

GENERAL NOTES

- THE CONTRACTOR SHALL PROVIDE SEDIMENT CONTROL MEASURES TO PROTECT STOCKPILE AREAS AND STORAGE AREAS. ALL AREAS USED BY THE CONTRACTOR FOR STAGING OPERATIONS SHALL BE FULLY RESTORED BY THE CONTRACTOR UPON COMPLETION OF THE PROJECT. IF THE STAGING AREA IS PAVED, IT SHALL BE RESTORED TO ITS ORIGINAL CONDITION. IF THE STAGING AREA IS UNPAVED, IT SHALL BE RE-GRADED, TOPSOILED, SEEDED AND MULCHED TO THE SATISFACTION OF THE ENGINEER. ALL COSTS ASSOCIATED WITH RESTORATION OF THE STAGING AREA SHALL BE AT THE CONTRACTOR'S EXPENSE. IF THE ENGINEER DETERMINES THAT A SATISFACTORY STAND OF GRASS DOES NOT EXIST AT THE TIME OF FINAL INSPECTION, ALL COSTS ASSOCIATED WITH REESTABLISHING A SATISFACTORY STAND OF GRASS SHALL BE AT THE CONTRACTOR'S EXPENSE.
- EQUIPMENT AND/OR STOCKPILE MATERIAL SHALL NOT BE STORED IN THE DRIP LINE AREA OF ANY TREE.
- THE CONTRACTOR SHALL CONTACT KENT COUNTY DEPARTMENT OF PUBLIC WORKS AT 302-744-2430 AT LEAST 48 HOURS IN ADVANCE OF STARTING CONSTRUCTION.
- THE CONTRACTOR SHALL CONTACT MISS UTILITY OF DELAWARE AT 1-800-282-8555 FOR UTILITY LOCATIONS WITHIN AND SURROUNDING CONSTRUCTION AREAS NOT LESS THAN 3 DAYS BEFORE PERFORMING ANY EXCAVATION.
- THE CONTRACTOR SHALL ESTABLISH BENCHMARK ELEVATION DATUM IN ACCORDANCE WITH KENT COUNTY DEPARTMENT OF PUBLIC WORKS.
- THE CONTRACTOR SHALL PROVIDE TEMPORARY SEED AND MULCH FOR ALL AREAS WHERE SOIL IS EXPOSED AND SILT FENCE IS NOT SPECIFIED, BY THE CLOSE OF EACH BUSINESS DAY.
- THE CONTRACTOR SHALL MAINTAIN PUBLIC ROADS AND STREETS IN A BROOM SWEEP CONDITION AT ALL TIMES.
- PIPE JOINTS TO BE RESTRAINED ARE SHOWN ON THE DRAWINGS.
- THE CONTRACTOR SHALL USE ONLY NEW MATERIALS, PARTS, AND PRODUCTS. ALL MATERIALS SHALL BE STORED SO AS TO ASSURE THE PRESERVATION OF THEIR QUALITY AND FITNESS FOR THE INTENDED WORK.
- MAINTENANCE OF TRAFFIC - ALL WORK SHALL BE PERFORMED IN A MANNER THAT WILL ENSURE THE LEAST PRACTICABLE OBSTRUCTION TO TRAFFIC, CONSISTENT WITH SAFETY, AND SHALL COMPLY WITH THE DELDOT DEPARTMENT MANUAL ENTITLED "TRAFFIC CONTROLS FOR STREETS AND HIGHWAY CONSTRUCTION, MAINTENANCE, UTILITY AND EMERGENCY OPERATIONS", THE MOST CURRENT VERSION OF THIS MANUAL IN EFFECT AT THE TIME OF CONSTRUCTION SHALL BE USED. HEREINAFTER, THIS MANUAL SHALL BE REFERRED TO AS THE "TRAFFIC CONTROL MANUAL". THE CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN FOR APPROVAL BY THE ENGINEER BEFORE THE START OF THE PROJECT.
- ALL UTILITIES PLOTTED ON THE DRAWINGS ARE FROM THE BEST AVAILABLE INFORMATION. THE CONTRACTOR, PRIOR TO LAYING A RUN OF PIPE OR OTHER INVOLVED CONSTRUCTION, SHALL EXCAVATE WITHIN THE ALIGNMENT AT POINTS OF POSSIBLE CONFLICT TO DETERMINE IF A CONFLICT EXISTS. ANY CONFLICTS SHALL BE COORDINATED BY THE CONTRACTOR WITH THE ENGINEER AND THE UTILITY INVOLVED. THE ENGINEER SHALL DETERMINE THE SOLUTION. EXCAVATING, BACK FILLING AND RESTORATION OF THE TEST HOLES AS REQUIRED FOR UTILITY INVESTIGATIONS SHALL BE CONSIDERED INCIDENTAL TO THE INSTALLATION OF THE UTILITIES AS SHOWN ON THE PLANS.
- CONTRACTOR SHALL OBTAIN ALL THE NECESSARY PERMITS FOR THE EXECUTION OF THIS CONTRACT.
- ALL CONSTRUCTION SHALL BE PERFORMED TO THE SATISFACTION OF THE ENGINEER, KENT COUNTY DEPARTMENT OF PUBLIC WORKS (DPW), DELAWARE DEPARTMENT OF TRANSPORTATION (DEDOT) AND ALL RESPECTIVE UTILITY OWNER/S IN ACCORDANCE WITH ALL APPLICABLE CONTRACT DRAWINGS AND SPECIFICATIONS.
- THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LAWS, ORDINANCES, RULES, REGULATIONS AND ORDERS OF ANY PUBLIC BODY HAVING JURISDICTION. THE CONTRACTOR SHALL ERECT AND MAINTAIN, AS REQUIRED BY THE CONDITIONS AND PROGRESS OF THE WORK, ALL NECESSARY SAFEGUARDS FOR SAFETY AND PROTECTION.
- CONTRACTOR SHALL PROVIDE 5 FT HORIZONTAL AND 1 FT VERTICAL MINIMUM SEPARATION BETWEEN THE PROPOSED SANITARY SEWER AND/OR FORCE MAIN AND EXISTING AND PROPOSED UTILITIES AND STORM DRAIN (EXCEPT WATER MAINS). THE CONTRACTOR SHALL MAINTAIN A MINIMUM HORIZONTAL CLEARANCE OF 10 FT BETWEEN WATER MAINS AND SANITARY SEWERS (BOTH EXISTING AND PROPOSED MAINS). IN CASES WHERE THIS MINIMUM HORIZONTAL CLEARANCE IS NOT SHOWN OR FEASIBLE, THE CONTRACTOR MAY INSTALL THE PROPOSED SANITARY SEWER LESS THAN 10 FT FROM EXISTING WATER LINES, PROVIDED ALL EXISTING WATER MAINS REMAIN ON AN UNDISTURBED EARTH SHELF IN A SEPARATE TRENCH FROM THE PROPOSED SANITARY SEWER MAINS AND THERE IS AT LEAST 18 INCHES OF VERTICAL CLEARANCE WITH THE WATER MAIN HIGHER THAN THE SEWER. IF VERTICAL CLEARANCE BETWEEN PROPOSED SANITARY SEWER AND/OR FORCE MAIN AND EXISTING OR PROPOSED WATER MAIN IS LESS THAN 18 INCHES, THE CONTRACTOR SHALL INSTALL THE SANITARY SEWER AND/OR FORCE MAIN PER KENT COUNTY STD. DETAIL MISC-006. STONE ENCASEMENT PER MISC-006 SHALL EXTEND A MINIMUM OF 10 FT ON EACH SIDE OF THE WATER MAIN CROSSING OR 10 FT BEYOND THE LIMITS OF VERTICAL CLEARANCE IS NOT MAINTAINED. WATER MAIN PROTECTION SHALL BE AS REQUIRED BY THE PURVEYOR.
- THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ALL MATERIALS FOR APPROVAL TO THE OWNER PRIOR TO COMMENCEMENT OF CONSTRUCTION. ALL MATERIALS ORDERED AND INSTALLED PRIOR TO THE OWNER'S REVIEW AND ACCEPTANCE WILL BE AT THE CONTRACTOR'S RISK.
- THE CONTRACTOR SHALL OPEN ONLY THAT SECTION OF TRENCH OR ACCESS PITS WHICH CAN BE BACK FILLED AND STABILIZED AT THE END OF EACH WORKING DAY. STEEL PLATES SHALL BE USED ON ANY TRENCH OR ACCESS PITS WHICH MUST REMAIN OPEN OVERNIGHT. THIS REQUIREMENT DOES NOT APPLY TO AREAS COMPLETELY CLOSED AND SECURE FROM VEHICULAR OR PEDESTRIAN TRAFFIC.
- "MANHOLE" SHALL INCLUDE PRECAST STRUCTURE, BEDDING, CONNECTION TO EXISTING AND PROPOSED SANITARY PIPING, FRAME AND COVER AND RELATED APPURTENANCES. SEE MANHOLE DETAILS AND APPLICABLE SPECIFICATIONS.
- SANITARY SEWER FLEXIBLE COUPLINGS SHALL BE RESILIENT, CHEMICAL-RESISTANT, THERMOPLASTIC OR WRC APPROVED EPDM RUBBER COUPLING, TWO SERIES 316 STAINLESS STEEL CLAMPS AND STAINLESS STEEL SCREWS AND HOUSINGS.

PS-38 CATTAIL CREEK

SEWAGE PUMP STATION & FORCE MAIN

SEWAGE DISPOSAL DISTRICT NO. 1

KENT COUNTY, DELAWARE

CONSTRUCTION DRAWINGS



KENT COUNTY LEVY COURT

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ERIC L. BUCKSON
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JEFFREY W. HALL
DIANA T. GOLT, P.E., DIRECTOR OF PUBLIC WORKS
MICHAEL PETIT De MANGE AICP, COUNTY ADMINISTRATOR

GENERAL NOTES (CONTINUED)

35. STRUCTURES AND/OR THRUST BLOCKING HAVE BEEN DESIGNED BASED ON THE FOLLOWING.

- A MINIMUM 3,000 PSF PASSIVE SOIL BEARING CAPACITY.
- A MINIMUM 28 DAY CONCRETE COMPRESSIVE STRENGTH OF 3,500 PSI (EXCEPT FOR PRECAST CONCRETE).
- TEST PRESSURE (WORKING PLUS SURGE) IS 100 PSI.
- DEPTH FROM FINISHED GRADE TO TOP OF PIPE ASSUMED TO BE 3.0 FT. OR DEEPER.
- EXISTING SOIL CONDITIONS ARE NOT SOFT OR ORGANIC.

DIFFERING SITE CONDITIONS AND/OR DIFFERING MATERIAL PROPERTIES SHALL REQUIRE KENT COUNTY DPW APPROVAL OF SPECIAL DESIGN DETAILS PREPARED BY THE DESIGN ENGINEER PRIOR TO INITIATING OR RESUMING CONSTRUCTION ACTIVITIES.

THE CONTRACTOR SHALL ALLOW SUFFICIENT TIME FOLLOWING EXCAVATIONS FOR INSPECTION AND EVALUATION OF EXISTING SOIL SUBGRADE CONDITIONS BY THE CONSTRUCTION ENGINEER (AGENT FOR KENT COUNTY DPW). THE CONSTRUCTION ENGINEER SHALL INSPECT ALL STRUCTURE AND THRUST BLOCKING SUBGRADE AND PIPELINE SUBGRADE FOLLOWING EXCAVATION AND PRIOR TO CONSTRUCTION OF NEW WORK TO CONFIRM DESIGN CONDITIONS ARE MET AND SUBGRADE CONDITIONS ARE SUITABLE FOR CONSTRUCTION. IN THE EVENT THE SOIL BEARING CAPACITY IS LESS THAN THE MINIMUM DESIGN VALUE, THE CONSTRUCTION ENGINEER SHALL CAUSE AFFECTED CONSTRUCTION TO CEASE AND SHALL NOTIFY THE DESIGN ENGINEER FOR REDESIGN TO ACCOMMODATE THE REDUCED SOIL BEARING CAPACITY.

IN THE EVENT THE SUBGRADE CONDITION IS UNSTABLE, DUE TO UNSUITABLE MATERIALS AND/OR GROUNDWATER INFILTRATION/INTRUSION INTO THE SURROUNDING SOILS, AS DETERMINED BY THE CONSTRUCTION ENGINEER, THE CONTRACTOR SHALL, AS DIRECTED BY THE CONSTRUCTION ENGINEER, REMOVE THE UNSUITABLE MATERIAL AND FILL WITH SUITABLE APPROVED GRANULAR FILL MATERIAL.

36. PVC PRESSURE SEWER PIPE 12" & SMALLER NOMINAL PIPE SIZE DIAMETER SHALL CONFORM TO ASTM D2241, PVC 1120 (12454-B); SDR 21.

37. DUCTILE IRON PRESSURE SEWER FITTINGS 3 INCHES TO 24 INCHES NOMINAL PIPE SIZE DIAMETER SHALL CONFORM TO ANWWA C153; DOUBLE CEMENT MORTAR LINED PER ANWWA C104 WITH AN INTERIOR SEAL COAT OF PROTECTO 401; OUTSIDE SURFACE BITUMINOUS COATED PER ANWWA C151; AND POLYETHYLENE ENCASED PER ANWWA C105.

38. RUBBER GASKET JOINTS, LUBRICANTS, GLANDS, BOLTS AND NUTS FOR DUCTILE IRON PRESSURE PIPE AND FITTINGS SHALL CONFORM TO ANWWA C111 WITH MECHANICAL JOINTS FOR BURIED FITTINGS AND MECHANICAL OR PUSH-ON JOINTS FOR BURIED PIPING.

39. ALL PRESSURE SEWER PIPE JOINTS AND FITTING JOINTS SHALL BE PUSH-ON UNLESS NOTED OTHERWISE.

40. PRESSURE SEWER PIPE AND FITTINGS LOCATED INSIDE STRUCTURES SHALL BE FLANGED (SPECIAL THICKNESS CLASS 53) CONFORMING TO ANWWA C115; AND DOUBLE CEMENT MORTAR LINED PER ANWWA C104 WITH AN INTERIOR SEAL COAT OF PROTECTO 401.

41. BENCHMARKS AND DATUM INFORMATION:

- VERTICAL DATUM: NAVD 88 & HORIZONTAL DATUM: NAD 83/86
EXISTING BENCHMARKS:
1. TR-2689: NORTH 375546.98, EAST 639796.66 ELEVATION 17.48 REBAR & CAP
2. TR-2679: NORTH 376146.51, EAST 639128.12 ELEVATION 24.15 REBAR & CAP

42. CONSTRUCTION OF THIS PROJECT SHALL BE PERFORMED IN ACCORDANCE WITH THESE CONTRACT DOCUMENTS, AND THE LATEST EDITION OF THE KENT COUNTY DEPARTMENT OF PUBLIC WORKS STANDARD DETAILS FOR CONSTRUCTION, OF SANITARY SEWER COLLECTION SYSTEMS.

APPROVED BY: _____ DATE: _____

FILE No.: _____ SET No.: _____

EX. UNDERGROUND UTILITIES COORDINATION NOTES:

- THE LOCATION OF UNDERGROUND UTILITIES AS INDICATED ON PLANS HAS BEEN OBTAINED FROM EXISTING RECORDS. NEITHER THE OWNER OR THE ARCHITECT/ENGINEER ASSUMES ANY RESPONSIBILITY IN RESPECT TO ACCURACY, COMPLETENESS, OR SUFFICIENCY OF THE INFORMATION SHOWN. THERE IS NO GUARANTEE, EITHER EXPRESSED OR IMPLIED, THAT THE LOCATIONS, SIZE, AND TYPE OF MATERIALS OF EXISTING UNDERGROUND UTILITIES INDICATED ARE REPRESENTATIVE OF THOSE TO BE ENCOUNTERED DURING CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE ACTUAL LOCATION OF ALL SUCH UTILITIES, INCLUDING SERVICE CONNECTIONS TO UNDERGROUND UTILITIES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE OWNER OF HIS OPERATIONAL PLANS. IN THE EVENT OF AN UNEXPECTED UTILITY INTERFERENCE DURING CONSTRUCTION, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER. ANY SUCH MAINS AND/OR SERVICES DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED IMMEDIATELY AT HIS EXPENSE.
- PRIOR TO PERFORMING ANY EXCAVATION GREATER THAN 6 INCHES, THE CONTRACTOR SHALL COORDINATE WITH KENT COUNTY DEPARTMENT OF PUBLIC WORKS AND ALL PRIVATE UTILITY COMPANIES TO DETERMINE THE LOCATION OF UNDERGROUND UTILITY LINES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH ALL ORGANIZATIONS THAT CONTROL EXISTING UNDERGROUND UTILITIES IN THE CONSTRUCTION AREA OR WOULD BE AFFECTED BY CONSTRUCTION WORK AROUND THE EXISTING UTILITIES.
- THE CONTRACTOR SHALL NOT START EXCAVATION UNTIL ALL UTILITY LINE LOCATIONS HAVE BEEN STAKED OR OTHERWISE CLEARLY MARKED AND DOCUMENTATION FURNISHED TO THE OWNER. ALL MARKINGS SHALL BE CONSIDERED APPROXIMATE, AND UTILITIES OTHER THAN THOSE SHOWN SHALL BE CONSIDERED TO EXIST.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DEFINITE LOCATION OF EACH UTILITY WITHIN THE WORK AREA. CARE SHOULD BE EXERCISED DURING EXCAVATION WORK TO AVOID DAMAGING OR DISRUPTING UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING (AT CONTRACTOR'S EXPENSE) DAMAGE TO ANY UTILITY CAUSED BY THE CONTRACTOR'S WORK.
- WHERE EXISTING UNDERGROUND UTILITIES OR OTHER CONSTRUCTION ARE EXPECTED TO BE IN PROXIMITY TO PROPOSED CONSTRUCTION, OR WHEN APPROACHING EXISTING UTILITIES OR STRUCTURES FOR CONNECTIONS, THE CONTRACTOR SHALL DIG TEST PITS TO DETERMINE THE EXACT LOCATION AND INVERTS OF THE EXISTING UTILITY TO ALLOW FOR POSSIBLE CHANGES TO THE PROPOSED UTILITY IN LINE AND/OR GRADE. THE CONTRACTOR SHALL ALSO DIG TEST PITS IN THE LOCATION OF THE PROPOSED CONNECTIONS TO EXISTING UTILITIES AND SHALL MAKE ALL MEASUREMENTS NECESSARY TO ENSURE PROPER CONNECTION. ANY NECESSARY CHANGES IN LINE OR GRADE OF WORK CAUSED BY FAILURE TO TAKE SUCH PRECAUTIONS SHALL BE AT THE EXPENSE OF THE CONTRACTOR.
- WHEN IT IS NECESSARY TO EXCAVATE NEAR OR INTERFERE WITH ANY SEWER LINE, WATER SERVICES, DRAIN PIPE, CATCH BASIN, CULVERT, OR OTHER STRUCTURES, THE CONTRACTOR SHALL MAINTAIN THE SAME IN WORKING ORDER AND SHALL REPAIR AND MAKE GOOD ANY DAMAGE DONE DURING THE PROGRESS OF THE WORK.
- WHERE EXISTING UTILITIES CROSS THE TRENCH EXCAVATION, THEY SHALL BE ADEQUATELY SUPPORTED AND PROTECTED FROM DAMAGE DUE TO CONSTRUCTION. ALL METHODS FOR SUPPORTING AND MAINTAINING THESE UTILITIES SHALL BE SUBJECT TO REVIEW BY OWNER. CARE SHALL BE TAKEN TO ENSURE THAT THE EXISTING UTILITY GRADES AND ALIGNMENT ARE MAINTAINED AND THE PIPE JOINTS ARE NOT DISTURBED. BACKFILL SHALL BE CAREFULLY PLACED AND TAMPED TO PREVENT SLOPE OR FUTURE SETTLEMENT. ANY DAMAGE OR IMPAIRMENT OF THE UTILITIES DUE TO CONSTRUCTION OR SETTLEMENT SHALL BE REPAIRED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.
- ANY UNPROTECTED CABLE (DIRECT BURIED) ENCOUNTERED THAT IS VERIFIED AS NOT ABANDONED IN PLACE SHALL BE PROTECTED. THE UTILITY OWNER MAY DIRECT THE CABLE BE PLACED IN SPLIT DUCT OF APPROPRIATE SIZE AND CONCRETE ENCASED DURING THE AREA OF CONSTRUCTION. CONTRACTOR SHALL TAKE ALL REASONABLE MEASURES TO AVOID HAVING TO CUT AND SPLICE DIRECT BURIED CABLE. THE CONTRACTOR SHALL NOTE SPLIT DUCT PORTIONS ON AS-BUILTS.
- ALL EXCESS EXCAVATED MATERIALS SHALL BE DISPOSED OF OFF COUNTY/STATE PROPERTY, EXCEPT FOR CONTAMINATED SOILS OR LIQUIDS. ALL CONTAMINATED SOILS AND LIQUIDS SHALL BE TRANSPORTED TO AN APPROVED RECEIVING SITE AS DIRECTED BY THE ENGINEER, FOR FINAL DISPOSITION.
- INTERRUPTION OF EXISTING UTILITIES SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS AND/OR AT THE DIRECTION OF THE UTILITY OWNER/S.

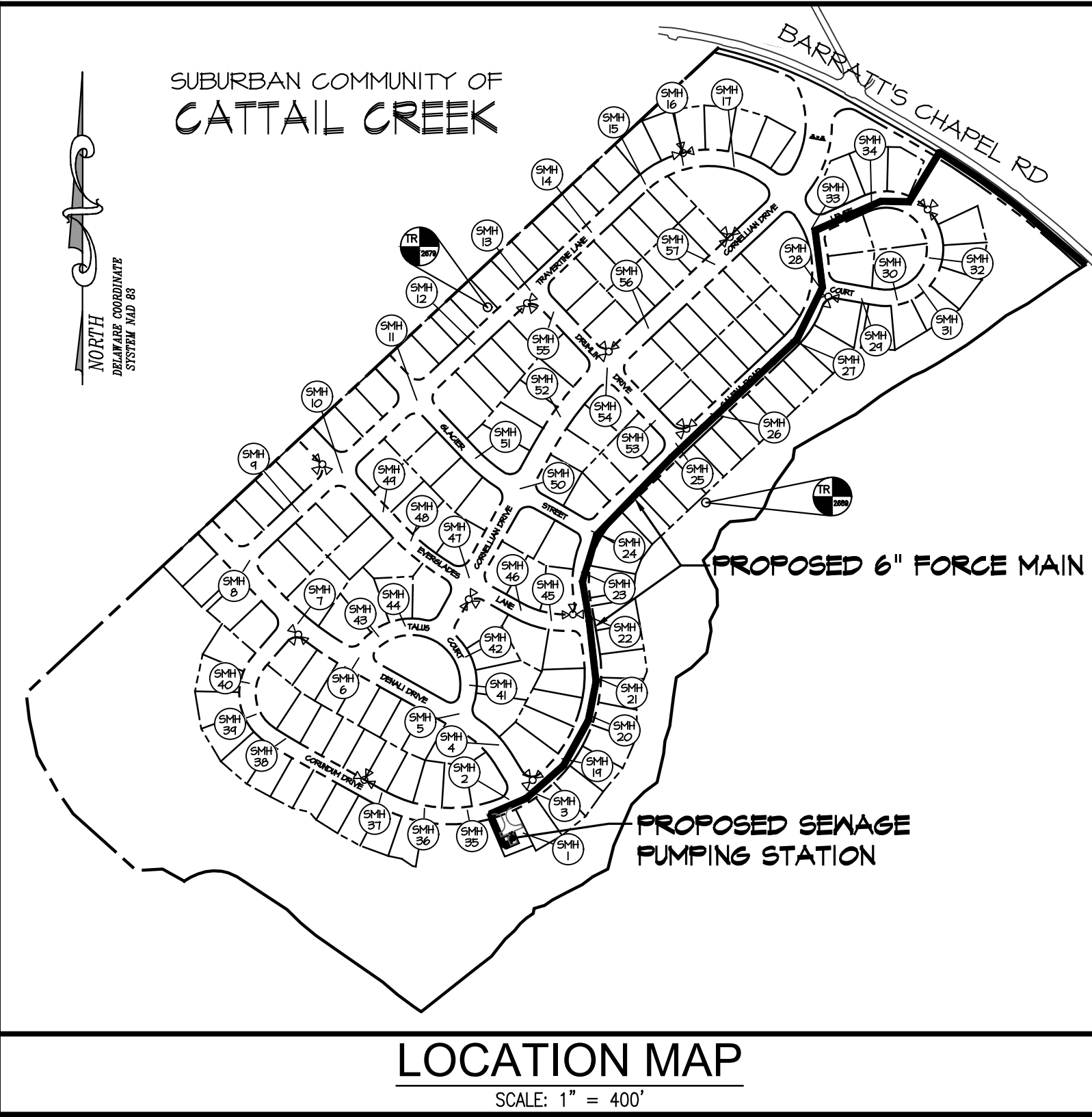
DRAWING INDEX

- COVER SHEET
- FM PLAN & PROFILE
- FM PLAN & PROFILE
- FM PLAN & PROFILE
- FM PLAN & PROFILE
- FM PLAN & PROFILE
- PUMP STATION SITE PLAN
- SPS MECHANICAL DETAIL
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- STRUCTURAL DETAIL & NOTES
- ELECTRICAL DETAILS
- VFD & SINGLE LINE ENCLOSURE
- RTU & PC ENCLOSURE
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- PUMP CONTROL SCHEMATIC
- PUMP CONTROL SCHEMATIC
- PUMP CONTROL SCHEMATIC



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PROTECT YOURSELF. GIVE THREE WORKING DAYS NOTICE.
THIS DRAWING DOES NOT INCLUDE NECESSARY COMPONENTS FOR THE PROPOSED CONSTRUCTION. CONSTRUCTION MUST BE DONE IN COMPLIANCE WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 AND ALL RULES AND REGULATIONS THERE TO APPURTENANT.



