



# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

## UTILITIES PLAN SHEET SYMBOLS

### PROPOSED WATER SYMBOLS

Water Line (Sized as Shown)	
11 1/4 Degree Bend	
22 1/2 Degree Bend	
45 Degree Bend	
90 Degree Bend	
Plug	
Tee	
Cross	
Reducer	
Gate Valve	
Butterfly Valve	
Tapping Valve	
Line Stop	
Line Stop with Bypass	
Blow Off	
Fire Hydrant	
Relocate Fire Hydrant	
Remove Fire Hydrant	REM FH
Water Meter	
Relocate Water Meter	
Remove Water Meter	REM WM
Water Pump Station	
RPZ Backflow Preventer	
DCV Backflow Preventer	
Relocate RPZ Backflow Preventer	
Relocate DCV Backflow Preventer	

### PROPOSED SEWER SYMBOLS

Gravity Sewer Line (Sized as Shown)	
Force Main Sewer Line (Sized as Shown)	
Manhole (Sized per Note)	
Sewer Pump Station	

### PROPOSED MISCELLANEOUS UTILITIES SYMBOLS

Power Pole	
Telephone Pole	
Joint Use Pole	
Telephone Pedestal	
Utility Line by Others (Type as Shown)	
Trenchless Installation	
Encasement by Open Cut	
Encasement	

Thrust Block	
Air Release Valve	
Utility Vault	
Concrete Pier	
Steel Pier	
Plan Note	
Pay Item Note	

### EXISTING UTILITIES SYMBOLS

Power Pole		*Underground Power Line	
Telephone Pole		*Underground Telephone Cable	
Joint Use Pole		*Underground Telephone Conduit	
Utility Pole		*Underground Fiber Optics Telephone Cable	
Utility Pole with Base		*Underground TV Cable	
H-Frame Pole		*Underground Fiber Optics TV Cable	
Power Transmission Line Tower		*Underground Gas Pipeline	
Water Manhole		Aboveground Gas Pipeline	
Power Manhole		*Underground Water Line	
Telephone Manhole		Aboveground Water Line	
Sanitary Sewer Manhole		*Underground Gravity Sanitary Sewer Line	
Hand Hole for Cable		Aboveground Gravity Sanitary Sewer Line	
Power Transformer		*Underground SS Force Main Line	
Telephone Pedestal		Underground Unknown Utility Line	
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) \_\_\_\_\_  
 Designated Utility Line (Type as Shown) \_\_\_\_\_

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 REV: 2/1/2012

5/14/99

# UTILITY CONSTRUCTION NOTES

 <p>Stantec Consulting Services Inc. 801 Jones Franklin Road Suite 300 Raleigh, NC 27606 Tel. (919) 851-6866 Fax. (919) 851-7024 www.stantec.com License No. F-0672</p>	PROJECT REFERENCE NO.	SHEET NO.
	R-3300A	UC-3
	DESIGNED BY: TK	
	DRAWN BY: TK	
	CHECKED BY: LLP	
APPROVED BY:		
REVISED:	NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	
		UTILITY CONSTRUCTION PLANS ONLY

## UTILITY CONSTRUCTION

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

### 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 2024.
2. THE EXISTING WATER UTILITIES BELONG TO PENDER COUNTY UTILITIES. KATIE LEUBNER, (910) 663-3776, PENDER COUNTY UTILITY PROJECT MANAGER WILL SERVE AS THE UTILITY OWNER CONTACT.
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 AND 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 SECTION. PERFORM ALL WORK IN ACCORDANCE WITH THE APPLICABLE PLUMBING CODES.
4. THE UTILITY OWNER OWNS THE EXISTING 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 THE 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 OWNER'S 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 THE INVESTIGATIONS FOR DETERMINING THE EXACT LOCATION, SIZE, AND TYPE OF 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.

### STANDARD DETAIL DRAWINGS:

1. STANDARD DETAILS ARE PROVIDED FOR THE PROJECT. PENDER COUNTY STANDARD DETAILS ARE TO BE USED WHEN APPLICABLE. A COPY OF PENDER COUNTY'S STANDARD DETAILS ARE AVAILABLE ONLINE: <http://www.pendercountync.gov/>
2. IF NO STANDARD DETAILS ARE PROVIDED IN DRAWINGS OR BY PENDER COUNTY, THEN USE NCDOT STANDARD SPECIFICATIONS, DIVISION 15 STANDARD DETAILS FOR UTILITY CONSTRUCTION.

### PROJECT SPECIFIC NOTES:

1. A PRE-CONSTRUCTION MEETING IS REQUIRED BEFORE BEGINNING WORK. THE MEETING MUST BE SCHEDULED WITH PENDER COUNTY UTILITIES (PCU) AT LEAST ONE WEEK IN ADVANCE. ATTENDEES MUST INCLUDE PCU, THE UTILITY CONTRACTOR'S SUPERINTENDENT, THE SUPPLIER, NCDOT, AND THE CONSULTING ENGINEER.
2. ALL PIPE SHALL BE C900 DR18 PVC, UNLESS OTHERWISE NOTED. PIPE SHOULD NEVER BE UNDER THE ROADWAY, PARKING LOT, OR SIDEWALKS. SIZE-ON-SIZE TAPS SHALL NOT BE USED AND WILL NOT BE ACCEPTED FOR FINAL CERTIFICATION.
3. WATERLINE PIPE RESTRAINING METHOD IS MEGA LUGS. AT A MINIMUM ALL FITTINGS, VALVES, ETC. MUST BE RESTRAINED.
4. PCU MUST WITNESS PRESSURE TESTS, AND WITHDRAWAL OF BACTERIOLOGICAL SAMPLES. CONTACT PENDER COUNTY UTILITIES INSPECTOR TO SCHEDULE.
5. CLOSE-OUT DOCUMENTS WHICH MUST BE RECEIVED PRIOR TO PCU SIGNING THE NCDEQ PWSS APPLICANT CERTIFICATION INCLUDE: BACTERIOLOGICAL TESTS, PRESSURE TESTS, DEED OF DEDICATION, AND RECORDS DRAWINGS (PDF & GIO REFERENCED CAD).
6. FOR SECTIONS OF WATER PIPE TO BE INSTALLED BY HORIZONTAL DIRECTIONAL DRILLING, WATER LINE SHALL BE 8" HDPE, DIPS, DR9, 200 PSI. HDPE PIPE SHALL MEET THE REQUIREMENTS, AS DEFINED IN ASTM D-3350, WITH A MINIMUM CELL CLASSIFICATION OF PE 445574. THE MATERIAL SHALL BE TESTED AND APPROVED FOR POTABLE WATER IN ACCORDANCE WITH NSF/ANSI 61. MINIMUM PIPE WALL THICKNESS SHALL BE BASED ON A DR OF 9. CONTRACTOR AND PIPE MANUFACTURER SHALL MUTUALLY DETERMINE ACTUAL WALL THICKNESS REQUIRED, BASED ON STATIC AND DYNAMIC LOADS, WITH AN APPLIED FACTOR OF SAFETY OF 2.5.
7. THE CONTRACTOR SHALL USE EROSION CONTROL MEASURES, AS DIRECTED.
8. THE CONTRACTOR SHALL TEMPORARILY SUPPORT AND PROTECT ANY EXISTING UNDERGROUND UTILITIES ENCOUNTERED DURING TRENCH EXCAVATION AND/OR PIPE INSTALLATION.
9. WATER LINE INSTALLATION MAY NECESSITATE EXCAVATING AROUND AND BENEATH RELOCATED TELECOMMUNICATION LINES FOR WATER LINE RELOCATION.
10. IF THE PROPOSED WATER OR SEWER MAIN IS INSTALLED WITHIN 12" IN ANY DIRECTION (VERTICALLY OR HORIZONTALLY) OF A GAS MAIN THEN THE CONTRACTOR SHALL CALL GAS COMPANY AND INFORM THEM.
11. ALL NEW WATER LINES SHALL BE INSTALLED A MINIMUM OF 18" BELOW EXISTING AND PROPOSED STORM DRAINS AND STREAMS OR AS INDICATED ON DRAWINGS.
12. MINIMUM PIPE SEPARATION: 10 FEET HORIZONTAL SEPARATION OR 18" VERTICAL SEPARATION SHALL BE MAINTAINED BETWEEN WATER MAINS OVER SEWER MAINS. WHEN WATER MAINS ARE BELOW SEWER MAINS OR THE ABOVE MINIMUM SEPARATIONS CANNOT BE MAINTAINED, DUCTILE IRON PIPE SHALL BE USED FOR BOTH MAINS TO 10 FEET ON EITHER SIDE OF THE CROSSINGS, AND ALL ALONG THE LENGTH OF MAINS WHERE MINIMUM SEPARATION CANNOT BE MAINTAINED.
13. KATIE LEUBNER, UTILITY PROJECT MANAGER OF PENDER COUNTY UTILITIES, WILL SERVE AS THE UTILITY OWNER CONTACT ON THIS PROJECT. CONTRACTOR, AS REQUIRED BY STANDARD SPECIFICATION SECTION 1500-2, SHALL CONTACT KATIE LEUBNER AT (910) 663-3776.
14. EXISTING WATER VALVES ARE TO BE OPERATED BY PENDER COUNTY UTILITIES STAFF ONLY. PROVIDE A MINIMUM OF 3 BUSINESS DAYS NOTICE.
15. NO INTERRUPTION OF EXISTING WATER SERVICE SHALL BE MADE DURING CONSTRUCTION UNLESS AGREED UPON IN THE PRECONSTRUCTION MEETING.

