



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

September 1, 2017

Addendum No. 1

RE: Contract # C204082

WBS # 52016.3.1

F. A. # FF-0012(064)

Dare County (F-5700)

Construct 183'-7" X 46' X 10'-6" Passenger/Vehicle Ferry

September 19, 2017 Letting

To Whom It May Concern:

Reference is made to the plans and proposal form furnished to you on this project.

The following revisions have been made to the Ferry plans (please note all plans start with the prefix "16101-200-"):

Sheet No.	Revisions
	Lines Plans
100-1: Sheet 1, Zone 2B	Removed 10' and 12' waterlines from body plan
100-1: Sheet 1, Zone 3B	Updated description of bilge tangents
100-1: Sheet 1, Zone 5B	Added transverse chine line to flat hull
100-1: Sheet 2, Zone 2A	Added thruster CL Frame 37 to shear plan
100-1: Sheet 2, Zone 2C	Added transverse chine line to flat hull
	Profiles and Deck Arrangements
101-1: Sheet 1, Zones 3B & 5B	Relocated masts to Frame 23
101-1: Sheet 2, Zone 3C	Added camber and tumblehome dimensions to midship section
101-1: Sheet 3	Updated chock and cleat locations in main deck plan; added hatches to main deck and hold plan views and added tank capacities to hold plan
101-1: Sheet 4, Zone 1D	Added grab-rail to pilot house console detail
101-1: Sheet 4, Zone 2D	Modified pilot chair location / size in pilot house console detail
	Bottom and Side Shell
110-1: Sheet 2, Zone 4D	Reversed position of keel coolers about midship
110-1: Sheet 4, Zone 4B	Reversed position of keel coolers about midship

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
CONTRACT STANDARDS AND DEVELOPMENT
1591 MAIL SERVICE CENTER
RALEIGH, NC 27699-1591

Telephone: (919) 707-6900
Fax: (919) 250-4127
Customer Service: 1-877-368-4968

Location:
1020 BIRCH RIDGE DR.
RALEIGH, NC 27610

Website: www.ncdot.gov

	Hull Transverse Frames
120-4: Sheet 2, Zone 2A	Added view 2-2A for Frame 28
120-4: Sheet 2, Zone 3A	Updated tonnage frame lightening hole scheme to clarify
120-4: Sheet 3, Zone 4A	Updated tonnage frame lightening hole scheme to clarify
	Main Deck
130-2: Sheet 1, Zone 2B	Updated material description of insert plates at ends
130-2: Sheet 1, Zone 4A	Added manholes and hatches and updated cleat inserts locations
130-2: Sheet 2, Zone 3A	Added manholes and hatches and updated cleat inserts locations
130-2: Sheet 2, Zones 5C & 6C	Updated material description of insert plates at ends
	Superstructure Main Deck to 01 Deck
150-1: Sheet 1, Zones 2B & 6B	Updated location of mast support structure a and b end
150-1: Sheet 1, Zone 6C	Added hatch cutout
150-1: Sheet 3, Zone 1B	Updated emergency generator room bulkheads / louver cutouts
150-1: Sheet 4, Zone 4A	Updated emergency generator room bulkheads / louver cutouts
150-1: Sheet 4, Zone 5C	Added louver description
	Main Deck Bulwarks
150-3: Sheet 1, Zone 3C	Added details for bulwark connection to rub rail
	Masts
170-1: Sheet 1, Zones 3B & 5B	Updated location of main masts to Frame 23
170-1: Sheet 2, Zones 2B & 3B	Updated location of main masts to Frame 23
	Fuel Oil Piping Schematic
261-1: Sheet 2 (general) & Zone 3B	Removed tank penetration symbols from return lines and increased size of supply cross-connect from 2" to 3"
	Navigation Light Arrangement and Block Diagram
422-1: Sheet 2, Zone 3B	Relocated masts to Frame 23
	Fills, Vents, and Sounds
506-1: Sheet 2, Zone 4A	Removed fill cross-connect pipe between fuel tanks
	Machinery Ventilation Arrangement
513-1: Sheet 1, Zones 6A & 6B	Revised emergency generator size and airflow and void louver dimension
	Fire Main System Schematic
521-1: Sheet 1, Zone 3C	Added Note 21
	Bilge and Ballast Schematic
529-1: Sheet 1, Zone 3C	Added Note 22
529-1: Sheet 3, Zone 3A	Revised ballast suction locations to reflect low point of each tank
	Hatch Schedule
624-3: Sheet 1, Zone 6C	Added hatch at Frame 21, B-End starboard
624-3: Sheet 2, Zone 4C	Added hatch at Frame 21, B-End starboard

Please void Sheet Nos. 100-1 Sheets 1 & 2; 101-1 Sheets 1, 2, 3 & 4; 110-1 Sheets 2 & 4; 120-4 Sheets 2 & 3; 130-2 Sheets 1 & 2 ; 150-1 Sheets 1, 3 & 4; 150-3 Sheet 1; 170-1 Sheets 1 & 2; 261-1 Sheet 2; 422-1 Sheet 2; 506-1 Sheet 2; 513-1 Sheet 1; 521-1 Sheet 1; 529-1 Sheet 1; and 624-3 Sheets 1 & 2 in your plans and staple the revised sheets thereto.

The following revisions have been made to the proposal:

Page No.	Revisions
Proposal Cover	Note added that reads "Includes Addendum No. 1 Dated 09-01-17".
G-1	Deleted item No. 6 entitled "Additional Ferry Vessel Bid Sheet" from the "Execution of Signature Sheets" project special provision
G-3	Added links to the FHWA Construction Program Guide and the Nationwide Waiver of Buy America for Ferryboats to the "Domestic Steel and Iron Products" project special provision
CS-17	Corrected spelling error to read "Cycloidal" under Section A.8-2 of "Purchase Technical Specifications, Requisitions and Purchase Orders" project special provision
CS-25	Deleted "water jet thrusters" and replaced with "cycloidal thrusters" in Section "A.18 Hauling and Lay Time"
CS-25	Deleted "railway" from required certificate of condition and capacity list under Section "A.19 Railway Certification"
TS-15	Removed the word "provisional" from description of COI at delivery under Section "072 – Government Regulation and Other Requirements"
TS-16	Corrected item "A" by removing gross tonnage and the word "small" from Section "072- Government Regulation and Other Requirements"
TS-37	Revised 3 rd paragraph under Section "233.2 Installation" to clarify requirements for resilient mounts
TS-37	Revised reduction gear ratio under Section "241.1 General"
TS-40	Revised material for blades under Section "245 Cycloidal Propellers"
TS-49	Revised material for cable labels, and removed reference to plastic cable labeling systems under Section "300.6 Nameplates and Labels"
TS-64	Revised searchlight system requirements under Section "332.3 Searchlights"
TS-76	Removed requirement for external talk back loudhailer speakers in Section "441 VHF Radios"
TS-80	Revised pump suction requirements in second paragraph of Section "505.2 System Design"
TS-89	Revised last paragraph of Section "528 Sanitary Sewer" to correctly describe zero-discharge pumps shown in Reference (5G)
TS-93	Corrected free air delivery requirement in second paragraph of Section "551 Compressed Air System"
TS-95	Revised Section "581 Anchor and Mooring" to specify size and grade of chain and line
TS-126	Added new Section "681.4 Inflatable Buoyant Apparatus (IBA)"
TS-130	Revised tonnage limits and removed the duplication of words "less than" in Section "835 Tonnage Admeasurement"
TS-139 & TS-140	Revised Section "983 Delivery" in its entirety

Page No.	Revisions
TS-140	Added final paragraph in Section "996 Launching and Dry Docking"

Please void the Proposal Cover; Page No. G-1; Page No. G-3; Page No. CS-17; Page No. CS-25; Page No. TS-15; Page No. TS-16; Page No. TS-37; Page No. TS-40; Page No. TS-49; Page No. TS-64; Page No. TS-76; Page No. TS-80; Page No. TS-89; Page No. TS-93; Page No. TS-95; Page No. TS-126; Page No. TS-130; Page No. TS-139 and Page No. TS-140 in your proposal and staple the revised pages thereto.

The contract will be prepared accordingly.

Sincerely,

DocuSigned by:

 FB1B8038A47A442...

Ronald. E. Davenport, Jr., PE
 State Contract Officer

RED/jag
 Attachments

cc: Mr. Lamar Sylvester, PE
 Mr. Jerry Jennings, PE
 Mr. Chris Werner, PE
 Mr. Ken Kennedy, PE
 Ms. Jaci Kincaid
 Mr. Sterling Baker, PE
 Mr. Joe Waldrep
 Project File (2)

Mr. Ray Arnold, PE
 Ms. Theresa Canales, PE
 Mr. Mike Gwyn
 Ms. Penny Higgins
 Mr. Mitchell Dixon
 Ms. Lori Strickland
 Mr. Jon Weathersbee, PE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH, N.C.

PROPOSAL

INCLUDES ADDENDUM No. 1 DATED 09-01-17

DATE AND TIME OF BID OPENING: **SEPTEMBER 19, 2017 AT 2:00 PM**

CONTRACT ID C204082
WBS 52016.3.1

VOID FOR BIDDING

FEDERAL-AID NO. FF-0012(064)
COUNTY DARE
T.I.P. NO. F-5700
MILES 0.000
ROUTE NO. NC 12
LOCATION NC-12

TYPE OF WORK CONSTRUCT 183'-7" X 46' X 10'-6" PASSENGER/VEHICLE FERRY.

NOTICE:

ALL BIDDERS SHALL COMPLY WITH ALL APPLICABLE LAWS REGULATING THE PRACTICE OF GENERAL CONTRACTING AS CONTAINED IN CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA WHICH REQUIRES THE BIDDER TO BE LICENSED BY THE N.C. LICENSING BOARD FOR CONTRACTORS WHEN BIDDING ON ANY NON-FEDERAL AID PROJECT WHERE THE BID IS \$30,000 OR MORE, EXCEPT FOR CERTAIN SPECIALTY WORK AS DETERMINED BY THE LICENSING BOARD. BIDDERS SHALL ALSO COMPLY WITH ALL OTHER APPLICABLE LAWS REGULATING THE PRACTICES OF ELECTRICAL, PLUMBING, HEATING AND AIR CONDITIONING AND REFRIGERATION CONTRACTING AS CONTAINED IN CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA. NOTWITHSTANDING THESE LIMITATIONS ON BIDDING, THE BIDDER WHO IS AWARDED ANY FEDERAL - AID FUNDED PROJECT SHALL COMPLY WITH CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA FOR LICENSING REQUIREMENTS WITHIN 60 CALENDAR DAYS OF BID OPENING

BIDS WILL BE RECEIVED AS SHOWN BELOW:

THIS IS A FERRY PROPOSAL

5% BID BOND OR BID DEPOSIT REQUIRED

PROJECT SPECIAL PROVISIONS**GENERAL****EXECUTION OF SIGNATURE SHEETS**

(6-17-82)

The Bidder's attention is directed to the various sheets in the proposal form which are to be signed by the Bidder. A list of these sheets is shown below. The bid bond is inserted in the proposal form.

1. Listing of DBE subcontractors
2. Facility Location
3. Labor and Materials
4. Cost Breakdown
5. Item sheet
6. Execution of Bid Sheets: 1, 2, 3, 4, 5, or 6 (Bid)
7. Bid Bond (Proposal Insert)

PROPRIETARY ITEMS ON PLANS

The Contractor's attention is directed to the fact that there are numerous references to proprietary items listed throughout the contract plans. These references shall not supersede the provisions in the contract proposal. Other products of equal quality may be used provided they meet or exceed the requirements of the special provisions and are approved for use by the Ferry Division. In those instances where there is no provision in the contract proposal to cover the work, the plan information shall apply unless otherwise directed by the Ferry Division.

LICENSURE / CERTIFICATION:

The Bidder does not need a NC General Contractors license to bid this project. However, they will be required to furnish proof of licensure and/or certifications to build passenger vessels of the size and type, as described in the Contract Drawings and Specifications, by the state in which they are performing the work and the United States Coast Guard.

MANDATORY PRE-BID CONFERENCE (Prequalifying To Bid):

(7-18-06) (Rev. 3-25-13)

SPI 1-14

In order for all prospective bidders to have an extensive knowledge of the project, all prospective bidders shall attend a mandatory pre-bid conference at **10:00 a.m., Tuesday, August 22, 2017.**

NCDOT State Shipyard
8550 Shipyard Rd.
Manns Harbor, North Carolina 27953
Phone (252) 473-3461

The pre-bid conference will include a thorough discussion of the plans, contract pay items, special provisions, etc.

steel and iron products may be used provided the combined project cost of the bid items involved does not exceed one-tenth of one percent (0.1 percent) of the total amount bid for the entire project or \$2,500.00, whichever is greater. This minimal amount of foreign produced steel and iron products permitted for use by this Special Provision is not applicable to fasteners. Domestically produced fasteners are required for this project.

All steel and iron products furnished as "domestic products" shall be melted, cast, formed, shaped, drawn, extruded, forged, fabricated, produced, or otherwise processed and manufactured in the United States. Raw materials used in manufacturing "domestic" steel and iron products may be imported; however, all manufacturing processes to produce the products, including coatings, must occur in the United States.

Before each steel or iron product is incorporated into this project or included for partial payment on a monthly estimate, the Contractor shall furnish the Resident Engineer a notarized certification certifying that the product conforms to the above requirements of this Special Provision. The Resident Engineer will forward a copy of each certification to the Materials and Tests Unit.

Each purchase order issued by the Contractor or a subcontractor for steel and iron products to be permanently incorporated into this project shall contain in bold print a statement advising the supplier that all manufacturing processes to produce the steel or iron shall have occurred in the United States. The Contractor and all affected subcontractors shall maintain a separate file for steel products permanently incorporated into this project so that verification of the Contractor's efforts to purchase "domestic" steel and iron products can readily be verified by an authorized representative of the Department or the Federal Highway Administration.

For additional information, the Federal Highway Administration Construction Program Guide can be found at <https://www.fhwa.dot.gov/construction/cqit/buyam.cfm>. The nationwide waiver of Buy America for Ferryboat Equipment and Machinery can be found at <https://www.gpo.gov/fdsys/pkg/FR-1994-02-09/html/94-2906.htm>.

DISADVANTAGED BUSINESS ENTERPRISE:

(10-16-07)(Rev. 1-17-17)

102-15(J)

SP1 G61

Description

The purpose of this Special Provision is to carry out the U.S. Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts financed in whole or in part with Federal funds. This provision is guided by 49 CFR Part 26.

Definitions

Additional DBE Subcontractors - Any DBE submitted at the time of bid that will not be used to meet the DBE goal. No submittal of a Letter of Intent is required.

Committed DBE Subcontractor - Any DBE submitted at the time of bid that is being used to meet the DBE goal by submission of a Letter of Intent. Or any DBE used as a replacement for a previously committed DBE firm.

Contract Goal Requirement - The approved DBE participation at time of award, but not greater than the advertised contract goal.

DBE Goal - A portion of the total contract, expressed as a percentage, that is to be performed by committed DBE subcontractor(s).

CS-17

item.

(h) Verification that the item has similar or longer history of in use experience in commercial marine service.

(i) Statement from Contractor indicating that the proposed substitution will not be a cost increase and will not extend the delivery date of the vessel.

Incomplete substitution requests will not be considered.

Substitutions will be considered if based upon Contractor preference or familiarity with an item or equipment, provided it can be demonstrated that the item is equivalent (as defined above) to or better than the design item.

Substitutions will not be considered based upon cost savings alone. For each substitution proposed, a valid price quote shall be obtained by the Contractor from the manufacturer of the item integrated into the design and the proposed substitution. If the substitution is approved, any such cost savings will be subject of a change order providing a credit for the full difference to the Owner. Substitutions for more expensive items will only be considered if they result in no cost change to the Owner, unless there is substantial benefit for the Owner.

NCDOT will respond to complete written requests within ten (10) working days. NCDOT's decision will be final.

The Contractor shall be responsible for all engineering costs and construction costs associated with any substitution.

A.8-2 PURCHASE TECHNICAL SPECIFICATIONS, REQUISITIONS AND PURCHASE ORDERS

The Contractor shall submit all purchase technical specifications, requisitions, purchase orders, or similar descriptive data for review of compliance with the contract requirements by NCDOT prior to purchasing equipment. Each document shall contain a full technical description of the material to be ordered. If the Contractor wishes to purchase or supply equipment, fittings, or outfit other than that specified, the Contractor shall first inform NCDOT of the details of the intended purchase, and secure specific written approval in each such instance.

The Contractor shall, at a minimum, develop detailed purchase technical specifications for the following major equipment and systems:

- (a) Propulsion engines and generators
- (b) Reduction gears
- (c) Cycloidal Drive Units - 600 HP
- (d) Ship service generators
- (e) Ship service switchboard
- (f) Control systems
- (g) Alarm and monitoring systems

CS-25

(b) The vessel is agreed to be in the custody of the Contractor from the start of work at his plant until the completion of the vessels, including the tests and trials if required by the Technical Specifications herein, and until delivery to the Owner.

(c) The Contractor shall keep all litter and debris removed from the vessels, and shall conform to normal standard safety practices in the prosecution of the work and condition of the shipyard area.

A.17 MATERIAL FURNISHED BY OWNER AND TO BE RETAINED BY OWNER

(a) The Contractor shall receive, handle, and install all Owner furnished material and equipment, if any, and shall provide the required foundation, piping, wiring, etc., to make a complete and satisfactory installation at no additional cost to the Owner as a part of this contract.

A.18 HAULING AND LAY-TIME

(a) The Contractor shall provide a suitable safe means for hauling the vessel and sufficient lay days to complete all work as required, or that may become necessary.

(b) The vessel shall enter the drydock or railway without list and without excessive trim. If any strain or possible damage to the vessel be suspected or observed, the docking operation shall be suspended and necessary corrective measures taken. Blocking and shores shall be arranged in accordance with standard practice, leaving room in way of cycloidal thrusters, and other obstructions. The vessel shall remain on the drydock or railway until the underwater work has been satisfactorily completed, then it shall be carefully undocked.

A.19 RAILWAY CERTIFICATION

Upon award of the contract, the Contractor shall submit to the Ferry Division Engineer, a certificate of condition and capacity of Crane, Travel Lift or Drydock intended for use during docking if required. Certificate shall indicate capacity, maximum width, and condition of facility which has been inspected within thirty (30) days of bidding by a Certified Marine Inspector or Registered Professional Engineer.

A.20 GUARANTEE

(a) The Contractor shall guarantee all materials furnished and all workmanship performed by him under these specifications for a period of twelve months following final acceptance date by the Owner. This guarantee shall be limited to replacement (including labor) of any parts giving out under normal service because of defect in material or workmanship, and not because of carelessness or neglect on the part of the Owner, his officers or agents; provided further, that any work necessary under this warranty shall be performed without delay by the Contractor at a shipyard or such other place as may be approved by the Owner, and said Contractor shall not be liable for any expense or damages other than as herein called for above. The regular manufacturer's warranty shall be furnished with all equipment, machinery, fitting, etc., provided by the Contractor.

(b) Manufacturer's warranties shall be filed by the Contractor for all equipment provided and installed and said warranties shall be transferred and/or filed in the Owner's name for all

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072 Government Regulation and Other Requirements

The vessel will be designed and constructed in accordance with the applicable requirements of the USCG for Subchapter H vessels. The vessel structure shall be designed to comply with the requirements of ABS Rules for Building and Classing Steel Vessels under 90 meters. Classification Society approval is not required.

The ferry will be delivered to the Owner, with a USCG Certificate of Documentation and Certificate of Inspection, for service on "Lakes, Bays, and Sounds" as a Subchapter H passenger ferry. The Certificate of Inspection shall allow the ferry to operate with up to 300 passengers and seven or fewer crew members.

A Certificate of Admeasurement for Regulatory Tonnage and International Tonnage Convention will be required. The Contractor shall contract with the American Bureau of Shipping or an equivalent classification society to obtain the Certificate of Admeasurement. The Contractor will assist and facilitate the work of the vessel admeasurers.

With the exception of the Owner's crew demonstrating familiarity with the vessel operation, lifesaving and firefighting, the Contractor shall be entirely responsible for obtaining certificates and documentation, and provide all testing, failure analyses, components, and signage as necessary for the vessel to be put into passenger carrying service as described above.

The following certificates are required prior to delivery:

1. Tonnage Certificate, to include both international and US Regulatory tonnages
2. Builder's Certificate (required to obtain Certificate of Documentation by Owner).
3. Steel Certificates for domestic US steel to include Origin, Heat Number, Size of member and Quantity.
4. Engine Manufacture Certificates by ABS
5. Reduction Gear Manufacturer Certificates by ABS
6. Cycloidal propeller Certificates ABS
7. Stability Letter, USCG
8. Stability Data Package, USCG stamped included tank tables
9. Temporary Certificate of Inspection COI by USCG OCM I at vessel origin
10. Permanent Certificate of Inspection COI by USCG OCMI NCDOT
11. FCC Bridge to Bridge Radio Certificate (Owner Furnished)
12. FCC Radio Certificate (Owner Furnished)
13. Certificate of Documentation "COD" (Owner Furnished)
14. Certificate of Financial Responsibility "COFR" (Owner Furnished)
15. Certificate of Liability Insurance
16. EPIRB Registration Certificate, if required by USCG for delivery of vessel
17. Consent of Surety Certificate
18. Certificate for Official Number [Documentation Center] (Owner Furnished)
19. EPA Response Plan (Owner Furnished)
20. Station Bill (Owner Furnished)
21. Security Certification (Owner Furnished)
22. Security Officer Certification (Owner Furnished)
23. Drug Testing Audit (Owner Furnished)
24. Drug Testing Proof List (Owner Furnished)
25. Vessel Response Plan (Owner Furnished)

TS-16

26. DVTP and PSTP, USCG Stamped for all equipment required by USCG, including main engines, gears, cycloidal propellers, propulsion controls, etc.) see Section 982.4
27. Payment of Final Estimate (NCDOT State Construction Engineer Furnished)
28. Life Raft Certificate (Dated within 30 days of vessel delivery date)
29. Letter of Payment Certification (Stating all vendors have been paid in full prior to vessel delivery)
30. Delivery and Acceptance Certificate
31. EPA NPDES Certificate (Owner Furnished)
32. Extended Warranty Certificate for main engines, 5 years
33. Extended Warranty Certificate for cycloidal propellers, 5 years
34. Torsional Analysis (engine, Gear, Shafting and cycloidal propellers)
35. Right of Way Field Certification (Owner Furnished)
36. Portable Fire Extinguisher Certification, including tags on each extinguisher
37. Fire Extinguishing Flooding System Installation and Testing Certificate
38. Potable Water Tank Laboratory Testing Certificate
39. Horn Decibel Certification
40. Alternate Navigation Light Certificate (if required)

The Contractor shall develop and submit all plans, details, calculations, material and equipment certifications, documents, and any other information necessary to obtain USCG approval. All email and written correspondence to or from the USCG shall immediately be copied to the NCDOT Representative.

Where an EBDG contract or contract guidance drawing has been developed for this project, the Contractor may submit it for USCG approval after it has been revised by the Contractor to include sufficient information and details required by the USCG for approval. Such drawing revisions shall be clearly and explicitly identified with a revision note and revision mark at the revision. The EBDG title block shall remain on all drawings utilized by the Contractor.

Fees entailed in securing certificates, including associated inspection fees and expense of regulatory body inspectors, shall be paid by the Contractor.

The applicable requirements of the various regulatory bodies and rules noted below, in force at the time of submission of bids, shall be complied with:

- A. 46 CFR Subchapter H: "Passenger Vessels" and other applicable CFRs and USCG Navigation and Vessel Inspection Circulars (NVIC)
- B. ABS Rules for Building and Classing Steel Vessels under 90 meters, 2017.
- C. 23 CFR 635.410: "Buy America Requirements"
- D. IEEE Standard No. 45: "Recommended Practice for Electrical Installations on Shipboard"
- E. U.S. Public Health Service: "Handbook on Sanitation of Vessel Construction"
- F. Federal Communications Commission
- G. U.S. Access Board: Proposed Passenger Vessel Accessibility Guidelines

TS-37

233.2 Installation

Installation shall be performed to the satisfaction of the NCDOT Representative and the equipment manufacturers' representatives. Engage the services of the manufacturers' representatives to attend equipment installation, start-up, and sea trials.

The main engines shall be installed as shown on Reference (2C) subject to alignment of the shafting. Each engine and its fluid coupling shall be resiliently mounted as a unit.

Resilient mounts shall be combination steel spring and rubber spring or rubber spring isolators, with internal snubbers. Each isolator shall be furnished with a steel soleplate and threaded height adjuster. Align each main engine on its mounts using a marine grade, 100% solids, two component, non-shrinking, chocking compound between the soleplate and engine girder. The Contractor shall require six degrees of freedom solid body calculations be performed by the mount manufacturer to verify mount selection and engine range of motion. Refer to Section 200.4 for additional alignment requirements.

The Contractor shall provide or design and fabricate engine mounting brackets to suit the resilient mounts and engine installation.

All piping connections to the main engines are to be made with USCG approved flexible hose or bellows. Flexible connections shall have sufficient flexibility to accommodate the full range of engine motion on its resilient mounts. Controls shall be provided as described in Section 252.

The engines shall not be barred over or started for the first time without the prior approval of the NCDOT Representative and the manufacturer's technical representative

241 REDUCTION GEARS

241.1 General

Provide and install two (2) vertical offset, reversing reduction gears with a 2.48:1 reduction ratio. The reduction ratio shall be confirmed with the propeller manufacturer after completion of the Contractor's weight estimate. Each gear shall be rated for continuous duty at 600 hp at 1,675 input rpm, minimum.

The reduction gears shall be supplied with the manufacturer's standard equipment, except as superseded by the additional equipment listed herein. The following equipment shall be furnished with each reduction gear:

Qty	Item
1	Input flange for free standing installation
1	Electronic clutch control module with manual override
2	Pressure switches for indication of clutch engagement

TS-40

Design, provide, and install a foundation for each bearing. Mount and align each shaft bearing using adjustable steel chocks. After alignment is completed to the satisfaction of the NCDOT Representative, fitted bolts or dowels shall be installed to maintain alignment.

Each bearing shall be factory drilled for installation of resistance temperature detectors (RTD) sensors. The Contractor shall install RTD sensors for remote monitoring. See Section 436 for remote monitoring requirements.

243.6 Bulkhead Seals

Where the propulsion shafting passes through a watertight bulkhead, an effective bulkhead seal shall be provided and installed.

Bulkhead seals shall be provided and installed. The bulkhead seals shall be fully split for ease of installation and replacement with the line shaft in place, self-aligning, and capable of automatically sealing the bulkhead in the event of flooding on either side of the bulkhead at all shaft speeds. The seals shall not require lubrication or cooling, nor utilize packing. Tapered dowels shall be provided where removable bulkhead seal housings are fastened to bulkheads to ensure proper realignment of the seals upon reinstallation.

243.7 Shaft guards

Provide and install protective guards over rotating propulsion shafts and equipment. The guards shall be constructed 1/4" aluminum pattern plate supported by of 2"x2"x1/4" angle frames. Guards shall be attached to framing with 3/8" diameter flat socket head countersunk stainless steel machine screws. Angle frames shall be drilled and tapped.

Rubber isolation material 1/8" thick shall be installed between angle and aluminum plating.

Hinge covers shall be installed in way of bearings and other equipment requiring periodic maintenance. Hinges shall be stainless steel.

245 CYCLOIDAL PROPELLERS

Provide and install two (2) cycloidal propellers. The cycloidal propellers shall be designed, constructed and certified in accordance with ABS requirements and provided with all required approvals and certificates. Installation shall be in strict accordance with the manufacturer's installation guidelines. Each propeller shall be provided with all necessary features and accessories including, but not limited to the following:

- Rated for 470 kW (630 HP) with an input speed of 670 RPM.
- 1600mm blade orbit diameter
- five (5) bronze blades, 1000mm blade length
- Integral lube oil system
- Integral control oil system
- Propulsion control system as described in Section 252
- Local gauges and thermometers

TS-49

prevent loosening, such as nylon insert nuts, locking washers, or thread adhesive. Cable hangars may be welded to ship structure. Electrical equipment shall be installed independently from piping, ventilation, and other mechanical systems.

300.5 Bonding

Ground non-current carrying metallic parts of electrical machinery and equipment to the structure, either by the mounting bolts and foundations, or by separate grounding straps or conductors sized per the National Electrical Code (NEC). Ground metal frames of portable lamps, tools and other similar cord and plug appliances supplied as ship equipment or Owner-Furnished Equipment (OFE) through a suitable conductor in the power supply cord at the ground pole of all receptacles. All conductive electrical enclosures or equipment shall be electrically bonded to the vessel's structure. Provide bonding/equipment grounding systems in accordance with 46 CFR 111.

Bonding shall be ensured by mounting equipment directly to ship structure, or by use of flexible copper cable or grounding straps. Either method shall form a positive ground connection from the enclosure to vessel's structure. The Contractor shall test each installed item for ground impedance, and reduce impedance as necessary. The Contractor shall document tests and results of equipment grounding, and present the document to the Owner.

Each 120V receptacle circuit shall include an independent equipment grounding conductor included in the cabling supplying the circuit, and connected to the grounding connection on the receptacle. In circuits supplying multiple loads, such as receptacles, heaters, and lights, the removal of any device shall not interrupt the continuity of the grounding conductor.

Ensure bonding of the propulsion shafting and cycloidal propellers.

300.6 Nameplates and Labels

Each electrical enclosure or equipment item shall be labeled with an engraved phenolic nameplate using white text on a black field. Nameplates shall provide concise descriptions with minimal abbreviation, and shall be affixed with screws or a very high bond (VHB) tape system.

Each cable shall be labeled with its cable name per the cable schedule on the exterior of each enclosure, equipment, or junction box penetration, and on each side of each deck or bulkhead penetration. The labels shall be embossed aluminum, robustly banded to the cable. An assembled sample shall be submitted to the Owner for acceptance, and acceptance shall be obtained prior to installation aboard the vessel.

