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SOUTHPORT BRIDGE ROUTE 27
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INDEX OF ELECTRICAL DRAWINGS



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GENERAL ELECTRICAL NOTES:

1. Design drawings depict electrical devices and enclosures, switches and terminal boxes are shown in their approximate general area. Actual exact location shall be verified at the site and determined or established in the field and coordinated with all other trades.
2. All metal enclosures of electrical equipment and devices shall be securely grounded. 208 volt, three phase motors and other equipment shall have separate equipment grounding conductor running with the phase conductors. Multiconductor cables used for switches and control devices shall contain a bare or covered ground conductor of minimum size #12 for enclosure ground. Insulated grounding conductor shall be green in color or identified with green tape at the terminal points.
3. Before installing the electrical raceway/conduit system, a careful check shall be made in the field for interference with equipment, piping and structures. The conduit schematic is shown diagrammatically and exact routing must be determined in the field.
4. Raceway/conduits shall be properly supported. In no case shall supports be more than six feet apart and shall be within three feet of all boxes, fittings and cabinets.
5. Conduits shall not be supported from HVAC ducts or from piping. Parallel runs with hot surfaces must maintain a minimum clearance of 12 inches. A minimum clearance of 6 inches shall be maintained when crossing a hot pipe
6. Conduit shall run parallel to the vertical and horizontal planes with respect to the walls as far as practicable. Draining T's shall be provided at all low points of conduit
7. Unless otherwise noted, PVC coated rigid metal conduit shall be used for above ground outdoor locations. Unless noted otherwise minimum conduit size for above ground installation shall be 1 inch.
8. Supports for PVC coated rigid metal conduit shall be PVC-coated supports provided by the conduit manufacturer and installed using manufacturer-approved tools and in accordance with manufacturer's instructions.
9. Any PVC coated rigid metal conduit with damage to PVC coating shall be replaced or repaired with manufacturer recommended products and in accordance with manufacturer repair instructions.
10. Standard radius factory made conduit elbows are acceptable in above ground installation. Unless otherwise noted on the drawing, field bend conduits shall have a minimum radius of six times the internal conduit diameter. Conduit bends shall never be so sharp as to roughen the inside surface of the conduit or flatten or reduce the cross sectional area.
11. All wires and cables shall be pulled into their conduits by the application of a suitable industrial grade non hardening pulling compound. Pulling distance shall not exceed the equivalent of 100 feet straight run and a pull shall contain no more than the equivalent of 3-90 degree bends. Pull boxes shall be used where necessary.
12. A bare copper #2/0 equipment grounding conductor shall be run along the entire length of the wireway and bonded to it at both ends and at each joint. The wire system shall be grounded to the motor cabinet ground bus or structure ground bus using a #2/0 bare copper conductor.
13. Control cables to individual devices are to include 20% spare conductors (minimum two).
14. Where multiconductor cables are used, the individual conductors in the cable shall have color coding and/or stamped numbers by the manufacturer. Where single conductors to equipment or a field device are used each individual conductor shall be labeled with one wire number as shown on the shop drawings
15. Grounding is to be provided in accordance with NEC requirements.
16. Unless otherwise noted, all field conductors shall be XHHW-2 insulated, stranded, minimum #12. Control conductors within cabinets shall be XHHW-2 insulated, stranded, minimum #14.
17. The conductor count and conduit sizes are approximate. Contractor shall provide as necessary at no additional cost.
18. Liquid-tight flexible metal conduit shall be used for final connection to all motors and limit switches and any device which may require positional adjustment. Liquid-tight conduit shall carry a separate ground conductor.

19. Expansion/deflection fittings shall be furnished and installed wherever conduit crosses a structural joint.
20. All electrical boxes shall be provided with drain and breather.
21. All exterior electrical boxes shall have bottom or side conduit entry. There shall be no top entry.
22. Electrical equipment installed outdoors or in wet locations shall be NEMA 4X, fabricated from 316 stainless steel.
23. Conduit and wiring sizes and quantities are for informational purposes. Contractor shall prepare schedule and tabulation of all conduit and wiring required to complete all portions of the project and is responsible for all its accuracy, and shall provide the approved conduit and wiring at no additional cost to the department.
24. All conduit hubs must be grounded and bonded and provided with insulated throat entry.

DEMOLITION PLAN:

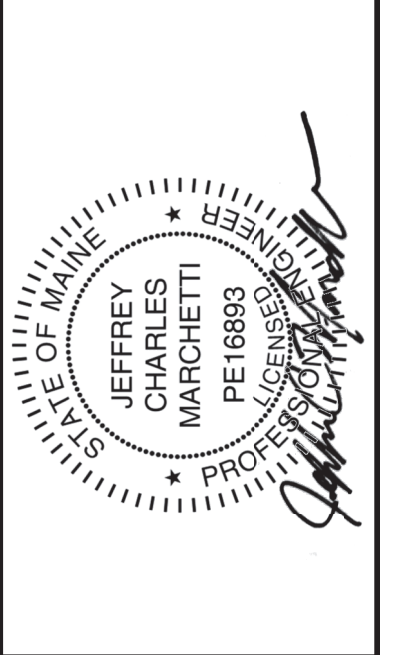
Equipment to retain and reuse:

1. Equipment to remain for re-use: Submarine cables; upper chord navigation lights (3) and conduit; Pier 1 navigation lights; Pier 3 navigation lights; tender's shack and service conduit from abutment to shack; Southport service meter, service disconnect switch, and conduit to Pier 3; Southport weatherhead and aerial cable to advance warning beacon; Boothbay aerial cable to advance warning beacon; bridge structure grounding conductors.

Demolition:

1. Southport approach: Remove the advance warning beacon weatherhead, conduit, and wiring in the vicinity of the existing beacon (aerial cable to remain); oncoming warning gate conduit and wiring; and service conductors (service conduit from meter to remain).
2. Southport fixed span (Span 3): Remove the red flasher conduit and wiring; offgoing warning gate conduit and wiring; pier 3 navigation light conduit and wiring; Pier 3 control submarine cable terminal box; service conductors (service conduit to Pier 3 to remain); Pier 3 power submarine cable junction box.
3. Swing span (Span 2): Remove conduit and wiring from control house to HPU, valves, and all cylinders; span drive motors; conduit and wiring from control house to span drive motors, brakes, span limit switch (rotating cam), power droop cable junction box, control droop cable junction box; service lighting and convenience outlets with associated conduit and wiring; control submarine cable terminal box; power droop cable and junction box, control droop cables and terminal box; span limit switch
4. Boothbay fixed span (Span 1): Remove the offgoing warning gate conduit and wiring; Pier 1 navigation light conduit and wiring; Pier 1 control submarine cable conduit body and terminal box. Only the tender's shack service conduit and cable TV conduit shall remain from the shack along the fixed span and onto the abutment.
5. Boothbay approach: Remove the red flasher conduit and wiring; utility service meter, disconnect switch, weatherheads and pole; conduit and wiring from abutment to the service disconnect switch; oncoming warning gate conduit and wiring; advance warning beacon weatherhead, conduit, and wiring in the vicinity of the existing beacon (aerial cable to remain); oncoming warning gate conduit and wiring.
6. Payment for all labor, materials, equipment, and other costs required to remove and dispose of the existing bridge materials will be considered incidental to the work and pay item. The existing bridge materials shall be removed by, and become the property of, the Contractor.
7. Some of the existing components and supporting members may be coated with lead based paint. The contractor is responsible for containment, proper management and disposal of all lead contaminated hazardous waste generated by performing the work. The contractor is responsible for implementing appropriate OSHA mandated personal protection standards related to this work. Once the existing components are removed, the Contractor is solely responsible for the care, custody, and control of the components and any hazardous waste generated as a result of the storage, recycling or disposal of them.

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SOUTHPORT BRIDGE, ROUTE 27
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ADDITIONAL ELECTRICAL NOTES:

Electrical Service:

1. The existing electrical service to remain. Service emanates from a pole on each approach and enters a service disconnect switch on each approach.
2. Furnish and install a new service circuit breaker within the Southport service disconnect switch as shown on the Plans.
3. Furnish and install new service disconnect switch on Boothbay approach as shown on the Plans.
4. Furnish and install Power Panel as shown on the Plans.
5. Furnish and install all conduit and wiring for this equipment.

Emergency Power Supply:

1. There is no emergency electrical supply to be included in this contract.

Bridge Grounding System:

1. Furnish and install bridge grounding system. It will include bonding to the existing grounding system at the service. Ground bond each and every electrical device including control panels, control console disconnect switches, junction boxes, motors, brakes, limit switches, auxiliary systems, conduit, etc. All conduit shall be grounded through a grounding bushing hub at each entry. Grounding lugs shall be readily visible for inspection. Bridge grounding system shall be as detailed in the specification and its special provisions.
2. Additional grounding electrodes may be needed. Measure and verify that the ground resistance is 5 ohms or less and install additional grounding electrodes as required to achieve this value at no additional cost to the owner.

Bridge Operation System Machinery:

1. Furnish and install two ac vector duty NEMA Design B span drive motors as shown in the Plans. Mounting, alignment and coupling of all motors to be performed under the mechanical pay item.
2. Furnish and install conduit and wiring for motor brakes and machinery brakes which are provided under the mechanical pay item.

Instrumentation:

1. Furnish and install a span limit switch of rotating cam type with integral encoder type span position transmitter and indicator.
2. Furnish and install conduit and wiring system to span limit switch enclosure.

Motor Control:

1. Furnish and install Motor Starter Cabinet in the control house, as shown on the Plans.
2. Furnish and install Span Motor Drive Cabinet in the control house, as shown on the Plans.
3. Furnish and install all conduit and wiring for this equipment.

Controls:

1. Furnish and install the control system as shown on the Plans and as described in the Special Provisions. Furnish and install all conduit and wiring for this equipment.
2. Time delay relay settings shown on the Plans are approximate. Adjust settings in the field as required to ensure operation of the control system as intended.

Span Jacking and Stabilization:

1. Furnish and install conduit and wiring to the end jacks and stabilizing end seat actuators. Jacks and seat actuators are provided under mechanical pay item.

Submarine Cable System:

1. Furnish and install new submarine cable terminal boxes as shown on the Plans. Furnish and install all conduit and wiring for this equipment.
2. Existing submarine cable to be reused. Cut ends of existing

submarine cables, re-support the submarine cables, and re-terminate in the newly provided terminal boxes.

Drag Cables:

1. Furnish and install new drag cables and terminal boxes. Furnish and install all conduit and wiring for this equipment.

Traffic Controls and Gates:

1. Provide conduit and wiring to traffic signals, advanced warning hazard beacons, and barrier gates as shown on the Plans.
2. All traffic control devices to be provided under a different pay item.

Emergency Operation:

1. In the case of a complete electrical failure or failure of the control system or drive system, emergency operation will be effected through the use of hand cranks on the span drive motors extension shaft, hand releasing of the brakes and manual jacking and manual operation of the end seat actuators at the ends.

Cross Channel Power and Controls:

1. Cross channel power and controls will be conducted through submarine cables. Existing cables will be reused, re-supported and re-terminated in new submarine cable terminal boxes.

Traffic Controls:

1. Traffic controls will include new advanced warning hazard beacons, traffic signals, and barrier gates. Furnish and install conduit wiring and controls for this equipment.

Lighting:

1. Furnish and install lighting in the control house and span lighting as shown on the Plans. Furnishing install conduit and wiring for this equipment.

HVAC:

1. Furnish and install heating, ventilation and air conditioning in the control house as called out in the Plans. Furnish and install conduit and wiring to the equipment.

CCTV:

1. Furnish and install cameras, monitors, recorders, and controls for a complete CCTV system as shown on the Plans. Furnish and install conduit and wiring to the equipment. Note that CAT6 cables shall be run in a separate conduit.

Miscellaneous Systems:

1. Furnish and install marine horn as shown in the Plans and called out in the specifications. Furnish and install conduit and wiring for this equipment.

Conduit and Wiring:

1. Furnish and install all exposed, embedded and buried conduit and trough, supports, junction boxes, pull boxes, terminal boxes, cables, wire, signal conductors and CAT6 cable with accessories and interfacing.
2. Provide conduit and wiring schedule for approval prior to beginning any work on this item.

Fire Alarm System:

1. Furnish and install fire alarm in the control house.

Spare Parts

1. Furnish, catalog and store all spare parts as detailed in the specifications and its special provisions. Verify conductor requirements and then add a minimum of 20% spares with a minimum of two spares per conduit.

Testing:

1. Testing shall include shop testing, site testing, and final acceptance testing as called out in the specifications and its special provisions.
2. Provide all shop testing as called out in the specification, including

coordination for Department witnessing. Perform preliminary testing to troubleshoot and make corrections prior to witness testing. Submit testing procedure for review and approval by the Department including possible enhancement by the Department.

3. Acceptance testing paid for under the testing pay item.

Training:

1. Furnish operator training and maintenance personnel training as called out in the specifications and its special provisions. Training shall take place only after approval of the operating manual and the maintenance manual, and after acceptance testing has been completed successfully and signed off by the Department.

Manuals:

1. Furnish operating manuals and maintenance manuals as detailed in the specification and its special provisions. No formal site testing will be performed without all manuals having been approved.

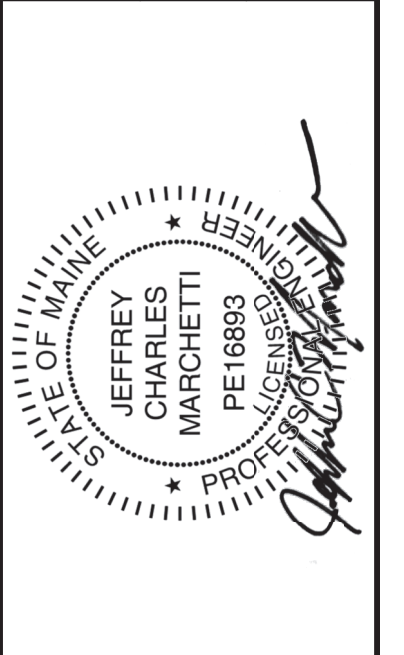
Warranty:

1. Warrant all supplied equipment, installation methods, wiring and operation against equipment failure and/or wear and deterioration and any operational failure for a period of two years from the date of the final acceptance of the bridge by the Department. See specification and its special provisions for further details.

Codes and Standards:

1. All work shall meet the current requirements of the National Electrical Code, National Electrical Safety Code, National Electrical Manufacturers Association, OSHA, Manual on Uniform Traffic Control Devices, AASHTO, US Coast Guard, and all other codes and standards as called out in the specification and its special provisions and as required by local codes.

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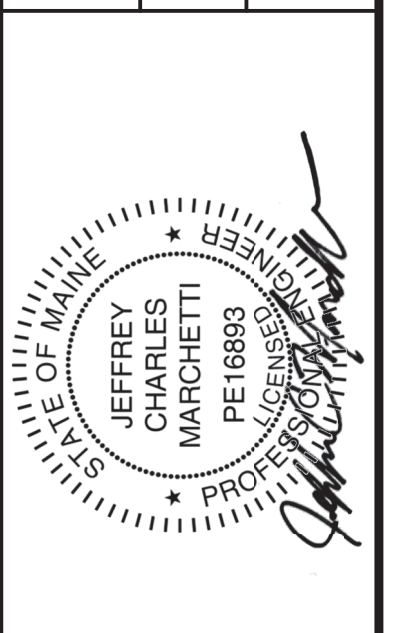
ABBREVIATIONS:

BGN North (Boothbay) Barrier Gate
 BGS South (Southport) Barrier Gate
 CB-CPANEL Motor Starter Panel Circuit Breaker
 CB-CTRL Control Circuit Circuit Breaker
 CB-EJNE Northeast End Jack Circuit Breaker
 CB-EJNW Northwest End Jack Circuit Breaker
 CB-FVD1 Flux Vector Drive 1 Circuit Breaker
 CB-FVD2 Flux Vector Drive 2 Circuit Breaker
 CB-GATE-BOOTH Boothbay Barrier Gate Circuit Breaker
 CB-GATE-SPORT Southport Barrier Gate Circuit Breaker
 CB-GATEAUX-BOOTH Boothbay Barrier Gate Auxiliaries Circuit Breaker
 CB-GATEAUX-SPORT Southport Barrier Gate Auxiliaries Circuit Breaker
 CB-HORN Horn Circuit Breaker
 CB-HTR-HOUSE Control House Hvac Circuit Breaker
 CB-LTS-BENDMACH Boothbay End Machinery Area Service Lights Circuit Breaker
 CB-LTS-DRVMACH Drive Machinery Area Service Lights Circuit Breaker
 CB-LTS-HOUSE Control House Lights Circuit Breaker
 CB-LTS-ROAD Roadway Lights Circuit Breaker
 CB-LTS-SENDMACH Southport End Machinery Area Service Lights Circuit Breaker
 CB-MAIN Main Circuit Breaker
 CB-MHTR Motor Heaters Circuit Breaker
 CB-NAV-BOOTH Boothbay Fender Lights Circuit Breaker
 CB-NAV-SPORT Southport Fender Lights Circuit Breaker
 CB-NAV-UPCHORD Upper Chord Navigation Lights Circuit Breaker
 CB-RCPT-BENDMACH Boothbay End Machinery Area Receptacles Circuit Breaker
 CB-RCPT-DRVMACH Drive Machinery Area Receptacles Circuit Breaker
 CB-RCPT-HOUSE Control House Receptacles Circuit Breaker
 CB-RCPT-SENDMACH Southport End Machinery Area Receptacles Circuit Breaker
 CB-SERVICE Utility Service Circuit Breaker
 CB-TRF-BOOTH Boothbay Traffic Signals Circuit Breaker
 CB-TRF-SPORT Southport Traffic Signals Circuit Breaker
 CR-ASR Yellow Signal Relay
 CR-BC FVD Brake Control Relay
 CR-BCHK Brake Check Relay
 CR-BGLP Barrier Gate Lower Permissive
 CR-BGNL North Barrier Gate Lowered
 CR-BGNR North Barrier Gate Raised
 CR-BGRP Barrier Gate Raise Permissive
 CR-BGSL South Barrier Gate Lowered
 CR-BGSR South Barrier Gate Raised
 CR-BHRP Brake Hand Release Permissive
 CR-BRCHK Brakes Released Check Relay
 CR-CS Close Span
 CR-DHI FVD1 Drive Healthy
 CR-DH2 FVD2 Drive Healthy
 CR-DS End Seat Drive Sequence Relay
 CR-EJDC End Jacks Disconnects Closed
 CR-EJE All End Jacks Extended
 CR-EJEA Extend End Jacks Auto Relay
 CR-EJHC End Jacks Manual Operation
 CR-EJR All End Jacks Retracted
 CR-EJRA Retract End Jacks Auto Relay
 CR-EMAP End Machinery Auto Permissive
 CR-EMDC End Machinery Disconnects Closed
 CR-EN Drive Enable
 CR-ESD All End Seats Driven
 CR-ESDA Drive End Seats Auto Relay
 CR-ESP All End Seats Pulled
 CR-ESPA Pull End Seats Auto Relay
 CR-EXT1 FVD1 External Trip Relay
 CR-EXT2 FVD2 External Trip Relay
 CR-FC Span Fully Closed Relay
 CR-FO Span Fully Open
 CR-HORN Marine Horn
 CR-JEP Jacks Extend Permissive Relay
 CR-JNEE Northeast End Jack Extended
 CR-JNER Northeast End Jack Retracted
 CR-JNWE Northwest End Jack Extended
 CR-JNWR Northwest End Jack Retracted
 CR-JRP Jacks Retract Permissive Relay
 CR-JSEE Southeast End Jack Extended
 CR-JSER Southeast End Jack Retracted
 CR-JSWE Southwest End Jack Extended
 CR-JSWR Southwest End Jack Retracted
 CR-NBL North Barrier Gate Lowered And Locked
 CR-NC Span Nearly Closed
 CR-NO Span Nearly Open
 CR-OS Open Span
 CR-OT Span Open Overtravel
 CR-PS Pull Sequence Relay
 CR-RSR Red Signal Relay
 CR-RT Reduce Torque Relay
 CR-SBL South Barrier Gate Lowered And Locked

CR-SDP End Seat Drive Permissive Relay
 CR-SJ Span Jacked
 CR-SNED Northeast End Seat Driven
 CR-SNEP Northeast End Seat Pulled
 CR-SNWD Northwest End Seat Driven
 CR-SNWP Northwest End Seat Pulled
 CR-SP Span Permissive Relay
 CR-SPD Span Full Speed Relay
 CR-SPP End Seat Pull Permissive
 CR-SSED Southeast End Seat Driven
 CR-SSEP Southeast End Seat Pulled
 CR-SSWD Southwest End Seat Driven
 CR-SSWP Southwest End Seat Pulled
 DS-BGS South Barrier Gate Disconnect Switch
 DS-EJNW Northwest End Jack Disconnect Switch
 DS-BGN North Barrier Gate Disconnect Switch
 DS-EJNE Northeast End Jack Disconnect Switch
 DS-EJSE Southeast End Jack Disconnect Switch
 DS-EJSW Southwest End Jack Disconnect Switch
 DS-ESNE Northeast End Seat Disconnect Switch
 DS-ESNW Northwest End Seat Disconnect Switch
 DS-ESSE Southeast End Seat Disconnect Switch
 DS-ESSW Southwest End Seat Disconnect Switch
 DS-MOBK Motor Brake Disconnect Switch
 DS-MYBK Machinery Brake Disconnect Switch
 DS-SDM1 Span Drive Motor 1 Disconnect Switch
 DS-SDM2 Span Drive Motor 2 Disconnect Switch
 E-STOP Emergency Stop
 EJNE Northeast End Jack Actuator
 EJNW Northwest End Jack Actuator
 EJSE Southeast End Jack Actuator
 EJSW Southwest End Jack Actuator
 ESNE Northeast End Seat Actuator
 ESNW Northwest End Seat Actuator
 ESSE Southeast End Seat Actuator
 ESSW Southwest End Seat Actuator
 FTS Control Console Footswitch
 FU-FVD1 Flux Vector Drive 1 Line Fuses
 FU-FVD2 Flux Vector Drive 2 Line Fuses
 FVD1 Flux Vector Drive 1
 FVD2 Flux Vector Drive 2
 GND Ground
 JB-CP Center Pier Junction Box
 JB-SP Southport Pier Junction Box
 LS-BGN-HC North Barrier Gate Hand Crank/Door Limit Switch
 LS-BGN North Barrier Gate Raised Limit Switch
 LS-BGNL North Barrier Gate Locked Limit Switch
 LS-BGS-HC South Barrier Gate Hand Crank/Door Limit Switch
 LS-BGS South Barrier Gate Raised Limit Switch
 LS-BGSL South Barrier Gate Locked Limit Switch
 LS-EJNE-E Northeast End Jack Extended Limit Switch
 LS-EJNE-NC Northeast End Jack Hand Crank
 LS-EJNE-R Northeast End Jack Retracted Limit Switch
 LS-EJNW-E Northwest End Jack Extended Limit Switch
 LS-EJNW-NC Northwest End Jack Hand Crank Limit Switch
 LS-EJNW-R Northwest End Jack Retracted Limit Switch
 LS-EJSE-E Southeast End Jack Extended Limit Switch
 LS-EJSE-NC Southeast End Jack Hand Crank Limit Switch
 LS-EJSE-R Southeast End Jack Retracted Limit Switch
 LS-EJSW-E Southwest End Jack Extended Limit Switch
 LS-EJSW-NC Southwest End Jack Hand Crank Limit Switch
 LS-EJSW-R Southwest End Jack Retracted Limit Switch
 LS-ESNE-D Northeast End Seat Driven Limit Switch
 LS-ESNE-NC Northeast End Seat Hand Crank
 LS-ESNE-P Northeast End Seat Pulled Limit Switch
 LS-ESNW-D Northwest End Seat Driven Limit Switch
 LS-ESNW-NC Northwest End Seat Hand Crank
 LS-ESNW-P Northwest End Seat Pulled Limit Switch
 LS-ESSE-D Southeast End Seat Driven Limit Switch
 LS-ESSE-NC Southeast End Seat Hand Crank
 LS-ESSE-P Southeast End Seat Pulled Limit Switch
 LS-ESSW-D Southwest End Seat Driven Limit Switch
 LS-ESSW-NC Southwest End Seat Hand Crank
 LS-ESSW-P Southwest End Seat Pulled Limit Switch
 LS-FC Span Fully Closed Limit Switch
 LS-MOBK-HR Motor Brake Hand Released Limit Switch
 LS-MOBK-R Motor Brake Released Limit Switch
 LS-MOBK-S Motor Brake Set Limit Switch
 LS-MYBK-HR Machinery Brake Hand Released Limit Switch
 LS-MYBK-R Machinery Brake Released Limit Switch
 LS-MYBK-S Machinery Brake Set Limit Switch
 LS-NSJ North End Jacked Limit Switch
 LS-OT Span Open Overtravel Limit Switch

LS-SDM1-HC Span Drive Motor 1 Hand Crank Limit Switch
 LS-SDM2-HC Span Drive Motor 2 Hand Crank
 LS-SLS Span Limit Switch
 LS-SNEG-D Northeast End Seat Driven Go Switch
 LS-SNEG-P Northeast End Seat Pulled Go Switch
 LS-SNWG-D Northwest End Seat Driven Go Switch
 LS-SNWG-P Northwest End Seat Pulled Go Switch
 LS-SSEG-D Southeast End Seat Driven Go Switch
 LS-SSEG-P Southeast End Seat Pulled Go Switch
 LS-SSJ South End Jacked Limit Switch
 LS-SSWG-D Southwest End Seat Driven Go Switch
 LS-SSWG-P Southwest End Seat Pulled Go Switch
 MC-BGN-L North Barrier Gate Lower Starter
 MC-BGN-R North Barrier Gate Raise Starter
 MC-BGS-L South Barrier Gate Lower Starter
 MC-BGS-R South Barrier Gate Raise Starter
 MC-EJNE-E Northeast End Jack Extend Starter
 MC-EJNE-R Northeast Jack Retract Starter
 MC-EJNW-E Northwest End Jack Extend Starter
 MC-EJNW-R Northwest Jack Retract Starter
 MC-EJSE-E Southeast End Jack Extend Starter
 MC-EJSE-R Southeast Jack Retract Starter
 MC-EJSW-E Southwest End Jack Extend Starter
 MC-EJSW-R Southwest Jack Retract Starter
 MC-ESNE-D Northeast End Seat Drive Starter
 MC-ESNE-P Northeast End Seat Pull Starter
 MC-ESNW-D Northwest End Seat Drive Starter
 MC-ESNW-P Northwest End Seat Pull Starter
 MC-ESSE-D Southeast End Seat Drive Starter
 MC-ESSE-P Southeast End Seat Pull Starter
 MC-ESSW-D Southwest End Seat Drive Starter
 MC-ESSW-P Southwest End Seat Pull Starter
 MC-MOBK Machinery Brake Starter
 MCP-BGN North Barrier Gate Motor Circuit Protector
 MCP-BGS South Barrier Gate Motor Circuit Protector
 MCP-EJNE Northeast End Jack Motor Circuit Protector
 MCP-EJNW Northwest End Jack Motor Circuit Protector
 MCP-EJSE Southeast End Jack Motor Circuit Protector
 MCP-EJSW Southwest End Jack Motor Circuit Protector
 MCP-ESNE Northeast End Seat Motor Circuit Protector
 MCP-ESNW Northwest End Seat Motor Circuit Protector
 MCP-ESSE Southeast End Seat Motor Circuit Protector
 MCP-ESSW Southwest End Seat Motor Circuit Protector
 MCP-MOBK Motor Brake Motor Circuit Protector
 MOBK Motor Brake
 MTS1 Drive Motor 1 Thermal Switch
 MTS2 Drive Motor 2 Thermal Switch
 MYBK Machinery Brake
 OL-BGN North Barrier Gate Overload Relay
 OL-BGS South Barrier Gate Overload Relay
 OL-EJNE Northeast End Jack Overload Relay
 OL-EJNW Northwest End Jack Overload Relay
 OL-EJSE Southeast End Jack Overload Relay
 OL-EJSW Southwest End Jack Overload Relay
 OL-ESNE Northeast End Seat Overload Relay
 OL-ESNW Northwest End Seat Overload Relay
 OL-ESSE Southeast End Seat Overload Relay
 OL-ESSW Southwest End Seat Overload Relay
 OL-MOBK Motor Brake Overload Relay
 OL-MYBK Machinery Brake Overload Relay
 PM Power Monitor
 RFVD1 Flux Vector Drive 1 Load Reactor
 RFVD2 Flux Vector Drive 2 Load Reactor
 RTS1 Dynamic Braking Resistor 1 Thermal Switch
 RTS2 Dynamic Braking Resistor 2 Thermal Switch
 SDM1 Span Drive Motor 1
 SDM2 Span Drive Motor 2
 TR-AP End Machinery Anti-Plug Off Delay Timer
 TR-ASR Yellow Traffic Signal Timer
 TR-BRCHK Brake Check Delay Timer
 TR-DC Span Deceleration Check Timer
 TR-EJ2 Jack 2 Sequence Timer
 TR-EJ3 Jack 3 Sequence Timer
 TR-EJ4 Jack 4 Sequence Timer
 TR-EM End Machinery Sequence Off Delay Timer
 TR-EMT End Machinery Sequence Timeout On Delay Timer
 TR-SOT Span Operation Timeout On Delay Timer
 TR-DC Decel Check Timer On Delay
 TR-FC Fully Closed Timer


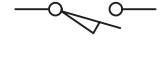
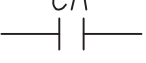

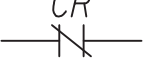
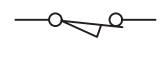
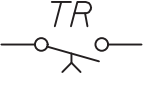
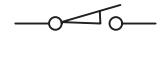

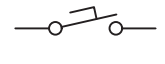
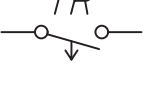

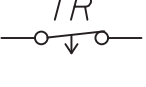
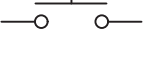
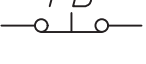
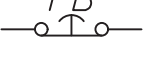
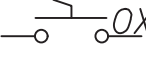
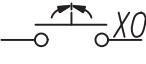
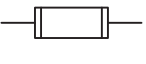

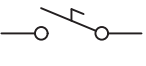



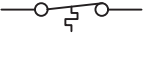
STATE OF MAINE
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 STP-2175(100)
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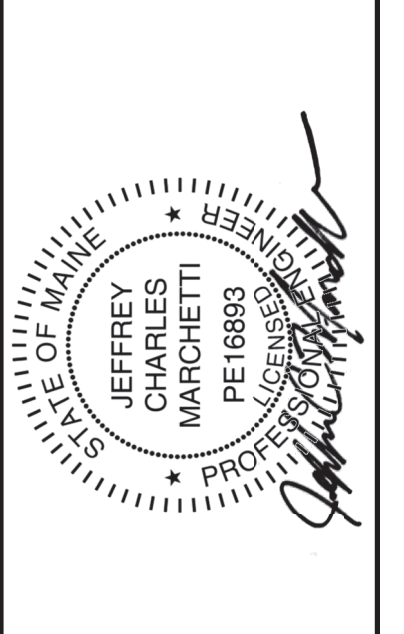
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SOUTHPORT BRIDGE, ROUTE 27
 OVER TOWNSEND GUT LINCOLN COUNTY
 SOUTHPORT & BOOTHBAY HARBOR ME
 ELECTRICAL ABBREVIATIONS

ELECTRICAL SYMBOLS

	CR/TR/MC Relay/Timer/Contactor coil		Limit switch normally open contact
	CR Normally open relay contact		Limit switch normally closed contact
	CR Normally closed relay contact		Limit switch normally open contact held closed
	TR Timer on delay normally open contact		Limit switch normally closed contact held open
	TR Timer on delay normally closed contact		Footswitch
	TR Timer off delay normally open contact		Heater
	TR Timer off delay normally closed contact		
	PB Pushbutton/selector switch normally open contact		
	PB Pushbutton/selector switch normally closed contact		
	PB Pushbutton mushroom head maintained normally closed contact		
	CS Selector switch two position maintained contact		
	CS Selector switch three position spring return to center contact		
	Fuse		
	Circuit breaker/Motor circuit protector		
	Disconnect switch		
	Overload relay		
	Motor		
	Pilot light		
	Thermal switch normally closed		

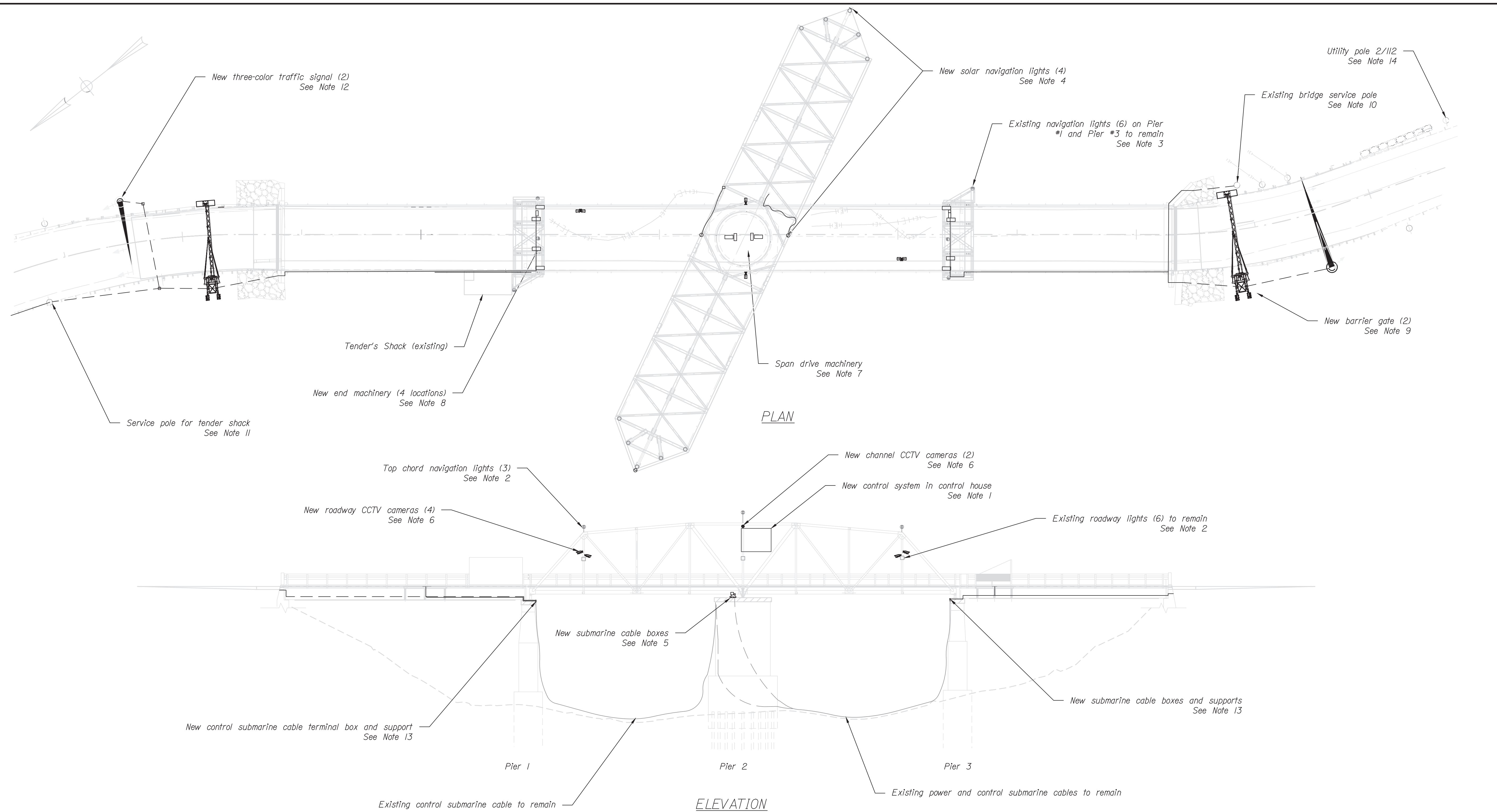
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BRIDGE PLANS



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SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME
ELECTRICAL SYMBOLS

SHEET NUMBER
E5
OF 48



PLAN

ELEVATION

- Notes:**
1. The Contractor shall provide a complete control system in the new control house (control house provided by others). See sheet E12 for control house layout. The Contractor shall provide new conduit from control house to new equipment.
 2. Existing top chord navigation lights (120VAC), roadway lights (208VAC), and associated conduit to be reused and interfaced with electrical system.
 3. Existing Pier 1 and Pier 3 navigation lights (120VAC) to be reused with new wiring and conduit. See sheet E34 for details. The fender mounted navigation lights at Pier 1 and Pier 3 shall be reinstalled at same locations after fender replacement.
 4. The Contractor shall provide new solar powered navigation lights on the Pier 2 fender. See sheet E33 for details.
 5. The Contractor shall provide new power and control submarine cable terminal boxes with drag cables to movable terminal box. See sheet E35 for details.
 6. The Contractor shall provide new CCTV system to monitor roadway and marine traffic. See sheet E43 for details.
 7. The Contractor shall provide new span drive motors, new conduit, wiring and disconnect switches with the new span drive machinery. Contractor shall provide new span limit switch, span overtravel limit switch, GFCI receptacles and switched service lighting to be provided in the machinery area. See sheet E11 for details.
 8. The Contractor shall provide new conduit, wiring, disconnect switches, GFCI receptacles and service lighting for the new end machinery. See sheet E10 for details. The Contractor shall provide fully closed

9. The Contractor shall provide new conduit and wiring for new barrier gates. Conduit and wiring for existing warning gates to be removed. See sheet 37 for details.
10. The Contractor shall replace the Southport service 125 amp circuit breaker with a 150 amp circuit breaker. The Contractor shall provide new Southport warning hazard beacon conductors to be spliced at the Southport service pole. The Contractor shall extend aerial cable toward new warning beacon sign location and trench remaining distance. See sheet E46 for details.
11. The Contractor shall provide new service meter and service circuit breaker to be installed at Boothbay utility pole. New service conduit/conductors to be trenched and conductors to be connected/spliced at the Boothbay abutment. The Contractor shall install a new riser and weatherhead and splice new conductors to the existing aerial cable. Aerial cable to be extended to new advance warning beacon. See sheets E37 and E46 for details.
12. The Contractor shall provide conductors and conduit to the new three-color traffic signals on the Boothbay and Southport approaches. See sheet E37 for details.
13. The Contractor shall provide a new submarine cable terminal box on Pier 1, terminal box and junction box on Pier 2, and new submarine cable supports on Pier 1 and Pier 2. See sheet E34 for details.
14. The Contractor shall coordinate with the utility company to upgrade the service transformer on utility pole 2 / 112. The existing service transformer is 30 kVA. The recommended transformer rating based on estimated loads is 75 kVA.

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BRIDGE PLANS

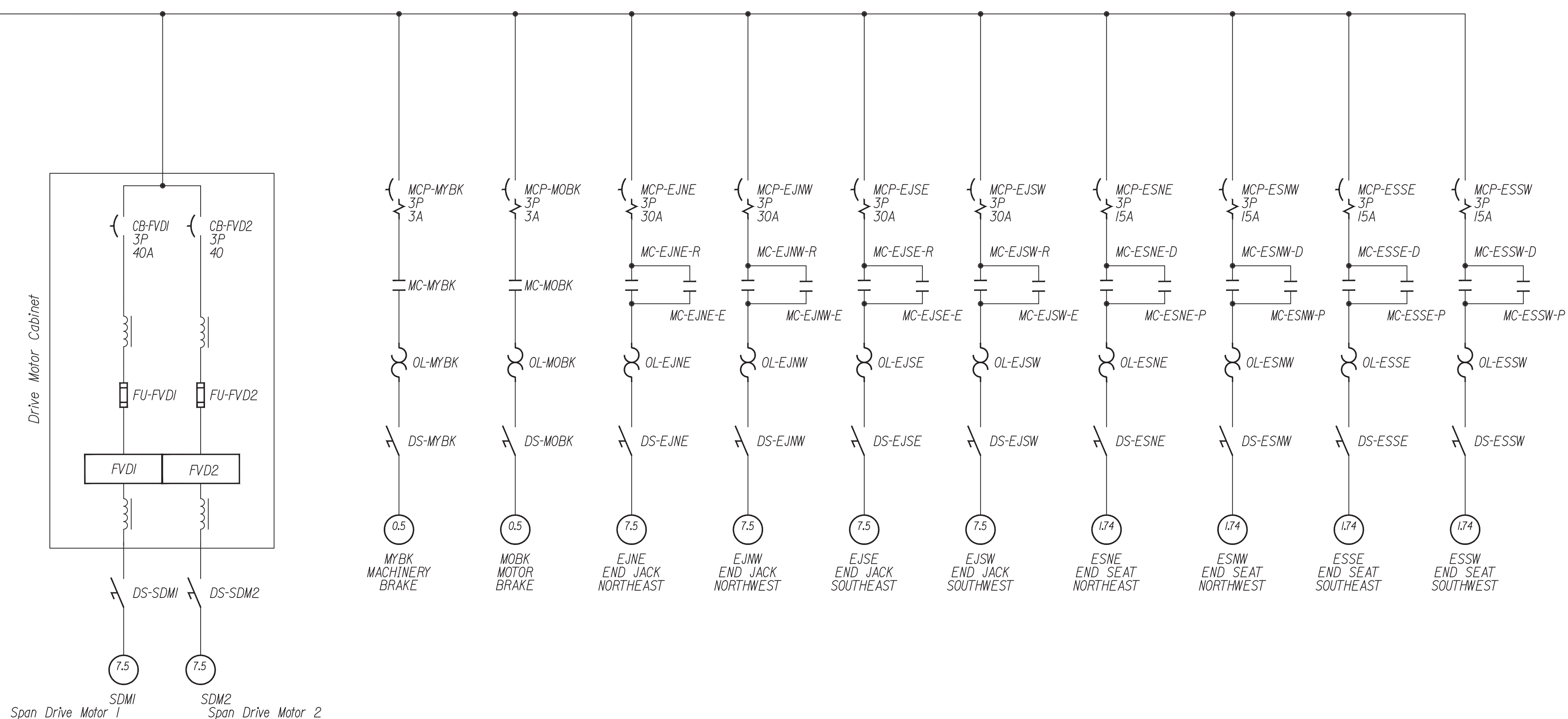


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SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME
KEY PLAN

SHEET NUMBER
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FROM POWER PANEL



STATE OF MAINE
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SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME

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OF 48

ONE LINE DIAGRAM 2

BRIDGE NO. 2789
WIN
21751.00
BRIDGE PLANS

BRIDGE CONTROL SYSTEM DESCRIPTION AND SEQUENCE OF OPERATION:

General Description:

1. Power is available for bridge and auxiliary system operation as 208 VAC, 3-phase, 4-wire, 30 kVA from the service pole on the Southport approach. The power is brought to the existing service disconnect on the service pole. From the service disconnect, power is brought to the Southport submarine cable terminal box, then through the submarine cable to the center pier submarine cable terminal box and into the power panel in the control house.
2. The bridge operator uses the console to operate the bridge and traffic control systems. Operation includes control power, traffic signals and advanced alternating hazard beacon, marine horn, barrier gates, end jacks, end seats, and span opening and closing.
3. Each moving system can be stopped with a normal stop or an emergency stop. In addition, barrier gate lower operation can be stopped by releasing the selector switch. All critical systems are provided with a keyed bypass switch.

Normal Bridge Control System Operation:

1. The Normal Bridge Control System is used for typical bridge operation. Only the operator is needed for its control. Prior to the normal operation, the operator will: verify that utility power is available by observing the display on the power monitor, turn on control power, communicate with vessel using marine radio, press lamp test to assure all indicators are functioning, observe traffic and pedestrians, turn traffic signals to red, observe traffic stopped behind stop line, observe no pedestrians on bridge or approach or bridge side of barrier gates, lower barrier gates, extend end jacks, pull end seats, retract end jacks, sound marine horn, depress footswitch, swing span in open direction, observe brakes release, observe span accelerate to full speed in the opening direction, observe span decelerate to creep speed at the nearly open position, observe span come to a complete stop when fully opened and aligned with the fender system, observe brakes set, release foot switch. Observe vessel travel fully through channel. Sound marine horn, depress footswitch, swing span in the close direction, observe brakes release, observe span accelerate to full speed in the close direction, observe span decelerate to creep speed at the nearly closed position, observe span stop at the closed position and with the roadway properly aligned, observe brakes set, release footswitch, extend jacks, drive end seats, retract jacks, observe no pedestrian or vehicular interference with gate operation, raise barrier gates, turn traffic signal to green, turn off control power.
2. When lowering, the barrier gates may be stopped at any time by releasing their selector switches. The barrier gate raise function is latched. When raising, the barrier gates may be stopped at any time by pressing their associated stop button.
3. End jacks, end seat actuators, span, may be stopped at any time in their operation by pressing the associated stop button.
4. Gates, jacks, end seat actuators and span maybe instantly stopped by depressing the emergency stop button.
5. Releasing the footswitch or pressing the SPAN STOP pushbutton at any time during span operation will cause the span to decelerate to a stop.
6. Each step in the operation of the span is interlocked with the prior steps. Failure of any one step may be bypassed using the associated bypass switch if it is determined to be safe to do so.

Span Jog Operation

1. The span may be jogged in the open or close direction by use of the Span Jog selector switch on the drive motor cabinet.
2. All span permissive interlocks must be satisfied prior to jogging.
3. When jogging, the span drive motors operate at creep speed.

Emergency Bridge Control System Operation:

1. In the case of a drive failure or a control system failure, the bridge can be operated in a totally manual mode by the operator with the assistance of maintenance personnel. This will be performed as follows:
 - 1.1. Traffic will be stopped using appropriate means such as

bump trucks.

- 1.2. Bridge will be manually jacked with the manual handwheels.
- 1.3. End seats will be operated by manually operating the actuator.
- 1.4. Separate canned air horn will be used in place of the marine horn.
- 1.5. Span will be operated through the use of hand cranks on the extension shafts of the motors.
- 1.6. Brakes will be manually released.

