dejongandlebet.com

Title: 45.5'x20'x6.5' NCDOT TOWBOAT

COVER PAGE

Dwg. No. 17-1393-001 Alt. No. 0
 Sht. 1 of 1

Drawn By: JACOB CONNALLY Date: DECEMBER 31, 2018
 Checked By: _____ Date: _____
 App'd By: _____ Scale: NONE
 ABS App'r: _____ USCG App'r: _____

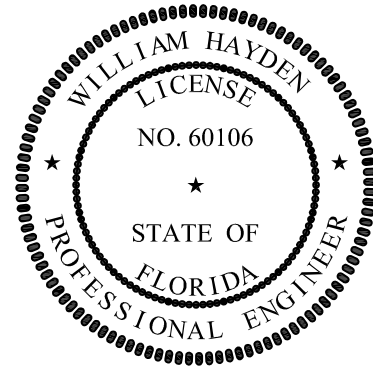


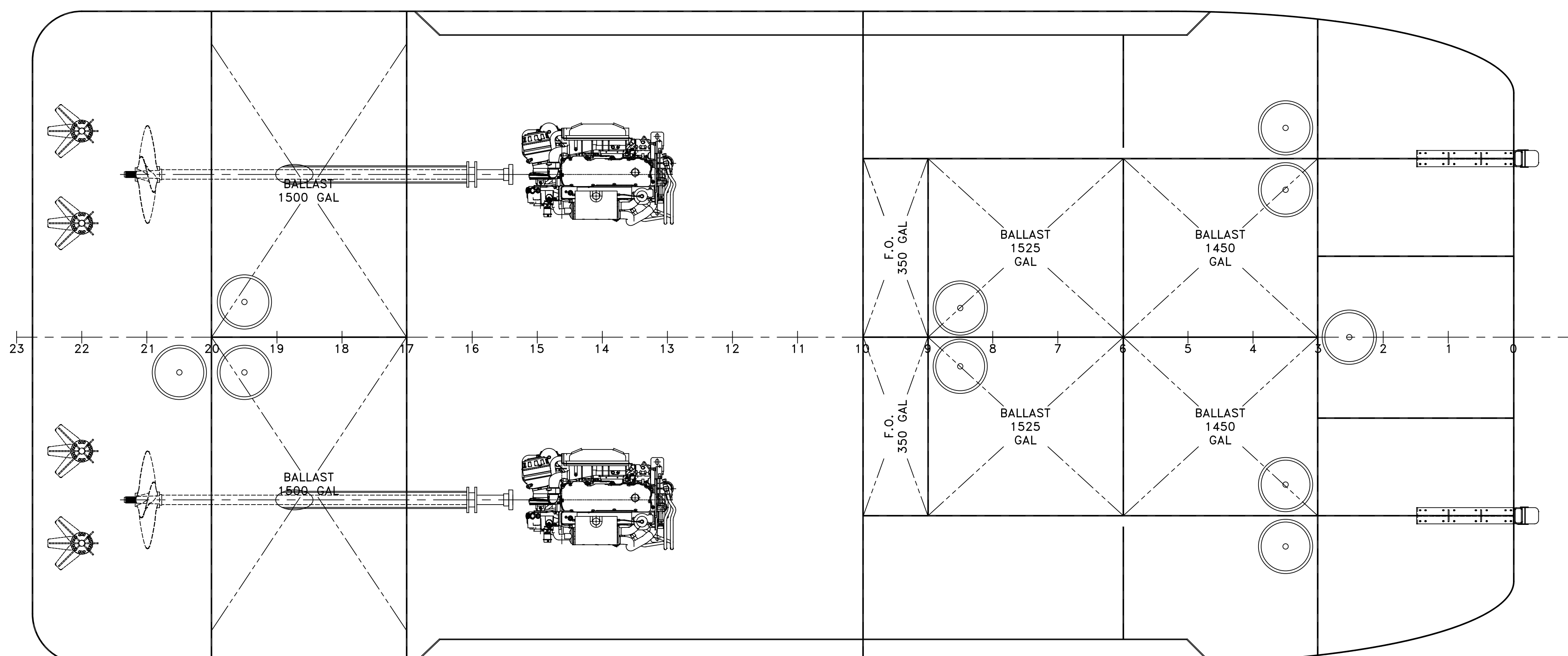
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Title: 45.5' x 20' x 6.5" NCDOT PUSHBOAT
GENERAL ARRANGEMENTS
MAIN DECK

Dwg. No. 17-1393-100 Alt. No. 0 Sht. 1 of 3
 Drawn By: JACOB CONNALLY Date: JUNE 05, 2018
 Checked By: _____ Date: _____
 App'd By: _____ Scale: 1/2" = 1'-0"
 ABS App'l: _____ USCG App'l: _____





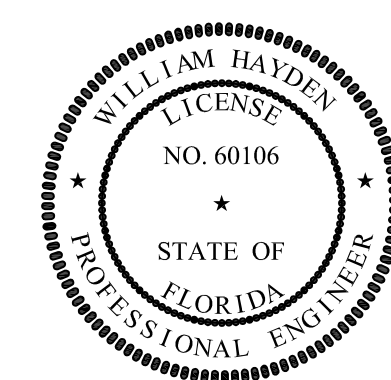
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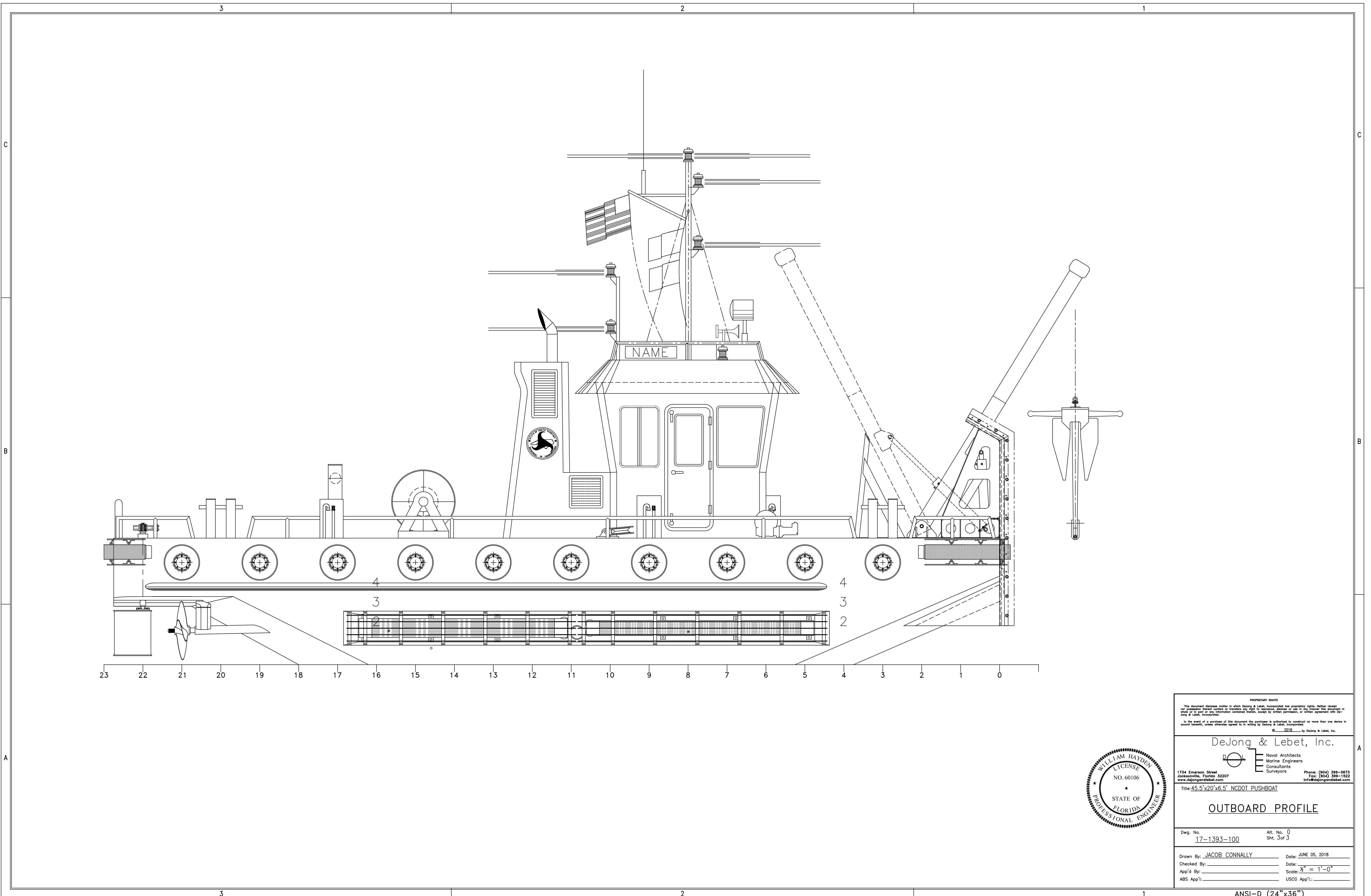
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Title: 45.5' x 20' x 6.5" NCDOT PUSHBOAT
GENERAL ARRANGEMENTS HOLD

Dwg. No. 17-1393-100 Alt. No. 0 Sht. 2 of 3
 Drawn By: JACOB CONNALLY Date: JUNE 05, 2018
 Checked By: _____ Date: _____
 App'd By: _____ Scale: 1/2" = 1'-0"
 ABS App'l: _____ USCG App'l: _____





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 info@dejongandlebet.com

Title: 45.5'x20'x6.5' NCDOT PUSHBOAT

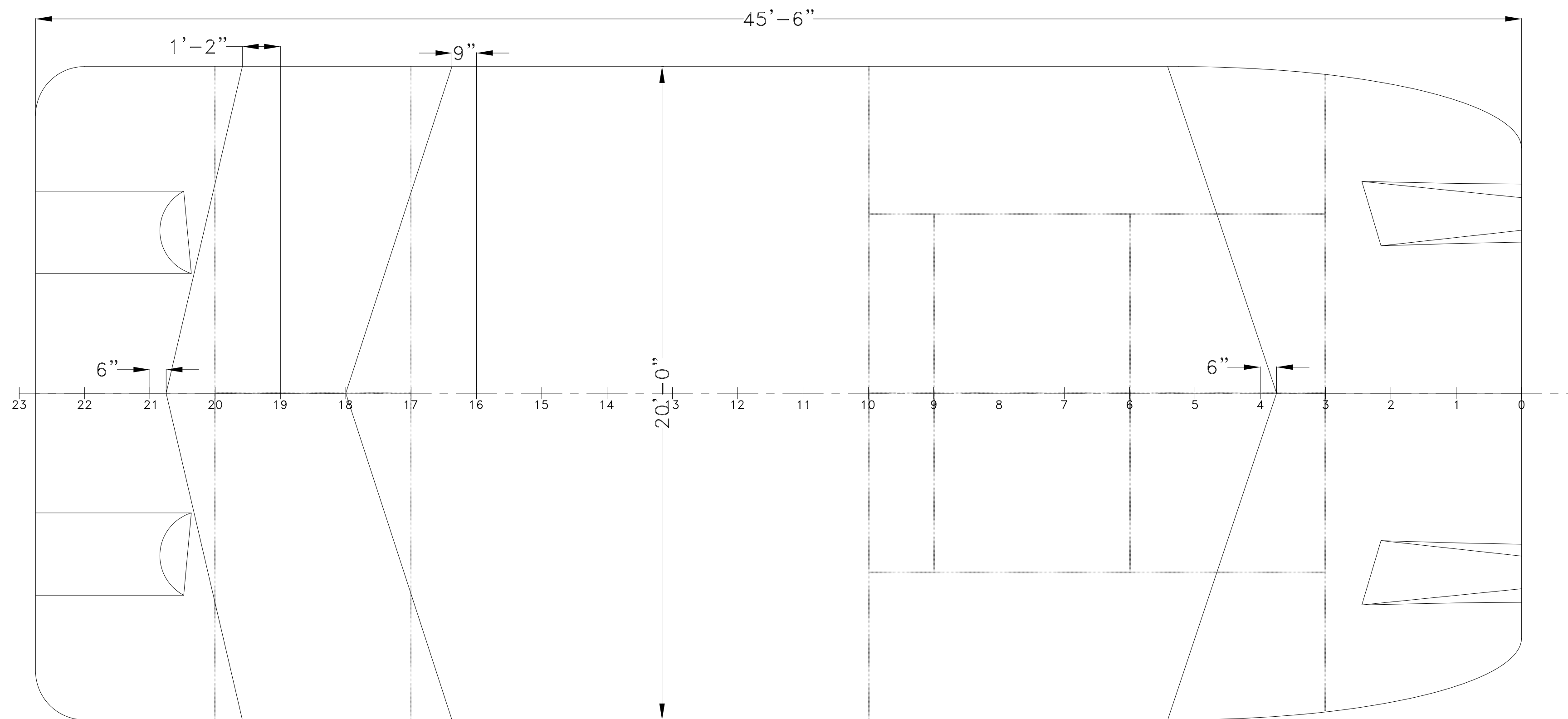
OUTBOARD PROFILE

Dwg. No. 17-1393-100 Alt. No. 0 Sht. 3 of 3
 Drawn By: JACOB CONNALLY Date: JUNE 05, 2018
 Checked By: _____ Date: _____
 App'd By: _____ Scale: 1/2" = 1'-0"
 ABS App'l: _____ USCG App'l: _____

TABLE OF OFFSETS (FEET-INCHES-EIGHTHS)	POINT 1		POINT 2		POINT 3		POINT 4		POINT 5		POINT 6		POINT 7		POINT 8		POINT 9	
	WIDTH	HEIGHT	WIDTH	HEIGHT	WIDTH	HEIGHT	WIDTH	HEIGHT	WIDTH	HEIGHT	WIDTH	HEIGHT	WIDTH	HEIGHT	WIDTH	HEIGHT	WIDTH	HEIGHT
FRAME 0	0-0-0	3-3-0	4-7-4	4-0-6+	4-11-7	2-0-0	5-11-6+	2-0-0	6-4-6+	4-4-2+	7-6-0	4-6-5	7-6-0	0-0-0	6-6-0			
FRAME 1	0-0-0	2-4-5	4-7-0	3-0-4+	4-9-1+	2-0-0	6-2-2	2-0-0	6-5-0+	3-3-6	8-11-5	3-8-1+	8-11-5	6-6-0	0-0-0	6-6-0		
FRAME 2	0-0-0	1-6-1+	4-6-2	2-1-5	4-6-4+	2-0-0	6-4-5+	2-0-0	6-5-4+	2-4-7	9-5-4+	2-9-6+	9-5-4+	6-6-0	0-0-0	6-6-0		
FRAME 3	0-0-0	0-7-6+	9-9-1	1-11-3	9-9-1	6-6-0	0-0-0	6-6-0										
FRAME 4	0-0-0	0-0-0	1-6-0	0-0-0	9-11-1	1-1-0	9-11-1	6-6-0	0-0-0	6-6-0								
FRAME 5	0-0-0	0-0-0	7-6-0	0-0-0	10-0-0	0-2-5	10-0-0	1-0-0	9-3-0	1-2-0	9-3-0	2-7-0	10-0-0	2-9-0	10-0-0	6-6-0	0-0-0	6-6-0
FRAME 6	0-0-0	0-0-0	10-0-0	0-0-0	10-0-0	1-0-0	9-3-0	1-2-0	9-3-0	2-7-0	10-0-0	2-9-0	10-0-0	6-6-0	0-0-0	6-6-0		
FRAME 7	0-0-0	0-0-0	10-0-0	0-0-0	10-0-0	1-0-0	9-3-0	1-2-0	9-3-0	2-7-0	10-0-0	2-9-0	10-0-0	6-6-0	0-0-0	6-6-0		
FRAME 8	0-0-0	0-0-0	10-0-0	0-0-0	10-0-0	1-0-0	9-3-0	1-2-0	9-3-0	2-7-0	10-0-0	2-9-0	10-0-0	6-6-0	0-0-0	6-6-0		
FRAME 9	0-0-0	0-0-0	10-0-0	0-0-0	10-0-0	1-0-0	9-3-0	1-2-0	9-3-0	2-7-0	10-0-0	2-9-0	10-0-0	6-6-0	0-0-0	6-6-0		
FRAME 10	0-0-0	0-0-0	10-0-0	0-0-0	10-0-0	1-0-0	9-3-0	1-2-0	9-3-0	2-7-0	10-0-0	2-9-0	10-0-0	6-6-0	0-0-0	6-6-0		
FRAME 11	0-0-0	0-0-0	10-0-0	0-0-0	10-0-0	1-0-0	9-3-0	1-2-0	9-3-0	2-7-0	10-0-0	2-9-0	10-0-0	6-6-0	0-0-0	6-6-0		
FRAME 12	0-0-0	0-0-0	10-0-0	0-0-0	10-0-0	1-0-0	9-3-0	1-2-0	9-3-0	2-7-0	10-0-0	2-9-0	10-0-0	6-6-0	0-0-0	6-6-0		
FRAME 13	0-0-0	0-0-0	10-0-0	0-0-0	10-0-0	1-0-0	9-3-0	1-2-0	9-3-0	2-7-0	10-0-0	2-9-0	10-0-0	6-6-0	0-0-0	6-6-0		
FRAME 14	0-0-0	0-0-0	10-0-0	0-0-0	10-0-0	1-0-0	9-3-0	1-2-0	9-3-0	2-7-0	10-0-0	2-9-0	10-0-0	6-6-0	0-0-0	6-6-0		
FRAME 15	0-0-0	0-0-0	10-0-0	0-0-0	10-0-0	1-0-0	9-3-0	1-2-0	9-3-0	2-7-0	10-0-0	2-9-0	10-0-0	6-6-0	0-0-0	6-6-0		
FRAME 16	0-0-0	0-0-0	10-0-0	0-0-0	10-0-0	1-0-0	9-3-0	1-2-0	9-3-0	2-7-0	10-0-0	2-9-0	10-0-0	6-6-0	0-0-0	6-6-0		
FRAME 17	0-0-0	0-0-0	6-1-7	0-0-0	10-0-0	0-8-1+	10-0-0	6-6-0	0-0-0	6-6-0								
FRAME 18	0-0-0	0-0-0	10-0-0	1-9-5+	10-0-0	6-6-0	0-0-0	6-6-0										
FRAME 19	0-0-0	1-1-0+	10-0-0	2-9-6	10-0-0	6-6-0	0-0-0	6-6-0										
FRAME 20	0-0-0	2-2-1+	6-5-1	3-3-7	10-0-0	3-6-0	10-0-0	6-6-0	0-0-0	6-6-0								
FRAME 21	0-0-0	3-0-0	3-8-0	3-2-1+	4-4-0	3-7-0+	5-0-0	3-8-4	5-8-0	3-7-1	6-2-1+	3-3-5+	10-0-0	3-6-0	10-0-0	6-6-0	0-0-0	6-6-0
FRAME 22	0-0-0	3-0-0	3-8-0	3-2-1+	4-4-0	3-7-0+	5-0-0	3-8-4	5-8-0	3-7-1	6-2-1+	3-3-5+	10-0-0	3-6-0	10-0-0	6-6-0	0-0-0	6-6-0
TRANSOM @ 45'-6" AFT	0-0-0	3-0-0	3-8-0	3-2-1+	4-4-0	3-7-0+	5-0-0	3-8-4	5-8-0	3-7-1	6-2-1+	3-3-5+	8-6-0	3-5-1	8-6-0	6-6-0	0-0-0	6-6-0

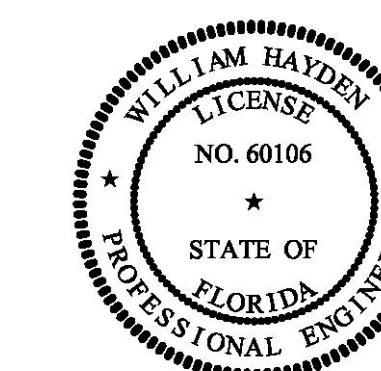
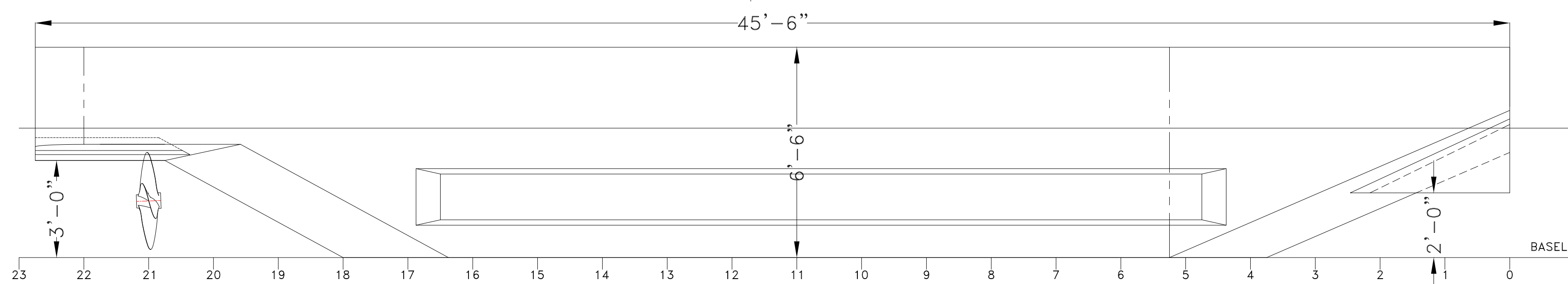
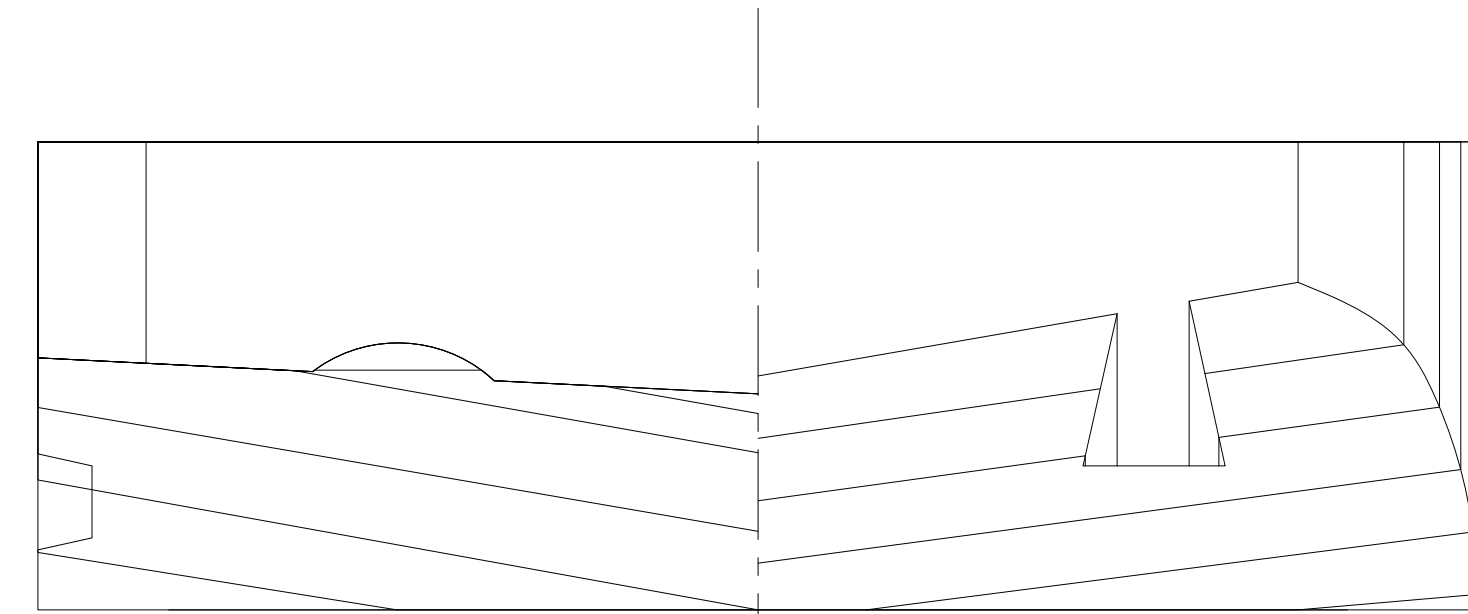
VESSEL PARTICULARS

LENGTH OVERALL HULL 45'-6"
 BEAM - MOLDED 20'-0"
 DEPTH AT SIDE 6'-6"
 LIGHTSHIP DISPLACEMENT 51 LT
 FULL LOAD DISPLACEMENT 85 LT

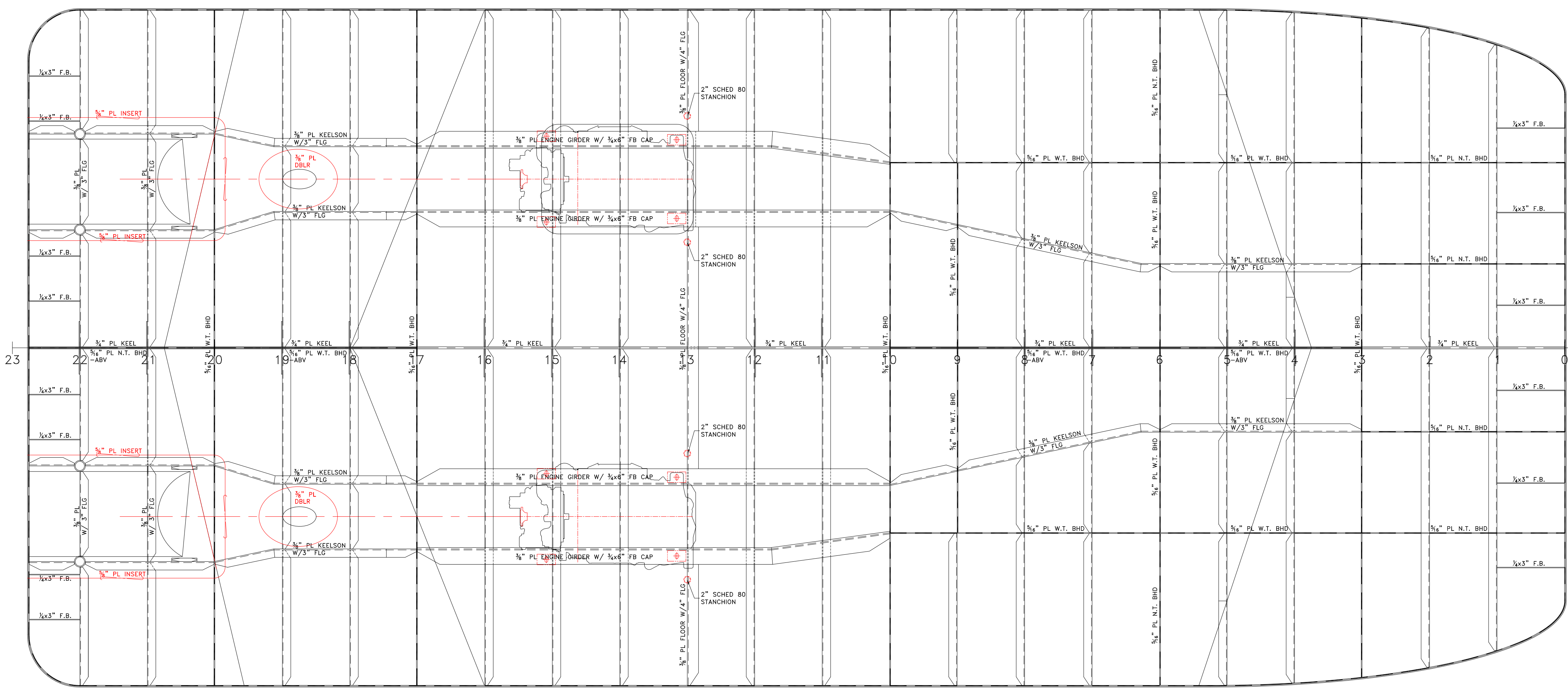


DRYDOCKING

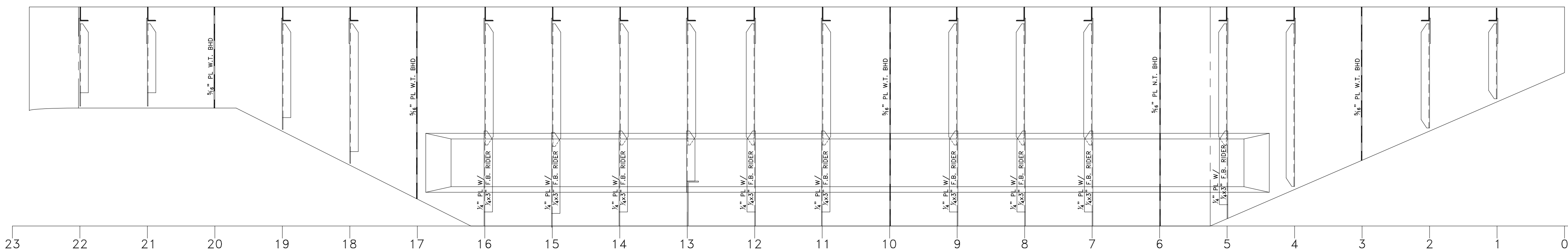
-KEEL BLOCKS @ 6'-0" CENTERS UNDER FRAMING
 -CHINE BLOCKS AT ALL XVERSE BHDS @ FRS 3, 10, 17 & 20
 -KEEL & CHINE BLOCKS SHALL BE MINIMUM 2'x2' PADS OF HARDWOOD OR COMPOSITE MATERIAL
 MINIMUM AREA OF HULL BLOCKING = 36 SQ. FT



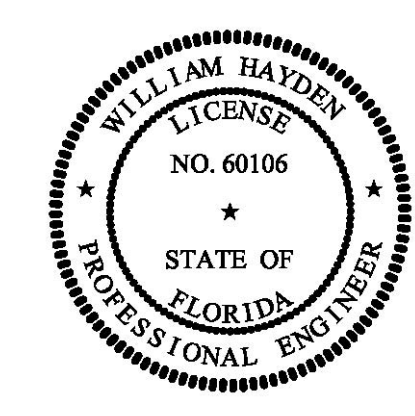
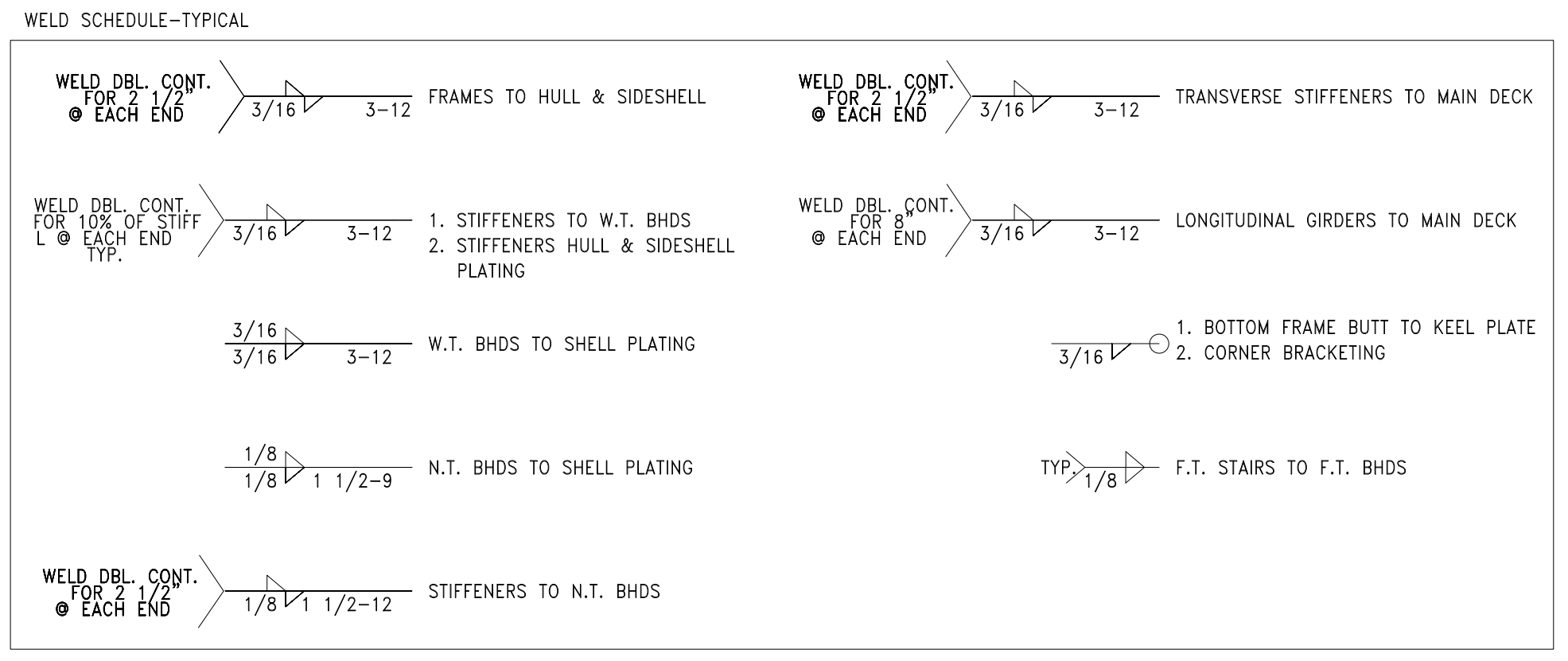
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 info@dejongandlebet.com
 Title: 45.5'x20'x6.5' NCDOT PUSHBOAT
 LINESPLAN
 Dwg. No. 17-1393-101
 Art. No. 0
 Sht. 1 of 1
 Drawn By: JACOB CONNALLY Date: JUNE 05, 2018
 Checked By: Date: _____
 App'd By: Scale: 3/8" = 1'-0"
 ABS App'l: USCG App'l: _____



BOTTOMSHELL STRUCTURAL PLAN
 3/8" PL W/ 5x3x1/4" L XVERSE BEAMS ON 2'-0" CENTERS
 UNLESS OTHERWISE NOTED



SIDESHELL STRUCTURAL PLAN
 3/16" PL W/ 5x3x1/4" L XVERSE FRAMES ON 2'-0" CENTERS
 UNLESS OTHERWISE NOTED
 PORT SIDE SHOWN LKG OUTBD. STBD SIMILAR; OPP HAND



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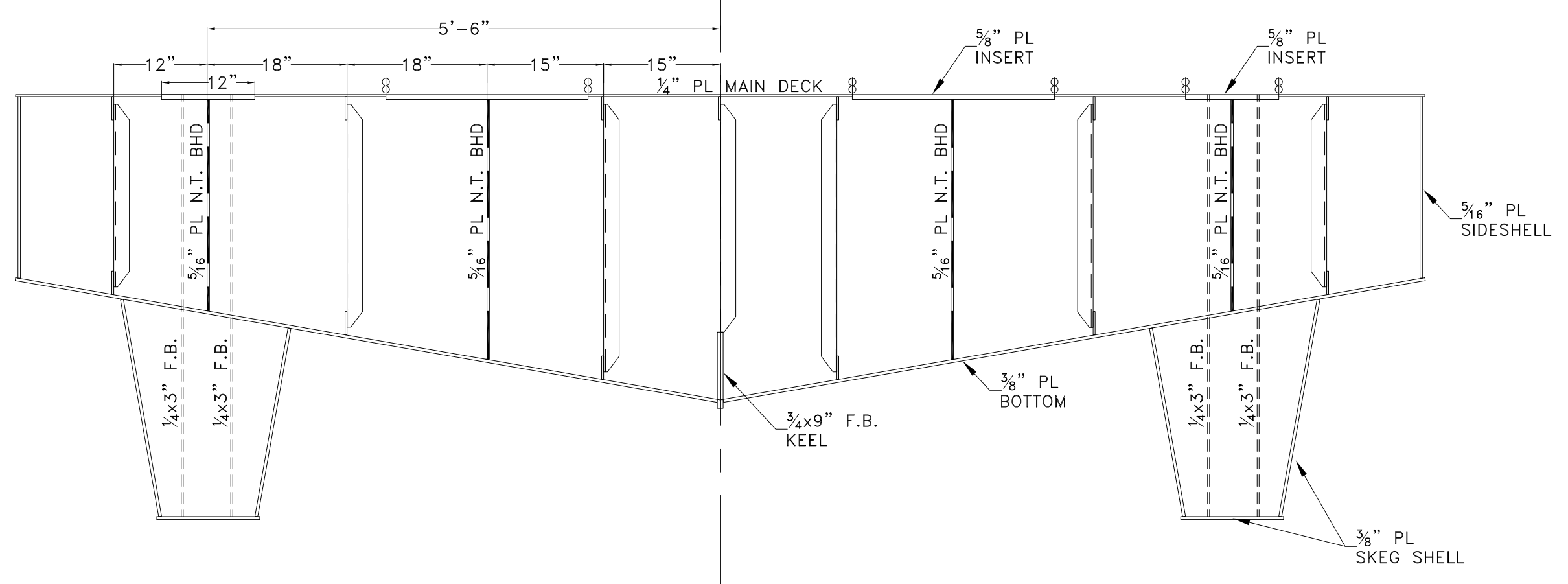
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Fax: (904) 399-1522
info@dejongandlebel.com

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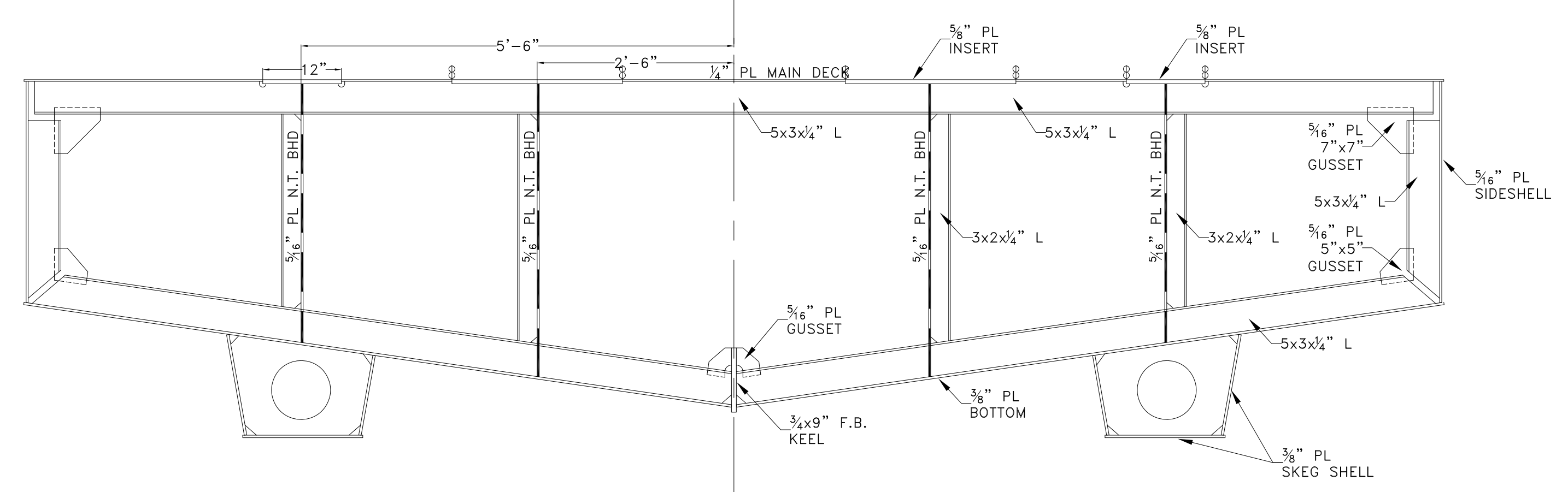
BOTTOM & SIDESHELL STRUCTURAL DETAILS

Dwg. No. 17-1393-110 Alt. No. 0
Sh. 1 of 1

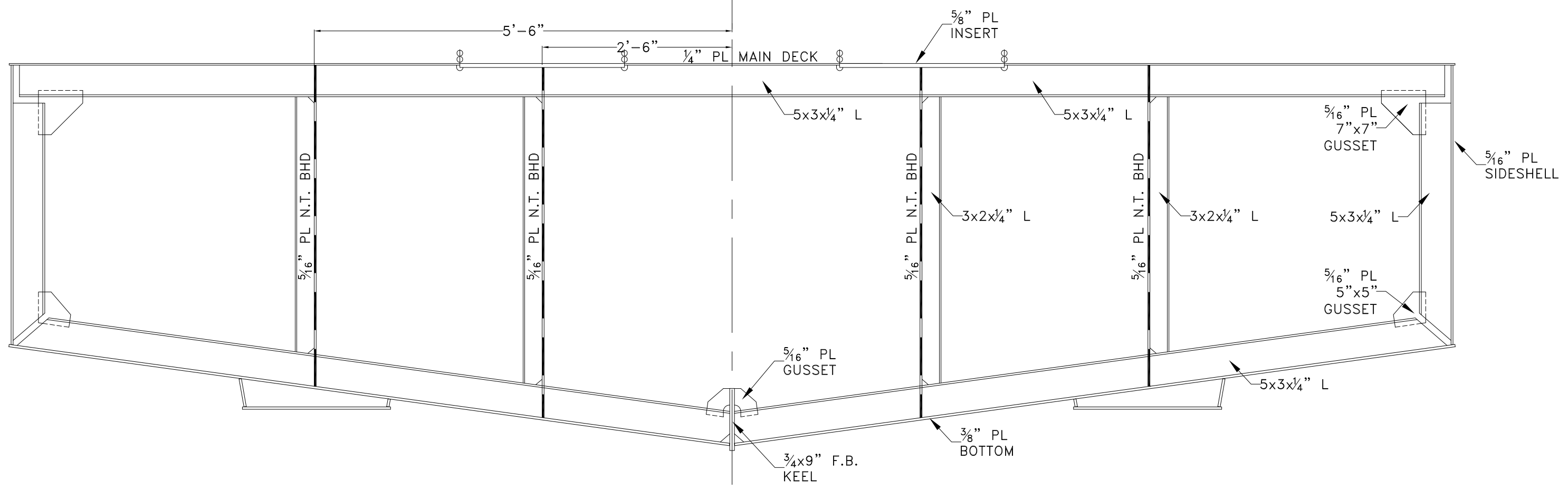
Drawn By: JACOB CONNALLY Date: JUNE 05, 2018
Checked By: _____ Date: _____
App'd By: _____ Scale: 1/2" = 1'-0"
ABS App'l: _____ USCG App'l: _____



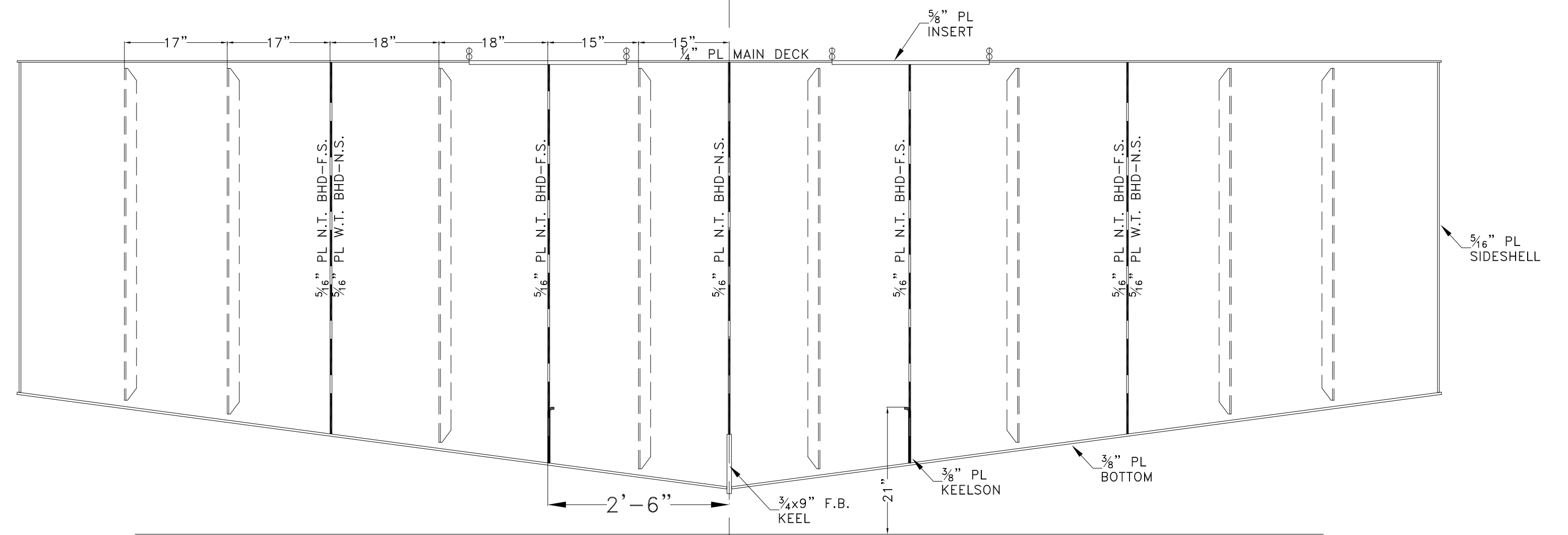
BOW PLATE @ FR 0
 5/16" PL W/ 3x2x1/4" L STIFFENERS ON AFT FACE
 UNLESS OTHERWISE NOTED
 -SHOWN LKG FWD-



TRANSVERSE SECTION @ FR 1
 -SHOWN LKG FWD-



TRANSVERSE SECTION @ FR 2
 -SHOWN LKG FWD-



TRANSVERSE W.T. BHD @ FR 3
 5/16" PL W/ 3x2x1/4" L STIFFENERS ON FWD FACE
 UNLESS OTHERWISE NOTED
 -SHOWN LKG FWD-

WELD SCHEDULE-TYPICAL

WELD DBL. CONT. FOR 2 1/2" @ EACH END	3/16	3-12	FRAMES TO HULL & SIDESHELL
WELD DBL. CONT. FOR 2 1/2" @ EACH END	3/16	3-12	TRANSVERSE STIFFENERS TO MAIN DECK
WELD DBL. CONT. FOR 10% OF STIFF L @ EACH END TYP.	3/16	3-12	1. STIFFENERS TO W.T. BHDS 2. STIFFENERS HULL & SIDESHELL PLATING
	3/16	3-12	W.T. BHDS TO SHELL PLATING
	1/8	1 1/2-9	N.T. BHDS TO SHELL PLATING
WELD DBL. CONT. FOR 1" @ EACH END	1/8	1 1/2-12	STIFFENERS TO N.T. BHDS
	3/16		1. BOTTOM FRAME BUTT TO KEEL PLATE 2. CORNER BRACKETING
	TYP. 1/8		F.T. STAIRS TO F.T. BHDS

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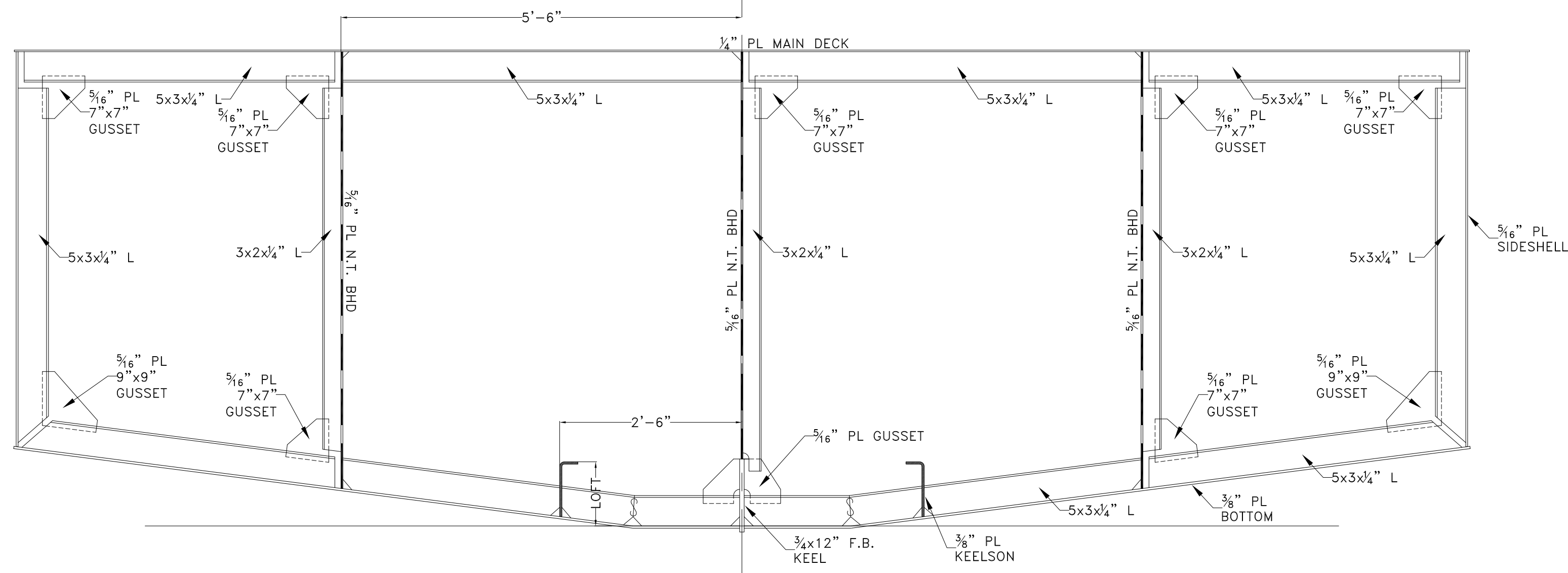
Title: 45.5'x20'x6.5' NCDOT PUSHBOAT
**TRANSVERSE HULL SECTIONS
 FRAMES 0 THRU 3**

Dwg. No. 17-1393-117
 Alt. No. 0
 Sht. 1 of 7

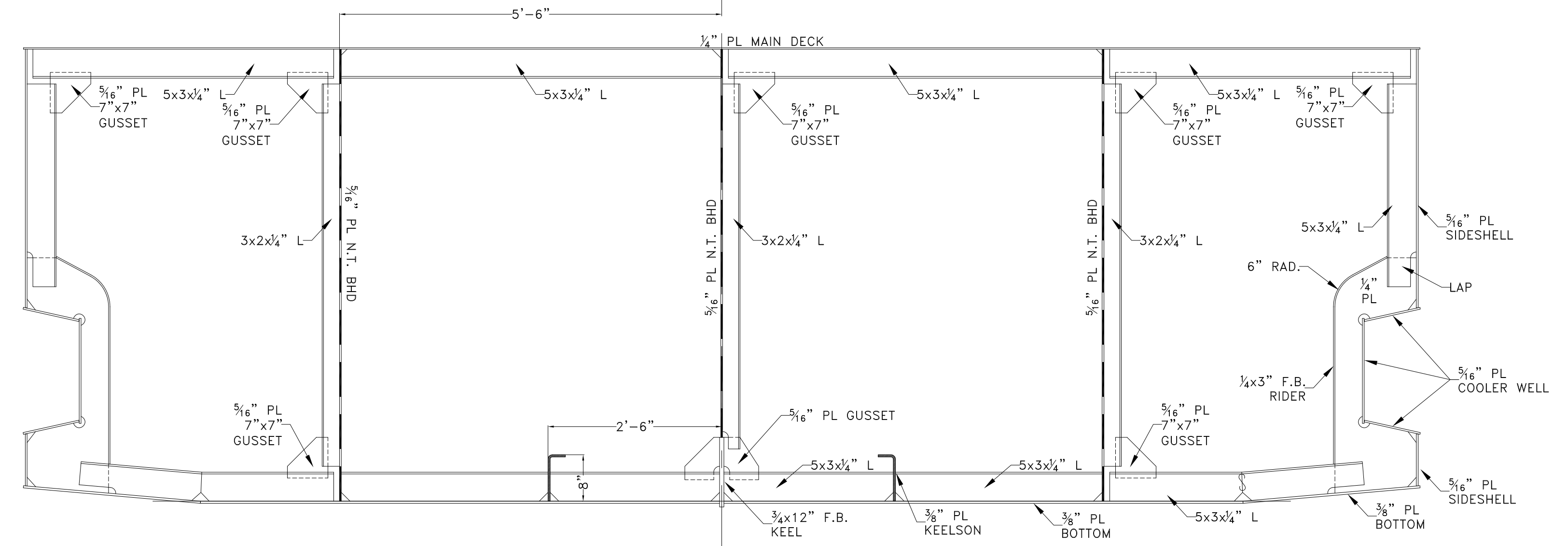
Drawn By: JACOB CONNALLY
 Checked By: _____
 App'd By: _____
 ABS App'l: _____

Date: JUNE 05, 2018
 Date: _____
 Scale: 3/4" = 1'-0"
 USCG App'l: _____

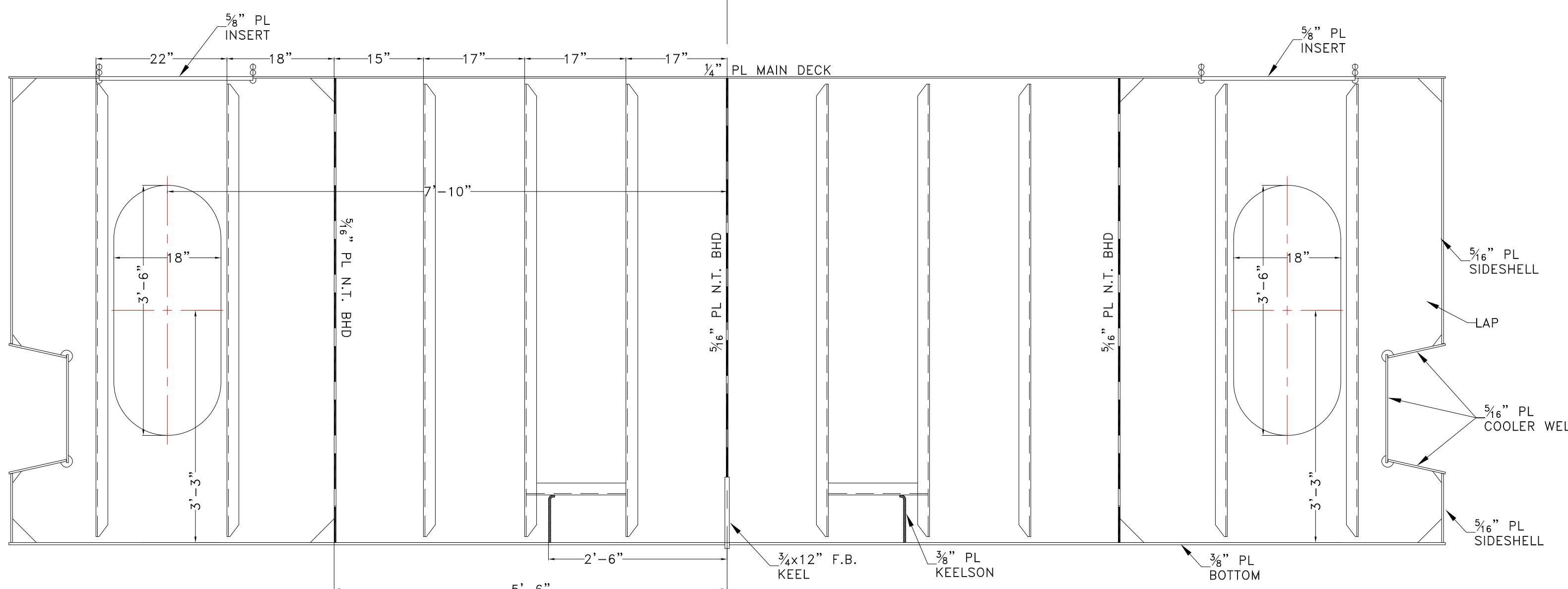
**WILLIAM HAYDEN
 LICENSE
 NO. 60106
 STATE OF
 FLORIDA
 PROFESSIONAL ENGINEER**



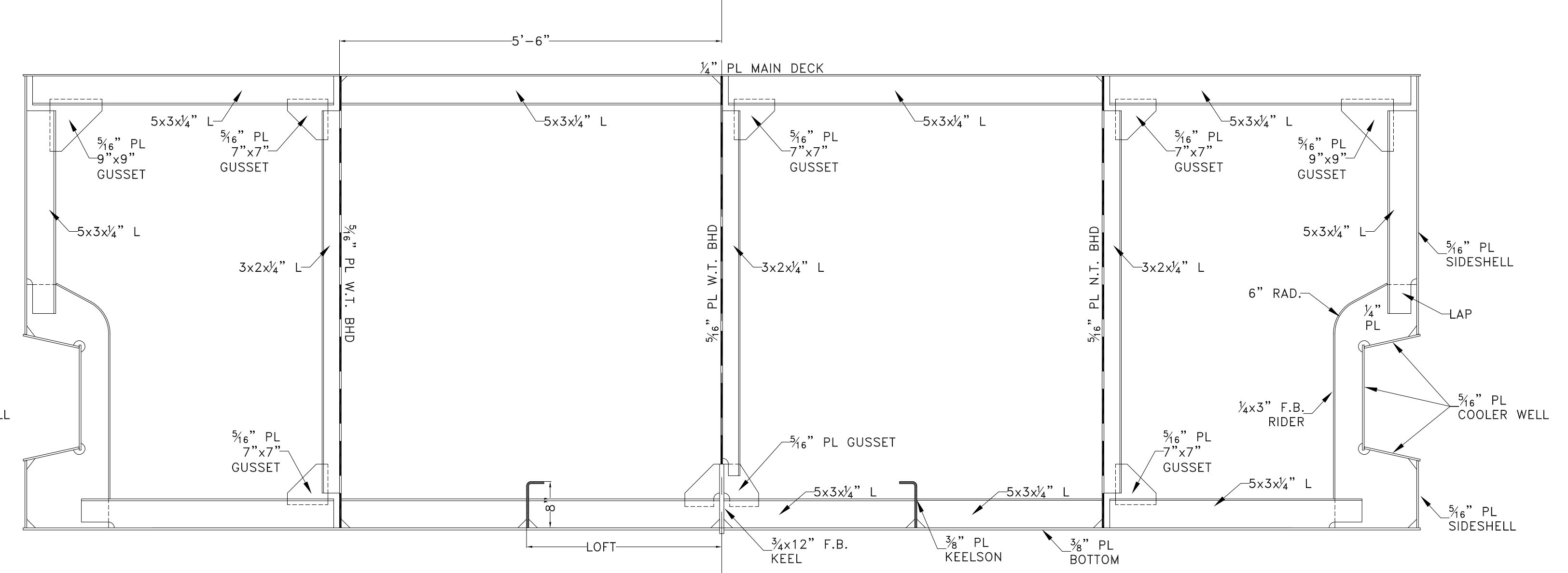
TRANSVERSE SECTION @ FR 4
-SHOWN LKG FWD-



TRANSVERSE SECTION @ FR 5
-SHOWN LKG FWD-



TRANSVERSE W.T./N.T. BHD @ FR 6
5/16" PL W/ 3x2x1/4" L STIFFENERS ON AFT FACE
UNLESS OTHERWISE NOTED
-SHOWN LKG FWD-



TRANSVERSE SECTION @ FR 7
-SHOWN LKG FWD-

WELD SCHEDULE-TYPICAL

WELD DBL. CONT. FOR 2 1/2" EACH END	3/16 3-12	FRAMES TO HULL & SIDESHELL	WELD DBL. CONT. FOR 2 1/2" EACH END	3/16 3-12	TRANSVERSE STIFFENERS TO MAIN DECK
WELD DBL. CONT. FOR 10% OF STIFF L @ EACH END	3/16 3-12	1. STIFFENERS TO W.T. BHDS 2. STIFFENERS HULL & SIDESHELL PLATING	WELD DBL. CONT. FOR 8" EACH END	3/16 3-12	LONGITUDINAL GIRDERS TO MAIN DECK
3/16 3-12	3-12	W.T. BHDS TO SHELL PLATING	3/16 3-12	3-12	1. BOTTOM FRAME BUTT TO KEEL PLATE 2. CORNER BRACKETING
1/8 1 1/2-9	1 1/2-9	N.T. BHDS TO SHELL PLATING	1/8 1 1/2-9	1 1/2-9	F.T. STAIRS TO F.T. BHDS
WELD DBL. CONT. FOR 2 1/2" EACH END	1/8 1 1/2-12	STIFFENERS TO N.T. BHDS			

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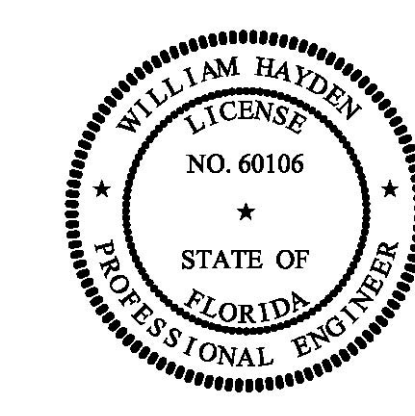
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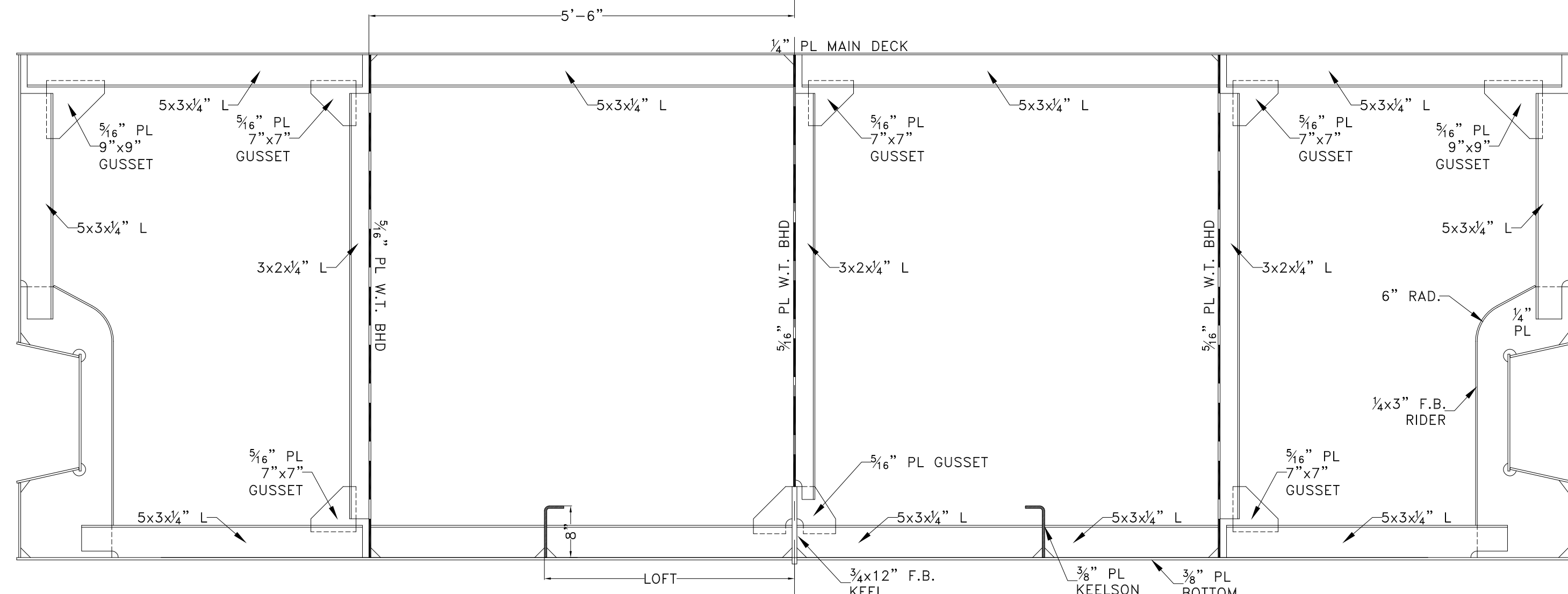
Title: 45.5'x20'x6.5' NCDOT PUSHBOAT

**TRANSVERSE HULL SECTIONS
FRAMES 4 THRU 7**

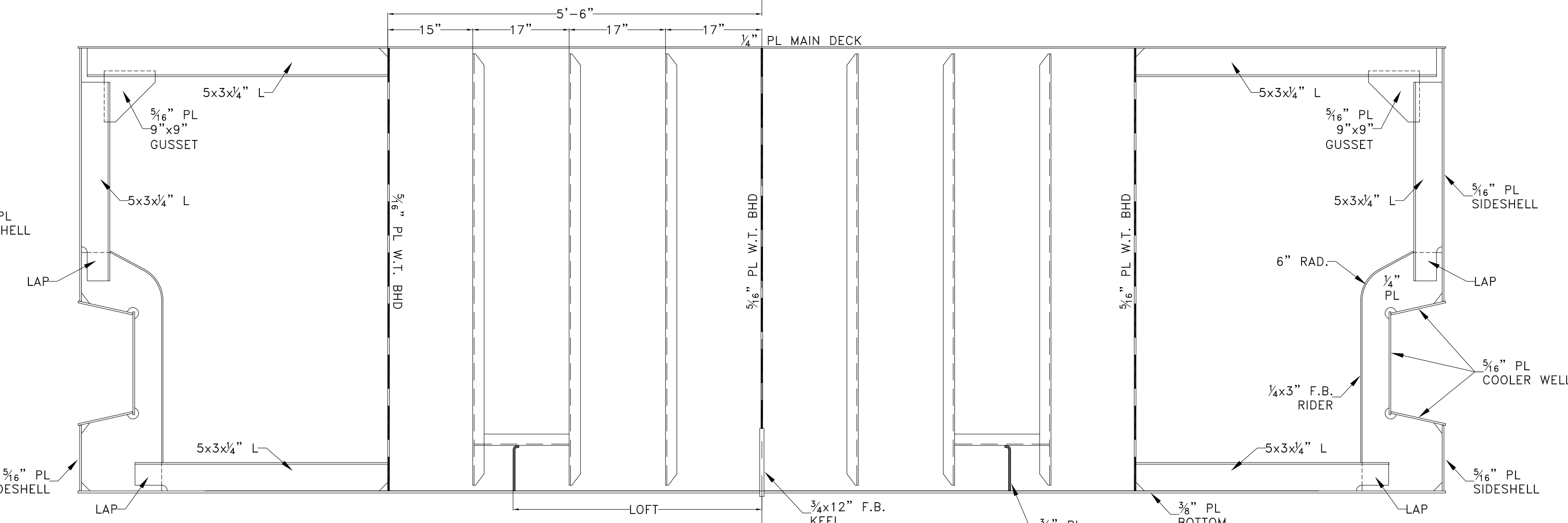
Dwg. No. 17-1393-117 Alt. No. 0
Sht. 2 of 7

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018
Checked By: _____ Date: _____
App'd By: _____ Scale: 3/4" = 1'-0"
ABS App'l: _____ USCG App'l: _____

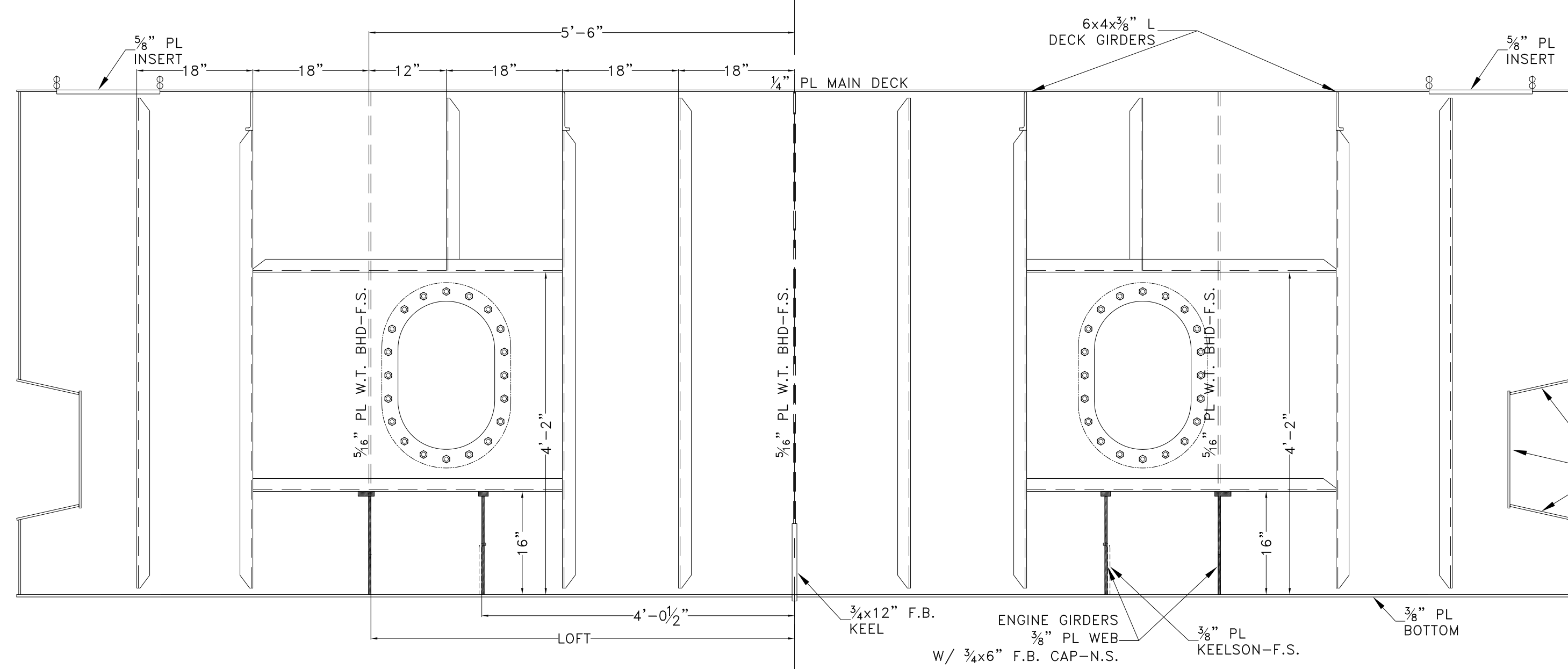




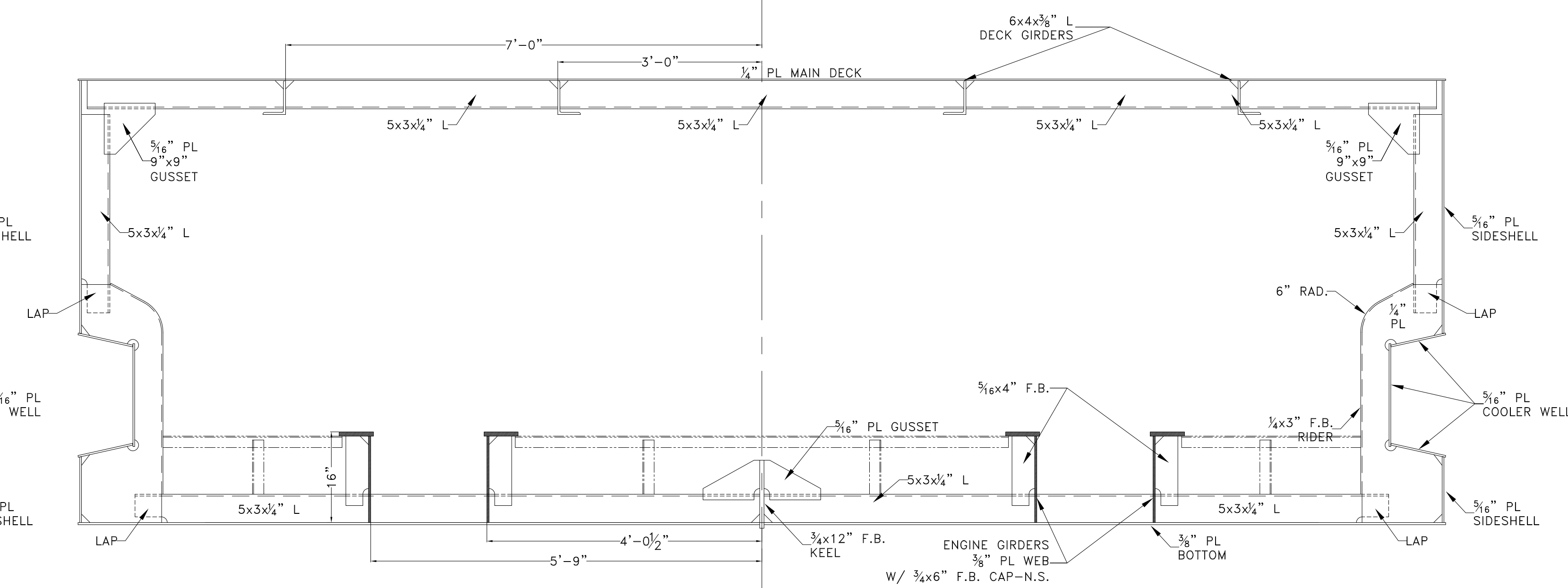
TRANSVERSE SECTION @ FR 8
-SHOWN LKG FWD-



O.T. BHD & TRANSVERSE FRAME @ FR 9
5/16" PL W/ 3x2x1/4" L STIFFENERS ON AFT FACE
UNLESS OTHERWISE NOTED
-SHOWN LKG FWD-



TRANSVERSE W.T./N.T. BHD @ FR 10
5/16" PL W/ 3x2x1/4" L STIFFENERS ON AFT FACE
UNLESS OTHERWISE NOTED
-SHOWN LKG FWD-



TRANSVERSE SECTION @ FR 11
-SHOWN LKG FWD-

WELD SCHEDULE-TYPICAL

WELD DBL. CONT. FOR EACH END	3-12	FRAMES TO HULL & SIDESHELL
WELD DBL. CONT. FOR EACH END	3-12	TRANSVERSE STIFFENERS TO MAIN DECK
WELD DBL. CONT. FOR EACH END	3-12	1. STIFFENERS TO W.T. BHDS 2. STIFFENERS HULL & SIDESHELL PLATING
WELD DBL. CONT. FOR EACH END	3-12	LONGITUDINAL GIRDERS TO MAIN DECK
3-12		1. BOTTOM FRAME BUTT TO KEEL PLATE 2. CORNER BRACKETING
1/2-9		W.T. BHDS TO SHELL PLATING
1/2-9		N.T. BHDS TO SHELL PLATING
1/2-12		STIFFENERS TO N.T. BHDS
1/2-9		F.T. STAIRS TO F.T. BHDS

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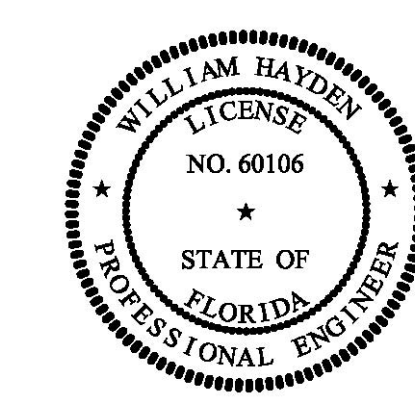
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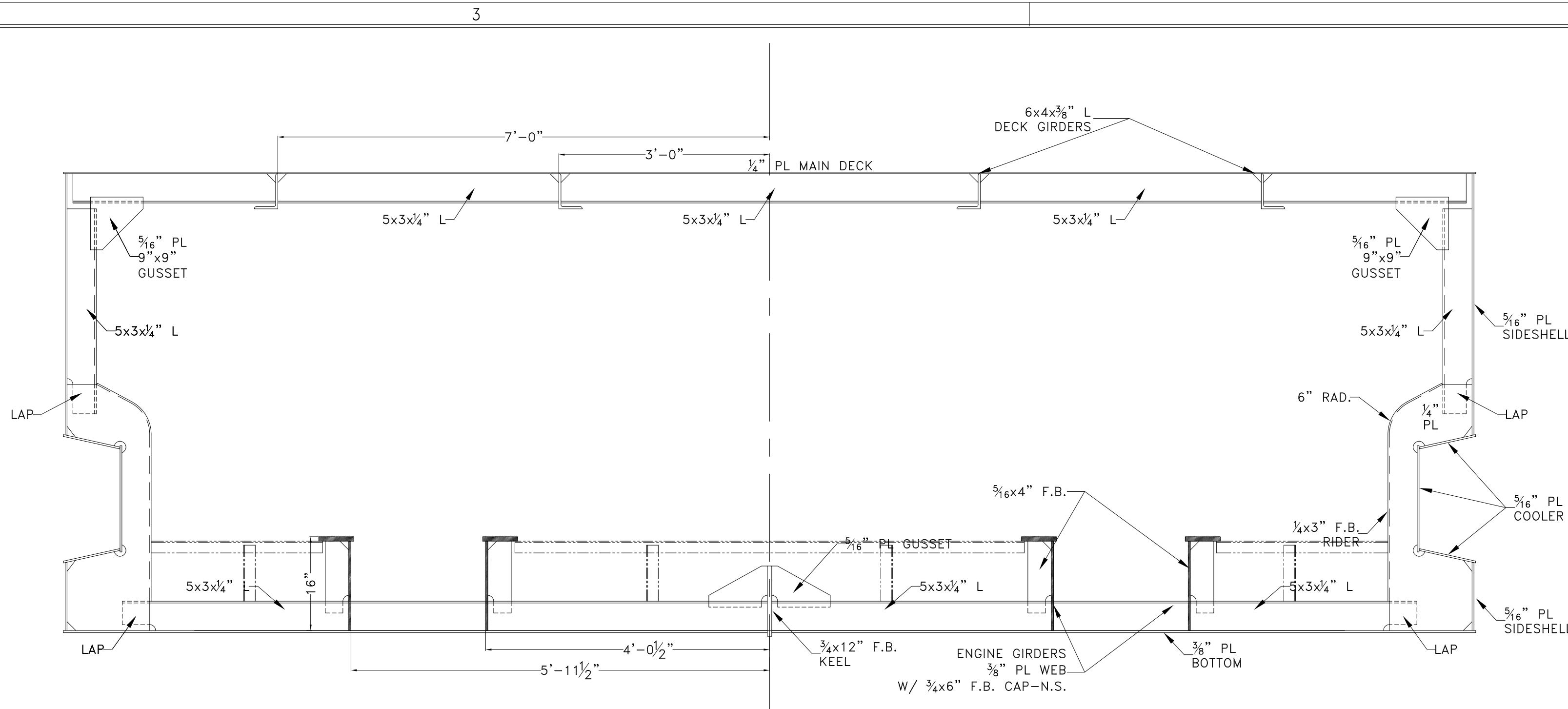
**TRANSVERSE HULL SECTIONS
FRAMES 8 THRU 11**

Dwg. No. 17-1393-117
Art. No. 0
Sht. 3 of 7

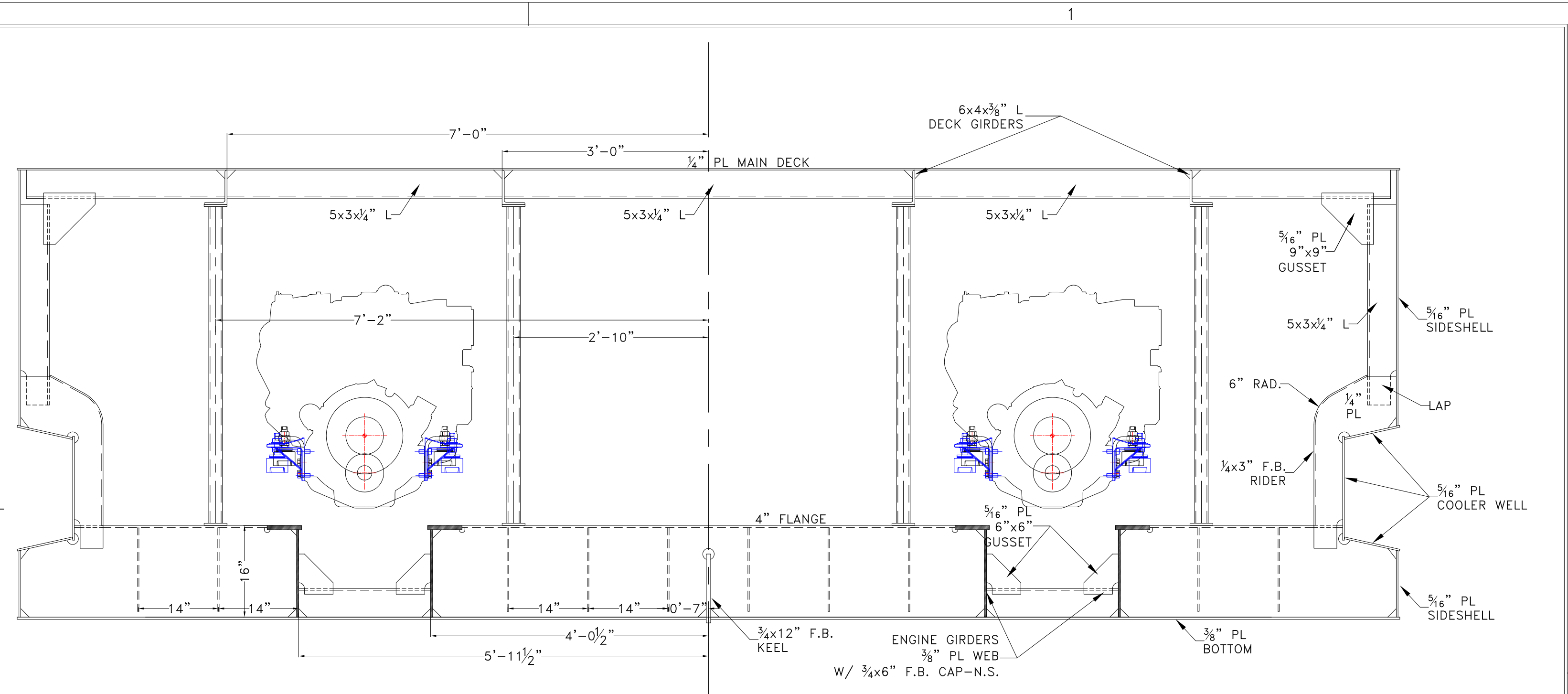
Drawn By: JACOB CONNALLY
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Date: JUNE 05, 2018
Date: _____
Scale: 3/4" = 1'-0"
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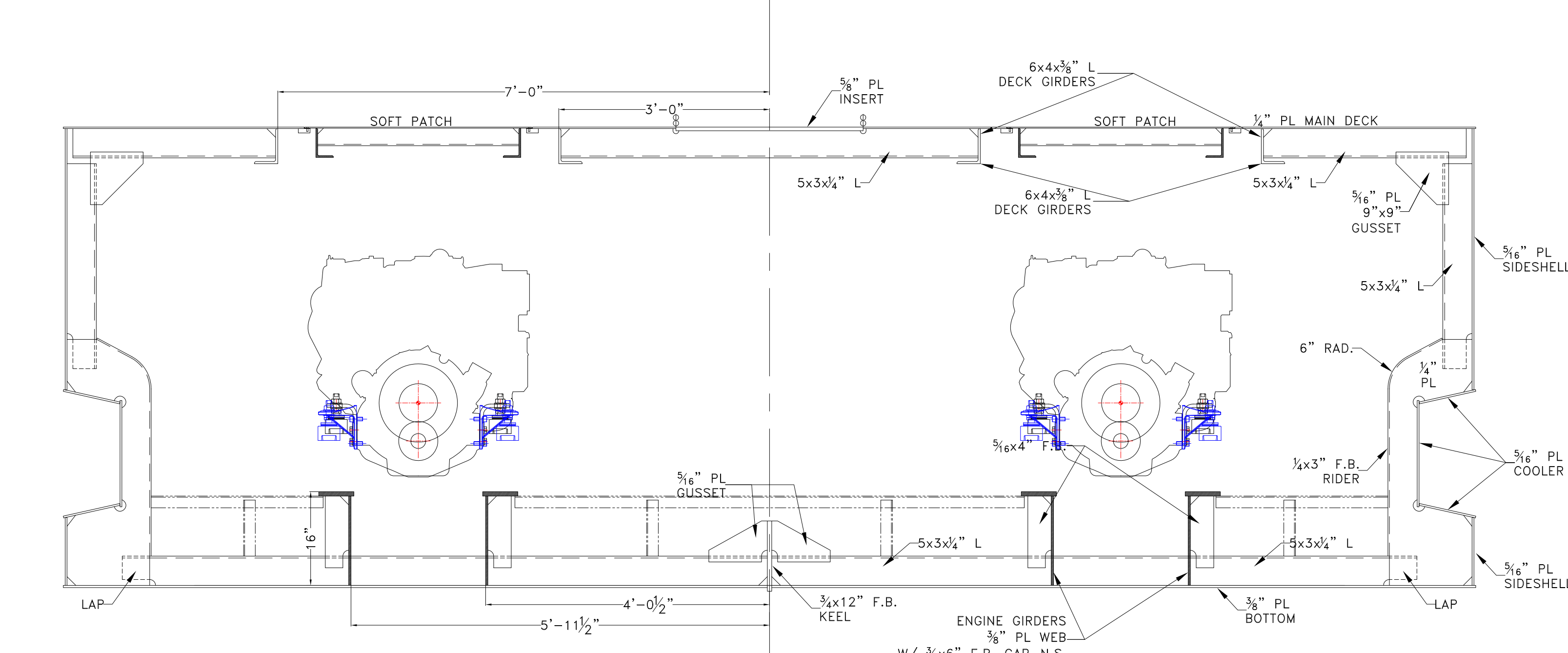




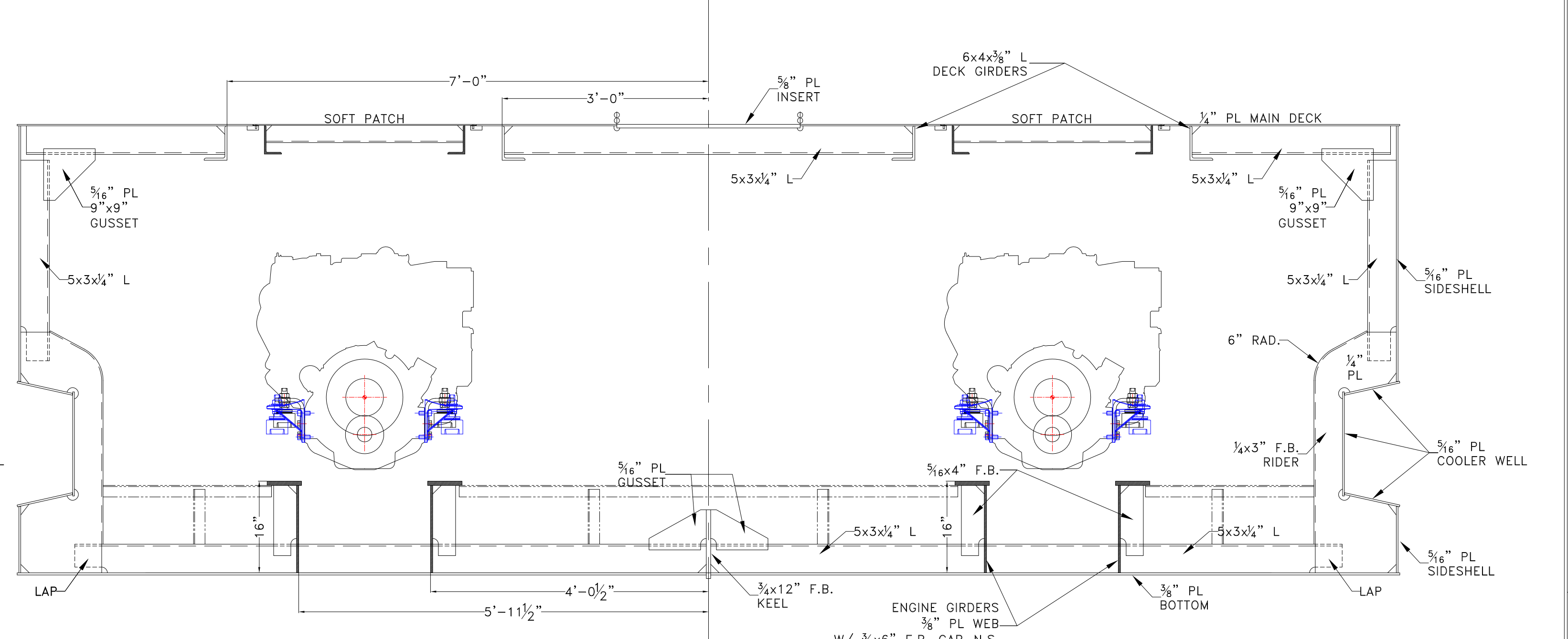
TRANSVERSE SECTION @ FR 12
-SHOWN LKG FWD-



TRANSVERSE SECTION @ FR 13
5/8" FLG PL FLOOR W/ 1/4x3" F.B. STIFFS ON FWD FACE
-SHOWN LKG FWD-



TRANSVERSE SECTION @ FR 14
-SHOWN LKG FWD-



TRANSVERSE SECTION @ FR 15
-SHOWN LKG FWD-

WELD SCHEDULE-TYPICAL

WELD DBL. CONT. FOR EACH END $\frac{3}{16}$ 3-12	FRAMES TO HULL & SIDESHELL	WELD DBL. CONT. FOR EACH END $\frac{3}{16}$ 3-12	TRANSVERSE STIFFENERS TO MAIN DECK
WELD DBL. CONT. FOR LOSS OF STIFF L @ EACH END $\frac{3}{16}$ 3-12	1. STIFFENERS TO W.T. BHDS 2. STIFFENERS HULL & SIDESHELL PLATING	WELD DBL. CONT. FOR EACH END $\frac{3}{16}$ 3-12	LONGITUDINAL GIRDERS TO MAIN DECK
$\frac{3}{16}$ 3-12	W.T. BHDS TO SHELL PLATING	$\frac{3}{16}$ 1-2	1. BOTTOM FRAME BUTT TO KEEL PLATE 2. CORNER BRACKETING
$\frac{1}{8}$ 1/2-9	N.T. BHDS TO SHELL PLATING	TYP $\frac{1}{8}$ 1/2-9	F.T. STAIRS TO F.T. BHDS
WELD DBL. CONT. FOR EACH END $\frac{1}{8}$ 1/2-12	STIFFENERS TO N.T. BHDS		

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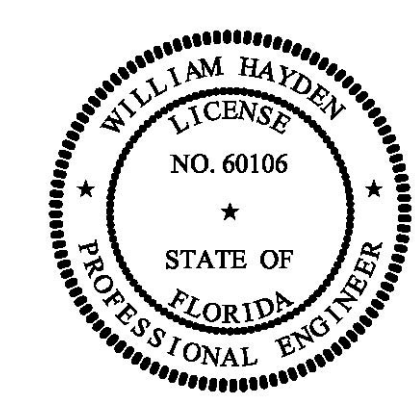
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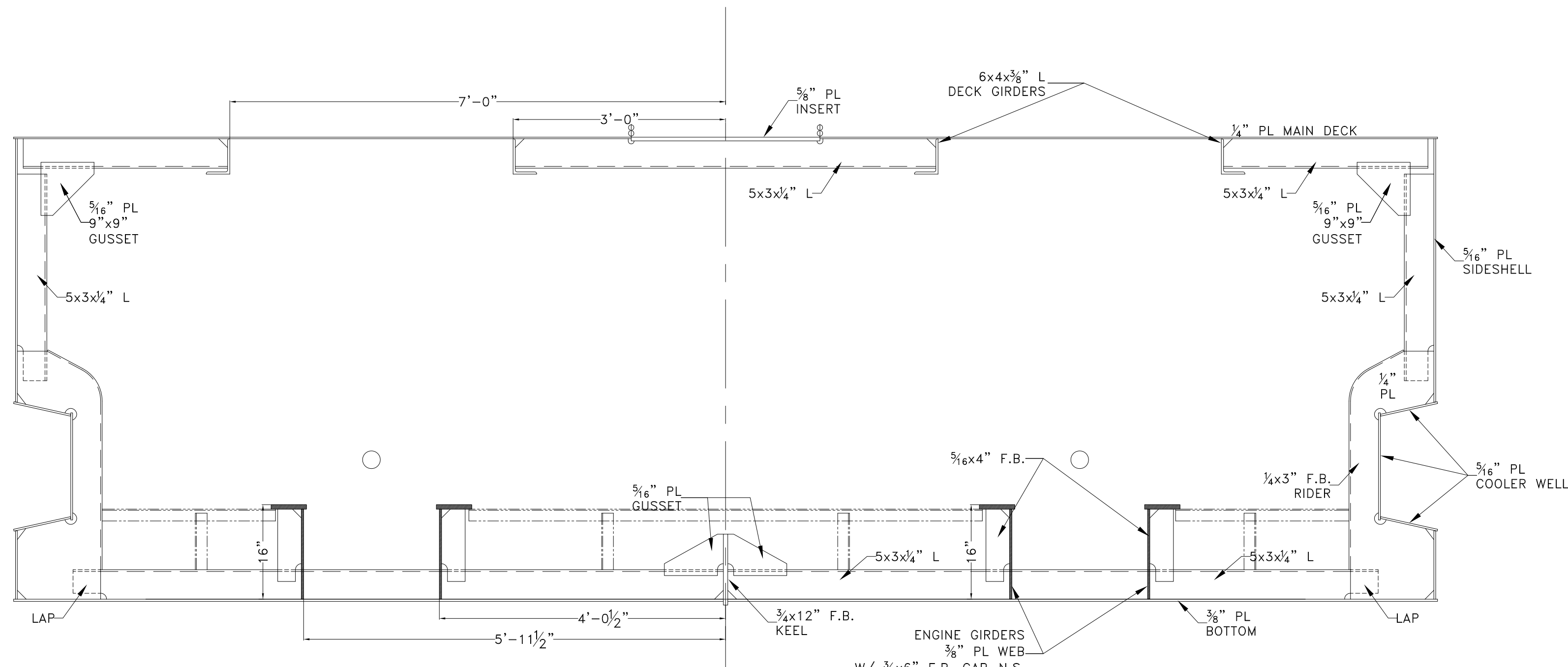
Title: 45.5'x20'x6.5' NCDOT PUSHBOAT

**TRANSVERSE HULL SECTIONS
FRAMES 12 THRU 15**

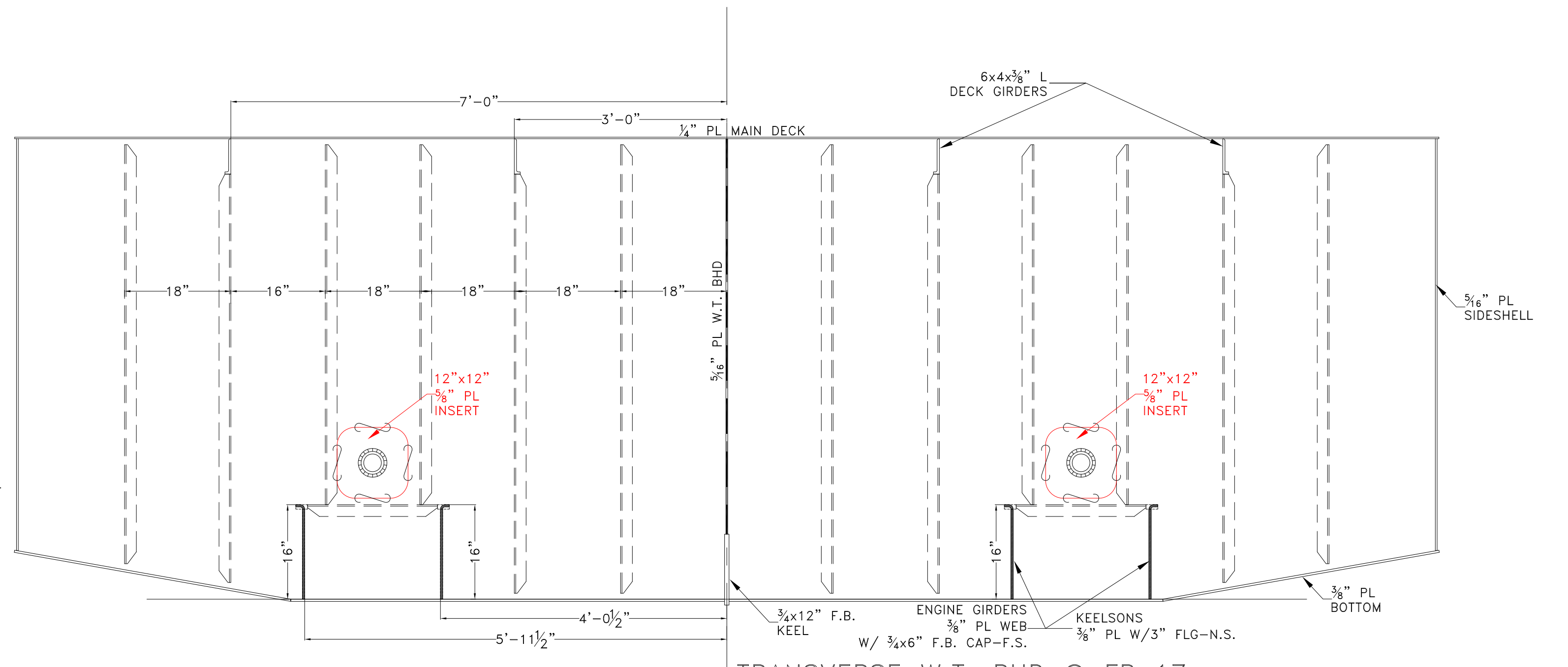
Dwg. No. 17-1393-117 Alt. No. 0
Sht. 4 of 7

