NORTH CHARLESTON SEWER DISTRICT
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Weston & Sampson
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Tel: 843.881.9804

NORTH CHARLESTON SEWER DISTRICT

PURCHASING DEPARTMENT

Purchasing Manager: Kimberly Caver, P.O. Box 63009 or
7225 Stall Road (BLDG C), North Charleston, SC 29419
PHONE: (843) 764-2653

TO: All Prospective Offerors

FROM: Kimberly Caver, Purchasing Manager

RFP TITLE: Sunnyside Pump Station Replacement

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ADDENDUM NUMBER 2 – May 21, 2025 – 5 PAGES

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Acknowledge receipt of this addendum by inserting its number and date in the space provided on the BID FORM, Section 00 41 00 Page 2, for receipt of Addenda. Failure to do so may subject Bidder as non-responsive. This addendum should be attached to and become part of the Contract Documents.

Attachments to this Addendum:

1. Updated plan sheets C-100, C-101, C-202, C-203, C-204, C-504, C-505, C-507, E001, E002, E003 and new plan sheets C-508, E050, and E100.
2. Updated Specification Sections 33 01 30.12 – Acceptance Testing for Sanitary Sewers and 40 05 78.26 – Air Vacuum Valves for Wastewater Service
3. New Specification Sections 33 31 13.16 – PVC Gravity Pipe and Fittings and 33 39 19 – Precast Manholes and Wet Wells.

Questions/Clarifications:

1. Will there be linings for the pump station?
    - The new wet well will require a Level C lining, new specification Section 33 39 19 – Precast Manholes and Wet Well added to cover wet well installation.

2. Are there any epoxy coatings required for the inside of the wet well or doghouse manhole?
    - Yes, see plan sheets C-204 and C-205. Level C lining is specified in added Section 33 39 19 – Precast Manholes and Wet Well.

3. What size and type of pipe material should be used between the Dominion Gas meter to the new Cummins Generator?
    - The gas service line should be 1-1/4" steel.

4. Plan sheet C-203 calls for a permeable pavement system for the new pump station site. This is in reference to the Ecoraster E50 material shown on sheet C-505 correct?
    - That is correct.

5. Will delays in permitting, delays in procurement, or delays in Owner furnished equipment be granted to the contractor in form of time extension change order?
    - Yes. See the information below for the estimated dates for delivery of the Owner purchased equipment.

        - Generator – August 2025
        - ATS – August 2025
        - Flow Meter – August 2025
        - Pumps + Accessories – September to October 2025
        - Pump Control Package – September to October 2025
        - AP500 GridBee Mixer – August 2025

6. Is the Owner Supplied electrical canopy the responsibility of the contractor to install, it just states "Canopy by Others?" If the canopy is the responsibility of the contractor to install, are the columns surface mount or embed?
    - The electrical panel canopy is to be provided and installed by the Contractor. See the canopy detail on Sheet C-503. There are two options available for installing the columns.

7. With regards to the concrete repair/lining can you identify the scope of lining sub. Only the wet well and new receiving manhole, or are we going to secondary receiving manholes in each direction?
    - The Level C lining is required for the new receiving manhole (first MH upstream of wet well) and the wet well.

8. In the details of the composite fence, we can source the deck boards but struggling to find rails and 6x6 posts out of composite material. Are those supposed to be pressure treated wood posts and rails and the deck boards only made of composite?
    - The 2"x6" rails (stringers) and 6"x6" posts are Yellawood pressure treated pine. The gate frames are 2" welded galvanized steel, and the gate posts are 4" galvanized steel.

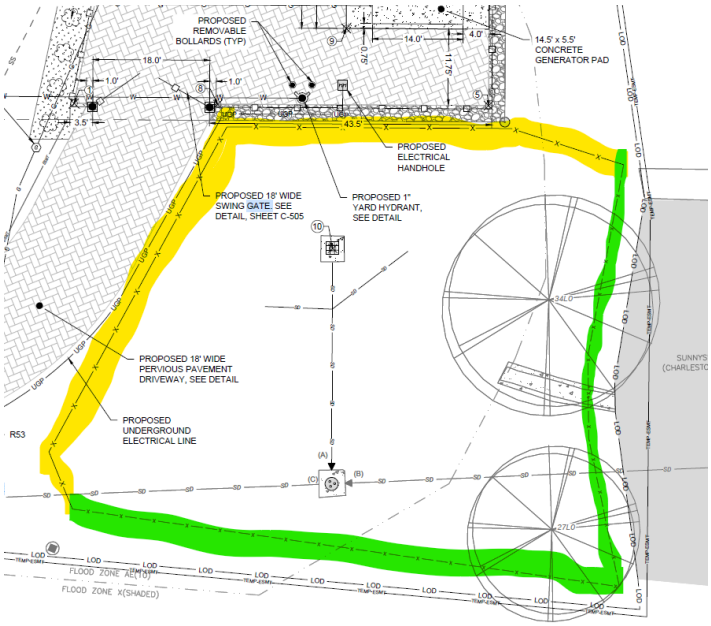
9. Can you provide a list of owner furnished equipment?
    - See the tables on Sheets C-101 and E001

10. Can you provide arrival dates of owner furnished equipment and /or if it is onsite?
    - See Item 5. above.

11. Can you require that the apparent low bidder only be required to provide the qualifications package if requested by NCSD and not be a part of bid form submittal? It is a lot of work. Bid bond should suffice I would think for the bid itself.
    - The Bidder's Qualifications (Section 00 41 00.15) is not required with the bid submittal. It is the Owner's option to request it after the bid opening and before the contract award.

12. Hal w/ Electric Supply is questioning the use of conduit seal offs as shown vs. normally used cable gland fittings.
    - See the revised electrical plans sheets for use of cable trays.

13. On the 8' chain link, does the green remain and the yellow is new install to tie into the existing that does not get demolished? That's what it looks like comparing C202 demo plan with C203.



    - That is correct.

14. Plans call for H-Tec or ARI Air Release Valve, epoxy coated steel body OR plastic body "refer to detail." Go to detail and it refers to specs. Specs call for Vent-Tech SZG or Engineer's approved equal. Can you clarify what ARV to use or options for the engineered approved equal per the spec? Specs typically govern.
    - The correct air vacuum valve manufacturer and model is the Vent-Tech Model 02SZG10TBR-6. The plans and specifications have been revised to reflect this correction.

15. Existing utilities "WATER"- New water meter has to be furnished by the new account holder, NCSD. CWS will not allow the tap or set the meter until tap / impact fees are paid for by Account Holder, NCSD. We can relocate the existing water meter for Kiawah house

after approval is obtained from CWS. Meter installation has to be scheduled by the Account Holder, NCSD.

- NCSD will pay all tap/impact fees required to install the new meter for the pump station and relocate the existing meter for the Kiawah Homes Community Center. Contractor shall notify NCSD two weeks in advance prior to installing and relocating the meter.

16. What is the size of the new water meter for the 2" water service to the site yard hydrant so we know what size the tap and yoke box and / or setter will be for our install? CWS allows 2" tap on 2" meter, 2" Tap on 1 ½" Meter, 1 ½" tap on 1 ½" Meter, 1" tap on 1" Meter, 1" Tap on ¾" Full Size Meter, and 1" Tap on ¾" Meter.
    - The pump station water service has been changed to 1-1/2". The new water meter size should be 1-1/2".

17. Existing utilities " GAS" – Existing Gas Service removal and Gas Meter relocation has to be paid for and scheduled by the Account Holder, NCSD.
    - NCSD will pay for and schedule the removal of the existing gas meter and setting of the new gas meter. Contractor shall notify NCSD two weeks in advance of needing the gas meter set.

18. Existing utilities " Electrical" – Existing overhead line removal, power pole removal, and meter relocation has to be paid for and scheduled by the Account Holder, NCSD.
    - NCSD will pay for and schedule the removal of the existing overhead electrical line, power pole, and meter relocation. Contractor shall notify NCSD two weeks in advance of needing these items accomplished.

19. The specs indicate that the Control Panel should be built with the SCADA equipment mounted INSIDE it. This would seem to indicate that we don't need to hire MR Systems, but the "SCADA Control Diagram" on Sheet E003 indicates otherwise.
    - The control panel will be built with space inside it for SCADA. Inframark (MR Systems) will still install their equipment into the control panel. See notes added to revised Sheet E003.

<u>The following changes are made to the Contract Documents:</u>

Plans:

1. Plan sheets C-100, C-101, C-202, C-203, C-204, C-504, C-505, C-507, E001, E002, and E003 have been updated. Replace these sheets with the updated sheets attached to this addendum.
2. Plan sheets C-508, E050, and E100 attached to this addendum have been added to the plan set.

Specifications:

1. **DELETE** Section 03 01 30.61, Repair of Structural Concrete, in its entirety.

2. **DELETE** Section 03 64 01, Polyurethane Injection Grouting, in its entirety.

3. **DELETE** Section 09 90 00, Paint and Coatings, in its entirety.

4. **DELETE** Section 31 37 00, Riprap, in its entirety.

5. **REPLACE** Section 33 01 30.12, Acceptance Testing for Sanitary Sewers, with the attached section.

6. **ADD** the attached Section 33 31 13.16, Polyvinyl Chloride Gravity Pipe and Fittings (SDR-35).

7. Section 33 34 00 – Sanitary Sewer Force Mains, page 2, paragraph 2.01.A.4, **DELETE** the following text, “Protecto 401TM by Vulcan Painters or”.

8. Section 33 34 00 part 2.01 A, 6 **ADD** the following Sherwin Williams products as alternatives to the existing Tnemec products:
    a. Tnemec Series 66 Hi-Build Epoxoline – SW B58W00610 Macropoxy 646 Fast Cure Epoxy Part A Mill White
    b. Tnemec Series 73 Endura-Shield – SW B65W01411 AC77000 GL WHTBS A
    c. Tnemec Series 76 Endura-Clear – SW B65T00105 Diamond-Clad Clear Coat Urethane Gloss Clear Part A

9. Section 33 34 00 – Sanitary Sewer Force Mains, **ADD** part 3.07 QUALITY ASSURANCE
    “A. On completion of installation of force main piping, the Contractor shall test the piping in accordance with Section 33 01 30.12, Acceptance Testing for Sanitary Sewer, at no additional cost to the Owner.”

10. **ADD** the attached Section 33 39 19, Precast Manholes and Wet Well.

11. **REPLACE** Section 40 05 78.26, Air and Vacuum Valves for Wastewater Service, with the attached section.

****

END ADDENDUM NUMBER 2

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NORTH CHARLESTON SEWER DISTRICT

SUNNYSIDE PUMP STATION REPLACEMENT

CHARLESTON, SC 29403
CHARLESTON COUNTY

LOCATION MAP
NOT TO SCALE

VICINITY MAP
NOT TO SCALE

ISSUED FOR BID

CITY OF CHARLESTON PROJECT ID NUMBER: CA2202400446 (4)

STORMWATER DESIGN STANDARDS MANUAL (SWDSM) DESIGN EXCEPTIONS			
APPLICABLE SECTION	DESCRIPTION OF THE DESIGN EXCEPTION	SUBMITTAL DATE	APPROVAL DATE

NOTE:
1. CONTRACTOR WILL ENSURE THAT ALL ASPECTS OF CONSTRUCTION WILL MEET OR EXCEED THE REQUIREMENTS OF THE CITY OF CHARLESTON STORMWATER DESIGN STANDARDS MANUAL UNLESS OTHERWISE NOTED.

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SHEET INDEX

SHEET NO.	SHEET NAME
C-100	COVER SHEET
C-101	NOTES & LEGEND
C-200	EXISTING CONDITIONS
C-201	SEDIMENT & EROSION CONTROL PLAN
C-202	DEMOLITION PLAN
C-203	PROPOSED SITE PLAN
C-204	PROPOSED PUMP STATION SECTION VIEWS
C-205	PROPOSED GRAVITY & FORCE MAIN PLANS
C-206	PROPOSED GRADING & DRAINAGE PLAN
C-500	SEDIMENT AND EROSION CONTROL DETAILS
C-501	SEDIMENT AND EROSION CONTROL DETAILS
C-502	NCSD STANDARD DETAILS
C-503	NCSD STANDARD DETAILS
C-504	STANDARD SITE DETAILS
C-505	STANDARD SITE DETAILS
C-506	TOP SLAB DETAIL
C-507	ALTERNATE BID ITEMS
C-508 (4)	BACKFLOW PREVENTER ASSEMBLY DETAILS
E-001	ELECTRICAL NOTES, LEGENDS, AND DETAILS
E-002	ELECTRICAL DETAILS
E-003	ELECTRICAL ONE-LINE DIAGRAMS AND DETAILS
E-050 (4)	ELECTRICAL SITE DEMOLITION PLAN
E100	ELECTRICAL SITE RENOVATION PLAN

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CONSTRUCTION SEQUENCING: (4)

1. ALL TEMPORARY BEST MANAGEMENT PRACTICES WILL BE INSTALLED PRIOR TO BEGINNING ANY LAND DISTURBING ACTIVITIES.
2. CLEAR AND GRUB NEW PUMP STATION SITE AS NECESSARY FOR THE PROPER INSTALLATION OF THE NEW WET WELL AND PIPING AS SHOWN IN THE CONSTRUCTION PLANS. ONLY REMOVE THE TREES IDENTIFIED IN THE CONSTRUCTION PLANS AND APPROVED FOR REMOVAL.
3. INSTALL CONSTRUCTION ENTRANCES AND STAGE THE CONSTRUCTION AND PIPE MATERIALS.
4. RELOCATE KIAWAH HOMES COMMUNITY CENTER STORMWATER POND.
5. INITIATE EXCAVATION OF THE WETWELL, GRAVITY SEWER, AND FORCE MAIN TRENCHES. EXCAVATED SOIL WILL BE STOCKPILED ADJACENT TO THE TRENCH IN UPLAND AREAS. SUPPLEMENTAL EROSION CONTROL MEASURES WILL BE IMPLEMENTED AS APPROPRIATE TO ENSURE SEDIMENT IS CONFINED TO THE IMMEDIATE CONSTRUCTION AREA.
6. CONSTRUCTION ACTIVITIES WILL BE PERFORMED FOR THE INSTALLATION OF THE WETWELL AND ITS ASSOCIATED STRUCTURES, CONCRETE PADS, MANHOLE MAINTENANCE, GRAVITY AND FORCE MAIN INSTALLATION, FENCE INSTALLATION, LANDSCAPING, ETC.
7. DEMOLISH EXISTING STRUCTURES AS DENOTED IN THE CONSTRUCTION PLANS.
8. POST-CONSTRUCTION PERMEABILITY TESTS OF INFILTRATION BASED PERMANENT STRUCTURAL MEASURES SHALL BE CONDUCTED IN ACCORDANCE WITH THE FOLLOWING APPROACH TO ENSURE THAT THE INSTALLED BMP FUNCTION AS AS DESIGNED. SUCH TESTING SHOULD BE CAREFULLY UNDERTAKEN WHEN ALL BMP CONSTRUCTION THAT MAY AFFECT SOIL PERMEABILITY HAS BEEN COMPLETED. THIS INCLUDES THE USE OF ALL CONSTRUCTION EQUIPMENT AND THE PLACEMENT OF ALL CONSTRUCTION MATERIAL THAT MAY AFFECT SOIL PERMEABILITY. ALL IN SITU TESTING OF PERMANENT STRUCTURAL BMP'S SHALL COMPLY WITH THE LOW IMPACT DEVELOPMENT IN COASTAL SOUTH CAROLINA: A PLANNING AND DESIGN GUIDE
9. UPON COMPLETION OF INSTALLATION ACTIVITIES, ALL DISTURBED AREAS WILL BE BACKFILLED, GRADED, AND SEEDED, OR PAVED WITH PERVIOUS PAVEMENT.
10. REMOVAL OF TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES UPON FINAL STABILIZATION.

NOTE: MAINTENANCE OF TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES MUST CONTINUE UNTIL THE SITE IS PERMANENTLY STABILIZED AND THE CONTROLS ARE REMOVED.

TMS: 464-13-00-016, 464-13-00-035, 464-13-00-026

OWNER INFORMATION	
OWNER	NORTH CHARLESTON SEWER DISTRICT (NCSD)
ADDRESS	7225 STALL RD. NORTH CHARLESTON, SC 29406
OFFICE NUMBER	(843) 764 - 3072

TOTAL PROJECT AREA (AC)	TOTAL DISTURBED AREA (AC)
0.70	0.60

POST-DEVELOPMENT IMPERVIOUS AREAS	
PAVED AREAS (ASPHALT/CONCRETE)	982 SQ FT

HISTORICAL AND CULTURAL RESOURCES NOTE:

1. IN THE EVENT THAT ANY HISTORIC OR CULTURAL RESOURCES AND/OR ARCHAEOLOGICAL MATERIALS ARE FOUND DURING THE COURSE OF WORK, THE APPLICANT WILL NOTIFY THE STATE HISTORIC PRESERVATION OFFICE AND THE SOUTH CAROLINA INSTITUTE OF ARCHAEOLOGY AND ANTHROPOLOGY. HISTORIC OR CULTURAL RESOURCES CONSIST OF THOSE SITES LISTED IN THE NATIONAL REGISTER. ARCHAEOLOGICAL MATERIALS CONSIST OF ANY ITEMS, FIFTY YEARS OLD OR OLDER, WHICH WERE MADE OR USED BY MAN. THESE ITEMS INCLUDE, BUT ARE NOT LIMITED TO, STONE PROJECTILE POINTS (ARROWHEADS), CERAMIC SHARDS, BRICKS, WORKED WOOD, BONE AND STONE, METAL AND GLASS OBJECTS AND HUMAN SKELETAL MATERIALS.

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Weston & Sampson Engineers, Inc.
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www.westonandsampson.com

FOR BID
WESTON & SAMPSON ENGINEERS, INC. No. 4208 — SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION
4/21/2025

No.	Date	Dr.By	Ck.By	App.By	Description
4	5/19/2025	RCS	WRF	KRG	ADDENDUM 2
3	4/21/2025	RCS	WRF	KRG	ISSUED FOR BID
2	4/4/2025	RCS	WRF	KRG	100% DESIGN
1	8/29/2024	GDV	WRF	KRG	PERMIT REVIEW
0	4/5/2024	GDV	BJR	KRG	60% DESIGN

NORTH CHARLESTON, SOUTH CAROLINA
NORTH CHARLESTON SEWER DISTRICT
SUNNYSIDE PUMP STATION REHABILITATION

COVER SHEET

APP BY	CHK BY	DSN BY	DR BY	JOB NO.	CONTRACT:	SCALE:	CADD NO.	FILE NO.
KRG	WRF	WBD	GDV	ENG23-3282		AS SHOWN	-	-

C-100

GENERAL CONSTRUCTION NOTES:

1. CONTRACTOR TO VERIFY ALL INFORMATION CONTAINED HEREIN PRIOR TO CONSTRUCTION AND NOTIFY ENGINEER OR OWNER OF ANY DISCREPANCY PRIOR TO CONSTRUCTION. WHERE CONFLICT OCCURS BETWEEN CONSTRUCTION PLANS, SPECIFICATIONS, AND/OR FIELD CONDITIONS, CONTRACTOR IS TO CONTACT ENGINEER AND OWNER FOR CLARIFICATION PRIOR TO CONSTRUCTION.
2. LOCATION OF ALL UTILITIES , RIGHT-OF-WAY LINES, AND EDGE OF PAVEMENT SHOWN ON THESE PLANS ARE APPROXIMATE AND ARE FOR INFORMATIONAL PURPOSES ONLY.
3. CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL UTILITIES AND SHALL PAY FOR ALL DAMAGES RESULTING FROM FAILURE TO DO SO. CONTRACTOR SHALL CONTACT PALMETTO UTILITY PROTECTION SERVICE (PUPS) AT 811 OR (888) 721-7877 AT LEAST 72 HOURS PRIOR TO COMMENCING CONSTRUCTION FOR LOCATION OF UTILITIES.
4. WASTEWATER INSTALLATION SHALL BE IN ACCORDANCE WITH THE TEN STATES STANDARDS AND NCSD STANDARDS SANITARY SEWER SYSTEMS.
5. ANY DEVIATIONS FROM THE CONSTRUCTION PLANS SHALL BE APPROVED IN WRITING BY NCSD.
6. CONTRACTOR TO COORDINATE WITH OWNER AND ENSURE ALL APPLICABLE CONSTRUCTION AND LAND DISTURBANCE PERMITS HAVE BEEN OBTAINED PRIOR TO COMMENCING ANY WORK.
7. CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH NCSD REPRESENTATIVE (843-764-3072) AT LEAST 72 HOURS PRIOR TO BEGINNING WORK. CONTRACTOR SHALL COORDINATE ALL WORK WITH THE OWNER.
8. ANY CONNECTIONS TO EXISTING SEWER SYSTEMS SHALL BE MADE IN THE PRESENCE OF NCSD PERSONNEL WITH AT LEAST 72 HOURS ADVANCED NOTICE.
9. THE PUMP STATION SITE SHALL REMAIN SECURED DURING ALL CONSTRUCTION ACTIVITIES. AT NO TIME SHALL THE PUMP STATION BE LEFT OPEN OR UNSECURED WHILE THE SITE IS UNATTENDED BY THE CONTRACTOR'S PERSONNEL. WORK SPACE AND PUMP STATION SECURITY IS THE RESPONSIBILITY OF THE CONTRACTOR.
10. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO THE OWNER AND ENGINEER ON ALL MATERIALS. SHOP DRAWINGS SHALL REACH AN ACCEPTABLE STATUS PRIOR TO PURCHASE OR ORDERING. ALL MATERIALS SHALL CONFORM TO NCSD SPECIFICATIONS AS TO TYPE, DESIGN, AND MANUFACTURER.
11. FOR ALL OWNER PROVIDED MATERIALS, CONTRACTOR SHALL REVIEW OWNER'S PURCHASE ORDERS (AVAILABLE UPON REQUEST TO ENGINEER/OWNER) AND WILL BE RESPONSIBLE FOR FILLING ANY GAPS BETWEEN OWNER PROVIDED MATERIAL AND THE SPECIFICATIONS. CONTRACTOR WILL BE RESPONSIBLE TO PROVIDE ANY ADDITIONAL MATERIALS NEEDED TO COMPLETE INSTALLATION AND SHALL PROPERTY INSTALL ALL OWNER PROVIDED MATERIALS.
12. CONTRACTOR IS RESPONSIBLE FOR PICKING UP AND TRANSPORTING ANY EQUIPMENT/MATERIALS THAT ARE PROVIDED BY NCSD. CONTRACTOR ASSUMES ALL RESPONSIBILITY FOR ALL EQUIPMENT/MATERIALS ONCE THEY ARE PICKED UP FROM NCSD. LOGISTICS SHALL BE COORDINATED WITH NCSD.
13. CONTRACTOR SHALL WARRANTY REPAIRED OR DISTURBED SURFACE AREAS (ROADWORK, SIDEWALKS, DRIVEWAYS, ETC.) FOR A PERIOD OF TWO YEARS AFTER FINAL ACCEPTANCE.
14. CONTRACTOR SHALL COMPLY WITH ALL OSHA REQUIREMENTS. JOB SITE SAFETY IS THE RESPONSIBILITY OF THE CONTRACTOR.
15. HORIZONTAL DATUM USED IS NAD83. VERTICAL DATUM USED IS NAVD88.
16. CONTRACTOR SHALL KEEP AND MAINTAIN AN UPDATED SET OF RED-LINED PLANS OF THE CONSTRUCTION DRAWINGS ON SITE AT ALL TIMES. RED-LINED DRAWINGS SHALL BE SUBMITTED EACH MONTH WITH APPLICATION FOR PAYMENT.
17. CONTRACTOR SHALL SURVEY AND STAKE ALL PROPERTY LINES, EASEMENTS, TEMPORARY EASEMENTS, AND RIGHT-OF-WAYS PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION RELATED ACTIVITIES. ENGINEER WILL PROVIDE THE CONTRACTOR WITH AUTOCAD FILES FOR THE PURPOSES OF STAKING PROPERTY GEOMETRY.
18. ANY QUANTITIES SHOWN ON PLANS ARE FOR COMPARATIVE BIDDING PURPOSES ONLY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VISIT THE PROJECT SITE TO VERIFY ALL QUANTITIES AND CONDITIONS PRIOR TO SUBMITTING BID.
19. WORKING HOURS TO BE MONDAY THROUGH FRIDAY 8:00 AM TO 5:00 PM FOR RESIDENTIAL CONSIDERATION.

DEMOLITION & SITE PREPARATION NOTES:

1. ONCE THE ITEMS HAVE BEEN DEMOLISHED, CONTRACTOR SHALL CONTACT NCSD REPRESENTATIVE TO GIVE THEM FIRST OPTION OF SALVAGING/KEEPING THE ITEMS REMOVED. IF NCSD DECLINES THEN ALL DEMOLISHED ITEMS BECOME PROPERTY OF THE CONTRACTOR AND ARE TO BE REMOVED AND DISPOSED OF OFF-SITE IN A SATISFACTORY MANNER.
2. ALL SURFACE AREAS DISTURBED BY CONSTRUCTION SHALL BE RESTORED TO PROVIDE POSITIVE DRAINAGE AWAY FROM PUMP STATION. CONTRACTOR SHALL SEED AND RESTORE SITE UPON COMPLETION.
3. CONTRACTOR SHALL BE HELD SOLELY RESPONSIBLE FOR ANY EXISTING EQUIPMENT/FEATURES MARKED "TO REMAIN" OR NOT TO BE DEMOLISHED THAT IS NOT FUNCTIONING AS IT SHOULD FOLLOWING COMPLETION OF CONSTRUCTION. THIS EQUIPMENT SHALL BE REPLACED OR RESTORED TO ORIGINAL OR BETTER CONDITION AT NO ADDITIONAL COST TO THE OWNER. PROTECTION OF SUCH EQUIPMENT IS THE RESPONSIBILITY OF THE CONTRACTOR
4. AREAS BACKFILLED AFTER DEMOLITION OF STRUCTURE(S) AND/OR ASSOCIATED APPURTENANCES SHALL BE COMPACTED TO MEET 95% MODIFIED PROCTOR.
5. THE CONTRACTOR SHALL INCLUDE IN THE BID THE COST OF REMOVING ANY EXISTING SITE FEATURES AND APPURTENANCES NECESSARY TO ACCOMPLISH THE CONSTRUCTION OF THE PROPOSED SITE IMPROVEMENTS. THE CONTRACTOR SHALL ALSO INCLUDE IN THE BID THE COST NECESSARY TO RESTORE SUCH ITEMS THAT ARE SCHEDULED TO REMAIN AS PART OF THE FINAL SITE IMPROVEMENTS. REFER TO PLANS TO DETERMINE EXCAVATION, DEMOLITION, AND TO DETERMINE THE LOCATION OF THE PROPOSED SITE IMPROVEMENTS.
6. ALL EXISTING SITE FEATURES TO REMAIN SHALL BE PROTECTED THROUGHOUT THE CONSTRUCTION PERIOD. ANY FEATURES DAMAGED DURING CONSTRUCTION OPERATIONS SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE AT NO ADDITIONAL COST.
7. DURING EARTHWORK OPERATIONS, CONTRACTOR SHALL TAKE CARE TO NOT DISTURB EXISTING MATERIALS IN EXCAVATION, OUTSIDE THE LIMITS OF EXCAVATION AND BACKFILL AND SHALL TAKE WHATEVER MEASURES NECESSARY, AT THE CONTRACTOR'S EXPENSE, TO PREVENT ANY EXCAVATED MATERIAL FROM COLLAPSING. ALL BACKFILL MATERIALS SHALL BE PLACED AND COMPACTED AS SPECIFIED TO THE SUBGRADE REQUIRED FOR THE INSTALLATION OF THE REMAINDER OF THE CONTRACT WORK.
8. DEMOLITION INCLUDES REMOVAL AND LEGAL DISPOSAL.
9. CONTRACTOR SHALL REFERENCE THE GEOTECHNICAL REPORT COMPLETED FOR SUNNYSIDE PUMP STATION, FOR ALL EARTHWORK. THE GETOTECHNICAL REPORT IS PROVIDED IN THE PROJECT SPECIFICATIONS.
10. CONTRACT SHALL USE SELECT FILL MATERIAL AS REQUIRED TO MEET PROPOSED GRADES. SEE PROJECT SPECIFICATIONS.

