COMPOSITE SUBMARINE CAMEL

NAVAL FACILITIES ENGINEERING COMMAND

LIST OF DRAWINGS

SHEET NO.		NAVFAC DWG NO.	TITLE
1	G-001	14019607	COVER SHEET AND LIST OF DRAWINGS
2	G-002	14019608	GENERAL ARRANGEMENT
3	S-001	14019609	NOTES AND TYPICAL DETAILS
4	S-002	14019610	LIFTING/LOWERING PROCEDURES
5	S-501	14019611	PLAN AND ELEVATIONS
6	S-502	14019612	SECTIONS
7	S-503	14019613	SECTIONS
8	S-504	14019614	SECTIONS
9	S-505	14019615	DETAILS

SYM	DESCRIPTION	DATE	APPR
1	MISCELLANEOUS MODIFICATIONS	8/2013	

NAVFAC

Composite Advantage

WR&A

401 North Carolina Street, Baltimore, MD 21224
WHITMAN, REQUARDT & ASSOCIATES, LLP

APPROVED

R. B. Fritz

FOR COMPANY NAVFAC 11/21/2014

ACTIVITY

DESIGNED BY MHL DATE

CCS MHL CHK MHL CHK JBS

PROJECT

HEADER NUMBER

CHIEF CALCULATOR

FIRE PROTECTION

DEPARTMENT OF THE NAVY

NAVAL FACILITIES ENGINEERING COMMAND

NAVFAC LANT

COMPOSITE SUBMARINE CAMEL

COVER SHEET AND LIST OF DRAWINGS

SCALE AS NOTED

CONTRACT NO.

N66540-09-C-0029

NAVFAC DRAWING NO.

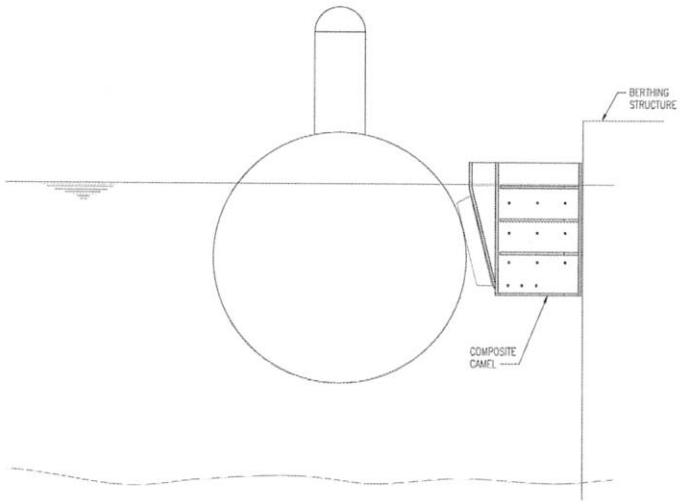
14019607

SHEET 1 OF 9

G-001

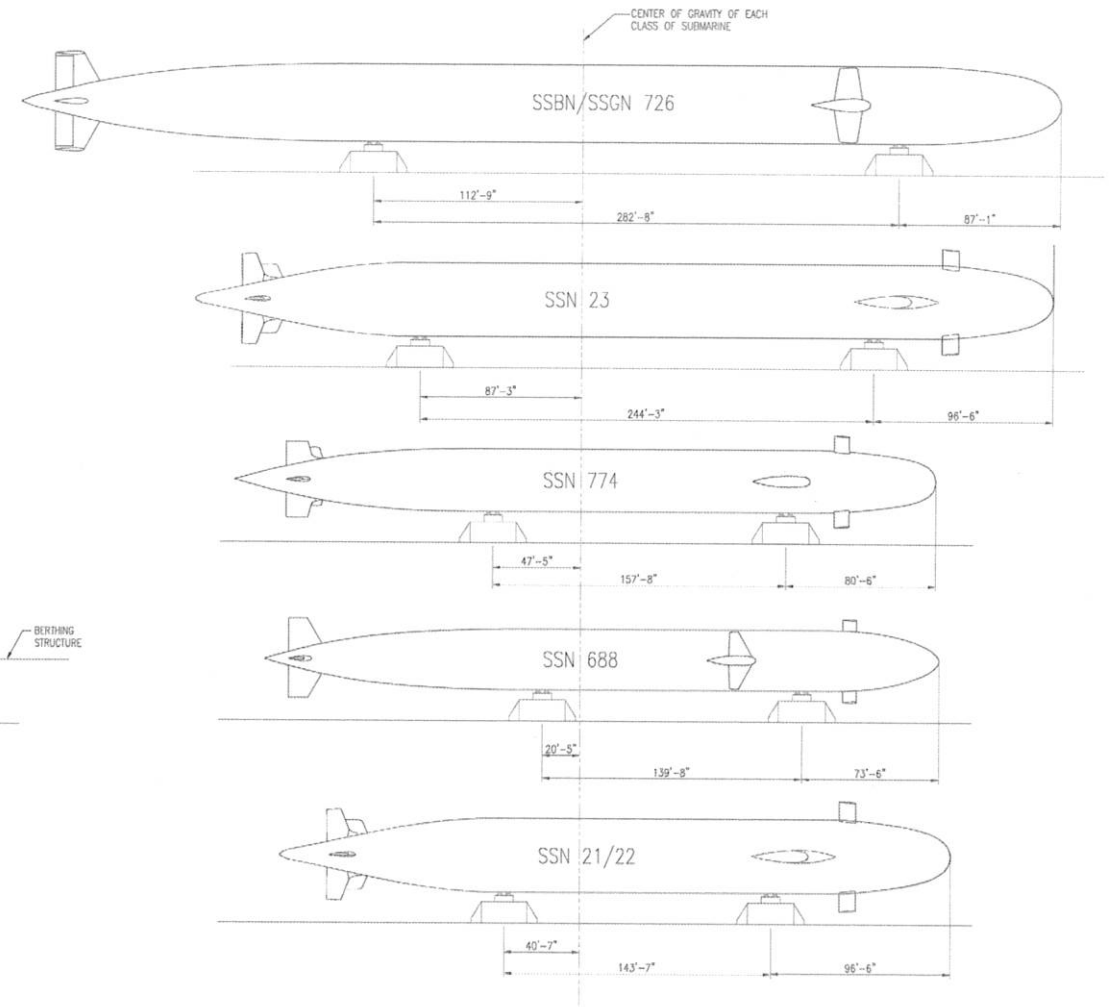
DRAWTOWN REVISION 18 MARCH 2008

SUBMARINE	DISTANCE BOW TO FORWARD PARALLEL MID-BODY	DISTANCE BOW TO AFT PARALLEL MID-BODY	DISTANCE BOW TO CENTER OF GRAVITY
SSBN/SSGN 726	74' – 7"	382' – 3"	257' – 0"
SSN 23	57' – 6 ½"	353' – 2 1/2"	253' – 5 1/2"
SSN 774	68' – 0"	250' – 8"	190' – 9"
SSN 688	61' – 0"	225' – 8"	192' – 9 1/2"
SSN 21/22	57' – 6 ½"	252' – 7"	199' – 6"



ELEVATION - CAMEL GENERAL ARRANGEMENT

SCALE: 1/8" = 1'-0"



PLAN - CAMEL GENERAL ARRANGEMENT

SCALE: 1/32" = 1'-0"

NOTE: THE ASSUMED CAMEL BERTHING LAYOUT, AS DIMENSIONED IN THE CAMEL GENERAL ARRANGEMENT, LOCATES THE OUTSIDE CORNER OF THE MAIN CAMEL BODY AT THE END OF THE PARALLEL MIDBODY OF EACH SUBMARINE.