### PROJECT SPECIFIC NOTES CONT'D:

16. NO INTERRUPTION TO EXISTING WATER OR SEWER SERVICE SHALL TAKE PLACE UNTIL ALL CUSTOMERS HAVE BEEN NOTIFIED A MINIMUM OF 48 HOURS IN ADVANCE. NOTICE OF INTERRUPTION SHALL BE PREPARED BY THE UTILITY OWNERS OFFICE ON OFFICIAL LETTERHEAD. DISTRIBUTION TO EACH CUSTOMER SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR UNDER THE DIRECTION OF THE UTILITY OWNER'S OFFICE.
17. ABSOLUTELY NO SHUTDOWNS OF EXISTING WATER SYSTEM SHALL OCCUR AT ANY TIME BETWEEN MEMORIAL DAY AND LABOR DAY IN ANY GIVEN YEAR.
18. MAXIMUM SHUTDOWN PERIOD FOR TIE-INS SHALL BE 6 HOURS BETWEEN 10 P.M. AND 4 A.M. DURING SHUTDOWN CONTRACTOR SHALL WORK CONTINUOUSLY UNTIL TIE-IN IS COMPLETE.
19. LAY PIPE STRAIGHT IN ALIGNMENT AND GRADIENT OR FOLLOW CURVES AS NEARLY AS POSSIBLE. DO NOT DEFLECT ANY JOINT MORE THAN THE MAXIMUM DEFLECTION RECOMMENDED BY THE MANUFACTURER.
20. JOINTS OF HDPE PIPE SEGMENTS SHALL BE BUTT-WELDED FLUSH TO THE OUTSIDE DIAMETER OF THE PIPE. PRIOR TO PERFORMING THE FINAL HYDROSTATIC TEST, THE ENDS OF THE PIPE SHALL BE PROVIDED WITH A DUCTILE IRON BLIND FLANGE, WITH A FLANGED CONNECTION TO THE HDPE PIPE. FLANGED JOINTS SHALL MEET THE REQUIREMENTS OF ANSI B16.1, CLASS 125.
21. TRACER WIRE MUST BE ATTACHED TO ALL NEWLY INSTALLED PIPE AS REQUIRED BY NC GENERAL STATUTES CHAPTER 87-121G. DO NOT USE STRANDED WIRE. CONTRACTOR WILL CONDUCT A CONTINUITY TEST ON ALL TRACER WIRE AFTER INSTALLATION. INSTALLATION MUST WITNESSED BY OWNER AND PROVIDE A REPORT TO UTILITY OWNER.
22. THE CONTRACTOR SHALL INSTALL THE HDPE PIPE BY HORIZONTALLY DRILLED, DIRECTIONALLY-CONTROLLED METHOD OF CONSTRUCTION WHERE INDICATED. PIPE SHALL BE FILLED WITH POTABLE WATER AND NOT BE CONNECTED TO ANY OTHER PIPE OR FITTINGS FOR ONE WEEK FROM TIME OF INSTALLATION.
23. THE CONTRACTOR SHALL EMPLOY EXPERIENCED PERSONNEL TO OPERATE THE DIRECTIONAL DRILLING EQUIPMENT AND THE POSITION MONITORING AND STEERING EQUIPMENT. THE CONTRACTOR SHALL USE CERTIFIED FUSING PERSONNEL APPROVED BY THE PIPE MANUFACTURER.
24. THE CONTRACTOR SHALL AT ALL TIMES, PROVIDE AND MAINTAIN INSTRUMENTATION THAT WILL ACCURATELY LOCATE THE PILOT HOLE POSITION IN THE X, Y, AND Z AXES RELATIVE TO THE GROUND SURFACE. DRILL FLUID FLOWRATE AND PRESSURE SHALL ALSO BE MONITORED. THE CONTRACTOR SHALL MAINTAIN AND PROVIDE TO THE ENGINEER ACCESS TO THE DATA GENERATED BY THE DOWNHOLE SURVEY TOOLS.
25. THE CONTRACTOR SHALL HAVE ACCURATE WORKING GAUGES THAT REGISTER TENSILE FORCE BEING USED TO OULL THE PIPELINE BACK THROUGH THE REAMED BOREHOLE.
26. DEVIATIONS FROM, AND CORRECTIONS TO, THE DESIGN CENTERLINE SHALL NOT EXCEED 2% OF THE DEPTH PER 100 FEET AND 2% HORIZONTALLY PER 100 FEET. CONTRACTOR TO ENSURE NEWLY CONSTRUCTED UTILITIES ARE ENTIRELY WITHIN RIGHT-OF-WAY OR UTILITY EASEMENT.
27. THE HORIZONTAL DIRECTIONAL DRILLING OPERATION SHALL BE CONDUCTED IN A MANNER TO ELIMINATE THE DISCHARGE OF WATER, DRILLING MUD, AND CUTTINGS TO AREAS NOT INVOLVED IN THE CONSTRUCTION PROCESS. THE CONTRACTOR SHALL IMMEDIATELY CONTAIN AND CLEAN UP ANY INADVERTENT RETURNS. THE CONTRACTOR SHALL ALSO PROVIDE EQUIPMENT AND PROCEDURES TO MAXIMIZE THE RECIRCULATION OR REUSE OF DRILLING MUD TO MINIMIZE WASTE DISPOSAL.

### PROJECT SPECIFIC NOTES CONT'D:

28. FOR SECTIONS INSTALLED BY HORIZONTAL DIRECTIONAL DRILLING, NEWLY INSTALLED PIPE SHALL BE PRESSURE TESTED SUCCESSFULLY FOR MINIMUM 24 HOURS PRIOR TO ACCEPTANCE.
29. AFTER INSTALLING VIA DIRECTIONAL DRILL AND TESTING, CONTRACTOR TO DIG DOWN, CUT PIPE AND INSTALL FITTINGS REQUIRED TO COMPLETE CONNECTION.
30. CONTRACTOR SHALL ADHERE TO SECTION 1530 "ABANDON OR REMOVE UTILITIES" FOR ABANDONMENT OF EXISTING UTILITY PIPES.
31. WHEN ABANDONING VALVES, CLOSE THE VALVE BEFORE REMOVING THE VALVE BOX.
32. REMOVED FIRE HYDRANT SHALL BE TURNED OVER TO PENDER COUNTY.

### WATER LINE TYPICAL SEQUENCE OF CONSTRUCTION:

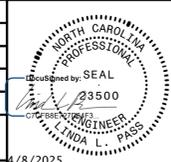
1. INSTALL NEW WATER LINE(S) ALONG ALIGNMENT TO A POINT SHORT OF TIE-INS.
2. SUCCESSFULLY PRESSURE TEST AND CHLORINATE NEW WATER LINES. CHLORINATED WATER WILL BE TREATED PRIOR TO RELEASE INTO ENVIRONMENT.
3. PROVIDE RESULTS OF ALL TESTS TO PENDER COUNTY AND NCDOT. TIE-INS TO EXISTING WATER SYSTEM TO BE PERFORMED WITHIN 5 BUSINESS DAYS OF SUCCESSFUL BACTERIOLOGICAL TEST.
4. CONTACT PENDER COUNTY MINIMUM OF 3 BUSINESS DAYS IN ADVANCE OF SHUTTING DOWN EXISTING WATER LINES FOR SCHEDULING TIE-INS.
5. UPON APPROVAL BY PENDER COUNTY, TAKE EXISTING WATER LINE OUT OF SERVICE USING EXISTING VALVES AND PROPOSED LINE STOPS AND CONNECT NEW WATER LINES.
6. OBSERVE CONNECTION PIPING FOR SIGNS OF VISIBLE LEAKAGE AND CORRECT IMMEDIATELY.
7. PLACE NEW WATER LINE(S) INTO OPERATION.
8. SEQUENCE SHALL BE UTILIZED FOR EACH WATER LINE SEGMENT.