PUMP STATION NOTES:

1. ALL APPLICABLE LOCAL MS4 ORDINANCES APPLY TO WORK BEING PERFORMED AS PART OF THE PROJECT.
2. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF ANY ADJACENT UTILITIES DAMAGED DURING CONSTRUCTION. CONTRACTOR SHALL MAINTAIN EXISTING SLOPES ON ANY STORM DRAIN REPAIR OR REPLACEMENT. FOR ALL WORK ADJACENT TO STORM DRAINS, CONTRACTOR SHALL ENSURE SLOPES ARE NOT IMPACTED FROM CONSTRUCTION OF THE NEW FORCE MAIN.
3. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR AND REPLACE ALL DAMAGES TO EXISTING ROADWAYS, SIDEWALKS, DRIVEWAYS, OR CURBS AT NO EXPENSE TO THE OWNER. REMOVAL AND REPAIR OF CONCRETE SECTIONS SHALL EXTEND TO THE NEAREST JOINT AT EACH SIDE OF THE DISTURBANCE. SIDEWALK, DRIVEWAY, OR CURB TO BE RESTORED TO ORIGINAL CONDITION IN A TIMELY FASHION. CONTRACTOR IS ALSO RESPONSIBLE FOR REPAIRING/RESTORING DAMAGED LANDSCAPING, FLOWER BEDS, IRRIGATION SYSTEMS, MAIL BOXES (OR ANY OTHER MATERIAL, EQUIPMENT, OR PROPERTY) TO ITS ORIGINAL CONDITION IN A TIMELY MANNER. THIS NOTE APPLIES TO ALL AREAS IN AND AROUND THE PROJECT AREA, INCLUDING ANY PROPERTIES USED FOR LAYDOWN.
4. NO TRENCHES SHALL REMAIN OPEN OVERNIGHT OR AT TIMES WHEN WORK IS NOT UNDERWAY AT THE SITE. CONTRACTOR SHALL ADEQUATELY PROTECT ALL EXCAVATED AREAS FROM PEDESTRIAN AND VEHICULAR TRAFFIC.
5. THERE SHALL BE NO LAND DISTURBING WORK COMPLETED OUTSIDE OF THE LIMITS OF DISTURBANCE OUTLINED.
6. CONSTRUCTION WILL CONSIST OF THE INSTALLATION OF A NEW PUMP STATION ADJACENT TO THE EXISTING PUMP STATION. ALL PIPING AND PUMP STATION MECHANICAL/ELECTRICAL EQUIPMENT SHALL BE TESTED PRIOR TO COMPLETION OF CONSTRUCTION.
7. CONTRACTOR SHALL CLEAN THE CONSTRUCTION SITE ON A DAILY BASIS AND KEEP THE CONSTRUCTION AREA FREE OF LITTER AND DEBRIS FROM CONSTRUCTION ACTIVITIES.
8. CONTRACTOR IS RESPONSIBLE FOR SCHEDULING AND COORDINATING WITH THE OWNER, ENGINEER, SUBCONTRACTORS, VENDORS, AND ALL OTHER ASSOCIATED PARTIES FOR PUMP STATION STARTUP.
9. CONTRACTOR SHALL NOT OPERATE ANY EXISTING VALVE ON NCSD WASTEWATER SYSTEM. CONTRACTOR SHALL CONTACT NCSD FOR OPERATION OF THESE VALVES. NCSD REPRESENTATIVE MUST BE PRESENT FOR ANY CONNECTIONS OR TAPS MADE TO EXISTING WASTEWATER SYSTEM.
10. ALL NEW AND BELOW GRADE FORCE MAIN, VALVES, AND FITTINGS (I.E. BELLS, BENDS, TEES, ETC.) SHALL BE RESTRAINED C900 PVC DR18. ALL FITTINGS SHALL BE M.J. FITTINGS WITH MEGALUGS. CONTRACTOR SHALL INVESTIGATE RESTRAINT ON THE EXISTING FORCE MAIN AT THE TIE-IN POINTS. WHERE RESTRAINT IS MISSING, CONTRACTOR SHALL INSTALL.
11. CONTRACTOR MUST COORDINATE WITH LOCAL RESIDENTS THAT WILL BE AFFECTED BY CONSTRUCTION ACTIVITIES. LOCAL RESIDENTS MUST BE NOTIFIED TWO (2) WEEKS IN ADVANCE OF THE START OF CONSTRUCTION. LOCAL RESIDENTS MUST HAVE ACCESS TO THEIR PROPERTIES AT ALL TIMES.
12. NO CONSTRUCTION MATERIAL SHALL BE PLACED ON PRIVATE PROPERTY WITHOUT WRITTEN PERMISSION FROM LAND OWNER THROUGH COORDINATION WITH NCSD.
13. ALL ABOVE GRADE PIPING AND FITTINGS SHALL BE PRESSURE CLASS 350 DUCTILE IRON. ALL DUCTILE IRON PIPE AND FITTINGS SHALL BE LINED WITH TNEMEC PERMA SHIELD 431. PIPE AND FITTINGS SHALL BE PAINTED IN ACCORDANCE WITH SPECIFICATION SECTION 33 34 00. ALL DUCTILE IRON PIPE AND FITTINGS THAT ARE BURIED SHALL HAVE A BITUMASTIC EXTERNAL COATING AND SHALL BE COVERED WITH POLY WRAP. ALL PIPING HARDWARE SHALL BE 316 STAINLESS STEEL. CONTRACTOR SHALL INSTALL ALL OWNER PROVIDED MATERIALS. CONTRACTOR SHALL FURNISH AND INSTALL ALL MATERIALS (HARDWARE, PIPING, FITTINGS, ETC.) THAT ARE NOT OWNER PROVIDED, BUT ARE NEEDED IN ORDER TO COMPLETE CONSTRUCTION IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
14. ALL METAL STRUCTURES SHALL BE GROUNDED, INCLUDING BUT NOT LIMITED TO THE CONTROL PANEL AND GENERATOR PER NCSD GROUNDING SPECIFICATIONS.
15. CONTRACTOR SHALL PROVIDE AND USE A SCDHEC APPROVED BACKFLOW DEVICE WHEN USING WATER SUPPLY AVAILABLE AT THE PUMP STATION.
16. CONTRACTOR SHALL PROVIDE A BYPASS PUMPING PLAN TO THE OWNER & ENGINEER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
17. UPON COMPLETION OF CONSTRUCTION, CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO ORIGINAL OR BETTER CONDITION. WHERE HEAVING OCCURS FROM PIPE BURSTING ACTIVITIES, CONTRACTOR SHALL GRADE OUT TO ORIGINAL GRADE.
18. UPON COMPLETION OF THE WORK, THE FOLLOWING APPROVAL PROCEDURES MUST BE FOLLOWED:
   - 18.1. THE CONTRACTOR SHALL SCHEDULE ALL REQUIRED TESTS AND INSPECTIONS WITH NCSD AT LEAST 72 HOURS IN ADVANCE.
   - 18.2. THE CONTRACTOR SHALL SUPPLY TO THE ENGINEER AN AS-BUILT SURVEY THAT IS TO SCALE AND HAS ALL REQUIRED MEASUREMENTS CLEARLY DISPLAYED SO THAT THE ENGINEER CAN DRAFT THE RECORD DRAWINGS.
   - 18.3. THE ENGINEER SHALL SUBMIT THE TEST RESULTS, RECORD DRAWINGS, AND ALL OTHER REQUIRED DOCUMENTS TO NCSD FOR REVIEW AND APPROVAL.
   - 18.4. THE ENGINEER SHALL SCHEDULE A FINAL INSPECTION WITH NCSD AT LEAST 72 HOURS IN ADVANCE.
   - 18.5. THE PROJECT SHALL BE COMMISSIONED IN ACCORDANCE WITH THE RELEVANT SPECIFICATION SECTION.

GRADING, UTILITY, & DRAINAGE NOTES:

1. ALL WORK RELATING TO INSTALLATION, RENOVATION OR MODIFICATION OF WATER, DRAINAGE AND/OR SEWER SERVICES SHALL BE PERFORMED IN ACCORDANCE WITH THE STANDARDS OF CHARLESTON WATER SYSTEM, THE CITY OF CHARLESTON, AND THE OWNER AS APPLICABLE.
2. ALL GRADING IS TO BE SMOOTH AND CONTINUOUS WHERE PROPOSED PAVED SURFACE MEETS EXISTING SURFACE, BLEND THE TWO PAVEMENTS AND ELIMINATE ROUGH SPOTS AND ABRUPT GRADE CHANGES AND MEET LINE AND GRADE OF EXISTING CONDITIONS WITH NEW IMPROVEMENTS.
3. CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE (1.5% MINIMUM) AWAY FROM ALL BUILDING FOUNDATIONS AND STRUCTURES.
4. CONTRACTOR SHALL ENSURE ALL AREAS ARE PROPERLY PITCHED TO DRAIN, WITH NO SURFACE WATER PONDING OR PUDDLING.
5. ALL UNSUITABLE UNCONTAMINATED EXCESS SOIL FROM CONSTRUCTION ACTIVITIES SHALL BE STOCKPILED ON SITE, AS REQUIRED BY THE CITY, AT NO ADDITIONAL COST TO THE OWNER. REMOVAL ACTIVITIES SHALL BE IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS AT NO ADDITIONAL COST TO THE OWNER. SUITABLE SOIL EXCAVATION AS PART OF THE PROJECT MUST MEET ONE OR MORE OF THE MATERIAL REQUIREMENTS SPECIFIED IN 31 00 00-EARTHWORK. ON-SITE FILL MATERIALS, WHICH DO NOT CONFORM TO SPEC 31 00 00, SHALL NOT BE USED BELOW ANY STRUCTURES. IF THE CONTRACTOR PROPOSES TO USE THE EXISTING FILL ON SITE BELOW PAVEMENT AREAS, HE MUST DEMONSTRATE THAT THE FILL MEETS THE REQUIREMENTS PER SECTION 31 00 00 OF THE SPECIFICATIONS. ALL EXCAVATED FILL MATERIAL WHICH DOES NOT MEET THE REQUIREMENTS OF THE CONTRACT DOCUMENTS SHALL BE REMOVED AND DISPOSED OF OFF-SITE AT NO ADDITIONAL COST.
6. NO FILL SHALL CONTAIN HAZARDOUS MATERIALS.
7. THE LIMIT OF WORK SHALL BE DELINEATED IN THE FIELD PRIOR TO THE START OF SITE CLEARING, GRADING, OR CONSTRUCTION.

STANDARD EROSION CONTROL NOTES:

1. STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN FOURTEEN (14) DAYS AFTER WORK HAS CEASED, EXCEPT AS STATED BELOW.
   - 1.1. WHERE STABILIZATION BY THE 14TH DAY IS PRECLUDED BY SNOW COVER OR FROZEN GROUND CONDITIONS STABILIZATION MEASURES MUST BE INITIATED AS SOON AS PRACTICABLE.
   - 1.2. WHERE CONSTRUCTION ACTIVITY ON A PORTION OF THE SITE IS TEMPORARILY CEASED, AND EARTH-DISTURBING ACTIVITIES WILL BE RESUMED WITHIN 14 DAYS, TEMPORARY STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF THE SITE.
2. ALL SEDIMENT AND EROSION CONTROL DEVICES SHALL BE INSPECTED ONCE EVERY CALENDAR WEEK. WITH NO TIME PERIOD BETWEEN INSPECTIONS EXCEEDING 9 DAYS, AND MUST BE CONDUCTED UNTIL FINAL STABILIZATION IS REACHED ON ALL AREAS OF THE CONSTRUCTION SITE. IF PERIODIC INSPECTION OR OTHER INFORMATION INDICATES THAT A BMP HAS BEEN INAPPROPRIATELY OR INCORRECTLY INSTALLED, THE PERMITTEE MUST ADDRESS THE NECESSARY REPLACEMENT OR MODIFICATION REQUIRED TO CORRECT THE BMP WITHIN 48 HOURS OF IDENTIFICATION.
3. PROVIDE SILT FENCE AND/OR OTHER CONTROL DEVICES, AS MAY BE REQUIRED, TO CONTROL SOIL EROSION DURING UTILITY CONSTRUCTION. ALL DISTURBED AREAS SHALL BE CLEANED, GRADED, AND STABILIZED WITH GRASSING IMMEDIATELY AFTER THE UTILITY INSTALLATION. FILL, COVER, AND TEMPORARY SEEDING AT THE END OF EACH DAY ARE RECOMMENDED. IF WATER IS ENCOUNTERED WHILE TRENCHING, THE WATER SHOULD BE FILTERED TO REMOVE ANY SEDIMENTS BEFORE BEING PUMPED BACK INTO ANY WATERS OF THE STATE.
4. ALL EROSION CONTROL DEVICES SHALL BE PROPERLY MAINTAINED DURING ALL PHASES OF CONSTRUCTION UNTIL THE COMPLETION OF ALL CONSTRUCTION ACTIVITIES AND ALL DISTURBED AREAS HAVE BEEN STABILIZED. ADDITIONAL CONTROL DEVICES MAY BE REQUIRED DURING CONSTRUCTION IN ORDER TO CONTROL EROSION AND/OR OFFSITE SEDIMENTATION. ALL TEMPORARY CONTROL DEVICES SHALL BE REMOVED ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED.
5. THE CONTRACTOR MUST TAKE NECESSARY ACTION TO MINIMIZE THE TRACKING OF MUD ONTO PAVED ROADWAY(S) FROM CONSTRUCTION AREAS AND THE GENERATION OF DUST. THE CONTRACTOR SHALL DAILY REMOVE MUD/SOIL FROM PAVEMENT, AS MAY BE REQUIRED.
6. TEMPORARY DIVERSION BERMS AND/OR DITCHES WILL BE PROVIDED AS NEEDED DURING CONSTRUCTION TO PROTECT WORK AREAS FROM UPSLOPE RUNOFF AND/OR TO DIVERT SEDIMENT-LADEN WATER TO APPROPRIATE TRAPS OR STABLE OUTLETS.
7. ALL WATERS OF THE STATE (WOS), INCLUDING WETLANDS, ARE TO BE FLAGGED OR OTHERWISE CLEARLY MARKED IN THE FIELD. A DOUBLE ROW OF SILT FENCE IS TO BE INSTALLED IN ALL AREAS WHERE A 50-FOOT BUFFER CAN'T BE MAINTAINED BETWEEN THE DISTURBED AREA AND ALL WOS. A 10-FOOT BUFFER SHOULD BE MAINTAINED BETWEEN THE LAST ROW OF SILT FENCE AND ALL WOS.
8. LITTER, CONSTRUCTION DEBRIS, OILS, FUELS, AND BUILDING PRODUCTS WITH SIGNIFICANT POTENTIAL FOR IMPACT (SUCH AS STOCKPILES OF FRESHLY TREATED LUMBER) AND CONSTRUCTION CHEMICALS THAT COULD BE EXPOSED TO STORM WATER MUST BE PREVENTED FROM BECOMING A POLLUTANT SOURCE IN STORM WATER DISCHARGES.
9. A COPY OF THE SWPPP, INSPECTIONS RECORDS, AND RAINFALL DATA MUST BE RETAINED AT THE CONSTRUCTION SITE OR A NEARBY LOCATION EASILY ACCESSIBLE DURING NORMAL BUSINESS HOURS, FROM THE DATE OF COMMENCEMENT OF CONSTRUCTION ACTIVITIES TO THE DATE THAT FINAL STABILIZATION IS REACHED.
10. INITIATE STABILIZATION MEASURES ON ANY EXPOSED STEEP SLOPE (3H:1V OR GREATER) WHERE LAND-DISTURBING ACTIVITIES HAVE PERMANENTLY OR TEMPORARILY CEASED, AND WILL NOT RESUME FOR A PERIOD OF 7 CALENDAR DAYS.
11. MINIMIZE SOIL COMPACTION AND, UNLESS INFEASIBLE, PRESERVE TOPSOIL.
12. MINIMIZE THE DISCHARGE OF POLLUTANTS FROM EQUIPMENT AND VEHICLE WASHING, WHEEL WASH WATER, AND OTHER WASH WATERS. WASH WATERS MUST BE TREATED IN A SEDIMENT BASIN OR ALTERNATIVE CONTROL THAT PROVIDES EQUIVALENT OR BETTER TREATMENT PRIOR TO DISCHARGE;
13. MINIMIZE THE DISCHARGE OF POLLUTANTS FROM DEWATERING OF TRENCHES AND EXCAVATED AREAS. THESE DISCHARGES ARE TO BE ROUTED THROUGH APPROPRIATE BMPS (SEDIMENT BASIN, FILTER BAG, ETC.).
14. THE FOLLOWING DISCHARGES FROM SITES ARE PROHIBITED:
   - 14.1. WASTEWATER FROM WASHOUT OF CONCRETE, UNLESS MANAGED BY AN APPROPRIATE CONTROL;
   - 14.2. WASTEWATER FROM WASHOUT AND CLEANOUT OF STUCCO, PAINT, FORM RELEASE OILS, CURING COMPOUNDS AND OTHER CONSTRUCTION MATERIALS;
   - 14.3. FUELS, OILS, OR OTHER POLLUTANTS USED IN VEHICLE AND EQUIPMENT OPERATION AND MAINTENANCE;
   - 14.4. AND SOAPS OR SOLVENTS USED IN VEHICLE AND EQUIPMENT WASHING.
15. AFTER CONSTRUCTION ACTIVITIES BEGIN, INSPECTIONS MUST BE CONDUCTED AT A MINIMUM OF AT LEAST ONCE EVERY CALENDAR WEEK AND MUST BE CONDUCTED UNTIL FINAL STABILIZATION IS REACHED ON ALL AREAS OF THE CONSTRUCTION SITE.
16. IF EXISTING BMPS NEED TO BE MODIFIED OR IF ADDITIONAL BMPS ARE NECESSARY TO COMPLY WITH THE REQUIREMENTS OF THIS PERMIT AND/OR SC'S WATER QUALITY STANDARDS, IMPLEMENTATION MUST BE COMPLETED BEFORE THE NEXT STORM EVENT WHENEVER PRACTICABLE. IF IMPLEMENTATION BEFORE THE NEXT STORM EVENT IS IMPRACTICABLE, THE SITUATION MUST BE DOCUMENTED IN THE SWPPP AND ALTERNATIVE BMPS MUST BE IMPLEMENTED AS SOON AS REASONABLY POSSIBLE.
17. A PRE-CONSTRUCTION CONFERENCE MUST BE HELD FOR EACH CONSTRUCTION SITE WITH AN APPROVED ON-SITE SWPPP PRIOR TO THE IMPLEMENTATION OF CONSTRUCTION ACTIVITIES. FOR NON-LINEAR PROJECTS THAT DISTURB 10 ACRES OR MORE THIS CONFERENCE MUST BE HELD ON-SITE UNLESS THE DEPARTMENT HAS APPROVED OTHERWISE.

4

OWNER PROVIDED MATERIAL LIST

ITEM	QUANTITY
GENERATOR	1
AUTOMATIC TRANSFER SWITCH	1
8" FLOW METER	1
PUMPS AND ACCESSORIES*	2
PUMP CONTROL PACKAGE**	1
AP500 GRIDBEE MIXER	1
ENDRESS-HAUSER PRESSURE TRANDUCER	1

* KIT INCLUDES PUMP LEADS, 2X GUIDE RAILS WITH BRACKETS AND HARDWARE, 2X LIFT CHAINS, 1X SIX HOOK CABLE BRACKET

** ASSEMBLY INCLUDES 1X CONTROL PANEL, 2X SOFT STARTS, RADAR LEVEL SENSOR, LEVEL PROBE AND CONVERTER (ALL WITHIN NEMA 4X SS ENCLOSURE)

LEGEND: (SYMBOLS ARE NOT TO SCALE AND ARE SHOWN LARGER ON THE PLANS FOR CLARITY)

EXISTING

CONTROL POINT
PROPERTY IRON PIN
LIGHT POLE
LANDSCAPING LIGHT
POWER POLES
ROAD SIGN
SEWER MANHOLE
STORM DRAIN MANHOLE
SEWER CLEANOUT
WATER METER
FIRE DEPARTMENT CONNECTION
GUY WIRES
GAS METER
ELECTRIC METER
CONCRETE MONUMENT
GRATE INLET
A/C UNIT
WOODEN POST
BOLLARD
PARK BENCH
GENERAL TREE (CANOPY REPRESENTATIVE OF PROTECTED ZONE)
GRAND TREE (MIN 24" DBH) (CANOPY REPRESENTATIVE OF PROTECTED ZONE)

EXISTING

SYMBOL	DESCRIPTION
OHP	OVERHEAD POWER LINE
G	UNDERGROUND GAS LINE
ESMT	EASEMENT LINES
R/W	RIGHT-OF-WAY LINES
FM	FORCE MAIN
SS	SANITARY SEWER
SD	STORM DRAIN
W	WATER MAIN
UGE	UNDERGROUND POWER
x	FENCELINE
	VEGETATION LINE
	PROPERTY LINE
	FLOOD ZONE
TB	TOP OF BANK
BB	BOTTOM OF BANK
10	CONTOUR
	PAVEMENT
	CONCRETE
	BUILDING/STRUCTURE
	GRAVEL

PROPOSED

SYMBOL	DESCRIPTION
LOD	LIMIT OF DISTURBANCE
ESMT	EASEMENT LINE
TEMP ESMT	TEMPORARY EASEMENT LINE
SF	SILT FENCE
TP	TREE PROTECTION
FM	FORCE MAIN
SS	SANITARY SEWER
UGE	UNDERGROUND POWER
G	GAS MAIN
SD	STORM DRAIN
	ABANDONED UTILITY
	CHAINLINK FENCE
	COMPOSITE FENCE
	SINGLE LEAF METAL GATE
TB	TOP OF BANK
BB	BOTTOM OF BANK
10	CONTOUR
	DEMOLITION
	PERMEABLE PAVEMENT SYSTEM, SEE DETAIL
	CONCRETE
	GRAVEL
	LANDSCAPE AREA

PROPOSED

SEDIMENT TUBE
TREE/SHRUB REMOVAL
CONSTRUCTION ENTRANCE
SEWER MANHOLE
GATE POST
BOLLARD
YARD HYDRANT
BACKFLOW PREVENTER
WATER METER
GAS METER
ELECTRIC HANDHOLE
DRAIN INLET
GRADE SPOT SHOT
PLANTING

ABBREVIATIONS

BFP	BACKFLOW PREVENTER
CP	CONTROL POINT
DATUR	DATA ACCORDING TO RECORD
DI	DUCTILE IRON
DIP	DUCTILE IRON PIPE
EHH	ELECTRIC HANDHOLE
EL	ELEVATION
EOP	EDGE OF PAVEMENT
FM	SEWER FORCE MAIN
GRAVITY	GRAVITY SEWER MAIN
HOA	HOMEOWNER'S ASSOCIATION
IE/INV	INVERT ELEVATION
IPF	IRON PIN FOUND
IPNF	IRON PIN NOT FOUND
ISA	INTERNATIONAL SOCIETY OF ARBORICULTURE]
LOD	LIMITS OF DISTURBANCE
LP	LIGHT POLE
M.J.	MECHANICAL JOINT
NCSD	NORTH CHARLESTON SEWER DISTRICT
NTS	NOT TO SCALE
PP	POWER POLE

ABBREVIATIONS

PVC	POLYVINYL CHLORIDE
R10	10' RADIUS
RBF	REBAR FOUND
RCP	REINFORCED CONCRETE PIPE
REQ'D	REQUIRED
R/W	RIGHT-OF-WAY
SABC	SAND ASPHALT BASE COURSE
SCDHEC	SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
SCDOT	SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
SS	STAINLESS STEEL
TBM	TEMPORARY BENCH MARK
TC	TOP OF CONCRETE
TG	TOP OF GENERATOR PAD
TP	TOP OF PAVEMENT
TYP	TYPICAL
WQMB	WATER QUALITY MONITORING BOX

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FOR BID

WESTON & SAMPSON ENGINEERS, INC. No. 4208 — SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION

4/21/2025

No.	Date	Dr.By	Ck.By	App.By	Description
4	5/19/2025	RCS	WRF	KRG	ADDENDUM 2
3	4/21/2025	RCS	WRF	KRG	ISSUED FOR BID
2	4/4/2025	RCS	WRF	KRG	100% DESIGN
1	8/29/2024	GDV	WRF	KRG	PERMIT REVIEW
0	4/5/2024	GDV	BJR	KRG	60% DESIGN

APP BY: KRG
CHK BY: WRF
DSN BY: WBD
DR BY: GDV

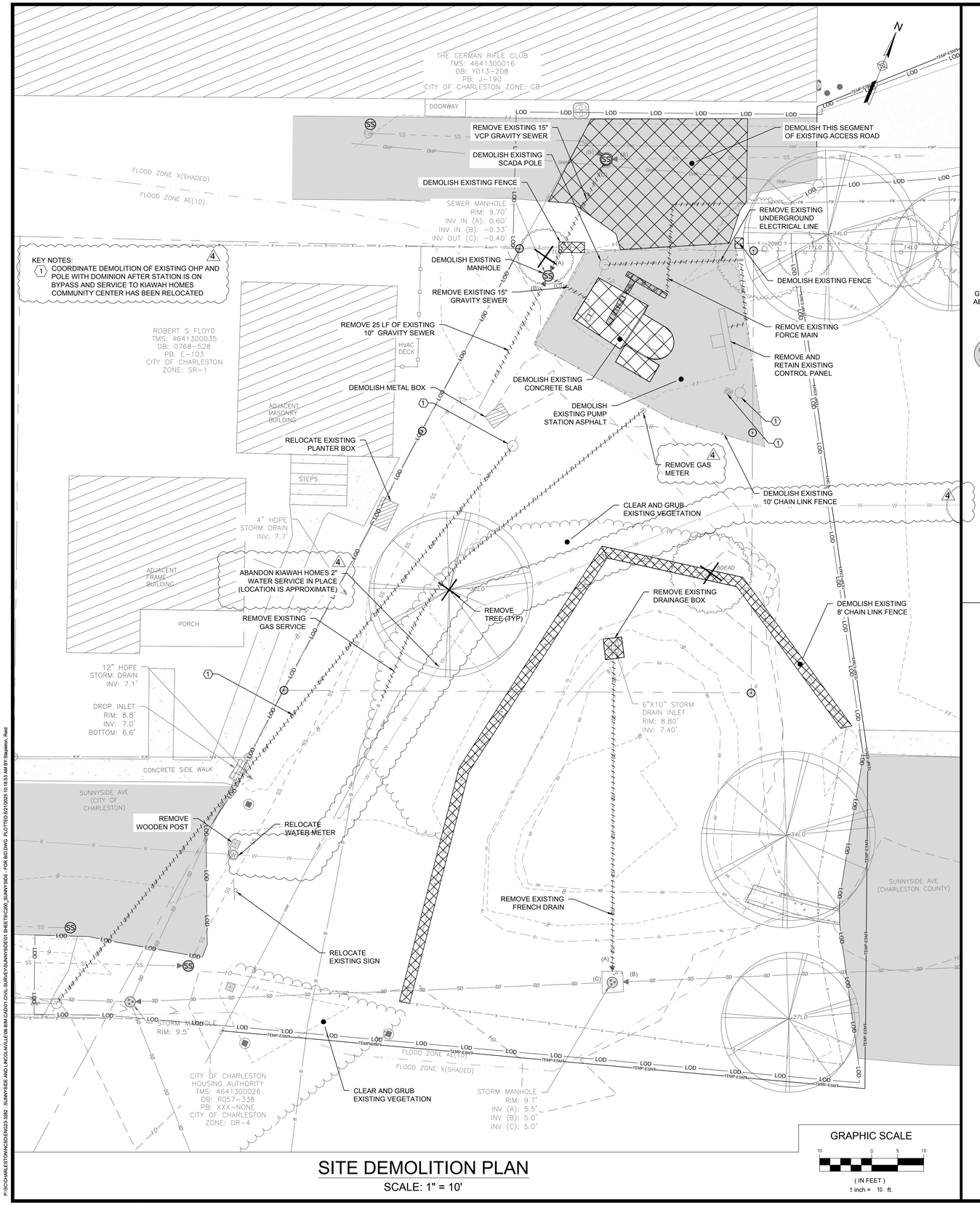
NORTH CHARLESTON, SOUTH CAROLINA
NORTH CHARLESTON SEWER DISTRICT
SUNNYSIDE PUMP STATION REHABILITATION

NOTES & LEGEND

SCALE: AS SHOWN
CONTRACT: -
JOB NO.: ENG23-3282
CADD NO.: -
FILE NO.: -

C-101

P:\SC\CHARLESTON\NCSD\ENG23-3282 - SUNNYSIDE AND LINCOLNVILLE\06-BIM-CADD\1-CIVIL-SURVEY\SUNNYSIDE\01 SHEETS\C101_SUNNYSIDE - FOR BID.DWG PLOTTED 5/20/2025 1:34:17 PM BY Stephen, Reid



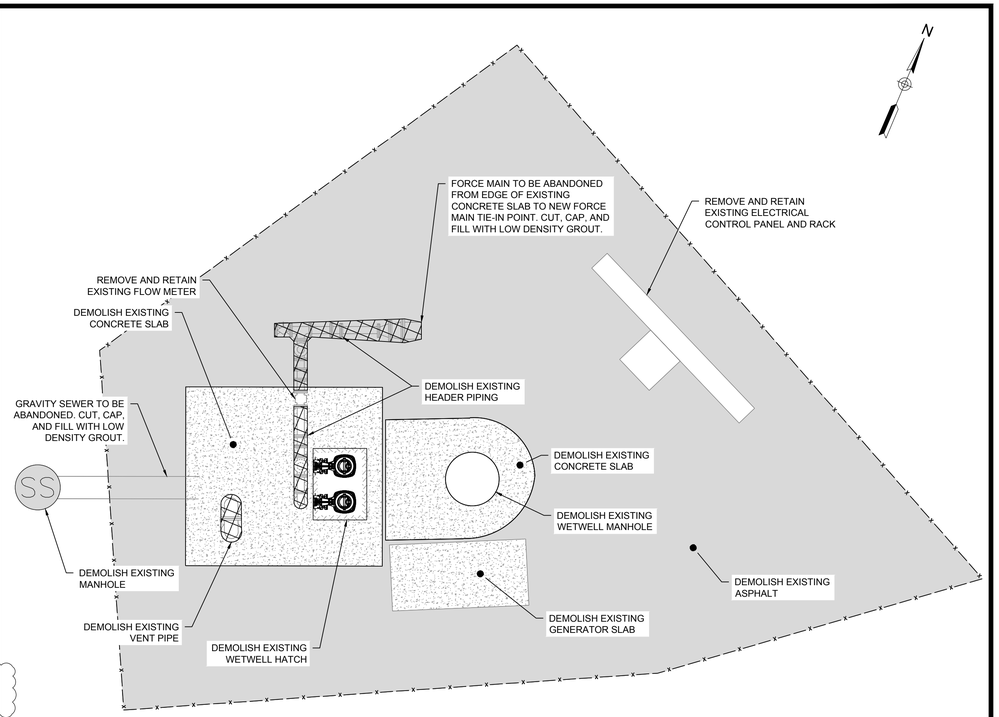
SITE DEMOLITION PLAN

SCALE: 1" = 10'

GRAPHIC SCALE

10 0 5 10

(IN FEET)
1 inch = 10 ft.



EXISTING PUMP STATION DEMOLITION PLAN

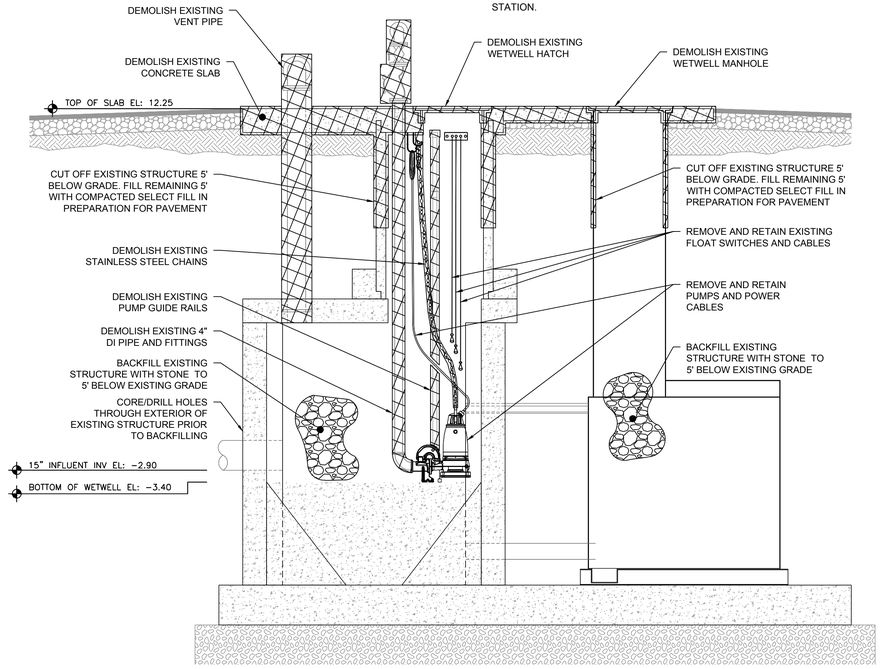
SCALE: 1" = 4'

GRAPHIC SCALE

4 0 2 4

(IN FEET)
1 inch = 4 ft.

NOTE: CONTRACTOR SHALL DEWATER, REMOVE, AND PROPERLY DISPOSE OF ALL WASTE WITHIN THE WETWELL PRIOR TO DEMOLITION AND ABANDONMENT OF EXISTING PUMP STATION.



EXISTING PUMP STATION DEMOLITION PROFILE

SCALE: 1" = 3'

GRAPHIC SCALE

3 0 1.5 3

(IN FEET)
1 inch = 3 ft.