GRAPHIC SCALES

0 4' 8' 16'
SCALE: 1/8" = 1'-0"

0 16' 32' 64'
SCALE: 1/32" = 1'-0"

1 MISCELLANEOUS MODIFICATIONS 9/2013

Composite Advantage

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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC LANT

COMPOSITE SUBMARINE CAMEL

GENERAL ARRANGEMENT

AS NOTED

N66540-09-C-0029

14019608

G-002

GENERAL NOTES

1. THE CAMEL SUPPLIER IS RESPONSIBLE FOR PLACING AND ADJUSTING BALLAST PLATES AS INDICATED UNDER "INITIAL INSTALLATION NOTES."
2. CAMELS ARE DESIGNED FOR EXTREME LOADING CONDITIONS RESULTING FROM THE IMPACT OF A BERTHING SUBMARINE. THE SUBMARINE IS ASSUMED TO INITIALLY IMPACT ONLY ONE (1) CAMEL.
3. CALCULATED DESIGN WEIGHT OF ONE CAMEL IS APPROXIMATELY 105,000 POUNDS INCLUDING BALLAST, WITHOUT WATER. CALCULATED DESIGN WEIGHT OF CAMEL WITHOUT BALLAST IS APPROXIMATELY 70,000 POUNDS. BASED ON THE AS-BUILT WEIGHT OF THE CAMEL (WITHOUT BALLAST) THE AMOUNT AND DISTRIBUTION OF BALLAST MAY VARY. IF THE AS-BUILT WEIGHT OF THE CAMEL (WITHOUT BALLAST) IS DIFFERENT THAN 70,000 POUNDS, THE CAMEL SUPPLIER SHALL BE RESPONSIBLE FOR PROVIDING ADDITIONAL BALLAST AS REQUIRED SUCH THAT THE SPECIFIED FREEBOARD, TRIM, AND STABILITY ARE MAINTAINED.
4. ALL DESIGN DRAWINGS, SHOP DRAWINGS, CALCULATIONS, MATERIAL LISTS, AND ANY OTHER DOCUMENTS USED IN DESIGN, FABRICATION, OR INSTALLATION OF THE CAMELS SHALL BECOME THE PROPERTY OF THE GOVERNMENT.
5. CAMELS SHALL BE COMPLETELY FLOODED WHEN SUBMERGED. FLOODING/DRAINAGE AND AIR EQUALIZATION HOLES SHALL ONLY BE CAPPED ONCE FLOODING OF CAMEL HAS BEEN COMPLETED AFTER LOWERING CAMEL IN THE WATER.
6. TOW/MOVE CAMEL IN WATER USING AT LEAST BOTH CLEATS OR 2 OF THE 4 LIFTING BARS.

DESIGN PARAMETERS

1. DESIGN PARAMETERS OF THE COMPOSITE SUBMARINE CAMELS HAVE BEEN ESTABLISHED BASED ON THE FOLLOWING CLASSES OF SUBMARINES:
   - 1.1. LOS ANGELES CLASS (SSN 688)
   - 1.2. VIRGINIA CLASS (SSN 774)
   - 1.3. SEAWOLF CLASS (SSN 21/22)
   - 1.4. USS JIMMY CARTER (SSN 23) (MODIFIED SEAWOLF CLASS)
   - 1.5. OHIO CLASS (SSBN 730)
   - 1.6. (CONVERTED) OHIO CLASS (SSGN 726)
2. VESSEL CHARACTERISTICS

SUBMARINE	SSN 688	SSN 774	SSN 21/22	SSN 23	SSBN/SSGN 726
LENGTH (FT)	360	377	353	453	560
BEAM (FT)	33	34	40	40	42
DISP. (LT)	6237	6958	8096	10460	16783

3. DESIGN LOADS –
   - 3.1. SUBMARINE BERTHING:
     309 FT-KIP DESIGN ENERGY (INCLUDES 1.5 ACCIDENTAL FACTOR) FROM SSGN 726 AT 0.4 FT/SEC BERTHING VELOCITY NORMAL TO CAMEL. ENERGY IS ABSORBED BY ARCH RUBBER FENDERS.
   - 3.2. MOORING LOAD ON CLEATS: 10 KIPS PER CLEAT (HORIZONTAL)
     (ASSUME 2 CLEATS USED TO MOOR CAMEL TO BERTH)
   - 3.3. NON-VESSEL LOADING (SIMULTANEOUSLY APPLIED):
     LIVE LOAD ON TOP OF CAMEL: 50 PSF
     CONCENTRATED LOAD ALONG TOP PERIMETER OF CAMEL: 500 LB

CODES AND STANDARDS

1. UFC 4-151-10, "GENERAL CRITERIA FOR WATERFRONT CONSTRUCTION."
2. UFC 4-152-01, "DESIGN: PIERS AND WHARVES"
3. UFC 4-159-03, "DESIGN: MOORINGS"
4. TR-6064-OCN "BERTHING GUIDELINES FOR SUBMARINES"
5. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) "MANUAL OF STEEL CONSTRUCTION" 13TH EDITION.

COMPOSITE SANDWICH PANEL NOTES

1. COMPOSITE SANDWICH PANELS SHALL HAVE THE MINIMUM MATERIAL PROPERTIES AS SPECIFIED IN SPECIFICATION SECTION 06 90 00.
2. THE OVERALL THICKNESS OF THE COMPOSITE PANELS SHALL BE THE THICKNESS OF EACH FACE PLUS 3.5 INCH THICKNESS OF CORE.
3. THICKNESS OF FRP FACES OF PANEL SHALL BE NOMINAL 0.3 INCHES EACH FACE.
4. ALL EDGES AND OPENINGS IN PANELS SHALL BE WRAPPED WITH FACE LAMINATE MATERIAL TO CREATE A CONTINUOUS AND SMOOTH EDGE WITH NO CORE MATERIAL EXPOSED.
5. COLOR OF THE PANELS AND EXTERIOR POLYMER COATING SHALL BE YELLOW, OR AS INDICATED BY THE GOVERNMENT. PANELS SHALL NOT BE PAINTED.

CONCRETE NOTES

1. PROVIDE CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS.
2. DETAIL AND CONSTRUCT CONCRETE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE ACI 301, "SPECIFICATION FOR STRUCTURAL CONCRETE."

ADHESIVE NOTES

1. METHYL METHACRYLATE (MMA) ADHESIVE SHALL BE USED TO CONNECT FRP SHAPES AND PVC PIPES AND FITTINGS TO THE COMPOSITE PANELS.
2. CURED MMA ADHESIVE SHALL HAVE A MINIMUM TENSILE STRENGTH OF 2,500 PSI; A MINIMUM SHEAR AND BONDING STRENGTH OF 1,000 PSI.
3. BONDLINE SHALL HAVE MINIMUM THICKNESS OF 0.030 INCH AND MINIMUM COVERAGE AREA OF 75%.