4/28/2025  
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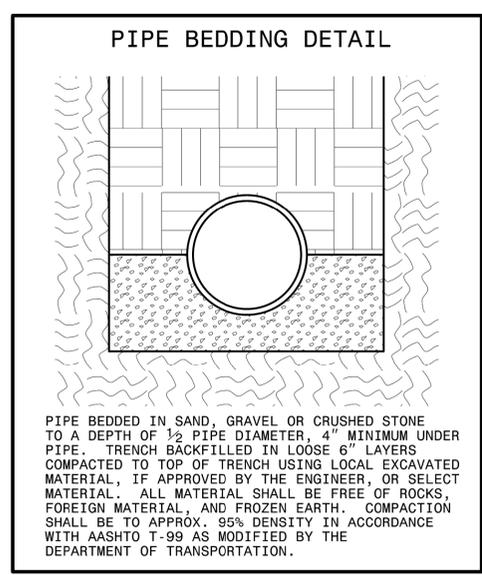
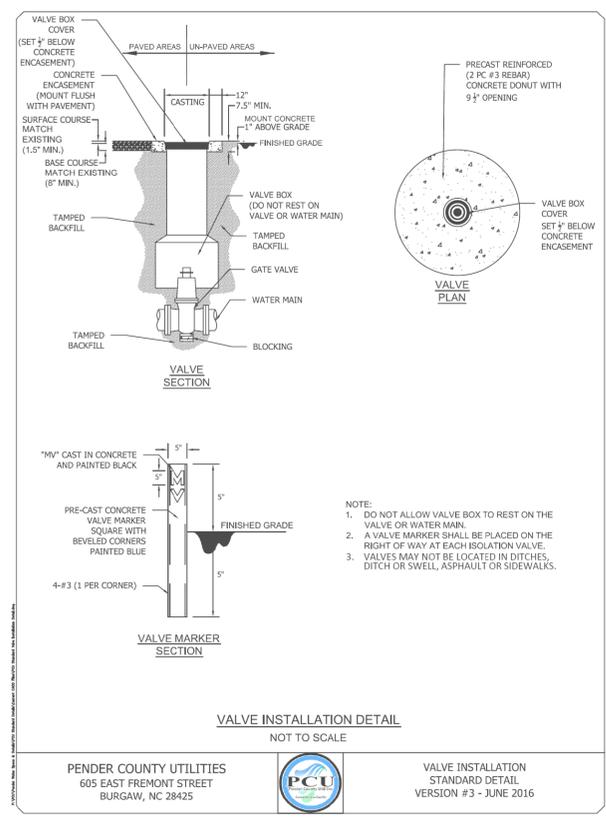
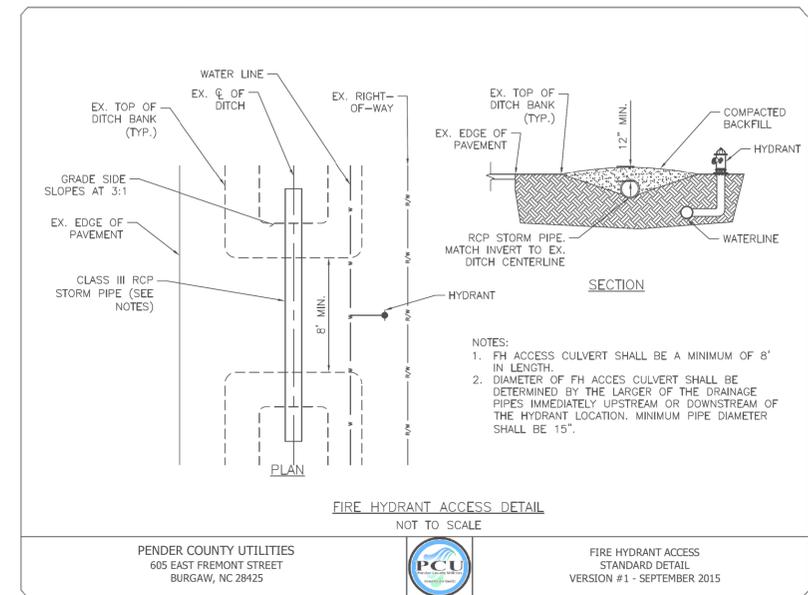
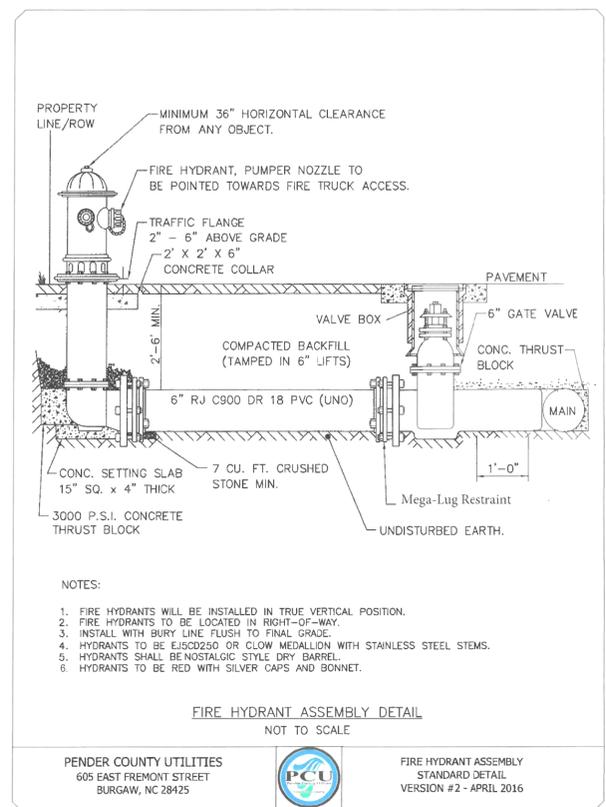
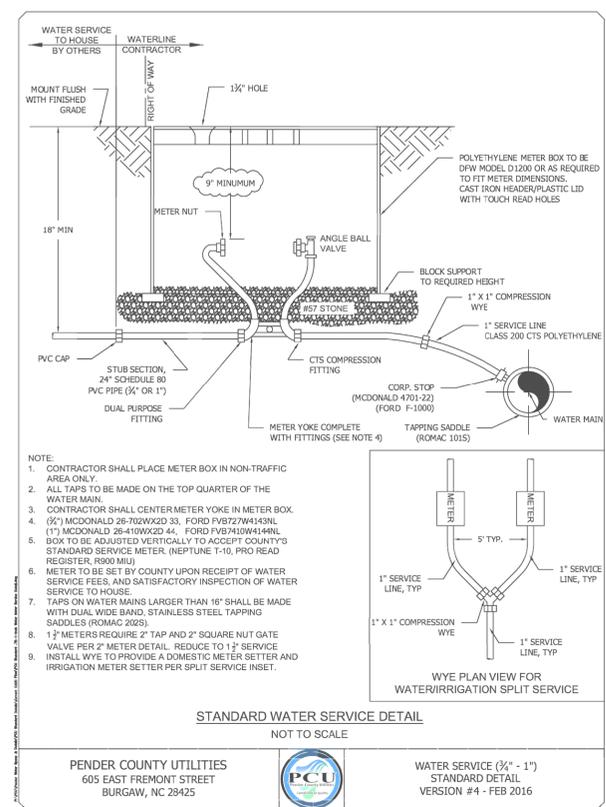
# PROJECT TYPICAL DETAILS



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PROJECT REFERENCE NO. <b>R-3300A</b>	SHEET NO. <b>UC-3A</b>
DESIGNED BY: <b>TK</b>	
DRAWN BY: <b>TK</b>	
CHECKED BY: <b>LLP</b>	
APPROVED BY:	
REVISED:	4/8/2025
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151 UTILITY CONSTRUCTION PLANS ONLY	

**UTILITY CONSTRUCTION**  
DOCUMENT NOT CONSIDERED FINAL  
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MAXIMUM TRENCH WIDTH AT TOP OF PIPE			
NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)	NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)
4	28	20	44
6	30	24	48
8	32	30	54
10	34	36	60
12	36	42	66
14	38	48	72
16	40	54	78
18	42		

# PROJECT TYPICAL DETAILS

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PROJECT REFERENCE NO.	R-3300A	SHEET NO.	UC-3B
DESIGNED BY:	TK		
DRAWN BY:	TK		
CHECKED BY:	LLP		
APPROVED BY:			
REVISED:		5/1/2025	UTILITY CONSTRUCTION PLANS ONLY
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**UTILITY CONSTRUCTION**  
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PIPE DIAMETER (INCHES)	D. I. P.				P. V. C.			
	90°	45°	22 1/2°	11 1/4°	90°	45°	22 1/2°	11 1/4°
3"	30"	18"	10"	8"	40"	20"	10"	8"
4"	30"	18"	10"	8"	38"	20"	10"	8"
6"	30"	18"	10"	8"	30"	20"	10"	8"
8"	30"	18"	10"	8"	30"	20"	10"	8"
10"	30"	18"	10"	8"	30"	20"	10"	8"
12"	30"	18"	10"	8"	30"	20"	10"	8"
14"	30"	18"	10"	8"	30"	20"	10"	8"
16"	30"	18"	10"	8"	30"	20"	10"	8"
18"	30"	18"	10"	8"	30"	20"	10"	8"
20"	30"	18"	10"	8"	30"	20"	10"	8"
24"	30"	18"	10"	8"	30"	20"	10"	8"
30"	30"	18"	10"	8"	30"	20"	10"	8"
36"	30"	18"	10"	8"	30"	20"	10"	8"
42"	30"	18"	10"	8"	30"	20"	10"	8"
48"	30"	18"	10"	8"	30"	20"	10"	8"

Restrained lengths for valves, dead ends and branches from tees shall be the same as for 90° (degree) bends