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SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER
FOR BID

SOUTH CAROLINA
WESTON & SAMPSON ENGINEERS, INC.
No. 4208
CERTIFICATE OF AUTHORIZATION
4/21/2025

No.	Date	Dr.By	Ck.By	App.By	Description
4	5/19/2025	RCS	WRF	KRG	ADDENDUM 2
3	4/21/2025	RCS	WRF	KRG	ISSUED FOR BID
2	4/4/2025	RCS	WRF	KRG	100% DESIGN
1	8/29/2024	GDV	WRF	KRG	PERMIT REVIEW
0	4/5/2024	GDV	BJR	KRG	60% DESIGN

NORTH CHARLESTON, SOUTH CAROLINA
NORTH CHARLESTON SEWER DISTRICT
SUNNYSIDE PUMP STATION REHABILITATION

DEMOLITION PLAN

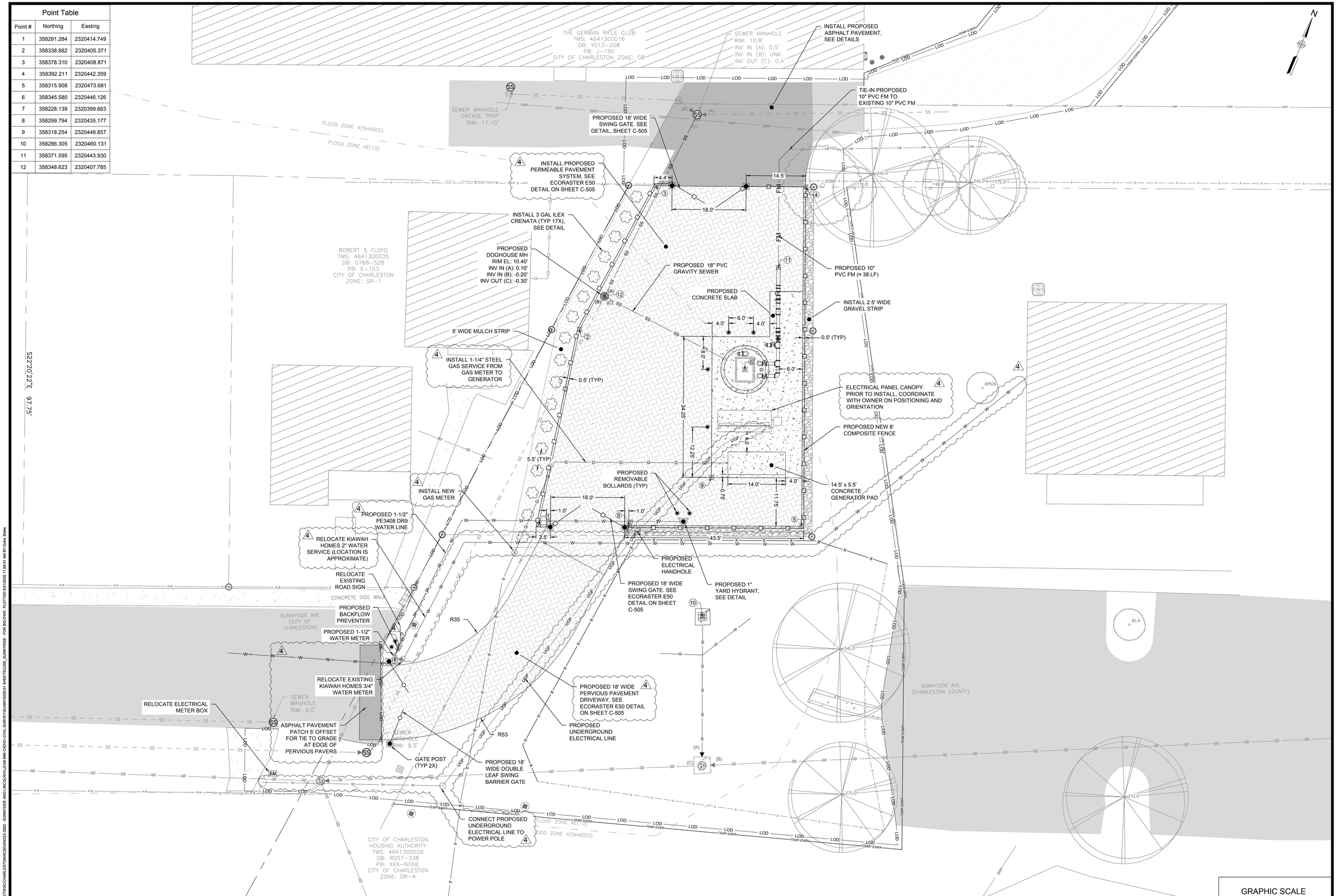
CADD NO.	SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
-	AS SHOWN		ENG23-3282	GDV	WBD	WRF	KRG

C-202

FILE NO. -

P:\SCHARLESTON\WSSD\ENG23-3282 - SUNNYSIDE AND LINCOLN\ENGLEW\BIM-CAD\01-CIVIL SURVEY\SUNNYSIDE\1 SHEETS\C202_SUNNYSIDE - FOR BID.DWG PLOTTED:5/21/2025 10:19:53 AM BY:Stephen, Reid

Point Table		
Point #	Northing	Easting
1	358291.284	2320414.749
2	358338.882	2320405.371
3	358378.310	2320408.871
4	358392.211	2320442.359
5	358315.908	2320473.681
6	358345.580	2320446.126
7	358228.139	2320399.663
8	358299.794	2320435.177
9	358318.254	2320448.857
10	358286.305	2320460.131
11	358371.595	2320443.930
12	358348.623	2320407.785



PROPOSED SITE PLAN

SCALE: 1" = 10'

GRAPHIC SCALE

10 0 5 10

(IN FEET)

1 inch = 10 ft.

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WESTON & SAMPSON ENGINEERS, INC. No. 4208 SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION

4/21/2025

No.	Date	Description	Dr.By	Ck.By	App.By
4	5/19/2025	ADDENDUM 2	RCS	WRF	KRG
3	4/21/2025	ISSUED FOR BID	RCS	WRF	KRG
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0	4/5/2024	60% DESIGN	GDV	BJR	KRG

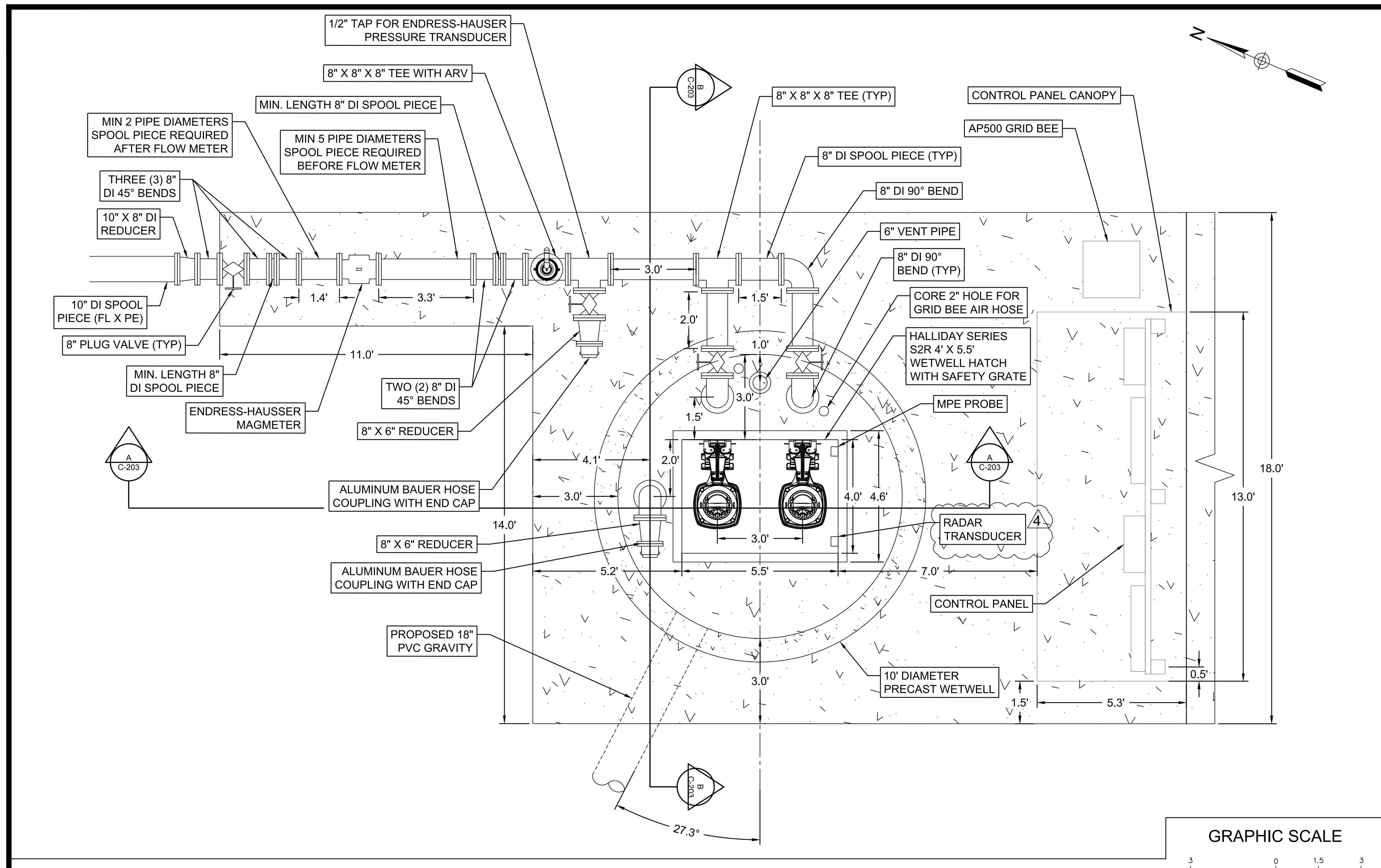
NORTH CHARLESTON, SOUTH CAROLINA
NORTH CHARLESTON SEWER DISTRICT
SUNNYSIDE PUMP STATION REHABILITATION

PROPOSED SITE PLAN

CADD NO.	SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
-	AS SHOWN		ENG23-3282	GDV	WBD	WRF	KRG

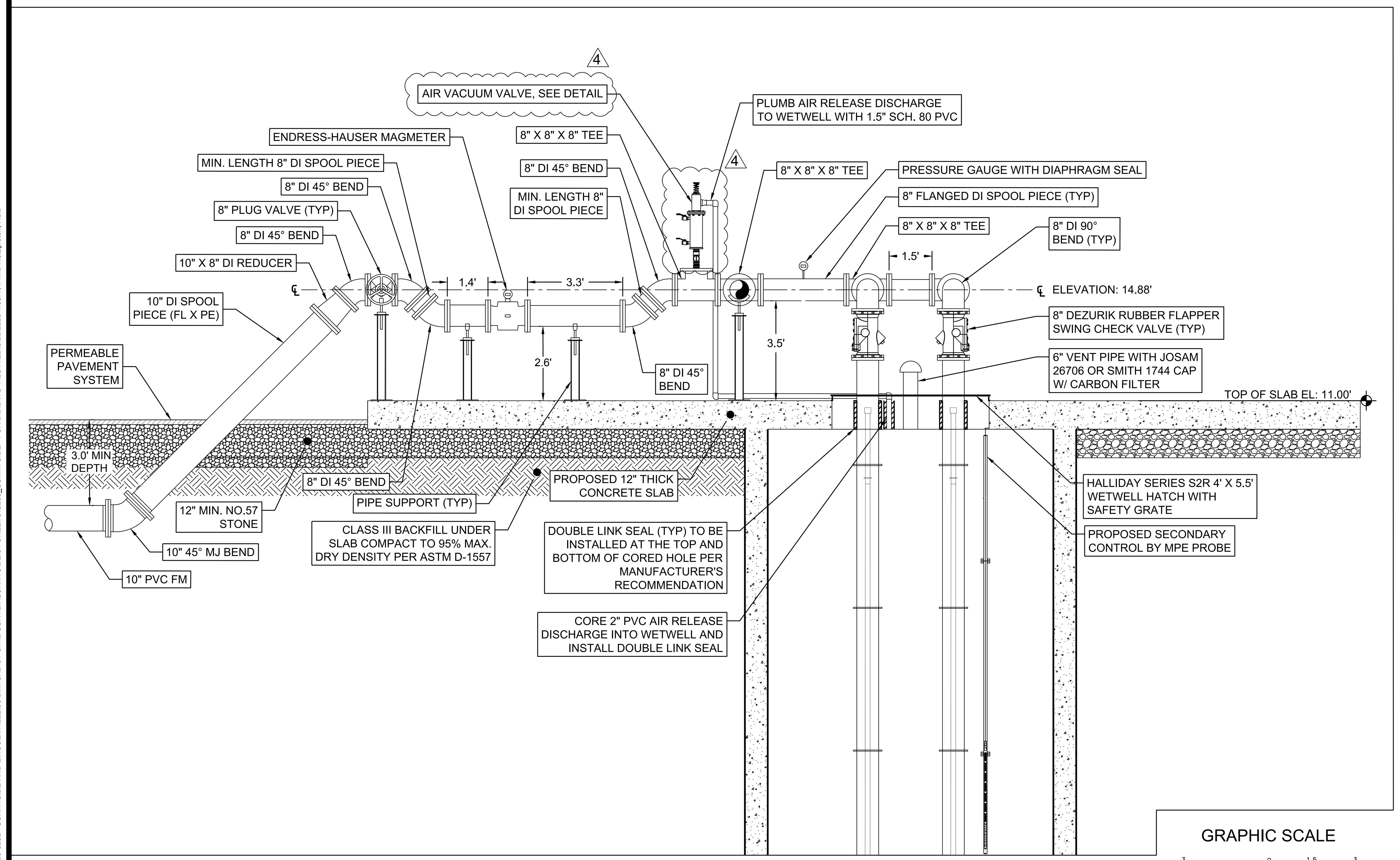
C-203

FILE NO. -



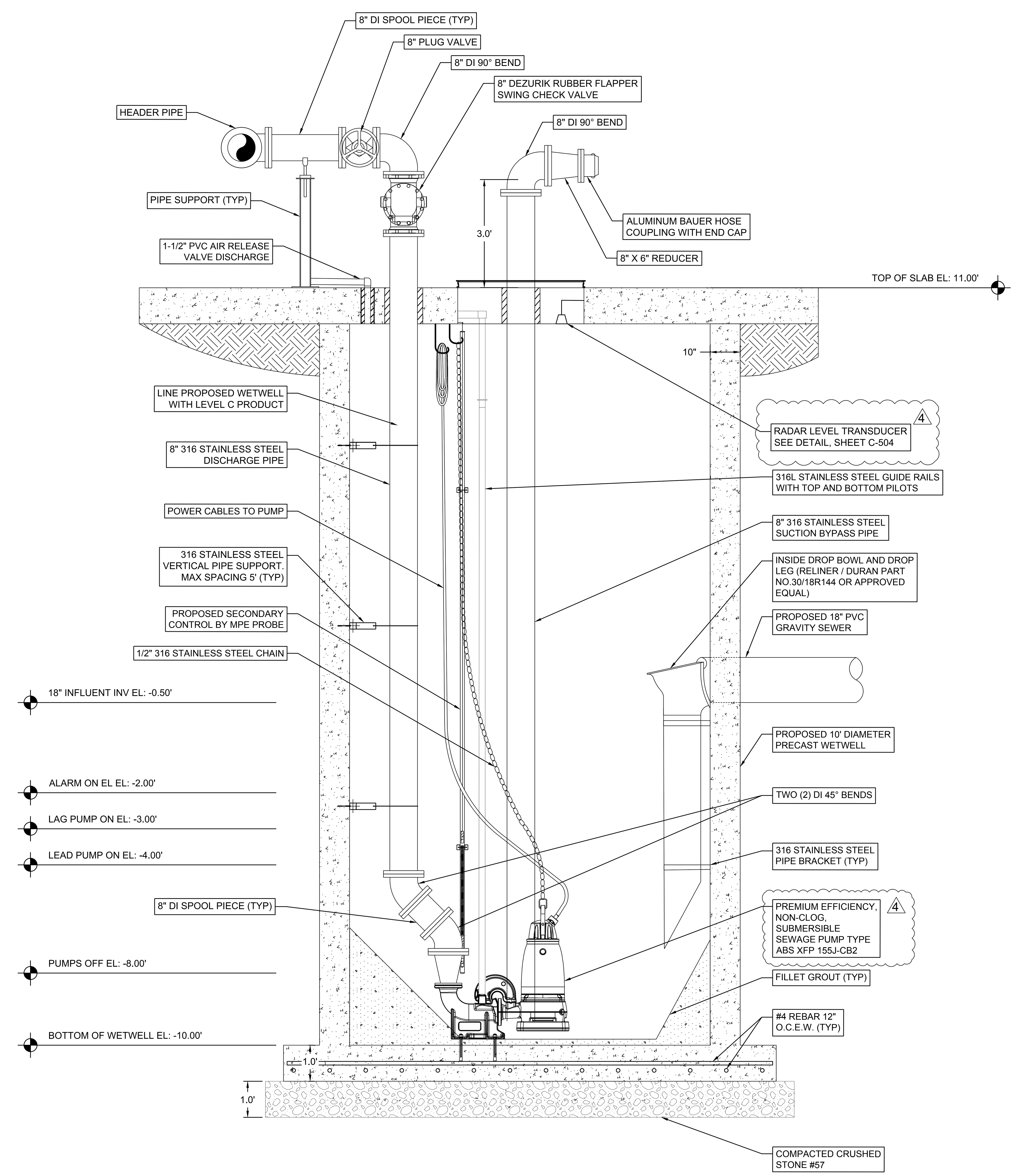
HEADER PIPING PLAN

SCALE: 1" = 3'



SECTION A - HEADER PIPING PROFILE VIEW

SCALE: 1" = 3'



SECTION B - WETWELL PROFILE VIEW

SCALE: 1" = 2'

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SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION
WESTON & SAMPSON ENGINEERS, INC.
No. 4208

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NORTH CHARLESTON, SOUTH CAROLINA
NORTH CHARLESTON SEWER DISTRICT
SUNNYSIDE PUMP STATION REHABILITATION

PROPOSED PUMP STATION PLAN & SECTION VIEW

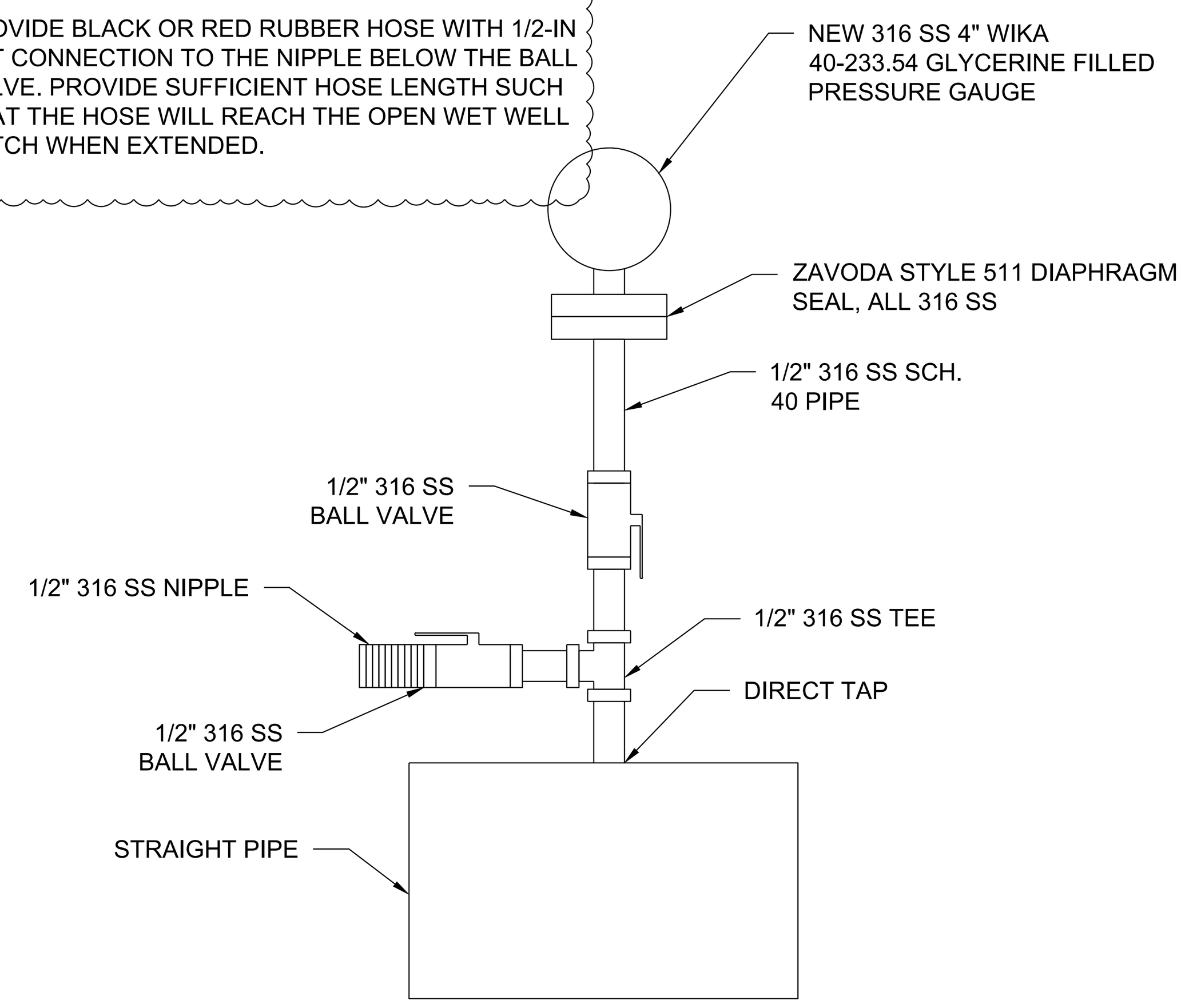
SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
AS SHOWN		ENG23-3282	GDV	WBD	WRF	KRG

CADD NO. -

FILE NO. -

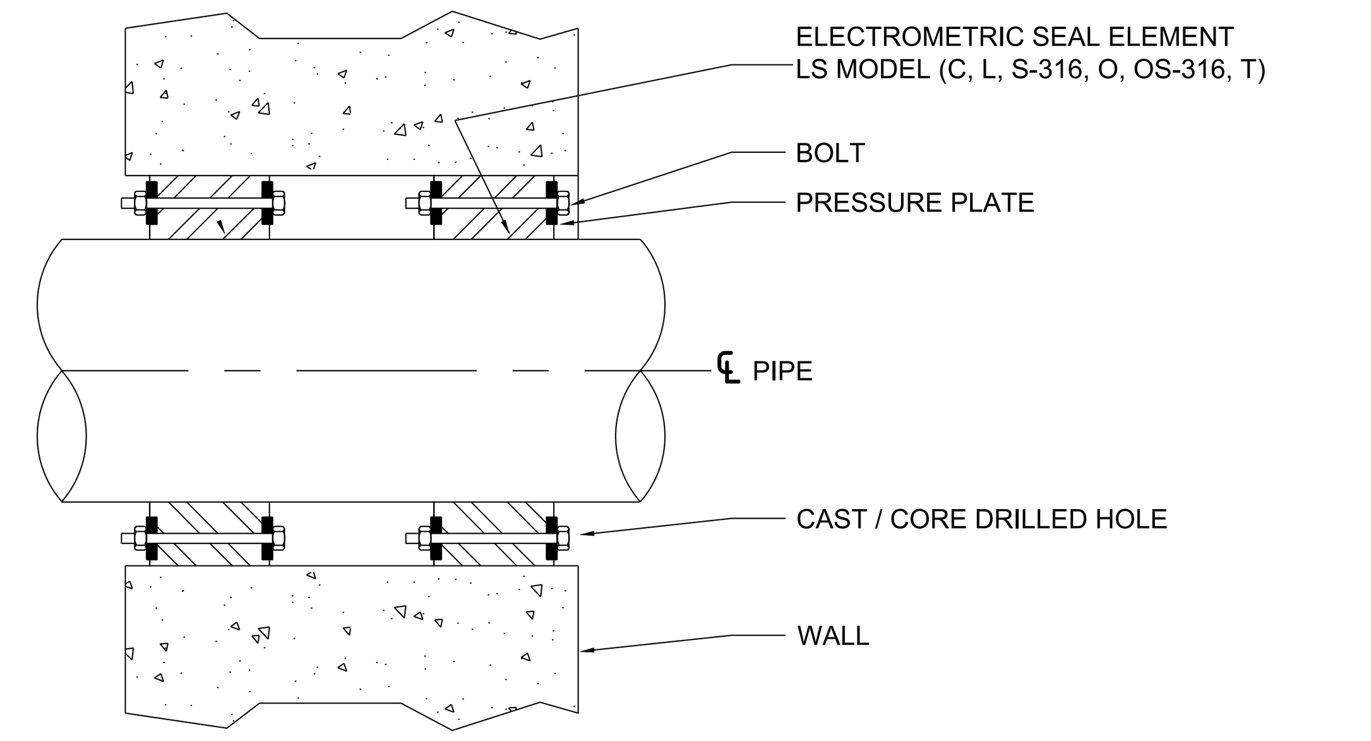
C-204

NOTES:
1. PROVIDE BLACK OR RED RUBBER HOSE WITH 1/2-IN NPT CONNECTION TO THE NIPPLE BELOW THE BALL VALVE. PROVIDE SUFFICIENT HOSE LENGTH SUCH THAT THE HOSE WILL REACH THE OPEN WET WELL HATCH WHEN EXTENDED.



PRESSURE GAUGE CONNECTION DETAIL
NTS

LINK-SEAL® MODULAR SEALS WITH CAST OR CORE DRILLED WALL OPENING MANUFACTURED BY PIPELINE SEAL & INSULATOR, INC. HOUSTON, TEXAS, U.S.A. TEL: 800-423-2410 E-MAIL: INFO@PSIPSI.COM

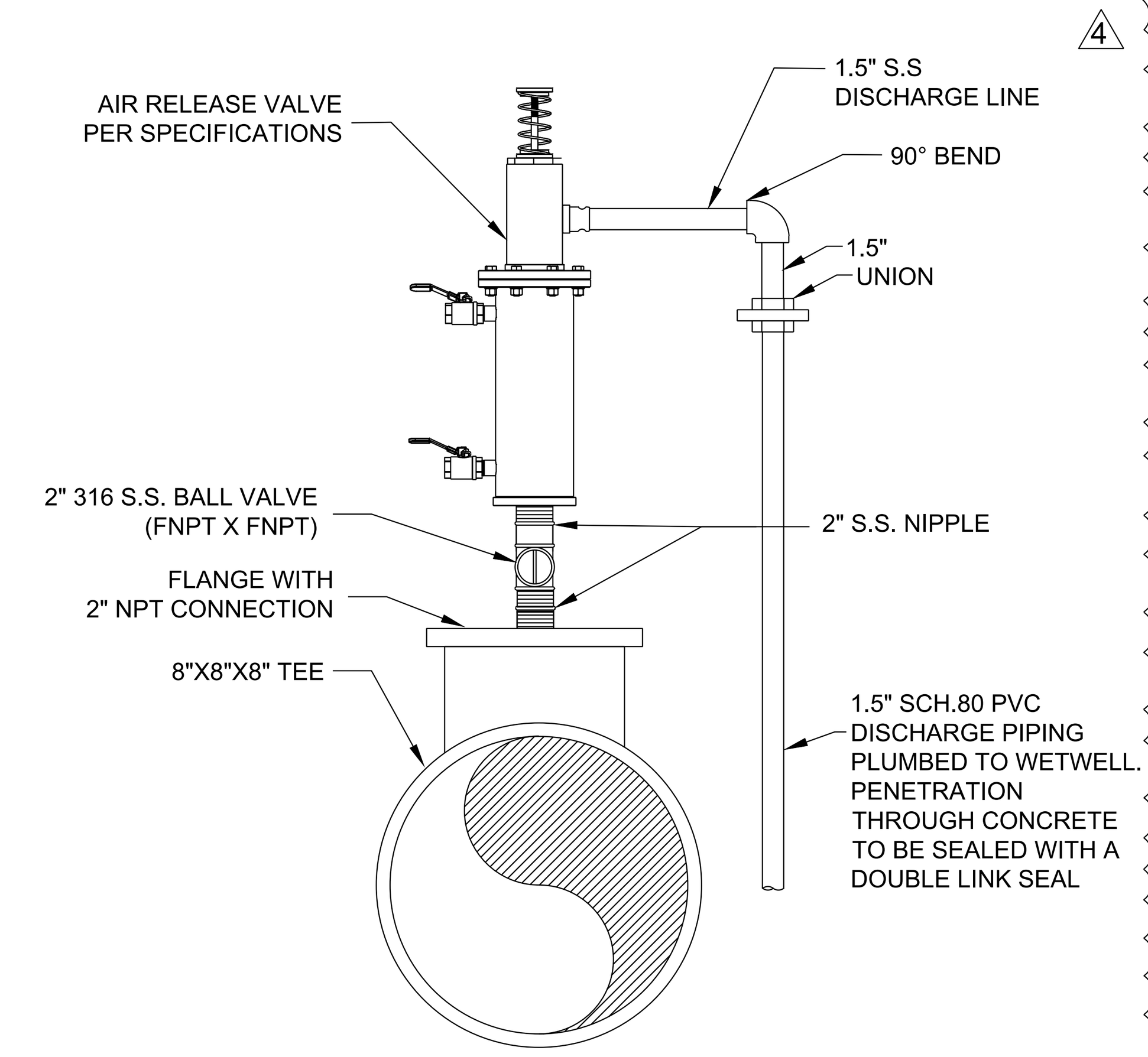


LS MODEL	SEAL ELEMENT	BOLTS/NUTS	PRESSURE PLATE
(C,L,O)+S-316	(SEE MODEL OPTIONS)	316 STAINLESS STEEL	REINFORCED NYLON POLYMER

