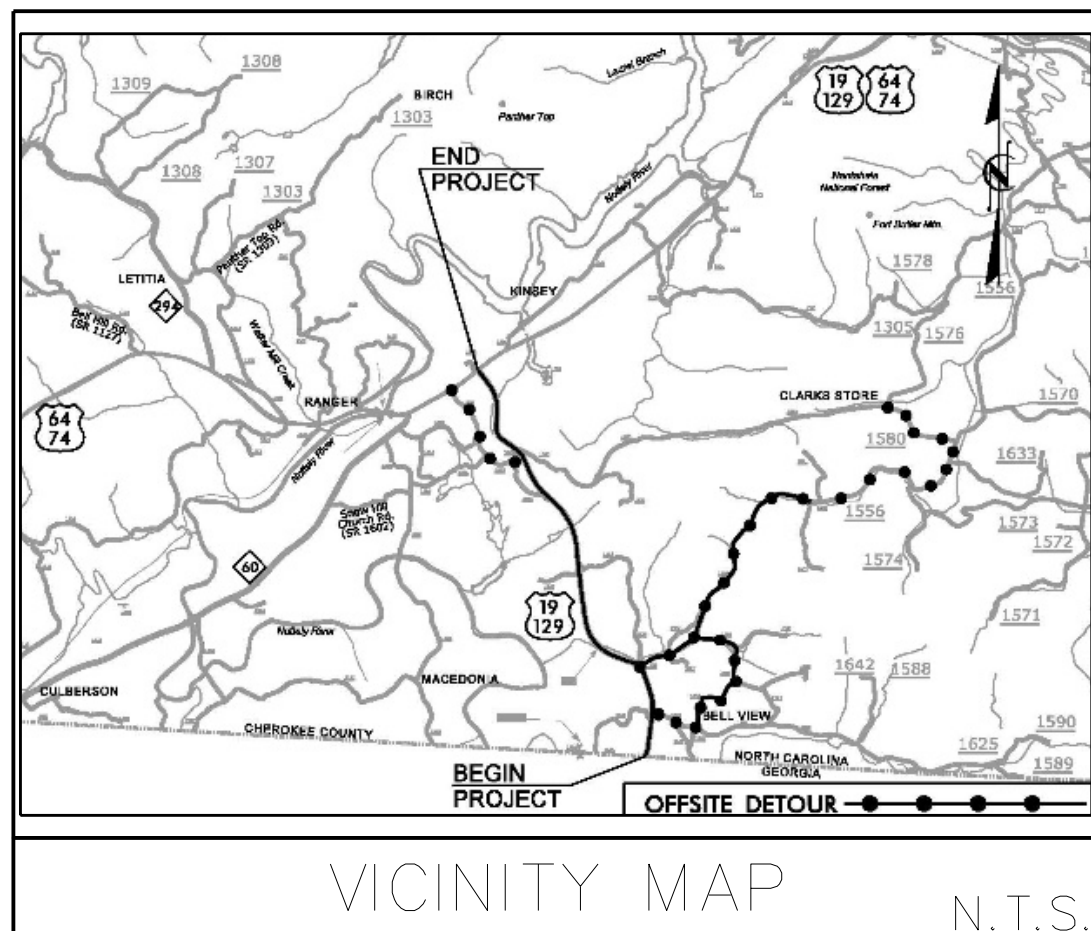


09.08.09

TIP PROJECT: R-5861

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

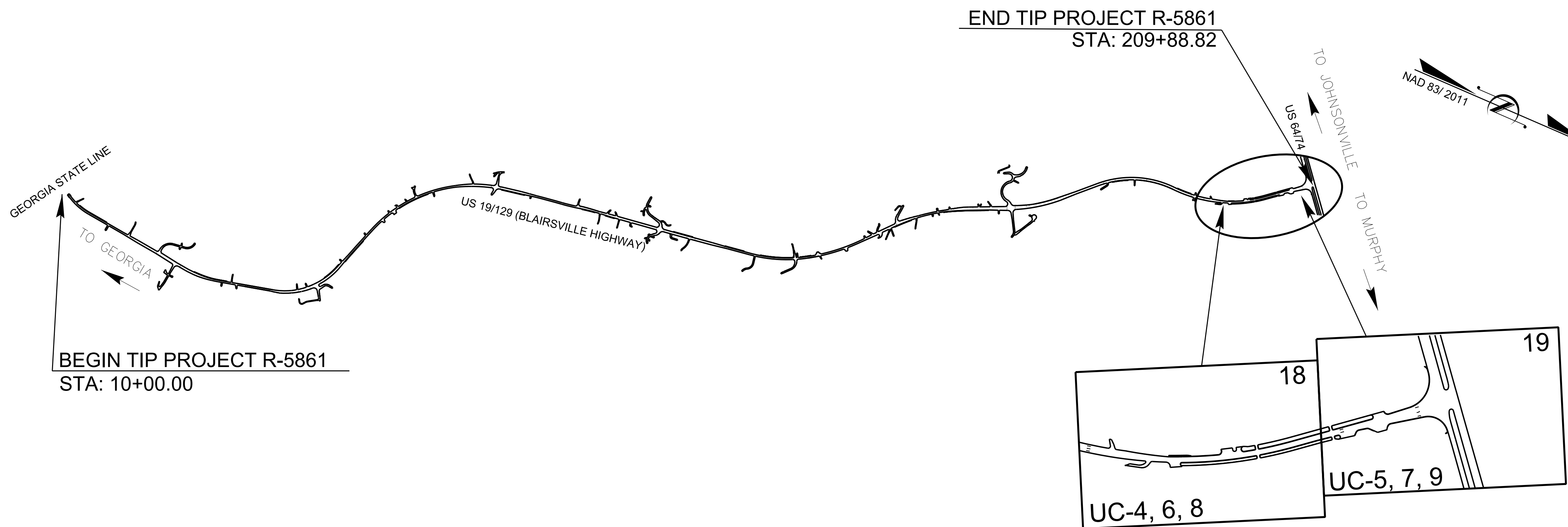
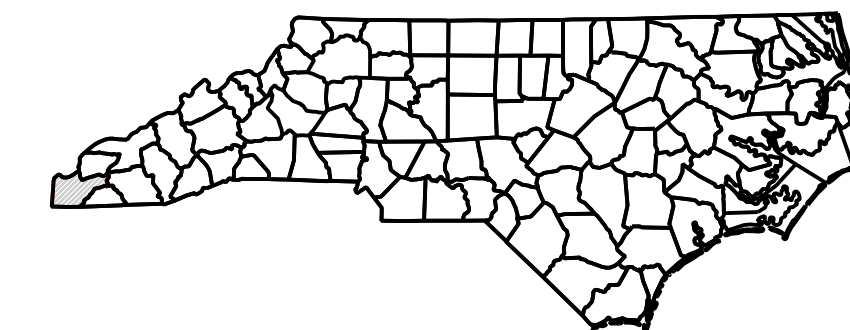
T.I.P. NO.	SHEET NO.
R-5861	UC-1



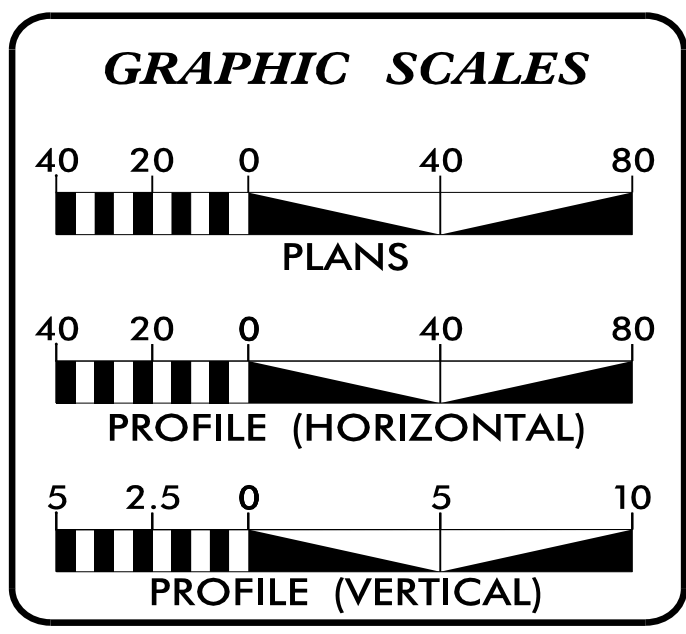
UTILITY CONSTRUCTION PLANS CHEROKEE COUNTY

LOCATION: WIDENING US 19/29 FROM THE GEORGIA STATE LINE TO US 64/74.

TYPE OF WORK: WATER AND SEWER UTILITY RELOCATIONS FOR PLANNED ROADWAY IMPROVEMENTS



DOCUMENT NOT CONSIDERED FINAL
UNTIL ALL SIGNATURES ARE COMPLETED



INDEX OF SHEETS

SHEET NO.:	DESCRIPTION:
UC-1	TITLE SHEET
UC-2	UTILITY SYMBOLOGY
UC-3	NOTES
UC-3A THRU US-3D	DETAILS
UC-4 THRU UC-9	UTILITY CONSTRUCTION PLAN & PROFILE SHEETS

WATER AND SEWER OWNER ON PROJECT

TOWN OF MURPHY
PUBLIC WORKS DEPARTMENT
5 WOFFORD STREET
MURPHY, NC 28906

828-837-2510

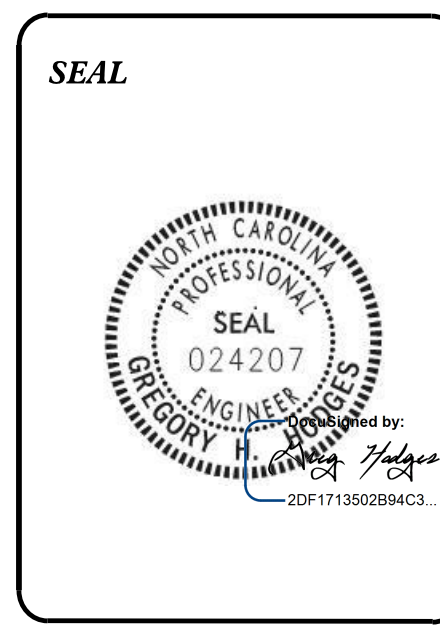
PREPARED IN THE OFFICE OF

Michael Baker International

700 Huger Street
Columbia, SC 29201
NC License: F-1084

Michael Baker INTERNATIONAL

KYLE CRAGER, P.E. UTILITY PROJECT DESIGNER



DIVISION OF HIGHWAYS UTILITIES UNIT
1555 MAIL SERVICES CENTER
RALEIGH, NC 27699-1555
PHONE (919) 707-6690
FAX (919) 250-4151

Donald Hampton UTILITIES REGIONAL ENGINEER
Bob Golding DIVISION UTILITY ENGINEER
Amy Dupree UTILITIES AREA COORDINATOR

9/25/2023
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mccarey

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	

NOTE
PAY ITEM

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 Forced 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)

5/14/99
 9/25/2013
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 REV: 2/1/2012

UTILITY CONSTRUCTION

GENERAL NOTES:

1. THE PROPOSED UTILITY CONSTRUCTION WILL MEET THE APPLICABLE REQUIREMENTS OF THE NC DEPARTMENT OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANUARY 2018.

2. ALL WATER AND 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.

3. EXISTING UTILITY OWNER INFORMATION:

TOWN OF MURPHY
PUBLIC WORKS DEPARTMENT
5 WOFFORD STREET
MURPHY, NC 28906

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.

7. CONTRACTOR IS RESPONSIBLE FOR LOCATING EXISTING UTILITIES FOR LOCATION, SIZE, AND TYPE MATERIAL AS NECESSARY FOR THE CONSTRUCTION OF THE PROPOSED UTILITIES AND FOR AVOIDING DAMAGE TO EXISTING FACILITIES.

8. PRIOR TO ORDERING ANY MATERIAL, CONTRACTOR SHALL FIELD LOCATE THE PLANNED TIE-IN LOCATIONS AND CONFIRM ELEVATION.

9. REPAIR ANY DAMAGE INCURRED TO EXISTING FACILITIES TO THE ORIGINAL OR BETTER CONDITION AT NO ADDITIONAL COST TO THE DEPARTMENT OR UTILITY OWNER.

10. 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 BY PROJECT ENGINEER.

11. CONTRACTOR WILL COORDINATE WITH THE TOWN OF MURPHY FOR SHUTDOWN OF ANY WATER OR SEWER SERVICES. ANY SHUTDOWN MUST BE COORDINATED WITH ADVANCE NOTICE PER GENERAL NOTE 5.

12. 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.

13. ALL UTILITY MATERIALS WILL BE APPROVED PRIOR TO DELIVERY TO THE PROJECT. SEE 1500-7, " SUBMITTALS AND RECORDS" IN SECTION 1500 OF THE STANDARD SPECIFICATIONS.

14. CONTRACTOR TO COORDINATE DRIVEWAY CROSSINGS AS NECESSARY WITH PROPERTY OWNERS. OTHERWISE DRIVEWAY ACCESS SHALL BE MAINTAINED AT ALL TIMES, UNLESS OTHERWISE NOTED.

15. CONTRACTOR AND OWNER TO COORDINATE ELEVATION ADJUSTMENT OF PROPOSED MANHOLE FROM EXISTING TO PROPOSED GRADE AS NECESSARY DURING ROADWAY PROJECT.

LIST OF STANDARD DRAWINGS

1. 1. STANDARD DETAILS ARE PROVIDED FOR THE PROJECT.
 - 1.1. 840.52 - PRECAST MANHOLE 4', 5' AND 6' DIAMETER
 - 1.2. 840.54 - MANHOLE FRAME AND COVER
 - 1.3. 1515.01 - WATER METER
 - 1.4. 1515.02 - FIRE HYDRANT
 - 1.5. 1520.01 - SEWER CLEAN OUT
 - 1.7. 1525.02 - PRECAST CONCRETE SANITARY SEWER MANHOLE - OUTSIDE DROP
 - 1.8. 1525.06 - PRECAST CONCRETE SANITARY SEWER MANHOLE WITH CAST - IN - PLACE BOTTOM
 - 1.9. 1605.01 - TEMPORARY SILT FENCE
 - 1.10. 1645.01 - TEMPORARY STREAM CROSSING
2. 2. WHERE NO STANDARD DETAIL IS PROVIDED IN DRAWINGS, COORDINATE WITH THE PROJECT ENGINEER.

PROJECT SPECIFIC NOTES:

1. CONTRACTOR'S ATTENTION IS DIRECTED TO THE UTILITY CONSTRUCTION PROJECT SPECIAL PROVISIONS PROVIDED ALONG WITH THIS PLAN SET.

2. ALL WATER MAIN PIPING SHALL CONFORM TO ANSI/AWWA C151/A21.51 IN ACCORDANCE WITH NCDOT STANDARD SPECIFICATIONS SECTION 1036, CLASS 350. FITTINGS SHALL CONFORM TO ANSI/AWWA C110/A21.10 WITH A CEMENT MORTAR LINING AND A SEAL COAT IN ACCORDANCE WITH ANSI/AWWA C104/A21.4.

