

TIP PROJECT: R-2603

CONTRACT:

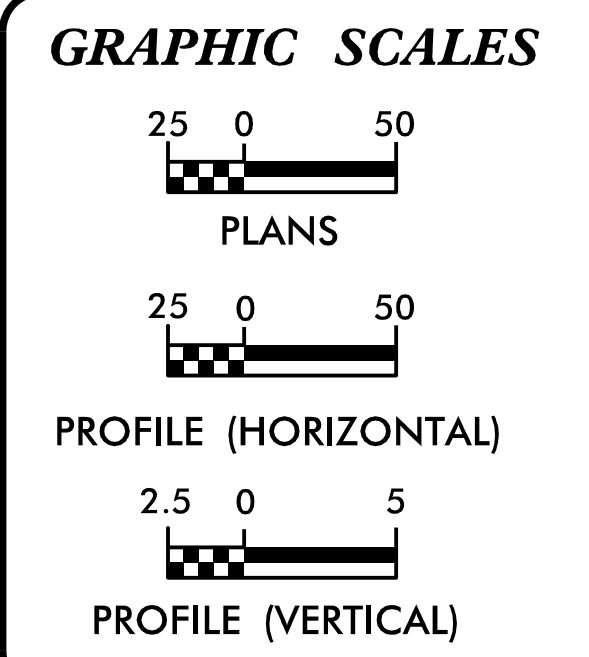
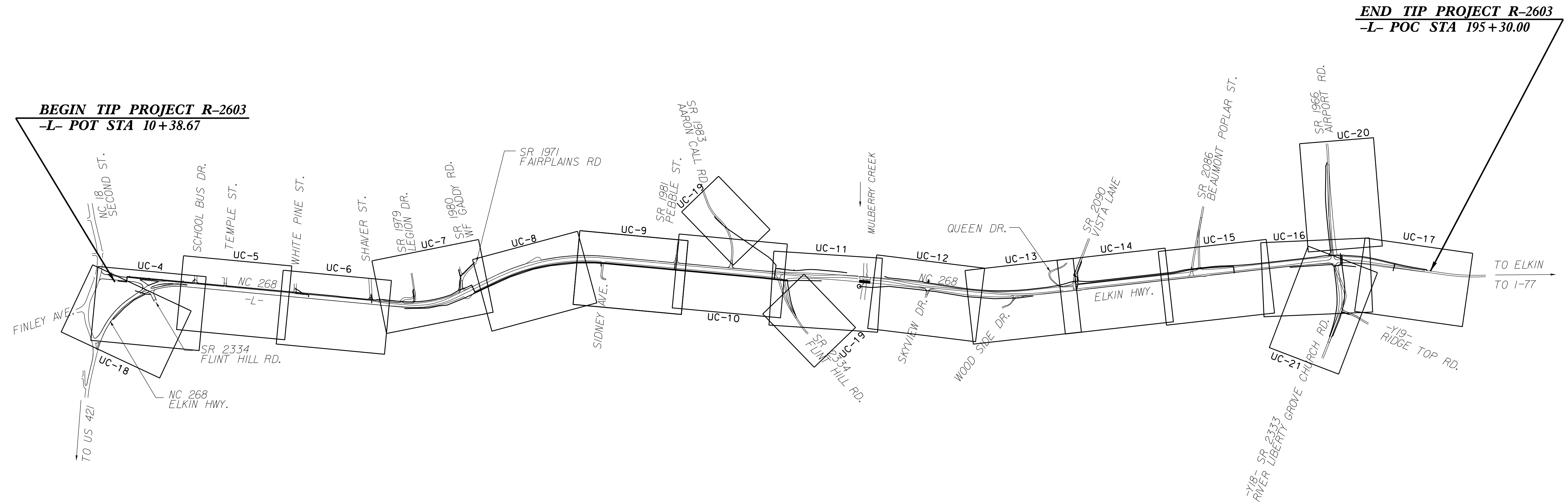
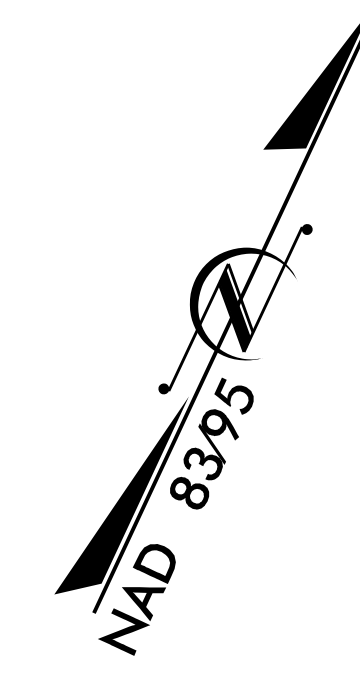
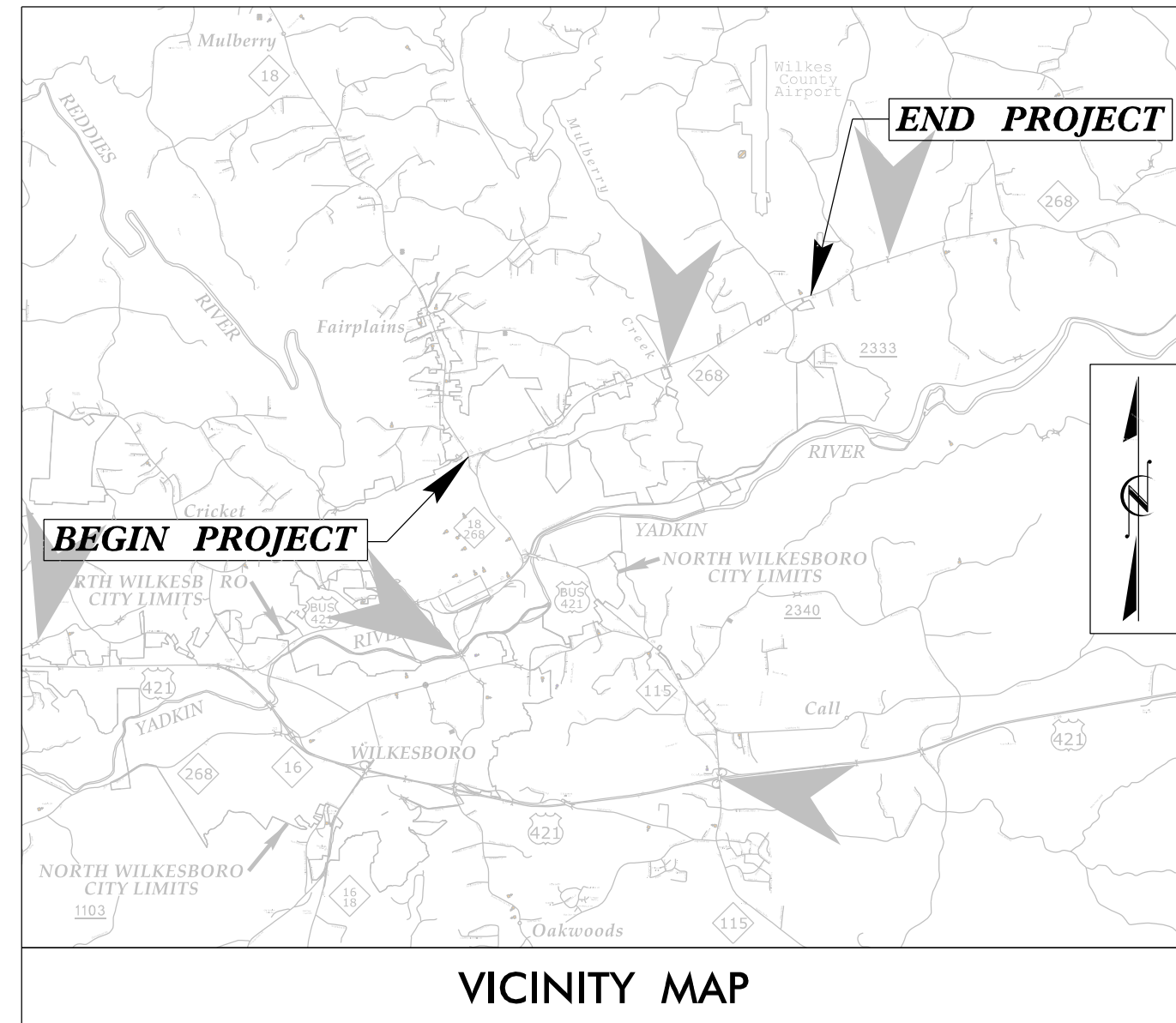
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WILKES COUNTY

**LOCATION: NC 268 FROM MULTI-LANES EAST
OF NC 18 TO SR 1966 (AIRPORT ROAD)**

TYPE OF WORK: UTILITY RELOCATION

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2603	UC-1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	



INDEX OF SHEETS

SHEET No.	DESCRIPTION
UC-1	TITLE SHEET
UC-2	PLAN SHEET SYMBOLS
UC-3 TO UC-3F	GENERAL NOTES AND DETAILS
UC-4 TO UC-28	PLAN AND PROFILE SHEETS

UTILITY OWNERS ON PROJECT

WATER: NORTH WILKESBORO, BLUE RIDGE WATER ASSOCIATION AND MULBERRY FAIRPLAIN

SEWER: NORTH WILKESBORO

Municipal Services Engineering Company, P.A.

P.O. BOX 97 GARNER, N.C. 27529 (919) 772-5393

P.O. BOX 349 BOONE, N.C. 28607 (828) 262-1767

LICENSE NUMBER: C-0281

DocuSigned by:
William Henry Bright
SEAL 10446
UTILITY DESIGN ENGINEER

04/13/2015

PREPARED IN THE OFFICE OF:
**DIVISION OF HIGHWAYS
UTILITIES UNIT**

1555 MAIL SERVICES CENTER
RALEIGH NC 27699-1555
PHONE (919) 707-6690
FAX (919) 206-4119

Roger Worthington, P.E. UTILITIES SECTION ENGINEER
Michael Bright UTILITIES SQUAD LEADER PROJECT ENGINEER
UTILITIES PROJECT DESIGNER

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

UTILITIES PLAN SHEET SYMBOLS

PROPOSED COLOR CODE		
UTILITY	OWNER	COLOR
SEWER	N. WILKESBORO	
WATER- BETTERMENT	N. WILKESBORO	
WATER- BETTERMENT	MULBERRY FAIRPLAIN	
WATER- BETTERMENT	BLUERIDGE	
WATER- BETTERMENT	BLUERIDGE	
WATER- JOINT OWNERS/ BETTERMENT	N. WILKES. / MULBERRY FP.	
WATER- NOT BETTERMENT	MULBERRY FAIRPLAIN	
WATER- NOT BETTERMENT	BLUERIDGE	

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	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	

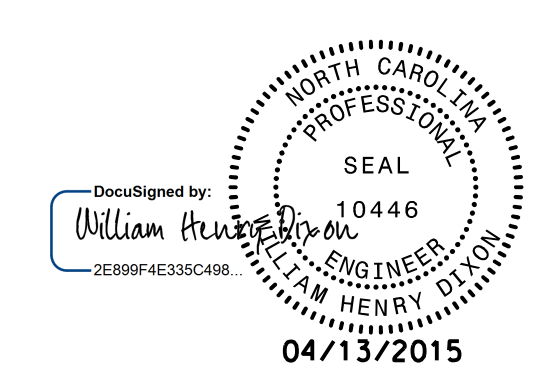
PROPOSED MISCELLANEOUS UTILITIES SYMBOLS

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	

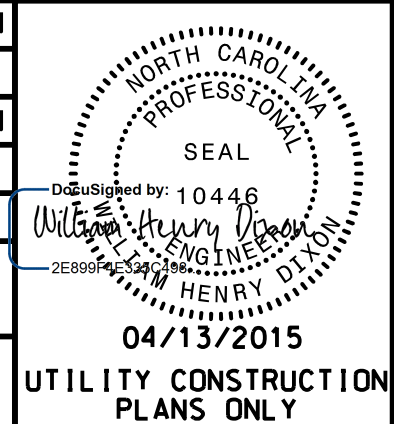
EXISTING UTILITIES SYMBOLS

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 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)

UTILITY CONSTRUCTION

PROJECT REFERENCE NO. R-2603	SHEET NO. UC-3
DESIGNED BY: B.DIXON	
DRAWN BY: R.MOSS	
CHECKED BY: B.DIXON	
APPROVED BY:	
REVISED:	
MUNICIPAL ENGINEERING SERVICES COMPANY, PA. P.O. BOX 97 GARNER, NC 27529 (919)772-5393	
04/13/2015 UTILITY CONSTRUCTION PLANS ONLY	

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 2012.

2. THE EXISTING UTILITIES BELONG TO

WATER: NORTH WILKESBORO, BLUE RIDGE WATER ASSOCIATION AND MULBERRY FAIRPLAIN
SEWER: NORTH WILKESBORO

3. ALL WATER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL AND NATURAL RESOURCES, DIVISION OF WATER RESOURCES. ALL SEWER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES, DIVISION OF WATER QUALITY. 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 OPPROTUNITY 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. INTERRUPTION OF WATER AND SEWER SERVICE ON MAIN LINES SHALL BE LIMITED TO A MAXIMUM OF (4) HOURS.

2. INDIVIDUAL SERVICE CONNECTION INTERRUPTIONS SHALL BE SCHEDULED BETWEEN REGULAR WORKING HOURS UNLESS OTHERWISE PERMITTED BY THE OWNER.

3. WATER AND SEWER SERVICES SHALL BE RESTORED WITHIN THE SAME WORKING DAY.

4. OWNER, OR HIS AGENT, SHALL WITNESS ALL PRESSURE AND BIOLOGICAL TESTING.

5. THE CONTRACTOR SHALL TAKE ALL BIOLOGICAL SAMPLES AMD SEND TO OWNERS PREFERRED LABORATORY FOR TESTING.

6. ALL EXISTING APPURTENANCES (HYDRANTS, VALVES, GLANDS AND FITTINGS) THAT ARE REMOVED AS A RESULT OF THE WATER MAIN RELOCATION WILL REMAIN THE PROPERTY OF THE OWNER, AND THE CONTRACTOR WILL REMOVE SAID APPURTENANCES TO 193 FOSTER ROAD, NORTH WILKESBORO, NC. AS DIRECTED BY THE ENGINEER.

7. THE CONTRACTOR SHALL HAVE THE PARTS AVAILABLE ON HAND AND CAPABILITY TO REPAIR THE SERVICE MAINS IMMEDIATELY IF SERVICE IS INTERRUPTED DUE TO DAMAGE CAUSED BY THE CONTRACTOR.

8. WATER AND SEWER SERVICE TO ALL CUSTOMERS SHALL BE MAINTAINED DURING CONSTRUCTION OF THE NEW WATER AND SEWER MAINS. SERVICE DISRUPTIONS FOR ANY REASON SHALL BE LIMITED TO A MAXIMUM TIME OF FOUR HOURS.