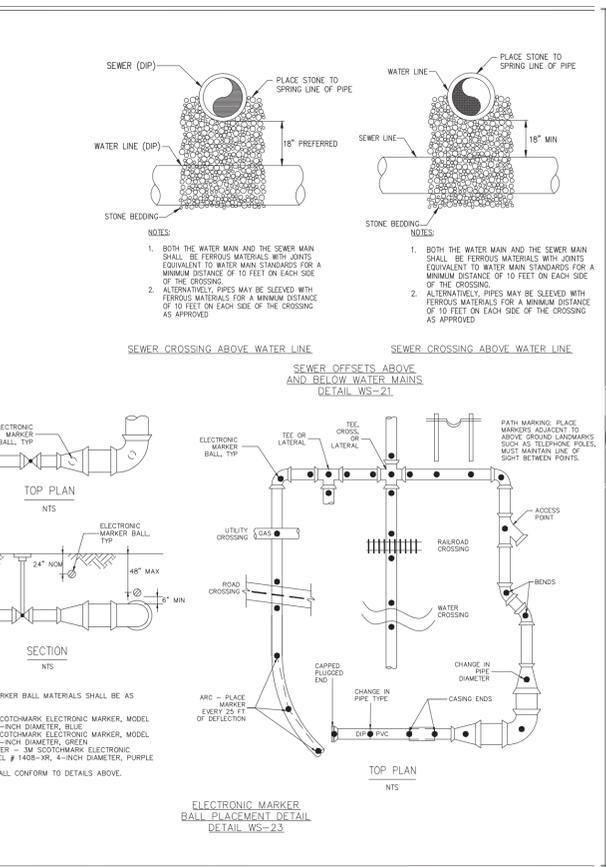
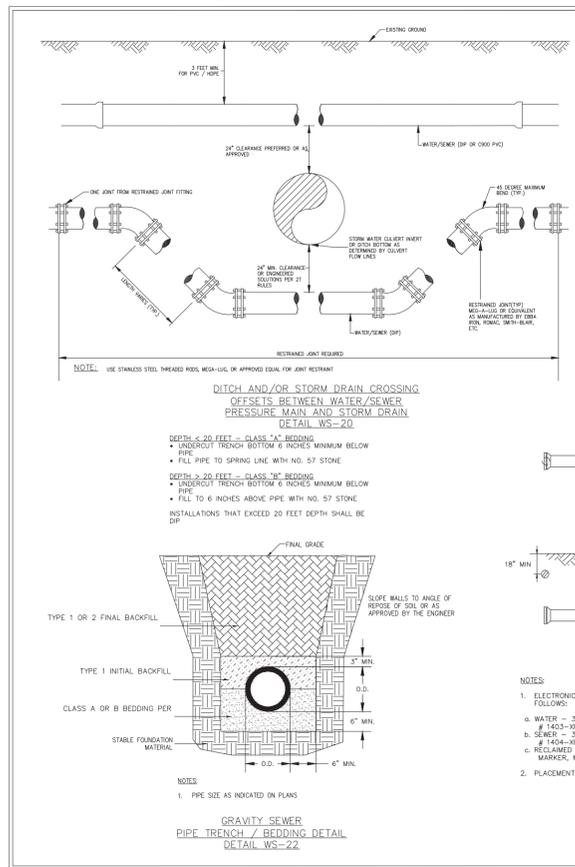
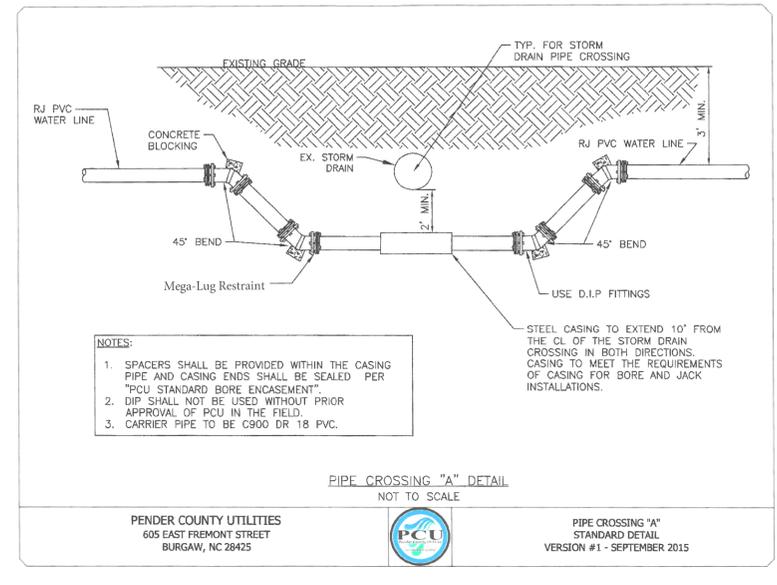
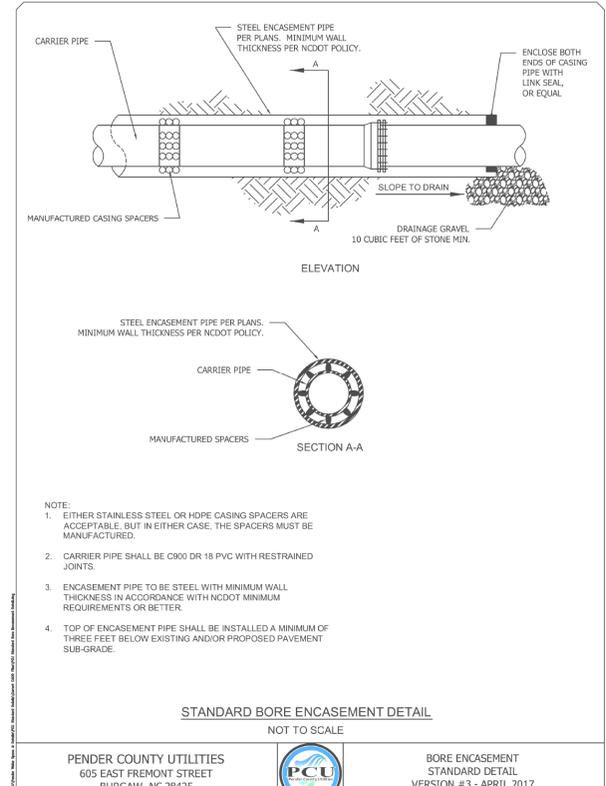
PIPE DIAMETER (INCHES)	3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
3"	0	0	0	0	0	0	0	0	0	0
4"	0	0	0	0	0	0	0	0	0	0
6"	0	0	0	0	0	0	0	0	0	0
8"	0	0	0	0	0	0	0	0	0	0
10"	0	0	0	0	0	0	0	0	0	0
12"	0	0	0	0	0	0	0	0	0	0
16"	0	0	0	0	0	0	0	0	0	0
20"	0	0	0	0	0	0	0	0	0	0
24"	0	0	0	0	0	0	0	0	0	0
30"	0	0	0	0	0	0	0	0	0	0
36"	0	0	0	0	0	0	0	0	0	0
42"	0	0	0	0	0	0	0	0	0	0
48"	0	0	0	0	0	0	0	0	0	0

Length of restrained joint for larger diameter pipe

NOTES:  
 1. PENDER COUNTY STANDARD RESTRAINT METHOD IS MEGA LUGS, UNLESS SPECIFICALLY APPROVED BY PCU IN WRITING.  
 2. ALL FITTINGS AND JOINTS SHALL BE RESTRAINED JOINT.  
 3. "L" ABOVE IS GIVEN IN FEET FROM FITTING JOINT.