3. PVC GRAVITY SEWER PIPE SHALL CONFORM TO ASTM D3034 WITH MINIMUM SDR 26 IN ACCORDANCE WITH NCDOT STANDARD SPECIFICATIONS SECTION 1034. SEWER SERVICES ARE TO BE REPLACED IN KIND.

4. PVC FORCE MAIN PIPE SHALL CONFORM TO ASTM D2241 OR ANSI/AWWA C900 WITH MINIMUM SDR OF 21 AND MINIMUM PRESSURE RATING OF 200 PSI IN ACCORDANCE WITH NCDOT STANDARD SPECIFICATIONS SECTION 1034, OR AWWA C900 MINIMUM DR 18 AND MINIMUM PRESSURE CLASS OF 235 PSI.

5. ALL PROPOSED FITTINGS (BENDS, PLUGS, ETC.) WILL BE ADEQUATELY RESTRAINED BY THE USE OF RESTRAINED JOINT PIPE CONSTRUCTION AND / OR CAST IN PLACE CONCRETE THRUST RESTRAINS AS DETAILED ON THESE DRAWINGS OR AS DIRECTED BY THE RESIDENT PROJECT REPRESENTATIVE OR PROJECT ENGINEER.

6. MAINTAIN 3-FEET COVER MINIMUM FOR ALL PIPING, UNLESS OTHERWISE SPECIFIED ON THE DRAWINGS.

7. WHEN REQUIRED OR NOTED ON THE DRAWINGS, 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.

8. WATER METERS ARE PROVIDED AND INSTALLED BY THE TOWN OF MURPHY PUBLIC WORKS DEPARTMENT.

9. EXISTING WATER METERS TO BE RELOCATED WILL BE CONNECTED TO THE EXISTING WATER LINE WITH NEW WATER SERVICES LINES. ANY EXTENSIONS OR MODIFICATIONS TO THE EXISTING SERVICE LINES ON THE CUSTOMER SIDE OF THE WATER METER WILL BE INCIDENTAL TO THE RELOCATION OF THE WATER METER.

10. ALL WORK FOR WATER SERVICES WILL BE CONDUCTED WITH LIKE PIPE MATERIALS AS THE EXISTING PIPES. UNLESS THE EXISTING MATERIAL IS FOUND TO BE UNSUITABLE (I.E. GALVANIZED OR LEAD). FOR UNSUITABLE MATERIAL, CONTRACTOR WILL USE COPPER WATER PIPE AND TUBING CONFORMING TO ASTM B88 SOFT ANNEALED TYPE K. ALL JOINT TO USE COMPRESSION TYPE FITTINGS CONFORMING TO ANSI/AWWA C800.

11. ALL PIPE TESTING WILL BE DONE IN THE PRESENCE OF TOWN OF MURPHY PUBLIC WORKS DEPARTMENT REPRESENTATIVE.

12. PIPE TESTING WILL BE PER THE PROJECT SPECIAL PROVISIONS.

13. AFTER PRESSURE TESTING AND PRIOR TO PUTTING PIPE INTO SERVICE, ALL WATER LINES WILL BE DISINFECTED. FOLLOW DISINFECTION, CHLORINATION AND TESTING PROCEDURES PER THE PROJECT SPECIAL PROVISIONS.

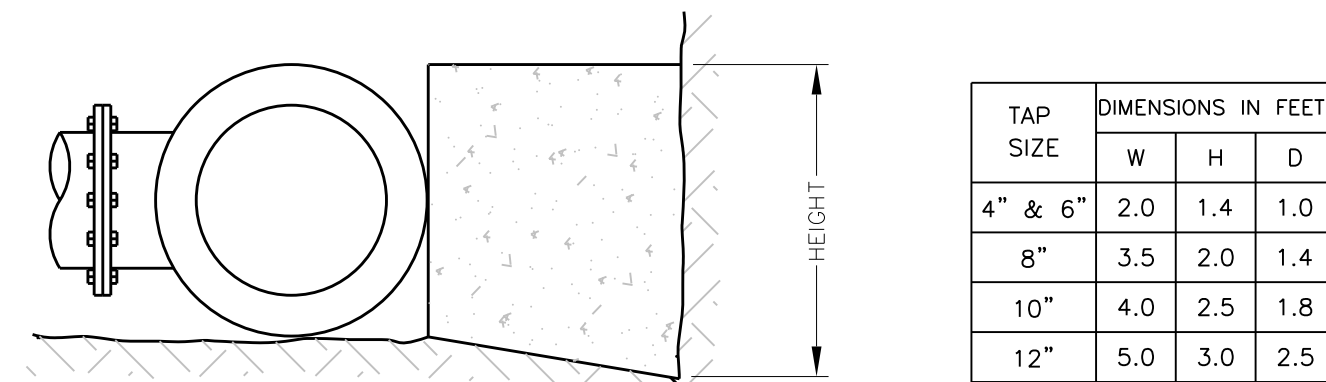
14. THE CONTRACTOR IS RESPONSIBLE FOR TAKING WATER SAMPLES AND HAVING THEM TESTED AT AN AWWA APPROVED LABORATORY. NO WATER LINE WILL BE PUT INTO SERVICE UNTIL WATER SAMPLES HAVE PASSED LABORATORY TESTING.

PROJECT REFERENCE NO.	SHEET NO.
R-5861	UC-3
DESIGNED BY: KTC	
DRAWN BY: ATL	
CHECKED BY: GHH	
APPROVED BY: GHH	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	

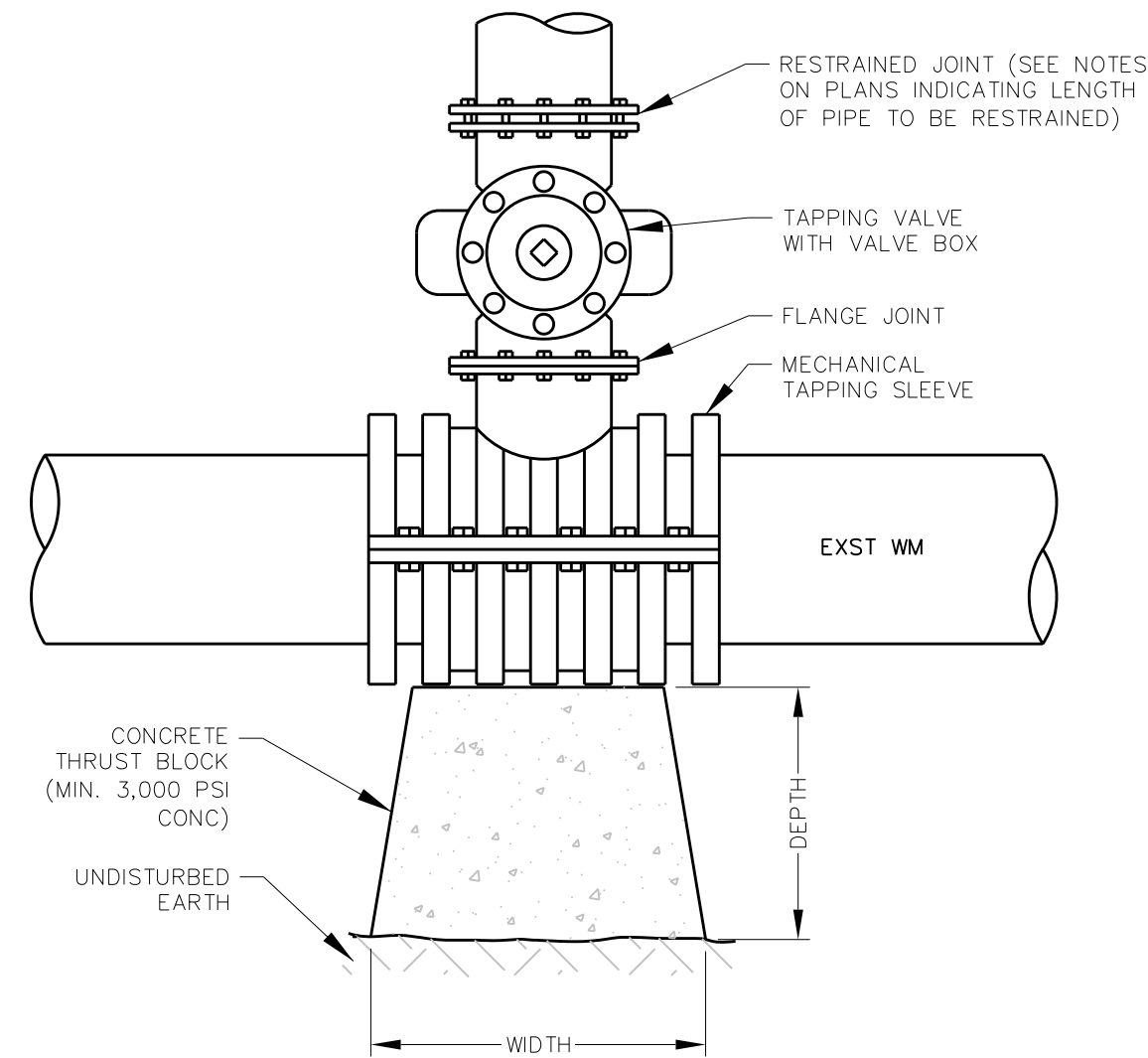
UTILITY CONSTRUCTION
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
R-5861	UC-3A
DESIGNED BY: KTC	
DRAWN BY: ATL	
CHECKED BY: GHH	
APPROVED BY: GHH	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	
UTILITY CONSTRUCTION PLANS ONLY	

PROJECT TYPICAL DETAILS

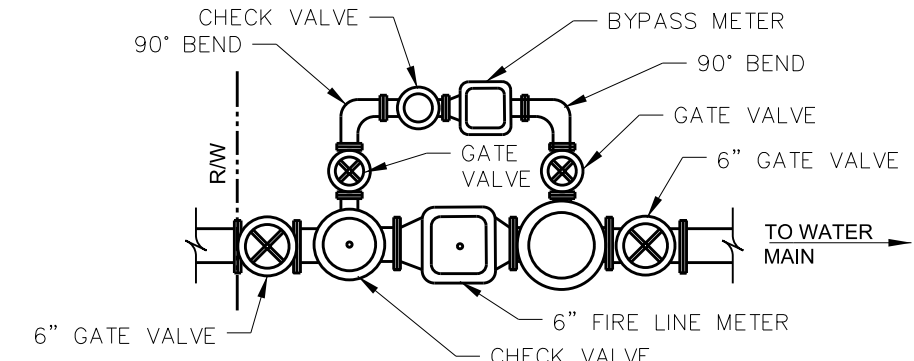


TAP SIZE	DIMENSIONS IN FEET		
	W	H	D
4" & 6"	2.0	1.4	1.0
8"	3.5	2.0	1.4
10"	4.0	2.5	1.8
12"	5.0	3.0	2.5

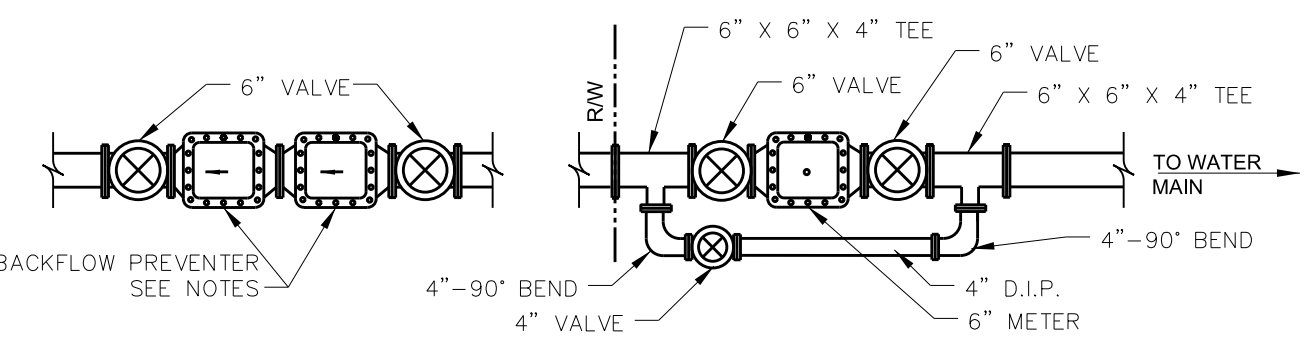


TYPICAL TAPPING SLEEVE AND VALVE DETAIL
NOT TO SCALE

- NOTES:**
1. BASED ON 100 PSI STATIC PRESSURE PLUS AWWA WATER HAMMER ALLOWANCE
 2. ALL BEARING SURFACES TO BE CARRIED TO UNDISTURBED GROUND WITH 2000 PSF BEARING CAPACITY
 3. THRUST BLOCKS TO BE USED AT ALL LINES OPERATING UNDER PRESSURE.
 4. KEEP ALL PIPING JOINTS CLEAR OF THRUST BLOCKS.
 5. POOR SOIL A-4-A-8, SILTY SOILS, CLAYS, MUCK, AND PEAT WILL REQUIRE LARGER THRUST BLOCKS.