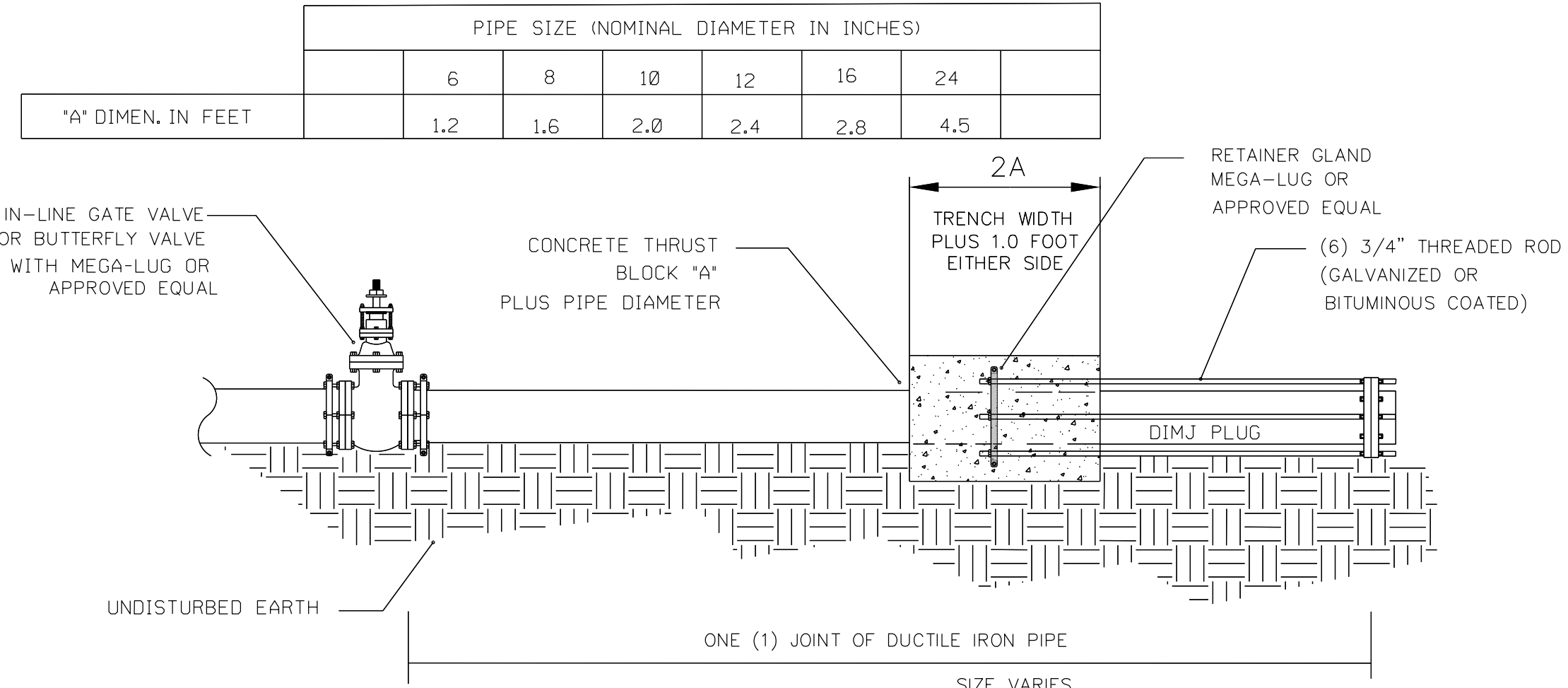
LIST OF STANDARD DRAWINGS

N/A

UTILITY CONSTRUCTION

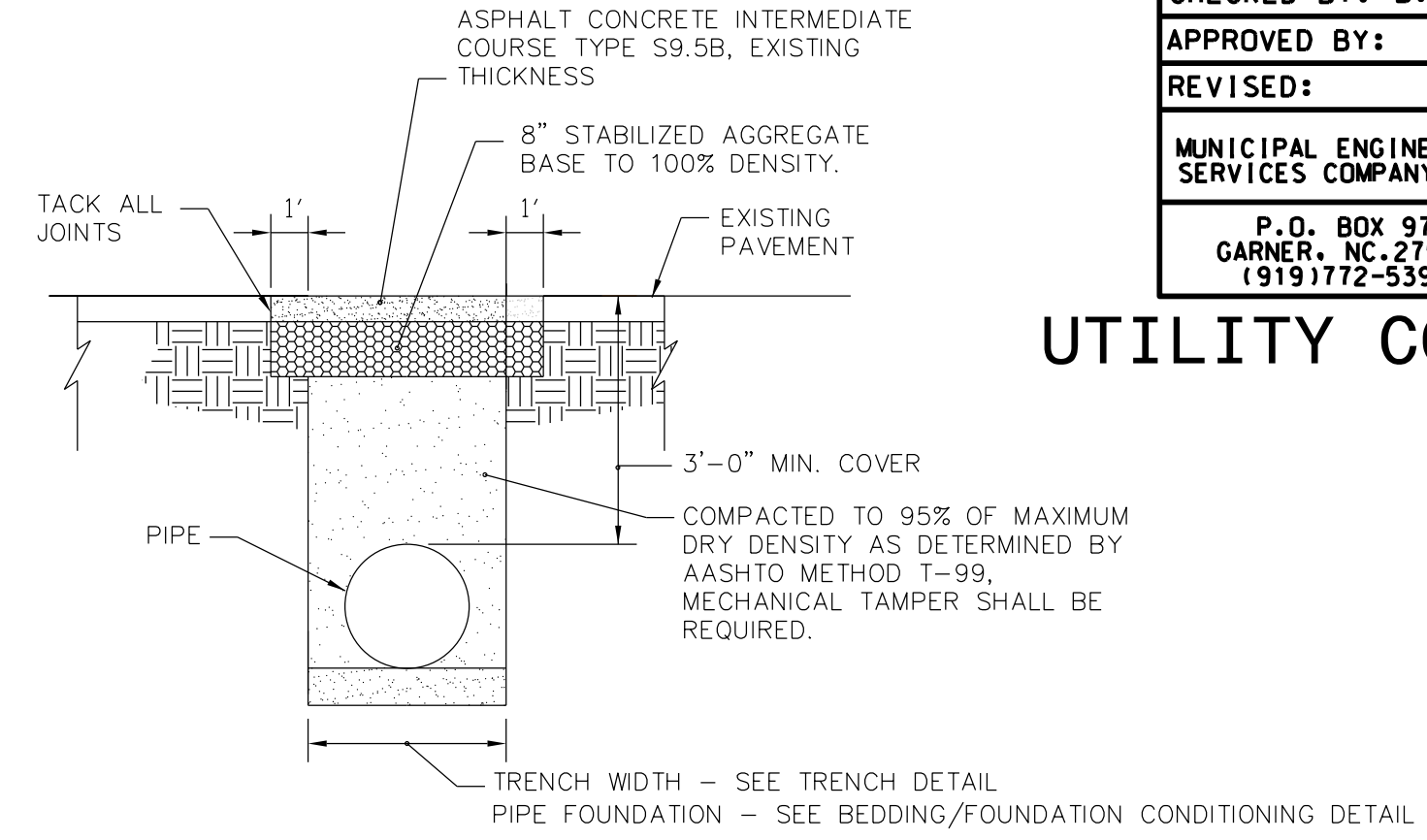
PROJECT TYPICAL DETAILS (WATER)

PROJECT REFERENCE NO.	SHEET NO.
R-2603	UC-3A
DESIGNED BY: B. DIXON	
DRAWN BY: R. MOSS	
CHECKED BY: B. DIXON	
APPROVED BY:	
REVISER:	
MUNICIPAL ENGINEERING SERVICES COMPANY, PA.	
P.O. BOX 97 GARNER, NC 27529 (919) 772-5393	
UTILITY CONSTRUCTION PLANS ONLY	

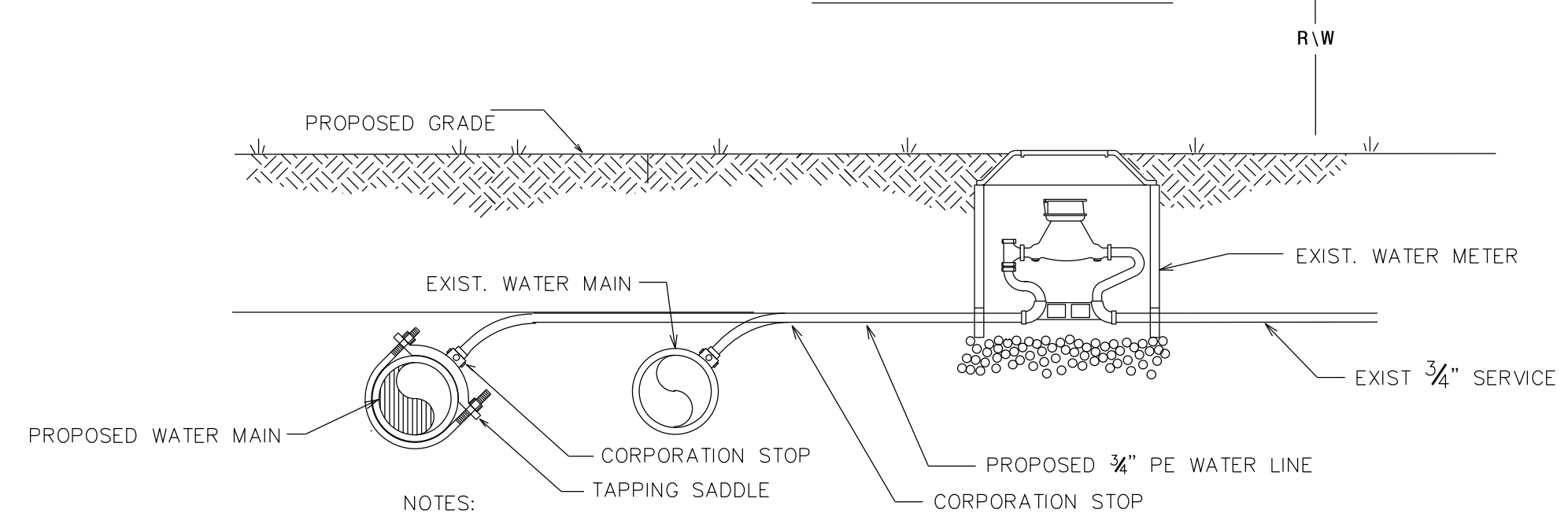


- ALL FITTINGS MUST BE RESTRAINED WITH RETAINER GLAND, MEGA-LUG THRUST BLOCKS OR AN APPROVED EQUAL.
- DIMENSION TABLE GIVEN IS A GUIDE ONLY. ENGINEER SHALL BE RESPONSIBLE TO CALCULATE THRUST BLOCK DIMENSIONS BASED ON ACTUAL SOIL AND OPERATING
- FITTING JOINTS SHALL BE KEPT FREE OF CONCRETE. A LAYER OF POLYETHYLENE PLASTIC SHALL BE PLACED BETWEEN THE FITTING AND THE CONCRETE.