SLEEVE MODEL	DESCRIPTION	MATERIAL
CS	CENTURY-LINE SLEEVE	HDPE
WS	STEEL WALL SLEEVE	STEEL

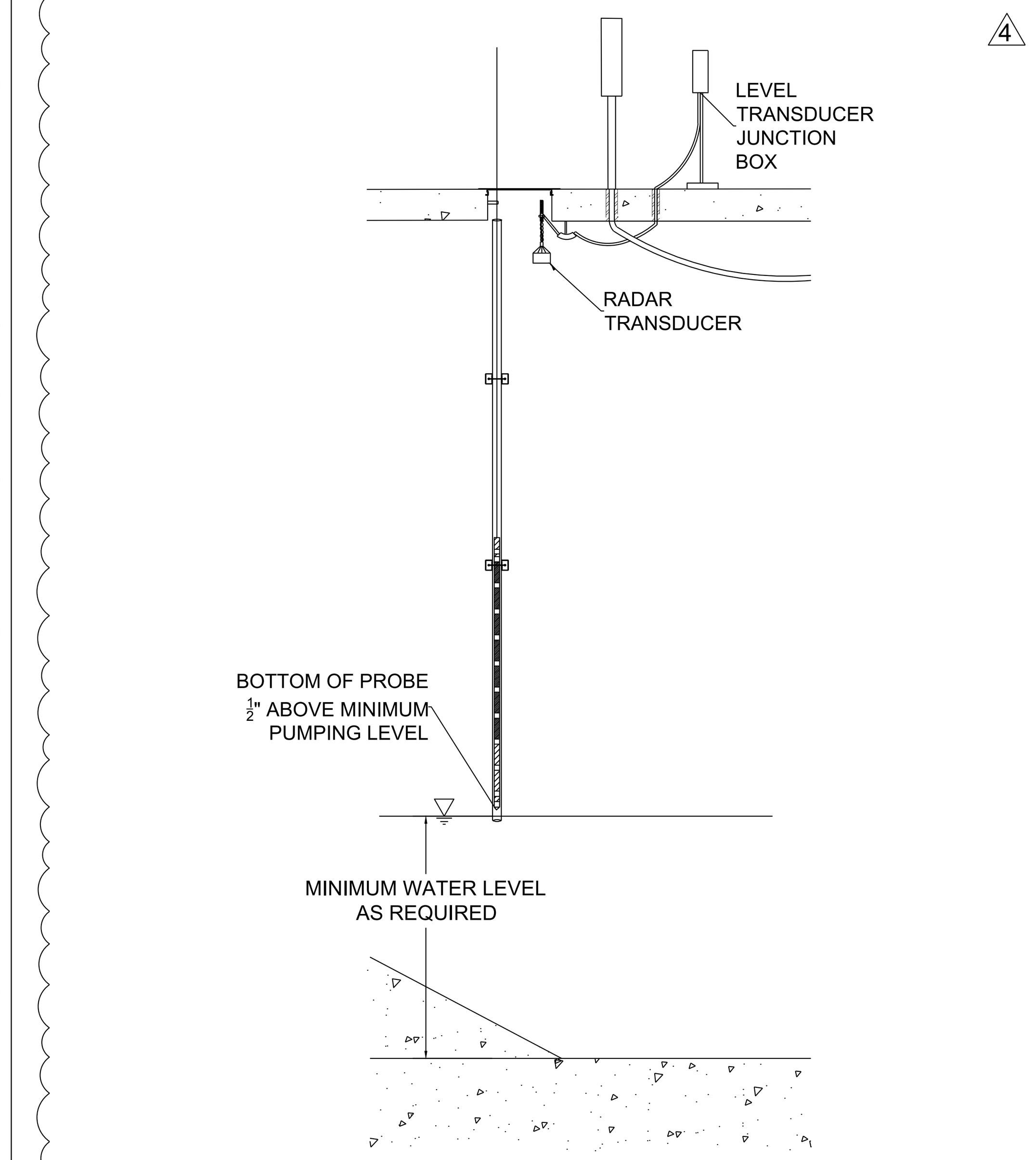
INSTALL PER MANUFACTURER'S RECOMMENDATIONS

LINK-SEAL WALL PENETRATION DETAIL
NOT TO SCALE

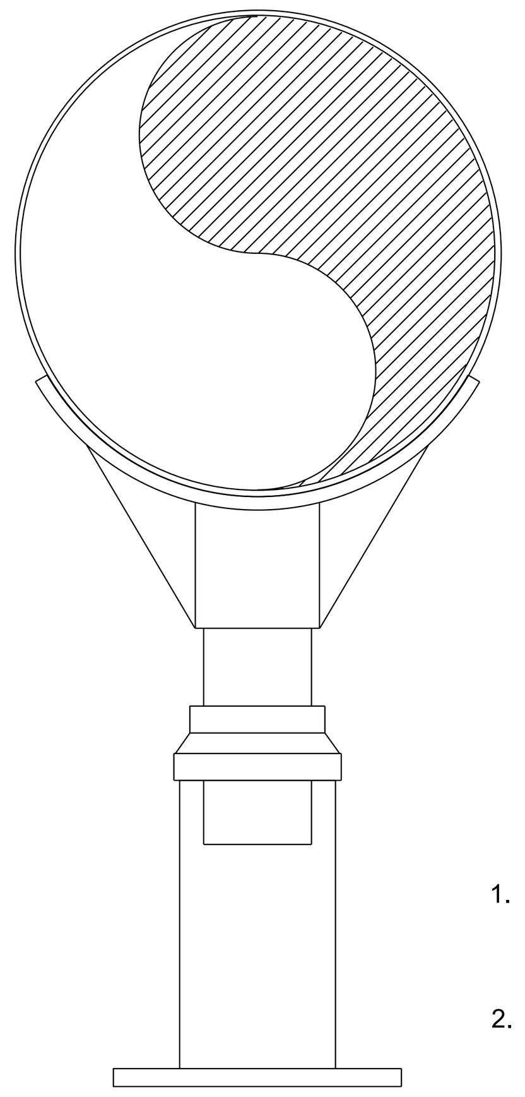


1. ALL HARDWARE SHALL BE 316 STAINLESS STEEL UNLESS OTHERWISE NOTED.

AIR RELEASE VALVE
NOT TO SCALE

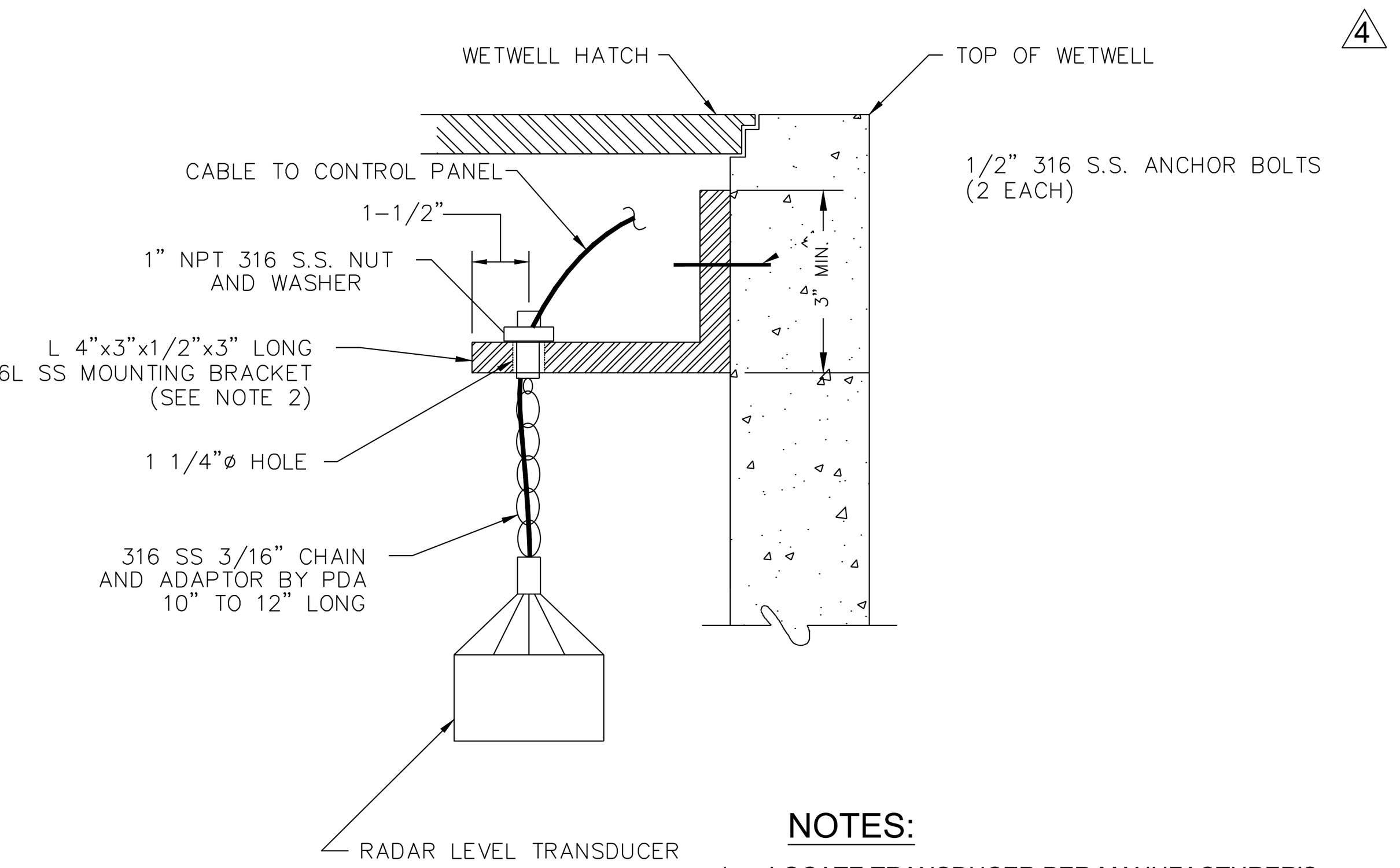


RADAR TRANSDUCER AND MPE PROBE
NOT TO SCALE



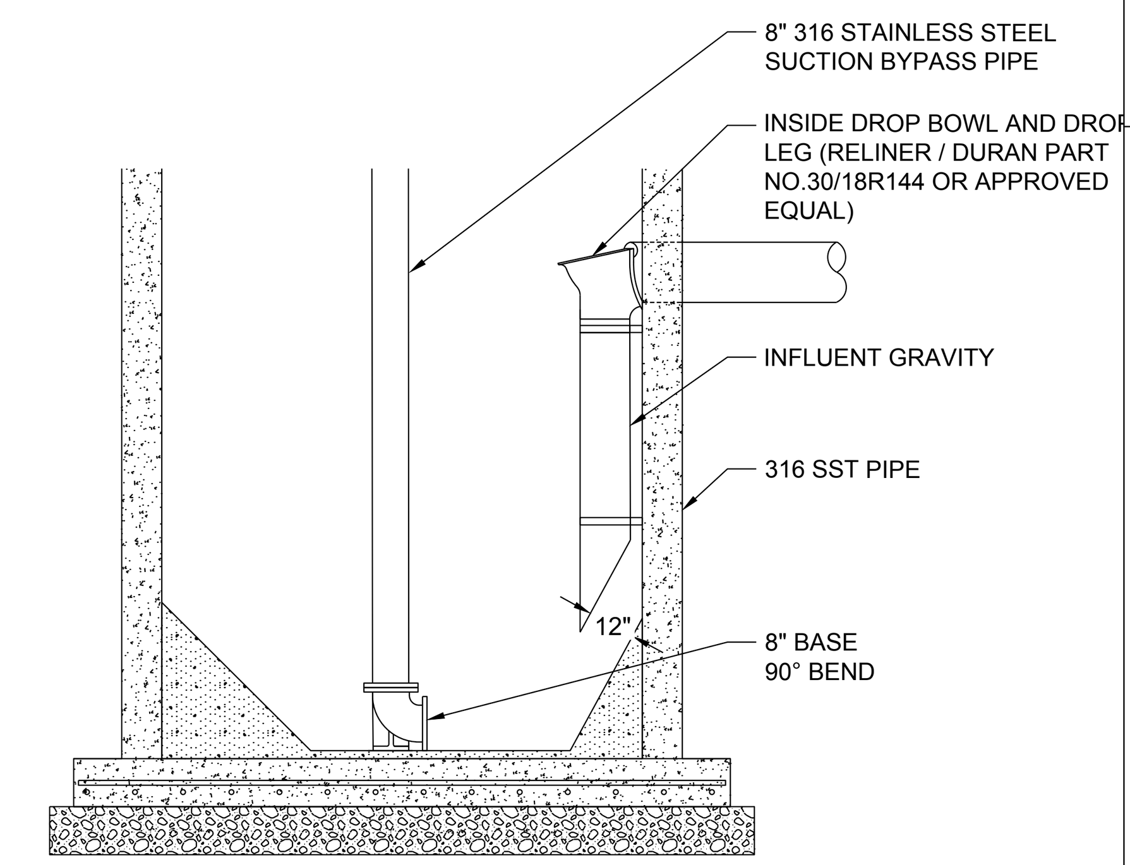
NOTES:
1. PIPE SUPPORT MATERIALS SHALL BE 316 STAINLESS STEEL AND MANUFACTURED BY SPIDER SUPPORTS AND SPACERS (MODEL SPSS) OR APPROVED EQUAL.
2. ALL DIMENSIONS TO BE FIELD VERIFIED AND SUBMITTED WITH SHOP DRAWING PRIOR TO ORDERING.
3. PIPE SUPPORTS SHALL BE SPACED APPROPRIATELY SUCH THAT ALL PIPING IS SUFFICIENTLY SUPPORTED TO THE SATISFACTION OF THE OWNER AND ENGINEER.

PIPE SUPPORT
NTS

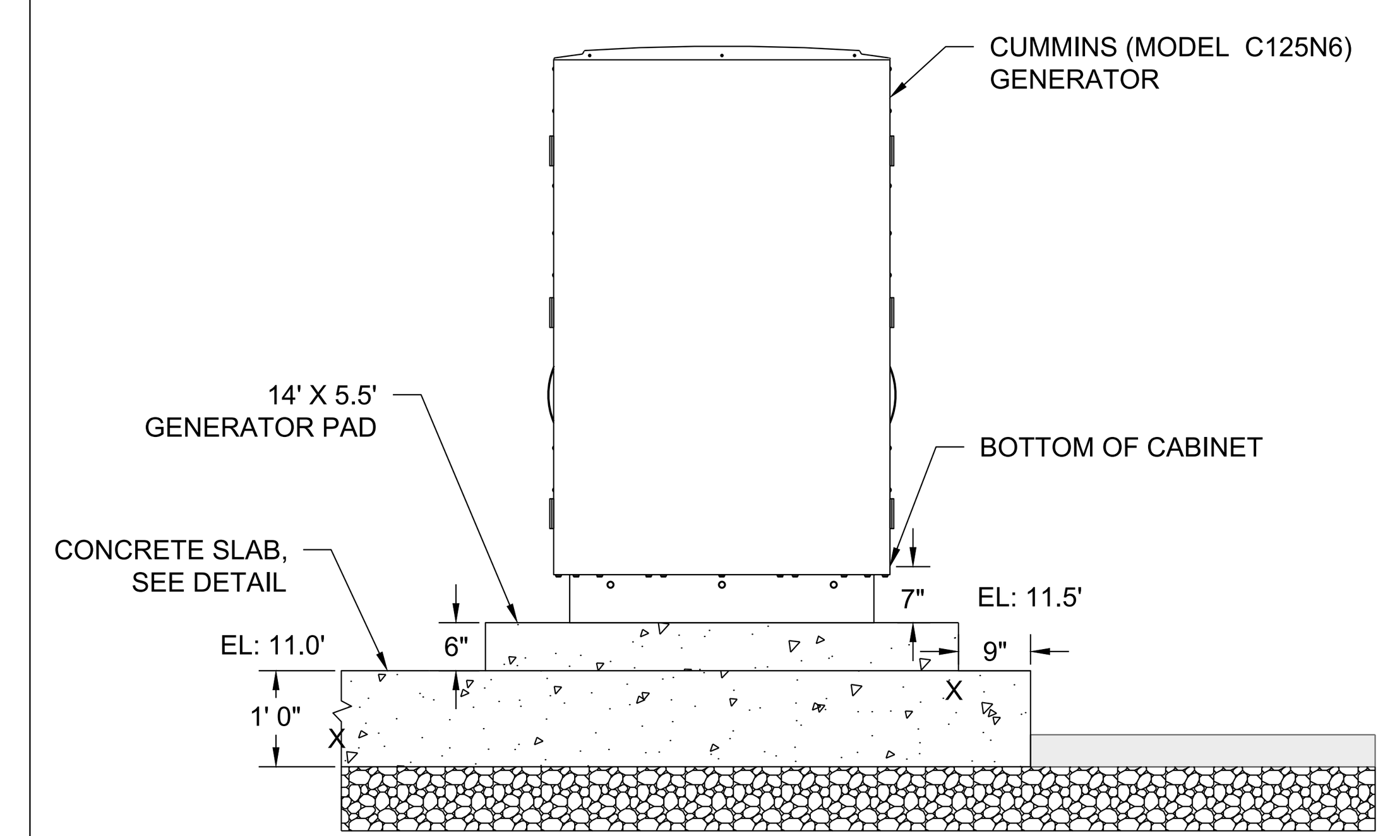


NOTES:
1. LOCATE TRANSDUCER PER MANUFACTURER'S RECOMMENDATIONS TO AVOID INTERFERENCE FROM PUMPS, WALL, ETC. IN THE WETWELL.
2. IF TRANSDUCER NEEDS TO EXTEND OUT INTO WETWELL, CONTACT PUMP STATION MAINTENANCE MANAGER FOR DIFFERENT MOUNTING DETAIL.

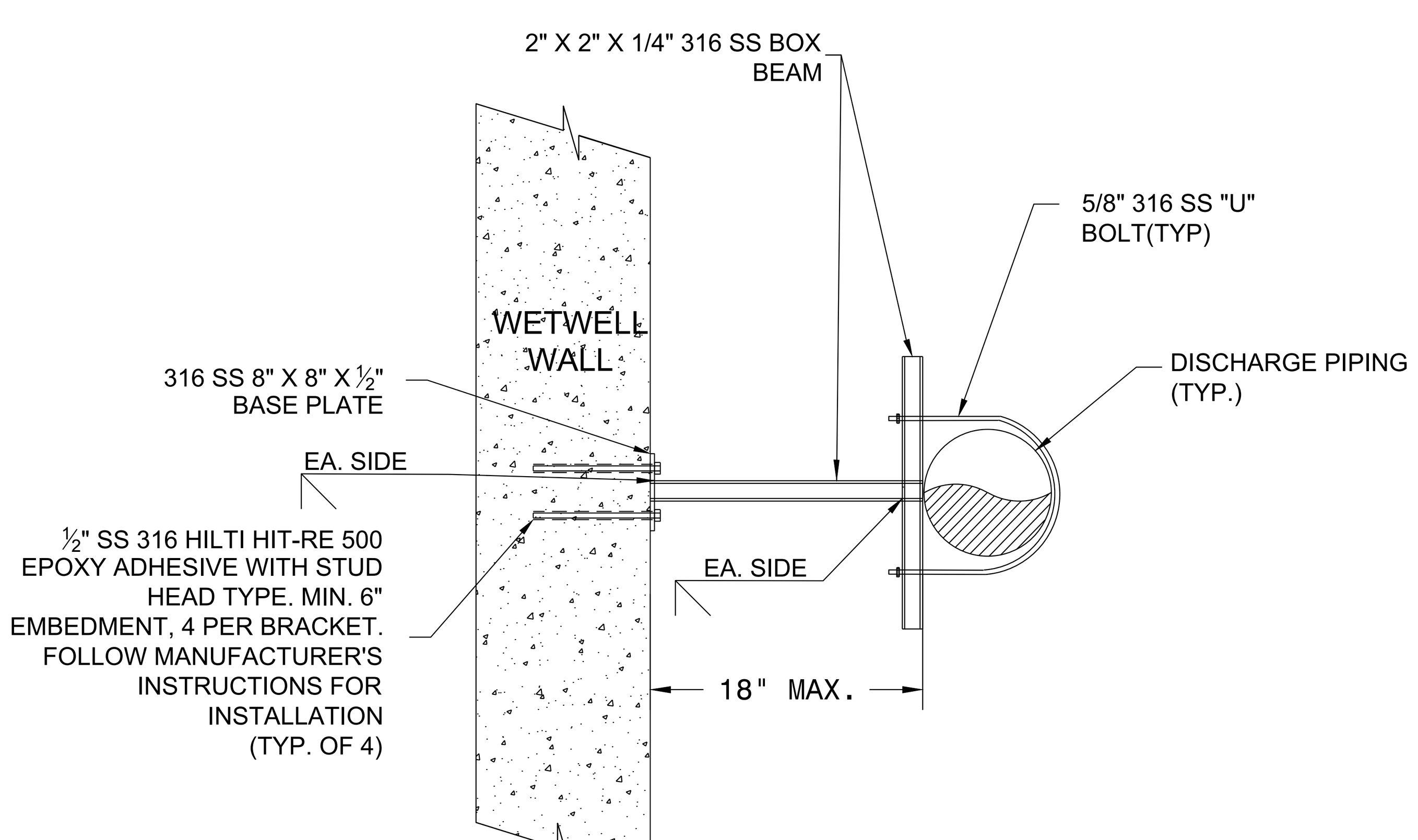
RADAR LEVEL TRANSDUCER MOUNTING DETAIL
NOT TO SCALE



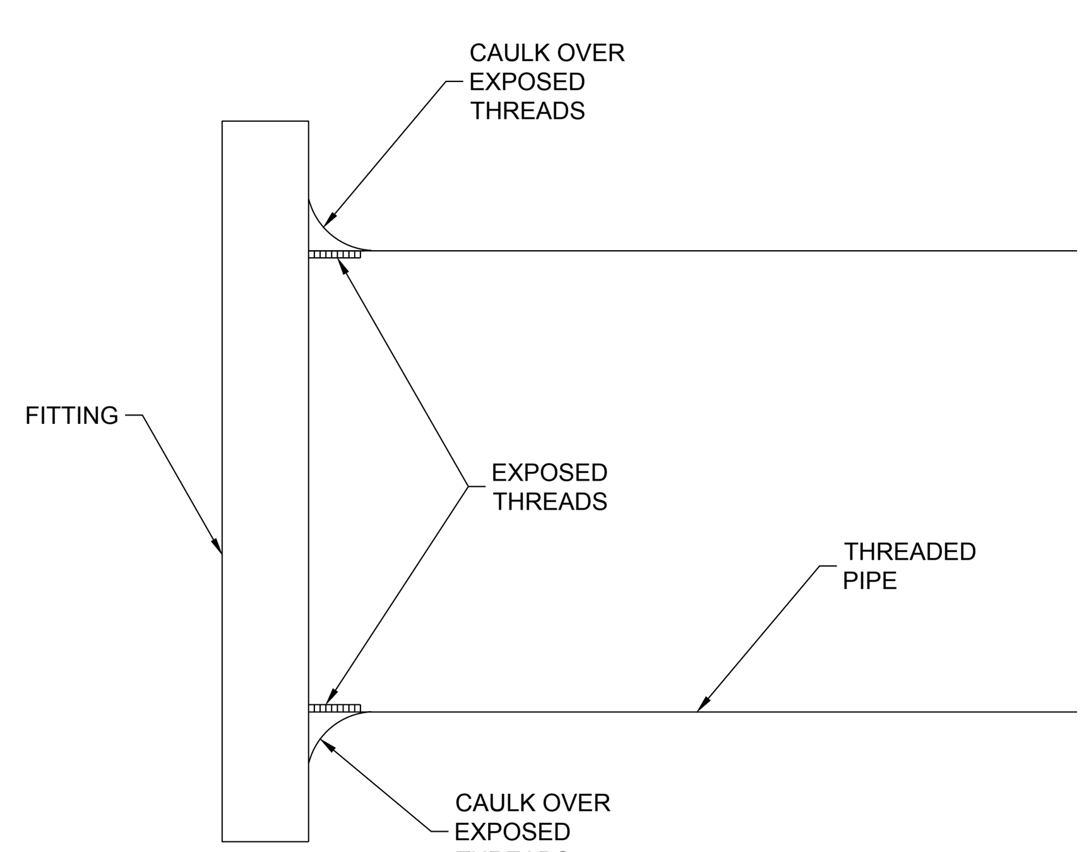
BYPASS SUCTION PIPE AND INFLUENT DROP PIPE DETAIL
NTS



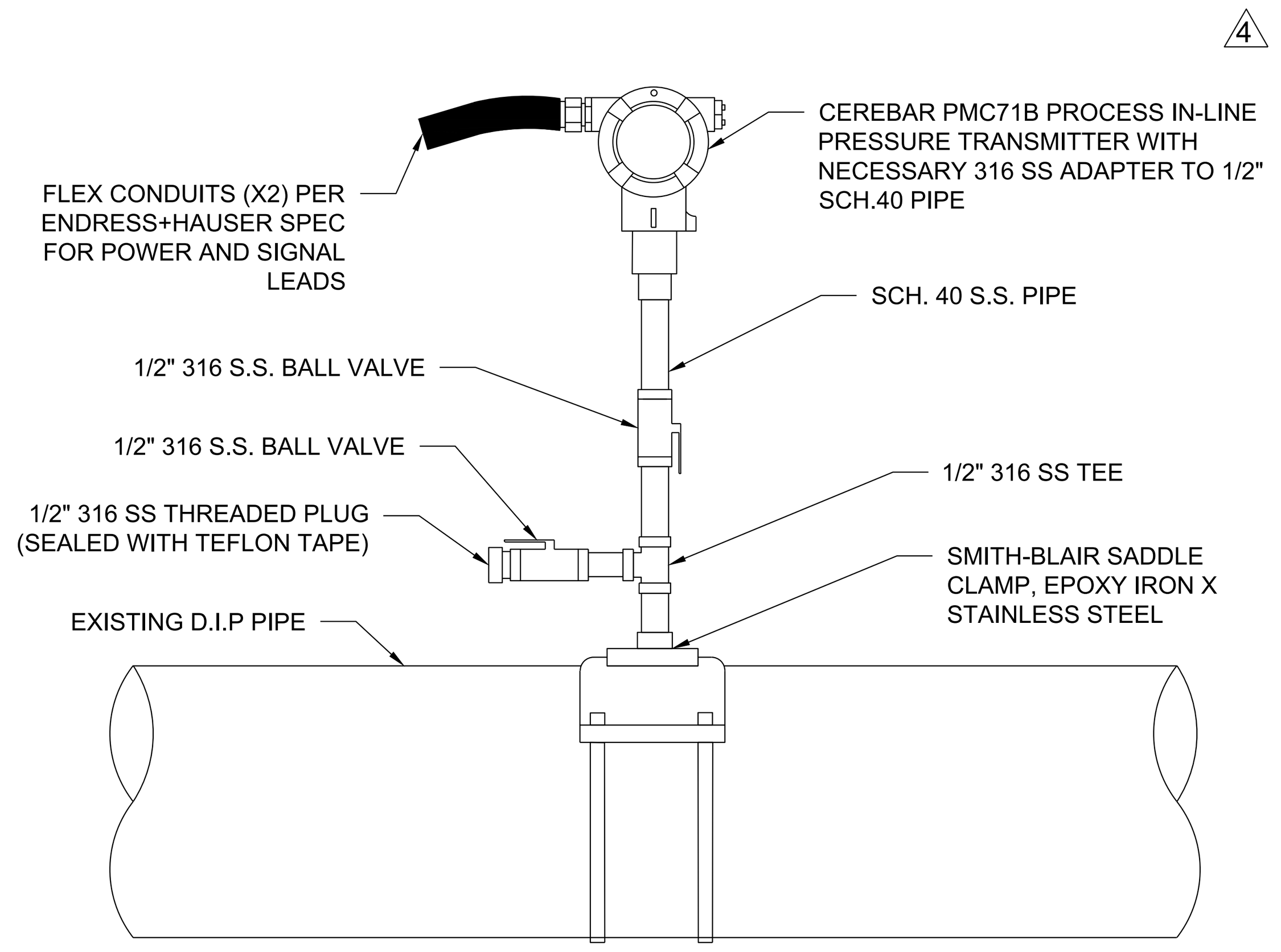
GENERATOR PAD / PS SLAB SECTION VIEW
NTS



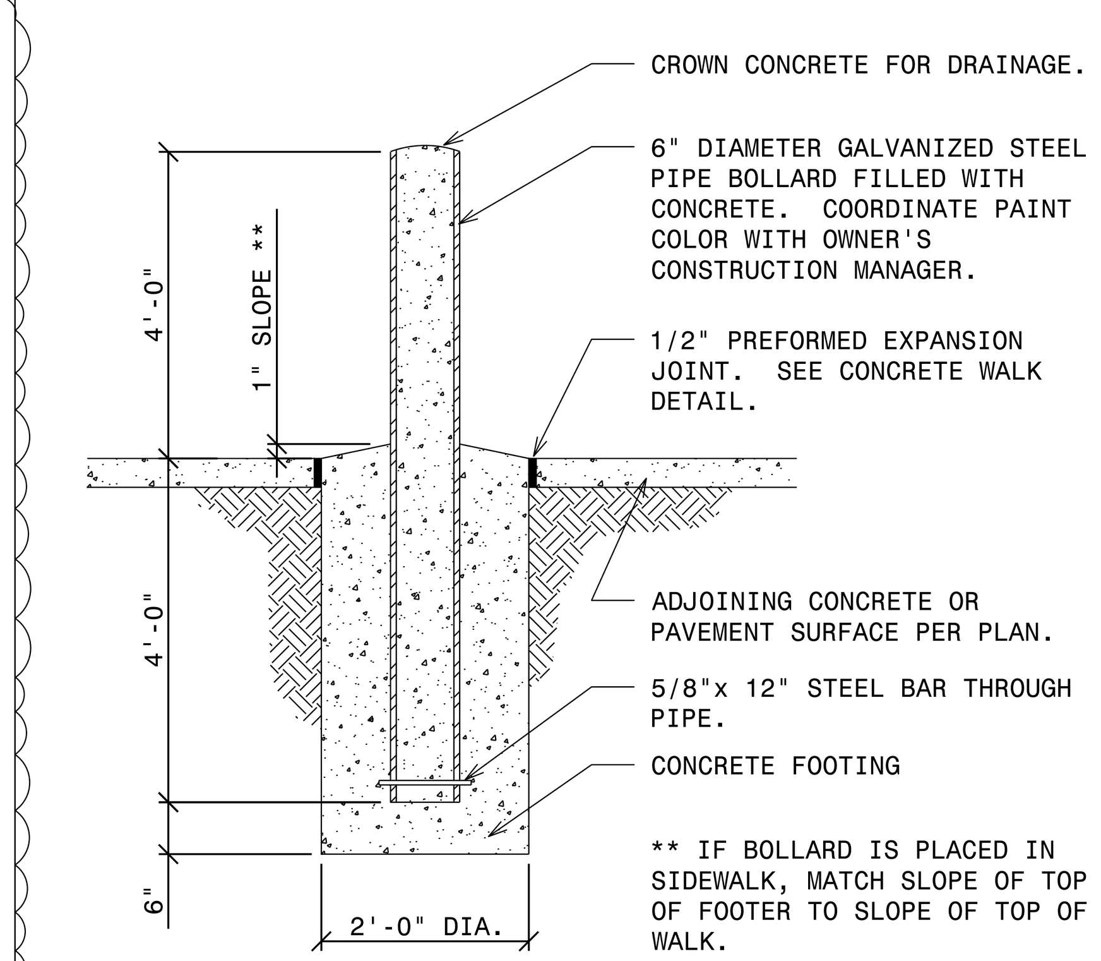
VERTICAL PIPE SUPPORT
NOT TO SCALE



THREADED PIPE DETAIL



PRESSURE TRANSMITTER AND CONNECTION ASSEMBLY DETAIL
NTS



BOLLARD DETAIL

Weston & Sampson
Weston & Sampson Engineers, Inc.
3955 Faber Place Dr., Suite 200
North Charleston, SC 29405
843.881.9804 800.SAMPSON
www.westonandsampson.com

FOR BID

SOUTH CAROLINA WESTON & SAMPSON ENGINEERS, INC. No. 4208 CERTIFICATE OF AUTHORIZATION
4/21/2025

No.	Date	Dr.By	Ck.By	App.By	Description
4	5/19/2025	RCS	WRF	KRG	ADDENDUM 2
3	4/21/2025	RCS	WRF	KRG	ISSUED FOR BID
2	4/4/2025	RCS	WRF	KRG	100% DESIGN
1	8/29/2024	GDV	WRF	KRG	PERMIT REVIEW
0	4/5/2024	GDV	BJR	KRG	60% DESIGN

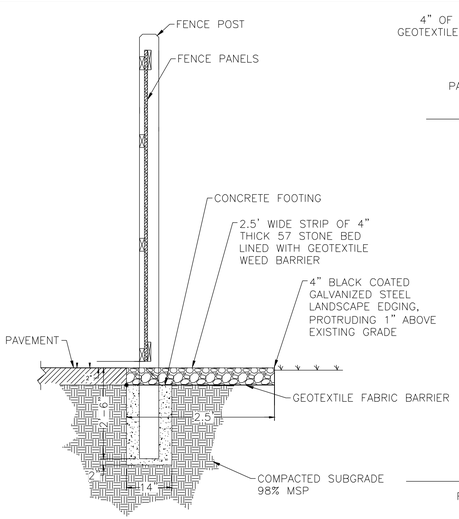
NORTH CHARLESTON, SOUTH CAROLINA
NORTH CHARLESTON SEWER DISTRICT
SUNNYSIDE PUMP STATION REHABILITATION