PENDER COUNTY UTILITIES  
 605 E FREMONT STREET  
 PO BOX 995, BURGAW, NC 28425

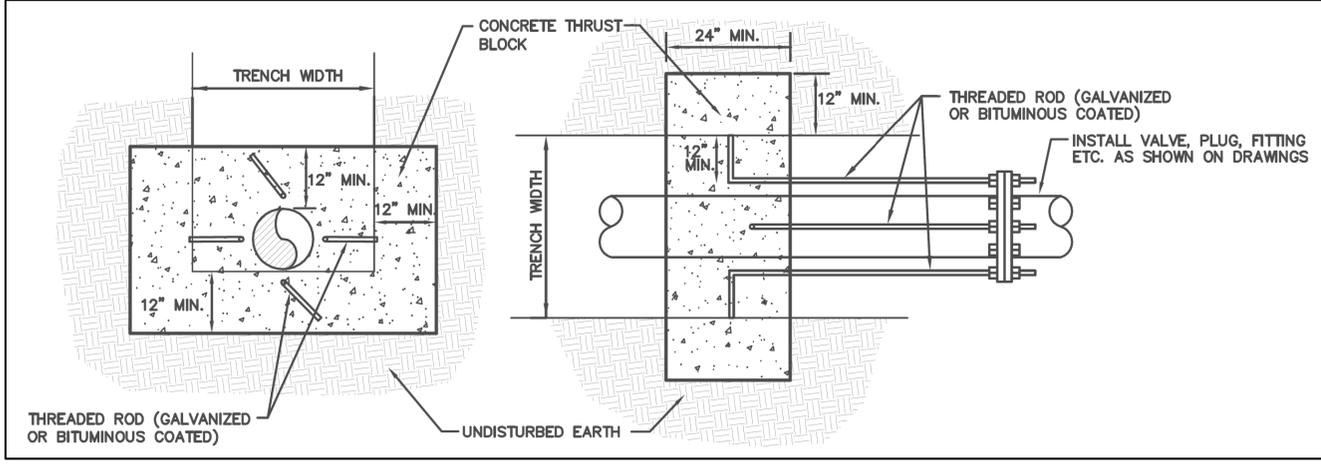
RESTRAINED JOINT TABLE  
 STANDARD DETAIL  
 VERSION #2 – OCTOBER 2023



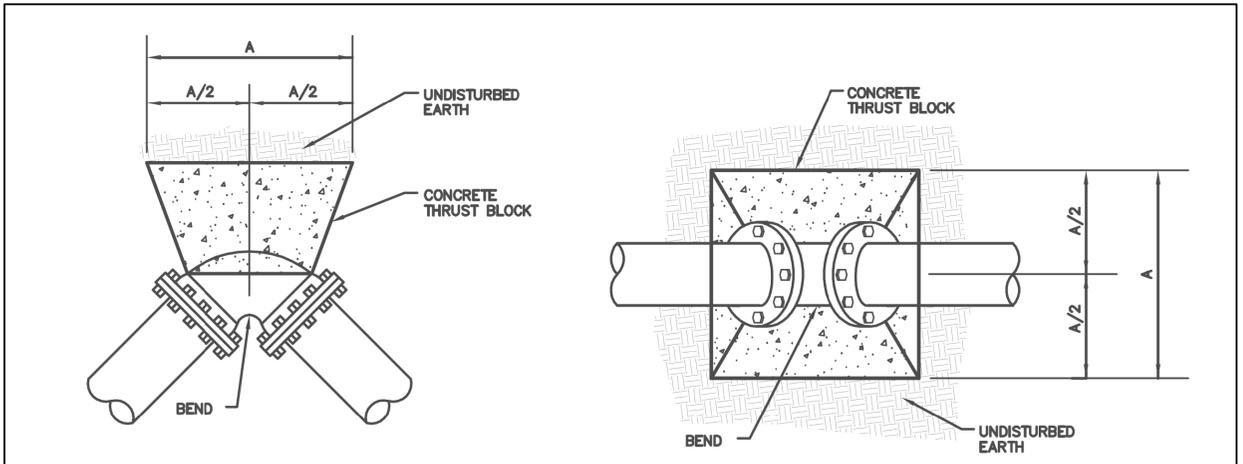
GENERAL WATER & SEWER DETAIL  
 VERSION # 1 - APRIL 2024

PENDER COUNTY UTILITIES  
 605 EAST FREMONT STREET  
 BURGAW, NC 28425

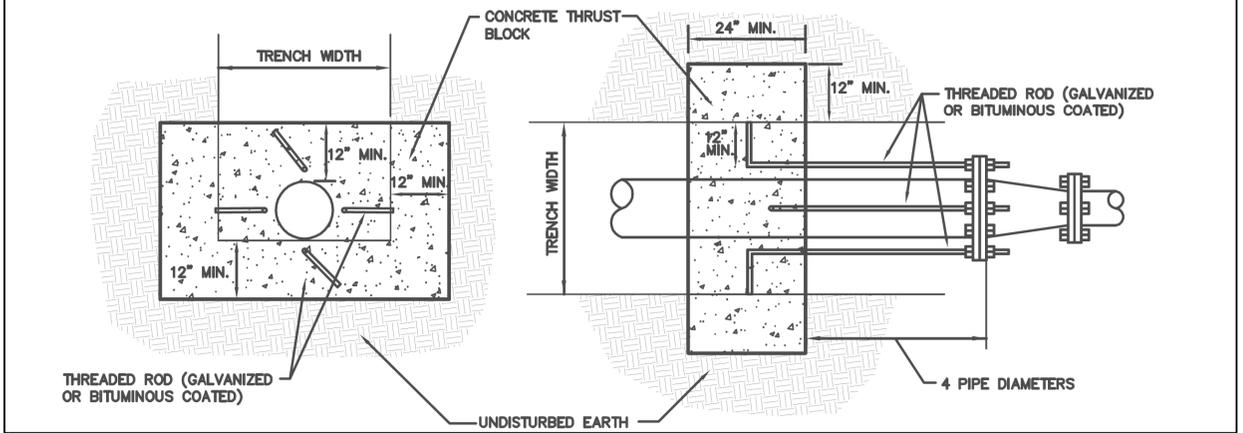
# TYPICAL THRUST BLOCK DETAILS



TYPICAL DEADMAN THRUST BLOCK



TYPICAL THRUST BLOCKS FOR BENDS



TYPICAL THRUST BLOCK FOR REDUCER

## THRUST BLOCK NOTES:

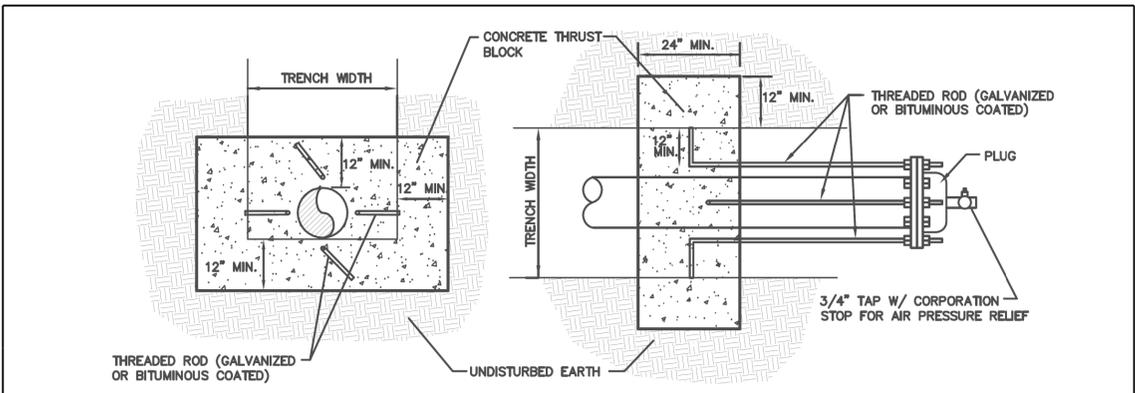
1. FITTING JOINTS SHALL NOT BE POURED IN CONCRETE OR HAVE CONCRETE SPILLED ON THE BOLTS OR NUTS. THE FITTING SHALL BE WRAPPED IN A LAYER OF POLYETHYLENE PLASTIC PRIOR TO POURING THE THRUST BLOCK.
2. ROD AND EYE BOLT DIAMETER SHALL BE MINIMUM OF 3/4" AND SHALL MATCH THE SIZE OF THE BOLT PROVIDED WITH THE FITTING.
3. CONTRACTOR SHALL REPLACE FITTING BOLTS WITH THREADED ROD FOR 1/2 OF THE BOLTS SUPPLIED WITH EACH FITTING. RODS SHALL BE EQUALLY SPACED.

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 Tel. (919) 851-6866  
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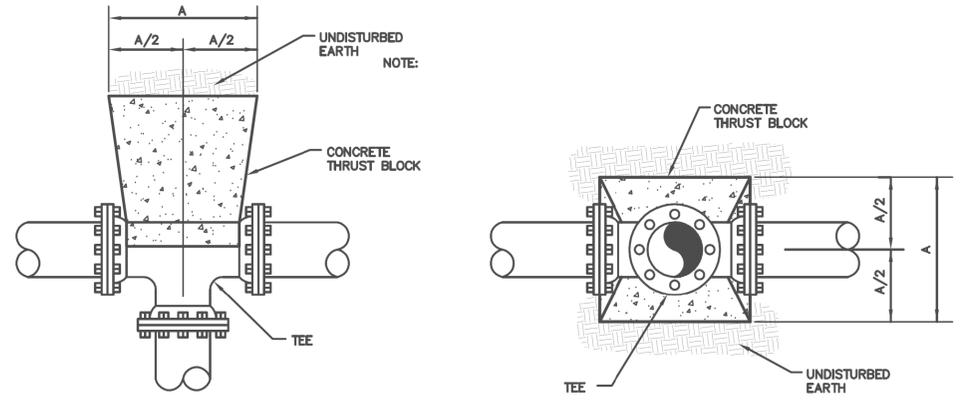
PROJECT REFERENCE NO.	SHEET NO.
R-3300A	UC-3C
DESIGNED BY: TK	
DRAWN BY: TK	
CHECKED BY: LLP	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	4/8/2025
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	UTILITY CONSTRUCTION PLANS ONLY