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018
Checked By: Date: Scale: 3/4" = 1'-0"
App'd By: Scale: 3/4" = 1'-0"
ABS App'l: USCG App'l:

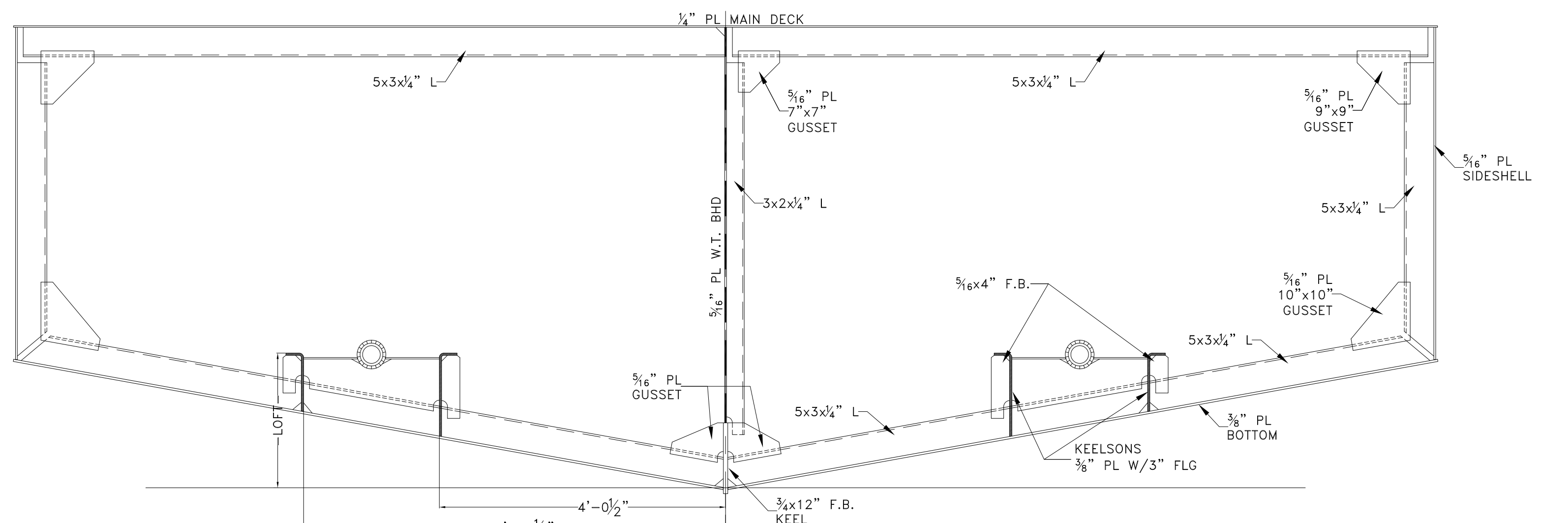




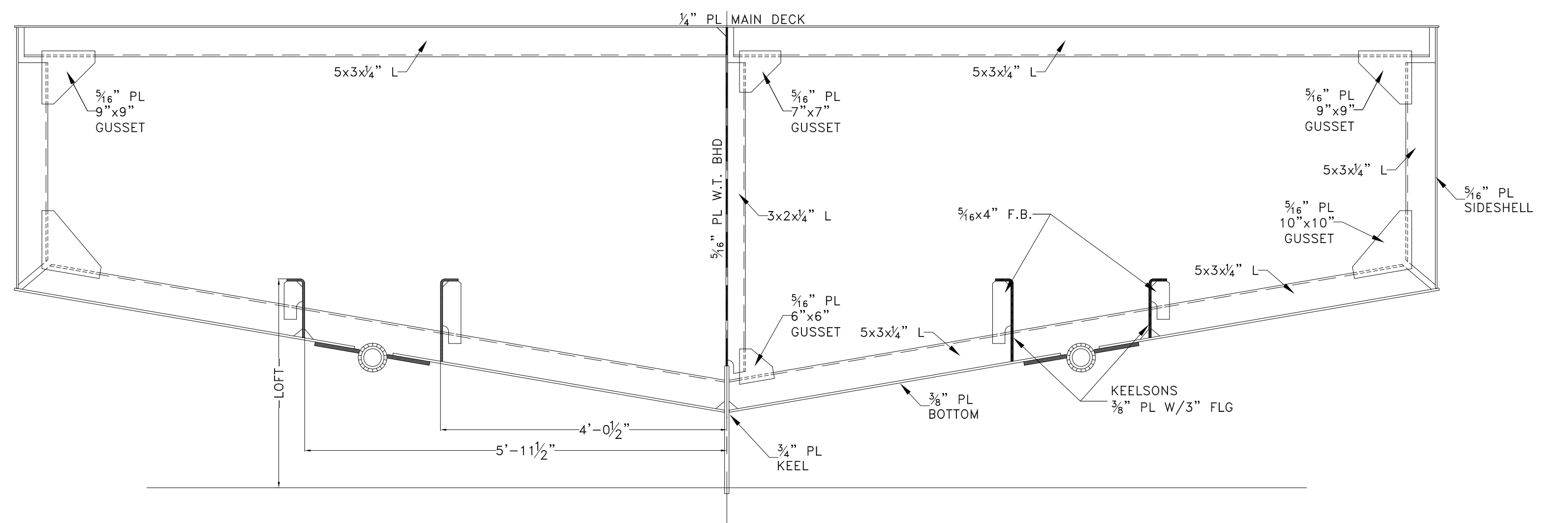
TRANSVERSE SECTION @ FR 16
-SHOWN LKG FWD-



TRANSVERSE W.T. BHD @ FR 17
UNLESS OTHERWISE NOTED
-SHOWN LKG FWD-



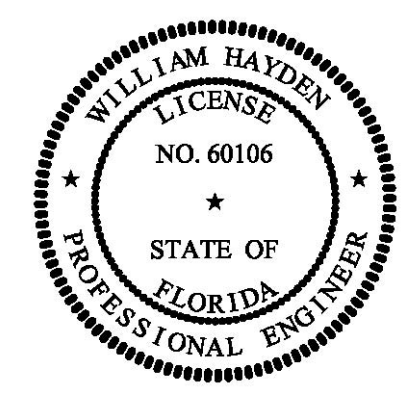
TRANSVERSE SECTION @ FR 18
-SHOWN LKG FWD-



TRANSVERSE SECTION @ FR 19
-SHOWN LKG FWD-

WELD SCHEDULE-TYPICAL

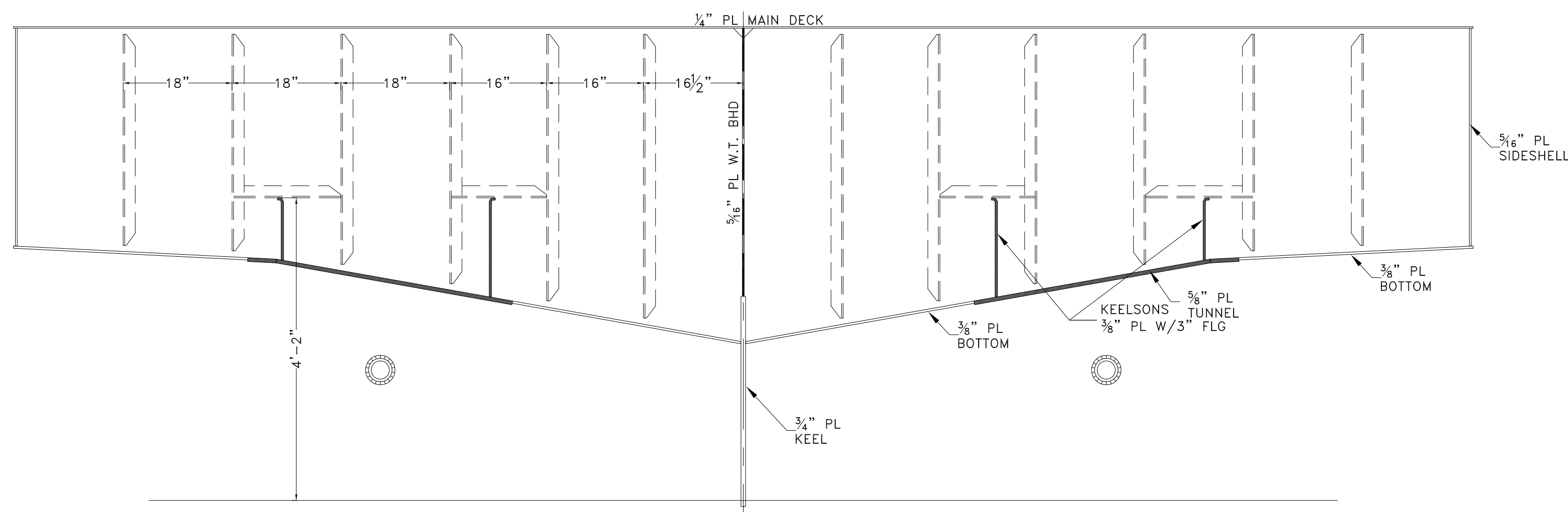
WELD DBL. CONT. FOR 2 1/8" EACH END	3/16 3-12 FRAMES TO HULL & SIDESHELL	WELD DBL. CONT. FOR 2 1/8" EACH END	3/16 3-12 TRANSVERSE STIFFENERS TO MAIN DECK
WELD DBL. CONT. FOR 10% OF STIFF L EACH END TYP.	3/16 3-12 1. STIFFENERS TO W.T. BHDS 2. STIFFENERS HULL & SIDESHELL PLATING	WELD DBL. CONT. FOR 8" EACH END	3/16 3-12 LONGITUDINAL GIRDERS TO MAIN DECK
3/16 3-12	W.T. BHDS TO SHELL PLATING	3/16	1. BOTTOM FRAME BUTT TO KEEL PLATE 2. CORNER BRACKETING
1/8 1 1/2-9	N.T. BHDS TO SHELL PLATING	TYP 1/8	F.T. STAIRS TO F.T. BHDS
WELD DBL. CONT. FOR 1 1/8" EACH END	1/8 1 1/2-12 STIFFENERS TO N.T. BHDS		



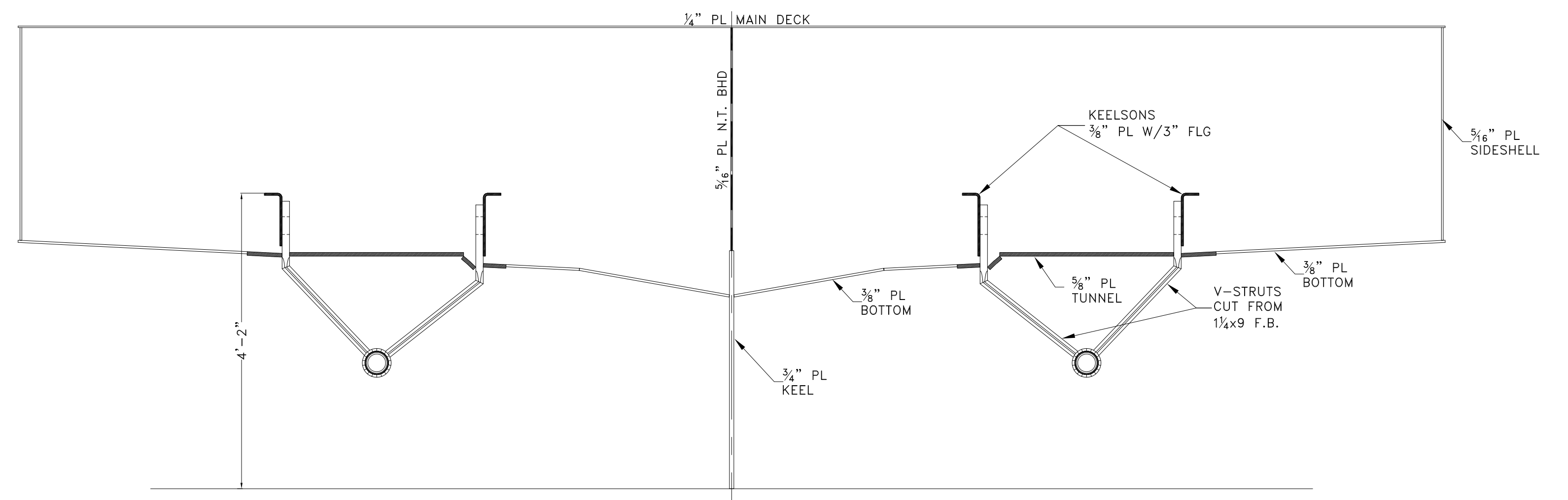
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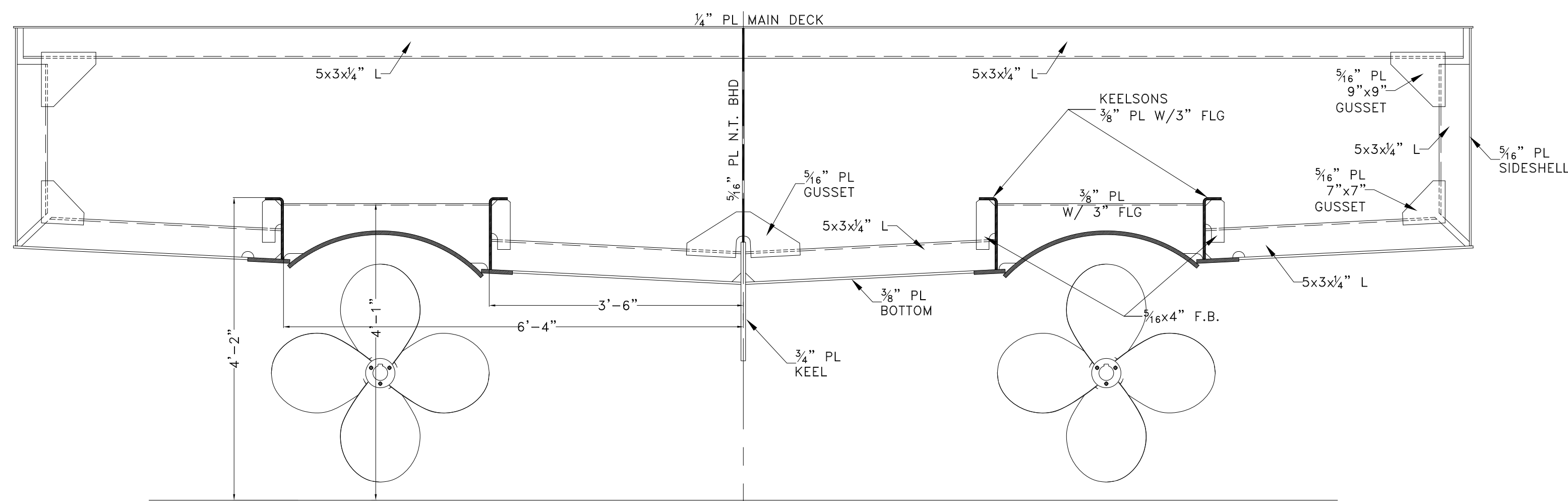
Title: 45.5'x20'x6.5' NCDOT PUSHBOAT
TRANSVERSE HULL SECTIONS
FRAMES 16 THRU 19
Dwg. No. 17-1393-117
Date: JUNE 05, 2018
Art. No. 0
Sht. 5 of 7
Drawn By: JACOB CONNALLY
Checked By:
App'd By:
ABS App'l:
Date:
Date:
Scale: 3/4" = 1'-0"
USCG App'l:



TRANSVERSE W.T. BHD @ FR 20
 5/16" PL W/ 3x2x1/4" L STIFFENERS ON FWD FACE
 UNLESS OTHERWISE NOTED
 -SHOWN LKG FWD-



TRANSVERSE SECTION @ FR 20.5
 -SHOWN LKG FWD-



TRANSVERSE SECTION @ FR 21
 -SHOWN LKG FWD-

WELD SCHEDULE-TYPICAL

<p>WELD DBL. CONT. FOR 2 1/2" EACH END</p> <p>FRAMES TO HULL & SIDESHELL</p>	<p>WELD DBL. CONT. FOR 2 1/2" EACH END</p> <p>TRANSVERSE STIFFENERS TO MAIN DECK</p>
<p>WELD DBL. CONT. FOR 10% OF STIFF L TYP.</p> <p>1. STIFFENERS TO W.T. BHDS 2. STIFFENERS HULL & SIDESHELL PLATING</p>	<p>WELD DBL. CONT. FOR 2 1/2" EACH END</p> <p>LONGITUDINAL GIRDERS TO MAIN DECK</p>
<p>W.T. BHDS TO SHELL PLATING</p>	<p>1. BOTTOM FRAME BUTT TO KEEL PLATE 2. CORNER BRACKETING</p>
<p>N.T. BHDS TO SHELL PLATING</p>	<p>TYP. 1/8 F.T. STAIRS TO F.T. BHDS</p>
<p>WELD DBL. CONT. FOR 2 1/2" EACH END</p> <p>STIFFENERS TO N.T. BHDS</p>	

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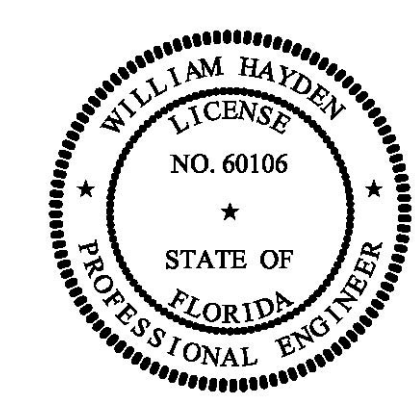
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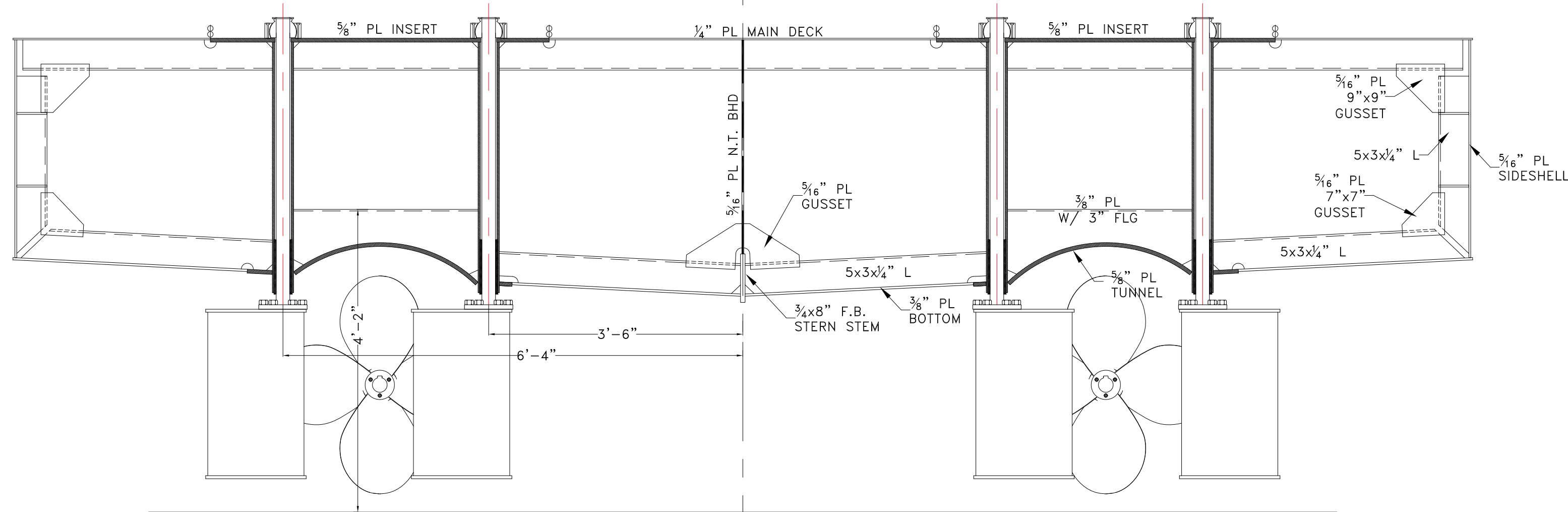
Title: 45.5'x20'x6.5' NCDOT PUSHBOAT

**TRANSVERSE HULL SECTIONS
 FRAMES 20 THRU 21**

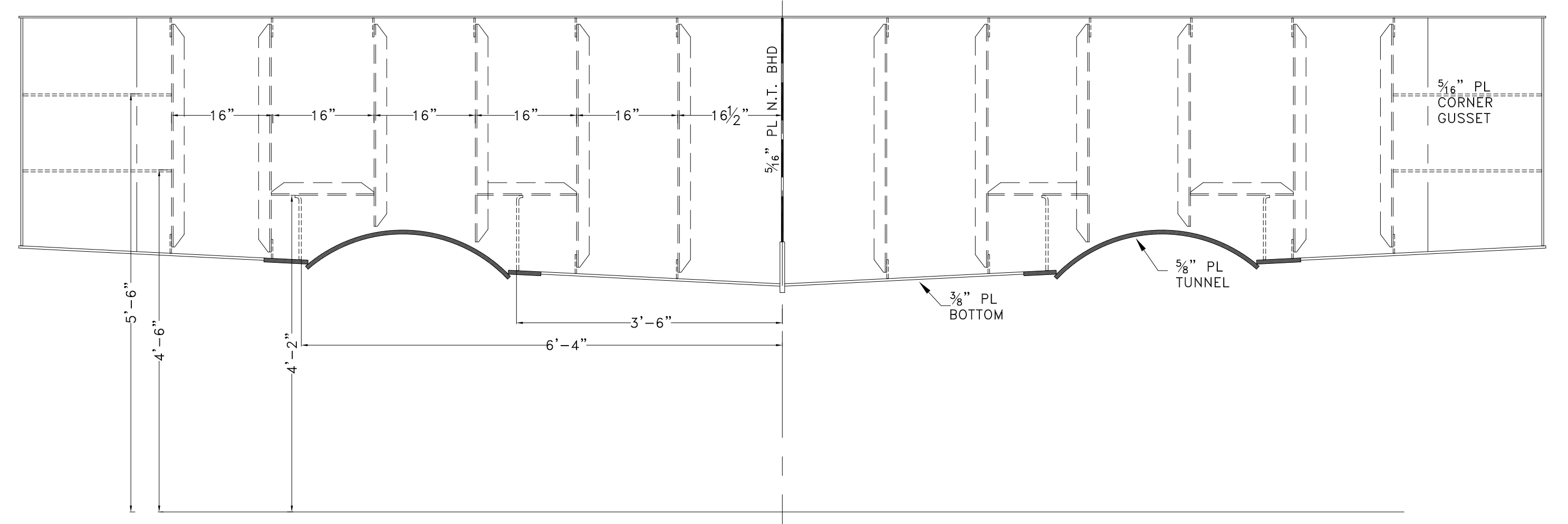
Dwg. No. 17-1393-117 Alt. No. 0
 Sht. 6 of 7

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018
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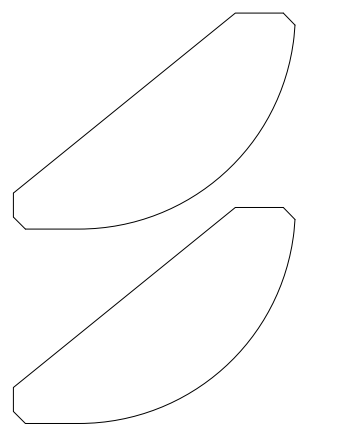
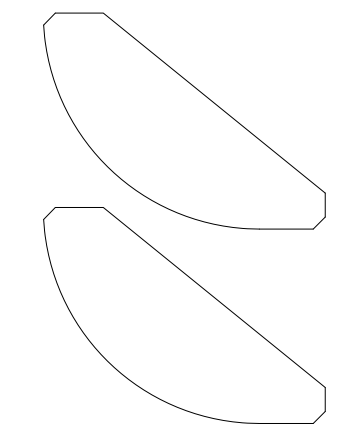




TRANSVERSE SECTION @ FR 22
-SHOWN LKG FWD-

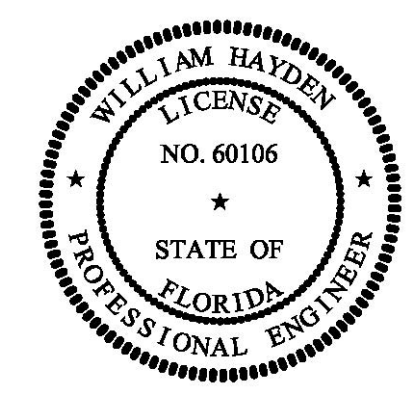


TRANSOM @ 18" AFT FR 22
5/16" PL W/ 3x2x1/4" L STIFFENERS ON FWD FACE
UNLESS OTHERWISE NOTED
-SHOWN LKG FWD-



WELD SCHEDULE-TYPICAL

WELD DBL. CONT. FOR 2 1/2" EACH END	3/16	5-12	FRAMES TO HULL & SIDESHELL
WELD DBL. CONT. FOR 2 1/2" EACH END	3/16	3-12	TRANSVERSE STIFFENERS TO MAIN DECK
WELD DBL. CONT. FOR 10% OF STIFF L. EACH END TYP.	3/16	3-12	1. STIFFENERS TO W.T. BHDS 2. STIFFENERS HULL & SIDESHELL PLATING
WELD DBL. CONT. FOR 2 1/2" EACH END	3/16	3-12	LONGITUDINAL GIRDERS TO MAIN DECK
	3/16	3-12	W.T. BHDS TO SHELL PLATING
	1/8	1 1/2-9	N.T. BHDS TO SHELL PLATING
	3/16		1. BOTTOM FRAME BUTT TO KEEL PLATE 2. CORNER BRACKETING
WELD DBL. CONT. FOR 2 1/2" EACH END	1/8	1 1/2-12	STIFFENERS TO N.T. BHDS
	TYP	1/8	F.T. STAIRS TO F.T. BHDS



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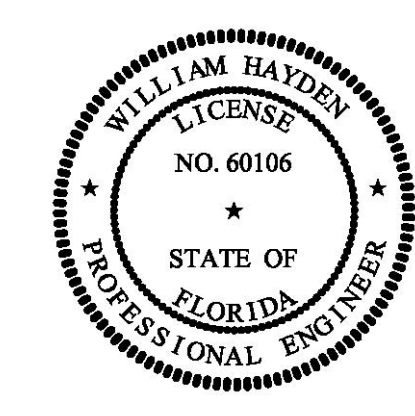
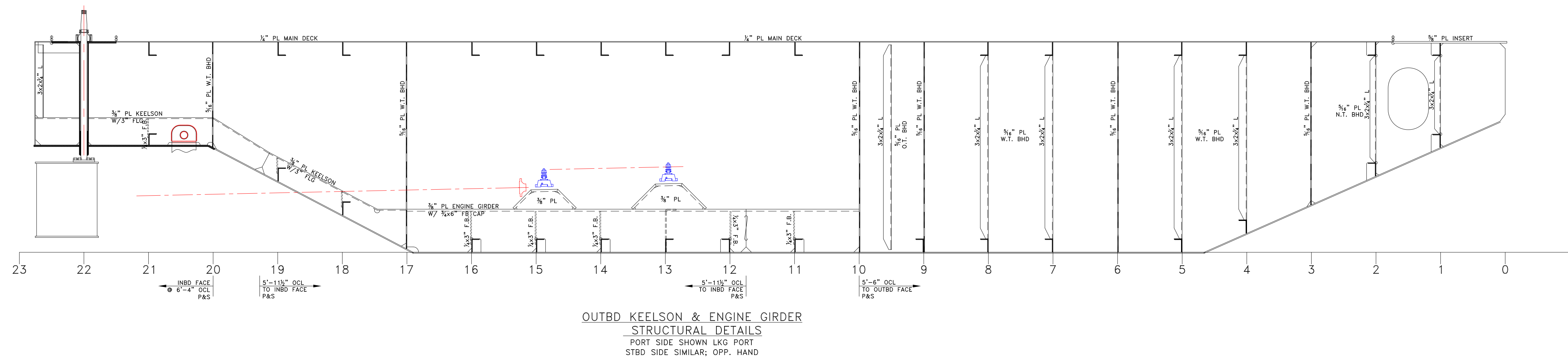
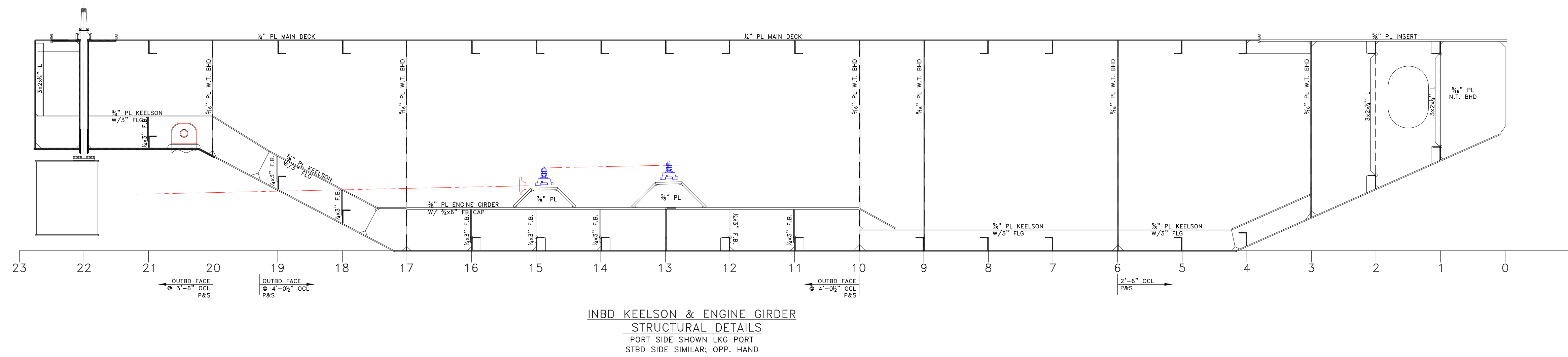
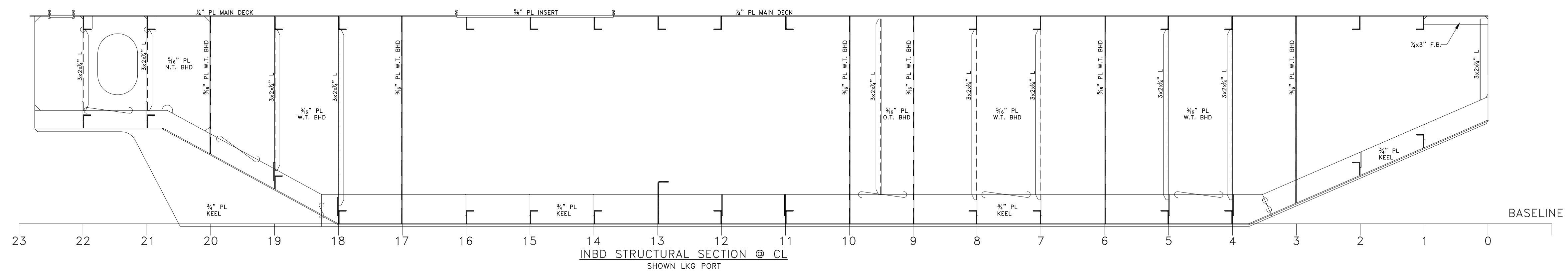
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Title: 45.5'x20'x6.5' NCDOT PUSHBOAT

TRANSVERSE FRAME @ 22 & TRANSOM DETAILS

Dwg. No. 17-1393-117
Alt. No. 0
Sht. 7 of 7

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018
Checked By: Date: 3/4" = 1'-0"
App'd By: Scale: 3/4" = 1'-0"
ABS App'l: USCG App'l:



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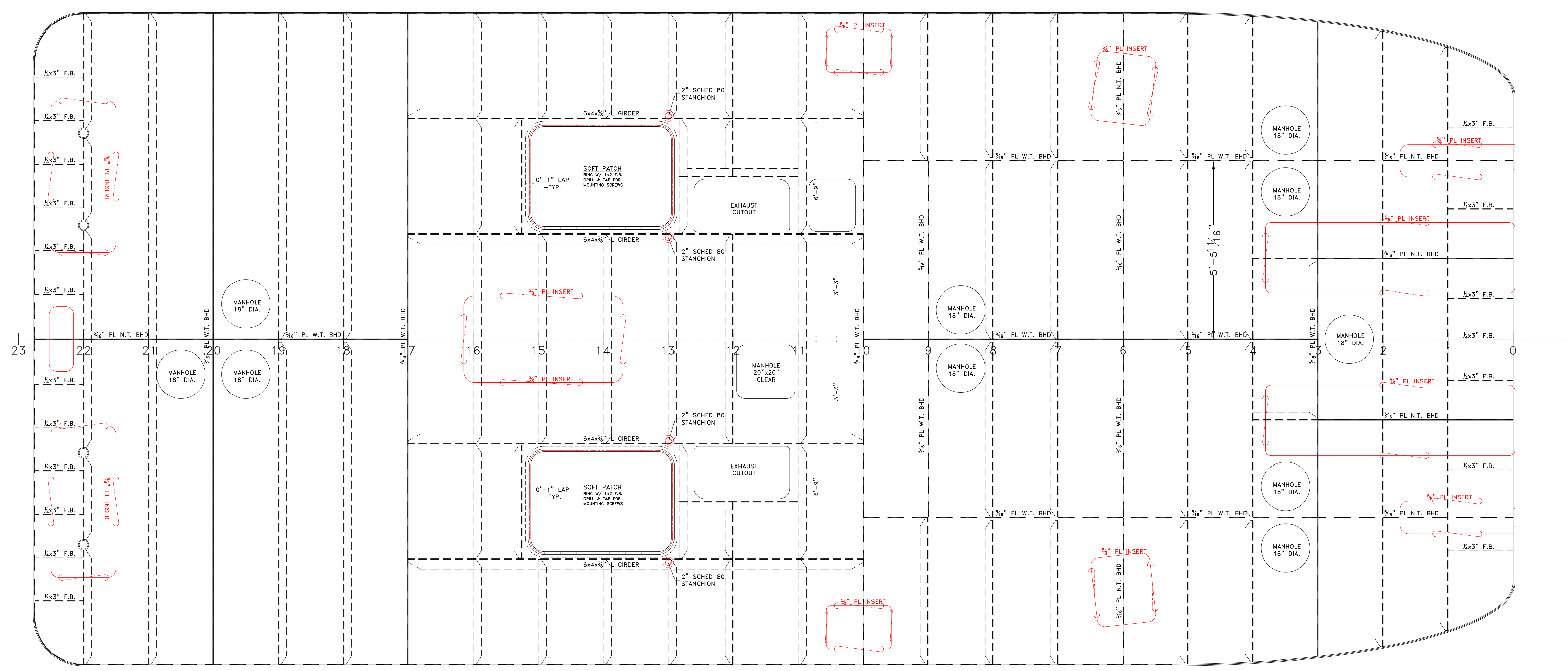
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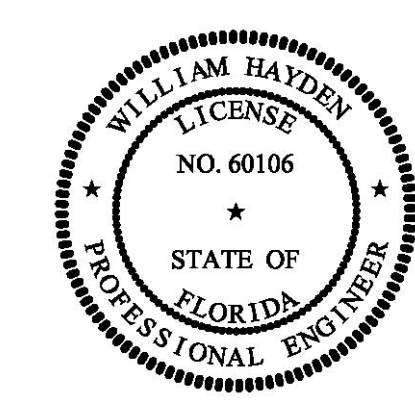
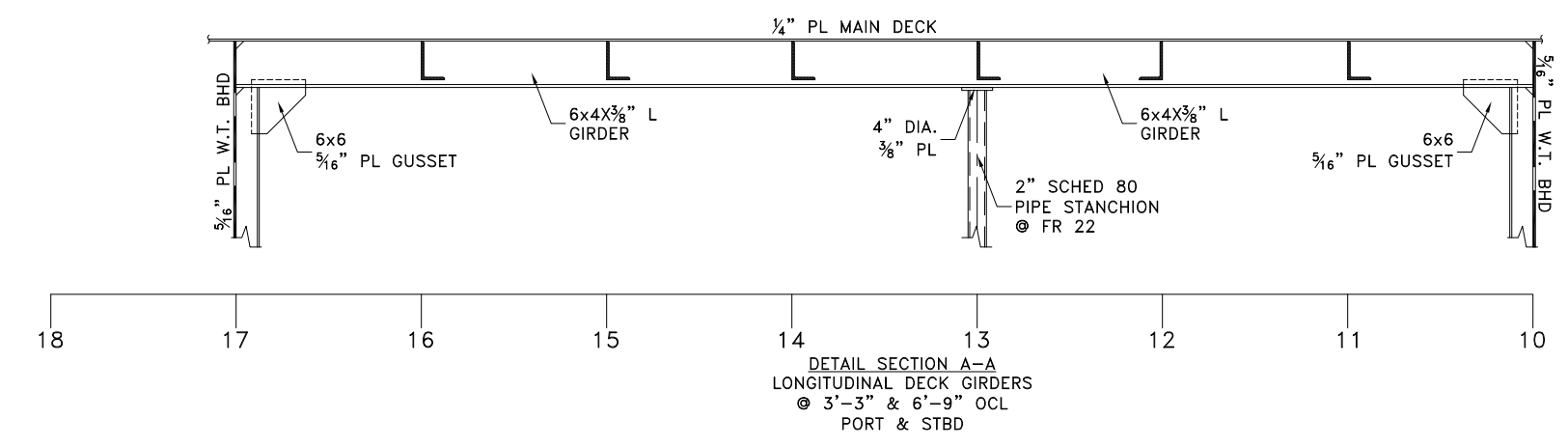
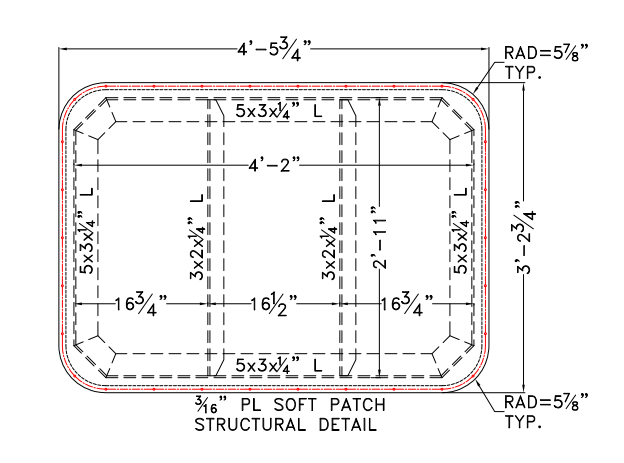
LONGITUDINAL SECTIONS

Dwg. No. **17-1393-120** Alt. No. **0**
 Sh. 1 of 1

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 ABS App'l: _____ USCG App'l: _____



MAIN DECK STRUCTURAL PLAN
 1/2" PL W/ 5x3 1/2" L XVERSE BEAMS ON 2'-0" CENTERS
 UNLESS OTHERWISE NOTED



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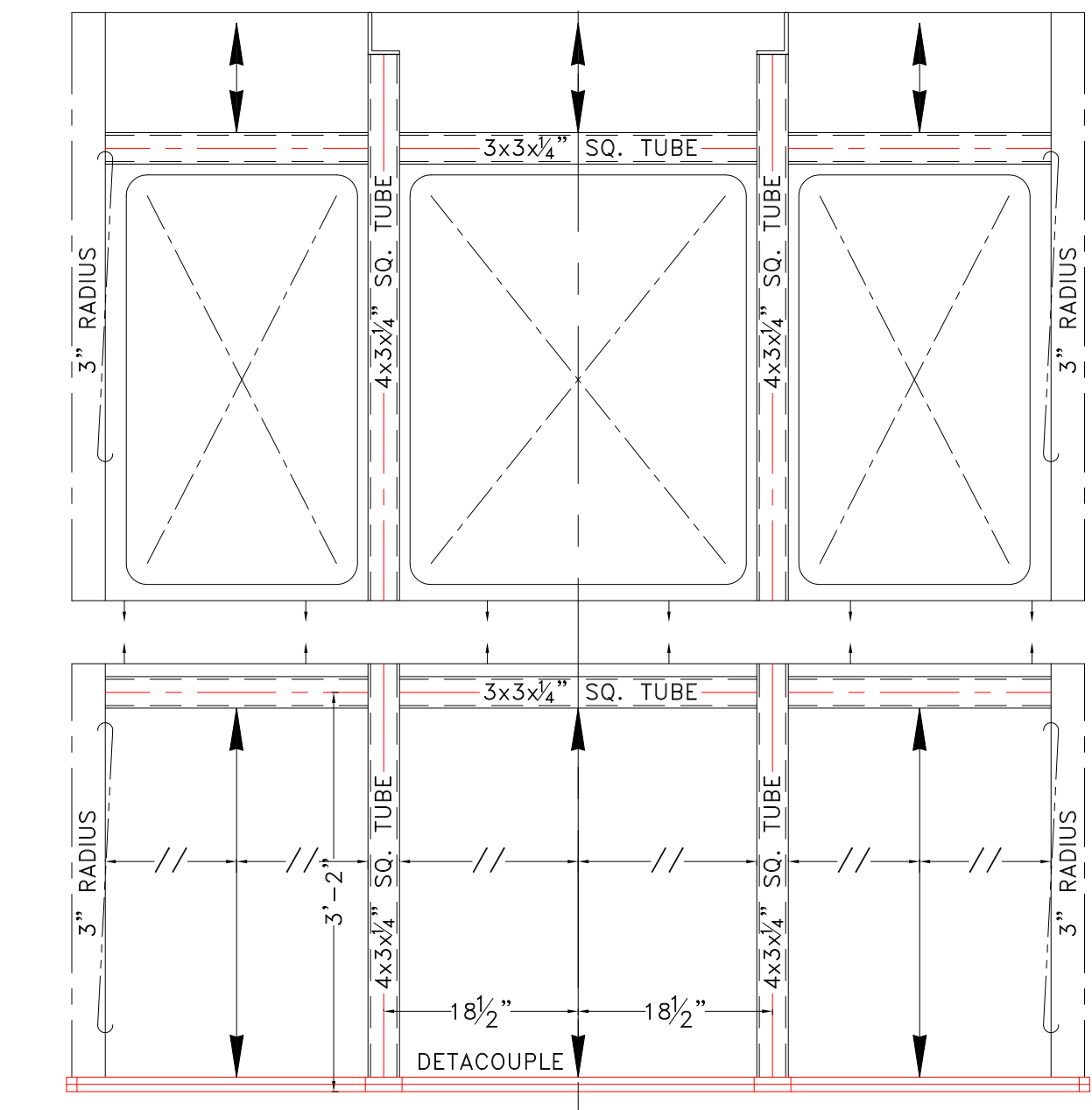
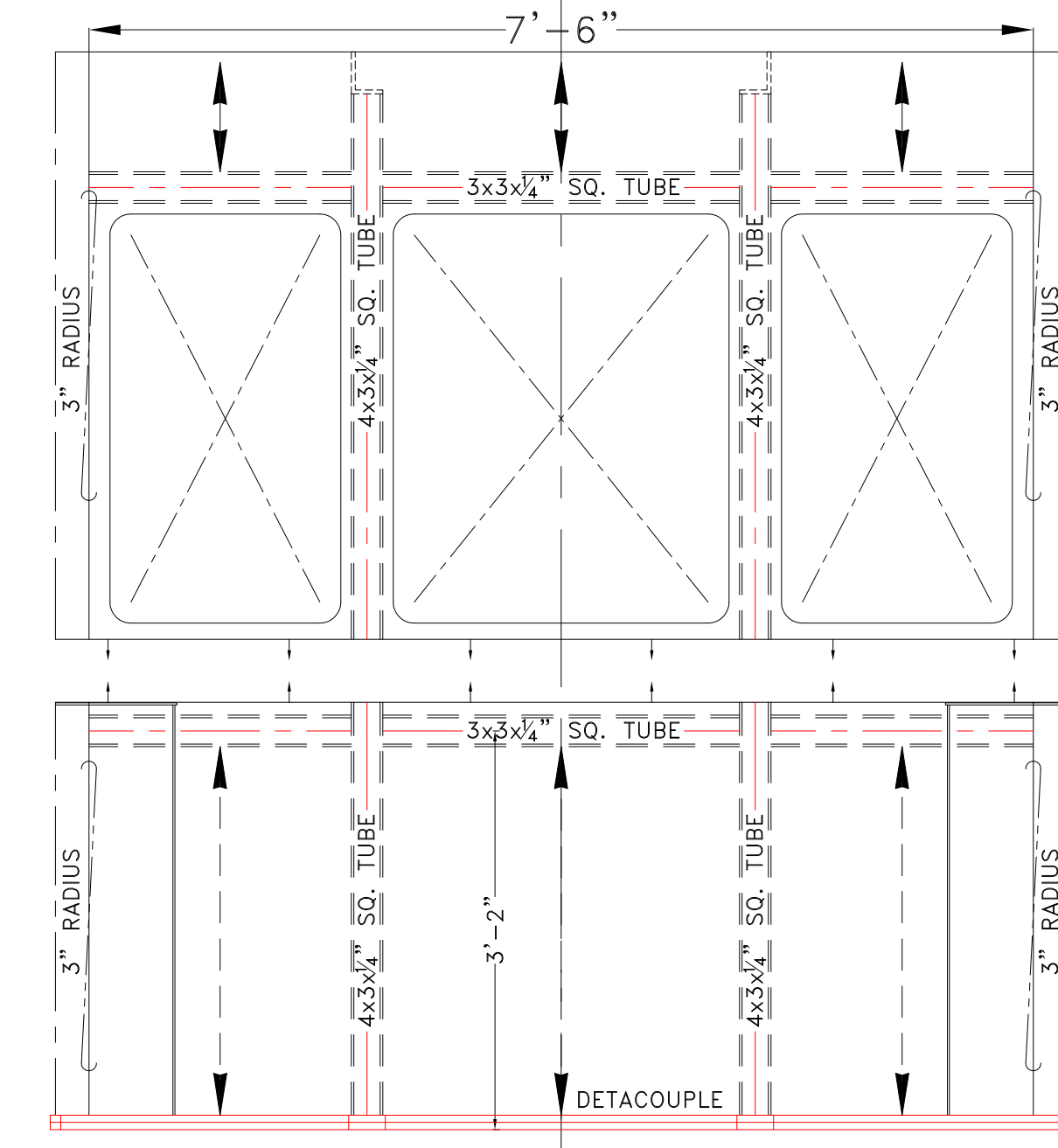
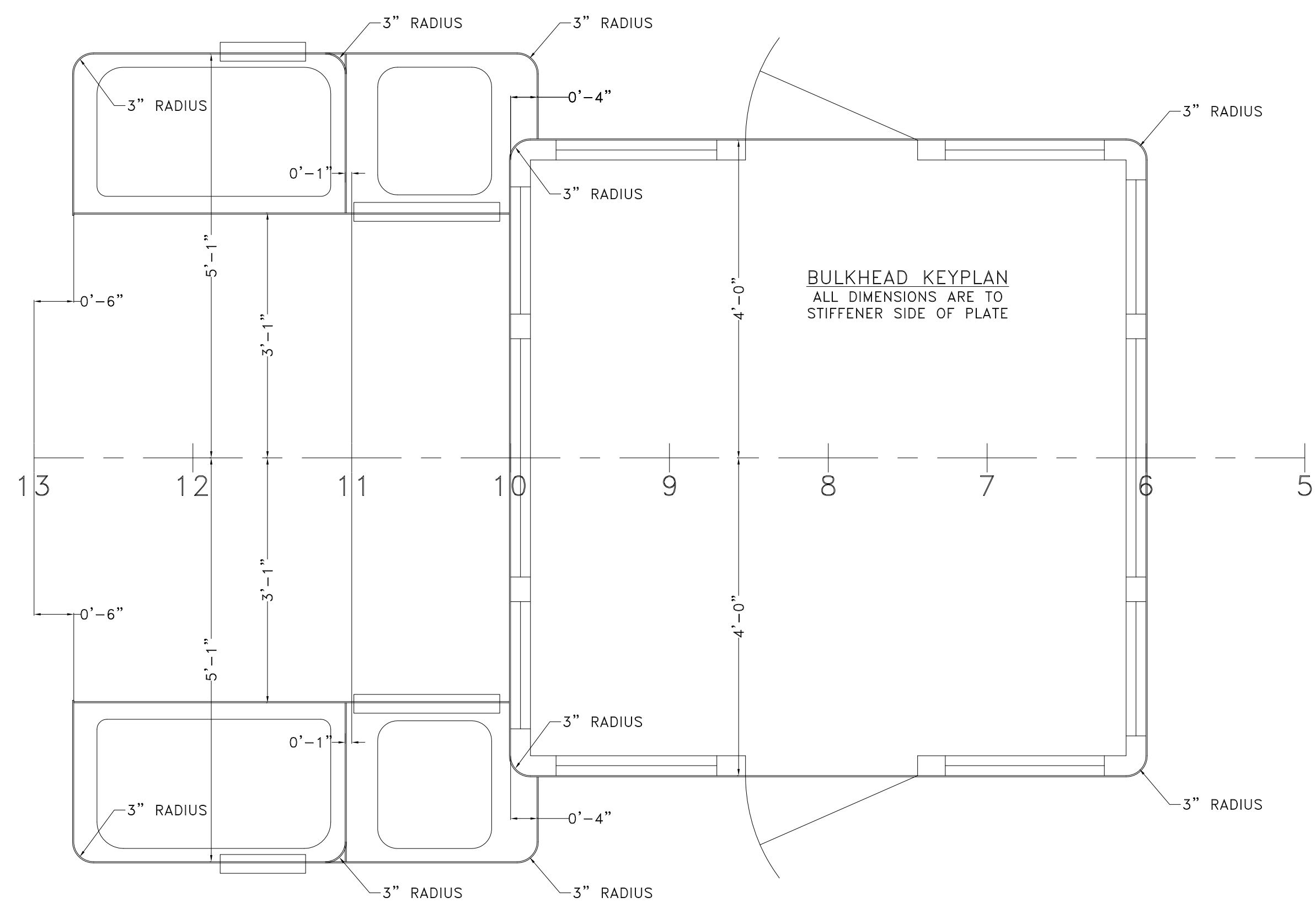
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Title: 45.5'x20'x6.5' NCDOT PUSHBOAT

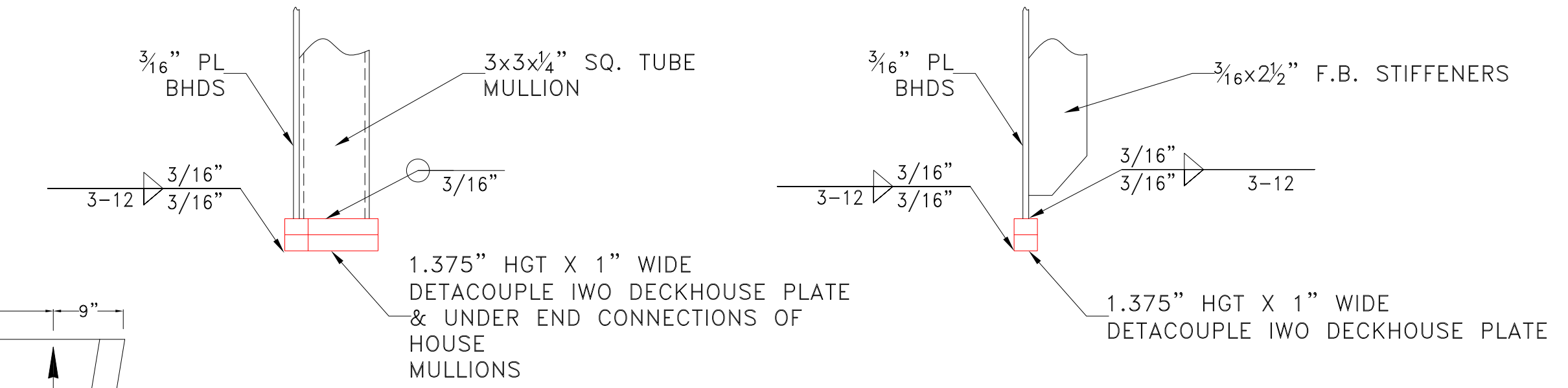
**MAIN DECK
 STRUCTURAL DETAILS**

Dwg. No. 17-1393-130 Alt. No. 0
 Sh. 1 of 1

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018
 Checked By: _____ Date: _____
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 ABS App'l: _____ USCG App'l: _____

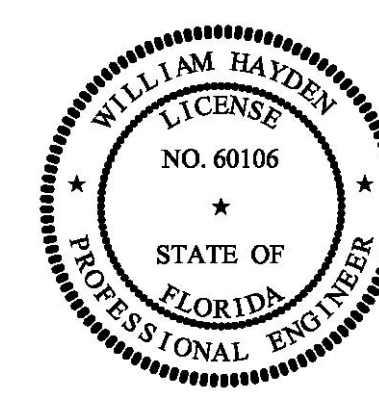
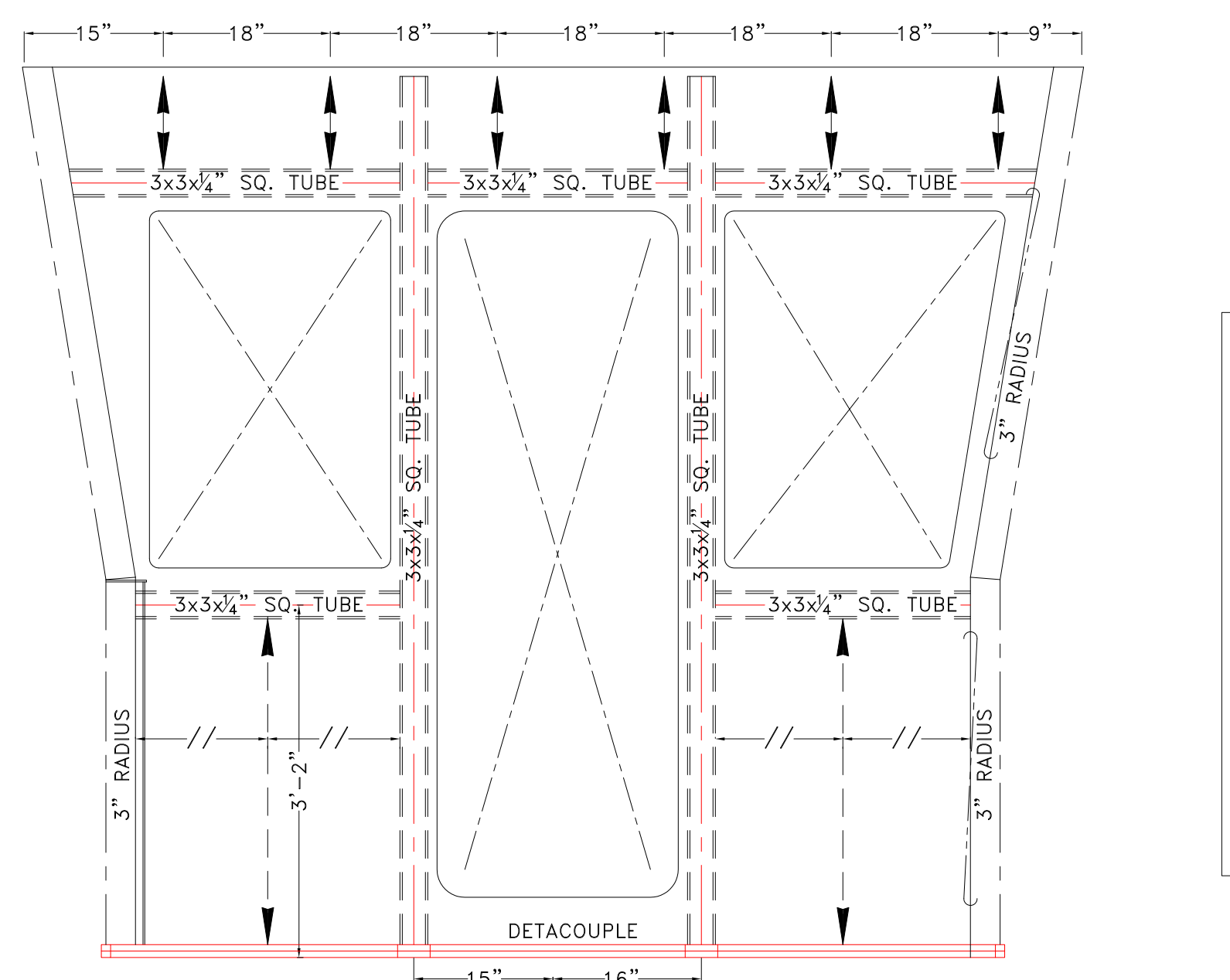
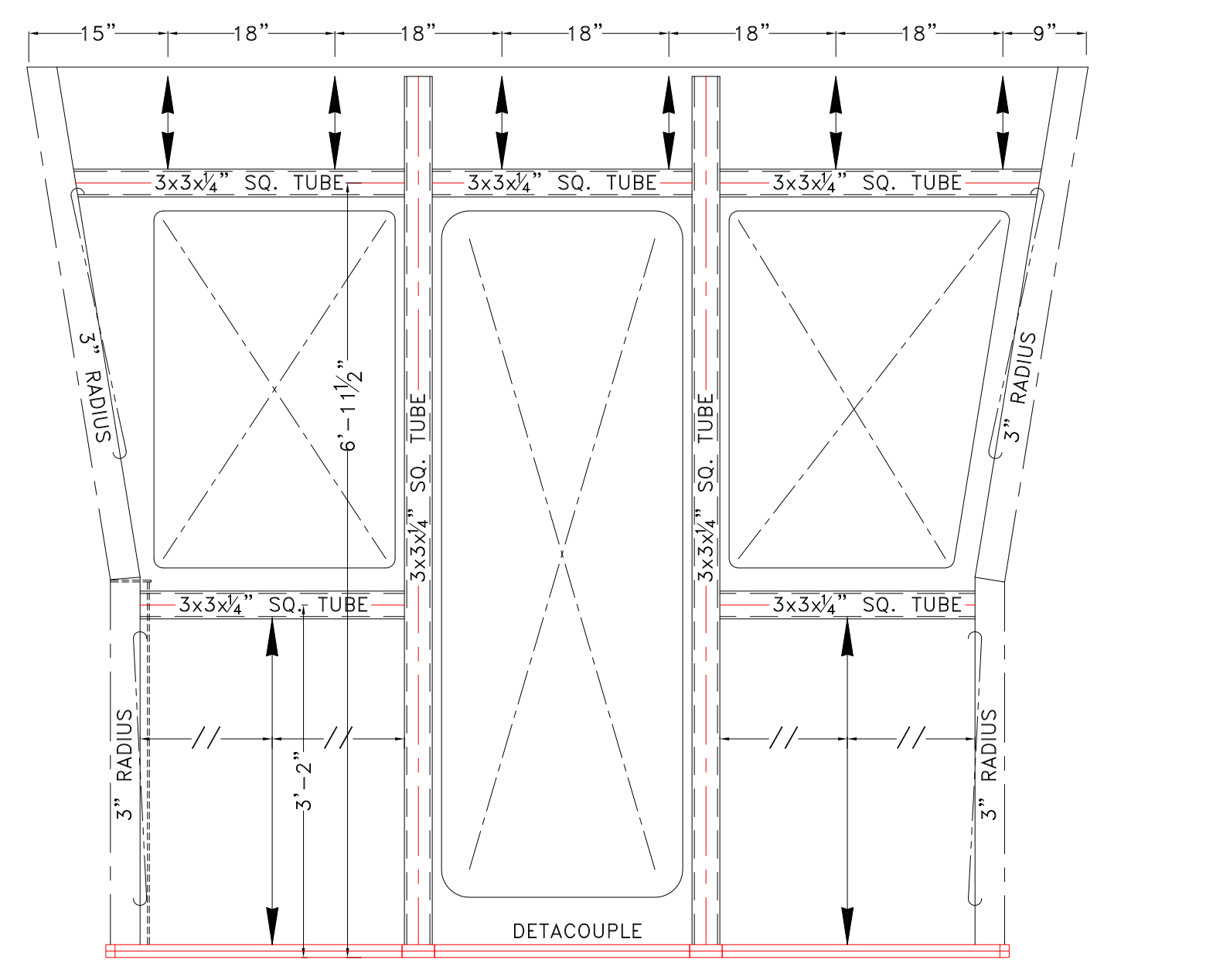


ALL DECKHOUSE CONSTRUCTION
5086 H116 AL. PLATING
6061-T6 AL. EXTRUSIONS



WELD SCHEDULE-TYPICAL

WELD DBL. CONT. @ EACH END	3/16 1/2 1/2-10	GIRDERS TO DECK PLATE
WELD DBL. CONT. @ EACH END	3/16 1/2 1/2-12	1. STIFFENERS TO DECK PLATE 2. STIFFENERS TO BHD
	3/16 1/2 1/2-12	1. CORNER BRACKETING 2. STIFFENER LAPS 3. MULLIONS @ ENDS
	3/16 1/2 1/2-12	LOWER BULKHEAD EDGE TO DECKS
	3/16 1/2 1/2-12	UPPER BULKHEAD EDGE TO DECKS



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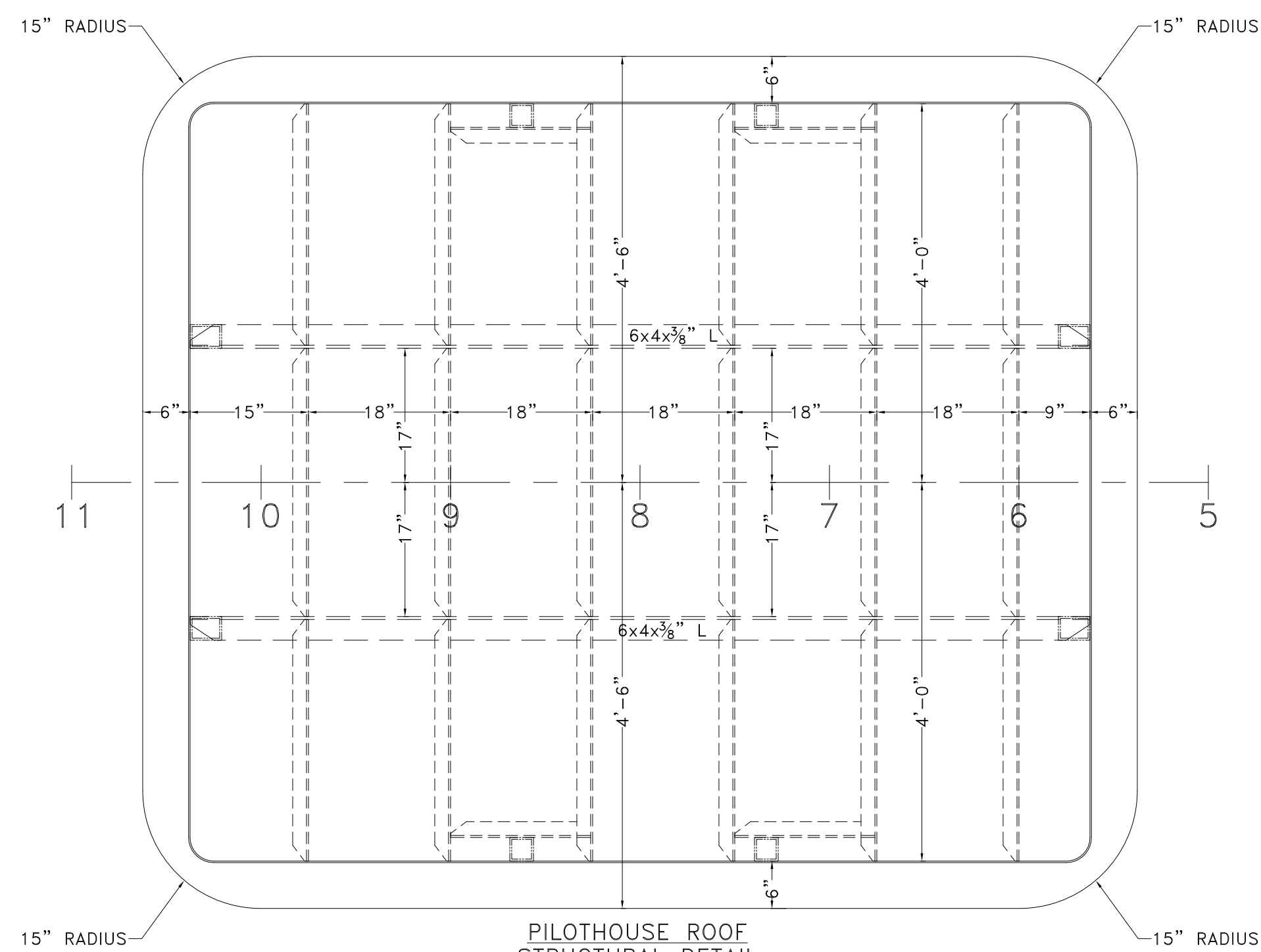
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Fax: (904) 399-1522
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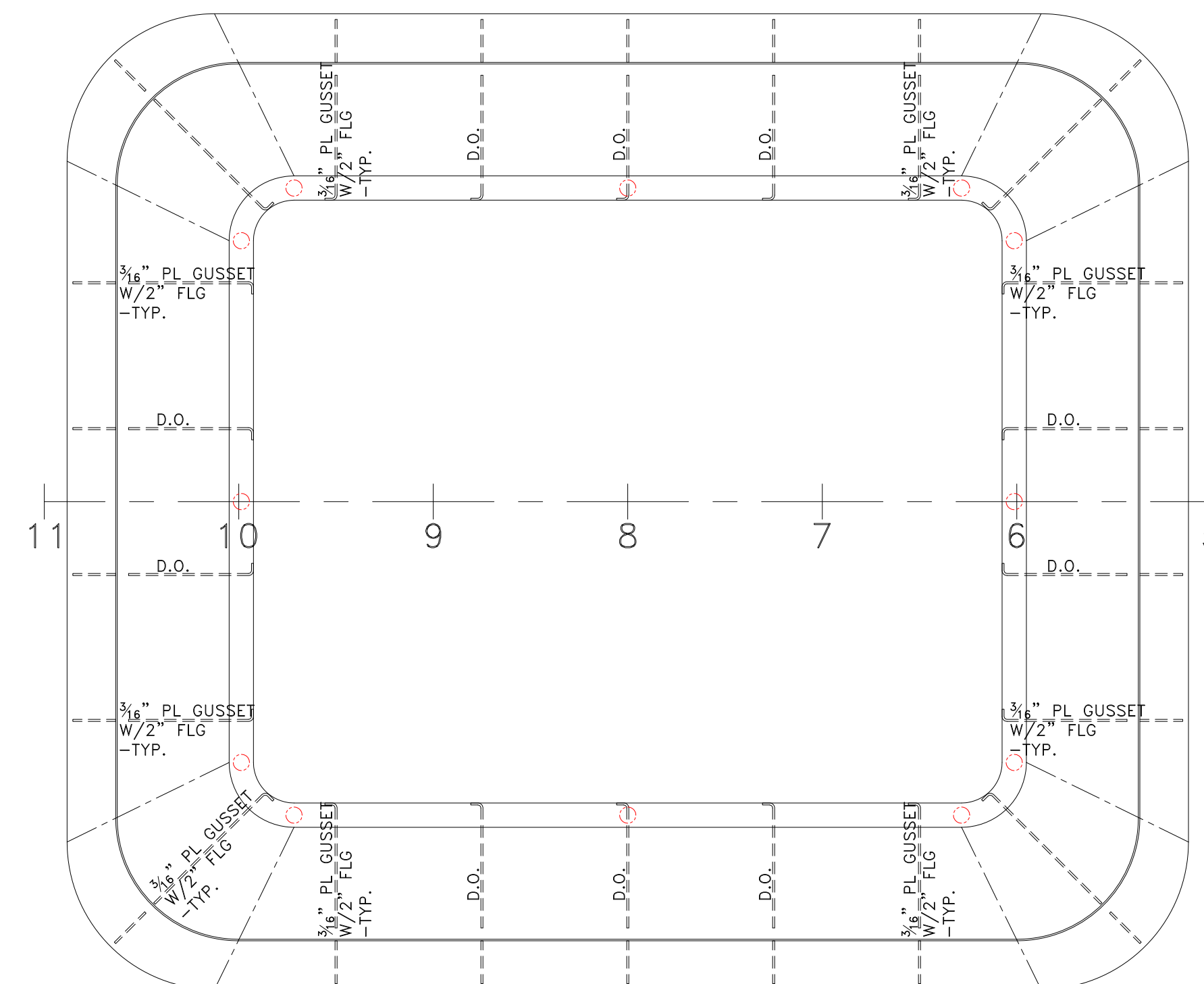
ALUMINUM PILOTHOUSE STRUCTURAL DETAILS

Dwg. No. 17-1393-152 Alt. No. 0
Sh. 1 of 3

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018
Checked By: _____ Date: _____
App'd By: _____ Scale: 3/4" = 1'-0"
ABS App'l: _____ USCG App'l: _____

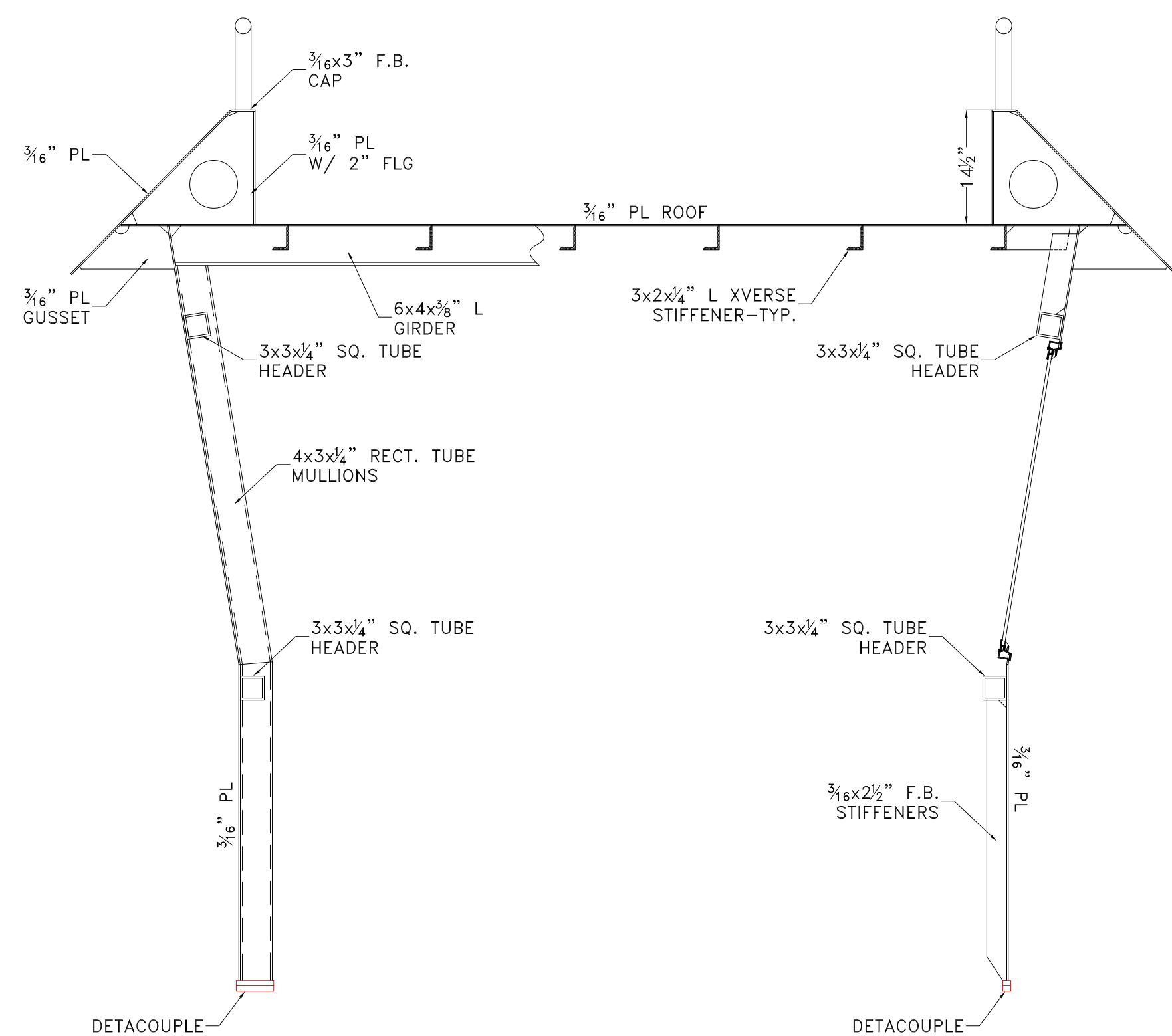


PILOTHOUSE ROOF
STRUCTURAL DETAIL
@ 8'-0" ABV MAIN DECK
3/16" PL W/ 3x2x1/4" L STIFFENERS
UNLESS OTHERWISE NOTED
SHOWN LKG DOWN

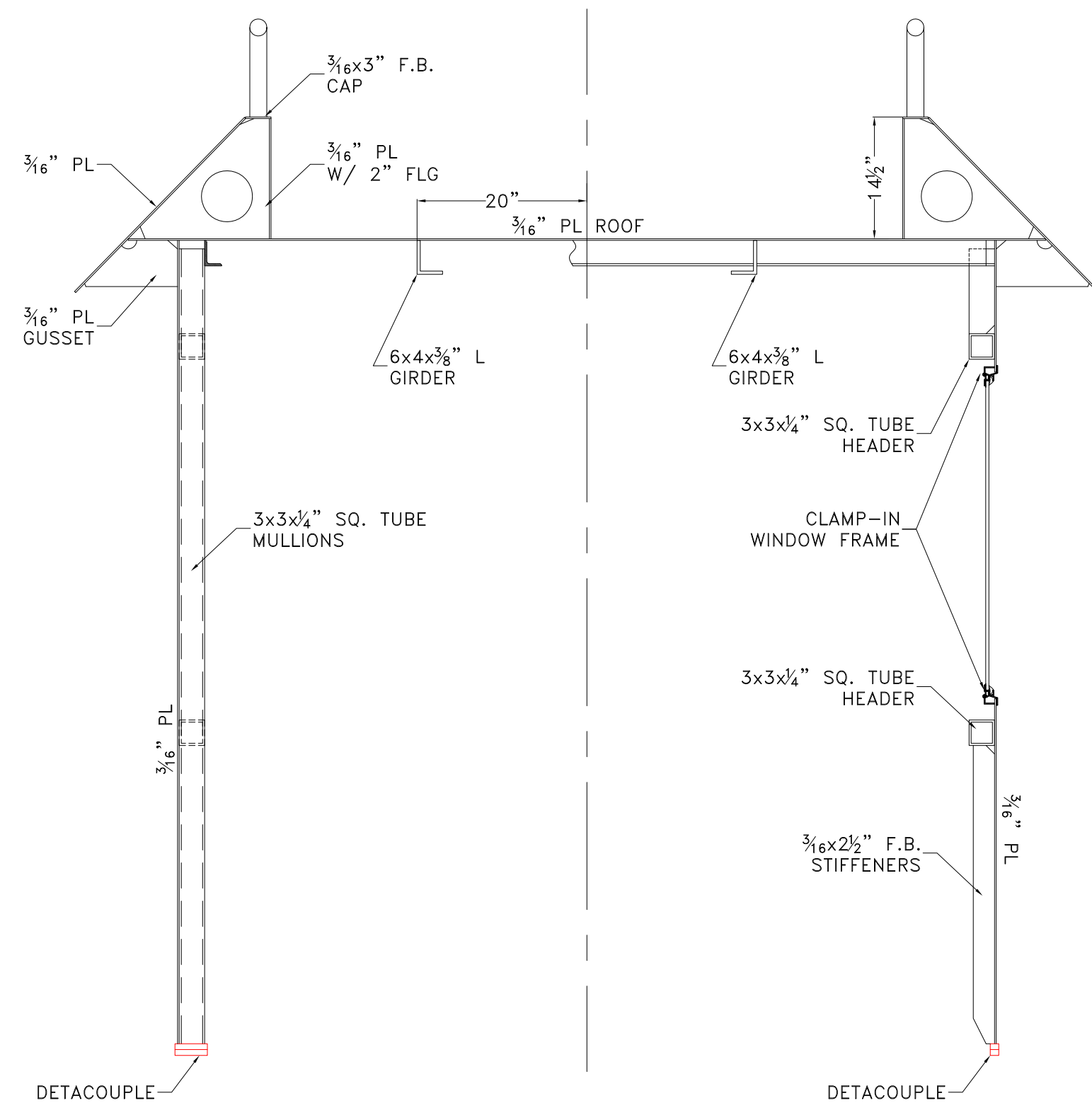


PILOTHOUSE ROOF
COAMING DETAIL
3/16" PL W/ 3/16" PL GUSSET FRAMES
UNLESS OTHERWISE NOTED
SHOWN LKG DOWN

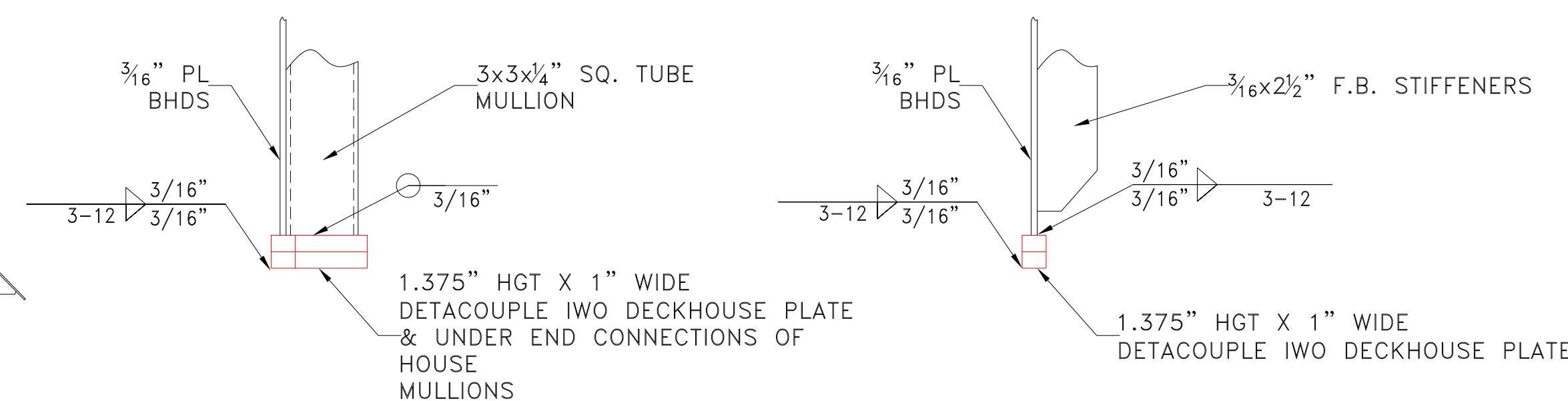
ALL DECKHOUSE CONSTRUCTION
5086 H116 AL. PLATING
6061-T6 AL. EXTRUSIONS



PILOTHOUSE
TYPICAL LONGITUDINAL
SECTION DETAIL



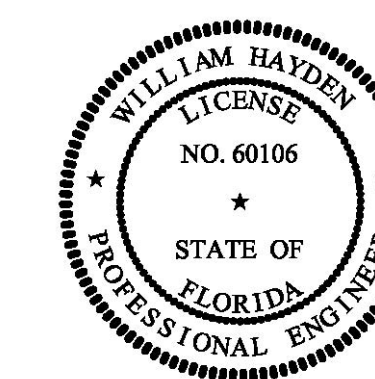
PILOTHOUSE
TYPICAL XVERSE
SECTION DETAIL



DETACOUPLE DETAILS
@ MAIN DECK

WELD SCHEDULE-TYPICAL

WELD DBL. CONT. FOR 6 @ EACH END		GIRDERS TO DECK PLATE
WELD DBL. CONT. FOR 3 @ EACH END		1. STIFFENERS TO DECK PLATE 2. STIFFENERS TO BHDS
		1. CORNER BRACKETING 2. STIFFENER LAPS 2. MULLIONS @ ENDS
		LOWER BULKHEAD EDGE TO DECKS
		UPPER BULKHEAD EDGE TO DECKS



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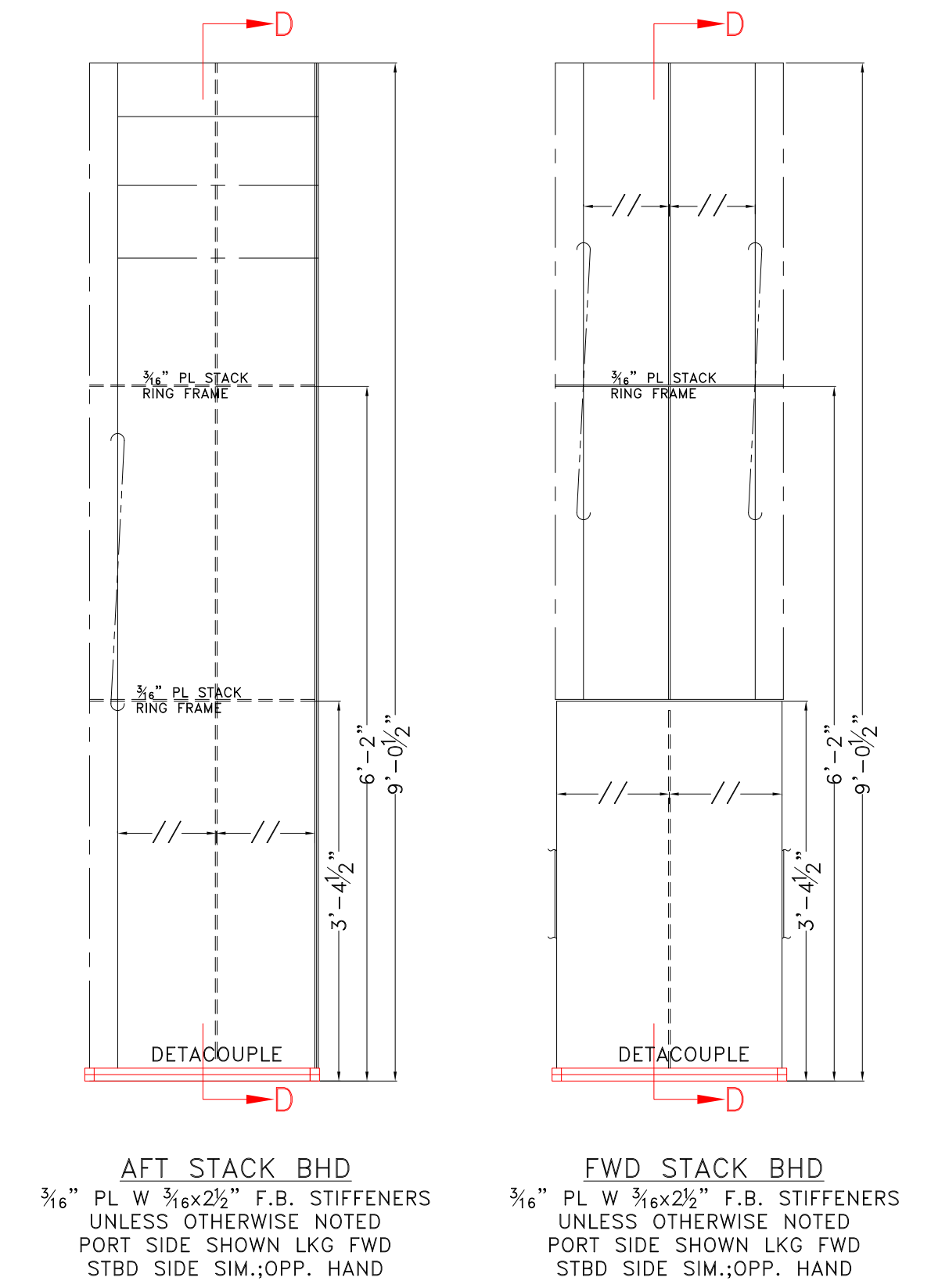
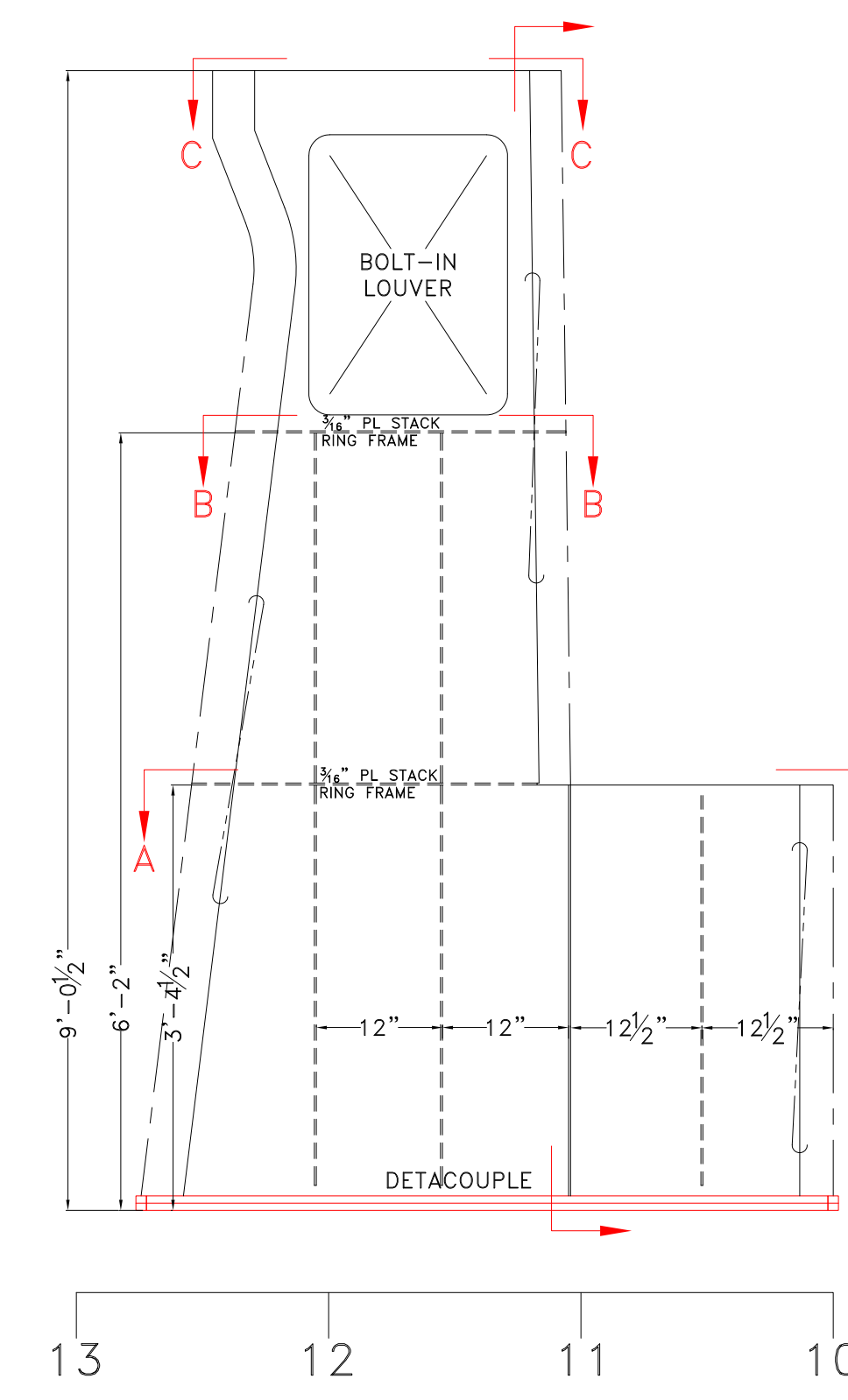
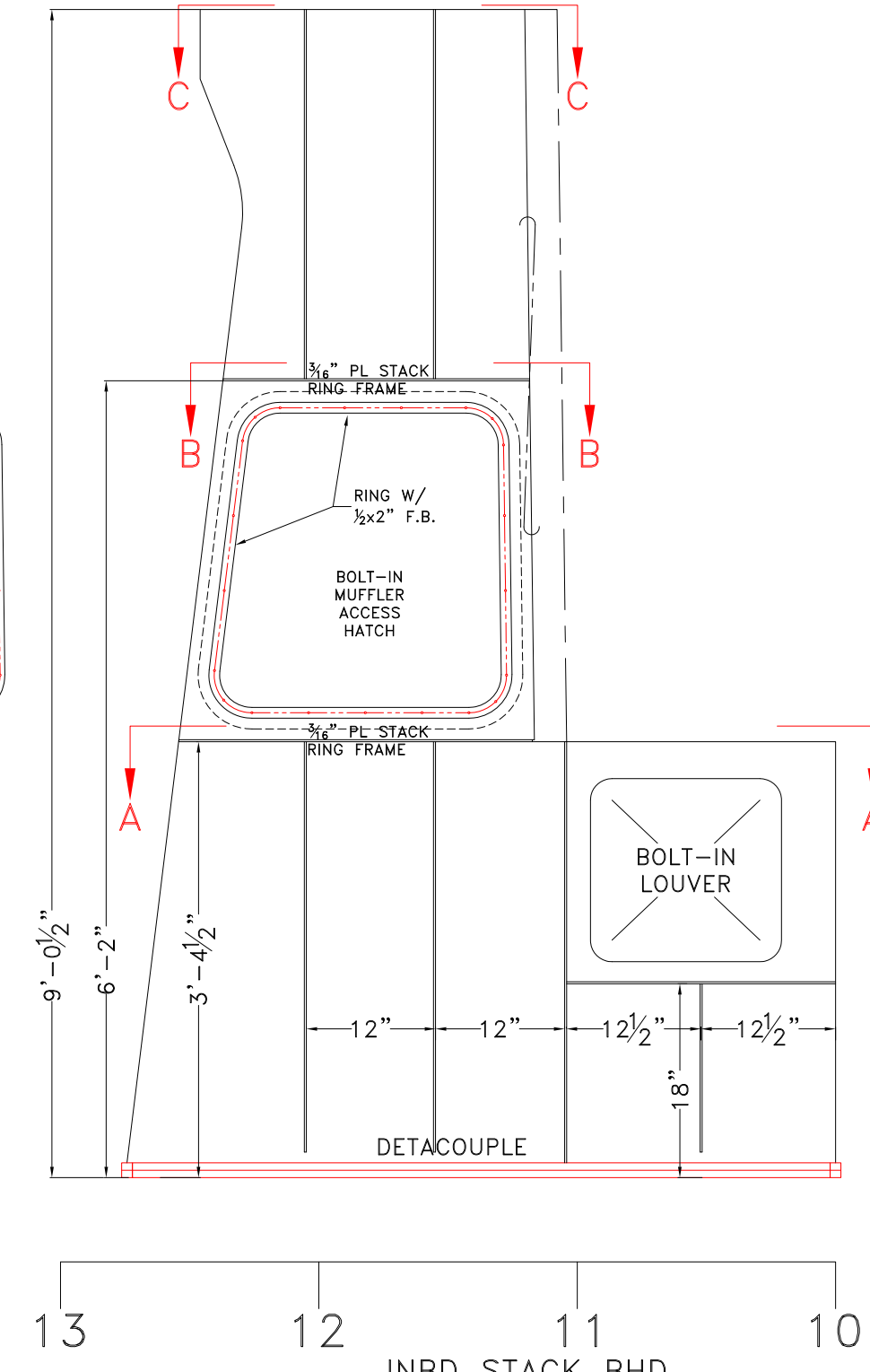
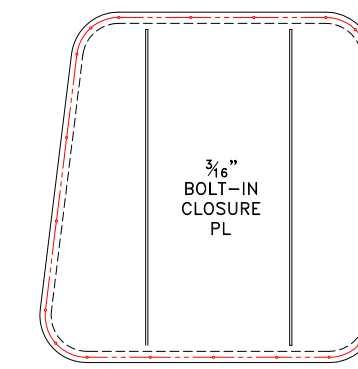
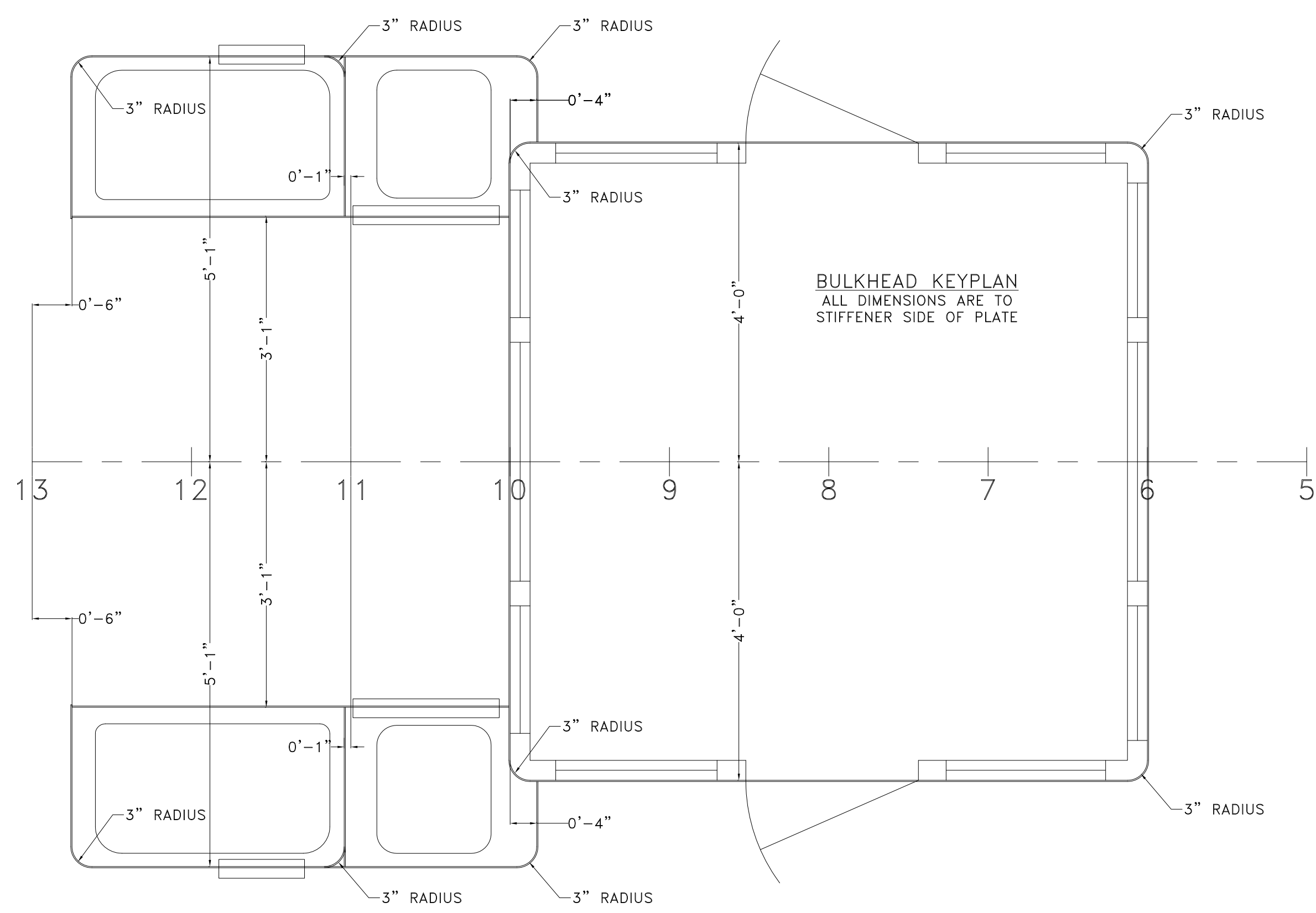
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Title: 45.5'x20'x6.5' NCDOT PUSHBOAT