STEEL NOTES:

1. FABRICATE AND ERECT STEEL CONFORMING TO THE REQUIREMENTS OF AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), "MANUAL OF STEEL CONSTRUCTION" 13TH ED.
2. SUBMIT INSTALLATION PLANS AND SHOP DETAILS AND RECEIVE APPROVAL BEFORE PROCEEDING WITH FABRICATION.
3. PROVIDE ASTM A 36 STEEL PLATES AND BARS.
4. STEEL AND STAINLESS STEEL (SS) BOLTS, NUTS, AND WASHERS:
   - 4.1. PROVIDE ASTM A 307 STEEL FASTENERS.
   - 4.2. PROVIDE ASTM A 193 AND ASTM A 194 TYPE 316 SS FASTENERS.
5. PROVIDE ASTM A 307 STEEL RODS.
6. HOT DIP GALVANIZE IN ACCORDANCE WITH ASTM A 123.

FRP ANGLE NOTES:

1. FABRICATE ANGLES USING VACUUM INFUSION PROCESS.
   - 1.1. FIBERGLASS CONTENT SHALL BE 370 TO 380 OZ/SQ.YD.
   - 1.2. FIBERS IN 0 DEGREE DIRECTION (LENGTH OF ANGLE) SHALL BE 16-20%.
   - 1.3. FIBERS IN +45 DEGREE DIRECTION SHALL BE 23-28%.
   - 1.4. FIBERS IN -45 DEGREE DIRECTION SHALL BE 23-28%.
   - 1.5. FIBERS IN 90 DEGREE DIRECTION SHALL BE 29-33%.

FLOTATION FOAM NOTES

1. FLOTATION FOAM SHALL BE A RIGID, CLOSED CELL FOAM WHICH WILL RESIST THE ABSORPTION OF WATER.
2. DENSITY OF FOAM SHALL BE 2 PCF.
3. FOAM SHALL ENTIRELY FILL THE AREA OF THE CAMEL AS INDICATED ON THE DRAWINGS.

ARCH RUBBER FENDER NOTES

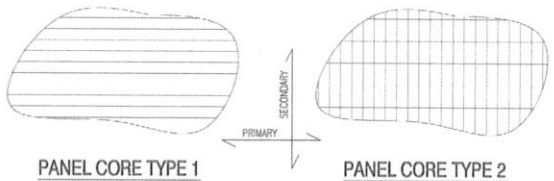
1. ARCH RUBBER FENDER SIZE SHALL BE AS SHOWN ON DRAWINGS.
2. ARCH RUBBER FENDERS SHALL HAVE THE CAPACITY TO ABSORB 35,000 FOOT-POUNDS OF ENERGY ±10% PER FOOT OF FENDER LENGTH WHEN 50% COMPRESSED, WITH A CORRESPONDING REACTION LOAD OF NOT MORE THAN 31,500 POUNDS ±10% PER FOOT OF FENDER LENGTH.
3. RUBBER SHALL BE IN ACCORDANCE WITH ASTM D 2000.
4. IF ARCH RUBBER FENDERS CANNOT BE PROCURED AT THE EXACT LENGTH AS SHOWN HEREIN, PROVIDE JOINT IN FENDERS AT A POINT APPROXIMATELY ½ OF THE TOTAL LENGTH FROM THE BOTTOM OF THE FENDERS.

INITIAL INSTALLATION NOTES:

1. FLOTATION CRITERIA FOR ACCEPTANCE BY THE CONTRACTING OFFICER SHALL BE AS FOLLOWS:
   - 1.1. LIST/TRIM SHALL BE NO GREATER THAN 1 DEGREE FROM HORIZONTAL (2" RISE PER 10'-0" LENGTH).
   - 1.2. FREEBOARD SHALL BE 3'-0" BELOW TOP OF CAMEL ±2.5", AS INDICATED BY THE 5" STRIPE AROUND THE CAMEL. THE WATERLINE SHALL FALL COMPLETELY WITHIN THE 5" STRIP, TAKING INTO ACCOUNT LIST/TRIM.
2. STEEL BALLAST PLATES SHALL NOT BE INSTALLED UNTIL THE CAMELS ARE DELIVERED TO THE SITE.
3. AFTER INITIAL PLACEMENT IN WATER, THE FLOTATION OF THE CAMEL WILL BE OBSERVED BY THE CONTRACTING OFFICER FOR ACCEPTANCE.
4. CAMEL SHALL BE REMOVED FROM THE WATER FOR ADJUSTMENT OF STEEL BALLAST PLATES AS REQUIRED. AFTER ADJUSTMENT OF STEEL PLATES, PLACE CAMEL BACK IN WATER FOR OBSERVATION. ASSUME THAT THIS PROCEDURE WILL BE REPEATED UP TO 3 TIMES FOR THE FIRST CAMEL.
5. INSTALL THE TOP PANEL AFTER THE FLOTATION CRITERIA HAS BEEN MET AND ACCEPTED BY THE CONTRACTING OFFICER.
6. CAP ALL FLOODING/DRAINAGE HOLES AND AIR EQUALIZATION HOLES AFTER CAMEL IS PLACED IN WATER.

INSPECTION AND ACCEPTANCE

1. ADHESIVE BONDLINE CHECKED FOR MINIMUM THICKNESS AND AREA.
2. COATING CHECKED FOR FLAKING, BLISTERING, COLOR, AND MINIMUM THICKNESS.
3. SURFACES EXAMINED FOR SHARP EDGES AND BURRS.
4. SUB-ASSEMBLY CHECKED FOR DIMENSIONS.

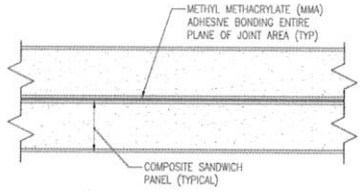


PANEL CORE TYPE 1

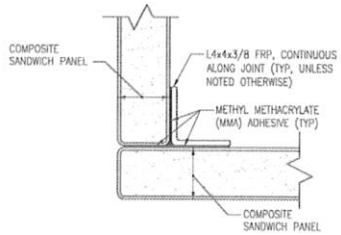
WEBS RUN IN "PRIMARY" OR "0 DEGREE" DIRECTION. DIRECTION PERPENDICULAR TO WEBS IS "SECONDARY" OR "90 DEGREE" DIRECTION.

PANEL CORE TYPE 2

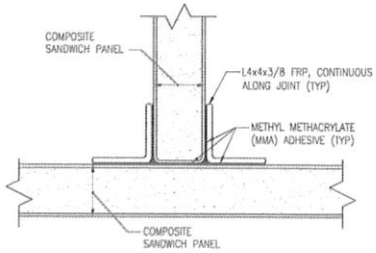
WEBS SPACED FARTHER APART RUN IN "PRIMARY" OR "0 DEGREE" DIRECTION. WEBS SPACED CLOSER TOGETHER RUN IN "SECONDARY" OR "90 DEGREE" DIRECTION.