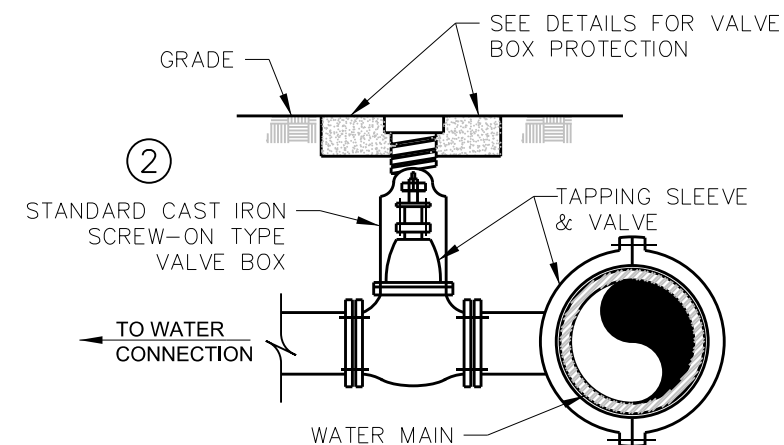


FIRE SERVICE COMBINED WITH DOMESTIC SERVICE (TYPICAL)



SERVICE CONNECTION 4" & OVER WITHOUT FIRE SERVICE

NOTE:
BACKFLOW PREVENTERS MAY BE HOUSED INSIDE BUILDING OR IN SEPARATE VALVE PIT



SERVICES 2" AND LARGER

- NOTE:**
1. SIZE-ON-SIZE TAPPING SLEEVES SHALL BE MECHANICAL JOINTS.
 2. SMALLER TAPS ONTO LARGER LINES MAY USE FABRICATED TAPPING SLEEVES AND VALVES

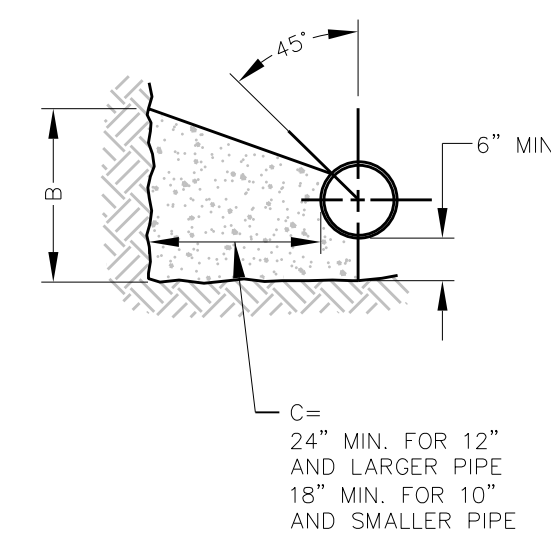
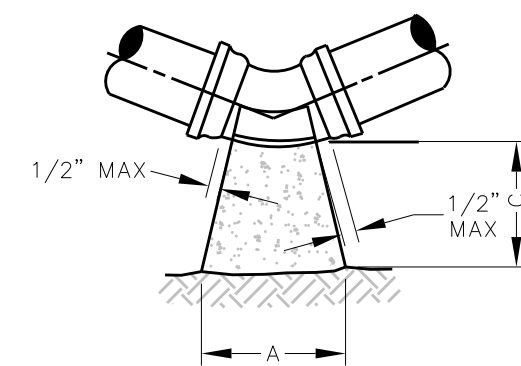
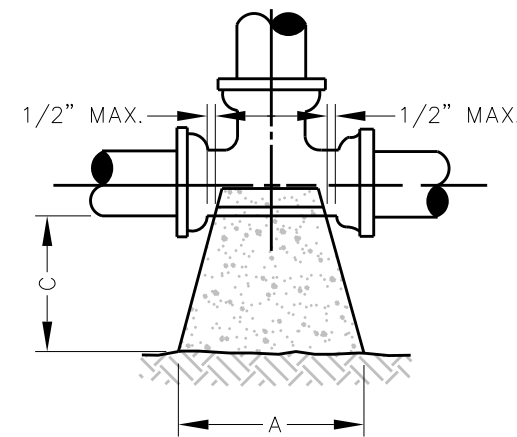
TYPICAL SERVICE CONNECTIONS
NOT TO SCALE

- NOTES:**
1. FIRE SERVICE METER ASSEMBLY UTILIZES ONLY ONE LINE FOR FIRE PROTECTION SERVICE AND DOMESTIC WATER SERVICE. ONLY ONE METER BOX REQUIRED TO HOUSE SERVICE TO PROPERTY.
 2. THE SIZES OF FIRE LINE METER AND BYPASS METER VARIES WITH APPLICATION.
 3. METERS AND BACKFLOW PREVENTERS ARE IN SEPARATE PITS NORMALLY.
 4. TYPE OF BACKFLOW PREVENTER VARIES WITH APPLICATION.
 5. METERS ARE INSTALLED BY TOWN FORGES AT OWNER'S EXPENSE.
 6. ALL VALVES MUST MEET SPECIFICATIONS.
 7. VALVES NOT IN PITS WILL BE IN CAST IRON BOXES WITH CAST IRON LIDS AS SHOWN IN MUELLER CATALOG W-103, OR APPROVED EQUAL.
 8. ALL D.I. PIPE JOINTS TO BE FLANGED.
 9. ALL COPPER JOINTS TO BE FLARED.
 10. SERVICE LINES 2" AND SMALLER NOT SPECIFIED IN THE DRAWINGS SHALL BE POLYETHYLENE PE 3408 DR-11 CLASS 160 CTS TUBING WITH BRASS FITTINGS. SERVICE SADDLES ARE REQUIRED ON ALL SERVICE CONNECTIONS 2" OR SMALLER ON ALL WATER MAINS. SERVICE SADDLES USED TO MAKE SERVICE CONNECTIONS SHALL PROVIDE FULL SUPPORT AROUND THE CIRCUMFERENCE OF THE WATER MAIN. DIRECT SERVICE TAPS ON WATER MAINS SHALL NOT BE ALLOWED.
 11. WHEN THE TOWN ELECTS TO INSTALL THE SERVICE ON NEW MAINS, THE CONTRACTOR SHALL STUBOUT THE SERVICE WITH A FLANGED TO MECHANICAL JOINT VALVE.
 12. ALL PRESSURE REDUCING BACKFLOW PREVENTERS SHALL BE IN ACCORDANCE WITH NCDEQ REQUIREMENTS.
 13. METER BOXES FOR METERS 2" AND SMALLER WITHIN THE TRAVELED WAY MUST BE CAST IRON OR CONCRETE. METER BOXES OUTSIDE THE TRAVELED WAY MAY BE CAST IRON, CONCRETE, OR PLASTIC. CAST IRON METER READER COVERS ARE REQUIRED. FOR METERS 3" AND LARGER REFER TO THE STANDARD DETAIL.

UTILITY CONSTRUCTION
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

9/25/2023
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 mcarey

UTILITY CONSTRUCTION
 DOCUMENT NOT CONSIDERED
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 SIGNATURES COMPLETED



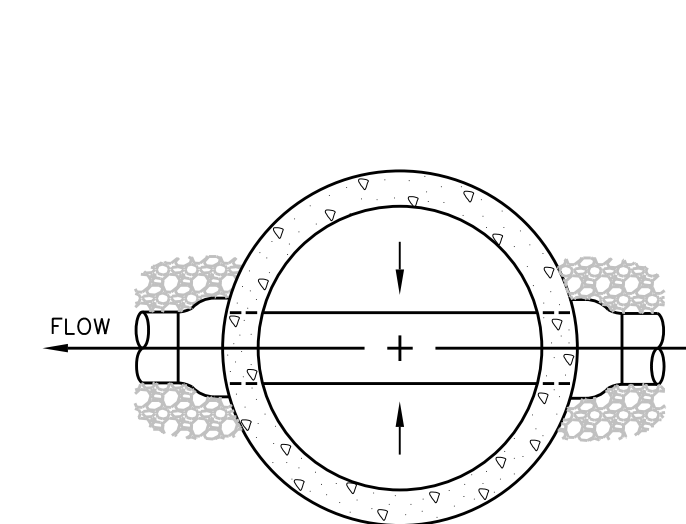
SIZE	TEES			S.F. BEARING SURFACE
	A	B	C	
4"	16"	16"	18"	1.78
6"	20"	24"	18"	3.33
8"	26"	32"	18"	5.78
10"	32"	40"	18"	8.89
12"	36"	48"	24"	12.00
14"	40"	56"	24"	15.56
16"	48"	60"	24"	20.00
18"	56"	64"	24"	24.89
20"	60"	76"	24"	31.67
24"	72"	90"	24"	45.00
30"	86"	102"	24"	60.67
36"	116"	108"	24"	86.11

NOTES:

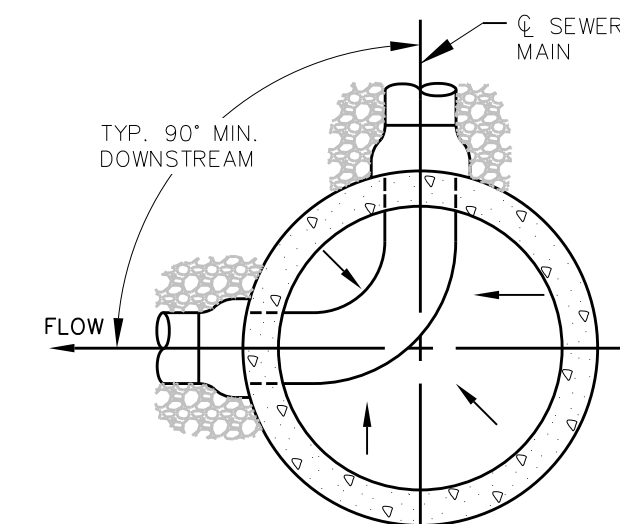
- ALL BEARING SURFACES TO BE CARRIED TO UNDISTURBED SOIL.
- THESE TABLES SHOW MINIMUM SIZES FOR THRUST BLOCKS IN GOOD SOIL (A-1 THRU A-3, CLEAN SANDS AND GRAVELS) WITH MINIMUM BEARING CAPACITY OF 2000 PSI.
- POOR SOILS A-4 THRU A-8, SILTY SOILS, CLAYS, MUCK AND PEAT WILL REQUIRE LARGER THRUST BLOCKING.
- BOTH CONCRETE THRUST BLOCKS AND TIE RODS/RESTRIAINED JOINTS MUST BE USED WHEN, IN THE JUDGEMENT OF THE ENGINEER, THE NATURE AND CRITICALITY OF AN INSTALLATION IS SUCH AS TO REQUIRE POSITIVE ASSURANCE OF STABILITY.
- THE USE OF THRUST BLOCKS SHALL BE LIMITED TO SITUATIONS SUCH AS POINT REPAIR WHERE EXPOSING SEVERAL JOINTS OF PIPE IS NOT FEASIBLE DUE TO EXISTING GROUND CONDITIONS.
- MAXIMUM TEST PRESSURE TO BE 150 PSI.

SIZE	90° BEND			S.F. BEARING SURFACE	45° BEND			S.F. BEARING SURFACE	22-1/2° BEND			S.F. BEARING SURFACE	11-1/4° BEND			S.F. BEARING SURFACE
	A	B	C		A	B	C		A	B	C		A	B	C	
4"	16"	16"	18"	1.78	14"	16"	18"	1.56	14"	16"	18"	1.56	14"	16"	18"	1.56
6"	22"	32"	18"	4.89	16"	18"	18"	2.00	14"	16"	18"	1.56	14"	16"	18"	1.56
8"	32"	36"	18"	8.00	24"	28"	18"	4.67	16"	18"	18"	2.00	14"	16"	18"	1.56
10"	36"	46"	18"	11.50	26"	36"	18"	6.50	20"	24"	18"	3.33	14"	18"	18"	1.75
12"	44"	56"	24"	17.11	32"	40"	24"	8.89	24"	30"	24"	5.00	16"	20"	24"	2.22
14"	52"	62"	24"	22.39	36"	48"	24"	12.00	26"	36"	24"	6.50	20"	24"	24"	3.33
16"	58"	72"	24"	29.00	40"	54"	24"	15.00	32"	38"	24"	8.44	22"	26"	24"	3.97
18"	64"	80"	24"	35.56	46"	60"	24"	19.17	36"	42"	24"	10.50	24"	32"	24"	5.33
20"	72"	88"	24"	44.00	52"	66"	24"	23.83	38"	48"	24"	12.67	26"	36"	24"	6.50
24"	96"	96"	24"	36.89	64"	78"	24"	34.67	46"	56"	24"	17.89	32"	40"	24"	8.89
30"	122"	102"	24"	86.11	72"	94"	24"	47.00	56"	62"	24"	24.11	36"	48"	24"	12.00
36"	166"	104"	24"	123.33	88"	108"	24"	66.00	64"	78"	24"	34.67	44"	54"	24"	16.50

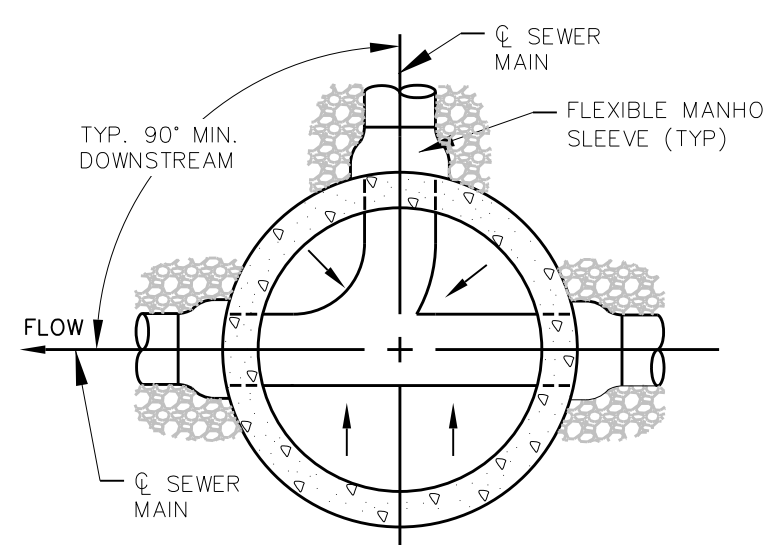
THRUST BLOCK SIZE CHART AND DETAIL
 NOT TO SCALE



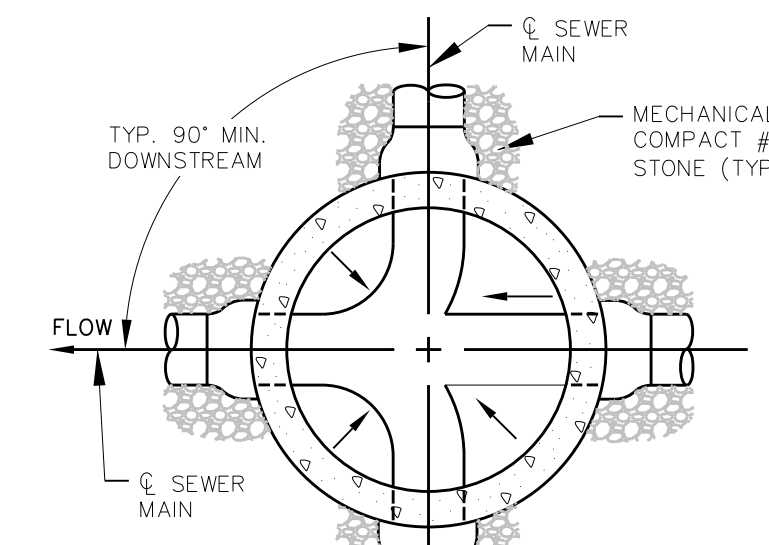
STRAIGHT



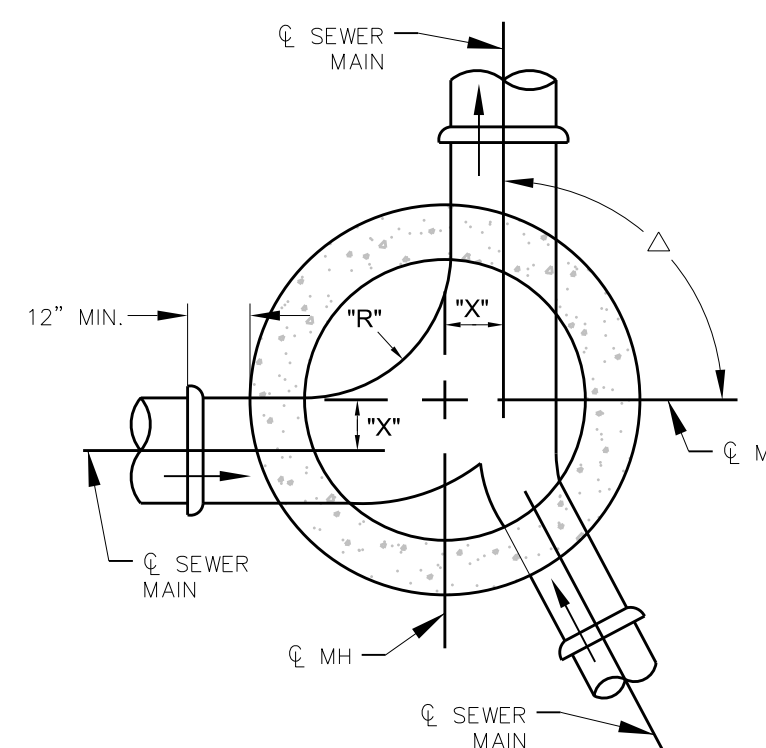
TWO-WAY INTERSECTION



THREE-WAY INTERSECTION



FOUR-WAY INTERSECTION



TYPICAL STANDARD MANHOLE PLAN

STANDARD MANHOLES SCHEDULE OF GOVERNING DIMENSIONS				
PIPE SIZE	ANGLE Δ	INSIDE DIAMETER	"R"	"X"
8" TO 15"	0° TO 90°	4'-0"	2'-0"	0"
16" TO 30"	0° TO 90°	5'-0"	2'-0"	6"
36" TO 42"	0° TO 90°	6'-0"	3'-0"	9"
36" TO 42"	60° TO 90°	6'-0"	3'-0"	1'-2"
48" OR LARGER	0° TO 45°	7'-0"	4'-0"	6"
48" OR LARGER	45° TO 90°	8'-0"	3'-0"	1'-3"

*MANHOLE DEEPER THAN 12' SHALL BE 5' MIN.