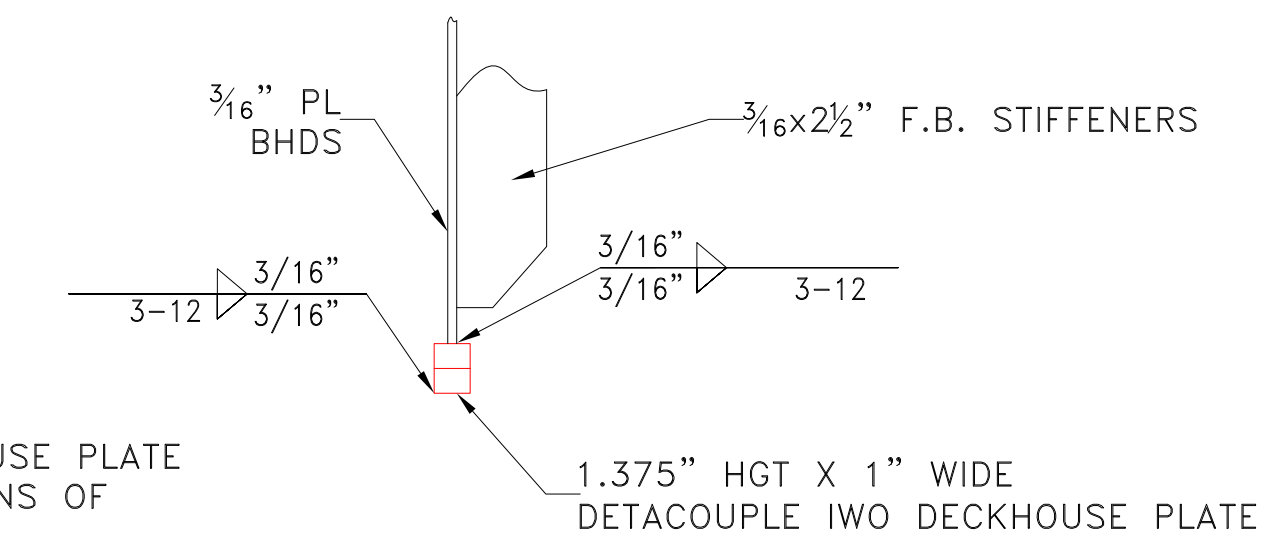
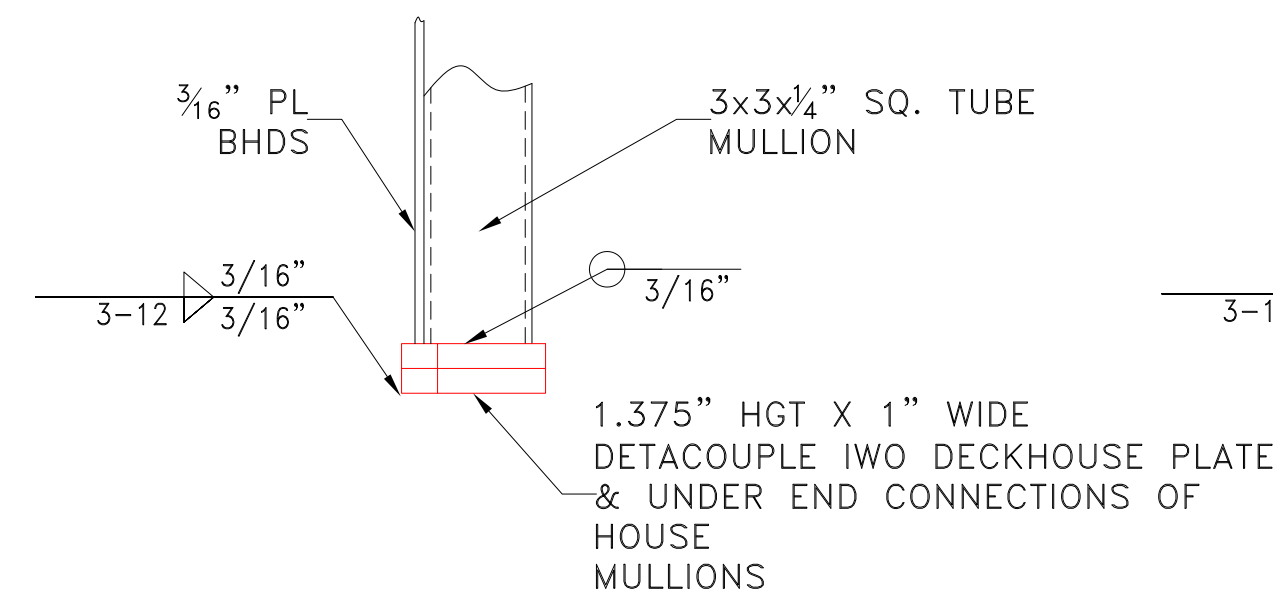
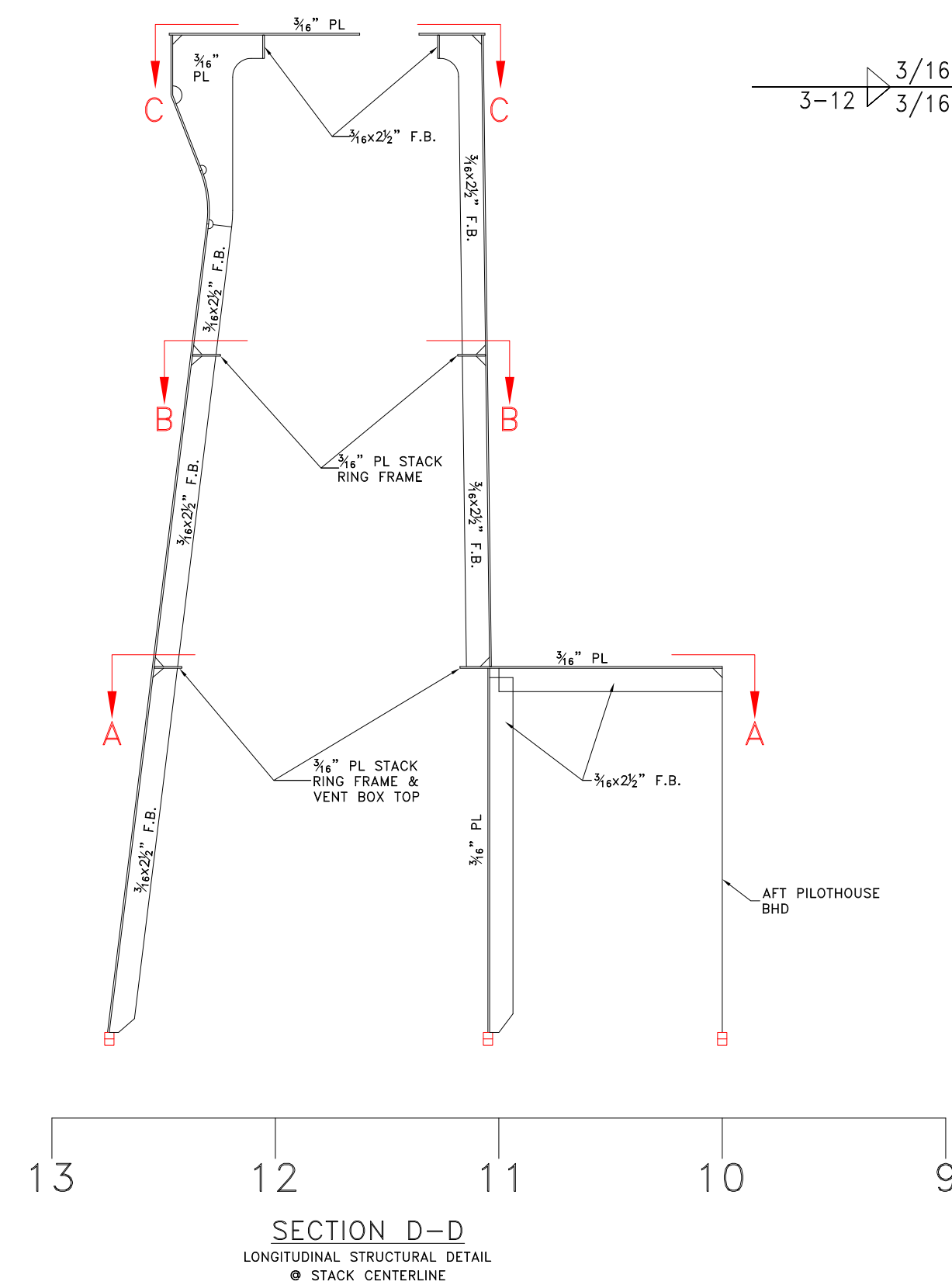
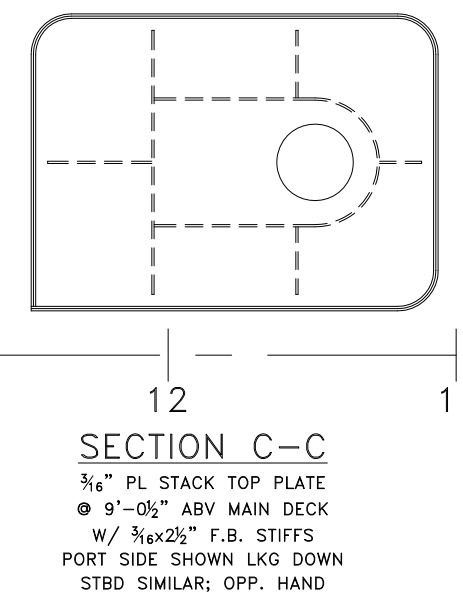
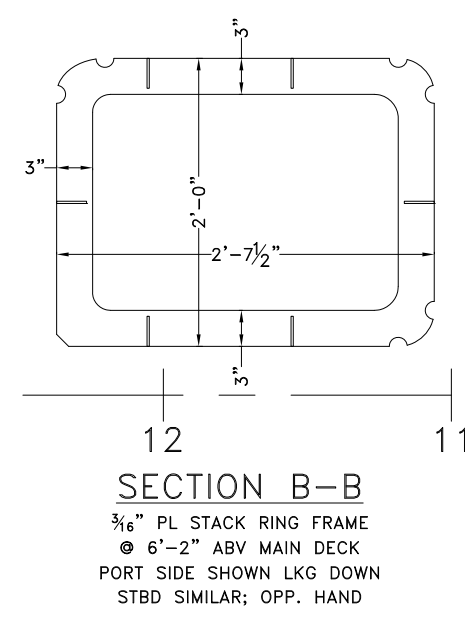
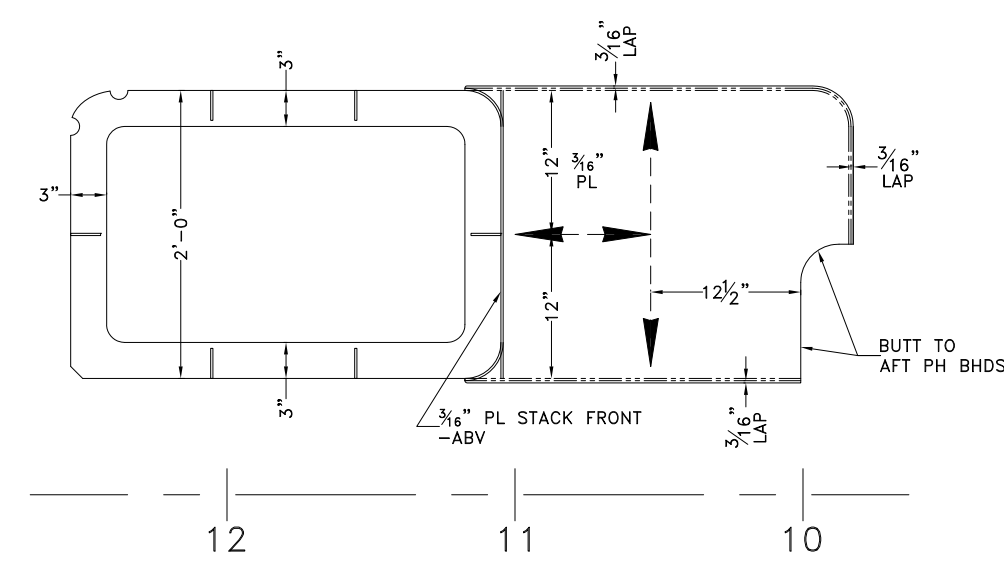
**ALUMINUM DECKHOUSE
ROOF & COAMING DETAILS**

Dwg. No. 17-1393-152 Alt. No. 0
Sh. 2 of 3

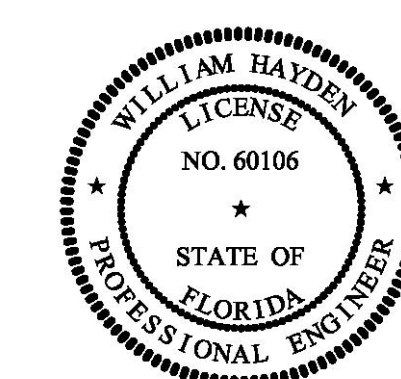
Drawn By: JACOB CONNALLY Date: JUNE 05, 2018
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ALL DECKHOUSE CONSTRUCTION
5086 H116 AL. PLATING
6061-T6 AL. EXTRUSIONS



DETACOUPLE DETAILS
@ MAIN DECK



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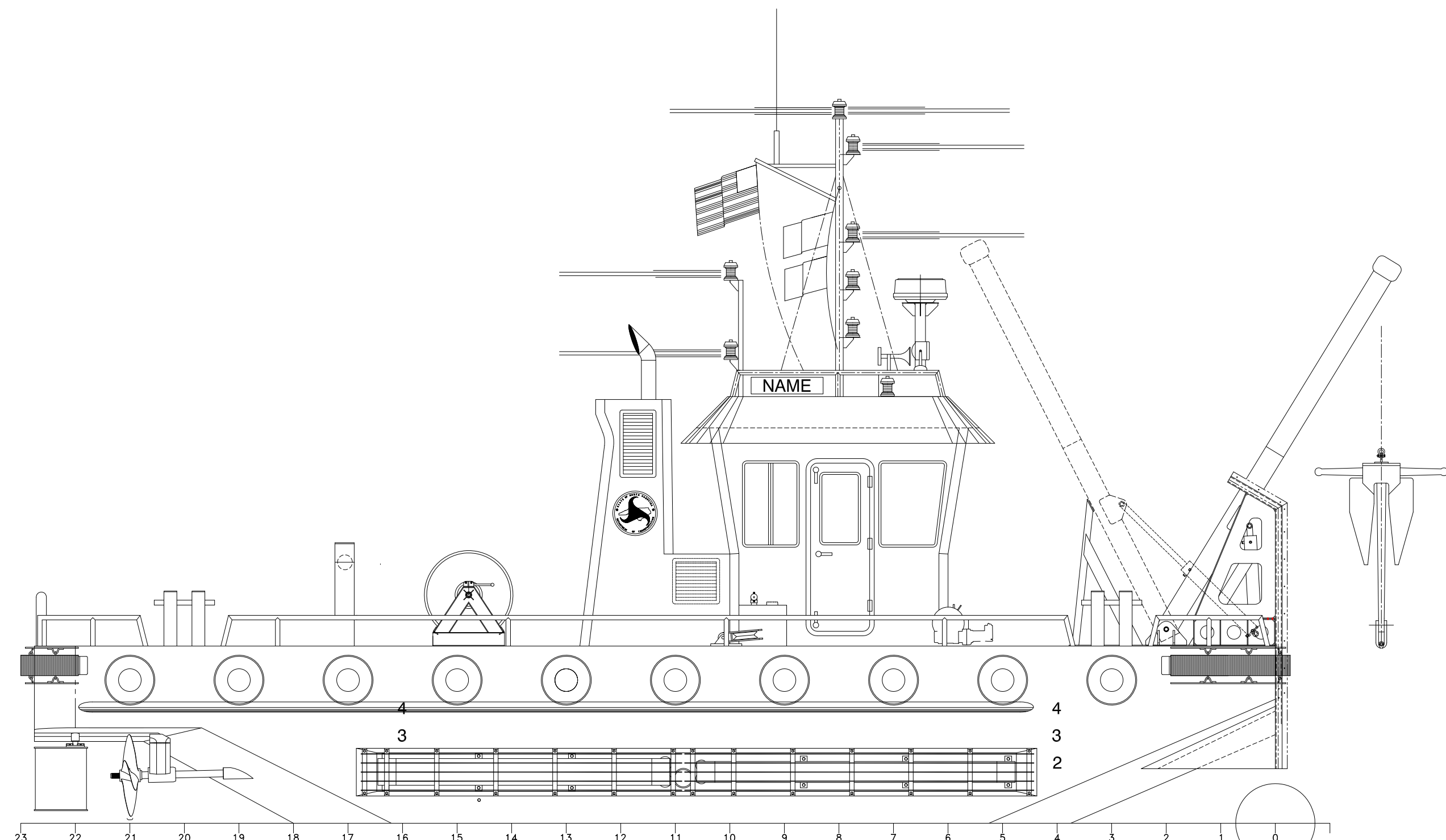
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Title: 45.5'x20'x6.5' NCDOT PUSHBOAT

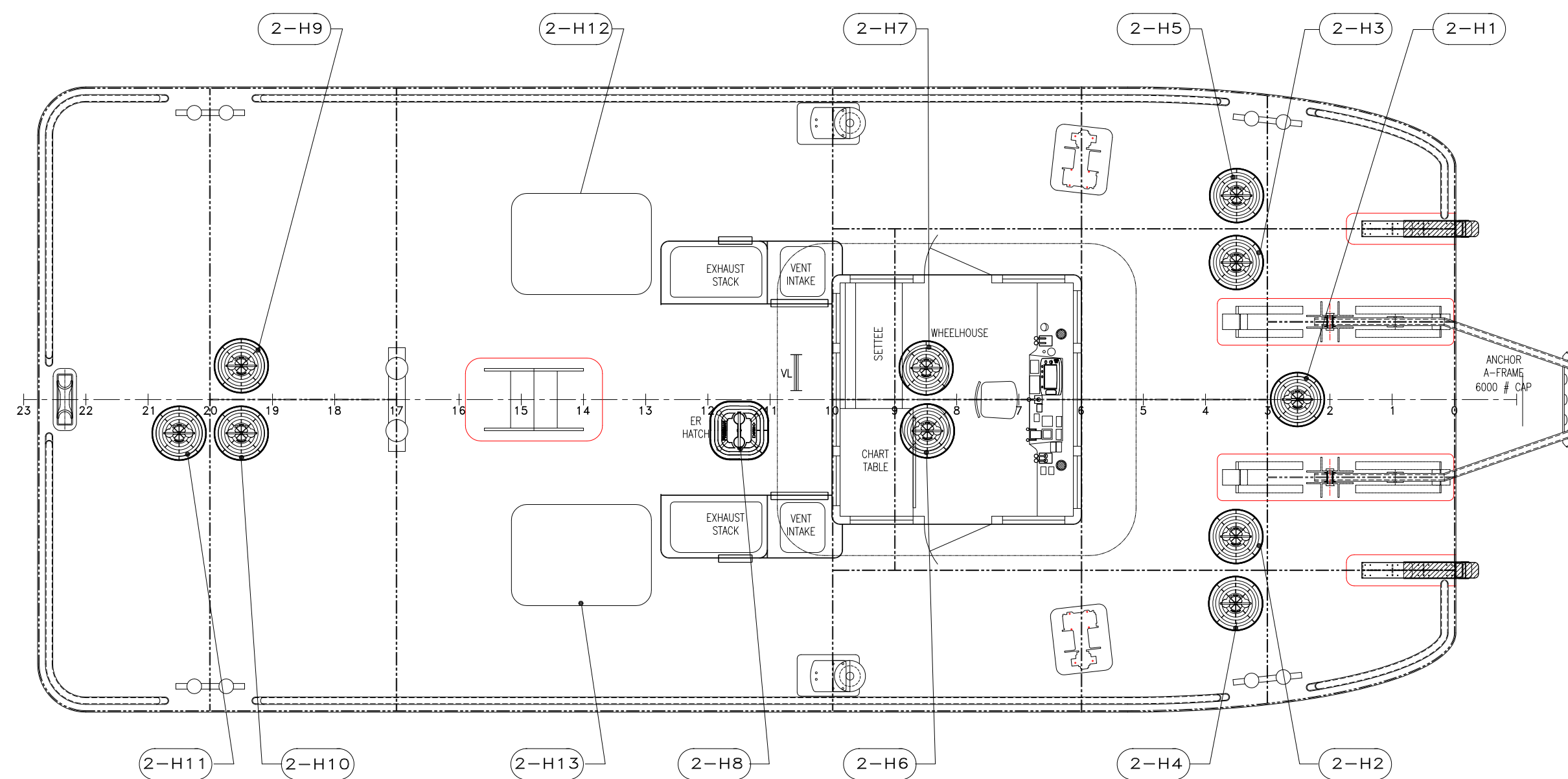
ALUMINUM STACK STRUCTURAL DETAILS

Dwg. No. 17-1393-152 Alt. No. 0
Sh. 3 of 3

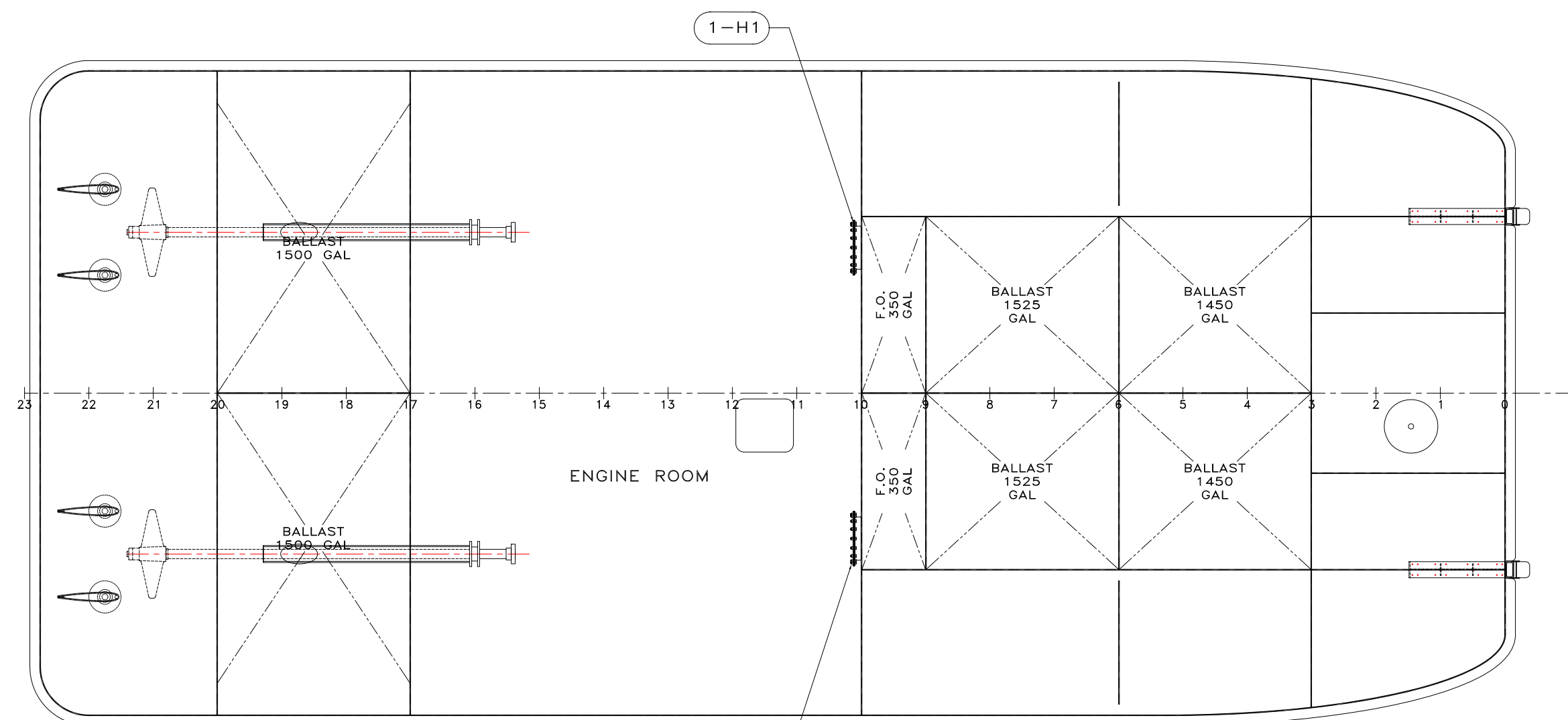
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OUTBOARD PROFILE



MAIN DECK



HOLD

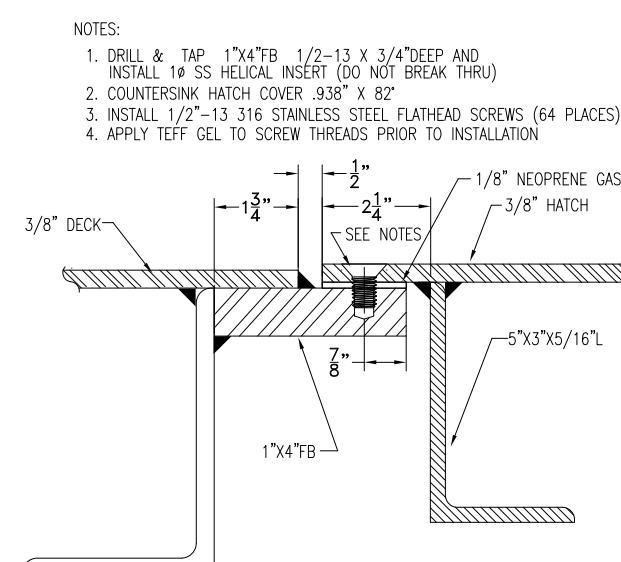
HATCH SCHEDULE

HOLD

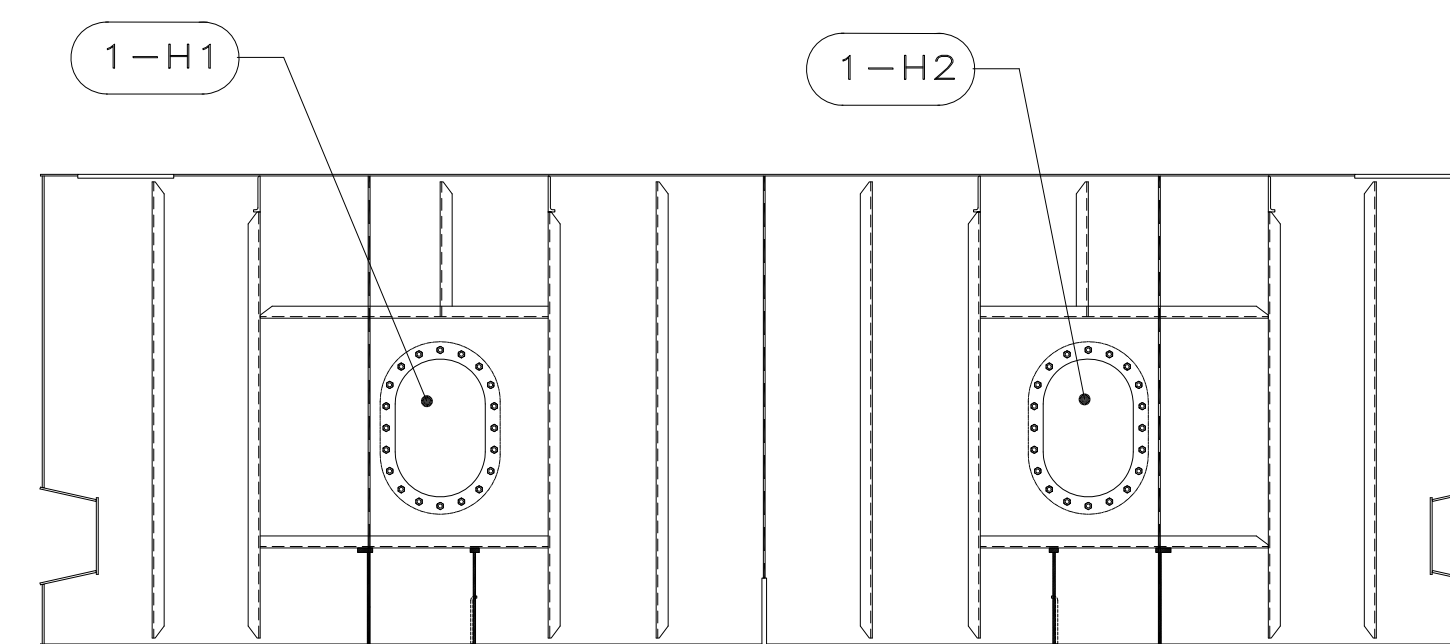
ITEM	SIZE	DESCRIPTION	COMPARTMENT	LOCATION	PART NUMBER	MANUFACTURER	MATERIAL	COAMING	REMARKS
1-H1	15"X23"	HATCH, RAISED, MULTIBOLT, OILTIGHT	ENGINE ROOM	F.O. TANK, STBD	302	FREEMAN	STEEL	2.5"	
1-H2	15"X23"	HATCH, RAISED, MULTIBOLT, OILTIGHT	ENGINE ROOM	F.O. TANK, STBD	302	FREEMAN	STEEL	2.5"	

MAIN DECK

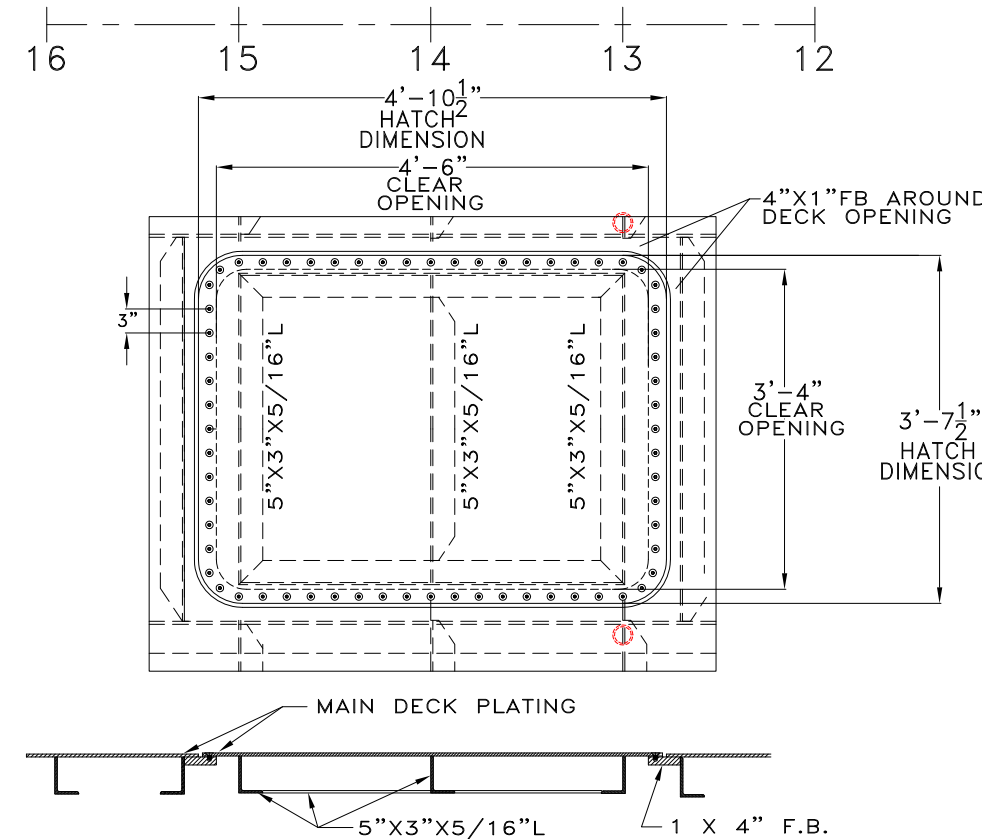
2-H1	Ø18"	HATCH, FLUSH, WATERTIGHT, SINGLE BOLT	FOREPEAK	MAIN DECK BOW	2105-0003-0001	FREEMAN	ALUM./STEEL		
2-H2	Ø18"	HATCH, WATERTIGHT, Q.A. . STEEL RING	BALLAST #1S TANK	MAIN DECK FWD STBD	2105-0003-0001	FREEMAN	ALUM./STEEL		
2-H3	Ø18"	HATCH, WATERTIGHT, Q.A. . STEEL RING	BALLAST #1P TANK	MAIN DECK FWD PORT	2105-0003-0001	FREEMAN	ALUM./STEEL		
2-H4	Ø18"	HATCH, WATERTIGHT, Q.A. . STEEL RING	FWD STBD VOID	MAIN DECK FWD STBD	2105-0003-0001	FREEMAN	ALUM./STEEL		
2-H5	Ø18"	HATCH, WATERTIGHT, Q.A. . STEEL RING	FWD PORT VOID	MAIN DECK FWD PORT	2105-0003-0001	FREEMAN	ALUM./STEEL		
2-H6	Ø18"	HATCH, WATERTIGHT, Q.A. . STEEL RING	BALLAST #2S TANK	INSIDE WHEELHOUSE	2105-0003-0001	FREEMAN	ALUM./STEEL		
2-H7	Ø18"	HATCH, WATERTIGHT, Q.A. . STEEL RING	BALLAST #2P TANK	INSIDE WHEELHOUSE	2105-0003-0001	FREEMAN	ALUM./STEEL		
2-H8	20" SQUARE	HATCH, WATERTIGHT, Q.A. . STEEL RING	ENGINE ROOM ACCESS	BETWEEN STACKS	2422-0003	FREEMAN	ALUM./STEEL		
2-H9	Ø18"	HATCH, WATERTIGHT, Q.A. . STEEL RING	BALLAST #3P TANK	AFT DECK	2105-0003-0001	FREEMAN	ALUM./STEEL		
2-H10	Ø18"	HATCH, WATERTIGHT, Q.A. . STEEL RING	BALLAST #3P TANK	AFT DECK	2105-0003-0001	FREEMAN	ALUM./STEEL		
2-H11	Ø18"	HATCH, WATERTIGHT, Q.A. . STEEL RING	STEERING COMP. VOID	STERN DECK	2105-0003-0001	FREEMAN	ALUM./STEEL		
2-H12	Ø18"	HATCH, MAIN ENGINE PORT	ENGINE ROOM	AFT DECK			STEEL		SEE DETAIL 2-H12 & 2-H12A
2-H13	Ø18"	HATCH, MAIN ENGINE STBD	ENGINE ROOM	AFT DECK			STEEL		SEE DETAIL 2-H12 & 2-H12A



DETAIL 2-H12A
MAIN DECK ENGINE HATCHES
SCALE: 3" = 1'-0"



FRAME 10
FUEL TANK MANHOLES
SCALE: 3/8" = 1'-0"



DETAIL 2-H12
MAIN DECK HATCHES (2 EA)
SCALE: 1/2" = 1'-0"
MATERIAL: A36 STEEL

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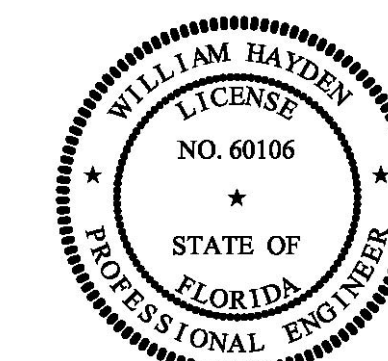
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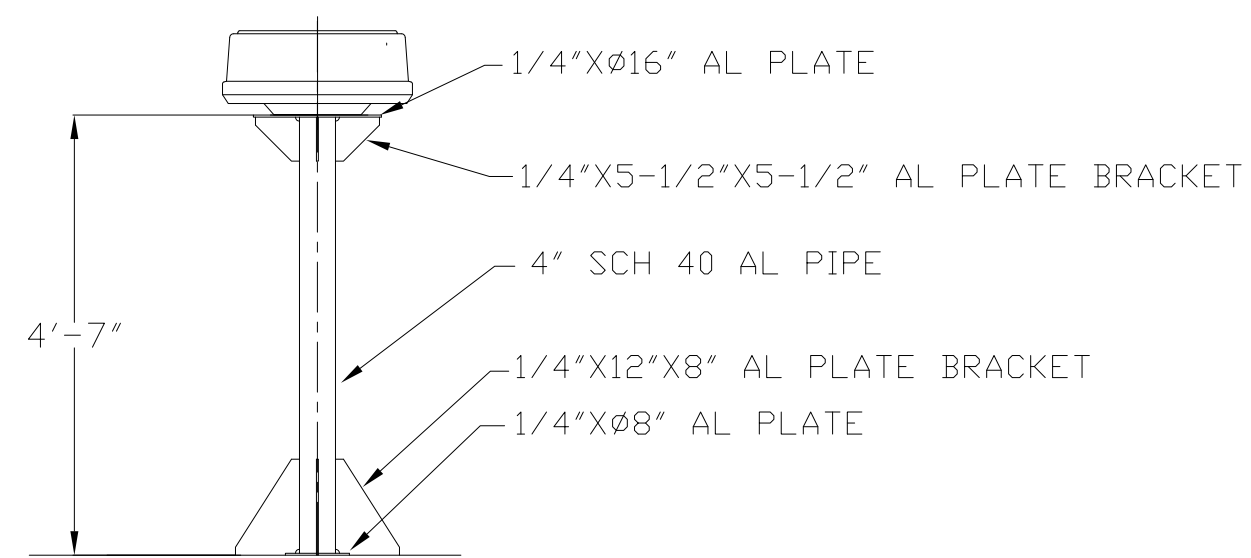
Title: 45.5'x20'x6.5' NCDOT PUSHBOAT

HATCHES & MANHOLES

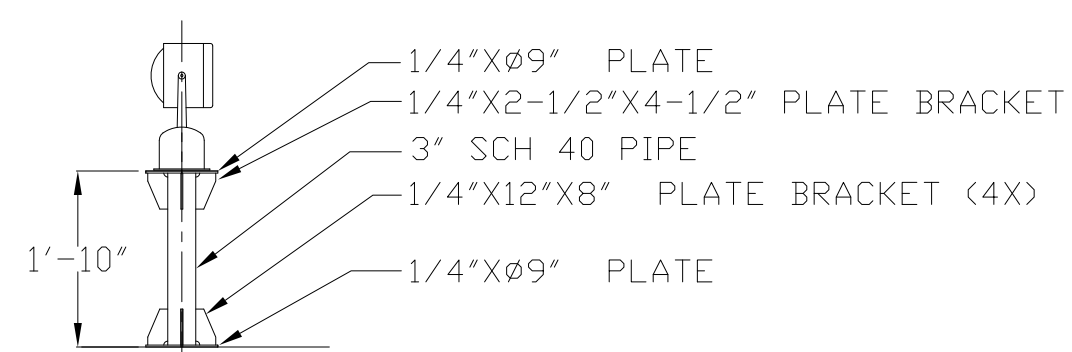
Dwg. No. 17-1393-167
Alt. No. 0
Sht. 1 of 1

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018
Checked By: Date:
App'd By: Scale: AS NOTED
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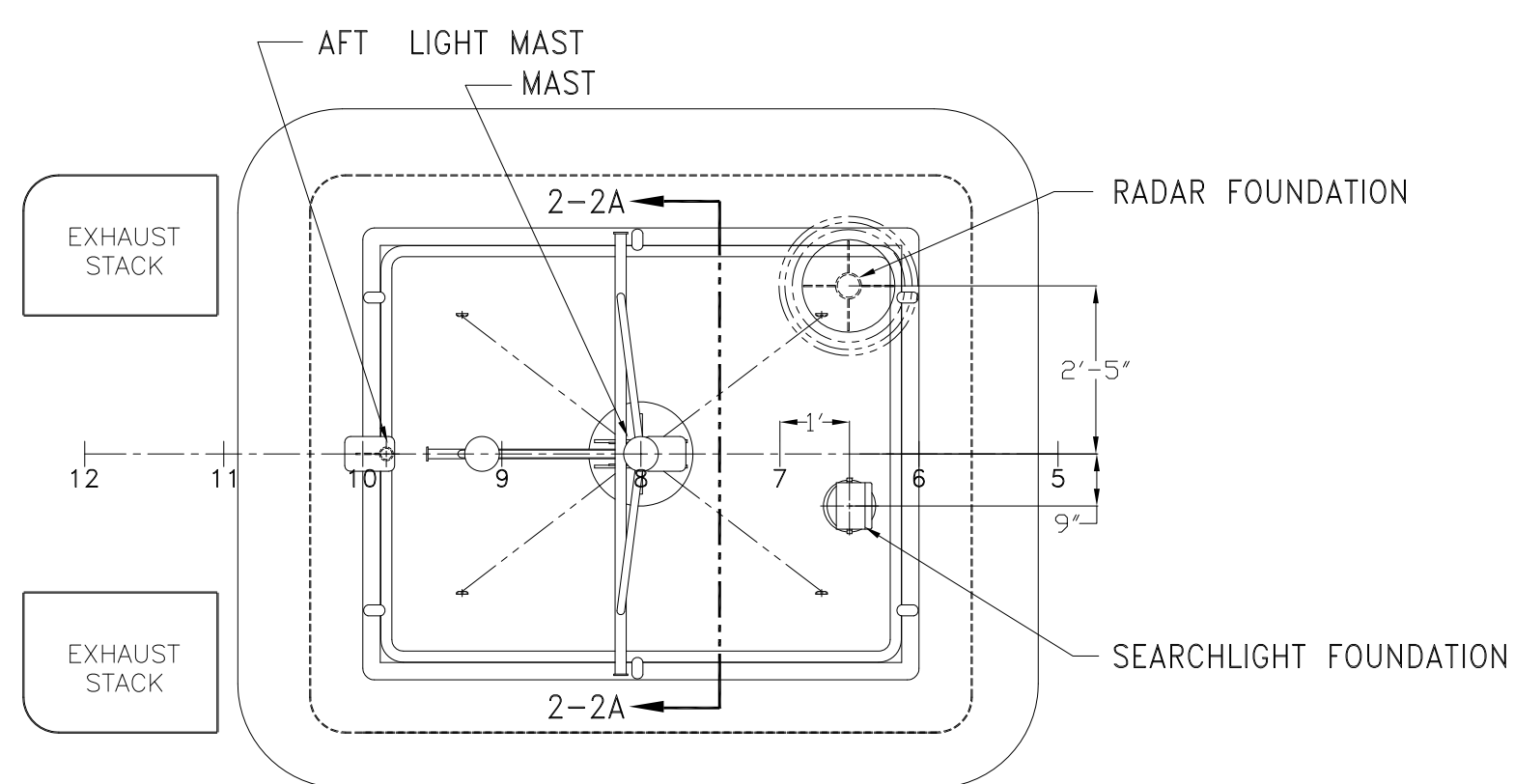




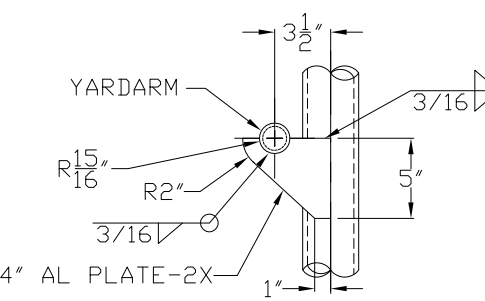
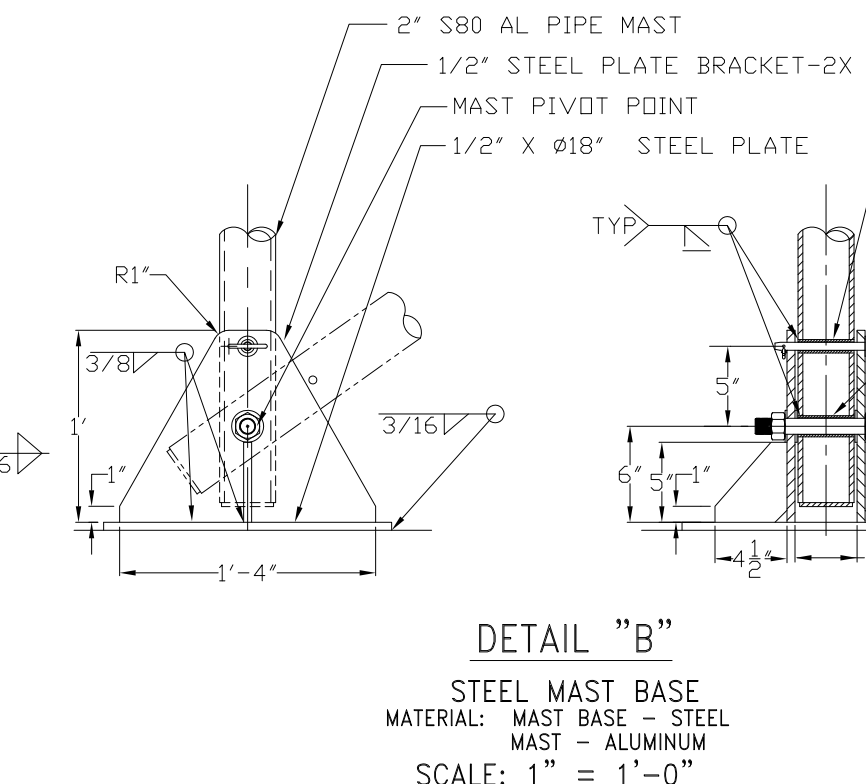
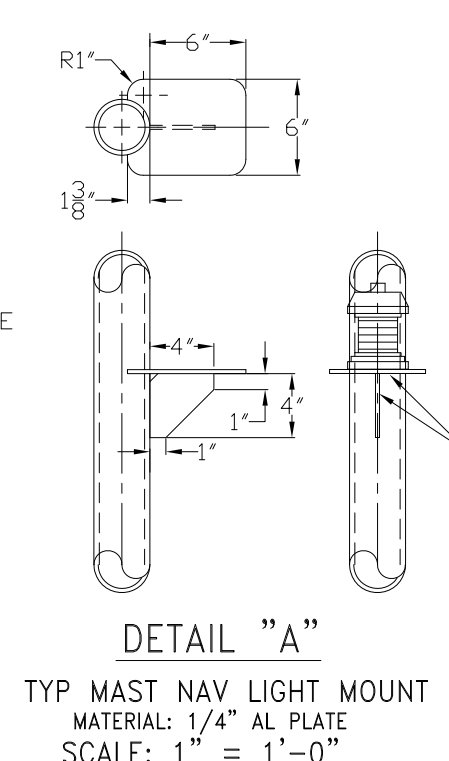
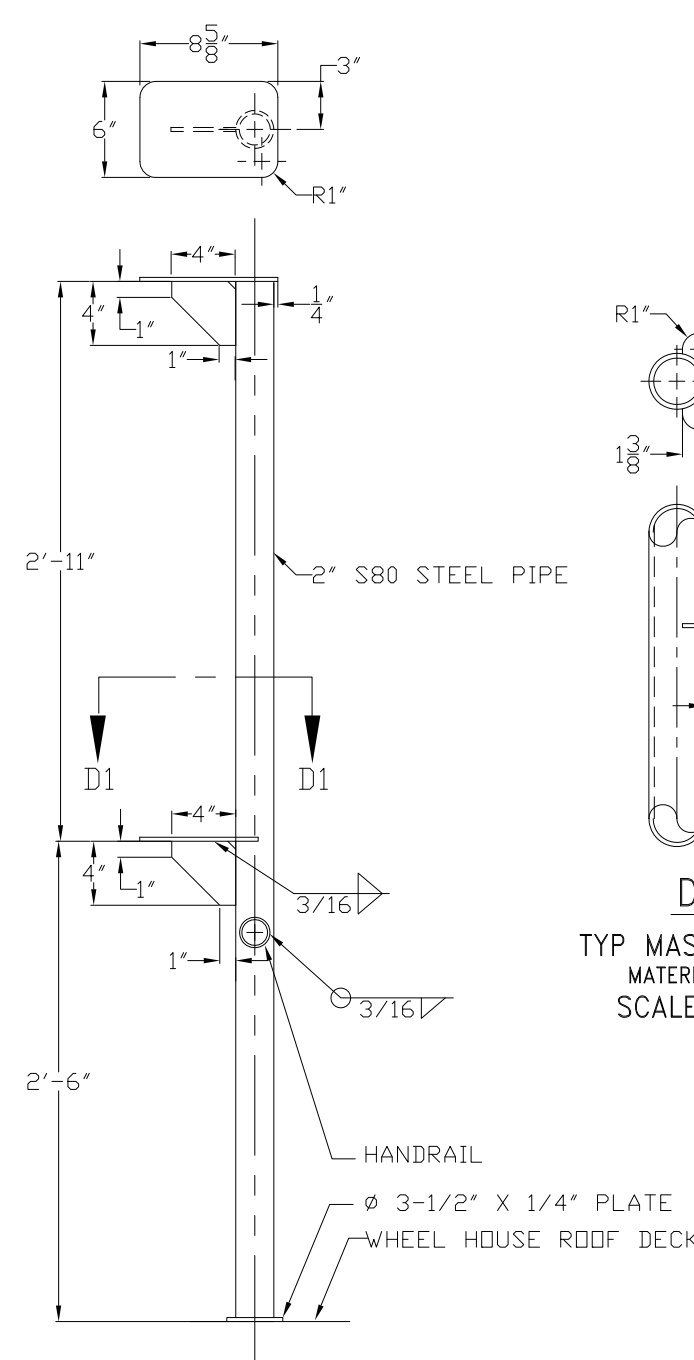
ELEVATION 2-3B
RADAR MAST
2'-5" OCL
SCALE: 1/2"=1'-0"



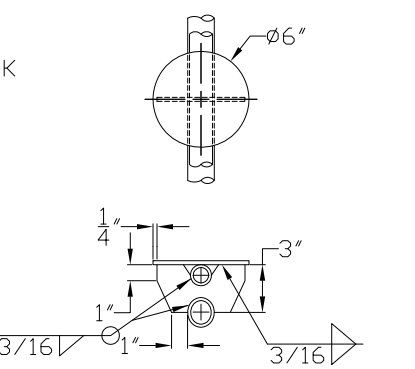
ELEVATION 2-3A
SEARCHLIGHT FOUNDATION
9" OCL STARBOARD
SCALE: 1/2"=1'-0"



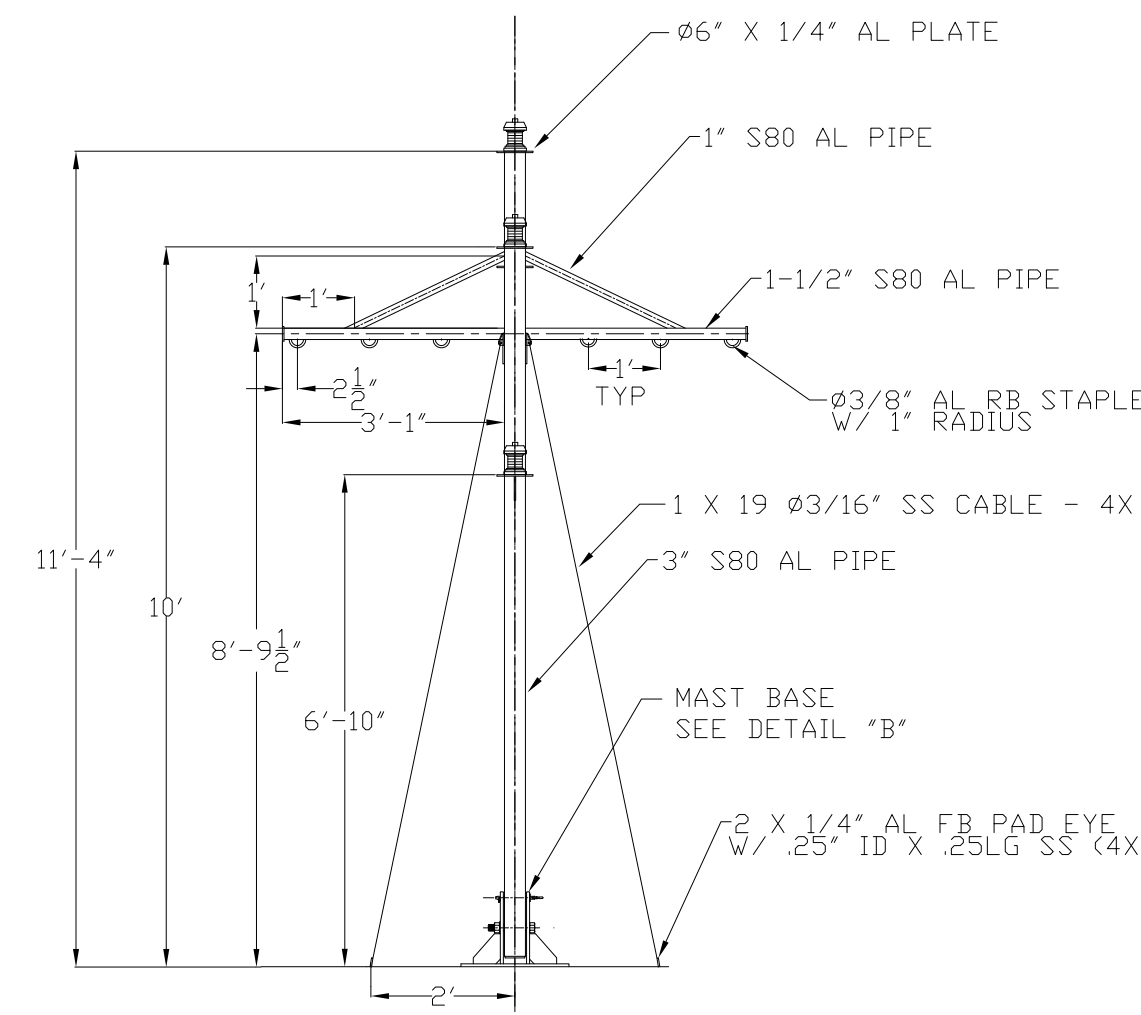
ELEVATION 2-1A
AFT LIGHT MAST
MATERIAL: 1/4" STEEL PLATE
2" SCHED 80 STEEL PIPE
SCALE: 1" = 1'-0"



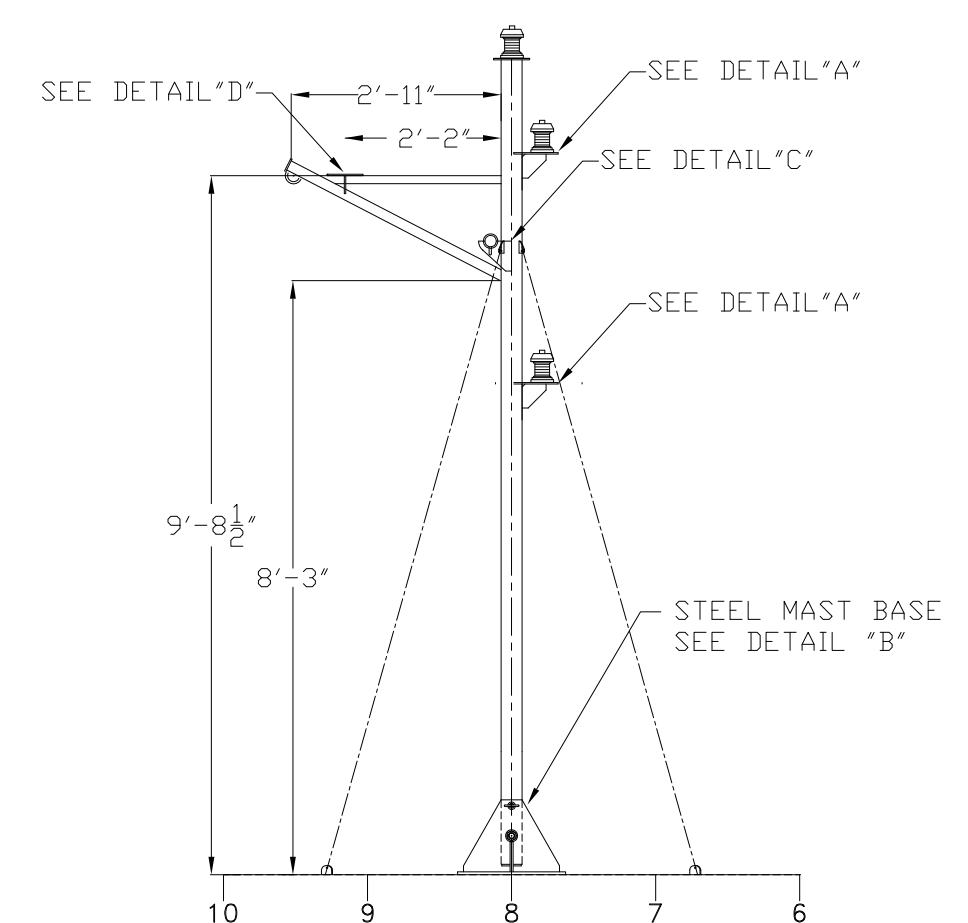
DETAIL "C"
YARDARM BRACKET
MATERIAL: 1/4" AL PLATE
SCALE: 1" = 1'-0"



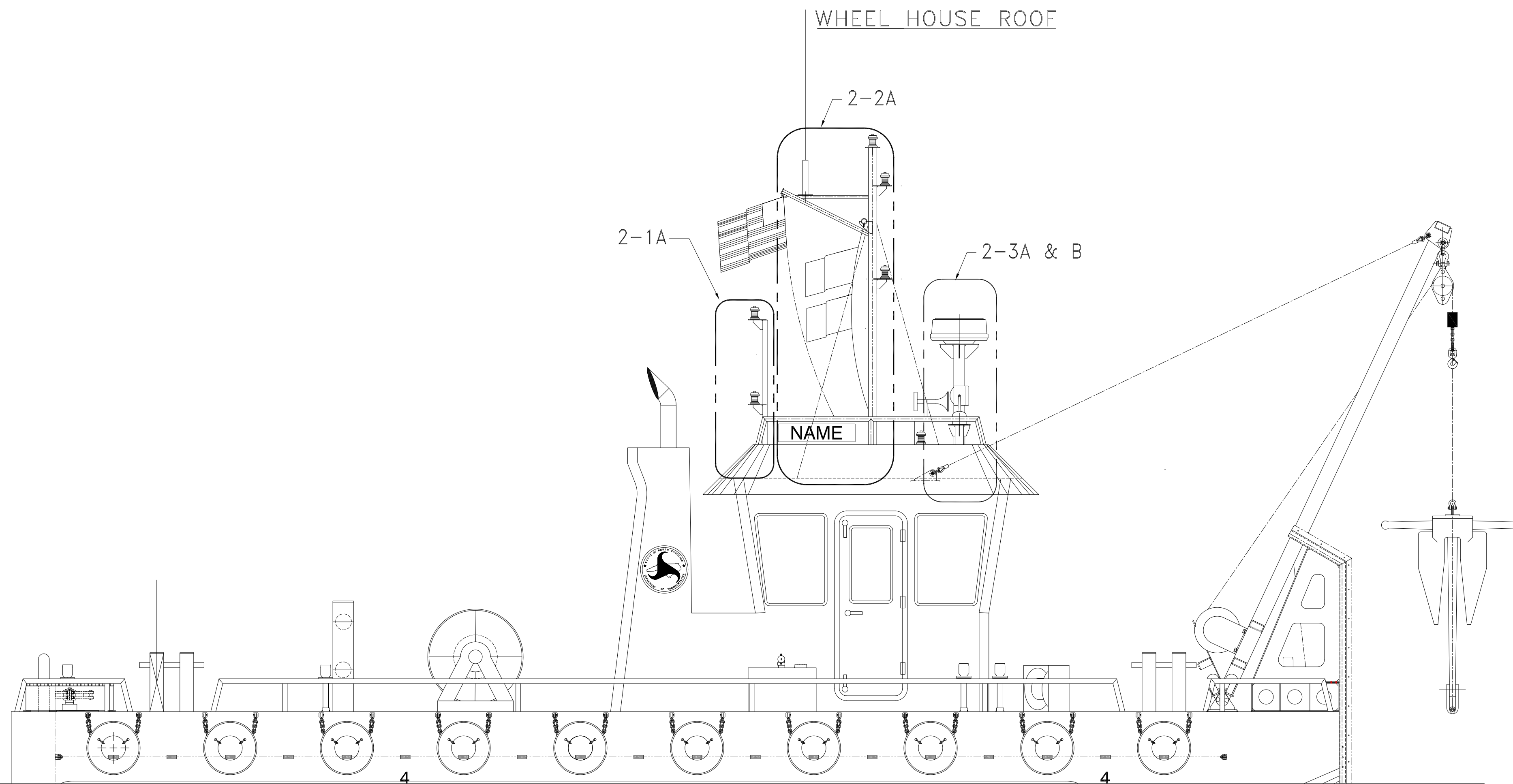
DETAIL "D"
ANTENNA BRACKET
MATERIAL: 1/4" AL PLATE
SCALE: 1" = 1'-0"



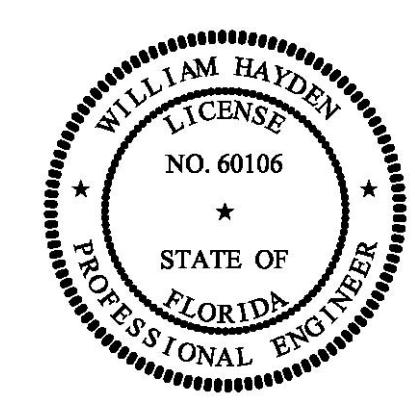
SECTION 2-2A
MAST
SCALE: 1/2"=1'-0"



ELEVATION 2-2A
MAST
SCALE: 1/2"=1'-0"



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Title: 45.5' x 20' x 6.5' NCDOT PUSHBOAT

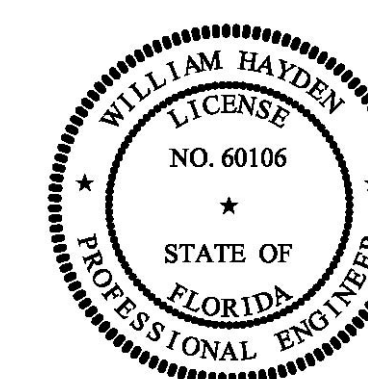
MAST DETAILS

Dwg. No. 17-1393-171
Art. No. 0
Sht. 1 of 1

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018
Checked By: _____ Date: _____
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BILL OF MATERIALS

#	QTY.	SERVICE	TYPE	MAKE/MODEL	COMMENTS
①	2	PROPELLER SHAFT	3" DIA. SHAFT	3" DIA. AQUAMET 17	
②	2	PROPELLER SHAFT	COMPANION FLANGE	TWIN DISC SUPPLIED W/ GEARS	
③	2	PACKING GLAND	3" DIAMETER INFLATABLE PACKING GLAND	WARTSILA PSE STYLE	DEEP SEA SEALS. LTD
④	2	STERN TUBE	3" ID X 12" LENGTH BRASS SLEEVE CUTLESS BEARINGS	DURAMAX JOHNSON #870762101-DARE	OR EQUAL
⑤	2	PROPELLERS	36" DIA. 28" PITCH 4-BLADE .80 DAR WORKHORSE STYLE PROPELLER-BRONZE OR STAINLESS	DURAMAX JOHNSON #870762101-DARE	HS MARINE
⑥	2 SETS	PROPELLER SHAFT	PROPELLER LOCK NUT & JAM NUT		



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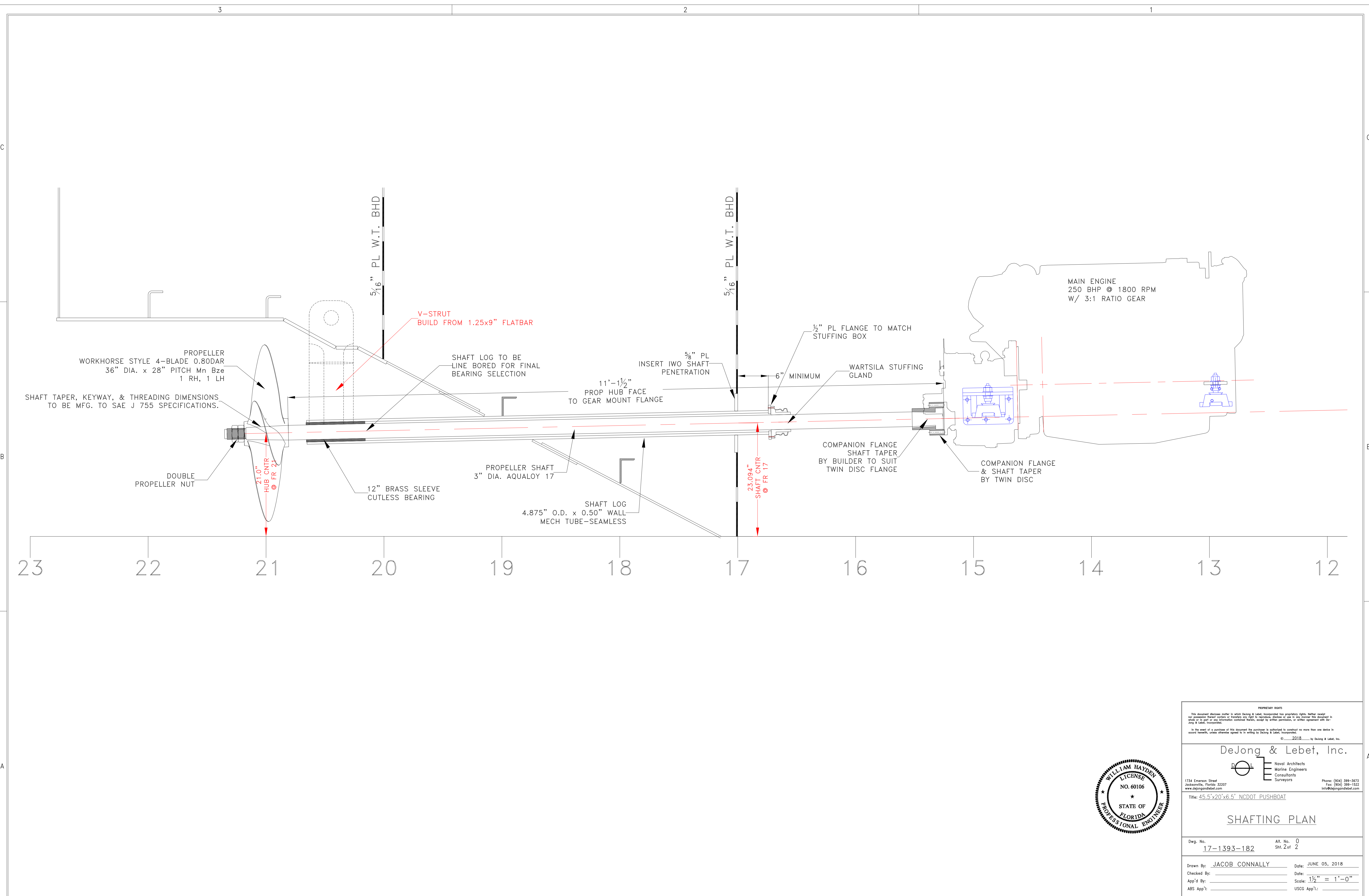
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Title: 45.5'x20'x6.5' NCDOT PUSHBOAT

SHAFTING PLAN
-BOM-

Dwg. No. **17-1393-182** Alt. No. **0**
 Sh. 1 of 2

Drawn By: JACOB CONNALLY Date: JUNE 05, 2018
 Checked By: _____ Date: _____
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 ABS App'l: _____ USCG App'l: _____

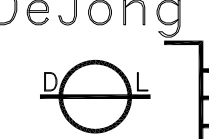


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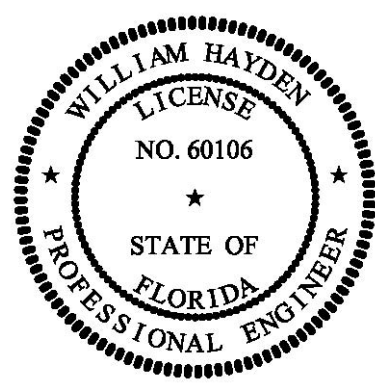
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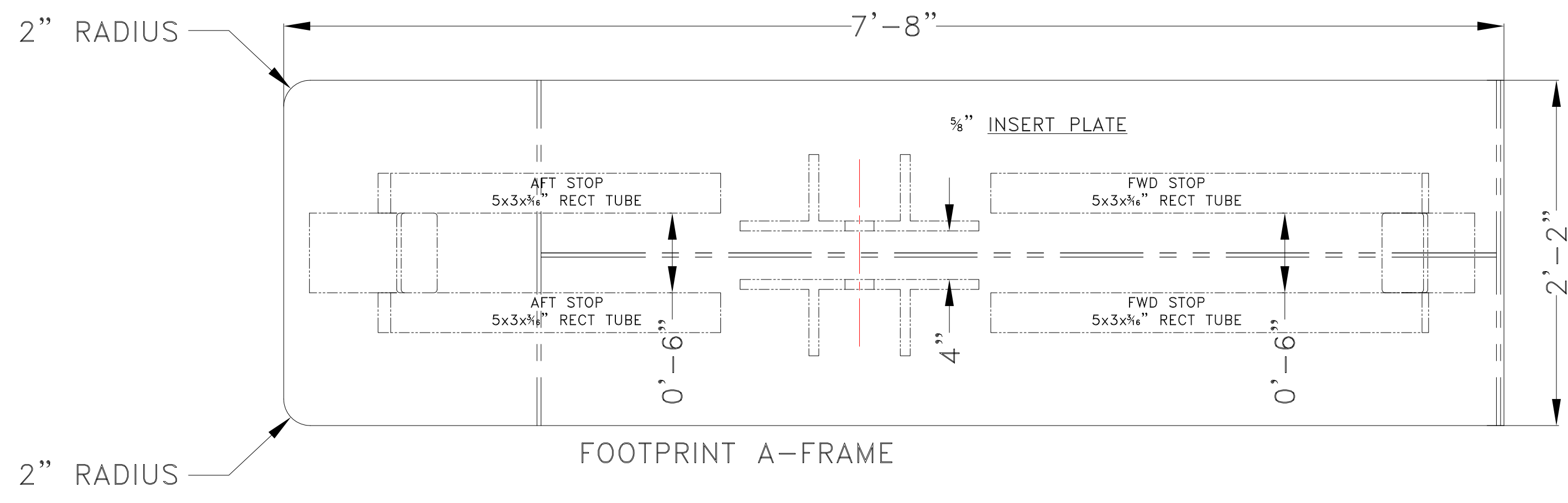
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SHAFTING PLAN

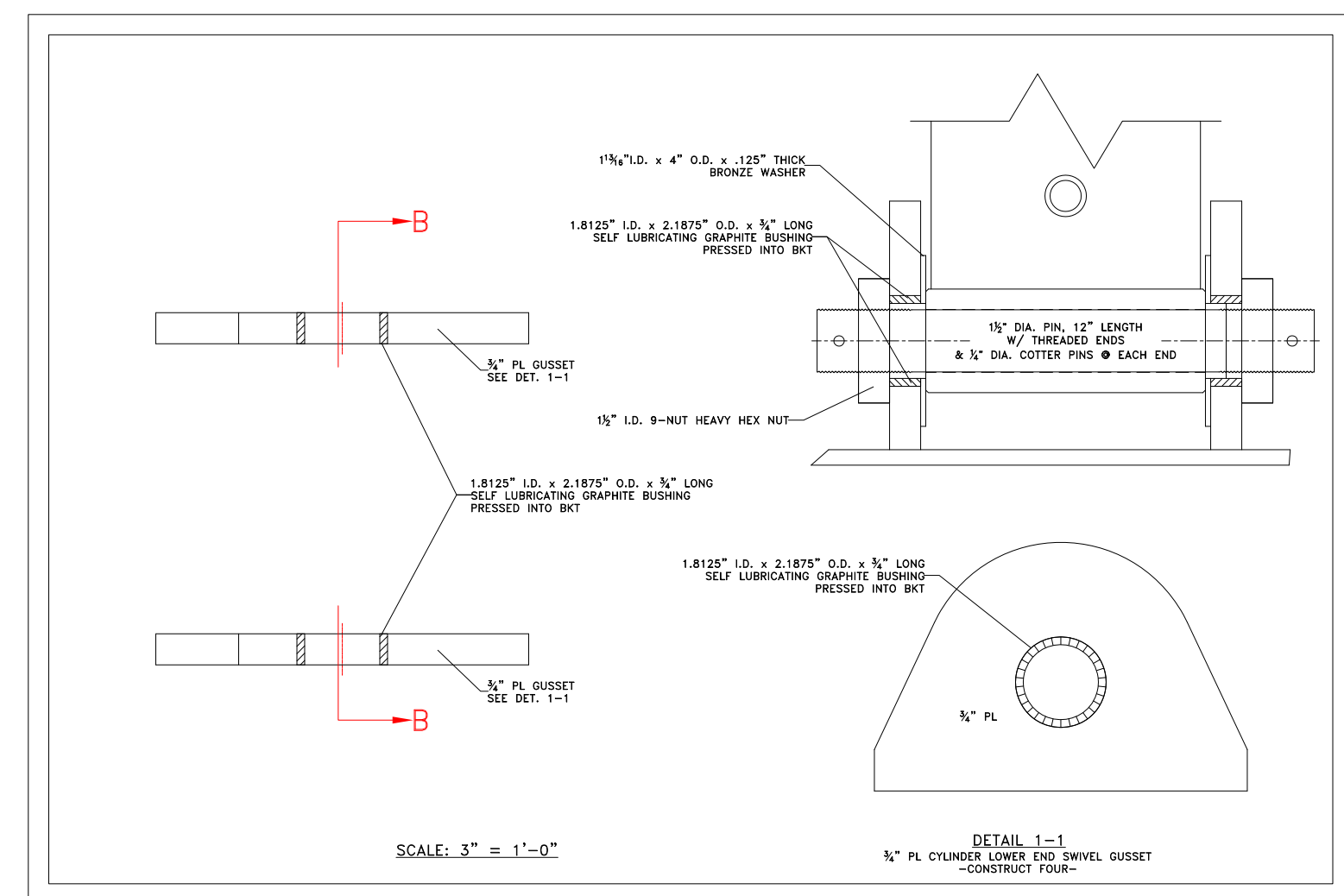
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Drawn By: JACOB CONNALLY	Date: JUNE 05, 2018
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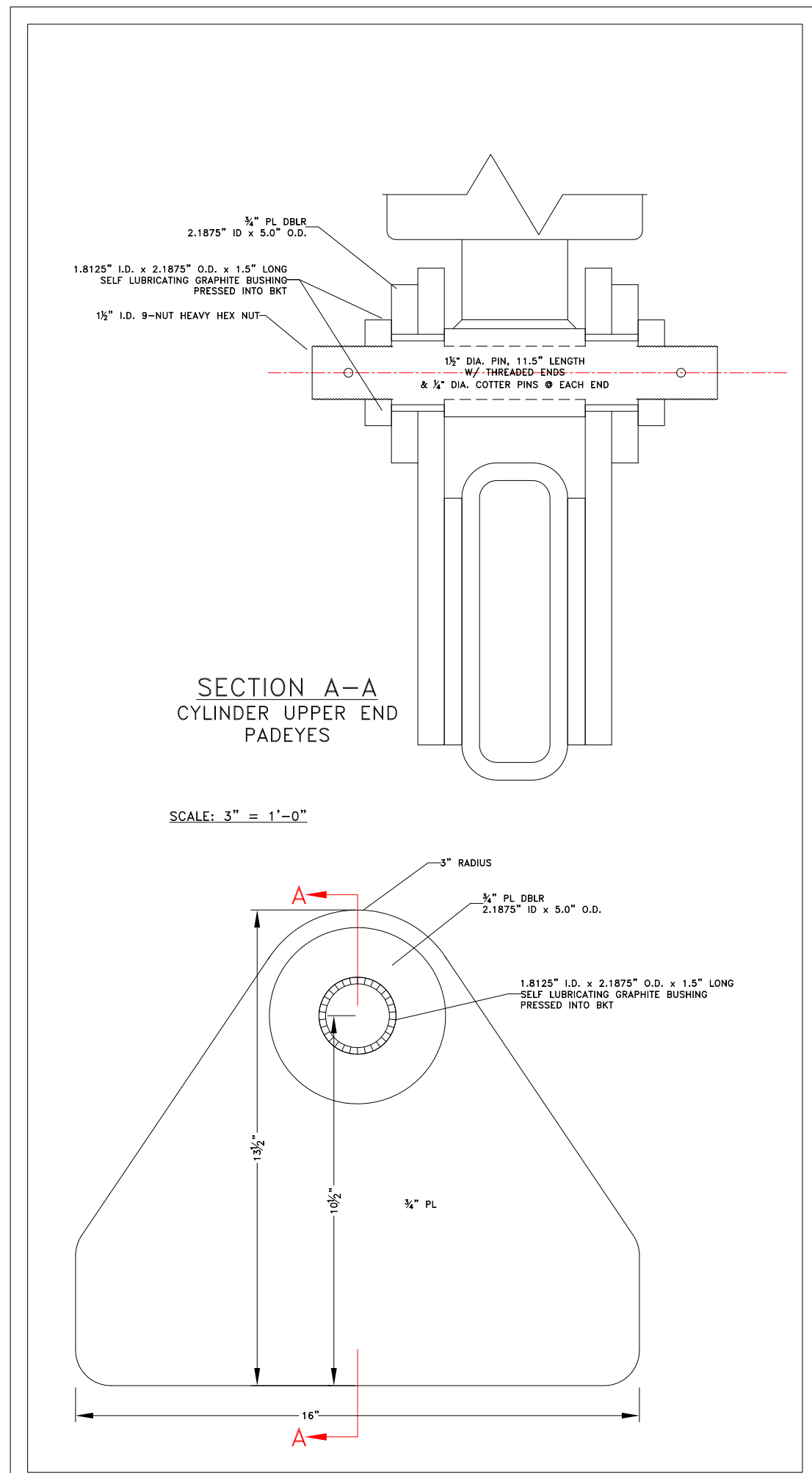




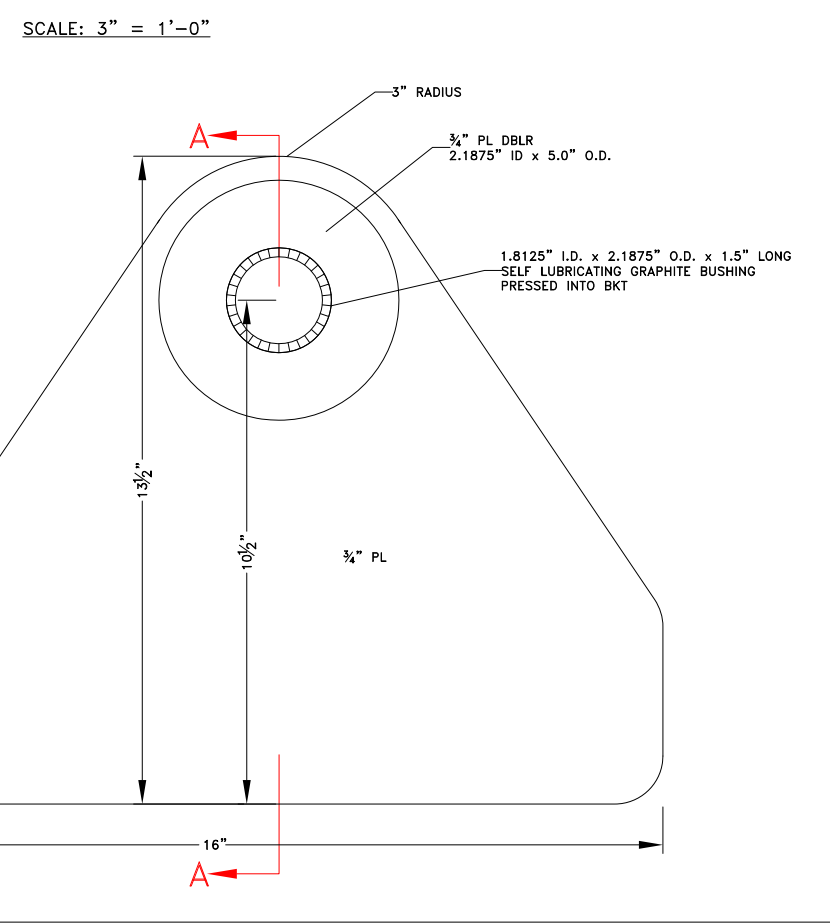
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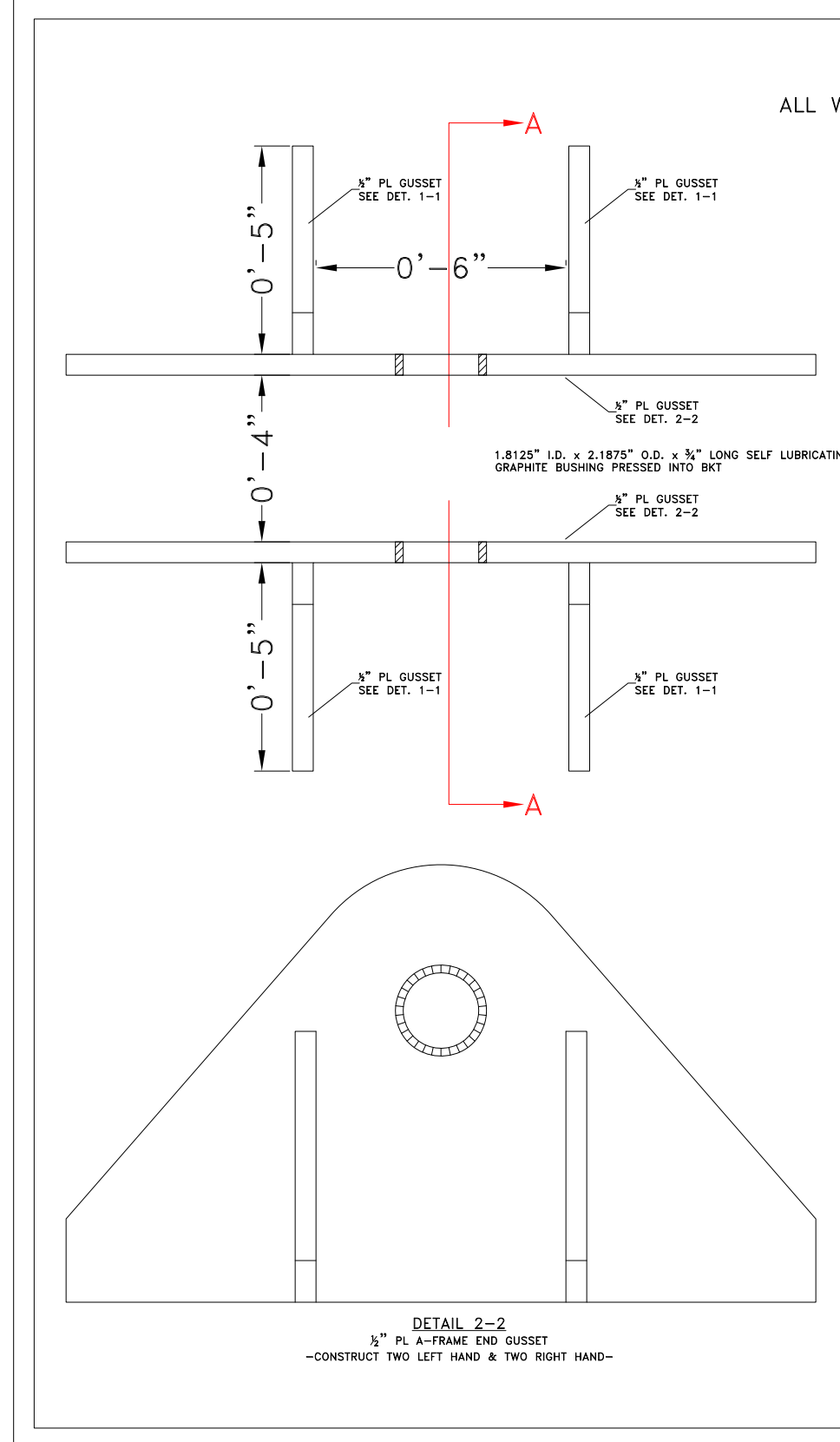
DETAIL A-A
HYDRAULIC CYLINDER
LOWER END GUSSET DETAIL



SECTION A-A
CYLINDER UPPER END
PAIDEYES

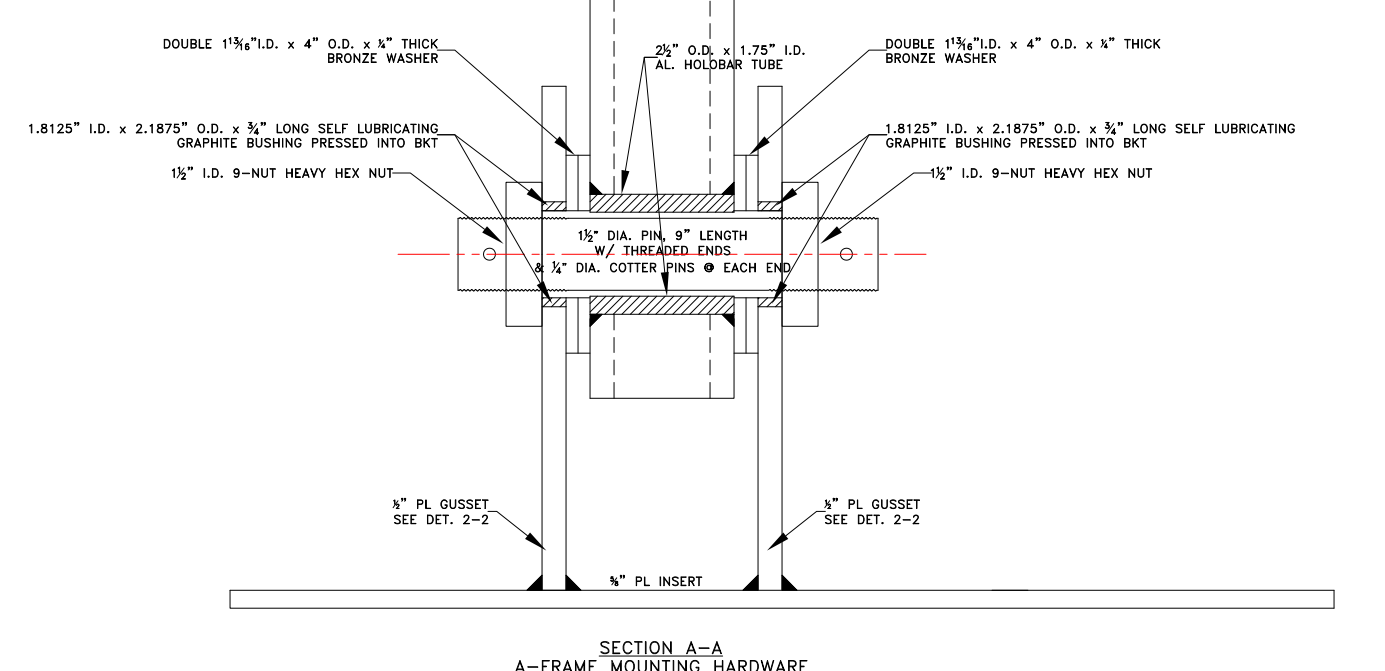


DETAIL B-B
HYDRAULIC CYLINDER
UPPER END GUSSET
ATTACHMENT TO A-FRAME

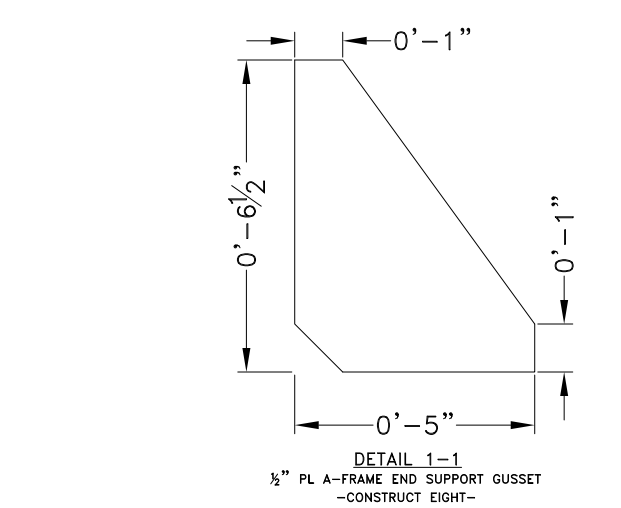


DETAIL 2-2
1/2" PL A-FRAME END GUSSET
-CONSTRUCT TWO LEFT HAND & TWO RIGHT HAND-

CONSTRUCT A-FRAME PAIDEYE
FROM A36 MILD STEEL
ALL WELDING TO BE 3/16" LEG CONTINUOUS

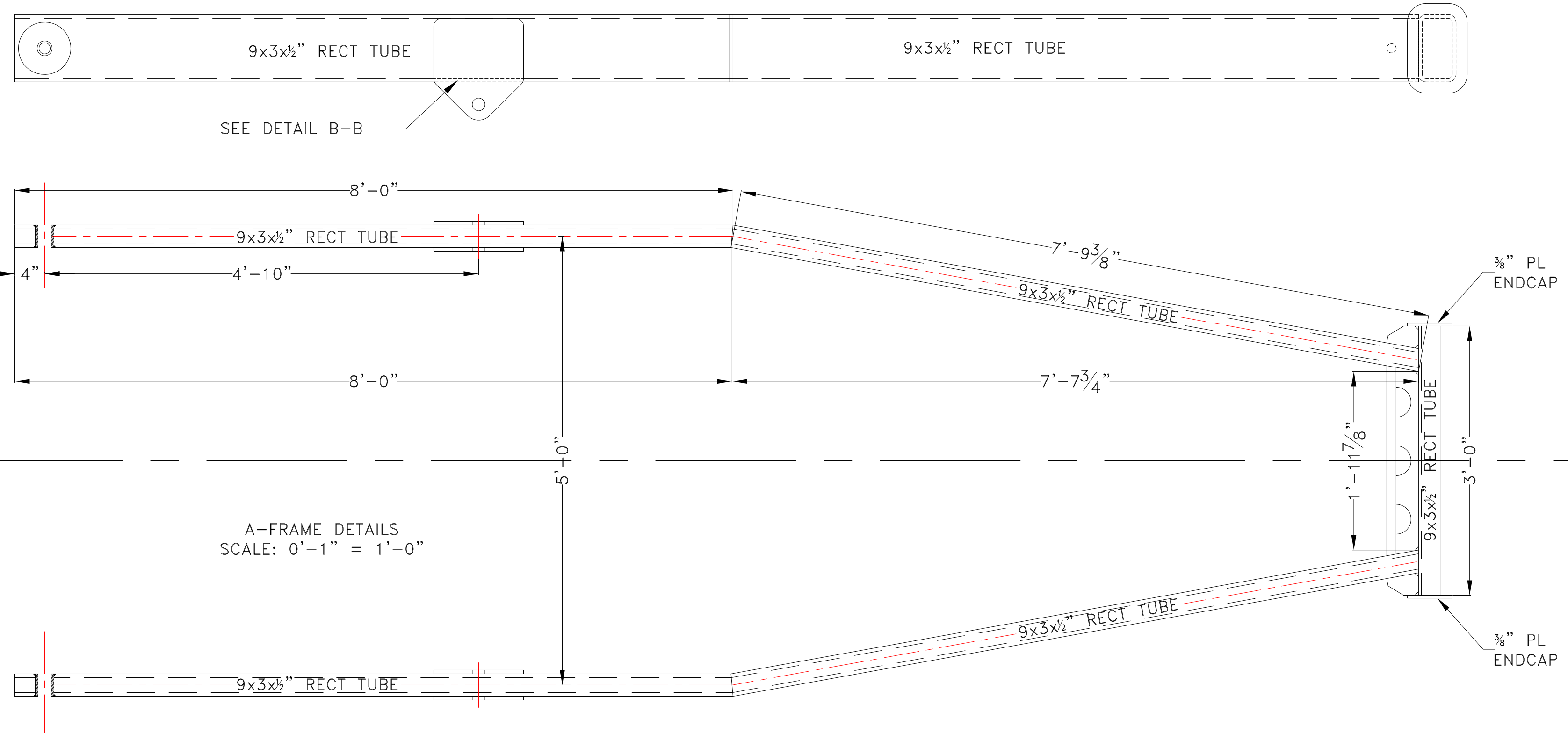


SECTION A-A
A-FRAME MOUNTING HARDWARE



DETAIL 1-1
1/2" PL A-FRAME END SUPPORT GUSSET
-CONSTRUCT EIGHT-

DETAIL C-C
A-FRAME
LOWER END GUSSET
ATTACHMENT TO DECK



A-FRAME DETAILS
SCALE: 0'-1" = 1'-0"