END OF LINE PLUG

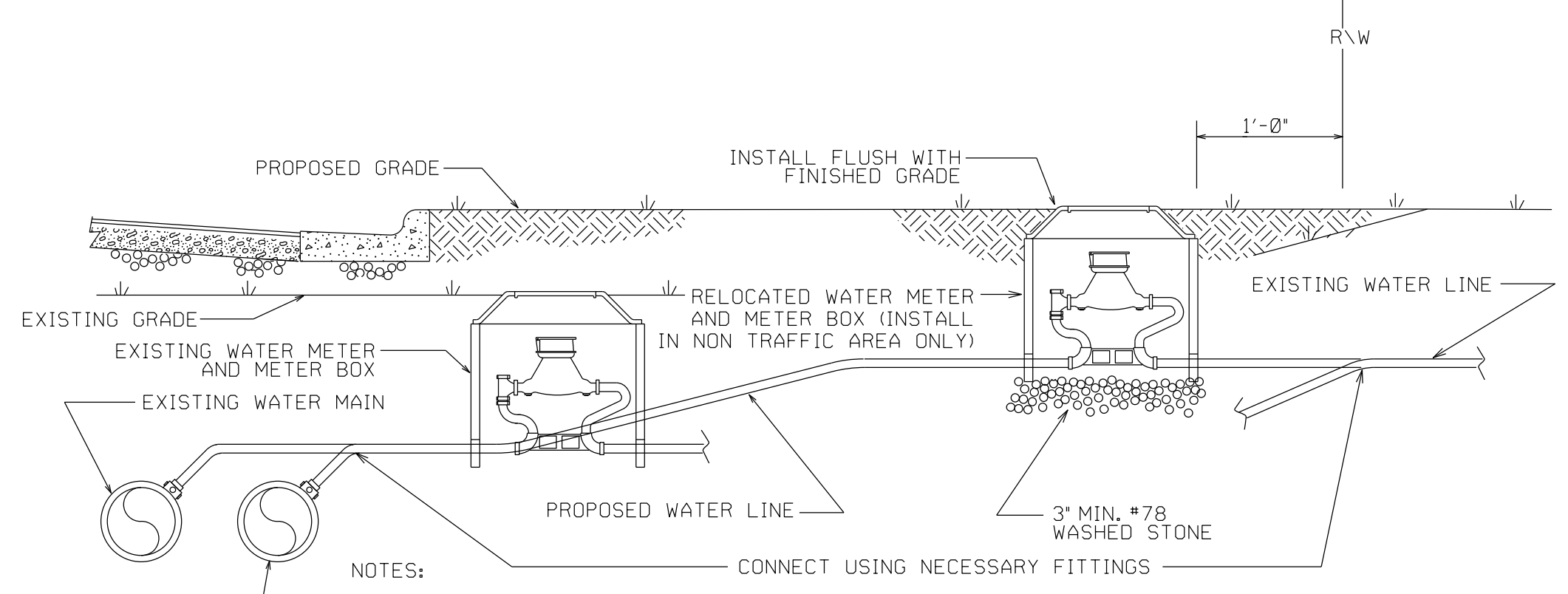


TYPICAL OPEN CUT ROADWAY CROSSING DETAIL



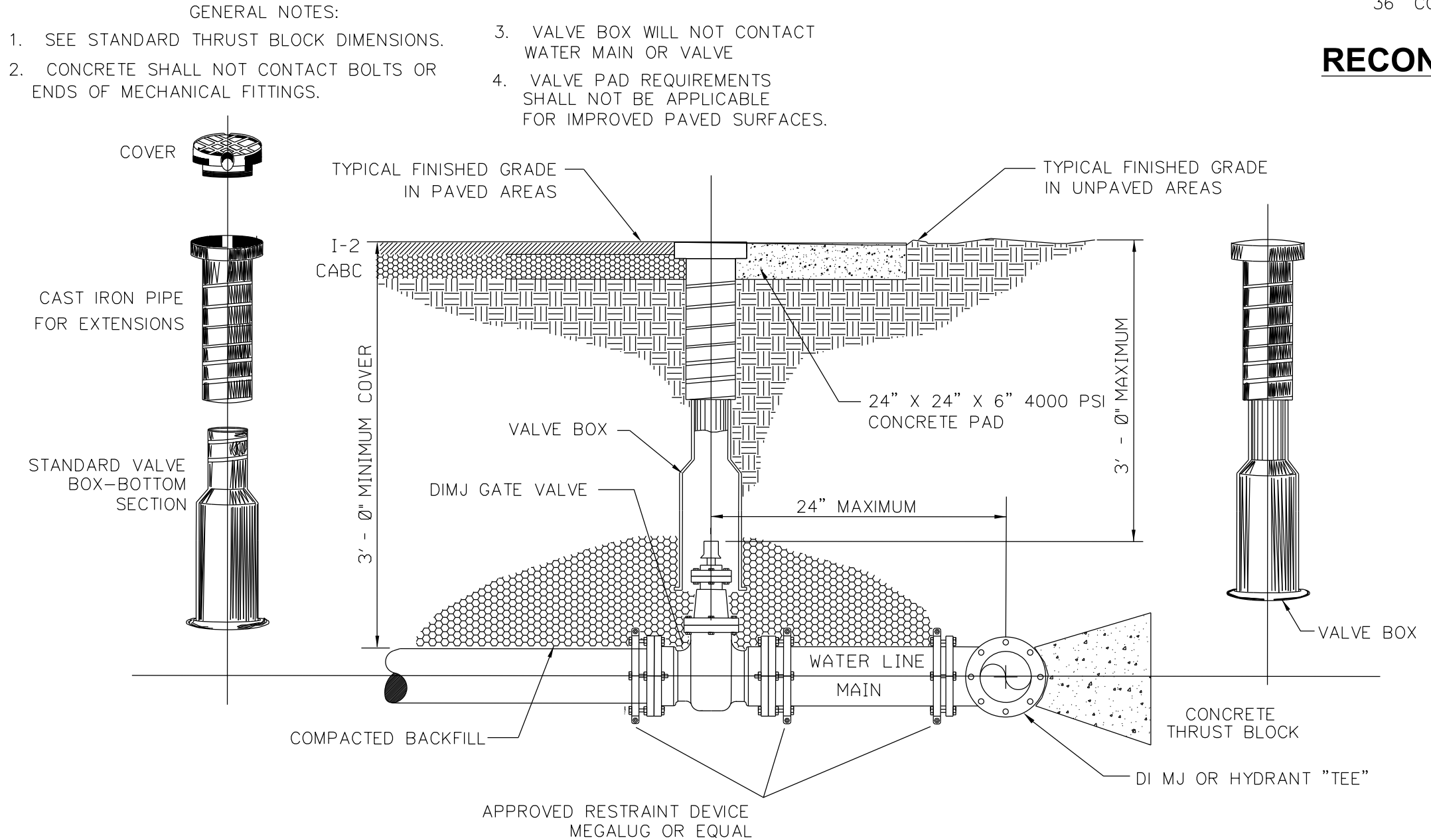
- NOTES:
- INSTALLATION SHALL INCLUDE THE APPROPRIATE LOCATION OF THE WATER METER, METER SETTER AND YOKE, METER VALVES, AND METER BOX WITH LID.
 - THE NEW WATER SERVICE LINE SHALL BE INSTALLED WITH A MINIMUM OF 36" COVER BELOW FINISHED GRADE.

RECONNECT EXISTING WATER METER DETAIL

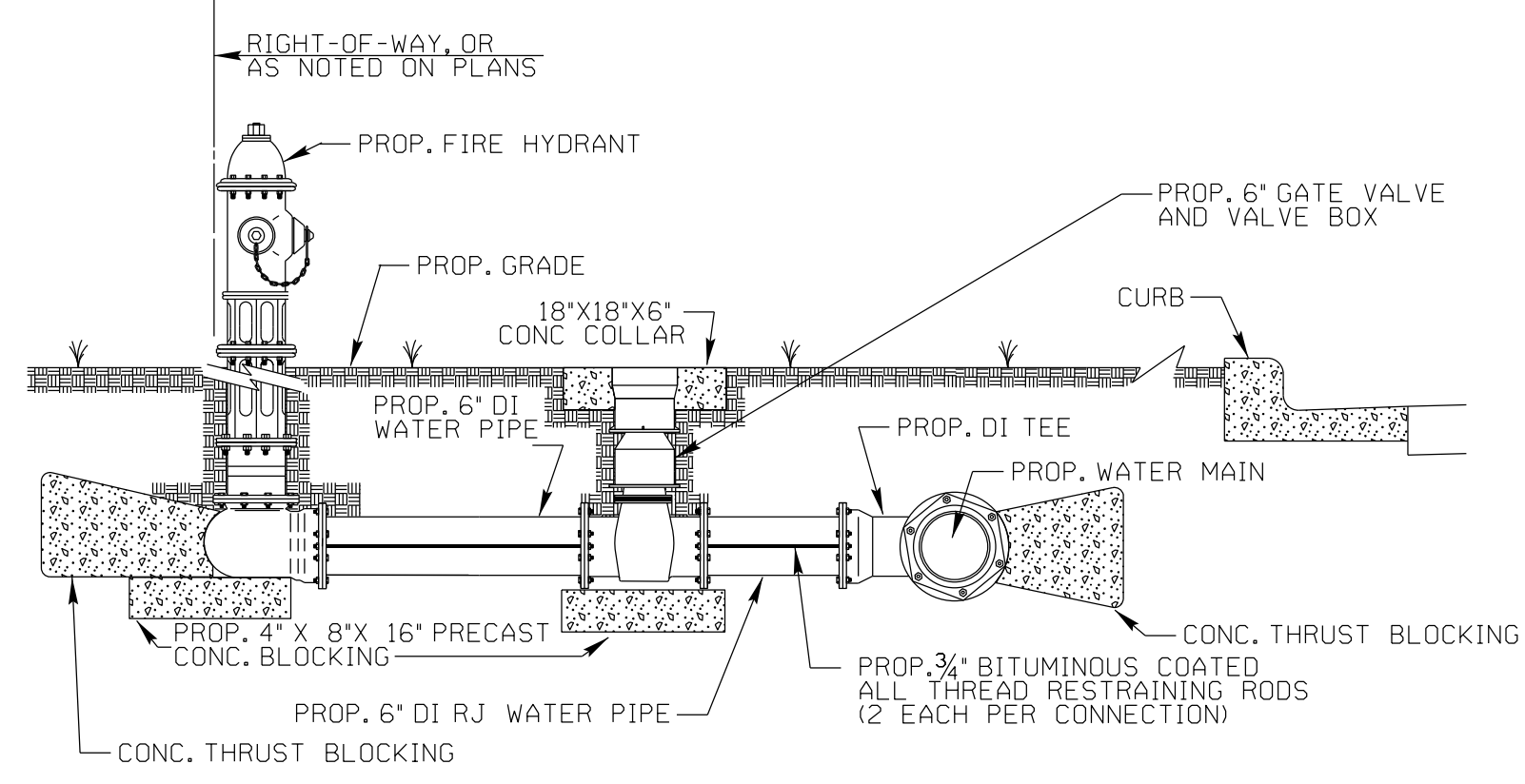


- NOTES:
- RELOCATION SHALL INCLUDE THE REMOVAL AND INSTALLATION AT THE APPROPRIATE LOCATION OF THE WATER METER, METER SETTER AND YOKE, METER VALVES, AND METER BOX WITH LID.
 - THE NEW WATER SERVICE LINE SHALL BE OF THE SAME TYPE AND GRADE AS THE EXISTING WATER SERVICE LINE UNLESS OTHERWISE SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER.
 - THE NEW WATER SERVICE LINE SHALL BE INSTALLED WITH A MINIMUM OF 36" COVER BELOW FINISHED GRADE.
 - RELOCATED METER SHALL BE RECONNECTED TO EXISTING WATER MAIN, IF NECESSARY, OR RECONNECTED TO NEW WATER MAIN AS DIRECTED BY ENGINEER.

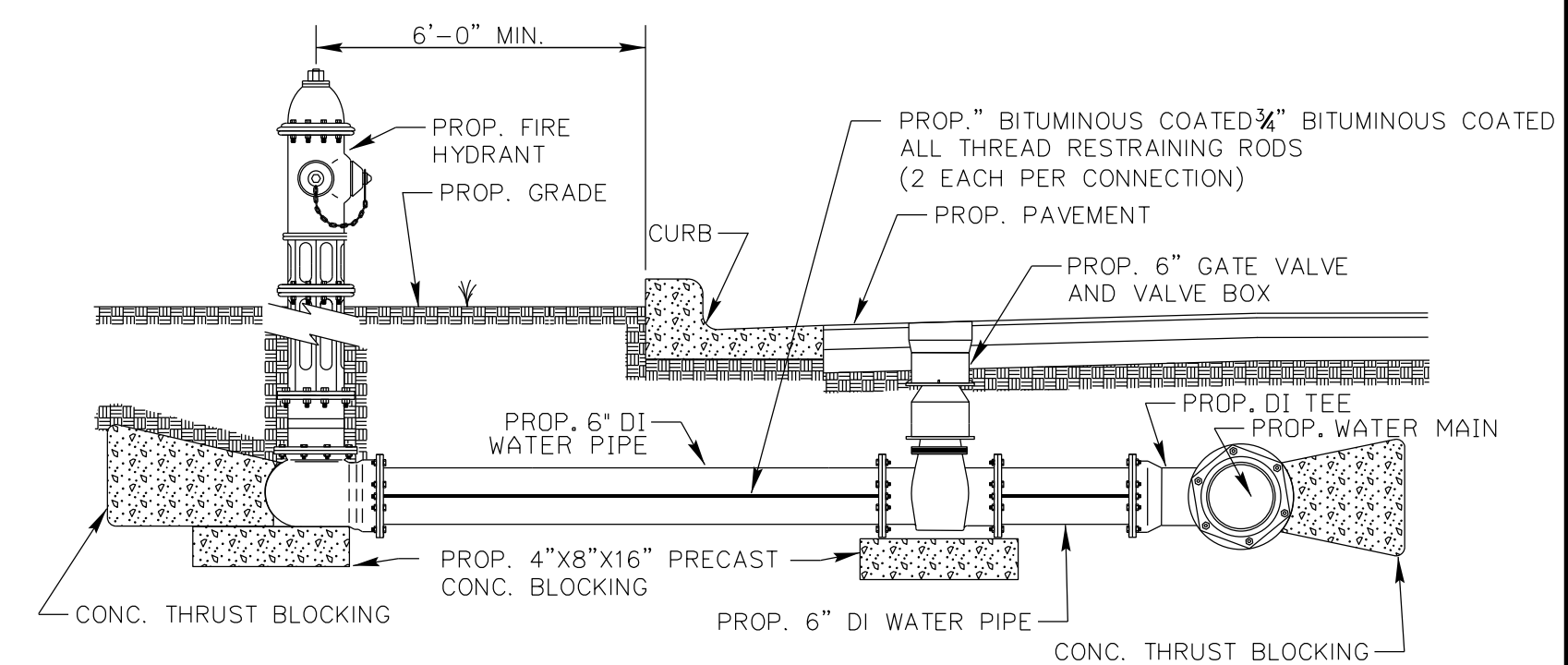
WATER METER RELOCATION DETAIL



TYPICAL VALVE & VALVE BOX INSTALLATION



FIRE HYDRANT INSTALLATION DETAIL (UNPAVED AREAS)

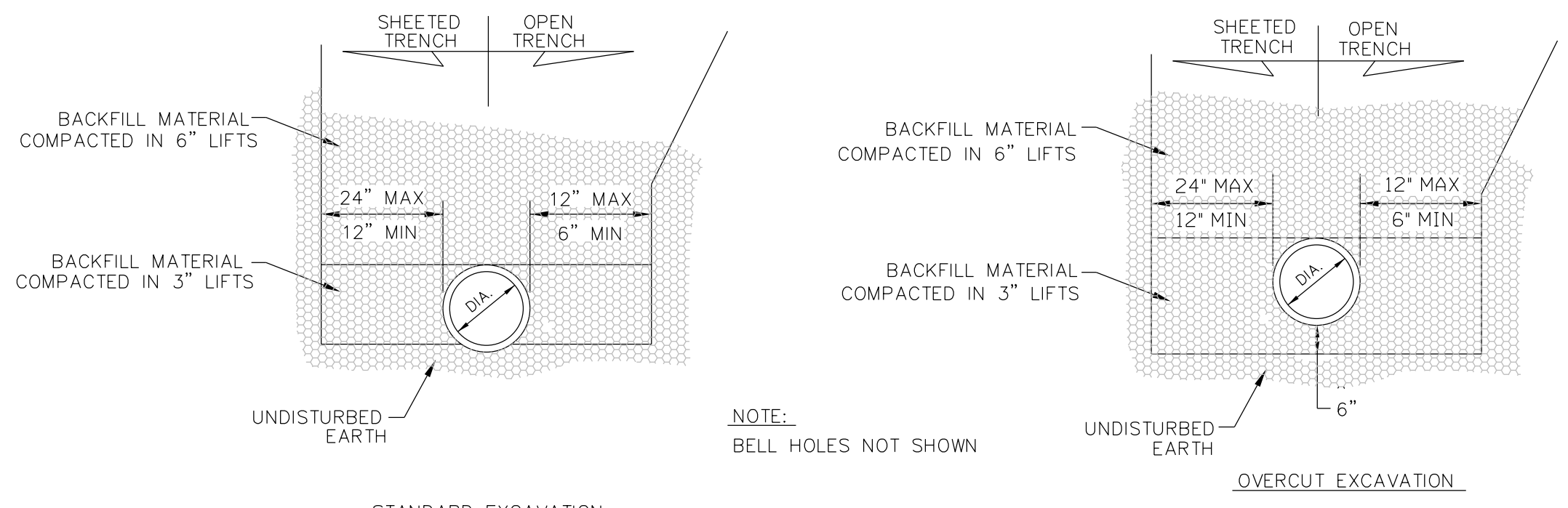


FIRE HYDRANT INSTALLATION DETAIL (PAVED AREAS)