STANDARD SITE DETAILS

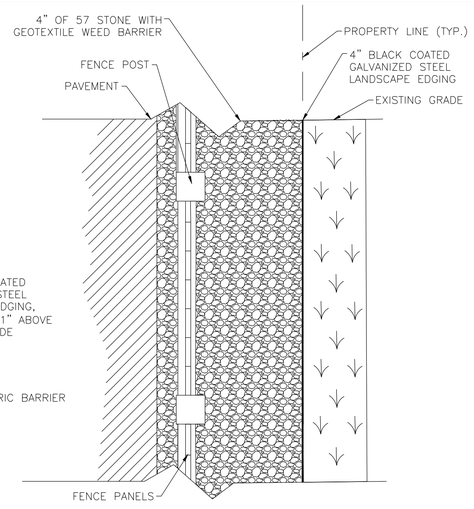
CADD NO.	SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
-	AS SHOWN		ENG23-3282	GDV	WBD	WRF	KRG

FILE NO. -

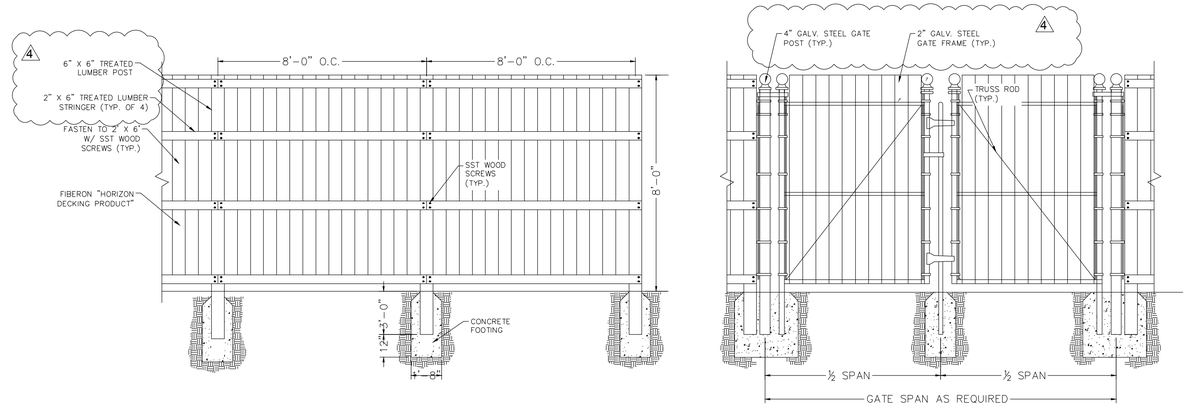
C-504



SECTION VIEW OF FENCE IN GRAVEL
NOT TO SCALE



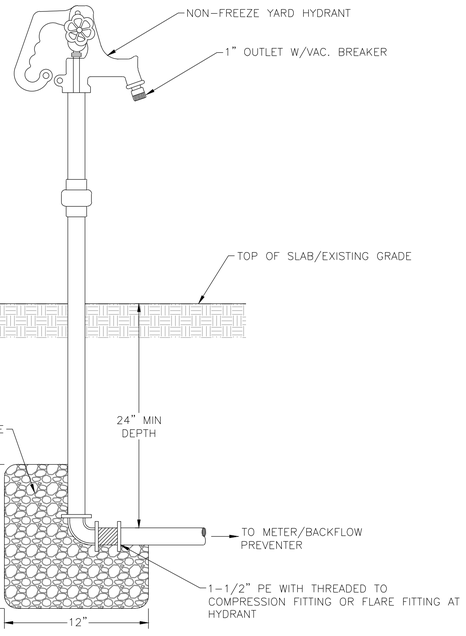
PLAN VIEW OF PERIMETER GRAVEL STRIP
NOT TO SCALE



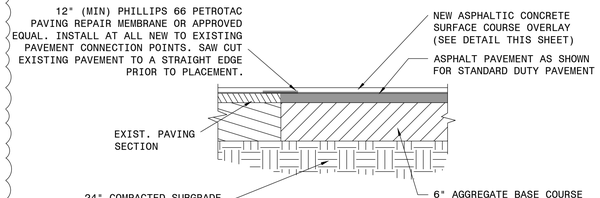
ELEVATION

GATE

COMPOSITE FENCE DETAIL

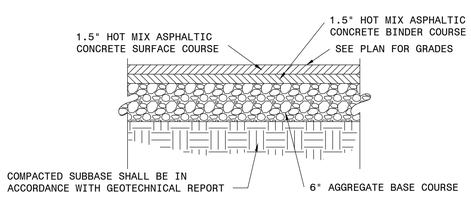


1" YARD HYDRANT DETAIL
NOT TO SCALE



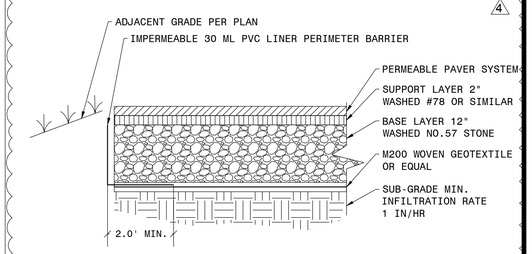
NOTES:
1. ALL PAVING MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS (LATEST EDITION).
2. SEE GENERAL NOTES.

TYPICAL NEW TO EXISTING ASPHALT PAVEMENT CONNECTION
NOT TO SCALE



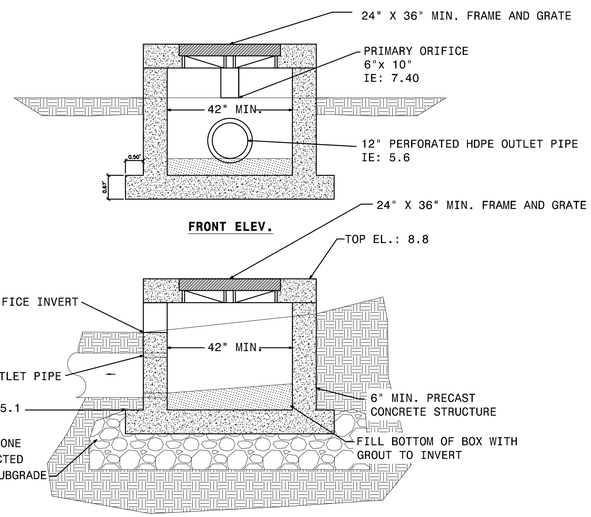
NOTES:
1. ALL MATERIALS AND INSTALLATION SHALL BE IN ACCORDANCE WITH STATE DOT STANDARD SPECIFICATION (LATEST EDITION).
2. CONTRACTOR SHALL REFER TO GEOTECHNICAL REPORT FOR FURTHER RECOMMENDATIONS.

STANDARD DUTY PAVEMENT SECTION
NOT TO SCALE



NOTE: TO BE USED AROUND FULL PERIMETER OF BOTH GRAVEL STORAGE AREAS.

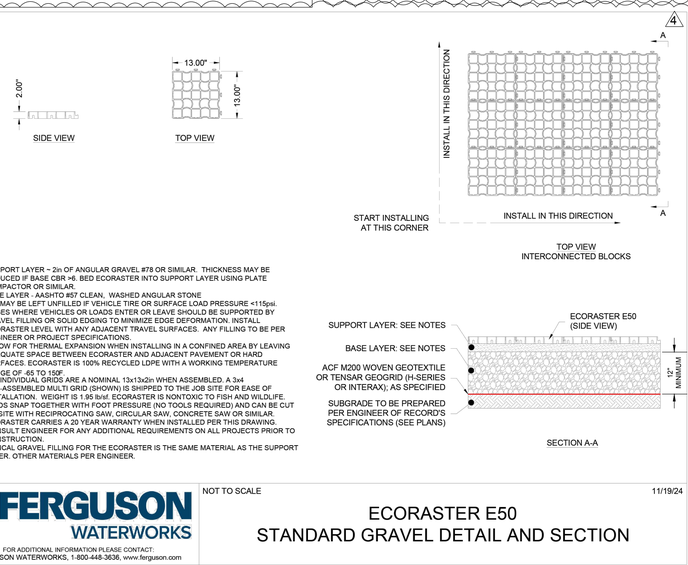
GRAVEL STORAGE PERIMETER DETAIL
NOT TO SCALE



FRONT ELEV.

NOTES:
1. FRAME AND GRATE SHALL BE US FNDRY NO. USF 4655 OR EQUIVALENT.
2. CHAMFER ALL EXPOSED CONCRETE EDGES ¾"

PRECAST CONCRETE OUTLET STRUCTURE DETAIL



NOTES:
1. SUPPORT LAYER - 2in OF ANGULAR GRAVEL #78 OR SIMILAR. THICKNESS MAY BE REDUCED IF BASE CBR >6. BED ECORASTER INTO SUPPORT LAYER USING PLATE COMPACTOR OR SIMILAR.
2. BASE LAYER - AASHTO #57 CLEAN, WASHED ANGULAR STONE
3. E50 MAY BE LEFT UNFILLED IF VEHICLE TIRE OR SURFACE LOAD PRESSURE <115psi. EDGES WHERE VEHICLES OR LOADS ENTER OR LEAVE SHOULD BE SUPPORTED BY GRAVEL FILLING OR SOLID EDGING TO MINIMIZE EDGE DEFORMATION. INSTALL ECORASTER LEVEL WITH ANY ADJACENT TRAVEL SURFACES. ANY FILLING TO BE PER ENGINEER OR PROJECT SPECIFICATIONS.
4. ALLOW FOR THERMAL EXPANSION WHEN INSTALLING IN A CONFINED AREA BY LEAVING ADEQUATE SPACE BETWEEN ECORASTER AND ADJACENT PAVEMENT OR HARD SURFACES. ECORASTER IS 100% RECYCLED LDPE WITH A WORKING TEMPERATURE RANGE OF -65 TO 150F.
5. E50 INDIVIDUAL GRIDS ARE A NOMINAL 13x13x2in WHEN ASSEMBLED. A 3x4 PRE-ASSEMBLED MULTI GRID (SHOWN) IS SHIPPED TO THE JOB SITE FOR EASE OF INSTALLATION. WEIGHT IS 1.95 lb/sf. ECORASTER IS NONTOXIC TO FISH AND WILDLIFE.
6. GRIDS SNAP TOGETHER WITH FOOT PRESSURE (NO TOOLS REQUIRED) AND CAN BE CUT ON SITE WITH RECIPROCATING SAW, CIRCULAR SAW, CONCRETE SAW OR SIMILAR.
7. ECORASTER CARRIES A 20 YEAR WARRANTY WHEN INSTALLED PER THIS DRAWING. CONSULT ENGINEER FOR ANY ADDITIONAL REQUIREMENTS ON ALL PROJECTS PRIOR TO CONSTRUCTION.
8. TYPICAL GRAVEL FILLING FOR THE ECORASTER IS THE SAME MATERIAL AS THE SUPPORT LAYER. OTHER MATERIALS PER ENGINEER.

FERGUSON WATERWORKS
FOR ADDITIONAL INFORMATION PLEASE CONTACT:
FERGUSON WATERWORKS, 1-800-448-3636, www.ferguson.com

NOT TO SCALE 11/19/24

ECORASTER E50
STANDARD GRAVEL DETAIL AND SECTION

Weston & Sampson Engineers, Inc.
3955 Faber Place Dr., Suite 200
North Charleston, SC 29405
843.881.9804 800.SAMPSON
www.westonandsampson.com

FOR BID

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER 09 NORTH CAROLINA SEAL

WESTON & SAMPSON ENGINEERS, INC. No. 4208 SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION
4/21/2025

No.	Date	Dr.By	Ck.By	App.By	Description
4	5/19/2025	RCS	WRF	KRG	ADDENDUM 2
3	4/21/2025	RCS	WRF	KRG	ISSUED FOR BID
2	4/4/2025	RCS	WRF	KRG	100% DESIGN
1	8/29/2024	GDV	WRF	KRG	PERMIT REVIEW
0	4/5/2024	GDV	BJR	KRG	60% DESIGN

NORTH CHARLESTON, SOUTH CAROLINA
NORTH CHARLESTON SEWER DISTRICT
SUNNYSIDE PUMP STATION REHABILITATION

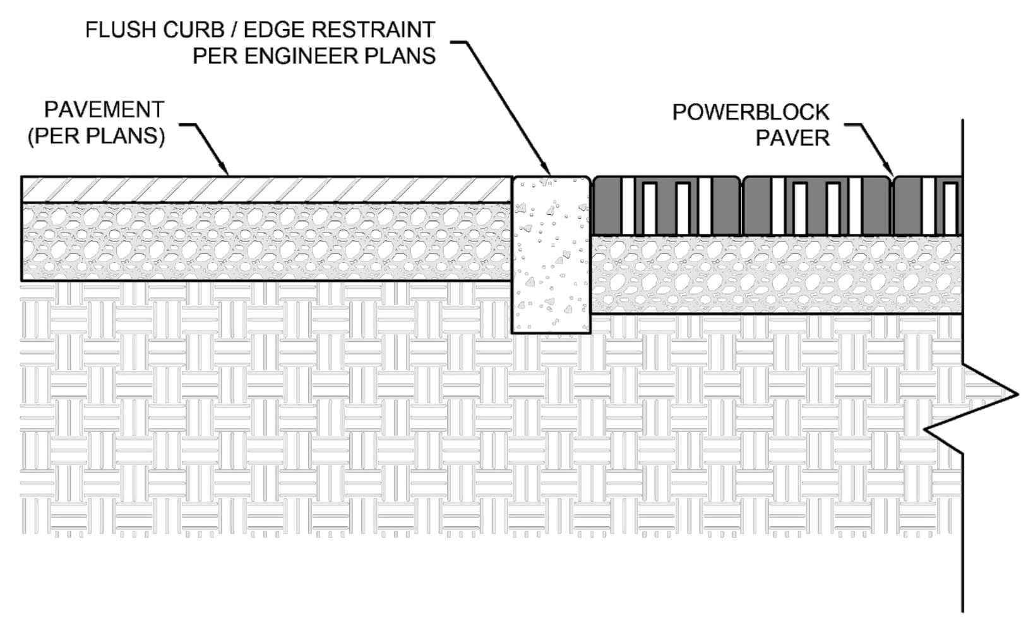
STANDARD SITE DETAILS

APP.BY KRG | CHK.BY WRF | DSN.BY WBD | DR.BY GDV | JOB NO. ENG23-3282 | CONTRACT: | SCALE: AS SHOWN | CADD NO. -

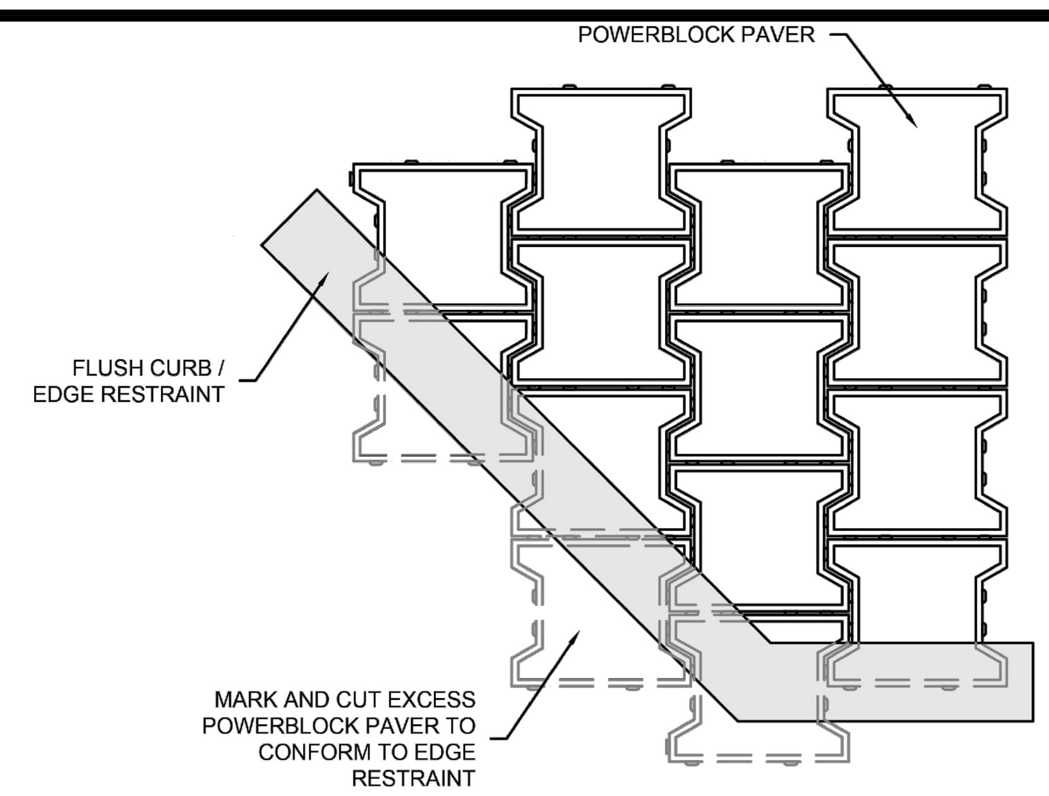
C-505

FILE NO. -

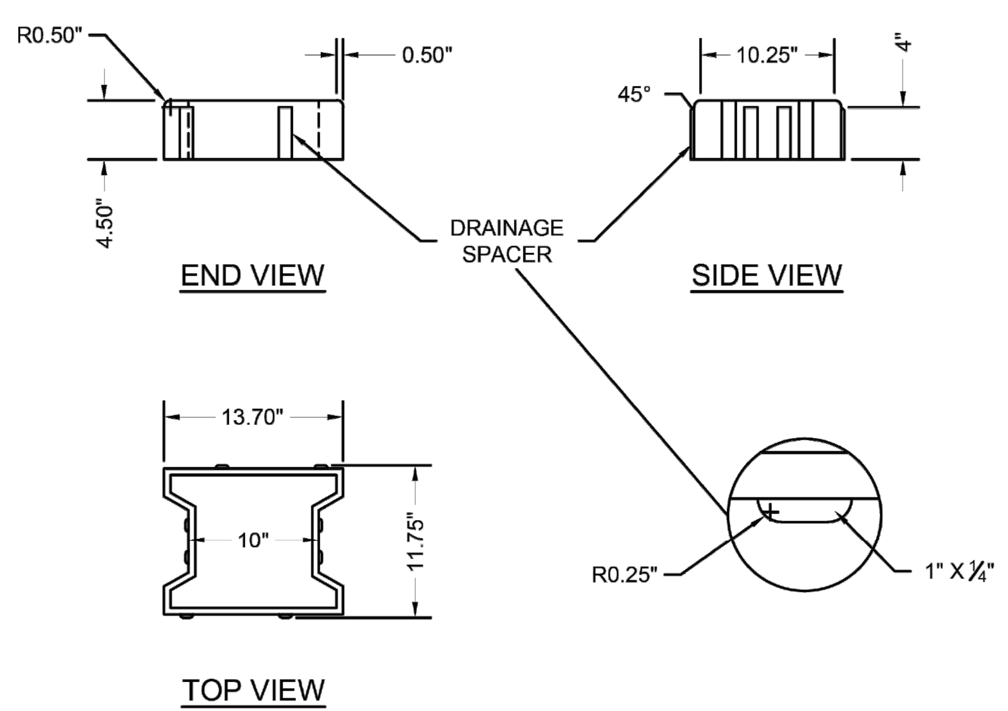
P:\SCHARLESTON\WORK\ENG23-3282 - SUNNYSIDE AND LINDEN VALLEY\CAD\PLANS\CIVIL\SURVEY\SUNNYSIDE\SHEETS\ENG23-3282_C-505 - FOR BID.DWG PLOTTED:5/5/2025 2:58:48 PM BY:Stephen Pelt

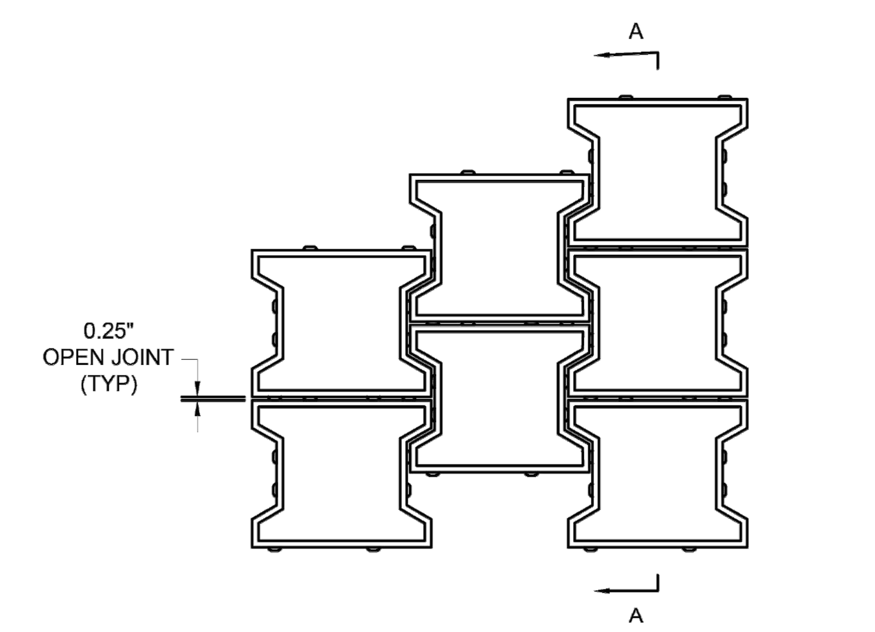


POWERBLOCK W/ EDGE RESTRAINT & PAVEMENT DETAIL



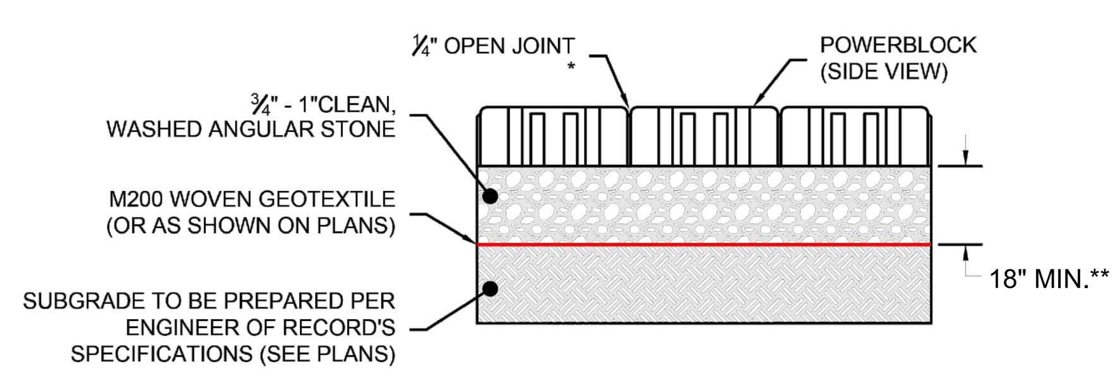
POWERBLOCK CUT EDGE DETAIL





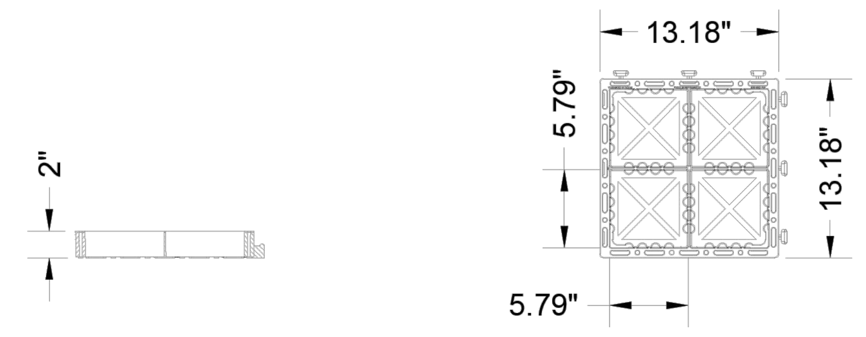
TOP VIEW
INTERCONNECTED BLOCKS

SPECIFICATIONS	
SURFACE INFILTRATION RATE	1,000 IN/HR AVG.
OPEN JOINT WIDTH	0.25 IN
JOINT FILLER BETWEEN BLOCKS *	NONE ALLOWED

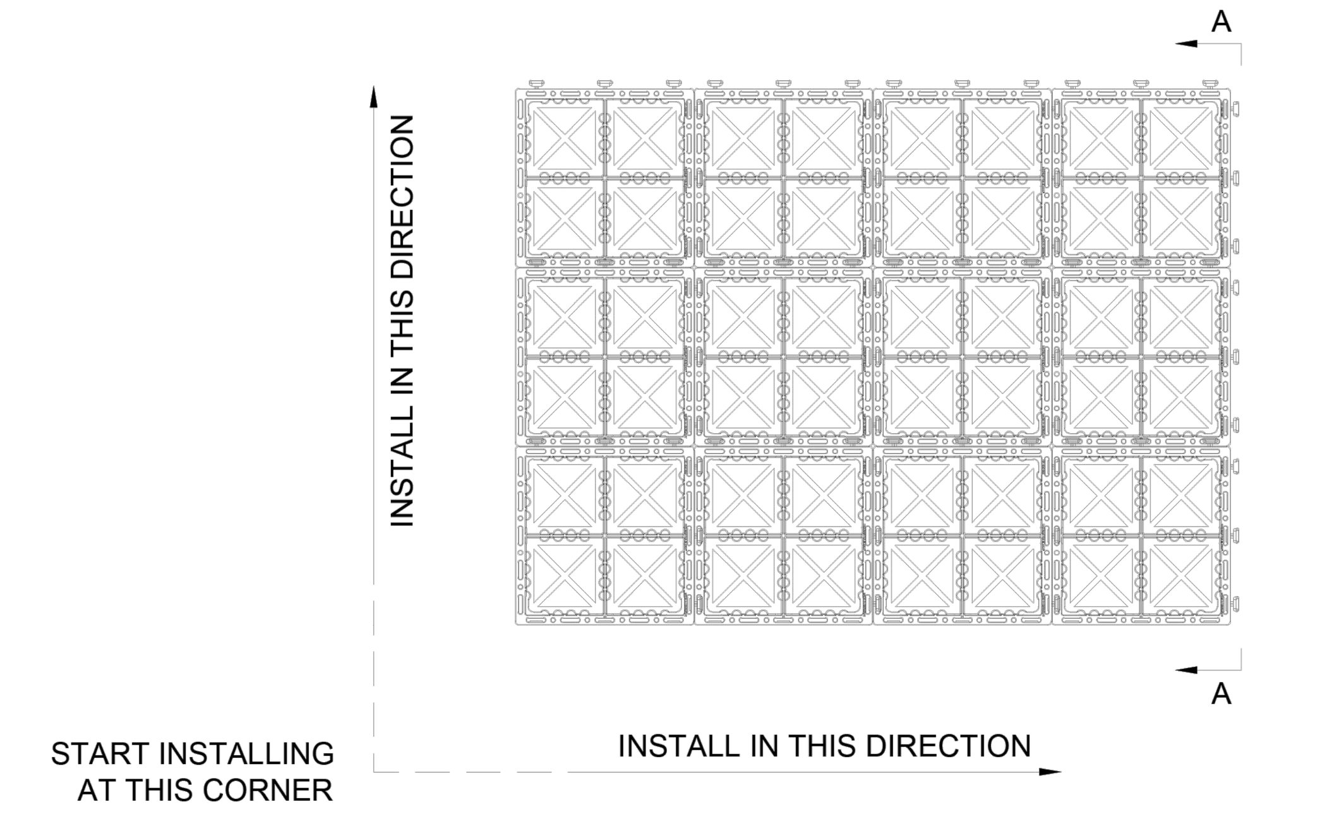


SECTION A-A

ALTERNATIVE ADDER 1

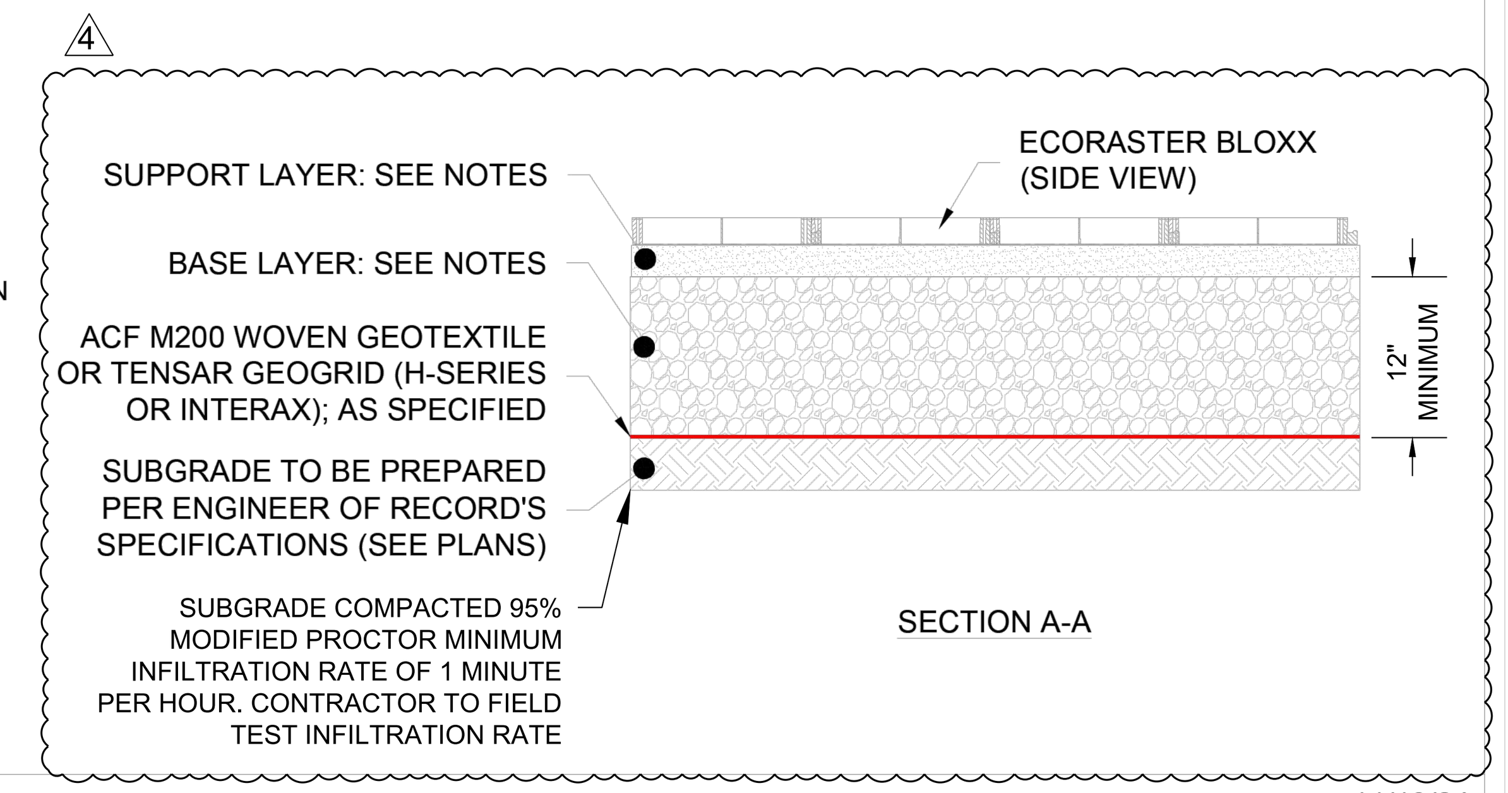


SPECIFICATIONS	
SURFACE INFILTRATION RATE	2,500 IN/HR AVG.



