

TIP PROJECT: R-5021

CONTRACT: C204123

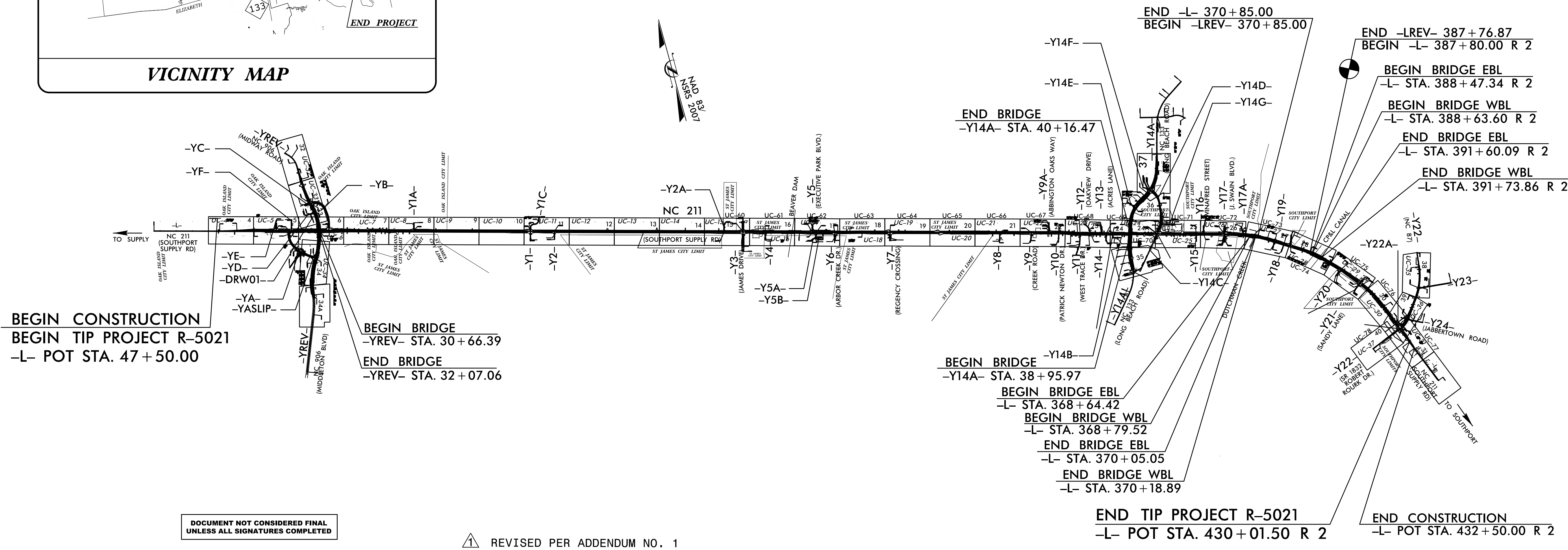
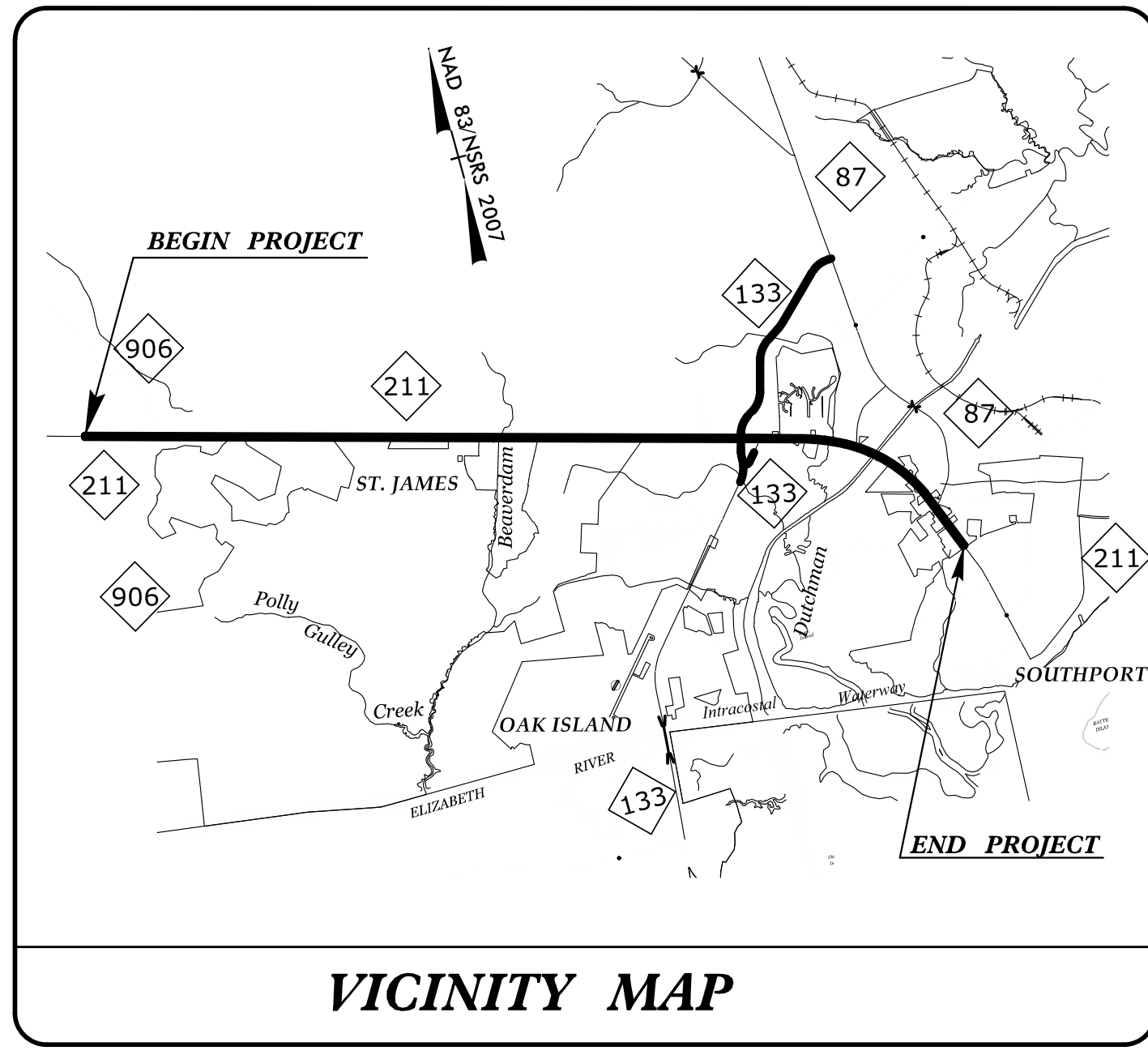
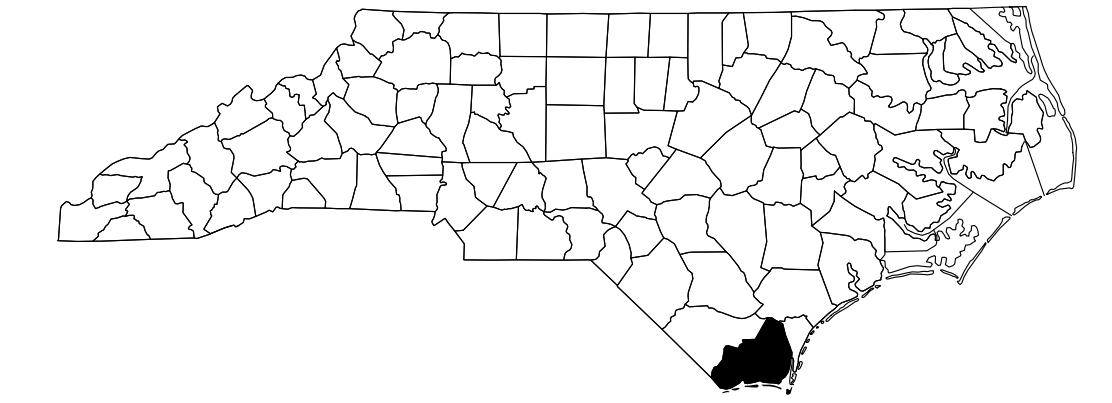
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BRUNSWICK COUNTY

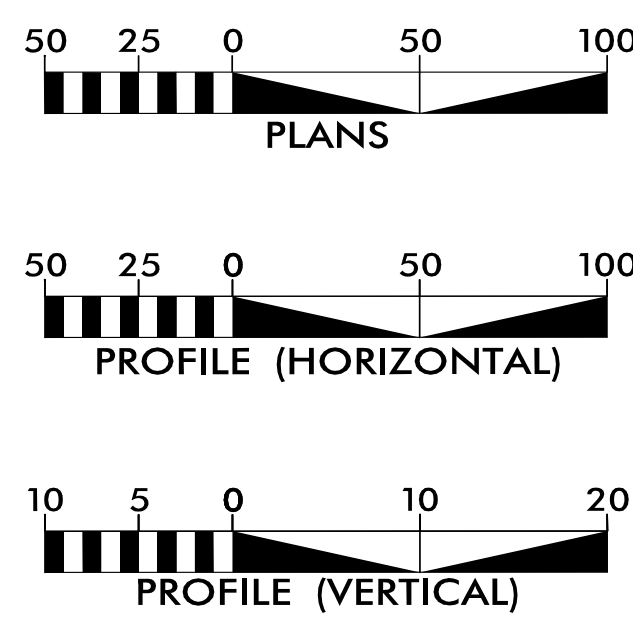
LOCATION: NC 211 FROM WEST OF NC 906 (MIDWAY ROAD)
TO EAST OF NC 87

TYPE OF WORK: WATER AND SEWER RELOCATIONS

T.I.P. NO. R-5021	SHEET NO. UC-1
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GRAPHIC SCALES



INDEX OF SHEETS

SHEET NO.:	DESCRIPTION:
UC-1	TITLE SHEET
UC-2	LEGEND OF SYMBOLS
UC-3	GENERAL NOTES (AECOM)
UC-3A THRU UC-3V	CONSTRUCTION DETAILS (AECOM)
UC-4 THRU UC-37	UTILITY CONST. PLAN SHEETS (AECOM)
UC-38 THRU UC-58	UTILITY CONST. PROFILES (AECOM)
UC-59	GENERAL NOTES (RK&K)
UC-59A THRU UC-59D	CONSTRUCTION DETAILS (RK&K)
UC-60 THRU UC-78	UTILITY CONST. PLAN SHEETS (RK&K)
UC-79 THRU UC-93	PROFILE SHEETS (RK&K)

WATER AND SEWER OWNERS ON PROJECT

- (A) WATER: BRUNSWICK COUNTY & CITY OF SOUTHPORT
- (B) SANITARY SEWER: BRUNSWICK COUNTY & CITY OF SOUTHPORT
- (C) SANITARY SEWER: SE BRUNSWICK SANITARY DISTRICT

PREPARED IN THE OFFICE OF:



AECOM TECHNICAL SERVICES OF NORTH CAROLINA, INC.
701 CORPORATE CENTER DRIVE, SUITE 475, RALEIGH, NC 27607
919-854-6200 919-854-6259 (fax)
F - 0342

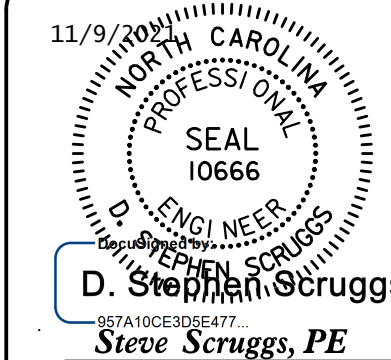
PREPARED IN THE OFFICE OF:



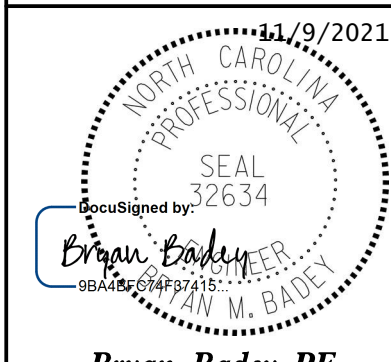
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE, SUITE 350
RALEIGH, NORTH CAROLINA 27609
NC LICENSE NO. F-0112
1-888-521-4455 OR 919-878-9560

2018 STANDARD SPECIFICATIONS

LETTING DATE:
DECEMBER 7, 2021



D. Stephen Scruggs
Steve Scruggs, PE
AECOM
UTILITIES PROJECT ENGINEER



Bryan Badey, PE
RK&K
UTILITIES PROJECT ENGINEER



DIVISION OF HIGHWAYS
UTILITIES UNIT
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Bo Hemphill, PE UTILITIES REGIONAL ENGINEER
Nabil Hamdan UTILITIES ENGINEER
Kyle Pleasant UTILITIES AREA COORDINATOR
Larry James UTILITIES COORDINATOR

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

UTILITIES PLAN SHEET SYMBOLS

PROPOSED WATER SYMBOLS

Water Line (Sized as Shown)	12" WL
11¼ Degree Bend	+
22½ Degree Bend	+*
45 Degree Bend	+x
90 Degree Bend	+†
Plug	⊥
Tee	⊕
Cross	⊕⊕
Reducer	▶
Gate Valve	GV
Butterfly Valve	BV
Tapping Valve	TGV
Line Stop	LS
Line Stop with Bypass	LS/BP
Blow Off	BO
Fire Hydrant	PFH
Relocate Fire Hydrant	REH
Remove Fire Hydrant	REM FH
Water Meter	PWM
Relocate Water Meter	RWM
Remove Water Meter	REM WM
Water Pump Station	PST(W)
RPZ Backflow Preventer	PRPZ
DCV Backflow Preventer	PBFP
Relocate RPZ Backflow Preventer	RRPZ
Relocate DCV Backflow Preventer	RBFP

PROPOSED SEWER SYMBOLS

Gravity Sewer Line (Sized as Shown)	12" SS
Force Main Sewer Line (Sized as Shown)	12" FSS
Manhole (Sized per Note)	•
Sewer Pump Station	PS(SS)

PROPOSED MISCELLANEOUS UTILITIES SYMBOLS

Power Pole	⊖
Telephone Pole	⊖
Joint Use Pole	⊖
Telephone Pedestal	TEL PED
Utility Line by Others (Type as Shown)	PROP O/H POW LINES
Trenchless Installation	12" TL INSTALL
Encasement by Open Cut	24" ENCAS BY OC
Encasement	24" ENCASEMENT

Thrust Block	⊥
Air Release Valve	AR
Utility Vault	UV
Concrete Pier	CP
Steel Pier	SP
Plan Note	NOTE
Pay Item Note	PAY ITEM

EXISTING UTILITIES SYMBOLS

Power Pole	⊖	*Underground Power Line	P
Telephone Pole	⊖	*Underground Telephone Cable	T
Joint Use Pole	⊖	*Underground Telephone Conduit	TC
Utility Pole	•	*Underground Fiber Optics Telephone Cable	T FO
Utility Pole with Base	□	*Underground TV Cable	TV
H-Frame Pole	••	*Underground Fiber Optics TV Cable	TV FO
Power Transmission Line Tower	⊗	*Underground Gas Pipeline	G
Water Manhole	⊖	Aboveground Gas Pipeline	A/G Gas
Power Manhole	⊖	*Underground Water Line	W
Telephone Manhole	⊖	Aboveground Water Line	A/G Water
Sanitary Sewer Manhole	•	*Underground Gravity Sanitary Sewer Line	SS
Hand Hole for Cable	⊗	Aboveground Gravity Sanitary Sewer Line	A/G Sanitary Sewer
Power Transformer	⊗	*Underground SS Forced Main Line	FSS
Telephone Pedestal	TEL PED	Underground Unknown Utility Line	?UTL
CATV Pedestal	⊗	SUE Test Hole	•
Gas Valve	◇	Water Meter	⊖
Gas Meter	◇	Water Valve	•
Located Miscellaneous Utility Object	•	Fire Hydrant	⊖
Abandoned According to Utility Records	AATUR	Sanitary Sewer Cleanout	⊖
End of Information	E.O.I.		

*For Existing Utilities
 Utility Line Drawn from Record (Type as Shown) — ?UTL —
 Designated Utility Line (Type as Shown) - - - ?UTL - - -

DATE: 8/13/2021
 TIME: 1:23:40 PM
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UTILITY CONSTRUCTION

Prepared In the Office of:



AECOM TECHNICAL SERVICES OF NORTH CAROLINA, INC.
701 CORPORATE CENTER DRIVE, SUITE 475, RALEIGH, NC 27607
919-854-6200 919-854-6259 (fax)
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DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
R-5021	UC-3
DESIGNED BY:	
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	

UTILITY CONSTRUCTION

GENERAL NOTES

1. THE PROPOSED UTILITY CONSTRUCTION SHALL MEET THE APPLICABLE REQUIREMENTS OF THE NC DEPARTMENT OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANUARY 2018.
2. THE EXISTING WATER AND SEWER UTILITIES BELONG TO BRUNSWICK COUNTY, CITY OF SOUTHPORT AND SE BRUNSWICK SANITARY DISTRICT.
3. ALL WATER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF WATER RESOURCES, PUBLIC WATER SUPPLY SECTION. ALL SEWER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF WATER RESOURCES, WATER QUALITY SECTION. PERFORM ALL WORK IN ACCORDANCE WITH THE APPLICABLE PLUMBING CODES.
4. THE UTILITY OWNER OWNS THE EXISTING UTILITY FACILITIES AND WILL OWN THE NEW UTILITY FACILITIES AFTER ACCEPTANCE BY THE DEPARTMENT. THE DEPARTMENT OWNS THE CONSTRUCTION CONTRACT AND HAS ADMINISTRATIVE AUTHORITY. COMMUNICATIONS AND DECISIONS BETWEEN THE CONTRACTOR AND UTILITY OWNER ARE NOT BINDING UPON THE DEPARTMENT OR THIS CONTRACT UNLESS AUTHORIZED BY THE ENGINEER. AGREEMENTS BETWEEN THE UTILITY OWNER AND CONTRACTOR FOR THE WORK THAT IS NOT PART OF THIS CONTRACT OR IS SECONDARY TO THIS CONTRACT ARE ALLOWED, BUT ARE NOT BINDING UPON THE DEPARTMENT.
5. PROVIDE ACCESS FOR THE DEPARTMENT PERSONNEL AND THE OWNER'S REPRESENTATIVES TO ALL PHASES OF CONSTRUCTION. NOTIFY DEPARTMENT PERSONNEL AND THE UTILITY OWNER TWO WEEKS PRIOR TO COMMENCEMENT OF ANY WORK AND ONE WEEK PRIOR TO SERVICE INTERRUPTION. KEEP UTILITY OWNERS' REPRESENTATIVES INFORMED OF WORK PROGRESS AND PROVIDE OPPORTUNITY FOR INSPECTION OF CONSTRUCTION AND TESTING.
6. THE PLANS DEPICT THE BEST AVAILABLE INFORMATION FOR THE LOCATION, SIZE, AND TYPE OF MATERIAL FOR ALL EXISTING UTILITIES. MAKE INVESTIGATIONS FOR DETERMINING THE EXACT LOCATION, SIZE, AND TYPE MATERIAL OF THE EXISTING FACILITIES AS NECESSARY FOR THE CONSTRUCTION OF THE PROPOSED UTILITIES AND FOR AVOIDING DAMAGE TO EXISTING FACILITIES. REPAIR ANY DAMAGE INCURRED TO EXISTING FACILITIES TO THE ORIGINAL OR BETTER CONDITION AT NO ADDITIONAL COST TO THE DEPARTMENT.
7. MAKE FINAL CONNECTIONS OF THE NEW WORK TO THE EXISTING SYSTEM WHERE INDICATED ON THE PLANS, AS REQUIRED TO FIT THE ACTUAL CONDITIONS, OR AS DIRECTED.
8. MAKE CONNECTIONS BETWEEN EXISTING AND PROPOSED UTILITIES AT TIMES MOST CONVENIENT TO THE PUBLIC, WITHOUT ENDANGERING THE UTILITY SERVICE, AND IN ACCORDANCE WITH THE UTILITY OWNER'S REQUIREMENTS. MAKE CONNECTIONS ON WEEKENDS, AT NIGHT, AND ON HOLIDAYS IF NECESSARY.
9. ALL UTILITY MATERIALS SHALL BE APPROVED PRIOR TO DELIVERY TO THE PROJECT. SEE 1500-7, " SUBMITTALS AND RECORDS" IN SECTION 1500 OF THE STANDARD SPECIFICATIONS.

PROJECT SPECIFIC NOTES:

1. ALL HDPE PIPE INSTALLED BY HORIZONTAL DIRECTIONAL DRILLING SHALL NOT BE CONNECTED TO ANY OTHER PIPE OR FITTINGS FOR A PERIOD OF AT LEAST SEVEN (7) DAYS FROM THE TIME OF INSTALLATION TO ALLOW THE TENSIONAL STRESSES TO RELAX, IN ACCORDANCE WITH NC DOT REQUIREMENTS. LONGER PERIODS MAY BE REQUIRED DEPENDENT UPON PROJECT CONDITIONS. SEE DETAIL FOR RESTRAINING METHOD.
2. THE WATER MAINS AND FORCE MAINS SHALL BE INSTALLED 10 FEET FROM THE EDGE OF CONCRETE ELECTRICAL POWER TRANSMISSION POLES.
3. FOR ALL HOT BOXES TO BE RELOCATED, THE CONTRACTOR SHALL RELOCATE ALL PIPING, VALVES, ENCLOSURE AND ALL ELSE REQUIRED FOR A FULLY FUNCTIONAL BACKFLOW ASSEMBLY. THE RELOCATED BACKFLOW PREVENTION DEVICES SHALL BE INSPECTED BY A LICENSED BACKFLOW DEVICE TESTER. THE CONTRACTOR SHALL DEMOLISH THE EXISTING CONCRETE SLAB (IF EXISTING) AROUND THE PIPING AND INSTALL A NEW CONCRETE SLAB AROUND THE RELOCATED PIPING. THE NEW SLAB SHALL BE OF EQUAL DIMENSIONS AND THICKNESS AS THE EXISTING SLAB. THE SLAB SHALL BE OF 2,500 PSI CONCRETE.
4. THE NEW FIRE HYDRANTS SHALL BE INSTALLED FULLY WITHIN THE NEW NCDOT RIGHT-OF-WAY OR PUE. THE DRAWINGS MAY SHOW THE HYDRANTS OUTSIDE THE PUE ONLY FOR CLARITY.
5. MAJOR SHUT-DOWNS AND CONNECTIONS FOR THE SEWER FORCE MAIN, RECLAIMED WATER MAIN AND POTABLE WATER MAIN WILL NOT BE ALLOWED DURING THE PEAK USAGE PERIOD FROM MEMORIAL DAY THROUGH LABOR DAY. THE CONTRACTOR SHALL MAKE CONNECTIONS BETWEEN THE PROPOSED FORCE MAIN AND EXISTING FORCE MAIN AT NIGHT ON A WEEKEND. PRIOR TO MAKING THE CONNECTION, THE CONTRACTOR SHALL PROVIDE AND HAVE ON SITE AT THE RIVER MIST LIFT STATION A TANKER TRUCK INTO WHICH RAW SEWAGE SHALL BE PUMPED INTO BY WAY OF THE EXISTING PUMPS AND 6" EMERGENCY PUMP CONNECTION. ONCE THE FORCE MAIN CONNECTION HAS BEEN MADE AND THE FORCE MAIN OPERATIONAL, THE CONTRACTOR SHALL RETURN THE STORED SEWAGE IN THE TANKER TRUCK TO THE PUMP STATION WET WELL. PAYMENT FOR THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE " FORCE MAIN PAY ITEM. NO ADDITIONAL MEASUREMENT OR PAYMENT WILL BE MADE.
6. FOR CUTTING OF EXISTING ASBESTOS CEMENT (AC) PIPE, THE CONTRACTOR SHALL FOLLOW THE PROCEDURES OUTLINED IN THE OCCUPATIONAL HEALTH AND SAFETY REGULATIONS AND SAFE WORK PRACTICES FOR HANDLING ASBESTOS. ANY REMOVED ASBESTOS PIPES SHALL BE PROPERLY DISPOSED AT AN APPROVED LANDFILL.

WATER METER RELOCATION NOTES

1. THE NEW WATER SERVICE TAP, PIPE AND YOKEBOXES SHALL BE INSTALLED, TESTED AND DISINFECTED PRIOR TO SHUTTING OFF THE WATER TO THE EXISTING USER. WHEN THE NEW SERVICE IS READY FOR USE, THE CONTRACTOR SHALL THEN RELOCATE THE EXISTING METER.
2. THE CONTRACTOR IS RESPONSIBLE FOR MAKING THE CONNECTION FROM THE RELOCATED METER TO THE EXISTING SERVICE MAIN ON THE CUSTOMER'S SIDE OF THE METER, INCLUDING THE COST OF A LICENSED PLUMBER, IF REQUIRED.
3. THE NEW OR RELOCATED METER BOXES SHALL BE LOCATED OUTSIDE BUT AT THE RIGHT-OF-WAY LINE IN ACCORDANCE WITH THE METER INSTALLATION DETAILS.

PROJECT SPECIFIC NOTES (CONT.):

① CONSTRUCTION SEQUENCE FOR NEW 18-INCH RAW WATER MAIN

1. CLEAR THE ROUTE OF THE PROPOSED RAW WATER MAIN.
2. INSTALL THE WATER MAIN FOR THE FULL LENGTH, BUT DO NOT MAKE CONNECTIONS.
3. MAKE CONNECTIONS TO EXISTING 10-INCH MAIN FROM WELL NO.15 AS SHOWN ON PLAN SHEET NO. UC-11. CLOSE EXISTING 10" VALVE NO. EV#2 AND NEW 18" BUTTERFLY VALVE RWV#1. KEEP EXISTING 24" RAW WATER MAIN IN SERVICE.
4. USE WATER FROM WELL NO. 15 TO FILL, TEST AND DISINFECT THE NEW 18" RAW WATER MAIN. OPEN NEW 10" VALVE NO. RWV#2 AS SHOWN ON PLAN SHEET UC-11. DISINFECT THE NEW RAW WATER MAIN IN ACCORDANCE WITH SPECIFICATION SECTION TS 18.01-WATER DISTRIBUTION SYSTEM.
5. MAKE CONNECTION TO EXISTING 18" RAW WATER MAIN AS SHOWN ON PLAN SHEET UC-11. CLOSE EXISTING VALVES NO. EV#1 AND EV#2. OPEN THE NEW 18" BUTTERFLY VALVE RWV#1. DURING THIS PERIOD, THE COUNTY SHALL USE THE WELLS NORTH OF THE TREATMENT PLANT.
6. ON PLAN SHEET UC-17, INSTALL NEW 18" VALVE RWV#3 AND NEW 24" VALVE RWV#4 INCLUDING 24" X 24" TEE AND BLOCKING. CLOSE VALVES RWV#3 AND RWV#4.
7. MAKE CONNECTION OF NEW RAW WATER MAIN AND EXISTING 24" RAW WATER MAIN AS SHOWN ON PLAN SHEET UC-17 AND DETAIL A. DURING THIS PERIOD, THE COUNTY SHALL SHUT DOWN THE WELLS TO THE WEST AND TO THE NORTH. CLOSE EXISTING VALVES EV#5 AND EV#6. INSTALL THE CUT-IN 24" X 90 ELL AND BLOCKING. MAKE CONNECTION TO THE NEW 18" RAW WATER MAIN. OPEN 18" VALVE RWV#3. THE COUNTY CAN THEN RESTART THE WELLS FROM THE WEST AND PLACE THE NEW 18" RAW WATER MAIN IN SERVICE. PLEASE NOTE THAT NEITHER WELL FIELD SHALL BE TAKEN OUT OF SERVICE DURING THE PEAK SUMMER SEASON. THE COUNTY SHALL APPROVE THE SCHEDULE FOR TAKING EITHER WELL FIELD OUT OF SERVICE.
8. MAKE THE CONNECTION FROM THE EXISTING 24" RAW WATER MAIN TO THE NEW 24" VALVE RWV#4 AS SHOWN ON PLAN SHEET UC-17. MAKE THE CONNECTION FROM THE EXISTING 8" RAW WATER MAIN TO THE EXISTING 24" RAW WATER MAIN AS SHOWN ON PLAN SHEET UC-17 AND IN DETAIL D ON PLAN SHEET UC-18. AT THIS POINT, THE COUNTY CAN RESTART USING THE WELLS FROM THE NORTH.
9. THE ABANDONED 24" RAW WATER MAIN SHALL BE COMPLETELY DRAINED. THE CONTRACTOR SHALL CUT THE PIPE AT LOW POINTS SO THAT THE WATER WILL SLOWLY DRAIN FROM THE PIPE. CHECK DAMS AND OTHER EROSION AND SEDIMENT CONTROL DEVICES SHALL BE INSTALLED TO PREVENT EROSION AND SEDIMENT FROM ENTERING THE STREAMS AND DITCHES.
10. ALL OPENINGS TO THE EXISTING RAW WATER MAIN SHALL BE GROUTED CLOSED.
11. COORDINATE CONNECTION DATE & TIME WITH BRUNSWICK COUNTY PUBLIC UTILITIES AND THE ENGINEER. IT IS EXPECTED THAT NIGHT WORK WILL BE REQUIRED. CONNECTIONS MAY NOT BE MADE DURING THE MONTHS OF JUNE, JULY, OR AUGUST UNLESS SPECIFICALLY AGREED TO BY THE ENGINEER. CONTRACTOR SHALL NOT BE ENTITLED TO ANY ADDITIONAL COMPENSATION (TIME OR MONIES) FOR DELAY DURING THESE MONTHS.

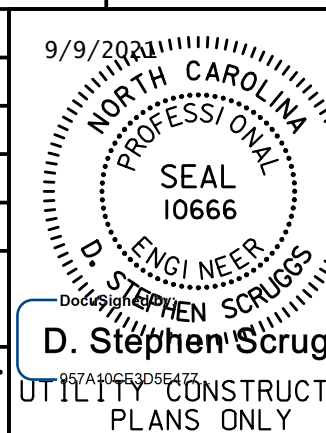
② CONSTRUCTION SEQUENCE FOR ABANDONING 8-INCH ABESTOS CEMENT (AC) WATER MAIN

1. SEE PLAN SHEETS UC-25 THROUGH UC-28.
2. INSTALL THE PROPOSED 8-INCH PVC WATER MAIN FOR THE FULL LENGTH, AND MAKE CONNECTIONS AS SHOWN ON PLAN SHEETS UC-25 AND UC-26. TEST, CHLORINATE, SAMPLE AND FLUSH NEW 8-INCH WATER MAIN. PLACE INTO SERVICE AFTER SATISFACTORY BACTERIOLOGICAL TEST HAVE BEEN RECEIVED FROM AN APPROVED LABORATORY.
3. TRANSFER EXISTING WATER SERVICES FROM EXISTING 8-INCH AC TO EITHER THE NEW 8-INCH PVC OR EXISTING 24-INCH DUCTILE IRON WATER MAIN, AS SHOWN ON THE CONTRACT DRAWINGS.
4. ABANDON IN PLACE THE EXISTING 8-INCH AC WATER MAIN AND FILL ENTIRE LENGTH WITH FLOWABLE FILL.
5. THE ABANDONED 8-INCH AC POTABLE WATER MAIN SHALL BE COMPLETELY DRAINED. THE CONTRACTOR SHALL CUT THE PIPE AT LOW POINTS SO THAT THE WATER WILL SLOWLY DRAIN FROM THE PIPE. CHECK DAMS AND OTHER SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE INSTALLED TO PREVENT EROSION AND SEDIMENT FROM ENTERING THE STREAMS AND DITCHES.

④ CONSTRUCTION SEQUENCE FOR NEW 24-INCH POTABLE WATER MAIN

1. CLEAR AND GRUB THE ROUTE OF THE PROPOSED 24-INCH POTABLE WATER MAIN.
2. INSTALL THE PROPOSED WATER MAIN FOR THE FULL LENGTH, BUT DO NOT MAKE CONNECTIONS.
3. POTABLE WATER FROM THE EXISTING 24-INCH POTABLE WATER MAIN SHALL BE USED TO FILL, TEST AND CHLORINATE THE NEW 24-INCH POTABLE WATER MAIN. TEMPORARY TAPS OR FIRE HYDRANT CONNECTIONS EQUIPPED WITH DOUBLE CHECK VALVE ASSEMBLIES SHALL BE USED TO SUPPLY AND FILL THE NEW MAIN. IT WILL NOT BE NECESSARY TO DRAIN THE PIPE ONCE TESTING AND CHLORINATION HAS BEEN COMPLETED.
4. ONCE THE WATER MAIN HAS BEEN TESTED AND THE BACTERIOLOGICAL TEST RESULTS ARE APPROVED BY THE ENGINEER AND OWNER, THE CONTRACTOR SHALL FLUSH THE NEW MAIN UNTIL THE CHLORINE CONCENTRATIONS ARE BELOW 4 PPM. IMMEDIATELY AFTER FLUSHING, THE CONTRACTOR SHALL MAKE THE CONNECTION BETWEEN THE NEW AND EXISTING 24-INCH MAINS AS SHOWN ON PLAN SHEET UC-17. THIS WILL ALLOW FOR BOTH MAINS TO BE IN SERVICE AT THE SAME TIME AND TO ALLOW TIME FOR MAKING CONNECTIONS TO THE BRANCH MAINS AND WATER SERVICES. ONCE ALL OF THE BRANCH MAINS AND WATER SERVICES HAVE BEEN MADE, THEN THE EXISTING 24-INCH DUCTILE IRON MAIN SHALL BE TAKEN OUT OF SERVICE AND THE FINAL CONNECTION BETWEEN THE NEW AND EXISTING 24-INCH MAINS AS SHOWN ON PLAN SHEET UC-23 SHALL BE MADE.
5. THE ABANDONED 24-INCH POTABLE WATER MAIN SHALL BE COMPLETELY DRAINED. THE CONTRACTOR SHALL CUT THE PIPE AT LOW POINTS THAT THE WATER WILL SLOWLY DRAIN FROM THE PIPE. CHECK DAMS AND OTHER SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE INSTALLED TO PREVENT EROSION AND SEDIMENT FROM ENTERING THE STREAMS AND DITCHES. ONCE DRAINED, THE 24" DI MAIN SHALL BE ABANDONED IN PLACE AND FILLED WITH FLOWABLE FILL.
6. COORDINATE CONNECTION DATE & TIME WITH BRUNSWICK COUNTY PUBLIC UTILITIES AND THE ENGINEER. IT IS EXPECTED THAT CONNECTIONS MAY NOT BE MADE DURING THE MONTHS OF JUNE, JULY, OR AUGUST UNLESS SPECIFICALLY AGREED TO BY BRUNSWICK COUNTY. CONTRACTOR SHALL NOT BE ENTITLED TO ANY ADDITIONAL COMPENSATION (TIME OR MONIES) FOR DELAY DURING THESE MONTHS. NIGHT WORK WILL BE REQUIRED.

DESIGNED BY:	9/9/2011
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	



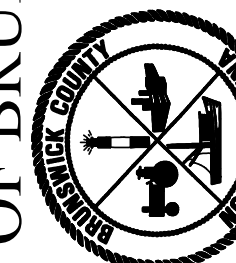
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UTILITY CONSTRUCTION

Revisions

1.1 - DATED 4/30/2013
1.2 - DATED 5/29/2013
1.3 - DATED 7/15/2015
1.4 - DATED 12/8/2016
1.5 - DATED 2/6/2020
1.6 - DATED 3/27/2020
Mod Detail W-1 & W-2
1.7 - DATED 4/22/2020
Mod Detail W-4

COUNTY OF BRUNSWICK

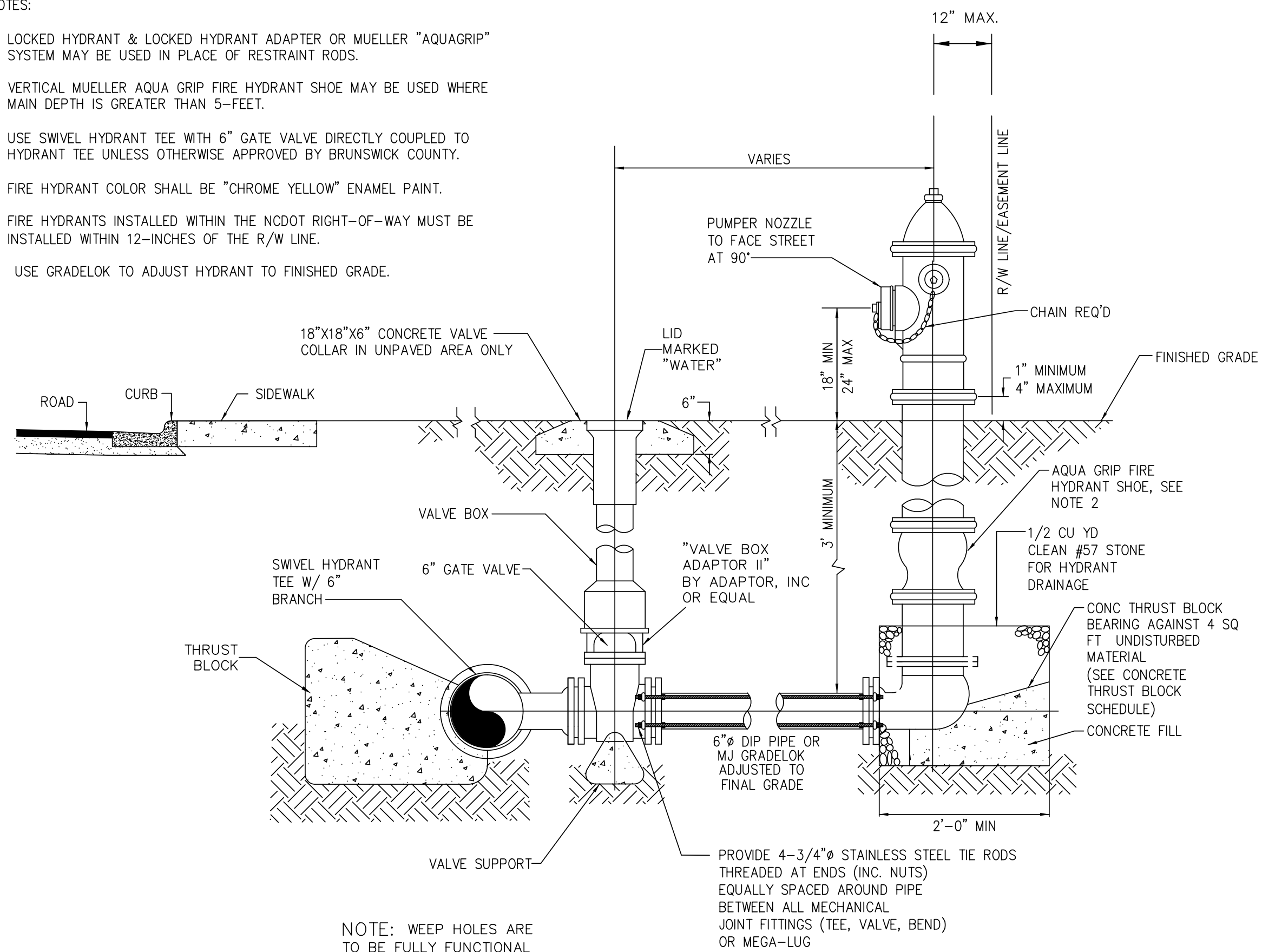


GENERAL WATER DETAILS FOR
BRUNSWICK COUNTY
NORTH CAROLINA

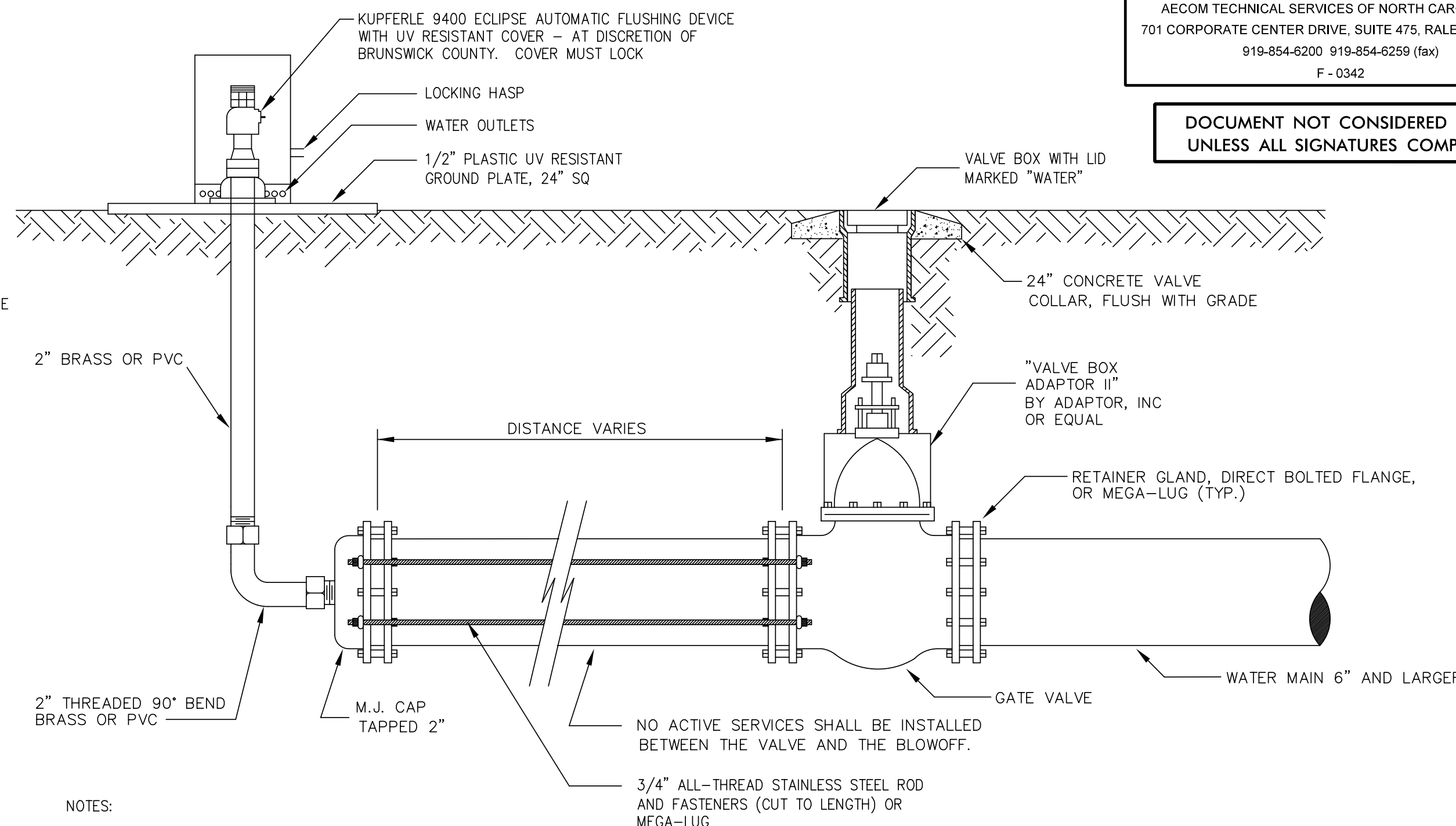
Date: 05-22-12
Scale: NTS
Drawn By: JDM
Checked By: WLP

NOTES:

1. LOCKED HYDRANT & LOCKED HYDRANT ADAPTER OR MUELLER "AQUAGRIP" SYSTEM MAY BE USED IN PLACE OF RESTRAINT RODS.
2. VERTICAL MUELLER AQUA GRIP FIRE HYDRANT SHOE MAY BE USED WHERE MAIN DEPTH IS GREATER THAN 5- FEET.
3. USE SWIVEL HYDRANT TEE WITH 6" GATE VALVE DIRECTLY COUPLED TO HYDRANT TEE UNLESS OTHERWISE APPROVED BY BRUNSWICK COUNTY.
4. FIRE HYDRANT COLOR SHALL BE "CHROME YELLOW" ENAMEL PAINT.
5. FIRE HYDRANTS INSTALLED WITHIN THE NCDOT RIGHT-OF-WAY MUST BE INSTALLED WITHIN 12-INCHES OF THE R/W LINE.
6. USE GRADELOK TO ADJUST HYDRANT TO FINISHED GRADE.



**FIRE HYDRANT ON MAINS 12" AND SMALLER
DETAIL W-1**



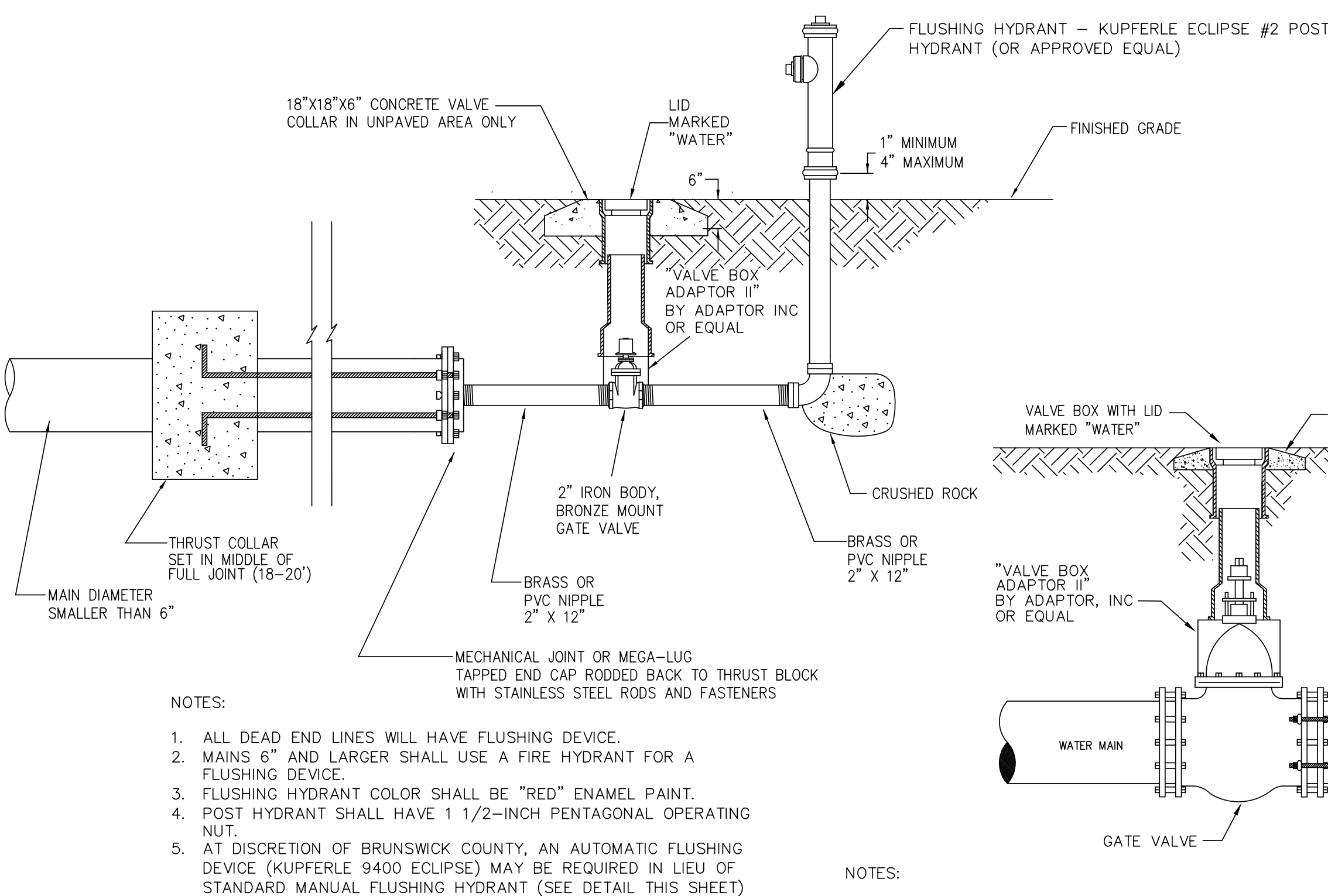
**AUTOMATIC FLUSHING DEVICE FOR MAINS 6" AND LARGER (FOR MAINS TO BE EXTENDED LATER)
DETAIL W-2**

NOTES:

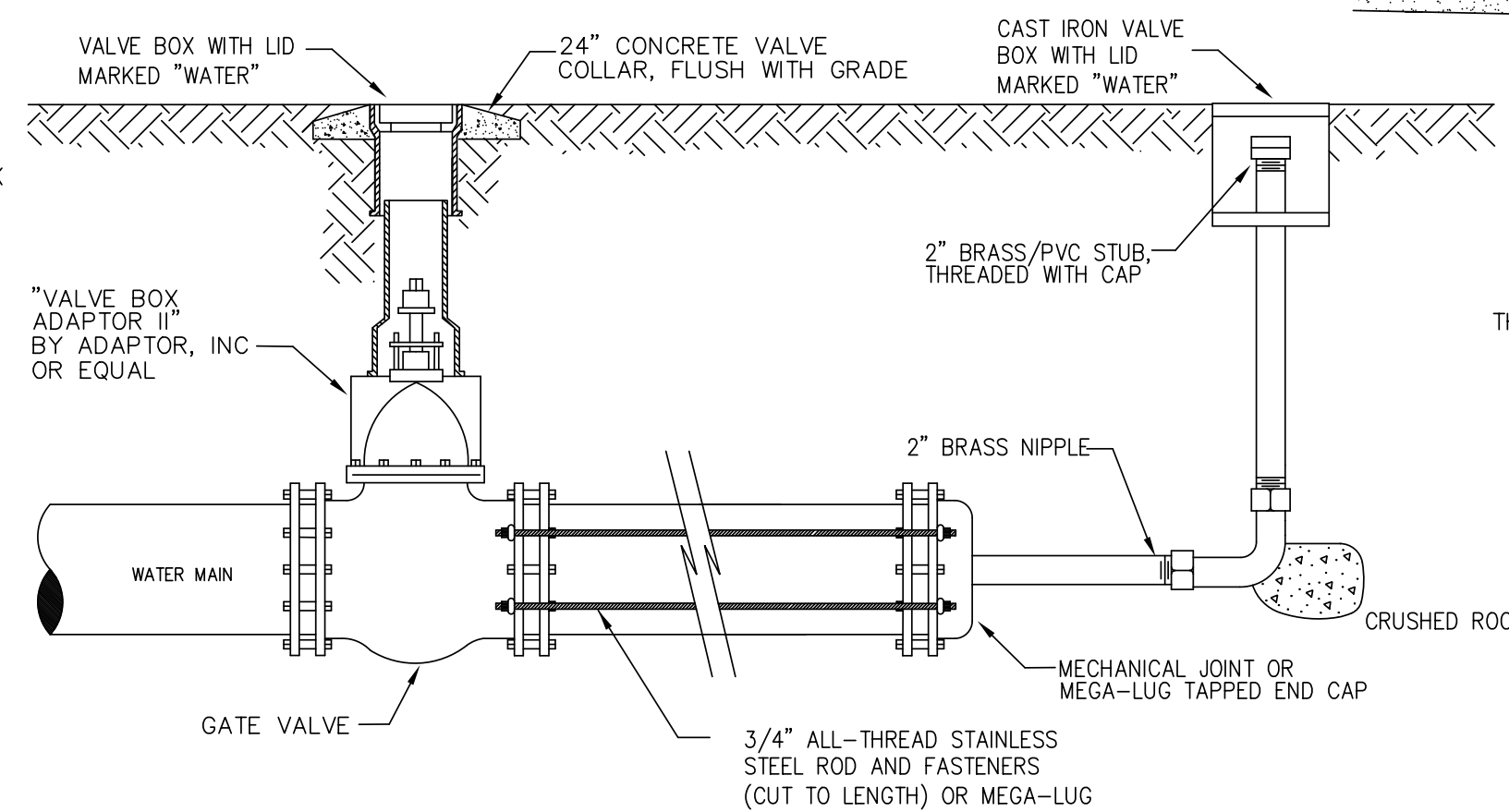
1. ALL DEAD END LINES WILL HAVE FLUSHING DEVICES.
2. MAINS 6" AND GREATER NOT BEING EXTENDED IN THE FUTURE SHALL USE A FIRE HYDRANT FOR A FLUSHING DEVICE.
3. CONTRACTOR SHALL REMOVE AUTOMATIC FLUSHING DEVICE FOR MAIN EXTENSIONS AND DELIVER AUTOMATIC FLUSHING DEVICE TO BRUNSWICK COUNTY REPRESENTATIVE.

NOTES:

1. LOCKED HYDRANT & LOCKED HYDRANT ADAPTER OR MUELLER "AQUAGRIP" SYSTEM MAY BE USED IN PLACE OF RESTRAINT RODS.
2. VERTICAL MUELLER AQUA GRIP FIRE HYDRANT SHOE MAY BE USED WHERE MAIN DEPTH IS GREATER THAN 5- FEET.
3. USE SWIVEL HYDRANT TEE WITH 6" GATE VALVE DIRECTLY COUPLED TO HYDRANT TEE UNLESS OTHERWISE APPROVED BY BRUNSWICK COUNTY.
4. FIRE HYDRANT COLOR SHALL BE "CHROME YELLOW" ENAMEL PAINT.
5. FIRE HYDRANTS INSTALLED WITHIN THE NCDOT RIGHT-OF-WAY MUST BE INSTALLED WITHIN 12-INCHES OF THE R/W LINE.
6. USE GRADELOK TO ADJUST HYDRANT TO FINISHED GRADE.



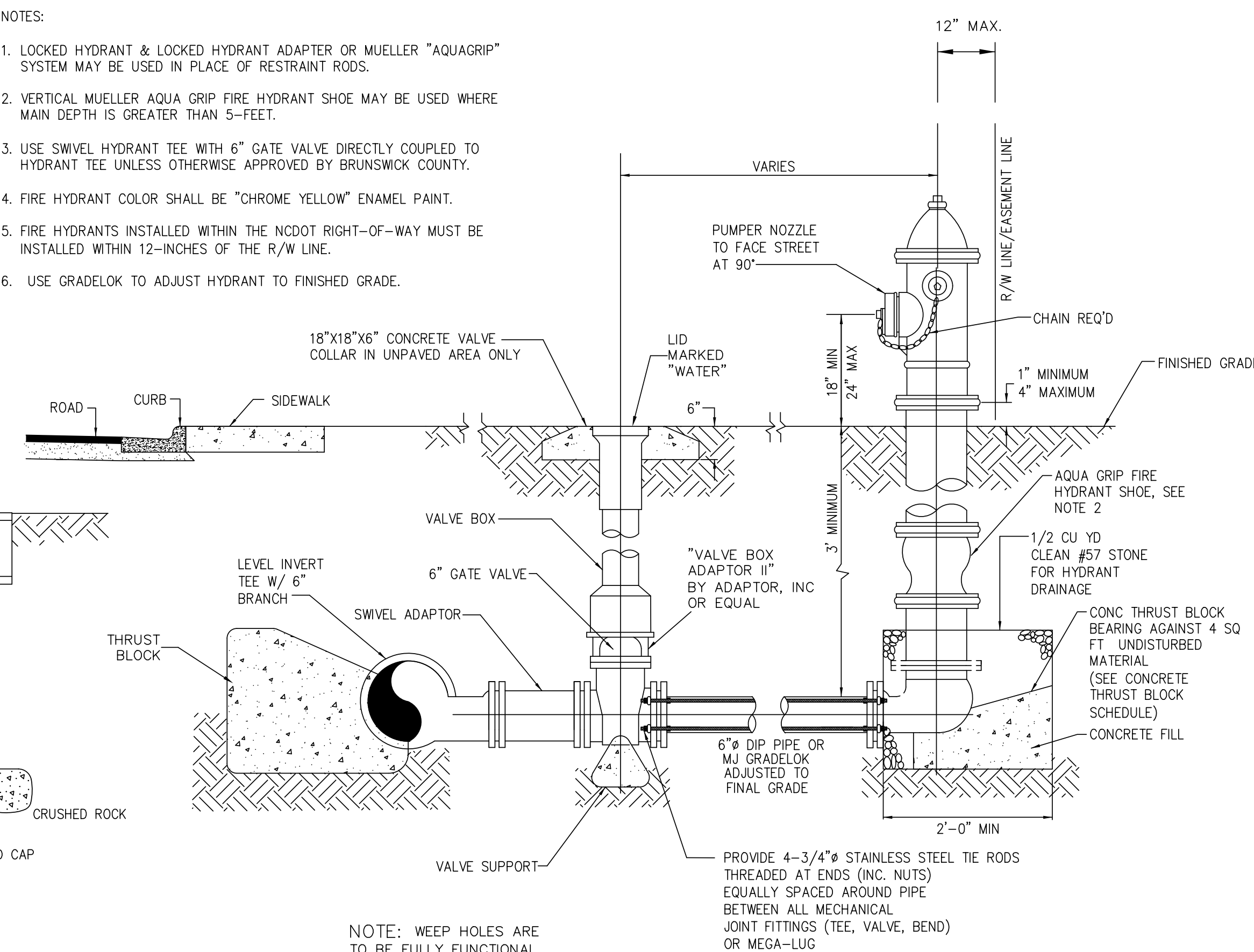
**STANDARD FLUSHING DEVICE FOR WATER MAINS
DETAIL W-3**



**OLD STYLE TEMPORARY BLOW-OFF ASSEMBLY
DETAIL W-4A**

NOTES:

1. TO BE USED WHEN FUTURE EXTENSION OF WATER MAIN IS KNOWN (i.e. PHASES)
2. FULL SIZE BOUNDARY VALVE REQUIRED.
3. THIS CAN ONLY BE USED WITH BRUNSWICK COUNTY ENGINEERING APPROVAL.

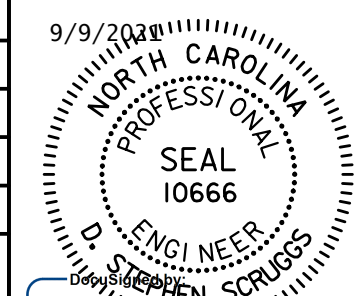


**FIRE HYDRANT ON MAINS LARGER THAN 12"
DETAIL W-4**

NOTE: WEEP HOLES ARE TO BE FULLY FUNCTIONAL

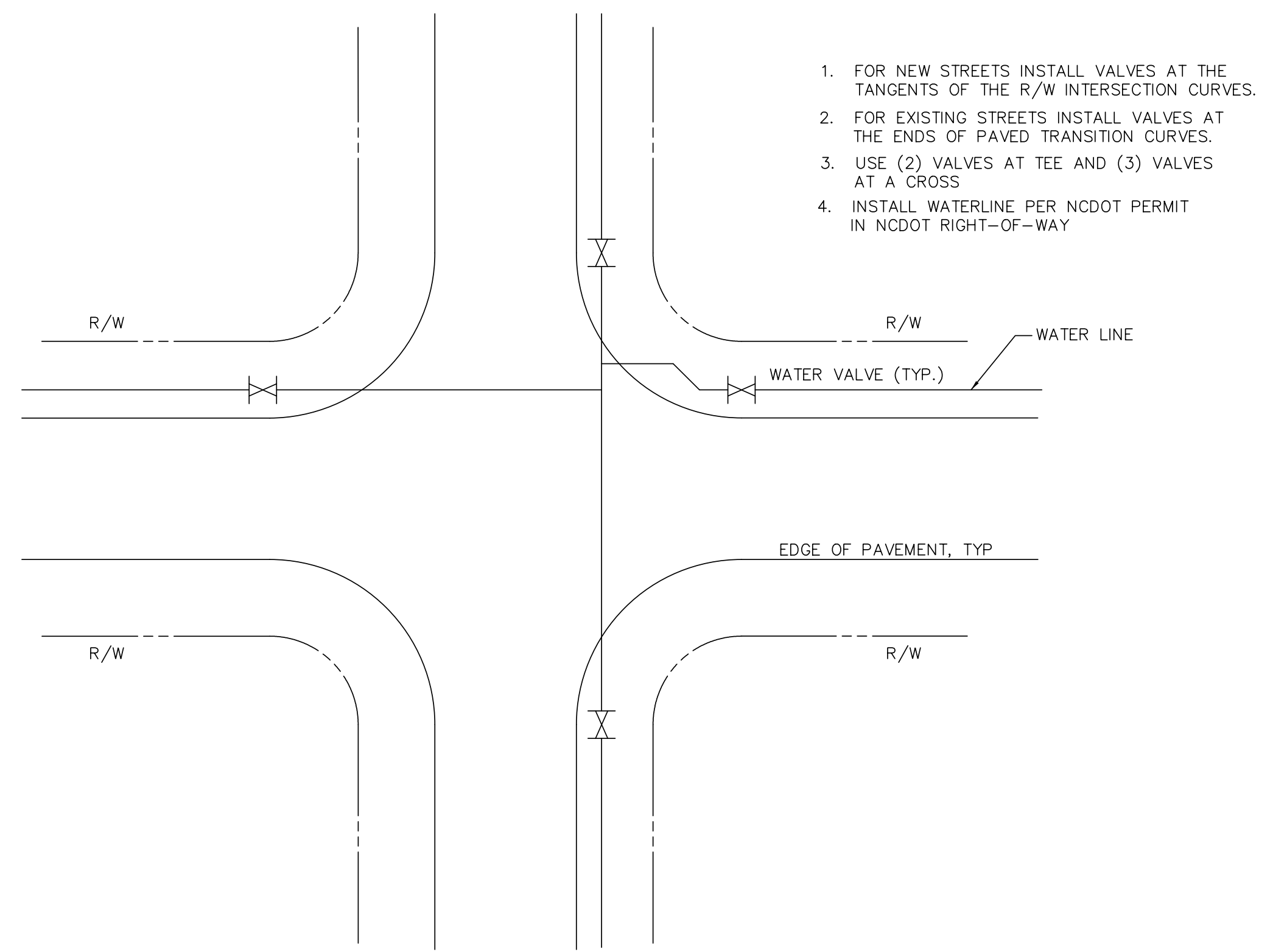
Prepared In the Office of:
AECOM
 AECOM TECHNICAL SERVICES OF NORTH CAROLINA, INC.
 701 CORPORATE CENTER DRIVE, SUITE 475, RALEIGH, NC 27607
 919-854-6200 919-854-6259 (fax)
 F - 0342

PROJECT REFERENCE NO.	SHEET NO.
R-5021	UC-3B
DESIGNED BY:	9/9/2018
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	



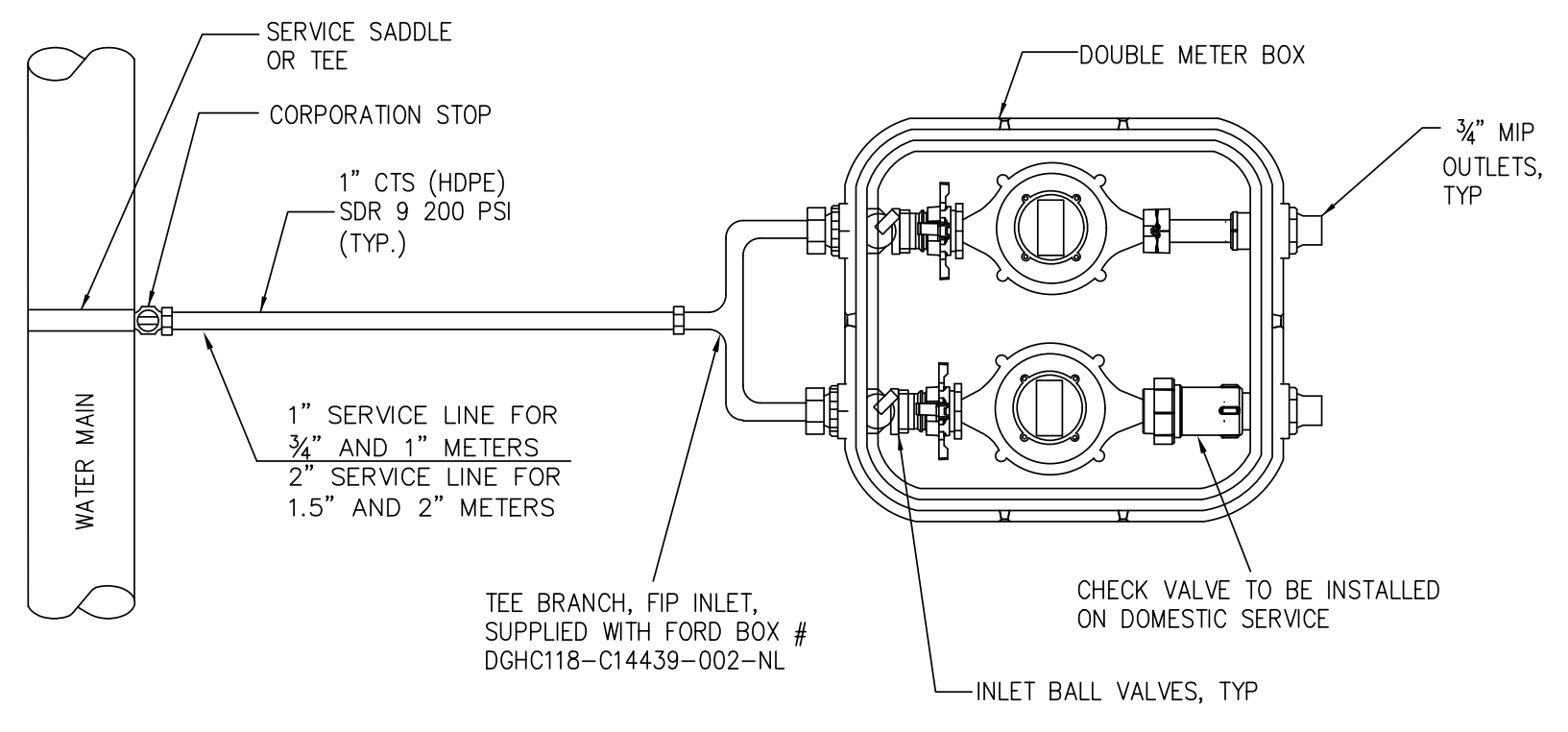
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UTILITY CONSTRUCTION



**INTERSECTION VALVE LOCATIONS
 DETAIL W-5**

1. FOR NEW STREETS INSTALL VALVES AT THE TANGENTS OF THE R/W INTERSECTION CURVES.
2. FOR EXISTING STREETS INSTALL VALVES AT THE ENDS OF PAVED TRANSITION CURVES.
3. USE (2) VALVES AT TEE AND (3) VALVES AT A CROSS
4. INSTALL WATERLINE PER NCDOT PERMIT IN NCDOT RIGHT-OF-WAY

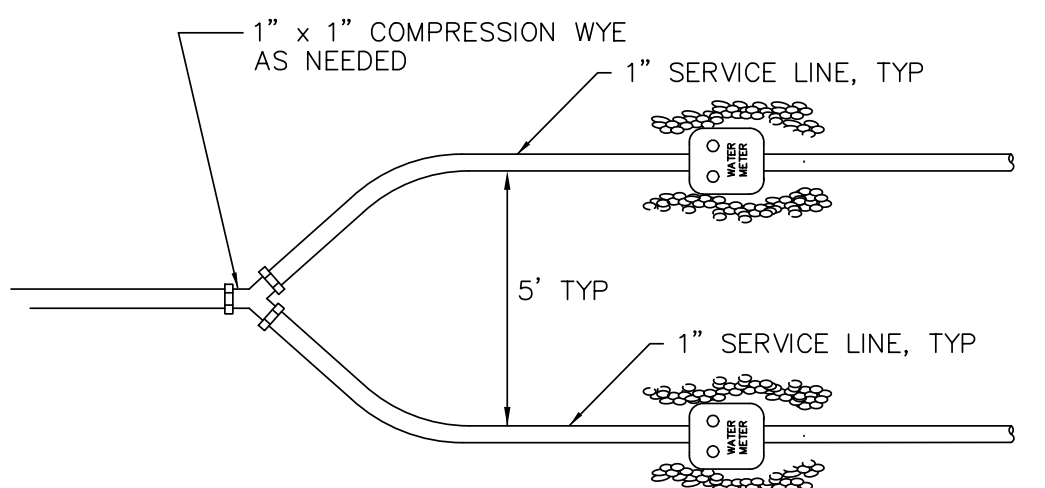


**PLAN VIEW FOR WATER/IRRIGATION SPLIT SERVICE
 (WATER/IRRIGATION SERVICES INSTALLED CONCURRENTLY)**

- NOTES:
1. CONNECTION BETWEEN 1" CTS SERVICE LINE AND YOKE BOX TO BE MADE USING A 1" BRASS UNION.
 2. ALL WATER SERVICE LATERALS SHALL HAVE A TRACER WIRE INSTALLED PER BRUNSWICK COUNTY WATER DISTRIBUTION TECHNICAL SPECIFICATIONS.

ACCEPTABLE DOUBLE METER BOXES	
FORD	DGHC118-C14439-002-NL
MCDONALD	773N208BCGP 434TCX001

- * OR APPROVED EQUAL
1. OR APPROVED EQUAL - MUST ACCOMMODATE TWO (2) SENSUS WATER METERS WITH AMR/AMI
 2. LID TO BE LOCKING TYPE
 3. DOUBLE METER BOX IS FOR (2) 3/4" METERS ONLY



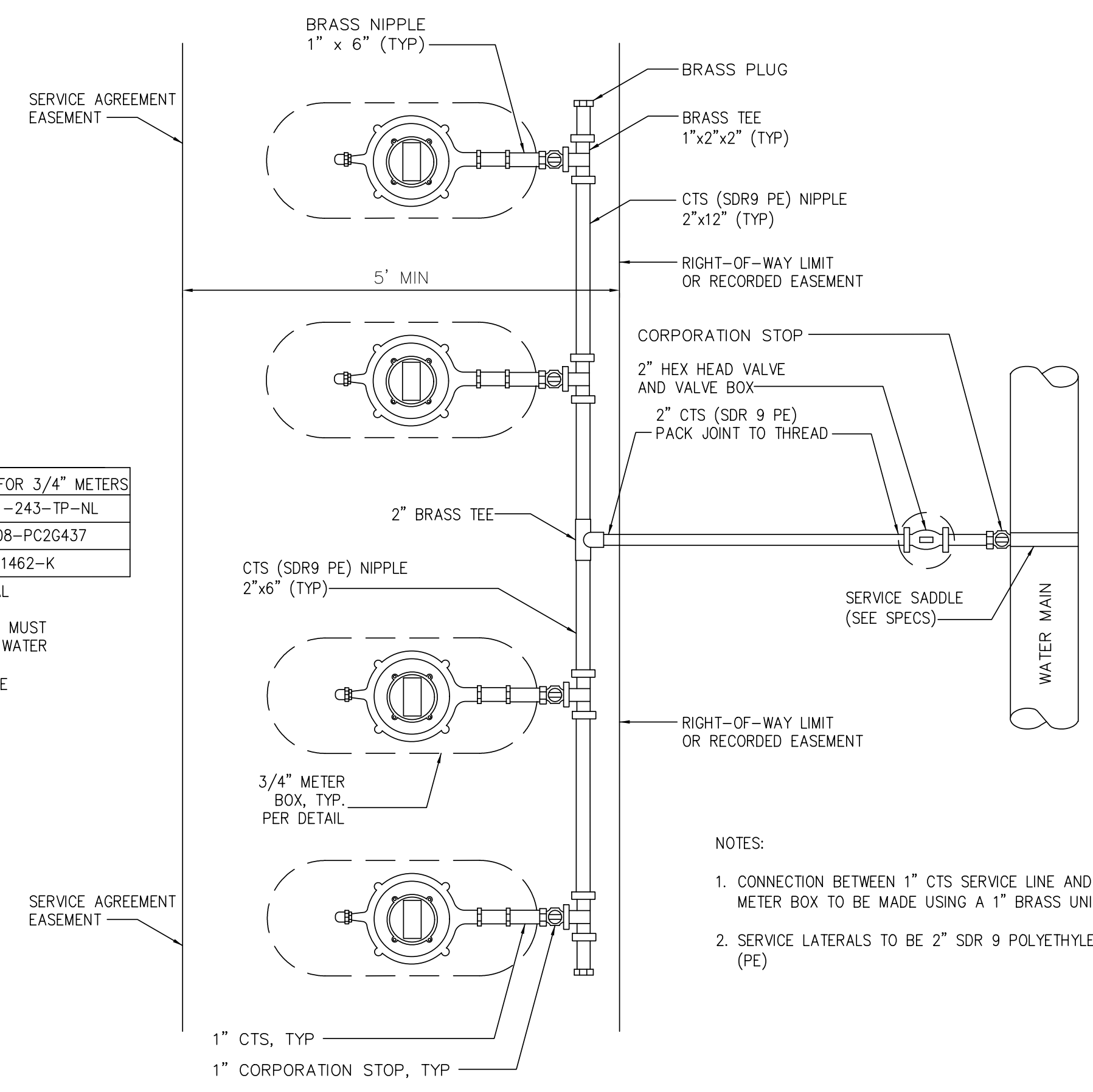
**WYE PLAN VIEW FOR WATER/IRRIGATION SPLIT SERVICE
 (IRRIGATION SERVICE INSTALLED AFTER MAIN METER)**

APPROVED SINGLE METER BOXES FOR 3/4" METERS	
FORD	LYLV-141-243-TP-NL
MCDONALD	776-208-PC2G437
MUELLER	H-1462-K

- * OR APPROVED EQUAL
1. OR APPROVED EQUAL - MUST ACCOMMODATE SENSUS WATER METER WITH AMR/AMI
 2. LID TO BE LOCKING TYPE

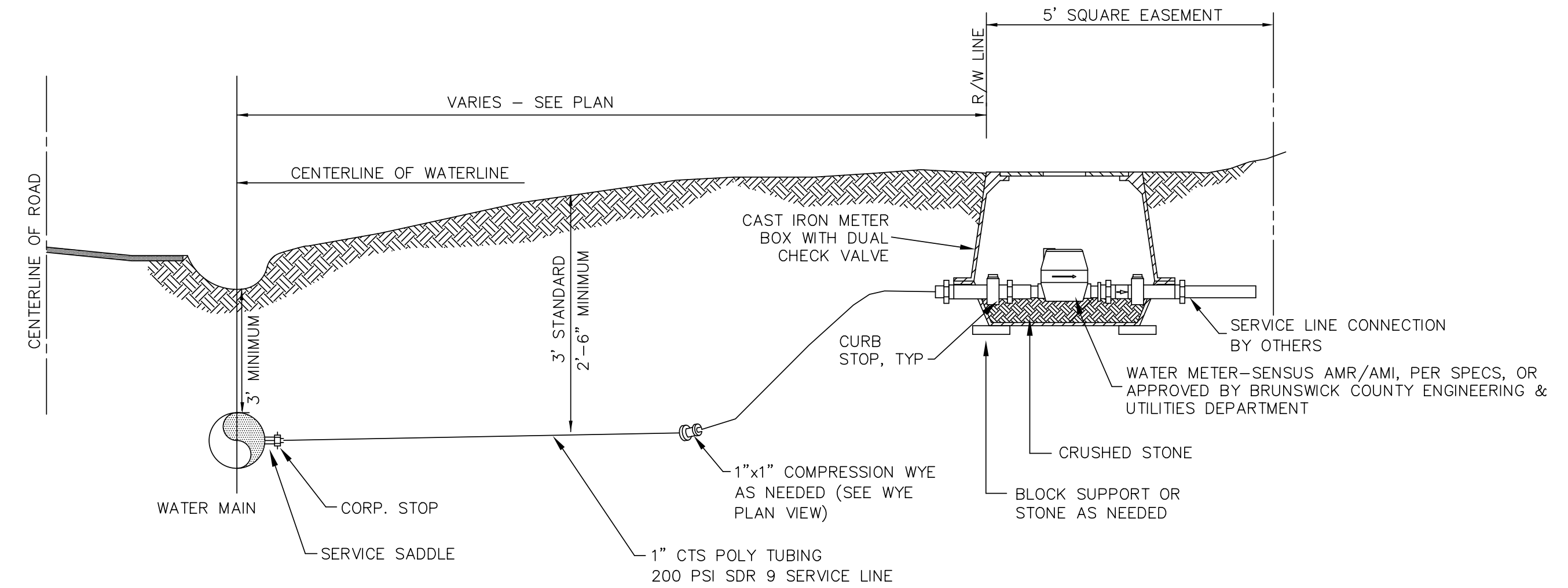
APPROVED SINGLE METER BOXES FOR 3/4" METERS	
FORD	LYLV-141-243-TP-NL
MCDONALD	776-208-PC2G437
MUELLER	H-1462-K

- * OR APPROVED EQUAL
1. OR APPROVED EQUAL - MUST ACCOMMODATE SENSUS WATER METER WITH AMR/AMI
 2. LID TO BE LOCKING TYPE



**STANDARD GANG METER ASSEMBLY
 DETAIL W-6**

- NOTES:
1. CONNECTION BETWEEN 1" CTS SERVICE LINE AND METER BOX TO BE MADE USING A 1" BRASS UNION.
 2. SERVICE LATERALS TO BE 2" SDR 9 POLYETHYLENE (PE)



**3/4" - 2" STANDARD WATER TAP
 INSTALLATION
 DETAIL W-7**

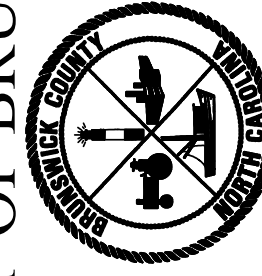
- NOTE:
- 1) CONTRACTOR SHALL PLACE METER BOX IN NON-TRAFFIC AREA AT LOCATION SPECIFIED BY BRUNSWICK COUNTY ENGINEERING DEPARTMENT.
 - 2) METER BOXES SHALL BE CAST IRON WITH DUAL CHECK VALVES.
 - 3) 1-1/2" AND 2" METERS WILL REQUIRE 2" CTS POLY TUBING.
 - 4) 1, 1-1/2" AND 2" METERS WILL REQUIRE A METER BOX SIZED ADEQUATELY TO HOUSE A 1, 1-1/2" OR 2" SENSUS METER, HORIZONTAL BYPASS SETTER, AND MXU. ALL REQUIRED ITEMS TO BE PROVIDED BY INSTALLER.
 - 5) 1, 1-1/2" AND 2" METER BOXES SHALL BE MARKED WATER AND HAVE A HOLE FOR INSTALLATION OF THE MXU AND TOUCH PAD TO BE PROVIDED BY INSTALLER.
 - 6) NO PLASTIC BOXES FOR 1 1/2" AND 2" METERS. BOX MUST BE DUCTILE IRON OR QUAZITE.
 - 7) ALL WATER SERVICE LATERALS SHALL HAVE A TRACER WIRE INSTALLED PER BRUNSWICK COUNTY WATER DISTRIBUTION TECHNICAL SPECIFICATIONS.