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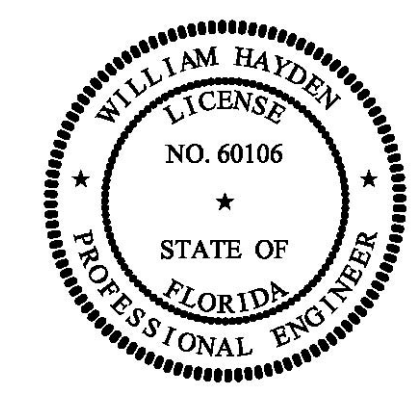
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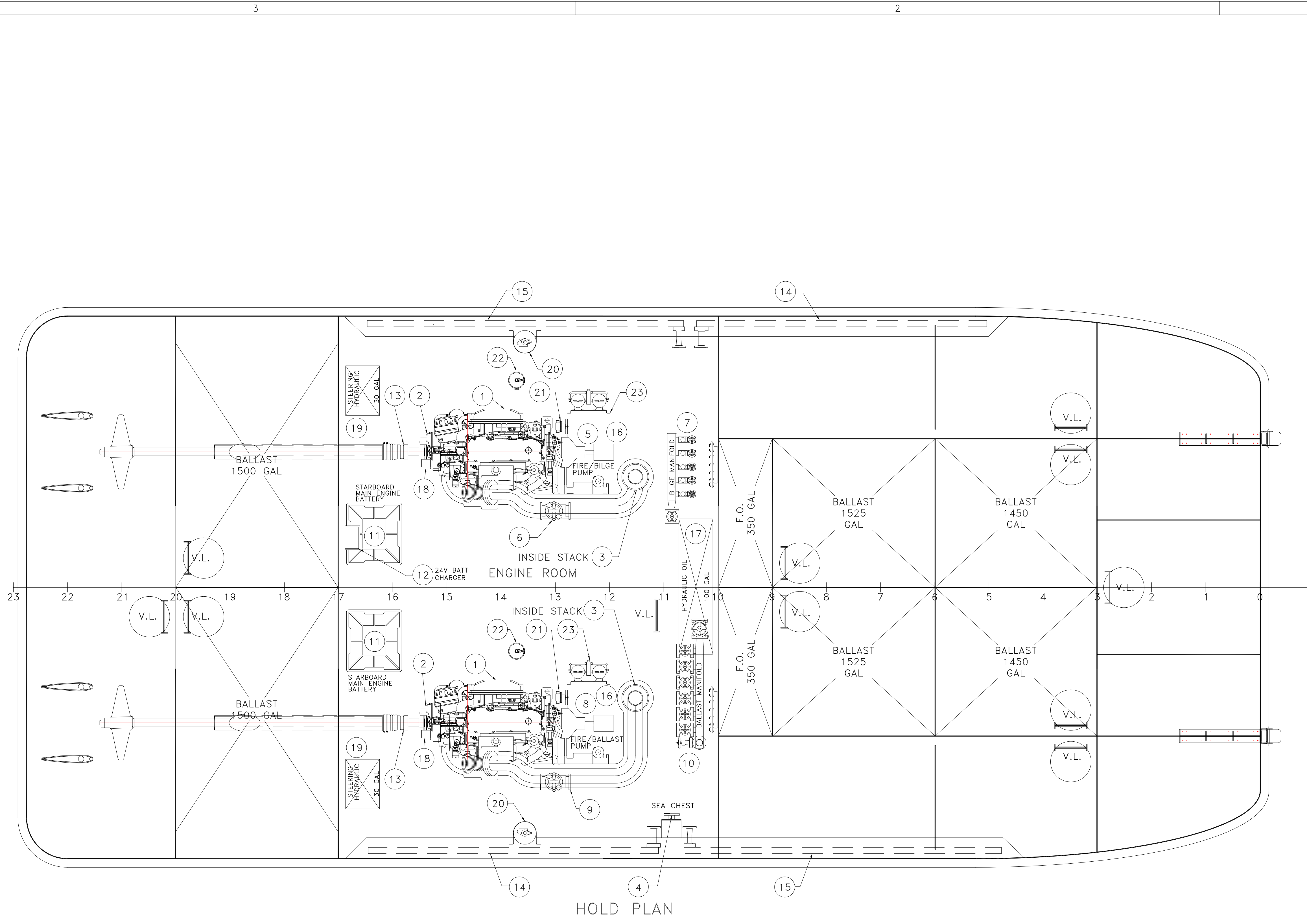
Title: 45.5'x20'x6.5' NCDOT PUSHBOAT

A-FRAME DETAILS

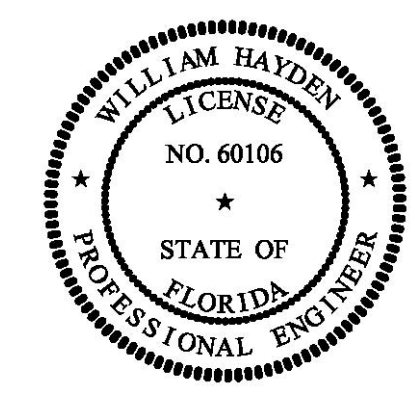
Dwg. No. 17-1393-185 Alt. No. 0
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Drawn By: JACOB CONNALLY Date: JUNE 05, 2018
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EQUIPMENT LIST			
ITEM	QTY	DESCRIPTION	REMARKS
1	2	MAIN ENGINE	
2	2	REDUCTION GEAR	
3	2	MAIN ENGINE EXHAUST SILENCER	
4	2	SEA CHEST	
5	2	FIRE/BILGE PUMP	
6	2	FIRE/BILGE PUMP STRAINER	
7	1	BILGE MANIFOLD	
8	1	FIRE/BALLAST PUMP	
9	1	FIRE/BALLAST PUMP STRAINER	
10	1	BALLAST MANIFOLD	
11	2	MAIN ENGINE BATTERY	
12	1	MAIN ENGINE BATTERY CHARGER	
13	2	SHAFT SEAL	
14	2	MAIN ENGINE J.W. KEEL COOLER	
15	2	MAIN ENGINE SCAC KEEL COOLER	
16	2	HYDRAULIC PUMP	
17	1	100 GALLON HYDRAULIC RESERVIOR	
18	2	STEERING HYDRAULIC PUMP	
19	2	30 GALLON STEERING HYDRAULIC RESERVIOR	
20	2	FIRE SUPPRESSION SYSTEM	
21	2	SHAFT SEAL COOLING PUMP	
22	2	SHAFT SEAL PUMP SEA CHEST	
23	2	FUEL FILTER	
24			



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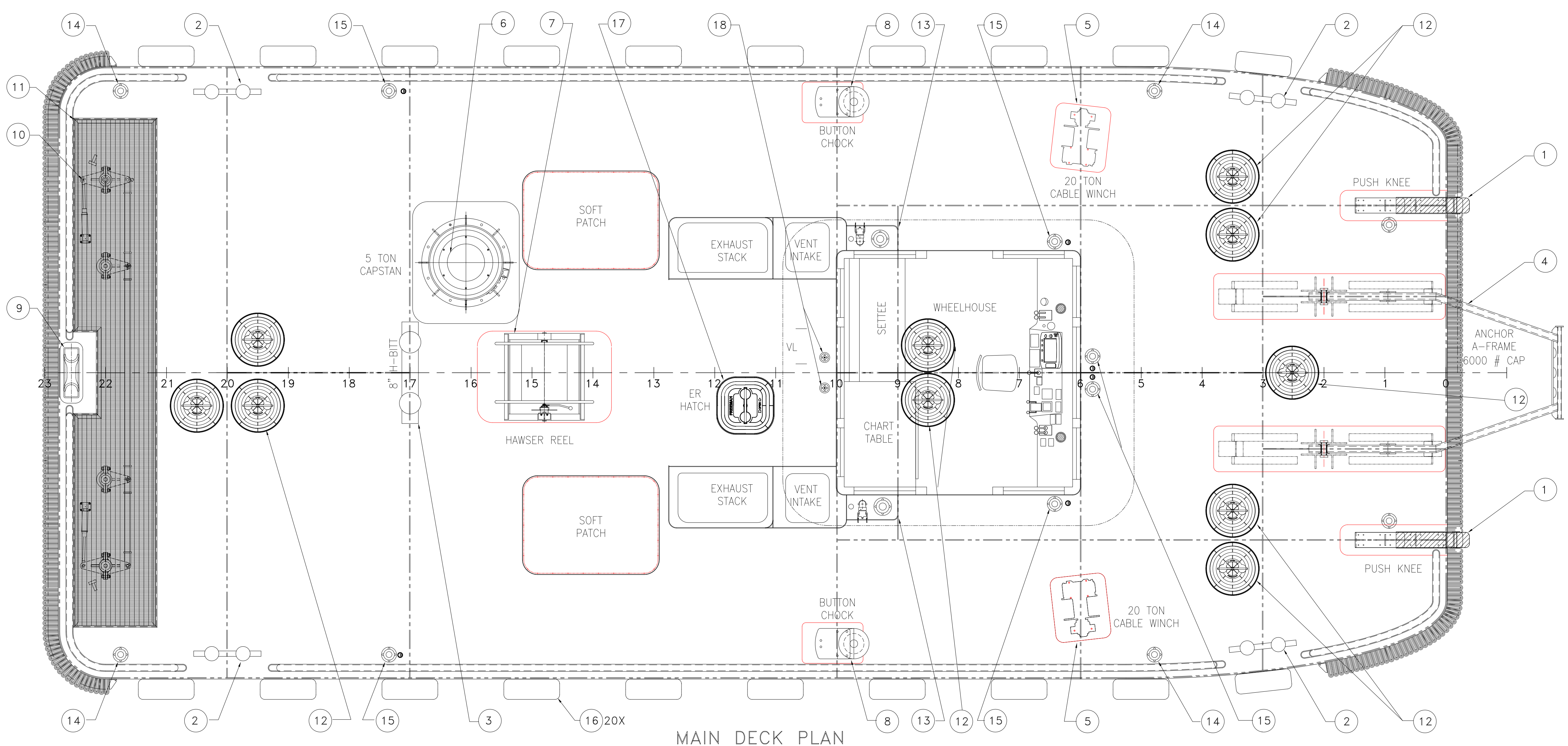
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Title: 45.5'x20'x6.5' NCDOT PUSHBOAT

MACHINERY ARRANGEMENT

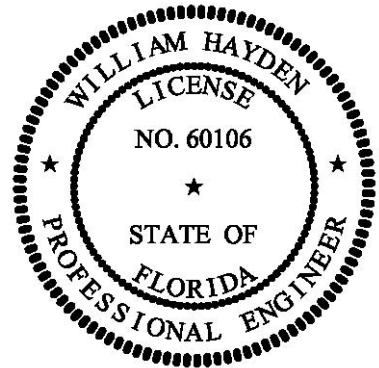
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Drawn By: JAH Date: DECEMBER 19, 2018
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ABS App'l: _____ USCG App'l: _____



MAIN DECK PLAN

EQUIPMENT LIST			
ITEM	QTY	DESCRIPTION	REMARKS
1	2	PUSH KNEE	
2	4	DOUBLE BITT	
3	1	8" H-BITT	
4	1	A-FRAME	
5	2	20 TON CABLE WINCH	
6	1	5 TON CAPSTAN	
7	1	HAWSER REEL	
8	2	BUTTON CHOCK	
9	1	FAIRLEAD	
10	1	STEERING SYSTEM COMPONENTS	
11	1	FIBERGLASS GRATING WALKING PLATFORM	
12	10	20" QUICK ACTING HATCH	
13	2	FUEL FILL, VENT, SOUNDING & CONTAINMENT	
14	6	COMPARTMENT VENT	
15	6	BALLAST TANK FILL & VENT	
16	20	FENDER TIRE	
17	1	20" SQ. ENGINE ROOM HATCH	
18	2	EMERGENCY FUEL SHUTOFF	



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Title: 45.5'x20'x6.5' NCDOT PUSHBOAT

MAIN DECK OUTFITTING

Dwg. No. **17-1393-201** Alt. No. 0
Sht. 1 of 1

Drawn By: JAH Date: DECEMBER 19, 2018
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App'd By: Scale: 1" = 1'-0"
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MATERIAL SCHEDULE

SERVICE	SIZE	PIPE	COMPONENTS			GASKETS	VALVES		BOLTING		REMARKS
			TAKEDOWN JOINTS	FITTINGS	FLEX CONNECT		BODY	TRIM	BOLTS/STUDS	NUTS/WASHERS	
HYDRAULIC OIL SERVICE PIPING MAWP: 750 PSIG MAWT: 150°F	ALL	STAINLESS STEEL TUBING, TYPE 316L, ASTM A213 WALL THICKNESS VARIES STAINLESS STEEL PIPE, TYPE 316L, ASTM A312	FLANGE SOCKET WELD, WELD NECK OR SLIP ON, 316L STAINLESS STEEL, ASTM SA182, ANSI B16.11 UNION GROUND JOINT, SOCKET WELD CARBON STEEL, ASTM A105, MSS-SP-83	SOCKET WELD STAINLESS STEEL, TYPE 316L, ASTM A182, ANSI B16.11 BUTTWELD STAINLESS STEEL, ASTM A403, ANSI B16.9, MSS SP-43 COMPRESSION TYPE 316 STAINLESS STEEL, ASTM A276, ASTM A479, ASTM A182	FLEX HOSE MEETING SAE J1942 AND J1475 FOR HYDRAULIC SERVICE SEE NOTE 9	GARLOCK STYLE 3000	GATE FLANGED CARBON STEEL, ASTM A216 GR WCB OR ASTM A105 ANSI B16.34 BALL THREADED, CARBON STEEL, ASTM A105, ASTM A181, OR ASTM A216 GR WCB CHECK THREADED, CARBON STEEL, ASTM A105, ASTM A181, OR ASTM A216 GR WCB	GATE CRES STEM, DISC AND SEAT BALL CHROME PLATED BALL, RPTFE OR VITON SEATS CHECK CRES DISC	CARBON STEEL ANSI B18.2.1 HEX-HEAD CARBON STEEL ASTM A563 GR A ANSI B18.2.2		

SYMBOLS LIST

	TUBING		HYDRAULIC CYLINDER
	GATE VALVE		RELIEF VALVE
	BALL VALVE		CROSS PORT RELIEF VALVE
	BALL VALVE WITH THREADED PLUG		CROSS PORT RELIEF VALVE
	REDUCER		CROSS PORT RELIEF VALVE
	FLEXIBLE CONNECTION		HYDRAULIC CHECK VALVE
	HYDRAULIC CHECK VALVE		FLOW DIRECTION ARROW
	FLOW DIRECTION ARROW		HYDRAULIC PUMP
	HYDRAULIC PUMP		FLOW CONTROL VALVE
	LEVEL		

EQUIPMENT LIST (HYDRAULIC)

ITEM #	QTY	SERVICE	TYPE	MODEL	CAPACITY	DRIVE	NOTES
1	2	STEERING HYDRAULIC PUMP	GEAR, SAE A 2 BOLT MOUNT	-	.36 CU IN./REV	MAIN ENGINE GEAR	-
2	2	STEERING CYLINDER	UNBALANCED, ABS TYPE APPROVED	-	1-1/2" BORE, #5/8" ROD, 10" STROKE	-	-
3	2	STEERING RESERVIOR	RESERVIOR, STEEL	-	30 GALLON	-	W/ LOW LEVEL SWITCH, SIGHT/TEMPERATURE GAGE,
4	2	STEERING CONTROL	24 VOLT DC SOLENOID BASE DIRECTIONAL CONTROL VALVE	-	6 GPM	-	OPEN CENTER
5	2	RELIEF VALVE	1500 PSI, 3/4" NPT	-	10 GPM	-	-
6	1	CROSS PORT RELIEF VALVE	1500 PSI, 7/8"-14	-	10 GPM	-	-
7	2	SUCTION STRAINER	1" FPT	-	-	-	INTERNAL RESERVIOR MOUNT
8	2	RETURN FILTER & HEAD ASSEMBLY	10 MICRON, 5 5 PSI BYPASS	-	16 GPM	-	-
9	2	FLOW CONTROL VALVE	3/4" FPT	-	20 GPM	-	-

EQUIPMENT LIST (STEERING COMPONENTS)

ITEM #	QTY	DESCRIPTION	NOTES
10	4	RUDDER ASSEMBLY	-
11	2	TILLER ASSEMBY, OUTBOARD	-
12	2	TILLER ASSEMBY, INBOARD	-
13	1	JOCKEY BAR	-
14	1	RUDDER TUBE ASSEMBLY	-
15	2	5/8" X 3-1/2" CLEVIS PIN (CYLINDER)	-
16	4	1" X 3-1/2" CLEVIS PIN ASSEMBLY (JOCKEY BAR)	-
17	4	2-1/4" COMPOSITE UPPER RUDDER BEARING	PART OF ITEM 14
18	4	2-3/16" ID X 5" OD X 1/2" THICK NYLON THRUST WASHER	-

EQUIPMENT LIST (ELECTRICAL CONTROL)

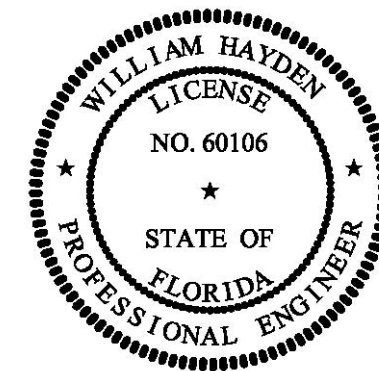
ITEM #	QTY	DESCRIPTION	NOTES
20	2	JOG LEVER, NON FOLLUP UP	-
21	2	CONTROL LEVER, FULL FOLLOW UP	-
22	1	SELECTOR SWITCH, PORT AND STARBOARD PUMP	-
23	1	ALARM PANEL, STEERING CONTROL	-
24	1	SELECTOR SWITCH, JOG LEVER/ FULL FOLLO UP CONTROL LEVER	-
25	1	RUDDER ANGLE INDICATOR, MASTER	-
26	1	JUNCTION BOX, STEERING SYSTEM	-
27	1	AMPLIFIER, FULL FOLLOW UP	-
28	2	LEVEL SWITCH, HYDRAULIC RESERVIOR	-
29	1	PRESSURE SWITCH, HYDRAULIC	-
30	1	JUNCTION BOX, LIMIT SWITCH	-
31	1	RUDDER FEEDBACK UNIT, 2 POT, 4 SWITCH	-

GENERAL NOTES

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- AVOID POCKETS IN THE PIPE LINES. BOSSES AND VALVES OR SCREWED PLUGS SHALL BE FITTED TO ENABLE COMPLETE DRAINING OF PIPES WHERE POCKETS DO OCCUR.
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- PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES. HANGERS SUPPORTING TUBING SHALL UTILIZE A RESILIENT NONMETALLIC LINER BETWEEN THE TUBING AND STEEL HANGER.
- INSTALL RUDDER ANGLE INDICATOR IN PILOT HOUSE OVERHEAD.
- HYDRAULIC RESERVIORS TO HAVE FILLER/BREATHER, LEVEL/TEMPERATURE GAGE AND LOW LEVEL ALARM SWITCH.
- INSTALL RUDDER BEARINGS PER MANUFACTURERS RECOMMENDATIONS.
- CABLE SIZES AND # OF CONDUCTORS PER MANUFACTURERS SPECIFICATIONS.

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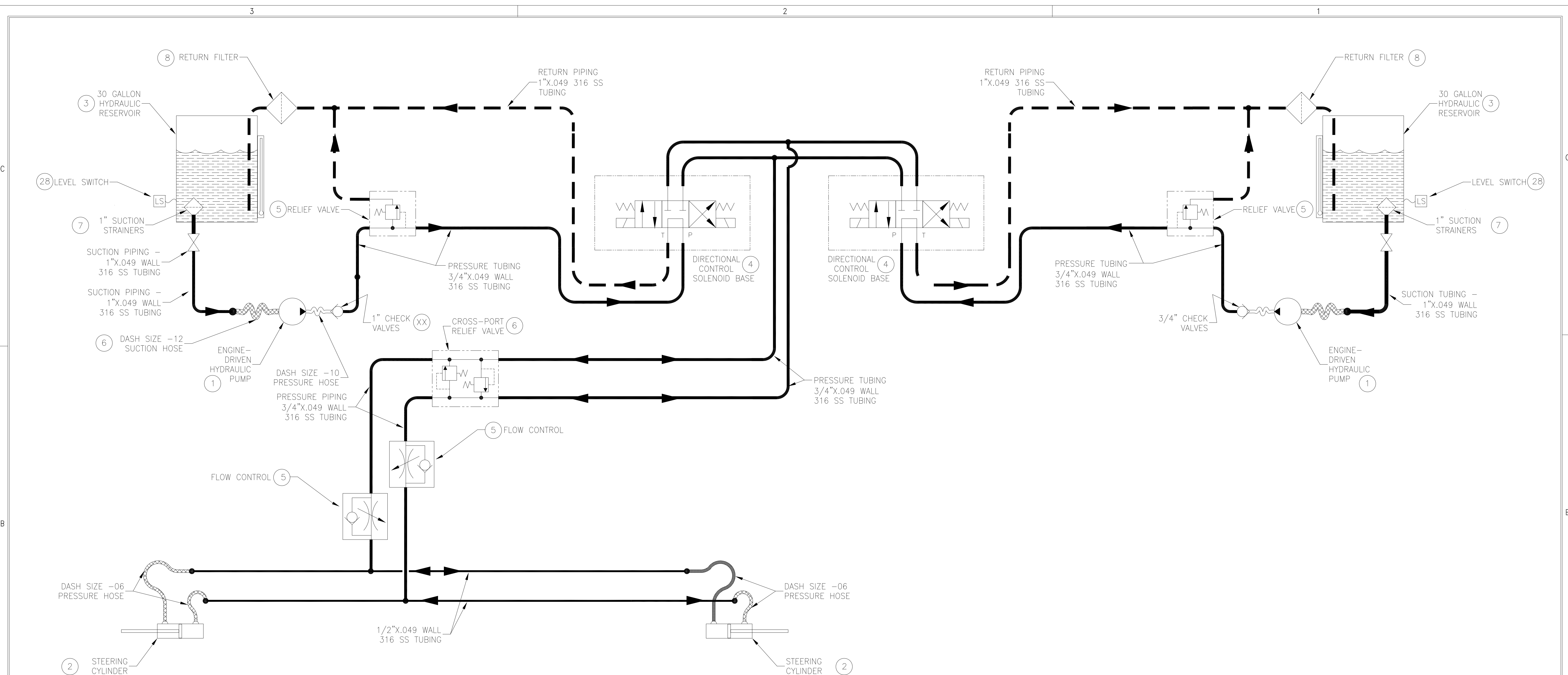
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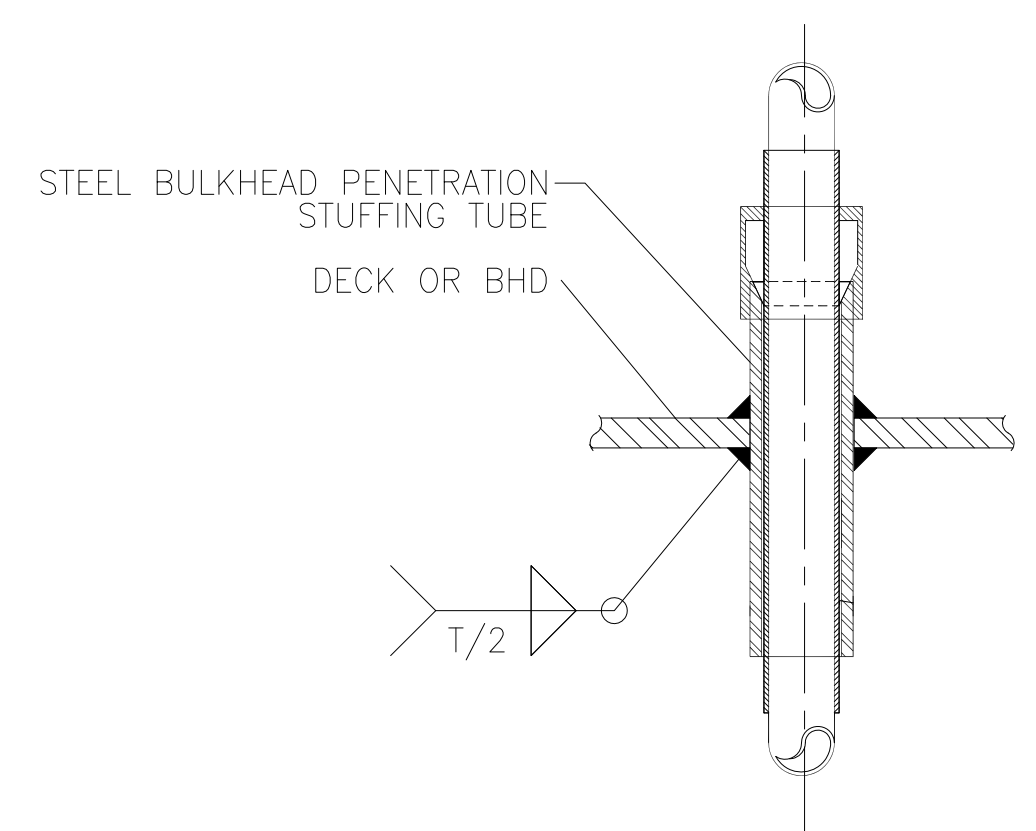
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 Sh. 1 of 5

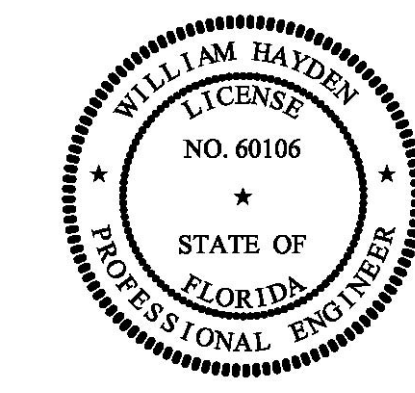
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 Checked By: _____ Date: _____
 App'd By: _____ Scale: NONE
 ABS App'l: _____ USCG App'l: _____



STEERING SYSTEM HYDRUALIC DIAGRAM



-- GENERAL NOTES --		-- GENERAL NOTES --	
NO.	DESCRIPTION	NO.	DESCRIPTION
1.	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER M VESSELS.		
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7.	INSTALL RUDDER ANGLE INDICATOR IN PILOT HOUSE OVERHEAD		
8.	HYDRAULIC RESERVOIRS TO HAVE FULLEN/BREATHER, LEVEL/TEMPERATURE GAGE AND LOW LEVEL ALARM SWITCH		
9.	INSTALL RUDDER BEARINGS PER MANUFACTURERS RECOMMENDATIONS		
10.	CABLE SIZES AND # OF CONDUCTORS PER MANUFACTURERS SPECIFICATIONS		



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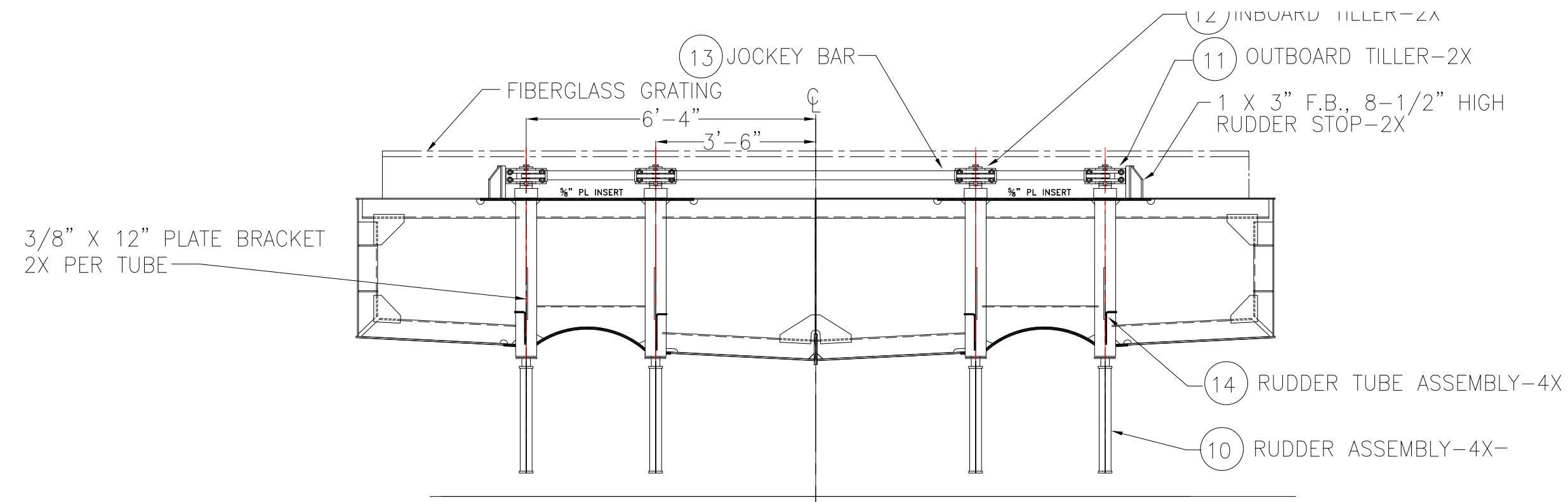
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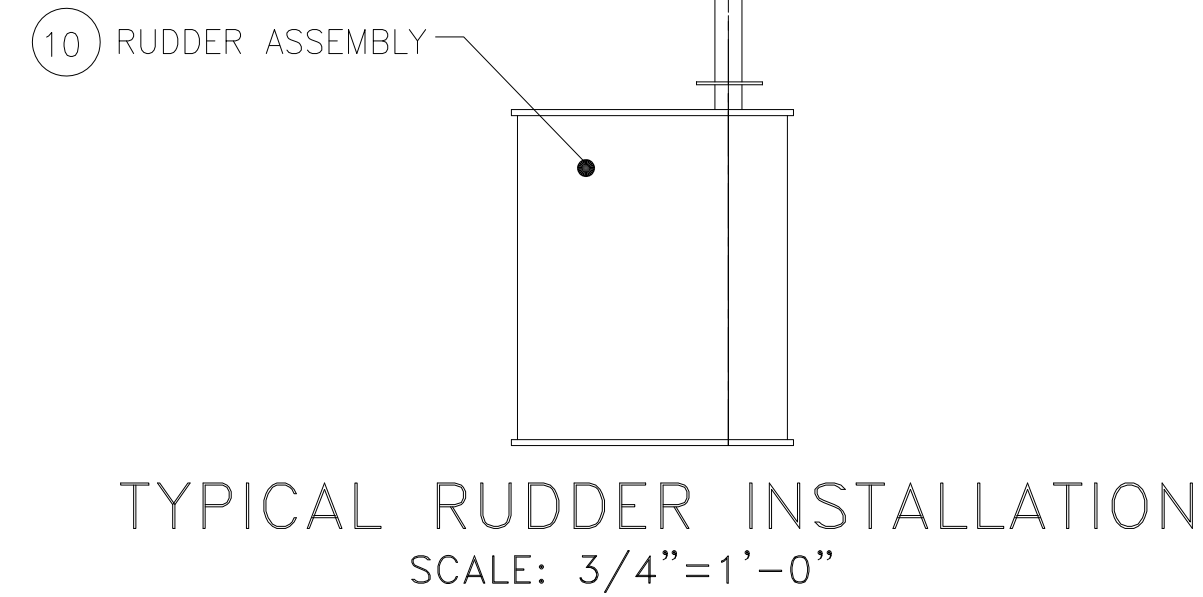
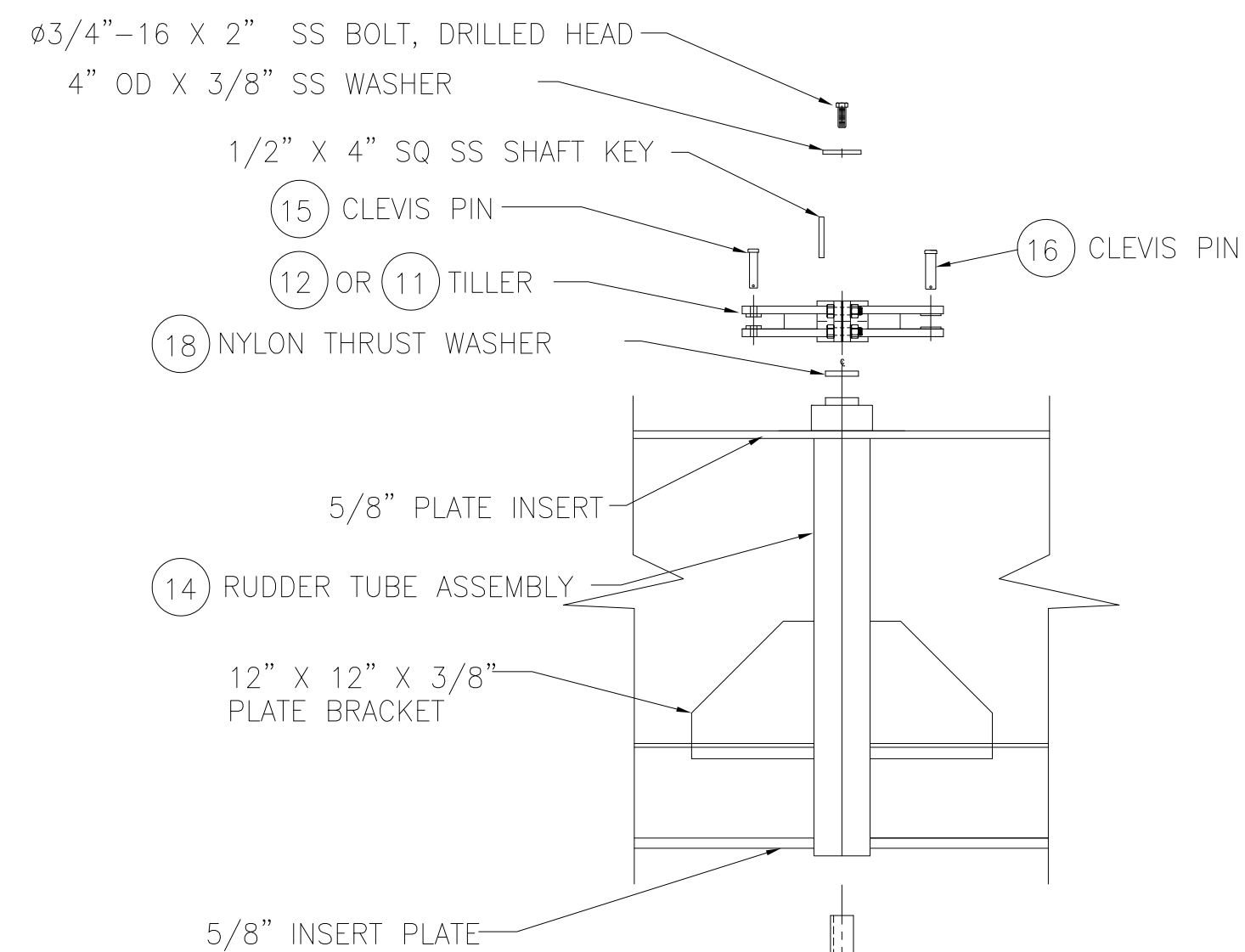
STEERING SYSTEM

Dwg. No. 17-1393-253 Alt. No. 0
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Drawn By: JAH Date: NOVEMBER 5, 2018
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 App'd By: _____ Scale: NONE
 ABS App'l: _____ USCG App'l: _____

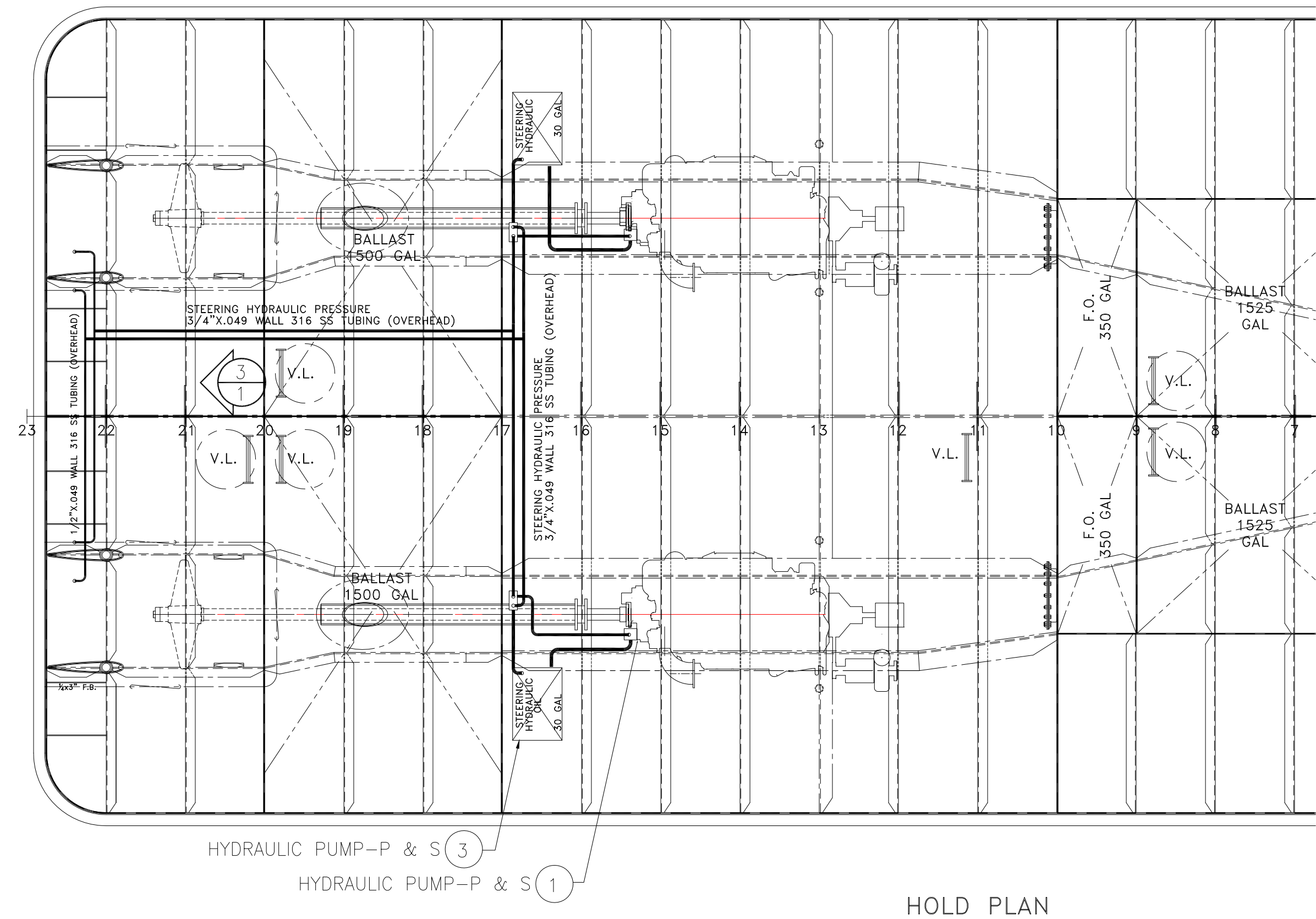
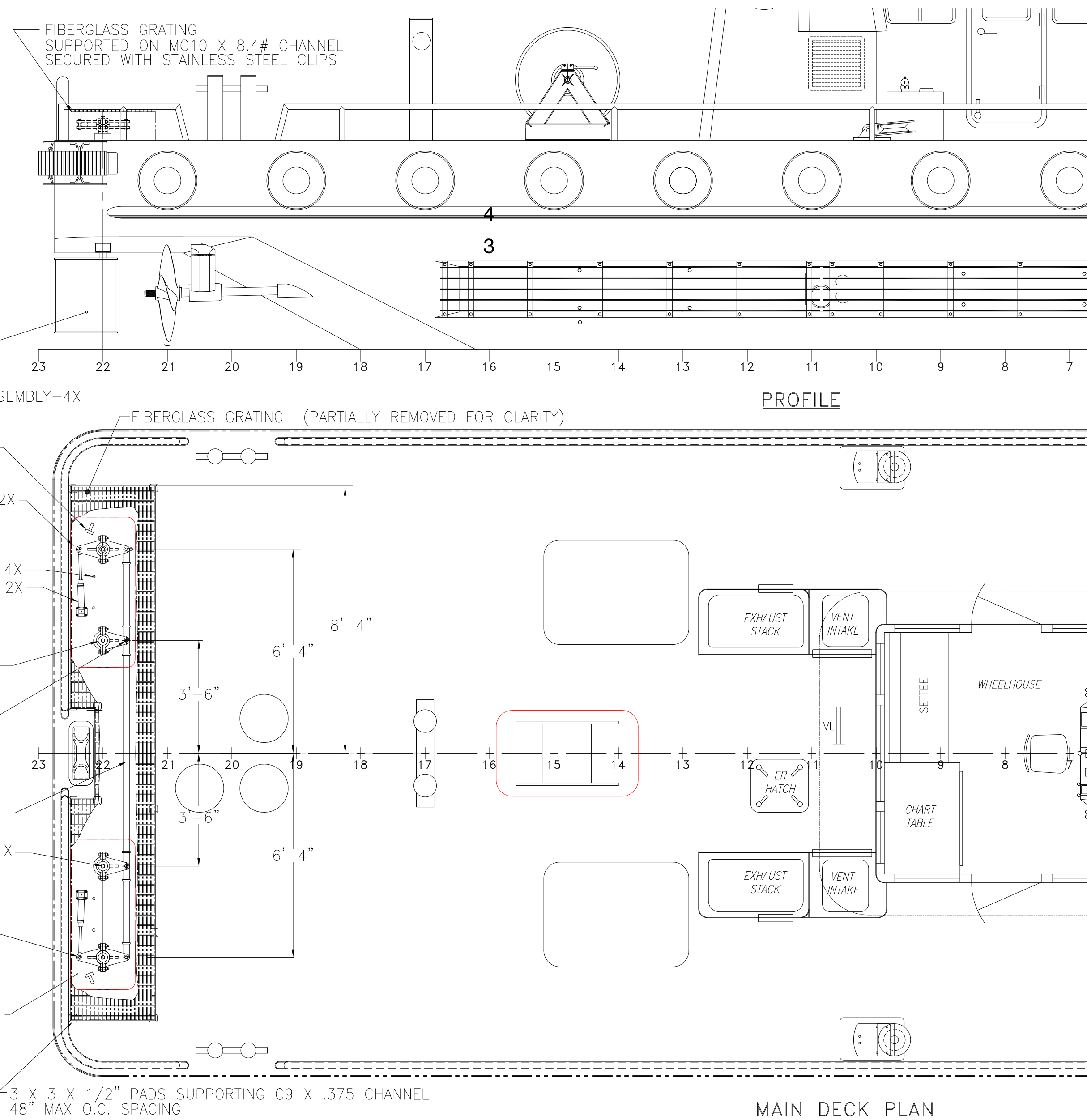


1 RUDDER INSTALLATION FRAME 22
SCALE: 3/8"=1'-0"



STEERING SYSTEM ARRANGMENT

- GENERAL NOTES -		- GENERAL NOTES -	
NO.	DESCRIPTION	NO.	DESCRIPTION
1.	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER M VESSELS.		
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3.	PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS AND WITH SUFFICIENT TAKE DOWN JOINTS TO PROVIDE FOR REMOVAL, INSPECTION, SERVICING, AND REPLACEMENT OF PIPING, VALVES, FITTINGS, AND EQUIPMENT.		
4.	AVOID POCKETS IN THE PIPE LINES. BOSSES AND VALVES OR SCREWED PLUGS SHALL BE FITTED TO ENABLE COMPLETE DRAINING OF PIPES WHERE POCKETS DO OCCUR.		
5.	THE PIPING SYSTEM SHALL BE PRESSURE TESTED, CLEANED, AND FLUSHED PRIOR TO BEING PLACED IN SERVICE. PER MANUFACTURER'S TEST PIPING TO 3000 PSI.		
6.	PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES. HANGERS SUPPORTING TUBING SHALL UTILIZE A RESILIENT NONMETALLIC LINER BETWEEN THE TUBING AND STEEL HANGER.		
7.	INSTALL RUDDER ANGLE INDICATOR IN PILOT HOUSE OVERHEAD.		
8.	HYDRAULIC RESERVOIRS TO HAVE FILLER/BREATHER, LEVEL/TEMPERATURE GAGE AND LOW LEVEL ALARM SWITCH.		
9.	INSTALL RUDDER BEARINGS PER MANUFACTURERS RECOMMENDATIONS.		
10.	CABLE SIZES AND # OF CONDUCTORS PER MANUFACTURERS SPECIFICATIONS.		



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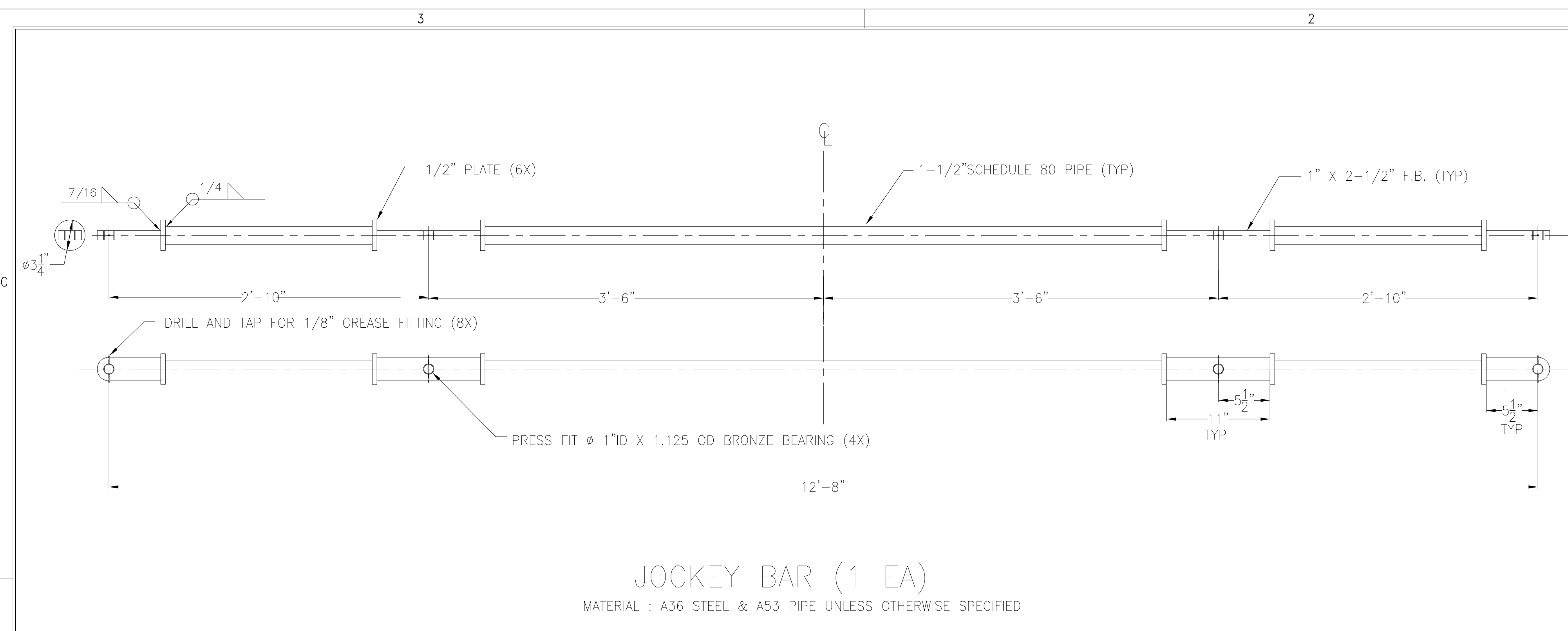
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www.dejongandlebet.com
Phone: (904) 399-1673
Fax: (904) 399-1522
info@dejongandlebet.com

Title: 45'-6"x20'-0"x6'-6" NCDOT PUSHBOAT

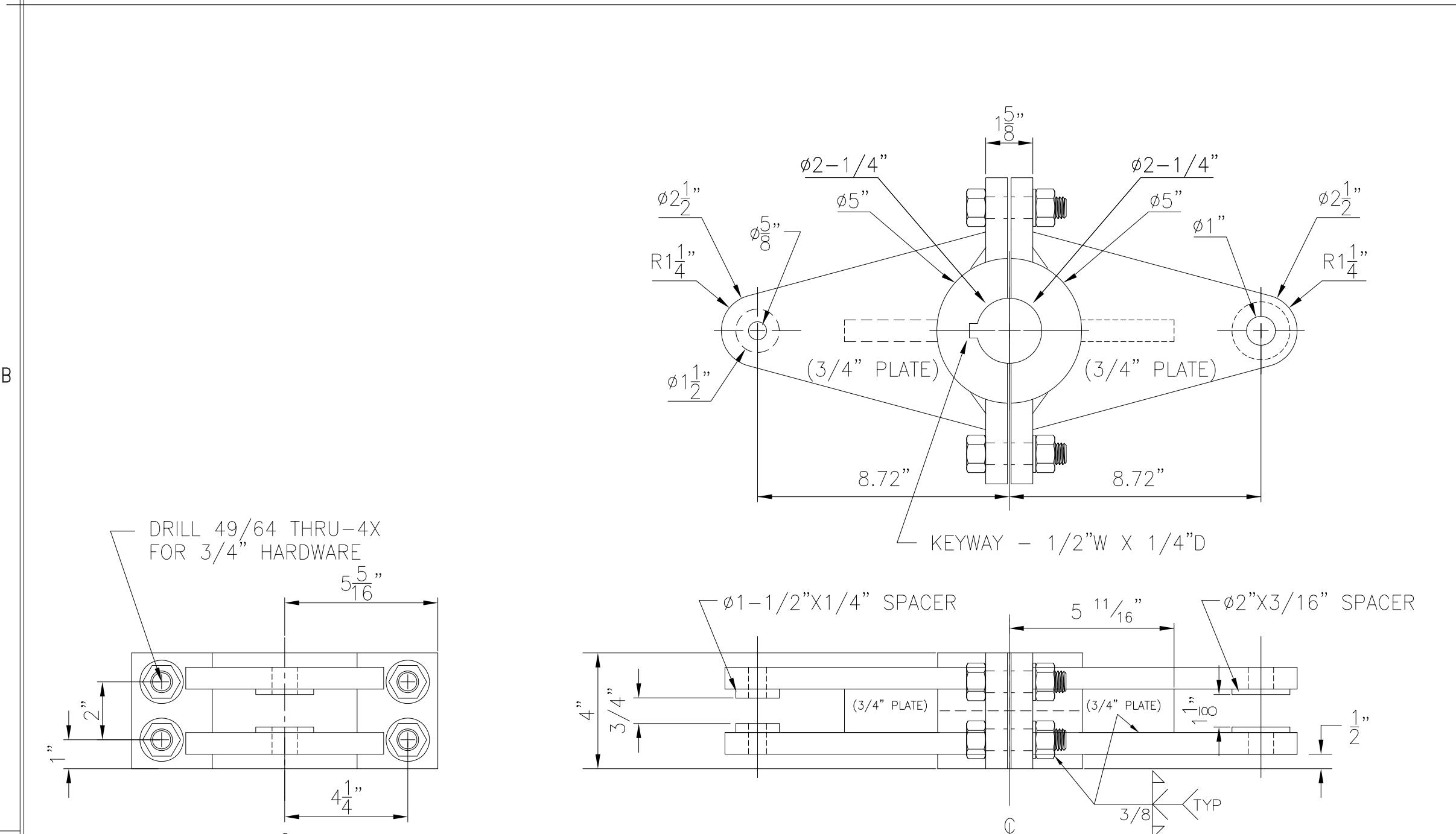
STEERING SYSTEM

Dwg. No. 17-1393-253 Alt. No. 0
Sh. 3 of 5

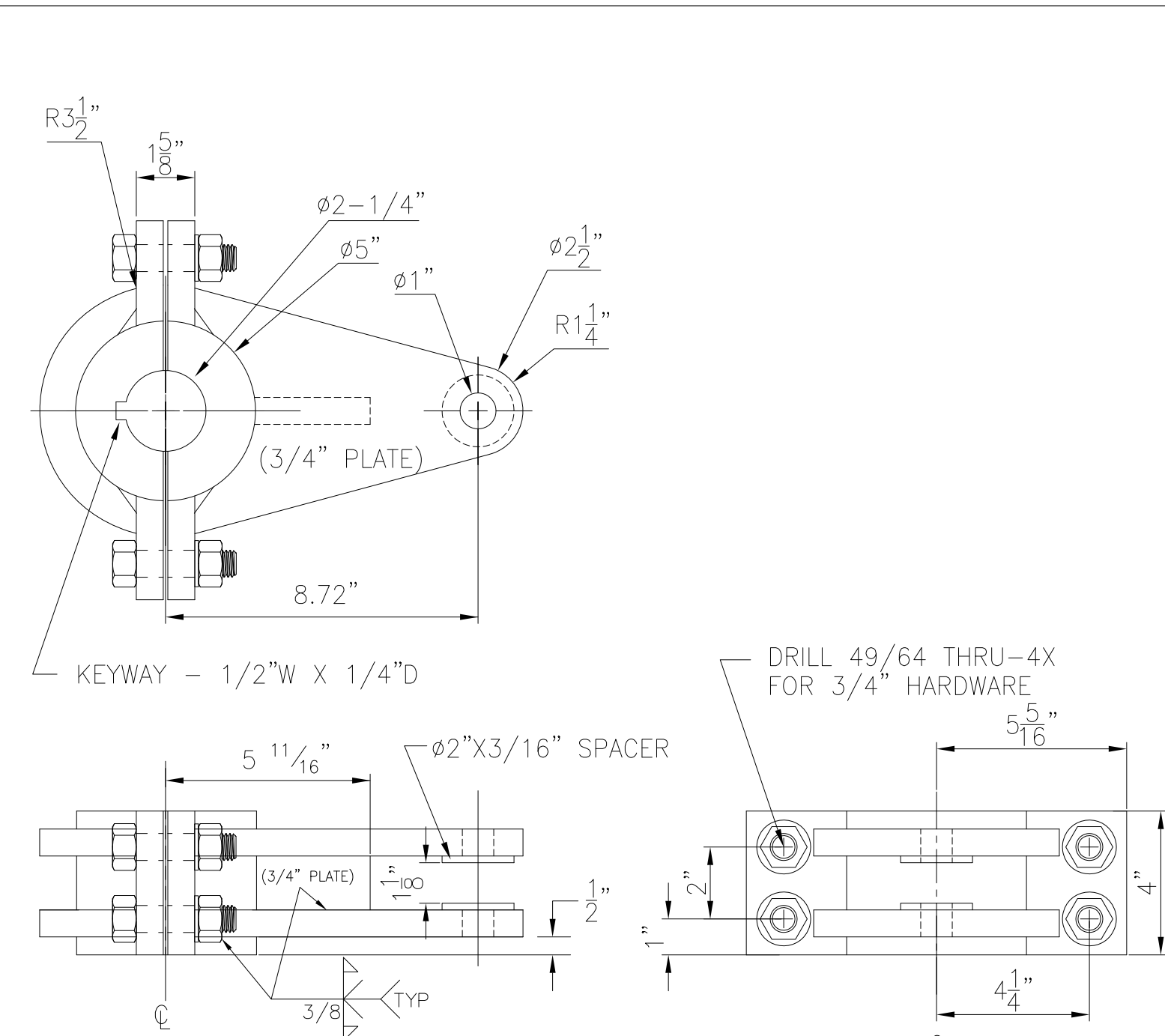
Drawn By: JAH Date: NOVEMBER 5, 2018
Checked By: _____ Date: _____
App'd By: _____ Scale: 3/8"=1'-0" OR NOTED
ABS App'l: _____ USCG App'l: _____



JOCKEY BAR (1 EA)
 MATERIAL : A36 STEEL & A53 PIPE UNLESS OTHERWISE SPECIFIED



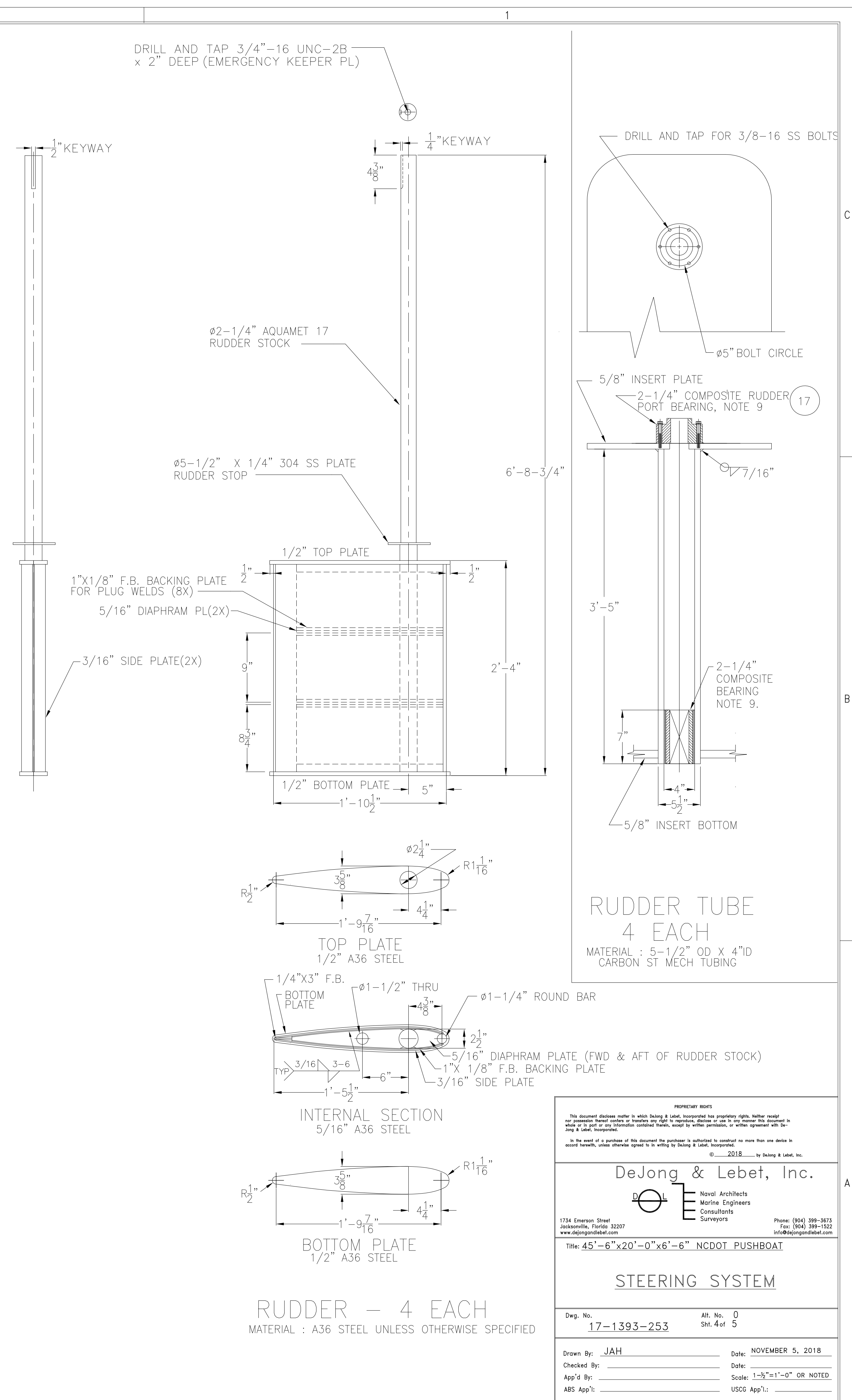
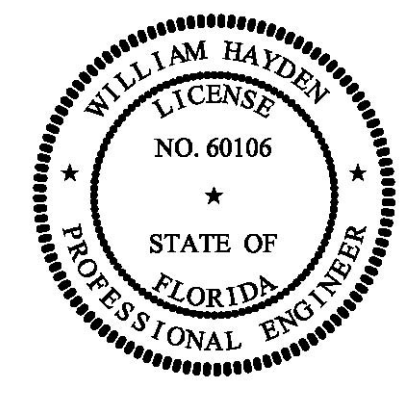
OUTBOARD TILLERS - 2 EACH
 MATERIAL : A36 STEEL UNLESS OTHERWISE SPECIFIED
 SCALE: 3" = 1'-0"



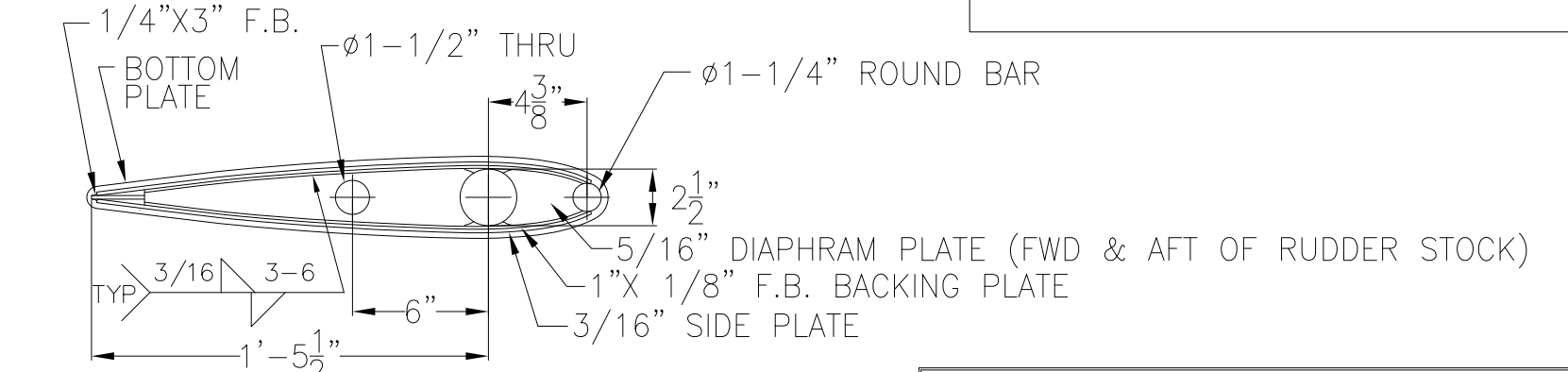
INBOARD TILLERS - 2 EACH
 MATERIAL : A36 STEEL UNLESS OTHERWISE SPECIFIED
 SCALE: 3" = 1'-0"

STEERING SYSTEM COMPONENTS

- GENERAL NOTES -		- GENERAL NOTES -	
NO.	DESCRIPTION	NO.	DESCRIPTION
1.	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER M VESSELS.		
2.	THIS DRAWING IS DIAGRAMMATIC AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. EQUIPMENT LAYOUT IN A GIVEN AREA IS APPROXIMATE. THE CONTRACTOR SHALL DEVELOP A DETAILED DESIGN THAT PROVIDES A FULLY FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION, TAKING INTO ACCOUNT ALL NECESSARY SYSTEM INTERFACES AND INTERFERENCES. DIMENSIONS SHALL BE VERIFIED FROM THE SHIP AND MANUFACTURERS' CERTIFIED DRAWINGS AS APPROPRIATE.		
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5.	THE PIPING SYSTEM SHALL BE PRESSURE TESTED, CLEANED, AND FLUSHED PRIOR TO BEING PLACED IN SERVICE. PER MANUFACTURER'S TEST PIPING TO 3000 PSI		
6.	PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES. HANGERS SUPPORTING TUBING SHALL UTILIZE A RESILIENT NONMETALLIC LINER BETWEEN THE TUBING AND STEEL HANGER.		
7.	INSTALL RUDDER ANGLE INDICATOR IN PILOT HOUSE OVERHEAD		
8.	HYDRAULIC RESERVOIRS TO HAVE FILLER/BREATHER, LEVEL/TEMPERATURE GAGE AND LOW LEVEL ALARM SWITCH		
9.	INSTALL RUDDER BEARINGS PER MANUFACTURERS RECOMMENDATIONS		
10.	CABLE SIZES AND # OF CONDUCTORS PER MANUFACTURERS SPECIFICATIONS		



RUDDER TUBE 4 EACH
 MATERIAL : 5-1/2" OD X 4" ID CARBON ST MECH TUBING



INTERNAL SECTION
 5/16" A36 STEEL

TOP PLATE
 1/2" A36 STEEL

BOTTOM PLATE
 1/2" A36 STEEL

RUDDER - 4 EACH
 MATERIAL : A36 STEEL UNLESS OTHERWISE SPECIFIED

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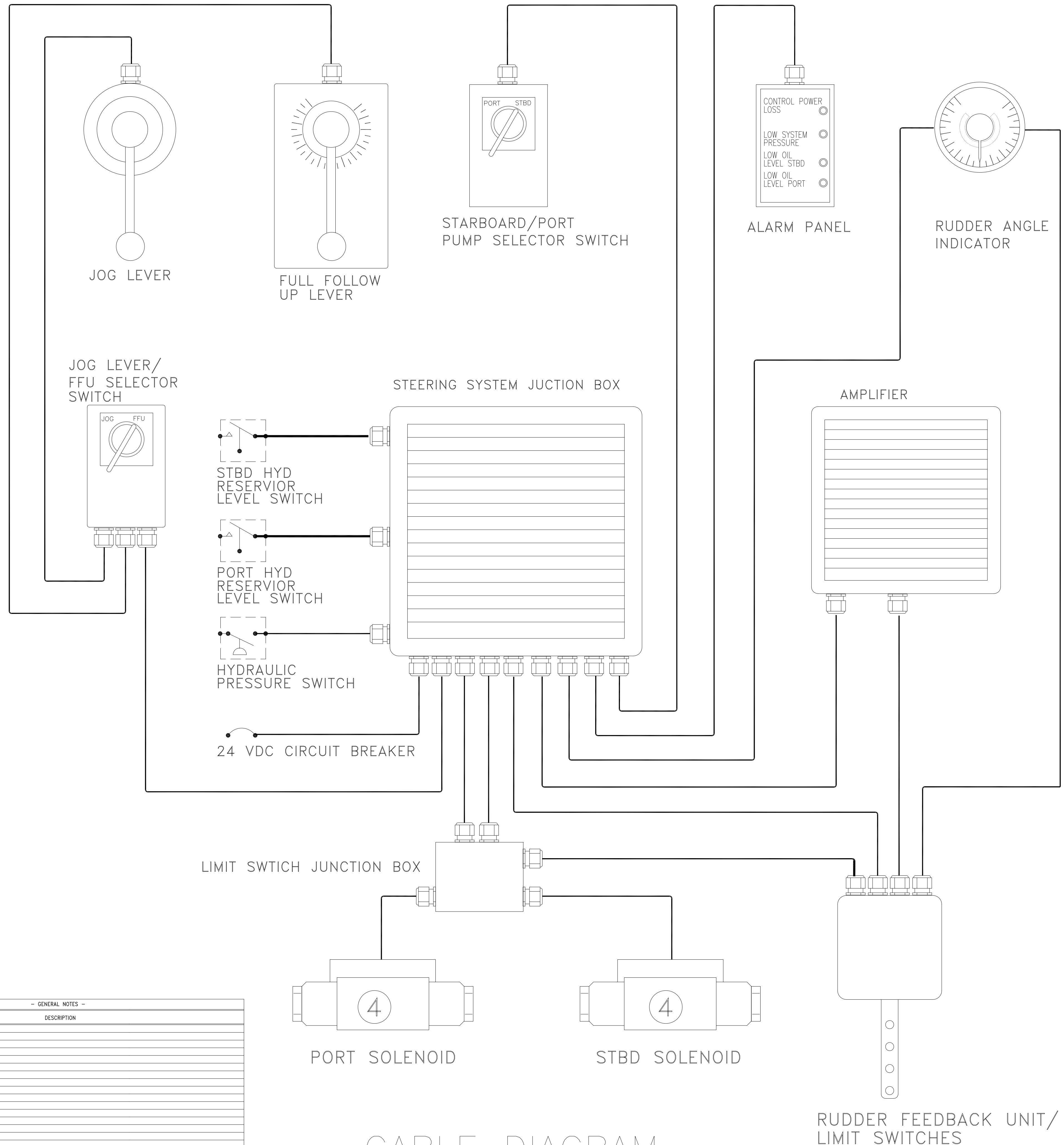
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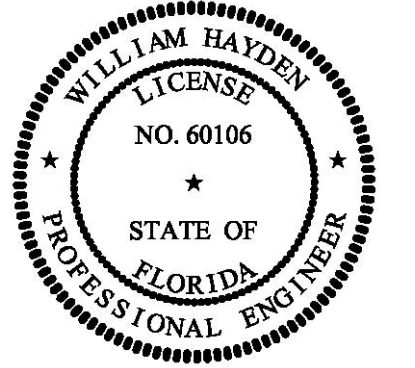
STEERING SYSTEM

Dwg. No. 17-1393-253 Alt. No. 0 Sh. 4 of 5

Drawn By: JAH Date: NOVEMBER 5, 2018
 Checked By: Date:
 App'd By: Scale: 1-1/2"=1'-0" OR NOTED
 ABS App'l: USCG App'l:



CABLE DIAGRAM



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Title: 45'-6" x 20'-0" x 6'-6" NCDOT PUSHBOAT

STEERING SYSTEM

Dwg. No. 17-1393-253 Alt. No. 0
Sht. 5 of 5

Drawn By: JAH Date: NOVEMBER 5, 2018
Checked By: _____ Date: _____
App'd By: _____ Scale: NONE
ABS App'l: _____ USCG App'l: _____

- GENERAL NOTES -		- GENERAL NOTES -	
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3.	PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS AND WITH SUFFICIENT TAKE DOWN JOINTS TO PROVIDE FOR REMOVAL, INSPECTION, SERVICING, AND REPLACEMENT OF PIPING, VALVES, FITTINGS, AND EQUIPMENT.		
4.	AVOID POCKETS IN THE PIPE LINES. BOSSES AND VALVES OR SCREWED PLUGS SHALL BE FITTED TO ENABLE COMPLETE DRAINING OF PIPES WHERE POCKETS DO OCCUR.		
5.	THE PIPING SYSTEM SHALL BE PRESSURE TESTED, CLEANED, AND FLUSHED PRIOR TO BEING PLACED IN SERVICE. PER MANUFACTURER'S TEST PIPING TO 3000 PSI.		
6.	PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES. HANGERS SUPPORTING TUBING SHALL UTILIZE A RESILIENT NONMETALLIC LINER BETWEEN THE TUBING AND STEEL HANGER.		
7.	INSTALL RUDDER ANGLE INDICATOR IN PILOT HOUSE OVERHEAD.		
8.	HYDRAULIC RESERVOIRS TO HAVE FILLER/BREATHER, LEVEL/TEMPERATURE GAGE AND LOW LEVEL ALARM SWITCH.		
9.	INSTALL RUDDER BEARINGS PER MANUFACTURERS RECOMMENDATIONS.		
10.	CABLE SIZES AND # OF CONDUCTORS PER MANUFACTURERS SPECIFICATIONS.		

SYSTEM OPERATION INTENT

EACH ENGINE IS PROVIDED WITH INDEPENDENT COOLING CIRCUITS, IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

SYMBOLS LIST

SYMBOL	DESCRIPTION
—	PIPE
	BUTTERFLY VALVE
	BALL VALVE
	BALL VALVE WITH THREADED PLUG
	REDUCER
	FLEXIBLE CONNECTION
	THERMOMETER
	FLOW DIRECTION ARROW
	FLOW SWITCH
	LEVEL SWITCH

GENERAL MATERIAL SCHEDULE

SERVICE	SIZE	PIPE	TAKEDOWN JOINTS			VALVES		FITTINGS	FLEXIBLE CONNECTIONS	COMMENTS
			MATERIAL	GASKETS	BOLTING	BODY	TRIM			
FW COOLING MAWP: 20 PSIG MAX TEMP: 200°F	1 1/2" & ABOVE	CARBON STEEL ASTM A53 OR A106, GRADE B SEAMLESS ANSI B36.10 SCH 40	FLANGE CARBON STEEL ASTM A105 ANSI B16.5 150# SLIP-ON OR WELD NECK	GARLOCK STYLE IFG 5500 OR EQUAL	BOLTS: CARBON STEEL ASTM A307 GRADE B ANSI B18.2.1 NUTS: CARBON STEEL ASTM A563 GRADE A ANSI B18.2.2	BUTTERFLY: DUCTILE IRON, ASTM A395, MSS-SP-67 150#, LUG TYPE	BUTTERFLY: SS DISC BUNA-M SEATS	CARBON STEEL ASTM A234, GR WPB ANSI B16.9 SCH 40 BUTT WELD	SEE B.O.M.	SEE NOTE 6
	UNDER 1-1/2"	SCH 80 SHALL BE USED AT HULL PENETRATIONS	UNION CARBON STEEL ASTM A105 ANSI B16.11 SOCKET WELD	-	-	BALL: CARBON STEEL ASTM A216 GR WCB THREADED 1500 PSI	BALL: CHROME PLATED CARBON STEEL BALL RPTFE SEATS	CARBON STEEL ASTM A105 ANSI B16.11 3000# SOCKET WELD	SEE B.O.M.	

EQUIPMENT LIST

ITEM #	QTY	SERVICE	TYPE	MODEL	CAPACITY	DRIVE	NOTES
1	2	MAIN ENGINE SCAC & GEARBOX OIL COOLER KEEL COOLER	KEEL COOLER	FERNSTRUM D8135U-Z	4541 BTU/MIN 50-58 GPM (0 KNOTS)	-	SEE NOTE 10
2	2	MAIN ENGINE J/W KEEL COOLER	KEEL COOLER	FERNSTRUM D10123-Z	10,758 BTU/MIN 53-77 GPM (0 KNOTS)	-	SEE NOTE 10

GENERAL NOTES

GENERAL NOTES

1. MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER M VESSELS.	9. TDH OF PUMPS FOR REQUIRED FLOW IS APPROXIMATE. THE CONTRACTOR SHALL PROVIDE PUMPS MEETING THE REQUIRED FLOW WITH THE INSTALLED PIPING SYSTEM. PUMP MOTORS SHALL BE SELECTED TO PREVENT MOTOR OVERLOAD OVER THE ENTIRE PUMP OPERATING RANGE.
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3. PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS AND WITH SUFFICIENT TAKE DOWN JOINTS TO PROVIDE FOR REMOVAL, INSPECTION, SERVICING, AND REPLACEMENT OF PIPING, VALVES, FITTINGS, AND EQUIPMENT.	11. CONNECT SWITCHES TO SHIP'S ALARM AND MONITORING SYSTEM AND PROVIDE LOW COOLANT LEVEL ALARMS FOR EACH ENGINE.
4. AVOID POCKETS IN THE PIPE LINES. BOSSES AND VALVES OR SCREWED PLUGS SHALL BE FITTED TO ENABLE COMPLETE DRAINING OF PIPES WHERE POCKETS DO OCCUR.	12. WHERE PRACTICABLE, ROUTE KEEL COOLER PIPING WITHOUT HIGH SPOTS THAT COULD TRAP AIR. A VENT SHALL BE PROVIDED AT EACH HIGH SPOT CAPABLE OF TRAPPING AIR IN THE SYSTEM.
5. THE PIPING SYSTEM SHALL BE PRESSURE TESTED, CLEANED, AND FLUSHED PRIOR TO BEING PLACED IN SERVICE. PER MANUFACTURER'S RECOMMENDATIONS KEEL COOLERS MAY BE PRESSURE TESTED TO 20 PSI.	13. MOUNT REDUCTION GEAR COOLER AS CLOSE AS POSSIBLE TO REDUCTION GEAR. OIL FLOW MUST BE OPPOSITE OF WATER FLOW IN OIL COOLER.
6. PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES. HANGERS SUPPORTING TUBING SHALL UTILIZE A RESILIENT NONMETALLIC LINER BETWEEN THE TUBING AND STEEL HANGER.	
7. KEEL COOLER INLET AND OUTLET VALVES SHALL BE LOCATED CLEAR OF OBSTRUCTIONS, AND WITHIN EASY REACH FOR OPERATION. ALL VALVES SHALL BE PROVIDED WITH VISUAL POSITION INDICATION.	
8. THE CONTRACTOR SHALL VERIFY ENGINE REQUIREMENTS AND KEEL COOLER SELECTION PRIOR TO ORDERING KEEL COOLERS.	

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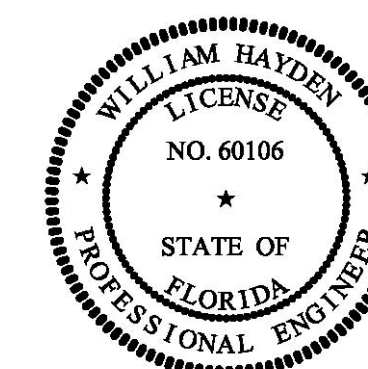
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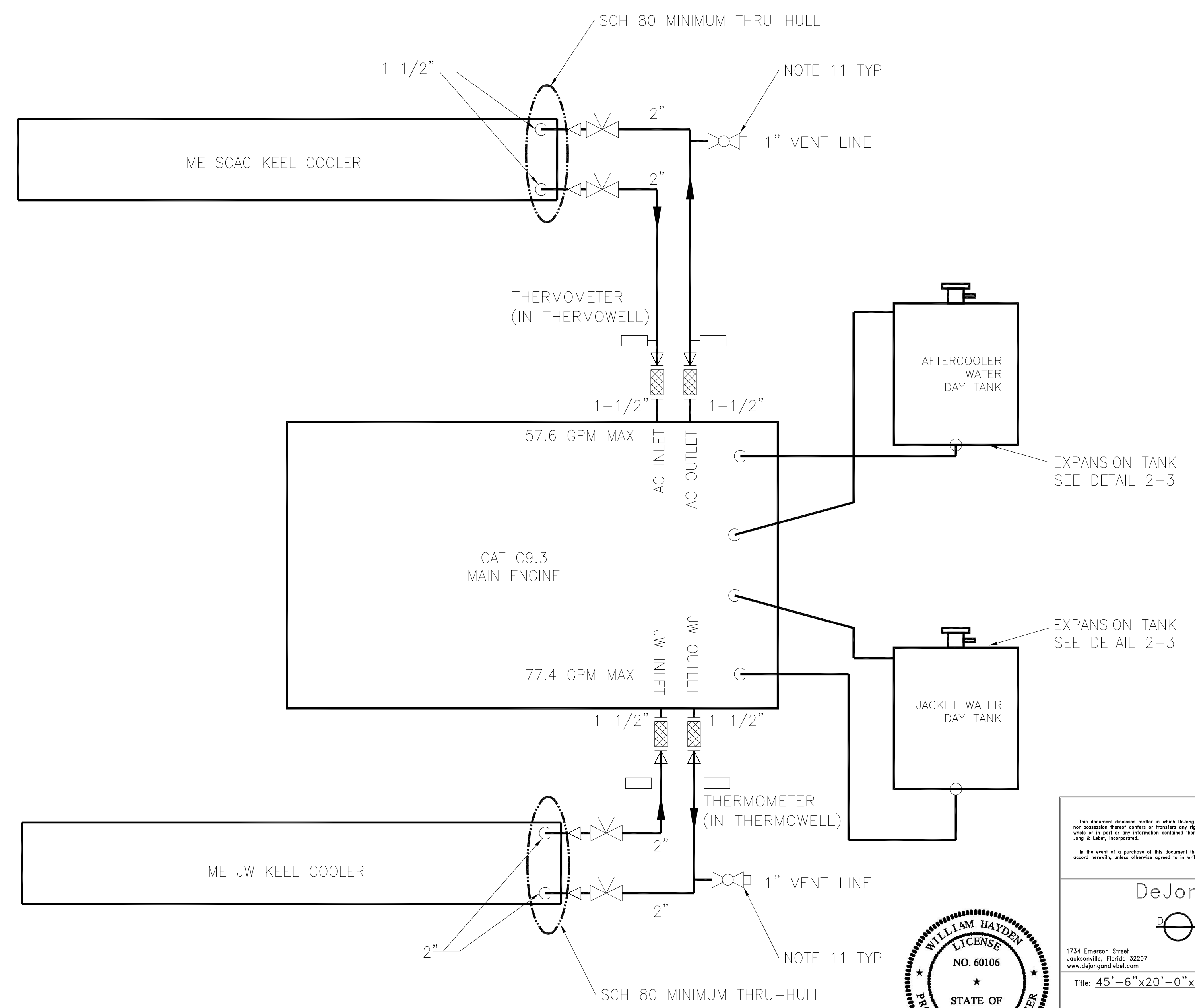
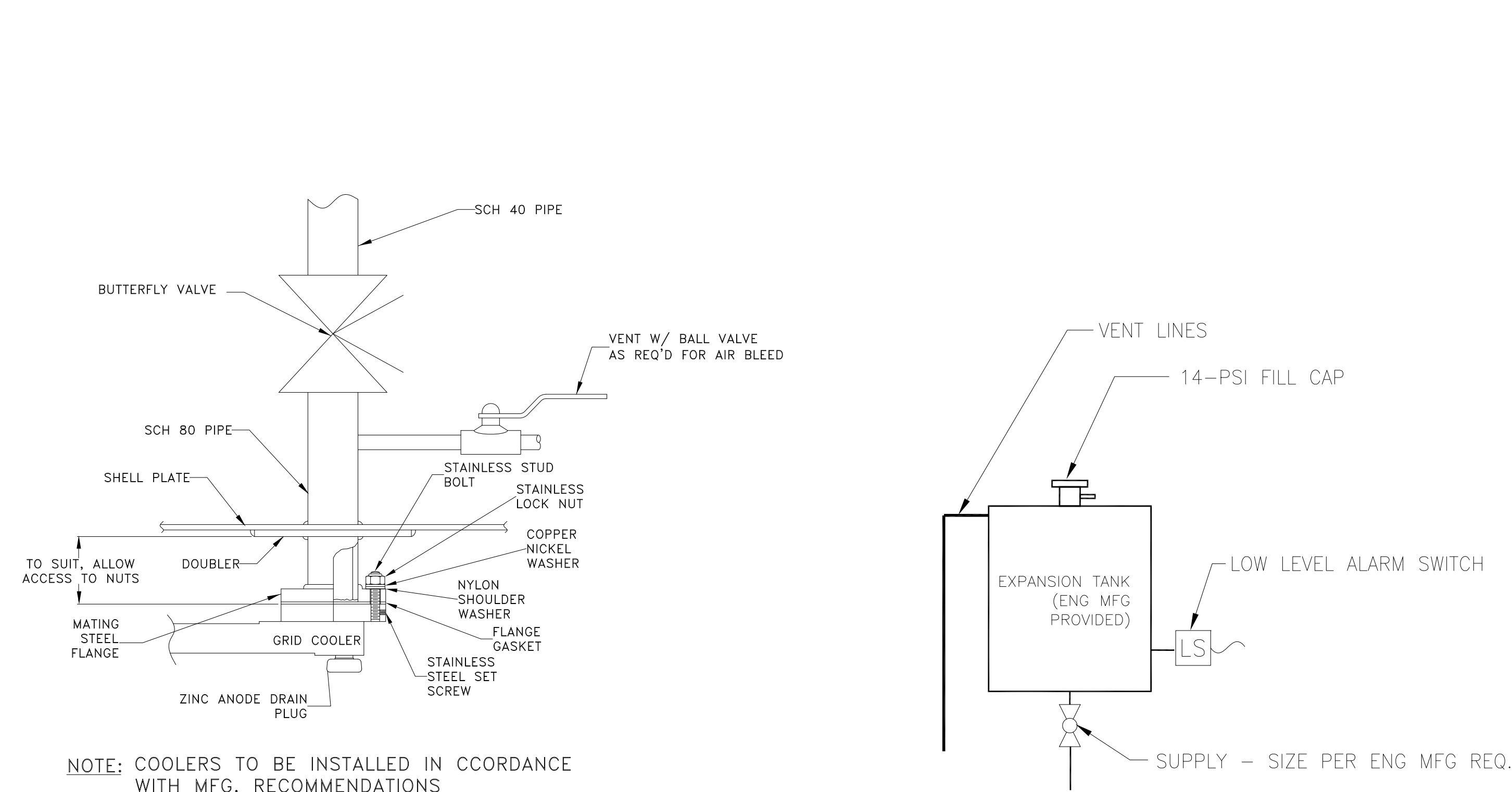
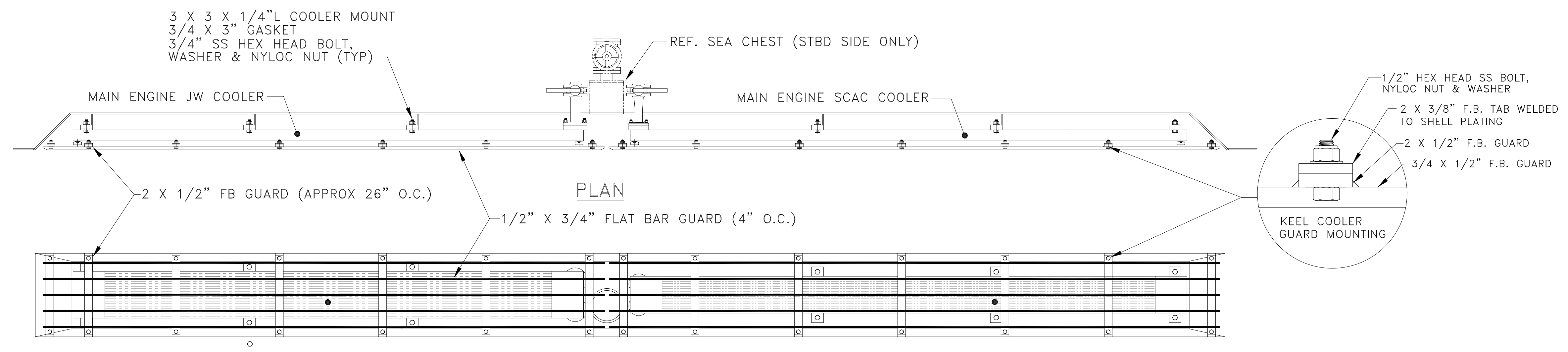
Title: 45'-6"x20'-0"x6'-6" NCDOT PUSHBOAT

MAIN ENGINE COOLING

Dwg. No. 17-1393-255 Alt. No. 0
 Sh. 1 of 1

Drawn By: JAH Date: OCTOBER 25, 2018
 Checked By: Date:
 App'd By: Scale: NONE
 ABS App'l: USCG App'l:





DETAIL 2-2
 KEEL COOLER PENETRATION DETAIL
 NO SCALE

DETAIL 2-3
 TYPICAL EXPANSION TANK
 NO SCALE

PLAN 2-1
 SSDG COOLING PIPING DIAGRAM
 NO SCALE

-- GENERAL NOTES --		-- GENERAL NOTES --	
NO.	DESCRIPTION	NO.	DESCRIPTION
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3.	PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS AND WITH SUFFICIENT TAKE DOWN JOINTS TO PROVIDE FOR REMOVAL, INSPECTION, SERVICING, AND REPLACEMENT OF PIPING, VALVES, FITTINGS, AND EQUIPMENT.	11.	CONNECT SWITCHES TO SHIP'S ALARM AND MONITORING SYSTEM AND PROVIDE LOW COOLANT LEVEL ALARMS FOR EACH ENGINE.
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5.	THE PIPING SYSTEM SHALL BE PRESSURE TESTED, CLEANED, AND FLUSHED PRIOR TO BEING PLACED IN SERVICE. PER MANUFACTURER'S RECOMMENDATIONS KEEL COOLERS MAY BE PRESSURE TESTED TO 20 PSI.	13.	MOUNT REDUCTION GEAR COOLER AS CLOSE AS POSSIBLE TO REDUCTION GEAR. OIL FLOW MUST BE OPPOSITE OF WATER FLOW IN OIL COOLER.
6.	PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES. HANGERS SUPPORTING TUBING SHALL UTILIZE A RESILIENT NONMETALLIC LINER BETWEEN THE TUBING AND STEEL HANGER.		
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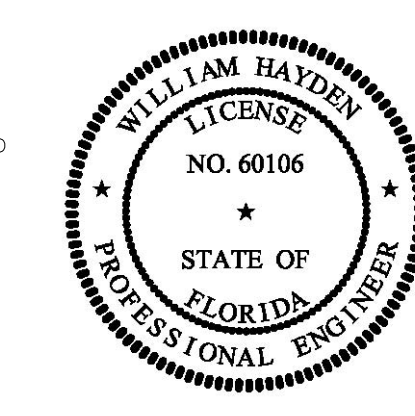
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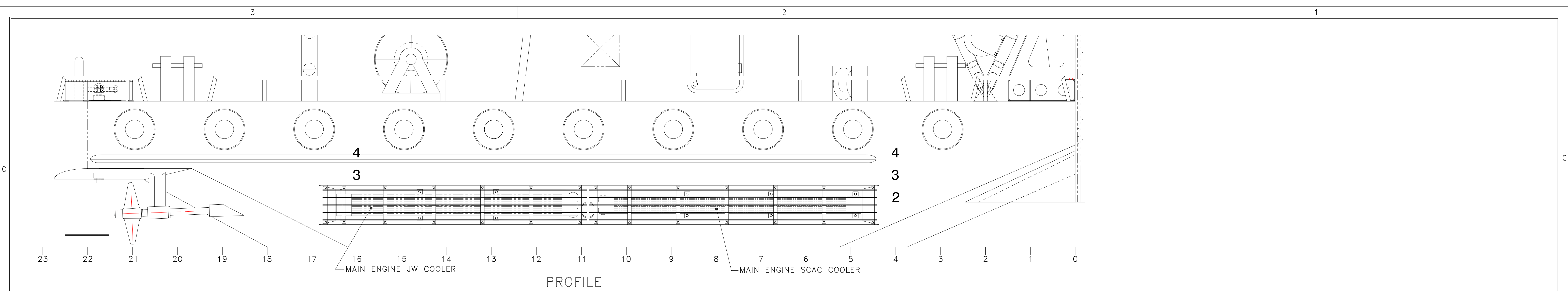
Title: 45'-6"x20'-0"x6'-6" NCDOT PUSHBOAT

MAIN ENGINE COOLING

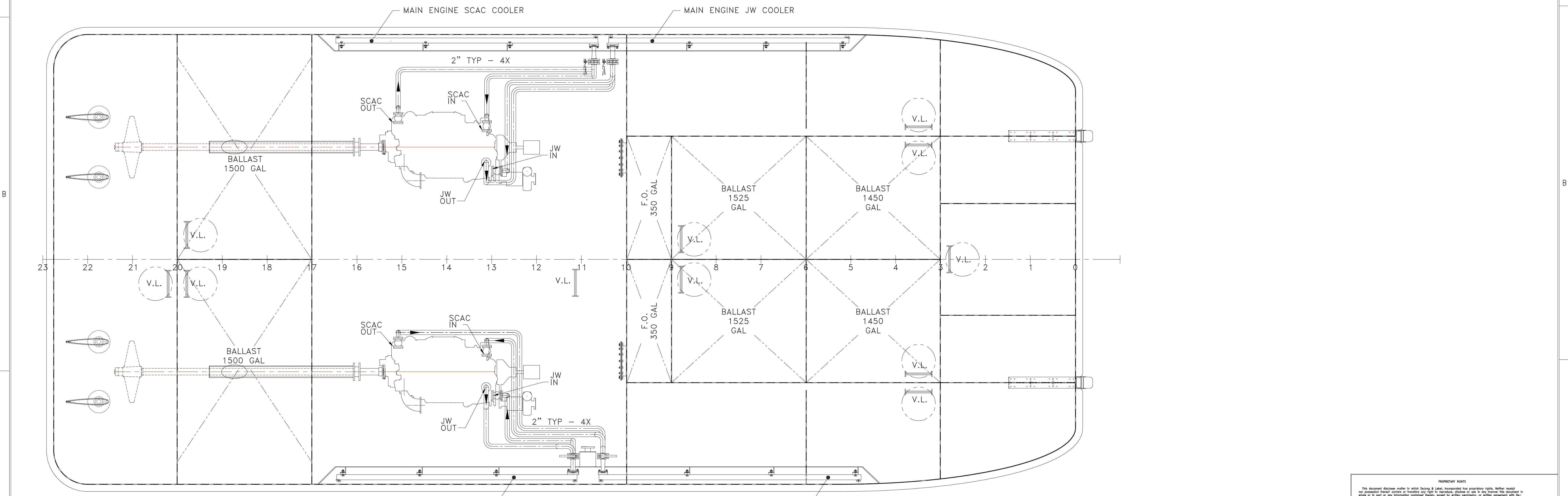
Dwg. No. 17-1393-255 Alt. No. 0
 Sh: 2 of 3

Drawn By: JAH Date: OCTOBER 25, 2018
 Checked By: Date: None
 App'd By: Scale: None
 ABS App'l: USCG App'l:





PROFILE



HOLD PLAN

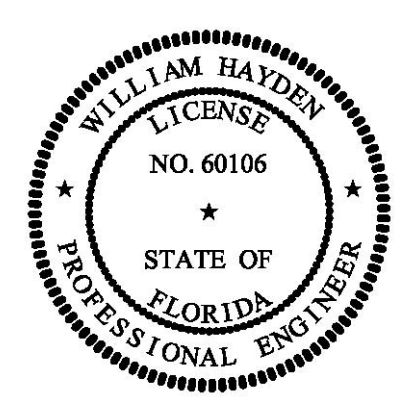
MAIN ENGINE COOLING ARRANGEMENT

GENERAL NOTES

NO.	DESCRIPTION
1.	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER M VESSELS.
2.	THIS DRAWING IS DIAGRAMMATIC AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. EQUIPMENT LAYOUT IN A GIVEN AREA IS APPROXIMATE. THE CONTRACTOR SHALL DEVELOP A DETAILED DESIGN THAT PROVIDES A FULLY FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION, TAKING INTO ACCOUNT ALL NECESSARY SYSTEM INTERFACES AND INTERFERENCES. DIMENSIONS SHALL BE VERIFIED FROM THE SHIP AND MANUFACTURERS' CERTIFIED DRAWINGS AS APPROPRIATE.
3.	PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS AND WITH SUFFICIENT TAKE DOWN JOINTS TO PROVIDE FOR REMOVAL, INSPECTION, SERVICING, AND REPLACEMENT OF PIPING, VALVES, FITTINGS, AND EQUIPMENT.
4.	AVOID POCKETS IN THE PIPE LINES. BOSSES AND VALVES OR SCREWED PLUGS SHALL BE FITTED TO ENABLE COMPLETE DRAINING OF PIPES WHERE POCKETS DO OCCUR.
5.	THE PIPING SYSTEM SHALL BE PRESSURE TESTED, CLEANED, AND FLUSHED PRIOR TO BEING PLACED IN SERVICE. PER MANUFACTURER KEEL COOLERS MAY BE PRESSURE TESTED TO 20 PSI.
6.	PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES. HANGERS SUPPORTING TUBING SHALL UTILIZE A RESILIENT NONMETALLIC LINER BETWEEN THE TUBING AND STEEL HANGER.
7.	KEEL COOLER INLET AND OUTLET VALVES SHALL BE LOCATED CLEAR OF OBSTRUCTIONS, AND WITHIN EASY REACH FOR OPERATION. ALL VALVES SHALL BE PROVIDED WITH VISUAL POSITION INDICATION.
8.	THE CONTRACTOR SHALL VERIFY ENGINE REQUIREMENTS AND KEEL COOLER SELECTION PRIOR TO ORDERING KEEL COOLERS.

GENERAL NOTES

NO.	DESCRIPTION
9.	TDH OF PUMPS FOR REQUIRED FLOW IS APPROXIMATE. THE CONTRACTOR SHALL PROVIDE PUMPS MEETING THE REQUIRED FLOW WITH THE INSTALLED PIPING SYSTEM. PUMP MOTORS SHALL BE SELECTED TO PREVENT MOTOR OVERLOAD OVER THE ENTIRE PUMP OPERATING RANGE.
10.	CONTRACTOR TO SIZE, LOCATE AND INSTALL EXPANSION TANKS IN ACCORDANCE WITH ENGINE MANUFACTURER'S RECOMMENDATIONS. PROVIDE A 1" VALVED DRAIN WITH PLUG AT THE LOWEST POINT OF EACH COOLING CIRCUIT.
11.	CONNECT SWITCHES TO SHIP'S ALARM AND MONITORING SYSTEM AND PROVIDE LOW COOLANT LEVEL ALARMS FOR EACH ENGINE.
12.	WHERE PRACTICABLE, ROUTE KEEL COOLER PIPING WITHOUT HIGH SPOTS THAT COULD TRAP AIR. A VENT SHALL BE PROVIDED AT EACH HIGH SPOT CAPABLE OF TRAPPING AIR IN THE SYSTEM.
13.	MOUNT REDUCTION GEAR COOLER AS CLOSE AS POSSIBLE TO REDUCTION GEAR. OIL FLOW MUST BE OPPOSITE OF WATER FLOW IN OIL COOLER.