PROJECT TYPICAL DETAILS

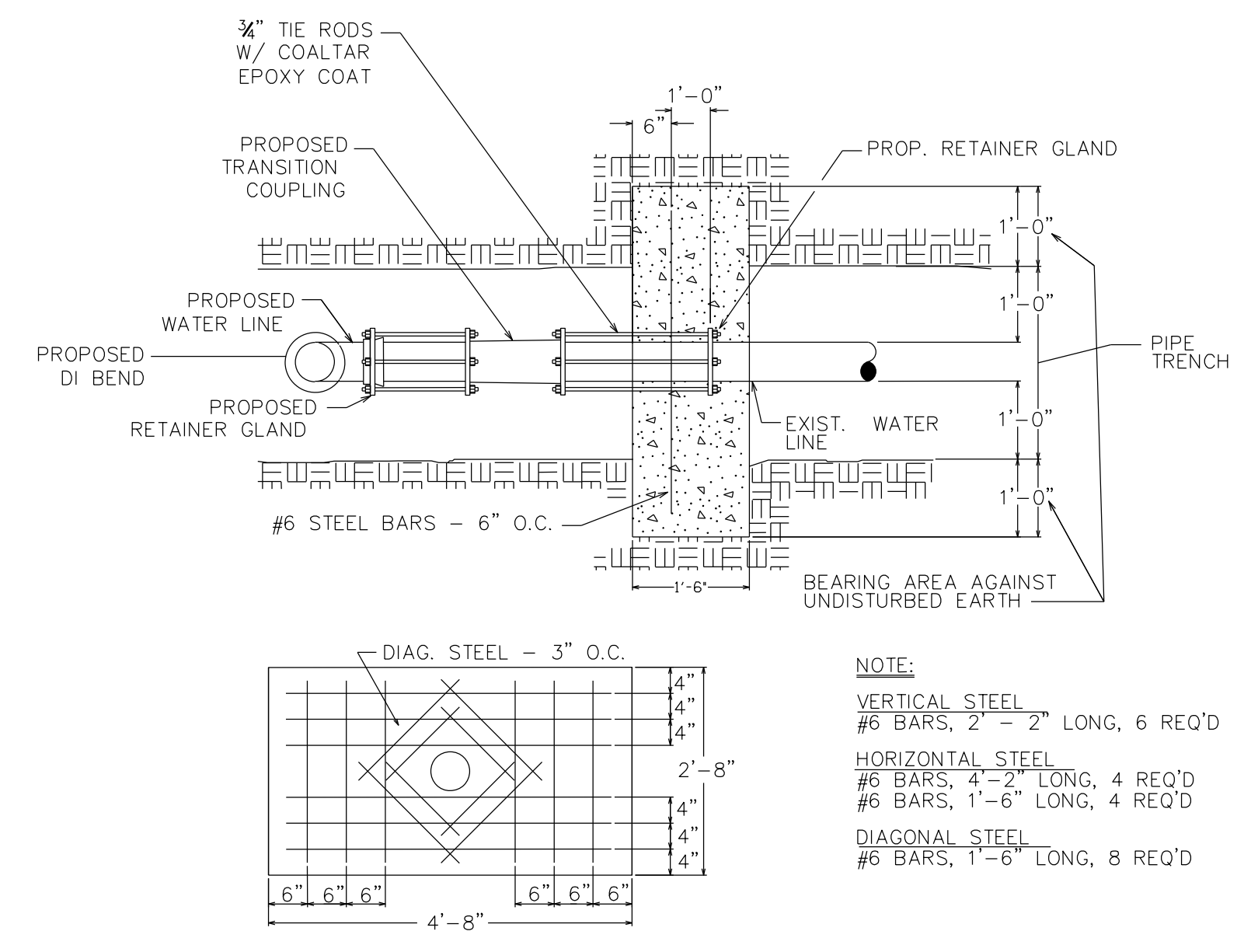
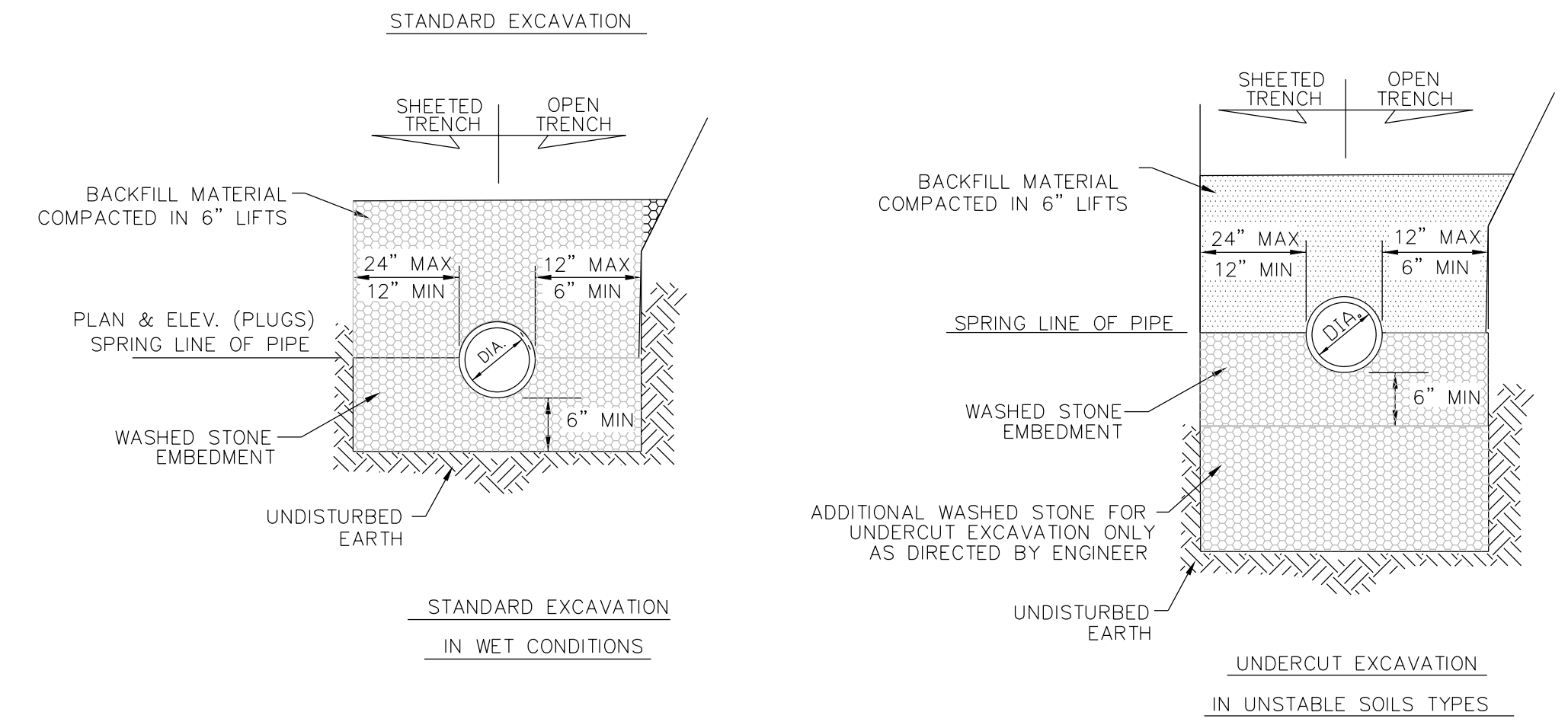
PROJECT REFERENCE NO.	SHEET NO.
R-2603	UC-3B
DESIGNED BY: B. DIXON	
DRAWN BY: R. MOSS	
CHECKED BY: B. DIXON	
APPROVED BY:	
REVISED:	04/13/2015
MUNICIPAL ENGINEERING SERVICES COMPANY, PA.	UTILITY CONSTRUCTION PLANS ONLY
P.O. BOX 97 GARNER, NC 27529 (919) 772-5393	

UTILITY CONSTRUCTION



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

TYPICAL TRENCH DETAIL

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

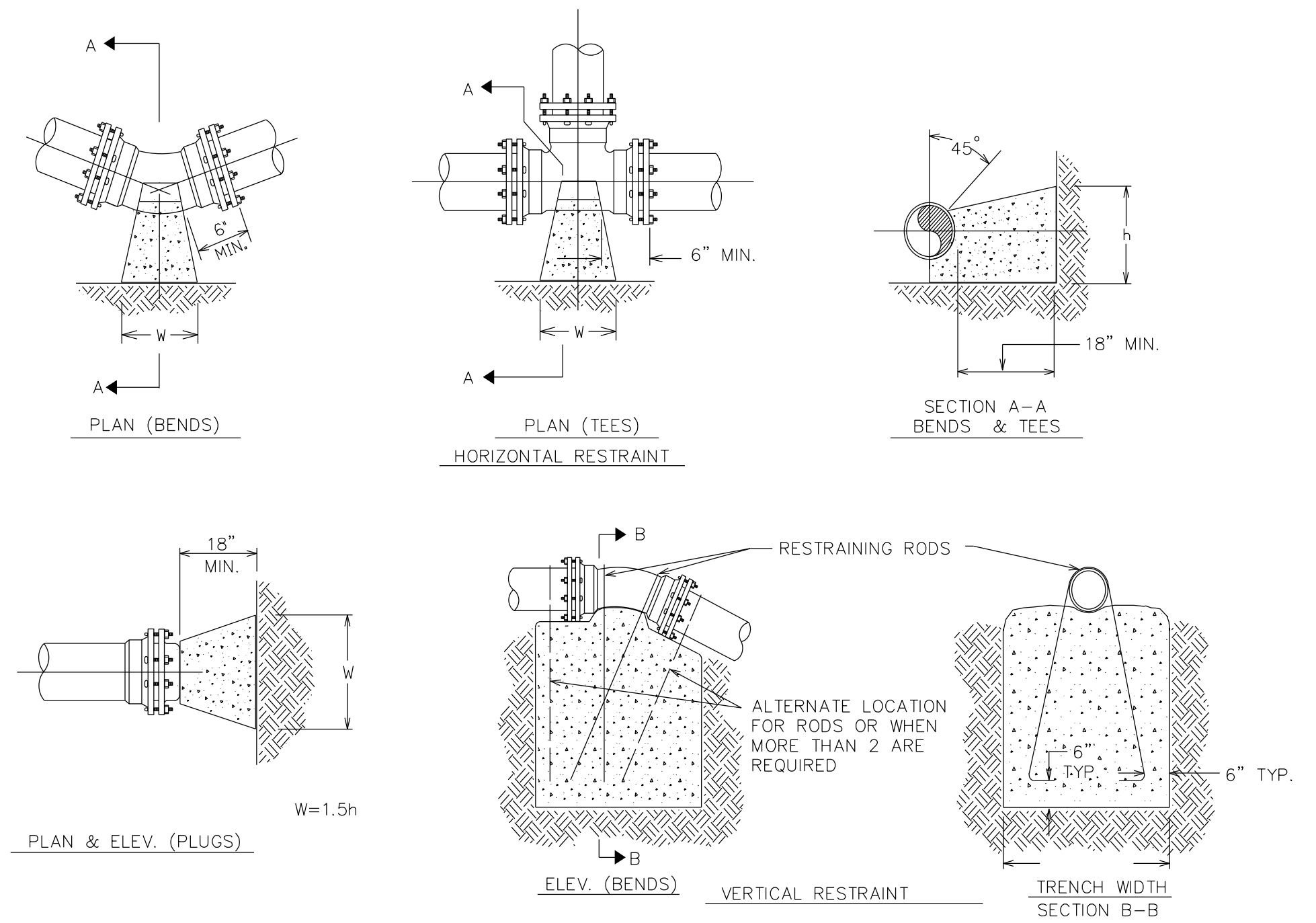
BASED ON TEST PRESSURE OF 200 P.S.I.

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	RESTRAINING RODS NO. REQ'D	DIA.	DEGREE OF BEND				
			1000	2000	3000	4000	5000	6000	7000	8000				11 1/4°	22 1/2°	45°		
6"	11 1/4°	1,385	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	22 1/2°	2,758	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	45°	5,409	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	90°	9,999	10	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	TEE/PLUG	7,068	7	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
10"	11 1/4°	3,846	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	22 1/2°	7,661	8	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	45°	15,028	15	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	90°	27,768	28	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
	TEE/PLUG	19,635	20	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
16"	11 1/4°	9,854	10	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	22 1/2°	19,612	20	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
	45°	38,471	38	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
	90°	71,085	71	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
	TEE/PLUG	50,265	50	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25

* 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.