Wires within control, alarm and monitoring, and communications enclosures shall be labeled with adhesive labels, alpha-numeric floaters, or via labeling of the terminal to which the wire is connected. Labels shall correspond to design drawings.

Provide each emergency lighting fixture with an engraved laminated phenolic label having a white letter E on a red background. Locate the label in relation to the fixture to clearly associate one with the other. The letter E shall be 1/2 in high.

TS-64

332.1 Exit Lighting

Illuminated exit signs will be installed above doorways as required by regulation. If electric, they shall be supplied by the emergency bus.

332.2 Floodlights

Four LED deck floodlights will be installed under the bridge deck where directed by NCDOT. One will face each end of the vessel. The remaining two will face inboard towards the main deck. Lights shall be switched from the Pilothouse. Floodlights shall be from the same manufacturer as others in the fleet.

332.3 Searchlights

Four (4) 1000W xenon, 80 million CD, remotely controlled searchlight systems shall be provided. The searchlights shall be marine grade aluminum and steel with salt-resistant powder coat finish, remote electric beam focus, and electric joystick remote control. One searchlight shall be located on each corner of the Pilothouse top, elevated to clear the Pilothouse visor and provide clear illumination.

332.4 Switches and Junction Boxes

Provide local switching for the lighting as shown in Reference (3C). When a lighting circuit is required to have a switch, the switch is to be T rated.

Junction boxes used in emergency lighting circuits are to be watertight with watertight cable glands.

340 BATTERIES AND CHARGERS

340.1 General

All batteries are to be Absorbed Glass Mat (AGM) construction, sealed valve regulated lead acid, 12-volt, sized and wired in series/parallel as required. Engine starting batteries shall be commercial marine grade. Battery connections shall be pressure type lugs. Each battery bank shall be located in a vented battery boxes securely mounted in a foundation.

The Contractor shall provide and install all necessary ancillary materials and equipment, including but not limited to all foundations, battery boxes, cables of sufficient size to supply required amperage to all starters, solder type battery lugs, fuses and circuit breakers of proper size and type, wiring, hangers, etc., for a complete and operational system.

Battery chargers shall not be installed directly over batteries.

Batteries and battery chargers shall be provided for engine starting and backup power as necessary. Provide one 24V backup power battery bank for the Pilot House, and two for the Engine Room. Size banks to provide backup power for the duration required by regulation.

Three engine starting banks will be provided, two for the Engine Room, one for the Emergency Generator Room.

TS-76

439 CCTV SYSTEM

439.1 System Equipment

A CCTV system shall be provided with coverage of all passenger accessible spaces with monitoring capabilities at each pilothouse control station. Locate nine (9) cameras in the passenger areas where directed by NCDOT during detailed design.

Provide one 19-inch flat screen monitor and system controls at each pilothouse control station. The system installation shall include all cabling, foundations, power supplies, and mounting hardware for a complete, functional system. Cabling will consist of CAT 6E cable capable of power over Ethernet. External cameras shall be weatherproof.

Cameras shall be high resolution, outdoor ready, vandal-resistant, dome type cameras with mirrored domes.

Final direction and location of cameras shall be approved by the NCDOT Representative.

439.2 Modes of Operation

All camera inputs will be recorded and stored on a DVR system for a minimum of 72 hours. Camera views at the displays in the Pilothouse and EOS shall be user selectable.

A UPS shall be integrated to the DVR to provide an orderly shutdown of the DVR after loss of power and before the UPS batteries are depleted.

441 VHF RADIOS

The vessel shall use VHF radio as the principal means of external communication. The Contractor shall furnish and install four (4) complete systems consisting of a VHF radio, with a 4-foot antenna. Supply and install all interconnecting cabling and support brackets for a complete functional system.

The VHF radios shall have the following characteristics

- 25W output power
- Horn/fog horn feature built in
- Active noise canceling
- IPX8 waterproofing
- Weather and alert channels

TS-80

exposed hot surfaces. Piping shall be located at least 18 inches away from surfaces that have temperatures under the insulation of 450 degrees Fahrenheit.

Pipe fittings shall not be located directly over or within 2 feet of electrical switchboards, panels, disconnects, switches, or receptacles. Pipes shall not be routed directly over engines except for systems which connect to the engine.

505.2 System Design

Piping sizes indicated on the Contract Guidance Drawings are given for reference purposes. The final selection of pipe sizes for fabrication and installation is the responsibility of the Contractor. Fluid velocity criteria given in the following table shall be used in piping system sizing, where D is the internal pipe diameter.

<u>Service</u>	<u>Velocity (ft/sec)</u>	
	<u>Nominal</u>	<u>Maximum</u>
Fuel Oil Suction	$2D^{1/2}$	7
Fuel Oil Discharge	$5D^{1/2}$	12
Lube Oil Suction	$D^{1/2}$	4
Lube Oil Discharge	$2D^{1/2}$	6
Seawater Suction	$3D^{1/2}$	7
Seawater Discharge	$5D^{1/2}$	9
Fresh Water Suction	$3D^{1/2}$	15
Fresh Water Discharge	$5D^{1/2}$	20

Pumps shall be provided with ensured suctions through submergence or priming systems in order that the pump operation is immediate and positive. Pumps for seawater service shall be installed so they remain flooded at lightship draft or equipped with automatic priming systems.

Flexible connections shall be provided to isolate vibration and to accommodate thermal growth. In general, fluid piping systems shall use flexible hose assemblies with 37-degree flare swivel-end connections on both ends for connections 2 inches and smaller, or flanged flexible connections, for larger connections. Hose assemblies conveying fuel or lube oil shall be USCG-approved flame resistant type. In general, flexible hose assemblies shall not be less than 9 inches long or more than 30 inches long.

Flexible connections shall meet the requirements of 46 CFR 56.60-25. Flanged flexible connections where supplied, shall additionally meet the requirements of ASTM F1123.

Flexible hoses shall not be painted.

Isolation capability is required so that individual components may be secured while the vessel is in service. In order to meet operational requirements and to facilitate on-board maintenance,

TS-89

528 SANITARY SYSTEM

Provide and install a sanitary drain system as shown on Reference (5G) serving black and gray water drains. The black and gray water will be collected via a gravity system into a marine sanitation device (MSD) in the engine Room. The MSD shall be arranged to discharge overboard or into a pair of zero-discharge holding tanks.

The MSD shall be a USCG approved type II marine sanitation device that utilizes an extended aeration biological water treatment process. The MSD shall have a designed hydraulic capacity of at 750 gallons (2.9 m³) per day and a biological oxygen demand (BOD) capacity of 3.0 kg/day. The MSD shall be skid mounted with 1/4" steel plate chamber construction, with all required equipment and controls mounted on the unit. The MSD shall be arranged for gravity feed and pumped discharge.

Provide and install two rectangular high-density polyethylene waste tanks. Each tank shall have a capacity of 500 gallons, a 16" diameter locking clean-out lid, and fill, vent, and drain fittings to suit the installation. Tank level indication shall be as described in Section 436.

Drain piping shall be routed as directly as possible and shall be provided with a sufficient number of accessible cleanout connections for clearing the drainpipes by use of a plumber's snake or a pressurized water hose.

Where a drain is combined with other drains, "Y" or "Y-Tee" branches or fittings shall be used to facilitate flow. All drains shall be independently trapped and provided with an accessible cleanout connection.

Furnish lavatory fixtures complete with valves, faucets, stops, drain fittings, vents, and hangers. Install fixtures and accessories to the vessel's structure in a manner that does not impair the integrity nor damage decorative linings.

Deck drains shall be commercially manufactured heavy-wall steel weld-in style deck drains with removable strainer plates and integral traps. Drains shall be flush with the finished deck surface with no protrusions that would prevent water from flowing into the drain.

Sanitary drain piping shall be CPVC above the Main Deck and stainless steel within the hold.

Test piping system in accordance with Section 982.

Provide and install two (2) self-priming centrifugal pumps, sized for 105 gpm at 75ft TDH. The pumps shall be arranged to take suction from the zero-discharge holding tanks and discharge overboard or to a deck connection on the main deck as shown in Reference (5G).

529 DRAINAGE AND BALLAST SYSTEMS

529.1 Bilge System

Provide and install bilge system meeting all USCG requirements and as shown in Reference (5H).

TS-93

camlock fitting and plug. Mark with an engraved label plate stating POTABLE WATER ONLY. The filling station must meet the requirements of FDA.

The Contractor shall provide two (2) potable water pumps with integral flow and pressure switches. Each pump shall be capable of 8 gpm at 50 psig. During normal operation, one (1) pump will pressurize the system and the other shall be on standby. Pumps shall be equipped to start at 40 psig and turn off at 60 psig.

One (1) ASME rated diaphragm-type potable water pressure tank shall be provided. The pressure tank shall have a minimum volume of 68 gallons and a pressure rating of 125 psig.

Install piping to distribute potable water to the vessel's lavatories, toilets, hot water system and hose bibs located as shown in References (5J). All components in the system shall be rated for a minimum working pressure of 100 psig minimum. Piping shall be seamless, type K or L copper tubing.

Mount a stainless steel hose reel at each hose bib and equip with 50 ft of red rubber hose and a handle-type hose nozzle.

Exterior hose bibs shall be frost-free type.

Provide and install one (1) hot water heater with a twenty-gallon tank and 2 kW heating element. The water heater shall have a pressure/temperature relief valve installed that cannot be isolated from the water heater.

Appropriate backflow prevention devices shall be provided and installed.

Provide and install window-washing jets over the A-end and B-end Pilothouse windows. The quantity and location of the jets shall be selected to provide good spray coverage. Install a solenoid valve in the wash supply line to each window. Wire each solenoid valve to a momentary push button located in the Pilothouse console facing that window. Colocate the window wash pushbutton with the wiper controls for the same window.

551 COMPRESSED AIR SYSTEM

Provide and install a compressed air system as shown in Reference (5K). The system will provide compressed air to drive the ship's horns, pneumatically actuated valves in the ballast system, and service air stations.

Provide and install two (2) two-stage, two-cylinder, air-cooled, air compressors each mounted on an 80 gallon horizontal air receiver. Each compressor shall deliver not less than 17 CFM and shall discharge at 150 psig. Each compressor shall be V-belt driven by a 5 HP 208V/3PH/60Hz electric motor. Removable personnel safety guards shall be fitted over the drive belts.

Air compressors shall have load-less starting and a controller with hand-off-auto switch. In the "auto" position, the compressor motor controllers shall be configured for automatic start/stop based on the pressure in the common supply header. The system shall be equipped with two pressure switches to initiate compressor start and stop. One pressure switch shall be set for

TS-95

Clean agent cylinders shall be new, fully charged, and fitted level indicators. When required to protect discharge heads during handling and transportation, safety caps shall be provided.

Mount all fixed clean agent cylinders on elevated foundations and securely fastened in a vertical position. Secure cylinders with circumferential band/steel strap type bolted clamps around the cylinder body. Use individual band clamps for each bottle to permit maintenance service and removal.

The system shall include all necessary storage cylinders, piping and control systems, alarms, warning lights, relief valves, discharge nozzles, solenoid shut down and pressure release cylinders, and interfaces with engine, damper, and ventilation controls.

Arrange nozzles to evenly distribute and diffuse the clean agent throughout the protected spaces. Design size and flow requirements per the manufacturer's approved design manual USCG requirements.

Configure pressure switches to stop the ventilation supply and exhaust fans, close the fire dampers, and shut down fuel transfer pumps and all diesel-fired equipment in the protected space upon release of the clean agent system serving the space protected.

The remote manual release for each space shall be located immediately outside the space served, in a location approved by the NCDOT Representative.

581 ANCHOR AND MOORING

Provide and install a 400 lb lightweight type, hinged fluke anchor with 25ft of 1/2" grade 2 chain and 100 ft of braided synthetic line with a minimum strength of 40,000 lb. The anchor will be stowed on a slide built into the bulwark. Provide and install a rope locker near the anchor slide. No anchor recovery system shall be provided.

TS-126

shown on the References (6A) and (6B). Provide a wood grating in each locker; finish shall be natural with varnish sealant. Adult and children's life preservers shall be separated by a divider. Divider shall be 1/8" aluminum plate with 3-inch radius corners, sized to suit. Locker hinges shall be 316 stainless steel. Lockers shall be securely mounted on 3" high foundation angles.

681.3 Life Rings

A total of eight (8) 30-in diameter, USCG-approved life rings shall be provided, labeled, and stowed in stainless steel brackets. The installation of all life rings shall meet the requirements set forth in 46 CFR 199.

681.4 Inflatable Buoyant Apparatus (IBA)

The Contractor shall provide and install five (5) 50-person, passenger-vessel-type USCG-approved IBAs. Install as shown in Reference (6B). IBAs shall be stowed with a float free configuration that includes a painter, weak link, and hydrostatic release. Handrails shall have chained sections to provide easy access to launch IBAs.

TS-130

833 WEIGHT ESTIMATE

The Contractor shall prepare a detailed weight estimate for the vessel and submit it to the NCDOT Representative within forty five (45) calendar days of award of contract. The Contractor shall weigh all items furnished for the vessel and shall update the weight estimate and submit it to the NCDOT Representative on a biweekly basis. The weight estimate shall include a summary page with the current light ship weight estimate, longitudinal center of gravity and vertical center of gravity.

835 TONNAGE ADMEASUREMENT

The Contractor shall be responsible for conducting a tonnage survey. Tonnage admeasurement will include calculation of ITC69 and US regulatory tonnages and issuance of a US National Tonnage Certificate. The Contractor shall be responsible that the vessel be admeasured at less than 400 Gross Registers Tons (US domestic). All admeasurement fees shall be to the Contractor's expense.

843 DEADWEIGHT SURVEY

The Contractor shall prepare and submit to the USCG for approval a deadweight survey procedure in order to determine the weight, longitudinal center of gravity, and transverse center of gravity of the vessel. The vessel shall be essentially complete and afloat at the Contractor's dock and the "weights to go on/off list" shall be within the tolerance permitted by the USCG. The data gained from this survey shall be used to prepare the stability submittal to the USCG to obtain a stability letter. The Contractor shall supply a copy of the stability model and calculations in electronic format.

851 TRAINING

Introductory training shall be provided to the NCDOT operators. The training shall provide an overview of the entire propulsion system, including controls and monitoring. The training shall include start up procedures, operating procedures and shutdown procedures. The training shall include personnel safety procedures. The training shall also include basic maintenance procedures and good practice. The training shall be provided at the NCDOT's Manns Harbor facility immediately prior to delivery of the vessel. It shall be conducted for up to fifteen (15) NCDOT employees.

The Contractor shall record the training sessions and provide recorded training sessions to the Owner in DVD format.

856 INSTRUCTION BOOKS, OPERATING MANUALS, AND TECHNICAL DATA SHEETS

The Contractor shall provide instruction books and/or operating manuals for all equipment and machinery on board. Before delivery of the vessel, one (1) paper copy and one (1) electronic copies shall be provided to NCDOT.

TS-139

Following completion of sea trials, the Contractor shall coordinate with a local oil test laboratory to perform diagnostic analysis on all lubricants. The tests shall include the standard diagnostics recommended by the engine manufacturer, including tests for water and fuel contamination.

Tests shall include a sample of fresh oil of each type, prior to filling machinery, and an operating sample. The operating oil sample shall be drawn from a machine operating at normal temperatures. Samples shall not be drawn from stagnant points in the equipment system.

A spectrographic analysis shall be conducted for trace metals, employing an emission spectrometer for the following elements:

- Iron
- Lead
- Copper
- Chromium
- Silicon
- Molybdenum
- Aluminum
- Nickel
- Silver
- Tin
- Magnesium

The following machinery shall be sampled:

- Cycloidal propellers
- Generator engines
- Main engines
- Reduction gears

983 DELIVERY

Upon completion of construction, operational tests, sea trials, and after all known defects have been corrected, and the vessel is ready and able to be put into passenger service, the Contractor shall safely deliver the vessel afloat at NCDOT's shipyard located in Manns Harbor, NC. Plans for the delivery voyage shall be approved by the NCDOT Representative. During transit, the vessel shall remain within twenty (20) miles of a port of safe refuge at all times.

The delivery voyage shall not use supplemental fuel tanks or bladders. The NCDOT Representative shall attend the delivery voyage as observer, but shall be given right to stop the voyage in the event of poor weather. Regardless, the voyage shall not proceed if significant wave height exceeds 4'.

Prior to the delivery voyage, the Contractor shall obtain a provisional Certificate of Inspection (COI) with the only outstanding requirement being the required USCG testing with the vessel's crew.

TS-140

At the completion of the delivery voyage and prior to the Owner taking delivery (acceptance) of the vessel, the Contractor shall repeat the sea trials in Pamlico Sound to the satisfaction of the Owner and the final COI shall be obtained.

After completion of these trials, the vessel shall be dry docked at NCDOT's expense. The underwater hull surfaces shall be thoroughly inspected and any damage found, including that to coatings, plate, equipment, and hull fittings, shall be repaired prior to acceptance at the Contractor's expense.

NCDOT will provide afloat berthing at the Manns Harbor facility from arrival until acceptance for a maximum of two months.

The vessel shall be in first class condition throughout. The vessel shall be thoroughly cleared of all dunnage, staging, debris, spatters, and dirt and shall be washed down, painted out and left clean. Special care shall be taken to see that all surfaces in bilges, tanks and voids, piping, wireways, machinery, floor plates, and gratings are clean and free from any foreign substances.

The vessel's engines and equipment shall be filled with lubricating oil. Diesel oil remaining on the vessel at delivery will be purchased by NCDOT at the certified cost to the Contractor.

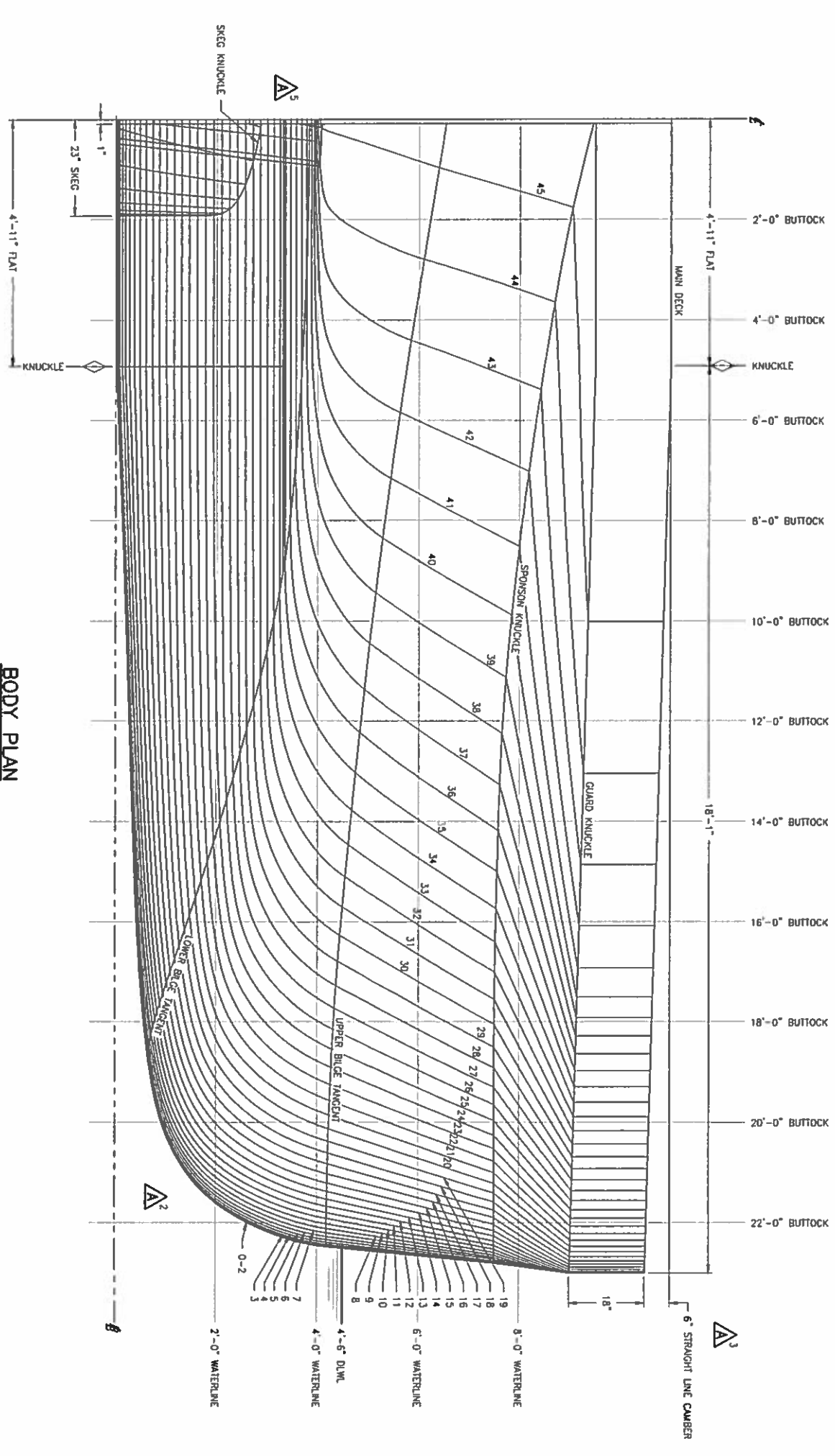
996 LAUNCHING AND DRY DOCKING

The Contractor shall be responsible for the satisfactory launching of the vessel at a time to be mutually agreed upon by all parties concerned. Arrangements for the sponsor will be made by NCDOT. Expenses connected with the launching shall be borne by the Contractor.

While dry-docking prior to sea trials is not an absolute requirement unless the vessel has been in the water for more than twenty (20) calendar days, the Contractor is responsible for conducting sea trials with a clean bottom and clean sea chests. Approximately four (4) calendar days prior to scheduled sea trials, the Contractor shall determine the condition of the bottom and sea chests and notify NCDOT of same. If necessary to conduct proper trials, the Contractor shall thoroughly clean the underwater surface of the hull.

If the sea trials at Manns Harbor, NC are started within one (1) week of the vessels arrival the bottom need not be cleaned beforehand. If more than one (1) week has elapsed the bottom shall be inspected and if necessary cleaned at the Contractor's expense.

The Contractor shall bear the cost of any required dry-docking prior to the vessel's arrival at NCDOT's Manns Harbor facility. NCDOT will provide dry-docking services for the vessel at the Manss Harbor facility.



BODY PLAN

REV	ZONE	DESCRIPTION	DWG	DATE	APVD
1	A	1. UPDATED PE STAMP FOR REV A.			
2		2. UPDATED DESCRIPTION OF BLDG TANGENTS.	DWG	08/31/17	KJ
3		3. REMOVED 10' AND 12' WATERLINES FROM BODY PLAN.			
4		4. ADDED THRUSTER CL AT FR 37 TO SHEAR PLAN.			
5		5. ADDED TRANSVERSE CHINE LINE TO FLAT HULL PLATE.			
2-2C					

GENERAL NOTES

1. VESSEL TO BE CONSTRUCTED IN ACCORDANCE WITH 46 CFR SUBCHAPTER H REGULATIONS.
2. FRAME SPACING IS 24" UNLESS NOTED OTHERWISE.
3. ALL DIMENSIONS ARE MOLDED.
4. HULL IS SYMMETRICAL ABOUT MIDSHIP AND CENTERLINE.

VESSEL PARTICULARS

LENGTH OVERALL: 183'-7"
 LENGTH DESIGN LOAD WATERLINE: 180'-6"
 BEAM OVER GUARDS: 46'-0"
 DEPTH AT SIDE: 10'-6"
 DRAFT AT DLM: 4'-6"
 FREEBOARD AT SIDE: 6'-0"
 TOTAL PERSONS ON BOARD CAPACITY: 300 MAX.
 VEHICLE CAPACITY: 40 SV

REFERENCES

1. 16101-200-632-1 TECHNICAL SPECIFICATION

Elliott Bay Design Group
 North Carolina, PLLC
 NORTH CAROLINA D.O.T.
 RALEIGH, NORTH CAROLINA
 NEW RIVER CLASS FERRY

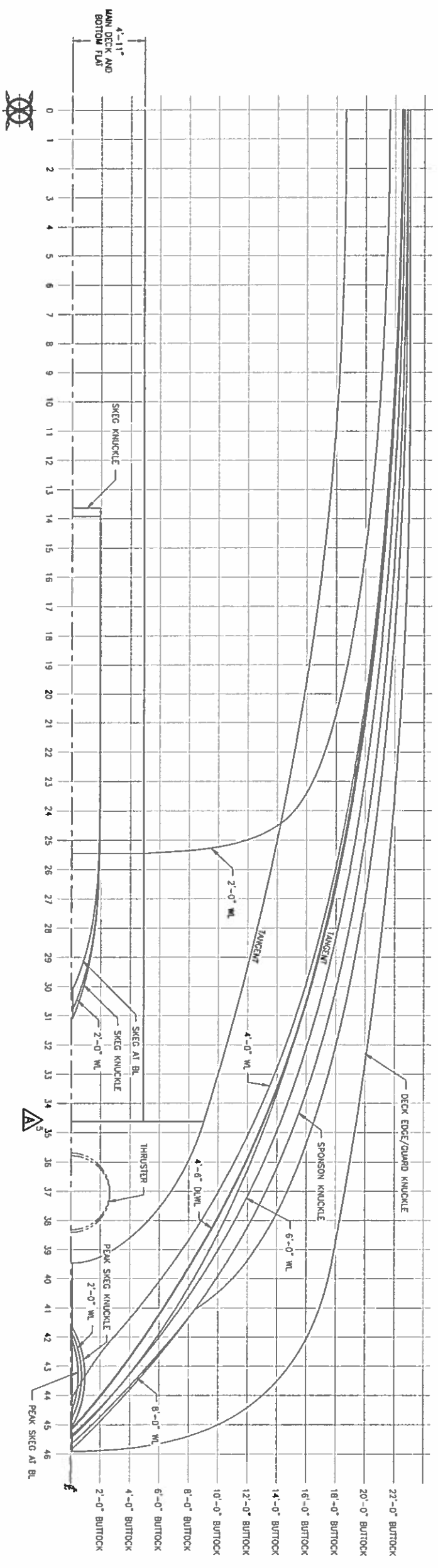
North Carolina Ferry System
 AND SERVICE OF
THE FERRY

FOR REV A ONLY

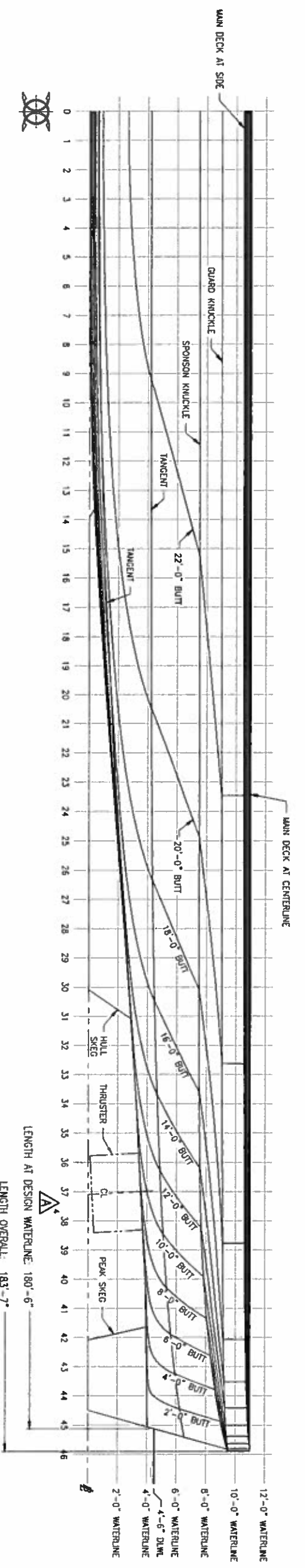
PROFESSIONAL ENGINEER
 STAMP FOR:
 ENGR: PATRICK D. FAAS
 DATED: 07/27/2017
 STATE: WA
 REG NO: 49313



REV	DATE	BY	CHKD
D	16101-200-100-1	A	
1	16101-200-100-1A	1	2
2			



HALF BREADTH PLAN



SHEAR PLAN

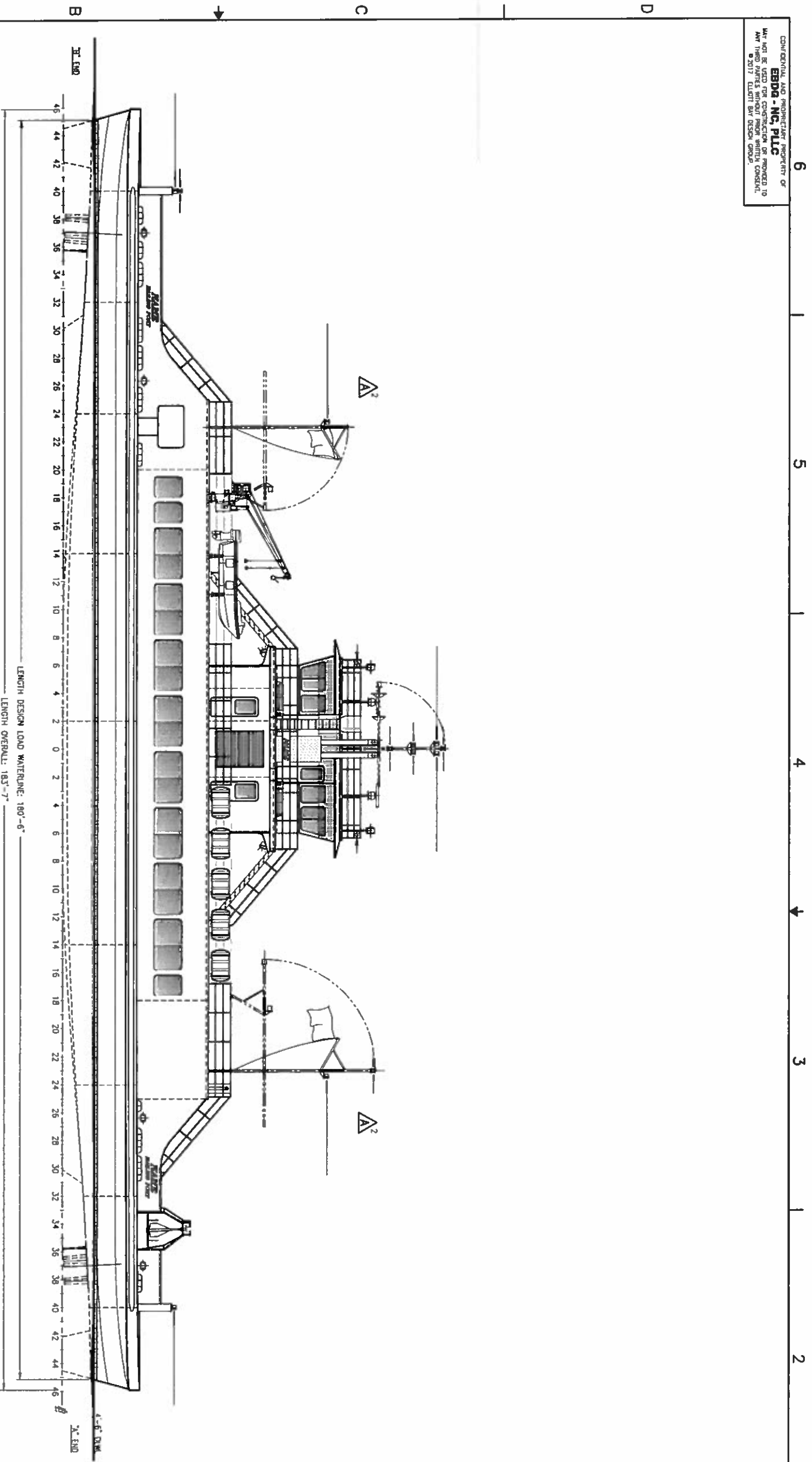
LENGTH AT DESIGN WATERLINE: 180'-6"
 LENGTH OVERALL: 183'-7"

PROFESSIONAL ENGINEER
 STAMP PER
 REV: _____
 ENGR: PATRICK D. FAS
 DATED: 07/27/2017
 STATE: WA
 REG NO: 49313



DATE	DATE	SCALE	SCALE
D	D	1/4" = 1'-0"	1/4" = 1'-0"
16101-200-100-1	16101-200-100-1A	SHEET 2	OF 2

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OUTBOARD PROFILE

LENGTH DESIGN LOAD WATERLINE: 180'-6"
 LENGTH OVERALL: 183'-7"

REVISION HISTORY

REV	ZONE	DESCRIPTION	DWG	DATE	APP'D
A		1. UPDATED PE STAMP FOR REV A. 2. RELOCATED MASTS TO FRAME 23.		08/31/17	KJA
1-58		1. ADDED CAMBER AND TURNLEHOUPE			
2-30		2. DIMENSIONS TO MIDSHIP SECTION.			
3-4		3. UPDATED CHOCK AND CLEAN LOCATIONS IN MAIN DECK PLAN.			
3-5		4. ADDED RAILS TO MAIN DECK AND HOLD			
3-16		5. ADDED TANK CAPACITIES TO HOLD PLAN.			
4-20		6. ADDED PILOT CHAIR LOCATION AND SIZE IN PILOT HOUSE CONSOLE DETAIL.			
4-10		7. ADDED GRABRAIL TO PILOT HOUSE CONSOLE DETAIL.			

