

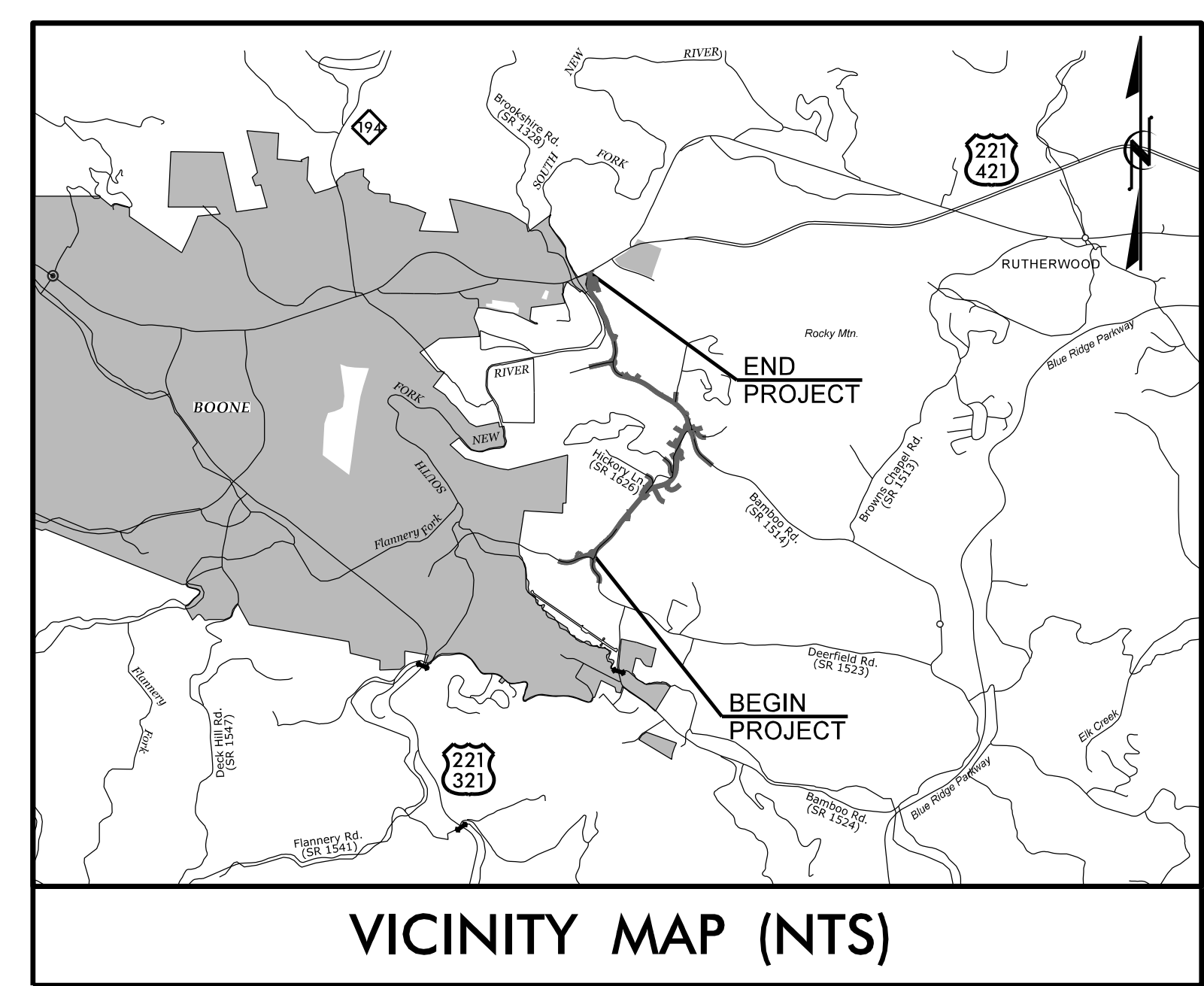
CONTRACT: TIP PROJECT: U-5810

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

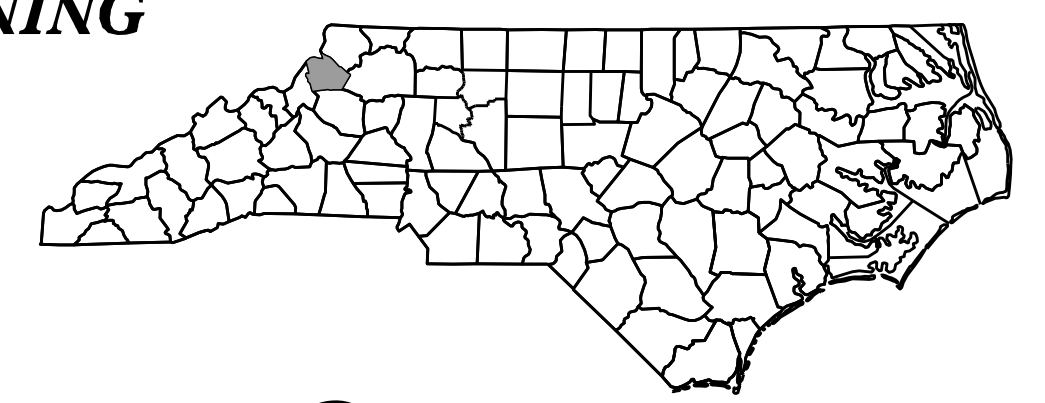
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5810	UC-1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
44383.3.1	4438301	UTILITY CONSTRUCTION	

UTILITY CONSTRUCTION PLANS
WATAUGA COUNTY

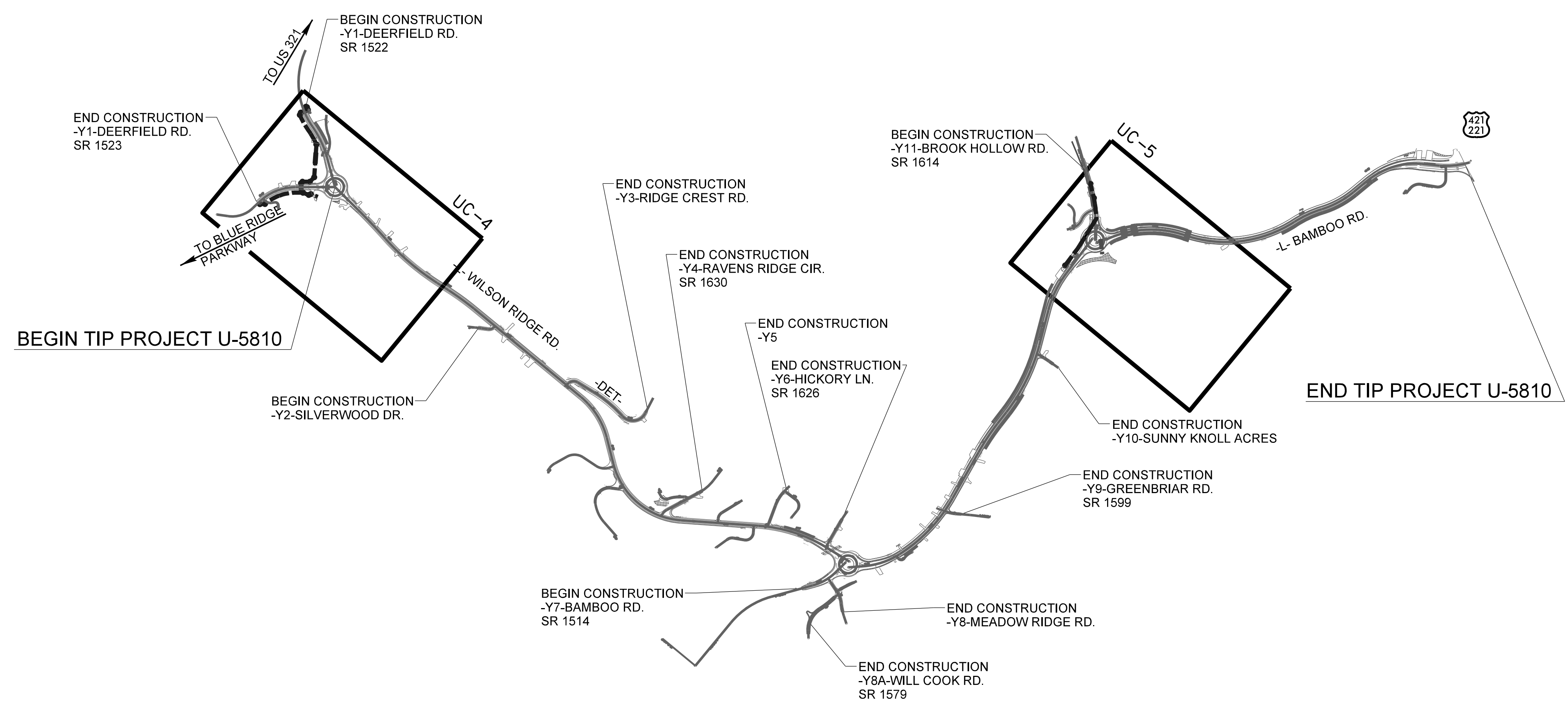
LOCATION: WILSON RIDGE RD. (SR 1523) & BAMBOO RD. (SR 1514) WIDENING
TYPE OF WORK: WATER AND SEWER RELOCATION



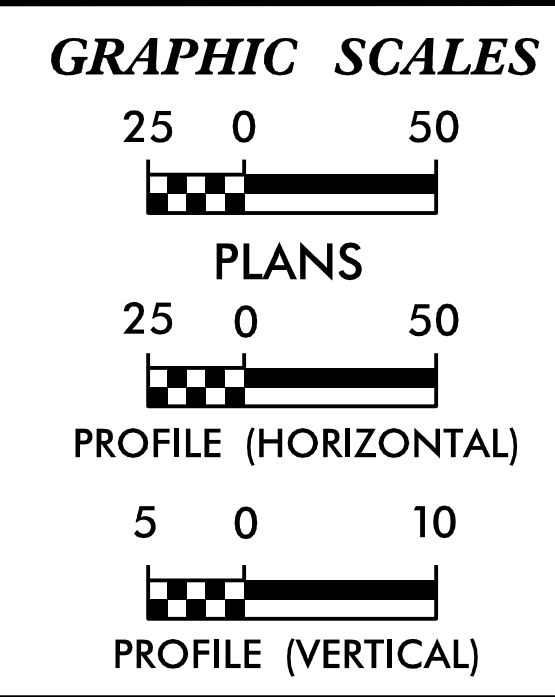
VICINITY MAP (NTS)



NAD 83/2011



Signed by:
Alan J. Crees
77AB3E8647F84C3
6-24-26



INDEX OF SHEETS	
SHEET No.	DESCRIPTION
UC-1	TITLE SHEET
UC-2	PLAN SHEET SYMBOLS
UC-3	PROJECT NOTES
UC-3A TO UC-3D	GENERAL NOTES AND DETAILS
UC-4 TO UC-5	PLAN SHEETS

UTILITY OWNERS ON PROJECT
(1.) TOWN OF BOONE

MUNICIPAL ENGINEERING, INC.