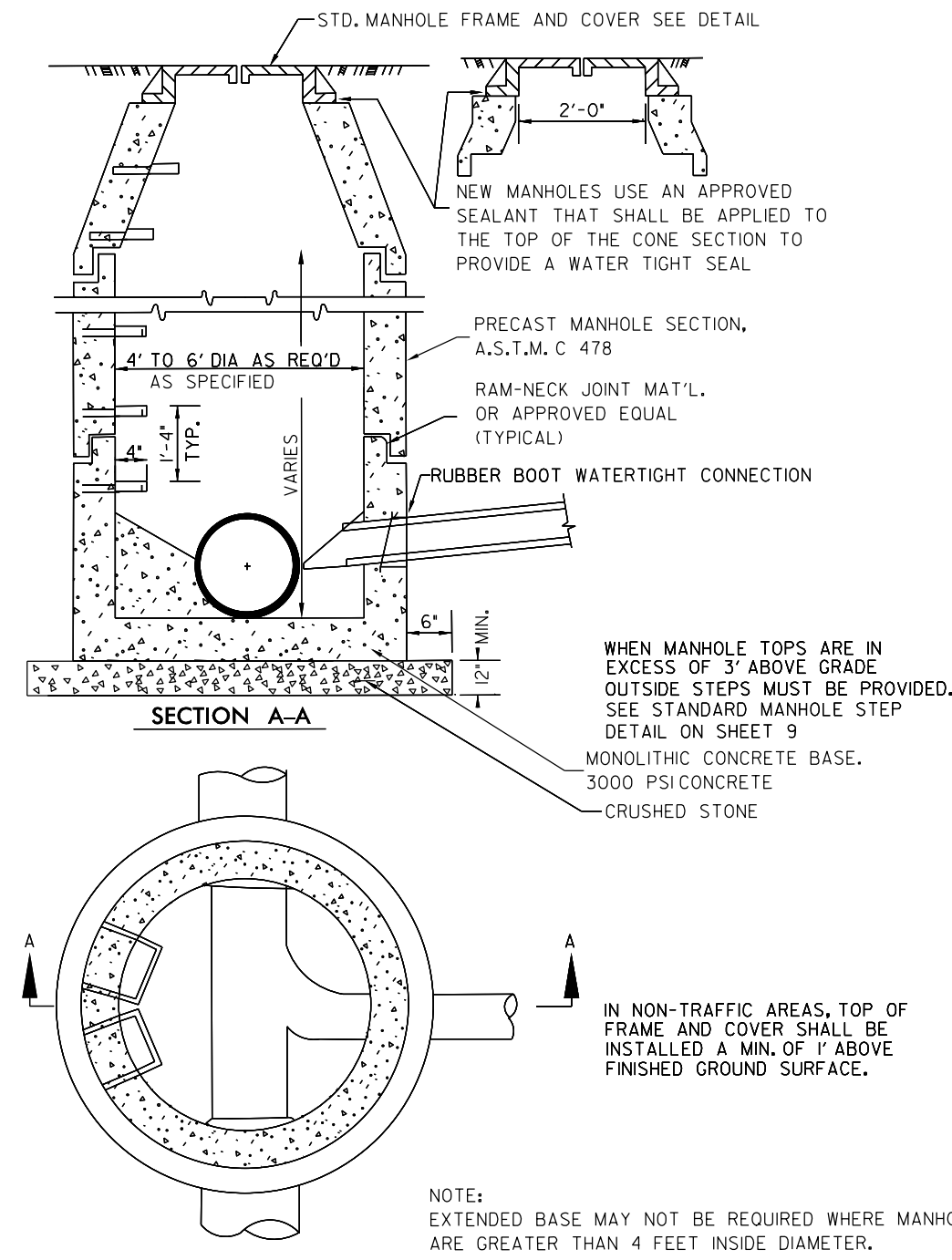
THRUST RESTRAINT FOR WATER MAINS



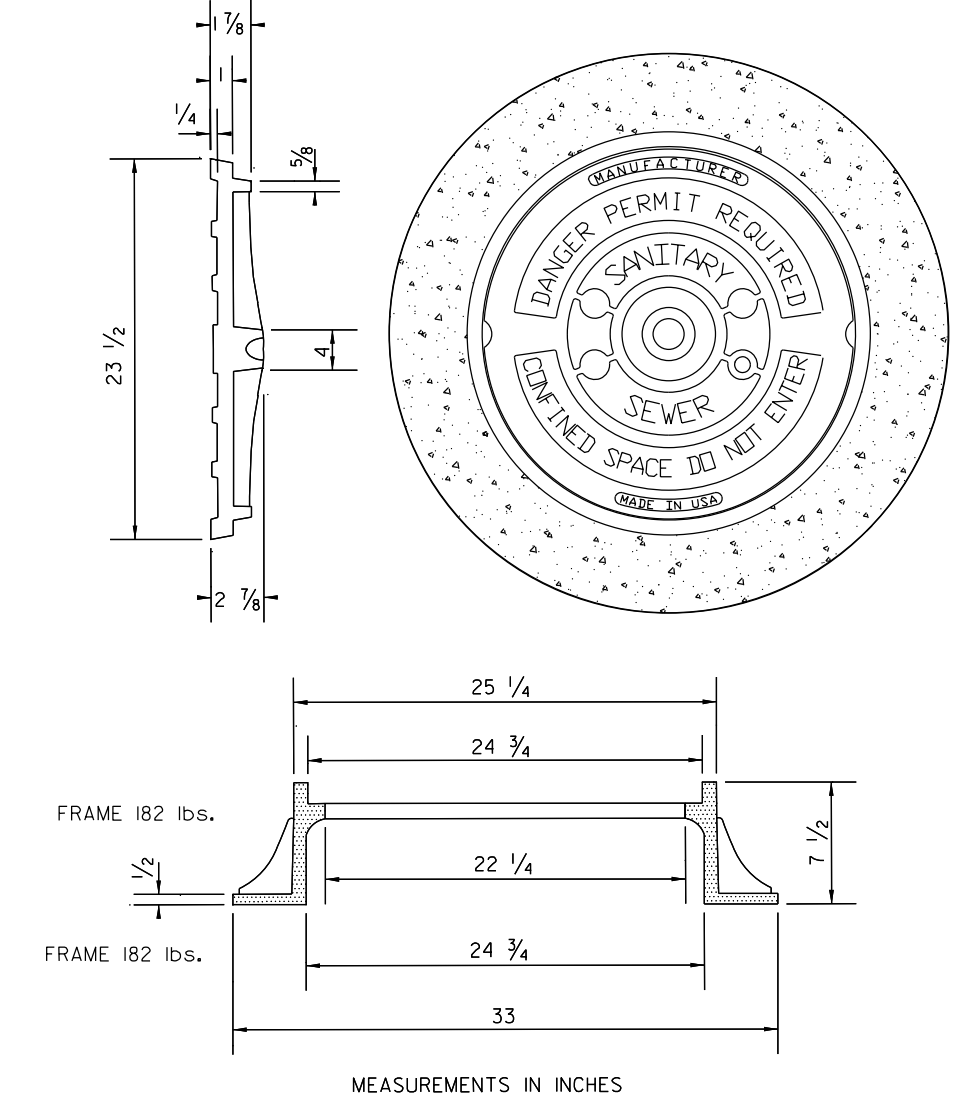
THRUST RESTRAINT FOR PIPE LINES

PROJECT REFERENCE NO.	SHEET NO.
R-2603	UC-3C
DESIGNED BY: B. DIXON	
DRAWN BY: R. MOSS	
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REVISED:	
MUNICIPAL ENGINEERING SERVICES COMPANY, PA.	
P.O. BOX 97 GARNER, NC 27529 (919) 772-5395	
UTILITY CONSTRUCTION PLANS ONLY	

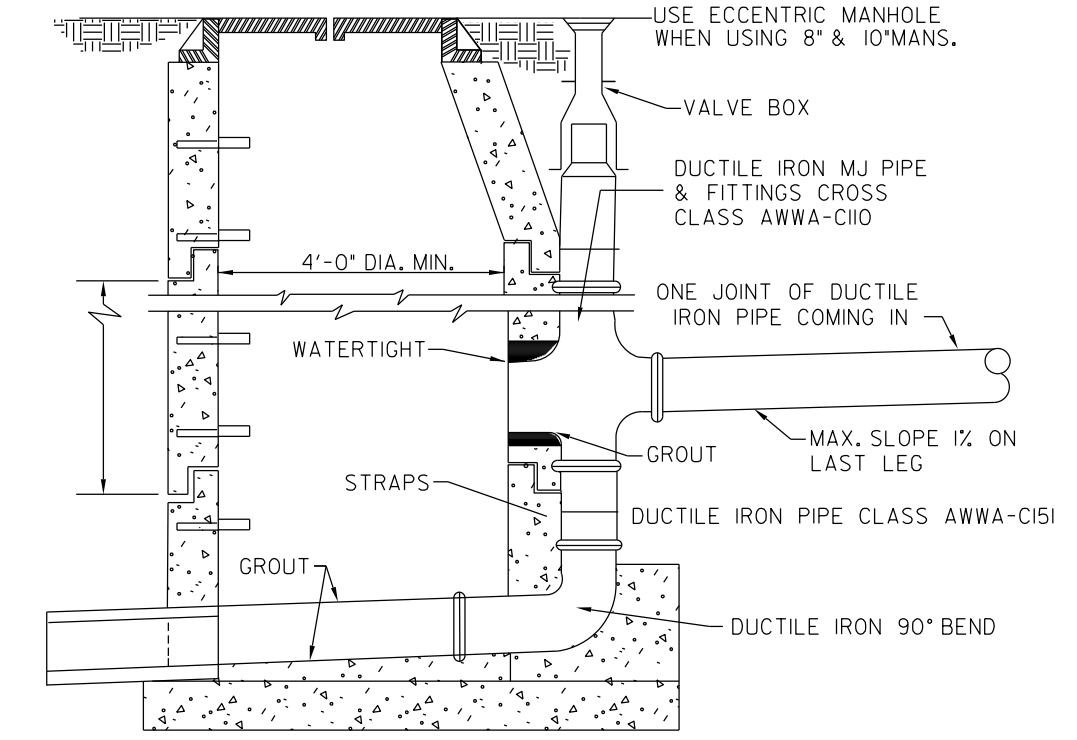
PROJECT TYPICAL DETAILS (SEWER)



STANDARD PRECAST SANITARY SEWER MANHOLE

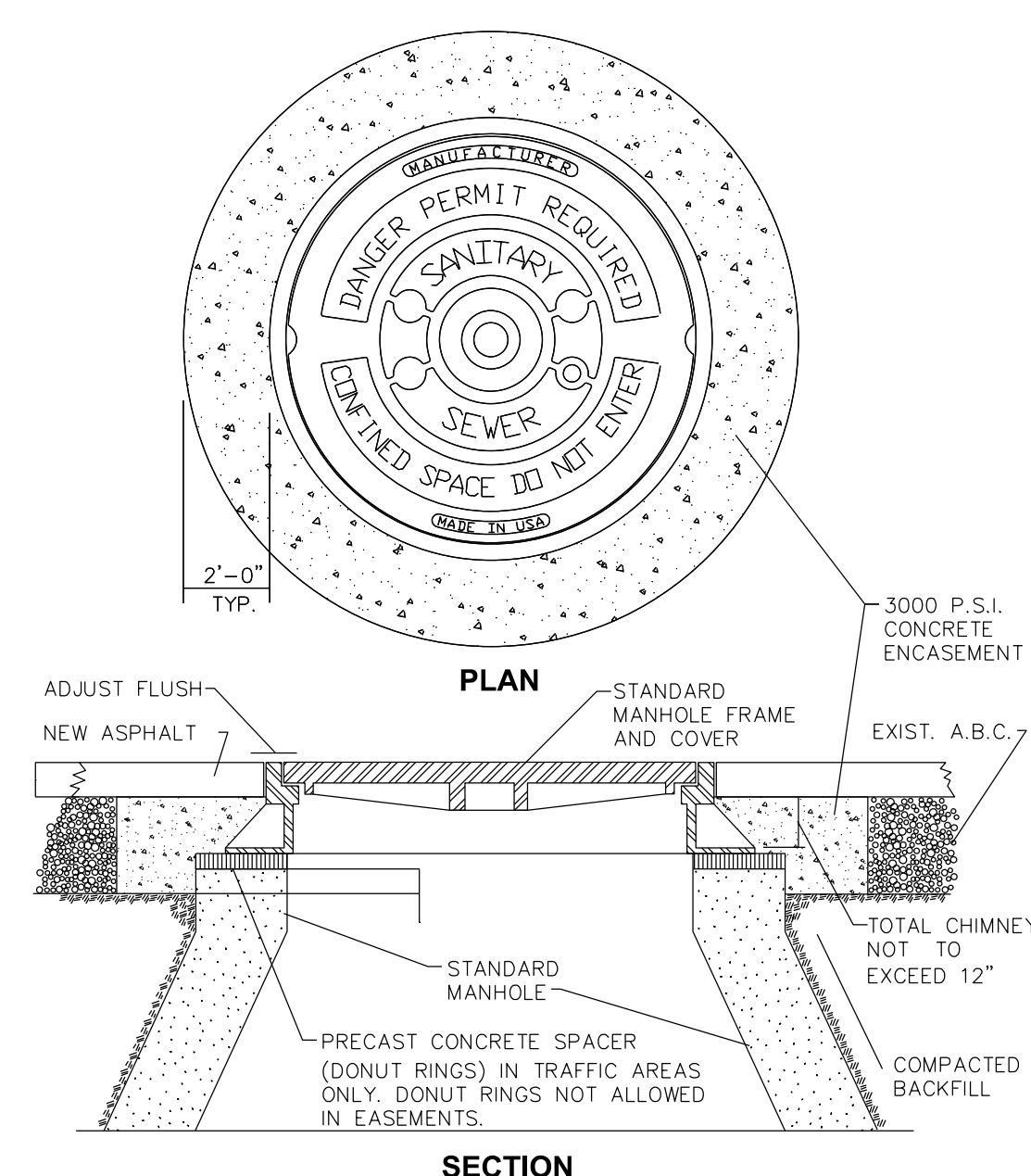


STANDARD MANHOLE COVER

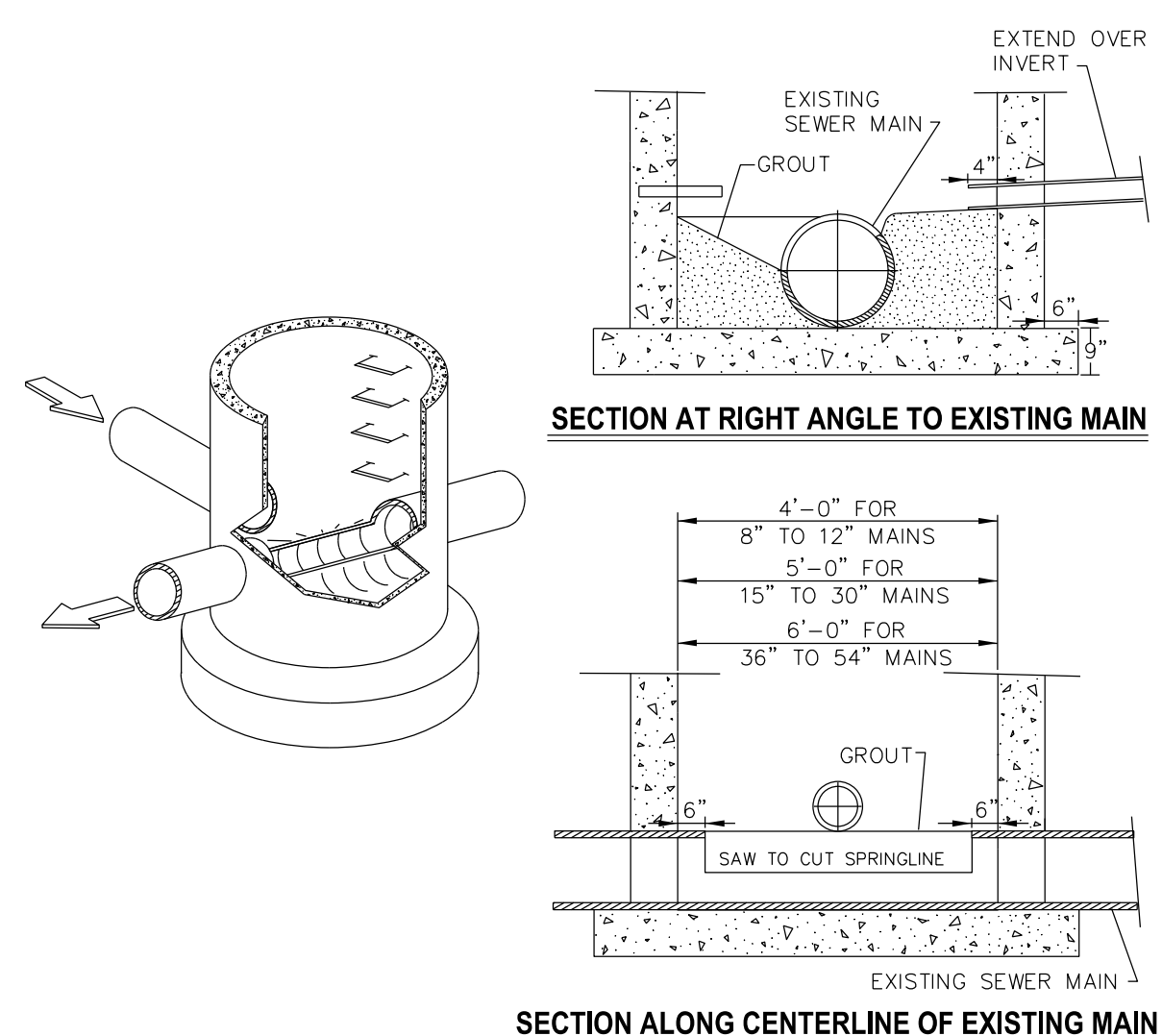


- NOTES:**
- PIPE SIZE FOR DROP TO EQUAL INFLOW SEWER PIPE SIZE
 - SAW-CUT OR DRILL ALL HOLES FOR PIPE AND BOLTS.
 - DROP-MANHOLE MANDATORY WHEN DIFFERENTIAL BETWEEN INVERTS IS GREATER THAN 3'-0\".
 - SEE PRECAST MANHOLE DETAIL.

