

**TANGIPAHOA REGIONAL SOLID WASTE FACILITY**  
**CELL 13 CONSTRUCTION**  
**INSTALLATION OF GEOSYNTHETIC MATERIALS**

**ADDENDUM No. 2 – MARCH 12, 2018**

**DON'T FORGET TO ACKNOWLEDGE RECEIPT OF ADDENDUM No. 2 ON THE BID FORM.**

- 1. Leachate Flow Diagram.** A Leachate Flow Diagram is provided in Appendix A, which summarizes the leachate and contact stormwater collection and removal systems for the project.
- 2. Revised Drawings.** Revised Drawings are provided in Appendix B.

**Revised Drawing M101**

The leachate force main, stormwater force main, compressed air line, and electrical conduit shall be buried in the same trench while maintaining all appropriate separations in accordance with the specifications. Trenches for the force mains, air-line, and electrical conduit will be excavated and backfilled by the OWNER.

**Revised Drawing M102**

The leachate cleanouts and leachate risers shall be able to move freely at the headwalls to preclude the impacts of the expansion/contraction of the HDPE pipes (i.e. the connection between the cleanouts and risers shall not be rigid to the headwall).

**Revised Drawing M103**

The wet well shall be constructed from solid wall HDPE pipe ONLY. Sheet stock (1.5 inch) shall be extrusion-welded to the bottom of the wet well along the entire perimeter. The lid for the wet well shall consist of an HDPE ring welded to the top of the pipe. A bolt pattern shall be drilled into the HDPE ring. The lid shall be constructed from 1.5-inch HDPE sheet stock, and the bolt pattern shall be drilled into the lid. Once the lid has been constructed, it shall be fastened to the HDPE ring using nuts and bolts. A neoprene gasket shall be used to seal the connection.

Gorman T4 pumps are now being specified for the centrifugal pumps at the leachate wet well (instead of T6 pumps).

**Please see complete revised Drawings, which include several other changes, in Appendix B.**

3. **Revised Bid Form.** Line item number 25 of the Bid Forms has been revised to reflect FleetZOOM and Integralert as options to the SCADA system. Please refer to the Drawings for specifications regarding these other options. The revised Page 4/4 of the Bid Form is presented in Appendix C. Please make sure to substitute only this page when submitting the bid.
4. **Revised Technical Specifications.** The technical specifications for the pumps, compressor, and air dryer have been included as Appendix D.

#### **RESPONSE TO REQUEST FOR CLARIFICATION**

**Will check valves be required at each headwall to prevent backflow from other pumps?**

In accordance with Drawing M102, a check valve shall be provided on the suction side of all headwall pumps inside the cell sumps.

**Will the leachate wet well be buried?**

Yes, the leachate wet well will be buried and will have the top approximately 4 ft above the top of the levee in accordance with Revised Drawing M103. Excavation and backfilling for the burying of the wet well will be done by OWNER.

**Will measurements be provided for the depth of the liquid level detectors inside the leachate wet well?**

Location of the liquid level detectors inside the wet well will be field verified based on volume calculations provided by the ENGINEER and the diameter of the leachate wet well. Measurements for the liquid level detectors will be provided by the ENGINEER after the wet well has been installed.

**How will materials delivered to the site be offloaded?**

Materials delivered to the site will be offloaded by the OWNER.

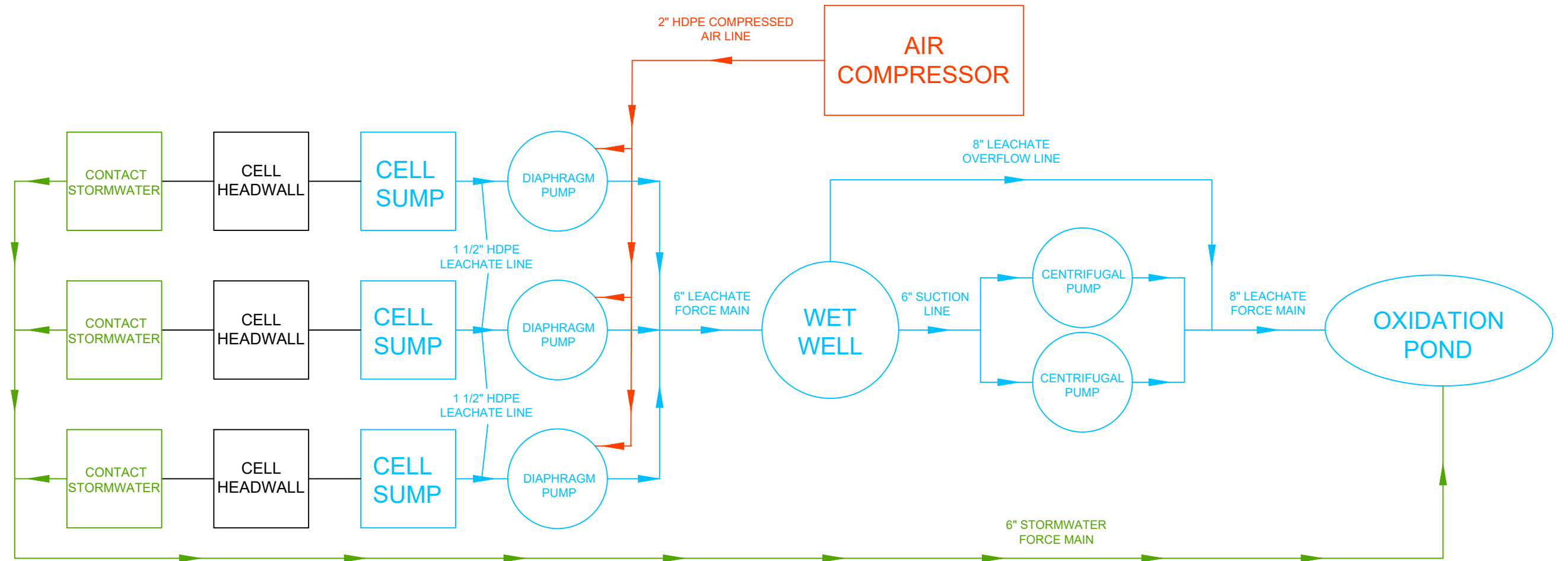
**How will the leachate and stormwater force mains discharge into the oxidation pond?**

The leachate force main and stormwater force main shall extend up and over the perimeter berm of the oxidation pond using a series of elbows and “spill” into the northwestern section of the oxidation pond. Material and labor for the end treatment of the force mains shall be provided by the CONTRACTOR. Cost for the end treatment of the stormwater force main should be included under line item 10 of the Bid Forms, and materials and labor for the end treatment of the leachate force main shall be included under line item 11 of the Bid Forms.

**Headwall Detail, Drawing M102: Can the 2-inch drain line be moved from the center of the headwall floor to one of the sidewalls or front wall?**

At this time, it is preferred that the drain line be positioned as close to the center of the headwall as possible.

**APPENDIX A**  
**LEACHATE FLOW DIAGRAM**



- Legend**
- Leachate Line
  - Contact Stormwater Line
  - Air Line

**TANGIPAOA PARISH REGIONAL  
SOLID WASTE FACILITY  
INDEPENDENCE, LOUISIANA**

for  
**TANGIPAOA PARISH GOVERNMENT  
AMITE, LOUISIANA**



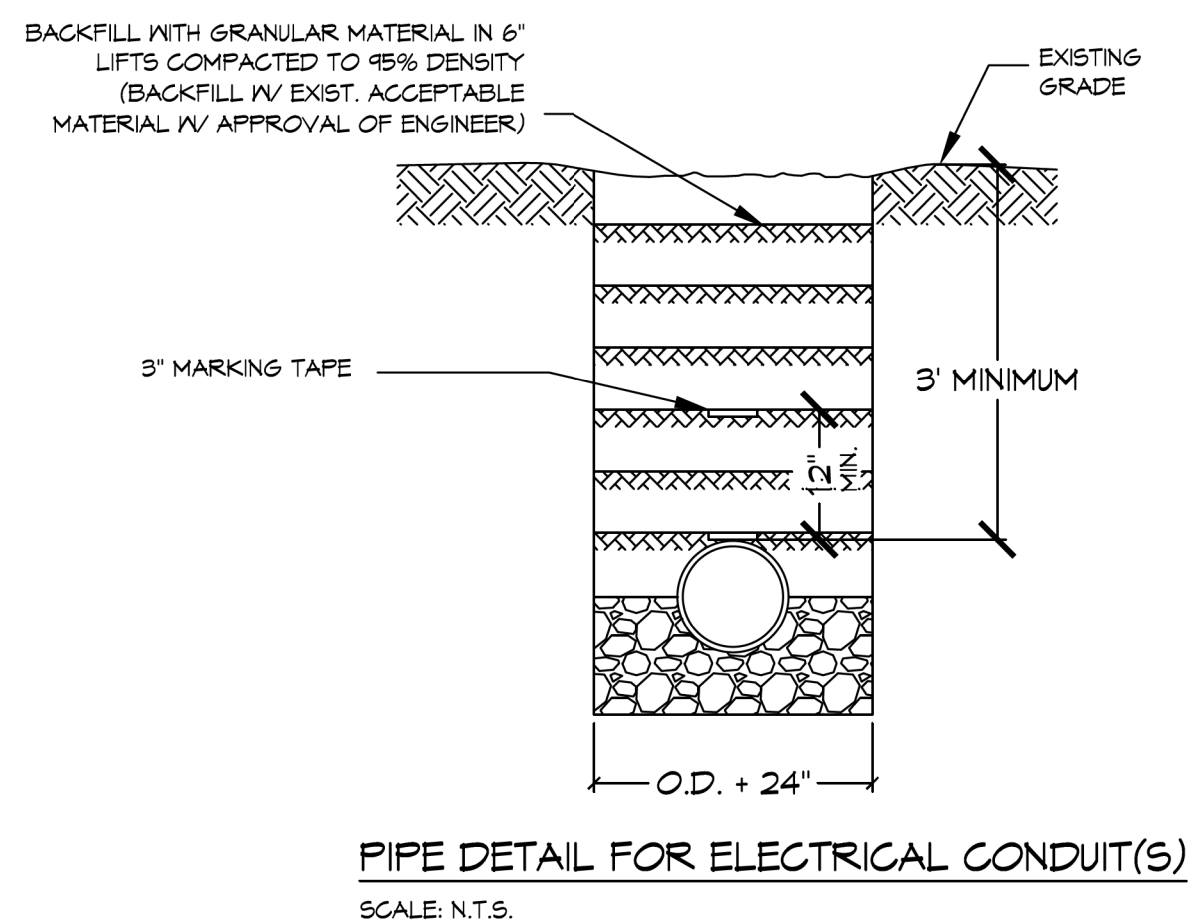
**Fourier & de Abreu  
Engineers, L.L.C.**  
Environmental and Civil Engineering

3084 WESTFORK DR. SUITE A BATON ROUGE, LA 70816      PHONE: 225-677-7950  
contact@fdaengineers.com  
www.fdaengineers.com

**CELL 13 CONSTRUCTION  
LEACHATE FLOW DIAGRAM**

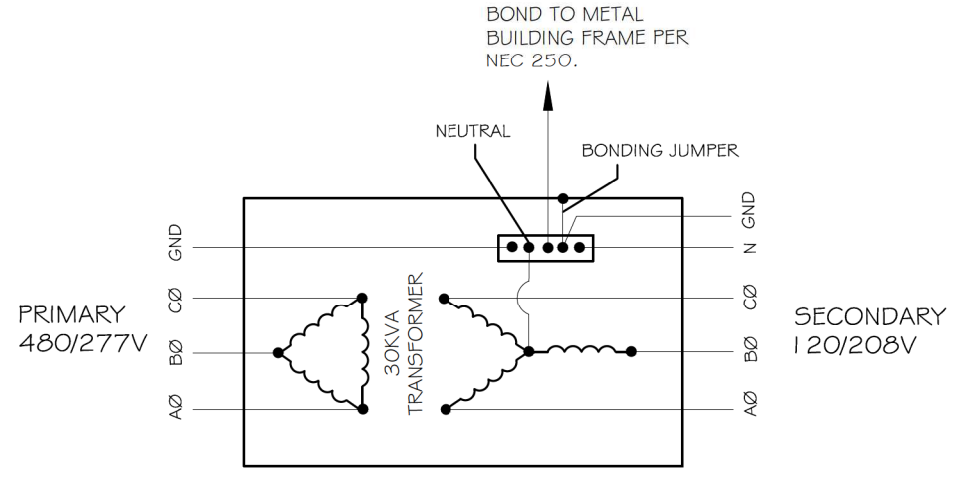
Project Engineer:	Project No.:	Date:	Figure No.:
D. Romero	TAN-041	02-14-18	1

**APPENDIX B**  
**REVISED DRAWINGS**

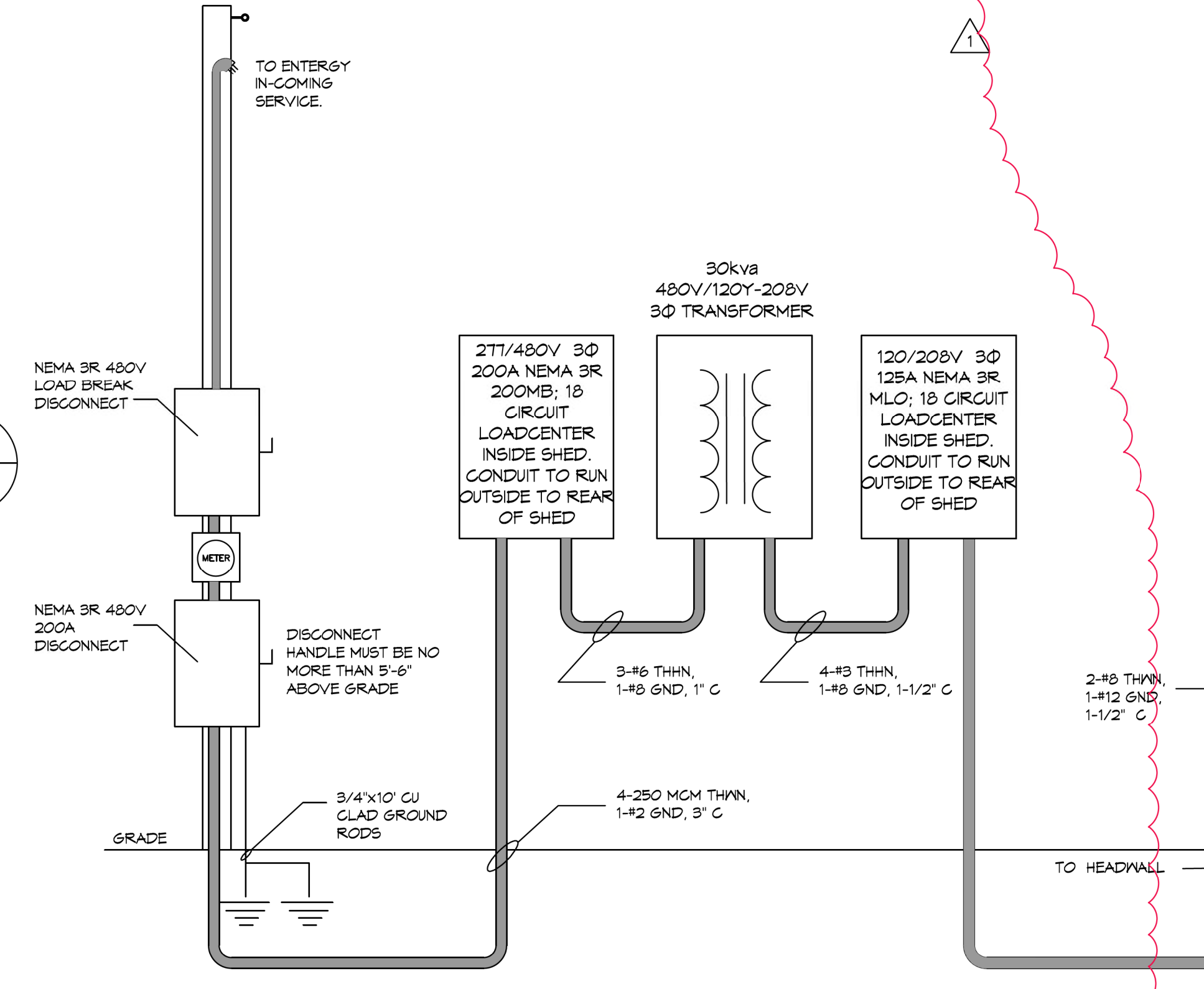


PIPE DETAIL FOR ELECTRICAL CONDUIT(S)  
SCALE: N.T.S.

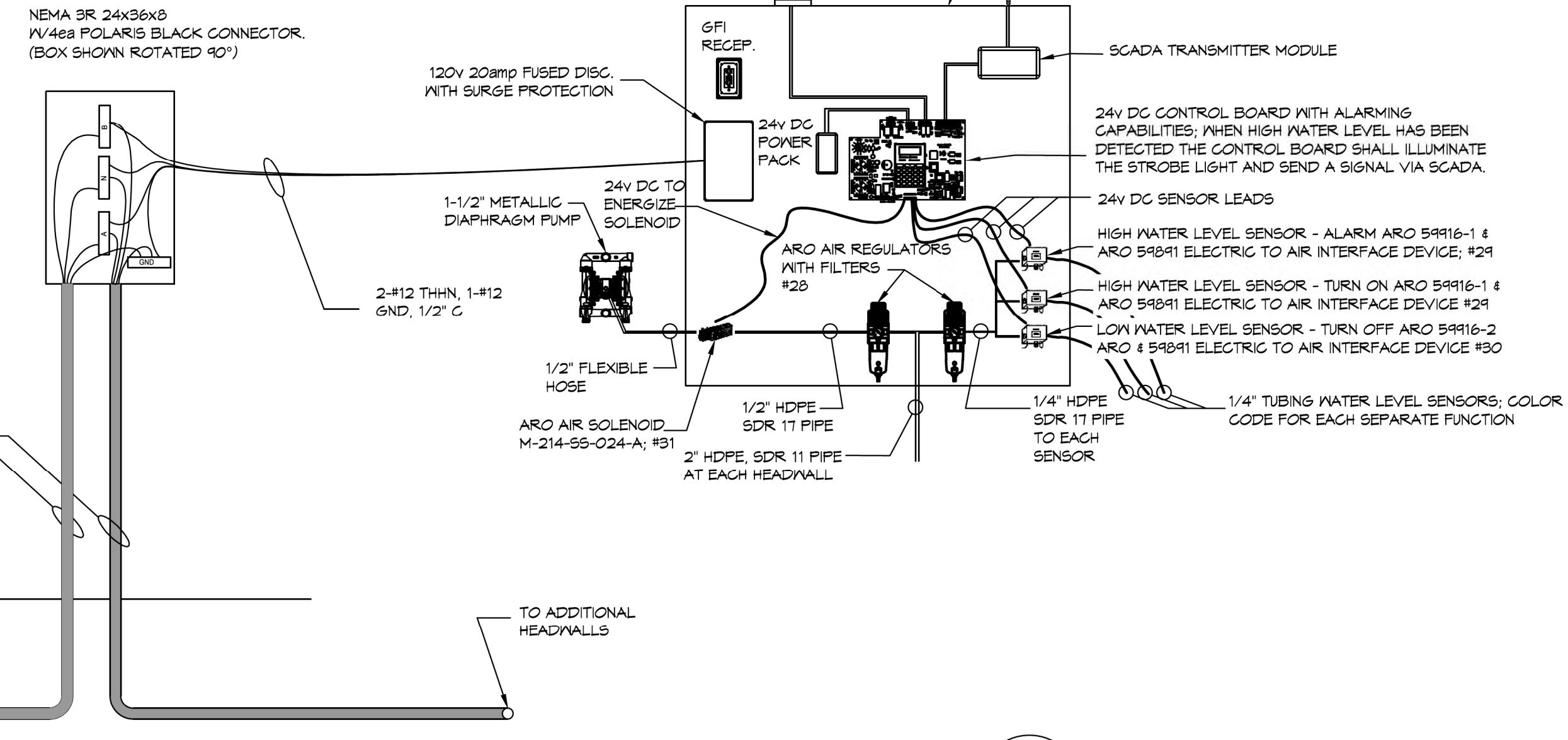
TRANSFORMER NOTES:  
TRANSFORMER SHALL BE A 480V - 120V/208V 30kva DRY TYPE, COMPLETELY ENCLOSED WITH OPENINGS FOR VENTILATION.



TRANSFORMER GROUNDING DETAIL (TYP.)  
N.T.S.



NEW 200amp SERVICE ENTRANCE  
N.T.S.



HEADWALL ELECTRICAL CONNECTION (TYP.)  
N.T.S.

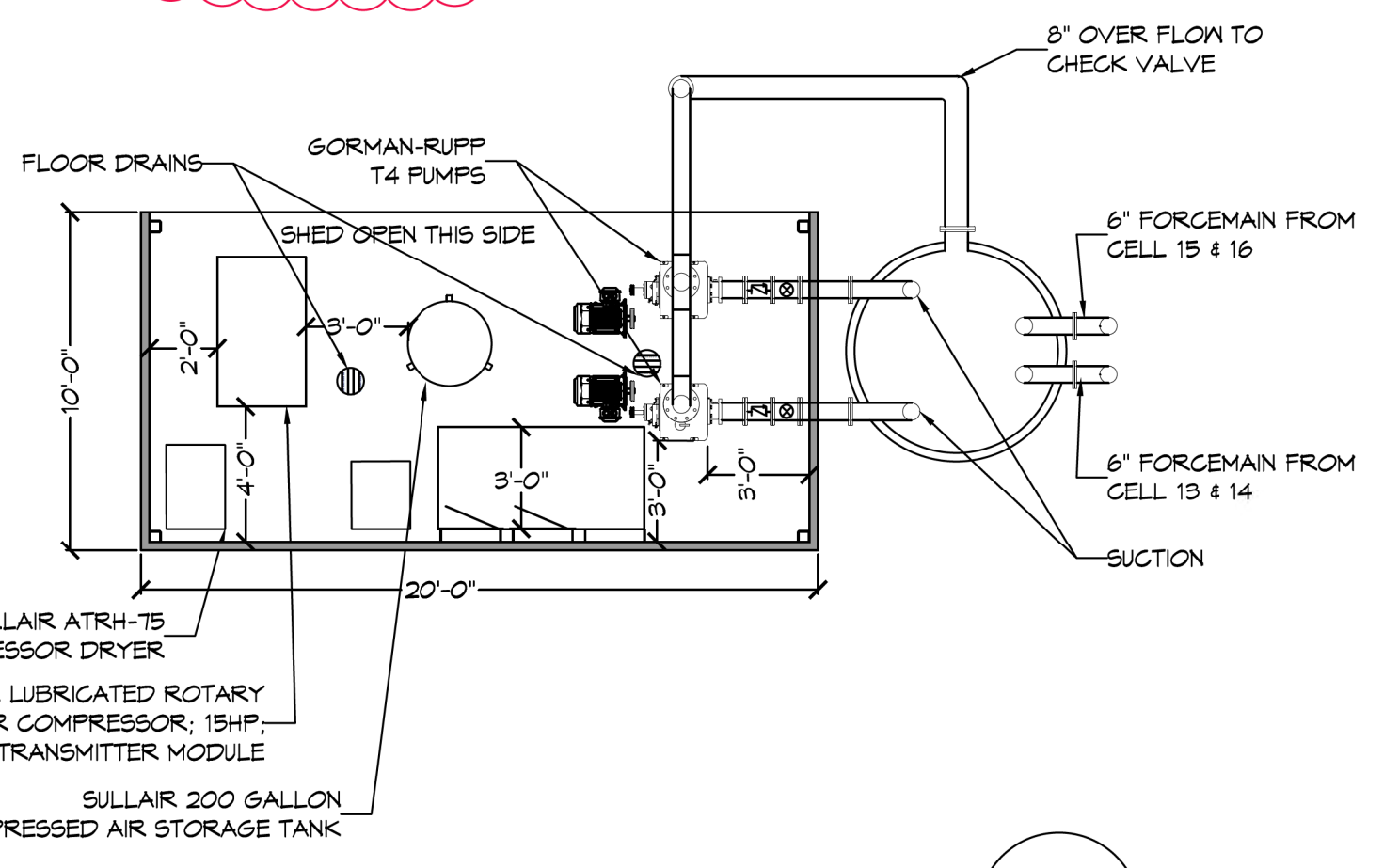
**GENERAL NOTES:**

- 2" UNDERGROUND CONDUITS SHALL BE INSTALLED BETWEEN HEADWALLS. EACH 20 AMP CIRCUIT BREAKER SHALL SUPPORT 3 HEADWALLS.
- TERMINATE ALL EQUIPMENT ACCORDING TO MANUFACTURER'S RECOMMENDATION.
- SCADA SOFTWARE SHALL BE FROM A FREE OPEN-SOURCE PROVIDER UNDER THE GPL LICENSE AND SHALL INTEGRATE WITH TANGIPAHOA PARISH'S EXISTING SYSTEM. EXAMPLES ARE SCADA LTS, OPENSOCADA, RAPID SCADA.
- THE SOFTWARE SHALL BE WEB-BASED THAT OPERATES ON ANY OPERATING ARCHITECTURE (PC/MAC/LINUX/IPHONE/ANDROID)
- THE SOFTWARE SHALL BE SCALABLE AND CAPABLE OF PRODUCING ALARMS TO HANDHELD DEVICES. IT SHALL ALSO LOG EVENTS FOR HISTORIC INFORMATION AND BE CAPABLE OF PRODUCING REPORTS.
- THE SIGNAL TRANSMITTER MODULE SHALL BE PAIRED WITH A MATCHING RECEIVER MODULE, THESE SHALL BE THE SAME MANUFACTURE/MODEL USED IN THE TANGIPAHOA PARISH'S EXISTING SYSTEM.
- SCADA APPROVED ALTERNATIVES ARE FLEETZOOM AND INTEGRALERT SOFTWARE AND HARDWARE PACKAGES.

**ELECTRICAL NOTES**

- ALL WORK SHALL CONFORM TO THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, THE GOVERNING ELECTRICAL CODE AND ALL OTHER INSPECTION DEPARTMENTS HAVING JURISDICTION. OBTAIN CERTIFICATES OR APPROVAL WHERE REQUIRED.
- ALL MATERIALS FURNISHED SHALL BE NEW AND SHALL BE U.L. LISTED.
- THE DRAWINGS INDICATE SIZE AND GENERAL LOCATION OF WORK. SCALE DIMENSIONS SHALL NOT BE USED. THE EXACT LOCATION AND LOCATION OF ALL POWER POLES AND ALL RISERS SHALL BE DETERMINED BY ACTUAL CONDITIONS IN THE FIELD.
- PRIOR TO BIDDING, CONTRACTOR SHALL VISIT THE JOB SITE AND FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS.
- ELECTRICAL CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER TRADES AND WITH OTHER CONTRACTORS WHOSE WORK MAY AFFECT THIS INSTALLATION.
- ELECTRICAL CONTRACTOR SHALL COORDINATE INCOMING ELECTRICAL SERVICE WITH UTILITY COMPANY AND INCLUDE IN HIS BID ALL CHARGES AND FEES INCURRED IN MODIFICATIONS. IF THE INCOMING ELECTRICAL SERVICE VOLTAGE IS NOT AT THE PROPER VOLTAGE, THE ELECTRICAL CONTRACTOR IS TO INSTALL BUCK&BOOST TRANSFORMERS.
- PERFORM TEST REQUIRED BY THE OWNER OR THE ENGINEER IN CONNECTION WITH THE OPERATION OF THE ELECTRICAL SYSTEM IN THE BUILDING.
- ALL TESTS SHALL BE MADE IN ACCORDANCE WITH THE LATEST STANDARD OF THE IEEE AND THE NATIONAL ELECTRICAL CODE.
- MINIMUM CONDUCTOR SIZE SHALL BE #12, 600V INSULATION. MINIMUM SIZE CONDUIT SHALL BE 1" SCH 80 FOR EXTERIOR USE, UNLESS OTHERWISE SHOWN.
- CONTRACTOR SHALL INSTALL WIRING AND OTHER CIRCUIT COMPONENTS TO MATCH EQUIPMENT ACTUALLY INSTALLED.
- INSTALL GROUND FAULT RECEPTACLES AT RECEPTACLE LOCATIONS AT EXTERIOR LOCATIONS. EXTERIOR RECEPTACLES SHALL ALSO BE WATERPROOF.
- BONDING AND GROUNDING SHALL BE IN ACCORDANCE WITH NFPA 70:250-63, NFPA 250-23, 250-71 & 250-72.
- GROUND NEUTRAL IN ACCORDANCE WITH NFPA 70:250-23b.
- FUSES SHALL BE ITC CLASS K5, 250 VOLT, 200,000 AMP INTERRUPTING CAP. ALL FDP SHALL HAVE THERMAL-MAGNETIC CIRCUIT BREAKERS FOR ALL MOTORS.
- ALL ELECTRICAL CONDUIT SHALL BE SCHEDULE 40 PIPE BELOW GRADE AND SCHEDULE 80 PIPE ABOVE GRADE.

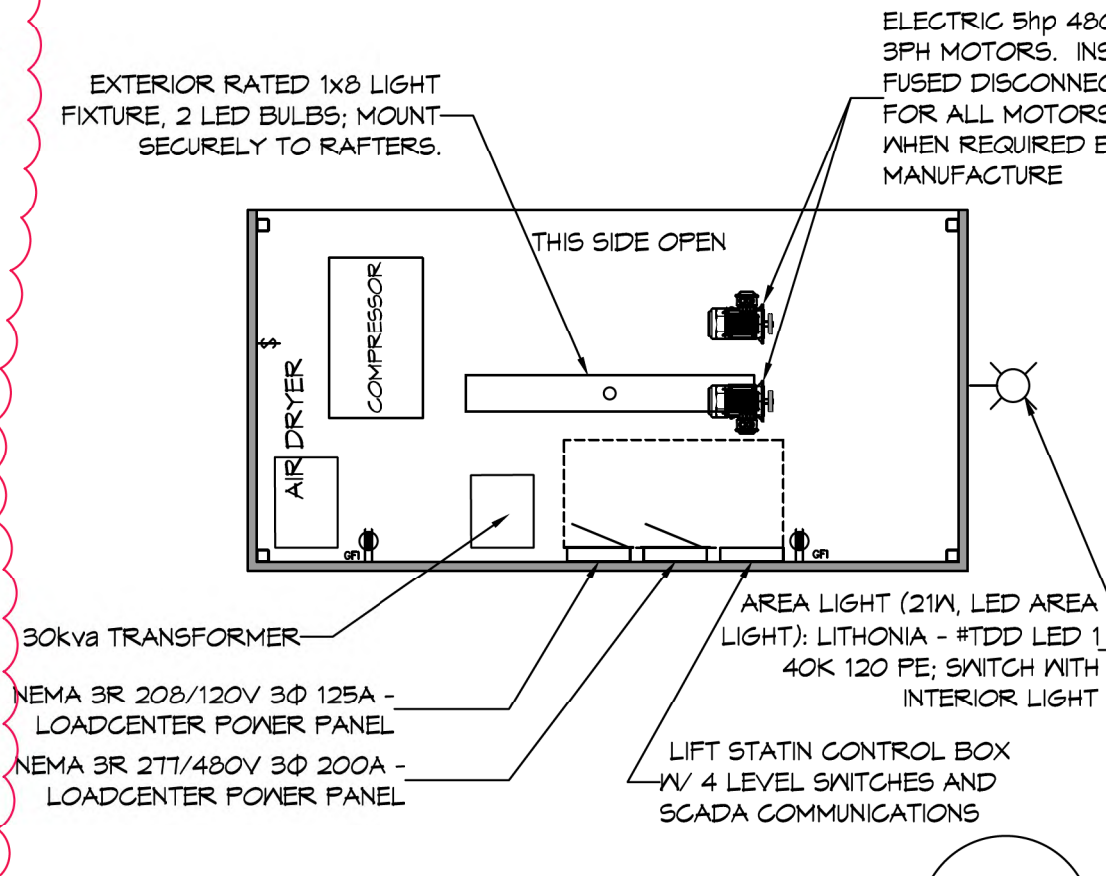
NOTE : ONLY COMPRESSOR SHED & CELL 13 IS BEING CONSTRUCTED UNDER THIS PROJECT.



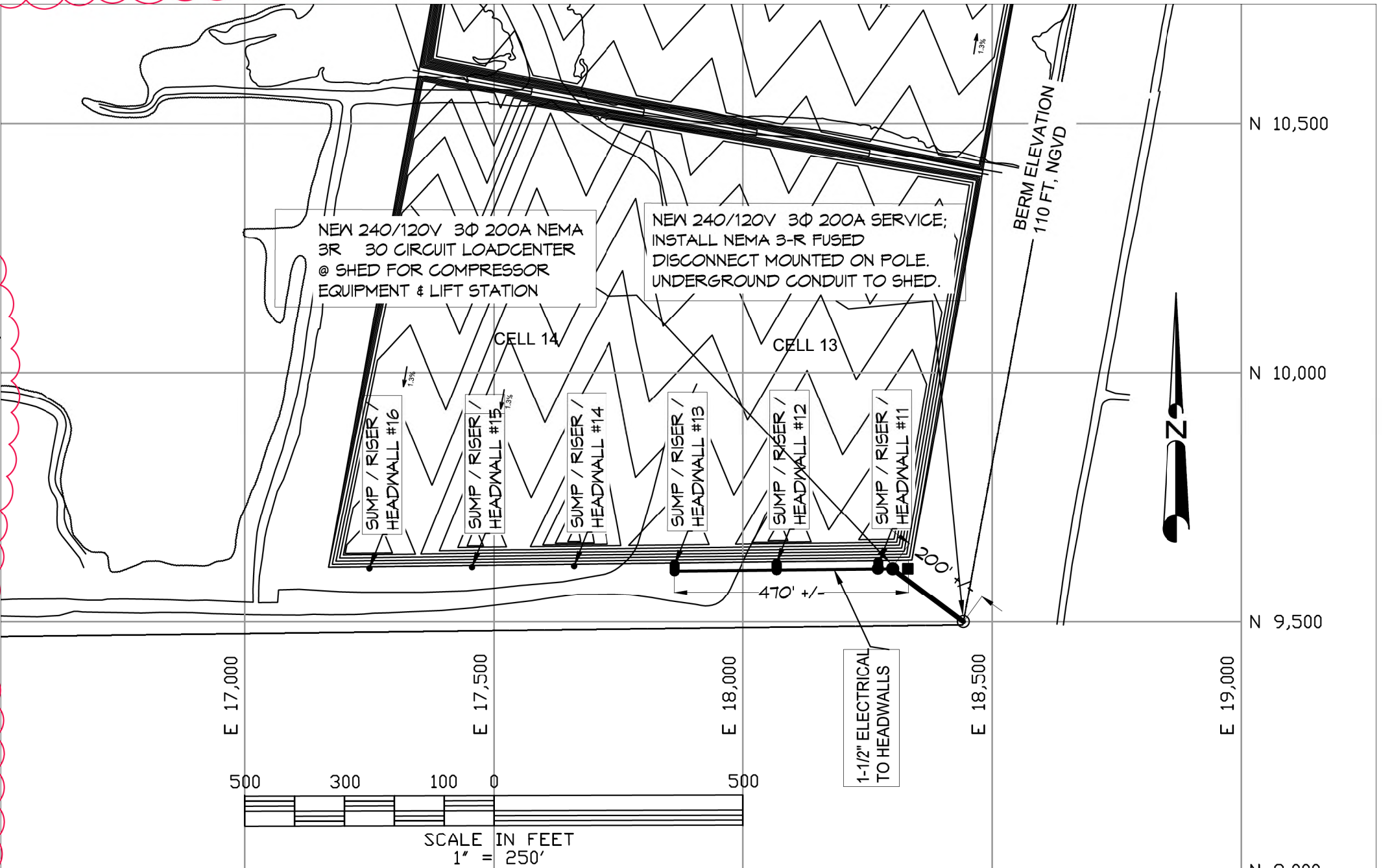
COMPRESSOR SHED GENERAL LAYOUT  
N.T.S.