Bridge Control System Operation Overtravel and Speed Control Failure Protection

1. Span operation is protected from overtravel in the open direction and speed control failure.
 - 1.1. The fully open position will be detected via a switch in the rotating cam span limit switch. A separate limit switch shall be provided for fully closed. A separate open overtravel limit switch shall be provided which will trigger an emergency stopping of the span should it overtravel. The Span Overtravel Bypass allows the span to be moved in the close direction when the overtravel limit switch is actuated.
 - 1.2. Overspeed protection for any commanded speed is inherent in the drive system itself and should the span fail to match the commanded speed within an acceptable speed error window, the drive will trigger a fault and emergency stop the span.
 - 1.3. The deceleration check function uses a timer that starts when creep speed is commanded at nearly open and nearly closed. The timer triggers an input to the motor drive that uses the drive logic to lower the overspeed threshold resulting in a drive fault if the speed is not below this threshold. Contractor to determine timer setting and overspeed threshold setting.

Interlocking and Bypassing

1. The traffic signals, barrier gates, end jacks, end seats, and span shall be interlocked to prevent out of sequence operation.
2. Interlocking shall follow the following sequence:
 - 2.1. The barrier gates may not be lowered unless the traffic signals are red. The barrier gates may not be raised unless the span is fully closed, the end seats are fully driven, and the end jacks are fully retracted.
 - 2.2. The end jacks may not be extended unless the span is fully closed, the traffic signals are red and the barrier gates are lowered and locked. The end jacks may not be retracted unless traffic signals are red and the barrier gates are lowered and locked.
 - 2.3. The end seats may not be pulled unless traffic signals are red, the barrier gates are lowered and locked, the end jacks are fully extended, and the ends of the movable span are fully jacked.
 - 2.4. The span may not be operated unless traffic signals are red, the barrier gates are lowered and locked, the end seats are fully pulled, and the end jacks are fully retracted.
 - 2.5. The traffic signals are forced to yellow and then to red if either barrier gate arm is less than 80 degrees from horizontal, any end jack is not fully retracted, any end seat is not fully driven, or the span is not fully closed.
3. Keyed bypass selector switches shall be provided on the Control Console for use in the event of a limit switch failure. The following bypasses shall be provided:
 - 3.1. Barrier Gate Bypass: bypasses barrier gates lowered limit switches to allow end jacks, end seat actuators, and span to operate; bypasses barrier gates raised limit switches to allow traffic signals to turn green.
 - 3.2. End Jack Bypass: bypasses end jacks extended limit

switches to allow end seat actuators to operate; bypasses end jacks retracted limit switches to allow span to operate, barrier gates to raise, and traffic signals to turn green.

- 3.3. End seat Bypass: bypasses end seats retracted limit switches to allow span to operate; bypasses end seats extended limit switches to allow barrier gates to raise and traffic signals to turn green.
- 3.4. Span Closed Bypass: bypasses the span fully closed limit switch to allow end seats to drive, end jacks to operate, barrier gates to raise, and traffic signals to turn green.
- 3.5. Brakes Hand-Released Bypass: bypasses the brake hand released limit switches to allow span operation in the event of a limit switch failure.
- 3.6. Span Overtravel Bypass: bypasses the overtravel limit switch to allow the span to be rotated in the close direction. It does not allow the span to be rotated in the open direction.

Bridge Sequence of Operation

1. Opening Sequence of Operation:

BRIDGE STATUS PRIOR TO OPENING: Bridge Span closed, bridge open to vehicle and pedestrian traffic, but closed to marine traffic.

- 1.1. Operator turns on control power and verifies the control system is free of system faults by observing the FVDI and FVD2 keypads on the drive motor cabinet and the overload and manual operation indicators on the motor starter cabinet.
- 1.2. Operator commands the traffic signals to red using the TRAFFIC SIGNALS switch. Gongs sound, gate arm lights flash, advanced warning beacon lights flash and traffic lights turn yellow then red with corresponding pilot lights on the console. Operator verifies TRAFFIC SIGNAL RED pilot light illuminates.
- 1.3. Operator turns and holds each barrier gate switch to the lower position until the pilot lights indicate lowered and locked.
- 1.4. Operator sounds the marine horn with the HORN pushbutton.
- 1.5. Operator pulls the end seats by switching the END SEATS spring return switch to the pull position and releasing. The end seat circuit latches and extends the jacks to the raised position, pulls the end seats, lowers the jacks, and silences the gongs. Operator verifies the end seat pilot lights indicate pulled and end jack pilot lights indicate lowered.
- 1.6. Operator opens the span by depressing and holding the footswitch, then pressing and releasing the SPAN OPEN pushbutton which latches the span open circuit.
- 1.7. The span motor drives accelerate the motors and automatically signal the brakes to release. The span drive motors accelerate to full speed in approximately six seconds, and the span begins to move in the counter-clockwise direction when viewed from above. Span position is indicated on the control console span position indicator and with pilot lights from the span limit switch indicating fully closed, nearly closed, and fully open positions. At the nearly open position, the span motor drives lose the full speed signal and decelerate to creep speed. The fully open position removes the run command from the drives, resulting in a deceleration to stop with the span at approximately 65 degrees while setting the brakes. Operator verifies the span is stopped at the fully open position.

2. Closing Sequence of Operation:

BRIDGE STATUS PRIOR TO CLOSING: Bridge span open to marine traffic, but closed to vehicle and pedestrian traffic.

- 2.1. Operator turns on control power (as necessary) and verifies the control system is free of system faults by observing the FVDI and FVD2 keypads on the drive motor cabinet and the overload and manual operation indicators on the motor starter cabinet.
- 2.2. Operator sounds the marine horn with the HORN pushbutton.
- 2.3. Operator closes the span by depressing and holding the

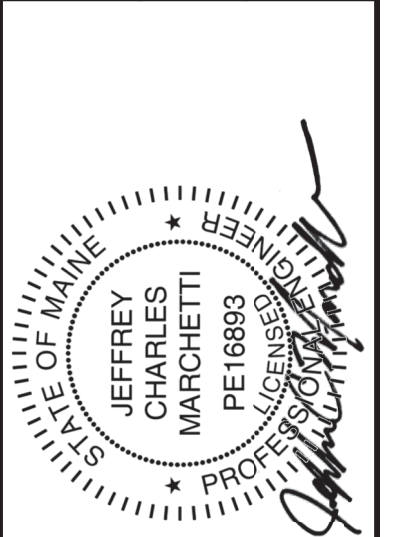
footswitch, then pressing and releasing the SPAN CLOSE pushbutton which latches the span close circuit.

- 2.4. The span motor drives accelerate the motors and automatically signal the brakes to release. The span drive motors accelerate to full speed in approximately six seconds, and the span begins to move in the clockwise direction when viewed from above. Span position is indicated on the console span position indicator and with pilot lights from the span limit switch indicating fully open, nearly open, nearly closed, and fully closed. At the nearly closed position, the span motor drives lose the full speed signal and decelerate to creep speed. The fully closed limit switch sends a reduce torque signal to the drives and starts a timer to continue to run for approximately 5 seconds, allowing the span to contact and hold against the hard stop at a reduced torque limit. The drives set the brakes and the timer removes the run signal from the drive stopping the removes the run command from the drives. Operator verifies the span is fully closed.
- 2.5. Operator drives the end seats by switching the END SEATS spring return switch to the drive position and releasing. The end seat circuit latches and starts the gongs, extends the jacks to the raised position, drives the end seats, and lowers the jacks. Operator verifies the end seat pilot lights indicate driven and all jack lowered pilot lights indicate lowered.
- 2.6. Operator turns each barrier gate switch to the raise position, then releases the switch. Selected barrier gate arm raise command latches and runs until the gate arm reaches the fully raised position.
- 2.7. Operator commands the traffic signals to green using the TRAFFIC SIGNALS switch. Gongs stop, gate arm lights extinguish, and advanced warning beacon lights stop, traffic lights turn green with corresponding pilot lights on the console. Operator verifies TRAFFIC SIGNAL GREEN pilot light illuminates.
- 2.8. Operator turns off control power.

Stop, Emergency Stop, and Bypass Controls

1. Gate Stop - The GATE STOP pushbutton is located on the control console and stops all gate movement. The operator can resume gate operation after a stop using the barrier gate control switches.
2. End Seat Stop - The END SEAT STOP pushbutton located on the control console, stops the end seat pull or drive sequence (including jacks) at any point. The sequence can be restarted by selecting the pull or drive position on the END SEAT switch.
3. Span Stop - The SPAN STOP pushbutton is located on the control console and commands the span motor drives to ramp to a stop and set the brakes.
4. Emergency Stop - The EMERGENCY STOP pushbutton is located on the control console and disables the FVD system and all bridge automatic control functions. The EMERGENCY STOP PUSHBUTTON is illuminated when depressed. The operator must pull up on the EMERGENCY STOP switch to resume operation. No movement or operation of any span drive motor, end jack, end seat, or gate arm may automatically resume upon resetting of the EMERGENCY STOP pushbutton. Operation must be resumed by the initiation of the Operator.
5. Bypasses. The BARRIER GATE BYPASS, END JACK BYPASS, END SEAT BYPASS, SPAN CLOSED BYPASS, BRAKES HAND-RELEASED BYPASS and SPAN OVERTRAVEL BYPASS keyswitches are located on the control console. These switches bypass respective interlock circuitry to allow the continuation of the operation sequence. The Operator shall assess conditions and determine safe conditions before continuing the bridge operation. The bypass switches shall be keyed differently from the CONTROL POWER switch and keys shall only be removable when a bypass switch is in the NORMAL position. Keys shall not be left in the bypass switches, but will be held by maintenance personnel.
6. Interlocking. The operations of the bridge are interlocked so that they can be performed only in the proper sequence for safety. All interlocking and bypassing shall be in accordance with the requirements of AASHTO.

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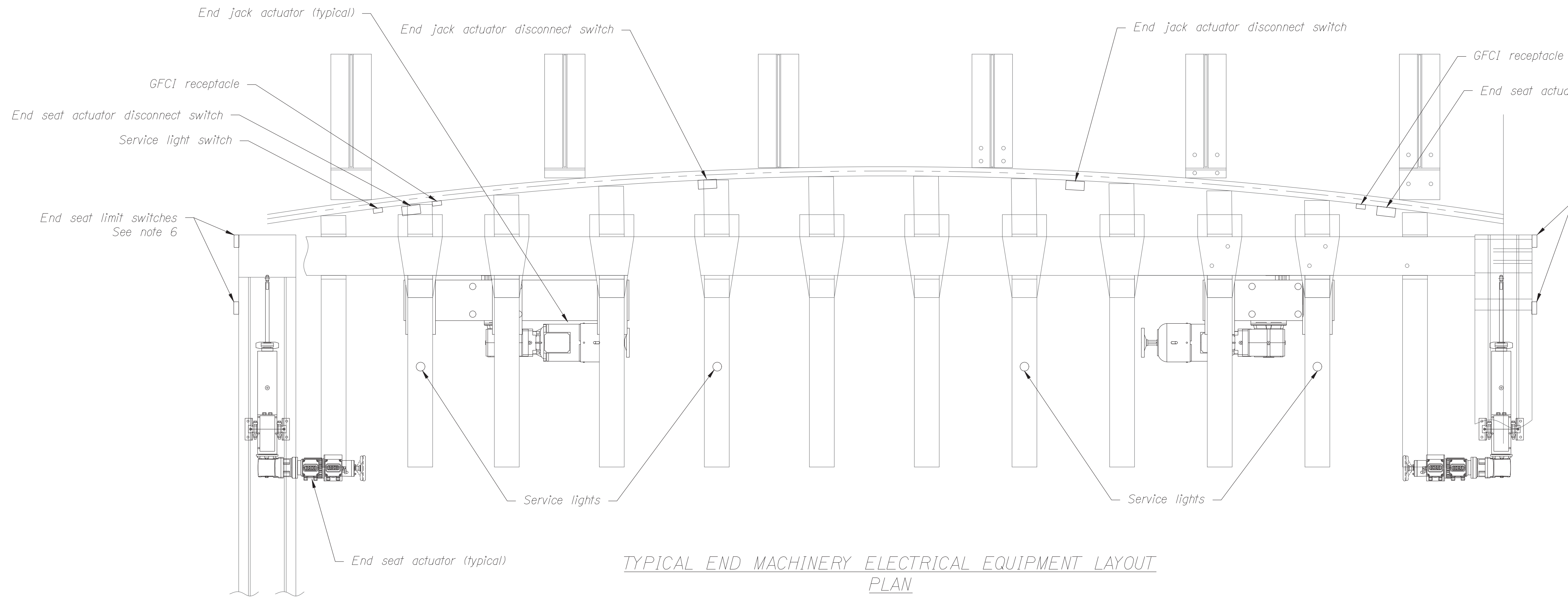
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SOUTHPORT BRIDGE, ROUTE 27
OVER TOWNSEND GUT
SOUTHPORT & BOOTHBAY HARBOR ME
LINCOLN COUNTY
SYSTEM DESCRIPTION 1

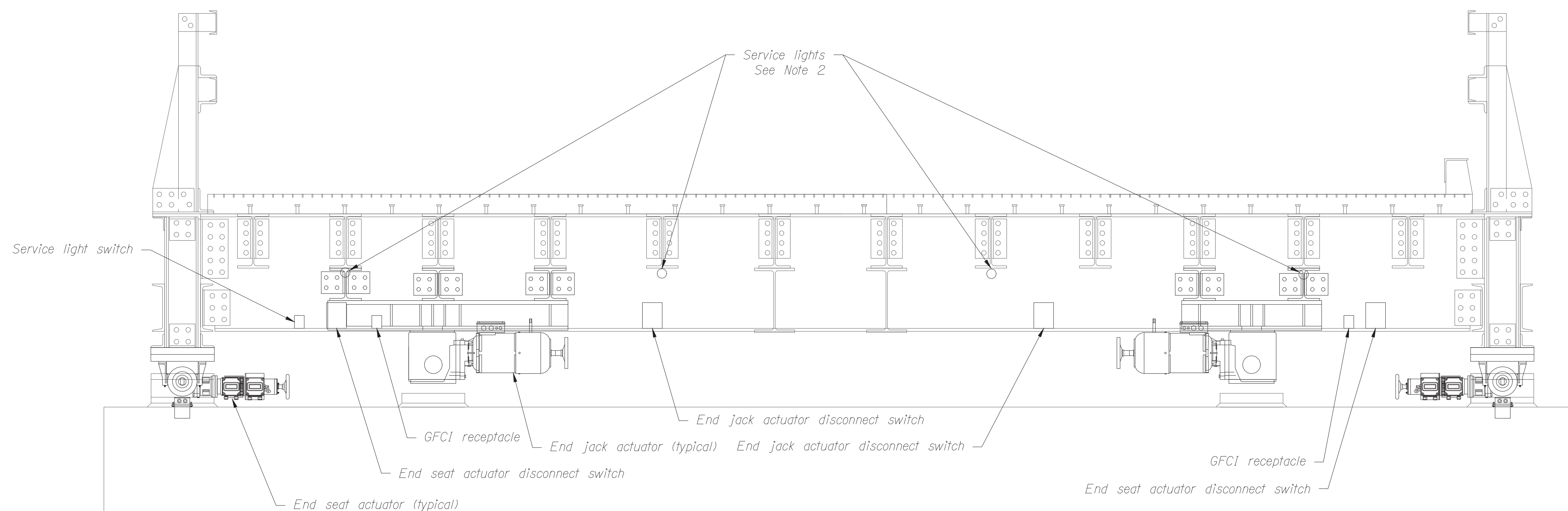
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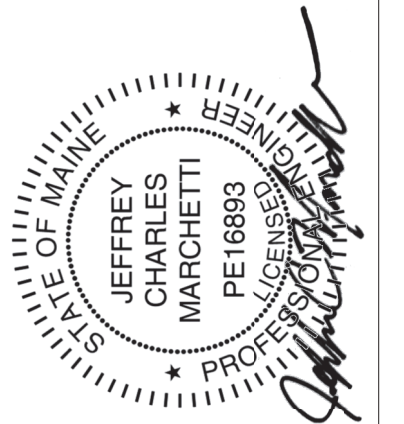
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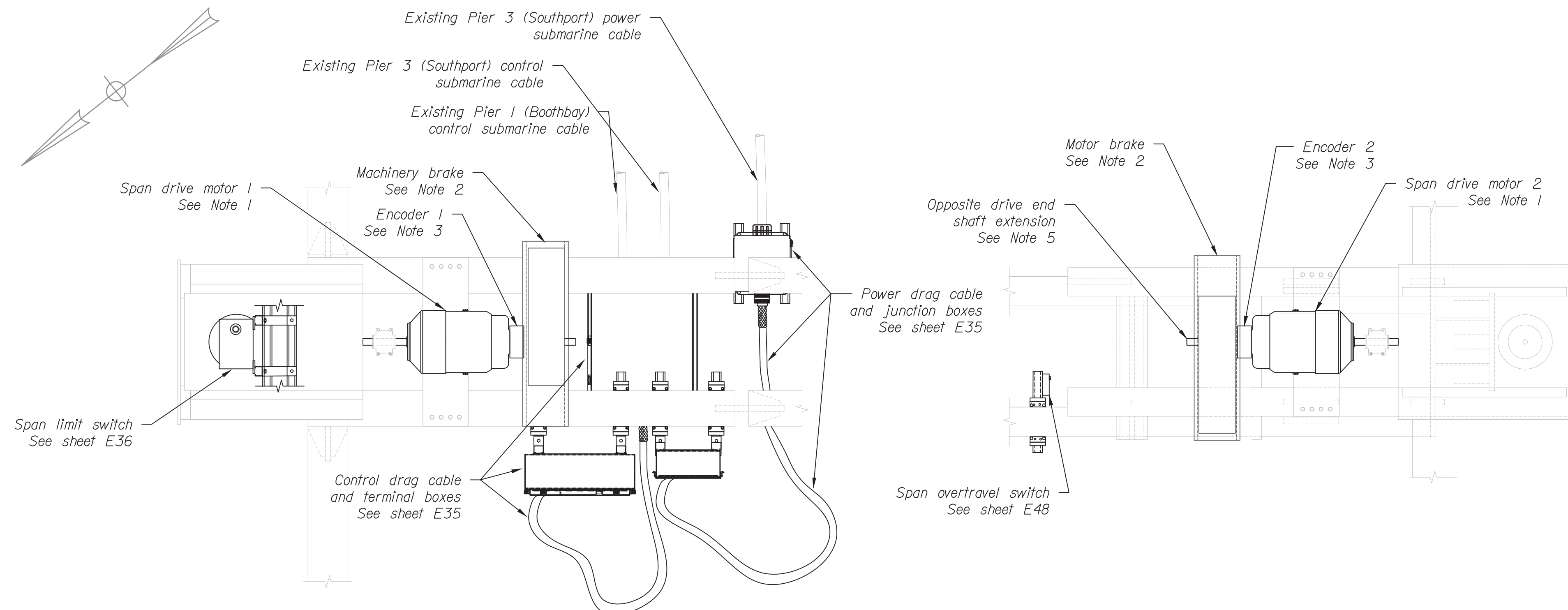
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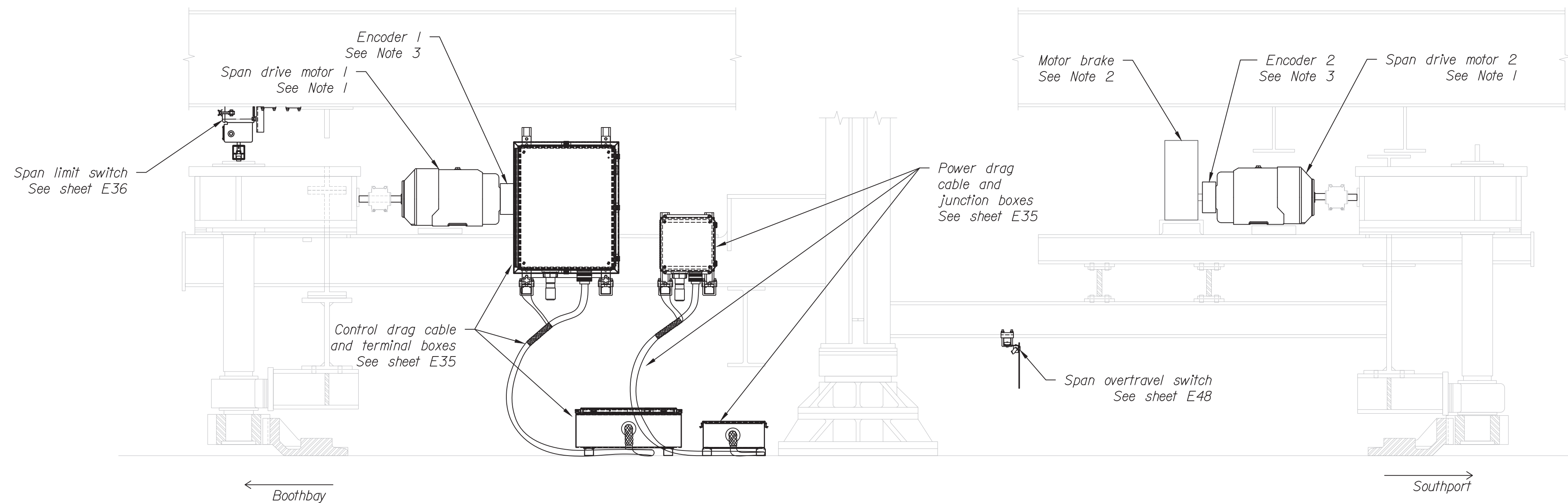
1. The Contractor shall provide a disconnect switch for each end seat actuator and each end jack actuator in accordance with the special provisions.
2. The Contractor shall provide 4 service lights for each end machinery area (8 total) in accordance with the special provisions. Contractor shall provide a single switch for each end machinery area (2 total). The light switch shall be located on the side of the movable span that is nearest to the access ladder and shall be within easy reach from the pier fender walkway. Light fixtures shall be positioned to be accessible from the pier fender walkway.
3. The Contractor shall provide 2 duplex GFCI receptacles with weatherproof enclosures for each end machinery area (4 total). GFCI receptacles shall be positioned between end seat motors and end jack motors and shall be within easy reach from the pier fender walkway.
4. The Contractor shall provide conduit and boxes (not shown) in accordance with the conduit schematic diagram, conduit schedule, and special provisions. Conduit entry to terminal/junction boxes shall be at the bottom if practical. Side entry is permissible if necessary, but top entry is prohibited.
5. Fully closed and span jacked limit switches not shown. See sheet E47 for details.
6. End seat limit switches not detailed. The Contractor shall provide end seat driven magnetic limit switches and end seat pulled magnetic limit switches to sense the position of each end seat block. End seat limit switches shall be in accordance with the special provisions. The Contractor shall design and provide mounting brackets to support each end seat limit switch and allow for field adjustment. End seat limit switches shall be oriented such that the end seat block cuts through the sensing zone instead of approaching head-on. Refer to the New End Seat Machinery Details in the mechanical plans.



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DESIGN3-DETAILED3		
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REVISIONS 4		
FIELD CHANGES		



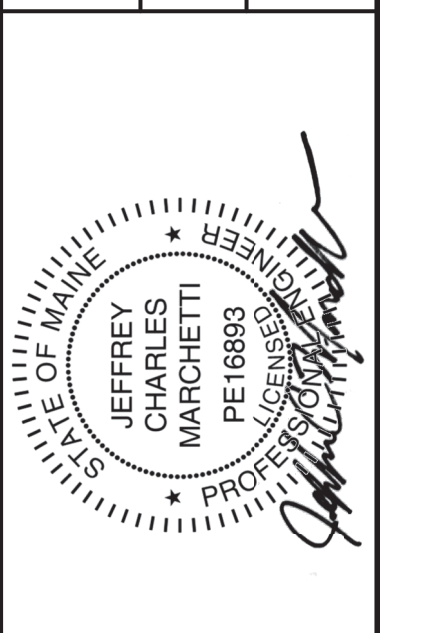
SPAN DRIVE MACHINERY ELECTRICAL EQUIPMENT LAYOUT
PLAN
Not to scale



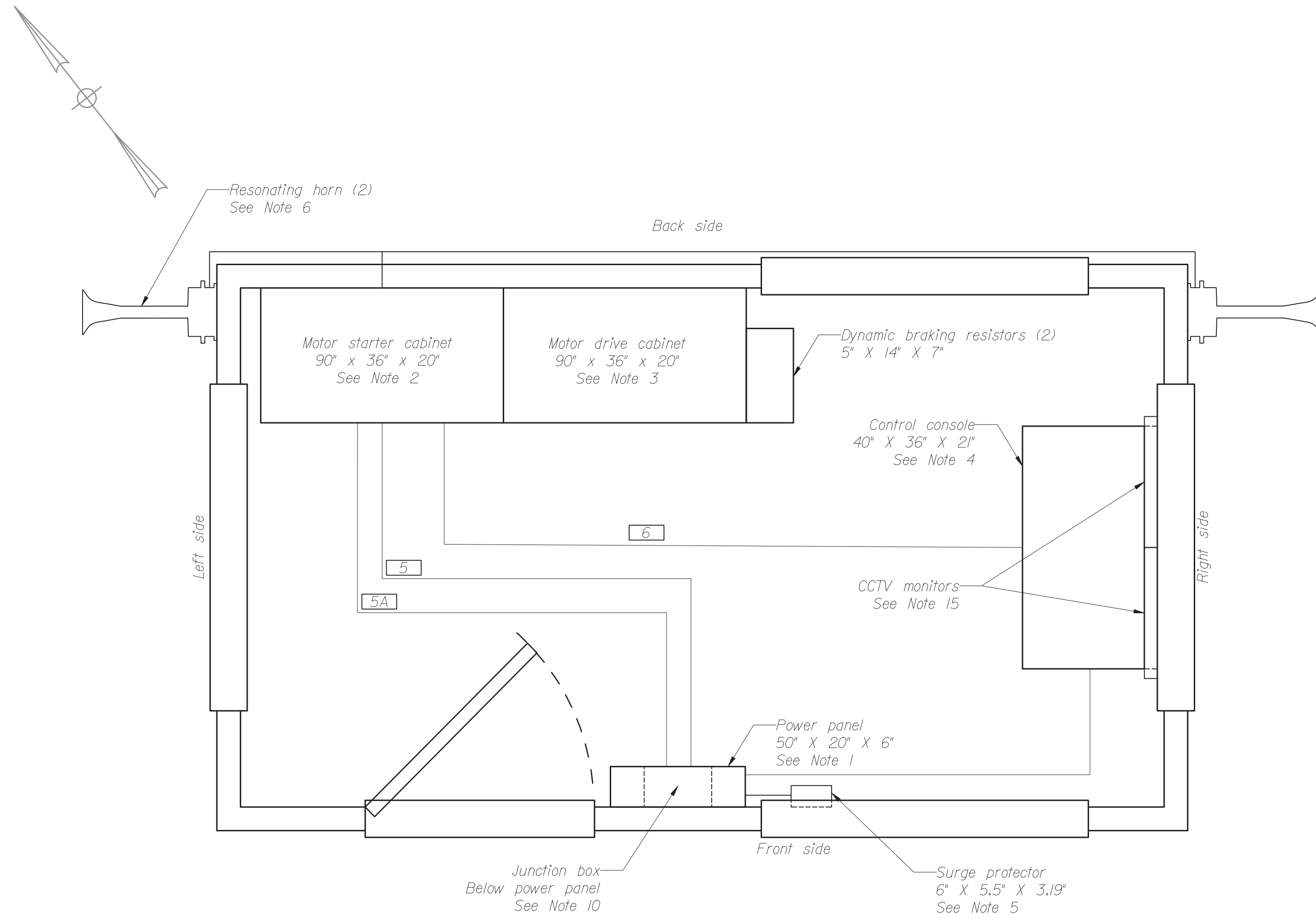
SPAN DRIVE MACHINERY ELECTRICAL EQUIPMENT LAYOUT
ELEVATION
Not to scale

NOTES:

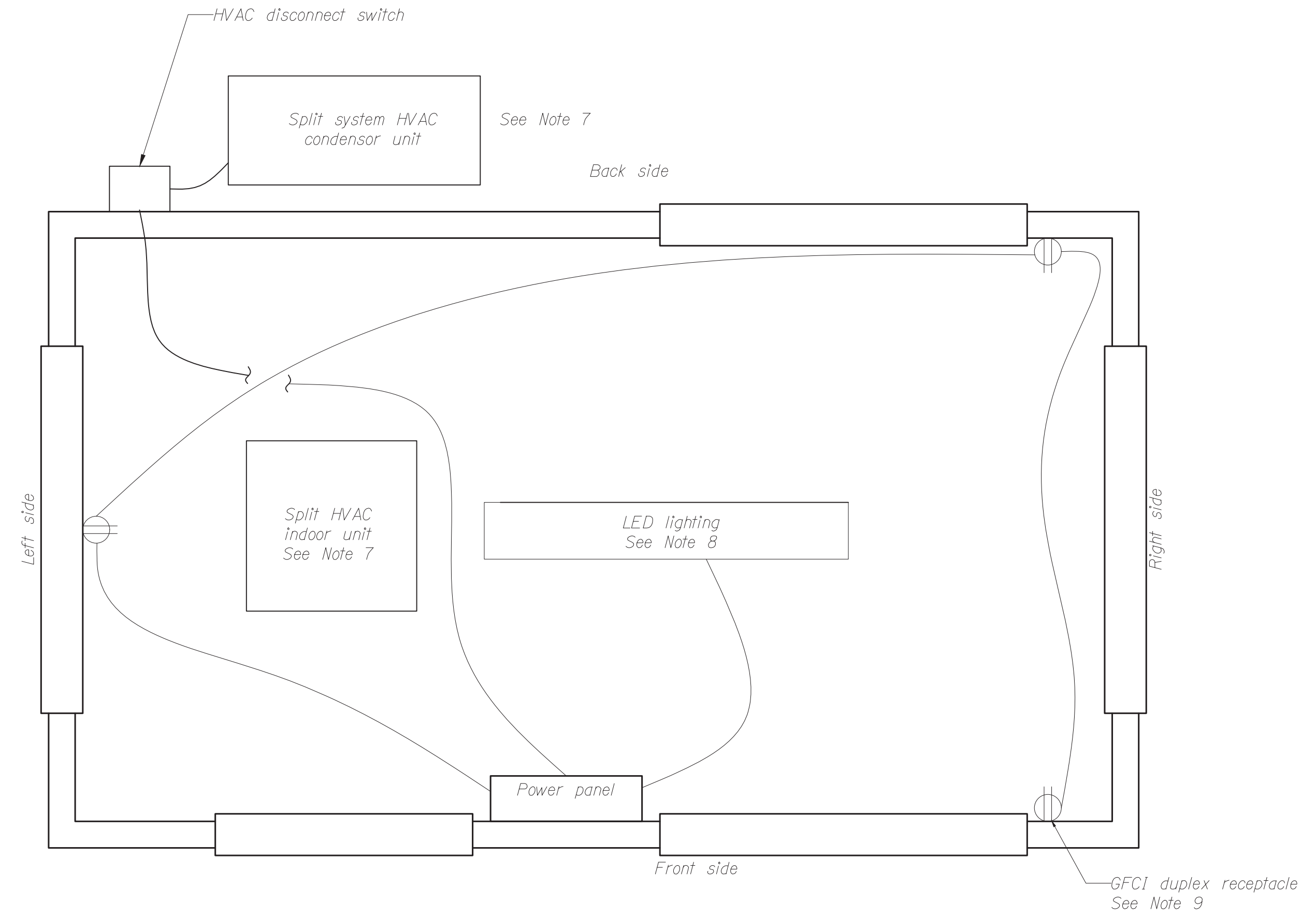
1. The Contractor shall provide span drive motors in accordance with the special provisions and installed in accordance with the mechanical plans. See mechanical plans for motor shaft detail.
2. The motor brake and machinery brake are mechanical pay items which include set, released, and hand released limit switches for each brake in accordance with the special provisions. See mechanical plans for brake details.
3. The Contractor shall provide an encoder on the opposite drive end of each span drive motor in accordance with the special provisions. The Contractor shall provide a disconnect switch for each span drive motor and each brake in accordance with the special provisions. These shall be located in sight of associated equipment (not shown).
4. The Contractor shall provide manual operation interlock switches (not shown) at the opposite drive end shaft extension for each span drive motor in accordance with the special provisions.
5. The Contractor shall provide 2 duplex GFCI receptacles (not shown) for the span drive machinery areas. GFCI receptacles shall be positioned for convenient access from the span drive machinery on the Boothbay side and the Southport side.
6. The Contractor shall provide service lights and a switch (not shown) for the Boothbay side and Southport side span drive machinery areas. They lights shall be arranged to provide sufficient illumination to safely access and maintain the span drive machinery.
7. The Contractor shall provide conduit and wiring (not shown) for all new equipment in accordance with the conduit schematic diagram, conduit schedule, and special provisions.
8. Hidden lines not shown for clarity.



PROJ. MANAGER	J. STETSON, PE	DATE
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FIELD CHANGES		



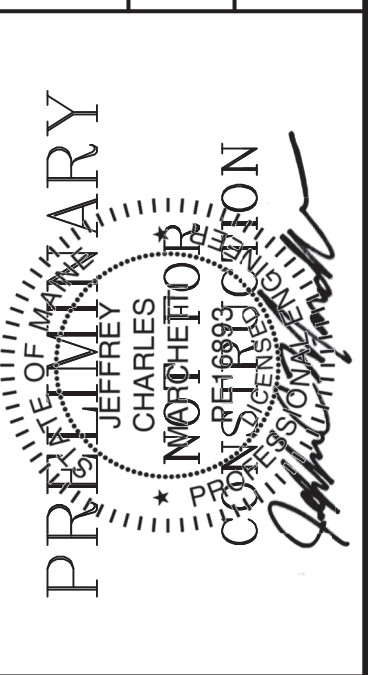
**ELECTRICAL EQUIPMENT LAYOUT
PLAN**
Not to scale



**CONTROL HOUSE LIGHTING AND HVAC LAYOUT
PLAN**
Not to scale

NOTES:

1. The Contractor shall provide a 42 circuit power panel, 3 phase, 4 wire, 150 amp main circuit breaker, mount 6'-0" from finished floor to top of panel. Power panel schedule shown on sheet E41.
2. The Contractor shall provide a motor starter cabinet. See sheets E15 and E16 for details.
3. The Contractor shall provide a motor drive cabinet with dynamic braking resistors mounted to the side of the cabinet. See sheet E17 for details.
4. The Contractor shall provide a control console. See sheets E13 and E14 for details.
5. The Contractor shall provide a surge protective device (SPD) in accordance with the special provisions and installed in close proximity to the power panel. SPD shown installed below window.
6. The Contractor shall provide two resonator type signal horns in accordance with the Special Provisions. These shall be mounted opposite each other on the control house exterior walls as shown.
7. The Contractor to design and provide mini split system air conditioner/heat pump in accordance with the Special Provisions. Conduit to HVAC indoor unit not shown.
8. The Contractor shall provide dual tube 4' LED surface mounted light fixture with prismatic acrylic lens. Contractor shall provide appropriately located switch with dimmer for overhead LED lighting.
9. The Contractor shall provide a minimum of three duplex GFCI receptacles, the Contractor shall determine precise positioning of receptacles.
10. The Contractor shall provide a junction box beneath the power panel with service power conductors passing through the junction box to the power panel. The power monitor current and voltage connections shall be made on the service power conductors inside the junction box. The power monitor current and voltage conductors shall be run in a separate conduit (No. 5A) from the motor starter cabinet to the junction box.
11. The Contractor shall provide an emergency exit sign and emergency lighting (not shown) wired to the control house lighting circuit.
12. The Contractor shall provide a battery powered fire alarm and a fire extinguisher (not shown).
13. The Contractor shall verify control house equipment clearances.
14. The Conduit for lighting, and GFCI receptacles shall be exposed EMT within the control house. All other conduit shown shall be PVC coated RGS installed beneath the control house floor.
15. Conduits for lighting, HVAC, receptacles, marine horn, and surge protector to be sized and provided by the contractor (not shown on conduit schematic or conduit schedule).
16. See sheets E43 through E45 for CCTV details.
17. New control house is a structural pay item.



PROJ. MANAGER	DATE
J. STETSON, PE	
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DESIGN-2-DETAILED2	
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PROJ. MANAGER	J. STETSON, PE	DATE
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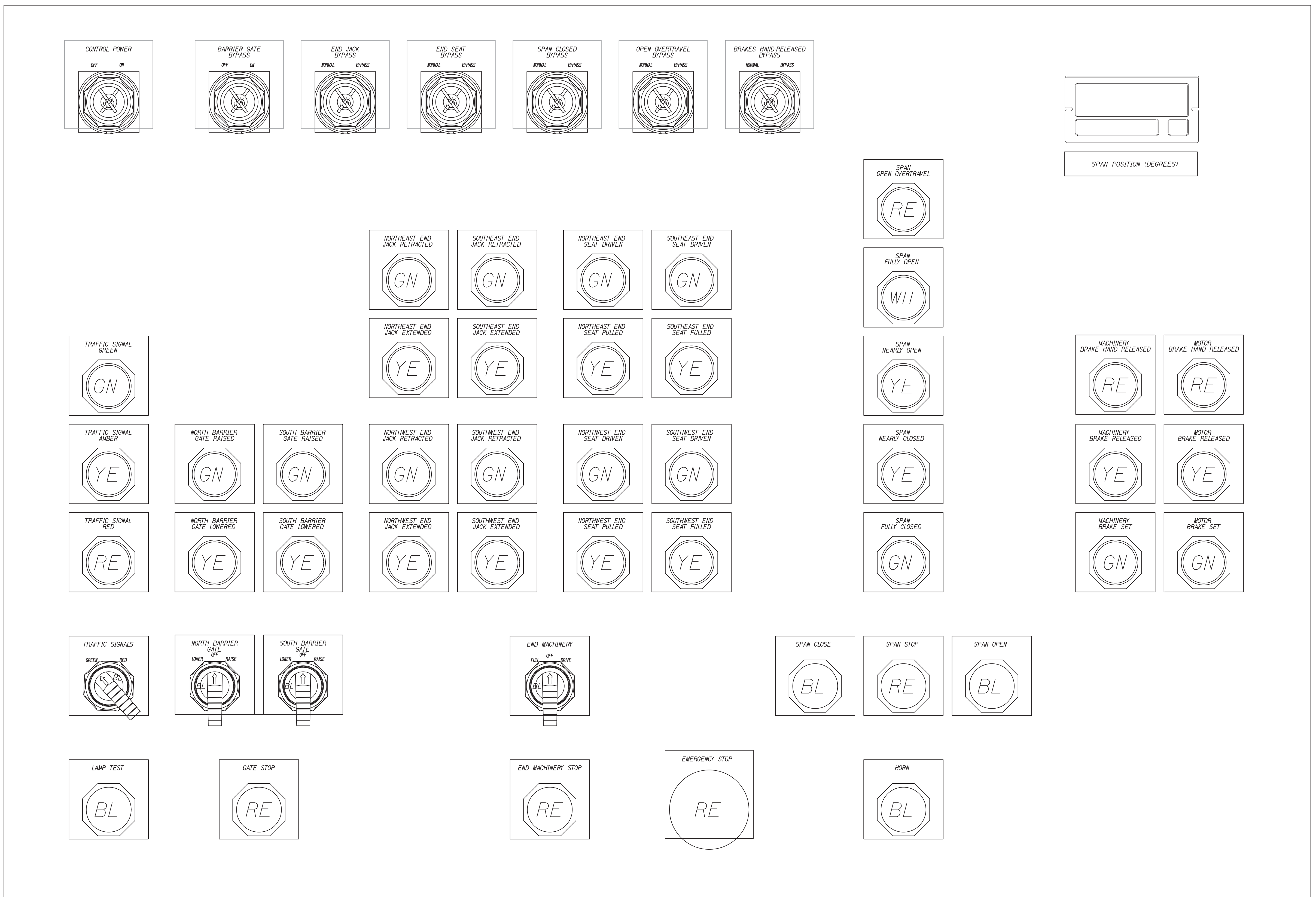
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OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME

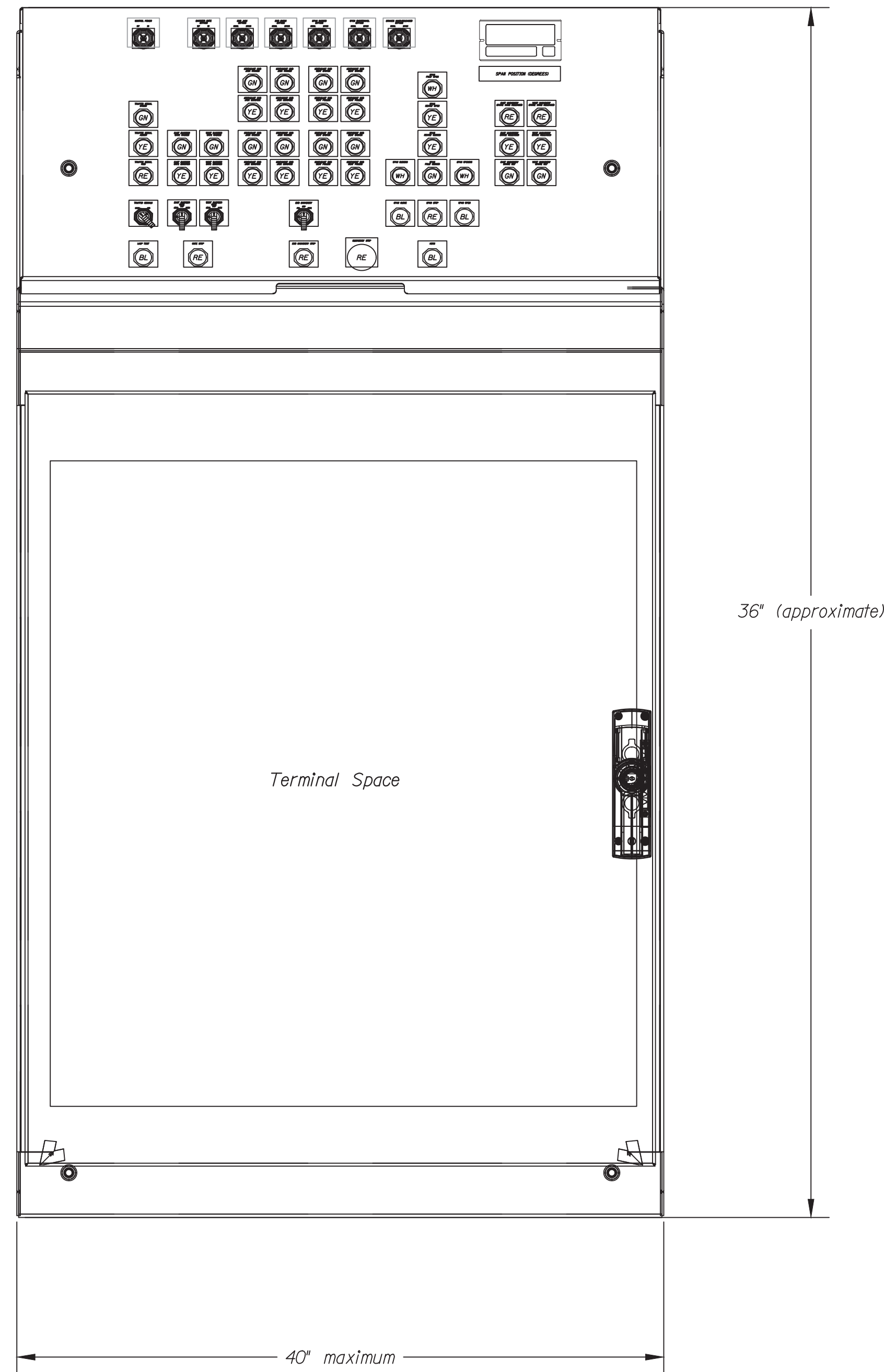
CONTROL CONSOLE - CONTROL SURFACE

SHEET NUMBER

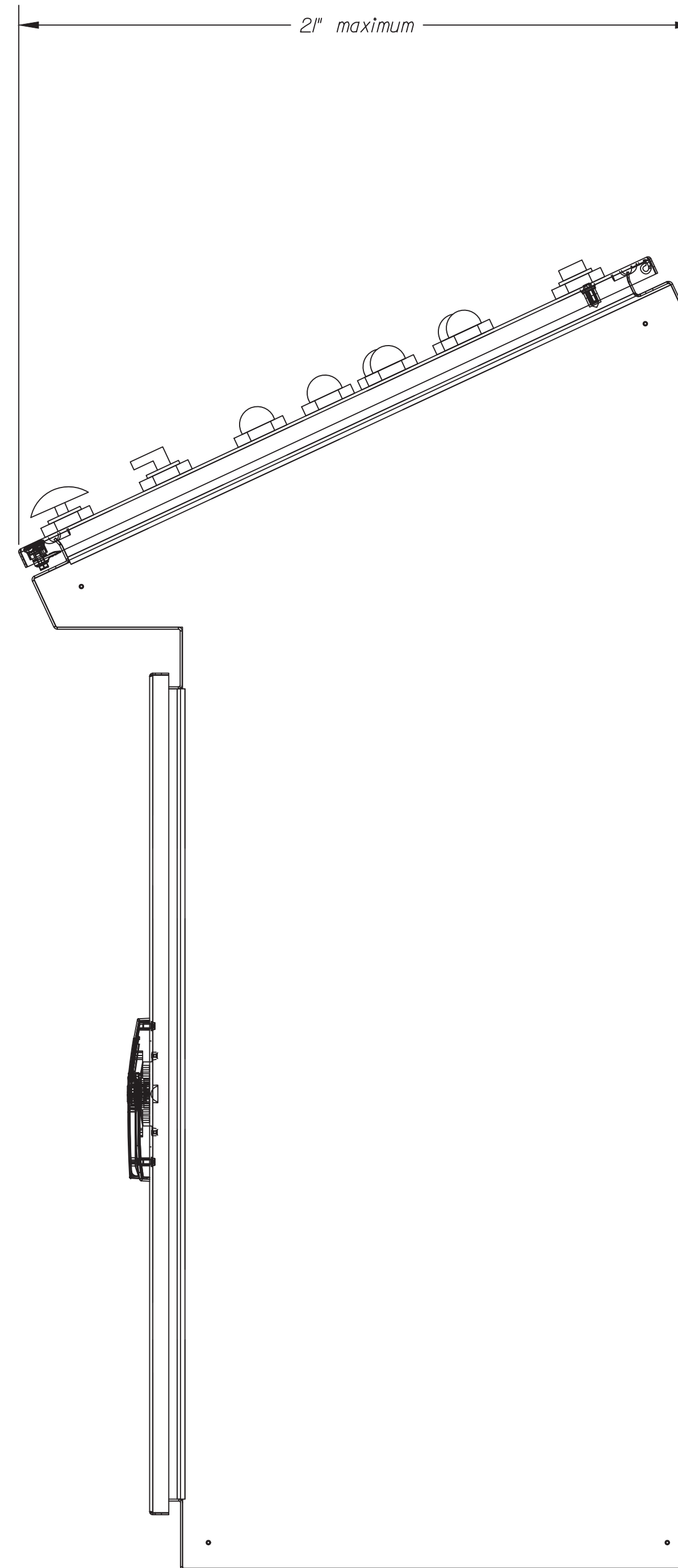
E13

OF 48





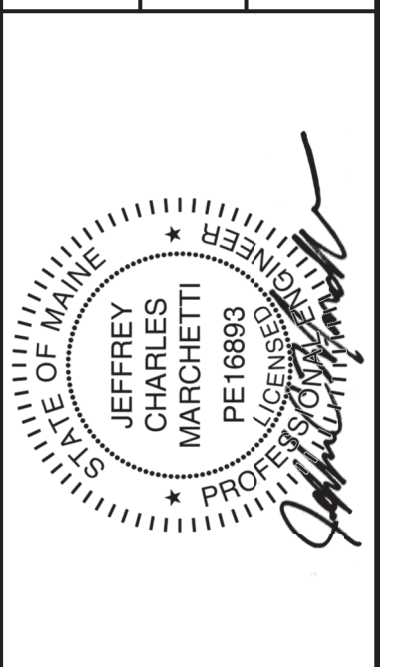
CONTROL CONSOLE ENCLOSURE - FRONT
Not to scale



CONTROL CONSOLE ENCLOSURE - LEFT
Not to scale

NOTES:

1. The Contractor shall provide a control console in accordance with the special provisions.
2. Control console details are for sizing requirements only. Contractor shall submit actual control console layout and hardware details and catalog cut(s) for approval. The Contractor shall verify control house clearances.
3. Control Console shall be rated NEMA 12 and shall have a stainless steel operating surface.