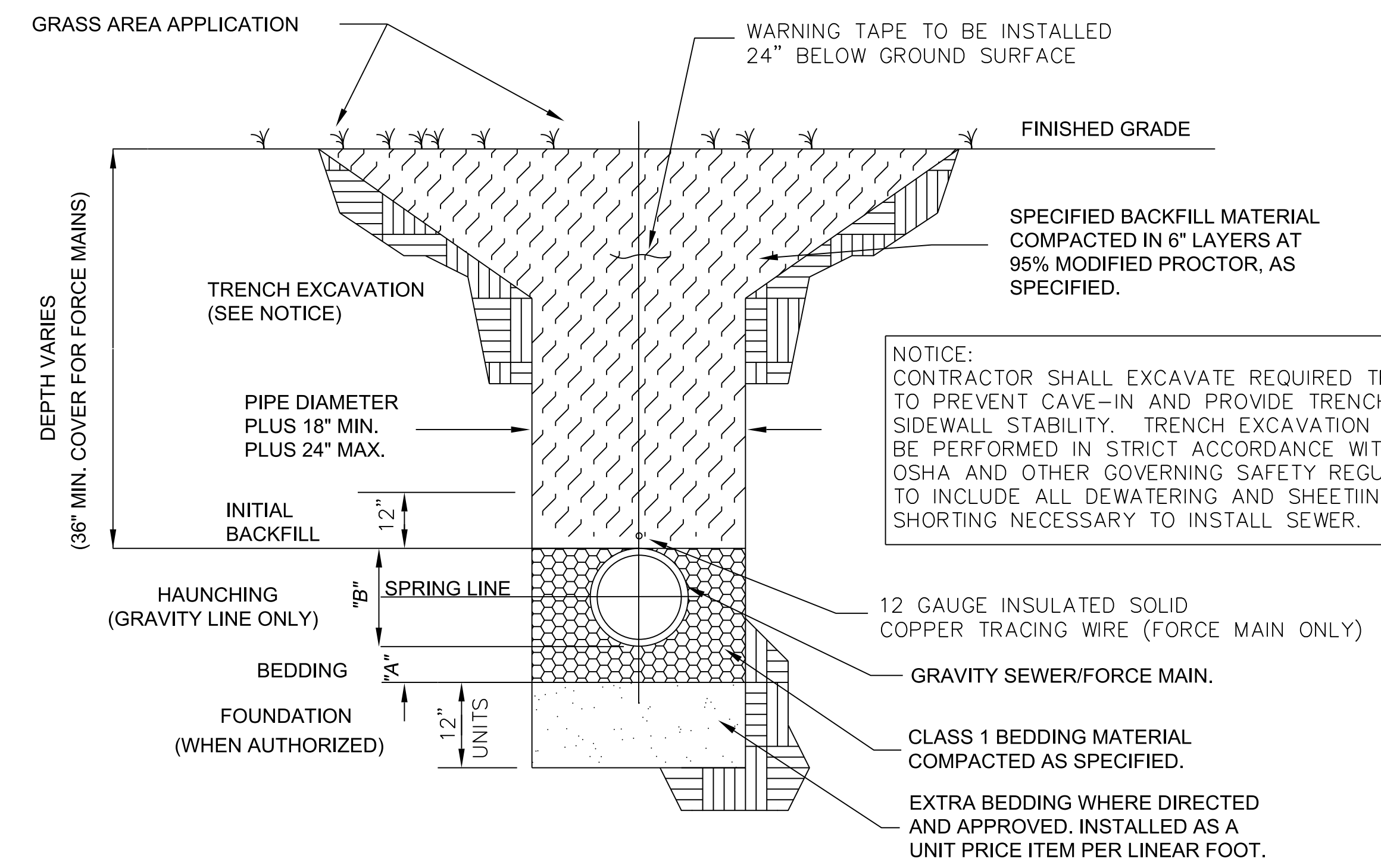
MANHOLE PLAN AND INVERT DETAIL

NOT TO SCALE

NOTES:

- TROWEL SHAPE INVERTS TO BE UNIFORM AND SMOOTH.
- ARROWS INDICATE DIRECTION OF SLOPE.

UTILITY CONSTRUCTION
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

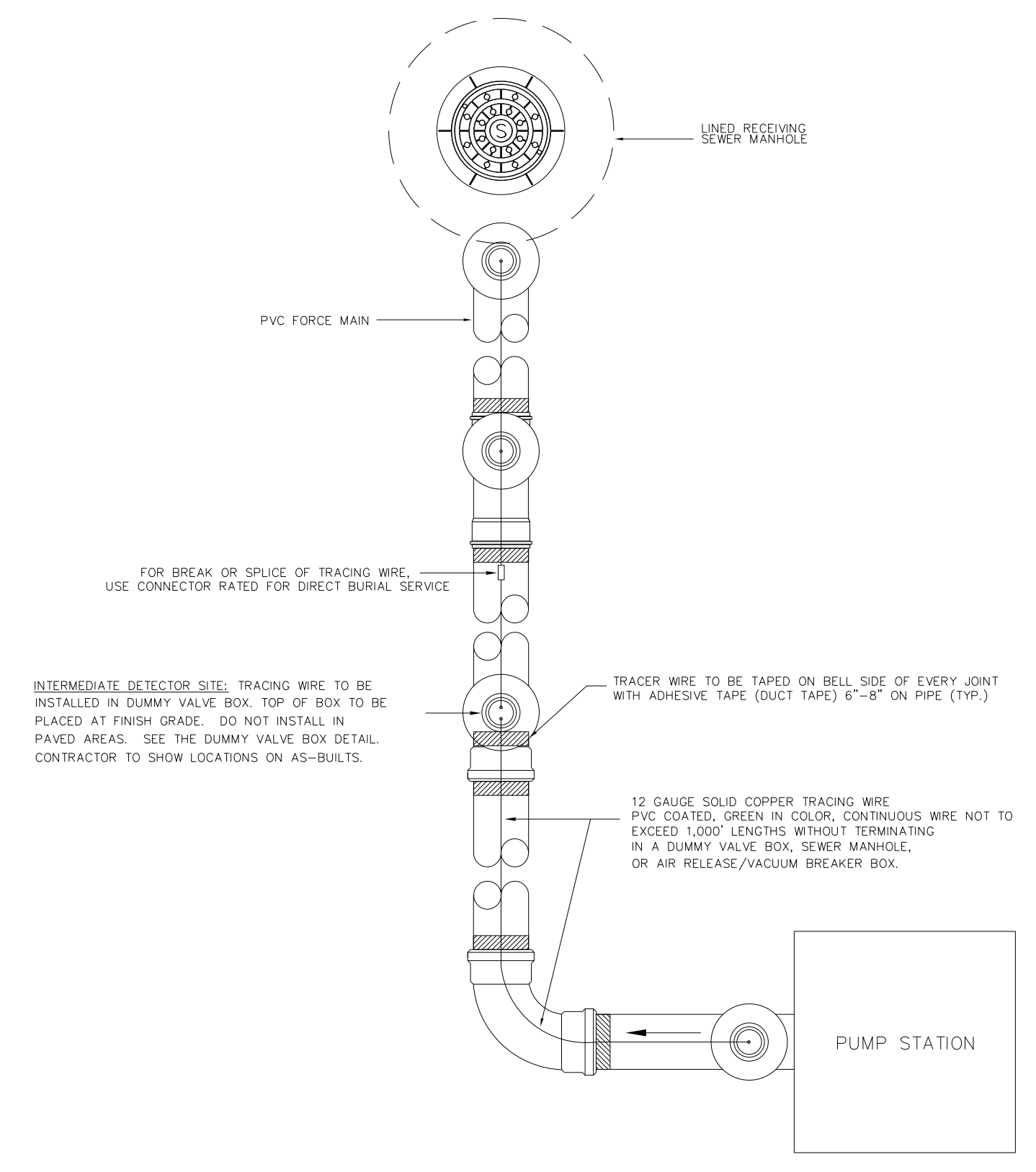


NOTICE:
CONTRACTOR SHALL EXCAVATE REQUIRED TRENCH TO PREVENT CAVE-IN AND PROVIDE TRENCH SIDEWALL STABILITY. TRENCH EXCAVATION SHALL BE PERFORMED IN STRICT ACCORDANCE WITH OSHA AND OTHER GOVERNING SAFETY REGULATIONS TO INCLUDE ALL DEWATERING AND SHEETING & SHORTING NECESSARY TO INSTALL SEWER.

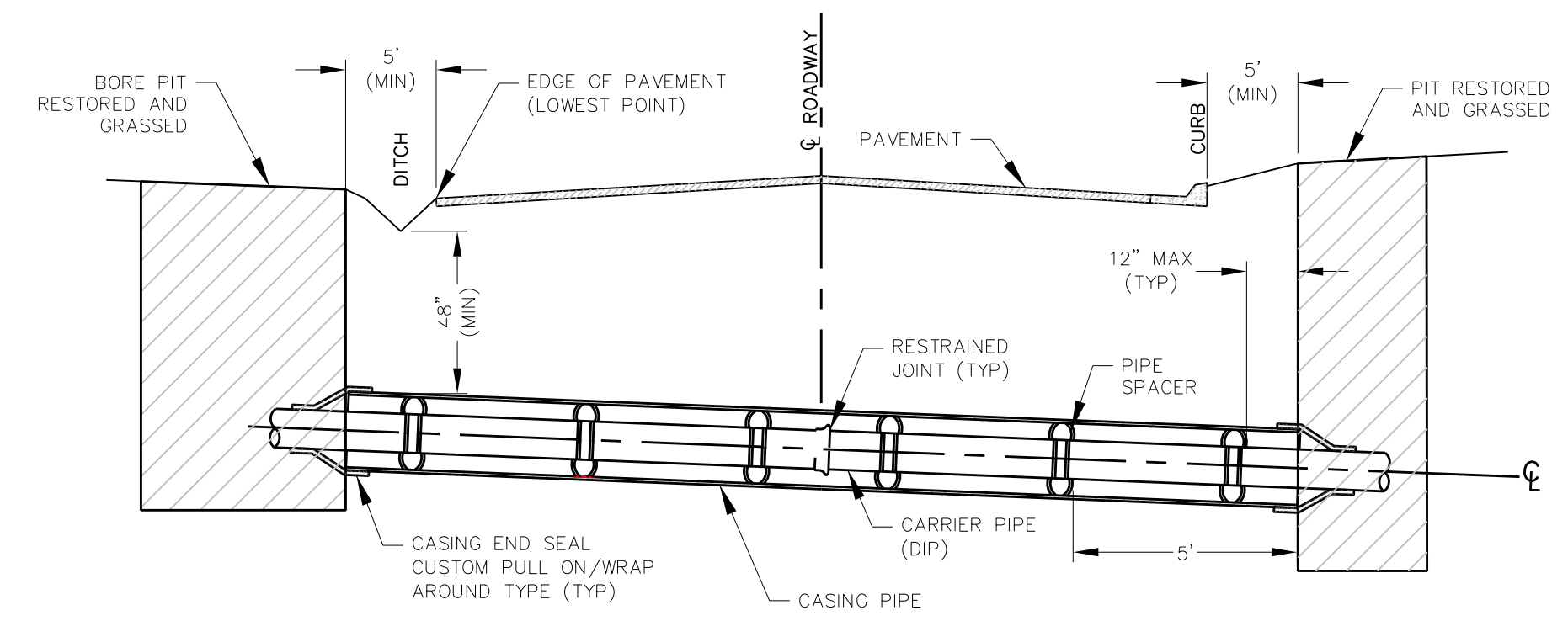
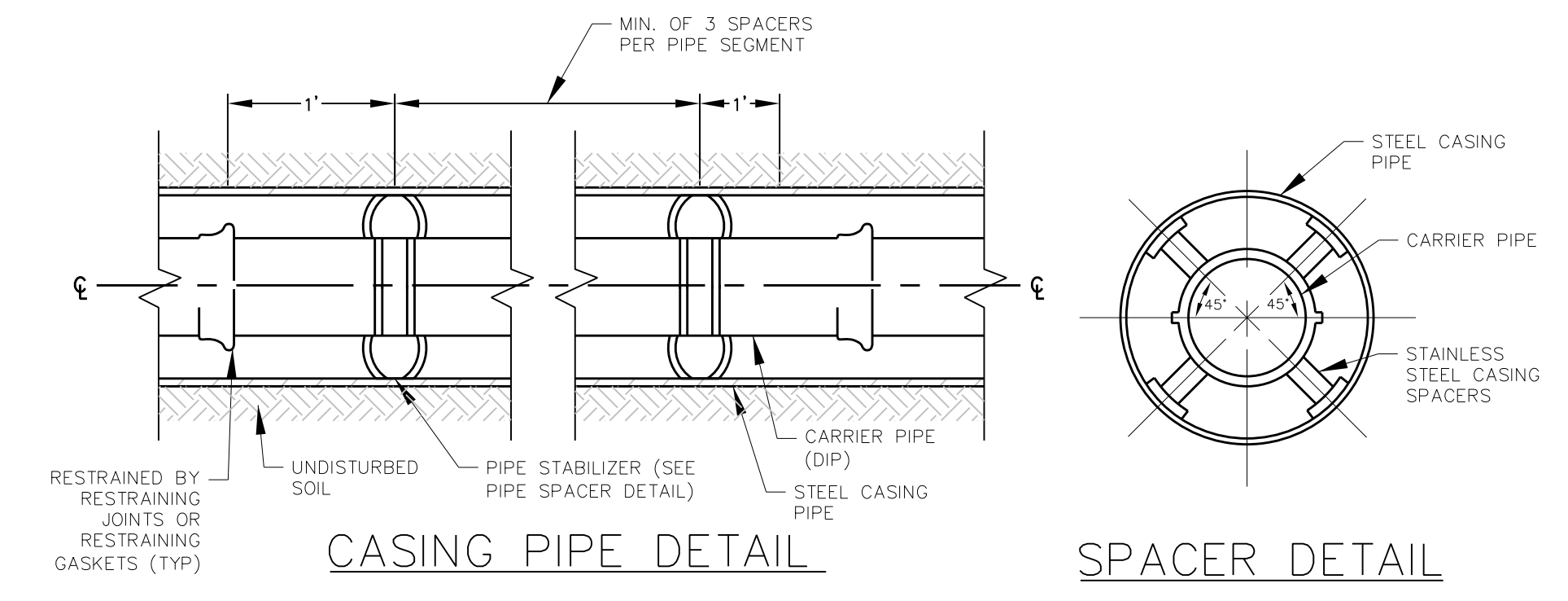
DEPTH SCHEDULE FOR HAUNCHING (GRAVITY LINE ONLY) AND BEDDING				
PIPE Ø	4"-10"	12"-18"	24"	36"
"A"	6"	8"	10"	12"
"B"	TO TOP OF PIPE		20"	27"

EMBEDMENT COMPACTION SHALL BE THE MINIMUM DENSITIES INDICATED IN TABLE 2 OF ASTM D2321-LR.