GENERAL NOTES

- VESSEL TO BE CONSTRUCTED IN ACCORDANCE WITH 46 CFR SUBCHAPTER H REGULATIONS.
- FRAME SPACING IS 24" UNLESS NOTED OTHERWISE.

VESSEL PARTICULARS

LENGTH OVERALL: 183'-7"
 LENGTH DESIGN LOAD WATERLINE: 180'-6"
 BEAM, MOLDED: 46'-0"
 BEAM OVER GUARDS: 46'-10"
 DEPTH AT SIDE: 10'-6"
 DRAUGHT AT D.M.W.: 4'-6"
 FREEBOARD AT SIDE: 6'-0"
 TOTAL PASSENGER CAPACITY: 300 MAX
 VEHICLE CAPACITY: 40 SV

- REFERENCES**
- 16101-200-832-1 TECHNICAL SPECIFICATION
 - 16101-200-100-1 UNES PLAN
 - 16101-200-101-7 FIRE ZONE PLAN
 - 16101-200-120-1 MIDSHIP SECTION
 - 16101-200-201-1 MACHINERY ARRANGEMENT

Elliott Bay Design Group
 North Carolina, PLLC
 NORTH CAROLINA D.O.T.
 RALEIGH, NORTH CAROLINA
 NEW RIVER CLASS FERRY

PROFILES AND DECK ARRANGEMENTS

PROJECT: 16101-200-101A
 SHEET: 1 OF 4
 DATE: 7/27/2017

PROFESSIONAL ENGINEER
 STAMP PER: PATRICK D. FAAS
 ENGINEER: PATRICK D. FAAS
 DATED: 07/27/2017
 STATE: WA
 REG. NO.: 48313



A

6

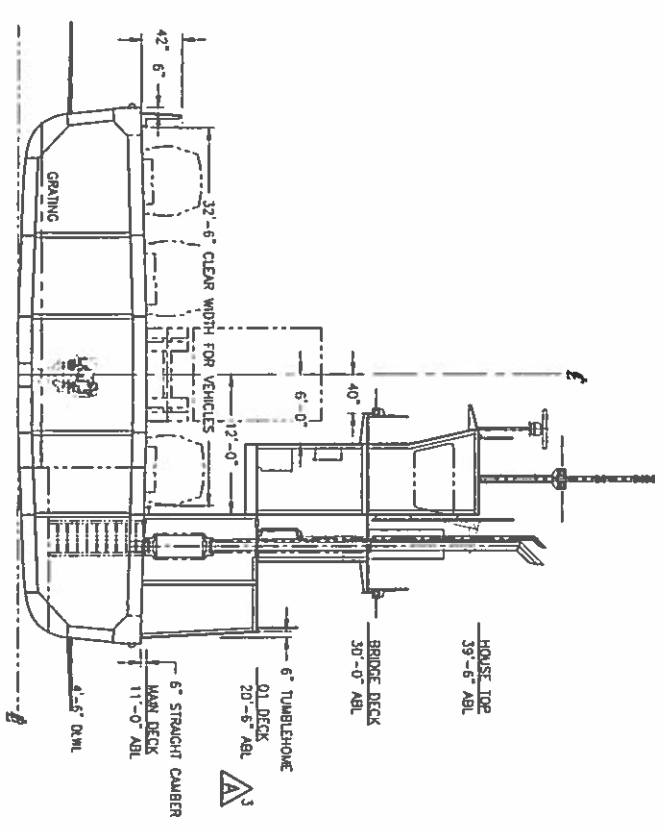
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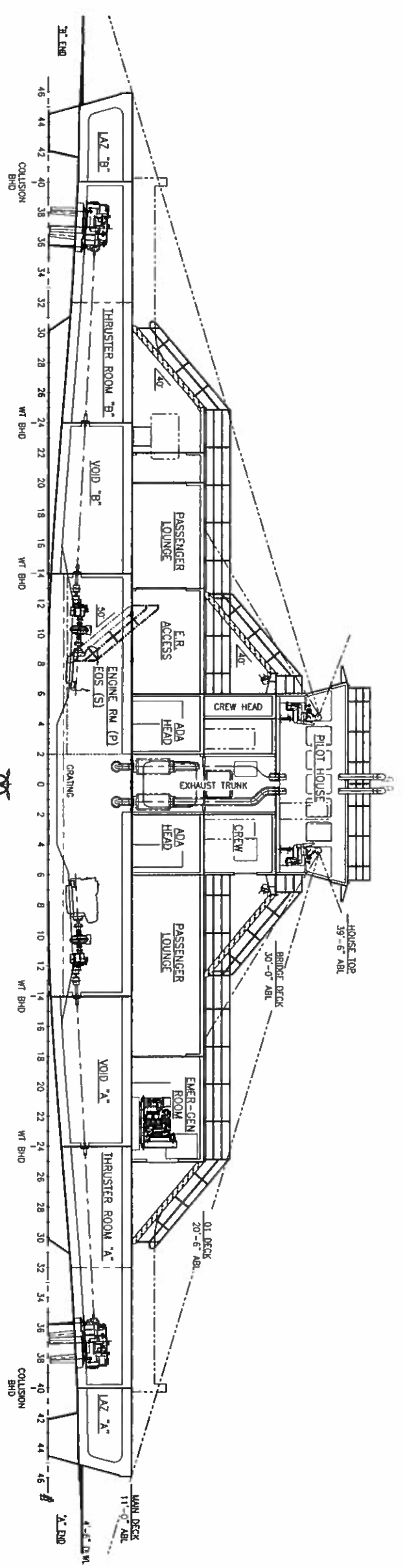
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MIDSHIP SECTION

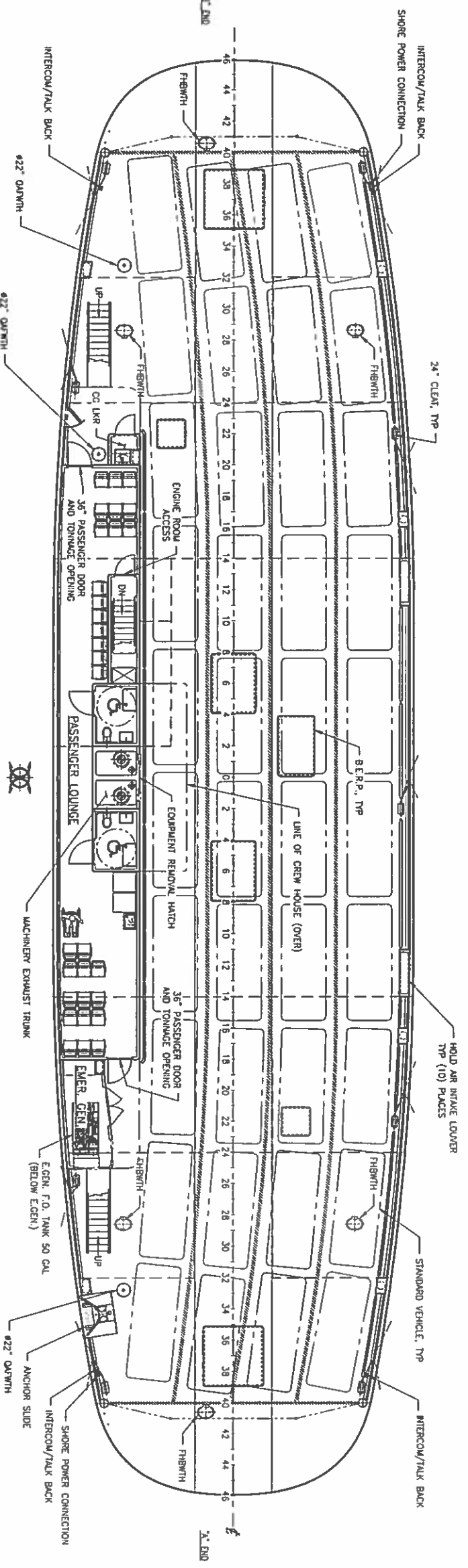


INBOARD PROFILE

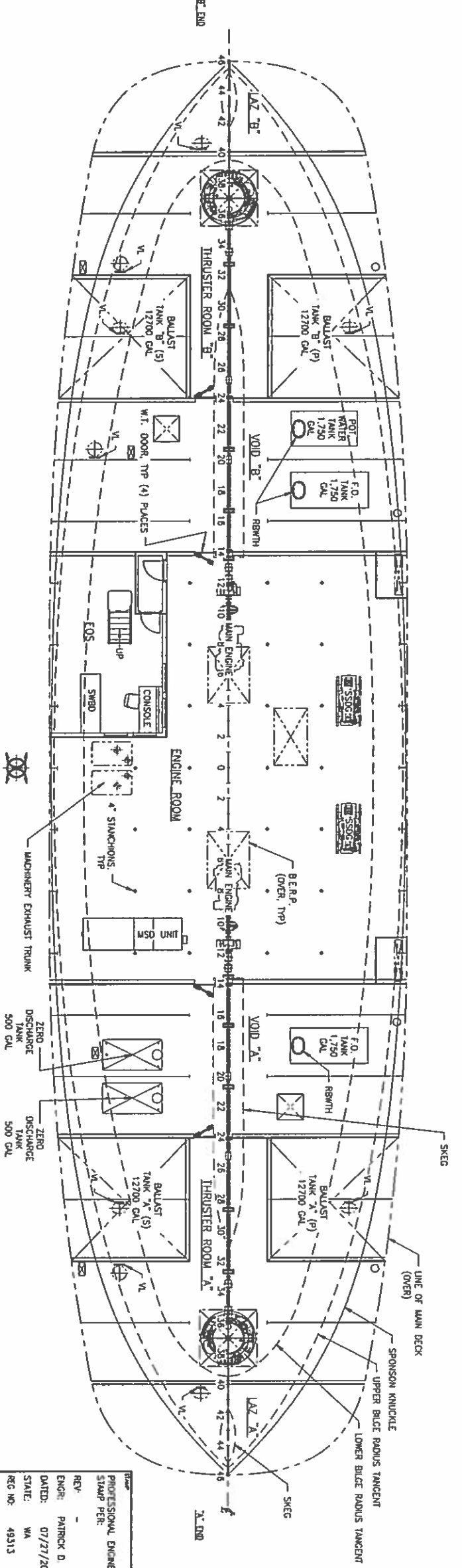
FOR REV A ONLY
 PROFESSIONAL ENGINEER
 STAMP PER:
 ENGR: PATRICK D. FRAS
 DATED: 07/27/2017
 STATE: WA
 REG NO: 48313



REV	DATE	BY	APP'D
D	16101-200-101A		
SCALE: 1/8" = 1'-0"		16101-200-101A	
16101-200-101-1		SHEET 2 OF 4	



A⁴⁵ MAIN DECK PLAN

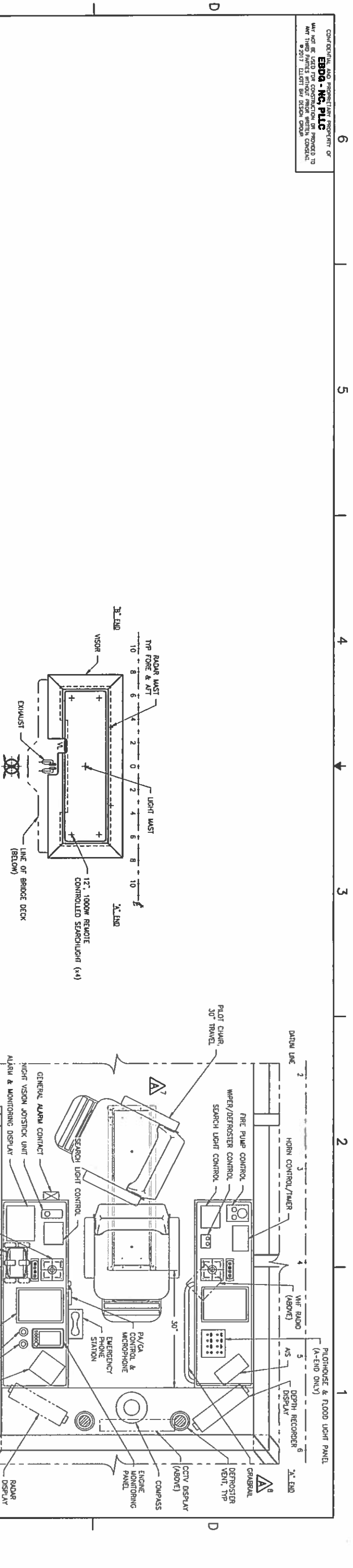


A⁵⁵ HOLD PLAN

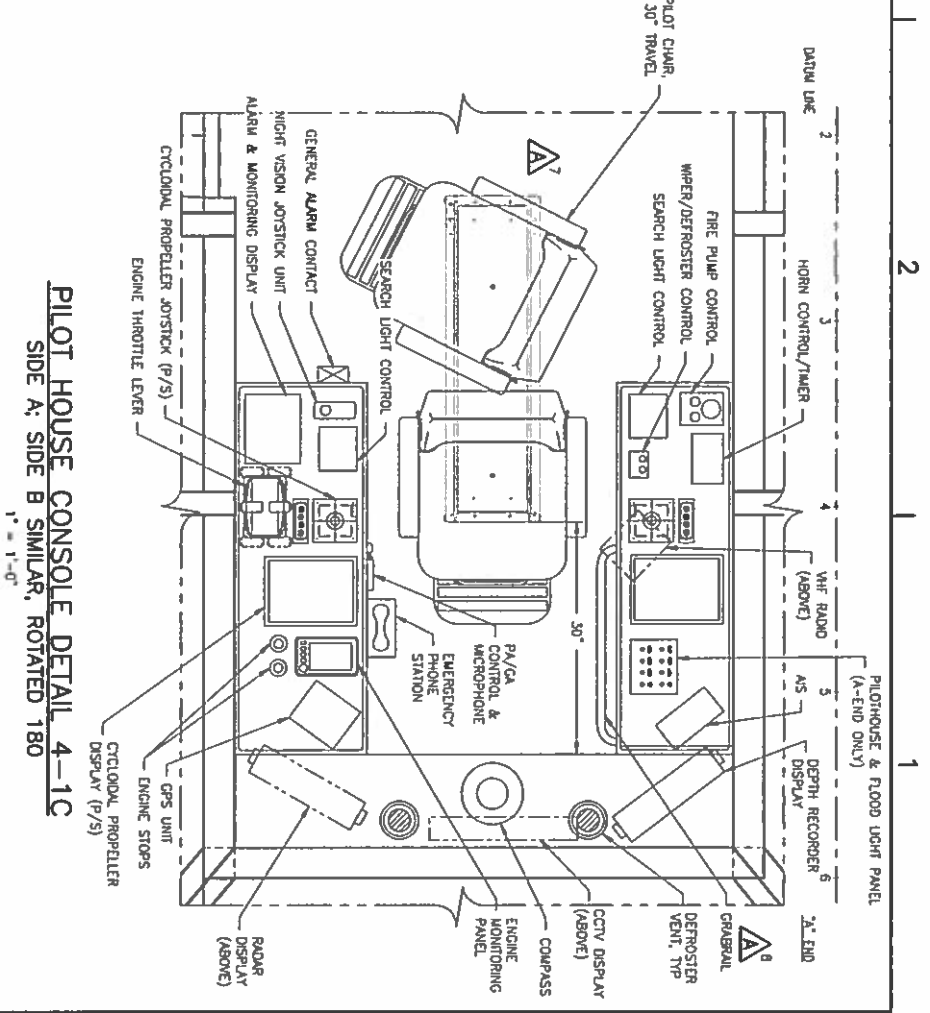
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 ENGR: PATRICK D FAAS
 DATED: 07/27/2017
 STATE: WA
 REG NO: 49313



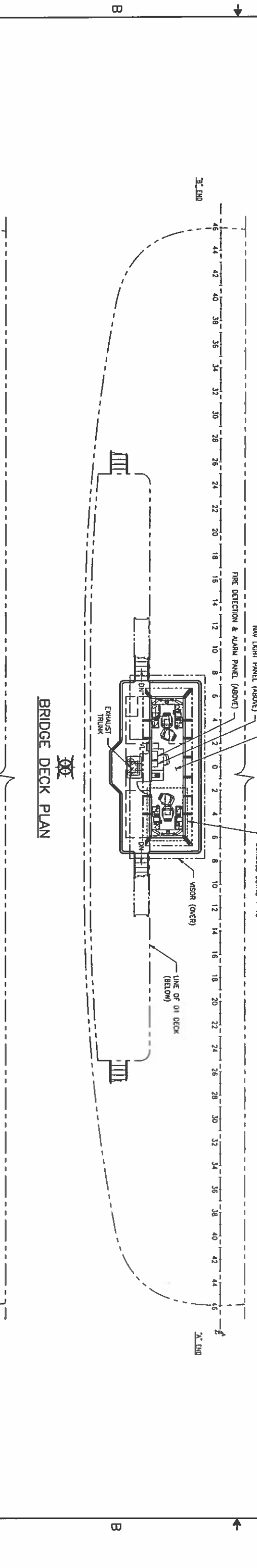
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PROJECT	16101-200-101A				
DWG NO.	16101-200-101-1				
DATE	08/31/2017				



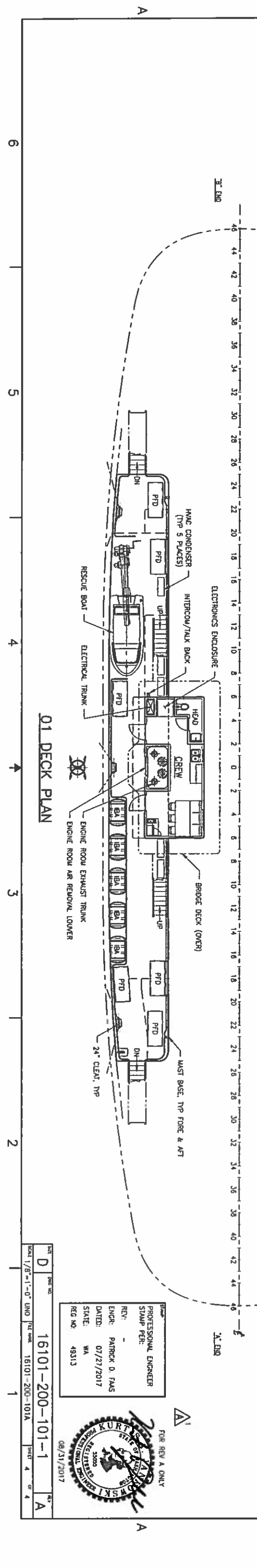
HOUSE TOP PLAN



PILOT HOUSE CONSOLE DETAIL 4-1C
 SIDE A; SIDE B SIMILAR, ROTATED 180



BRIDGE DECK PLAN

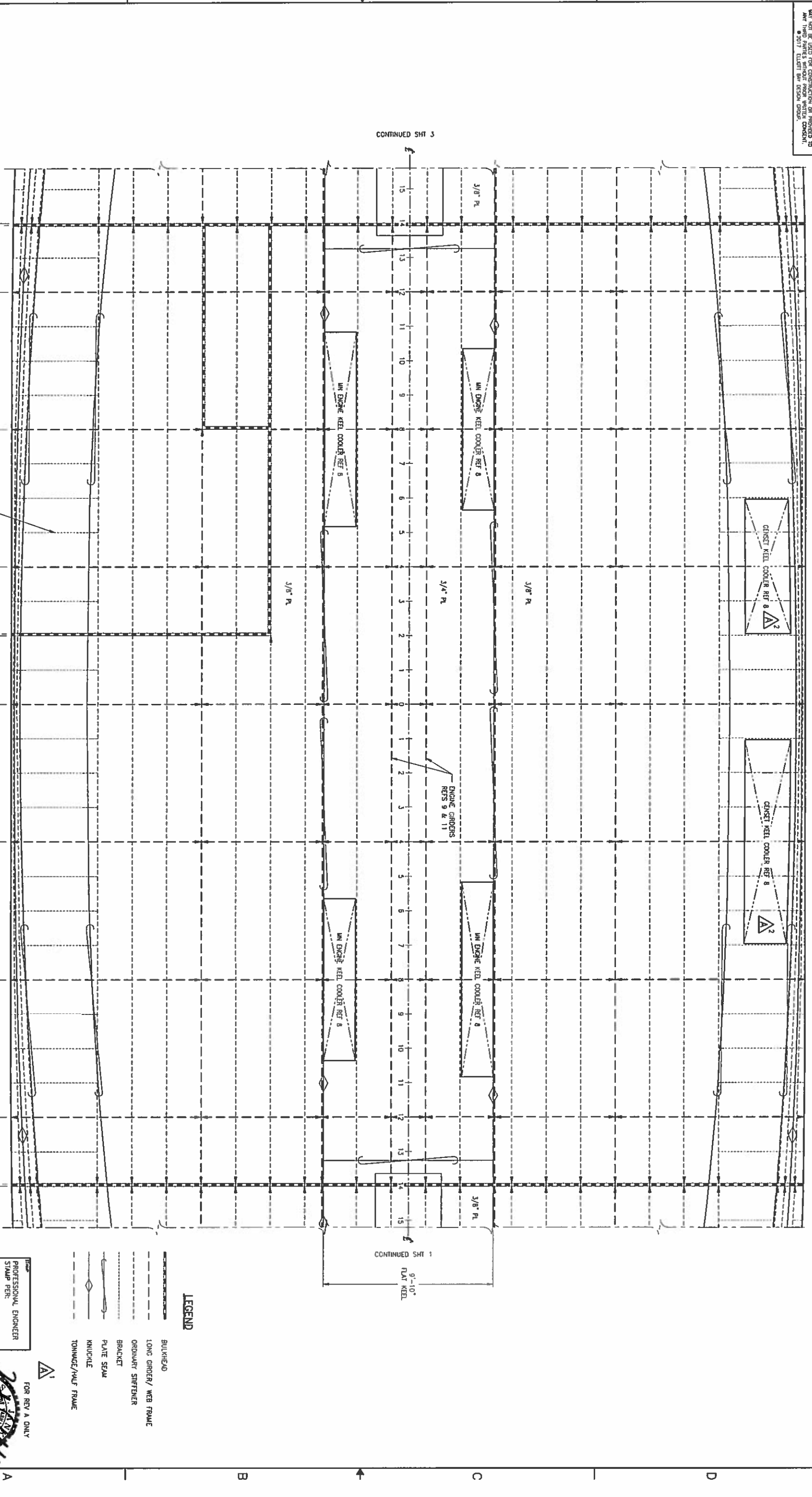


01 DECK PLAN

PROFESSIONAL ENGINEER
 STAMP PER:
 REVR: PATRICK D. FAAS
 DATED: 07/27/2017
 STATE: VA
 REG NO: 49313



SCALE: 1/8"=1'-0" UNDO
 16101-200-101A
 SHEET: 4 OF 4



CONTINUED SHT 3

CONTINUED SHT 1

LEGEND

- BULKHEAD
- LONG GIRDER/ WEB FRAME
- ORDINARY STIFFENER
- BRACKET
- PLATE SEAM
- KNUCKLE
- TONNAGE/WMF FRAME

PROFESSIONAL ENGINEER
 STAMP PER:
 REV: PATRICK D. FAS
 ENGR: PATRICK D. FAS
 DATED: 07/27/2017
 STATE: WA
 REG NO: 49313



FOR REV. A ONLY

PLAN 2-4A
BOTTOM SHELL - MIDSHIP
 REFLECTED PLAN

- KEEL PL.
- BOTTOM SHELL PL.
- SIDE SHELL PL.
- BOTTOM STIFFENERS:
- SIDE SHELL STIFFENERS:
- WEB FRAMES:
- BOTTOM GIRDERS:

- 3/4" TYP U.N.O.
- 3/8" TYP U.N.O.
- 5/16" TYP U.N.O.
- 5.33x1/2x1/4 L TYP U.N.O.
- 4.33x1/4 L TYP U.N.O.
- 14.33x5/16" FP TYP U.N.O.
- 14.33x5/16" FP TYP U.N.O.