68 SHIPWASH DRIVE, GARNER, NC 27529 • PHONE: 919-772-5393
P.O. BOX 349, BOONE, NC 28607 • PHONE: 828-262-1767
LICENSE NUMBERS: F-0812 & D-586

UTILITY DESIGN ENGINEER ALAN J. CREES, PE

DIVISION OF HIGHWAYS
DIVISION II

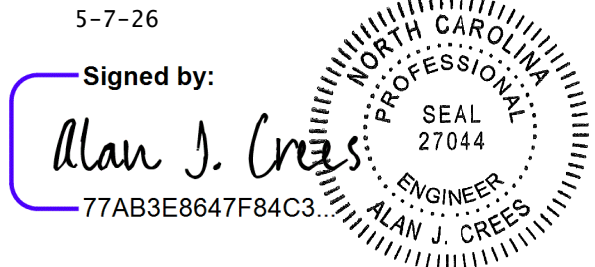
801 STATESVILLE ROAD
NORTH WILKESBORO NC 28659
PHONE (336) 903-9101
FAX (336) 667-4549

BRANDON GREER DIVISION UTILITY ENGINEER
DANIEL ADAMS, PE DIVISION PROJECT TEAM LEAD
HEATH SLAUGHTER DIVISION PROJECT MANAGER

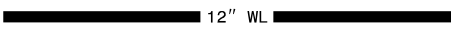
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITIES PLAN SHEET SYMBOLS

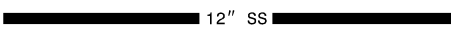
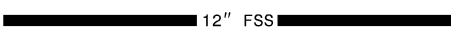
PROJECT REFERENCE NO.	SHEET NO.
U-5810	UC-2



PROPOSED WATER SYMBOLS

Water Line (Sized as Shown)	
11¼ Degree Bend	
22½ 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	
Water Meter	
Relocate Water Meter	
Remove Water Meter	
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	

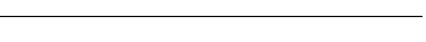
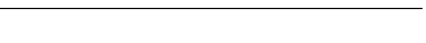
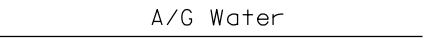
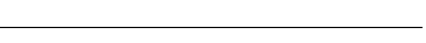
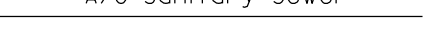
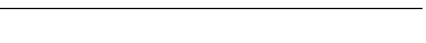
PROPOSED MISCELLANEOUS UTILITIES SYMBOLS

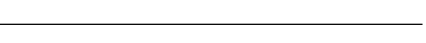
Power Pole	
Telephone Pole	
Joint Use Pole	
Telephone Pedestal	
Utility Line by Others (Type as Shown)	
Trenchless Installation	
Encasement by Open Cut	
Encasement	

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

EXISTING UTILITIES SYMBOLS

Power Pole	
Telephone Pole	
Joint Use Pole	
Utility Pole	
Utility Pole with Base	
H-Frame Pole	
Power Transmission Line Tower	
Water Manhole	
Power Manhole	
Telephone Manhole	
Sanitary Sewer Manhole	
Hand Hole for Cable	
Power Transformer	
Telephone Pedestal	
CATV Pedestal	
Gas Valve	
Gas Meter	
Located Miscellaneous Utility Object	
Abandoned According to Utility Records	
End of Information	

*Underground Power Line	
*Underground Telephone Cable	
*Underground Telephone Conduit	
*Underground Fiber Optics Telephone Cable	
*Underground TV Cable	
*Underground Fiber Optics TV Cable	
*Underground Gas Pipeline	
Aboveground Gas Pipeline	
*Underground Water Line	
Aboveground Water Line	
*Underground Gravity Sanitary Sewer Line	
Aboveground Gravity Sanitary Sewer Line	
*Underground SS Forced Main Line	
Underground Unknown Utility Line	
SUE Test Hole	
Water Meter	
Water Valve	
Fire Hydrant	
Sanitary Sewer Cleanout	

*For Existing Utilities	
Utility Line Drawn from Record (Type as Shown)	
Designated Utility Line (Type as Shown)	

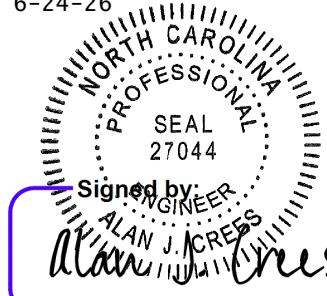
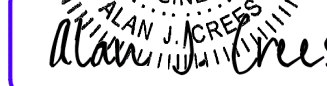
UTILITY CONSTRUCTION

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 2024.
2. THE EXISTING UTILITIES BELONG TO THE TOWN OF BOONE.
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 ENVIRONMENT 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, " SUBMITTAL'S AND RECORDS" IN SECTION 1500 OF THE STANDARD SPECIFICATIONS.

PROJECT SPECIFIC NOTES:

1. CONTRACTOR'S ATTENTION IS DIRECTED TO SECTIONS 102, 107, AND 1550 OF THE STANDARD SPECIFICATIONS CONCERNING TRENCHLESS INSTALLATION. IT IS CONTRACTOR'S RESPONSIBILITY TO HAVE BORE DESIGNED AND SEALED BY A LICENSED NORTH CAROLINA PROFESSIONAL ENGINEER. NO DAMAGE IS ALLOWED TO RIVER, WETLANDS, OR BUFFER ZONES.
2. WELL IN ADVANCE OF BEGINNING UTILITY WORK, SOFT DIGS SHALL BE PERFORMED BY CONTRACTOR TO VERIFY ACTUAL WATER LINE DEPTH AND MATERIAL AT PROPOSED TIE-IN LOCATIONS.
3. LAY PIPE STRAIGHT IN ALIGNMENT AND GRADIENT OR FOLLOW TRUE CURVES AS NEARLY AS POSSIBLE. DO NOT DEFLECT ANY JOINT MORE THAN THE MAXIMUM DEFLECTION RECOMMENDED BY THE MANUFACTURER.
4. ANY SERVICE INTERRUPTIONS SHALL BE SCHEDULED FOR MINIMAL IMPACT TO CUSTOMERS AND APPROVED BY THE TOWN OF BOONE.
5. THE CONTRACTOR SHALL NOTIFY THE TOWN OF BOONE IN ADVANCE OF THE FOLLOWING ACTIVITIES.
 - A. START OF UTILITY CONSTRUCTION - 48 HRS
 - B. MAIN LINE SERVICE INTERRUPTIONS - 96 HRS
 - C. PRESSURE TESTING - 24 HRS
 - D. DISINFECTION - 24 HRS
6. TOWN OF BOONE AND NCDOT HAVE RIGHT-OF-ENTRY TO THE PROJECT SITE.
7. ALL VALVES USED IN PROJECT SHALL BE GATE VALVES.
8. THE CONTRACTOR SHALL LOCATE ALL SERVICES CURRENTLY CONNECTED TO EXISTING SEWER MAIN (WHETHER SHOWN OR NOT SHOWN ON PLANS) AND CONNECT TO THE NEW SEWER BY INSTALLING A NEW CLEANOUT ASSEMBLY.
9. ALL WATER LINES SHALL HAVE A MINIMUM COVER OF 36".
10. THE OWNER OR THEIR AGENT SHALL WITNESS ALL PRESSURE AND BIOLOGICAL TESTING.
11. THE CONTRACTOR SHALL TAKE ALL BIOLOGICAL SAMPLES AND SEND TO OWNER'S PREFERRED LABORATORY FOR TESTING.
12. ALL EXISTING APPURTENANCES (HYDRANTS, VALVES, GLAND, FITTINGS) THAT ARE REMOVED AS A RESULT OF WATER MAIN RELOCATION WILL REMAIN THE PROPERTY OF THE OWNER.

PROJECT REFERENCE NO.	SHEET NO.
U-5810	UC-3
DESIGNED BY: A.CREES	6-24-26 
DRAWN BY: R.MOSS	
CHECKED BY: A.CREES	
APPROVED BY:	
REVISED:	
MUNICIPAL ENGINEERING SERVICES COMPANY, PA.	Signed by:  77AB3E8647F84C3...
P.O. BOX 97 GARNER, NC 27529 (919) 772-5393	UTILITY CONSTRUCTION PLANS ONLY

PROJECT TYPICAL DETAILS

PROJECT REFERENCE NO.
U-5810

SHEET NO.
UC-3A

DESIGNED BY: A. CREES

DRAWN BY: R. MOSS

CHECKED BY:

APPROVED BY:

REVISED:

MUNICIPAL ENGINEERING, INC.