(FOR METERS LARGER THAN 2", REFER TO DETAIL ON PAGE 3 OF 5)

Revisions

- 1.1 - DATED 3/7/2013
- Modified double meter box
- 1.2 - DATED 4/5/2013
- Corrected meter box #'s
- 1.3 - DATED 7/15/2015
- Updated meter box #'s
- 1.4 - DATED 10/27/2015
- Modified W-7
- 1.5 - DATED 12/8/2016
- Revise Detail Numbers
- 1.6 - DATED 3/6/2017
- Revise Detail W-6
- 1.7 - DATED 3/22/2017
- Revise Detail W-6
- 1.8 - DATED 10/29/2018
- Updated acceptable double meter boxes

COUNTY OF BRUNSWICK



GENERAL WATER DETAILS
 FOR
BRUNSWICK COUNTY
 NORTH CAROLINA

Date: 05-23-12
 Scale: NTS
 Drawn By: JDM
 Checked By: WLP

DATE: 8/13/2018
 TIME: 10:34:56 PM
 DGN: P:\6048203\900_Work\916\Utility_Construction\W-5021_UC_UC3B.dgn

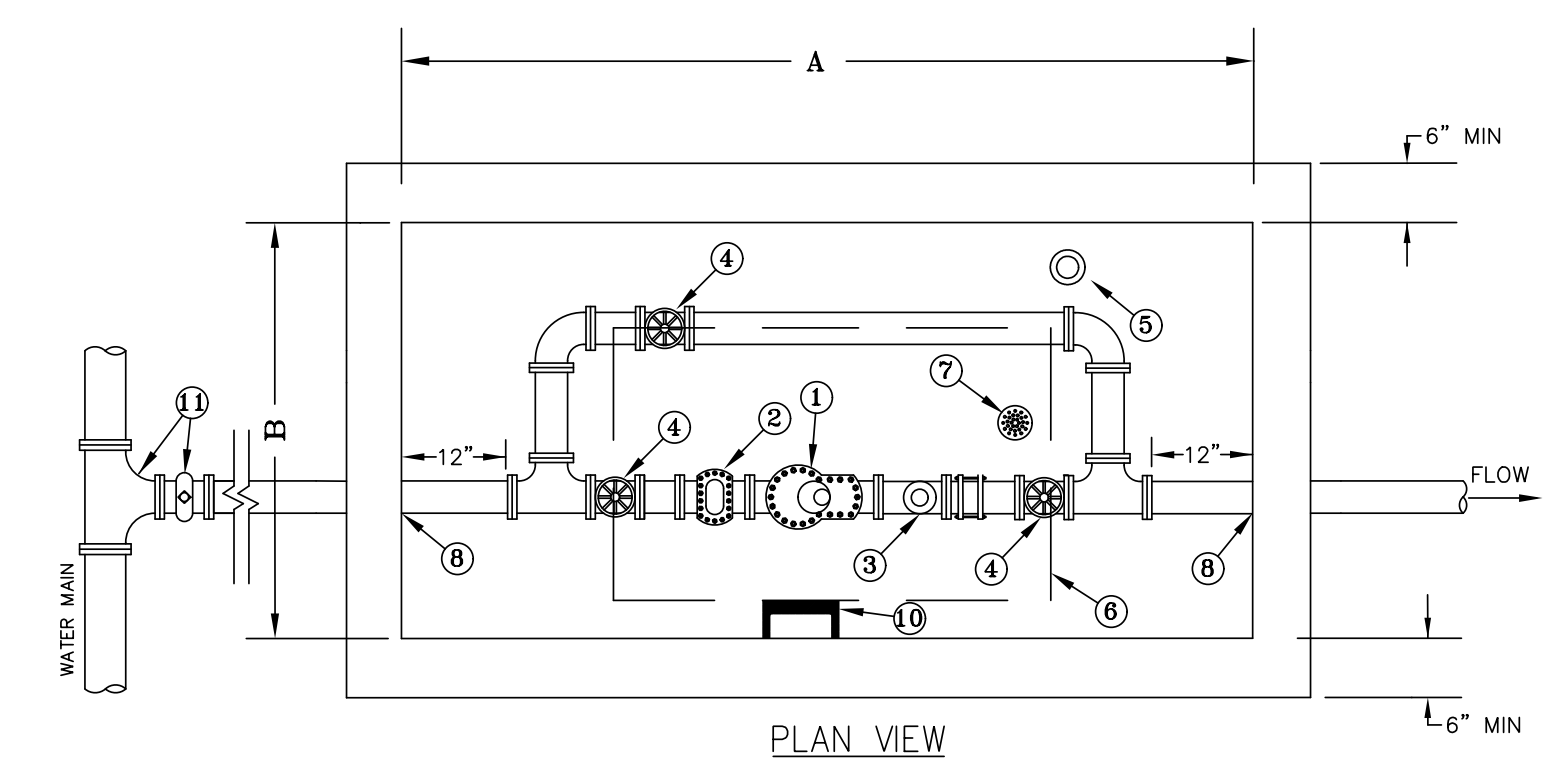
DESIGNED BY: 9/9/2011
 DRAWN BY:
 CHECKED BY:
 APPROVED BY:
 REVISED:
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 UTILITIES ENGINEERING SEC.
 PHONE: (919) 707-6690
 FAX: (919) 250-4151

D. Stephen Scruggs
 PROFESSIONAL ENGINEER
 SEAL 10666
 STATE OF NORTH CAROLINA

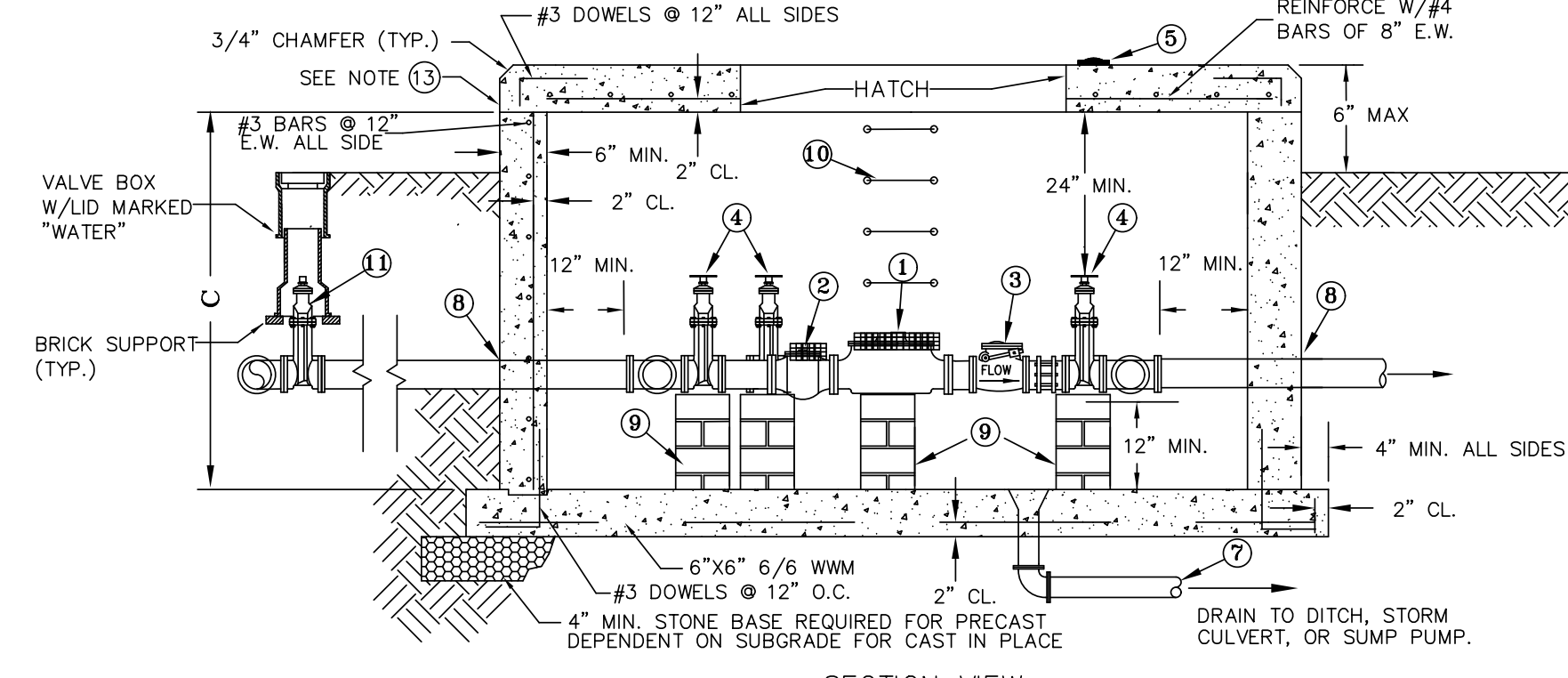
UTILITY CONSTRUCTION PLANS ONLY

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UTILITY CONSTRUCTION



PLAN VIEW



SECTION VIEW

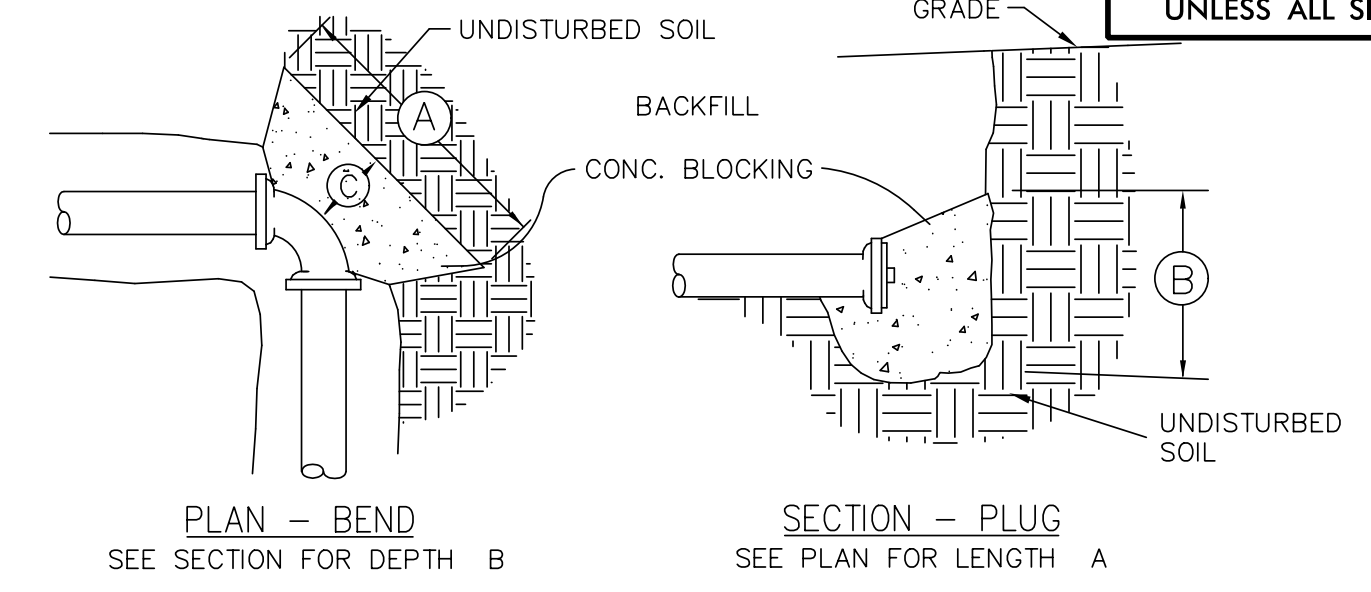
WATER METER VAULTS (3" TO 10")
DETAIL W-8

- CONSTRUCTION NOTES:
- CONCRETE SHALL HAVE 4,000 PSI MIN. COMPRESSIVE STRENGTH AT 28 DAYS.
 - REINFORCING BARS SHALL BE GRADE 60 DEFORMED STEEL.
 - METERS SHALL BE APPROVED BY BRUNSWICK COUNTY.
 - WHERE WALL MOUNTED STEPS ARE NOT ACCESSIBLE FROM HATCH, A PERMANENTLY MOUNTED LADDER MEETING O.S.H.A. STANDARDS SHALL BE PROVIDED.
 - RELOCATE REINFORCEMENT AROUND HATCH TO PROVIDE EQUIVALENT STEEL CROSS-SECTION.
 - ALL PIPING SHALL BE DUCTILE IRON.

MIN. VAULT DIMENSIONS			
METER SIZE	A	B	C
3"	8'-6"	5'-6"	5'-0"
4"	9'-6"	5'-6"	5'-0"
6"	11'-0"	6'-0"	5'-6"
8"	12'-0"	7'-0"	6'-0"
10"	14'-0"	8'-0"	6'-0"

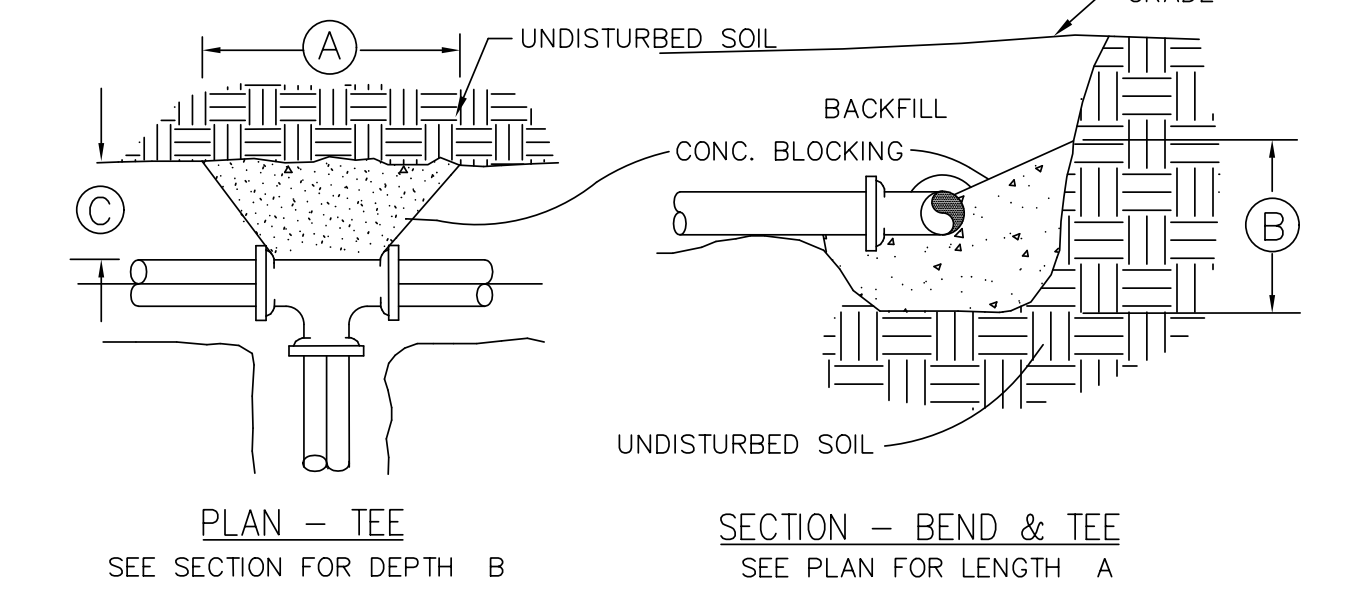
- AWWA C701 TURBINE METER OR AWWA C702 COMPOUND METER w/ENCODING REGISTER FOR REMOTE READING (SENSUS OR APPROVED EQUAL) METER MUST BE SUBMITTED FOR REVIEW AND APPROVAL BY BRUNSWICK COUNTY ENGINEER
- STRAINER BY METER MANUFACTURER AS DETERMINED BY BRUNSWICK COUNTY, AWWA C508 SWING CHECK VALVE WITH LEVER & WEIGHT, OR SPRING, OR FLOMATIC MODEL 848/895 SPLIT DISC
- AWWA C509 GATE VALVE w/HAND WHEEL
- AMR ITRON 50W-2 PIT ERT WITH COMPATIBLE REGISTER OR EQUIVALENT-MUST BE APPROVED BY BRUNSWICK COUNTY
- SINGLE OR DOUBLE LEAF ALUMINUM HATCH
- GRAVITY DRAIN TO DAYLIGHT OR SUMP PUMP WITH FORCE MAIN TO STORM DRAINAGE
- WATERTIGHT GASKET w/HYDRAULIC CEMENT SEAL
- SOLID MASONRY PIER FIXTURE SUPPORTS
- STEPS SPACED AT 16" O.C.
- IN-LINE TEE OR TAPPING SLEEVE, w/VALVE AND BOX TO GRADE WITH LID MARKED "WATER"
- ALL WATER METER VAULTS MUST BE SUBMITTED TO BRUNSWICK COUNTY ENGINEERING DEPARTMENT AS A SHOP SUBMITTAL FOR REVIEW AND APPROVAL.
- METER VAULT LID SHALL REST ON TOP OF VAULT WALLS- NO JOINTS ARE ALLOWED IN VAULT WALLS- VAULT BOTTOM AND SIDES MAY BE PRECAST BUT TOP SHALL BE PLACED ON TOP OF WALLS.

BLOCKING DIMENSIONS			
PIPE SIZE	(A)	(B)	(C)
UP TO 10"	4' - 0"	2' - 6"	1' - 6"
12" TO 16"	5' - 0"	4' - 0"	2' - 0"
18" TO 24"	8' - 0"	6' - 0"	3' - 0"



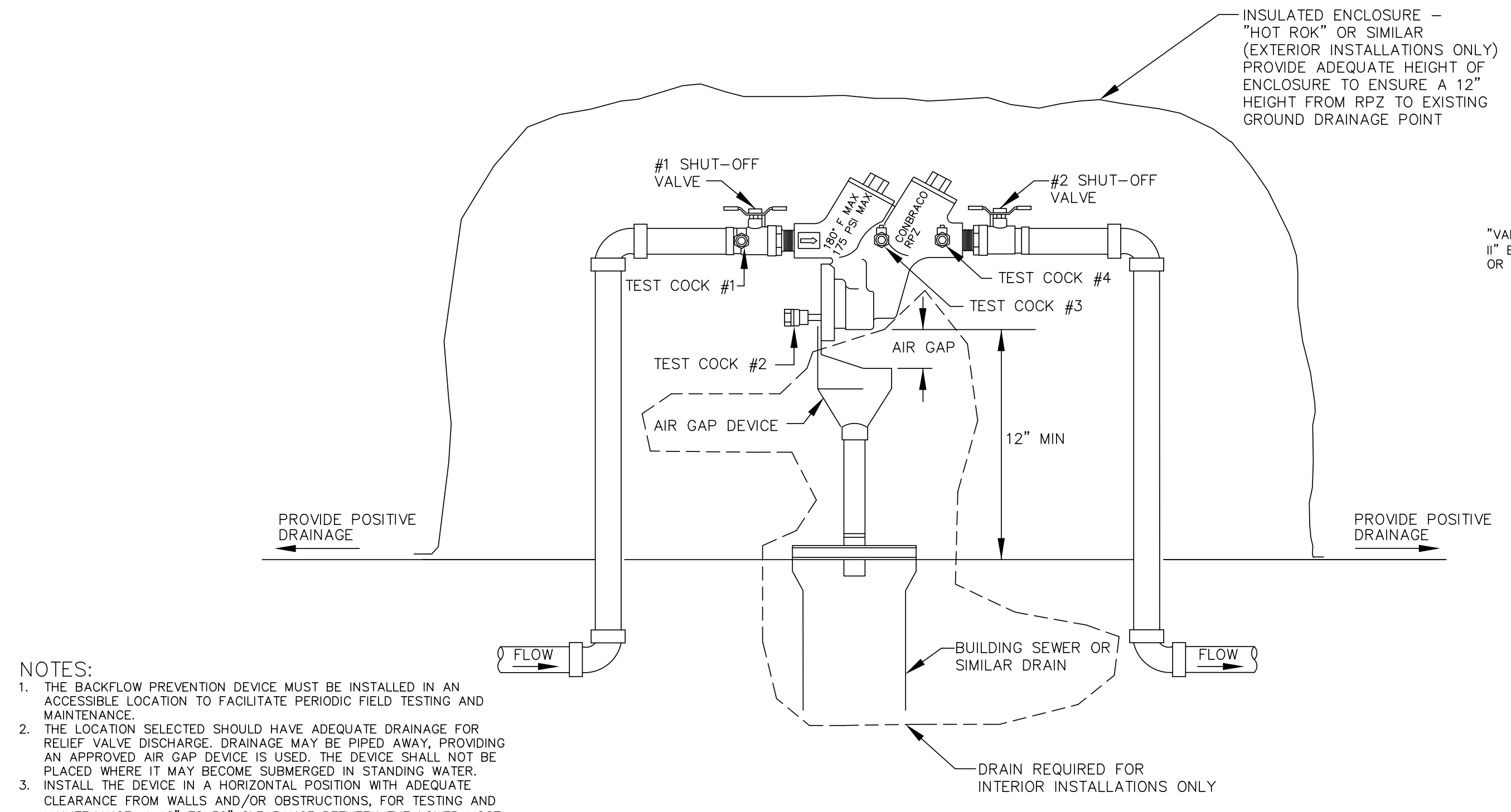
PLAN - BEND SEE SECTION FOR DEPTH B
SECTION - PLUG SEE PLAN FOR LENGTH A

- NOTES:
- 2500 P.S.I. CONC.
 - REMOVE LOOSE EARTH AND POUR AGAINST UNDISTURBED SOIL.
 - BACKFILL TO EXISTING/FINISH GRADE AFTER CONCRETE HAS CURED FOR 24 HOURS.
 - CONCRETE SHALL NOT COVER FLANGES, BOLTS, MEGA-LUGS, RODS, ETC.



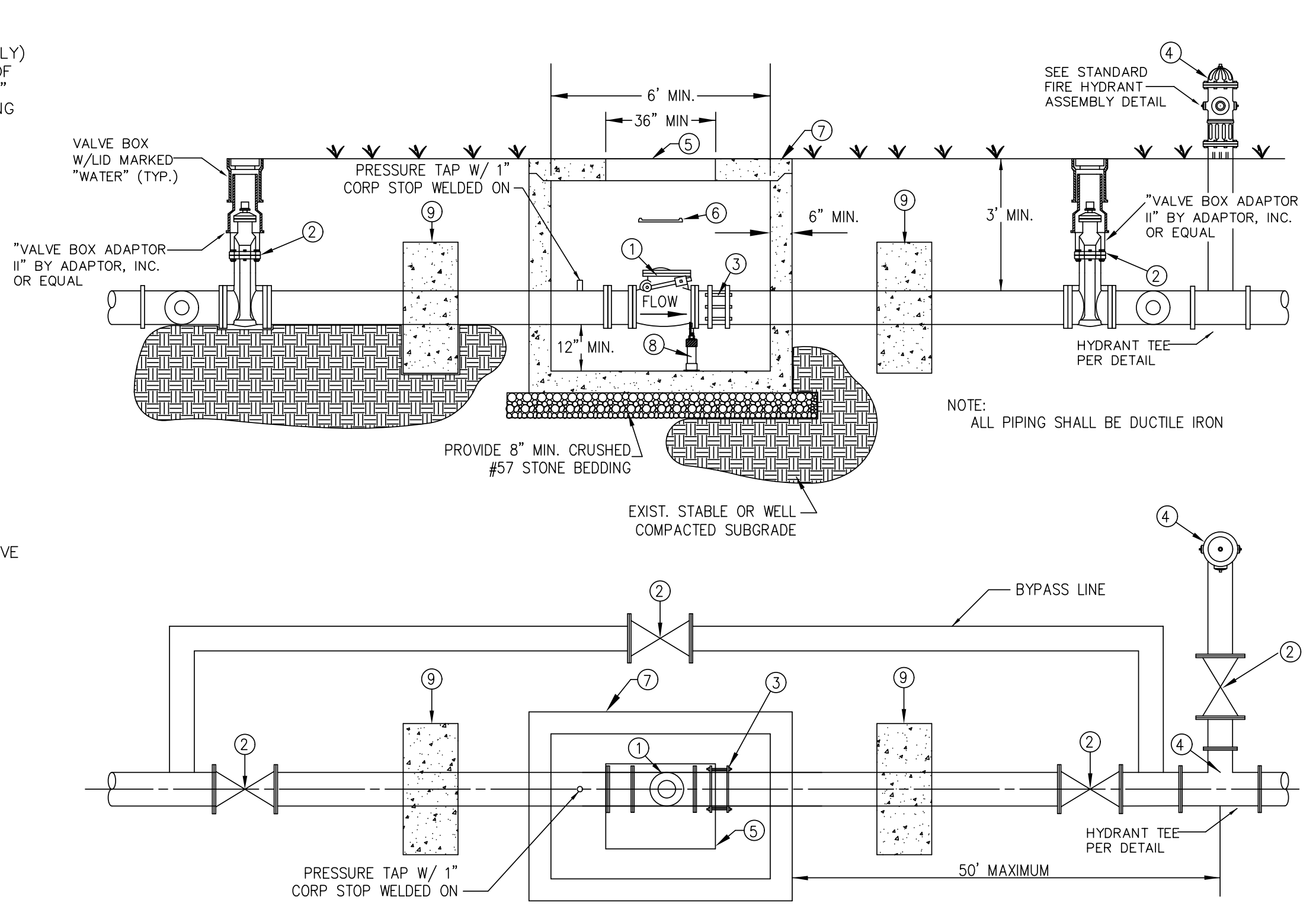
PLAN - TEE SEE SECTION FOR DEPTH B
SECTION - BEND & TEE SEE PLAN FOR LENGTH A

THRUST BLOCKS
DETAIL W-9



STANDARD BACKFLOW PREVENTION DEVICE
DETAIL W-10

- NOTES:
- THE BACKFLOW PREVENTION DEVICE MUST BE INSTALLED IN AN ACCESSIBLE LOCATION TO FACILITATE PERIODIC FIELD TESTING AND MAINTENANCE.
 - THE LOCATION SELECTED SHOULD HAVE ADEQUATE DRAINAGE FOR RELIEF VALVE DISCHARGE. DRAINAGE MAY BE PIPED AWAY, PROVIDING AN APPROVED AIR GAP DEVICE IS USED. THE DEVICE SHALL NOT BE PLACED WHERE IT MAY BECOME SUBMERGED IN STANDING WATER.
 - INSTALL THE DEVICE IN A HORIZONTAL POSITION WITH ADEQUATE CLEARANCE FROM WALLS AND/OR OBSTRUCTIONS, FOR TESTING AND MAINTENANCE. A 12" TO 30" CLEARANCE BETWEEN THE LOWER MOST PORTION OF THE DEVICE AND FLOOD GRADE OR FLOOR SHALL BE PROVIDED.
 - A "Y" STRAINER MAY BE INSTALLED JUST UPSTREAM OF THE BACKFLOW PREVENTION ASSEMBLY TO ELIMINATE ANY DEBRIS FROM ENTERING THE DEVICE AND FOULING THE CHECK AND/OR RELIEF VALVE.
 - NO UNDERGROUND INSTALLATIONS ALLOWED.



CHECK VALVE VAULT
DETAIL W-11

- AS DETERMINED BY BRUNSWICK COUNTY, AWWA C508 SWING CHECK VALVE WITH LEVER & WEIGHT OR SPRING OR FLOMATIC MODEL 848/895 SPLIT DISC. GATE VALVE WITH VALVE BOX MARKED "WATER".
- FLANGED COUPLING ADAPTER
- HYDRANT ASSEMBLY INSTALLED ON DOWNSTREAM SIDE WITHIN 50' OF CHECK VALVE.
- ALUMINUM HATCH W/ COMPRESSION SPRING OPERATORS OR APPROVED EQUAL
- STEPS SPACED AT 16" O.C.
- PRECAST REINFORCED CONCRETE VAULT WITH H2O LOAD RATING AND MIN. INSIDE DIMENSIONS: 6' L x 5' W x 4' D
- STANDON MODEL S89 OR APPROVED EQUAL FIXTURE SUPPORT.
- CONCRETE THRUST COLLAR PER SPECIFICATIONS.

COUNTY OF BRUNSWICK

GENERAL WATER DETAILS FOR
BRUNSWICK COUNTY
NORTH CAROLINA

Date: 06-01-12
Scale: NTS
Drawn By: JDM
Checked By: WLP

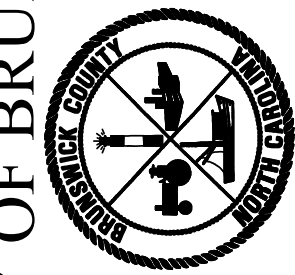
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 F-0342

PROJECT REFERENCE NO.	SHEET NO.
R-5021	UC-3D
DESIGNED BY:	9/9/2004
DRAWN BY:	SEAL 10666
CHECKED BY:	PROFESSIONAL ENGINEER
APPROVED BY:	STEPHEN SCRUGGS
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
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PHONE: (919) 707-6690	
FAX: (919) 250-4151	

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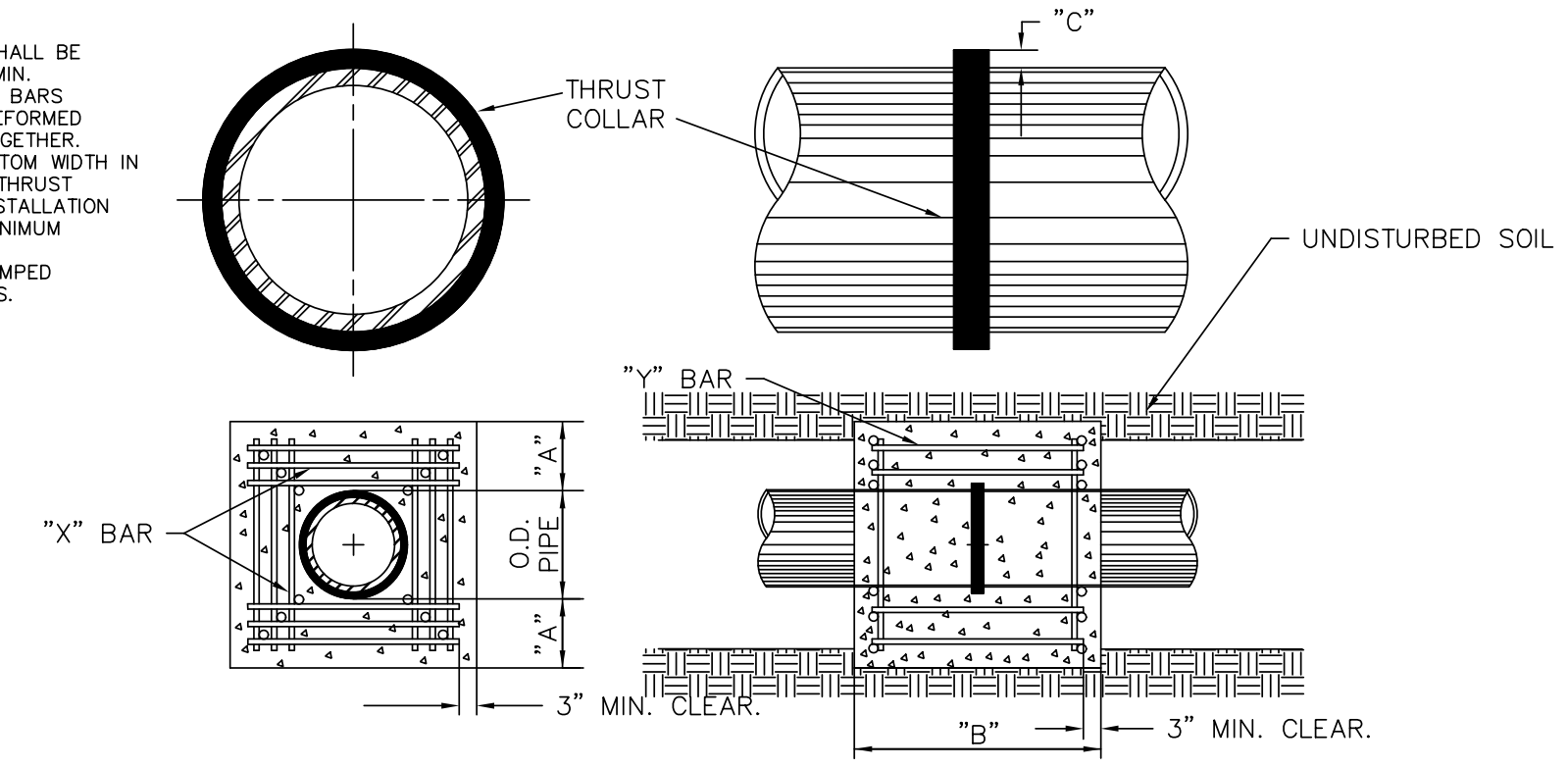
COUNTY OF BRUNSWICK



GENERAL WATER DETAILS FOR
BRUNSWICK COUNTY
 NORTH CAROLINA

Date: 06-05-12
 Scale: NTS
 Drawn By: JDM
 Checked By: WLP

- NOTES:
1. CONCRETE SHALL BE 2500 P.S.I. MIN.
 2. REINFORCING BARS SHALL BE DEFORMED AND TIED TOGETHER.
 3. TRENCH BOTTOM WIDTH IN VICINITY OF THRUST BLOCK(S) INSTALLATION SHALL BE MINIMUM WIDTH.
 4. BACKFILL TAMPED IN 6" LAYERS.

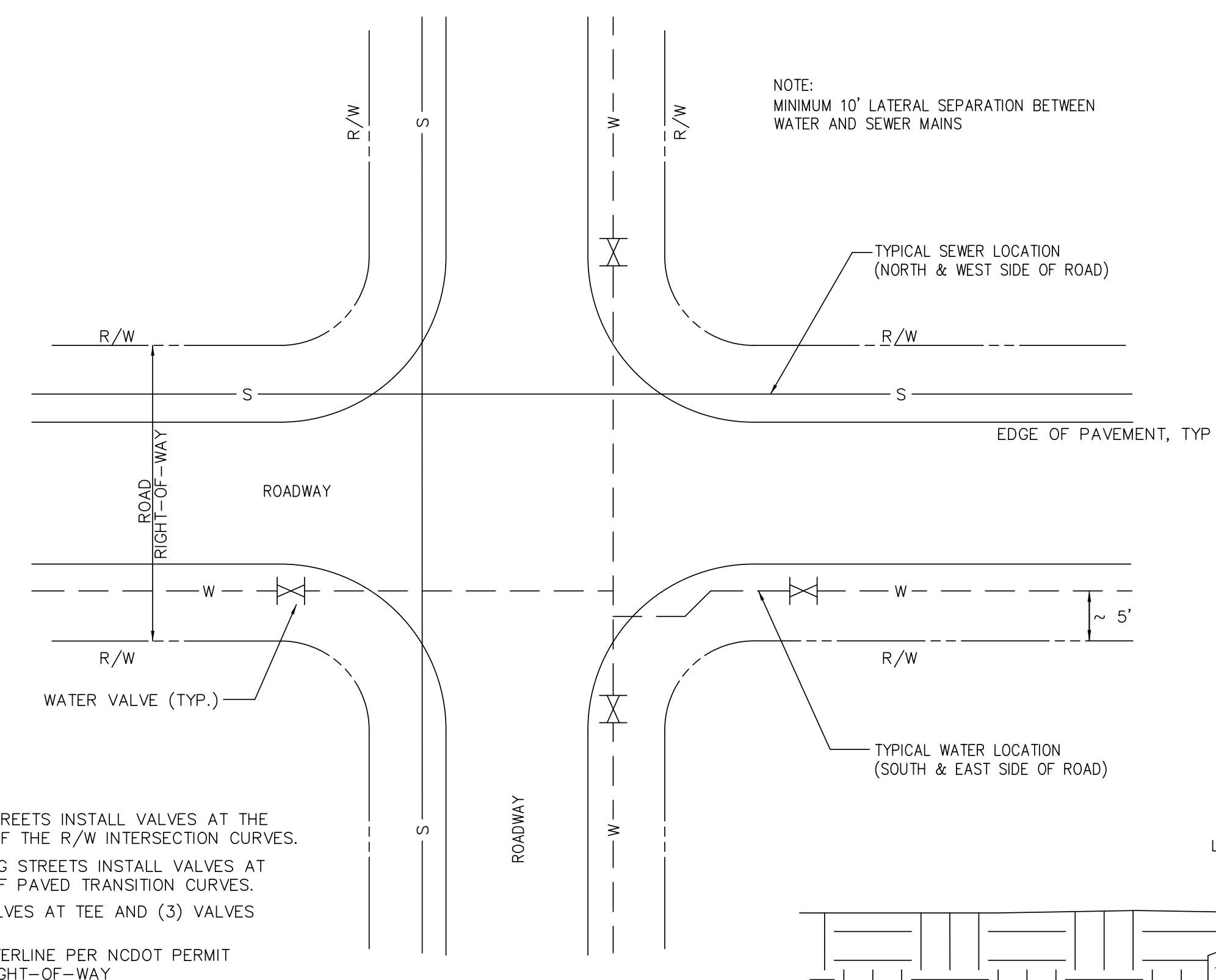


REINFORCING REQUIREMENTS

I.D. PIPE	REBAR SIZE	"X" BAR LENGTH	"X" BAR WGT.	"Y" BAR LENGTH	"Y" BAR WGT.	NO. REQ.
6"-36"	#5	2'-2"+O.D. PIPE	1.043 LBS./FT	1'-1"	1.1 LBS. EA.	X-24, Y-12
48"	#6	3'-0"+O.D. PIPE	1.502 LBS./FT	1'-3"	1.9 LBS. EA.	X-24, Y-12

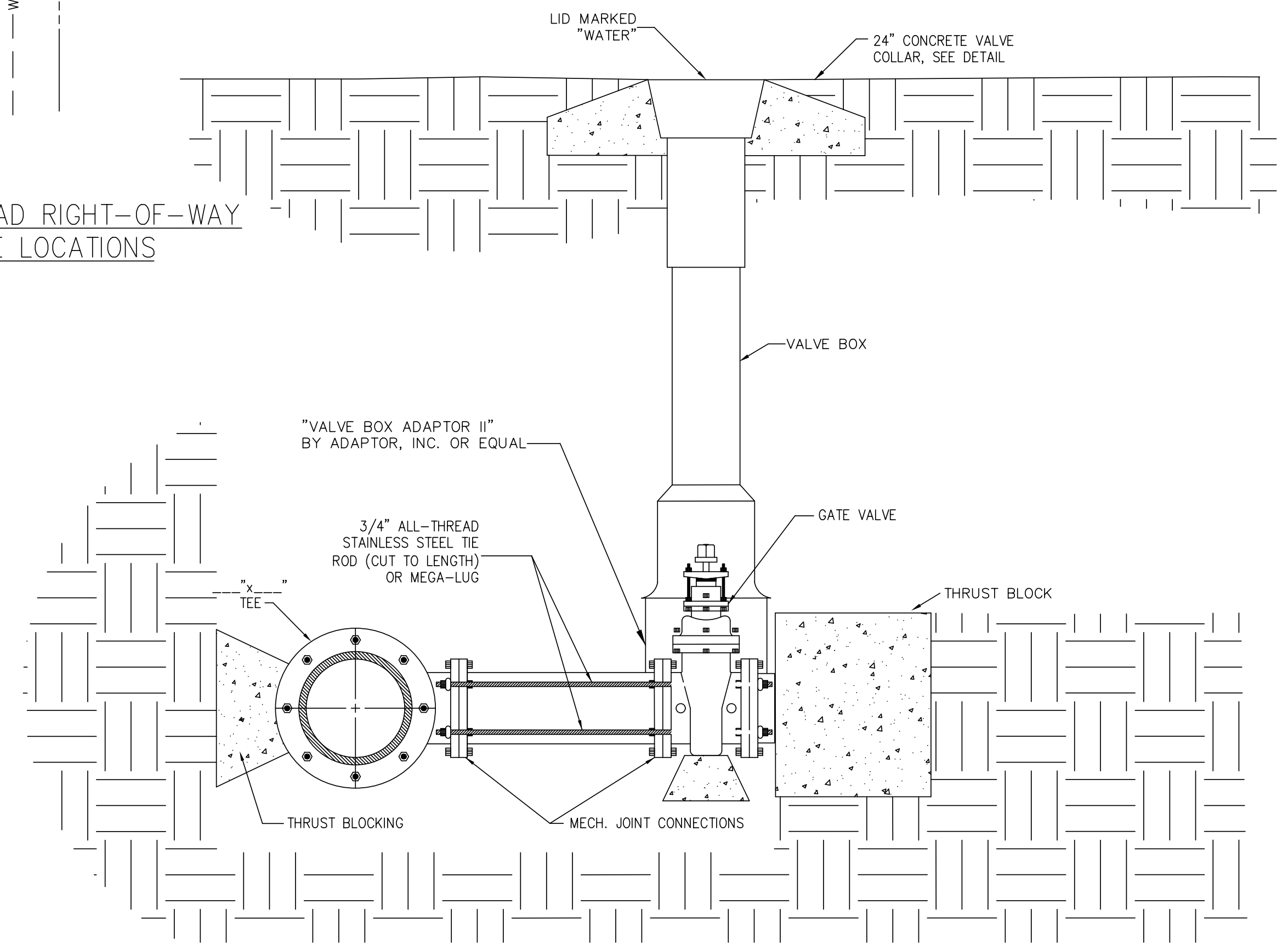
I.D. PIPE	"A"	"B"	"C" - 6"-16", 20"-24", 30"-36", 48"
6"-36"	1'-4"	1'-7"	2' 3' 4'
48"	1'-8"	1'-9"	2' 3' 4' 6"

THRUST COLLAR FOR WATER MAINS
 DETAIL W-12



1. FOR NEW STREETS INSTALL VALVES AT THE TANGENTS OF THE R/W INTERSECTION CURVES.
2. FOR EXISTING STREETS INSTALL VALVES AT THE ENDS OF PAVED TRANSITION CURVES.
3. USE (2) VALVES AT TEE AND (3) VALVES AT A CROSS
4. INSTALL WATERLINE PER NCDOT PERMIT IN NCDOT RIGHT-OF-WAY

PLACEMENT OF UTILITIES IN ROAD RIGHT-OF-WAY
 AND INTERSECTION VALVE LOCATIONS
 DETAIL W-13



- NOTES:
1. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL FITTINGS.
 2. ALL TIE RODS AND NUTS TO BE STAINLESS STEEL.
 3. LENGTH OF PIPE SHALL BE MINIMUM NEEDED TO INSTALL FITTINGS. VALVE SHALL BE BOLTED DIRECTLY TO TEE WHENEVER POSSIBLE.

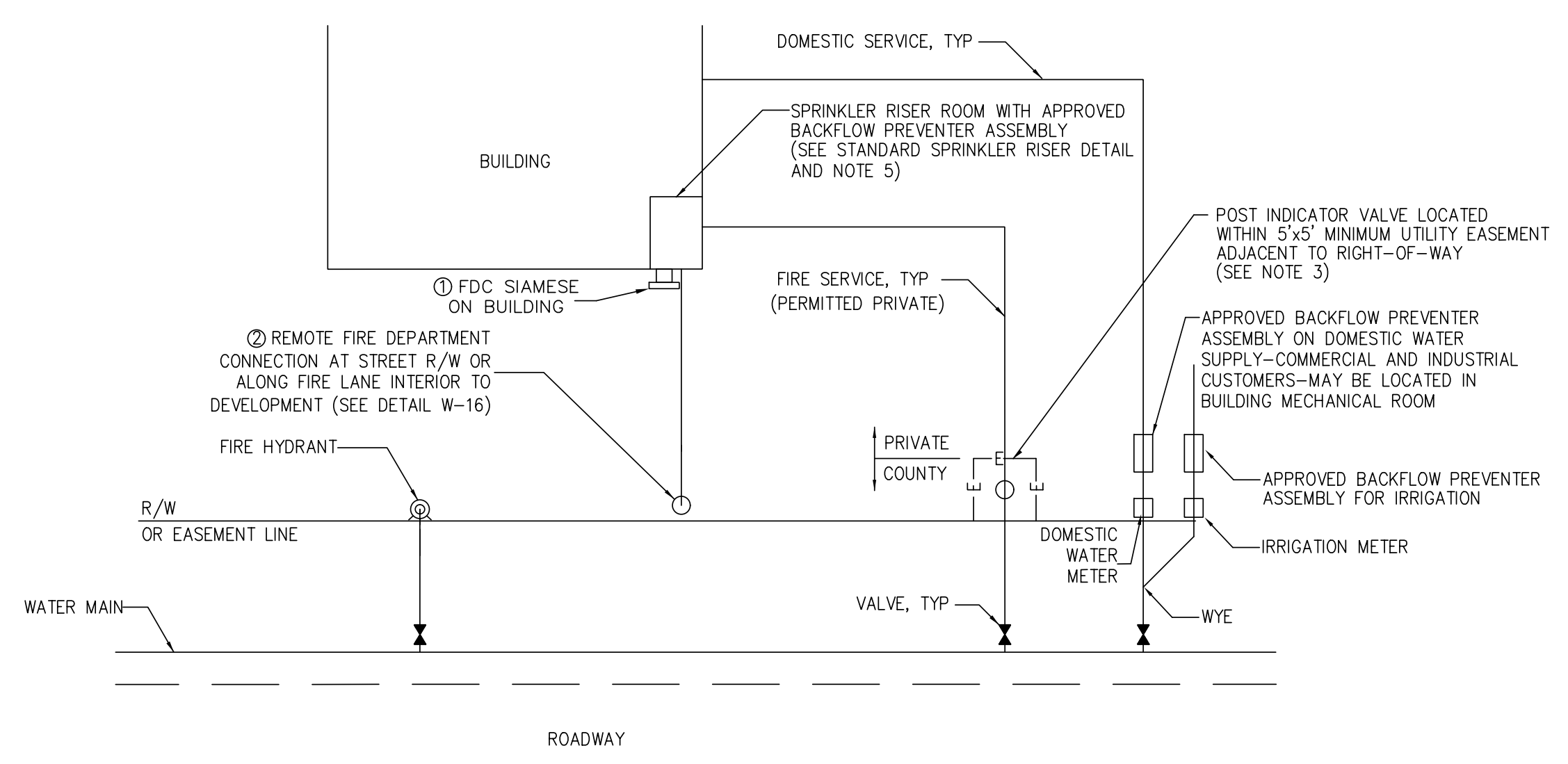
ROD REQUIREMENTS

BRANCH SIZE	NO. OF RODS
4"	2 EA.
6"	2 EA.
8"	4 EA.
12"	4 EA.
16"	6 EA.
20"	6 EA.
24"	6 EA.

BRANCH STUB-OUT FOR FUTURE CONNECTION
 (6-INCH DIA AND LARGER MAIN)
 DETAIL W-14

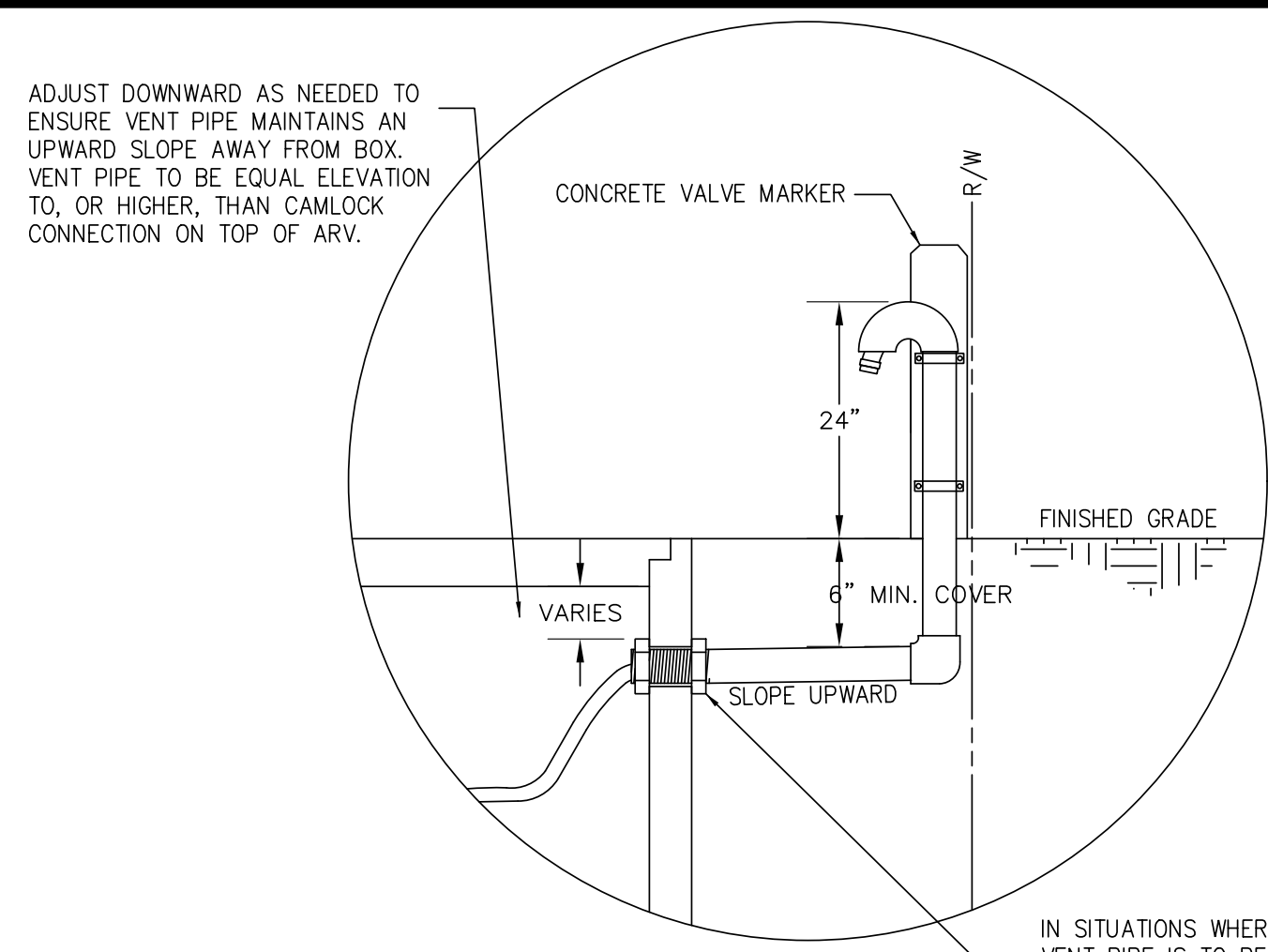
- NOTES:

1. NO FIRE HYDRANTS ARE PERMITTED ON PRIVATE FIRE SERVICE LINES.
2. FIRE SERVICE LINES WITH FIRE HYDRANT(S) SHALL BE PUBLIC WATER MAINS LOCATED WITHIN A RECORDED PUBLIC UTILITY EASEMENT. THE POST INDICATOR VALVE SHALL BE LOCATED AFTER THE MOST DOWNSTREAM HYDRANT ON THE MAIN.
3. FIRE SERVICE LINES WITH HYDRANTS SHALL BE 6" MINIMUM DIAMETER.
4. POST INDICATOR VALVES FOR PRIVATE FIRE SERVICE LINES SHALL BE LOCATED AS SHOWN.
5. RPZ MAY BE LOCATED IN BUILDING IF BUILDING IS LESS THAN 200 LINEAR FEET FROM THE WATER MAIN SERVING THE BUILDING.
6. FIRE HYDRANT REQUIRED WITHIN 100' MAX OF FDC OR AS APPROVED OTHERWISE BY THE FIRE MARSHALL.
7. FDC MAY BE REQUIRED TO BE A 5" STORZ WITH 30 DEGREE FIXED ELBOW WITH KNOX LOCKING CAPS AS REQUIRED BY THE FIRE MARSHALL.
8. A 5" STORZ CONVERSION KIT WILL BE REQUIRED ON ALL NEW FIRE HYDRANTS AND EXISTING FIRE HYDRANTS HAVING NST THREADS WITHIN 1,000 FEET (VIA A FIRE DEPARTMENT HOSE LAY METHOD) OF NEW COMMERCIAL BUILDINGS AND MULTI-FAMILY BUILDING OCCUPANCIES AND ADDITIONS, CHANGE OF USE OR RENOVATIONS TO EXISTING COMMERCIAL OCCUPANCY BUILDINGS PER THE COUNTY FIRE PREVENTION ORDINANCE.



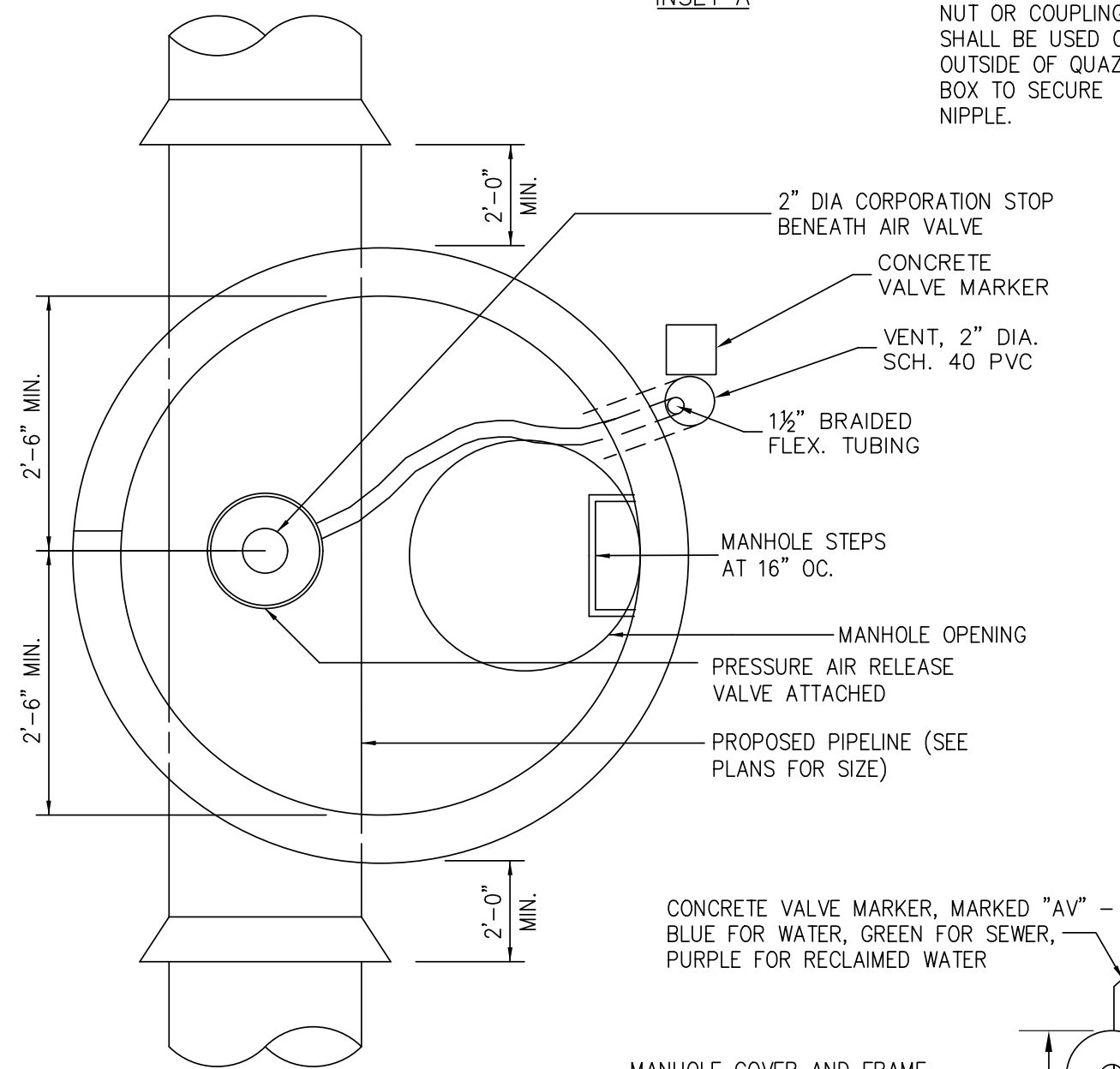
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 DETAIL W-14

DATE: 8/13/2004
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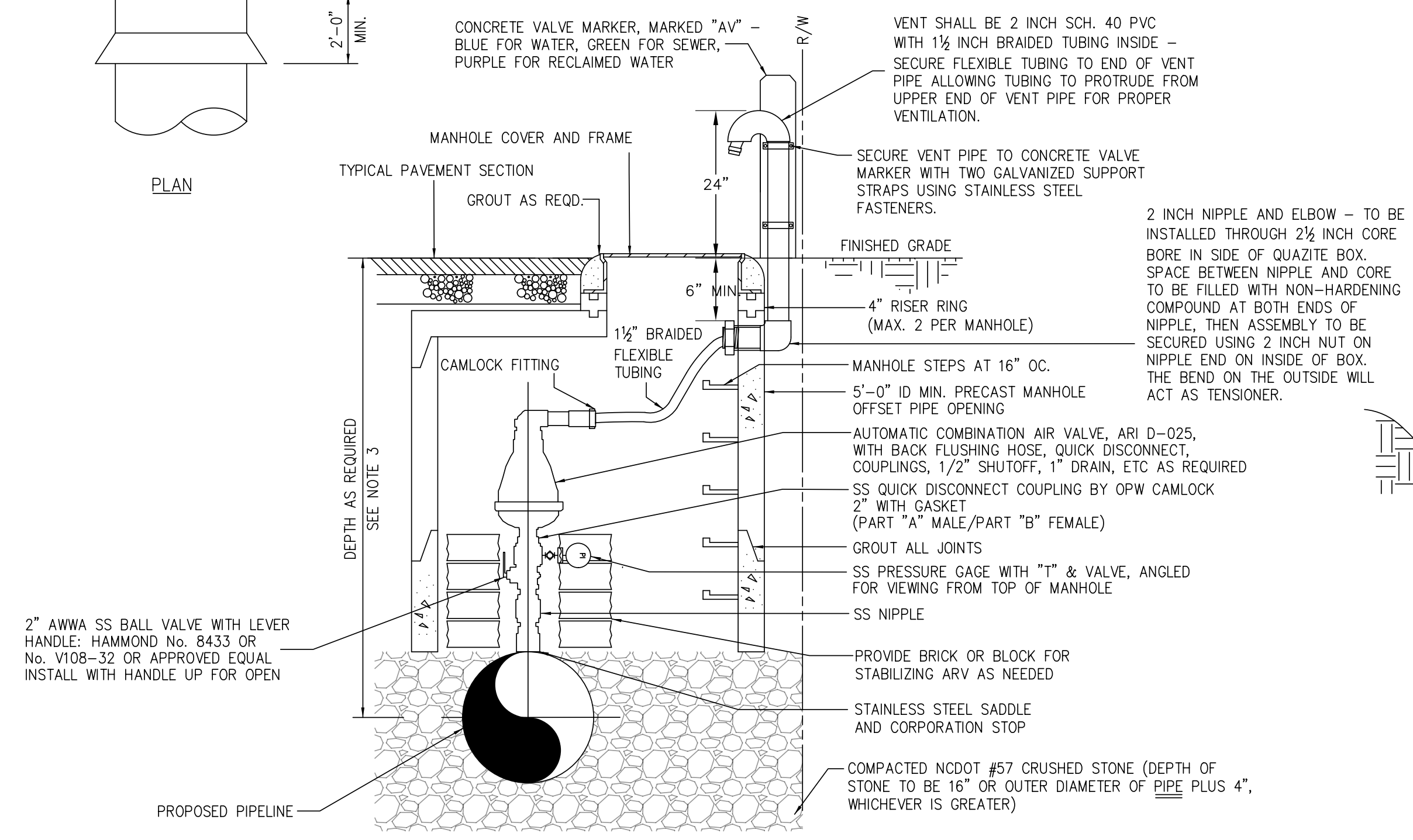


INSET A

IN SITUATIONS WHERE VENT PIPE IS TO BE EXTENDED AS SHOWN, AN ADDITIONAL 2" NUT OR COUPLING SHALL BE USED ON OUTSIDE OF QUAZITE BOX TO SECURE NIPPLE.



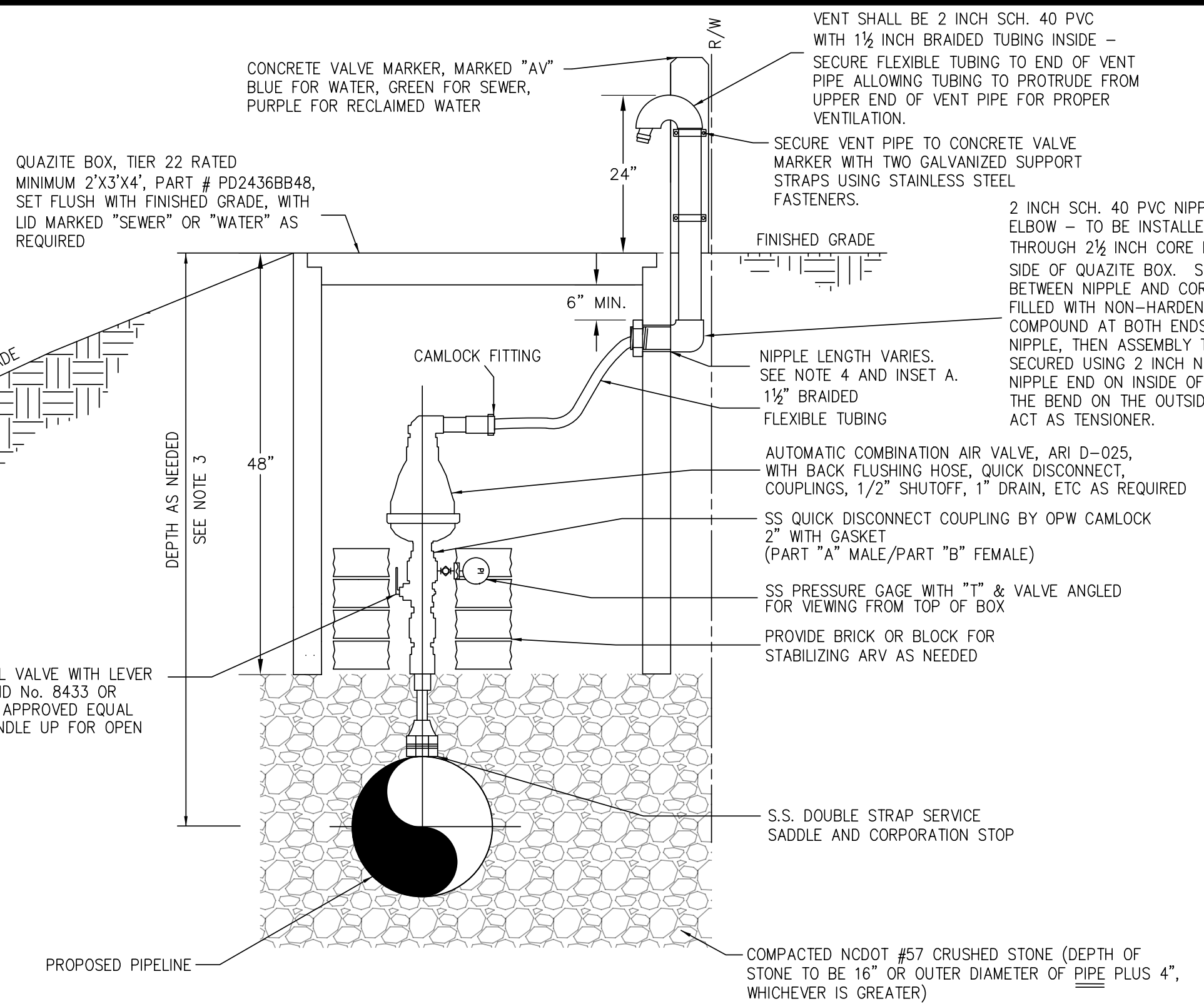
PLAN



SECTION

- NOTES:
- USE AN APPROVED JOINT COMPOUND ON ALL THREADED CONNECTIONS.
 - 2" SS NIPPLES SHALL BE USED IF NEEDED.
 - CONTRACTOR SHALL ADJUST PIPELINE PROFILE DOWNWARD IN APPROACH TO ARV IN ORDER TO ATTAIN ADEQUATE DEPTH FOR ARV ASSEMBLY. TRANSITION LENGTH SHALL BE SUFFICIENT TO ENSURE THAT ARV IS LOCATED AT HIGH POINT.
 - SET VALVE MARKER AND VENT STACK AT RIGHT-OF-WAY LINE.

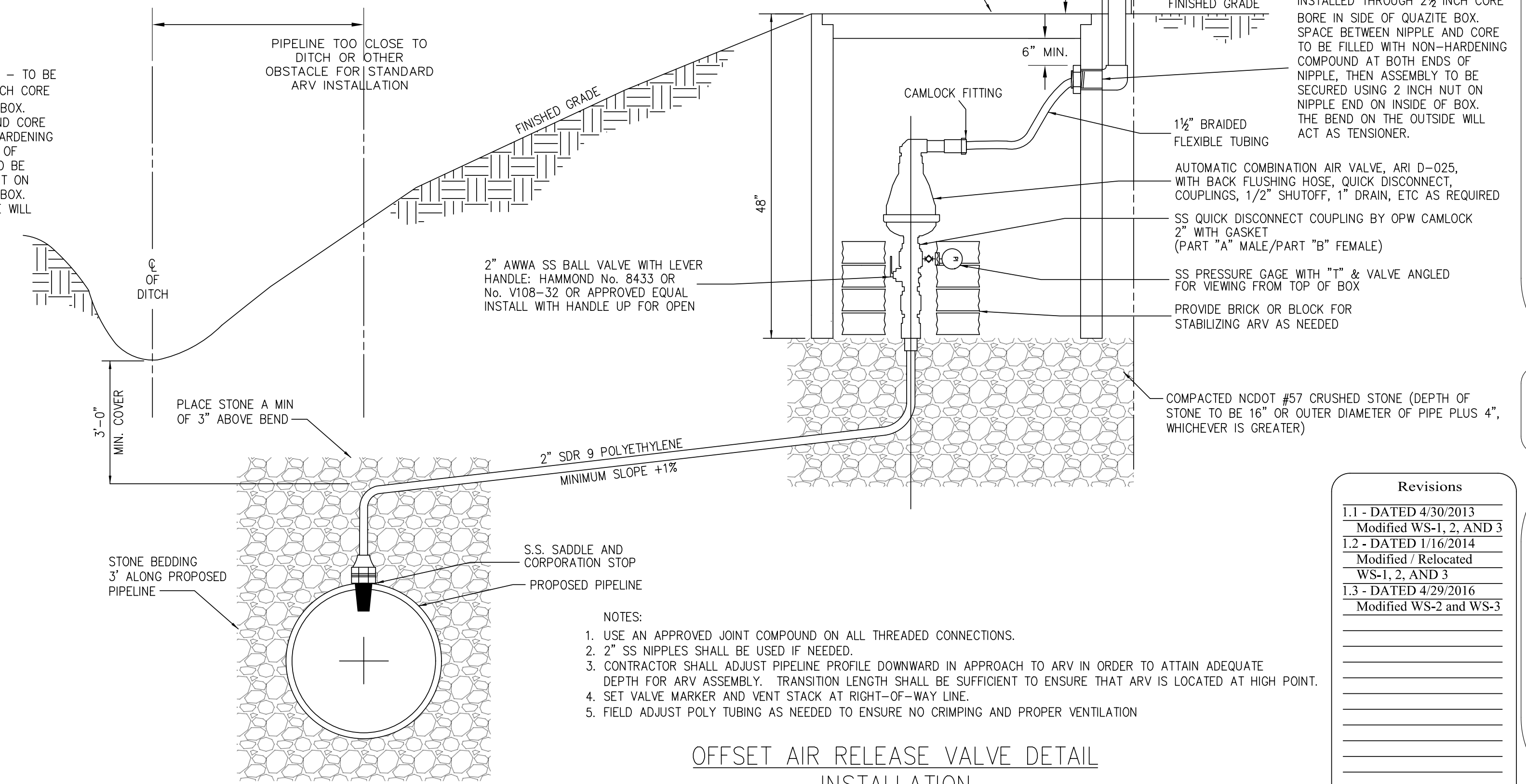
STANDARD MANHOLE AND AIR RELEASE VALVE
NON-NCDOT R/W
DETAIL WS-2



SECTION

- NOTES:
- USE AN APPROVED JOINT COMPOUND ON ALL THREADED CONNECTIONS.
 - 2" SS NIPPLES SHALL BE USED IF NEEDED.
 - CONTRACTOR SHALL ADJUST PIPELINE PROFILE DOWNWARD IN APPROACH TO ARV IN ORDER TO ATTAIN ADEQUATE DEPTH FOR ARV ASSEMBLY. TRANSITION LENGTH SHALL BE SUFFICIENT TO ENSURE THAT ARV IS LOCATED AT HIGH POINT.
 - SET VALVE MARKER AND VENT STACK AT RIGHT-OF-WAY LINE. EXTEND VENT PIPE AS REQUIRED (SEE INSET A).
 - AT THE DISCRETION OF BRUNSWICK COUNTY, THE VALVE MARKER AND VENT STACK MAY BE LOCATED IMMEDIATELY ADJACENT TO THE QUAZITE BOX IF THE DISTANCE FROM THE QUAZITE BOX TO THE RIGHT-OF-WAY LINE EXCEEDS 10 FEET, OR OBSTACLES OR FINISHED GRADE PREVENT VENT STACK INSTALLATION AT THE RIGHT-OF-WAY LINE.