LEGEND

- EXISTING PROPERTY BOUNDARY LINE
- EXISTING STREAM
- EXISTING PAVING
- EXISTING 1' CONTOUR
- EXISTING 5' CONTOUR
- EXISTING WATER
- EXISTING SANITARY SEWER
- EXISTING FORCE MAIN
- PROPOSED WALK
- PROPOSED PROPERTY LOT LINES
- PROPOSED RIGHT-OF-WAY LINE
- PROPOSED LOT NUMBER
- PROPOSED EASEMENT LINE
- PROPOSED WATER MAIN (SEPARATE CONTRACT)
- PROPOSED STORM DRAIN (SEPARATE CONTRACT)
- PROPOSED CURB AND GUTTER
- PROPOSED FORCE MAIN/STATION
- PROPOSED SANITARY SEWER LINE
- PROPOSED 1' CONTOUR
- PROPOSED 5' CONTOUR
- PROPOSED FENCE
- FIRE HYDRANT
- MINIMUM BUILDING SETBACK LINE
- REINFORCED CONCRETE CIRCULAR PIPE
- HDP.E. HIGH DENSITY POLYETHYLENE

PS & FM



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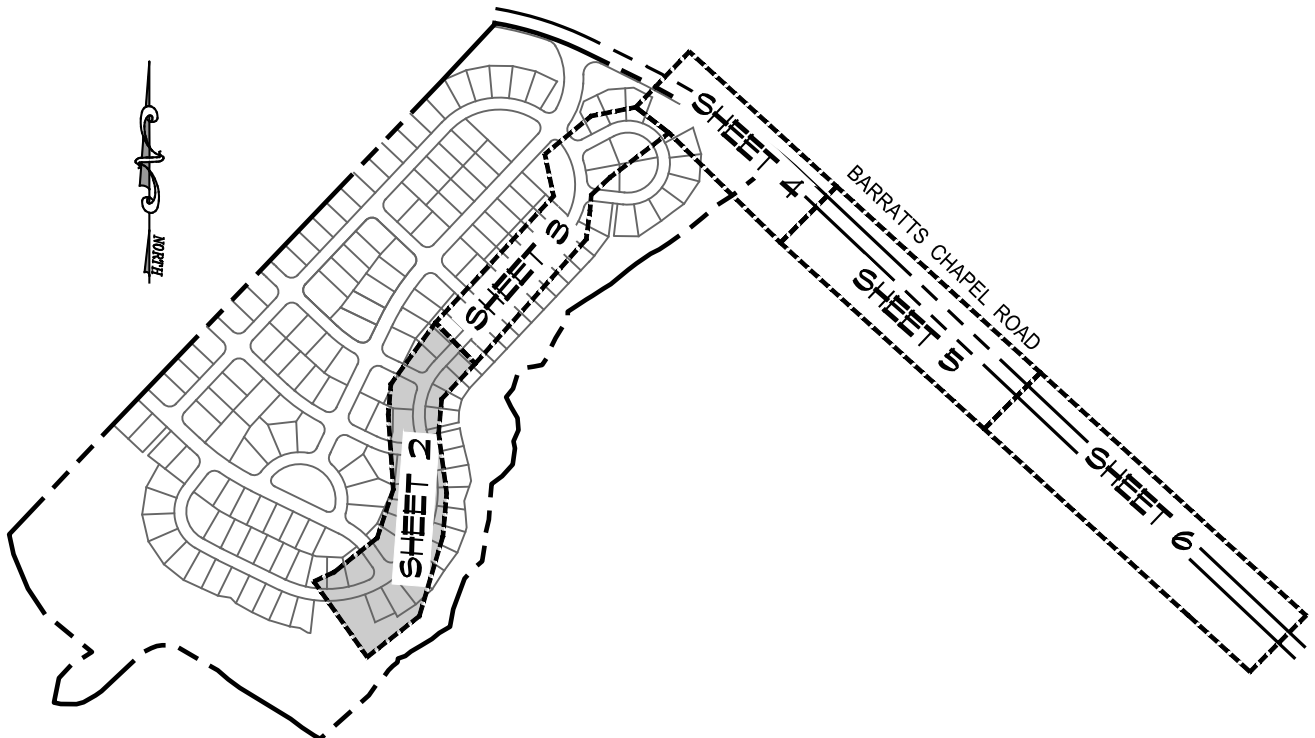
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SEWAGE PUMP STATION
PS-38
TITLE SHEET

FOR

CATTAIL CREEK

ENGINEER'S SEAL		SOUTH MURDERKILL HUNDRED		KENT COUNTY, DE	
DATE	REVISIONS	JOB NO.: 13870			
10/21/2020	QA/QC REVISIONS	DATE: 6/28/2019			
		DRAWN BY: KH			
		DESIGN BY: SS			
		REVIEW BY: PD			
		SHEET: 1 OF 17			

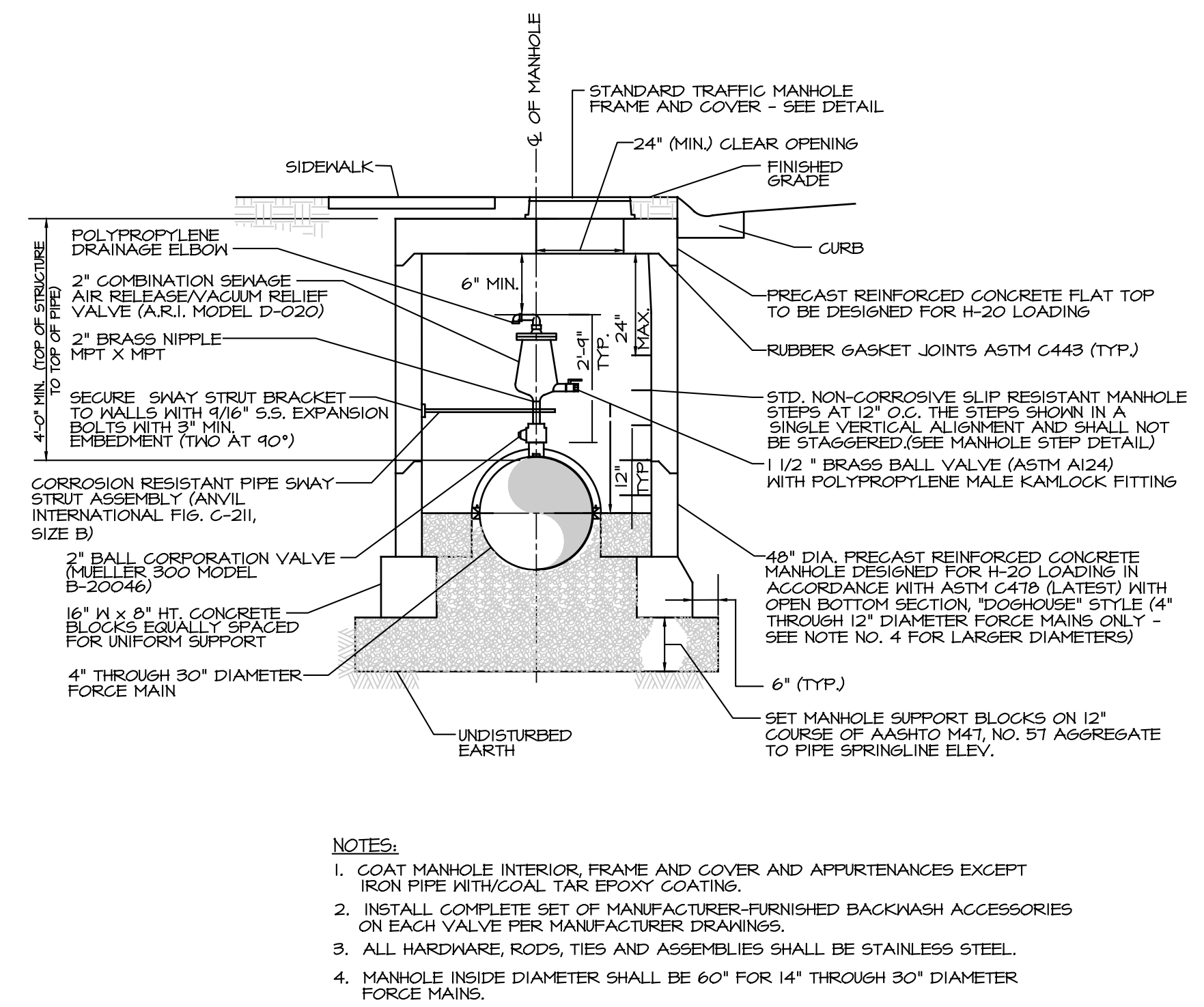
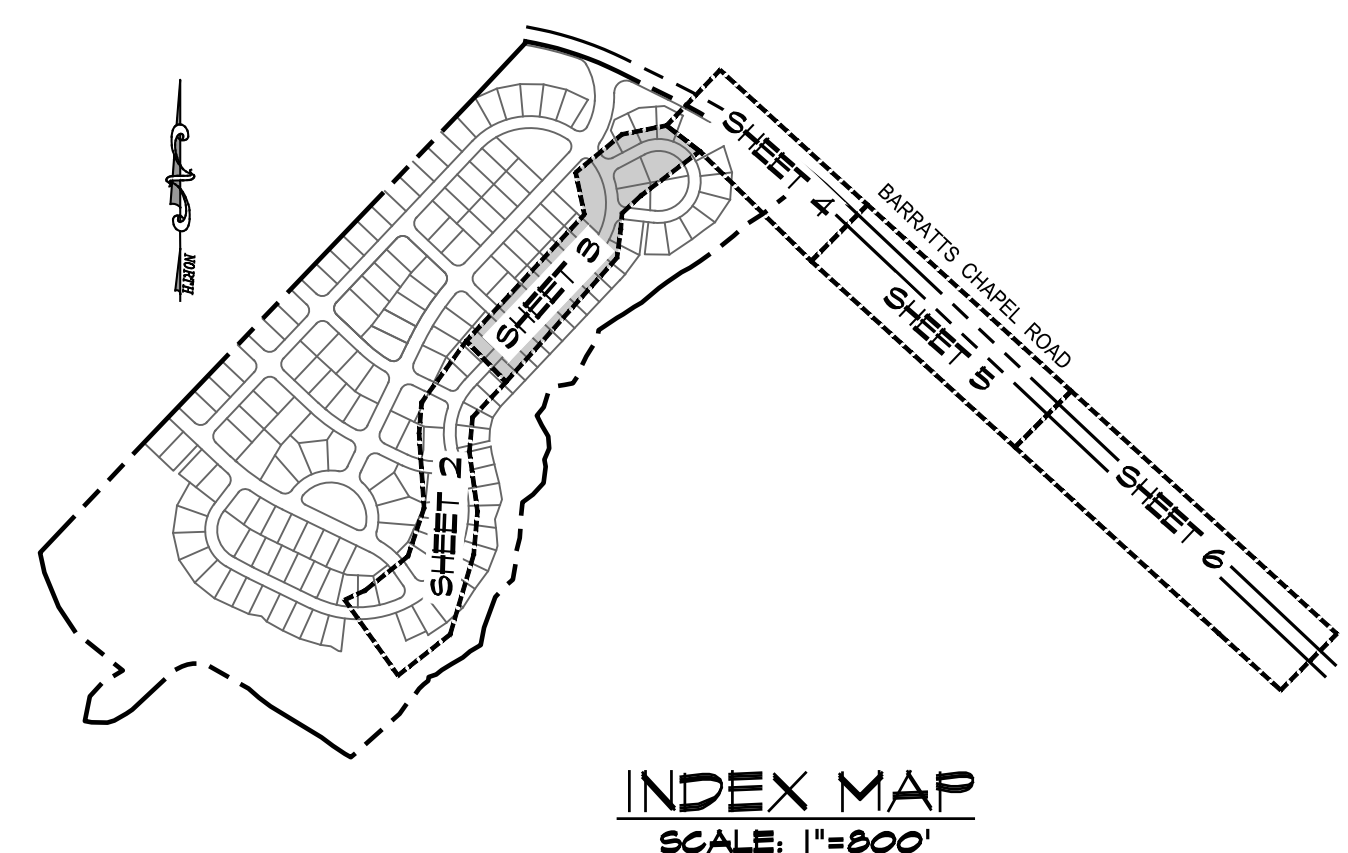


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SOUTH MURDERKILL HUNDRED

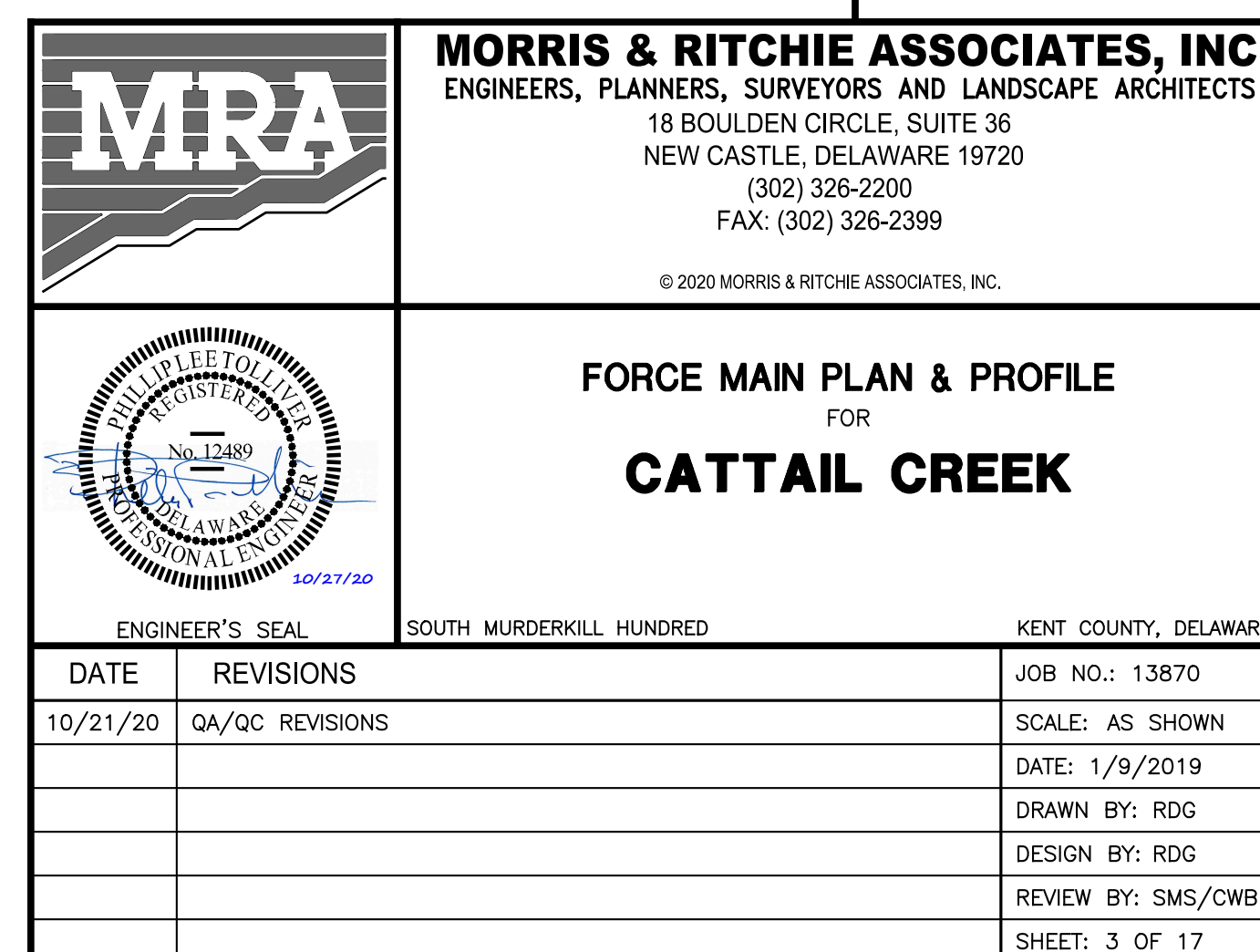
KENT COUNTY, DELAWARE

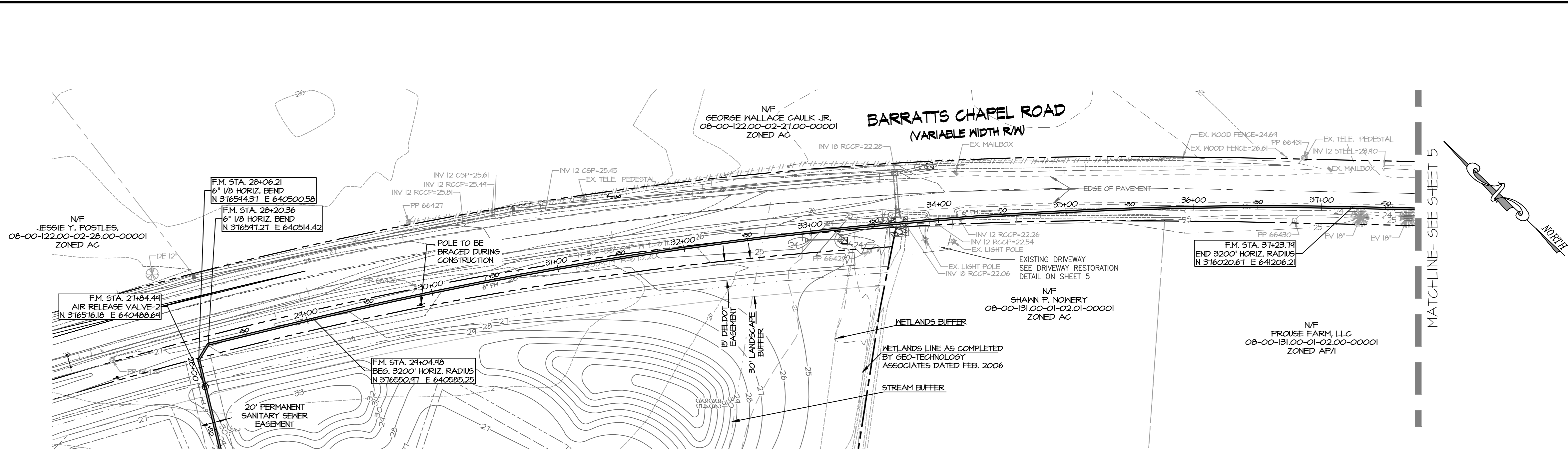
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10/21/20	QA/QC REVISIONS	SCALE: AS SHOWN
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		DESIGN BY: RDG
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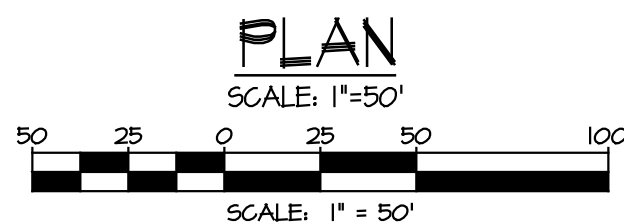
**MODIFIED PLATE PS-07 COMBINATION SEWAGE AIR RELEASE/VACUUM
RELIEF VALVE AND MANHOLE DETAIL - SIDEWALK AREAS**
NOT TO SCALE

PS & FM

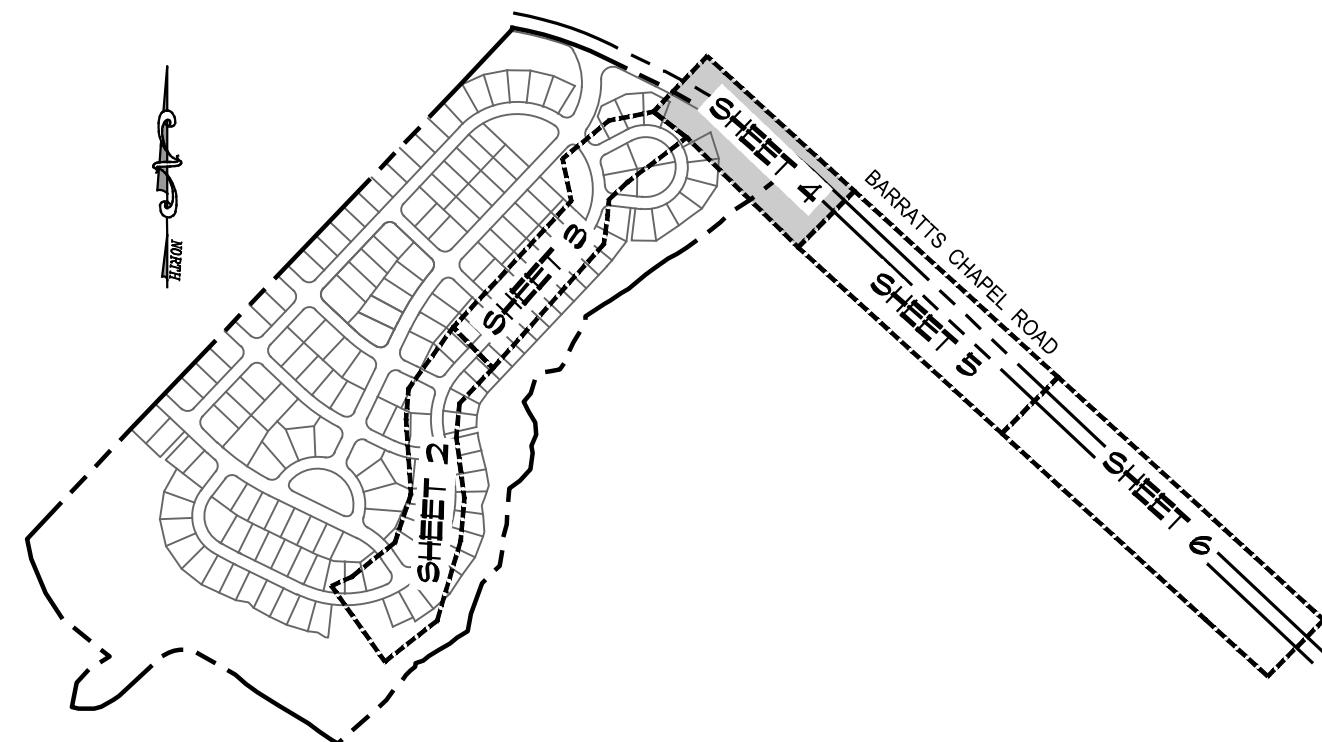




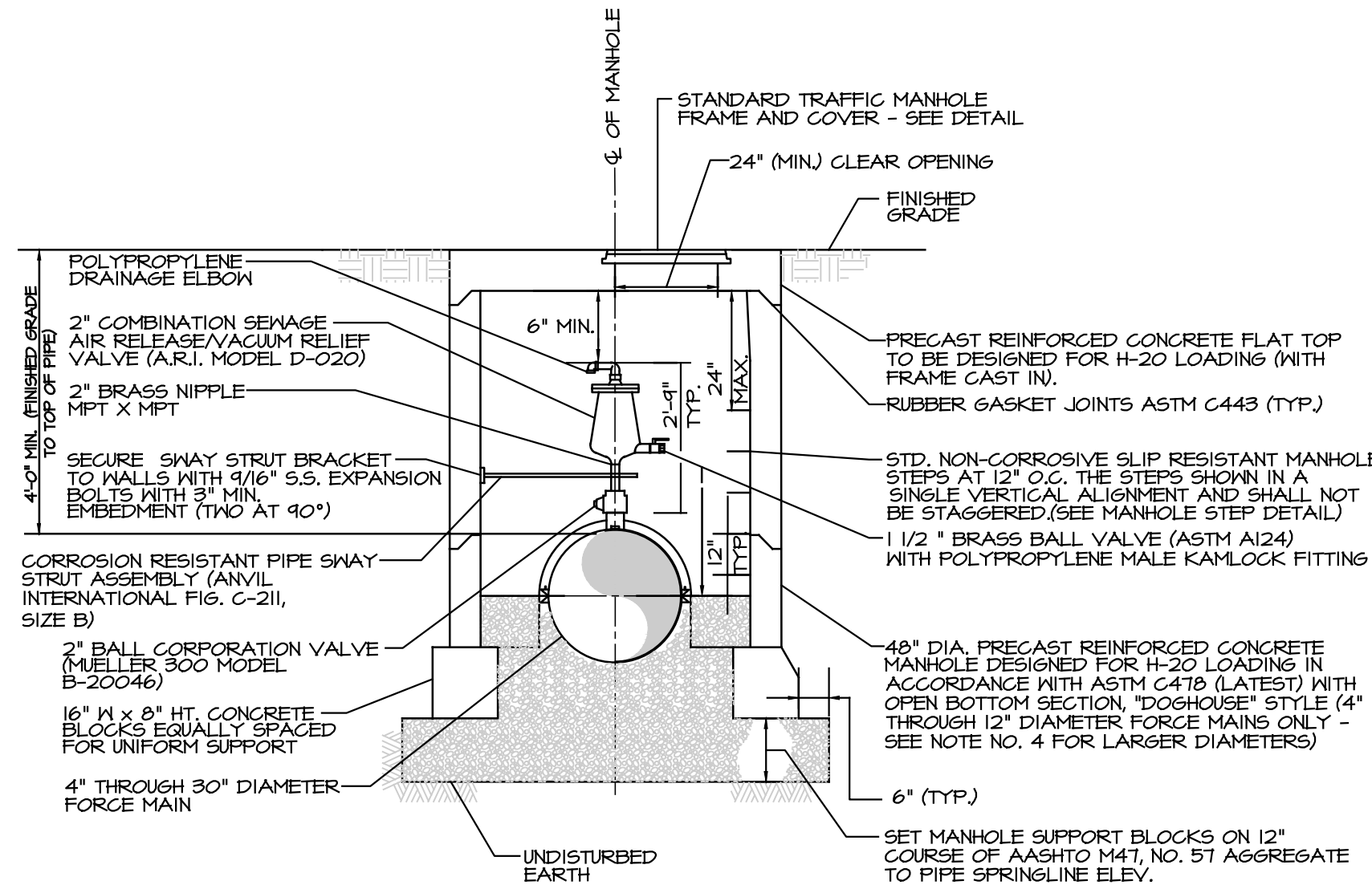
MATCHLINE- SEE SHEET 3



NOTE:
EXISTING UTILITY POLES ALONG THE FORCE MAIN ALIGNMENT MAY REQUIRE BRACING DURING CONSTRUCTION. CONTRACTOR SHALL NOTIFY THE UTILITY OWNER PRIOR TO ANY WORK SO THAT THE NECESSARY BRACING/ACTION MAY BE TAKEN. ANY DAMAGE TO EX. UTILITIES INCURRED DUE TO CONSTRUCTION SHALL BE REPAIRED IMMEDIATELY AND THE COST BORNE BY THE CONTRACTOR.



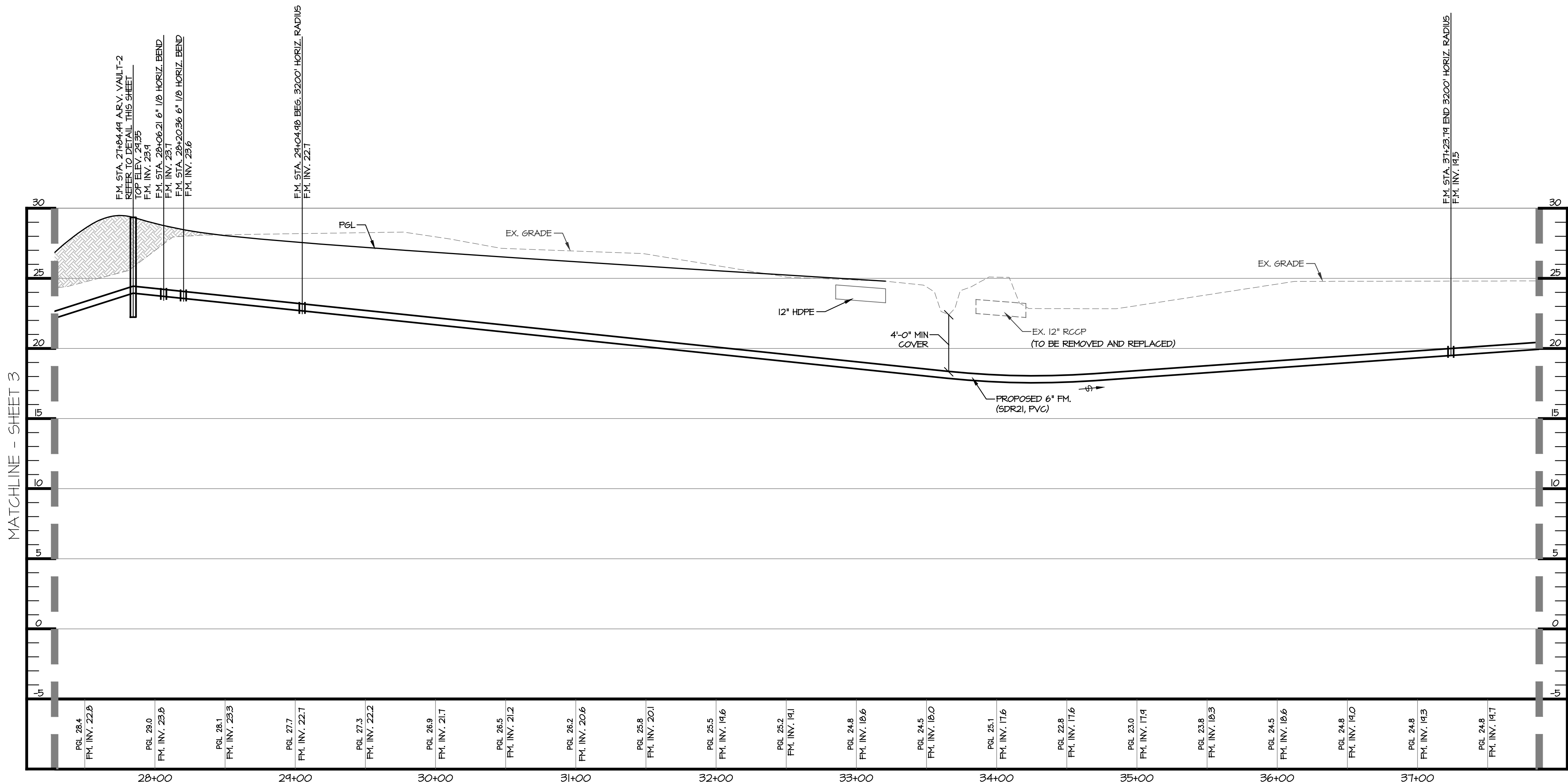
INDEX MAP
SCALE: 1"=800'



- NOTES:
1. COAT MANHOLE INTERIOR, FRAME AND COVER AND APPURTENANCES EXCEPT IRON PIPE WITH COAL TAR EPOXY COATING.
 2. INSTALL COMPLETE SET OF MANUFACTURER-FURNISHED BACKWASH ACCESSORIES ON EACH VALVE PER MANUFACTURER DRAWINGS.
 3. ALL HARDWARE, RODS, TIES AND ASSEMBLIES SHALL BE STAINLESS STEEL.
 4. MANHOLE INSIDE DIAMETER SHALL BE 60" FOR 14" THROUGH 30" DIAMETER FORCE MAINS.