820-B STATE FARM RD.
BOONE, NC. 28607
(828) 262-1767

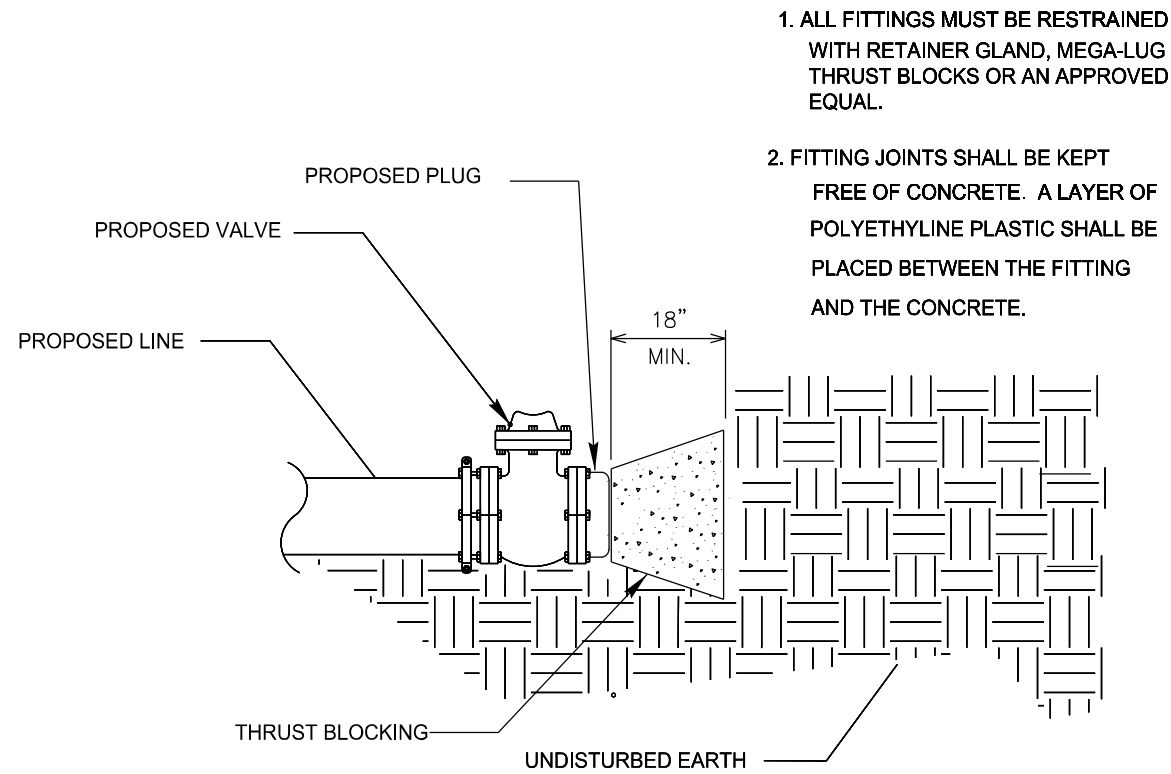
5-7-26

NORTH CAROLINA
PROFESSIONAL
ENGINEER
SEAL
27044

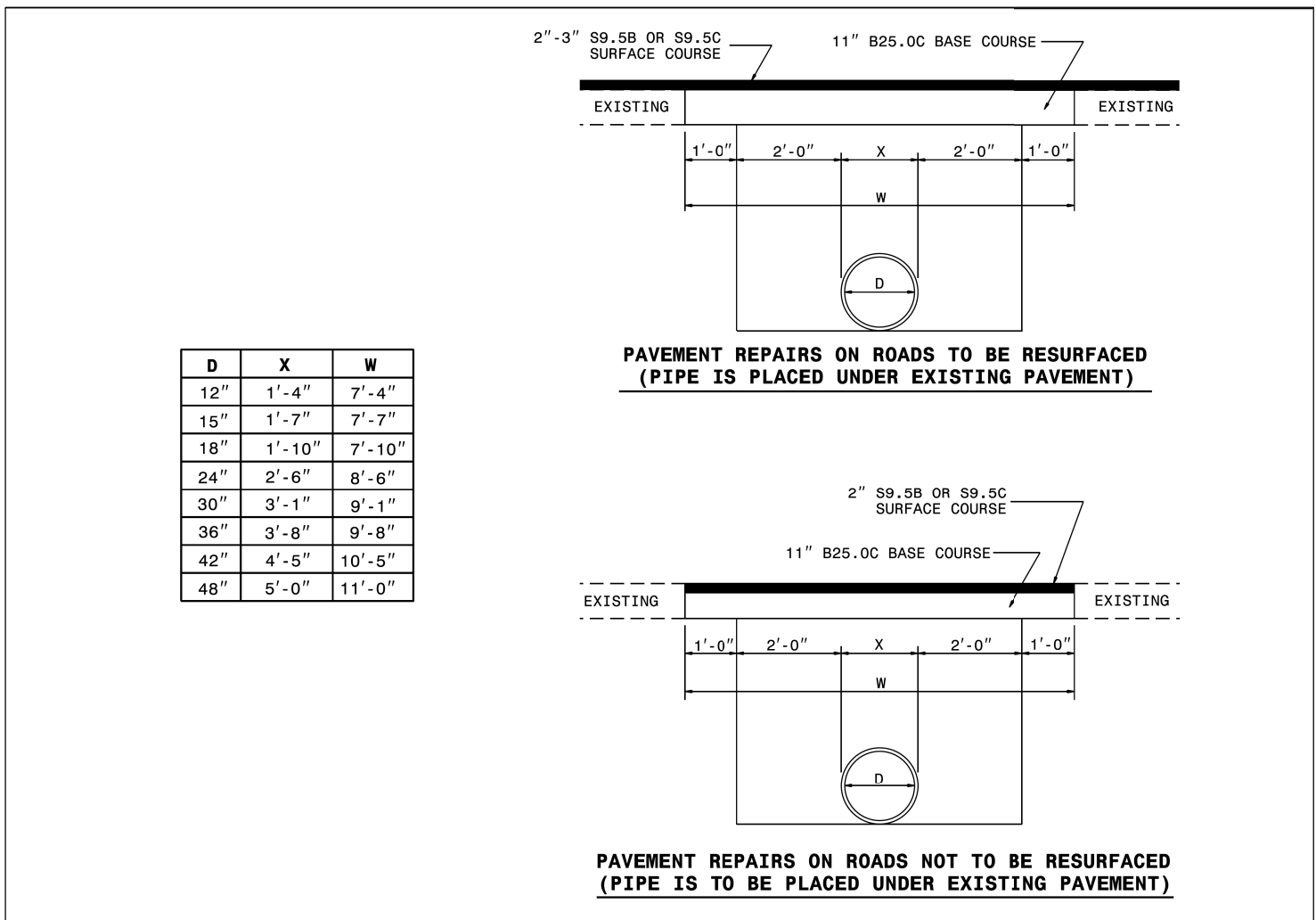
Signed by:
A. Crees
A. CREES

77AB3E8647F84C3...
UTILITY CONSTRUCTION
PLANS ONLY

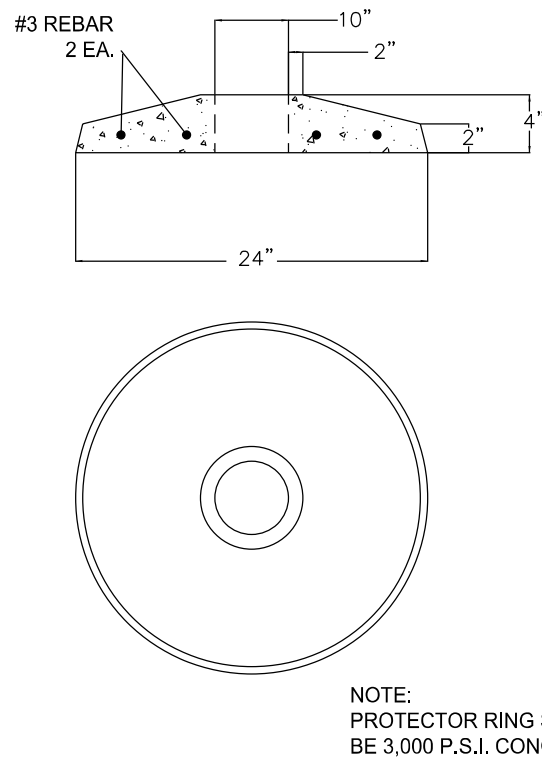
UTILITY CONSTRUCTION



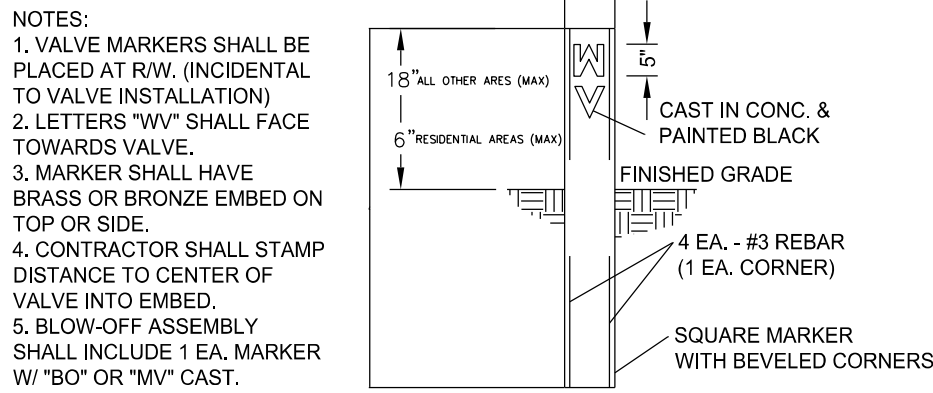
END OF LINE PLUG INSTALLATION



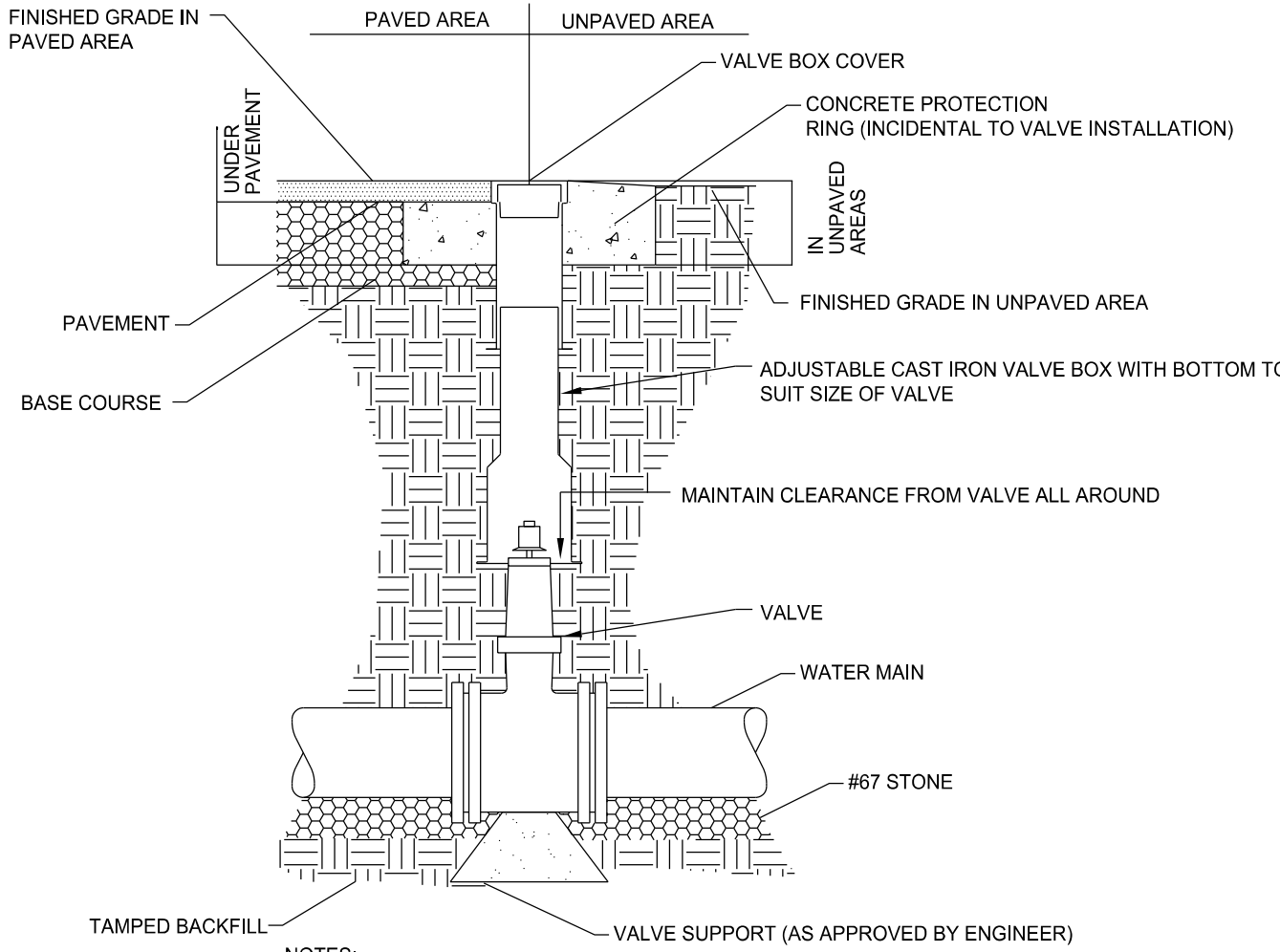
STANDARD ASPHALT PAVEMENT PATCH DETAIL



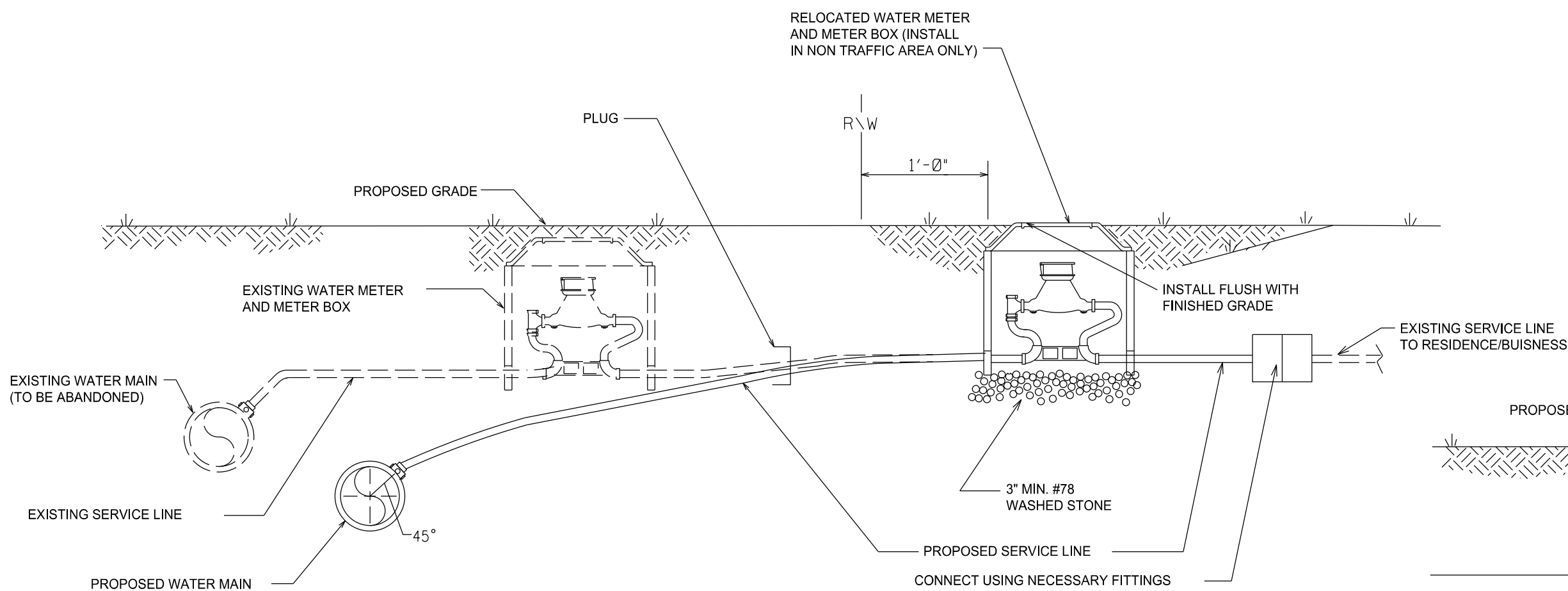
CONCRETE PROTECTOR RING



VALVE MARKER DETAIL

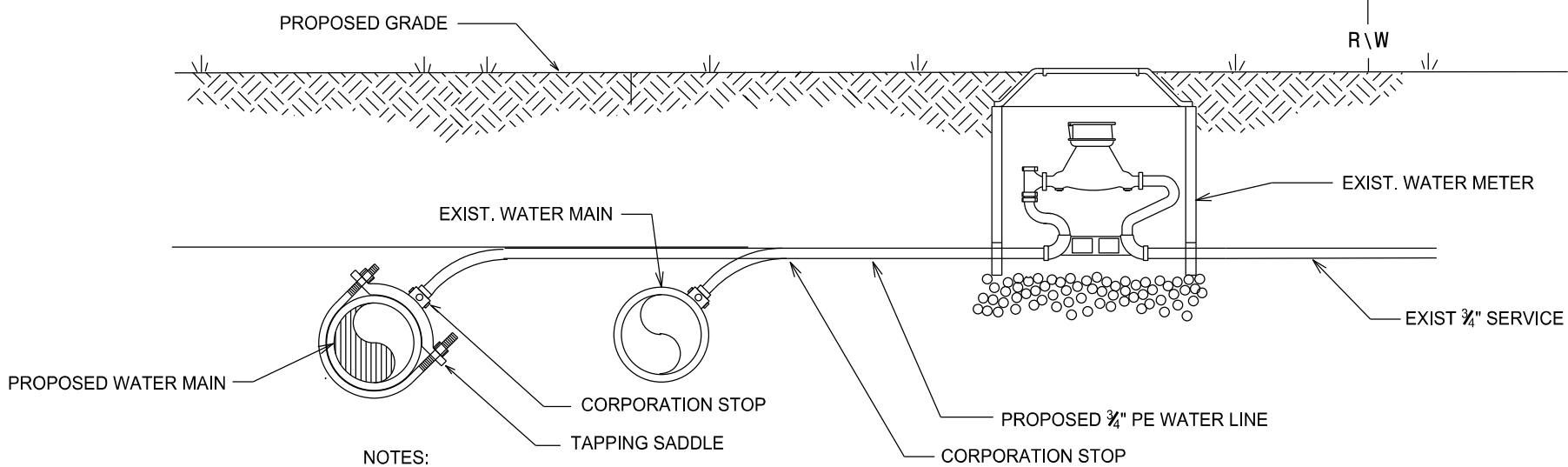


TYPICAL VALVE DETAIL

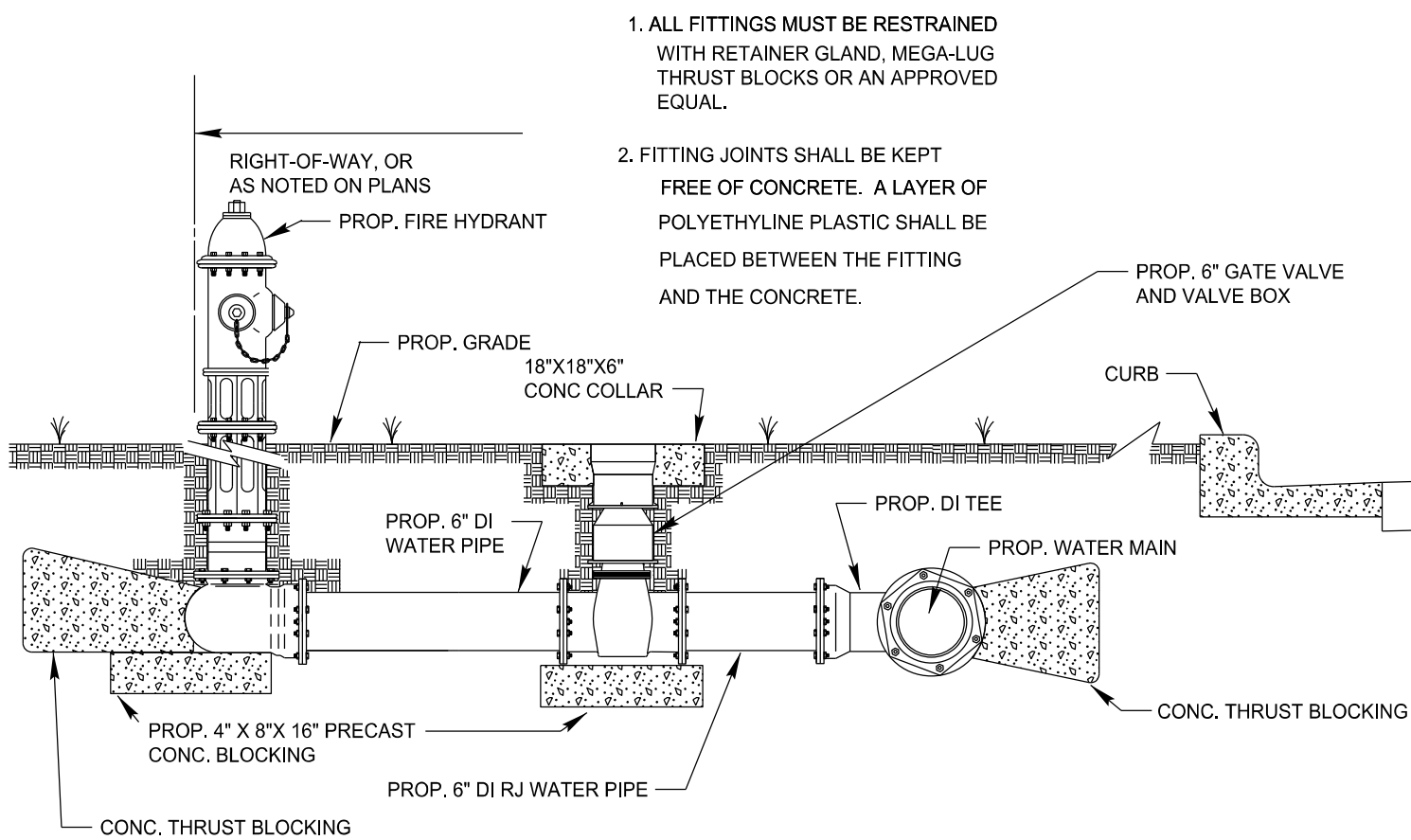


WATER METER RELOCATION DETAIL

- NOTES:
1. RELOCATION SHALL INCLUDE THE REMOVAL AND INSTALLATION AT THE SPECIFIED LOCATION OF THE WATER METER, METER SETTER AND YOKE, METER VALVES, AND METER BOX WITH LID, AND CONNECTION TO PROPOSED WATER MAIN AND EXISTING SERVICE.