STANDARD AIR RELEASE VALVE INSTALLATION
NCDOT R/W
DETAIL WS-1



SECTION

- NOTES:
- USE AN APPROVED JOINT COMPOUND ON ALL THREADED CONNECTIONS.
 - 2" SS NIPPLES SHALL BE USED IF NEEDED.
 - CONTRACTOR SHALL ADJUST PIPELINE PROFILE DOWNWARD IN APPROACH TO ARV IN ORDER TO ATTAIN ADEQUATE DEPTH FOR ARV ASSEMBLY. TRANSITION LENGTH SHALL BE SUFFICIENT TO ENSURE THAT ARV IS LOCATED AT HIGH POINT.
 - SET VALVE MARKER AND VENT STACK AT RIGHT-OF-WAY LINE.
 - FIELD ADJUST POLY TUBING AS NEEDED TO ENSURE NO CRIMPING AND PROPER VENTILATION

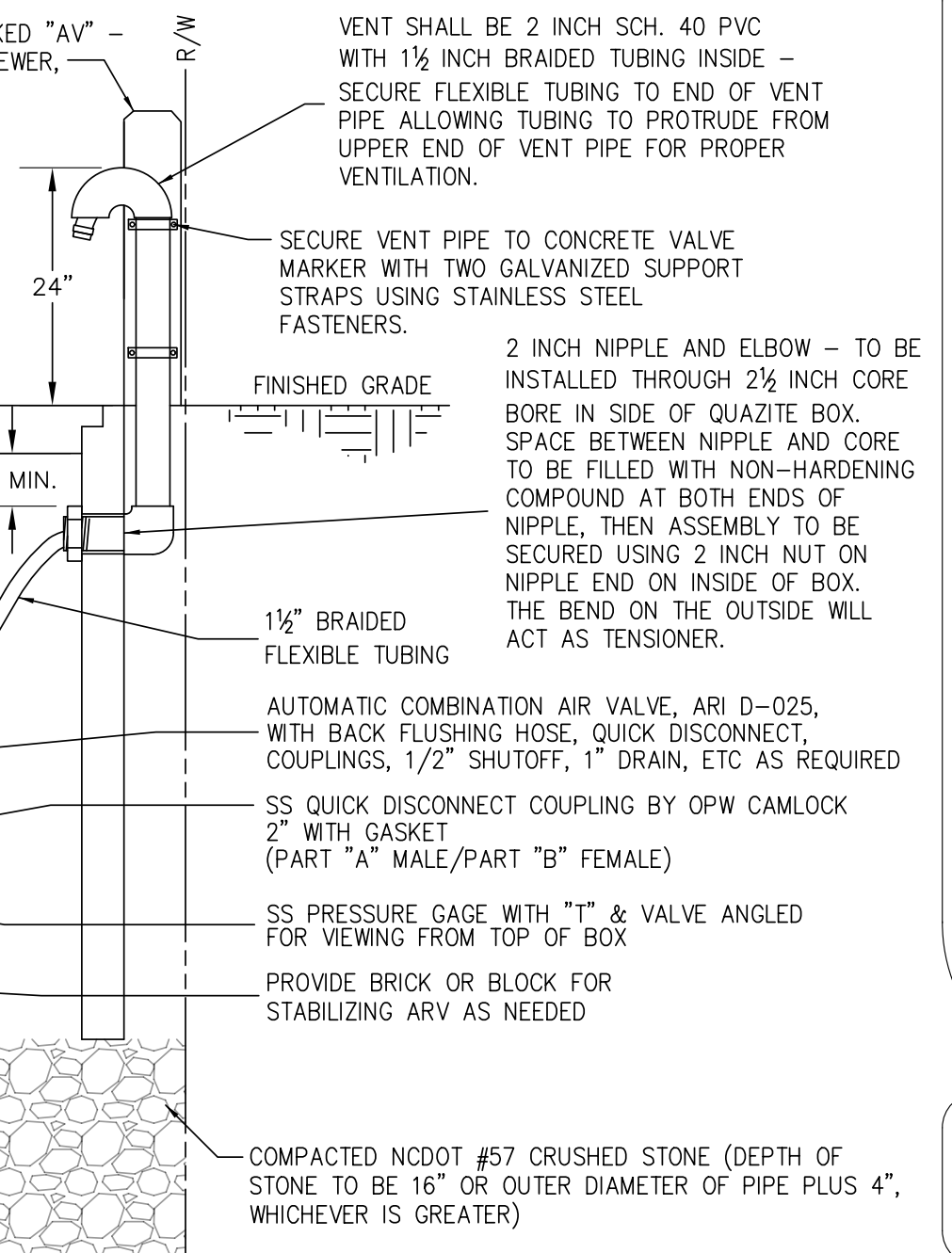
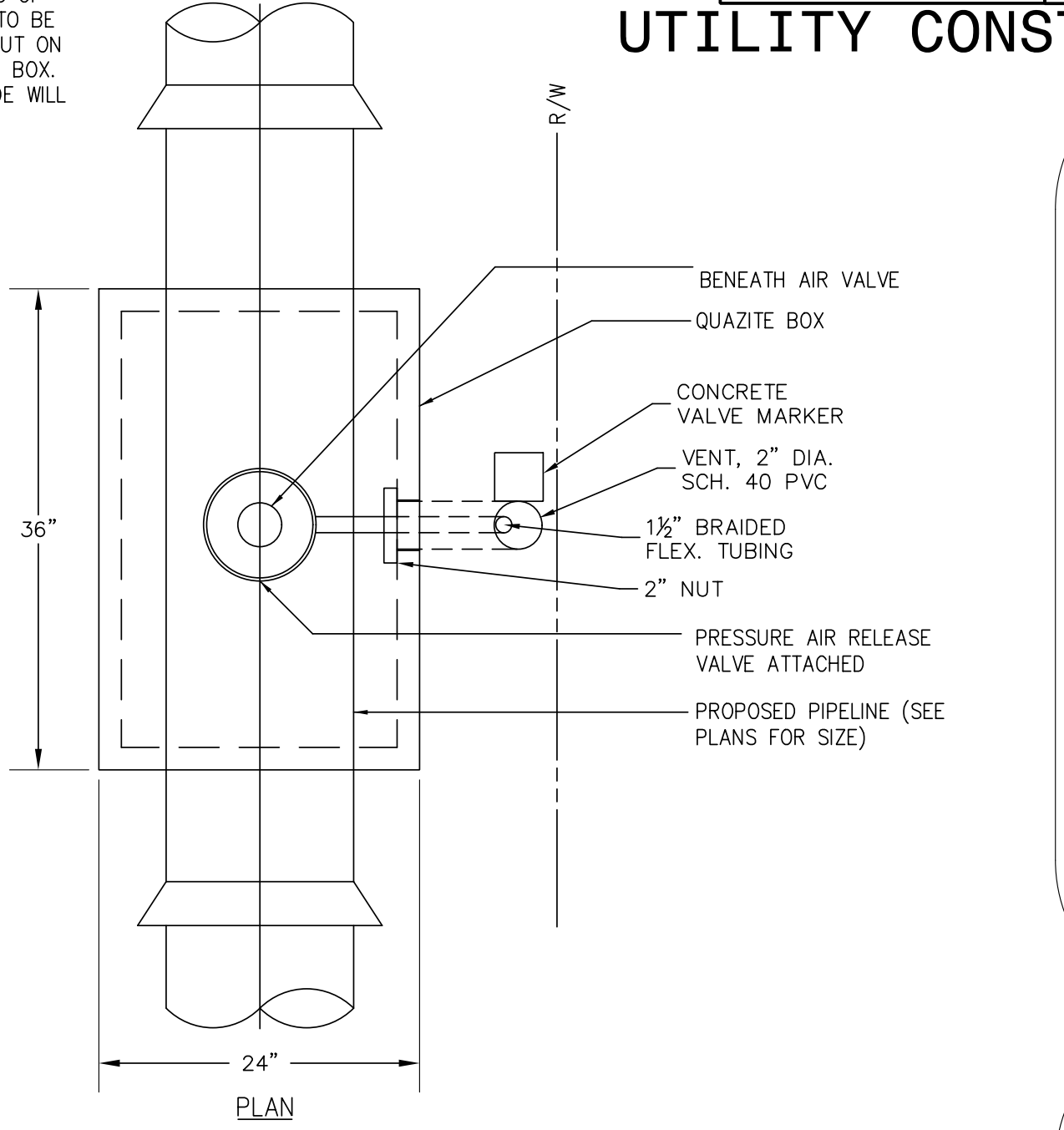
OFFSET AIR RELEASE VALVE DETAIL
INSTALLATION
DETAIL WS-3

Prepared In the Office of:

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Revisions

1.1 - DATED 4/30/2013
Modified WS-1, 2, AND 3
1.2 - DATED 1/16/2014
Modified / Relocated WS-1, 2, AND 3
1.3 - DATED 4/29/2016
Modified WS-2 and WS-3

PROJECT REFERENCE NO. R-5021

SHEET NO. UC-3F

DESIGNED BY: DIA CORPORATION

DRAWN BY:

CHECKED BY:

APPROVED BY:

REVISED:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151

SEAL 10666

D. Stephen Struggs

UTILITY CONSTRUCTION PLANS ONLY

COUNTY OF BRUNSWICK

GENERAL WATER & SEWER DETAILS FOR
BRUNSWICK COUNTY
NORTH CAROLINA

Date: 06-05-12

Scale: NTS

Drawn By: JDM

Checked By: WLP

DATE: 8/13/2013
TIME: 10:36:06 PM
DGN: P:\604828203\900_Works\15_Utility_Construction\NCR-5021_UC_UCSE.dgn

Prepared In the Office of:

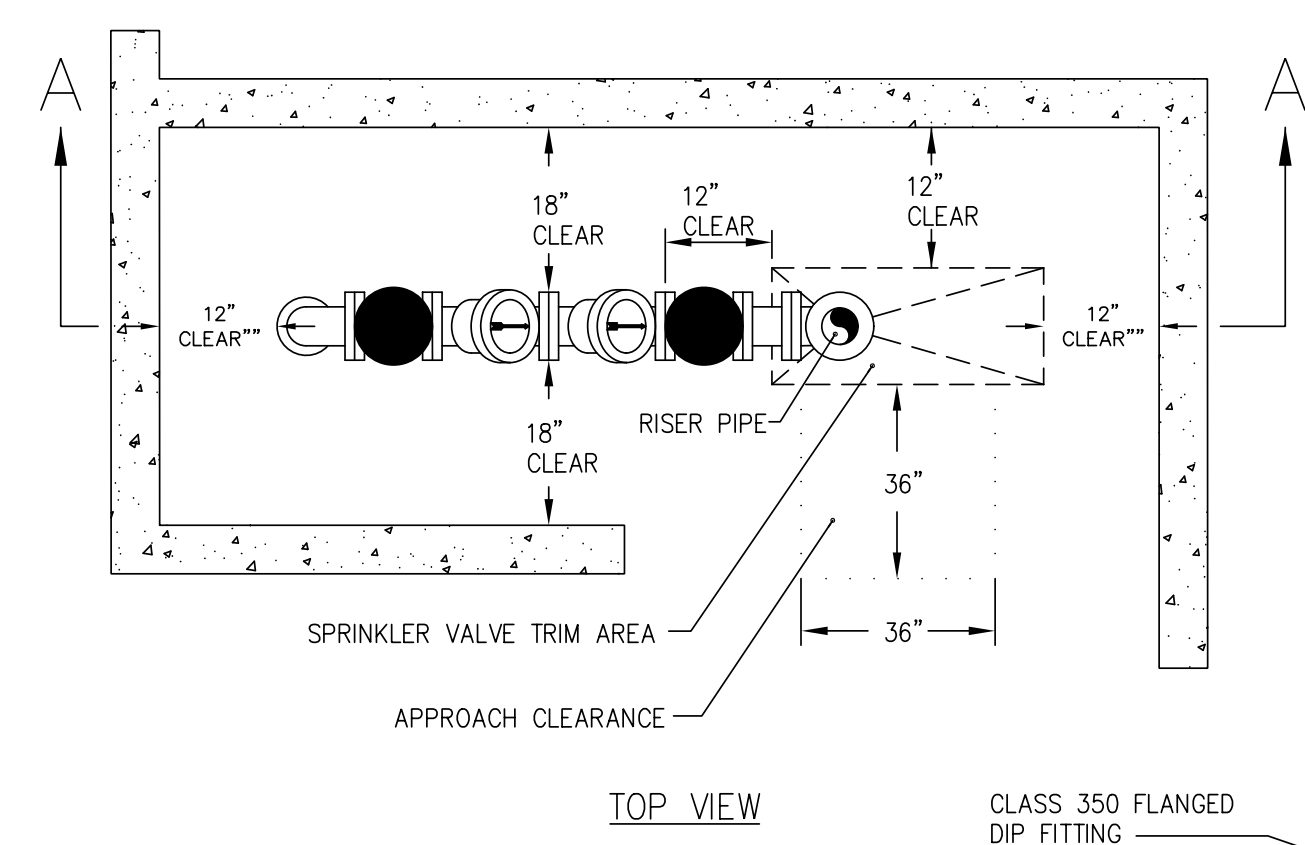


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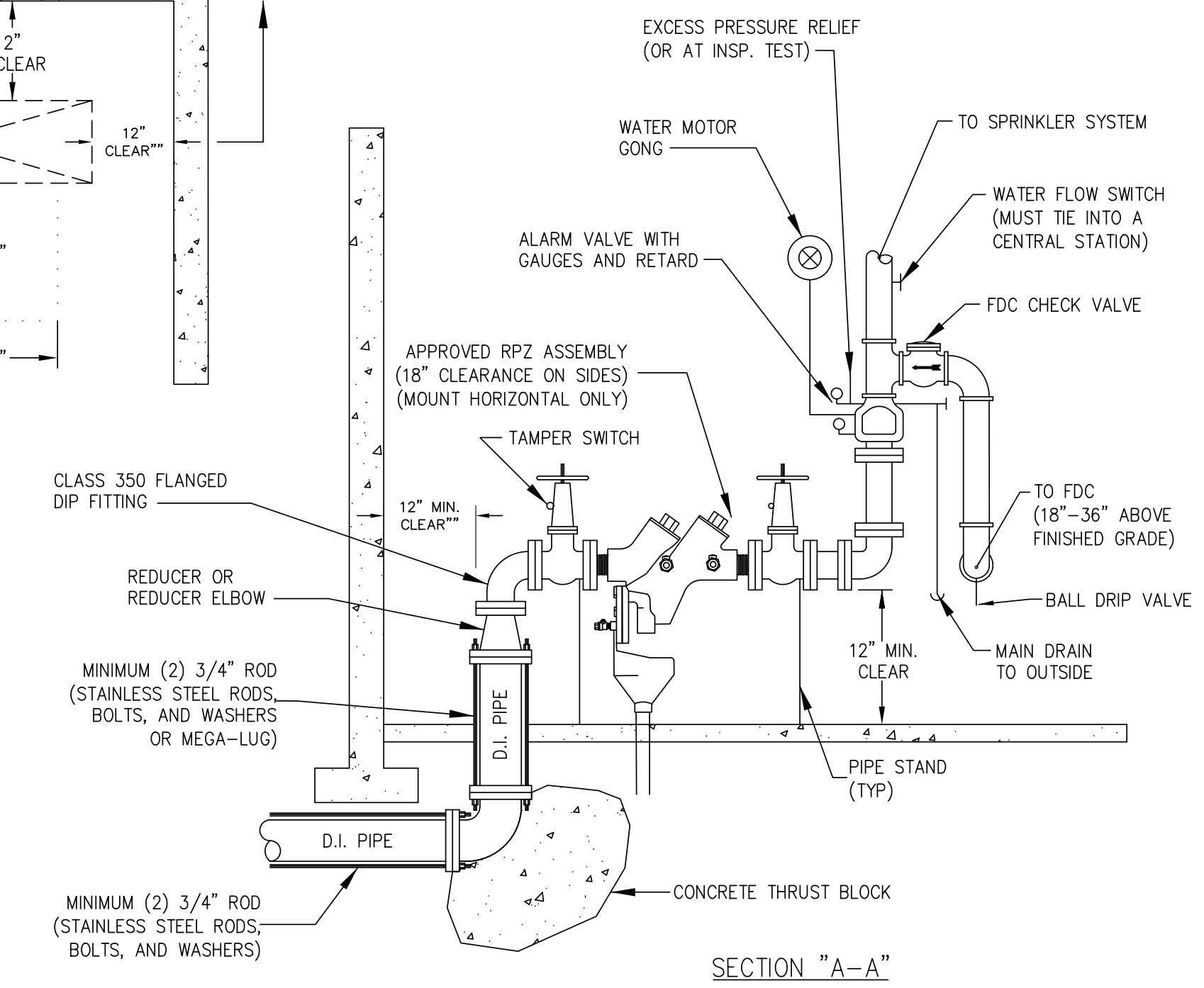
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PROJECT REFERENCE NO. R-5021	SHEET NO. UC-3E
DESIGNED BY:	9/9/2001
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	
D. Stephen Scruggs UTILITIES CONSTRUCTION PLANS ONLY	

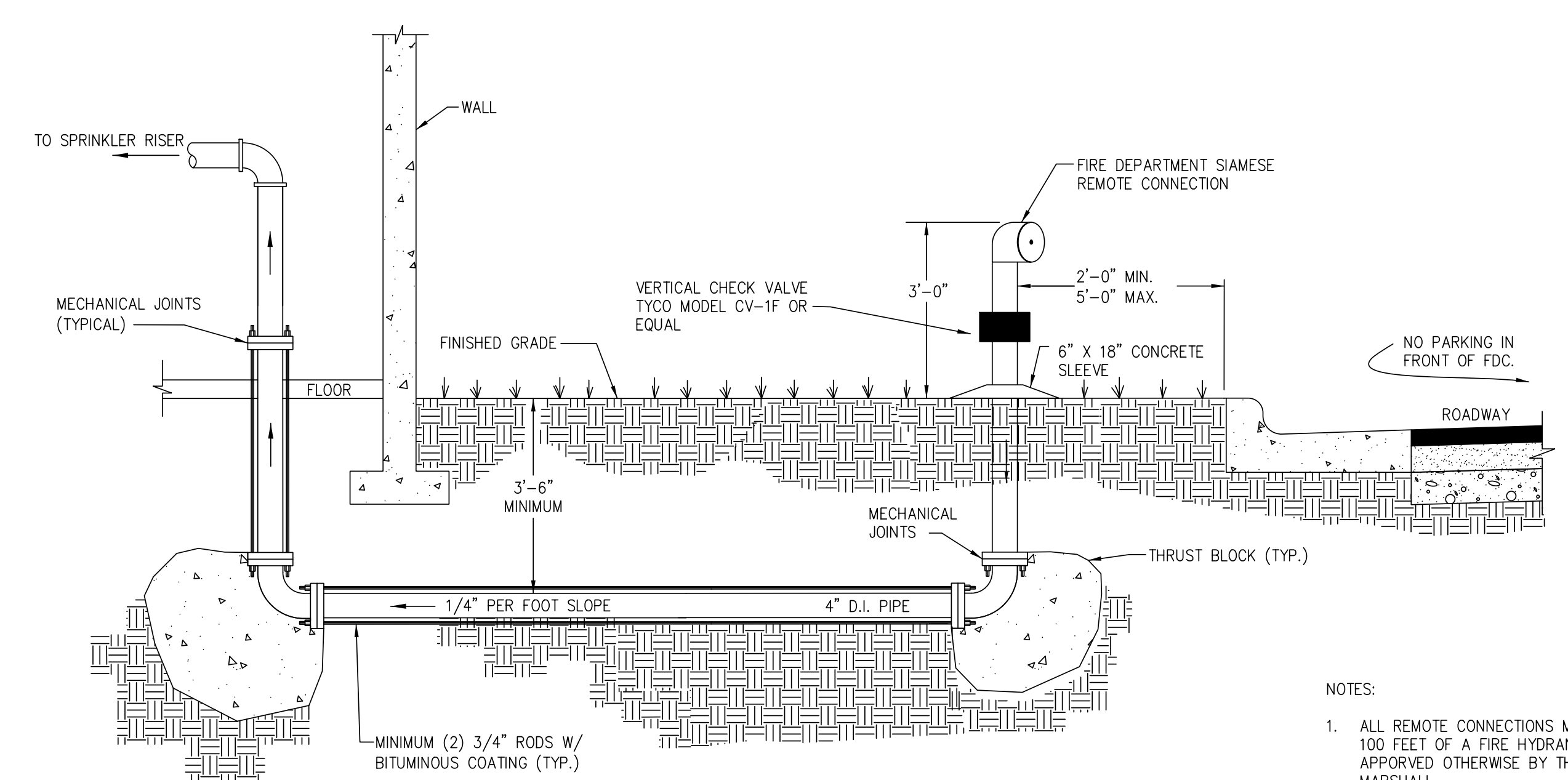
UTILITY CONSTRUCTION



NOTES:
- SPRINKLER RISER SHALL BE INSIDE BUILDING
- ACCESS SHALL BE PROVIDED FROM EXTERIOR OF BUILDING AND LOCK SHALL BE KEYPED TO BRUNSWICK COUNTY STANDARD LOCK



STANDARD SPRINKLER RISER
DETAIL W-15



- NOTES:
1. ALL REMOTE CONNECTIONS MUST BE WITHIN 100 FEET OF A FIRE HYDRANT OR AS APPROVED OTHERWISE BY THE FIRE MARSHALL.
 2. FIRE DEPARTMENT CONNECTION CAN BE ATTACHED TO BUILDING - SEE W-14
 3. FDC MAY BE REQUIRED TO BE A 5\"/>

REMOTE FIRE DEPARTMENT CONNECTION
DETAIL W-16

Revisions

COUNTY OF BRUNSWICK

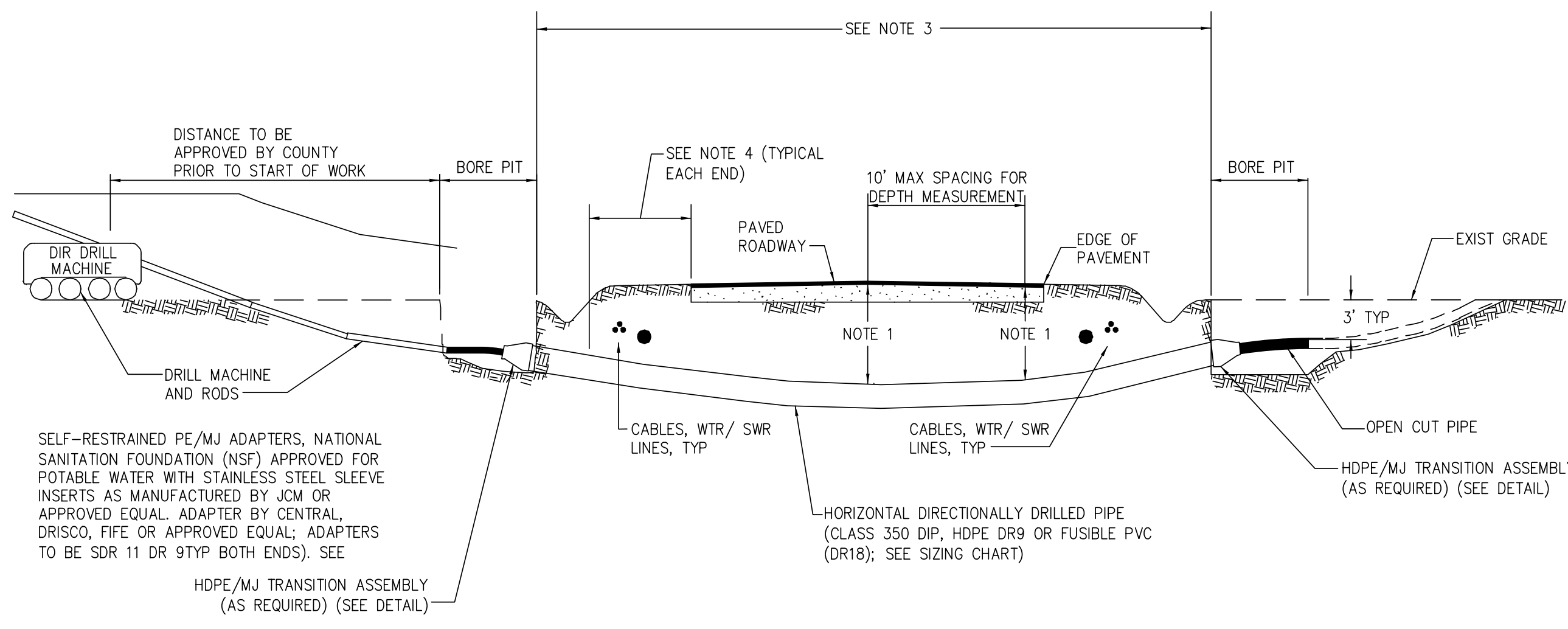
GENERAL WATER DETAILS
FOR
BRUNSWICK COUNTY
NORTH CAROLINA

Date: 06-05-12
Scale: NTS
Drawn By: JDM
Checked By: WLP

DATE: 8/13/2001
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UTILITY CONSTRUCTION

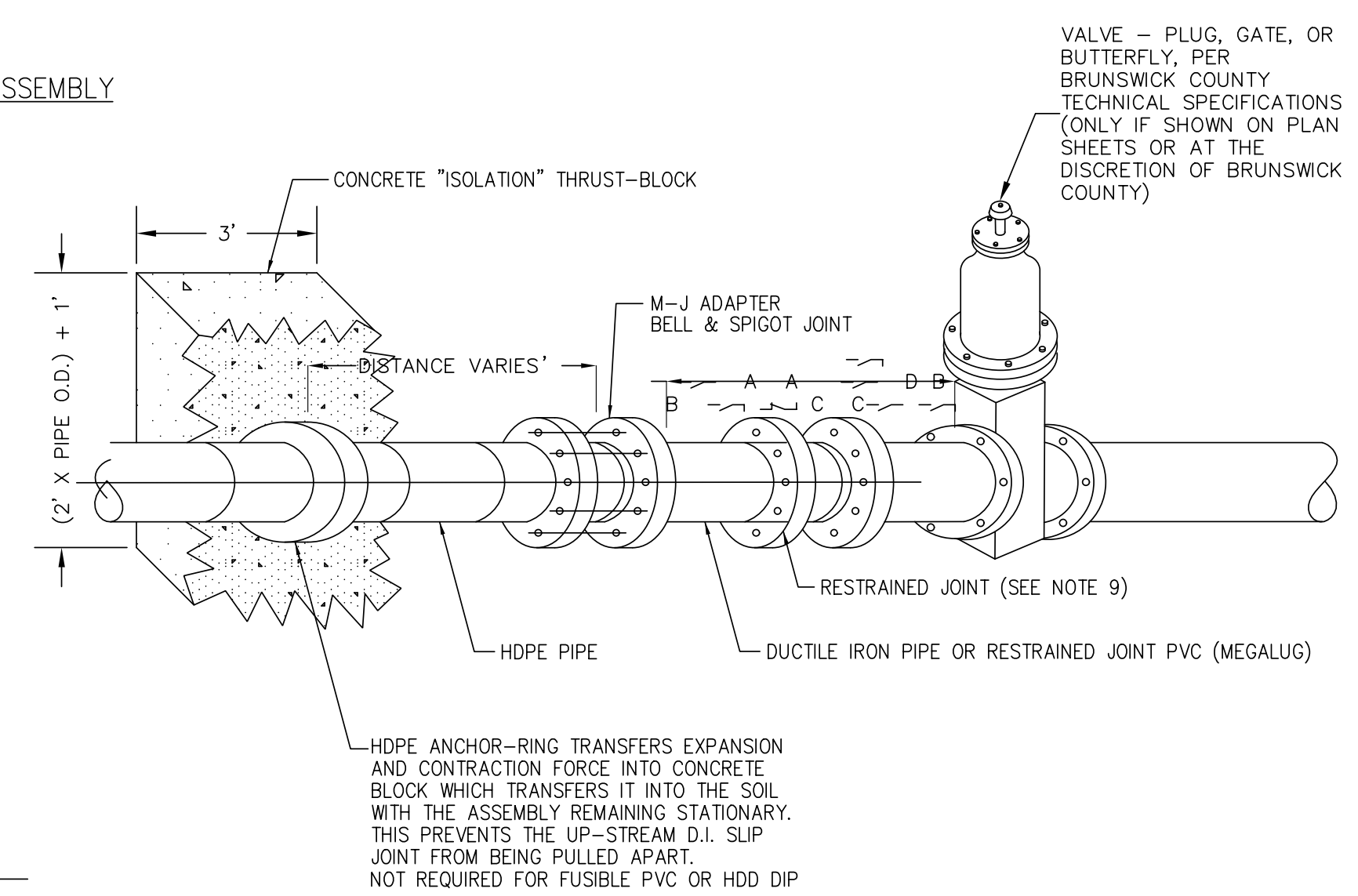


HDPE DIAMETER CONVERSION TABLE

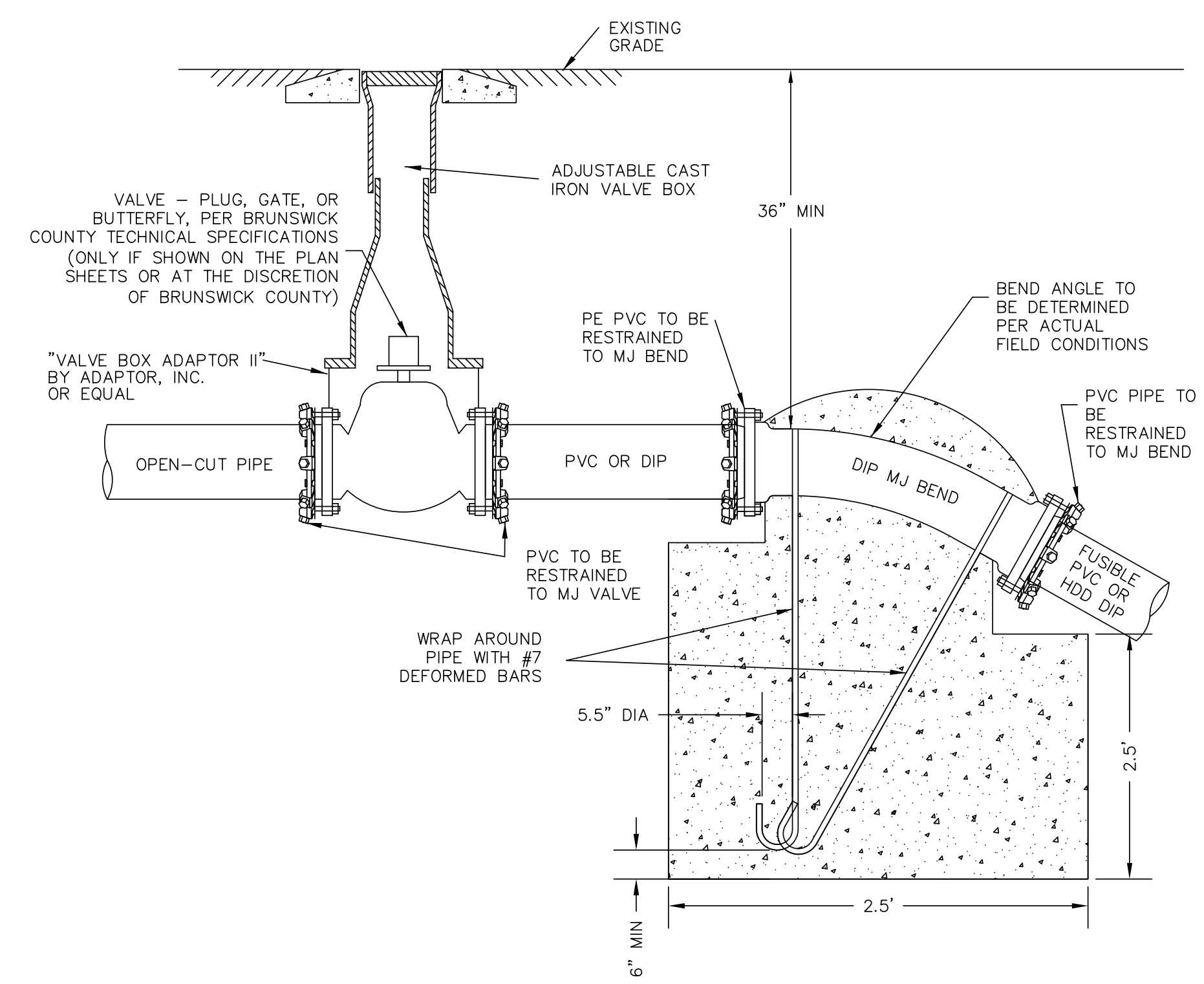
NOMINAL OPEN CUT PIPE SIZE (INCHES)	NOMINAL HDPE DR9 HDD PIPE SIZE (INCHES)
3	3
4	6
6	8
8	10
10	12
12	16
14	18
16	20
18	24
20	24
24	30
30	36

SELF-RESTRAINED PE/MJ ADAPTERS, NATIONAL SANITATION FOUNDATION (NSF) APPROVED FOR POTABLE WATER WITH STAINLESS STEEL SLEEVE INSERTS AS MANUFACTURED BY JCM OR APPROVED EQUAL. ADAPTER BY CENTRAL, DRISCO, FIFE OR APPROVED EQUAL; ADAPTERS TO BE SDR 11 DR 9TYP BOTH ENDS. SEE

HDPE/MJ TRANSITION ASSEMBLY WS-4A

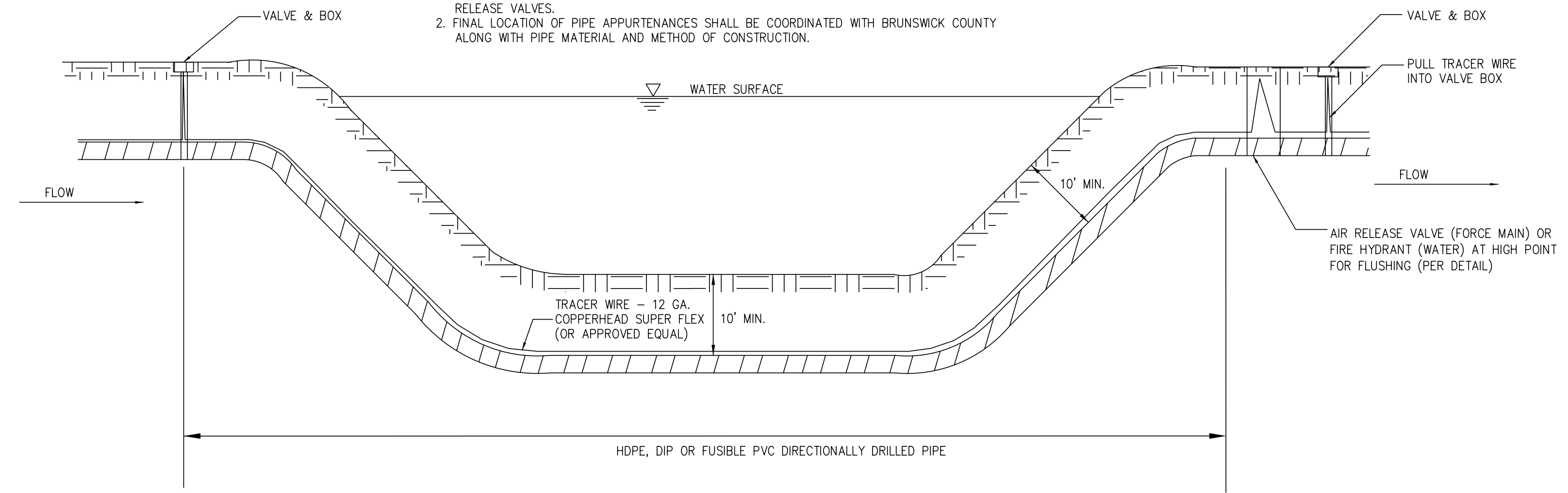


HDPE/MJ TRANSITION ASSEMBLY WS-4B



OPEN-CUT PIPE TO FUSIBLE PVC OR HDD DIP TRANSITION ASSEMBLY WS-4C

- NOTES:
1. THIS DETAIL IS A GENERAL SCHEMATIC SHOWING ISOLATION VALVE LOCATIONS AND AIR RELEASE VALVES.
 2. FINAL LOCATION OF PIPE APPURTENANCES SHALL BE COORDINATED WITH BRUNSWICK COUNTY ALONG WITH PIPE MATERIAL AND METHOD OF CONSTRUCTION.



VALVE LOCATIONS FOR DIRECTIONAL DRILL OF PIPE UNDER WETLANDS/WATER BODY DETAIL WS-5

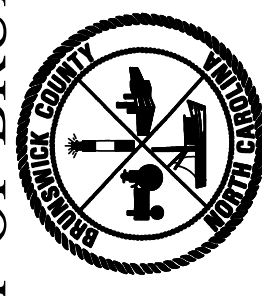
NOTES:

1. AN AS-BUILT PLAN AND PROFILE SHALL BE PROVIDED FROM ENTRY TO EXIT FOR EACH DIRECTIONAL BORE SECTION BY THE DIRECTIONAL BORE CONTRACTOR. THIS SHALL INCLUDE ACCURATE HORIZONTAL AND VERTICAL DIMENSIONS AND SHALL MEET OR EXCEED NCDOT VERTICAL REQUIREMENTS FROM HDD PIPE TO EDGE OF PAVEMENT.
2. ALL BORE SECTIONS SHALL BE HYDROSTATICALLY TESTED PER COUNTY STANDARDS AFTER INSTALLATION, AND PRIOR TO CONNECTION TO THE OPEN CUT WATER/SEWER LINE. A FINAL TEST WILL BE A PART OF THE TOTAL MAIN LINE SYSTEM TEST.
3. LENGTH OF CROSSING, LOCATION OF INSPECTION/OBSERVATION EXCAVATION, NUMBER OF HDD PIPE JOINTS, LOCATION OF DRILL MACHINE, AUGER ENTRANCE LOCATION AND TIE-IN POINTS ARE TO BE APPROVED BY COUNTY PRIOR TO ANY START OF WORK.
4. ON CONVENTIONAL HIGHWAYS, AS A MINIMUM, THE HDD PIPE SHALL EXTEND TO THE SHOULDER BREAK OR 10 FEET BEYOND THE EDGE OF PAVEMENT ON FILL SLOPES, WHICHEVER IS GREATER; 3 FEET BEYOND THE DITCH LINE IN CUTS; AND ON CURBED SECTIONS TO THE BACK OF THE SIDEWALK AREA. ON FREEWAYS, EXPRESSWAYS, AND OTHER CONTROLLED ACCESS HIGHWAYS, THE HDD PIPE WILL BE REQUIRED TO EXTEND TO THE ACCESS CONTROL LINES, TO THE OUTSIDE OF FRONTAGE ROADS, OR A SUFFICIENT DISTANCE TO ALLOW FOR FUTURE HIGHWAY IMPROVEMENTS, OR AS REQUIRED BY THE NCDOT ENCROACHMENT AGREEMENT.
5. THE BORE DEVELOPED FOR THE DIRECTIONALLY DRILLED PIPE SHALL BE KEPT AT A MINIMUM DIAMETER FOR THE PIPE INSTALLATION. THE AUGER HEAD SIZE SHALL BE APPROVED BY THE COUNTY PRIOR TO THE START OF WORK.
6. HORIZONTAL DIRECTIONAL DRILL OF NCDOT STATE ROADS TO BE APPROVED BY NCDOT PRIOR TO CONSTRUCTION. PIPE MATERIAL AND THICKNESS MAY VARY.
7. THE CONTRACTOR SHALL ALLOW SUFFICIENT LENGTHS OF PIPE TO EXTEND PAST THE TERMINATION POINT TO ALLOW FOR CONTRACTION. PULLED HDD PIPE SHALL BE ALLOWED TO RELAX A MINIMUM OF (48) HOURS OR THE AMOUNT OF TIME RECOMMENDED BY THE MANUFACTURER PRIOR TO INITIAL PRESSURE TEST AND MAKING CONNECTIONS.
8. FUSIBLE PVC HAS BEEN APPROVED FOR USE WITHIN NCDOT RIGHT-OF-WAYS.
9. MINIMUM OF (3) RESTRAINED JOINTS ARE REQUIRED UPSTREAM AND DOWNSTREAM OF DIP/HDPE/FUSIBLE PVC MJ ADAPTER ON EACH END OF THE HORIZONTAL DIRECTIONALLY DRILLED PIPE UNLESS OTHERWISE APPROVED BY BRUNSWICK COUNTY.
10. DIP NOT ALLOWED IN SEWER APPLICATION WITHOUT WRITTEN PERMISSION FROM BRUNSWICK COUNTY.

Revisions

- 1.1 - DATED 3/10/2017
Mod WS-4C
- 1.2 - DATED 1/23/2019
Mod NOTES
- 1.3 - DATED 3/14/2019
Mod NOTES

COUNTY OF BRUNSWICK



GENERAL WATER & SEWER DETAILS FOR
BRUNSWICK COUNTY
NORTH CAROLINA

Date: 07-13-12
Scale: NTS
Drawn By: JDM
Checked By: WLP

Prepared In the Office of:

AECOM

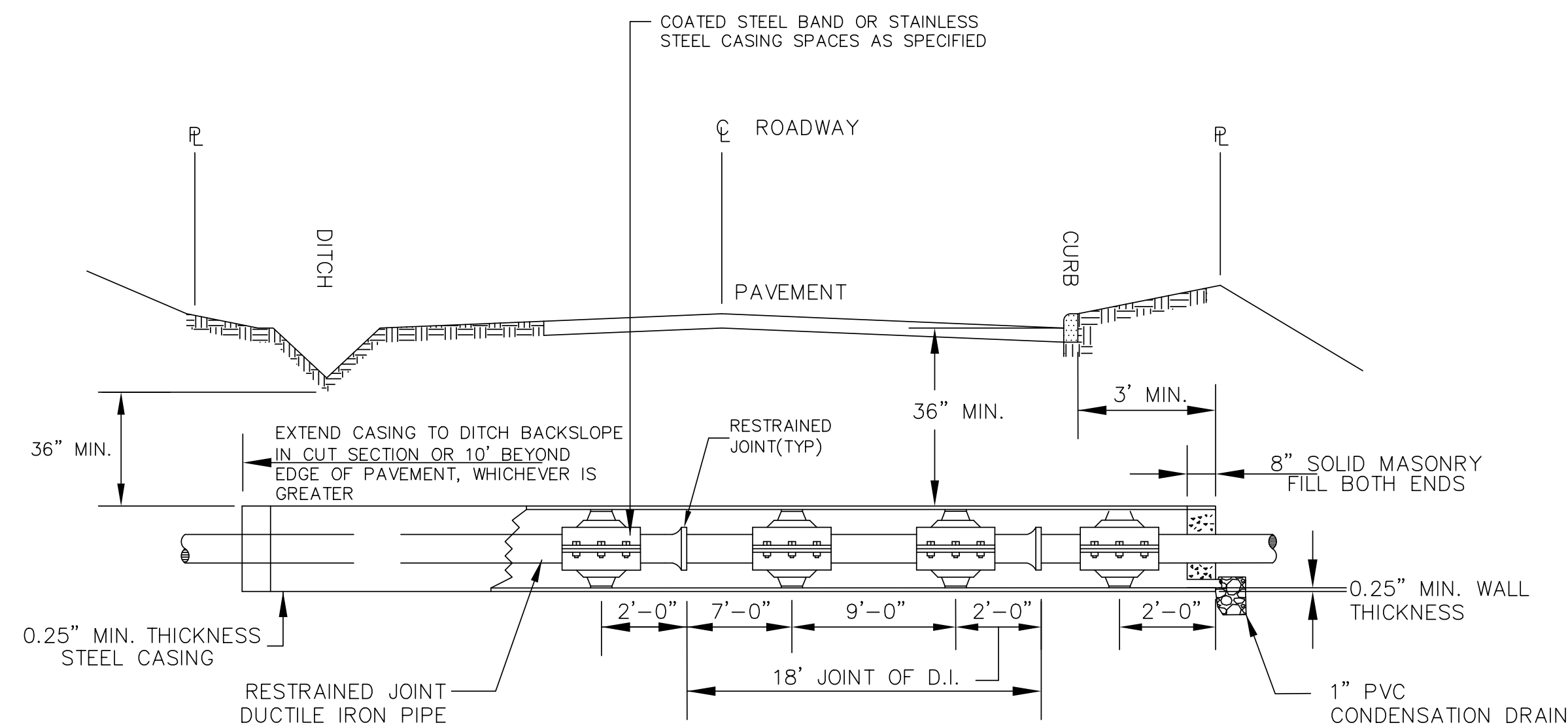
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919-854-6200 919-854-6259 (fax)
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PROJECT REFERENCE NO. R-5021 SHEET NO. UC-3H

DESIGNED BY: 9/9/2011
DRAWN BY:
CHECKED BY:
APPROVED BY:
REVISED:
NORTH CAROLINA
DEPARTMENT OF
TRANSPORTATION
UTILITIES ENGINEERING SEC.
PHONE: (919) 707-6690
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D. Stephen Scruggs
SEAL
10666
PROFESSIONAL
ENGINEER
STEPHEN SCRUGGS

UTILITY CONSTRUCTION



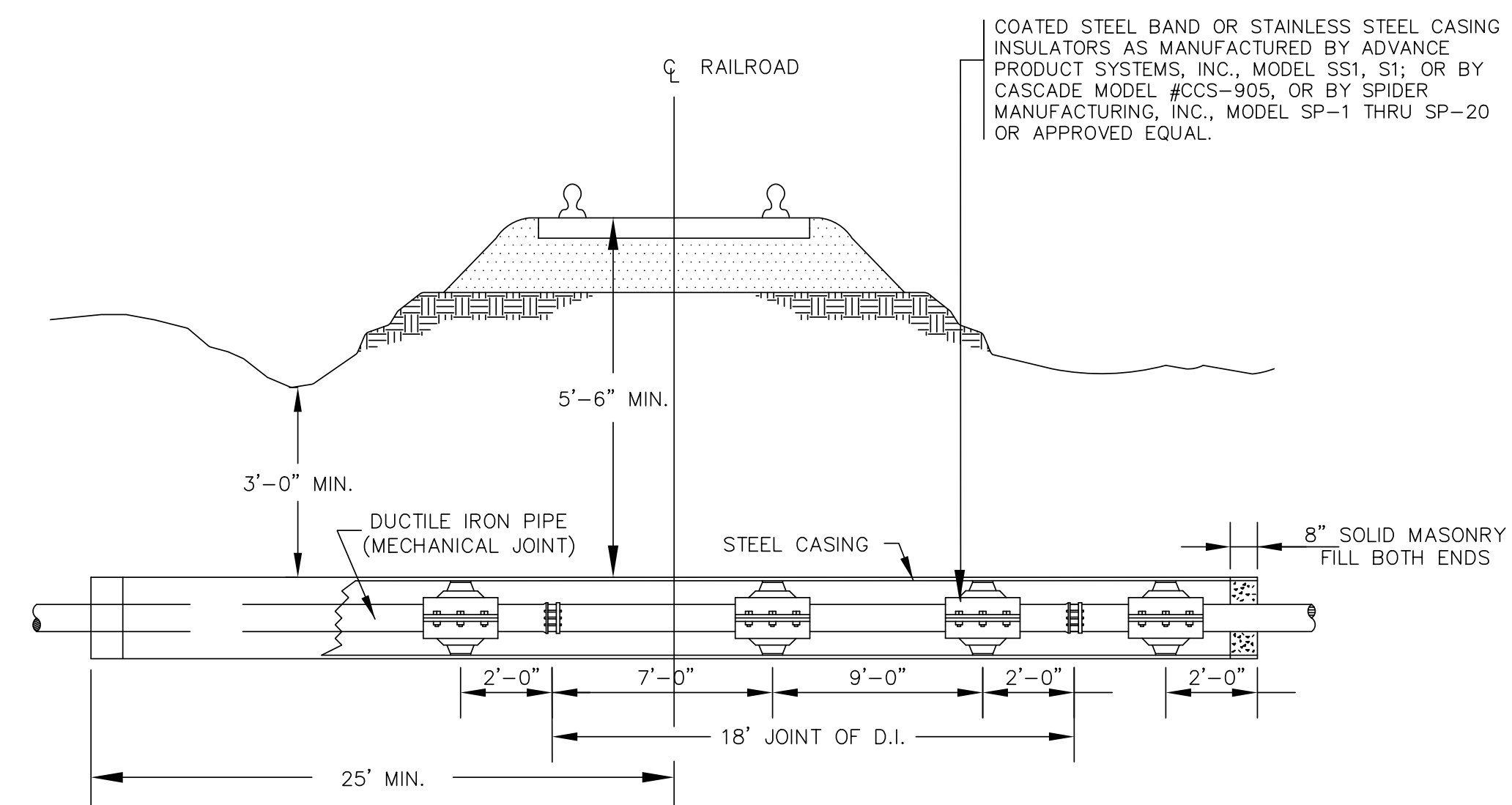
NOTE:

- ALL PIPELINES LARGER THAN 6" NOMINAL INSIDE DIAMETER INSTALLED BY BORING AND JACKING SHALL BE INSTALLED WITH STEEL ENCASEMENT (0.250" MIN. THICKNESS.)
- ENDS OF CASING SHALL BE SEALED USING A MODEL AC PULL-ON END SEAL GASKET, AS MANUFACTURED BY ADVANCE PRODUCT SYSTEMS, INC., OR APPROVED EQUAL IN LIEU OF MASONRY FILL.
- STEEL CASING SHALL EXTEND A MINIMUM OF 3' BEYOND BACK OF CURB, SIDEWALK, OR PAVEMENT EDGE. FOR STREETS WITH A SHOULDER AND DITCH CROSS SECTION, CASING SHALL EXTEND TO BACK SLOPE OF DITCH IN CUT SECTIONS OR TO 10' BEYOND EDGE OF PAVEMENT, WHICHEVER IS GREATER.
- WHEN CARRIER PIPE IS USED FOR CONVEYING LIQUID FLAMMABLE SUBSTANCES, VENT PIPES SHALL BE PROVIDED FROM ENDS OF CASING TO PROPERTY LINE.
- CASING PIPE SECTION JOINTS SHALL BE WELDED COMPLETELY AROUND THE CIRCUMFERENCE OF EACH JOINT, NO GAPS IN WELDED BEAD ALLOWED.
- DIP NOT ALLOWED IN SEWER APPLICATIONS.
- PER NCDOT:

WELDING 1072-18: QUALIFICATIONS OF PERSONNEL

WELDERS MUST BE CERTIFIED TO MEET STATE REQUIREMENTS AS NOTED WITHIN THE NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES (2012). UPON REQUEST, EVIDENCE OF SUCH QUALIFICATIONS SHALL BE FURNISHED TO THE NCDOT DEPARTMENT ENGINEER OR HIS/HER REPRESENTATIVE.

JACK AND BORE FOR ROADWAYS
DETAIL WS-6



ALSO SEE THE "A.R.E.A. MANUAL FOR RAILWAY ENGINEERING - PART 5, PIPELINES"

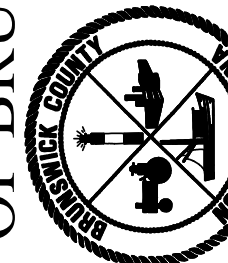
- NOTE:
- ENDS OF CASING SHALL BE SEALED USING A MODEL AC PULL-ON END SEAL GASKET, AS MANUFACTURED BY ADVANCE PRODUCT SYSTEMS, INC., OR APPROVED EQUAL IN LIEU OF MASONRY FILL.
 - MINIMUM WALL THICKNESS FOR STEEL CASING FOR E80 LOADING SHALL BE AS SPECIFIED IN TABLE 5.1.4.1 OF THE AMERICAN RAILWAY ENGINEERING ASSOCIATION (A.R.E.A.) MANUAL.
 - WHEN CARRIER PIPE IS USED FOR CONVEYING LIQUID FLAMMABLE SUBSTANCES, VENT PIPES SHALL BE PROVIDED FROM ENDS OF CASING TO PROPERTY LINE AS SPECIFIED IN SECTION 5.1.5.5 OF THE A.R.E.A. MANUAL.
 - RAILROAD OWNER (CSX, NORFOLK SOUTHERN, ETC.) WILL PROVIDE MINIMUM DESIGN CRITERIA.
 - DIP NOT ALLOWED IN SEWER APPLICATIONS.

JACK AND BORE FOR RAILROADS
DETAIL WS-7

Revisions

- 1.1 - DATED 5/29/2013
Added Note 6 to WS-6
- 1.2 - DATED 1/23/2019
Added Note to WS-6 & WS-7

COUNTY OF BRUNSWICK



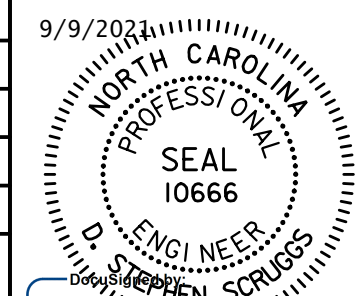
GENERAL WATER & SEWER DETAILS
FOR
BRUNSWICK COUNTY
NORTH CAROLINA

Date: 07-11-12
Scale: NTS
Drawn By: JDM
Checked By: WLP

Prepared In the Office of:

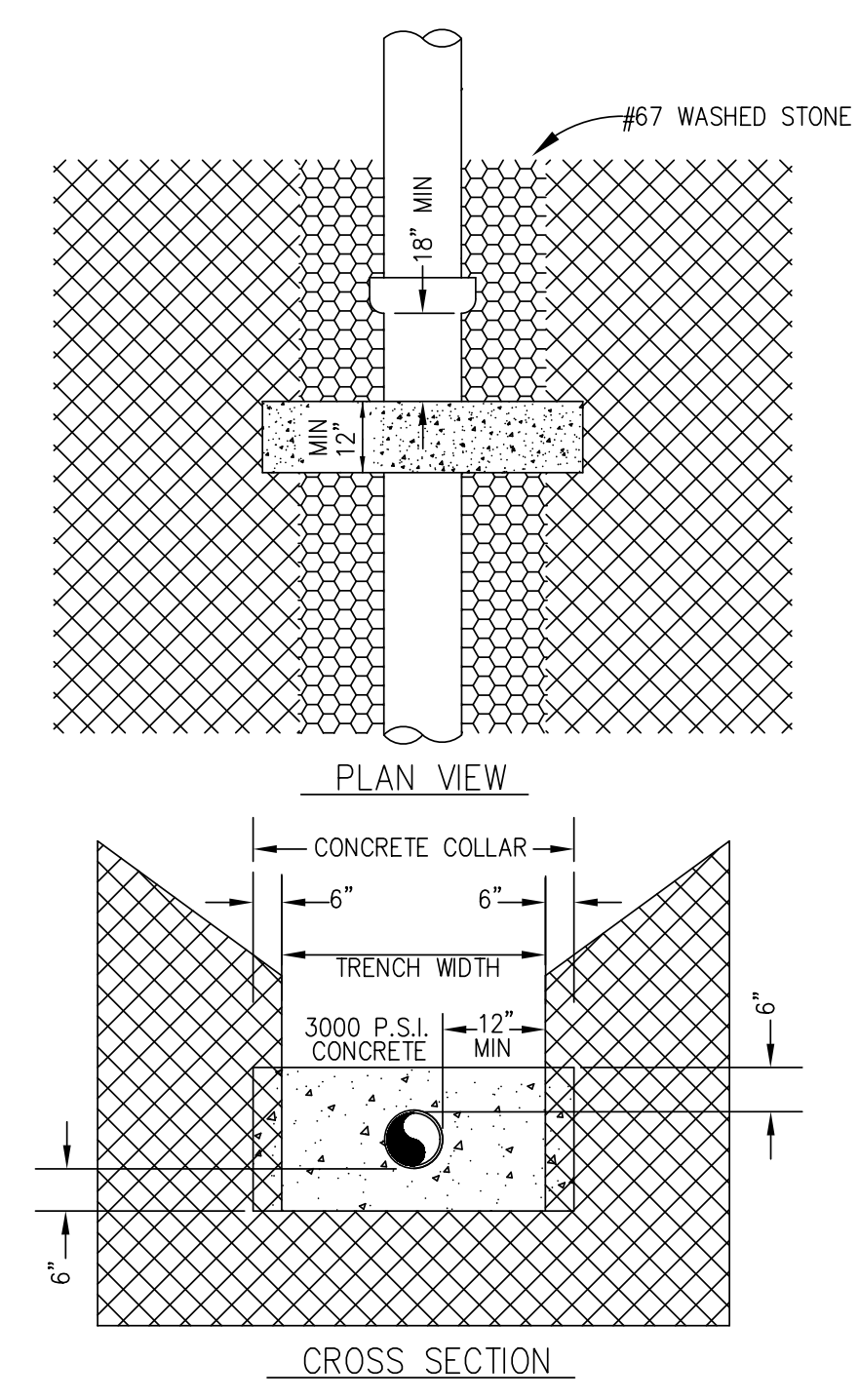
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919-854-6200 919-854-6259 (fax)
F - 0342

PROJECT REFERENCE NO. R-5021	SHEET NO. UC-31
DESIGNED BY:	9/9/2004
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
REVISED:	
	
D. Stephen Scruggs UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	

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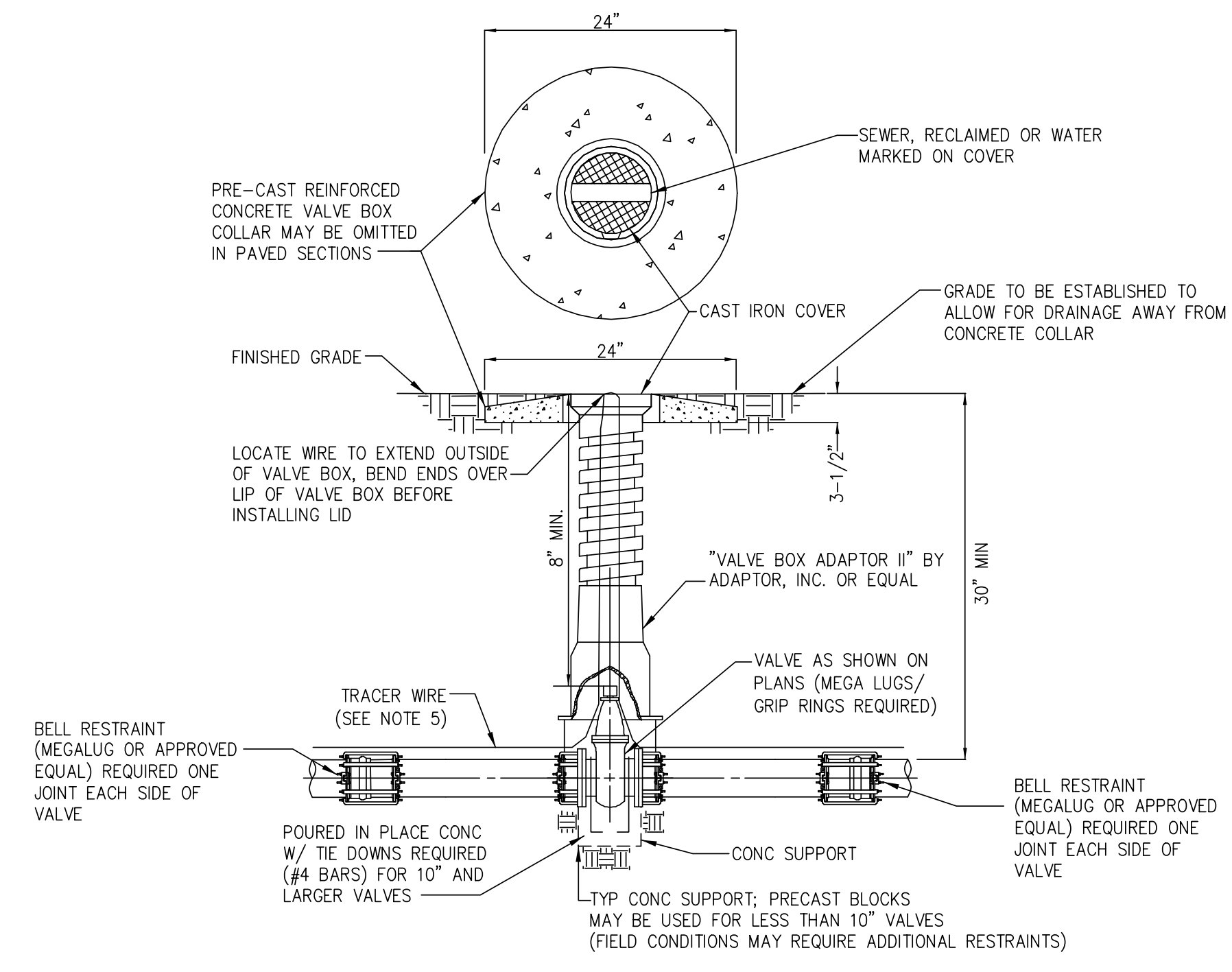
UTILITY CONSTRUCTION



PIPE COLLAR DETAIL
WS-8

NOTES:

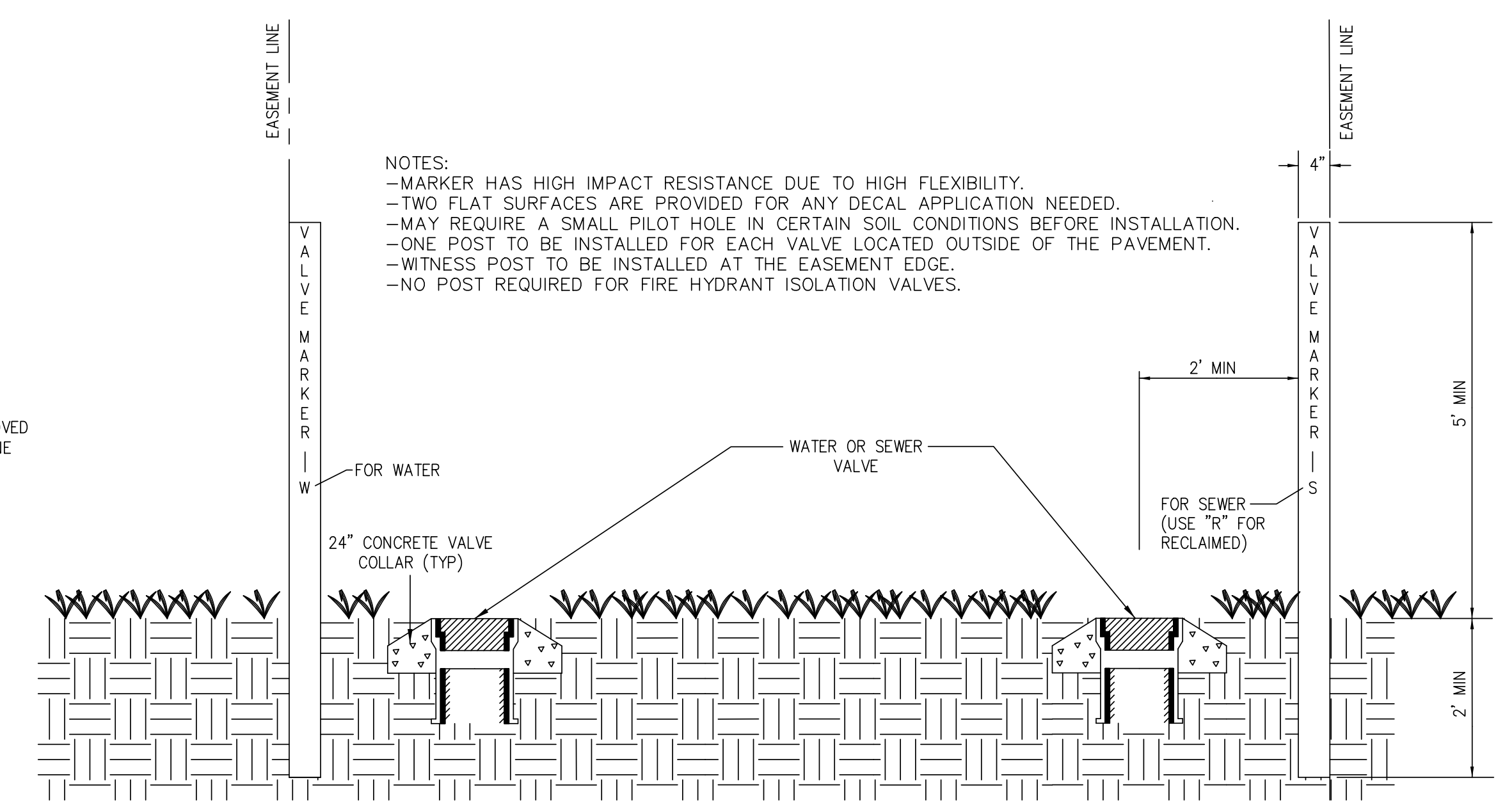
1. UNRESTRAINED SEWER LINES ON 20% SLOPE OR GREATER SHALL BE ANCHORED SECURELY WITH CONCRETE COLLARS. MINIMUM 1 CONCRETE COLLAR PER PIPE JOINT. ADDITIONAL COLLARS MAY BE REQUIRED BY ENGINEER.
2. COLLARS FOR ANTI-SEEPAGE (PIPING) CONTROL FOR PIPELINES CONSTRUCTED THROUGH WETLANDS SHALL BE INSTALLED AT LOCATIONS SHOWN ON THE PLANS.



VALVE BOX
DETAIL WS-9

NOTES:

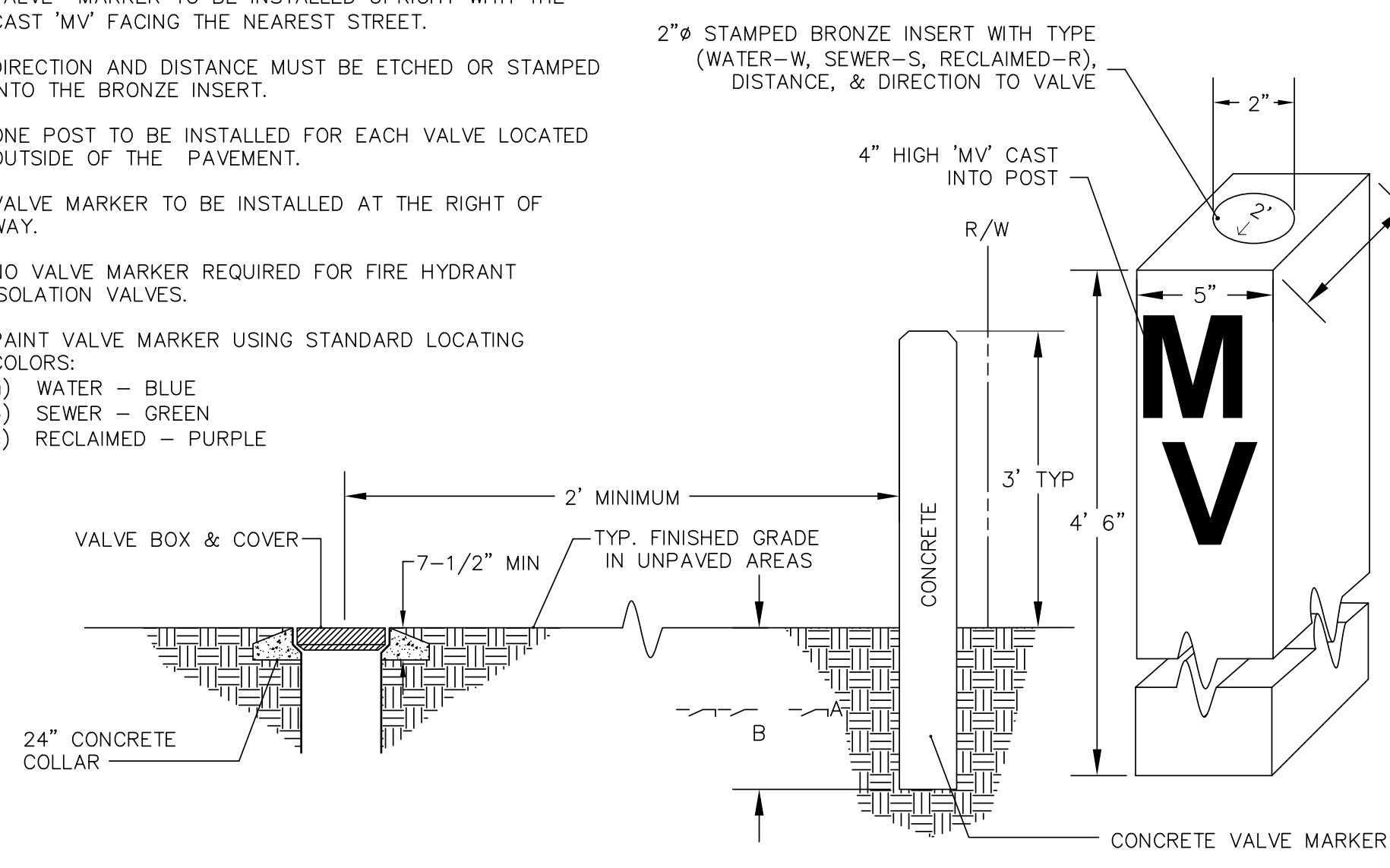
1. TOP OF VALVE BOX AND COLLAR SHALL BE PAINTED GREEN FOR SEWER FM, PURPLE FOR RECLAIMED WATER, AND BLUE FOR WATER.
2. EXTENSION STEM WILL BE REQUIRED TO BE WITHIN 2 FEET OF THE SURFACE IF OPERATING NUT WOULD OTHERWISE BE OVER 5 FEET BELOW GRADE. EXTENSIONS SHALL BE PERMANENTLY ATTACHED TO VALVE NUT AND SHALL BE PROVIDED WITH HORIZONTAL SPACERS FOR VERTICAL ALIGNMENT WITHIN THE VALVE BOX.
3. MINIMUM CLEARANCE TO EXTENSION IS 8".
4. WIRE COLORS REQUIRED: SEWER-GREEN/WATER-BLUE/RECLAIMED WATER-PURPLE OR GREEN WITH PURPLE STRIPE
5. 12 GA. COPPERHEAD SUPER FLEX TRACER WIRE OR APPROVED EQUAL.



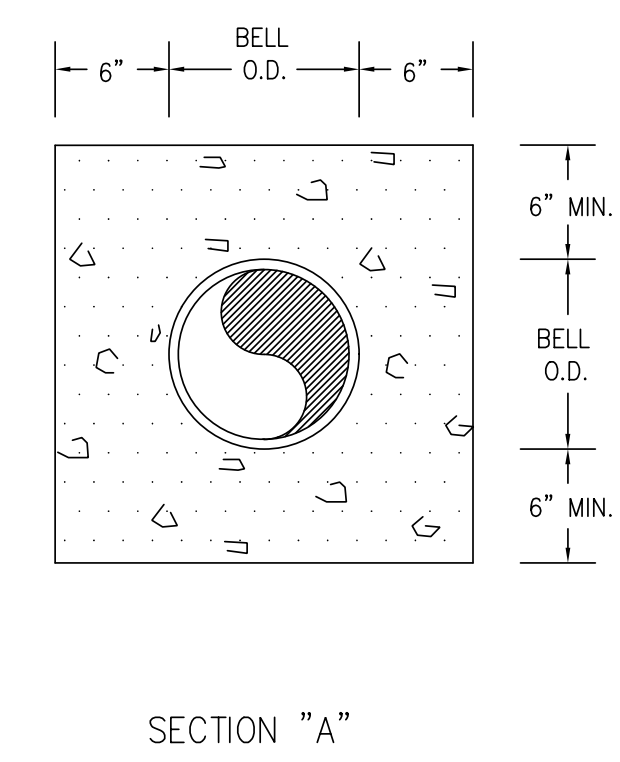
VALVE MARKER IN EASEMENTS (UNPAVED)
DETAIL WS-10

NOTES:

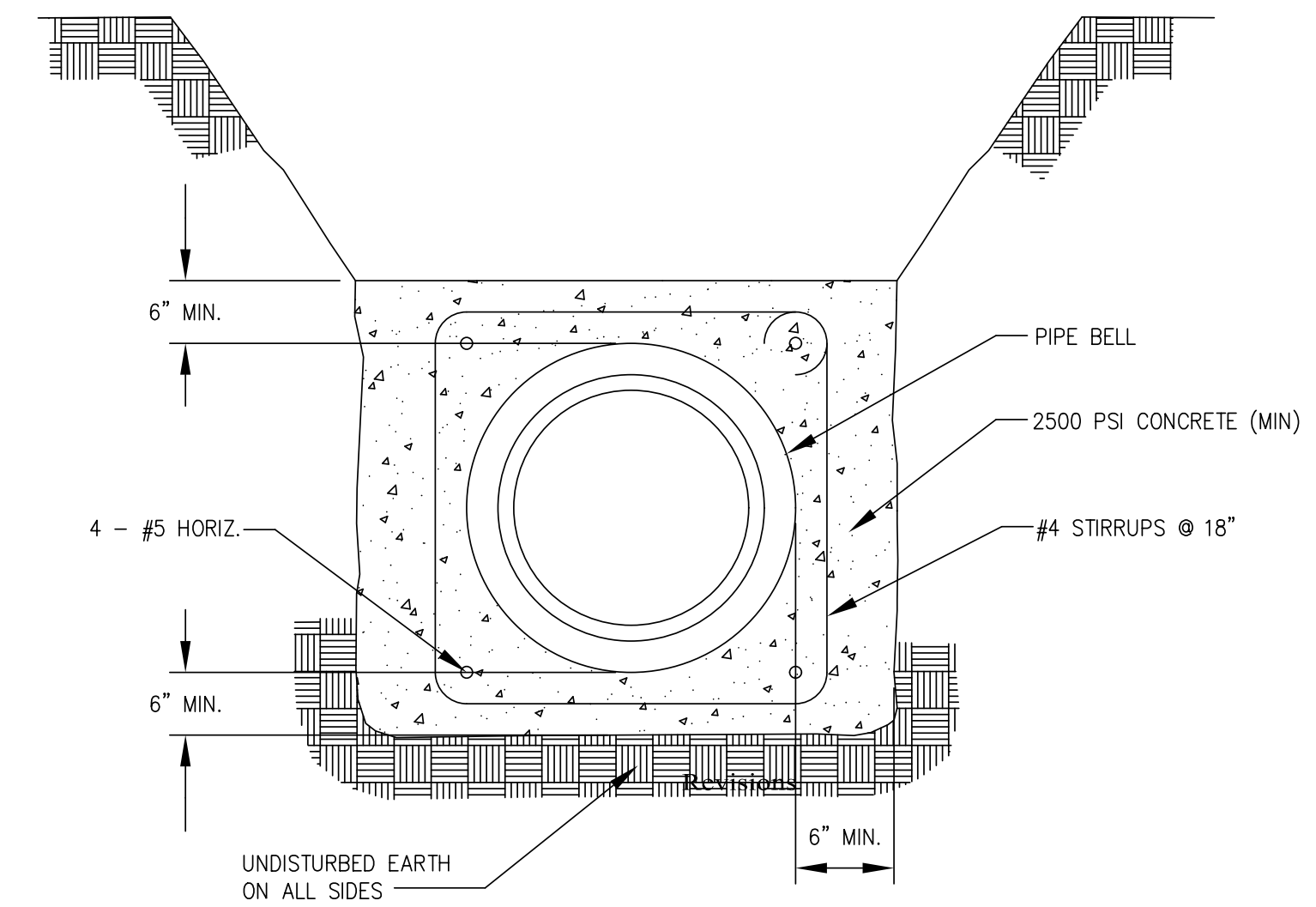
1. VALVE MARKER TO BE INSTALLED UPRIGHT WITH THE CAST 'MV' FACING THE NEAREST STREET.
2. DIRECTION AND DISTANCE MUST BE ETCHED OR STAMPED INTO THE BRONZE INSERT.
3. ONE POST TO BE INSTALLED FOR EACH VALVE LOCATED OUTSIDE OF THE PAVEMENT.
4. VALVE MARKER TO BE INSTALLED AT THE RIGHT OF WAY.
5. NO VALVE MARKER REQUIRED FOR FIRE HYDRANT ISOLATION VALVES.
6. PAINT VALVE MARKER USING STANDARD LOCATING COLORS:
 - a) WATER - BLUE
 - b) SEWER - GREEN
 - c) RECLAIMED - PURPLE



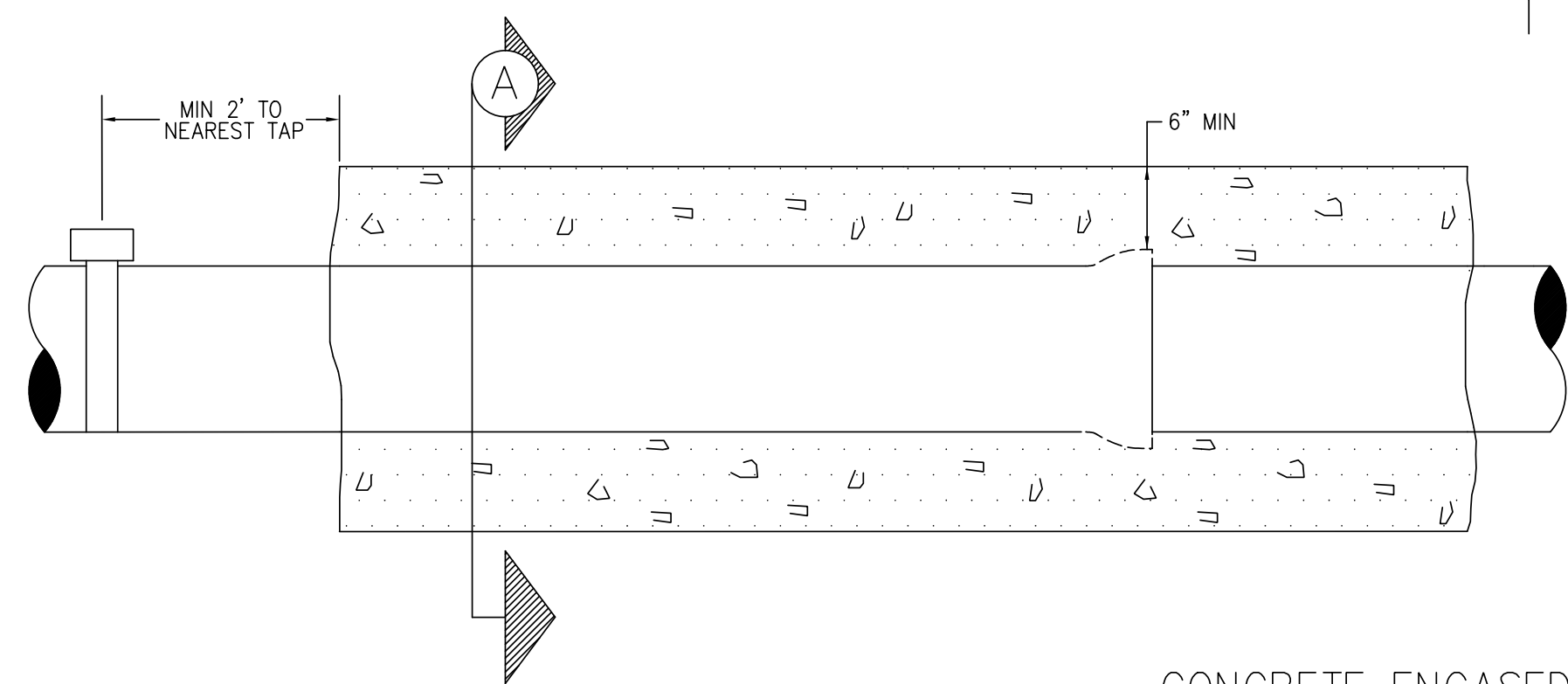
VALVE MARKER IN RIGHT OF WAY (PAVED)
DETAIL WS-11



SECTION "A"

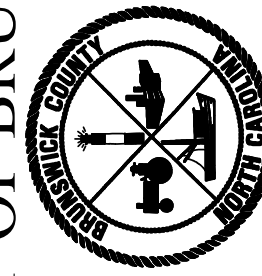


CONCRETE ENCASEMENT DETAIL



CONCRETE ENCASED PIPE
DETAIL WS-12

COUNTY OF BRUNSWICK



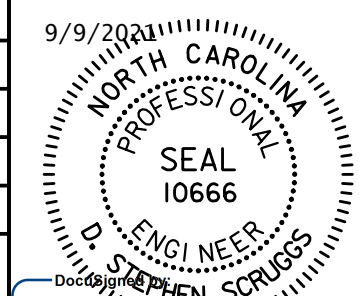
GENERAL WATER & SEWER DETAILS
FOR
BRUNSWICK COUNTY
NORTH CAROLINA

Date: 06-12-12
Scale: NTS
Drawn By: JDM
Checked By: WLP

- 1.1 - DATED 7/15/2015
Mod collar dim. WS-9 & 10
- 1.2 - DATED 3/10/2017
Revise WS-9
- 1.3 - DATED 7/31/2018
Revise WS-11

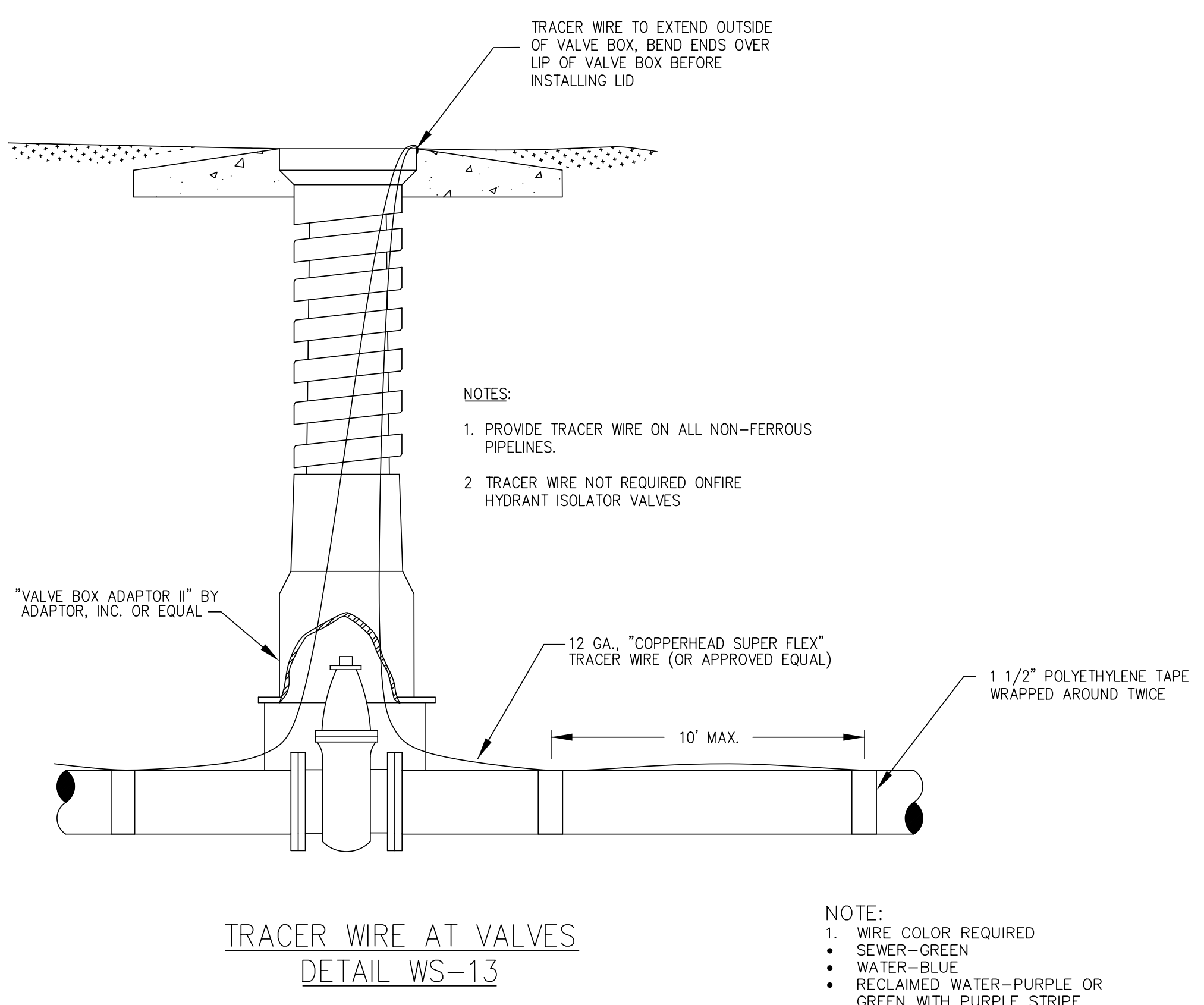
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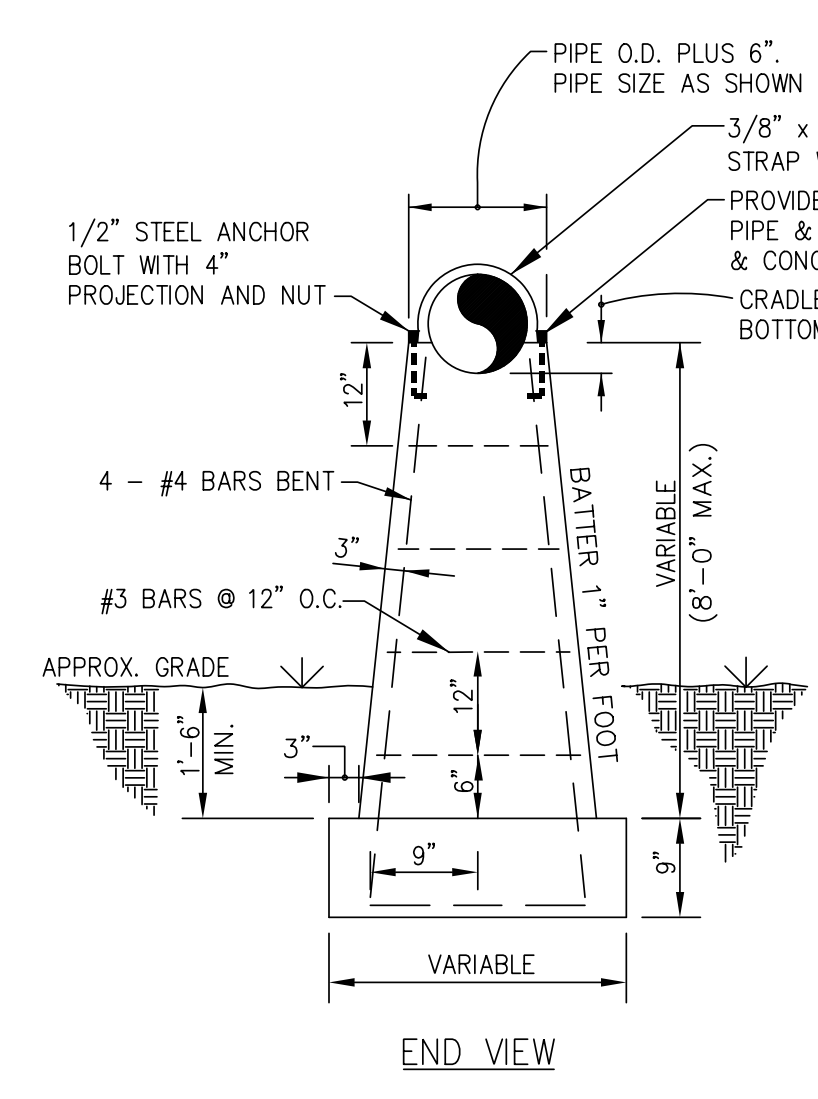
UTILITY CONSTRUCTION



- NOTES:
1. PROVIDE TRACER WIRE ON ALL NON-FERROUS PIPELINES.
 2. TRACER WIRE NOT REQUIRED ON FIRE HYDRANT ISOLATOR VALVES