STANDARD OUTSIDE DROP MANHOLE

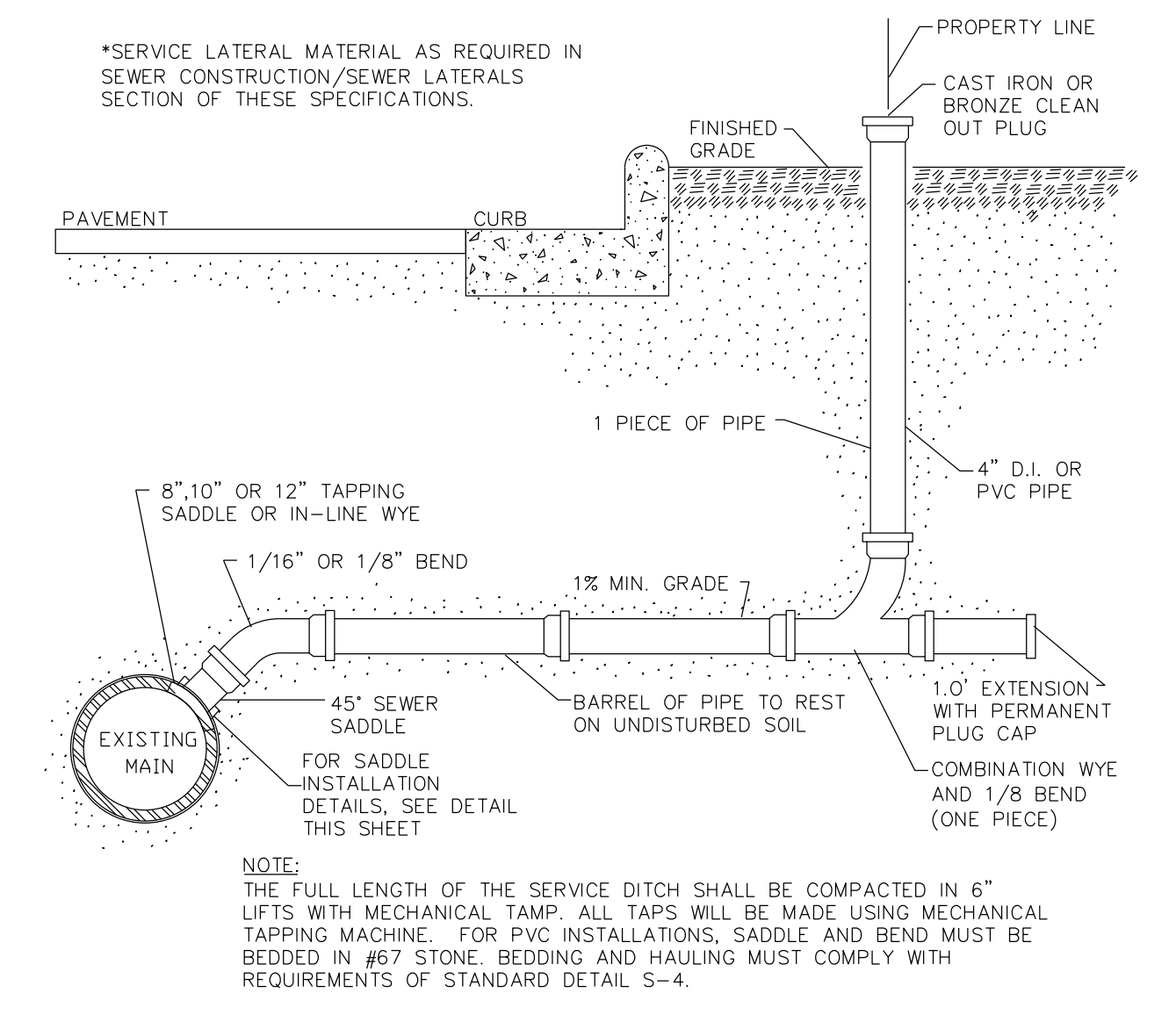


STANDARD MANHOLE FRAME AND COVER DETAIL WITHIN PAVED SURFACES

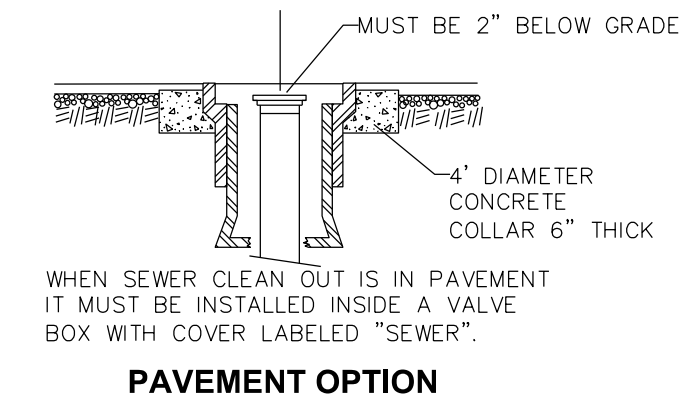


- NOTES:**
- FLOW SHALL BE MAINTAINED DURING CONSTRUCTION.
 - THIS DETAIL TO BE USED WHEN A 6\" OR LARGER LATERAL NECESSITATES CONSTRUCTION OF A NEW MANHOLE.
 - SEE STANDARD PRECAST MANHOLE & DETAILS.
 - THE CONTRACTOR SHALL PROVIDE A MINIMUM 6\" COMPACTED # 67 STONE BASE.
 - FOR USE ON DIP AND PVC ONLY; (NOT ALLOWED ON VCP)
 - SEE CONCRETE BASE DETAIL FOR REINFORCING.

STANDARD MANHOLE INSTALLATION OVER EXISTING SEWER MAIN



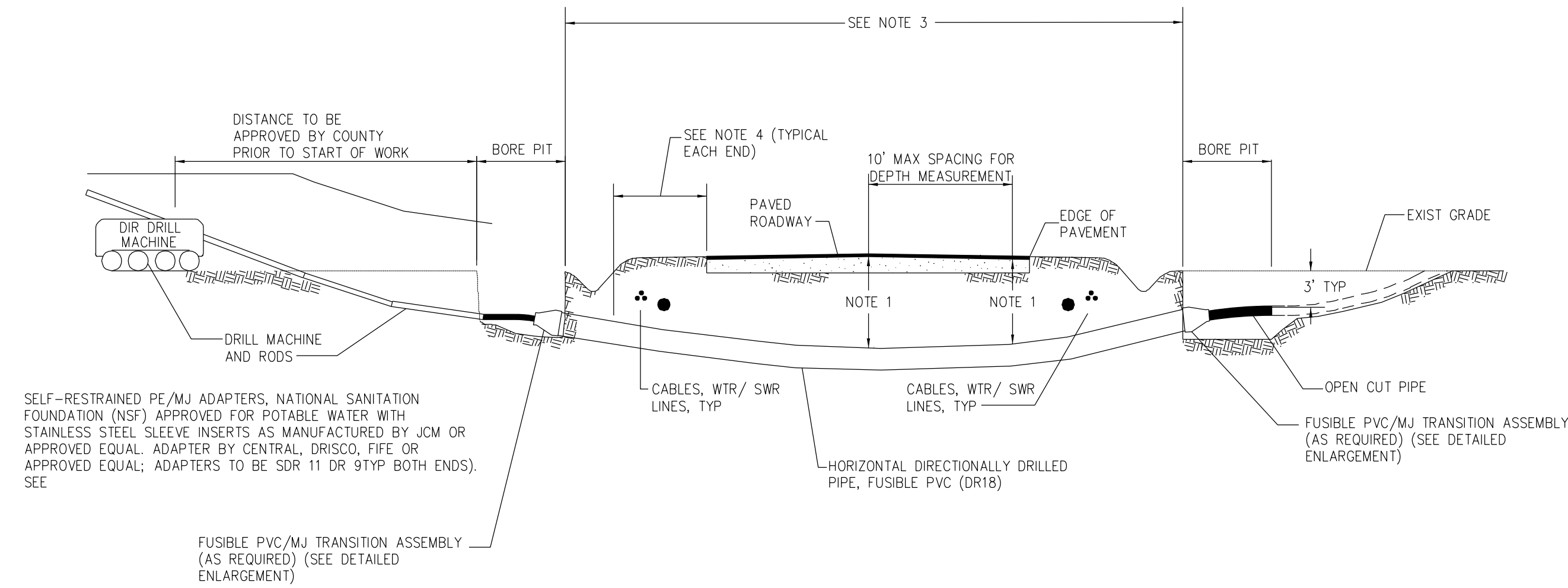
NOTE: THE FULL LENGTH OF THE SERVICE DITCH SHALL BE COMPACTED IN 6\" LIFTS WITH MECHANICAL TAMP. ALL TAPS WILL BE MADE USING MECHANICAL TAPPING MACHINE. FOR PVC INSTALLATIONS, SADDLE AND BEND MUST BE BEDDED IN #67 STONE. BEDDING AND HAULING MUST COMPLY WITH REQUIREMENTS OF STANDARD DETAIL S-4.



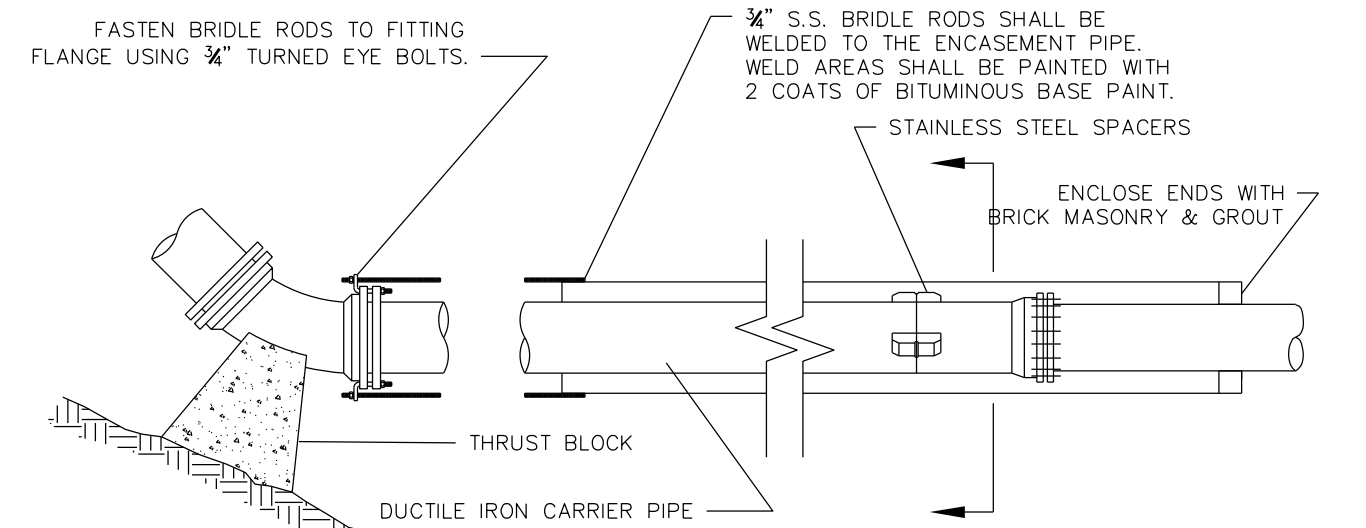
PAVEMENT OPTION

TYPICAL SANITARY SEWER LATERAL CONNECTION

PROJECT TYPICAL DETAILS



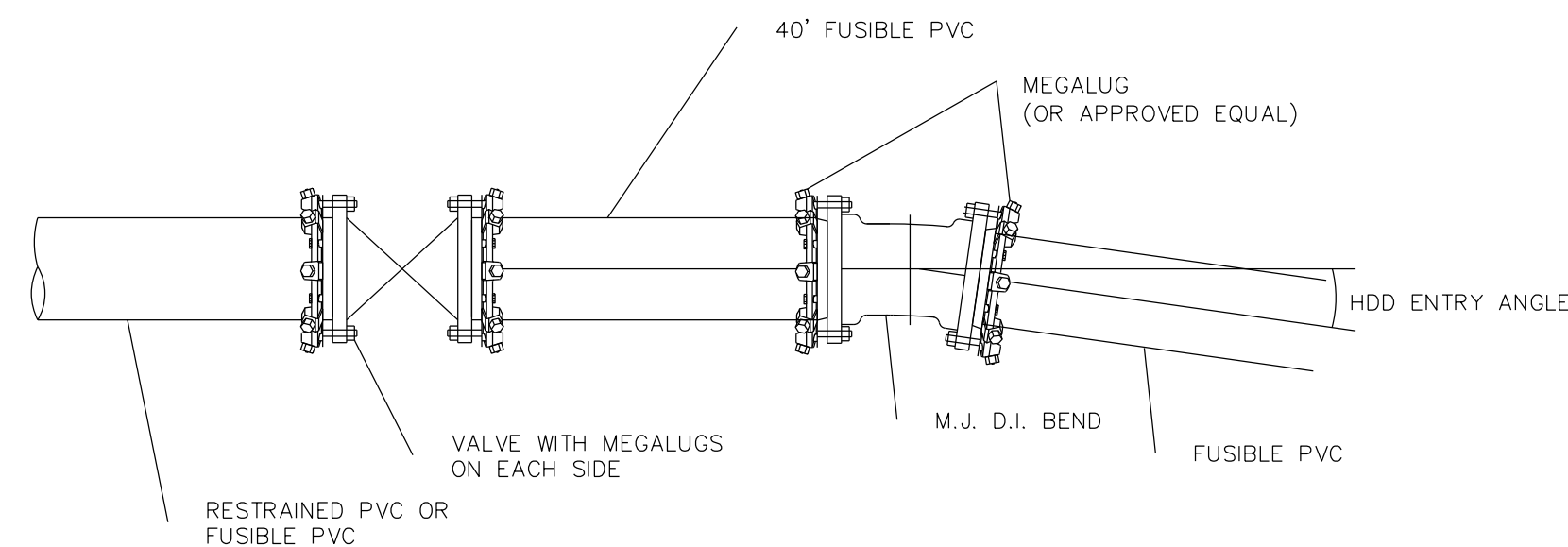
FUSIBLE PVC/MJ TRANSITION ASSEMBLY



NOTES:

1. STAINLESS STEEL SPACERS SHALL BE USED. NO TIMBER SKIDS ARE ALLOWED.
2. TWO SPACERS PER JOINT SHALL BE USED FOR D.I.P. CARRIER PIPE.
3. ENCASED BORES ALONG GRAVITY COLLECTION SYSTEMS SHALL NOT REQUIRE BRIDLE RODS.
4. 2 EA. 1/2" S.S. BRIDLE RODS SHALL BE REQUIRED ON ALL LINES 8"Ø AND SMALLER. 4 EA. 1/2" S.S. BRIDLE RODS SHALL BE REQUIRED ON ALL LINES 10"Ø AND LARGER.
5. CARRIER PIPE SHALL BE INSTALLED USING 'FIELD LOK' GASKETS OR APPROVED EQUAL.