## UTILITY CONSTRUCTION

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**



TYPICAL THRUST BLOCK FOR PLUGS



TYPICAL THRUST BLOCK DETAILS

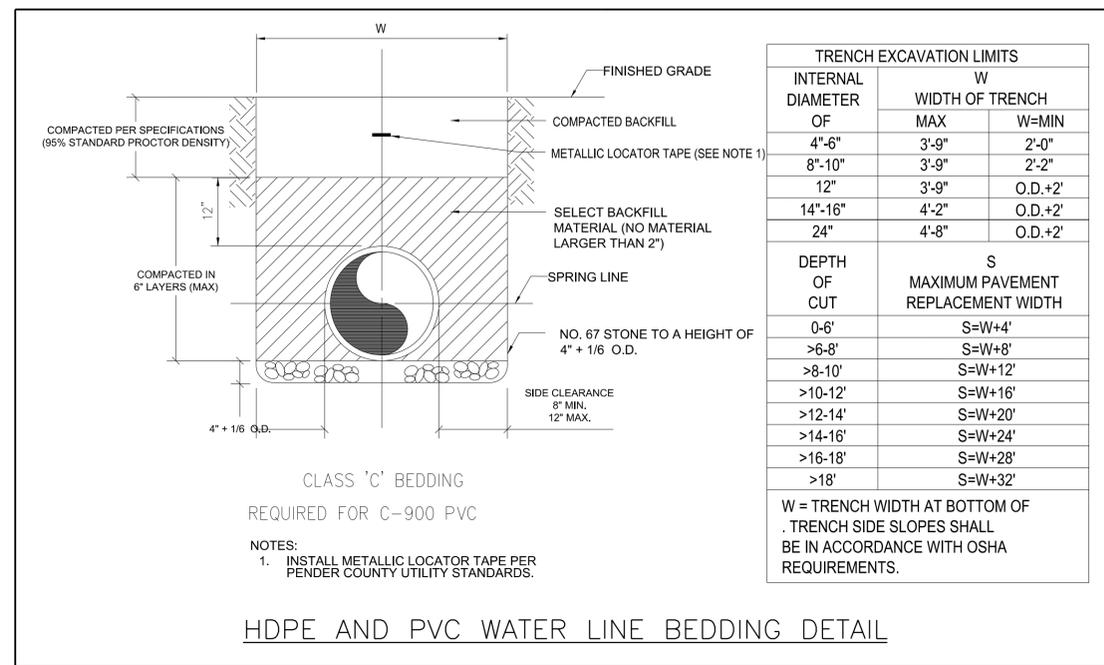
SIZE	TYPE					
	11-1/4" BEND	22-1/2" BEND	45° BEND	90° BEND	TEE	PLUG
2-6	12	12	12	16	16	14
8	12	12	16	22	22	18
10	12	14	20	28	28	22
12	12	18	24	32	32	28
14	14	20	28	38	38	32
16	16	22	32	42	42	36
18	18	26	36	48	48	40
20	20	28	40	52	52	44
24	24	34	46	64	64	54
30	30	42	58	78	78	66
36	36	50	70	94	94	80
42	40	58	80	108	108	92
48	46	66	90	124	124	104

THRUST BLOCK DIMENSION "A"

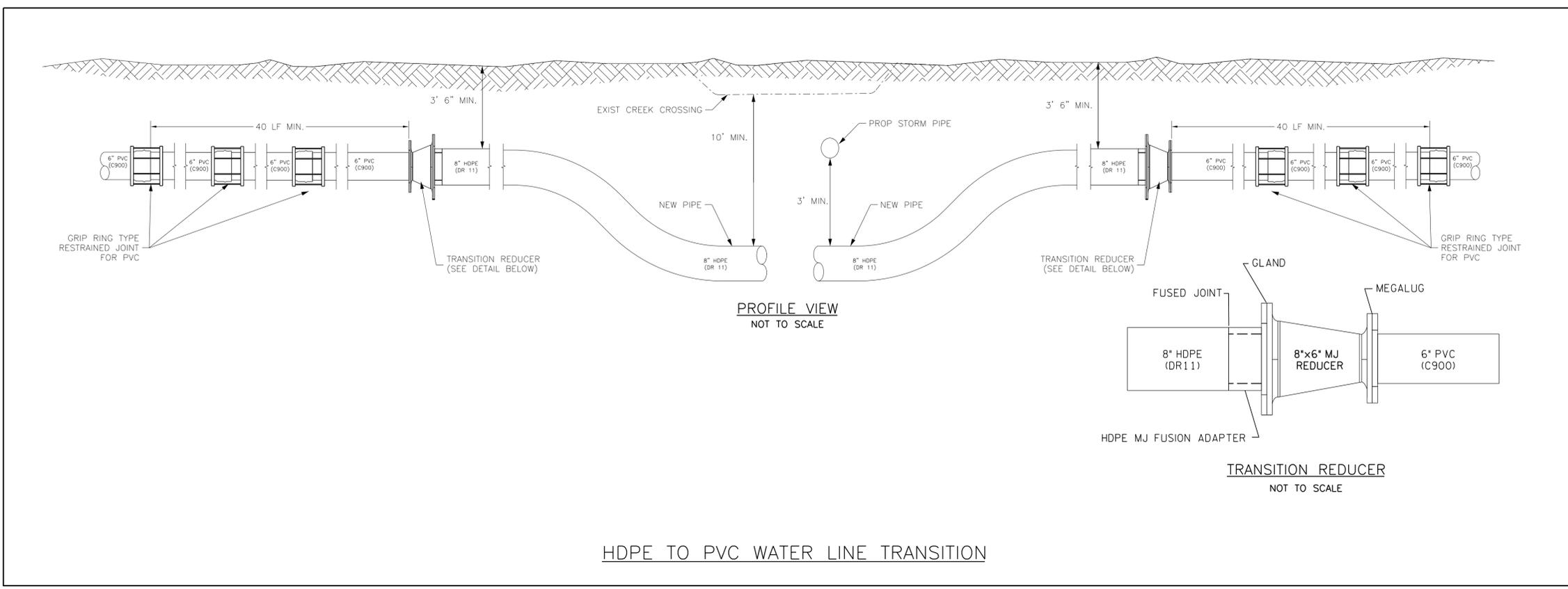
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PROJECT REFERENCE NO. <b>R-3300A</b>	SHEET NO. <b>UC-3D</b>
DESIGNED BY: <b>TK</b>	
DRAWN BY: <b>TK</b>	
CHECKED BY: <b>LLP</b>	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	
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# PROJECT TYPICAL DETAILS



**UTILITY CONSTRUCTION**  
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5/14/99

NOTES:

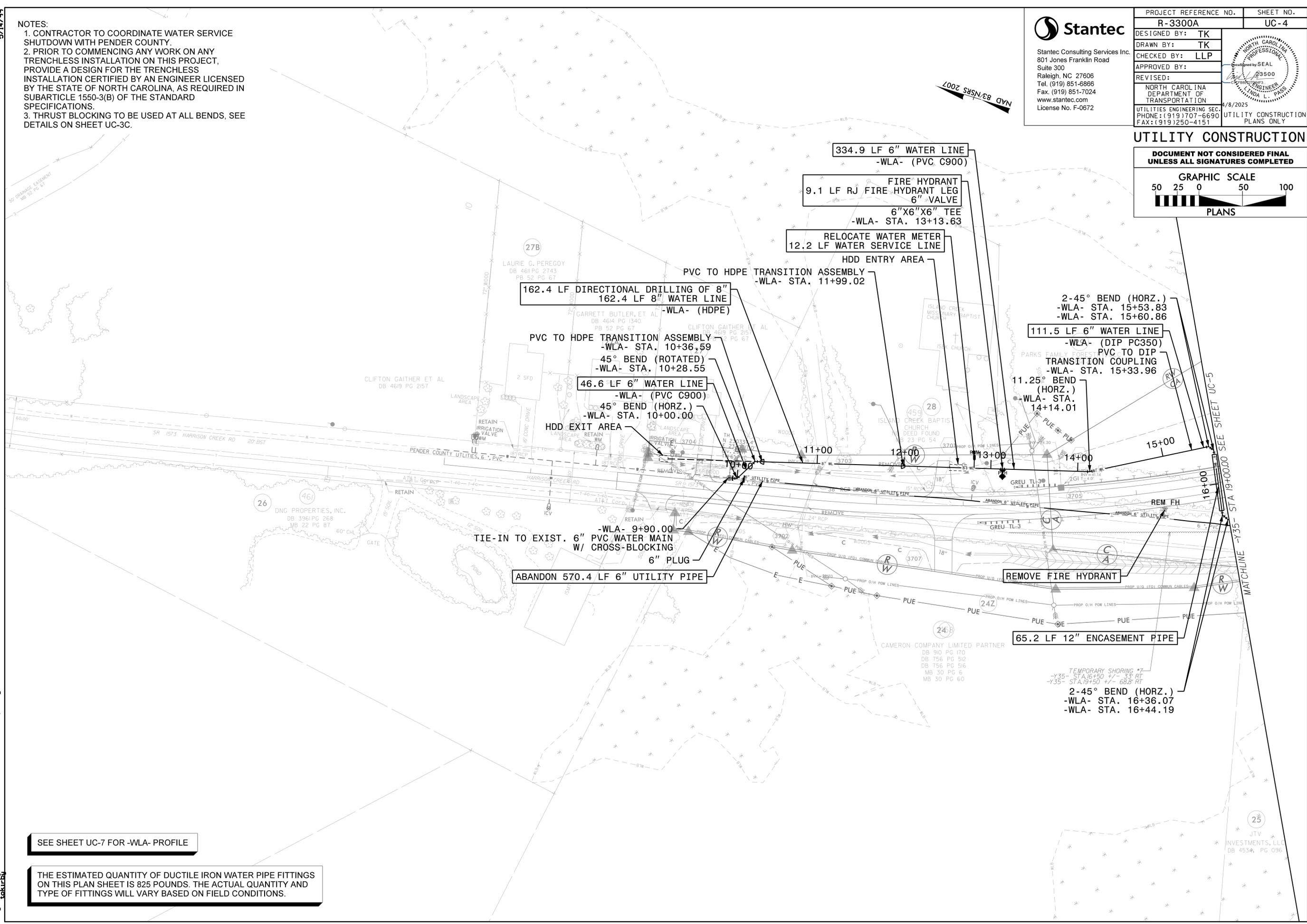
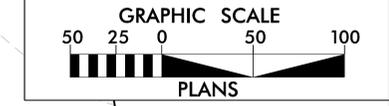
1. CONTRACTOR TO COORDINATE WATER SERVICE SHUTDOWN WITH PENDER COUNTY.
2. PRIOR TO COMMENCING ANY WORK ON ANY TRENCHLESS INSTALLATION ON THIS PROJECT, PROVIDE A DESIGN FOR THE TRENCHLESS INSTALLATION CERTIFIED BY AN ENGINEER LICENSED BY THE STATE OF NORTH CAROLINA, AS REQUIRED IN SUBARTICLE 1550-3(B) OF THE STANDARD SPECIFICATIONS.
3. THRUST BLOCKING TO BE USED AT ALL BENDS, SEE DETAILS ON SHEET UC-3C.