6 5 4 3 2 1

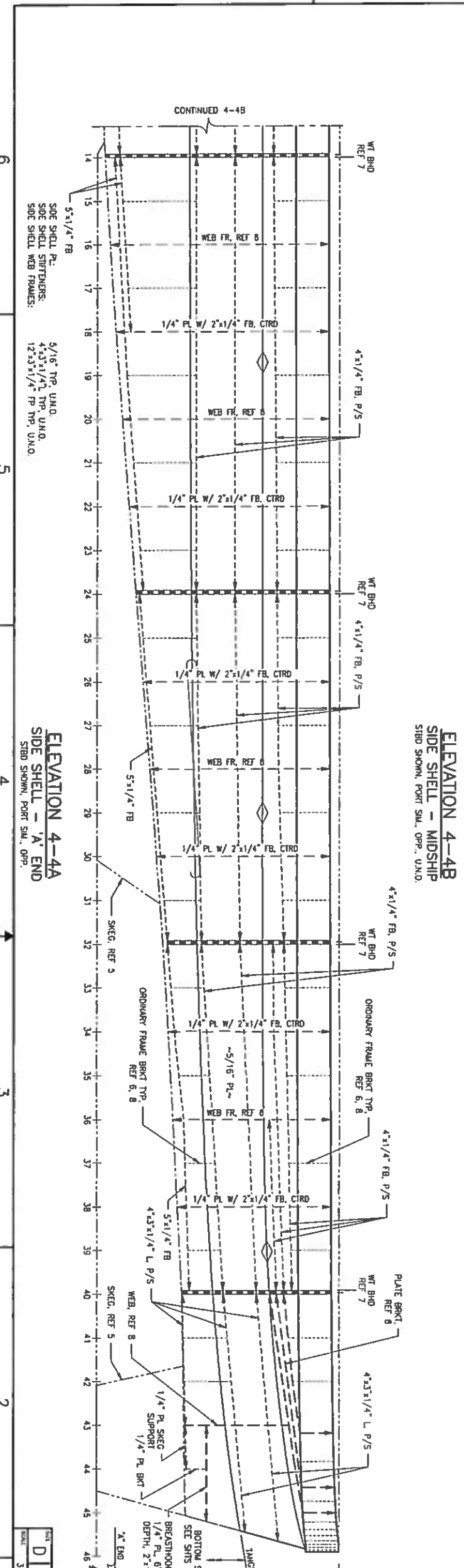
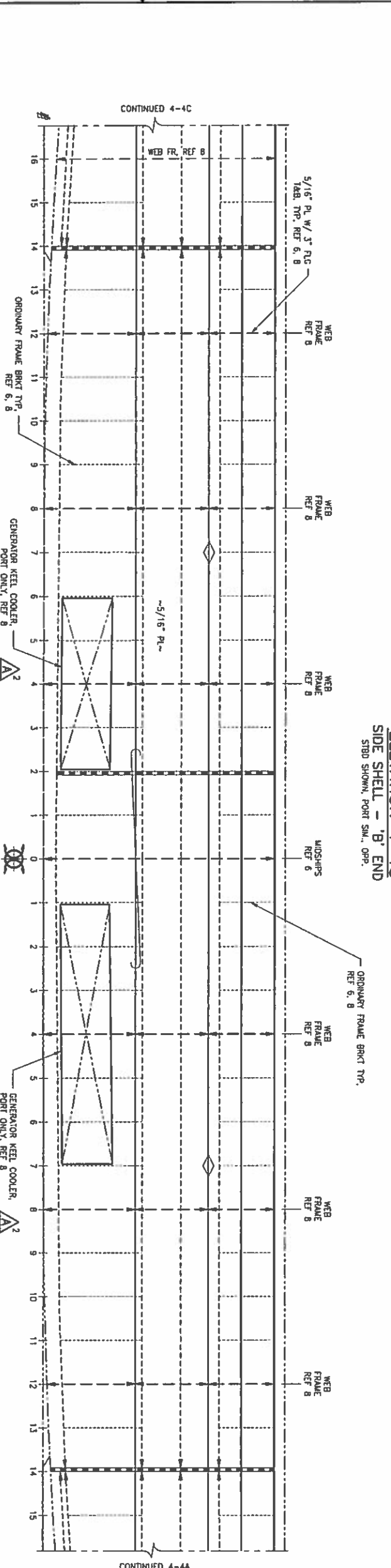
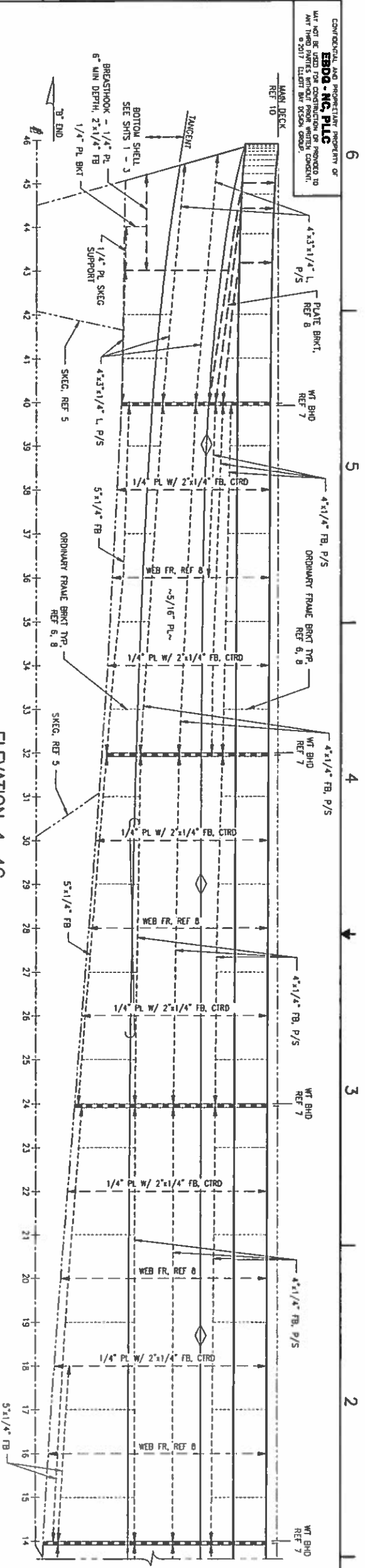
A B C D

1 2 3 4 5 6

16101-200-110-1

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

Sheet: 2 of 4

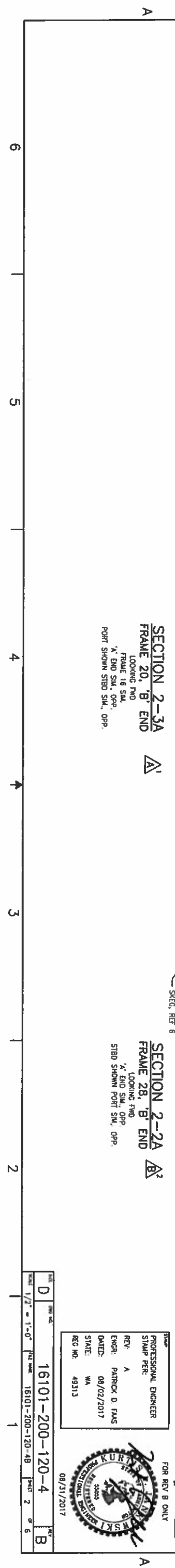
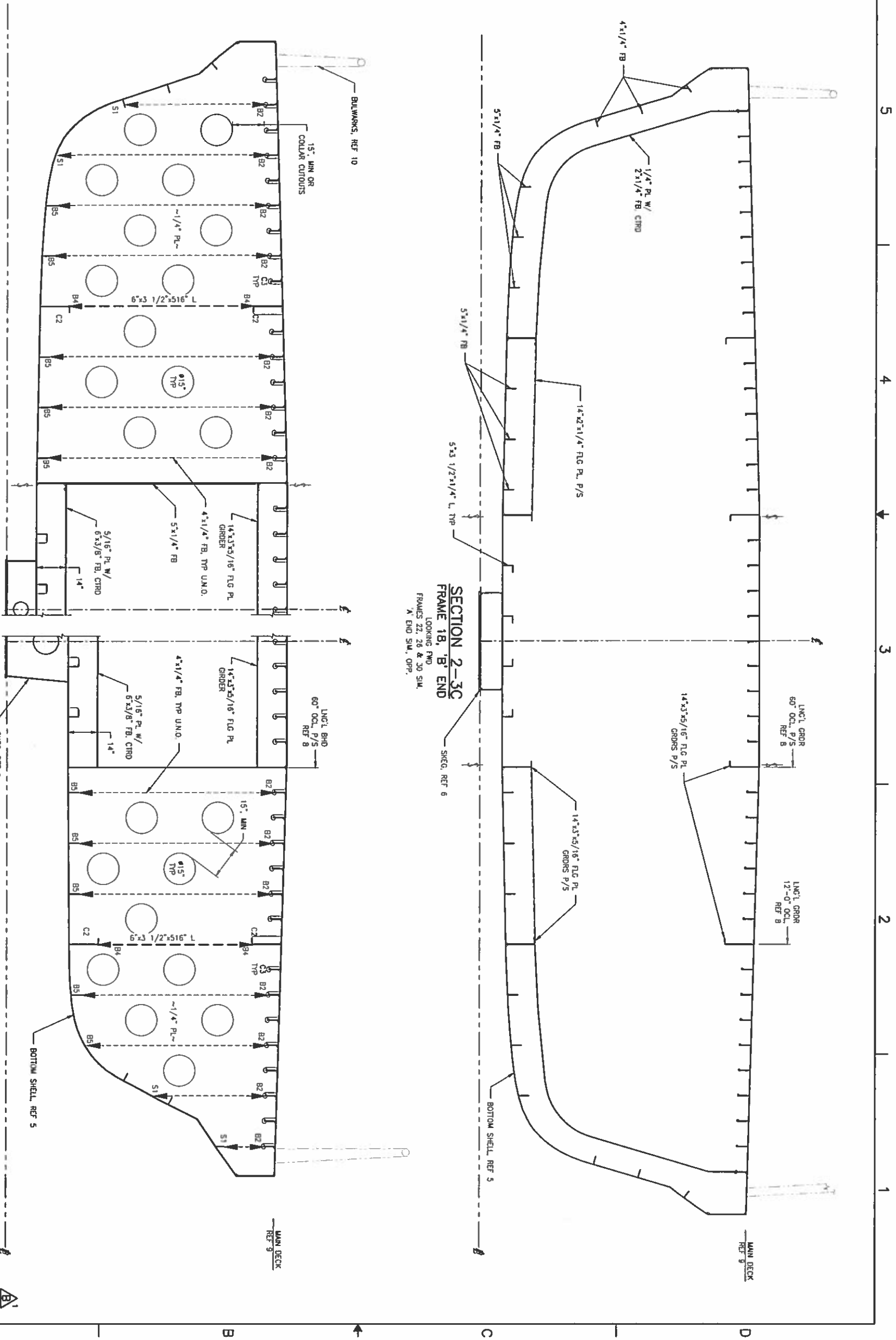
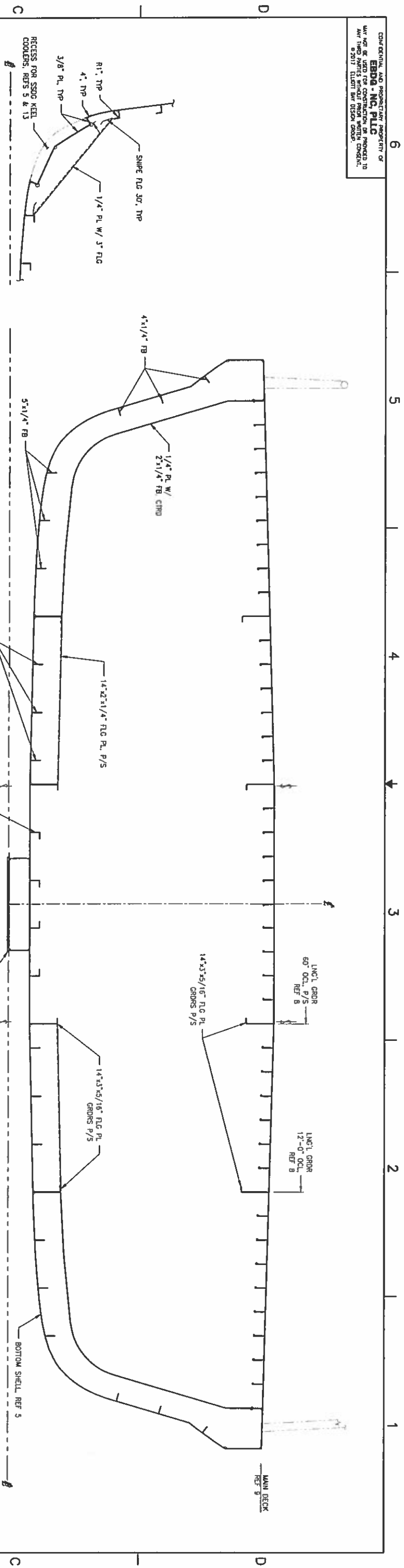


LEGEND

	BULKHEAD
	LONG CHORD / WEB FRAME
	ORDINARY STIFFENER
	BROCKET
	PLATE SEAM
	KNOCKLE
	TONNAGE / HALF FRAME

PROFESSIONAL ENGINEER
 STAMP PER:
 ENGR: PATRICK D. FAAS
 DATED: 07/27/2017
 STATE: WA
 REG. NO: 49313



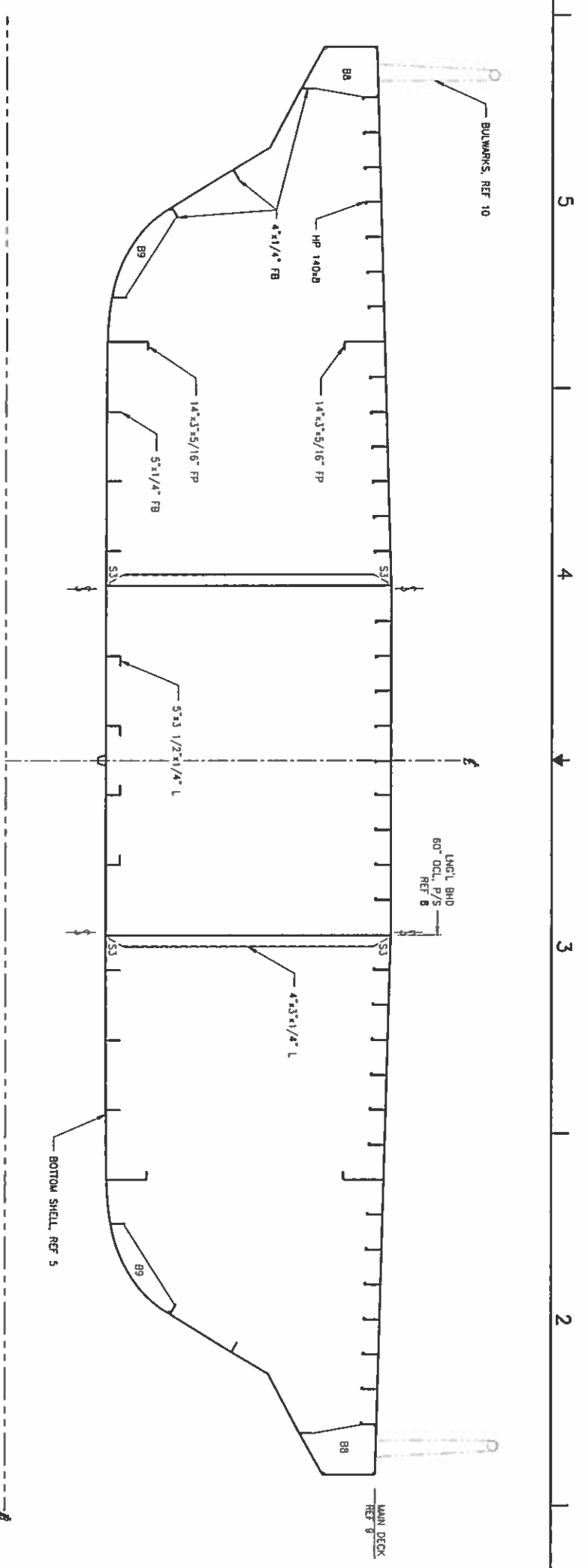


FOR REV B ONLY

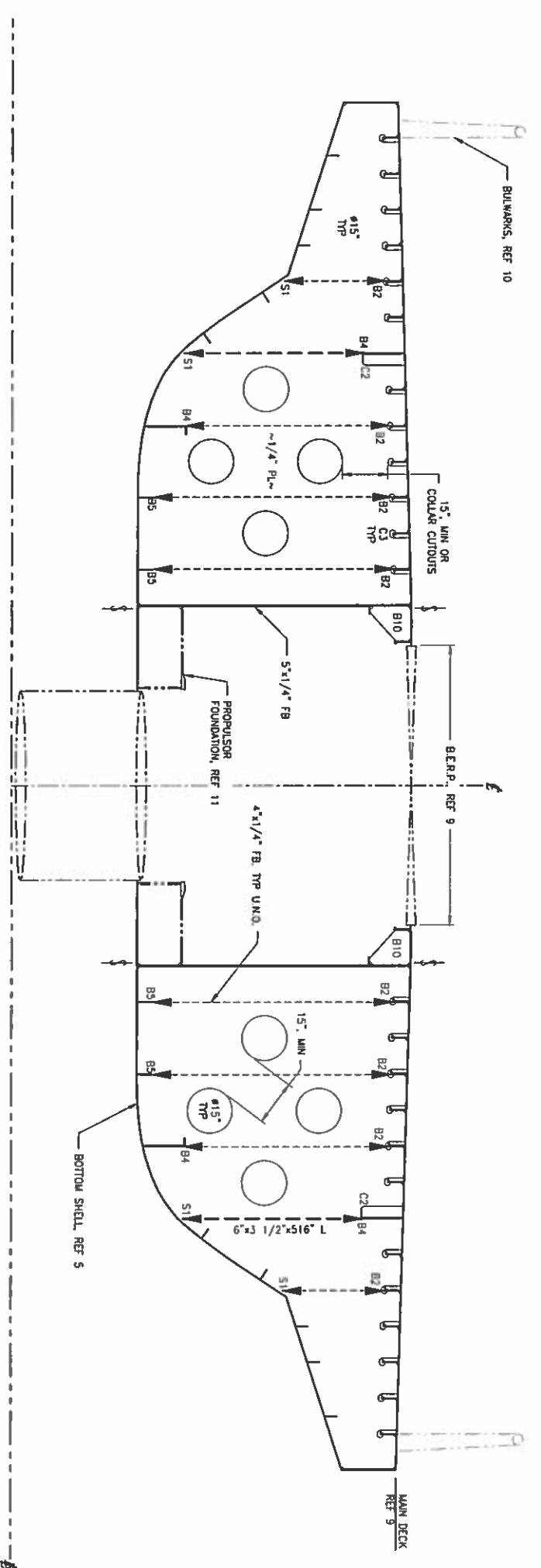
PROFESSIONAL ENGINEER
 STAMP PER:
 REV: A
 ENGR: PATRICK D FIAS
 DATED: 08/02/2017
 STATE: WA
 REG NO: 49313



REV	DATE	BY	CHKD
D	16101-200-120-4		
SCALE: 1/2" = 1'-0"		SHEET: 2 OF 6	
PROJECT: 16101-200-120-4B			



SECTION 3-4C
FRAME 31, 'B' END
 LOOKING FWD

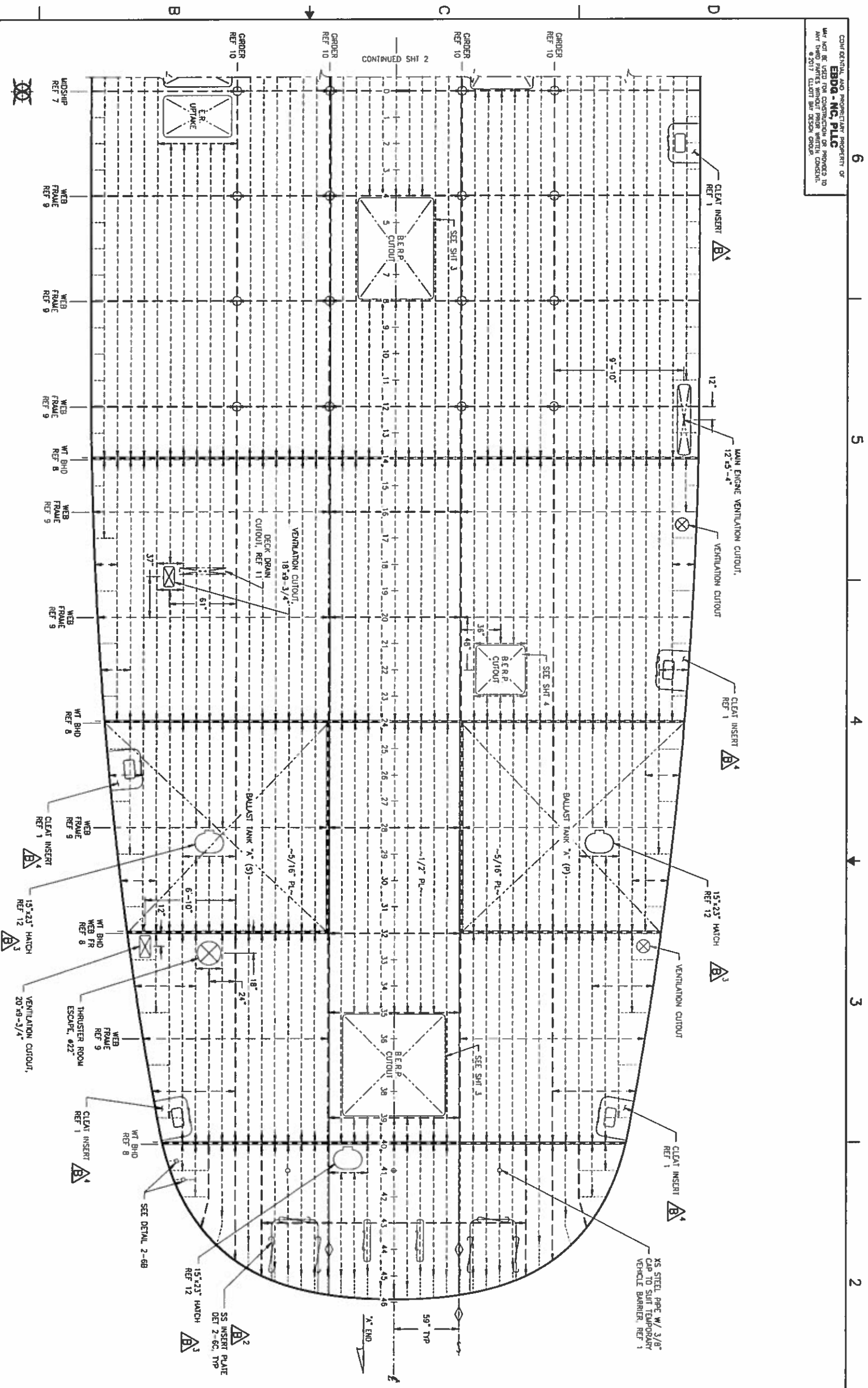


SECTION 3-4A
FRAME 36, 'B' END
 LOOKING FWD

PROFESSIONAL ENGINEER
 STAMP PER:
 REV: A
 ENGR: PATRICK O. FIAS
 DATED: 08/02/2017
 STATE: WA
 REG NO: 49313

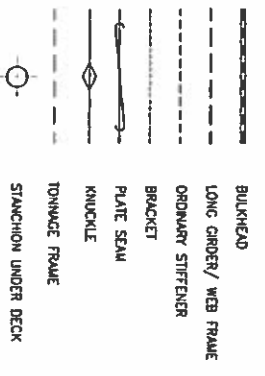


REV	DATE	BY	CHKD
D	16101-200-120-4		
SCALE 1/2" = 1'-0"		DATE PLOT 16101-200-120-4B	SHEET 3 OF 6



PLAN 1-4A
MAIN DECK - 'A' END

MAIN DECK PL - CENTER: 1/2" TYP UNO.
 MAIN DECK PL - QUIBD: 5/16" TYP UNO.
 MAIN DECK STIFFENERS: HP14x8 TYP UNO.
 MAIN DECK GIRDERS & WEBS: 14"x3.5"/16" TYP UNO.
 STANCHIONS: 4" SCH 40 TYP UNO.



REVISION HISTORY

REV	ZONE	DESCRIPTION	DRWN	DATE	APVD
A	1-4A	1. CORRECTED DECK PLATE THICKNESS	PPF	7/28/17	PPF
B	2-3A	1. UPDATED PE STAMP FOR REV B. 2. UPDATED MATERIAL DESCRIPTION OF INSERT PLATES AT ENDS TO STAINLESS STEEL 3. ADDED MANHOLES AND HATCHES 4. UPDATED LOCATIONS OF CLEAT INSERTS	DWG	8/31/17	KAJ
C	1-4A				
D	2-3A				

GENERAL NOTES

- VESSEL TO BE CONSTRUCTED IN ACCORDANCE WITH 46 CFR SUBCHAPTER H REGULATIONS
- FRAME SPACING @ 24"
- TOP SURFACE OF MAIN DECK TO BE RUSH THROUGHOUT. SEE REF 1.

REFERENCES

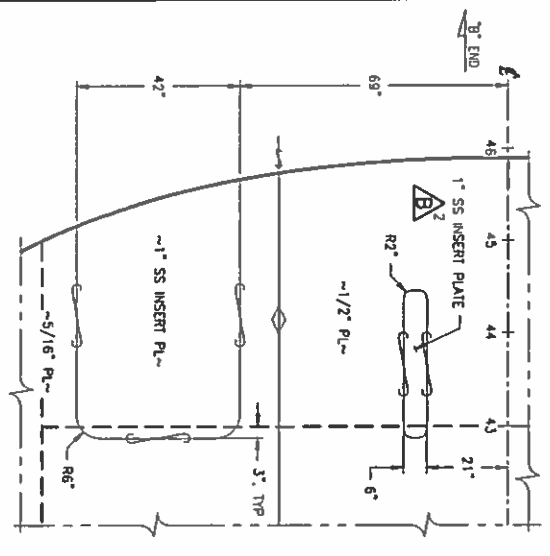
- 16101-200-632-1 TECHNICAL SPECIFICATION
- 16101-200-061-1 SCANTLING CALCULATIONS
- 16101-200-100-1 UNES PLAN
- 16101-200-101-1 PROFILES AND DECK ARRANGEMENTS
- 16101-200-110-1 BOTTOM AND SIDE SHELL
- 16101-200-110-2 SKES
- 16101-200-120-1 MIPSHIP SECTION
- 16101-200-120-3 HULL TRANSVERSE BULKHEADS
- 16101-200-120-4 HULL TRANSVERSE FRAMES
- 16101-200-120-5 HULL LONGITUDINAL BULKHEADS AND GIRDERS
- 16101-200-526-1 DECK DRAIN PUMP SYSTEM
- 16101-200-624-3 HATCH SCHEDULE

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 RALEIGH, NORTH CAROLINA
 NEW RIVER CLASS FERRY

MAIN DECK

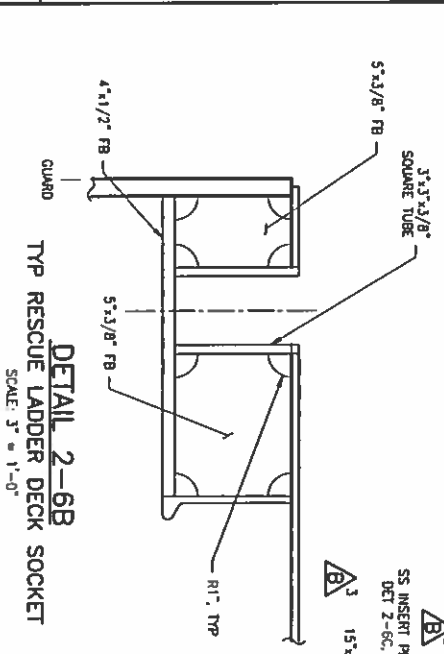
PROFESSIONAL ENGINEER
 STAMP PER:
 REV: A
 ENGR: PATRICK D. FIAS
 DATED: 07/28/2017
 STATE: WA
 REG. NO: 48313





DETAIL 2-6C
MAIN DECK LOADING ZONE
 INSERT PLATES
 SCALE: 1/2" = 1'-0"

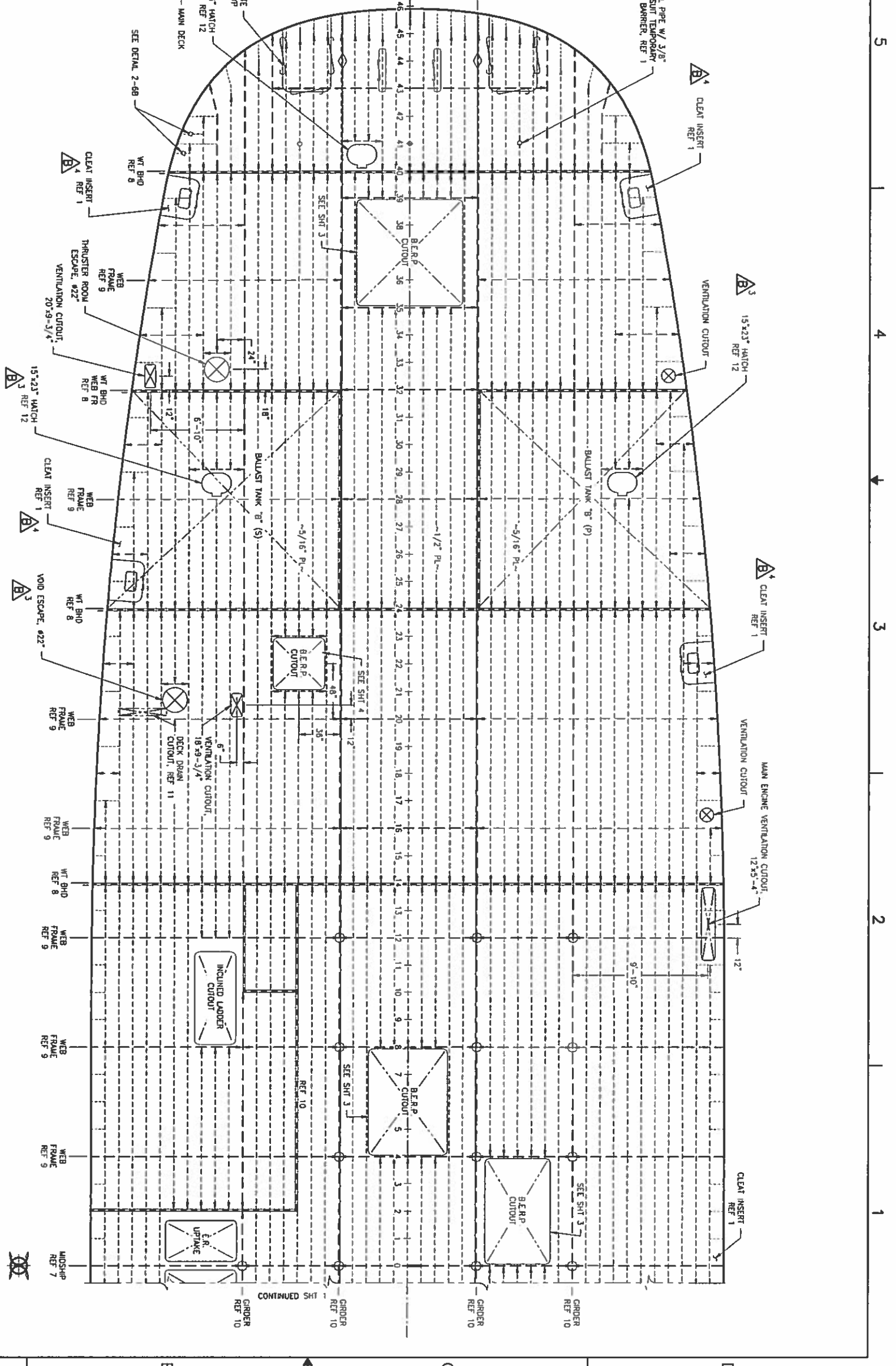
NOTE:
 B END STARBOARD SHOWN
 PORT S/W/OPP.
 A END S/W/OPP.