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Title: 45'-6"x20'-0"x6'-6" NCDOT PUSHBOAT

MAIN ENGINE COOLING

Dwg. No. 17-1393-255 Alt. No. 0
 Sh. 3 of 3

Drawn By: JAH Date: OCTOBER 25, 2018
 Checked By: Date:
 App'd By: Scale: 1/2" = 1'-0"
 ABS App'l: USCG App'l:

MATERIAL SCHEDULE											
SERVICE	SIZE	PIPE	COMPONENTS				VALVES		BOLTING		REMARKS
			TAKEDOWN JOINTS	FITTINGS	FLEX CONNECT	GASKETS	BODY	TRIM	BOLTS/STUDS	NUTS/WASHERS	
MAIN ENGINE EXHAUST PIPING MAWP: 27" H2O MAWT: 703°F	ALL	S.S.321 SCH 20, SEAMLESS, ASTM A312, ANSI B36.10	FLANGES: WELD NECK OR SOCKET WELD, S.S. 321 ASTM A182, ANSI B16.5	FLANGED: ASTM SA182 F321, ANSI B16.5 BUTTWELD: S.S.321, ASTM A403/SA403, ANSI B16.9 OR B16.28;	SEE NOTE 7	FLEXITALLIC STYLE CG W/ FLEXICARD GRAPHITE OR 304L SS SPIRAL WOUND METALLIC W/ GRAPHITE FILLER	DRAIN VALVES (GATE) FORGED STEEL ASTM A105	STAINLES STEEL	BOLTS/STUDS: CRES, ASTM A193/193M, GRADE B8T ANSI B18.2.1;	NUTS: CRES, ASTM A194/194M, GRADE B8T, ANSI B18.2.2;	-
EXHAUST PIPING EXPOSED TO WEATHER	ALL	STAINLESS STEEL ASTM A312, GR TP304L, ANSI B36.10 SCH 40 -6"	-	-	-	-	-	-	-	-	-

EQUIPMENT LIST						
ITEM	QTY	SERVICE	SIZE	TYPE	MAKE/MODEL	REMARKS
1	2	MAIN ENGINE SILENCER	6"	CRITICAL GRADE SPARK ARRESTING	(END IN/END OUT)	SEE NOTE 14
2	2	MAIN ENGINE TURBO OUTLET EXPANSION JOINT	VENDOR SUPPLY	-	-	SEE NOTES 6 & 7
3	2	MAIN ENGINE EXPANSION JOINT ENGINE EXHAUST	6"	-	-	SEE NOTES 6 & 7
4	2	EXHAUST RAIN CAP	6"	-	-	SEE DETAIL 1-1A
5	AS REQD	EXHAUST BLANKET	-	-	-	SEE NOTE 9
PS-6"	AS REQD	EXHAUST PIPE	6"	SCHED 40, 316 SS	-	SEE MATERIAL SCHEDULE
F-6"	AS REQD	EXHAUST PIPE FITTINGS	6"	SCHED 40, 316 SS	-	SEE MATERIAL SCHEDULE ALL ELBOWS LONG RADIUS

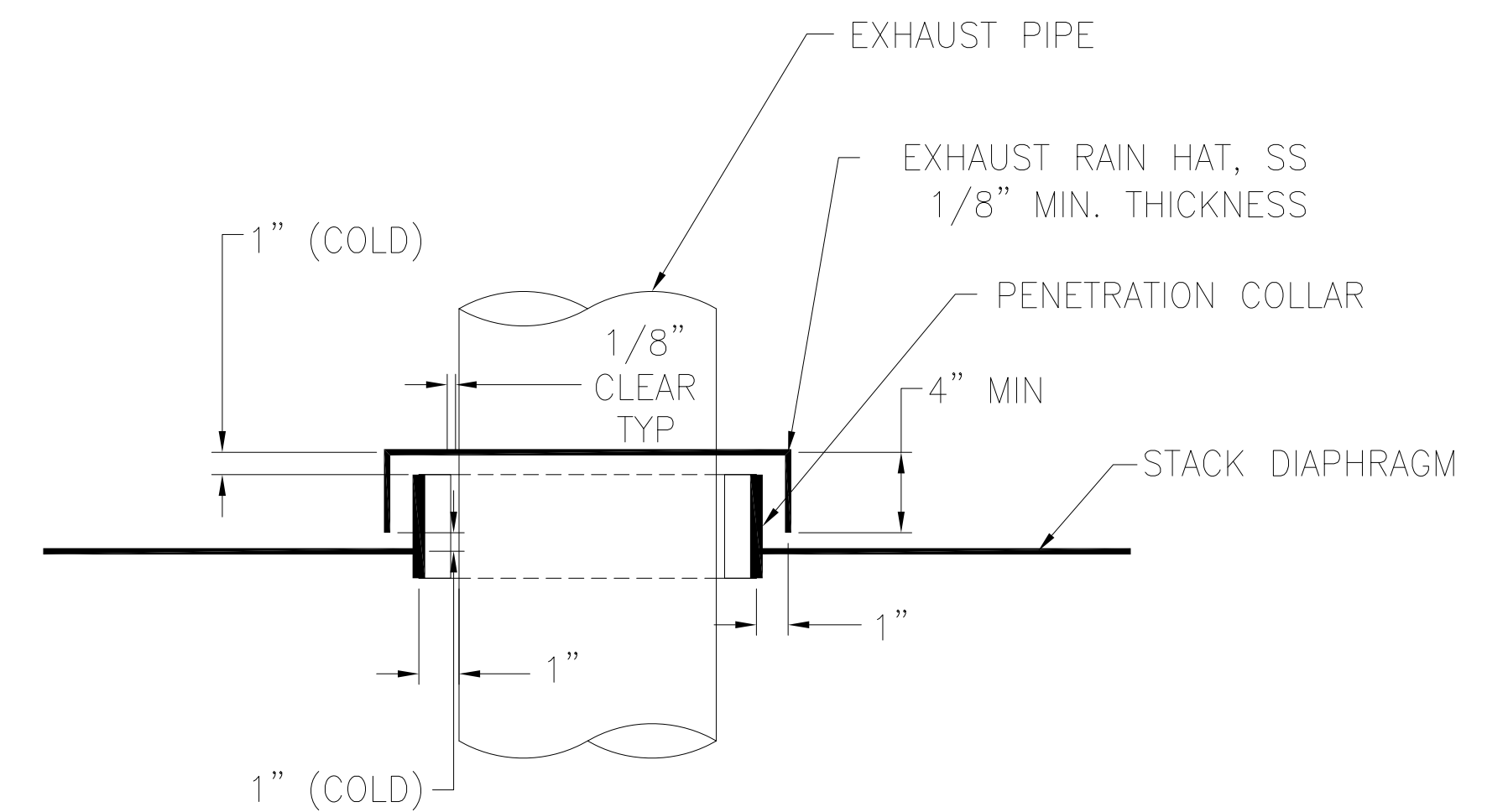
SPECIFIC NOTES

SYSTEM DETAILS:
EX: EXHAUST PIPING ANCHOR, RAINCAP, AND GUIDE DETAILS SHOW PRELIMINARY CONFIGURATION AND LOCATIONS FOR PIPING SUPPORT SYSTEM. FINAL DIMENSIONING AND DETAILING ARE TO BE COMPLETED BY CONTRACTOR AND ARE SUBJECT TO OWNER APPROVAL. PIPE HANGERS SHALL BE RUBBER DESIGN OR EQUAL.

PRELIMINARY DESIGN NOTES:
EX: EXHAUST PIPING ROUTING SHOWS PRELIMINARY CONFIGURATION AND LOCATIONS FOR PIPING SUPPORT SYSTEM. FINAL DIMENSIONING AND DETAILING ARE TO BE COMPLETED BY CONTRACTOR AND ARE SUBJECT TO OWNER APPROVAL. PIPE HANGERS SHALL BE LO-REZ OR EQUAL.

EX: ENGINE DETAILS SHOWN ARE NOT FROM CERTIFIED VENDOR DRAWINGS. CONTRACTOR TO VERIFY ENGINE CONNECTIONS AND EXHAUST SYSTEM REQUIREMENTS.

PARTS EXPOSED TO WEATHER:
EX: TAIL PIPE, RAIN HAT, HEAT SHIELD, FASTENERS & HANGERS EXPOSED TO WEATHER AT THE NAV/BRIDGE DECK LEVEL AND ABOVE SHALL BE ASTM A312 TYPE 316L STAINLESS STEEL.



DETAIL 1-1A
TYP RAIN HAT DETAIL
NO SCALE

- GENERAL NOTES -

NO.	DESCRIPTION
1	ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH 46 CFR SUBCHAPTER M
2	PIPING SHALL BE RUN AS DIRECTLY AS POSSIBLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS. PROVIDE A SUFFICIENT NUMBER OF TAKEDOWN JOINTS TO ALLOW FOR REMOVAL & INSPECTION
3	PRIOR TO FABRICATION OF MATING PIPE ASSEMBLIES, VERIFY EQUIPMENT CONNECTIONS FOR SIZE, LOCATION AND TYPE IN ACCORDANCE WITH MANUFACTURER CERTIFIED DRAWINGS, OR DIRECTLY FROM THE EQUIPMENT. TEMPLATE BOLTING PATTERNS AND CONNECTIONS AS REQUIRED.
4	ALL BOLTED FLANGES ARE TO BE MATED UP FREE OF STRAIN.
5	PIPE HANGERS SHALL MEET THE REQUIREMENTS OF ASTM F708. THE CONTRACTOR SHALL DESIGN AND INSTALL PIPE HANGERS AS NECESSARY TO ADEQUATELY SUPPORT EXHAUST SYSTEMS UNDER STATIC AND DYNAMIC LOADS IMPOSED BY VESSEL MOTIONS, VIBRATION AND THERMAL EXPANSION. THERMAL INSULATION GASKETS SHALL BE INSTALLED BETWEEN THE EXHAUST PIPE AND THE HANGER ATTACHMENT TO THE SHIP.
6	PROVIDE EXPANSION JOINTS WHERE REQUIRED TO ACCOMMODATE THERMAL GROWTH OF EXHAUST PIPES. EXPANSION JOINTS ARE TO BE STAINLESS STEEL MULTI-PLY LAMINATE TYPE MANUFACTURED TO EJMA STANDARDS. EACH EXPANSION JOINT SHALL HAVE ONE END FIXED FLANGE AND THE OTHER END WITH A FLOATING FLANGE. A FLOW DIRECTION ARROW SHALL BE PERMANENTLY MARKED ON EACH EXPANSION JOINT.
7	EXHAUST ELBOW AND EXPANSION JOINT AT ENGINE TURBO OUTLET SHALL BE SUPPLIED BY THE ENGINE MANUFACTURER. ALL OTHERS SHALL BE DME, AMERICAN BOA, OR EQUAL.
8	WEIGHT TRANSMITTED TO EACH ENGINE EXHAUST OUTLET CONNECTION IS NOT TO EXCEED THE MANUFACTURERS' RECOMMENDATIONS IN ANY CONDITION.
9	INSULATION FOR ENGINE EXHAUST PIPING AND SILENCERS SHALL BE REMOVABLE INSULATION BLANKETS HAVING A 2" MINIMUM THICKNESS. BLANKETS SHALL BE FASTENED WITH STAINLESS STEEL HOOKS AND INSULATION MATERIALS AND INSTALLATION DETAILS SHALL BE IN ACCORDANCE WITH ASTM F683.
10	1/4" PIPE TAPS SHALL BE INSTALLED ON ENGINE EXHAUST OUTLET PIPING TO FACILITATE BACK PRESSURE MEASUREMENTS.
11	TAIL PIPE, TOP HAT, AND HANGERS EXPOSED TO WEATHER AT THE BRIDGE DECK LEVEL AND ABOVE SHALL BE ASTM A312 TYPE 316L STAINLESS STEEL.
12	VERTICAL EXHAUST PIPING RUNS SHALL BE FITTED WITH VALVED DRAINS LOCATED AT THE LOWEST POINT. EACH DRAIN SHALL CONSIST OF A THREADED STEEL WELDOLET OR HALF COUPLING WELDED TO THE PIPE, FITTED WITH A SCHEDULE 40 PIPE, AND CAPPED WITH A 1" INCH GATE VALVE.
13	PRIOR TO BEING PLACED INTO SERVICE THE EXHAUST PIPING SHALL BE CLEANED AND CHECKED FOR LEAKS.
14	WEIGHT TRANSMITTED TO THE ENGINE CONNECTION IS NOT TO EXCEED THE MANUFACTURERS' RECOMMENDATIONS IN HOT AND COLD CONDITIONS.
15	CONTRACTOR SHALL VERIFY ENGINE EXHAUST BACK PRESSURE REQUIREMENTS AND CONNECTION DETAILS PRIOR TO ORDERING MATERIALS.

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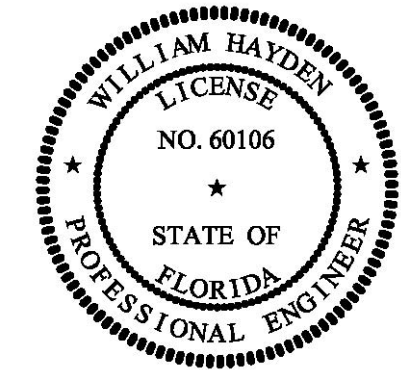
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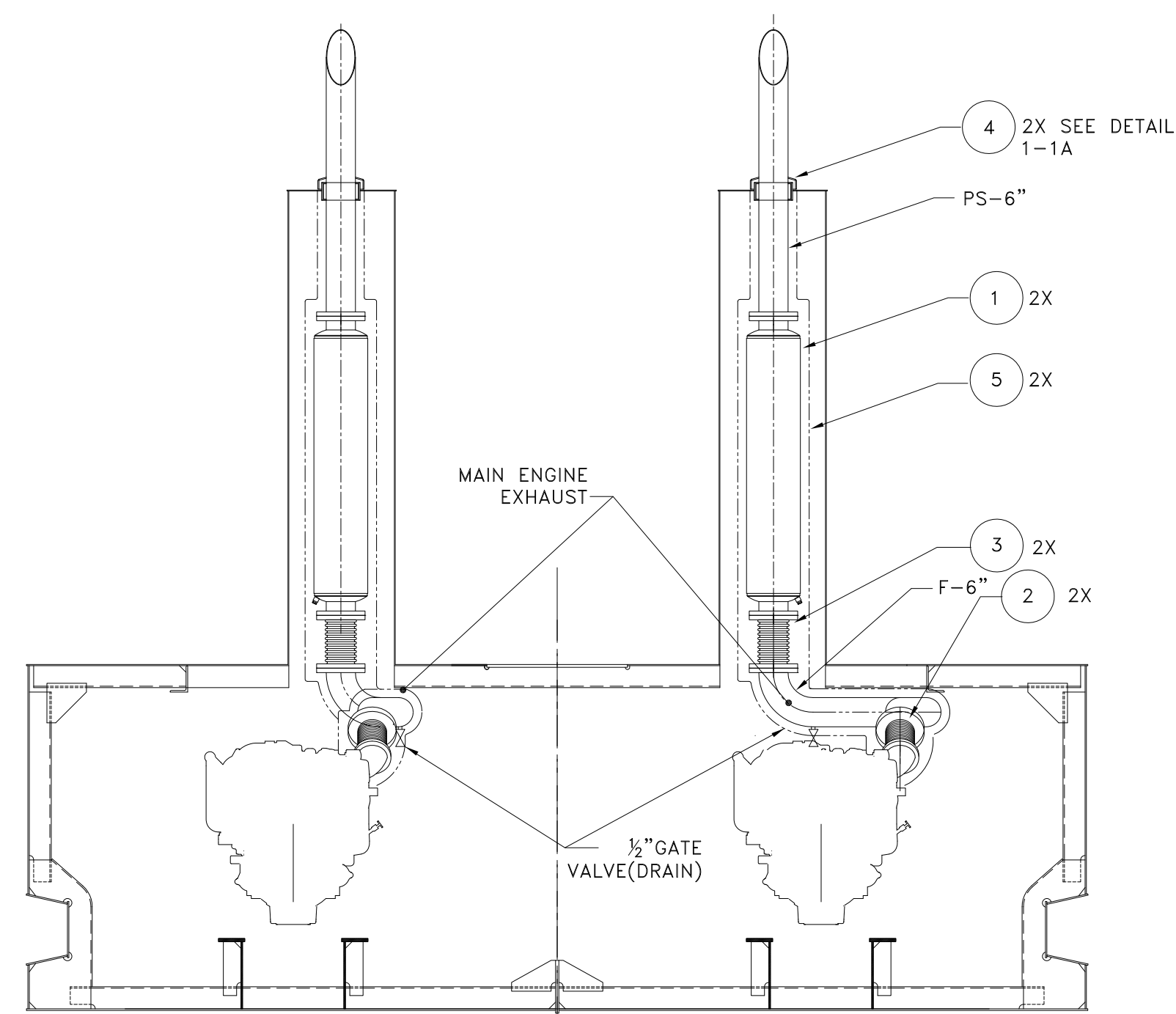
Title: 45.5'x20'x6.5' NCDOT PUSHBOAT

MAIN ENGINE EXHAUST ARRANGEMENT

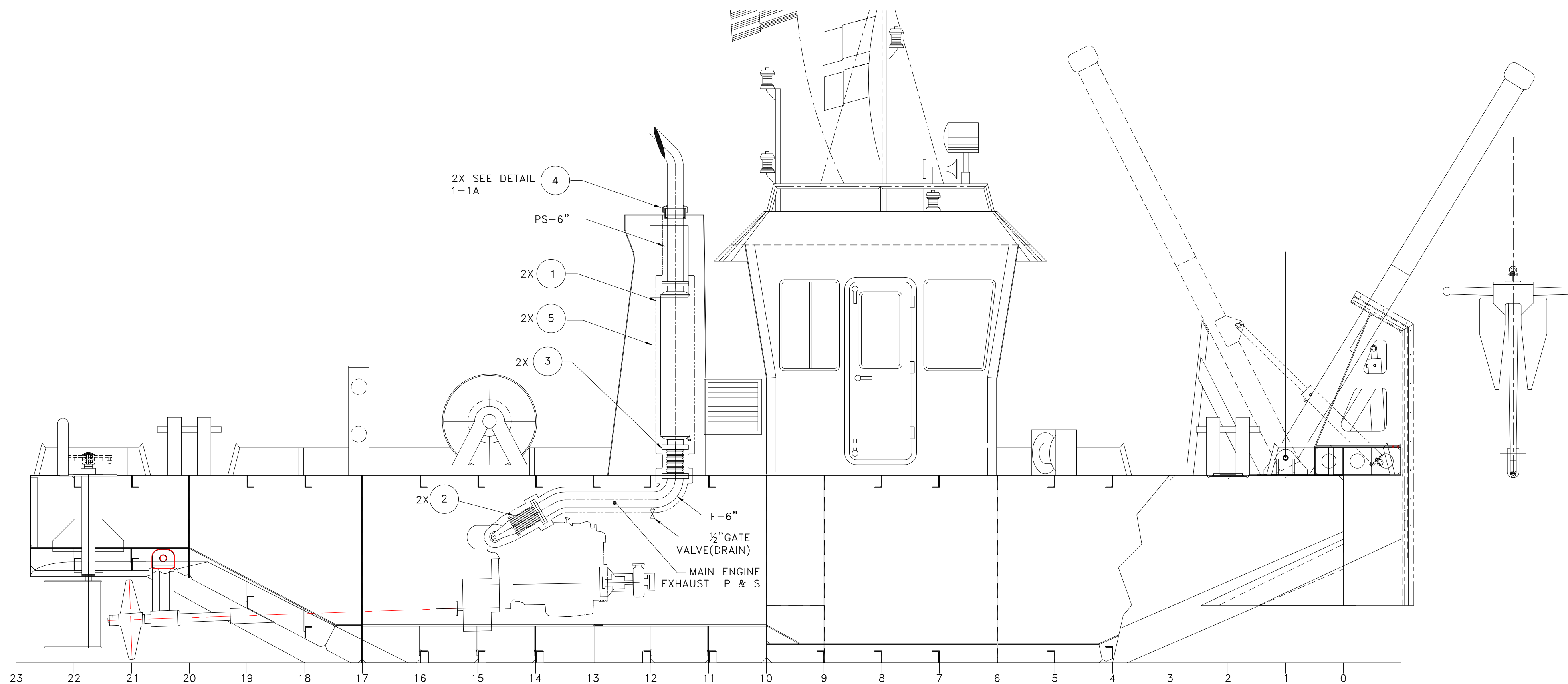
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Shr. 1 of 2

Drawn By: JAH Date: DECEMBER 7, 2013
Checked By: _____ Date: _____
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ABS App'l: _____ USCG App'l: _____

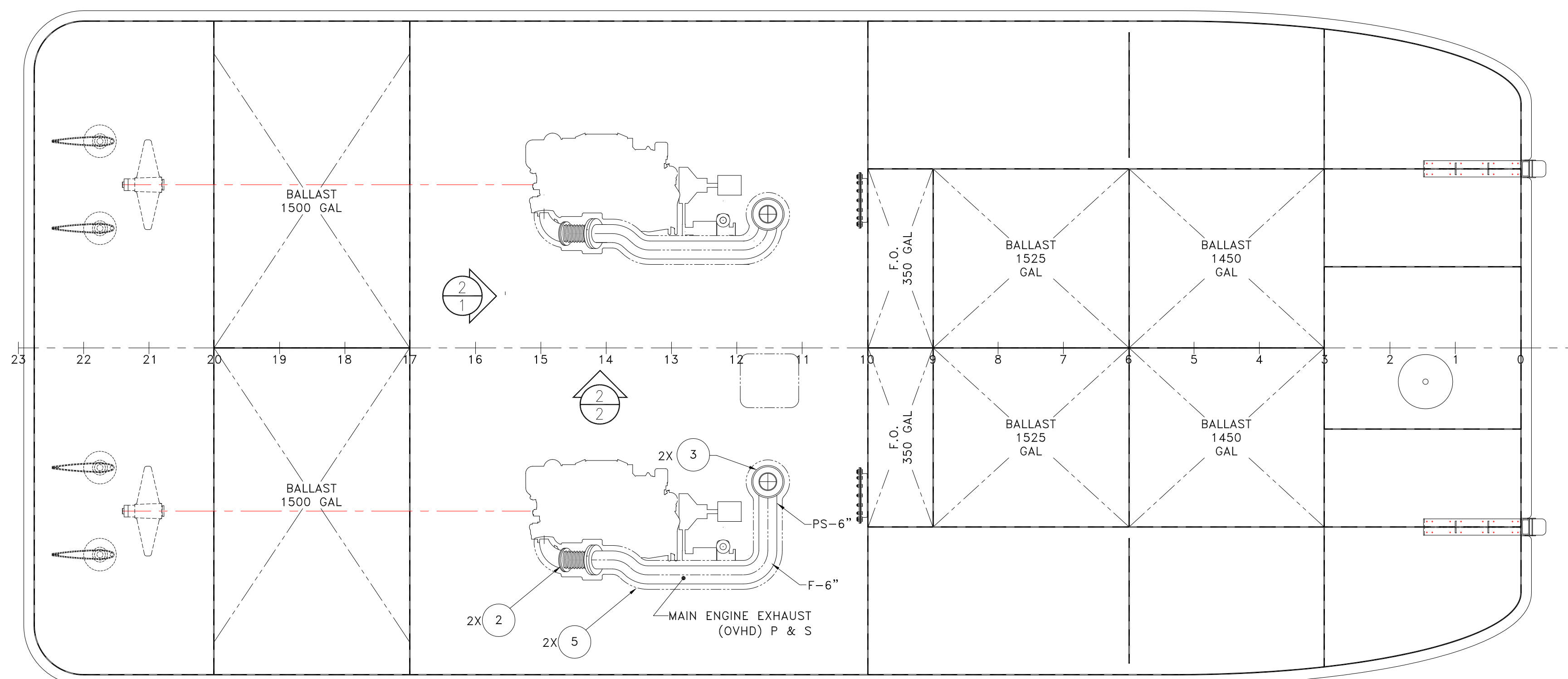




1 MAIN ENGINE EXHAUST SECTION
SCALE: 3/8" = 1'-0"




1 MAIN ENGINE EXHAUST PROFILE
SCALE: 3/8" = 1'-0"



MAIN ENGINE EXHAUST PLAN

NO.	DESCRIPTION
1	ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH 46 CFR SUBCHAPTER
2	PIPING SHALL BE RUN AS DIRECTLY AS POSSIBLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS. PROVIDE A SUFFICIENT NUMBER OF TAKEDOWN JOINTS TO ALLOW FOR REMOVAL & INSPECTION
3	PRIOR TO FABRICATION OF MATING PIPE ASSEMBLIES, VERIFY EQUIPMENT CONNECTIONS FOR SIZE, LOCATION AND TYPE IN ACCORDANCE WITH MANUFACTURER CERTIFIED DRAWINGS, OR DIRECTLY FROM THE EQUIPMENT. TEMPLATE BOLTING PATTERNS AND CONNECTIONS AS REQUIRED.
4	ALL BOLTED FLANGES ARE TO BE MATED UP FREE OF STRAIN.
5	PIPE HANGERS SHALL MEET THE REQUIREMENTS OF ASTM F708. THE CONTRACTOR SHALL DESIGN AND INSTALL PIPE HANGERS AS NECESSARY TO ADEQUATELY SUPPORT EXHAUST SYSTEMS UNDER STATIC AND DYNAMIC LOADS IMPOSED BY VESSEL MOTIONS, VIBRATION AND THERMAL EXPANSION. THERMAL INSULATION GASKETS SHALL BE INSTALLED BETWEEN THE EXHAUST PIPE AND THE HANGER ATTACHMENT TO THE SHIP.
6	PROVIDE EXPANSION JOINTS WHERE REQUIRED TO ACCOMMODATE THERMAL GROWTH OF EXHAUST PIPES. EXPANSION JOINTS ARE TO BE STAINLESS STEEL MULTI-PLY LAMINATE TYPE MANUFACTURED TO EJMA STANDARDS. EACH EXPANSION JOINT SHALL HAVE ONE END FIXED FLANGE AND THE OTHER END WITH A FLOATING FLANGE. A FLOW DIRECTION ARROW SHALL BE PERMANENTLY MARKED ON EACH EXPANSION JOINT.
7	EXHAUST ELBOW AND EXPANSION JOINT AT ENGINE TURBO OUTLET SHALL BE SUPPLIED BY THE ENGINE MANUFACTURER. ALL OTHERS SHALL BE DME, AMERICAN BGA, OR EQUAL.
8	WEIGHT TRANSMITTED TO EACH ENGINE EXHAUST OUTLET CONNECTION IS NOT TO EXCEED THE MANUFACTURERS' RECOMMENDATIONS IN ANY CONDITION.
9	INSULATION FOR ENGINE EXHAUST PIPING AND SILENCERS SHALL BE REMOVABLE INSULATION BLANKETS HAVING A 2" MINIMUM THICKNESS. BLANKETS SHALL BE FASTENED WITH STAINLESS STEEL HOOKS AND INSULATION MATERIALS AND INSTALLATION DETAILS SHALL BE IN ACCORDANCE WITH ASTM F683.
10	1/4" PIPE TAPS SHALL BE INSTALLED ON ENGINE EXHAUST OUTLET PIPING TO FACILITATE BACK PRESSURE MEASUREMENTS.
11	TAIL PIPE, TOP HAT, AND HANGERS EXPOSED TO WEATHER AT THE BRIDGE DECK LEVEL AND ABOVE SHALL BE ASTM A312 TYPE 316L STAINLESS STEEL.
12	VERTICAL EXHAUST PIPING RUNS SHALL BE FITTED WITH VALVED DRAINS LOCATED AT THE LOWEST POINT. EACH DRAIN SHALL CONSIST OF A THREADED STEEL WELDOLET OR HALF COUPLING WELDED TO THE PIPE, FITTED WITH A SCHEDULE 40 PIPE, AND CAPPED WITH A 1" INCH GATE VALVE.
13	PRIOR TO BEING PLACED INTO SERVICE THE EXHAUST PIPING SHALL BE CLEANED AND CHECKED FOR LEAKS.
14	WEIGHT TRANSMITTED TO THE ENGINE CONNECTION IS NOT TO EXCEED THE MANUFACTURERS' RECOMMENDATIONS IN HOT AND COLD CONDITIONS.
15	CONTRACTOR SHALL VERIFY ENGINE EXHAUST BACK PRESSURE REQUIREMENTS AND CONNECTION DETAILS PRIOR TO ORDERING MATERIALS.

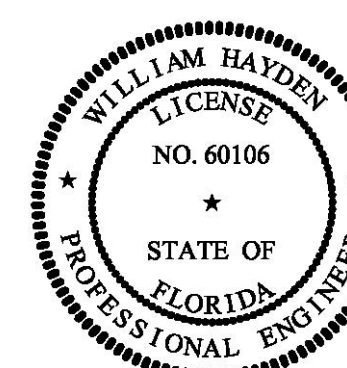
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Title: 45.5'x20'x6.5' NCDOT PUSHBOAT
MAIN ENGINE EXHAUST ARRANGEMENT

Dwg. No. 17-1393-259 Alt. No. 0
 Shk. 2 of 2

Drawn By: JAH Date: DECEMBER 7, 2018
 Checked By: _____ Date: _____
 App'd By: _____ Scale: 3/8" = 1'-0"
 ABS App'l: _____ USCG App'l: _____



A

MATERIAL SCHEDULE

SERVICE	SIZE	PIPE	COMPONENTS				VALVES		BOLTING		REMARKS
			TAKEDOWN JOINTS	FITTINGS	FLEX CONNECT	GASKETS	BODY	TRIM	BOLTS/STUDS	NUTS/WASHERS	
FUEL OIL SERVICE PIPING MAWP: 15 PSIG MAWT: 126°F	ALL	CARBON STEEL, SCH 80, SEAMLESS, ASTM A53 OR ASTM A106 GRADE B, ANSI B36.10	FLANGE SOCKET WELD, WELD NECK OR SLIP ON, CARBON STEEL, ASTM A105, ANSI B16.5 UNION GROUND JOINT, SOCKET WELD CARBON STEEL, ASTM A105, MSS-SP-83	SOCKET WELD CARBON STEEL, ASTM A105 OR ASTM A234 GR WPB, ANSI B16.11 BUTTWELD CARBON STEEL, ASTM A234, GR WPB, ANSI B16.9 OR B16.28	FLEX HOSE MEETING SAE J1942 AND J1475 FOR DIESEL SERVICE SEE NOTE 9	GARLOCK STYLE 3000	GATE FLANGED CARBON STEEL, ASTM A216 GR WCB OR ASTM A105 ANSI B16.34 BALL THREADED, CARBON STEEL, ASTM A105, ASTM A181, OR ASTM A216 GR WCB CHECK THREADED, CARBON STEEL, ASTM A105, ASTM A181, OR ASTM A216 GR WCB	GATE CRES STEM, DISC AND SEAT BALL CHROME PLATED BALL, RPTFE OR VITON SEATS CHECK CRES DISC	CARBON STEEL ASTM A307 GR B ANSI B18.2.1 HEX-HEAD CARBON STEEL ASTM A563 GR A ANSI B18.2.2		

BILL OF MATERIALS

#	QTY.	SERVICE	TYPE	MAKE/MODEL	COMMENTS
1	2	FO TANK LEVEL ALARM	SWITCH MODULE ON GEM SURESITE SIGHTGLASS	GEM MINI SURESITE PART # 86567 SPST, 20VA RATING	MOUNTS TO SURESITE TUBE OPPOSITE LEVEL INDICATOR FLAGS
2	2	ME FUEL FILTER	DUPLEX COALESCING, 180 GPH	RACOR 75900MAX	SEE NOTE 11
3	2	REMOTE SHUTDOWN FO TANK VALVES	1-1/4" 150# ANSI FLG. GLOBE VALVE, HYD. ACTUATED	ABS APPROVED. LK VALVE	W&O 973357.032.ANSI
4	2	CAM LOCK	2" CAM AND GROOVE MALE HOSE COUPLING AND CAP, 316 SS	MCMASER CARR 53015K45 & 53015K85	
5	2	VENT GUARD	INVERTED VENT PIPE HEAD	WINTEB 2000 SERIESDN65 W/ SCREEN	
6	2	REMOTE FUEL SHUTOFF	REACH ROD	B&G MARINE	SEE DETAIL 1-2A FOR PART NUMBERS
P-1/2"	AS REQ'D		1/2" SCH.40 PIPE, SEAMLESS, BLACK		ASTM A-106
P-3/4"	AS REQ'D		3/4" SCH.40 PIPE, SEAMLESS, BLACK		ASTM A-106
P-1"	AS REQ'D		1" SCH.40 PIPE, SEAMLESS, BLACK		ASTM A-106
P-1 1/4"	AS REQ'D		1-1/4" SCH.40 PIPE, SEAMLESS, BLACK		ASTM A-106
H-1	24		3/4" FUEL OIL HOSE, USCG APPROVED 150# WOG		SAE J-1942, SAE J-1475 (FITTINGS)
H-2	24		1/2" FUEL OIL HOSE, USCG APPROVED 150# WOG		SAE J-1942, SAE J-1475 (FITTINGS)
V-1	2		1/2" FULL PORT BALL VALVE, STEEL, SCREWED,		ASTM A105/A234
V-2	4		3/4" FULL PORT BALL VALVE, STEEL, SCREWED,		ASTM A105/A234
V-3	4		1" FULL PORT BALL VALVE, STEEL, SCREWED		ASTM A105/A234
V-4	4		1-1/4" GATE VALVE, STEEL, FLANGED		ASTM A105/A234
CV-1	2		1/2" LIFT CHECK VALVE, STEEL, SCREWED, 150# WOG		ASTM A105/A234
CV-2	2		1" LIFT CHECK VALVE, STEEL, SCREWED, 150# WOG		ASTM A105/A234

SYMBOLS LIST

	NPS PIPE SIZE AND FLOW DIRECTION ARROW
	REDUCER
	BULKHEAD PENETRATION (SEE DETAIL 2-5A)
	HOSE
	PIPE CAP/CAMLOCK FITTING
	DUPLEX FILTER
	TRIPLEX FILTER
	DRIP PAN (SEE NOTE 11)
	BALL VALVE
	CHECK VALVE
	GATE VALVE WITH REACH ROD
	TANK SUCTION BELLMOUTH (SEE NOTE 10)
	LEVEL SWITCH
	LIQUID LEVEL TRANSDUCER

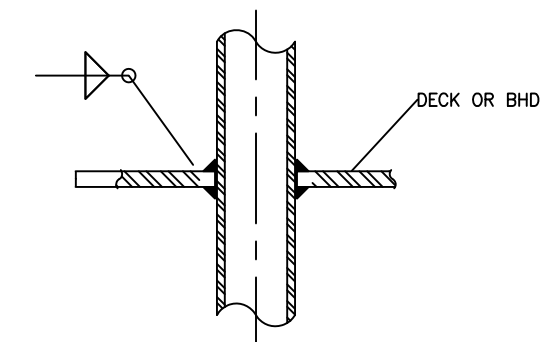


DIAGRAM 1-1A
TANK BULKHEAD PENETRATION

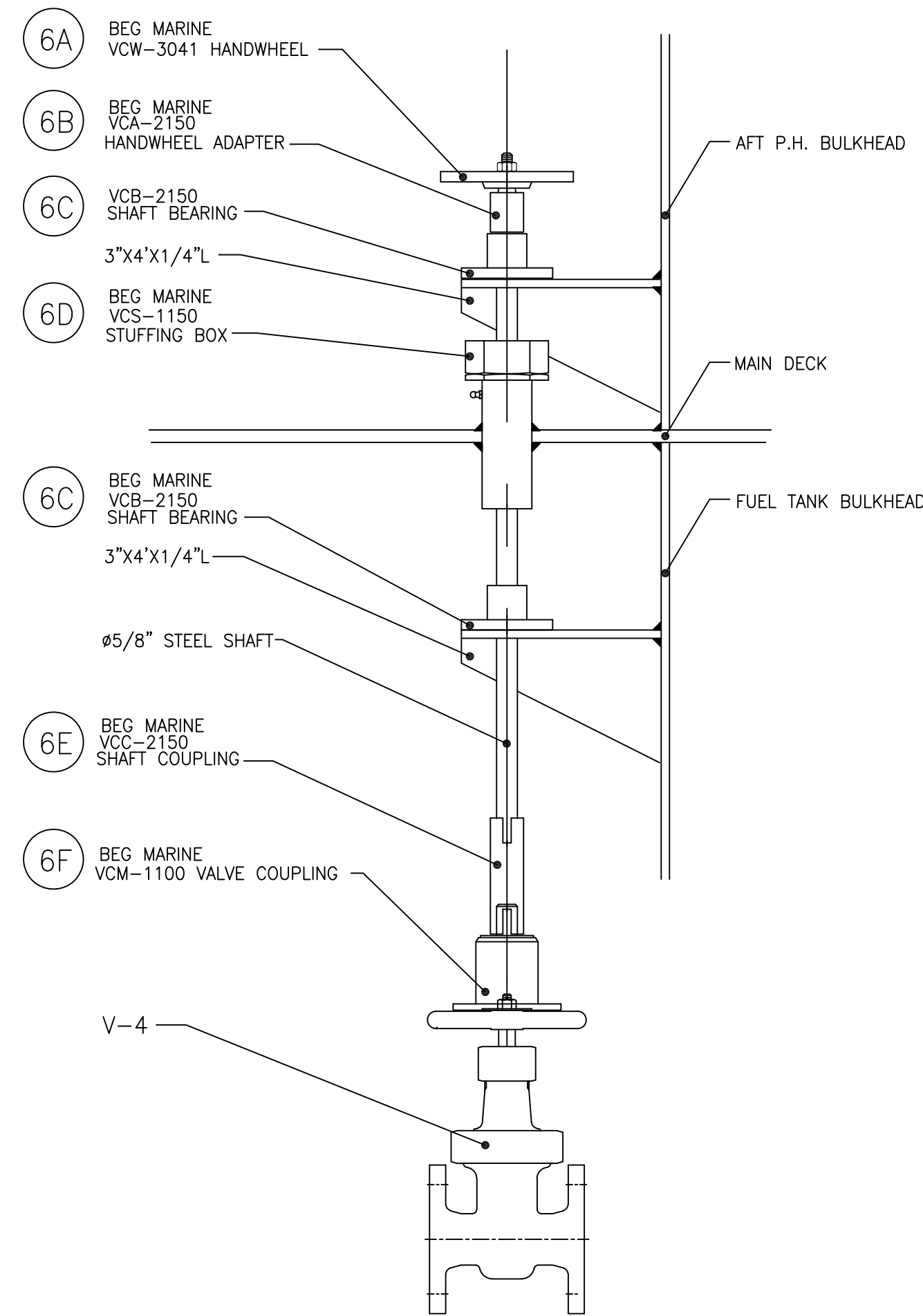
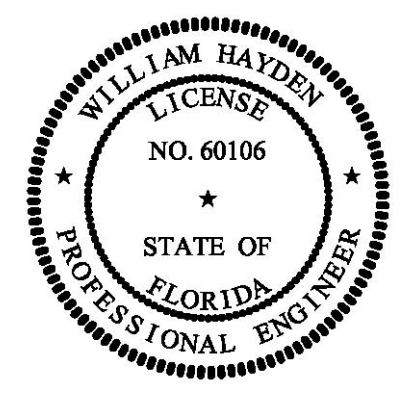


DIAGRAM 1-2A
FUEL SHUTOFF - 2 EA



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Title: 45.5'x20'x6.5' NCDOT PUSHBOAT

Dwg. No. 17-1393-261
Alt. No. 0
Sht. 1 of 3

Drawn By: JAH
Checked By: [Blank]
App'd By: [Blank]
ABS App'l: [Blank]

Date: SEPT 28, 2018
Date: [Blank]
Scale: NONE
USCG App'l: [Blank]

- GENERAL NOTES -		- GENERAL NOTES -		- ALTERATIONS -		- RESERVATIONS -		- REFERENCES -	
NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION
1.	PIPING SYSTEM MATERIALS, INSTALLATION, AND WORKMANSHIP SHALL BE IN ACCORDANCE 46 CFR SUBCHAPTER M (TOWING VESSELS).	10.	FUEL OIL SUPPLY SUCTION BELLSOUTH AREA SHALL BE AT LEAST 1 1/2 TIMES THE SUCTION PIPE INTERNAL AREA.					1.	DWG 1393-506 FILLS, VENTS & SOUNDS
2.	THIS DRAWING IS DIAGRAMMATIC ONLY AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. THE CONTRACTOR SHALL DEVELOP FULLY A DETAILED DESIGN THAT PROVIDES A FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION.	11.	FUEL FILTERS SHALL BE USCG APPROVED WITH METAL BOWLS FILTERS SHALL BE FITTED WITH BALL VALVES FOR FILTER ISOLATION WHILE THE ENGINE IS RUNNING, WATER PROBES, AND DIFFERENTIAL PRESSURE GAUGES.						
3.	PRIOR TO FABRICATION OF MATING PIPE ASSEMBLIES, VERIFY EQUIPMENT CONNECTIONS FOR SIZE, LOCATION AND TYPE IN ACCORDANCE WITH MANUFACTURER CERTIFIED DRAWINGS, OR DIRECTLY FROM THE EQUIPMENT. TEMPLATE BOLTING PATTERNS AND CONNECTIONS AS REQUIRED.	12.	DRIP PANS WITH UP-TURNED EDGES SHALL BE PROVIDED BENEATH ALL FILTERS. EACH DRIP PAN SHALL BE FITTED WITH A LOW POINT DRAIN PORT.						
4.	PIPING SHALL BE ROUTED AS DIRECTLY AS POSSIBLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS.	13.	REMOTE FUEL OIL SUPPLY SHUT OFF REACH RODS SHALL TERMINATE AT HANDWHEELS ON THE MAIN DECK BEHIND THE PILOT HOUSE						
5.	DO NOT ROUTE PIPING CONTAINING FUEL OIL NEAR ANY ELECTRICAL DEVICES OR EQUIPMENT. DO NOT LOCATE TAKEDOWN JOINTS AROUND, NEAR, OR OVER ELECTRICAL EQUIPMENT. ROUTE ALL FUEL OIL PIPING AT LEAST 18 INCHES AWAY FROM ANY SURFACE THAT NORMALLY HAS AN OPERATING TEMPERATURE OF 450°F OR GREATER EQUIPMENT	14.	FUEL SYSTEM PIPING SHALL BE CLEANED, FLUSHED AND HYDROSTATICALLY TESTED PRIOR TO BEING PLACED INTO SERVICE.						
6.	TAKEDOWN JOINTS SHALL BE PROVIDED AT INTERVALS WHICH ALLOW DISASSEMBLY AND REMOVAL OF PIPING AND EQUIPMENT WITHOUT REQUIRING REMOVAL OR MODIFICATION OF PERMANENT STRUCTURE.	15.	PIPE THREAD SEALING TAPE, GALVANIZED PIPE, AND GALVANIZED FITTINGS SHALL NOT BE USED.						
7.	PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE PIPE WITH BOLTED CLAMPS AND WELDED TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES.								
8.	WHERE PIPES PENETRATE TANK BOUNDARIES, BULKHEADS, OR DECKS HEAVY WEIGHT SPOOL PIECES OR REINFORCING PENETRATION FITTINGS SHALL BE USED. SEE DETAIL 1-1A								
9.	FLEXIBLE HOSE ASSEMBLIES SHALL MEET THE REQUIREMENTS OF 46 CFR 182.720 AND BE APPROVED FOR FUEL OIL SERVICE. END FITTINGS SHALL MEET SAE J1475. HOSE ASSEMBLIES SHALL NOT BE LESS THAN 9" IN LENGTH NOR MORE THAN 30" IN LENGTH.								

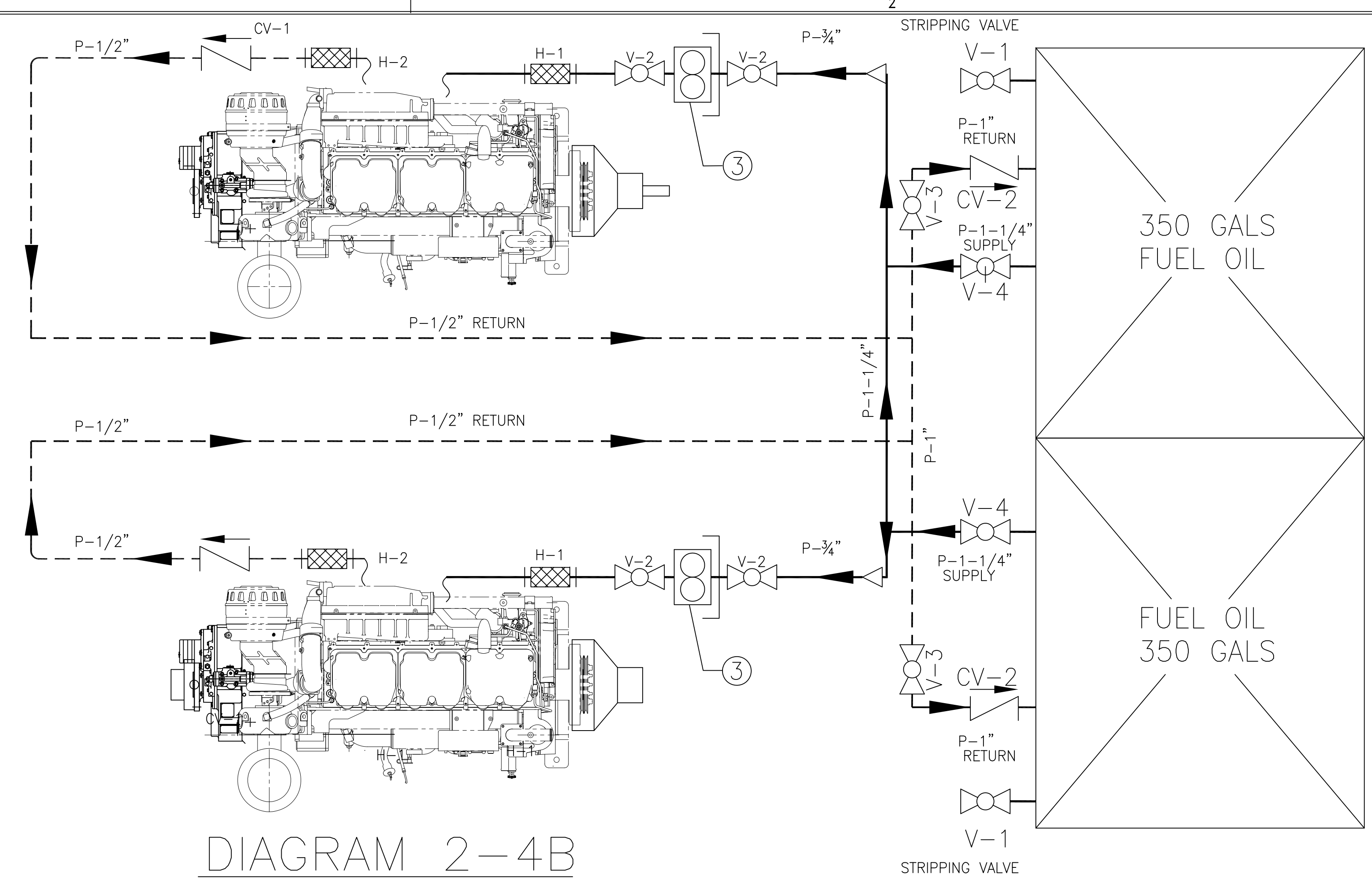
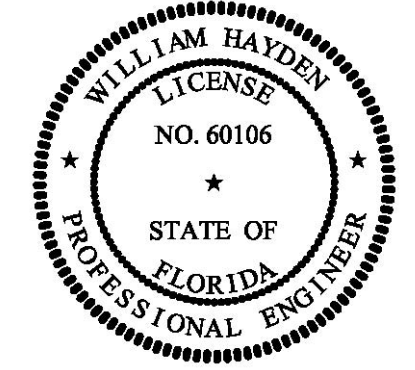


DIAGRAM 2-4B
FUEL OIL SERVICE SYSTEM SCHEMATIC

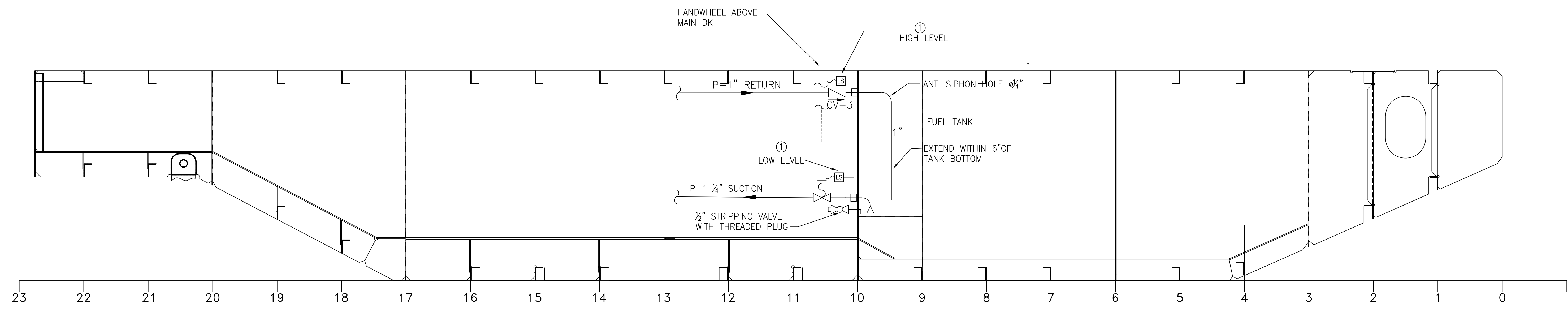


DIAGRAM 2-4C
FUEL OIL TANK SCHEMATIC

- GENERAL NOTES -		- GENERAL NOTES -		- ALTERATIONS -		- RESERVATIONS -		- REFERENCES -	
NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION
1.	PIPING SYSTEM MATERIALS, INSTALLATION, AND WORKMANSHIP SHALL BE IN ACCORDANCE 46 CFR SUBCHAPTER M (TOWING VESSELS).	10.	FUEL OIL SUPPLY SUCTION BELLSOUTH AREA SHALL BE AT LEAST 1 1/2 TIMES THE SUCTION PIPE INTERNAL AREA.					1.	DWG 1393-506 FILLS, VENTS & SOUNDS
2.	THIS DRAWING IS DIAGRAMMATIC ONLY AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. THE CONTRACTOR SHALL DEVELOP FULLY A DETAILED DESIGN THAT PROVIDES A FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION.	11.	FUEL FILTERS SHALL BE USCG APPROVED WITH METAL BOWLS FILTERS SHALL BE FITTED WITH BALL VALVES FOR FILTER ISOLATION WHILE THE ENGINE IS RUNNING, WATER PROBES, AND DIFFERENTIAL PRESSURE GAUGES.						
3.	PRIOR TO FABRICATION OF MATING PIPE ASSEMBLIES, VERIFY EQUIPMENT CONNECTIONS FOR SIZE, LOCATION AND TYPE IN ACCORDANCE WITH MANUFACTURER CERTIFIED DRAWINGS, OR DIRECTLY FROM THE EQUIPMENT. TEMPLATE BOLTING PATTERNS AND CONNECTIONS AS REQUIRED.	12.	DRIP PANS WITH UP-TURNED EDGES SHALL BE PROVIDED BENEATH ALL FILTERS. EACH DRIP PAN SHALL BE FITTED WITH A LOW POINT DRAIN PORT.						
4.	PIPING SHALL BE ROUTED AS DIRECTLY AS POSSIBLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS.	13.	REMOTE FUEL OIL SUPPLY SHUT OFF REACH RODS SHALL TERMINATE AT HANDWHEELS ON THE MAIN DECK BEHIND THE PILOT HOUSE						
5.	DO NOT ROUTE PIPING CONTAINING FUEL OIL NEAR ANY ELECTRICAL DEVICES OR EQUIPMENT. DO NOT LOCATE TAKEDOWN JOINTS AROUND, NEAR, OR OVER ELECTRICAL EQUIPMENT. ROUTE ALL FUEL OIL PIPING AT LEAST 18 INCHES AWAY FROM ANY SURFACE THAT NORMALLY HAS AN OPERATING TEMPERATURE OF 450°F OR GREATER EQUIPMENT	14.	FUEL SYSTEM PIPING SHALL BE CLEANED, FLUSHED AND HYDROSTATICALLY TESTED PRIOR TO BEING PLACED INTO SERVICE.						
6.	TAKEDOWN JOINTS SHALL BE PROVIDED AT INTERVALS WHICH ALLOW DISASSEMBLY AND REMOVAL OF PIPING AND EQUIPMENT WITHOUT REQUIRING REMOVAL OR MODIFICATION OF PERMANENT STRUCTURE.	15.	PIPE THREAD SEALING TAPE, GALVANIZED PIPE, AND GALVANIZED FITTINGS SHALL NOT BE USED.						
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8.	WHERE PIPES PENETRATE TANK BOUNDARIES, BULKHEADS, OR DECKS HEAVY WEIGHT SPOOL PIECES OR REINFORCING PENETRATION FITTINGS SHALL BE USED. SEE DETAIL 1-1A								
9.	FLEXIBLE HOSE ASSEMBLIES SHALL MEET THE REQUIREMENTS OF 46 CFR 182.720 AND BE APPROVED FOR FUEL OIL SERVICE. END FITTINGS SHALL MEET SAE J1475. HOSE ASSEMBLIES SHALL NOT BE LESS THAN 9" IN LENGTH NOR MORE THAN 30" IN LENGTH.								

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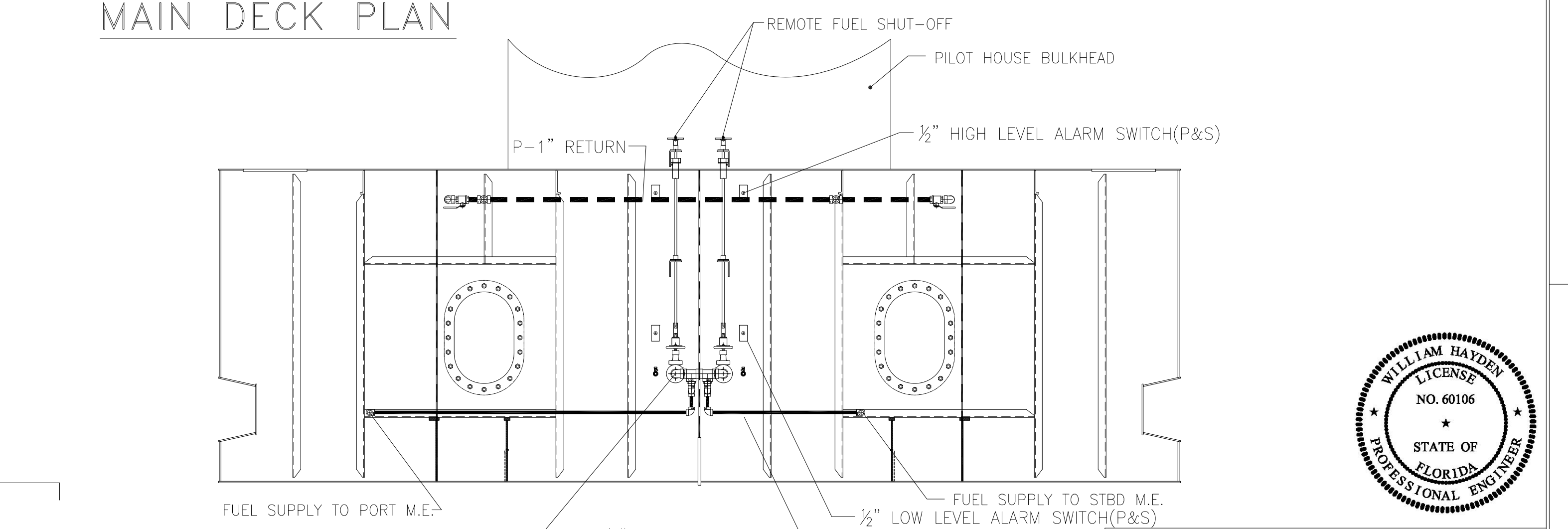
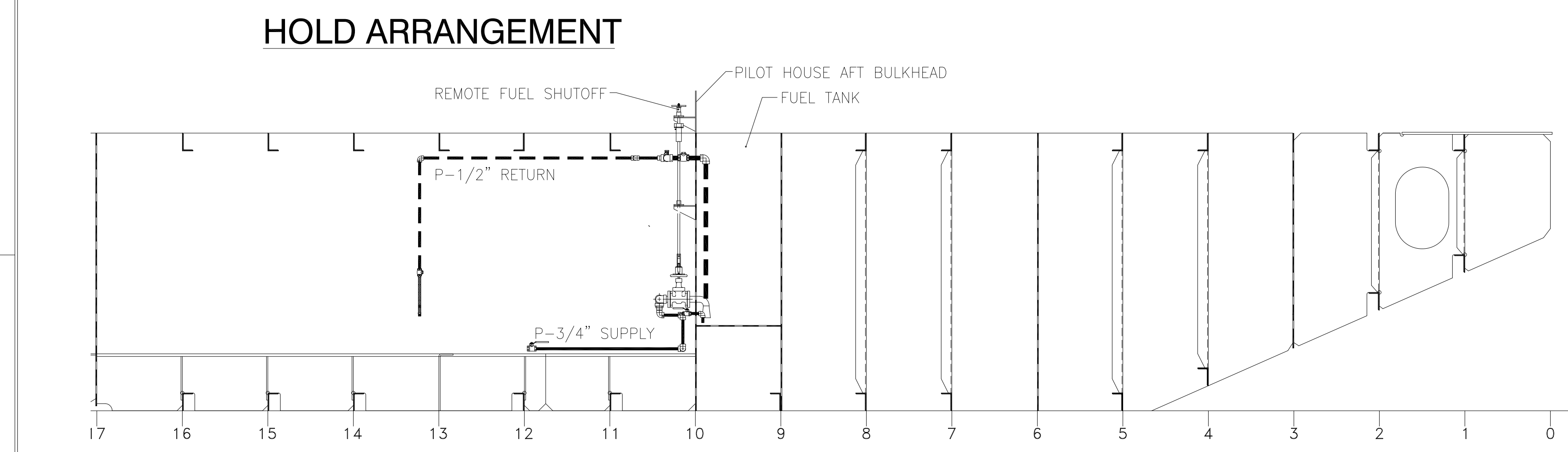
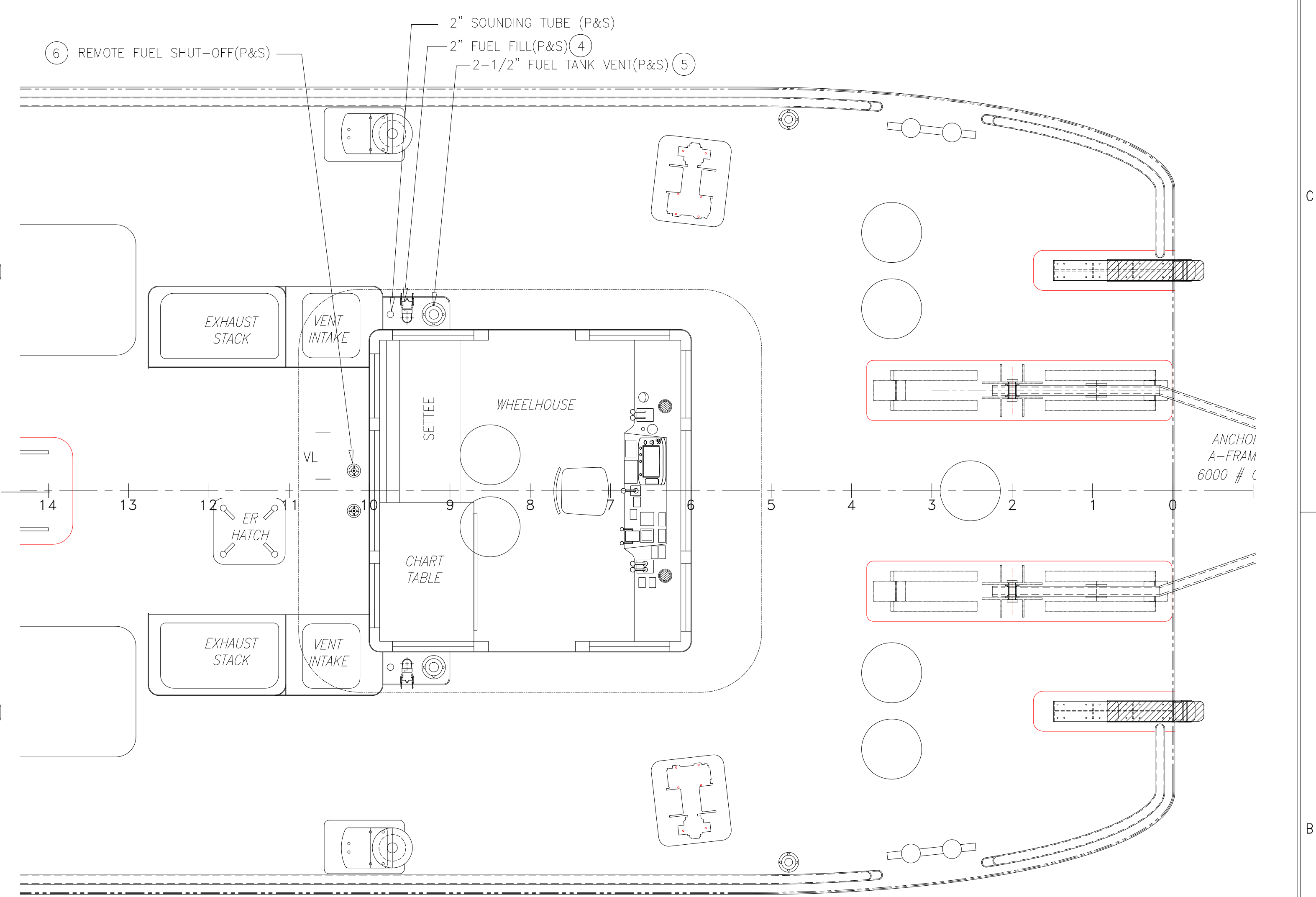
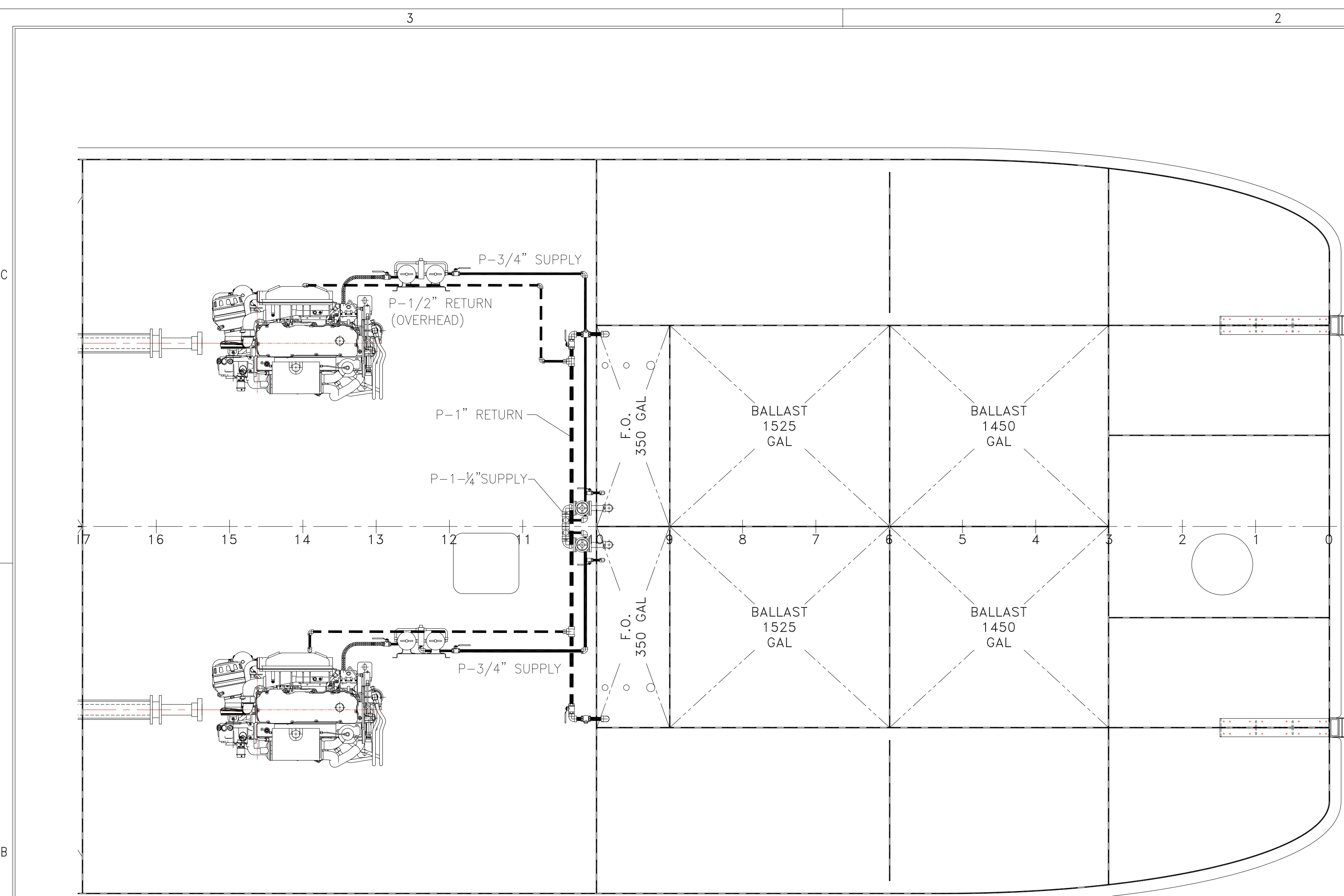
Title: 45.5'x20'x6.5' NCDOT PUSHBOAT

FUEL OIL

Dwg. No. **17-1393-261** Alt. No. 0
Sht. 2 of 3

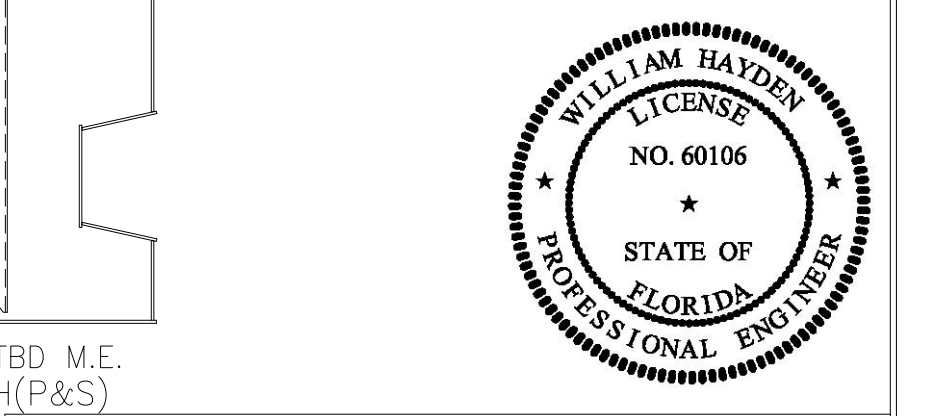
Drawn By: **JAH** Date: **SEPT 23, 2018**
Checked By: _____ Date: _____
App'd By: _____ Scale: **NONE**
ABS App'l: _____ USCG App'l: _____

- DRAWING SUBMITTALS -



FUEL OIL SERVICE SYSTEM ARRANGEMENT

-- GENERAL NOTES --		-- GENERAL NOTES --		-- ALTERATIONS --		-- RESERVATIONS --		-- REFERENCES --	
NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	DATE	BY NO.	NO.	DESCRIPTION
1.	PIPING SYSTEM MATERIALS, INSTALLATION, AND WORKMANSHIP SHALL BE IN ACCORDANCE 46 CFR SUBCHAPTER M (TOWING VESSELS).	10.	FUEL OIL SUPPLY SUCTION BELLSOUTH AREA SHALL BE AT LEAST 1 1/2 TIMES THE SUCTION PIPE INTERNAL AREA.					1.	DWG 1393-506 FILLS, VENTS & SOUNDS
2.	THIS DRAWING IS DIAGRAMMATIC ONLY AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. THE CONTRACTOR SHALL DEVELOP FULLY A DETAILED DESIGN THAT PROVIDES A FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION.	11.	FUEL FILTERS SHALL BE USCG APPROVED WITH METAL BOWLS FILTERS SHALL BE FITTED WITH BALL VALVES FOR FILTER ISOLATION WHILE THE ENGINE IS RUNNING, WATER PROBES, AND DIFFERENTIAL PRESSURE GAUGES.						
3.	PRIOR TO FABRICATION OF MATING PIPE ASSEMBLIES, VERIFY EQUIPMENT CONNECTIONS FOR SIZE, LOCATION AND TYPE IN ACCORDANCE WITH MANUFACTURER CERTIFIED DRAWINGS, OR DIRECTLY FROM THE EQUIPMENT. TEMPLATE BOLTING PATTERNS AND CONNECTIONS AS REQUIRED.	12.	DRIP PANS WITH UP-TURNED EDGES SHALL BE PROVIDED BENEATH ALL FILTERS. EACH DRIP PAN SHALL BE FITTED WITH A LOW POINT DRAIN PORT.						
4.	PIPING SHALL BE ROUTED AS DIRECTLY AS POSSIBLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS.	13.	REMOTE FUEL OIL SUPPLY SHUT OFF REACH RODS SHALL TERMINATE AT HANDWHEELS ON THE MAIN DECK BEHIND THE PILOT HOUSE						
5.	DO NOT ROUTE PIPING CONTAINING FUEL OIL NEAR ANY ELECTRICAL DEVICES OR EQUIPMENT. DO NOT LOCATE TAKEDOWN JOINTS AROUND, NEAR, OR OVER ELECTRICAL EQUIPMENT. ROUTE ALL FUEL OIL PIPING AT LEAST 18 INCHES AWAY FROM ANY SURFACE THAT NORMALLY HAS AN OPERATING TEMPERATURE OF 450°F OR GREATER EQUIPMENT	14.	FUEL SYSTEM PIPING SHALL BE CLEANED, FLUSHED AND HYDROSTATICALLY TESTED PRIOR TO BEING PLACED INTO SERVICE.						
6.	TAKEDOWN JOINTS SHALL BE PROVIDED AT INTERVALS WHICH ALLOW DISASSEMBLY AND REMOVAL OF PIPING AND EQUIPMENT WITHOUT REQUIRING REMOVAL OR MODIFICATION OF PERMANENT STRUCTURE.	15.	PIPE TRAIL SEALING TAPE, GALVANIZED PIPE, AND GALVANIZED FITTINGS SHALL NOT BE USED.						
7.	PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE PIPE WITH BOLTED CLAMPS AND WELDED TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES.								
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Title: 45.5'x20'x6.5' NCDOT PUSHBOAT

FUEL OIL

Dwg. No. 17-1372-261 Alt. No. 0
Sh. 3 of 3

Drawn By: JAH Date: SEPTEMBER 28, 2018
Checked By: Date: NONE
App'd By: Scale: NONE
ABS App'l: USCG App'l:

9
8
7
6
5
4
3
2
1
0
ALT. NO.

CODE: 4 - REVISION
3 - REVISION
2 - REVISION
1 - REVISION

-- DRAWING SUBMITTALS --

SYMBOLS LIST

Table with 2 columns: Symbol and Description. Includes FIREMAIN PIPING, BILGE SYSTEM PIPING, MATERIAL TRANSITION, REDUCER, BHD PENETRATION, GATE VALVE, SWING CHECK VALVE, BUTTERFLY VALVE, BALL VALVE, HYDRANT VALVE, PRESSURE GAUGE, VACUUM/PRESSURE GAUGE, FIRE STATION, CENTRIFUGAL PUMP, OVERBOARD DISCHARGE, SEA CHEST, SIMPLEX STRAINER, BILGE SUCTION STRAINER BOX.

MATERIAL SCHEDULE

Table with 10 columns: SYSTEM, SIZE, PIPE, TAKEDOWN JOINTS, VALVE BODY, VALVE TRIM, FITTINGS, BOLTS/BOLT STUDS, NUTS, GASKETS. Details specifications for Bilge, Fire, Ballast MAWP, and Seachest MAWP systems.

EQUIPMENT LIST

Table with 7 columns: QTY., SERVICE, TYPE, MAKE/MODEL, CAPACITYwcb, DRIVE, REMARKS. Lists equipment including Fire/Bilge Pump, Strainer, Pump, and Fire Station.

CALCULATIONS:

1.) REFERENCE ONLY: THE INTERNAL DIAMETER OF BILGE SUCTION PIPES INCLUDING STRAINERS SHALL BE DETERMINED BY 46 CFR SUBCHAPTER F, SUBPART 56.50-50 PARAGRAPH D(1):

Formula for suction to each main bilge pump: d = 1 + sqrt((L(B+D))/2500) = 1.7" USE 2" SCH. 40 PIPE

46 CFR 56.50-55 (c) BILGE PUMPS "...a suction velocity of not less than 400 feet per minute..." A 2" SCH. 40 PIPE @ 6.67 FT PER SECOND HAS 65 G.P.M. FLOW.

Formula for branch suction to cargo and machinery spaces: d = 1 + sqrt((c(B+D))/1500) = 1.49" LARGEST COMPARTMENT USE 1-1/2" SCH. 40 PIPE

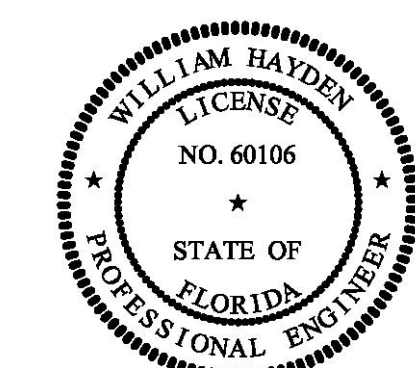
WHERE: L = LENGTH OF VESSEL ON LOADWATER LINE, IN FEET. = 45'-6" B = BREADTH OF VESSEL, IN FEET. = 20 D = MOLDED DEPTH OF BULKHEAD DECK, IN FEET. = 6.5' c = LENGTH OF COMPARTMENT, IN FEET. = 24' "LARGEST COMP." d = REQUIRED INTERNAL DIAMETER OF SUCTION PIPE, IN INCHES.

GENERAL NOTES

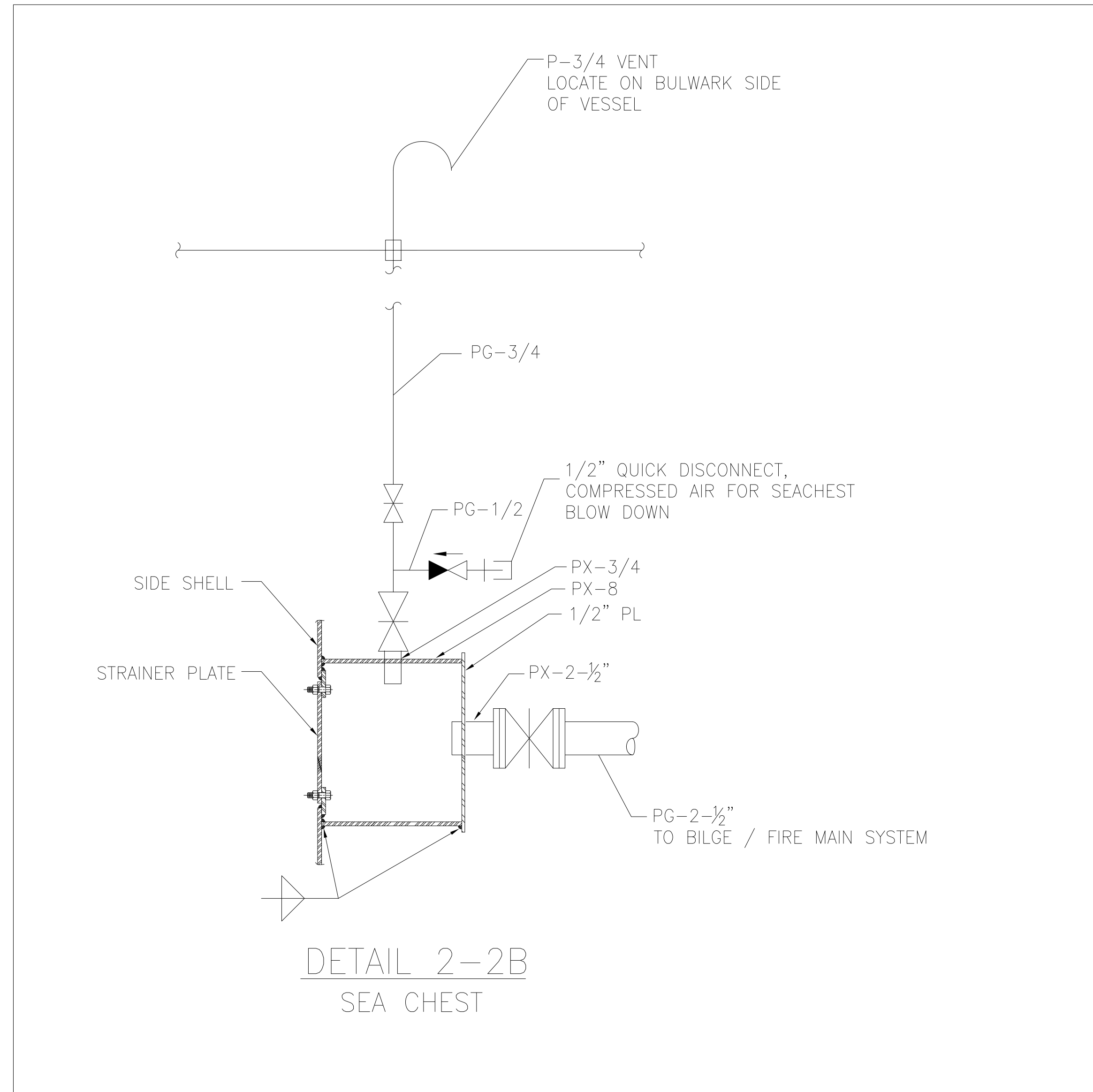
Table with 2 columns: NO. and DESCRIPTION. Contains 8 general notes regarding material standards, design details, and installation requirements.

GENERAL NOTES

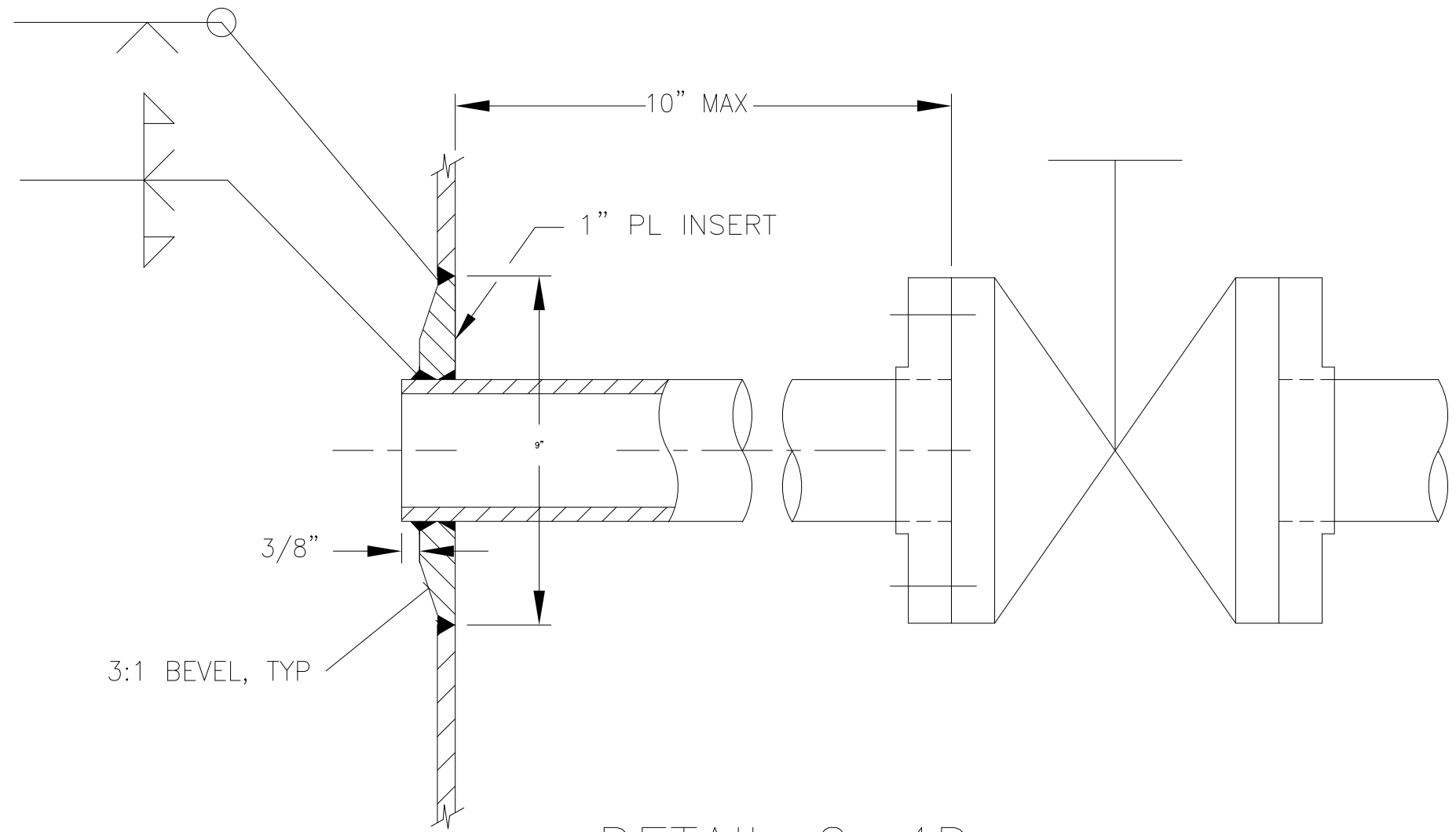
Table with 2 columns: NO. and DESCRIPTION. Contains 16 general notes regarding fire station equipment, piping materials, and testing procedures.



Project information block including DeJong & Lebet, Inc. logo, address (1734 Emerson Street, Jacksonville, Florida), phone/fax numbers, and drawing details (Dwg. No. 17-1393-263, Date: OCTOBER 19, 2018).



DETAIL 2-2B
SEA CHEST



DETAIL 2-4D
OVERBOARD DISCHARGE
NO SCALE

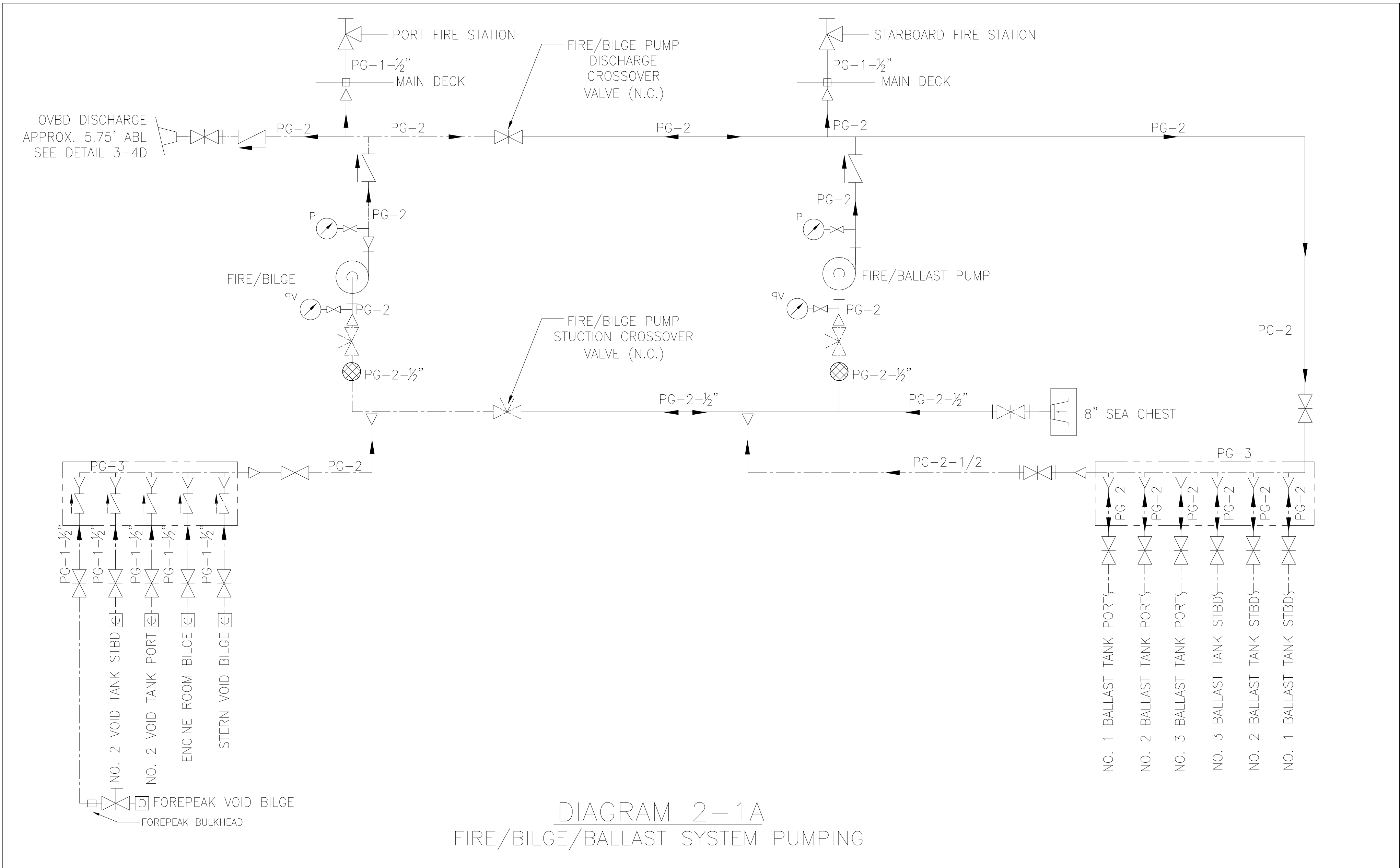
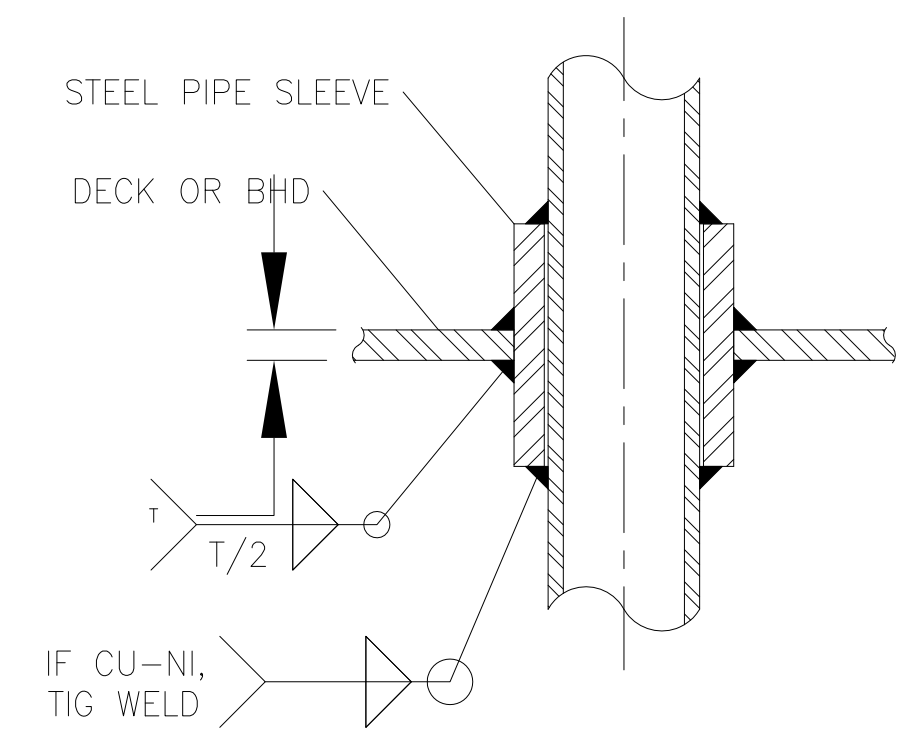
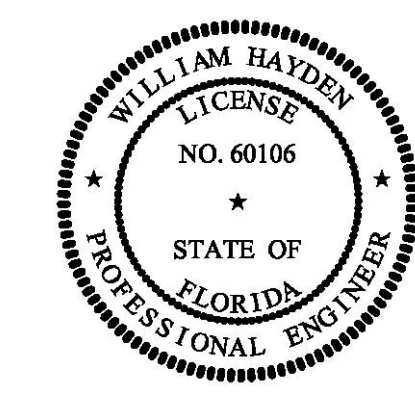


DIAGRAM 2-1A
FIRE/BILGE/BALLAST SYSTEM PUMPING



DETAIL 2-1C
TYP. DECK OR BULKHEAD PENETRATION
NO SCALE

- GENERAL NOTES -		- GENERAL NOTES -	
NO.	DESCRIPTION	NO.	DESCRIPTION
1.	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER "M" VESSELS.	9.	EACH FIRE STATION SHALL HAVE A 1 1/2" HYDRANT VALVE, 50 FEET OF 1 1/2" LINED COMMERCIAL FIRE HOSE CONFORMING TO UL19, A HOSE WRENCH, AND A USCG APPROVED COMBINATION FIRE NOZZLE. THE HOSE SHALL BE CONNECTED AND STOWED IN AN APPROVED STAINLESS STEEL HOSE RACK.
2.	THIS DRAWING IS DIAGRAMMATIC AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. THE CONTRACTOR SHALL DEVELOP A DETAILED DESIGN THAT PROVIDES A FULLY FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION, TAKING INTO ACCOUNT ALL FROM THE SHIP AND NECESSARY SYSTEM INTERFACES AND INTERFERENCES. DIMENSIONS SHALL BE VERIFIED MANUFACTURERS' CERTIFIED DRAWINGS AS APPROPRIATE.	10.	THE FIRE/BILGE PUMP IS SIZED TO EXCEED THE MINIMUM REQUIREMENTS OF ABS. THE PUMP CAPACITY SHALL MEET THE FLOW DEMANDS OF AT LEAST 80 GPM FROM THE HIGHEST TWO FIRE STATIONS OPERATING SIMULTANEOUSLY.
3.	PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS AND WITH SUFFICIENT TAKE DOWN JOINTS TO PROVIDE FOR REMOVAL, INSPECTION, SERVICING AND REPLACEMENT OF EQUIPMENT.	11.	VALVE HANDWHEELS AND CONTROLS TO BE FITTED WITH LABEL PLATES INDICATING FUNCTION.
4.	PROVIDE GAUGE ASSEMBLIES TO BE IN ACCORDANCE WITH ASTM F721. VALVES, TUBING, AND FITTINGS SHALL BE 316 STAINLESS STEEL.	12.	BILGE SUCTION STRAINER BOXES SHALL BE IN ACCORDANCE WITH ASTM F886, TYPE J, HOT DIP GALVANIZED AFTER FABRICATION. STRAINER OPEN AREA SHALL BE GREATER THAN THREE TIMES THE AREA OF THE BILGE PIPE.
5.	AVOID POCKETS IN THE PIPE LINES, BOSSES AND VALVES OR SCREWED PLUGS SHALL BE FITTED TO ENABLE COMPLETE DRAINING OF PIPES WHERE POCKETS DO OCCUR.	13.	A REMOTE PRESSURE GAUGE FOR THE FIREMAIN SHALL BE LOCATED IN THE PILOT HOUSE.
6.	PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE PIPE WITH BOLTED CLAMPS AND WELDED TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES. HANGERS SUPPORTING CU-NI TUBING SHALL UTILIZE A RESILIENT NONMETALLIC LINER BETWEEN THE TUBING AND STEEL HANGER.	14.	PIPING SHALL BE THOROUGHLY CLEANED BEFORE TESTING.
7.	WHERE PIPING PENETRATES BULKHEADS OR DECKS, THE PENETRATION SHALL MAINTAIN THE WATERTIGHT INTEGRITY OF THE SPACE. PIPE PENETRATIONS SHALL BE IN ACCORDANCE WITH DETAIL 2-1C.	15.	PIPING 2-1/2" AND LARGER SHALL BE BUTT WELDED.
8.	BOTH PUMPS SHALL BE CAPABLE OF REMOTE STARTING FROM THE BRIDGE.	16.	VALVES 1-1/2" AND SMALLER SHALL BE THREADED.