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PROJECT REFERENCE NO. <b>R-3300A</b>	SHEET NO. <b>UC-4</b>
DESIGNED BY: TK	
DRAWN BY: TK	
CHECKED BY: LLP	
APPROVED BY:	
REVISID:	4/8/2025
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	
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UTILITY CONSTRUCTION

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SEE SHEET UC-7 FOR -WLA- PROFILE

THE ESTIMATED QUANTITY OF DUCTILE IRON WATER PIPE FITTINGS ON THIS PLAN SHEET IS 825 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS.

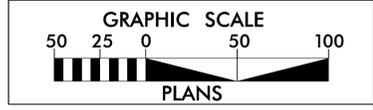
Engineering\U\2025\Revisions\2025\Sheets\R-3300A-ut\_UC4\_psh.dgn

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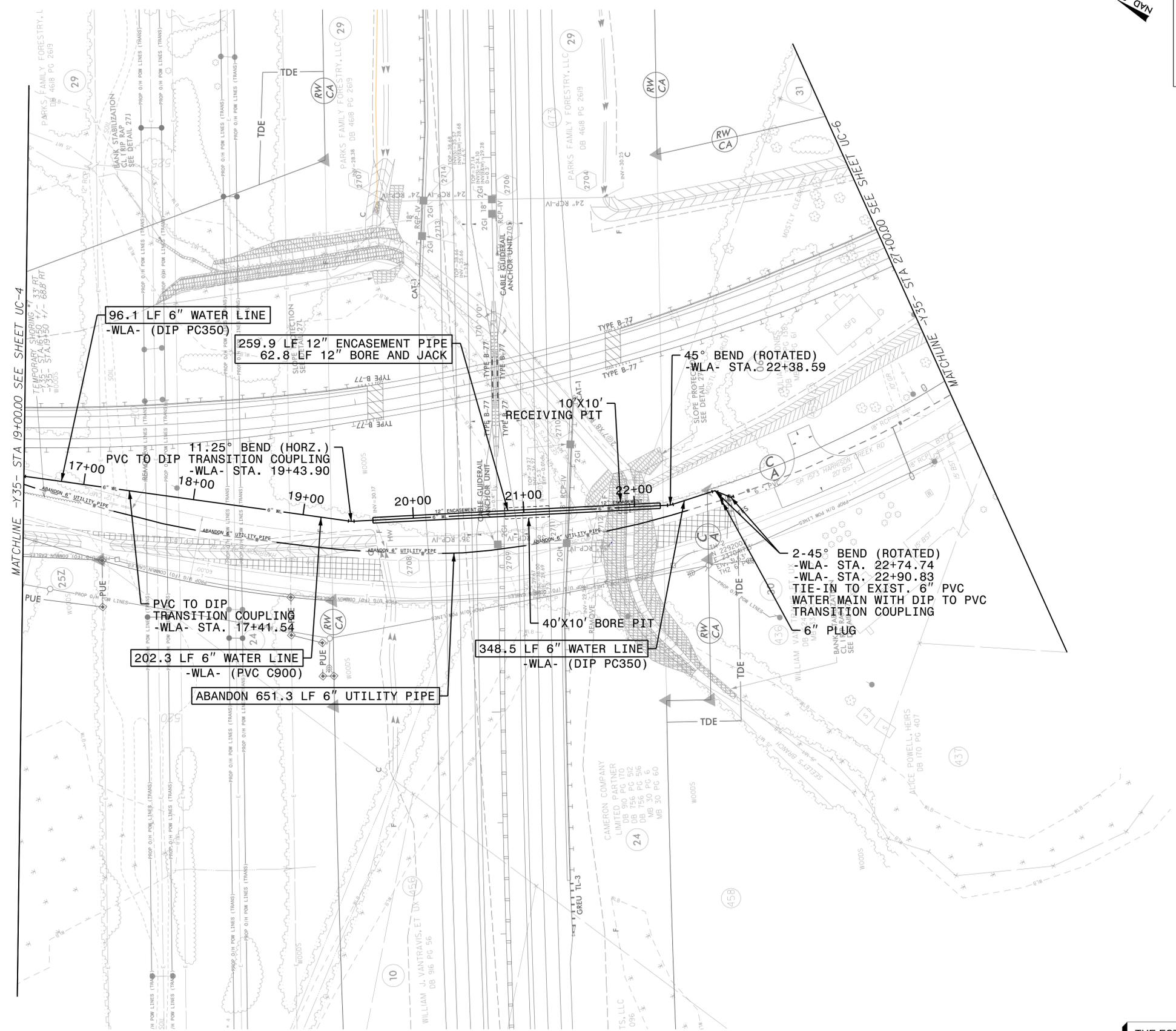
PROJECT REFERENCE NO.	R-3300A	SHEET NO.	UC-5
DESIGNED BY:	TK		
DRAWN BY:	TK		
CHECKED BY:	LLP		
APPROVED BY:			
REVISED:		DATE	4/8/2025
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION		UTILITY CONSTRUCTION PLANS ONLY	

**UTILITY CONSTRUCTION**

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**



- NOTES:
1. CONTRACTOR TO COORDINATE WATER SERVICE SHUTDOWN WITH PENDER COUNTY.
  2. PRIOR TO COMMENCING ANY WORK ON ANY TRENCHLESS INSTALLATION ON THIS PROJECT, PROVIDE A DESIGN FOR THE TRENCHLESS INSTALLATION CERTIFIED BY AN ENGINEER LICENSED BY THE STATE OF NORTH CAROLINA, AS REQUIRED IN SUBARTICLE 1550-3(B) OF THE STANDARD SPECIFICATIONS.
  3. THRUST BLOCKING TO BE USED AT ALL BENDS, SEE DETAILS ON SHEET UC-3C.



Engineering Utility Revisions: 2025 Sheets R-3300A-ut\_UC5\_psh.dgn

SEE SHEET UC-7 FOR -WLA- PROFILE

THE ESTIMATED QUANTITY OF DUCTILE IRON WATER PIPE FITTINGS ON THIS PLAN SHEET IS 550 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS.

5/14/99

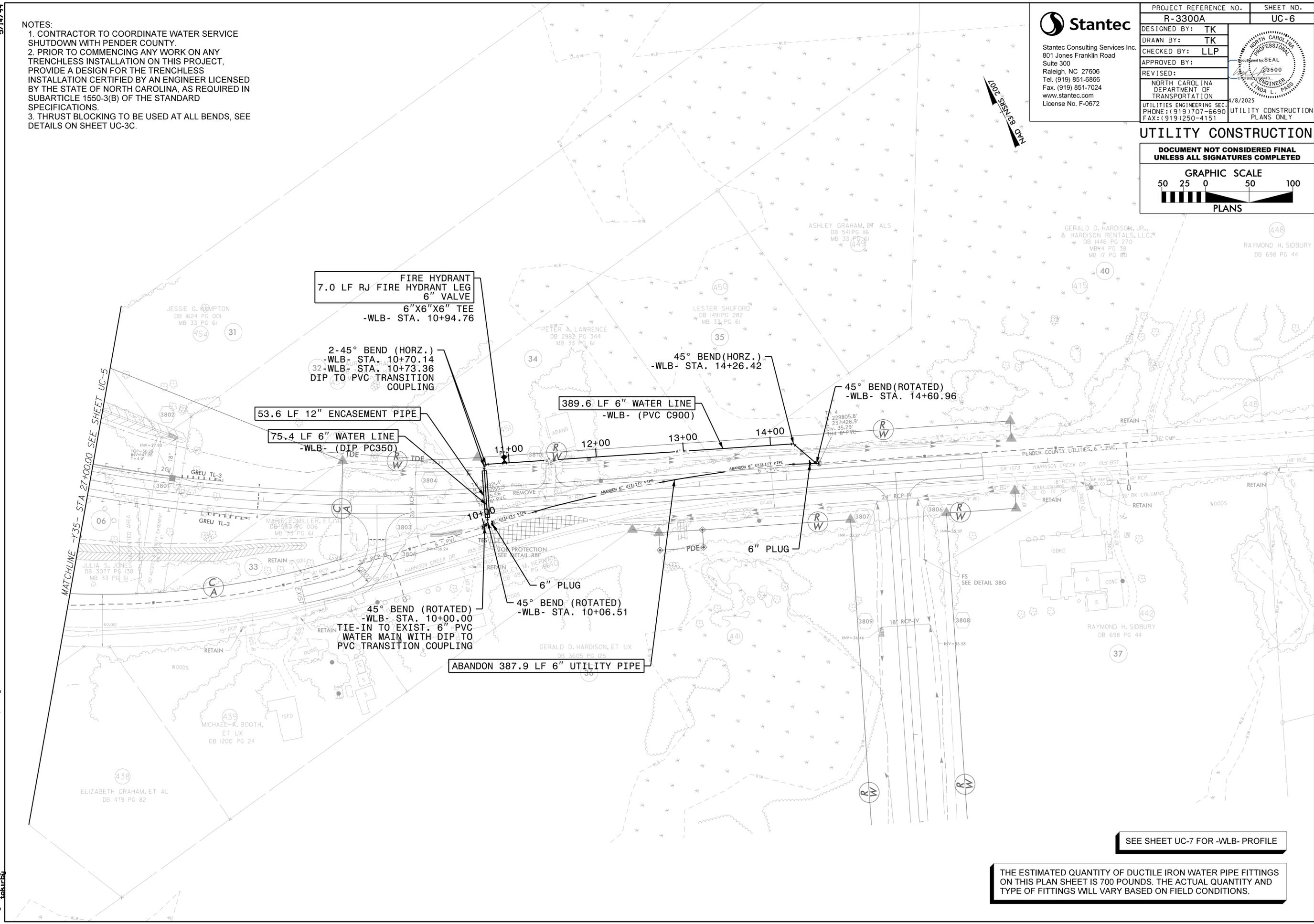
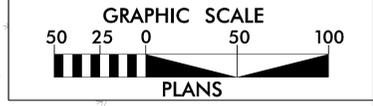
- NOTES:
1. CONTRACTOR TO COORDINATE WATER SERVICE SHUTDOWN WITH PENDER COUNTY.
  2. PRIOR TO COMMENCING ANY WORK ON ANY TRENCHLESS INSTALLATION ON THIS PROJECT, PROVIDE A DESIGN FOR THE TRENCHLESS INSTALLATION CERTIFIED BY AN ENGINEER LICENSED BY THE STATE OF NORTH CAROLINA, AS REQUIRED IN SUBARTICLE 1550-3(B) OF THE STANDARD SPECIFICATIONS.
  3. THRUST BLOCKING TO BE USED AT ALL BENDS, SEE DETAILS ON SHEET UC-3C.