 2. THE NEW WATER SERVICE LINE SHALL BE OF THE SAME TYPE AND GRADE AS THE EXISTING WATER SERVICE LINE UNLESS OTHERWISE SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER.
 3. THE NEW WATER SERVICE LINE SHALL BE INSTALLED WITH A MINIMUM OF 36" COVER BELOW FINISHED GRADE.
 4. WHEN SPECIFIED, DRY BORE UNDER PAVEMENT SHALL BE INCIDENTAL TO SERVICE LINE INSTALLATION.



RECONNECT EXISTING WATER METER DETAIL



FIRE HYDRANT INSTALLATION DETAIL
(UNPAVED AREAS)

PROJECT TYPICAL DETAILS

PROJECT REFERENCE NO.
U-5810

SHEET NO.
UC-38

DESIGNED BY: A. CREES

DRAWN BY: R. MOSS

CHECKED BY:

APPROVED BY:

REVISED:

5-7-26

NORTH CAROLINA
PROFESSIONAL
ENGINEER
SEAL
27044

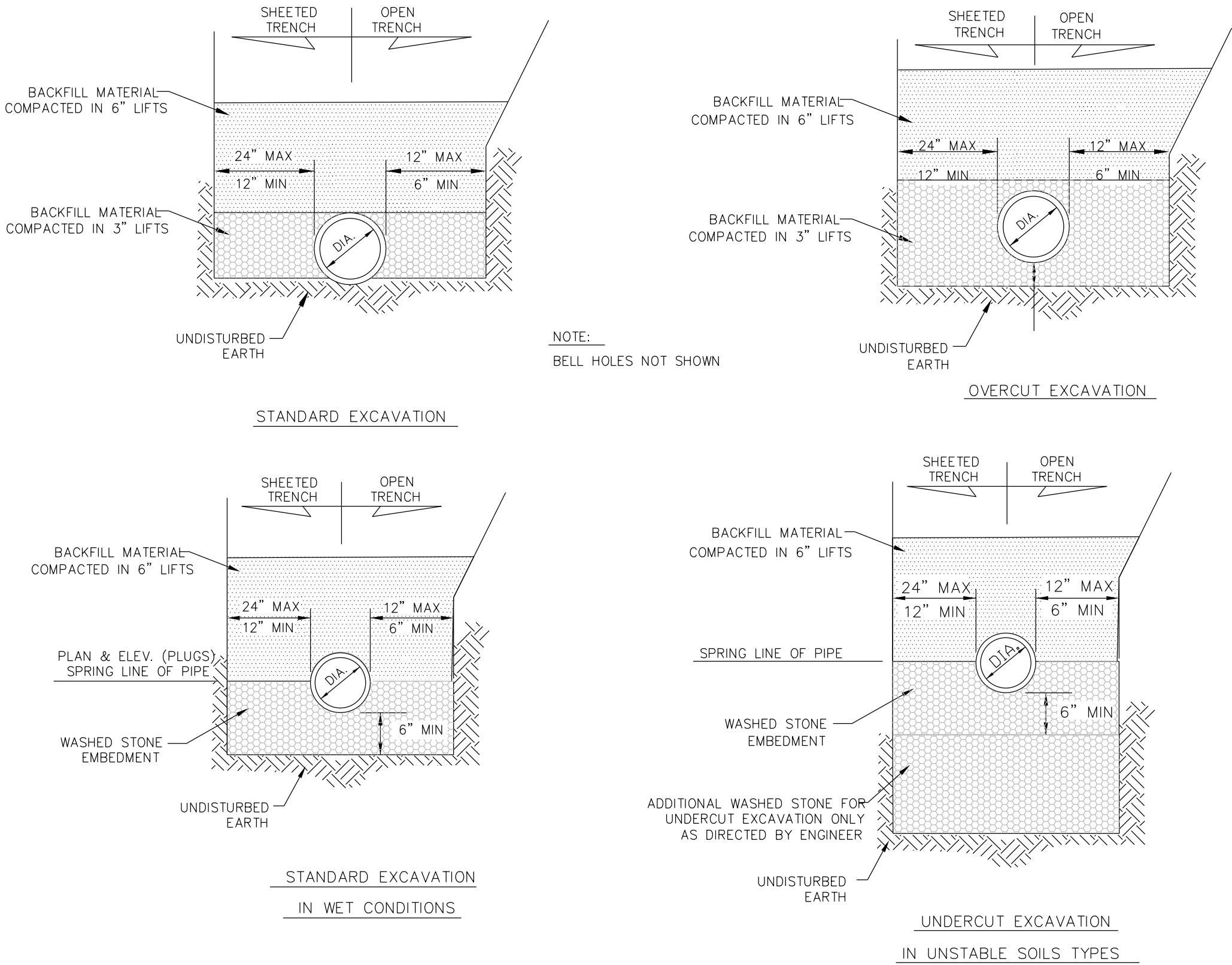
Signed by
A. CREES
77AB3E8847F84C3...

MUNICIPAL ENGINEERING, INC.