FORCE MAIN/GRAVITY LINE TRENCH DETAIL
SCALE: N.T.S



TRACING WIRE INSTALLATION DETAIL
NOT TO SCALE

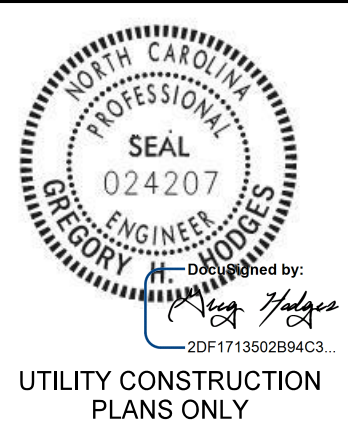


BORE AND JACK AND CASING DETAIL
NOT TO SCALE

- NOTES:**
1. STEEL CASING LENGTH SHALL BE IN ACCORDANCE WITH NCDOT'S UTILITY ACCOMMODATIONS MANUAL AND THE SPECIFICATIONS.
 2. CASING PIPE AND CARRIER PIPE DIAMETERS SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS AND DRAWINGS.
 3. USE SPIDER SUPPORTS (SEE DETAIL) TO MOVE CARRIER PIPE INTO CASING PIPE. SPACING OF SPIDERS WILL BE DICTATED BY THE LENGTH OF CASING PIPE AND NUMBER OF JOINTS OF CARRIER PIPE.
 4. MINIMUM OF 3 SPACERS PER JOINT OF PIPE.

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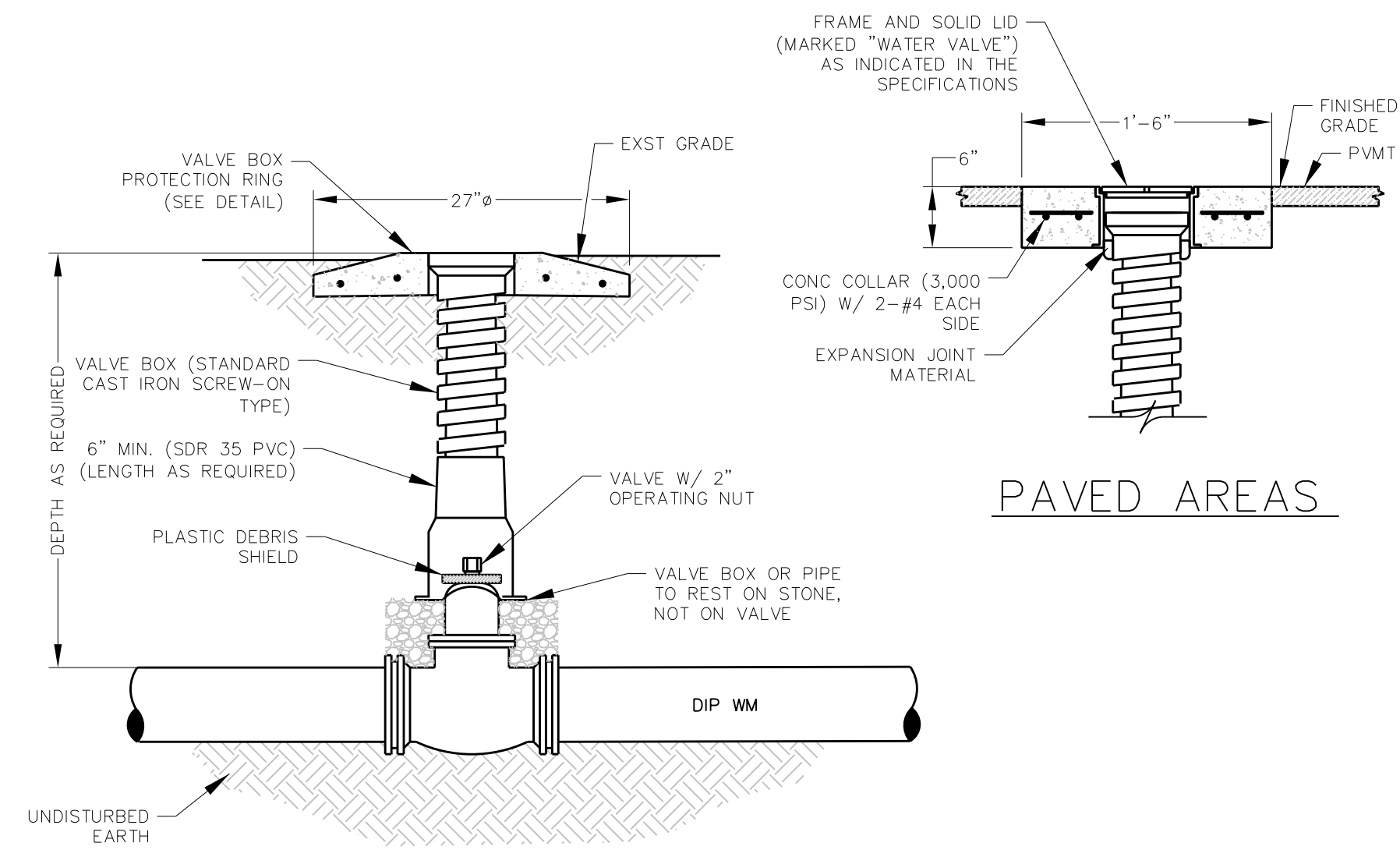
DESIGNED BY: KTC
 DRAWN BY: ATL
 CHECKED BY: GHH
 APPROVED BY: GHH



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

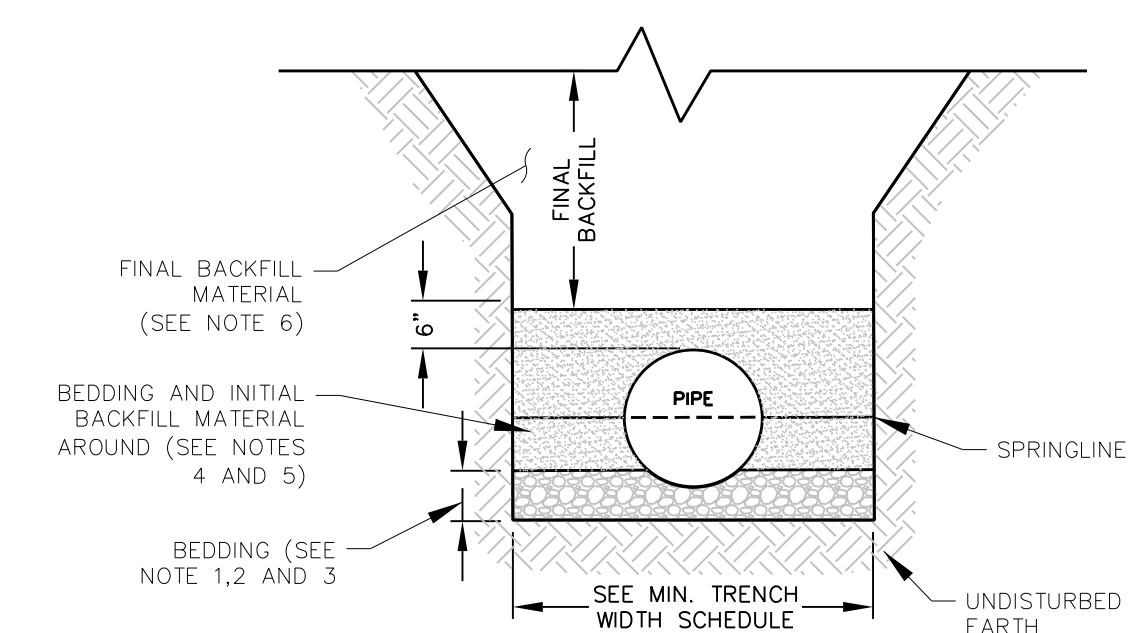
UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION
 DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED



GATE VALVE AND VALVE BOX DETAIL
 NOT TO SCALE

- NOTES:**
1. FOR UNPAVED LOCATIONS, A CONCRETE VALVE BOX PROTECTOR RING SHALL BE PROVIDED AND INSTALLED FLUSH WITH GRADE. PROTECTOR RING PAD IS NOT REQUIRED FOR VALVE LOCATED IN THE ROADWAY, UNLESS SHOWN OR NOTED OTHERWISE.
 3. FOR NEW CONSTRUCTION, THE VALVE BOX SHALL BE ADJUSTED TO MIDRANGE TO ALLOW FOR FUTURE BOX ADJUSTMENTS. ROUTE LOCATE WIRES THROUGH THE ADJUSTMENT SECTION OF BOX OR DRILL 3/8" HOLE IN THE BOX TOP SECTION. THE LOCATE WIRES SHALL BE CONNECTED TOGETHER WITH WIRE NUT.
 4. GATE VALVES SHALL OPEN LEFT.
 5. PROVIDE A WHITE OR BLACK PLASTIC DEBRIS SHIELD WHICH INSTALLS BELOW THE OPERATING NUT. SHIELD SHALL BE BY AFC, BOXLOK OR APPROVED EQUAL.

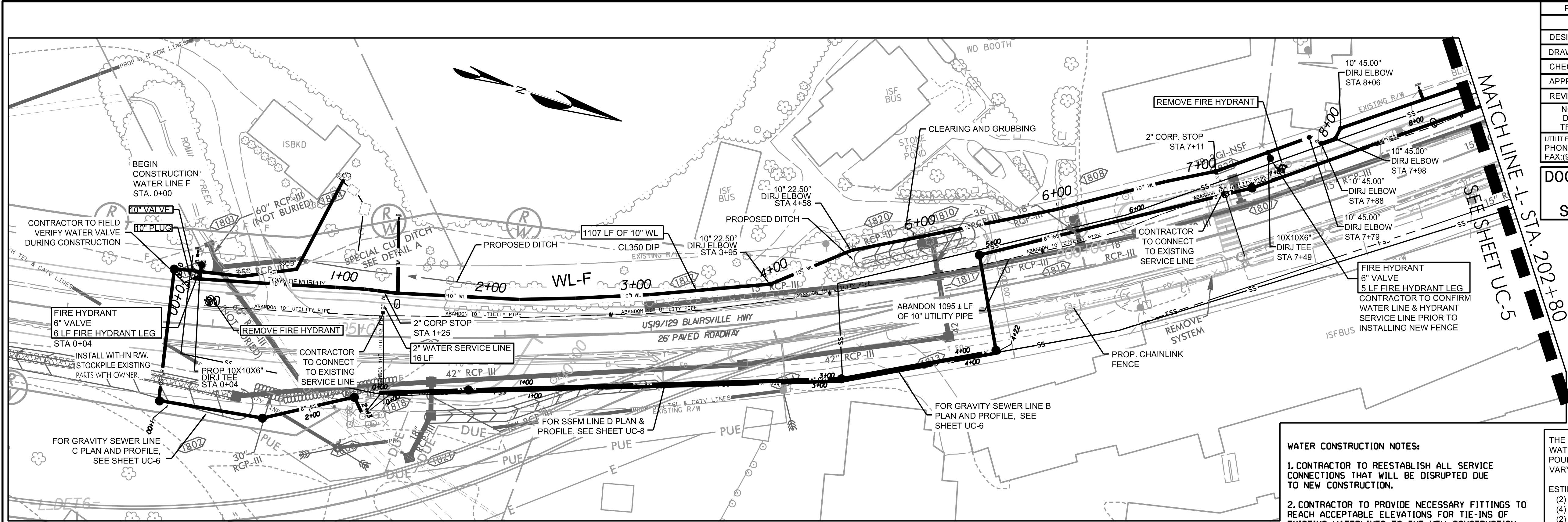


MINIMUM TRENCH WIDTH SCHEDULE				
PIPE SIZE I.D.	12" OR LESS	12" TO 21"	24" TO 30"	33" TO 54"
TRENCH WIDTH (W/O SHORING)	36"	I.D. + 24"	I.D. + 30"	I.D. + 30"
TRENCH WIDTH (W/ SHORING)	48"	I.D. + 36"	I.D. + 42"	I.D. + 42"

MINIMUM BEDDING FOR WATER MAIN DETAIL
 NOT TO SCALE

- NOTES:**
1. BEDDING DEPTH SHALL BE 6" MINIMUM FOR PIPE DIAMETER LESS THAN 12".
 2. DEPTH FOR REMOVAL OF UNSUITABLE MATERIAL SHALL GOVERN DEPTH OF BEDDING MATERIAL BELOW THE PIPE. THE ENGINEER SHALL DETERMINE IN THE FIELD THE AMOUNT OF UNSUITABLE MATERIAL REQUIRED TO REACH A SUITABLE FOUNDATION.
 3. THE PIPE BEDDING SHALL BE CONSOLIDATED NO. 57 STONE IN 6" LAYERS TO THE BOTTOM OF THE PIPE. THEN BACKFILLED WITH HAND PLACED MATERIAL CONSOLIDATED IN 6" LAYERS TO THE SPRINGLINE OF THE PIPE.
 4. BEDDING AND INITIAL BACKFILL MATERIAL SHALL MEET REQUIREMENTS OF AASHTO M145 GROUP CLASSIFICATION A1-A3 AND BE COMPACTED IN 6" LAYERS TO A MINIMUM COMPACTION OF 98% STANDARD PROCTOR WITH AN ALLOWABLE ±5% OF OPTIMUM MOISTURE CONTENT. BACKFILL MATERIAL UP TO A LEVEL ONE FOOT (1') OVER TOP OF PIPE AND SHALL EXCLUDE CLAY MATERIALS AND LOOSE ROCKS LARGER THAN 3".
 5. BELL HOLES SHALL BE DUG TO PERMIT THE ENTIRE STRAIGHT BARREL OF THE PIPE TO REST THE SUITABLE UNDISTURBED SOIL OR BEDDING MATERIAL.
 6. **FINAL BACKFILL MATERIAL**
 - A. **AREAS OUTSIDE THE NCDOT COUNTY AND CITY RIGHT-OF-WAYS:** FINAL BACKFILL MATERIAL SHALL MEET THE REQUIREMENTS OF AASHTO M145 GROUP CLASSIFICATION A1-A6 AND BE COMPACTED IN SUFFICIENT DEPTHS TO MEET A MINIMUM COMPACTION OF 85% STANDARD PROCTOR WITH AN ALLOWABLE ±5% OF OPTIMUM MOISTURE CONTENT.
 - B. **AREAS INSIDE THE NCDOT COUNTY AND CITY RIGHT-OF-WAYS:** FINAL BACKFILL MATERIAL SHALL MEET THE REQUIREMENTS OF AASHTO M145 GROUP CLASSIFICATION A1-A3 AND BE COMPACTED IN 6" LAYERS TO A MINIMUM COMPACTION OF 95% STANDARD PROCTOR WITH AN ALLOWABLE ±5% OF OPTIMUM MOISTURE CONTENT.
 - C. **UNDER PAVEMENT:** FINAL BACKFILL MATERIAL SHALL MEET REQUIREMENTS OF AASHTO M145 GROUP CLASSIFICATION A1 AND BE COMPACTED IN 6" LAYERS TO A MINIMUM COMPACTION OF 98% STANDARD PROCTOR WITH AN ALLOWABLE ±5% OF OPTIMUM MOISTURE CONTENT.
 - D. **UNDER DRIVEWAYS:** FINAL BACKFILL MATERIAL SHALL MEET REQUIREMENTS OF AASHTO M145 GROUP CLASSIFICATION A1-A3 AND BE COMPACTED IN 6" LAYERS TO A MINIMUM COMPACTION OF 98% STANDARD PROCTOR WITH AN ALLOWABLE ±5% OF OPTIMUM MOISTURE CONTENT.
 - E. **USE OF NATIVE MATERIAL:** NATIVE MATERIAL MAY BE USED IN FINAL BACKFILL ONLY WHEN APPROVED BY THE ENGINEER.