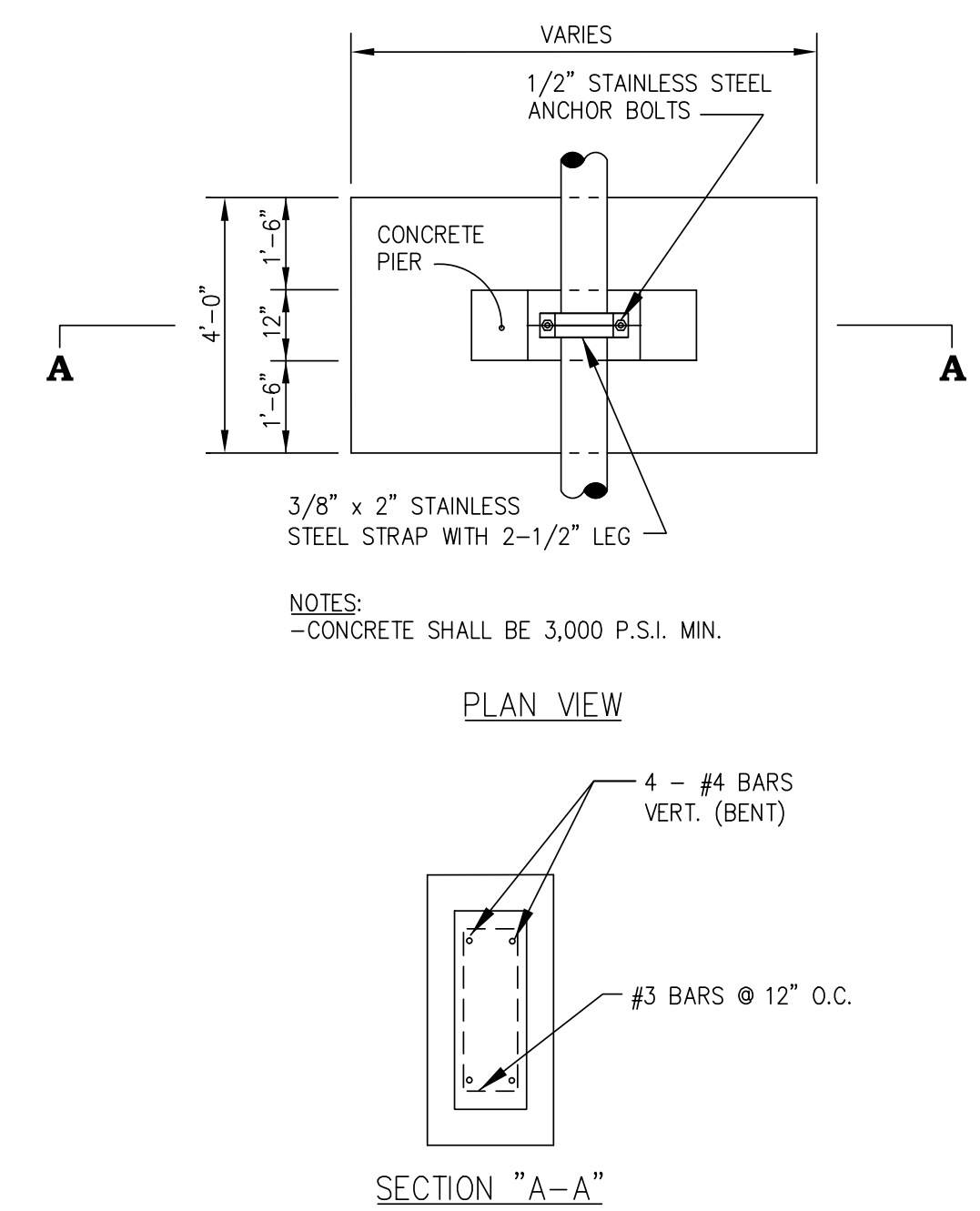
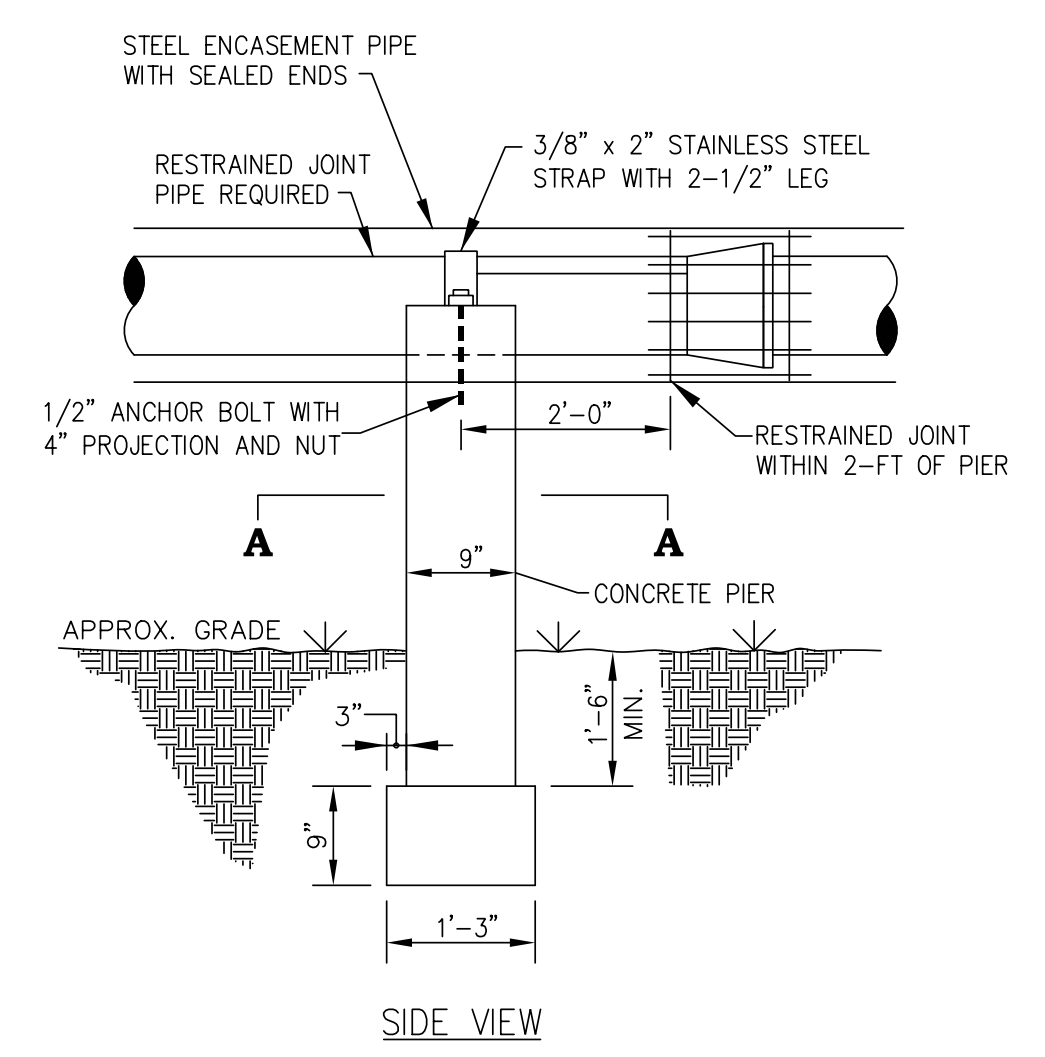
- NOTE:
1. WIRE COLOR REQUIRED
 - SEWER-GREEN
 - WATER-BLUE
 - RECLAIMED WATER-PURPLE OR GREEN WITH PURPLE STRIPE

TRACER WIRE AT VALVES
 DETAIL WS-13



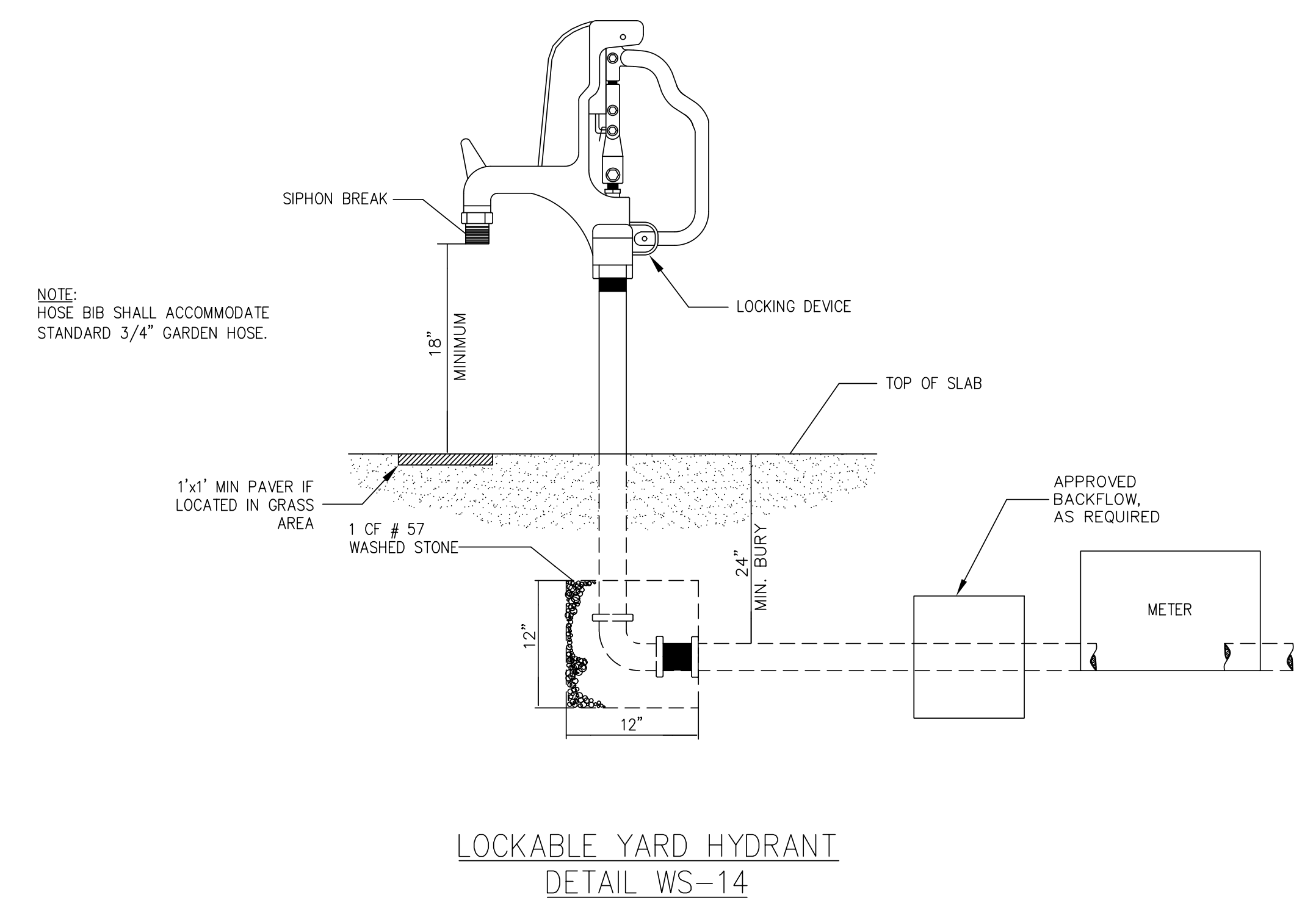
- NOTES:
1. PIERS OVER 3'-0" IN HEIGHT TO BE REINFORCED.
 2. SET PIPE BOTTOM A MINIMUM OF 2' ABOVE THE 25 YEAR WATER SURFACE ELEVATION.
 3. CAST-IN-PLACE CONCRETE SHALL BE FIELD TESTED.
 4. AT A MINIMUM, ONE PIER MUST BE INSTALLED EVERY 20-FT OR AS DIRECTED BY THE ENGINEER.
 5. ENGINEER SHALL VERIFY FOUNDATION REQUIREMENTS, REBAR SIZE, AND ALL OTHER DIMENSIONS.
 6. SEWER PIPE MUST BE DR-18 C900 AND ENCLOSED WITH STEEL CASING WITH SEALED ENDS.
 7. WATER PIPE MAY BE DIP OR DR-18 C900 WITH STEEL CASING WITH SEALED ENDS.

AERIAL PIPE CROSSING
 DETAIL WS-15

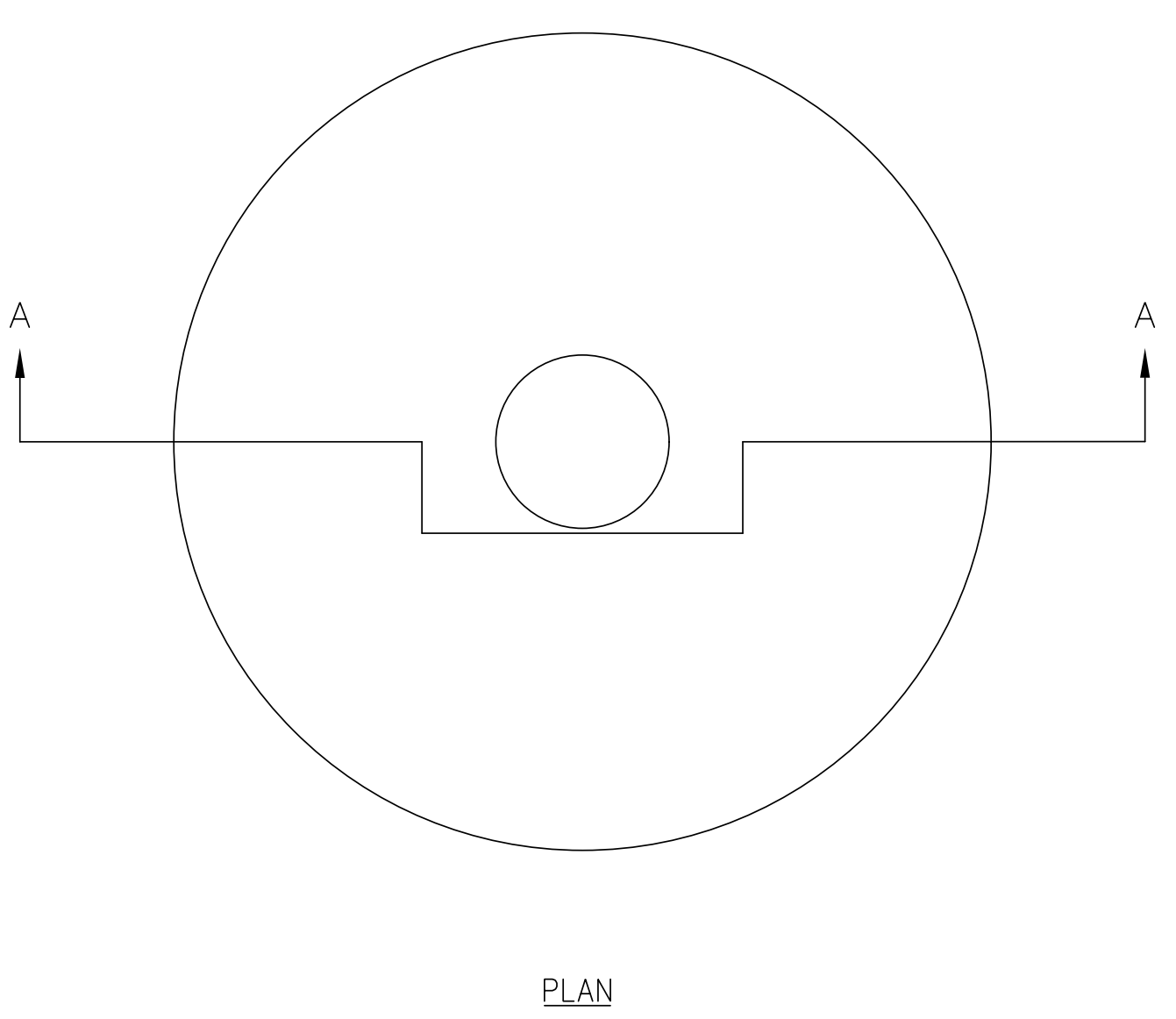


Revisions

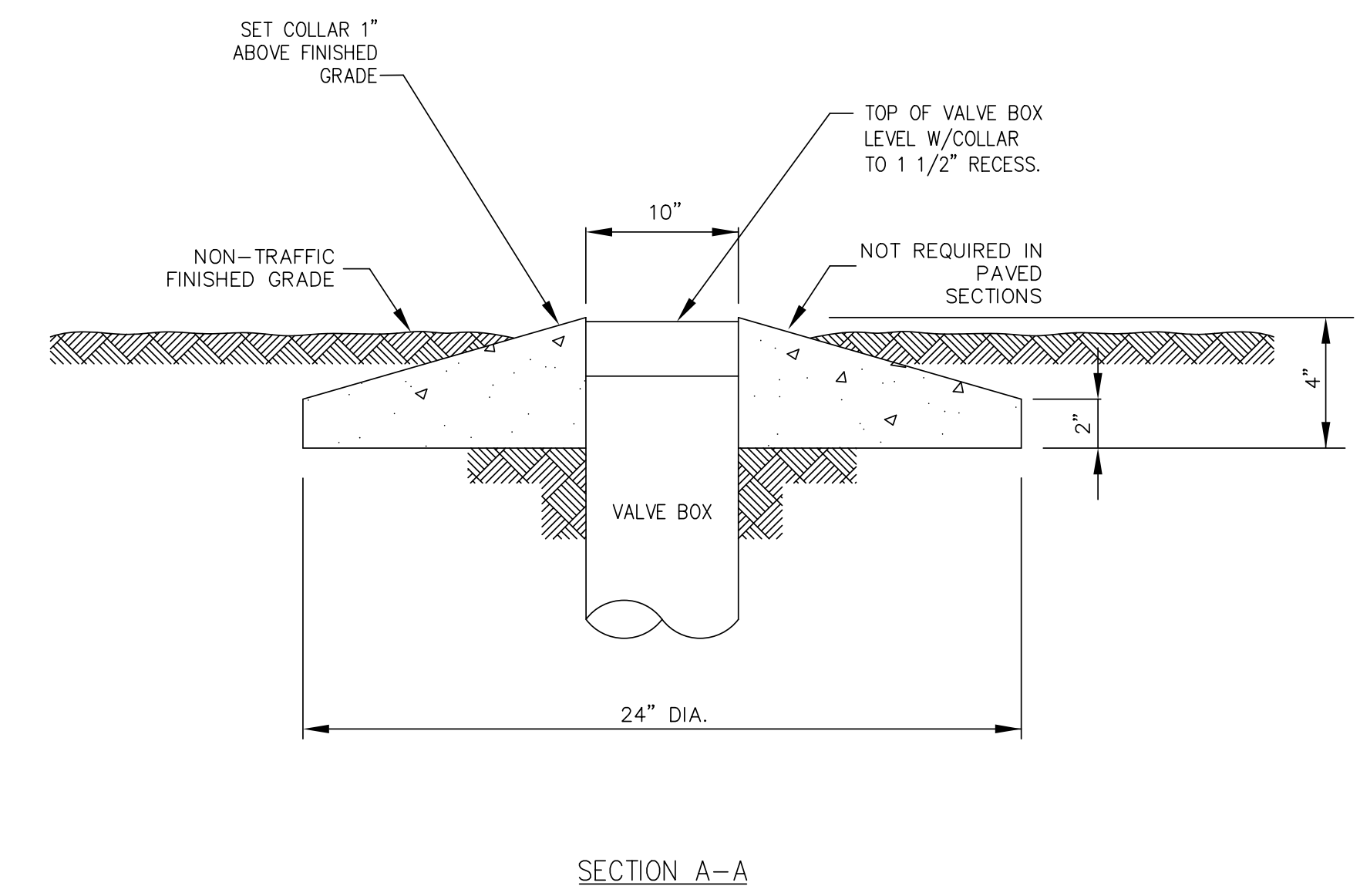
1.1 - DATED 7/12/2013	Mod WS-16
1.2 - DATED 3/10/2017	Mod WS-13
1.3 - DATED 1/23/2019	Mod WS-15



NOTE:
 HOSE BIB SHALL ACCOMMODATE STANDARD 3/4" GARDEN HOSE.



PRECAST CONCRETE VALVE BOX COLLAR
 DETAIL WS-16

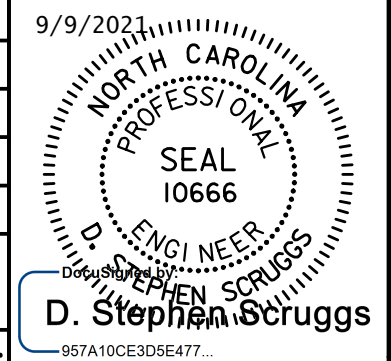


COUNTY OF BRUNSWICK

GENERAL WATER & SEWER DETAILS
 FOR
BRUNSWICK COUNTY
 NORTH CAROLINA

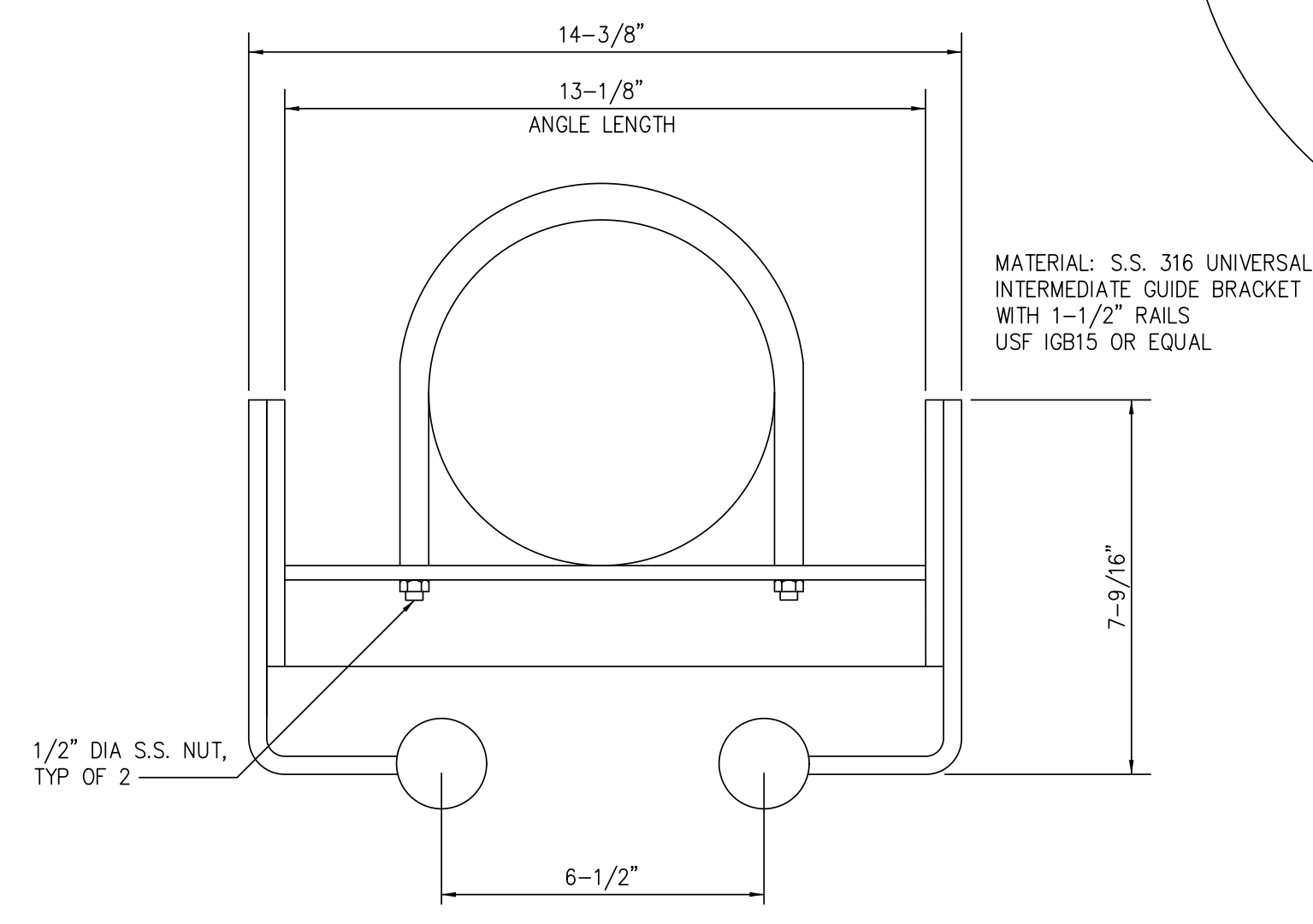
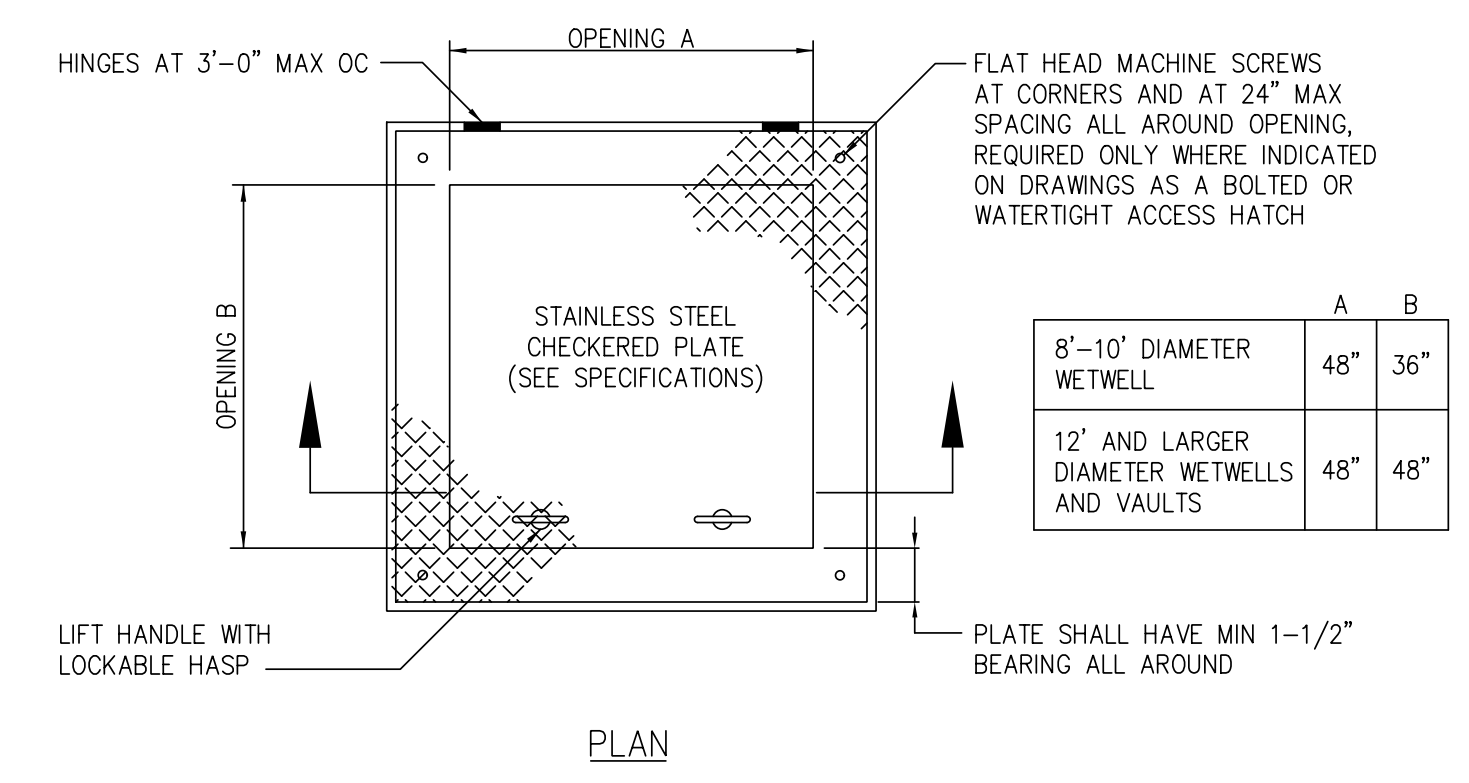
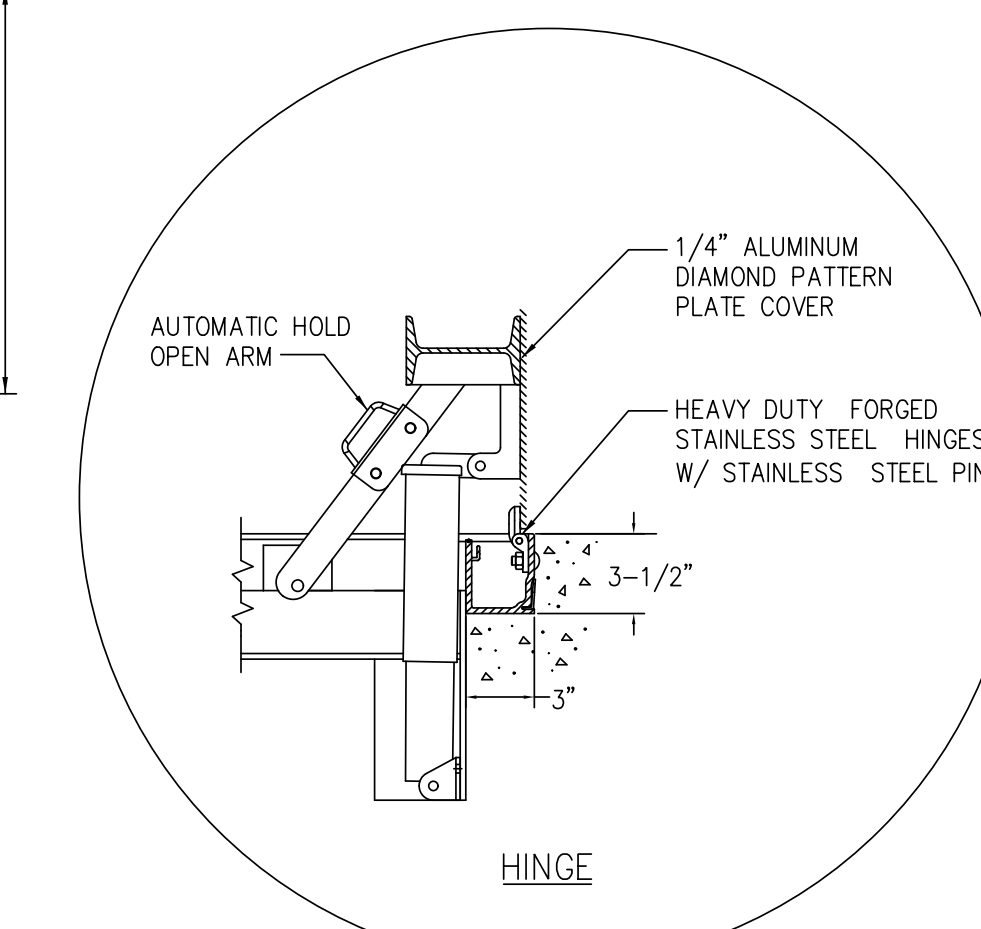
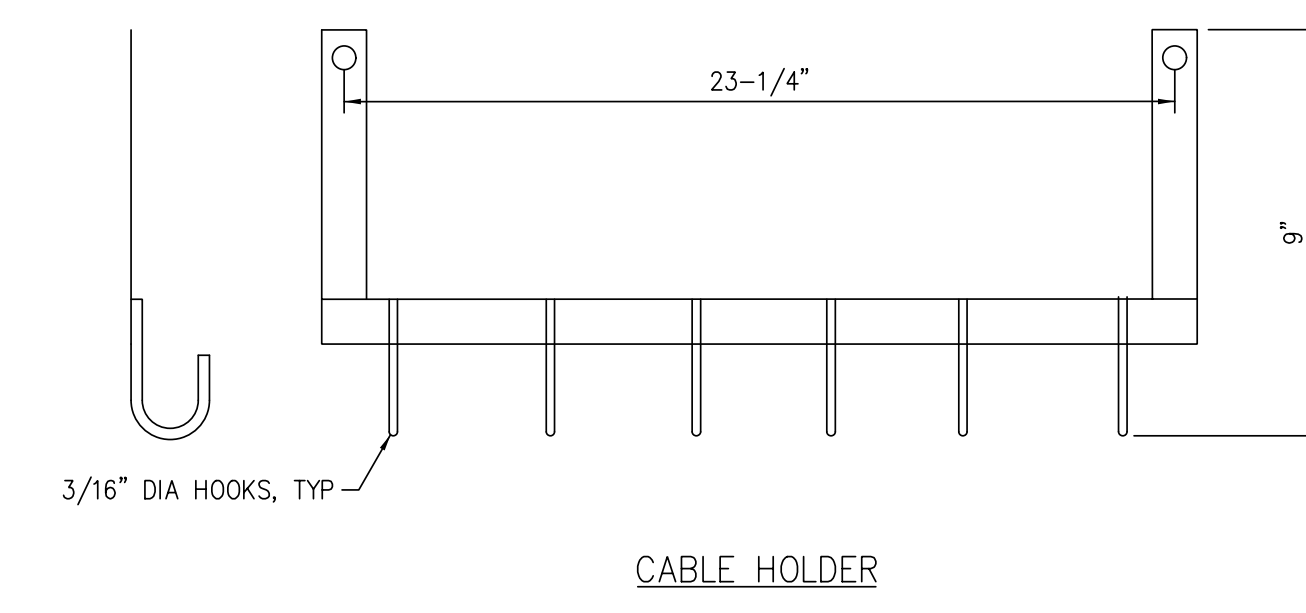
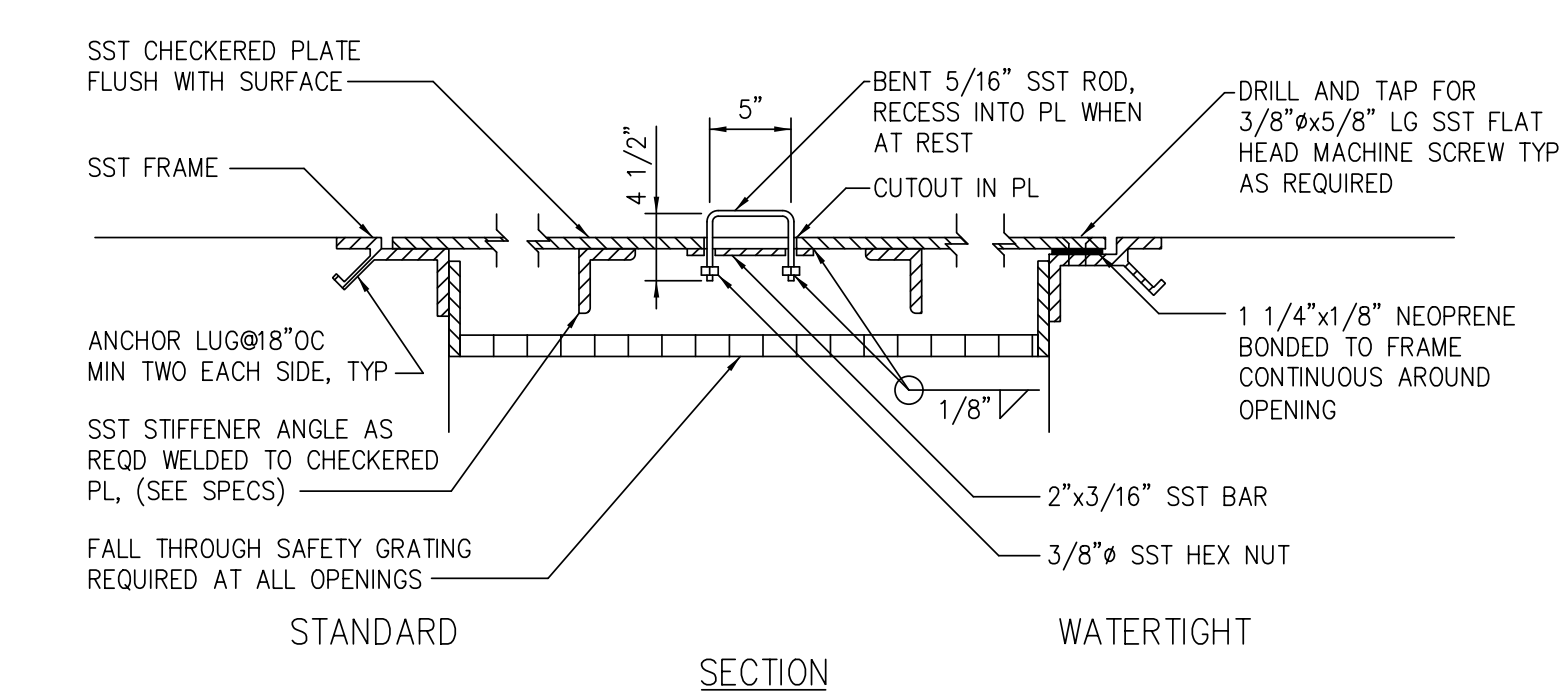
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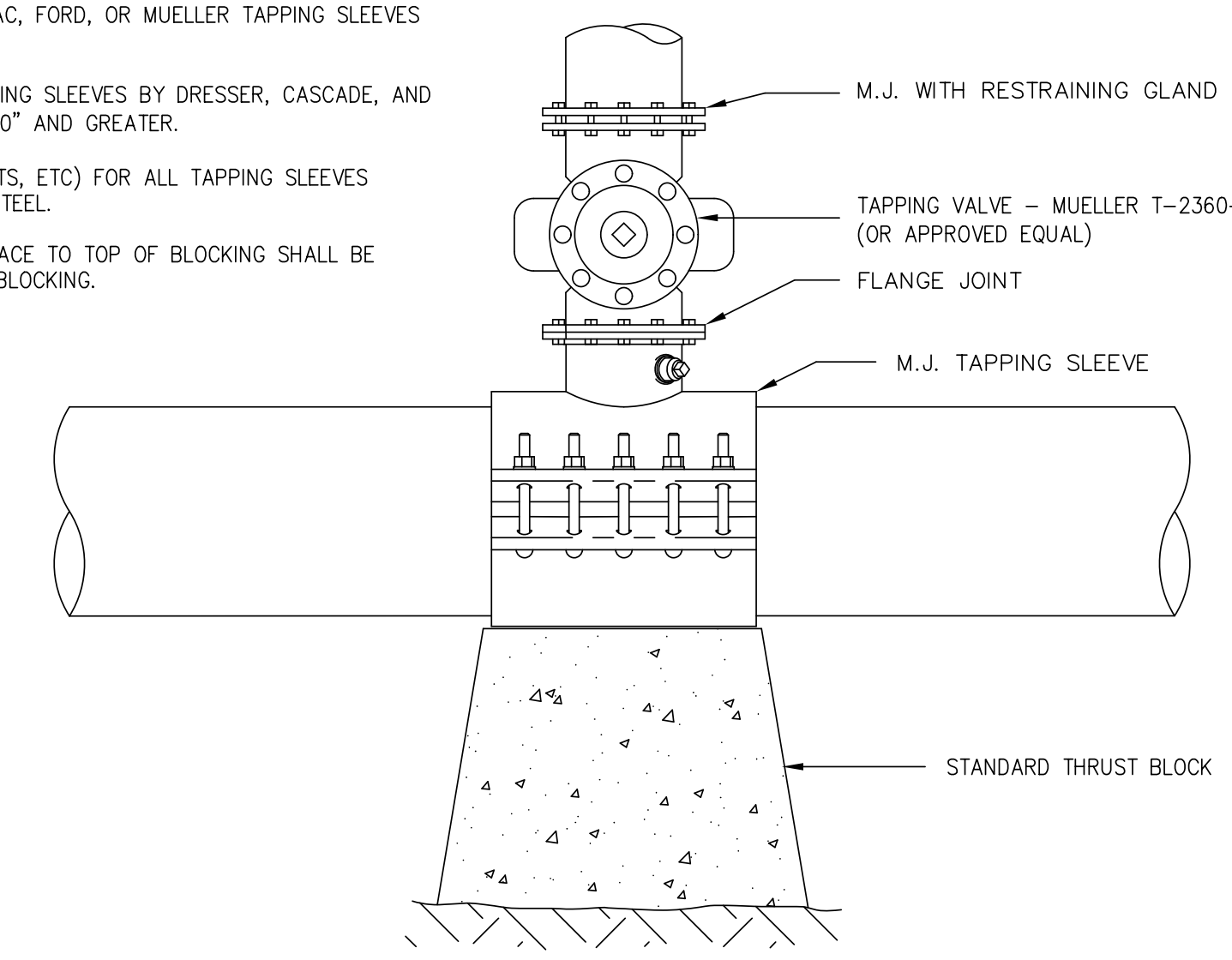
UTILITY CONSTRUCTION



ACCESS HATCH
DETAIL WS-17

NOTES:

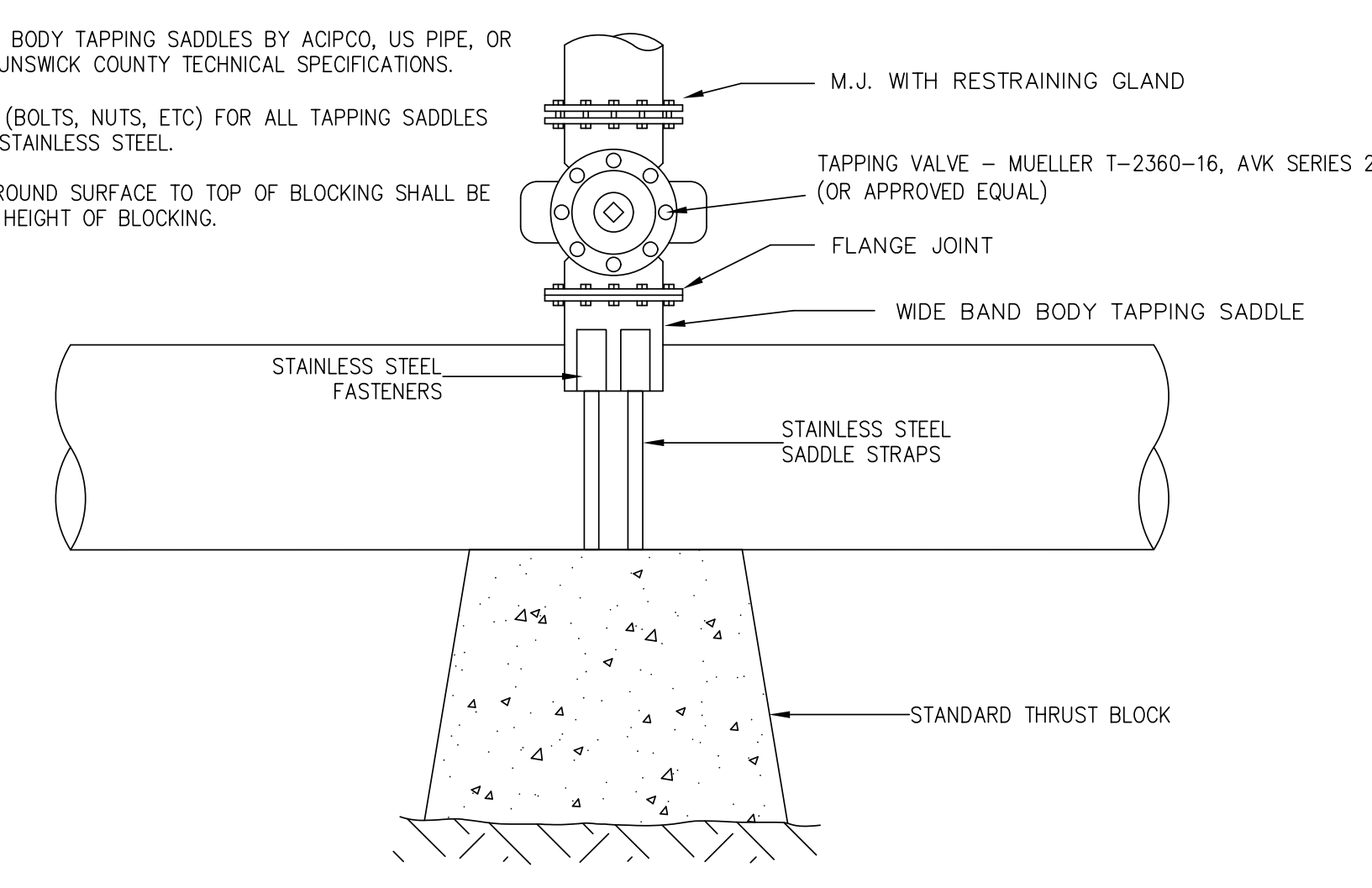
- TAPPING SADDLES ARE NOT ALLOWED WHEN CONNECTING MAIN DIAMETER IS 50% OR LARGER THAN EXISTING MAIN TO BE TAPPED.
- USE STAINLESS STEEL ROMAC, FORD, OR MUELLER TAPPING SLEEVES FOR TAP SIZES 4" - 24".
- USE STAINLESS STEEL TAPPING SLEEVES BY DRESSER, CASCADE, AND JCM FOR TAPS ON MAINS 30" AND GREATER.
- ALL HARDWARE (BOLTS, NUTS, ETC) FOR ALL TAPPING SLEEVES SHALL BE 304 STAINLESS STEEL.
- DEPTH FROM GROUND SURFACE TO TOP OF BLOCKING SHALL BE GREATER THAN HEIGHT OF BLOCKING.



TAPPING SLEEVE & VALVE ASSEMBLY
DETAIL WS-18

NOTES:

- TAPPING SADDLES ARE NOT ALLOWED WHEN CONNECTING MAIN DIAMETER IS 50% OR LARGER THAN EXISTING MAIN TO BE TAPPED.
- USE WIDE BAND BODY TAPPING SADDLES BY ACIPCO, US PIPE, OR EQUAL, PER BRUNSWICK COUNTY TECHNICAL SPECIFICATIONS.
- ALL HARDWARE (BOLTS, NUTS, ETC) FOR ALL TAPPING SADDLES SHALL BE 304 STAINLESS STEEL.
- DEPTH FROM GROUND SURFACE TO TOP OF BLOCKING SHALL BE GREATER THAN HEIGHT OF BLOCKING.



TAPPING SADDLES & VALVE ASSEMBLY
DETAIL WS-19

Revisions

1.1 - DATED 1/16/2014
Removed WS-20

COUNTY OF BRUNSWICK

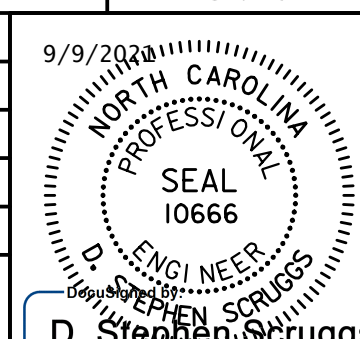
GENERAL WATER & SEWER DETAILS
FOR
BRUNSWICK COUNTY
NORTH CAROLINA

Date: 06-13-12
Scale: NTS
Drawn By: JDM
Checked By: WLP

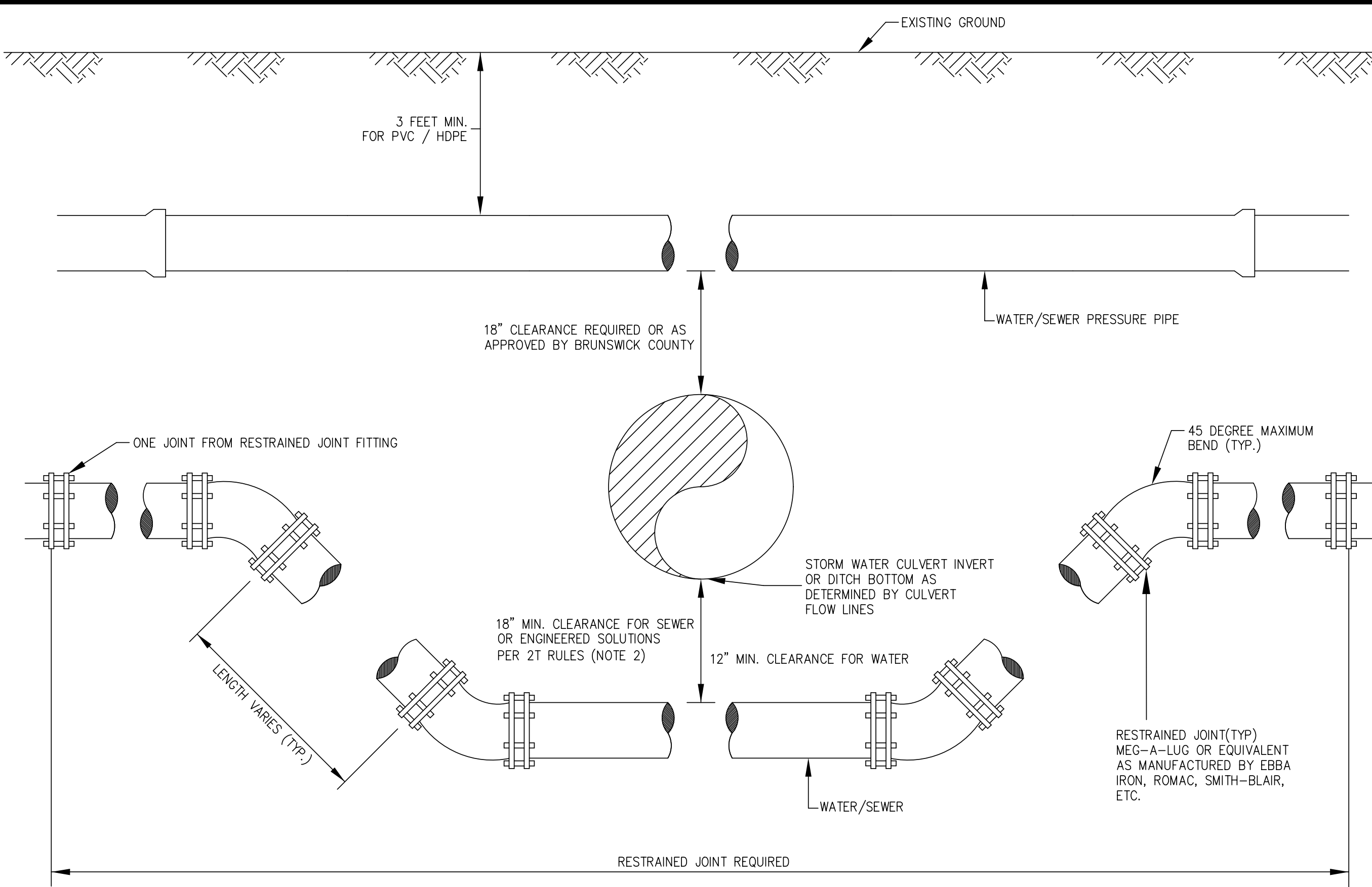
Prepared In the Office of:

AECOM

AECOM TECHNICAL SERVICES OF NORTH CAROLINA, INC.
701 CORPORATE CENTER DRIVE, SUITE 475, RALEIGH, NC 27607
919-854-6200 919-854-6259 (fax)
F - 0342

PROJECT REFERENCE NO. R-5021	SHEET NO. UC-3L
DESIGNED BY:	9/9/2021
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
REVISED:	
	
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UTILITY CONSTRUCTION	

UTILITIES ENGINEERING SEC.
PHONE: (919) 707-6690
FAX: (919) 250-4151



NOTES:

- USE STAINLESS STEEL THREADED RODS, MEGA-LUG OR APPROVED EQUAL FOR JOINT RESTRAINT.
- SEWER REQUIRES DR-18 C900 UNLESS OTHERWISE APPROVED BY BRUNSWICK COUNTY.
- WATER MAY BE DIP OR DR-18 C900 PIPE.

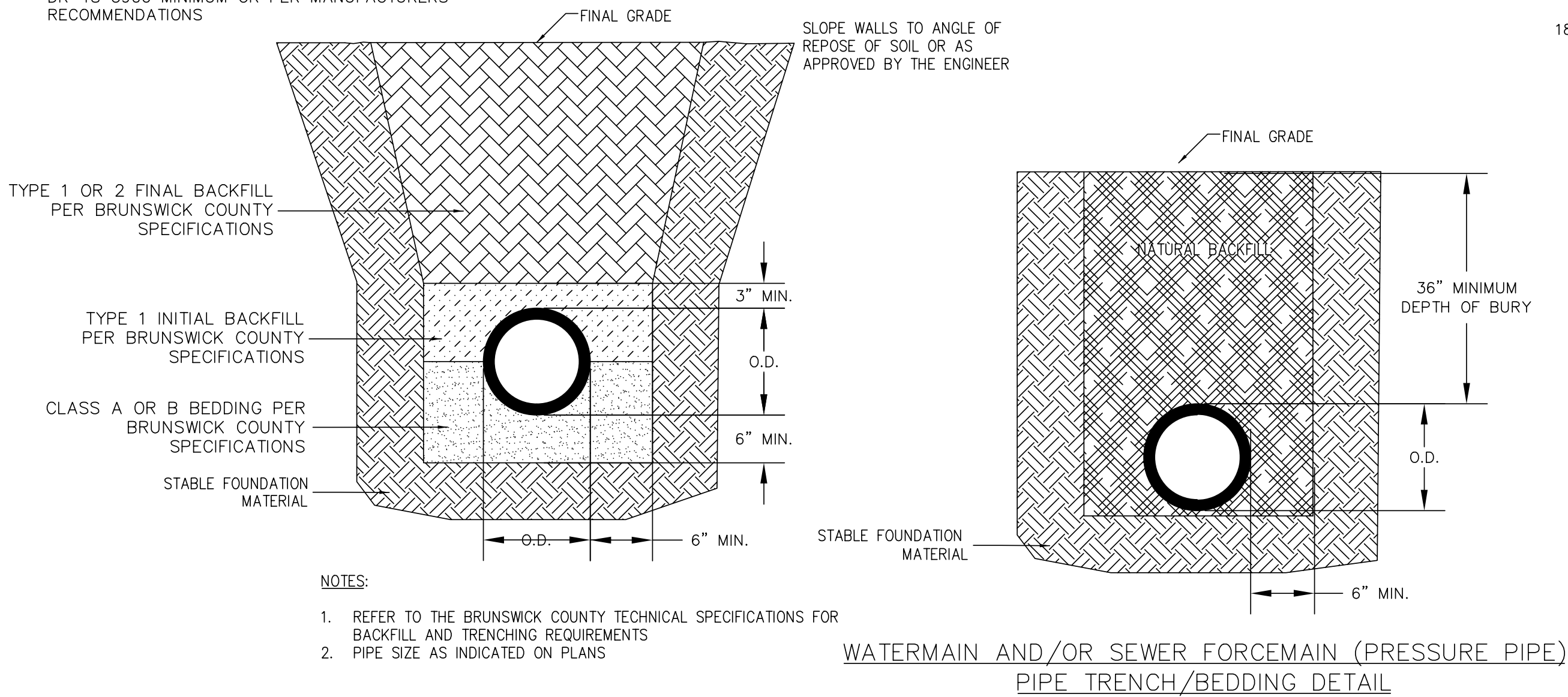
DEPTH < 20 FEET - CLASS "A" BEDDING

- UNDERCUT TRENCH BOTTOM 6 INCHES MINIMUM BELOW PIPE
- FILL PIPE TO SPRING LINE WITH NO. 57 STONE

DEPTH > 20 FEET - CLASS "B" BEDDING

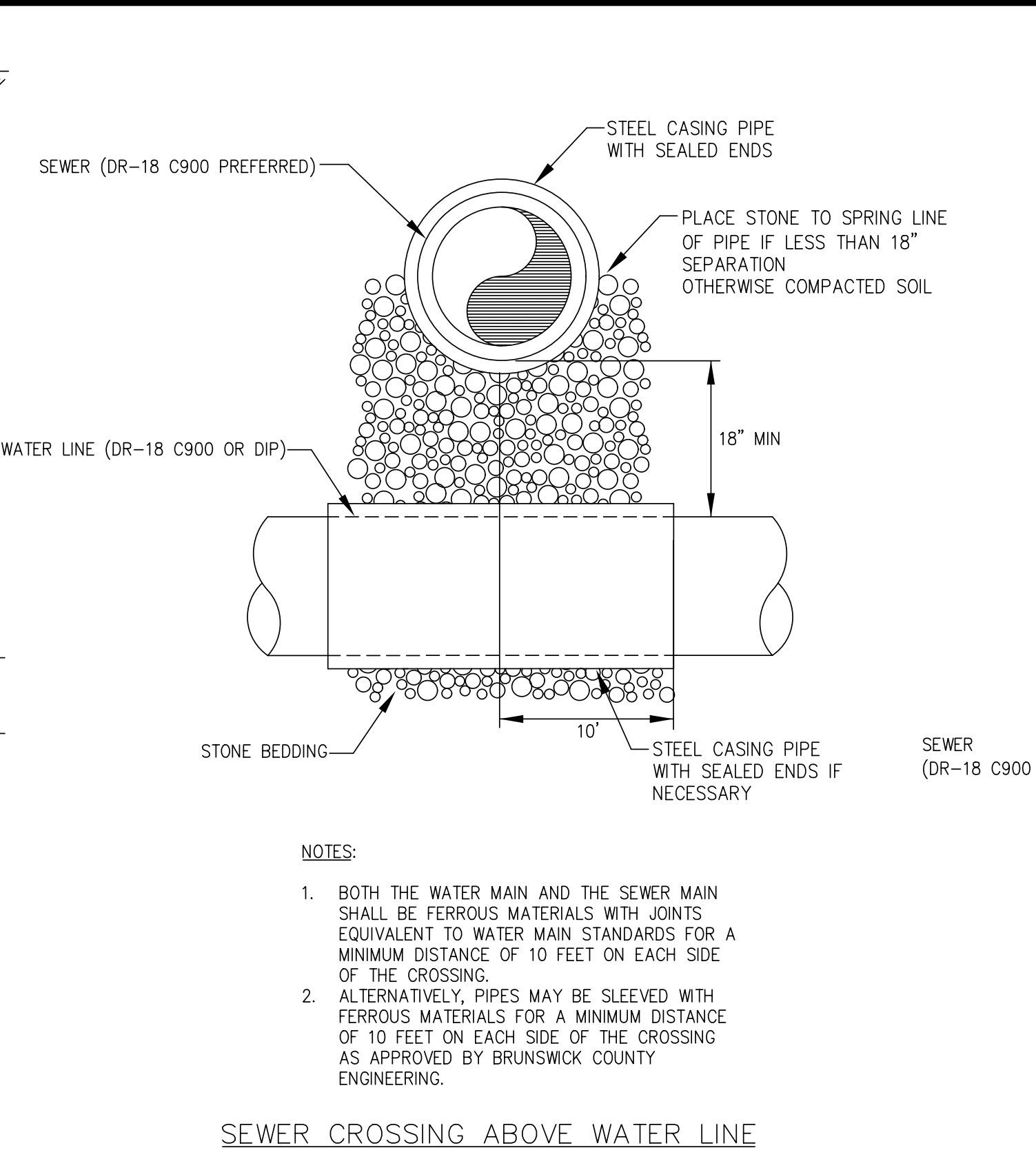
- UNDERCUT TRENCH BOTTOM 6 INCHES MINIMUM BELOW PIPE
- FILL TO 6 INCHES ABOVE PIPE WITH NO. 57 STONE

INSTALLATIONS THAT EXCEED 20 FEET DEPTH SHALL BE DR-18 C900 MINIMUM OR PER MANUFACTURERS RECOMMENDATIONS

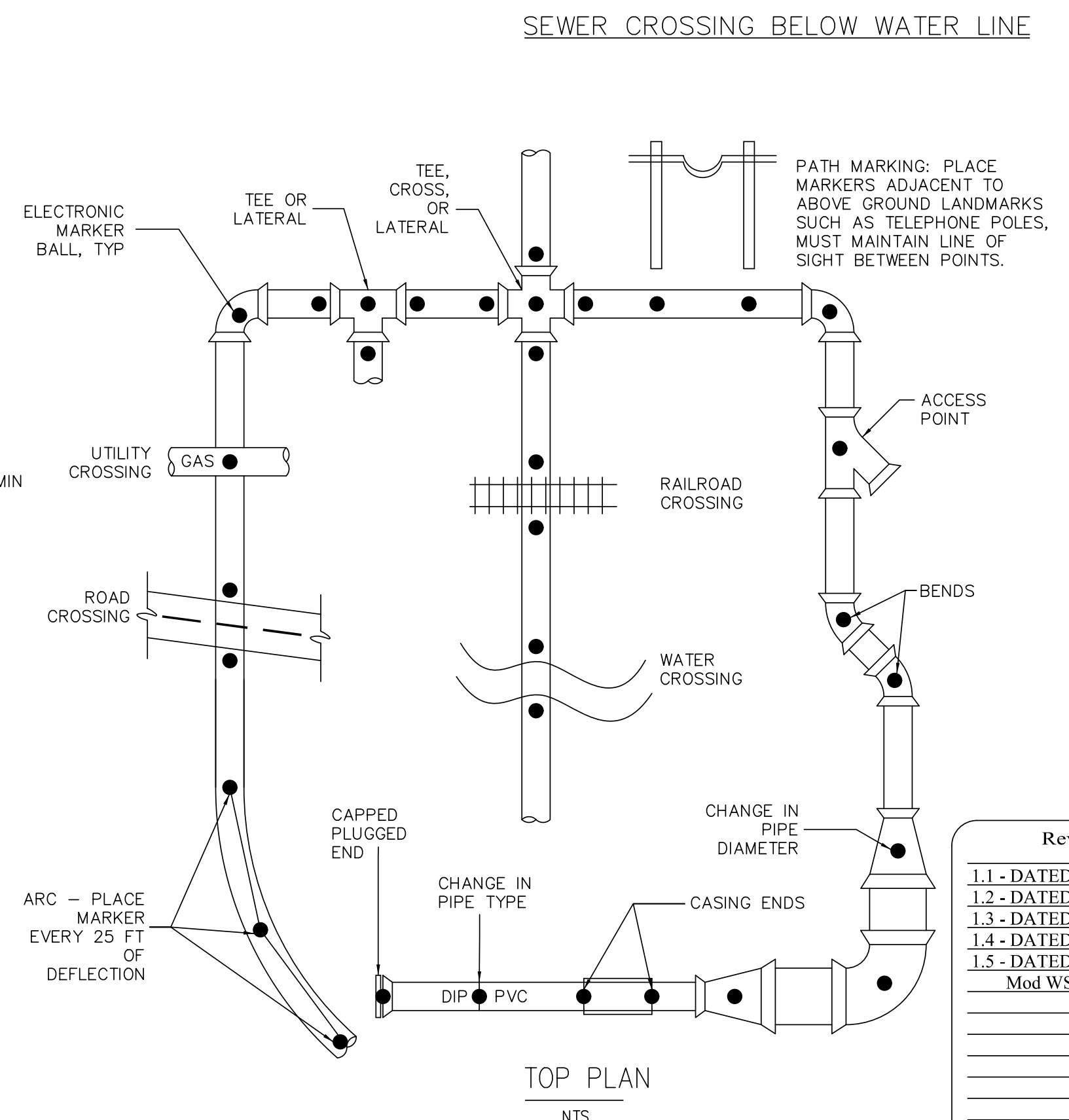
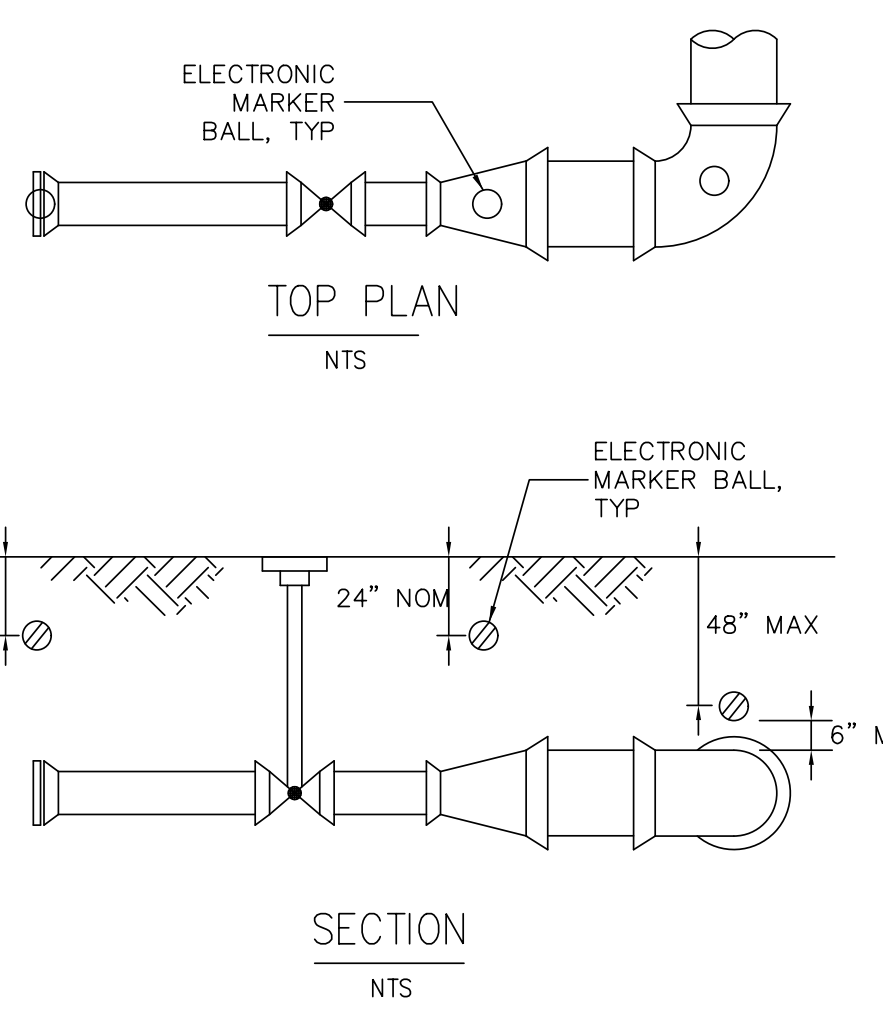


NOTES:

- REFER TO THE BRUNSWICK COUNTY TECHNICAL SPECIFICATIONS FOR BACKFILL AND TRENCHING REQUIREMENTS
- PIPE SIZE AS INDICATED ON PLANS



**SEWER OFFSETS ABOVE
AND BELOW WATER MAINS
DETAIL WS-21**



**ELECTRONIC MARKER
BALL PLACEMENT DETAIL
DETAIL WS-23**

COUNTY OF BRUNSWICK
 GENERAL WATER & SEWER DETAILS
 FOR
BRUNSWICK COUNTY
 NORTH CAROLINA

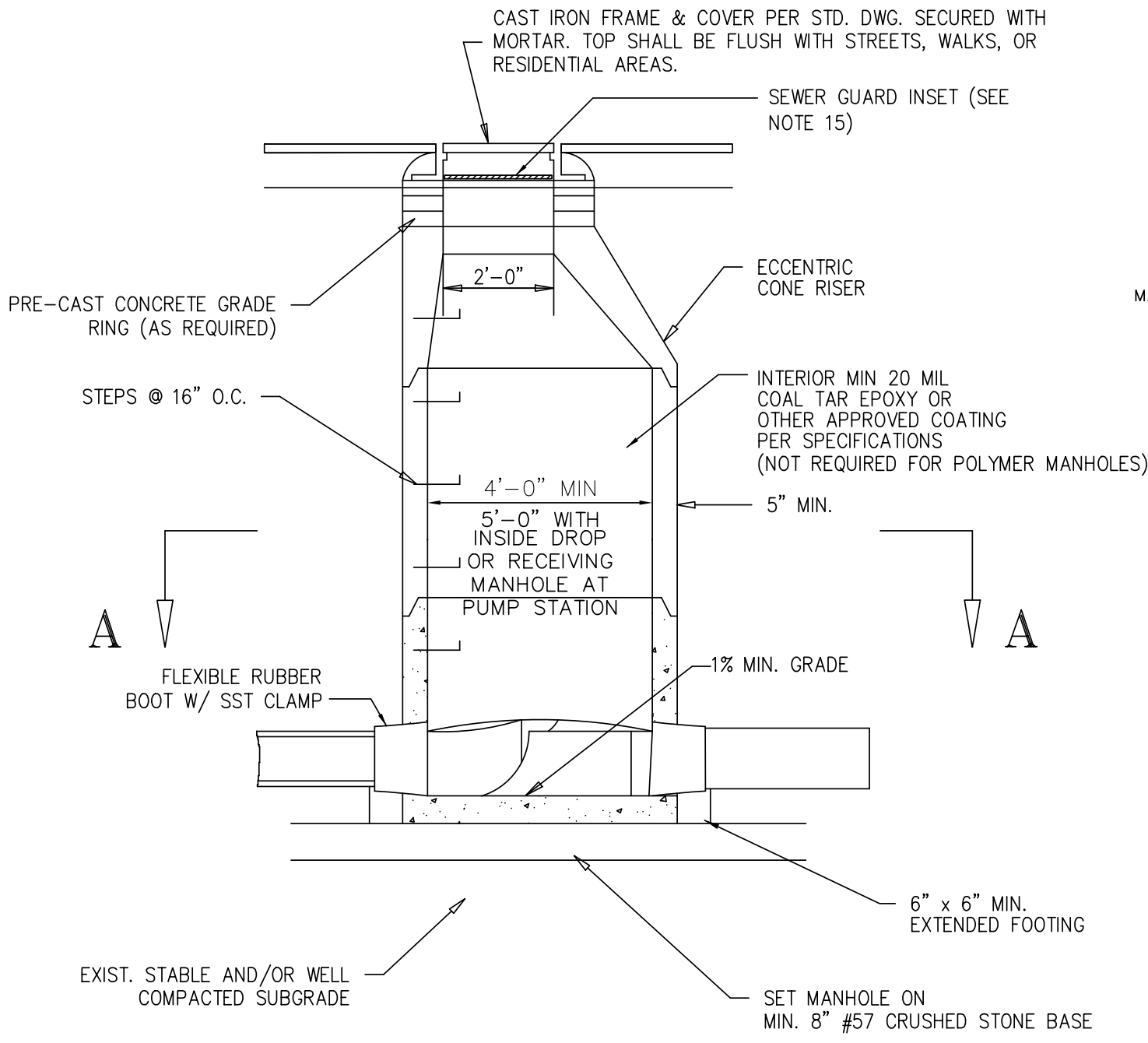
Date: 07-11-12
 Scale: NTS
 Drawn By: JDM
 Checked By: WLP

Revisions	
1.1 - DATED 7/12/2013	
1.2 - DATED 1/16/2014	
1.3 - DATED 1/23/2019	
1.4 - DATED 7/16/2019	
1.5 - DATED 2/12/2021	
Mod WS-20 & WS-21	

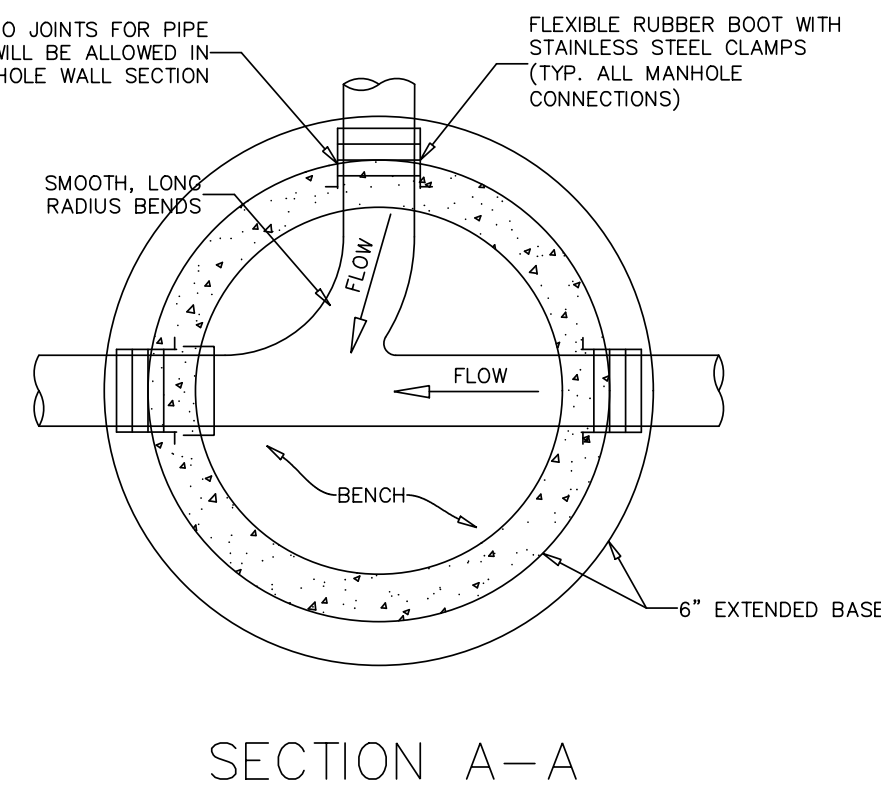
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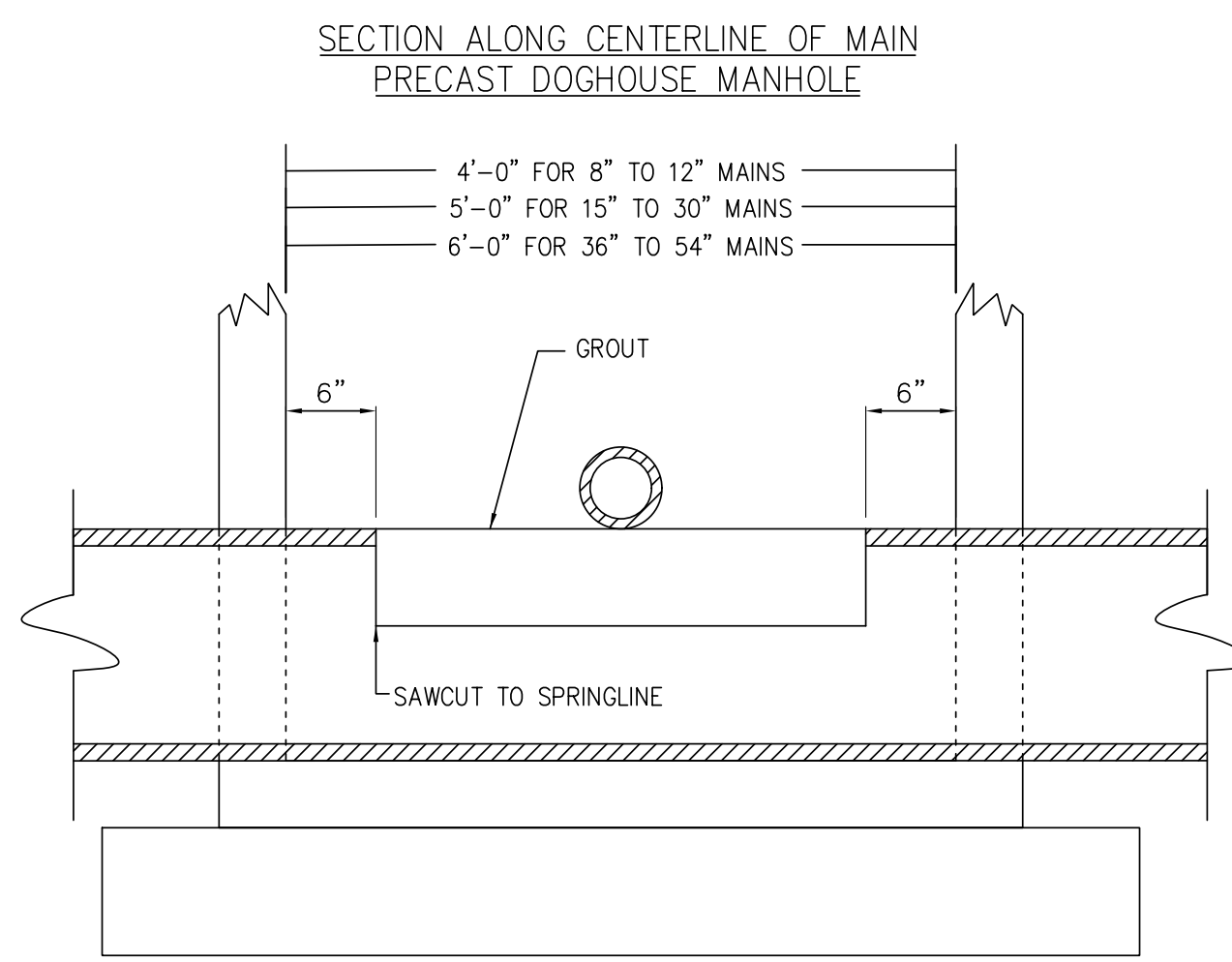
1. PRECAST CONCRETE MANHOLES SHALL MEET OR EXCEED THE REQUIREMENTS OF ASTM C 478. ALL SURFACES SHALL BE SMOOTH AND EVEN TEXTURED WITH A MINIMUM OF HONEYCOMB, FIN, AND OTHER IMPERFECTIONS.
2. JOINTS BETWEEN MANHOLE SECTIONS SHALL BE SEALED WATERTIGHT USING EITHER O-RING GASKETS CONFORMING WITH ASTM C 443 OR BUTYL RESIN CONFORMING WITH AASHTO M-198.
3. EXTERIOR JOINTS SHALL BE SEALED WITH A 4" WIDE BUTYL RUBBER WRAP.
4. ADD INTERIOR HIGH SOLIDS EPOXY PROTECTION COATING FOR EXISTING MANHOLES RECEIVING DISCHARGE FROM FORCE MAINS PER BRUNSWICK COUNTY TECHNICAL SPECIFICATIONS (MIN. 20 MILS).
5. HOLES FOR CONNECTION OF PIPE TO MANHOLE SHALL BE PRECAST OR CORED. DIAMETER OF HOLE SHALL NOT EXCEED OUTSIDE DIAMETER OR PIPE BY MORE THAN 3 INCHES.
6. CONNECTIONS OF PIPE TO MANHOLE SHALL BE MADE WATERTIGHT USING RESILIENT CONNECTORS CONFORMING TO ASTM C 923 OR NEOPRENE BOOTS EMBEDDED IN PRECAST BASE WITH STAINLESS STEEL COMPRESSION BANDS.
7. MANHOLE INVERTS SHALL BE INSTALLED USING BRICK AND MORTAR, OR MANHOLES MAY BE PRECAST, MONOLITHIC SECTIONS WITH FORMED INVERTS.
8. LIFT HOLES SHALL BE PLUGGED AND FILLED FLUSH WITH MORTAR.
9. ALL BRICK AND MORTAR SHALL RECEIVE A 1/2" MORTAR PARGE COAT ON INSIDE AND OUTSIDE.
10. ALL SPACE BETWEEN PIPE AND OPENING INSIDE OF MANHOLE TO BE GROUTED WITH TYPE S MORTAR.
11. SEWER MAIN PENETRATIONS AND/OR SERVICE LATERAL PENETRATIONS ENTERING AT 30" OR LESS ABOVE THE MANHOLE BENCH SHALL HAVE A SLIDE CONSTRUCTED OF BRICK AND MORTAR (SEE DETAIL).
12. ALL PENETRATIONS ENTERING MANHOLE AT GREATER THAN 30" SHALL BE AN INSIDE DROP MANHOLE (SEE DETAIL).
13. INSIDE DROP MANHOLES, AND PUMP STATION RECEIVING MANHOLES SHALL BE MINIMUM 5' DIAMETER MANHOLES.
14. SANITARY SEWER MANHOLES SHALL BE COATED WITH COAL TAR EPOXY 20 MILS THROUGHOUT THE INSIDE OF THE MANHOLE.
15. ALL MANHOLES SHALL HAVE A SEWER GUARD INSERT INSTALLED - PLASTIC IS ALLOWED IN NON-TRAFFIC AREAS - STAINLESS STEEL INSERT PANS ARE REQUIRED IN TRAFFIC AREAS.
16. MANHOLES SHALL BE TRAFFIC BEARING WITH A MINIMUM HS-20 LOAD ALLOWANCE.
17. FOR NEW SEWER FORCE MAINS CONNECTING TO AN EXISTING COUNTY GRAVITY SYSTEM THAT REQUIRES THE CUT IN OF A NEW MANHOLE:
 THE NEW SEWER MANHOLE SHALL BE PRECAST POLYMER CONFORMING TO ASTM C478 AS MANUFACTURED BY ARMOROCK, MEYER POLYCRETE OR APPROVED EQUAL. RISER SECTION JOINTS SHALL BE BELL AND SPICOT /SHIP-LAP DESIGN SEALED WITH BUTYL MASTIC AND/OR RUBBER GASKETS (ASTM C990) SO THAT ON ASSEMBLY THE MANHOLE BASE, RISER(S) AND TOP SECTIONS MAKE A CONTINUOUS AND UNIFORM MANHOLE STRUCTURE. A CARBON FILTER MUST BE PROVIDED ON ANY MANHOLE THAT HAS A FORCE MAIN SEWER SYSTEM CONNECTION.