DETAIL 2-6B
TYP RESCUE LADDER DECK SOCKET
 SCALE: 3" = 1'-0"

LEGEND

- BULKHEAD
- LONG GIRDER / WEB FRAME
- ORDINARY STIFFENER
- BRACKET
- PLATE SEAM
- KNUCKLE
- TONNAGE FRAME
- STANCHION UNDER DECK



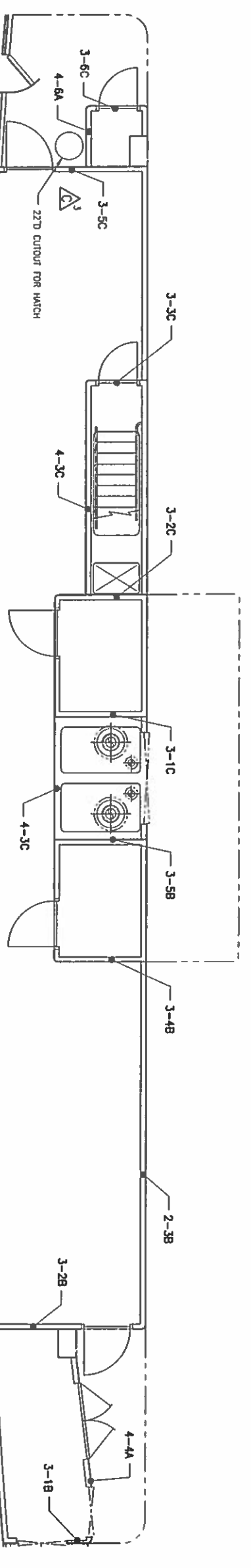
PLAN 2-3A
MAIN DECK - 'B' END
 SCALE: 1/4" = 1'-0"

MAIN DECK PL - CENTER: 1/2" TYP UNO.
 MAIN DECK PL - OUTBD: 5/16" TYP UNO.
 MAIN DECK STIFFENERS: HP140B TYP UNO.
 MAIN DECK GIRDERS & WEBS: 15" x 3 5/16" TYP UNO.
 STANCHIONS: 4" SCH 40 TYP UNO.

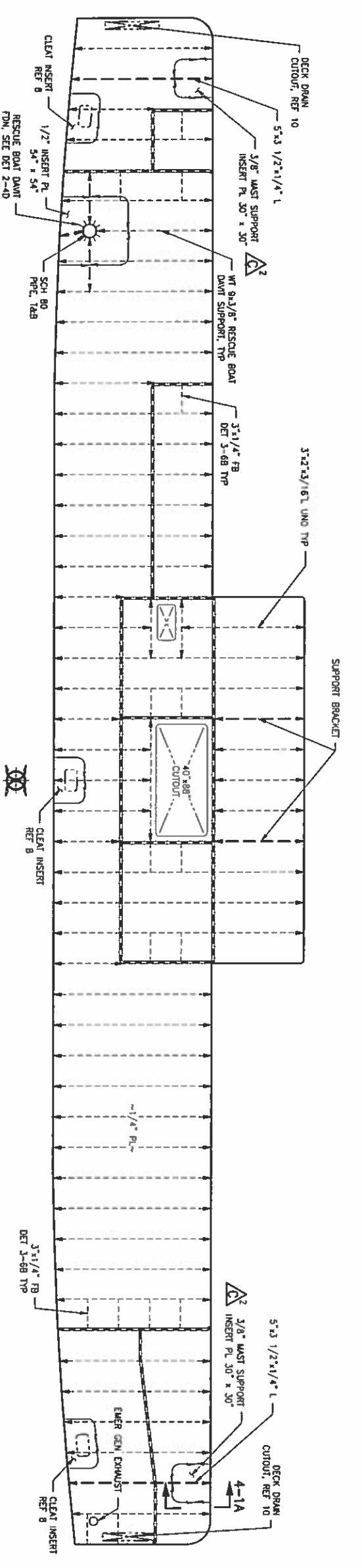
PROFESSIONAL ENGINEER
 STAMP PER:
 REV: A
 ENGR: PATRICK D. PAAS
 DATED: 07/28/2017
 STATE: WA
 REC NO: 43113



REV	DATE	DESCRIPTION
D	16/01-200-130-2B	AS NOTED



KEY PLAN 1-4C
 MAIN DECK BULKHEADS



DECK PLAN 1-4A
 01 DECK

KEY

- ██████████ BULKHEAD PARSONS
- ██████████ BULKHEAD KEARNSIDE
- ██████████ ORDNARY PARSONS
- ██████████ ORDNARY KEARNSIDE
- ██████████ ORDNARY STIFFENER PARSONS
- ██████████ ORDNARY STIFFENER KEARNSIDE
- ◇ KNUCKLE

PROFESSIONAL ENGINEER
 STAMP PER:
 REV: B
 ENGR. PATRICK D. FAMS
 DATED: 08/10/2017
 STATE: WA
 REG. NO. 49313



REVISION HISTORY

REV	ZONE	DESCRIPTION	OWN	DATE	APP'D
A	1-4A	1. ADDED RESCUE BOAT DAWT FOUNDATION	POF	7/28/17	POF
	2-3A	DETAILS AND DETAIL VIEW.			
	2-4D	2. ADDED WAST INSERT PLATE DETAILS.			
B	3-1B	1. UPDATED EMERGENCY GENERATOR ROOM	POF	8/10/17	POF
	4-4A	BULKHEADS AND LOWER CONDUITS.			
C	1-2B	1. UPDATED PE STAMP FOR REV C.	DWG	8/31/17	KM
	1-6B	2. STRUCTURED LOCATION OF WAST SUPPORT			
	1-6C	3. ADDED HATCH CUTOUT.			
	4-5C	4. ADDED LOWER DESCRIPTION.			

- GENERAL NOTES**
- VESSEL TO BE CONSTRUCTED IN ACCORDANCE WITH 48 CFR SUBCHAPTER H REGULATIONS.
 - FRAME SPACING IS 24".
 - TRANSVERSE BULKHEAD STIFFENER SPACING = 24" UNO
 - MAIN DECK CURTAIN PLATE 5/16" PLATE UNO STIFFENERS 3/32x1/4" L THROUGHOUT UNO
 - CONSTRUCTION SHALL VERIFY STRUCTURE FOR ALL FOUNDATIONS PRIOR TO CONSTRUCTION. SEE REF. 1.

REFERENCES

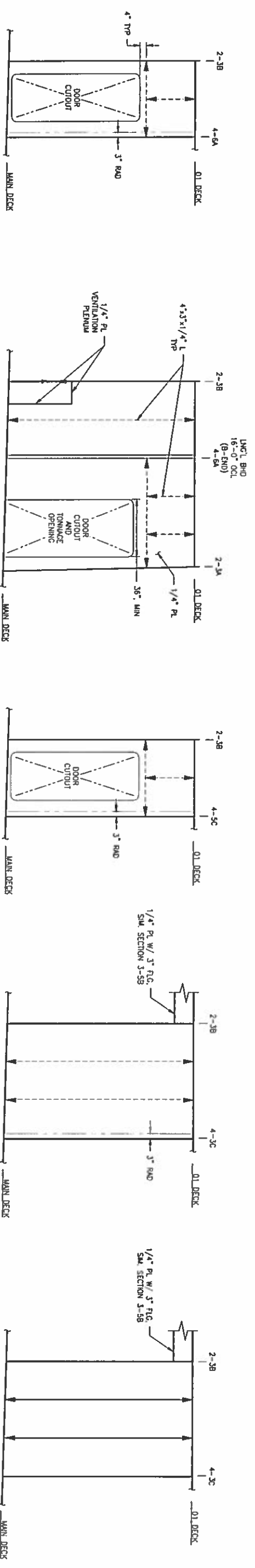
- 16101-200-081-1 SCANTLING CALCULATIONS
- 16101-200-101-0 PROFILES AND DECK ARRANGEMENTS
- 16101-200-120-1 MOSHIP SECTION
- 16101-200-130-2 MAIN DECK
- 16101-200-150-2 SUPERSTRUCTURE 01 DECK TO PILOT HOUSE TOP
- 16101-200-150-3 MAIN DECK BULKHEADS
- 16101-200-513-1 MACHINERY VENTILATION ARRANGEMENT
- 16101-200-832-1 TECHNICAL SPECIFICATION
- 16101-200-170-1 MASTS
- 16101-200-526-1 DECK DRAIN PUMP SYSTEM

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 BAILEY, NORTH CAROLINA
 NEW RIVER CLASS FERRY

SUPERSTRUCTURE
 MAIN DECK TO 01 DECK

16101-200-150-1

DATE	REV	BY	CHK	APP'D	DESCRIPTION
08/10/2017	B	P.D.F.	P.D.F.		PROFESSIONAL ENGINEER STAMP PER.
08/31/2017					FOR REV C ONLY
08/31/2017					PROFESSIONAL ENGINEER STAMP PER.



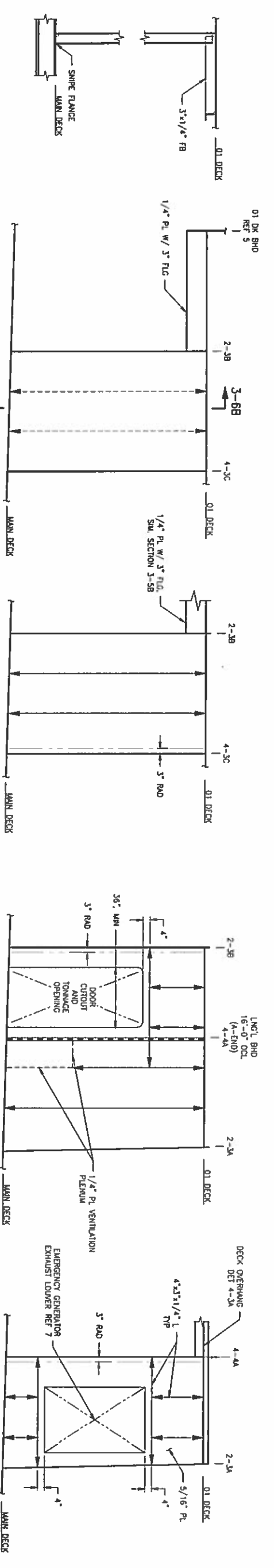
SECTION 3-6C
 FR 22, B-END
 LOOKING TO A-END
 3/8"=1'-0"

SECTION 3-5C
 FR 20, B-END
 LOOKING TO A-END
 3/8"=1'-0"

SECTION 3-3C
 FR 13, B-END
 LOOKING TO A-END
 3/8"=1'-0"

SECTION 3-2C
 FR 06, B-END
 LOOKING TO A-END
 3/8"=1'-0"

SECTION 3-1C
 FR 02, B-END
 LOOKING TO A-END
 3/8"=1'-0"



DETAIL 3-6B
 TYPICAL TRANSVERSE BHD STIFFENER
 SCALE 3/4"=1'-0"

SECTION 3-5B
 FR 02, A-END
 LOOKING TO A-END
 3/8"=1'-0"

SECTION 3-4B
 FR 06, A-END
 LOOKING TO A-END
 3/8"=1'-0"

SECTION 3-2B
 FR 18, A-END
 LOOKING TO A-END
 3/8"=1'-0"

SECTION 3-1B
 FR 25, A-END
 LOOKING TO A-END
 3/8"=1'-0"

NOTE:
 BHD PLATE 1/4"
 STIFFENERS 3x3x1/4" L UND

KEY

	BLUMHEAD FARSIDE
	BLUMHEAD NEARSIDE
	GIRDER FAR SIDE
	GIRDER NEAR SIDE
	ORDINARY STIFFENER FAR SIDE
	ORDINARY STIFFENER NEAR SIDE
	KNUCKLE

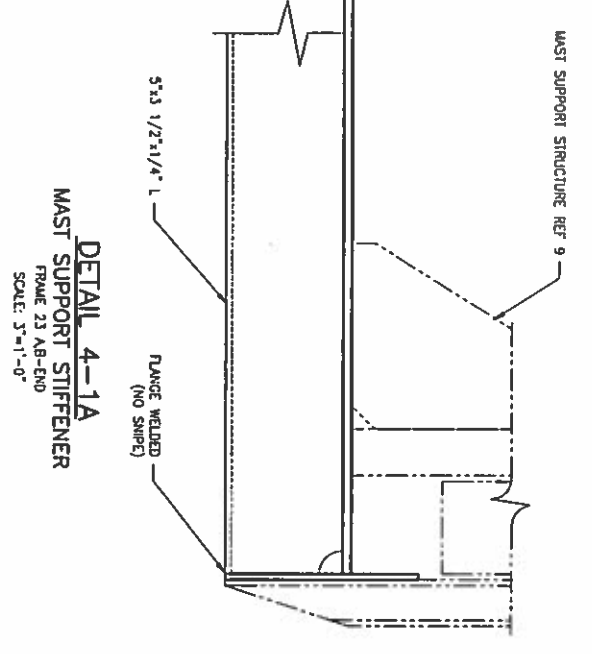
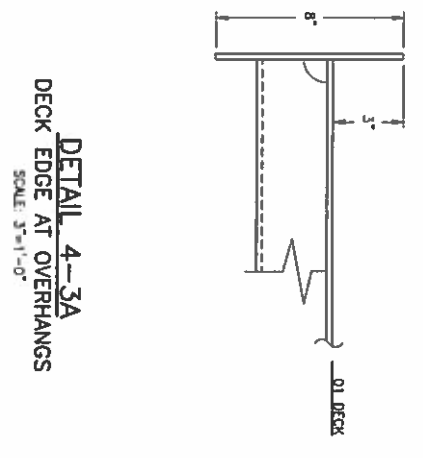
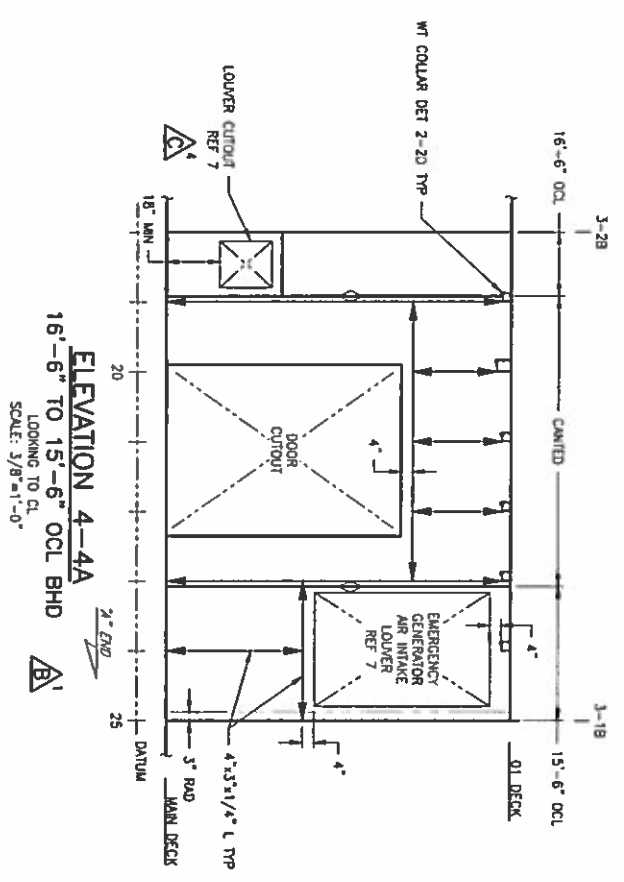
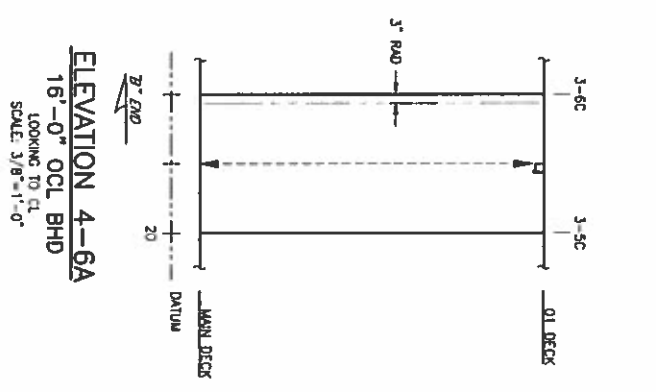
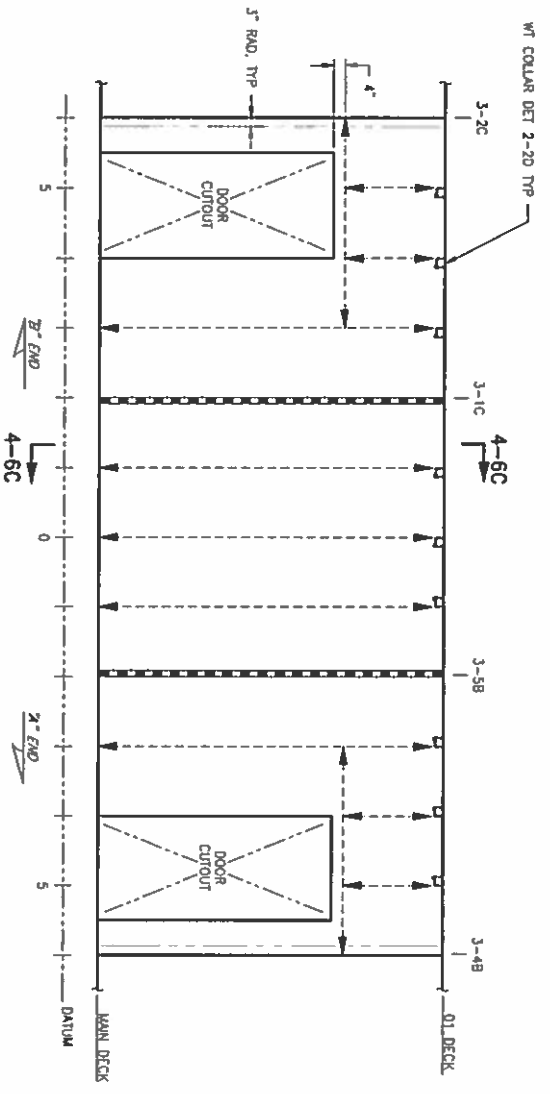
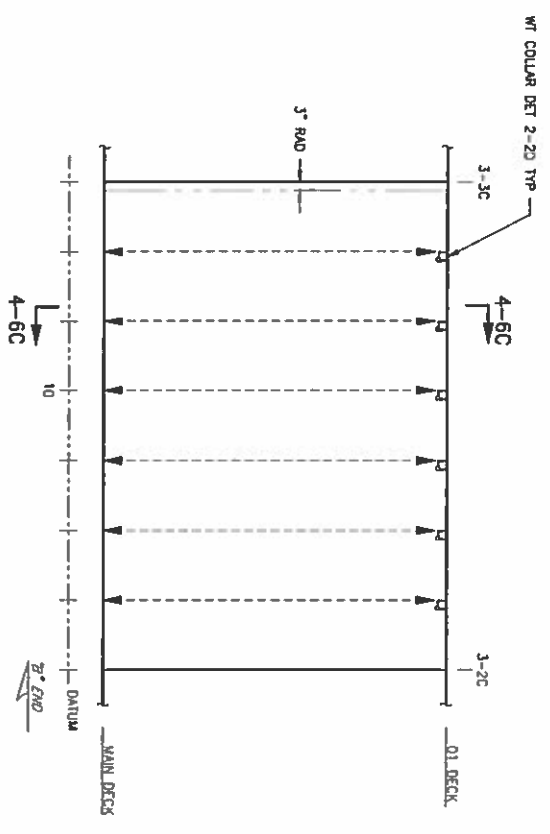
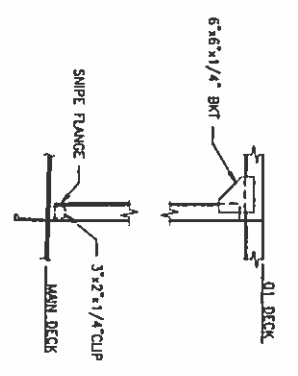
FOR REV C ONLY

PROFESSIONAL ENGINEER
 STAMP PER: _____
 REV: B
 ENGR: PATRICK D. FIAS
 DATED: 08/10/2017
 STATE: WA
 REG NO: 49313

16101-200-150-1

16101-200-150-1C

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- KEY**
- BULKHEAD FARSIDE
 - BULKHEAD NEARSIDE
 - GROSS FARSIDE
 - GROSS NEARSIDE
 - ORDINARY STIFFENER FARSIDE
 - ORDINARY STIFFENER NEARSIDE
 - ◇ KNOCKLE

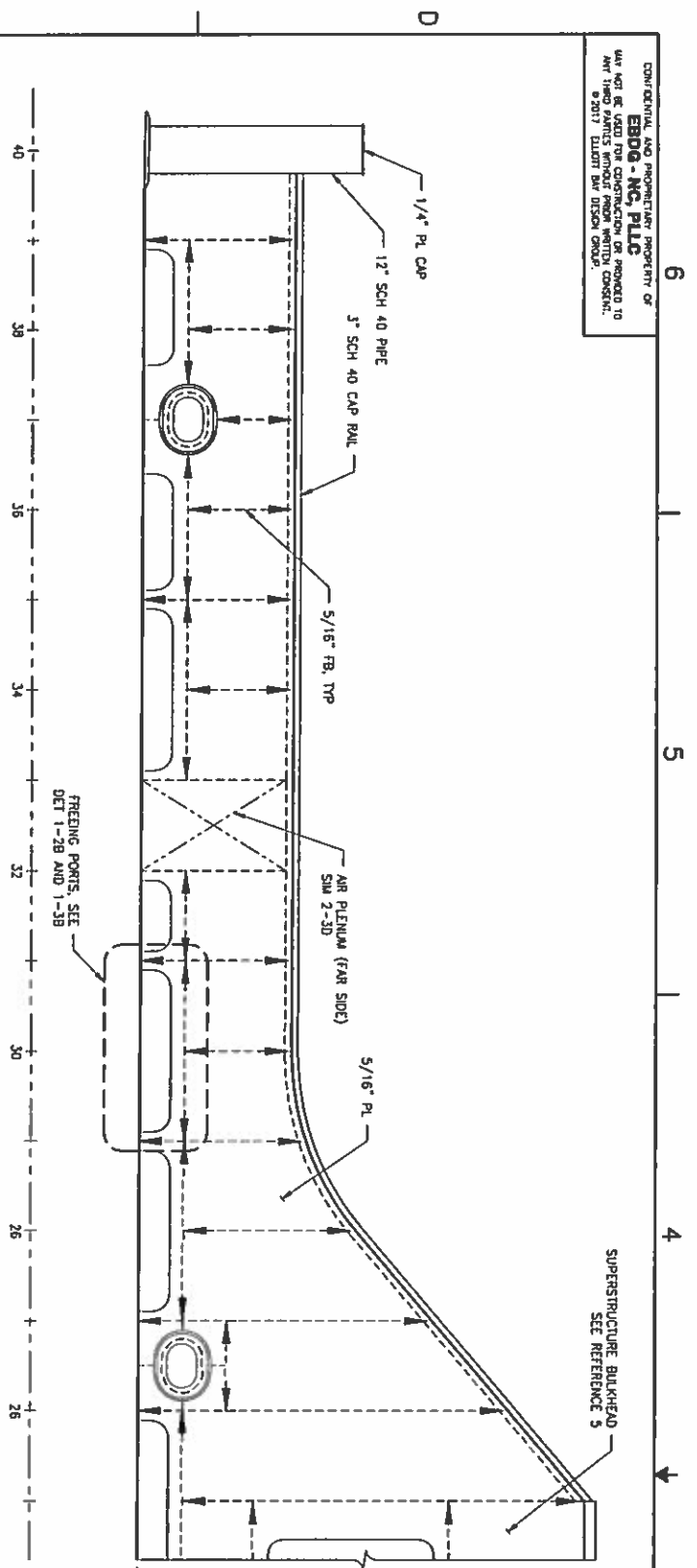
NOTE:
 BHD PLATE 1/4"
 STIFFENERS 3/8" x 1/4" L UNO

PROFESSIONAL ENGINEER	STAMP PER:
REV: B	ENGR: PATRICK D. FRAS
DATE: 08/10/2017	STATE: WA
REC NO: 49313	

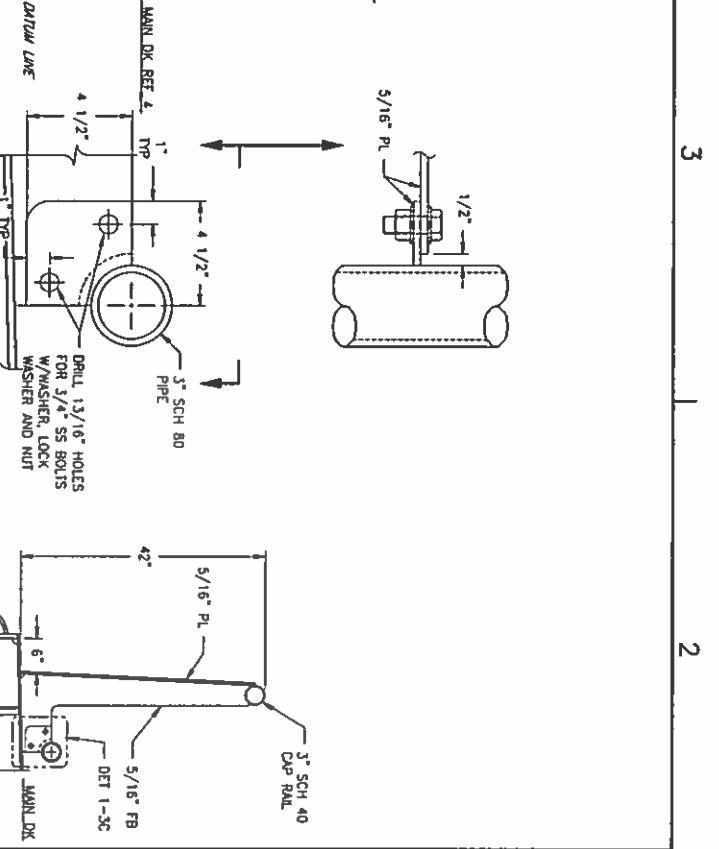


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D	AS NOTED	16101-200-150-1C	4
16101-200-150-1		4	4

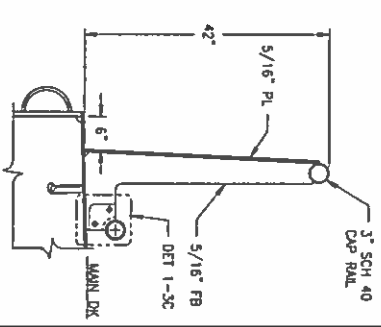
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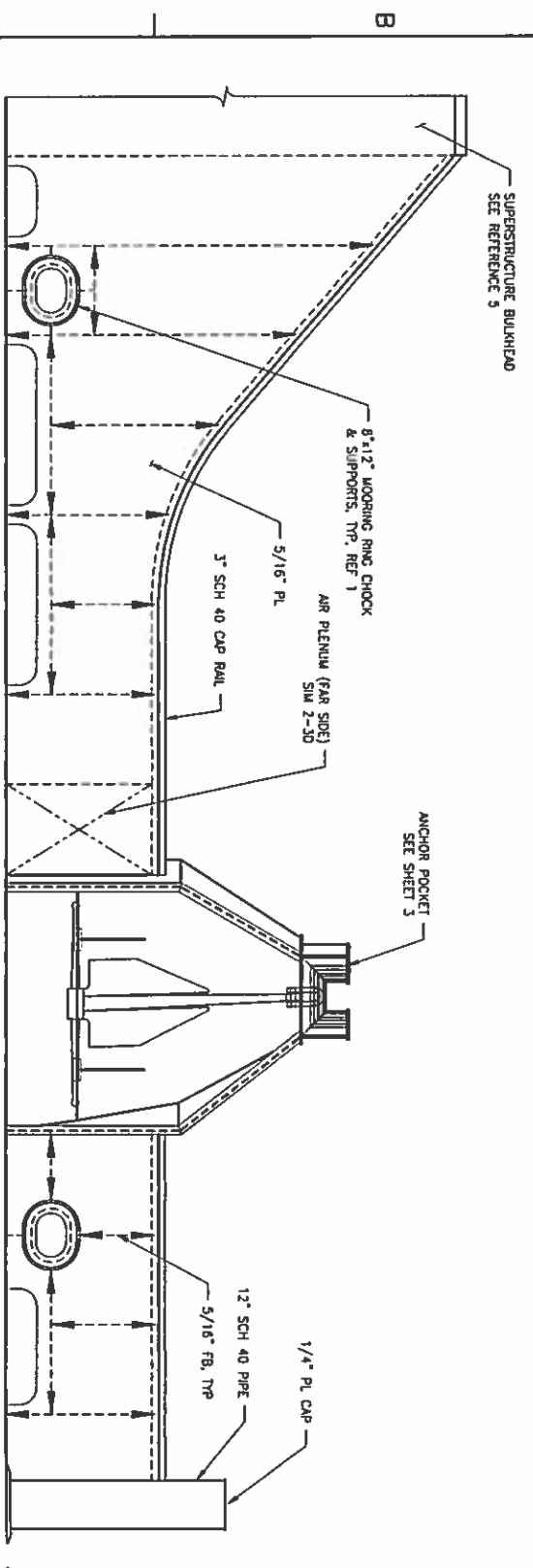
LONGITUDINAL ELEVATION 1-5C
 STARBOARD BULKWARK - B END
 LOOKING TO CENTERLINE
 SCALE: 1/2"=1'-0"



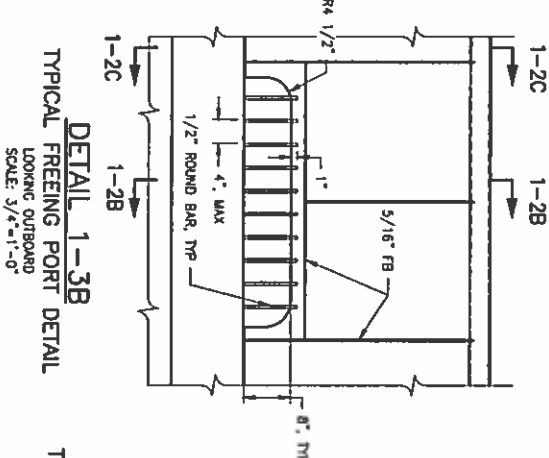
DETAIL 1-3C
 TYPICAL RUB RAIL ATTACHMENT
 SCALE: 3"=1'-0"



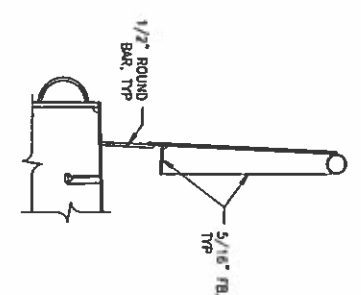
SECTION 1-2C
 TYPICAL BULKWARK STRUCTURE
 SCALE: 3/4"=1'-0"



LONGITUDINAL ELEVATION 1-5A
 STARBOARD BULKWARK - A END
 LOOKING TO CENTERLINE
 SCALE: 1/2"=1'-0"



DETAIL 1-3B
 TYPICAL FREEING PORT DETAIL
 LOOKING OUTBOARD
 SCALE: 3/4"=1'-0"



DETAIL 1-2B
 TYPICAL FREEING PORT DETAIL
 LONGITUDINAL SECTION
 SCALE: 3/4"=1'-0"

REVISION HISTORY				
REV	ZONE	DESCRIPTION	DATE	APPROVED
A	1-3C	1. UPDATED FE STAMP FOR REV A 2. ADDED DETAILS FOR BULKWARK CONNECTION TO RUB RAIL.	08/31/17	KAJ

- GENERAL NOTES**
1. VESSEL TO BE CONSTRUCTED IN ACCORDANCE WITH 48 CFR SUBCHAPTER H REGULATIONS.
 2. FRAME SPACING IS 24".
 3. CONTRACTOR SHALL VERIFY STRUCTURE FOR ALL FOUNDATIONS PRIOR TO CONSTRUCTION. SEE REF 1.