MODIFIED PLATE PS-07 COMBINATION SEWAGE AIR RELEASE/VACCUM RELIEF VALVE
AND MANHOLE DETAIL - GRASS/NON-TRAFFIC AREAS


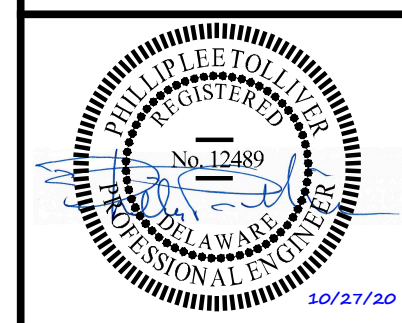
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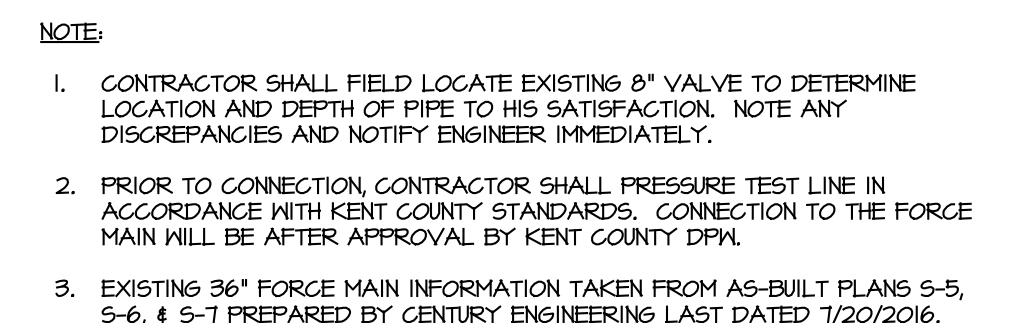
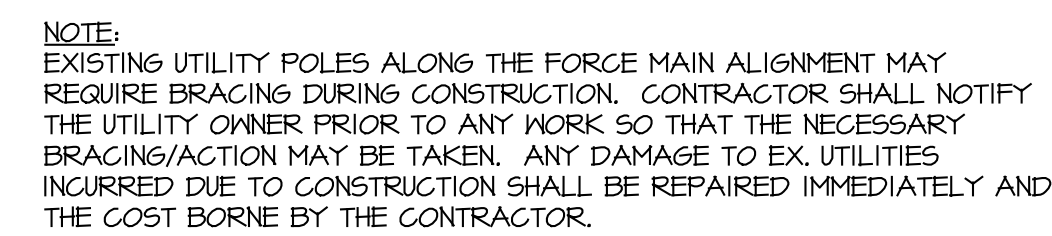
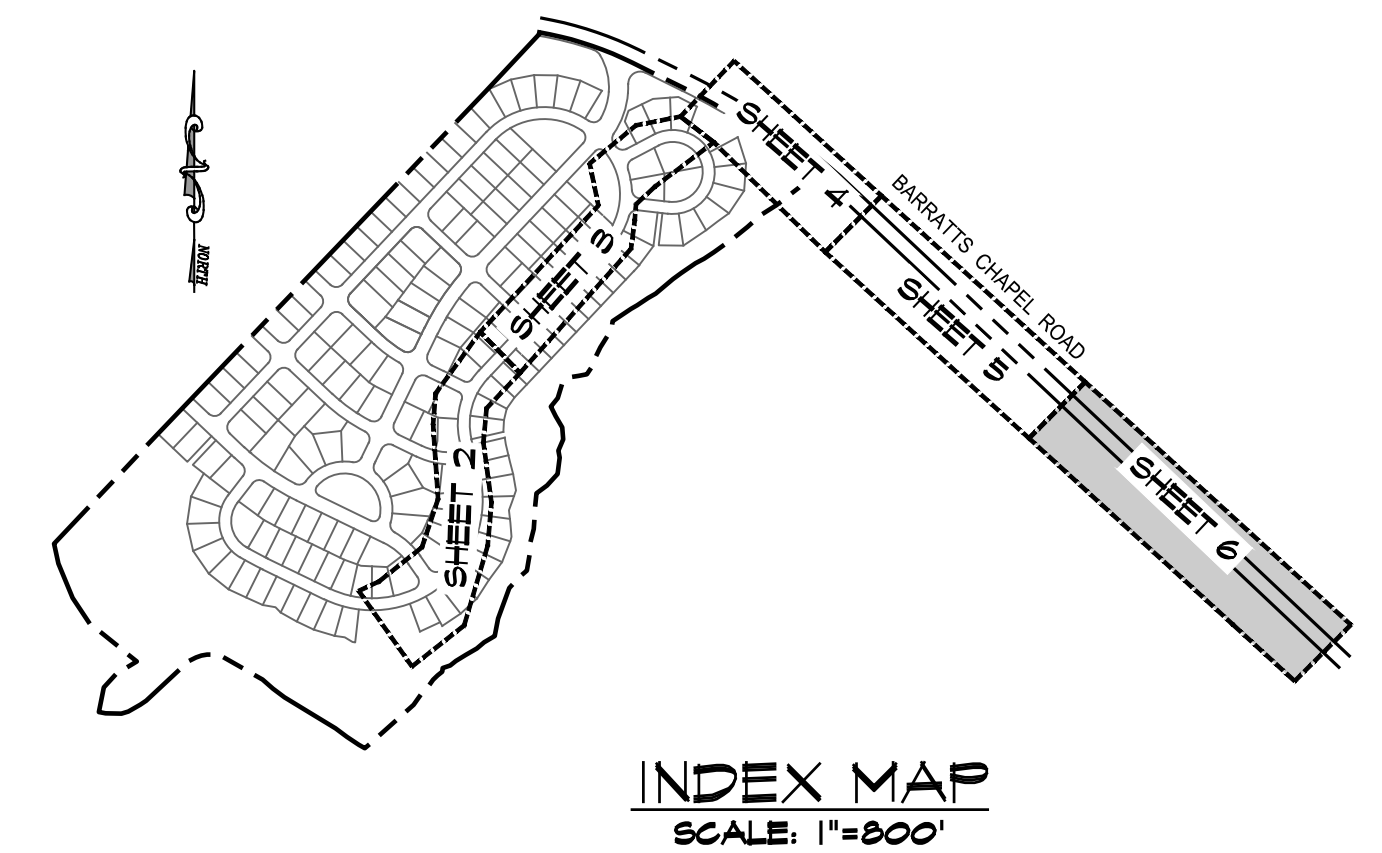


PROFILE

SCALE: 1"=50' (HORIZ) 1"=5' (VERT.)

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 FORCE MAIN PLAN & PROFILE FOR CATTAIL CREEK		
ENGINEER'S SEAL	SOUTH MURDERKILL HUNDRED	KENT COUNTY, DELAWARE
DATE	REVISIONS	JOB NO.: 13870
10/21/20	QA/QC REVISIONS	SCALE: AS SHOWN
		DATE: 1/9/2019
		DRAWN BY: RDG
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PROP. 6" F.M. →

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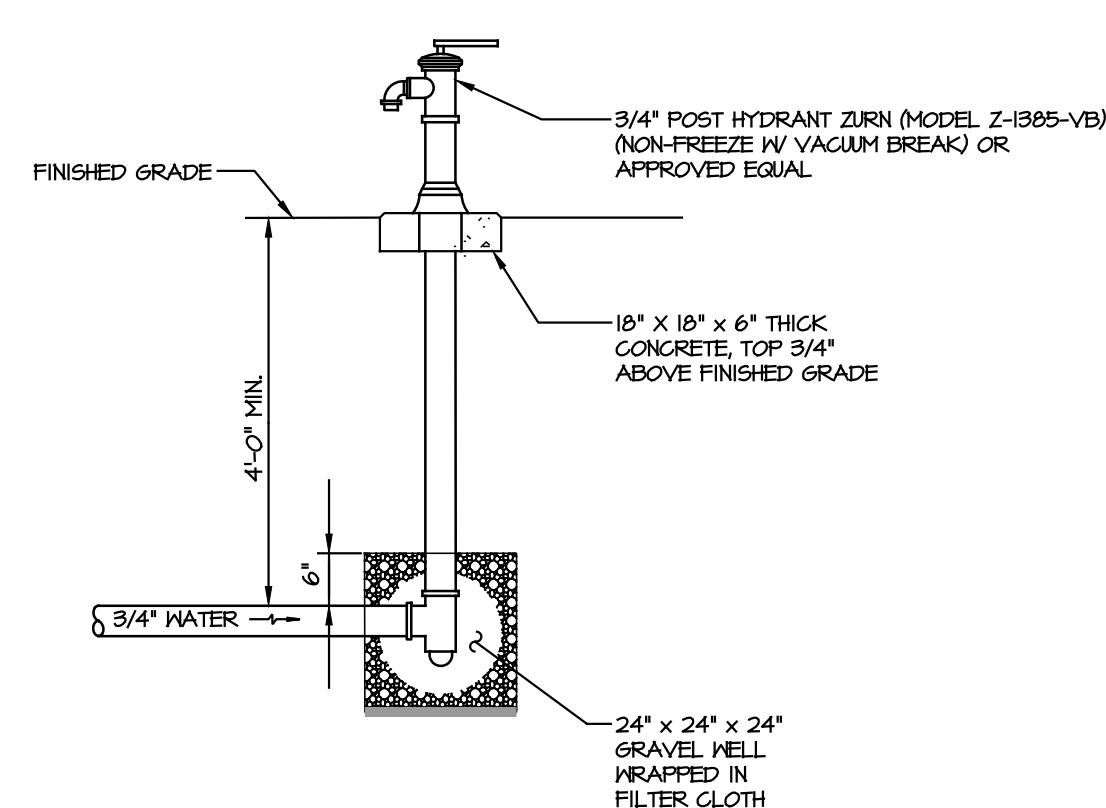
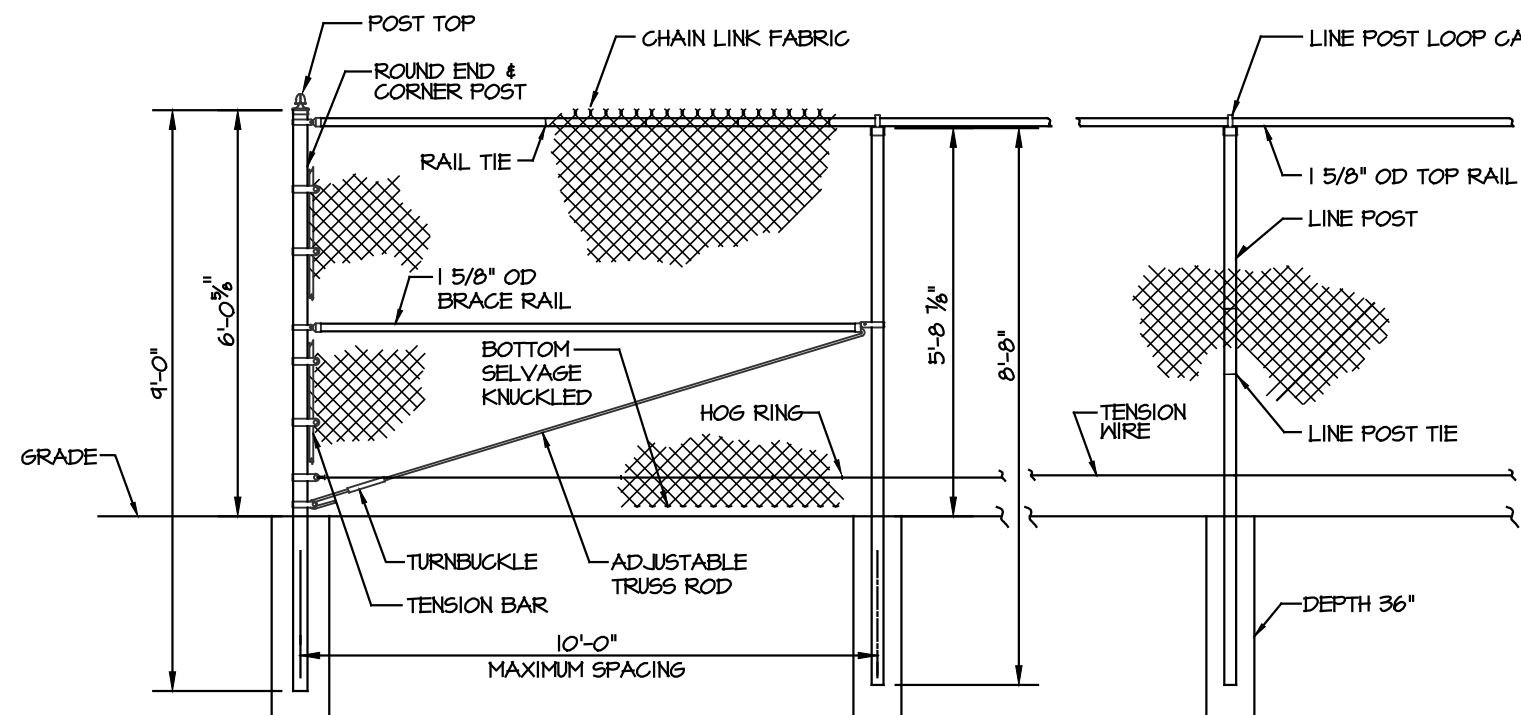
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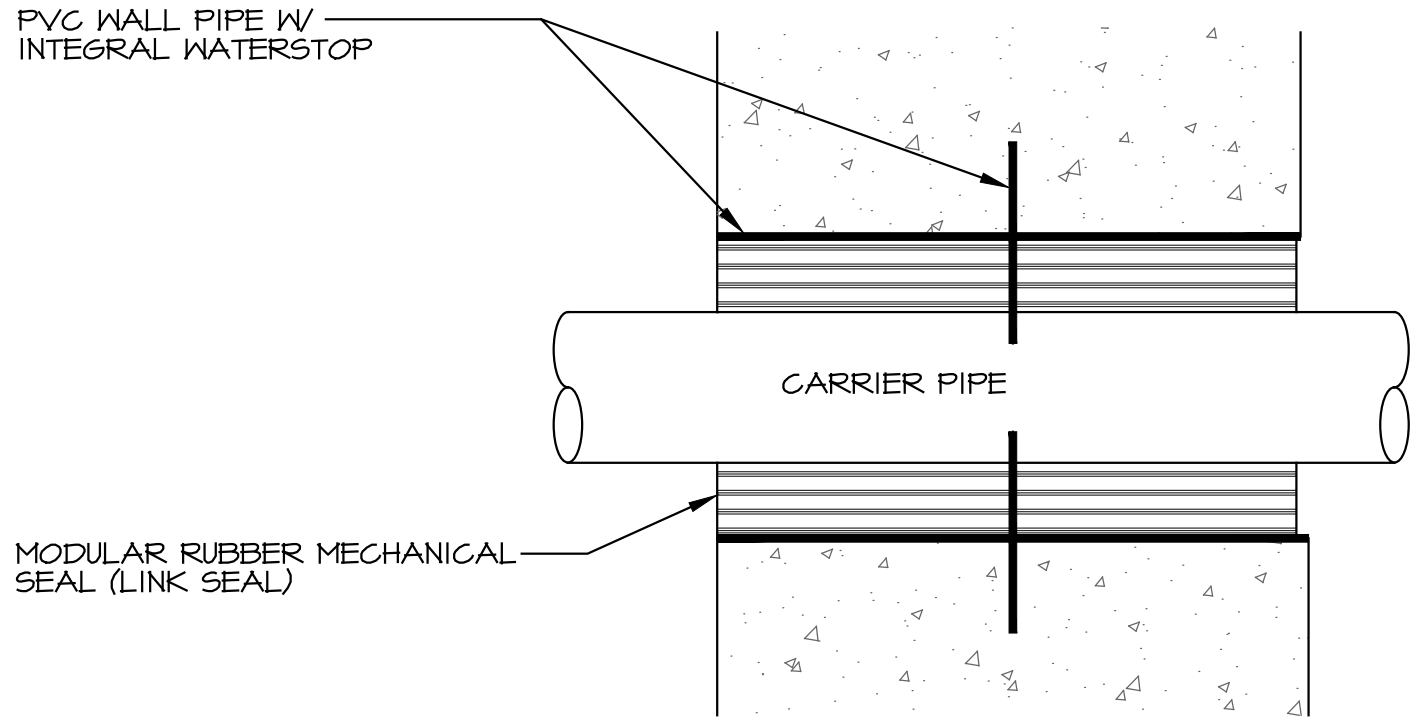


<u>PROJECTED WASTEWATER FLOW</u>		<u>NET WELL - 8 FT. I.D.</u>
SERVICE AREA		MINIMUM PUMP CYCLE BASED ON 10 MINUTES (10x270/4=675 GAL.)
ONSITE - CATTAIL CREEK	175 EDU	MINIMUM VOLUME REQUIRED: 675 GAL.
CHAPEL FARM	554 EDU	VOLUME PROVIDED: 752 GAL. (2.0 VF)
PROUSE PROPERTY (ASSUMED 2.3 EDU/AC)	207 EDU	<u>NET WELL VENTILATION FAN:</u>
EX. STRIP LOTS	3 EDU	MINIMUM 30 AIR CHANGES PER HOUR FOR INTERMITTENT OPERATION
TOTAL	944 EDU	8 FT I.D. = 50.27 CF/VERT FT.
AVERAGE DAILY FLOW:		50.27 CF x 26.50 FT. DP. = 1,332.15 CF x 30 AIR CHANGES/HOUR = 39,965 CFH
Qa= 250GPD/EDU Qa= 250 GPD x 944 EDU =	Qa = 236,000 GPD	39,965 CFH/60 MINUTES = 666.1 CFM
PEAK DESIGN FLOW:		REQUIRED = 667 CFM
Qp=Qa x PF = 236,000 GPD x 1.6=	Qp = 377,600 GPD	PROVIDED = 685 CFM @ 1" S.P.
(PF = PER KENT COUNTY STANDARDS)	(262 GPM)	
DESIGN PUMP RATE=	USE 270 GPM	
<u>PUMPING UNITS</u>		
REQUIRED: 2 @ 270 GPM @ 124 FEET EACH		
PROVIDED: 2 @ 270 GPM @ 124 FEET EACH		
MOTOR: 25 HP, 1740 RPM		
REFER TO PUMP & SYSTEM CURVE FOR PUMP SELECTION		

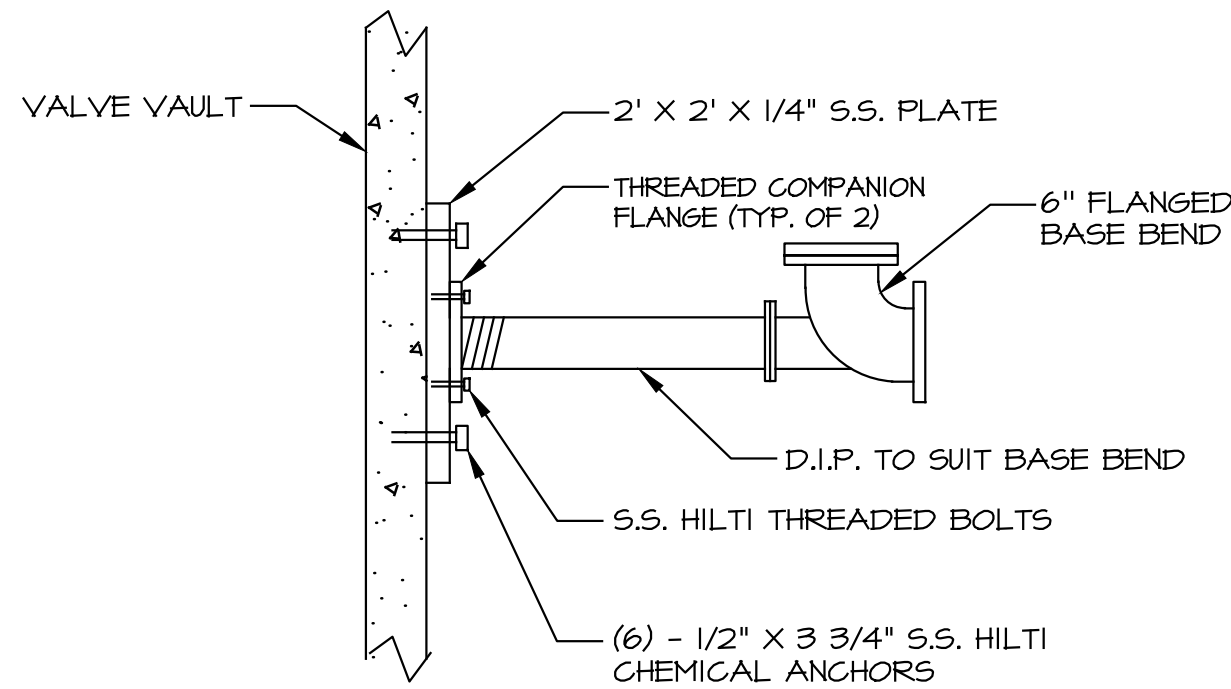
Scale 1" = 10'



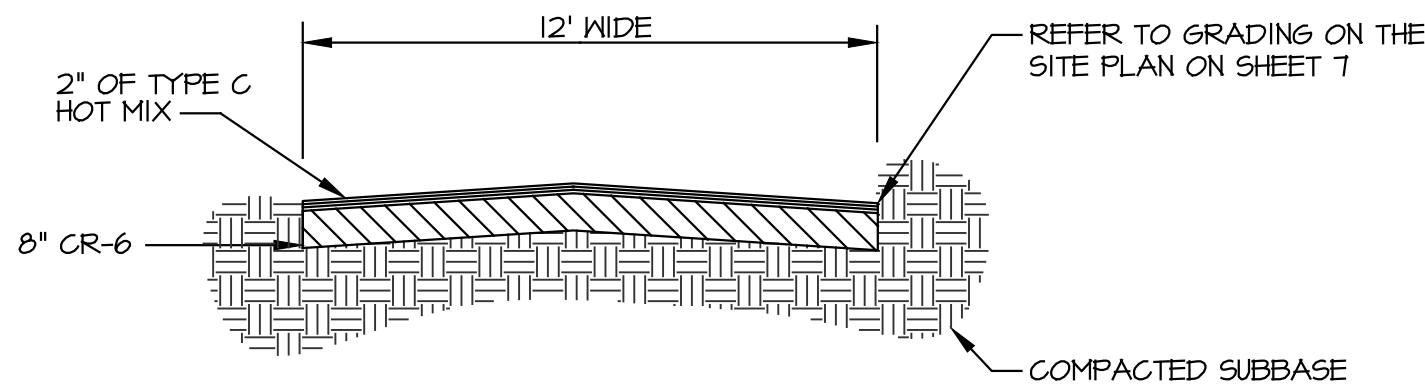
		MORRIS & RITCHIE ASSOCIATES, INC. ENGINEERS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS 3445-A BOX HILL CORPORATE CENTER DRIVE ABINGDON, MD 21009 (410) 515-9000 FAX: (410) 515-9002 MRAGTA.COM <small>© 2020 MORRIS & RITCHIE ASSOCIATES, INC.</small>	
 <small>10/27/20</small>		SEWAGE PUMP STATION PS-38 SITE PLAN FOR CATTAIL CREEK ENGINEER'S SEAL SOUTH MURDERKILL HUNDRED KENT COUNTY, DE	
DATE	REVISIONS		JOB NO.: 13870
10/21/2020	QA/QC REVISIONS		SCALE: AS SHOWN
			DATE: 12/23/2019
			DRAWN BY: KH
			DESIGN BY: SS
			REVIEW BY: PD
			SHEET: 7 OF 17



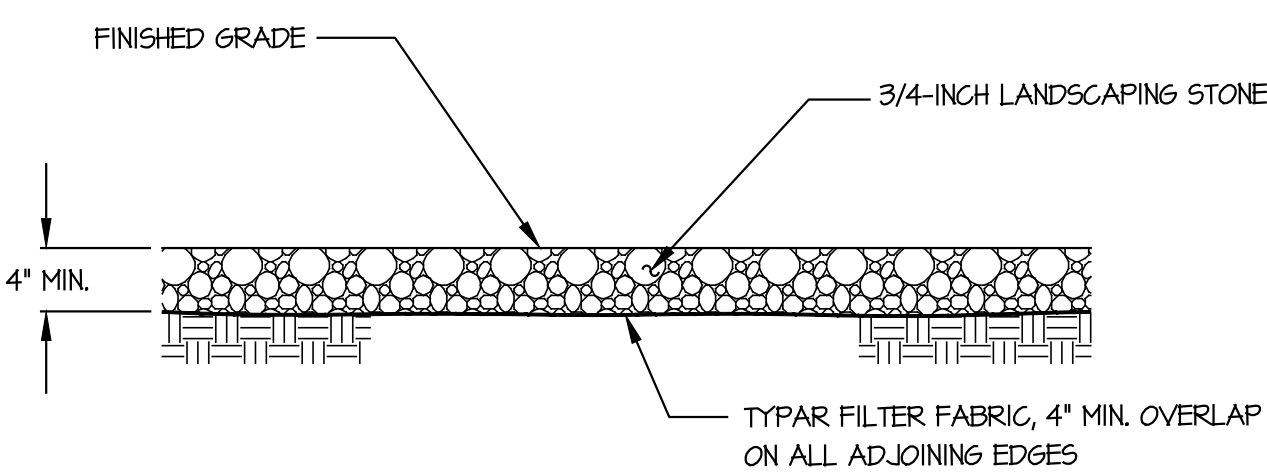
PIPE PENETRATION DETAIL
NOT TO SCALE



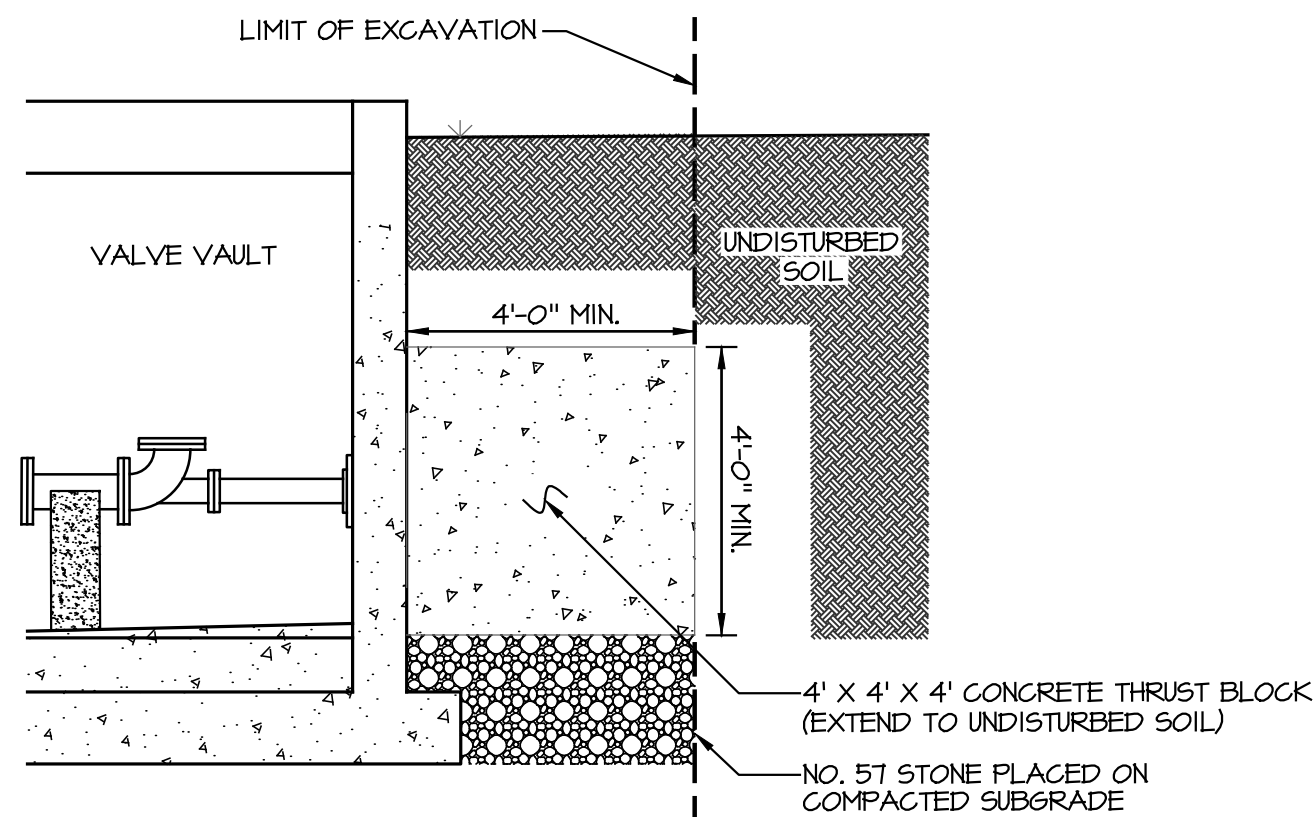
VALVE VAULT PIPE ANCHOR
NOT TO SCALE



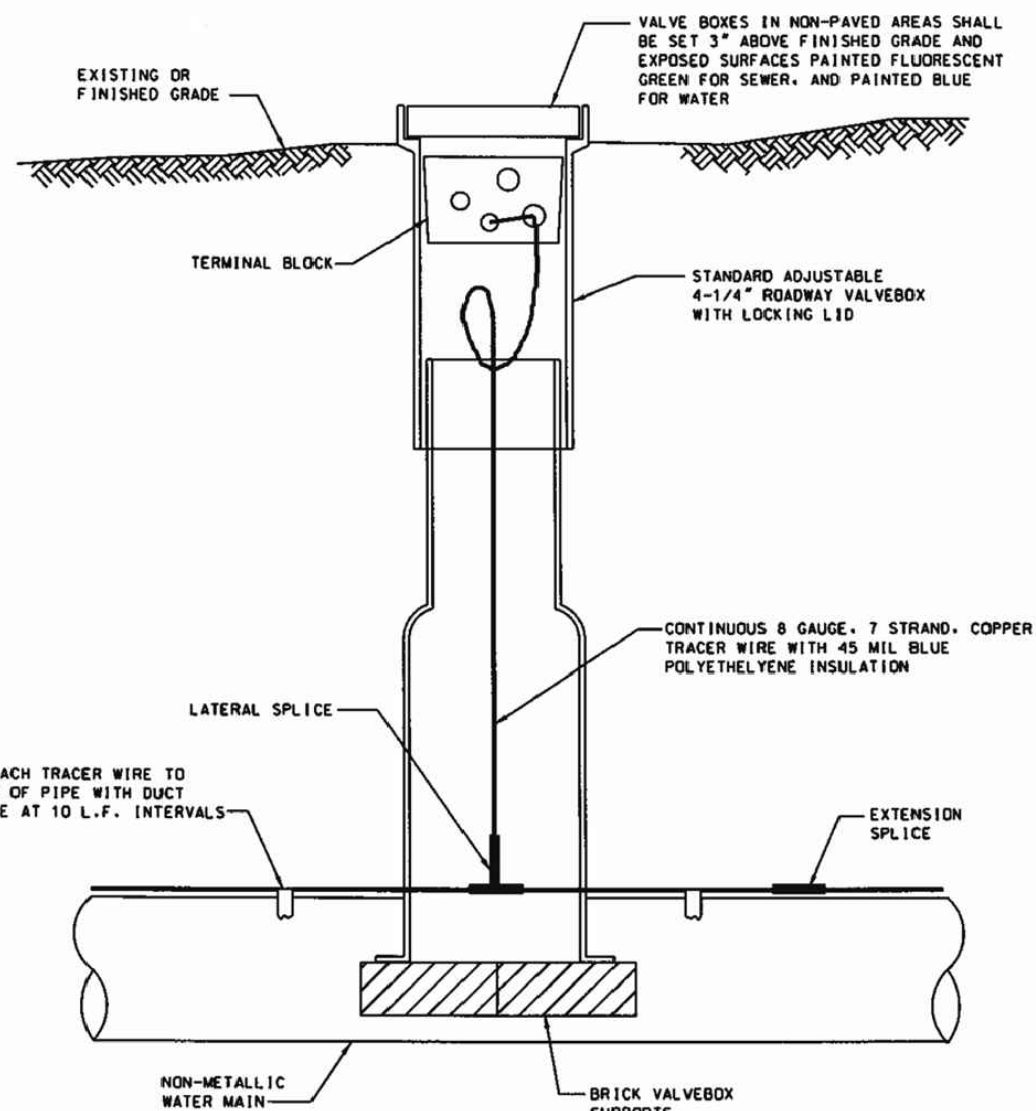
ACCESS DRIVE TO PUMP STATION
NOT TO SCALE