**ELECTRIC MOTOR NOTES:**

- ALL ELECTRICAL COMPONENTS SHALL MEET NEMA STANDARDS, AND SHALL COMPLY WITH NEC AND UL AS APPLICABLE TO CONSTRUCTION AND INSTALLATION OF WIRING AND COMPONENTS. THE ELECTRICAL SYSTEM INSIDE THE WET WELL SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE FOR HAZARDOUS LOCATIONS, CLASS I, DIVISION 1, GROUP D.
- ALL CIRCUIT BREAKERS SHALL BE OF THE THERMAL MAGNETIC TYPE, WITH MOLDED CASE BREAKERS. BREAKERS SHALL BE UL-LISTED AND CSA CERTIFIED.
- MOTOR STARTERS SHALL BE SOFT START, ELECTRONIC OVERLOAD STARTERS WITH ADJUSTABLE TRIP PHASE LOSS, GROUND FAULT, AND PHASE REVERSAL PROTECTION. THEY SHALL BE EQUIPPED WITH THREE (3) POLES AND SHALL BE PROVIDED WITH AUXILIARY CONTACTS FOR USE IN THE CONTROL CIRCUIT AND FOR STATUS INPUTS TO THE SCADA SYSTEM. STARTERS SHALL BE ALLEN BRADLEY BULLETIN 509 TYPE WITH SMP-2 ADJUSTABLE OVERLOAD RELAY, SQUARE D CLASS 8536 FULL VOLTAGE NEMA STARTERS WITH OPTIONAL SOLID STATE MOTOR LOGIC OVERLOAD RELAY (CLASS 9065 IF ORDERED SEPARATELY), OR FURNAS ESP 100 SERIES, CLASS 14 WITH CLASS 20 TRIP OVERLOAD, WITH SOLID STATE ADJUSTABLE THERMAL OVERLOADS.



COMPRESSOR SHED ELECTRICAL PLAN  
N.T.S.



ELECTRICAL SITE PLAN  
SCALE 1" = 250'

#	DESCRIPTION	DATE
1	Revised Service Voltage, Added Transformer, Added Lift Station Controller, Diagram & Panel Schedules	3/2/2018

SEAL:

TANGIPAHOA REGIONAL SOLID WASTE FACILITY  
57510 HANO ROAD  
INDEPENDENCE, LOUISIANA

SHEET TITLE: ELECTRICAL PLAN  
DRAWING NUMBER: E101  
SHEET No: of #

**Electrical Load Summary**

Project Name: Tangipahoa Regional Solid Waste Facility  
 Project Address: 57510 Hano Road  
 City / Town: Independence, Louisiana  
 Intended Use: Landfill  
 Requested Service: 480 Volts 3 Phase 4 Wires  
 Service Entrance Size: 200 Amps  
 HVAC Tonnage: --- Tons  
 Largest Motor: 15.0 HP (Note: Motors above 20 hp may require reduced Voltage starting and are never recommended for use with 120/240V, 3  $\phi$ , 4W services.)  
 Total Building Square Footage: --- Square Feet  
 Individual Unit Square Footage: --- Square Feet (Multiple Occupancy)  
 Individual Unit Designation: --- (Multiple Occupancy)

LOAD SOURCE	277V / 480V		120V / 208V	
	1 $\phi$ - kVA	3 $\phi$ - kVA	1 $\phi$ - kW	3 $\phi$ - kW
Building Lighting		or	0.2	
Leachate Lift Station (2 x 5hp)		12.6	or	
Leachate Lift Station Controller		or	0.6	
Compressor (1x 15hp)		24.4	or	
Refrigerated Dryer		or	6.6	
Diaphragm Pump Controllers		or	7.2	
Receptacles		or	2.5	
Other (Specify)		or		

**PANEL SCHEDULE**

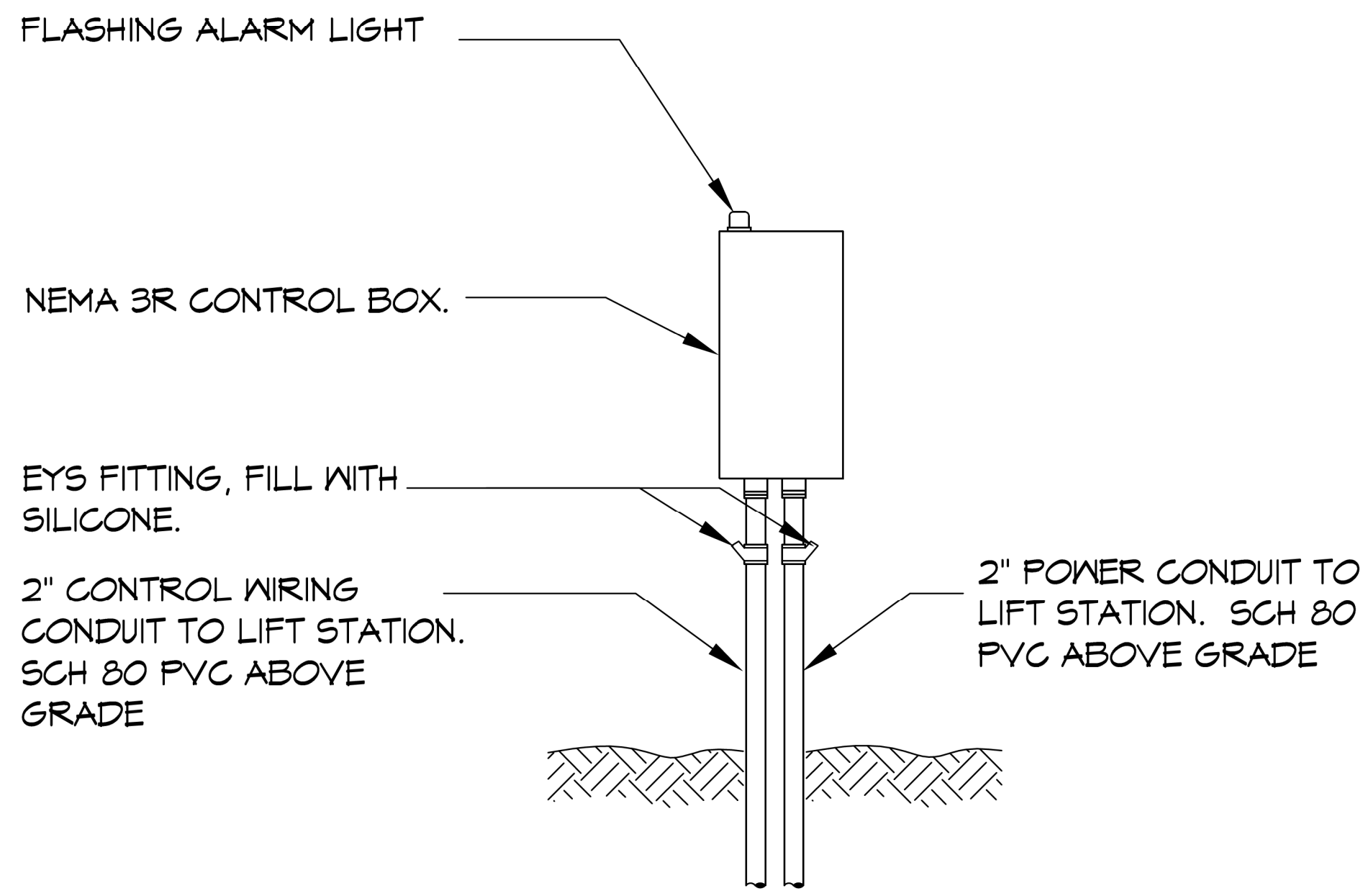
CKT NO	THHN WIRE SIZE	LOAD DESCRIPTION	BREAKER	LOAD (kva)		BREAKER	LOAD DESCRIPTION	THHN WIRE SIZE	CKT NO
				AMP	POLE				
1									
3	#6	30 kva TRANSFORMER	55	3			15hp COMPRESSOR	#6	4
5									6
7					2.1				8
4	#12	PUMP MOTOR #1	20	3	2.1	3	PUMP MOTOR #2	#12	10
11					2.1				12
13	-	SPARE	20	1	-	1	SPARE	-	14
15	-	SPARE	20	1	-	1	SPARE	-	16
17	-	SPARE	20	1	-	1	SPARE	-	18

SOLID NEUTRAL NEUTRAL WIRE (N) TOTAL CONNECTED LOAD (VA) = ####  
 GROUND BUS GROUND WIRE (G)  
 AD = #### B0 = #### B0 = ####  
 NOTE: USE THERMAL-MAGNETIC CIRCUIT BREAKERS FOR ALL MOTORS

**PANEL SCHEDULE**

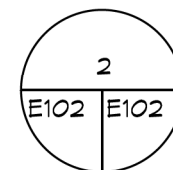
CKT NO	THHN WIRE SIZE	LOAD DESCRIPTION	BREAKER	LOAD (kva)		BREAKER	LOAD DESCRIPTION	THHN WIRE SIZE	CKT NO
				AMP	POLE				
1					4.2	1	CELL 13 CONTROLLERS	#12	2
3	#5	REFRIGERATED DRYER	50	3	4.2	1	CELL 14 CONTROLLERS (FUTURE)	#12	4
5					4.2	1	CELL 15 CONTROLLERS (FUTURE)	#12	6
7	#12	LIGHTING	20	1	0.2	1	CELL 16 CONTROLLERS (FUTURE)	#12	8
4	#12	BLDG OUTLETS	20	1	0.5	1	SPARE	-	10
11	-	SPARE	20	1	-	1	SPARE	-	12
13									14
15									16
17	-	SPACE	-	-	-	-	SPACE	-	18

SOLID NEUTRAL NEUTRAL WIRE (N) TOTAL CONNECTED LOAD (VA) = ####  
 GROUND BUS GROUND WIRE (G)  
 AD = #### B0 = #### B0 = ####  
 NOTE: USE THERMAL-MAGNETIC CIRCUIT BREAKERS FOR ALL MOTORS



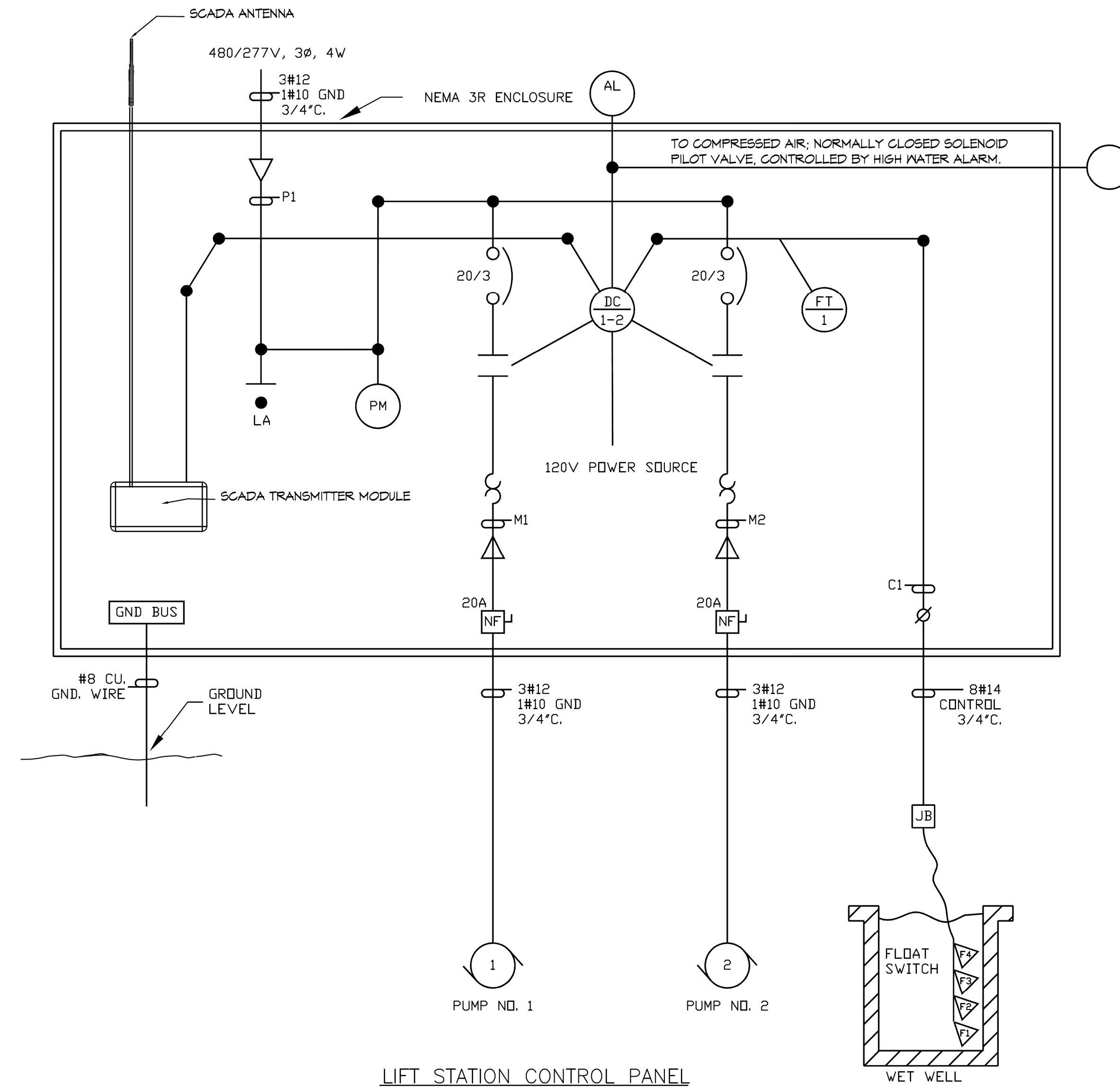
**TYPICAL LIFT STATION ELECTRICAL SERVICE**

N.T.S.

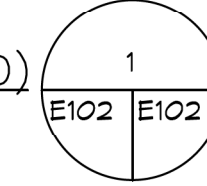


**LEGEND**

- LIGHTNING ARRESTOR
- PHASE MONITOR
- DUPLEX CONTROLLER
- FLOAT TEST
- ALARM LIGHT



LIFT STATION CONTROL PANEL  
 ONE LINE POWER DIAGRAM AND  
 PROCESS AND INSTRUMENTATION DIAGRAM (P&ID)



**DAMMON ENGINEERING, INC.**  
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 PH: 985.645.5832  
 Chief Engineer: Brian Mistich, PE  
 554 Old Spanish Trail  
 Slidell, LA 70458

#	DESCRIPTION	DATE
1	Revised Service Voltage, Added Transformer, Added Lift Station Controller Diagram & Panel Schedules	3/2/2018



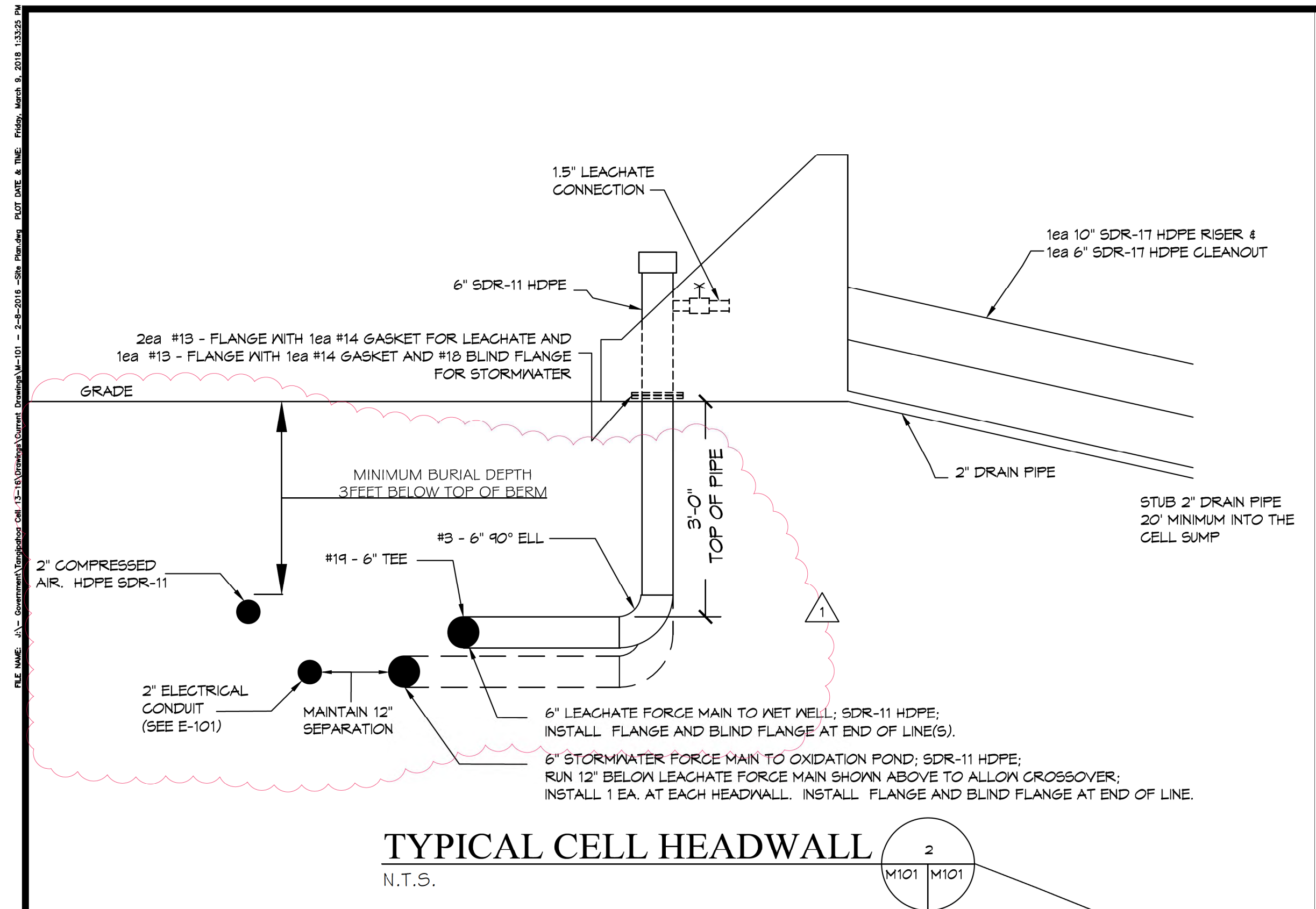
TANGIPAHOA REGIONAL SOLID WASTE FACILITY  
 57510 HANO ROAD  
 INDEPENDENCE, LOUISIANA  
 JOB No: 2936 DATE: 12/21/2017  
 DRAWN BY: BP  
 CHECKED BY: DPPD

SHEET TITLE:  
 Panel Schedules & Lift Station Controller

DRAWING NUMBER:

**E102**

SHEET No: of



**TYPICAL CELL HEADWALL**  
N.T.S.

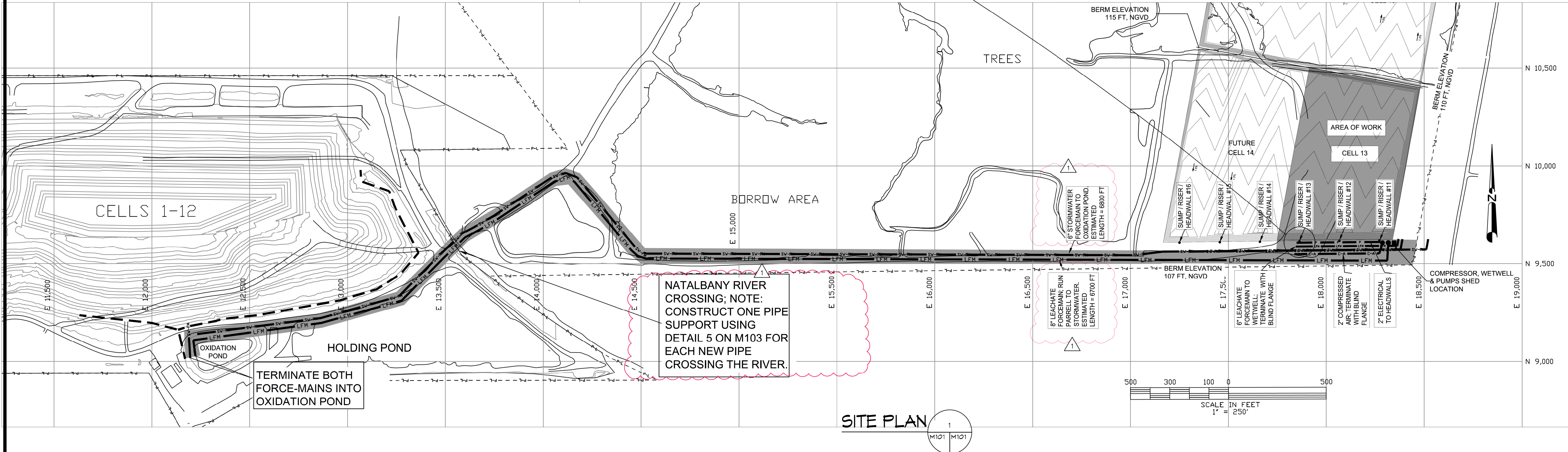
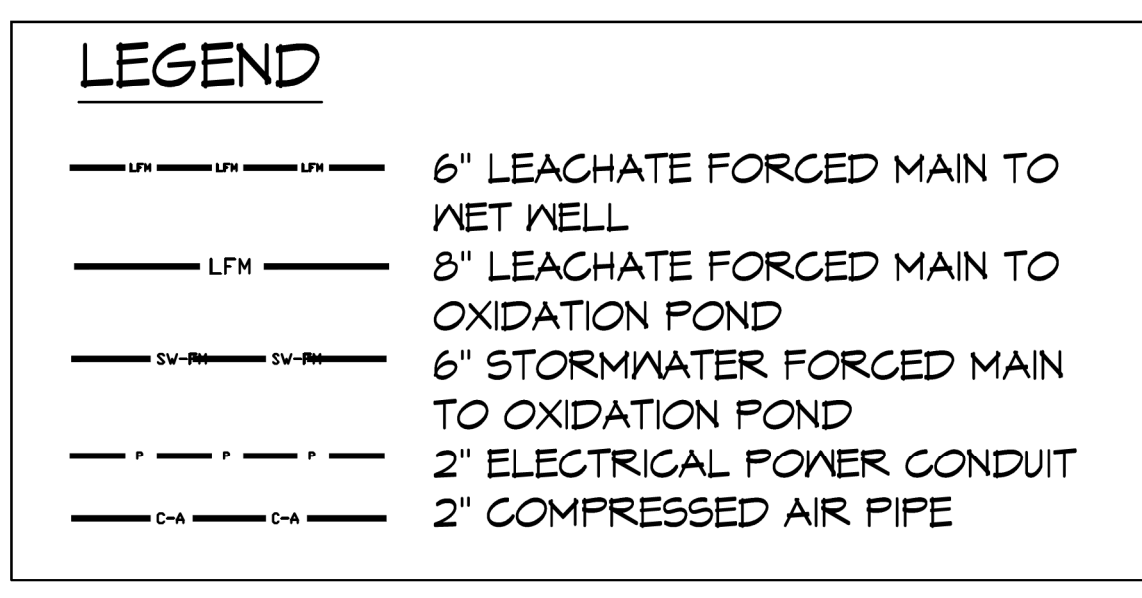
**GENERAL NOTES:**

1. PROVIDE ALL LABOR, MATERIAL AND EQUIPMENT FOR A COMPLETE OPERATING SYSTEM. THE SYSTEM SHALL INCLUDE PIPING, VALVES, FITTINGS, AND SUPPORTS WITHOUT ANY RESTRICTIONS TO VOLUME. CONTRACTOR TO CONSTRUCT NEW RISERS WITH CONNECTORS FOR RAIN WATER PUMPS AT EACH HEADWALL.
2. CONTRACTOR SHALL PROVIDE LISTED EQUIPMENT FROM MANUFACTURE LISTED OR EQUAL.
3. ALL WORK AND MATERIAL SHALL CONFORM STRICTLY TO THE LATEST LOCAL, CITY, PARISH, STATE, DEQ AND NATIONAL GOVERNING CODES.
4. CONTRACTOR INSTALLING HDPE PIPE SHALL BE CERTIFIED BY THE MANUFACTURER TO INSTALL HDPE PIPING.
5. CONTRACTOR IS TO FIELD VERIFY ALL EXISTING UTILITY LOCATIONS, ELEVATIONS AND SIZES PRIOR TO COMMENCING ANY WORK. CONTRACTOR SHALL PAY NECESSARY FEES FOR PERMITTING.
6. CONTRACTOR IS RESPONSIBLE TO VERIFY THE EXISTING INVERTS AND SET NEW INVERTS OF FORCE MAIN AND LEACHATE RISER PIPES.
7. FITTINGS SHALL BE MANUFACTURED FROM A HDPE, SDR-11 (HIGH DENSITY POLYETHYLENE) COMPOUND PER ANSI B-16.40, ASTM D2513 DOT PART 192 AND MANUFACTURED IN ACCORDANCE WITH ISO 9002. ALL FITTINGS SHALL BE PRODUCED TO SCHEDULE 80 DIMENSIONS. PRODUCTS SHALL BE PRESSURE RATED FOR A MINIMUM OF 160 PSI USING QUALITY ASSURANCE TEST REQUIREMENTS OF THESE STANDARDS WITH REGARD TO DIMENSIONS, WORKMANSHIP, BURST PRESSURE, FLATTENING RESISTANCE AND END PRODUCT QUALITY. ALL VALVE DIAPHRAGMS AND SEATS SHALL BE PTFE; VALVE O-RINGS SHALL BE EPDM OR VITON® AS APPLICABLE. ALL VALVE UNION NUTS SHALL HAVE BUTTRESS STYLE THREADS. ALL VALVE COMPONENTS SHALL BE REPLACEABLE. ALL SYSTEM COMPONENTS SHALL BE MANUFACTURED BY AN ISO CERTIFIED MANUFACTURER.
8. HDPE SDR 17 PIPE MATERIAL USED FOR THE MANUFACTURING OF POLYETHYLENE PIPE SHALL BE PE 3408 HIGH DENSITY POLYETHYLENE (HDPE), MEETING THE ASTM D3350 CELL CLASSIFICATION 345464C. POLYETHYLENE PIPE SHALL BE MANUFACTURED IN ACCORDANCE WITH ANNA C906, CONSISTENTLY MEETING AND/OR EXCEEDING THE QUALITY ASSURANCE TEST REQUIREMENTS OF THIS STANDARD WITH REGARD TO PRESSURE RATING, MATERIAL, WORKMANSHIP, BURST PRESSURE, FLATTENING, IMPACT RESISTANCE, AND EXTRUSION QUALITY. PRESSURE RATINGS FOR SDR-17 PIPE SHALL BE A MINIMUM OF 100 PSI (PE3408) OR 125 PSI (PE4710) FOR PIPE SIZES 4" TO 14", IPS (IRON PIPE SIZE). THE PIPE SHALL BE MANUFACTURED IN THE USA, USING DOMESTIC MATERIALS, BY A CERTIFIED HDPE MANUFACTURER. ALL PIPES SHALL BE STORED INDOORS AFTER PRODUCTION AT THE MANUFACTURING SITE UNTIL SHIPPED FROM FACTORY.

9. BUTT FUSION SHALL BE USED TO JOIN INDIVIDUAL LENGTHS OF PIPE IN THE FOLLOWING SEQUENCE.
  - A. SECURE COMPONENTS TO BE JOINED WITH CLAMPING DEVICE(S).
  - B. FACE PIPE ENDS TO MEET MANUFACTURERS SPECIFICATIONS, USING A ROTATING PLANNER BLOCK.
  - C. PROPERLY ALIGN PIPE.
  - D. HEAT ENDS OF PIPE TO MANUFACTURER'S RECOMMENDATION AND BRING TOGETHER AT RECOMMENDED FORCE USING A HYDRAULIC MACHINE THAT WILL APPLY MANUFACTURER'S SPECIFIED FORCE, FOR THE PIPE SIZE.
  - E. HOLD PRESSURE ON PIPE JOINT FOR TIME SUFFICIENT TO DEVELOP THE REQUIRED STRENGTH, AS RECOMMENDED BY THE MANUFACTURER.
  - F. REMOVE THE INTERIOR BEAD, USING MANUFACTURER'S RECOMMENDED EQUIPMENT.
  - G. ALL JOINTS SHALL BE INSTALLED SUCH THAT THE CONNECTION OF PIPE SECTION SHALL BE WATERTIGHT AND FORM A CONTINUOUS LINE FREE FROM IRREGULARITIES IN THE FLOW LINE.
10. TRENCH WIDTH SHALL BE IN ACCORDANCE WITH ASTM D2921 AND SHALL BE SUFFICIENT TO ENSURE WORKING ROOM TO PROPERLY AND SAFELY PLACE AND COMPACT HAUNCHING AND OTHER BACKFILL MATERIALS. TRENCH WIDTH SHALL INCLUDE SUFFICIENT AREA FOR HDPE FORCE MAIN AND ELECTRICAL CONDUITS WITH A MINIMUM SEPARATION OF 12". MINIMUM BACKFILL DEPTH SHALL NOT BE LESS THAN 36" WHERE VEHICULAR TRAFFIC CAN BE PRESENT AND 24" WHERE WASHOUT OCCURS.
11. TEST ALL PIPING AT REQUIRED PRESSURE.
12. THE DRAWINGS INDICATE SIZE AND GENERAL LOCATION OF WORK. SCALE DIMENSIONS SHALL NOT BE USED. THE EXACT LOCATION AND LOCATION OF ALL RISERS SHALL BE DETERMINED BY ACTUAL CONDITIONS IN THE FIELD.
13. ALL FORCE MAINS AND PIPING NOT SHOWN FOR CLARITY, ALL LOCATIONS FIELD VERIFIED.

**GENERAL CONSTRUCTION NOTES**

1. ALL MATERIALS AND WORK, INCIDENTAL TO THE CONSTRUCTION OF THIS PROJECT, SHALL CONFORM TO ALL GOVERNING CODES, AND REGULATIONS OF AGENCIES IN AUTHORITY.
2. CONTRACTOR SHALL PROVIDE ALL PUBLIC PROTECTIONS NECESSARY AS REQUIRED BY LAW.
3. THE DRAWINGS, SPECIFICATIONS AND ANY SUBSEQUENTLY ISSUED ADDENDA, AMENDMENTS OR SUCH CHANGE ORDERS APPROVED BY THE OWNER AND THE CONTRACTOR ARE PART OF THESE CONTRACT DOCUMENTS.
4. CONTRACTOR SHALL WARRANT ALL WORK FOR ONE (1) YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION UNLESS SPECIFICALLY DIRECTED IN OTHER DRAWINGS, SPECIFICATIONS OR SUBSEQUENTLY ISSUED ADDENDA OR AMENDMENTS.
5. **DO NOT SCALE DRAWINGS.** CONSULT WITH THE ENGINEER REGARDING ANY ITEMS IN THE CONTRACT DOCUMENTS THAT REQUIRE CLARIFICATION.
6. TRASH SHALL BE REMOVED FROM THE SITE NOT LESS THAN TWICE MONTHLY.
7. THE GENERAL CONTRACTOR SHALL VERIFY EXISTING CONDITIONS PRIOR TO COMMENCING WORK AND REPORT ANY AND ALL DISCREPANCIES TO THE ARCHITECT.
8. CONTRACTOR VEHICLES AND EQUIPMENT NECESSARY FOR CONSTRUCTION MAY BE PARKED ON THE SITE. OTHER VEHICLES PARKED ON THE SITE REQUIRE THE OWNER'S PERMISSION.
9. NAMING A CERTAIN BRAND, MAKE OR MANUFACTURER IS TO DESIGNATE THE GENERAL STYLE, TYPE, CHARACTER AND QUALITY STANDARD OF THE PRODUCT DESIRED. SUBSTITUTION REQUESTS MUST BE SUBMITTED PRIOR TO BIDDING.
10. ALL MATERIALS/EQUIPMENT SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. WORK NOT CONSISTENT WITH MANUFACTURER'S RECOMMENDATIONS WILL BE REJECTED BY OWNER/ARCHITECT.