REFERENCES

1. 16101-200-832-1 TECHNICAL SPECIFICATION
2. 16101-200-101-0 PROFILES AND DECK ARRANGEMENTS
3. 16101-200-120-1 WIDESHIP SECTION
4. 16101-200-130-1 MAIN DECK
5. 16101-200-150-1 SUPERSTRUCTURE, MAIN DECK TO OI DECK
6. 16101-200-513-1 MACHINERY VENTILATION ARRANGEMENT

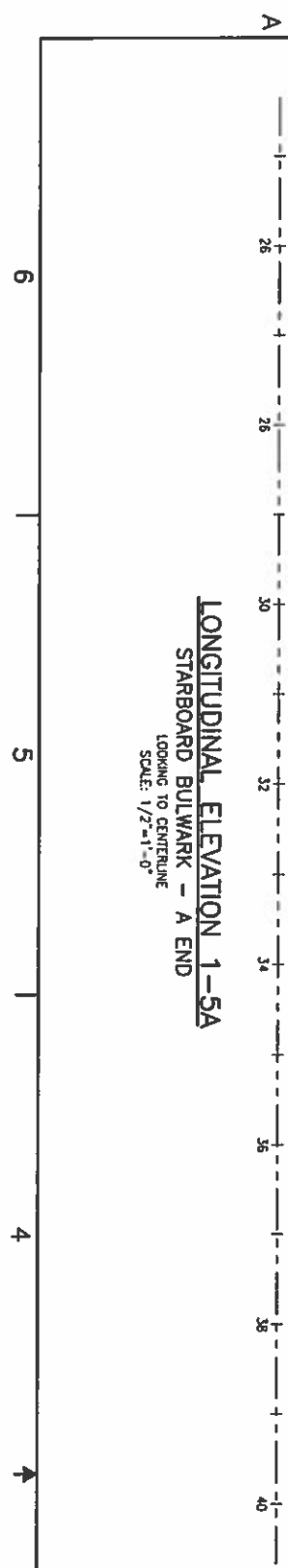
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 RALEIGH, NORTH CAROLINA
 NEW RIVER CLASS FERRY

FOR REV A ONLY
 PROFESSIONAL ENGINEER
 STAMP PER
 ENGR: PATRICK D. FAMS
 DATED: 07/27/2017
 STATE: WA
 REG. NO: 49313

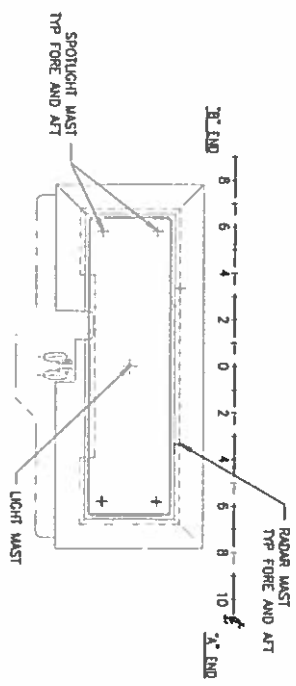


NO.	DATE	BY	CHKD	APP'D
D	16101-200-150-3	AS NOTED		
	16101-200-150-3A			

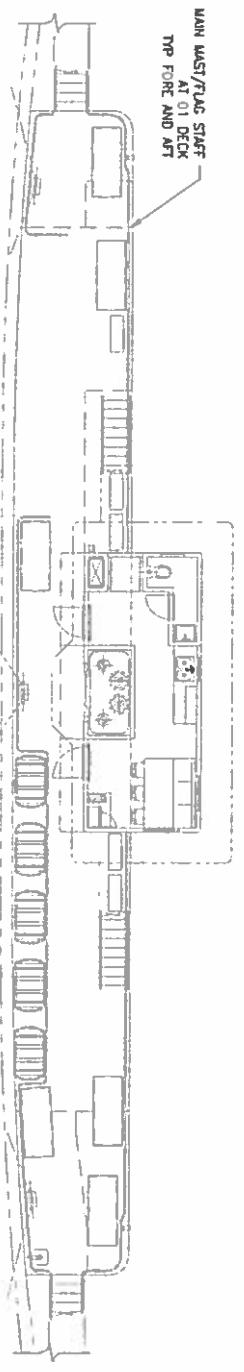
MAIN DECK BULKWARKS



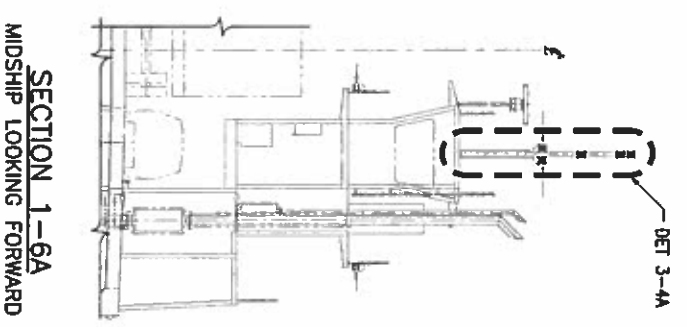
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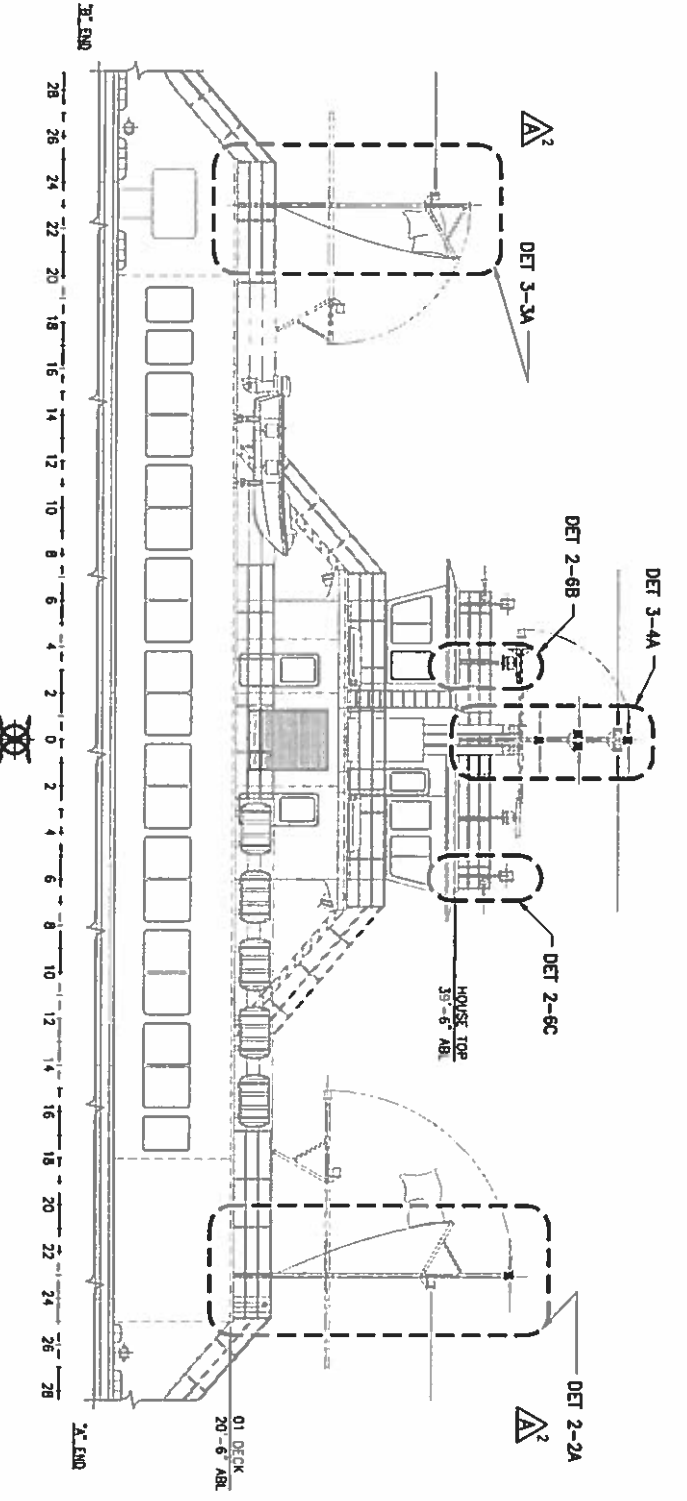
PLAN 1-4D
PILOT HOUSE TOP



PLAN 1-4B
01 DECK



SECTION 1-6A
MIDSHIP LOOKING FORWARD



ELEVATION 1-4A
OUTBOARD PROFILE

PROFESSIONAL ENGINEER
 STAMP PER
 ENGR. PATRICK D. PAUS
 DATED 07/27/2017
 STATE WA
 REG NO. 49313



REVISION HISTORY				
REV	ZONE	DESCRIPTION	BY	DATE
A	1-38 1-58 2-28 3-38	1. UPDATED PE STAMP FOR REV A. 2. UPDATED LOCATION OF MAIN MASTS TO FR. 23.	DWG	08/31/17
			KUJ	

GENERAL NOTES

- VESSEL TO BE CONSTRUCTED IN ACCORDANCE WITH 48 CFR SUBCHAPTER H REGULATIONS.
- FRAME SPACING IS 24" UNLESS NOTED OTHERWISE.
- CONTRACTOR SHALL VERIFY STRUCTURE AND FOUNDATIONS FOR ALL MASTS PRIOR TO CONSTRUCTION. SEE REFERENCE 1.

REFERENCES

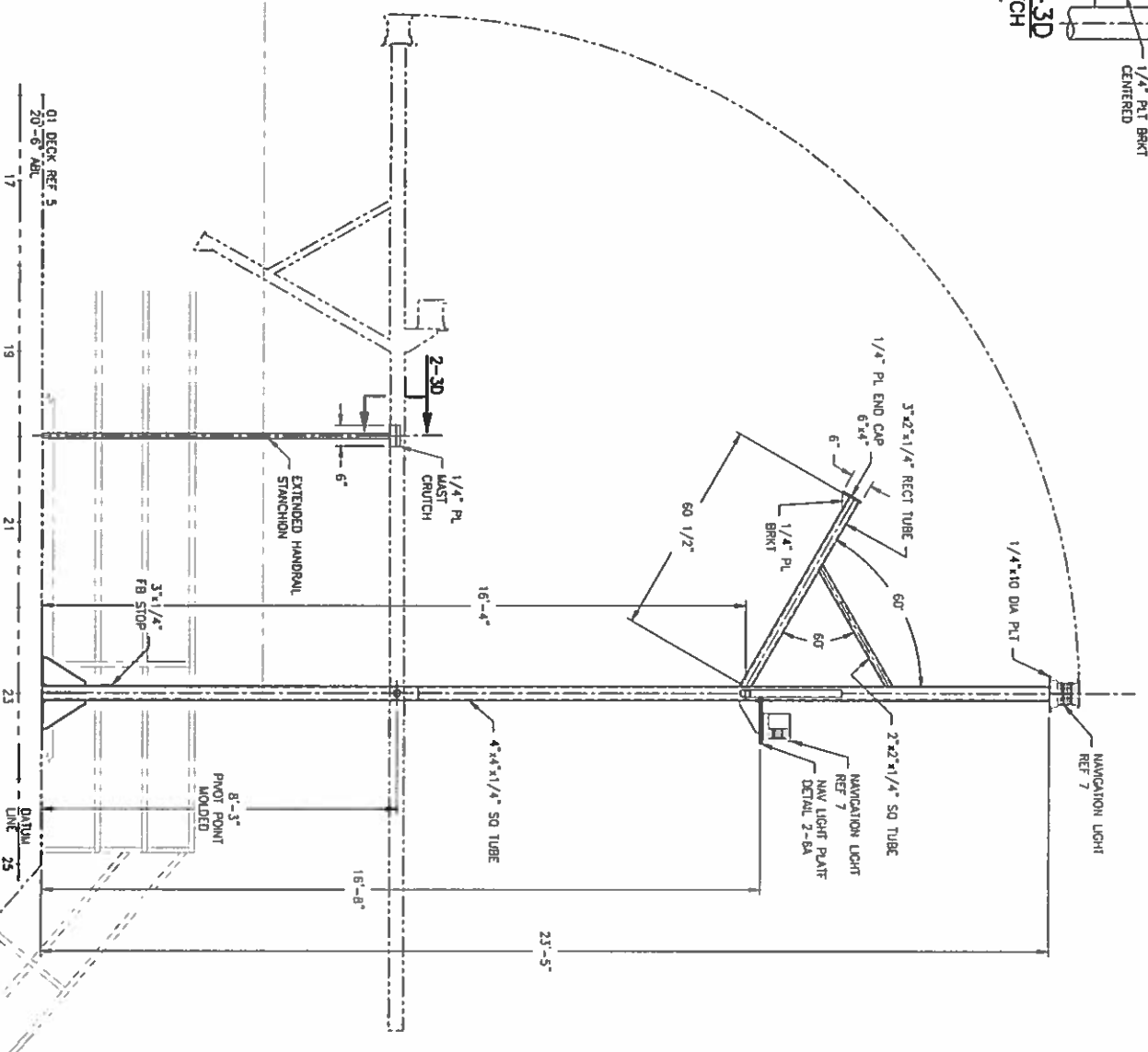
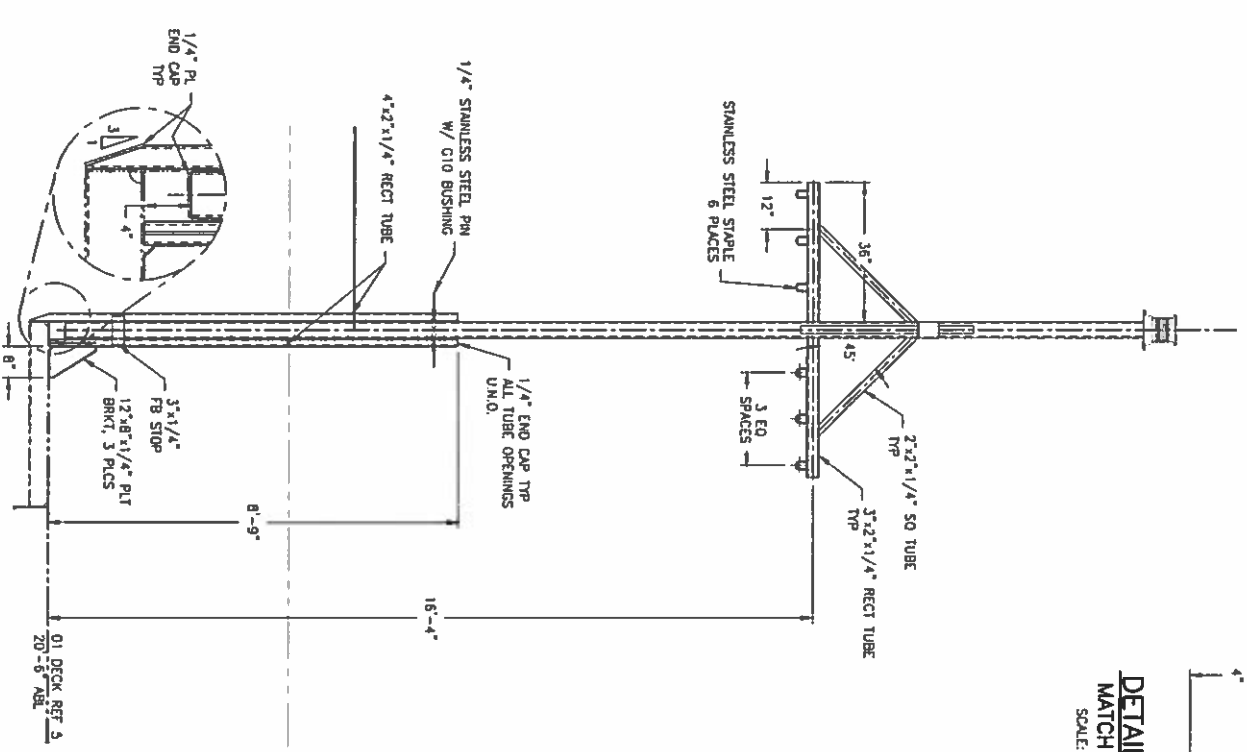
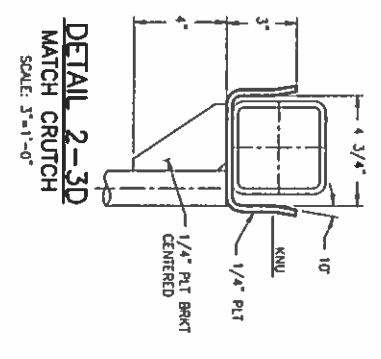
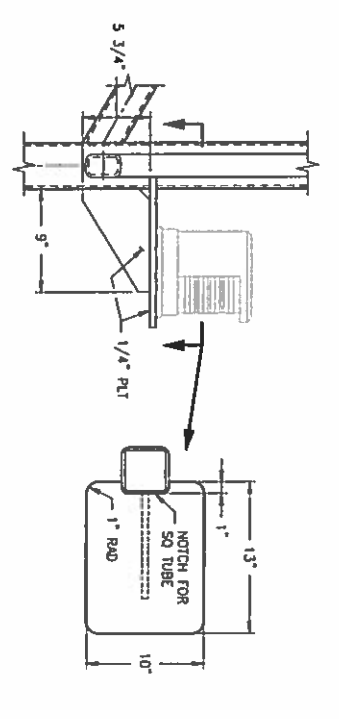
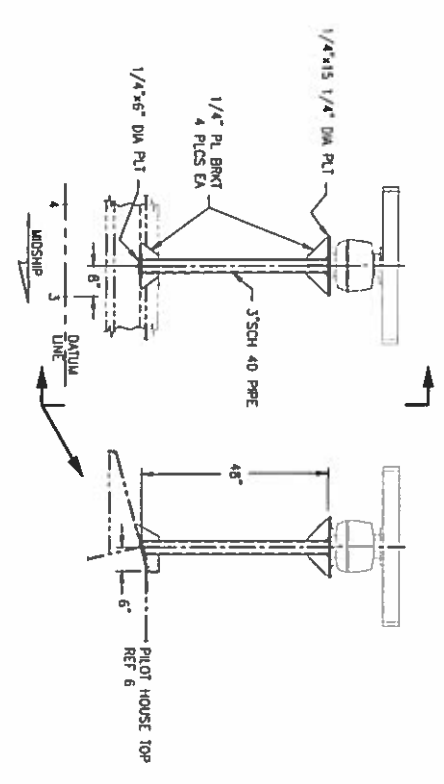
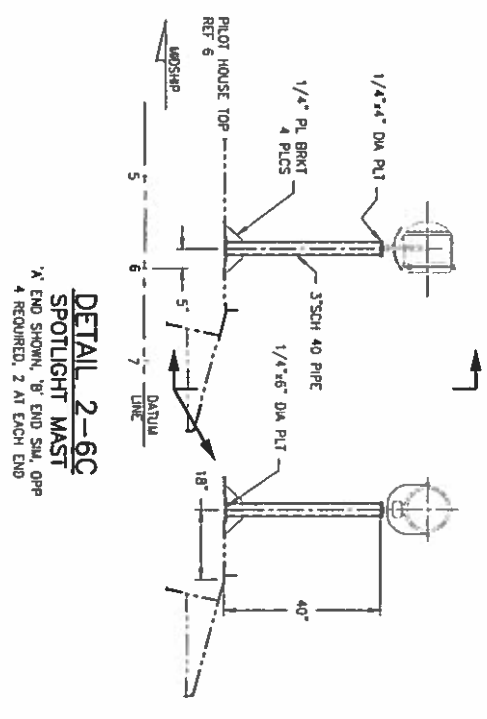
- 16101-200-832-1 TECHNICAL SPECIFICATION
- 16101-200-061-1 SCANNING CALCULATIONS
- 16101-200-101-1 PROFILES AND DECK ARRANGEMENTS
- 16101-200-120-1 MIDSHIP SECTION
- 16101-200-150-1 SUPERSTRUCTURE MAIN DECK TO 01 DECK
- 16101-200-150-2 SUPERSTRUCTURE 01 DECK TO PILOT HOUSE TOP
- 16101-200-422-1 NAVIGATION LIGHT ARR AND BLOCK DIAGRAM

Elliott Bay Design Group
 North Carolina, PLLC
 NORTH CAROLINA D.O.T.
 RALEIGH, NORTH CAROLINA
 NEW RIVER CLASS FERRY

MASTS

CDT	DATE	NO.	REV.
D	16101-200-170-1	1	A
SCALE	1/8"=1'-0"	TITLE	MASTS
DATE	16101-200-170-1A	DATE	7/27/2017

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ELEVATION 2-2A
 MAIN MAST
 1/4" END LKG PORT

SECTION 2-4A
 FRAME 23 LKG FWD

DETAIL 2-6A
 TYP NAV LIGHT PLATF
 SCALE: 1/4"=1'-0"

DETAIL 2-6B
 RADAR MAST
 1/4" END SHOWN, 2 AT EACH END
 4 REQUIRED, 2 AT EACH END

DETAIL 2-6C
 SPOTLIGHT MAST
 1/4" END SHOWN, 2 AT EACH END
 4 REQUIRED, 2 AT EACH END

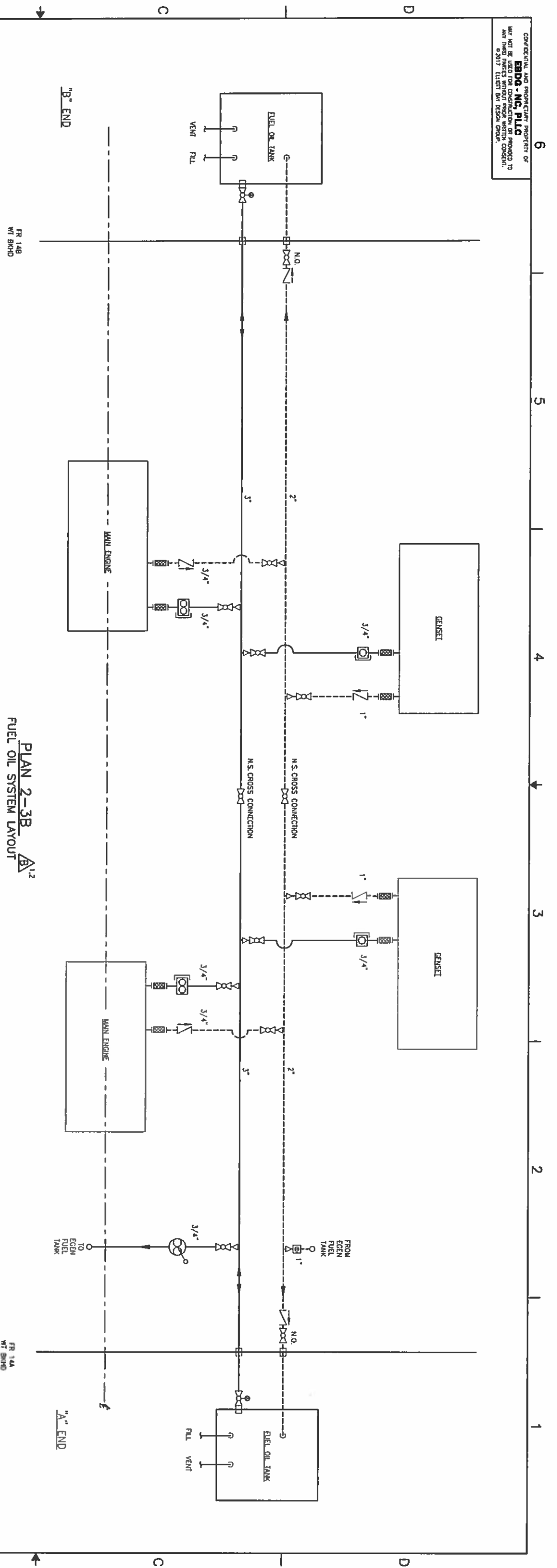
DETAIL 2-3D
 MATCH CRUTCH
 SCALE: 3/4"=1'-0"

FOR REV A ONLY
 PROFESSIONAL ENGINEER
 STAMP PER:
 ENGR: PATRICK D. FAS
 DATED: 07/27/2017
 STATE: WA
 REG NO. 49313

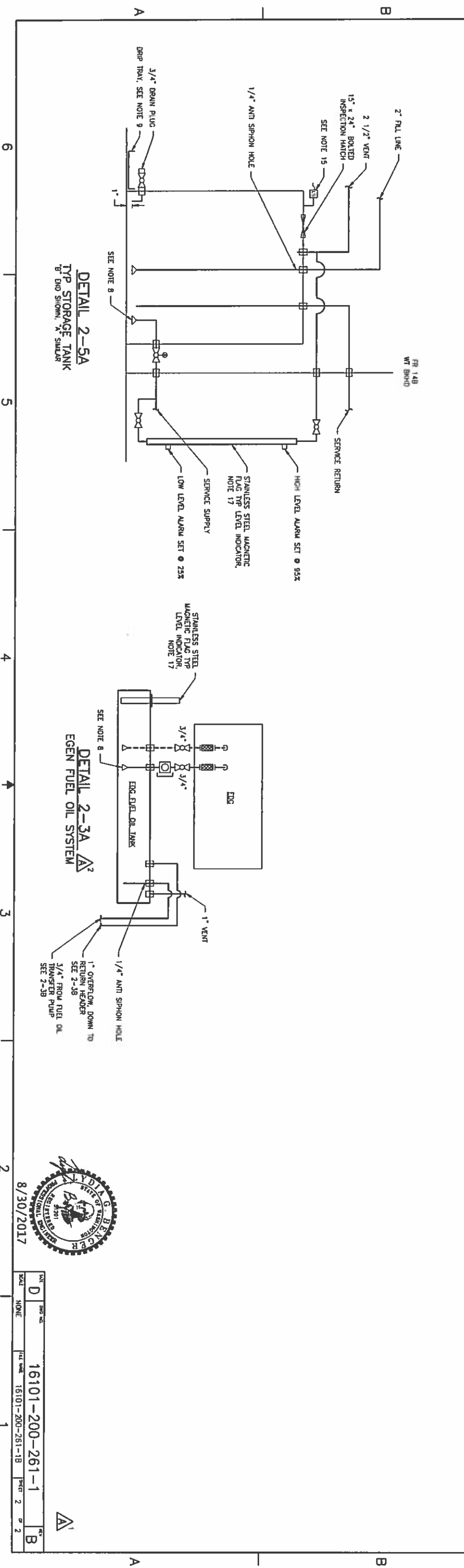


FIG. **D** SHEET NO. **16101-200-170-1**
 SCALE: 1/2"=1'-0" U.N.O. PROJECT: 16101-200-170-1A SHEET: 2 OF 3

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PLAN 2-3B $\Delta 12$
 FUEL OIL SYSTEM LAYOUT