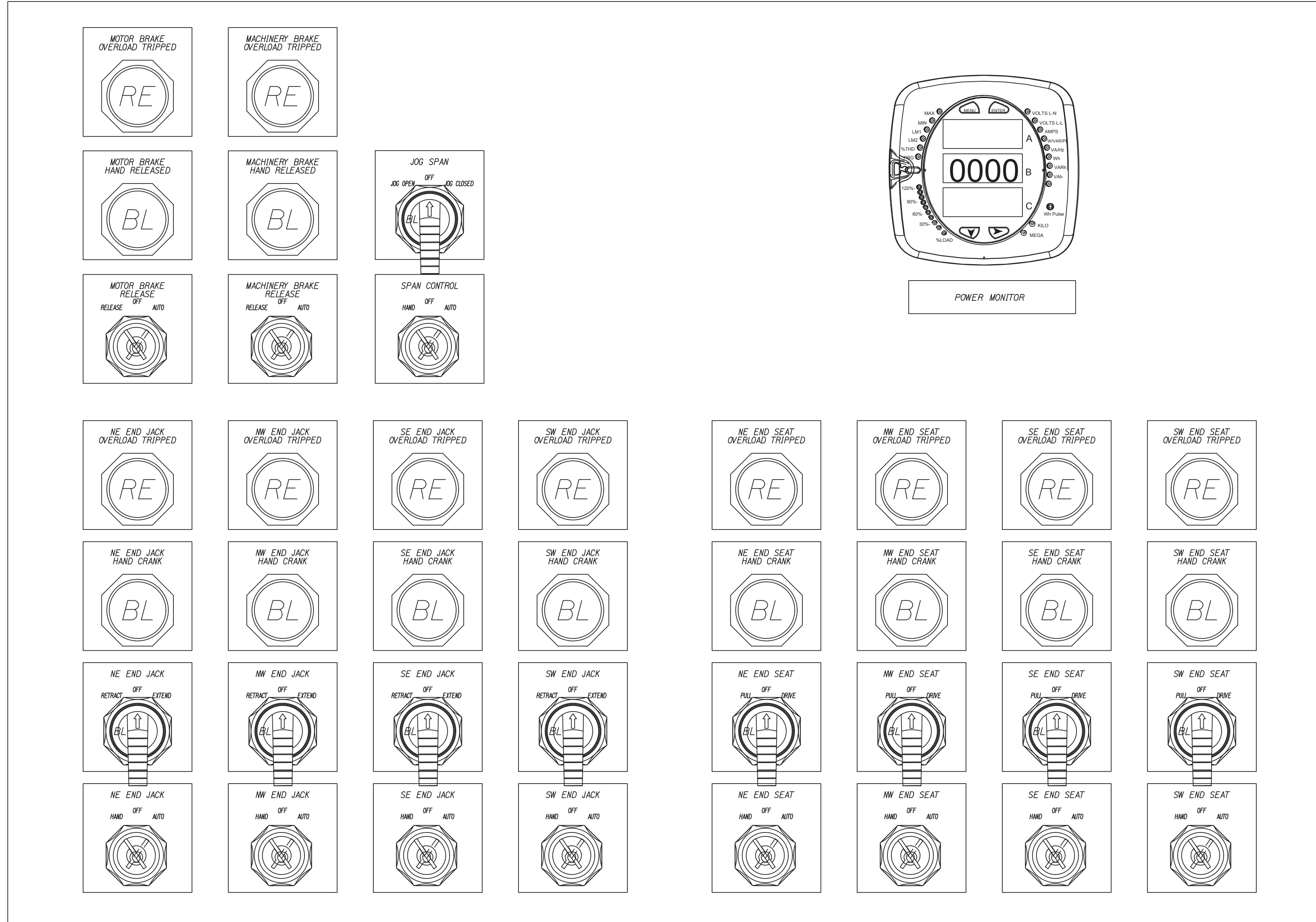


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REVISIONS 4			
FIELD CHANGES			

SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME
CONTROL CONSOLE ENCLOSURE
OUTLINE DETAILS

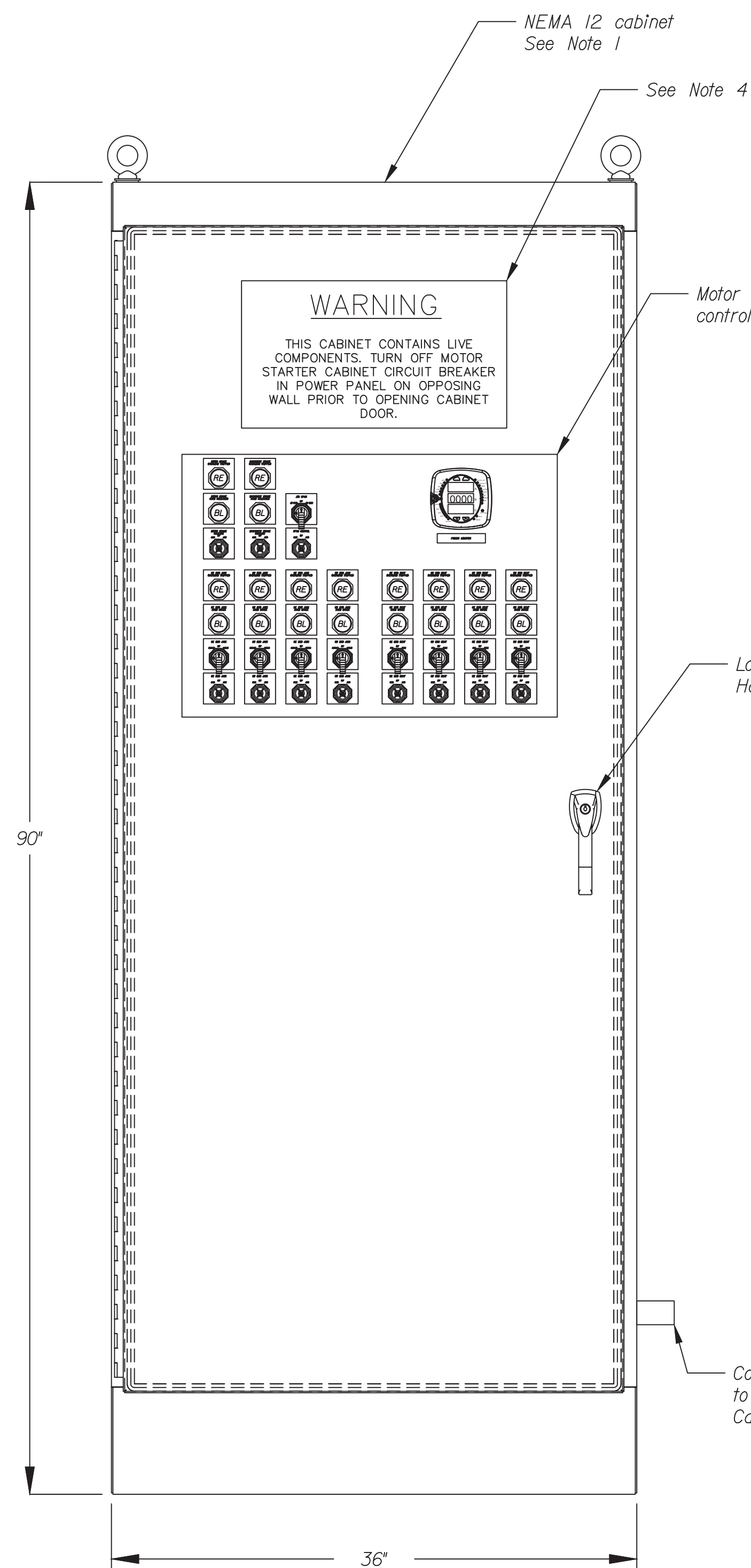
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E14

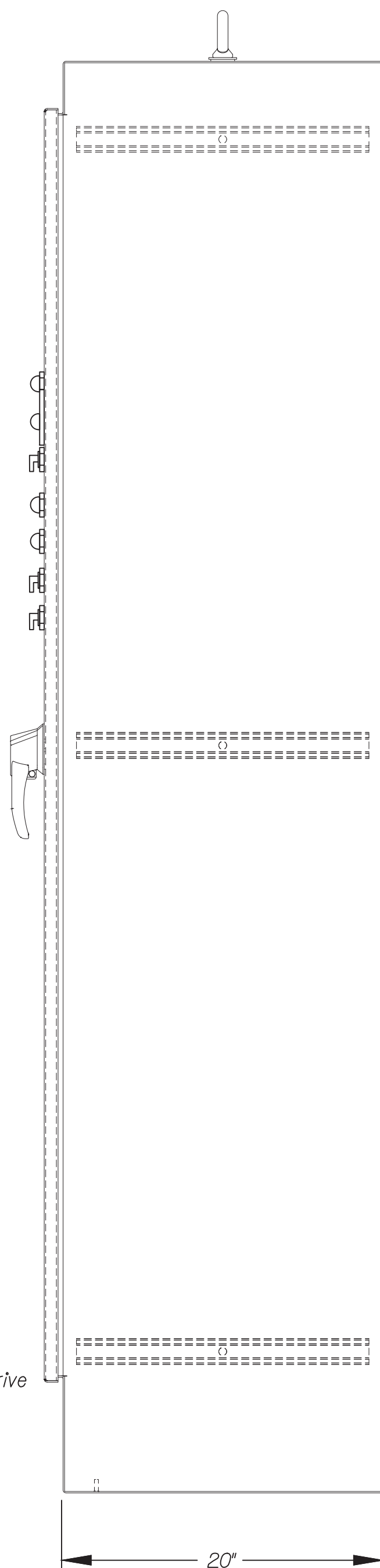


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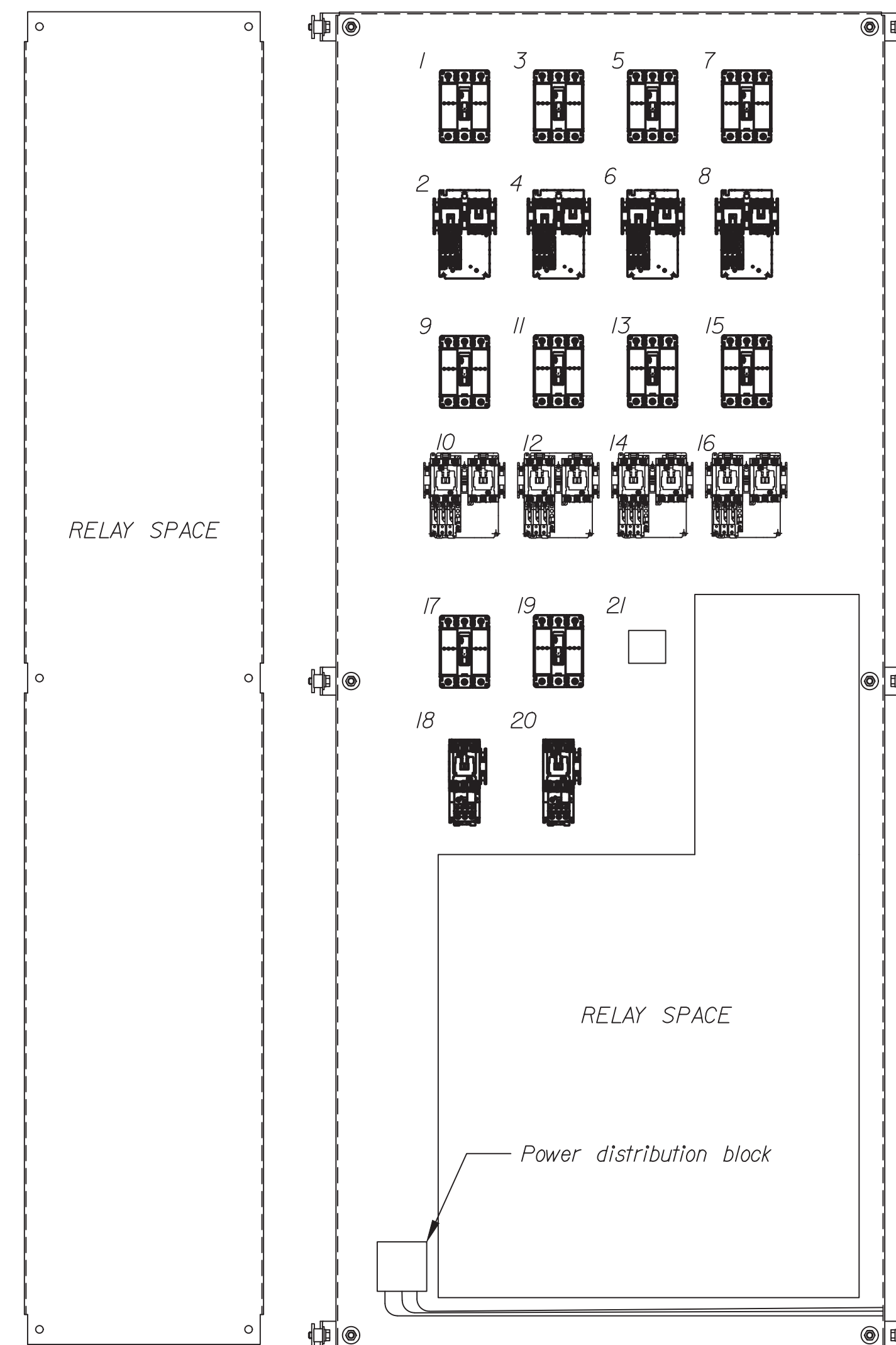
SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME
MOTOR STARTER CABINET
SURFACE



PANEL ENCLOSURE - FRONT
Not to scale



PANEL ENCLOSURE - SIDE
Not to scale



LEFT PANEL
(Right panel similar)
Not to scale

BACK PANEL
Not to scale

Motor Starter Cabinet Components

No.	Motor/Component	Description
1	ESNE	MCP, 3P, 15A
2	ESNE	STARTER, REV, 120V, SIZE 0
3	ESNW	MCP, 3P, 15A
4	ESNW	STARTER, REV, 120V, SIZE 0
5	ESSE	MCP, 3P, 15A
6	ESSE	STARTER, REV, 120V, SIZE 0
7	ESSW	MCP, 3P, 15A
8	ESSW	STARTER, REV, 120V, SIZE 0
9	EJNE	MCP, 3P, 30A
10	EJNE	STARTER, REV, 120V, SIZE 1
11	EJNW	MCP, 3P, 30A
12	EJNW	STARTER, REV, 120V, SIZE 1
13	EJSE	MCP, 3P, 30A
14	EJSE	STARTER, REV, 120V, SIZE 1
15	EJSW	MCP, 3P, 30A
16	EJSW	STARTER, REV, 120V, SIZE 1
17	MOT BRAKE	MCP, 3P, 3A
18	MOT BRAKE	STARTER, NONREV, 120V, SIZE 00
19	MACH BRAKE	MCP, 3P, 3A
20	MACH BRAKE	STARTER, REV, 120V, SIZE 00
21	SPAN POS. TRANSMITTER	POWER SUPPLY, 24VDC, 60W

NOTES:

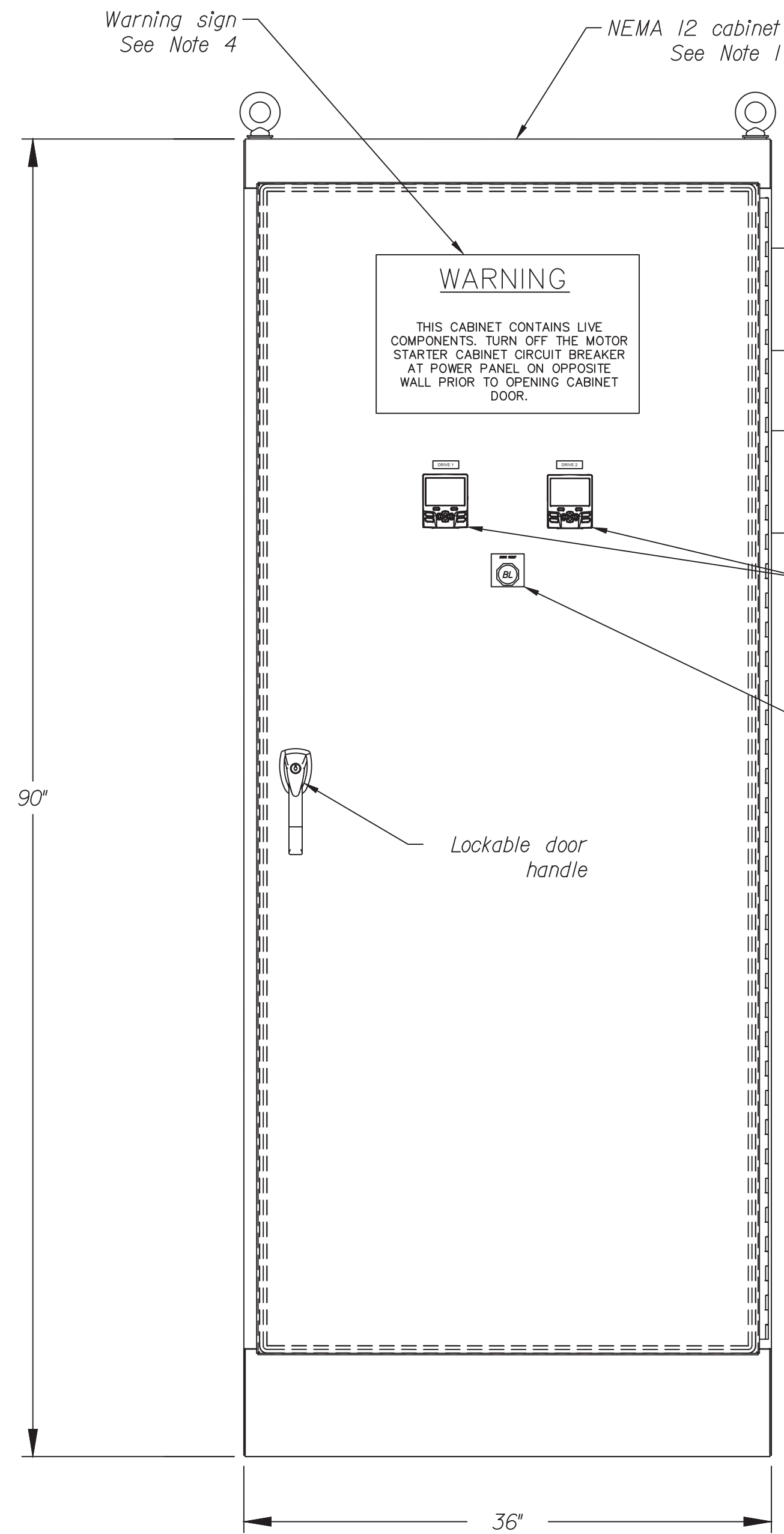
- Contractor shall provide a cabinet in accordance with the special provisions. Cabinet dimensions shown are maximum allowable. The contractor shall verify control house clearances.
- Contractor shall provide cabinet light (not shown) in accordance with the Special Provisions.
- Contractor shall ground bond to cabinet door and panels.
- Warning sign shall be red phenolic placard with white letters, stating, "THIS CABINET CONTAINS LIVE COMPONENTS. TURN OFF MOTOR STARTER CABINET CIRCUIT BREAKER IN POWER PANEL ON OPPOSING WALL PRIOR TO OPENING CABINET DOOR."

STATE OF MAINE
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PROFESSIONAL ENGINEER

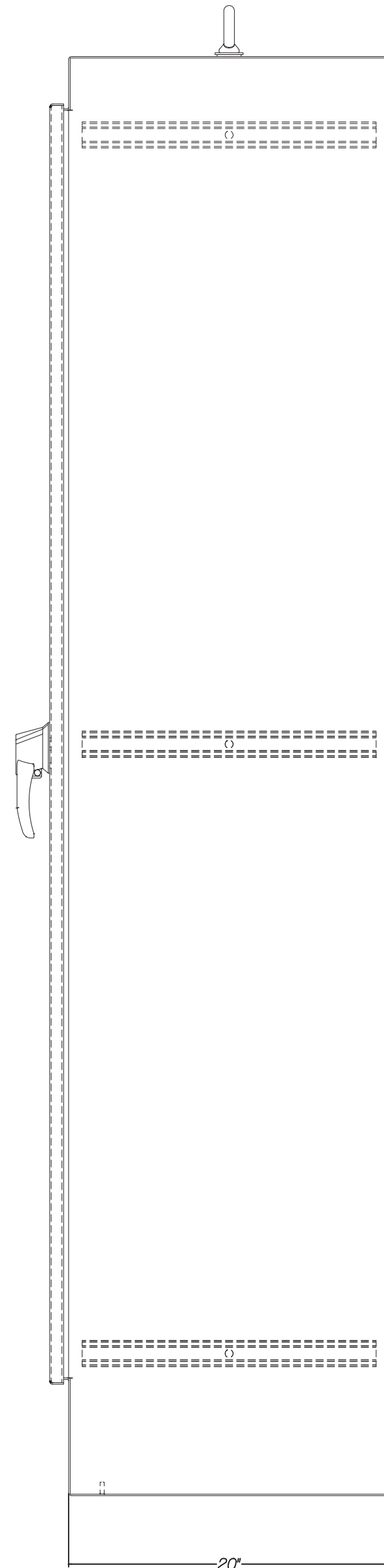
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FIELD CHANGES		

SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME

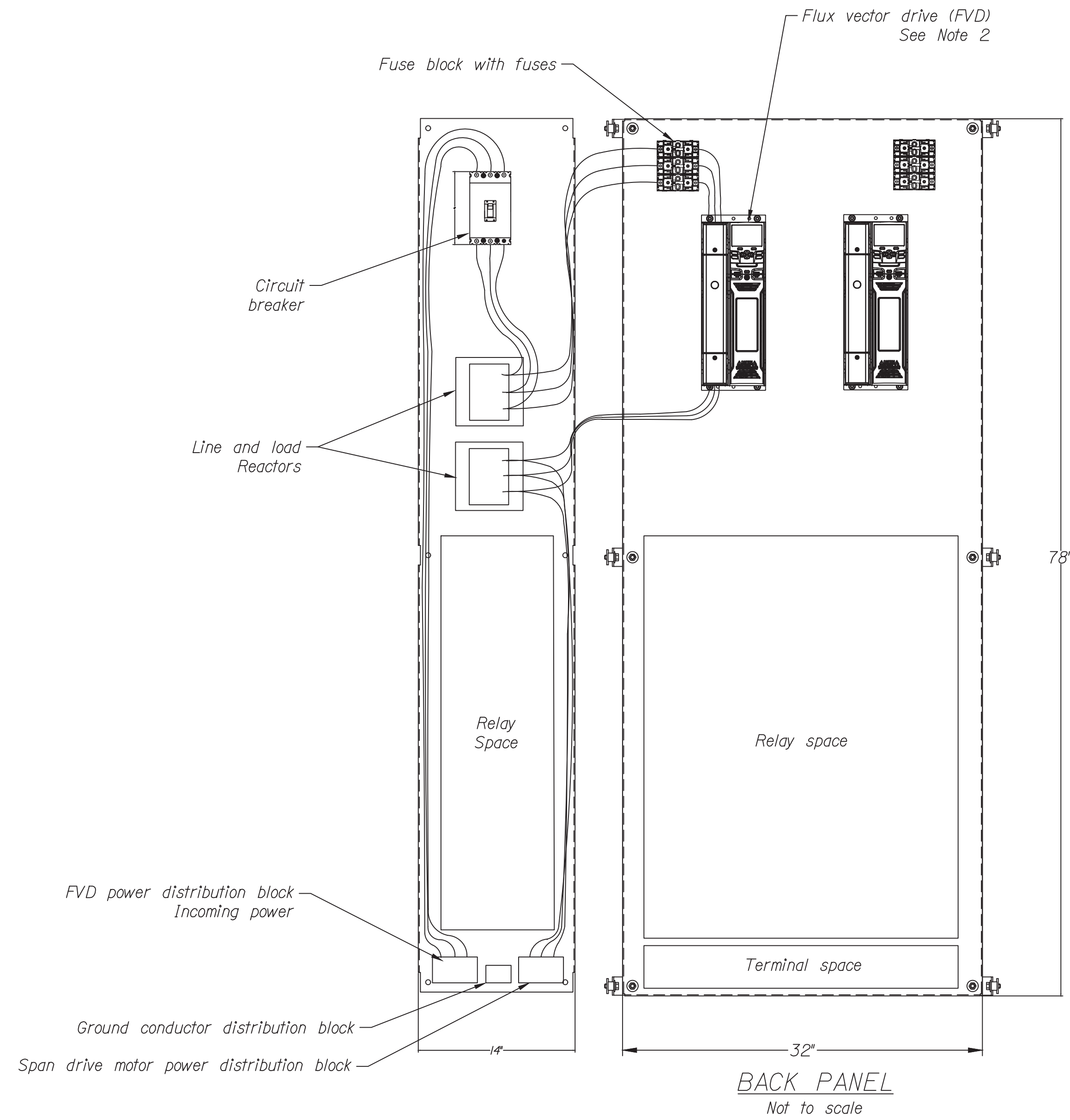
MOTOR STARTER CABINET
ASSEMBLY



PANEL ENCLOSURE - FRONT
Not to scale



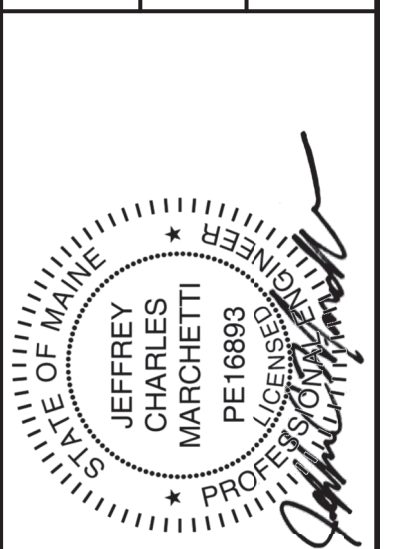
PANEL ENCLOSURE - SIDE
Not to scale



LEFT PANEL
(Right panel similar)
Not to scale

NOTES:

- The Contractor shall provide a cabinet in accordance with the special provisions. Cabinet dimensions shown are maximum allowable. The Contractor shall verify control house clearances.
- The Drives shown are Control Techniques Unidrive M700-05200250A 10 hp (7.5 hp heavy duty). Provide door mounted remote keypad for each drive.
- The Contractor shall provide dynamic braking resistors in accordance with the Special Provisions. The dynamic braking resistors shown are Control Techniques DBR-0200-00600-ENC.
- The Contractor shall provide a warning sign on the cabinet door directing maintenance personnel to turn off the control panel circuit breaker prior to opening the door.
- The Encoder cable (not shown) shall terminate at the drive encoder terminals and at the span drive motor encoder with no intermediate terminations. terminate shields at drive end only.
- The Contractor shall provide ground conductor for drives and span drive motors (not shown).
- The Contractor shall provide cabinet light (not shown) in accordance with the Special Provisions.
- The Contractor shall ground bond to cabinet door and panels.

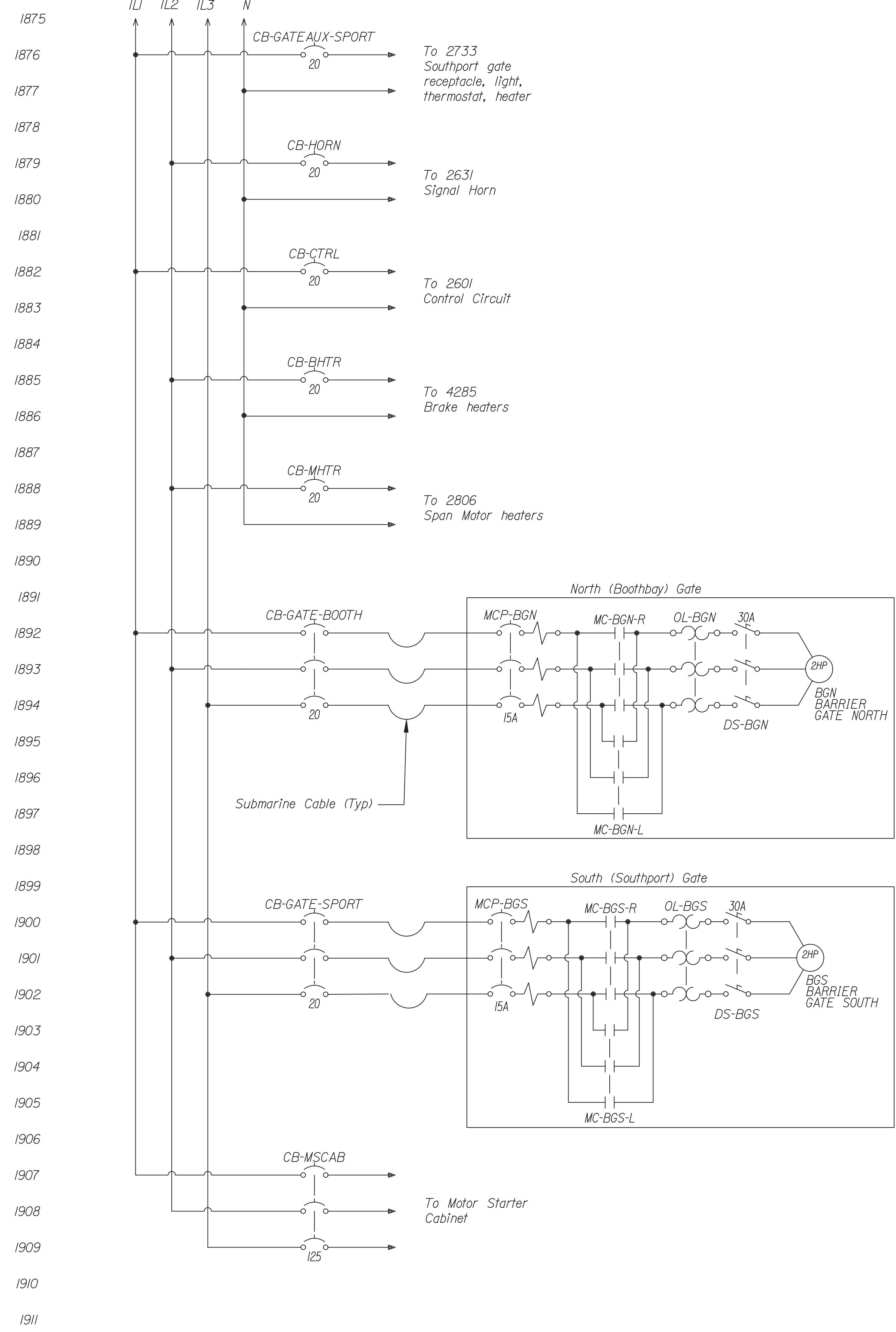
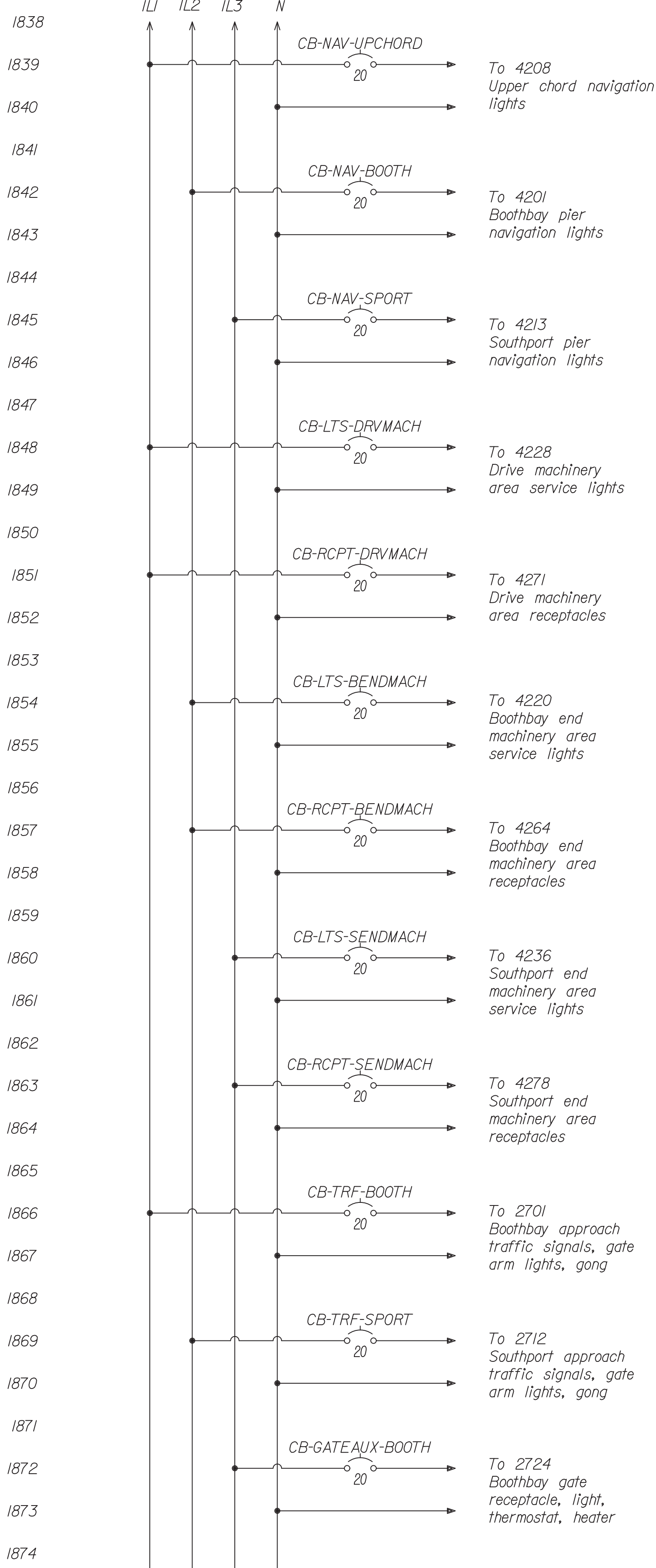
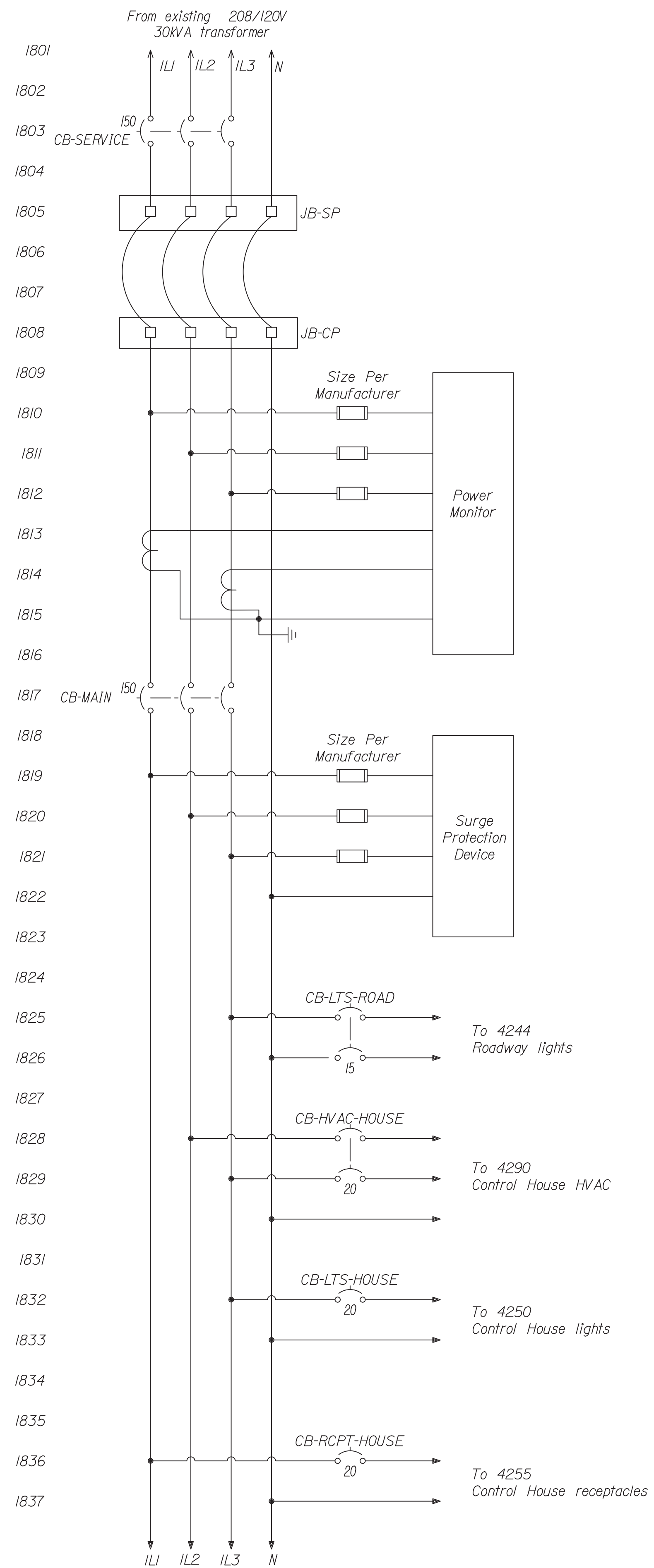


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FIELD CHANGES		

SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME
DRIVE MOTOR CABINET ASSEMBLY
DETAILS

SHEET NUMBER

E17



STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
STP-2175(100)

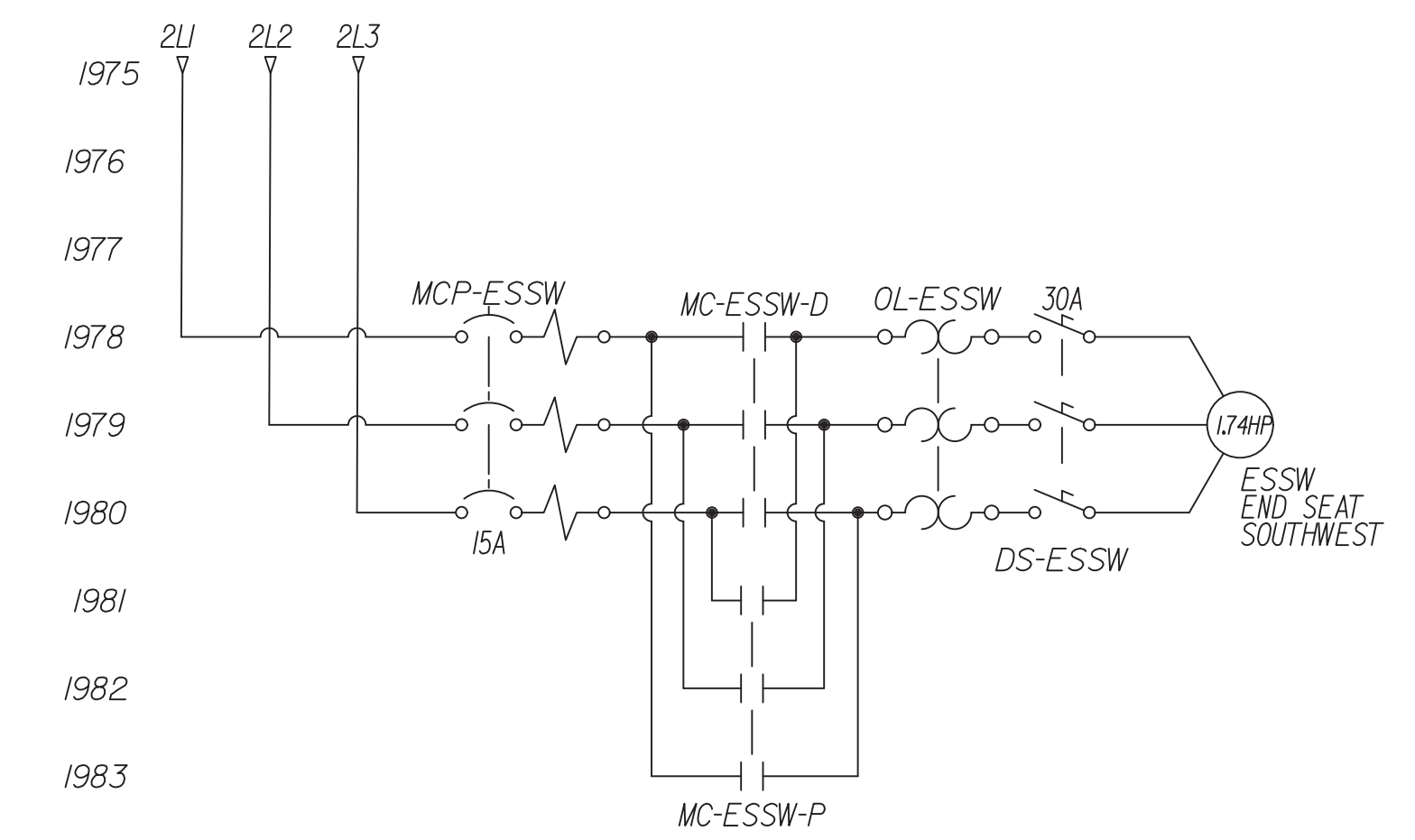
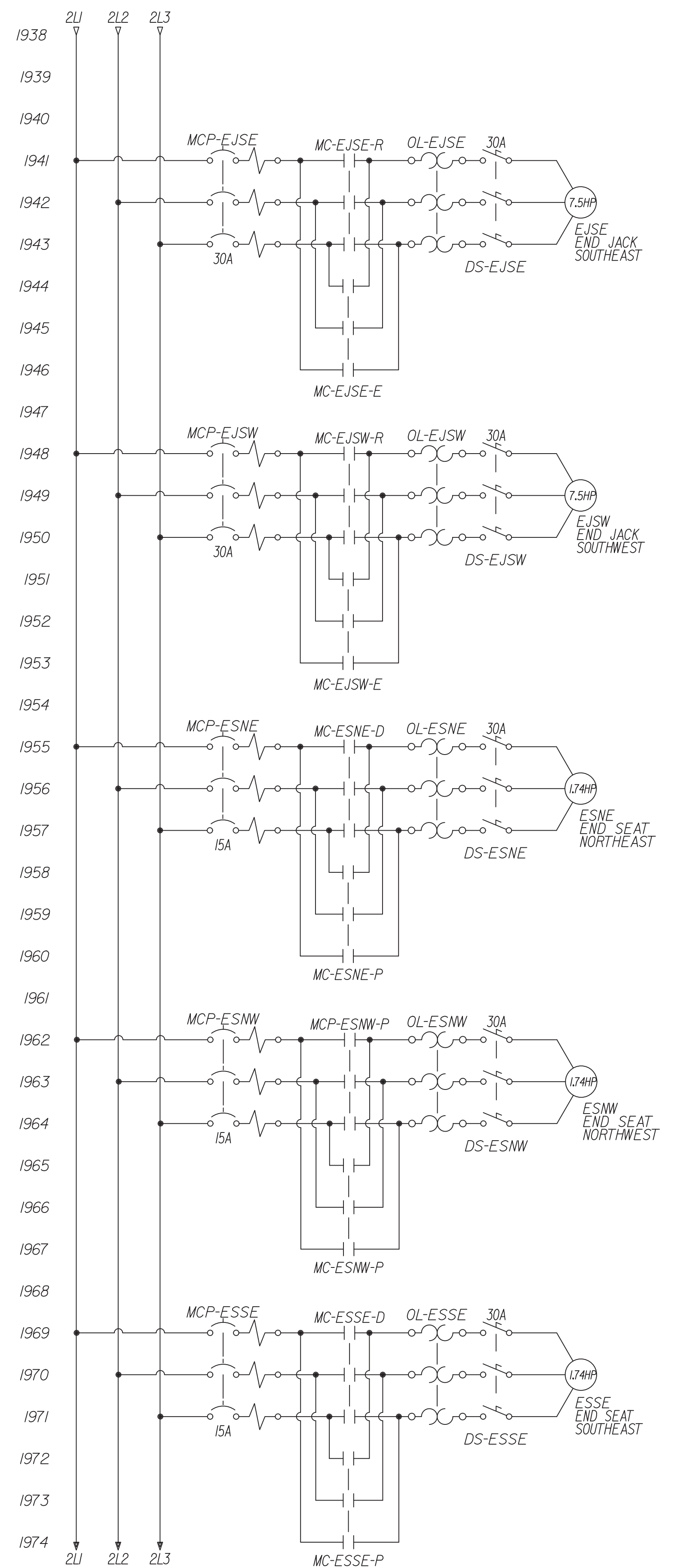
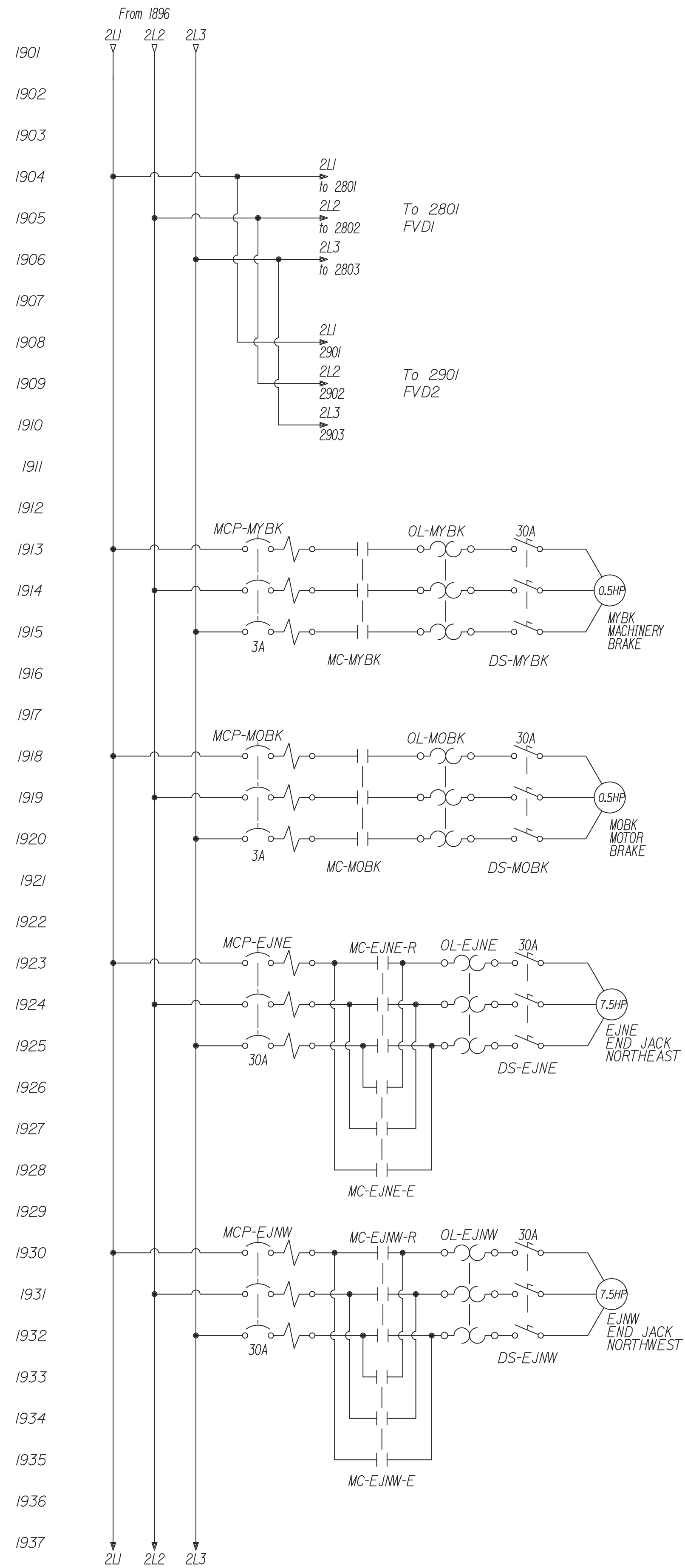
BRIDGE NO. 2789 WIN 21751.00 BRIDGE PLANS

PROJ. MANAGER J. STETSON, PE
DESIGN-DETAILED
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DESIGN-2-DETAILED2
DESIGN-3-DETAILED3
REVISIONS 1
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REVISIONS 3
REVISIONS 4
FIELD CHANGES

SOUTHPORT BRIDGE ROUTE 27
SOUTHPORT & BOOTHBAY HARBOR ME LINCOLN COUNTY

THREE LINE DIAGRAM 1

SHEET NUMBER
E18
OF 48



STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
STP-2175(100)

BRIDGE NO. 2789 WIN 21751.00 BRIDGE PLANS

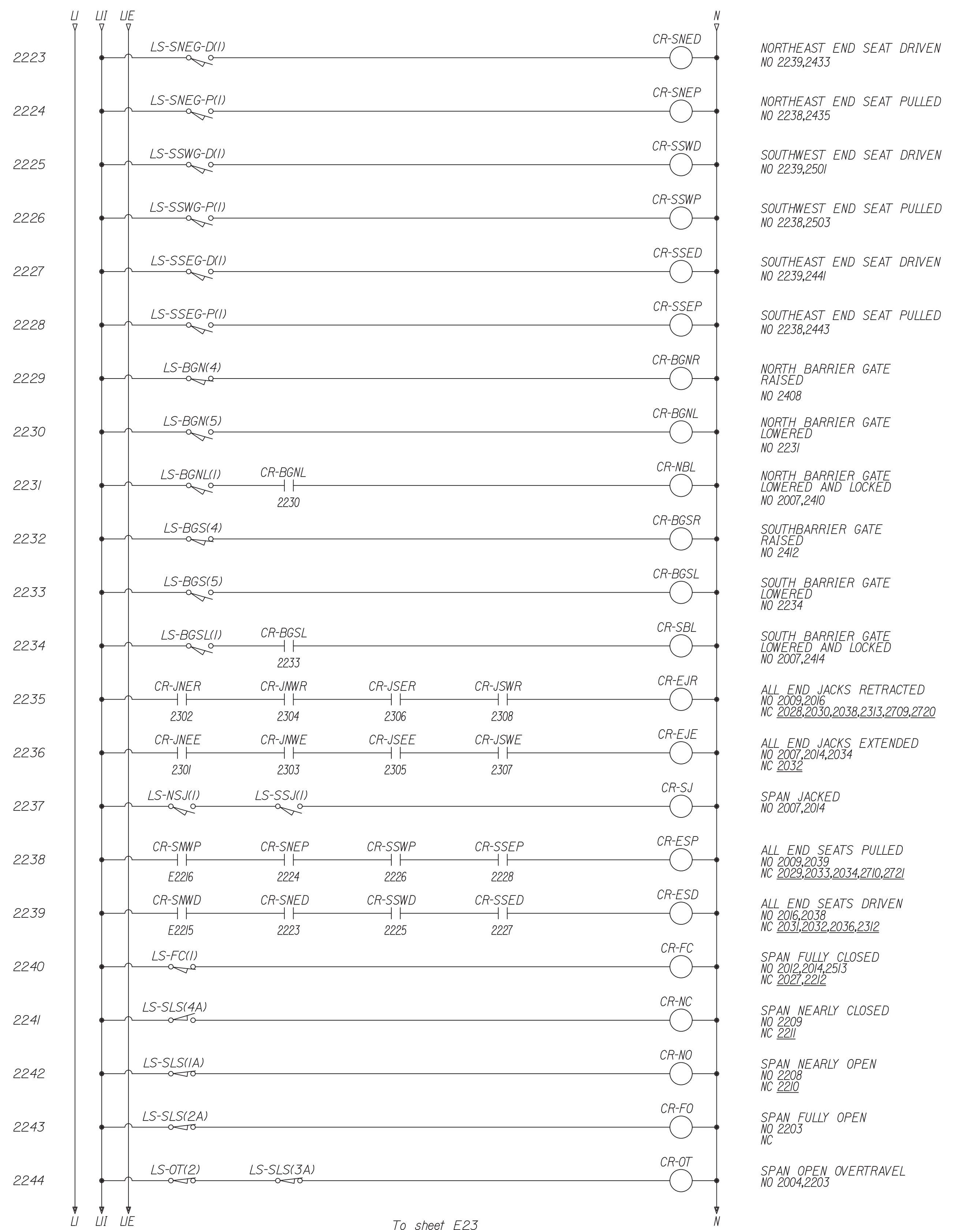
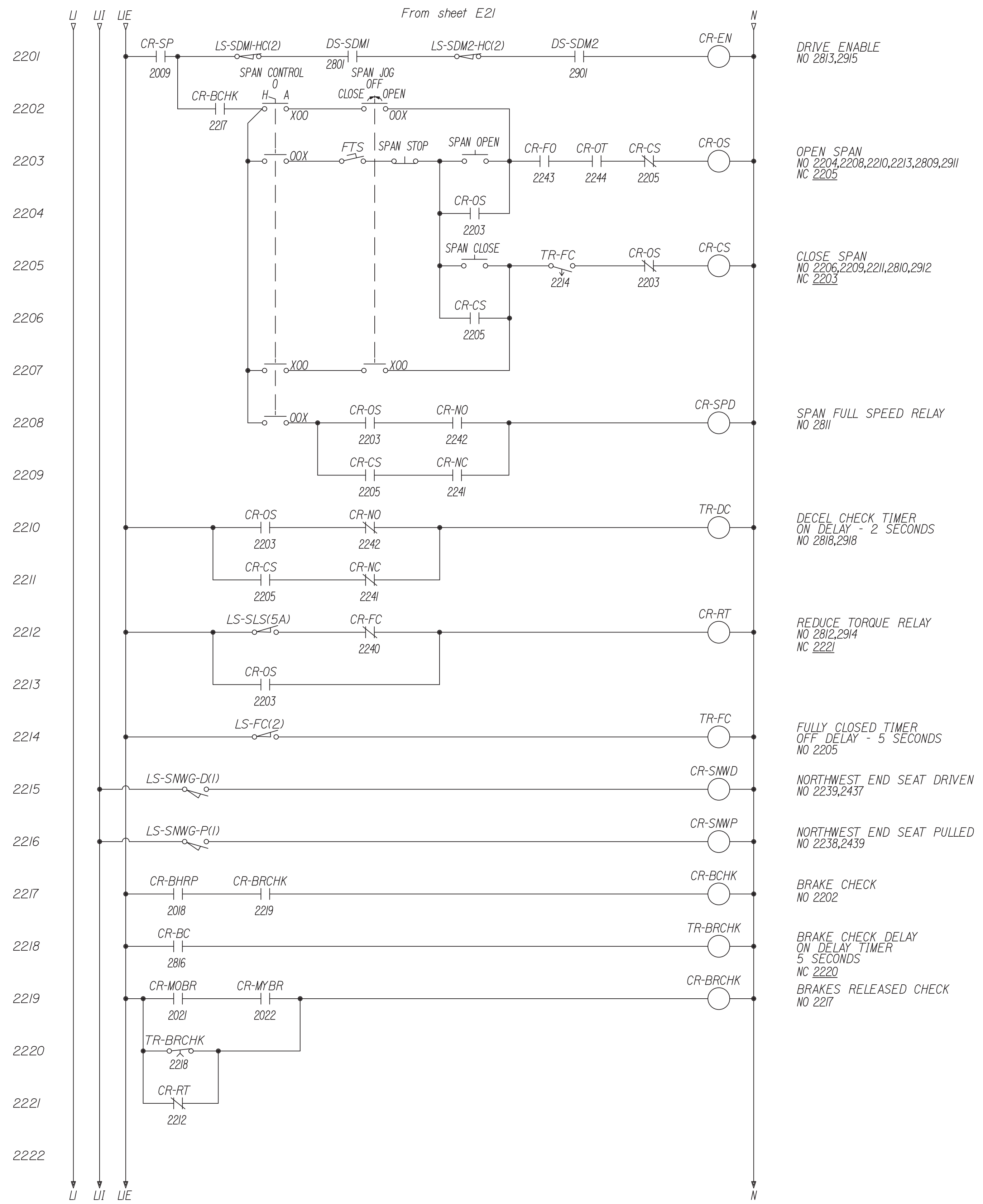
STATE OF MAINE
JEFFREY CHARLES MARCHETTI
PE 16893
PROFESSIONAL ENGINEER

PROJ. MANAGER	U. STETSON, PE	DATE
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FIELD CHANGES		

SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME

THREE LINE DIAGRAM 2

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E19
OF 48



STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
STP-2175(100)

BRIDGE NO. 2789 WIN 21751.00 BRIDGE PLANS

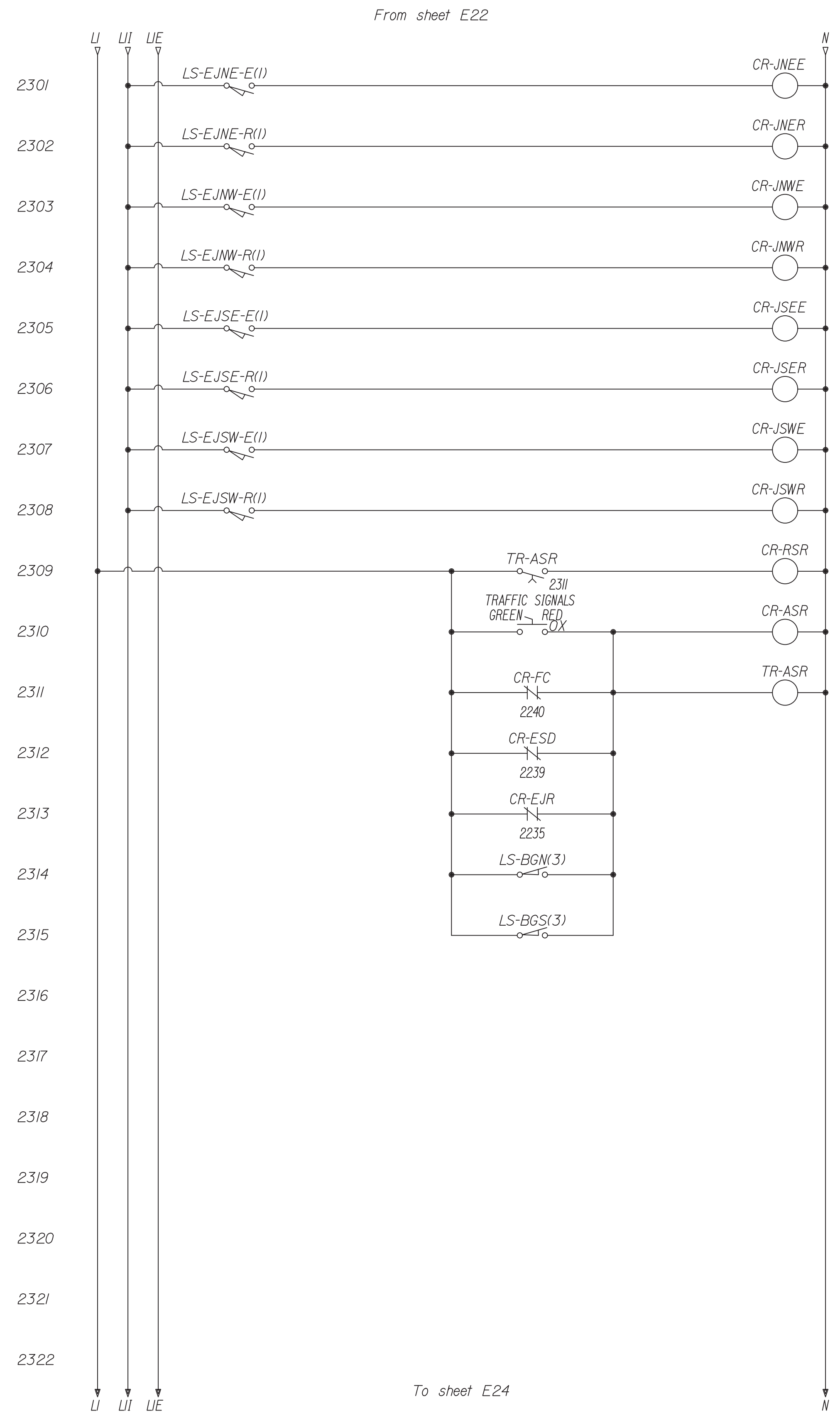
STATE OF MAINE
JEFFREY CHARLES MARCHETTI
PE 16893
PROFESSIONAL ENGINEER

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		REVISIONS 4
		FIELD CHANGES

SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME

CONTROL SCHEMATIC 3

SHEET NUMBER
E22
OF 48



From sheet E22

To sheet E24

- 2301 CR-JNEE NORTHEAST END JACK EXTENDED
NO 2236,2418
- 2302 CR-JNER NORTHEAST END JACK RETRACTED
NO 2235,2416
- 2303 CR-JNWE NORTHWEST END JACK EXTENDED
NO 2236,2423
- 2304 CR-JMWR NORTHWEST END JACK RETRACTED
NO 2235,2420
- 2305 CR-JSEE SOUTHEAST END JACK EXTENDED
NO 2236,2427
- 2306 CR-JSER SOUTHEAST END JACK RETRACTED
NO 2235,2425
- 2307 CR-JSWE SOUTHWEST END JACK EXTENDED
NO 2236,2431
- 2308 CR-JSWR SOUTHWEST END JACK RETRACTED
NO 2235,2429
- 2309 CR-RSR RED SIGNAL RELAY
NO 2006,2406,2701,2712
NC 2402,2702,2713
- 2310 CR-ASR YELLOW SIGNAL RELAY
NO 2404,2702,2707,2713,2718
NC 2402,2703,2714
- 2311 TR-ASR YELLOW TRAFFIC SIGNAL
TIMER - 6 SECONDS
NO 2309

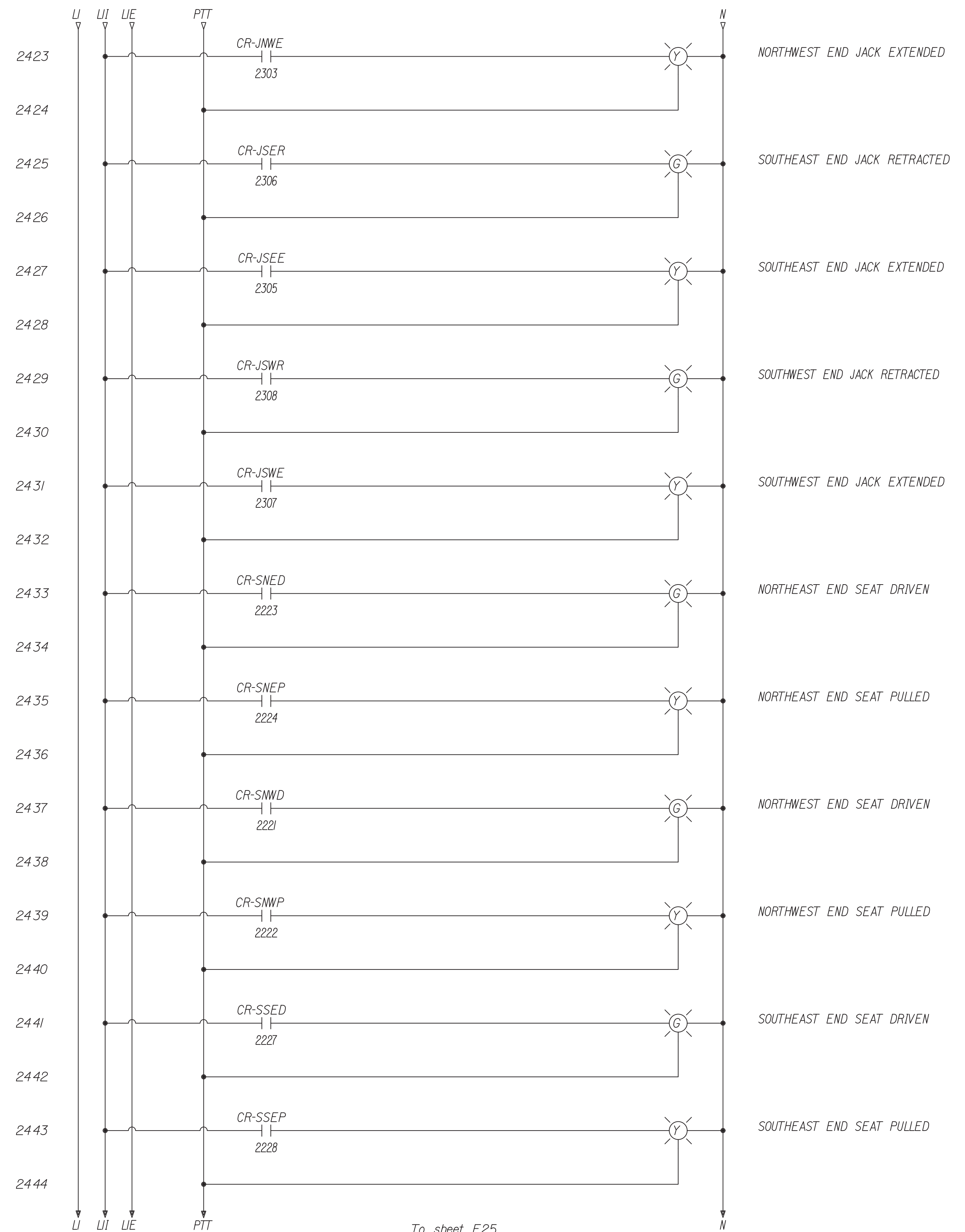
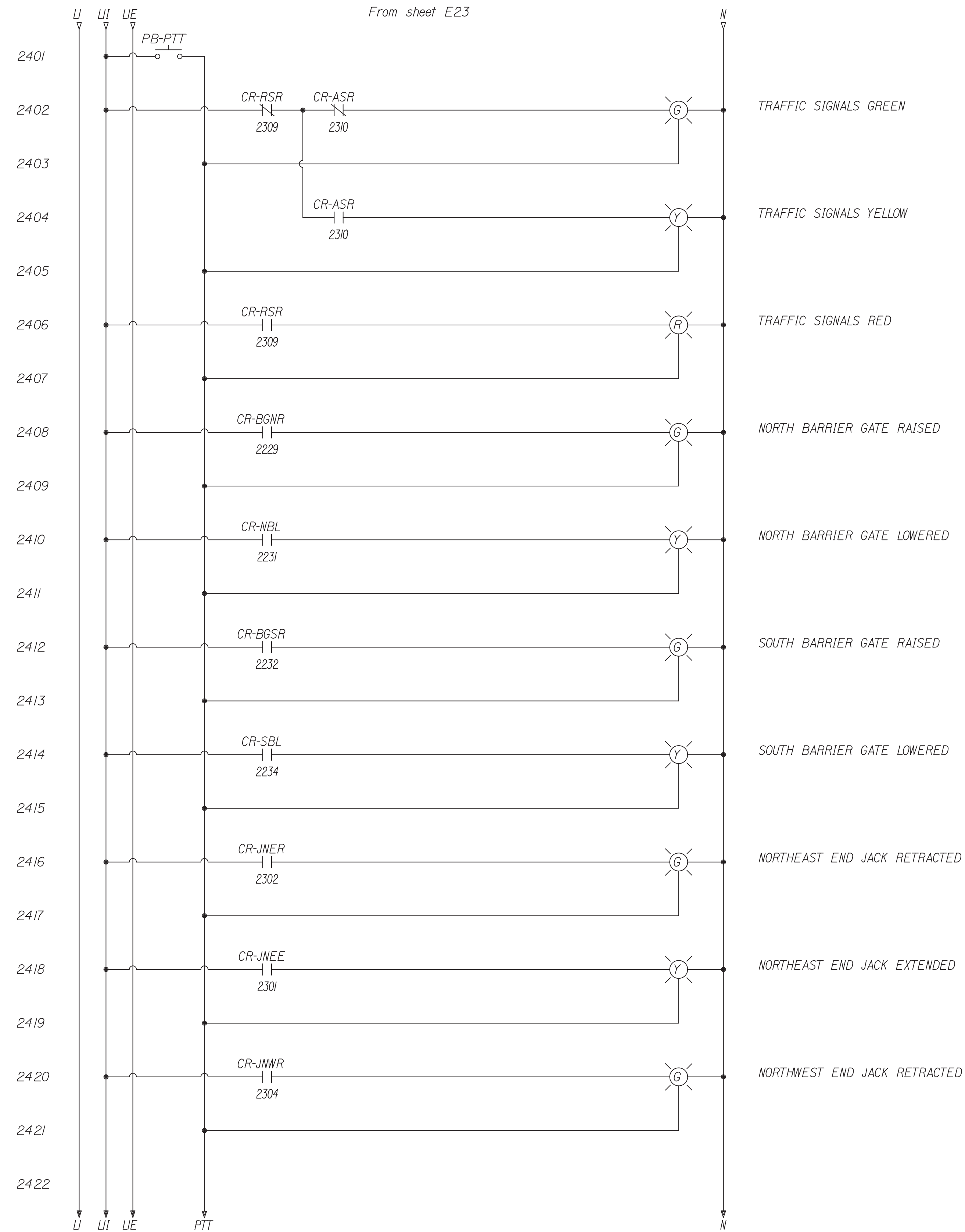
STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
STP-2175(100)
BRIDGE NO. 2789 WIN 21751.00 BRIDGE PLANS



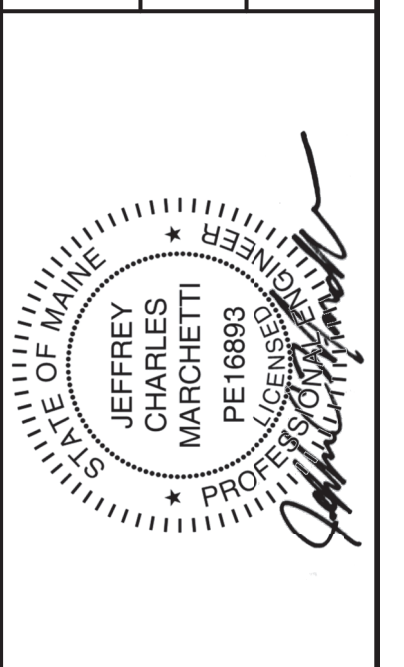
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REVISIONS 4		
FIELD CHANGES		

SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME
CONTROL SCHEMATIC 4

SHEET NUMBER
E23
OF 48



STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
STP-2175(100)
BRIDGE NO. 2789
WIN
21751.00
BRIDGE PLANS

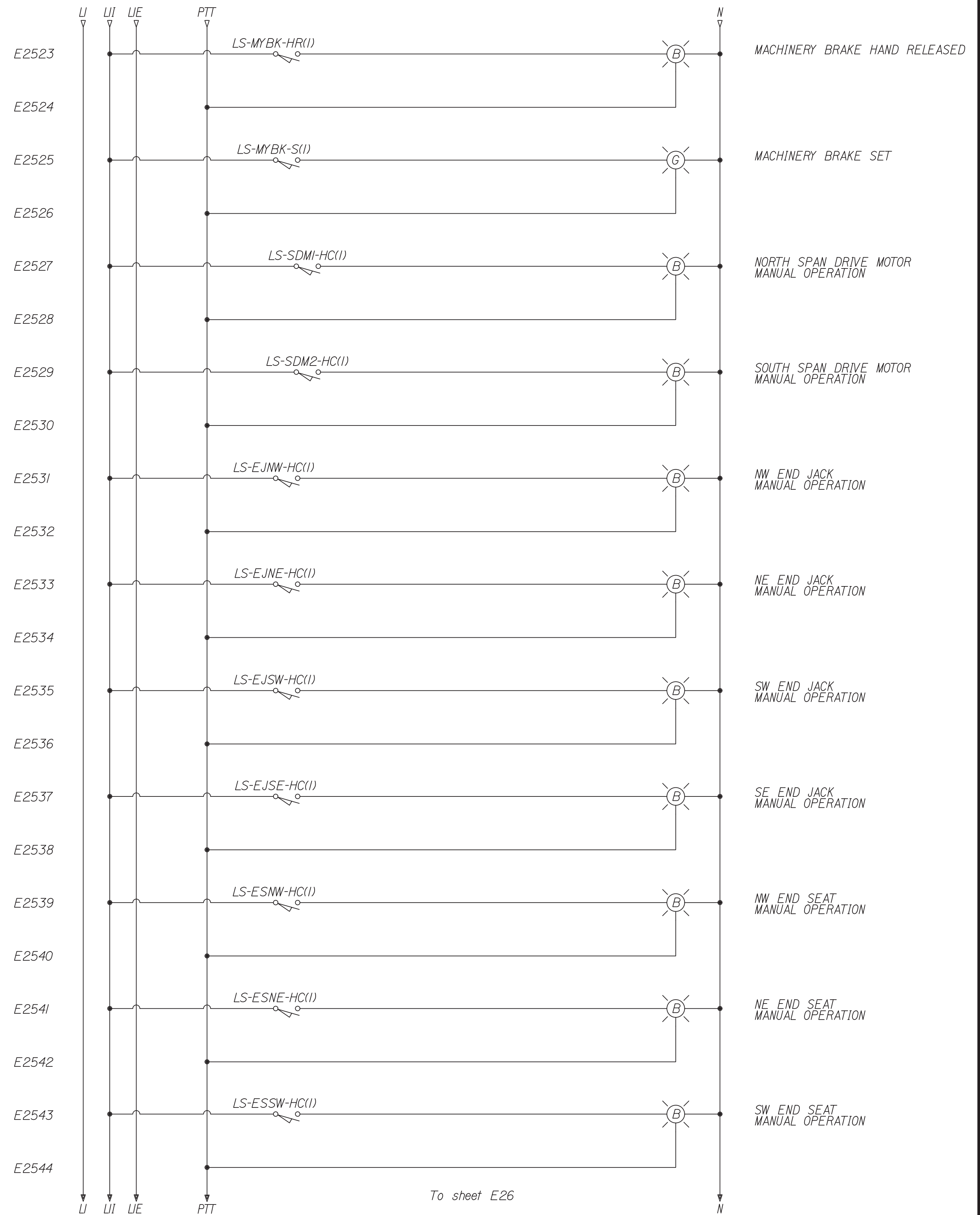
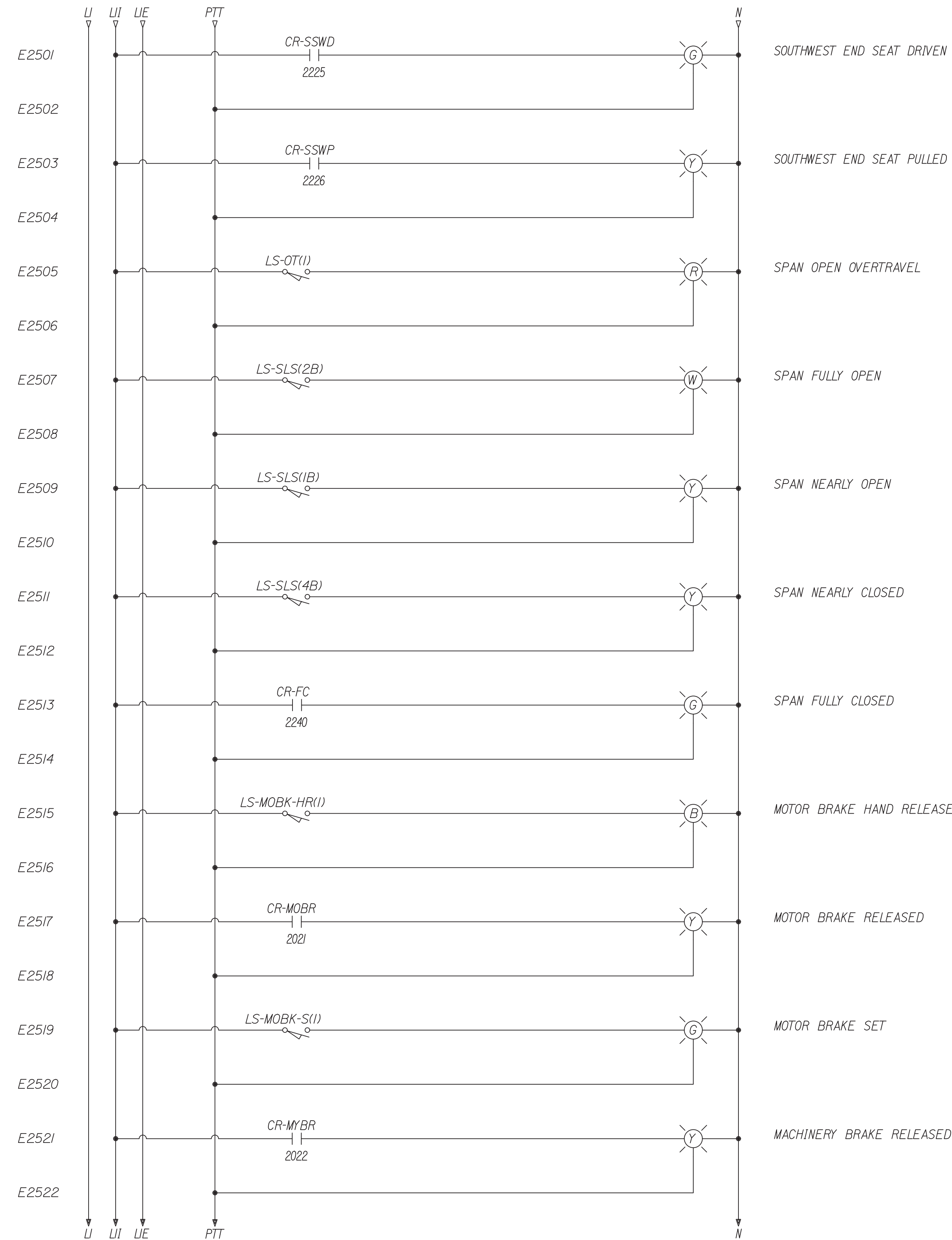


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SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME
CONTROL SCHEMATIC 5

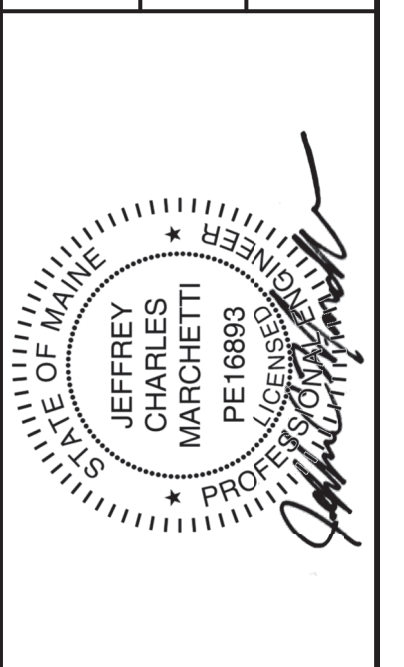
SHEET NUMBER
E24
OF 48

From sheet E24



To sheet E26

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
STP-2175(100)
BRIDGE NO. 2789
WIN
21751.00
BRIDGE PLANS

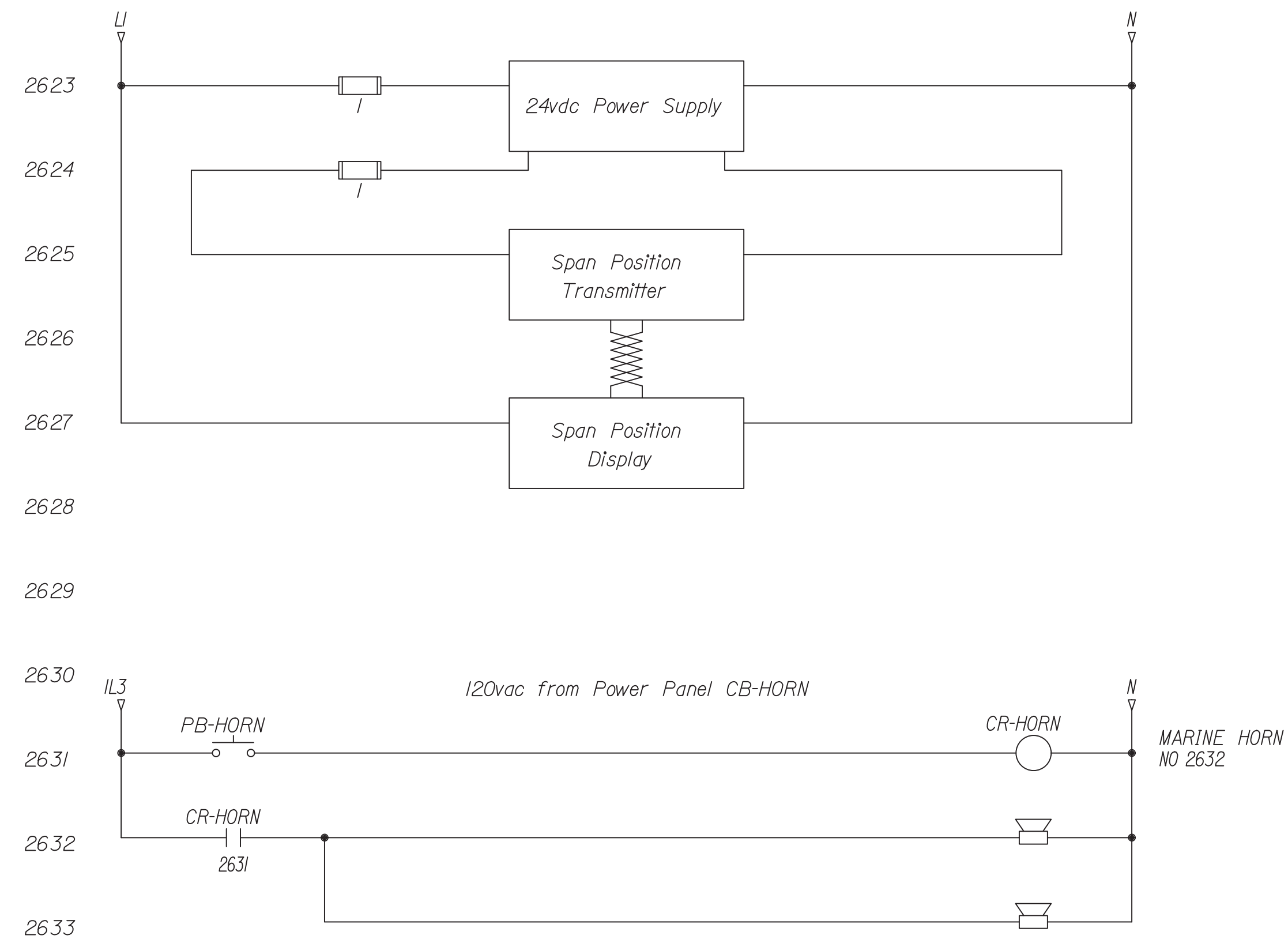
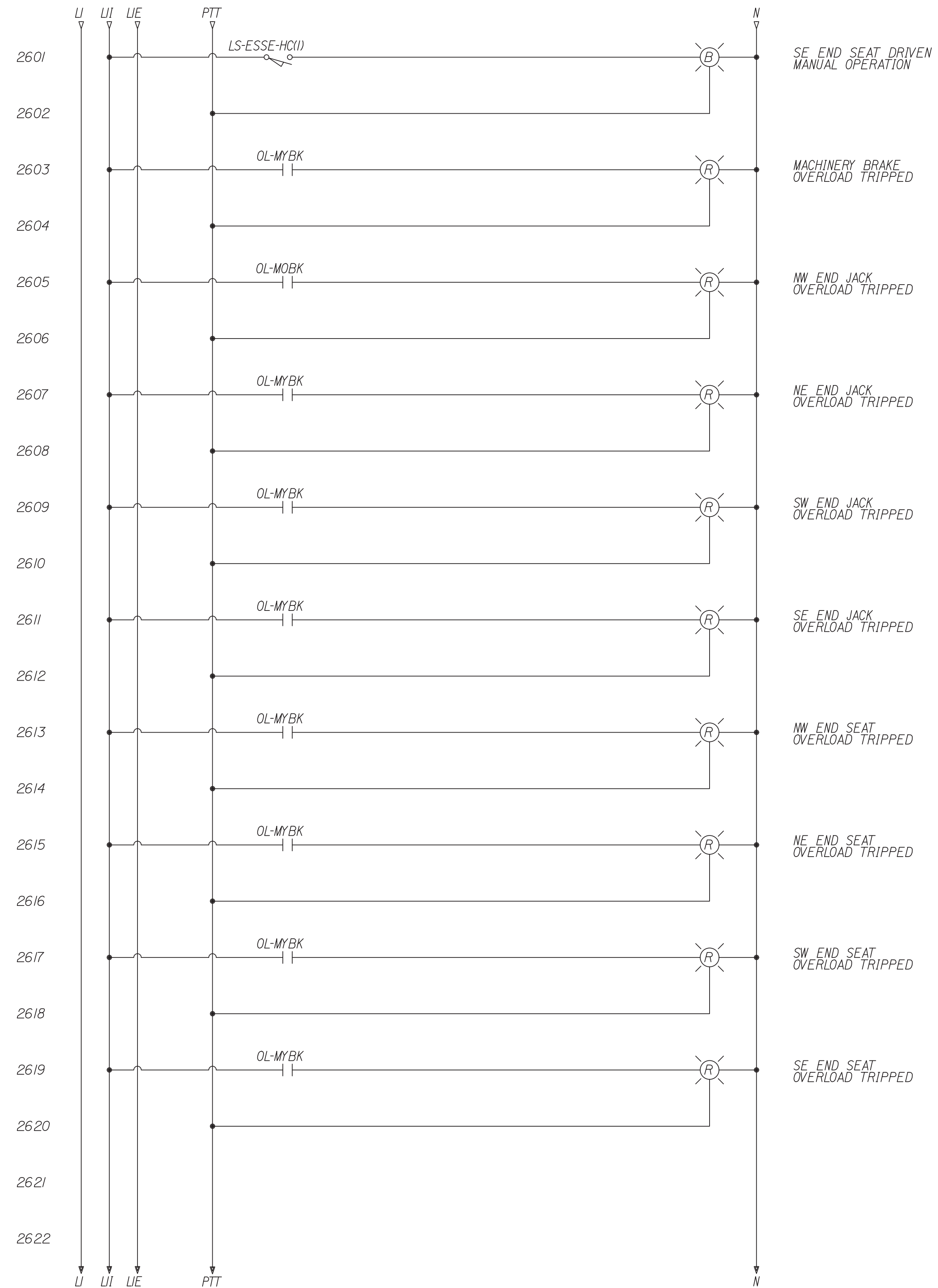


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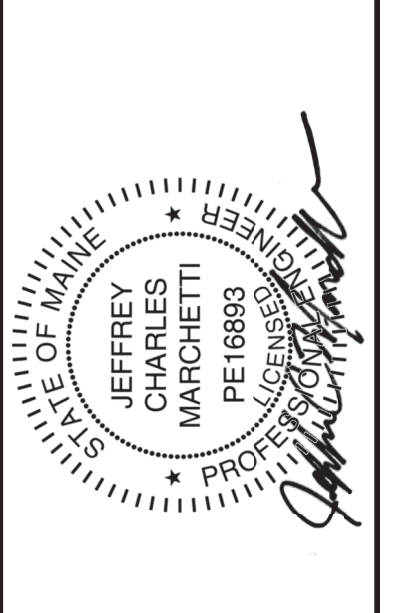
SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME
CONTROL SCHEMATIC 6

SHEET NUMBER
E25
OF 48

From sheet E25



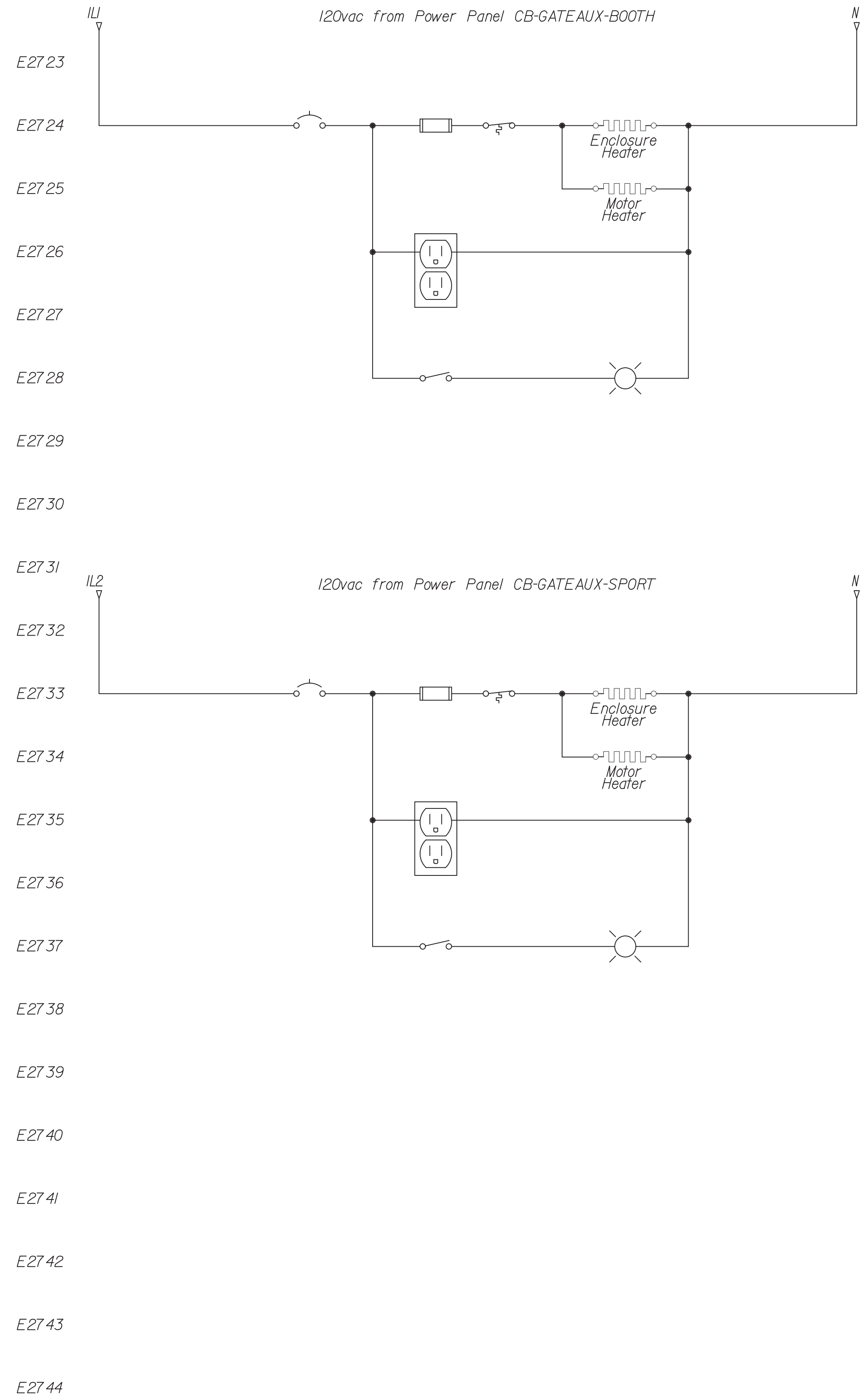
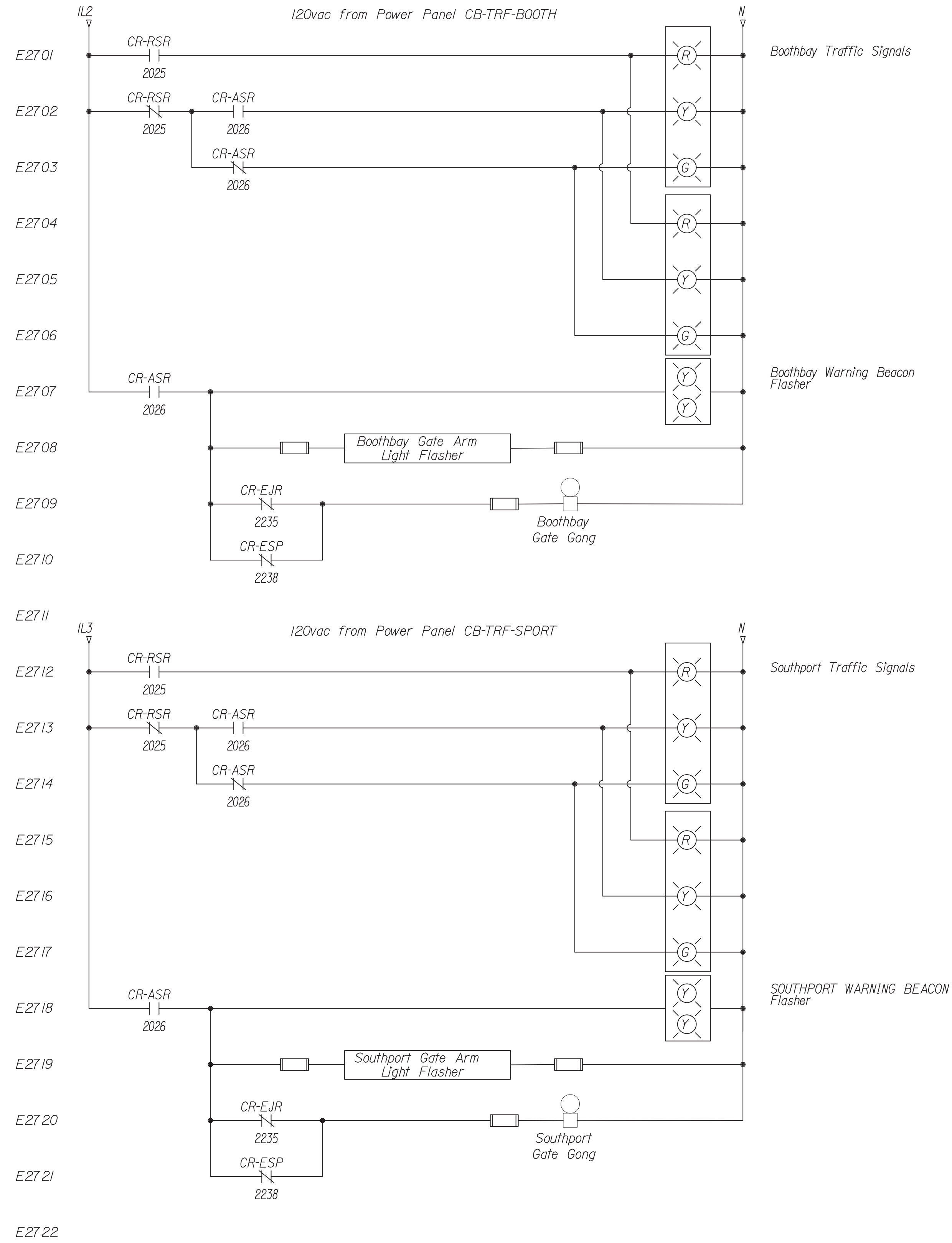
STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
STP-2175(100)
BRIDGE NO. 2789 WIN 21751.00 BRIDGE PLANS



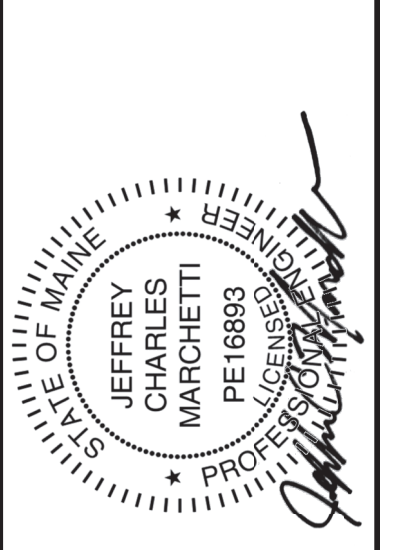
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FIELD CHANGES		

SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME
CONTROL SCHEMATIC 7

SHEET NUMBER
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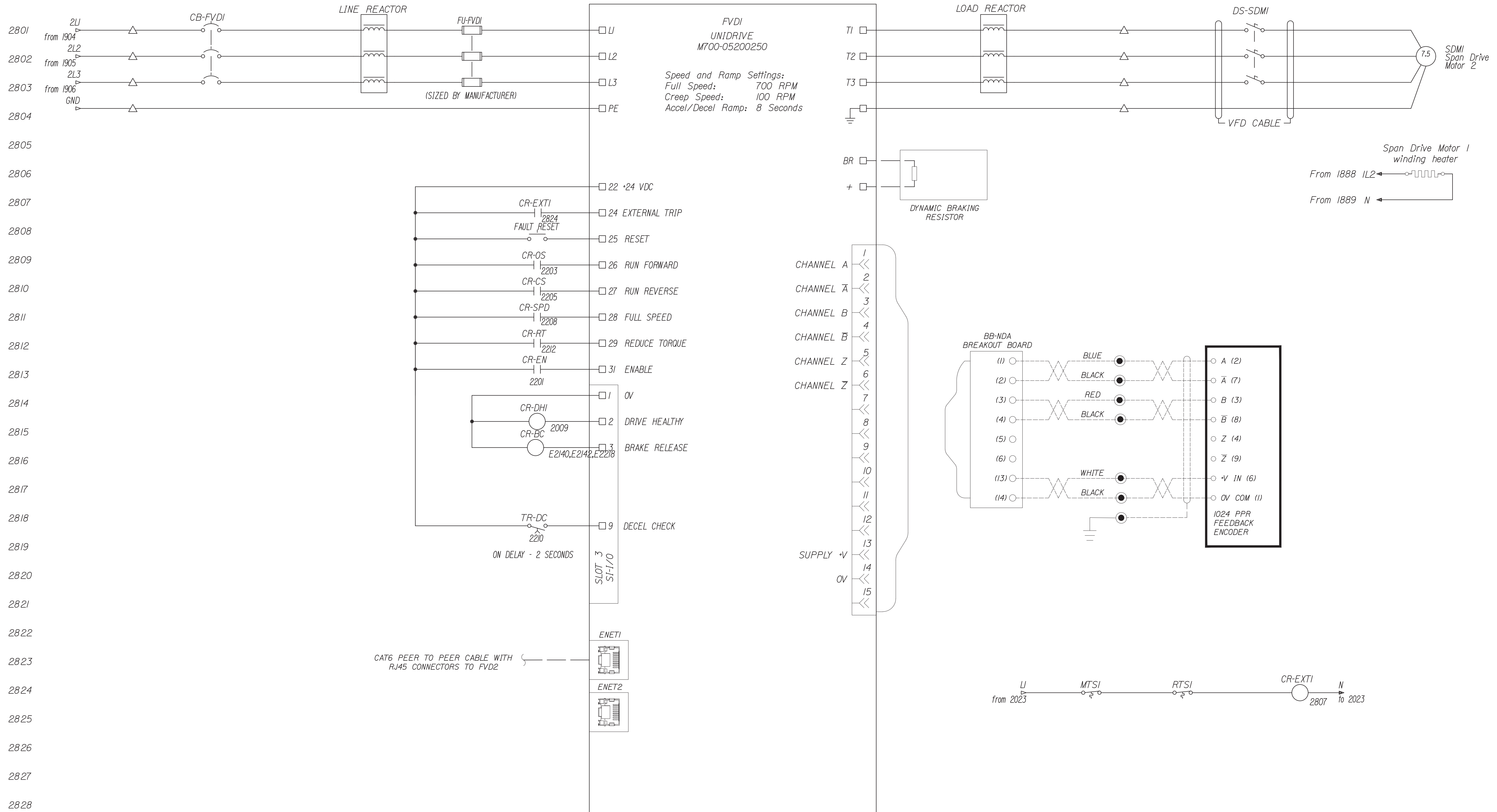
STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
STP-2175(100)
BRIDGE NO. 2789 WIN 21751.00 BRIDGE PLANS



PROJ. MANAGER	U. STETSON, PE	DATE
DESIGN-DETAILED		
CHECKED-REVIEWED		
DESIGN-2-DETAILED2		
DESIGN-3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME
CONTROL SCHEMATIC 8

SHEET NUMBER
E27
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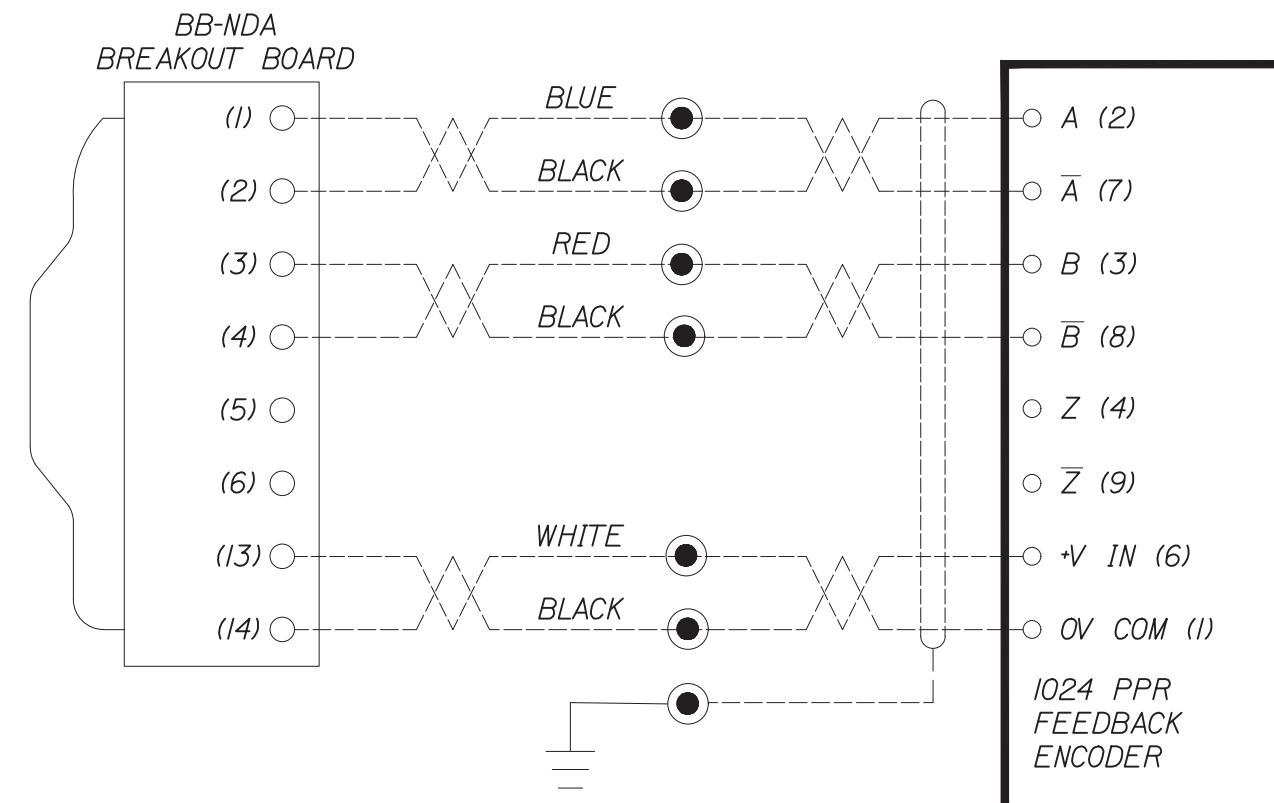
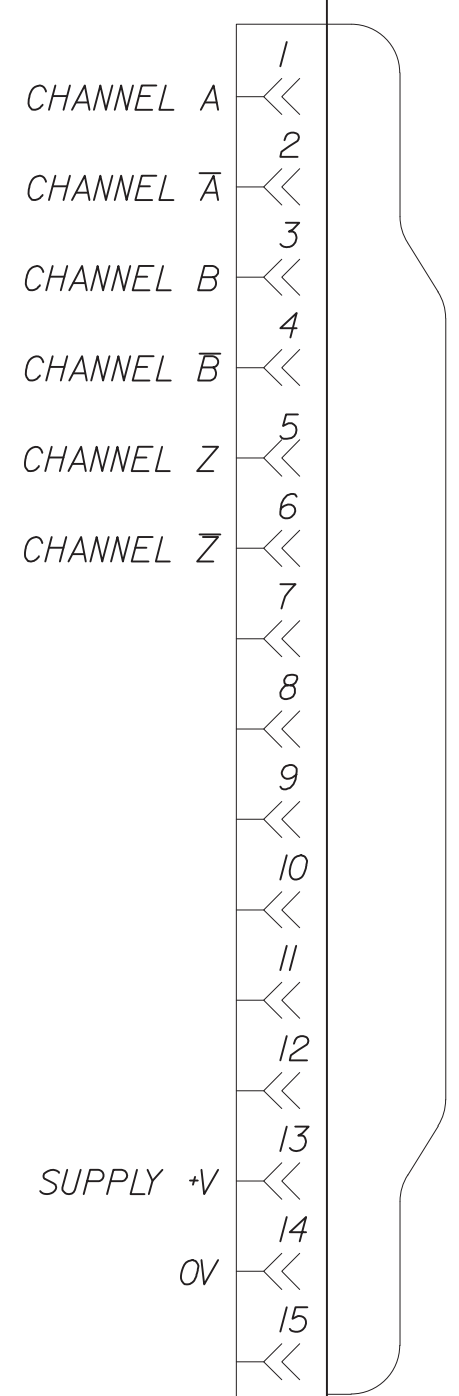
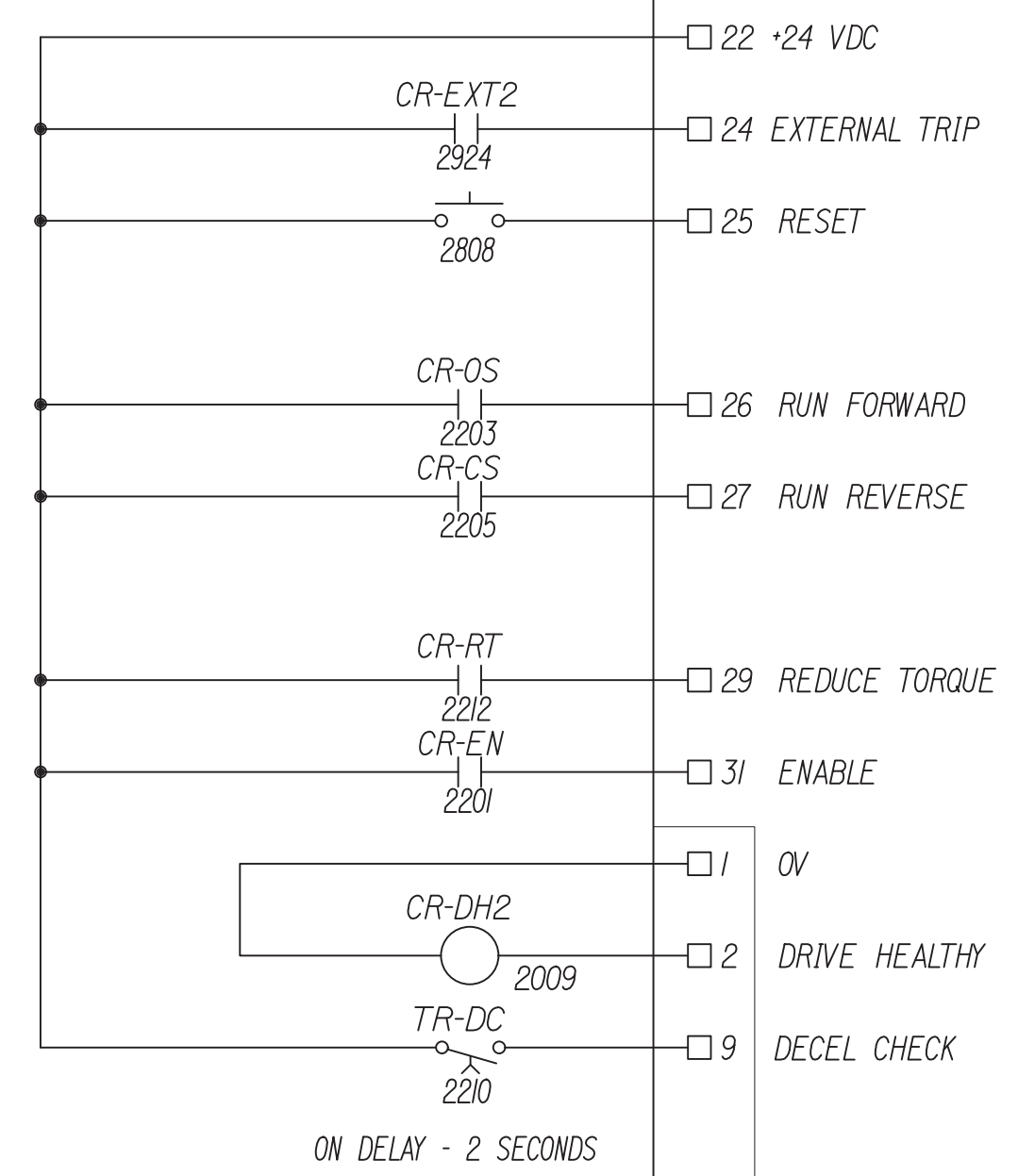
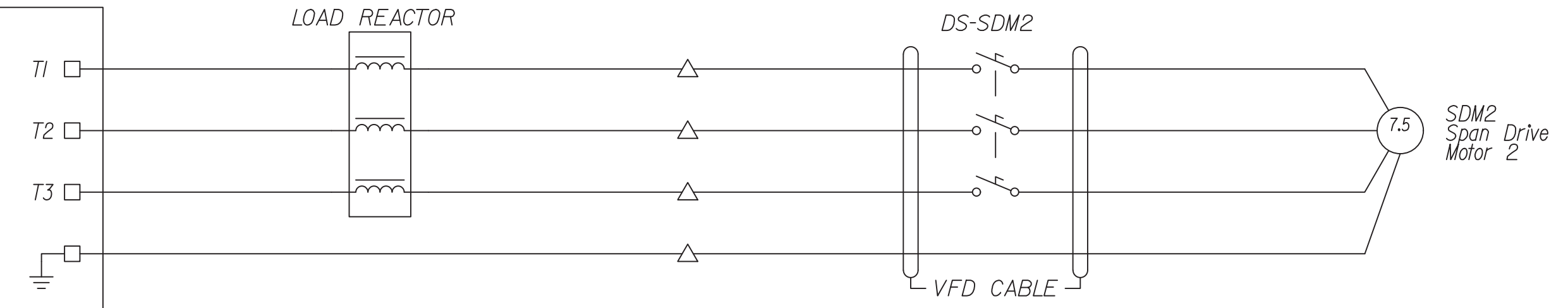
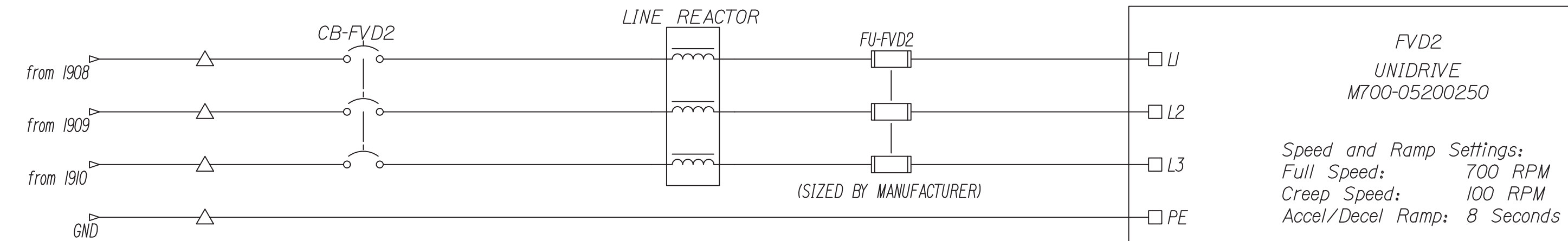
PROJ. MANAGER	J. STETSON, PE	DATE
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CHECKED-REVIEWED		
DESIGN-2-DETAILED2		
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REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SHEET NUMBER

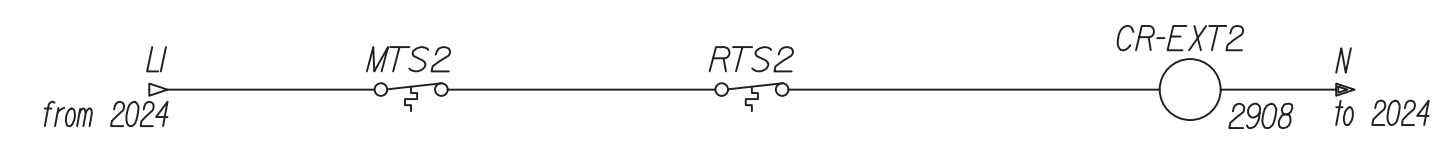
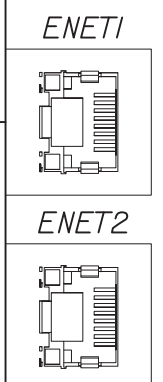
E28

- NOTES:**
- EXCEPT AS OTHERWISE INDICATED, ALL DEVICES AND WIRING SHOWN ON THIS SHEET ARE LOCATED IN/ON THE DRIVE CABINET.
 - DECEL CHECK INPUT TO USE DRIVE LOGIC TO WRITE TO OVERSPEED THRESHOLD PARAMETER, SWITCHING FROM THE FULL OVERSPEED THRESHOLD TO A LOWER THRESHOLD TO DETERMINED AND SET IN THE FIELD AND COORDINATED WITH THE CR-DC TIMER RELAY.
 - FVD2 TO RUN IN TORQUE FOLLOW, RECEIVING SIGNALS FROM FVD1 VIA CAT6.

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CAT6 PEER TO PEER CABLE WITH RJ45 CONNECTORS FROM FVDI



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DESIGN-3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
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FIELD CHANGES		

SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME
DRIVE CONTROL SCHEMATIC 2

SHEET NUMBER
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*Span Limit Switch Contact Development
Span Limit Switch (rotary Cam)*

Contact	Operator Position	Wire Number		Function
		LS-SLS		
1A		2242		Open at nearly open
1B		2509		Closed at nearly open
2A		2243		Open at fully open
2B		2507		Closed at fully open
3A		2244		Open at open overtravel
4A		2241		Open at nearly closed
4B		2511		Closed at nearly closed
5A		2212		Open at reduce torque position

Full closed	Reduced torque	Near closed	Near open	Full open	Over travel
Deg. 1	2	5	60	65	70

*Limit Switch Contact Development
Brake Set Limit Switch*

Contact	Operator Position	Wire Number		Function
		LS-MOBK-S	LS-MYBK-S	
1		2519		Closed at set
2				Open at set

Brake not set	Brake set
---------------	-----------

*Limit Switch Contact Development
Brake Released Limit Switch*

Contact	Operator Position	Wire Number		Function
		LS-MOBK-R	LS-MYBK-R	
1		2021	2022	Closed at released
2				Open at released

Brake not released	Brake released
--------------------	----------------

*Limit Switch Contact Development
Brake Hand Released Limit Switch*

Contact	Operator Position	Wire Number		Function
		LS-MOBK-HR	LS-MYBK-HR	
1		2515	2523	Closed at hand released
2		2018	2019	Open at hand released

Brake not hand released	Brake hand Released
-------------------------	---------------------

*Limit Switch Contact Development
Span Fully Closed Limit Switch*

Contact	Operator Position	Wire Number		Function
		LS-FC		
1		2240		Closed at fully closed
2		2214		Open at fully closed

Not fully closed	Fully closed
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*Limit Switch Contact Development
Span Open Overtravel Limit Switch*

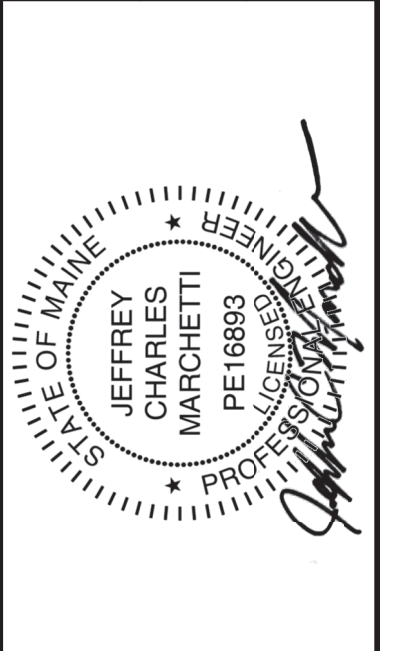
Contact	Operator Position	Wire Number		Function
		LS-OT		
1		2505		Closed at open overtravel
2		2244		Open at open overtravel

Not overtraveled	Open overtravel
------------------	-----------------

*Limit Switch Contact Development
Span Jacked Limit Switches*

Contact	Operator Position	Wire Number		Function
		LS-NSJ	LS-SSJ	
1		2237	2237	Closed at span end jacked
2				Open at span end jacked

Not jacked	Jacked
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PROJ. MANAGER	J. STETSON, PE	DATE
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DESIGN-2-DETAILED2		
DESIGN-3-DETAILED3		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
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*Limit Switch Contact Development
End Jack Retracted*

Contact	Operator Position	Wire Number				Function
		LS-EJNE-R	LS-EJNW-R	LS-EJSE-R	LS-EJSW-R	
1		2302	2304	2306	2308	Closed at retracted
2		2107	2111	2115	2119	Open at retracted

Not retracted Retracted

*Limit Switch Contact Development
End Jack Extended*

Contact	Operator Position	Wire Number				Function
		LS-EJNE-E	LS-EJNW-E	LS-EJSE-E	LS-EJSW-E	
1		2301	2303	2305	2307	Closed at extended
2		2108	2112	2116	2120	Open at extended

Not extended Extended

*Limit Switch Contact Development
End Seat Actuator Pulled Limit Switches*

Contact	Operator Position	Wire Number				Function
		LS-ESNE-P	LS-ESNW-P	LS-ESSE-P	LS-ESSW-P	
1						Closed at pulled
2		2123	2127	2131	2135	Open at pulled

Not pulled Pulled

*Limit Switch Contact Development
End Seat Actuator Driven Limit Switches*

Contact	Operator Position	Wire Number				Function
		LS-ESNE-D	LS-ESNW-D	LS-ESSE-D	LS-ESSW-D	
1						Closed at driven
2		2124	2128	2132	2136	Open at driven

Not driven Driven

*Limit Switch Contact Development
End Seat Pulled Limit Switches (external Go Switch)*

Contact	Operator Position	Wire Number				Function
		LS-SNEG-P	LS-SNWG-P	LS-SSEG-P	LS-SSWG-P	
1		2224	2222	2228	2226	Closed at pulled
2						Open at pulled

Not pulled Pulled

*Limit Switch Contact Development
End Seat Driven Limit Switches (external Go Switch)*

Contact	OPERATOR POSITION	Wire Number				Function
		LS-SNEG-D	LS-SNWG-D	LS-SSEG-D	LS-SSWG-D	
1		2223	2221	2227	2225	Closed at driven
2						Open at driven

Not driven Driven

*Limit Switch Contact Development
End Jack Hand Crank Engaged*

Contact	Operator Position	Wire Number				Function
		LS-EJNE-HC	LS-EJNW-HC	LS-EJSE-HC	LS-EJSW-HC	
1		2533	2531	2537	2535	Closed at engaged
2		2027	2027	2027	2027	Open at engaged

Not engaged Hand crank engaged

*Limit Switch Contact Development
End Seat Hand Crank Engaged*

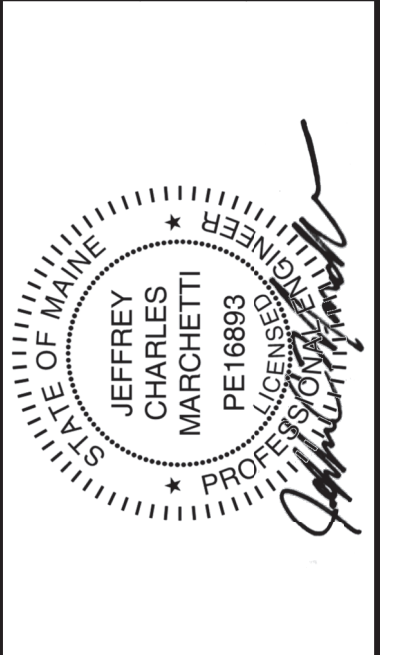
Contact	Operator Position	Wire Number				Function
		LS-ESNE-HC	LS-ESNW-HC	LS-ESSE-HC	LS-ESSW-HC	
1		2541	2539	2601	2543	Closed at engaged
2		2123	2127	2131	2135	Open at engaged

Not engaged Hand crank engaged

*Limit Switch Contact Development
Span Drive Motor Hand Crank Engaged*

Contact	Operator Position	Wire Number		Function
		LS-SDM1-HC	LS-SDM2-HC	
1		2527	2529	Closed at engaged
2		2201	2201	Open at engaged

Not engaged Hand crank engaged



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DESIGN-3-DETAILED3		
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*Span Limit Switch Contact Development
Barrier Gate Rotating Cam Limit Switch*

Contact	Operator Position	Wire Number		Function
		LS-BGN	LS-BGS	
1		2101	2104	Open at raised
2		2103	2106	Open at lowered
3		2314	2315	Closed below 80 degrees
4		2229	2232	Closed at raised
5		2230	2233	Closed at lowered
6				Spare
7				Spare
8				Spare

Lowered 80 deg Raised

*Limit Switch Contact Development
Barrier Gate Locked Limit Switch*

Contact	Operator Position	Wire Number		Function
		LS-BGNL	LS-BGSL	
1		2231	2234	Closed at barrier gate locked
2				open at barrier gate locked

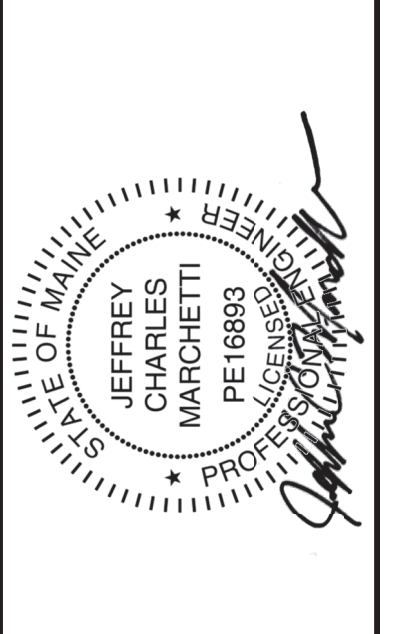
Gate not locked Gate locked

*Limit Switch Contact Development
Barrier Gate Hand Crank Limit Switch*

Contact	Operator Position	Wire Number		Function
		LS-BGN-HC	LS-BGS-HC	
1				Closed at hand crank inserted
2		2101	2104	Open at hand crank inserted

Hand crank not inserted Hand crank inserted

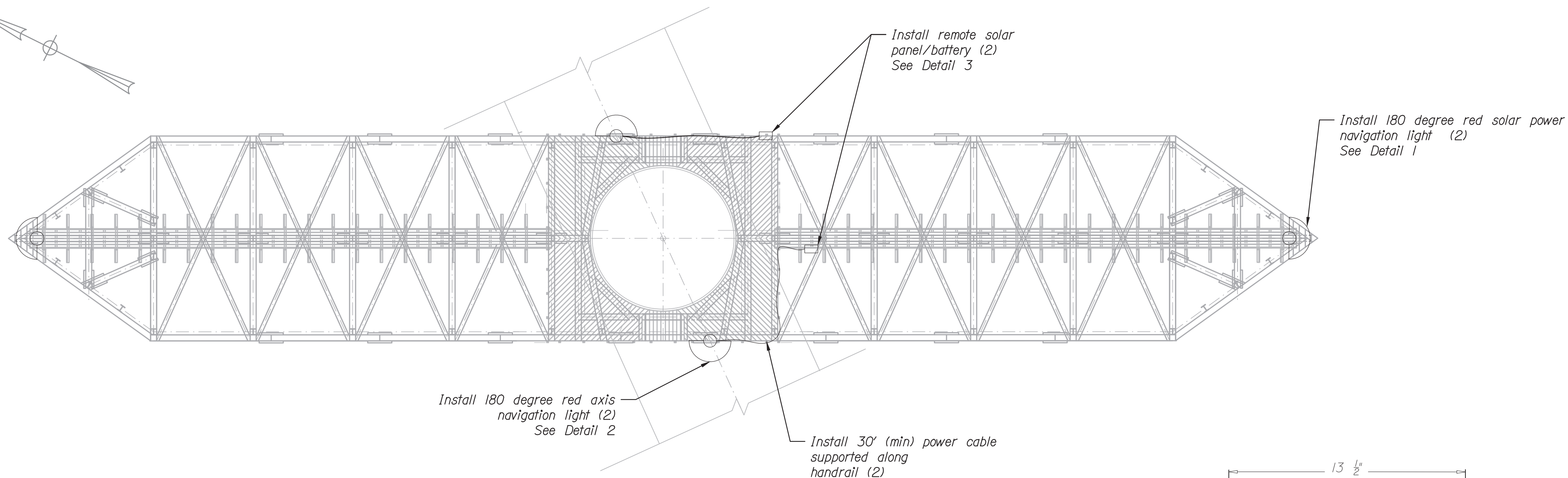
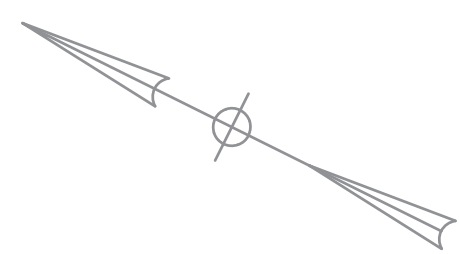
STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
STP-2175(100)
WIN 2175.100
BRIDGE NO. 2789 BRIDGE PLANS



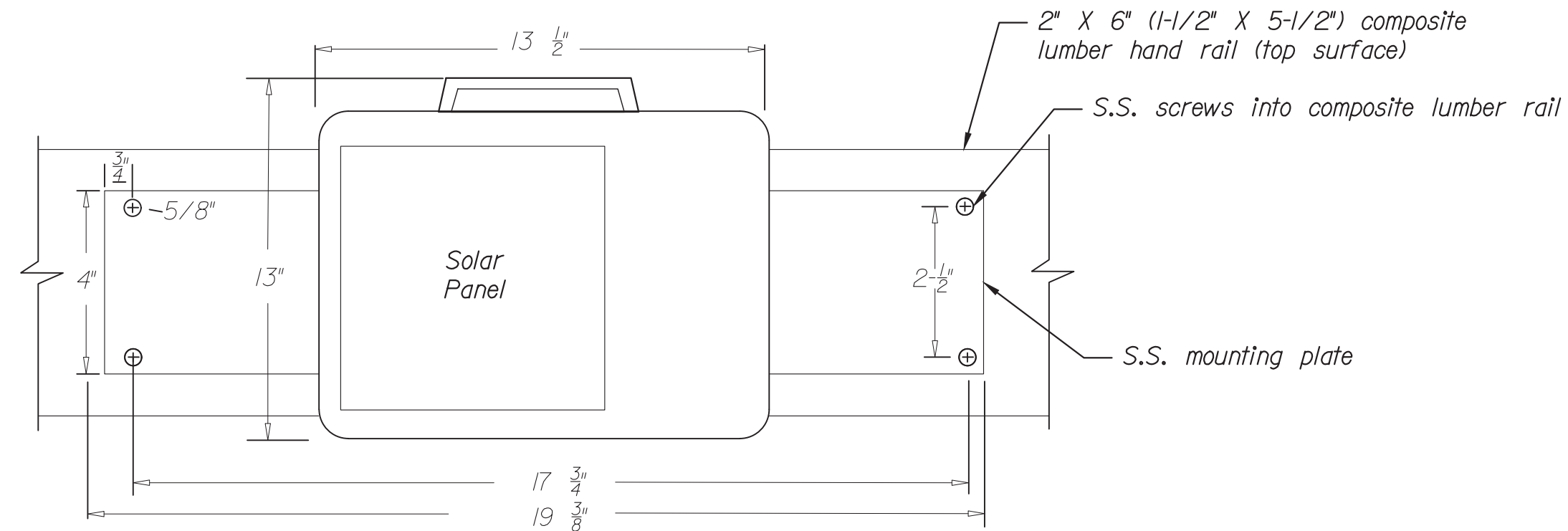
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DESIGN-3-DETAILED3			
REVISIONS 1			
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FIELD CHANGES			

SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME
LIMIT SWITCH DEVELOPMENT 3

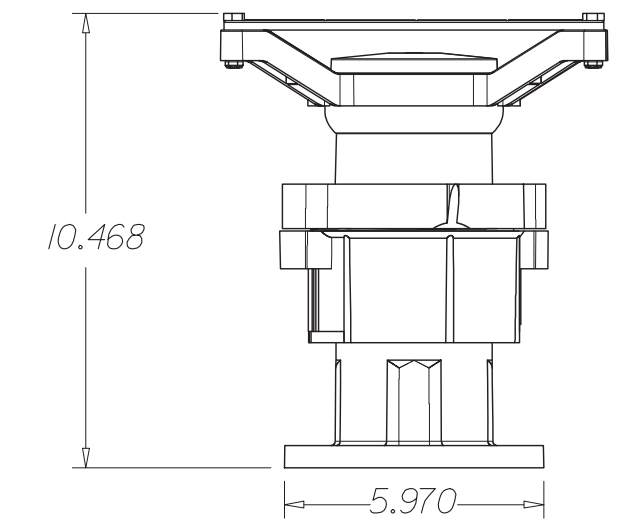
SHEET NUMBER
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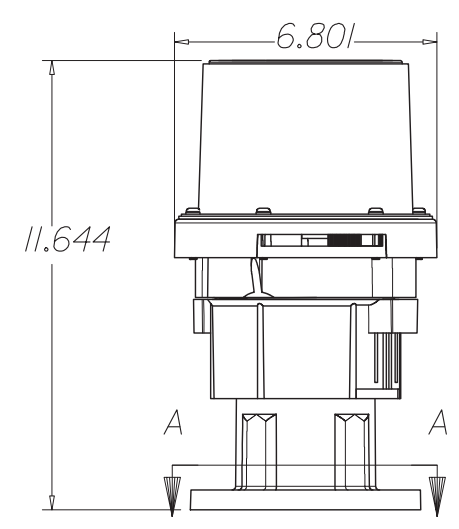
FENDER NAVIGATION LIGHT MOUNTING LOCATIONS - PLAN VIEW
Not to scale



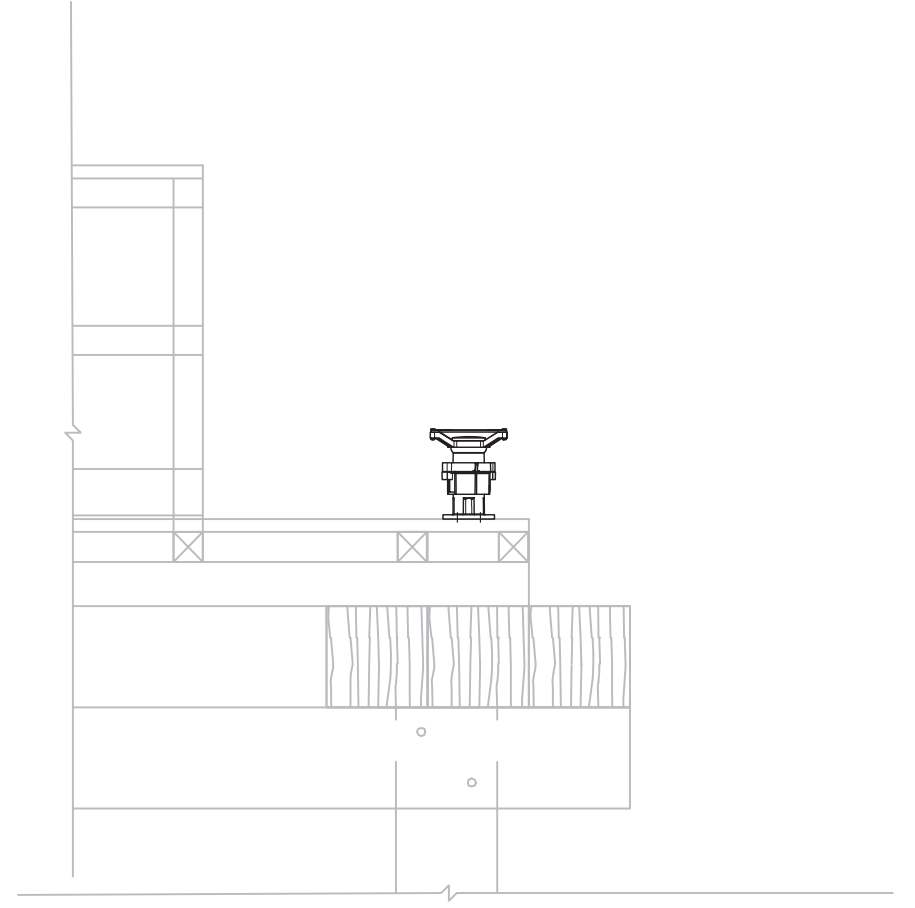
DETAIL 3: REMOTE SOLAR PANEL/BATTERY MOUNTED ON HANDRAIL - PLAN VIEW
Not to scale



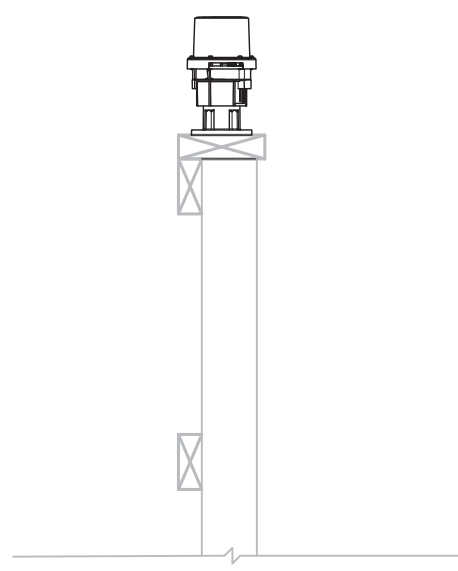
DETAIL 1: 180 DEGREE RED SOLAR POWER FENDER TIP NAVIGATION LIGHT
Not to scale



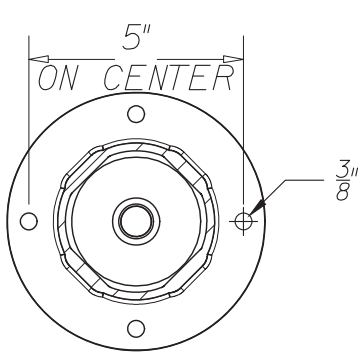
DETAIL 2: 180 DEGREE RED AXIS NAVIGATION LIGHT
Not to scale



TYPICAL NAVIGATION LIGHT FENDER TIP MOUNTING
Not to scale



TYPICAL NAVIGATION LIGHT HANDRAIL MOUNTING
Not to scale



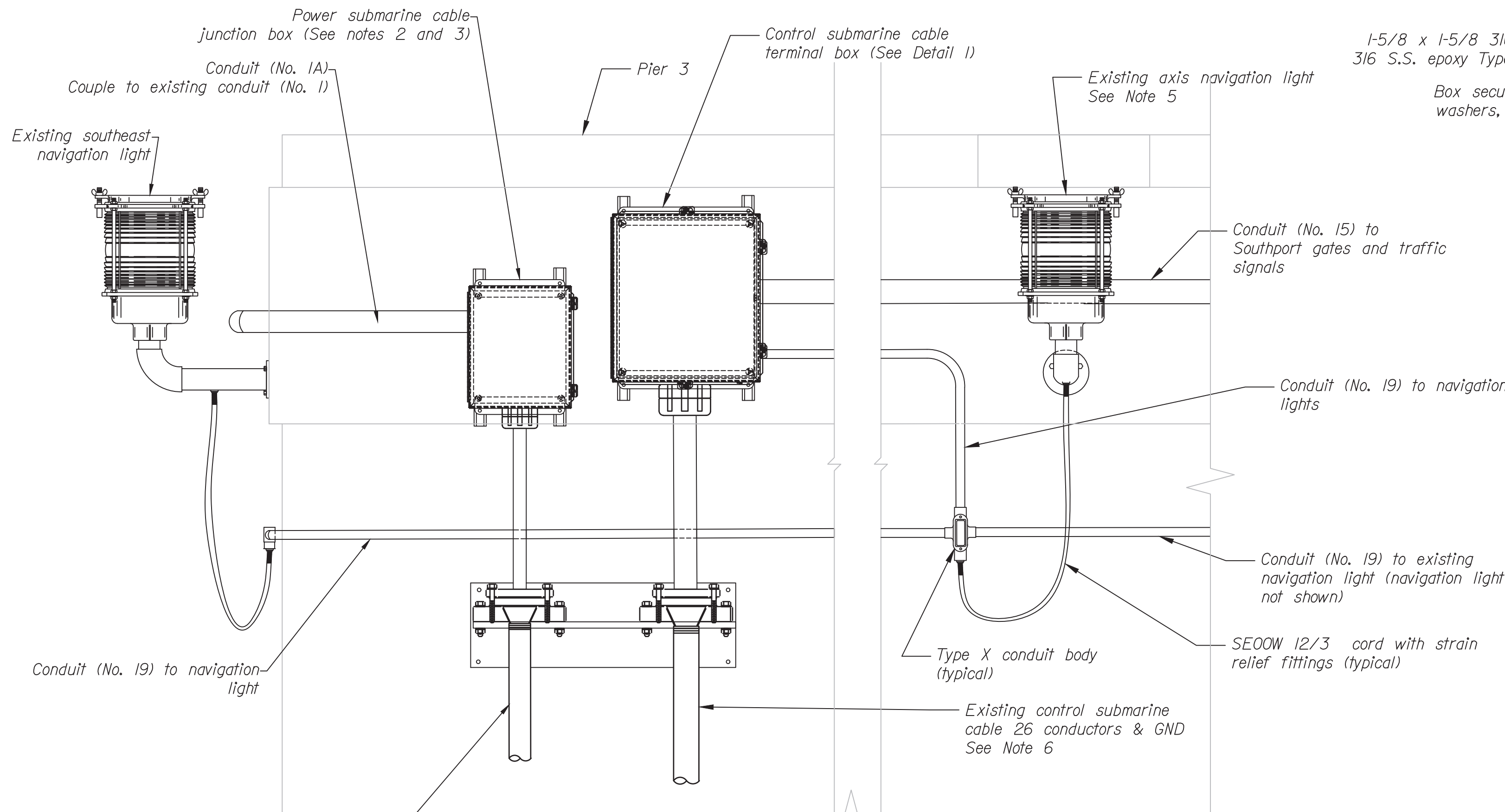
SECTION A-A: BASEPLATE
(Typical for all Pier 2 fender navigation lights)
Not to scale

NOTES:

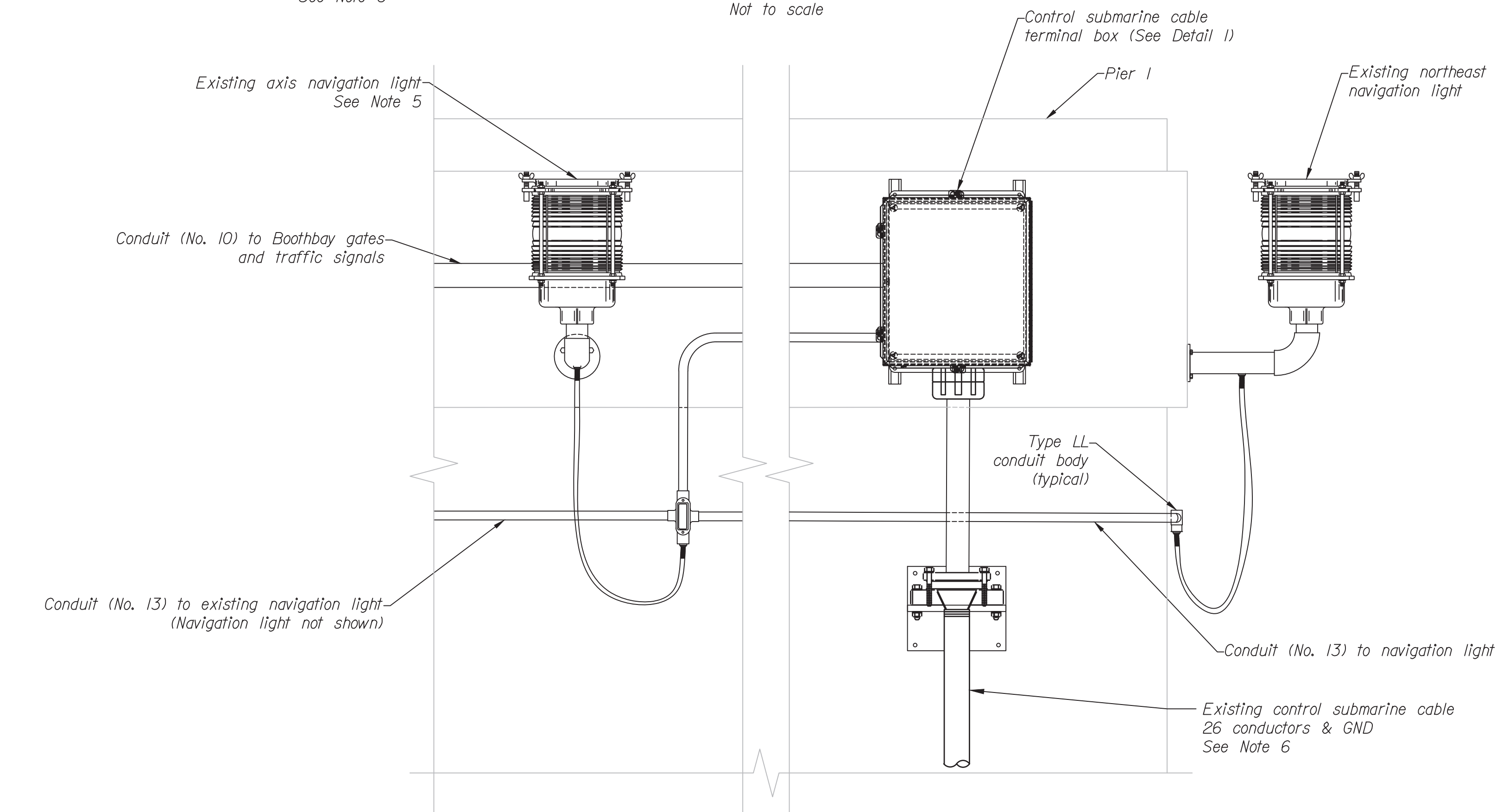
1. The Contractor shall provide two 180 degree red solar powered navigation lights shall in accordance with the Special Provisions and fastened to fender tip deck with 316 stainless steel 5/8" lag screws.
2. The Contractor shall provide two 180 degree red axis navigation lights in accordance with the special provisions and fastened to hand rail with 316 stainless steel 5/8" lag screws.
3. The Contractor shall provide two remote solar panel/battery units in accordance with the special provisions and fastened to southeast side fender hand rail with 30' (min) cable and positioned to maximize panel exposure to direct sunlight. Fasteners shall be 316 stainless steel 5/8" lag screws. The remote solar panel/battery units shall provide power through the cable to each 180 degree red axis navigation light.
4. The Contractor shall determine precise positioning of navigation lights. Navigation lights shall be positioned in accordance with 33 CFR 118 requirements.
5. The Contractor to provide bird spikes for all fender navigation lights and solar panels.
6. The Contractor shall provide new electrical connections to the existing wired navigation lights on the upper chord, Pier 1, and Pier 3. See sheet E34 for Pier 1 and Pier 3 navigation light details.



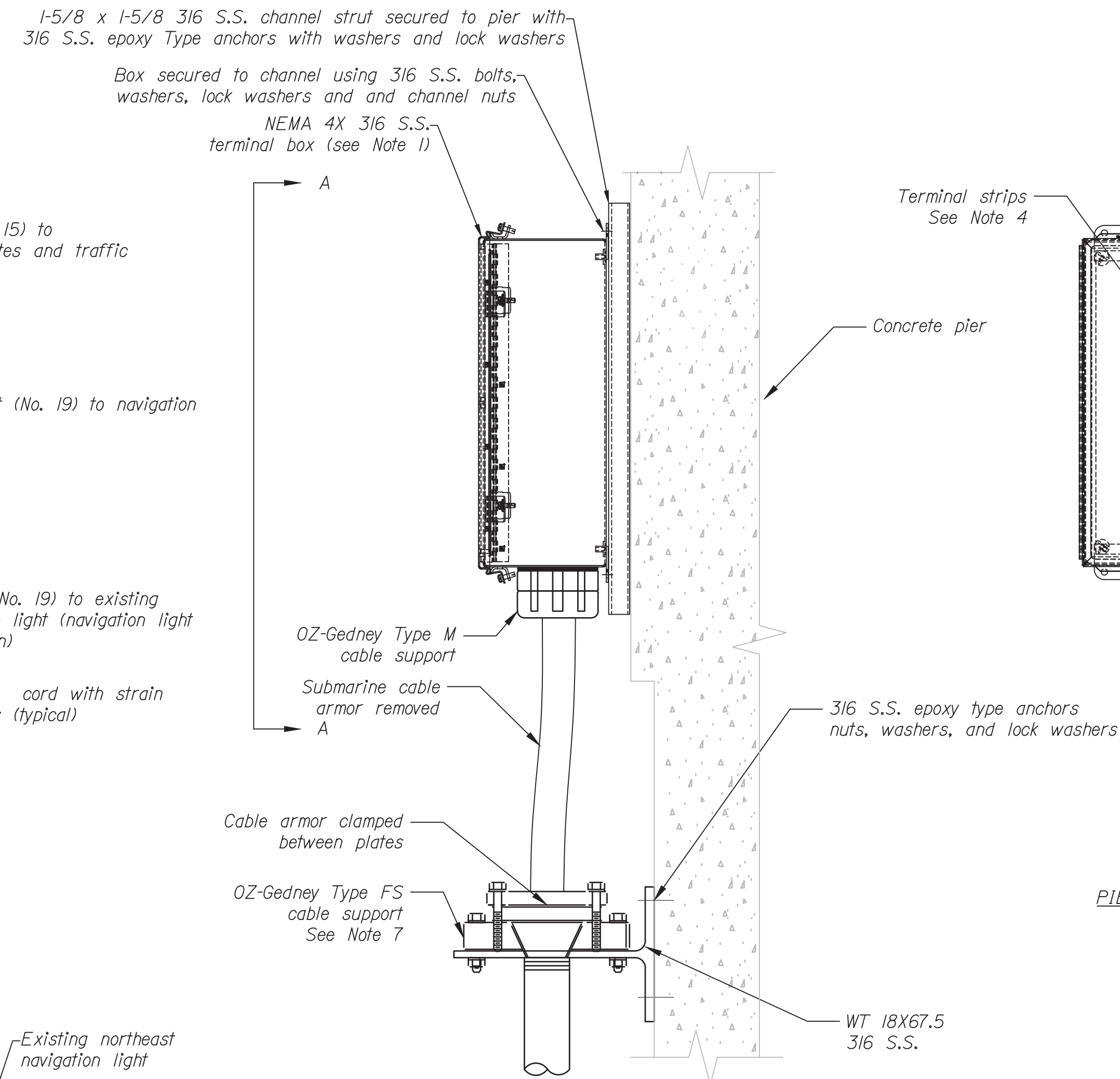
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DESIGN-2-DETAILED2		
DESIGN-3-DETAILED3		
REVISIONS 1		
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REVISIONS 3		
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FIELD CHANGES		



PIER 3 BOX/CONDUIT LAYOUT
ELEVATION
Not to scale



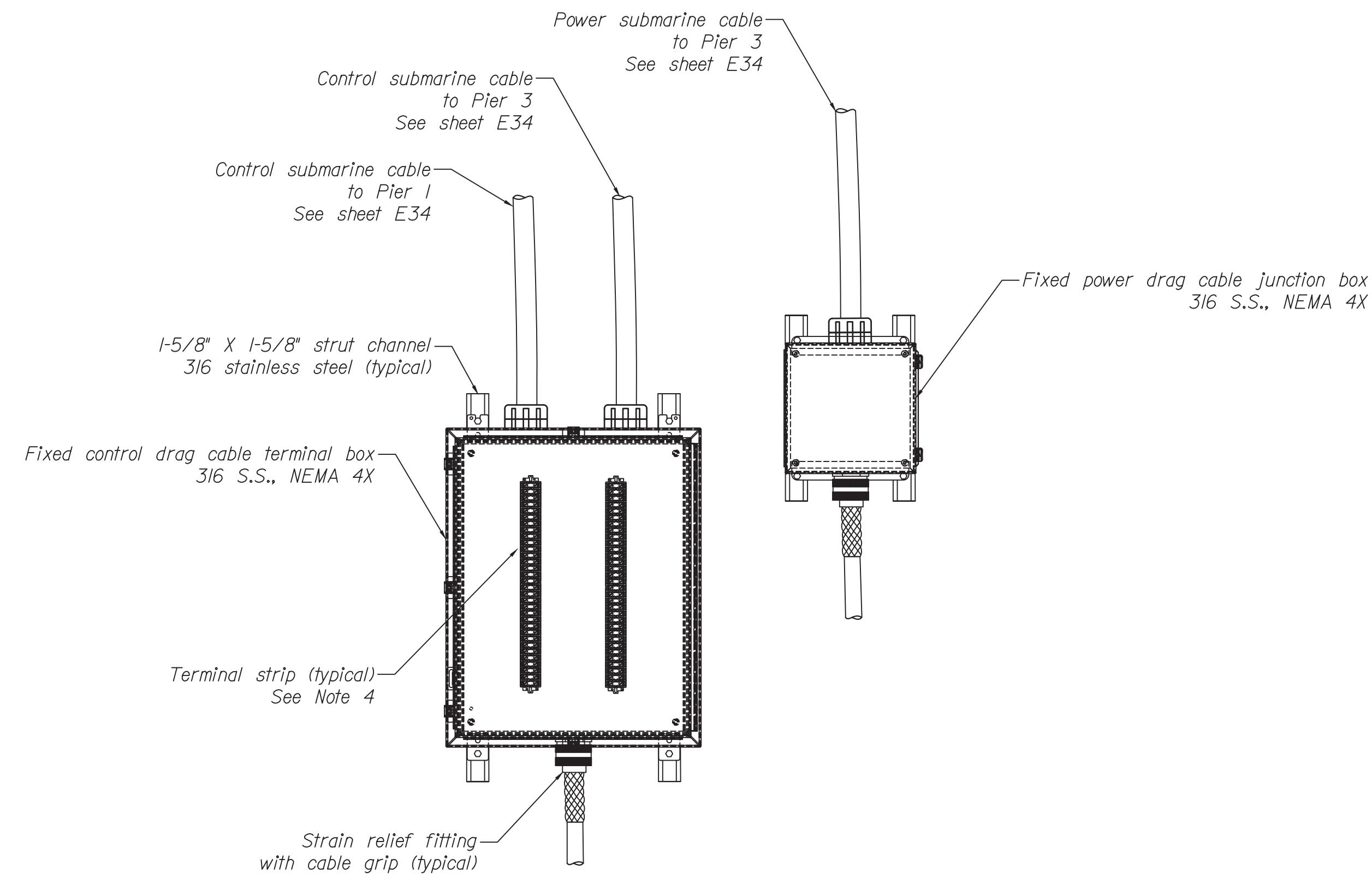
PIER 1 BOX/CONDUIT LAYOUT
ELEVATION
Not to scale



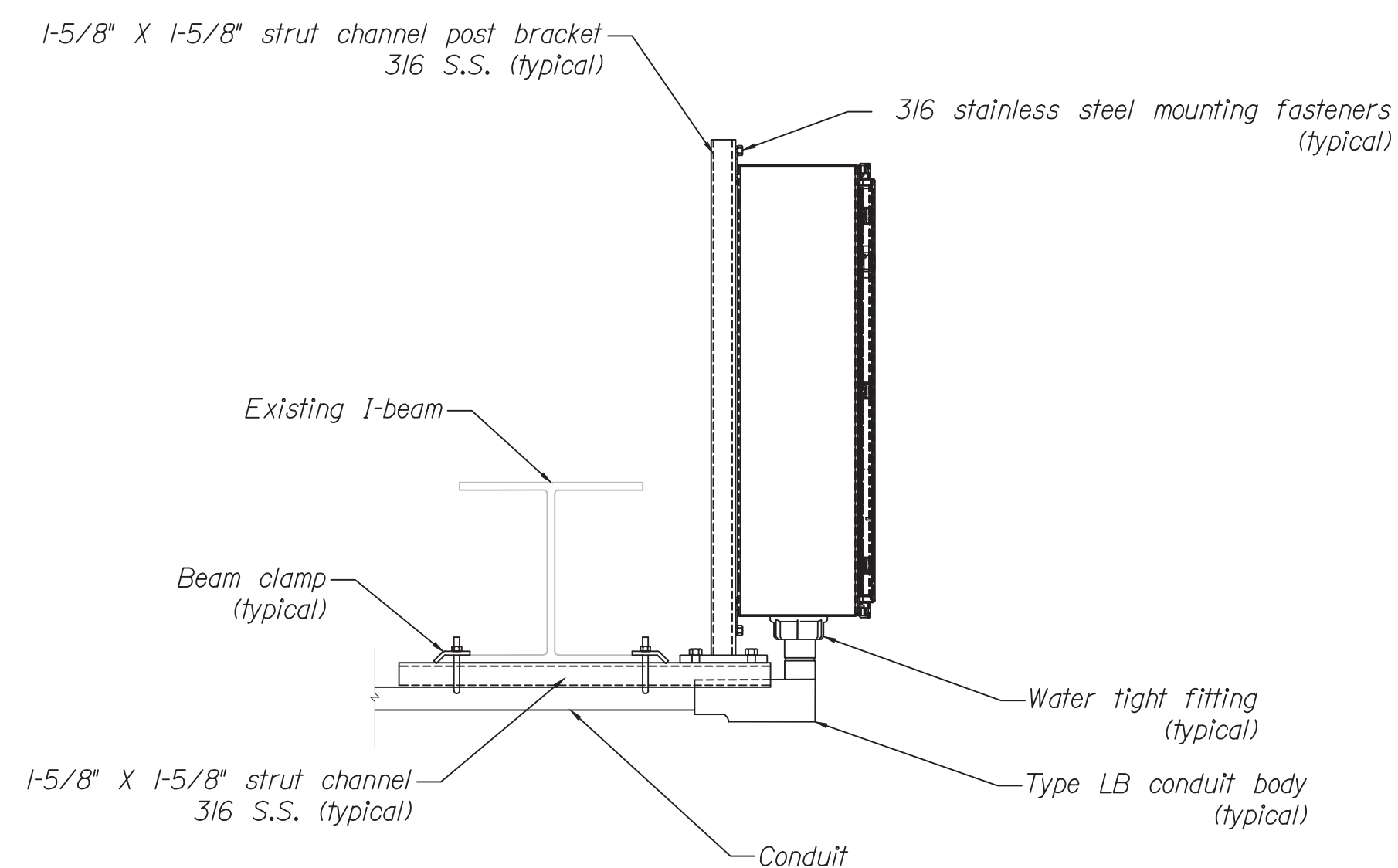
DETAIL 1: PIER 3 CONTROL SUBMARINE CABLE
TERMINAL BOX MOUNTING DETAIL (TYPICAL)
Not to scale

- NOTES:
1. The Contractor shall provide a power junction box and control terminal box (sized by contractor). Each shall contain a breather/drain (not shown). The Contractor shall determine the precise position of each box. The Contractor shall remove existing boxes. Power junction box to contain waterproof compression splices for all conductors.
 2. Power junction box mounted similar to control terminal box.
 3. The Contractor shall provide terminal strips in accordance with the special provisions.
 4. Existing Pier 1 and Pier 3 existing navigation lights to be reused. Each pier has a single navigation light mounted to the fender guard rail which shall be carefully removed during fender demolition and re-installed on replacement fender. The Contractor shall provide new conduit and cord to each light.
 5. Existing submarine cables shall be cut back as required to interface with new terminal/junction boxes. Cable armor shall be carefully cut back to fit the armor cable supports. Care shall be taken to remove only the length of cable/armor necessary.
 6. The Contractor shall provide armor cable supports in accordance with the special provisions. Armor cable supports shall be located above Pier 1 and Pier 3 fender decks. Cable armor shall be clamped within support such that the weight of the cable rests on the support with no strain at the terminal/junction box. All armor cable support fasteners shall be 316 stainless steel.
 7. All equipment shown is new unless otherwise noted.
 8. The Contractor shall provide conduit supports (not shown) in accordance with AASHTO LRFD Movable Bridge Design Specifications, using those supports provided by the conduit manufacturer. The Contractor shall install conduit using the conduit manufacturer recommended tools and supports. Care shall be taken to select supports that will protect the conduit PVC coating. The Contractor shall repair any damage to conduit PVC coating in accordance with the conduit manufacturer instructions and using the conduit manufacturer recommended products.

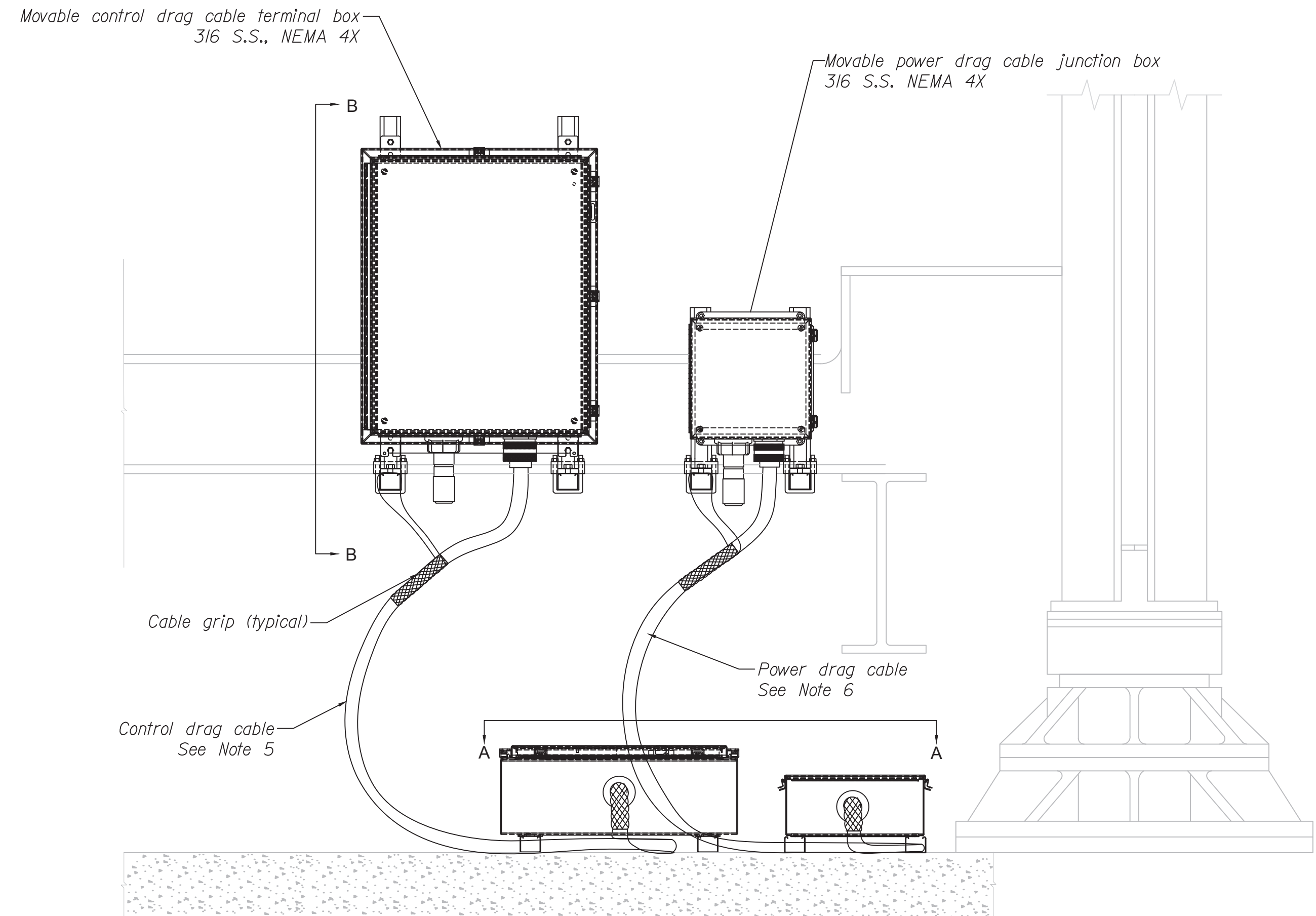
STATE OF MAINE DEPARTMENT OF TRANSPORTATION		STP-2175(100)		BRIDGE NO. 2789		BRIDGE PLANS	
SOUTHPORT BRIDGE ROUTE 27 OVER TOWNSEND GUT SOUTHPORT & BOOTHBAY HARBOR ME LINCOLN COUNTY		SUBMARINE CABLE AND TERMINAL BOX DETAIL 1		SHEET NUMBER		E34	
PROJ. MANAGER J. STETSON, PE		DATE		BY		FIELD CHANGES	
DESIGN-DETAILED	CHECKED-REVIEWED	DESIGN-2-DETAILED2	DESIGN-3-DETAILED3	REVISIONS 1	REVISIONS 2	REVISIONS 3	REVISIONS 4
JEFFREY CHARLES MARCHETTI PE 16893 REGISTERED PROFESSIONAL ENGINEER							
WIN		2175.100					



SECTION A-A: FIXED DRAG CABLE BOXES
Not to scale



SECTION B-B: TERMINAL BOX MOUNTING DETAIL
See Note 7
Not to scale



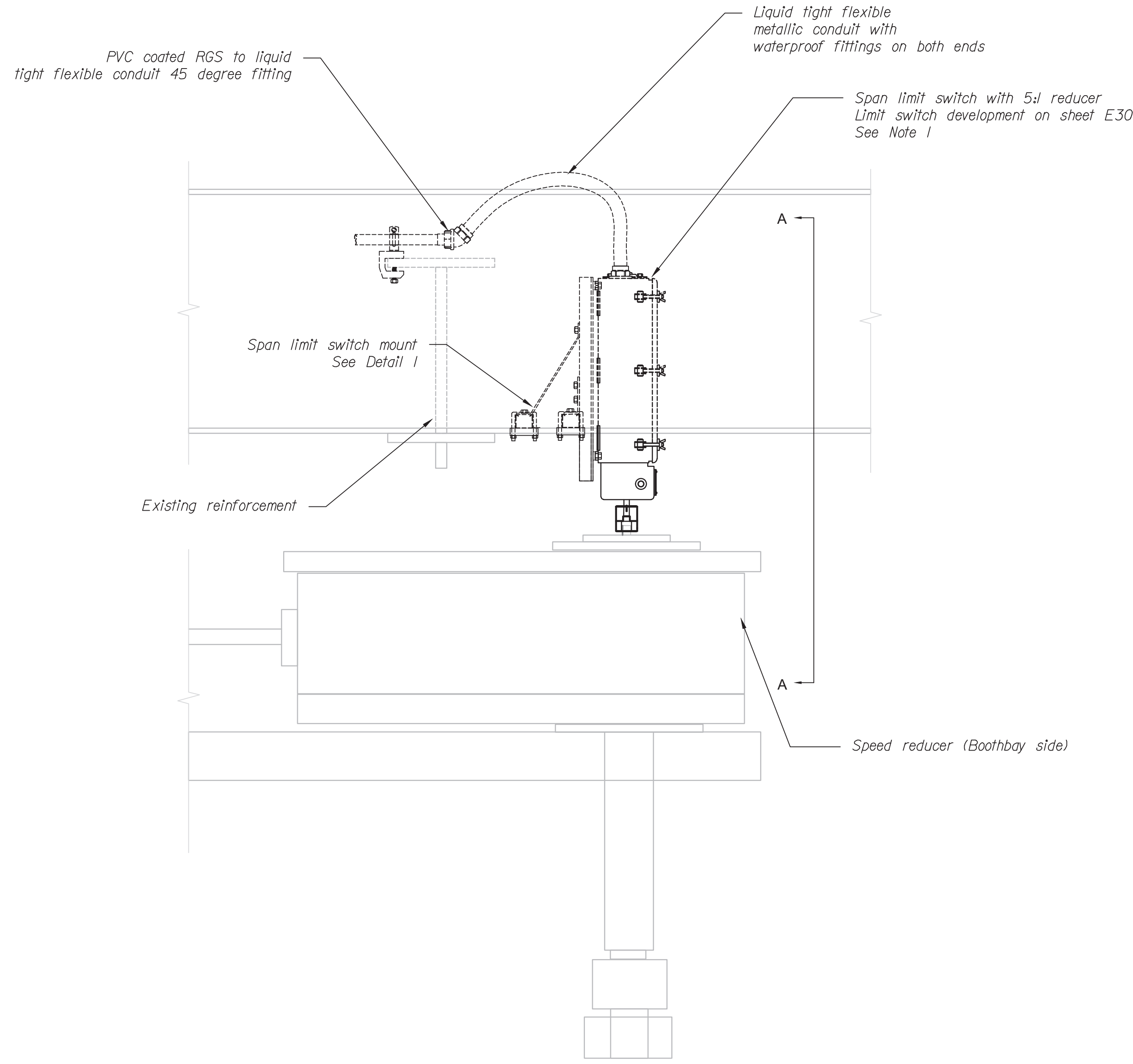
DRAG CABLE TERMINAL/JUNCTION BOX ARRANGEMENT DETAIL
Not to scale

NOTES:

1. The Contractor shall provide power junction boxes and control terminal boxes. These shall be sized by the contractor and each shall include breather/drain (not shown). Precise position of the movable boxes to be determined by the Contractor. The fixed boxes shall be located in the position of the existing fixed boxes and adjusted as necessary to interface with the existing submarine cables.
2. Power junction box to contain waterproof compression splices for all conductors
3. Power junction box mounted similar to control terminal box.
4. The Contractor shall provide two terminal strips in accordance with the special provisions.
5. The Contractor shall provide a control drag cable in accordance with the special provisions and conduit schedule (sheet E39). The Contractor shall provide cable with 53 (minimum) conductors, a single bare ground conductor, and of sufficient length to open bridge to 90 degrees without damage or strain to cable. The Contractor may provide two control drag cables (minimum of 27 conductors and single bare ground conductor each) instead of a single control drag cable if necessary for reduced cable size and improved cable flexibility. Train cable(s) for minimum motion and contact along pier surface.
6. The Contractor shall provide a power drag cable in accordance with the special provisions and the conduit schedule (see sheet E39). The Contractor shall provide cable of sufficient length to open bridge to 90 degrees without damage or strain to cable. Train cable for minimum motion and contact along pier surface.
7. The Contractor may provide alternative mounting configuration with Department approval.
8. The Contractor shall provide one spare power drag cable and one spare control drag cable cut to length.
9. All equipment is new unless otherwise noted.
10. All fittings and hardware shall be 316 stainless steel.



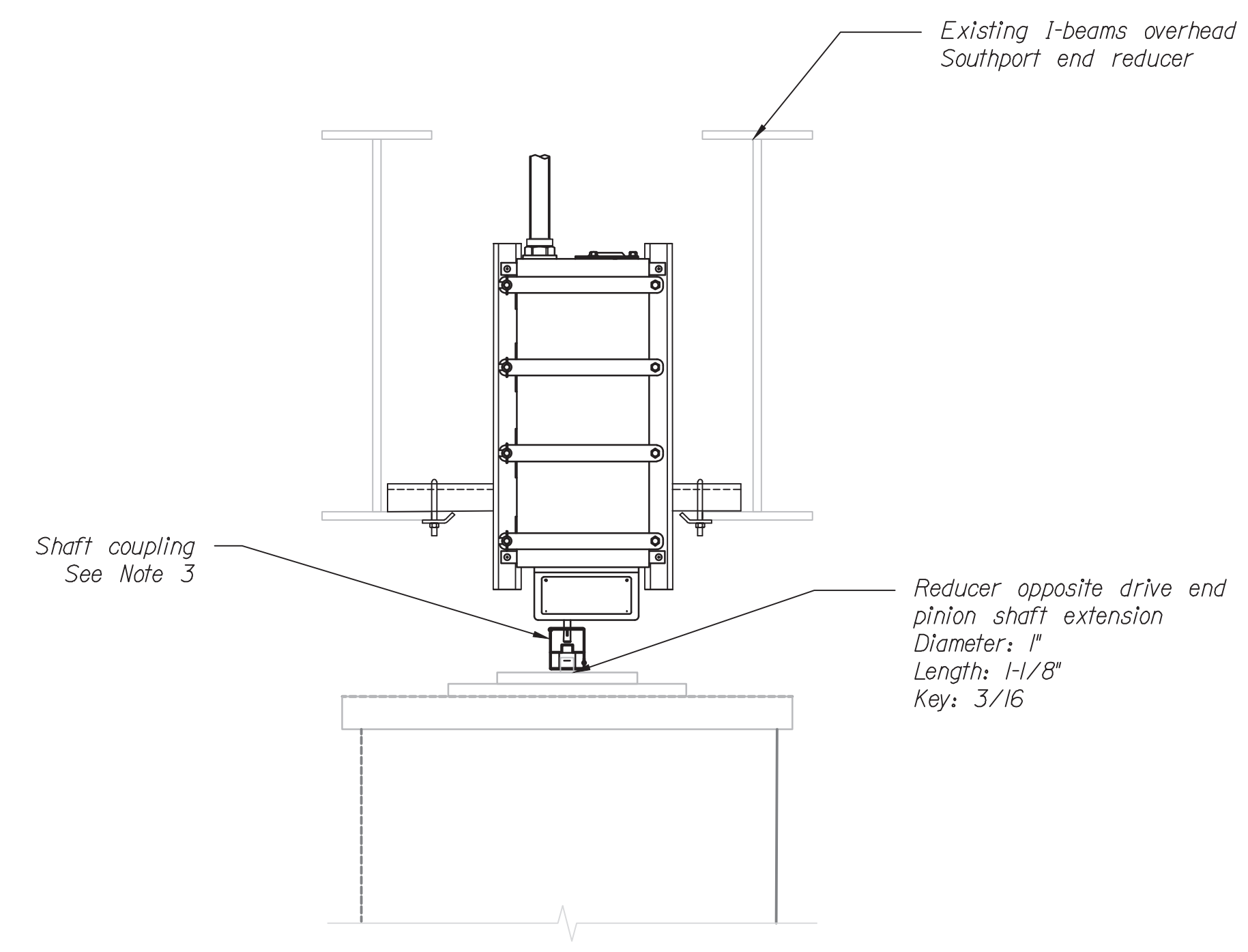
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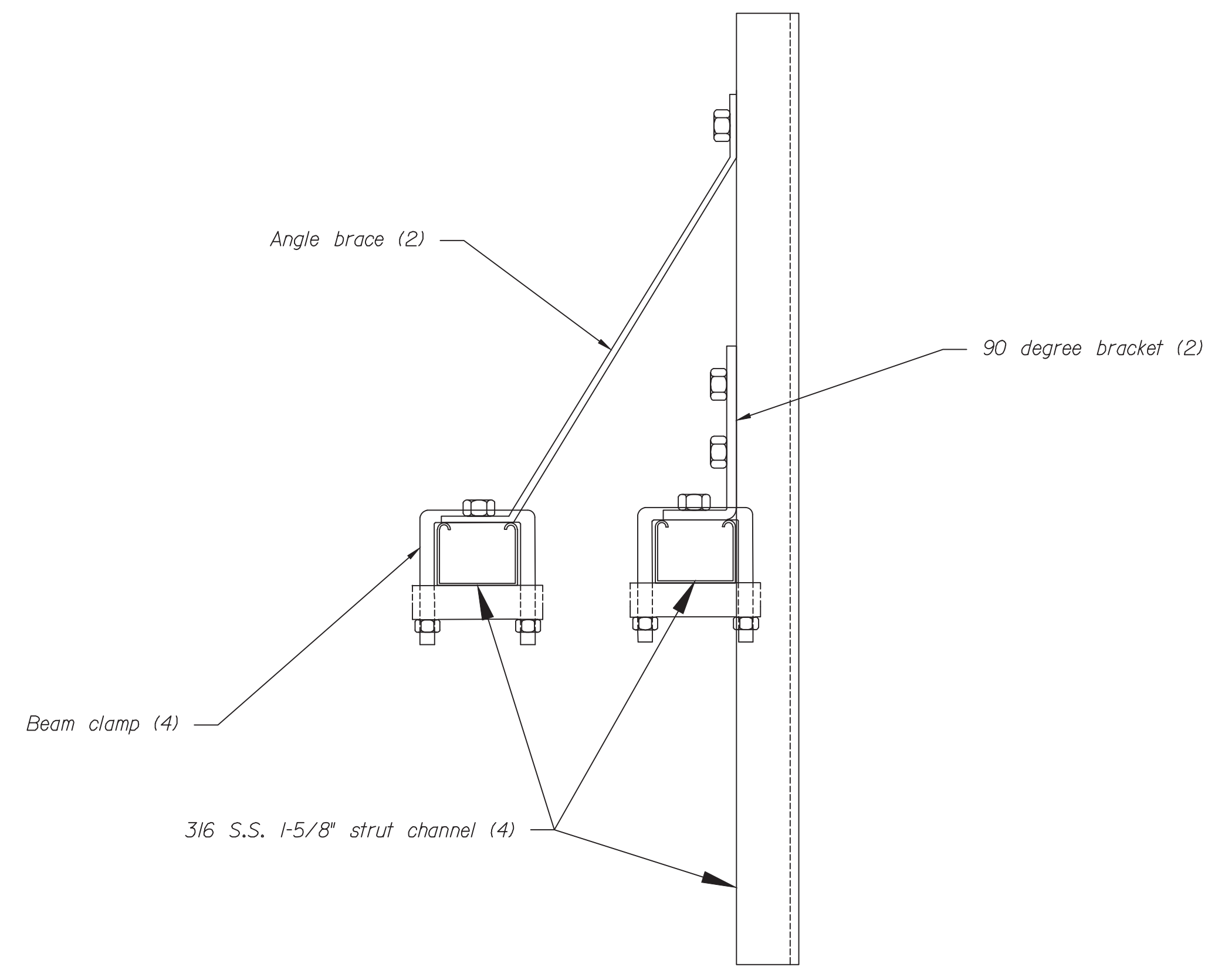
SPAN LIMIT SWITCH
Not to scale

Notes:

1. The Contractor shall provide a NEMA 4X rotating cam type span limit switch with a 4-20mA encoder built into enclosure. Install span limit switch above the Boothbay side speed reducer. See Special Provisions.
2. Span limit switch mount materials shall be 316 stainless steel, including fasteners. The Contractor may provide an alternative mounting configuration with Department approval.
3. The Contractor shall couple span limit switch shaft to the speed reducer shaft with a zero backlash type coupling in accordance with the Special Provisions.

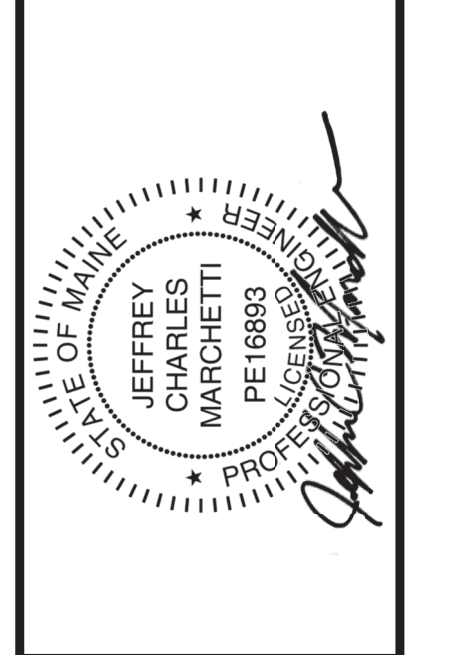


SECTION A-A: SPAN LIMIT SWITCH AND COUPLING
Not to scale



DETAIL 1: SPAN LIMIT SWITCH MOUNT
See Note 2
Not to scale

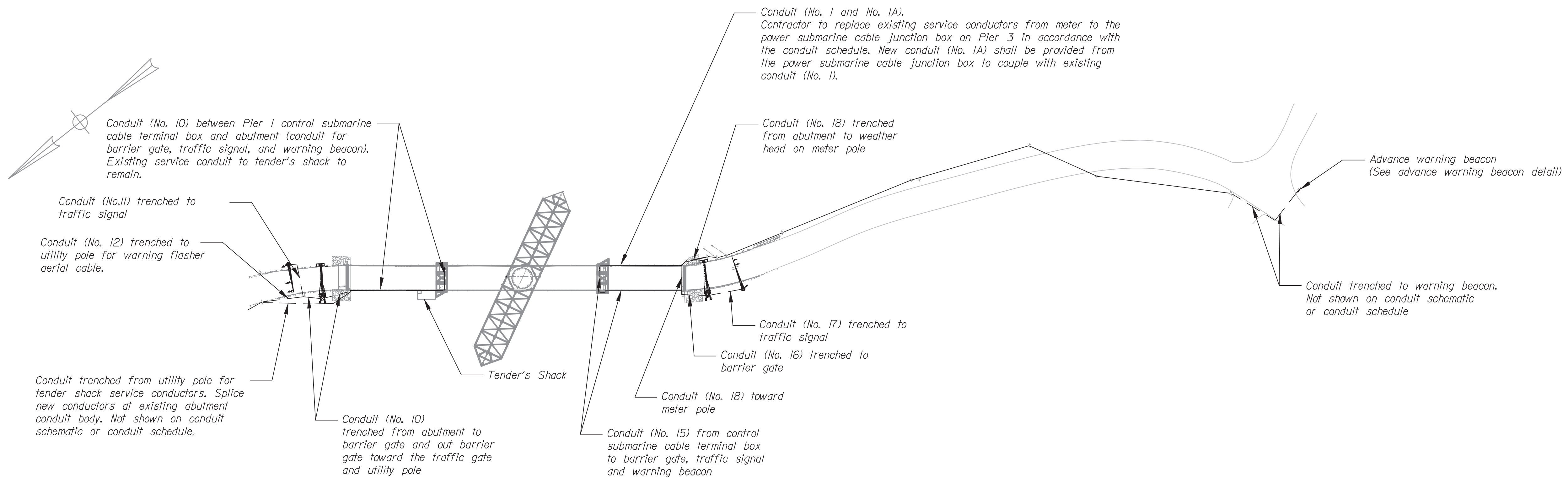
STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
STP-2175(100)
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BRIDGE PLANS



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DESIGN3-DETAILED3		
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REVISIONS 4		
FIELD CHANGES		

SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME
SPAN LIMIT SWITCH DETAIL

SHEET NUMBER
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CONDUIT LAYOUT
PLAN VIEW
Not to scale

NOTES:

1. Conduit trench shall be in accordance with current MaineDOT Standard Specifications and Standard Details.
2. Conduit for barrier gate, traffic signal, and advance warning beacon to be trenched from abutment with stub up through barrier gate foundation and trenched to utility pole for warning beacon aerial cable and also trenched to traffic signal pole. Conduit includes all conductors for barrier gate, traffic signal, and beacon.
3. Aerial cables and trenched conduit to advance warning beacon conduit not shown on conduit schematic and conduit schedule, but shall be trenched from nearest utility pole to the advance warning beacon.
4. Conduit on swing span not shown.
5. Pier 1 and Pier 3 navigation light conduit not shown. See sheet E34.

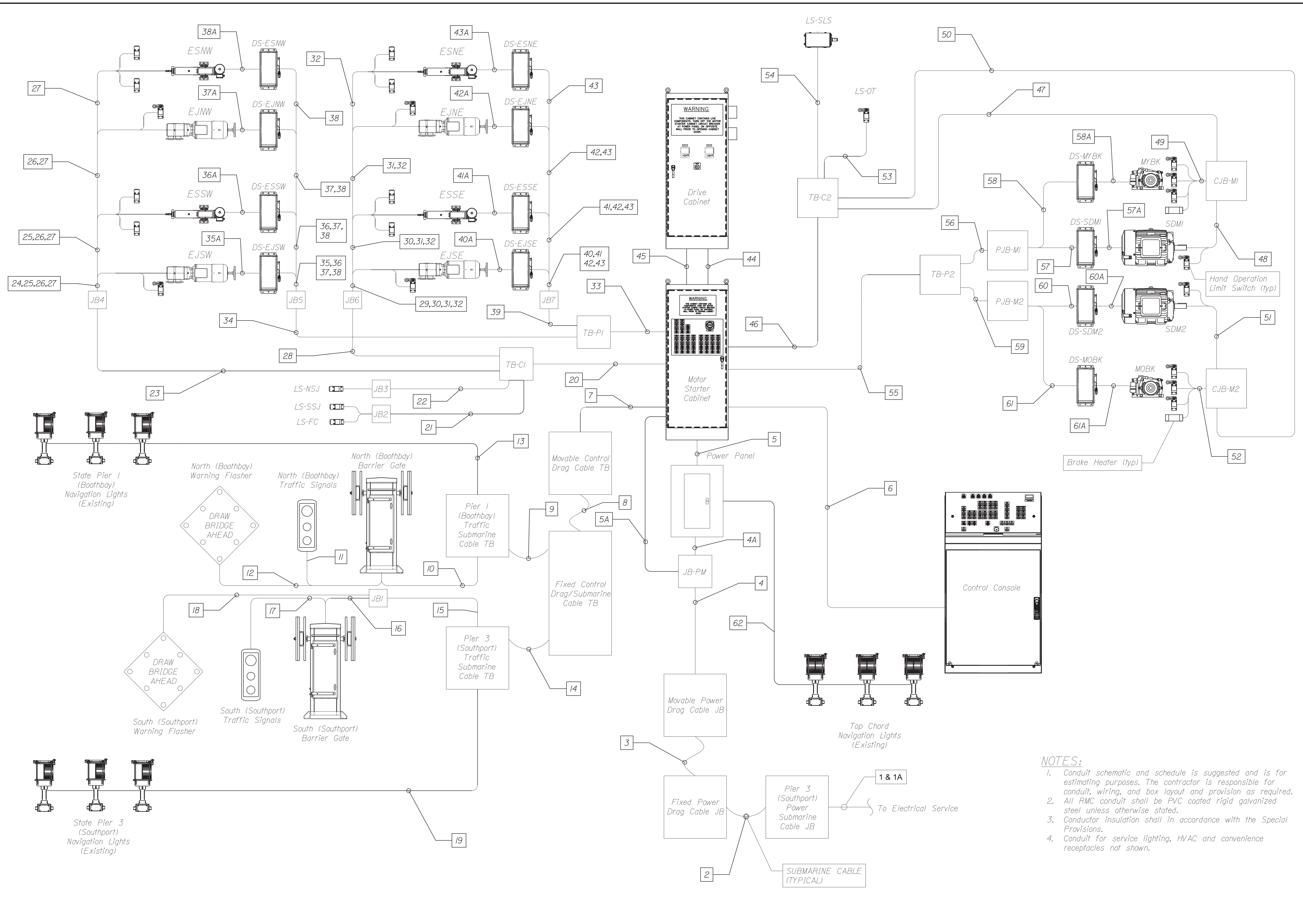
STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
STP-2175(100)
BRIDGE NO. 2789 WIN 21751.00 BRIDGE PLANS



PROJ. MANAGER	J. STETSON, PE	DATE
DESIGN-DETAILED		
CHECKED-REVIEWED		
DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
REVISIONS 1		
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REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME
CONDUIT LAYOUT

SHEET NUMBER
E37
OF 48



- NOTES:**
1. Conduit schematic and schedule is suggested and is for estimating purposes. The contractor is responsible for conduit, wiring, and box layout and provision as required.
 2. All RMC conduit shall be PVC coated rigid galvanized steel unless otherwise stated.
 3. Conductor insulation shall in accordance with the Special Provisions.
 4. Conduit for service lighting, HVAC and convenience receptacles not shown.

STATE OF MAINE																															
DEPARTMENT OF TRANSPORTATION																															
STP-2175(100)																															
BRIDGE NO. 2789	WIN 21751.00																														
BRIDGE PLANS																															
SOUTHPORT BRIDGE ROUTE 27 OVER TOWNSEND GUT SOUTHPORT & BOOTHBAY HARBOR ME	LINCOLN COUNTY CONDUIT SCHEMATIC																														
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>PROJ. MANAGER</th> <th>J. STETSON, PE</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>DESIGN-DETAILED</td> <td></td> <td></td> </tr> <tr> <td>CHECKED-REVIEWED</td> <td></td> <td></td> </tr> <tr> <td>DESIGN-2-DETAILED2</td> <td></td> <td></td> </tr> <tr> <td>DESIGN-3-DETAILED3</td> <td></td> <td></td> </tr> <tr> <td>REVISIONS 1</td> <td></td> <td></td> </tr> <tr> <td>REVISIONS 2</td> <td></td> <td></td> </tr> <tr> <td>REVISIONS 3</td> <td></td> <td></td> </tr> <tr> <td>REVISIONS 4</td> <td></td> <td></td> </tr> <tr> <td>FIELD CHANGES</td> <td></td> <td></td> </tr> </tbody> </table>		PROJ. MANAGER	J. STETSON, PE	DATE	DESIGN-DETAILED			CHECKED-REVIEWED			DESIGN-2-DETAILED2			DESIGN-3-DETAILED3			REVISIONS 1			REVISIONS 2			REVISIONS 3			REVISIONS 4			FIELD CHANGES		
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CONDUIT NUMBER	FROM	TO	NUMBER OF CONDUITS	CONDUIT SIZE	CONDUIT TYPE	NO. AND SIZE OF CONDUCTORS	GND	SPARE CONDUCTORS	COMMENT
35	JB5	DS-EJSW	1	1	RMC	(2) #12; (3) #6	(1) #12	N/A	EJSW Power, Disconnect Auxiliary Contact
35A	DS-EJSW	EJSW	1	1	RMC/LFMC	(3) #6	(1) #12	N/A	EJSW Power
36	JB5	DS-ESSW	1	1	RMC	(5) #12	(1) #12	N/A	ESSW Power, Disconnect Auxiliary Contact
36A	DS-ESSW	ESSW	1	1	RMC/LFMC	(3) #12	(1) #12	N/A	ESSW Power
37	JB5	DS-EJNW	1	1	RMC	(2) #12; (3) #6	(1) #12	N/A	EJNW Power, Disconnect Auxiliary Contact
37A	DS-EJNW	EJNW	1	1	RMC/LFMC	(3) #6	(1) #12	N/A	EJNW Power
38	JB5	DS-ESNW	1	1	RMC	(5) #12	(1) #12	N/A	ESNW Power, Disconnect Auxiliary Contact
38A	DS-ESNW	ESNW	1	1	RMC/LFMC	(3) #12	(1) #12	N/A	ESNW Power
39	TB-P1	JB7	1	1.5	RMC	(14) #12; (6) #6	(1) #10	N/A	East End Machinery Power Conductors, Disconnect Auxiliary Contacts
40	JB7	DS-EJSE	1	1	RMC	(2) #12; (3) #6	(1) #12	N/A	EJSE Power, Disconnect Auxiliary Contact
40A	DS-EJSE	EJSE	1	1	RMC/LFMC	(3) #6	(1) #12	N/A	EJSE Power
41	JB7	DS-ESSE	1	1	RMC	(5) #12	(1) #12	N/A	ESSE Power, Disconnect Auxiliary Contact
41A	DS-ESSE	ESSE	1	1	RMC/LFMC	(3) #12	(1) #12	N/A	ESSE Power
42	JB7	DS-EJNE	1	1	RMC	(2) #12; (3) #6	(1) #12	N/A	EJNE Power, Disconnect Auxiliary Contact
42A	DS-EJNE	EJNE	1	1	RMC/LFMC	(3) #6	(1) #12	N/A	EJNE Power
43	JB7	DS-ESNE	1	1	RMC	(5) #12	(1) #12	N/A	ESNE Power, Disconnect Auxiliary Contact
43A	DS-ESNE	ESNE	1	1	RMC/LFMC	(3) #12	(1) #12	N/A	ESNE Power
44	Motor Starter Cabinet	Drive Cabinet	1	1.5 (Estimated)	RMC	(30) #12 (Estimated); (2) 3TSP Encoder Cable	N/A	(6) #12 (Estimated)	Span Drive Cabinet Control System Relays; Encoder Feedback
45	Motor Starter Cabinet	Drive Cabinet	1	1	RMC	(3) #3; (6) #8	(1) #3	N/A	Span Drive Input/Output Power
46	Motor Starter Cabinet	TB-C2	1	1.5	RMC	(30) #12; (2) 3TSP	(1) #12	(6) #12	LS-SLS, LS-OT, Brake Limit Switches/Heater, Motor Encoder Feedback
47	TB-C2	CJB-M1	1	1	RMC	(12) #12; (1) 3TSP	(1) #12	(2) #12	MYBK Limit Switches/HTR, SDM1 Encoder, Span Motor Manual Operation Limit Switch
48	CJB-M1	SDM1 (Encoder)	1	1	RMC/SOOW	(2) #12; (1) 3TSP	N/A	N/A	SDM1 Encoder, Manual Operation Limit Switch
49	CJB-M1	MYBK (Limit Switches/HTR)	1	1	RMC/LFMC	(10) #12	(1) #12	(2) #12	MYBK Limit Switches; Heater
50	TB-C2	CJB-M2	1	1	RMC	(12) #12; (1) 3TSP	(1) #12	(2) #12	MOBK Limit Switches/HTR, SDM2 Encoder, Span Motor Manual Operation Limit Switch
51	CJB-M2	SDM2 (Encoder)	1	1	RMC/SOOW	(2) #12; (1) 3TSP	N/A	N/A	SDM2 Encoder, Manual Operation Limit Switch
52	CJB-M2	MOBK (Limit Switches/HTR)	1	1	RMC/LFMC	(10) #12	(1) #12	(2) #12	MOBK Limit Switches; Heater
53	TB-C2	LS-OT	1	1	RMC/LFMC	(4) #12	(1) #12	(2) #12	Overtravel Limit Switch
54	TB-C2	LS-SLS	1	1	RMC	(13) #12	(1) #12	(3) #12	Span Limit Switch, Span Position Transmitter Power & Output
55	Motor Starter Cabinet	TB-P2	1	2	RMC	(6) #6; (12) #12	(1) #8	(3) #12	Motor/Brake Power, Heater, Overtemp Sensor, Motor Disconnect Switch Auxiliary Contacts
56	TB-P2	PJB-M1	1	1.5	RMC	(3) #6; (9) #12	(1) #8	(2) #12	Motor/Brake Power, Heater, Overtemp Sensor, Motor Disconnect Switch Auxiliary Contacts
57	PJB-M1	DS-SDM1	1	1	RMC	(3) #6; (6) #12	(1) #8	(2) #12	SDM1 Motor Power, Heater, Overtemp Sensor, Motor Disconnect Switch Auxiliary Contact
57A	DS-SDM1	SDM1	1	1	RMC/LFMC	(3) #6; (4) #12	(1) #8	(2) #12	SDM1 Motor Power, Heater, Overtemp Sensor
58	PJB-M1	DS-MYBK	1	1	RMC	(3) #12	(1) #12	N/A	MYBK Power
58A	DS-MYBK	MYBK	1	1	RMC/LFMC	(3) #12	(1) #12	N/A	MYBK Power
59	TB-P2	PJB-M2	1	1.5	RMC	(3) #6; (9) #12	(1) #8	(2) #12	Motor/Brake Power, Heater, Overtemp Sensor, Motor Disconnect Switch Auxiliary Contact
60	PJB-M2	DS-SDM2	1	1	RMC	(3) #6; (6) #12	(1) #8	(2) #12	SDM2 Motor Power, Heater, Overtemp Sensor, Motor Disconnect Switch Auxiliary Contact
60A	DS-SDM2	SDM2	1	1	RMC/LFMC	(3) #6; (4) #12	(1) #8	(2) #12	SDM2 Motor Power, Heater, Overtemp Sensor
61	PJB-M2	DS-MOBK	1	1	RMC	(3) #12	(1) #12	N/A	MOBK Power
61A	DS-MOBK	MOBK	1	1	RMC/LFMC	(3) #12	(1) #12	N/A	MOBK Power
62	Power Panel	Top Chord Navigation Lights	1	1	RMC/LFMC	(3) #12	(1) #12	N/A	Top Chord Navigation Lights Power

STATE OF MAINE
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BRIDGE NO. 2789 WIN 21751.00 BRIDGE PLANS



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DESIGN-DETAILED		
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DESIGN2-DETAILED2		
DESIGN3-DETAILED3		
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FIELD CHANGES		

SOUTHPORT BRIDGE, ROUTE 27
OVER TOWNSEND GUT
SOUTHPORT & BOOTHBAY HARBOR ME LINCOLN COUNTY

CONDUIT SCHEDULE 2

SHEET NUMBER

E40

OF 48



PROJ. MANAGER	J. STETSON, PE
DESIGN-DETAILED	
CHECKED-REVIEWED	
DESIGN2-DETAILED2	
DESIGN3-DETAILED3	
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REVISIONS 4	
FIELD CHANGES	

SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME
POWER PANEL SCHEDULE

SHEET NUMBER

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OF 48

POWER PANEL												
CKT. NO	SERVICE	LOAD (W)			TRIP (A)			LOAD (W)			SERVICE	CKT. NO.
		A	B	C	A	B	C	A	B	C		
1					X			20	300		UPPER CHORD NAV LIGHTS	2
3	BOOTHBAY BARRIER GATE MOTOR POWER	2700			20	X		20		300	BOOTHBAY PIER NAV LIGHTS	4
5						X		20		300	SOUTHPORT PIER NAV LIGHTS	6
7					X			20	300		SPAN DRIVE MACHINERY SERVICE LIGHTS	8
9	SOUTHPORT BARRIER GATE MOTOR POWER	2700			20	X		20		300	BOOTHBAY END MACHINERY SERVICE LIGHTS	10
11						X		20		300	SOUTHPORT END MACHINERY SERVICE LIGHTS	12
13					X			20	500		SPAN DRIVE MACHINERY RECEPTACLES	14
15	MOTOR STARTER CABINET	35000			125	X		20		500	BOOTHBAY END MACHINERY RECEPTACLES	16
17						X		20		500	SOUTHPORT END MACHINERY RECEPTACLES	18
19	ROADWAY LIGHTS	162			15	X		20	200		BOOTHBAY TFC SIG, GATE ARM LIGHTS, GONG	20
21						X		20	200		SOUTHPORT TFC SIG, GATE ARM LIGHTS, GONG	22
23	CONTROL HOUSE LIGHTS			200	20		X	20		300	BOOTHBAY GATE RECEPTACLE, LIGHT, TSTAT, HEATER	24
25	CONTROL HOUSE RECEPTACLES	600			20	X		20	300		SOUTHPORT GATE RECEPTACLE, LIGHT, TSTAT, HEATER	26
27	CONTROL HOUSE HVAC		3120		20		X	20		200	SPAN MOTOR HEATERS	28
29							X	20		300	BRAKE HEATERS	30
31	CONTROL SYSTEM POWER	2000			20	X					SPACE	32
33	SIGNAL HORN		200		20		X				SPACE	34
35	SPACE						X				SPACE	36
37	SPACE						X				SPACE	38
39	SPACE						X				SPACE	40
41	SPACE						X				SPACE	42

PANEL MOUNTING: SURFACE

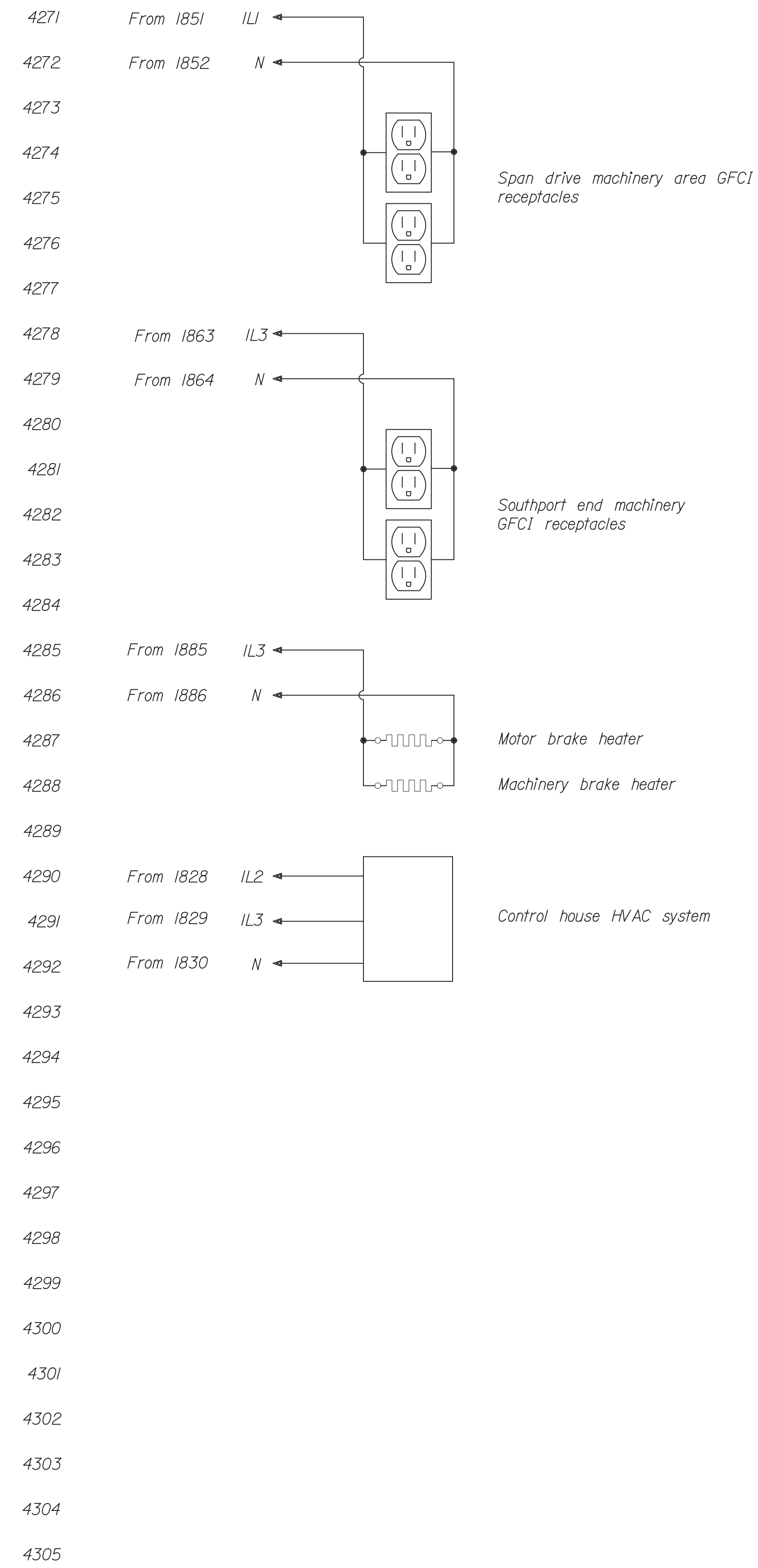
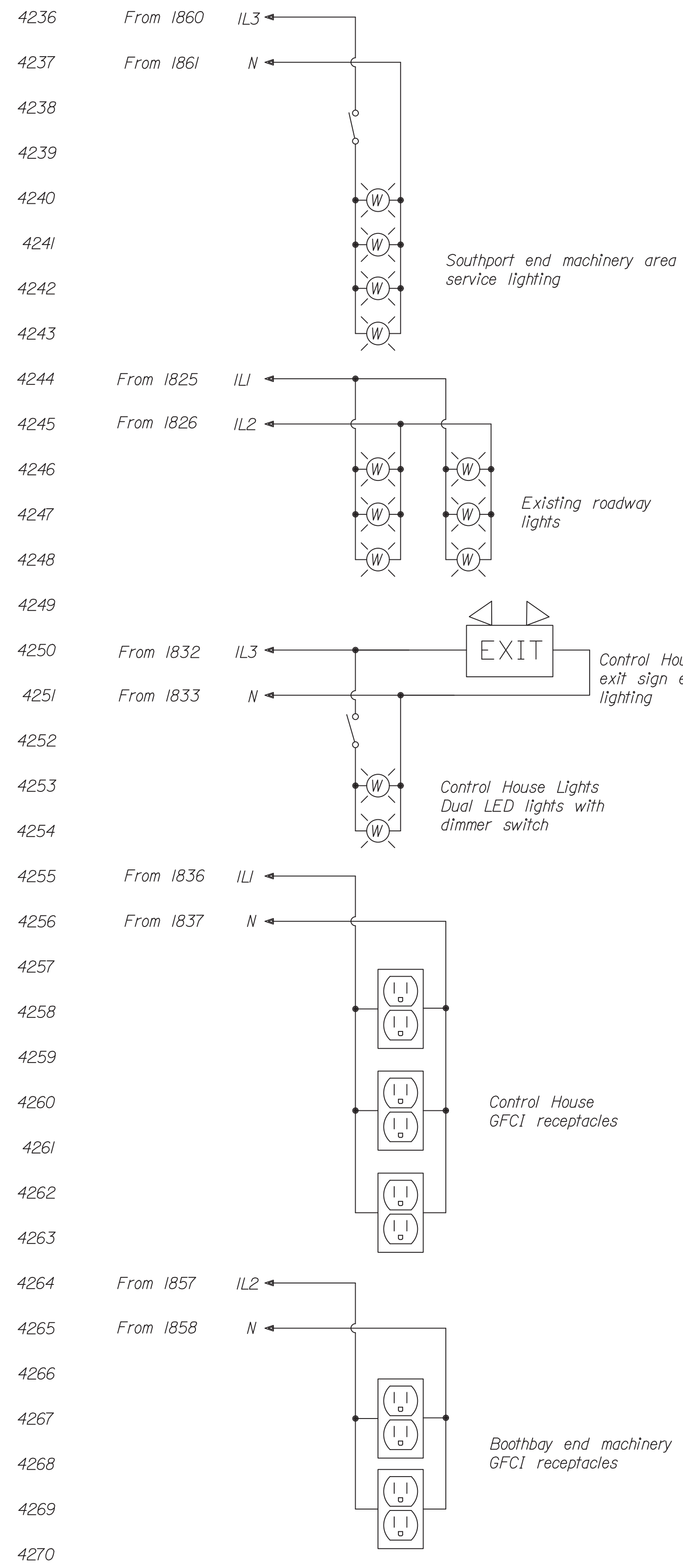
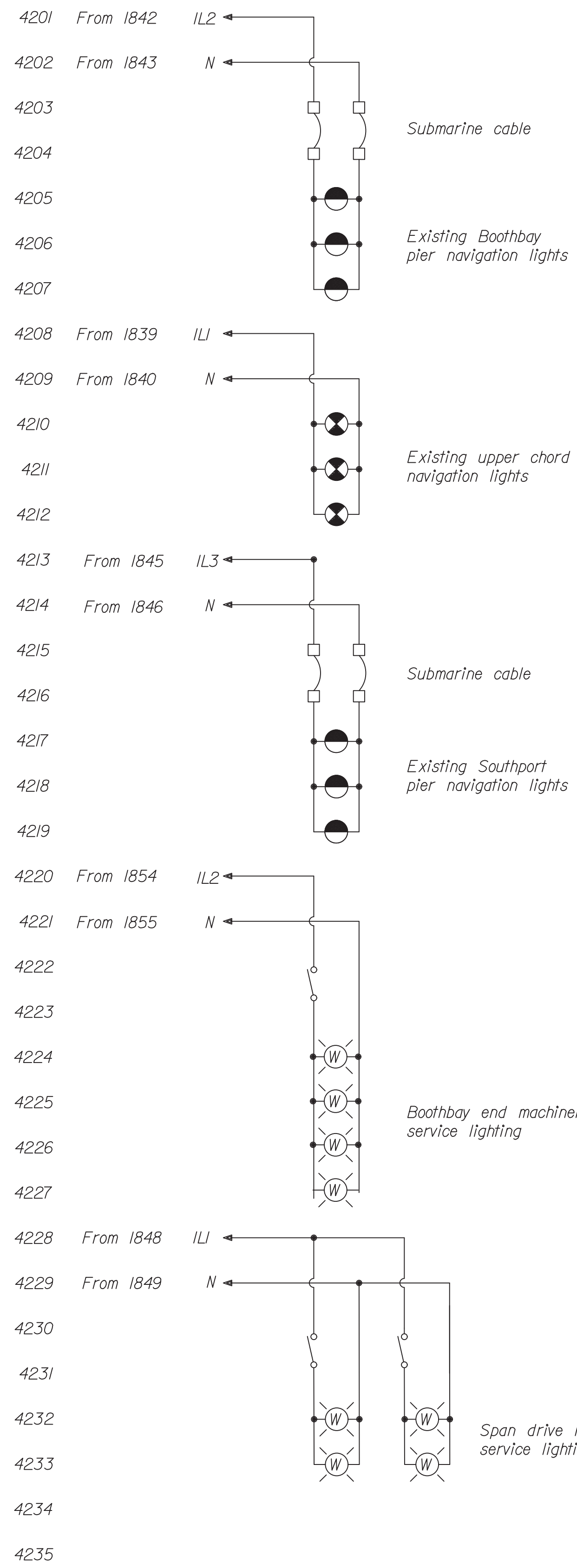
ENCLOSURE: NEMA 1 LOCATION: CONTROL HOUSE

SERVICE CHARACTERISTICS	VA
42-CIRCUIT PANEL	51482
208 / 120 VOLT, 3 PHASE, 4 WIRE, SOLID NEUTRAL	10882
60 HZ	40600
GROUND BUS	
PNL: 14 KA SHORT CIRCUIT RATING	
MIN CB: 10KA SHORT CIRCUIT RATING	
225 AMP MAIN BUS	
150 AMP MAIN CIRCUIT BREAKER	

PANEL LOADING SCHEDULE	
PHASE	VA
A	17748
B	16808
C	16927
CONNECTED LOAD	51482
DEMAND LOAD	10882
SPARE	0
MAX LOAD	51482

NOTES:

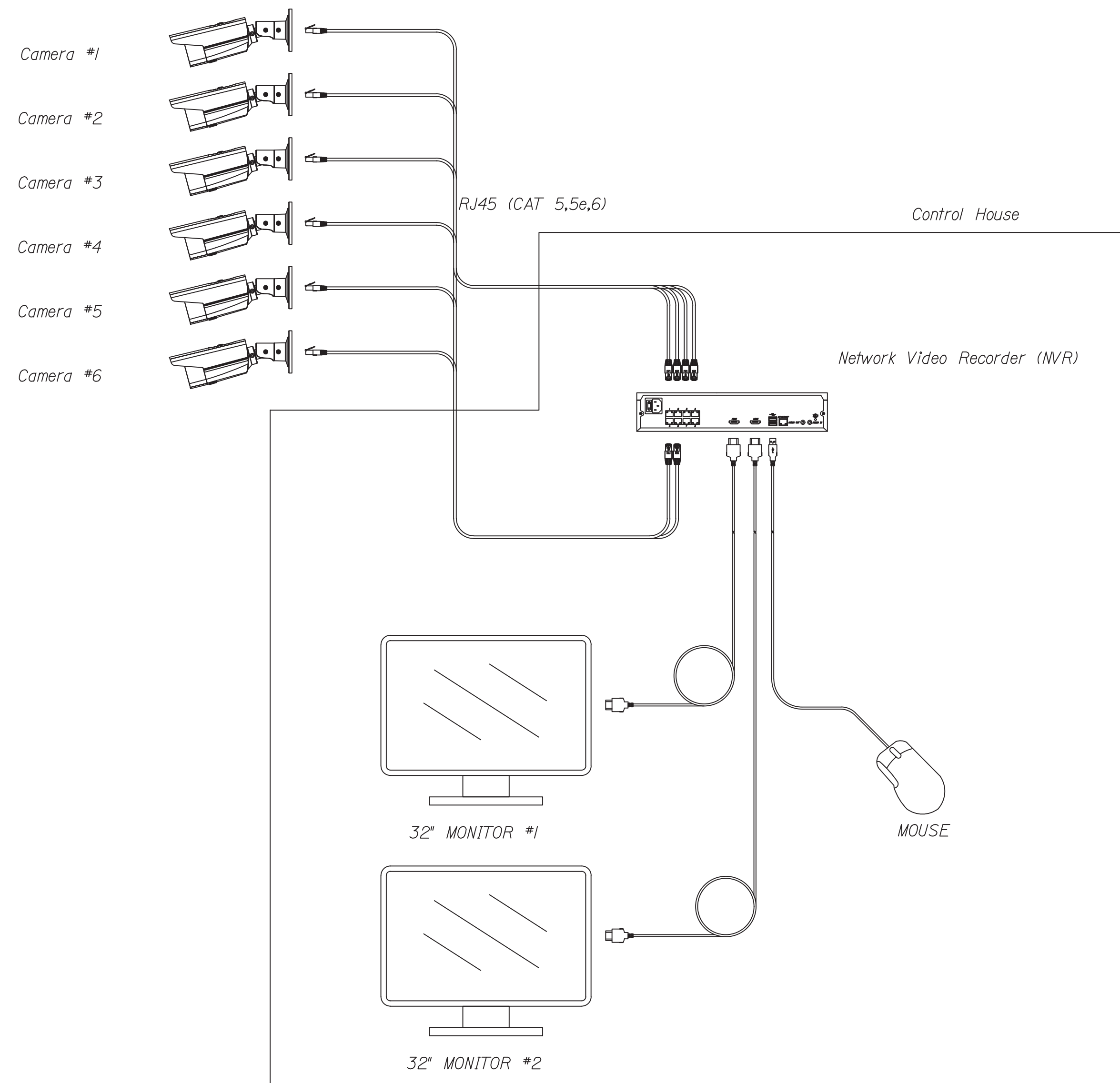
1. Loads are approximate, contractor to verify and adjust panel schedule as necessary to balance loads.



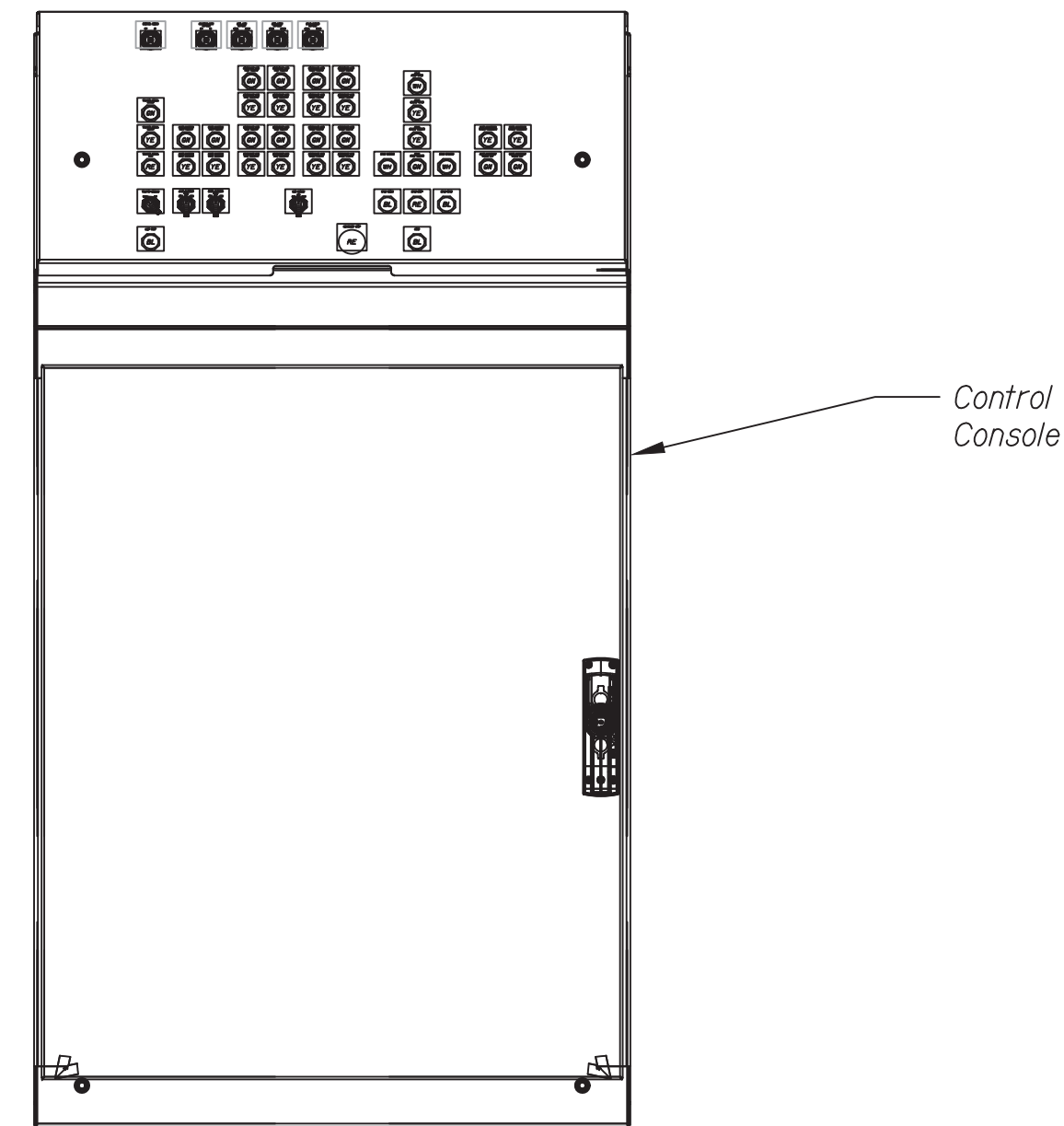
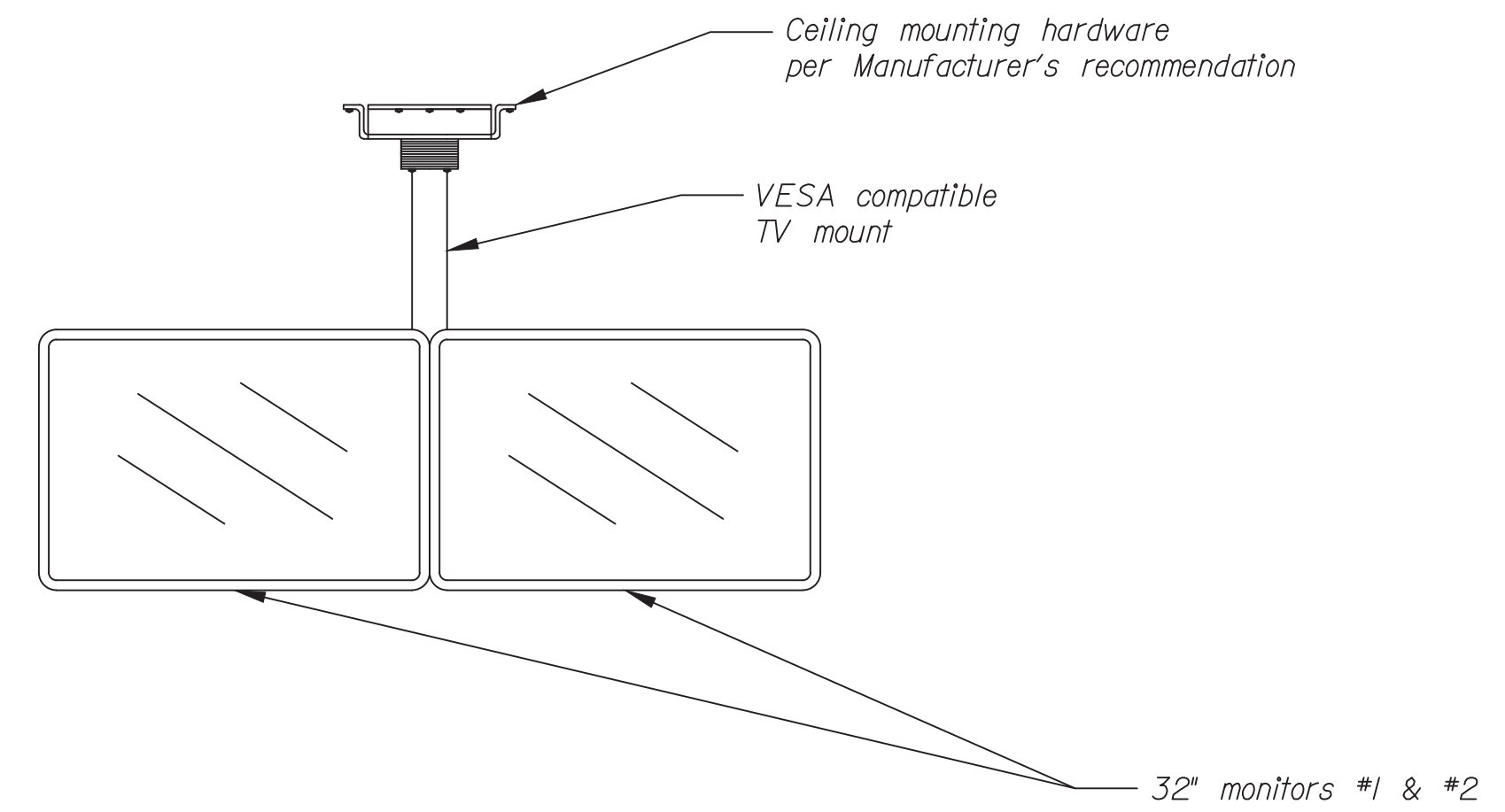
Notes:
 1. Ground all equipment in accordance with the National Electrical Code

STATE OF MAINE		DEPARTMENT OF TRANSPORTATION	
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DESIGN-DETAILED		BY	
CHECKED-REVIEWED			
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DESIGN-3-DETAILED3			
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FIELD CHANGES			
SOUTHPORT BRIDGE ROUTE 27 OVER TOWNSEND GUT LINCOLN COUNTY SOUTHPORT & BOOTHBAY HARBOR ME CONTROL HOUSE LIGHTING, HEATING, AND A/C 1			
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CCTV CAMERA SCHEDULE		
CAMERA	VIEW	MOUNTING LOCATION
CAMERA #1	NORTH APPROACH	UI-LO NORTH TRUSS AT BRACING GUSSET (OUTBOARD)
CAMERA #2	BRIDGE SPAN SOUTH	UI-LO NORTH TRUSS AT BRACING GUSSET (INBOARD)
CAMERA #3	NORTH APPROACH	UI-L0' NORTH TRUSS AT BRACING GUSSET (OUTBOARD)
CAMERA #4	BRIDGE SPAN SOUTH	UI-L0' NORTH TRUSS AT BRACING GUSSET (INBOARD)
CAMERA #5	EAST CHANNEL	CENTER TOP CHORD NORTH
CAMERA #6	WEST CHANNEL	CENTER TOP CHORD SOUTH

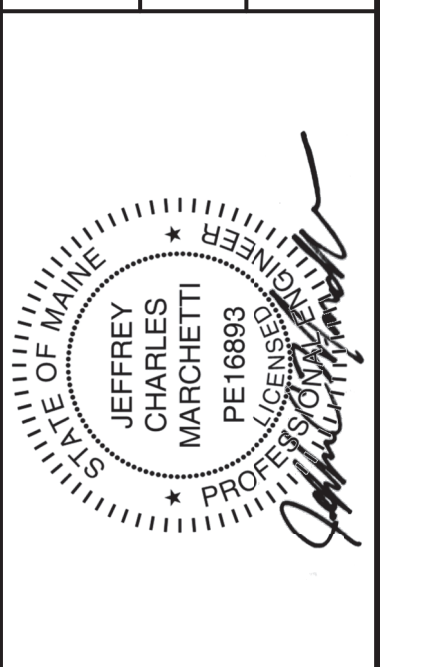


CCTV SYSTEM SCHEMATIC



CCTV MONITOR MOUNTING ARRANGEMENT

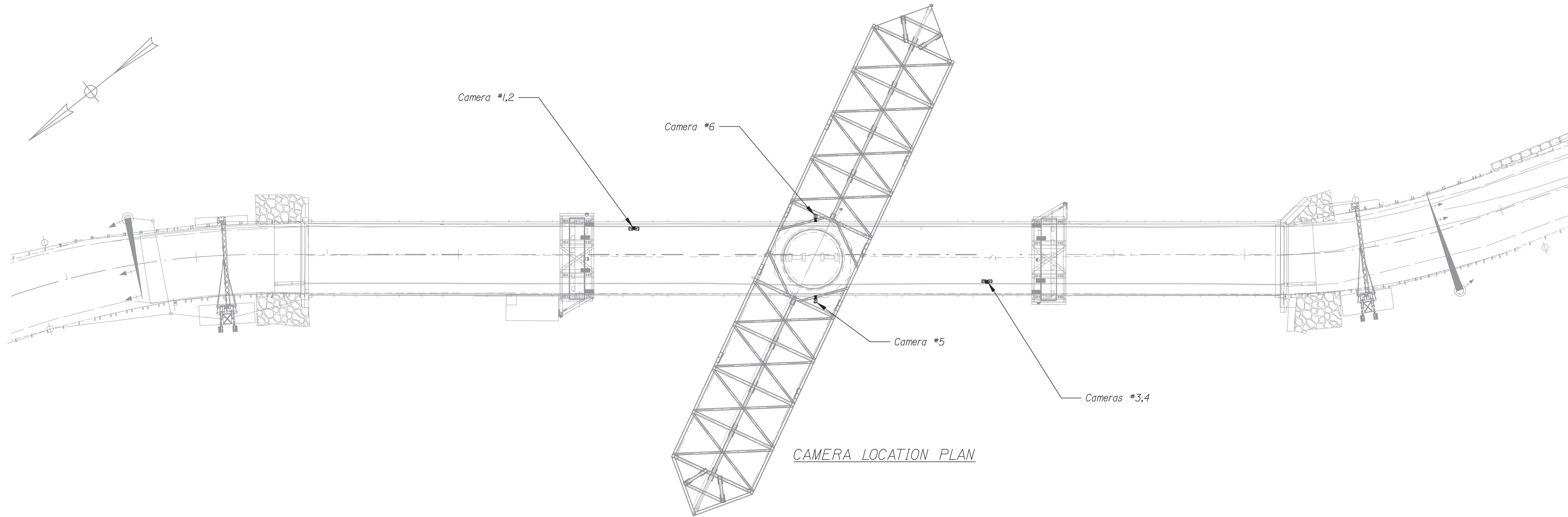
STATE OF MAINE
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STP-2175(100)
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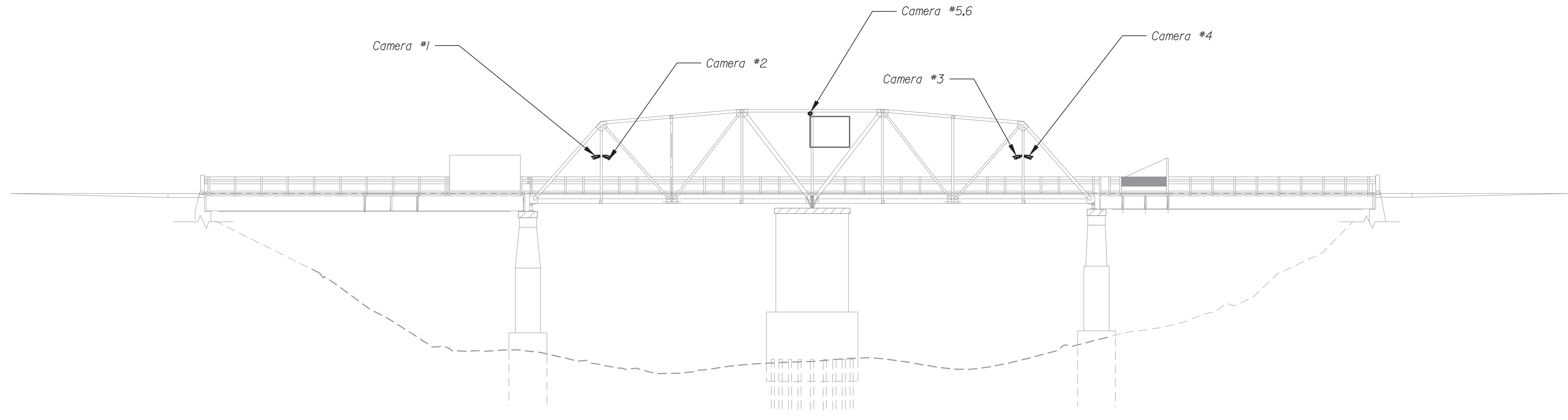
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SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME
CCTV SYSTEM 1

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CAMERA LOCATION PLAN



CAMERA LOCATION ELEVATION

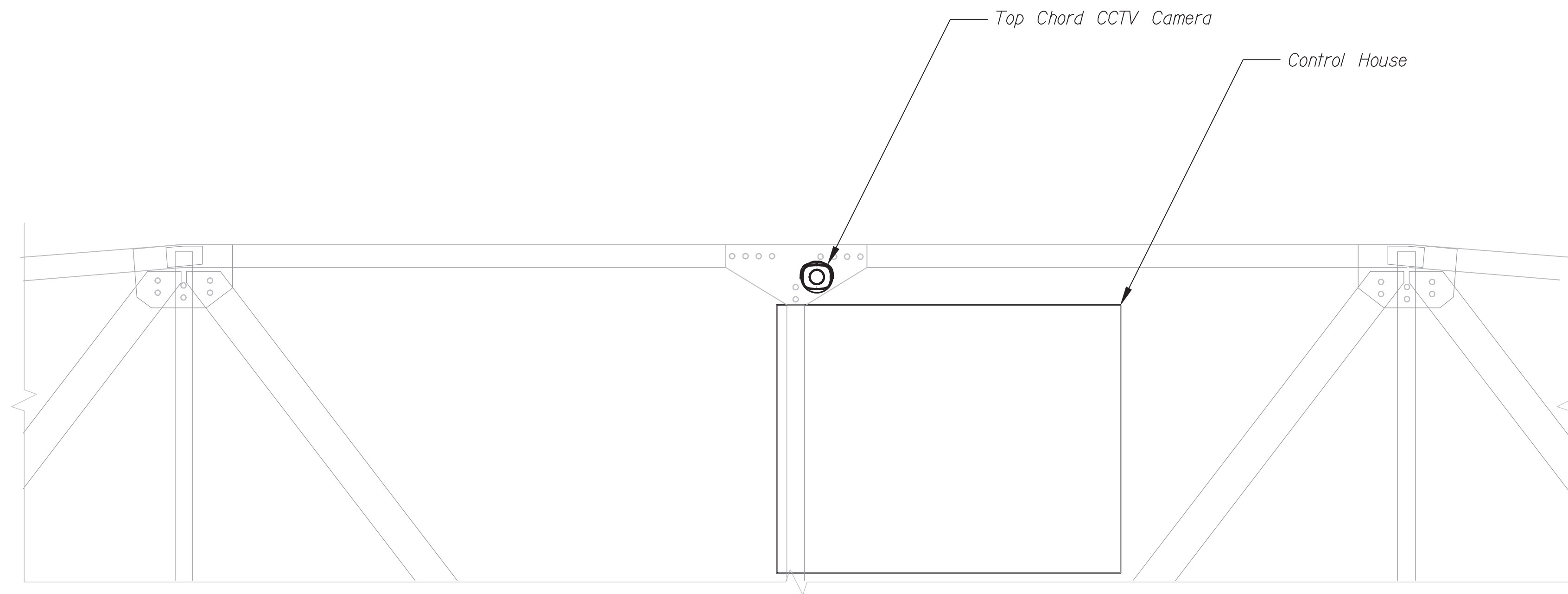
STATE OF MAINE
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 STP-2175(100)
 BRIDGE NO. 2789 WIN 21751.00 BRIDGE PLANS



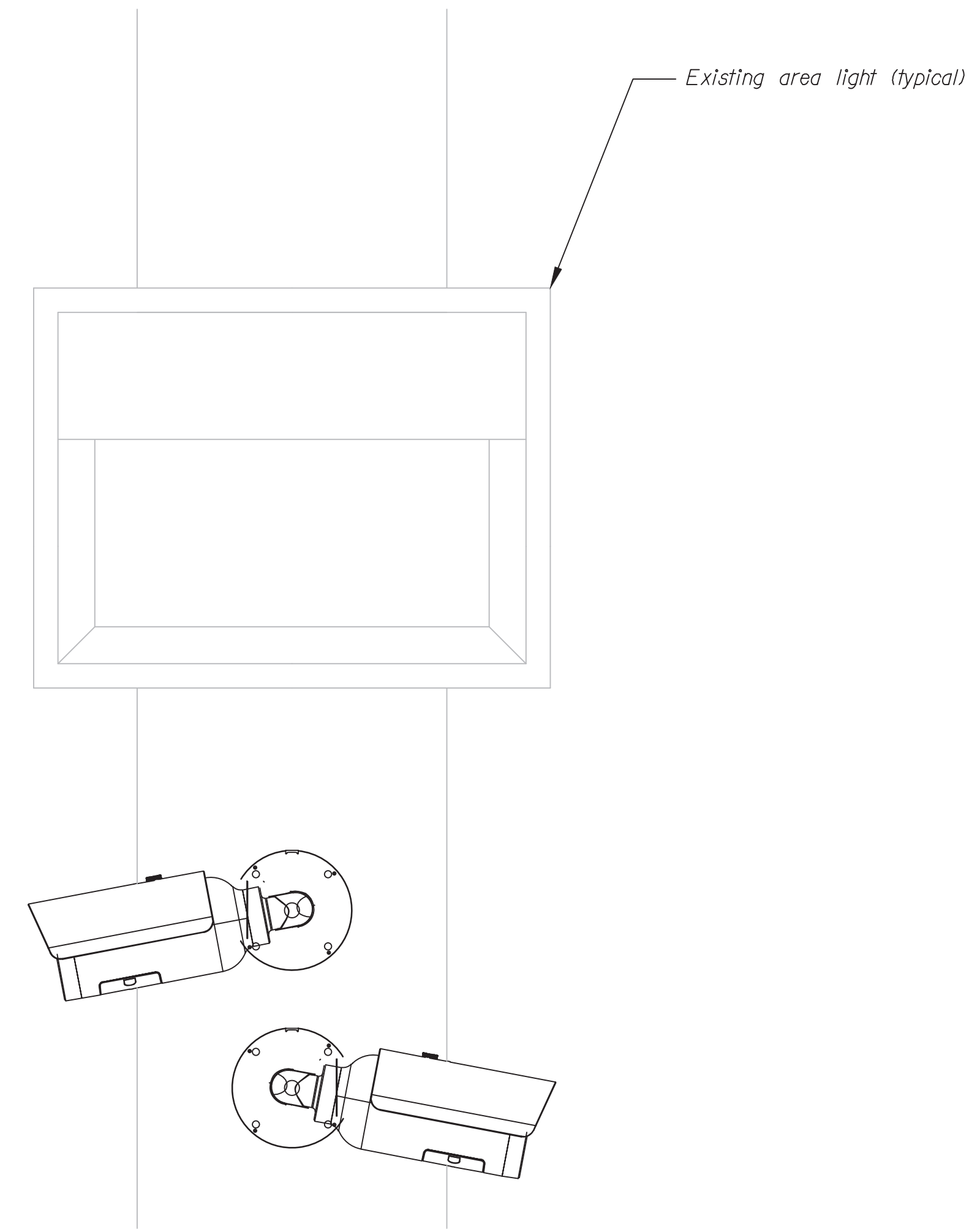
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DESIGN2-DETAILED2			
DESIGN3-DETAILED3			
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REVISIONS 2			
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SOUTHPORT BRIDGE ROUTE 27
 OVER TOWNSEND GUT LINCOLN COUNTY
 SOUTHPORT & BOOTHBAY HARBOR ME
 CCTV SYSTEM 2

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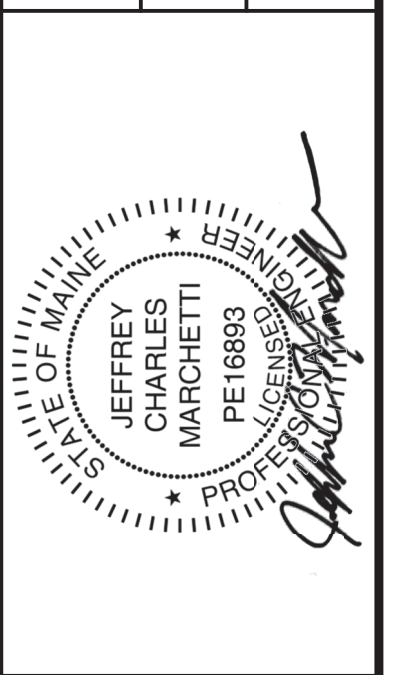


TOP CHORD CCTV CAMERA ARRANGEMENT (TYPICAL)
Not to scale



TYPICAL CCTV MOUNTING ARRANGEMENT
Not to scale

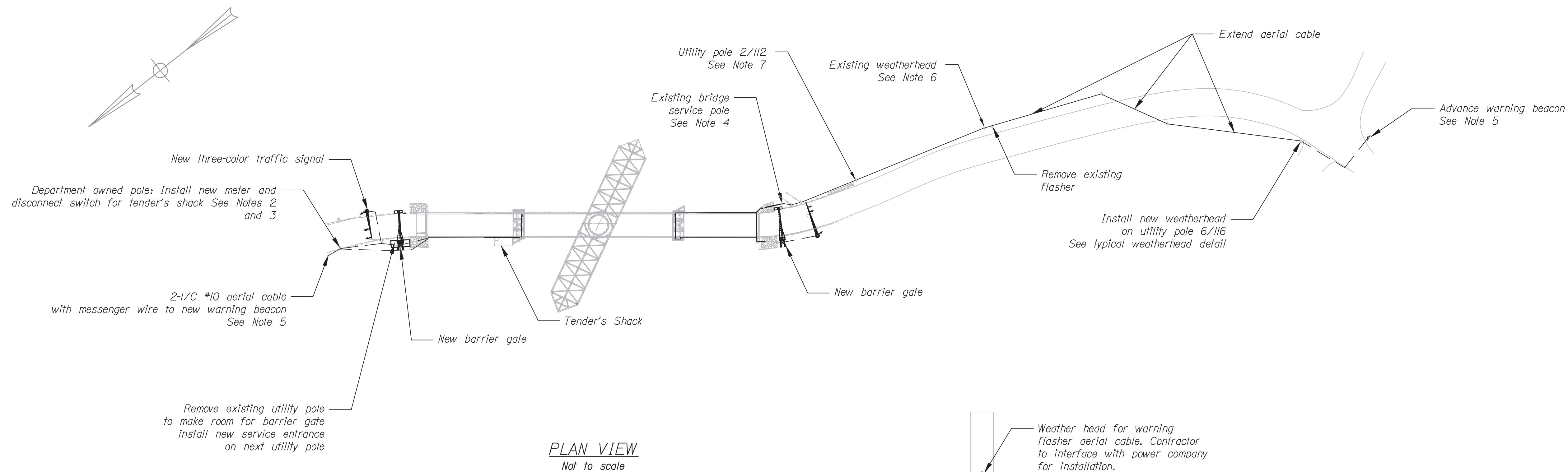
STATE OF MAINE
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 BRIDGE NO. 2789 WIN 21751.00 BRIDGE PLANS



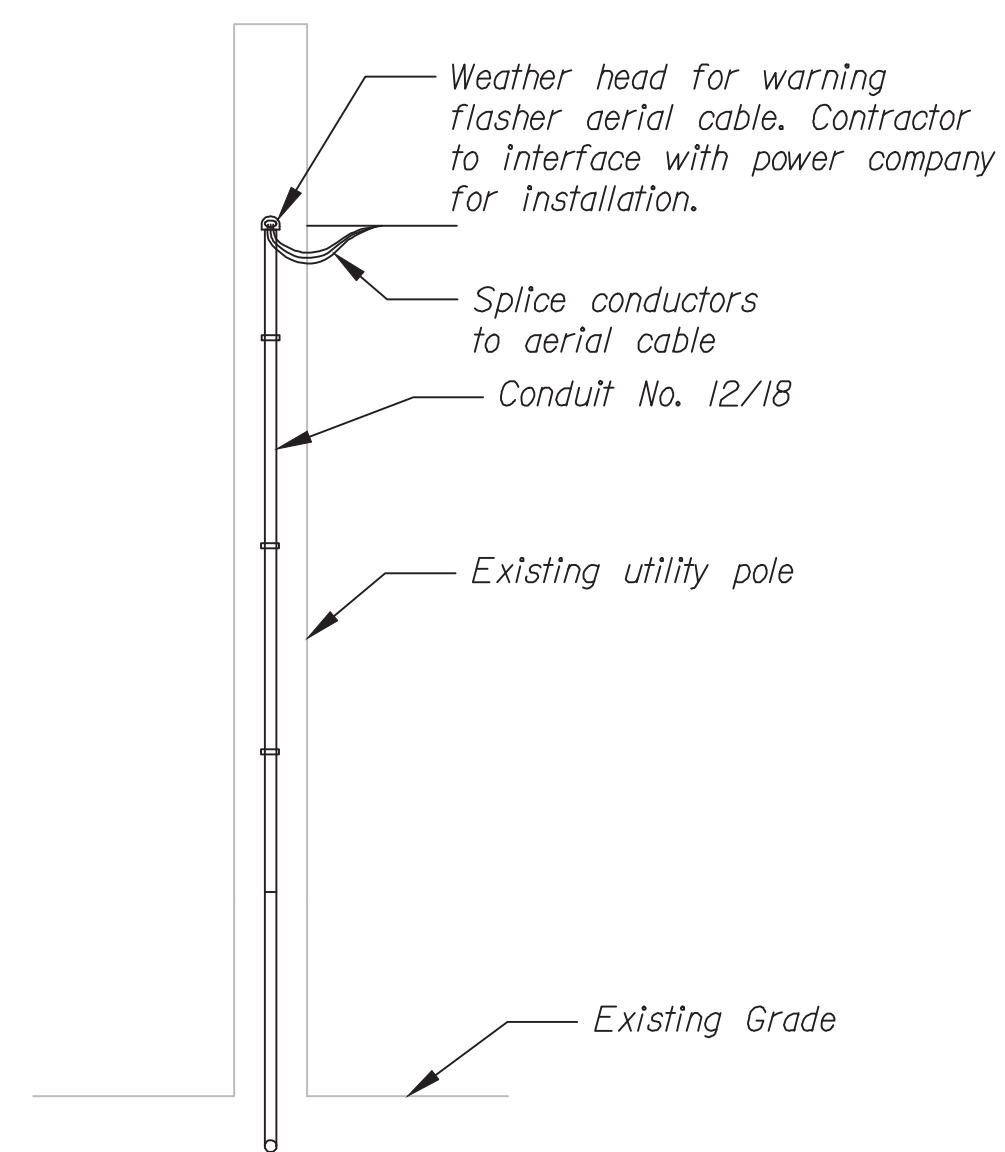
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DESIGN-3-DETAILED3			
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SOUTHPORT BRIDGE ROUTE 27
 OVER TOWNSEND GUT LINCOLN COUNTY
 SOUTHPORT & BOOTHBAY HARBOR ME
 CCTV SYSTEM 3

SHEET NUMBER
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PLAN VIEW
Not to scale



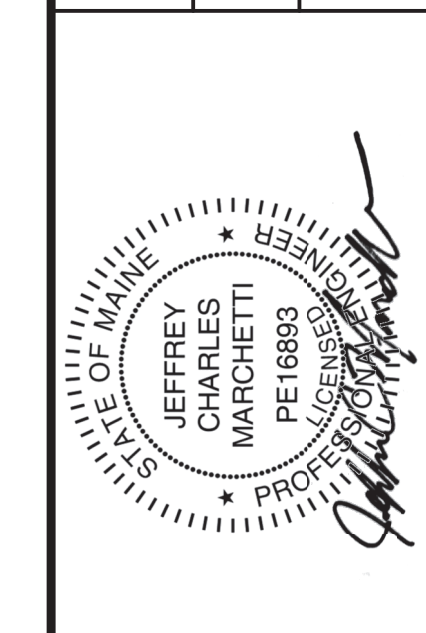
TYPICAL WEATHERHEAD
DETAIL
Not to scale

NOTES:

1. The Conduit trench shall be in accordance with current MaineDOT Standard Specifications and Standard Details.
2. The Contractor shall provide a new service meter and service disconnect switch on department owned pole (service for Tender's Shack). Service entrance shall be in accordance with current MaineDOT Standard Specifications and Standard Details. The Contractor shall coordinate with the utility company for equipment selection, disconnect switch rating, and circuit breaker rating.
3. The Contractor shall provide weatherheads in accordance with MaineDOT Standard Specifications and Standard Details. The weatherhead for the aerial cable near Boothbay barrier gate shall share the same Department owned pole as the meter. See typical weatherhead detail.
4. The Contractor shall replace the Southport 125 amp service disconnect circuit breaker with a 150 amp circuit breaker and coordinate trip settings with the power panel main circuit breaker. The Contractor shall coordinate with the utility company for equipment selection and circuit breaker rating. The Contractor shall coordinate with the utility company to replace the Watt/hour meter as required for the new service transformer.
5. Advance warning beacon locations shown on Advance Warning Beacon Plan in the structural plans. Aerial cable continues to typical weatherhead on nearest utility pole to warning beacon. Trench conduit from utility pole to warning beacon. See typical advance warning beacon detail on Advance Warning Beacon Plan in the structural plans.
6. Remove the Southport warning beacon weatherhead (adjacent to existing beacon), splice new aerial cable, and extend aerial cable to new weatherhead location.

7. The Contractor shall coordinate with the utility company to upgrade the service transformer on utility pole 2 / 112. The existing service transformer is 30 kVA. The recommended transformer rating based on estimated loads is 75 kVA.
8. See sheet E37 for conduit layout and sheet E38 for conduit schematic
9. Barrier gates, traffic signals and advance warning beacons are structural pay items.

STATE OF MAINE
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BRIDGE PLANS



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SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME
MISCELLANEOUS DETAILS

SHEET NUMBER
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PROJ. MANAGER	J. STETSON, PE	DATE
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FIELD CHANGES		

SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT
SOUTHPORT & BOOTHBAY HARBOR ME LINCOLN COUNTY
FULLY CLOSED AND BRIDGE
JACKED LIMIT SWITCH DETAILS

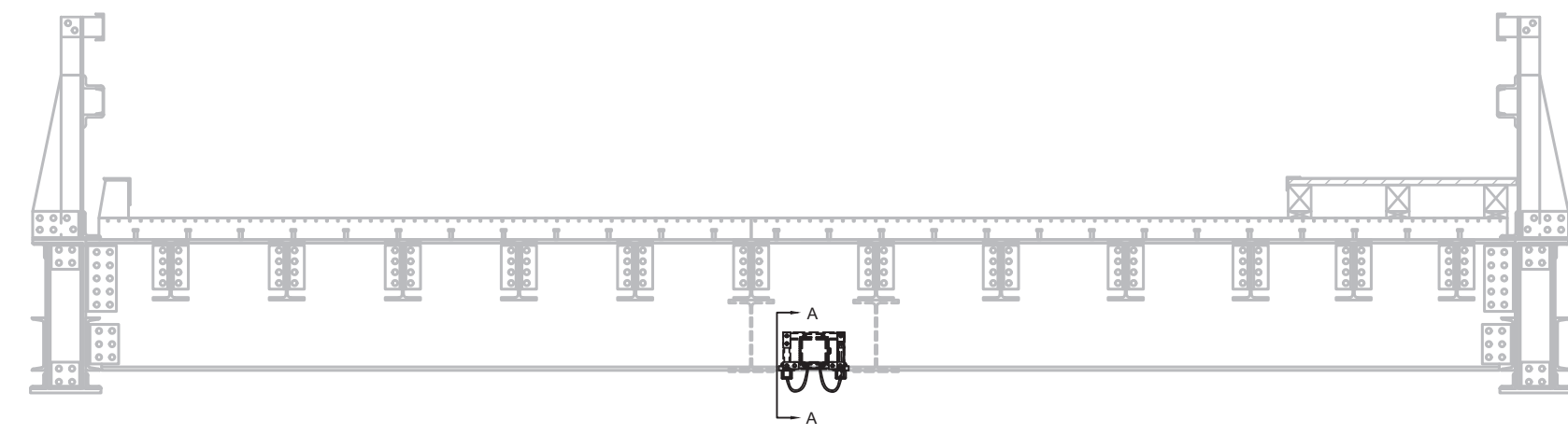
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E47

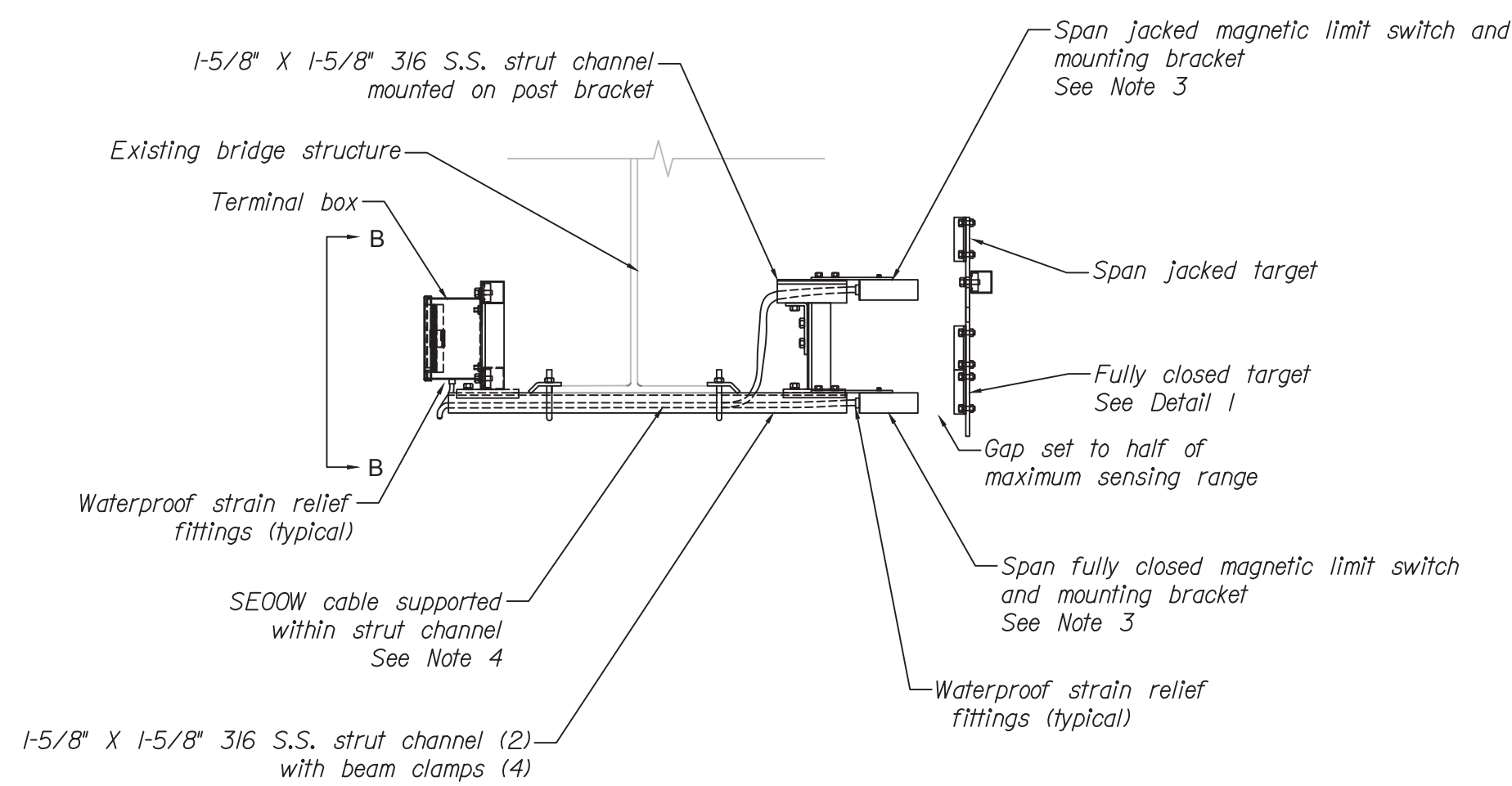
OF 48

NOTES:

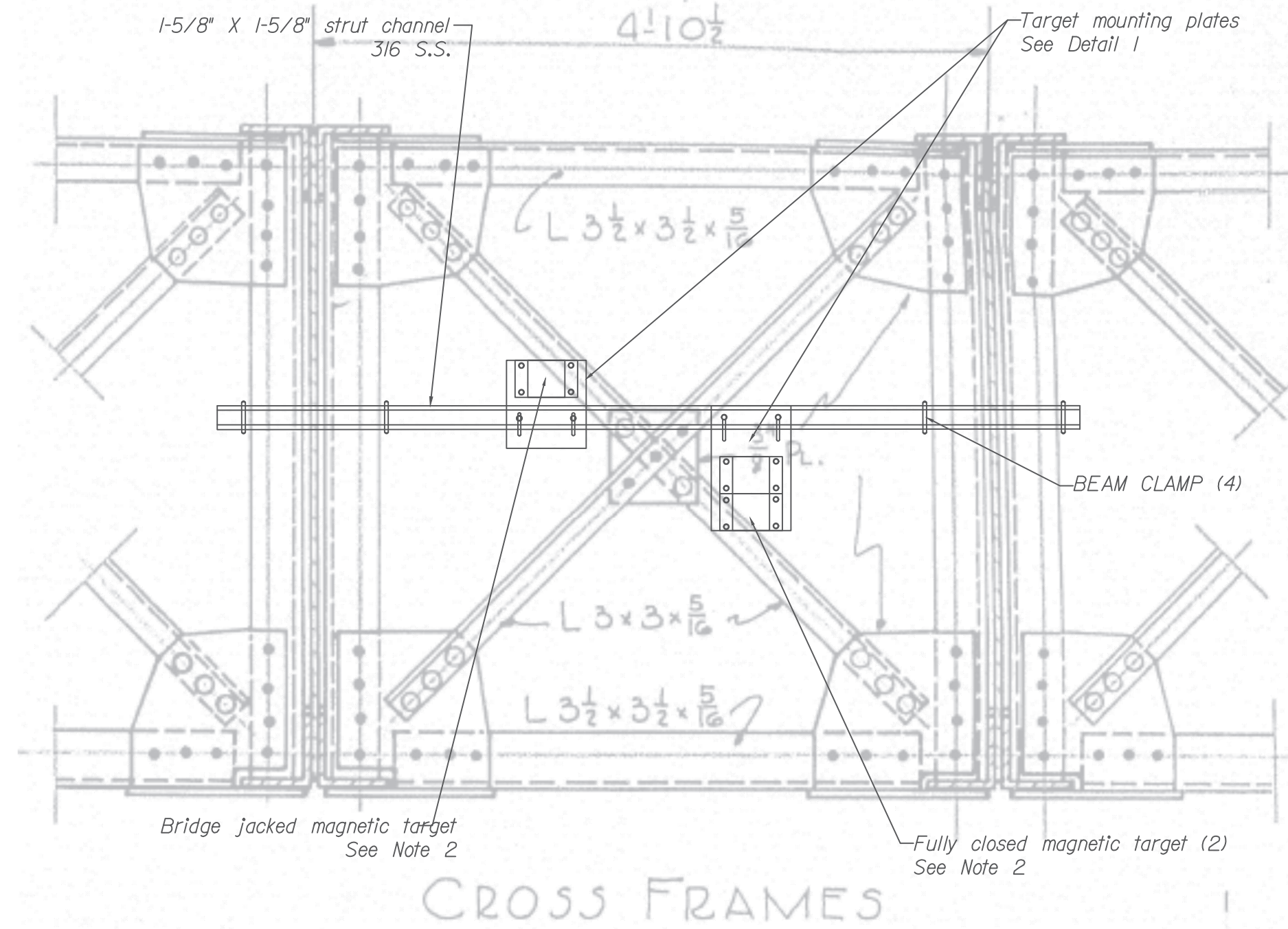
- The fully closed limit switch and bridge jacked limit switch shall be located the bottom center of the Boothbay end movable span toe and secured to the structure using strut channel with beam clamps.
- The fully closed limit switch target and bridge jacked limit switch target shall be mounted on 316 stainless steel strut channel clamped to the vertical beam faces at the Boothbay end fixed span center cross frame and positioned to coordinate with the fully closed limit switch and the bridge jacked limit switch.
- The Contractor shall provide magnetic limit switches and mounting brackets in accordance with the Special Provisions. The mounting bracket shall be fastened to the strut channel using 316 stainless steel screws, lock washers, washers and channel nuts and allow depth adjustment (gap) within the full sensing range of each switch.
- Each limit switch shall be provided with a 12/3 SEOW cable with waterproof fittings at the switch and at the terminal box. Sufficient cable length shall be provided to allow full adjustment of the limit switches without strain on the cable fittings. The strut channel shall be used as a raceway for the cable with end caps (not shown) on the channel to protect the cable from abrasion.
- The terminal box shall be 316 stainless steel NEMA 4X hinged terminal box with back panel and terminals for the fully closed limit switch and the bridge jacked limit switch. Terminal box shall be sized by contractor and shall be provided with a breather/drain (not shown).
- The fully closed limit switch and the bridge jacked limit switches shall be spaced a minimum of 10" horizontally from each other. The Contractor shall provide sufficient vertical spacing between switches and targets to prevent the fully closed limit switch from sensing the span jacked target as the span swings.
- The magnetic target mounting plates shall be 316 stainless steel and $\frac{3}{16}$ " thick and sized by the Contractor. Two inch slots shall be provided for mounting the plate to the strut channel to allow two inches of vertical adjustment. The fully closed target shall consist of two magnetic targets mounted as shown the bridge jacked target shall consist of a single magnetic target as shown. The fully closed limit switch targets shall be adjusted such that the limit switch senses the fully closed target (does not sense the span jacked target) at a Contractor-determined position prior to the span contacting the hard stop and maintains positive sensing when the span contacts the hard stop and when the span toe is jacked. The bridge jacked target shall be adjusted such that the bridge jacked limit switch senses the target only when fully closed and jacked to a contractor determined height providing minimum clearance for driving the blocks.
- The Contractor shall provide magnetic targets in accordance with the special provisions. the targets shall be fastened to the mounting plates with 316 stainless steel screws, washers, lock washers and nuts.
- The contractor shall provide a bridge jacked limit switch and target on the Southport side similar arrangement to the Boothbay side but without the fully closed limit switch.
- The Contractor shall field verify all clearances to physical structure interference with the limit switches/targets and to avoid limit switch sensing on any objects other than their associated target. The mounting arrangement shown is for conceptual guidance. The Contractor shall provide submit dimensional shop plans showing limit switch, target, and mounting configuration for Department approval.
- The Contractor shall provide shields (not shown) over the the fully closed and bridge jacked limit switches to deflect water and roadway debris from the limit switches and strut channel.
- The Contractor shall provide one spare fully closed limit switch, two spare bridge jacked limit switches, and one cable for each switch cut the length.
- All equipment is new unless otherwise noted.
- All fittings and hardware shall be 316 stainless steel.



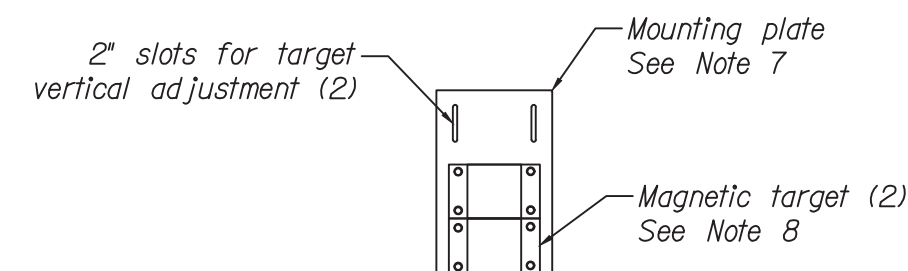
FULLY CLOSED/JACKED LIMIT SWITCH ARRANGEMENT
(Boothbay side movable span end as viewed from fixed span)
See Note 1
Not to scale



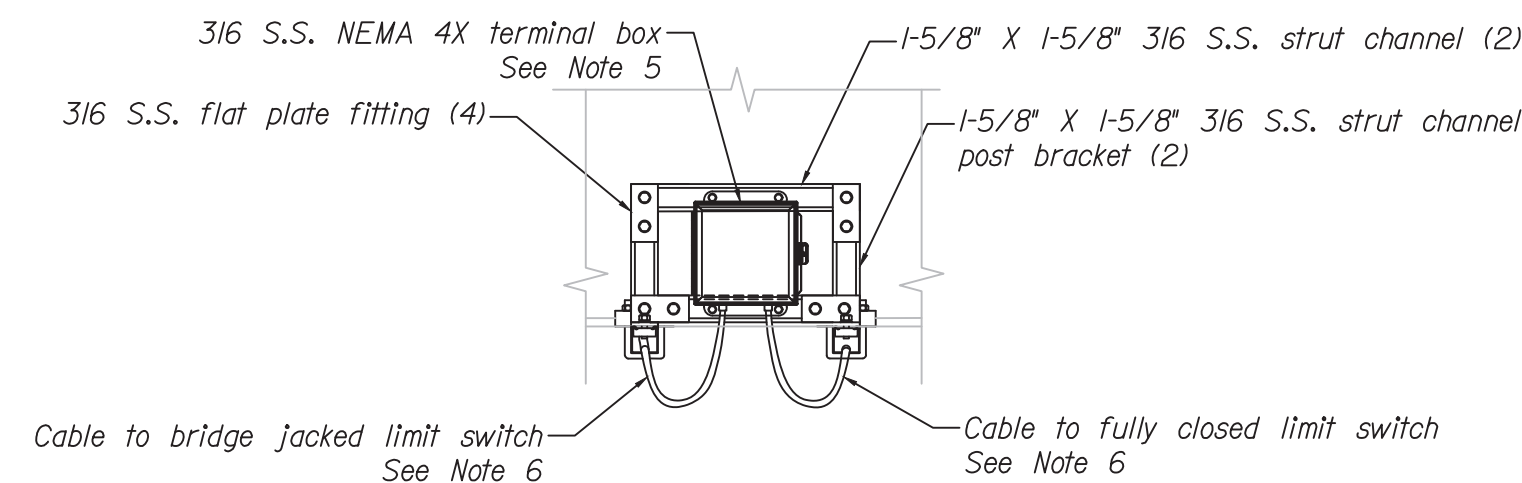
SECTION A-A: FULLY CLOSED AND SPAN JACKED LIMIT SWITCHES AND TARGETS
(Bridge jacked limit switch hidden from view)
Not to scale



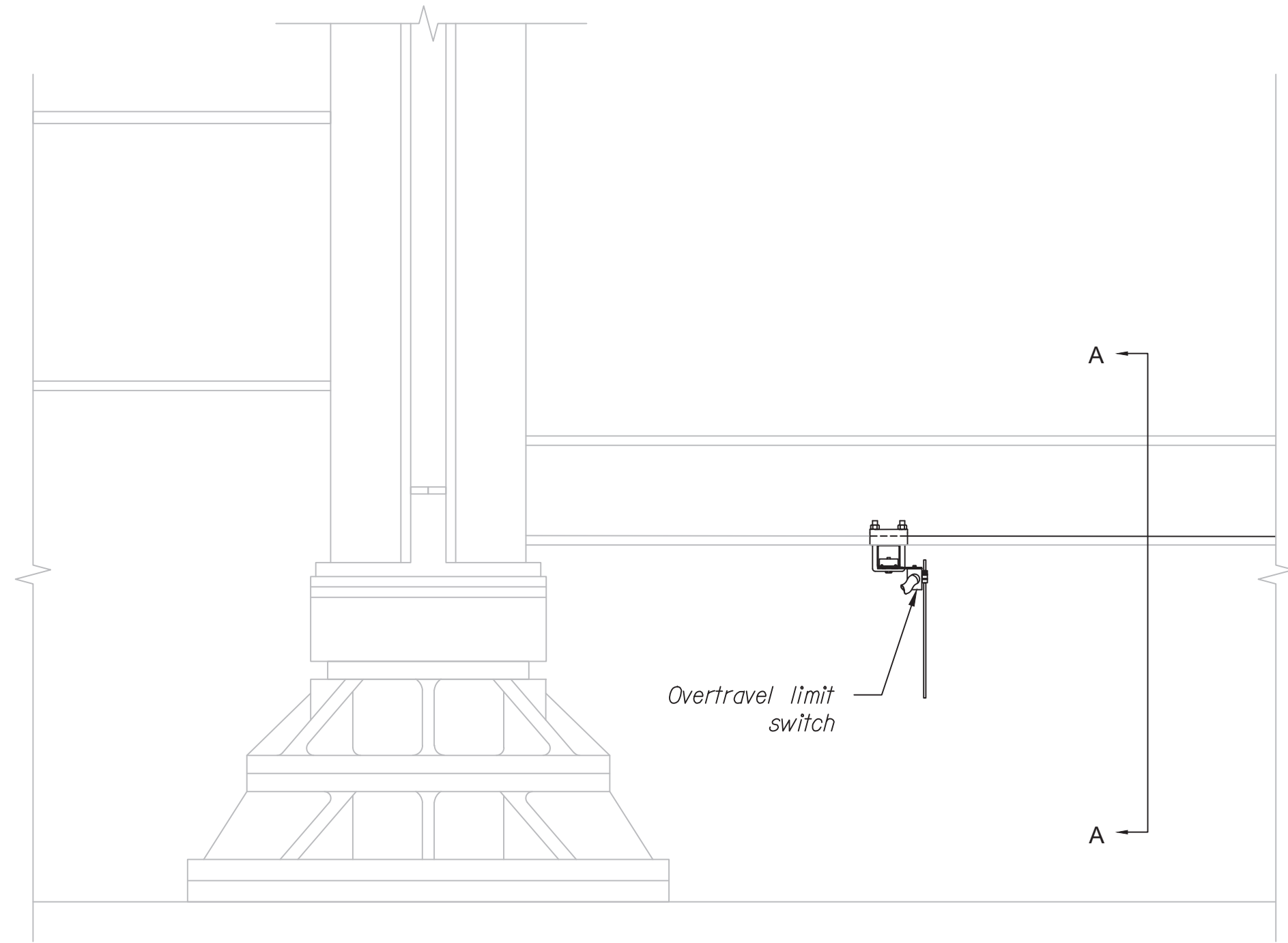
FULLY CLOSED AND SPAN JACKED LIMIT SWITCH TARGET LAYOUT
(Overlaid on cross frame detail from Sheet 19 of P.W.A. Project No. Maine 1120F Oct 1938)
Not to scale



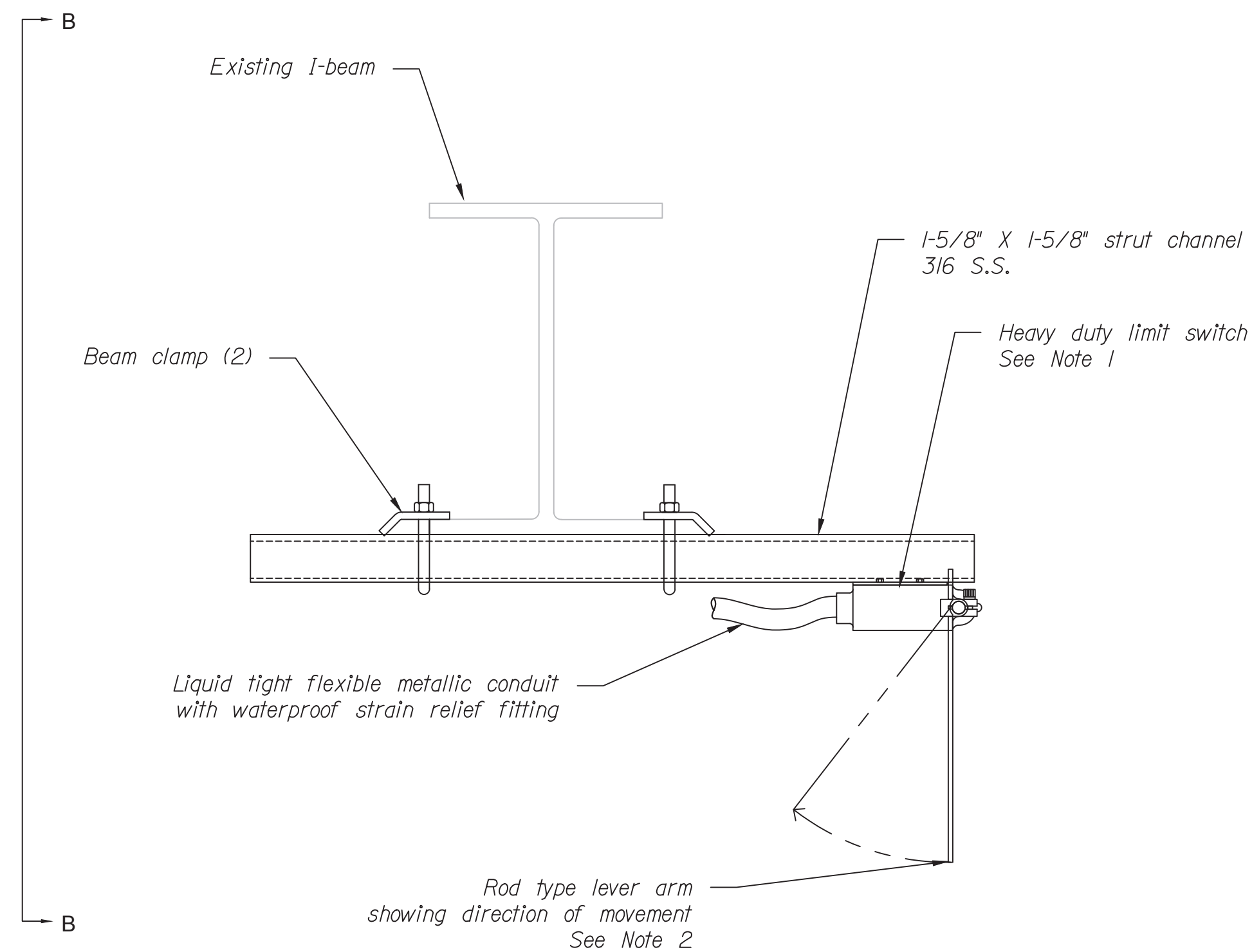
DETAIL 1: FULLY CLOSED LIMIT SWITCH MAGNETIC TARGET
Not to scale



SECTION B-B: LIMIT SWITCH TERMINAL BOX
Not to scale



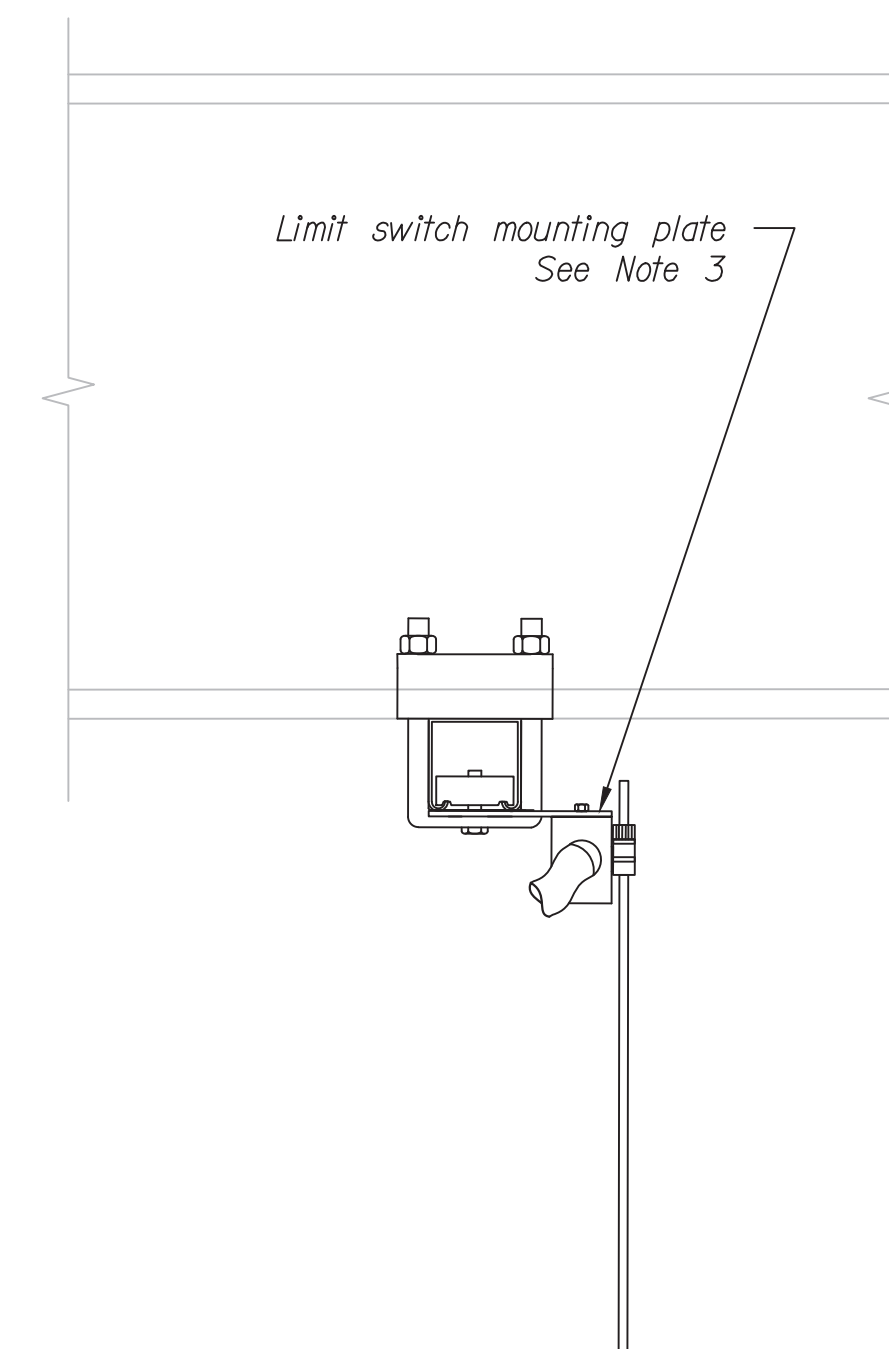
SPAN OVERTRAVEL SWITCH POSITION ON SOUTHPORT SIDE STRUCTURE
NEAR CENTER BEARING
Not to scale



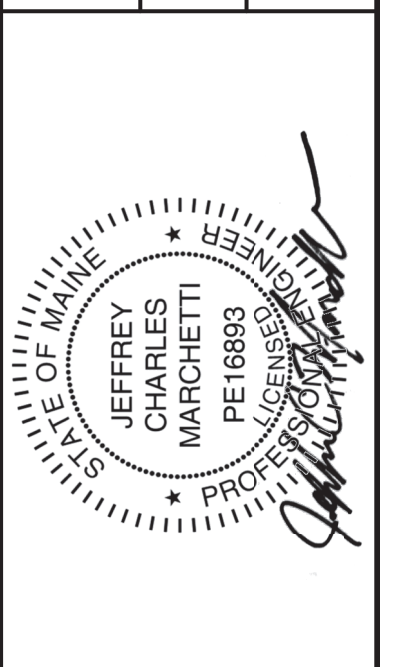
SECTION A-A SPAN OVERTRAVEL SWITCH
Not to scale

NOTES:

1. The Contractor shall provide a span overtravel limit switch in accordance with the Special Provisions. The Contractor shall provide a strike plate (not shown) constructed from 316 stainless steel and mounted to the center pier. The Contractor shall position the limit switch and strike plate such that the limit switch is actuated with the swing span at 70 degrees.
2. The Contractor shall provide the span overtravel limit switch with a rod type lever arm. The length of the lever arm rod and the height of the strike plate shall be coordinated such that the rod does not travel beyond the strike plate before the swing span comes to a stop in an overtravel situation.
3. The Contractor shall provide a mounting plate for the span overtravel limit switch of 316 stainless steel flat mounting plate of $\frac{3}{16}$ " minimum thickness. Screw holes shall be provided to match the screw pattern on the limit switch and to mount the plate to the strut channel. The mounting plate size and length of channel shall be coordinated to provide a minimum of 5" position adjustment of the limit switch along the strut channel.
4. The Contractor may provide alternative mounting configuration with engineer approval.
5. The Contractor shall provide one spare span overtravel limit switch.
6. All equipment is new unless otherwise noted.
7. All fittings and hardware shall be 316 stainless steel.



SECTION B-B SPAN OVERTRAVEL LIMIT SWITCH
Not to scale



PROJ. MANAGER	J. STETSON, PE	DATE
DESIGN-DETAILED		
CHECKED-REVIEWED		
DESIGN-2-DETAILED		
DESIGN-3-DETAILED		
REVISIONS 1		
REVISIONS 2		
REVISIONS 3		
REVISIONS 4		
FIELD CHANGES		

SOUTHPORT BRIDGE ROUTE 27
OVER TOWNSEND GUT LINCOLN COUNTY
SOUTHPORT & BOOTHBAY HARBOR ME
OVERTRAVEL LIMIT SWITCH DETAIL