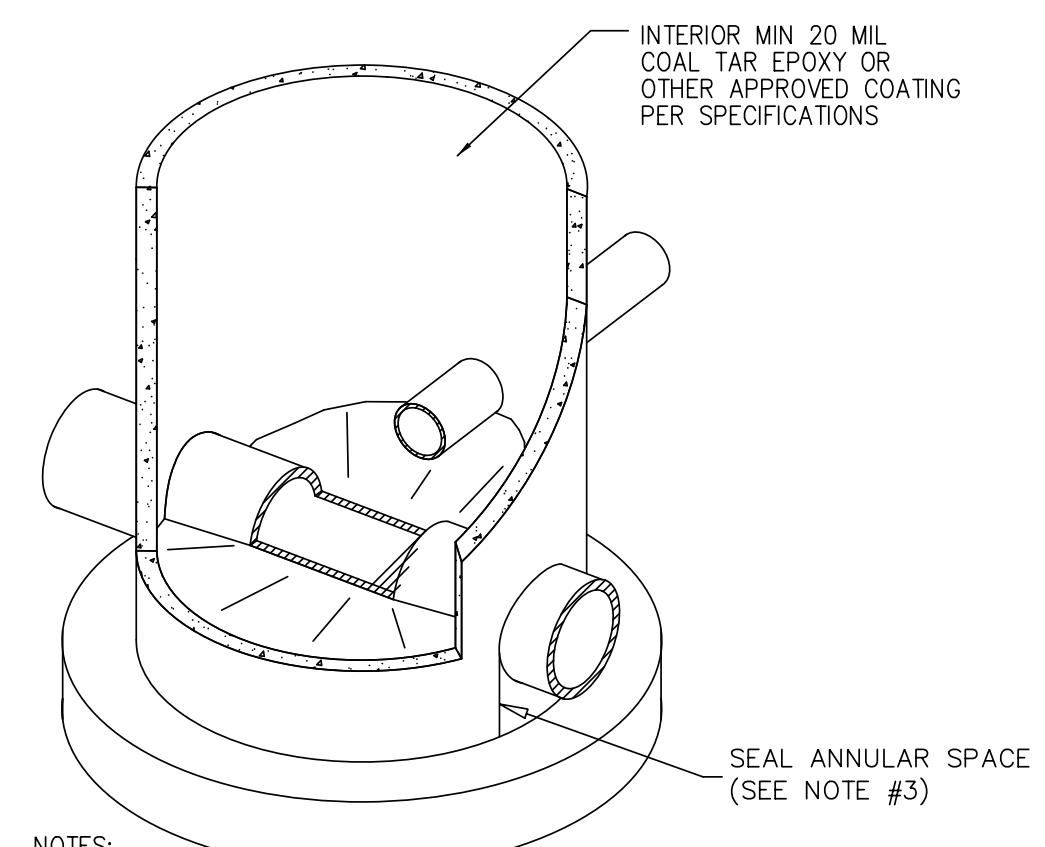
PRECAST CONCRETE MANHOLE
DETAIL S-1



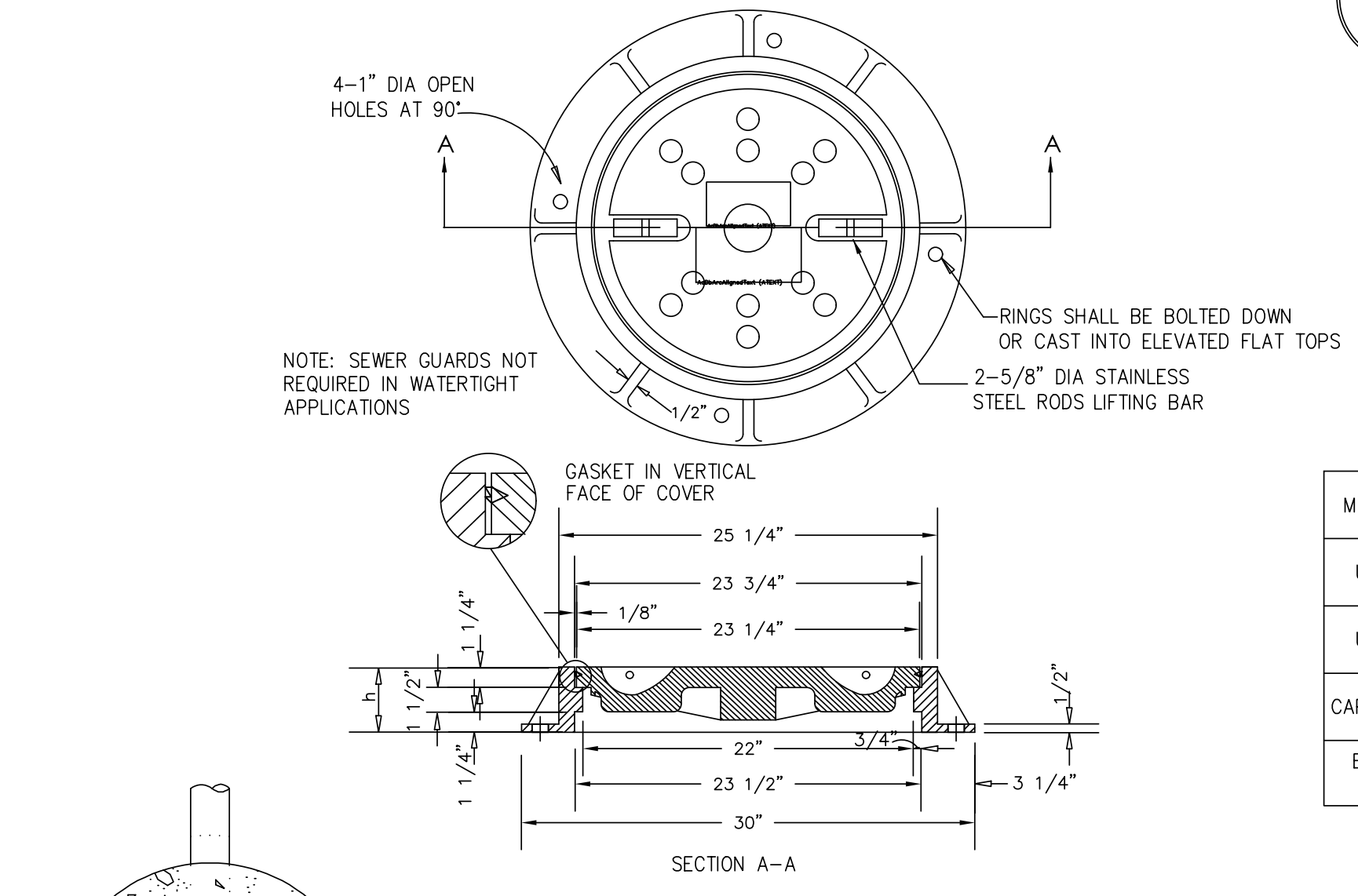
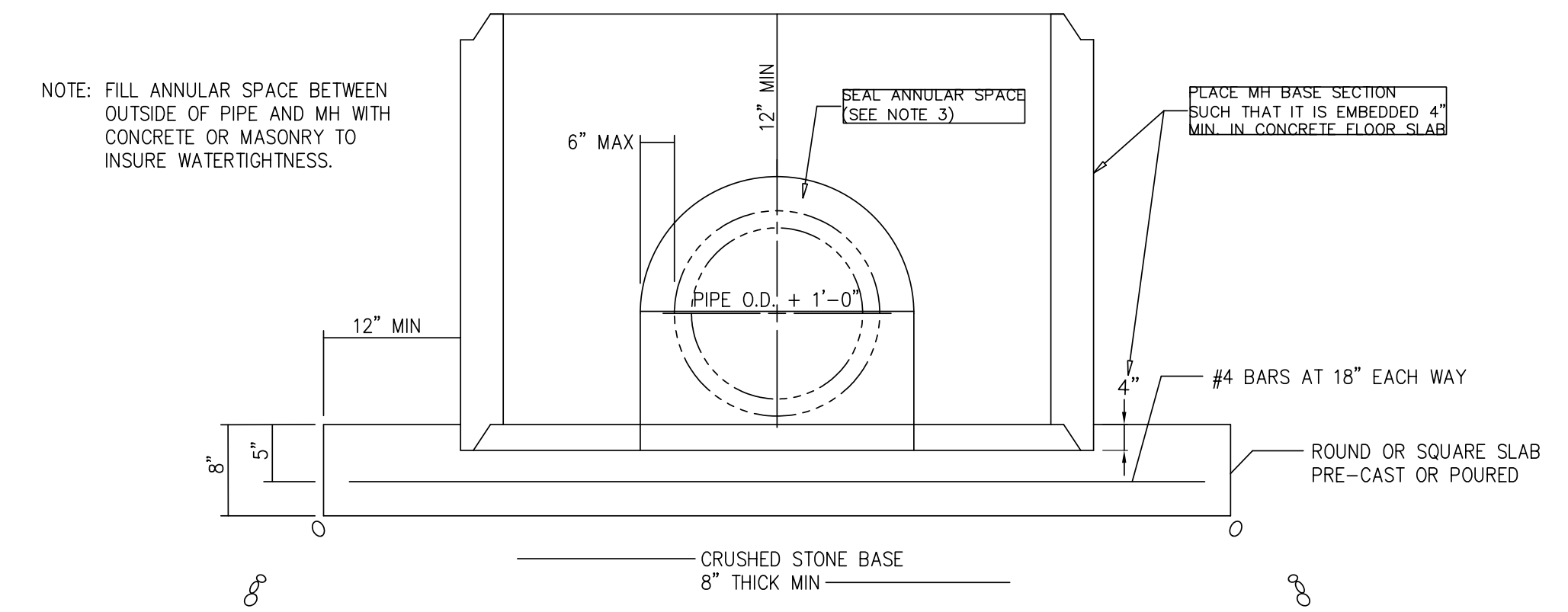
SECTION A-A



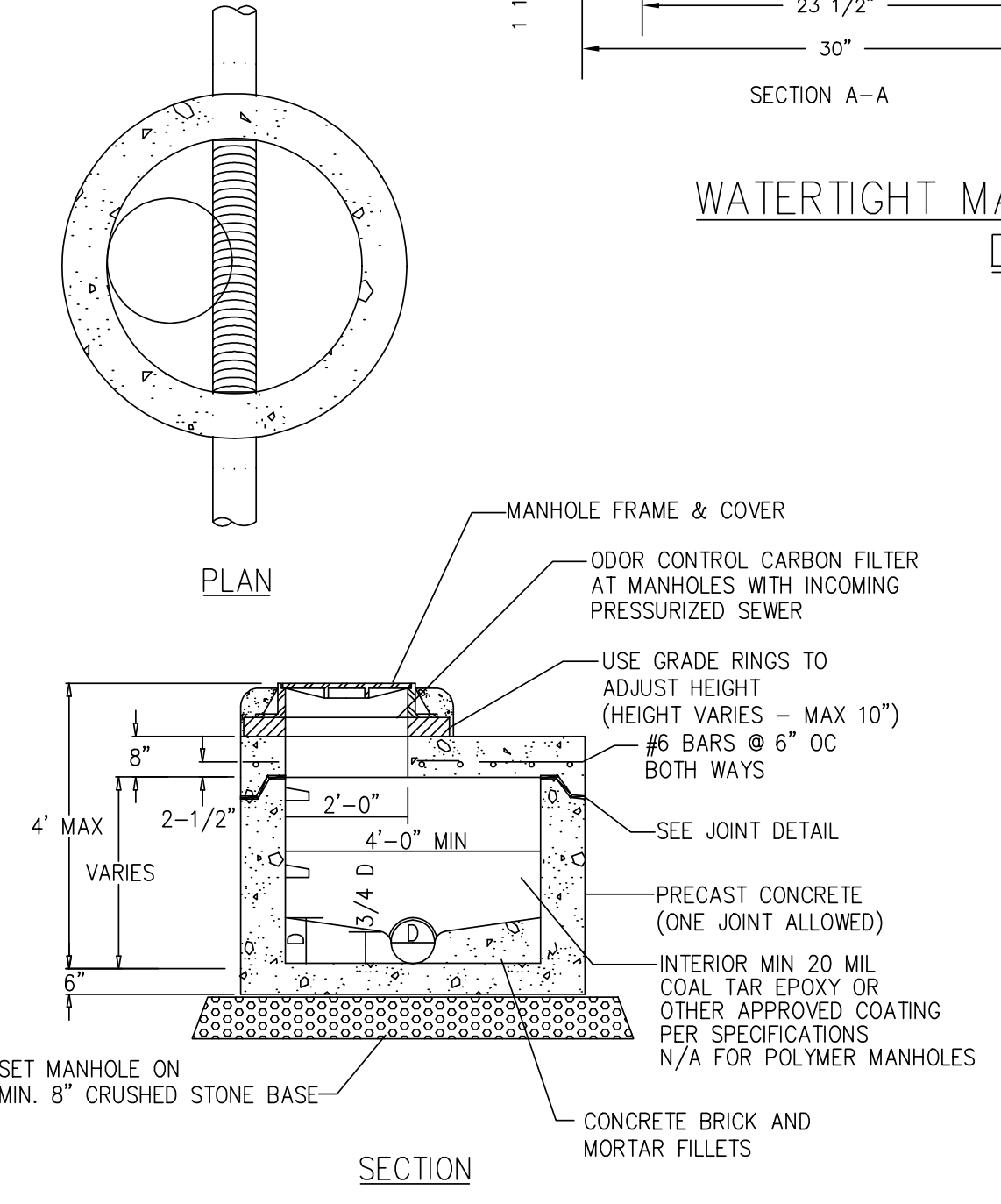
PRECAST CONCRETE DOGHOUSE MANHOLE
DETAIL S-4



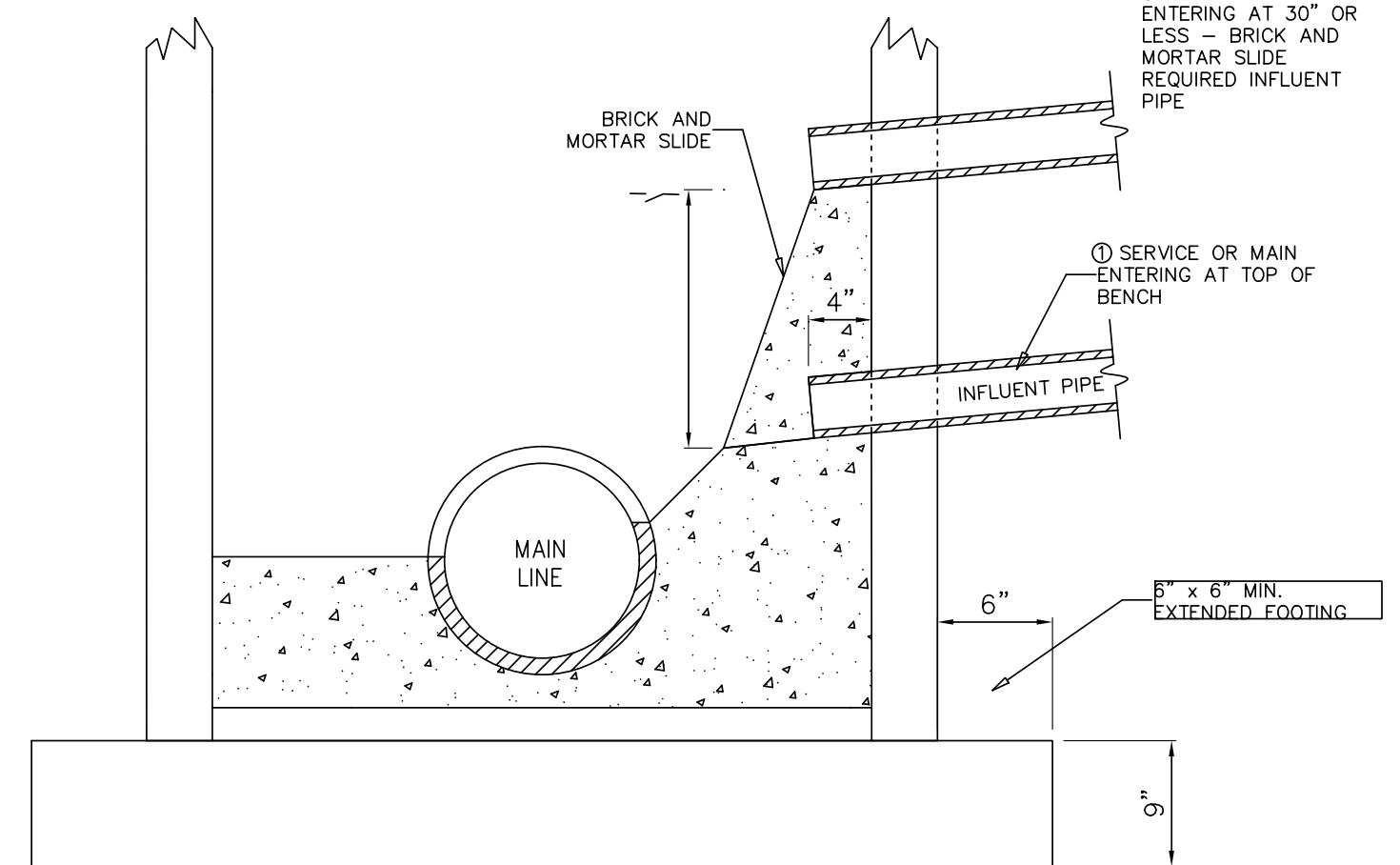
- NOTES:
1. FLOW SHALL BE MAINTAINED DURING CONSTRUCTION.
 2. THIS DETAIL TO BE USED WHEN A NEW 6" OR LARGER LATERAL OR MAIN NECESSITATES CONSTRUCTION OF A NEW MANHOLE.
 3. ANNULAR SPACE BETWEEN PIPE AND MANHOLE MUST BE SEALED WITH BRICK AND MORTAR TO PREVENT INFILTRATION.
 4. FOR POLYMER MANHOLE - CONCRETE GROUT AND COATED WITH EPOXY KIT AS REQUIRED PER MANUFACTURER.



WATERTIGHT MANHOLE RING AND COVER
DETAIL S-3

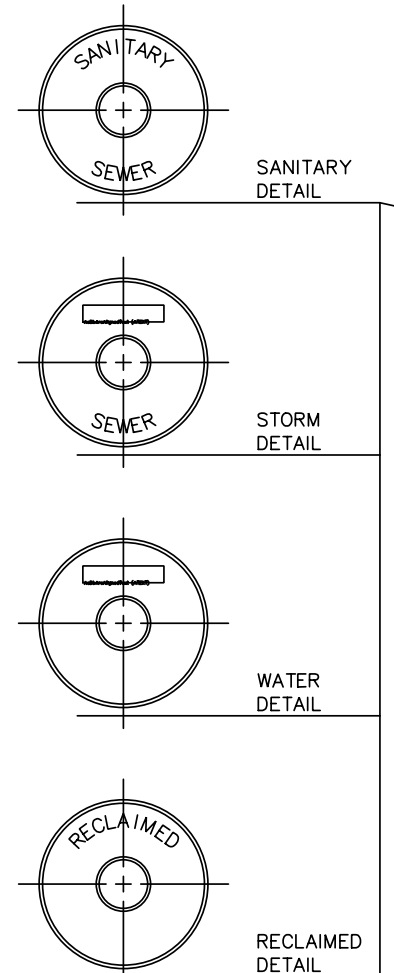


SHALLOW PRECAST CONCRETE MANHOLE WITH FLAT TOP
DETAIL S-5



CROSS SECTION AT EXISTING MANHOLE MAINS OR SERVICES ENTERING MANHOLE
DETAIL S-6

MANUFACTURER	MODEL NUMBER
US FOUNDRY	725 RING / DP-SSG COVER
US FOUNDRY	710 RING / DP-SSG COVER
CAPITAL FOUNDRY	MH-3000
EAST JORDAN IRON WORKS	202711 RING / 202746 COVER
GENERAL FOUNDRIES	GFI-7126 / GFI-41261



STANDARD MANHOLE RING AND COVER
DETAIL S-2

MANUFACTURER	MODEL NUMBER
US FOUNDRY	725 RING / DP-LOC SSG
US FOUNDRY	710 RING / DP-LOC SSG
CAPITAL FOUNDRY	MH-3000-WT
EAST JORDAN IRON WORKS	202701 RING / 202722 COVER

Revisions

1.1 - DATED 4/30/2013
1.2 - DATED 1/23/2019
1.3 - DATED 5/3/2020
1.4 - DATED 10/7/2020
Mod Detail S-3

Prepared In the Office of:
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 AECOM TECHNICAL SERVICES OF NORTH CAROLINA, INC.
 701 CORPORATE CENTER DRIVE, SUITE 475, RALEIGH, NC 27607
 919-854-6200 919-854-6259 (fax)
 F-0342

PROJECT REFERENCE NO. **R-5021** SHEET NO. **UC-3M**

DESIGNED BY: 9/9/2021
 DRAWN BY:
 CHECKED BY:
 APPROVED BY:
 REVISED:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 UTILITIES ENGINEERING SEC.
 PHONE: (919)707-6690
 FAX: (919)250-4151

SEAL 10666
 D. Stephen Scruggs
 REGISTERED PROFESSIONAL ENGINEER
 STATE OF NORTH CAROLINA

UTILITY CONSTRUCTION PLANS ONLY

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UTILITY CONSTRUCTION

COUNTY OF BRUNSWICK
 BRUNSWICK COUNTY
 NORTH CAROLINA

GENERAL SEWER DETAILS FOR
BRUNSWICK COUNTY
 NORTH CAROLINA

Date: 06-14-22
 Scale: NTS
 Drawn By: JDM
 Checked By: WLP

DATE: 8/13/2021
 TIME: 10:35:44 PM
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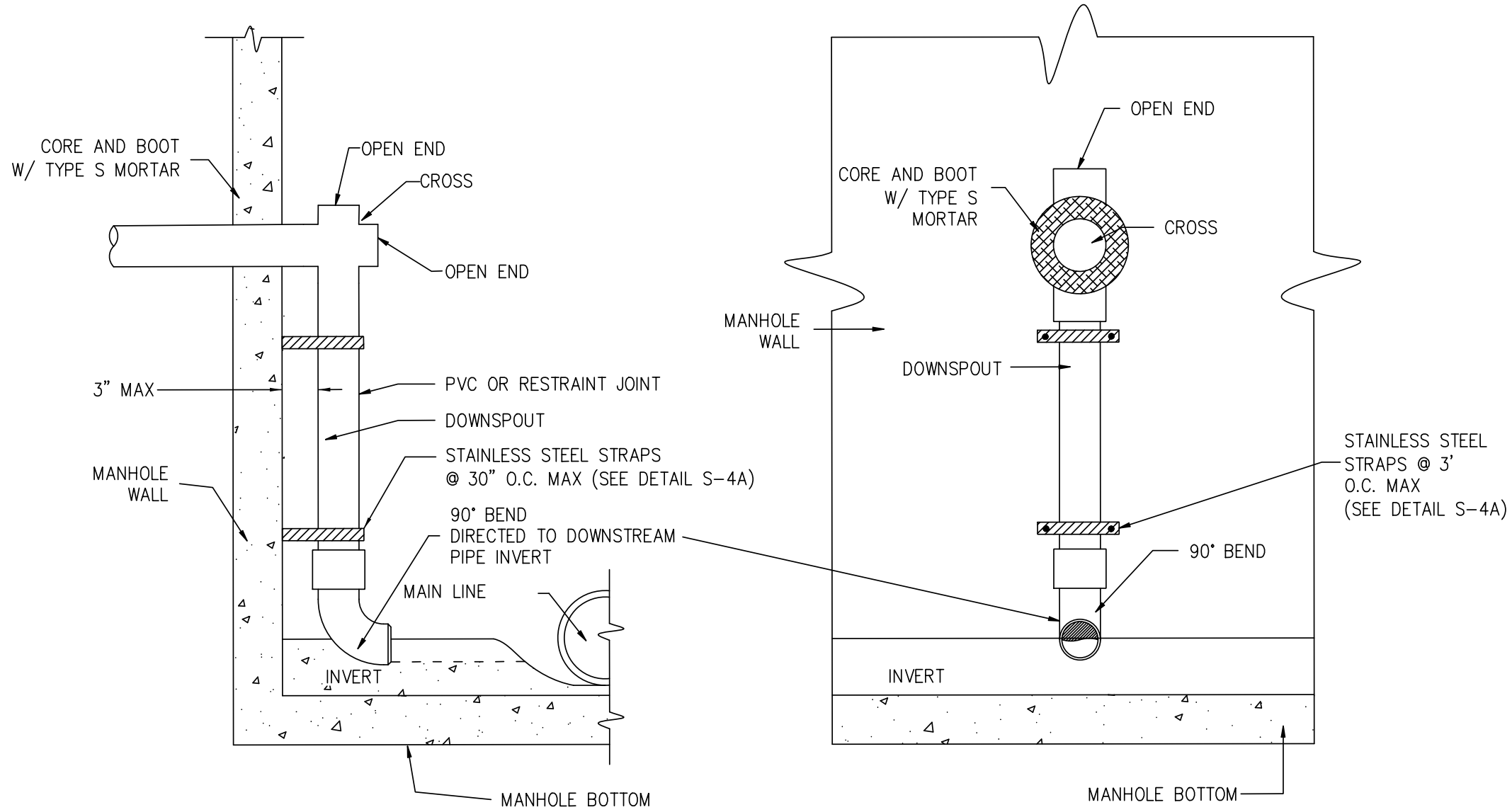
AECOM

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 701 CORPORATE CENTER DRIVE, SUITE 475, RALEIGH, NC 27607
 919-854-6200 919-854-6259 (fax)
 F-0342

PROJECT REFERENCE NO.	R-5021	SHEET NO.	UC-3N
DESIGNED BY:		9/9/2013	
DRAWN BY:			
CHECKED BY:			
APPROVED BY:			
REVISED:			
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION			
UTILITIES ENGINEERING SEC.			
PHONE: (919) 707-6690			
FAX: (919) 250-4151			

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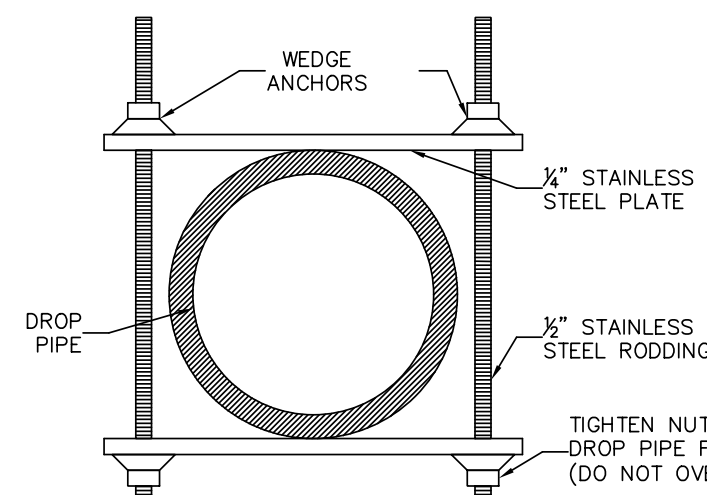
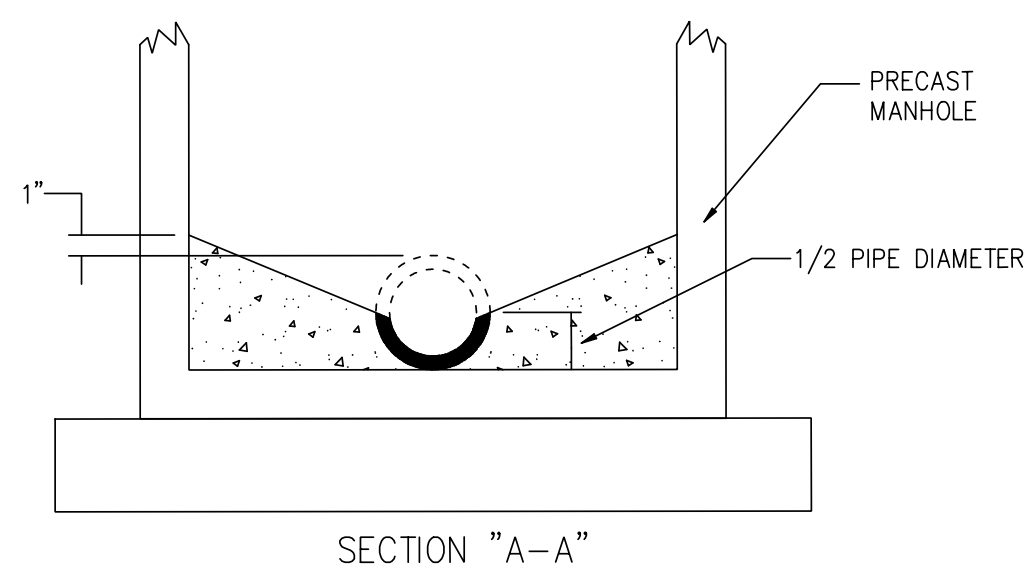
UTILITY CONSTRUCTION



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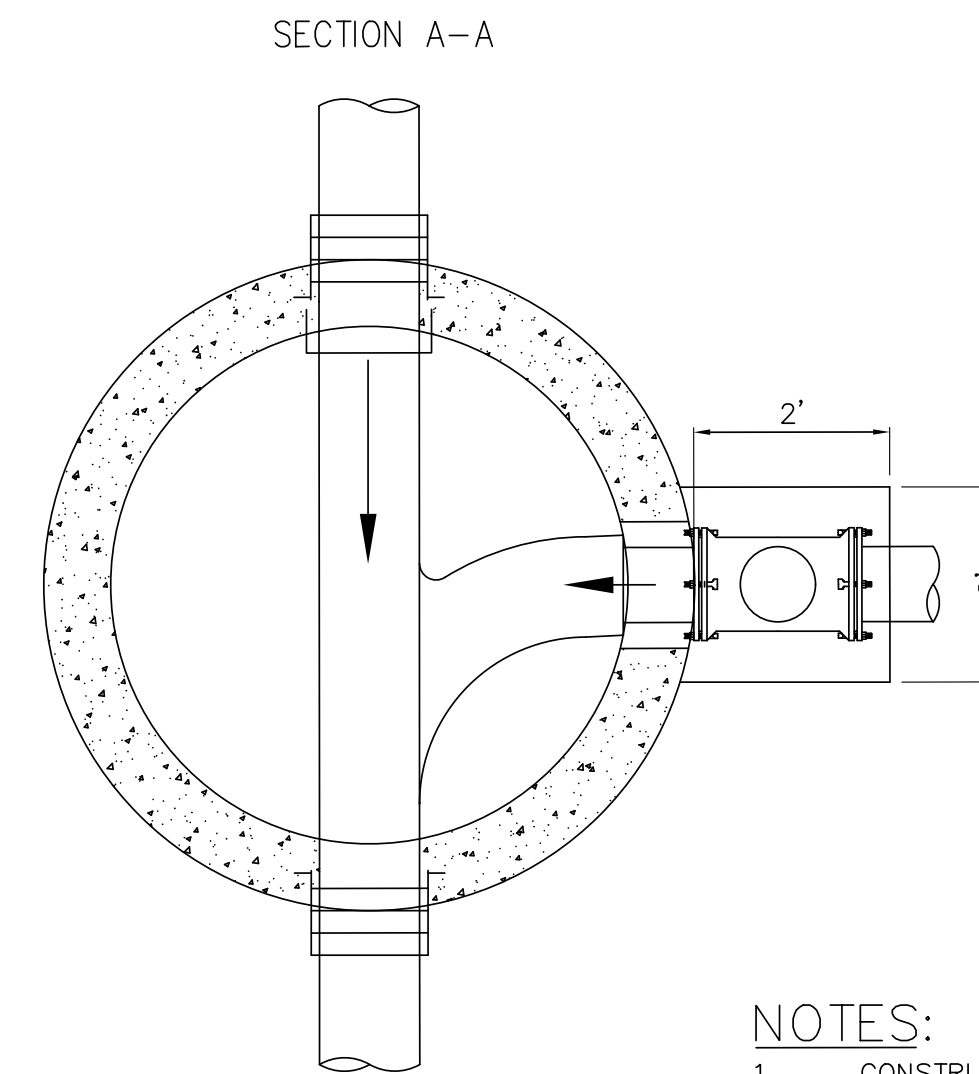
1. PIPING CONFIGURATION TO BE USED ON ALL DROPS ENTERING AT GREATER THAN 30" ABOVE BENCH.
2. FOR LOW PRESSURE SEWER CONNECTIONS, CROSS SHALL BE REPLACED BY A TEE (OPEN END UP).
3. FOR HIGH PRESSURE FORCE MAINS, CROSS SHALL BE REPLACED BY A RJ 90° BEND.
4. LINE MAY NOT ENTER MANHOLE THROUGH CONE SECTION OR THROUGH ANY JOINT.
5. STAINLESS STEEL STRAPPING SHALL BE 1" WIDE BY 1/8" THICK AND ATTACHED TO THE MANHOLE WALL WITH STAINLESS STEEL MASONRY ANCHORS. FOR INTERIOR STRAPPING OF DROP PIPE, SEE DETAIL S-7A.

**INSIDE DROP PIPING
FOR MANHOLE
DETAIL S-7**

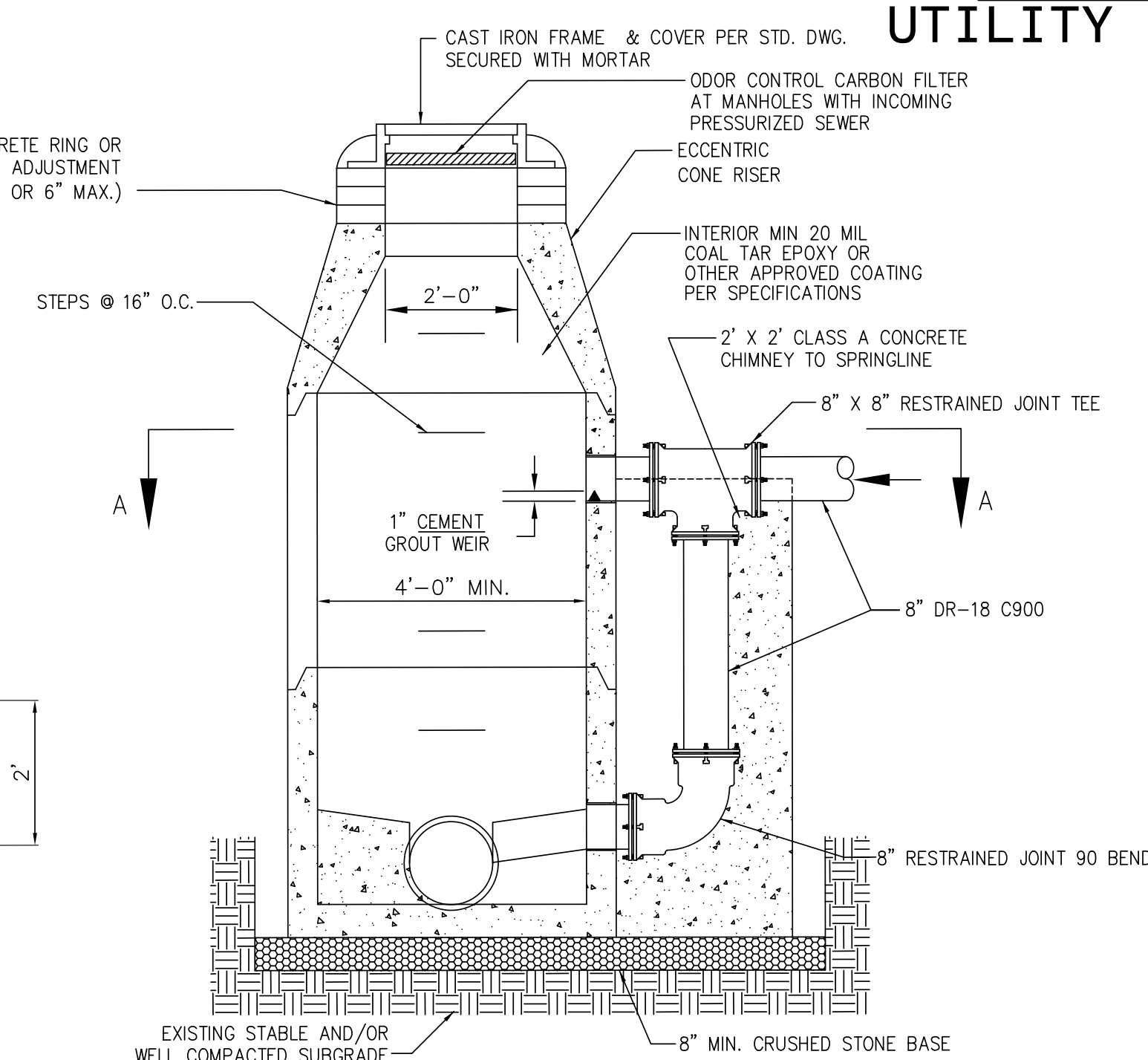


NOTE:
ALL PARTS SHALL BE STAINLESS STEEL

**DROP PIPE STRAP
DETAIL S-7A**



PRECAST CONCRETE RING OR BRICK & MORTAR GRADE ADJUSTMENT (LIMIT - THREE COURSES OR 6" MAX.)

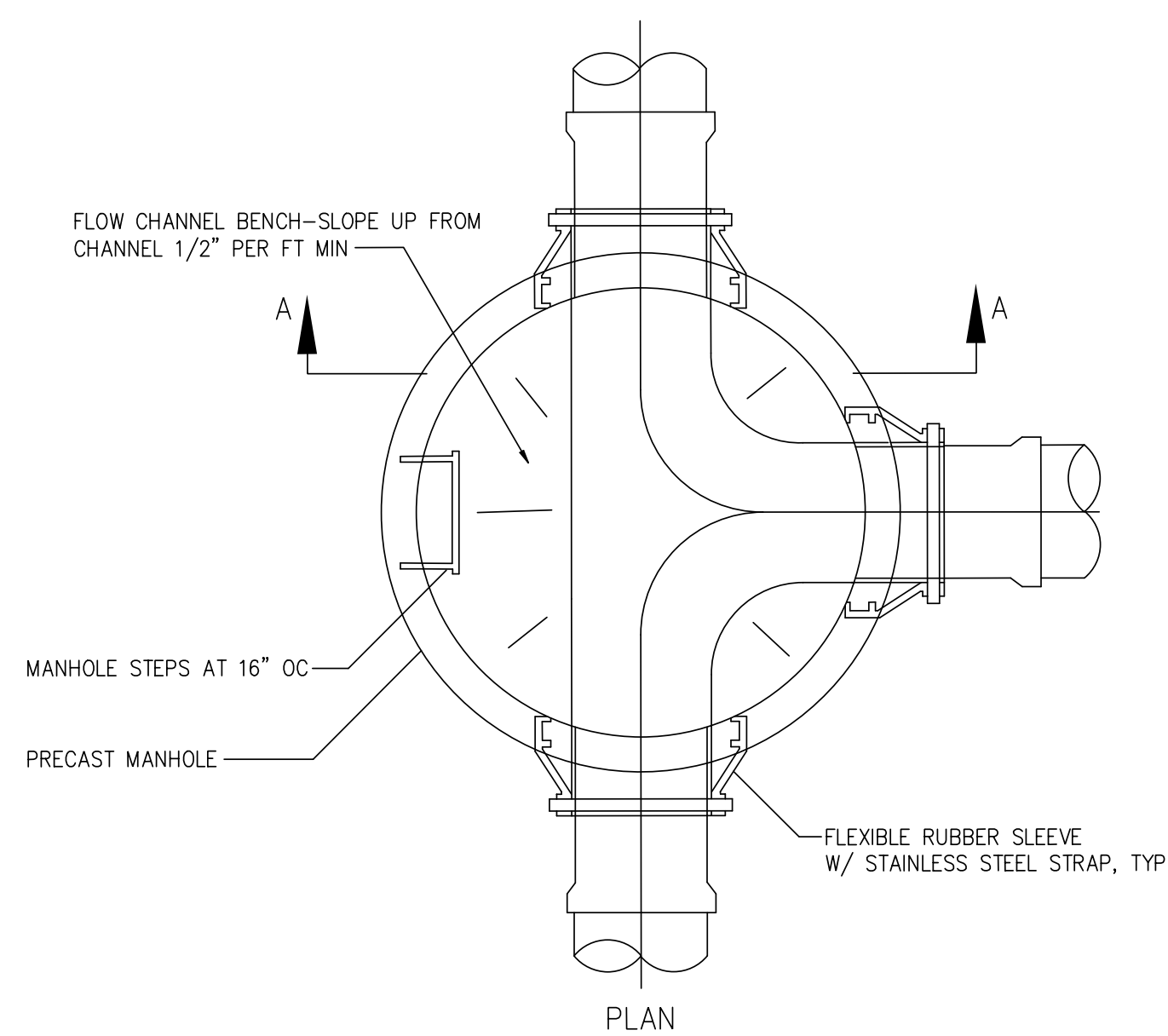


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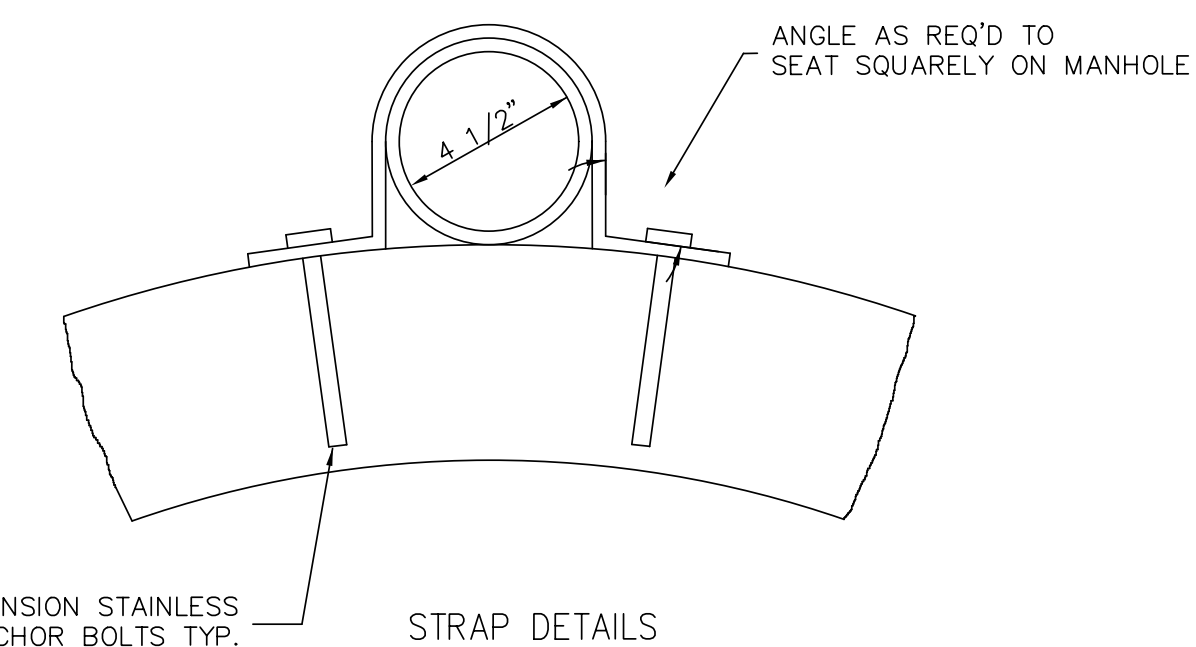
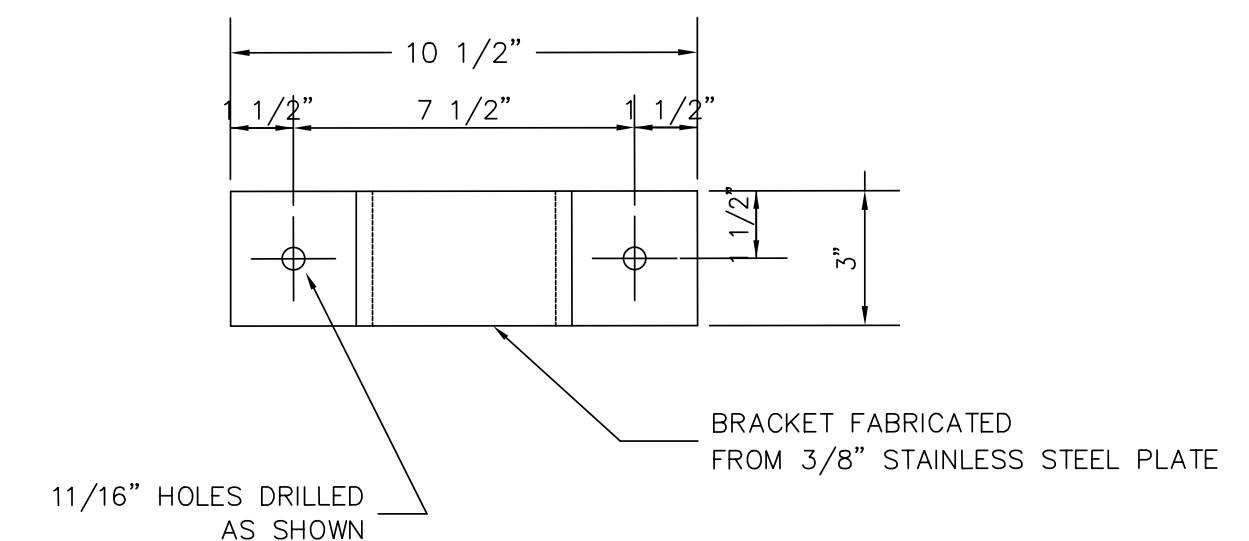
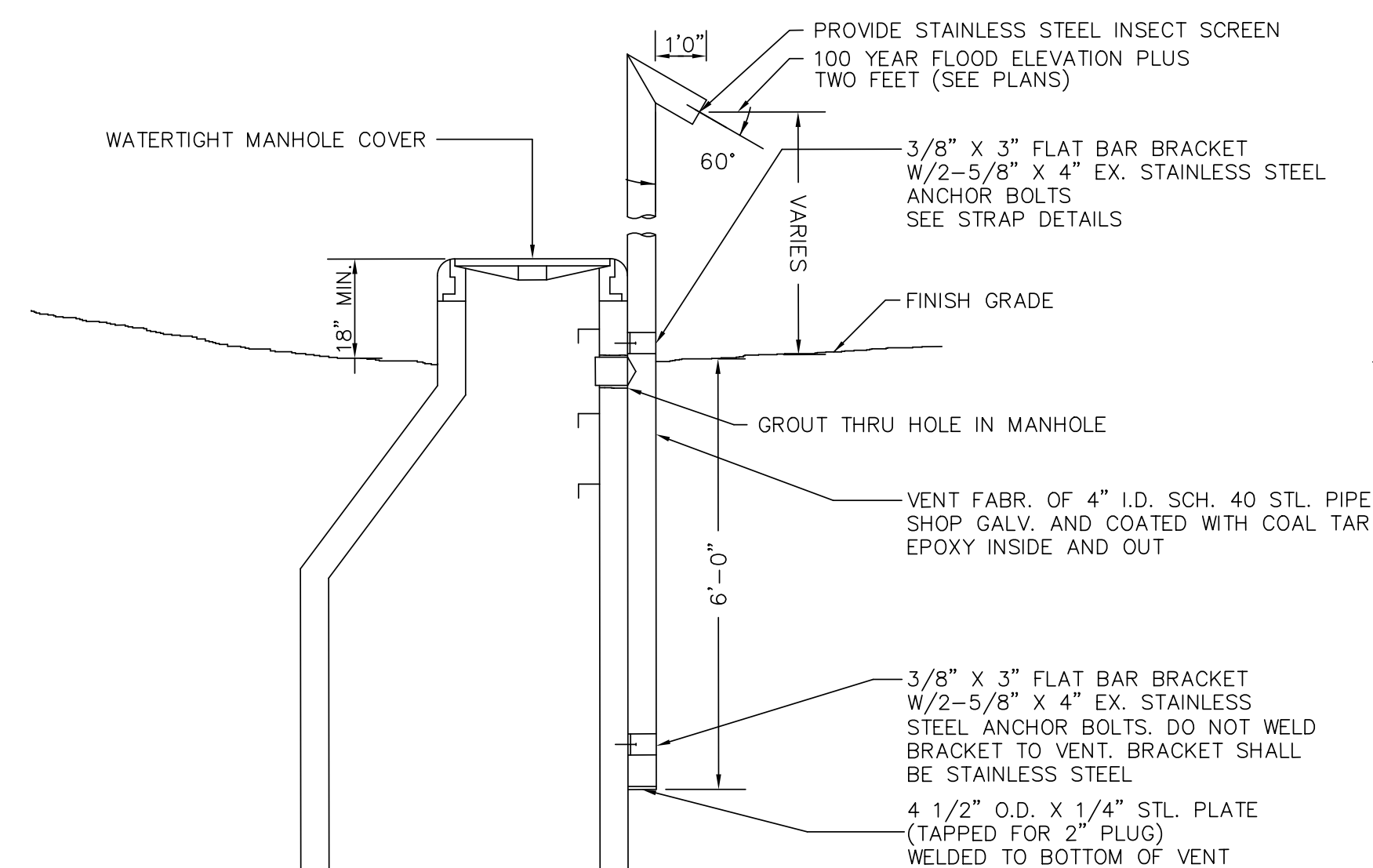
1. CONSTRUCT OUTSIDE DROP CONCRETE AND PIPING WITH EACH SECTION OF MANHOLE RISER.
2. DO NOT RETROFIT OUTSIDE DROP TO EXISTING MANHOLE. USE INSIDE DROP INSTEAD.
3. ALL OUTSIDE DROP SANITARY SEWER MANHOLES MUST BE APPROVED BY BRUNSWICK COUNTY ENGINEERING.
4. ALL EXTERIOR JOINTS SHALL BE SEALED WITH A 4" WIDE BUTYL RUBBER WRAP.

**PRECAST MANHOLE WITH OUTSIDE DROP
DETAIL S-8**

Revisions	
1.1	DATED 4/30/2013
	Mod S-7, Add S-7A
1.2	DATED 1/23/2019
	Mod S-7, S-8
1.3	DATED 3/18/2020
	Mod S-7

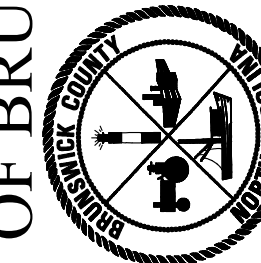


**TYPICAL MANHOLE INVERTS
DETAIL S-9**



**MANHOLE VENTING FOR FLOODPLAIN AREAS
DETAIL S-10**

COUNTY OF BRUNSWICK



GENERAL SEWER DETAILS
FOR

BRUNSWICK COUNTY NORTH CAROLINA

Date: 06-18-12
 Scale: NTS
 Drawn By: JDM
 Checked By: WLP


Prepared in the Office of:



AECOM TECHNICAL SERVICES OF NORTH CAROLINA, INC.
701 CORPORATE CENTER DRIVE, SUITE 475, RALEIGH, NC 27607
919-854-6200 919-854-6259 (fax)
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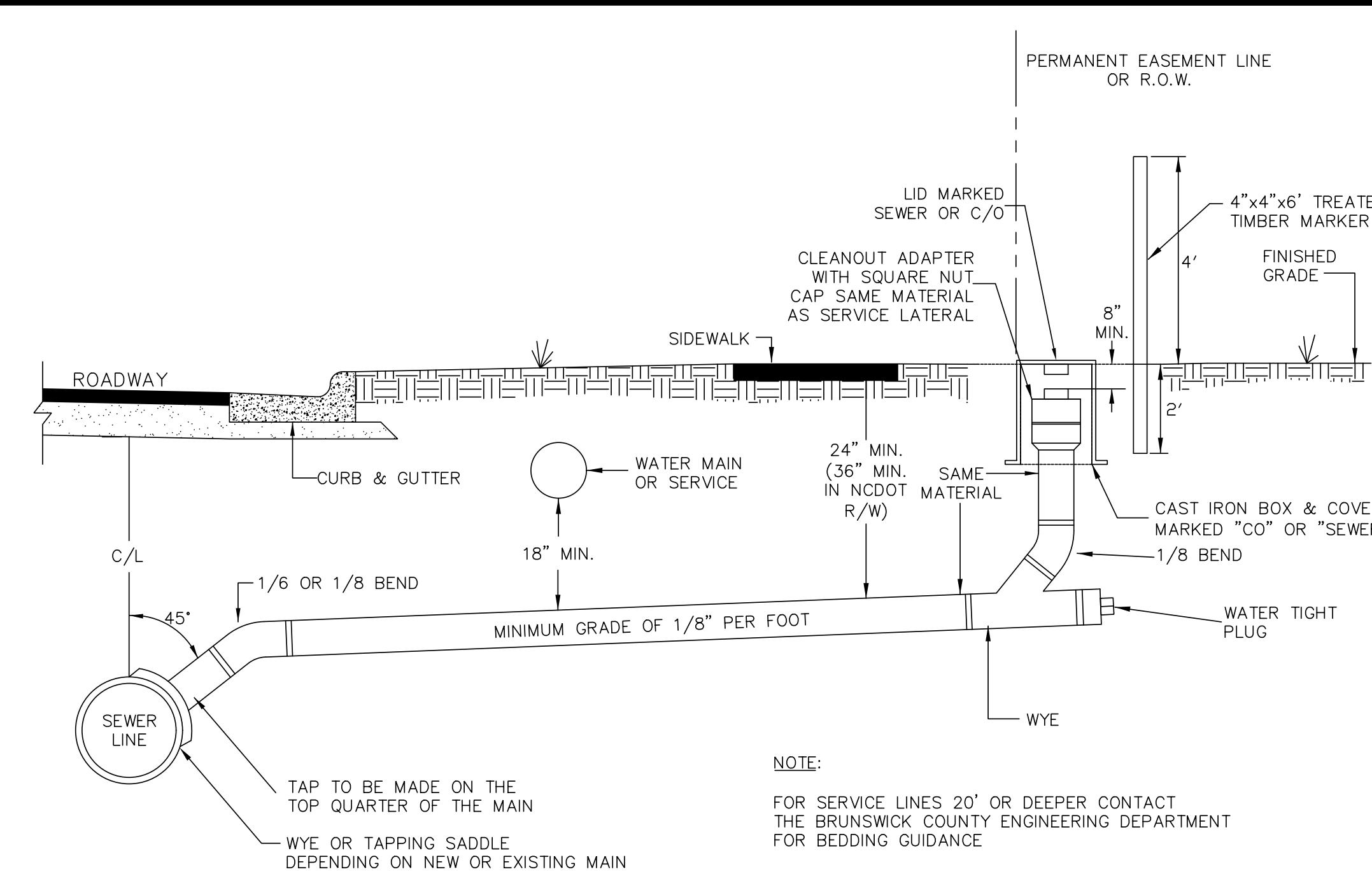
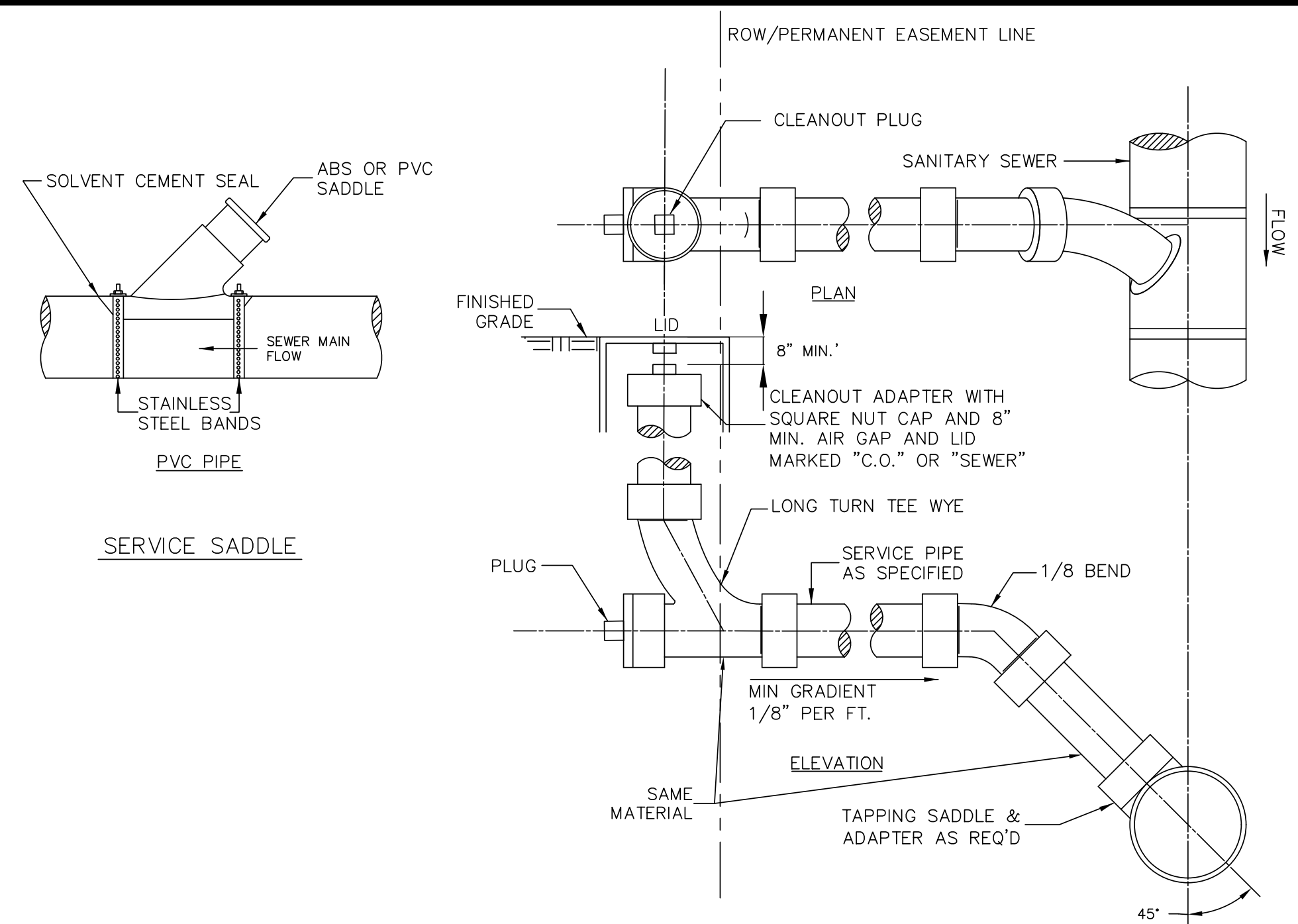
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R-5021	UC-30
DESIGNED BY:	9/9/2011
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	

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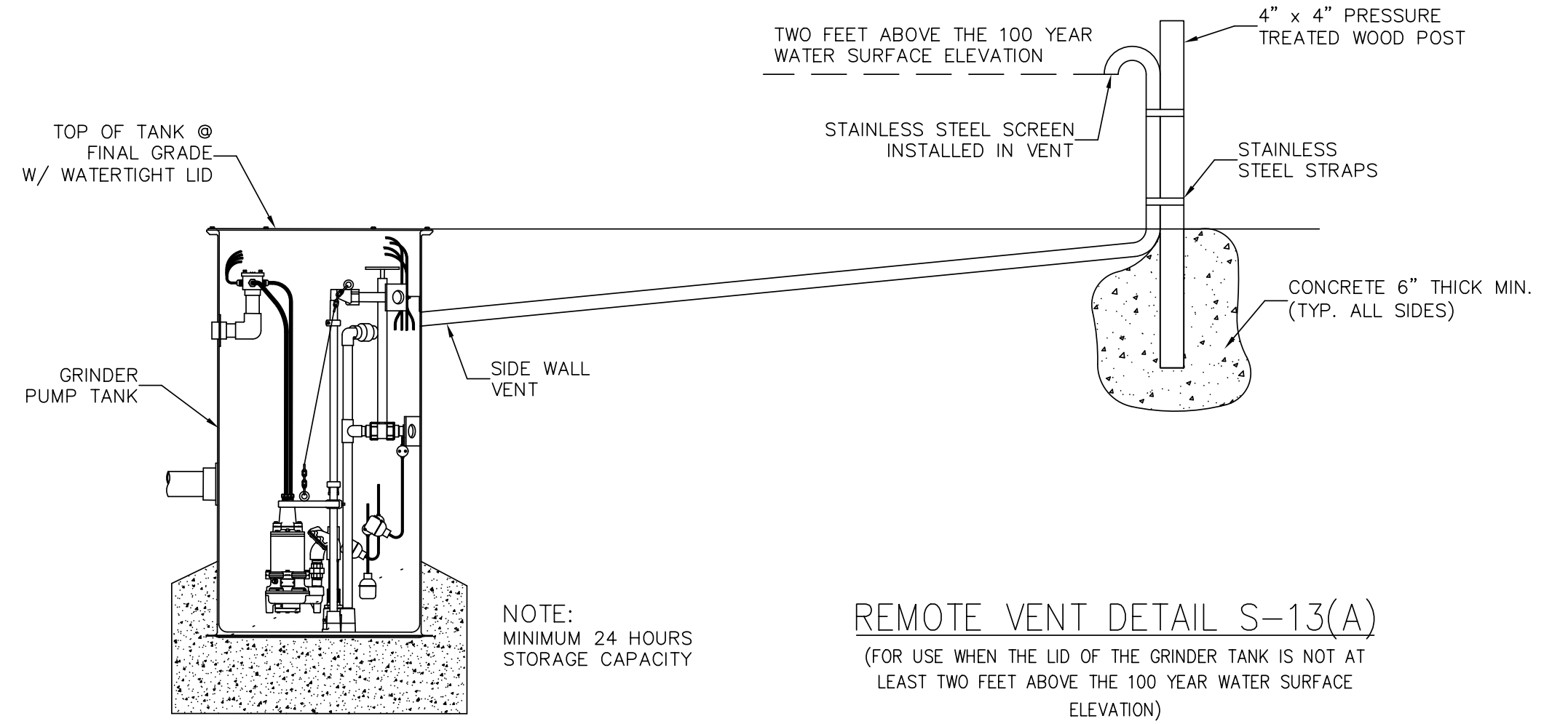
D. Stephen Scruggs
Professional Engineer
License No. 10666

UTILITY CONSTRUCTION



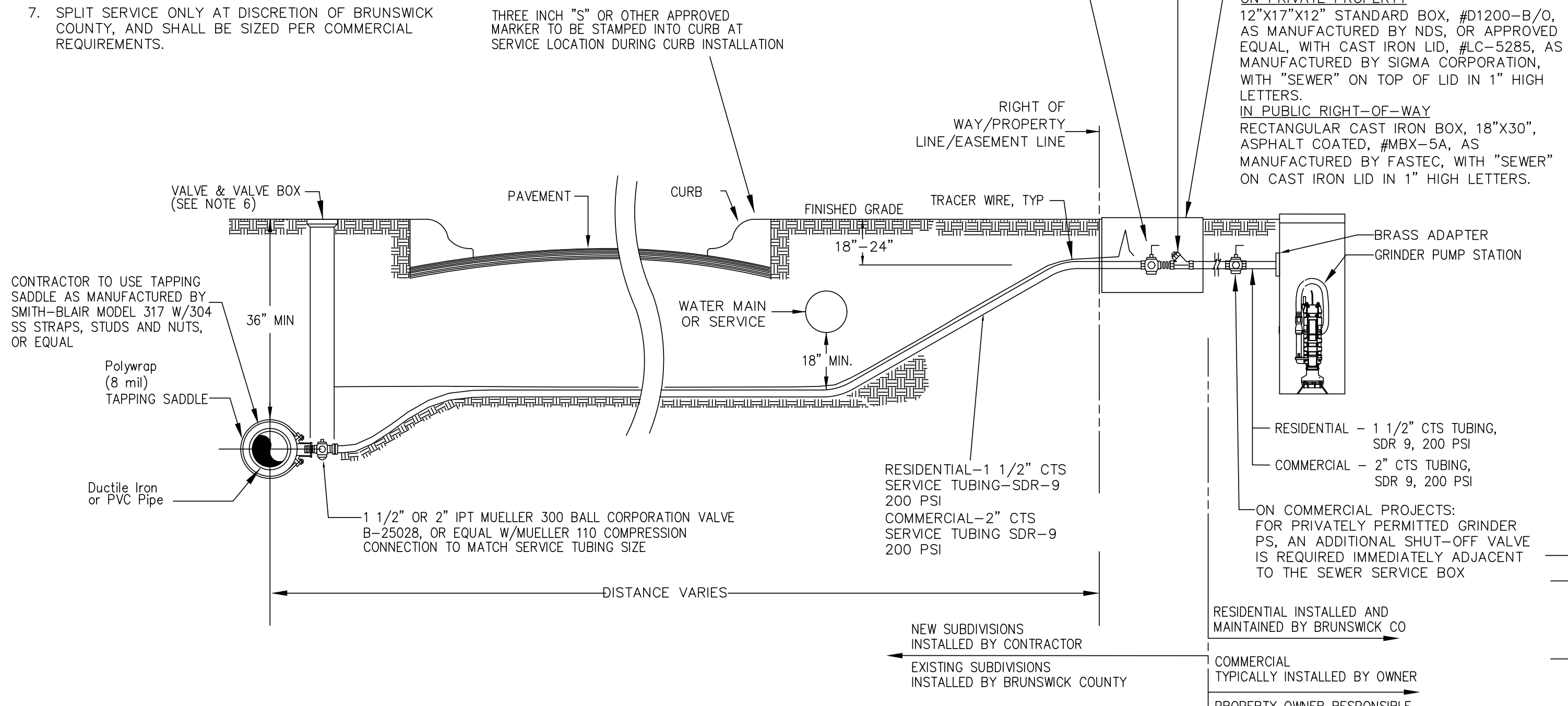
- NOTES:
- ALL TAPS WILL BE MADE IN ACCORDANCE WITH BRUNSWICK COUNTY SPECIFICATIONS AND AWWA GUIDELINE "ANSI/AWWA C600-93" OR LATEST REVISION FOR TAPPING THROUGH POLYETHYLENE ENCASEMENT.
 - ALL MATERIAL TO COMPLY WITH BRUNSWICK COUNTY SPECIFICATIONS.
 - TRACER WIRE SHALL BE INSTALLED FROM THE FORCE MAIN TO THE VALVE BOX.
 - THE HOMEOWNER IS RESPONSIBLE FOR THE GRAVITY CONNECTION FROM THE STRUCTURE TO THE GRINDER PUMP STATION AND FOR THE ELECTRICAL WIRING TO PROVIDE POWER TO THE PUMP PANEL.
 - AT THE DISCRETION OF BRUNSWICK COUNTY, ON SELECT BRUNSWICK COUNTY CAPITAL PROJECTS AND SPECIAL ASSESSMENT DISTRICT PROJECTS, THE VALVE BOX HOUSING, SHUT-OFF VALVE, AND CHECK VALVE MAY BE LOCATED WITHIN THE RIGHT-OF-WAY.
 - VALVE BOX AND LID ARE NOT REQUIRED ON SHORT SIDE TAPS IN NON-PUBLIC R/W.
 - SPLIT SERVICE ONLY AT DISCRETION OF BRUNSWICK COUNTY, AND SHALL BE SIZED PER COMMERCIAL REQUIREMENTS.