TYPICAL COMPOSITE PANEL PARALLEL JOINTS



CORNER



MID-PANEL

TYPICAL COMPOSITE PANEL PERPENDICULAR JOINTS

NO.	DESCRIPTION	DATE
1	MISCELLANEOUS MODIFICATIONS	8/2013

NAVFAC

Composite Advantage

WR&A
801 South Caroline Street, Baltimore, MD 21231
WISEMAN, RICHARDOT & ASSOCIATES, LLP

DESIGNED BY: RBW DATE: 11/21/2012
DRAWN BY: MHL CHK: MHL JOS
CHECKED BY:
QUALITY MGR:
PROJECT MGR:

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC LANT

COMPOSITE SUBMARINE CAMEL
NOTES AND TYPICAL DETAILS

SCALE: AS NOTED
CONTRACT NO.
CONTR. COMPL NO. N66540-09-C-0029
DRAWING NUMBER: 14019609
SHEET 3 OF 9
S-001

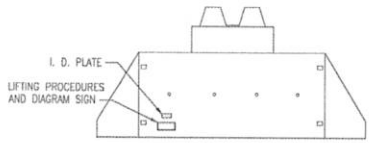
CAMEL LIFTING NOTES

LOADS:

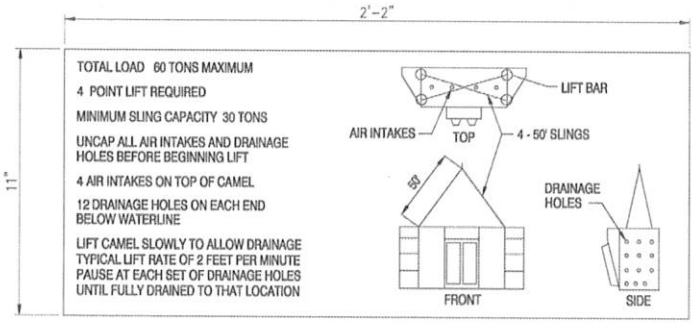
1. "DRY" WEIGHT OF CAMEL (WITHOUT ANY WATER INSIDE): 105,000 POUNDS.
2. "CROSS" WEIGHT OF CAMEL (FILLED WITH WATER): 335,000 POUNDS.
3. MAXIMUM LIFT IF PROPER PROCEDURES ARE FOLLOWED (SEE BELOW): 120,000 POUNDS.

PROCEDURES FOR LOWERING/LIFTING CAMEL INTO/OUT OF THE WATER:

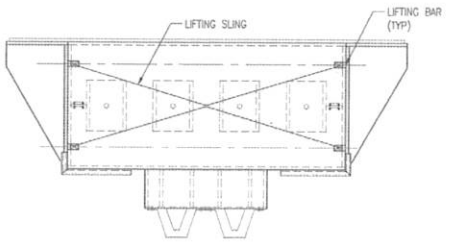
1. THESE NOTES APPLY TO LIFTING/LOWERING THE CAMEL INTO THE WATER DURING INITIAL INSTALLATION AND AFTER INITIAL INSTALLATION HAS TAKEN PLACE.
2. LOWERING THE CAMEL INTO THE WATER:
   - 2.1. CAMEL MUST BE LIFTED USING ALL 4 BUILT IN LIFTING LOCATIONS.
   - 2.2. PRIOR TO LOWERING THE CAMEL INTO THE WATER, ALL PLUGS FOR FLOODING/DRAINAGE HOLES AND ALL PLUGS FOR AIR EQUALIZATION HOLES ON THE CAMEL MUST BE OPENED.
   - 2.3. 4-50' LONG LIFTING SLINGS, ARRANGED DIAGONALLY, SHALL BE SECURED AND ATTACHED TO CRANE HOIST AT HEIGHT AS INDICATED.
   - 2.4. THE CAMEL SHALL BE LOWERED INTO THE WATER SLOWLY SUCH THAT THE GENERAL ORIENTATION OF THE CAMEL SHALL BE MAINTAINED WITH THE FLOTATION FOAM LOCATED "UP" AND THE BALLAST LOCATED "DOWN" FOR THE ENTIRE DURATION WHILE HOISTING THE CAMEL FROM THE BULKHEAD/PIER INTO THE WATER.
   - 2.5. CAP ALL FLOODING/DRAINAGE HOLES AND AIR EQUALIZATION HOLES.
3. LIFTING THE CAMEL OUT OF THE WATER:
   - 3.1. CAMEL MUST BE LIFTED USING ALL 4 BUILT IN LIFTING LOCATIONS.
   - 3.2. PRIOR TO LIFTING THE CAMEL OUT OF THE WATER, ALL PLUGS FOR FLOODING/DRAINAGE HOLES AND ALL PLUGS FOR AIR EQUALIZATION HOLES ON THE CAMEL MUST BE OPENED.
   - 3.3. 4-50' LONG LIFTING SLINGS, ARRANGED DIAGONALLY, SHALL BE SECURED AND ATTACHED TO CRANE HOIST AT HEIGHT AS INDICATED.
   - 3.4. THE CAMEL SHALL BE LIFTED OUT OF THE WATER SLOWLY TO ALLOW DRAINAGE DURING THE LIFT. (THE LOAD ON THE CRANE SHOULD NOT EXCEED 60 TONS.) TYPICAL LIFT RATE OF 2 FEET PER MINUTE MAXIMUM. PAUSE AT EACH SET OF DRAINAGE HOLES TO ALLOW DRAINAGE UP TO THAT LOCATION.



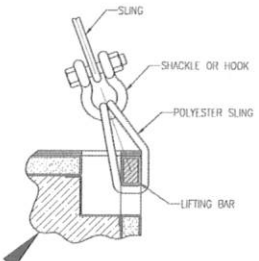
PLACEMENT OF SIGNS

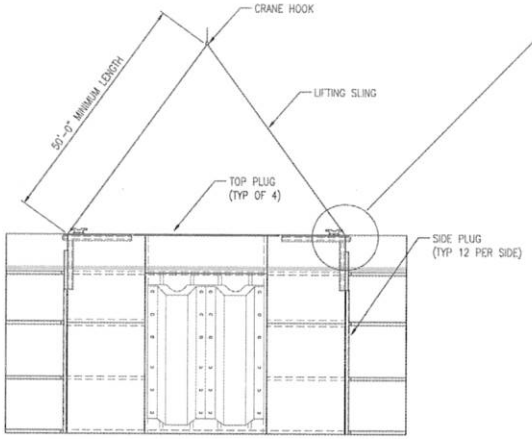


LIFTING PROCEDURES AND DIAGRAM SIGN

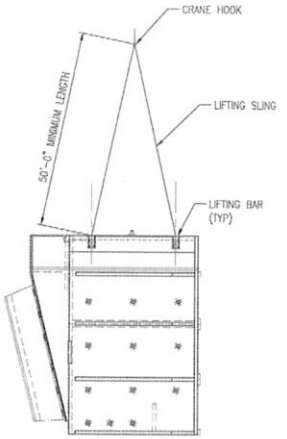


UPPER PLAN



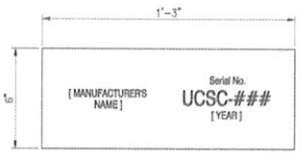


FRONT ELEVATION



SIDE ELEVATION

CAMEL LIFTING SCHEMATICS



I. D. PLATE

NOTES: 1. SERIAL NO. SHALL BE "UCSC-###" W/NUMBERS PROVIDED BY CONTRACTING OFFICER.
2. ATTACH SIGNS IN A PERMANENT AND WEATHERPROOF MANNER.