TOP VIEW
INTERCONNECTED BLOCKS

NOTES:
1. SUPPORT LAYER ~ 2in OF ANGULAR GRAVEL #78 OR SIMILAR. THICKNESS MAY BE REDUCED IF BASE CBR >6. COMPACT SUPPORT LAYER USING PLATE COMPACTOR OR SIMILAR BEFORE INSTALLING BLOXX GRIDS OR LOOSE GRAVEL MAY PREVENT PAVERS FROM SEATING CORRECTLY.
2. BASE LAYER - AASHTO #57 CLEAN, WASHED ANGULAR STONE
3. BLOXX GRIDS MUST BE USED WITH APPROVED PAVERS AND WILL NOT SUPPORT ANYTHING BUT FOOT TRAFFIC UNTIL PAVERS ARE INSTALLED. PAVERS ARE AVAILABLE IN A VARIETY OF MATERIALS AND COLORS.
4. ALLOW FOR THERMAL EXPANSION WHEN INSTALLING IN A CONFINED AREA BY LEAVING ADEQUATE SPACE BETWEEN ECORASTER AND ADJACENT PAVEMENT OR HARD SURFACES. ECORASTER IS 100% RECYCLED LDPE WITH A WORKING TEMPERATURE RANGE OF -65 TO 150F.
5. BLOXX INDIVIDUAL GRIDS ARE A NOMINAL 13x13x2in WHEN ASSEMBLED. A 3x4 PRE-ASSEMBLED MULTI GRID (SHOWN) IS SHIPPED TO THE JOB SITE FOR EASE OF INSTALLATION. WEIGHT IS 1.55 lb/sf. ECORASTER IS NONTOXIC TO FISH AND WILDLIFE.
6. GRIDS SNAP TOGETHER WITH FOOT PRESSURE (NO TOOLS REQUIRED) AND CAN BE CUT ON SITE WITH RECIPROCATING SAW, CIRCULAR SAW, CONCRETE SAW OR SIMILAR.
7. ECORASTER CARRIES A 20 YEAR WARRANTY WHEN INSTALLED PER THIS DRAWING. CONSULT ENGINEER FOR ANY ADDITIONAL REQUIREMENTS ON ALL PROJECTS PRIOR TO CONSTRUCTION.



SECTION A-A

FERGUSON
WATERWORKS

FOR ADDITIONAL INFORMATION PLEASE CONTACT:
FERGUSON WATERWORKS, 1-800-448-3636, www.ferguson.com

NOT TO SCALE

11/19/24

ECORASTER BLOXX
STANDARD DETAIL AND SECTION

ALTERNATIVE ADDER 2

Weston & Sampson
Weston & Sampson Engineers, Inc.
3955 Faber Place Dr., Suite 200
North Charleston, SC 29405
843.881.9804 800.SAMPSON
www.westonandsampson.com

SOUTH CAROLINA FOR BID

SOUTH CAROLINA WESTON & SAMPSON ENGINEERS, INC. No. 4208 CERTIFICATE OF AUTHORIZATION

4/21/2025

No.	Date	Dr.By	Ck.By	App.By	Description
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3	4/21/2025	RCS	WRF	KRG	ISSUED FOR BID
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1	8/29/2024	GDV	WRF	KRG	PERMIT REVIEW
0	4/5/2024	GDV	BJR	KRG	60% DESIGN

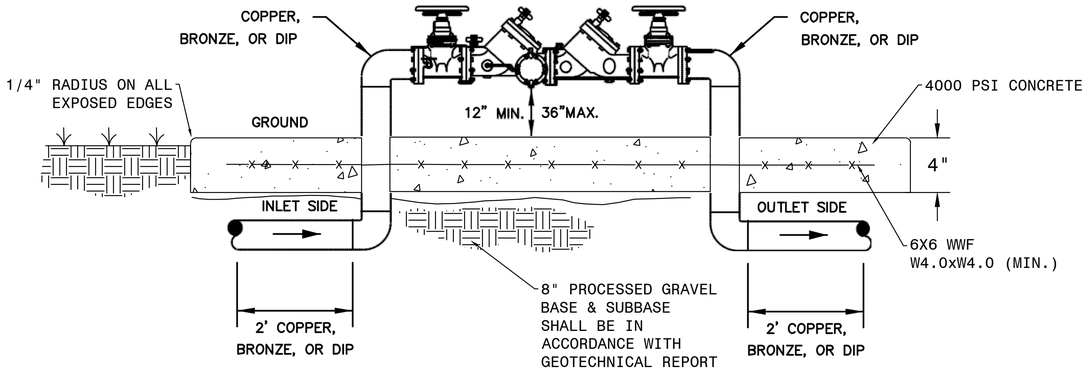
NORTH CHARLESTON, SOUTH CAROLINA
NORTH CHARLESTON SEWER DISTRICT
SUNNYSIDE PUMP STATION REHABILITATION

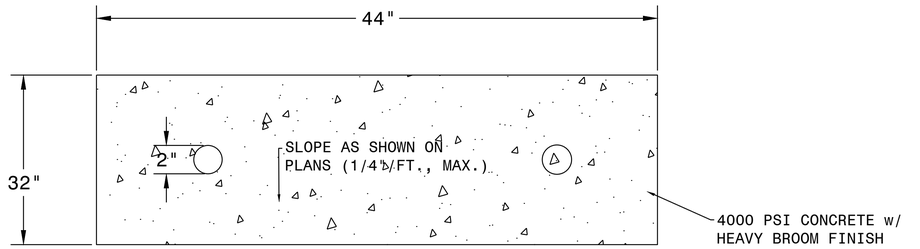
ALTERNATE BID ITEMS

SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
AS SHOWN		ENG23-3282	GDV	WBD	WRF	KRG

CADD NO. - FILE NO. -

C-507



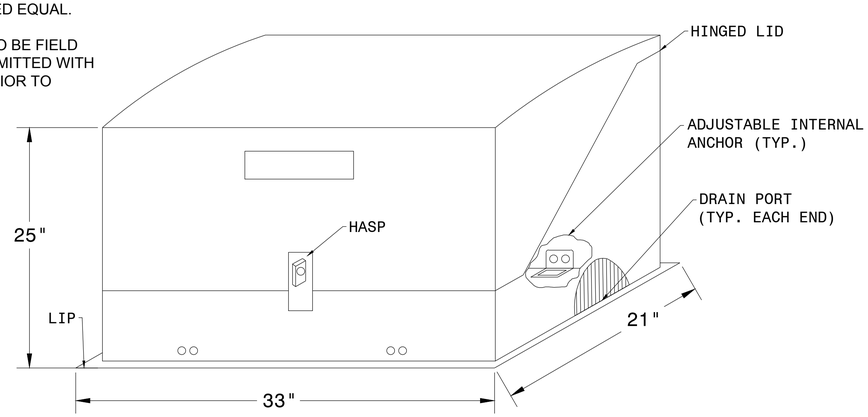


REDUCED PRESSURE ASSEMBLY DETAIL

NOT TO SCALE

NOTES:

1. REDUCED PRESSURE ASSEMBLY ENCLOSURE SHALL BE MANUFACTURED BY WATTS (MODEL WB-1) OR APPROVED EQUAL.
2. ALL DIMENSIONS TO BE FIELD VERIFIED AND SUBMITTED WITH SHOP DRAWING PRIOR TO ORDERING.



REDUCED PRESSURE ASSEMBLY ENCLOSURE DETAIL

NOT TO SCALE

Weston & Sampson
Weston & Sampson Engineers, Inc.
3955 Faber Place Dr., Suite 200
North Charleston, SC 29405
843.881.9804 800.SAMPSON
www.westonandsampson.com

FOR BID

SOUTH CAROLINA
WESTON & SAMPSON ENGINEERS, INC.
No. 4208
CERTIFICATE OF AUTHORIZATION
4/21/2025

No.	Date	Dr.By	Ck.By	App.By	Description
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NORTH CHARLESTON, SOUTH CAROLINA
NORTH CHARLESTON SEWER DISTRICT
SUNNYSIDE PUMP STATION REHABILITATION

STANDARD SITE DETAILS

CADD NO.	SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
-	AS SHOWN		ENG23-3282	GDV	WBD	WRF	KRG

C-508

FILE NO. -

ELECTRICAL NOTES

GENERAL

G1: WHERE DEVICES ARE REQUIRED TO BE IDENTIFIED, PROVIDE ENGRAVED WHITE PLATE USING 1/8" HIGH BLACK LETTERS.

G2: INSTALLATION SHALL BE PER NFPA 70 2020 (NATIONAL ELECTRICAL CODE).

G3: ALL ABOVE GRADE CONDUIT SHALL BE RIGID ALUMINUM CONDUIT (RAC).

G4: ALL BELOW GRADE CONDUIT 10' OR LESS IN LENGTH SHALL BE RAC. UNDERGROUND PVC SCHEDULE 80 CONDUIT MAY BE USED FOR CONDUIT GREATER THAN 10' IN LENGTH. TRANSITION FROM RAC TO PVC BELOW GRADE.

G5: ALL POWER CONDUCTORS SHALL BE COPPER, XHHW 90 DEG.

G6: ALL CONTROL POWER CONDUCTORS SHALL BE COPPER, MTW 90 DEGREE.

G7: ALL ELECTRICAL DEVICES OR COMPONENTS SHALL BE LOCATED AT LEAST 5'-0" OUTSIDE THE WET WELL HATCH OPENING(S) OR VENTS UNLESS NOTED OTHERWISE.

G8: ALL CONDUITS ENTERING THE WET WELL SHALL BE PROTECTED BY AN EXPLOSION PROOF SEAL FITTING. THE WET WELL IS A CLASS 1 DIVISION 1 GROUP D AREA.

G9: PROVIDE STAINLESS HARDWARE ON ALL CABLES ENTERING OR LEAVING THE WET WELL. PROVIDE STAINLESS STEEL STRAIN RELIEF FOR ALL CORDS ENTERING THE WET WELL.

GROUNDING

GR1: ALL BELOW GROUND CONNECTIONS SHALL BE EXOTHERMIC WELDS OR COMPRESSION AND SHALL BE INSPECTED BY NCSD BEFORE BURIAL.

GR2: PROTECT THE GROUND CONDUCTOR FROM DAMAGE. INSTALL ALL EXPOSED GROUND CONDUCTORS IN RAC CONDUIT.

GR3: ALL RACKS AND EQUIPMENT ENCLOSURES SHALL BE GROUNDED WITH A CONNECTION TO THE EQUIPMENT GROUNDING SYSTEM.

POWER

P1: COORDINATE THE EXACT LOCATION OF THE UTILITY SERVICE POINT IN THE FIELD WITH THE UTILITY COMPANY PRIOR TO CONSTRUCTION. COORDINATE WITH UTILITY COMPANY TO PROVIDE METER ON SERVICE. METER SHALL BE LOCATED AS PER UTILITY COMPANY REQUIREMENTS. ALL COSTS ASSOCIATED WITH THE ELECTRICAL SERVICE, TRANSFORMER PAD, SERVICE CONDUIT AND CABLE, METER AND PERMITTING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. COORDINATE TO DELIVERY OF POWER TO THE SITE WITH THE CONSTRUCTION SCHEDULE.

P2: ALL ELECTRICAL EQUIPMENT SHALL BE PROVIDED WITH NEMA 4X 316 STAINLESS STEEL ENCLOSURES.

P3: PROVIDE THERMAL MAGNETIC CIRCUIT BREAKERS HAVING A MINIMUM SYMMETRICAL RMS INTERRUPTING RATING BASED ON AVAILABLE FAULT CURRENT.

P4: PAY ALL ELECTRICAL UTILITY FEES, CHARGES, AND NATURAL GAS UTILITY FEES FOR COMMISSIONING AND INSTALLATION OF THIS PUMP STATION.

P5: SHORT CIRCUIT RATING OF EQUIPMENT SHALL BE 10,000 A MINIMUM.

P6: PROVIDE SERVICE DISCONNECT WITH DUAL LUGS FOR THE PHASE CONDUCTORS AND SURGE PROTECTOR.

CONTROL

C1: SEAL ALL CONDUITS ENTERING TO PREVENT MOISTURE OR AIR FLOW INTO OR FROM THE CONTROLS ENCLOSURE.

C2: ISOLATE ALL INTRINSICALLY SAFE SYSTEMS AND WIRING FROM THE REST OF THE CONTROL PANEL EQUIPMENT.

C3: PUMP STATION CONTROL PANEL SHALL CONFORM TO THIRD PARTY SAFETY CERTIFICATION. THE PANEL SHALL HAVE A SERIALIZED UL LABEL LISTED FOR "ENCLOSED INDUSTRIAL CONTROL PANELS". THE ENCLOSURE, AND ALL COMPONENTS MOUNTED ON THE SUB-PANEL OR CONTROL COVER AND KAIC RAITING SHALL CONFORM TO UL DESCRIPTIONS AND PROCEDURES.

C4: PROVIDE A GFI DUPLEX RECEPTACLE IN THE CONTROL PANEL.

C5: CONTROL AND ATS ENCLOSURES SHALL BE TYPE 316 STAINLESS STEEL: NEMA 4X, NEOPRENE GASKETED PANEL. ENCLOSURE SHALL BE ANODIZED WHITE WITH POWDER COATED HEAT SHIELD WITH AIR GAP MOUNTED INSIDE ENCLOSURE.PROVIDE FOR SUPPORT FRAME MOUNTING WITH EXTERIOR FLANGES WITH SINGLE 3-POINT LOCKING LATCH WITH PAD LOCKING PROVISIONS AND WITH CAPTIVE CLOSING HARDWARE. CONTROL PANEL SHALL BE ANODIZED WHITE.

C6: CONTROL COMPONENTS SHALL BE DIN RAIL MOUNTED ON STEEL BACK PANELS SECURED TO ENCLOSURE WITH COLLAR STUDS. ALL CONTROL DEVICES AND INSTRUMENTS SHALL BE MOUNTED USING THREADED FASTENERS, AND SHALL BE CLEARLY LABELED TO INDICATE FUNCTION.

C7: THE CONTROLS SHALL ALTERNATE THE PUMPS LEAD / LAG.

SEISMIC AND WIND REQUIREMENTS

IBC-2021 /ASCE 7-16

A. EQUIPMENT, APPLIANCES AND SUPPORTS (INCLUDING ROOF CURBS & ROOF RAILS) EXPOSED TO WIND SHALL BE DESIGNED AND INSTALLED TO RESIST THE WIND PRESSURES DETERMINED IN ACCORDANCE WITH THE INTERNATIONAL BUILDING CODE. WHERE SEISMIC RESTRAINT IS REQUIRED, THE MORE DEMANDING FORCE OF WIND AND SEISMIC MUST BE USED. SEE SEISMIC INFORMATION CONTAINED IN THE STRUCTURAL DRAWINGS FOR SITE SPECIFIC INFORMATION ON SEISMIC DESIGN CATEGORY.
B. SEE EQUIPMENT SCHEDULES AND DETAILS FOR SPECIFIC COMPONENT IMPORTANCE FACTOR DESIGNATIONS.
C. USE APPLICABLE TABLE BELOW TO DETERMINE SEISMIC RESTRAINT REQUIREMENTS FOR EACH MECHANICAL COMPONENT.
D. FOR ALL COMPONENTS REQUIRING SEISMIC RESTRAINT, THE COMPONENT SUPPORTS AND ATTACHMENTS SHALL BE DESIGNED BY A REGISTERED DESIGN PROFESSIONAL LICENSED IN THE STATE OF WORK. SUBMITTALS MUST INCLUDE STAMPED AND SIGNED DRAWINGS AND CALCULATIONS.
E. WHERE SEISMIC RESTRAINT IS REQUIRED, HOUSEKEEPING PADS NEEDED FOR THE INSTALLATION OF EQUIPMENT UNDER THIS CONTRACT MUST BE DESIGNED BY THE SEISMIC ENGINEER. DO NOT POUR ANY HOUSEKEEPING PADS PRIOR TO THE THE RECEIPT OF THE SEISMIC SUBMITTAL.
F. SEISMIC RESTRAINTS FOR CONDUIT, CABLE TRAY, AND BUS DUCT MUST BE SHOWN ON LAYOUT DRAWINGS SHOWING SPECIFIC RESTRAINT LOCATIONS ALONG WITH ACCOMPANYING DETAILS AND CALCULATIONS.
G. REFER TO ASCE 7-16 FOR SEISMIC INSTALLATION GUIDELINES.
E. SEISMIC RESTRAINTS FOR PIPING AND DUCTWORK MUST BE SHOWN ON LAYOUT DRAWINGS SHOWING SPECIFIC RESTRAINT LOCATIONS ALONG WITH ACCOMPANYING DETAILS AND CALCULATIONS.

COMPONENT IMPORTANCE FACTOR (Ip) DESIGNATION

Ip = 1.0	Ip = 1.5
	• ALL ELECTRICAL COMPONENTS

		COMPONENT IMPORTANCE FACTOR (Ip) 1.0		1.5	
COMPONENT IDENTIFICATION		SEISMIC RESTRAINT REQUIREMENT	NOTES	SEISMIC RESTRAINT REQUIREMENT	NOTES
ROOF/GROUND MOUNTED		RESTRAIN ALL	1	RESTRAIN ALL	-
COMPONENT SUPPORTS		RESTRAIN ALL	1	RESTRAIN ALL	-
SUSPENDED EQUIPMENT	INLINE W/ DUCT	RESTRAIN IF >75 LBS PROVIDE FLEX. CONN.	3	RESTRAIN IF >75 LBS PROVIDE FLEX. CONN.	3
	NOT INLINE W/ DUCT/PIPE	RESTRAIN ALL	1	RESTRAIN ALL	-
SUSPENDED DUCTILE PIPING (STEEL, ALUMINUM, COPPER, ETC.)		>3"	4	>1"	4
SUSPENDED NON DUCTILE PIPING (CAST IRON, PLASTIC, CERAMIC)		RESTRAIN ALL	4	RESTRAIN ALL	4
DUCTWORK		6 SQ.FT. AND LARGER	-	6 SQ.FT. AND LARGER	5
COMPONENT CERTIFICATION (SEE NOTE 6)		NOT REQUIRED	-	REQUIRED	-
FLOOR MOUNTED		RESTRAIN ALL	1,2	RESTRAIN ALL	-
WALL MOUNTED		RESTRAIN ALL	1,2	RESTRAIN ALL	-
SINGLE CONDUIT		>3"	4,7	>1"	4,7
CABLE TRAY/BUS DUCT TRAPEZED CONDUIT		RESTRAIN IF ANY CONDUIT ON TRAPEZE > 3" RESTRAIN IF TOTAL WEIGHT OF SUSPENDED COMPONENT > 10 LBS/FT	4	RESTRAIN IF ANY CONDUIT ON TRAPEZE > 1" RESTRAIN IF TOTAL WEIGHT OF SUPPORTED COMPONENT > 10 LBS/FT	4

NOTES:
1. EQUIPMENT 20 LBS. OR LESS IS EXEMPT IF FLEXIBLE CONNECTIONS ARE PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT.
2. RESTRAINTS ARE NOT REQUIRED IF THE COMPONENT WEIGHS 400 LBS. OR LESS, IS MOUNTED AT 4 FT. OR LESS ABOVE A FLOOR, AND HAS FLEXIBLE CONNECTIONS BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT.
3. FLEXIBLE CONNECTIONS REQUIRED FOR PIPE CONNECTIONS ONLY.
4. RESTRAINT IS NOT REQUIRED IF THE PIPING / DUCTWORK / CONDUIT IS SUPPORTED BY HANGERS AND EACH HANGER IN THE RUN IS 12 IN. OR LESS IN LENGTH FROM THE TOP OF THE PIPE TO THE SUPPORTING STRUCTURE. WHERE PIPES ARE SUPPORTED ON A TRAPEZE, THE TRAPEZE SHALL BE SUPPORTED BY HANGERS HAVING A LENGTH OF 12 IN. OR LESS. WHERE ROD HANGERS ARE USED, THEY SHALL BE EQUIPPED WITH SWIVELS, EYE NUTS OR OTHER DEVICES TO PREVENT BENDING IN THE ROD.
5. ALL DUCTWORK , REGARDLESS OF SIZE, DESIGNED TO CARRY TOXIC, HIGHLY TOXIC, OR EXPLOSIVE GASES OR USED FOR SMOKE CONTROL MUST BE RESTRAINED.
6. COMPONENT CERTIFICATION MUST BE SUPPLIED BY THE EQUIPMENT MANUFACTURER AT TIME OF SUBMITTAL FOR REVIEW BY ENGINEER OF RECORD.
7. ALL NON-DUCTILE PIPING (IE - PLASTIC) MUST BE RESTRAINED.

ELECTRICAL LEGEND

- UTILITY METER
- GROUNDING ELECTRODE CONDUCTOR
- (M) MOTOR
- FUSED DISCONNECT, SIZE / FUSE SIZE / # OF POLES / NEMA RATING
- G GROUND ROD
- INDICATES GROUNDING ELECTRODE CONDUCTOR
- POLE MOUNTED LIGHT FIXTURE
- GFCI RECEPTACLE
- FM FLOW METER
- PT PRESSURE TRANSDUCER
- HH HANDHOLE

ABBREVIATIONS

ATS	AUTOMATIC TRANSFER SWITCH
ECB	ENCLOSED CIRCUIT BREAKER
GFI	GROUND FAULT INTERRUPTING
MCB	MAIN CIRCUIT BREAKER
NEC	NATIONAL ELECTRIC CODE
NTS	NOT TO SCALE
RAC	RIGID ALUMINUM CONDUIT
SPD	SURGE PROTECTION DEVICE
STP	SHIELDED TWISTED PAIR
XFMR	TRANSFORMER

OWNER PROVIDED MATERIAL LIST

ITEM	QUANTITY
GENERATOR	1
AUTOMATIC TRANSFER SWITCH	1
8" FLOW METER	1
PUMPS + ACCESSORIES*	2
PUMP CONTROL PACKAGE**	1
AP500 GRIDBEE MIXER	1
ENDRESS-HAUSER PRESSURE TRANSDUCER	1

OWNER PROVIDED MATERIALS NOTES:

* KIT INCLUDES PUMP LEADS, 2X GUARD RAILS WITH BRACKETS AND HARDWARE, 2X LIFT CHAINS, 1X SIX HOOK CABLE BRACKET.
** ASSEMBLY INCLUDES 1X CONTROL PANEL, 2X SOFT STARTS, ULTRASONIC SENSOR, LEVEL PROBE AND CONVERTER ALL IN NEMA 4XSS ENCLOSURES.

UNIT SUBSTATION "PZ" SCHEDULE

240/120 VOLTS, 1 PHASE, 3 WIRE, 60 AMP MCB, 5 KVA TRANSFORMER
SURFACE MOUNT, HINGED FRONT TRIM, NEMA 4X STAINLESS STEEL

LOCATION: RACK MOUNTED
10KAIC INTERRUPTING CAPACITY

CIR NO.	CIRCUIT DESIGNATION	TRIP/ LOAD	CIR VA	VOLT-AMP/PHASE PH X	VOLT-AMP/PHASE PH Y	CIR VA	TRIP/ LOAD	CIRCUIT DESIGNATION	CKT NO.
1	ENGINE BLOCK HEATER	20/1	750	900		150	20/1	SITE LIGHTING	2
3	BATTERY CHARGER	20/1	1000		1180	180	20/1	GFCI RACK RECEPTACLE	4
5	CONTROL PANEL RECEPTACLE	20/1	180	280		100	20/1	FLOW METER	6
7	CONTROL PANEL LIGHTING	20/1	50		1490	1440	20/1	GRIDBEE	8
9	SPARE	20/1	0	0		0	20/1	SPARE	10
11	SPARE	20/1	0		0	0	20/1	SPARE	12
			TOTALS:	1180	1180				
	FACTORS:				2360	CONN	240	V (L-L)	
	DEMAND		1.0		2360	DEM	9.8	A (DEM)	

PUMP STATION LOAD SUMMARY			
LOAD	HP / POWER	PHASE	CURRENT
PUMP #1	47 HP / 49.4 KVA	3	59.4 A
PUMP #2	47 HP / 49.4 KVA	3	59.4 A
DISTRIBUTION PANEL	4.5KVA	1	
CONTROLS	1KVA	1	
TOTAL CONNECTED KVA			104.3 KVA
TOTAL CONNECTED CURRENT @ 480V			125.4 A
TOTAL DIVERSIFIED KVA			116.8 KVA
TOTAL DIVERSIFIED CURRENT @ 480V			140.5 A

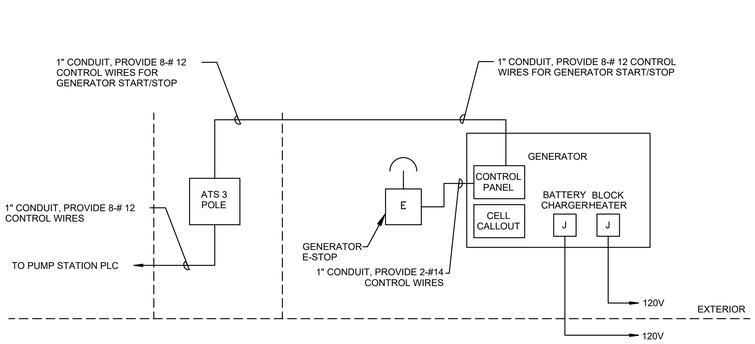
GENERATOR STEP LOAD REQUIREMENTS:

STEP 1: PUMP #1 AND STATION CONTROLS

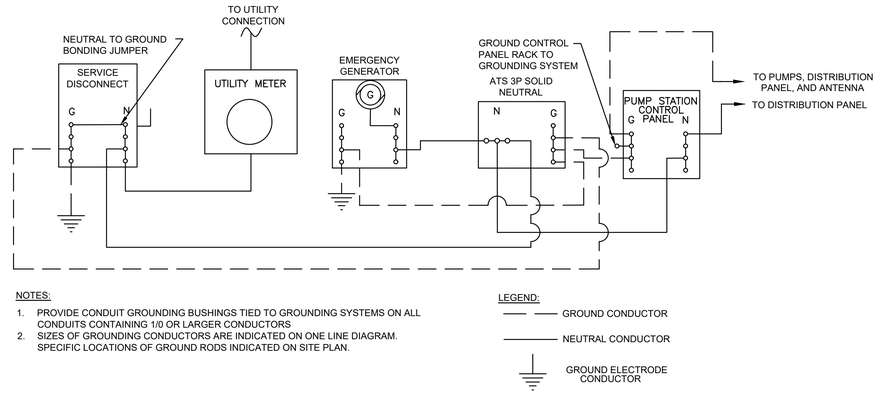
STEP 2: PUMP #2

MAX 30% VOLTAGE AND FREQUENCY DIP PER STEP

MAX 1 SIZE LARGER ALTERNATOR THAN GENERATOR RATING



1 / E001 GENERATOR CONTROLS DETAIL
NOT TO SCALE



NOTES:
1. PROVIDE CONDUIT GROUNDING BUSHINGS TIED TO GROUNDING SYSTEMS ON ALL CONDUITS CONTAINING 1/0 OR LARGER CONDUCTORS
2. SIZES OF GROUNDING CONDUCTORS ARE INDICATED ON ONE LINE DIAGRAM. SPECIFIC LOCATIONS OF GROUND RODS INDICATED ON SITE PLAN.

LEGEND:
- GROUND CONDUCTOR
- NEUTRAL CONDUCTOR
- GROUND ELECTRODE CONDUCTOR

2 / E001 ELECTRICAL GROUNDING DETAIL
NOT TO SCALE

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www.westonandsampson.com

SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION DWG, INC. CONSULTING ENGINEERS No.C03649

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 33226 ETHAN ROBERT LOCEY

4/21/25

No.	Date	Dr. By	Description	Ck.By	App.By
6	5/20/2025	ERL	ADDENDUM #2	BSB	BSB
5	4/22/2025	ERL	ISSUED FOR BID	BSB	BSB
4	4/4/2024	ERL	100% DESIGN	BSB	BSB
3	9/6/2024	ERL	90% DESIGN	BSB	BSB
2	8/30/2024	ERL	PERMIT DRAWINGS	BSB	BSB
1	4/4/2024	ERL	60% DESIGN	BSB	BSB
0	4/4/2024	ERL		BSB	BSB

NORTH CHARLESTON, SOUTH CAROLINA
NORTH CHARLESTON SEWER DISTRICT
SUNNYSIDE PUMP STATION

ELECTRICAL NOTES, LEGENDS AND DETAILS

CADD NO.	SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
-	NONE		ENG21-1072	ERL	ERL	BSB	BSB

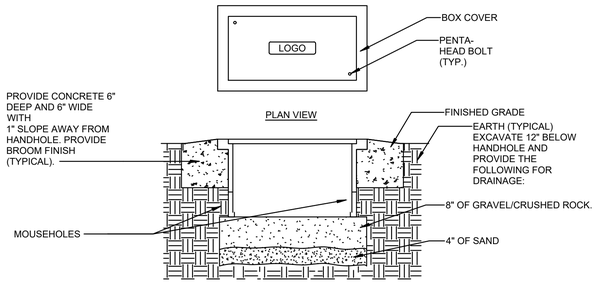
FILE NO. -

E001

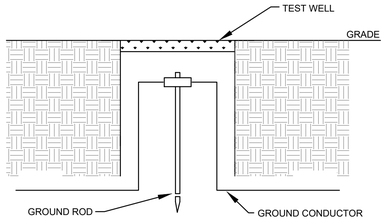
DWG CONSULTING ENGINEERS EMPLOYEE OWNED

J:\23\2178-00 WSE NCSD SUNNYSIDE PUMP STATION AND LINCOLNVILLE FORCE MAIN REPLACEMENTS PROJECT\8 WORKING DRAWINGS (AUTOCAD)\2178 WSE NCSD SUNNYSIDE FS AND LINCOLNVILLE FM EDWGS.DWG, PLOTTED:5/21/2025 9:09:23 AM BY:Ethan Locey

1. BASIS OF DESIGN IS QUAZITE PG STYLE HANDHOLES.
2. ALL HANDHOLES SHALL BE UL LISTED TO MEET ANSI 77 REQUIREMENTS. BOXES AND COVERS SHALL BE GREEN IN COLOR.
3. HANDHOLES SHALL BE ADEQUATELY SIZED FOR ENTERING RACEWAYS AND WIRE.
4. HANDHOLES SHALL BE TIER 22 MINIMUM.
5. PROVIDE TWO (2) PENTA-SOCKET LUG WRENCHES TO OWNER.

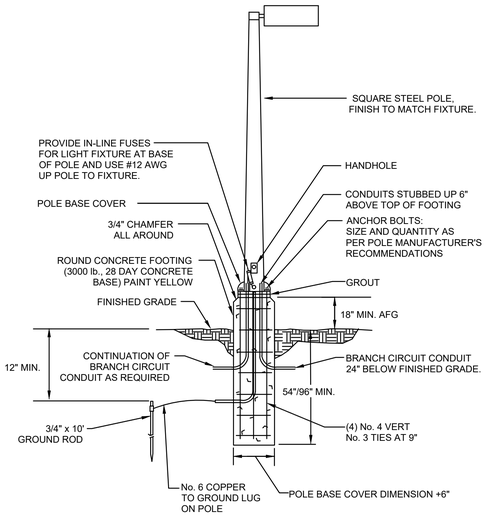


1 / E002 ELECTRICAL HANDHOLE DETAIL
NOT TO SCALE

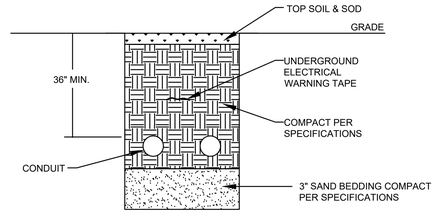


NOTE:
1. PROVIDE A 12" CONCRETE GROUND TEST WELL AT EACH NEW GROUND ROD.