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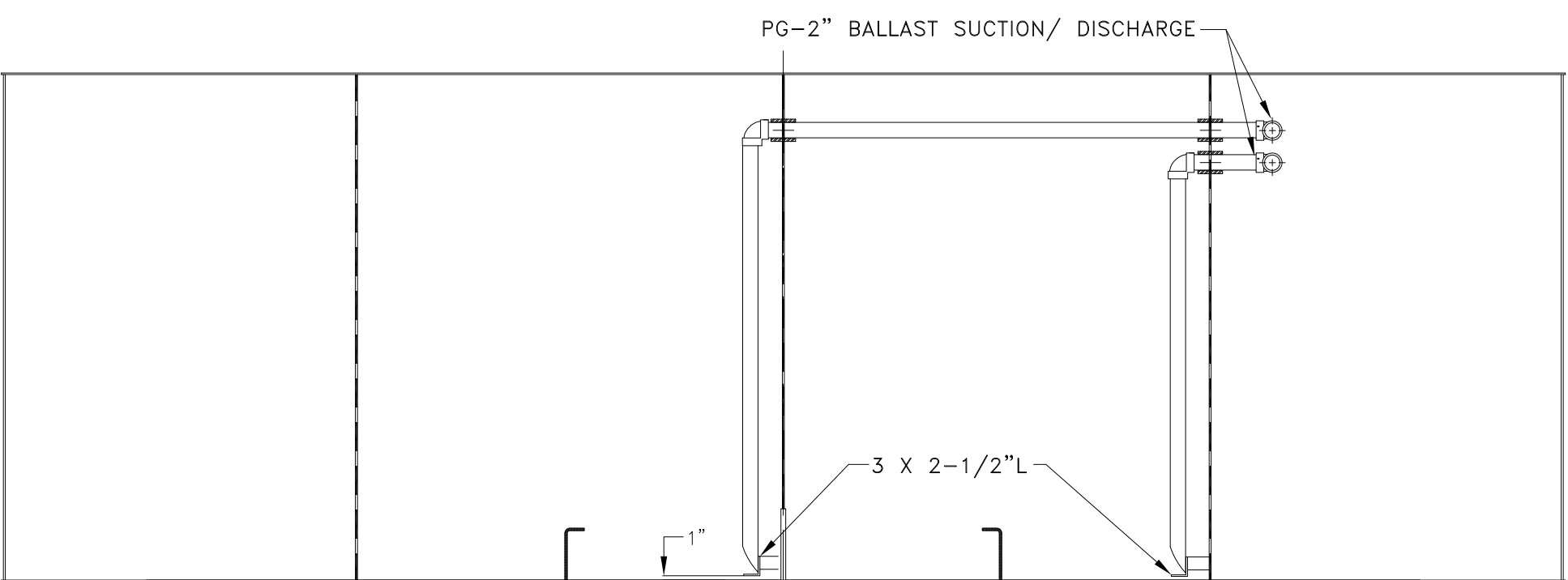
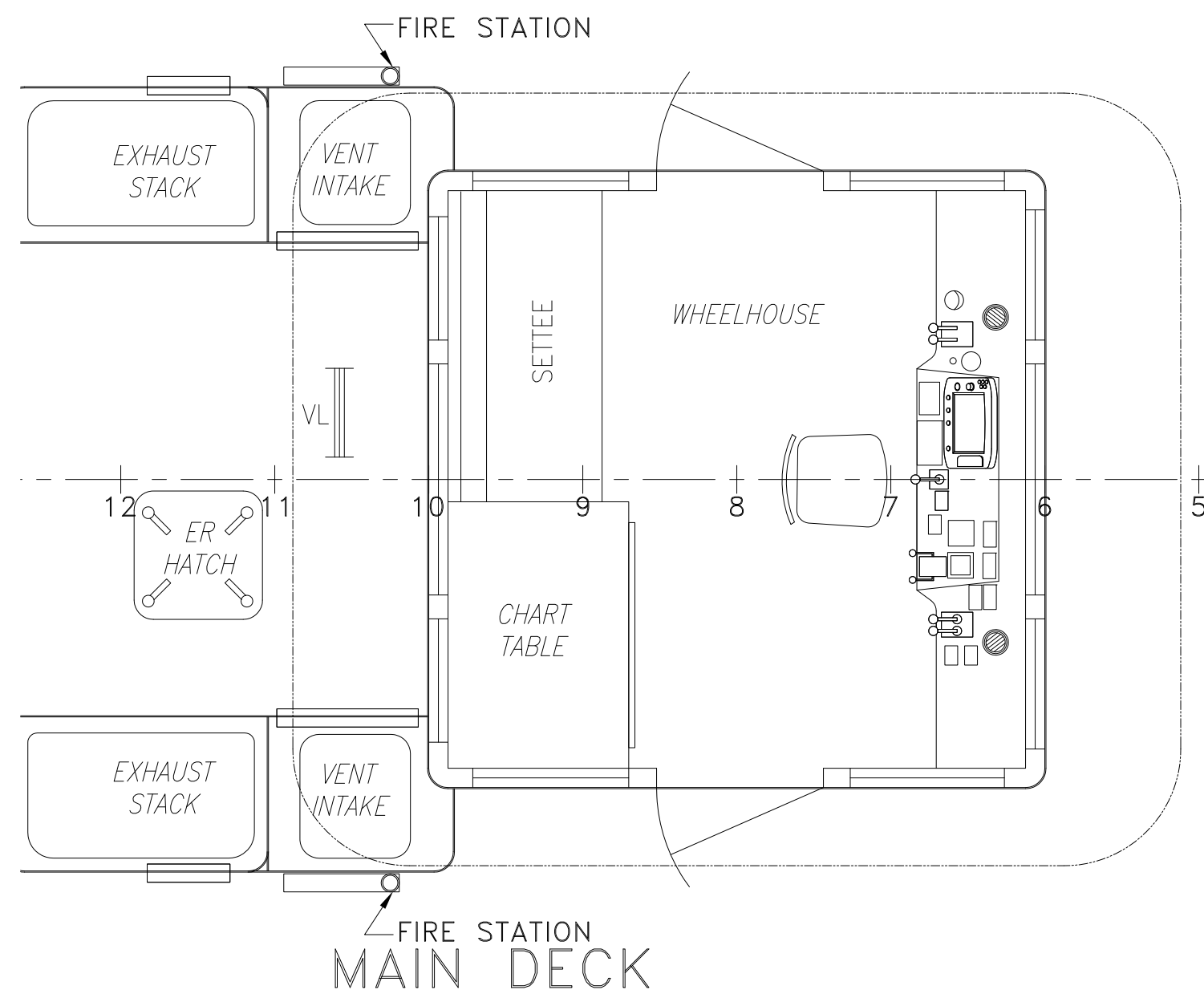
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Title: 45' x 20' x 6.5' NCDOT PUSHBOAT

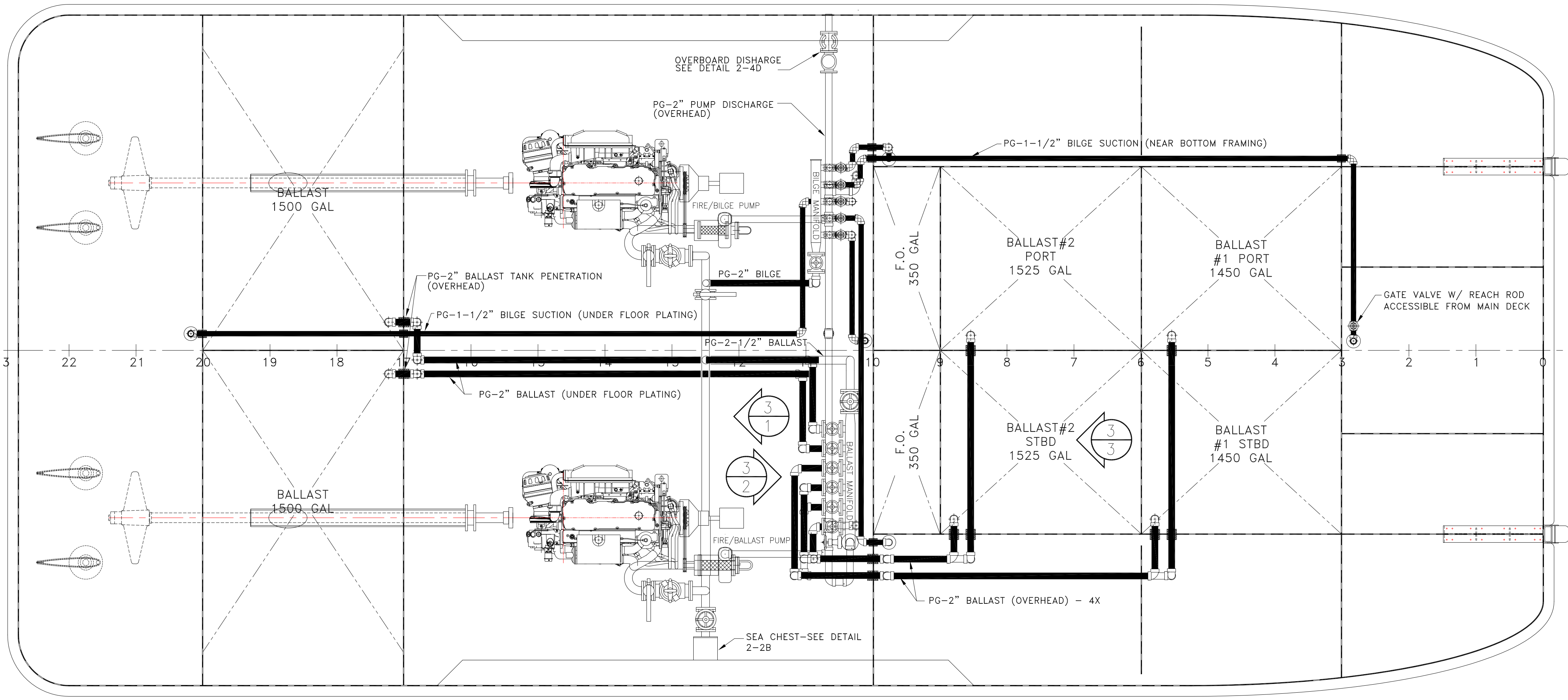
BILGE, BALLAST & FIREMAIN SYSTEM

Dwg. No. 17-1393-263 Alt. No. 0
 Sh: 2 of 3

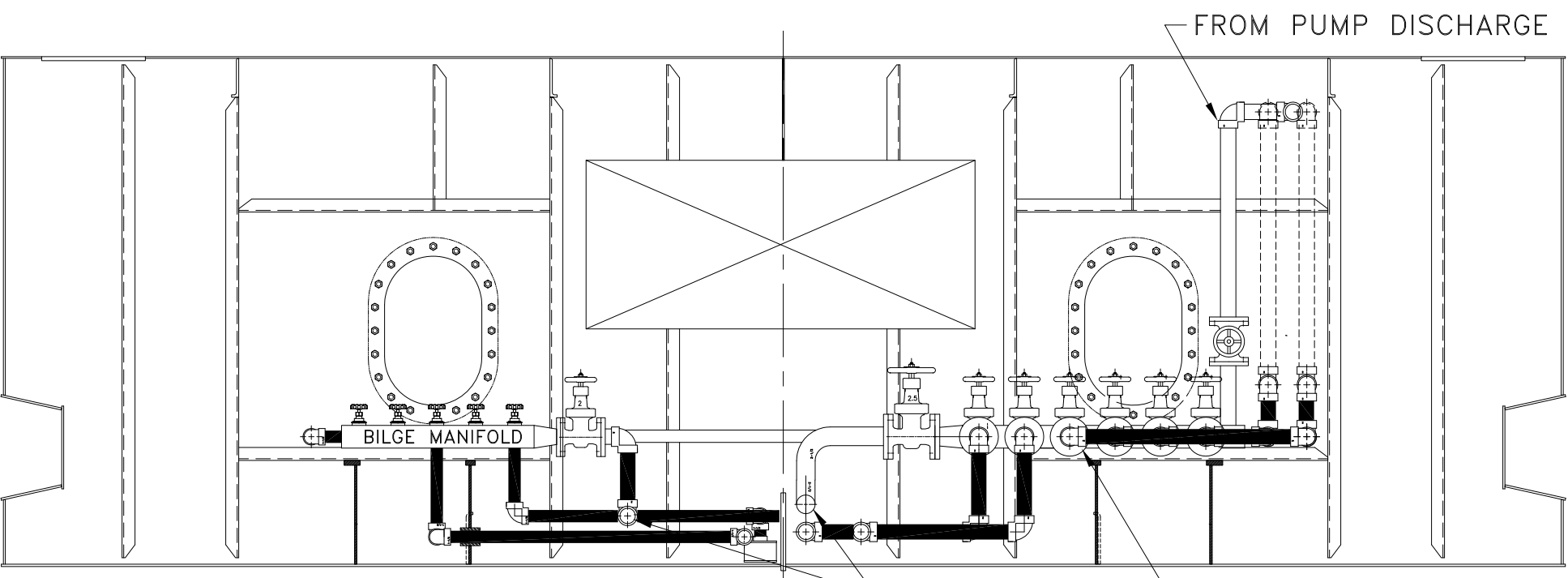
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 App'd By: _____ Scale: NONE
 ABS App'l: _____ USCG App'l: _____



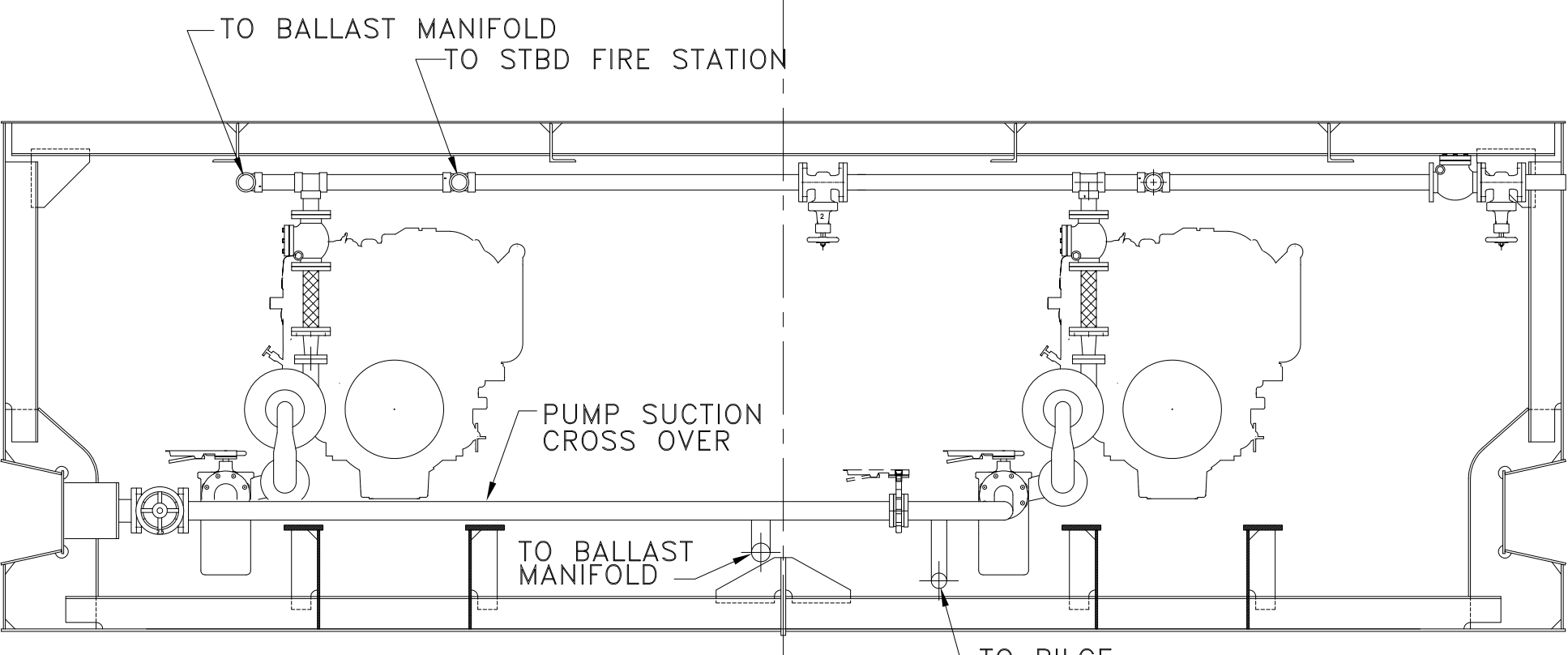
3 BALLAST #2 TANKS PIPING
SCALE: 1/2" = 1'-0"



HOLD FIRE, BALLAST & BILGE PIPING ARRANGEMENT

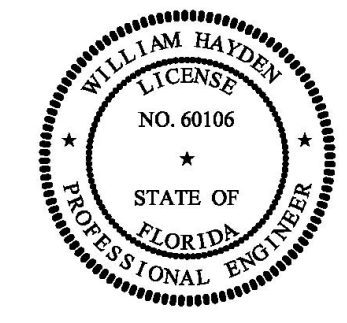


2 BILGE & BALLAST MANIFOLD PIPING
SCALE: 1/2" = 1'-0"



1 PUMP SUCTION AND DISCHARGE PIPING
SCALE: 1/2" = 1'-0"

GENERAL NOTES		GENERAL NOTES		ALTERATIONS		RESERVATIONS		REFERENCES	
NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	DATE	BY NO.	DESCRIPTION	DESCRIPTION
1.	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER "M" VESSELS.	9.	EACH FIRE STATION SHALL HAVE A 1 1/2" HYDRANT VALVE, 50 FEET OF 1 1/2" LINED COMMERCIAL FIRE HOSE CONFORMING TO UL19, A HOSE WRENCH, AND A USCG APPROVED COMBINATION FIRE NOZZLE. THE HOSE SHALL BE CONNECTED AND STOWED IN AN APPROVED STAINLESS STEEL HOSE RACK.						
2.	THIS DRAWING IS DIAGRAMMATIC AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. THE CONTRACTOR SHALL DEVELOP A DETAILED DESIGN THAT PROVIDES A FULLY FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION, TAKING INTO ACCOUNT ALL FROM THE SHIP AND NECESSARY SYSTEM INTERFACES AND INTERFERENCES. DIMENSIONS SHALL BE VERIFIED MANUFACTURERS' CERTIFIED DRAWINGS AS APPROPRIATE.	10.	THE FIRE/BILGE PUMP IS SIZED TO EXCEED THE MINIMUM REQUIREMENTS OF ABS. THE PUMP CAPACITY SHALL MEET THE FLOW DEMANDS OF AT LEAST 80 GPM FROM THE HIGHEST TWO FIRE STATIONS OPERATING SIMULTANEOUSLY.						
3.	PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS AND WITH SUFFICIENT TAKE DOWN JOINTS TO PROVIDE FOR REMOVAL, INSPECTION, SERVICING AND REPLACEMENT OF EQUIPMENT.	11.	VALVE HANDWHEELS AND CONTROLS TO BE FITTED WITH LABEL PLATES INDICATING FUNCTION.						
4.	PROVIDE GAUGE ASSEMBLIES TO BE IN ACCORDANCE WITH ASTM F721. VALVES, TUBING, AND FITTINGS SHALL BE 316 STAINLESS STEEL.	12.	BILGE SUCTION STRAINER BOXES SHALL BE IN ACCORDANCE WITH ASTM F986, TYPE 1, HOT DIP GALVANIZED AFTER FABRICATION. STRAINER OPEN AREA SHALL BE GREATER THAN THREE TIMES THE AREA OF THE BILGE PIPE.						
5.	AVOID POCKETS IN THE PIPE LINES, BOSSES AND VALVES OR SCREWED PLUGS SHALL BE FITTED TO ENABLE COMPLETE DRAINING OF PIPES WHERE POCKETS DO OCCUR.	13.	A REMOTE PRESSURE GAUGE FOR THE FIREMAIN SHALL BE LOCATED IN THE PILOT HOUSE.						
6.	PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE PIPE WITH BOLTED CLAMPS AND WELDED TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES. HANGERS SUPPORTING CU-NI TUBING SHALL UTILIZE A RESILIENT NONMETALLIC LINER BETWEEN THE TUBING AND STEEL HANGER.	14.	PIPING SHALL BE THOROUGHLY CLEANED BEFORE TESTING.						
7.	WHERE PIPING PENETRATES BULKHEADS OR DECKS, THE PENETRATION SHALL MAINTAIN THE WATERTIGHT INTEGRITY OF THE SPACE. PIPE PENETRATIONS SHALL BE IN ACCORDANCE WITH DETAIL 2-1C.	15.	PIPING 2-1/2" AND LARGER SHALL BE BUTT WELDED.						
8.	BOTH PUMPS SHALL BE CAPABLE OF REMOTE STARTING FROM THE BRIDGE.	16.	VALVES 1-1/2" AND SMALLER SHALL BE THREADED.						



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Title: 45'x20'x6.5' NCDOT PUSHBOAT
BILGE, BALLAST & FIREMAIN SYSTEM

Dwg. No. 17-1393-263
Alt. No. 0
Sh. 3 of 3

Drawn By: JAH
Checked By:
App'd By:
ABS App'l:
Date: OCTOBER 19, 2018
Date:
Scale: 1/2" = 1'-0"
USCG App'l:

MATERIAL SCHEDULE

SERVICE	SIZE	PIPE	TAKEDOWN JOINTS	VALVES		FITTINGS	FLEXIBLE CONNECTIONS	COMMENTS
			MATERIAL	BODY	TRIM			
FW COOLING MAWP: 35 PSIG MAX TEMP: 110°F	ALL	STAINLESS STEEL PIPE, TYPE 316L, ASTM A312 SCHEDULE 40	UNION 316 SS STEEL MSS-SP-14 ASTM A-351 ANSI B1.20.1 THREADED	<u>GATE_CHECK VALVE:</u> 316 SS STEEL ASTM 16.34 ASTM A-351 ANSI B1.20.1 THREADED, 200#WOG	316 SS STEM, DISC AND SEAT	UNION 316 SS STEEL MSS-SP-14 ASTM A-351 ANSI B1.20.1 THREADED	FLEX HOSE MEETING SAE J1475	-
SEACHEST	ALL	CARBON STEEL ASTM ASTM A53 OR A106, GRADE B SEAMLESS ANSI B36.10 SCH 80		<u>BALL VALVE:</u> STAINLESS STEEL ASME B16.24 ASTM A351 TYPE CF8M THREADED 1000 PSI <u>GATE VALVE:</u> 316 SS STEEL ASTM 16.34 ASTM A-351 ANSI B1.20.1 THREADED, 200#WOG	<u>BALL VALVE:</u> STAINLESS STEEL, ASTM A276 TYPE 316 STEEL BALL PTFE SEATS <u>GATE VALVE</u> 316 SS STEM, DISC AND SEAT	CARBON STEEL ASTM A105 ANSI B16.11 3000# THREADED		

EQUIPMENT LIST

ITEM #	QTY	SERVICE	TYPE	MODEL	CAPACITY	DRIVE	NOTES
1	2	FLUSHNG PUMP	SELF PRIMING, CLUTCH DRIVEN	-	20 GPM@30 PSI	MAIN ENGINE	-
2	2	STRAINER	SIMPLEX, STAINLESS STEEL, THREADED	-	PRESSURE DROP .45 PSI @ 20 GPM	-	-
3	2	PRESSURE GAGE	2-1/2" STAINLESS STEEL, 1/4" NPT	-	0 - 30 PSI	-	-
4	2	PUMP CLUTCH	DUAL BELT DRIVEN, 24VDC, 72 WATTS	PITTS H28V200 13654	200 FT-LB	MAIN ENGINE	INSTALL TENSION IDLERS ON DRIVE BELTS

SYMBOLSLIST

Symbol	Description
—	PIPING
▷	REDUCER
⊞	BHD PENETRATION
⋈	GATE VALVE
⌒	SWING CHECK VALVE
⊘	BALL VALVE
⊗	SIMPLEX STRAINER
⌒	SEA CHEST
⊕	PUMP
⊕ ^P	PRESSURE GAUGE

GENERAL NOTES

- MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER M VESSELS.
- THIS DRAWING IS DIAGRAMMATIC AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. EQUIPMENT LAYOUT IN A GIVEN AREA IS APPROXIMATE. THE CONTRACTOR SHALL DEVELOP A DETAILED DESIGN THAT PROVIDES A FULLY FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION, TAKING INTO ACCOUNT ALL NECESSARY SYSTEM INTERFACES AND INTERFERENCES. DIMENSIONS SHALL BE VERIFIED FROM THE SHIP AND MANUFACTURERS' CERTIFIED DRAWINGS AS APPROPRIATE.
- PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS AND WITH SUFFICIENT TAKE DOWN JOINTS TO PROVIDE FOR REMOVAL, INSPECTION, SERVICING, AND REPLACEMENT OF PIPING, VALVES, FITTINGS, AND EQUIPMENT.
- AVOID POCKETS IN THE PIPE LINES. BOSSES AND VALVES OR SCREWED PLUGS SHALL BE FITTED TO ENABLE COMPLETE DRAINING OF PIPES WHERE POCKETS DO OCCUR.
- THE PIPING SYSTEM SHALL BE PRESSURE TESTED, CLEANED, AND FLUSHED PRIOR TO BEING PLACED IN SERVICE. PER MANUFACTURER.
- PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F706. HANGERS SHALL BE ATTACHED TO THE TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES.
- WHERE PIPING PENETRATES BULKHEADS OR DECKS, THE PENETRATION SHALL MAINTAIN THE WATERTIGHT INTEGRITY OF THE SPACE PIPE PENETRATIONS SHALL BE IN ACCORDANCE WITH DETAIL 2-2A.
- EACH PUMP SHALL BE CAPABLE OF PROVIDING TO GALLONS PER MINUTE AT 15 PSI TO EACH SHAFT IN THE EVENT THAT THE PRIMARY SHAFT FLUSHING PUMP FAILS.

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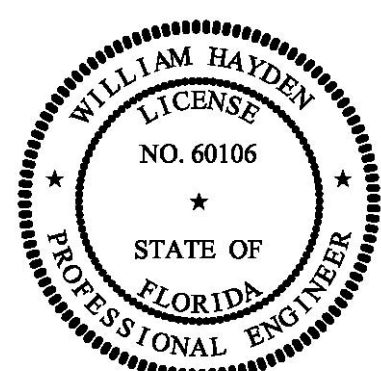
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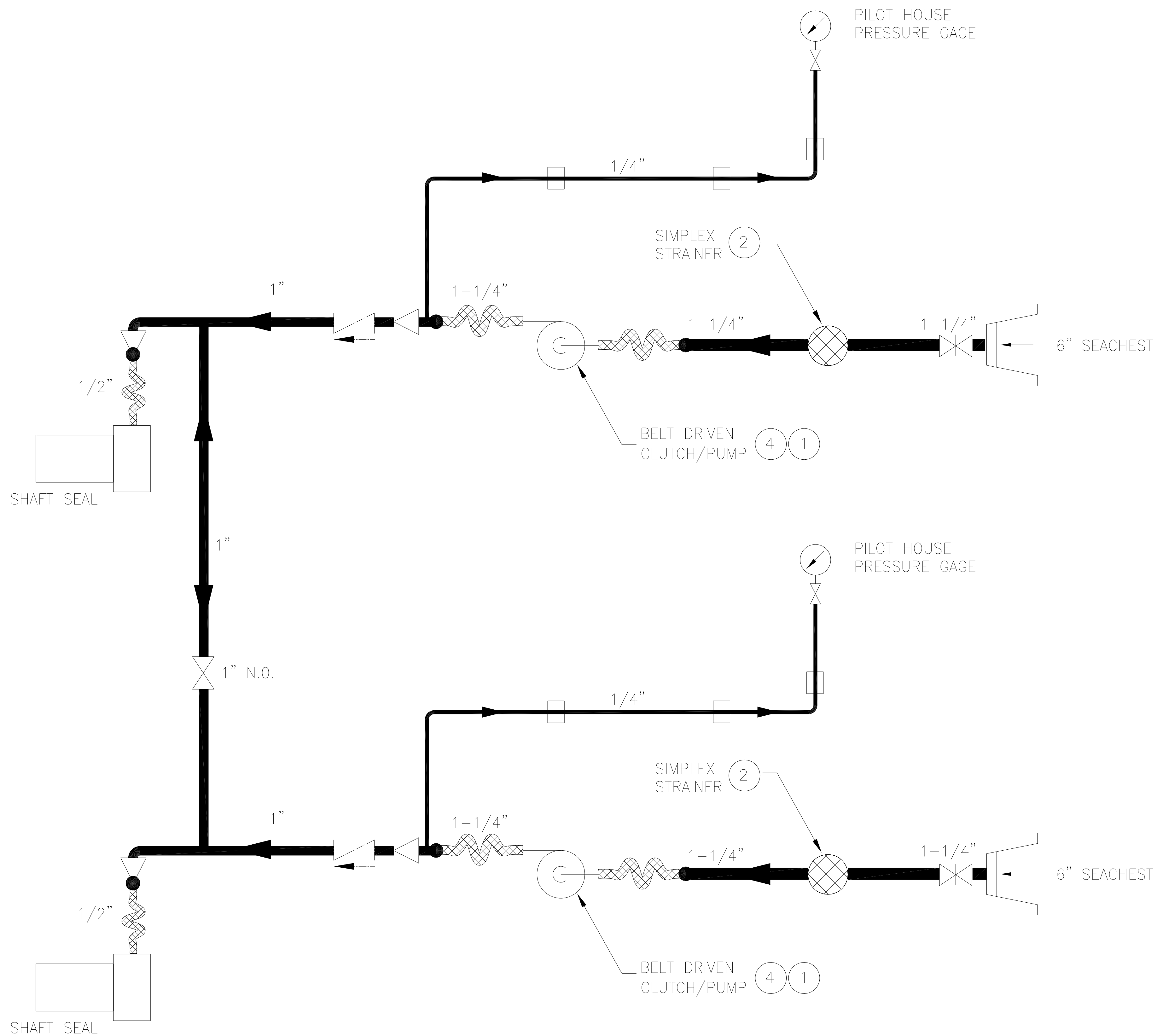
Title: 45'-6"x20'-0"x6'-6" NCDOT PUSHBOAT

SHAFT FLUSHING PIPING

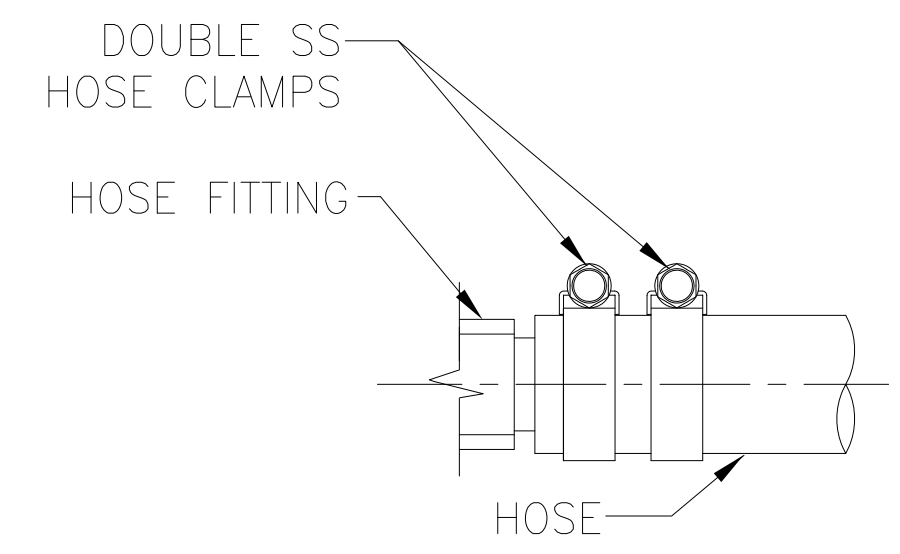
Dwg. No. 17-1393-264 Alt. No. 0
 Sh. 1 of 3

Drawn By: JAH Date: NOVEMBER 16, 2018
 Checked By: _____ Date: _____
 App'd By: _____ Scale: NONE
 ABS App'l: _____ USCG App'l: _____

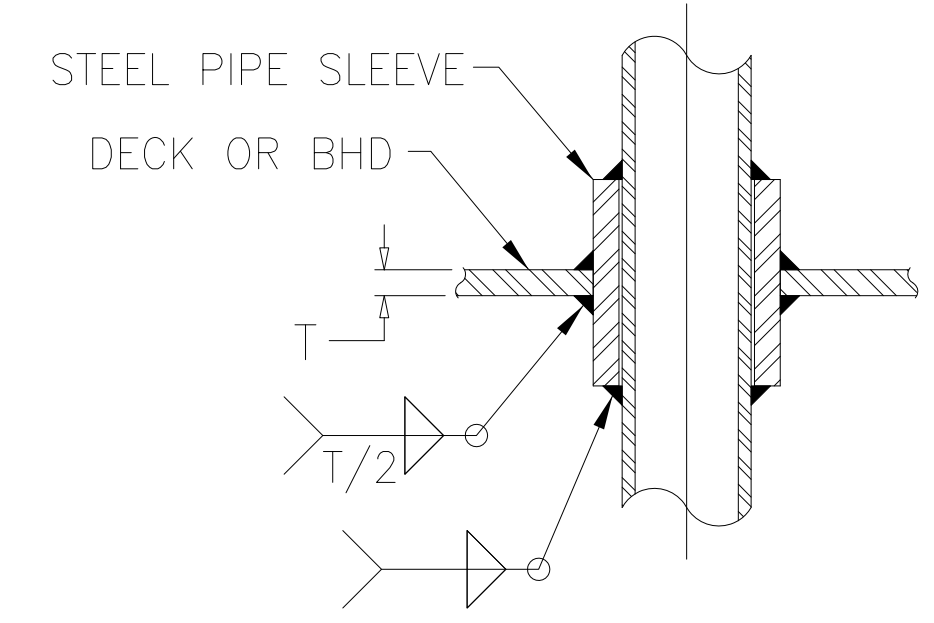




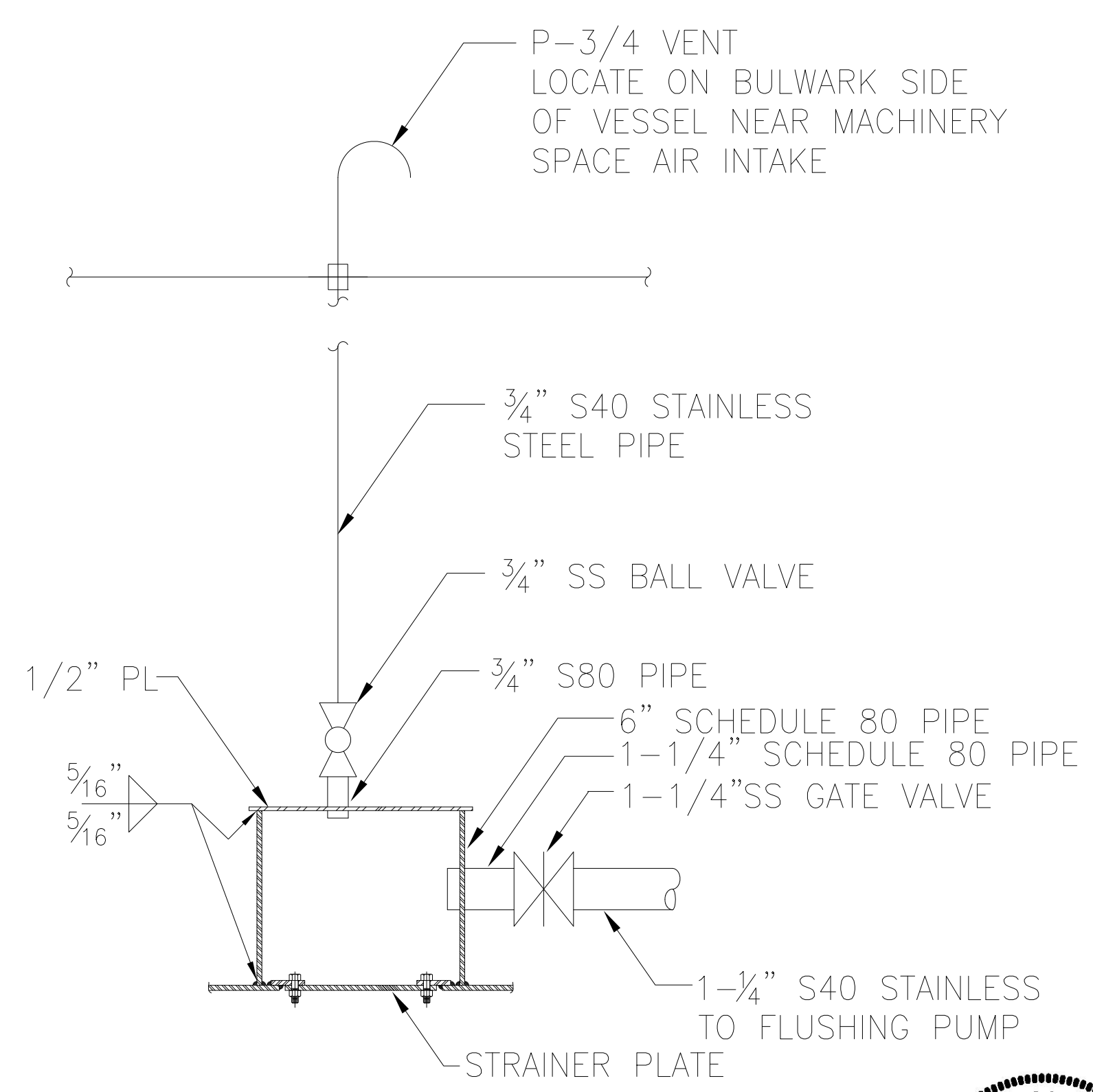
SHAFT FLUSHING PIPING DIAGRAM



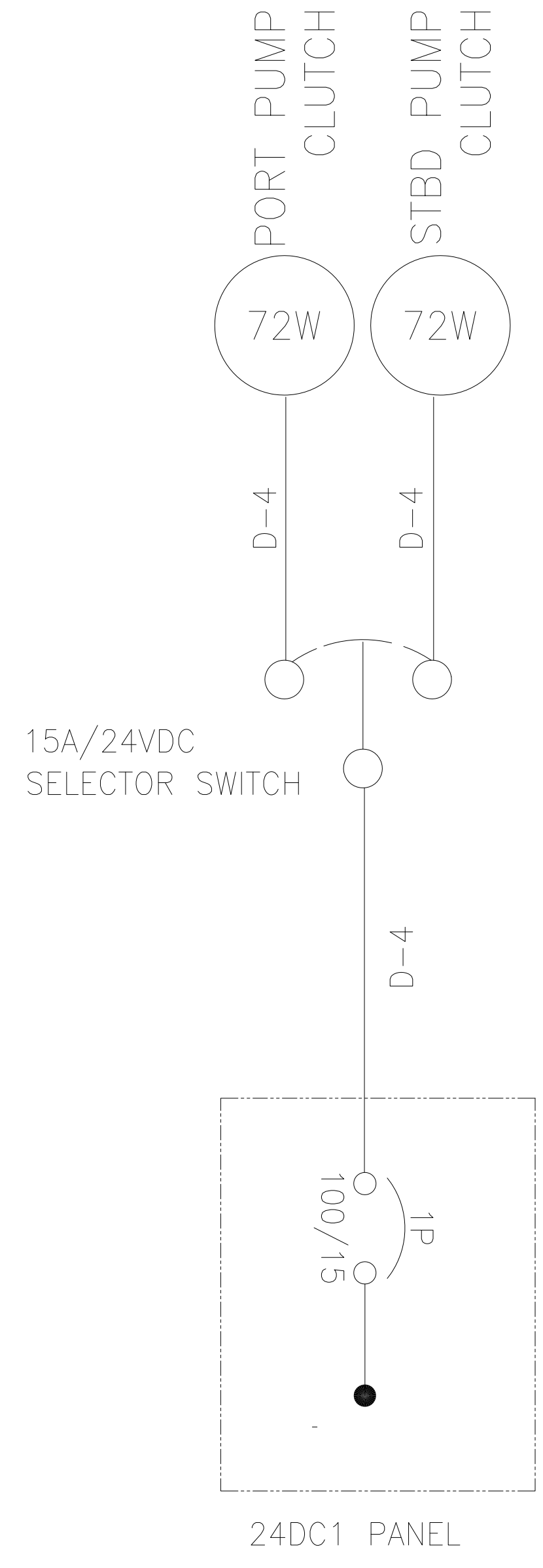
DETAIL 2-3A
TYPICAL HOSE CONNECTION
SCALE: NONE



DETAIL 2-2A
TYPICAL DECK/BULKHEAD PENETRATION
SCALE: NONE



DETAIL 2-1A
SEA CHEST
SCALE: NONE



ELECTRICAL SWITCH SCHEMATIC

-- GENERAL NOTES --

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4.	AVOID POCKETS IN THE PIPE LINES. BOSSES AND VALVES OR SCREWED PLUGS SHALL BE FITTED TO ENABLE COMPLETE DRAINING OF PIPES WHERE POCKETS DO OCCUR.
5.	THE PIPING SYSTEM SHALL BE PRESSURE TESTED, CLEANED, AND FLUSHED PRIOR TO BEING PLACED IN SERVICE. PER MANUFACTURER.
6.	PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES.
7.	WHERE PIPING PENETRATES BULKHEADS OR DECKS, THE PENETRATION SHALL MAINTAIN THE WATERTIGHT INTEGRITY OF THE SPACE. PIPE PENETRATIONS SHALL BE IN ACCORDANCE WITH DETAIL 2-2A.
8.	EACH PUMP SHALL BE CAPABLE OF PROVIDING TO GALLONS PER MINUTE AT 15 PSI TO EACH SHAFT IN THE EVENT THAT THE PRIMARY SHAFT FLUSHING PUMP FAILS.

PROFESSIONAL ENGINEER

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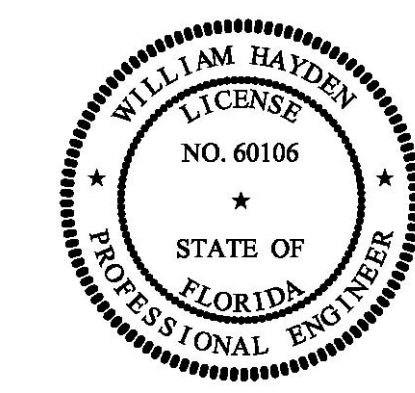
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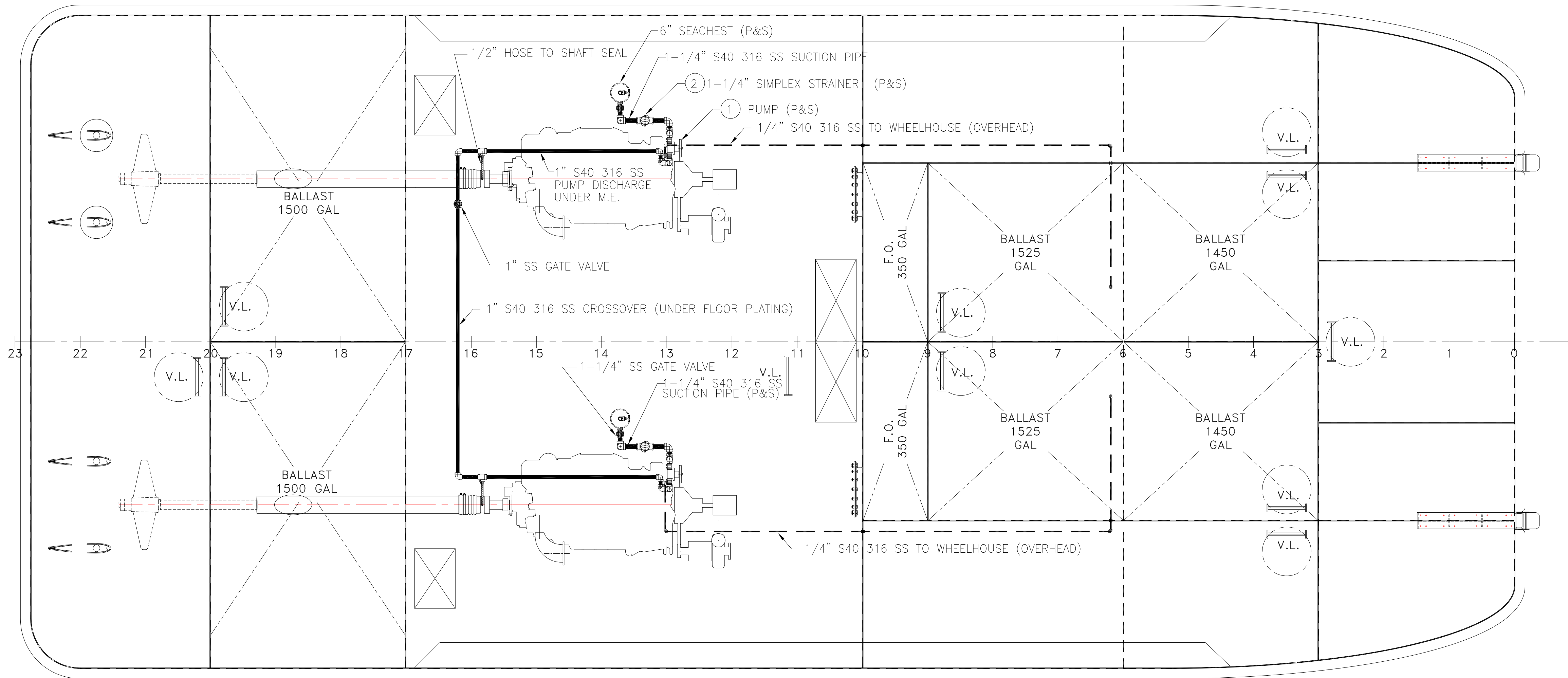
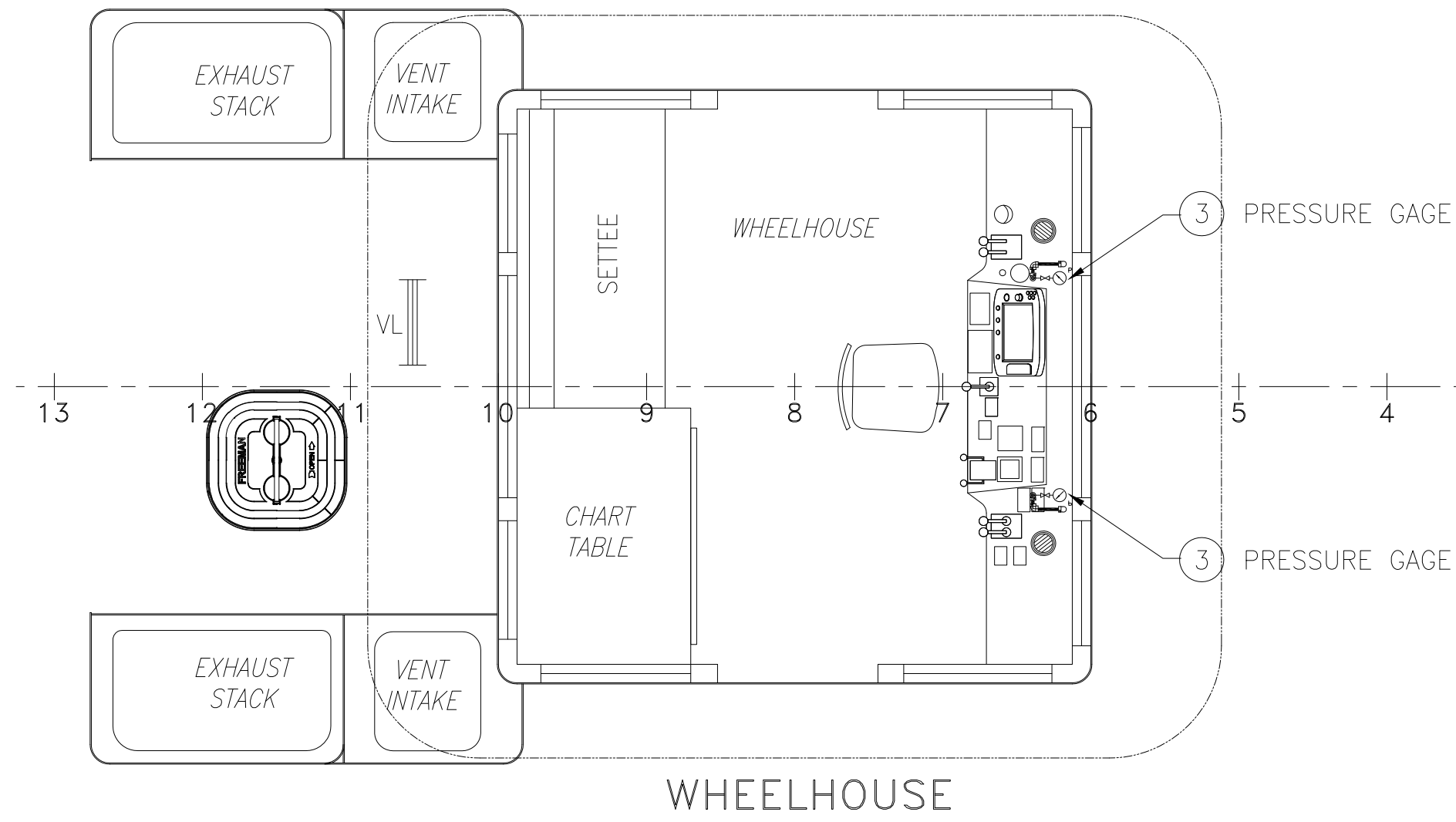
Title: 45'-6"x20'-0"x6'-6" NCDOT PUSHBOAT

SHAFT FLUSHING PIPING

Dwg. No. 17-1393-264 Alt. No. 0
Sh: 2 of 3

Drawn By: JAH Date: NOVEMBER 16, 2018
Checked By: Date: NONE
App'd By: Scale: NONE
ABS App'l: USCG App'l: Scale: NONE



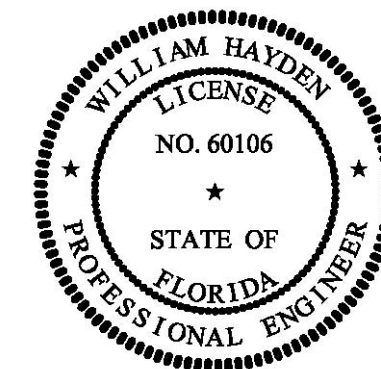


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8.	EACH PUMP SHALL BE CAPABLE OF PROVIDING TO GALLONS PER MINUTE AT 15 PSI TO EACH SHAFT IN THE EVENT THAT THE PRIMARY SHAFT FLUSHING PUMP FAILS.

HOLD PLAN

SHAFT FLUSHING ARRANGEMENT



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info@dejongandlebet.com

Title: 45'-6"x20'-0"x6'-6" NCDOT PUSHBOAT

SHAFT FLUSHING PIPING

Dwg. No. 17-1393-264 Alt. No. 0
Sh. 3 of 3

Drawn By: JAH Date: NOVEMBER 16, 2018
Checked By: _____ Date: _____
App'd By: _____ Scale: NONE
ABS App'l: _____ USCG App'l: _____

EQUIPMENT LIST

Table with 8 columns: ITEM #, QTY, SERVICE, TYPE, MODEL, CAPACITY, DRIVE, NOTES. Lists 15 items including hydraulic pumps, level switches, reservoirs, control valves, relief valves, cross port relief valves, suction strainers, return filters, shuttle valves, winches, capstans, pump clutches, pressure gages, and hydraulic cylinders.

SYMBOLS LIST

Table mapping symbols to components: TUBING, VARIABLE DISPLACEMENT HYDRAULIC PUMP, LEVEL, GATE VALVE, MANUAL DIRECTIONAL CONTROL VALVE, RELIEF VALVE, CROSS PORT RELIEF VALVE, FILTER/STRAINER, HYDRAULIC CHECK VALVE, HYDRAULIC BRAKE, BI-DIRECTIONAL HYDRAULIC MOTOR, VARIABLE FLOW CONTROL VALVE, REDUCER, FLOW DIRECTION ARROW, FLEXIBLE CONNECTION, PRESSURE GAUGE, HYDRAULIC CYLINDER.

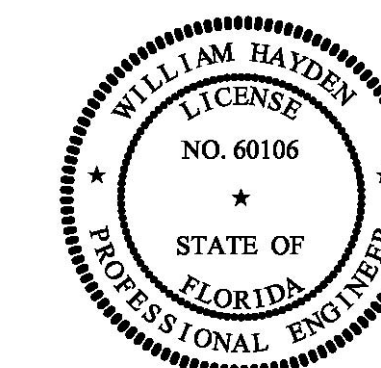
MATERIAL SCHEDULE

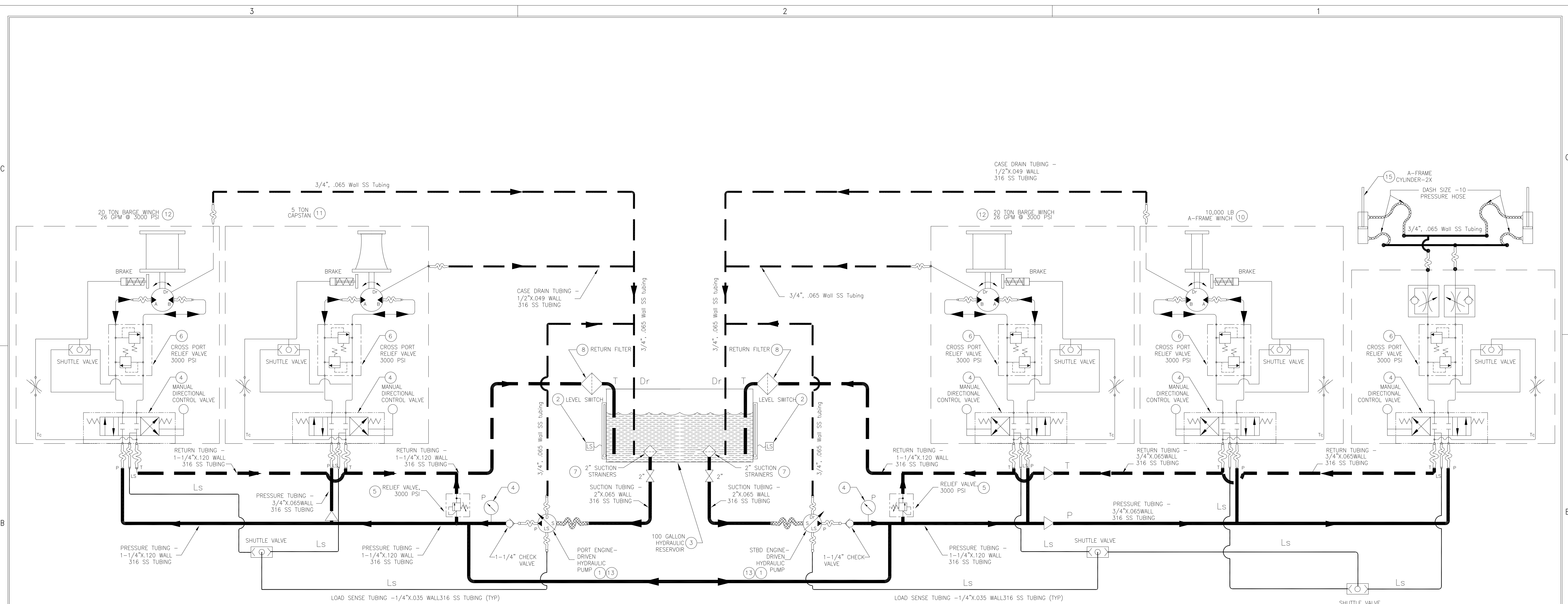
Table with columns: SERVICE, SIZE, PIPE, COMPONENTS (TAKEDOWN JOINTS, FITTINGS, FLEX CONNECT), GASKETS, VALVES (BODY, TRIM), BOLTING (BOLTS/STUDS, NUTS/WASHERS), REMARKS. Details material specifications for hydraulic oil service piping.

GENERAL NOTES

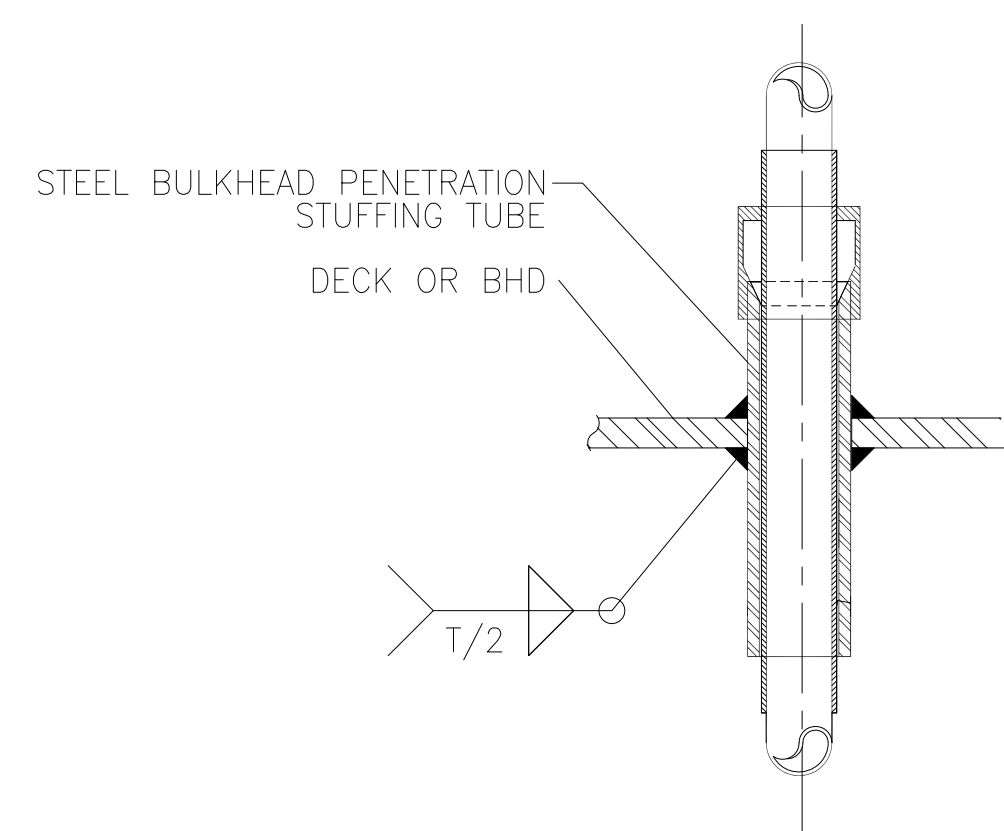
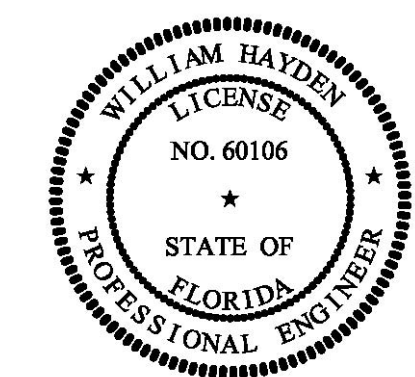
Table of general notes for the hydraulic system, including notes on piping materials, installation, design, and inspection requirements.

Project information block including: PROJECT NO. 17-1393-265, TITLE: 45'-6"x20'-0"x6'-6" NCDOT PUSHBOAT, DEJONG & LEBET, Inc. logo, and contact information for Jacksonville, Florida.





DECK MACHINERY HYDRUALIC SYSTEM DIAGRAM



DETAIL 2-1A
TYP. DECK OR BULKHEAD PENETRATION
NO SCALE

PIPING IDENTIFICATION	
P	- PRESSURE
LS	- LOAD SENSING
T	- TANK RETURN
Tc	- BRAKE TANK RETURN LINE
Dr	- DRAIN
K	- BRAKE PRESSURE
S	- PUMP SUCTION

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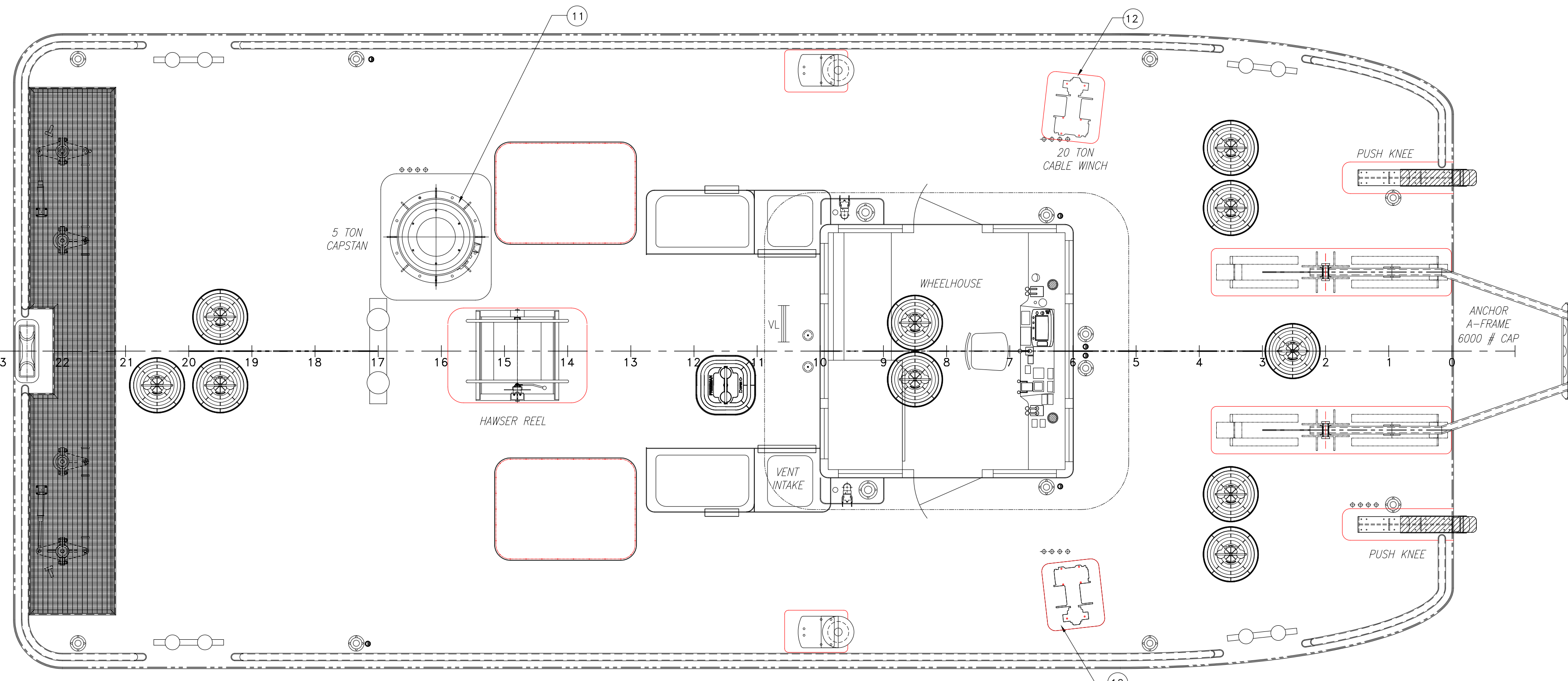
Title: 45'-6"x20'-0"x6'-6" NCDOT PUSHBOAT

HYDRAULIC SYSTEM

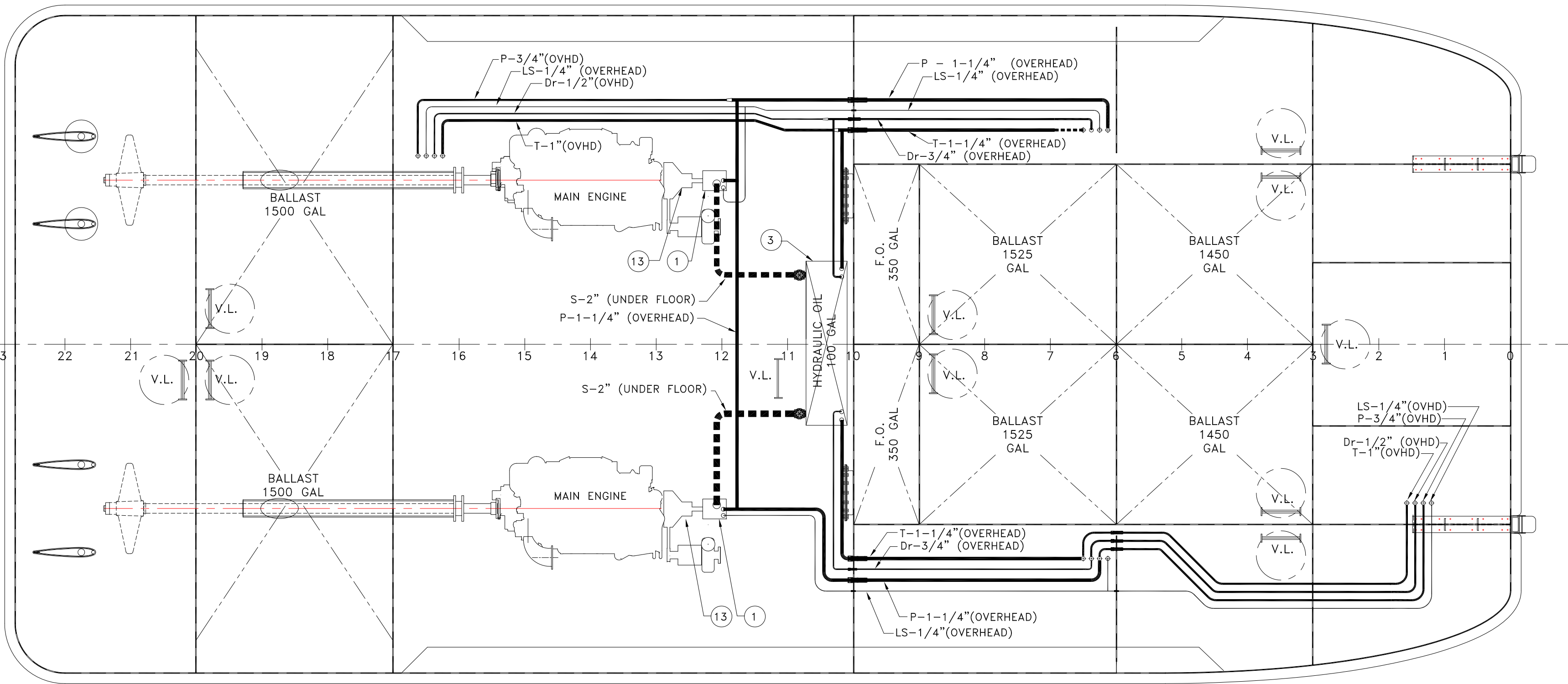
Dwg. No. 17-1393-265 Alt. No. 0
Sht. 2 of 3

Drawn By: JAH Date: NOVEMBER 21, 2018
Checked By: _____ Date: _____
App'd By: _____ Scale: NONE
ABS App'l: _____ USCG App'l: _____

- GENERAL NOTES -	
NO.	DESCRIPTION
1.	PIPING SYSTEM MATERIALS, INSTALLATION, AND WORKMANSHIP SHALL BE IN ACCORDANCE 46 CFR SUBCHAPTER M (TOWING VESSELS).
2.	THIS DRAWING IS DIAGRAMMATIC ONLY AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. THE CONTRACTOR SHALL DEVELOP FULLY A DETAILED DESIGN THAT PROVIDES A FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION.
3.	PRIOR TO FABRICATION OF MATING PIPE ASSEMBLIES, VERIFY EQUIPMENT CONNECTIONS FOR SIZE, LOCATION AND TYPE IN ACCORDANCE WITH MANUFACTURER CERTIFIED DRAWINGS, OR DIRECTLY FROM THE EQUIPMENT. TEMPLATE BOLTING PATTERNS AND CONNECTIONS AS REQUIRED.
4.	PIPING SHALL BE ROUTED AS DIRECTLY AS POSSIBLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS.
5.	DO NOT ROUTE PIPING CONTAINING HYDRAULIC OIL NEAR ANY ELECTRICAL DEVICES OR EQUIPMENT. DO NOT LOCATE TAKE-DOWN JOINTS AROUND, NEAR, OR OVER ELECTRICAL EQUIPMENT. ROUTE ALL HYDRAULIC OIL PIPING AT LEAST 18 INCHES AWAY FROM ANY SURFACE THAT NORMALLY HAS AN OPERATING TEMPERATURE OF 450°F OR GREATER EQUIPMENT.
6.	TAKE-DOWN JOINTS SHALL BE PROVIDED AT INTERVALS WHICH ALLOW DISASSEMBLY AND REMOVAL OF PIPING AND EQUIPMENT WITHOUT REQUIRING REMOVAL OR MODIFICATION OF PERMANENT STRUCTURE.
7.	PIPING SHALL BE ADEQUATELY SUPPORTED BY CLAMPS OR HANGERS IN ACCORDANCE WITH APPLICATION. HANGERS SHALL BE ATTACHED TO THE PIPE WITH BOLTED CLAMPS AND WELDED TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES.
8.	WHERE PIPES PENETRATE TANK BOUNDARIES, BULKHEADS, OR DECKS, STUFFING TUBES SHALL BE USED.
9.	FLEXIBLE HOSE ASSEMBLIES SHALL MEET THE REQUIREMENTS OF 46 CFR 182.720 AND BE APPROVED FOR HYDRAULIC OIL SERVICE. END FITTINGS SHALL MEET SAE J1475. HOSE ASSEMBLIES SHALL NOT BE LESS THAN 9" IN LENGTH NOR MORE THAN 24" IN LENGTH.
10.	SUPPORT HYDRAULIC TUBING WITH VIBRATION DAMPENING CLAMPS SUPPORTED WITH THE MAXIMUM SPAN INDICATED BELOW
	BETWEEN TUBING CLAMPS BETWEEN CLAMP & UNION CLAMP & 90 BEND
	TUBING SIZE TUBING CLAMPS CLAMP & UNION CLAMP & 90 BEND
	1/4" THRU 3/8" 36" 2" 4"
	1/2" THRU 1" 60" 4" 8"
	1-1/4" THRU 2" 84" 8" 12"
11.	HYDRAULIC OIL PIPING MUST BE SUITABLY INSULATED TO PREVENT INJURIES AND ALLOW ACCESS FOR PIPING INSPECTION

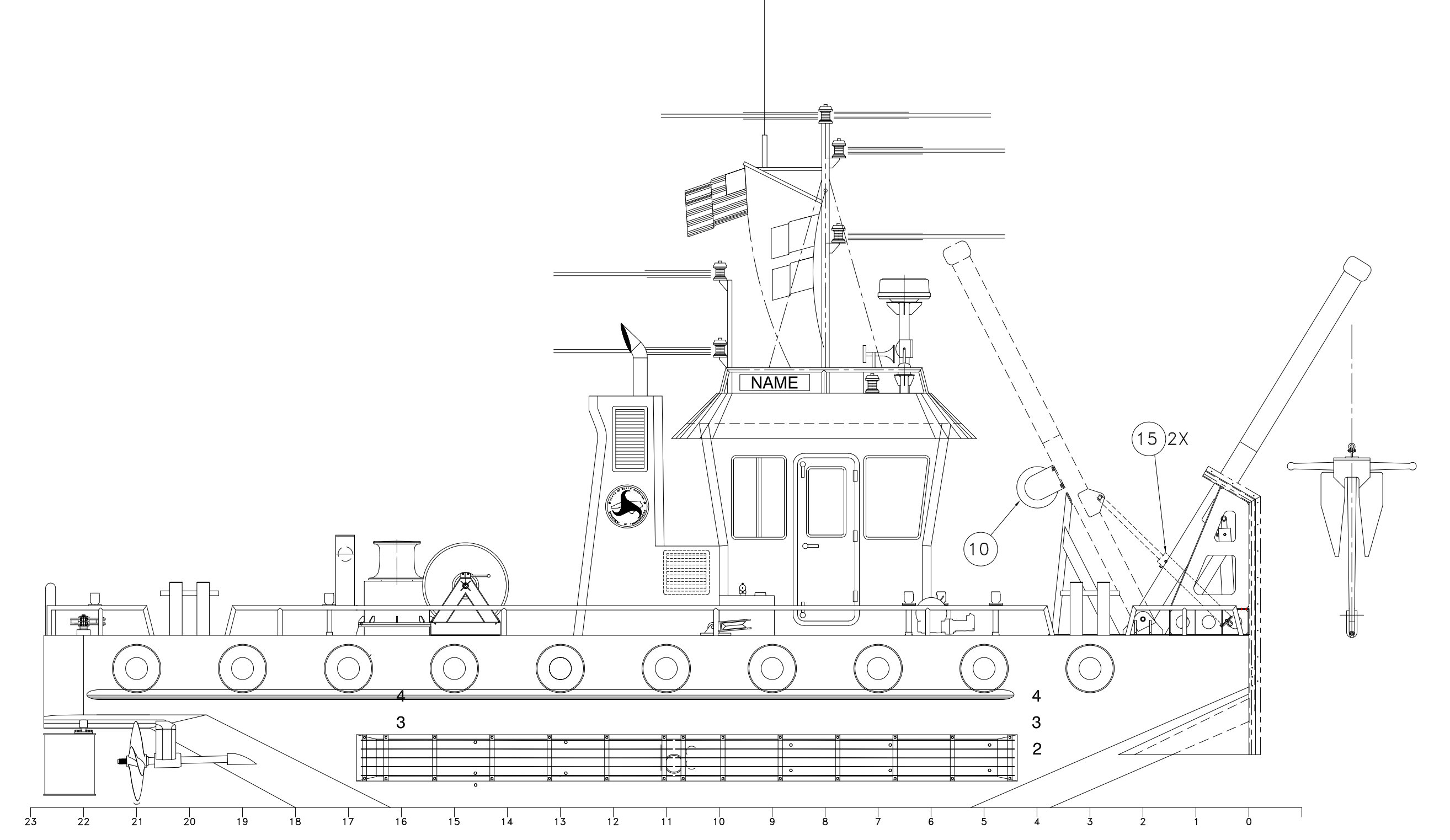


MAIN DECK PLAN

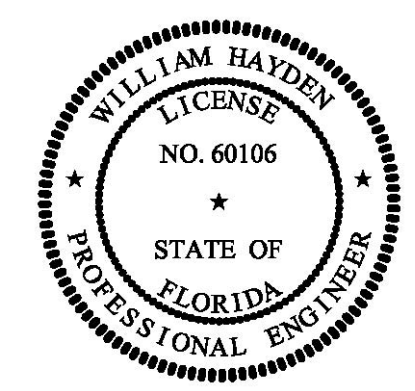


HOLD PLAN

HYDRAULIC SYSTEM ARRANGEMENT



PROFILE
SCALE: 1/4" = 1'-0"



GENERAL NOTES	
NO.	DESCRIPTION
1.	PIPING SYSTEM MATERIALS, INSTALLATION, AND WORKMANSHIP SHALL BE IN ACCORDANCE 46 CFR SUBCHAPTER M (TOWING VESSELS).
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4.	PIPING SHALL BE ROUTED AS DIRECTLY AS POSSIBLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS.
5.	DO NOT ROUTE PIPING CONTAINING HYDRAULIC OIL NEAR ANY ELECTRICAL DEVICES OR EQUIPMENT. DO NOT LOCATE TAKEDOWN JOINTS AROUND, NEAR, OR OVER ELECTRICAL EQUIPMENT. ROUTE ALL HYDRAULIC OIL PIPING AT LEAST 18 INCHES AWAY FROM ANY SURFACE THAT NORMALLY HAS AN OPERATING TEMPERATURE OF 450°F OR GREATER EQUIPMENT.
6.	TAKEDOWN JOINTS SHALL BE PROVIDED AT INTERVALS WHICH ALLOW DISASSEMBLY AND REMOVAL OF PIPING AND EQUIPMENT WITHOUT REQUIRING REMOVAL OR MODIFICATION OF PERMANENT STRUCTURE.
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NO.	DESCRIPTION
10.	SUPPORT HYDRAULIC TUBING WITH VIBRATION DAMPENING CLAMPS SUPPORTED WITH THE MAXIMUM SPAN INDICATED BELOW
	BETWEEN TUBING CLAMPS BETWEEN CLAMP & UNION CLAMP & 90 BEND
	TUBING SIZE TUBING CLAMPS CLAMP & UNION CLAMP & 90 BEND
	1/4" THRU 3/8" 36" 2" 4"
	1/2" THRU 1" 60" 4" 8"
	1-1/4" THRU 2" 84" 8" 12"
11.	HYDRAULIC OIL PIPING MUST BE SUITABLY INSULATED TO PREVENT INJURIES AND ALLOW ACCESS FOR PIPING INSPECTION

PIPING IDENTIFICATION	
P	- PRESSURE
LS	- LOAD SENSING
T	- TANK RETURN
Tc	- BRAKE TANK RETURN LINE
Dr	- DRAIN
K	- BRAKE PRESSURE
S	- PUMP SUCTION

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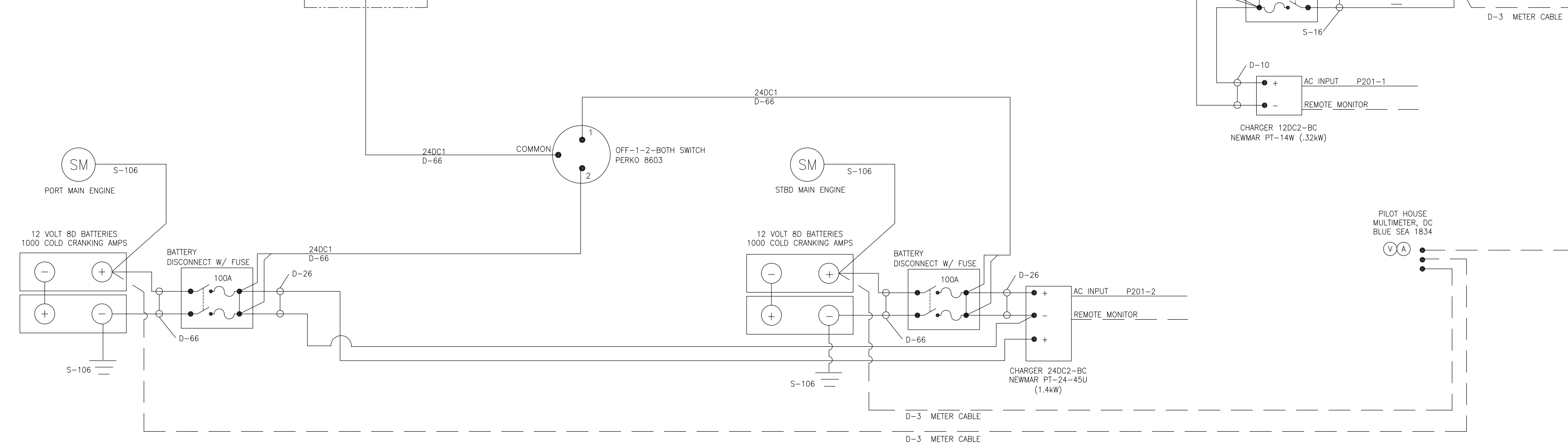
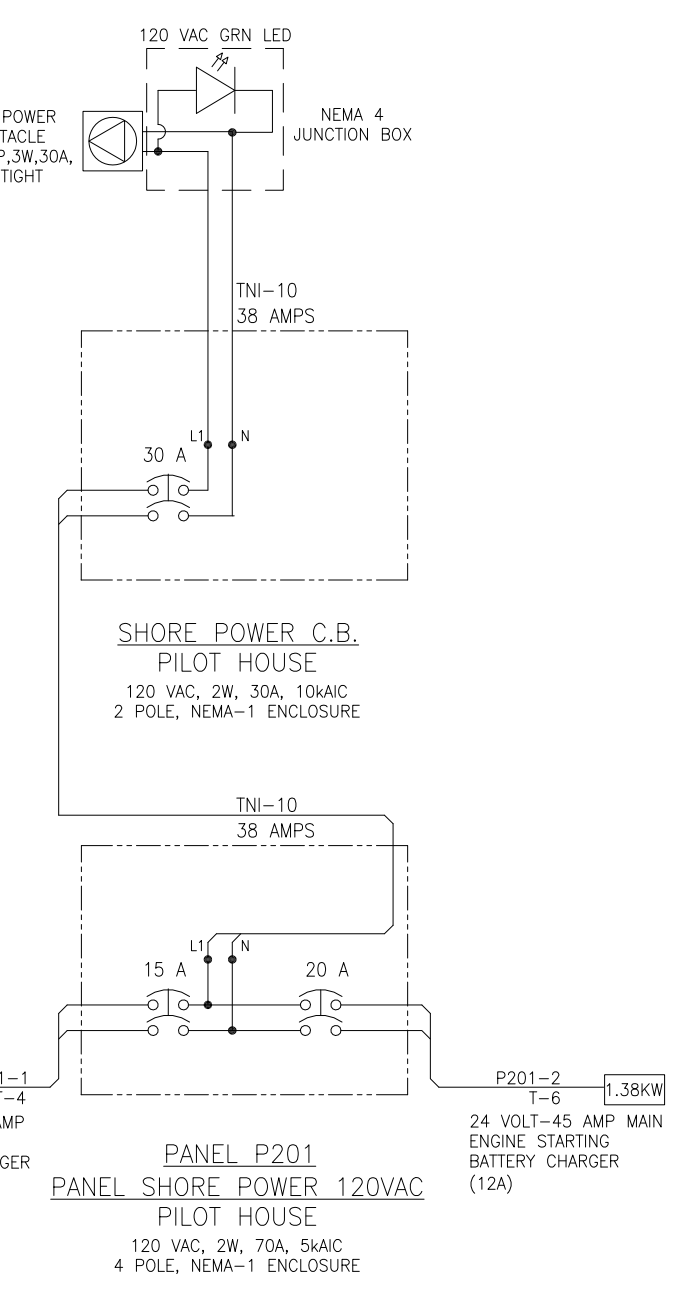
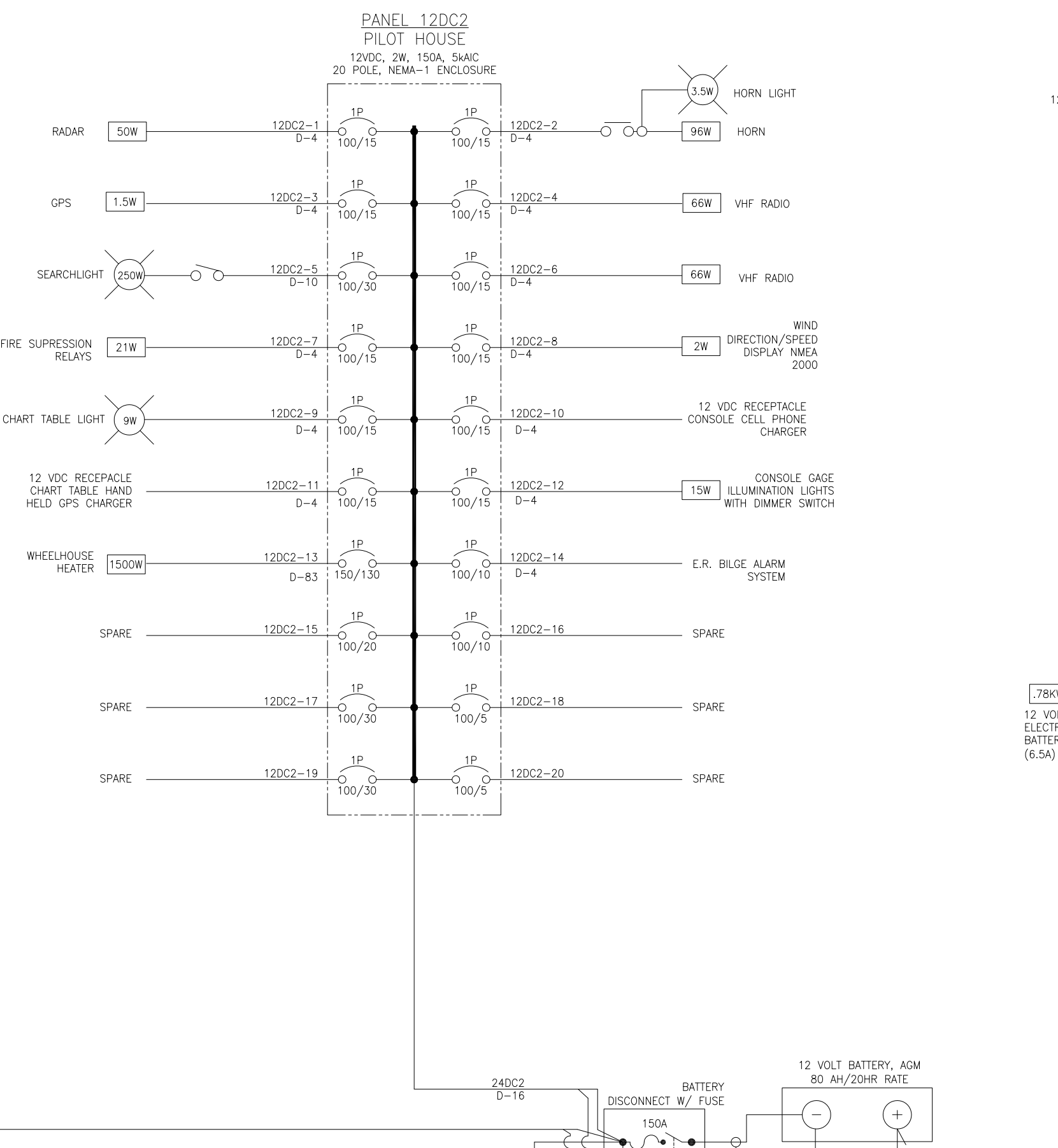
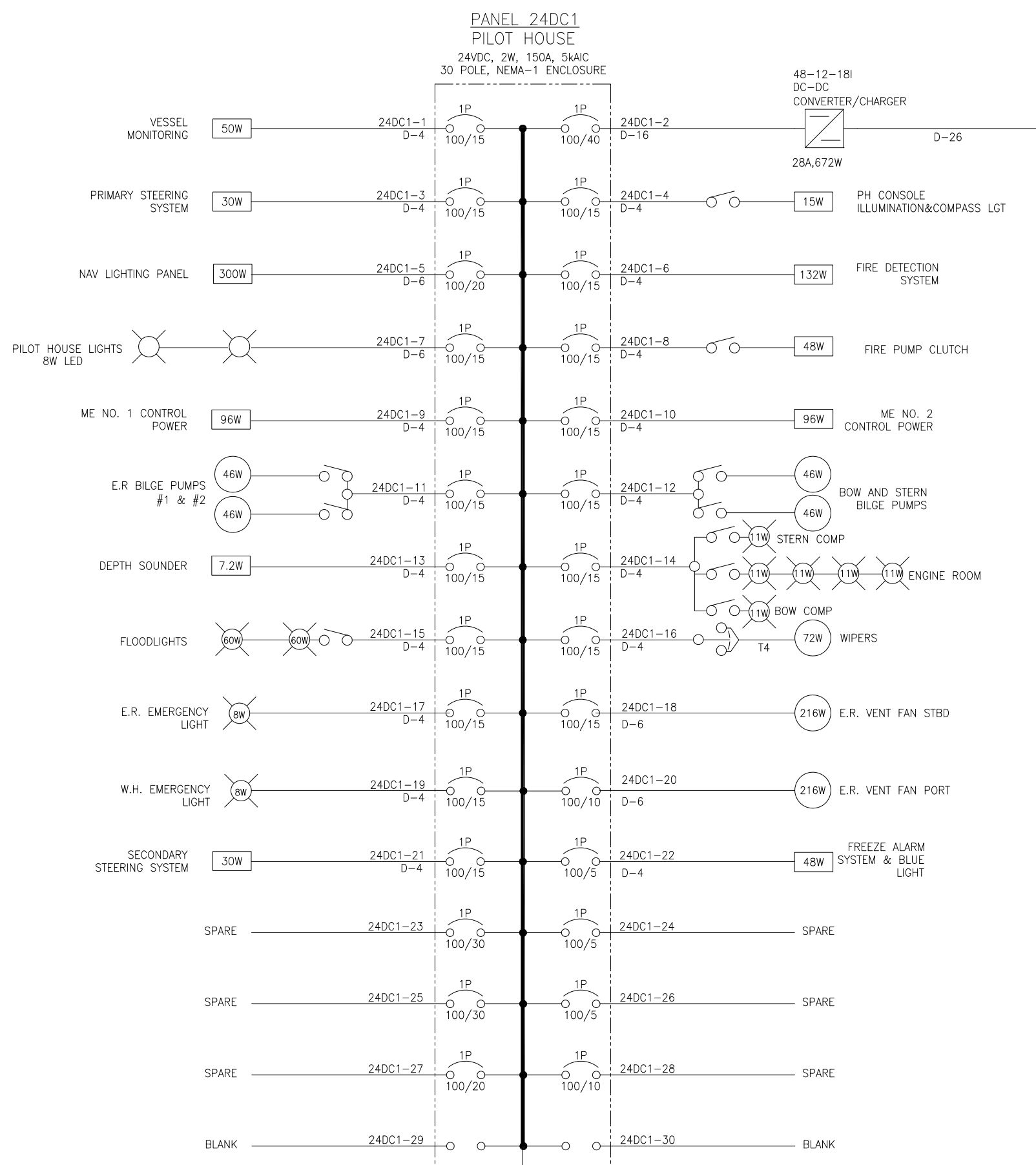
Title: 45'-6"x20'-0"x6'-6" NCDOT PUSHBOAT

HYDRAULIC SYSTEM

Dwg. No. 17-1393-265 Alt. No. 0
 Sht. 3 of 3

Drawn By: JAH Date: NOVEMBER 21, 2018
 Checked By: _____ Date: _____
 App'd By: _____ Scale: 3/8" = 1'-0" OR NOTED
 ABS App'l: _____ USCG App'l: _____

SYMBOLS LIST	
	CIRCUIT BREAKER X = POLES Y = FRAME SIZE Z = TRIP RATING
	SWITCH
	TWO SPEED SWITCH
	EQUIPMENT
	RECEPTACLE
	LIGHTING
	MOTOR
	DC-DC CONVERTER
	SHORE POWER RECEPTACLE
	INSTRUMENTATION V = VOLTS, A = AMPERES, KW = KILOWATTS, Hz = FREQUENCY PA = POWER AVAILABLE RO = PHASE ROTATION
	OFF-1-2-BOTH SWITCH
	CONTROL DEVICES/FUNCTIONS PB = PUSH-BUTTON PB/IL = PUSH-BUTTON, ILLUMINATED PS = PRESSURE SWITCH LS = LEVEL SWITCH FR = FIRE SHUTDOWN FS = FLOW SWITCH DS = DISCONNECT SWITCH TH = THERMOSTAT
	FUSE
	VENDOR PROVIDED MOTOR CONTROLLER
	MAIN ENGINE MOTOR
	LED



- GENERAL NOTES -	
NO.	DESCRIPTION
1	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER "M" VESSELS AND AMERICAN BUREAU OF SHIPPING RULES FOR BUILDING AND CLASSING STEEL VESSELS UNDER 90M.
2	SHIP SERVICE SWITCHBOARD IS A 3 PHASE 4 WIRE SYSTEM, 208/120V, 60 Hz, WITH GROUNDED NEUTRAL. SEE REFERENCE 1 FOR SWITCHBOARD LOCATION.
3	ALL PERMANENTLY INSTALLED ELECTRICAL EQUIPMENT SHALL HAVE METAL ENCLOSURES PROPERLY GROUNDED PER ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE, UNLESS NOTED OTHERWISE.
4	ALL POWER CABLE SHALL COMPLY WITH THE REQUIREMENTS OF IEEE 1580. ALL CABLE SHALL BE LOW SMOKE, ZERO HALOGEN TYPE, TRICAB OR EQUAL.
5	NYLON OR BRASS STUFFING TUBES SHALL BE USED WHEN PENETRATING ELECTRICAL ENCLOSURES OR JUNCTION BOXES.
6	RESIZE CABLE FOR LENGTH OF RUN OF DC CIRCUITS IF APPLICABLE
7	ALL CABLES SHALL BE RATED AT 90°C CONDUCTOR TEMPERATURE IN ACCORDANCE WITH IEEE STANDARD NO. 45 2002 TABLE 25.
8	EACH CABLE SHALL BE TAGGED WITH ITS UNIQUE CIRCUIT DESIGNATION USING EMBOSSED ALUMINUM TAGS ON EACH SIDE OF PENETRATIONS AND INTO CONNECTION BOXES AND/OR EQUIPMENT.
9	METAL USED FOR TERMINAL STUDS, LUGS, NUTS, AND WASHERS SHALL BE CORROSION RESISTANT AND GALVANICALLY COMPATIBLE WITH THE WIRE AND TERMINAL LUGS.
10	WIRES TERMINATING IN EQUIPMENT SHALL BE ARRANGED TO PROVIDE A SURPLUS LENGTH OF WIRE SUFFICIENT TO ALLOW FOR DISCONNECTION, AND TO PERMIT MULTIPLE WIRES TO BE FORMED AT TERMINAL STUDS.
11	CABLE PENETRATIONS OF STRUCTURAL FIRE PROTECTION SHALL UTILIZE FIRE STOPS WHICH MAINTAIN THE FIRE PROTECTION LEVEL (GRADE A, B, ETC.) ASSOCIATED WITH THE FIRE ZONE PENETRATED.
12	CABLE PENETRATIONS THROUGH BULKHEADS AND DECKS, BOTH WATERTIGHT AND NON-WATERTIGHT, SHALL COMPLY WITH REGULATORY BODY REQUIREMENTS. MULTI-CABLE TRANSIT TYPE PENETRATIONS MAY BE SUBSTITUTED FOR STUFFING TUBES FOR ALL PENETRATIONS EXCEPT THROUGH OPEN DECKS. EXTRA HEAVY, LOW ALLOY KICK PIPES WITH STUFFING TUBES, OR EQUIVALENT, SHALL BE WELDED INTO ALL OPEN DECKS AND SHALL BE NINE INCHES HIGH TO TOP OF THE STUFFING TUBE. BUILT-IN WATERTIGHT BOXES MAY BE USED IN LIEU OF KICK PIPES. POURED SEALERS SHALL NOT BE ALLOWED.