GRAPHIC SCALE
0 2' 4' 6' 10'
SCALE: 3/16" = 1'-0"

DESIGNED	MRL
DRAWN	MRL
CHECKED	JBS

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC LANT

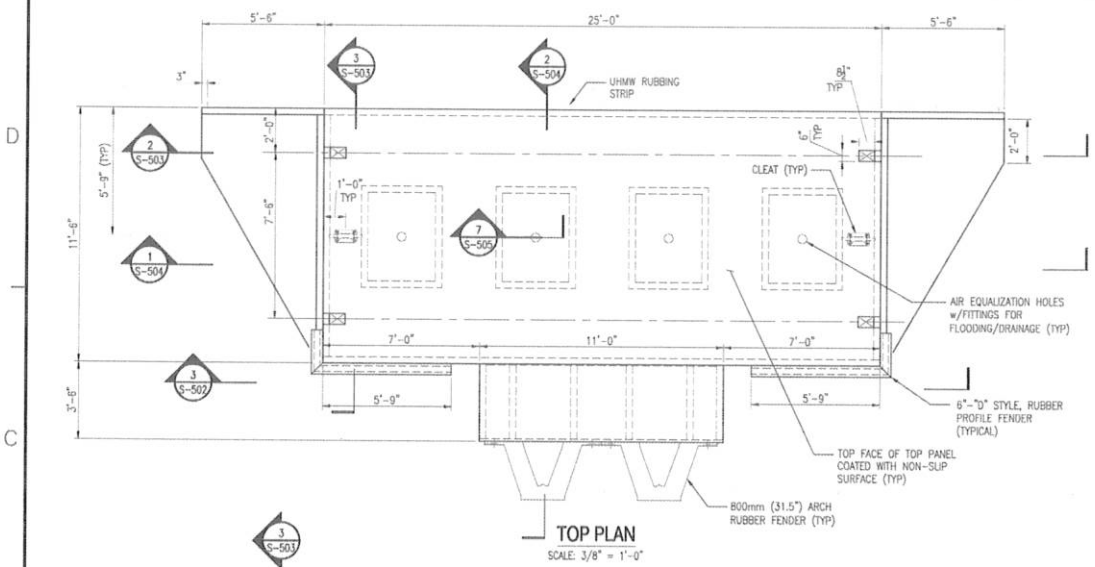
COMPOSITE SUBMARINE CAMEL
LIFTING/LOWERING PROCEDURES

SCALE	AS NOTED
PROJECT NO.	
CONTR. COMPL. NO.	N68540-09-C-0029
FINAL ACCEPTANCE NO.	14019610
SHEET	4 OF 8

S-002

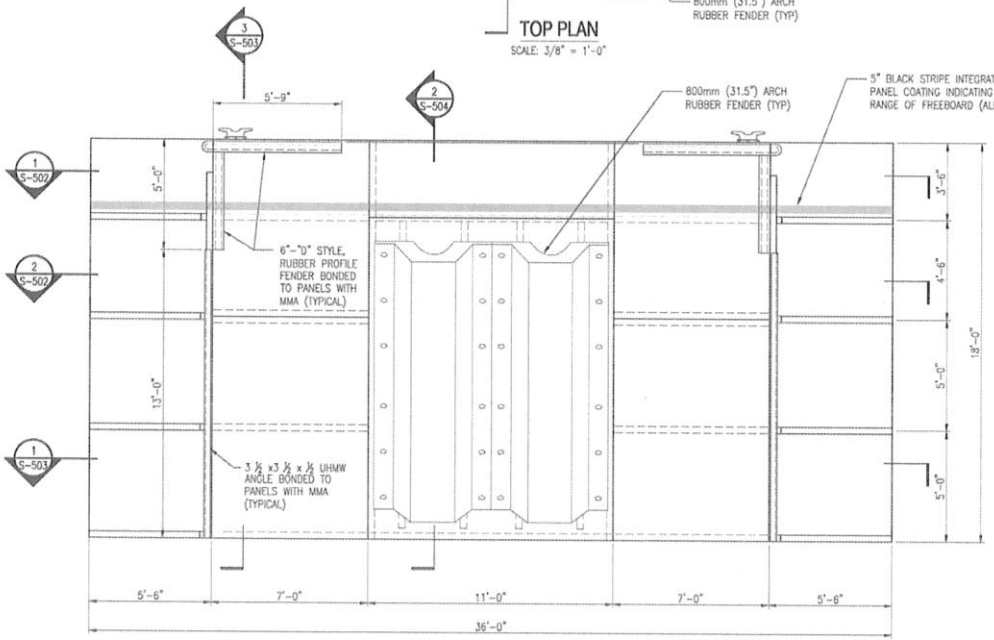
DATE	DESCRIPTION	BY
8/2013	MISCELLANEOUS MODIFICATIONS	

Composite Advantage
WR&A



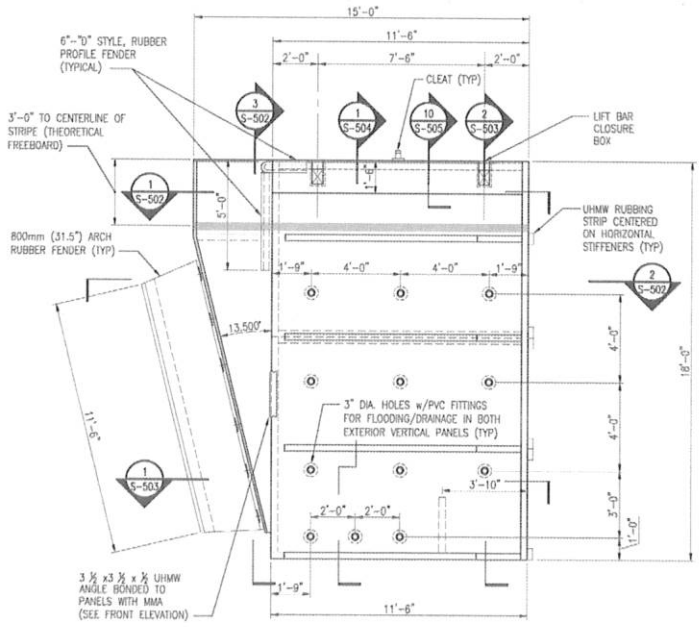
TOP PLAN

SCALE: 3/8" = 1'-0"



FRONT ELEVATION

SCALE: 3/8" = 1'-0"



SIDE ELEVATION

SCALE: 3/8" = 1'-0"

GRAPHIC SCALE

0 1' 2' 3' 5'

SCALE: 3/8" = 1'-0"