PERMANENT SPS SITE STABILIZATION
NOT TO SCALE



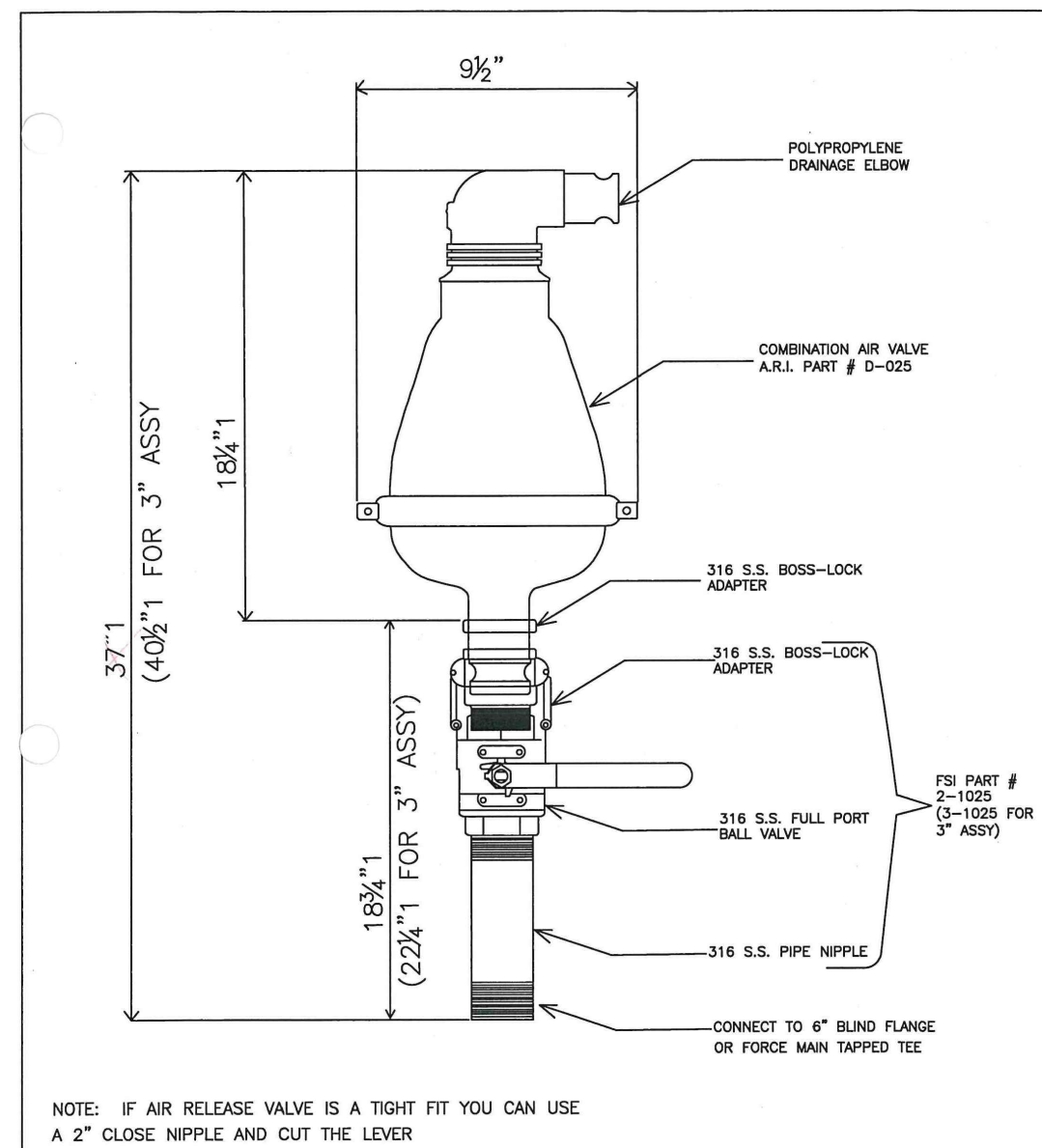
CONCRETE THRUST BLOCK
SCALE: 3/8" = 1'-0"



NOTES

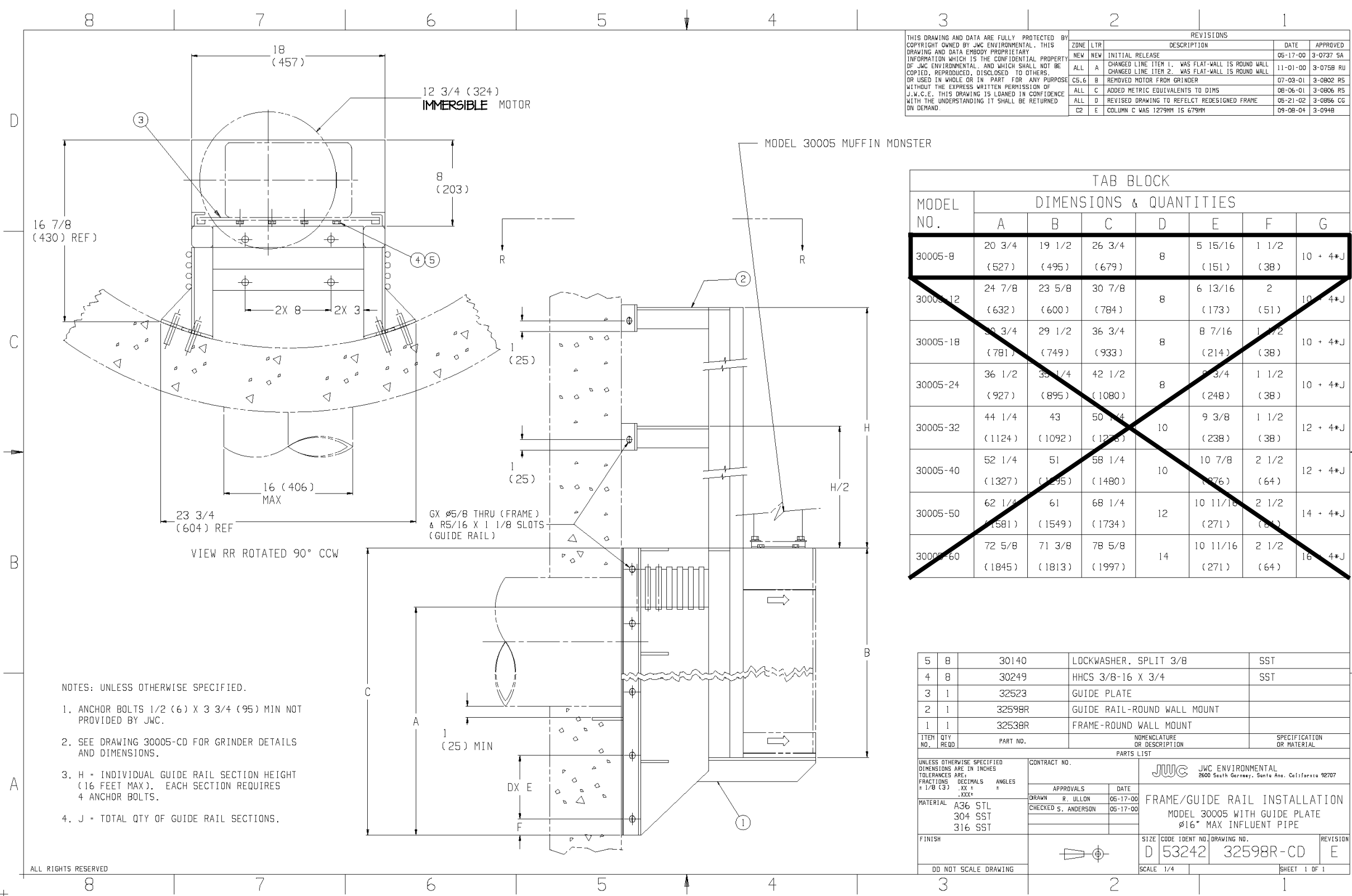
1. TRACER WIRE SHALL EXTEND 12" INCHES ABOVE THE TOP OF THE ROADWAY BOX. AFTER THE TOP OF THE ROADWAY BOX IS ADJUSTED FLUSH WITH FINAL GRADE, STRIP THE INSULATION FROM THE LAST 3/4 OF AN INCH OF TRACER WIRE AND SECURE TO TERMINAL BLOCK.
2. LATERAL SPLICING SHALL BE MADE USING A BRASS COMPRESSION NUT, WATERPROOF BINDER, AND UNDERGROUND ELECTRICAL TAPE. EXTENSION SPLICING SHALL BE MADE USING A CRIMP CONNECTOR AND SHRINK TUBING.
3. LOCATING POSTS TO BE INSTALLED MAX. 1000 FT. APART.

TRACER WIRE / ROADWAY VALVE BOX
NOT TO SCALE



2" AIR RELEASE VALVE ASSEMBLY
WITH 316 STAINLESS STEEL
QUICK COUPLER ASSEMBLY

APPROVAL	DEPARTMENT OF PUBLIC WORKS STANDARD DETAILS 2" AIR RELEASE VALVE ASSEMBLY	REVISION	5-14-08
DIRECTOR OF PUBLIC WORKS	DATE	PS-078	PLATE



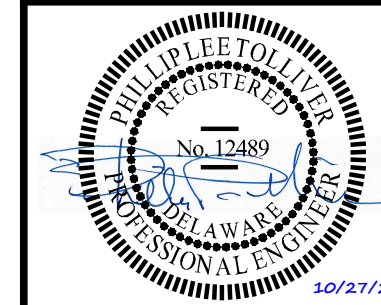
SAN. SEWER PROFILE
SMH-1 TO NET WELL
VERTICAL SCALE: 1"=5'
HORIZONTAL SCALE: 1" = 20'

PS & FM

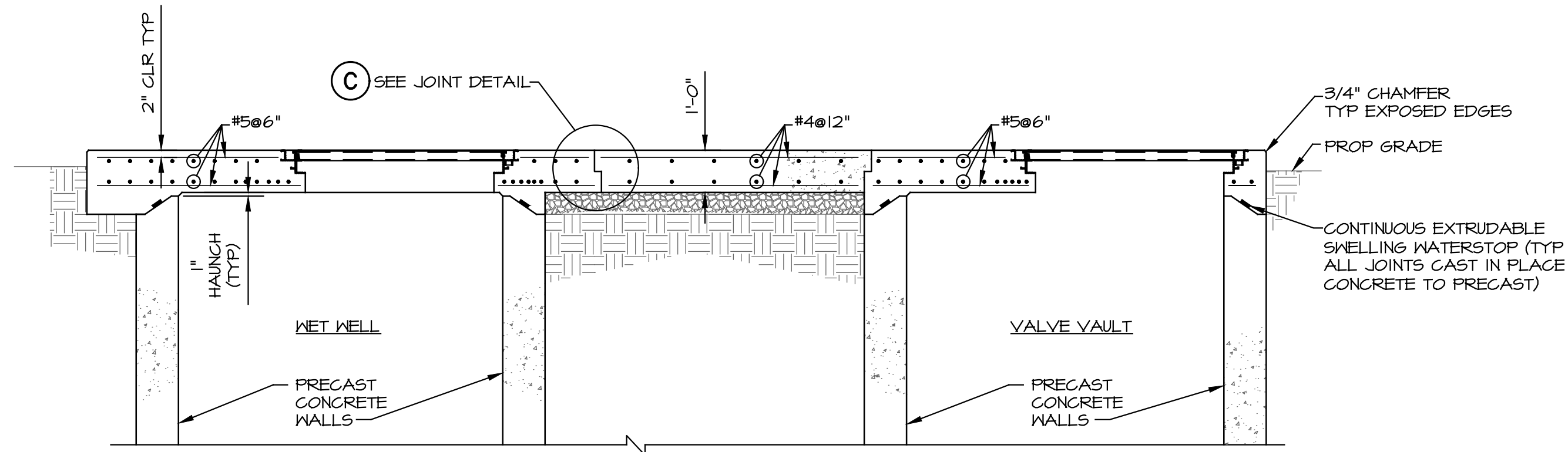
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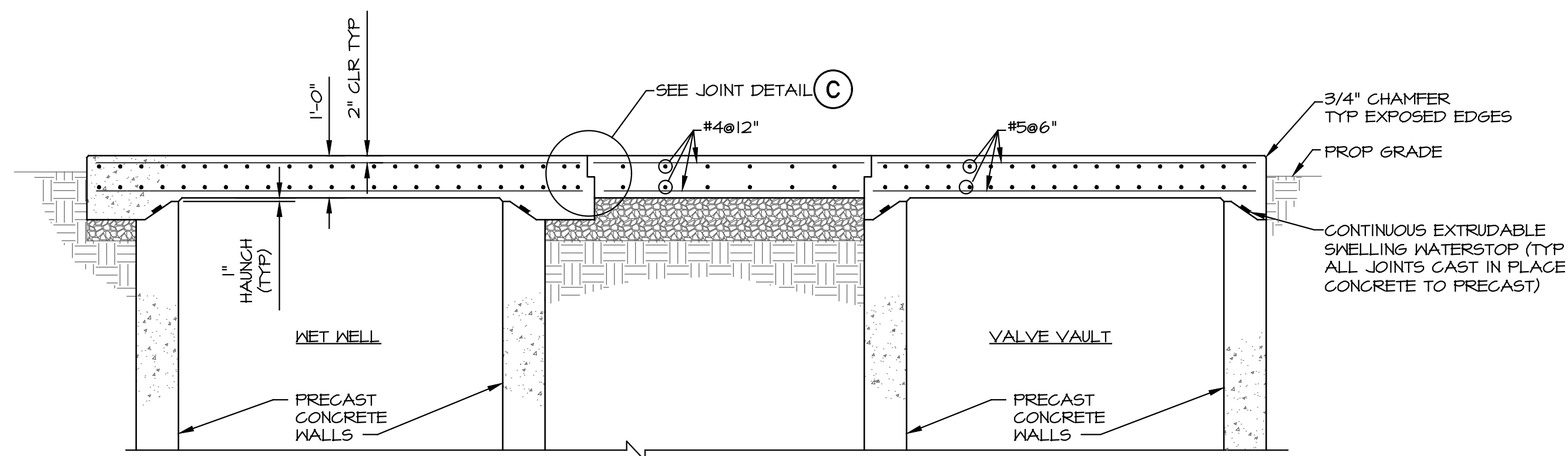
SEWAGE PUMP STATION
PS-38
DETAILS
FOR
CATTAIL CREEK



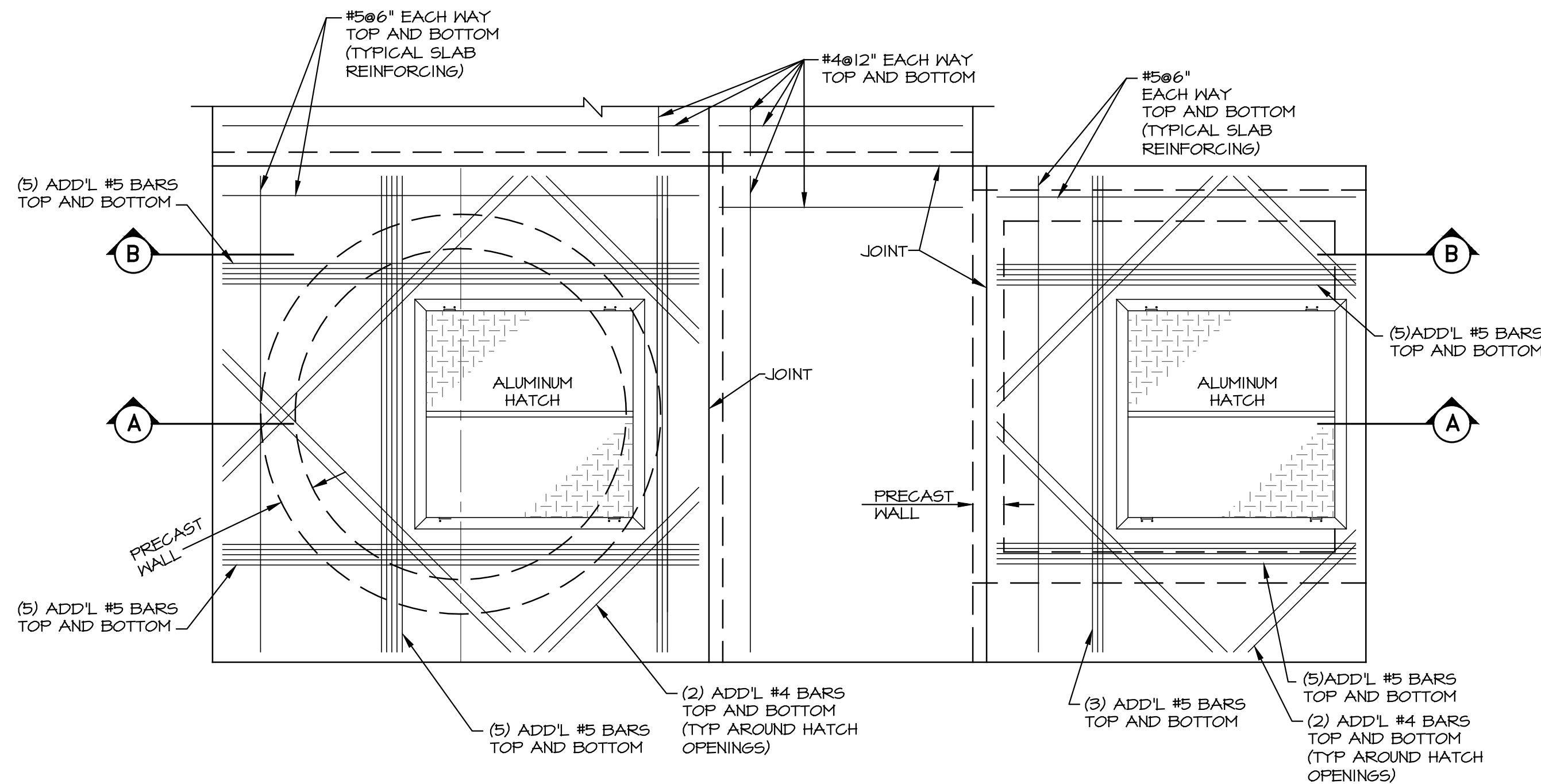
DATE	REVISIONS	JOB NO.: 13870
10/21/2020	QA/QC REVISIONS	SCALE: AS SHOWN
		DATE: 6/28/2019
		DRAWN BY: KH
		DESIGN BY: SS
		REVIEW BY: PD
		SHEET: 9 OF 17



A SECTION THROUGH WETWELL AND VALVE VAULT
NOT TO SCALE

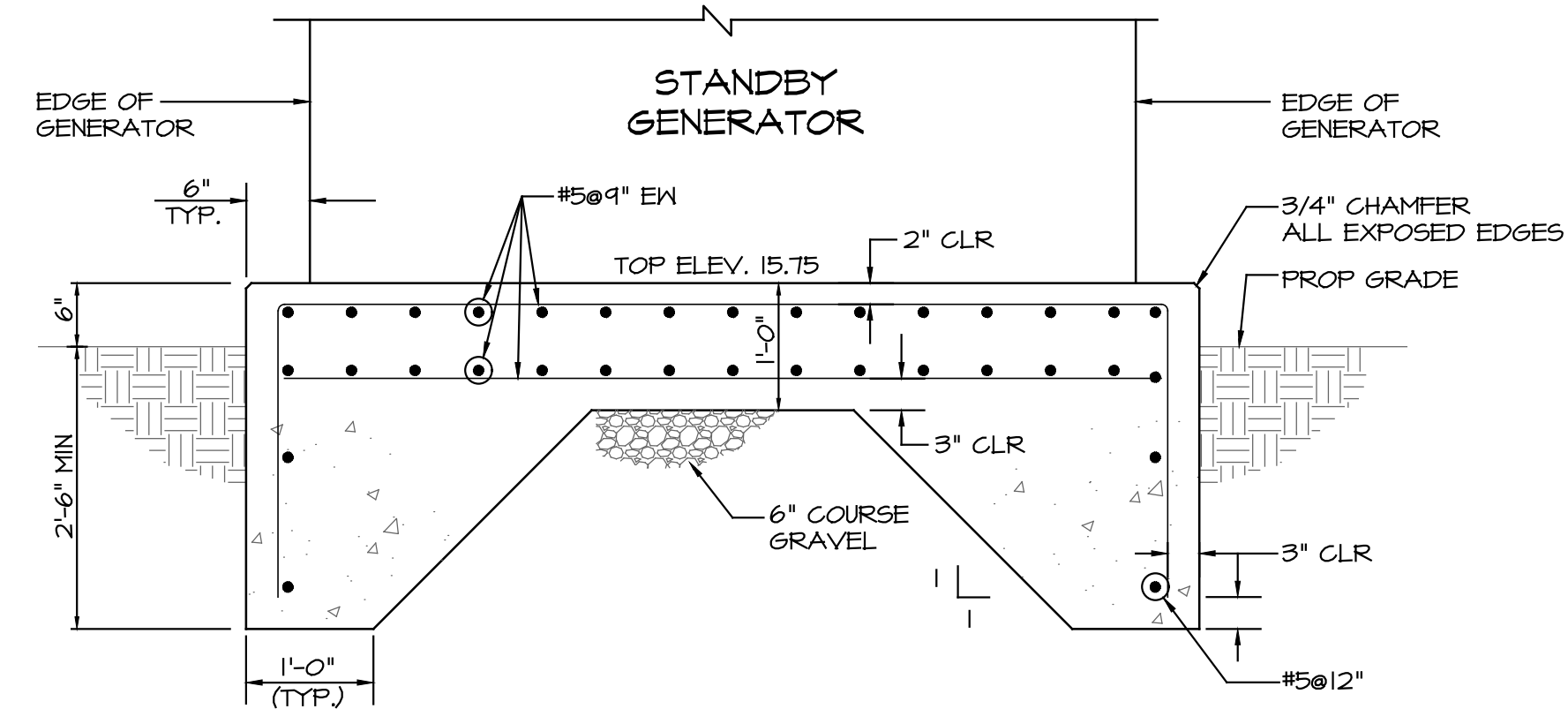


B SECTION THROUGH WETWELL AND VALVE VAULT
NOT TO SCALE

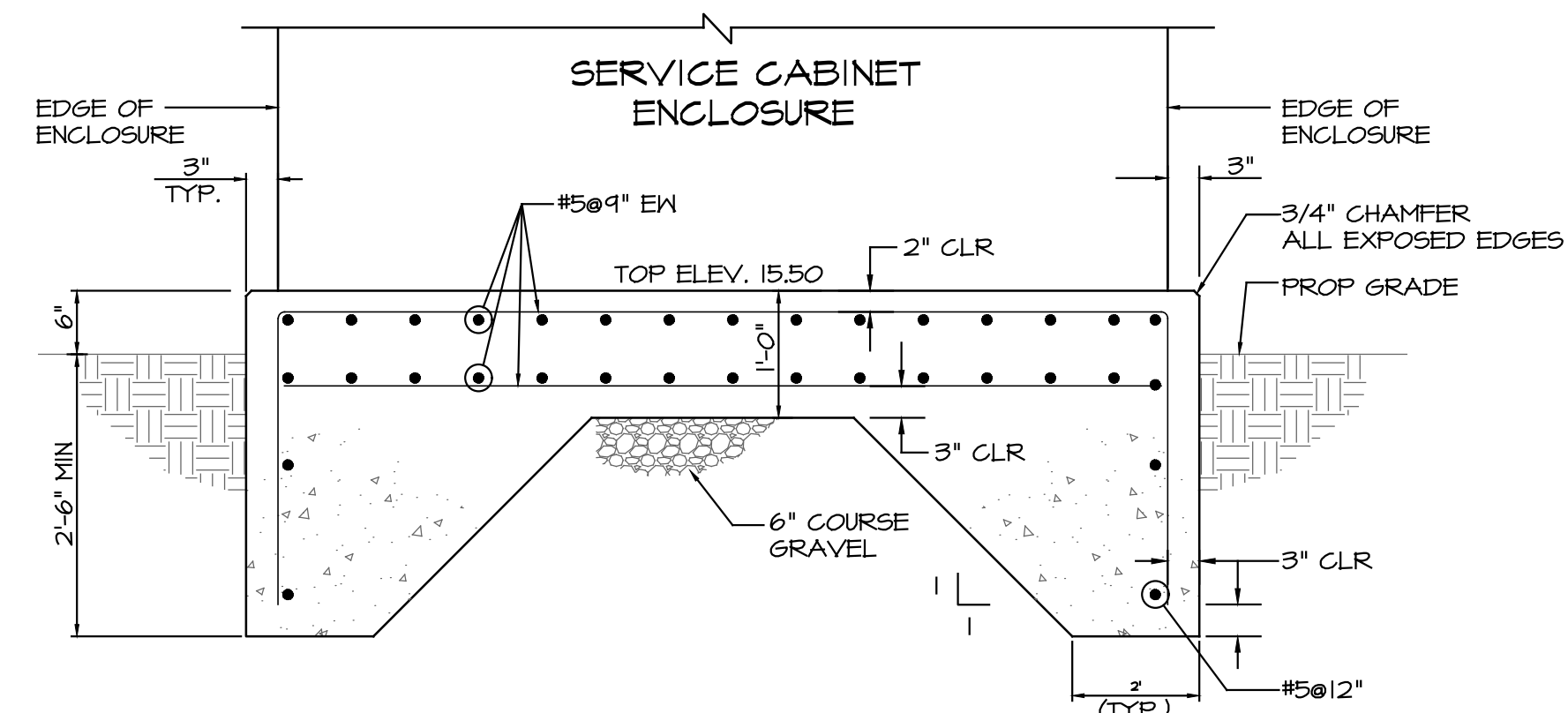


PLAN - TOP SLAB FOR VALVE VAULT AND WETWELL
NOT TO SCALE

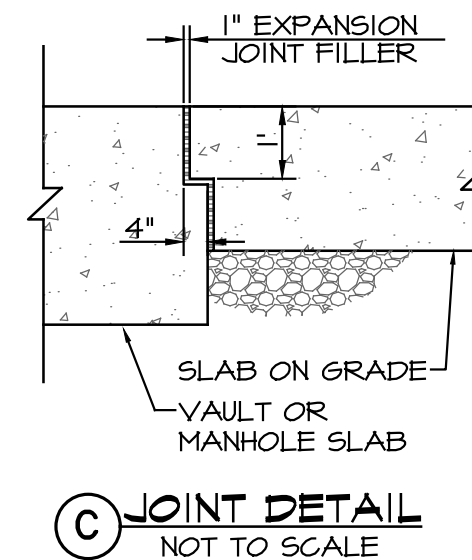
NOTE:
REFER TO PLANS AND ELEVATION ON SHEET 5 FOR SIZES,
AND EQUIPMENT LOCATIONS



STANDBY GENERATOR FOUNDATION
NOT TO SCALE



SERVICE CABINET ENCLOSURE FOUNDATION
NOT TO SCALE



C JOINT DETAIL
NOT TO SCALE

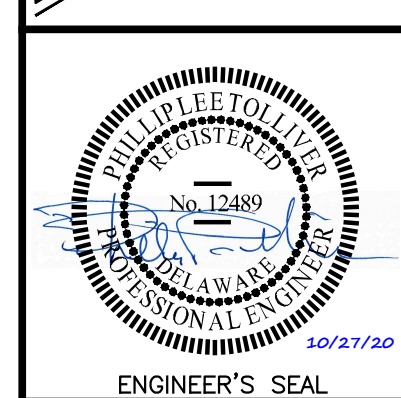
CAST IN PLACE CONCRETE

- ALL CONCRETE WORK, INCLUDING FORMING, MIXING, PLACING, AND CURING, SHALL BE IN ACCORDANCE WITH ACI-318.
- MINIMUM COMPRESSIVE STRENGTH, UNLESS NOTED OTHERWISE ON PLANS, AND MAXIMUM WATER CEMENT RATIO SHALL BE AS FOLLOWS:
 - FRAMED SLABS: 3500 PSI (0.45)
 - EXTERIOR EXPOSED PAVEMENT: 3500 PSI (0.50)
- ALL CONCRETE REINFORCING SHALL CONFORM TO ASTM A615, GRADE 60.
- WELDED WIRE MESH SHALL CONFORM TO ASTM-A185.
- REINFORCING SHALL HAVE THE FOLLOWING COVER UNLESS OTHERWISE NOTED:
 - FOOTINGS AND OTHER CONCRETE POURED AGAINST EARTH: 3"
 - FORMED CONCRETE EXPOSED TO EARTH: 1 1/2" FOR #5 BARS AND SMALLER OR 2" FOR BARS LARGER THAN #5
 - INTERIOR FACES OF WALLS: 2"
 - SLAB ON GRADE: REINFORCING TOP THIRD OF THICKNESS
 - BEAMS, COLUMNS: 2"
 - SLABS: 2"
- ALL EXTERIOR EXPOSED CONCRETE SHALL HAVE A MINIMUM OF 5% ENTRAINED AIR, $\pm 1.5\%$.
- SURFACES OF ALUMINUM HATCHES TO BE IN CONTACT WITH CONCRETE SHALL HAVE A BITUMINOUS COATING.