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Title: 45.5'x20'x6.5' NCDOT PUSHBOAT

ELECTRICAL ONE-LINE DIAGRAM

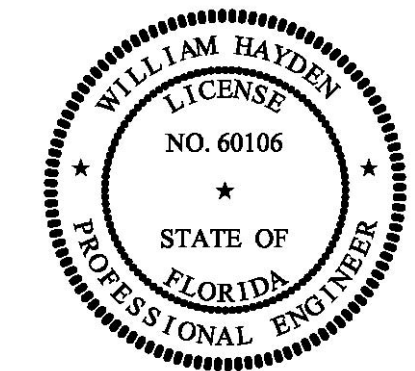
Dwg. No. 17-1393-320 Alt. No. 0 Sht. 1 of 1

Drawn By: JAH Date: DECEMBER 19, 2018

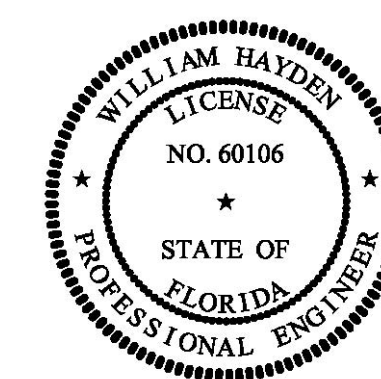
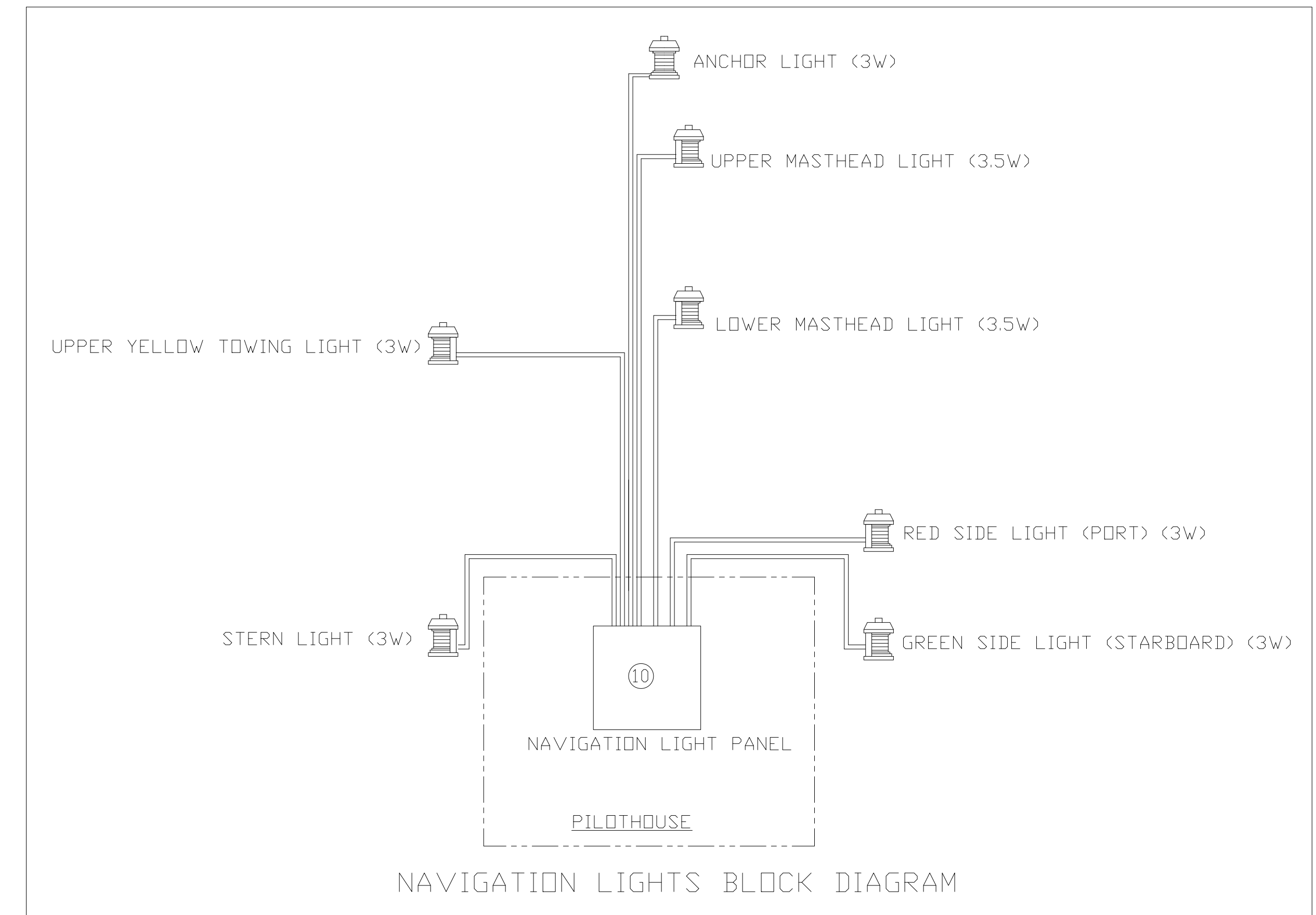
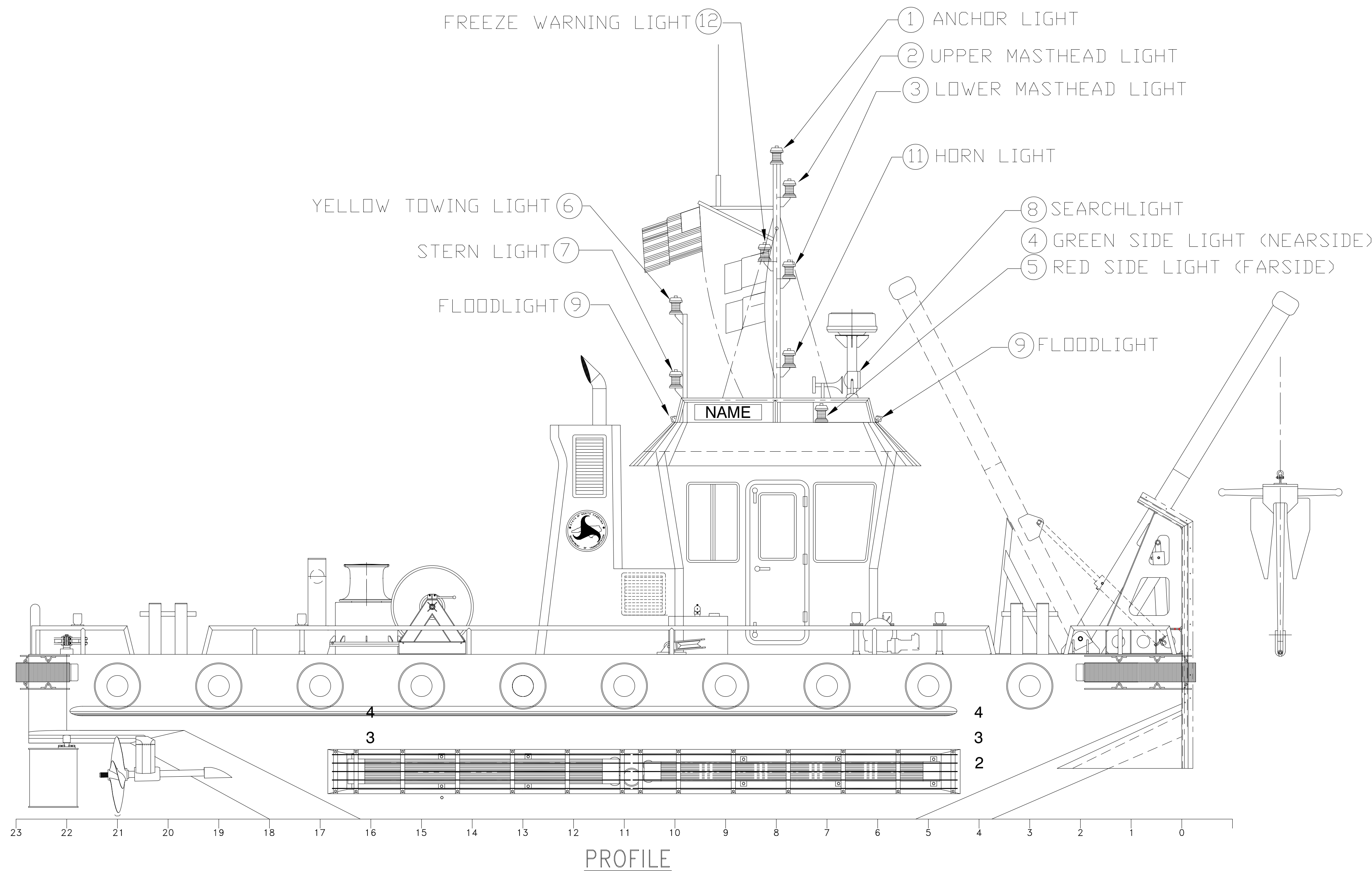
Checked By: Date:

App'd By: Scale: 1/4" = 1'-0"

ABS App'l: USCG App'l:



BILL OF MATERIALS						
LIGHTING FIXTURE SCHEDULE						
ITEM	QTY.	DESCRIPTION	MANUFACTURER #	ARC	VISIBILITY	REMARKS
1	1	ANCHOR LIGHT - WHT ALL AROUND	PERKO 0210SWBDP1	360°	2 MILES	OR EQUAL
2	1	UPPER MASTHEAD LIGHT, LED	PERKO 0210MBDDP1	225°	3 MILES	OR EQUAL
3	1	LOWER MASTHEAD LIGHT, LED	PERKO 0210MBDDP1	225°	3 MILES	OR EQUAL
4	1	GREEN SIDE LIGHT, LED	PERKO 0210SDBDP1	112.5°	2 MILES	OR EQUAL
5	1	RED SIDE LIGHT, LED	PERKO 0210PDBDP1	112.5°	2 MILES	OR EQUAL
6	1	YELLOW TOWING LIGHTS, SINGLE LENS ,LED	PERKO 0210PDBDP1	135°	2 MILES	OR EQUAL
7	1	WHITE STERN LIGHT, LED	PERKO 0210SNBDP1	135°	2 MILES	OR EQUAL
8	1	SEARCHLIGHT, 8", 12 VOLT, SEALED BEAM CHROME PLATED, LEVER CONTROL	PERKO 0314C0812V			
9	2	FLOODLIGHT, LED, 1000 LUMEN	LUMITEC 101334			OR EQUAL
10	1	NAVIGATION LIGHT PANEL, 7 SINGLE LAMP CIRCUITS	J-BOX NLFM7S24VDC-PFA			OR EQUAL
11	1	HORN LIGHT - WHT ALL AROUND	PERKO 0210SWBDP1	360°	2 MILES	OR EQUAL
12	1	FREEZE WARNING LT - BLUE ALL AROUND	-	360°	2 MILES	24 VDC



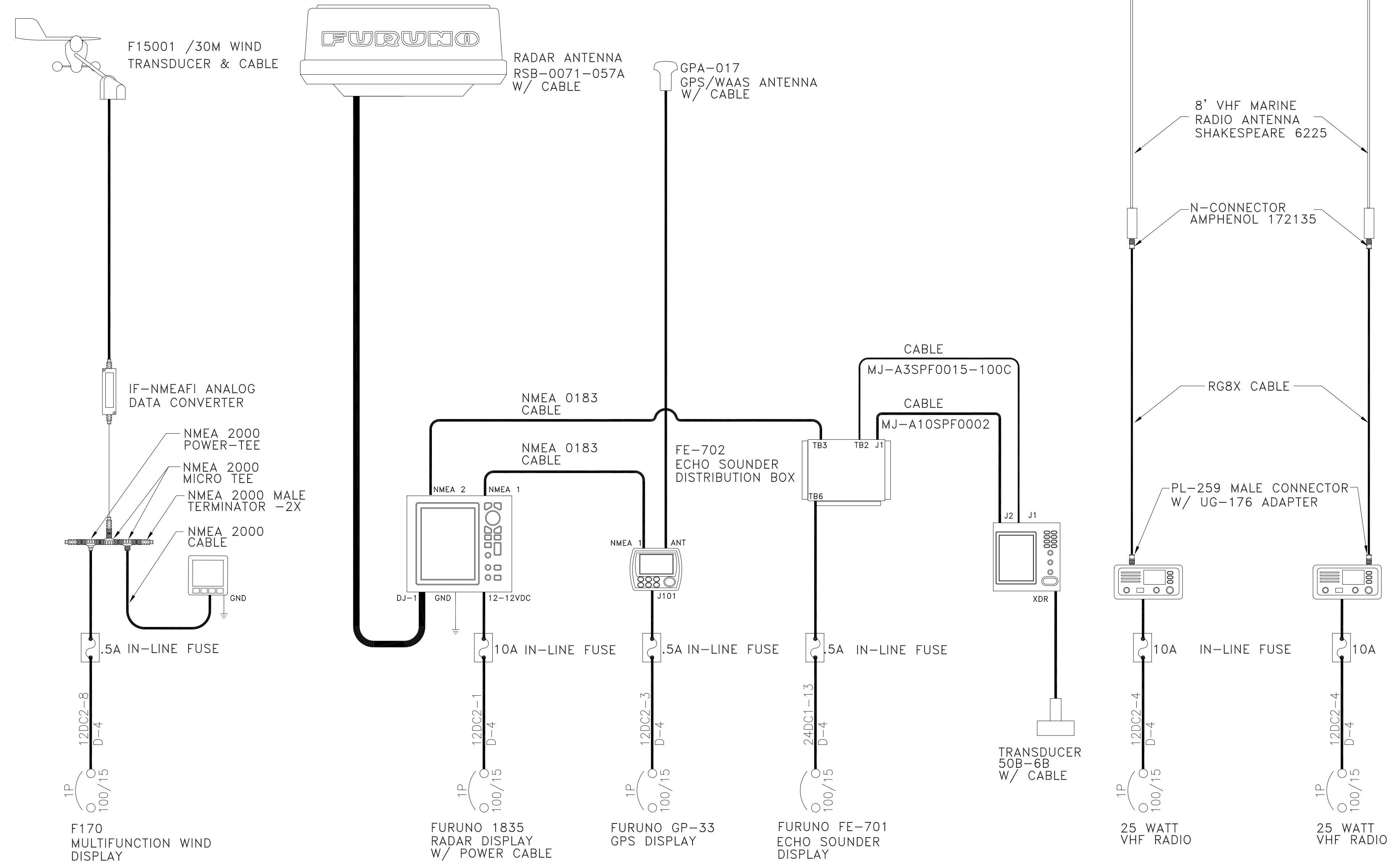
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Title: 45.5'x20'x6.5' NCDOT PUSHBOAT
**NAVIGATION/SEARCH/FLOODLIGHTS
& NAV. LTS. BLOCK DIAGRAM**

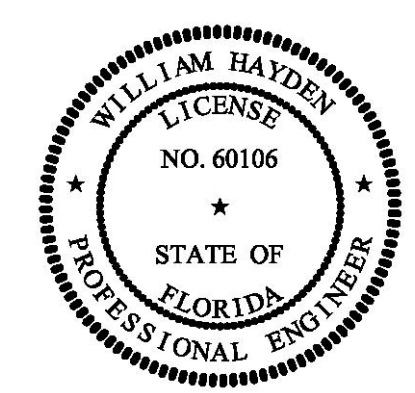
Dwg. No. 17-1393-422 Alt. No. 0 Sht. 1 of 1
Date: DECEMBER 19, 2018
Scale: 1/4" = 1'-0"
USCG App'l: _____

MATERIAL SCHEDULE				
SYMBOL	ITEM	QTY	DESCRIPTION	MFG
	1	1	CIRCUIT BREAKER X - POLES Y - FRAME SIZE Z - TRIP RATING	-
	2	1	WIND SPEED/DIRECTION TRANSDUCER & CABLE	FURUNO F15001
	3	1	ANALOG DATA CONVERTER	FURUNO IF-NMEAFI
	4	1	COLOR DISPLAY	FURUNO FI-70
	5	1	NMEA 2000 POWER TEE	-
	6	2	NMEA 2000 MICRO TEE	-
	6	2	NMEA 2000 TERMINATOR RESISTOR	-
	7	AR	IN-LINE FUSE	-
	8	1	RADAR DISPLAY	FURUNO 1835/ RDP-152
	9	1	RADAR ANTENNA	FURUNO 1835 RSB-0071-057A
	10	1	GPS DISPLAY	FURUNO GP-33
	11	1	GPS/WAAS ANTENNA W/ CABLE	FURUNO GPA-017
	12	1	ECHO SOUNDER DISPLAY	FURUNO FE-701
	13	1	TRANSDUCER W/ CABLE	FURUNO 50B-6B
	14	1	ECHO SOUNDER DISTRIBUTION BOX	FURUNO FE-702
	15	1	25 WATT VHF RADIO	-
-	16	AR	NMEA 2000 CABLE	-
-	17	AR	NMEA 0183 CABLE	-
-	18	1	SOUNDER POWER CABLE	MJ-A3SPF0015 -100C
-	19	2	SOUNDER SIGNAL CABLE	MJ-A10SPF0002
-	20	2	8' VHF MARINE RADIO ANTENNA	SHAKESPEARE 6225
-	21	AR	RGBX CABLE	-
-	22	2	N-CONNECTOR	AMPHENOL 172135
-	23	2	PL-259 MALE CONNECTOR W/ UG-176 ADAPTER	-



GENERAL NOTES

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Title: 45.5x20x6.5" NCDOT PUSHBOAT

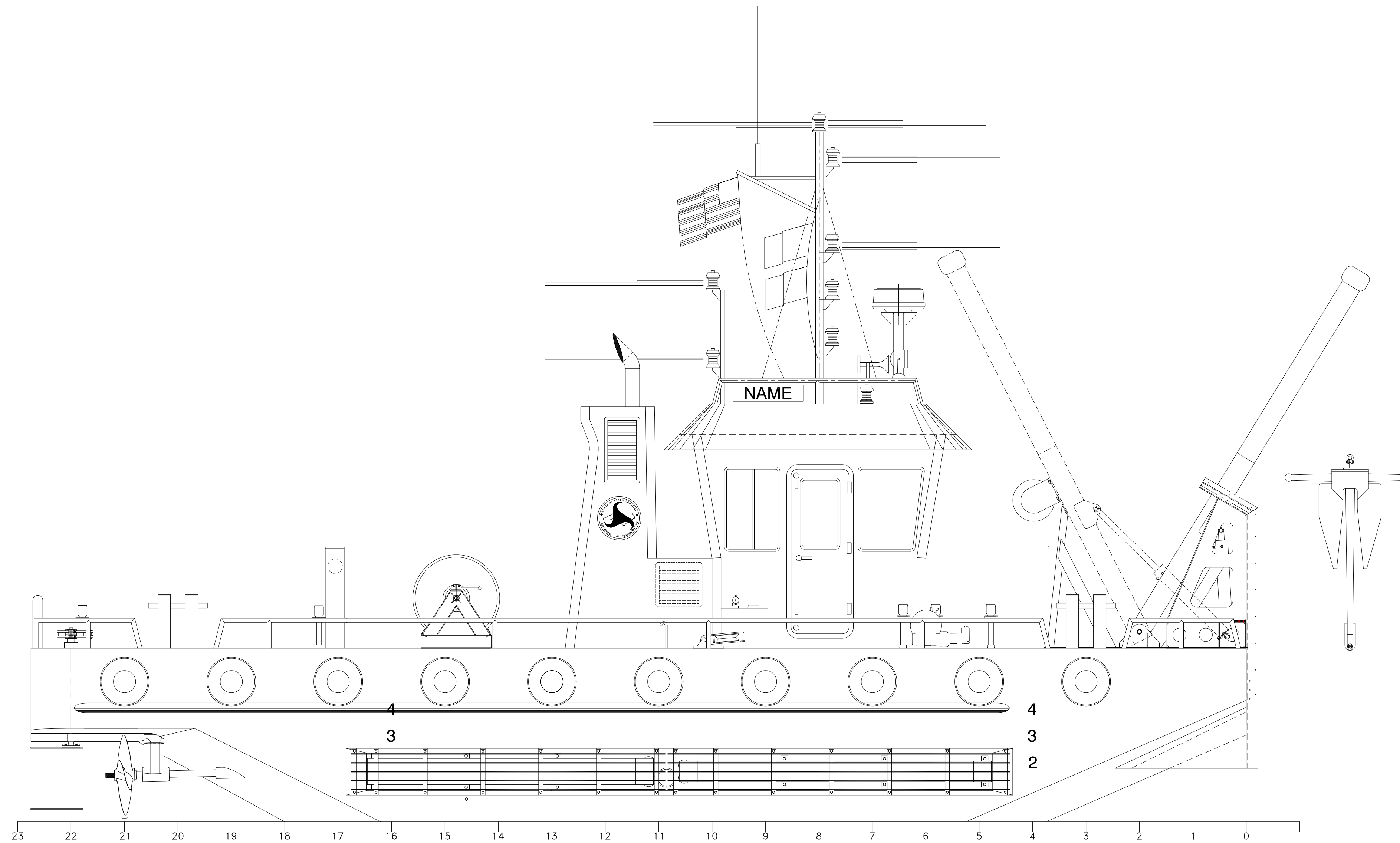
ELECTRONIC WIRING DIAGRAM

Dwg. No. 17-1393-423 Alt. No. 0
Sht. 1 of 1

Drawn By: JAH Date: DECEMBER 19, 2018
Checked By: Date:
App'd By: Scale: 1/8" = 1'-0"
ABS App'l: USCG App'l:

SYMBOLS LIST	
	PIPE - FILL/DISCHARGE
	PIPE - VENT
	PIPE UP
	PIPE DOWN
	HOSE CAMLOCK
	SOUNDING TUBE TERMINAL
	VENT TERMINAL
	BULKHEAD PENETRATION

SERVICE	SIZE	PIPE	COMPONENTS				VALVES		BOLTING		REMARKS
			TAKEDOWN JOINTS	FITTINGS	FLEX CONNECT	GASKETS	BODY	TRIM	BOLTS/STUDS	NUTS/WASHERS	
VENTS, FILLS, AND SOUNDING TUBES MAWP: 100 PSIG MAWT: 120°F	ALL	CARBON STEEL, SCH 80, SEAMLESS, ASTM A53 OR ASTM A106, GRADE B, ANSI B36.10 (BELOW DECK) S. STEEL, SCH 80, SEAMLESS, ASTM A312 GR 304/304L (ABV DECK)	FLANGE SLIP ON, CARBON STEEL, ASTM A105, ANSI B16.5, 150# (BELOW DECK) SLIP ON, S. STEEL, ASTM A182 GR 304/304L, ANSI B16.5, 150# (ABOVE DECK)	SOCKET WELD CARBON STEEL, ASTM A105 OR ASTM A234 GR WPB, ANSI B16.11 (BELOW DECK) SOCKET WELD S. STEEL, ASTM A351 GR 304/304L, ANSI B16.11 (ABOVE DECK)	-	GARLOCK IFG 5500	BALL THREADED, SW, OR FLANGED STAINLESS STEEL, ASTM A351 CF8M	BALL S. STEEL BALASTM RPTFE OR VITON SEATS	CARBON STEEL ASTM A307 GR B ANSI B18.2.1	HEX-HEAD CARBON STEEL ASTM A563 GR A ANSI B18.2.2	



PROFILE

- GENERAL NOTES -		- GENERAL NOTES -	
NO.	DESCRIPTION	NO.	DESCRIPTION
1.	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER M VESSELS.	10.	TANK AND VOID VENT TERMINALS SHALL BE WINTER WINDOOS HIAS OR EQUAL. THE FUEL OIL, WASTE OIL, & OILY WATER TANKS SHALL BE FURNISHED WITH SS FLAME SCREENS.
2.	THIS DRAWING IS DIAGRAMMATIC AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. EQUIPMENT LAYOUT IN A GIVEN AREA IS APPROXIMATE. THE CONTRACTOR SHALL DEVELOP A DETAILED DESIGN THAT PROVIDES A FULLY FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION, TAKING INTO ACCOUNT ALL NECESSARY SYSTEM INTERFACES AND INTERFERENCES. DIMENSIONS SHALL BE VERIFIED FROM THE SHIP AND MANUFACTURERS' CERTIFIED DRAWINGS AS APPROPRIATE.	11.	EACH VENT PIPE SHALL BE SLOPED CONTINUOUSLY TO PROVIDE EFFECTIVE DRAINAGE BACK TO THE TANK.
3.	PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS AND WITH SUFFICIENT TAKE DOWN JOINTS TO PROVIDE FOR REMOVAL AND INSPECTION.	12.	WHERE PIPING PENETRATES TANK BOUNDARIES, BULKHEADS OR DECKS, SEE DETAIL 3-1A OR 3-2A.
4.	AVOID POCKETS IN THE PIPE LINES. BOSSES AND VALVES OR SCREWED PLUGS SHALL BE FITTED TO ENABLE COMPLETE DRAINING OF PIPES WHERE POCKETS DO OCCUR.	13.	PROVIDE 14" HIGH SPILL CONTAINMENTS SURROUNDING THE WASTE OIL AND OILY WATER VENTS. EACH CONTAINMENT SHALL BE FITTED WITH A 1" SS DRAIN PLUG NEAR THE BOTTOM.
5.	PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F708. HANGERS SHALL BE ATTACHED TO THE PIPE WITH BOLTED CLAMPS AND WELDED TO THE BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE ATTACHED BY WELDING DIRECTLY TO PIPES.		
6.	SOUNDING TUBES SHALL BE AS VERTICAL AS PRACTICAL AND SHALL TERMINATE AS CLOSE AS POSSIBLE TO THE DEEPEST POINT OF THE TANK OR VOID.		
7.	SOUNDING TUBES SHALL HAVE FLUSH SOUNDING TUBE CAPS, STAINLESS STEEL COMMERCIAL WELD-IN TYPE (NOT A PIPE COUPLING) WITH A BRONZE PLUG. TANK IDENTIFICATION SHALL BE ENGRAVED IN THE TUBE SOCKETS AND CAPS.		
8.	SOUNDING TUBE TERMINALS SHALL BE LOCATED IN EASILY ACCESSIBLE LOCATIONS, GENERALLY AS SHOWN IN PLAN, 3-1B & 3-4C.		
9.	FUEL TANKS SHALL BE FITTED WITH HIGH LEVEL AND LOW LEVEL ALARMS AND CONTINUOUS LEVEL TRANSDUCERS PER REFS 1. SENSORS SHALL BE INTERFACED WITH THE SHIP'S ALARM AND MONITORING SYSTEM.		

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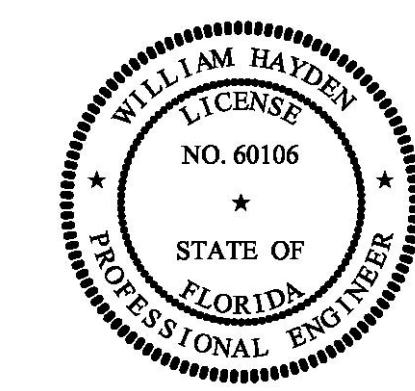
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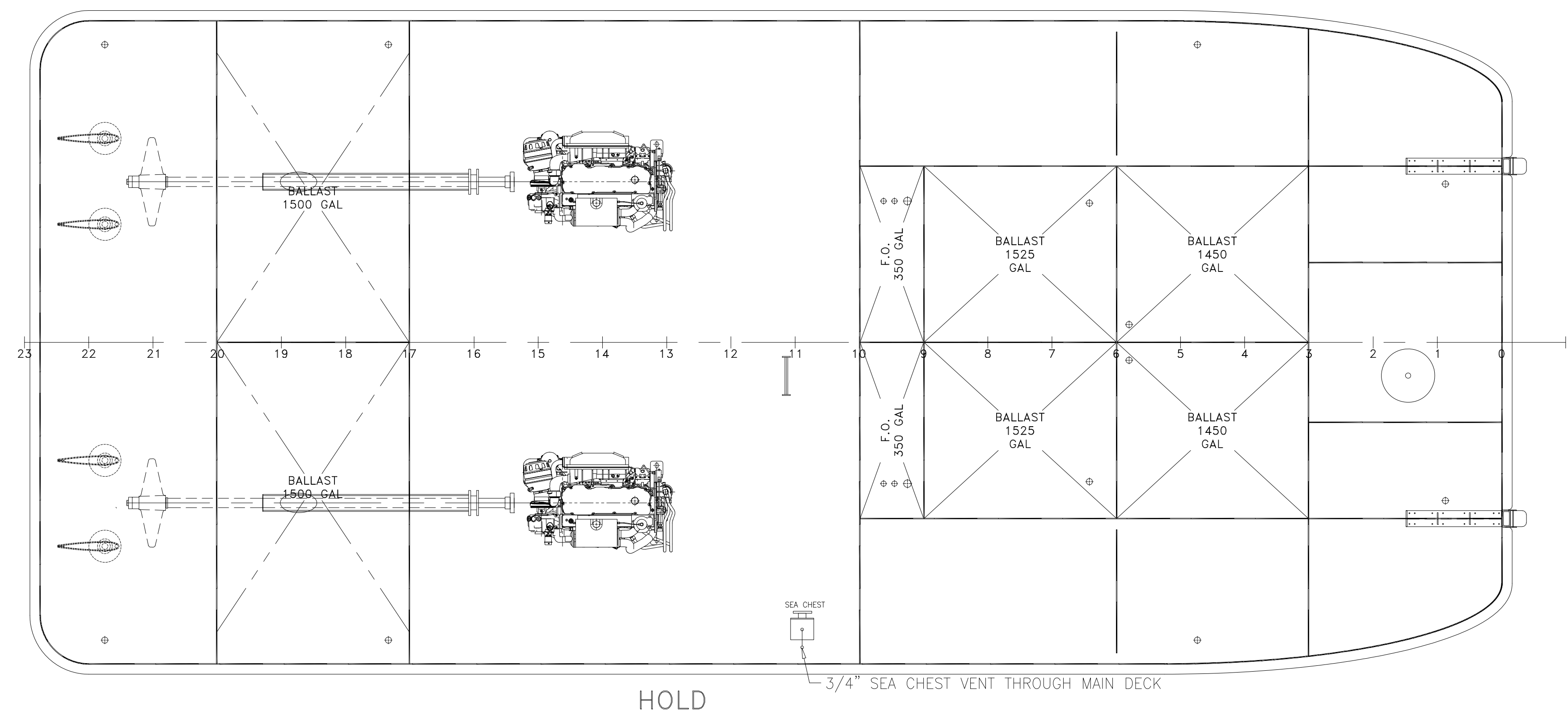
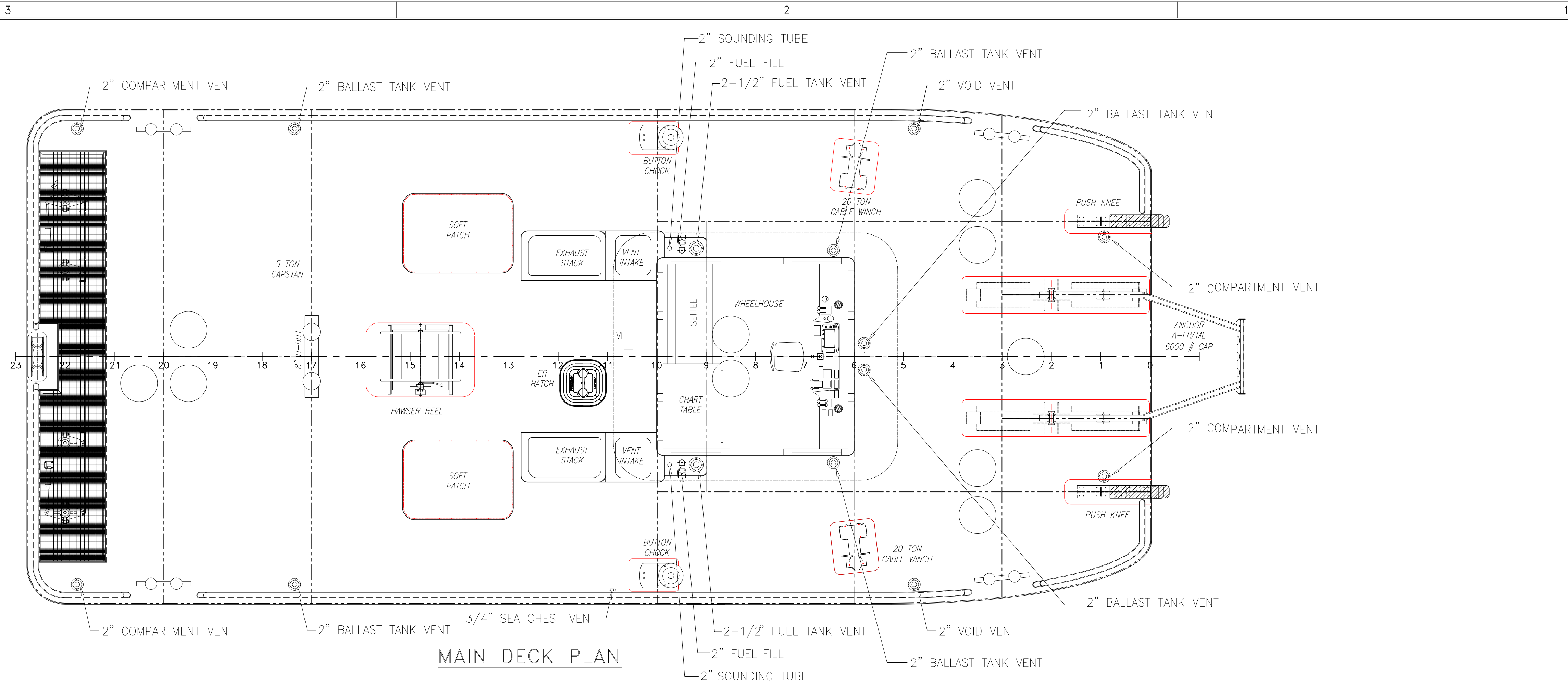
Title: 45.5x20'x6.5' NCDOT PUSHBOAT

VENTS & FILLS

Dwg. No: 17-1393-506 Alt. No: 0
 Sh: 1 of 3

Drawn By: JAH Date: SEPT 26, 2018
 Checked By: Date:
 App'd By: Scale: 3/8" = 1'-0"
 ABS App'l: USCG App'l:



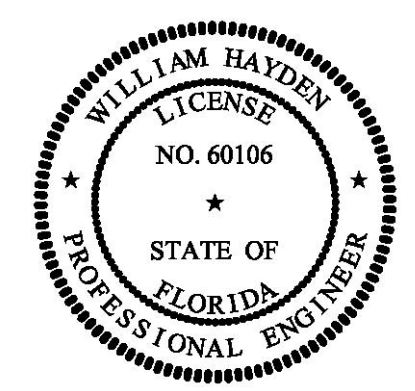


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9.	FUEL TANKS SHALL BE FITTED WITH HIGH LEVEL AND LOW LEVEL ALARMS AND CONTINUOUS LEVEL TRANSDUCERS PER REFS 1 AND 4. SENSORS SHALL BE INTERFACED WITH THE SHIP'S ALARM AND MONITORING SYSTEM.

GENERAL NOTES

NO.	DESCRIPTION
10.	TANK AND VOID VENT TERMINALS SHALL BE WINTER WINZODD HIAS OR EQUAL. THE FUEL OIL, WASTE OIL, & OILY WATER TANKS SHALL BE FURNISHED WITH SS FLAME SCREENS.
11.	EACH VENT PIPE SHALL BE SLOPED CONTINUOUSLY TO PROVIDE EFFECTIVE DRAINAGE BACK TO THE TANK.
12.	WHERE PIPING PENETRATES TANK BOUNDARIES, BULKHEADS OR DECKS, SEE DETAIL 3-1A OR 3-2A.
13.	PROVIDE 14" HIGH SPILL CONTAINMENTS SURROUNDING THE WASTE OIL AND OILY WATER VENTS. EACH CONTAINMENT SHALL BE FITTED WITH A 1" SS DRAIN PLUG NEAR THE BOTTOM.



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Title: 45.5x20'x6.5' NCDOT PUSHBOAT

VENTS & FILLS

Dwg. No. 17-1393-506 Alt. No. 0
 Sh:2 of 3

Drawn By: JAH Date: SEPT 26, 2018
 Checked By: Date:
 App'd By: Scale: 3/8" = 1'-0"
 ABS App'l: USCG App'l:

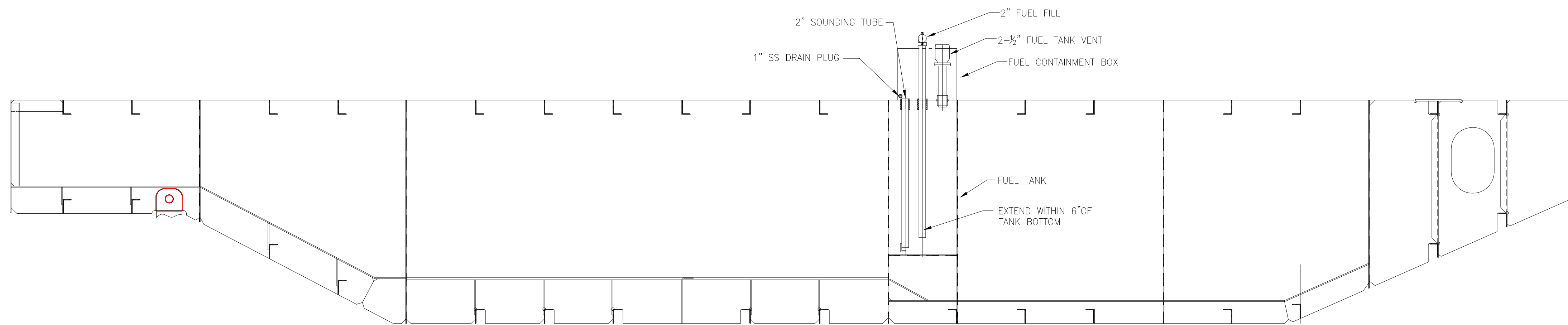
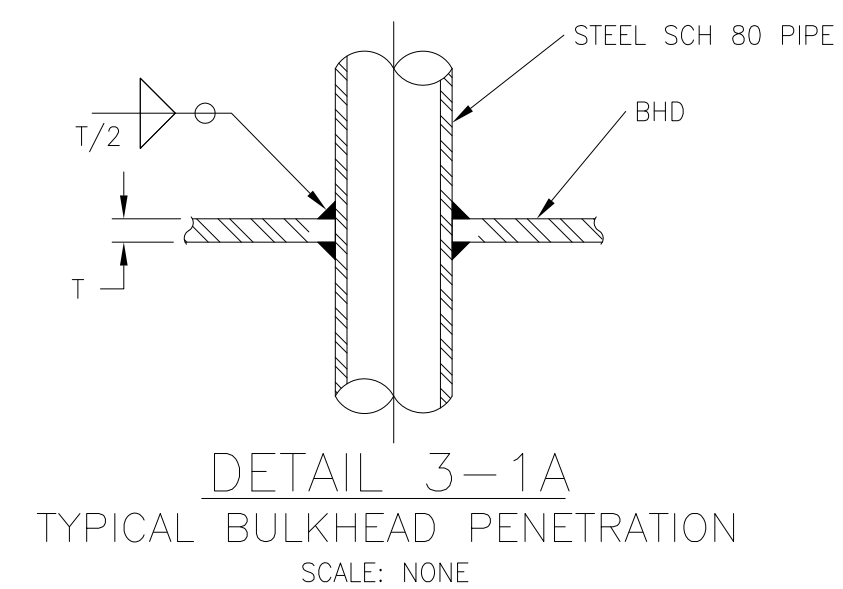
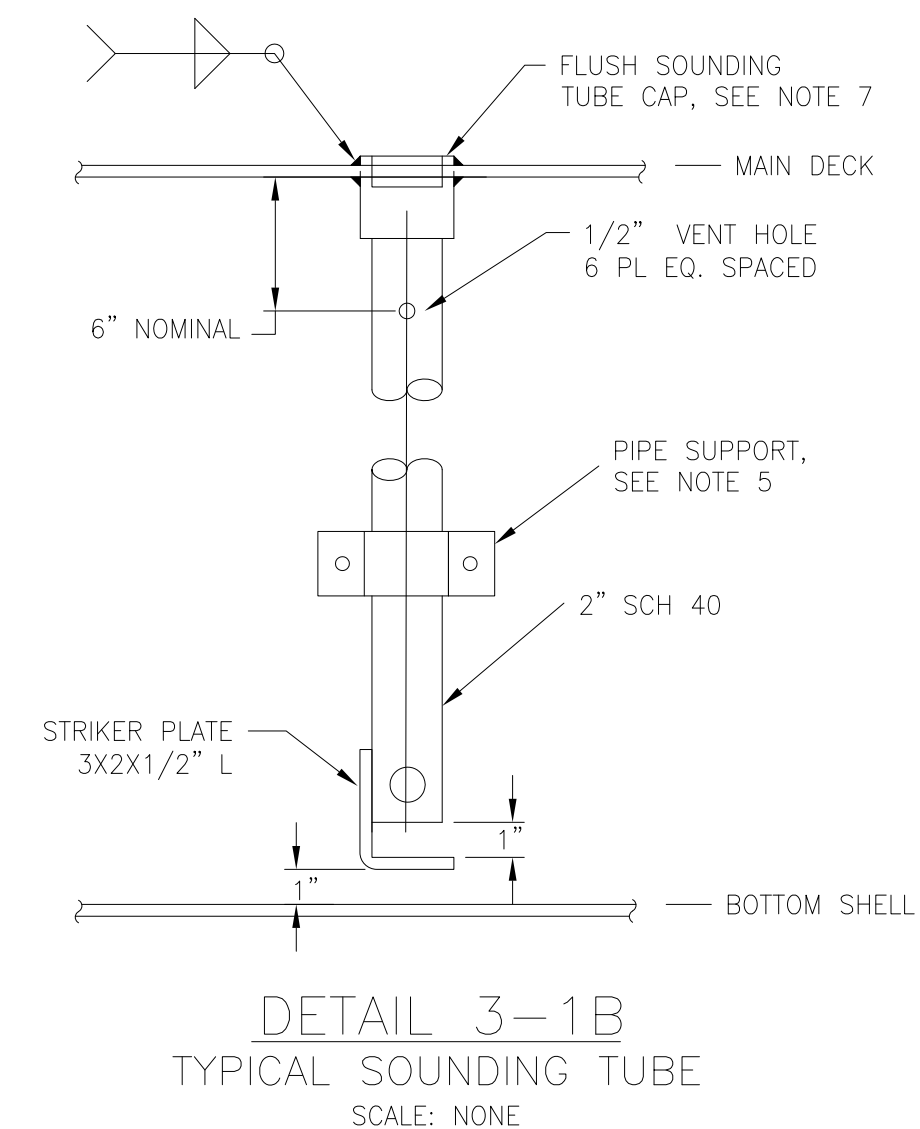
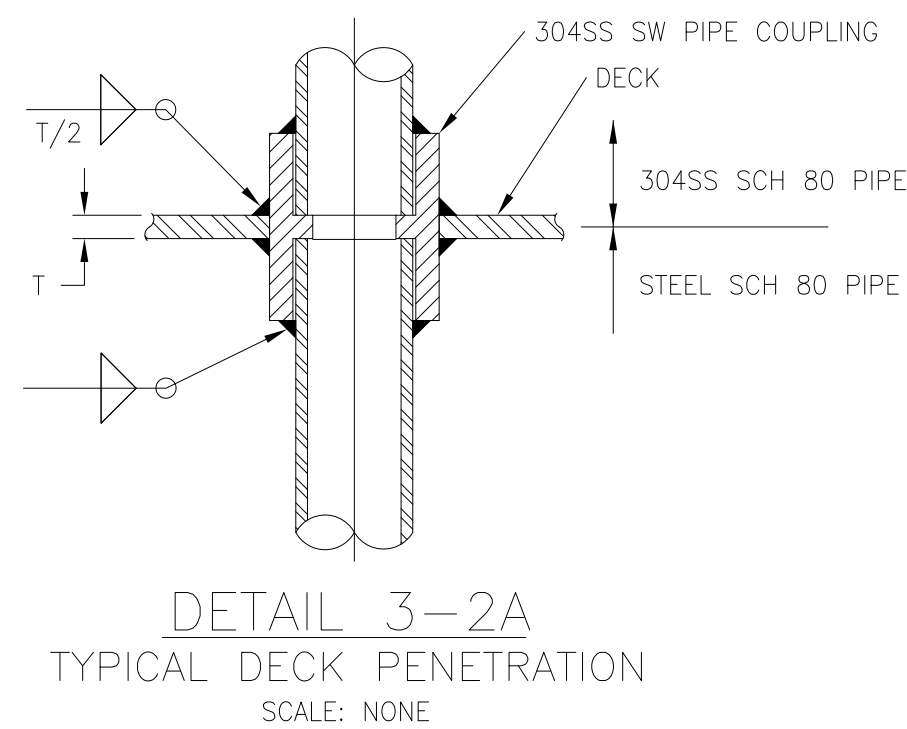
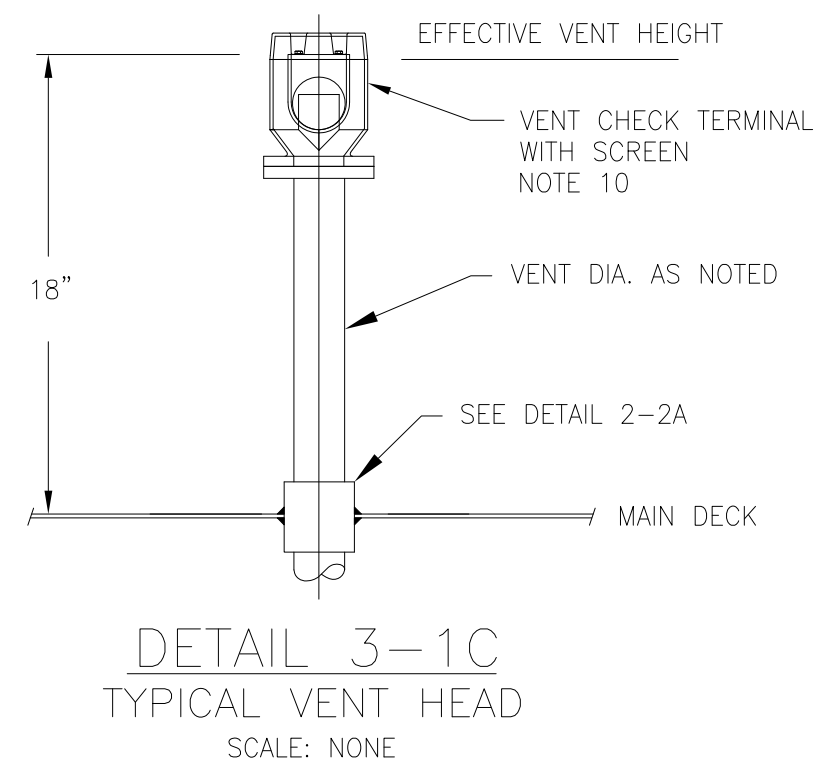
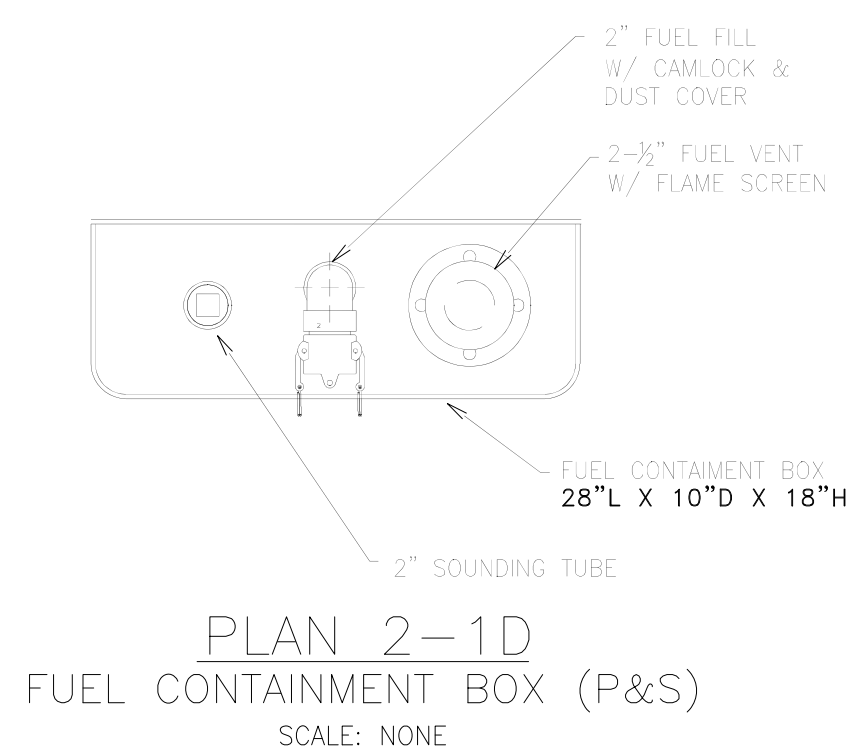
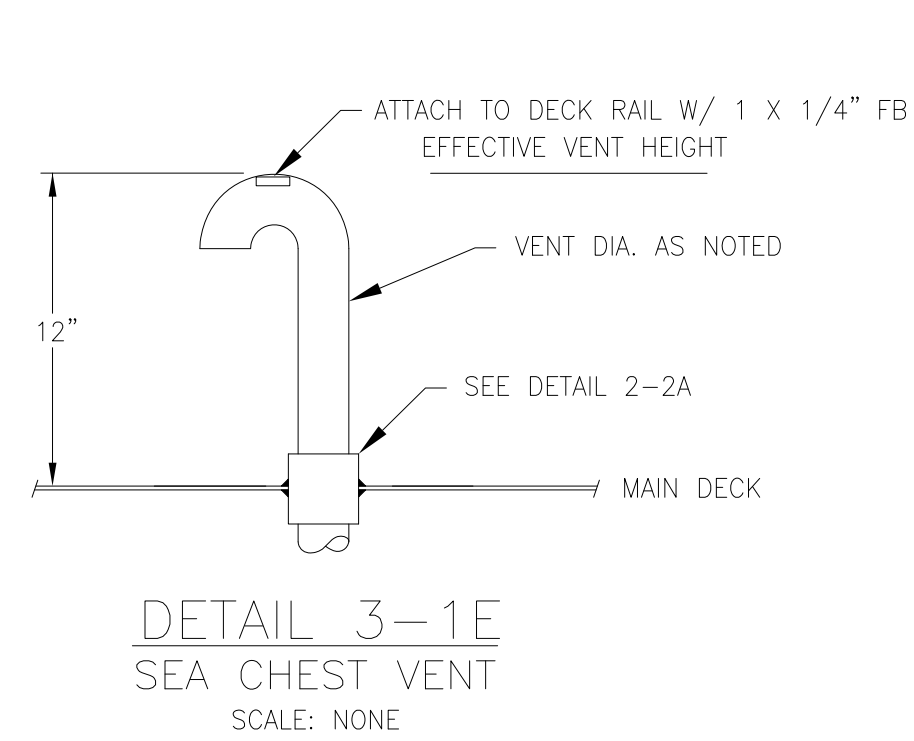
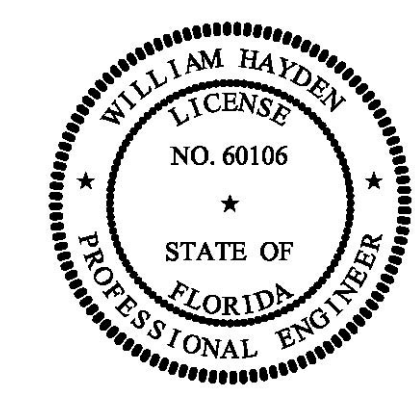


DIAGRAM 3-4C
FUEL OIL TANK INBOARD PROFILE

-- GENERAL NOTES --		-- GENERAL NOTES --	
NO.	DESCRIPTION	NO.	DESCRIPTION
1.	MATERIAL AND WORKMANSHIP SHALL CONFORM TO U.S. COAST GUARD REQUIREMENTS FOR SUBCHAPTER M VESSELS.	10.	TANK AND VOID VENT TERMINALS SHALL BE WINTER WINZODD HIAS OR EQUAL. THE FUEL OIL, WASTE OIL, & OILY WATER TANKS SHALL BE FURNISHED WITH SS FLAME SCREENS.
2.	THIS DRAWING IS DIAGRAMMATIC AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. EQUIPMENT LAYOUT IN A GIVEN AREA IS APPROXIMATE. THE CONTRACTOR SHALL DEVELOP A DETAILED DESIGN THAT PROVIDES A FULLY FUNCTIONAL ARRANGEMENT SUITABLE FOR INSTALLATION, TAKING INTO ACCOUNT ALL NECESSARY SYSTEM INTERFACES AND INTERFERENCES. DIMENSIONS SHALL BE VERIFIED FROM THE SHIP AND MANUFACTURERS' CERTIFIED DRAWINGS AS APPROPRIATE.	11.	EACH VENT PIPE SHALL BE SLOPED CONTINUOUSLY TO PROVIDE EFFECTIVE DRAINAGE BACK TO THE TANK.
3.	PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS AND WITH SUFFICIENT TAKE DOWN JOINTS TO PROVIDE FOR REMOVAL AND INSPECTION.	12.	WHERE PIPING PENETRATES TANK BOUNDARIES, BULKHEADS OR DECKS, SEE DETAIL 3-1A OR 3-2A.
4.	AVOID POCKETS IN THE PIPE LINES. BOSSES AND VALVES OR SCREWED PLUGS SHALL BE FITTED TO ENABLE COMPLETE DRAINING OF PIPES WHERE POCKETS DO OCCUR.	13.	PROVIDE 14\"/>



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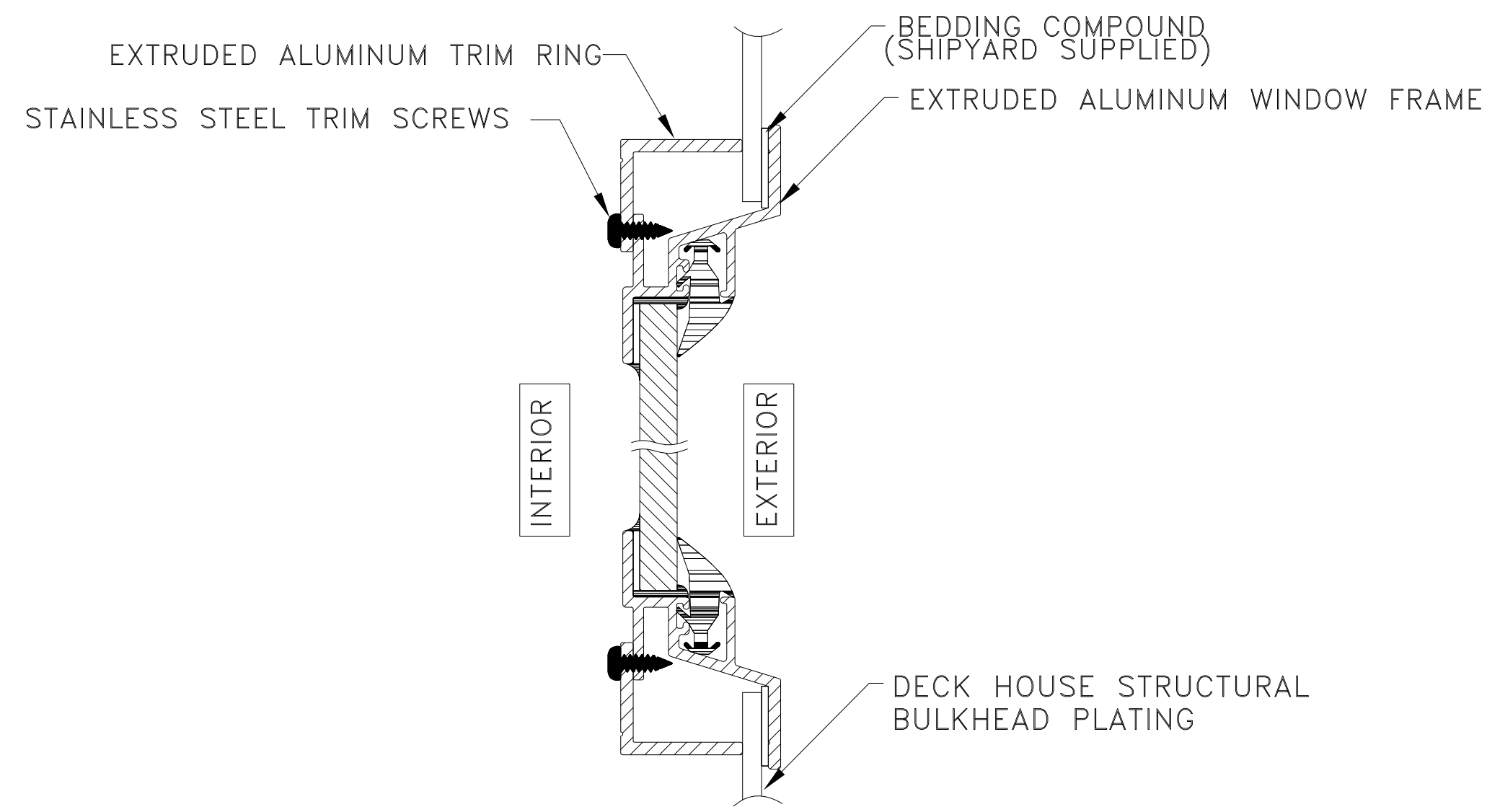
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 info@dejongandlebet.com

Title: 45.5x20'x6.5' NCDOT PUSHBOAT

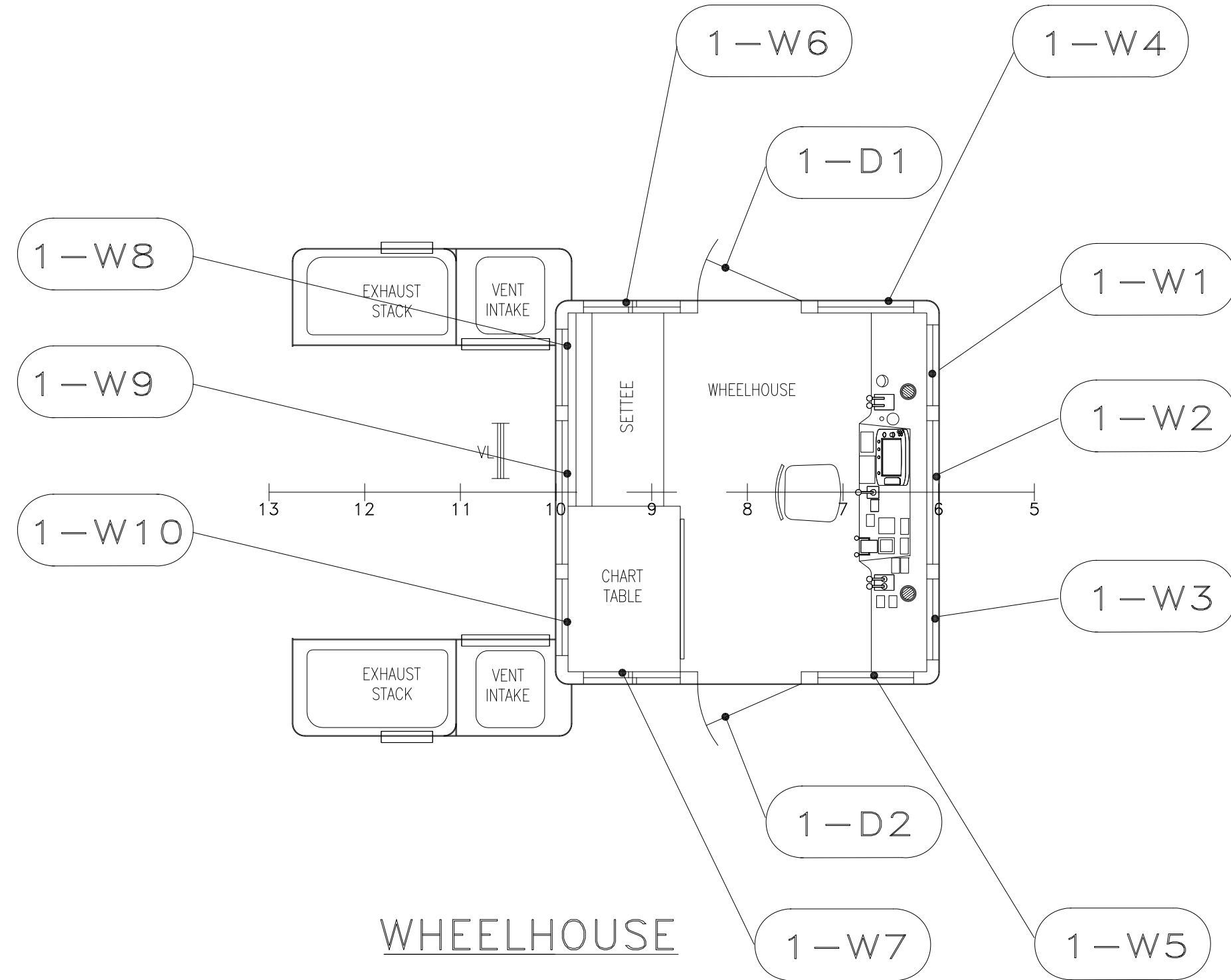
VENTS & FILLS

Dwg. No. 17-1393-506 Alt. No. 0
 Sh. 3 of 3

Drawn By: JAH Date: SEPT 26, 2018
 Checked By: Date:
 App'd By: Scale: 3/8" = 1'-0"
 ABS App'l: USCG App'l:



SECTION A-A WINDOW MOUNTING DETAIL



WHEELHOUSE

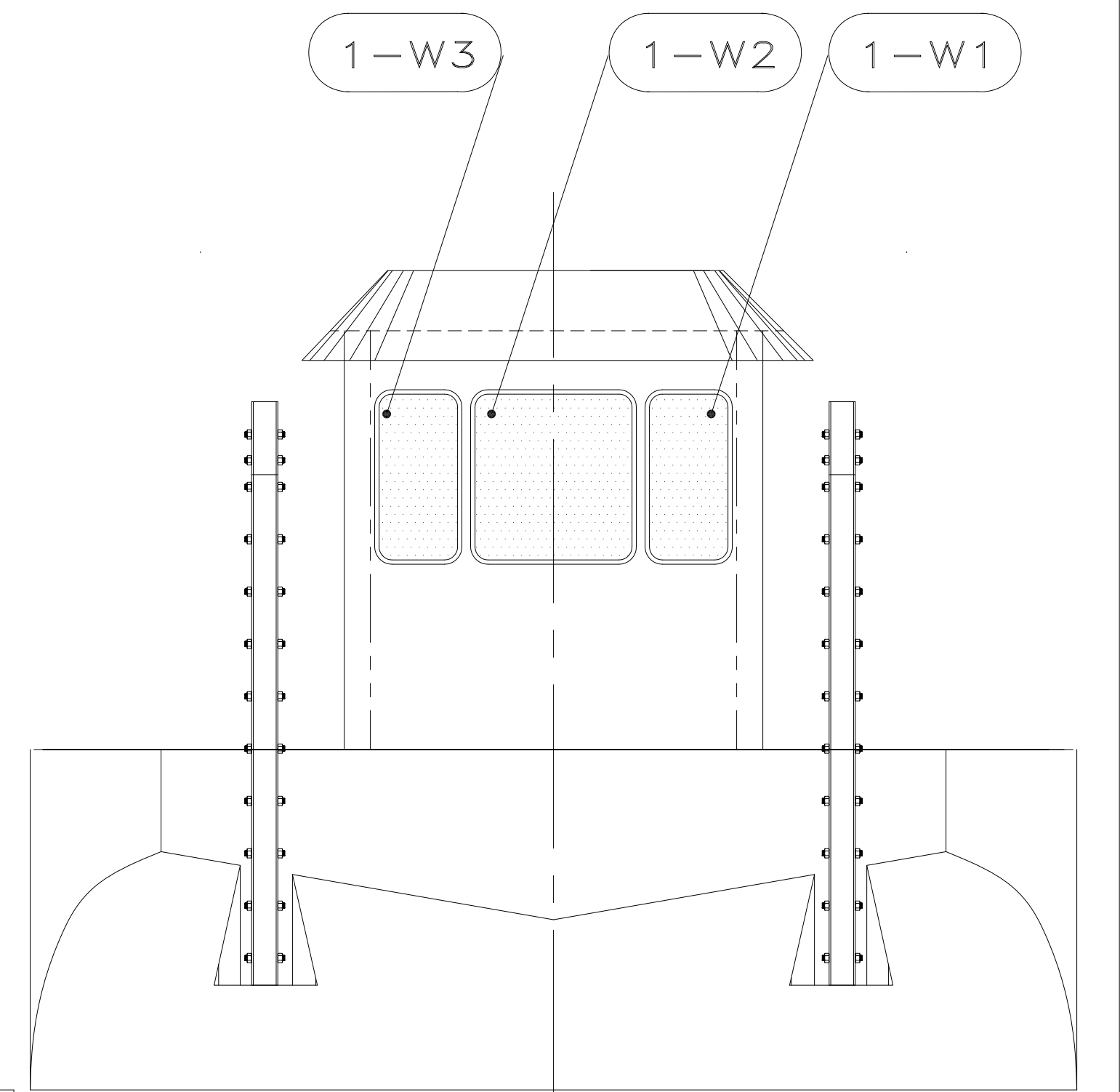
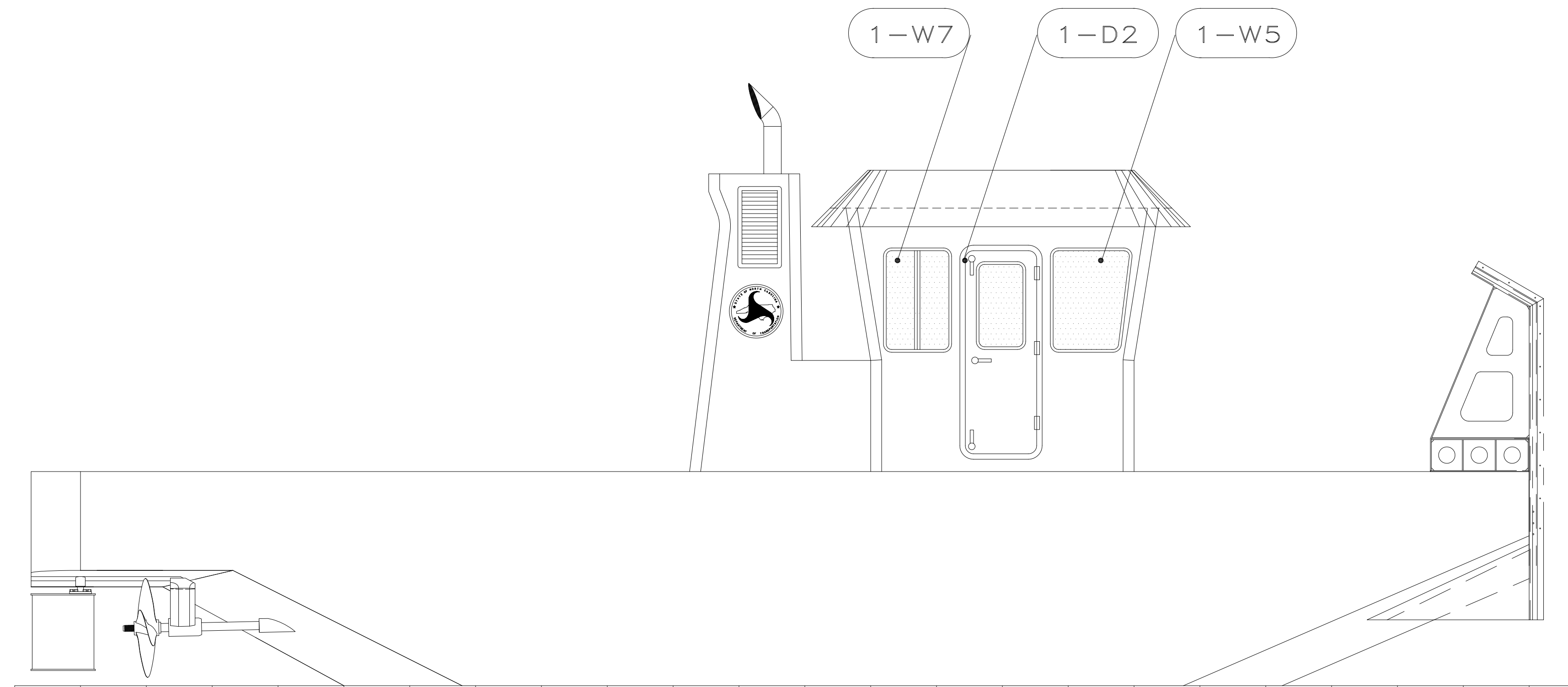
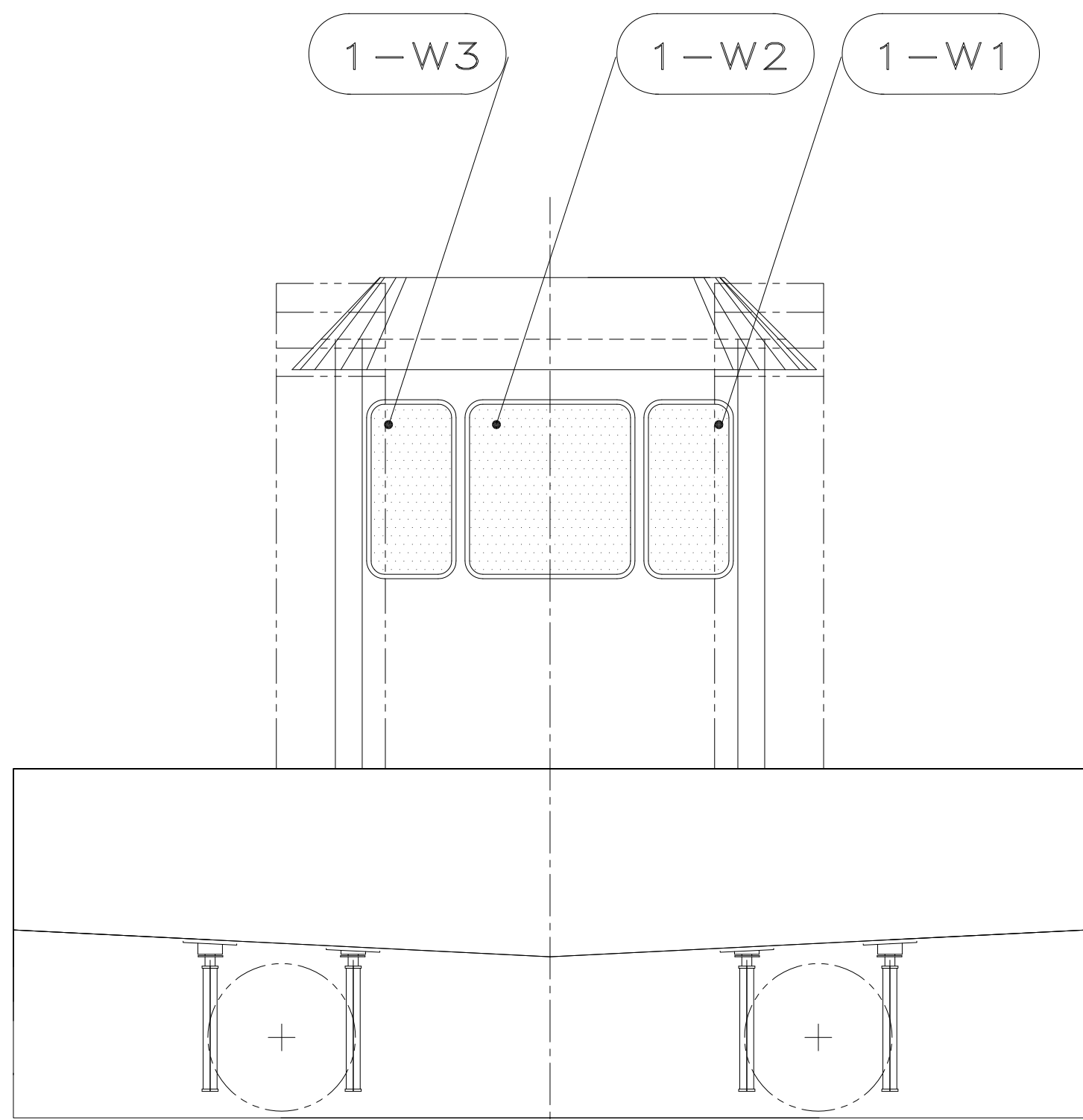
DOOR & WINDOW SCHEDULE

MAIN DECK DOORS

ITEM	SIZE	TYPE	LOCATION	GLASS THICK	CORNER RADIUS	FINISH	NOTES
1-D1	26"W X 74"H	DOOR, WEATHERTIGHT ALUMINUM 4 SIDED SS BOLT-ON FRAME 2 DOGS, THERMAL INSULATION, 16"W X 30"H WINDOW, CLEAR GLASS	W.H. PORT SIDE 6" SILL	1/4"	4"	COATED WITH WHEELHOUSE PAINT SYSTEM	DOORS TO BE INSTALLED WITH LATCHES, LOCKS, HOLDBACKS & BUMBERS
1-D2	26"W X 74"H		W.H. STDB SIDE 6" SILL				

MAIN DECK WINDOWS

ITEM	SIZE	TYPE	LOCATION	GLASS THICK	CORNER RADIUS	FINISH	NOTES
1-W1	18"W X 38.5"H	WINDOW, FIXED, CLAMP-IN	FWD PILOT HOUSE, PORT	3/8"	3"	POWDER COATED ALUMINUM	CLEAR GLASS
1-W2	36"W X 38.5"H	WINDOW, FIXED, CLAMP-IN	FWD PILOT HOUSE, CENTER	9/16"	3"	POWDER COATED ALUMINUM	CLEAR GLASS
1-W3	18"W X 38.5"H	WINDOW, FIXED, CLAMP-IN	FWD PILOT HOUSE, STBD	3/8"	3"	POWDER COATED ALUMINUM	CLEAR GLASS
1-W4	26"W X 36"H	WINDOW, FIXED, CLAMP-IN	PORT SIDE PH FWD	5/16"	3"	POWDER COATED ALUMINUM	CLEAR GLASS
1-W5	26"W X 36"H	WINDOW, FIXED, CLAMP-IN	STBD SIDE PH FWD	5/16"	3"	POWDER COATED ALUMINUM	CLEAR GLASS
1-W6	23"W X 36"H	WINDOW, SLIDING, CLAMP-IN	PORT SIDE PH AFT	5/16"	3"	POWDER COATED ALUMINUM	CLEAR GLASS
1-W7	23"W X 36"H	WINDOW, SLIDING, CLAMP-IN	STBD SIDE PH AFT	5/16"	3"	POWDER COATED ALUMINUM	CLEAR GLASS
1-W8	18"W X 38.5"H	WINDOW, FIXED, CLAMP-IN	AFT PILOT HOUSE, PORT	5/16"	3"	POWDER COATED ALUMINUM	CLEAR GLASS
1-W9	36"W X 38.5"H	WINDOW, FIXED, CLAMP-IN	AFT PILOT HOUSE, CENTER	3/8"	3"	POWDER COATED ALUMINUM	CLEAR GLASS
1-W10	18"W X 38.5"H	WINDOW, FIXED, CLAMP-IN	AFT PILOT HOUSE, STBD	1/4"	3"	POWDER COATED ALUMINUM	CLEAR GLASS



PROFILE

GENERAL NOTES

NO.	DESCRIPTION
1.0	VESSEL TO BE CONSTRUCTED IN ACCORDANCE WITH 46 CFR SUBCHAPTER M
2.0	ALL GLASS SHALL BE TEMPERED SAFETY GLASS
3.0	WINDOW SIZES TO BE VERIFIED WITH LOFTED PLATE CUT OUTS
4.0	SEE SECTION A-A FOR WINDOW MOUNTING DETAIL

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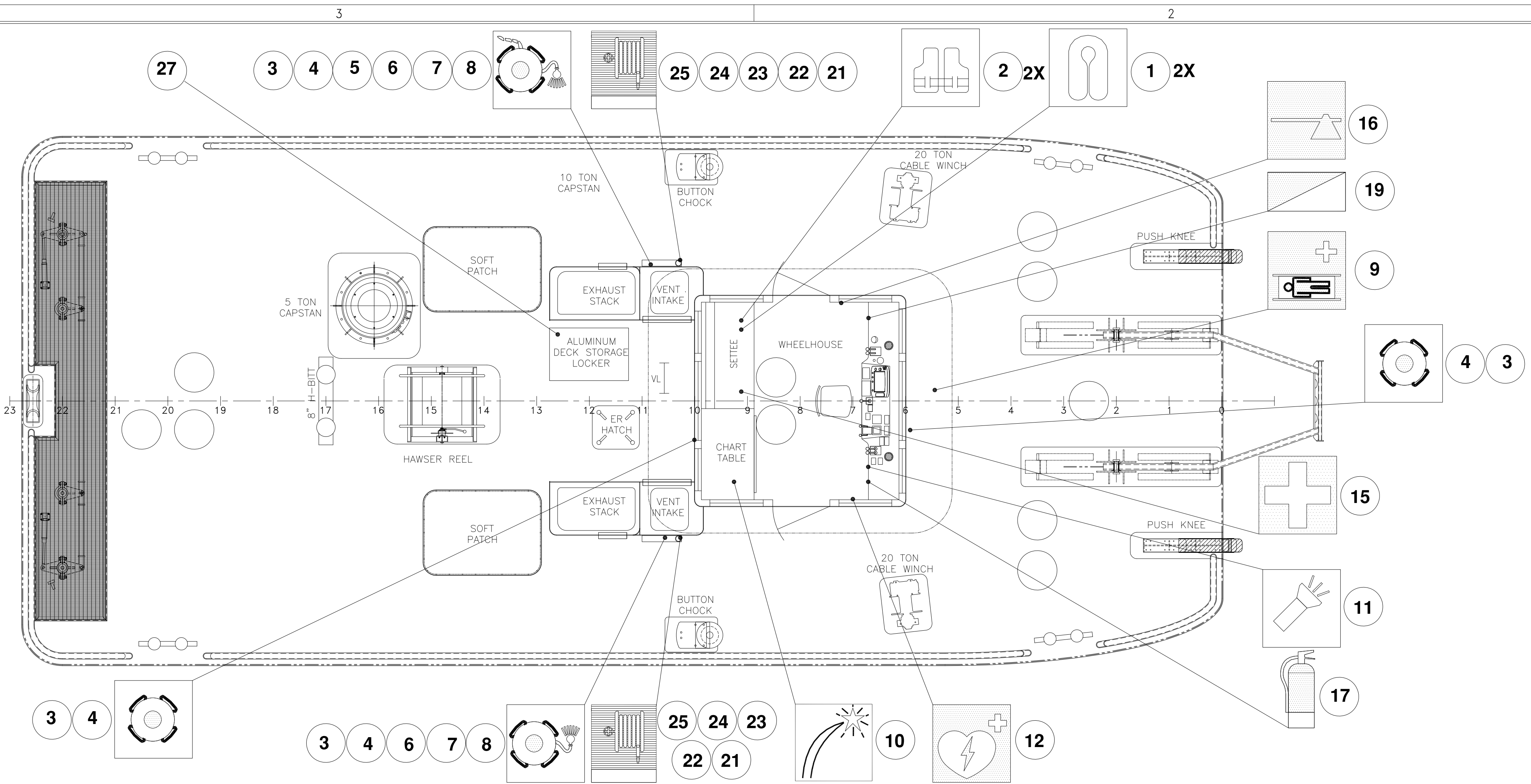
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Fax: (904) 599-1522
info@dejongandlebet.com

Title: 45.5' x 20' x 6.5' NCDOT TOWBOAT

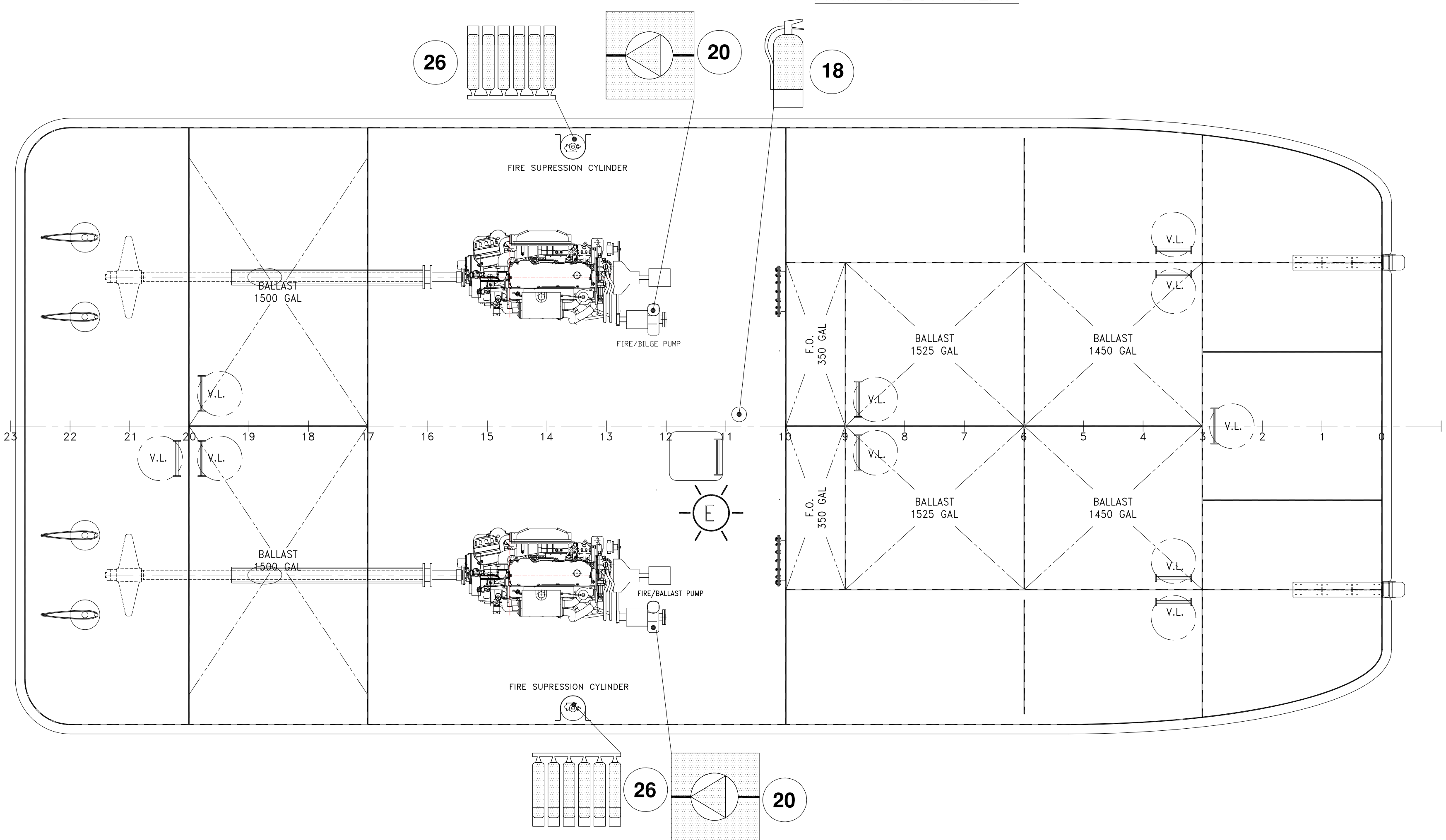
DOOR & WINDOW SCHEDULE

Dwg. No. 17-1393-625 Alt. No. 0 Sht. 1 of 1

Drawn By: JAH Date: NOVEMBER 26, 2018
Checked By: Date:
App'd By: Scale: 3/8" = 1'-0"
ABS App'l: USCG App'l:



MAIN DECK PLAN



HOLD

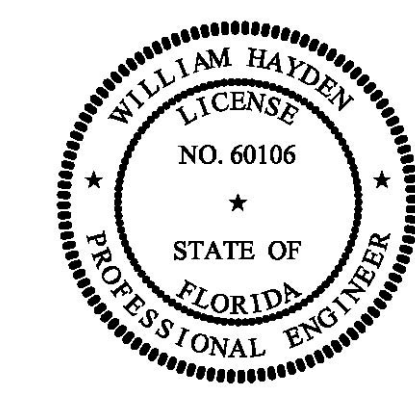
SYMBOL LEGEND	
SYMBOL	DESCRIPTION
[Symbol]	FLOATING RESCUE LITTER
[Symbol]	LIFE PRESERVERS, ADULT
[Symbol]	ADULT WORK VEST
[Symbol]	30" LIFE RING
[Symbol]	30" LIFE RING & WATERLIGHT
[Symbol]	VISUAL DISTRESS SIGNALS
[Symbol]	DEFIBRILLATOR
[Symbol]	FIRE AXE
[Symbol]	FIRE EXTINGUISHER
[Symbol]	FIRE PUMP
[Symbol]	FIRE HOSE STATION W/ RACK, VALVE, HOSE AND NOZZLE
[Symbol]	FIXED FIRE EXTINGUISHING SYSTEM
[Symbol]	FIRE DETECTION SYSTEM CONTROL PANEL
[Symbol]	FIRST AID KIT
[Symbol]	FLASHLIGHT
[Symbol]	EMERGENCY LIGHT

EQUIPMENT LIST

LIFE SAVING EQUIPMENT						
ITEM	QTY.	DESCRIPTION	LOCATION	PART NUMBER	MANUFACTURER	REMARKS
1	2	LIFE PRESERVERS, ADULT	SEE DWG			
2	2	ADULT WORK VEST	SEE DWG			
3	4	LIFE RING, 30"	SEE DWG			
4	4	BRACKET, LIFE RING	SEE DWG			
5	60 FT	ROPE, ORANGE, POLYETHYLENE, 5/16"	MAIN DECK			
6	2	LIGHT, MAN OVERBOARD	MAIN DECK			
7	2	BRACKET, MAN OVERBOARD LT	MAIN DECK			
8	12 FT	ROPE, ORANGE, POLYETHYLENE, 5/16"	MAIN DECK			6 FT PER LIGHT

RESCUE EQUIPMENT						
ITEM	QTY.	DESCRIPTION	LOCATION	PART NUMBER	MANUFACTURER	REMARKS
9	1	FLOATING RESCUE LITTER	WHEELHOUSE EXT			
10	1	VISUAL DISTRESS SIGNALS	WHEELHOUSE			
11	1	FLASHLIGHT & D BATTERIES	WHEELHOUSE			
12	1	DEFIBRILLATOR, PORTABLE	GALLEY			

FIRE & SAFETY EQUIPMENT						
ITEM	QTY.	DESCRIPTION	LOCATION	PART NUMBER	MANUFACTURER	REMARKS
16	1	AXE, FIRE	WHEELHOUSE			W/ MOUNTING BRACKETS
17	1	FIRE EXTINGUISHER, 10# ABC TYP. II	WHEELHOUSE			W/ MOUNTING BRACKETS
18	1	FIRE EXTINGUISHER, 10# ABC TYPE II	ENGINE ROOM			W/ MOUNTING BRACKETS
19	1	FIRE DETECTION SYSTEM	WHEELHOUSE			
20	1	FIRE PUMP, 50 PSI @ 80 GPM	ENGINE ROOM			
21	2	FIRE HOSE ENCLOSURE	SEE DWG			STAINLESS STEEL
22	2	FIRE HOSE, UL, 1 1/2", 50', 1.5"	SEE DWG			
23	2	ANGLE HOSE VALVE, BRASS, 1.5"	SEE DWG			
24	2	COMBINATION NOZZLE, 1.5"	SEE DWG			
25	2	SPANNER WRENCH, UNIVERSAL	SEE DWG			
26	1	FIXED FIRE EXTINGUISHING SYSTEM	ENGINE ROOM			24"Wx36"Lx24"H RAISED 1/2" ABOVE THE MAIN DECK W/ 3/4" DRAIN
27	1	ALUMINUM DECK STORAGE LOCKER	MAIN DECK			



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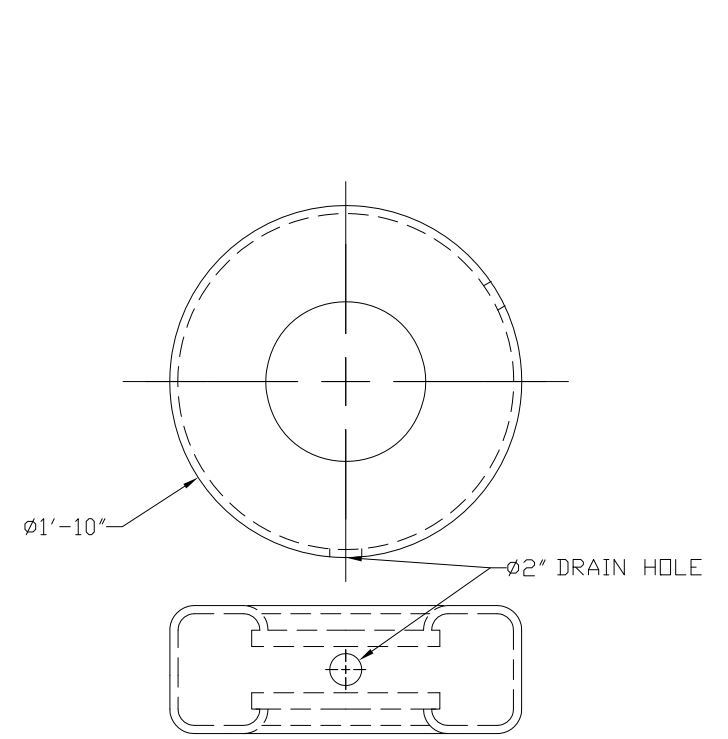
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Title: 45.5'x20'x6.5' NCDOT PUSHBOAT

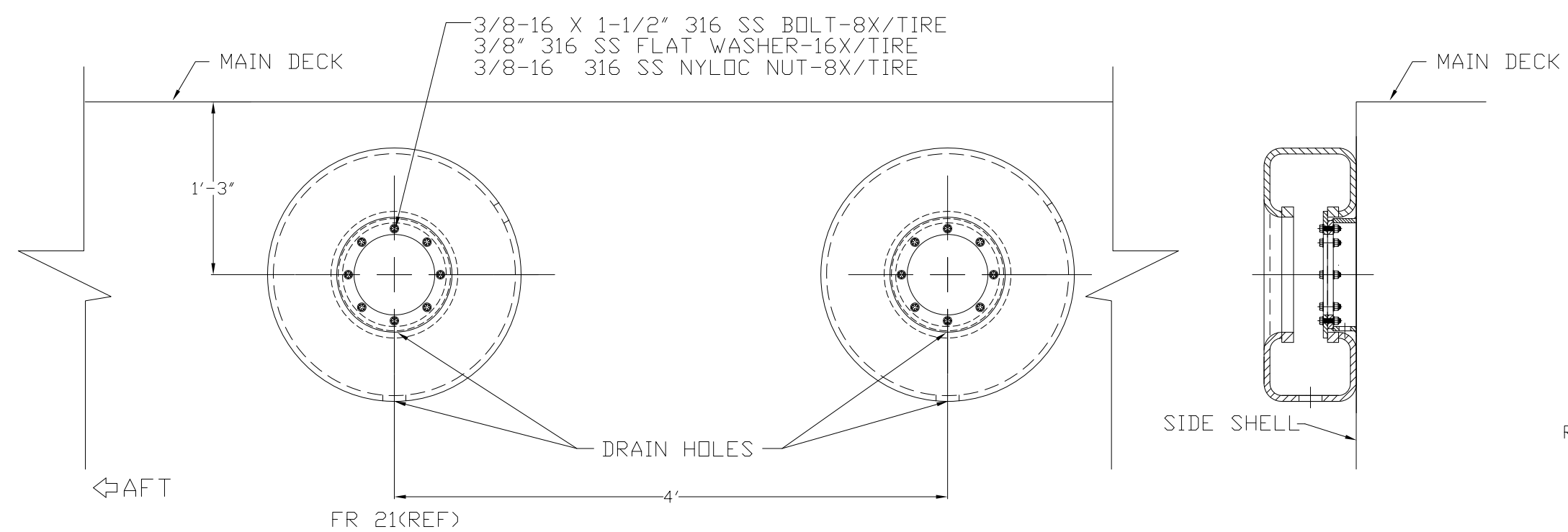
**LIFE, EMERGENCY &
 FIRE FIGHTING EQUIPMENT**

Dwg. No. 17-1393-680 Alt. No. 0
 Sht. 1 of 1

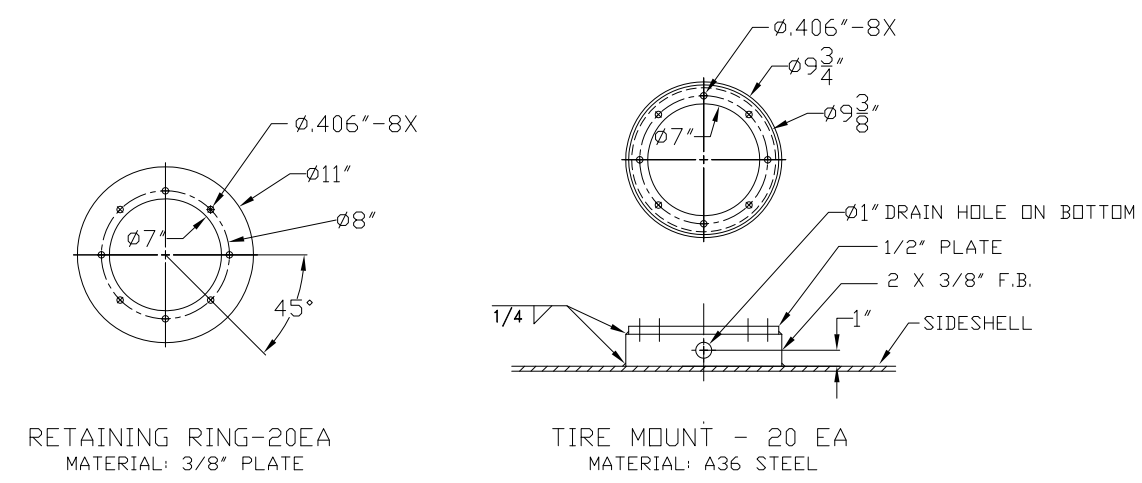
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 Checked By: Date:
 App'd By: Scale: 3/8" = 1'-0"
 ABS App'l: USCG App'l:



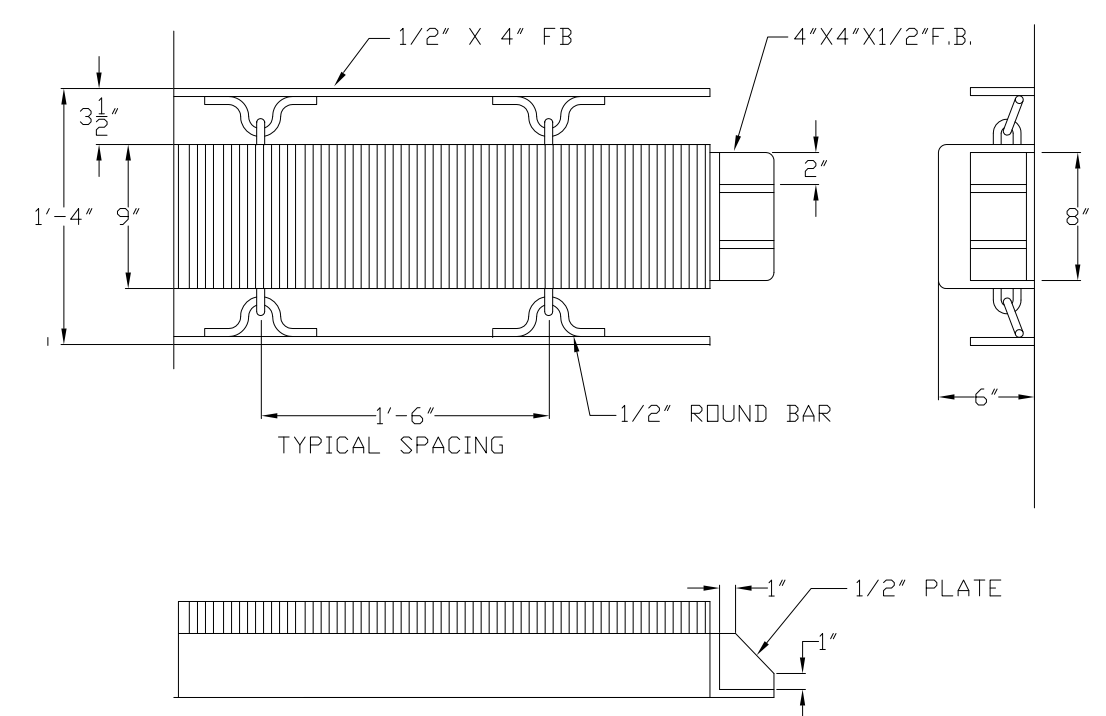
TIRE HOLE DETAIL "A"
 SIZE: 22 X 8-10
 DIMENSIONS: 22"H X 8"W X 10" RIM
 WEIGHT: 28 LBS
 SCALE: 1" = 1'-0"



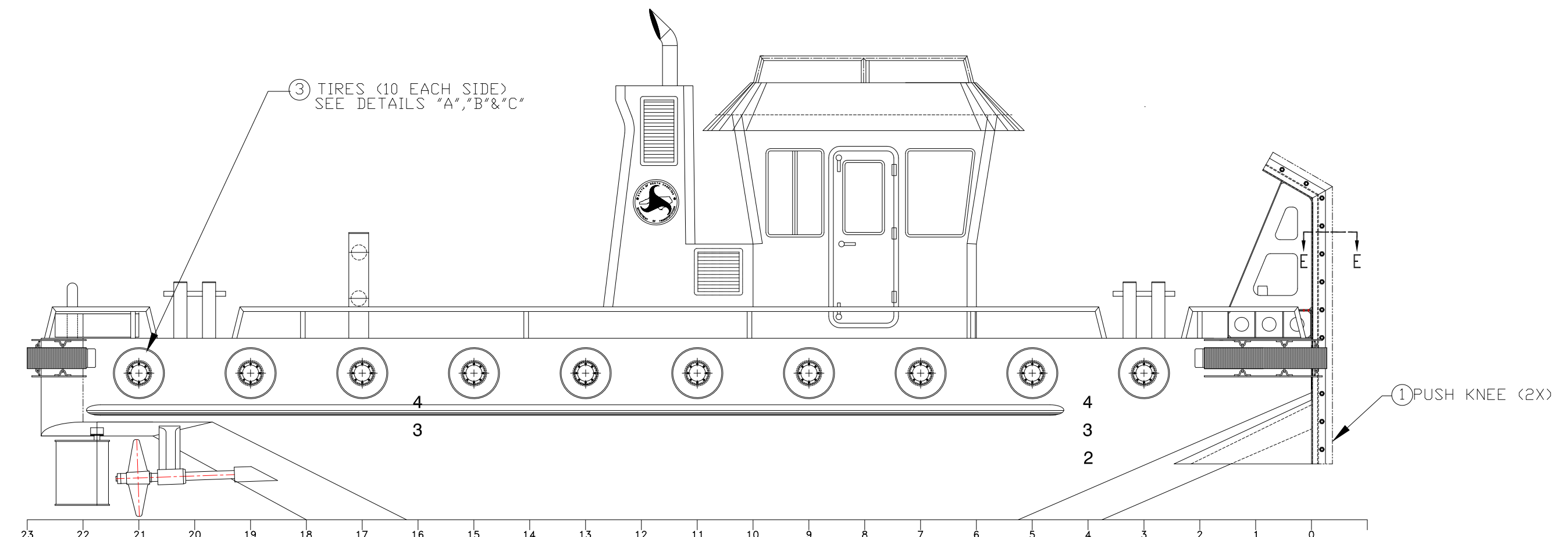
SIDE SHELL TIRES DETAIL "B"
 20 EACH (10 PER SIDE)
 22"H X 8"W X 10" RIM
 SCALE: 1" = 1'-0"