DN	DESCRIPTION	DATE	APPR
1	MISCELLANEOUS MODIFICATIONS	8/2013	

NAVFAC

Composite Advantage

WR&A

Wiltshire, Recknagel & Associates, LLP

DES MHL DRW MHL CHK JBS

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND

NAVFAC LANT

COMPOSITE SUBMARINE CAMEL

PLAN AND ELEVATIONS

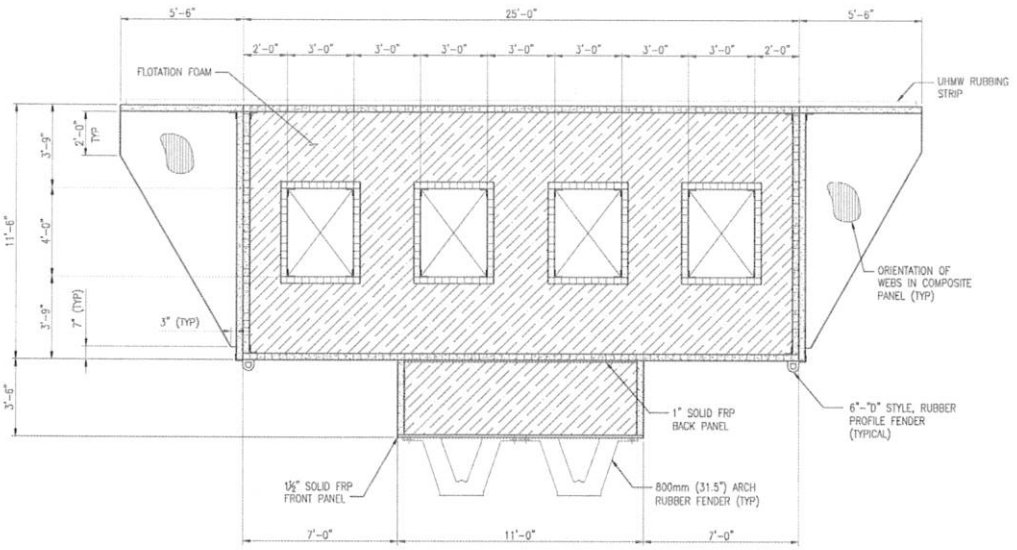
SCALE AS NOTED

N66540-09-C-0029

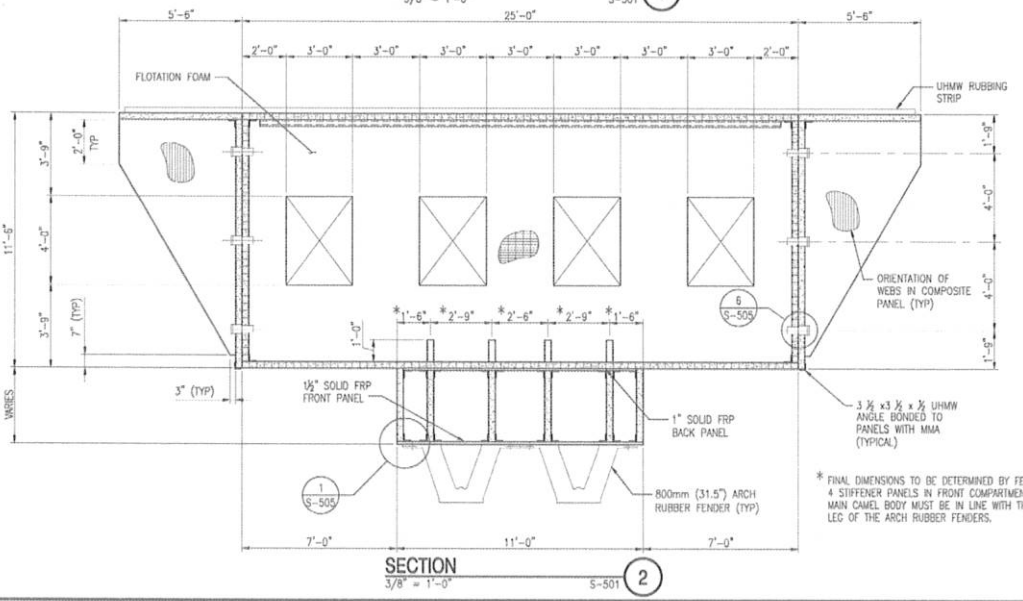
14019611

SHEET 5 OF 9

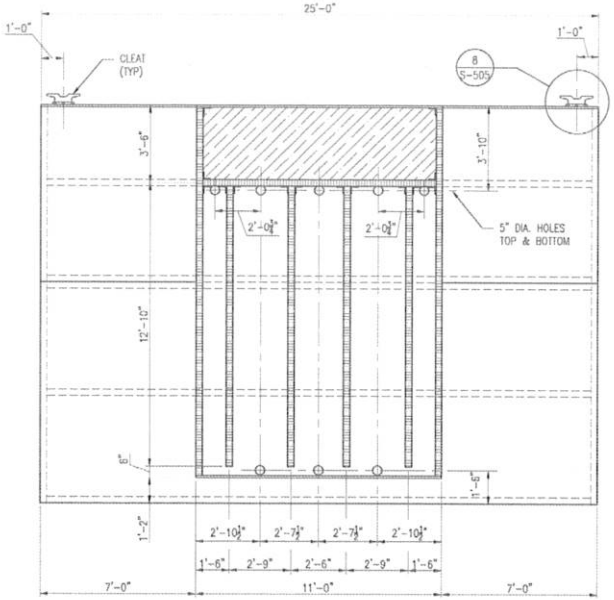
S-501



SECTION 1
3/8" = 1'-0" S-501



SECTION 2
3/8" = 1'-0" S-501



SECTION 3
3/8" = 1'-0" S-501

* FINAL DIMENSIONS TO BE DETERMINED BY FENDERS PURCHASED. 4 STIFFENER PANELS IN FRONT COMPARTMENT AND GUSSETS IN MAIN CAMEL BODY MUST BE IN LINE WITH THE CENTERS OF EACH LEG OF THE ARCH RUBBER FENDERS.

GRAPHIC SCALE
0 1' 2' 3' 5'
SCALE: 3/8" = 1'-0"

1	MISCELLANEOUS MODIFICATIONS	8/2013	
SYM	DESCRIPTION	DATE	APPR

NAVFAC

Composite Advantage

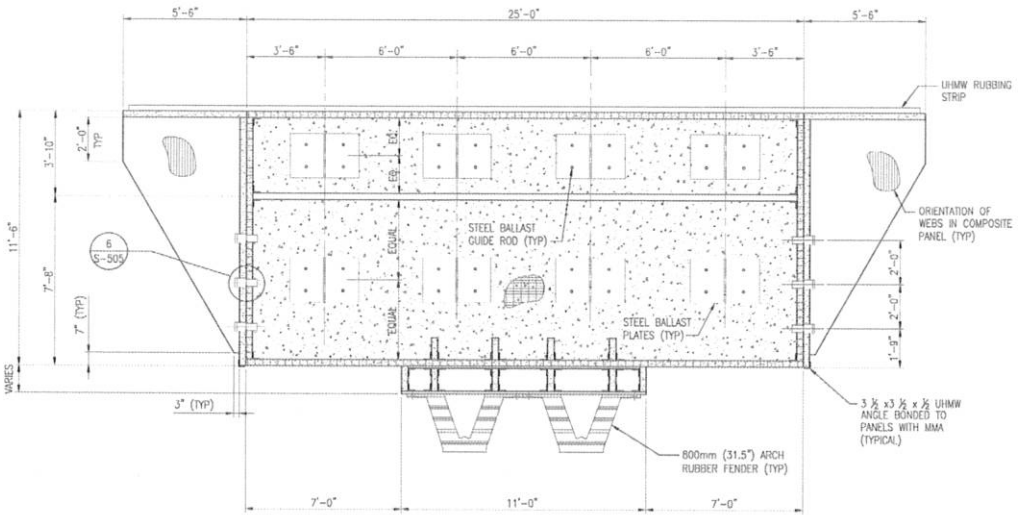
WR&A
801 North Carolina Street, Baltimore, MD 21205
WHITMAN, REQUARDT & ASSOCIATES, LLP

APPROVED
R. B. Fetter
FOR COMMANDER NAVFAC 11/01/2014

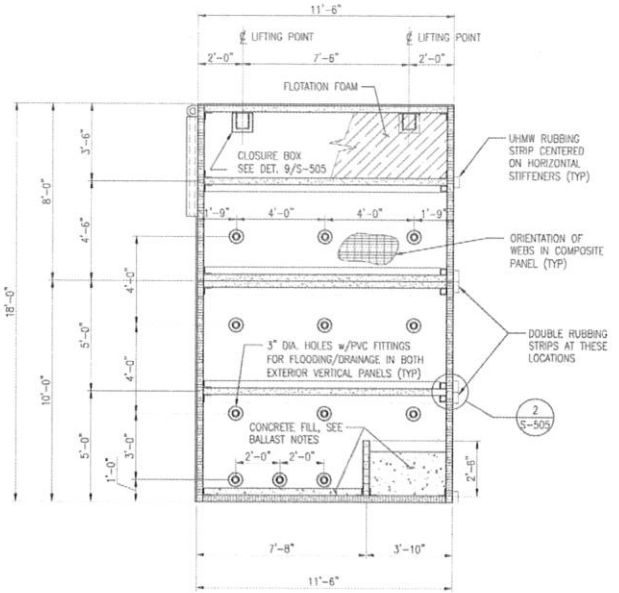
SUBMITTED BY: DATE
DES. MHL DFN. MHL CHK. JBS
FACTOR
NUMBER SERVICES
CHIEF ENG/PROJ
FIRE PROTECTION