PS & FM



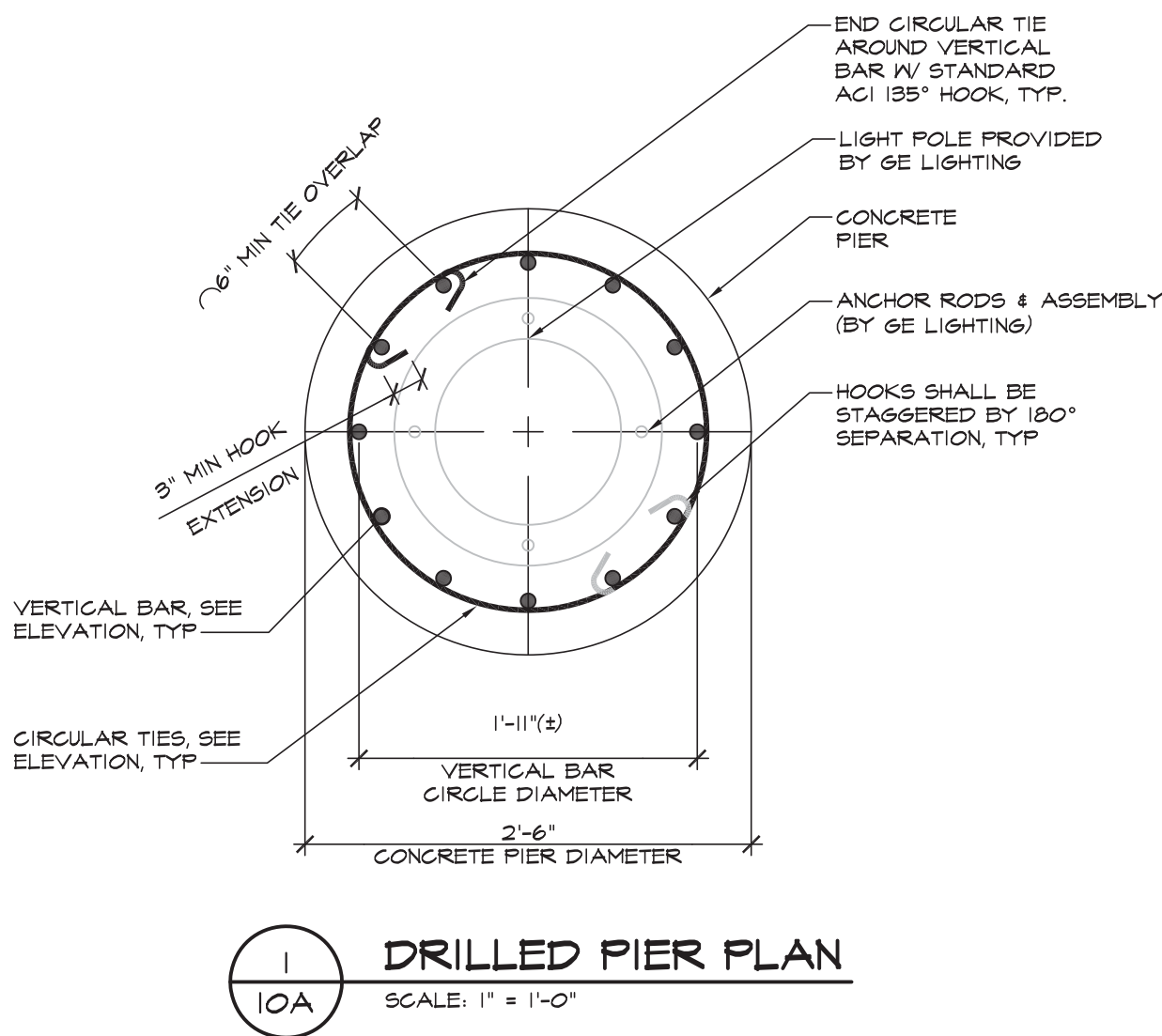
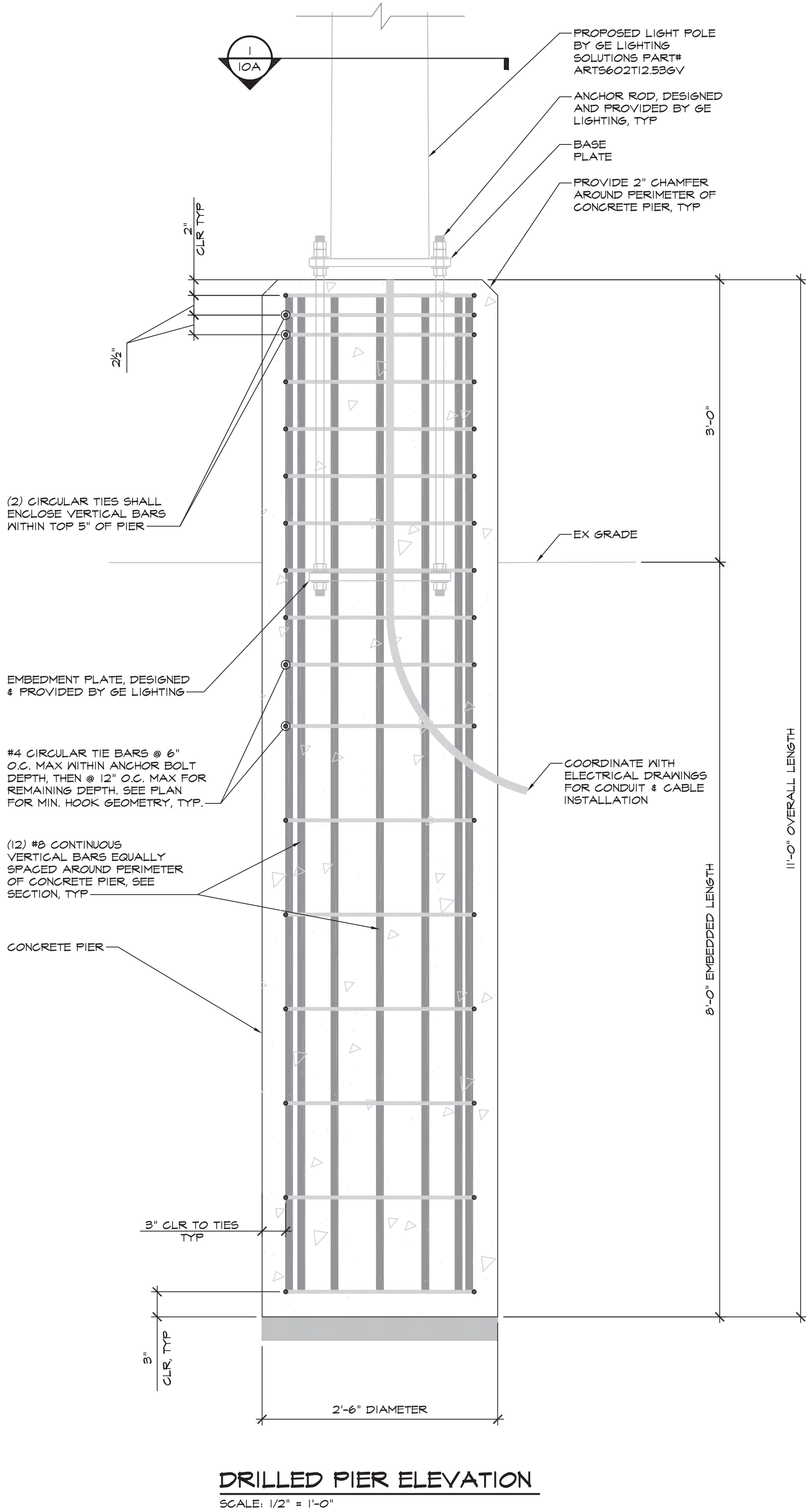
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SEWAGE PUMP STATION
PS-38
STRUCTURAL DETAILS
FOR
CATTAIL CREEK

DATE	REVISIONS	JOB NO.: 13870
10/21/2020	QA/QC REVISIONS	SCALE: AS SHOWN
		DATE: 6/28/2019
		DRAWN BY: KH
		DESIGN BY: SS
		REVIEW BY: PD
		SHEET: 10 OF 17



GENERAL STRUCTURAL NOTES

BUILDING CODES

- A. AASHTO LRFDLTS-1 "LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS", FIRST EDITION 2015
- B. INTERNATIONAL BUILDING CODE (IBC 2012) AND ALL SUBSEQUENT SUPPLEMENTS
- C. IN ADDITION, ALL CONSTRUCTION SHALL CONFORM WITH THE GOVERNING LOCAL BUILDING CODE

DESIGN LOADS

- A. THE DRILLED PIER HAS BEEN DESIGNED TO SUPPORT A PROPOSED 60' TAPERED STEEL POLE PER THE MAXIMUM FACTORED FOUNDATION REACTIONS AND IN CONJUNCTION WITH THE GEOTECHNICAL RECOMMENDATIONS PREPARED BY GEO-TECHNOLOGY ASSOCIATES, INC. (JOB#190451 DATED MARCH 29, 2019) THE MAXIMUM FACTORED REACTIONS PROVIDED ARE LISTED BELOW:
- | | |
|---------------------|--------------|
| DOWNLOAD: | 1.8 KIPS |
| SHEAR: | 0.7 KIPS |
| OVERTURNING MOMENT: | 24.2 FT-KIPS |
- B. THE CONTRACTOR SHALL PROVIDE TEMPORARY BRACINGS AND SHORINGS AS REQUIRED DURING ERECTION AND CONSTRUCTION. DESIGN OF TEMPORARY BRACINGS AND SHORINGS IS THE RESPONSIBILITY OF THE CONTRACTOR.

MISCELLANEOUS

- A. THE CONTRACTOR SHALL LOCATE ALL UTILITIES IN THE AREA OF CONSTRUCTION AND PREVENT DAMAGE TO THEM. SHOULD DAMAGE OCCUR TO ANY UTILITIES, THE CONTRACTOR IS REQUIRED TO REPAIR THE DAMAGE TO THE SATISFACTION OF THE OWNER AT HIS OWN EXPENSE.
- B. SHOP DRAWINGS FOR ALL STRUCTURAL ELEMENTS SHOWN ON THE CONTRACT DOCUMENTS MUST BE SUBMITTED BY THE CONTRACTOR OR OWNER FOR REVIEW BY THE ENGINEER. IF THE CONTRACTOR OR OWNER FAILS TO SUBMIT THE SHOP DRAWINGS, THE ENGINEER WILL NOT BE RESPONSIBLE FOR STRUCTURAL CERTIFICATION AND DESIGN OF THE PROJECT. THE SHOP DRAWINGS SHALL INDICATE ANY DEVIATIONS OR OMISSIONS FROM THE CONTRACT DOCUMENTS. THE GENERAL CONTRACTOR SHALL REVIEW ALL SHOP DRAWINGS PRIOR TO SUBMISSION AND MAKE ALL CORRECTIONS DEEMED NECESSARY.
- C. IN CASES OF CONFLICT BETWEEN THE DRAWINGS AND/OR SPECIFICATIONS AND OTHER DISCIPLINES OR EXISTING/PROPOSED CONDITIONS, CONTRACTOR SHALL NOTIFY THE DESIGN PROFESSIONALS AND OBTAIN CLARIFICATION PRIOR TO BIDDING AND PROCEEDINGS WITH WORK.
- D. THE CONTRACTOR SHALL NOT SUBMIT REPRODUCTIONS OF THE STRUCTURAL CONTRACT DOCUMENTS AS SHOP DRAWINGS.
- E. SCALES SHOWN ON THE STRUCTURAL CONTRACT DRAWINGS ARE FOR GENERAL INFORMATION ONLY. DIMENSIONAL INFORMATION SHALL NOT BE OBTAINED BY SCALING THE DRAWINGS.
- F. APPLY DETAILS, SECTIONS AND NOTES ON THE DRAWINGS WHERE CONDITIONS ARE SIMILAR TO THOSE INDICATED BY DETAIL, DETAIL TITLE OR NOTE.
- G. ASSUME EQUAL SPACINGS BETWEEN ESTABLISHED DIMENSIONS, IF NOT INDICATED ON DRAWINGS.
- H. THE CONTRACTOR SHALL VERIFY THAT CONSTRUCTION LOADS DO NOT EXCEED THE CAPACITY OF THE STRUCTURE AT THE TIME THE LOAD IS APPLIED.
- I. PROVIDE SHORINGS AND PROTECTION FOR EXCAVATION BANKS AS NECESSARY TO PREVENT CAVING AND COMPLY WITH ALL APPLICABLE OSHA RULES AND REGULATIONS.

CAST-IN-PLACE CONCRETE & REINFORCING STEEL

- A. ALL CONCRETE CONSTRUCTION SHALL CONFORM TO THE "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS (ACI 308)", AND TO THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318)".
- B. IN ADDITION TO THE ABOVE, ALL CONCRETE WORK SHALL CONFORM TO THE FOLLOWING:
- RECOMMENDED PRACTICE FOR HOT WEATHER CONCRETING (ACI 308),
RECOMMENDED PRACTICE FOR COLD WEATHER CONCRETING (ACI 306),
RECOMMENDED PRACTICE FOR CONCRETE FORMWORK (ACI 347),
STANDARD SPECIFICATION FOR TOLERANCES FOR CONCRETE CONSTRUCTION AND MATERIALS (ACI 117),
CHEMICAL ADMIXTURES FOR CONCRETE (ACI 212.3),
STANDARD SPECIFICATION FOR CURING CONCRETE (ACI 308.1).
- C. ALL CONCRETE, UNLESS NOTED OTHERWISE, SHALL BE STONE AGGREGATE CONCRETE HAVING A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4500 PSI. ALL CONCRETE EXPOSED TO WEATHER SHALL HAVE AN AIR ENTRAINMENT OF 6% +/- 1.5%. NO ADMIXTURES CONTAINING CALCIUM CHLORIDE SHALL BE PERMITTED. MAXIMUM AGGREGATE SIZE SHALL BE 1", AND MAXIMUM SLUMP SHALL BE 4". MAXIMUM WATER / CEMENT (w/c) RATIO = 0.45.
- D. ALL CONCRETE MIX DESIGNS, INCLUDING CEMENT CONTENT, WATER CEMENT RATIO, FINE AND COARSE AGGREGATE CONTENT AND ALL ADMIXTURES, SHALL BE REVIEWED BY ENGINEER PRIOR TO PLACING FIRST CONCRETE.
- E. ALL CONCRETE SHALL BE SAMPLED AND TESTED BY THE TESTING AGENCY. THE CONTRACTOR SHALL NOTIFY THE TESTING AGENCY 48 HOURS PRIOR TO THE PLACING OF ANY CONCRETE. TESTING SHALL BE IN ACCORDANCE WITH ASTM C172.
- F. THE CONCRETE STRUCTURE SHALL NOT SUPPORT THE DESIGN LIVE LOAD FOR A MINIMUM OF 28 DAYS AND ALL SHORINGS AND RE-SHORINGS REQUIRED TO SUPPORT THE CONCRETE STRUCTURE DURING CONSTRUCTION SHALL BE DESIGNED AND PROVIDED BY THE CONTRACTOR. SHOP DRAWINGS, SIGNED AND SEALED BY A REGISTERED ENGINEER IN THE GOVERNING JURISDICTION, SHALL BE SUBMITTED FOR REVIEW. SHOP DRAWINGS SHALL INDICATE THE TYPE, EXTENT, SIZE, AND LOCATION OF ALL SHORINGS AND RE-SHORINGS AS WELL AS THE SEQUENCE OF CONSTRUCTION.
- G. GROUND BLAST FURNACE SLAG MAY BE USED TO REPLACE UP TO 50 PERCENT OF THE PORTLAND CEMENT IN A CONCRETE MIX, AND FLY ASH OR POZZOLAN MAY BE USED TO REPLACE UP TO 25 PERCENT OF PORTLAND CEMENT, SUBJECT TO THE APPROVAL OF THE STRUCTURAL ENGINEER AND SHALL CONFORM TO ASTM C684.
- H. ALL REINFORCING BARS SHALL BE NEW BILLET STEEL CONFORMING TO ASTM A615 GRADE 60 (Fy = 60 KSI).
- I. LAP ALL REINFORCING BARS A MINIMUM OF 48 BAR DIAMETERS, UNLESS OTHERWISE NOTED.
- J. ALL REINFORCING SHALL BE DETAILED, FABRICATED AND PLACED IN ACCORDANCE WITH THE CRSI "MANUAL OF STANDARD PRACTICE", ACI 315' DETAILS AND DETAILING OF CONCRETE REINFORCEMENT", ACI SP 66 "DETAILING MANUAL".
- K. MINIMUM COVER FOR ALL REINFORCING SHALL BE AS SHOWN ON THE DRAWINGS. APPROVED SPACERS SHALL BE USED TO ENSURE THE MINIMUM COVER FOR REINFORCING HAS BEEN SATISFIED. SPACERS SHALL BE ATTACHED INTERMITTENTLY THROUGHOUT THE ENTIRE LENGTH OF VERTICAL REINFORCING CAGES TO ENSURE CONCENTRIC PLACEMENT OF CAGES IN EXCAVATIONS.
- L. REINFORCING CAGES SHALL BE BRACED TO RETAIN PROPER DIMENSIONS DURING HANDLING AND THROUGHOUT PLACEMENT OF CONCRETE. WHEN TEMPORARY CASING IS UTILIZED, BRACINGS SHALL BE ADEQUATE TO RESIST FORCES OCCURRING FROM FLOWING CONCRETE DURING CASING EXTRACTION.
- M. WELDING IS PROHIBITED ON REINFORCING STEEL AND EMBEDMENTS.
- N. LOOSE MATERIAL SHALL BE REMOVED FROM BOTTOM OF EXCAVATION PRIOR TO CONCRETE PLACEMENT. SIDES OF EXCAVATION SHALL BE ROUGH AND FREE OF LOOSE CUTTINGS.
- O. CONCRETE SHALL BE PLACED IN A MANNER THAT WILL PREVENT SEGREGATION OF CONCRETE MATERIALS, INFILTRATION OF WATER OR SOIL AND OTHER OCCURRENCES WHICH MAY DECREASE THE STRENGTH OR DURABILITY OF THE FOUNDATION.
- P. FREE FALL CONCRETE MAY BE USED PROVIDED FALL IS VERTICAL DOWN WITHOUT HITTING SIDES OF EXCAVATION, FORMWORK, REINFORCING BARS, FORM TIES, CAGE BRACINGS OR OTHER OBSTRUCTIONS. UNDER NO CIRCUMSTANCES SHALL CONCRETE FALL THROUGH WATER.
- Q. DRILLING FLUID, IF USED, SHALL BE FULLY DISPLACED BY CONCRETE AND SHALL NOT BE DETRIMENTAL TO CONCRETE OR SURROUNDING SOIL. CONTAMINATED CONCRETE SHALL BE REMOVED FROM TOP OF FOUNDATION AND REPLACED WITH FRESH CONCRETE.
- R. ALL CAST-IN-PLACE CONCRETE WILL EXPERIENCE DIFFERING VARIATIONS OF CRACKING. ANY ELEMENT EXPOSED TO DIRECT WEATHER AND/OR TEMPERATURE VARIATIONS DURING CONSTRUCTION OR IN THE FINAL CONDITION IS TO BE TREATED AND REGULARLY MAINTAINED TO PREVENT PROPAGATION OF CRACKS AND WATER INFILTRATION. THE CONTRACTOR SHALL DEVELOP A REGULAR MAINTENANCE PROGRAM AND SUBMIT IT TO THE OWNER.
- S. ALL CONCRETE CONSTRUCTION SHALL BE INSPECTED IN ACCORDANCE WITH CHAPTER 17 OF THE INTERNATIONAL BUILDING CODE.

DRILLED PIER FOUNDATIONS

- A. DRILLED PIER FOUNDATIONS (CAISSONS) SHALL BEAR ON UNDISTURBED SOIL WITH AN ASSUMED ALLOWABLE NET BEARING CAPACITY OF 8 KSF. THE ALLOWABLE SOIL BEARING PRESSURE SHALL BE FIELD VERIFIED BY A REGISTERED GEOTECHNICAL ENGINEER AND APPROVED PRIOR TO PLACING FOUNDATIONS. SHOULD THE ACTUAL SOIL BEARING PRESSURE BE LESS THAN 8 KSF, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER.
- B. BEARING ELEVATION OF DRILLED PIER FOUNDATIONS SHOWN ON THE DRAWINGS ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED IN FIELD.
- C. DRILLED PIER FOUNDATIONS SHALL BE DRILLED WITHOUT DISTURBING THE SURROUNDING SOIL AND SHALL BE KEEP FREE OF WATER INFILTRATION UNTIL CONCRETE CAN BE PLACED.
- D. DRILLED PIERS WITH BELLS OR SHAFTS LESS THAN 2'-0" CLEAR SHALL NOT BE PLACED LESS THAN 24 HOURS APART.
- E. FOUNDATION DEPTH INDICATED IS BASED ON THE GRADE LINE DESCRIBED IN THE REFERENCED GEOTECHNICAL REPORT. FOUNDATION MODIFICATION MAY BE REQUIRED IN THE EVENT CUT OR FILL OPERATIONS HAVE TAKEN PLACE SUBSEQUENT TO THE GEOTECHNICAL INVESTIGATION.

POST-CONSTRUCTION INSPECTION

- A. A POST-MODIFICATION INSPECTION REPORT IS REQUIRED AND SHALL BE INCLUDED IN THE CONTRACTOR'S BID. A POST-MODIFICATION INSPECTION IS A VISUAL INSPECTION OF THE FOUNDATION CONSTRUCTION AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE FOUNDATION DESIGN.
- B. THE POST-MODIFICATION INSPECTION REPORT SHALL BE COMPLETED BY A PROFESSIONAL ENGINEER LICENSED IN THE JURISDICTION IN WHICH THE PROJECT IS LOCATED.
- C. THE INTENT OF THE POST-MODIFICATION INSPECTION REPORT IS TO CONFIRM INSTALLATION AND CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE FOUNDATION DESIGN ITSELF.
- D. TO ENSURE THAT THE REQUIREMENTS OF THE POST-MODIFICATION INSPECTION REPORT ARE MET, IT IS VITAL THAT THE CONTRACTOR AND POST-MODIFICATION INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED.

PS & FM



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SEWAGE PUMP STATION

PS-38

STRUCTURAL DETAIL & NOTES

FOR

CATTAIL CREEK

ENGINEER'S SEAL

SOUTH MURDERKILL HUNDRED

KENT COUNTY, DE

PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF DELAWARE.

LICENSE No. 19728

EXPIRATION DATE: 06/30/2020

DATE REVISIONS

JOB NO.: 13870

SCALE: AS SHOWN

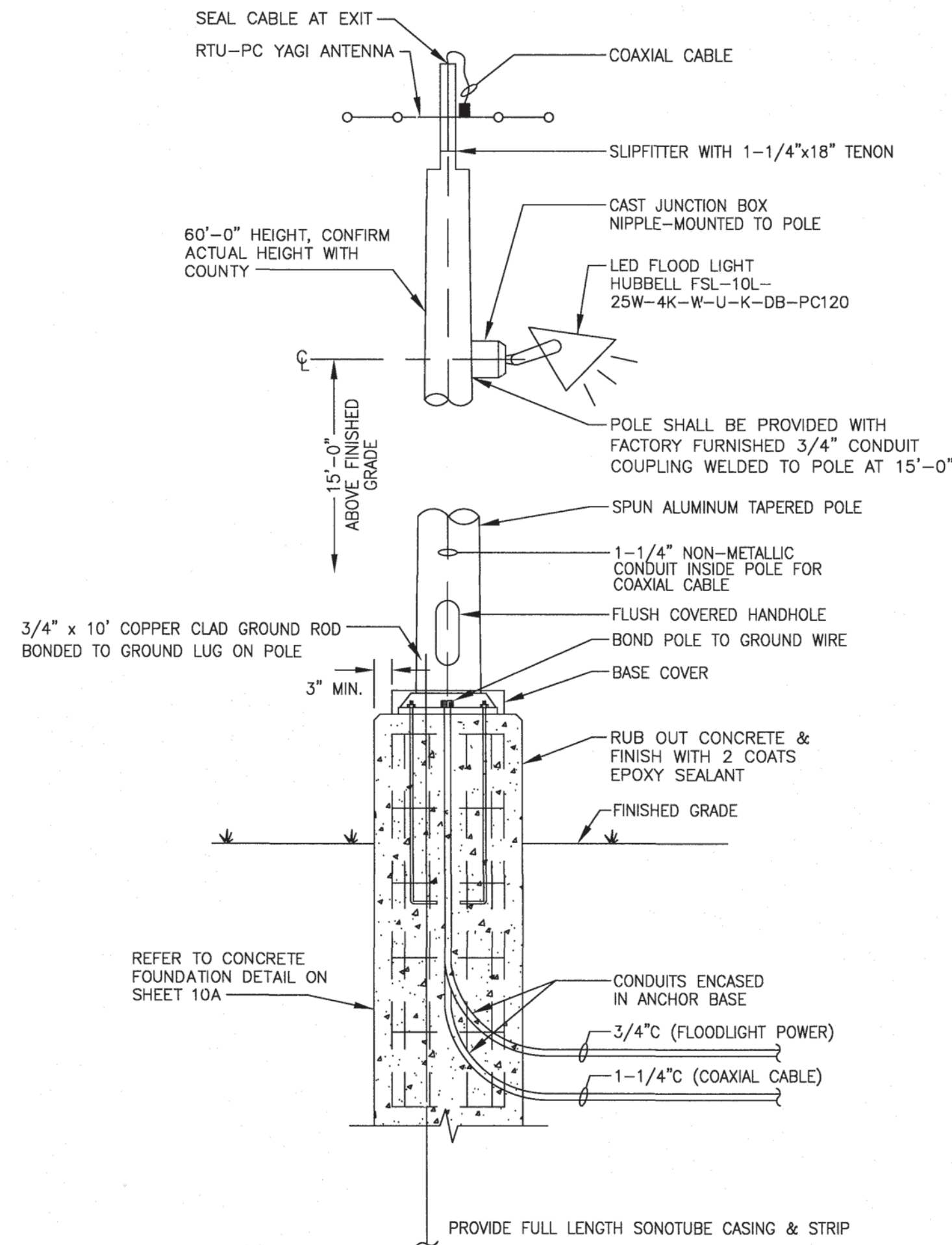
DATE: 6/5/2019

DRAWN BY: SG

DESIGN BY: RJD

REVIEW BY: RJD

SHEET: 10A OF 17



LIGHT POLE ELEVATION
N.T.S.