820-B STATE FARM RD.
BOONE NC, 28607
(828) 262-1767

UTILITY CONSTRUCTION
PLANS ONLY

UTILITY CONSTRUCTION



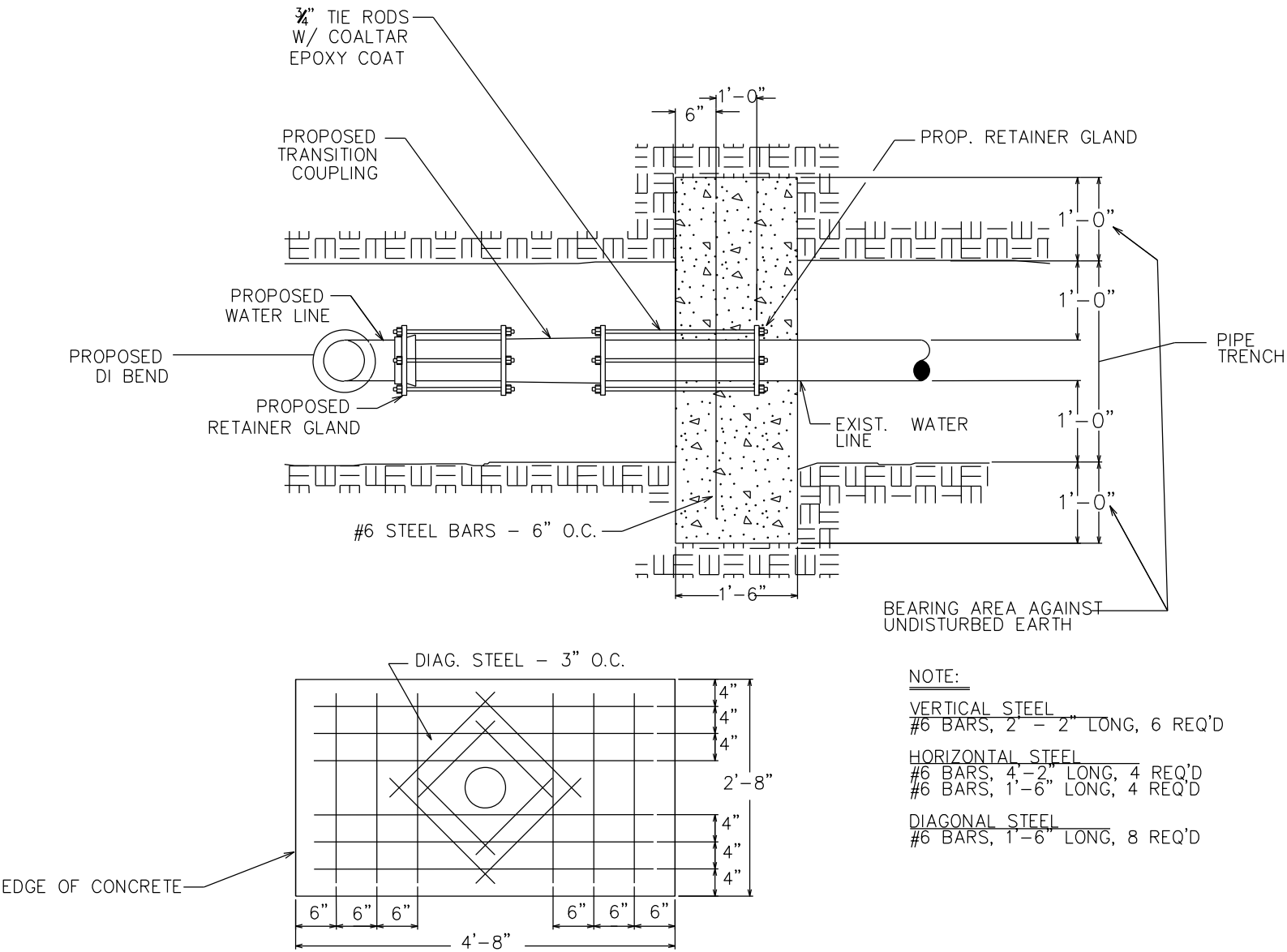
TYPICAL TRENCH DETAIL

MAXIMUM TRENCH WIDTH AT TOP OF PIPE			
NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)	NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)
6	30	24	48
10	34	36	60
16	40	54	78

NOTES:
CONSTRUCTION OF TRENCHES
SHALL BE IN ACCORDANCE
WITH THE LATEST OSHA
REGULATIONS. CONTRACTOR
SHALL BE RESPONSIBLE FOR
COMPLIANCE WITH ALL
APPLICABLE REGULATIONS.

NO BOULDERS OR STONES
IN EXCESS OF 4" IN SIZE
SHALL BE USED AS PART
OF THE INITIAL BACKFILL.

PIPE BEDDING MATERIAL
SHALL BE # 57 WASHED
STONE.



NOTE:
VERTICAL STEEL
#6 BARS, 2'-2" LONG, 6 REQ'D
HORIZONTAL STEEL
#6 BARS, 4'-4" LONG, 4 REQ'D
#6 BARS, 1'-6" LONG, 4 REQ'D
DIAGONAL STEEL
#6 BARS, 1'-6" LONG, 8 REQ'D

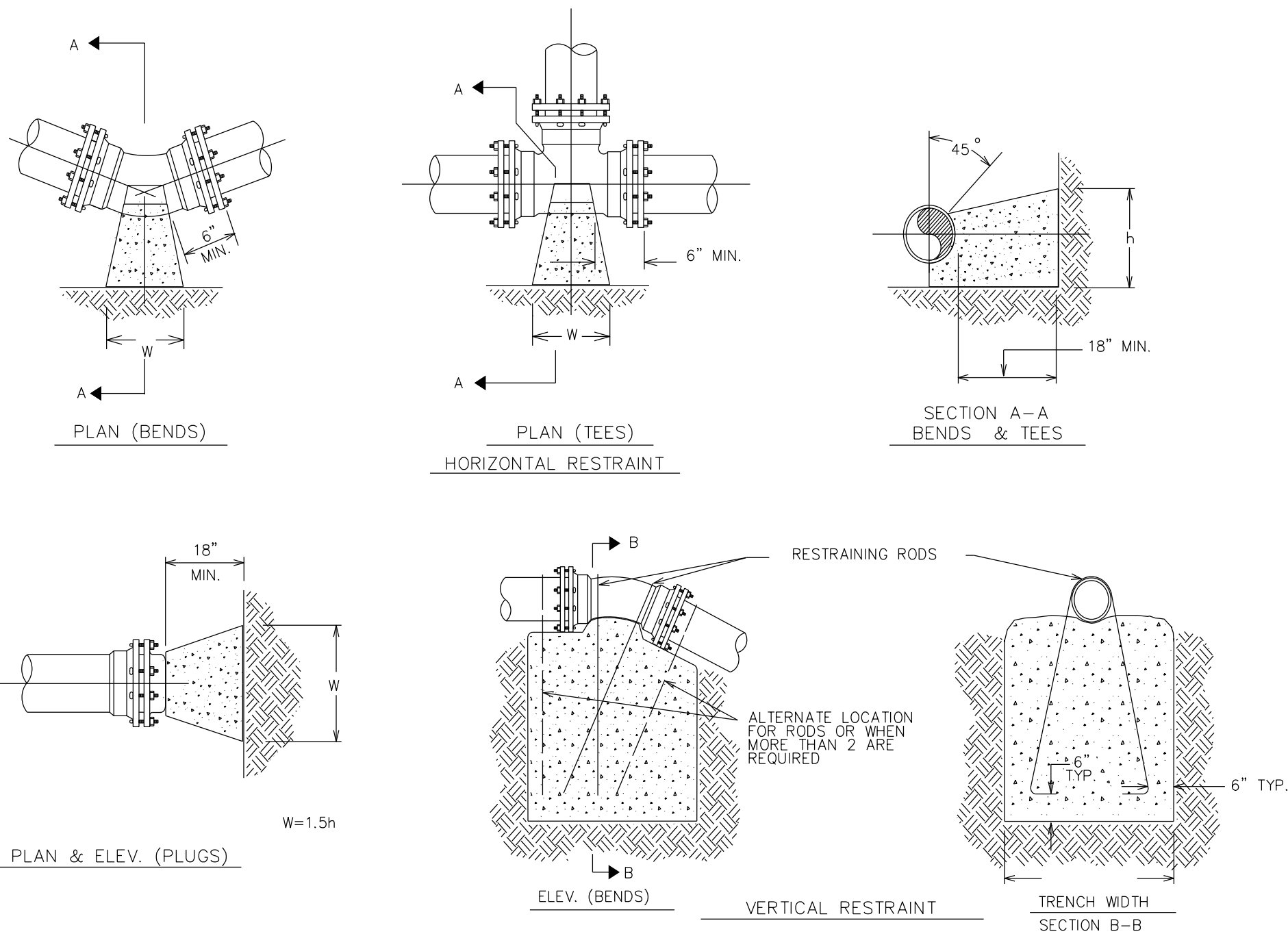
THRUST RESTRAINT WITH RETAINER GLANDS FOR PROP. PIPE TO EXIST. PIPE

BASED ON TEST PRESSURE OF 200 P.S.I.											
HORIZONTAL RESTRAINT (ALL AREAS GIVEN ARE IN SQUARE FEET)								VERTICAL RESTRAINT (ALL VOLUMES GIVEN ARE IN CUBIC YARDS)**			
PIPE SIZE	DEGREE OF BEND	LBS. STATIC THRUST *	ALLOWABLE SOIL BEARING (PSF)								PIPE SIZE
			1000	2000	3000	4000	5000	6000	7000	8000	
6"	11 1/4°	1,385	2	1	1	1	1	1	1	1	6"
	22 1/2°	2,758	3	2	1	1	1	1	1	1	
	45°	5,409	5	3	2	2	1	1	1	1	
	90°	9,999	10	5	3	3	2	2	2	1	
	TEE/PLUG	7,068	7	4	3	2	2	1	1	1	
	11 1/4°	3,846	4	2	2	1	1	1	1	1	
10"	22 1/2°	15,028	15	8	5	4	3	2	2	2	10"
	45°	27,768	28	14	9	7	6	5	4	3	
	90°	50,265	50	25	17	13	10	8	7	6	
	TEE/PLUG	19,635	20	10	7	5	4	3	3	2	
	11 1/4°	9,854	10	5	3	3	2	2	2	2	
	22 1/2°	19,612	20	10	7	5	4	3	3	3	
16"	45°	38,471	38	17	13	10	8	6	5	5	16"
	90°	71,085	71	36	24	18	14	12	10	9	
	TEE/PLUG	50,265	50	25	17	13	10	8	7	6	
	11 1/4°	19,635	20	10	7	5	4	3	3	2	
	22 1/2°	38,471	38	17	13	10	8	6	5	5	
	90°	71,085	71	36	24	18	14	12	10	9	

* INCLUDES 1.25 SAFETY FACTOR

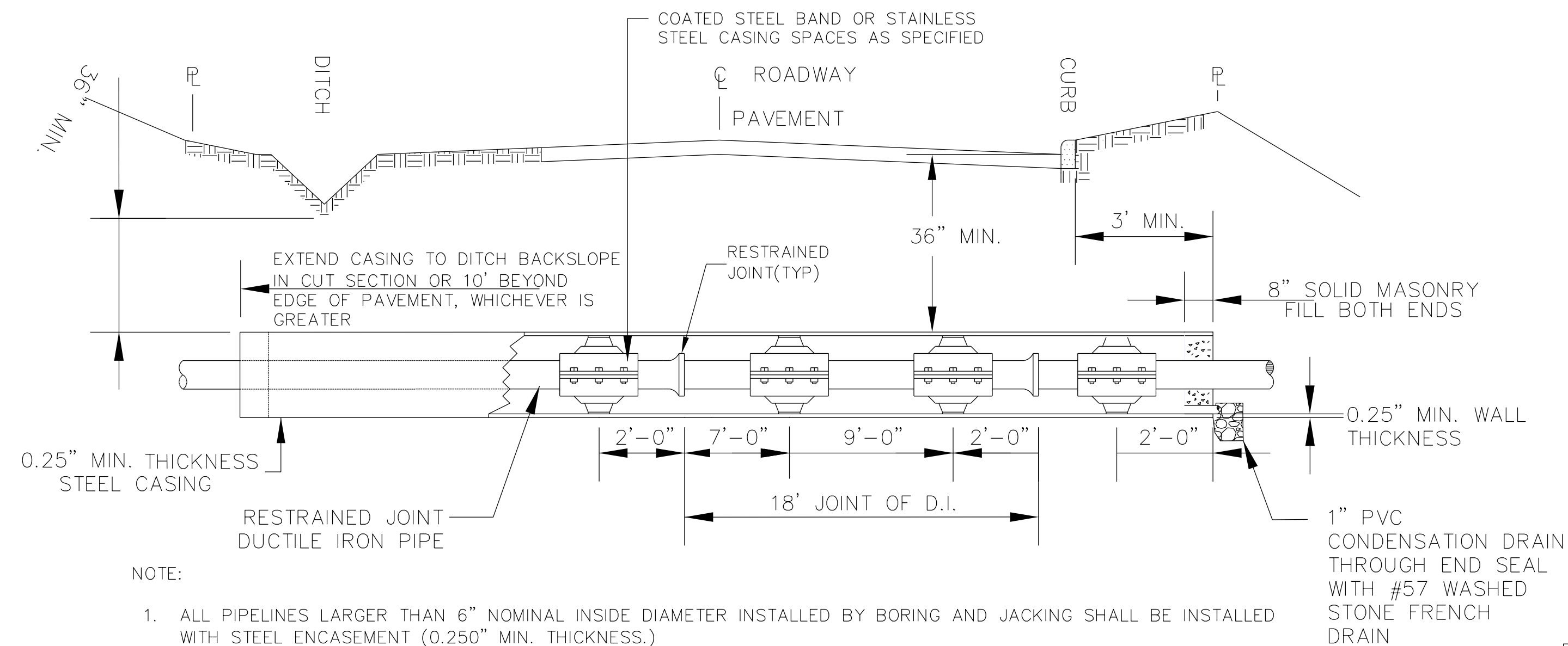
GENERAL NOTES:
1. CONCRETE SHALL BE CLASS "B"
2. CONCRETE SHALL NOT CONTACT BOLTS ENDS OF MECHANICAL JOINT FITTINGS.
3. CONSULT WITH ENGINEER FOR CONCRETE REQUIREMENTS ON MAINS LARGER THAN 16 INCHES.
(FOR VERTICAL & HORIZONTAL BENDS)
4. ALLOWABLE SOIL BEARING SHALL BE DETERMINED BY THE ENGINEER.