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



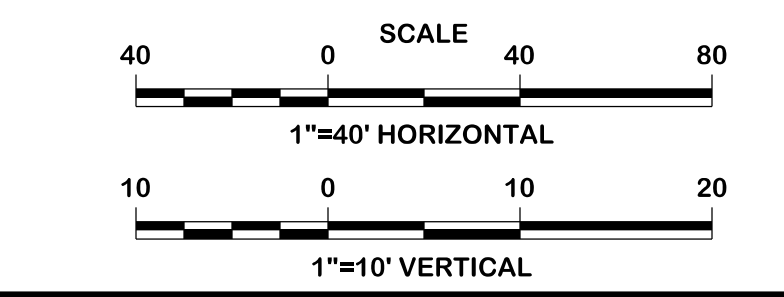
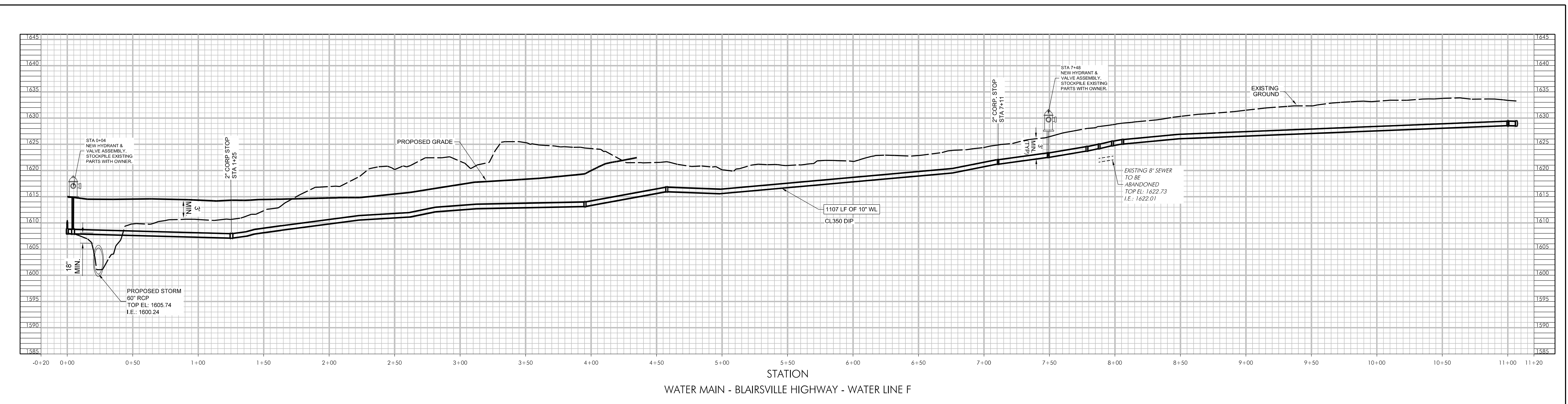
WATER CONSTRUCTION NOTES:

1. CONTRACTOR TO REESTABLISH ALL SERVICE CONNECTIONS THAT WILL BE DISRUPTED DUE TO NEW CONSTRUCTION.
2. CONTRACTOR TO PROVIDE NECESSARY FITTINGS TO REACH ACCEPTABLE ELEVATIONS FOR TIE-INS OF EXISTING WATERLINES TO THE NEW CONSTRUCTION.
3. ALL EXISTING UTILITIES SHOWN WERE IDENTIFIED BY SUE LEVEL B AND PROVIDED BY NCDOT. ALL CONFLICTING UTILITIES SHALL BE VERIFIED PRIOR TO EXCAVATION.

THE ESTIMATED QUANTITY OF DUCTILE IRON PIPE WATER FITTINGS ON THIS PLAN SHEET IS 1,500 POUNDS. THE ACTUAL NUMBER OF FITTINGS WILL VARY BASED ON PLAN CONDITIONS.

ESTIMATED FITTINGS:

- (2) 10" Ø 22.5" DIRJ ELBOWS
- (4) 10" Ø 45" DIRJ ELBOWS
- (2) 10X10X6" DIRJ TEE
- (1) 10" PLUG



10/24/2023 - NCDOT - R-5861 - Cherokee\05-Export Client\Final\R5861-ut-Rd\18_U04_psh.dgn
 181603 - Curtis, Ellison

PROJECT REFERENCE NO.	SHEET NO.
R-5861	UC-5
DESIGNED BY: KTC	ROADWAY SHEET NO. 19
DRAWN BY: ATL/CBE	
CHECKED BY: GHH	
APPROVED BY: GHH	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-8690 FAX: (919) 250-4151	

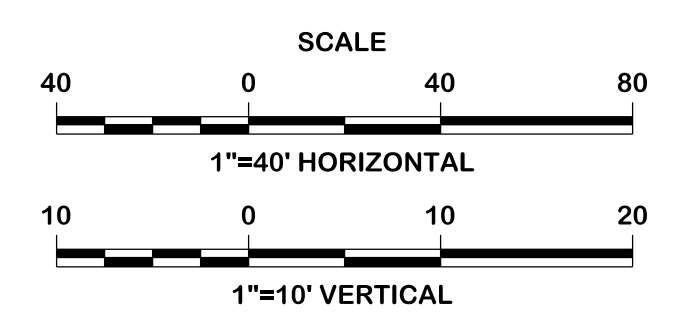
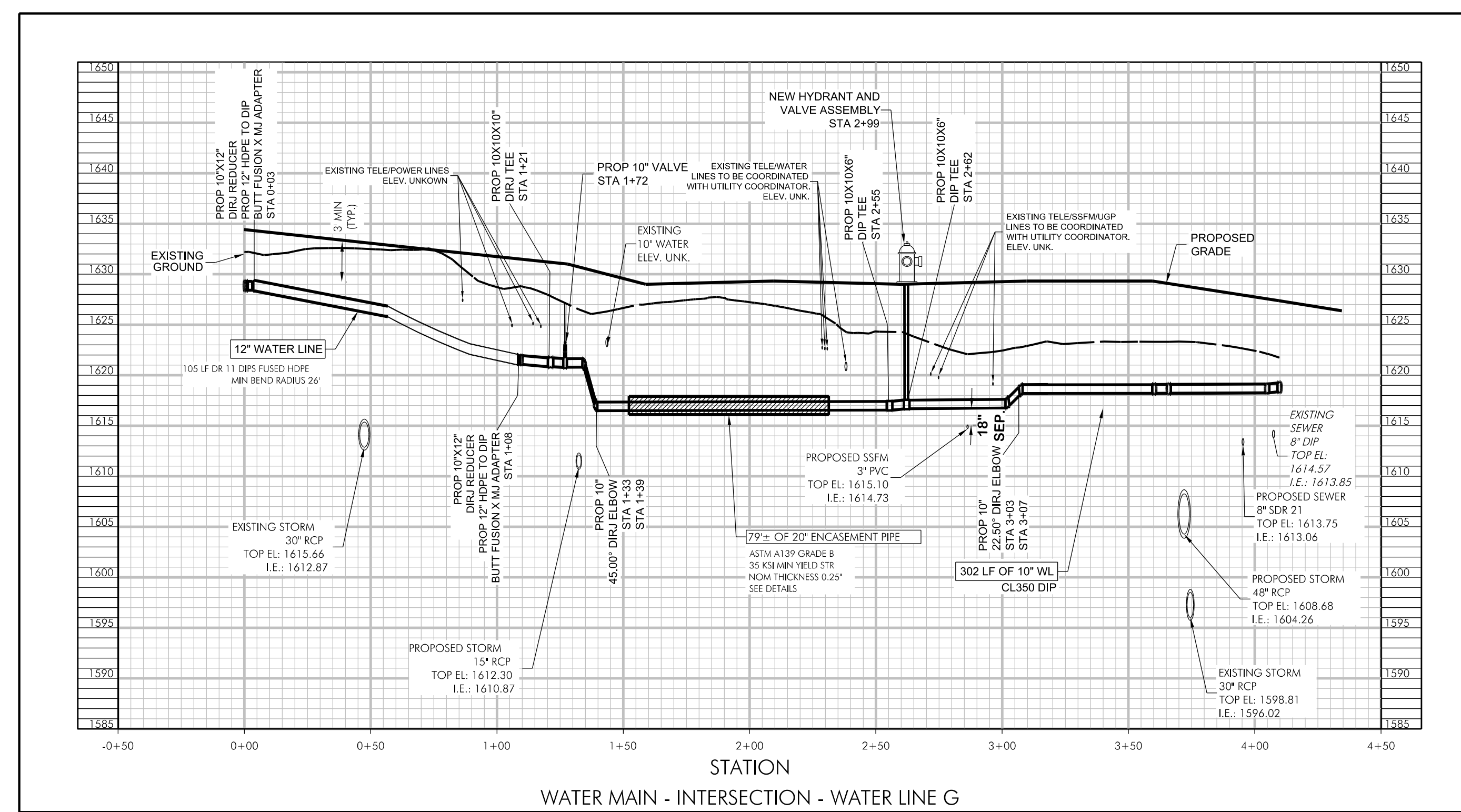
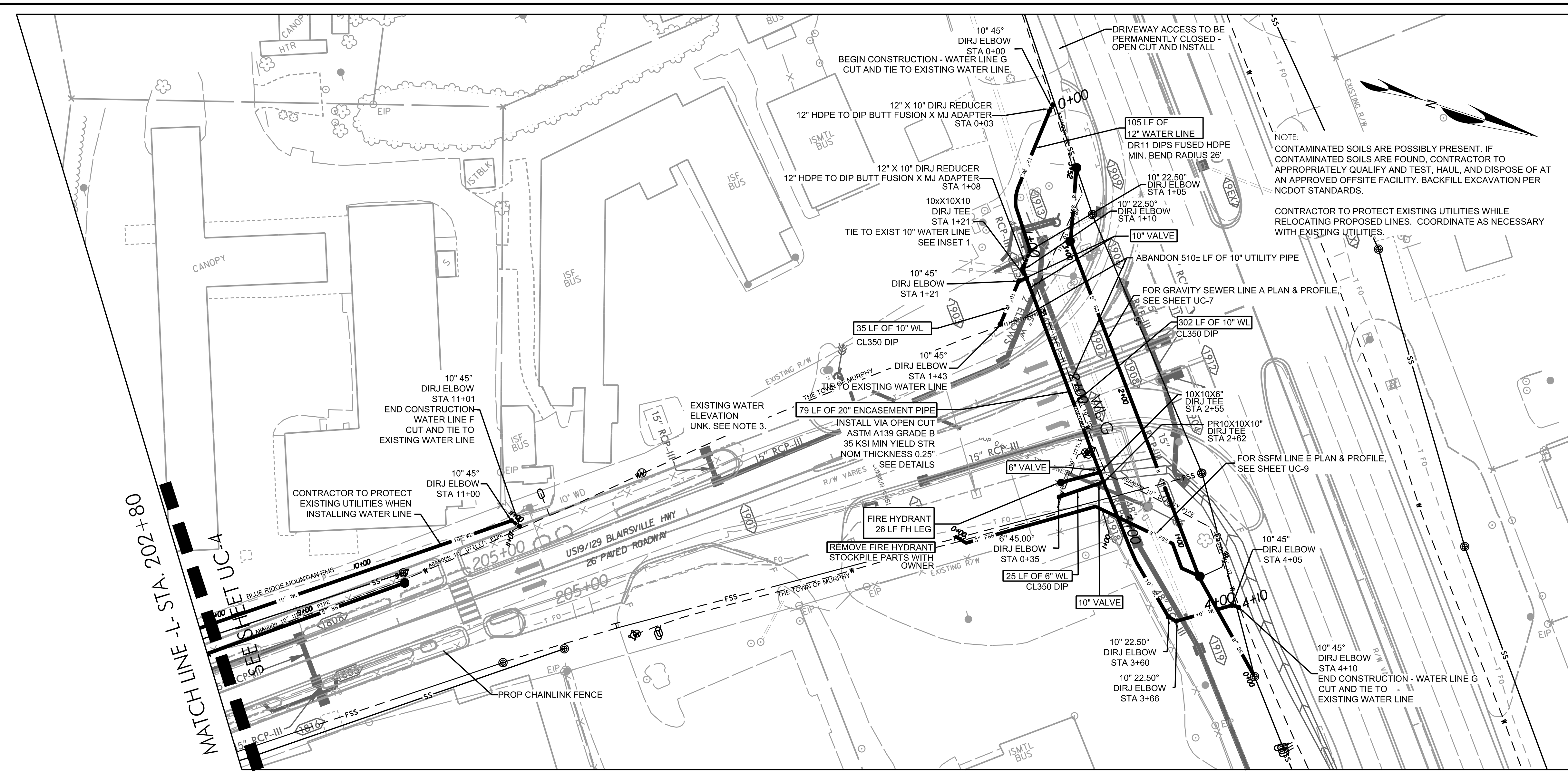
**DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED**

- WATER CONSTRUCTION NOTES:
- CONTRACTOR TO REESTABLISH ALL SERVICE CONNECTIONS THAT WILL BE DISRUPTED DUE TO NEW CONSTRUCTION.
 - CONTRACTOR TO PROVIDE NECESSARY FITTINGS TO REACH ACCEPTABLE ELEVATIONS FOR TIE-INS OF EXISTING WATER LINES TO THE NEW CONSTRUCTION.
 - ALL EXISTING UTILITIES SHOWN WERE IDENTIFIED BY SUE LEVEL B AND PROVIDED BY NCDOT. ALL CONFLICTING UTILITIES SHALL BE VERIFIED PRIOR TO EXCAVATION.
 - DIP JOINTS ARE TO BE RESTRAINED WITH FIELD-LOK GASKETS.
 - MEGALUG FITTINGS ARE TO BE USED ON ALL DIP PIPE.
 - PLUGS TO HAVE MEGALUG 2100 SERIES ADAPTER OR APPROVED EQUAL.