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC LANT
COMPOSITE SUBMARINE CAMEL
SECTIONS

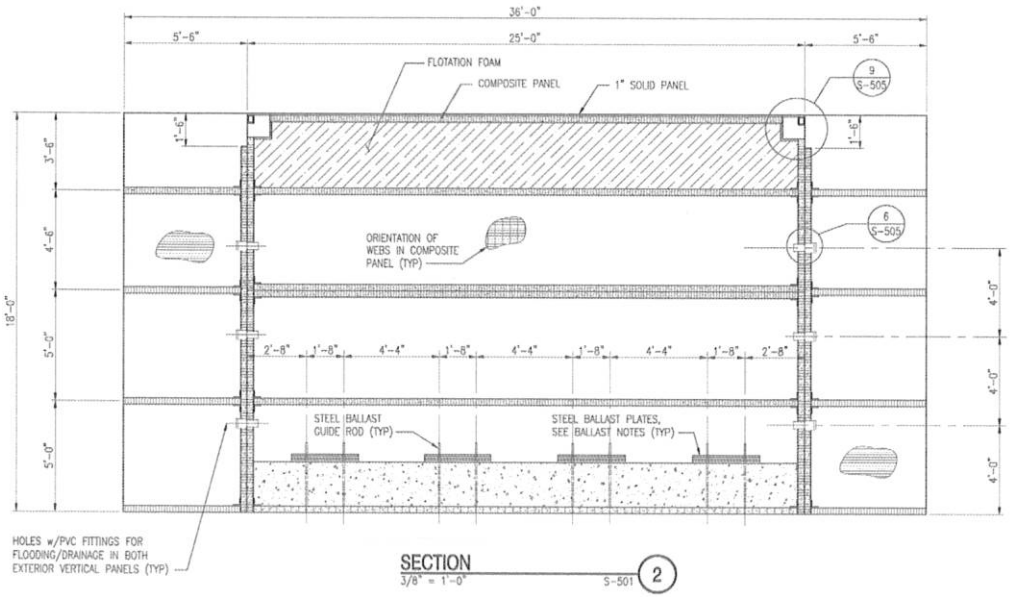
SCALE: AS NOTED
CONTRACT NO.
N66540-09-C-0029
NAVFAC LEGEND NO.
14019612
SHEET 6 OF 9
S-502



SECTION 1
3/8" = 1'-0" S-501



SECTION 3
3/8" = 1'-0" S-501



SECTION 2
3/8" = 1'-0" S-501

BALLAST NOTES:

1. CONTRACTOR SHALL DETERMINE THE REQUIRED DEPTH OF CONCRETE BALLAST PRIOR TO POURING CONCRETE.
2. BASED ON THE ESTIMATED WEIGHT OF THE CAMEL, CONCRETE DEPTH IN THE FORWARD COMPARTMENT MAY VARY FROM 0 TO 4 INCHES, AND CONCRETE IN THE AFT COMPARTMENT MAY VARY FROM 24 TO 30 INCHES.
3. NUMBER OF STEEL BALLAST PLATES PER STACK WILL VARY DEPENDING ON THE AS-BUILT WEIGHT OF THE CAMEL. FOR BIDDING PURPOSES, CONTRACTOR SHALL ASSUME 11 PLATES PER STACK WITH A CONTINGENCY OF AN ADDITIONAL 6 PLATES PER STACK FOR FINAL FREEBOARD/TRIM ADJUSTMENTS AT INITIAL CAMEL INSTALLATION.

GRAPHIC SCALE
0 1' 2' 3' 4'
SCALE: 3/8" = 1'-0"

NO.	DESCRIPTION	DWN	DATE
1	MISCELLANEOUS MODIFICATIONS		8/2013

NAVFAC

Composite Advantage

WR&A
836 Sixth Gretna Road, Baltimore, MD 21224
WHITMAN, REQUARDT & ASSOCIATES, LLP

DESIGNED R. B. Pfeffer 11/21/2013
DETAILED
CHECKED MHL
QUALITY MHL
MANAGER JBS

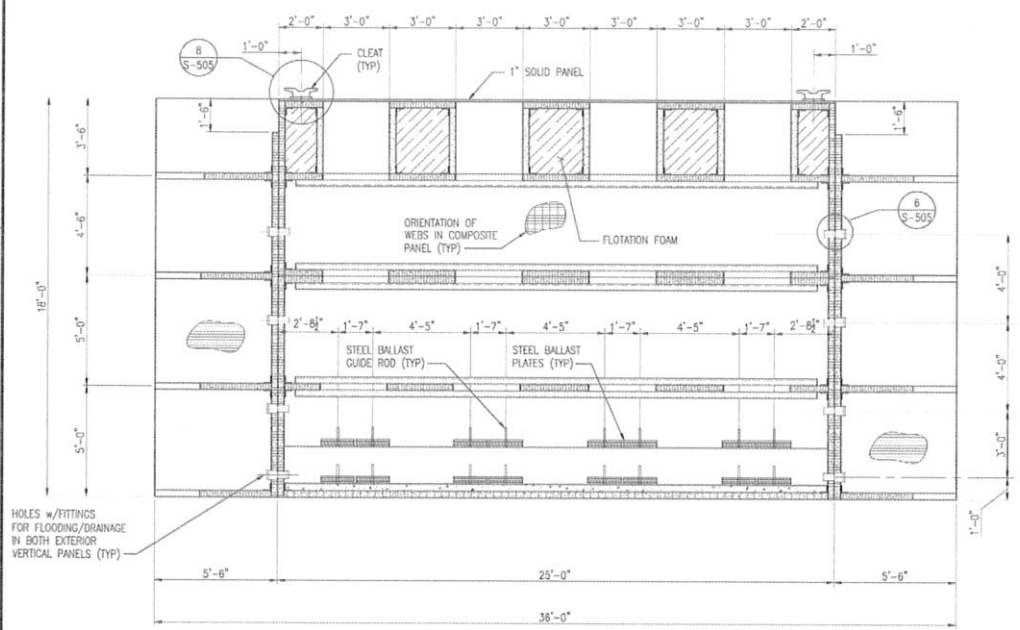
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC LANT