SANITARY SEWER GRAVITY TAPS & SERVICE LATERALS
DETAIL S-11

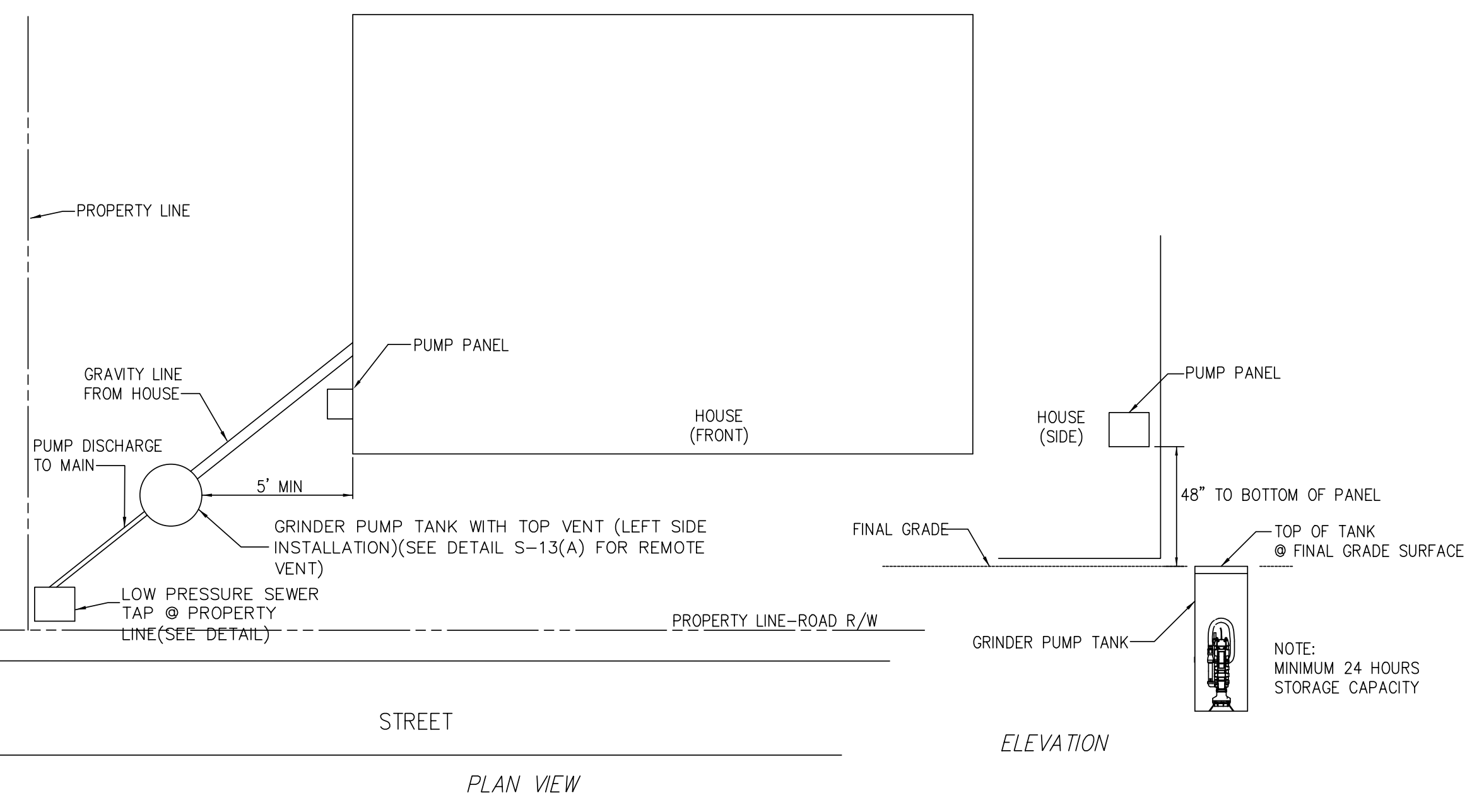


NOTE: MINIMUM 24 HOURS STORAGE CAPACITY

REMOTE VENT DETAIL S-13(A)
(FOR USE WHEN THE LID OF THE GRINDER TANK IS NOT AT LEAST TWO FEET ABOVE THE 100 YEAR WATER SURFACE ELEVATION)



LOW PRESSURE SEWER CONNECTION
DETAIL S-12

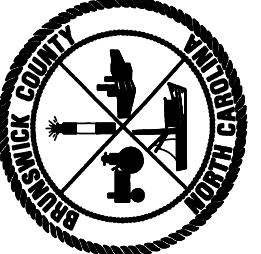


TYPICAL RESIDENTIAL GRINDER PUMP STATION LOCATION
DETAIL S-13

Revisions

1.1 - DATED 3/7/2013	Mod S-12
1.2 - DATED 11/14/2016	Mod S-12
1.3 - DATED 4/11/2018	Mod S-13A
1.4 - DATED 1/23/2019	Mod S-11

COUNTY OF BRUNSWICK



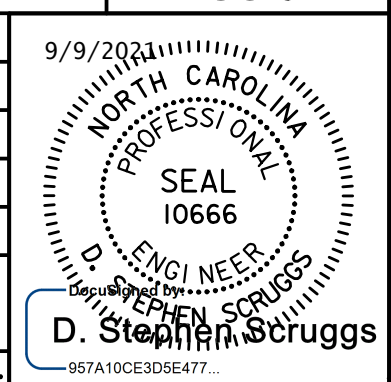
GENERAL SEWER DETAILS FOR
BRUNSWICK COUNTY
NORTH CAROLINA

Date: 06-28-12
Scale: NTS
Drawn By: JDM
Checked By: WLP

DATE: 8/13/2011
TIME: 10:40:00 AM
DRN: P:\60482623\900\Work\915\Utility Construction\NF-5021_UC_30.dgn

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AECOM TECHNICAL SERVICES OF NORTH CAROLINA, INC.
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919-854-6200 919-854-6259 (fax)
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PROJECT REFERENCE NO.	SHEET NO.
R-5021	UC-3P
DESIGNED BY:	9/9/2011
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	



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UTILITY CONSTRUCTION

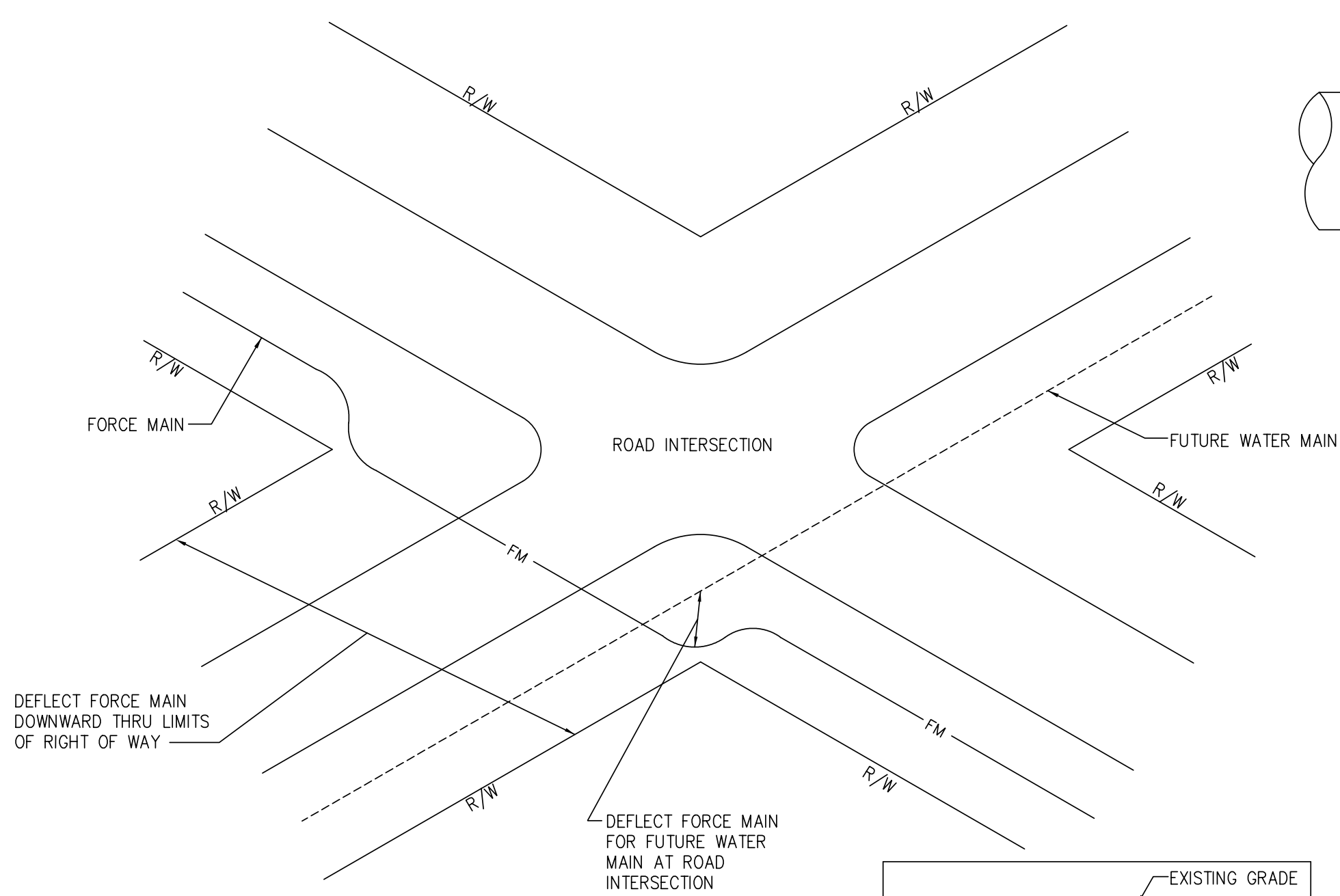
COUNTY OF BRUNSWICK

GENERAL SEWER DETAILS FOR
BRUNSWICK COUNTY
NORTH CAROLINA

Date: 07.09.12
Scale: NTS
Drawn By: JDM
Checked By: WLP

Revisions

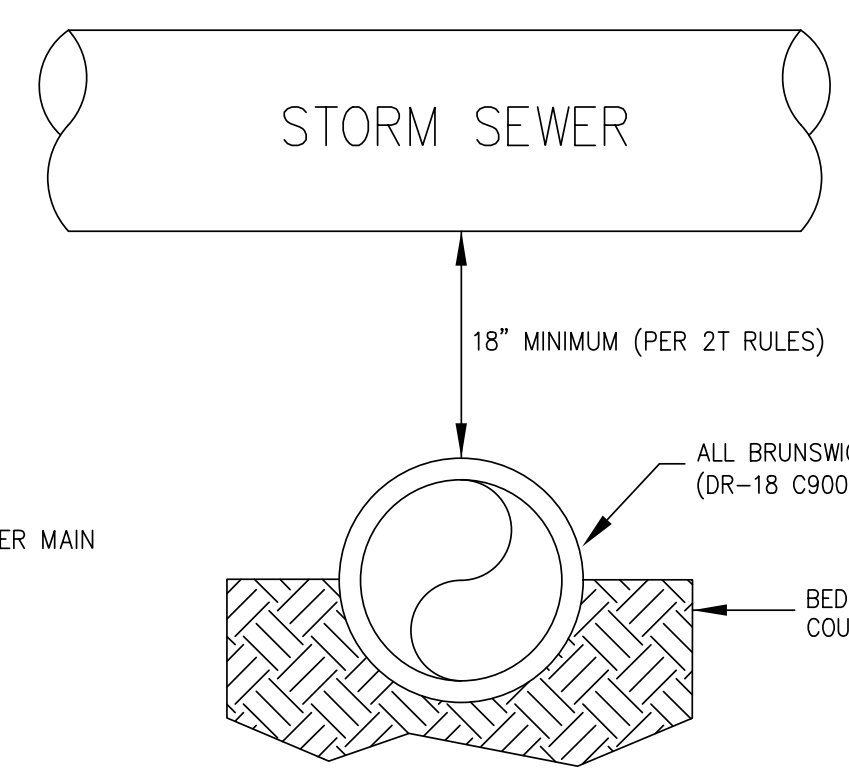
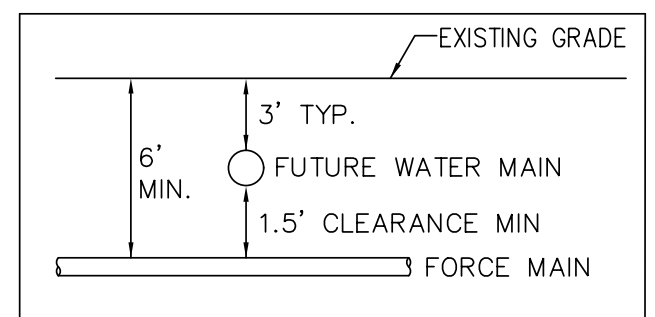
1.1 - DATED 10/27/2015
Mod S-15
1.2 - DATED 1/23/2019
Mod S-15B, S-15C



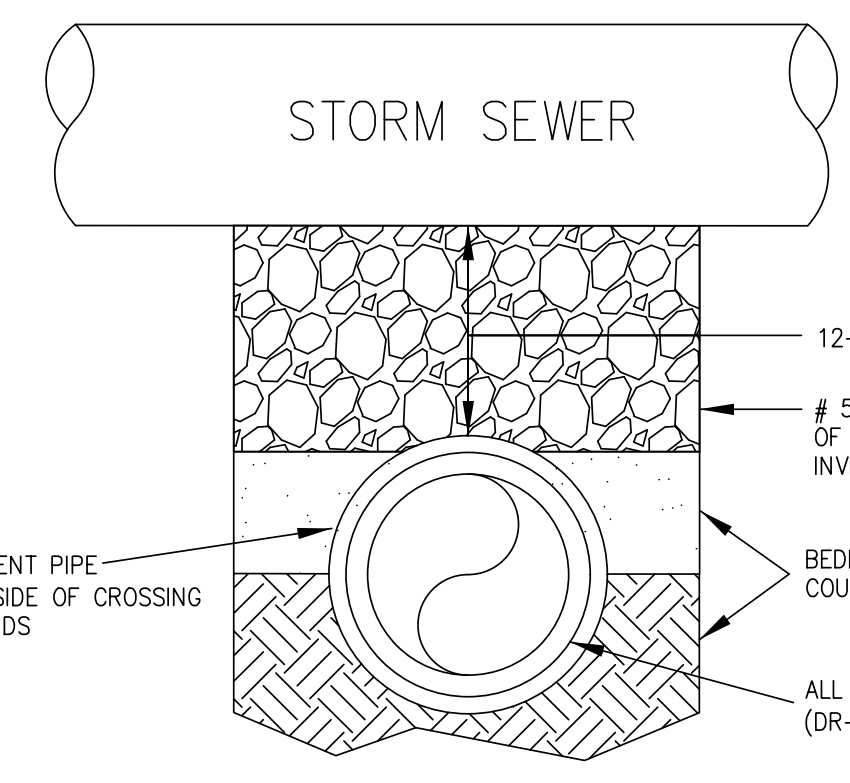
SEWER FORCE MAIN @ ROAD INTERSECTIONS
DETAIL S-14

MINIMUM DESIGN & CONSTRUCTION STANDARDS FOR GREASE TRAP AND OIL/SAND SEPARATOR

- A. GENERAL**
1. USABLE LIQUID CAPACITY OF TANK MUST NOT BE LESS THAN 1000 GALLONS. FOR OIL/SAND SEPARATOR REFER TO SPECIFICATIONS FOR SIZING CALCULATIONS.
 2. THE TANK LENGTH MUST BE AT LEAST TWO (2) BUT NOT MORE THAN THREE (3) TIMES THE WIDTH.
 3. THE UNIFORM LIQUID DEPTH MUST NOT BE LESS THAN FOUR (4) FEET.
 4. AT LEAST ONE (1) FOOT OF FREEBOARD MUST BE PROVIDED.
 5. VIBRATION METHODS MUST BE EMPLOYED TO PREVENT VOIDS.
 6. WALL AND BOTTOM THICKNESS SHALL BE AS REQUIRED FOR STRUCTURAL STABILITY, BUT NOT LESS THAN FOUR (4) INCHES IN THICKNESS.
 7. INLET MUST ENTER TANK A MINIMUM OF THREE (3) INCHES ABOVE THE LIQUID LEVEL.
 8. INLET TEE SHALL EXTEND SIXTEEN (16) INCHES BELOW LIQUID LEVEL.
 9. OUTLET TEE SHALL EXTEND DOWN TO SIX (6) INCHES ABOVE THE BOTTOM OF THE GREASE TRAP.
 10. ACCESS OPENINGS MUST BE LOCATED ABOVE INLET AND OUTLET DEVICES, AND LIDS SHALL BE EQUIPPED WITH LIFT RINGS.
 11. TANKS LOCATED IN TRAFFIC AREAS MUST BE DESIGNED TO A HS-20 LOADING.
- B. TYPE OF REINFORCEMENT**
1. TANK WALLS AND BOTTOM - 6 X 6, 10 GAUGE WIRE MESH.
 2. TANK LIDS (TOPS) - NUMBER 3 RODS, 6 INCHES ON CENTER EACH WAY, OR 6 X 6, 10 GAUGE WIRE MESH PLUS ONE NUMBER 3 ROD PER LINEAR FOOT OF TANK TOP.
 3. ALL REINFORCING WIRE AND RODS SHOULD BE COVERED BY AT LEAST 1/2 INCH OF CONCRETE.
- C. CONCRETE**
1. STRENGTH - MIX SHOULD BE CALCULATED TO YIELD A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4,000 PSI.
 2. TYPES OF AGGREGATE
 - A. SAND - FINE UP TO 1/4 INCH
 - B. GRANITE DUST OR FINE SCREENINGS FROM CRUSHER OPERATION MAY BE USED IN LIEU OF SAND
 - C. GRAVEL OR CRUSHED STONE - SHOULD NOT EXCEED 1/3 OF WALL THICKNESS, I.E., FOR 2 1/2" WALL THICKNESS, AGGREGATE SHOULD NOT EXCEED A SIZE OF 3/4"
 3. PORTION AND QUALITY CONTROL - EVERY MANUFACTURER SHOULD HAVE PORTION CONTROL AND SUCH OTHER EQUIPMENT AND CAPABILITIES NECESSARY TO MAINTAIN CONSTANT MIX RATIOS AND SYSTEMATIC INSPECTION OF FINISHED PRODUCTS TO RULE OUT UNSUITABLE SPECIMENS.
- D. TANK IDENTIFICATION**
- AN IDENTIFYING SEAL BEARING THE FOLLOWING ITEMS MUST BE CAST OR STAMPED INTO THE OUTLET END, WITHIN SIX (6) INCHES OF THE TOP:
1. MANUFACTURER
 2. MANUFACTURER'S ADDRESS
 3. LIQUID CAPACITY OF TANK
 4. DESIGN LOADING
- E. GUARANTEE**
- ALL TANKS MUST BE GUARANTEED IN WRITING FOR TWO (2) YEARS AGAINST FAILURE DUE TO POOR WORKMANSHIP AND MATERIALS OF THE MANUFACTURER.

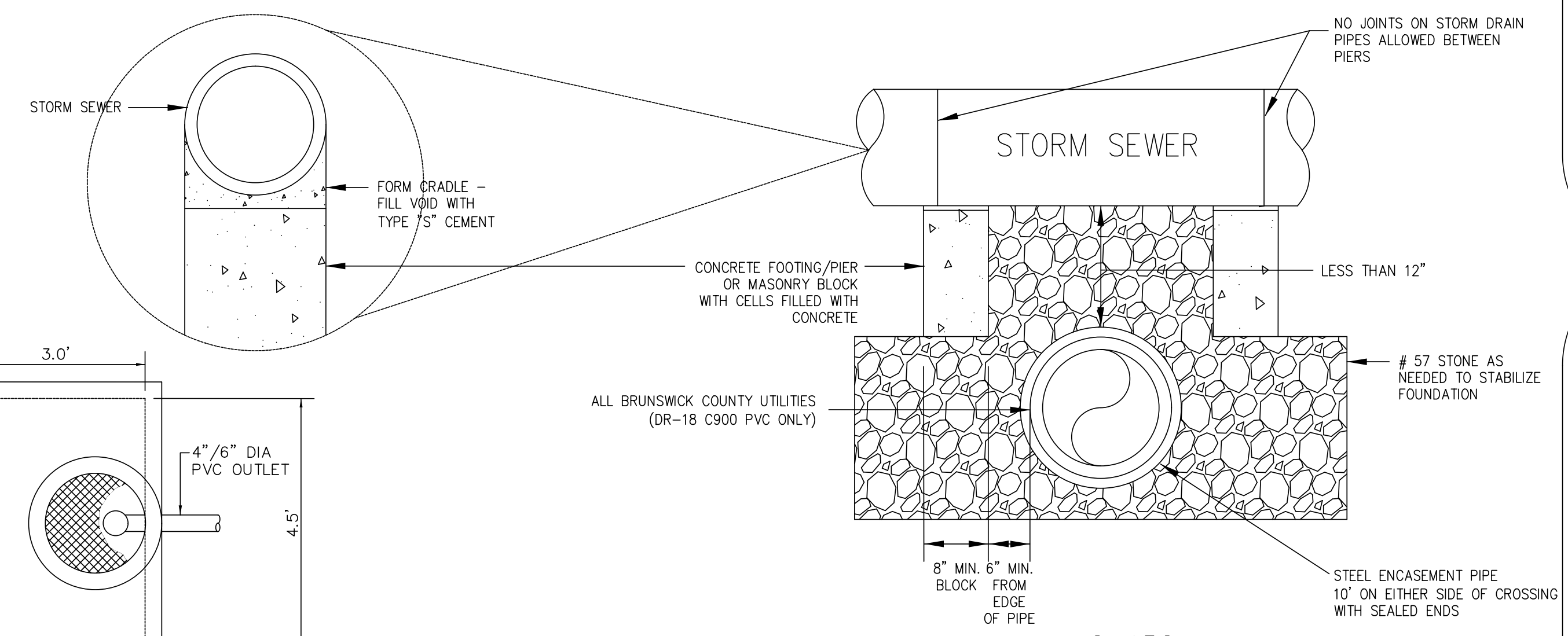


S-15A
STANDARD CONDITION

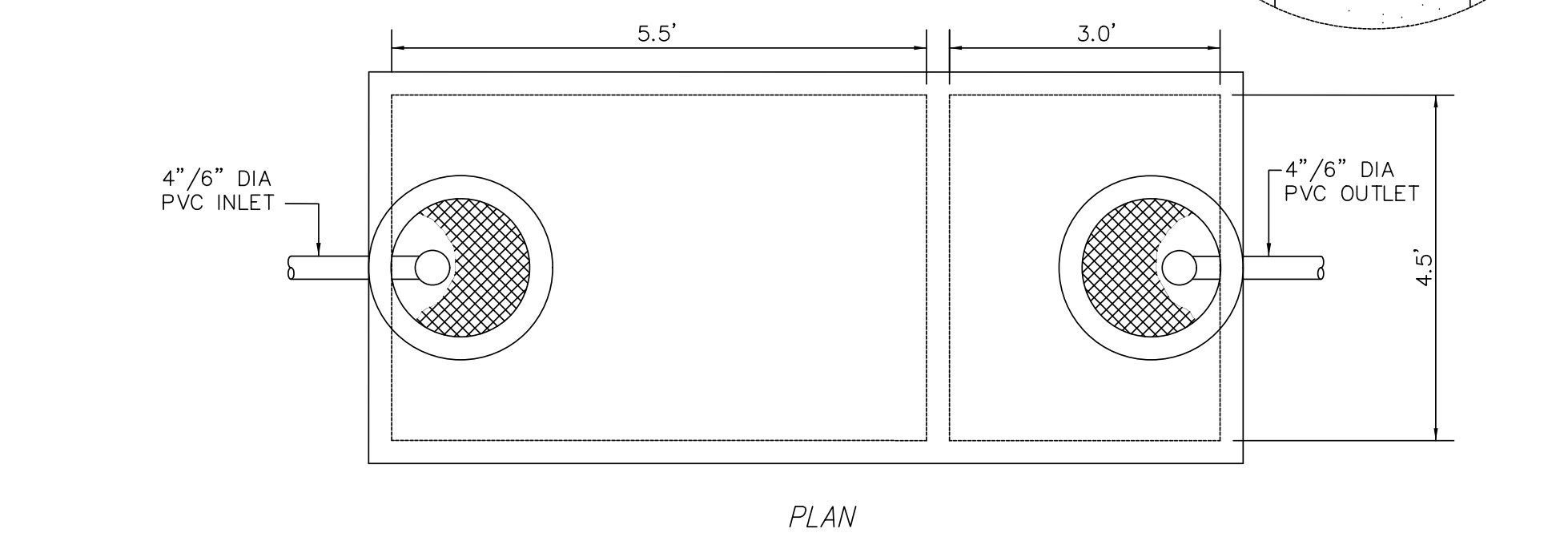


S-15B
12-18" VERTICAL CLEARANCE

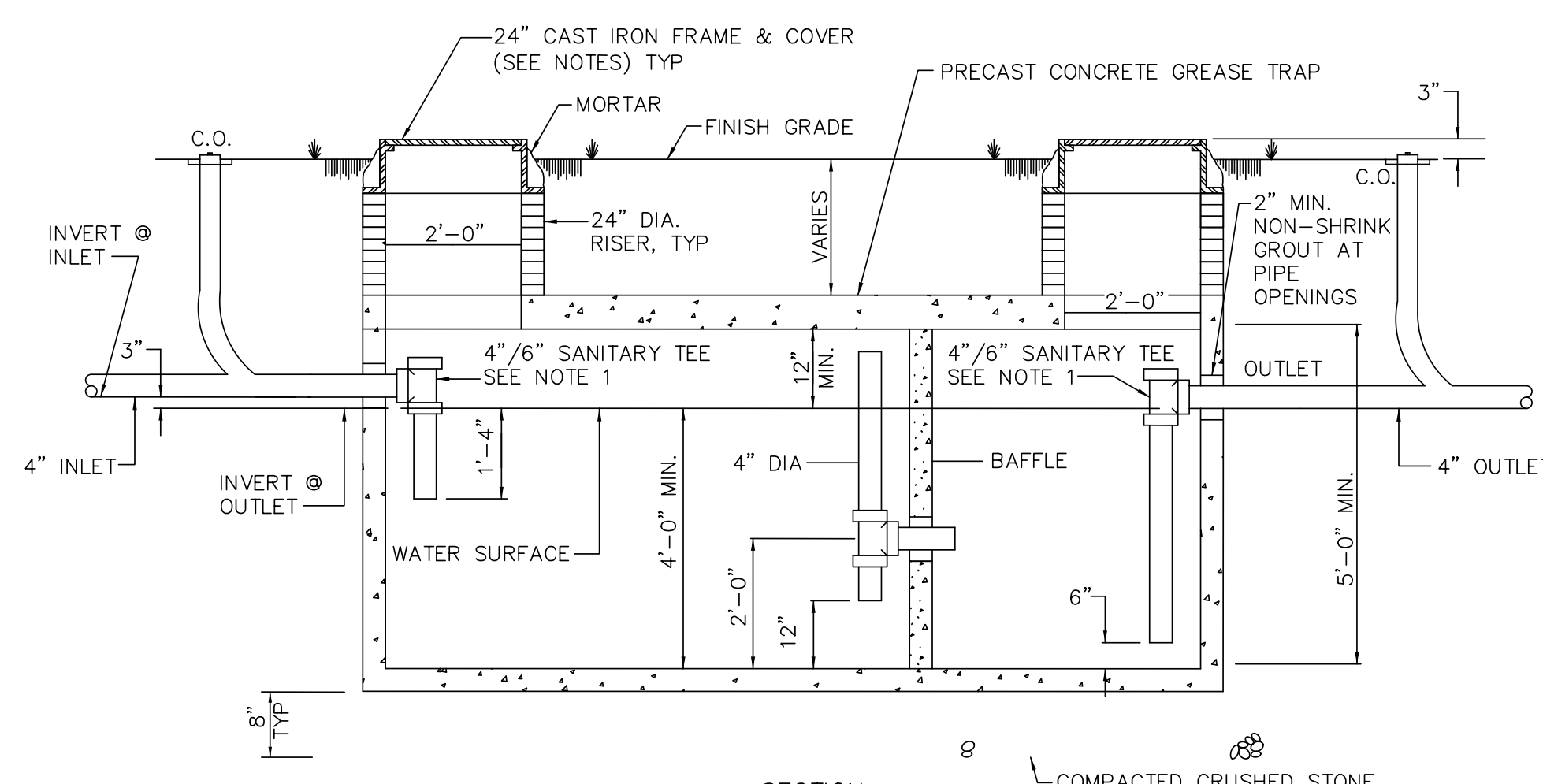
GRAVITY SEWER CROSSING BELOW STORM SEWER DETAIL S-15



S-15C
LESS THAN 12" VERTICAL CLEARANCE

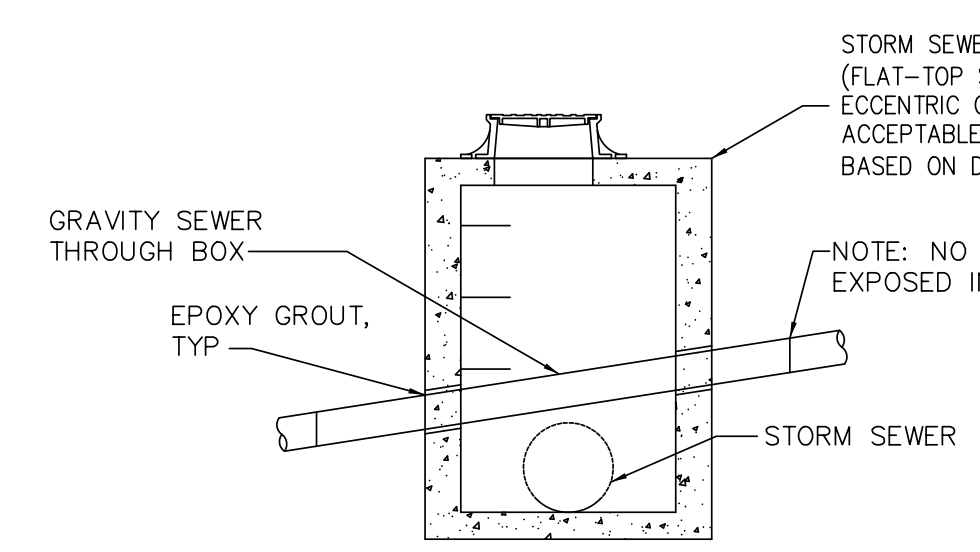


PLAN

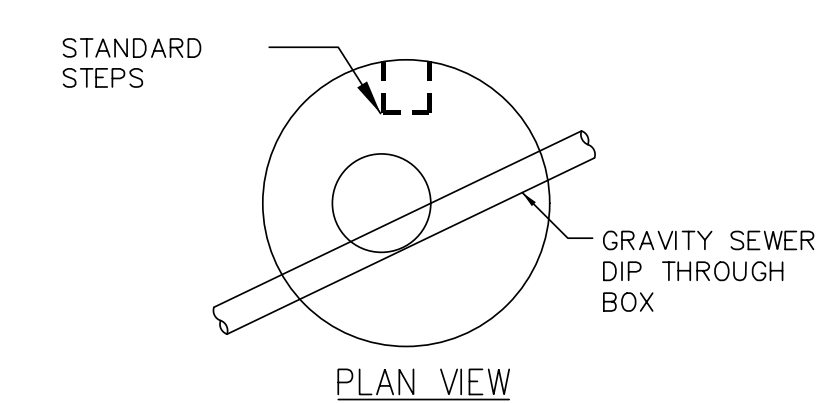


SECTION

- NOTES:**
1. SANITARY INLET AND OUTLET TEE SHALL BE 4" FOR GREASE TRAP AND 6" FOR OIL/SAND SEPARATOR.
 2. MANHOLE RING & COVER SHALL BE GAS AND WATER TIGHT PROVIDING A 22" MINIMUM CLEAR OPENING.
 3. CONCRETE GRADE RINGS SHALL BE UTILIZED TO BRING COVER TO FINISHED GRADE.
 4. MINIMUM SIZE OF OIL/SAND/GREASE SEPARATORS IS 1000 GALLONS PER BRUNSWICK COUNTY POLICY. FACILITIES MAY REQUIRE LARGER TRAPS BASED ON USAGE. ENGINEER MUST SIZE AS REQUIRED.



SECTION VIEW



PLAN VIEW

INTERFERENCE SANITARY SEWER MANHOLE GRAVITY SEWER THROUGH STORM SEWER DETAIL S-17

1,000 GALLON OIL/SAND/GREASE SEPARATOR
DETAIL S-16

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TIME: 10:40:24 PM
DGN: P:\040428203\000\Work\915\Utility Construction\A-5021_UC_UCSP.dgn

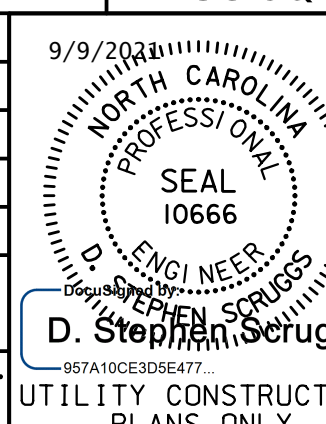
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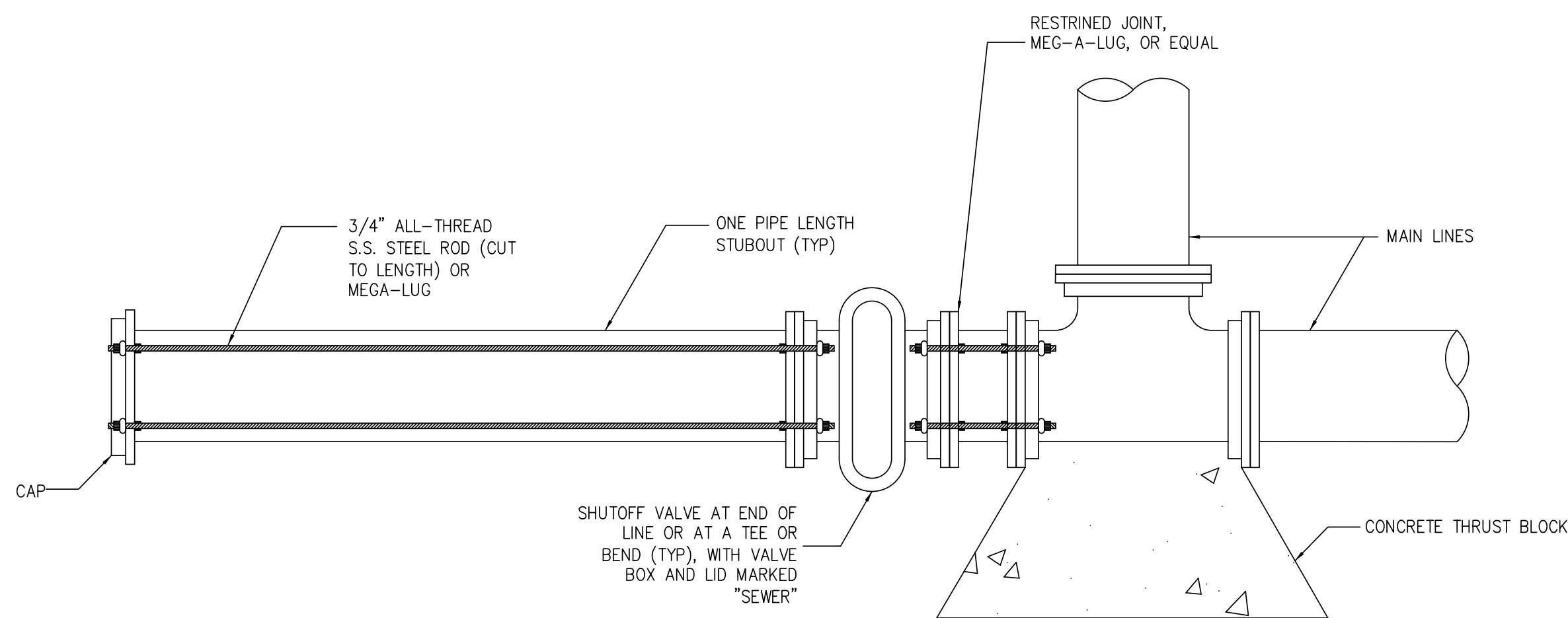
AECOM TECHNICAL SERVICES OF NORTH CAROLINA, INC.
701 CORPORATE CENTER DRIVE, SUITE 475, RALEIGH, NC 27607
919-854-6200 919-854-6259 (fax)
F - 0342

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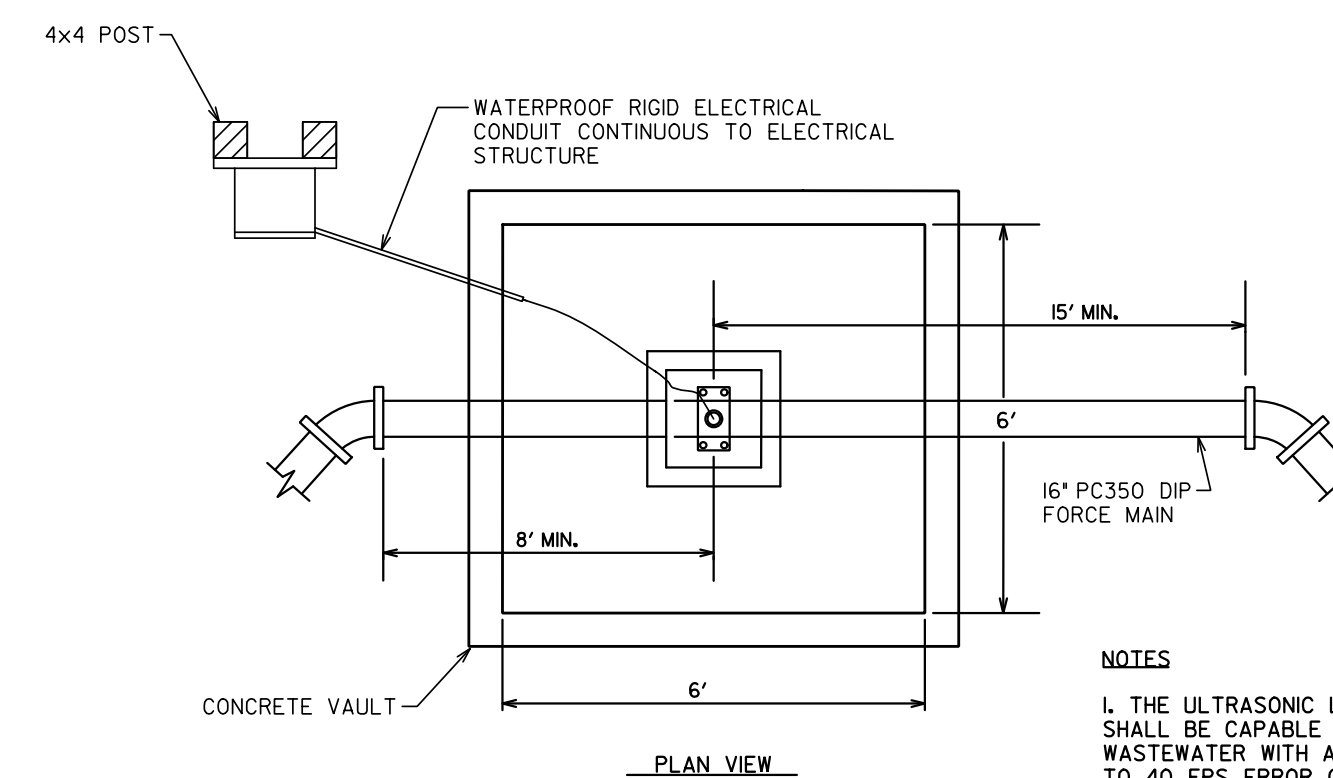
PROJECT REFERENCE NO.	SHEET NO.
R-5021	UC-3Q
DESIGNED BY:	9/9/2013
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	



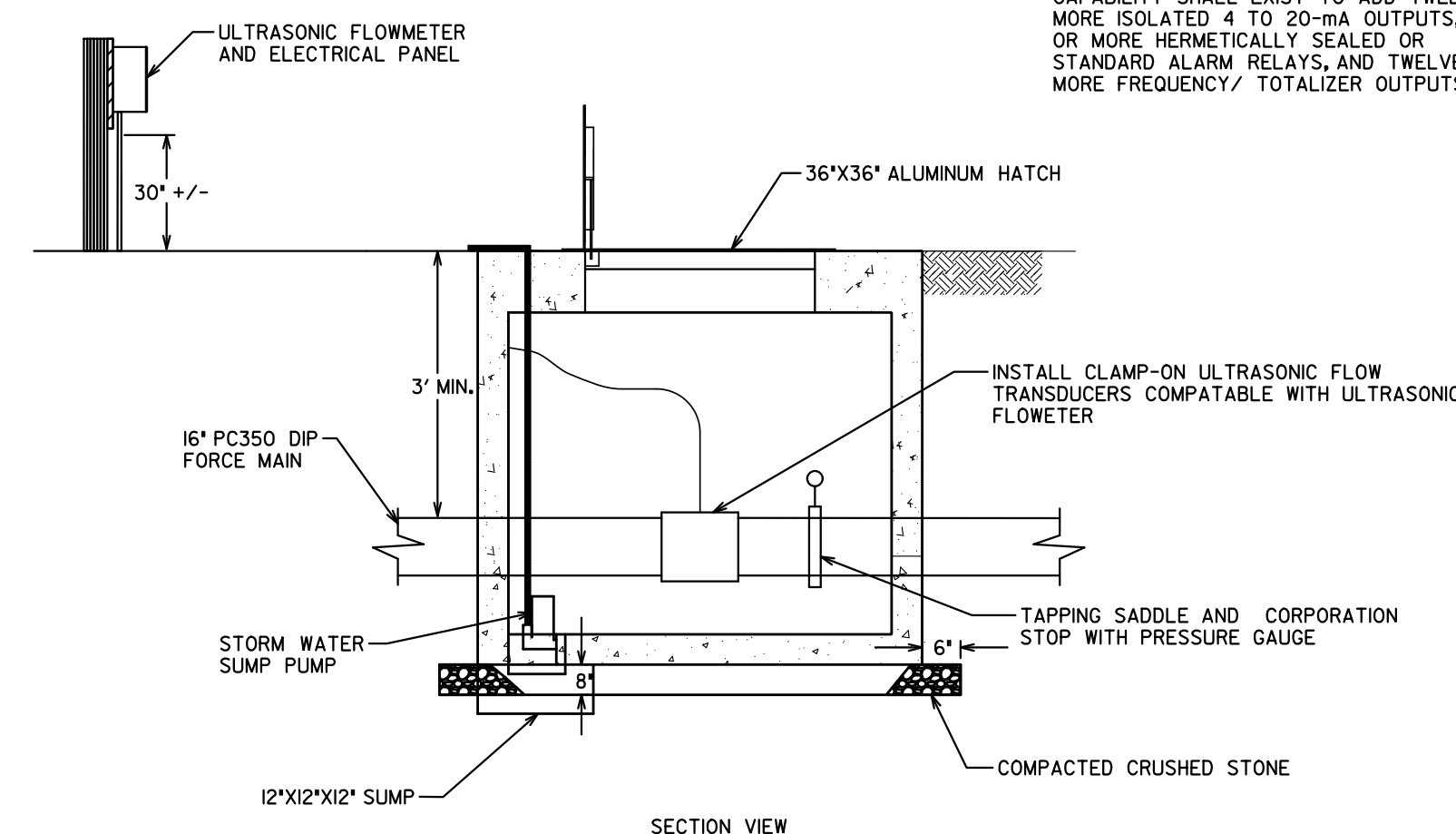
UTILITY CONSTRUCTION



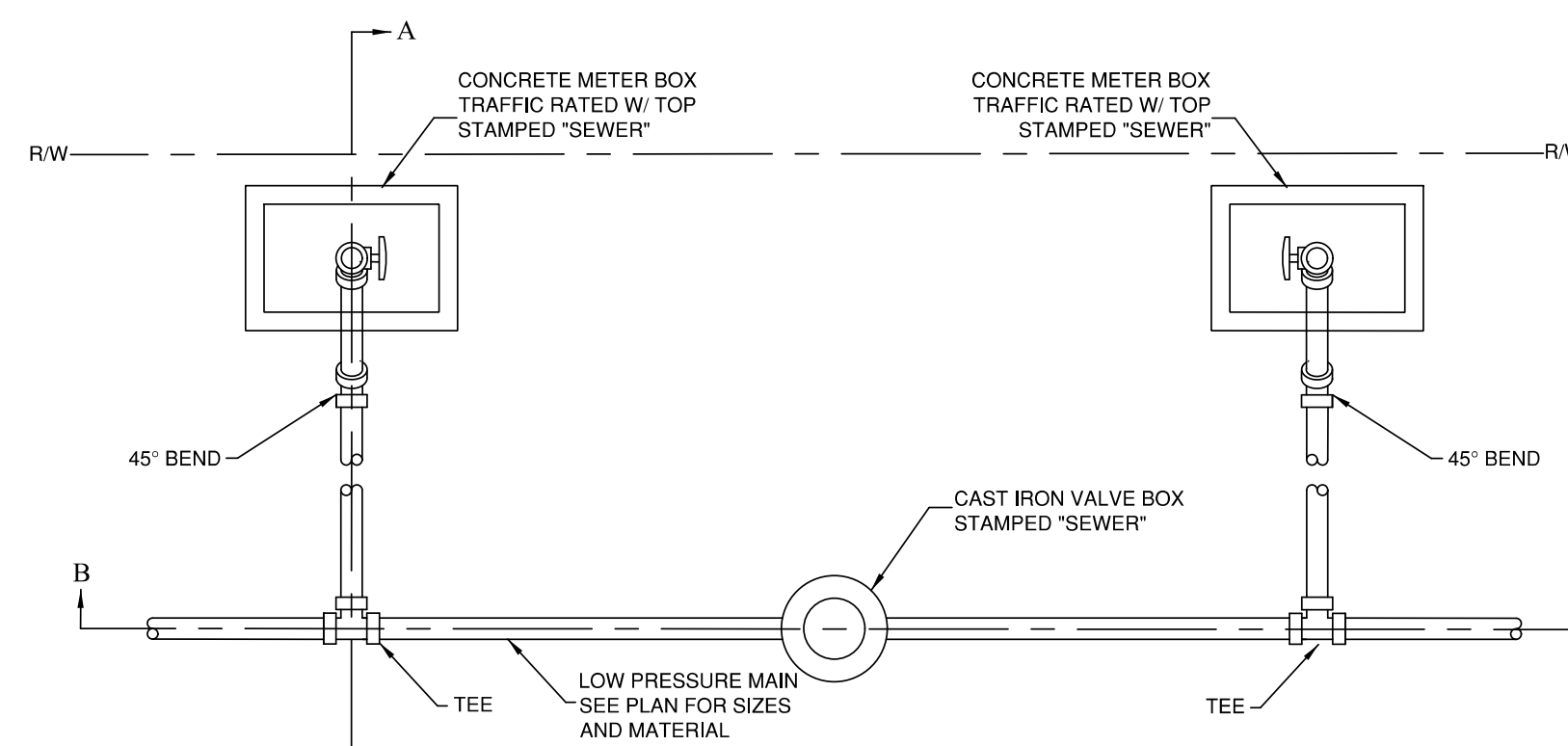
PLAN VIEW
FUTURE FORCE MAIN STUBOUT
DETAIL S-18



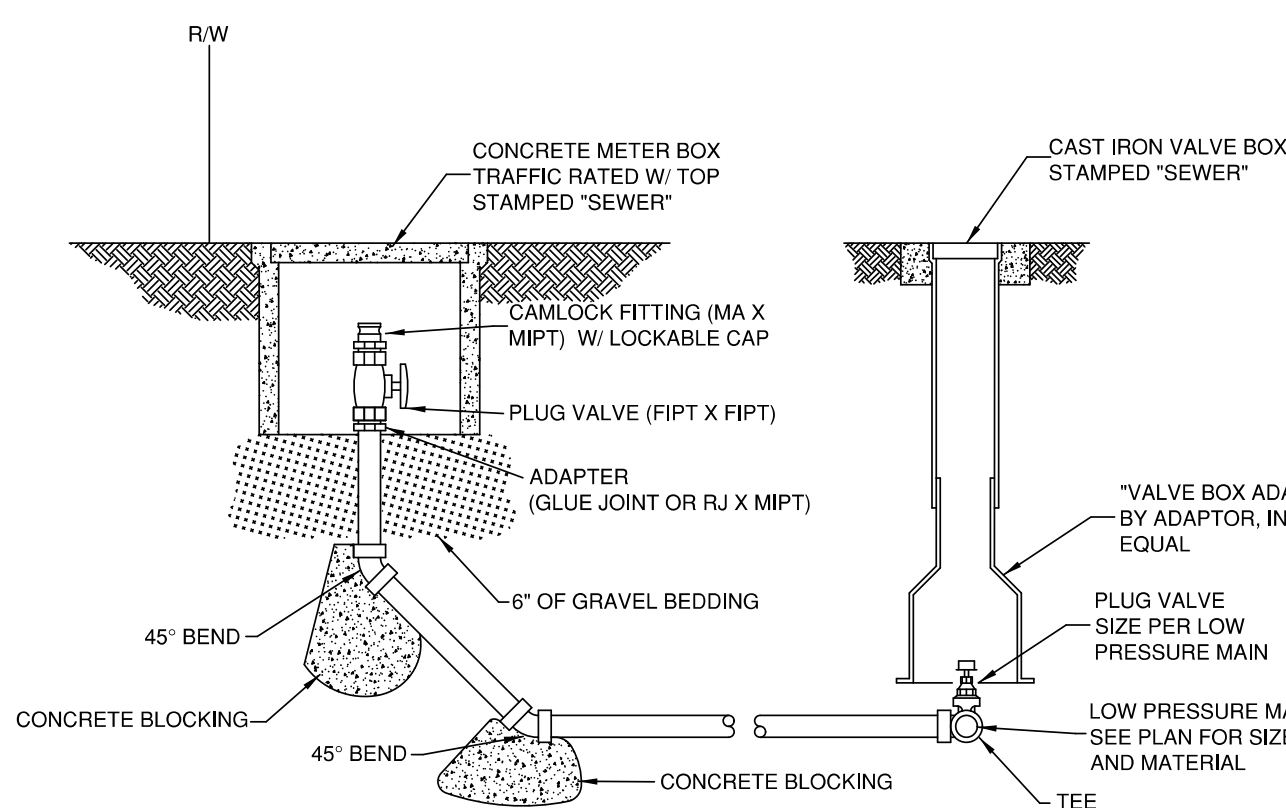
NOTES
1. THE ULTRASONIC LIQUID FLOWMETER SHALL BE CAPABLE OF MEASURING WASTEWATER WITH A VELOCITY RANGE OF 0.1 TO 40 FPS. ERROR OVER THIS FLOW RANGE SHALL BE LESS THAN 3% THE FLOWMETER SHALL BE SINGLE OR DUAL CHANNEL WITH USER-PROGRAMMABLE GRAPHIC LCD'S. THE CAPABILITY SHALL EXIST TO ADD TWELVE OR MORE ISOLATED 4 TO 20-mA OUTPUTS, SIX OR MORE HERMETICALLY SEALED OR STANDARD ALARM RELAYS, AND TWELVE OR MORE FREQUENCY/ TOTALIZER OUTPUTS



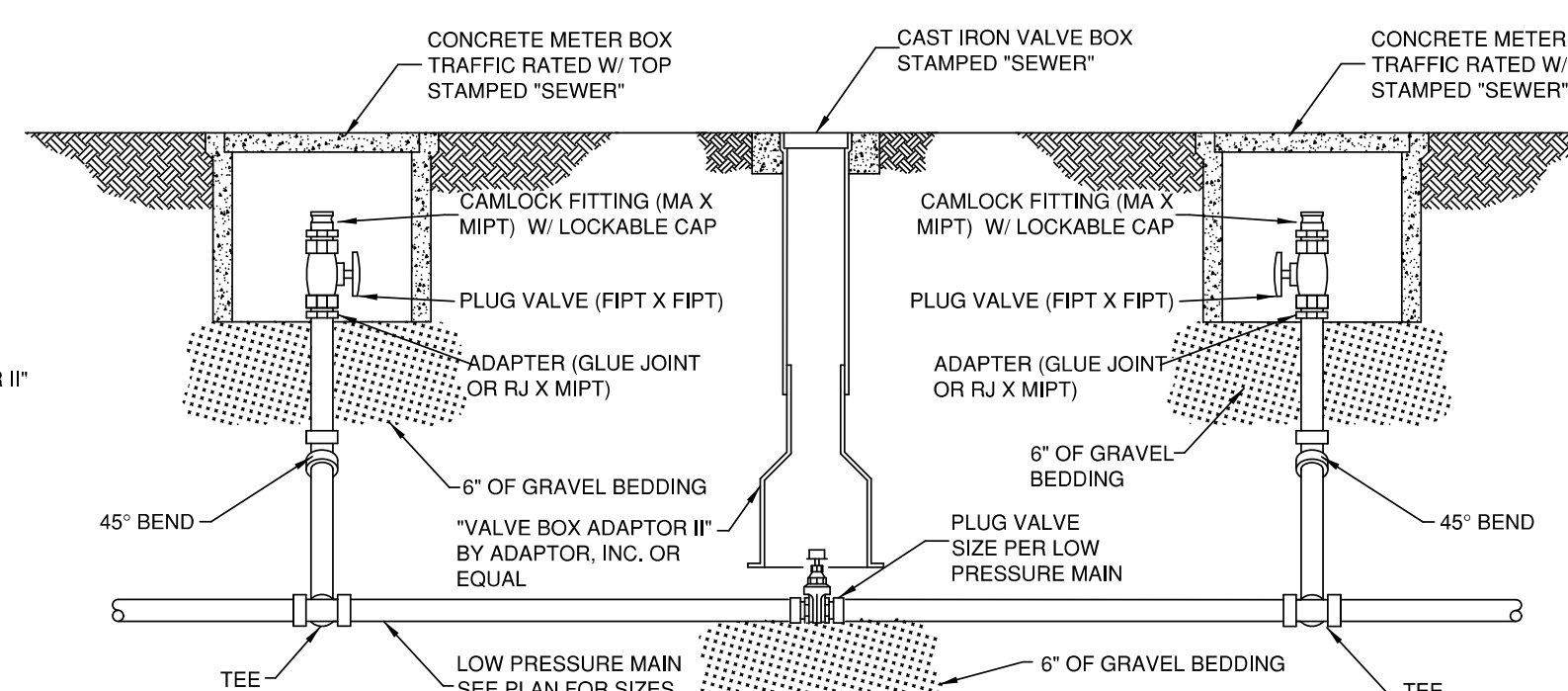
SECTION VIEW
FLOW METER VAULT DETAIL



PLAN VIEW
IN-LINE PRESSURE SEWER CLEANOUT

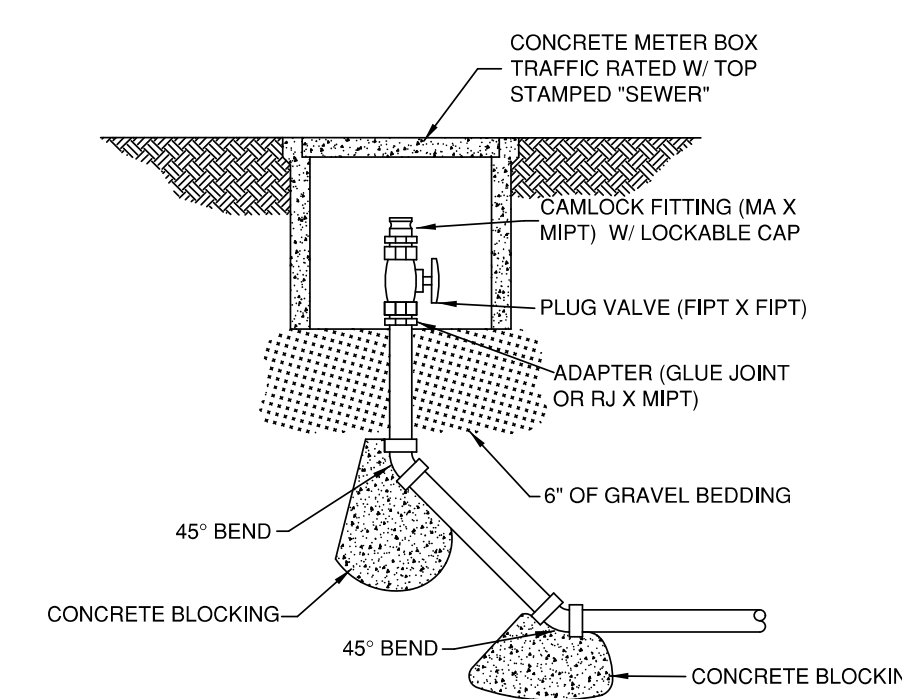


SECTION VIEW A-A
IN-LINE PRESSURE SEWER CLEANOUT



SECTION VIEW B-B
IN-LINE PRESSURE SEWER CLEANOUT

LOW PRESSURE SEWER CLEANOUT
DETAIL S-19



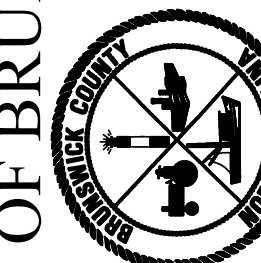
SECTION VIEW
END OF LINE PRESSURE SEWER CLEANOUT

NOTE:
1. GASKETED OR GLUE JOINT PIPE PER APPROVED PLANS.
2. RESTRAINED JOINTS SHALL BE INSTALLED ON GASKETED PIPE PER BRUNSWICK COUNTY TECHNICAL SPECIFICATIONS.
3. THRUST BLOCKING IS MANDATORY.

Revisions

1.1 - DATED 4/30/2013
Modified S-18
1.2 - DATED 3/10/2017
Revised S-19

COUNTY OF BRUNSWICK



GENERAL SEWER DETAILS
FOR
BRUNSWICK COUNTY
NORTH CAROLINA

Date: 1-9-12
Scale: NTS
Drawn By: JTP, MGB
Checked By:

DATE: 8/13/2013
TIME: 10:40:44 AM
DGN: P:\60482623\900_Works\9165_Jiminy_Construction\NF-5021_UC_UC30.dgn

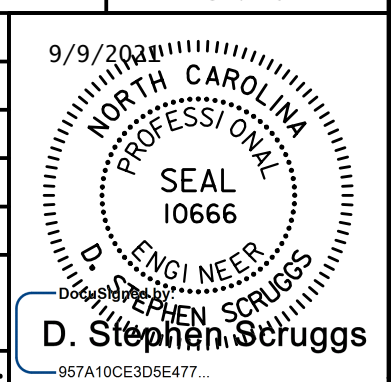
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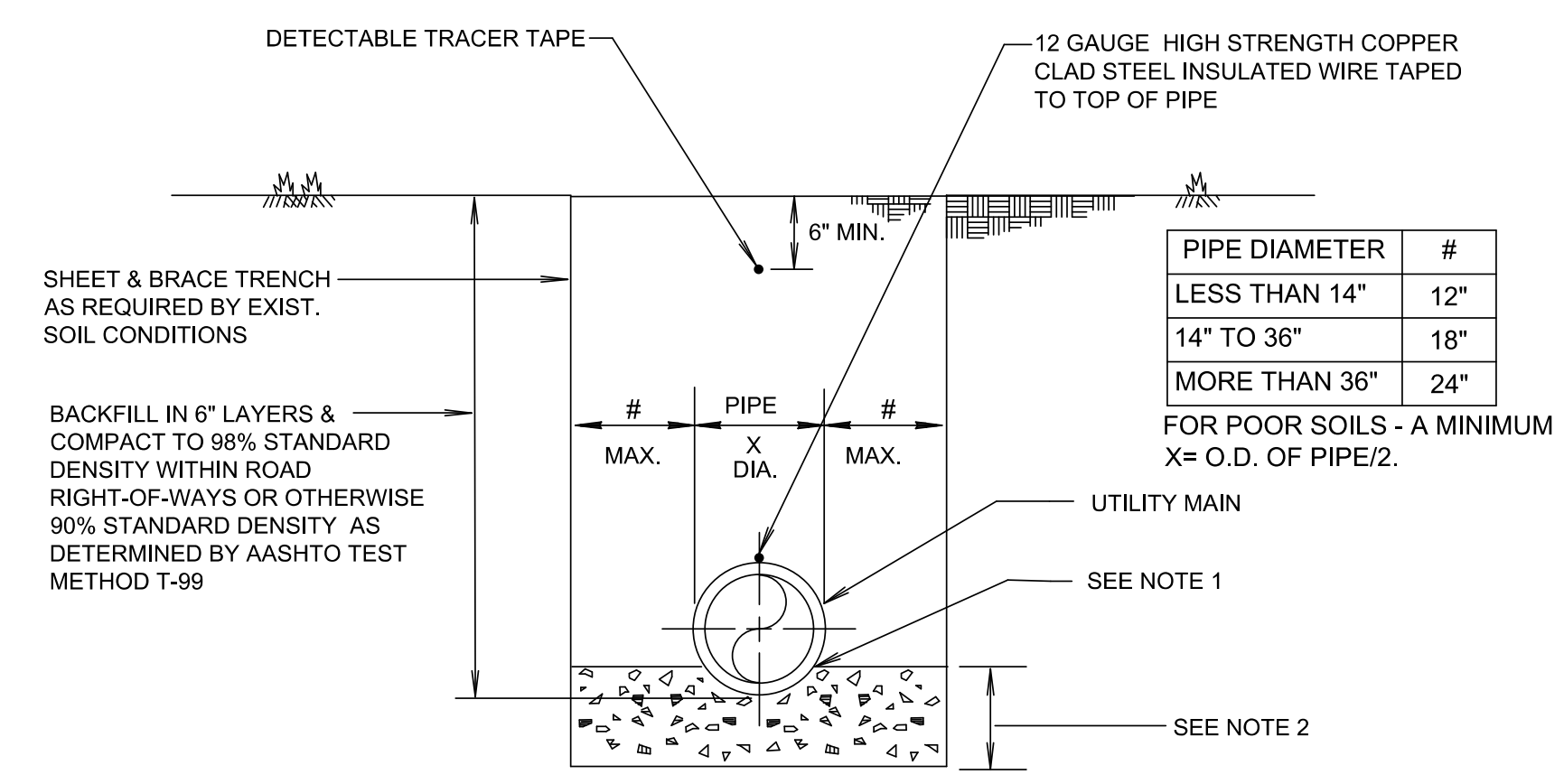
AECOM TECHNICAL SERVICES OF NORTH CAROLINA, INC.
701 CORPORATE CENTER DRIVE, SUITE 475, RALEIGH, NC 27607
919-854-6200 919-854-6259 (fax)
F - 0342

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PROJECT REFERENCE NO.	SHEET NO.
R-5021	UC-3R
DESIGNED BY:	9/9/2004
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	

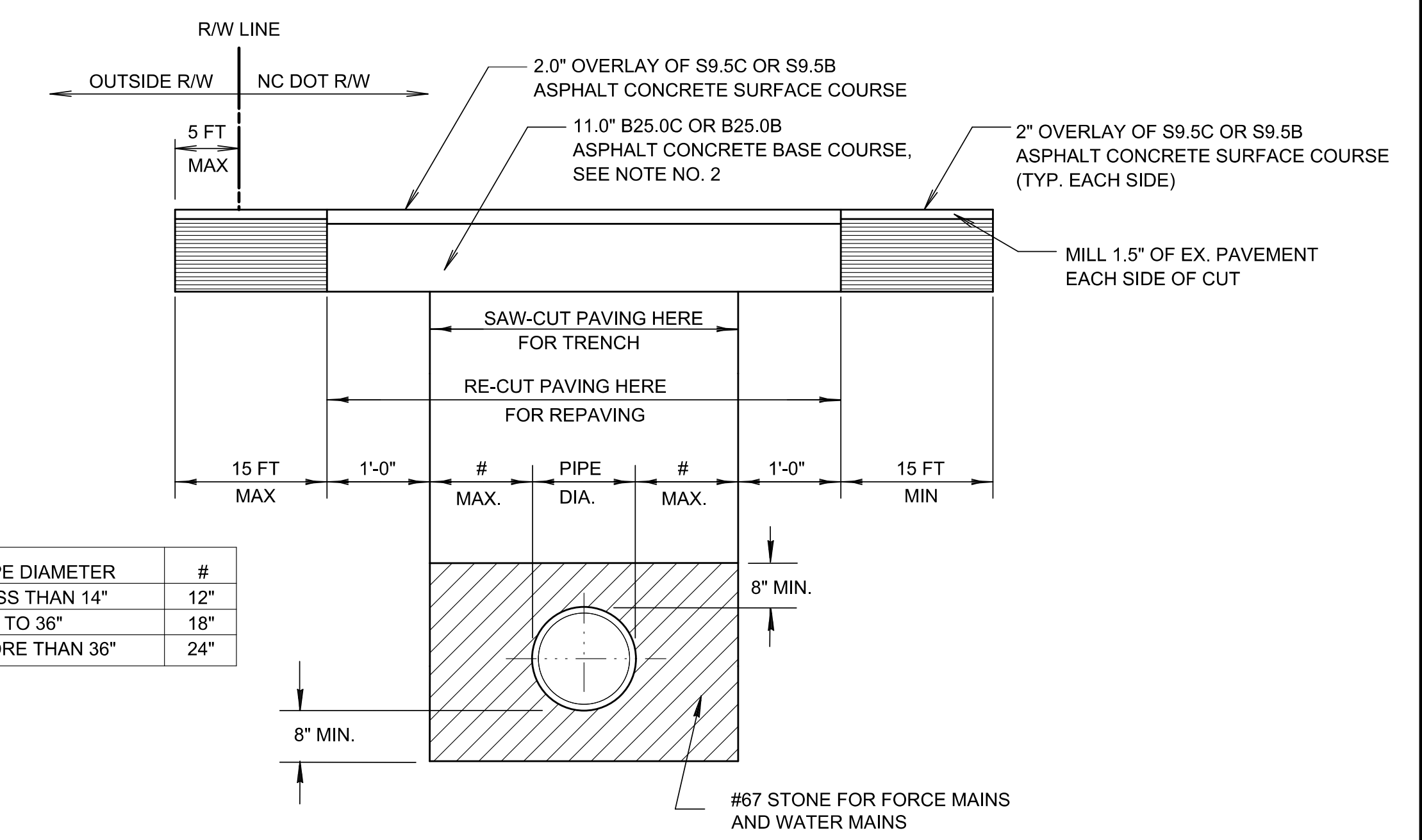


UTILITY CONSTRUCTION



- NOTES:
- SHAPE BOTTOM OF TRENCH TO FIT BOTTOM QUARTER ON SIDES OF AND BENEATH PIPE. BED ONE-QUARTER THE PIPE OUTSIDE DIAMETER ON THE SIDES OF AND 6" BENEATH PIPE WITH #67 STONE. EXCAVATE UNDER EACH BELL SUFFICIENTLY TO PREVENT ANY LOAD ON BELL.
 - WHERE UNSTABLE SOIL IS ENCOUNTERED, EXCAVATE THE SOIL AS DIRECTED BY THE ENGINEERS AND BACKFILL WITH AT LEAST 8" OF #467 STONE. THE BACKFILL SHALL BE COMPACTED AND SHAPED TO FORM A BED FOR THE PIPE.
 - BACKFILL IN 6" LAYERS AND COMPACT TO 98% STANDARD DENSITY WITHIN ROAD RIGHT-OF-WAYS OR OTHERWISE 90% STANDARD DENSITY AS DETERMINED BY AASHTO TEST METHOD T-99.

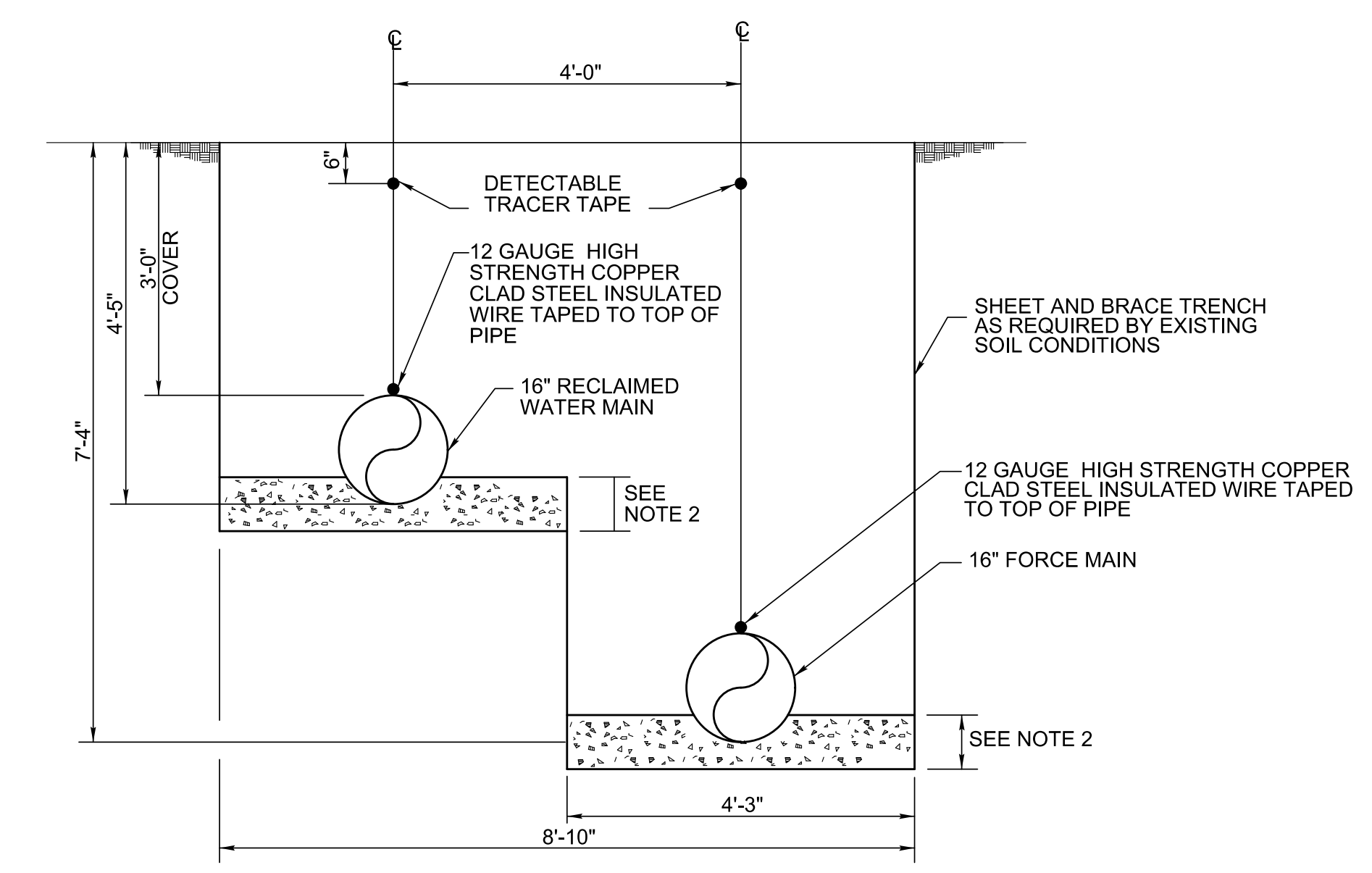
UTILITY PRESSURE MAINS TRENCH, BEDDING & BACKFILL DETAIL 1



PIPE DIAMETER	#
LESS THAN 14"	12"
14" TO 36"	18"
MORE THAN 36"	24"

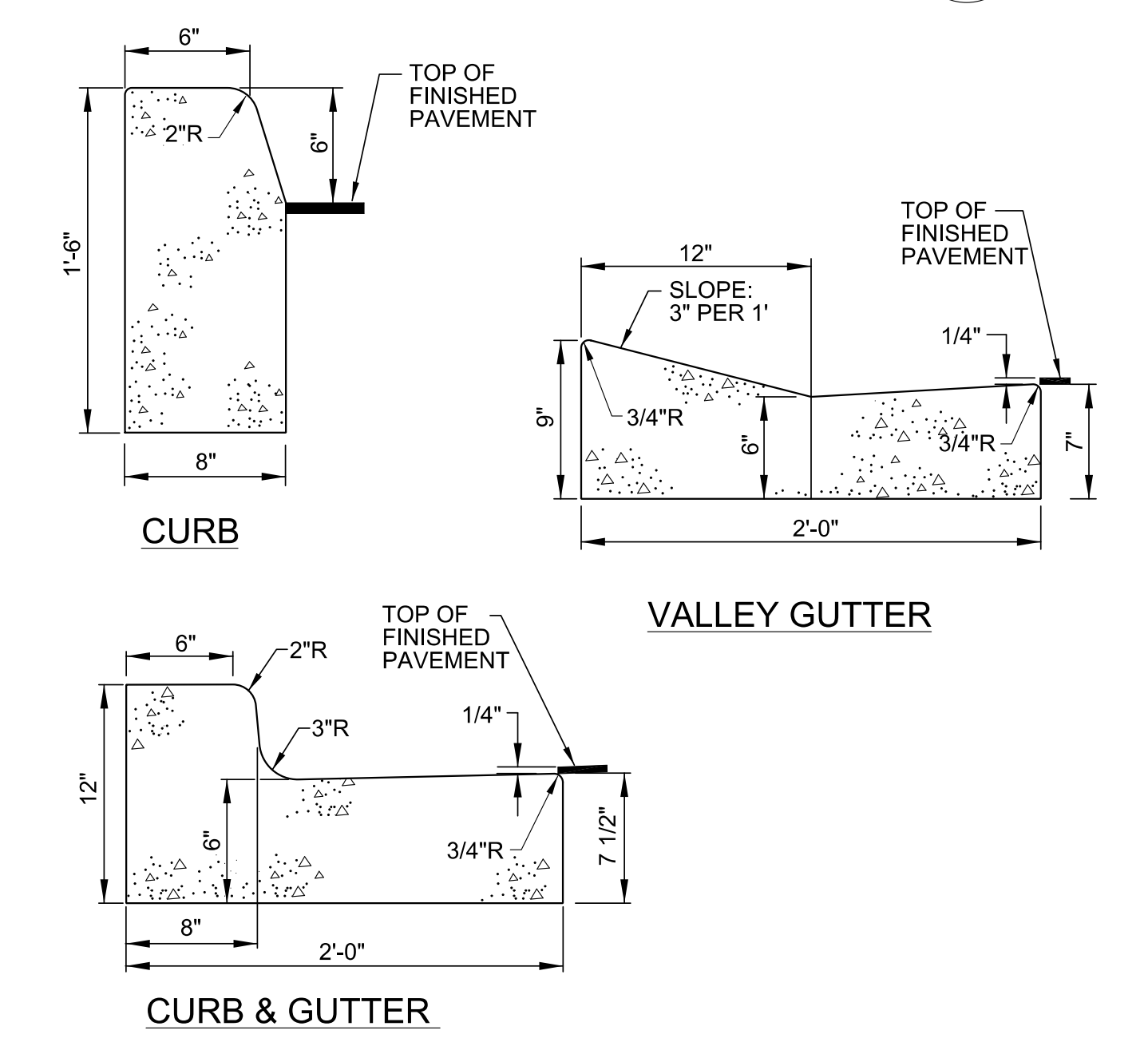
- ALL STATE ROADS WHICH ARE OPEN CUT FOR THE INSTALLATION OF THE FORCE MAIN MUST BE REPAIRED ACCORDING TO THIS DETAIL.
- THE 11.0" BASE COURSE SHALL BE INSTALLED IN TWO (2) LIFTS.

ROAD AND DRIVEWAY PAVEMENT REPAIR DETAIL 2



- NOTES:
- SHAPE BOTTOM OF TRENCH TO FIT BOTTOM QUARTER ON SIDES OF AND BENEATH PIPE. BED ONE-QUARTER THE PIPE OUTSIDE DIAMETER ON THE SIDES OF AND 6" BENEATH PIPE WITH #67 STONE. EXCAVATE UNDER EACH BELL SUFFICIENTLY TO PREVENT ANY LOAD ON BELL.
 - WHERE UNSTABLE SOIL IS ENCOUNTERED, EXCAVATE THE SOIL AS DIRECTED BY THE ENGINEERS AND BACKFILL WITH AT LEAST 8" OF #467 STONE. THE BACKFILL SHALL BE COMPACTED AND SHAPED TO FORM A BED FOR THE PIPE.
 - BACKFILL IN 6" LAYERS AND COMPACT TO 98% STANDARD DENSITY WITHIN ROAD RIGHT-OF-WAYS OR OTHERWISE 90% STANDARD DENSITY AS DETERMINED BY AASHTO TEST METHOD T-99.

BENCHING DETAIL 3



NOTE: CLASS 1 CONCRETE, 3,000 P.S.I. AT 28 DAYS SHALL BE USED FOR CURB REPLACEMENT.

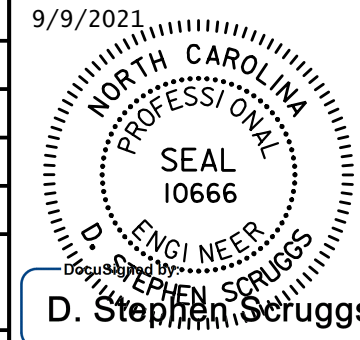
CONCRETE CURB DETAIL 4

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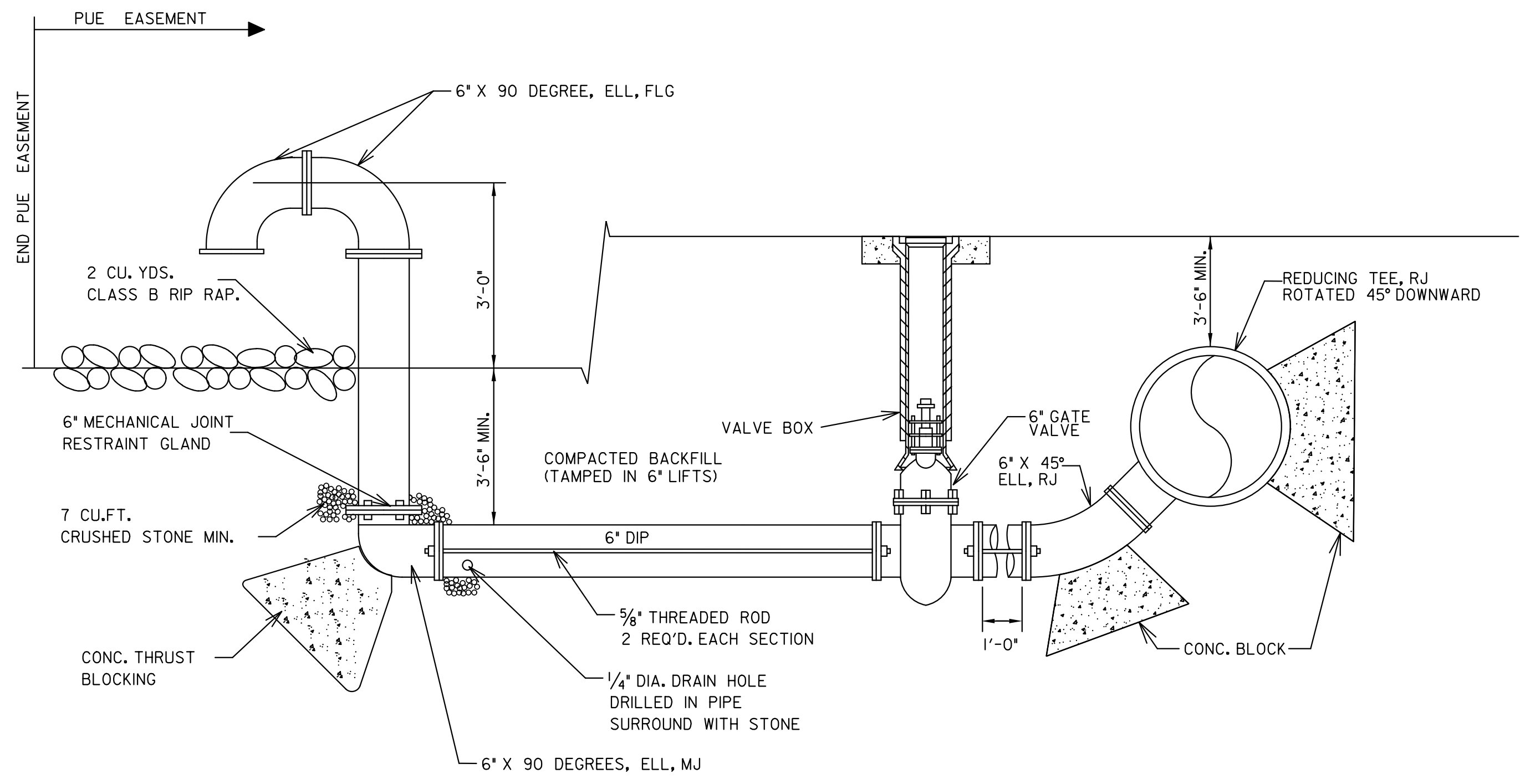
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PROJECT REFERENCE NO. R-5021	SHEET NO. UC-3S
DESIGNED BY:	9/9/2021
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
REVISED:	
	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	

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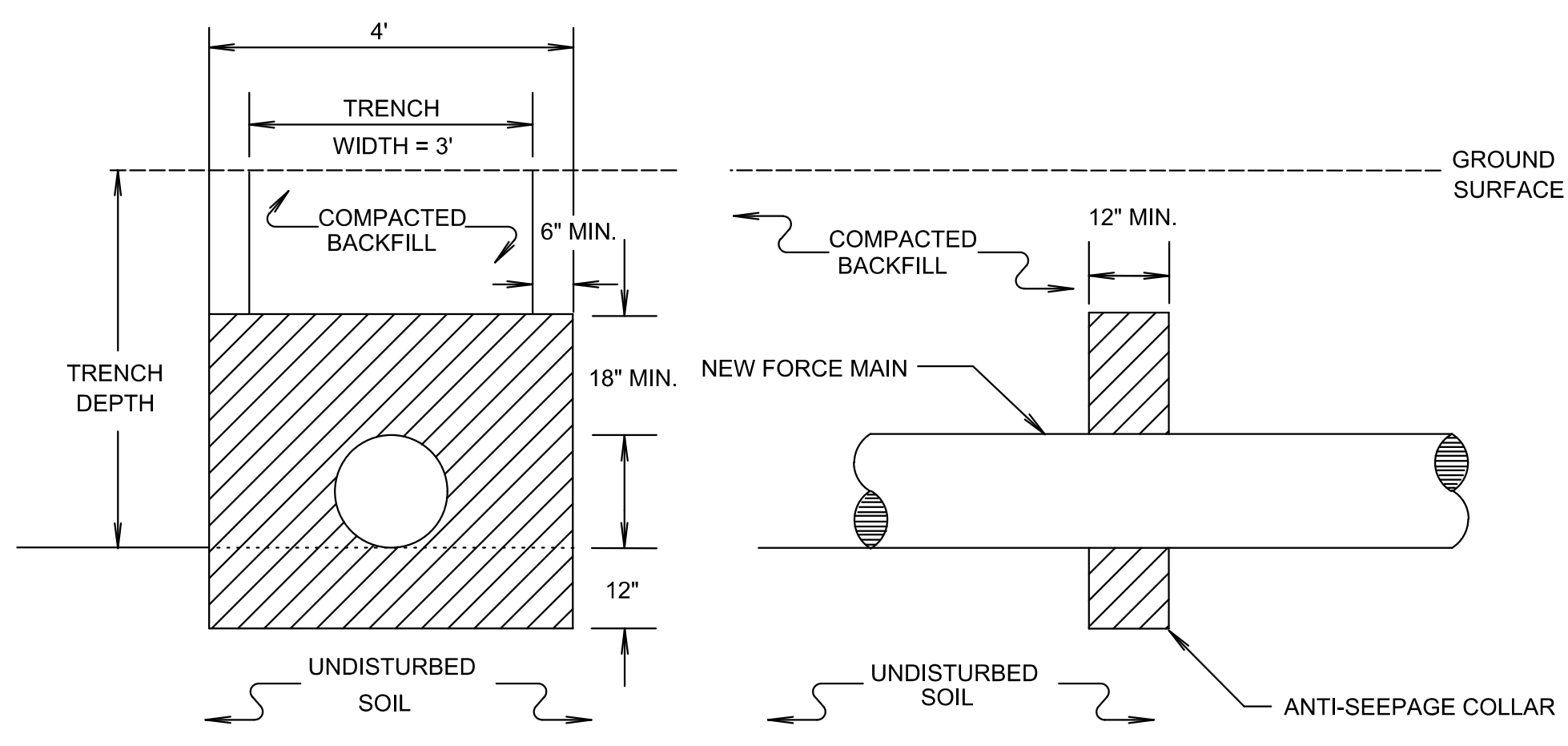
UTILITY CONSTRUCTION



6" BLOW-OFF INSTALLATION DETAIL

SCALE: NTS

- NOTES:
1. A DUCTILE IRON DOUBLE SOCKET INVERT TEE WITH FLANGE BRANCH MAY BE USED IN LIEU OF THE TEE AND 45° ELL

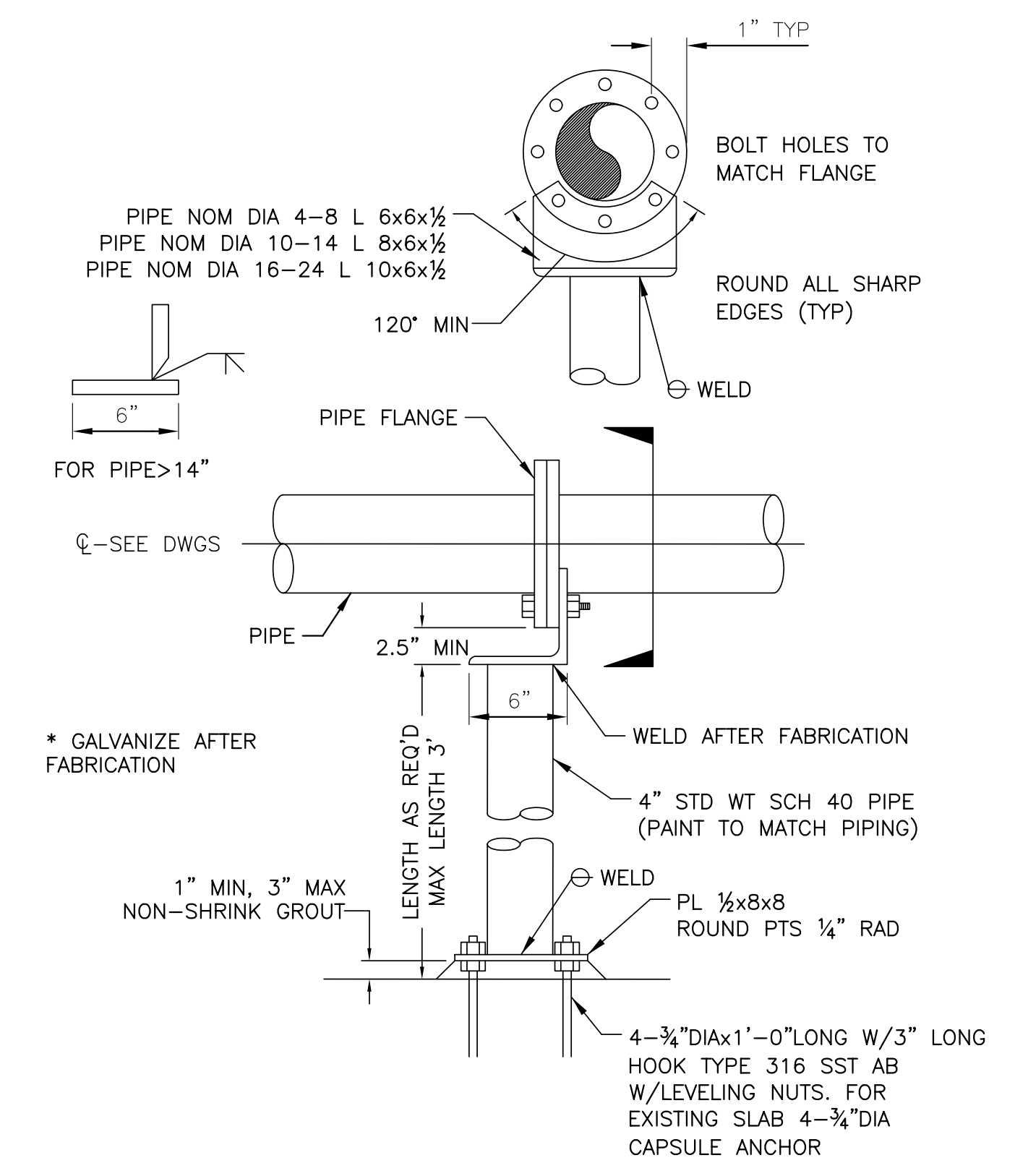


NOTES:

1. ANTI-SEEPAGE COLLARS SHALL BE PROVIDED AT THE LOCATIONS NOTED ON THE DRAWINGS.
2. ANTI-SEEPAGE COLLARS SHALL BE CONSTRUCTED OF PORTLAND CEMENT CONCRETE WITH A MINIMUM STRENGTH OF 3,000 PSI AFTER 28 DAYS.
3. ANTI-SEEPAGE COLLARS SHALL EXTEND A MINIMUM OF ONE FOOT BELOW THE BASE OF THE EXCAVATION, A MINIMUM OF SIX INCHES INTO THE TRENCH WALL ON EACH SIDE OF THE EXCAVATION, AND A MINIMUM OF 18 INCHES ABOVE THE CROWN OF THE PIPE.
4. ANY COLLARS FAILING TO MEET THE REQUIRED SPECIFICATIONS SHALL BE REMOVED AND REBUILT AT THE CONTRACTOR'S EXPENSE.