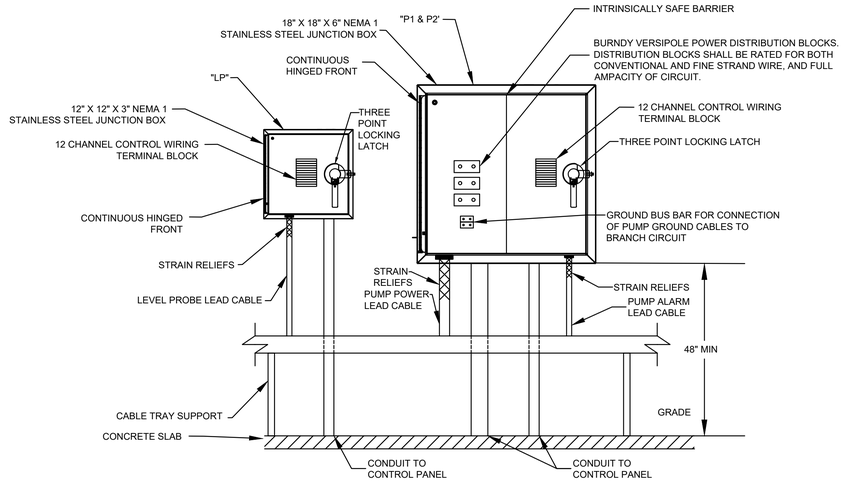
2 / E002 GROUND ROD TEST WELL DETAIL
NOT TO SCALE



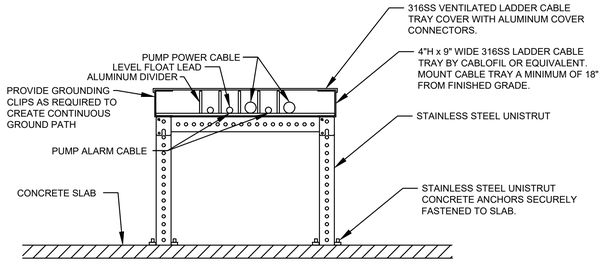
3 / E002 LIGHT POLE BASE DETAIL
NOT TO SCALE



4 / E002 UNDERGROUND CONDUIT DETAIL
NOT TO SCALE



5 / E002 JUNCTION BOX DETAIL
NOT TO SCALE



6 / E002 LADDER CABLE TRAY CROSS SECTION DETAIL
NOT TO SCALE

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SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION
DWG, INC. CONSULTING ENGINEERS No.C03649

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER
No. 33226
ERLAN ROBERT LOEF
4/21/25

No.	Date	Dr. By	Ck. By	App. By	Description
6	5/20/2025	ERL	BSB	BSB	ADDENDUM #2
4	4/22/2025	ERL	BSB	BSB	ISSUED FOR BID
3	4/4/2024	ERL	BSB	BSB	100% DESIGN
2	9/6/2024	ERL	BSB	BSB	90% DESIGN
1	8/30/2024	ERL	BSB	BSB	PERMIT DRAWINGS
0	4/4/2024	ERL	BSB	BSB	60% DESIGN

NORTH CHARLESTON, SOUTH CAROLINA
NORTH CHARLESTON SEWER DISTRICT
SUNNYSIDE PUMP STATION

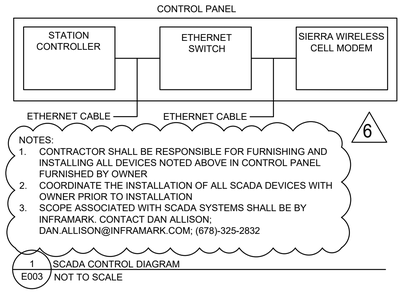
ELECTRICAL DETAILS

CADD NO.	SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
-	NONE		ENG21-1072	ERL	ERL	BSB	BSB

FILE NO.

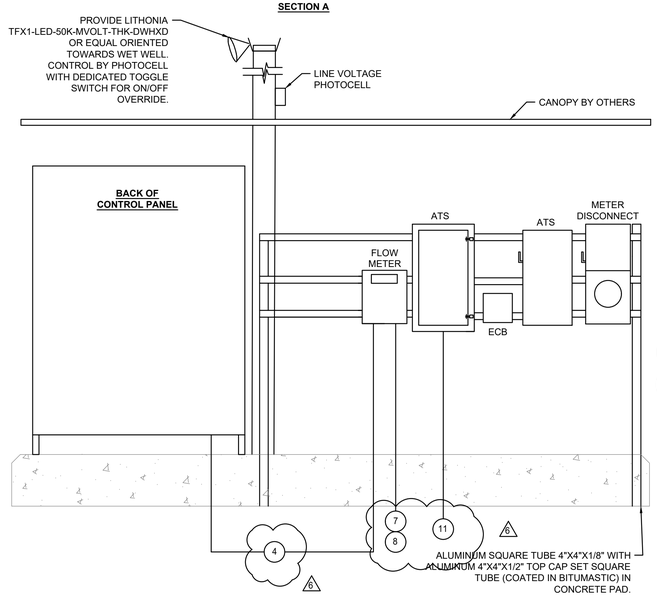
E002

DWG CONSULTING ENGINEERS EMPLOYEE OWNED

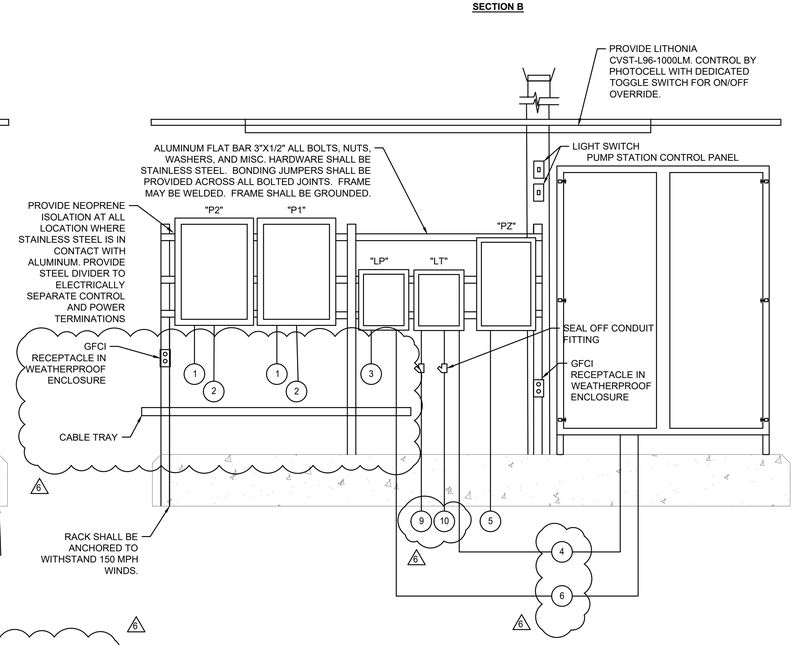


1 / E003 SCADA CONTROL DIAGRAM
NOT TO SCALE

SECTION A

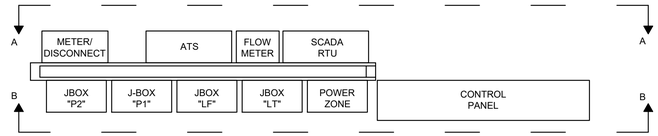


SECTION B



KEYED NOTES (#)

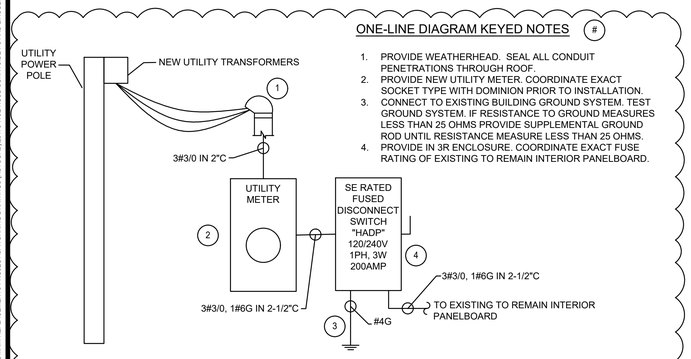
1. PUMP POWER CABLE IN FREE AIR
2. PUMP ALARM CABLES IN FREE AIR
3. LEVEL FLOAT CABLING IN FREE AIR
4. (2) STP #14, 1#14(G) IN 1-1/2" CONDUIT
5. MULTIPLE BRANCH CIRCUITS IN 1" CONDUIT.
6. 18#14, 1#14(G) IN 1" CONDUIT
7. (2) SETS OF MULTI-TRODE CABLE IN 1-1/2" CONDUIT
8. STUB UP AT FLOW METER LOCATION
9. STP #14, 1#14(G) IN 1" CONDUIT FOR RADAR TRANSDUCER
10. STP #14, 1#14(G) IN 1" CONDUIT FOR PRESSURE TRANSDUCER
11. GENERATOR POWER AND CONTROL CONDUITS. SEE GENERATOR CONTROL DETAIL AND ELECTRICAL ONE-LINE DIAGRAM
12. ALL REQUIRED CONDUIT NOT SHOWN IN THIS DETAIL. REFER TO ONE-LINE DIAGRAM FOR ADDITIONAL INFORMATION



2 / E003 PUMP STATION ELECTRICAL RACK ELEVATIONS
NOT TO SCALE

ONE-LINE DIAGRAM KEYED NOTES (#)

1. PROVIDE WEATHERHEAD. SEAL ALL CONDUIT PENETRATIONS THROUGH ROOF.
2. PROVIDE NEW UTILITY METER. COORDINATE EXACT SOCKET TYPE WITH DOMINION PRIOR TO INSTALLATION.
3. CONNECT TO EXISTING BUILDING GROUND SYSTEM. TEST GROUND SYSTEM. IF RESISTANCE TO GROUND MEASURES LESS THAN 25 OHMS PROVIDE SUPPLEMENTAL GROUND ROD UNTIL RESISTANCE MEASURE LESS THAN 25 OHMS.
4. PROVIDE IN 3R ENCLOSURE. COORDINATE EXACT FUSE RATING OF EXISTING TO REMAIN INTERIOR PANELBOARD.



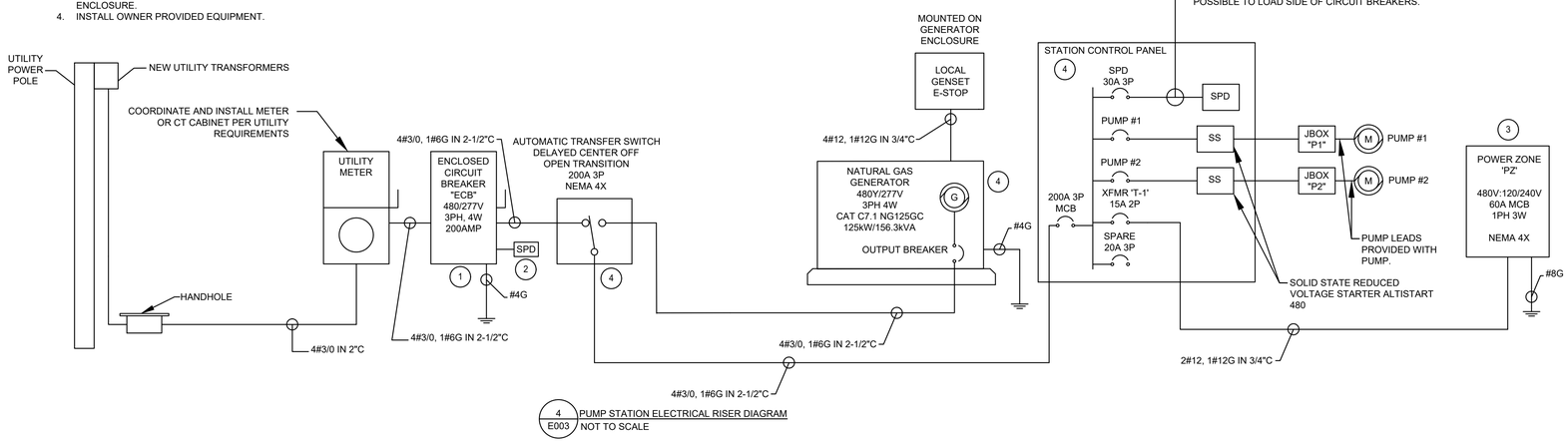
3 / E003 HOUSING AUTHORITY ELECTRICAL RISER DIAGRAM
NOT TO SCALE

ONE-LINE DIAGRAM KEYED NOTES (#)

1. PROVIDE SERVICE ENTRANCE RATED ENCLOSED CIRCUIT BREAKER WITH NEMA 4X 316SS ENCLOSURE AND MINIMUM 10kAIC RATING.
2. SPD SHALL BE CIRCUITED TO LOAD SIDE OF ENCLOSED CIRCUIT BREAKER. DETERMINE VIABILITY OF CONNECT SPD TO CIRCUIT BREAKER LUGS PRIOR TO ORDERING. PROVIDE WITH DUAL LUGS.
3. WITH 5KVA INTEGRAL TRANSFORMER AND NEMA 4X 316SS ENCLOSURE.
4. INSTALL OWNER PROVIDED EQUIPMENT.

AVAILABLE FAULT CURRENT

BASED ON THREE 25KVA, POLE MOUNTED TRANSFORMERS WITH 1.6% IMPEDANCE, THE MAXIMUM FAULT CURRENT AVAILABLE AT THE SERVICE ENTRANCE DISCONNECT IS CALCULATED TO BE **5,640** AMPS. LABEL THE SERVICE ENTRANCE DISCONNECT WITH THIS MAXIMUM FAULT CURRENT AND THE DATE OF INSTALLATION. CONTACT ENGINEER 2 WEEKS PRIOR TO SUBSTANTIAL COMPLETION TO CONFIRM AVAILABLE FAULT CURRENT PRIOR TO LABELING EQUIPMENT.



4 / E003 PUMP STATION ELECTRICAL RISER DIAGRAM
NOT TO SCALE

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SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION DWG, INC. CONSULTING ENGINEERS No.C03649

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER No. 43226 ERIKAN ROBERT LOVEY

4/21/25

No.	Date	Description	Dr. By	Ck. By	App. By
6	5/20/2025	ADDENDUM #2	ERL	BSB	BSB
4	4/22/2025	ISSUED FOR BID	ERL	BSB	BSB
3	4/4/2024	100% DESIGN	ERL	BSB	BSB
2	9/6/2024	90% DESIGN	ERL	BSB	BSB
1	8/30/2024	PERMIT DRAWINGS	ERL	BSB	BSB
0	4/4/2024	60% DESIGN	ERL	BSB	BSB

NORTH CHARLESTON, SOUTH CAROLINA
NORTH CHARLESTON SEWER DISTRICT
SUNNYSIDE PUMP STATION

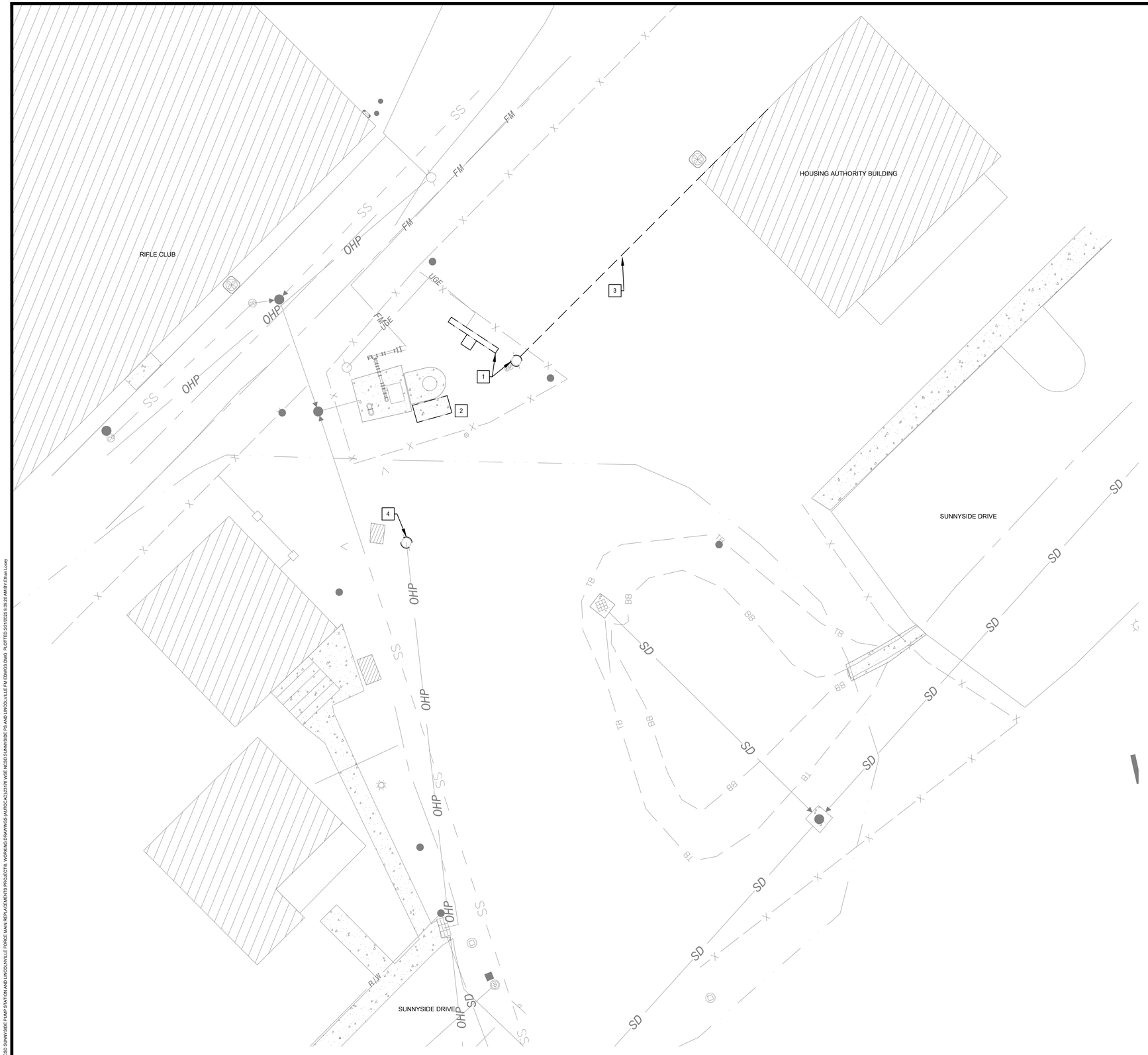
ELECTRICAL ONE-LINE DIAGRAMS AND DETAILS

CADD NO.	SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
	NONE		ENG21-1072	ERL	ERL	BSB	BSB

E003

FILE NO. -

DWG CONSULTING ENGINEERS EMPLOYEE OWNED



1 E050 ELECTRICAL DEMOLITION SITE PLAN
NOT TO SCALE

DEMOLITION KEYNOTES

1. DEMOLISH EXISTING PUMP STATION ELECTRICAL SERVICE, SERVICE EQUIPMENT AND CONTROL EQUIPMENT IN THEIR ENTIRETY AFTER STATION IS ON BYPASS.
2. DEMOLISH EXISTING GENERATOR IN ITS ENTIRETY AFTER STATION IS ON BYPASS.
3. DEMOLISH ELECTRICAL SERVICE FEEDING ADJACENT HOUSING AUTHORITY BUILDING. ABANDON AND CAP CONDUIT AT BOTH ENDS.
4. COORDINATE DEMOLITION OF EXISTING POWER POLE, TRANSFORMERS AND PRIMARY WIRING WITH DOMINION AFTER EXISTING PUMP STATION IS ON BYPASS.

Weston & Sampson
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SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION
DWG, INC. CONSULTING ENGINEERS No.C03649

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER
No. 43226
ERIN ROBERT LOCKE

4/21/25

No.	Date	Dr. By	Ck. By	App. By	Description
6	5/20/2025	ERL	BSB	BSB	ADDENDUM #2

NORTH CHARLESTON, SOUTH CAROLINA
NORTH CHARLESTON SEWER DISTRICT
SUNNYSIDE PUMP STATION

ELECTRICAL SITE DEMOLITION PLAN

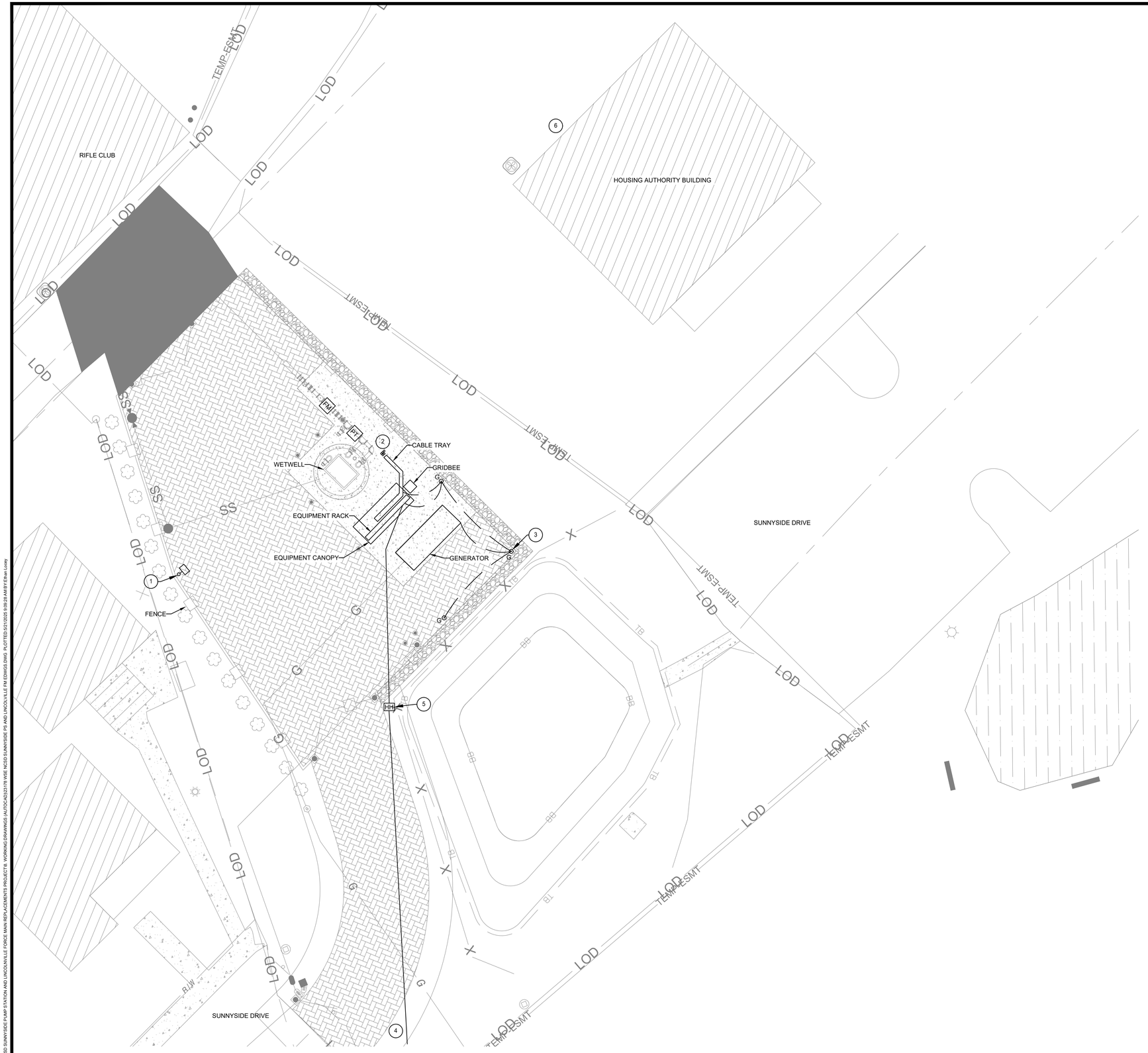
CADD NO.	SCALE:	CONTRACT:	JOB NO.	DR BY	DSN BY	CHK BY	APP BY
-	NONE		ENG21-1072	ERL	ERL	BSB	BSB

FILE NO.

E050

6

DWG CONSULTING ENGINEERS EMPLOYEE OWNED



1 E100 ELECTRICAL RENOVATION SITE PLAN
NOT TO SCALE

RENOVATION KEYNOTES

1. PROVIDE RSX1-P2-50K-MVOLT-SPA-PE-EGS-DBLXD OR EQUAL AREA LIGHT FIXTURE ON 20' SQUARE STEEL POLE. PROVIDE WITH EXTERNAL GLARE SHIELD AND INTEGRAL PHOTOCELL.
2. PROVIDE (2) 2" AND (3) 1-1/2" CONDUITS TO WETWELL FOR PUMP POWER CABLING, PUMP ALARM CABLING AND LEVEL PROBE LEAD TO WETWELL. STUB CONDUITS AT GRADE.
3. PROVIDE GROUND ROD WITH GROUND ROD TEST WELL.
4. PROVIDE SERVICE CONDUITS TO UTILITY SERVICE POINT. COORDINATE EXACT LOCATION WITH DOMINION PRIOR TO INSTALLATION.
5. PROVIDE TIER 22 HANDHOLE ADEQUATELY SIZED FOR ENTERING CONDUIT. USE HANDHOLE AS PULL POINT ONLY.
6. PROVIDE NEW SERVICE EQUIPMENT. COORDINATE INSTALLATION OF METER AND OVERHEAD DROP WITH DOMINION.

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SOUTH CAROLINA PROFESSIONAL ENGINEER
No. 43226
ETHAN ROBERT LOVEY
4/21/25

No.	Date	Description
6	5/20/2025	ADDENDUM #2

Dr. By	Ck. By	App. By
ERL	BSB	BSB

NORTH CHARLESTON, SOUTH CAROLINA
NORTH CHARLESTON SEWER DISTRICT
SUNNYSIDE PUMP STATION

ELECTRICAL SITE RENOVATION PLAN

CADD NO.	SCALE:	CONTRACT:	JOB NO.	DR BY	DSN BY	CHK BY	APP BY
-	NONE		ENG21-1072	ERL	ERL	BSB	BSB

FILE NO.

E100

5

DWG CONSULTING ENGINEERS EMPLOYEE OWNED

SECTION 33 01 30.12
ACCEPTANCE TESTING FOR SANITARY SEWERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Force main and gravity sewer testing requirements.

1.02 RELATED SECTIONS

A. Section 33 34 00 - Sanitary Sewer Force Mains

B. Section 33 31 13.16 – Polyvinyl Chloride Gravity Pipe and Fittings (SDR 35)

1.03 REGULATORY REQUIREMENTS

A. Conform to SCDHEC Standards for Wastewater Facility Construction: R.61-67.

PART 2 EXECUTION

2.01 GENERAL

A. Schedule inspections with NCSD at least 72 hours in advance.

B. Compaction testing will be performed in accordance with ASTM D1557.

2.02 FORCE MAIN PRESSURE TEST

A. Pressure test all sections of the force main in accordance with AWWA C600 (DIP) or AWWA C-605 (PVC).

B. Provide temporary blocking, bulkheads, flanges and plugs as necessary to assure all new pipes, valves and appurtenances will be pressure tested.

C. Before applying test pressure, completely expel air from the force mains and all appurtenances. Utilize air release valves, as shown on the Drawings, to expel air as line is filled with water.

D. Measure test pressure at the lowest point in the test segment. Maintain test pressure for a minimum of two hours. Provide a test pressure of 150 psi or 1.5 times the working pressure in the finished force main, whichever is greater.

E. Do not allow a variance in the test pressure of more than 5 psi for the test duration. If the pressure drops more than 5 psi at any time during the test period, restore the pressure to the specified test pressure. Provide an accurate pressure gauge, four inches in diameter, with a range

of pressure large enough to allow the specific test pressure to fall in the middle of the range (i.e. for 150 psi test pressure need 300 psi range on gage). Face gradations shall be at 20 psi intervals with tick marks every one psi, or equal approved by NCSD.

F. Definition of Leakage: The quantity of water that is pumped and metered into the test section to maintain test pressure within 5 psi of the specified test pressure for the test duration, plus the quantity of water required to return line to test pressure at the end of the test.

G. Test Results: Reject test section if the leakage exceeds the limits determined by the AWWA allowable leakage rate as stated in Section C605 and C600 as follows:

$$L = \frac{SD(P)^{0.5}}{148{,}000}$$

For the PVC pipe equation, "L" is the allowable leakage in gallons per hour, "S" is the length of force main tested, "D" is the nominal diameter of the force main in inches, and "P" is the test pressure in pounds per square inch (psi).

H. If tests indicate work does not meet specified requirements, remove work, replace, and retest at no cost to the Owner.

I. Locate and repair defective joints and/or pipes, and retest until the allowable test rates are within specified allowances.

J. Complete the NCSD Force Main Pressure Test Form Report attached to the end of this section.

2.03 GRAVITY PIPE TESTING

A. CCTV Inspection

1. Televised, recorded video inspections performed by a NASSCO certified inspector are required on all new gravity sewer mains and laterals at the Contractor's expense prior to inspections by NCSD.
2. Videos must be in CUES-GraniteNet or NAASCO exchange database.
3. Videos must be recorded with labels on the video stream of the line section being recorded that denote the line section, date, and time.
4. Videos must be provided to NCSD on a CD, DVD, or other approved media with the media cover labeled accordingly with the project name, sewer section(s), video date(s), and name of the company performing the video inspection service.
5. Video submittals must include contact information for the video inspection company to include company name, inspection operator's name, company address, company phone, and company email address. The inspector shall obtain GIS asset numbers from NCSD before the start of the inspection.

6. NCSD may video the sewer line at its expense at any time within the 2-year construction warranty period before it expires.

B. Low Pressure Air Test
   1. The air test procedures shall conform to the Uni Bell Recommended Practice for Low Pressure Air Testing of Installed Sewer Pipe, UNI B 6. The starting air pressure for the test shall be 4 psig (greater than the average groundwater back pressure of any groundwater above the pipe, but not greater than 9.0 psig). The minimum duration permitted for the prescribed low pressure air exfiltration pressure drop between two consecutive manholes shall not be less than provided in Table I or Table II of UNI B 6. Note that UNI-B-6 suggests that use of the 0.5 psig pressure drop is more efficient since the time requirements are half of the 1.0 psig-pressure drop. The two tables are reproduced on the following pages.
   2. Using the air pressure test, if there has been no leakage (zero psig drop) after one hour of testing, the section undergoing test shall have passed.
   3. Appropriate notes and Mandrel and Air Pressure Test Form (attached to the end of this section) shall be completed at the time of testing by the Contractor.

C. Deflection Test
   1. In accordance with ASTM D3034, no less than 30 days after completion of the PVC sewer pipe installation, the Contractor shall test the pipeline for deflection using a "go/no-go" deflection mandrel having a minimum of nine evenly spaced arms or prongs. The "go/no-go" gauge shall be hand pulled through all sections of the pipeline by the Contractor. The Contractor shall submit drawings of the "go/no-go" gauge to the Engineer for approval prior to testing. Complete dimensions of the gauge for each diameter of pipe to be tested shall be in accordance with ASTM D3034.
   2. Any section of pipe found to exceed 5 percent deflection shall be deemed a failed pipe and shall be excavated and replaced by the Contractor at its own expense.
   3. Appropriate notes and Mandrel and Air Pressure Test Form (attached to the end of this section) shall be completed at the time of testing by the Contractor.