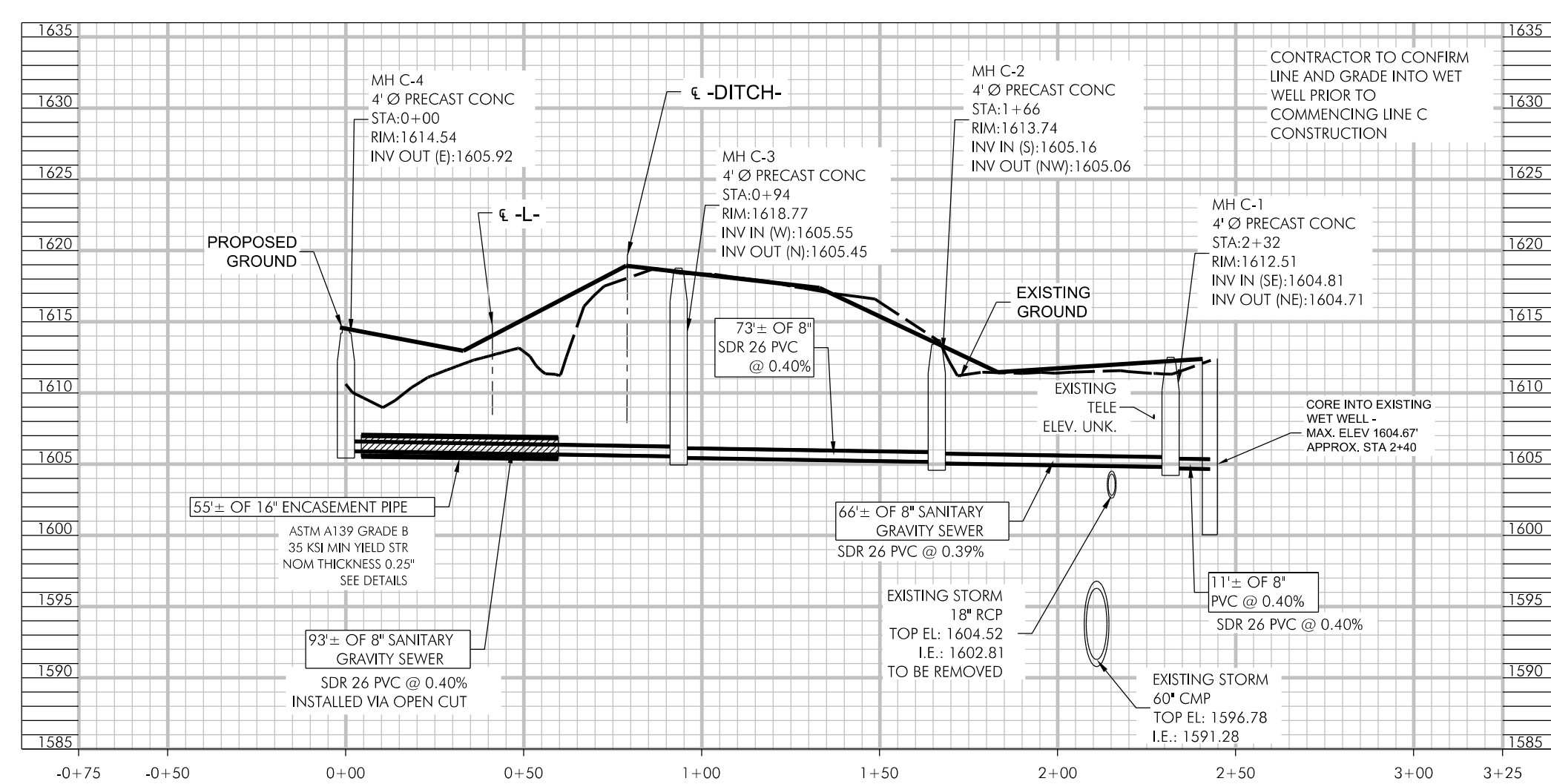
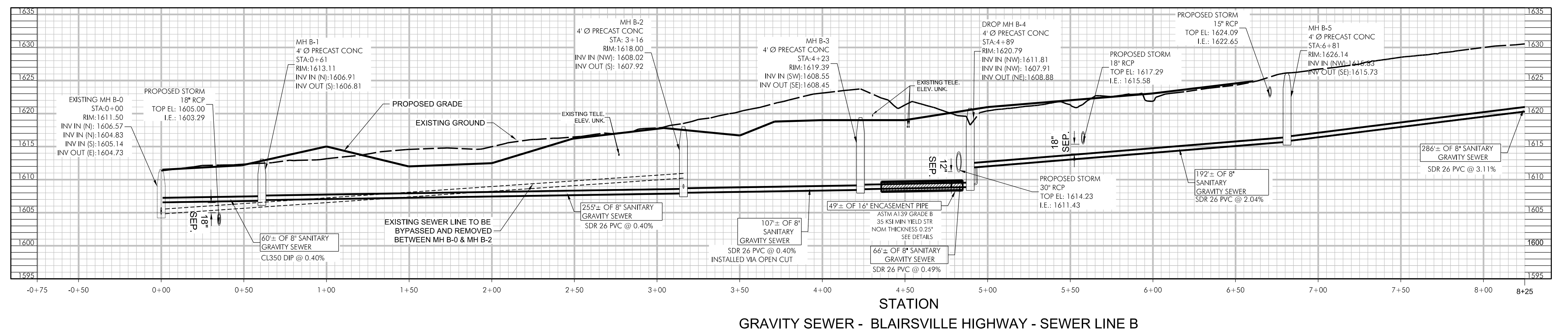
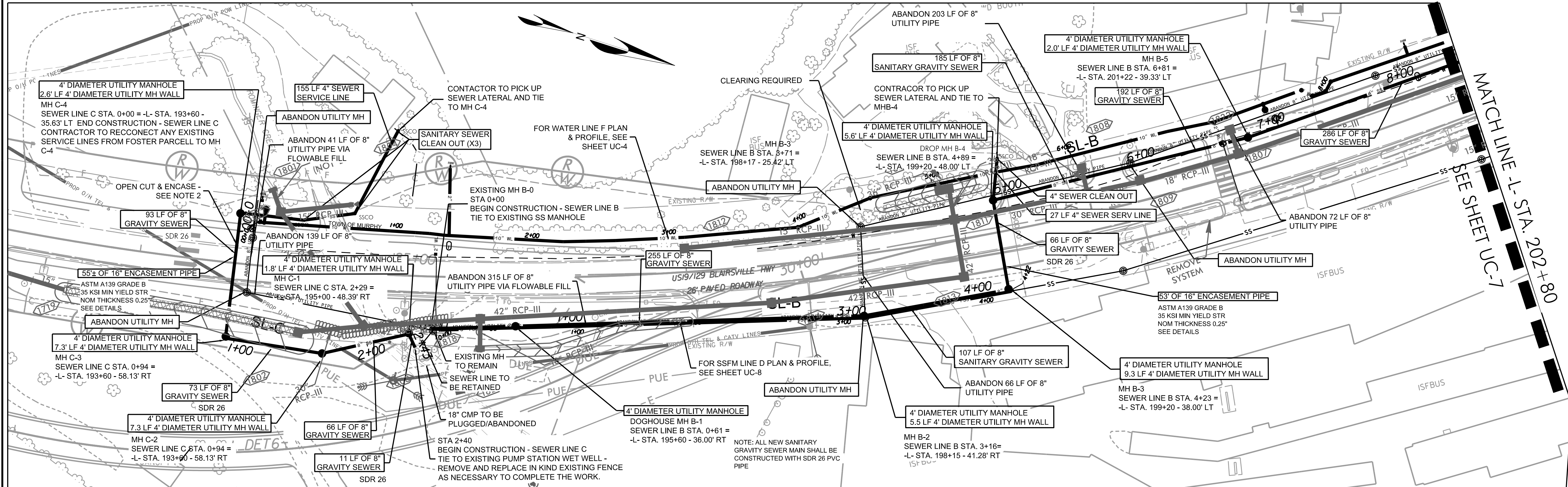
THE ESTIMATED QUANTITY OF DUCTILE IRON PIPE WATER FITTINGS ON THIS PLAN SHEET IS 3,380 POUNDS. THE ACTUAL NUMBER OF FITTINGS WILL VARY BASED ON PLAN CONDITIONS.

ESTIMATED 21 FITTINGS:

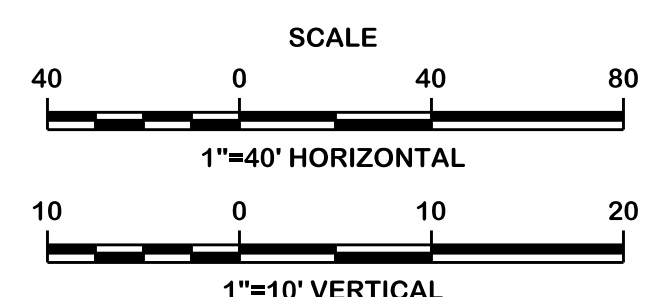
- (4) 10" Ø 22.5" DIRJ ELBOWS
- (10) 10" Ø 45" DIRJ ELBOWS
- (1) 10X10X10 TEE
- (2) 10X10X6 TEE
- (2) 12 x 10 REDUCER
- (2) HDPE TO DIP ADAPTERS



10/25/2023
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 Curtis, E. J.



GRAVITY SEWER
BLAIRSVILLE HIGHWAY
SOUTH
SEWER LINE C



- GRAVITY SEWER CONSTRUCTION NOTES:
- CONTRACTOR TO LOCATE ALL SEWER CLEANOUTS AND RESET CLEANOUTS AT NEW RIGHT OF WAY TO CONNECT SERVICES TO MAIN SEWER.
 - CONTRACTOR TO PERFORM OPEN CUT CROSSING AT NIGHT AND MAINTAIN AT LEAST ONE LANE OF TRAFFIC THROUGHOUT THE DURATION OF THE CROSSING. ADHERE TO NCDOT STANDARD DRAWINGS AND SPECIFICATIONS FOR ASPHALT REPAIR.