**DAMMON ENGINEERING, INC.**  
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Chief Engineer: Brian Mistic, PE  
554 Old Spanish Trail  
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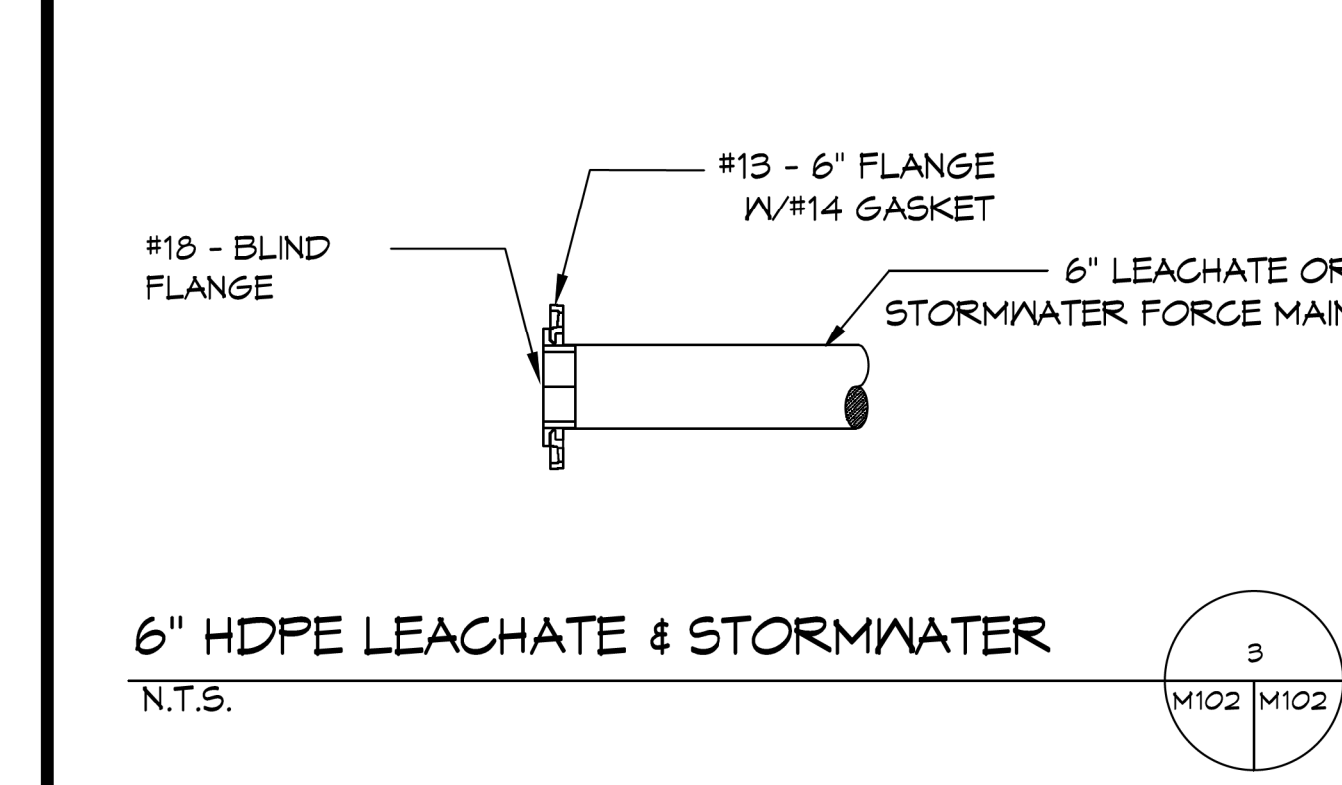
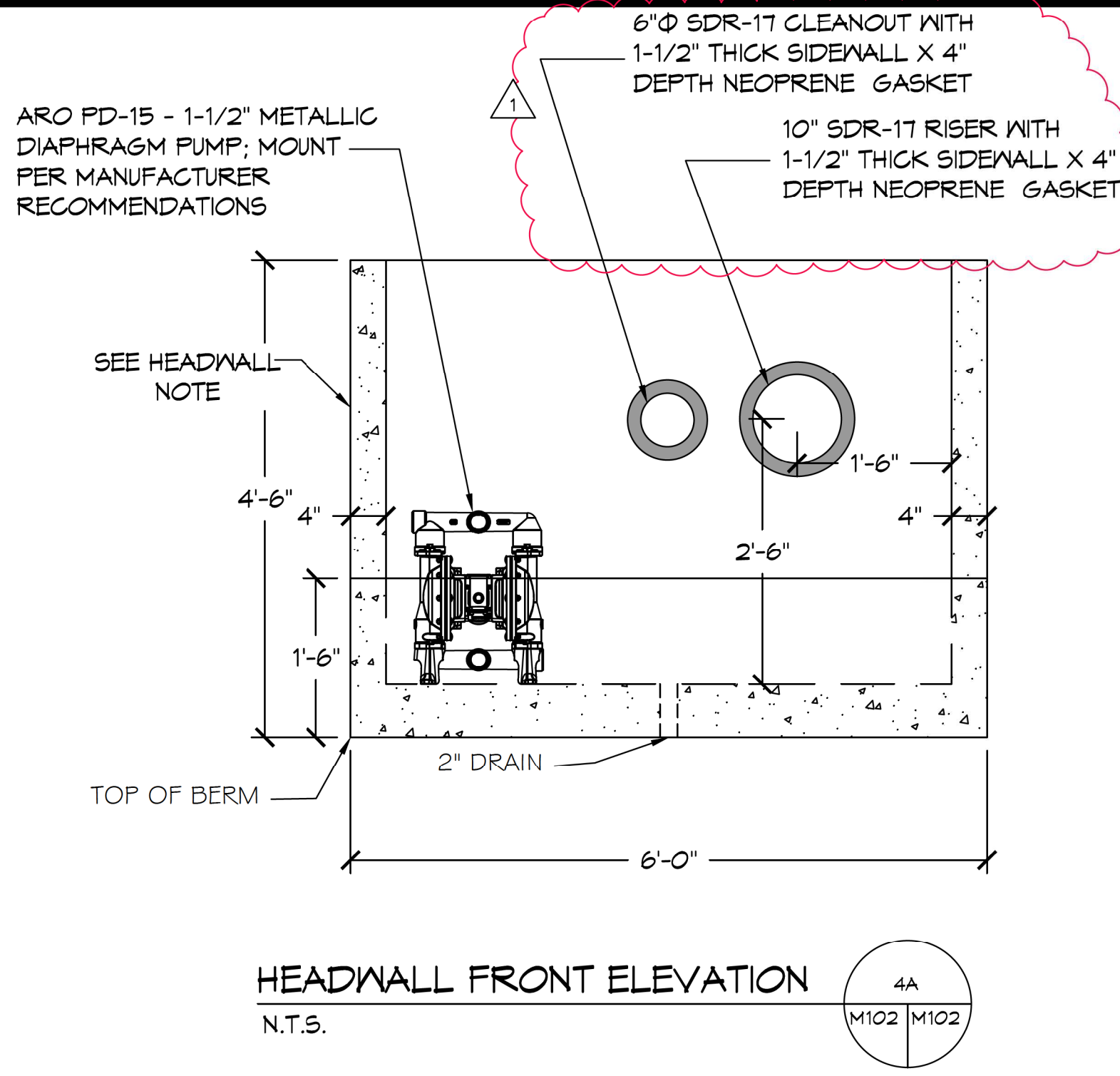
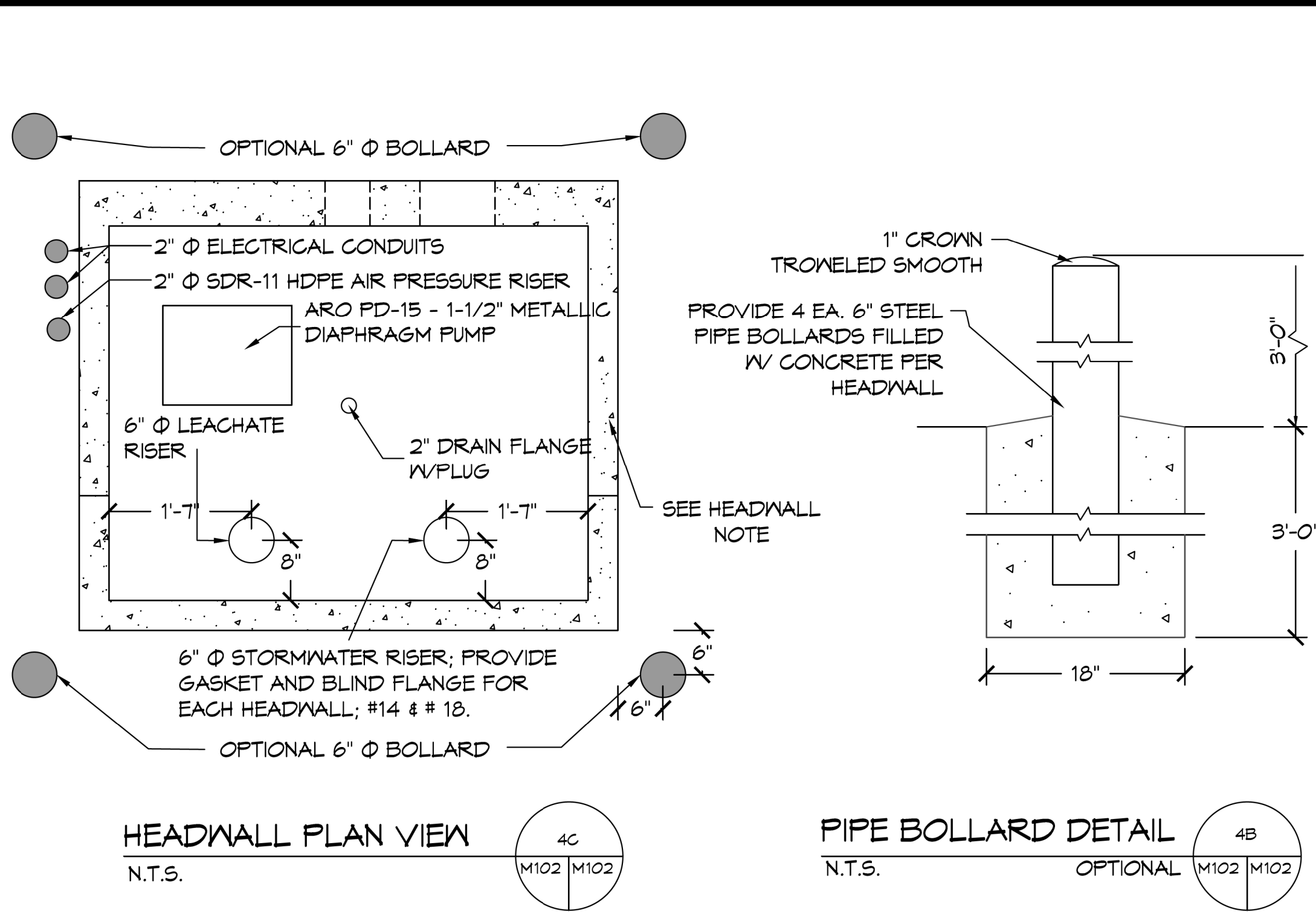
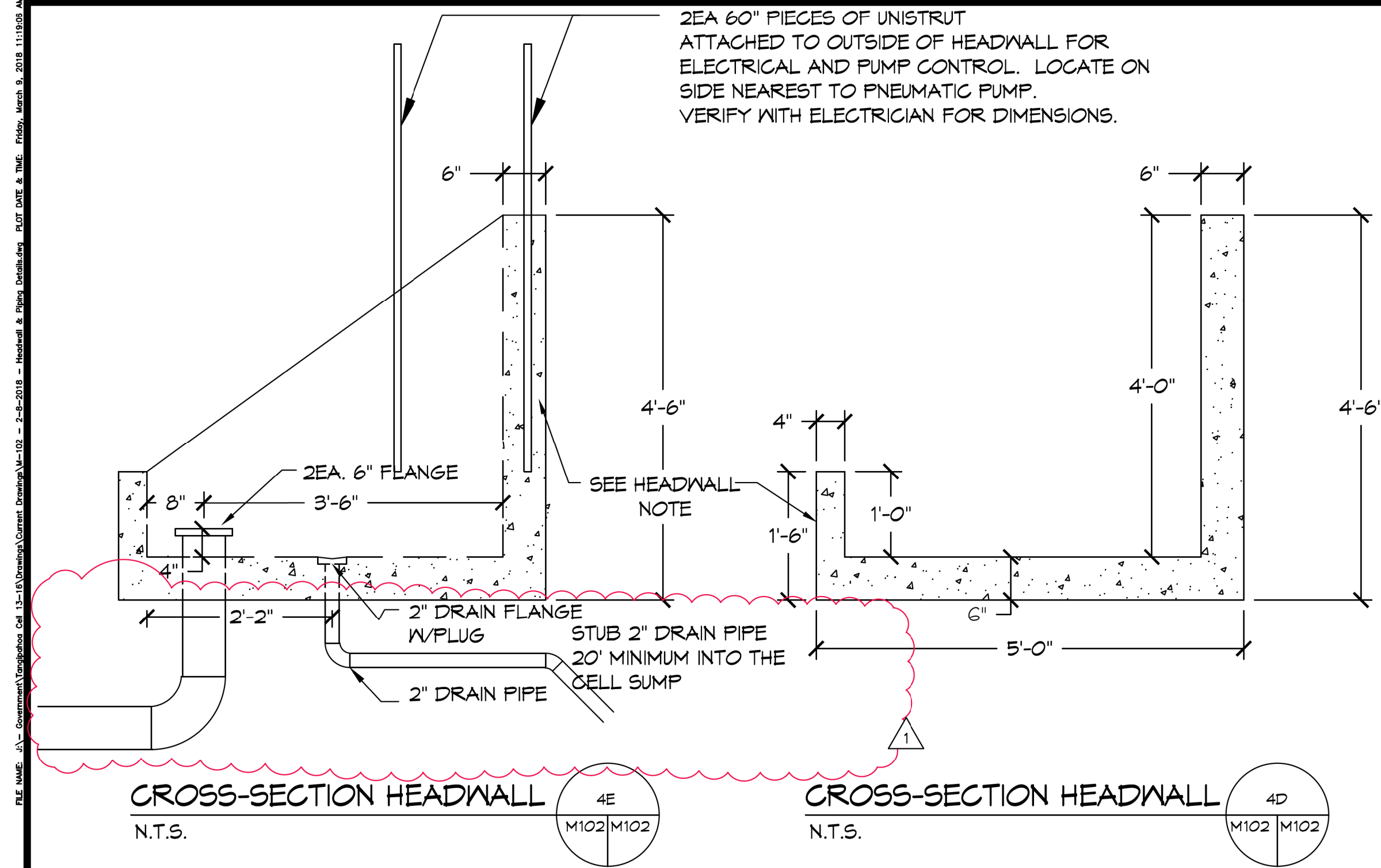
#	DESCRIPTION	DATE
1	Revised Compressed Air Line	3/2/2018



TANGIPAHOLA REGIONAL SOLID WASTE FACILITY  
57510 HANO ROAD  
INDEPENDENCE, LOUISIANA  
JOB No: 2936 DATE: 12/21/2017 CHECKED BY: KJK/JTL  
DRAWN BY: KJK

SHEET TITLE:  
PARTIAL SITE PLAN  
DRAWING NUMBER:  
**M101**  
SHEET No: of #

FILE NAME: A:\S-DAMMON\Engineering\04-13-10\Drawings\04-Dammon\04-Dammon.dwg, DATE: 04/13/10, DRAWN BY: J.K., CHECKED BY: J.K., PLOT DATE: 04/13/10, PLOT BY: J.K.

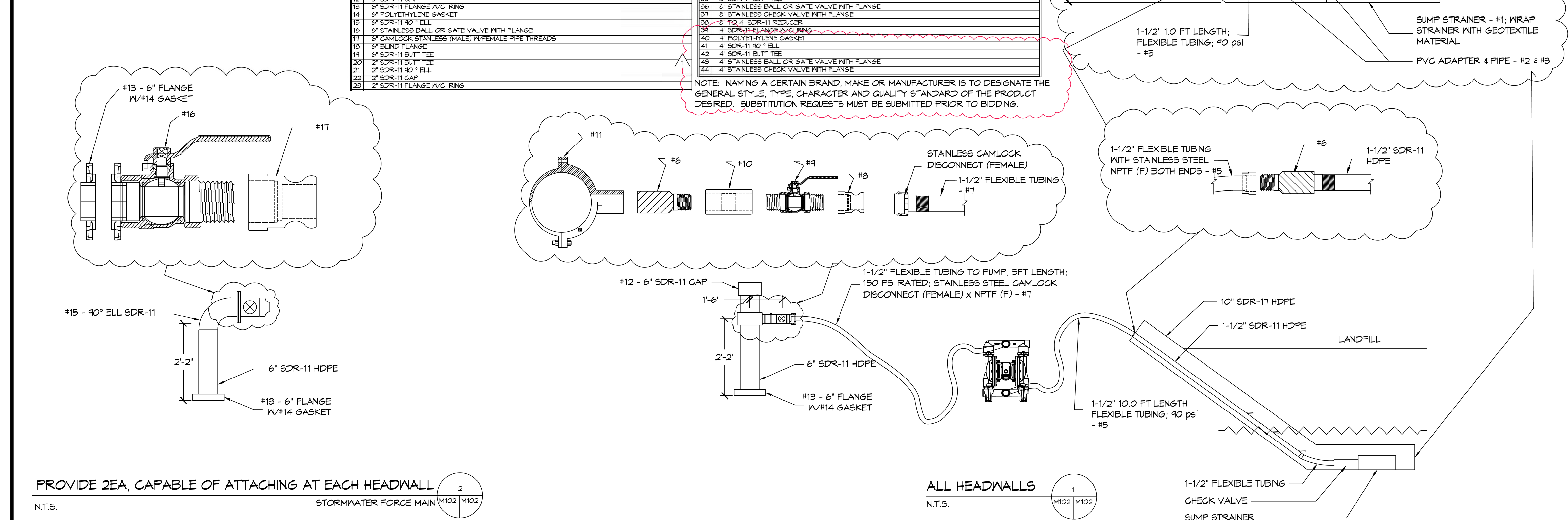


HEADWALL NOTE: CONTRACTOR SHALL USE 4,000 psi CONCRETE, #5 BARS CONTINUOUS 12" O.C., ALL EDGES SHALL HAVE A CHAMFERED EDGES.

HEADWALL DETAILS 4  
N.T.S. M102 M102

MATERIAL LIST		MATERIAL LIST	
#	ITEM	#	ITEM
1	1" SUMP STRAINER, 50 GPM; PART # CASS - 50 - 1-1/2" - NIPPLE - 100"	24	2" POLYETHYLENE GASKET
2	1.5" SCH 80 PVC FEMALE ADAPTER NPT X SOCKET	25	2" X 1.5" HDPE SADDLE
3	1.5" SCH 80 PVC PIPE	26	1.5" SDR-11 BUTT TEE
4	1.5" PVC ZOELLER UNICHECK VALVE; PART # 30-0041 CLEAR BODY	27	2" SDR-11 90° ELL
5	1.5" FLEXIBLE SUCTION TUBING, 90 PSI; STAINLESS STEEL NPTF (F) BOTH ENDS	28	AIR REGULATOR W/FILTER; ARO P34344-810
6	1.5" POLYCAM TRANSITION HDPE TO STAINLESS STEEL	29	2 EA WATER LEVEL SENSOR - ARO 54916-1 & ARO 54941 ELECTRIC TO AIR INTERFACE DEVICE
7	1.5" FLEXIBLE TUBING, 150 PSI; STAINLESS STEEL CAMLOCK DISCONNECT (FEMALE) X NPTF (F)	30	1 EA WATER LEVEL SENSOR - ARO 54916-2 & ARO 54941 ELECTRIC TO AIR INTERFACE DEVICE
8	1.5" STAINLESS CAMLOCK DISCONNECT (MALE) W/FEMALE PIPE THREADS	31	1 EA AIR SOLENOID - ARO M-214-S8-024-A & ARO M254PS
9	1.5" STAINLESS BALL VALVE W/ MALE PIPE THREADS	32	8" POLYETHYLENE GASKET
10	1.5" STAINLESS COLLAR	33	6" SDR-11 90° ELL
11	6" X 1.5" HDPE SADDLE	34	6" SDR-11 BUTT TEE
12	6" SDR-11 CAP	35	6" SDR-11 BUTT TEE
13	6" SDR-11 FLANGE W/G RING	36	6" STAINLESS BALL OR GATE VALVE WITH FLANGE
14	6" POLYETHYLENE GASKET	37	6" STAINLESS CHECK VALVE WITH FLANGE
15	6" SDR-11 90° ELL	38	6" TO 4" SDR-11 REDUCER
16	6" STAINLESS BALL OR GATE VALVE WITH FLANGE	39	4" SDR-11 FLANGE W/G RING
17	6" CAMLOCK STAINLESS (MALE) W/FEMALE PIPE THREADS	40	4" POLYETHYLENE GASKET
18	6" BLIND FLANGE	41	4" SDR-11 90° ELL
19	6" SDR-11 BUTT TEE	42	4" SDR-11 BUTT TEE
20	2" SDR-11 BUTT TEE	43	4" STAINLESS BALL OR GATE VALVE WITH FLANGE
21	2" SDR-11 90° ELL	44	4" STAINLESS CHECK VALVE WITH FLANGE
22	2" SDR-11 CAP		
23	2" SDR-11 FLANGE W/G RING		

NOTE: NAMING A CERTAIN BRAND, MAKE OR MANUFACTURER IS TO DESIGNATE THE GENERAL STYLE, TYPE, CHARACTER AND QUALITY STANDARD OF THE PRODUCT DESIRED. SUBSTITUTION REQUESTS MUST BE SUBMITTED PRIOR TO BIDDING.

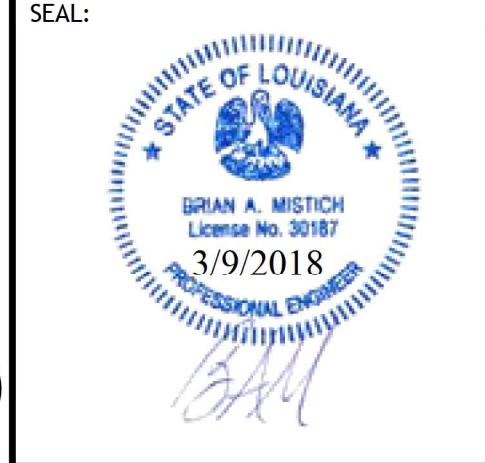


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PH: 985.649.5832

REVISIONS

#	DESCRIPTION	DATE
1	Added Note to Material List & Revised Headwall 3/2/2018	3/2/2018

SEAL:

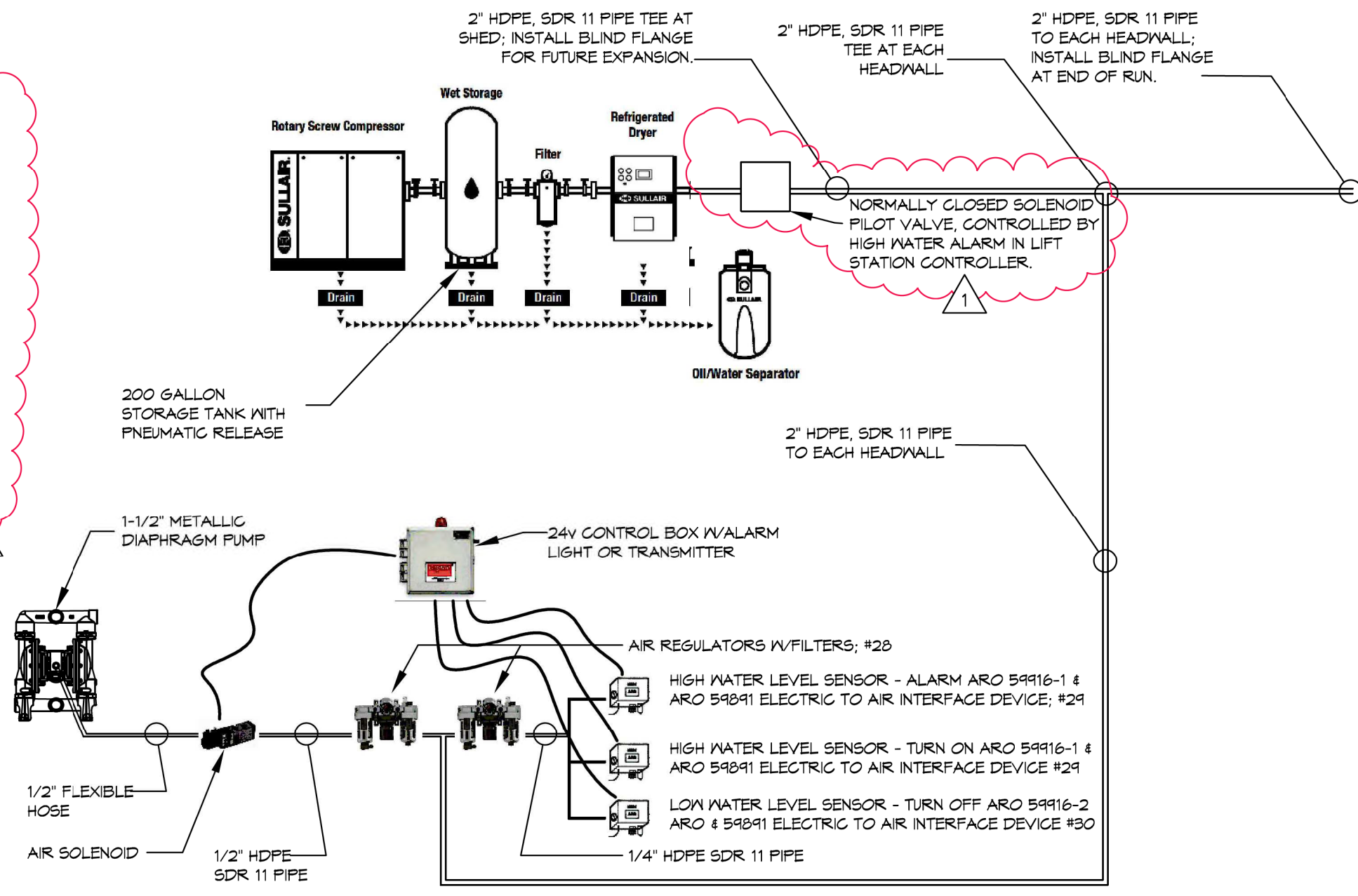


TANGIPAHOLA REGIONAL SOLID WASTE FACILITY  
57510 HANO ROAD  
INDEPENDENCE, LOUISIANA  
JOB No: 2936 DATE: 12/21/2017  
DRAWN BY: KJK/JTL CHECKED BY: KJK

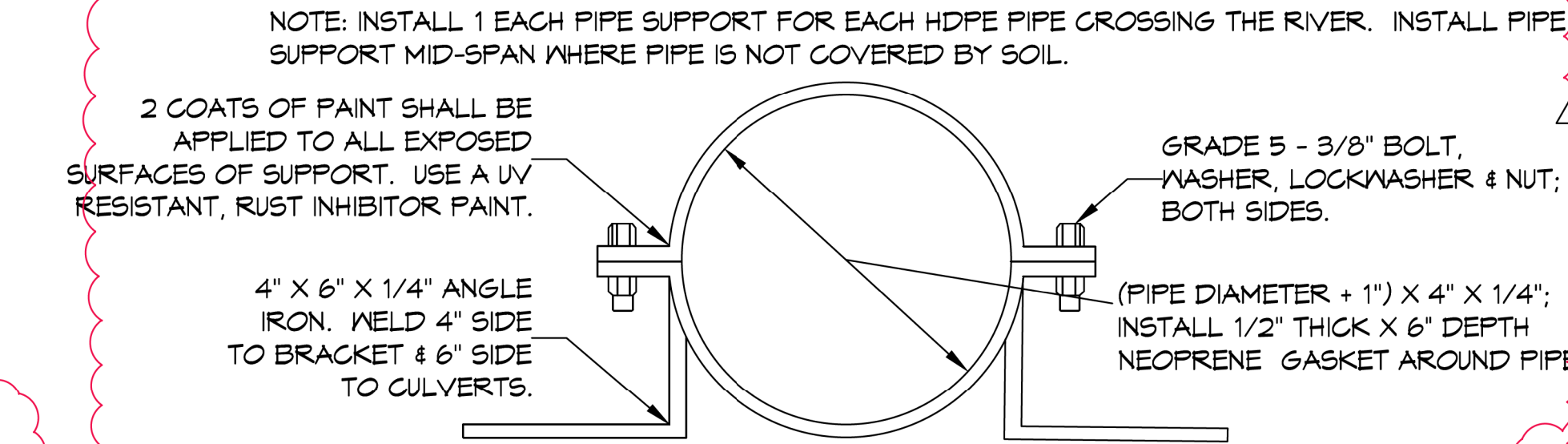
SHEET TITLE: HEADWALL & PIPING DETAILS  
DRAWING NUMBER: **M102**  
SHEET No: of #

QUANTITY	ITEM
3	1-1/2" METALLIC DIAPHRAGM PUMP, 40 GPM, MANUFACTURE: ARO, MODEL: PD-15A-AAS-CCC
2	4 INCH LIFT STATION PUMPS; MANUFACTURE: GORMAN-RUPP; MODEL: T4A-B-9; FLOW RATE 200 GPM
2	5HP 3-PHASE, SOFT START ELECTRIC MOTORS;
1	LIFT STATION CONTROL BOX W/ 4 LEVEL FLOAT SWITCHES AND SCADA COMMUNICATIONS AND CONTROLS TO SHUT OFF AIR CONTROL VALVE WHEN HIGH WATER MARK IS REACHED
1	AIR COMPRESSOR, 15HP, 60.2 SCFM @ 125 PSI, MANUFACTURE: SULLIAIR, MODEL: 1109e
1	COMPRESSOR DRYER, MANUFACTURE: SULLIAIR, MODEL: ATRH-75 SCFM
1	200 GALLON STORAGE TANK WITH PNEUMATIC RELEASE, MANUFACTURE: SULLIAIR, MODEL: 200 GALLON

#	ITEM
1	1 1/2" SUMP STRAINER, 50 GPM; PART # CASS - 50 - 1-1/2" - NIPPLE - 100
2	1 1/2" SCH 80 PVC FEMALE ADAPTER, NPT X SOCKET
3	1 1/2" SCH 80 PVC PIPE
4	1 1/2" PVC ZOLLER UNICHECK VALVE; PART # 30-0041 CLEAR BODY
5	1 1/2" FLEXIBLE SUCTION TUBING, 40 PSI, STAINLESS STEEL NPTF (F) BOTH ENDS
6	1 1/2" POLYCAM TRANSITION HDPE TO STAINLESS STEEL
7	1 1/2" FLEXIBLE TUBING, 150 PSI, STAINLESS STEEL CAMLOCK DISCONNECT (FEMALE) X NPTF (F)
8	1 1/2" STAINLESS CAMLOCK DISCONNECT (MALE) X FEMALE PIPE THREADS
9	1 1/2" STAINLESS BALL VALVE X MALE PIPE THREADS
10	1 1/2" STAINLESS COLLAR
11	6" X 1 1/2" HDPE SADDLE
12	6" SDR-11 CAP
13	6" SDR-11 FLANGE W/G RING
14	6" POLYETHYLENE GASKET
15	6" SDR-11 90° ELL
16	6" STAINLESS BALL OR GATE VALVE WITH FLANGE
17	6" CAMLOCK STAINLESS (MALE) X FEMALE PIPE THREADS
18	6" BLIND FLANGE
19	6" SDR-11 BUTT TEE
20	2" SDR-11 BUTT TEE
21	2" SDR-11 90° ELL
22	2" SDR-11 CAP
23	2" SDR-11 FLANGE W/G RING
24	2" POLYETHYLENE GASKET
25	2" X 1 1/2" HDPE SADDLE
26	1 1/2" SDR-11 BUTT TEE
27	2" SDR-11 90° ELL
28	AIR REGULATOR W/FILTER; ARO P38344-610
29	2 EA WATER LEVEL SENSOR - ARO 58916-1 & ARO 58901 ELECTRIC TO AIR INTERFACE DEVICE
30	1 EA WATER LEVEL SENSOR - ARO 58916-2 & ARO 58901 ELECTRIC TO AIR INTERFACE DEVICE
31	1 EA AIR SOLENOID - ARO M-214-95-024-A & ARO M254FS
32	6" SDR-11 FLANGE W/G RING
33	6" POLYETHYLENE GASKET
34	6" SDR-11 90° ELL
35	6" SDR-11 BUTT TEE
36	6" STAINLESS BALL OR GATE VALVE WITH FLANGE
37	6" STAINLESS CHECK VALVE WITH FLANGE
38	8" TO 4" SDR-11 REDUCER
39	4" SDR-11 FLANGE W/G RING
40	4" POLYETHYLENE GASKET
41	4" SDR-11 90° ELL
42	4" SDR-11 BUTT TEE
43	4" STAINLESS BALL OR GATE VALVE WITH FLANGE
44	4" STAINLESS CHECK VALVE WITH FLANGE

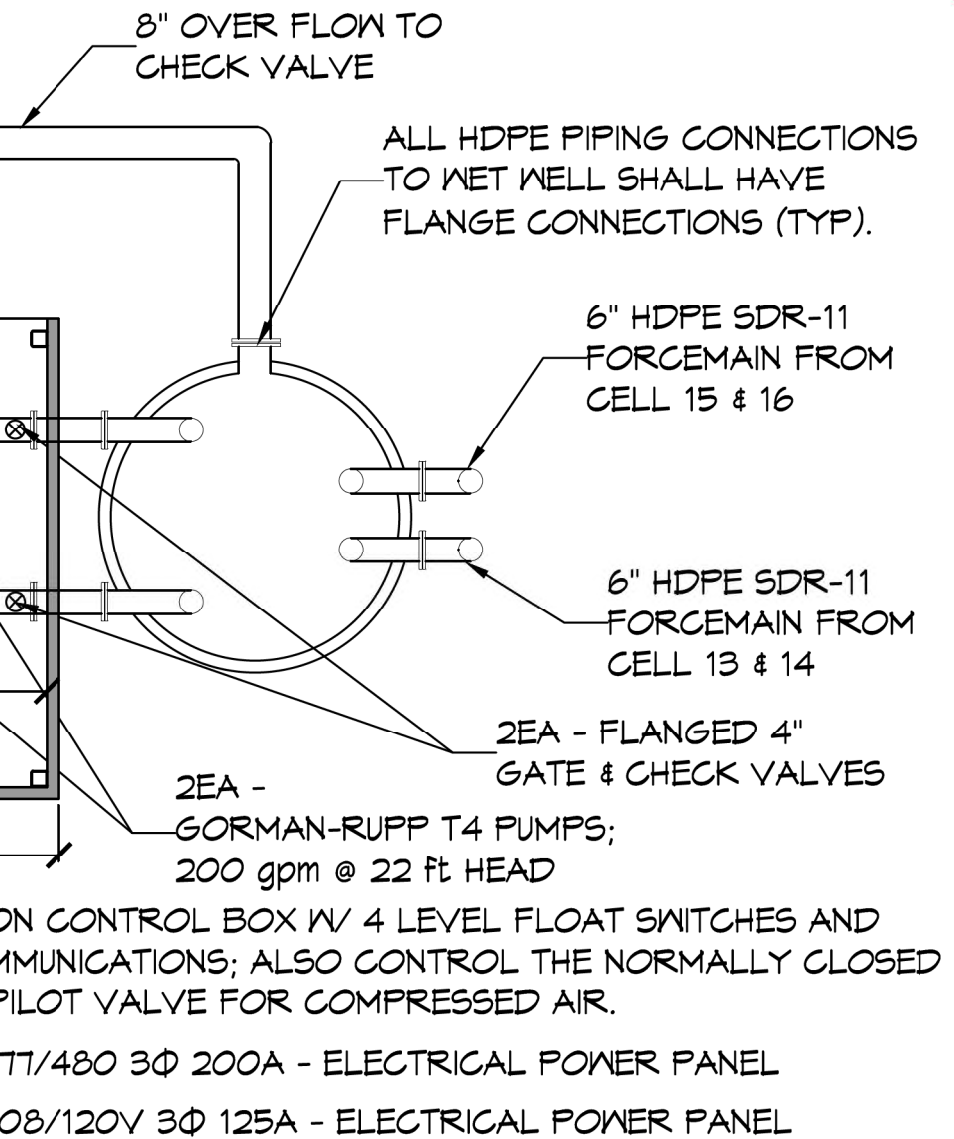


**COMPRESSOR ONE-LINE DIAGRAM**  
N.T.S.

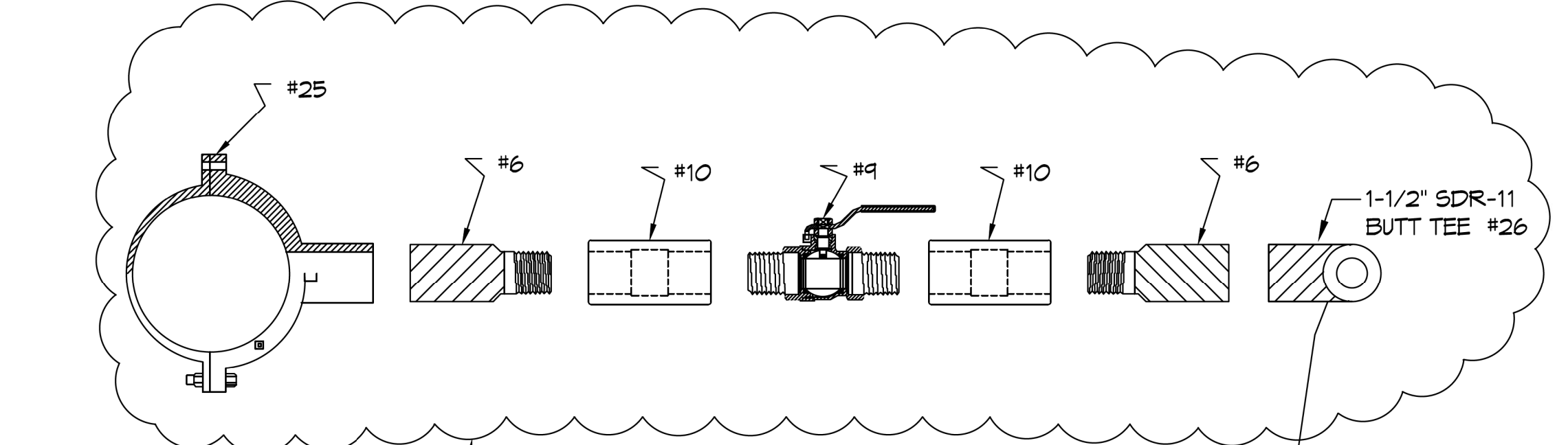


**6" STORMWATER & 8" LEACHATE HDPE PIPE SUPPORT @ RIVER**  
N.T.S.

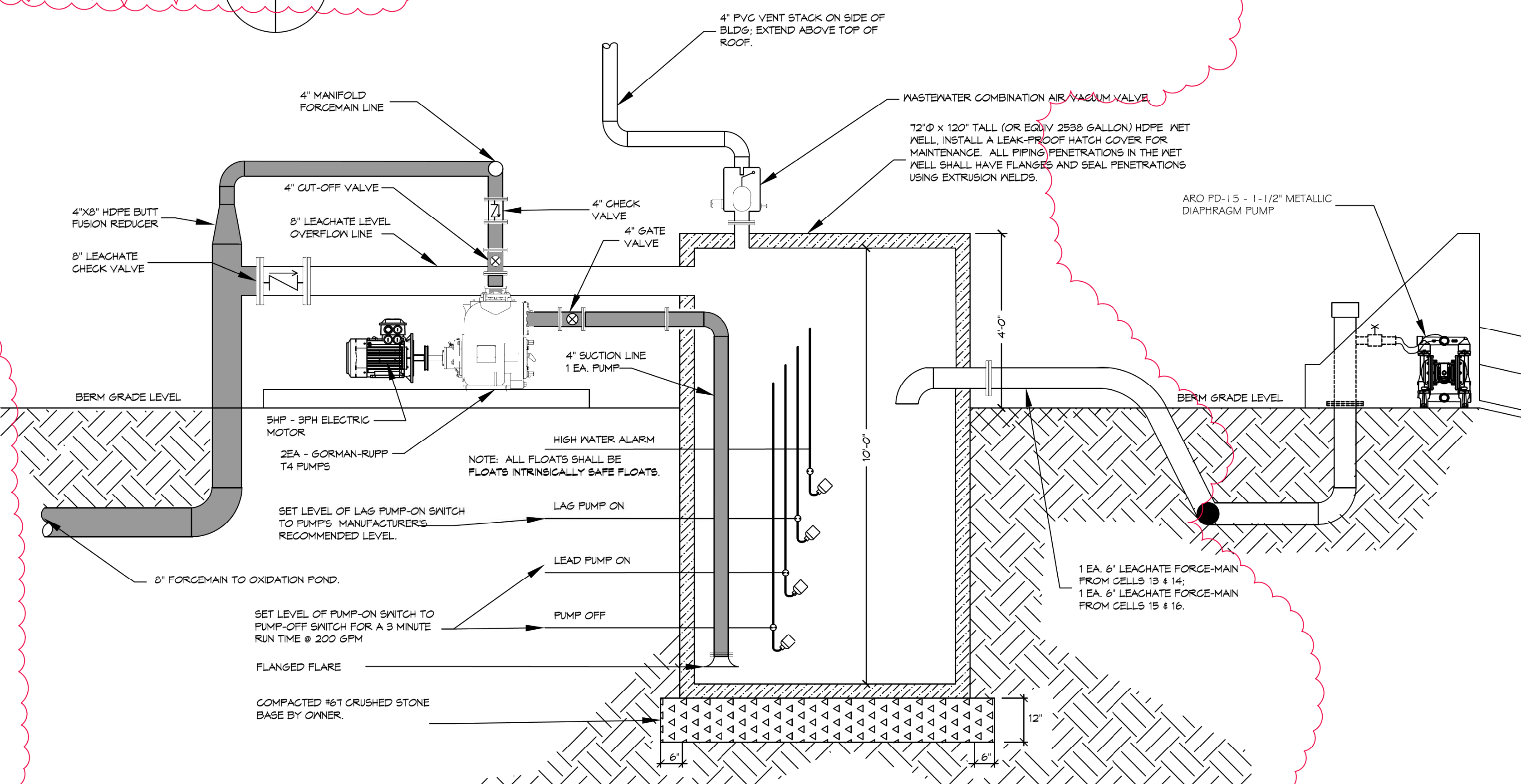
**WET WELL NOTES:** WET WELL SHALL BE MADE OF SOLID WALL SDR-26 PIPE, PE100. THE TOP AND BOTTOM OF THE WET WELL SHALL BE CONSTRUCTED FROM SHEET STOCK. ALL PENETRATIONS & TOP AND BOTTOM CONNECTIONS SHALL HAVE EXTRUSION WELDS THAT ARE CONTINUOUS AROUND THE ENTIRE CIRCUMFERENCE OF THE CONNECTION.



**COMPRESSOR SHED LAYOUT**  
N.T.S.



**COMPRESSOR HEADWALL DETAILS**  
N.T.S.



**HEADWALL TO LIFT STATION DIAGRAM**  
N.T.S.

**NOTE:** NAMING A CERTAIN BRAND, MAKE OR MANUFACTURER IS TO DESIGNATE THE GENERAL STYLE, TYPE, CHARACTER AND QUALITY STANDARD OF THE PRODUCT DESIRED. SUBSTITUTION REQUESTS MUST BE SUBMITTED PRIOR TO BIDDING.

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#	DESCRIPTION	DATE
1	Revised Headwall to Lift Station Diagram and Compressor Layout; Added Control Valve to Compressed Air Line	3/2/2018

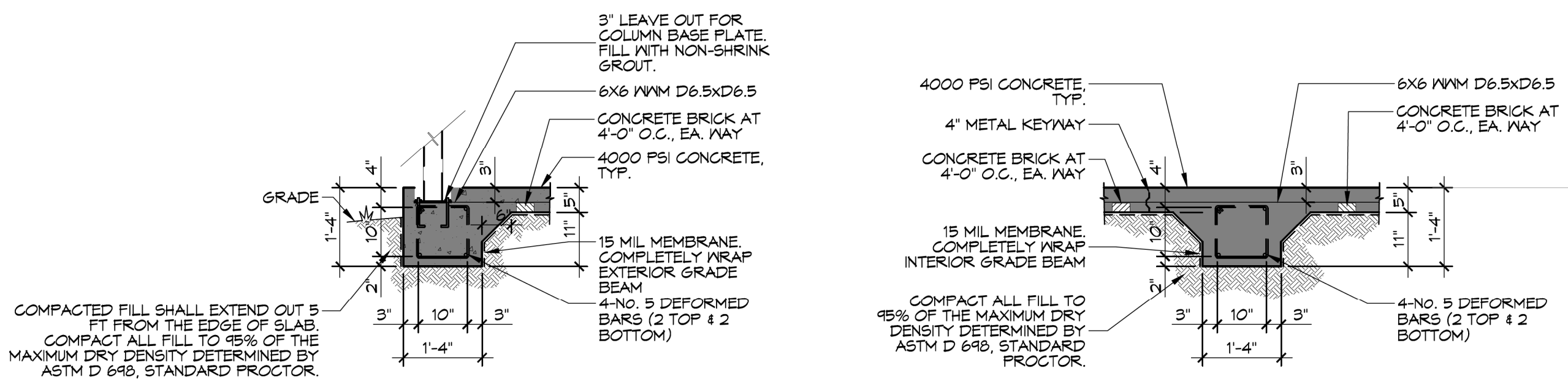
SEAL:

**TANGIPAHOLA LEACHATE TREATMENT TANKS**  
TANGIPAHOLA REGIONAL SOLID WASTE FACILITY  
5750 HANO ROAD  
INDEPENDENCE, LOUISIANA  
JOB No: 2336 DATE: 12/21/2017 CHECKED BY: KJK/JTL  
DRAWN BY: KJK

SHEET TITLE:  
**COMPRESSOR & HEADWALL TO LIFT STATION DETAILS**

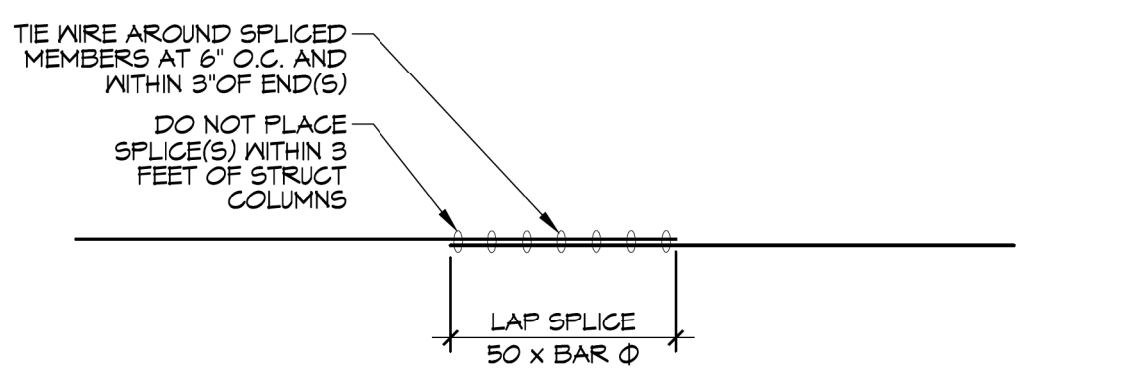
DRAWING NUMBER:  
**M103**

SHEET No: of #



**A** DETAIL  
SCALE: 1/2" = 1'-0"  
AT TYP. SLAB EDGE

**B** DETAIL  
SCALE: 1/2" = 1'-0"  
AT INNER GRADE BEAMS



DETAIL  
SCALE: N.T.S.  
TYP. SPLICE DETAIL

**SITE PREP NOTES**

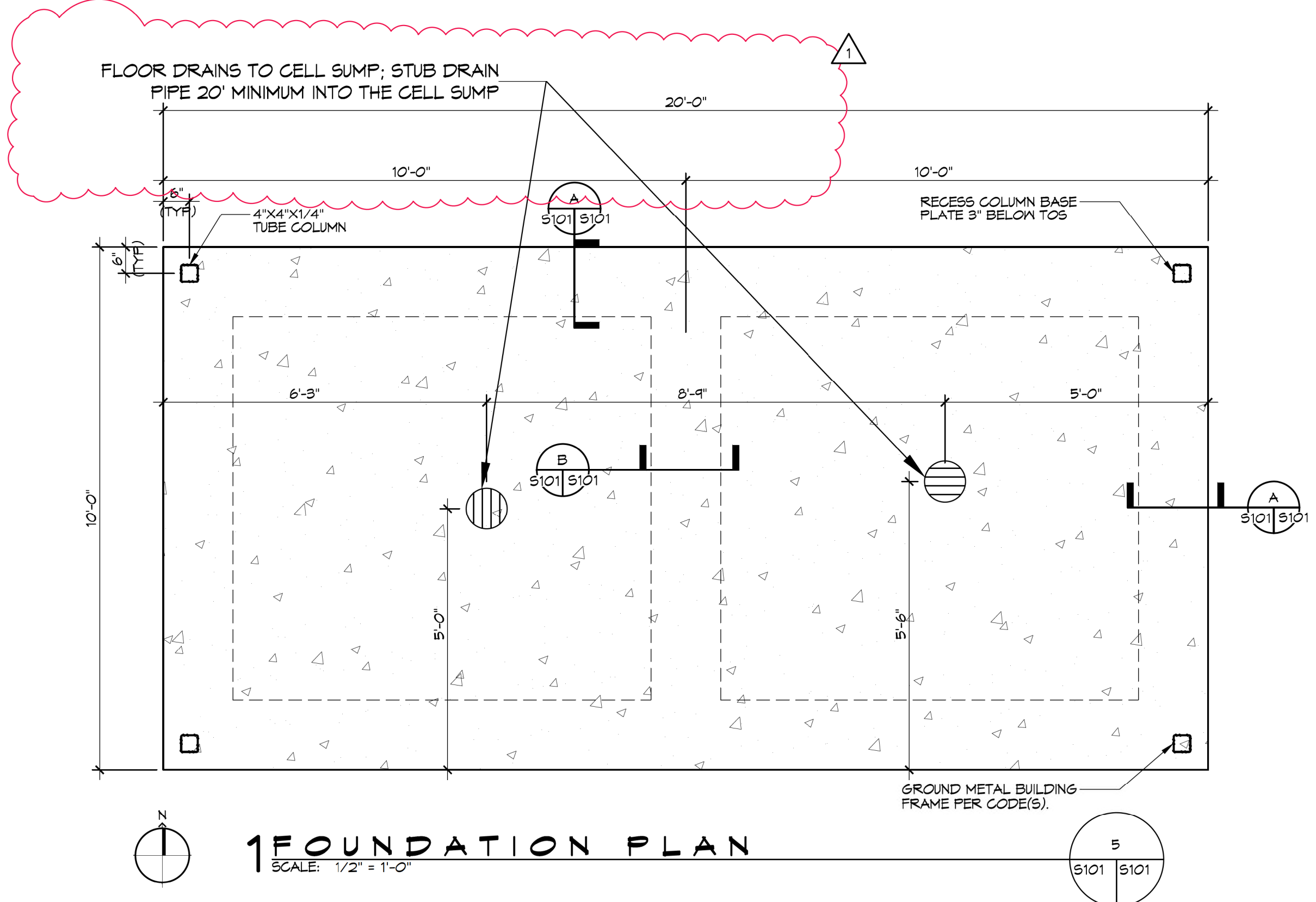
- STRUCTURAL (A4 SELECT) FILL SHALL BE INSTALLED IN 6" LIFTS FOR A DEPTH OF 2 FT BELOW GRADE BEAMS. IT SHALL BE COMPACTED TO 95% OF MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D-698 STANDARD PROCEDURE.
- OWNER SHALL RETAIN AN INDEPENDENT GEOTECHNICAL ENGINEER FOR TESTING, COMPACTION AND TO INSPECT ALL FOOTING AND SLAB SUBGRADES. TEST AND INSPECTION RESULTS SHALL BE REPORTED IN WRITING TO THE ENGINEER AND CONTRACTOR WITHIN 24 HOURS AFTER TESTS ARE MADE. ANY RETESTING OR ADDITIONAL WORK REQUIRED DUE TO IMPROPERLY COMPACTED FILL SHALL BE DONE BY THE CONTRACTOR.
- TREAT SOIL BELOW FOR TERMITES.

**GENERAL FOUNDATION NOTES**

- ALL DIMENSIONS ARE EDGE OF CONCRETE (EOC) TO EDGE OF CONCRETE (EOC) UNLESS NOTED OTHERWISE.
- CONCRETE MIX SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS. CONCRETE MIX SHALL BE IN ACCORDANCE WITH ACI-318.
- CURING COMPOUND SHALL MEET ASTM C-309 WITH A MINIMUM OF 30% SOLIDS CONTENT BY VOLUME.
- CONCRETE TEST CYLINDERS AND SLUMP TESTS ARE TO BE MADE FOR EACH 100 CUBIC YARDS OR FRACTION THEREOF, OR FOR EACH 5,000 S.F. OF SURFACE AREA PLACED. TEST RESULTS SHALL BE REPORTED IN WRITING TO THE ENGINEER WITHIN 48 HOURS AFTER TESTS AREA MADE. ACCEPTABLE SLUMPS SHALL BE 3" TO 4".
- ALL CONVENTIONAL REINFORCING STEEL SHALL MEET ASTM-A615 REQUIREMENTS (GRADE 60).
- ONE LAYER OF POLYETHYLENE VAPOR BARRIER SHALL BE PLACED UNDER ALL CONCRETE. VAPOR RETARDER TO BE MINIMUM 15 MIL THICKNESS; ASTM E 1745 CLASS A, PERMEANCE LESS THAN 0.01 PERMS, EQUAL TO STEGO INDUSTRIES STEGO WRAP, ECOSHIELD-E 15 MIL BY EPFO, OR IRONBAR 15 BY FLATIRON FILMS. PROVIDE APPROPRIATE ACCESSORIES FOR A COMPLETE SYSTEM.
- ALL REINFORCING STEEL AND MESH SHALL BE SECURELY SUPPORTED TO PREVENT BOTH VERTICAL AND HORIZONTAL MOVEMENT DURING CONCRETE PLACEMENT.
- THE CONTRACTOR SHALL VERIFY ALL DROPS, OFFSETS, LEDGES, DIMENSIONS AND CONFIGURATIONS. CONTRACTOR MUST BE RESPONSIBLE FOR SAME.
- GRADE BEAM DIMENSIONS MAY VARY BY -5%, +20%.
- ALL RUNOFF WATER MUST BE CARRIED AWAY FROM THE SLAB TO PREVENT SATURATION OF THE SUB-BASE.
- PROVIDE AND MAINTAIN IMMEDIATE SITE DRAINAGE BEFORE, DURING, AND AFTER CONSTRUCTION. PROVIDE GRADING, SWELLS, AND SUMP PUMPS AS MAY BE REQUIRED TO IMMEDIATELY DRAIN ALL RAINWATER FROM THE CONSTRUCTION AREA. FOOTING EXCAVATIONS SHALL BE OBSERVED AND CONCRETE PLACED AS QUICKLY AS POSSIBLE TO AVOID EXPOSURE OF THE FOOTING BOTTOMS TO WETTING AND DRYING. STANDING WATER SHALL NOT BE ALLOWED TO SOAK INTO THE FOOTINGS. SURFACE RUNOFF WATER SHALL BE DRAINED AWAY FROM THE EXCAVATIONS AND NOT BE ALLOWED TO POND PRIOR TO OR AFTER CONCRETE PLACEMENT. IF IT IS REQUIRED THAT ANY FOOTING EXCAVATIONS BE LEFT OPEN FOR MORE THAN ONE DAY, THEY SHOULD

**BUILDING CODE INFORMATION**

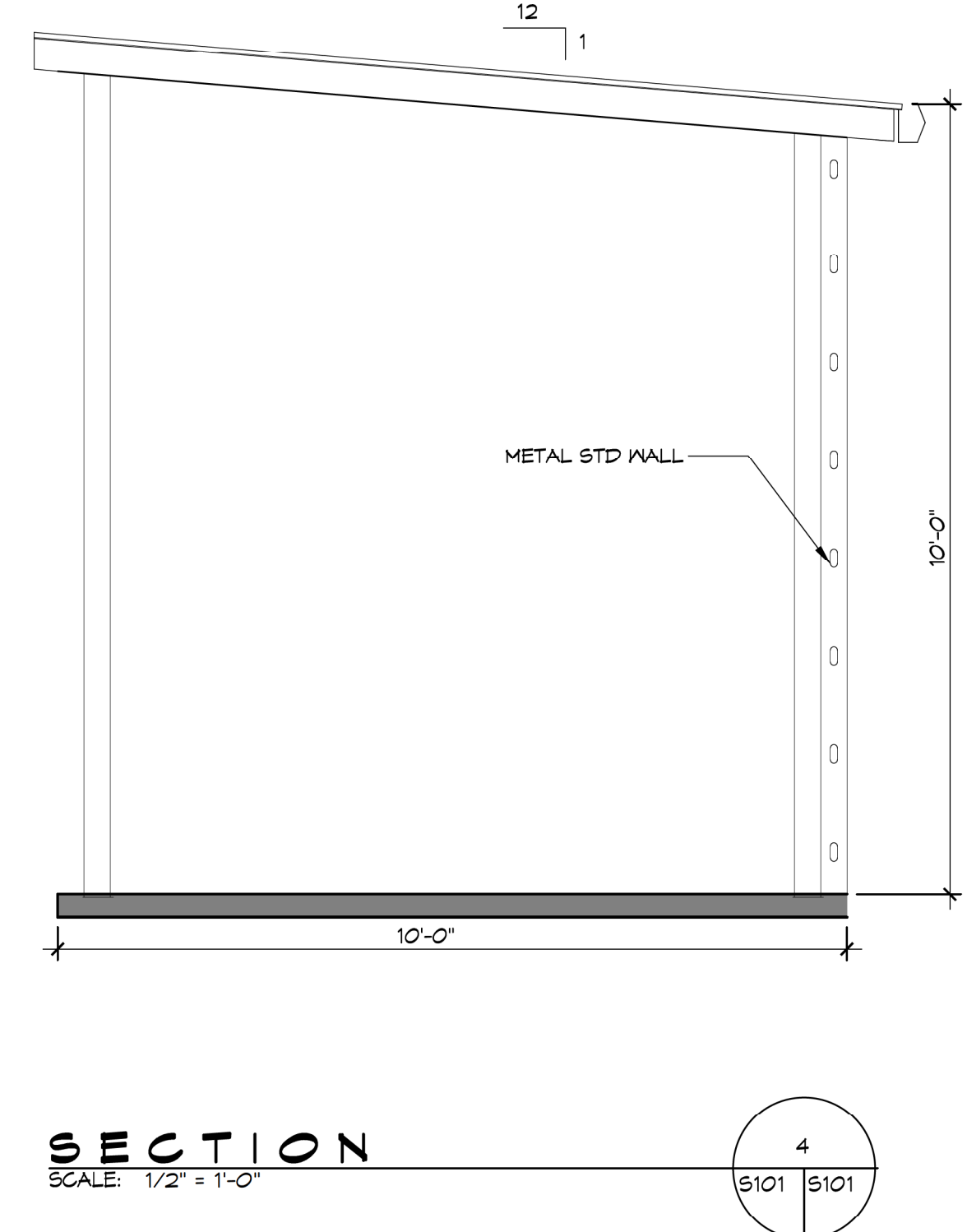
<b>APPLICABLE CODES</b>	
IBC 2012	
<b>BUSINESS GROUP B</b> (IBC 2012 CHAPTER 19)	
LOX-HAZARD STORAGE 5-2	
<b>OCCUPANT LOAD CALCULATIONS</b> (TABLE 1004.1.2)	
ACCESSORY STORAGE AREA = 190 sq. ft.	100 SF PER OCCUPANT (GROSS)
2 OCCUPANTS	
<b>CONSTRUCTION TYPE(S)</b> (TABLE 503)	
IB (SECTION 503)	
<b>ALLOWABLE HEIGHT AND BUILDING AREA LIMITED BY TYPE OF CONSTRUCTION</b>	
MAXIMUM HEIGHT IN STORIES (SECTION 503 & 504, TABLE 503)	2
MAXIMUM AREA IN SQUARE FEET (SECTION 503, 506 & 507, TABLE 503)	19,500
<b>WIND SPEED DESIGN REQUIREMENTS</b>	
THIS BUILDING SHALL BE DESIGNED WITH IBC SEC 1609 AS PARTIALLY ENCLOSED BLDG USING THE FOLLOWING INFORMATION:	
<b>WIND DESIGN DATA:</b>	
DETERMINATION OF WIND LOADS SHALL BE IN ACCORDANCE WITH IBC SEC 1609.3 (A), (B), OR (C) DEPENDING ON THE RISK CATEGORY	
BASIC WIND SPEED (3 SECOND GUST) =	114 MPH (IBC FIG 1609C)
RISK FACTOR:	CATEGORY I BLDG
TOPOGRAPHIC FACTOR =	1
HORIZONTAL DESIGN WIND PRESSURE (ASCE 7-10 TABLE 28.6-1):	20.6 PSF
INTERNAL PRESSURE COEFFICIENT (ASCE 7-10 TABLE 26.11-1):	± 0.35
LIVE LOADS (IBC SEC 1607)	
STORAGE, LIGHT (IBC TABLE 1607.1):	125 PSF
ROOF LIVE LOADS (IBC TABLE 1607.1):	20 PSF UNIFORM, 300 LB CONCENTRATED
GROUND SNOW LOADS (IBC TABLE 1608 & FIG 1608.2):	5 PSF



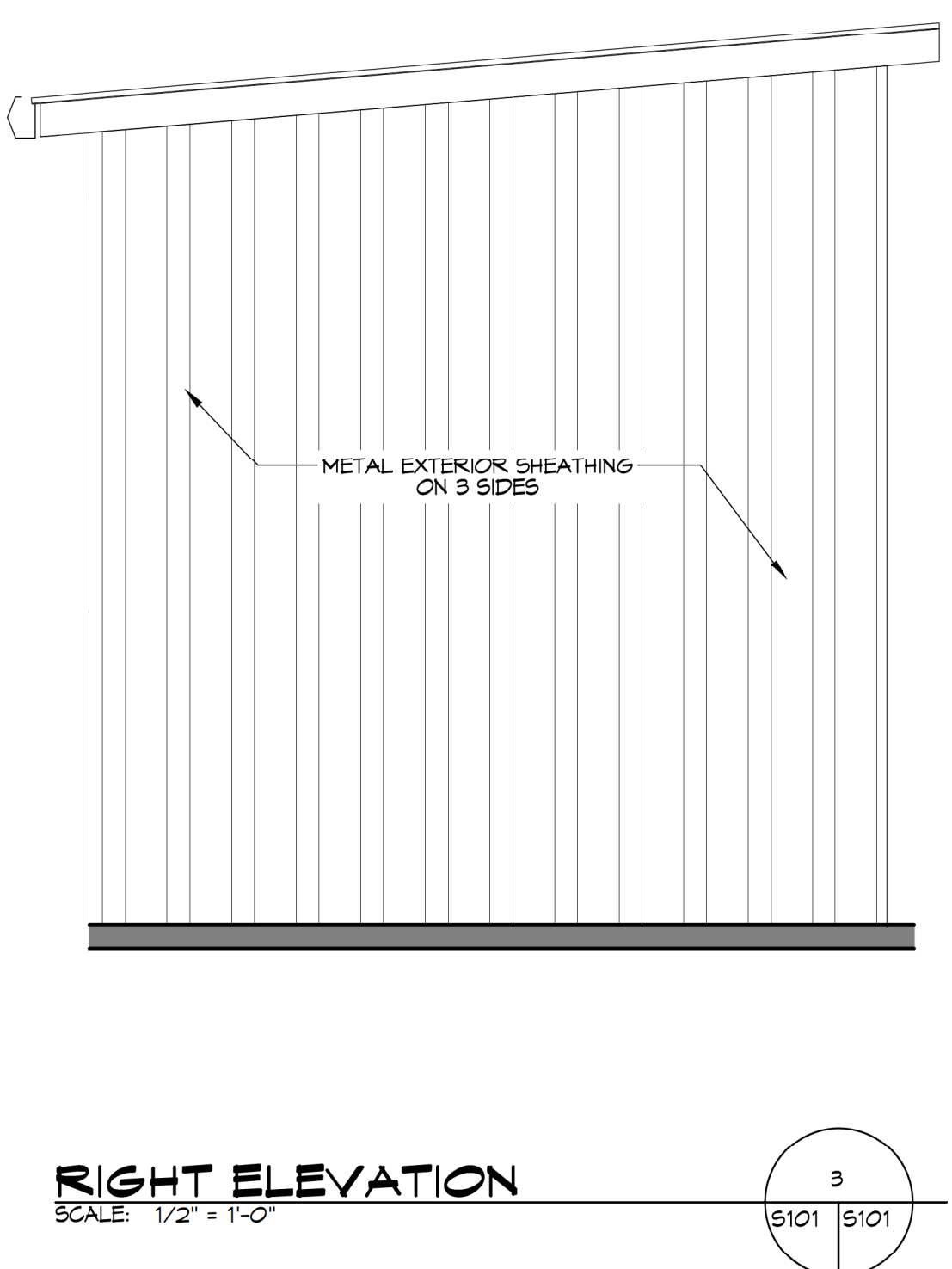
**FOUNDATION PLAN**  
SCALE: 1/2" = 1'-0"

**GENERAL NOTES**

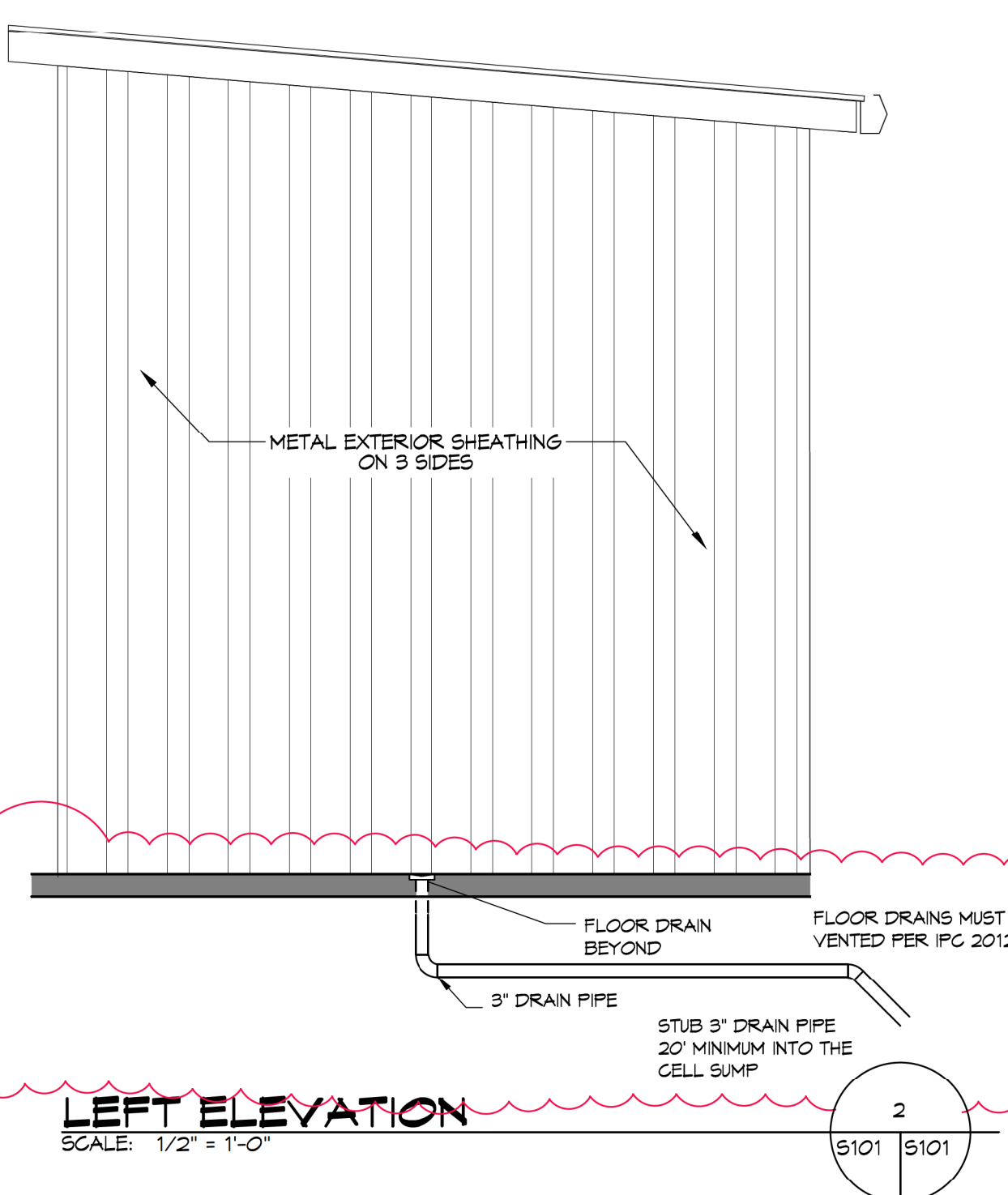
- ALL MATERIALS AND WORK, INCIDENTAL TO THE CONSTRUCTION OF THIS PROJECT, SHALL CONFORM TO ALL GOVERNING CODES, AND REGULATIONS OF AGENCIES IN AUTHORITY.
- CONTRACTOR SHALL PROVIDE ALL PUBLIC PROTECTIONS NECESSARY AS REQUIRED BY LAW.
- THE DRAWINGS, AND ANY SUBSEQUENTLY ISSUED ADDENDA, AMENDMENTS OR SUCH CHANGE ORDERS APPROVED BY THE OWNER AND THE CONTRACTOR ARE PART OF THESE CONTRACT DOCUMENTS.
- CONTRACTOR SHALL WARRANT ALL WORK FOR ONE (1) YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION UNLESS SPECIFICALLY DIRECTED IN OTHER DRAWINGS, SPECIFICATIONS OR SUBSEQUENTLY ISSUED ADDENDA OR AMENDMENTS.
- DO NOT SCALE DRAWINGS. CONSULT WITH THE ENGINEER REGARDING ANY ITEMS IN THE CONTRACT DOCUMENTS THAT REQUIRE CLARIFICATION.
- TRASH SHALL BE REMOVED FROM THE SITE NOT LESS THAN TWICE MONTHLY.
- THE GENERAL CONTRACTOR SHALL VERIFY EXISTING CONDITIONS PRIOR TO COMMENCING WORK AND REPORT ANY AND ALL DISCREPANCIES TO THE ARCHITECT.
- CONTRACTOR VEHICLES AND EQUIPMENT NECESSARY FOR CONSTRUCTION MAY BE PARKED ON THE SITE. OTHER VEHICLES PARKED ON THE SITE REQUIRE THE OWNER'S PERMISSION.
- NAMING A CERTAIN BRAND, MAKE OR MANUFACTURER IS TO DESIGNATE THE GENERAL STYLE, TYPE, CHARACTER AND QUALITY STANDARD OF THE PRODUCT DESIRED. SUBSTITUTION REQUESTS MUST BE SUBMITTED PRIOR TO BIDDING.
- ALL MATERIALS/EQUIPMENT SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. WORK NOT CONSISTENT WITH MANUFACTURER'S RECOMMENDATIONS WILL BE REJECTED BY OWNER/ARCHITECT.



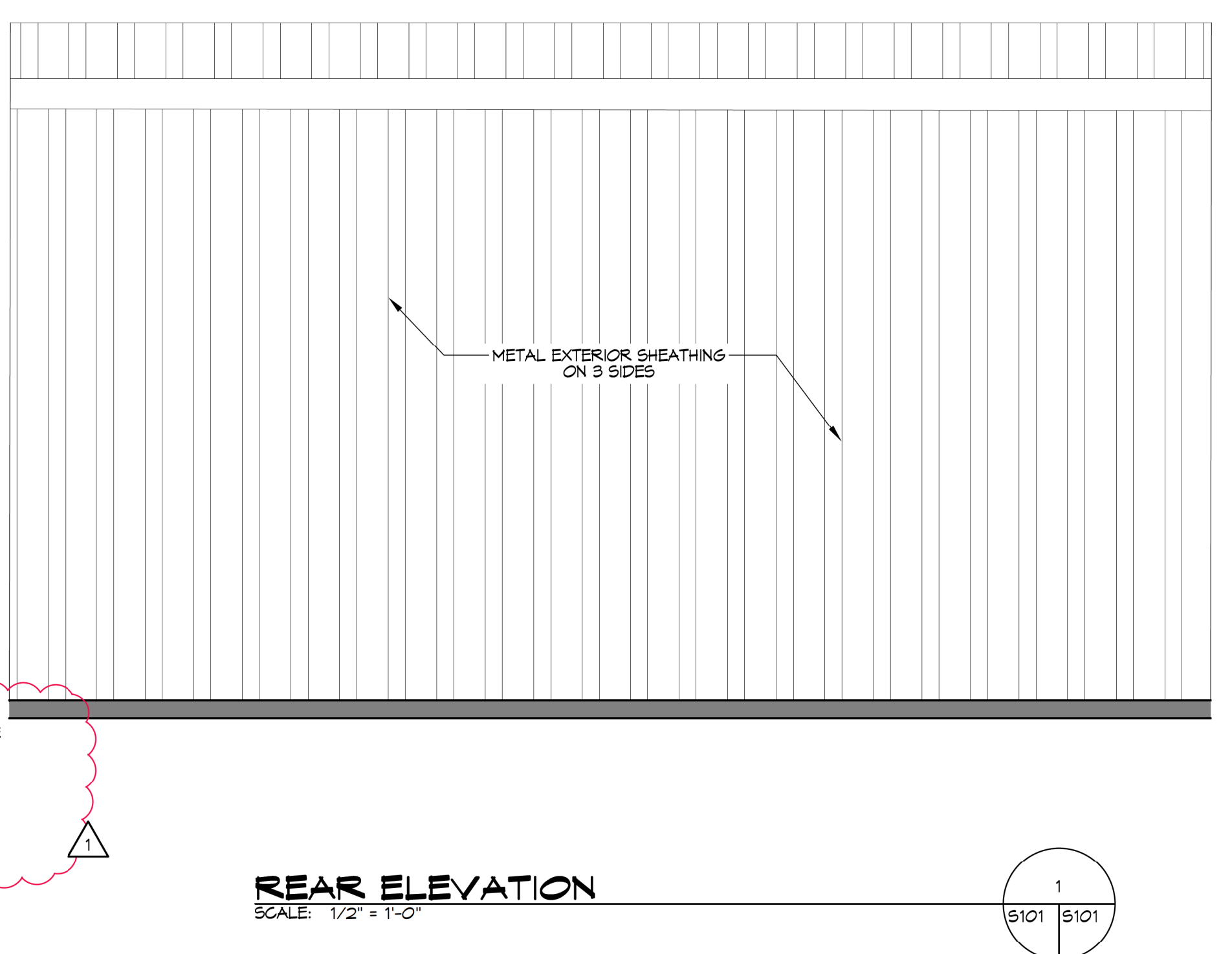
**SECTION 4**  
SCALE: 1/2" = 1'-0"



**RIGHT ELEVATION 3**  
SCALE: 1/2" = 1'-0"



**LEFT ELEVATION 2**  
SCALE: 1/2" = 1'-0"



**REAR ELEVATION 1**  
SCALE: 1/2" = 1'-0"

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info@dammonengineering.com  
PH: 985.649.9832  
Chief Engineer: Brian Mestich, PE  
554 Old Spanish Trail  
Slidell, LA 70488

DATE	REVISIONS
2/14/2018	Added Floor Drains

SEAL:

**ANGISA HOA CELL SITE**  
1561 CEMENTAINERS  
TANGIPAHUA REGIONAL SOLID WASTE FACILITY  
5730 HANO ROAD  
INDEPENDENCE, LOUISIANA  
JOB No: 2586  
DATE: 12/21/2017  
DRAWN BY: BAH  
CHECKED BY: CCD

SHEET TITLE:  
**BUILDING & FOUNDATION PLAN**  
DRAWING NUMBER:  
**S101**  
SHEET No: of #

**APPENDIX C**  
**REVISED BID FORM**

# LOUISIANA UNIFORM PUBLIC WORK BID FORM

## UNIT PRICE FORM

**TO:** Tangipahoa Parish Government  
206 E. Mulberry Street  
Amite, LA 70422

**BID FOR:** Tangipahoa Parish Regional Solid Waste Facility  
Cell 13 Construction – Installation of Geosynthetic  
Materials

4/4

**UNIT PRICES:** This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amounts shall be stated in figures and only in figures.

DESCRIPTION:	<input checked="" type="checkbox"/> Base Bid or <input type="checkbox"/> Alt.# <b>Smooth HDPE Geomembrane for Temporary Berm (60-mil) – Includes Welding and Remobilization – Supply and Install</b>			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION ( <i>Quantity times Unit Price</i> )
<b>22</b>	<b>37,000*</b>	<b>Sq. ft.</b>		

DESCRIPTION:	<input checked="" type="checkbox"/> Base Bid or <input type="checkbox"/> Alt.# <b>Concrete Headwalls – Supply and Construct</b>			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION ( <i>Quantity times Unit Price</i> )
<b>23</b>	<b>3</b>	<b>Each</b>		

DESCRIPTION:	<input checked="" type="checkbox"/> Base Bid or <input type="checkbox"/> Alt.# <b>Compressor Metal Shed – Includes Foundation, Frame, Sheathing, Roofing and Floor Drains (With Associated Plumbing) – Supply and Construct</b>			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION ( <i>Quantity times Unit Price</i> )
<b>24</b>	<b>1</b>	<b>Lump Sum</b>		

DESCRIPTION:	<input checked="" type="checkbox"/> Base Bid or <input type="checkbox"/> Alt.# <b>Leachate Level Monitoring and Notification System for Sumps and Wet Well – Provide all Hardware, Software, Installation and Training for a Complete Operational System – SCADA, FleetZOOM, Integralert, or Equivalent in Accordance with the Drawings</b>			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION ( <i>Quantity times Unit Price</i> )
<b>25</b>	<b>1</b>	<b>Lump Sum</b>		

DESCRIPTION:	<input checked="" type="checkbox"/> Base Bid or <input type="checkbox"/> Alt.# _____			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION ( <i>Quantity times Unit Price</i> )
<b>26</b>				

DESCRIPTION:	<input checked="" type="checkbox"/> Base Bid or <input type="checkbox"/> Alt.# _____			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION ( <i>Quantity times Unit Price</i> )
<b>27</b>				

DESCRIPTION:	<input checked="" type="checkbox"/> Base Bid or <input type="checkbox"/> Alt.# _____			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION ( <i>Quantity times Unit Price</i> )
<b>28</b>				

**Wording for “DESCRIPTION” is to be provided by the Owner.**

**All quantities are estimated. The contractor will be paid based upon actual quantities as verified by the Owner.**

\* Quantities are estimated as a three-dimensional area and include anchor trenches

Revision 1
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**APPENDIX D**  
**TECHNICAL SPECIFICATIONS FOR PUMPS,  
COMPRESSOR, AND AIR DRYER**

# **CENTRIFUGAL PUMPS**

TOTAL HEAD

REPRIMING LIFTS

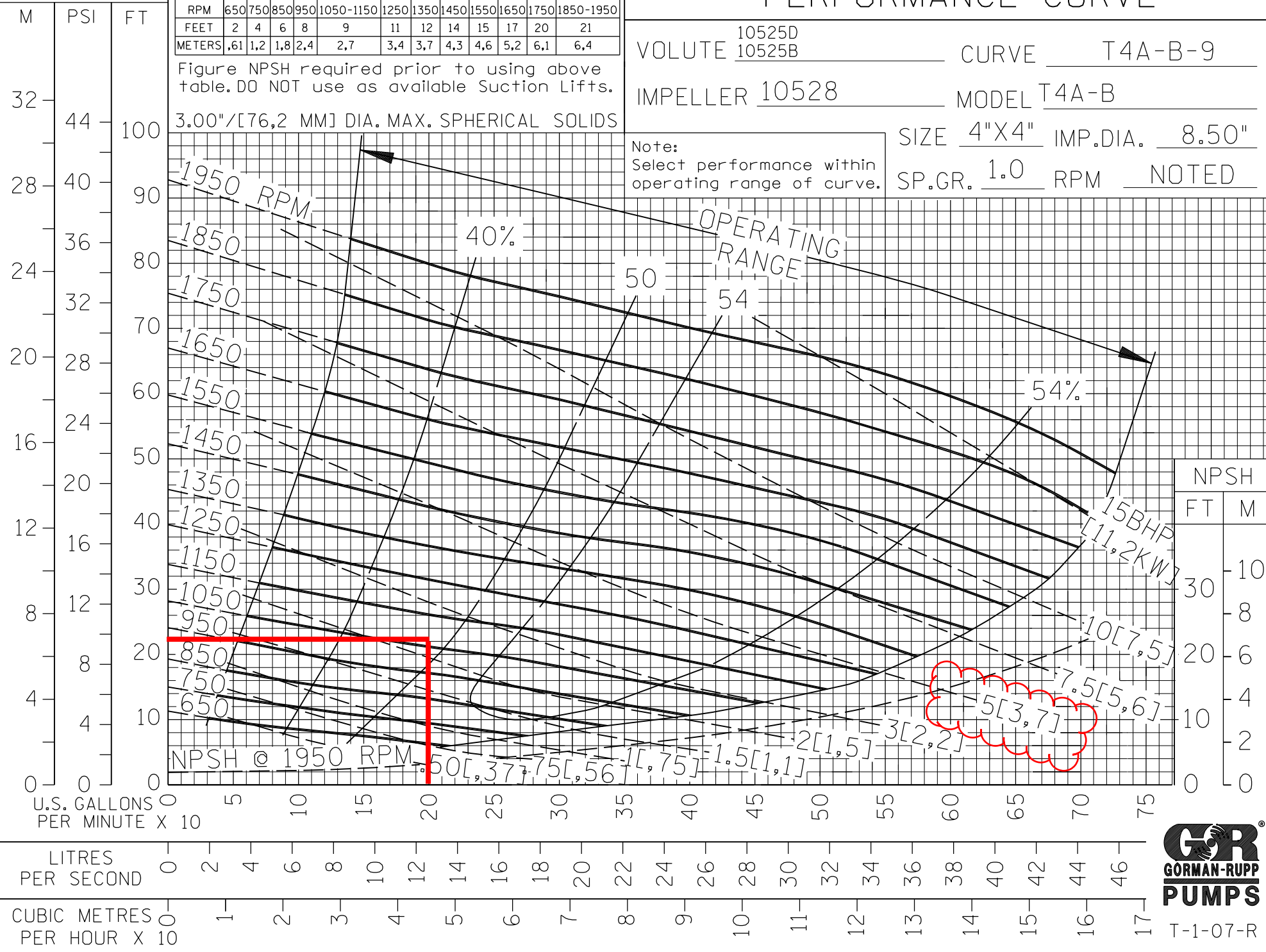
PERFORMANCE CURVE

RPM	650	750	850	950	1050-1150	1250	1350	1450	1550	1650	1750	1850-1950
FEET	2	4	6	8	9	11	12	14	15	17	20	21
METERS	.61	1.2	1.8	2.4	2.7	3.4	3.7	4.3	4.6	5.2	6.1	6.4

Figure NPSH required prior to using above table. DO NOT use as available Suction Lifts.  
 3.00"/[76,2 MM] DIA. MAX. SPHERICAL SOLIDS

VOLUTE 10525D CURVE T4A-B-9  
 IMPELLER 10528 MODEL T4A-B  
 SIZE 4"X4" IMP.DIA. 8.50"  
 SP.GR. 1.0 RPM NOTED

Note:  
 Select performance within operating range of curve.



FILE NO. t4ab.s09



T-1-07-R

**INSTALLATION, OPERATION,  
AND MAINTENANCE MANUAL**  
WITH PARTS LIST



**SUPER T SERIES® PUMPS**

MODELS
<b>T4A3S-B</b> INCLUDING: /F, /FM, /WW, /WWS

**GORMAN-RUPP PUMPS**

[www.grpumps.com](http://www.grpumps.com)

Register your new  
Gorman-Rupp pump online at  
**[www.grpumps.com](http://www.grpumps.com)**

Valid serial number and e-mail address required.

**RECORD YOUR PUMP MODEL AND SERIAL NUMBER**

Please record your pump model and serial number in the spaces provided below. Your Gorman-Rupp distributor needs this information when you require parts or service.

Pump Model: \_\_\_\_\_

Serial Number: \_\_\_\_\_

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## INTRODUCTION

**Thank You** for purchasing a Gorman-Rupp pump. **Read this manual** carefully to learn how to safely install and operate your pump. Failure to do so could result in personal injury or damage to the pump.

Because pump installations are seldom identical, this manual cannot possibly provide detailed instructions and precautions for every aspect of each specific application. Therefore, it is the responsibility of the owner/installer of the pump to ensure that applications not addressed in this manual are performed **only** after establishing that neither operator safety nor pump integrity are compromised by the installation. Pumps and related equipment **must** be installed and operated according to all national, local and industry standards.

If there are any questions regarding the pump or its application which are not covered in this manual or in other literature accompanying this unit, please contact your Gorman-Rupp distributor, or The Gorman-Rupp Company:

**The Gorman-Rupp Company**  
**P.O. Box 1217**  
**Mansfield, Ohio 44901—1217**  
**Phone: (419) 755—1011**  
 or:  
**Gorman-Rupp of Canada Limited**  
**70 Burwell Road**  
**St. Thomas, Ontario N5P 3R7**  
**Phone: (519) 631—2870**

For information or technical assistance on the power source, contact the power source manufacturer's local dealer or representative.

## HAZARD AND INSTRUCTION DEFINITIONS

The following are used to alert maintenance personnel to procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel:



**Immediate hazards which WILL result in severe personal injury or death. These instructions describe the procedure required and the injury which will result from failure to follow the procedure.**



**Hazards or unsafe practices which COULD result in severe personal injury or death. These instructions describe the procedure required and the injury which could result from failure to follow the procedure.**



Hazards or unsafe practices which COULD result in minor personal injury or product or property damage. These instructions describe the requirements and the possible damage which could result from failure to follow the procedure.

### NOTE

*Instructions to aid in installation, operation, and maintenance or which clarify a procedure.*

## SAFETY – SECTION A

This information applies to Super T Series basic pumps. Gorman-Rupp has no control over or particular knowledge of the power source which will be used. Refer to the manual accompanying the power source before attempting to begin operation.

Because pump installations are seldom identical, this manual cannot possibly provide detailed instructions and precautions for each specific application. Therefore, it is the owner/installer's responsibility to ensure that applications not addressed in this manual are performed only after establishing that neither operator safety nor pump integrity are compromised by the installation.



Before attempting to open or service the pump:

1. Familiarize yourself with this manual.
2. Disconnect or lock out the power source to ensure that the pump will remain inoperative.
3. Allow the pump to completely cool if overheated.
4. Check the temperature before opening any covers, plates, or plugs.
5. Close the suction and discharge valves.
6. Vent the pump slowly and cautiously.
7. Drain the pump.



This pump is designed to handle liquids containing large entrained solids or slurries. Do not attempt to pump volatile, corrosive, or flammable materials

which may damage the pump or endanger personnel as a result of pump failure.



After the pump has been positioned, make certain that the pump and all piping connections are tight, properly supported and secure before operation.



Do not operate the pump without the guards in place over the rotating parts. Exposed rotating parts can catch clothing, fingers, or tools, causing severe injury to personnel.



Do not remove plates, covers, gauges, pipe plugs, or fittings from an overheated pump. Vapor pressure within the pump can cause parts being disengaged to be ejected with great force. Allow the pump to cool before servicing.



Do not operate the pump against a closed discharge valve for long periods of time. If operated against a closed discharge valve, pump components will deteriorate, and the liquid could come to a boil, build pressure, and cause the pump casing to rupture or explode.



Death or serious personal injury and damage to the pump or components can occur if proper lifting procedures

are not observed. Make certain that hoists, chains, slings or cables are in good working condition and of sufficient capacity and that they are positioned so that loads will be balanced and the pump or components will not be damaged when lifting. Suction and discharge hoses and piping must be removed from the pump before lifting. Lift the pump or component only as high as necessary and keep personnel away from suspended objects.

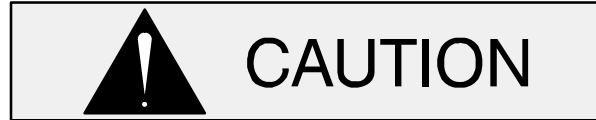


**Do not attempt to disengage any part of an overheated pump unit. Vapor pressure within the pump casing can eject**

these parts with great force when they are disengaged. Allow the pump to completely cool before servicing it.



This pump may be used to handle materials which could cause illness through direct exposure or emitted fumes. Wear adequate protective clothing when working on the pump or piping.



Pumps and related equipment must be installed and operated according to all national, local and industry standards.

## INSTALLATION – SECTION B

### Review all SAFETY information in Section A.

Since pump installations are seldom identical, this section offers only general recommendations and practices required to inspect, position, and arrange the pump and piping.

Most of the information pertains to a standard **static lift application** where the pump is positioned above the free level of liquid to be pumped.

If installed in a **flooded suction application** where the liquid is supplied to the pump under pressure, some of the information such as mounting, line configuration, and priming must be tailored to the

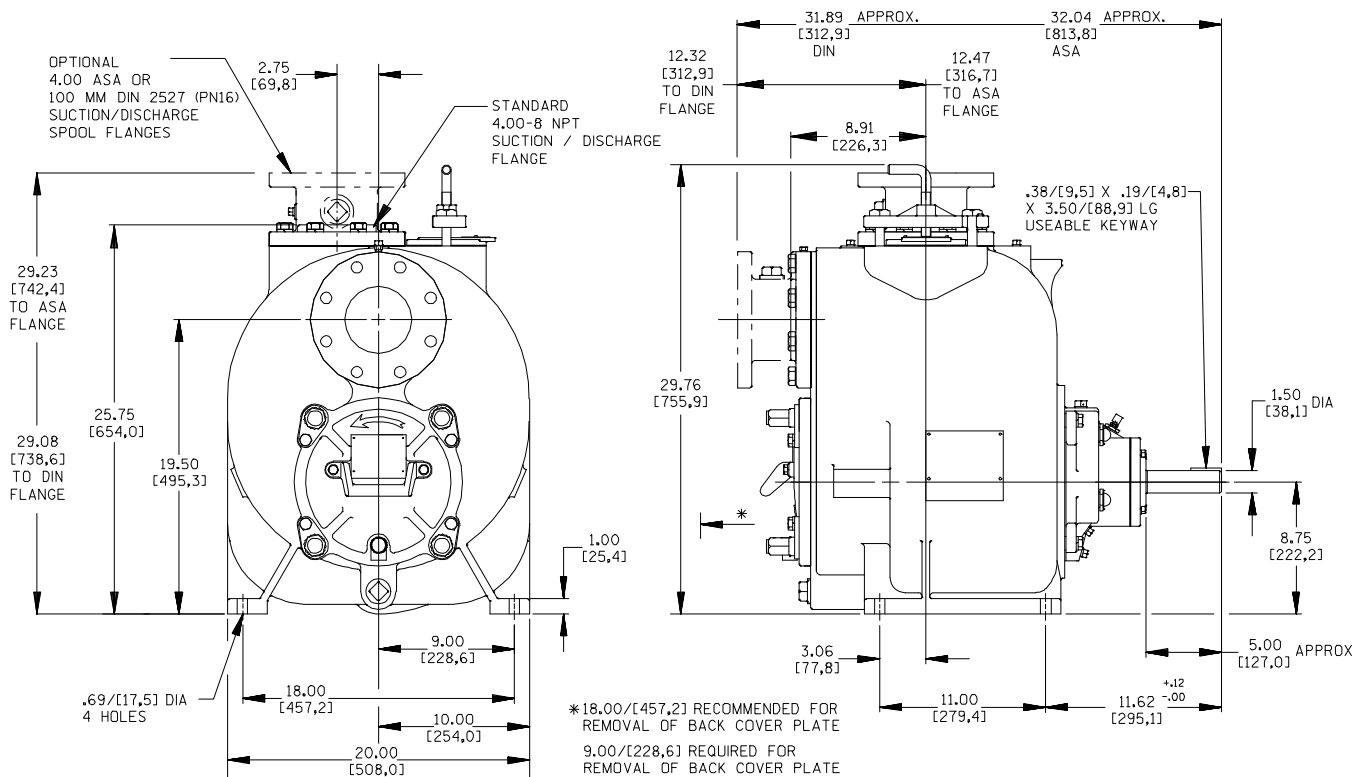
specific application. Since the pressure supplied to the pump is critical to performance and safety, **be sure** to limit the incoming pressure to **50%** of the maximum permissible operating pressure as shown on the pump performance curve.

For further assistance, contact your Gorman-Rupp distributor or the Gorman-Rupp Company.

### Pump Dimensions

See Figure 1 for the approximate physical dimensions of this pump.

### OUTLINE DRAWING



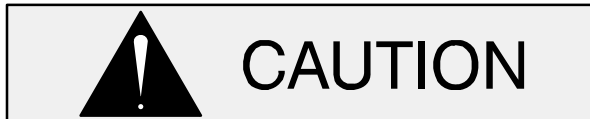
NOTE: OPTIONAL ASA OR DIN STANDARD SUCTION & DISCHARGE SPOOL FLANGES AVAILABLE

Figure 1. Pump Model T4A3S-B, Including /F, /FM, /WW and /WWS

## PREINSTALLATION INSPECTION

The pump assembly was inspected and tested before shipment from the factory. Before installation, inspect the pump for damage which may have occurred during shipment. Check as follows:

- a. Inspect the pump for cracks, dents, damaged threads, and other obvious damage.
- b. Check for and tighten loose attaching hardware. Since gaskets tend to shrink after drying, check for loose hardware at mating surfaces.
- c. Carefully read all warnings and cautions contained in this manual or affixed to the pump, and perform all duties indicated. Note the direction of rotation indicated on the pump. Check that the pump shaft rotates counter-clockwise when facing the impeller.



Only operate this pump in the direction indicated by the arrow on the pump body and on the accompanying decal. Refer to **ROTATION** in **OPERATION**, Section C.

- d. Check levels and lubricate as necessary. Refer to **LUBRICATION** in the **MAINTENANCE AND REPAIR** section of this manual and perform duties as instructed.
- e. If the pump and power source have been stored for more than 12 months, some of the components or lubricants may have exceeded their maximum shelf life. These **must be inspected or replaced** to ensure maximum pump service.

If the maximum shelf life has been exceeded, or if anything appears to be abnormal, contact your Gorman-Rupp distributor or the factory to determine the repair or updating policy. **Do not** put the pump into service until appropriate action has been taken.

## POSITIONING PUMP

### Lifting



**Death or serious personal injury and damage to the pump or components can occur if proper lifting procedures are not observed. Make certain that hoists, chains, slings or cables are in good working condition and of sufficient capacity and that they are positioned so that loads will be balanced and the pump or components will not be damaged when lifting. Suction and discharge hoses and piping must be removed from the pump before lifting. Lift the pump or component only as high as necessary and keep personnel away from suspended objects.**

Pump unit weights will vary depending on the mounting and drive provided. Check the shipping tag on the unit packaging for the actual weight, and use lifting equipment with appropriate capacity. Drain the pump and remove all customer-installed equipment such as suction and discharge hoses or piping before attempting to lift existing, installed units.

### Mounting

Locate the pump in an accessible place as close as practical to the liquid being pumped. Level mounting is essential for proper operation.

The pump may have to be supported or shimmed to provide for level operation or to eliminate vibration.

### Clearance

It is recommended that **18 inches (457 mm)** of clearance be provided in front of the back cover to permit removal of the cover and easy access to the pump interior. A **minimum** clearance of **10.5 in-**

**ches (267 mm)** must be maintained to permit removal of the cover.

## SUCTION AND DISCHARGE PIPING

Pump performance is adversely effected by increased suction lift, discharge elevation, and friction losses. See the performance curve and operating range shown on Page E-1 to be sure your overall application allows pump to operate within the safe operation range.

### Materials

Either pipe or hose may be used for suction and discharge lines; however, the materials must be compatible with the liquid being pumped. If hose is used in suction lines, it must be the rigid-wall, reinforced type to prevent collapse under suction. Using piping couplings in suction lines is not recommended.

### Line Configuration

Keep suction and discharge lines as straight as possible to minimize friction losses. Make minimum use of elbows and fittings, which substantially increase friction loss. If elbows are necessary, use the long-radius type to minimize friction loss.

### Connections to Pump

Before tightening a connecting flange, align it exactly with the pump port. Never pull a pipe line into place by tightening the flange bolts and/or couplings.

Lines near the pump must be independently supported to avoid strain on the pump which could cause excessive vibration, decreased bearing life, and increased shaft and seal wear. If hose-type lines are used, they should have adequate support to secure them when filled with liquid and under pressure.

### Gauges

Most pumps are drilled and tapped for installing discharge pressure and vacuum suction gauges. If

these gauges are desired for pumps that are not tapped, drill and tap the suction and discharge lines not less than 18 inches (457,2 mm) from the suction and discharge ports and install the lines. Installation closer to the pump may result in erratic readings.

## SUCTION LINES

To avoid air pockets which could affect pump priming, the suction line must be as short and direct as possible. When operation involves a suction lift, the line must always slope upward to the pump from the source of the liquid being pumped; if the line slopes down to the pump at any point along the suction run, air pockets will be created.

### Fittings

Suction lines should be the same size as the pump inlet. If reducers are used in suction lines, they should be the eccentric type, and should be installed with the flat part of the reducers uppermost to avoid creating air pockets. Valves are not normally used in suction lines, but if a valve is used, install it with the stem horizontal to avoid air pockets.

### Strainers

If a strainer is furnished with the pump, be certain to use it; any spherical solids which pass through a strainer furnished with the pump will also pass through the pump itself.

If a strainer is not furnished with the pump, but is installed by the pump user, make certain that the total area of the openings in the strainer is at least three or four times the cross section of the suction line, and that the openings will not permit passage of solids larger than the solids handling capability of the pump.

This pump is designed to handle up to 3-inch (76,2 mm) diameter spherical solids.

### Sealing

Since even a slight leak will affect priming, head, and capacity, especially when operating with a high suction lift, all connections in the suction line should be sealed with pipe dope to ensure an air-

tight seal. Follow the sealant manufacturer’s recommendations when selecting and applying the pipe dope. The pipe dope should be compatible with the liquid being pumped.

**Suction Lines In Sumps**

If a single suction line is installed in a sump, it should be positioned away from the wall of the sump at a distance equal to 1 1/2 times the diameter of the suction line.

If there is a liquid flow from an open pipe into the sump, the flow should be kept away from the suction inlet because the inflow will carry air down into the sump, and air entering the suction line will reduce pump efficiency.

If it is necessary to position inflow close to the suction inlet, install a baffle between the inflow and the suction inlet at a distance 1 1/2 times the diameter of the suction pipe. The baffle will allow entrained air to escape from the liquid before it is drawn into the suction inlet.

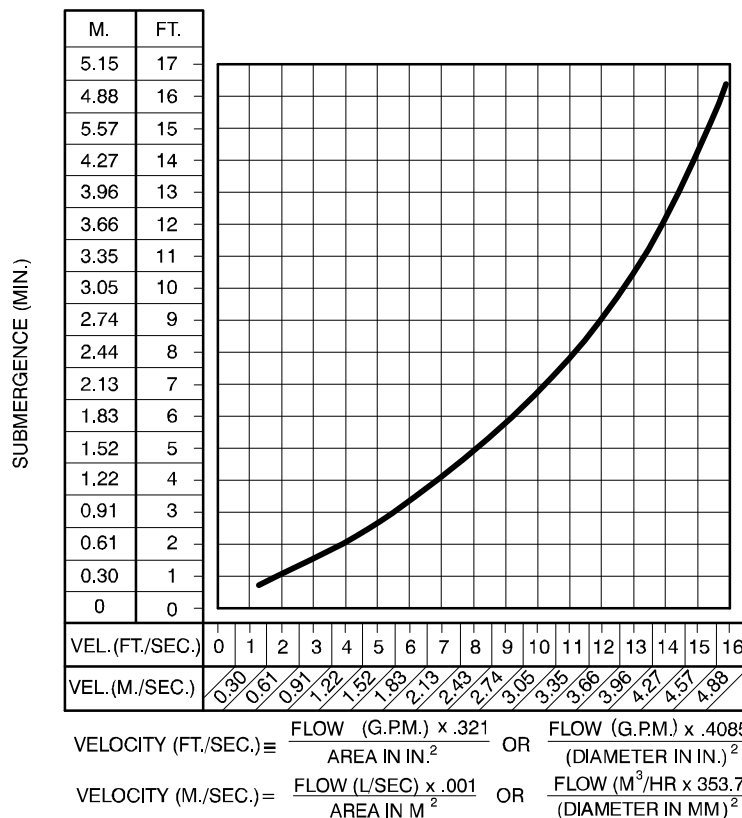
If two suction lines are installed in a single sump, the flow paths may interact, reducing the efficiency of one or both pumps. To avoid this, position the suction inlets so that they are separated by a distance equal to at least 3 times the diameter of the suction pipe.

**Suction Line Positioning**

The depth of submergence of the suction line is critical to efficient pump operation. Figure 2 shows recommended minimum submergence vs. velocity.

**NOTE**

*The pipe submergence required may be reduced by installing a standard pipe increaser fitting at the end of the suction line. The larger opening size will reduce the inlet velocity. Calculate the required submergence using the following formula based on the increased opening size (area or diameter).*



**Figure 2. Recommended Minimum Suction Line Submergence vs. Velocity**

## DISCHARGE LINES

### Siphoning

Do not terminate the discharge line at a level lower than that of the liquid being pumped unless a siphon breaker is used in the line. Otherwise, a siphoning action causing damage to the pump could result.

### Valves

If a throttling valve is desired in the discharge line, use a valve as large as the largest pipe to minimize friction losses. Never install a throttling valve in a suction line.

With high discharge heads, it is recommended that a throttling valve and a system check valve be installed in the discharge line to protect the pump from excessive shock pressure and reverse rotation when it is stopped.



If the application involves a high discharge head, gradually close the discharge throttling valve before stopping the pump.

### Bypass Lines

Self-priming pumps are not air compressors. During the priming cycle, air from the suction line must be vented to atmosphere on the discharge side. If the discharge line is open, this air will be vented through the discharge. However, if a check valve has been installed in the discharge line, the discharge side of the pump must be opened to atmospheric pressure through a bypass line installed between the pump discharge and the check valve. A self-priming centrifugal pump **will not prime** if there is sufficient static liquid head to hold the discharge check valve closed.

### NOTE

*The bypass line should be sized so that it does not affect pump discharge capacity; however, the bypass line should be at least 1 inch in diameter to minimize the chance of plugging.*

In **low discharge head applications** (less than 30 feet or 9 meters), it is recommended that the bypass line be run back to the wet well, and located 6 inches below the water level or cut-off point of the low level pump. In some installations, this bypass line may be terminated with a six-to-eight foot length of 1 1/4 inch I.D. **smooth-bore** hose; air and liquid vented during the priming process will then agitate the hose and break up any solids, grease, or other substances likely to cause clogging.



A bypass line that is returned to a wet well must be secured against being drawn into the pump suction inlet.

It is also recommended that pipe unions be installed at each 90° elbow in a bypass line to ease disassembly and maintenance.

In **high discharge head applications** (more than 30 feet), an excessive amount of liquid may be bypassed and forced back to the wet well under the full working pressure of the pump; this will reduce overall pumping efficiency. **Therefore, it is recommended that a Gorman-Rupp Automatic Air Release Valve be installed in the bypass line.**

Gorman-Rupp Automatic Air Release Valves are reliable, and require minimum maintenance. See **AUTOMATIC AIR RELEASE VALVE** in this section for installation and theory of operation of the Automatic Air Release Valve. Consult your Gorman-Rupp distributor, or contact the Gorman-Rupp Company for selection of an Automatic Air Release Valve to fit your application.

If the installation involves a flooded suction such as a below-ground lift station. A pipe union and manual shut-off valve may be installed in the bleed line to allow service of the valve without shutting down the station, and to eliminate the possibility of flooding. If a manual shut-off valve is installed **anywhere** in the air release piping, it **must** be a full-opening **ball type** valve to prevent plugging by solids.



**If a manual shut-off valve is installed in a bypass line, it must not be left closed**

**during operation. A closed manual shut-off valve may cause a pump which has lost prime to continue to operate without reaching prime, causing dangerous overheating and possible explosive rupture of the pump casing. Personnel could be severely injured.**

**Allow an over-heated pump to completely cool before servicing. Do not remove plates, covers, gauges, or fittings from an over-heated pump. Liquid within the pump can reach boiling temperatures, and vapor pressure within the pump can cause parts being disengaged to be ejected with great force. After the pump completely cools, drain the liquid from the pump by removing the casing drain plug. Use caution when removing the plug to prevent injury to personnel from hot liquid.**

### **AUTOMATIC AIR RELEASE VALVE**

When properly installed, a Gorman-Rupp Auto-

matic Air Release Valve will permit air to escape through the bypass line and then close automatically when the pump is fully primed and pumping at full capacity.

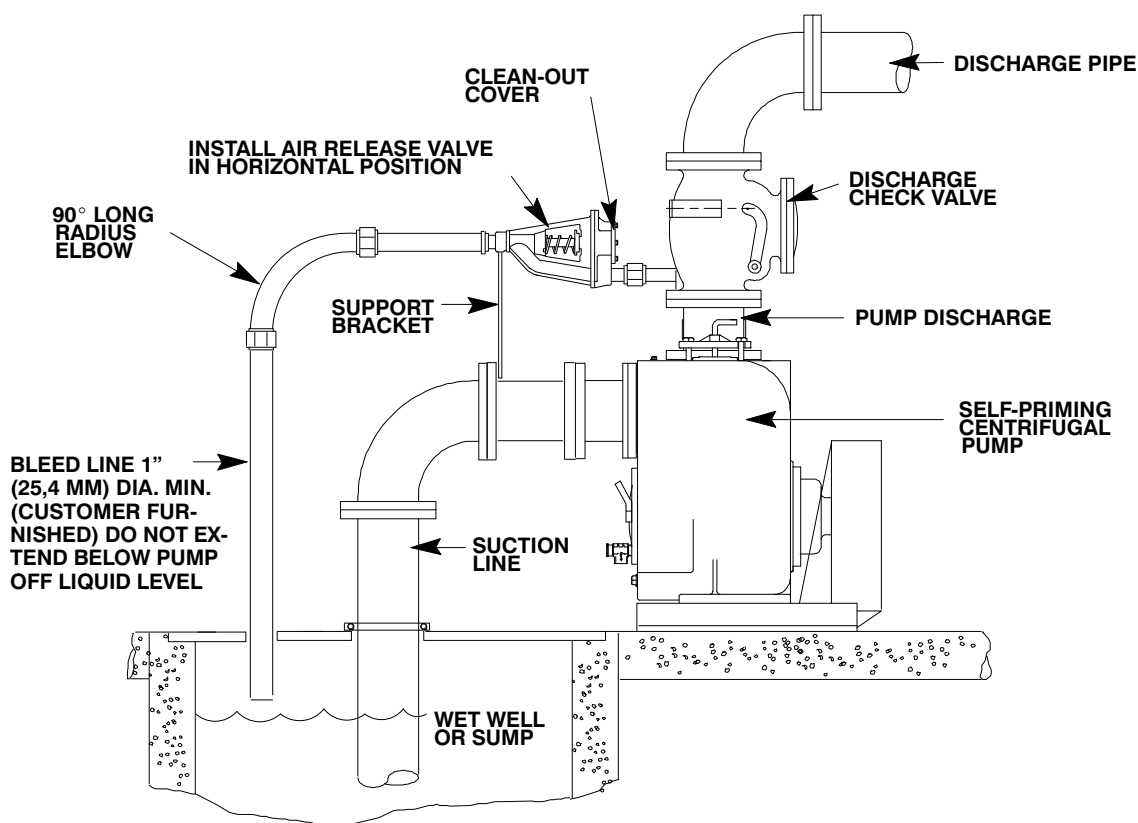


**Some leakage (1 to 5 gallons [3.8 to 19 liters] per minute) will occur when the valve is fully closed. Be sure the bypass line is directed back to the wet well or tank to prevent hazardous spills.**

Consult the manual accompanying the Air Release Valve for additional information on valve installation and performance.

#### **Air Release Valve Installation**

The Automatic Air Release Valve must be independently mounted in a horizontal position between the pump discharge port and the inlet side of the discharge check valve (see Figure 3). The inlet opening in the Air Release Valve is equipped with standard 1-inch NPT pipe threads.



**Figure 3. Typical Automatic Air Release Valve Installation**

Connect the valve outlet to a bleed line which slopes back to the wet well or sump. The bleed line must be the same size as the outlet opening or larger, depending on which Air Release Valve is being used. If **piping** is used for the bleed line, avoid the use of elbows whenever possible.

**NOTE**

*For multiple pump installations, it is recommended that each Air Release Valve be fitted with an independent bleeder line directed back to the wet well. If multiple Air Release Valves are installed in a system, **do not** direct bleeder lines to a common manifold pipe. Contact your Gorman-Rupp distributor or the Gorman-Rupp Company for information about installation of an Automatic Air Release Valve for your specific application.*

shafts are aligned with and parallel to each other. It is imperative that alignment be checked after the pump and piping are installed, and before operation.

**NOTE**

*Check **Rotation**, Section C, before final alignment of the pump.*

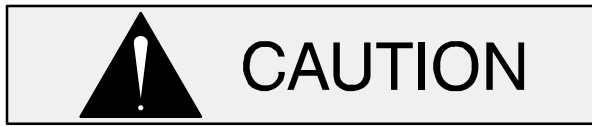
When mounted at the Gorman-Rupp factory, driver and pump are aligned before shipment. Misalignment will occur in transit and handling. Pumps **must** be checked and realigned before operation. Before checking alignment, tighten the foundation bolts. The pump casing feet and/or pedestal feet, and the driver mounting bolts should also be tightly secured.

**ALIGNMENT**

The alignment of the pump and its power source is critical for trouble-free mechanical operation. In either a flexible coupling or V-belt driven system, the driver and pump must be mounted so that their



**When checking alignment, disconnect the power source to ensure that the pump will remain inoperative.**

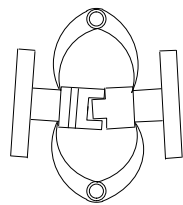


Adjusting the alignment in one direction may alter the alignment in another direction. Check each procedure after altering alignment.

**Coupled Drives**

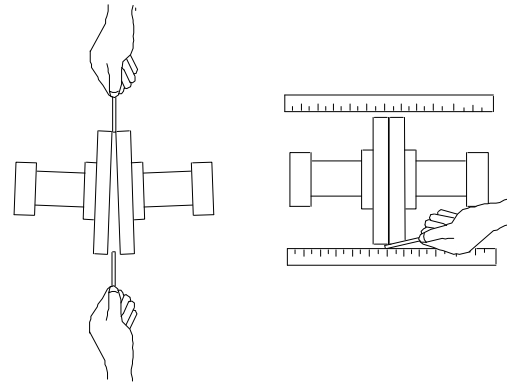
When using couplings, the axis of the power source must be aligned to the axis of the pump shaft in both the horizontal and vertical planes. Most couplings require a specific gap or clearance between the driving and the driven shafts. Refer to the coupling manufacturer’s service literature.

Align spider insert type couplings by using calipers to measure the dimensions on the circumference of the outer ends of the coupling hub every 90°. The coupling is in alignment when the hub ends are the same distance apart at all points (see Figure 4).



**Figure 4. Aligning Spider-Type Couplings**

Align non-spider type couplings by using a feeler gauge or taper gauge between the coupling halves every 90°. The coupling is in alignment when the hubs are the same distance apart at all points (see Figure 5).

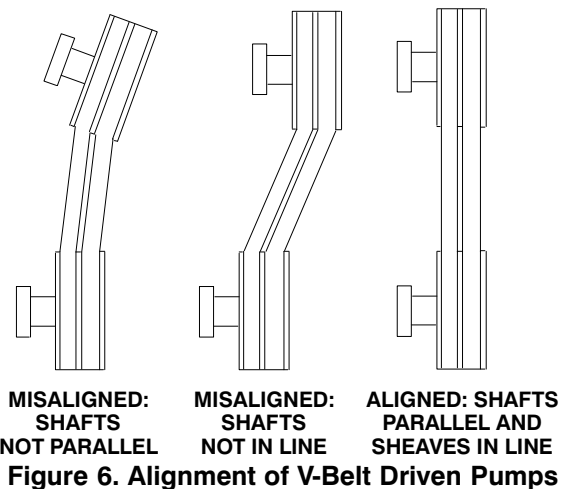


**Figure 5. Aligning Non-Spider Type Couplings**

Check parallel adjustment by laying a straightedge across both coupling rims at the top, bottom, and side. When the straightedge rests evenly on both halves of the coupling, the coupling is in horizontal parallel alignment. If the coupling is misaligned, use a feeler gauge between the coupling and the straightedge to measure the amount of misalignment.

**Drive Belts**

When using drive belts, the power source and the pump must be parallel. Use a straightedge along the sides of the pulleys to ensure that the pulleys are properly aligned (see Figure 6). In drive systems using two or more belts, make certain that the belts are a matched set; unmatched sets will cause accelerated belt wear.



Tighten the belts in accordance with the belt manufacturer’s instructions. If the belts are too loose, they will slip; if the belts are too tight, there will be excessive power loss and possible bearing failure.

Select pulleys that will match the proper speed ratio; overspeeding the pump may damage both pump and power source.



**Do not operate the pump without the guard in place over the rotating parts. exposed rotating parts can catch clothing, fingers, or tools, causing severe injury to personnel.**

## DRIVE BELT TENSIONING

### General Rules of Tensioning

For new drive belts, check the tension after 5, 20 and 50 hours of operation and re-tension as required (see the following procedure for measuring belt tension). Thereafter, check and re-tension if required monthly or at 500 hour intervals, whichever comes first.

Ideal drive belt tension is the **lowest** tension at which the belt will not slip under peak load conditions. Do not over-tension drive belts. Over-tensioning will shorten both drive belt and bearing life. Under-tensioning will cause belt slippage. Always keep belts free from dirt, grease, oil and other foreign material which may cause slippage.

## OPERATION – SECTION C

Review all **SAFETY** information in Section A.

Follow the instructions on all tags, labels and decals attached to the pump.



**This pump is designed to handle liquids containing large entrained solids and slurries. Do not attempt to pump volatile, corrosive, or flammable liquids which may damage the pump or endanger personnel as a result of pump failure.**



Pump speed and operating conditions must be within the performance range shown on page E-1.

### PRIMING

Install the pump and piping as described in **INSTALLATION**. Make sure that the piping connections are tight, and that the pump is securely mounted. Check that the pump is properly lubricated (see **LUBRICATION** in **MAINTENANCE AND REPAIR**).

This pump is self-priming, but the pump should never be operated unless there is liquid in the pump casing.



Never operate this pump unless there is liquid in the pump casing. The pump will not prime when dry. extended operation of a dry pump will destroy the seal assembly.

Add liquid to the pump casing when:

1. The pump is being put into service for the first time.
2. The pump has not been used for a considerable length of time.
3. The liquid in the pump casing has evaporated.

Once the pump casing has been filled, the pump will prime and reprime as necessary.



**After filling the pump casing, reinstall and tighten the fill plug. Do not attempt to operate the pump unless all connecting piping is securely installed. Otherwise, liquid in the pump forced out under pressure could cause injury to personnel.**

To fill the pump, remove the pump casing fill cover or fill plug in the top of the casing, and add clean liquid until the casing is filled. Replace the fill cover or fill plug before operating the pump.

### STARTING

Consult the operations manual furnished with the power source.

#### Rotation

The correct direction of pump rotation is counter-clockwise when facing the impeller. The pump could be damaged and performance adversely affected by incorrect rotation. If pump performance is not within the specified limits (see the curve on page E-1), check the direction of power source rotation before further troubleshooting.



Only operate this pump in the direction in-

indicated by the arrow on the pump body and on the accompanying decal. Otherwise, the impeller could become loosened from the shaft and seriously damage the pump.

Consult the operating manual furnished with the power source before attempting to start the power source.

If an electric motor is used to drive the pump, remove V-belts, couplings, or otherwise disconnect the pump from the motor before checking motor rotation. Operate the motor independently while observing the direction of the motor shaft, or cooling fan.

If rotation is incorrect on a three-phase motor, have a qualified electrician interchange any two of the three phase wires to change direction. If rotation is incorrect on a single-phase motor, consult the literature supplied with the motor for specific instructions.

## OPERATION

### Lines With a Bypass

If a Gorman-Rupp Automatic Air Release Valve has been installed, the valve will automatically open to allow the pump to prime, and automatically close after priming is complete (see **INSTALLATION** for Air Release Valve operation).

If the bypass line is open, air from the suction line will be discharged through the bypass line back to the wet well during the priming cycle. Liquid will then continue to circulate through the bypass line while the pump is in operation.

### Lines Without a Bypass

Open all valves in the discharge line and start the power source. Priming is indicated by a positive reading on the discharge pressure gauge or by a quieter operation. The pump may not prime immediately because the suction line must first fill with liquid. If the pump fails to prime within five minutes, stop it and check the suction line for leaks.

After the pump has been primed, partially close the discharge line throttling valve in order to fill the line slowly and guard against excessive shock pressure which could damage pipe ends, gaskets, sprinkler heads, and any other fixtures connected to the line. When the discharge line is completely filled, adjust the throttling valve to the required flow rate.



**Do not operate the pump against a closed discharge throttling valve for long periods of time. If operated against a closed discharge throttling valve, pump components will deteriorate, and the liquid could come to a boil, build pressure, and cause the pump casing to rupture or explode.**

### Leakage

No leakage should be visible at pump mating surfaces, or at pump connections or fittings. Keep all line connections and fittings tight to maintain maximum pump efficiency.

### Liquid Temperature And Overheating

The **maximum** liquid temperature for this pump is 160°F (71°C). Do not apply it at a higher operating temperature.

Overheating can occur if operated with the valves in the suction or discharge lines closed. Operating against closed valves could bring the liquid to a boil, build pressure, and cause the pump to rupture or explode. If overheating occurs, stop the pump and allow it to cool before servicing it. Refill the pump casing with cool liquid.



**Allow an over-heated pump to completely cool before servicing. Do not remove plates, covers, gauges, or fittings from an over-heated pump. Liquid with-**

**in the pump can reach boiling temperatures, and vapor pressure within the pump can cause parts being disengaged to be ejected with great force. After the pump completely cools, drain the liquid from the pump by removing the casing drain plug. Use caution when removing the plug to prevent injury to personnel from hot liquid.**

As a safeguard against rupture or explosion due to heat, this pump is equipped with a pressure relief valve which will open if vapor pressure within the pump casing reaches a critical point. If overheating does occur, stop the pump immediately and allow it to cool before servicing it. **Approach any overheated pump cautiously.** It is recommended that the pressure relief valve assembly be replaced at each overhaul, or any time the pump casing overheats and activates the valve. **Never** replace this valve with a substitute which has not been specified or provided by the Gorman-Rupp Company.

#### Strainer Check

If a suction strainer has been shipped with the pump or installed by the user, check the strainer regularly, and clean it as necessary. The strainer should also be checked if pump flow rate begins to drop. If a vacuum suction gauge has been installed, monitor and record the readings regularly to detect strainer blockage.

**Never** introduce air or steam pressure into the pump casing or piping to remove a blockage. This could result in personal injury or damage to the equipment. If backflushing is absolutely necessary, liquid pressure **must** be limited to 50% of the maximum permissible operating pressure shown on the pump performance curve.

#### Pump Vacuum Check

With the pump inoperative, install a vacuum gauge in the system, using pipe dope on the threads. Block the suction line and start the pump. At operating speed the pump should pull a vacuum of 20 inches (508,0 mm) or more of mercury. If it does

not, check for air leaks in the seal, gasket, or discharge valve.

Open the suction line, and read the vacuum gauge with the pump primed and at operation speed. Shut off the pump. The vacuum gauge reading will immediately drop proportionate to static suction lift, and should then stabilize. If the vacuum reading falls off rapidly after stabilization, an air leak exists. Before checking for the source of the leak, check the point of installation of the vacuum gauge.

### STOPPING

Never halt the flow of liquid suddenly. If the liquid being pumped is stopped abruptly, damaging shock waves can be transmitted to the pump and piping system. Close all connecting valves slowly.

On engine driven pumps, reduce the throttle speed slowly and allow the engine to idle briefly before stopping.



If the application involves a high discharge head, gradually close the discharge throttling valve before stopping the pump.

After stopping the pump, lock out or disconnect the power source to ensure that the pump will remain inoperative.



**Do not operate the pump against a closed discharge throttling valve for long periods of time. If operated against a closed discharge throttling valve, pump components will deteriorate, and the liquid could come to a boil, build pressure, and cause the pump casing to rupture or explode.**

#### Cold Weather Preservation

In below freezing conditions, drain the pump to prevent damage from freezing. Also, clean out any solids by flushing with a hose. Operate the pump

for approximately one minute; this will remove any remaining liquid that could freeze the pump rotating parts. If the pump will be idle for more than a few hours, or if it has been pumping liquids containing a large amount of solids, drain the pump, and flush it thoroughly with clean water. To prevent large solids from clogging the drain port and preventing the pump from completely draining, insert a rod or stiff wire in the drain port, and agitate the liquid during the draining process. Clean out any remaining solids by flushing with a hose.

## BEARING TEMPERATURE CHECK

Bearings normally run at higher than ambient temperatures because of heat generated by friction. Temperatures up to 160°F (71°C) are considered normal for bearings, and they can operate safely to at least 180°F (82°C).

Checking bearing temperatures by hand is inaccurate. Bearing temperatures can be measured accurately by placing a contact-type thermometer against the housing. Record this temperature for future reference.

A sudden increase in bearing temperature is a warning that the bearings are at the point of failing to operate properly. Make certain that the bearing lubricant is of the proper viscosity and at the correct level (see **LUBRICATION** in **MAINTENANCE AND REPAIR**). Bearing overheating can also be caused by shaft misalignment and/or excessive vibration.

When pumps are first started, the bearings may seem to run at temperatures above normal. Continued operation should bring the temperatures down to normal levels.

## TROUBLESHOOTING – SECTION D

Review all SAFETY information in Section A.



**Before attempting to open or service the pump:**

1. Familiarize yourself with this manual.
2. Lock out or disconnect the power source to ensure that the pump will remain inoperative.
3. Allow the pump to completely cool if overheated.
4. Check the temperature before opening any covers, plates, or plugs.
5. Close the suction and discharge valves.
6. Vent the pump slowly and cautiously.
7. Drain the pump.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP FAILS TO PRIME	Not enough liquid in casing. Suction check valve contaminated or damaged. Air leak in suction line. Lining of suction hose collapsed. Leaking or worn seal or pump gasket.  Suction check valve or foot valve clogged or binding. Suction lift or discharge head too high.  Strainer clogged.	Add liquid to casing. See <b>PRIMING</b> . Clean or replace check valve.  Correct leak. Replace suction hose. Check pump vacuum. Replace leaking or worn seal or gasket. Clean valve.  Check piping installation and install bypass line if needed. See <b>INSTALLATION</b> . Check strainer and clean if necessary.
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE	Air leak in suction line. Lining of suction hose collapsed. Leaking or worn seal or pump gasket.  Plugged or malfunctioning air release line or air release valve (if so equipped).	Correct leak. Replace suction hose.  Check pump vacuum. Replace leaking or worn seal or gasket. Check, clean and/or repair air release valve and piping.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE (cont.)	<p>Suction intake not submerged at proper level or sump too small.</p> <p>Impeller or other wearing parts worn or damaged.</p> <p>Strainer clogged.</p> <p>Impeller clogged.</p> <p>Suction lift or discharge head too high.</p> <p>Pump speed too slow.</p>	<p>Check installation and correct submergence as needed.</p> <p>Replace worn or damaged parts. Check that impeller is properly centered and rotates freely.</p> <p>Check strainer and clean if necessary.</p> <p>Free impeller of debris.</p> <p>Check piping installation and install bypass line if needed. See <b>INSTALLATION</b>.</p> <p>Check driver output; check belts or couplings for slippage.</p>
PUMP REQUIRES TOO MUCH POWER	<p>Pump speed too high.</p> <p>Discharge head too low.</p> <p>Liquid solution too thick.</p>	<p>Check driver output; check that sheaves or couplings are correctly sized.</p> <p>Adjust discharge valve.</p> <p>Dilute if possible.</p>
PUMP CLOGS FREQUENTLY	<p>Discharge flow too slow.</p> <p>Suction check valve or foot valve clogged or binding.</p>	<p>Open discharge valve fully to increase flow rate, and run engine at maximum governed speed.</p> <p>Clean valve.</p>
EXCESSIVE NOISE	<p>Cavitation in pump.</p> <p>Pumping entrained air.</p> <p>Pump or drive not securely mounted.</p> <p>Impeller clogged or damaged.</p> <p>Suction and discharge lines not properly supported.</p>	<p>Reduce suction lift and/or friction losses in suction line. Record vacuum and pressure gauge readings and consult local representative or factory.</p> <p>Locate and eliminate source of air bubble.</p> <p>Secure mounting hardware.</p> <p>Clean out debris; replace damaged parts.</p> <p>Check piping installation for proper support.</p>
BEARINGS RUN TOO HOT	<p>Bearing temperature is high, but within limits.</p> <p>Low or incorrect lubricant.</p> <p>Drive misaligned.</p> <p>Pump speed too high.</p> <p>Bearing(s) frozen.</p>	<p>Check bearing temperature regularly to monitor any increase.</p> <p>Check for proper type and level of lubricant.</p> <p>Align drive properly.</p> <p>Reduce speed of power source.</p> <p>Disassemble pump and check bearing(s).</p>

### PREVENTIVE MAINTENANCE

Since pump applications are seldom identical, and pump wear is directly affected by such things as the abrasive qualities, pressure and temperature of the liquid being pumped, this section is intended only to provide general recommendations and practices for preventive maintenance. Regardless of the application however, following a routine preventive maintenance schedule will help assure trouble-free performance and long life from your Gorman-Rupp pump. For specific questions concerning your application, contact your Gorman-Rupp distributor or the Gorman-Rupp Company.

Record keeping is an essential component of a good preventive maintenance program. Changes in suction and discharge gauge readings (if so

equipped) between regularly scheduled inspections can indicate problems that can be corrected before system damage or catastrophic failure occurs. The appearance of wearing parts should also be documented at each inspection for comparison as well. Also, if records indicate that a certain part (such as the seal) fails at approximately the same duty cycle, the part can be checked and replaced before failure occurs, reducing unscheduled down time.

For new applications, a first inspection of wearing parts at 250 hours will give insight into the wear rate for your particular application. Subsequent inspections should be performed at the intervals shown on the chart below. Critical applications should be inspected more frequently.

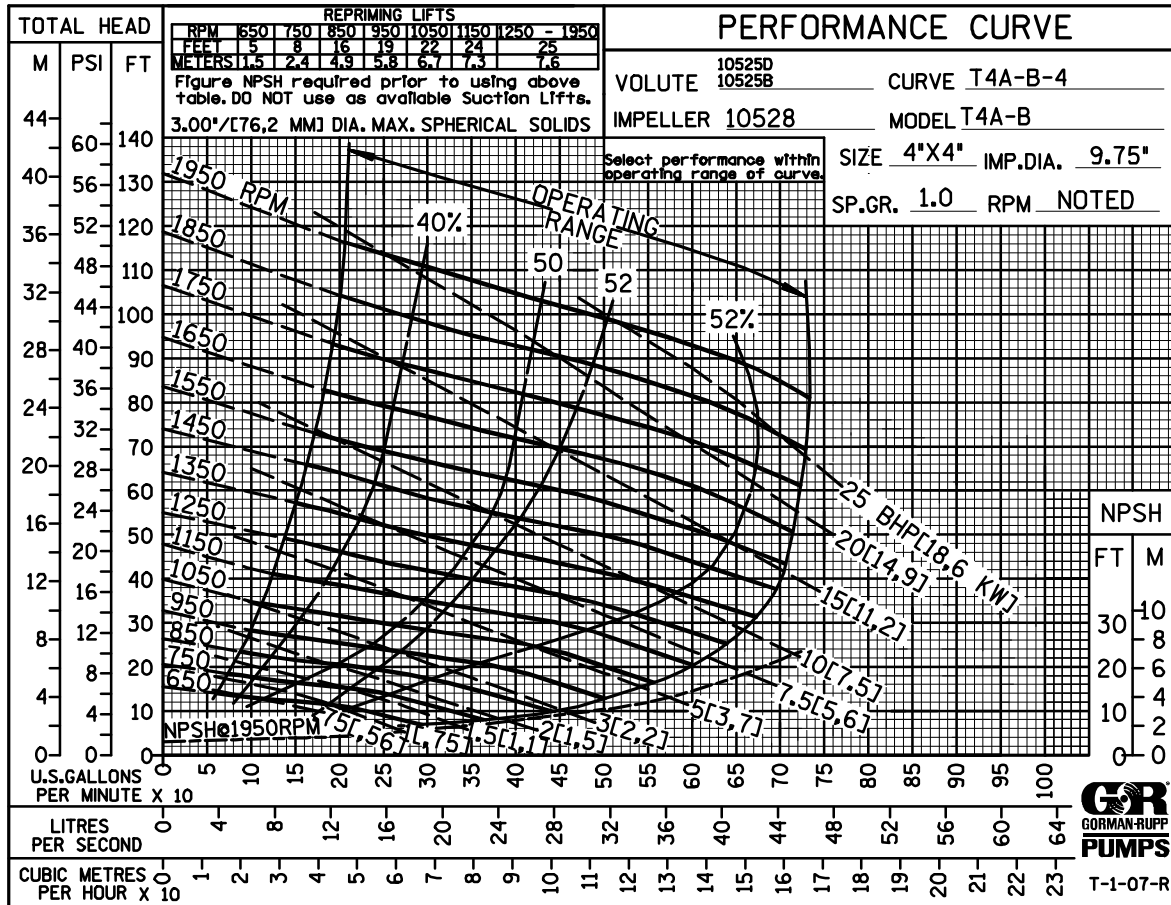
<b>Preventive Maintenance Schedule</b>					
Item	Service Interval*				
	Daily	Weekly	Monthly	Semi-Annually	Annually
General Condition (Temperature, Unusual Noises or Vibrations, Cracks, Leaks, Loose Hardware, Etc.)	I				
Pump Performance (Gauges, Speed, Flow)	I				
Bearing Lubrication		I			R
Seal Lubrication (And Packing Adjustment, If So Equipped)		I			R
V-Belts (If So Equipped)			I		
Air Release Valve Plunger Rod (If So Equipped)			I	C	
Front Impeller Clearance (Wear Plate)				I	
Rear Impeller Clearance (Seal Plate)				I	
Check Valve					I
Pressure Relief Valve (If So Equipped)					C
Pump and Driver Alignment					I
Shaft Deflection					I
Bearings					I
Bearing Housing					I
Piping					I
Driver Lubrication – See Mfgr’s Literature					I

**Legend:**  
 I = Inspect, Clean, Adjust, Repair or Replace as Necessary  
 C = Clean  
 R = Replace

\* Service interval based on an intermittent duty cycle equal to approximately 4000 hours annually. Adjust schedule as required for lower or higher duty cycles or extreme operating conditions.

## PUMP MAINTENANCE AND REPAIR – SECTION E

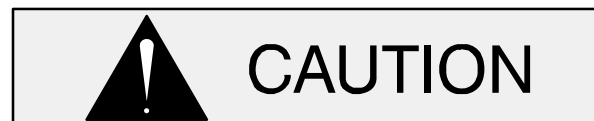
MAINTENANCE AND REPAIR OF THE WEARING PARTS OF THE PUMP WILL MAINTAIN PEAK OPERATING PERFORMANCE.



**\* STANDARD PERFORMANCE FOR PUMP MODEL T4A3S-B, Including /F, /FM, /WW, /WWS**

\* Based on 70°F (21°C) clear water at sea level with minimum suction lift. Since pump installations are seldom identical, your performance may be different due to such factors as viscosity, specific gravity, elevation, temperature, and impeller trim.

Contact the Gorman-Rupp Company to verify performance or part numbers.



Pump speed and operating condition points must be within the continuous performance range shown on the curve.

If your pump serial number is followed by an "N", your pump is **NOT** a standard production model.

ILLUSTRATION

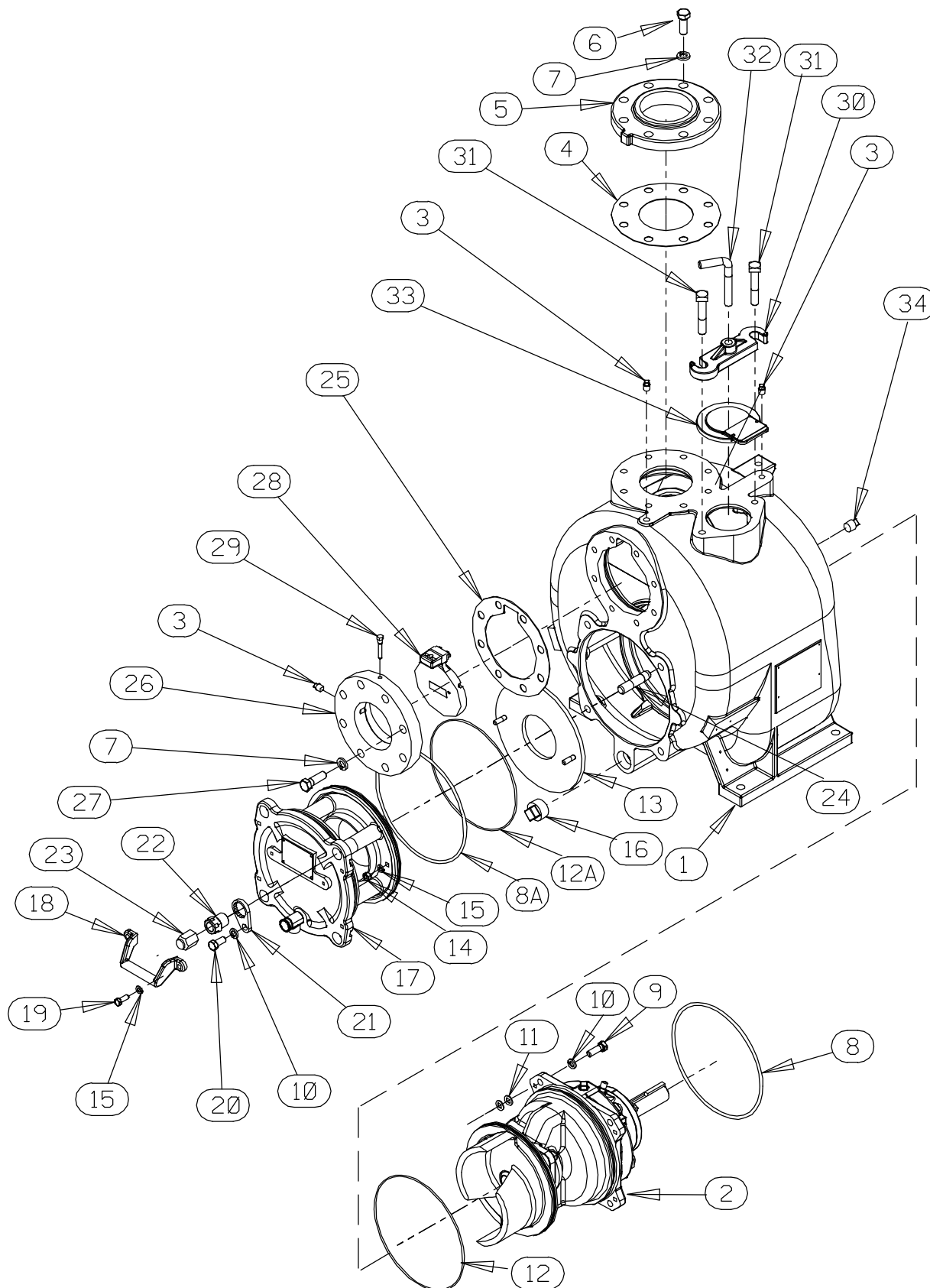


Figure 1. Pump Model T4A3S-B, Including /F, /FM, /WW, /WWS

## PARTS LIST

### Pump Model T4A3S-B, Including /F, /FM, /WW, /WWS

(From S/N 1206396 Up)

If your pump serial number is followed by an "N", your pump is **NOT** a standard production model. Contact the Gorman-Rupp Company to verify part numbers.

ITEM NO.	PART NAME	PART NUMBER	QTY	ITEM NO.	PART NAME	PART NUMBER	QTY
1	☐ PUMP CASING	SEE NOTE BELOW	1	NOT SHOWN:			
2	REPAIR ROTATING ASSY				DRIVE SCREW	BM#04-03 17000	4
	T4A3S-B, /F, /FM	44163-261	1		NAMEPLATE	38818-040 13990	1
	T4A3S-B /WW	44163-305	1		LUBRICATION DECAL	38817-084	1
	T4A3S-B /WWS	44163-276	1		ROTATION DECAL	2613M	1
3	☐ PIPE PLUG	P04 15079	3		WARNING DECAL	2613FE	1
4	* GASKET	25113-034	1		SUCTION STICKER	6588AG	1
5	DISCHARGE FLANGE	1756 10010	1		PRIMING STICKER	6588AH	1
6	HEX HEAD CAP SCREW	B1007 15991	8		DISCHARGE STICKER	6588BJ	1
7	LOCK WASHER	J10 15991	16		SUPER T DECAL	38812-089	1
8	* O-RING	S1674	1		G-R DECAL	GR-03	1
8A	* O-RING	S1674	1		INSTRUCTION TAG	38817-023	1
9	HEX HEAD CAP SCREW	B0806 15991	4		INSTRUCTION TAG	38817-011	1
10	LOCK WASHER	J08 15991	8	OPTIONAL:			
11	ROT ASSY ADJ SHIM	13130-3 17040	8		SELF CLEANING		
12	* O-RING	25152-273	1		WEAR PLATE	46451-763 24160	1
12A	* O-RING	25152-273	1		DISASSEMBLY TOOL	48711-020	1
13	* WEAR PLATE ASSY	10532A 15990	1		/F FLANGE KIT	48213-039	1
14	HEX NUT	D06 15991	2		-SUCTION	12066 10010	1
15	LOCK WASHER	J06 15991	4		-DISCHARGE	12066A 10010	1
16	☐ CASING DRAIN PLUG	P20 10009	1		/FM METRIC FLANGE KIT	48213-077	1
17	BACK CVR PLATE ASSY	42111-802	1		-SUCTION	38642-210 10000	1
	-WARNING PLATE	2613EV 13990	1		-DISCHARGE	38642-211 10000	1
	-DRIVE SCREW	BM#04-03 17000	4		WEAR PLATE ASSY:		
	* -PRESS RELIEF VALVE	26662-005	1		-STAINLESS STEEL	10532A 1718H	1
18	HANDLE	12354 13010	1		-ALLOY STEEL	46451-361 24160	1
19	HEX HEAD CAP SCREW	B0604 15991	2		CASING HEATERS:		
20	HEX HEAD CAP SCREW	B0804-1/2 15991	4		-120V	47811-078	1
21	LOCK COLLAR	38115-551 15001	4		-240V	47811-079	1
22	ADJUSTING SCREW	31871-070 1500G	4		CHECK VALVE ASSYS:		
23	BACK COVER NUT	31871-073 15000	4		-NEO SOLID TYPE	46411-020	1
24	☐ STUD	C1213 15991	4		☑ -VITON BLOW-OUT	46411-072	1
25	* GASKET	11389G 19370	1		-BUNA-N	46411-104	1
26	SUCTION FLANGE				-EPDM	46411-114	1
	T4A3S-B	11389 10010	1		PRESS RELIEF VALVES:		
	T4A3S-B /F, /WW, /WWS	12066 10010	1		-SEWAGE TYPE	46431-628	1
	T4A3S-B /FM	38642-210 10000	1		-STAINLESS STEEL	46431-629	1
27	HEX HEAD CAP SCREW				HI TEMP SHUT-DOWN KITS:		
	T4A3S-B	B1008 15991	8		-145°F	48313-186	1
	/F, /FM, /WW, /WWS	B1007 15991	6		-130°F	48313-256	1
	/F, /FM, /WW, /WWS	B1008 15991	2		-120°F	48313-257	1
28	* FLAP VALVE ASSY	46411-062	1		HI TEMP SHUT-DOWN THERMOSTAT KIT		
29	CHECK VALVE PIN	11557 17010	1		-145°F	48313-172	1
30	CLAMP BAR	38111-004 11010	1		AIR RELEASE VALVES:		
31	☐ SQUARE HEAD BOLT	A1014 15991	2		-10# COMP SPRING	GRP33-07A	1
32	CLAMP BAR SCREW	31912-009 15000	1		-25# COMP SPRING	GRP33-07	1
33	FILL COVER ASSY	42111-344	1		-80# COMP SPRING	GRP33-07B	1
	-WARNING PLATE	38816-097 13990	1		AIR REL VVL MNTG KIT	46331-515	1
	-DRIVE SCREW	BM#04-03 17000	2		BACK COVER O-RINGS		
	-COVER GASKET	50G 19210	1		★ -AFLAS	25150-409	1
34	☐ PIPE PLUG	P08 15079	1		☑ -VITON	25154-449	1

\* INDICATES PARTS RECOMMENDED FOR STOCK

☐ INCLUDED WITH REPAIR 46472-721 1  
PUMP CASING ASSY

☑ VITON® IS A REGISTERED TRADEMARK OF THE DUPONT CORP.

★ AFLAS® IS A PRODUCT OF THE 3M CORP.

ILLUSTRATION

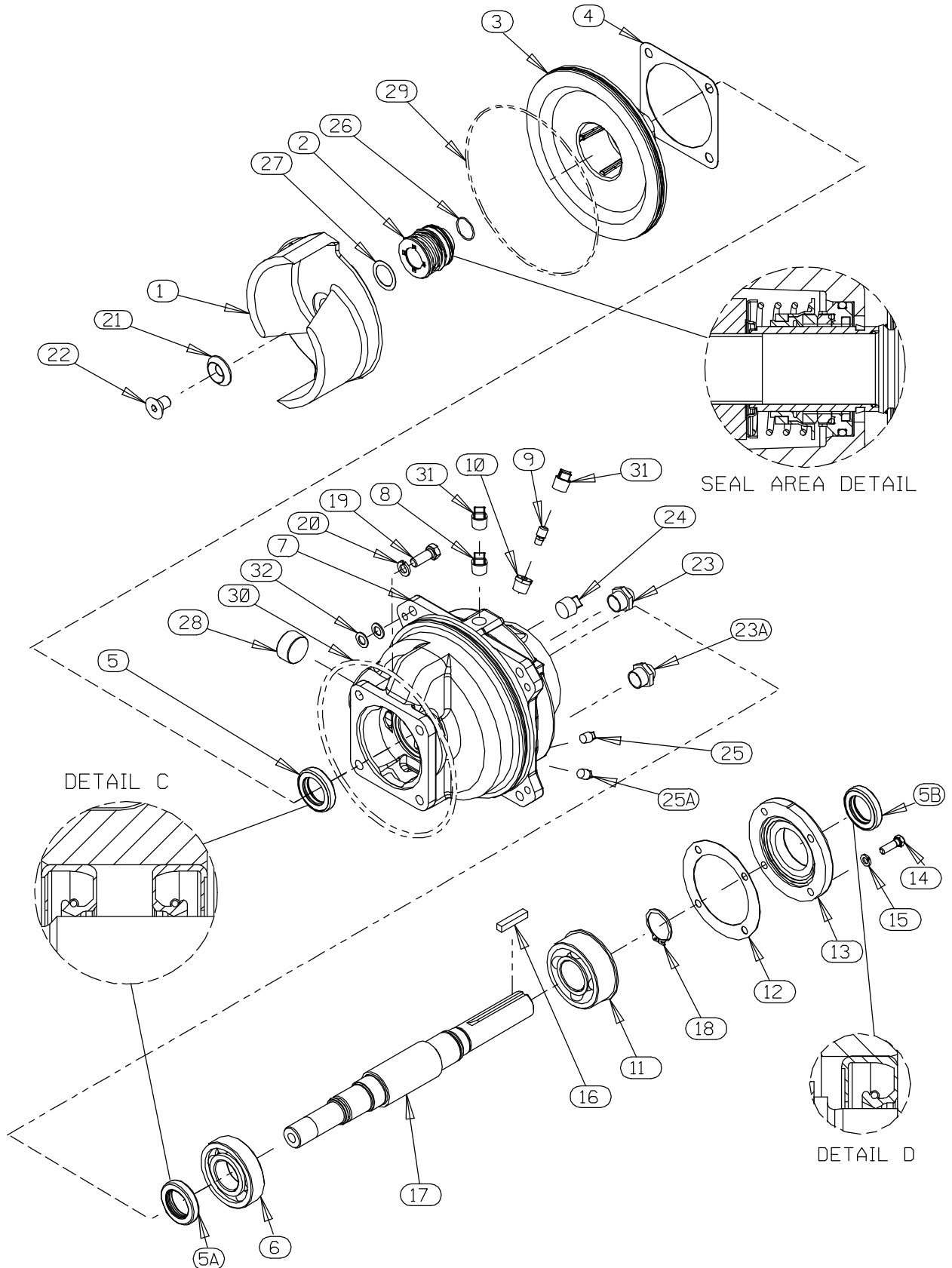


Figure 2. Repair Rotating Assemblies

**PARTS LIST**  
**Repair Rotating Assemblies**

ITEM NO.	PART NAME	PART NUMBER	QTY	ITEM NO.	PART NAME	PART NUMBER	QTY
1 *	IMPELLER	10528 11010	1	26	SHAFT SLEEVE O-RING	25154-022	REF
2 *	CART SEAL ASSY	46513-150	1	27	IMP ADJ SHIM SET	37J 17090	REF
	*/WWS MECH SEAL ASSY	12364D	1	28	PIPE PLUG	PC20 10009	1
3	SEAL PLATE	38272-234 10010	1	29 *	O-RING	25152-273	1
4 *	GASKET	10959G 20000	1	30 *	O-RING	S1674	1
5 *	OIL SEAL	S1352	1	31	SHIPPING PLUG	11495B 15079	2
5A *	OIL SEAL	S1352	1	32	ROT ASSY ADJ SHIM	13130-3 17040	8
5B *	OIL SEAL	S1352	1	NOT SHOWN:			
6 *	BALL BEARING	S1088	1		S/N PLATE	2613GG 13990	1
7	BEARING HOUSING	38251-411 10000	1		DRIVE SCREW	BM#04-03 17000	2
8	VENTED PIPE PLUG	4823A 15079	1		ROTATION DECAL	2613M	1
9	VENT	S1530	1		INSTRUCTION TAG	6588U	1
10	RED PIPE BUSHING	AP0802 15079	1	OPTIONAL:			
11 *	BALL BEARING	S375	1	STAINLESS STEEL PARTS:			
12 *	GASKET	38683-271 18000	1		SEAL PLATE	38272-234 1718H	1
13	BEARING CAP	38322-220 10000	1		CART SEAL ASSY	46513-156	1
14	HEX HEAD CAP SCREW	B0605 15991	4		IMPELLER WASHER	31167-029 1706H	1
15	LOCK WASHER	J06 15991	4		IMP CAPSCREW	F1004S 1704G	1
16 *	KEY	N0608 15990	1		MECH SEAL ASSY	46512-074	1
17 *	IMPELLER SHAFT	38514-817 16040	1	†	MECHANICAL SEAL		
	*/WWS IMPELLER SHAFT	38514-819 1706H	1		SHAFT SLEEVE	11876A 1706H	1
18	RETAINING RING	S442	1	† ★	AFLAS SEAL	46512-194	1
19	HEX HEAD CAP SCREW	B0805-1/2 15991	4	†	METAL BELLOWS MECH SEAL ASSY		
20	LOCK WASHER	J08 15991	4		-SEAL PLATE	38272-241 10010	1
21 *	IMPELLER WASHER	31167-029 16000	1	✓	-VITON OR EQUAL	46512-147	1
22 *	IMPELLER SCREW	F1004S 1500G	1	✓	-KALREZ	46512-142	1
23	SEAL CVTY SIGHT GAUGE	S1471	1	BEARING HSG O-RING:			
23A	BRG CVTY SIGHT GAUGE	S1471	1	★	-AFLAS	25150-409	1
24	PIPE PLUG	P12 15079	1	✓	-VITON	25154-449	1
25	BRG CVTY DRAIN PLUG	P04 15079	1				
25A	SEAL CVTY DRAIN PLUG	P04 15079	1				

\* INDICATES PARTS RECOMMENDED FOR STOCK

† OPTIONAL MECHANICAL SEAL(S) MUST BE USED WITH MECHANICAL SEAL SHAFT SLEEVE OR SOLID SST SHAFT.

✓ KALREZ® AND VITON™ ARE REGISTERED TRADEMARKS OF THE DUPONT CORP.

★ AFLAS® IS A REGISTERED TRADEMARK OF THE 3M CORP.

## PUMP AND SEAL DISASSEMBLY AND REASSEMBLY

Review all SAFETY information in Section A.

Follow the instructions on all tags, label and decals attached to the pump.

This pump requires little service due to its rugged, minimum-maintenance design. However, if it becomes necessary to inspect or replace the wearing parts, follow these instructions which are keyed to the illustrations (see Figures 1 and 2) and the accompanying parts lists.

This manual will alert personnel to known procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel. However, this manual cannot possibly anticipate and provide detailed precautions for every situation that might occur during maintenance of the unit. Therefore, it is the responsibility of the owner/maintenance personnel to ensure that **only** safe, established maintenance procedures are used, and that any procedures not addressed in this manual are performed **only** after establishing that neither personal safety nor pump integrity are compromised by such practices.

Many service functions may be performed by draining the pump and removing the back cover assembly. If major repair is required, the piping and/or power source must be disconnected. The following instructions assume complete disassembly is required.

Before attempting to service the pump, disconnect or lock out the power source and take precautions to ensure that it will remain inoperative. Close all valves in the suction and discharge lines.

For power source disassembly and repair, consult the literature supplied with the power source, or contact your local power source representative.



Before attempting to open or service the pump:

1. Familiarize yourself with this manual.
2. Disconnect or lock out the power source to ensure that the pump will remain inoperative.
3. Allow the pump to completely cool if overheated.
4. Check the temperature before opening any covers, plates, or plugs.
5. Close the suction and discharge valves.
6. Vent the pump slowly and cautiously.
7. Drain the pump.



Death or serious personal injury and damage to the pump or components can occur if proper lifting procedures are not observed. Make certain that hoists, chains, slings or cables are in good working condition and of sufficient capacity and that they are positioned so that loads will be balanced and the pump or components will not be damaged when lifting. Suction and discharge hoses and piping **must** be removed from the pump before lifting. Lift the pump or component only as high as necessary and keep personnel away from suspended objects.

### Back Cover And Wear Plate Removal

(Figure 1)

The wear plate (13) is easily accessible and may be serviced by removing the back cover assembly (10). Before attempting to service the pump, remove the pump casing drain plug (16) and drain the pump. Clean and reinstall the drain plug.

Remove the back cover nuts (23) and pry the back cover and assembled wear plate from the pump casing (1).

### NOTE

*An alternate method of removing the back cover from the pump casing is to remove the back cover nuts (23) and two diagonally opposing locking collars (21). Install two 1/2–13 UNC x 2-inch long screws in the tapped holes in the back cover and use them to press the back cover out of the pump casing.*

Inspect the wear plate and replace it if badly scored or worn. To remove the wear plate, disengage the hardware (14 and 15).

Inspect the back cover O-rings (8A and 12A) and replace them if damaged or worn.

### Suction Check Valve Removal

(Figure 1)

If the check valve assembly (28) is to be serviced, remove the check valve pin (29), reach through the back cover opening and pull the complete assembly from the suction flange (26).

### NOTE

*Further disassembly of the check valve is not required since it must be replaced as a complete unit. Individual parts are not sold separately.*

### Rotating Assembly Removal

(Figure 2)

The rotating assembly may be serviced without disconnecting the suction or discharge piping; however, the power source must be removed to provide clearance.

The impeller (1) should be loosened while the rotating assembly is still secured to the pump casing. Before loosening the impeller, remove the seal cavity drain plug (25A) and drain the seal lubricant. This will prevent the oil in the seal cavity from escaping when the impeller is loosened. Clean and reinstall the seal cavity drain plug.

Immobilize the impeller by wedging a block wood between the vanes and the pump casing, and remove the impeller capscrew and washer (21 and 22).

Install the shaft key (16). Install a lathe dog on the drive end of the shaft (17) with the “V” notch positioned over the shaft key.

With the impeller rotation still blocked, see Figure 3 and use a long piece of heavy bar stock to pry against the arm of the lathe dog in a counterclockwise direction (when facing the drive end of the shaft). **Use caution** not to damage the shaft or keyway. When the impeller breaks loose, remove the lathe dog, key and wood block.

### NOTE

*Do not remove the impeller until the rotating assembly has been removed from the pump casing.*

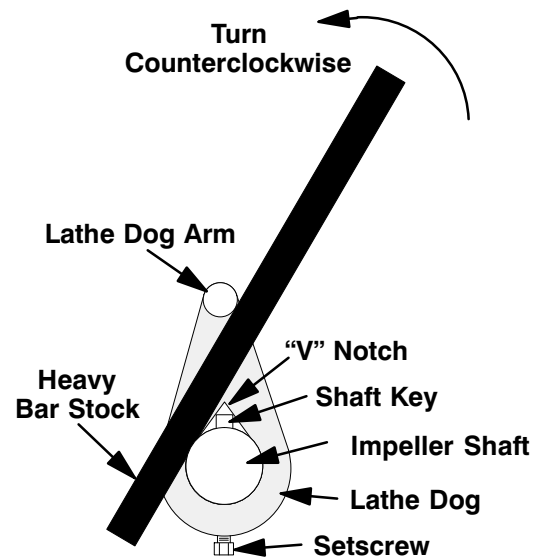


Figure 3. Loosening Impeller

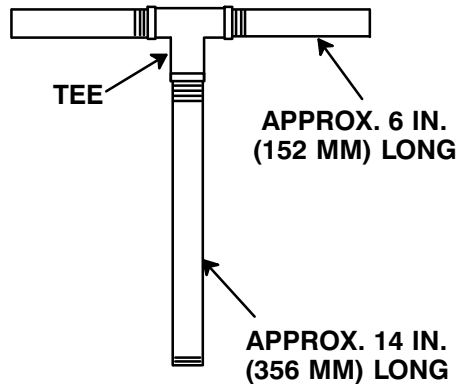
(Figure 1)

Remove the hardware (9 and 10) securing the rotating assembly to the pump casing. Separate the rotating assembly by pulling straight away from the pump casing. Tie and tag the rotating assembly shims (11) for ease of reassembly.

### NOTE

*An optional disassembly tool is available from the factory. If the tool is used, follow the instructions packed with it. A similar tool may be assembled using 1/2-inch pipe (schedule 80 steel or malleable*

iron) and a standard tee (see Figure 4). All threads are 1/2-inch NPT. **Do not pre-assemble the tool.**



**Figure 4. Rotating Assembly Tool**

To install the tool, remove the vented plug (10, Figure 2) from the bearing housing, and screw the longest length of pipe into the vent hole until fully engaged. Install the tee, and screw the handles into the tee. Use caution when lifting the rotating assembly to avoid injury to personnel or damage to the assembly.

Remove the bearing housing O-ring (9).

### Impeller Removal

#### (Figure 2)

With the rotating assembly removed from the pump casing, unscrew the impeller from the shaft. Use caution when unscrewing the impeller; tension on the shaft seal spring will be released as the impeller is removed. Inspect the impeller and replace if cracked or badly worn.

Remove the impeller adjusting shims (3); tie and tag the shims, or measure and record their thickness for ease of reassembly.

### Seal Removal

#### (Figure 2)

Slide the integral shaft sleeve and rotating portion of the seal off the shaft as a unit.

Use a pair of stiff wires with hooked ends to remove the stationary element and seat.

An alternate method of removing the stationary seal components is to remove the hardware (19 and 20) and separate the seal plate (3) and gasket (4) from the bearing housing (7). Position the seal plate on a flat surface with the impeller side down. Use a wooden dowel or other suitable tool to press on the back side of the stationary seat until the seat, O-rings, and stationary element can be removed.

Remove the shaft sleeve O-ring (26).

If no further disassembly is required, refer to **Seal Installation**.

### Shaft and Bearing Removal and Disassembly

#### (Figure 2)

When the pump is properly operated and maintained, the bearing housing should not require disassembly. Disassemble the shaft and bearings **only** when there is evidence of wear or damage.



Shaft and bearing disassembly in the field is not recommended. These operations should be performed only in a properly-equipped shop by qualified personnel.

Remove the bearing housing drain plug (25A) and drain the lubricant. Clean and reinstall the drain plug.

Disengage the hardware (14 and 15) and slide the bearing cap (13) and oil seal (5B) off the shaft. Remove the bearing cap gasket (12) and press the oil seal from the bearing cap.

Place a block of wood against the impeller end of the shaft and tap the shaft (17) and assembled bearings (6 and 11) from the bearing housing.

Pry or press the oil seals (5 and 5A) from the bearing housing.

After removing the shaft and bearings, clean and inspect the bearings **in place** as follows.



To prevent damage during removal from the shaft, it is recommended that bearings be cleaned and inspected **in place**. It is **strongly** recommended that the bearings be replaced **any** time the shaft and bearings are removed.

Clean the bearing housing, shaft and all component parts (except the bearings) with a soft cloth soaked in cleaning solvent. Inspect the parts for wear or damage and replace as necessary.



**Most cleaning solvents are toxic and flammable. Use them only in a well ventilated area free from excessive heat, sparks, and flame. Read and follow all precautions printed on solvent containers.**

Clean the bearings thoroughly in **fresh** cleaning solvent. Dry the bearings with filtered compressed air and coat with light oil.



Bearings must be kept free of all dirt and foreign material. Failure to do so will greatly shorten bearing life. **Do not** spin dry bearings. This may scratch the balls or races and cause premature bearing failure.

Rotate the bearings by hand to check for roughness or binding and inspect the bearing balls. If rotation is rough or the bearing balls are discolored, replace the bearings.

The bearing tolerances provide a tight press fit onto the shaft and a snug slip fit into the bearing housing. Replace the bearings, shaft, or bearing housing if the proper bearing fit is not achieved.

If bearing replacement is required, remove the outboard bearing snap ring (18) and use a bearing puller to remove the bearings from the shaft.

### Shaft and Bearing Reassembly and Installation (Figure 2)

Clean the bearing housing, shaft and all component parts (except the bearings) with a soft cloth soaked in cleaning solvent. Inspect the parts for wear or damage as necessary.



**Most cleaning solvents are toxic and flammable. Use them only in a well ventilated area free from excessive heat, sparks, and flame. Read and follow all precautions printed on solvent containers.**

Inspect the shaft for distortion, nicks or scratches, or for thread damage on the impeller end. Dress small nicks and burrs with a fine file or emery cloth. Replace the shaft if defective.

Position the inboard oil seal (5A) in the bearing housing bore with the lip positioned as shown in Figure 2. Press the oil seal into the housing until the face is **just flush** with the counterbored surface toward the inside of the housing.



To prevent damage during removal from the shaft, it is recommended that bearings be cleaned and inspected **in place**. It is **strongly** recommended that the bearings be replaced **any** time the shaft and bearings are removed.

#### NOTE

*Position the outboard bearing (11) on the shaft with the integral retaining ring on the bearing O.D. toward the drive end of the shaft.*

The bearings may be heated to ease installation. An induction heater, hot oil bath, electric oven, or

hot plate may be used to heat the bearings. Bearings should **never** be heated with a direct flame or directly on a hot plate.

### NOTE

*If a hot oil bath is used to heat the bearings, both the oil and the container must be **absolutely** clean. If the oil has been previously used, it must be **thoroughly** filtered.*

Heat the bearings to a uniform temperature **no higher than** 250°F (120°C) and slide the bearings onto the shaft, one at a time, until they are fully seated. This should be done quickly, in one continuous motion, to prevent the bearings from cooling and sticking on the shaft.

After the bearings have been installed and allowed to cool, check to ensure that they have not moved away from the shaft shoulders in shrinking. If movement has occurred, use a suitably sized sleeve and a press to reposition the bearings against the shaft shoulders.

If heating the bearings is not practical, use a suitably sized sleeve, and an arbor (or hydraulic) press to install the bearings on the shaft.



When installing the bearings onto the shaft, **never** press or hit against the outer race, balls, or ball cage. Press **only** on the inner race.

Secure the outboard bearing on the shaft with the bearing snap ring (18).

It is recommended that a sleeve be positioned against the inboard oil seal (5A) to prevent the lip of the oil seal from rolling as the shaft and bearings are installed in the bearing housing. The O.D. of the sleeve should be just smaller than the bearing housing bore, while the I.D. of the sleeve should be just larger than the O.D. of the lip seal area of the shaft.

With the lip seal sleeve in place, lubricate the lip seal area of the shaft, and slide the shaft and assembled bearings into the bearing housing until the retaining ring on the outboard bearing seats

against the bearing housing. Remove the lip seal sleeve.

Position the outboard oil seal (6) in the bearing housing bore with the lip positioned as shown in Figure 2. Press the oil seal into the housing until the face is **just flush** with the counterbored surface toward the outside of the housing.



When installing the shaft and bearings into the bearing bore, push against the outer race. **Never** hit the balls or ball cage.

Press the oil seal (5B) into the bearing cap (13) with the lip positioned as shown in Figure 2. Replace the bearing cap gasket (12) and secure the bearing cap with the hardware (14 and 15). **Be careful** not to damage the oil seal lip on the shaft keyway.

Lubricate the bearing housing as indicated in **LUBRICATION**.

### Seal Installation

(Figures 2, 5, 6 and 7)



**Most cleaning solvents are toxic and flammable. Use them only in a well ventilated area free from excessive heat, sparks, and flame. Read and follow all precautions printed on solvent containers.**

Clean the seal cavity and shaft with a cloth soaked in fresh cleaning solvent. Inspect the stationary seat bore in the seal plate for dirt, nicks and burrs, and remove any that exist. The stationary seat bore **must** be completely clean before installing the seal.



A new seal assembly should be installed **any time** the old seal is removed from the pump. Wear patterns on the finished faces cannot be realigned during reassembly.

Reusing an old seal could result in premature failure.

To ease installation of the seal, lubricate the shaft

sleeve O-ring and the external stationary seat O-ring with a very **small** amount of light lubricating oil. See Figure 5 for seal part identification.

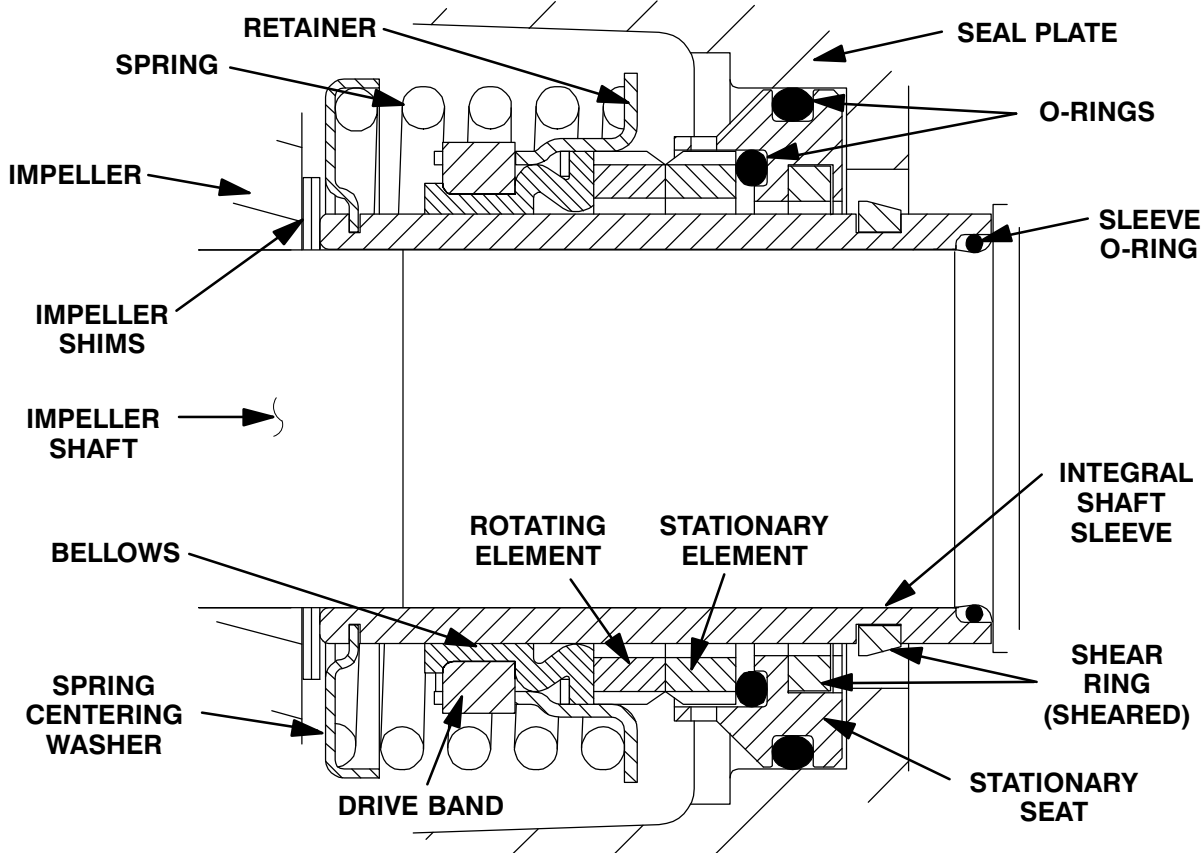


Figure 5. Cartridge Seal Assembly



This seal is not designed for operation at temperatures above 160°F (71°C). Do not use at higher operating temperatures.

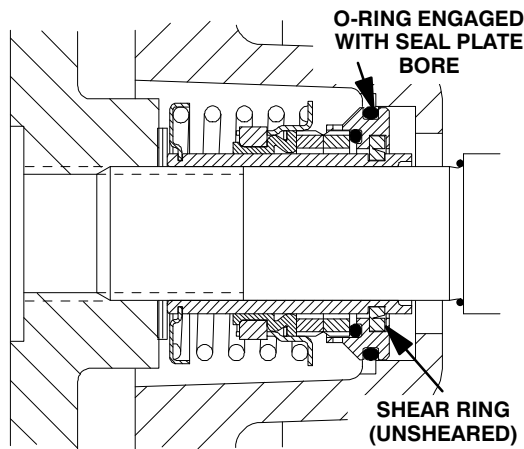
If the seal plate (3) was removed, install the seal plate gasket (4). Position the seal plate over the shaft and secure it to the bearing housing with the hardware (19 and 20).

To prevent damaging the shaft sleeve O-ring (not shown) on the shaft threads, cover the threads with electrical or duct tape. Slide the O-ring over the shaft until it seats against the shaft shoulder. Remove the tape covering the threads. Check to en-

sure that the shaft threads are free of any tape residue and clean as required before proceeding with seal installation.

**When installing a new cartridge seal assembly,** remove the seal from the container and lubricate the external stationary seat O-ring with light oil. Slide the seal assembly onto the shaft until the external stationary seat O-ring engages the bore in the seal plate.

Clean and inspect the impeller as described in **Impeller Installation and Adjustment.** Install the full set of impeller shims (27) provided with the seal, and screw the impeller onto the shaft until it is seated against the seal (see Figure 6).

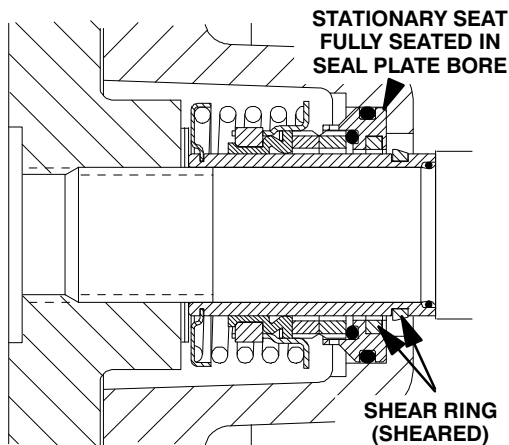


**Figure 6. Seal Partially Installed**

Continue to screw the impeller onto the shaft. This will press the stationary seat into the seal plate bore.

#### NOTE

*A firm resistance will be felt as the impeller presses the stationary seat into the seal plate bore.*



**Figure 7. Seal Fully Installed**

As the stationary seat becomes fully seated, the seal spring compresses, and the shaft sleeve will break the nylon shear ring. This allows the sleeve to slide down the shaft until seated against the shaft shoulder. Continue to screw the impeller onto the shaft until the impeller, shims, and sleeve are fully seated against the shaft shoulder (see Figure 7).

Measure the impeller-to-seal plate clearance, and remove impeller adjusting shims to obtain the

proper clearance as described in **Impeller Installation and Adjustment**.

**If necessary to reuse an old seal** in an emergency, carefully separate the rotating and stationary seal faces from the bellows retainer and stationary seat.



A new seal assembly should be installed **any time** the old seal is removed from the pump. Wear patterns on the finished faces cannot be realigned during reassembly. Reusing an old seal could result in premature failure.

Handle the seal parts with extreme care to prevent damage. Be careful not to contaminate precision finished faces; even fingerprints on the faces can shorten seal life. If necessary, clean the faces with a non-oil based solvent and a clean, lint-free tissue. Wipe **lightly** in a concentric pattern to avoid scratching the faces.

**Carefully** wash all metallic parts in fresh cleaning solvent and allow to dry thoroughly.



**Do not** attempt to separate the rotating portion of the seal from the shaft sleeve when reusing an old seal. The rubber bellows will adhere to the sleeve during use, and attempting to separate them could damage the bellows.

Inspect the seal components for wear, scoring, grooves, and other damage that might cause leakage. Inspect the integral shaft sleeve for nicks or cuts on either end. If any components are worn, or the sleeve is damaged, replace the complete seal; **never mix old and new seal parts**.

Install the stationary seal element in the stationary seat. Press this stationary subassembly into the seal plate bore until it seats squarely against the bore shoulder. A push tube made from a piece of plastic pipe would aid this installation. The I.D. of the pipe should be slightly larger than the O.D. of the shaft sleeve.

Slide the rotating portion of the seal (consisting of the integral shaft sleeve, spring centering washer, spring, bellows and retainer, and rotating element) onto the shaft until the seal faces contact.

Proceed with **Impeller Installation and Adjustment**.

### Impeller Installation

#### (Figure 2)

Inspect the impeller and replace it if cracked or badly worn. Inspect the impeller and shaft threads for dirt or damage, and clean or dress the threads as required.



The shaft and impeller threads **must** be completely clean before reinstalling the impeller. Even the slightest amount of dirt on the threads can cause the impeller to seize to the shaft, making future removal difficult or impossible without damage to the impeller or shaft.

Install the same thickness of impeller adjusting shims (27) as previously removed. Apply 'Never-Seez' or equivalent to the shaft threads and screw the impeller onto the shaft until tight.

#### NOTE

*At the slightest sign of binding, immediately back the impeller off, and check the threads for dirt. Do not try to force the impeller onto the shaft.*

A clearance of .025 to .040 inch (0,64 to 1,02 mm) between the impeller and the seal plate is recommended for maximum pump efficiency. Measure this clearance, and add or remove impeller adjusting shims as required.

#### NOTE

*If the rotating assembly has been installed in the pump casing, this clearance may be measured by reaching through the priming port with a feeler gauge.*

Proceed with **Rotating Assembly Installation** before installing the impeller capscrew and washer

(21 and 22). *The rotating assembly must be installed in the pump casing in order to torque the impeller capscrew.*

After the rotating assembly is installed in the pump casing, coat the threads of the impeller capscrew (22) with 'Never-Seez' or equivalent compound, and install the impeller washer (21) and capscrew; torque the capscrew to 90 ft. lbs. (1080 in. lbs. or 12,4 m. kg.).

### Rotating Assembly Installation

#### (Figure 1)

#### NOTE

*There is a 1-1/2 inch diameter socket head pipe plug (28, Figure 2) located in the side of the bearing housing. This hole is required for manufacturing purposes only; therefore the pipe plug should never require removal.*

Install the bearing housing O-ring (30) and lubricate it with light grease. Ease the rotating assembly into the pump casing using the installation tool. **Be careful** not to damage the O-ring.

Install the same thickness of rotating assembly adjusting shims (32) as previously removed, and secure the rotating assembly to the pump casing with the hardware (19 and 20).

To set the impeller and wear plate clearance, refer to the **Back Cover Installation And Adjustment**.

### Suction Check Valve Installation

#### (Figure 1)

Inspect the check valve assembly (28) and replace it if badly worn.

#### NOTE

*The check valve assembly must be replaced as a complete unit. Individual parts are not sold separately.*

Reach through the back cover opening with the check valve (28) and position the check valve adaptor in the mounting slot in the suction flange (26). Align the adaptor with the flange hole and secure the assembly with the check valve pin (29).

#### NOTE

*If the suction or discharge flanges were removed,*

replace the respective gaskets, apply 'Permatex Aviation No. 3 Form-A-Gasket' or equivalent compound to the mating surfaces, and secure them to the pump casing with the attaching hardware.

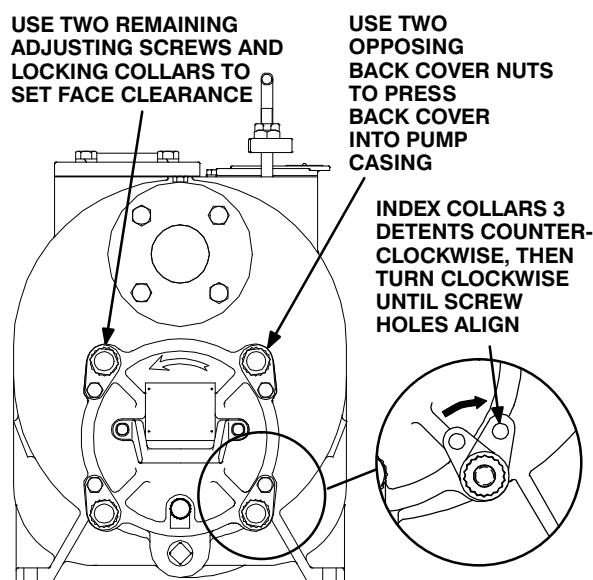
### Back Cover Installation and Adjustment

#### (Figure 1 and 8)

If the wear plate (13) was removed for replacement, carefully center it on the back cover and secure it with the hardware (14 and 15). The wear plate **must** be concentric to prevent binding when the back cover is installed.

Clearance between the impeller and wear plate is adjusted using four adjusting screws and locking collars (21 and 22). There are 18 detents on the I.D. of each locking collar. Indexing the collars one detent on the adjusting screws represents approximately .005 inch (0,13 mm) of wear plate clearance. The recommended clearance between the wear plate and the impeller is .010 to .020 inch (0,25 to 0,50 mm).

Replace the back cover O-rings (8A and 12A) and lubricate them with a generous amount of No. 2 grease. Clean any scale or debris from the contacting surfaces in the pump casing that might interfere or prevent a good seal with the back cover.



**Figure 8. Installing and Adjusting Back Cover**

Screw the four adjusting screws (22) into the tapped holes in the back cover plate until they are

**just flush** with the machined surface on the back side of the cover plate.

Align the back cover plate over the studs (24) and slide it into the pump casing. Use two back cover nuts (23) on diagonally opposing studs to press the back cover into the pump casing until the wear plate **just touches** the impeller when the shaft is turned by hand. **Tighten the back cover nuts evenly to avoid binding.**

With the wear plate just touching the impeller, turn the two free adjusting screws until they engage the pump casing. Position the locking collars over the adjusting screws so the holes in the collars for the locking screws align approximately with the holes in the cover plate.

Loosen the back cover nuts used to press the back cover into the pump casing one full turn.

Pull the collars off the adjusting screws, index them three detents counterclockwise, and reinstall the collars on the adjusting screws. Use the collars to turn the adjusting screws clockwise until the holes in the locking collars realign with the tapped screw holes in the back cover plate. Secure the locking collars to the back cover plate with the hardware (10 and 20). Install the two remaining back cover nuts snugly against the adjusting screws.

Remove the first two back cover nuts from their studs. Turn the adjusting screws clockwise until they engage the pump casing. Install the locking collars and hardware (10 and 10). Reinstall the back cover nuts.

Be sure the wear plate does not scrape against the impeller.

Over time it may be necessary to repeat the adjustment process to compensate for normal wear between the impeller and wear plate. When all of the adjustment has been used on the back cover side of the pump, an additional 0.125 inch (3,2 mm) of adjustment may be obtained by removing the rotating assembly adjusting shims (11).

Allow an installed pump to completely cool before draining liquid from the pump casing. Remove the back cover. Remove the rotating assembly adjusting shims, then reinstall the hardware securing the rotating assembly to the pump casing. Perform the

back cover adjustment procedure described above to obtain the proper face clearance.

## PRESSURE RELIEF VALVE MAINTENANCE

(Figure 1)

The back cover is equipped with a pressure relief valve (not shown) to provide additional safety for the pump and operator (refer to **Liquid Temperature and Overheating** in **OPERATION**).

It is recommended that the pressure relief valve assembly be replaced at each overhaul, or any time the pump overheats and activates the valve. **Never** replace this valve with a substitute which has not been specified or provided by the Gorman-Rupp Company.

Periodically, the valve should be removed for inspection and cleaning. When reinstalling the relief valve, apply 'Loctite Pipe Sealant With Teflon No. 592', or equivalent compound, on the relief valve threads. Position the valve as shown in Figure 1 with the discharge port pointing down.

### Final Pump Assembly

(Figure 1)

Install the shaft key (16, Figure 2) and reconnect the power source. Be sure to install any guards used over the rotating members.



**Do not operate the pump without the guards in place over the rotating parts. Exposed rotating parts can catch clothing, fingers, or tools, causing severe injury to personnel.**

Install the suction and discharge lines and open all valves. Make certain that all piping connections are tight, properly supported and secure.

**Be sure** the pump and power source have been properly lubricated, see **LUBRICATION**.

Remove the fill cover assembly (33) and fill the pump casing with clean liquid. Reinstall the fill

cover and tighten it. Refer to **OPERATION**, Section C, before putting the pump back into service.

## LUBRICATION

### Seal Assembly

(Figure 2)

Before starting the pump, remove the vented plug (8) and fill the seal cavity with SAE No. 30 non-detergent oil to the middle of the sight gauge (23) and maintain it at the middle of the gauge. Clean and reinstall the vented plug. Maintain the oil at this level.

### NOTE

*The white reflector in the sight gauge must be positioned horizontally to provide proper drainage.*

### Bearings

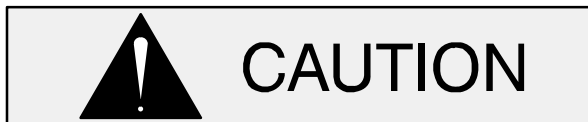
(Figure 2)

The bearing housing was fully lubricated when shipped from the factory. Check the oil level regularly through the sight gauge (23A) and maintain it at the middle of the gauge. When lubrication is required, add SAE No. 30 non-detergent oil through the hole for the air vent (9). **Do not** over-lubricate. Over-lubrication can cause the bearings to over-heat, resulting in premature bearing failure.

### NOTE

*The white reflector in the sight gauge must be positioned horizontally to provide proper drainage.*

Under normal conditions, drain the bearing housing once each year and refill with clean oil. Change the oil more frequently if the pump is operated continuously or installed in an environment with rapid temperature change.



Monitor the condition of the bearing lubricant regularly for evidence of rust or moisture condensation. This is especially important in areas where variable hot and cold temperatures are common.

For cold weather operation, consult the factory or a lubricant supplier for the recommended grade of oil.

**Power Source**

Consult the literature supplied with the power source, or contact your local power source representative.

**For U.S. and International Warranty Information,  
Please Visit [www.grpumps.com/warranty](http://www.grpumps.com/warranty)  
or call:  
U.S.: 419-755-1280  
International: +1-419-755-1352**

**For Canadian Warranty Information,  
Please Visit [www.grcanada.com/warranty](http://www.grcanada.com/warranty)  
or call:  
519-631-2870**

# **AIR COMPRESSOR**

# TECHNICAL DATA

## 1100e Series - 15 HP 60 Hz Horsepower Rated

MODEL	1107e	1109e	1112e
<b><u>Compressor Performance*</u></b>			
Full Load Pressure - psig	100	125	175
Capacity at Full Load Pressure - acfm	68.5	60.2	43.7
Power at Full Load Pressure - bhp	16.8	17.2	16.0
Package kW	14.4	14.7	13.7
Gear Ratio	3.16	2.86	2.21
<b><u>Cooling Data</u></b>			
Fluid Flow - gpm	7.3	8.6	10.0
Heat Rejection - Fluid Clr. BTU/min.	588	620	604
Heat Rejection - Aft. Clr. BTU/min.	125	109	75
<b><u>Cooling Air Flows</u></b>			
Air Flow Air-Cooled Fan - cfm	2000	2000	2000
Air-Cooled Fan Motor - hp	1.0	1.0	1.0
Air-Cooled Fan Motor Nominal Efficiency	85.5%	85.5%	85.5%
Standard Fan Water Column - in.	1/8	1/8	1/8
High Static Fan Water Column - in.	1/2	1/2	1/2
<b><u>Air/Fluid Housing</u></b>			
Fluid Fill Capacity - U.S. Gal.	2.5	2.5	2.5
Volume - Cubic Feet Air (U.S. Gal.)	9.0	9.0	9.0
Rated Pressure - psig	200	200	200
<b><u>dBa Ratings at 1 Meter (Typical)</u></b>			
Air-Cooled w/enclosure	66	66	66
<b><u>Dimensions &amp; Weights w/Enclosure - Uncrated (Crated)</u></b>			
Length - in.	53.2 (60)	53.2 (60)	53.2 (60)
Width - in.	31.5 (40.5)	31.5 (40.5)	31.5 (40.5)
Height - in.	53.2 (62)	53.2 (62)	53.2 (62)
Weight - lbs.	1044 (1274)	1044 (1274)	1044 (1274)
Discharge Connection - in. NPT	1 1/2	1 1/2	1 1/2
Moisture Drain Connection - in. NPT	1/4	1/4	1/4
<b><u>Filter Rating</u></b>			
Inlet Air	99.9% Eff. To 3 Microns Per SAE J726C		
Main Lubricant Flow Beta	Beta 3 = 2, Beta 15 = 75 Per ISO 16889		

# TECHNICAL DATA

Electrical Data (Typical across all models)	200V	230V	460V	575V
Motor HP	15	15	15	15
Motor Nominal Efficiency	93.0%	93.0%	93.0%	93.0%
Nominal RPM	1765	1765	1765	1765
Frame Size (TEFC)	256TYZ	256TYZ	256TYZ	256TYZ
Service Factor	1.2	1.2	1.2	1.2
Nameplate Amps	41.4	36	18	14.4
Locked Rotor Amps - Max.	263	229	114	91.5
Starter Enclosure Rating	NEMA 4	NEMA 4	NEMA 4	NEMA 4
Starter Size Amp Rating	65	65	32	32
Variable Speed Drive Enclosure Rating	N/A	N/A	N/A	N/A
Variable Speed Drive Amp Rating	N/A	N/A	N/A	N/A
Fan Amps (Air Cooled)	3.20	2.78	1.39	1.11
Package Amps 1107e	50.1	43.6	21.8	17.4
Package Amps 1109e	51.5	44.8	22.4	17.9
Package Amps 1112e	47.7	41.5	20.7	16.6

\* Capacity per CAGI/PNEUROP PN2CPTC2 (Annex C to ISO 1217)

\*\* Integral Dryer Amps not included in Package Amps

NOTE: Data subject to change without notice

TC Doc #: TDS-000302/00

# **REFRIGERATED AIR DRYER**



# REFRIGERATED DRYERS

Cycling; Non-Cycling; High Pressure; High Temperature

*20 – 30,000 scfm*



# THE IMPORTANCE OF CLEAN, DRY COMPRESSED AIR

## HOW MUCH WATER IS TOO MUCH? ANY AMOUNT OF WATER IS TOO MUCH.

Water jeopardizes everything you want your compressed air system to do. It ruins product and fouls processes. Removing it is vital in order to protect both your equipment and your operations.

Sullair Refrigerated Air Dryers reliably remove harmful moisture and contaminants from compressed air, helping protect your compressed air system, machinery and downstream tools.

### How?

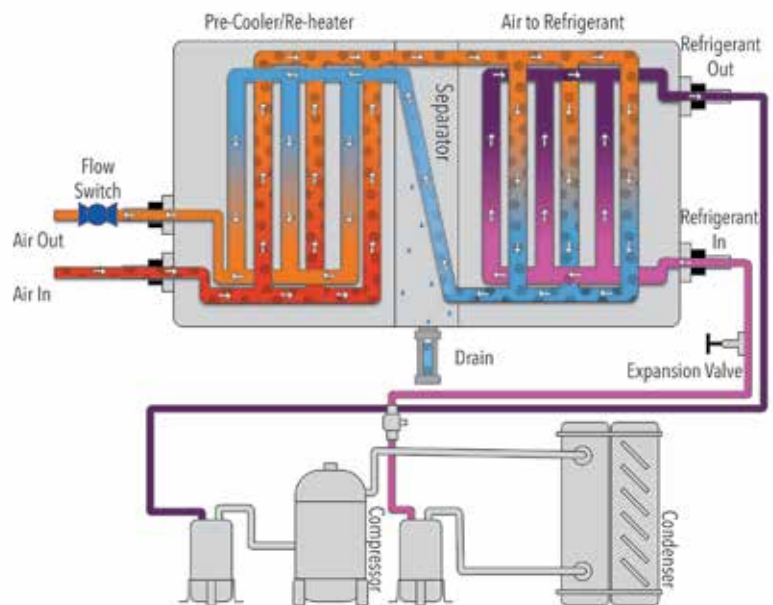
Saturated, compressed air enters the system and moves into the pre-cooler/re-heater, where it is pre-cooled by the cold outgoing air.

The air is then directed through the air-to-refrigerant heat exchanger, where it is cooled to 38°F by the refrigeration system.

The cold, saturated air flows into the three-stage separator, where liquids are removed from the air.

This separated condensate is then ejected from the system via the condensate drain.

The cold, dry air is then reheated by the incoming warm air before leaving the dryer.



## REFRIGERATED DRYER TYPES

### Non-Cycling

Non-cycling dryers are ideal for running at full load because they maintain a constant energy consumption no matter the flow and air demand. Using a hot gas bypass, they maintain a consistent dew point and control the amount of refrigerant circulating through the dryer.

### Digital Scroll

Advanced digital scroll technology saves the highest amount of energy possible in a refrigerated air dryer — up to 91% while in operation. Communication with the system evaporator — via temperature probe — adjusts refrigeration capacity to the temperature exiting the dryer while maintaining a consistent dewpoint.

# REFRIGERATED DRYERS

The next generation of Sullair Refrigerated Air Dryers focuses on high quality manufacturing standards, durable packaging and consistent, reliable dew point performance in all flow conditions.

## SULLAIR REFRIGERATED AIR DRYERS ARE BUILT FOR DURABLE PERFORMANCE, OPTIMUM RELIABILITY AND FEATURE:

- Stainless steel heat exchangers for consistent dew point and corrosion resistance
- 3-in-1 heat exchangers with internal separator and evaporator provide simplified maintenance and parts and reduce size
- Advanced digital scroll compressors for the highest performance with reduced power and energy consumption
- Zero air loss drains to remove condensate from the system without losing compressed air
- Environmentally friendly R-134a and R-404a refrigerants standard
- High heat transfer and large flow areas ensuring low pressure drop
- Easily serviceable cabinet
- Durable powder coated cabinets on enclosed models to protect the inner workings of the dryer from harsh environments
- Units with three phase voltage have a phase monitor to protect the compressor while eliminating possible phase reversal, loss and unbalance
- Electronic Unit Controller for easy service (*200 scfm and above*)

## SULLAIR REFRIGERATED AIR DRYERS ARE AVAILABLE IN THE FOLLOWING CONFIGURATIONS:

- **ATRH — Refrigerated High Temperature** — 20 to 125 scfm
- **ATRN — Refrigerated Non-Cycling** — 25 to 1000 scfm
- **ATRX — Refrigerated Extreme High Pressure** — 20 to 275 scfm
- **ATRP — Refrigerated High Pressure Stainless Steel** — 45 to 1000 scfm
- **ATRD — Refrigerated Energy Saving** — 200 to 2000 scfm
- **ATRS — Refrigerated Digital Cycling** — 1000 to 10,000 scfm
- **ATRDE — Refrigerated Large Flow Energy Saving** — 4000 to 30,000 scfm
- **ATRME — Refrigerated Thermal Mass** — 4000 to 30,000 scfm

# ENGINEERED TO SAVE



All Sullair Refrigerated Air Dryers come with a 3-year bumper-to-bumper warranty.

# ATRD SERIES

## ENERGY SAVING DIGITAL TOUCHSCREEN REFRIGERATED AIR DRYERS 200 – 2000 scfm

Combines the reliability and separation efficiency of non-cycling dryers with the added energy savings of digital cycling and a state-of-the-art touchscreen.

### Energy Savings

The Sullair ATRD Energy Saving Series senses air demand and shuts compressor off when no air flow is detected to optimize savings.

#### 1. Standard Digital Touchscreen Features:

- Sullair ATRD 7" state-of-the-art Color Touchscreen Controller
  - Provides easy access to all key dryer performance parameters
- Event log stores critical data and alarms
- ECO Mode Control
- Automatic restart when air flow is sensed

#### 2. Electronic Unit Controller (EUC)

*Standard on units 200 scfm and above*

The Electronic Unit Controller is designed specifically for demanding refrigeration applications to ensure precision in installation and operation. The EUC replaces existing adjustable low pressure controls, fan cycle switches and other relays, creating a virtually maintenance-free dryer.

#### EUC Features:

- Bump start (*where applicable*)
- Data storage
- Short cycling protection



#### 3. Heat Exchangers

- High performance stainless steel for consistent dew point and corrosion resistance
- 3-in-1 heat exchangers with internal separator and evaporator provide simplified maintenance and parts and reduce size



#### 4. Zero Air Loss Drain

- Removes condensate from system without losing compressed air



All Sullair Refrigerated Air Dryers come with a 3-year bumper-to-bumper warranty.



## ATRN SERIES

### NON-CYCLING REFRIGERATED AIR DRYERS 25 – 1000 scfm

Ensure consistent, reliable dew point performance in all flow conditions using a three-step separation process heat exchanger to thoroughly remove more than 99% of condensed moisture from the compressed air.

#### Standard Non-Cycling Features:

- Dryer on/off switch
- Dryer on light
- Refrigeration suction pressure gauge
- Refrigeration discharge gauge (*ATRN 200 and above*)
- Inlet pressure gauge (*ATRN 400 and above*)

## ATRH SERIES

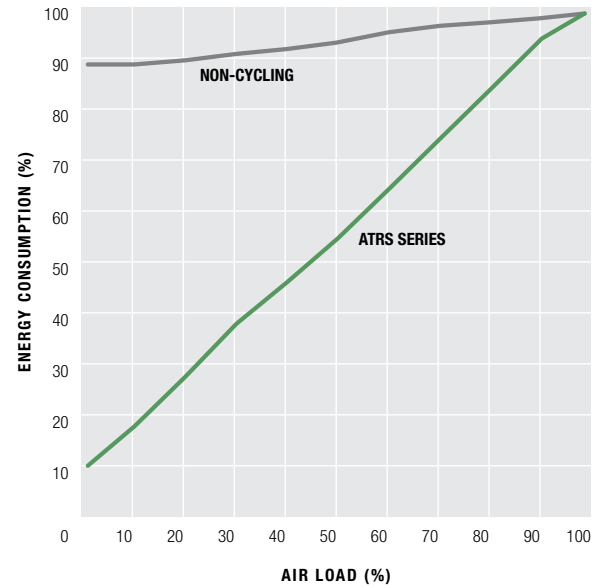
### HIGH TEMPERATURE DRYERS 20 – 125 scfm

Combines oversized refrigerated circuits, separators and high-efficiency heat exchangers into a single unit for high-inlet temperature applications.

#### Standard High Temperature Features:

- Maximum inlet temperature: 205°F/96°C
- Maximum inlet pressure: 200 psig
- Fully automatic operation
- Space-saving compact design
- No air-cooled aftercooler required for compressor

All Sullair Refrigerated Air Dryers come with a 3-year bumper-to-bumper warranty.



## ATRS SERIES

### DIGITAL CYCLING REFRIGERATED AIR DRYER 1000 – 10,000 scfm

Digitally cycles on and off to immediately and accurately adjust output to optimize energy.

#### Energy Savings

The Sullair ATRS Energy Saving Digital Cycling Series provides true money savings using proprietary programming in the Allen-Bradley PLC to precisely match power usage to air demand by automatically cycling the digital scroll refrigeration compressor from a loaded to unloaded state. This allows energy consumption to range from as low as 10% to 100% maximum capacity.

#### Optimum Performance, Fewer Parts

The Sullair ATRS Series is engineered with 71% fewer parts to provide greater reliability and reduced maintenance.

#### Expands with you

Increase your drying power as your plant grows. Modular units — configured in 500 and 1000 scfm increments — precisely match your air flow demand by 10 to 100%.

You can interface up to five modular dryers with isolation valves to expand drying capacity. Modular systems provide backup drying and lower pressure drop without increasing power consumption.

#### Standard Digital Cycling Features:

- Allen-Bradley PLC MicroLogix™ color touchscreen controller
- Monitors controls and system performance, tracks energy savings and displays system operation steps and alarms
- Ethernet ready

All Sullair Refrigerated Air Dryers come with a 3-year bumper-to-bumper warranty.



## ATRX SERIES

### REFRIGERATED EXTREME HIGH PRESSURE AIR DRYERS 20 – 275 scfm

*Available in 1200, 3625, 5000 and 6000 psig offerings*

Uses air-side 316 stainless steel components to provide corrosion resistance in extreme high pressure applications up to 6000 psig. The Sullair ATRX Series is designed for extreme high pressure applications such as pre-treatment for breathing air applications, pressure testing and other applications where the air must be pre-dried.

#### **Standard Extreme High Pressure Features:**

- Non-Cycling
- Maximum inlet pressure: 6000 psig
- 316 stainless steel air-side components



## ATRP SERIES

### REFRIGERATED HIGH PRESSURE STAINLESS STEEL AIR DRYERS 45 – 1000 scfm

Uses air-side 316 stainless steel components to provide corrosion resistance in high pressure applications up to 725 psig.

The Sullair ATRP Series is designed for the PET market, injection molding, military functions and other high pressure applications.

#### **Standard High Pressure Features:**

- Non-Cycling
- Maximum inlet pressure: 725 psig
- 316 stainless steel air-side components

All Sullair Refrigerated Air Dryers come with a 3-year bumper-to-bumper warranty.

## ATRDE SERIES

### REFRIGERATED LARGE FLOW ENERGY SAVING AIR DRYERS 4000 – 30,000 scfm

Combines shell-and-tube heat exchangers with rotary screw compressors to provide a consistent dew point over variable load conditions and class-leading pressure drop.

Sullair ATRDE Series Refrigerated Air Dryers optimize energy by modulating refrigeration compression to match output needs.

#### Standard Large Flow Energy Saving Features:

- Non-cycling refrigerated air dryer
  - Flow range: 4000 – 30,000 scfm
  - Designed for continuous duty cycle
- 4-inch display with customizable controls and dryer operation status
- Communication through RS-232/RS-485 combo port

## ATRME SERIES

### REFRIGERATED THERMAL MASS AIR DRYERS 4000 – 30,000 scfm

Uses high efficiency compressors with defined loading and unloading capacities and a thermal mass medium for energy storage to provide a consistent dew point for large air volumes.

Sullair ATRME Series Refrigerated Air Dryers decrease air distribution system costs, lengthen tool life and reduce maintenance downtime and system damage.

#### Standard Thermal Mass Features:

- Cycling thermal mass dryer
  - Flow range: 4000 – 30,000 scfm
  - Designed to run from 0–100% load
  - Compressor continuously modulates from 25–100% demand
- 4-inch display with customizable controls and dryer operation status
- Communication through RS-232/RS-485 combo port



All Sullair Refrigerated Air Dryers come with a 3-year bumper-to-bumper warranty.

# ABOUT SULLAIR

For more than 50 years, Sullair has been on the leading edge of compressed air solutions. We were one of the first to execute rotary screw technology in our air compressors, and our machines are famous all over the world for their legendary durability. As the industry moves forward, Sullair will always be at the forefront with quality people, innovative solutions, and air compressors that are built to last.

*Sullair was founded in Michigan City, Indiana in 1965, and has since expanded with a broad international network to serve customers in every corner of the globe. Sullair has offices in Chicago and manufacturing facilities in the United States, China and India — all ISO 9001 certified to ensure the highest quality standards in manufacturing. In addition, Sullair Suzhou and Shenzhen facilities are ISO 9001, ISO 14001 and OHSAS 18001 certified.*

**RELIABILITY.  
DURABILITY.  
PERFORMANCE.**

*These are the pillars that drive the quality of Sullair compressed air solutions. It's a promise we keep with every machine we make.*

## RELIABILITY

Customers who work with Sullair have found that the intangibles make all the difference — things like trust, confidence, and peace of mind. They go to work every day having full faith in their equipment, as well as the knowledge that dedicated distributors and Sullair personnel have their back every step of the way.

## DURABILITY

Bulletproof. Built to last. However you spin it, Sullair compressed air solutions are in it for the long haul, driven by the design of the legendary air end. In factories and shops all over the world, you'll find Sullair compressors that have stood the test of time, running consistently today like they did on day one.

## PERFORMANCE

You have high expectations for your operations, and we make machines that share your work ethic. Sullair compressed air solutions do what they're supposed to do, and they do it extremely well for a very long time. And working with us means not only access to clean, quality air, but also the tools you need to optimize this vital resource.



 **SULLAIR**

*Specifications enclosed*

FOR MORE INFORMATION, CONTACT YOUR LOCAL AUTHORIZED SULLAIR DISTRIBUTOR.



# ATRN SERIES

## NON-CYCLING REFRIGERATED AIR DRYERS



**FREQUENCY: 60 Hz**

MODEL #	VOLTAGE - PHASE	TYPE OF COOLING	scfm	INLET/OUTLET CONNECTION (NPT)	DRAIN OUTLET CONNECTION	HEIGHT (in)	WIDTH (in)	DEPTH (in)	WEIGHT (lbs)
ATRN 25	115-1	Air-cooled	25	1/2"	1/4"	15	16	16	76
ATRN 25	208/230-1	Air-cooled	25	1/2"	1/4"	15	16	16	76
ATRN 40	115-1	Air-cooled	40	3/4"	1/4"	15	16	16	78
ATRN 40	208/230-1	Air-cooled	40	3/4"	1/4"	15	16	16	78
ATRN 50	115-1	Air-cooled	50	3/4"	1/4"	15	16	16	80
ATRN 50	208/230-1	Air-cooled	50	3/4"	1/4"	15	16	16	80
ATRN 60	115-1	Air-cooled	60	3/4"	1/4"	15	16	16	102
ATRN 60	208/230-1	Air-cooled	60	3/4"	1/4"	15	16	16	102
ATRN 75	115-1	Air-cooled	75	1"	1/4"	32	22	22	124
ATRN 75	208/230-1	Air-cooled	75	1"	1/4"	32	22	22	124
ATRN 100	115-1	Air-cooled	100	1"	1/4"	32	22	22	138
ATRN 100	208/230-1	Air-cooled	100	1"	1/4"	32	22	22	138
ATRN 125	115-1	Air-cooled	125	1"	1/4"	32	22	22	156
ATRN 125	208/230-1	Air-cooled	125	1"	1/4"	32	22	22	156
ATRN 150	115-1	Air-cooled	150	1"	1/4"	32	22	22	162
ATRN 150	208/230-1	Air-cooled	150	1"	1/4"	32	22	22	162
ATRN 200	230-1	Air-cooled	200	1-1/2"	1/4"	36	28	32	240
ATRN 250	230-1	Air-cooled	250	1-1/2"	1/4"	36	28	32	332
ATRN 250	208/230-3	Air-cooled	250	1-1/2"	1/4"	36	28	32	332
ATRN 250	460-3	Air-cooled	250	1-1/2"	1/4"	36	28	32	332
ATRN 250	575-3	Air-cooled	250	1-1/2"	1/4"	36	28	32	332
ATRN 300	230-1	Air-cooled	300	2"	1/4"	36	28	32	345
ATRN 300	208/230-3	Air-cooled	300	2"	1/4"	36	28	32	345
ATRN 300	460-3	Air-cooled	300	2"	1/4"	36	28	32	345
ATRN 300	575-3	Air-cooled	300	2"	1/4"	36	28	32	345
ATRN 400	230-1	Air-cooled	400	2"	1/4"	45	34	48	567
ATRN 400	208/230-3	Air-cooled	400	2"	1/4"	45	34	48	567
ATRN 400	460-3	Air-cooled	400	2"	1/4"	45	34	48	567
ATRN 400	575-3	Air-cooled	400	2"	1/4"	45	34	48	567
ATRN 500	230-1	Air-cooled	500	2"	1/4"	45	34	48	582
ATRN 500	208/230-3	Air-cooled	500	2"	1/4"	45	34	48	582
ATRN 500	460-3	Air-cooled	500	2"	1/4"	45	34	48	582
ATRN 500	575-3	Air-cooled	500	2"	1/4"	45	34	48	582
ATRN 600	230-1	Air-cooled	600	3"	1/4"	45	34	48	598
ATRN 600	208/230-3	Air-cooled	600	3"	1/4"	45	34	48	598
ATRN 600	460-3	Air-cooled	600	3"	1/4"	45	34	48	598
ATRN 600	575-3	Air-cooled	600	3"	1/4"	45	34	48	598
ATRN 800	230-1	Air-cooled	800	3"	1/4"	50	40	58	790
ATRN 800	208/230-3	Air-cooled	800	3"	1/4"	50	40	58	790
ATRN 800	460-3	Air-cooled	800	3"	1/4"	50	40	58	790
ATRN 800	575-3	Air-cooled	800	3"	1/4"	50	40	58	790
ATRN 1000	230-1	Air-cooled	1000	3"	1/4"	50	40	58	800
ATRN 1000	208/230-3	Air-cooled	1000	3"	1/4"	50	40	58	800
ATRN 1000	460-3	Air-cooled	1000	3"	1/4"	50	40	58	800
ATRN 1000	575-3	Air-cooled	1000	3"	1/4"	50	40	58	800

### CAPACITY CORRECTION FACTORS FOR DIFFERING AMBIENT AIR TEMPERATURES (C1)

Ambient Temperature (°F)	70	80	90	100	110	115	120
Correction Factor	1.10	1.07	1.05	1.00	0.94	0.85	0.65

### CAPACITY CORRECTION FACTORS FOR DIFFERING INLET AIR TEMPERATURES (C2)

Inlet Temperature (°F)	80	90	100	110	120	140
Correction Factor	1.50	1.21	1.00	0.82	0.72	0.61

### CAPACITY CORRECTION FACTORS FOR DIFFERING SYSTEM AIR PRESSURE (C3)

System Pressure (psig)	50	75	100	125	150	175	200	225	250
Correction Factor	0.85	0.95	1.00	1.07	1.13	1.18	1.20	1.22	1.24

### CAPACITY CORRECTION FACTORS FOR DIFFERING PRESSURE DEW POINT REQUIREMENTS (C4)

Dew Point (°F)	38	41	45	50
Correction Factor	1.00	1.12	1.17	1.22

#### NOTES:

- For other conditions, consult your local Sullair representative
- For optional voltage consult factory
- Performance ratings based on standard conditions of 100°F inlet air temperature, 100°F ambient temperature, 100 psig inlet pressure
- Max inlet temperature: 140°F
- Max ambient temperature: 120°F
- Max pressure: 232 psig

### TO SIZE THE DRYER CAPACITY FOR ACTUAL CONDITIONS

$$\text{Adjusted Capacity} = \text{scfm} \times C1 \times C2 \times C3 \times C4$$

To calculate the capacity of a given dryer based on non-standard operating conditions, multiply the standard capacity by the appropriate correction factor(s).

Dryer Model:	ATRN-100
Standard Capacity:	100 scfm
Actual Operating Conditions:	90°F ambient temperature (C1) = 1.05 100°F inlet temperature (C2) = 1.00 125 psig system pressure (C3) = 1.07 38°F required dew point (C4) = 1.00

$$\text{Adjusted Capacity} = 100 \text{ scfm} \times 1.05 \times 1.0 \times 1.07 \times 1.0 = 112.4 \text{ scfm}$$

### TO SELECT THE DRYER MODEL FOR ACTUAL CONDITIONS

$$\text{Adjusted Capacity} = \text{scfm} / C1 / C2 / C3 / C4$$

To choose a dryer based on a given flow at non-standard operating conditions, divide the given flow by the appropriate correction factor(s).

Given Flow:	75 scfm
Actual Operating Conditions:	80°F ambient temperature (C1) = 1.07 90°F inlet temperature (C2) = 1.21 100 psig system pressure (C3) = 1.00 38°F required dew point (C4) = 1.00

$$\text{Adjusted Capacity} = 75 \text{ scfm} / 1.07 / 1.21 / 1.0 / 1.0 = 57.9 \text{ scfm}$$

Select Dryer Model: ATRN-60

# ATRH SERIES

## HIGH TEMPERATURE DRYERS



### FREQUENCY: 60 Hz

MODEL #	VOLTAGE - PHASE	TYPE OF COOLING	scfm	INLET/OUTLET CONNECTION (NPT)	DRAIN OUTLET CONNECTION	HEIGHT (in)	WIDTH (in)	DEPTH (in)	WEIGHT (lbs)
ATRH 20	115-1	Air-cooled	20	1/2" FPT	1/4"	15	16	16	102
ATRH 35	115-1	Air-cooled	35	1/2" FPT	1/4"	15	18	18	125
ATRH 50	115-1	Air-cooled	50	3/4" FPT	1/4"	16	20	20	145
ATRH 75	208/230-3	Air-cooled	75	1" FPT	1/4"	36	28	30	225
ATRH 100	208/230-3	Air-cooled	100	1" FPT	1/4"	36	28	30	250
ATRH 125	208/230-3	Air-cooled	125	1" FPT	1/4"	36	28	30	250

### CAPACITY CORRECTION FACTORS FOR DIFFERING AMBIENT AIR TEMPERATURES (C1)

Ambient Temperature (°F)	75	85	95	100	105	115	120
Correction Factor	1.10	1.07	1.03	1.00	0.96	0.82	0.55

### CAPACITY CORRECTION FACTORS FOR DIFFERING INLET AIR TEMPERATURES (C2)

Inlet Temperature (°F)	90	100	150	180	200	205
Correction Factor	1.30	1.27	1.06	1.00	0.98	0.90

### CAPACITY CORRECTION FACTORS FOR DIFFERING SYSTEM AIR PRESSURE (C3)

System Pressure (psig)	30	45	60	75	90	100	115	130	145	160	175	190	200
Correction Factor	0.30	0.50	0.70	0.75	0.80	0.83	0.86	0.90	0.93	0.96	1.00	1.10	1.12

### CAPACITY CORRECTION FACTORS FOR DIFFERING PRESSURE DEW POINT REQUIREMENTS (C4)

Dew Point (°F)	38	41	45	50	55	60
Correction Factor	0.65	0.73	0.80	1.00	1.10	1.22

#### NOTES:

- For other conditions, consult your local Sullair representative
- For optional voltage consult factory
- Performance ratings based on standard conditions of 100°F inlet air temperature, 100°F ambient temperature, 100 psig inlet pressure
- Max inlet temperature: 205°F
- Max ambient temperature: 120°F
- Max pressure: 232 psig

### TO SIZE THE DRYER CAPACITY FOR ACTUAL CONDITIONS

$$\text{Adjusted Capacity} = \text{scfm} \times C1 \times C2 \times C3 \times C4$$

To calculate the capacity of a given dryer based on non-standard operating conditions, multiply the standard capacity by the appropriate correction factor(s).

Dryer Model:	ATRH-100
Standard Capacity:	100 scfm
Actual Operating Conditions:	95°F ambient temperature (C1) = 1.03 150°F inlet temperature (C2) = 1.06 160 psig system pressure (C3) = 0.96 50°F required dew point (C4) = 1.00
<b>Adjusted Capacity = 100 scfm x 1.03 x 1.06 x 0.96 x 1.0 = 104.8 scfm</b>	

### TO SELECT THE DRYER MODEL FOR ACTUAL CONDITIONS

$$\text{Adjusted Capacity} = \text{scfm}/C1/C2/C3/C4$$

To choose a dryer based on a given flow at non-standard operating conditions, divide the given flow by the appropriate correction factor(s).

Given Flow:	80 scfm
Actual Operating Conditions:	75°F ambient temperature (C1) = 1.10 150°F inlet temperature (C2) = 1.06 200 psig system pressure (C3) = 1.12 50°F required dew point (C4) = 1.00
<b>Adjusted Capacity = 80 scfm/1.1/1.06/1.12/1.0 = 61.3 scfm</b>	
<b>Select Dryer Model: ATRH-75</b>	

# ATRD SERIES

ENERGY SAVING REFRIGERATED AIR DRYERS



**FREQUENCY: 60 Hz**

MODEL #	VOLTAGE - PHASE	TYPE OF COOLING	scfm	INLET/OUTLET CONNECTION (NPT)	DRAIN OUTLET CONNECTION	HEIGHT (in)	WIDTH (in)	DEPTH (in)	WEIGHT (lbs)
ATRD 200	230-1	Air-cooled	200	1-1/2"	1/4"	36	28	32	240
ATRD 250	230-1	Air-cooled	250	1-1/2"	1/4"	36	28	32	332
ATRD 250	208/230-3	Air-cooled	250	1-1/2"	1/4"	36	28	32	332
ATRD 250	460-3	Air-cooled	250	1-1/2"	1/4"	36	28	32	332
ATRD 250	575-3	Air-cooled	250	1-1/2"	1/4"	36	28	32	332
ATRD 300	230-1	Air-cooled	300	2"	1/4"	36	28	32	345
ATRD 300	208/230-3	Air-cooled	300	2"	1/4"	36	28	32	345
ATRD 300	460-3	Air-cooled	300	2"	1/4"	36	28	32	345
ATRD 300	575-3	Air-cooled	300	2"	1/4"	36	28	32	345
ATRD 400	230-1	Air-cooled	400	2"	1/4"	45	34	48	567
ATRD 400	208/230-3	Air-cooled	400	2"	1/4"	45	34	48	567
ATRD 400	460-3	Air-cooled	400	2"	1/4"	45	34	48	567
ATRD 400	575-3	Air-cooled	400	2"	1/4"	45	34	48	567
ATRD 500	230-1	Air-cooled	500	2"	1/4"	45	34	48	582
ATRD 500	208/230-3	Air-cooled	500	2"	1/4"	45	34	48	582
ATRD 500	460-3	Air-cooled	500	2"	1/4"	45	34	48	582
ATRD 500	575-3	Air-cooled	500	2"	1/4"	45	34	48	582
ATRD 600	230-1	Air-cooled	600	3"	1/4"	45	34	48	598
ATRD 600	208/230-3	Air-cooled	600	3"	1/4"	45	34	48	598
ATRD 600	460-3	Air-cooled	600	3"	1/4"	45	34	48	598
ATRD 600	575-3	Air-cooled	600	3"	1/4"	45	34	48	598
ATRD 800	230-1	Air-cooled	800	3"	1/4"	50	40	58	790
ATRD 800	208/230-3	Air-cooled	800	3"	1/4"	50	40	58	790
ATRD 800	460-3	Air-cooled	800	3"	1/4"	50	40	58	790
ATRD 800	575-3	Air-cooled	800	3"	1/4"	50	40	58	790
ATRD 1000	230-1	Air-cooled	1000	3"	1/4"	50	40	58	800
ATRD 1000	208/230-3	Air-cooled	1000	3"	1/4"	50	40	58	800
ATRD 1000	460-3	Air-cooled	1000	3"	1/4"	50	40	58	800
ATRD 1000	575-3	Air-cooled	1000	3"	1/4"	50	40	58	800
ATRD 1250	208/230-3	Air-cooled	1250	3"	1/4"	50	40	58	852
ATRD 1250	460-3	Air-cooled	1250	3"	1/4"	50	40	58	852
ATRD 1250	575-3	Air-cooled	1250	3"	1/4"	50	40	58	852
ATRD 1500	208/230-3	Air-cooled	1500	4" FLG	1/4"	84	42	64	1625
ATRD 1500	460-3	Air-cooled	1500	4" FLG	1/4"	84	42	64	1625
ATRD 1500	575-3	Air-cooled	1500	4" FLG	1/4"	84	42	64	1625
ATRD 1750	208/230-3	Air-cooled	1750	4" FLG	1/4"	84	42	64	1800
ATRD 1750	460-3	Air-cooled	1750	4" FLG	1/4"	84	42	64	1800
ATRD 1750	575-3	Air-cooled	1750	4" FLG	1/4"	84	42	64	1800
ATRD 2000	208/230-3	Air-cooled	2000	4" FLG	1/4"	84	42	64	2250
ATRD 2000	460-3	Air-cooled	2000	4" FLG	1/4"	84	42	64	2250
ATRD 2000	575-3	Air-cooled	2000	4" FLG	1/4"	84	42	64	2250

### CAPACITY CORRECTION FACTORS FOR DIFFERING AMBIENT AIR TEMPERATURES (C1)

Ambient Temperature (°F)	70	80	90	100	110	115	120
Correction Factor	1.10	1.07	1.05	1.00	0.94	0.85	0.65

### CAPACITY CORRECTION FACTORS FOR DIFFERING INLET AIR TEMPERATURES (C2)

Inlet Temperature (°F)	80	90	100	110	120	140
Correction Factor	1.50	1.21	1.00	0.82	0.72	0.61

### CAPACITY CORRECTION FACTORS FOR DIFFERING SYSTEM AIR PRESSURE (C3)

System Pressure (psig)	50	75	100	125	150	175	200	225	250
Correction Factor	0.85	0.95	1.00	1.07	1.13	1.18	1.20	1.22	1.24

### CAPACITY CORRECTION FACTORS FOR DIFFERING PRESSURE DEW POINT REQUIREMENTS (C4)

Dew Point (°F)	38	41	45	50
Correction Factor	1.00	1.12	1.17	1.22

#### NOTES:

- For other conditions, consult your local Sullair representative
- For optional voltage consult factory
- Performance ratings based on standard conditions of 100°F inlet air temperature, 100°F ambient temperature, 100 psig inlet pressure
- Max inlet temperature: 140°F
- Max ambient temperature: 120°F
- Max pressure: 232 psig

### TO SIZE THE DRYER CAPACITY FOR ACTUAL CONDITIONS

$$\text{Adjusted Capacity} = \text{scfm} \times C1 \times C2 \times C3 \times C4$$

To calculate the capacity of a given dryer based on non-standard operating conditions, multiply the standard capacity by the appropriate correction factor(s).

Dryer Model:	ATRD-1000
Standard Capacity:	1000 scfm
Actual Operating Conditions:	90°F ambient temperature (C1) = 1.05 100°F inlet temperature (C2) = 1.00 125 psig system pressure (C3) = 1.07 38°F required dew point (C4) = 1.00
Adjusted Capacity = 1000 scfm x 1.05 x 1.0 x 1.07 x 1.0 = 1123.5 scfm	

### TO SELECT THE DRYER MODEL FOR ACTUAL CONDITIONS

$$\text{Adjusted Capacity} = \text{scfm}/C1/C2/C3/C4$$

To choose a dryer based on a given flow at non-standard operating conditions, divide the given flow by the appropriate correction factor(s).

Given Flow:	250 scfm
Actual Operating Conditions:	80°F ambient temperature (C1) = 1.07 90°F inlet temperature (C2) = 1.21 100 psig system pressure (C3) = 1.00 38°F required dew point (C4) = 1.00
Adjusted Capacity = 250 scfm/1.07/1.21/1.0/1.0 = 193.1 scfm	
Select Dryer Model: ATRD-200	

# ATRS SERIES

DIGITAL CYCLING REFRIGERATED AIR DRYERS



# SULLAIR®

**FREQUENCY: 60 Hz**

MODEL #	VOLTAGE - PHASE	REFRIGERANT COMPRESSOR TYPE	scfm	INLET/OUTLET CONNECTION (NPT)	DRAIN OUTLET CONNECTION	HEIGHT (in/mm)	WIDTH (in/mm)	DEPTH (in/mm)	WEIGHT (lbs/kg)
ATRS-1000	460-3	Digital Scroll	1000	3" NPT	1/4"	48/1220	38/966	54/1372	810/1786
ATRS-1250	460-3	Digital Scroll	1250	3" NPT	1/4"	48/1220	38/966	54/1372	860/1896
ATRS-1500	460-3	Digital Scroll	1500	4" FLG	1/4"	84/2134	58/1474	41/1042	1650/3638
ATRS-1750	460-3	Digital Scroll	1750	4" FLG	1/4"	84/2134	58/1474	41/1042	2250/4961
ATRS-2000	460-3	Digital Scroll	2000	4" FLG	1/4"	84/2134	58/1474	41/1042	2300/5071
ATRS-2500	460-3	Digital Scroll	2500	6" FLG	1/4"	52/1321	114/2896	65/1651	2370/1075
ATRS-3000	460-3	Digital Scroll	3000	8" FLG	1/4"	110/2794	124/3150	44/1118	3980/1806
ATRS-3500	460-3	Digital Scroll	3500	8" FLG	1/4"	110/2794	124/3150	44/1118	5180/2350
ATRS-4000	460-3	Digital Scroll	4000	8" FLG	1/4"	110/2794	124/3150	44/1118	4600/2087
ATRS-4500	460-3	Digital Scroll	4500	8" FLG	1/4"	102/2591	186/4725	44/1118	4950/2246
ATRS-5250	460-3	Digital Scroll	5250	8" FLG	1/4"	102/2591	186/4725	44/1118	6750/3062
ATRS-6000	460-3	Digital Scroll	6000	8" FLG	1/4"	102/2591	186/4725	44/1118	6900/3130
ATRS-7000	460-3	Digital Scroll	7000	10" FLG	1/4"	109/2769	247/6274	44/1118	11,623/5273
ATRS-8000	460-3	Digital Scroll	8000	10" FLG	1/4"	109/2769	247/6274	44/1118	11,823/5363
ATRS-8750	460-3	Digital Scroll	8750	12" FLG	1/4"	111/2820	308/7824	47/1194	15,528/7044
ATRS-10,000	460-3	Digital Scroll	10,000	12" FLG	1/4"	111/2820	308/7824	47/1194	15,777/7157

### CAPACITY CORRECTION FACTORS FOR DIFFERING AMBIENT AIR TEMPERATURES (C1)

Ambient Temperature (°F)	70	80	90	100	110	115	120
Correction Factor	1.10	1.07	1.05	1.00	0.94	0.85	0.65

### CAPACITY CORRECTION FACTORS FOR DIFFERING INLET AIR TEMPERATURES (C2)

Inlet Temperature (°F)	80	90	100	110	120	140
Correction Factor	1.50	1.21	1.00	0.82	0.72	0.61

### CAPACITY CORRECTION FACTORS FOR DIFFERING SYSTEM AIR PRESSURE (C3)

System Pressure (psig)	50	75	100	125	150	175	200	225	250
Correction Factor	0.85	0.95	1.00	1.07	1.13	1.18	1.20	1.22	1.24

### CAPACITY CORRECTION FACTORS FOR DIFFERING PRESSURE DEW POINT REQUIREMENTS (C4)

Dew Point (°F)	38	41	45	50
Correction Factor	1.00	1.12	1.17	1.22

#### NOTES:

- For other conditions, consult your local Sullair representative
- For optional voltage consult factory
- Performance ratings based on standard conditions of 100°F inlet air temperature, 100°F ambient temperature, 100 psig inlet pressure
- Max inlet temperature: 140°F
- Max ambient temperature: 120°F
- Max pressure: 232 psig

### TO SIZE THE DRYER CAPACITY FOR ACTUAL CONDITIONS

$$\text{Adjusted Capacity} = \text{scfm} \times C1 \times C2 \times C3 \times C4$$

To calculate the capacity of a given dryer based on non-standard operating conditions, multiply the standard capacity by the appropriate correction factor(s).

Dryer Model:	ATRS-1000
Standard Capacity:	1000 scfm
Actual Operating Conditions:	90°F ambient temperature (C1) = 1.05 100°F inlet temperature (C2) = 1.00 125 psig system pressure (C3) = 1.07 38°F required dew point (C4) = 1.00
Adjusted Capacity = 1000 scfm x 1.05 x 1.0 x 1.07 x 1.0 = 1123.5 scfm	

### TO SELECT THE DRYER MODEL FOR ACTUAL CONDITIONS

$$\text{Adjusted Capacity} = \text{scfm}/C1/C2/C3/C4$$

To choose a dryer based on a given flow at non-standard operating conditions, divide the given flow by the appropriate correction factor(s).

Given Flow:	1275 scfm
Actual Operating Conditions:	80°F ambient temperature (C1) = 1.07 90°F inlet temperature (C2) = 1.21 100 psig system pressure (C3) = 1.00 38°F required dew point (C4) = 1.00
Adjusted Capacity = 1275 scfm/1.07/1.21/1.0/1.0 = 984.8 scfm	
Select Dryer Model: ATRS-1000	