GENERATOR SIZING CHART FOR MULTIPLE SEWAGE PUMP SIZES

1) ASSUME ADDITIONAL LOAD OF 5 HP @ 480V 3PHASE (GRINDER) FOR ALL CALCULATIONS & 5KVA ANCILLARY LOAD.
2) MOTORS INCLUDED IN CALCULATIONS ARE BASED ON VFD (4-POLE) PUMPS

Start Pump 1	Start Pump 2	Genset size w/ (2) 5HP	Genset size w/ (2) 7.5HP	Genset size w/ (2) 10HP	Genset size w/ (2) 12HP	Genset size w/ (2) 15HP	Genset size w/ (2) 18HP	Genset size w/ (2) 20HP
VFD	VFD	35kW	35kW	35kW	35kW	35kW	40kW	40kW
VFD	SS	25kW	35kW	35kW	35kW	35kW	40kW	40kW
SS	SS	25kW	35kW	35kW	35kW	40kW	40kW	40kW
VFD	ATL	25kW	35kW	35kW	35kW	40kW	50kW	50kW
SS	ATL	25kW	35kW	35kW	35kW	40kW	50kW	50kW
ATL	ATL	25kW	35kW	35kW	35kW	40kW	50kW	50kW

	Genset size w/ (1) 5HP	Genset size w/ (1) 7.5HP	Genset size w/ (1) 10HP	Genset size w/ (1) 12HP	Genset size w/ (1) 15HP	Genset size w/ (1) 18HP	Genset size w/ (1) 20HP
VFD	25kW	25kW	25kW	35kW	35kW	35kW	35kW
SS	25kW	25kW	25kW	35kW	35kW	35kW	35kW
ATL	25kW	25kW	25kW	35kW	35kW	40kW	40kW

Start Pump 1	Start Pump 2	Genset size w/ (2) 25HP	Genset size w/ (2) 30HP	Genset size w/ (2) 35HP	Genset size w/ (2) 40HP	Genset size w/ (2) 45HP	Genset size w/ (2) 50HP	Genset size w/ (2) 60HP
VFD	VFD	50kW	60kW	80kW	80kW	80kW	100kW	125kW
VFD	SS	60kW	60kW	80kW	80kW	80kW	100kW	125kW
SS	SS	60kW	60kW	80kW	80kW	80kW	100kW	150kW
VFD	ATL	80kW	80kW	100kW	100kW	100kW	125kW	150kW
SS	ATL	80kW	80kW	100kW	100kW	100kW	125kW	150kW
ATL	ATL	80kW	80kW	100kW	100kW	100kW	125kW	150kW

	Genset size w/ (1) 25HP	Genset size w/ (1) 30HP	Genset size w/ (1) 35HP	Genset size w/ (1) 40HP	Genset size w/ (1) 45HP	Genset size w/ (1) 50HP	Genset size w/ (1) 60HP
VFD	35kW	35kW	35kW	40kW	50kW	50kW	60kW
SS	35kW	40kW	40kW	40kW	85kW	80kW	100kW
ATL	40kW	50kW	100kW	100kW	100kW	125kW	125kW

NOTE: CALCULATIONS ARE BASED ON CUMMINS POWER SYSTEMS GENERATORS

STANDBY GENERATOR SIZING CRITERIA:

THE GENERATOR SHALL BE SIZED TO SUPPORT EITHER ONE OR TWO SEWAGE PUMPS AND ANCILLARY LOADS SUCH AS A GRINDER PUMP AND CABINET HEATERS/CONTROLS. ALL PUMPS (INCLUDING GRINDER) SHALL BE STEPPED IN THROUGH THE PLC AND SO REPRESENTED IN THE GENERATOR SIZING CALCS. THE STANDBY GENERATOR SHALL BE SIZED TO SUPPORT BOTH OF THE FOLLOWING SCENARIOS. THE LARGER GENERATOR SIZE RESULTS FOR THE TWO CRITERIA STATEMENTS SHALL BE UTILIZED.

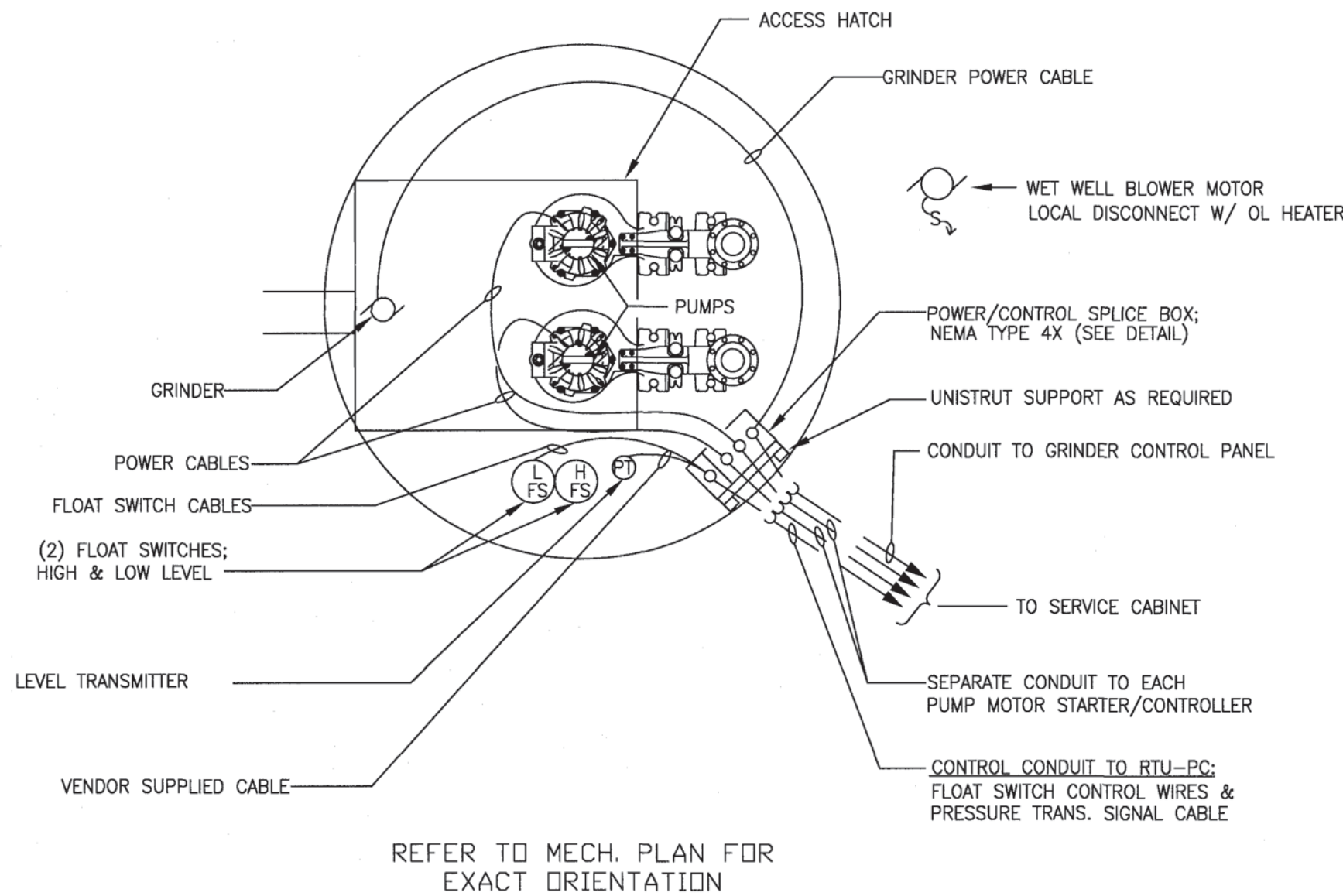
*1. ONE (1) SEWAGE PUMP STARTING ACROSS THE LINE, OTHER SEWAGE PUMP NOT RUNNING.

*2. TWO (2) SEWAGE PUMPS STARTING WITH ONE IN VFD MODE AND THE OTHER IN SOFT START MODE.

EXAMPLE:
MINIMUM GENERATOR SIZE FOR (2) 30HP SEWAGE PUMPS AND ONE SHP GRINDER PUMP ALL STEPPED IN SEPERATELY SHALL BE 60KW.

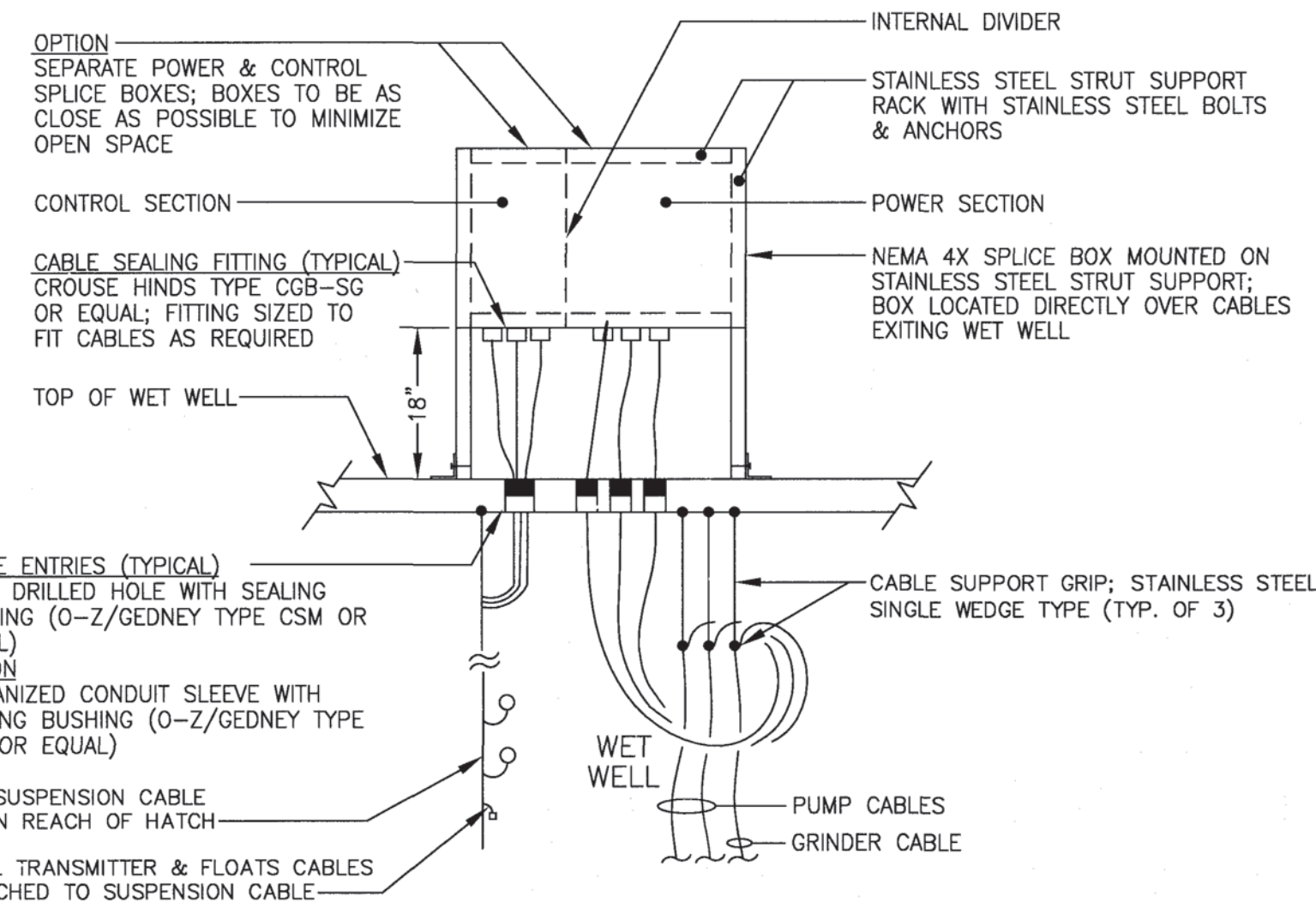
MINIMUM WIRING SIZING NOTES FOR 480 V 3Ø MOTORS, COPPER WIRING
REFER TO EQUIPMENT LIST NOTES:

- MOTORS LESS THAN EQUAL TO 7½ HP SHALL BE 3#10 & 1#12 GRD IN ¾" C.
- MOTORS GREATER THAN 7½ HP & LESS THAN OR EQUAL TO 15 HP SHALL BE 3#8 & 1#10 GRD IN ¾" C.
- MOTORS GREATER THAN 15 HP AND LESS OR EQUAL TO 20 HP SHALL BE 3#6 & 1#8 GRD IN ¾" C.
- MOTORS GREATER THAN 20 HP AND LESS OR EQUAL TO 30 HP SHALL BE 3#4 & 1#8 GRD IN 1¼" C.
- MOTORS GREATER THAN 30 HP AND LESS OR EQUAL TO 40 HP SHALL BE 3#3 & 1#8 GRD IN 1¼" C.
- MOTORS GREATER THAN 40 HP AND LESS OR EQUAL TO 50 HP SHALL BE 3#2 & 1#8 GRD IN 1½" C.
- MOTORS GREATER THAN 50 HP AND LESS OR EQUAL TO 60 HP SHALL BE 3#1 & 1#6 GRD IN 1½" C.
- MOTORS GREATER THAN 60 HP AND LESS OR EQUAL TO 70 HP SHALL BE 3#1/0 & 1#6 GRD IN 2" C.
- FEEDERS FROM GENERATOR 50 KW OR LESS TO ATS SHALL BE 4#1 & 1#6 GRD IN 2" C.
- FEEDERS FROM GENERATER GREATER THAN 50 KW OR LESS THAN OR EQUAL TO 100 KW SHALL BE 4 #3/0 & 1#4 GRD IN 2½" C.
- FEEDERS FROM GENERATER GREATER THAN 100 KW OR LESS THAN OR EQUAL TO 200 KW SHALL BE 4#500 KCMIL & 1#3 GRD IN 4" C.



TYPICAL WET WELL PLAN
N.T.S.

NOTICE
SPLICE BOX SHALL BE LOCATED AT WET WELL AS DETAILED ON THIS DRAWING WHEN DISTANCE FROM EDGE OF WET WELL TO END OF SERVICE CABINET CONTROL SECTION IS GREATER THAN 10 FEET. WHEN DISTANCE IS LESS THAN 10 FEET, AN ACCEPTABLE OPTION IS TO SURFACE-MOUNT SPLICE BOX ON END OF SERVICE CABINET; CONDUITS FROM WET WELL SHALL RISE DIRECTLY UNDER SPLICE BOX AND HAVE SEALING BUSHINGS (O-Z/GEDNEY TYPE CSB OR EQUAL) INSTALLED FOR CABLES.



FRONT ELEVATION SPLICE BOX DETAIL
N.T.S.

GENERATOR ENCLOSURE & FUEL TANK SIZING CHART

USE ON GENERIC MEDIUM PUMPING STATION DETAIL SHEET			
To Meet 69 dB(A) at the Property Line			
Generator Size	Distance to Property Line	Enclosure Type	Fuel Tank Capacity
25kW	9.1' or less	Specialty Enclosure	70 Gallons
	9.2' or greater	QS 2nd Stage	
	14.2' or greater	QS 1st Stage	
DSKCA	24.3' or greater	Basic Weather	70 Gallons
	8.7' or less	Specialty Enclosure	
	8.8' or greater	QS 2nd Stage	
35kW	14.2' or greater	QS 1st Stage	140 Gallons
	57.1' or greater	Basic Weather	
	9.0' or less	Specialty Enclosure	
40kW	9.1' or greater	QS 2nd Stage	140 Gallons
	14.2' or greater	QS 1st Stage	
	64.8' or greater	Basic Weather	
DSFAB	11.7' or less	Specialty Enclosure	140 Gallons
	11.8' or greater	QS 2nd Stage	
	15.4' or greater	QS 1st Stage	
DSFAC	36.9' or greater	Basic Weather	140 Gallons
	13.0' or less	Specialty Enclosure	
	13.1' or greater	QS 2nd Stage	
60kW	18.0' or greater	QS 1st Stage	173 Gallons
	86.4' or greater	Basic Weather	
	15.9' or less	Specialty Enclosure	
80kW	16.0' or greater	QS 2nd Stage	309 Gallons
	19.8' or greater	QS 1st Stage	
	88.5' or greater	Basic Weather	
DSFAE	18.8' or less	Specialty Enclosure	309 Gallons
	18.9' or greater	QS 2nd Stage	
	22.5' or greater	QS 1st Stage	
DSGAA	89.5' or greater	Basic Weather	309 Gallons
	23.4' or less	Specialty Enclosure	
	23.5' or greater	QS 2nd Stage	
125kW	26.7' or greater	QS 1st Stage	309 Gallons
	95.9' or greater	Basic Weather	
	26.0' or less	Specialty Enclosure	
150kW	26.1' or greater	QS 2nd Stage	309 Gallons
	32.8' or greater	QS 1st Stage	
	198.0' or greater	Basic Weather	
DSGAC	32.8' or less	Specialty Enclosure	336 Gallons
	32.9' or greater	QS 2nd Stage	
	34.0' or greater	QS 1st Stage	
DSHAB	222.2' or greater	Basic Weather	336 Gallons
	33.1' or less	Specialty Enclosure	
	33.2' or greater	QS 2nd Stage	
200kW	35.6' or greater	QS 1st Stage	336 Gallons
	205.0' or greater	Basic Weather	

- NOTES: 1.) CALCULATIONS ARE BASED ON CUMMINS POWER SYSTEMS GENERATORS
2.) SPECIALTY ENCLOSURE IS BASED ON ACOUSTICAL SHEETMETAL INC.
3.) GENERATOR MUST MEET CURRENT EPA & DNREC EXHAUST EMISSIONS REQUIREMENTS AT TIME OF PURCHASE.
4.) ALL GENERATORS RATED FOR 120/240VAC, 3Ø, 4WIRE OUTPUT SHALL HAVE STACKED OUTPUT ALTERNATORS.
5.) PROVIDE CRITAL GRADE EXHAUST SILENCER CONTAINED WITHIN THE GENERATOR ENCLOSURE. COORDINATE SOUND ATTENUATION LEVEL OF ENCLOSURE REQUIRED WITH LOCAL NOISE ORDANCES.

PROFESSIONAL CERTIFICATION

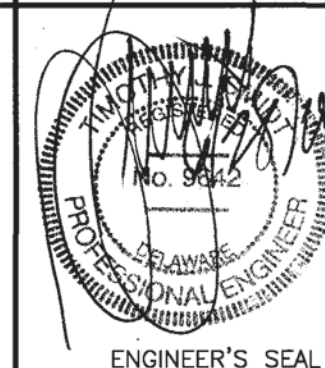
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, TIMOTHY SMIDT AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF DELAWARE.

LICENSE No. P.E. # 9642 EXPIRATION DATE: 6/30/2020

PS & FM



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SEWAGE PUMP STATION PS-38
MEDIUM PS ELECTRICAL DETAIL
FOR
CATTAIL CREEK
SOUTH MURDERKILL HUNDRED KENT COUNTY, DE

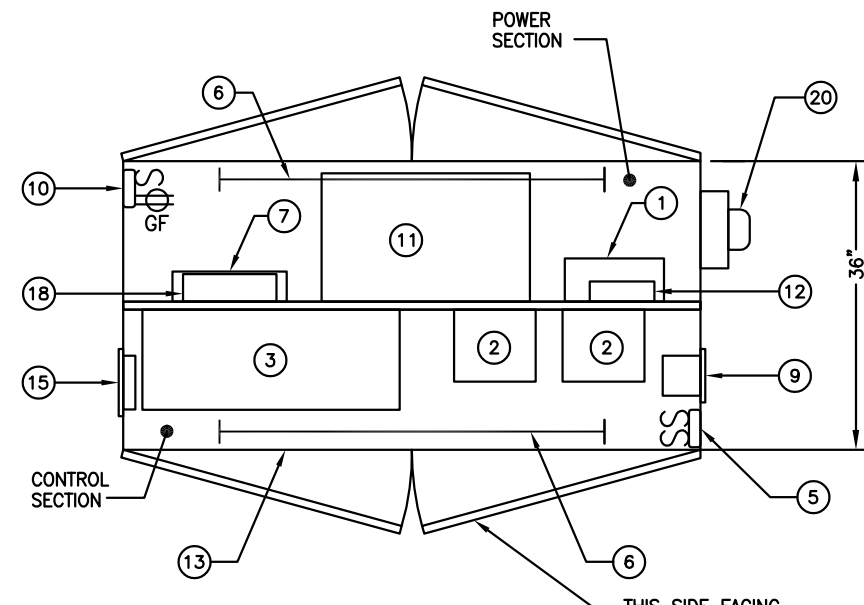
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GENERAL NOTES

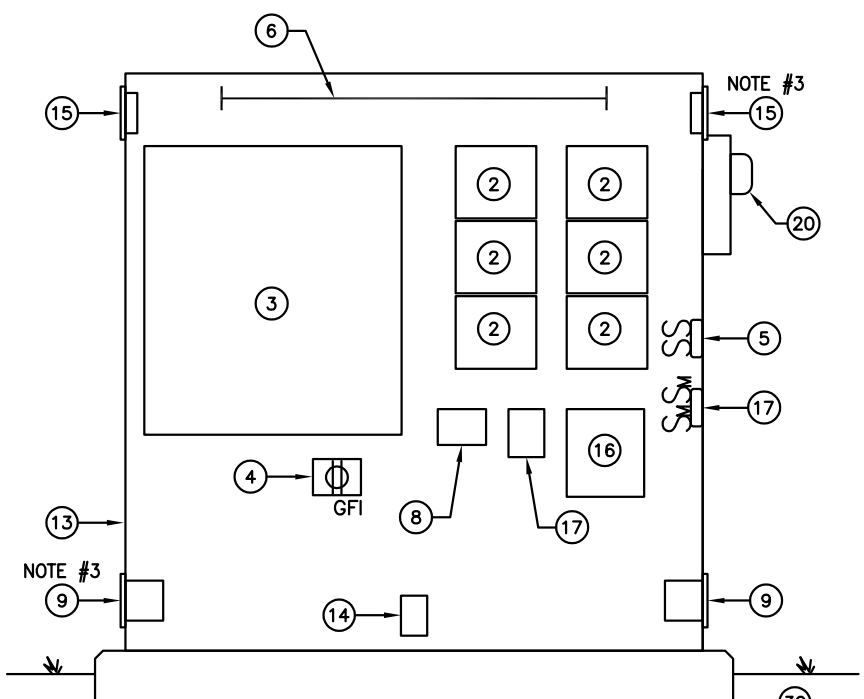
1. WIRING ENTERING FROM CONCRETE PAD SHALL BE IN RIGID GALVANIZED STEEL CONDUIT.
2. ALL INTERCONNECT WIRING WITHIN ENCLOSURE SHALL BE IN SCHEDULE 40 PVC OR RIGID ALUMINUM CONDUIT. LIQUID-TIGHT FLEXIBLE NONMETALLIC CONDUIT IN LENGTHS NOT EXCEEDING 12" MAY BE USED WHERE INSTALLATION OF RIGID CONDUIT IS IMPRACTICAL.
3. CONTROL SECTIONS WITH VFD DRIVE CONTROLLERS INSTALLED SHALL BE VENTILATED WITH AN ADDITIONAL THERMOSTATICALLY CONTROLLED FAN AND AN ADDITIONAL EXHAUST LOUVER WITH REPLACEABLE FILTER. LIVE TERMINALS OF THERMOSTAT SHALL BE SHIELDED FROM CONTACT.
4. FOR MOTOR & GENERATOR FEEDER EQUIPMENT SIZE REFER TO SIZING CHART.