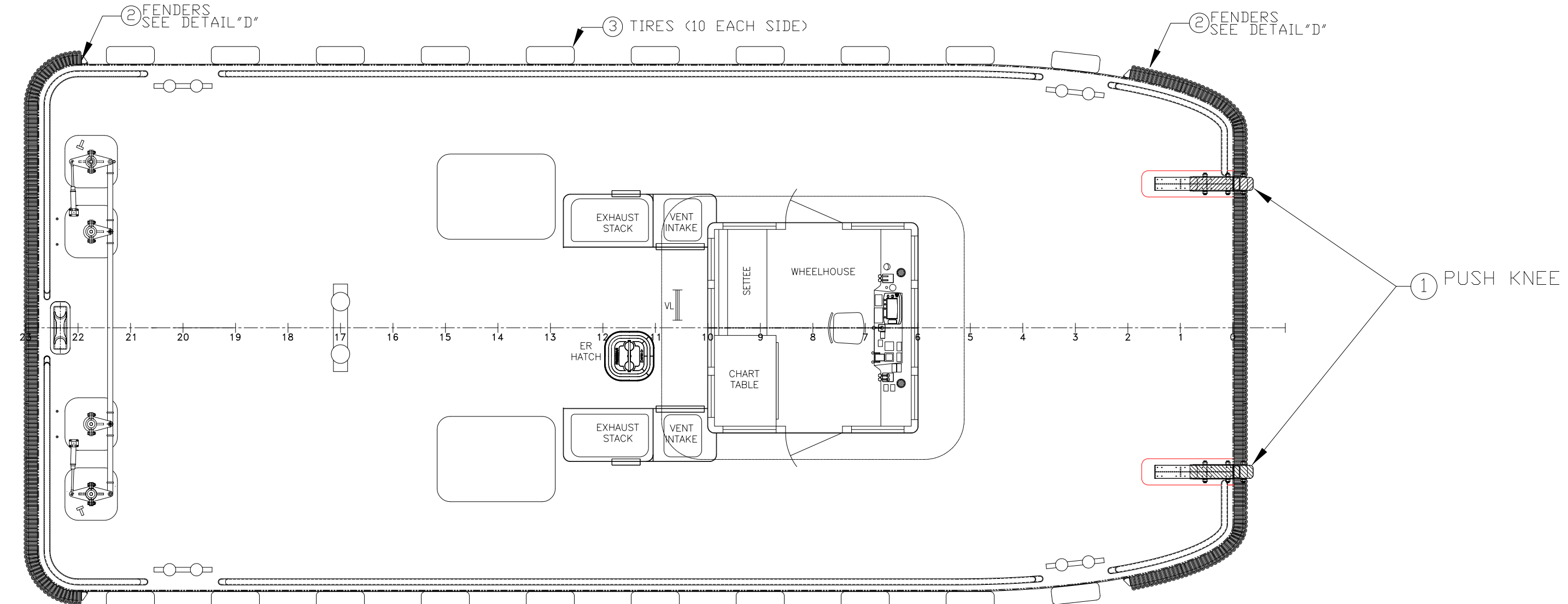
TIRE MOUNT DETAIL "C"
 SIZE: 22 X 8-10
 DIMENSIONS: 22"H X 8"W X 10" RIM
 WEIGHT: 28 LBS
 SCALE: 1" = 1'-0"



BOW AND STERN FENDER DETAIL "D"
 STERN FENDER SHOWN
 SCALE: 1" = 1'-0"

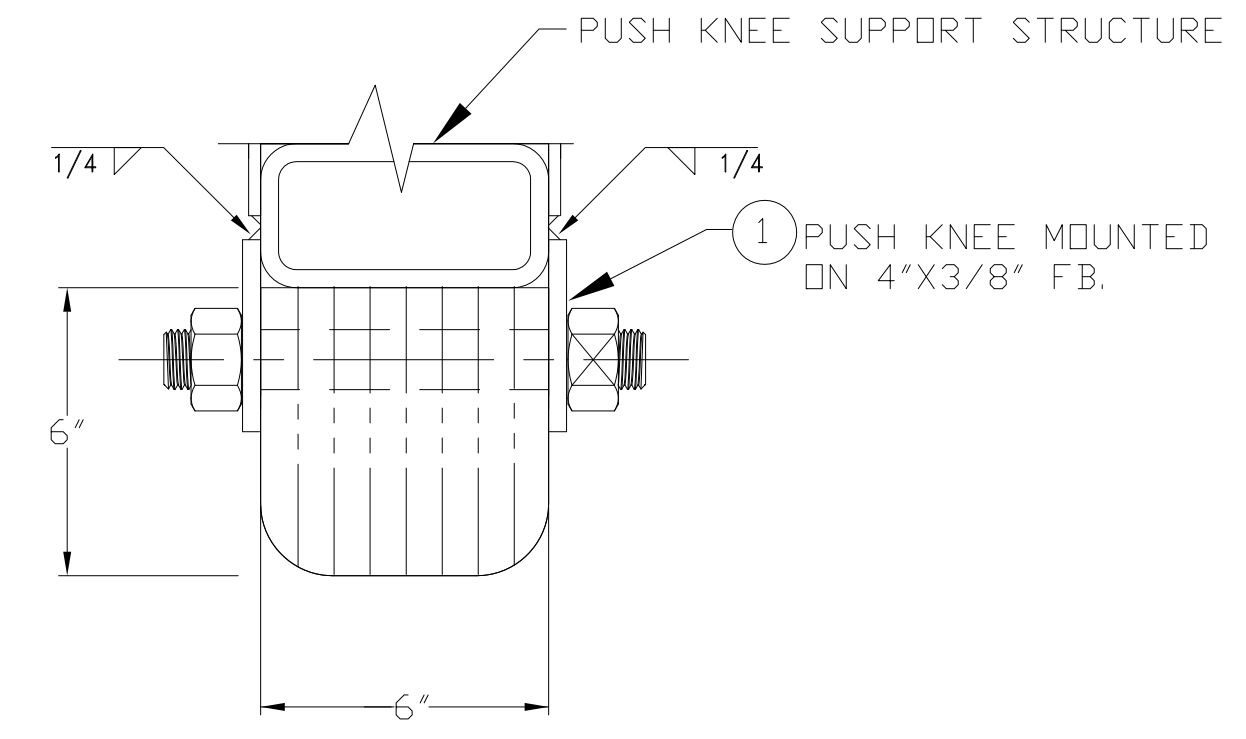


PROFILE
 1/2" = 1'-0"

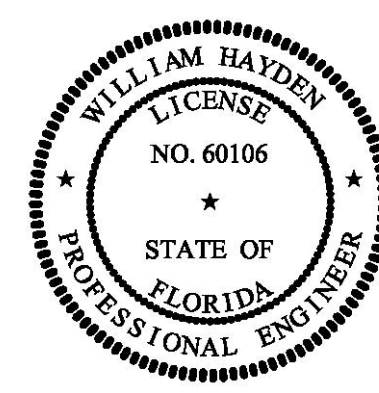


MAIN DECK PLAN
 1/2" = 1'-0"

BILL OF MATERIALS				
BUMPERS & TIRE SCHEDULE				
ITEM	QTY.	DESCRIPTION	MANUFACTURER #	REMARKS
1	AR	PUSH KNEE, 6"W X 6"D, EXTENDED F.B. MOUNT	SCHUYLER MODEL 115	OR EQUAL
2	AR	FENDER, 9" HIGH X 6" DEEP	SCHUYLER MODEL 114 & SR3D	OR EQUAL
3	20	TIRE, AIRCRAFT, 22 X 8-10, 12 PLY		



DETAIL "E" PUSH KNEE SECTION
 MATERIAL: ITEM 1 PUSH KNEE
 SCALE: 3" = 1'-0"



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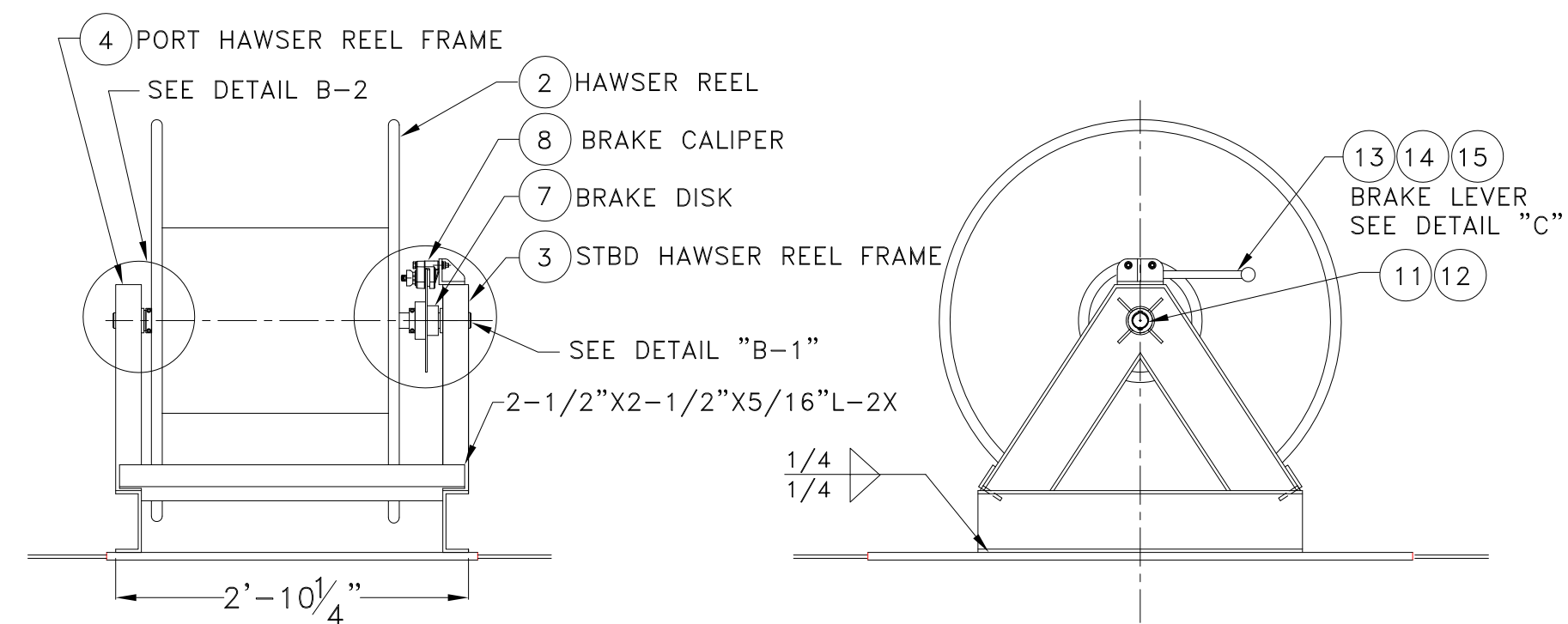
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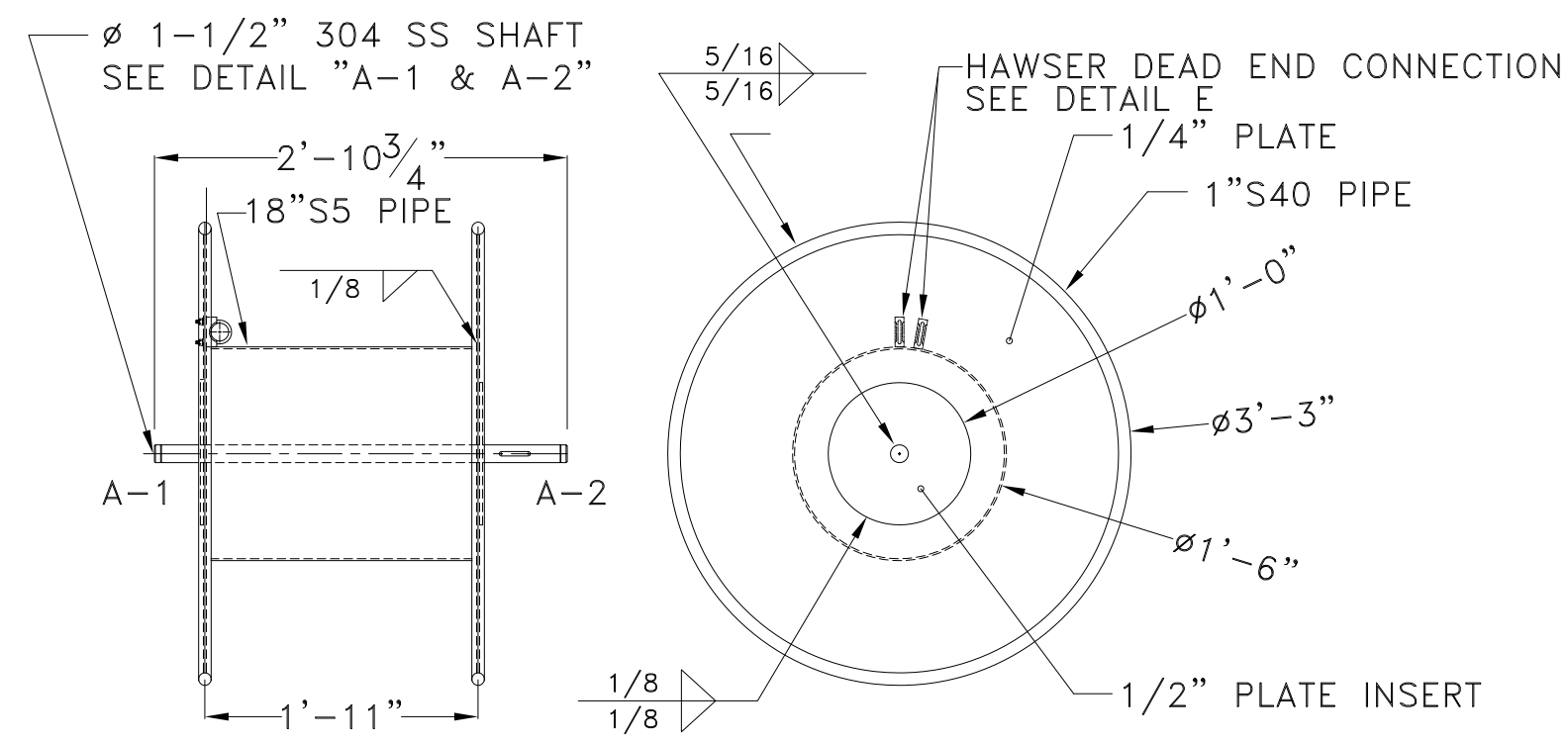
PUSH KNEE & FENDERS

Dwg. No. 17-1393-684
 Art. No. 0
 Sht. 1 of 1

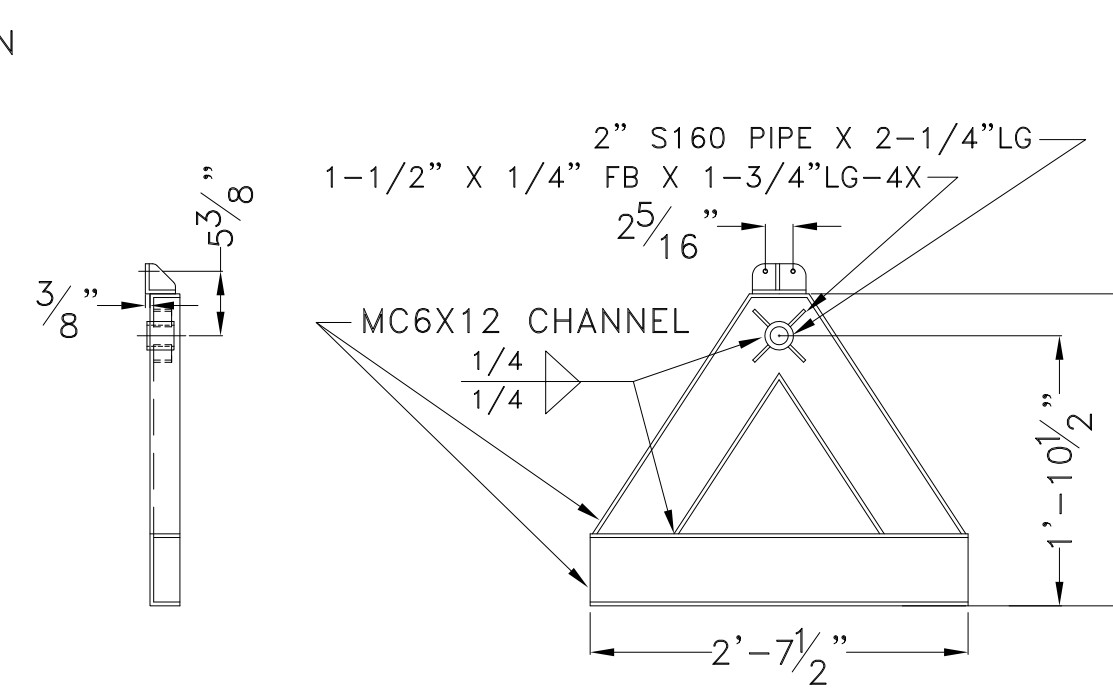
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 App'd By: Scale: SEE DWG
 ABS App'l: USCG App'l:



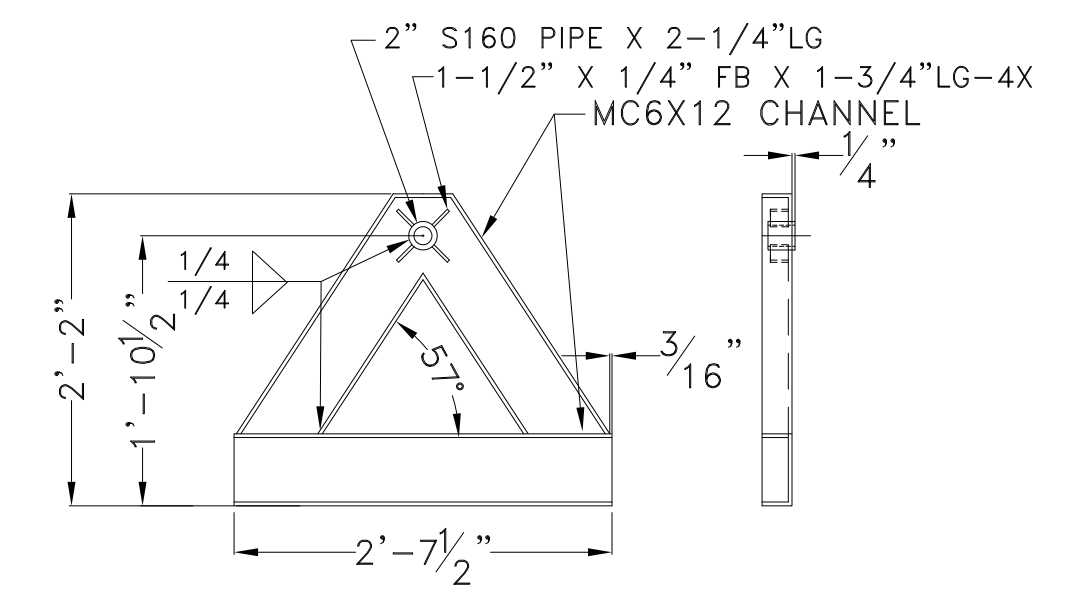
1 HAWSER REEL ASSEMBLY
 MATERIAL : A36 STEEL, ASTM A53 PIPE,
 UNLESS OTHERWISE NOTED
 SCALE: 3/4" = 1'



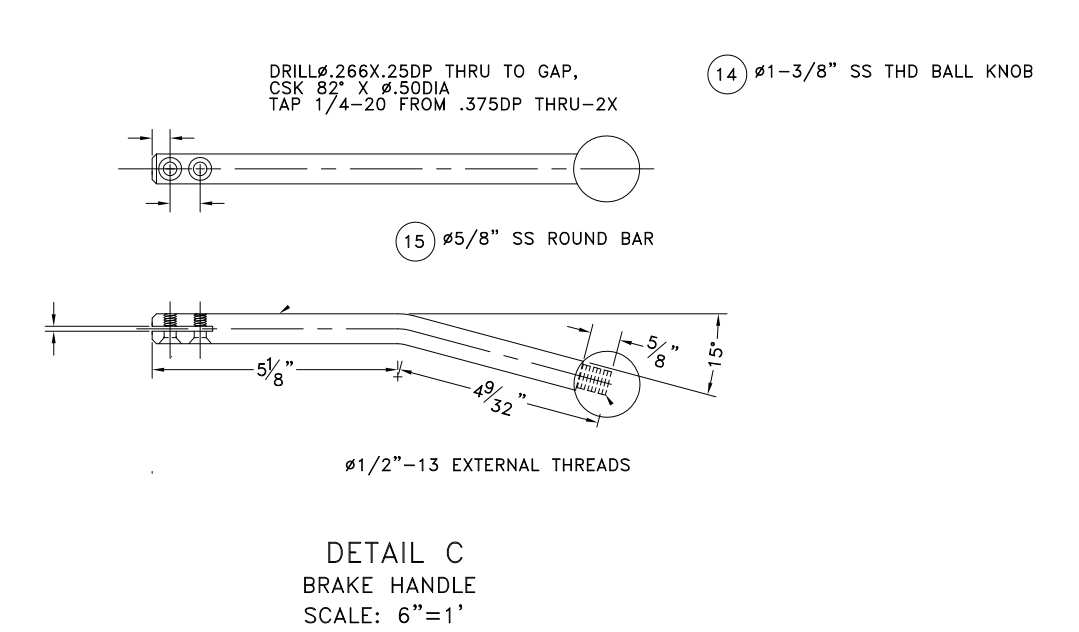
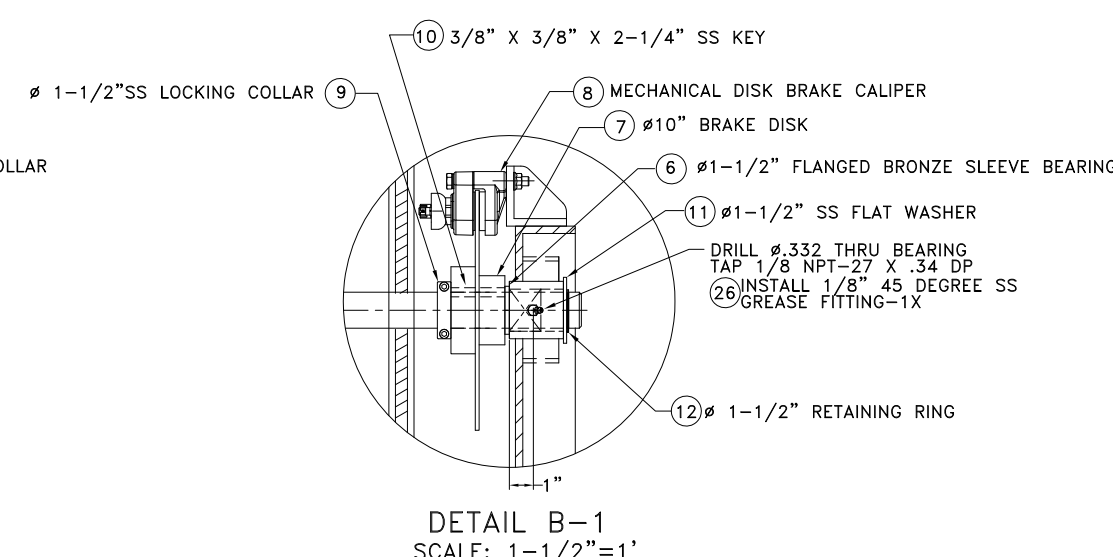
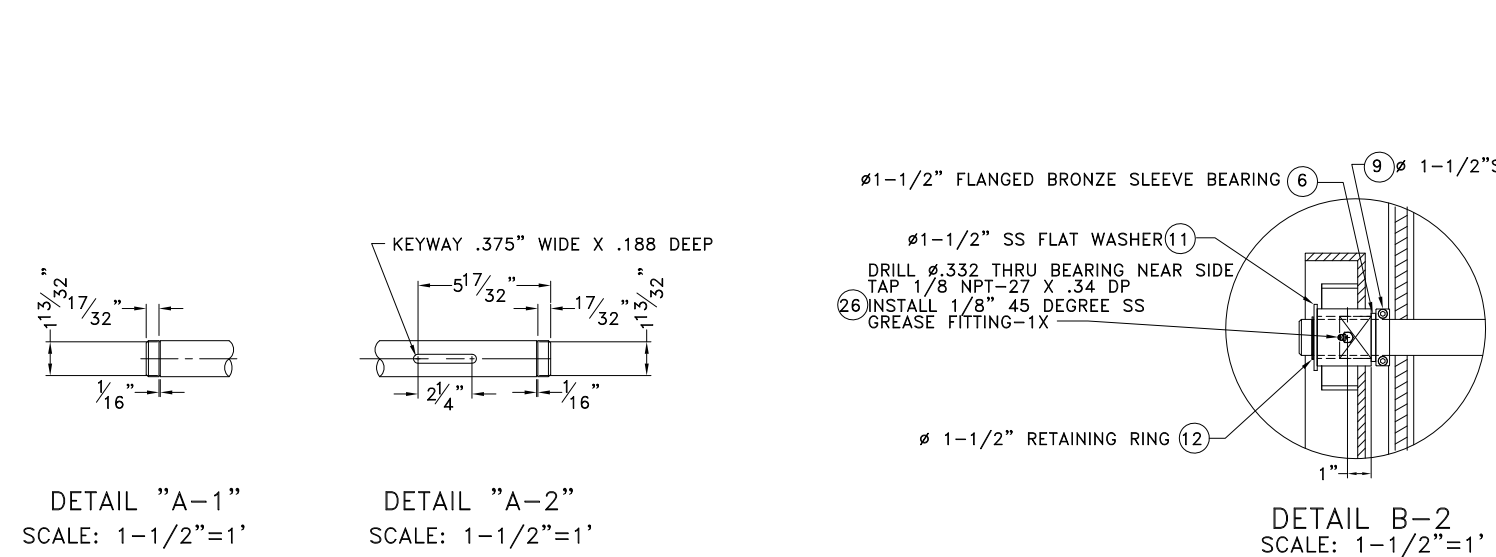
2 HAWSER REEL
 MATERIAL : A36 STEEL, ASTM A53 PIPE,
 UNLESS OTHERWISE NOTED



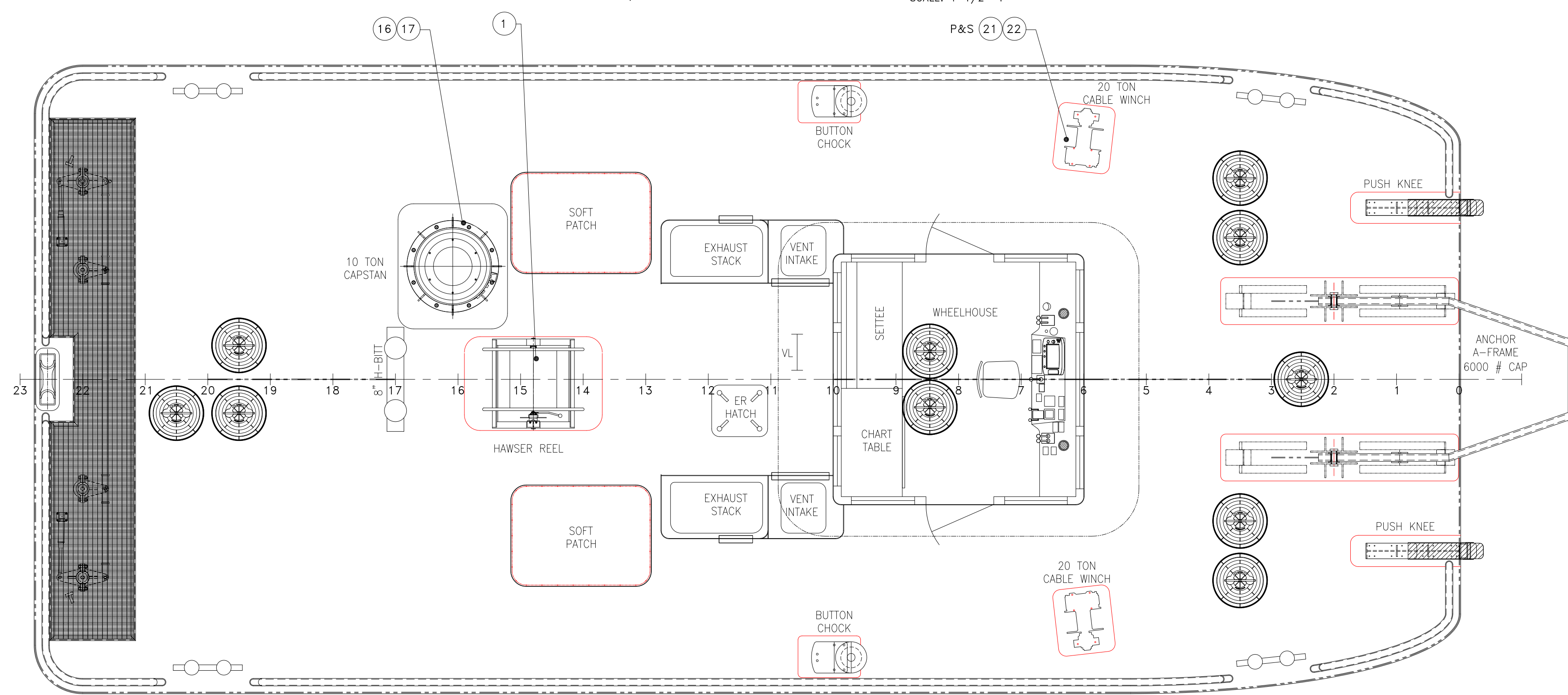
3 HAWSER REEL FRAME, STBD
 MATERIAL : A36 STEEL, ASTM A53 PIPE,
 UNLESS OTHERWISE NOTED



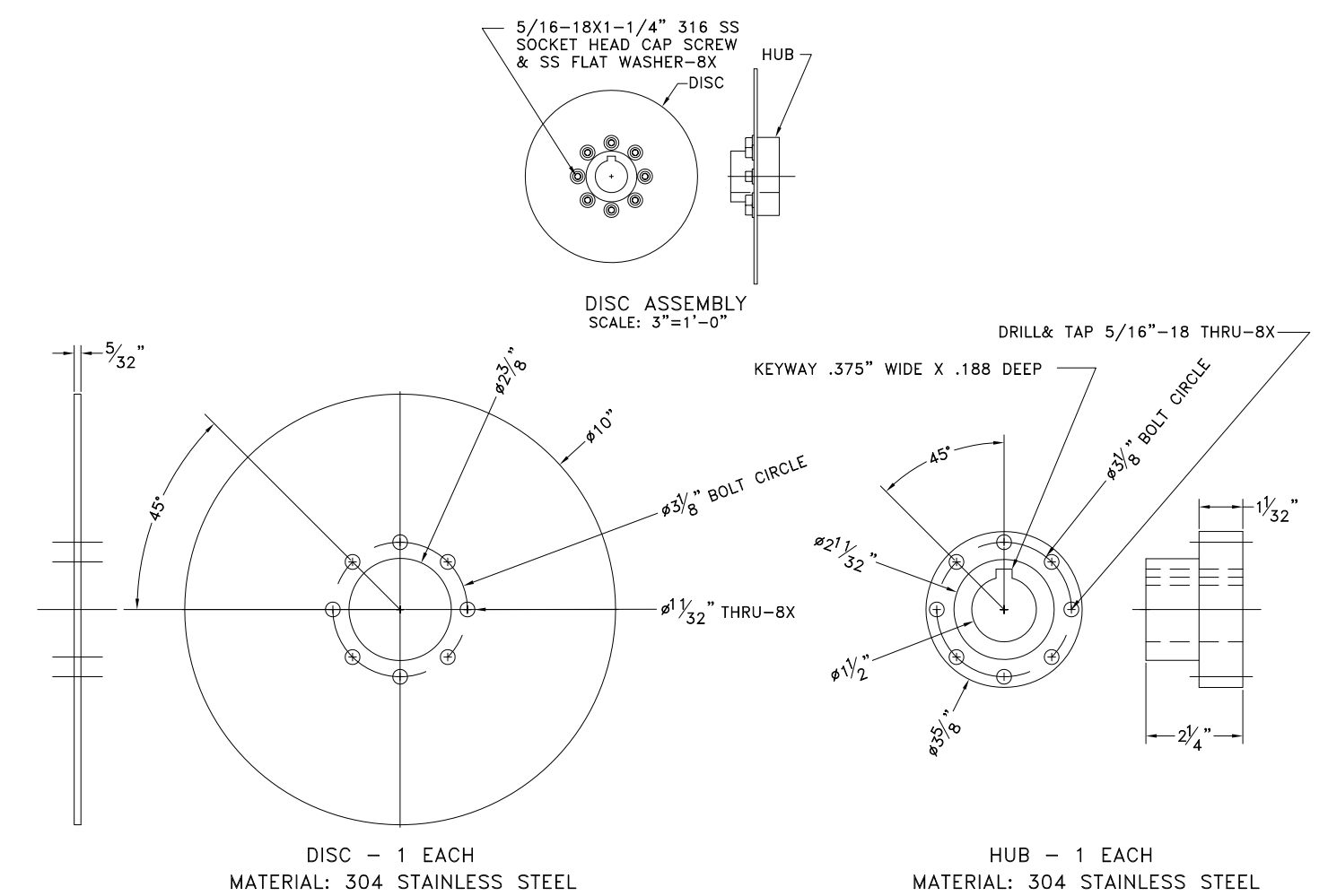
4 HAWSER REEL FRAME, PORT
 MATERIAL : A36 STEEL, ASTM A53 PIPE,
 UNLESS OTHERWISE NOTED



DETAIL C
 BRAKE HANDLE
 SCALE: 6\"/>



MAIN DECK PLAN
 SCALE: 3/8\"/>



DETAIL D
 BRAKE DISC ASSEMBLY
 SCALE: 3\"/>

BILL OF MATERIALS

ITEM	QTY.	DESCRIPTION	MANUFACTURER #/MATL	REMARKS	ITEM	QTY.	DESCRIPTION	MANUFACTURER #/MATL	REMARKS
1	1	HAWSER REEL ASSEMBLY		SEE DWG	16	1	CAPSTAN FOUNDATION		SEE DWG
2	1	HAWSER REEL		SEE DWG	17	1	CAPSTAN, VERTICAL, 5 TON, HYDRAULIC		
3	1	HAWSER REEL FRAME, STBD		SEE DWG	18	8	BOLT, 3/4\"/>		
4	1	HAWSER REEL FRAME, PORT		SEE DWG	19	8	NUT, NYLOC, 3/4\"/>		
5	1	1-1/2\"/>							
6	2	1-1/2\"/>							
7	1	10\"/>							
8	1	DISC BRAKE CALIPER, MECHANICAL, FIXED, FLOATING CALIPER, ALUMINUM	TOOLMATIC ME20MA	OR EQUAL	20	16	WASHER, FLAT, 3/4\"/>		
9	2	1-1/2\"/>							
10	1	3/8\"/>							
11	2	WASHER, FLAT, 1-1/2\"/>							
12	2	RETAINING RING, EXTERNAL, 1-1/2\"/>							
13	2	SCREW, OVAL HEAD, PHILLIPS 1/4-20 X 5/8\"/>							
14	1	KNOB, BALL, 1-3/8\"/>							
15	1	45/8\"/>							
					21	2	20 TON CABLE WINCH FOUNDATION		SEE DWG
					22	2	20 TON CABLE WINCH		
					23	8	BOLT, 3/4\"/>		
					24	8	NUT, NYLOC, 3/4\"/>		
					25	16	WASHER, FLAT, 3/4\"/>		
					26	2	GREASE FITTING, 45 DEGREE, 1/8\"/>		
					27	2	U-BOLT		SEE DETAIL E
					28	2	NUT, NYLOC		SEE DETAIL E
					29	2	WASHER, FLAT		SEE DETAIL E
					30	2	CLAMP, HAWSER	NYLON	SEE DETAIL E

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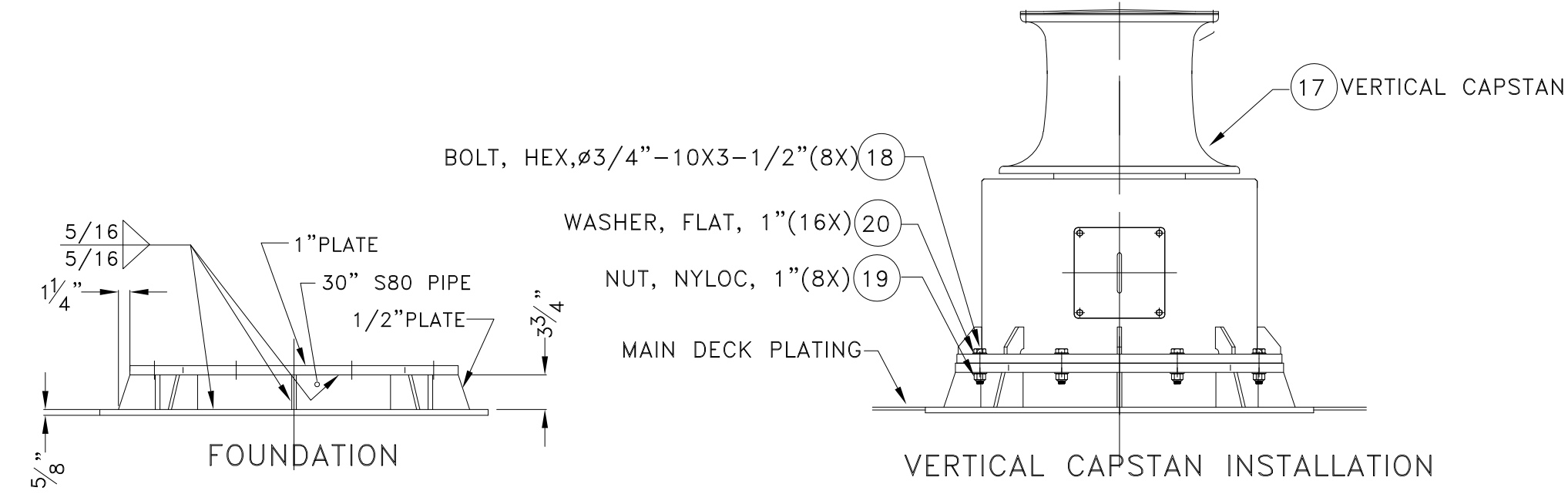
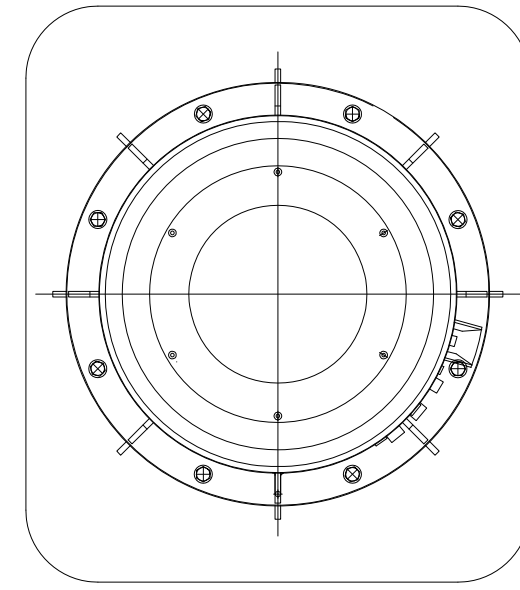
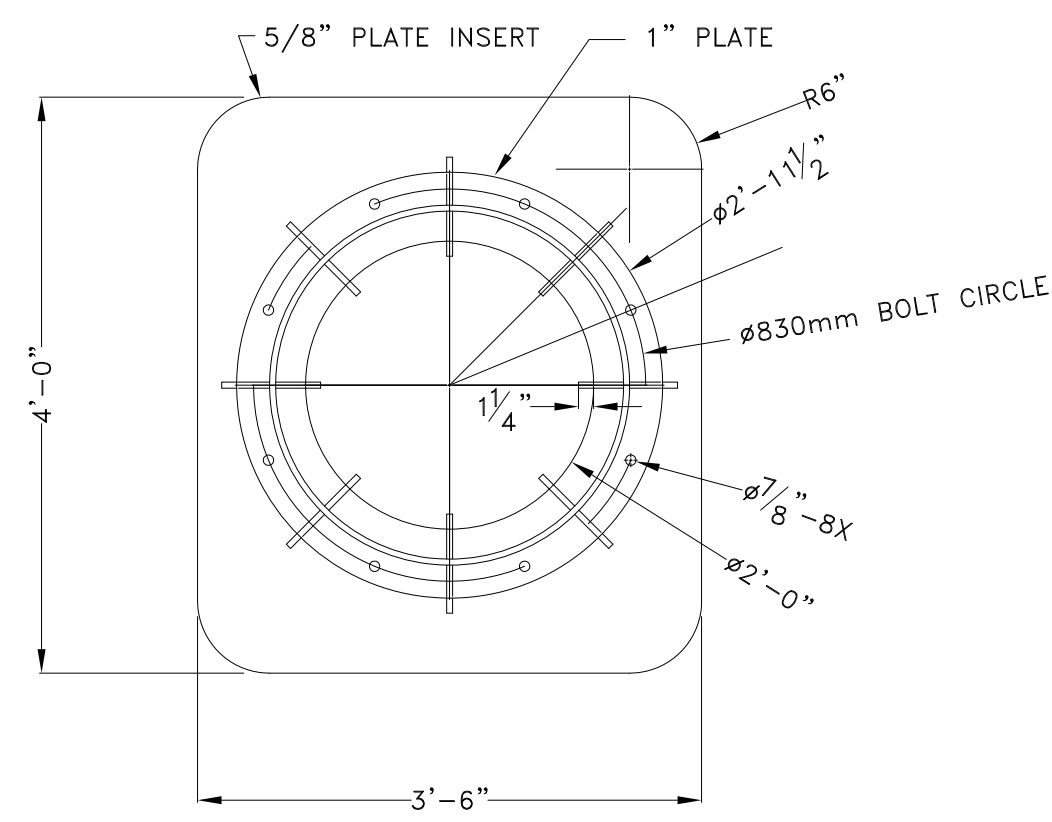
WILLIAM HAYDEN
 LICENSE
 NO. 60106

45.5'x18'x6.5' NCDOT PUSHBOAT

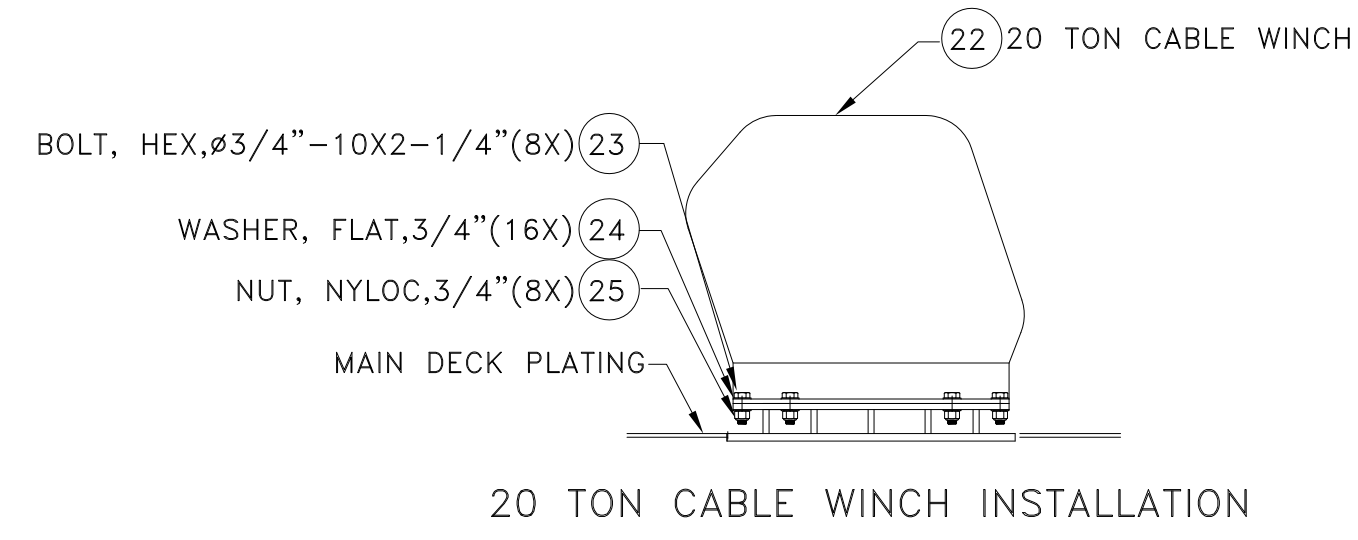
DECK CAPSTAN INSTALLATION & HAWSER REEL DETAILS

Dwg. No. **1393B-685** Alt. No. 0
 Sh. 1 of 1

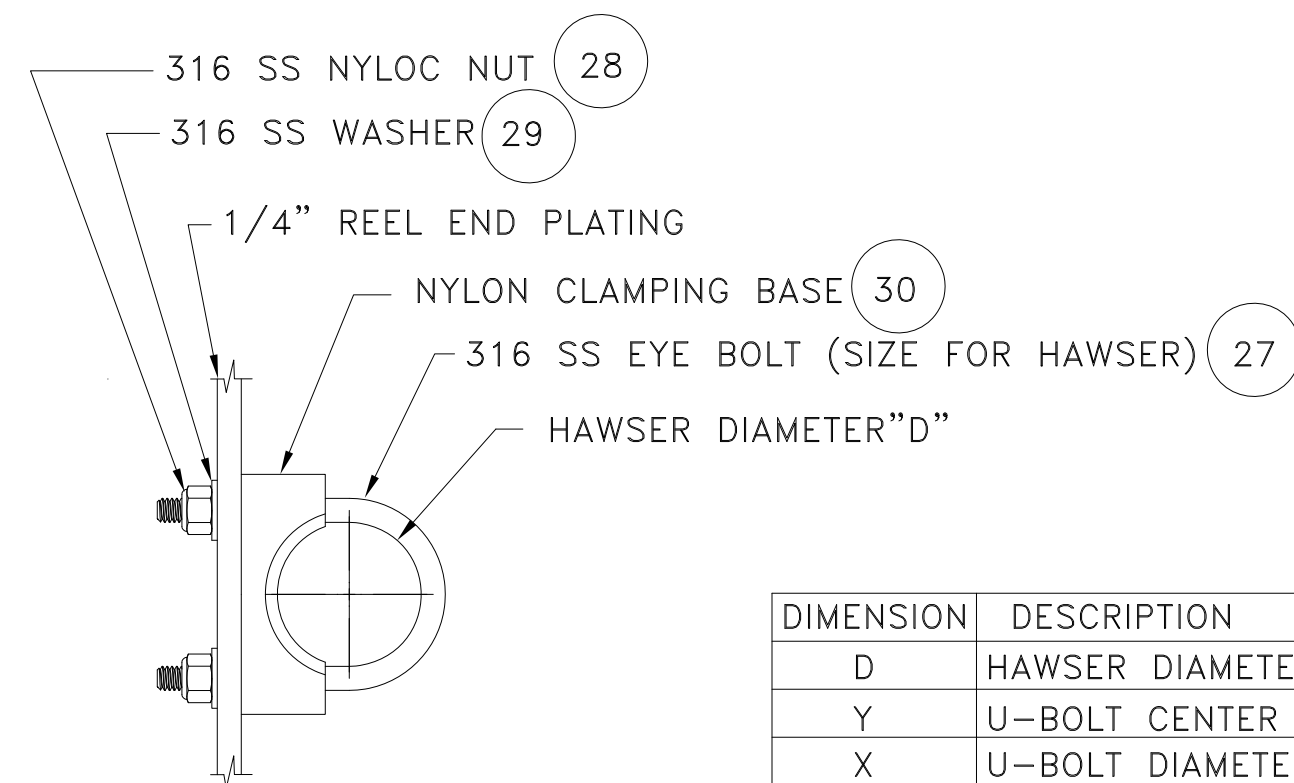
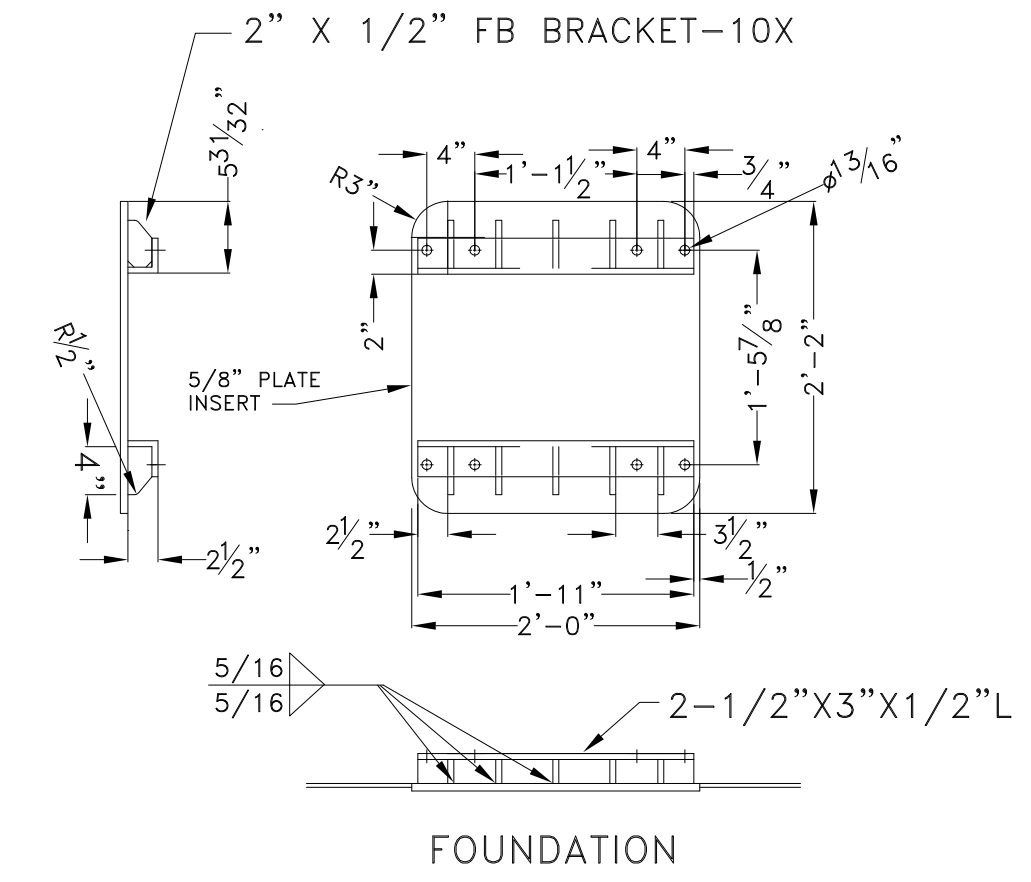
Drawn By: **JACOB CONNALLY** Date: **JANUARY 2, 2019**
 Checked By: _____ Date: _____
 App'd By: _____ Scale: **AS NOTED**
 ABS App'l: _____ USCG App'l: _____



16 CAPSTAN FOUNDATION
MATERIAL : A36 STEEL & NOTED
SCALE: 3/4" = 1'

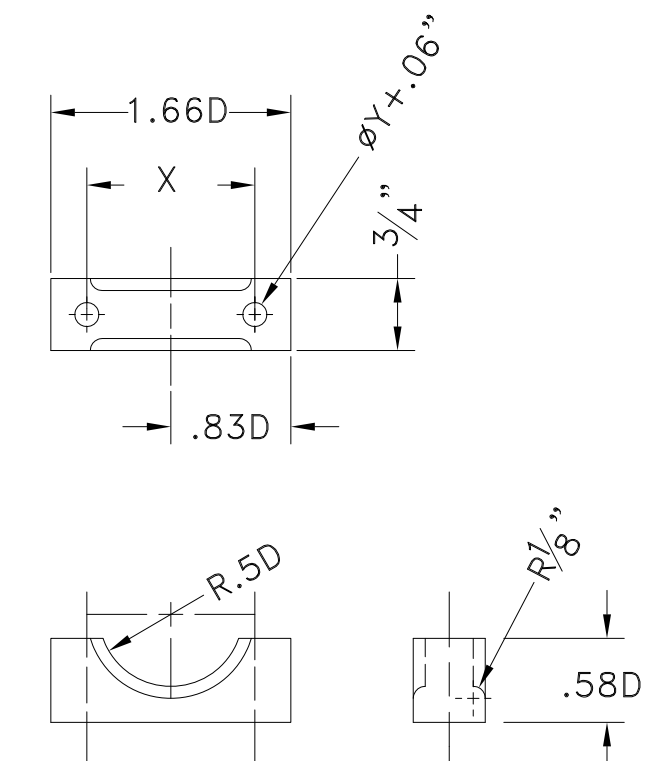


21 20 TON CABLE WINCH FOUNDATION-2EA
MATERIAL : A36 STEEL & NOTED
SCALE: 3/4" = 1'



HAWSER CLAMP ASSY-2 EA

DIMENSION	DESCRIPTION
D	HAWSER DIAMETER
Y	U-BOLT CENTER TO CENTER
X	U-BOLT DIAMETER



CLAMPING BASE-2 EA
MATERIAL: NYLON

DETAIL E
HAWSER DEAD END CONNECTION
SCALE: 6"=1' UNLESS OTHERWISE SPECIFIED

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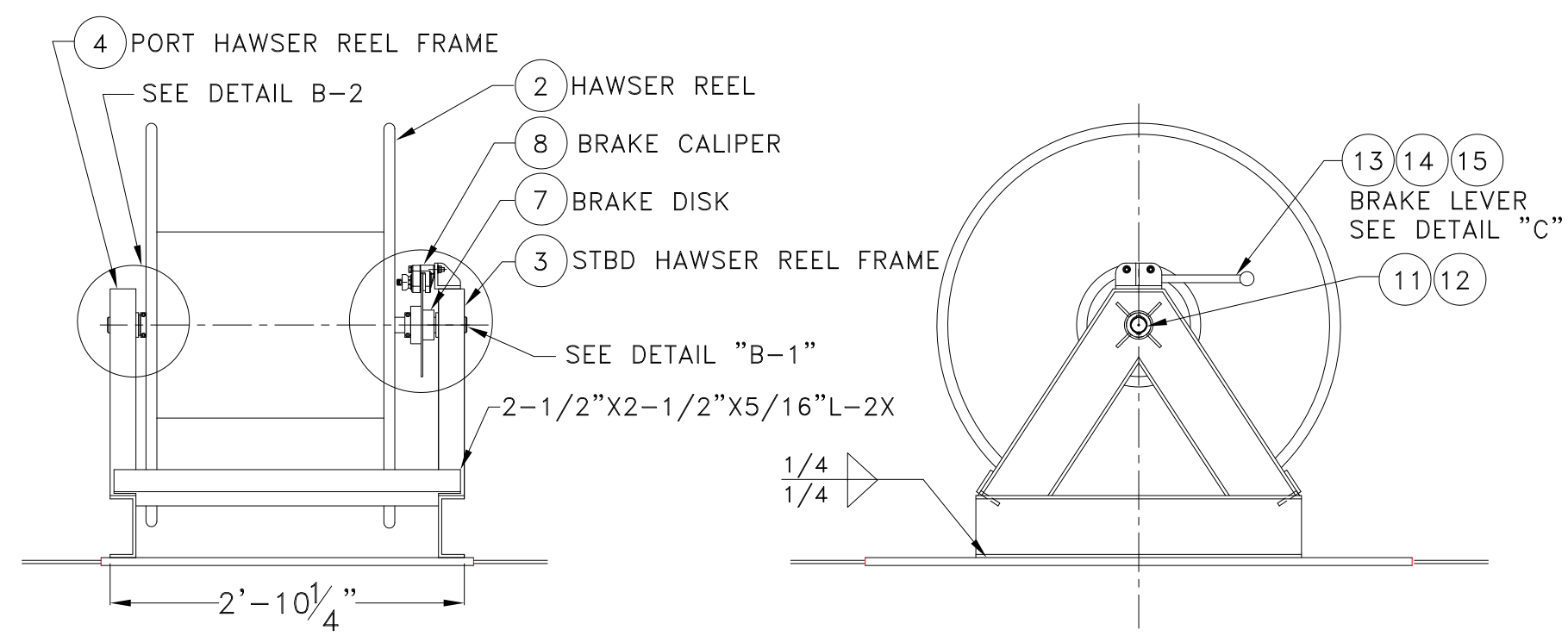
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Title: 45.5'x18'x6.5' NCDOT PUSHBOAT

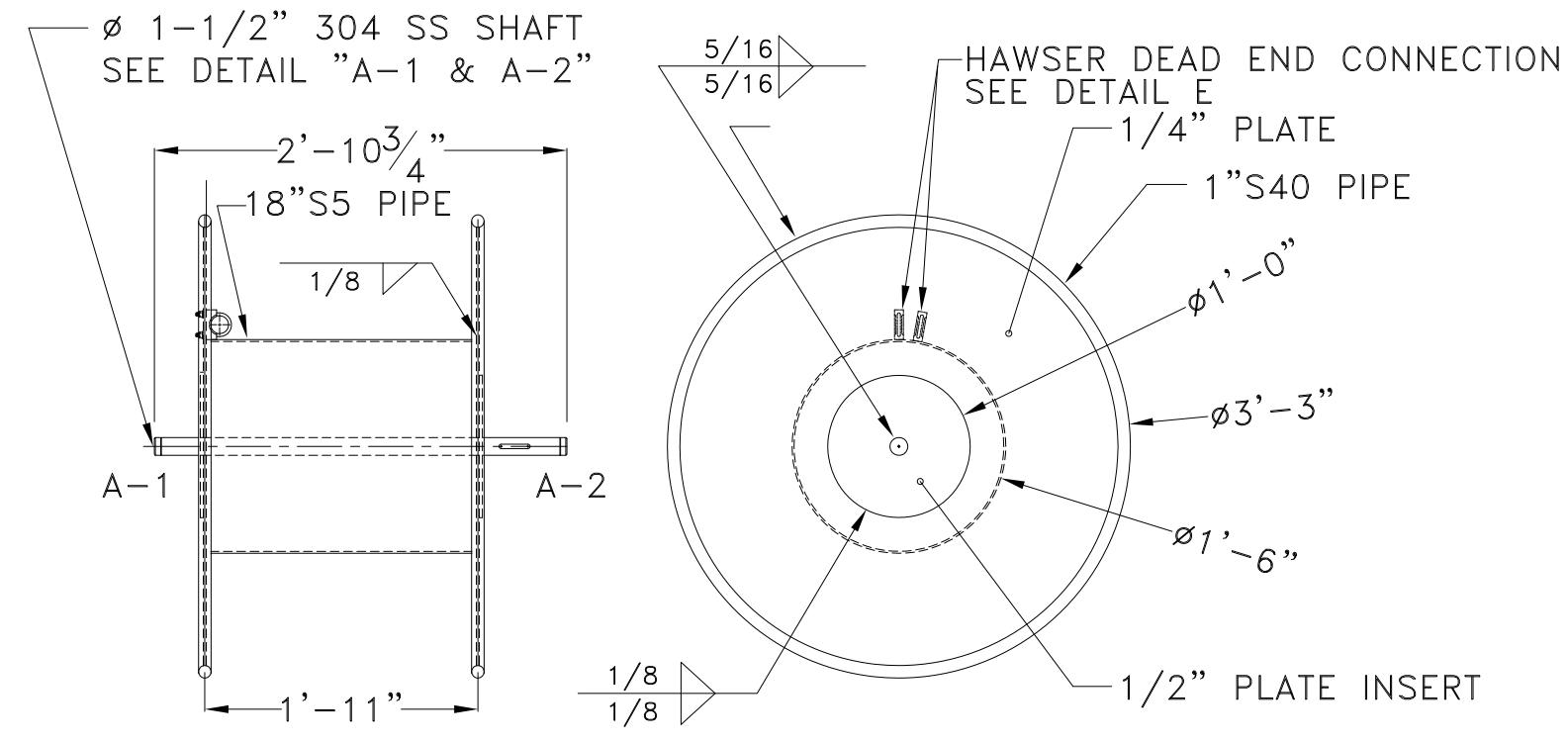
**DECK CAPSTAN INSTALLATION
& HAWSER REEL DETAILS**

Dwg. No. **1393B-685** Alt. No. 0
Sht. 2 of 2

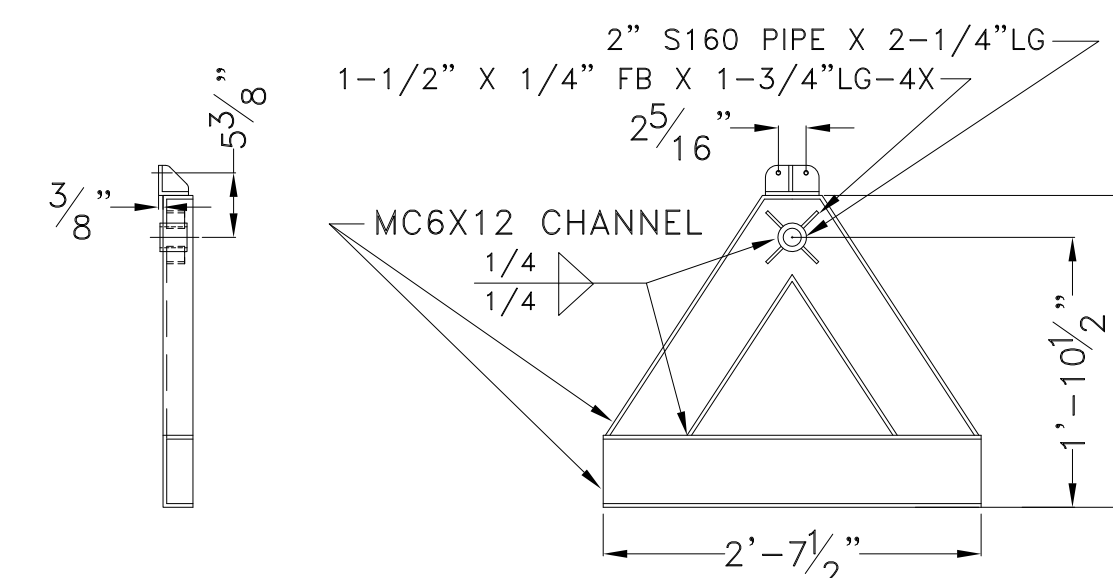
Drawn By: **JACOB CONNALLY** Date: **JANUARY 2, 2019**
Checked By: _____ Date: _____
App'd By: _____ Scale: **AS NOTED**
ABS App'l: _____ USCG App'l: _____



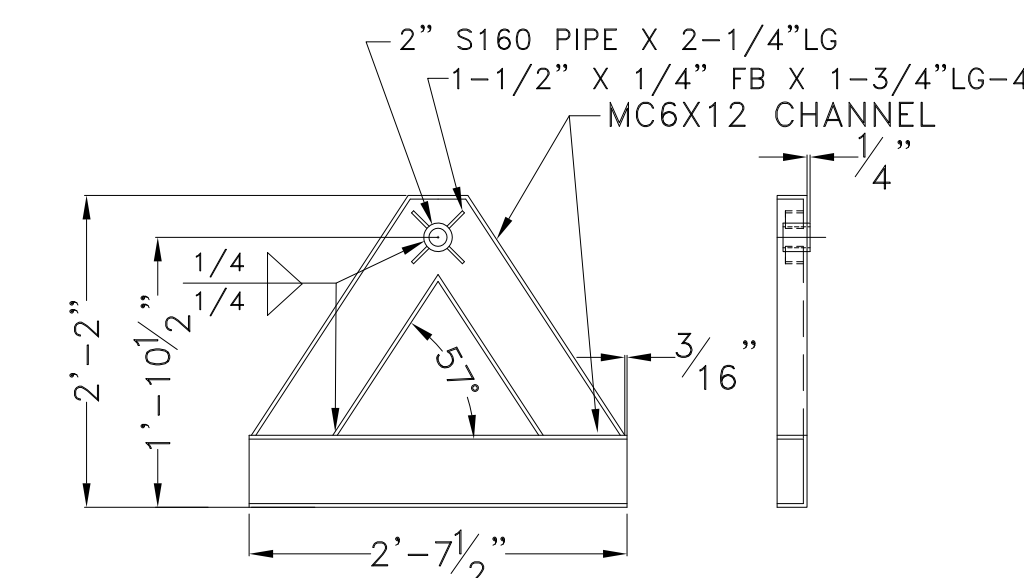
1 HAWSER REEL ASSEMBLY
 MATERIAL : A36 STEEL, ASTM A53 PIPE,
 UNLESS OTHERWISE NOTED
 SCALE: 3/4" = 1'



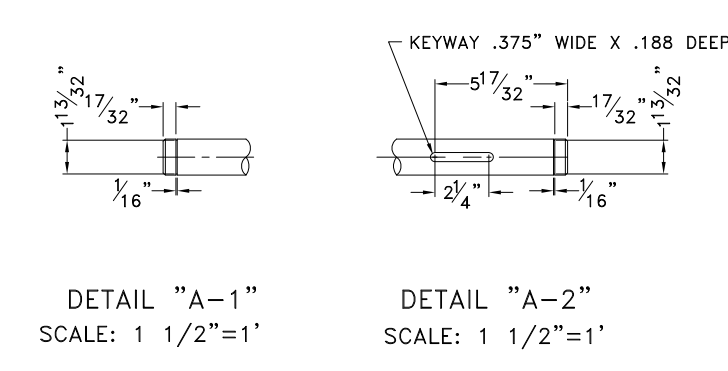
2 HAWSER REEL
 MATERIAL : A36 STEEL, ASTM A53 PIPE,
 UNLESS OTHERWISE NOTED



3 HAWSER REEL FRAME, STBD
 MATERIAL : A36 STEEL, ASTM A53 PIPE,
 UNLESS OTHERWISE NOTED

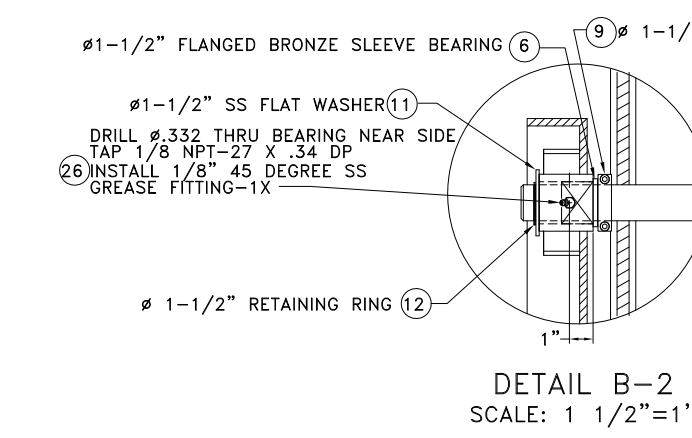


4 HAWSER REEL FRAME, PORT
 MATERIAL : A36 STEEL, ASTM A53 PIPE,
 UNLESS OTHERWISE NOTED

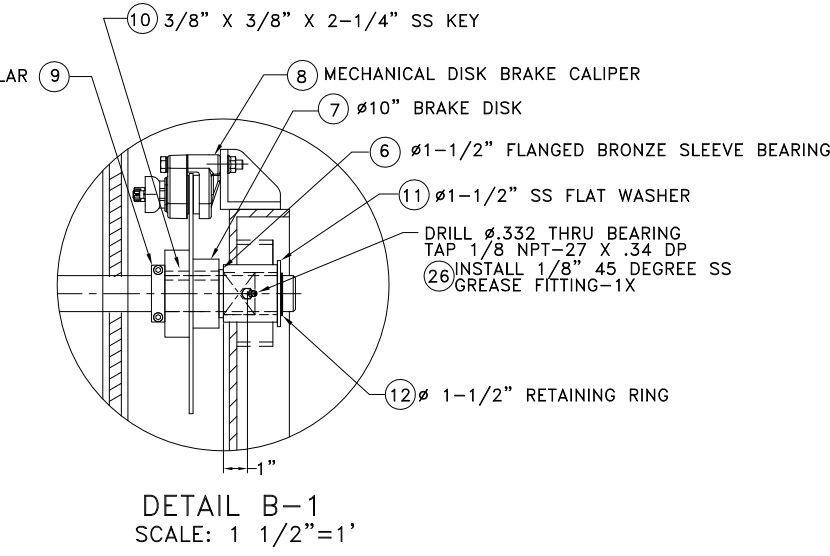


DETAIL "A-1"
SCALE: 1 1/2"=1'

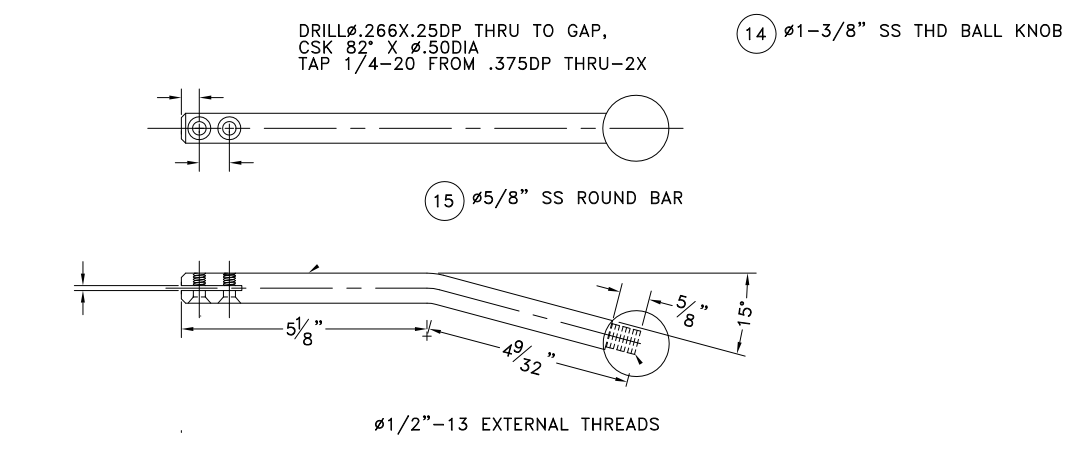
DETAIL "A-2"
SCALE: 1 1/2"=1'



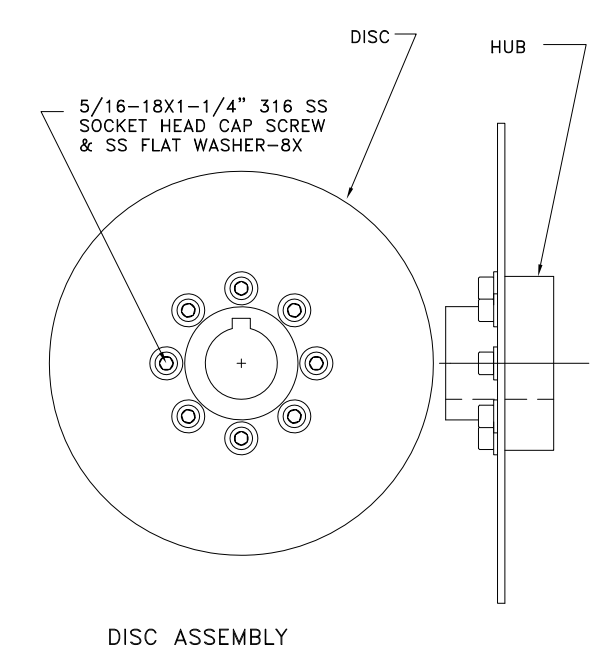
DETAIL B-2
SCALE: 1 1/2"=1'



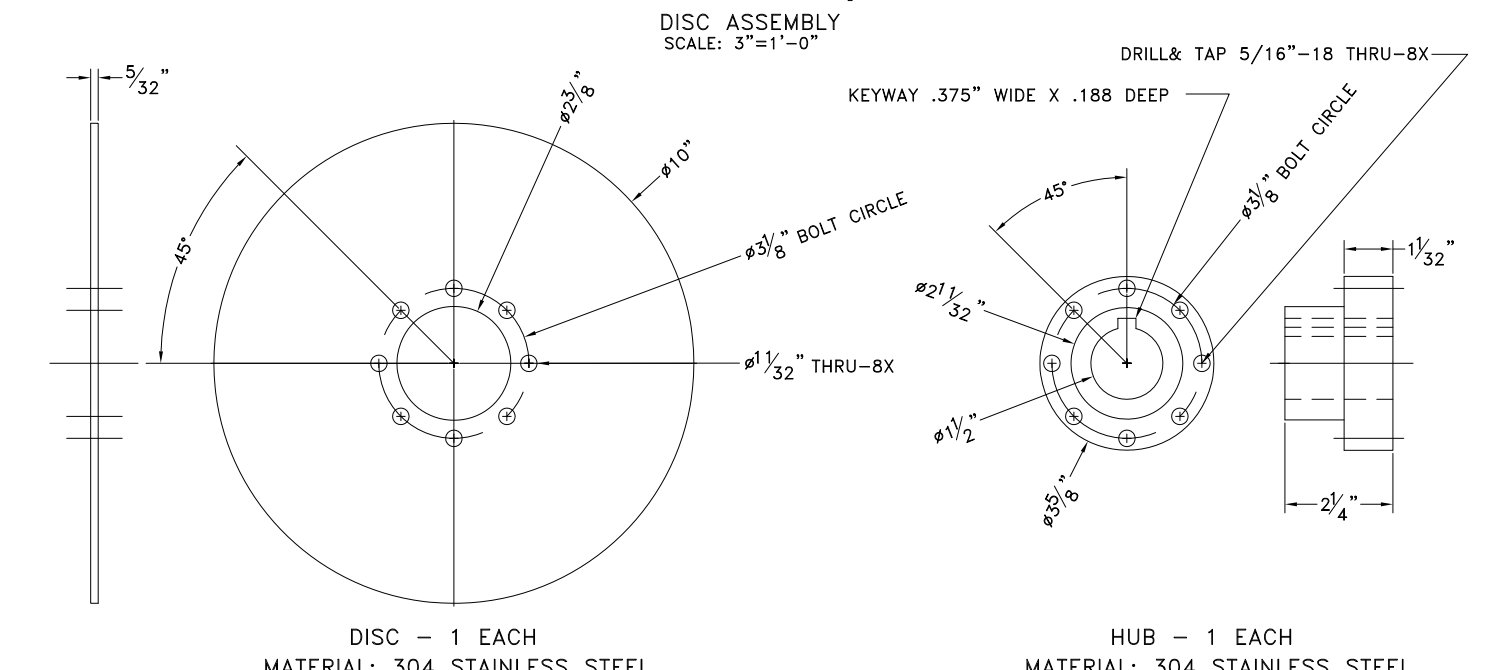
DETAIL B-1
SCALE: 1 1/2"=1'



DETAIL C
BRAKE HANDLE
SCALE: 3"=1'



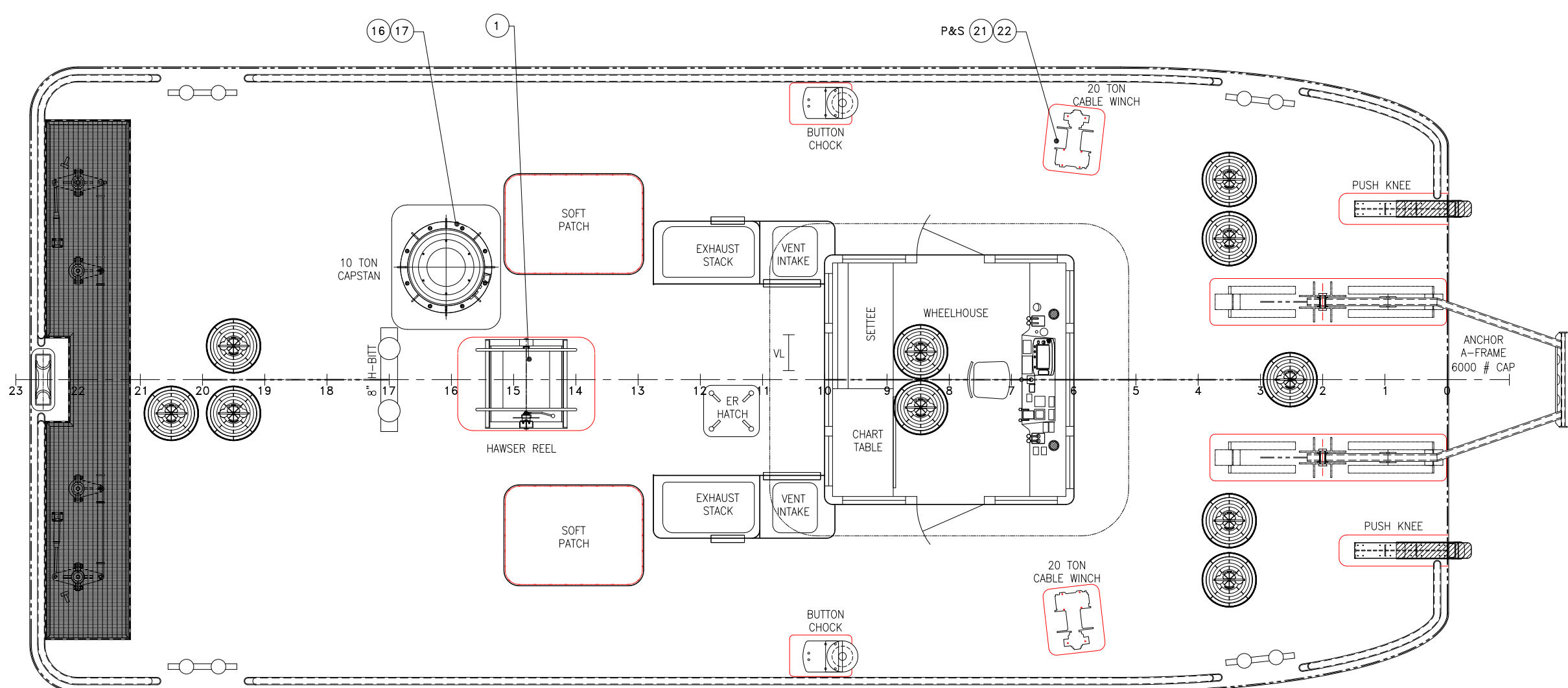
DISC ASSEMBLY



DISC - 1 EACH
MATERIAL: 304 STAINLESS STEEL

HUB - 1 EACH
MATERIAL: 304 STAINLESS STEEL

DETAIL D
BRAKE DISC ASSEMBLY
SCALE: 3"=1' UNLESS OTHERWISE SPECIFIED



MAIN DECK PLAN
SCALE: 1/4"=1'-0"

BILL OF MATERIALS

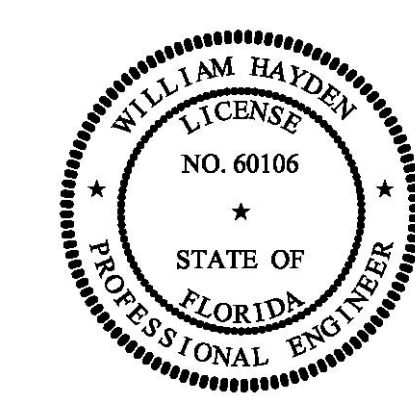
ITEM	QTY.	DESCRIPTION	MANUFACTURER #/MATL.	REMARKS	ITEM	QTY.	DESCRIPTION	MANUFACTURER #/MATL.	REMARKS
1	1	HAWSER REEL ASSEMBLY	SEE DWG		16	1	CAPSTAN FOUNDATION		SEE DWG
2	1	HAWSER REEL	SEE DWG		17	1	CAPSTAN, HORIZONTAL, 5 TON, HYDRAULIC		SEE DWG
3	1	HAWSER REEL FRAME, STBD	SEE DWG		18	8	BOLT, 3/4" x 10 x 2-1/2"	316 STAINLESS STEEL	
4	1	HAWSER REEL FRAME, PORT	SEE DWG		19	8	NUT, W/LOC, 3/4" x 10	316 STAINLESS STEEL	
5	1	1-1/2" OD X 34.75" LONG SHAFT	304 STAINLESS STEEL		20	16	WASHER, FLAT, 3/4"	316 STAINLESS STEEL	
6	2	1-1/2" ID FLANGED SLEEVE BEARING	SAE 462 BRONZE		21	2	20 TON CABLE WINCH FOUNDATION		SEE DWG
7	1	10" BRAKE DISK, 1-1/2" ID HUB, 15# THICK DISK	304 STAINLESS STEEL	SEE DETAIL "D"	22	2	20 TON CABLE WINCH		
8	1	MECH BRKE CALIPER, MECHANICAL, FIXED, FLOATING CALIPER, ALUMINUM	TOOL/MFG MEDIAN	OR EQUAL	23	8	BOLT, 3/4" x 10 x 2-1/4"	316 STAINLESS STEEL	
9	2	1-1/2" DIAMETER LOCKING COLLAR	303 STAINLESS STEEL		24	8	NUT, W/LOC, 3/4" x 10	316 STAINLESS STEEL	
10	1	3/8" X 3/8" X 2-1/4" LG. KEYSOCK	316 STAINLESS STEEL		25	16	WASHER, FLAT, 3/4"	316 STAINLESS STEEL	
11	2	WASHER, FLAT, 1-1/2"	316 STAINLESS STEEL		26	2	GREASE FITTING, 45 DEGREE, 1/8" PTF	303 STAINLESS STEEL	
12	2	MECHANICAL RING, EXTERNAL, 1-1/2" OD.	17-7 STAINLESS STEEL	SEE DWG	27	2	U-BOLT	316 STAINLESS STEEL	SEE DETAIL "E"
13	2	SOCKET, BALL HEAD, PHILLIPS 1/4-20 X 5/8" LG.	316 STAINLESS STEEL	SEE DWG	28	2	NUT, W/LOC	316 STAINLESS STEEL	SEE DETAIL "E"
14	1	WASHER, BALL, 1-1/2" DIA, THK 1-1/2" X 3/8" DP	303 STAINLESS STEEL	SEE DWG	29	2	WASHER, FLAT	316 STAINLESS STEEL	SEE DETAIL "E"
15	1	5/8" X 1 1/2" LG. SS ROUND BAR	304 STAINLESS STEEL		30	2	CLAMP, HAWSER	WELON	SEE DETAIL "E"

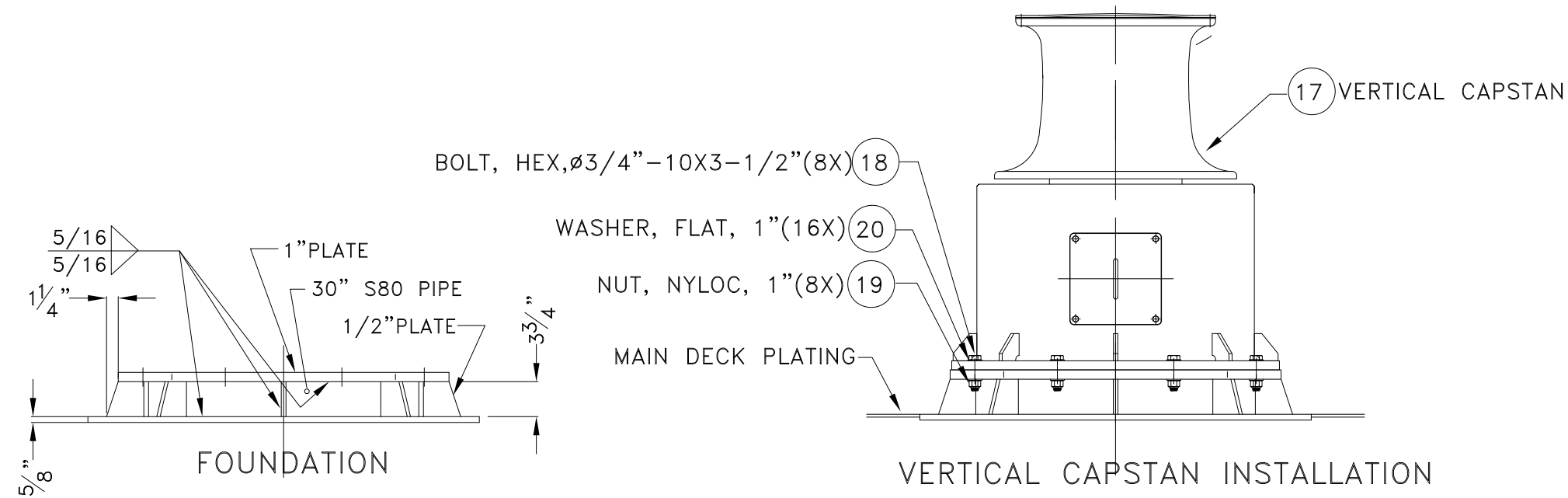
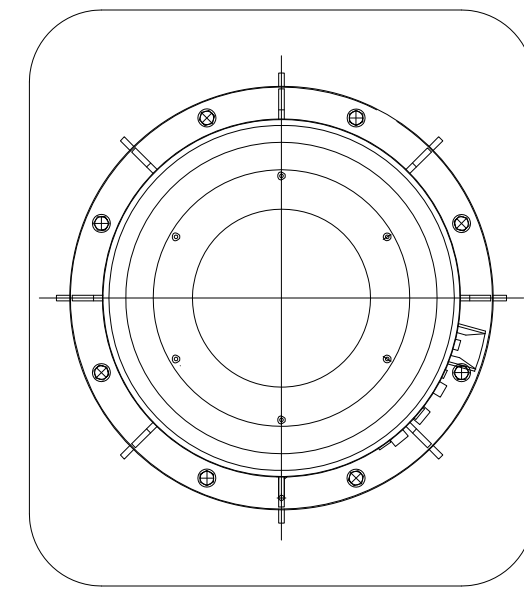
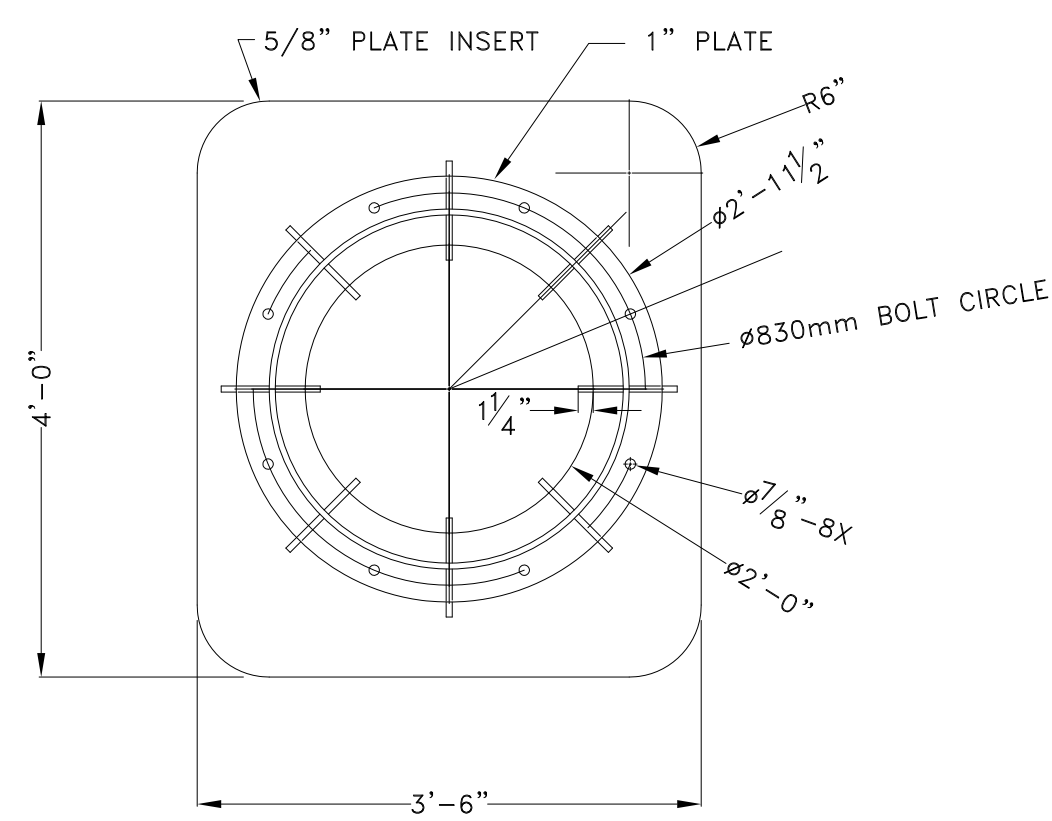
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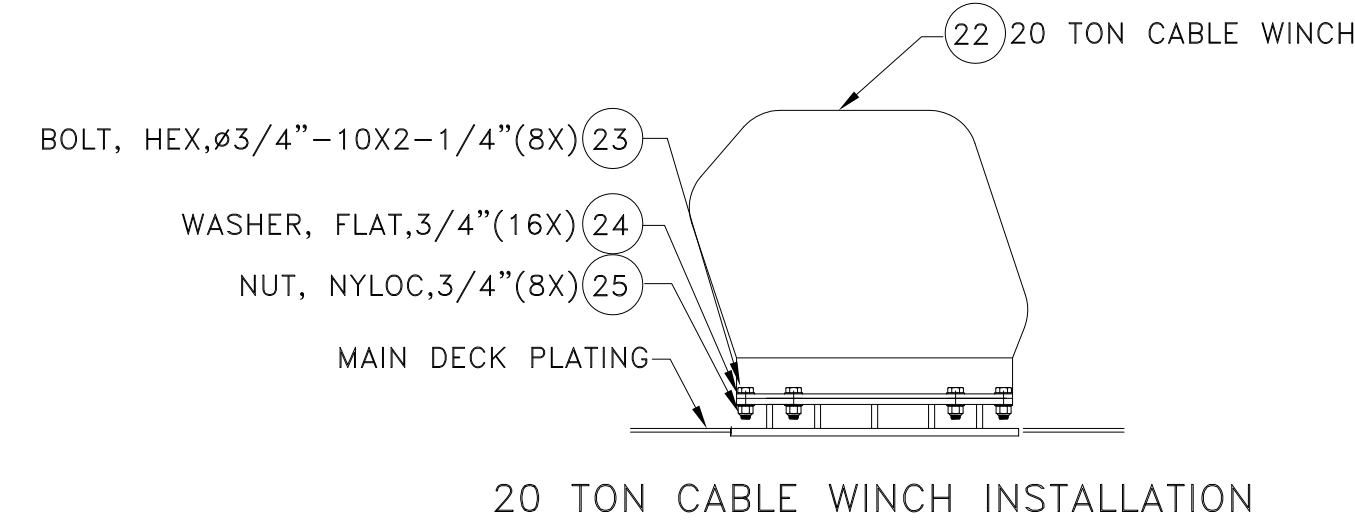
Title: 45.5'x20'x6.5' NCDOT PUSHBOAT
DECK CAPSTAN INSTALLATION & HAWSER REEL DETAILS

Dwg. No. 17-1393-685
 Date: DECEMBER 19, 2018
 Sht. 1 of 2
 App'd By: JAH
 Scale: AS NOTED
 ABS App'l: _____
 USCG App'l: _____

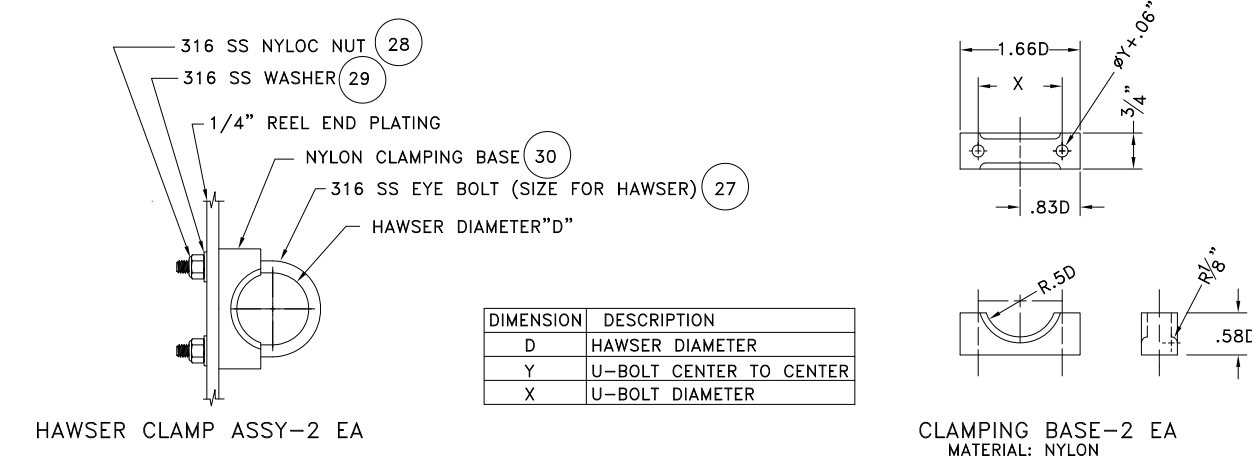
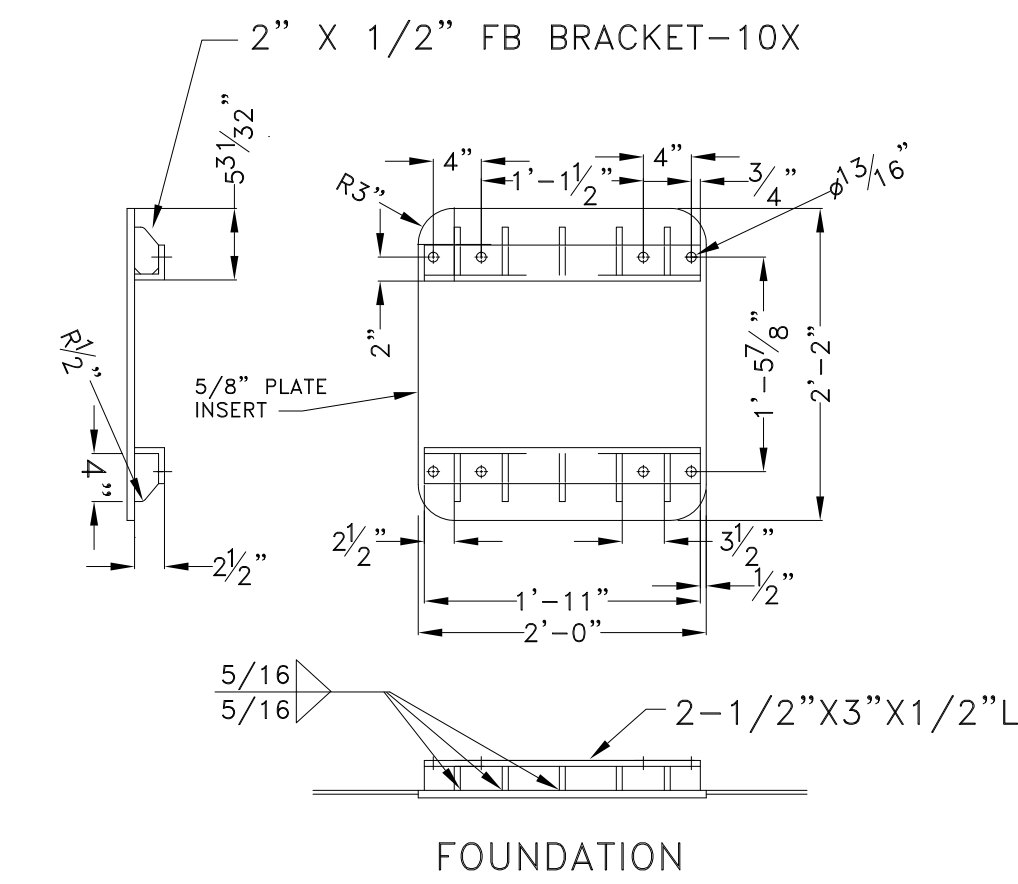




16 CAPSTAN FOUNDATION
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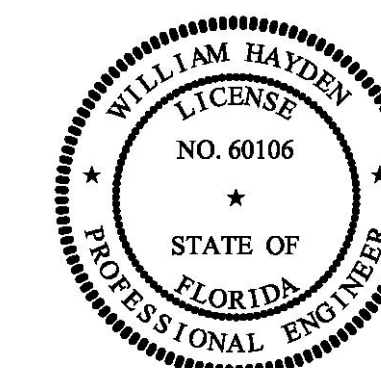


21 20 TON CABLE WINCH FOUNDATION-2EA
 MATERIAL : A36 STEEL & NOTED
 SCALE: 3/4" = 1'



DETAIL E
 HAWSER DEAD END CONNECTION
 SCALE: 3"=1' UNLESS OTHERWISE SPECIFIED

DIMENSION	DESCRIPTION
D	HAWSER DIAMETER
Y	U-BOLT CENTER TO CENTER
X	U-BOLT DIAMETER



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**DECK CAPSTAN INSTALLATION
 & HAWSER REEL DETAILS**

Dwg. No. 17-1393-685
 Art. No. 0
 Sht. 2 of 2

Drawn By: JAH Date: DECEMBER 19, 2018
 Checked By: Date:
 App'd By: Scale: AS NOTED
 ABS App'l: USCG App'l: