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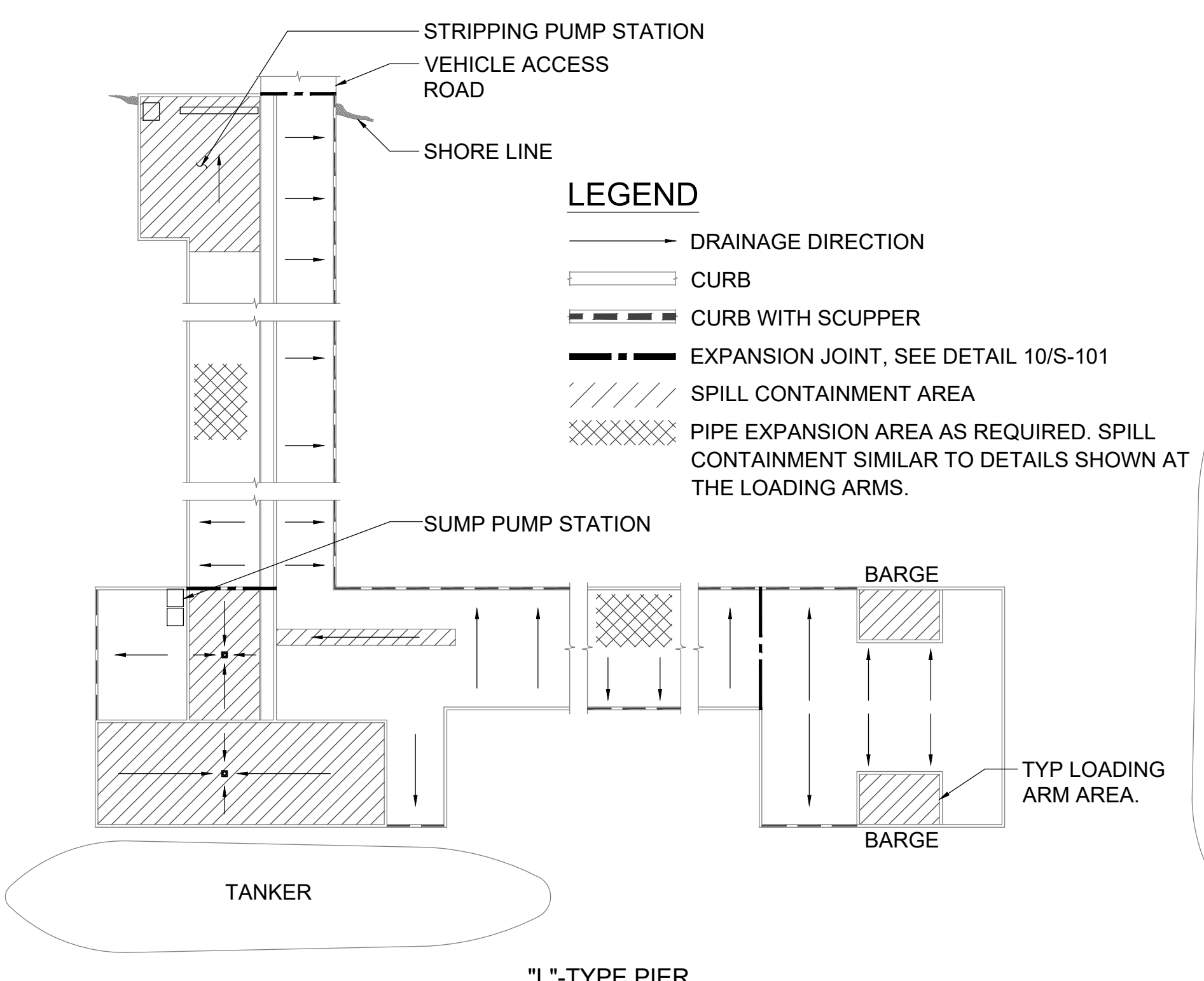
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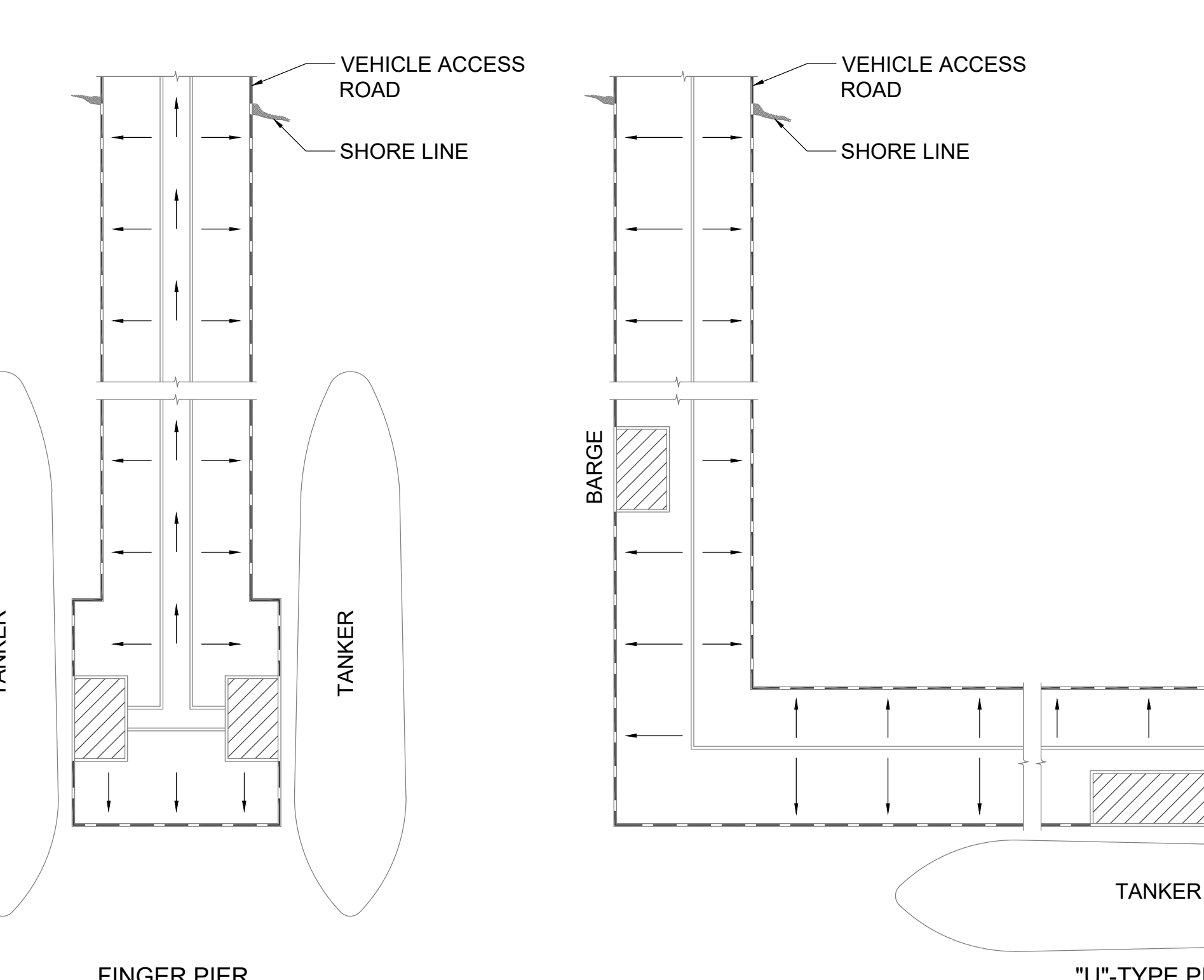
UNCLASSIFIED

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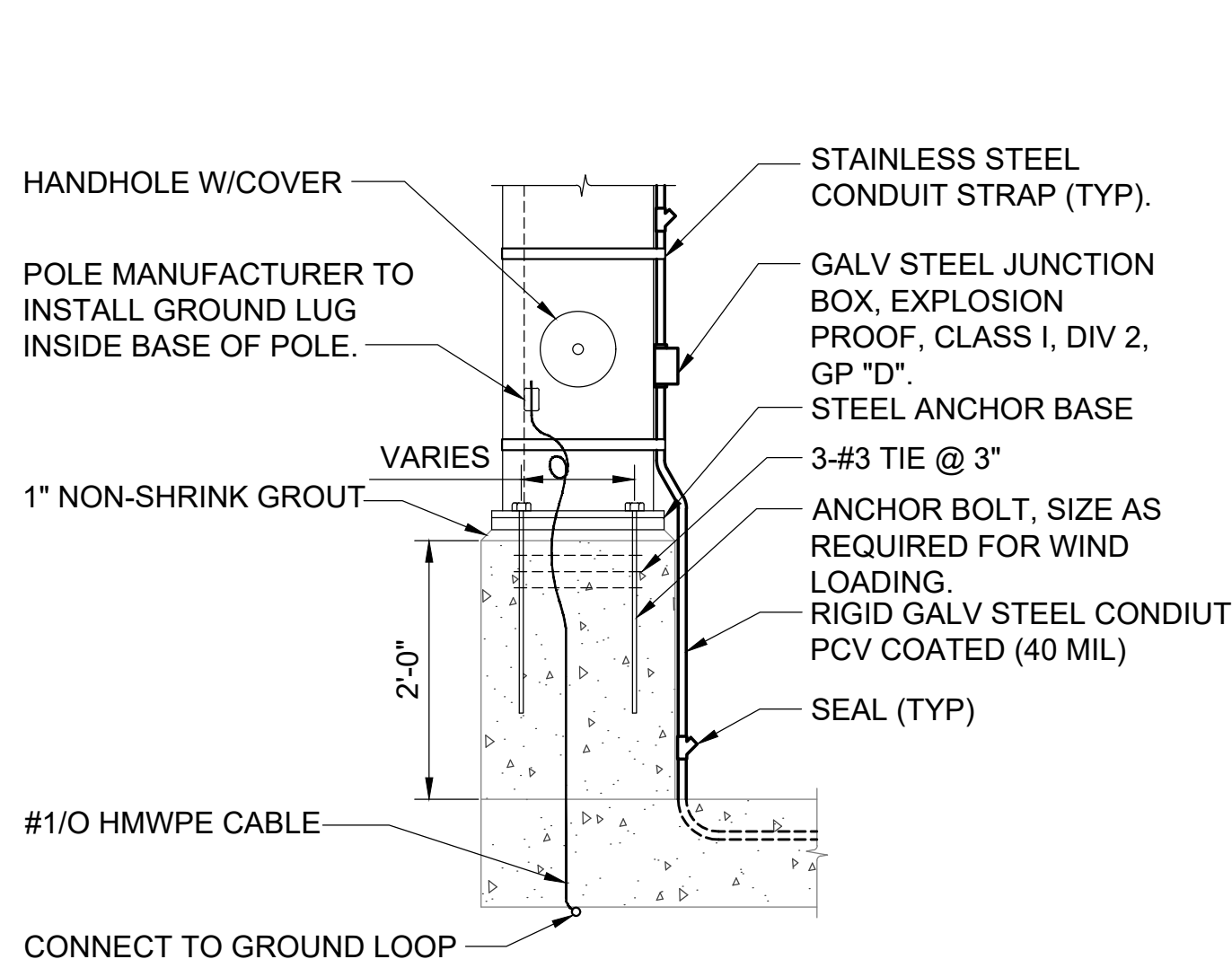


1 PIER DRAINAGE PLAN  
SCALE: 1" = 30'-0"

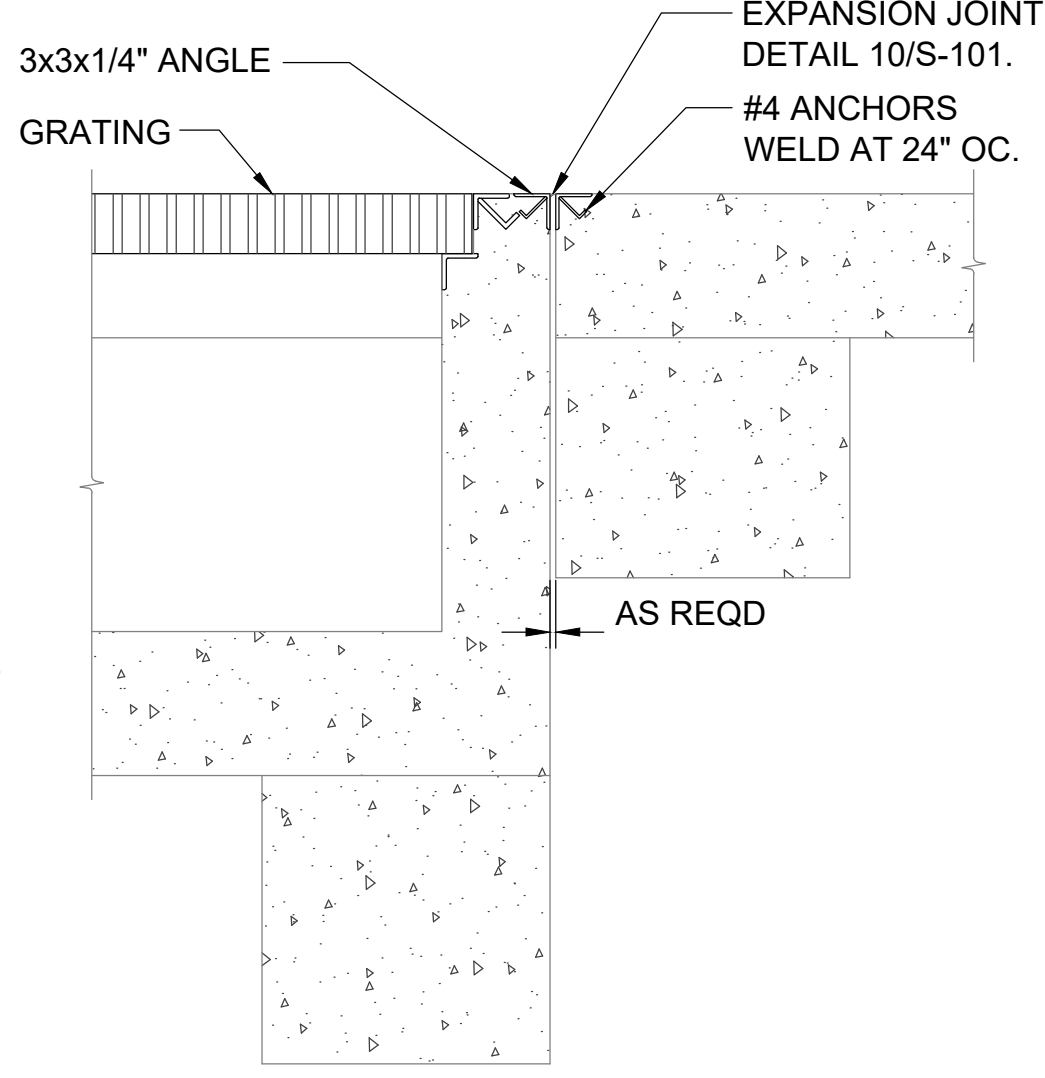


2 ALTERNATE PIER CONFIGURATIONS  
SCALE: 1" = 30'-0"

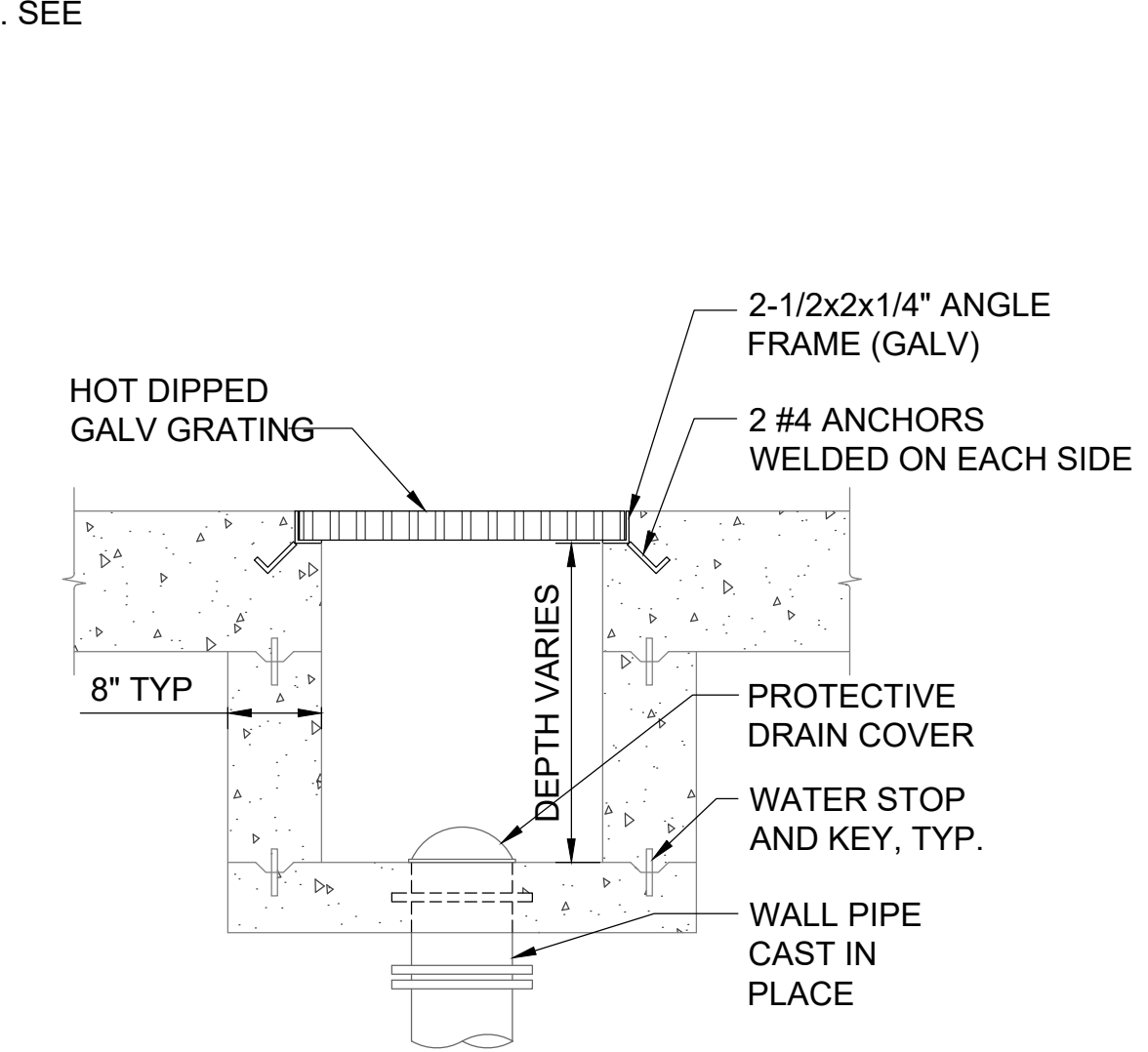
- DESIGNER NOTES:**
- ALL SURFACES EXPECTED TO BE IN CONTACT WITH POLYMER CONCRETE SHOULD BE CONSTRUCTED FROM CONCRETE WHICH HAS AIR ENTRAINING (ASTM C-260) AGENTS, WATER SLUMP REDUCER (ASTM C494 TYPE A OR D) AND SURFACE HARDENER, SEAL AND DUSTPROOFING AGENT (ASTM 309).
  - FOR PIER OR WHARF WITH RAILROAD ACCESS, BOND AND GROUND RAILS AND EQUIPMENT. ALSO INSULATE RAIL SYSTEM FROM SHORE TRACKAGE WITH INSULATED RAIL JOINTS.
  - ALL JOINTS IN CONCRETE CURBS AT CONTAINMENT AREAS SHALL HAVE WATER STOPS APPROVED FOR USE WITH HYDROCARBONS.
  - PROVIDE SPILL CONTAINMENT AREAS FOR FUEL SYSTEM. SIZE IN ACCORDANCE WITH THE CODE OF FEDERAL REGULATIONS 33 CFR 154.530 AND UFC 3-460-01. DESIGN CONTAINMENT DRAINAGE SYSTEM (COLLECTION AND TREATMENT, EVAPORATIVE, ETC.) AS REQUIRED BY GOVERNING REGULATIONS.
  - THE CONTAINMENT AREAS MUST BE ABLE TO DRAIN WITHOUT DISCHARGING OIL INTO THE WATER 33 CFR 154.530.
  - PIER STRUCTURE SHALL BE DESIGNED FOR SHIP COLLISION AND SEISMIC LOADS IN ACCORDANCE UFC 4-152-01.
  - FOR DETAILS OF THE PIER MOORING AND FENDER SYSTEMS, ANCHORAGE AND BREASTING DOLPHINS REFER TO UFC 4-152-01. ALSO REFERENCE UFC 4-159-03, TABLE 3-4 FOR MOORING SERVICE TYPE.
  - SEE UFC 4-152-01 FOR MINIMUM PIER WIDTH.
  - EXPANSION JOINTS SHALL BE PROVIDED AND ITS WIDTH SHALL SUIT STRUCTURAL ELONGATION DUE TO TEMPERATURE CHANGES OF 60°F IN ASHRAE CLIMATE ZONE 4-5 AND 70°F IN ASHRAE CLIMATE ZONE 6-8.
  - PIER CONFIGURATION SHALL TAKE INTO ACCOUNT REQUIRED BOOM REEL SIZES AND LOCATION(S).



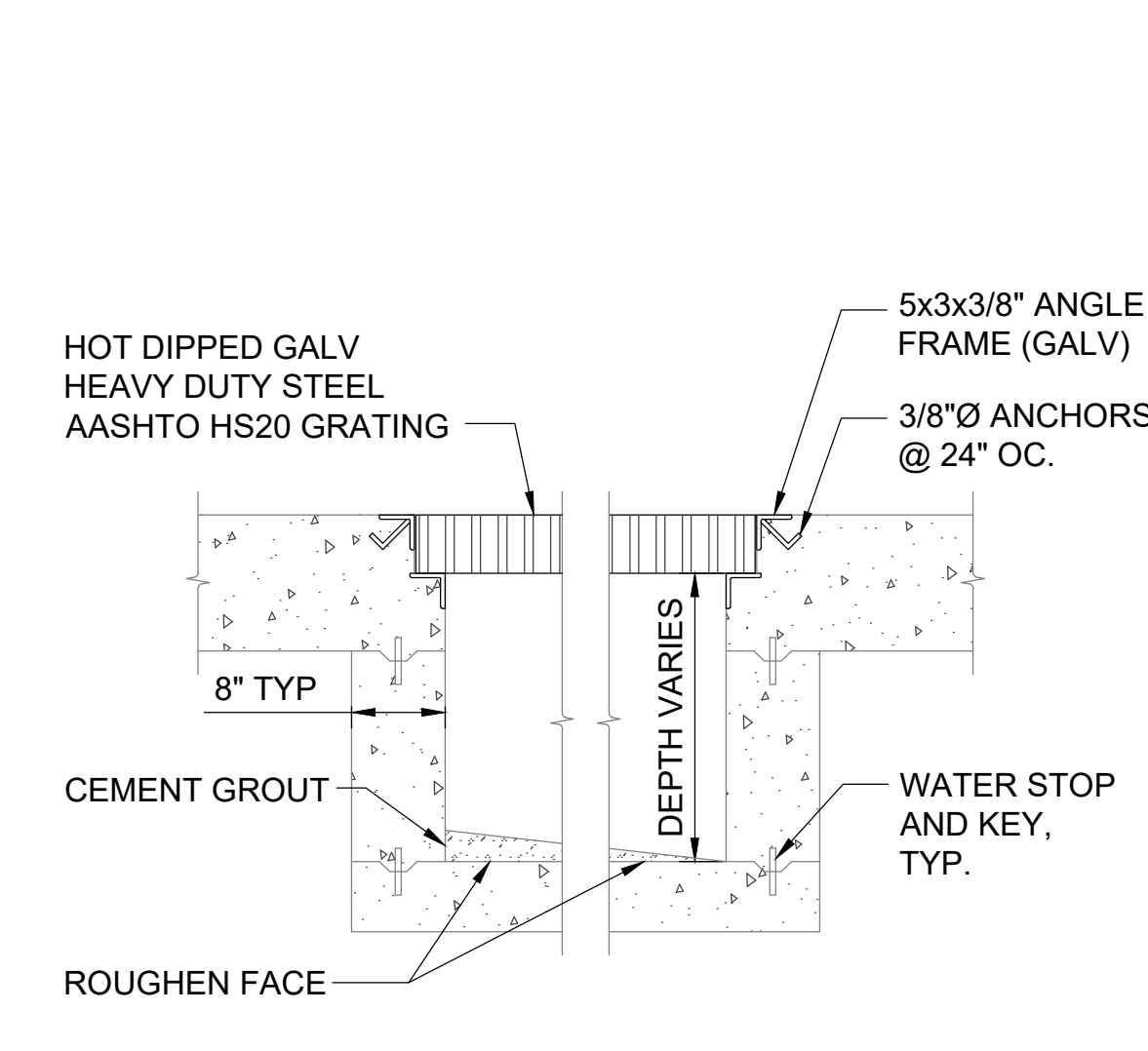
3 SECTION - M  
SCALE: 3/4" = 1'-0"



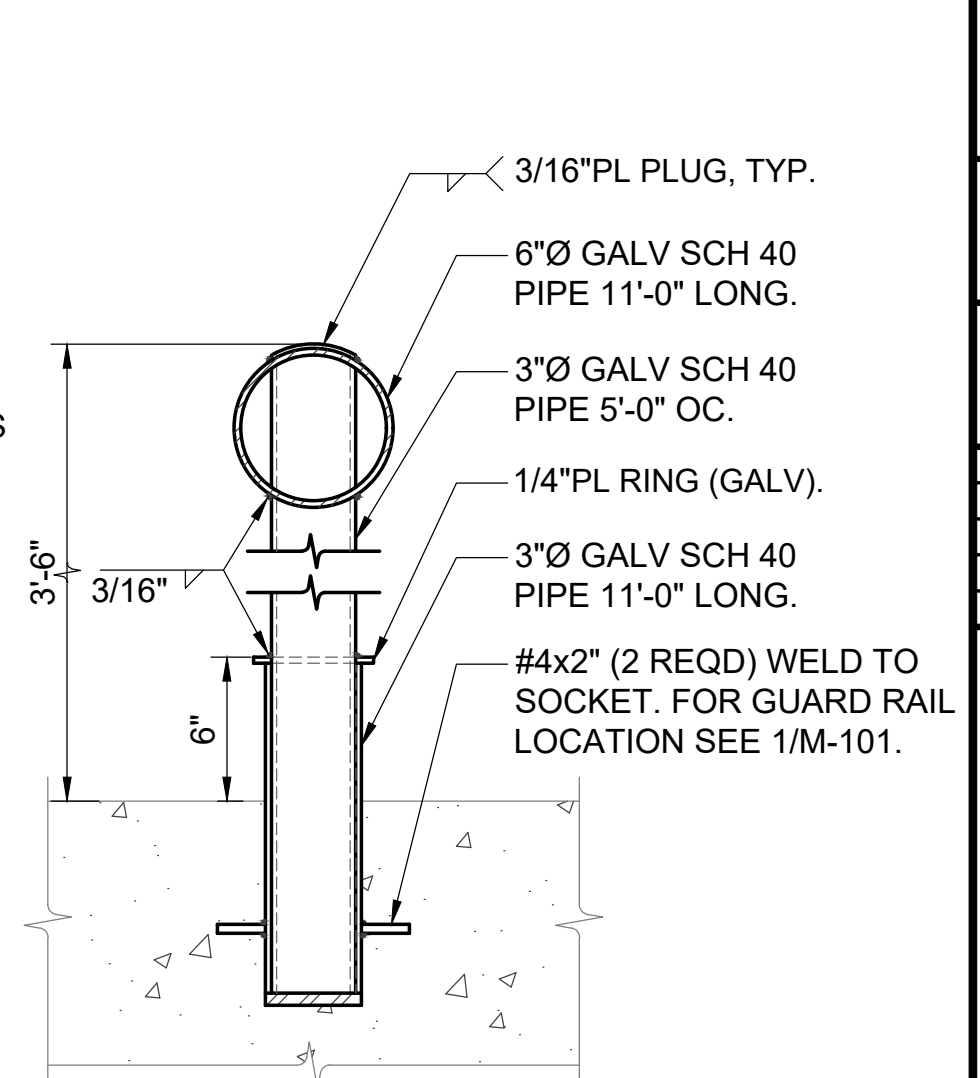
4 TRENCH DETAIL  
SCALE: 3/4" = 1'-0"



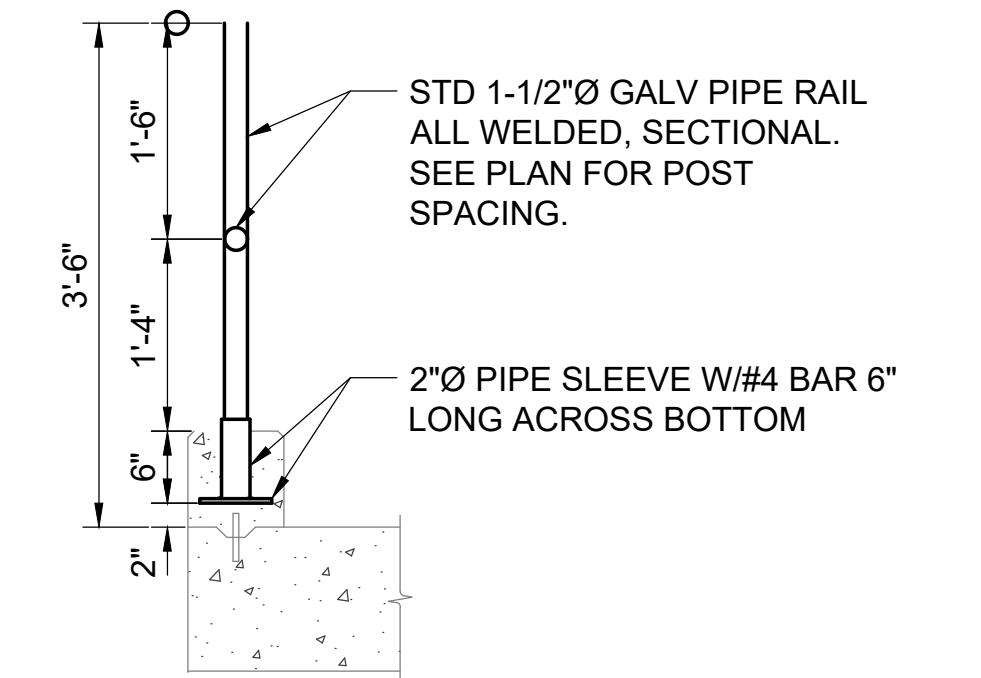
5 TYPICAL DECK DRAIN  
SCALE: 3/4" = 1'-0"



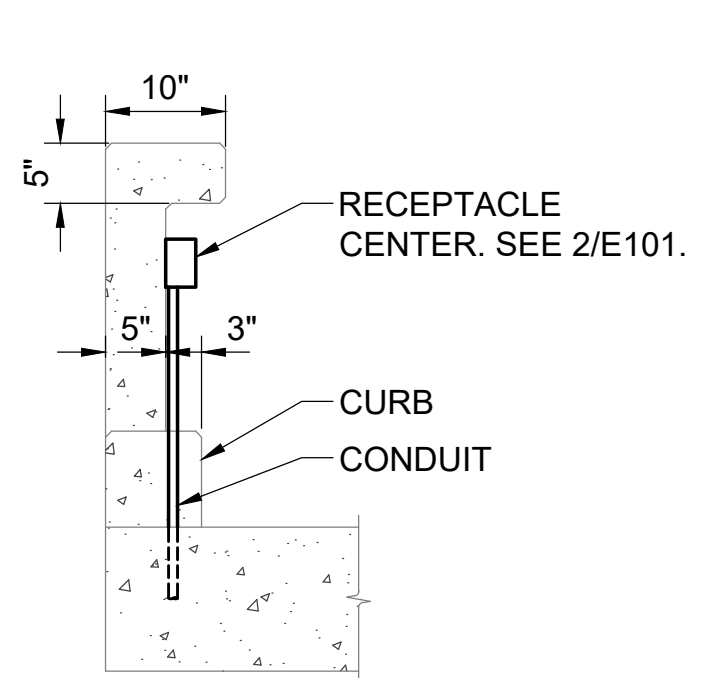
6 TRENCH SECTION  
SCALE: 3/4" = 1'-0"



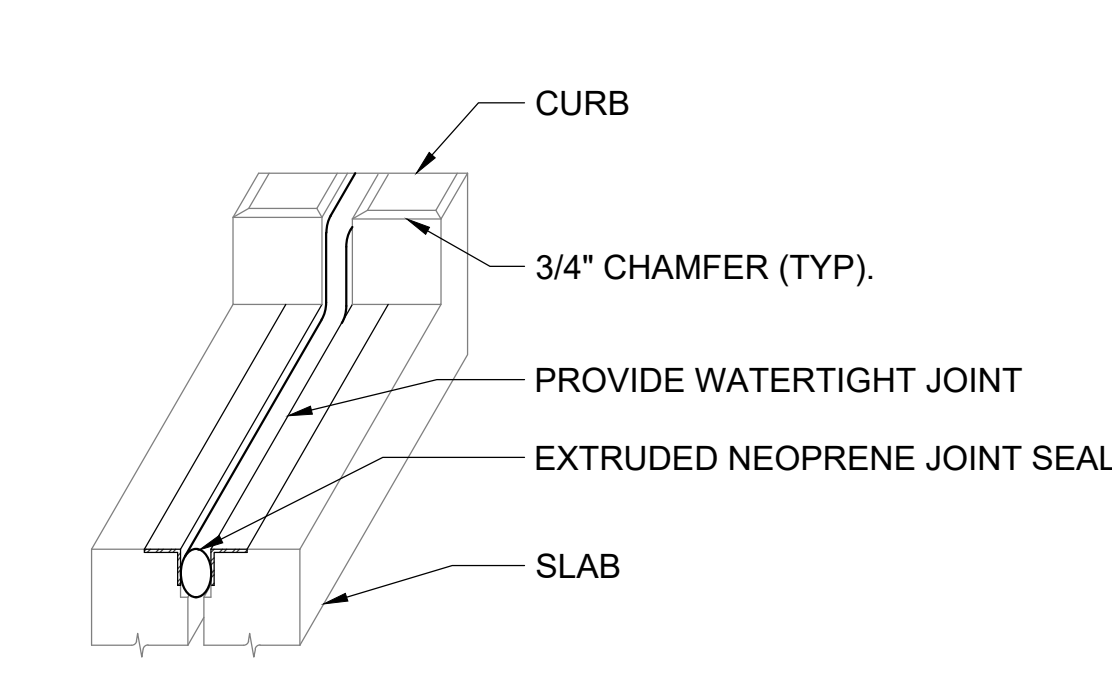
7 GUARD RAIL DETAIL  
SCALE: 1-1/2" = 1'-0"



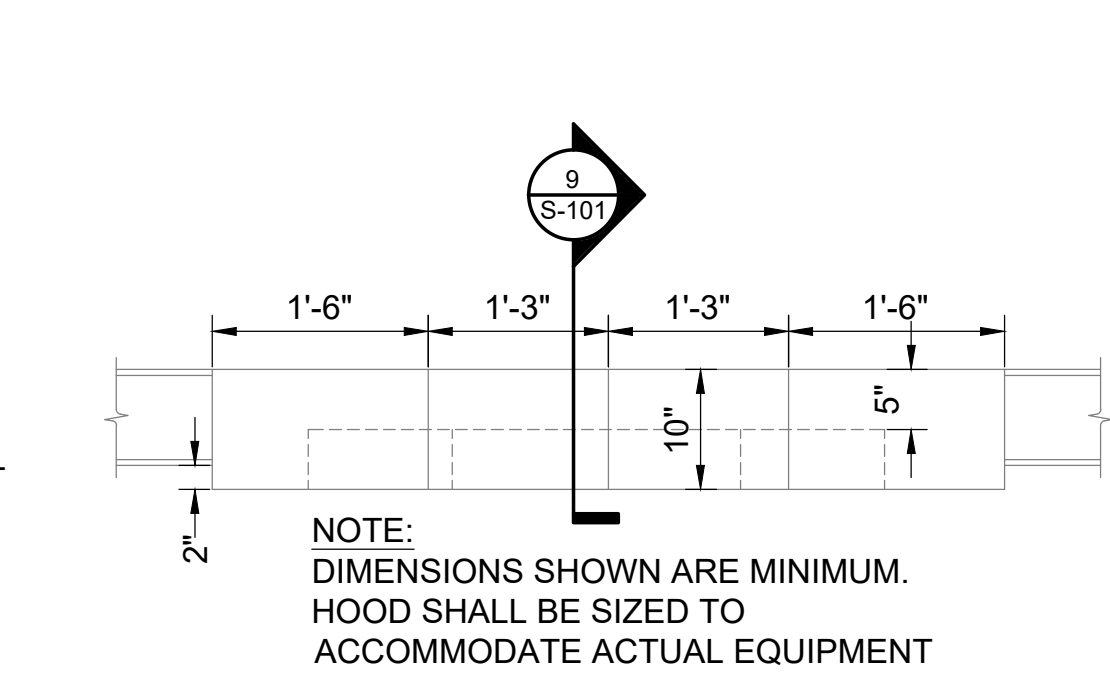
8 PIPE RAIL DETAIL  
SCALE: 3/4" = 1'-0"



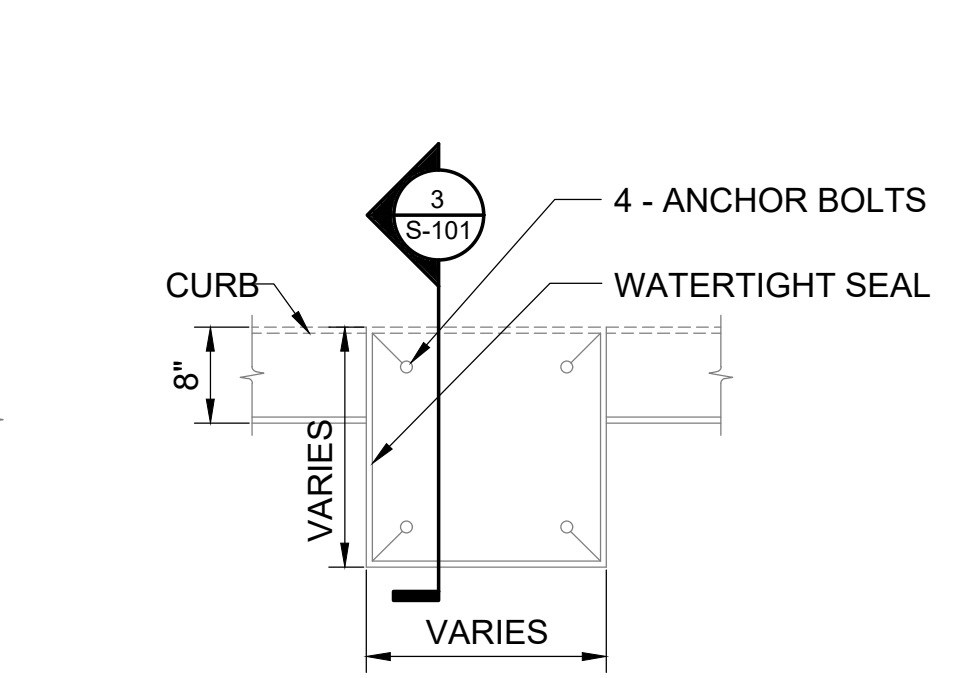
9 SECTION  
SCALE: 3/4" = 1'-0"



10 TYPICAL EXPANSION JOINT DETAIL  
SCALE: NONE



11 ELECTRICAL RECEPTACLE CENTER  
SCALE: 3/4" = 1'-0"

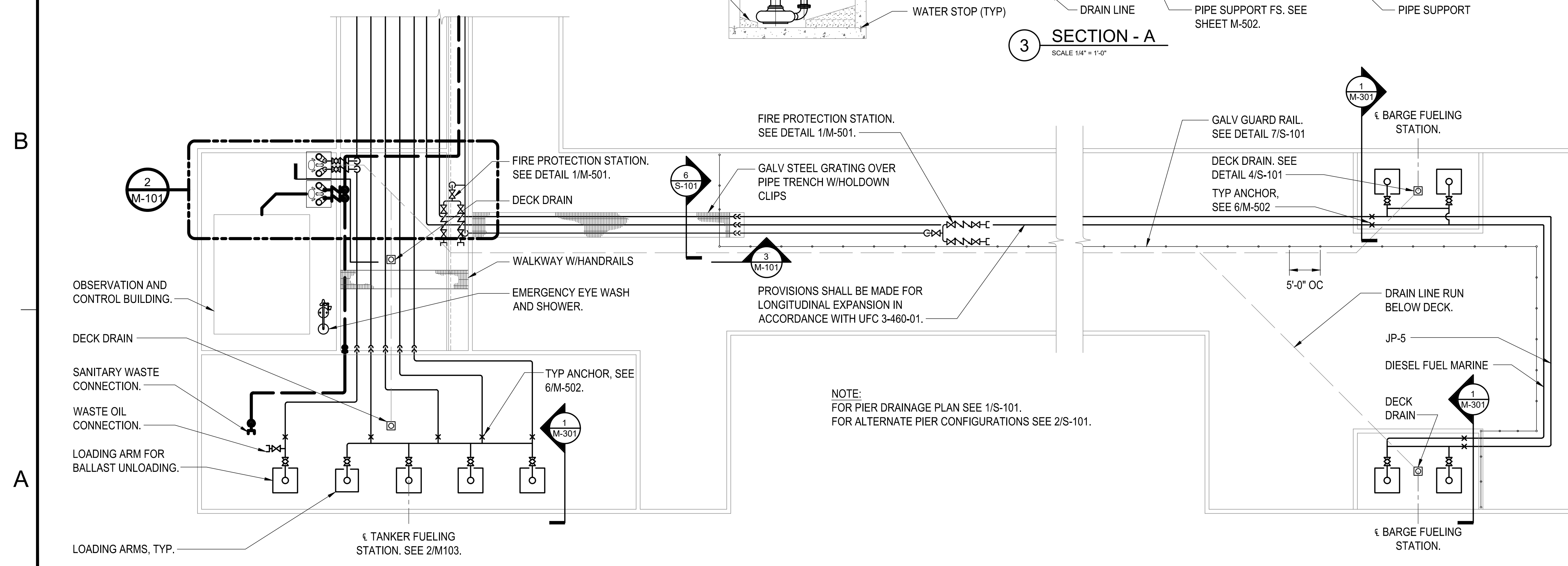
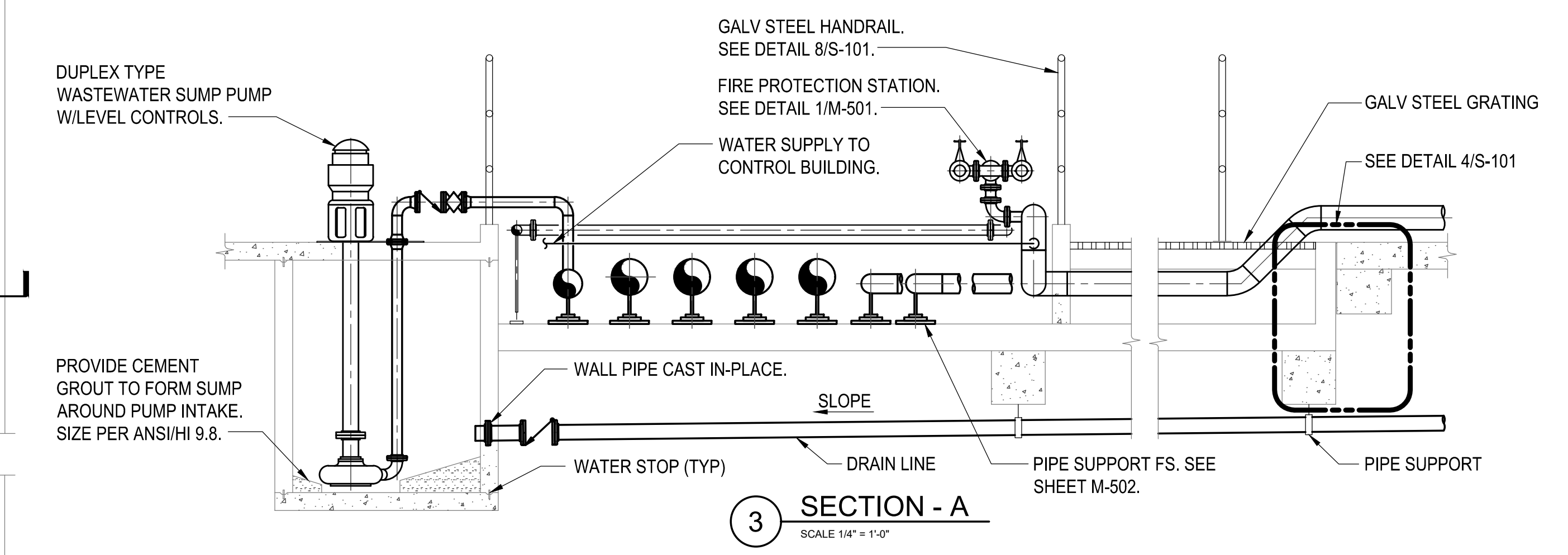
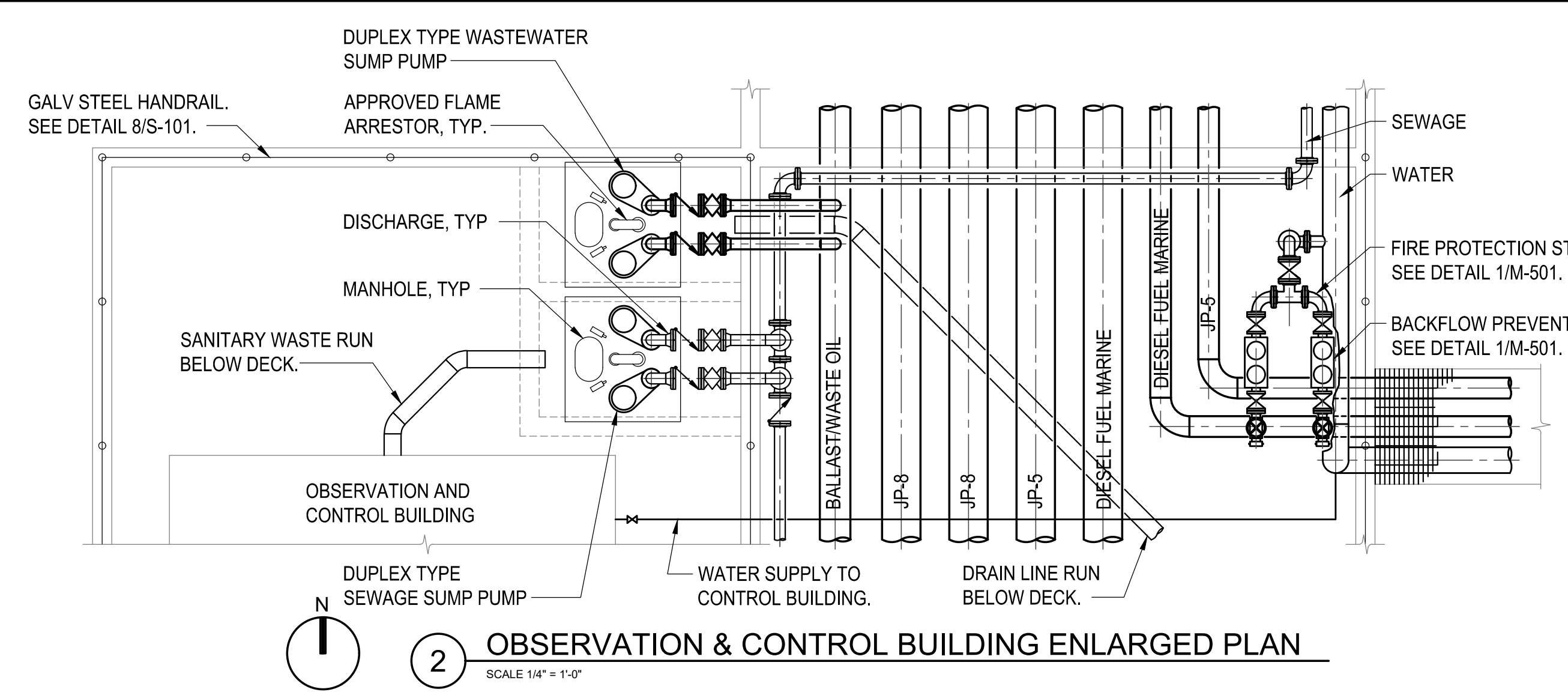
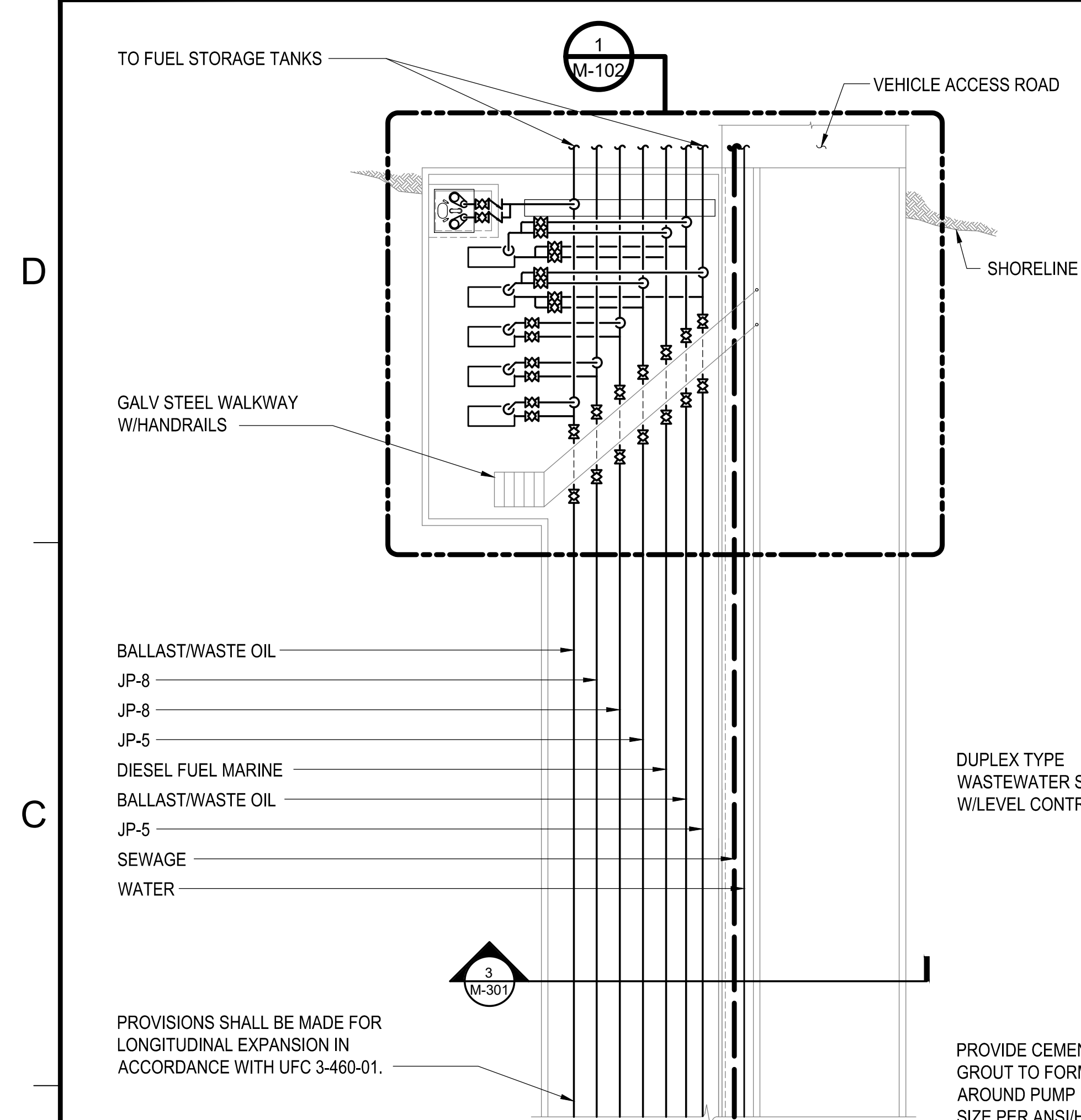


12 LIGHT POLE SUPPORT PLAN  
SCALE: 3/4" = 1'-0"



APPROVED	DATE	APP'R
FOR COMMANDER NAVFAC		
ACTIVITY		
SATISFACTORY TO: DATE	TBD	
DES: XXX	DRW: XXX	CHK: XXX
PM/IM		
BRANCH MANAGER		
CHIEF ENGINEER		
FIRE PROTECTION		
NAVAL FACILITIES ENGINEERING COMMAND		
NAVFAC EXWC		
1000 23RD AVE. PORT HUNTERS, CA		
DEPARTMENT OF THE NAVY		
EXPEDITIONARY WARFARE CENTER		
FUEL PIER		
PIER DRAINAGE PLANS AND DETAILS		
SCALE: AS NOTED		
EPROJCT NO.: T.B.D.		
CONSTR. CONTR. NO.		
NAVFAC DRAWING NO. 10009726		
SHEET 3 OF 11		
S-101		
DRAWING REVISION: 12 APRIL 2018		



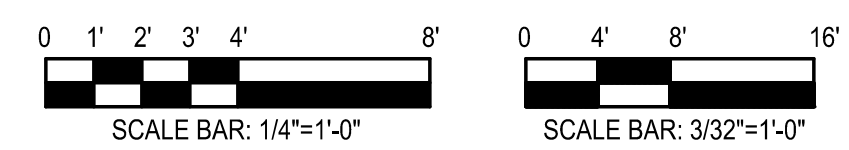


1 OVERALL PIER PIPING PLAN

SCALE 3/32" = 1'-0"

DESIGNER NOTES:

- DUPLEX WASTEWATER SUMP PUMPS MUST BE CAPABLE OF PUMPING WATER, JP-8, JET FUELS AND DIESEL FUEL MARINE.
- SIZE, NUMBER OF PIPELINES AND TYPE OF PRODUCTS TO BE HANDLED SHALL BE PROVIDED AS PER SERVICE HEADQUARTERS, PROJECT PROGRAMMING AND/OR SCOPE DOCUMENTS.
- LOADING ARMS ARE TO BE DESIGNED TO SUIT THE DESIGN CRITERIA OF THE TYPE OF VESSEL. SPACING SHALL BE TO SUIT MANUFACTURER'S INSTALLATION REQUIREMENTS.
- LOADING ARMS SHALL MEET THE DESIGN, FABRICATION, MATERIAL, INSPECTION AND TESTING REQUIREMENTS OF ASME B31.3, B31.4 AND 33CFR156.170 AS APPROPRIATE.
- EXPANSION LOOPS, BENDS AND OFFSETS SHALL BE USED TO ABSORB LONGITUDINAL EXPANSION WHEREVER POSSIBLE. IF SPACE LIMITATIONS PREVENT THEIR USE, AN EXPANSION JOINT IN ACCORDANCE WITH UFGS 33 52 40.
- IN COLD CLIMATES, THE DESIGN SHALL INCLUDE ALL NECESSARY FEATURES TO AVOID FREEZE UPS AND RUPTURE OF LINES AND EQUIPMENT.
- FACILITIES MAY BE PROVIDED ALONG APPROACH LEG OF PIER FOR FUELING SMALL BOATS AND BARGES WATER DEPTH AND PIER CONFIGURATION PERMITTING.
- NAVIGATION LIGHTS SHALL BE PROVIDED ON PIER AS REQUIRED BY COAST GUARD REGULATIONS.
- CHECK VALVES SHALL BE PROVIDED IN ALL DRAIN LINES WHERE LINES ENTER WASTEWATER SUMPS TO CONTAIN VAPOR.
- STORAGE FOR MANIFOLD FITTINGS/ADAPTERS, SPANNERS, GASKETS, BOLTS/NUTS, ETC. SHALL BE PROVIDED IN STORAGE ROOM OF OBSERVATION AND CONTROL BUILDING.
- FLANGE BOLTS AND NUTS SHALL BE IAW UFGS 33 52 40.
- PRESSURE TRANSMITTERS SHALL BE PROVIDED FOR ALL FUEL PIPELINES TO TRANSMIT LINE PRESSURE TO REMOTE GAGES IN CONTROL ROOM. HIGH AND LOW ALARM CONTACTS SHALL BE PROVIDED TO INDICATE WHEN LINE PRESSURE EXCEEDS DESIGN CONDITIONS.
- BARGE LOADING ARMS SIZES 8" AND SMALLER ARE NORMALLY MANUALLY OPERATED. TANKER LOADING ARMS SIZES 10" AND LARGER ARE NORMALLY PROVIDED WITH HYDRAULIC OPERATORS.
- VOLUME OF CONTAINMENT OF WASTE WATER SUMPS SHALL BE IN ACCORDANCE WITH COAST GUARD REGULATIONS 33 CFR 154.
- FENDERS, DOLPHINS, CLEATS, BOLLARDS, ETC. SHALL BE IN ACCORDANCE WITH UFC 4-152-01. CONSULT UFC 3-460-01 FOR ADDITIONAL BOLLARD REQUIREMENTS.
- THE PIER SHALL BE CONSTRUCTED OF FIRE RESISTIVE MATERIAL. THE PIER SHALL COMPLY WITH NFPA 307.
- PROVIDE SPACING OF ALIGNMENT GUIDES, ANCHORS AND SUPPORTS IN ACCORDANCE WITH UFC 3-460-01.
- DESIGNER SHALL SPECIFY THAT SPOOLS, HOSES, AND ADAPTORS FOR MAKING CONNECTION BETWEEN THE LOADING ARMS AND VESSELS SHALL BE SUPPLIED AS COLLATERAL EQUIPMENT.
- SLOPE ALL PIPELINES TOWARDS SHORE FOR STRIPPING. PROVIDE AIR VENTS AS NECESSARY.
- PROVIDE LOADING AND OFFLOADING METERS, FLOW STRAIGHTENER AND METER PROVING CONNECTIONS FOR EACH PRODUCT IN ACCORDANCE WITH UFC 3-460-01. FUEL PIPING AND METERING COMPONENTS SHALL CONFORM TO UFGS 33 52 40.
- MAINTAIN 8" MINIMUM CLEARANCE BETWEEN THE BOTTOM OF THE PIPING AND THE PIER DECK.
- WATER AND SEWAGE PIPING SHALL BE SUPPORTED ABOVE THE MAXIMUM LIQUID LEVEL OF THE CONTAINMENT AREA.
- PROVIDE HIGH POINT VENTS AND LOW POINT DRAINS AT THE APPROPRIATE LOCATIONS IN THE SYSTEM TO EFFECTIVELY DRAIN AND FILL THE FUEL LINES.
- PROVIDE PRESSURE RELIEF PIPING AROUND ISOLATION VALVES IN ACCORDANCE WITH 2/M501.
- PROVIDE VAPOR RECOVERY LINES AS REQUIRED FOR CLASS I LIQUIDS.
- PROVIDE EYEWASH STATION(S) IN ACCORDANCE WITH UFC 3-460-01 TABLE 2-5.
- COAT PIPE EXTERIOR IN ACCORDANCE WITH UFGS 09 97 13.27. LABEL PIPES IN ACCORDANCE WITH MIL-STD 161H.
- INTERNALLY COAT BALLAST/WASTE OIL LINES IN ACCORDANCE WITH UFC 3-460-01.



DATE	APP'R
DESCRIPTION	SYN
APPROVED FOR COMMANDER NAVFAC ACTIVITY SATISFACTORY TO: DATE TBD DES XXX DRW XXX CHK XXX PM/IM BRANCH MANAGER CHIEF ENGINEER FIRE PROTECTION NAVAL FACILITIES ENGINEERING COMMAND 1000 23RD AVE. FORT HAVENUE, CA NAVFAC EXWC DEPARTMENT OF THE NAVY EXPEDITIONARY WARFARE CENTER <b>FUEL PIER</b> OVERALL PIER PIPING PLAN ENLARGED PLAN AND SECTION SCALE: AS NOTED PROJECT NO.: T.B.D. CONSTR. CONTR. NO. NAVFAC DRAWING NO. 10009727 SHEET 4 OF 11 <b>M-101</b> <small>DRAWING REVISION: 12 APRIL 2018</small>	



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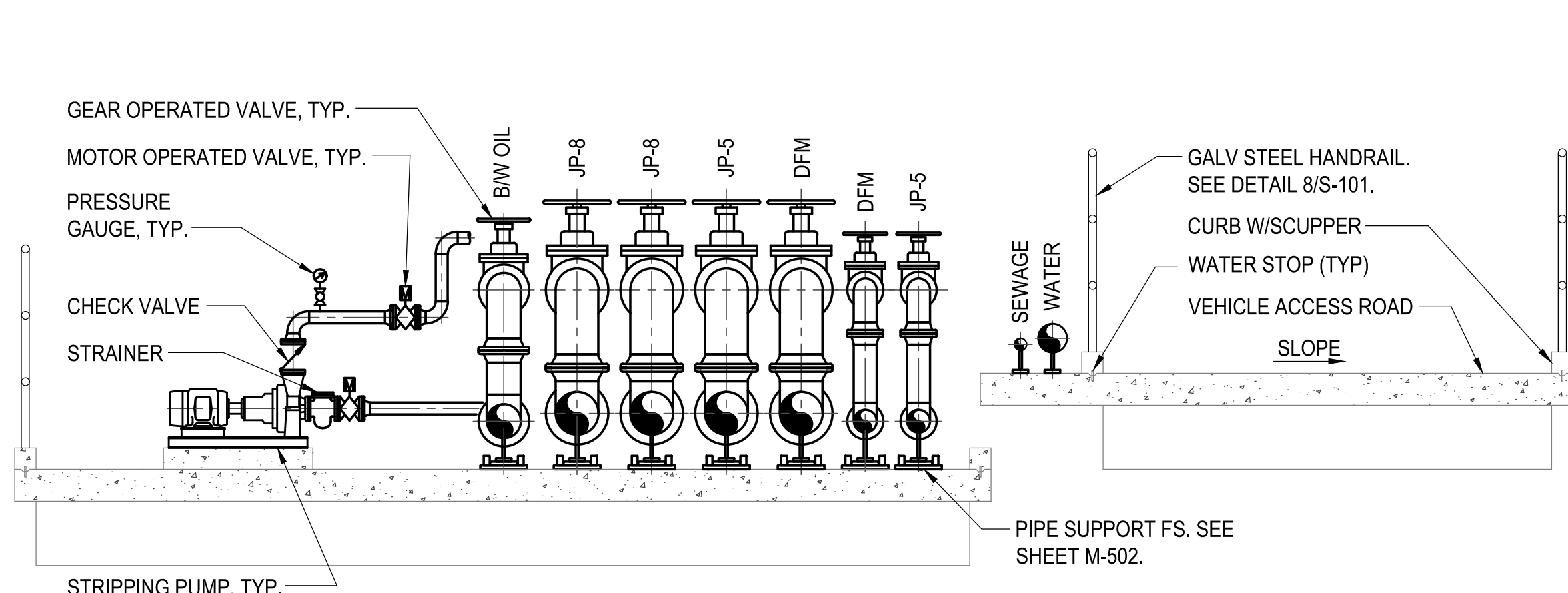
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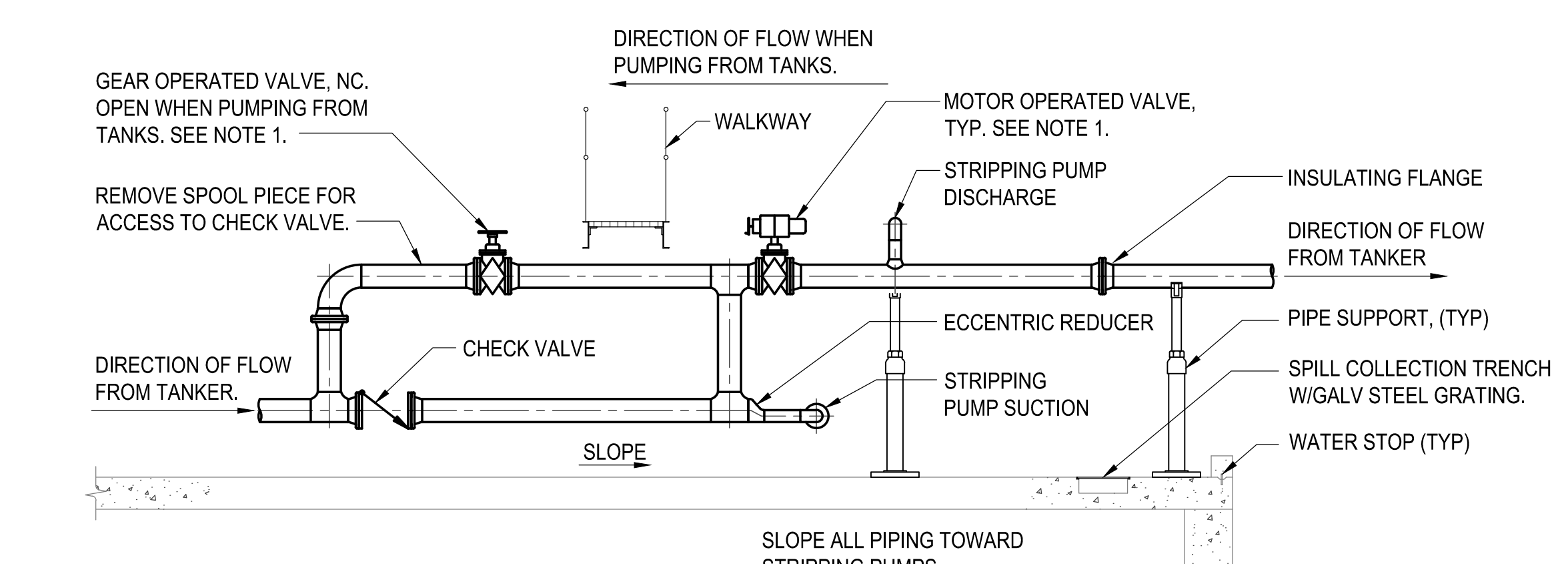
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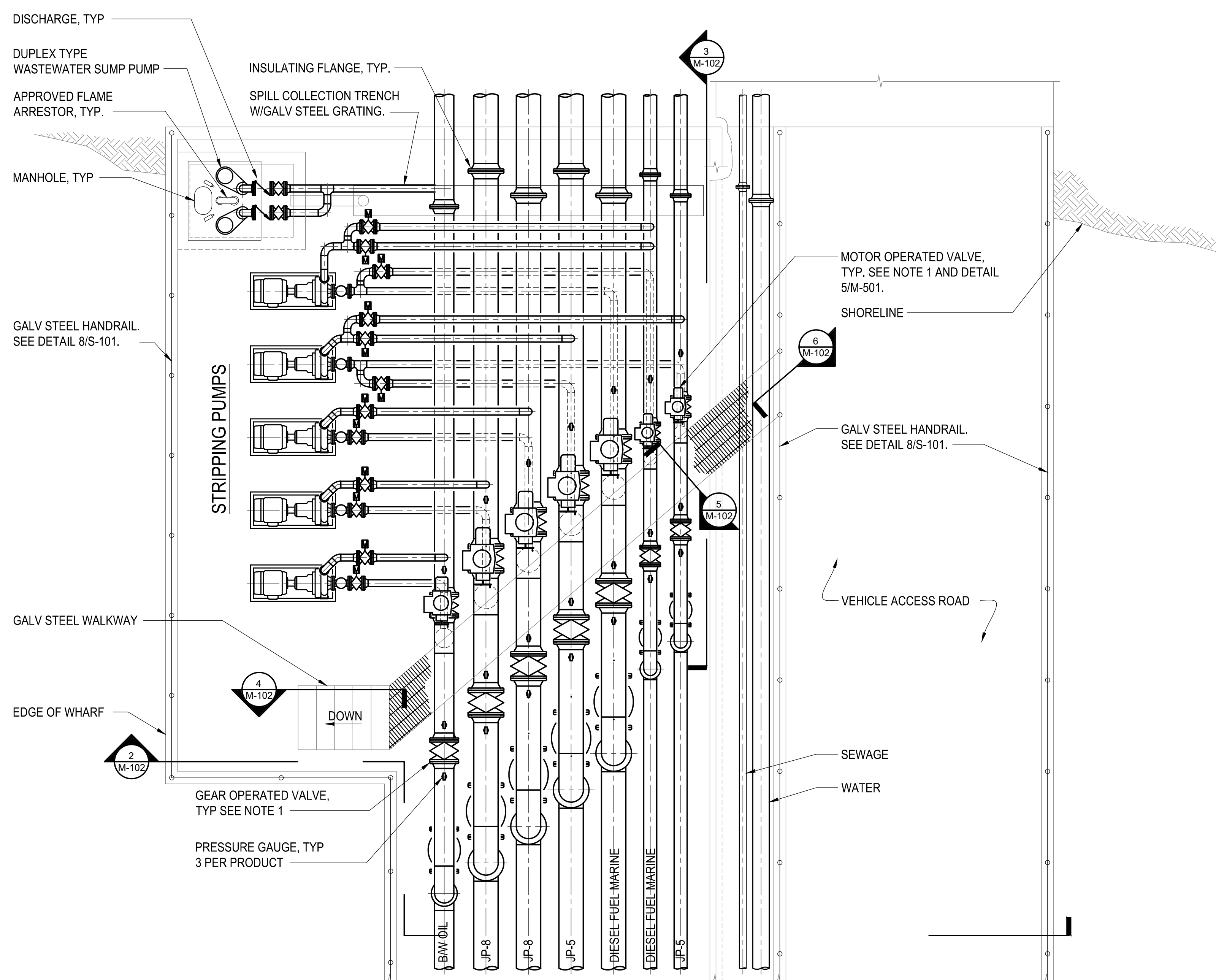
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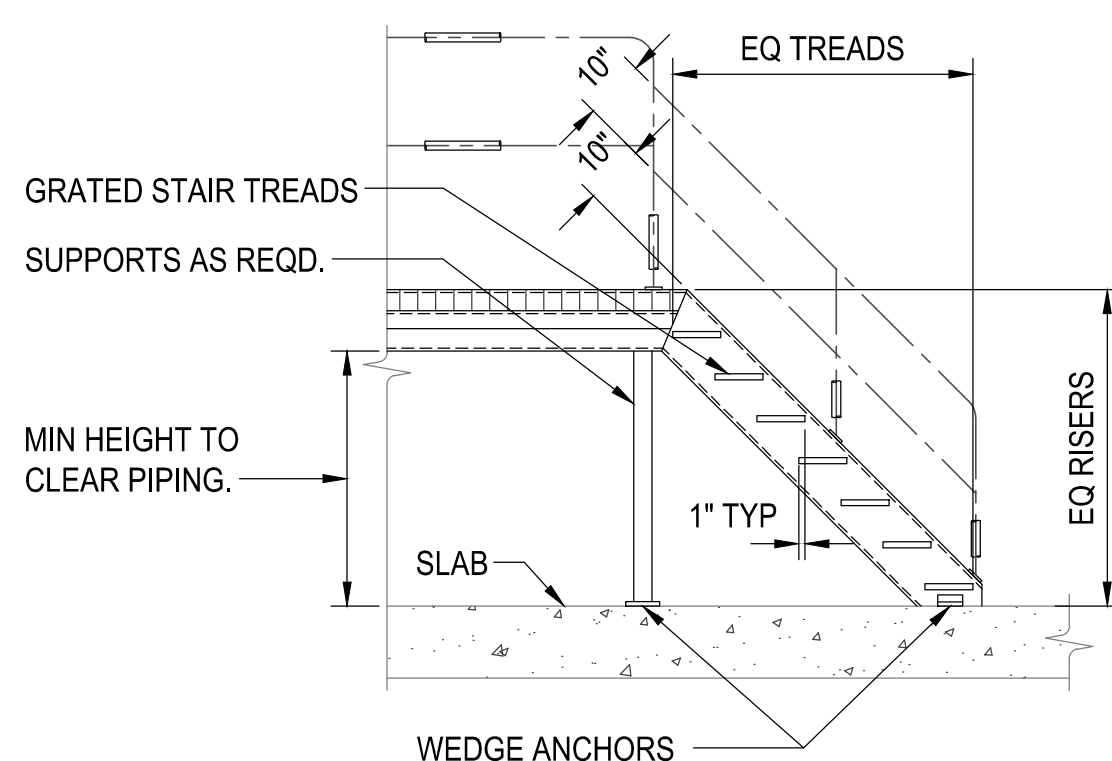
2 SECTION - A  
SCALE 1/4" = 1'-0"



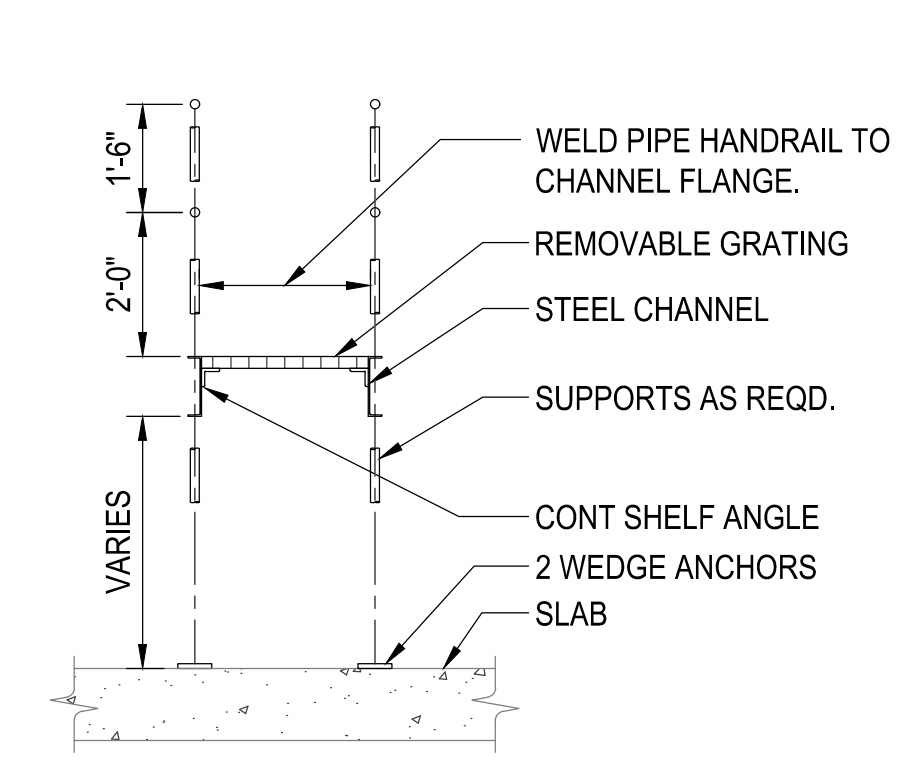
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SCALE 1/4" = 1'-0"



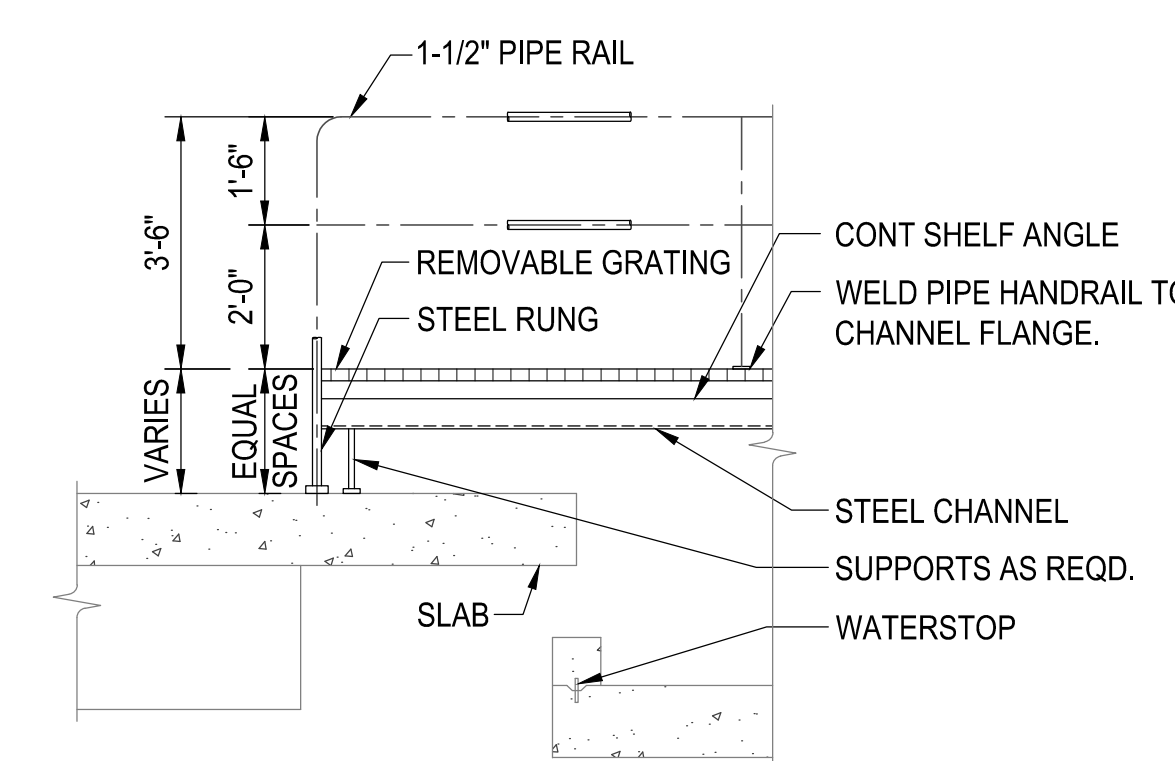
1 IN-BOUND END OF PIER ENLARGED PLAN  
SCALE 1/4" = 1'-0"



4 SECTION - C  
SCALE 1/4" = 1'-0"



5 SECTION - D  
SCALE 1/4" = 1'-0"



6 SECTION - E  
SCALE 1/4" = 1'-0"

DESIGNER NOTES:

1. PROVIDE EITHER HAND OR MOTOR OPERATED VALVES AS PER SERVICE HEADQUARTERS, PROJECT PROGRAMMING AND/OR SCOPING DOCUMENTS FOR PIERS WHICH DISPENSE FUEL AS FREQUENTLY AS RECEIVING FUEL, USE MOTOR OPERATED VALVES IN PLACE OF HAND OPERATED VALVES IN MAIN LINES.
2. PROVIDE PIPE SUPPORTS, ANCHORS AND GUIDES IN ACCORDANCE WITH UFC 3-460-01.
3. PROVIDE BASKET STRAINER WITH DP GAUGE, DRAIN AND SUPPORT FEET.
4. DESIGN PRESSURE RELIEF PIPE AROUND ISOLATION VALVES AS TO NOT INTERFERE WITH WALKWAY.



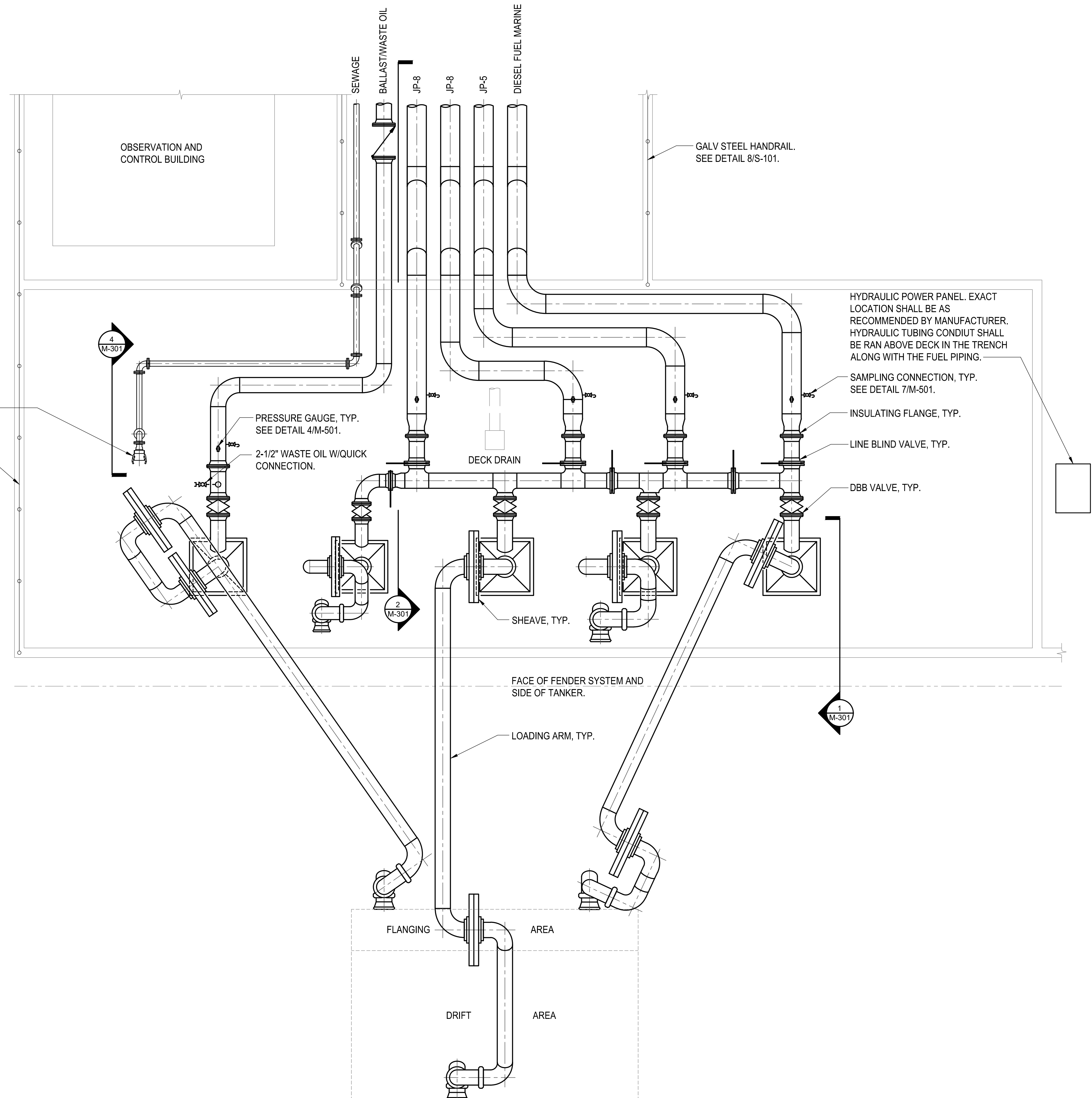
APPROVED	DATE	APP'D
FOR COMMANDER NAVFAC	ACTIVITY	DESCRIPTION
SATISFACTORY TO: DATE	TBD	
DES: XXX	DRW: XXX	CHK: XXX
PI/M		
BRANCH MANAGER		
CHIEF ENGINEER		
FIRE PROTECTION		
NAVFAC EXWC	100 23RD AVE. PORT HUENEME CA	
FUEL PIER		
FUELING PIER PARTIAL PLAN AND SECTIONS		
SCALE: AS NOTED	PROJECT NO.: T.B.D.	
CONSTR. CONTR. NO.		
NAVFAC DRAWING NO. 10009728		
SHEET 5 OF 11		
M-102		
DRAWING REVISION: 12 APRIL 2018		

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DESIGNER NOTES:

- MANUAL QUICK COUPLING ASSEMBLY AND LOADING ARMS ILLUSTRATED ARE REPRESENTATIVE OF ONE MANUFACTURER AND ARE NOT INTENDED TO BE RESTRICTIVE. PRODUCTS OF OTHER MANUFACTURERS MUST ALSO BE CONSIDERED.
- LOADING ARM FLANGE CONNECTION SHALL BE COMPLETELY ISOLATED FROM PIER AND PIER PIPING. THIS MAY REQUIRE INSULATING JOINTS IN HYDRAULIC TUBING WHERE USED OR IF REQUIRED, AN INSULATING FLANGE AT THE END OF LOADING ARM.
- IN SWIFT CURRENT, PROVIDE AN EMERGENCY BREAK AWAY COUPLING AT THE LOADING ARM FLANGE.
- ENSURE THE MARINE LOADING ARM (MLA) DOES NOT INTERFERE WITH ITEMS THAT JUT OUT FROM THE VESSELS. CONSIDER THE HEIGHT OF THE PIER AND THE HEIGHT OF THE VESSELS AND BARGES WHEN DESIGNING THE ANGLES AND REACH OF THE MLA. IF THE SAME MLA IS TO BE USED FOR BOTH BARGES AND VESSELS, THE DESIGN OF THE MLA'S REACH DUE TO THE HEIGHT DIFFERENCES BETWEEN THE VESSEL AND BARGE IS CRITICAL. DO NOT ASSUME THAT ADDITIONAL BUMPERS WILL BE USED TO MOVE THE VESSELS AWAY FROM THE PIER.
- PER UFC 3-460-01, THE MLA IS TO BE LOCATED SO THAT THE CONNECTED VESSEL CAN MOVE 15 FEET (4.6M) FORWARD, 15 FEET (4.6M) AFT. THE LOCATION FOR MEASURING THESE DISTANCES MUST CONSIDER THE ACTUAL CONNECTION POINT OF THE MLA TO THE VESSEL. FOR EXAMPLE, THE KAISER CLASS VESSEL FUELS FAIRLY CLOSE TO THE EDGE OF THE VESSEL AND CLOSE TO THE PIER, SO THE 15-FOOT MOVEMENT MUST BE BASED ON THE CLOSEST THE MLA CAN BE FROM THE CONNECTION POINT. THE SPACING ON THE NEW LEWIS CLASS VESSEL IS ABOUT THE SAME AS THE EXISTING KAISER CLASS VESSEL, BUT WITHOUT THE HOSE RACK INTERFERING WITH ANY POSSIBLE CLEARANCE ISSUES.
- ENSURE THAT THE TYPE OF OIL THAT IS USED IN THE MLA IS READILY AVAILABLE IN THE UNITED STATES, OR THE LOCATION WHERE THE MLA IS BEING INSTALLED.
- ENSURE THERE IS A VENT PULL LINE AVAILABLE FROM BOTH THE SHORE-SIDE AND THE SHIP-SIDE. IF THE MLA IS TO BE EMPTIED AFTER FUELING, THEN THE VENT PULL MUST BE OPERATED FROM SHORE-SIDE SO THAT THE MLA CAN BE DRAINED OF PRODUCT AFTER IT IS DISCONNECTED FROM THE VESSEL.
- ENSURE THE BROW LOCATION DOES NOT INTERFERE WITH EQUIPMENT AND THAT THERE IS SUFFICIENT SPACE FOR THE VESSEL'S LADDER OR A SHORE-BASED BROW TO BE PLACED.
- WIRELESS CONTROL, IF PROVIDED, SHOULD BE CLOSER TO WI-FI FREQUENCIES IN THE 2.4-5 GHZ RANGE TO AVOID INTERFERING WITH BASE SAFETY RADIOS. ENSURE THAT THIS RANGE IS COMPLIANT WITH THE ACTIVITY REQUIREMENTS AND FCC FOR WIRELESS SETUPS AND WITH UFC 4-010-06 FOR CYBERSECURITY REQUIREMENTS.
- PROVIDE INDEPENDENT STRIPPING PUMPS FOR EACH PRODUCT TYPE AT EACH MULTI-PRODUCT MLA. PROVIDE THERMAL RELIEF PIPING ON THE STRIPPING PUMPS AND ASSOCIATED PIPING.
- SINCE MOST MLA'S ARE LOCATED IN SALT-AIR ENVIRONMENTS, THEY WILL INTERNALLY CORRODE IF THEY SIT EMPTY WHEN THEY ARE NOT IN USE. PROVIDE MLA'S WITH INTERIOR COATED PIPING PER UFGS 33 52 80 OR CONSTRUCT MLA'S OUT OF STAINLESS STEEL.
- PROVIDE COLOR CODING FOR SHORE-TO-SHIP UTILITY CONNECTIONS IN ACCORDANCE WITH UFC-4-150-02.



**LOADING ARMS PARTIAL PLAN**  
 SCALE: 1/4" = 1'-0"



APPROVED	DATE	APP'R
FOR COMMANDER NAVFAC		
ACTIVITY		
SATISFACTORY TO	DATE	TBD
DES	XXX	DRAW
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PHIM		
BRANCH MANAGER		
CHIEF ENGINEER		
FIRE PROTECTION		
NAVAL FACILITIES ENGINEERING COMMAND		
NAVFAC EXWC	100 23RD AVE. FORT HUANUCHE CA	
DEPARTMENT OF THE NAVY		
EXPEDITIONARY WARFARE CENTER		
<b>FUEL PIER</b>		
<b>LOADING ARMS PARTIAL PLAN AND SECTIONS</b>		
SCALE:	AS NOTED	
PROJECT NO.:	T.B.D.	
CONSTR. CONTR. NO.		
NAVFAC DRAWING NO.	10009729	
SHEET	6	OF 11
<b>M-103</b>		
<small>DRAWING REVISION: 12 APRIL 2018</small>		

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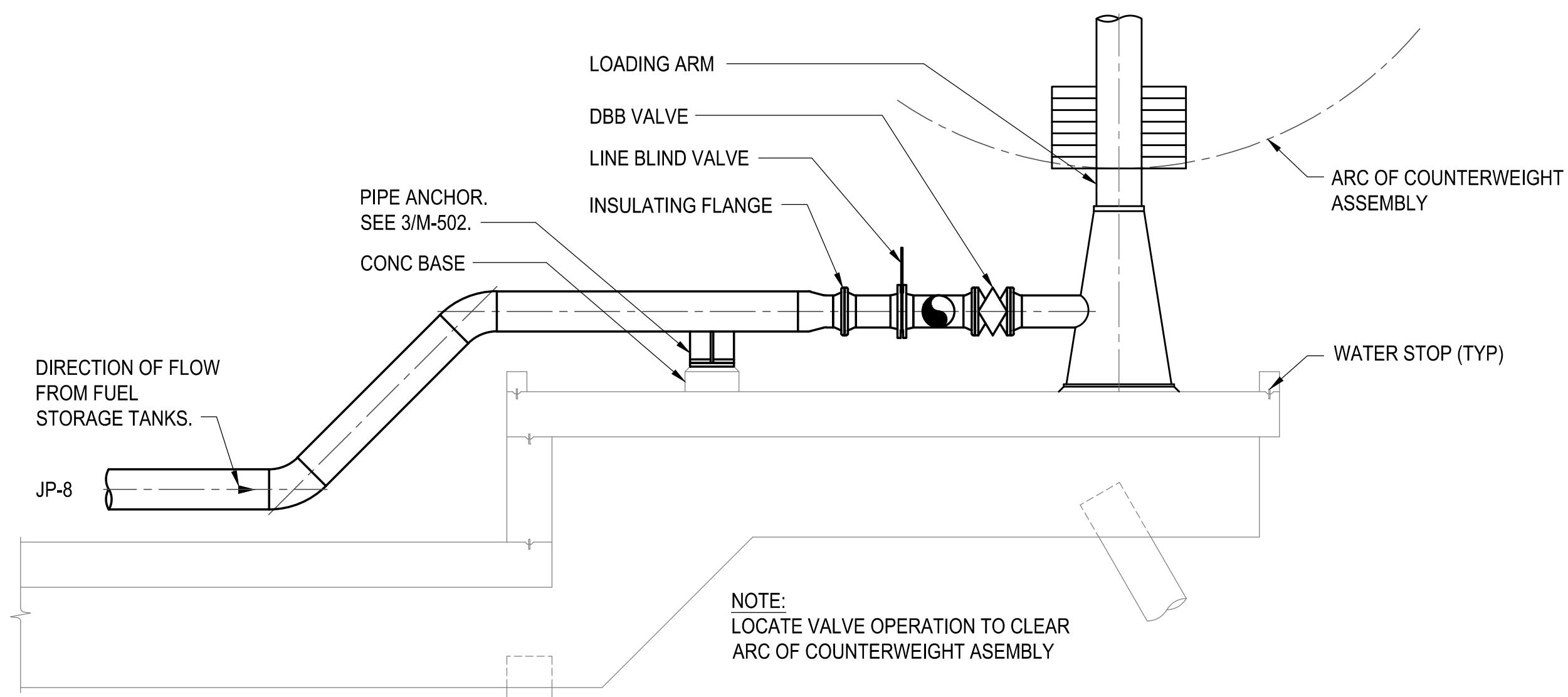
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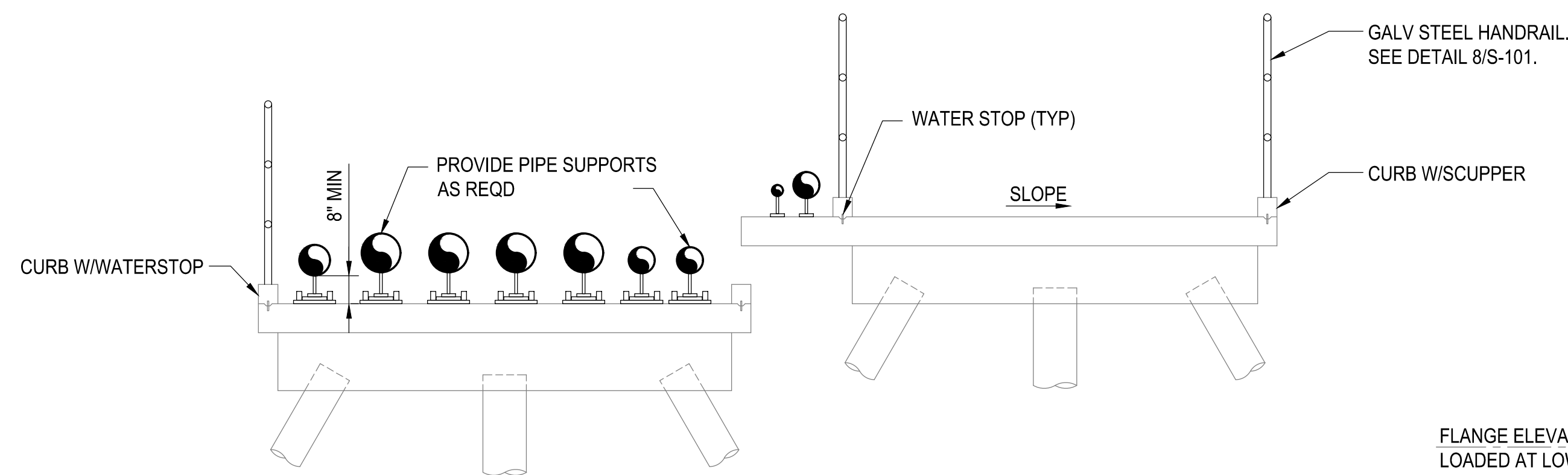
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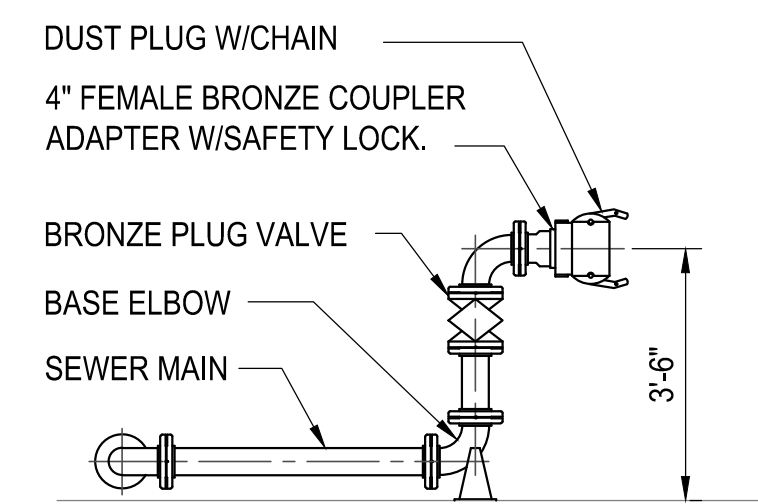
A



**2 SECTION - B**  
SCALE 1/4" = 1'-0"



**3 SECTION - C**  
SCALE 1/4" = 1'-0"



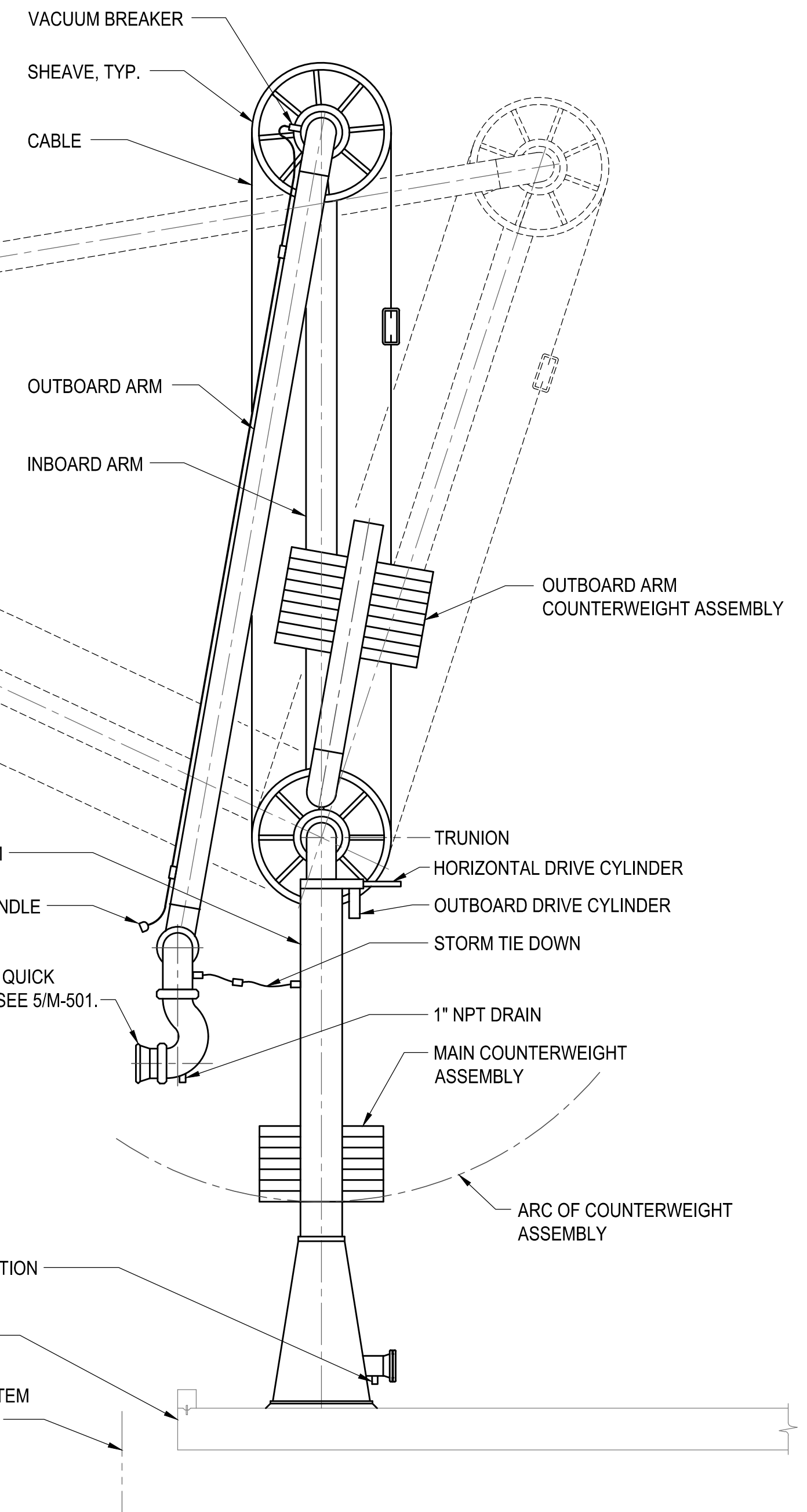
**4 SECTION - D**  
SCALE 3/8" = 1'-0"

FLANGE ELEVATION OF VESSEL  
LOADED AT HIGH WATER

FLANGE ELEVATION OF VESSEL  
LOADED AT LOW WATER

DRIFT AREA      FLANGING AREA

**1 SECTION - A**  
SCALE 1/4" = 1'-0"



**DESIGNER NOTES:**

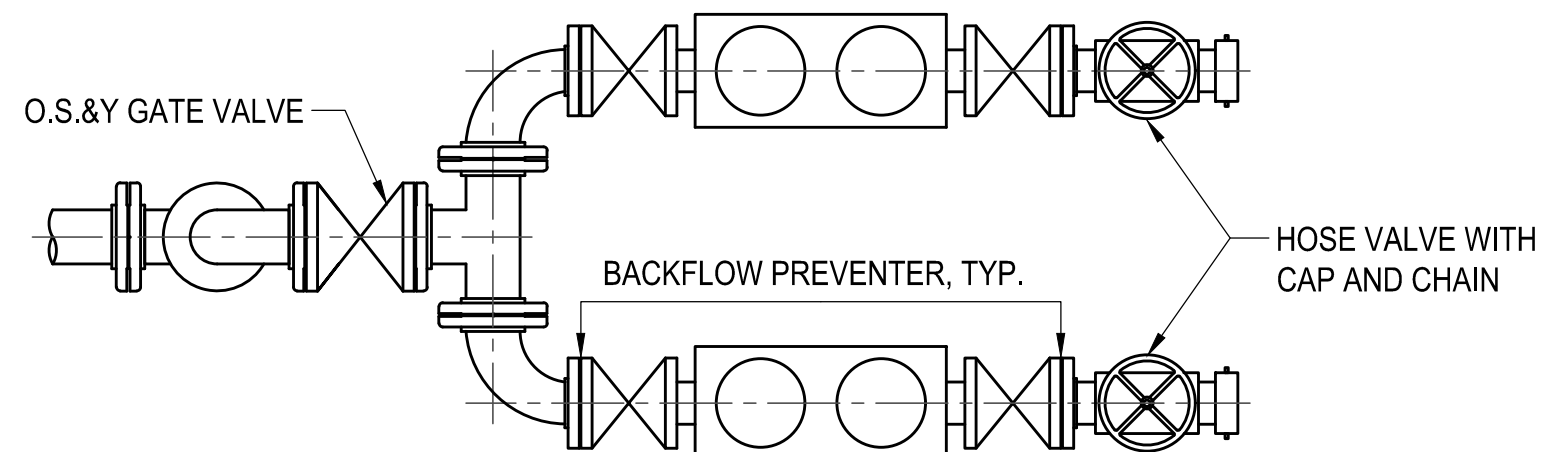
- MARINE LOADING ARM (MLA) DEPICTED HAS A WIRE ROPE/SHEAVE MOVEMENT ASSEMBLY. OTHER MOVEMENT ASSEMBLIES, SUCH AS A PANTOGRAPH, ARE AVAILABLE. DESIGNER TO INVESTIGATE AND PROVIDE THE BEST MLA FOR THE PROJECT.



APPROVED	DATE
FOR COMMANDER NAVFAC	TBD
ACTIVITY	DES XXX    DRW XXX    CHK XXX
BRANCH MANAGER	PM/IM
CHIEF ENGINEER	
FIRE PROTECTION	

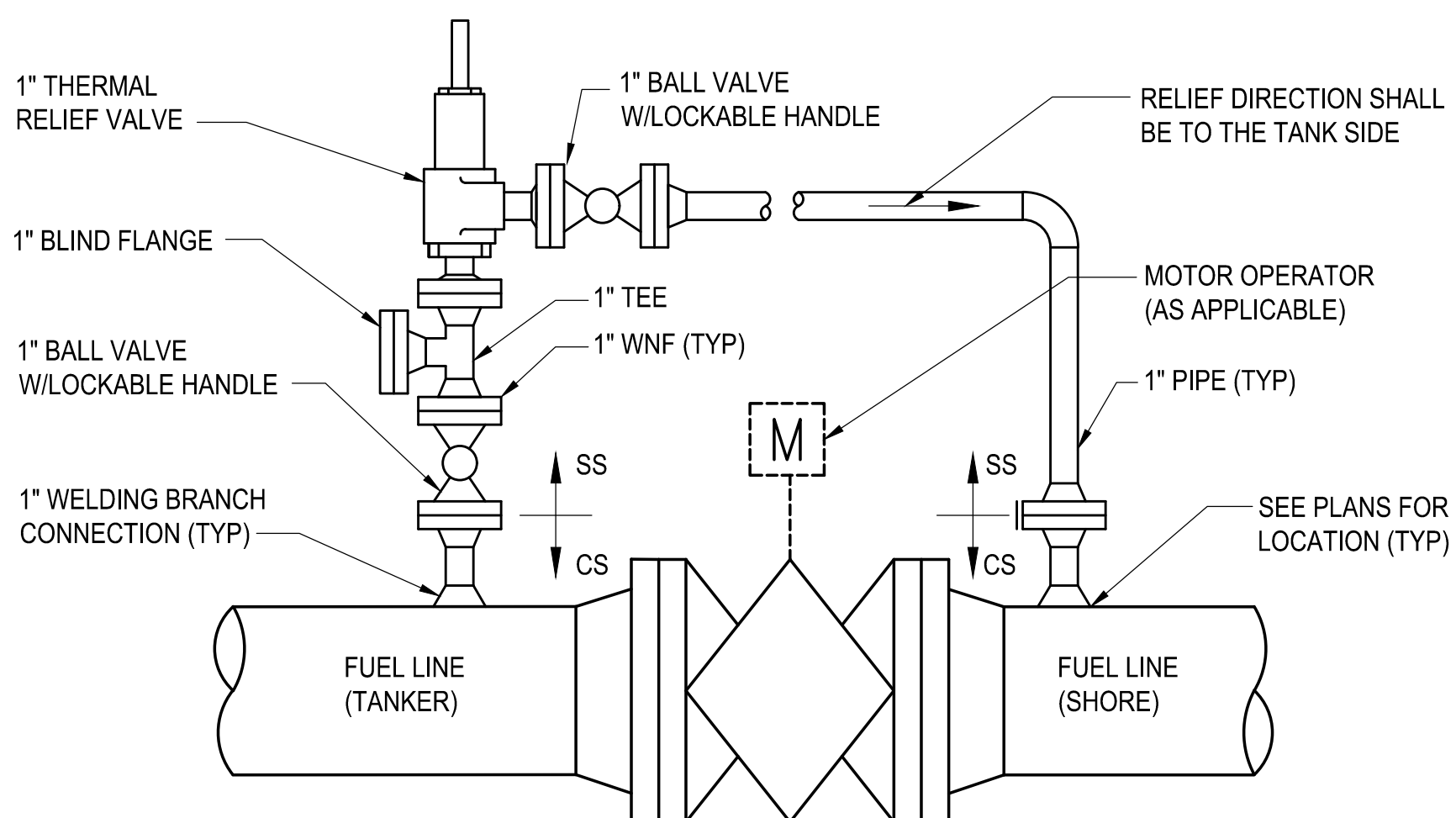
DEPARTMENT OF THE NAVY  
EXPEDITIONARY WAREHOUSE CENTER  
NAVFAC EXWC  
100 23RD AVE. PORT HUENEME CA  
NAVFAC DRAWING NO. 10009730  
SHEET 7 OF 11  
M-301

SCALE:	AS NOTED
PROJECT NO.:	T.B.D.
CONSTR. CONTR. NO.	
NAVFORM REVISION:	12 APRIL 2018



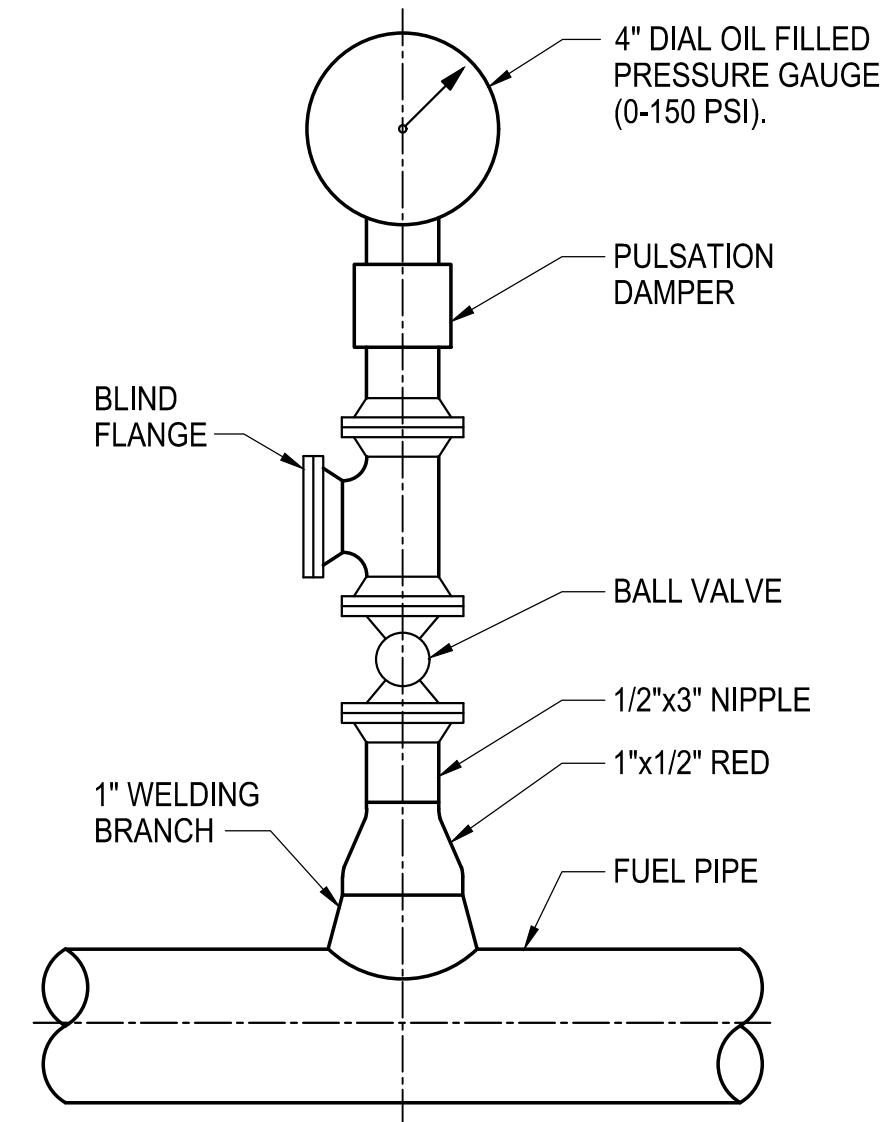
- NOTES:**
1. PROVIDE BACKFLOW PREVENTER IF FIRE WATER SYSTEM IS PART OF THE POTABLE WATER SYSTEM.
  2. PROVIDE FIRE PROTECTION IAW AUTHORITY HAVING JURISDICTION, UFC 3-460-01, UFC-4-152-01, UFC 4-150-02, UFC 4-150-06, NFPA 30, NFPA 307 AND "GUIDE ON MARINE TERMINAL FIRE PROTECTION AND EMERGENCY EVACUATION".
  3. PROVIDE PROPER FIRE PROTECTION SYSTEMS FOR CLASS I LIQUIDS.

**1 FIRE PROTECTION STATION**  
SCALE: 3/4" = 1'-0"

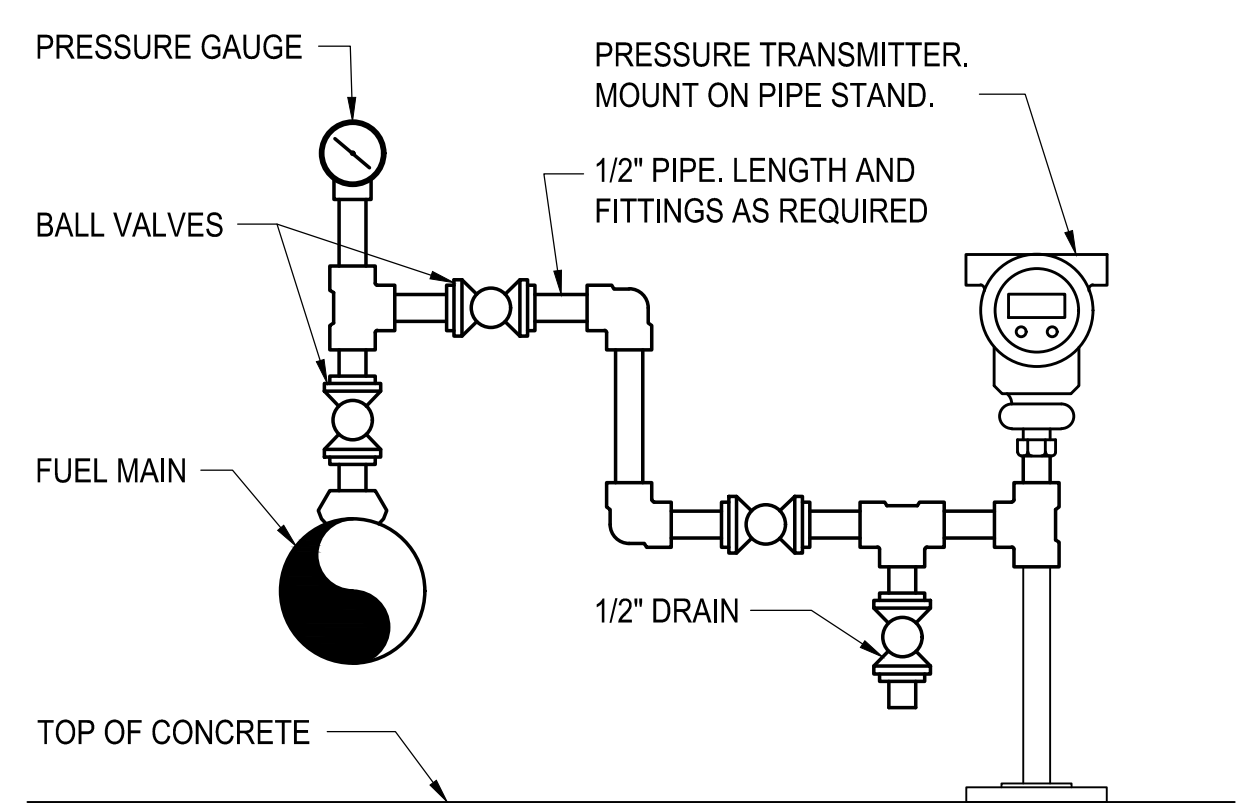


**NOTE:** MOUNT THERMAL RELIEF VALVES IN THE VERTICAL. PROVIDE THERMAL RELIEF AROUND VALVES AT LOADING ARMS AND FUEL MAINS.

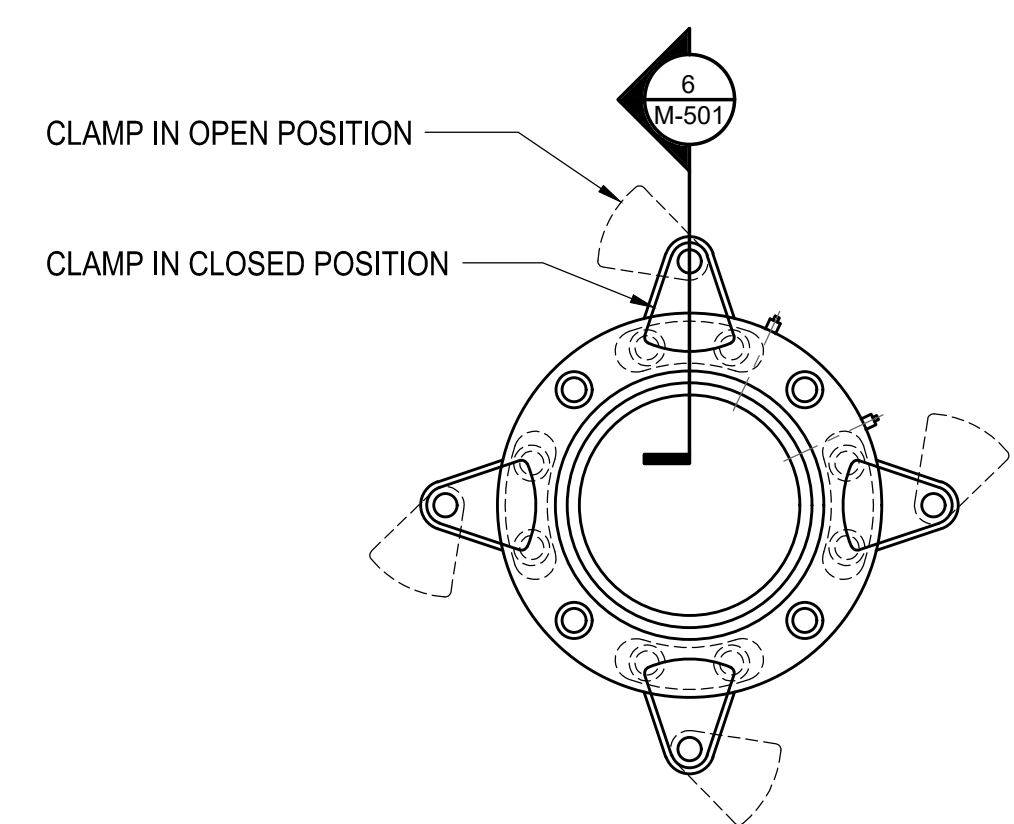
**2 THERMAL RELIEF VALVE (TRV)**  
SCALE: NONE



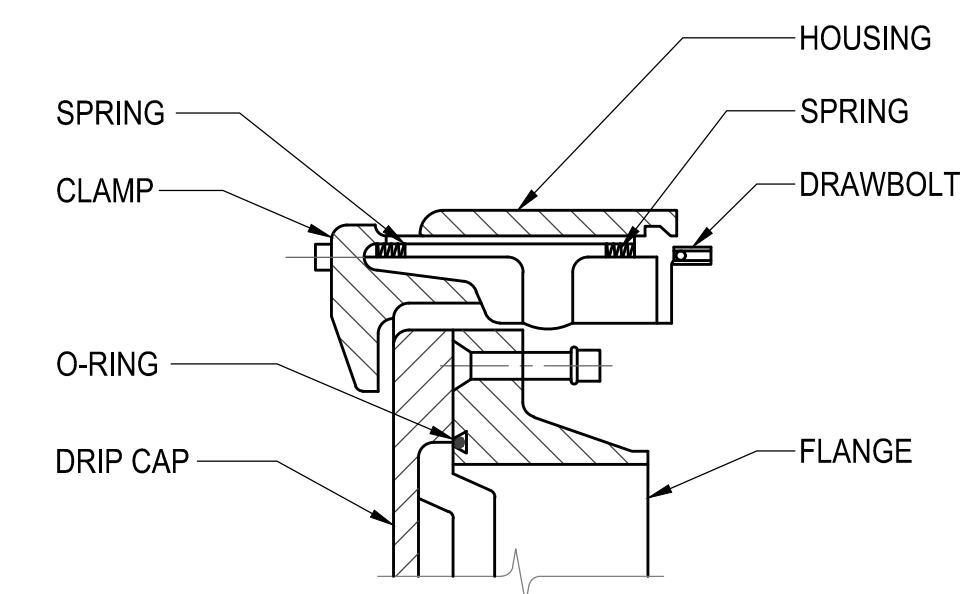
**3 PRESSURE GAUGE**  
SCALE: NONE



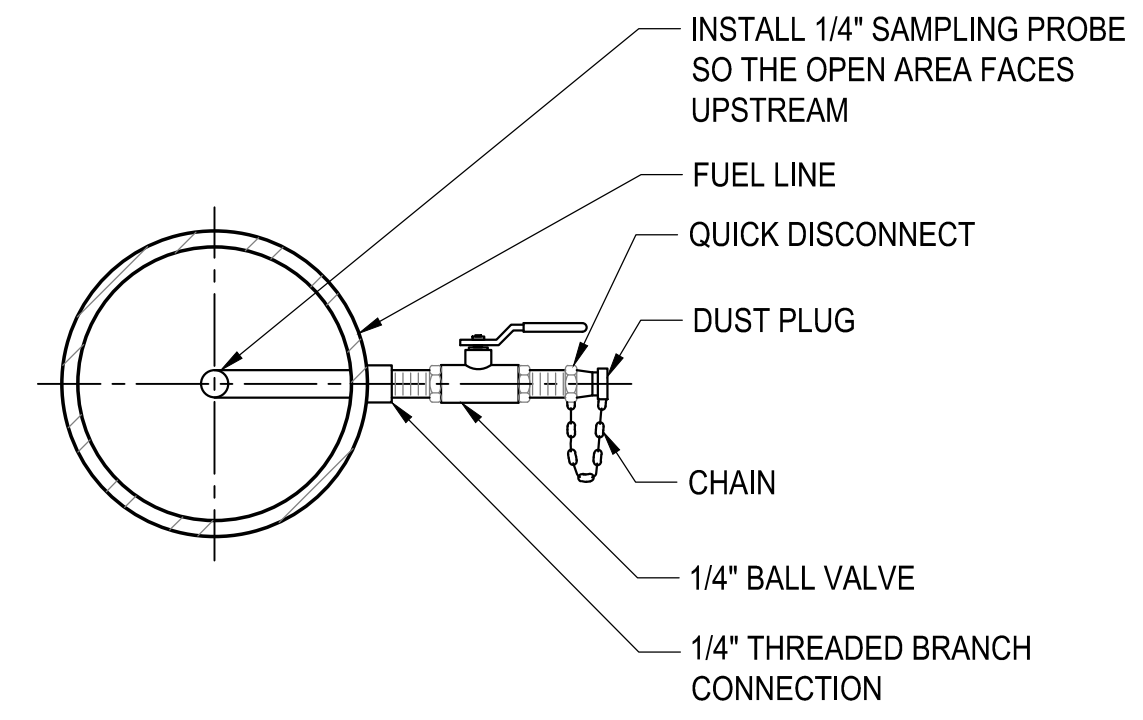
**4 PRESSURE GAUGE AND TRANSMITTER**  
SCALE: NONE



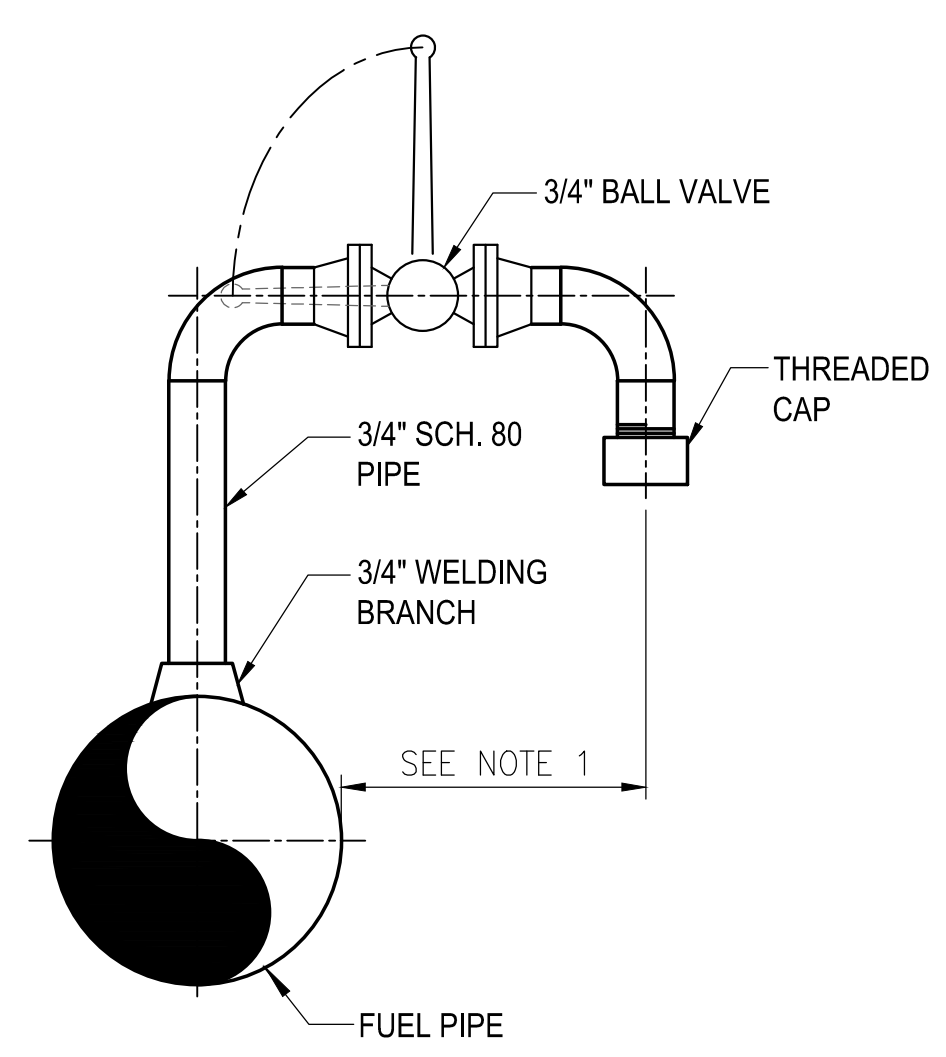
**5 MANUAL QUICK COUPLING**  
SCALE: NONE



**6 SECTION - A**  
SCALE: NONE

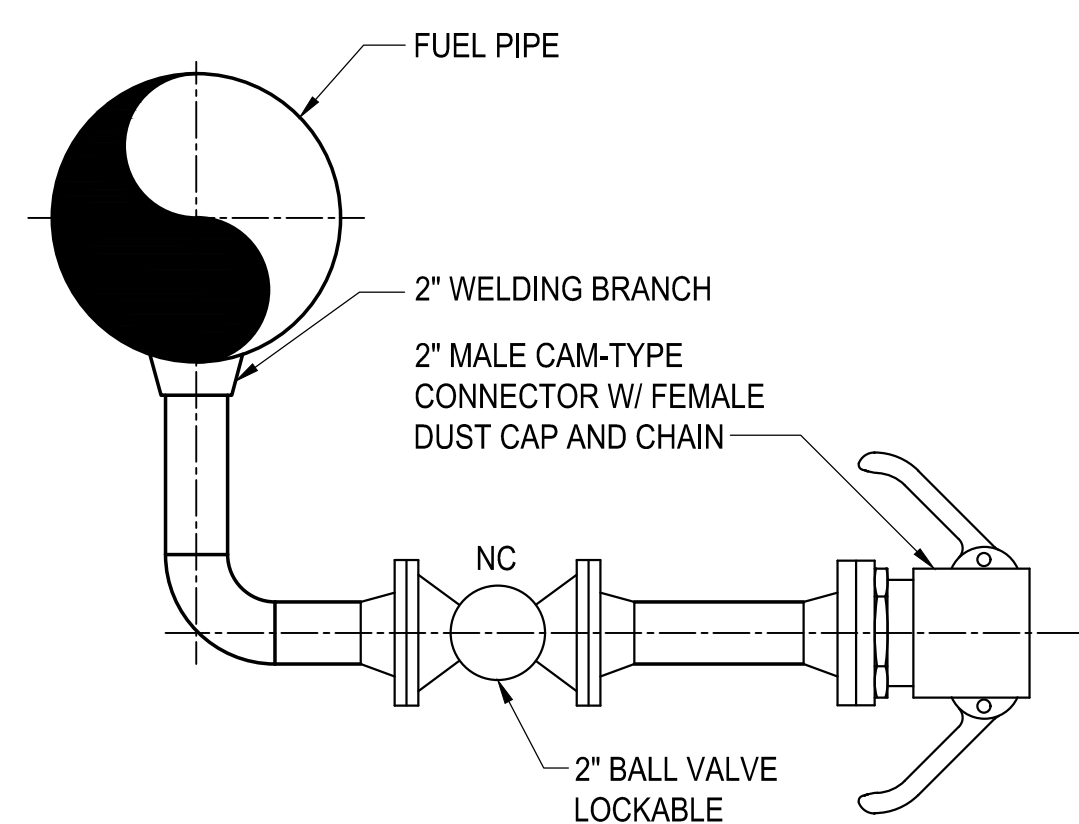


**7 SAMPLE CONNECTION DETAIL**  
SCALE: NONE



- NOTES:**
1. 2" MINIMUM FOR LINES 8" AND LARGER. KEEP DISTANCE AS SMALL AS POSSIBLE FOR PIPE LINES 6" AND SMALLER.
  2. ALL FITTINGS TO BE SOCKET WELDED.
  3. ALL VALVES SHALL BE FLANGED.