TABLE I

SPECIFICATION TIME REQUIRED FOR A 1.0 PSIG PRESSURE DROP
FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q=0.0015

Pipe Diameter (in)	Minimum Time (min:sec)	Length for Min. Time (ft)	Length for Longer Length (sec)	Specification time for length (L) shown (min:sec)							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	3:46	597	.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.52 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5:342 L	14:10	14:10	17:48	22:15	26:42	31:09	31:09	35:36
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46

TABLE II

SPECIFICATION TIME REQUIRED FOR A 0.5 PSIG PRESSURE DROP
FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q=0.0015

Pipe Diameter (in)	Minimum Time (min:sec)	Length for Min. Time (ft)	Length for Longer Length (sec)	Specification time for length (L) shown (min:sec)							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	1:53	597	.190 L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	398	.427 l	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8	3:47	298	.760 L	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10	4:43	239	1.187 L	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54
12	5:40	199	1.709 L	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50
15	7:05	159	2.671 l	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02
18	8:30	133	3.846 L	8:30	9:37	12:49	16:01	19:14	26:26	25:38	28:51
21	9:55	114	5.235 L	9:55	13	17:27	21:49	26:11	30:32	34:54	39:16
24	11:20	99	6.837 L	11:24	17:57	22:48	28:30	34:11	39:53	45:35	51:17
27	12:45	88	8.653 L	14:25	21:38	28:51	36:04	43:16	50:30	57:42	46:54
30	14:10	80	10:683 L	17:48	26:43	35:37	44:31	53:25	62:19	71:13	80:07
33	15:35	72	12:926 L	21:33	32:19	43:56	53:25	64:28	75:24	86:10	96:57
36	17:00	66	15:384 L	25:39	38:28	51:17	64:06	76:55	89:44	102:34	115:23

Force Main Pressure Test Report

Project: _____ Date: _____

DHEC Permit #: _____ Test Duration: _____

NCSD Representative: _____

Contractor: _____

Contractor Representative: _____

Engineering Firm: _____

Engineering Firm Representative: _____

Allowable leakage calculations based on American Water Works Association (AWWA):

$$L = \frac{SD\sqrt{P}}{148{,}000} \quad Where:$$

L = Allowable Leakage (gph)
$S = Length\ of\ Pipe\ Tested\ (ft)$
$D = Nominal\ Diamter\ of\ Pipe\ (in)$
$P = Average\ Test\ Pressure\ (psig)$

	Time	Pressure	Diameter (in)	Length (ft)	Allowable Leakage (gph)
Start		PSI			
End		PSI			

1-Hour Total Allowable Leakage, L_1 = _____ gal

2-Hour Total Allowable Leakage, L_2 = _____ gal

Actual Leakage = _____ gal

☐ Passed ☐ Failed

NORTH CHARLESTON
SEWER DISTRICT

Mandrel and Air Pressure Test Report

Project:_________________________________ Date: ____________________

Contractor:______________________________ Inspector: ________________

Tested Section: to

Diameter (in)	Material	Length (ft)		Time	Pressure
			Start		PSI
			End		PSI

Mandrel Test: ☐ Passed ☐ Failed Air Test: ☐ Passed ☐ Failed

Tested Section: to

Diameter (in)	Material	Length (ft)		Time	Pressure
			Start		PSI
			End		PSI

Mandrel Test: ☐ Passed ☐ Failed Air Test: ☐ Passed ☐ Failed

Tested Section: to

Diameter (in)	Material	Length (ft)		Time	Pressure
			Start		PSI
			End		PSI

Mandrel Test: ☐ Passed ☐ Failed Air Test: ☐ Passed ☐ Failed

Tested Section: to

Diameter (in)	Material	Length (ft)		Time	Pressure
			Start		PSI
			End		PSI

Mandrel Test: ☐ Passed ☐ Failed Air Test: ☐ Passed ☐ Failed

END OF SECTION

SECTION 33 01 30.12
POLYVINYL CHLORIDE GRAVITY PIPE AND FITTINGS (SDR-35)

PART 1 GENERAL

1.01 WORK INCLUDED:

This section covers the furnishing and installation of Polyvinyl Chloride (PVC) pipe and fittings, as indicated on the drawings and as specified herein.

1.02 RELATED WORK:

A. Section 31 00 00, EARTHWORK

B. Section 33 01 30.12, ACCEPTANCE TESTING FOR SANITARY SEWERS

1.03 REFERENCES:

A. The following standards form a part of these specifications as referenced:

American Society for Testing and Materials (ASTM)

ASTM	D2321	Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe
ASTM	D3034	Specification for Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings
ASTM	D3212	Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM	F679	Specification for Polyvinyl Chloride (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings

1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

Manufacturer's literature of the materials of this section.

PART 2 PRODUCTS

2.01 MATERIALS:

A. PVC nonpressure sewer pipe 4-inches through 15-inches diameter shall conform to ASTM D3034, 18-inches through 60-inches diameter to ASTM F679, all with SDR of 35 unless noted, and shall meet the specific requirements and exceptions to the aforementioned specifications that follow.

B. PVC nonpressure sewer pipe shall be furnished in standard lengths.

C. One pipe bell consisting of an integral wall section with a solid cross section rubber ring, factory assembled, shall be furnished with each standard, random and short length of pipe. Rubber rings shall be provided to the requirements of ASTM D32l2.

D. The rubber ring shall be retained within the bell of the pipe by a precision formed groove or recess designed to resist fishmouthing or creeping during assembly of joints.

E. Spigot pipe ends shall be supplied with bevels from the manufacturer to ensure proper insertion. Each spigot end shall have an "assembly stripe" imprinted thereon to which the bell end of the mated pipe will extend upon proper jointing of the two pipes.

F. PVC fittings shall be provided with bell and/or spigot configurations with rubber gasketed joints compatible with that of the pipe. Bend fittings with spigot ends shorter than the pipe recess bells will not be allowed. The shorter spigot end would not allow proper seating of the spigot in the mating bell and would permit undesired contact between the mating bell and the outside of the fitting bell.

G. All pipe delivered to the job site shall be accompanied by independent testing laboratory reports certifying that the pipe and fittings conform to the above-mentioned specifications. In addition, the pipe shall be subject to thorough inspection and tests, the right being reserved for the Engineer to apply such of the tests specified as he may from time to time deem necessary.

H. All cutting of pipe shall be done with a machine suitable for cutting PVC pipe. Cut ends shall be beveled when recommended by the pipe manufacturer.

PART 3 EXECUTION

3.01 INSTALLATION:

A. Except as modified herein, installation of the PVC pipe shall be in accordance with ASTM D232l.

B. Each pipe length shall be inspected before being laid to verify that it is not cracked. Pipe shall be laid to conform to the lines and grades indicated on the drawings or given by the Engineer. Each pipe shall be so laid as to form a close joint with the next adjoining pipe and bring the inverts continuously to the required grade.

C. The pipe shall be supported by compacted crushed stone. Crushed stone shall be as specified under Section 31 00 00, EARTHWORK.

D. The pipe shall not be driven down to grade by striking it with a shovel handle, timber, rammer, or other unyielding object. When each pipe has been properly bedded, enough of the backfill material shall be placed and compacted between the pipe and the sides of the trench to hold the pipe in correct alignment.

E. Before a joint is made, the pipe shall be checked to assure that a close joint with the next adjoining pipe has been maintained and that inverts are matched and conform to the required line and grade.

F. For pipe placed on crushed stone, immediately after the joint is made, the jointing area shall be filled with suitable materials so placed and compacted that the ends of either pipe will not settle under backfill load.

G. No pipe or fitting shall be permanently supported on saddles, blocking, or stones.

H. Branches and fittings shall be laid by the Contractor as indicated on the drawings, and/or as required by the Engineer. Open ends of pipe and branches shall be closed with PVC caps secured in place with premolded gasket joints or as required by the Engineer.

I. All pipe joints shall be made as nearly watertight as practicable. There shall be no visible leakage at the joints and there shall be no sand, silt, clay, or soil of any description entering the pipeline at the joints. Where there is evidence of water or soil entering the pipeline, connecting pipes, or structures, the defects shall be repaired to the satisfaction of the Engineer.

J. The Contractor shall build a tight bulkhead in the pipeline where new work enters an existing sewer. This bulkhead shall remain in place until the Engineer authorizes its removal.

K. Care shall be taken to prevent earth, water, and other materials from entering the pipe, and when pipe laying operations are suspended, the Contractor shall maintain a suitable stopper in the end of the pipe and also at openings for manholes.

L. As soon as possible after the pipe and manholes are completed on any street, the Contractor shall flush out the new pipeline using a rubber ball ahead of the water, and none of the flushing water or debris shall be permitted to enter any existing sewer.

M. Contractor shall furnish and install appropriate transition couplings to connect PVC pipe to existing pipe.

N. Gravity sewer crossing storm drains shall maintain a minimum vertical separation of 12". When crossing separation is less than 18" #57 stone shall be installed between the Storm drain invert and the Gravity Sewer invert.

O. Where a water line crosses under gravity sewer or within 18 inches above the sewer, sewer lines shall be constructed of C900/DR25 (no joint shall be allowed within 7' of the sewer line) at the crossing. In this case, gravity sewer shall be water pressure pipe from manhole to manhole in accordance with the SCDHEC Standards. Transition from water pipe to SDR class pipe must be in a manhole. Prior approval must be obtained from the AUTHORITY before proceeding. All replacement of sewer pipe shall be performed in a manner to cause the least interference with the operation of existing pipelines.

P. Gravity sewer crossing storm drains shall maintain a minimum vertical separation of 12". Gravity sewer crossing storm drain with separation less than 18" shall be installed as follows: a) The entire area between the bottom of the lower pipe to the bottom of the upper pipe shall be bedded in # 57 stone. The Engineer must certify to NCSD that stone was installed at such locations. b) Prior approval by NCSD must be obtained to install a gravity line with less than 12" separation between storm or water line.

Q. Gravity sewer and manholes shall be laid a minimum of 10 feet horizontally from any water main. The distance shall be measured edge-to-edge. Where it is impossible to maintain the prescribed 10 feet of

separation, the AUTHORITY may at its discretion allow deviation provided both the water and sewer line shall be constructed of pipe which conforms to SCDES drinking water standards for material and pressure testing. Prior approval must be obtained from the AUTHORITY before proceeding.

R. Installation shall be in accordance with the NCSD technical specifications. Where there is conflict between this specification and the NCSD technical specifications, the NCSD technical specifications shall control.

3.02 RECONNECTION OF EXISTING SERVICE LATERALS

A. If a preexisting sewer lateral is stubbed out at a lot property line, the CONTRACTOR must reconnect the lateral to the sewer main at an approved grade. No other taps to the gravity main or manholes shall be made without the approval of the AUTHORITY.

B. Contractor shall furnish appropriate transition couplings. Installation of services on existing lines shall normally be accomplished by cutting "Wye" into the line. Only with prior written approval from the Authority, may existing mains be tapped for new services.

C. NCSD Sewer lateral shall be either 4-inch or 6-inch diameter SDR-25 ASTM-3034 PVC. Private laterals shall be constructed using either gasketed sewer pipe with SDR-35 gasketed pipefittings or Schedule 40 glue jointed pipe and fittings. Primer is to be purple and glue gray. Petroleum-based pipe lube cannot be used.

D. The slope of the lateral must be at least ¼-inch per foot with no more than 5% deflection. The AUTHORITY will determine if this grade can be modified. A minimum 12 inches of earth cover is required for all lateral piping. Bedding may be required depending on soil conditions.

3.03 QUALITY ASSURANCE

A. On completion of a section of sewer, the Contractor shall inspect and test the section in accordance with Section 33 01 30.12, Acceptance Testing for Sanitary Sewer, at no additional cost to the Owner.

B. The Contractor shall be responsible for the satisfactory water-tightness of the entire section of the sewer. Should the Engineer determine that the sections inspected are unsatisfactory, the Contractor shall do all work required to locate and repair the defects and re-inspect as the Engineer may require without additional compensation.

C. A plan of the method for repairing any defects that are found shall be submitted to the Engineer for review.

END OF SECTION

SECTION 33 39 13
PRECAST MANHOLES AND WET WELL

PART 1 - GENERAL

1.01 WORK INCLUDED:

This Section covers all precast manholes and wet wells complete, including, but not limited to, bases, walls, cones, mortar, inverts, frames and covers.

1.02 RELATED WORK:

A. Section 31 00 00, EARTHWORK

B. Section 03 30 00, CAST-IN-PLACE CONCRETE

C. Section 03 60 00, GROUTING AND CONCRETE PATCHING

1.03 SYSTEM DESCRIPTION:

A. Precast sections shall conform in shape, size, dimensions, materials, and other respects to the details indicated on the drawings or as required by the Engineer.

B. All manholes and wet wells shall have concrete bases. Concrete bases shall be precast unless otherwise specified.

C. Riser and cone sections shall be precast concrete.

1.04 REFERENCES:

A. The following standards form a part of this specification as referenced:

ASTM International (ASTM)

ASTM A48	Standard Specification for Gray Iron Castings
ASTM C478	Standard Specification for Circular Precast Reinforced Concrete Manhole Sections
ASTM C923	Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals

ASTM C990	Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
ASTM C1244	Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill

1.05 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01 33 23 SUBMITTALS, SUBMIT THE FOLLOWING:

A. Manufacturer's literature of the materials of this section.

B. Test reports as required by the Engineer.

PART 2 - PRODUCTS

2.01 PRECAST CONCRETE SECTIONS:

A. All precast concrete sections shall conform to ASTM C478 with the following exceptions and additional requirements:

1. The wall thickness of precast sections shall be as designated on the drawings, meeting the following minimum requirements:

Section Diameter (Inches)	Minimum Wall Thickness (Inches)
48	5
60	6
72	7
84	8
120	10

2. Type II cement shall be used except as otherwise approved.

3. Sections shall be steam cured and shall not be shipped until at least five days after having been cast.

4. Minimum compressive strength of concrete shall be 4000 psi at 28 days.

5. No more than two lift holes may be cast or drilled in each section.

6. The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on the inside of each precast section.

7. Acceptance of the sections will be on the basis of material tests and inspection of the completed product.

8. Circumferential steel reinforcement in walls and bases shall be a minimum of 0.12 sq. in./lin. ft. for 4-foot diameter sections and 0.15 sq. in./lin. ft. for 5- and 6-foot diameter sections. Reinforcing shall extend into tongue and groove.

B. Conical reducing sections shall have a wall thickness not less than 5-inches at the bottom and wall thickness of 8-inches at the top. Conical sections shall taper from a minimum of 48-inches diameter to 24 or 30-inches diameter at the top, as shown on the drawings.

C. Except where insufficient depth of cover dictates the use of a shorter base, bases shall be a minimum of 4 feet in height.

D. Slab top sections and flat riser sections (Grade Rings) shall conform to the contract drawings, with particular attention focused upon the reinforcing steel and be designed to meet or exceed an HS-20 Loading requirement.

E. The tops of the bases shall be suitably shaped by means of accurate ring forms to receive the riser sections.

F. Precast sections shall be manufactured to contain wall openings of the minimum size to receive the ends of the pipes, such openings being accurately set to conform with line and grade of the sewer or drain. Subsequent cutting or tampering in the field, for the purpose of creating new openings or altering existing openings, will not be permitted except as required by the Engineer.

G. "Doghouse" manholes shall be placed where indicated on the drawings. The Contractor shall accurately measure the diameter of the existing outlet pipe and inform the manufacturer of its size, so that the "Doghouse" type opening can be cut into the precast manhole base.

H. The exterior surfaces of all precast manhole bases, walls, and cones shall be given a minimum of one shop coat of bituminous dampproofing.

I. The Engineer reserves the right to reject any unsatisfactory precast section and the rejected unit shall be tagged and removed from the job site immediately.

J. The Engineer may also require the testing of concrete sections as outlined under Physical Requirements in ASTM C478 with the Contractor bearing all testing costs.

2.02 FRAMES, GRATES, COVERS AND STEPS:

A. Castings shall be of good quality, strong, tough, even-grained cast iron, smooth, free from scale, lumps, blisters, sandholes, and defects of every nature which would render them

unfit for the service for which they are intended. Contact surfaces of covers and frame seats shall be machined to prevent rocking of covers.

B. All castings shall be thoroughly cleaned and may be subject to a careful hammer inspection at the Engineer's discretion.

C. Castings shall be ASTM A48 Class 30B or better.

D. The surface of the manhole covers shall be as shown in the detail in the drawings.

E. Manhole frames shall be as shown in the detail in the drawings.

F. Watertight type manhole frames shall be as shown in the detail in the drawings.

2.03 SEWER MANHOLE ACCESSORIES:

A. Gasket materials shall be top grade (100% solids, vulcanized) butyl rubber and shall meet or exceed ASTM C990.

B. Couplings at the manhole-pipe interface shall be made with a rubber seal system (with or without stainless steel straps) meeting the requirements of ASTM C923 and recommended for this type of connection.

C. Stubs installed as specified and indicated on the drawings shall be short pieces of the same class pipe as that entering the manhole and shall have either stoppers or end caps as shown on the drawings. Stoppers or end caps shall be especially designed for that application.

2.04 SEWER MANHOLE AND WET WELL LINING

A. Where indicated on the drawings, the precast manholes and wet wells shall include a Level C lining as specified below.

B. Polymer Resin-Based Linings

1. Polymer resin-based liners shall be 100% solids by volume, volatile organic compound (VOC) free and shall conform to the minimum physical properties listed in the following table:

Compressive Strength	ASTM D695	10,500 psi
Tensile Strength	ASTM D638	7,000 psi
Flexural Strength	ASTM D790	12,000 psi
Flexural Modulus (Initial)	ASTM D790	730,000 psi
Density		87 $\pm$ pcf

Bond		Exceed tensile strength of substrate

2. The structures lined with epoxy resin-based liners shall be resistant to corrosion caused by:

    1. Hydrogen Sulfide
    2. 20% Sulfuric Acid
    3. 17% Nitric Acid
    4. 5% Sodium Hydroxide
    5. All common ingredients normally associated with sanitary sewer environments

3. The finished liner shall have long-term (50-year) flexural modulus of elasticity value of 500,000 psi and shall be certified by independent third-party testing.

4. Polymer resin-based linings shall be compatible with existing thermal conditions in the wetwell.

5. The final product shall not deteriorate, corrode, or lose structural strength in any manner.

6. The system shall be designed to operate at ambient temperatures up to 140 degrees F with excellent abrasion resistance.

C. Level C Lining System

1. The Level C lining system shall be an polymer resin-based lining system applied with a minimum 250 mil (1/4-inch) finished thickness and shall be one of the following products:

    a. S-301 Epoxy Spray System as manufactured by Warren Environmental, Inc.
    b. Dinjer SG Mastic as manufactured by Pilgrim Permocoat Inc.
    c. Raven 405 as manufactured by Raven Lining Systems
    d. ShureFlex as manufactured by Sherwin-Williams
    e. DS-5 Mainystay Lining System as manufactured by Madewell Products Corp.
    f. SLS™ as manufactured by Citadel Technologies.
    g. Structure Guard as manufactured by Quadex.
    h. PLS as manufactured by Protective Liner Systems.
    i. 4553TM Epoxy Coating as manufactured by Standard Cement Materials

PART 3 - EXECUTION

3.01 INSTALLATION:

A. PRECAST SECTIONS:

1. Precast bases shall be supported on a compacted level foundation of crushed stone, as specified in Section 31 00 00 EARTHWORK, at a depths shown in the drawings.

2. Precast reinforced concrete sections shall be set vertical and with sections in true alignment.

3. Butyl rubber joint sealant shall be installed between each concrete section. Catch basin sections do not require joint sealant if so indicated on the drawings.

4. All holes in sections used for handling the sections shall be thoroughly plugged with mortar. Mortar shall be one part cement to 1-1/2 parts sand, mixed slightly damp to the touch (just short of "balling"), hammered into the holes until it is dense, and an excess of paste appears on the surface, and then finished smooth and flush with the adjoining surfaces.

B. CASTINGS:

1. Cast iron frames, grates and covers shall be as specified. The frames and covers shall be set by the Contractor to conform accurately to the grade of the finished pavement, existing ground surface, or as indicated on the drawings. Frames shall be adjusted to meet the street surface.

2. Cast iron manhole frames and covers not located in paved areas shall be set 6-inches above finished grade, at a height as required by the Engineer, or as indicated on the drawings. The top of the cone shall be built up with a minimum of 1 course and a maximum of 5 courses of brick and mortar used as headers for adjustment to final grade.

3. Frames shall be set concentric with the top of the concrete section and in a full bed of mortar so that the space between the top of the concrete section or brick headers and the bottom flange of the frame shall be completely filled and made watertight. A thick ring of mortar extending to the outer edge of the concrete shall be placed all around the bottom flange. The mortar shall be smoothly finished to be flush with the top of the flange and have a slight slope to shed water away from the frame.

4. Covers and/or grates shall be left in place in the frames, for safety reasons, except while work is being performed.

D. ACCESSORIES:

1. Accessories shall be installed in accordance with the manufacturer's instructions.

2. Stubs shall be set accurately to the dimensions indicated on the drawings. Stubs shall be sealed with suitable watertight plugs.

E. LEVEL C MANHOLE AND WET WELL LINING:

1. The contractor is responsible for creating and maintaining the necessary environmental conditions as required for mixing, installation, and curing by the cementitious and polymer-resin based lining systems. Appropriate conditions shall be maintained when mixing, installing, and curing the linings to ensure proper adhesion, curing, and overall lining success.

2. Manholes and wet well shall be monolithically coated to the required thickness by spray-on methods in a single pass or application.

3. A complete watertight seal shall be provided at the pipe and wet well wall connections. The Contractor shall submit details of how watertight connections shall be made to the Engineer for approval prior to performing any work.

4. The spray shall be applied so that the entire structure receives a structurally sound, monolithic liner. The finished invert surfaces shall be smooth, free of ridges and bumps and will be sloped in the direction of flow. Special care shall be taken to ensure a smooth transition between the new manhole or wet well invert and intersecting pipeline inverts so that flow will not be impaired.

5. The cured surfacing thickness shall be smooth, even (without ridges or bumps) and continuous with proper sealing connections to any non-rehabilitated areas.

6. The monolithic lining shall completely cover the interior of the manhole or wet well including the benches and invert unless otherwise directed by the Engineer. The lining shall effectively seal the interior surfaces of the structure and prevent any penetration or leakage of ground water infiltration.

7. Contractor shall prepare the manhole or wet well surface for lining per the manufacturer's requirements.

8. Application of the liner shall not be made unless the ambient temperature inside the structure is 50 degrees F or higher and expected to be the same or rise during the next 72 hours, unless otherwise approved by manufacturer.

9. The liner shall be manually sprayed to all surfaces by a factory-certified, trained technician experienced in the application of a spray applied resin. Contractor

shall monitor (and produce a report to the satisfaction of the engineer) on wet film thickness throughout the application.

3.02 LEAKAGE TESTS:

A. Leakage tests shall be made by the Contractor and observed by the Engineer on each manhole. The test shall be by vacuum or by water exfiltration as described below:

B. VACUUM TEST:

1. The vacuum test shall be conducted in accordance with ASTM C1244. Test results will be judged by the length of time it takes for the applied vacuum to drop from 10 inches of mercury to 9 inches. If the time is less than that listed in Table 1 of ASTM C1244, the manhole will have failed the test. Test times from Table 1 are excerpted below.

TABLE 1

Minimum Test Times for Various Manhole Diameters

	Diameter (Inches)		
Depth (Feet)	48	60	72
		Times (Seconds)	
0-12	30	39	49
12-16	40	52	67
16-20	50	65	81
20-24	59	78	97
26-30	74	98	121

2. If the manhole fails the initial test, the Contractor shall locate the leaks and make proper repairs. Leaks may be filled with a wet slurry of accepted quick setting material. If the manhole should again fail the vacuum test, additional repairs shall be made, and the manhole water tested as specified below.

C. WATER EXFILTRATION TEST:

1. After the manhole has been assembled in place, all lifting holes shall be filled and pointed with an approved non-shrinking mortar. All pipes and other openings into the manhole shall be suitably plugged and the plugs braced to prevent blow out. The test shall be made prior to placing the shelf and invert. If the groundwater table has been allowed to rise above the bottom of the manhole, it shall be lowered for the duration of the test.

2. The manhole shall be filled with water to the top of the cone section. If the excavation has not been backfilled and observation indicates no visible leakage, that is, no water visibly moving down the surface of the manhole, the manhole may be considered to be satisfactorily water-tight. If the test, as described above, is unsatisfactory as determined by the Engineer or if the manhole excavation has been backfilled, the test shall be continued. A period of time may be permitted if the Contractor so wishes, to allow for absorption by the manhole. At the end of this period, the manhole shall be refilled to the top of the cone, if necessary, and a measuring time of at least 8 hours begun. At the end of the test period, the manhole shall be refilled to the top of the cone, measuring the volume of water added. This amount shall be extrapolated to a 24-hour loss rate and the leakage determined on the basis of depth. The leakage for each manhole shall not exceed one gallon per vertical foot for a 24-hour period. If the manhole fails this requirement, but the leakage does not exceed 3 gallons per vertical foot per day, repairs by approved methods may be made as required by the Engineer to bring the leakage within the allowable rate of one gallon per foot per day. Leakage due to a defective section or joint or exceeding the 3 gallon per vertical foot per day, shall be cause for rejection of the manhole. It shall be the Contractor's responsibility to uncover the rejected manhole as necessary and to disassemble, reconstruct or replace it as required by the Engineer. The manhole shall then be retested and, if satisfactory, interior joints shall be filled and pointed.

3. No adjustment in the leakage allowance will be made for unknown causes such as leaking plugs, absorption, etc. It shall be assumed that all loss of water during the test is a result of leaks through joints or through the concrete. Furthermore, the Contractor shall take any steps necessary to assure the Engineer that the water table is below the bottom of the manhole throughout the test.

4. If the groundwater table is above the highest joint in the manhole, and there is no leakage into the manhole, as determined by the Engineer, such a test can serve to evaluate water-tightness of the manhole. However, if the Engineer is not satisfied with the results, the Contractor shall lower the water table and carry out the test as described hereinbefore.

3.03 LEVEL C LINING INSPECTION, TESTING, AND WARRANTY

A. There shall be no groundwater infiltration or other leakage (active or previously active) through the manhole or wet well walls, benches, inverts or pipe connections after the structures have been lined.

B. If leakage is detected, it shall be eliminated with an appropriate, grout or sealant as recommended by the manufacturer, over coated with epoxy or approved level C lining material and approved by the Engineer at no additional cost to the Owner. Injection grouting may be required to stop leaks around or in invert channels, pipe connections and benches.

C. Thickness Testing:

1. Thickness testing is required on finished product. Field acceptance of manhole or wet well lining shall be based on the Engineer's field inspection and evaluation of the appropriate installation and curing test data. The lining shall provide a continuous monolithic surfacing with uniform thickness throughout the manhole or wet well interior. If the thickness is not uniform or is less than specified, it shall be repaired or replaced at no additional cost to the Owner.

    a. Thickness testing up to 100 mils may be completed using a Tooke Gauge. Owner and Engineer may request core samples or "coupons" to be cut by the contractor from various coated areas as chosen by the Owner or Engineer. Such samples will be used by the Owner and Engineer to confirm thickness. These areas must be patched or repaired upon completion.

2. If the Engineer has to enter the manhole or wet well to inspect the work, the Contractor shall provide forced air ventilation, gas monitors, harnesses, lights, confined space entry, etc. for the Engineer to enter the manhole or wet well and perform the inspection in strict and complete accordance with OSHA requirements at no additional cost to the Owner.

D. Pull-Off Adhesion Strength Testing

1. Wet well and manhole polymer resin-base linings shall have adhesion strength testing (pull tests) completed by a third-party testing agency, hired by the contractor, to ensure proper adhesion to the substrate.

2. Test dollies shall be spaced across the coated areas, to the satisfaction of the Owner and Engineer, to give accurate representative samples of the installed lining across the entire area.

3. Adhesive bond strength shall meet or exceed the specified bond strength of the approved coating systems.

E. Spark Arrestor (Holiday) Testing

1. All epoxy resin-based manhole or wet well linings shall be spark tested prior to being placed in service. Spark testing shall be required of the entire surface area of the structure (field and joint) and shall be conducted in accordance with the liner system manufacturer's recommendations.

2. Results of the spark tests will be logged in duplicate and a copy of this log submitted to the Engineer.

3. Equipment systems used to perform spark testing shall be compatible with the materials to be tested. Spark testing equipment shall provide a visual as well as an audible indicator to identify pinholes or splits in the liner system.

F. Level C Lining Warranty:

1. The lining manufacturer shall warranty the protective coating applications for a period of TEN (10) YEARS from the date of acceptance by the OWNER. The warranty shall make no distinction between installation practices and material performance and shall not be prorated with respect to elapsed time for the entire warranty period. Manufacturer shall, within a reasonable period of time after receipt of written notice thereof by the Owner [period not to exceed sixty (60) calendar days], repair defects in materials or workmanship during said TEN (10) year period, and any damage to other work caused by such defects or repairing of same at his own expense and without cost to the Owner.

3.04 CLEANING:

All new manholes shall be thoroughly cleaned of all silt, debris and foreign matter of any kind, prior to final inspection.

END OF SECTION

SECTION 40 05 78.26
AIR AND VACUUM VALVES FOR WASTEWATER SERVICE

PART 1 - GENERAL

1.01 GENERAL PERFORMANCE REQUIREMENT:

This Section covers the furnishing and installation of air and vacuum valves for wastewater service. Valves shall be specifically designed and manufactured for wastewater applications. Valve bodies shall be tested to a minimum 1.5 times the system pressure specified and shall not experience leakage or deformation. The valve size shall be the nominal size of its connection fitting. The valve inlet, outlet, and internal clearance shall each have a cross-sectional area greater than or equal to the cross-sectional area of the valve's nominal size. The valve shall have a built-in anti-surge device with relief openings that are between 1/30th and 1/40th the cross sec-tonal area of the nominal valve size, designed to automatically limit the surge and transient pressure.

1.05 SUBMIT THE FOLLOWING IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 01 32 19 SUBMITTALS SCHEDULE

A. Operation and Maintenance Manual
B. Quality control inspection and test reports verifying the results of the following:

1. Hydrostatic leakage test at ½, 1, and 1 ½, times the valves rated pressure. Each test pressure level shall be held for not less than 5 minutes. Valves showing signs of leakage or weeping shall be rejected.

2. Low head leakage test at 0 psi. The valve shall be rejected if the valve shows any leakage after 2 minutes. Valves rated at zero pressure sealing will be tested at 0.1psi for 5 minutes.

3. Pressurized air release test at the valves rated pressure ("Drop Test"). The valve shall be filled with water and pressurized within 10% of the valve rated pressure. Gas shall be introduced into the valve from a source pressurized above the test pressure. The pressure shall be slowly reduced to working pressure and maintained using a pressure relief valve. While maintaining a test within 10% of the valves working pressure, gas shall continue to be introduced into the valve displacing the water until the control float loses buoyancy, "drops," and unseats the small nozzle orifice from the nozzle seat and releases pressurized air. Valves which fail to release air at full pressure rating shall be rejected.

4. A copy of the manufacturers ISO 9001:2015 registration certification. If of foreign manufacture, a copy of the ISO 9001:2015 registration certification of the domestic facility responsible for distribution

PART 2 - PRODUCTS

2.01 AIR RELEASE AND VACUUM RELIEF VALVES:

A. APPROVED MANUFACTURER: Vent-Tech, Model SZG, Model # 02SZG10TBR-6NN or Engineer's approved equal.

B. MATERIAL

1. Body and Flanges: ASTM A240 316L SS
2. Hardware: ASTM A240 316L SS
3. Trim and Venting Orifices: ASTM A240 316L SS
4. Primary and Secondary Floats: UHMW-PE

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Refer the design drawings for general installation requirements.

END OF SECTION