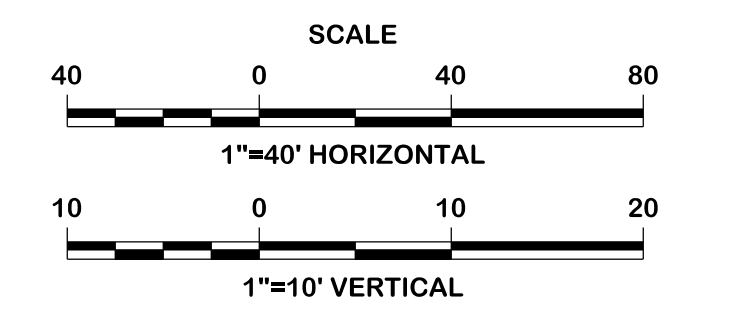
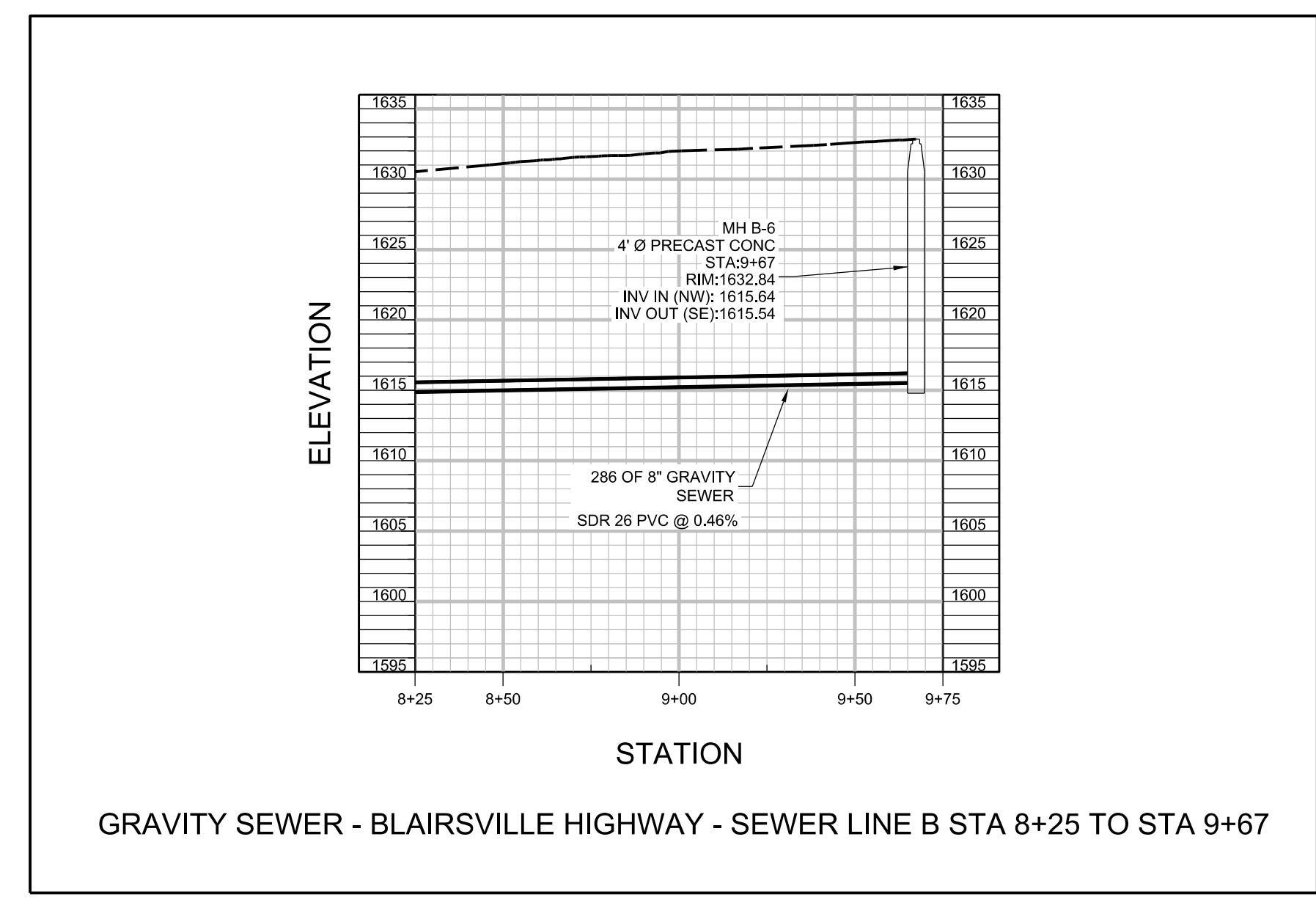
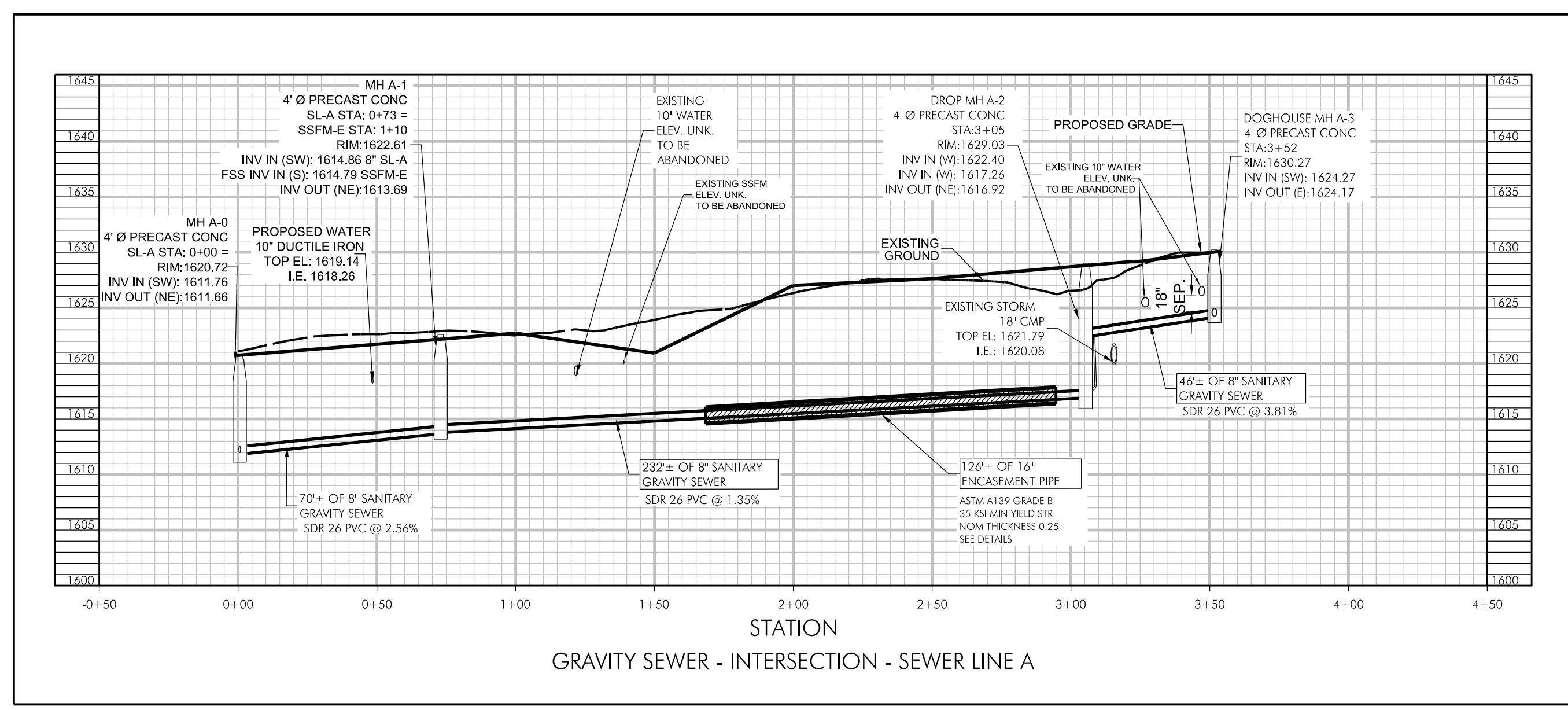
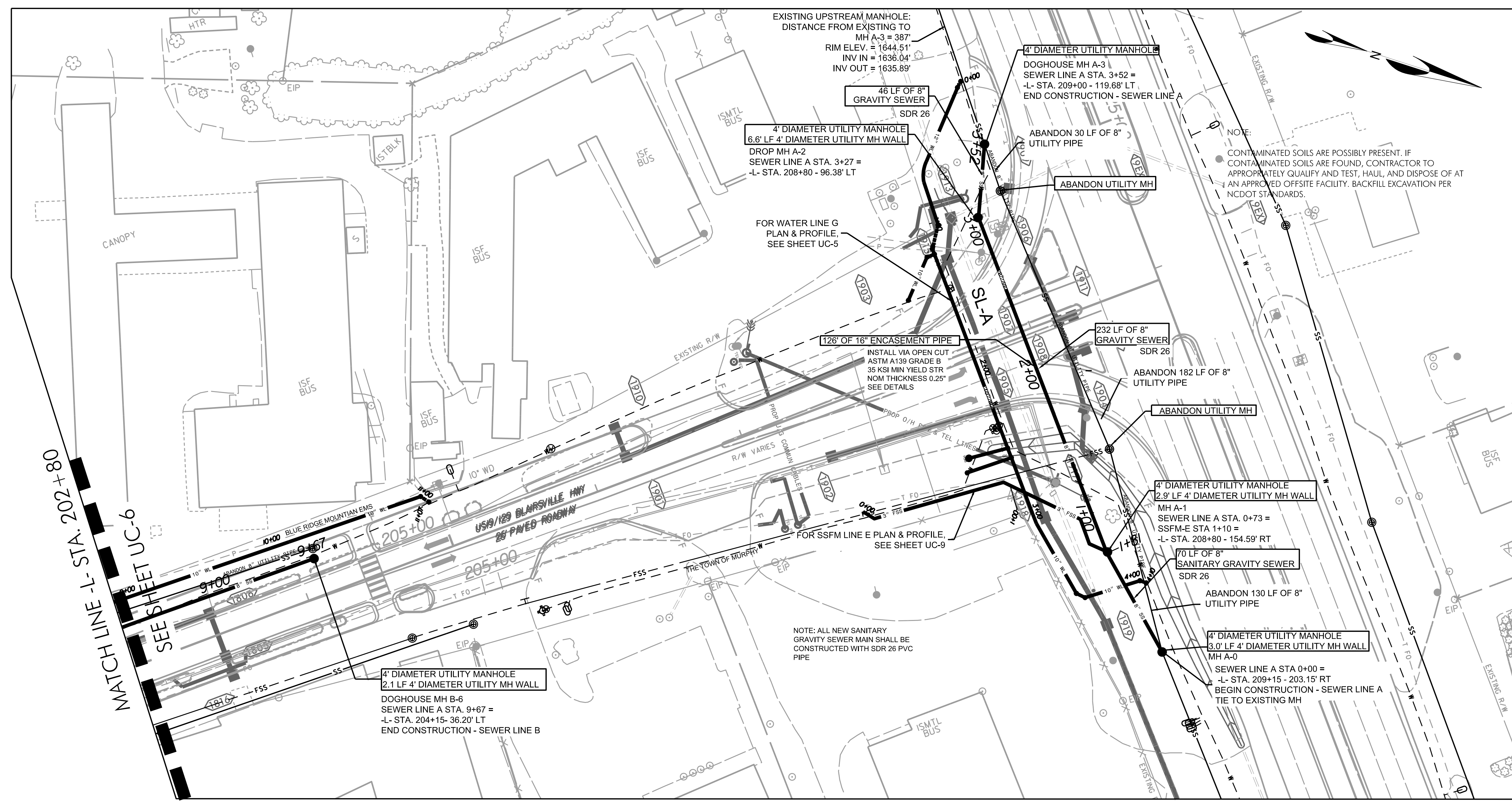
DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

PROJECT REFERENCE NO. R-5861	SHEET NO. UC-6
DESIGNED BY: KTC	ROADWAY SHEET NO. 18
DRAWN BY: ATL/CBE	
CHECKED BY: GHH	
APPROVED BY: GHH	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	
UTILITY CONSTRUCTION PLANS ONLY	

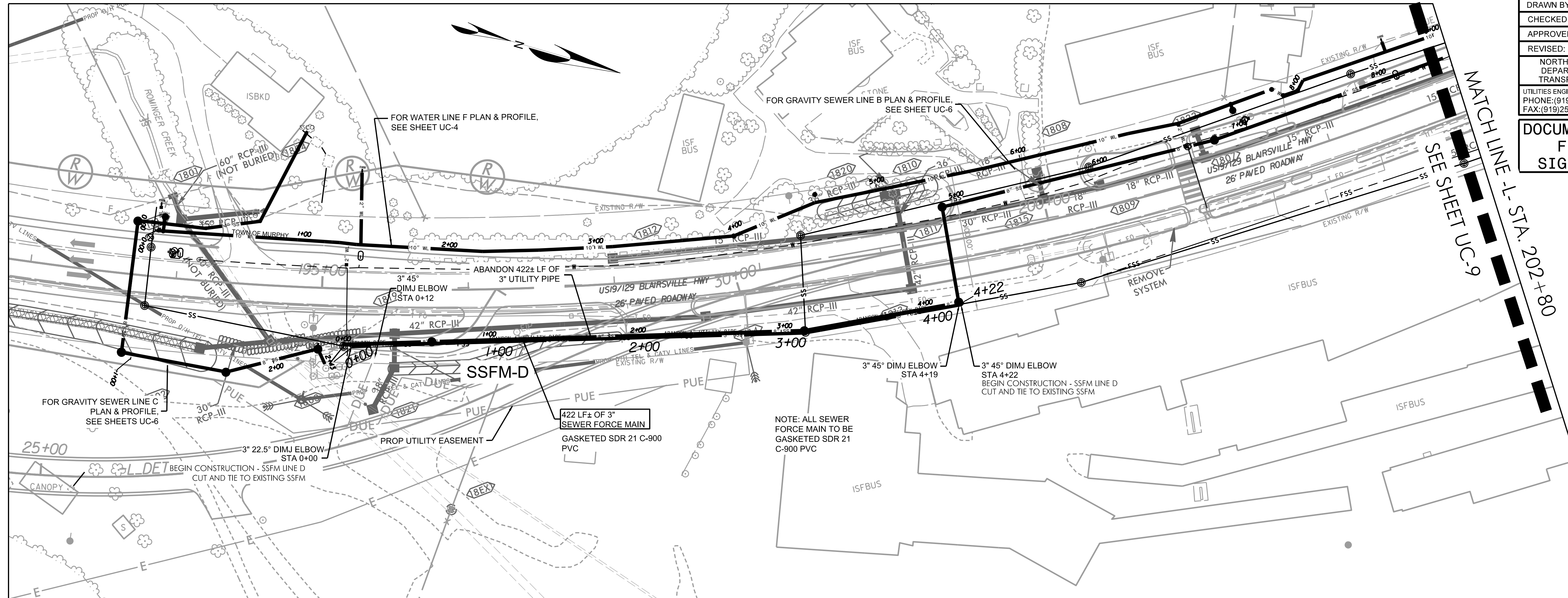
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 Curtiss, Elison

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

GRAVITY SEWER CONSTRUCTION NOTES:
 1. CONTRACTOR TO REESTABLISH ALL SERVICE CONNECTIONS THAT WILL BE DISRUPTED DUE TO NEW CONSTRUCTION.

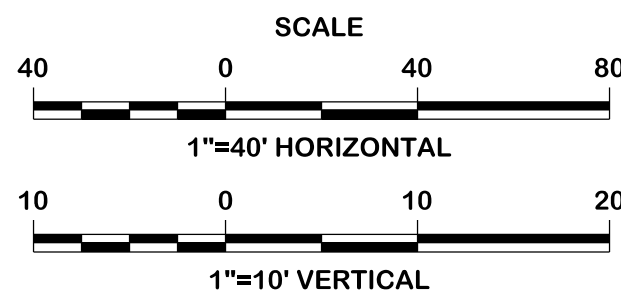
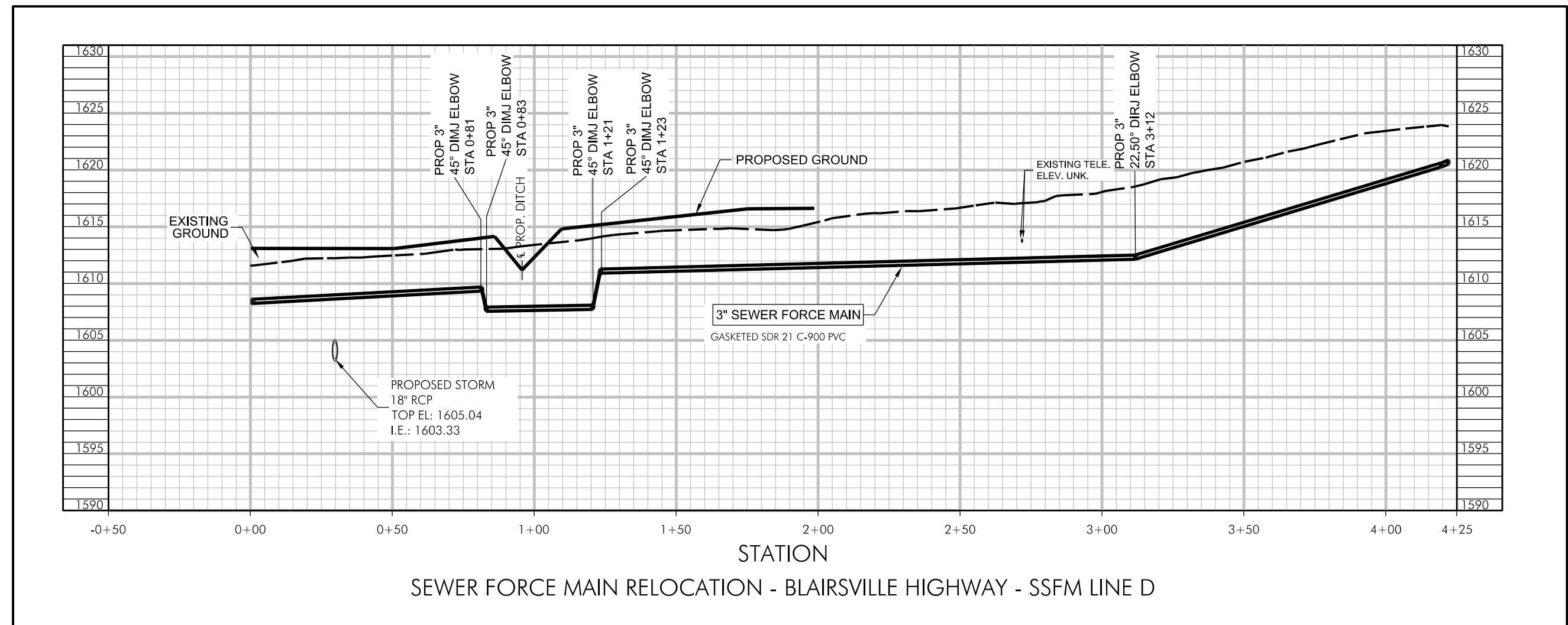


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THE ESTIMATED QUANTITY OF DUCTILE IRON PIPE SEWER FITTINGS ON THIS PLAN SHEET IS 350 POUNDS. THE ACTUAL NUMBER OF FITTINGS WILL VARY BASED ON PLAN CONDITIONS.

ESTIMATED I FITTINGS:
 (6) 3" Ø 45" DIRJ ELBOWS
 (1) 3" Ø 22.5" DIRJ ELBOWS



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 Curtis, Ellison