**8 MANUAL AIR VENT**  
SCALE: NONE



- NOTES:**
1. ALL FITTINGS TO BE SOCKET WELDED.
  2. ALL VALVES SHALL BE FLANGED.

**9 LOW POINT DRAIN**  
SCALE: NONE

**DESIGNER NOTES:**

1. PROVIDE BALANCED THERMAL RELIEF VALVE (TRV). IF THE TRV DISCHARGE IS PLUMBED DIRECTLY TO A PRODUCT RECOVERY TANK OR CALCULATIONS ARE PROVIDED FOR A CASCADING SYSTEM INDICATING RESULTING PRESSURE IS LESS THAN THE MAXIMUM SYSTEM PRESSURE, A TRADITIONAL TRV CAN BE INSTALLED.



APPROVED	DATE	APP'R
FOR COMMANDER NAVFAC		
ACTIVITY		
SATISFACTORY TO: DATE	TBD	
DES: XXX	DRW: XXX	CHK: XXX
PI/M/I		
BRANCH MANAGER		
CHIEF ENGINEER		
FIRE PROTECTION		
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING COMMAND	
EXPEDITIONARY WAREHOUSE CENTER	1000 23RD AVE. PORT HURON, MI 48130	
NAVFAC EXWC	FUEL PIER	
	MECHANICAL FUELING DETAILS	
SCALE: AS NOTED	PROJECT NO.: T.B.D.	
EPROJCT NO.:	CONSTR. CONTR. NO.:	
NAVFAC DRAWING NO. 10009731	SHEET 8 OF 11	
<b>M-501</b>		
DRAWING REVISION: 12 APRIL 2018		



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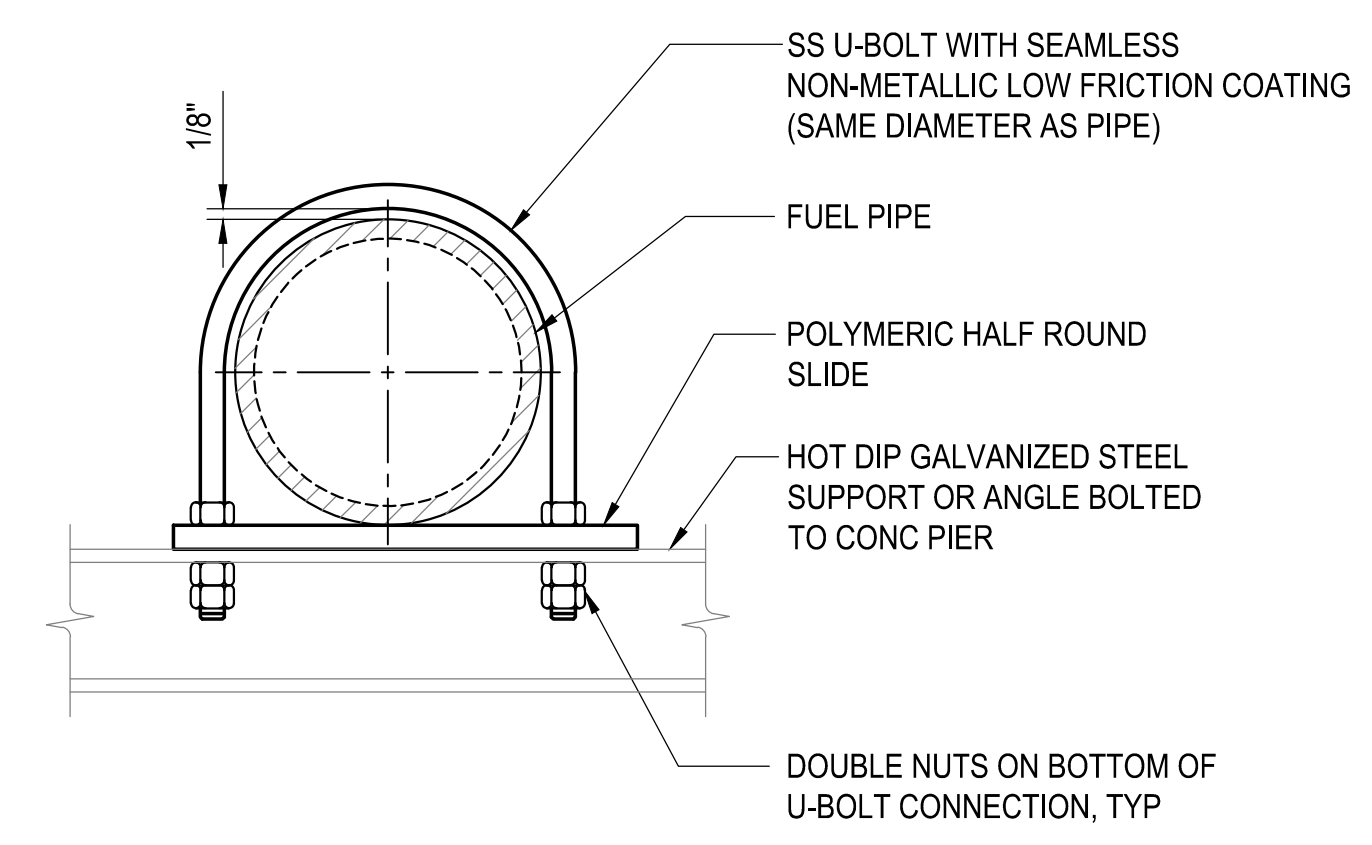
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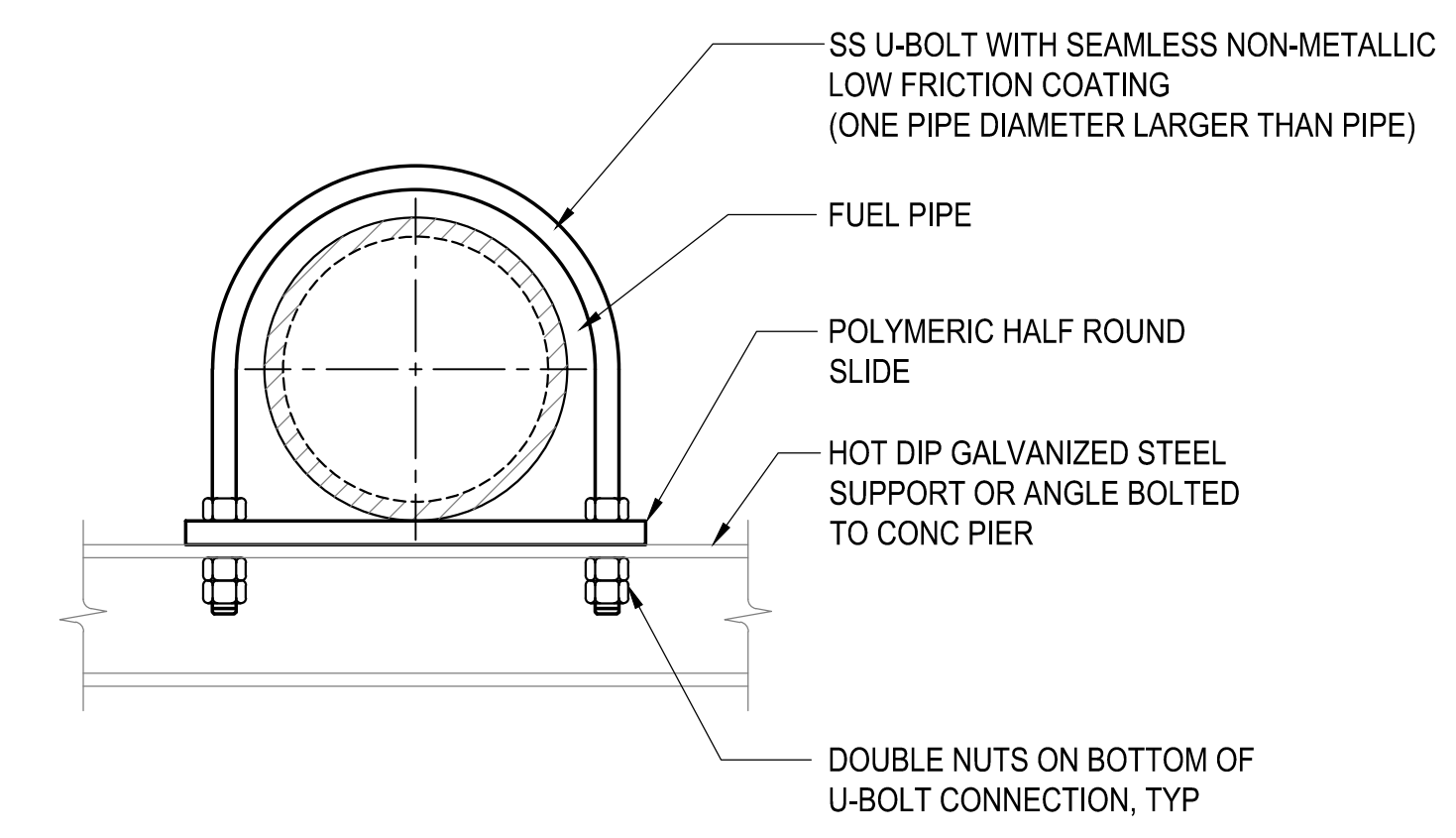
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**DESIGNER NOTES:**

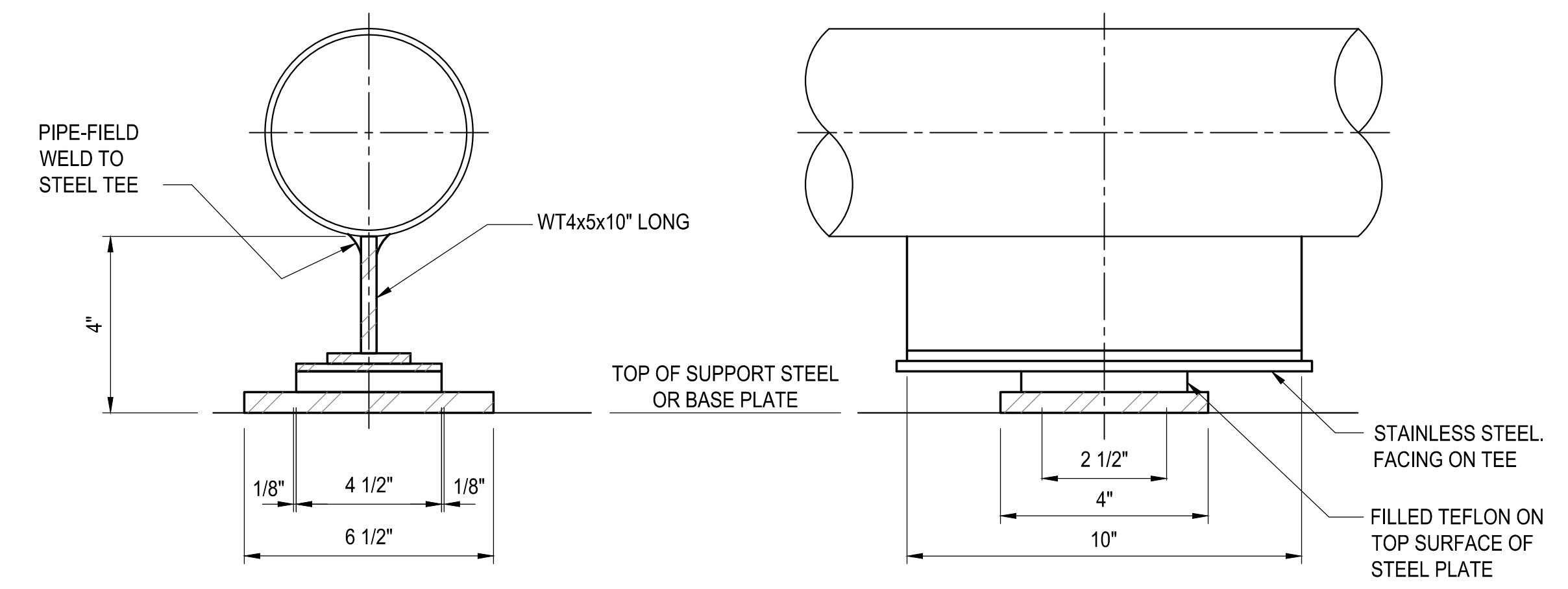
- 1. THE PIPE SUPPORT WEB ATTACHMENT TO THE PIPE SHALL BE THE SAME MATERIAL AS THE PIPE IN WHICH IT IS INSTALLED.



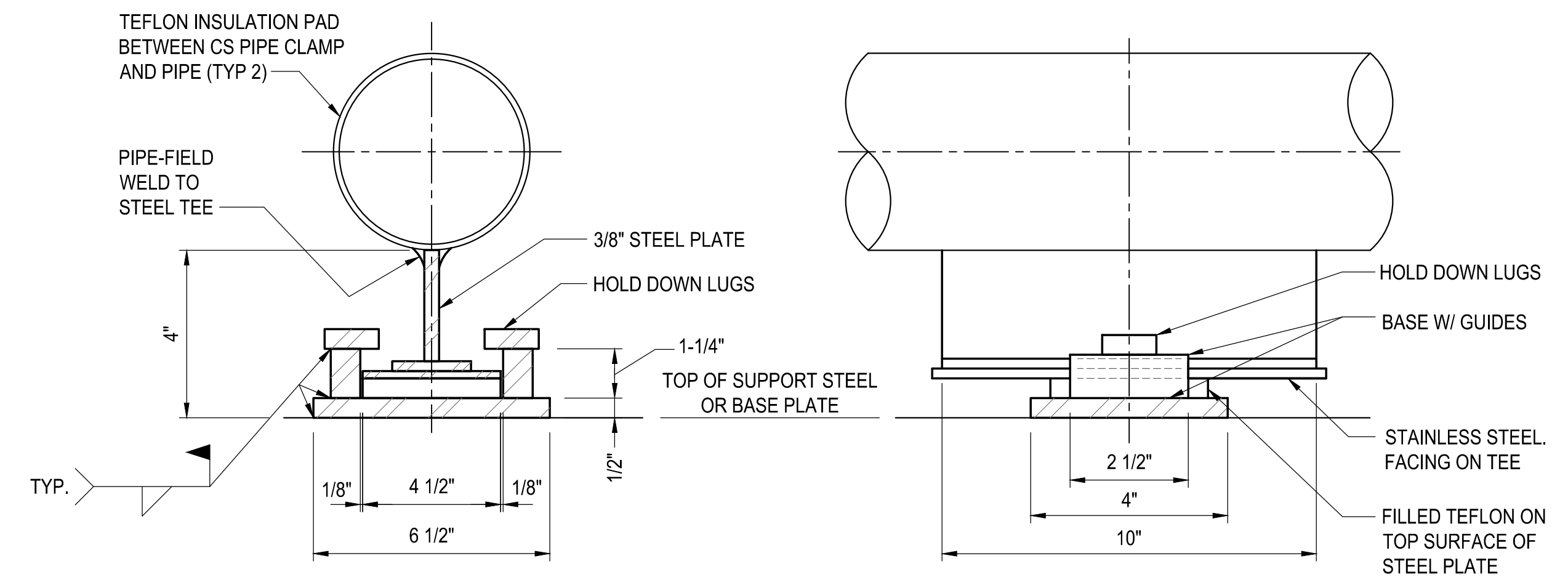
① LIMITED FIT U-BOLT INSTALLATION  
SCALE: NONE



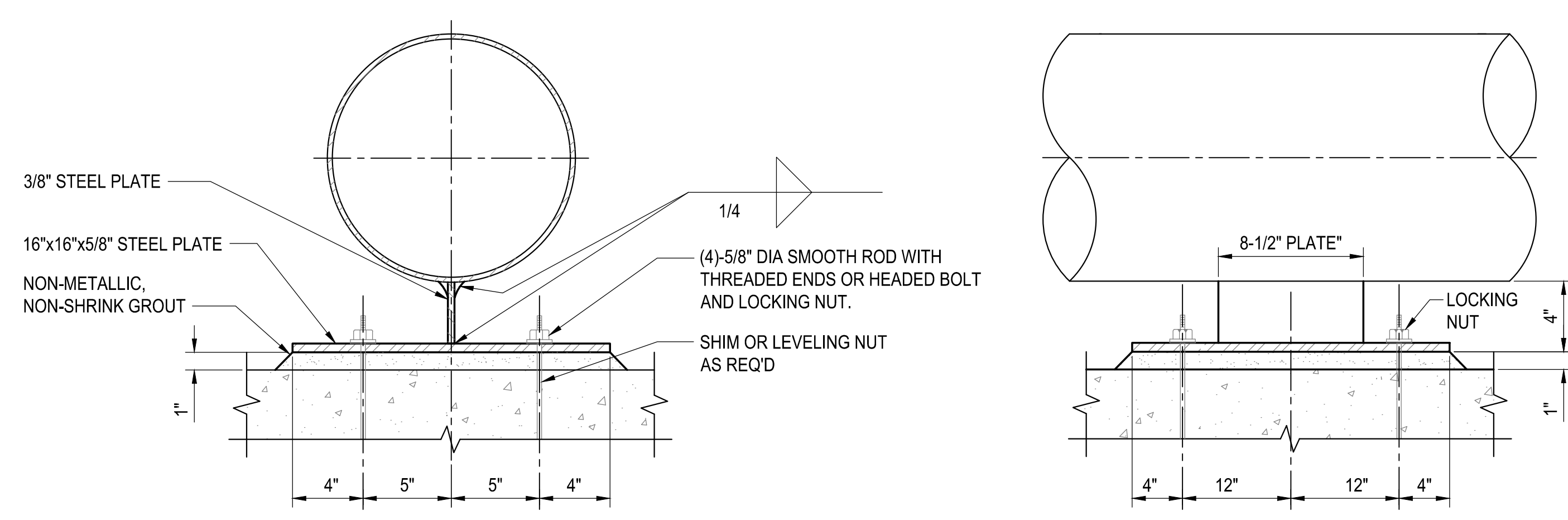
② LOOSE FIT U-BOLT INSTALLATION  
SCALE: NONE



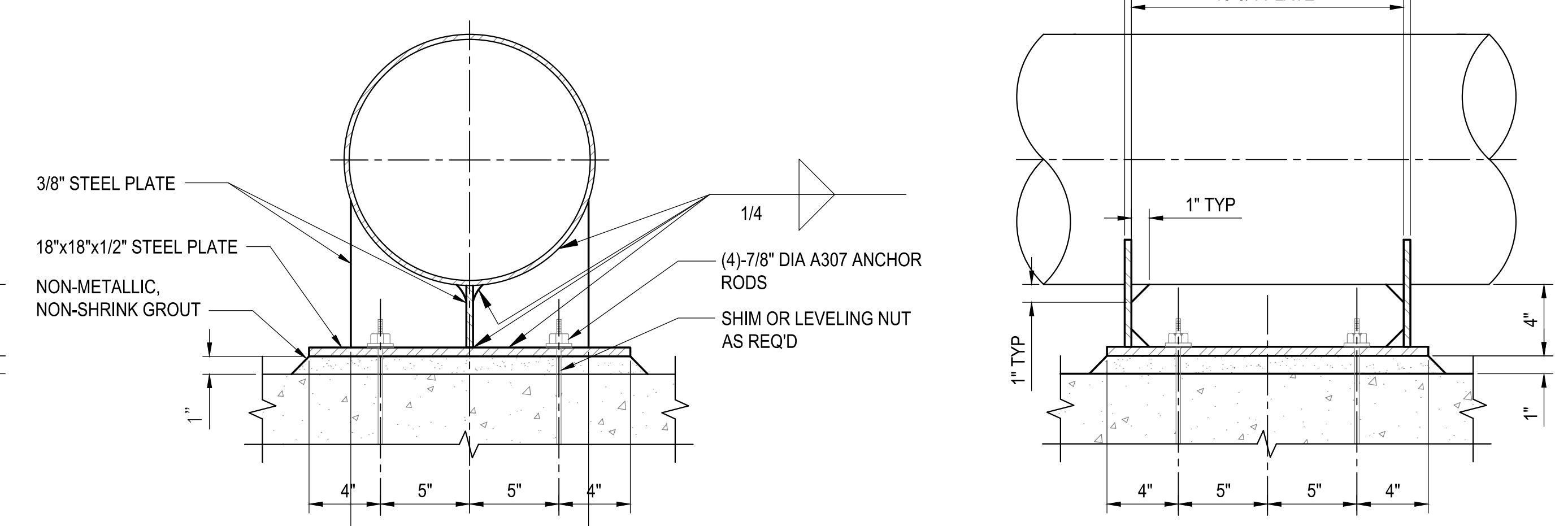
③ PIPE SUPPORT TYPE FS: FREE SUPPORT  
SCALE: NONE



④ PIPE SUPPORT TYPE GS: GUIDED SUPPORT  
SCALE: NONE



⑤ LESS THAN 8" DIA PIPE SUPPORT TYPE AS: ANCHORED SUPPORT  
SCALE: NONE



⑥ 8" DIA OR GREATER PIPE SUPPORT TYPE AS: ANCHORED SUPPORT  
SCALE: NONE

3/8" STEEL PLATE LENGTH  
 7-1/2" FOR 8" PIPE  
 9" FOR 10" PIPE  
 11" FOR 12" PIPE  
 14" FOR 16" PIPE

DATE	APP'R
DESCRIPTION	SYN
<p>APPROVED</p> <p>FOR COMMANDER NAVFAC</p> <p>ACTIVITY</p> <p>SATISFACTORY TO: DATE TBD</p> <p>DES XXX DRW XXX CHK XXX</p> <p>BRANCH MANAGER</p> <p>CHIEF ENGINEER</p> <p>FIRE PROTECTION</p>	
<p>NAVFAC EXWC</p> <p>100 23RD AVE. PORT HUNTERS CA</p> <p>NAVAL FACILITIES ENGINEERING COMMAND</p> <p>DEPARTMENT OF THE NAVY</p> <p>EXPEDITIONARY WARFARE CENTER</p>	
<p>FUEL PIER</p> <p>PIPE SUPPORT DETAILS</p>	
<p>SCALE: AS NOTED</p> <p>PROJECT NO.: T.B.D.</p> <p>CONSTR. CONTR. NO.</p> <p>NAVFAC DRAWING NO. 10009732</p> <p>SHEET 9 OF 11</p> <p>M-502</p> <p><small>DRAWING REVISION: 12 APRIL 2018</small></p>	