EQUIPMENT LIST

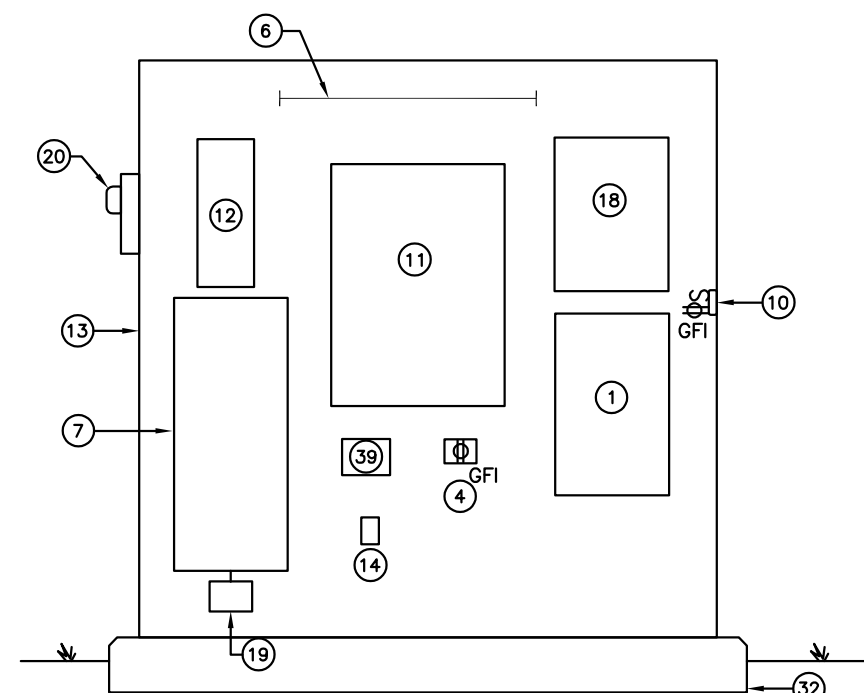
- 1 480/277V, 3PH, 4W PANEL, 225A MLO
- 2 AC DRIVE CONTROLLER WITH BACKUP SOLID STATE SOFT START AND STAND ALONE ACROSS THE LINE STARTERS.
- 3 REMOTE TELEMETRY UNIT WITH PUMP CONTROLLER (RTU/PLC) IN NEMA 12 ENCLOSURE
- 4 20A/120VAC DUPLEX GFCI RECEPTACLE IN FS BOX WITH COVER
- 5 FLOODLIGHT & ENCLOSURE LIGHT SWITCHES IN DUAL-GANG FS BOX; PROVIDE IDENTIFICATION LABELS
- 6 4' LONG (APPROX) LED LIGHTING FIXTURE.
- 7 100A, 120/240 1PH, 3W, 30 CKT PANEL - NEMA 1
- 8 EFFLUENT FLOW TRANSMITTER; 24V DC WITH RS-485 SERIAL WIRED TO 3
- 9 THERMOSTATICALLY CONTROLLED COOLING FAN
- 10 LIGHT SWITCH & 20A/120VAC DUPLEX GFCI RECEPTACLE IN DUAL-GANG FS BOX WITH COVER
- 11 3 POLE AUTOMATIC TRANSFER SWITCH, CUMMINS OTEC MODEL (POWER MONITORING MODULES ON LOAD SIDE CONDUCTORS)
- 12 NEMA 1 ENCLOSED MAIN CIRCUIT BREAKER, 3P 150A, 480V.
- 13 SERVICE CABINET ENCLOSURE; FREESTANDING NEMA TYPE 12, TYPICAL SIZE 72"H X 72"W X 36"D (ADJUST LENGTH AND NUMBER OF SECTIONS AS REQUIRED FOR INSTALLED EQUIPMENT)
- 14 THERMOSTATICALLY CONTROLLED ELECTRIC HEATER; QUANTITY/CAPACITIES AS REQUIRED FOR 30°F RISE ABOVE AMBIENT TEMPERATURE.
- 15 EXHAUST LOUVER PLATE WITH REPLACEABLE FILTER
- 16 GRINDER CONTROL PANEL
- 17 CAST ALUMINUM DIRECT DRIVE BLOWING INTO WET WELL
- 18 DRY TYPE TRANSFORMER - 10KVA, 1Ø 480-120/240
- 19 TRANSIENT VOLTAGE SURGE SUPPRESSOR UNIT (MODULAR)
(TYPE I) FOR ≥ 400A SERVICE
(TYPE II) FOR ≤ 400A SERVICE
LEADS TO BE KEPT AS SHORT AS POSSIBLE
- 20 POWER METER - CONTRACTOR TO FURNISH AND INSTALL KWH METER SOCKET. LOCATION PER UTILITY COMPANY.
- 21 DIESEL GENERATOR WITH DUAL WALL SUB BASE FUEL TANK.
GENERATOR SHALL MATCH INCOMING UTILITY SERVICE VOLTAGE AND PHASE (277/480V, 3Ø, 4W).
- 22 FILTER TO REDUCE OUTPUT SIGNAL NOISE PER MANUFACTURES RECOMMENDATIONS
- 23 BLOCK HEATER - 2#12 & 1#12 GND IN 3/4"C. CHECK MANUFACTURE REQUIREMENTS.
- 24 GENSET SOUND ENCLOSURE TYPE WILL BE SELECTED PER SIZING CHART
- 25 GENSET PAD - SEE DETAIL SHEET
- 26 4#1/OAWG - 1 1/2"C
- 27 4#1/OAWG + #6GRD - 1 1/2"C
- 28 SIZE PER MOTOR, #12 AWG MINIMUM
- 29 2#12 & 1#12 GND IN 3/4"C
- 30 2#12 & 1#12 GND IN 3/4"C
- 31 3#14 & 1#14 GND IN 3/4"C
- 32 SEE STRUCTURAL DRAWING FOR SERVICE CABINET ENCLOSURE PAD
- 33 DIRECT BURY FROM UTILITY TRANSFORMER TO POWER METER. PROVIDED BY UTILITY COMPANY. THE CONTRACTOR WILL FURNISH & INSTALL (SIZE & TYPE AS DIRECTED BY THE UTILITY) EMPTY CONDUIT FROM THE BOTTOM OF THE CONTRACTOR FURNISHED & INSTALLED METER SOCKET TO A LOCATION PAST THE CONCRETE PAD AS DIRECTED BY THE UTILITY.
- 34 TRANSFORMER, PAD AND GROUNDING PROVIDED BY UTILITY COMPANY
- 35 GENERATOR START SIGNAL WIRING IN 3/4"C. NO. & SIZE OF WIRES PROVIDED BY MANUFACTURER
- 36 GENERATOR CONTROL PANEL ALARM SIGNAL TO PLC
- 37 GENERATOR MCB PROVIDED BY GENERATOR MANUFACTURER
- 38 CONTROL WIRE TO PLC
- 39 POWER LOGIC PM-8000 DIGITAL METER, THD, MODBUS RS485 (SHARK MODEL 100) WITH A PATCH CABLE TO A 5 PORT ETHERNET SWITCH) IN SEPARATE NEMA 1 ENCLOSURE. PROVIDE CT'S IN PP1 BACKBOX.
- 40 OMIT MAIN BREAKER FOR STATIONS WITH 120/240VAC SERVICE VOLTAGE
- 41 NEMA 1 ENCLOSED 3P-30A CKT BRKR
- 42 4-#10 & 1-#10 GND - 3/4"C - 24" MAX. LEAD LENGTH
- 43 4#1/OAWG + #6GRD - 1 1/2"C
- 44 PROVIDE WEATHER-RESISTANT, GFCI TYPE RECEPTACLE IN ENCLOSURE FOR CONNECTION TO HEATER/HEAT TRACE TAPE.



PLAN VIEW-SERVICE CABINET ENCLOSURE
N.T.S.



CONTROL SIDE ELEVATION-SERVICE CABINET ENCLOSURE
N.T.S.



POWER SIDE ELEVATION-SERVICE CABINET ENCLOSURE
N.T.S.

PROFESSIONAL CERTIFICATION

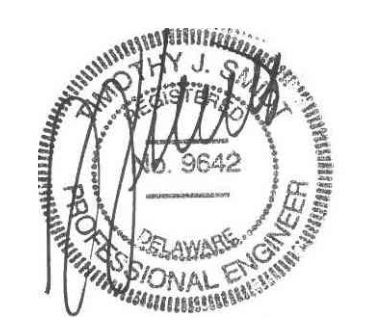
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LICENSE No. P.E. # 9642 EXPIRATION DATE: 6/30/2020

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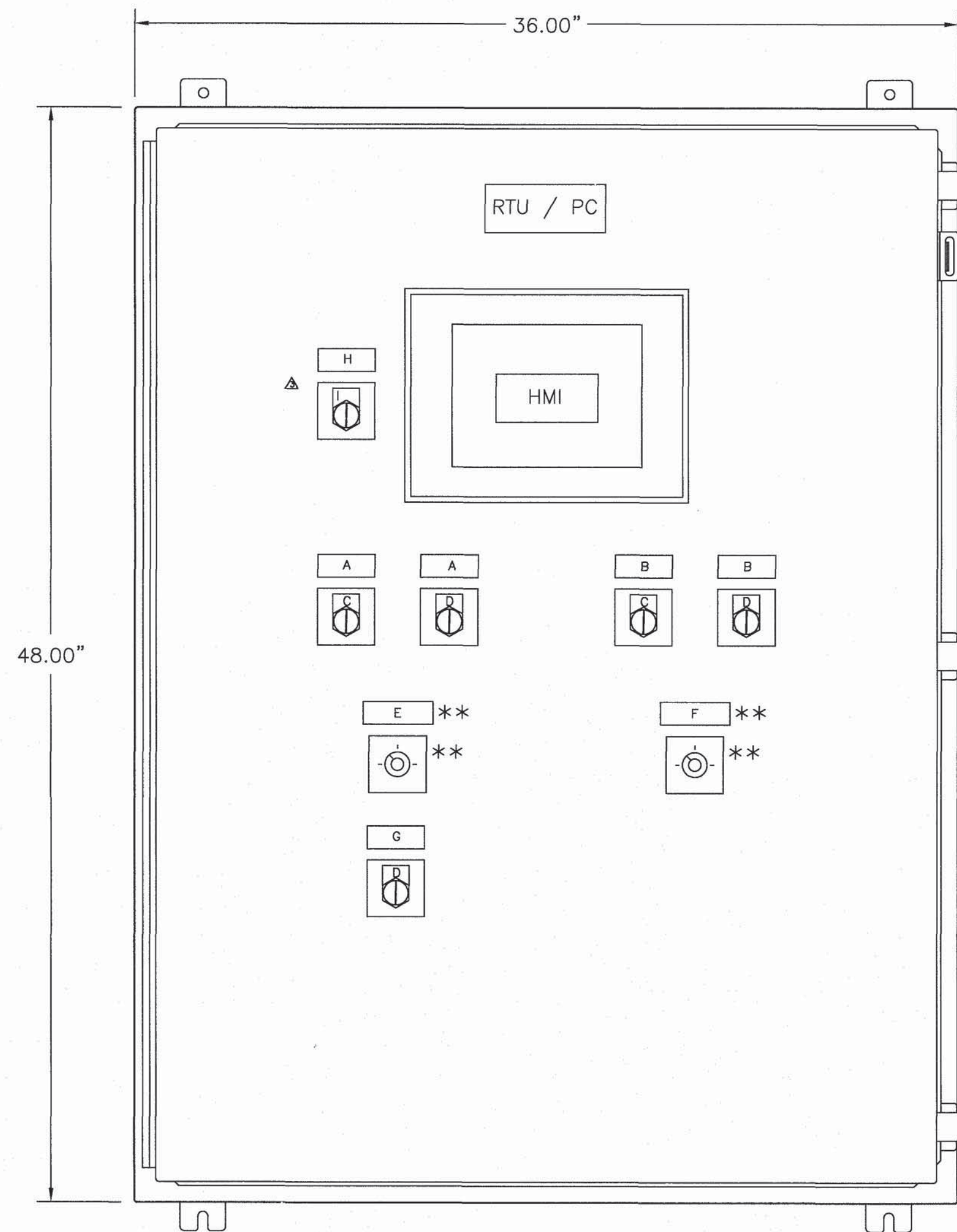


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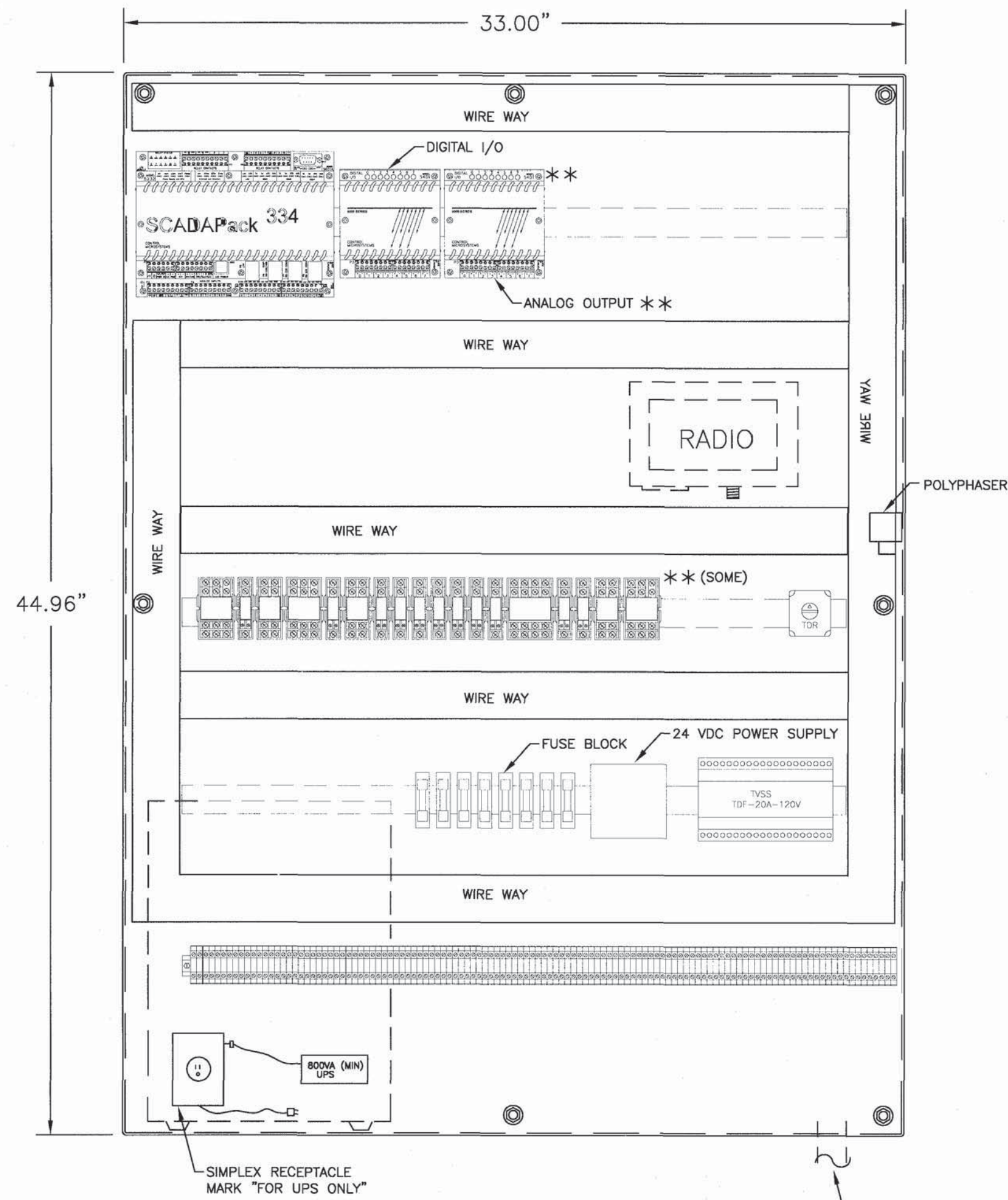


**SEWAGE PUMP STATION
PS-38**
MEDIUM PS WITH VFD, & SINGLE LINE ENCLOSURE
FOR
CATTAIL CREEK
SOUTH MURDERKILL HUNDRED KENT COUNTY, DE

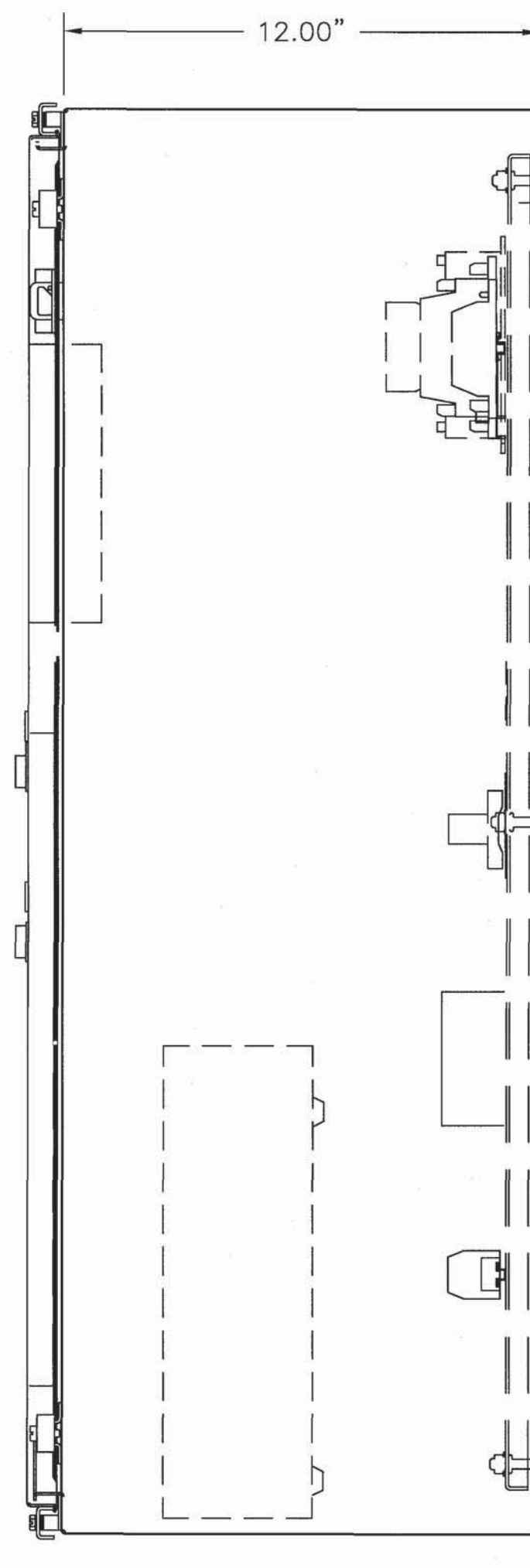
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		DATE: 12/23/2019
		DRAWN BY: AV
		DESIGN BY: AV
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		SHEET: 12 OF 17



FRONT VIEW
NEMA 12 ENCLOSURE



BACK PANEL VIEW



END VIEW
WIREWAY OMITTED FOR CLARITY

MATERIAL SCHEDULE

QTY	DESCRIPTION	CATALOG NUMBER	MANUFACTURER
1	ENCLOSURE NEMA 12	C-SD423612	HOFFMAN
1	BACK PANEL	C-P4236	HOFFMAN
1	SCADAPACK 334 24VDC INPUTS	TBUP334-1A20-AB00	SCHNEIDER
1	32 PT MODULE DIGITAL INPUT 120VAC	TBUX297249	SCHNEIDER
*1	4 PT ANALOG OUTPUT (VFD STATIONS)	TBUX297248	SCHNEIDER
1	LIGHTING SUPPRESSOR	IS-50NX-C2	POLYPHASER
1	RADIO	SP900XL-1000	COYOTE DATA COMM
1	INDUCTIVE PROXIMITY SWITCH	XS8C40MP230H7	TELEMECANIQUE
1	SURGE PROTECTOR (TVSS)	TDF-20A-120V	ERICO OR EQUAL
A/R	DT RELAY W/ BASE	TYPE RH	IDEC
A/R	TERMINALS	UK5N	PHOENIX
A/R	WIRE WAY	2X3, 1.5X3	TYTON
58	TERMINALS	UKK5	PHOENIX
1	POWER SUPPLY (60W MINIMUM)	PS5R-024	IDEC
1	HMI	MMI-8070IE	KEP
1	TDR	330-12-300S	TIME MARK
A/R	FUSES	3AG1A313, 3AG3A313	LITTELFUSE
A/R	TERMINAL	U5LKG5	PHOENIX
1	UPS	PULSAR 800/560 VA/W	MGE SYSTEMS

FIELD INSTRUMENT SCHEDULE

QTY	DESCRIPTION	CATALOG NUMBER	MANUFACTURER
1	MAGNETIC FLOW METER WITH MODBUS MODULE	MAGFLO MAG6000	SIEMENS
1	LEVEL TRANSMITTER (30' CABLE)	PBLT2-8.662-30	DWYER
1		0-20ft H2O	
2	PRESSURE TRANSMITTER	0-30 PSI	ASHCROFT
2	PRESSURE GLAND	PSQ	ONYX
2	FLOAT SWITCHES (30' CABLE)	ALL NORMALLY OPEN	HYDROMATIC

ENGRAVING SCHEDULE *

ID	FIRST LINE / SECOND LINE
A	PUMP 1
B	PUMP 2
C	VFD SS AUX (SS AUX)
D	HAND OFF AUTO
E	PUMP 1 / SPEED POT
F	PUMP 2 / SPEED POT
G	BLOWER
H	OFF ON
I	HMI POWER

* DESCRIPTIONS IN PARENTHESIS APPLY TO "SMALL" PUMP STATIONS.

NOTES:

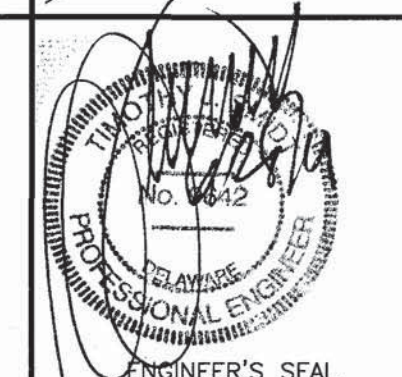
- RTU/PC PANEL AND ASSOCIATED CONTROL COMPONENTS SHALL BE PROVIDED AND CONFIGURED BY A SYSTEMS INTEGRATOR. CURRENT APPROVED RTU VENDORS INCLUDE TRIJAY (SUMMERVILLE, SC), POWER ELECTRONICS (MILLINGTON, MD), & ATLANTIC CONTROLS (FELTON, DE). CONTACT KENT COUNTY ENGINEERING FOR PRE-APPROVAL OF OTHER VENDORS PRIOR TO BID.
- THE SYSTEMS INTEGRATOR SHALL PROVIDE AS-BUILT DRAWINGS DOCUMENTING FINAL INSTALLATION & WIRING IN HARD COPY AND ELECTRONIC (AUTOCAD V14 .DWG COMPATABLE) FORMAT. ONE SET OF THE RTU SCHEMATICS SHALL REMAIN ON-SITE AT ALL TIMES AFTER INITIAL INSTALLATION. THE PLC AND HMI PROGRAMS SHALL BE PROVIDED BY KENT COUNTY. THE PANEL SHALL BE WIRED AS SHOWN IN THE PROJECT SCHEMATICS. THE SYSTEMS INTEGRATOR SHALL PROVIDE CHECKOUT AND STARTUP ASSISTANCE AND WILL CORRECT ANY WIRING DEFICIENCIES
- THE VFD AND SOFTSTART WIRING SCHEMATICS ARE BASED ON SQUARE D COMPONENTS. THE CONTRACTOR SHALL FURNISH AS-BUILT SCHEMATICS AS DETAILED ABOVE.
- LEVEL AND PRESSURE TRANSMITTERS SHALL BE 24VDC LOOP POWERED.
- FLOWMETER MUST HAVE A SELF-POWERED, ACTIVE OUTPUT & MODBUS RS-485 OPTION INSTALLED & WIRED..
- SEE TYPICAL MECHANICAL PLANS, ELEVATION AND DETAILS DRAWING FOR LOCATIONS OF COMPONENTS.

1. IN GENERAL, VFD'S ARE NOT REQUIRED FOR SMALL & MEDIUM PUMP STATIONS (GREATER THAN 5 HP & LESS THAN 20 HP) THAT DO NOT DISCHARGE TO A FORCE MAIN. SEPERATE SCHEMATICS ARE PROVIDED FOR "VFD" AND "NON-VFD" STATIONS.

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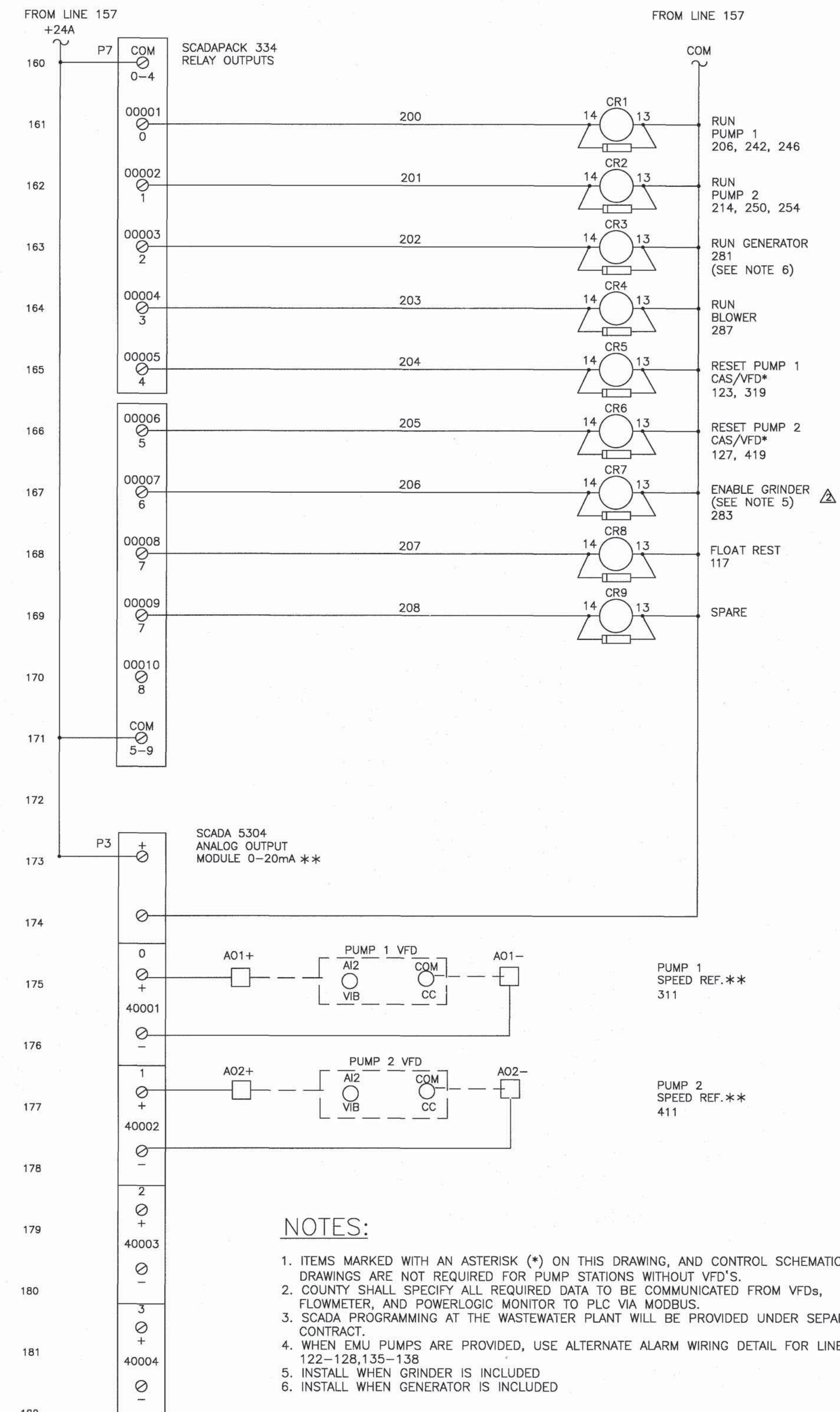
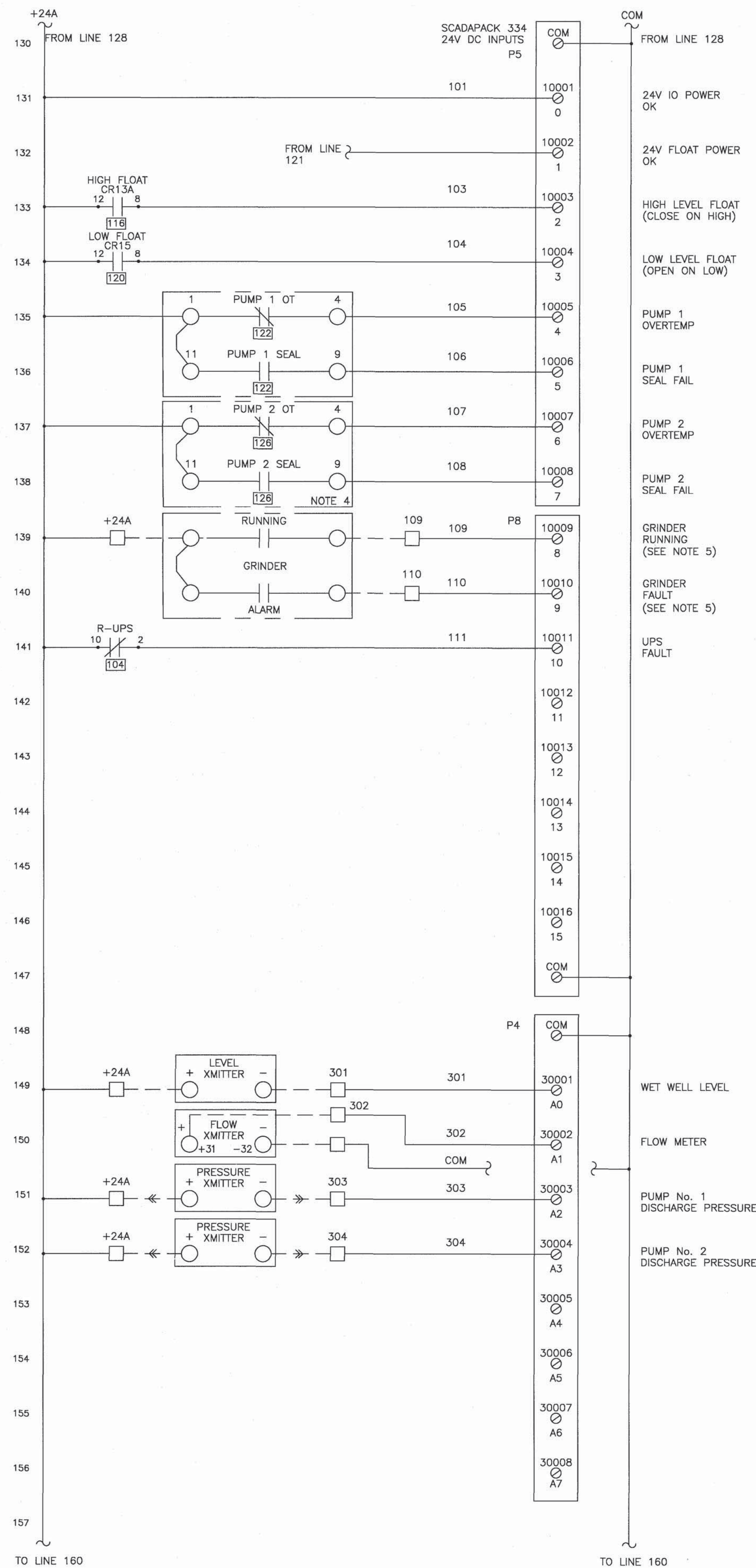
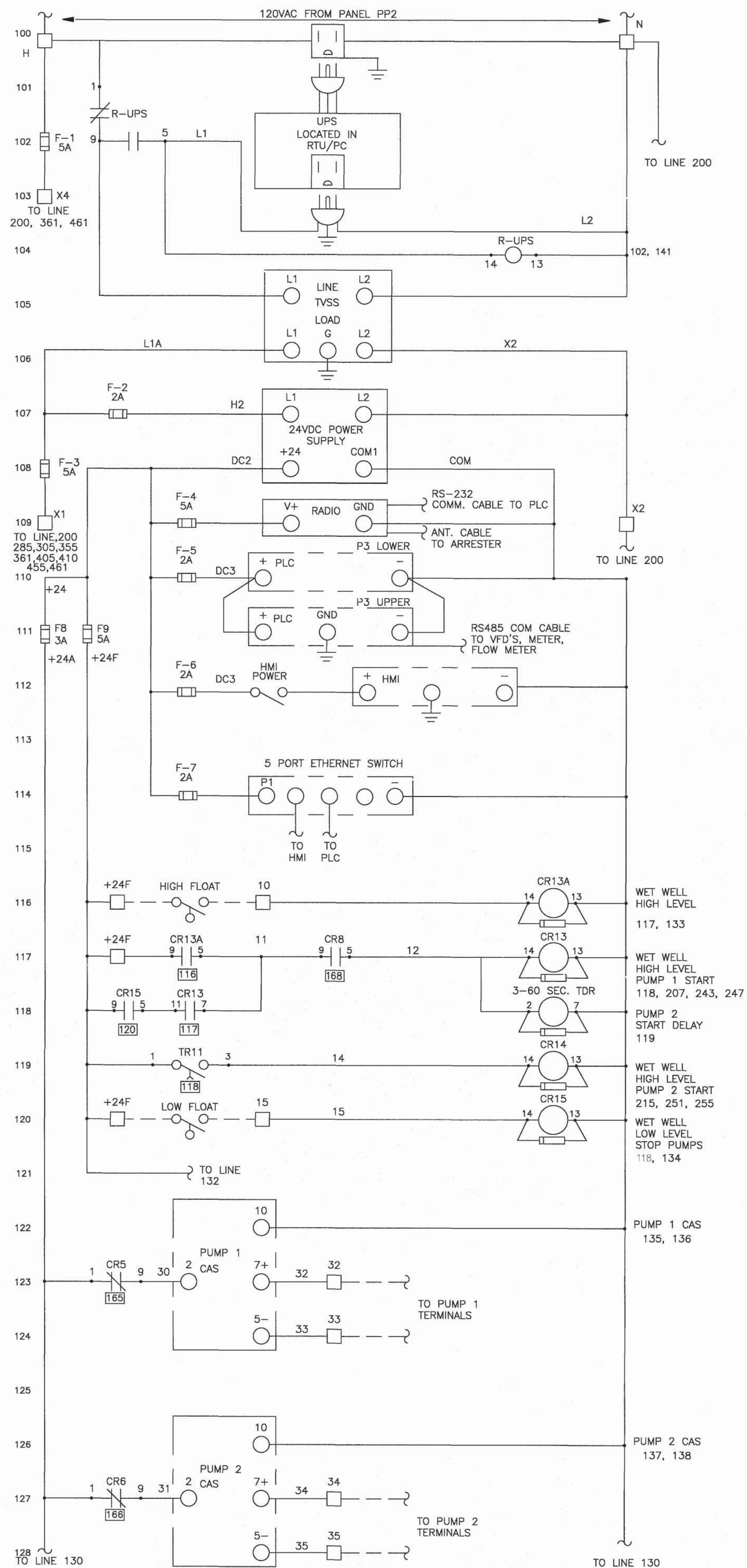
**SEWAGE PUMP STATION
PS-38
RTU AND PC ENCLOSURE
FOR
CATTAIL CREEK**
SOUTH MURDERKILL HUNDRED KENT COUNTY, DE

PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, TIMOTHY SMIDT AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF DELAWARE.