ANTI-SEEPAGE COLLAR DETAIL

SCALE: NTS



6" PIPE SUPPORT DETAIL

SCALE: NONE

DATE: 8/13/2021
TIME: 10:40:00 PM
DRN: P:\60482503\900_Works\915_Jimby_Construction\NF-5021_UC_UC3S.dgn

EQUIPMENT LEGEND - CHECK VALVE VAULT NO. 1			
MARK	SIZE	DESCRIPTION	MATERIAL
1	12"	MECHANICAL SEALS, LINK SEAL, OR EQUAL	DUCTILE IRON
2	18"	HOLE	
3	12"	SWING CHECK VALVE, FLG, WITH AIR CUSHION AND WEIGHT	DUCTILE IRON
4	30" X 30"	SINGLE LEAF ALUMINUM HATCH WITH EMBEDDED ALUMINUM FRAME, H-20 LOAD RATING	ALUMINUM
5	1 1/2"	SCH 80 PVC DRAIN PIPE	PVC
6	1 1/2"	MECHANICAL SEAL, LINK SEAL, OR EQUAL, WITH 3 1/2" DIA OPENING	DUCTILE IRON
7	1 1/2"	PVC CHECK VALVE	PVC
8	1 1/2"	90° ELL, SCH 80 PVC	PVC
9	1 CU FT	#5 WASHED STONE	-
10	18" ID	LADDER WITH 304 SS HARDWARE AND EXTENSION POST	ALUMINUM
11	12"	RESTRAINED FLANGE ADAPTER	DUCTILE IRON

NOTES:
 1. INSTALL 1 CUBIC FOOT OF #5 WASHED STONE UNDER THE DISCHARGES OF THE HATCH DRAIN AND OPEN SUMP.
 2. ALL BOLTS, WASHERS, NUTS AND FASTENERS SHALL BE 304 STAINLESS STEEL.
 3. THE PRECAST VAULT SHALL BE CONSTRUCTED OF 5,000 PSI CONCRETE THAT IS REINFORCED WITH #4 @ 6" OCEW. MINIMUM WALL THICKNESS SHALL BE 6-INCHES. THE VAULT SHALL BE RATED FOR H-20 LOADS.

Prepared In the Office of:

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 919-854-6200 919-854-6259 (fax)
 F - 0342

PROJECT REFERENCE NO. **R-5021** SHEET NO. **UC-3T**

DESIGNED BY: _____
 DRAWN BY: _____
 CHECKED BY: _____
 APPROVED BY: _____
 REVISED: _____

9/9/2008

SEAL 10666

PROFESSIONAL ENGINEER

D. Stephen Scruggs

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

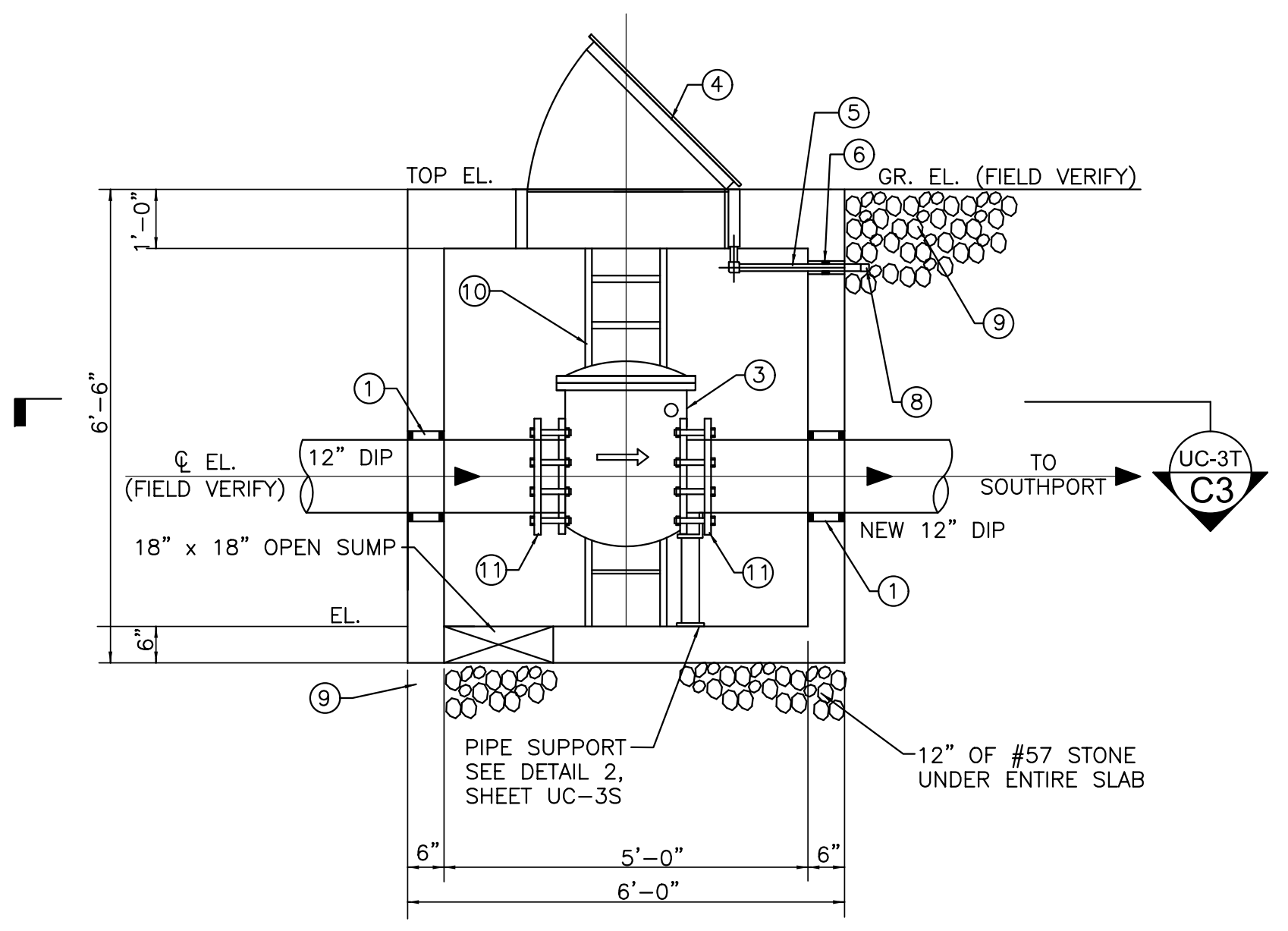
UTILITY ENGINEERING SECTION

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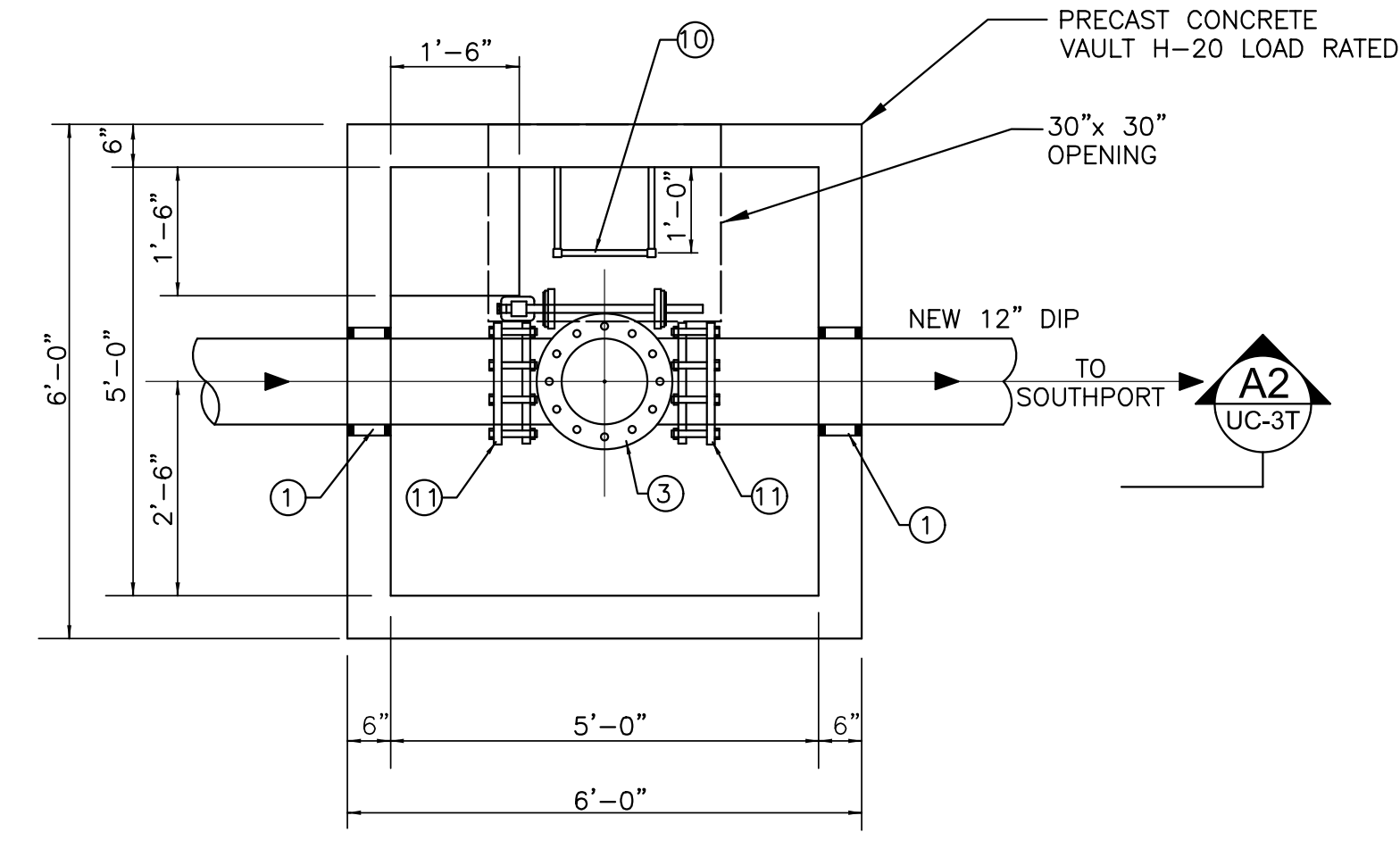
UTILITY CONSTRUCTION PLANS ONLY

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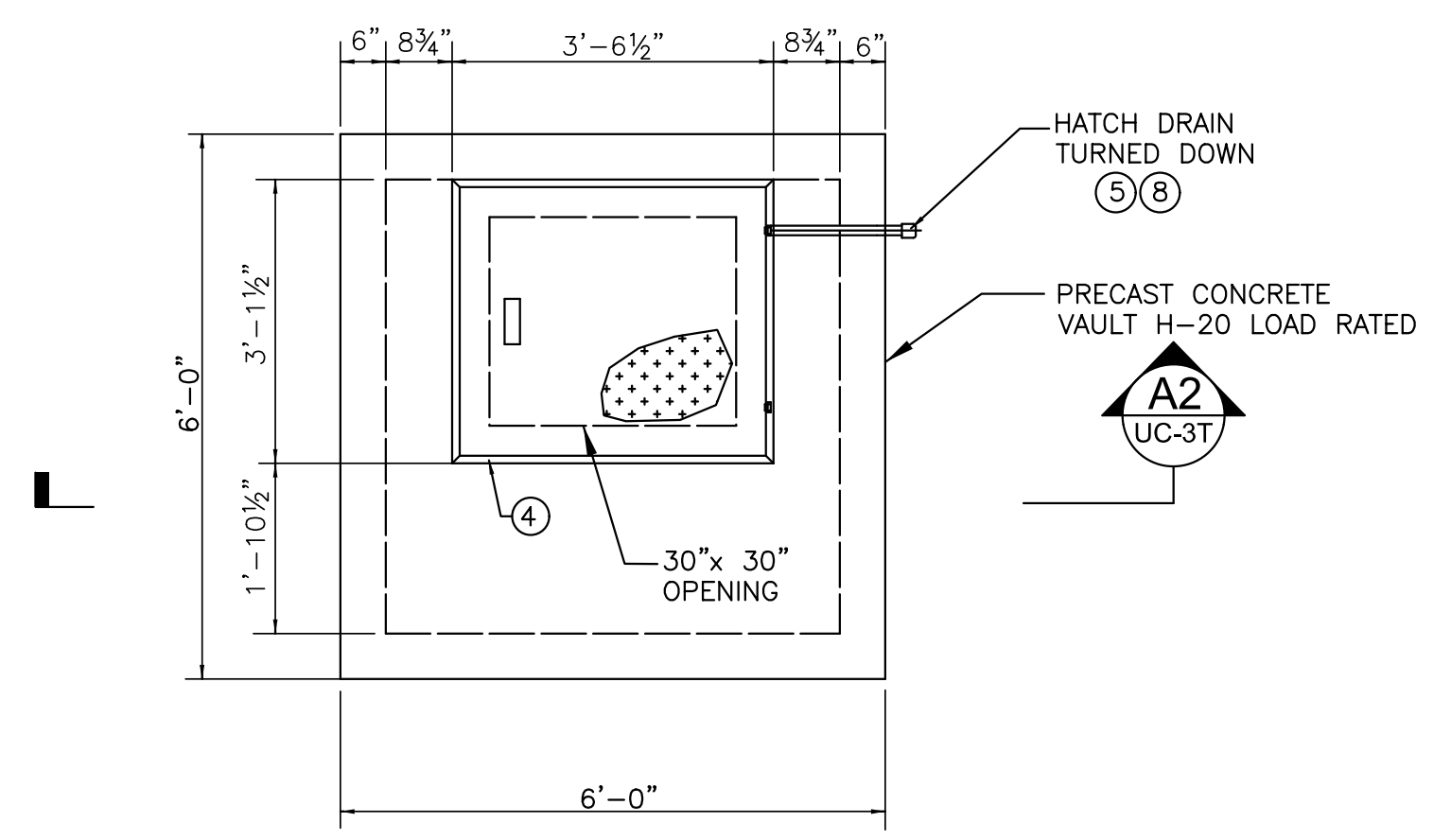
UTILITY CONSTRUCTION



SECTION CHECK VALVE VAULT
 SCALE: 1/2" = 1'-0"
A2



SECTION CHECK VALVE VAULT
 SCALE: 1/2" = 1'-0"
C3



PLAN AT TOP CHECK VALVE VAULT
 SCALE: 1/2" = 1'-0"
A3

DATE: 8/13/2008
 TIME: 10:44:41 PM
 DGN: P:\60482503\900_Works\916_Jim\Utility Construction\A3-UC-3T.dgn

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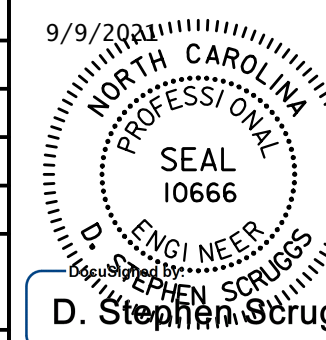
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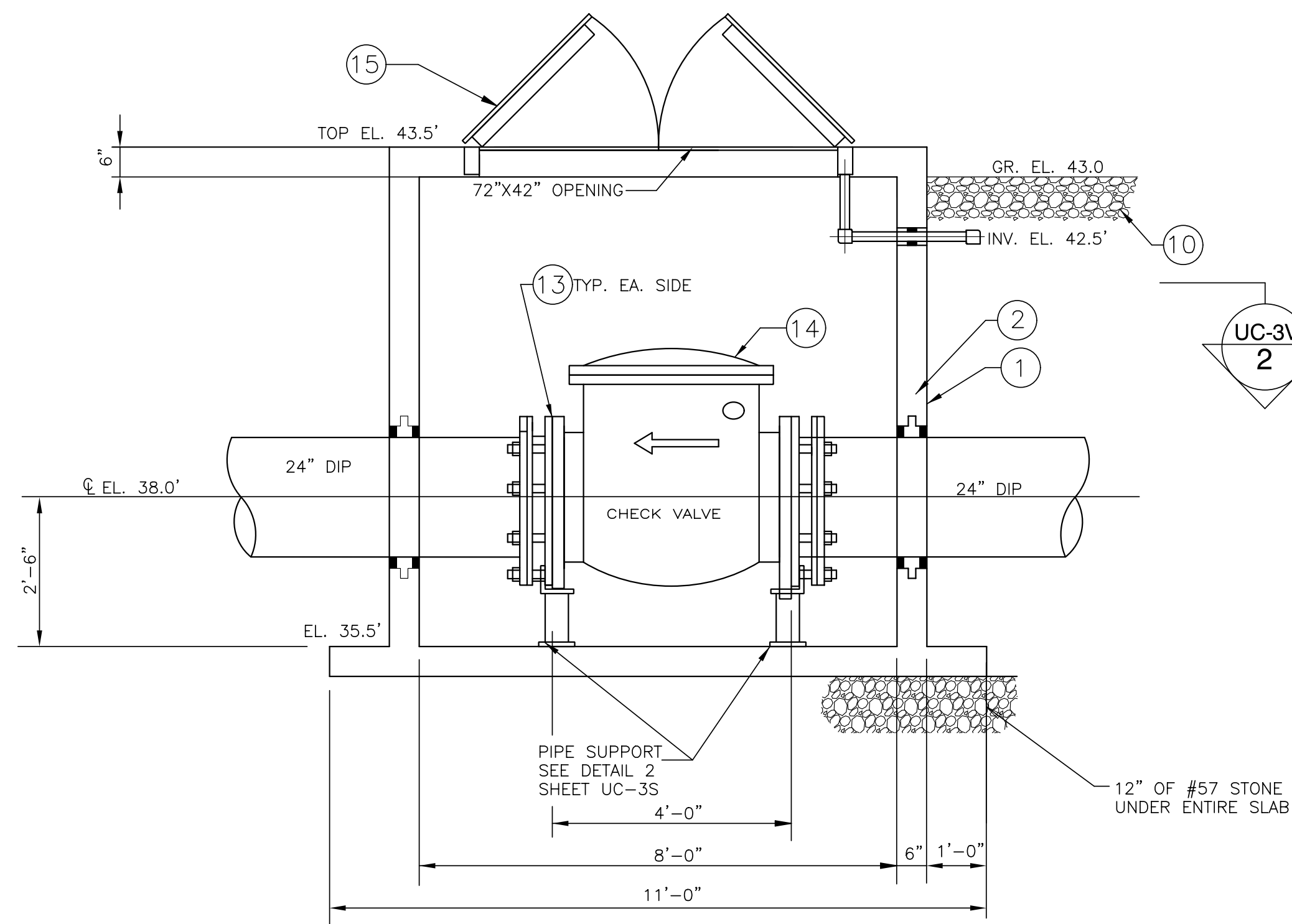
PROJECT REFERENCE NO. SHEET NO.

R-5021 UC-3U

DESIGNED BY:	9/9/2001
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC.	
PHONE: (919) 707-6690	
FAX: (919) 250-4151	



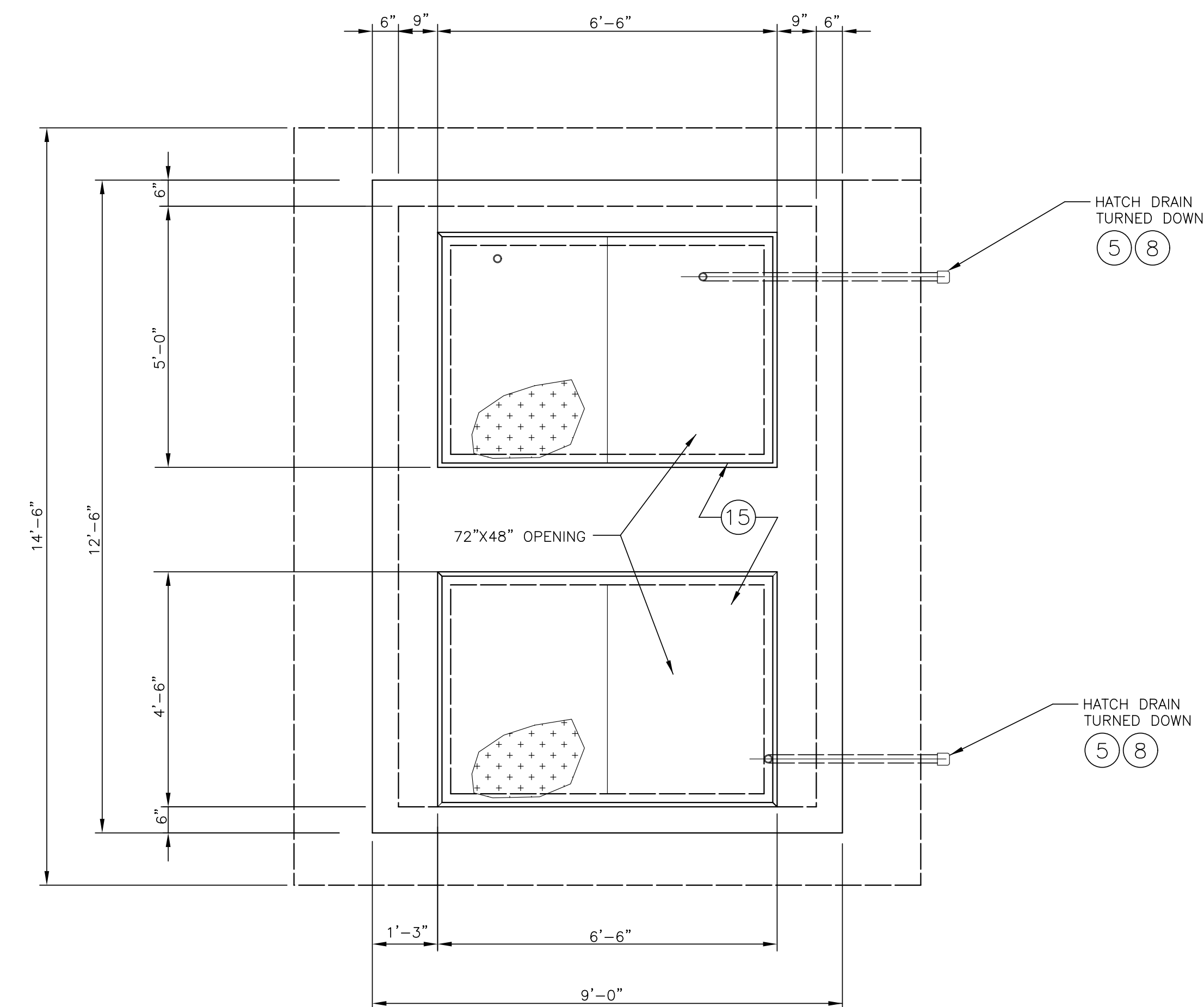
UTILITY CONSTRUCTION



SECTION VALVE VAULT

1/2" = 1'-0"

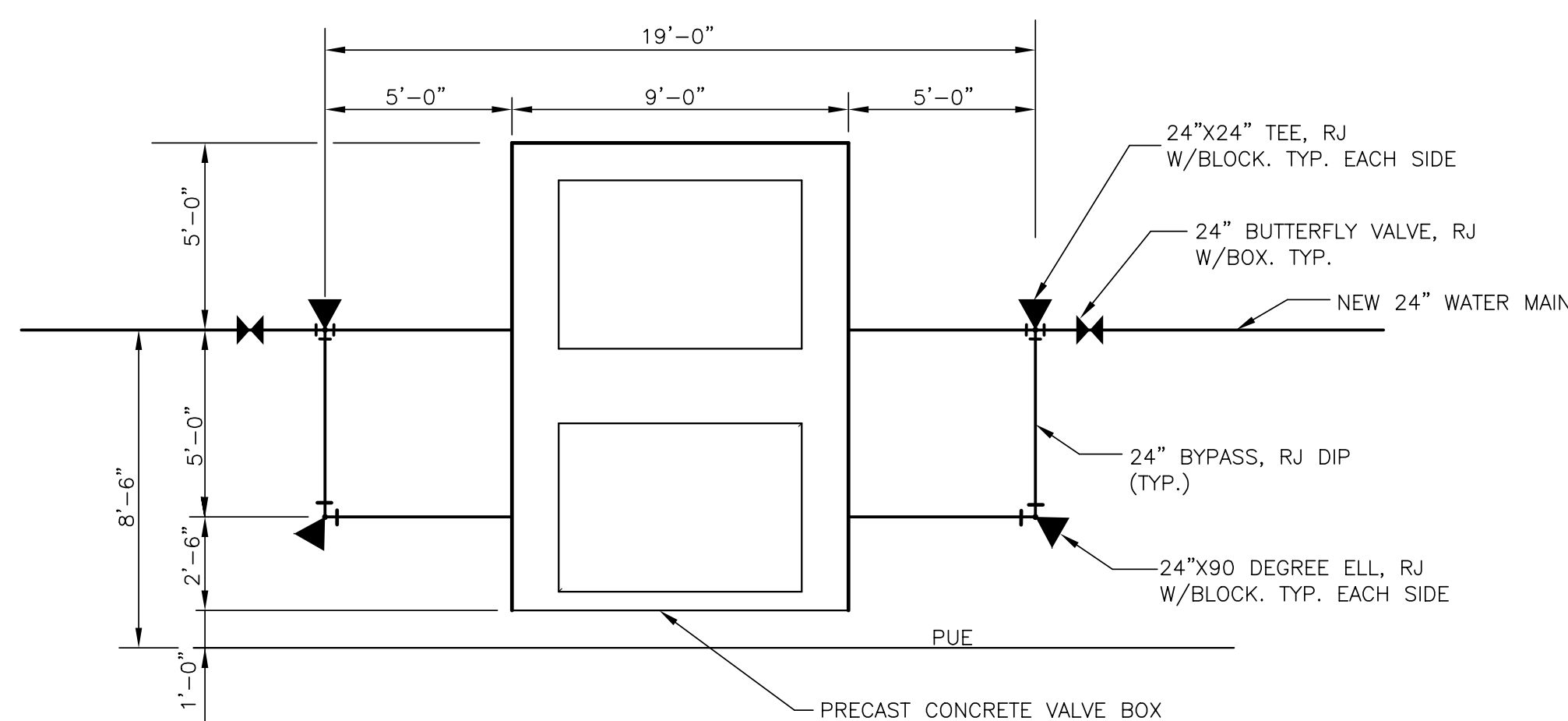
1



PLAN AT TOP VALVE VAULT

1/2" = 1'-0"

2



SITE PLAN PRESSURE SUSTAINING AND CHECK VALVE VAULT

1/4" = 1'-0"

3

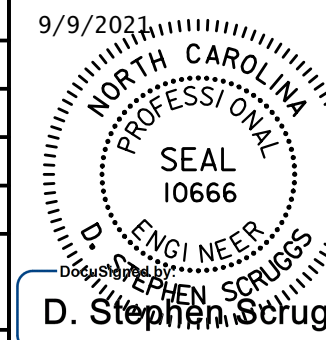
NOTE:

ENTIRE VAULT INCLUDING ALL EQUIPMENT, VALVES, AND INTERIOR PIPING, SHALL BE BID AS A LUMP SUM ITEM.

NOTES:

1. FOR EQUIPMENT LEGEND, SEE SHEET UC-3V

DESIGNED BY:	9/9/2021
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	

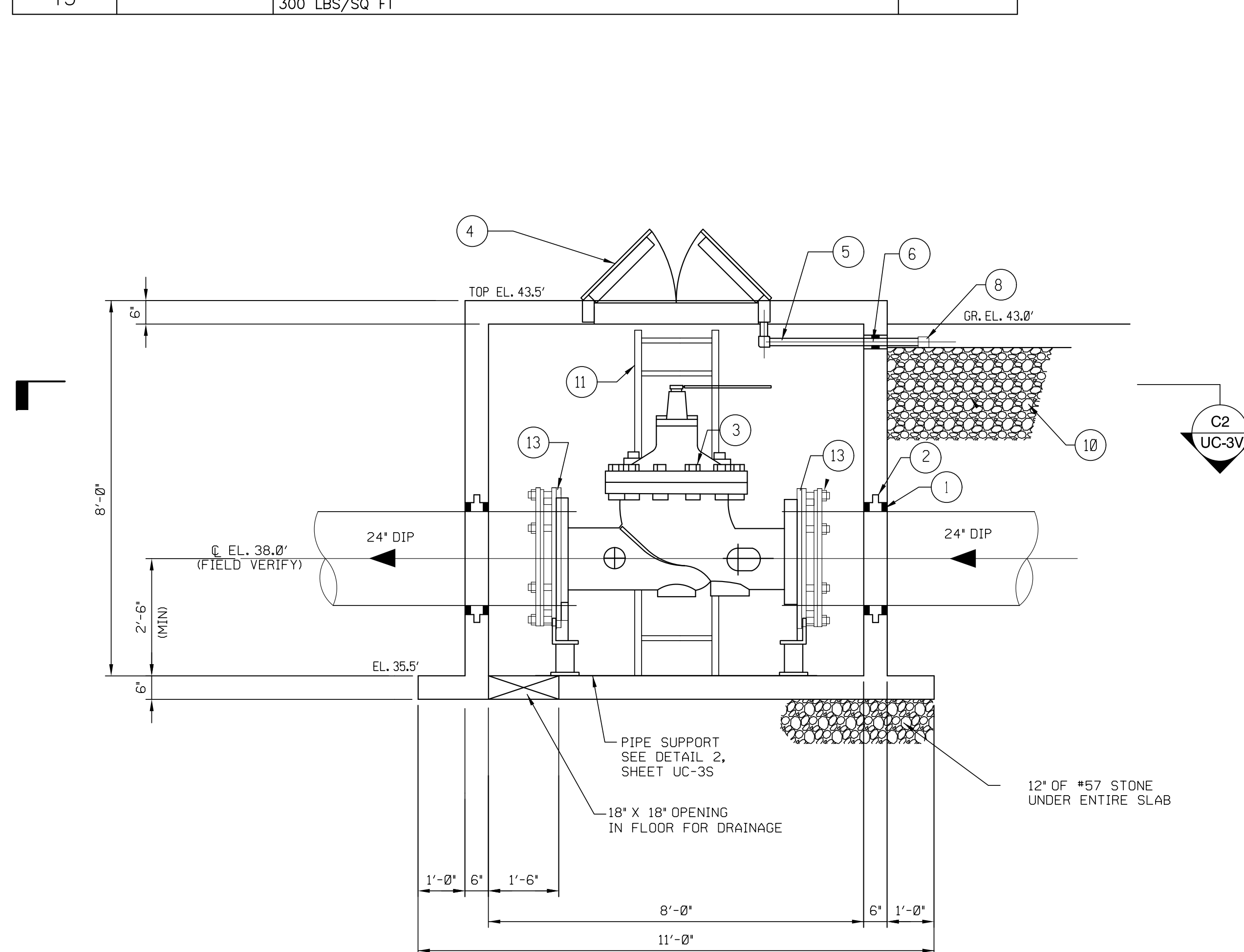


EQUIPMENT LEGEND - CHECK VALVE VAULT

MARK	SIZE	DESCRIPTION	MATERIAL
1	24"	DOUBLE MECHANICAL SEALS, LINK SEAL, OR EQUAL	DUCTILE IRON
2	24"	30" OD WALL SLEEVE WITH WATER-STOP, STEEL OR THERMOPLASTIC	DUCTILE IRON
3	24"	PRESSURE SUSTAINING VALVE	CAST IRON
5	1 1/2"	SCH 80 PVC DRAIN PIPE	PVC
6	1 1/2"	MECHANICAL SEAL, LINK SEAL, OR EQUAL, WITH 3 1/2" DIA OPENING	DUCTILE IRON
8	1 1/2"	90° ELL, SCH 80 PVC	PVC
9		NOT USED	
10	1 CU FT	#5 WASHED STONE	-
11	18" ID	LADDER WITH 304 SS HARDWARE AND EXTENSION POST	ALUMINUM
13	24"	RESTRAINED FLANGE ADAPTER	DUCTILE IRON
14	24"	CHECK VALVE, SWING TYPE WITH AIR CUSHION, FLANGED	DUCTILE IRON
15	6'-0" x 4'-0"	DOUBLE LEAF ALUMINUM HATCH WITH DRAIN, EMBEDDED ALUMINUM FRAME, 300 LBS/SQ FT	ALUMINUM

- NOTES:
- INSTALL 1 CUBIC FOOT OF #5 WASHED STONE UNDER THE DISCHARGES OF THE HATCH DRAIN AND OPEN SUMP.
 - ALL BOLTS, WASHERS, NUTS AND FASTENERS SHALL BE 304 STAINLESS STEEL.
 - THE PRECAST VAULT SHALL BE CONSTRUCTED OF 5,000 PSI CONCRETE THAT IS REINFORCED WITH #4 @ 6" OCEW. MINIMUM WALL THICKNESS SHALL BE 6-INCHES. THE VAULT SHALL BE RATED FOR H-20 LOADS.

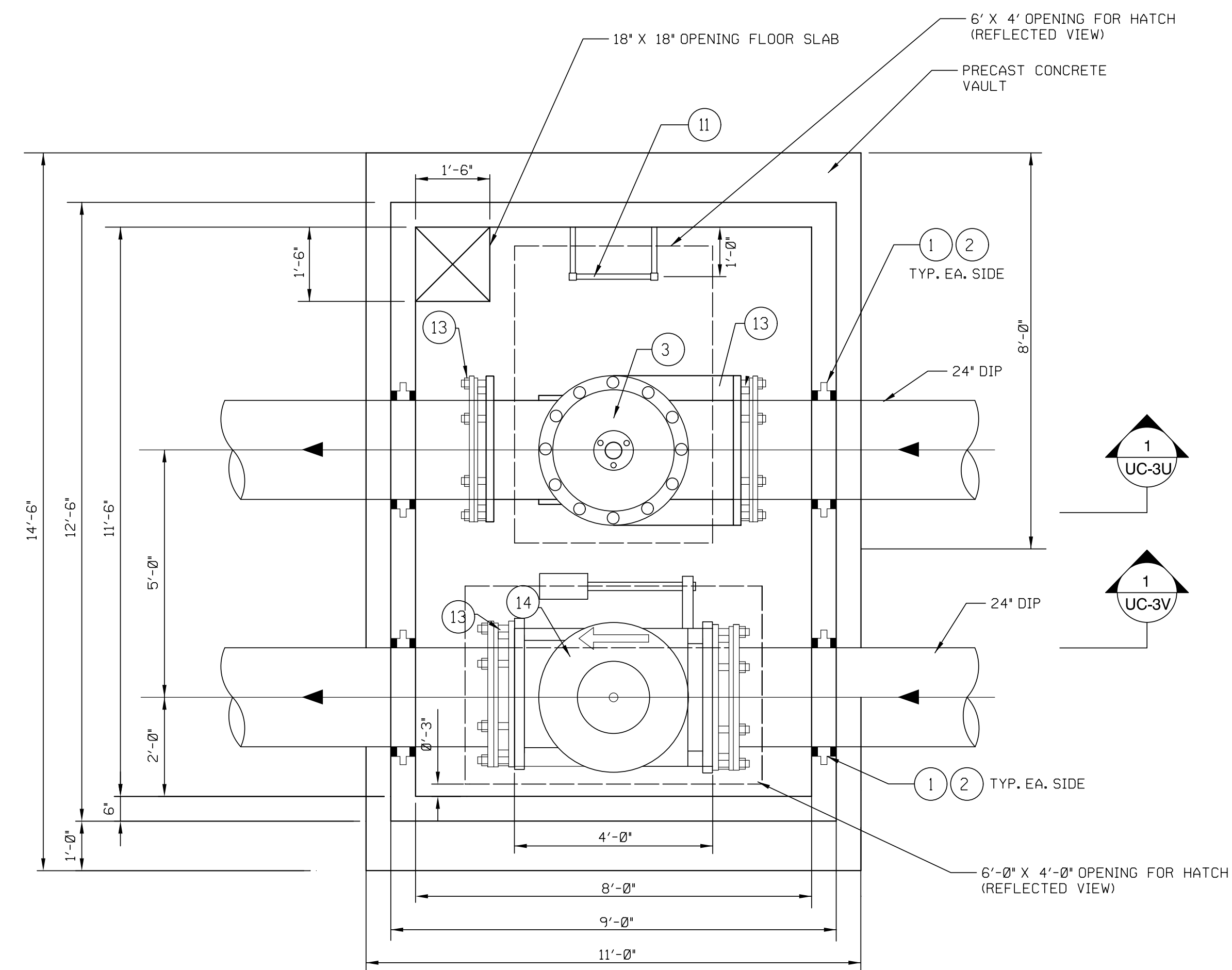
UTILITY CONSTRUCTION



SECTION VALVE VAULT

SCALE: 1/2" = 1'-0"

1



SECTION VALVE VAULT

SCALE: 1/2" = 1'-0"

2

MAD 8/3/2007

NOTES

- SEE SHEETS UC-38 & UC-56 FOR PROFILES OF NEW MAINS.
- FIELD LOCATE EXISTING 16" FORCE MAIN AND 16" RECLAIMED WATER MAIN.
- A BENCHMARK TRENCH SHALL BE USED TO INSTALL THE NEW FORCE MAIN AND 16" RECLAIMED WATER MAIN FOR THE FULL LENGTH. THE 16" RECLAIMED WATER MAIN SHALL BE AT THE HIGHER ELEVATION. SEE BENCHMARKING DETAIL 3, SHEET UC-3R.
- FOR THE NEW 24" FORCE MAIN USE TWO 16" X 22.5° ELL, RJ, TO LOWER THE FORCE MAIN APPROXIMATELY 34 INCHES BELOW THE RECLAIMED WATER MAIN SO AS TO ACHIEVE THE REQUIRED BENCHMARKING DESIGN.
- LOWER EXISTING 16" POTABLE WATER MAIN TO AVOID CONFLICT WITH FUTURE STORM DRAIN DITCH. INSTALL NEW RESTRAINED JOINT WATER MAINS AND FITTINGS IN ORDER TO LOWER EXISTING PIPE. SEE PROFILE SHEET UC-38.
- KEEP INTERIORS OF NEW POTABLE WATER PIPES AND FITTINGS CLEAN OF DIRT. SWAB INTERIORS OF PIPES AND FITTINGS WITH 200 PARTS PER MILLION OF CHLORINE SOLUTION.
- FIELD LOCATE EXISTING CUT-OFF VALVES AND SHUT OFF WATER. SAW CUT EXISTING PIPE AND INSTALL RESTRAINED PIPE AND FITTINGS, AND CONCRETE BLOCKING. RESTORE WATER SERVICE AS SOON AS POSSIBLE.
- RECLAIMED WATER FROM THE EXISTING 16" RECLAIMED WATER MAIN SHALL BE USED TO FILL AND TEST THE NEW 24" FORCE MAIN AND 16" RECLAIMED WATER MAIN. REMOVE THE 3-INCH TAPPING SLEEVE AND VALVE FROM THE TWO NEW MAINS AND REPLACE WITH 24" STAINLESS STEEL REPAIR SLEEVE ONCE TESTING HAS BEEN COMPLETED.
- INSTALL TWO 16-INCH TEMPORARY LINE STOPS ON THE EXISTING FORCE MAIN AND TWO 16-INCH TEMPORARY LINE STOPS ON THE EXISTING RECLAIMED WATER MAIN WHERE SHOWN. THE PURPOSE OF THESE LINE STOPS IS TO REDUCE THE VOLUME OF WATER TO BE DRAINED AND THE AMOUNT OF DOWN TIME FOR CONNECTION TO THE NEW MAINS. INSTALL THE FOUR LINE STOPS PRIOR TO MAKING THE CONNECTIONS.
- THE CONNECTION BETWEEN THE NEW AND EXISTING FORCE MAIN SHALL BE MADE WITHIN A 4-HOUR PERIOD AT NIGHT ON A WEEKEND. SEE PROJECT SPECIFIC NOTE #5 ON SHEET UC-3. THE SEWAGE AND RECLAIMED WATER THAT DRAINS FROM THE CUT PIPES SHALL BE REMOVED FROM THE PIT WITH A VACUUM TRUCK AND PROPERLY DISPOSED OFF SITE.

Prepared In the Office of:

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AECOM TECHNICAL SERVICES OF NORTH CAROLINA, INC.
701 CORPORATE CENTER DRIVE, SUITE 475, RALEIGH, NC 27607
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F-0342

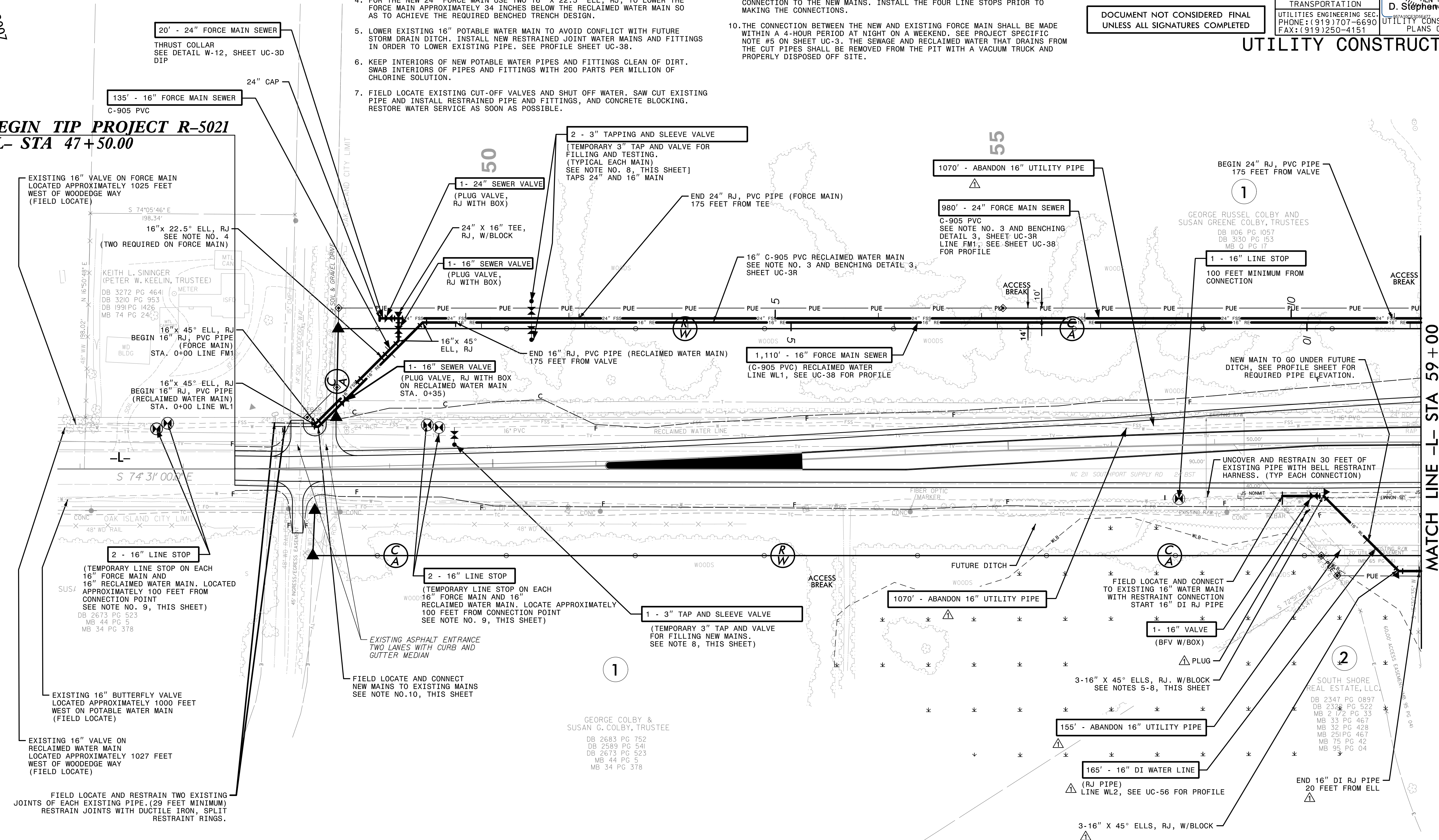
PROJECT REFERENCE NO. R-5021 SHEET NO. UC-4

DESIGNED BY: 10/29/2007
DRAWN BY:
CHECKED BY:
APPROVED BY: SEAL 10666
REVISED: D. STEPHEN SCRUGGS
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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BEGIN TIP PROJECT R-5021
-L- STA 47+50.00



The estimated quantity of Ductile Iron Sewer Pipe Fittings on this plan sheet is 3,339 pounds. The actual quantity and type of fittings will vary based on field conditions.

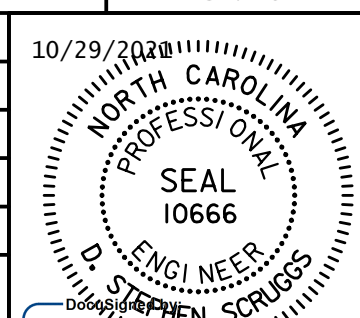
The estimated quantity of Ductile Iron Water Pipe Fittings on this plan sheet is 2,133 pounds. The actual quantity and type of fittings will vary based on field conditions.

△ 16" WATER MAIN RELOCATED AND EXTENDED PER ADDENDUM NO. 1. REMOVED NOTE BELOW PAY ITEM FOR ABANDON UTILITY PIPE PER ADDENDUM NO. 1

DATE: 10/19/2007 TIME: 3:25:05 PM DGN: Z:\Project\10450\10450.dwg

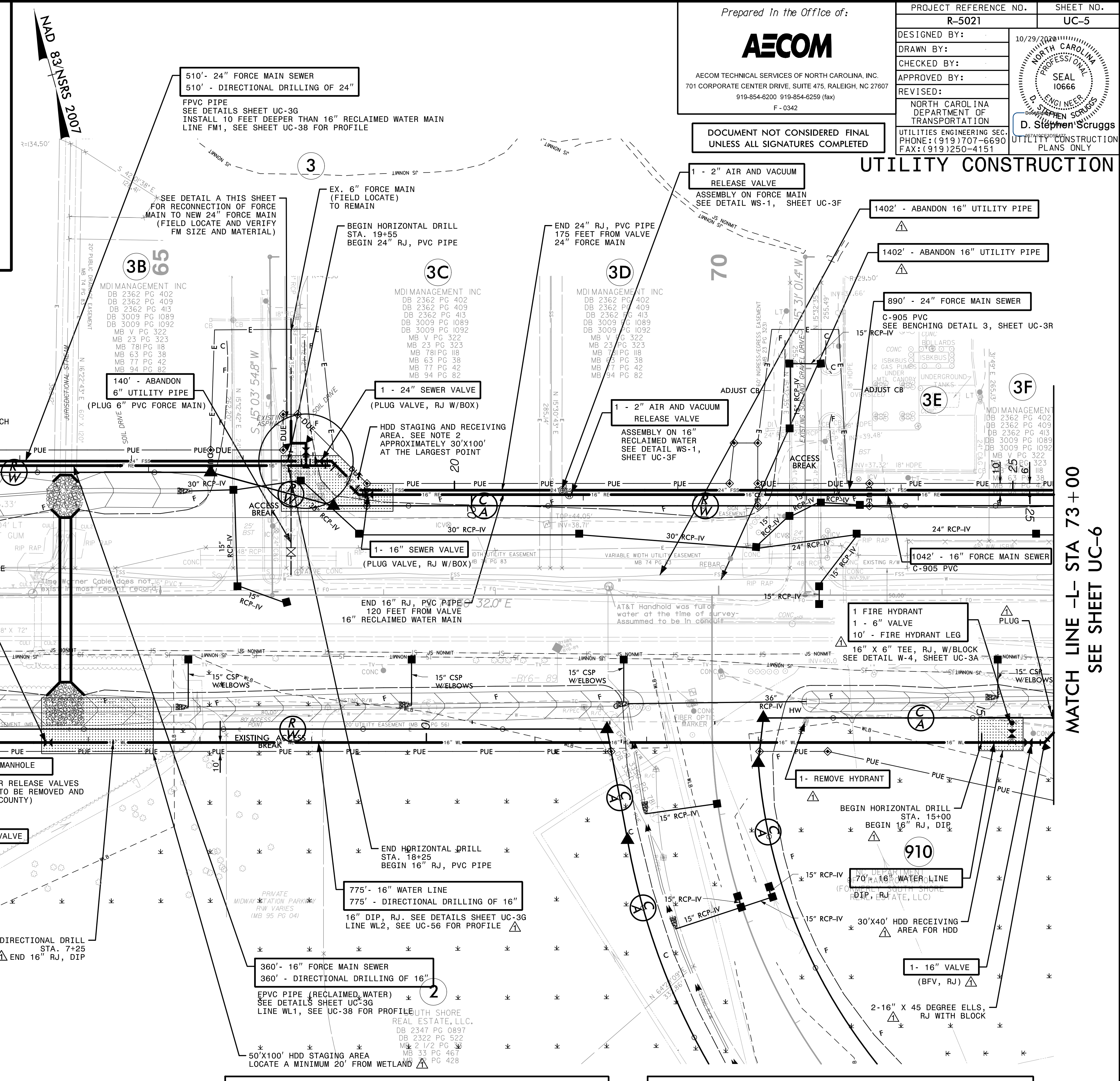
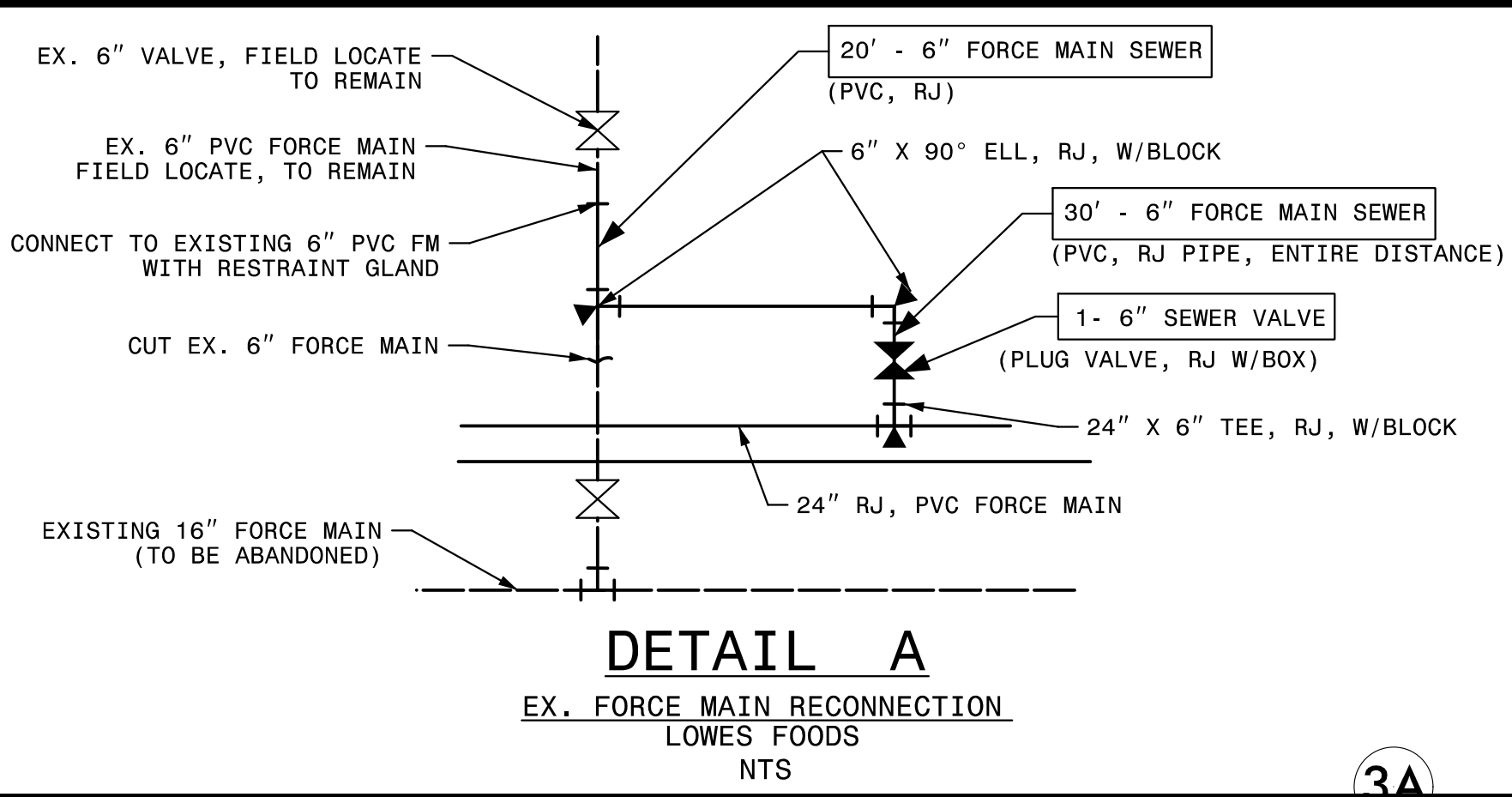
MATCH LINE -L- STA 59+00 SEE SHEET UC-5

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PROJECT REFERENCE NO.	R-5021	SHEET NO.	UC-5
DESIGNED BY:	10/29/2021		
DRAWN BY:			
CHECKED BY:			
APPROVED BY:			
REVISED:			
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151		UTILITY CONSTRUCTION PLANS ONLY	

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MATCH LINE -L- STA 59+00
SEE SHEET UC-4

MATCH LINE -L- STA 73+00
SEE SHEET UC-6

NOTES

- SEE SHEETS UC-38 AND UC-56 FOR PROFILES OF NEW MAINS.
- COORDINATE WITH MDI MANAGEMENT, INC FOR THE CLOSURE OF ONE OF THE LANES INTO THE SHOPPING CENTER. MAINTAIN ONE LANE OF TRAFFIC AT ALL TIMES. REPAIR THE ASPHALT ROAD ONCE COMPLETED.

The estimated quantity of Ductile Iron Water Pipe Fittings on this plan sheet is 1,313 pounds. The actual quantity and type of fittings will vary based on field conditions. ⚠

The estimated quantity of Ductile Iron Sewer Pipe Fittings on this plan sheet is 5,535 pounds. The actual quantity and type of fittings will vary based on field conditions.

⚠ 16" WATER MAIN RELOCATED AND EXTENDED PER ADDENDUM NO. 1.
REMOVED NOTE BELOW PAY ITEM FOR ABANDON UTILITY PIPE PER ADDENDUM NO. 1

DATE: 10/19/2021
TIME: 3:09:59 PM
DGN: Z:\NorthCarolina\Projects\5021\Utility Construction\2021\REV\5021UC_F515.dwg



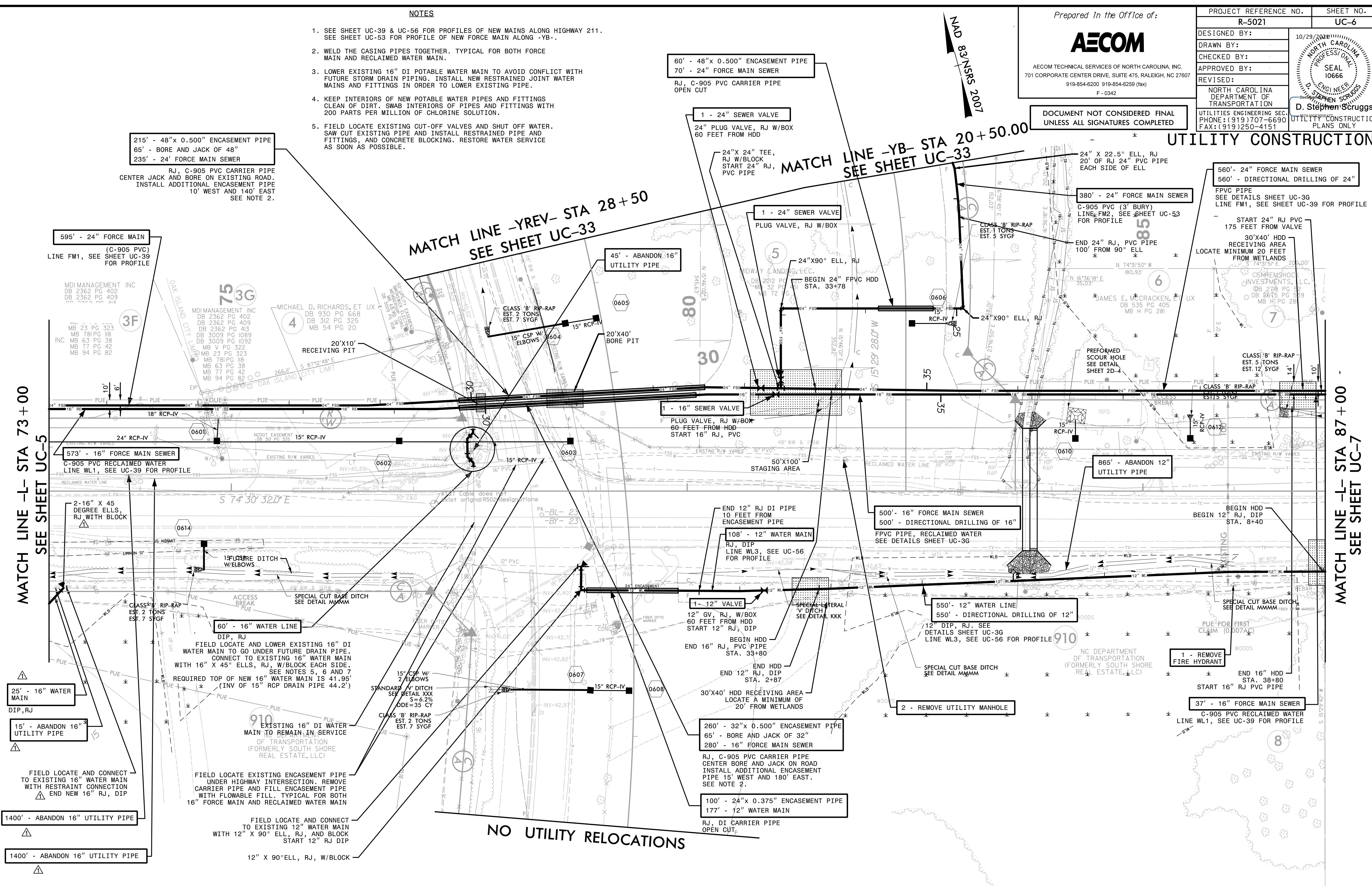
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PROJECT REFERENCE NO.	R-5021
SHEET NO.	UC-6
DESIGNED BY:	
DRAWN BY:	10/29/2021
CHECKED BY:	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SECTION PHONE: (919) 707-6690 FAX: (919) 250-4151	
D. Stephen Scruggs SEAL 10666 REGISTERED PROFESSIONAL ENGINEER NO. 13490 STATE OF NORTH CAROLINA	

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UTILITY CONSTRUCTION

- NOTES**
- SEE SHEET UC-39 & UC-56 FOR PROFILES OF NEW MAINS ALONG HIGHWAY 211. SEE SHEET UC-53 FOR PROFILE OF NEW FORCE MAIN ALONG -YB-.
 - WELD THE CASING PIPES TOGETHER. TYPICAL FOR BOTH FORCE MAIN AND RECLAIMED WATER MAIN.
 - LOWER EXISTING 16" DI POTABLE WATER MAIN TO AVOID CONFLICT WITH FUTURE STORM DRAIN PIPING. INSTALL NEW RESTRAINED JOINT WATER MAINS AND FITTINGS IN ORDER TO LOWER EXISTING PIPE.
 - KEEP INTERIORS OF NEW POTABLE WATER PIPES AND FITTINGS CLEAN OF DIRT. SWAB INTERIORS OF PIPES AND FITTINGS WITH 200 PARTS PER MILLION OF CHLORINE SOLUTION.
 - FIELD LOCATE EXISTING CUT-OFF VALVES AND SHUT OFF WATER. SAW CUT EXISTING PIPE AND INSTALL RESTRAINED PIPE AND FITTINGS, AND CONCRETE BLOCKING. RESTORE WATER SERVICE AS SOON AS POSSIBLE.

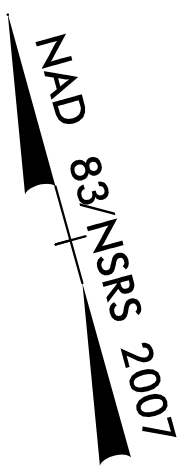


The estimated quantity of Ductile Iron Sewer Pipe Fittings on this plan sheet is 6,125 pounds. The actual quantity and type of fittings will vary based on field conditions.

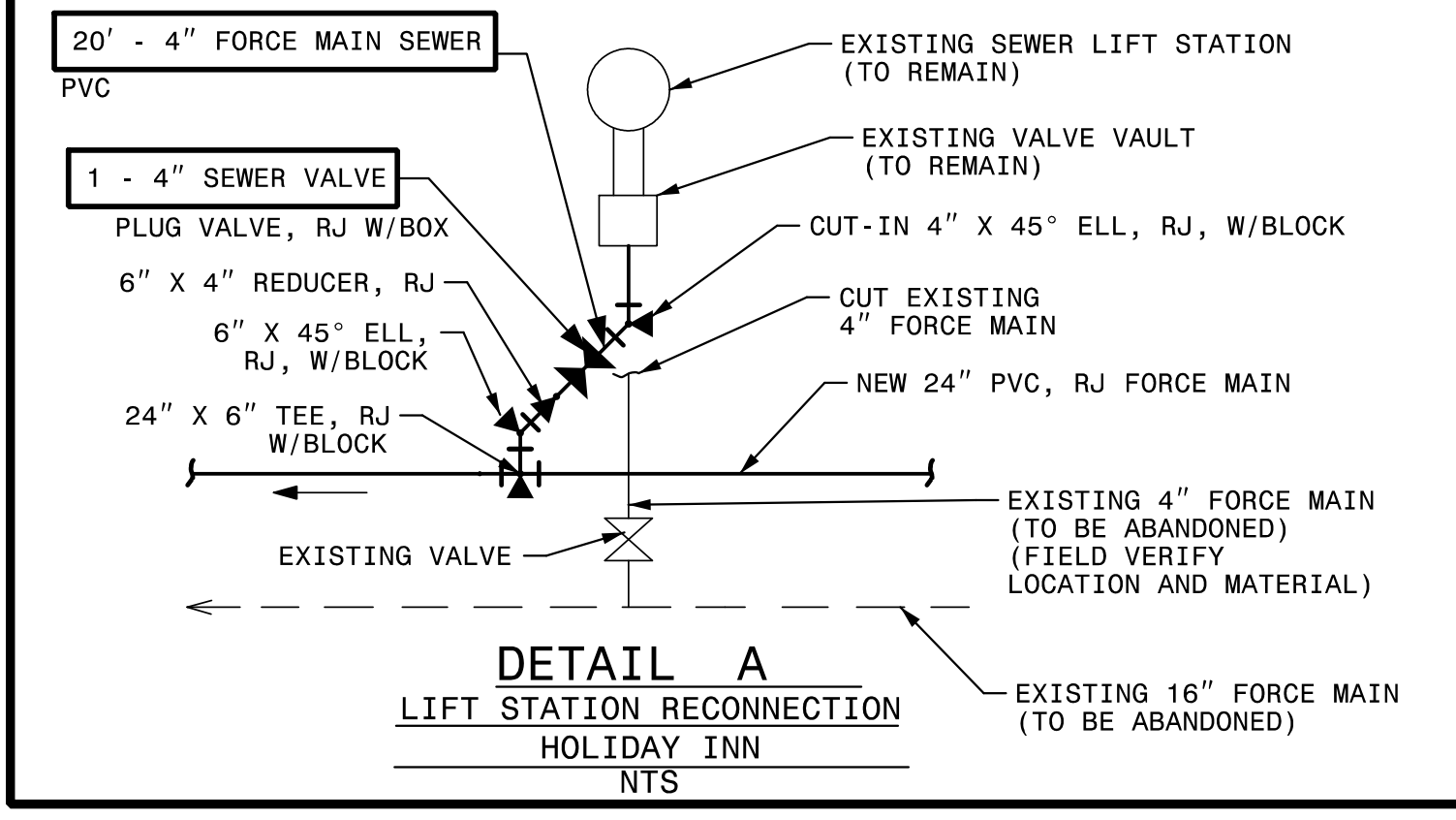
The estimated quantity of Ductile Iron Water Pipe Fittings on this plan sheet is 2,945 pounds. The actual quantity and type of fittings will vary based on field conditions.

16" WATER MAIN RELOCATED AND EXTENDED PER ADDENDUM NO. 1. REMOVED NOTE BELOW PAY ITEM FOR ABANDON UTILITY PIPE PER ADDENDUM NO. 1.

DATE: 10/19/2021
TIME: 3:07:16 PM
DN: Z:\Projects\Utility Construction\2021\REV\2021\UC-6\Final.dwg



- NOTES**
- SEE SHEETS UC-39, UC-40, & UC-56 FOR PROFILES OF NEW MAINS.
 - THE CONTRACTOR SHALL REFRAIN FROM USING THE PARKING LOT OF THE HOTEL FOR THE HDD STAGING AREA.



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PROJECT REFERENCE NO. **R-5021** SHEET NO. **UC-7**

DESIGNED BY: 10/29/2021
DRAWN BY:
CHECKED BY:
APPROVED BY:
REVISED:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151

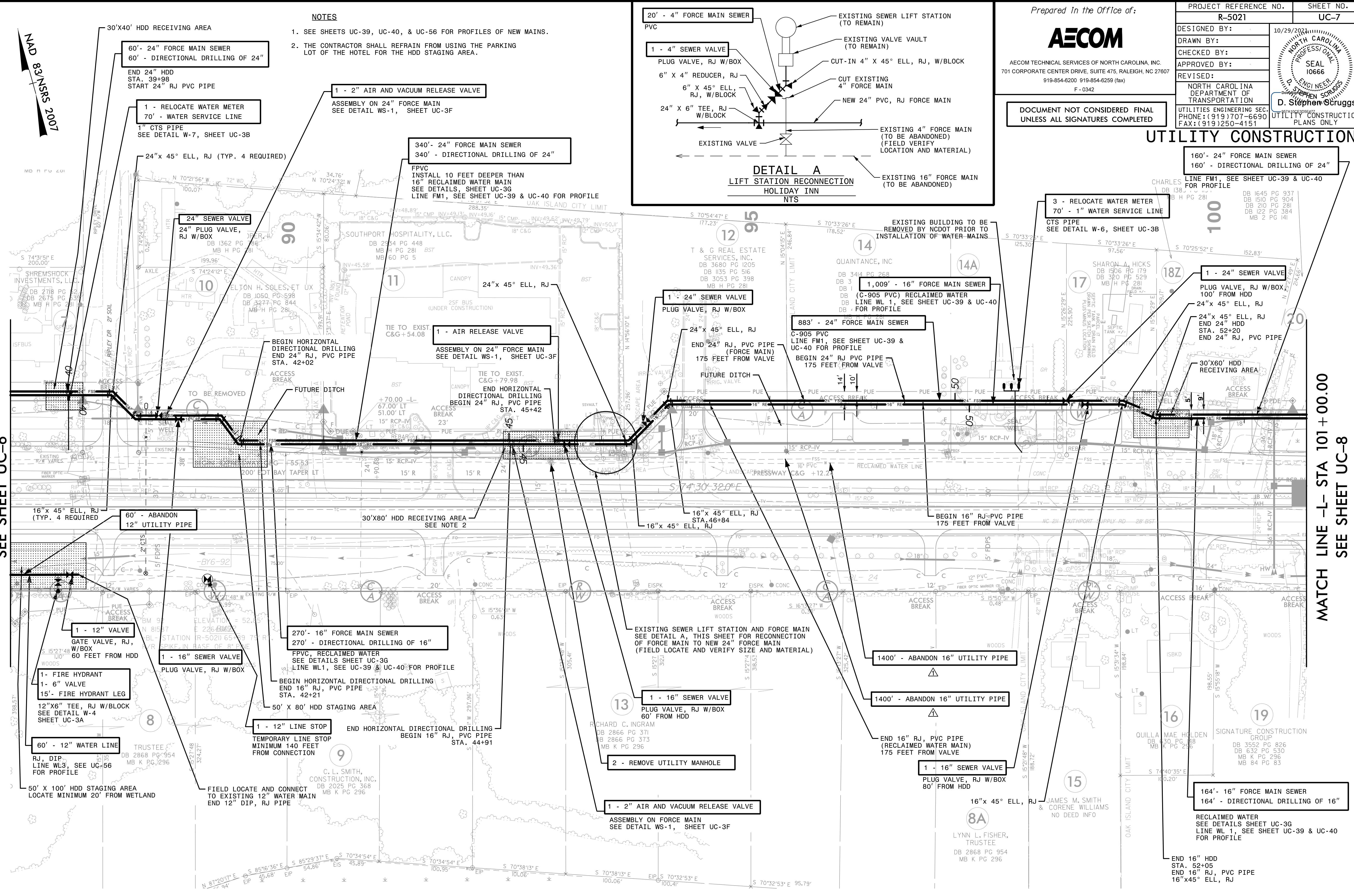
SEAL 10666
D. Stephen Struggs
REGISTERED PROFESSIONAL ENGINEER
STEPHEN STRUGGS

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MATCH LINE -L- STA 87+00.00
SEE SHEET UC-6

MATCH LINE -L- STA 101+00.00
SEE SHEET UC-8



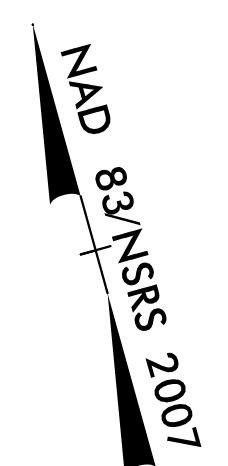
The estimated quantity of Ductile Iron Water Pipe Fittings on this plan sheet is 325 pounds. The actual quantity and type of fittings will vary based on field conditions.

The estimated quantity of Ductile Iron Sewer Pipe Fittings on this plan sheet is 14,310 pounds. The actual quantity and type of fittings will vary based on field conditions.

▲ REMOVED NOTE BELOW PAY ITEM FOR ABANDON UTILITY PIPE PER ADDENDUM NO. 1

DATE: 10/18/2021
TIME: 1:56:32 PM
DGN: Z:\Projects\UTILITY\Legacy\Projects\60428203\900_MerA\915_Utility Construction\2021_REV\1010\NSR-5021_UC-7.dgn

NOTES
1. SEE SHEET UC-40 FOR PROFILES OF NEW MAINS



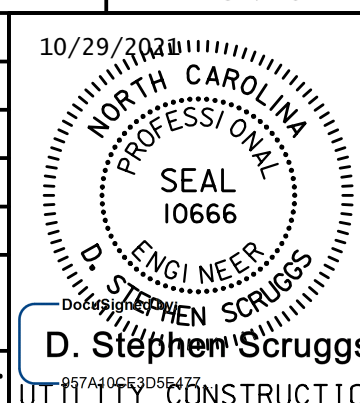
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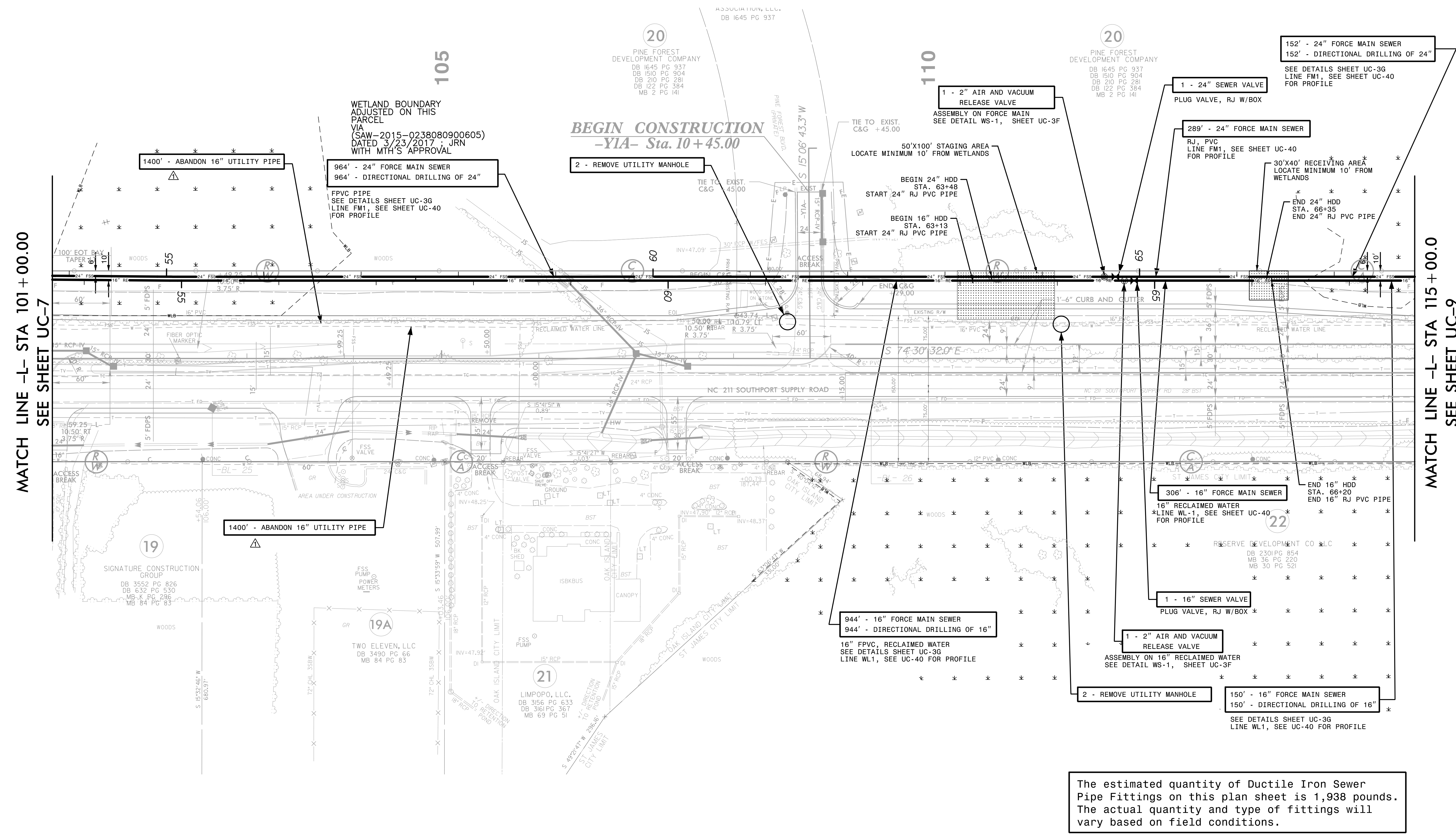
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PROJECT REFERENCE NO. R-5021	SHEET NO. UC-8
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CHECKED BY:	
APPROVED BY:	
REVISED:	
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UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	



UTILITY CONSTRUCTION



MATCH LINE -L- STA 101+00.00
SEE SHEET UC-7

MATCH LINE -L- STA 115+00.00
SEE SHEET UC-9

The estimated quantity of Ductile Iron Sewer Pipe Fittings on this plan sheet is 1,938 pounds. The actual quantity and type of fittings will vary based on field conditions.