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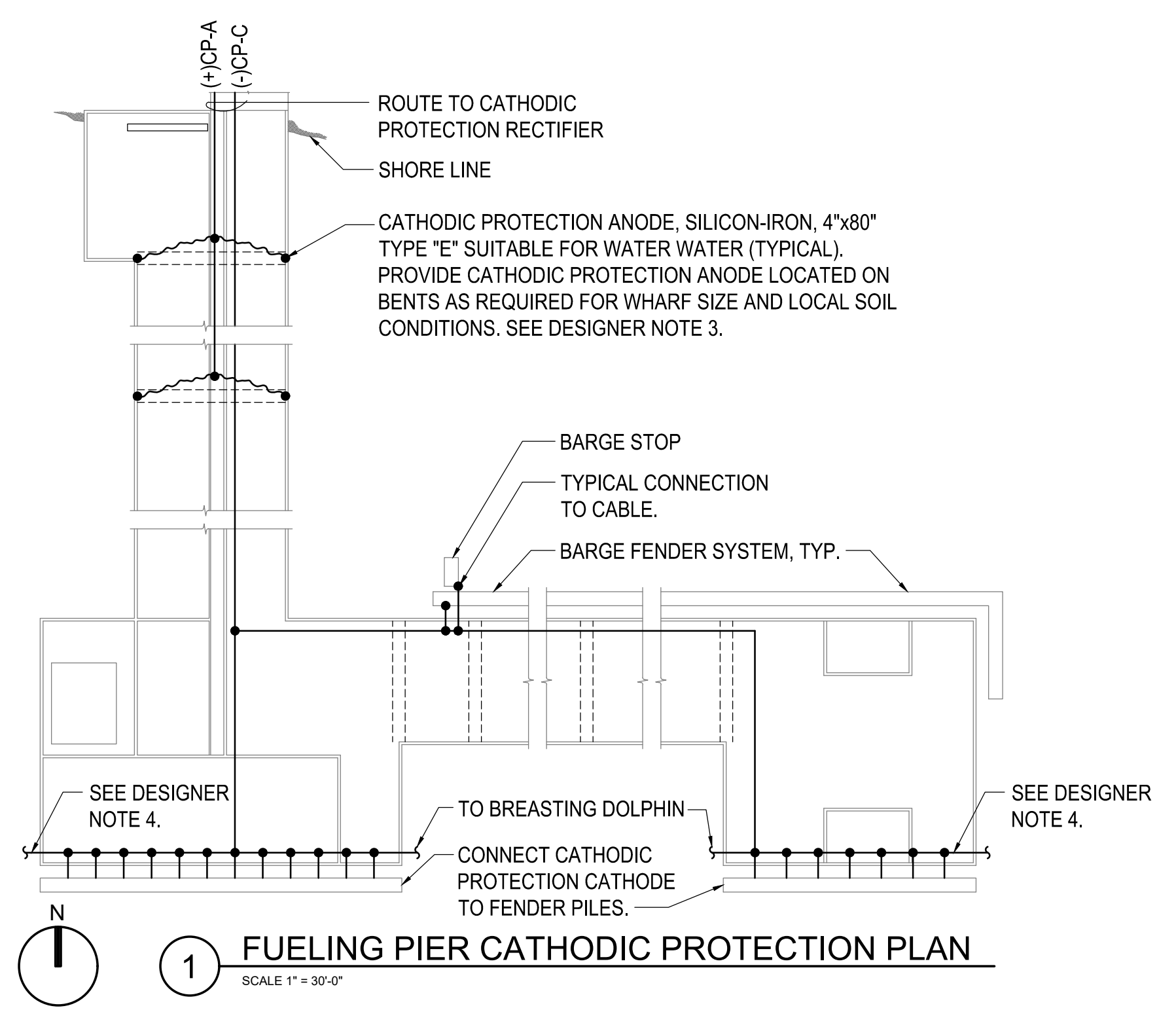
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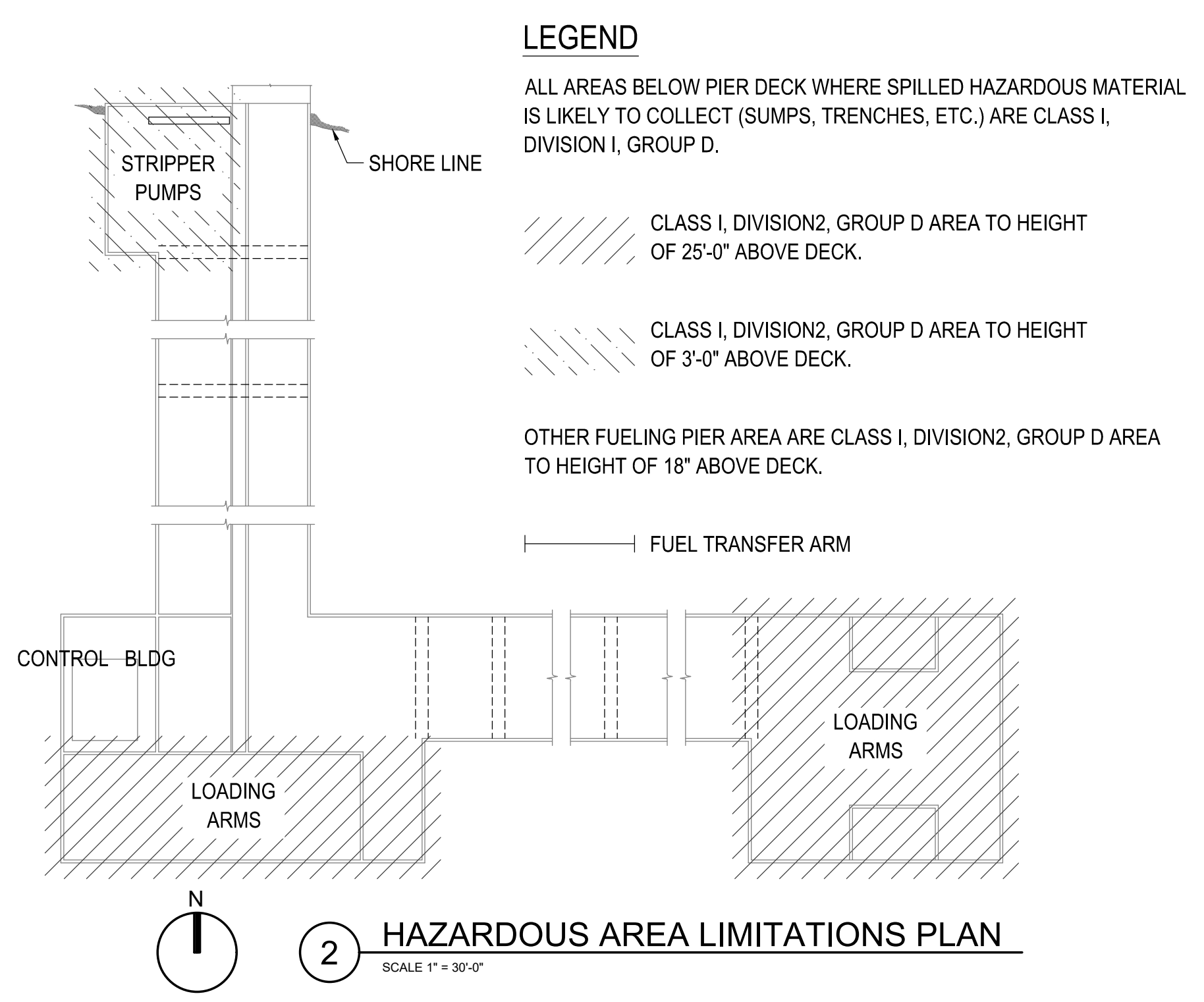


**1 FUELING PIER CATHODIC PROTECTION PLAN**  
SCALE 1" = 30'-0"

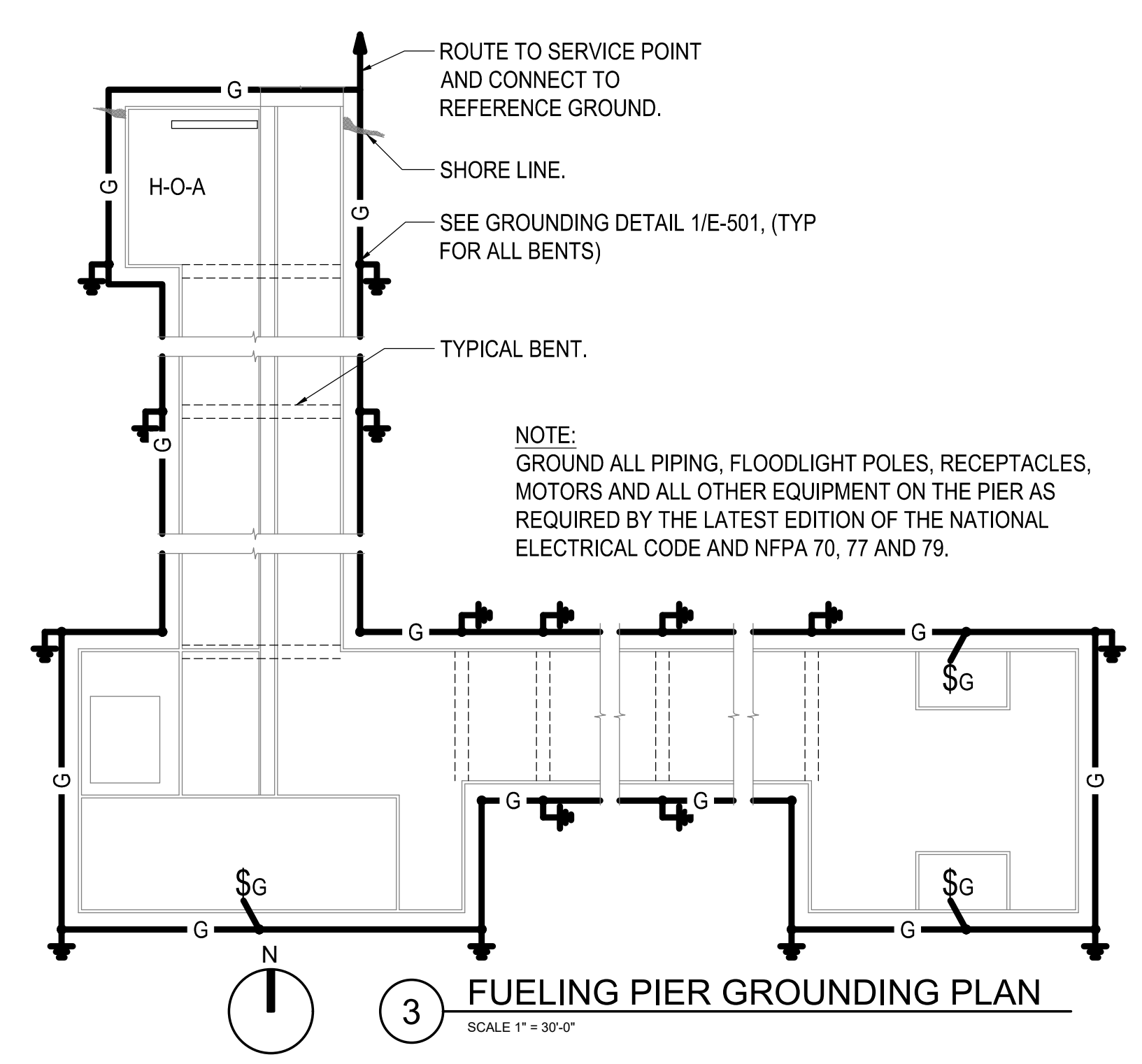
ELECTRICAL LEGEND	
TYPE	DESCRIPTION
CP-A, CP-C	CATHODIC PROTECTION CABLE, TYPE "CP", ANODE AND CATHODE LEADS.
\$G	GROUND DISCONNECT SWITCH, 30A, 250V, 1P, EXPLOSION PROOF, CLASS L, DIVISION 2, GROUP 0, NEMA TYPE 70. LOCATE ADJACENT TO RECEPTACLE CENTER AT LOADING ARMS. SEE 2/E501 AND 11/S101 FOR CENTER DETAIL
H-O-A	H-O-A SWITCH IN NEMA 7 ENCLOSURE. PROVIDE ONE DEDICATED SWITCH AT EACH STRIPPER PUMP WITH CONTROL CABLING ROUTED TO PUMP'S STARTER LOCATED WITHIN CONTROL BUILDING.
— G —	GROUND LOOP, STRANDED BARE COPPER WIRE, 1/4" # 1/0
⊕	GROUND ROD, SOLID STAINLESS STEEL
----	CONDUIT RUN IN CONCRETE, UNLESS OTHERWISE INDICATED, HOT-DIP GALVANIZED RIGID STEEL.
—	CONDUIT EXPOSED OR RUN IN WALLS, DOUBLE DIP HOT GALVANIZED RIGID STEEL

**DESIGNER NOTES:**

- ROUTE FUELING PIER SUPPLY CONDUITS ON SURFACE OF PIER HEAD FROM JUNCTION BOXES ALONG PIER HEAD. ROUTE CONDUITS IN CONCRETE DECK FROM JUNCTION BOXES AT SHORE END OF PIER TO OBSERVATION AND CONTROL BUILDING.
- ALL WIRING AND EQUIPMENT IN HAZARDOUS AREAS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE ARTICLES 500 AND 501.
- CATHODIC PROTECTION CABLES SHALL BE COPPER, HMW POLYETHYLENE INSULATION TYPE "C2" DIRECT BURY 2-1/2" CABLES FROM THE RECTIFIER TO THE PIER. ROUTE CABLES ON UNDERSIDE OF PIER TO PIER HEAD. PROVIDE ANODES WITH SUFFICIENT LEAD WIRE FOR SPLICE TO CATHODIC PROTECTION CABLE WITH NO ADDITIONAL SPLICES. POINT OF ANODE SHALL BE JETTED BELOW RIVER OR HARBOR BOTTOM 15' INTO FIRM SOIL.
- CONNECT CATHODIC PROTECTION CABLE TO BREASTING AND MOORING DOLPHINS (ROUTE CABLE UNDER WALKWAYS) BARGE FENDER SYSTEM, BARGE STOP (ROUTE CABLE FROM BOTTOM OF PIER DECK, DOWN PILING THEN UP BARGE TOP PILE TO AREA ABOVE HIGH WATER MARK); AND ALL OTHER SUBMERGED STEEL IN THE FUEL PIER. ALL CONNECTIONS SHALL BE EXOTHERMIC WELDS.
- PROVIDE ELECTRICAL GROUND AND BONDING IN ACCORDANCE WITH NFPA 70, 77 AND 78. BOND ALL STRUCTURAL STEEL, LIGHT STANDARDS, EQUIPMENT ENCLOSURES, ETC. ON PIER TO GROUND LOOPS, USE BARE COPPER BONDING JUMPER ACROSS EACH CONDUIT EXPANSION JOINT INSIDE THE EXPANSION JOINT FITTING.
- WHEN CONNECTING CATHODIC PROTECTION LEADS TO FENDER SYSTEM AND PILES, LEAVE SUFFICIENT SLACK TO ABSORB VIBRATIONS.
- PROVIDE NAVIGATION LIGHTS ON PIER PER COAST GUARD REGULATIONS.
- PROVIDE GROUND CABLE FROM \$G WITH NON-ARCHING WELDING TYPE CONNECTOR, FOR REMOVAL AND STORAGE OF CABLE.
- PROVIDE COMPLETE COMMUNICATIONS SYSTEM BETWEEN PIER OPERATIONS AND OBSERVATION AND CONTROL BUILDING AS REQUIRED BY LOCAL CONDITIONS.
- FLOODLIGHT POLES SHALL BE LOCATED SO THAT THERE IS NO INTERFERENCE WITH THE FUEL LOADING ARMS.
- LIGHTNING PROTECTION SHALL BE PROVIDED AT EACH FLOODLIGHT POLE IN ACCORDANCE WITH UFC 3-575-01.
- PROVIDE AC/DC CONVERTERS ON PIER HEAD AS REQUIRED.
- EXPLOSION PROOF AREAS AND INSTALLATION SHALL BE DETERMINED IN ACCORDANCE WITH THE LATEST EDITION OF API RP-500, NFPA 30, NFPA 70 AND IEEE C2.
- POLE MOUNTED FLOODLIGHT FIXTURES SHALL BE INSTALLED AT A HEIGHT TO CLEAR LOADING ARMS ON THE FUEL LOADING AREAS. ALL OTHER POLE MOUNTED FLOODLIGHT FIXTURES SHALL BE INSTALLED AT A HEIGHT TO SUIT LOCAL CONDITIONS.
- LIGHTING FIXTURES INSTALLED IN THE OBSERVATION AND CONTROL BUILDING OR THE STRIPPING PUMP AREA SHALL BE CLASS 1 DIVISION 1, GROUP D EXPLOSION-PROOF LED TYPE WITH CAST ALUMINUM HOUSING, A MINIMUM OF 8,000 DELIVERED LUMENS AND 5000K COLOR TEMPERATURE.
- STARTING EQUIPMENT FOR THE STRIPPING PUMP ELECTRIC MOTORS ALONG WITH ELECTRIC POWER AND LIGHTING PANEL BOARDS AND OTHER ELECTRICAL EQUIPMENT SHALL BE EXPLOSION PROOF TYPE, FOR CLASSIFICATION, SEE PLAN 2/E-101.
- ELECTRIC POWER AND LIGHTING PANEL BOARDS AND DRY TYPE TRANSFORMERS SHALL BE INSTALLED IN THE OBSERVATION AND CONTROL BUILDING. FOR HAZARDOUS AREA CLASSIFICATION, SEE PLAN 2/E-101.
- PROVIDE DOLPHIN LIGHTING AND POWER IN ACCORDANCE WITH 33 CFR 154.570.
- RECEPTACLES MAY NOT BE LOCATED IN CLASS 1, DIVISION 1, GROUP D AREAS.
- FLOODLIGHT POLE MANUFACTURER TO INSTALL VERTICAL LIGHTNING PROTECTION SYSTEM AIR TERMINAL CONNECTOR TO POLE BEFORE APPLYING SPECIFIED POLE FINISH. MANUFACTURER SHALL ALSO SUPPLY POLE WITH GROUND LUG AT BASE. CONTRACTOR SHALL CONNECT GROUND LUG TO GROUND LOOP WITH #1/0 HMWPE CABLE. REFER TO PLAN 3/S-101.
- PIER CONDUITS/CONDUCTORS SHALL BE ROUTED FROM A NEW SHORE MANHOLE AT THE START OF THE PIER. PROVIDE ELECTRICAL HANDHOLES/PULLBOXES AT A MAXIMUM 200' SPACING ALONG THE LENGTH OF THE PIER.



**2 HAZARDOUS AREA LIMITATIONS PLAN**  
SCALE 1" = 30'-0"



**3 FUELING PIER GROUNDING PLAN**  
SCALE 1" = 30'-0"

ILLUMINATION LEVELS (FLOOD LIGHTING):	
5 FOOTCANDLES	AVERAGE MAINTAINED LEVEL AT FUEL TRANSFER CONNECTION POINTS ON FACILITY AND BARGE, ETC.
1 FOOTCANDLE	AVERAGE MAINTAINED LEVEL AT THE FUEL TRANSFER OPERATIONS WORK AREA ON FACILITY AND BARGE, ETC.
1 FOOTCANDLE	AVERAGE MAINTAINED LEVEL ON ACCESS AREAS MEASURED HORIZONTALLY 3 FEET ABOVE THE DECK.



APPROVED: [Signature]

FOR COMMANDER NAVFAC

ACTIVITY

SATISFACTORY TO: [Signature] DATE: TBD

DES: XXX | DRW: XXX | CHK: XXX

BRANCH MANAGER: [Signature]

CHIEF ENGINEER: [Signature]

FIRE PROTECTION: [Signature]

NAVAL FACILITIES ENGINEERING COMMAND

NAVFAC EXWC

100 23RD AVE. PORT HUNTERS CA

FUEL PIER

ELECTRICAL PIER PLANS, LEGEND AND NOTES

DEPARTMENT OF THE NAVY

EXPEDITIONARY WAREHOUSE CENTER

SCALE: AS NOTED

PROJECT NO.: T.B.D.

CONSTR. CONTR. NO.

NAVFAC DRAWING NO. 10009733

SHEET 10 OF 11

**E-101**

DRAWING REVISION: 12 APRIL 2018