LICENSE No. P.E. # 9642 EXPIRATION DATE: 6/30/2020

DATE	REVISIONS	JOB NO.: 18140
		SCALE: AS NOTED
		DATE: 6/21/2019
		DRAWN BY: AV
		DESIGN BY: AV
		REVIEW BY: TS
		SHEET: 13 OF 17



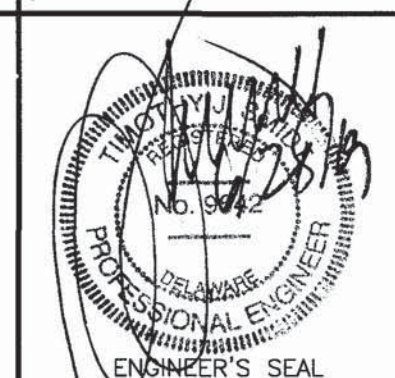
NOTES:

- ITEMS MARKED WITH AN ASTERISK (*) ON THIS DRAWING, AND CONTROL SCHEMATIC DRAWINGS ARE NOT REQUIRED FOR PUMP STATIONS WITHOUT VFD'S.
- COUNTY SHALL SPECIFY ALL REQUIRED DATA TO BE COMMUNICATED FROM VFD'S, FLOWMETER, AND POWERLOGIC MONITOR TO PLC VIA MODBUS.
- SCADA PROGRAMMING AT THE WASTEWATER PLANT WILL BE PROVIDED UNDER SEPARATE CONTRACT.
- WHEN EMU PUMPS ARE PROVIDED, USE ALTERNATE ALARM WIRING DETAIL FOR LINES 122-128, 135-138.
- INSTALL WHEN GRINDER IS INCLUDED
- INSTALL WHEN GENERATOR IS INCLUDED

PS & FM



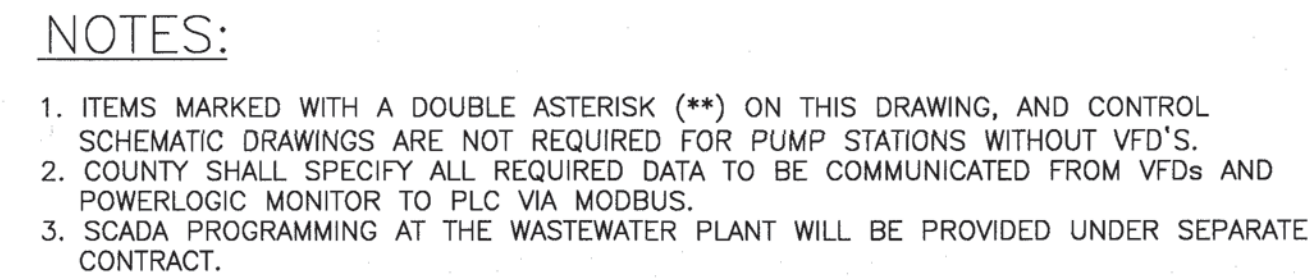
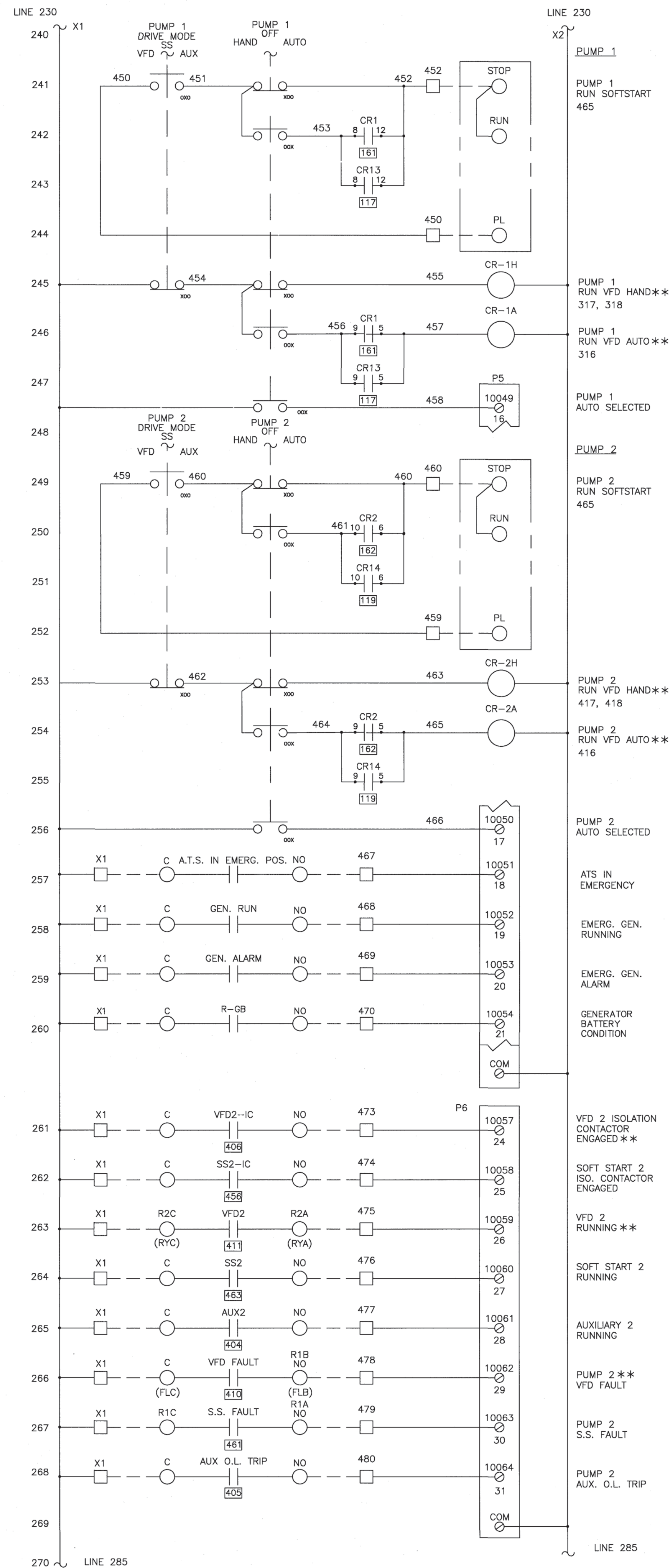
MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
3445-A BOX HILL CORPORATE CENTER DRIVE
ABINGDON, MD 21009
(410) 515-9000
FAX: (410) 515-9002
MRA@GTA.COM
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**SEWAGE PUMP STATION
PS-38
PUMP CONTROL SCHEMATIC
FOR
CATTAIL CREEK**


PROFESSIONAL CERTIFICATION
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		SHEET: 14 OF 17





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TELECENT ENGINEERING INC.
2716 Commerce Road, Suite 1
Forest Hill, MD 21050
(410) 692-3816
www.tei-eng.com



MRA
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ABINGDON, MD 21019
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MRAGTA.COM
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Professional Engineer Seal for Timothy J. Pappas, License No. 165642, State of Delaware.

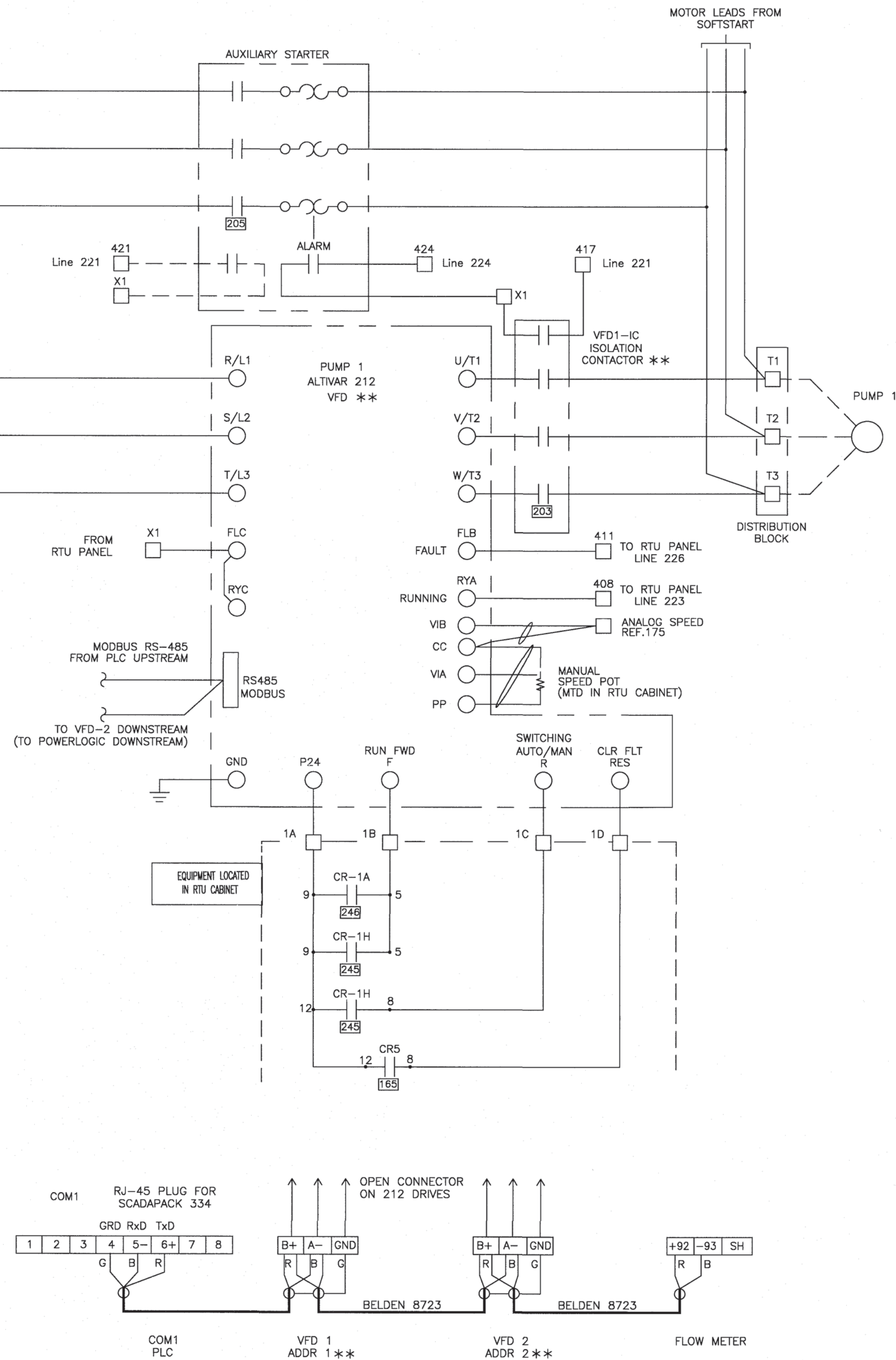
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		SHEET: 15 OF 17

PROFESSIONAL CERTIFICATION

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LICENSE No.	P.E. # 9642	EXPIRATION DATE:	6/30/2020
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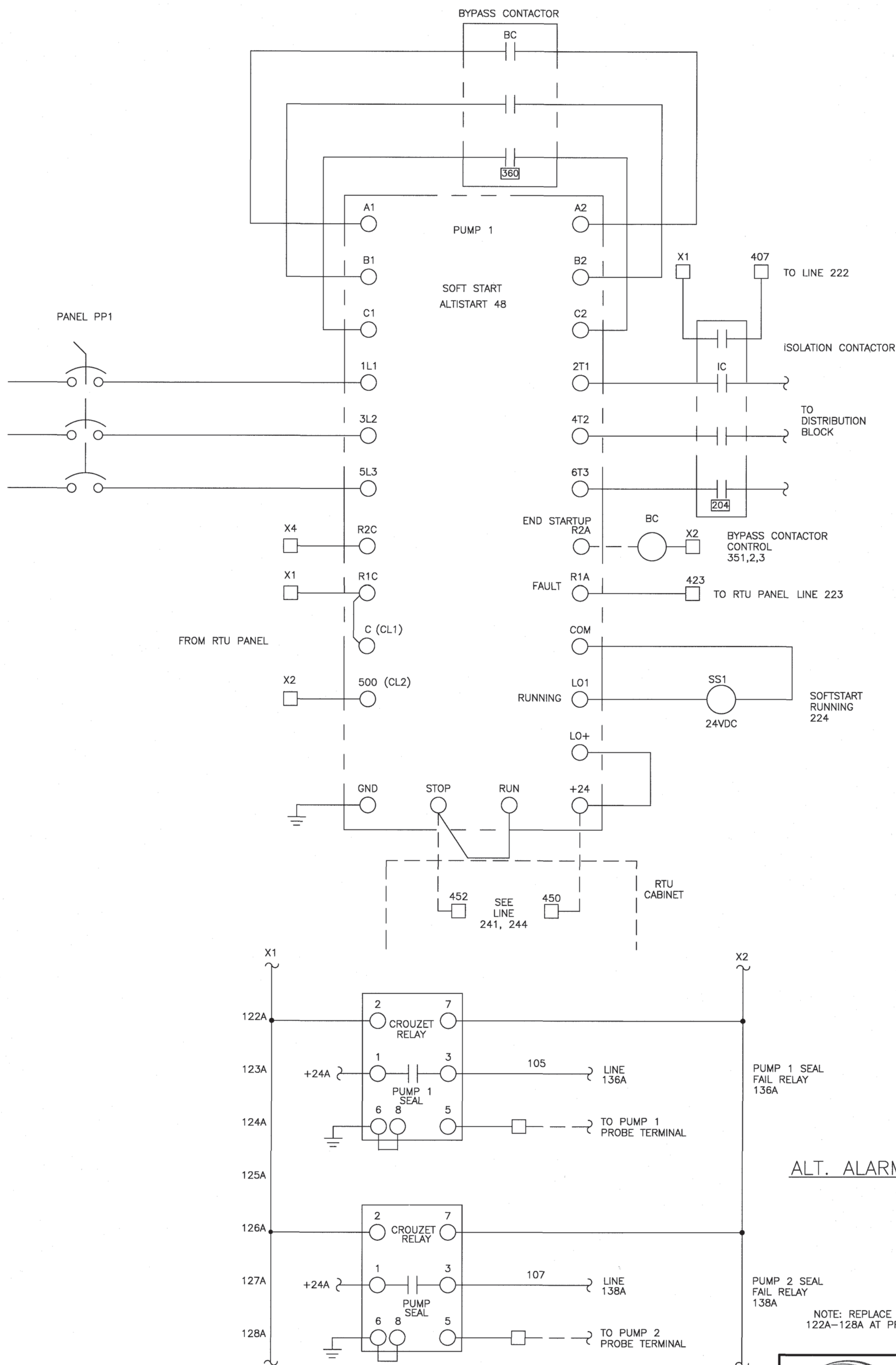


MODBUS COMMUNICATIONS WIRING

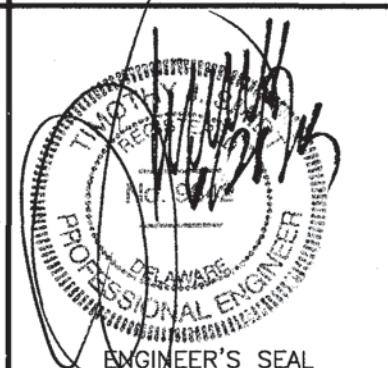
NOTES:

1. ITEMS MARKED WITH AN ASTERISK (*) ON THIS DRAWING, AND CONTROL SCHEMATIC DRAWINGS ARE NOT REQUIRED FOR SMALL PUMP STATIONS.
2. COUNTY SHALL SPECIFY ALL REQUIRED DATA TO BE COMMUNICATED FROM VFDs AND POWERLOGIC MONITOR TO PLC VIA MODBUS.
3. SCADA PROGRAMMING AT THE WASTEWATER PLANT WILL BE PROVIDED UNDER SEPARATE CONTRACT.
4. THIS DWG IS TYPICAL FOR 2 PUMPS. CROSS REFERENCES ARE SHOWN AS: PUMP1 (PUMP2)
5. OMIT JUMPER FOR SQUARE D, ALTIVAR 61 VFD.

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ALT. ALARM WIRING DETAIL FOR EMU PUMPS



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SEWAGE PUMP STATION
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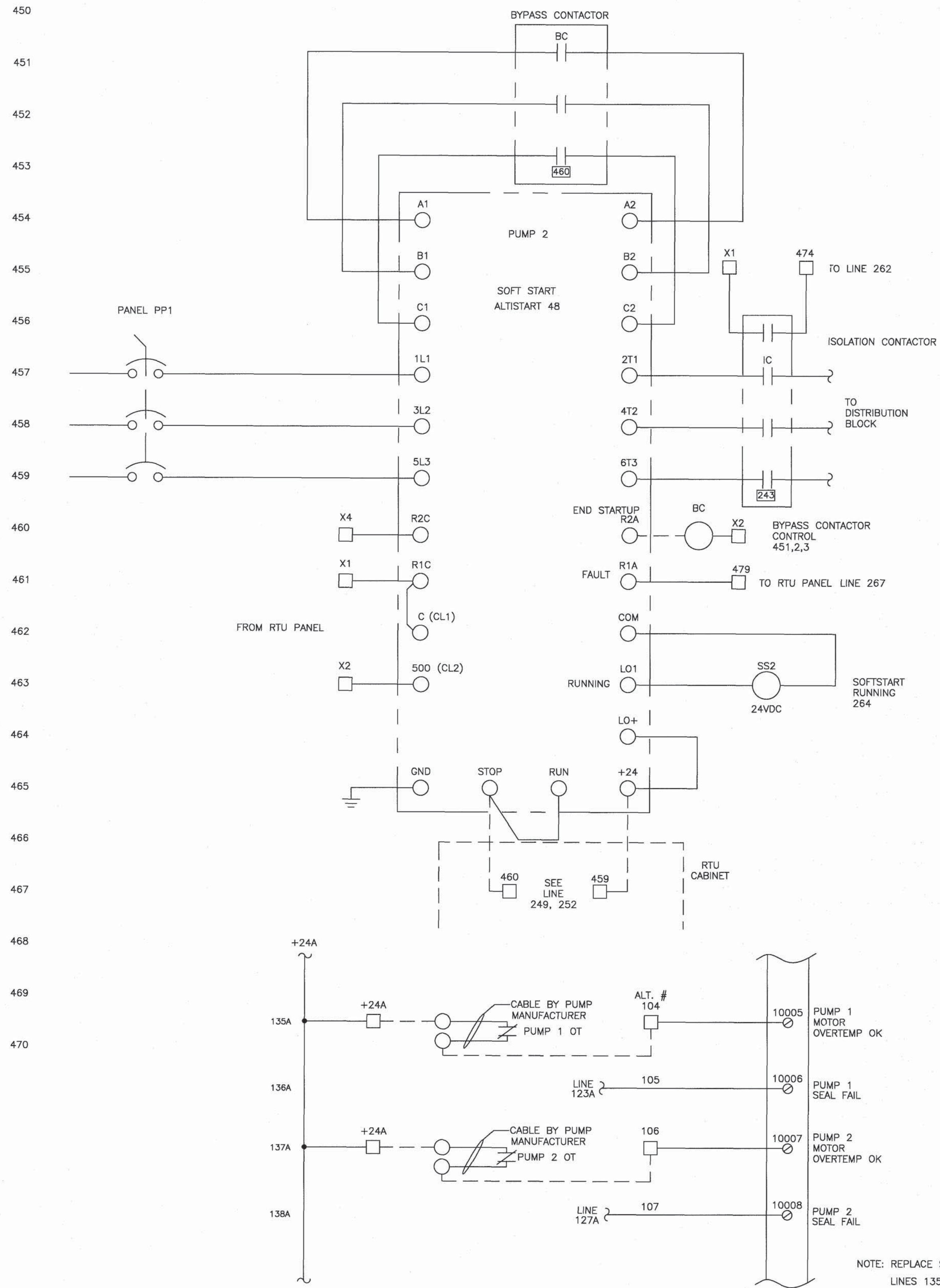
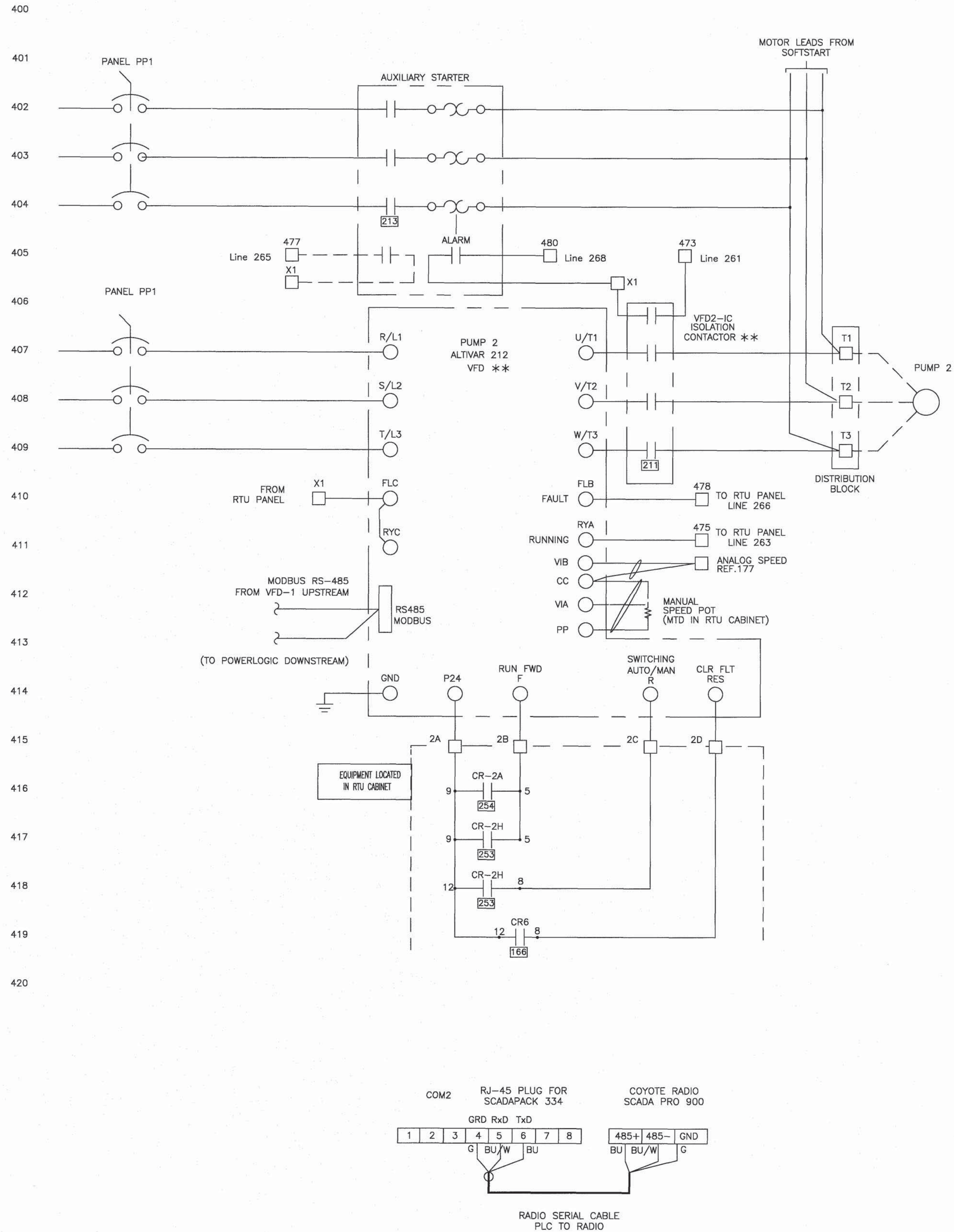
SOUTH MURDERKILL HUNDRED KENT COUNTY, DE

PROFESSIONAL CERTIFICATION

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		SHEET: 16 OF 17



ALT. ALARM WIRING DETAIL FOR EMU PUMPS

NOTES:

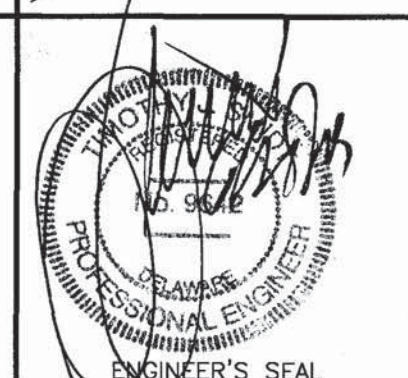
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- COUNTY SHALL SPECIFY ALL REQUIRED DATA TO BE COMMUNICATED FROM VFDs AND POWERLOGIC MONITOR TO PLC VIA MODBUS.
- SCADA PROGRAMMING AT THE WASTEWATER PLANT WILL BE PROVIDED UNDER SEPARATE CONTRACT.
- THIS DWG IS TYPICAL FOR 2 PUMPS. CROSS REFERENCES ARE SHOWN AS: PUMP1 (PUMP2)
- OMIT JUMPER FOR SQUARE D, ALTIVAR 61 VFD.

NOTE: REPLACE SCHEMATIC LINES 135-138 WITH LINES 135A-138A WHEN EMU PUMPS ARE USED.

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SEWAGE PUMP STATION
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