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PROJECT REFERENCE NO. <b>R-3300A</b>	SHEET NO. <b>UC-6</b>
DESIGNED BY: <b>TK</b>	
DRAWN BY: <b>TK</b>	
CHECKED BY: <b>LLP</b>	
APPROVED BY:	
REVISIONS:	NORTH CAROLINA DEPARTMENT OF TRANSPORTATION 4/8/2025
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	UTILITY CONSTRUCTION PLANS ONLY

**UTILITY CONSTRUCTION**

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**



SEE SHEET UC-7 FOR -WLB- PROFILE

THE ESTIMATED QUANTITY OF DUCTILE IRON WATER PIPE FITTINGS ON THIS PLAN SHEET IS 700 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS.

Engineering: 1/3/2025 Revisions: 2025 Sheets: R-3300A-ut-UC6.psh.dgn

5/28/99

SCALE: 1" = 50' HORIZONTAL  
1" = 10' VERTICAL

NOTES:  
1. LOCATION AND DEPTHS OF EXISTING UTILITIES ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY LOCATIONS AND DEPTHS PRIOR TO WATER LINE CONSTRUCTION.

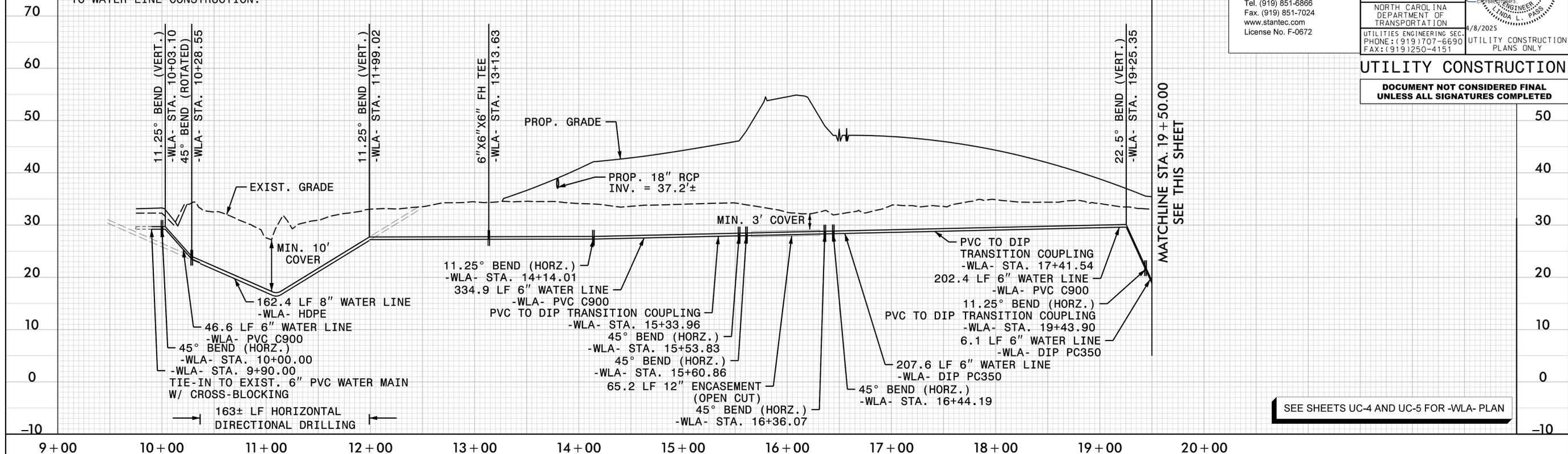
### PROP 6" WATER LINE -WLA- HARRISON CREEK DR

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PROJECT REFERENCE NO. <b>R-3300A</b>	SHEET NO. <b>UC-7</b>
DESIGNED BY: <b>TK</b>	
DRAWN BY: <b>TK</b>	
CHECKED BY: <b>LLP</b>	
APPROVED BY:	
REVISED:	4/8/2025
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### UTILITY CONSTRUCTION

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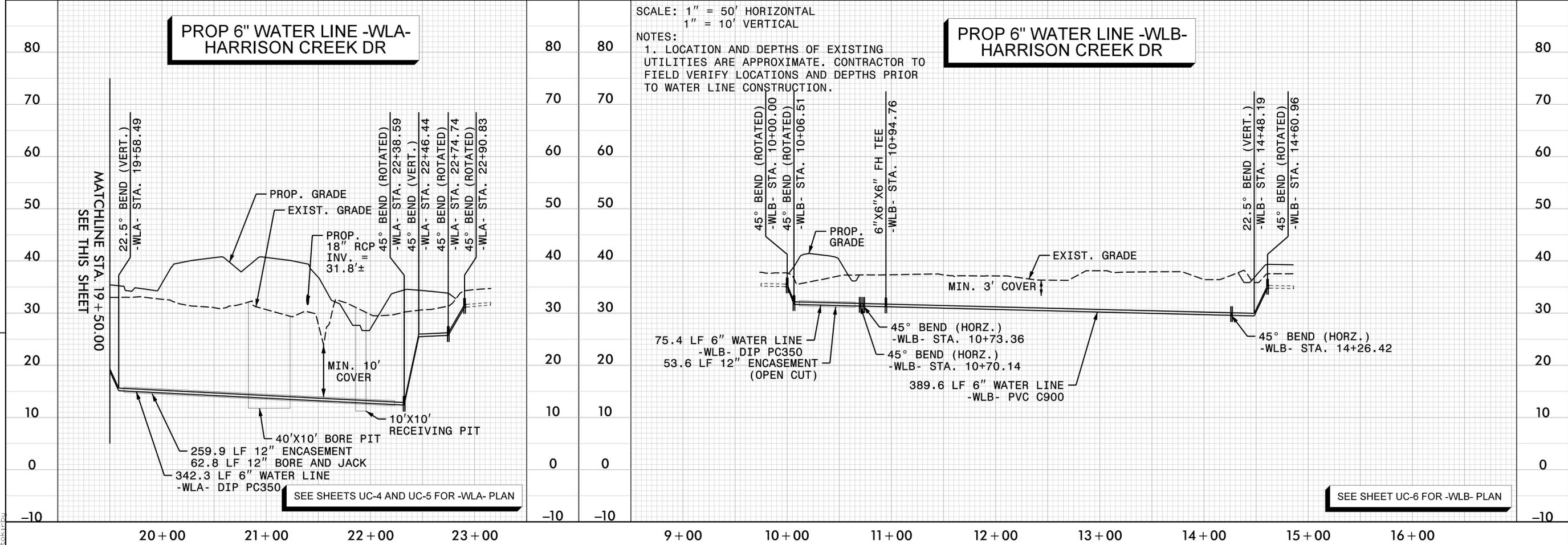
SEE SHEETS UC-4 AND UC-5 FOR -WLA- PLAN

### PROP 6" WATER LINE -WLA- HARRISON CREEK DR

SCALE: 1" = 50' HORIZONTAL  
1" = 10' VERTICAL

NOTES:  
1. LOCATION AND DEPTHS OF EXISTING UTILITIES ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY LOCATIONS AND DEPTHS PRIOR TO WATER LINE CONSTRUCTION.

### PROP 6" WATER LINE -WLB- HARRISON CREEK DR



SEE SHEETS UC-4 AND UC-5 FOR -WLA- PLAN

SEE SHEET UC-6 FOR -WLB- PLAN

REVISIONS

7/3/2025  
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