REMOVED NOTE BELOW PAY ITEM FOR ABANDON UTILITY PIPE PER ADDENDUM NO. 1

DATE: 10/18/2021
TIME: 4:30:02 PM
DB: Z:\Projects\USFAL3\Utility\Projects\60428203\900_MerA\916_UTILITY Construction\2021_REV\10101SVR-5021_UC_F514.dgn

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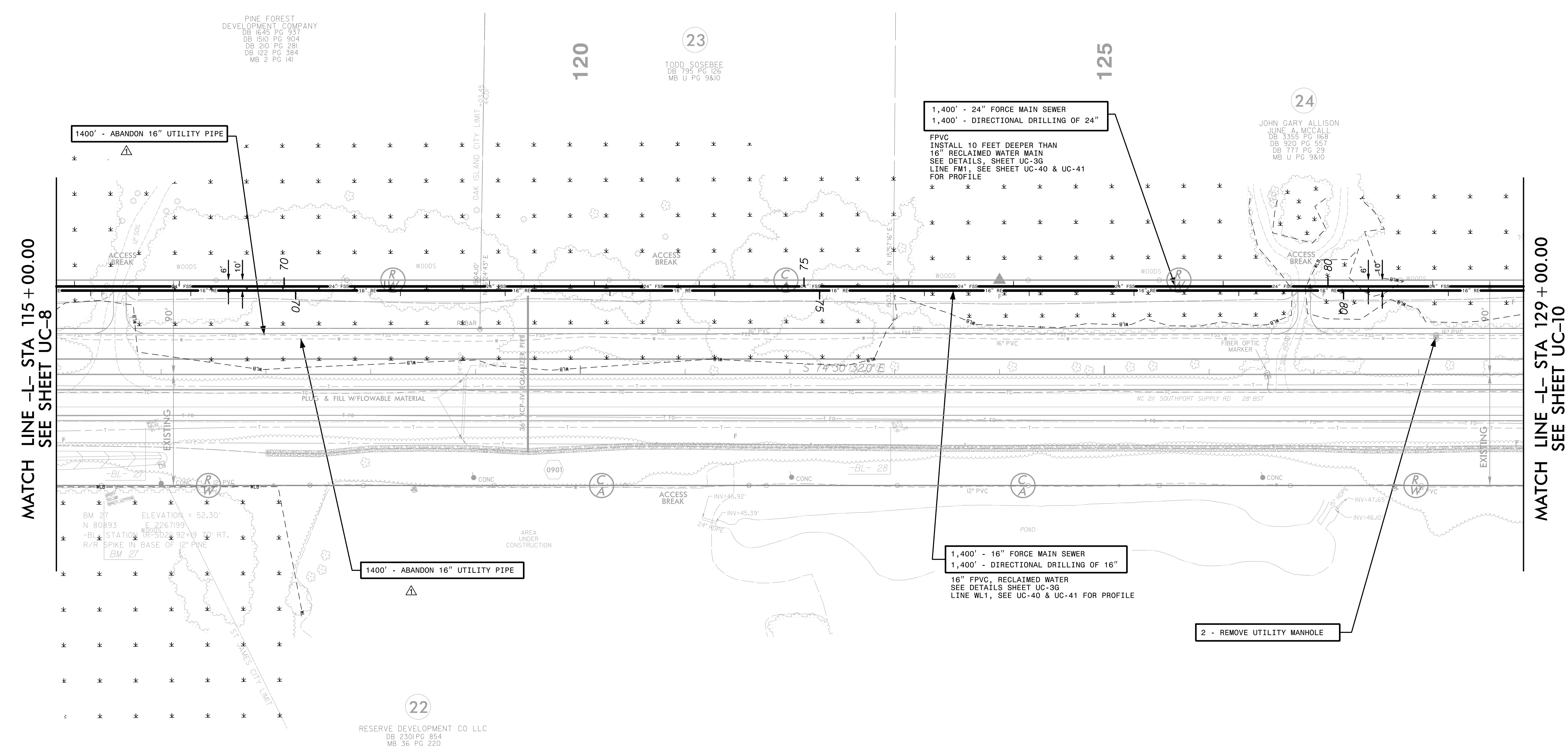
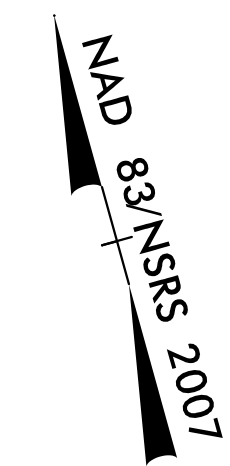
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PROJECT REFERENCE NO.	SHEET NO.
R-5021	UC-9
DESIGNED BY:	10/29/2021
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
REVISED:	
NORTH CAROLINA PROFESSIONAL SEAL 10666	
D. Stephen Cruggs	
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UTILITY CONSTRUCTION

NOTES

1. SEE SHEETS UC-40 & UC-41 FOR PROFILES OF NEW MAINS



MATCH LINE -L- STA 115 + 00.00
SEE SHEET UC-8

MATCH LINE -L- STA 129 + 00.00
SEE SHEET UC-10

DATE: 10/18/2021
TIME: 4:46:46 PM
DGN: Z:\Projects\UTILITY\Projects\6042823\900_MerA\915_Utility Construction\2021_REV\10\18\UC-9\UC-9.dgn

REMOVED NOTE BELOW PAY ITEM FOR ABANDON UTILITY PIPE PER ADDENDUM NO. 1

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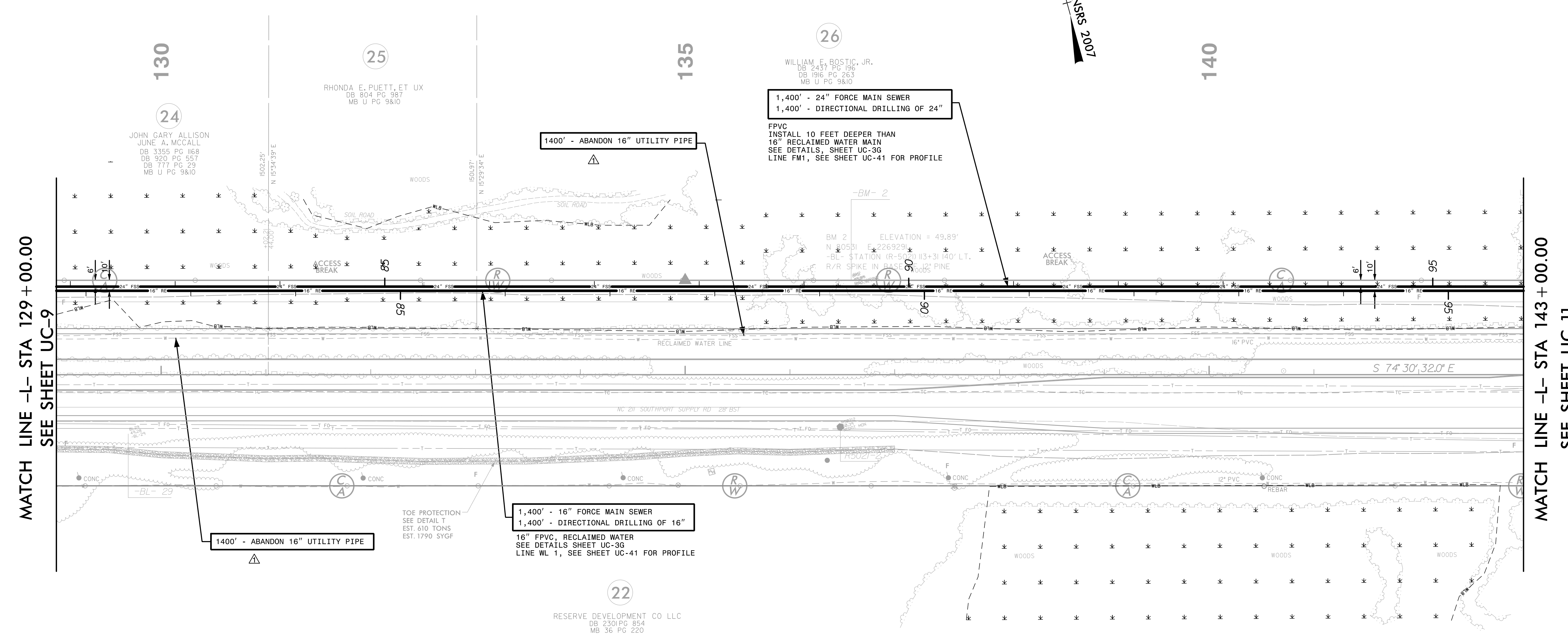
AECOM TECHNICAL SERVICES OF NORTH CAROLINA, INC.
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PROJECT REFERENCE NO.	SHEET NO.
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DESIGNED BY:	10/29/2021
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CHECKED BY:	
APPROVED BY:	
REVISED:	
NORTH CAROLINA PROFESSIONAL SEAL 10666	
D. Stephen Scruggs	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
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NOTES
1. SEE SHEET UC-41 FOR PROFILES OF NEW MAINS

UTILITY CONSTRUCTION



MATCH LINE -L- STA 129 + 00.00
SEE SHEET UC-9

MATCH LINE -L- STA 143 + 00.00
SEE SHEET UC-11

DATE: 10/18/2021
TIME: 15:03:32 PM
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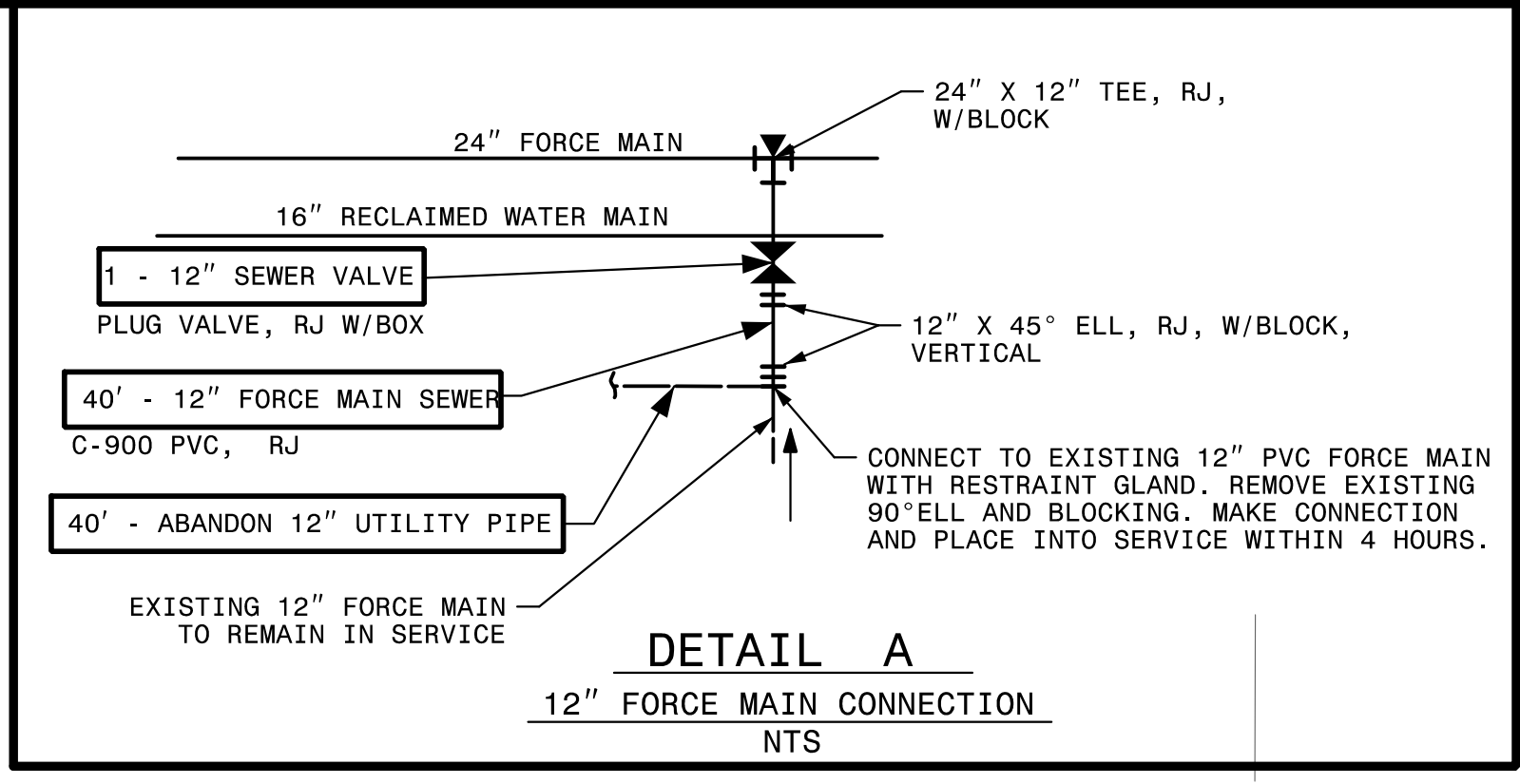
△ REMOVED NOTE BELOW PAY ITEM FOR ABANDON UTILITY PIPE PER ADDENDUM NO. 1

NAD
8/1/2007

45' - 24" FORCE MAIN SEWER
45' - DIRECTIONAL DRILL OF 24"
SEE DETAILS SHEET UC-3G

CONNECT EXISTING 12" FORCE MAIN
TO NEW 24" FORCE MAIN.
SEE DETAIL A, THIS SHEET

- NOTES**
1. SEE SHEETS UC-41 & UC-42 FOR PROFILES OF NEW 24" FORCE MAIN AND 16" RECLAIMED WATER MAIN.
 2. SEE SHEET UC-44 FOR PROFILE OF NEW 18" WATER MAIN.
 3. FIELD LOCATE EXISTING 18" RAW WATER MAIN AND VERIFY MATERIAL.
 4. SEE SHEET NO. UC-3 FOR CONSTRUCTION SEQUENCE NOTES FOR RAW WATER MAIN.



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919-854-6200 919-854-6259 (fax)
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PROJECT REFERENCE NO. R-5021 SHEET NO. UC-11

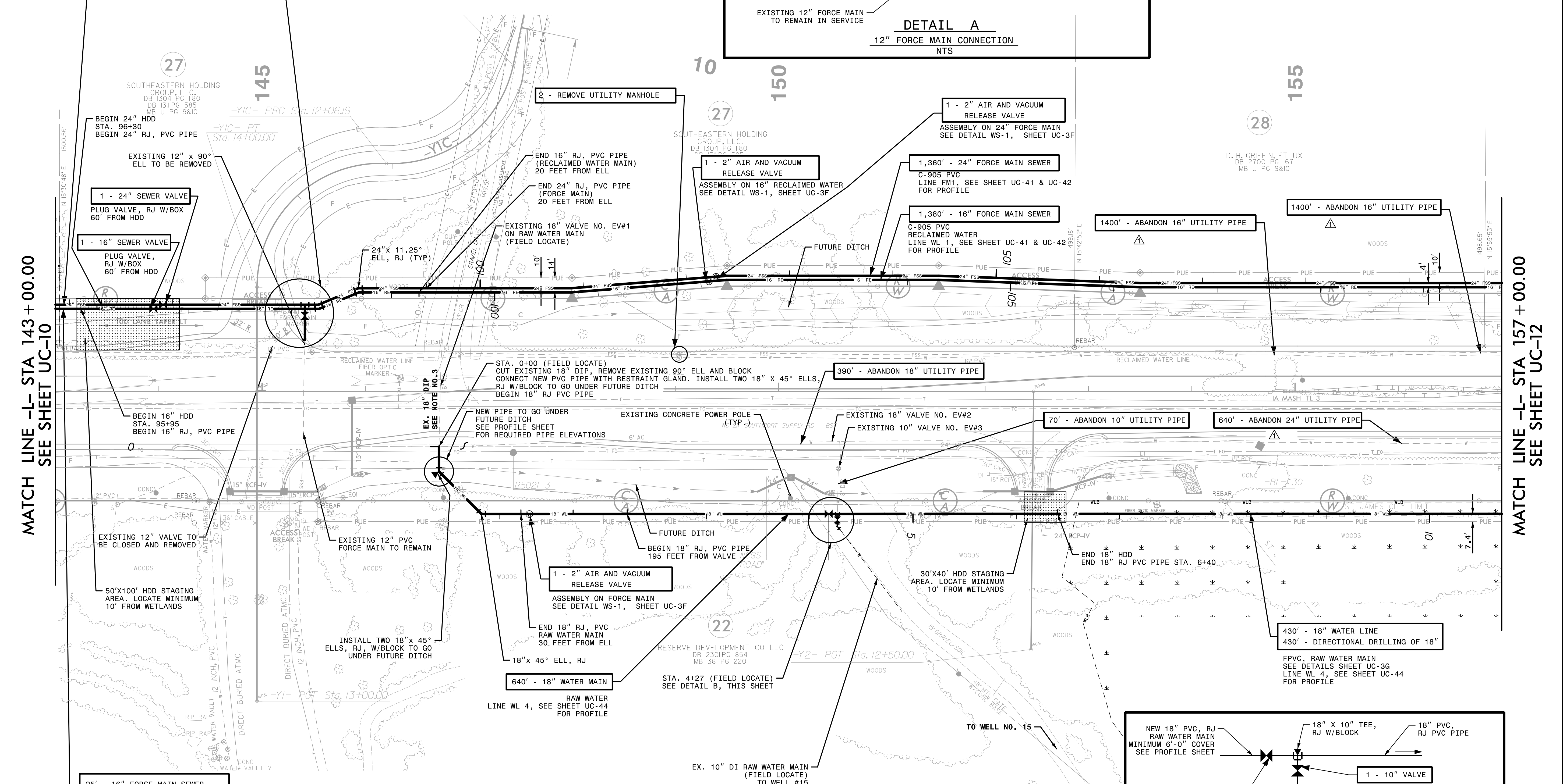
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DRAWN BY:
CHECKED BY:
APPROVED BY:
REVISED:

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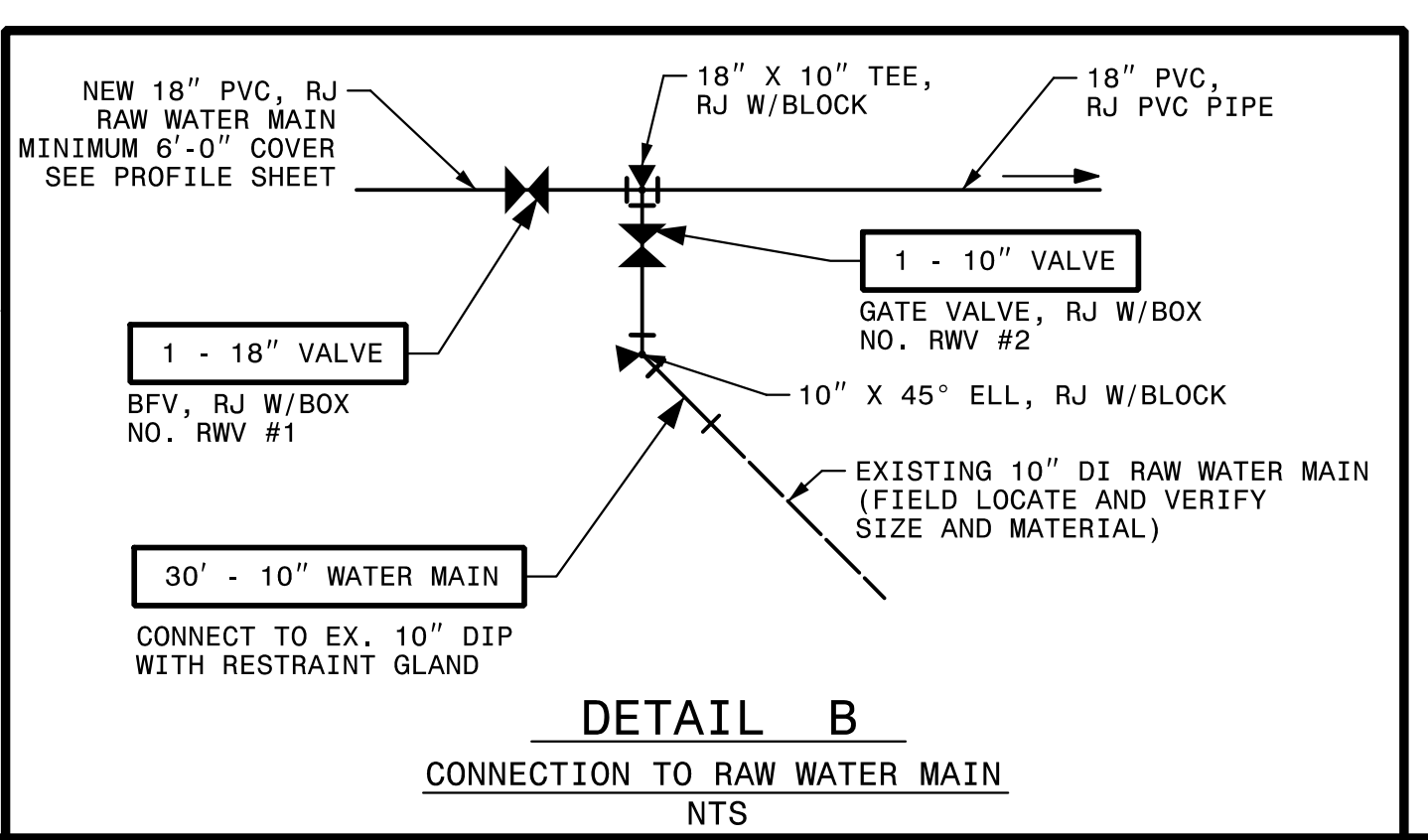


MATCH LINE -L- STA 143 + 00.00
SEE SHEET UC-10

MATCH LINE -L- STA 157 + 00.00
SEE SHEET UC-12

The estimated quantity of Ductile Iron Sewer Pipe Fittings on this plan sheet is 4,785 pounds. The actual quantity and type of fittings will vary based on field conditions.

The estimated quantity of Ductile Iron Water Pipe Fittings on this plan sheet is 3,295 pounds. The actual quantity and type of fittings will vary based on field conditions.



△ REMOVED NOTE BELOW PAY ITEM FOR ABANDON UTILITY PIPE PER ADDENDUM NO. 1

DATE: 10/18/2021
TIME: 1:56:35 PM
DGN: ZYNoleigh-USA/AL3/Utility/Projects/60428203/900_MerA/915_Utility_Construction/2021_REV/10/18/2021_UC-11.dgn

NOTES

- 1. SEE SHEET UC-42 FOR PROFILES OF NEW 24" FORCE MAIN AND 16" RECLAIMED WATER MAIN.
- 2. SEE SHEETS UC-44 & UC-45 FOR PROFILE OF NEW 18" WATER MAIN.

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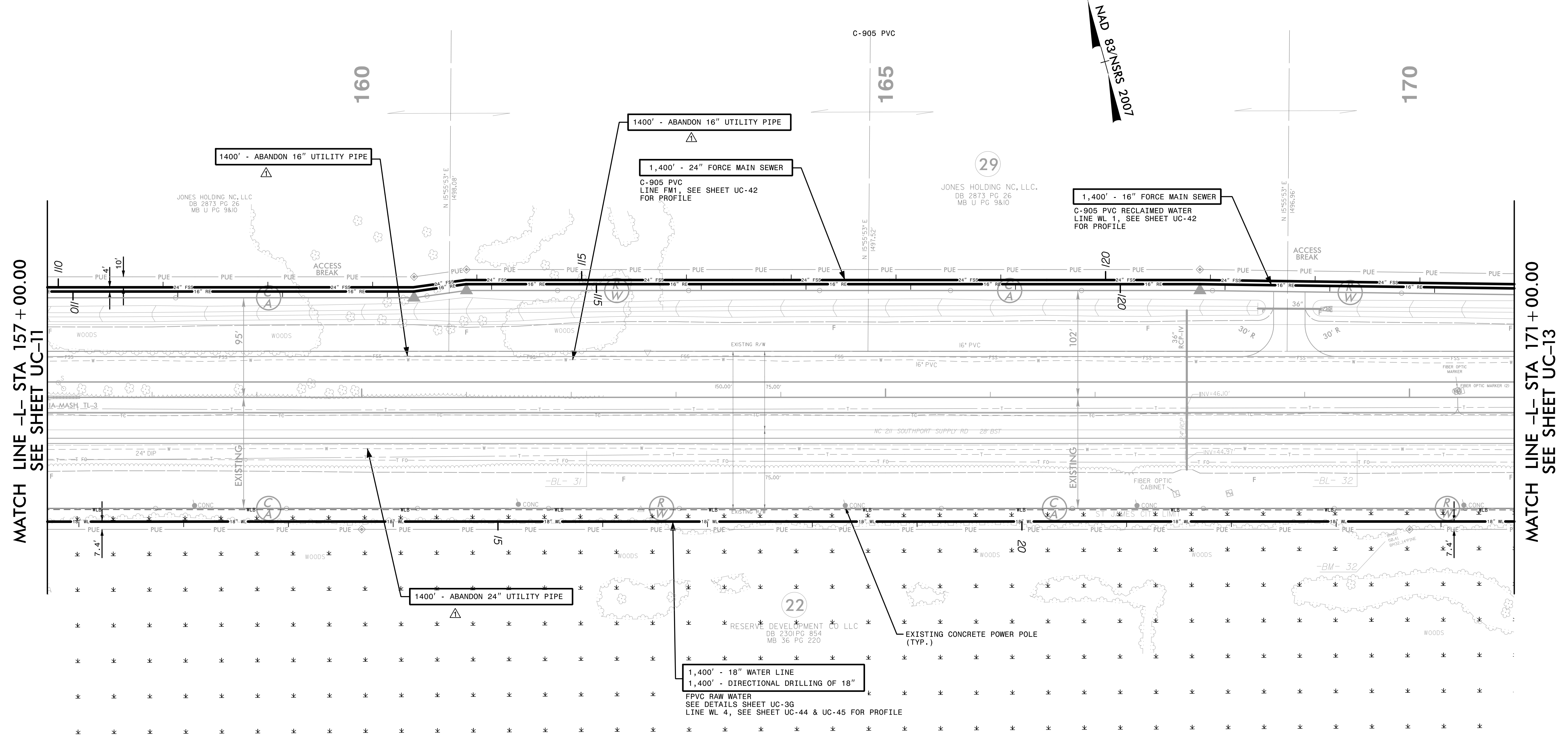


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PROJECT REFERENCE NO.	R-5021	SHEET NO.	UC-12
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION		SEAL 10666	
UTILITIES ENGINEERING SEC.		D. Stephen Scruggs	
PHONE: (919) 707-6690		UTILITY CONSTRUCTION PLANS ONLY	
FAX: (919) 250-4151			

UTILITY CONSTRUCTION



MATCH LINE -L- STA 157 + 00.00
SEE SHEET UC-11

MATCH LINE -L- STA 171 + 00.00
SEE SHEET UC-13

REMOVED NOTE BELOW PAY ITEM FOR ABANDON UTILITY PIPE PER ADDENDUM NO. 1

DATE: 10/18/2021
 TIME: 2:00:45 PM
 DGN: Z:\Projects\UTILITY\Projects\60428203\900_MerA\915_UTILITY Construction\2021_REV\VISIONS\R-5021_UC-12.dgn

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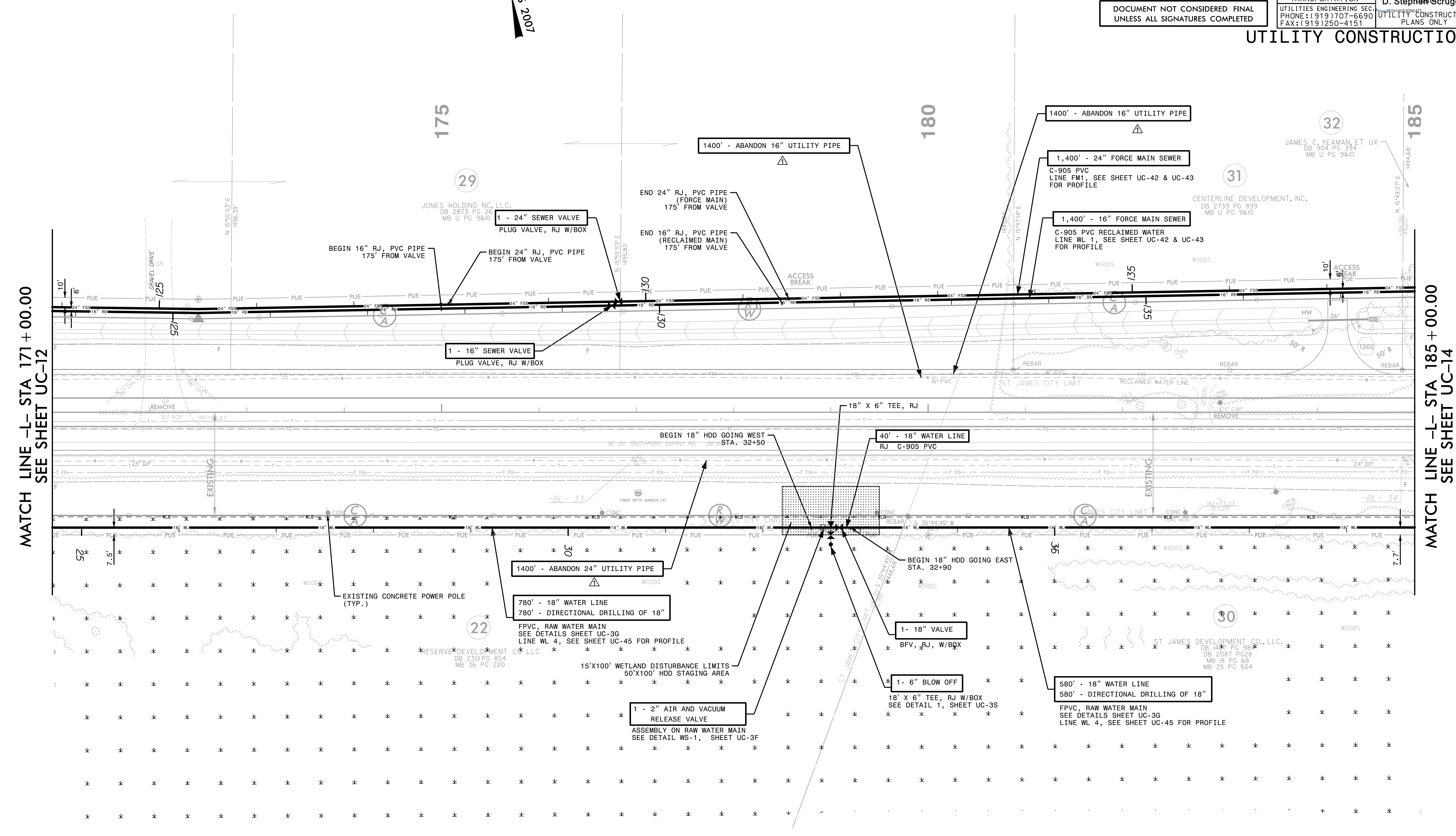
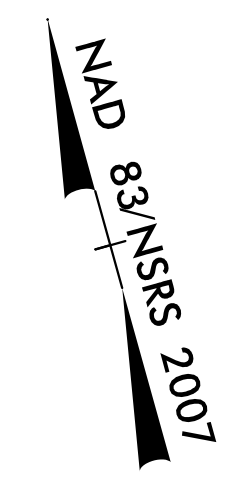
DOCUMENT NOT CONSIDERED FINAL
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PROJECT REFERENCE NO.	R-5021	SHEET NO.	UC-13
DESIGNED BY:		DATE:	10/29/2021
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CHECKED BY:			
APPROVED BY:			
REVISED:			
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION		SEAL 10666	
UTILITIES ENGINEERING SEC.		D. Stephen Scruggs	
PHONE: (919) 707-6690		UTILITY CONSTRUCTION PLANS ONLY	
FAX: (919) 250-4151			

UTILITY CONSTRUCTION

NOTES

- SEE SHEETS UC-42 AND UC-43 FOR PROFILES OF NEW 24" FORCE MAIN AND 16" RECLAIMED WATER MAIN.
- SEE SHEET UC-45 FOR PROFILE OF NEW 18" WATER MAIN.



MATCH LINE -L- STA 171 + 00.00
SEE SHEET UC-12

MATCH LINE -L- STA 185 + 00.00
SEE SHEET UC-14

The estimated quantity of Ductile Iron Water Pipe Fittings on this plan sheet is 1,430 pounds. The actual quantity and type of fittings will vary based on field conditions.

REMOVED NOTE BELOW PAY ITEM FOR ABANDON UTILITY PIPE PER ADDENDUM NO. 1

DATE: 10/18/2021
TIME: 2:06:51 PM
DGN: Z:\Projects\UTILITY\Projects\60428203\900_MerA\915_UTILITY Construction\2021_REV\VISIONS\R-5021_UC-13.dgn

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919-854-6200 919-854-6259 (fax)
F - 0342

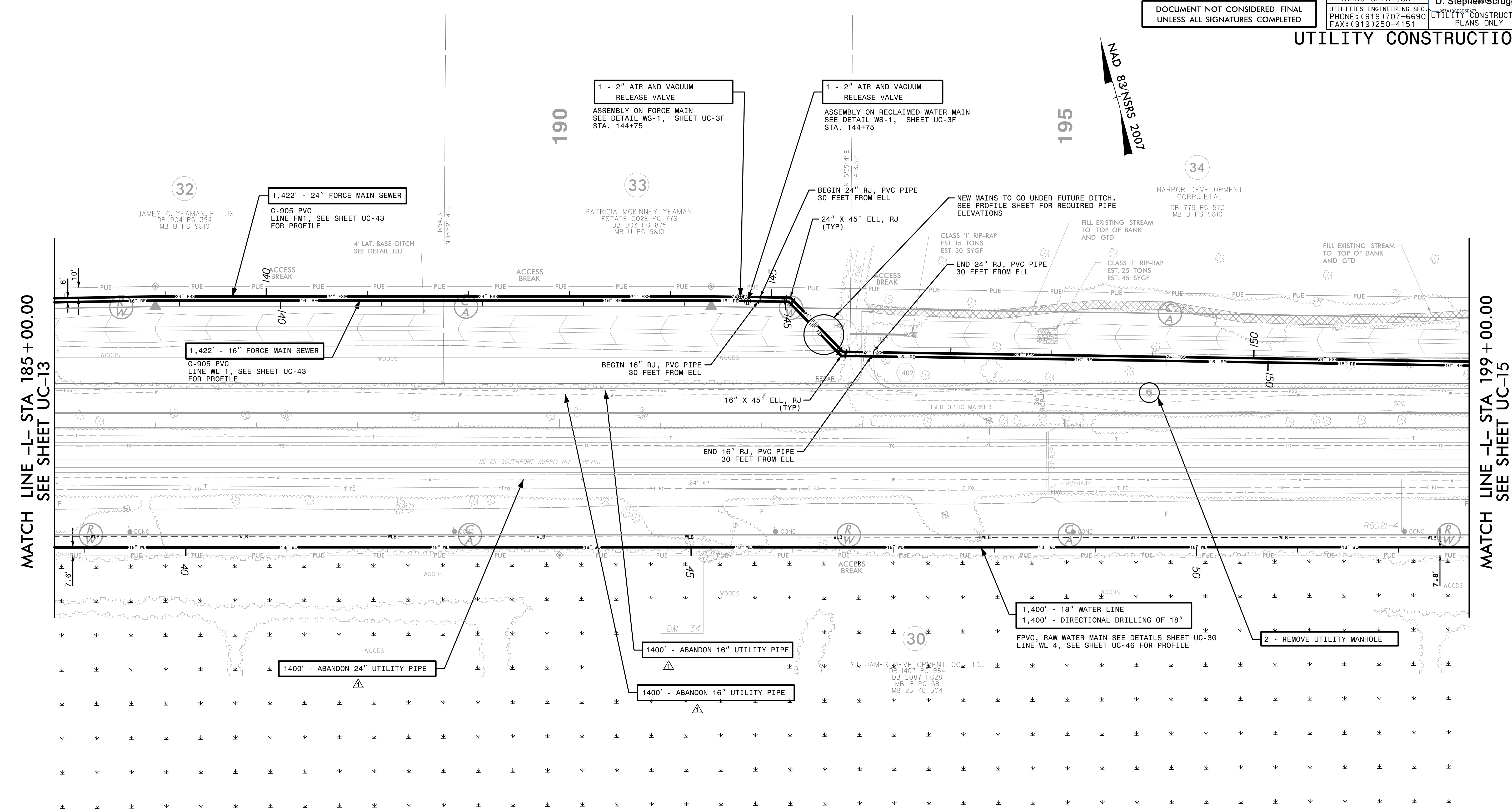
PROJECT REFERENCE NO.	R-5021	SHEET NO.	UC-14
DESIGNED BY:		10/29/2021	
DRAWN BY:			
CHECKED BY:			
APPROVED BY:			
REVISED:			
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION		SEAL 10666	
UTILITIES ENGINEERING SEC.		D. Stephen Scruggs	
PHONE: (919) 707-6690		UTILITY CONSTRUCTION PLANS ONLY	
FAX: (919) 250-4151			

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UTILITY CONSTRUCTION

NOTES

- SEE SHEET UC-43 FOR PROFILES OF NEW 24" FORCE MAIN AND 16" RECLAIMED WATER MAIN.
- SEE SHEET UC-46 FOR PROFILE OF NEW 18" WATER MAIN.



MATCH LINE -L- STA 185 + 00.00
SEE SHEET UC-13

MATCH LINE -L- STA 199 + 00.00
SEE SHEET UC-15

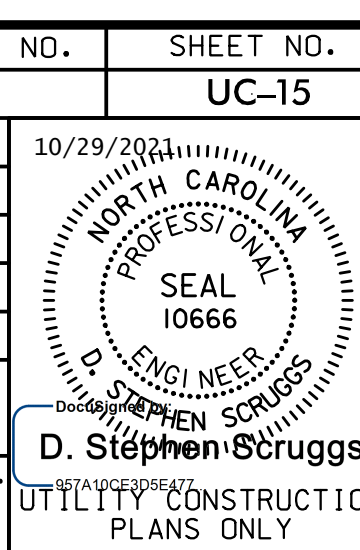
The estimated quantity of Ductile Iron Sewer Pipe Fittings on this plan sheet is 2,190 pounds. The actual quantity and type of fittings will vary based on field conditions.

△ REMOVED NOTE BELOW PAY ITEM FOR ABANDON UTILITY PIPE PER ADDENDUM NO. 1

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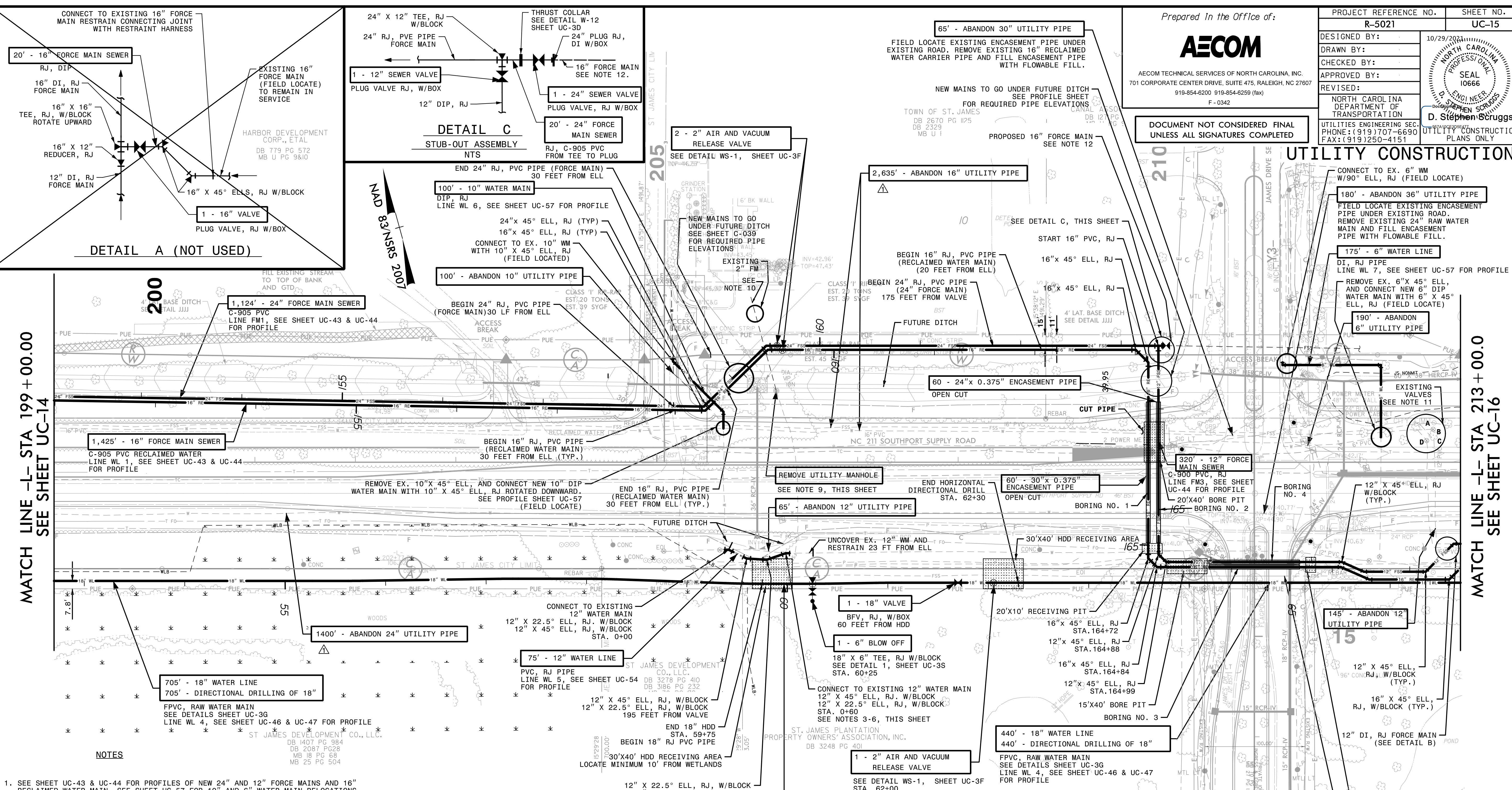
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919-854-6200 919-854-6259 (fax)
F-0342

PROJECT REFERENCE NO.	SHEET NO.
R-5021	UC-15
DESIGNED BY:	10/29/2021
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SECTION	
PHONE: (919) 707-6690	
FAX: (919) 250-4151	



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MATCH LINE -L- STA 199 + 00.00 SEE SHEET UC-14

MATCH LINE -L- STA 213 + 00.00 SEE SHEET UC-16

- NOTES**
- SEE SHEET UC-43 & UC-44 FOR PROFILES OF NEW 24" AND 12" FORCE MAINS AND 16" RECLAIMED WATER MAIN. SEE SHEET UC-57 FOR 10" AND 6" WATER MAIN RELOCATIONS. SEE SHEET UC-54 FOR 12" WATER MAIN RELOCATION
 - SEE SHEETS UC-46 & UC-47 FOR PROFILE OF NEW 18" WATER MAIN.
 - LOWER EXISTING 12" POTABLE WATER MAIN TO AVOID CONFLICT WITH FUTURE STORM DRAIN PIPING. INSTALL NEW RESTRAINED JOINT WATER MAINS AND FITTINGS IN ORDER TO LOWER EXISTING PIPE.
 - KEEP INTERIORS OF NEW POTABLE WATER PIPES AND FITTINGS CLEAN OF DIRT. SWAB INTERIORS OF PIPES AND FITTINGS WITH 200 PARTS PER MILLION OF CHLORINE SOLUTION.
 - FIELD LOCATE EXISTING CUT-OFF VALVES AND SHUT OFF WATER. SAW CUT EXISTING PIPE AND INSTALL RESTRAINED PIPE AND FITTINGS, AND CONCRETE BLOCKING. RESTORE WATER SERVICE AS SOON AS POSSIBLE.
 - RESTORE DISTURBED AREAS.
 - NOT USED
 - THE CONNECTION BETWEEN THE NEW AND EXISTING FORCE MAIN SHALL BE MADE WITHIN A 4 HOUR PERIOD AT NIGHT ON A WEEKEND. THE SEWAGE THAT DRAINS FROM THE CUT PIPE SHALL BE REMOVED FROM THE PIT WITH A VACUUM TRUCK AND PROPERLY DISPOSED OFF SITE.
 - EXISTING VALVE VAULT AND VALVES TO BE REMOVED. EX. VAULT IS A 5-FT ID MANHOLE THAT IS 5'-9" DEEP AND CONTAINS A 4-IN CHECK AND PLUG VALVE. PROVIDE AND INSTALL SECTION OF 2-IN SCHEDULE 80 PVC PIPE AND ALL ELSE TO REPAIR THE 2-IN FORCE MAIN AND RESTORE SERVICE.
 - NEW VALVE VAULT ON EX. 2-IN PVC FORCE MAIN. INSTALL 2-IN BALL VALVE AND CHECK VALVE. PROVIDE AND INSTALL IN ACCORDANCE WITH DETAIL S-12 SHEET UC-30.
 - EXISTING VALVES A AND C ON EXISTING FORCE MAIN TO REMAIN. VALVE A TO REMAIN OPEN; VALVE C TO BE CLOSED. VALVES B AND D TO BE REMOVED.
 - THE CONTRACTOR SHALL COORDINATE THE FORCE MAIN CONNECTION WITH BRUNSWICK COUNTY.

The estimated quantity of Ductile Iron Water Pipe Fittings on this plan sheet is 4,495 pounds. The actual quantity and type of fittings will vary based on field conditions.

The estimated quantity of Ductile Iron Sewer Pipe Fittings on this plan sheet is 7,104 pounds. The actual quantity and type of fittings will vary based on field conditions.

DATE: 10/19/2021
TIME: 3:46:29 PM
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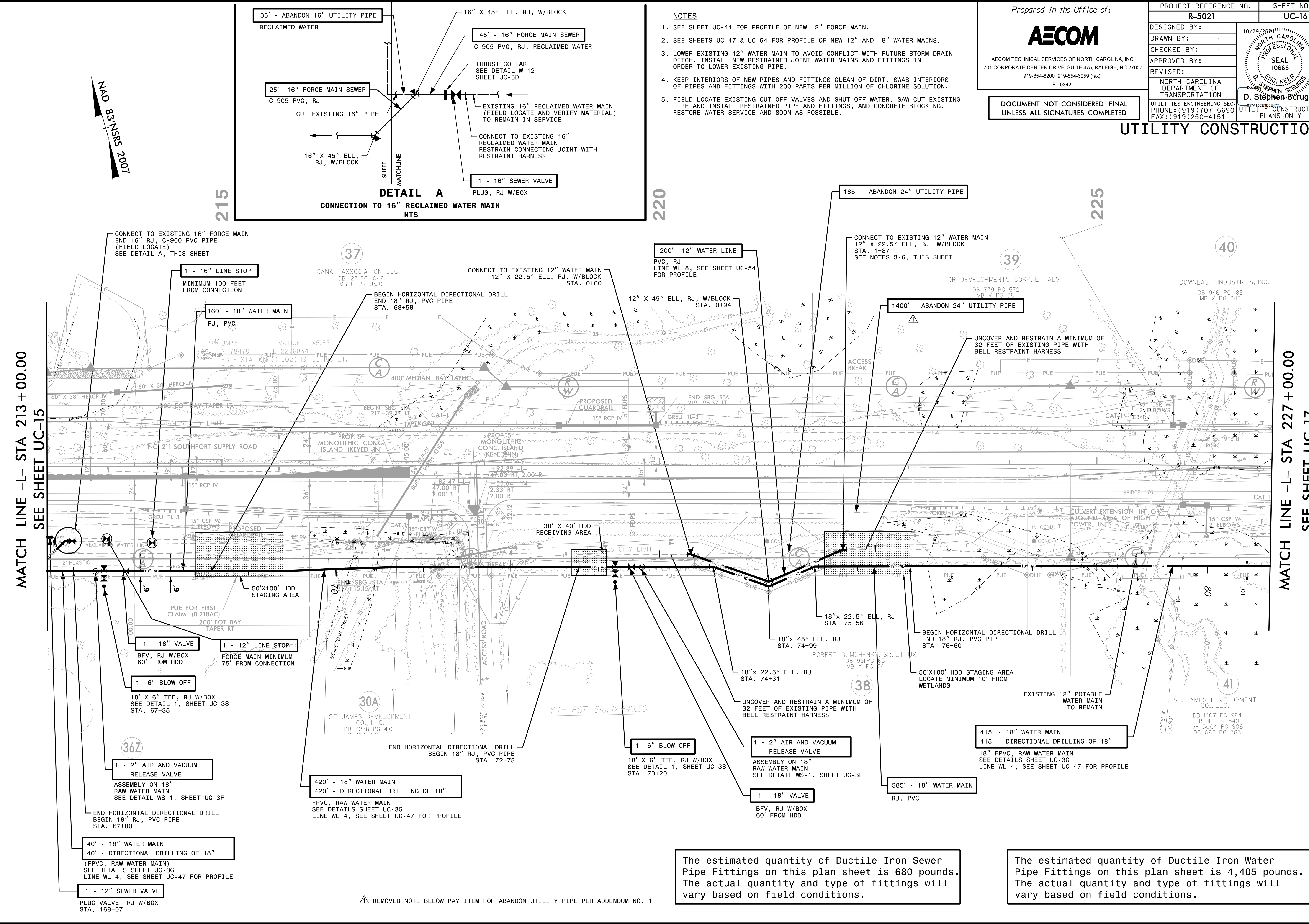
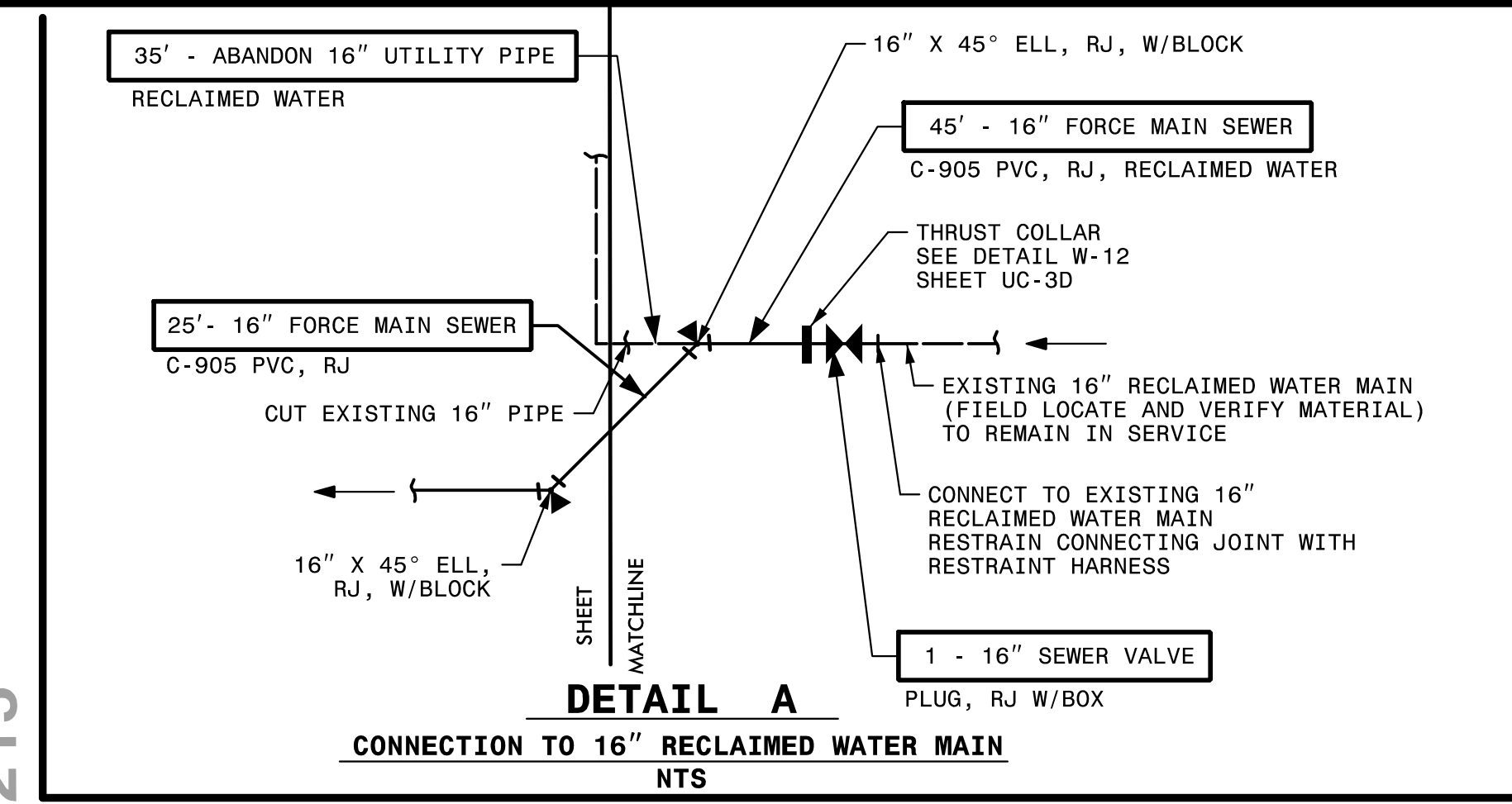
DOCUMENT NOT CONSIDERED FINAL
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PROJECT REFERENCE NO.	SHEET NO.
R-5021	UC-16
DESIGNED BY:	10/29/2001
DRAWN BY:	NORTH CAROLINA PROFESSIONAL SEAL 10666
CHECKED BY:	
APPROVED BY:	D. Stephen Struggs
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SECTION PHONE: (919) 707-6690 FAX: (919) 250-4151	

UTILITY CONSTRUCTION

NOTES

- SEE SHEET UC-44 FOR PROFILE OF NEW 12" FORCE MAIN.
- SEE SHEETS UC-47 & UC-54 FOR PROFILE OF NEW 12" AND 18" WATER MAINS.
- LOWER EXISTING 12" WATER MAIN TO AVOID CONFLICT WITH FUTURE STORM DRAIN DITCH. INSTALL NEW RESTRAINED JOINT WATER MAINS AND FITTINGS IN ORDER TO LOWER EXISTING PIPE.
- KEEP INTERIORS OF NEW PIPES AND FITTINGS CLEAN OF DIRT. SWAB INTERIORS OF PIPES AND FITTINGS WITH 200 PARTS PER MILLION OF CHLORINE SOLUTION.
- FIELD LOCATE EXISTING CUT-OFF VALVES AND SHUT OFF WATER. SAW CUT EXISTING PIPE AND INSTALL RESTRAINED PIPE AND FITTINGS, AND CONCRETE BLOCKING. RESTORE WATER SERVICE AND SOON AS POSSIBLE.



MATCH LINE -L- STA 213 + 00.00
SEE SHEET UC-15

MATCH LINE -L- STA 227 + 00.00
SEE SHEET UC-17

The estimated quantity of Ductile Iron Sewer Pipe Fittings on this plan sheet is 680 pounds. The actual quantity and type of fittings will vary based on field conditions.

The estimated quantity of Ductile Iron Water Pipe Fittings on this plan sheet is 4,405 pounds. The actual quantity and type of fittings will vary based on field conditions.

DATE: 10/18/2001
TIME: 2:23:33 PM
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REMOVED NOTE BELOW PAY ITEM FOR ABANDON UTILITY PIPE PER ADDENDUM NO. 1

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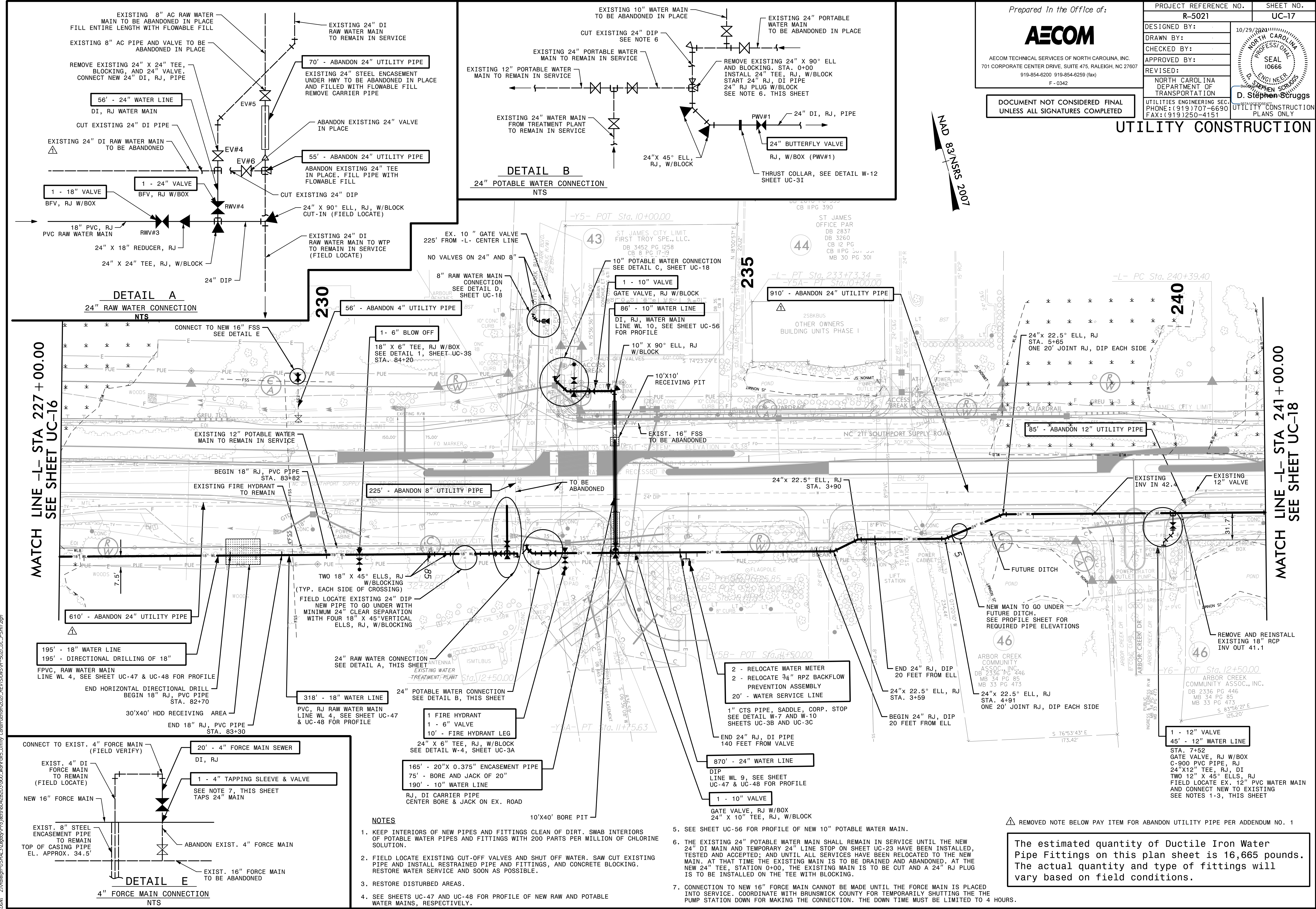


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PROJECT REFERENCE NO.	R-5021	SHEET NO.	UC-17
DESIGNED BY:		DATE:	10/29/2007
DRAWN BY:		SEAL:	10666
CHECKED BY:		PROFESSIONAL ENGINEER:	D. Stephen Struggs
APPROVED BY:		DEPARTMENT OF TRANSPORTATION:	
REVISED:		UTILITIES ENGINEERING SEC.:	
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		FAX: (919) 250-4151	

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UTILITY CONSTRUCTION



DETAIL A
24" RAW WATER CONNECTION
NTS

DETAIL B
24" POTABLE WATER CONNECTION
NTS

DETAIL E
4" FORCE MAIN CONNECTION
NTS

NOTES

- KEEP INTERIORS OF NEW PIPES AND FITTINGS CLEAN OF DIRT. SWAB INTERIORS OF POTABLE WATER PIPES AND FITTINGS WITH 200 PARTS PER MILLION OF CHLORINE SOLUTION.
- FIELD LOCATE EXISTING CUT-OFF VALVES AND SHUT OFF WATER. SAW CUT EXISTING PIPE AND INSTALL RESTRAINED PIPE AND FITTINGS, AND CONCRETE BLOCKING. RESTORE WATER SERVICE AND SOON AS POSSIBLE.
- RESTORE DISTURBED AREAS.
- SEE SHEETS UC-47 AND UC-48 FOR PROFILE OF NEW RAW AND POTABLE WATER MAINS, RESPECTIVELY.
- SEE SHEET UC-56 FOR PROFILE OF NEW 10" POTABLE WATER MAIN.
- THE EXISTING 24" POTABLE WATER MAIN SHALL REMAIN IN SERVICE UNTIL THE NEW 24" DI MAIN AND TEMPORARY 24" LINE STOP ON SHEET UC-23 HAVE BEEN INSTALLED, TESTED AND ACCEPTED; AND UNTIL ALL SERVICES HAVE BEEN RELOCATED TO THE NEW MAIN. AT THAT TIME THE EXISTING MAIN IS TO BE DRAINED AND ABANDONED. AT THE NEW 24" TEE, STATION 0+00, THE EXISTING MAIN IS TO BE CUT AND A 24" RJ PLUG IS TO BE INSTALLED ON THE TEE WITH BLOCKING.
- CONNECTION TO NEW 16" FORCE MAIN CANNOT BE MADE UNTIL THE FORCE MAIN IS PLACED INTO SERVICE. COORDINATE WITH BRUNSWICK COUNTY FOR TEMPORARILY SHUTTING THE THE PUMP STATION DOWN FOR MAKING THE CONNECTION. THE DOWN TIME MUST BE LIMITED TO 4 HOURS.

REMOVED NOTE BELOW PAY ITEM FOR ABANDON UTILITY PIPE PER ADDENDUM NO. 1

The estimated quantity of Ductile Iron Water Pipe Fittings on this plan sheet is 16,665 pounds. The actual quantity and type of fittings will vary based on field conditions.

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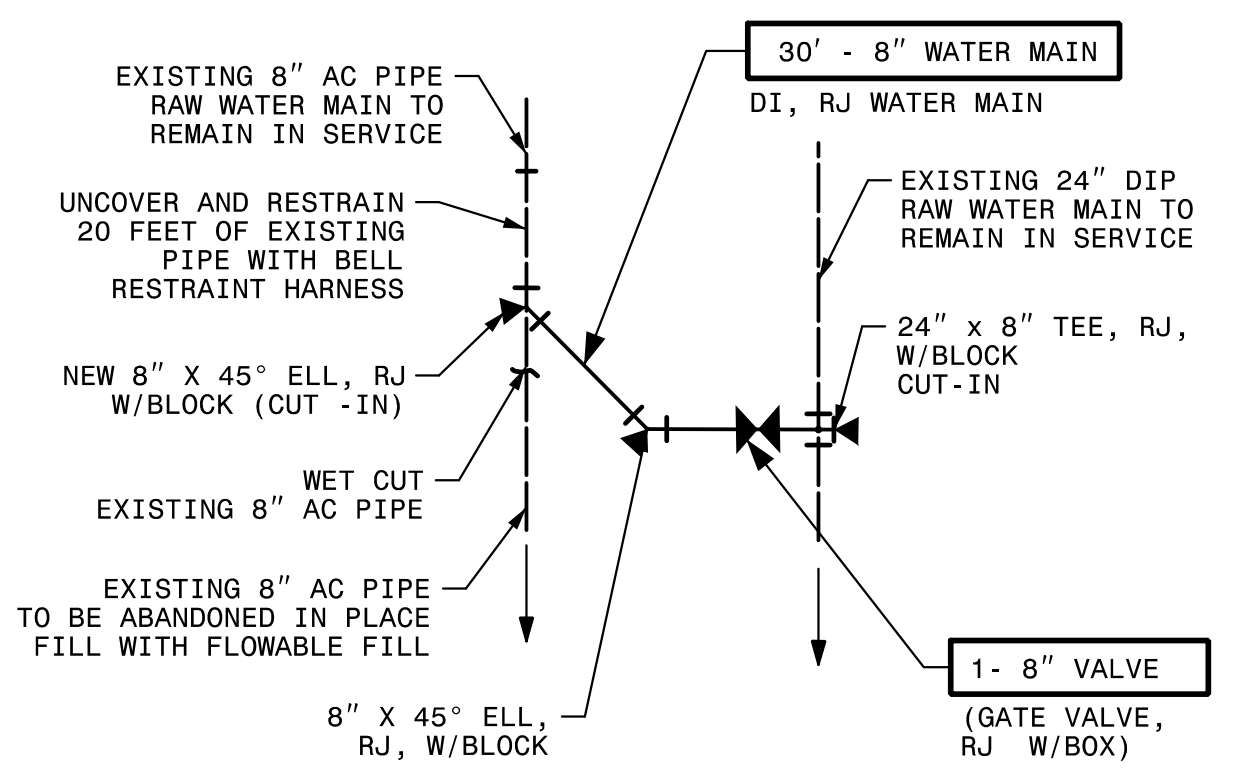
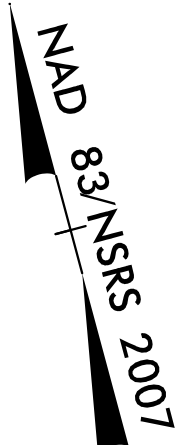
MATCH LINE -L- STA 227 + 00.00
SEE SHEET UC-16

MATCH LINE -L- STA 241 + 00.00
SEE SHEET UC-18

NAD 83 NSRS 2007

NOTES

1. SEE SHEET UC-48 FOR PROFILE OF NEW POTABLE WATER MAINS.



DETAIL D (FROM SHEET UC-17)
8" RAW WATER MAIN CONNECTION
NTS

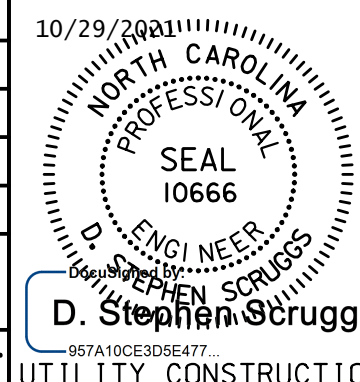
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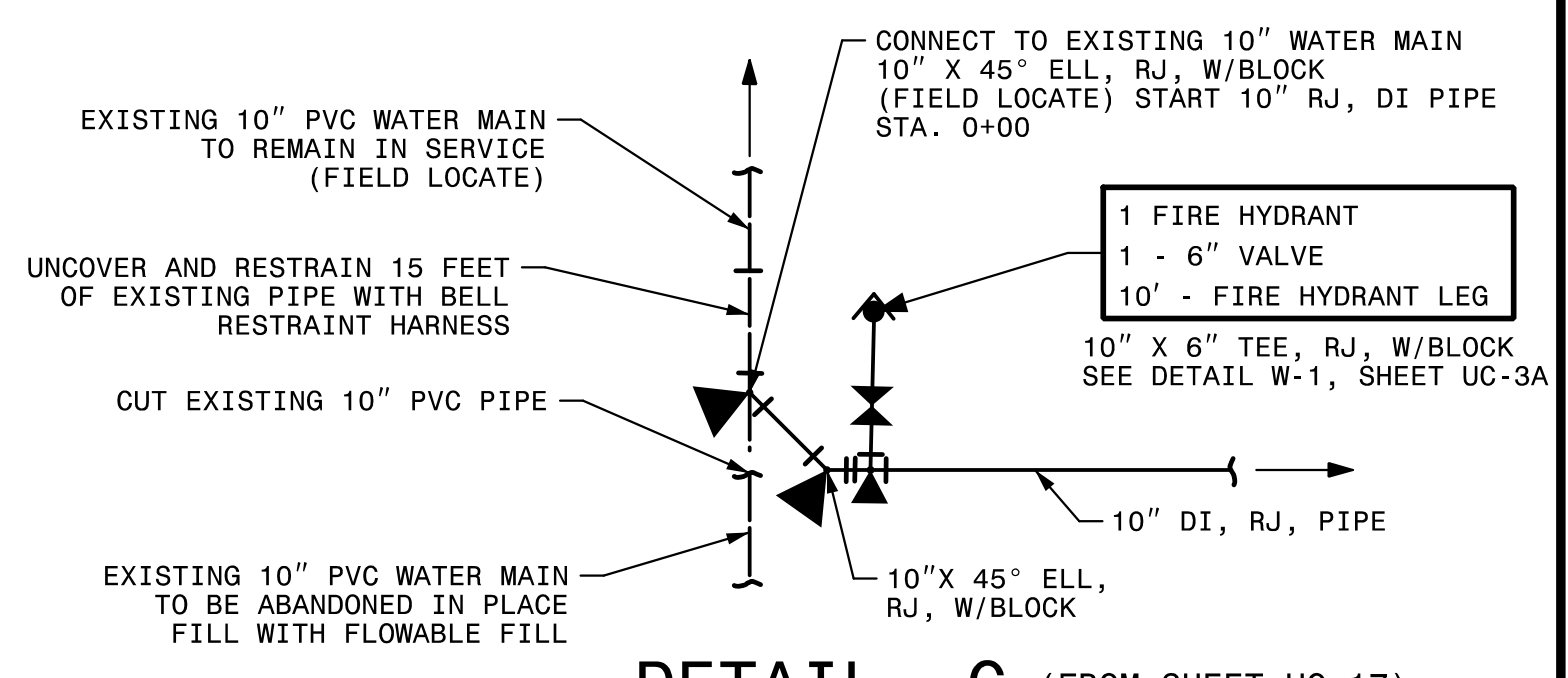
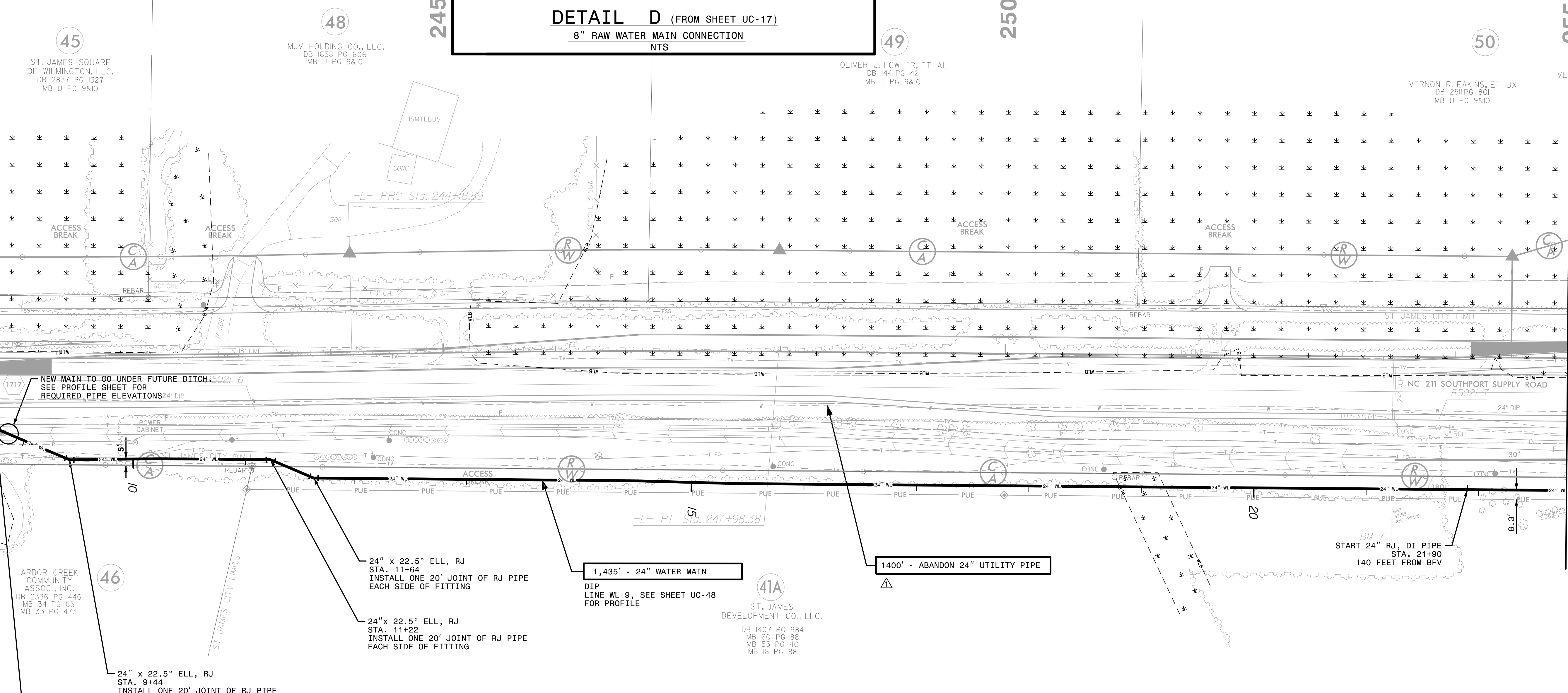
PROJECT REFERENCE NO.	SHEET NO.
R-5021	UC-18
DESIGNED BY:	10/29/2021
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
REVISED:	
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UTILITY CONSTRUCTION

MATCH LINE -L- STA 241+00.00
SEE SHEET UC-17

MATCH LINE -L- STA 255+00.00
SEE SHEET UC-19



DETAIL C (FROM SHEET UC-17)
10" POTABLE WATER CONNECTION
NTS

The estimated quantity of Ductile Iron Water Pipe Fittings on this plan sheet is 4,840 pounds. The actual quantity and type of fittings will vary based on field conditions.

REMOVED NOTE BELOW PAY ITEM FOR ABANDON UTILITY PIPE PER ADDENDUM NO. 1

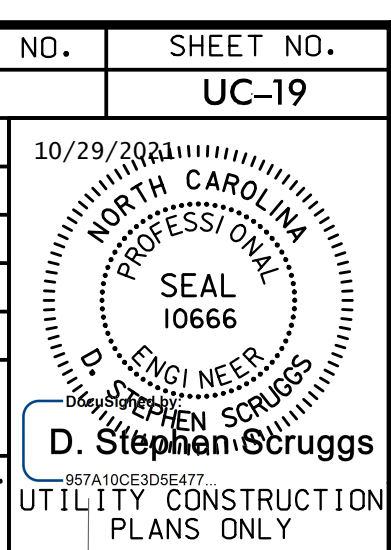
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PROJECT REFERENCE NO.	SHEET NO.
R-5021	UC-19
DESIGNED BY:	10/29/2021
DRAWN BY:	
CHECKED BY:	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	

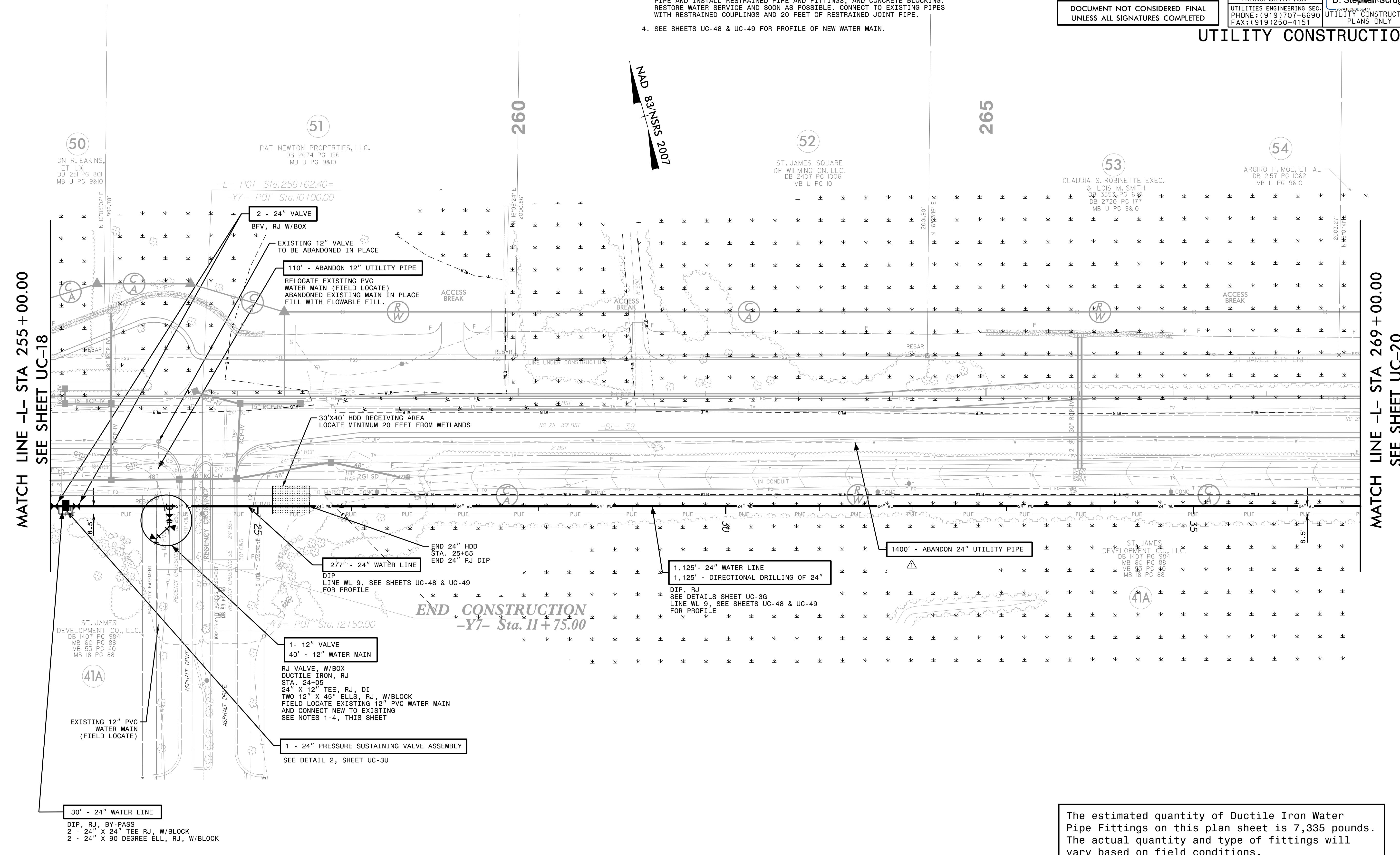


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UTILITY CONSTRUCTION

NOTES

1. INSTALL NEW 24 INCH WATER MAIN UNDER EXISTING 12 INCH WATER MAIN IN ORDER TO KEEP THE 12 INCH WATER MAIN IN SERVICE UNTIL THE RECONNECTIONS CAN BE MADE.
2. KEEP INTERIORS OF NEW PIPES AND FITTINGS CLEAN OF DIRT. SWAB INTERIORS OF PIPES AND FITTINGS WITH 200 PARTS PER MILLION OF CHLORINE SOLUTION.
3. FIELD LOCATE EXISTING CUT-OFF VALVES AND SHUT OFF WATER. FIELD VERIFY LOCATION, SIZE AND MATERIAL OF EXISTING WATER MAIN. SAW CUT EXISTING PIPE AND INSTALL RESTRAINED PIPE AND FITTINGS AND CONCRETE BLOCKING. RESTORE WATER SERVICE AND SOON AS POSSIBLE. CONNECT TO EXISTING PIPES WITH RESTRAINED COUPLINGS AND 20 FEET OF RESTRAINED JOINT PIPE.
4. SEE SHEETS UC-48 & UC-49 FOR PROFILE OF NEW WATER MAIN.



The estimated quantity of Ductile Iron Water Pipe Fittings on this plan sheet is 7,335 pounds. The actual quantity and type of fittings will vary based on field conditions.

△ REMOVED NOTE BELOW PAY ITEM FOR ABANDON UTILITY PIPE PER ADDENDUM NO. 1

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TIME: 2:35:38 PM
DGN: ZVoleigh-USFAL3\Legacy\Projects\60428203\900_MerA\915_Utility Construction\2021_REV\VISIONS\R-5021_UC_F5118.dgn