DETAIL 2-3A
 TYP STORAGE TANK
 'B' END SIPHON, X SIMILAR

DETAIL 2-3A $\Delta 2$
 EGEN FUEL OIL SYSTEM



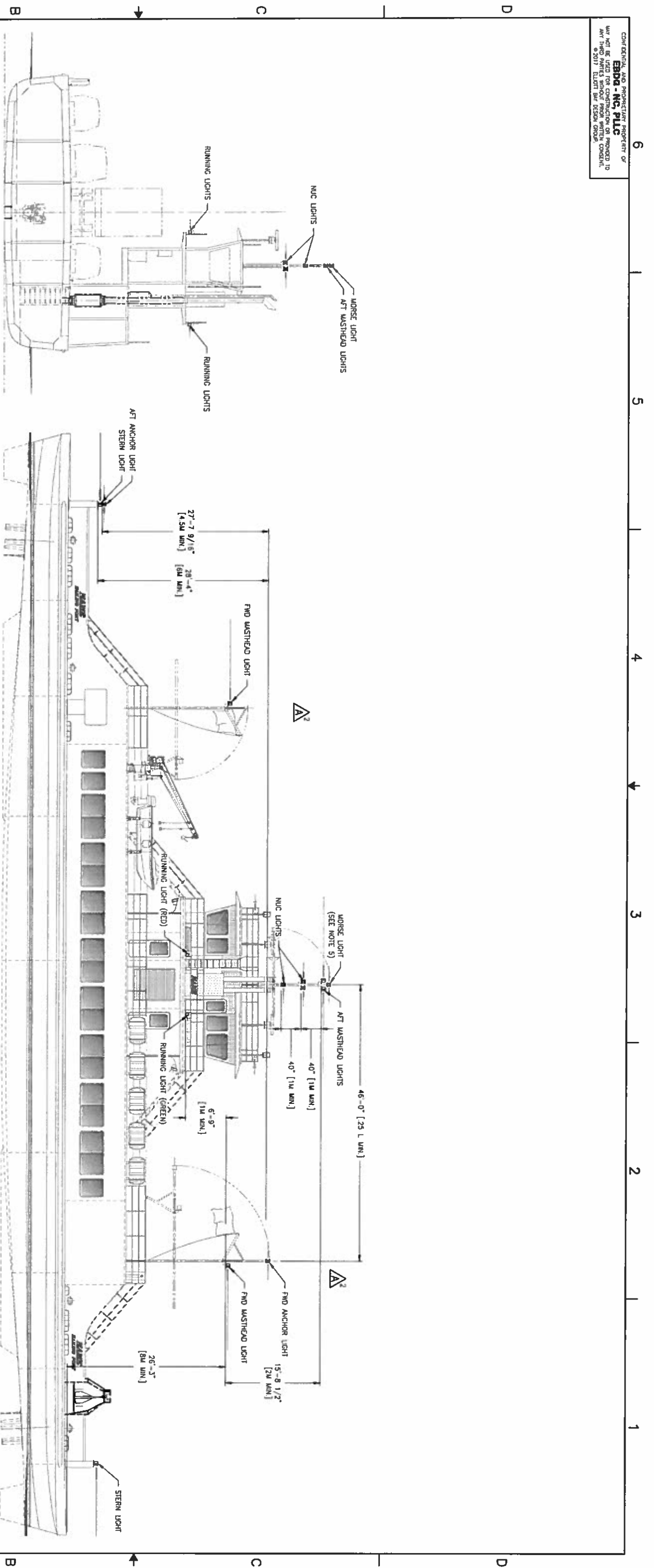
DATE	REV	DESCRIPTION
8/30/2017	D	NONE

16101-200-261-1

16101-200-261-1B

2 of 2

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ELEVATION 2-6B
AFT ELEVATION

ELEVATION 2-3B
OUTBOARD PROFILE

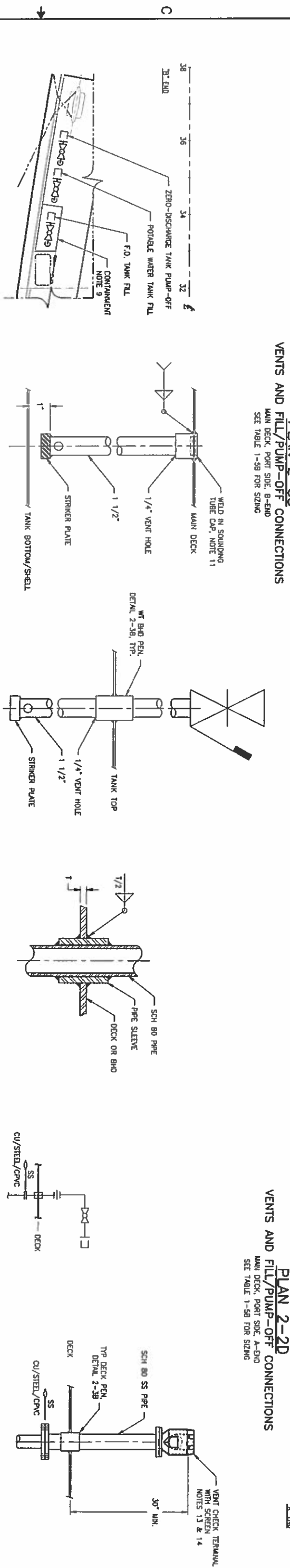
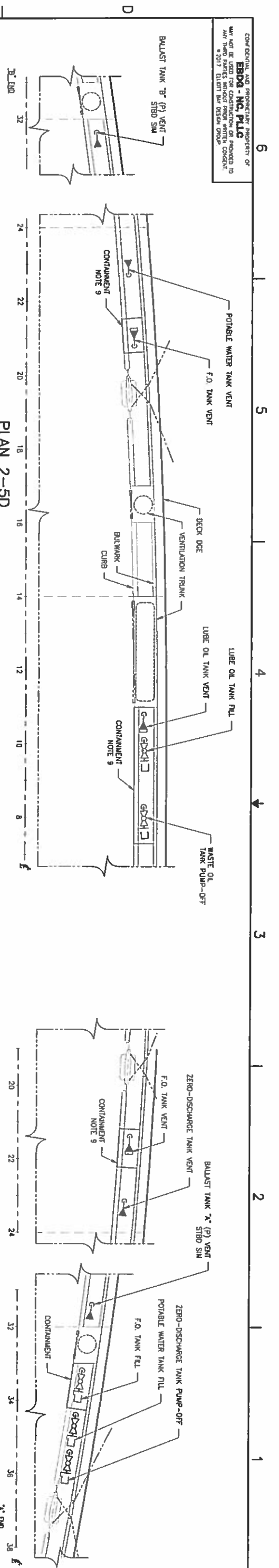
FOR REV A ONLY

PROFESSIONAL ENGINEER
 STAMP PER:
 REVISIONS:
 ENGR: PATRICK D. FIAS
 DATED: 07/27/2017
 STATE: WA
 REC NO: 49313



REV	DATE	BY	CHKD
D	16/01-200-422-1A		
16101-200-422-1		SHEET	2 OF 2

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PLAN 2-6B
 VENTS AND FILL/PUMP-OFF CONNECTIONS
 MAIN DECK, STBD SIDE, B-EHD
 SEE TABLE 1-58 FOR SIZING

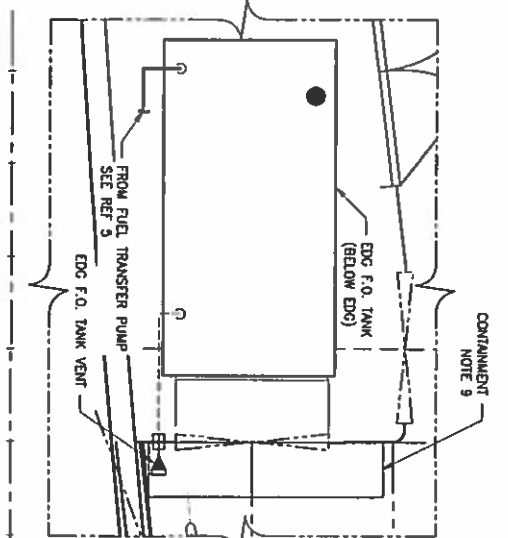
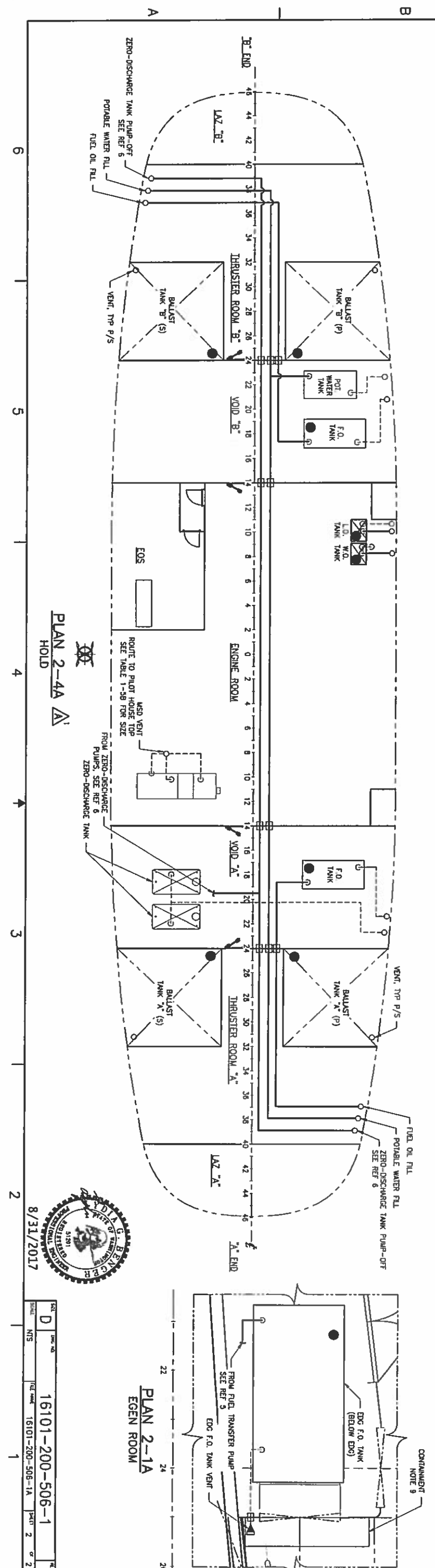
DETAIL 2-5B
 SOUNDING TUBE AT FREEBOARD DECK
 FUEL OIL & BALLAST TANKS

DETAIL 2-4B
 SOUNDING TUBE IN ENGINE ROOM
 WASTE OIL & LUBE OIL TANKS

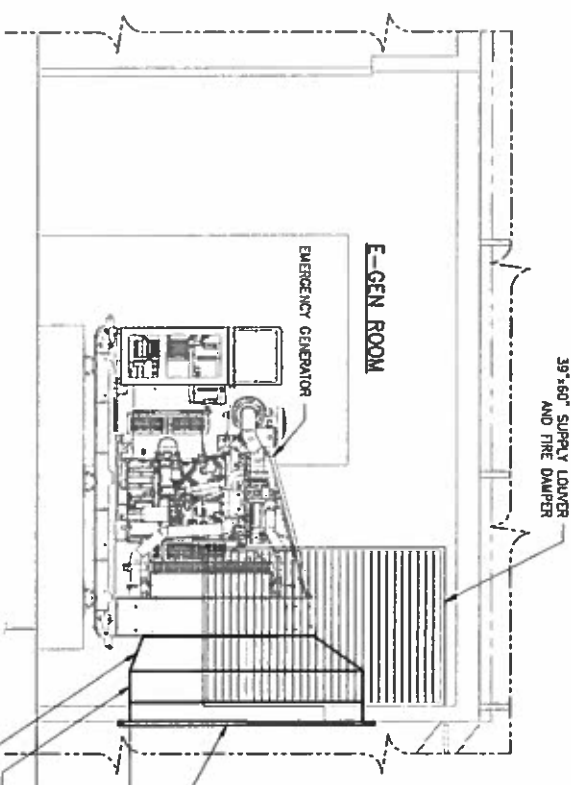
DETAIL 2-3B
 TYP DECK/BHD PENETRATION

DETAIL 2-2B
 TYPICAL DECK CONNECTION

DETAIL 2-1B
 TYPICAL VENT

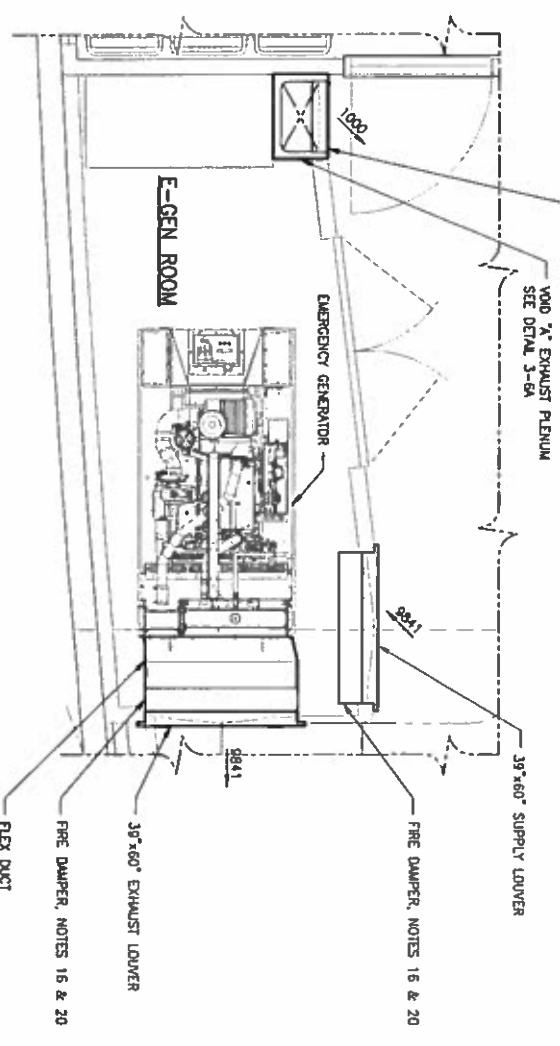


REV	DATE	DESCRIPTION
D	08/31/2017	16101-200-506-1
1		16101-200-506-1A
2		



EQUIPMENT LIST						
QTY.	SERVICE	TYPE	SIZE	CAPACITY	DRIVE	REMARKS
2	ENGINE ROOM SUPPLY FAN	AXIAL FAN	424"	6300 CFM @ 1.8 IN H2O	208V/24/60Hz 5 HP TEAD MOTOR 1740 RPM	-
2	ENGINE ROOM SUPPLY FIRE DAMPER	A-80 ROUND	424"	-	24 VDC ELECTRIC ACTUATOR	316SS CONSTRUCTION USCG APPROVED
1	ENGINE ROOM EXHAUST FIRE DAMPER	A-80 SQUARE	60"x78"	-	24 VDC ELECTRIC ACTUATOR	316SS CONSTRUCTION USCG APPROVED
2	E-GEN ROOM FIRE DAMPER	A-80 SQUARE	39"x50"	-	24 VDC ELECTRIC ACTUATOR	316SS CONSTRUCTION USCG APPROVED
4	VOID/THRUSTER ROOM SUPPLY FAN	AXIAL FAN	412"	1000 CFM @ 1.3 IN H2O	120V/14/60Hz 0.5 HP TEAD MOTOR 3450 RPM	-
4	ENGINE ROOM MIST ELIMINATOR	IMPINGEMENT TYPE	18"x25" OPEN AREA	6300 CFM	-	FACE DRAIN
4	VOID/THRUSTER ROOM MIST ELIMINATOR	IMPINGEMENT TYPE	12"x12" OPEN AREA	1000 CFM	-	FACE DRAIN

SYMBOLS LIST	
	BALL VALVE W/ STAINLESS PLUG



GENERAL NOTES CONT.

12. VENTILATION FANS SHALL BE MOUNTED USING NOSE/SDRAGON KITS.
13. TO THE EXTENT PRACTICABLE, FANS OF THE SAME SIZE SHALL BE INTERCHANGEABLE.
14. FANS SHALL BE LABELED WITH NAMEPLATES IDENTIFYING THE UNIT, LISTING THE SYSTEM SERVED BY THE FAN, THE FAN VOLUME IN CUBIC FEET PER MINUTE (CFM), STATIC PRESSURE RATING AT SPECIFIED VOLUME, MOTOR FULL LOAD AMPERAGE, FAN SPEED, AND MOTOR SPEED FOR BELT DRIVEN UNITS. AND MOTOR HORSEPOWER. AIRFLOW DIRECTION SHALL BE IDENTIFIED ON THE FAN EXTERIOR BODY.
15. FIRE DAMPERS SHALL BE PROVIDED WHERE REQUIRED BY REGULATION AND WHERE SHOWN IN THIS DIAGRAM.
16. FIRE DAMPERS SHALL BE ELECTRICALLY ACTUATED. POWER TO OPEN, SPRING CLOSED ON LOSS OF POWER. IN ADDITION, THEY SHALL HAVE ELECTRICAL THERMAL RELEASE, CLOSE AUTOMATICALLY AT A TEMPERATURE OF 182°F. AND BE CAPABLE OF MANUAL OPERATION.
17. CLOSURE STATUS OF FIRE DAMPERS SHALL BE VISIBLE OUTSIDE THE DUCT. ACCESS COVERS SHALL BE INSTALLED TO ALLOW SERVICE OF DAMPERS AND ACTUATORS IF REQUIRED.
18. ENGINE ROOM VENTILATION FANS SHALL SHUT DOWN AND FIRE DAMPERS SHALL CLOSE AUTOMATICALLY UPON RELEASE OF THE FIRE SUPPRESSION SYSTEM. SEE REFERENCE 1.
19. DUCTS SHALL BE ROUTED AS HIGH IN THE OVERHEAD AS PRACTICABLE.
20. EMERGENCY GENERATOR FIRE DAMPERS SHALL BE CONFIGURED TO OPEN ON GENERATOR START AND CLOSE ON GENERATOR STOP.
21. SLIDING CLOSURE PLATES SHALL BE STORED IN STAINLESS STEEL BRACKETS ADJACENT TO WEATHER LOUVERS AND MIST ELIMINATORS. CLOSURE PLATES SHALL BE STORED IN A SECURE MANNER WHICH ALSO ALLOWS FOR QUICK INSTALLATION.
22. DAMPERS USED AS WEATHER CLOSURES SHALL BE TESTED FOR WEATHER TIGHTNESS IN THE PRESENCE OF A USCG INSPECTOR.
23. ADJUST TENSURE SIZES AND PROVIDE BALANCING DAMPERS AS REQUIRED TO BALANCE SYSTEM WITHIN 10% OF NOTED AIR FLOWS.

REVISION HISTORY

REV	ZONE	DESCRIPTION	DATE	APPROVED
A	1-6A	REVISED EGEN LOUVER AND AIRFLOWS, WAS 39X50 AND 10,171	8/2/17	MEJ
B	1-6B	UPDATED LOUVER DIMENSIONS	8/30/17	DKG
				MEJ

GENERAL NOTES

1. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH 46 CFR SUBCHAPTER H REGULATIONS.
2. THIS DRAWING IS DIAGRAMMATIC ONLY AND DOES NOT REPRESENT A COMPLETE DETAILED DESIGN. THE CONTRACTOR SHALL DEVELOP A DETAILED DESIGN THAT PROVIDES A FULLY FUNCTIONAL ARRANGEMENT AND IS SUITABLE FOR INSTALLATION, TAKING INTO ACCOUNT ALL NECESSARY SYSTEM INTERFACES AND INTERDEPENDENCIES. DIMENSIONS SHALL BE VERIFIED FROM THE SHIP AND MANUFACTURERS' CERTIFIED DRAWINGS AS APPROPRIATE.
3. DUCT VELOCITIES SHALL GENERALLY BE LIMITED TO 3000 FPM.
4. ALL INSTALLED DUCTWORK SHALL BE AIRTIGHT. DUCTWORK SHALL BE MADE OF HOT-DIPPED GALVANIZED STEEL SHEET METAL, WITH THE MINIMUM THICKNESS AND REINFORCEMENT IN ACCORDANCE WITH SWAGAN HVAC DUCT CONSTRUCTION STANDARDS AND APPLICABLE USCG REGULATIONS, WHICHEVER IS GREATER. BURIED OR GALVANIZING SHALL BE REPAIRED WITH A SPRAY-ON TYPE GALVANIZING COATING. DUCTS SHALL BE SUITABLY SUPPORTED AND STIFFENED ON THE OUTSIDE TO PREVENT PANTING. ALL FASTENING SHALL BE STAINLESS STEEL. SEE REFERENCE 1.
5. DUCTING SHALL BE RUN AS DIRECTLY AS POSSIBLE WITH A MINIMUM NUMBER OF BONDS AND FITTINGS.
6. TAKE-DOWN JOINTS SHALL BE PROVIDED AT MAXIMUM 8 FT INTERVALS WHICH ALLOW DISASSEMBLY AND REMOVAL OF DUCTING WITHOUT REMOVAL OR MODIFICATION OF PERMANENT STRUCTURE.
7. DUCTS SHALL BE FITTED WITH REMOVABLE ACCESS PANELS FOR CLEANING OF INTERNAL DUCT SURFACES. SUCH PANELS SHALL BE PROVIDED AT INTERVALS OF NOT MORE THAN 30 FEET, AND IMMEDIATELY UPSTREAM OF SPLITTERS OR TURNING VANES.
8. DUCTING SHALL BE ADEQUATELY SUPPORTED BY HANGERS SPACED AT REGULAR INTERVALS AND RIGIDLY ATTACHED TO VESSEL STRUCTURE.
9. ELBOWS WITH A BEND RADIUS LESS THAN 1 TIMES THE DIAMETER SHALL HAVE STIFFENERS OR TURNING VANES.
10. WEATHER LOUVERS SHALL BE ALUMINUM WITH A STAINLESS STEEL GUG SCREEN. WEATHER LOUVERS SHALL BE REMOVABLE AND FASTENED TO SUPERSTRUCTURE WITH STAINLESS STEEL FASTENINGS.
11. DRAINS SHALL BE PROVIDED AT LOW POINTS OF ALL VENTILATION DUCTING TO ALLOW COMPLETE DRAINAGE OF ANY WATER TRAPPED IN THE DUCTING SYSTEM.

REFERENCES

1. 16101-200-032-1 TECHNICAL SPECIFICATION
2. 16101-200-101-1 PROFILES AND DECK ARRANGEMENTS
3. 16101-200-150-1 SUPERSTRUCTURE MAIN DECK TO 01 DECK
4. 16101-200-201-1 MACHINERY ARRANGEMENT
5. 16101-200-150-3 MAIN DECK BULKHEADS
6. 16101-200-120-3 HULL TRANSVERSE BULKHEADS
7. 16101-200-238-1 EXHAUST ARRANGEMENT

Elliott Bay Design Group
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 NEW RIVER CLASS FERRY

MACHINERY VENTILATION ARRANGEMENT

DATE	16101-200-513-1	REV	B
SCALE AS NOTED	16101-200-513-1B	SHEET	1 OF 4
DATE	8/31/2017	DATE	7/28/17



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MATERIAL SCHEDULE

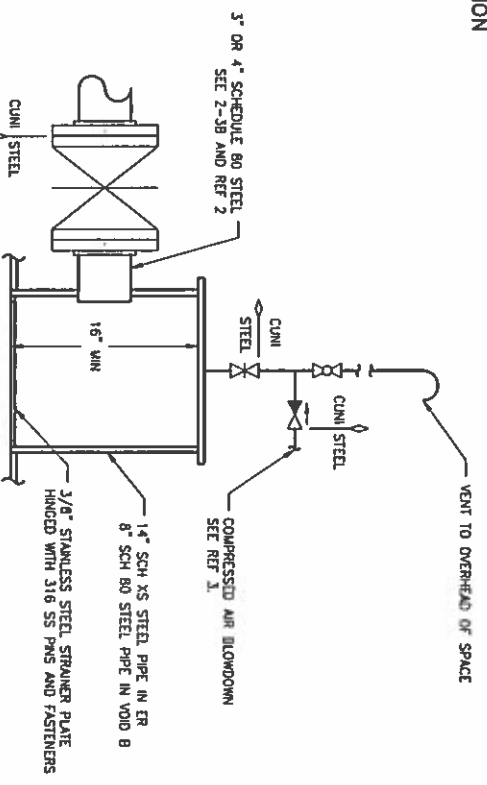
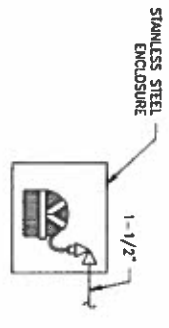
SERVICE	SIZE	PIPING		TAKEDOWN JOINTS		BODY	TRIM	FITTINGS	FLEX CONNECTIONS	REMARKS
		MATERIAL	MATERIAL	GASKETS	BOLTING					
FREEMAN WAMP: 120 PSIG MAX TEMP: AMBIENT	2" & ABOVE	CU-NI 90/10 ASTM B466 SEAMLESS CLASS 200	FLANGE: CU-NI 90/10 OR BRONZE ASTM B369 ANSI B16.5 SLP-ON OR WELD NECK, 150#	ORGANIC FIBER WITH NITRILE BRIDR ABS FIRE-SAFE TYPE APPROVED	BOLTS: STAINLESS STEEL ASTM A193 GRADE B8M ANSI B18.2.1 NUTS: STAINLESS STEEL ASTM A194 GRADE 8M ANSI B18.2.2	BUTTERFLY: BRONZE OR LINED DUCTILE IRON, WAFER TYPE	BUTTERFLY: BRONZE TRIM, RENEWABLE DISK	CU-NI 90/10 OR BRONZE ASTM B61 OR B62, BUTT WELD		
	2" & BELOW		CU-NI 90/10 UNION, SOCKET WELD, ASTM B369, 150#			CHECK: BRONZE ASTM B61 OR B62, 150#, FLANGED SEE NOTES 10 & 13	CHECK: BRONZE DISK, RENEWABLE SEALS & SEALS			
SHELL CONNECTIONS WAMP: 120 PSIG MAX TEMP: AMBIENT	ALL	CARBON STEEL: ASTM A53 OR A106, OR B, ANSI B36.10 SCH 80 SEAMLESS	FLANGE: CARBON STEEL ASTM A105 ANSI B16.5 SLP-ON OR WELD NECK, 150#	ORGANIC FIBER WITH NITRILE BRIDR ABS FIRE-SAFE TYPE APPROVED	BOLTS: STAINLESS STEEL ASTM A193 GRADE B8M OR ASTM A194 GRADE 8M ANSI B18.2.1 NUTS: STAINLESS STEEL ASTM A194 GRADE 8M ANSI B18.2.2	BALL: BRONZE ASTM B61 OR B62, THREADED	CARBON PLATED BRONZE BALL PITE SEALS	CARBON STEEL, ASTM A234, OR WPI ASTM B169 BUTT WELD SCH 80		

EQUIPMENT LIST

QTY.	SERVICE	TYPE	MODEL	CAPACITY	DRIVE	REMARKS
2	SEA WATER STRAWER	DUPLEX BASKET TYPE				SS BASKET BRONZE BODY
2	FIRE PUMP	HORIZONTAL CENTRIFUGAL		170 GPM @ 24.3 TPI	208V/24V/50HZ 25 HP TFC MOTOR 3550 RPM	SS 316 BODY

SYMBOLS LIST

SYMBOL	DESCRIPTION
	DIRECTION OF FLOW ARROW
	MATERIAL TRANSMISSION
	REDUCER
	DECK/BHD PENETRATION
	GATE VALVE
	BALL VALVE
	SWING CHECK VALVE
	BUTTERFLY VALVE
	CENTRIFUGAL PUMP
	PRESSURE GAUGE
	VACUUM PRESSURE GAUGE
	PRESSURE TRANSDUCER
	OVERBOARD DISCHARGE
	FIRE STATION
	DUPLEX STRAWER
	ANGLED GLOBE HOSE VALVE
	STOP CHECK VALVE
	SEA CHEST
	BLIGE ROSEBOX SUCTION
	GATE VALVE WITH REACH ROD
	DRAIN PLUG
	N.S. / N.O.



GENERAL NOTES (CONT)

- FIRE STATIONS SHALL HAVE A 1-1/2" HOSE VALVE, AND BE FITTED WITH 50 FEET OF 1-1/2" LINED COMMERCIAL FIRE HOSE CONFORMING TO UL-19, HOSE WRENCH, AND A USCG APPROVED COMBINATION FIRE NOZZLE WITH 5/8" ORifice. HOSES SHALL BE CONNECTED AND STORED IN APPROVED ENCLOSED HOSE RACKS.
- NOTED VALVES: ISOLATE EXTERIOR FIRE STATIONS PERIODICALLY EXPOSED TO FREEZING TEMPERATURES. LOCATE EACH VALVE IN AN EASY ACCESSIBLE LOCATION AS CLOSE AS POSSIBLE TO THE WEATHER BOUNDARY, WHERE LOCATED BEHIND JOINERY, PROVIDE A HINGED ACCESS PLATE.
- BUTTERFLY VALVES IN THE FIRE SYSTEM SHALL HAVE PASSED A FIRE TEST SUCH AS API 607. THE CONTRACTOR SHALL SUBMIT DOCUMENTATION.
- APPROVED MECHANICAL FITTING SYSTEMS MAY BE SUBSTITUTED FOR WELDED FITTINGS. FITTINGS SHALL BE ASS AND USCG APPROVED, AND USED IN ACCORDANCE WITH REDDARPORT REQUIREMENTS AND MANUFACTURER'S RECOMMENDATIONS.
- MATERIAL TRANSMISSIONS FROM STEEL TO COPPER-NICKEL PIPE SHALL BE ACCOMMODATED VIA FLANGED JOINTS. THE JOINTS SHALL BE FITTED WITH GALVANIC ISOLATION KITS TO PREVENT DIRECT METAL TO METAL CONTACT.
- FIRE STATIONS SHALL BE EQUIPPED WITH PUSH BUTTONS AND RUNNING LIGHTS FOR REMOTE START OF FIRE PUMP NO. 1, FIRE PUMP NO. 2 SHALL BE CAPABLE OF REMOTE START FROM THE EDS AND THE PLOTHOUSE. THE PLOTHOUSE SHALL HAVE RUNNING LIGHTS AND PRESSURE GAUGES FOR BOTH PUMPS. SEE REF 1.
- WELDED FITTINGS SHALL BE TIG WELDED. SL-BRAZING IS NOT ACCEPTABLE.
- WHERE PIPING PENETRATES BULKHEADS OR DECKS, WELDED SLEEVES OR PENETRATION SLEEVES WITH SUPPLY SEALING PADS (ASS CERT NO. 06-01820128/1-1-1) OR RES/NONRES SEALING (ASS CERT NO. 09-0293008/1-1-1) MAY BE USED. INSTALL PIPING TRANSITS IN ACCORDANCE WITH REGULATION REQUIREMENTS AND MANUFACTURER'S CERTIFIED INSTALLATION DETAILS.
- LOCATE DRAIN VALVES FOR COMPLETE DRAINAGE OF EXTERIOR FIRE STATIONS.
- 1" END HOSE STATIONS SHALL BE EQUIPPED WITH AIRF HOSE ENDS WITH (2) FIVE GALLON CONTAINERS IN ENGINE ROOMS.
- CONTRACTOR SHALL INSTALL PUMPS SUCH THAT FLOODED SUCTIONS ARE MAINTAINED AT OPERATIONAL LIGHTSHIP DRAIFT.