THRUST RESTRAINT FOR WATER MAINS

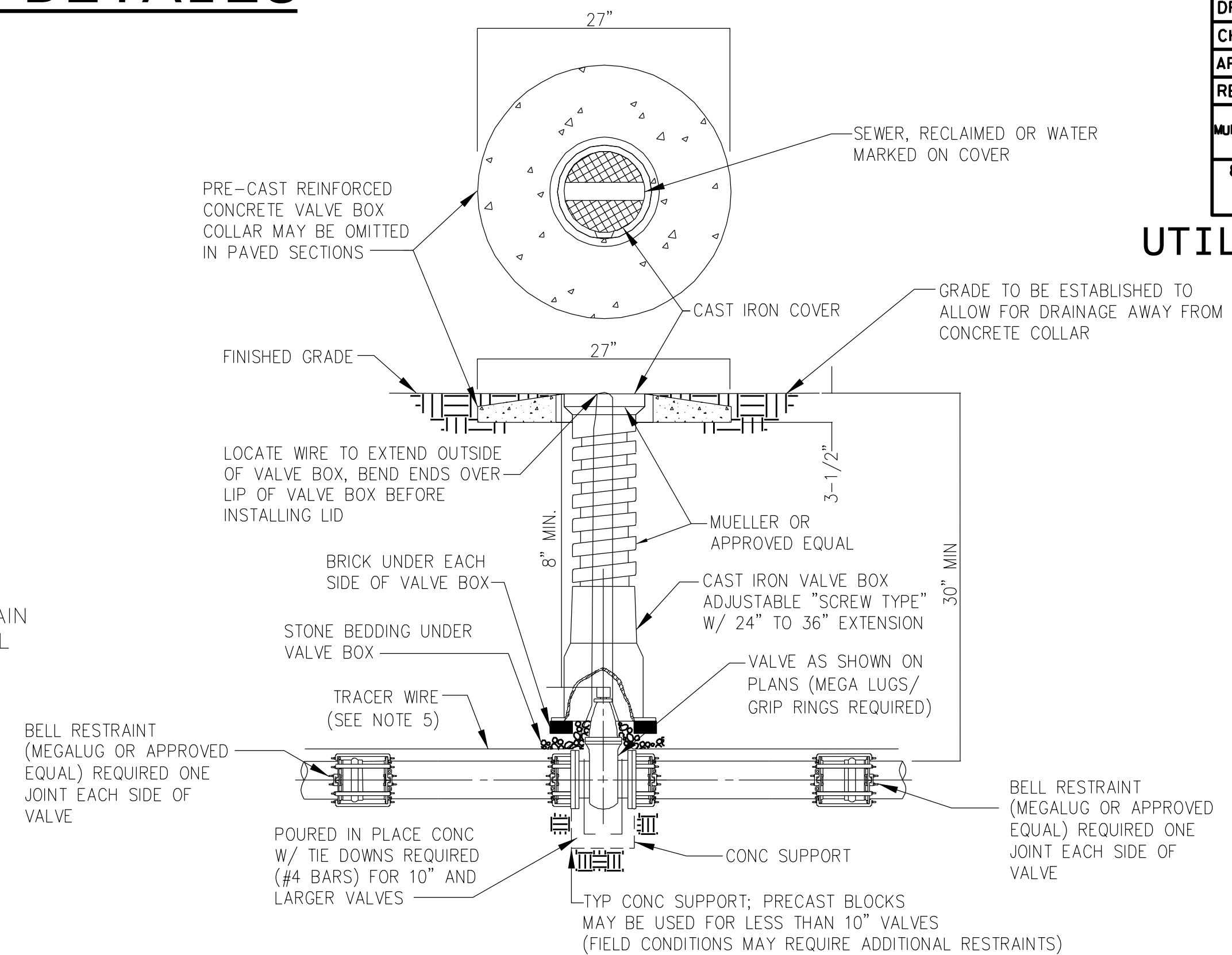


THRUST RESTRAINT FOR PIPE LINES

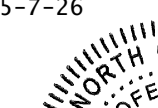
PROJECT TYPICAL DETAILS



JACK AND BORE FOR ROADWAYS DETAIL



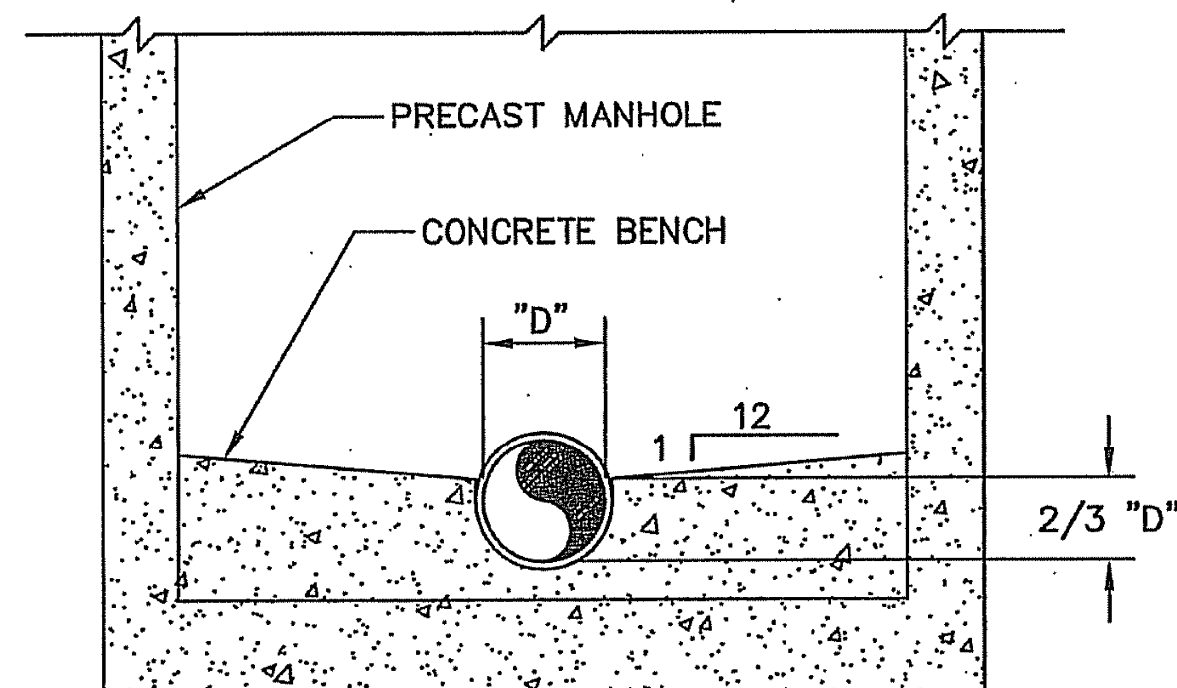
VALVE BOX DETAIL

PROJECT REFERENCE NO.		SHEET NO.	
U-5810		UC-3C	
DESIGNED BY: A. CREES		5-7-26	
DRAWN BY: R. MOSS			
CHECKED BY:			
APPROVED BY:			
REVISED:			
MUNICIPAL ENGINEERING, INC.			
820-B STATE FARM RD. BOONE NC. 28607 (828) 262-1767		77AB3E8647F84C3... UTILITY CONSTRUCTION PLANS ONLY	

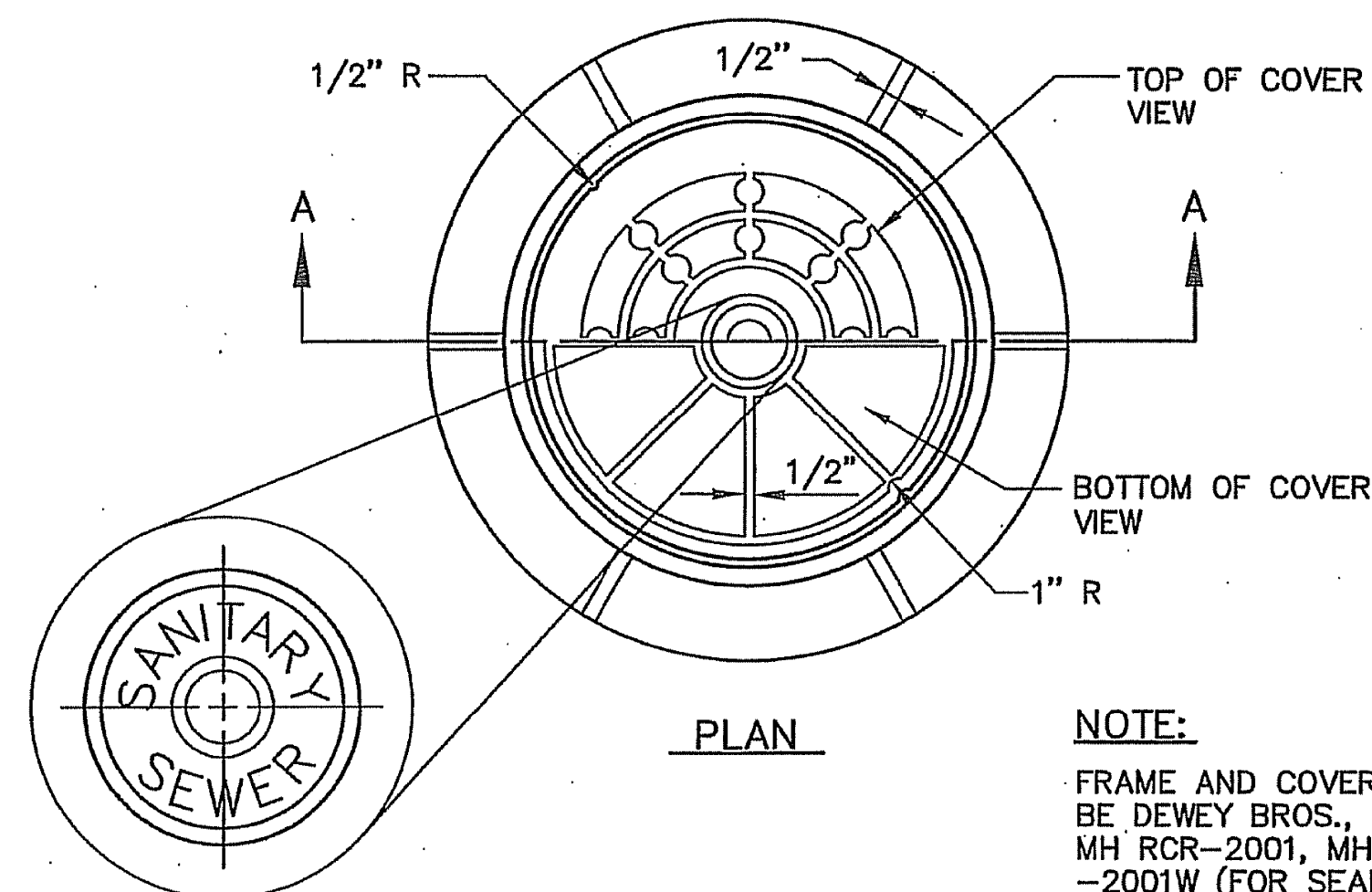
UTILITY CONSTRUCTION

PROJECT REFERENCE NO.		SHEET NO.	
U-5810		UC-3D	
DESIGNED BY: A. CREES		5-7-26	
DRAWN BY: R. MOSS			
CHECKED BY:			
APPROVED BY:			
REVISED:			
MUNICIPAL ENGINEERING, INC.			
820-B STATE FARM RD. BOONE NC 28607 (828) 262-1767		UTILITY CONSTRUCTION PLANS ONLY	