COMPOSITE SUBMARINE CAMEL

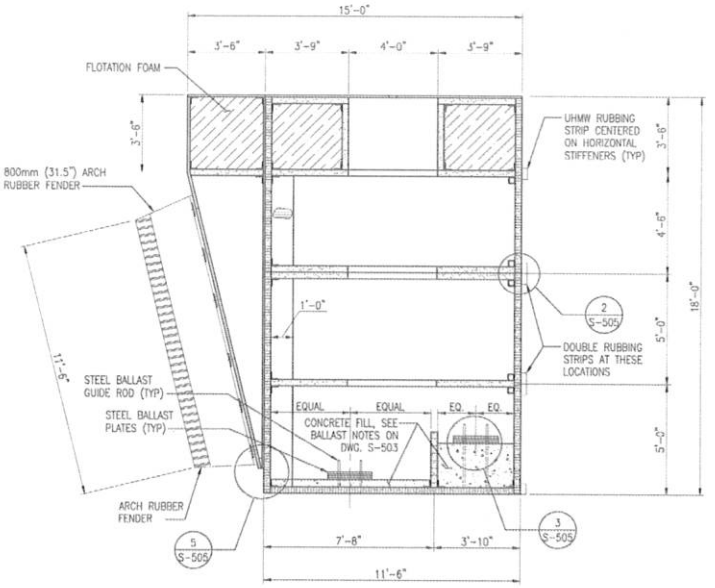
SECTIONS

SCALE AS NOTED
PROJECT NO.
CONTR. DOCS NO. N68540-09-C-0029
DRAWING NO. 14019613
SHEET 9 OF 9

S-503



SECTION
3/8" = 1'-0"
S-501 (1)



SECTION
3/8" = 1'-0"
S-501 (2)

GRAPHIC SCALE
0 1' 2' 3' 5'
SCALE: 3/8" = 1'-0"

NO.	DESCRIPTION	DATE	APP'D
1	MISCELLANEOUS MODIFICATIONS	8/2013	

Composite Advantage

WR&A
800 South Caroline Street, Baltimore, MD 21231
WHITMAN, REQUARDT & ASSOCIATES, LLP

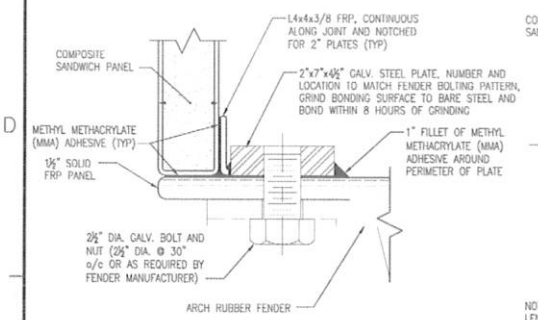
DESIGNED: R. B. Foster 10/1/2014
CHECKED: MHL
DRAWN: MHL
JOB:

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC LANT

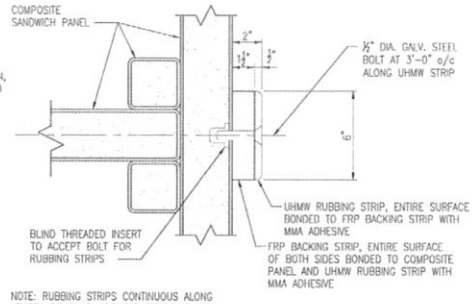
COMPOSITE SUBMARINE CAMEL

SECTIONS

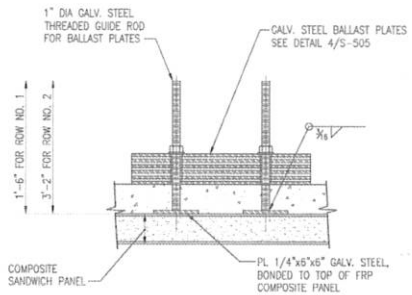
SCALE: AS NOTED
CONTRACT NO.
N69540-09-C-0029
DRAWING NO.
14019614
SHEET 9 OF 9
S-504



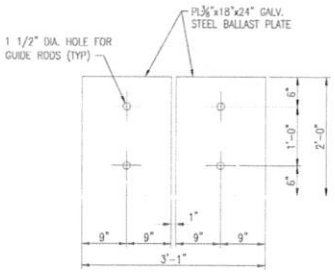
DETAIL 3" = 1'-0" S-502 (1)



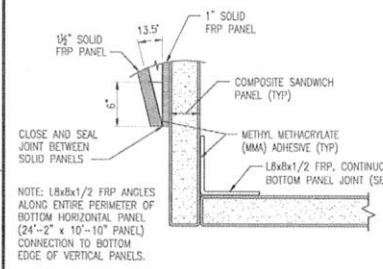
DETAIL 3" = 1'-0" S-503,S-504 (2)



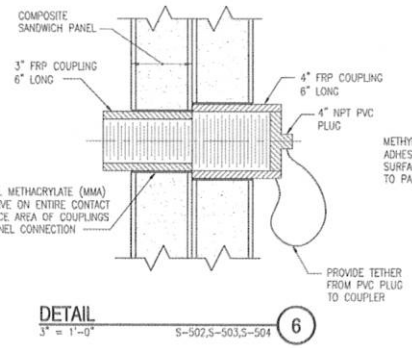
DETAIL 1 1/2" = 1'-0" S-504 (3)



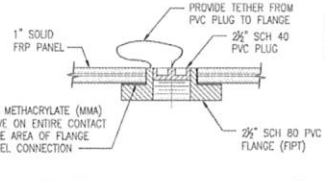
DETAIL 1" = 1'-0" S-505 (4)



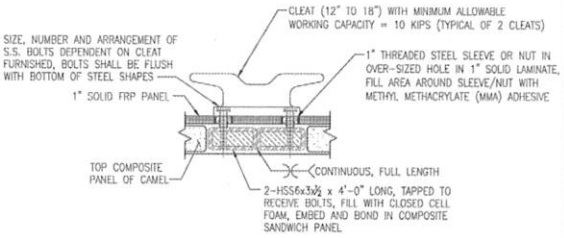
DETAIL 1 1/2" = 1'-0" S-504 (5)



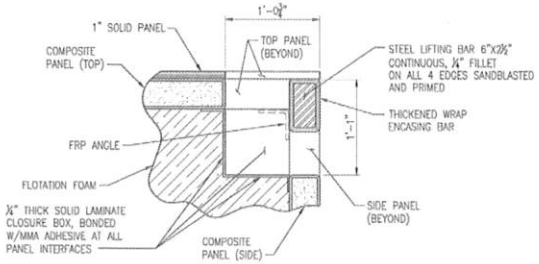
DETAIL 3" = 1'-0" S-502,S-503,S-504 (6)



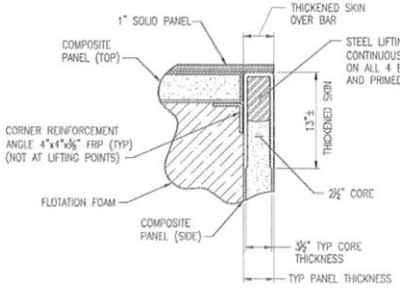
DETAIL 3" = 1'-0" S-507 (7)



DETAIL 1 1/2" = 1'-0" S-502,S-504 (8)



DETAIL 1 1/2" = 1'-0" S-503 (9)



SECTION 1 1/2" = 1'-0" S-501 (10)

GRAPHIC SCALES

SCALE: 1" = 1'-0"

SCALE: 1 1/2" = 1'-0"

SCALE: 3" = 1'-0"

DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC LANT	
COMPOSITE SUBMARINE CAMEL	
DETAILS	
SCALE: AS NOTED	
CONTRACT NO.	N66540-09-C-0029
DRAWING NO.	14019615
SHEET	9 OF 9
S-505	

1 MISCELLANEOUS MODIFICATIONS 8/2013

Composite Advantage

WR&A

NAVFAC

DESIGNED MHL DRAWN MHL CHECKED JDS