REVISION HISTORY

REV	ZONE	DESCRIPTION	DATE	APPRO
1	1-3C	ADDED NOTE 21.	6/30/17	LOB

GENERAL NOTES

- VESSEL TO BE CONSTRUCTED IN ACCORDANCE WITH 46 CFR SUBCHAPTER H REGULATIONS.
- THIS DRAWING IS DIAGNOSTIC 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 MANUFACTURER'S CERTIFIED DRAWINGS AS APPROPRIATE.
- PIPING SHALL BE RUN AS DIRECTLY AS PRACTICABLE WITH A MINIMUM NUMBER OF BENDS AND FITTINGS. PIPE SPOOLS SHALL BE SIZED AND ARRANGED TO PROVIDE FOR REMOVAL, INSPECTION, SERVICING, AND REPLACEMENT OF PIPING, VALVES, FITTINGS, AND EQUIPMENT WITHOUT CUTTING STRUCTURE OR PIPING.
- AVOID POCKETS IN THE PIPE LINES, BOSSES, AND VALVES OR SCREWED POCKETS DO OCCUR.
- PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F108. HANGERS SHALL BE ATTACHED TO THE PIPE WITH BOLTED CLAMPS AND WELDED TO BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE WELDED DIRECTLY TO PIPES. ALL COPPER-NICKEL PIPING SHALL BE SUPPORTED USING INSULATED HANGERS.
- THE PIPING SYSTEM SHALL BE CLEANED AND TESTED IN ACCORDANCE WITH USCG REQUIREMENTS. SEE REF 1.
- VALVES LOCATED BELOW THE FLOOR PLATES SHALL BE PROVIDED WITH REACH RODS. ALL VALVES SHALL BE PROVIDED WITH VISUAL POSITION INDICATION.
- OVERBOARD SHELL PENETRATIONS SHALL BE LOCATED AS FAR ABOVE BASELINE AS POSSIBLE WHILE STILL BEING UNDER THE GUMDS.
- TOTAL DYNAMIC HEAD OF PUMPS FOR REQUIRED FLOW ARE APPROXIMATE ONLY. 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 ENGINE PUMP OPERATING RANGE.
- FIRE STATION HOSE VALVES MAY BE COMMERCIAL SCREWED FIRE HOSE VALVES IN LEU OR FLANGED.

REFERENCES

- 16101-200-832-1 TECHNICAL SPECIFICATION
- 16101-200-529-1 BLIGE AND BALLAST SCHEMATIC
- 16101-200-551-1 COMPRESSED AIR PIPING SCHEMATIC

North Carolina Ferry System
OPERATED BY THE

Elliott Bay Design Group
 North Carolina, D.O.T.
 RALEIGH, NORTH CAROLINA
 NEW RIVER CLASS FERRY

FIRE MAIN SYSTEM SCHEMATIC

SCALE	DATE	BY	CHK
SCALE NONE	16101-200-521-1A	1	2
DATE	APP'D	DATE	BY
8/30/2017		7/21/17	

MATERIAL SCHEDULE

SERVICE	SIZE	MATERIAL	MATERIAL	TAKEDOWN JOINTS			BODY	VALVES	TRIM	FITTINGS	FLEX CONNECTIONS	REMARKS
				CASSETS	BOLTS	BRACKETING						
BILGE AND CONNECTIONS	2" & ABOVE	CARBON STEEL, ASTM A53 OR A106, GRADE B SEAMLESS, ANSI B36.10 SCH 80	FLANGE: CARBON STEEL, SLIP-ON, ANSI B16.5, ASTM A155 WELD NECK OR SLIP-ON, 150#	PROBANG FIBER WITH NITRILE BRIDER ABS FIRE-SAFE TYPE APPROVED	BOLTS: STAINLESS STEEL, ASTM A193, GRADE B8U, ANSI B18.2.1 NUTS: STAINLESS STEEL, ASTM A194, GRADE 8M, ANSI B18.2.2	BRACKETING: CARBON STEEL, ASTM A216 OR WCB 150#, WATER TIGHT	STOP CHECK: CARBON STEEL, ASTM A216 OR WCB 150#, FLANGED	BRACKETING: CARBON STEEL, ASTM A216 OR WCB 150#, FLANGED	BRACKETING: SS STEEL, SS RENEWABLE DISC AND SEAT, ASTM A182	CARBON STEEL, ASTM A216 OR WCB 150#, BUTT WELD LONG RADIUS SCH 80		NOTE 14
BALLAST	ALL	CU-NI 90/10, ASTM B466 SEAMLESS CLASS 200	FLANGE: CU-NI 90/10 OR BRONZE, ASTM B369, ANSI B16.5, SLIP-ON OR WELD NECK, 150#			BUTTERFLY: BRONZE OR LINED DUCTILE IRON, WATER TIGHT	BUTTERFLY: BRONZE TRIM, RENEWABLE DISK	CHECK: BRONZE OR LINED DUCTILE IRON, WATER TIGHT	CHECK: BRONZE OR LINED DUCTILE IRON, WATER TIGHT	CU-NI 90/10 OR BRONZE, ASTM B61 OR B62, BUTT WELD		NOTE 21

SYMBOLS LIST

SYMBOL	DESCRIPTION
—	PIPE
▷	REDUCER
⊔	DECK/BULKHEAD PENETRATION
⊔	MANIFOLD, STOP CHECK VALVES
⊔	MATERIAL TRANSITION
✕	BUTTERFLY VALVE
✕	GATE VALVE
✕	BUTTERFLY VALVE, ACTUATED
✕	GATE VALVE WITH REACH ROD
⊔	SWING CHECK VALVE
⊔	ANGLE STOP CHECK VALVE
⊔	BILGE ROSEBOX SUCTION
⊔	PRESSURE GAUGE
⊔	VACUUM PRESSURE GAUGE
⊔	FLANGE
⊔	DIFFERENTIAL PRESSURE GAUGE
⊔	DUPLICATE STRAINER
⊔	CENTRIFUGAL PUMP
⊔	OVERBOARD DISCHARGE
⊔	SEA CHEST
⊔	BALLAST SUCTION

EQUIPMENT LIST

QTY	SERVICE	TYPE	MODEL	CAPACITY	DRIVE	REMARKS
2	BILGE PUMP	CENTRIFUGAL SELF-PRIMING	-	149 GPM @ 40" TDH	209V/24/60HZ 5 HP ITC MOTOR 3450 RPM	BRONZE BODY
2	BILGE PUMP STRAINER 3" NPS	DUPLICATE BASKET TYPE	-	-	-	SS BASKET BRONZE BODY
2	BALLAST PUMP	CENTRIFUGAL	-	200 GPM @ 20" TDH	209V/24/60HZ 2 HP ITC MOTOR 1165 RPM	SS BODY
2	BALLAST PUMP STRAINER 4" NPS	DUPLICATE BASKET TYPE	-	-	-	SS BASKET BRONZE BODY

GENERAL NOTES (CONT)

- TOTAL DYNAMIC HEAD OF PUMPS FOR REQUIRED FLOW ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL PROVIDE PUMPS MEETING THE REQUIRED FLOW WITH THE INSTALLED PIPING SYSTEMS. PUMP MOTORS SHALL BE SELECTED TO PREVENT MOTOR OVERLOAD OVER THE ENTIRE PUMP OPERATING RANGE.
- VALVES CONSTRUCTED OF DUCTILE IRON, ASTM A155, MAY BE SUBSTITUTED WHERE APPROVED BY USCC & ABS REQUIREMENTS.
- ALL BILGE LINES SHALL BE ROUTED NO LESS THAN ONE FIFTH OF THE VESSEL BEAM FROM THE SIDE SHELL AND ABOVE THE 1/15 LINE IN ACCORDANCE WITH USCC AND ABS REGULATIONS.
- WHERE PIPES PENETRATE TANK BOUNDARIES, BULKHEADS OR DECKS HEAVY WEIGHT SPOOL PIECES SHALL BE USED. SEE DETAIL 2-5A.
- THE BILGE LINES SERVING THE LAZARETTES SHALL BE FITTED WITH AN ISOLATION VALVE OPERABLE FROM THE MAIN DECK. THE REMOTE OPERATOR SHALL BE A FLUSH MOUNTED DECK BOX WITH REACH ROD.
- BALLAST CONTROL VALVES SHALL BE AIR OPERATED VALVES WITH CONTROLS LOCATED IN THE EOS. SEE REF. 1 AND 3.
- BALLAST PUMPS SHALL BE CONTROLLED LOCALLY AND FROM THE EOS.
- MATERIAL TRANSITIONS FROM STEEL TO COPPER-NICKEL PIPE SHALL BE ACCORDANCE WITH USCC REQUIREMENTS. THE JOINTS SHALL BE FITTED WITH CALYNEUM ISOLATION KITS TO PREVENT DIRECT METAL TO METAL CONTACT.
- WELDED CLUNI FITTINGS SHALL BE TO BE WELDED. SURF-BRAZING IS NOT ACCEPTABLE.
- CONTRACTOR SHALL INSTALL PUMPS SUCH THAT FLOODED SUCTIONS ARE MAINTAINED AT OPERATIONAL UPGHSHIP DRAFT.

REVISION HISTORY

REV	ZONE	DESCRIPTION	DMN	DATE	APPD
1	3-SA	REvised BALLAST SUCTION LOCATION	LCB	8/30/17	LCB
2	1-3C	ADDED NOTE 22.			

GENERAL NOTES

- VESSEL TO BE CONSTRUCTED IN ACCORDANCE WITH 48 CFR SUBCHAPTER H REGULATIONS.
- 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. PIPE SPOOLS SHALL BE SIZED AND ARRANGED TO PROVIDE FOR REMOVAL, INSPECTION, SERVICING, AND REPLACEMENT OF PIPING, VALVES, FITTINGS, AND EQUIPMENT WITHOUT CONTING STRUCTURE OR PIPING.
- AND/POCKETS IN THE PIPE LINES, BOLTS AND VALVES OR SCREWED PLUGS SHALL BE FITTED TO SWAGE COMPLETE DRAWING OF PIPES WHERE POCKETS DO OCCUR.
- THE PIPING SYSTEM SHALL BE CLEANED AND TESTED IN ACCORDANCE WITH USCC REQUIREMENTS. SEE REF. 1.
- PIPING SHALL BE ADEQUATELY SUPPORTED BY HANGERS IN ACCORDANCE WITH ASTM F100. HANGERS SHALL BE ATTACHED TO THE PIPE WITH BOLTED CLAMPS AND WELDED TO BASIC SHIP STRUCTURE. HANGERS SHALL NOT BE WELDED DIRECTLY TO PIPES. ALL COPPER-NICKEL PIPING SHALL BE SUPPORTED USING INSULATED HANGERS.
- VALVES LOCATED BELOW THE FLOOR PLATES SHALL BE PROVIDED WITH INDICATION.
- REACH RODS: ALL VALVES SHALL BE PROVIDED WITH VISUAL POSITION INDICATION.
- BILGE ROSEBOX SCREENS SHALL BE HOT DIP GALVANIZED AFTER FABRICATION. SUCTION STRAINERS SHALL HAVE AN OPEN AREA OF AT LEAST THREE TIMES THE AREA OF SUCTION PIPE.
- OVERBOARD PENETRATIONS SHALL BE LOCATED AS FAR ABOVE BASELINE AS POSSIBLE WHILE STILL BEING UNDER THE GUNDS.
- BILGE SUCTIONS SHALL BE LOCATED AT THE COMPARTMENT LOW POINT.
- BILGE PUMPS SHALL BE CONTROLLED LOCALLY AND FROM THE EOS.
- EMERGENCY BILGE SUCTION IS LOCATED ON THE FIRE MAIN SYSTEM. SEE REF. 2.

REFERENCES

- 16101-200-432-1 TECHNICAL SPECIFICATION
- 16101-200-521-1 FIRE MAIN SYSTEM SCHEMATIC
- 16101-200-551-1 COMPRESSED AIR PIPING SCHEMATIC

CALCULATIONS

BILGE SYSTEM LPER 48 CFR 58.50-50)

DATA:
L = 180.5 FT
B = 46 FT
D = 10.5 FT
C = COMPARTMENT LENGTH (FT)

BILGE MAIN $d = 1 + \sqrt{\frac{L(B+D)}{2500}} = 3.02$ (USE 3" SCH 80 PIPE)

BRANCH SUCTION $d = 1 + \sqrt{\frac{L(C+D)}{1500}}$

COMPARTMENT	C	D	NO. VALVES	ID
LAZARETTE A	11.8	2.000	2"	1.939
THRU-DECK ROOM A	32.0	2.098	2"	1.939
VOID A	20.0	2.000	2"	1.939
ENGINE ROOM	56.0	2.452	2 1/2"	2.323
VOID B	20.0	2.000	2"	1.939
THRU-DECK ROOM B	32.0	2.098	2"	1.939
LAZARETTE B	11.8	2.000	2"	1.939

PUMP CAPACITY TO DEVELOP A SUCTION VELOCITY OF 400 FPM
Q = 18.32 cfm, WHERE d IS THE BILGE MAIN DIAMETER
Q = 149 GPM



Elliott Bay Design Group
North Carolina, D.O.T.
RALEIGH, NORTH CAROLINA
NEW RIVER CLASS FERRY

BILGE AND BALLAST SCHEMATIC

DATE: 8/30/2017

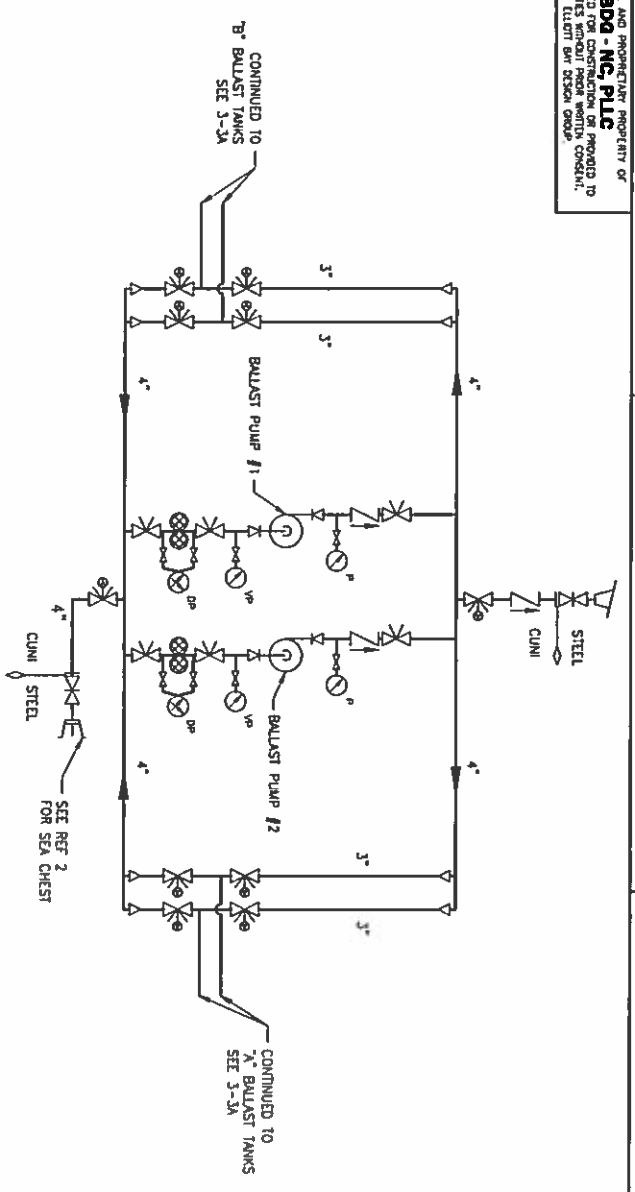
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NO. 16101-200-529-1

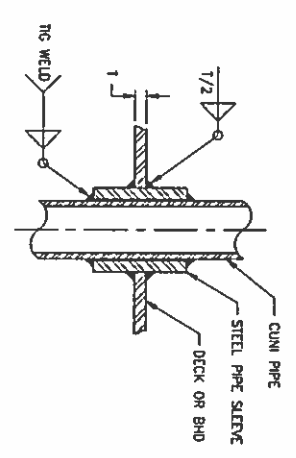
REV: 1

APPD: A

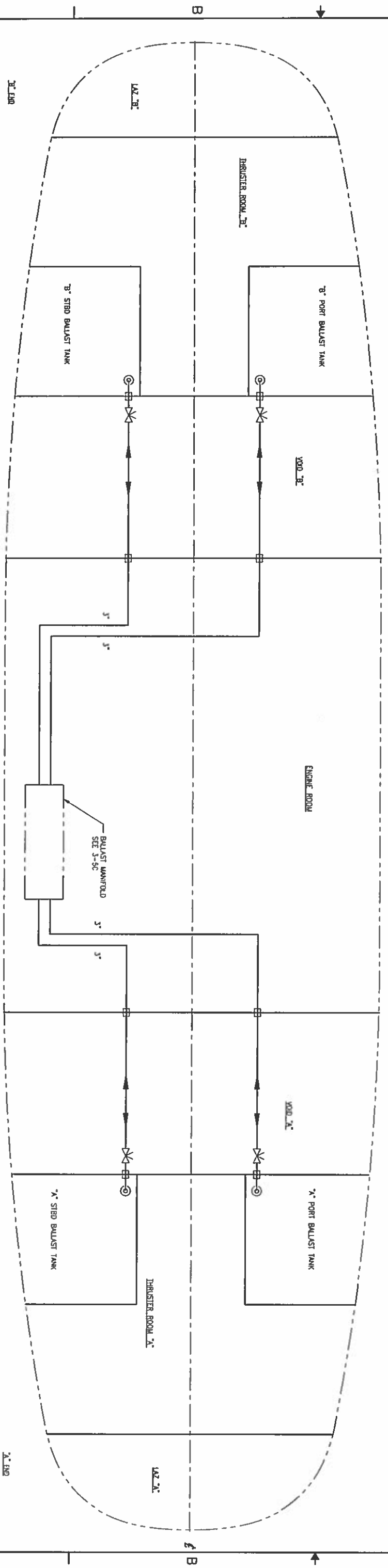
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PLAN 3-5C
BALLAST MANIFOLD



DETAIL 3-1C
TYP DECK/BHD PENETRATION
 CUMI PIPING



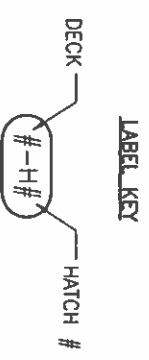
PLAN 3-3A
BALLAST SYSTEM DIAGRAM



Sheet No.	D	Project No.	16101-200-529-1
Scale	N.T.S.	Date	16101-200-529-1A
Part	3	Page	3

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		HATCHLIST				
NO.	DECK	SPACE	REMARKS	SIZE	COMING	REMARKS
141	HOLD	POTABLE WATER TANK (7)	MADE BOLTED WATER TIGHT	18'-2"	24	
142	HOLD	FUEL OIL TANK (6)	MADE BOLTED OIL TIGHT	18'-2"	24	
143	HOLD	FUEL OIL TANK (5)	MADE BOLTED OIL TIGHT	18'-2"	24	
241	MAIN	DOV VOID	FILSH, HINGED, WATER TIGHT, BOLTED	18'-2"	0	
242	MAIN	VENTILATION ACCESS	EQUIPMENT REMOVAL CAN DECK PLATE, FILSH, SCREWED, WATER TIGHT	31'-4"	0	
243	MAIN	BULLHEAD TANK (7)	FILSH, HINGED, WATER TIGHT, BOLTED	18'-2"	0	
244	MAIN	BULLHEAD TANK (6)	FILSH, HINGED, WATER TIGHT, BOLTED	18'-2"	0	
245	MAIN	THRUDECK ROOM V. ESCAPE	FILSH, HINGED, WATER TIGHT, GASKET ACTING, SPRING ASSIST	23'-4"	0	
246	MAIN	MAIN ENGINE ACCESS	EQUIPMENT REMOVAL CAN DECK PLATE, A-98, FILSH, SCREWED, WATER TIGHT, REF 2	8'-4"	0	
247	MAIN	ENGINE ACCESS	EQUIPMENT REMOVAL CAN DECK PLATE, A-98, FILSH, SCREWED, WATER TIGHT, REF 2	7'-2"	0	
248	MAIN	END PUL MACHINERY ACCESS	EQUIPMENT REMOVAL CAN DECK PLATE, A-98, FILSH, SCREWED, WATER TIGHT, REF 2	8'-2"	0	
249	MAIN	MAIN ENGINE ACCESS	EQUIPMENT REMOVAL CAN DECK PLATE, A-98, FILSH, SCREWED, WATER TIGHT, REF 2	8'-4"	0	
2410	MAIN	VOID V. MACHINERY ACCESS	EQUIPMENT REMOVAL CAN DECK PLATE, FILSH, SCREWED, WATER TIGHT, REF 3	40'-2"	0	
2411	MAIN	BULLHEAD TANK (7)	FILSH, HINGED, WATER TIGHT, BOLTED	18'-2"	0	
2412	MAIN	BULLHEAD TANK (6)	FILSH, HINGED, WATER TIGHT, BOLTED	18'-2"	0	
2413	MAIN	THRUDECK ROOM V. ESCAPE	FILSH, HINGED, WATER TIGHT, GASKET ACTING, SPRING ASSIST	23'-4"	0	
2414	MAIN	VENTILATION ACCESS	EQUIPMENT REMOVAL CAN DECK PLATE, FILSH, SCREWED, WATER TIGHT, REF 3	31'-4"	0	
2415	MAIN	DOV VOID	FILSH, HINGED, WATER TIGHT	18'-2"	0	
2416	MAIN	VOID V. MACHINERY ACCESS	EQUIPMENT REMOVAL CAN DECK PLATE, FILSH, SCREWED, WATER TIGHT, REF 3	34'-4"	0	
2417	MAIN	ANCHOR CHAIN STORAGE	FILSH, HINGED, WATER TIGHT, GASKET ACTING, SPRING ASSIST	18'-2"	0	
2418	MAIN	VOID V. ESCAPE	FILSH, HINGED, WATER TIGHT, GASKET ACTING, SPRING ASSIST	21'-8"	0	



PROFESSIONAL ENGINEER
 STAMP PER:
 REV: -
 ENGR: PATRICK D. FAS
 DATED: 07/27/2017
 STATE: VA
 REG. NO: 49313



REVISION HISTORY			
REV ZONE	DESCRIPTION	BY	DATE
A	1. UPDATED PE STAMP FOR REV A	DKC	08/31/17
2-4C	2. ADDED HATCH AT PR 21 B END STRD.		

GENERAL NOTES

- VESSEL TO BE CONSTRUCTED IN ACCORDANCE WITH 48 CFR SUBCHAPTER H REGULATIONS.
- FRAME SPACING IS 24" UNLESS NOTED OTHERWISE.
- ALL HATCHES ARE TO BE GASKETED, WATERTIGHT, FUSH HATCHES ON CAR DECK ARE TO USE ADDITIONAL SEALING COMPOUND TO ENSURE WATERTIGHT FIT.
- SEE REF 3 FOR BEAR. HATCH STRUCTURE.
- ESCAPE HATCHES SHALL BE PAINTED IN A BRIGHT COLOR CONTRASTING THE DECK.

VESSEL PARTICULARS

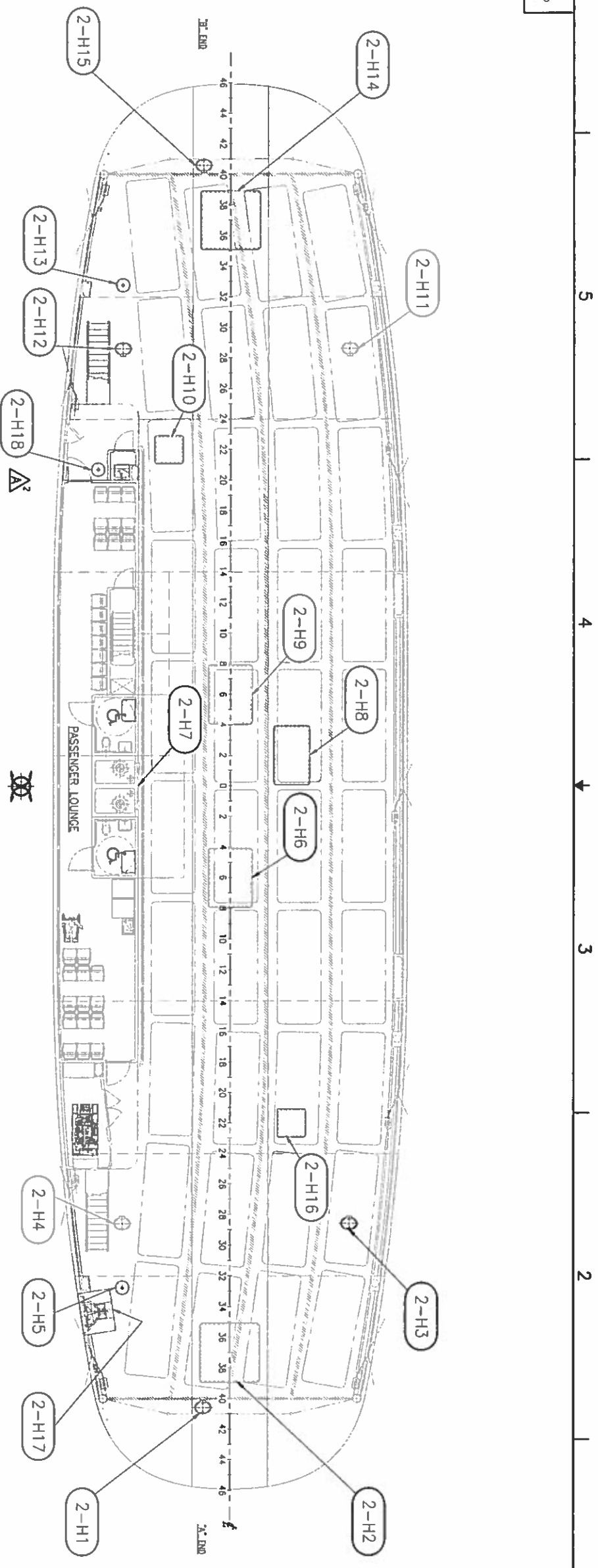
LENGTH OVERALL: 183'-7"
 LENGTH DESIGN LOAD WATERLINE: 180'-6"
 BEAM, MOLDED: 46'-0"
 BEAM OVER GUARDS: 46'-10"
 DEPTH AT SIDE: 10'-6"
 DRAFT AT D.W.L.: 4'-6"
 FREEBOARD AT SIDE: 6'-0"
 TOTAL PASSENGER CAPACITY: 300 MAX.
 VEHICLE CAPACITY: 40 SV

- REFERENCES**
- 16101-200-832-1 TECHNICAL SPECIFICATION
 - 16101-200-101-0 PROFILES AND DECK ARRANGEMENTS
 - 16101-200-130-2 MAIN DECK

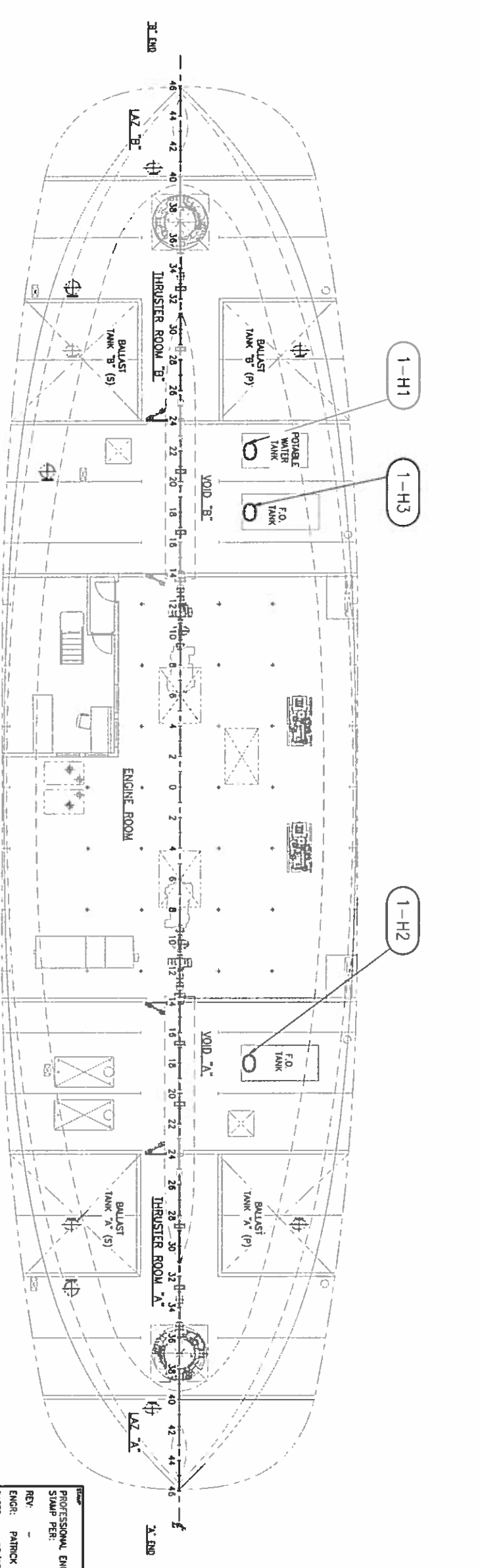
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HATCH SCHEDULE

SCALE	DATE	BY	CHKD	APP'D
D	16101-200-624-3			
SCALE NONE	16101-200-624-3A			
DATE	DATE	BY	CHKD	APP'D
JFH				
				7/27/2017



MAIN DECK PLAN



HOLD PLAN

PROFESSIONAL ENGINEER
 STAMP PER:
 REV: PATRICK D. FAS
 ENGR: 07/27/2017
 DATED: WA
 STATE: 45313
 REG NO: 08/31/2017



16101-200-624-3
 1/8"=1'-0"
 16101-200-624-3A