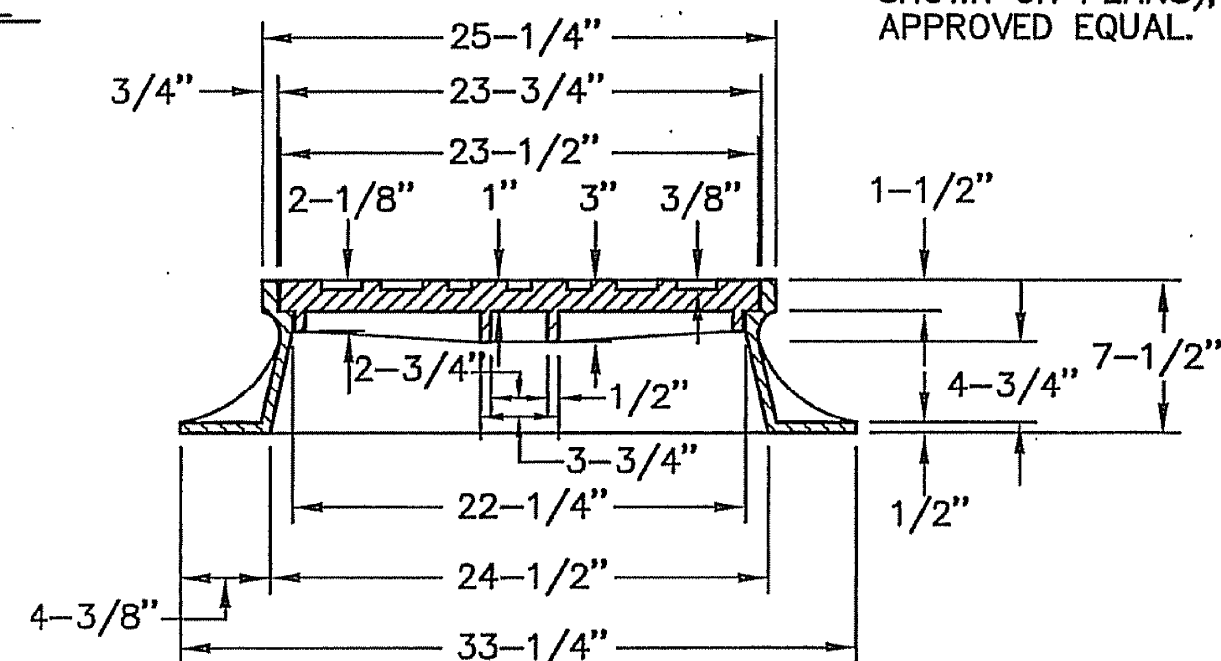
NOT TO SCALE
SL001



NOT TO SCALE
SL003

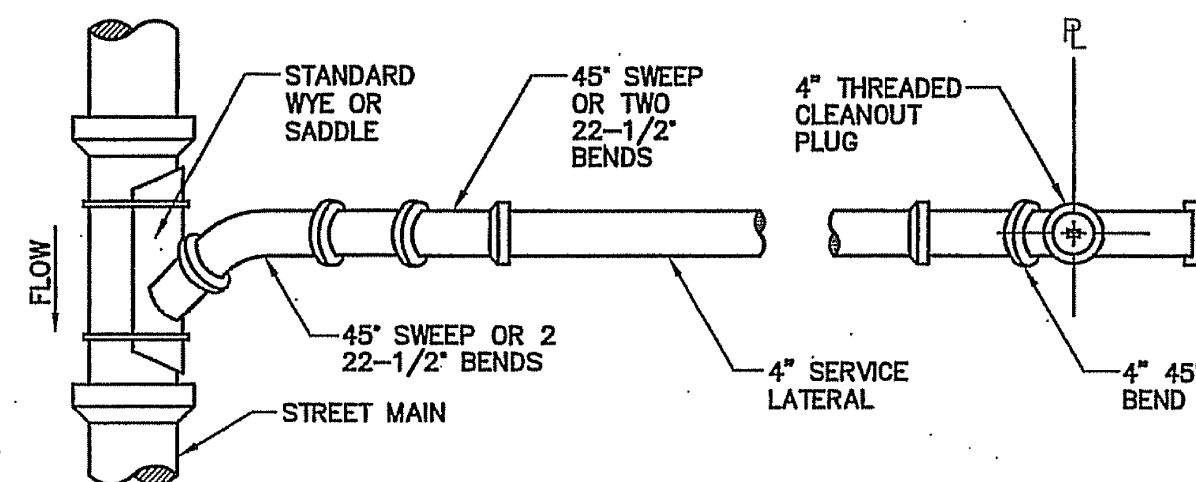


DETAIL

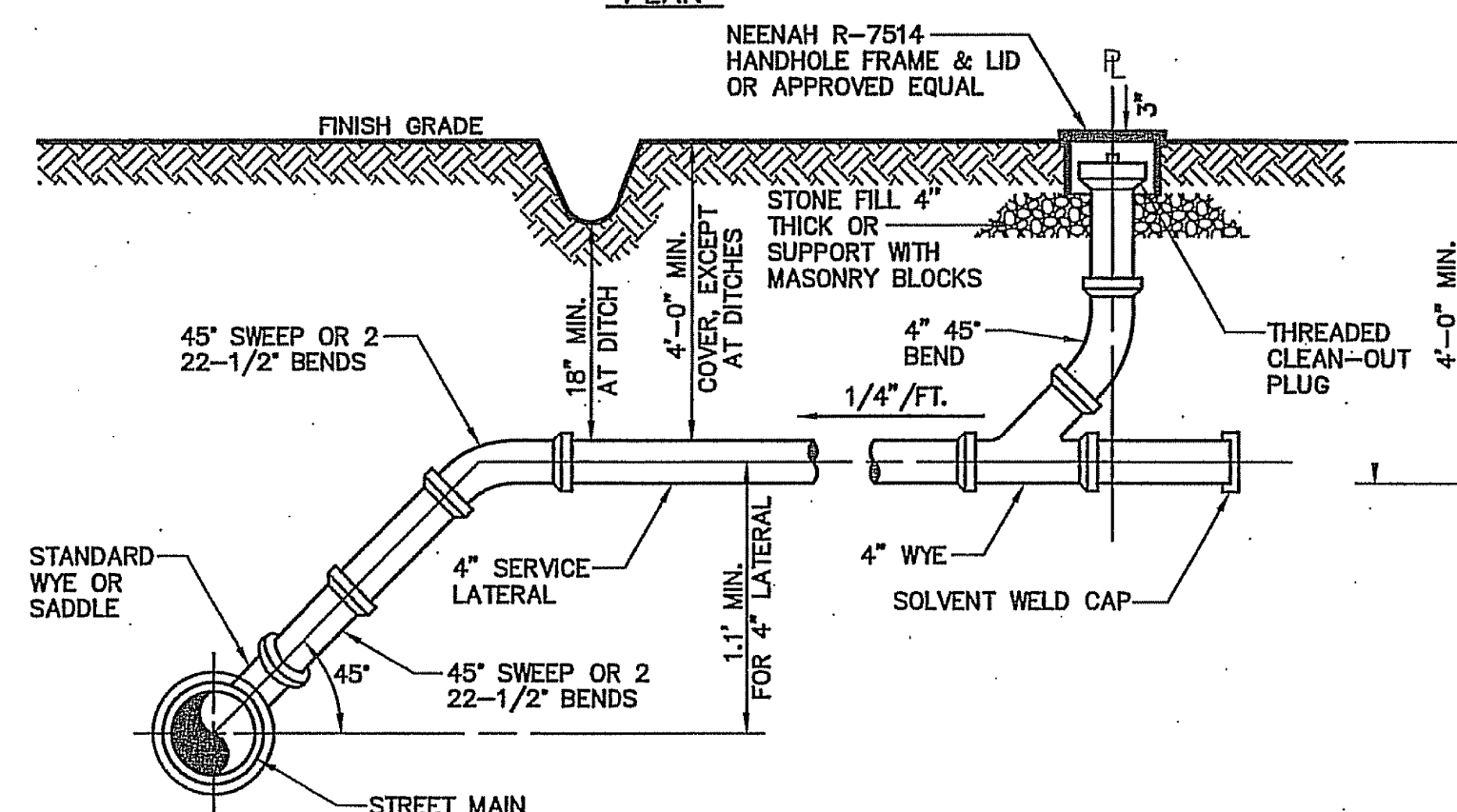


NOT TO SCALE
SL004

FRAME AND COVER TO BE DEWEY BROS., INC. MH RCR-2001, MH RCR-2001W (FOR SEALED MANHOLES IF REQ'D.-AS SHOWN ON PLANS), OR APPROVED EQUAL.

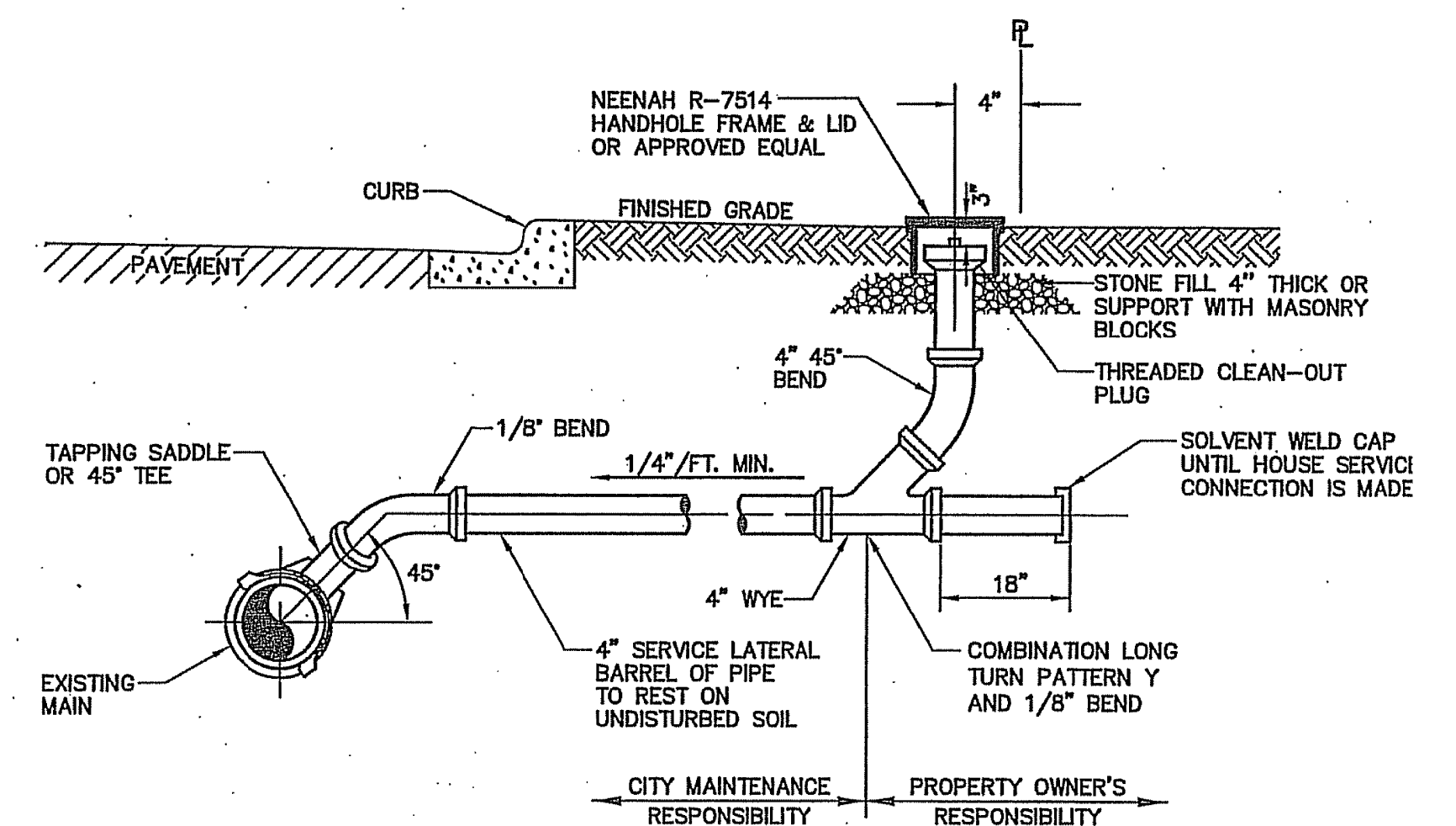


PLAN



ELEVATION

1. COORDINATE LOCATION & DEPTH OF LATERALS TO OCCUPIED LOTS WITH EACH PROPERTY OWNER.
2. ALL LATERALS SHALL BE INSTALLED AT 90° TO THE SEWER LINE UNLESS SHOWN OTHERWISE.
3. USE TYPICAL SERVICE LATERALS WHERE MINIMUM SLOPE AND COVER REQUIREMENTS CAN BE MET.
4. CLEANOUTS TO BE PROVIDED ON ALL LATERALS AT 50' INTERVALS AND AT CHANGES IN DIRECTION.

ELEVATION

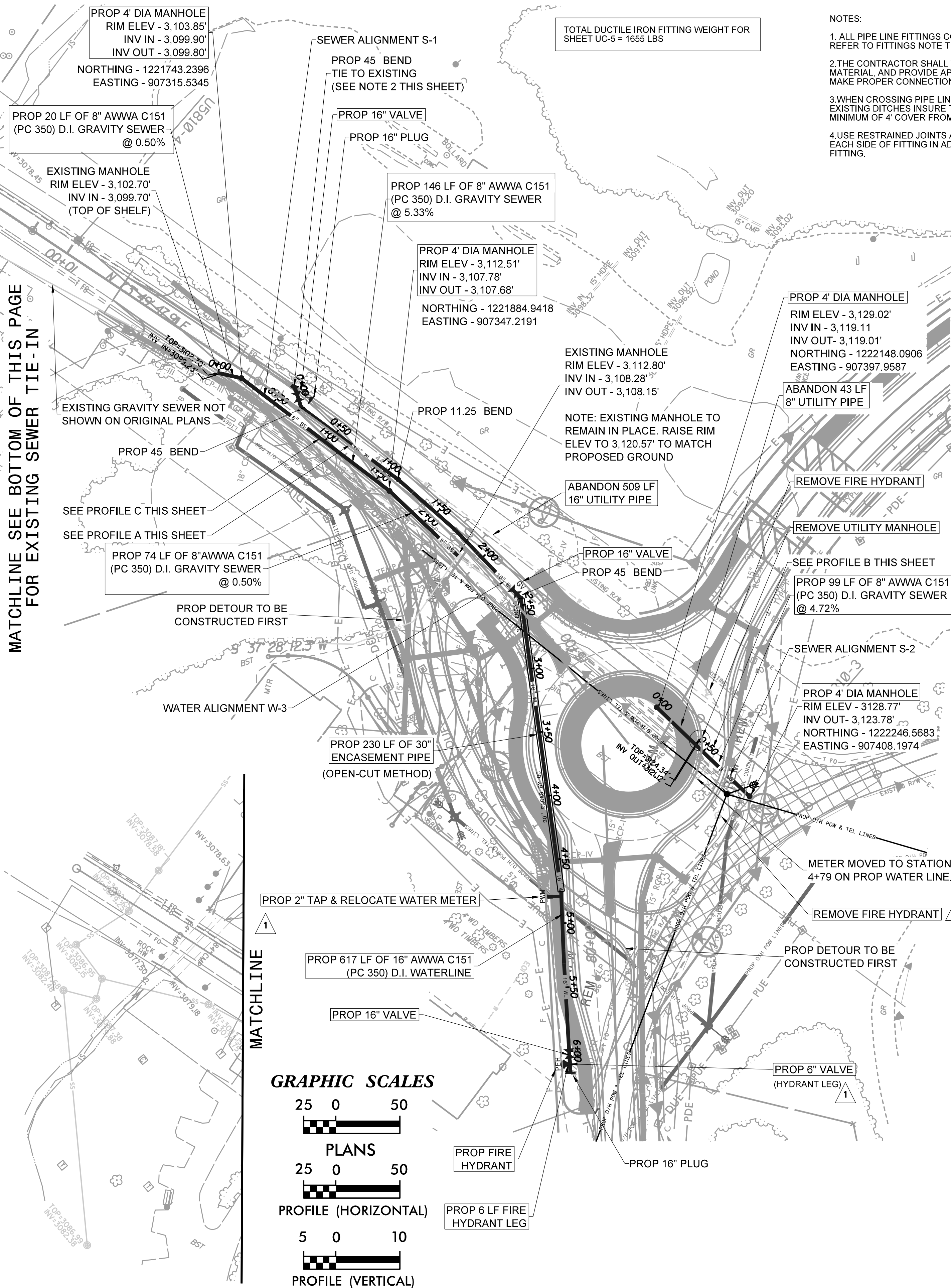
1. THE FULL LENGTH OF THE SERVICE DITCH SHALL BE COMPACTED IN 6" LAYERS WITH MECHANICAL TAMPING.
2. GUARD STAKE REQUIRED AT CLEANOUT LOCATION UNTIL LANDSCAPING IS COMPLETED.
3. LATERAL PIPE SHALL BE 4" PVC/DWV, ASTM 2665-68, SCHED. 40 (TYPE 1), SOLVENT CEMENTED JOINTS OR 4" CAST IRON SOLID PIPE.

NOT TO SCALE
SL013B

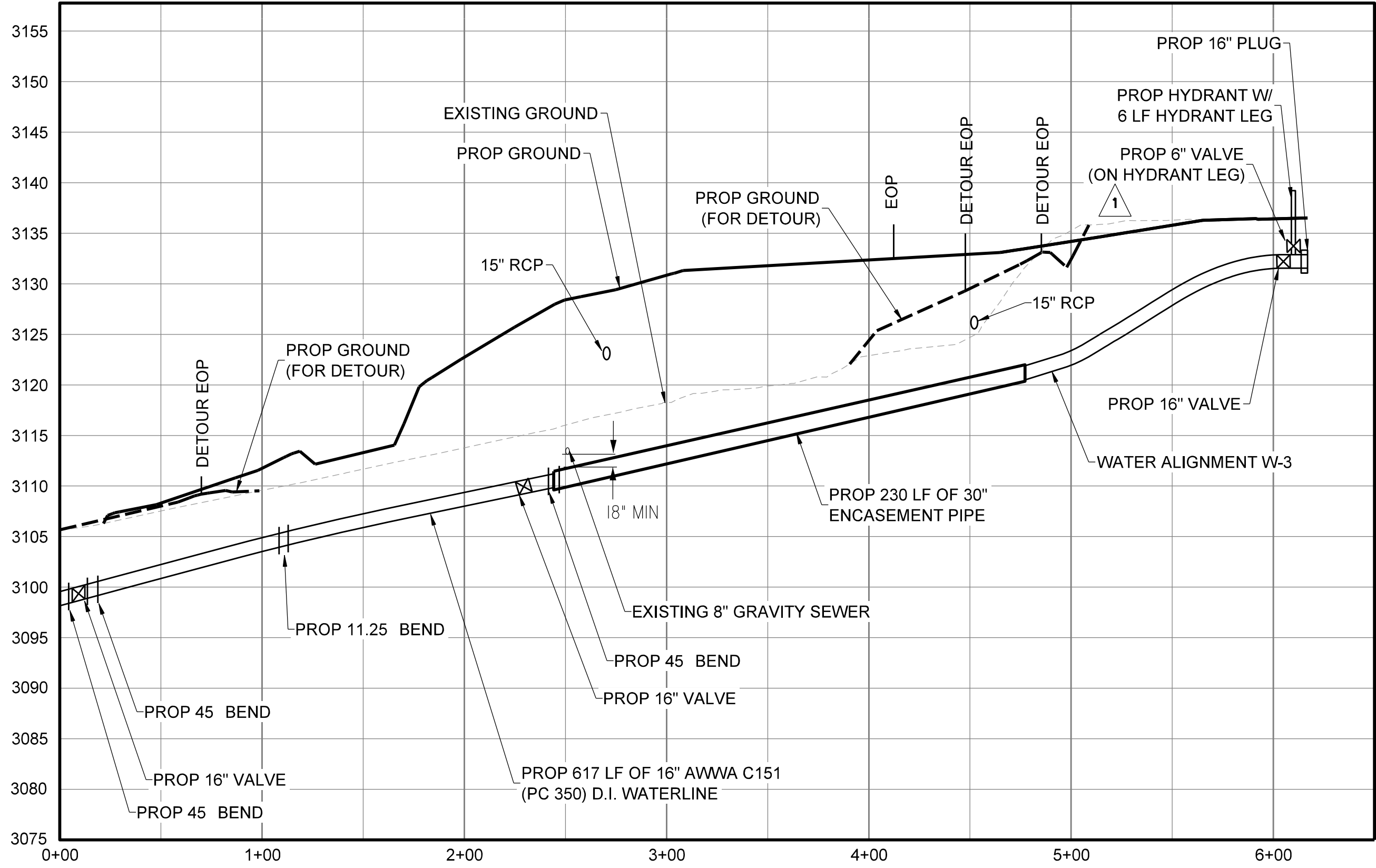
PROJECT REFERENCE NO.	SHEET NO.
U-5810	UC-5
DESIGNED BY: A. CREES	6-24-26
DRAWN BY: R. MOSS	
CHECKED BY: A. CREES	
APPROVED BY:	
REVISD:	
MUNICIPAL ENGINEERING, INC.	
820-B STATE FARM RD. BOONE NC, 28607 (828) 262-1767	



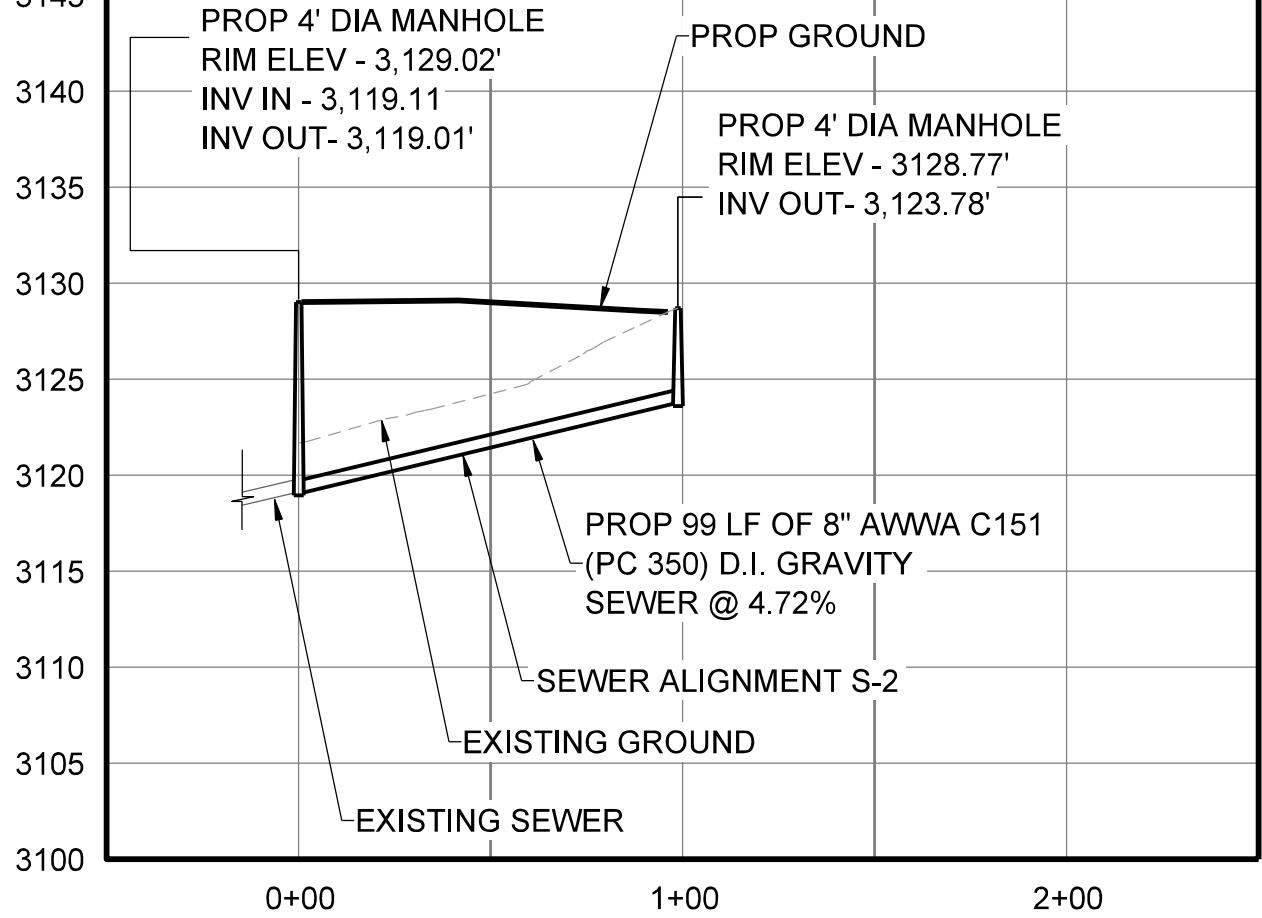
UTILITY CONSTRUCTION



PROFILE A



PROFILE B



PROFILE C