STANDARD BORE ENCASEMENT



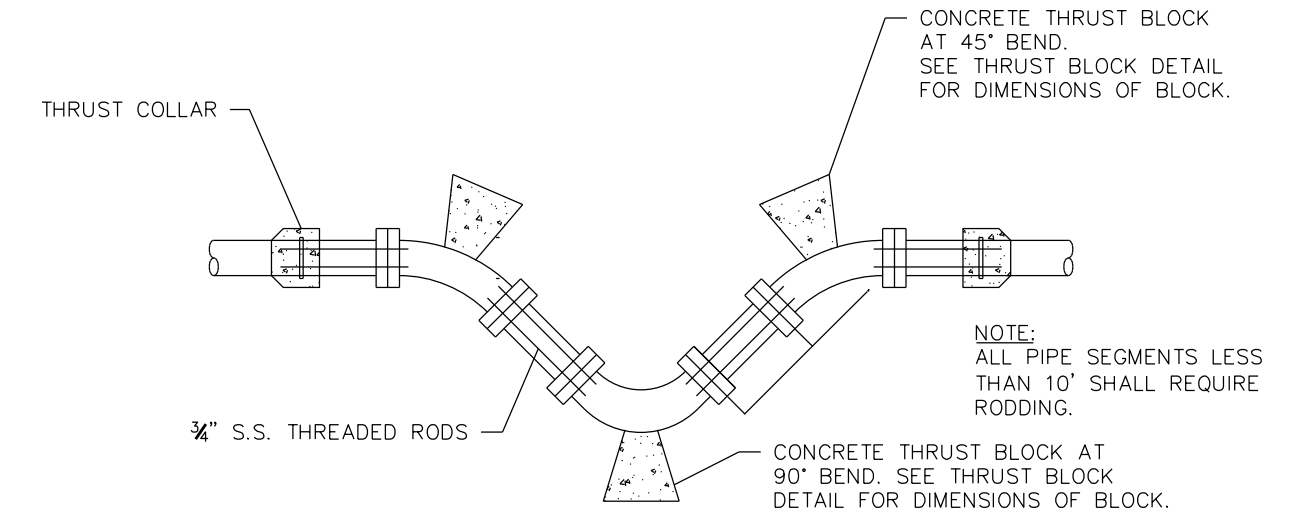
NOTES:

1. RESTRAINT SYSTEM TYPICAL ON BOTH SIDES OF DIRECTIONAL BORE.
2. ALL FITTINGS AND MEGALUGS SHALL BE INCLUDED IN THE UNIT PRICE (DEPENDS ON BID FORM) FOR HDD ITEMS.

SUGGESTED CONNECTION FOR FUSIBLE PVC TO DIRECT BURY PVC WITH GATE VALVE AND RESTRAINT

NOTE:

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 SPECIFICATIONS 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 THE ENGINEER PRIOR TO ANY START OF WORK.
4. 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 ENGINEER PRIOR TO THE START OF ANY WORK.
5. 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 FOR 7 DAYS OR THE AMOUNT OF TIME RECOMMENDED BY THE MANUFACTURER PRIOR TO MAKING ANY CONNECTIONS.
6. FUSIBLE PVC HAS BEEN APPROVED FOR USE WITHIN NCDOT RIGHT-OF-WAYS.
7. MINIMUM OF THREE(3) RESTRAINED JOINTS ARE REQUIRED UPSTREAM AND DOWNSTREAM OF FUSIBLE PVC MJ ADAPTER ON EACH END OF THE HORIZONTAL DIRECTIONALLY DRILLED PIPE UNLESS OTHERWISE APPROVED BY THE ENGINEER.



SIZE OF 45° BEND	STATIC THRUST IN POUNDS	NUMBER OF RODS REQUIRED
6"	4,328	2
8"	7,694	2
12"	17,312	4
16"	30,779	6
20"	48,091	8
24"	69,252	10

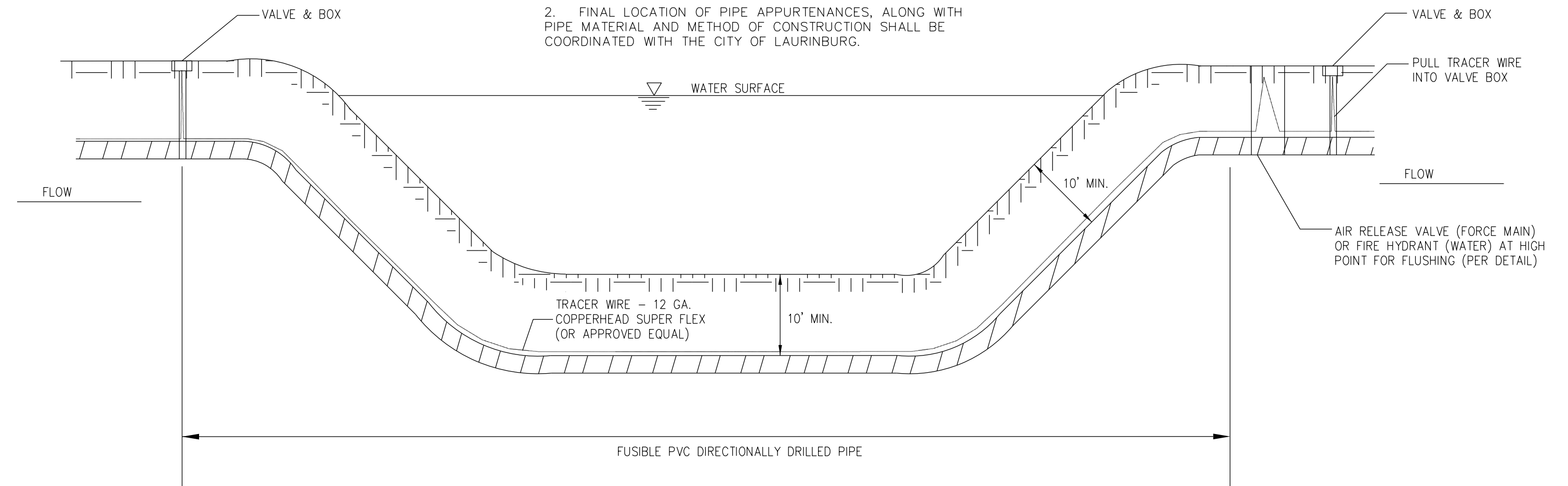
GENERAL NOTES

1. RODS AND NUTS SHALL BE OF TYPE 304 OR TYPE 316 STAINLESS STEEL.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT BENDS.

VERTICAL BEND RODDING AND BLOCKING DETAIL

NOTES:

1. THIS DETAIL IS A GENERAL SCHEMATIC SHOWING ISOLATION VALVE LOCATIONS AND AIR RELEASE VALVES.
2. FINAL LOCATION OF PIPE APPURTENANCES, ALONG WITH PIPE MATERIAL AND METHOD OF CONSTRUCTION SHALL BE COORDINATED WITH THE CITY OF LAURINBURG.



VALVE LOCATIONS FOR DIRECTIONAL DRILL OF PIPE UNDER WETLANDS/WATER BODY

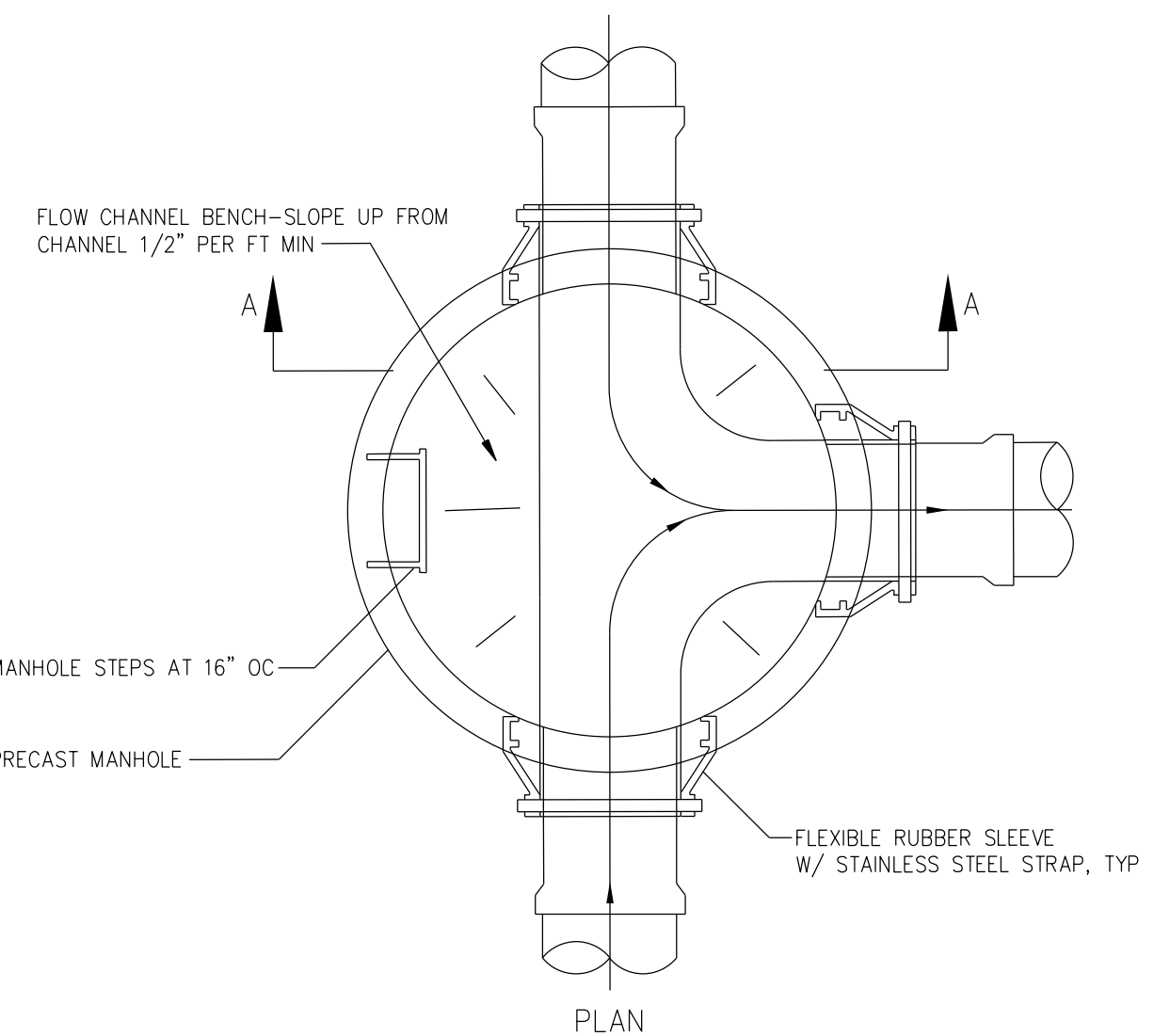
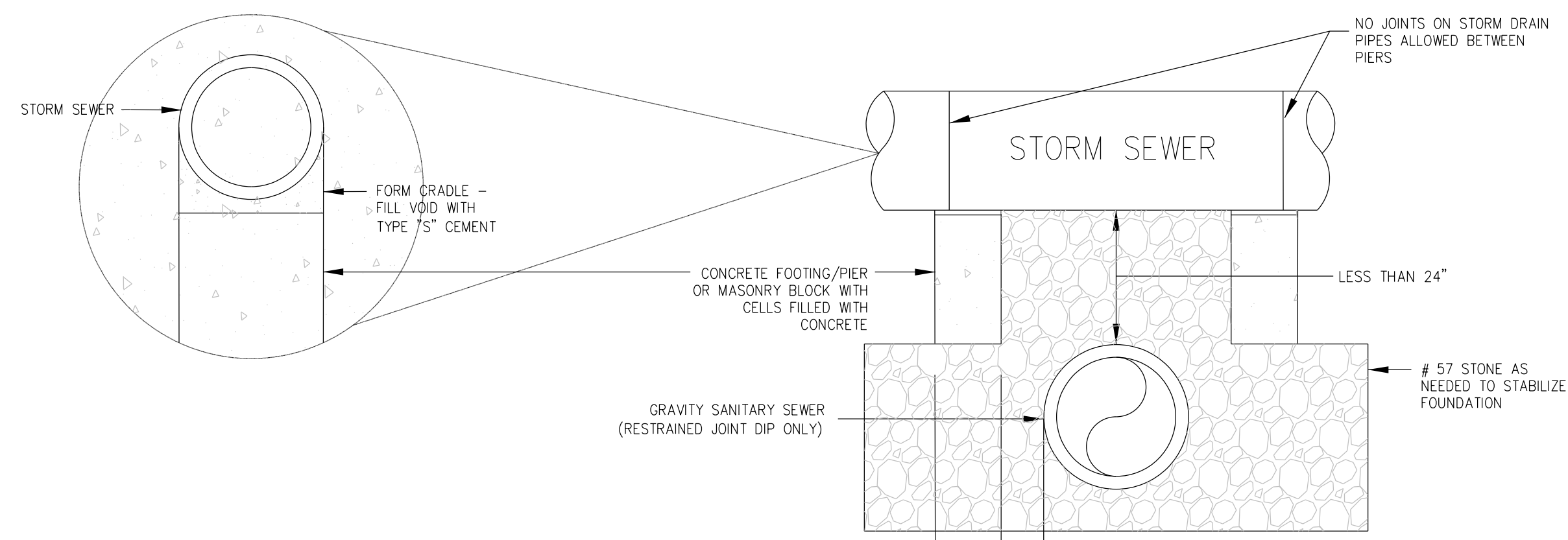
PROJECT REFERENCE NO.	SHEET NO.
R-2603	UC-3D
DESIGNED BY: B. DIXON	
DRAWN BY: R. MOSS	
CHECKED BY: B. DIXON	
APPROVED BY:	
REVISED:	
MUNICIPAL ENGINEERING SERVICES COMPANY, PA.	04/13/2015
P.O. BOX 97 GARNER, NC 27529 (919) 772-5393	UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION

PROJECT TYPICAL DETAILS

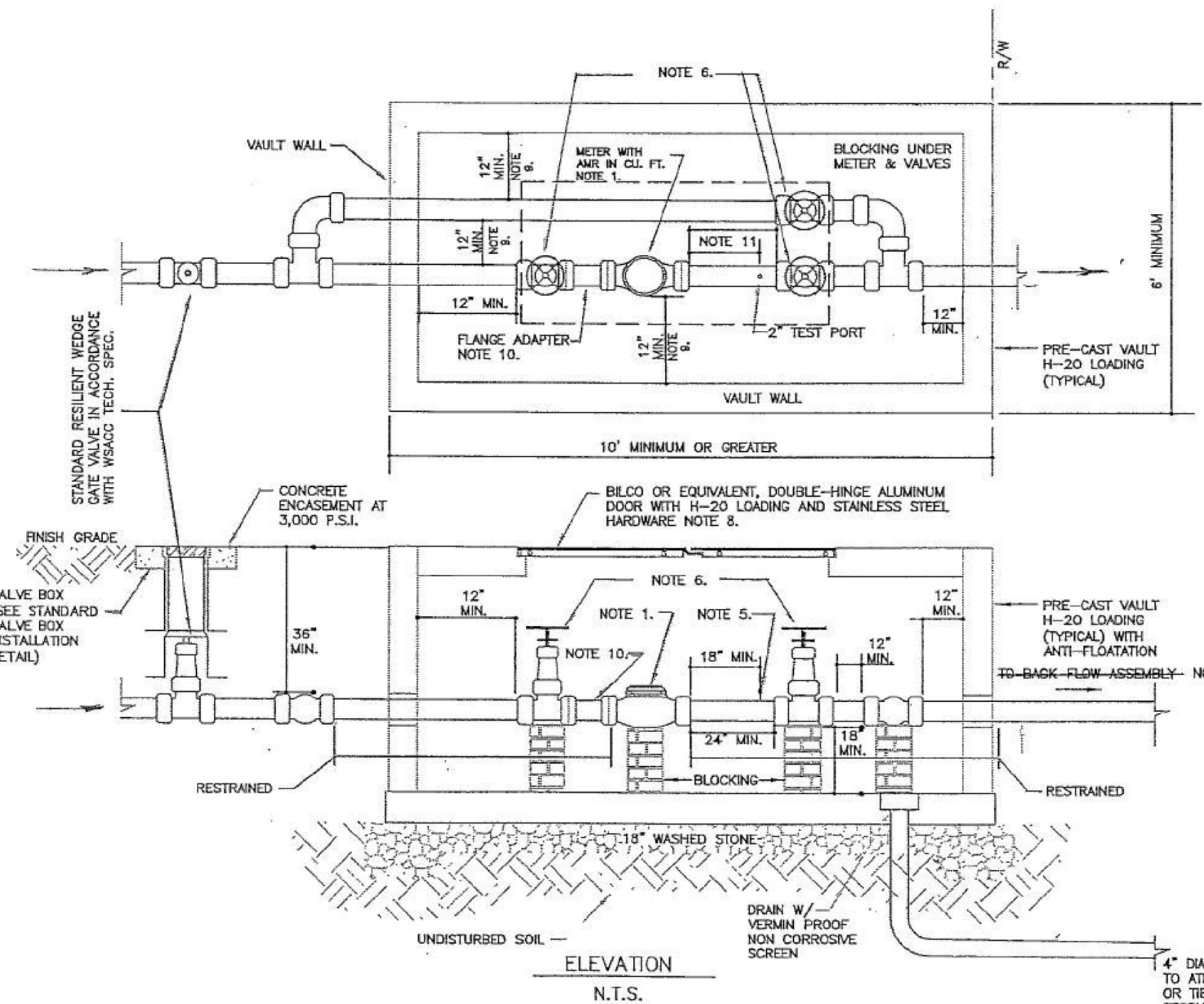
PROJECT REFERENCE NO.	SHEET NO.
R-2603	UC-3E
DESIGNED BY: B. DIXON	
DRAWN BY: R. MOSS	
CHECKED BY: B. DIXON	
APPROVED BY:	
REVISED:	
MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.	UTILITY CONSTRUCTION PLANS ONLY
P.O. BOX 97 GARNER, NC 27529 (919) 772-5393	

UTILITY CONSTRUCTION



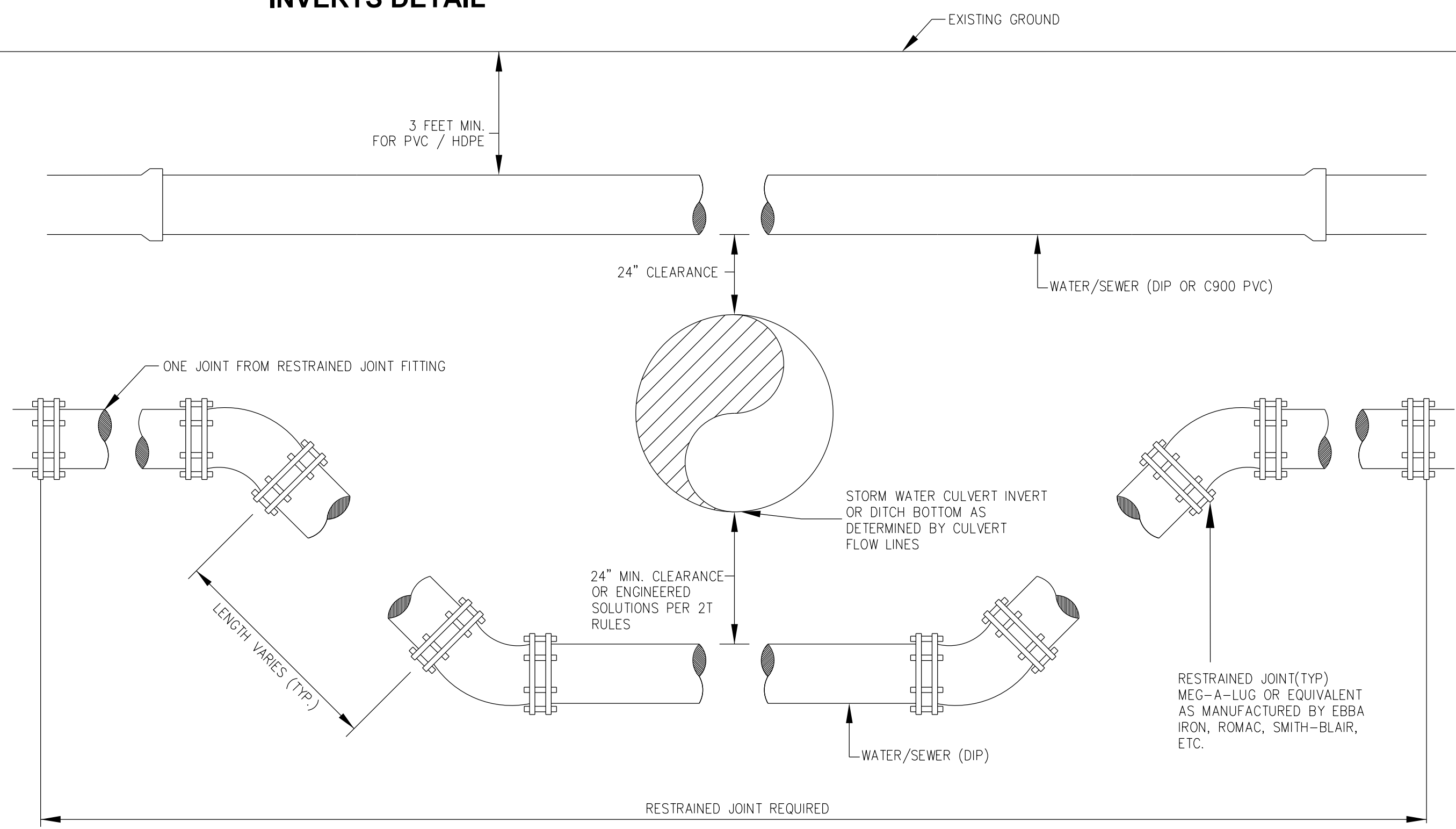
TYPICAL MANHOLE INVERTS DETAIL

LESS THAN 12" VERTICAL CLEARANCE



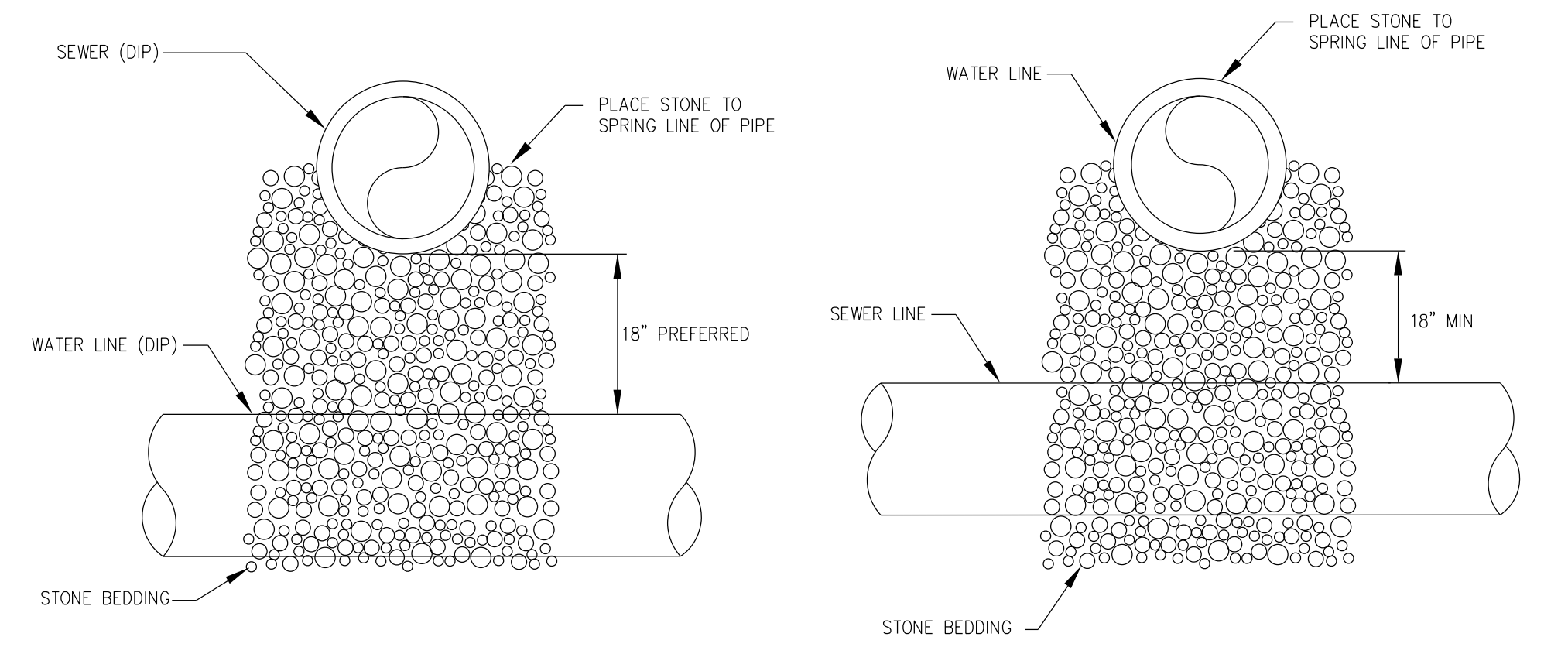
MASTER METER AND VAULT

- BADGER 8-INCH COMPOUND WATER METER EQUIPPED WITH BATTERY OPERATED ELECTRONIC READING SYSTEM OR EQUAL WITH CUBIC FEET READ REGISTRATION. THE LOCATION OF FITTINGS MUST COMPLY WITH MANUFACTURER'S RECOMMENDATIONS FOR STRAIGHT PIPE CONDITIONS.
- MASTER METER ASSEMBLY TO BE RESTRAINED DUCTILE IRON FLANGE PIPE WITHIN VAULT.
- WATER MAIN AND FITTINGS TO BE A MAXIMUM OF 3.5 FEET BELOW FINISHED GRADE.
- PRECAST CONCRETE BELOW GROUND VAULT WITH H-20 LOADING. VAULT AND OPENINGS SHALL BE WATER TIGHT AND SEALED. MASTIC GASKETS, NON-SHRINKING GROUT AND RESILIENT PIPE CONNECTORS SHALL BE USED, AS REQUIRED. ANTI-FLOATATION MEASURES MUST BE PROVIDED.
- 2-INCH TEST PORT BY TAP-SADDLE, BALL VALVE, AND PLUG.
- RESILIENT WEDGE GATE VALVE, NON-RISING STEM WITH HAND WHEEL.
- NOT USED.
- THE DOORS MUST BE FLUSH MOUNT, LOCKABLE AND SIZED SUCH THAT THE VALVES, METER, AND TEST PORT ARE LOCATED WITHIN THE DOOR OPENING AND ACCESSIBLE TO MUNICIPALITY STAFF.
- 12-INCHES OF CLEARANCE MUST BE PROVIDED BETWEEN THE INTERIOR VAULT WALL AND ANY ASSOCIATED FITTINGS OR APPURTENANCES AND 12-INCHES OF HORIZONTAL CLEARANCE BETWEEN ALL INTERNAL BY-PASS FITTINGS AND THE METER ASSEMBLY FITTINGS.
- ROMAC D4045 DISMANTLING JOINT OR EQUIVALENT.
- 18-INCHES FROM METER FLANGE TO TEST PORT CONNECTION. 24-INCHES TOTAL FROM METER FLANGE TO GATE VALVE.
- SHOP DRAWINGS FOR PROPOSED VAULT(S), METER, DOOR(S), AND ASSEMBLY MUST BE SUBMITTED TO THE MUNICIPALITY STAFF FOR APPROVAL PRIOR TO CONSTRUCTION.



DITCH AND/OR STORM DRAIN CROSSING OFFSETS BETWEEN WATER/SEWER PRESSURE MAIN AND STORM DRAIN

- NOTE:**
- USE THREADED RODS, MEGA-LUG OR EQUAL CAM-LOK, OR APPROVED EQUAL FOR JOINT RESTRAINT.
 - USE THRUST BLOCKING WHERE NEEDED TO REINFORCE JOINT RESTRAINT.



SEWER CROSSING ABOVE WATER LINE

SEWER CROSSING BELOW WATER LINE

SEWER OFFSETS ABOVE AND BELOW WATER MAINS

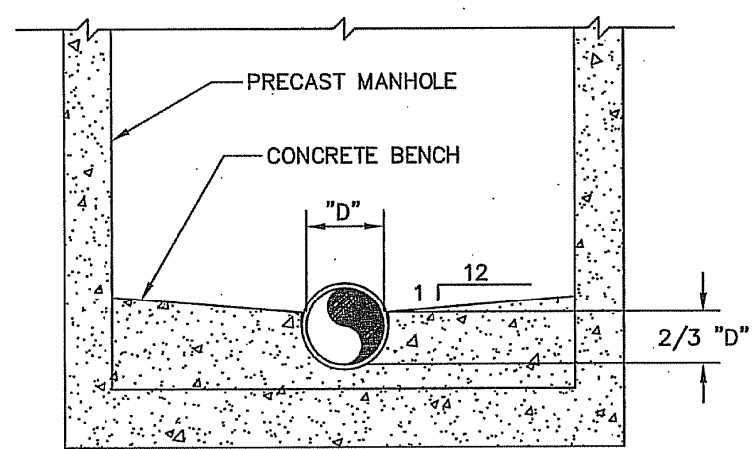
- NOTES:**
- BOTH THE WATER MAIN AND THE SEWER MAIN SHALL BE FERROUS MATERIALS WITH JOINTS EQUIVALENT TO WATER MAIN STANDARDS FOR A MINIMUM DISTANCE OF 10 FEET ON EACH SIDE OF THE CROSSING.
 - ALTERNATIVELY, PIPES MAY BE SLEEVED WITH FERROUS MATERIALS FOR A MINIMUM DISTANCE OF 10 FEET ON EACH SIDE OF THE CROSSING AS APPROVED BY BRUNSWICK COUNTY ENGINEERING.

- NOTES:**
- SOIL REPLACED UNDER THE WATER MAIN SHALL BE COMPACTED.
 - IF THE WATER MAIN CROSSES AT LESS THAN 18" ABOVE THE SEWER MAIN BOTH THE WATER MAIN AND THE SEWER MAIN SHALL BE FERROUS MATERIALS WITH JOINTS EQUIVALENT TO WATER MAIN STANDARDS FOR A MINIMUM DISTANCE OF 10 FEET ON EACH SIDE OF THE CROSSING, OR THEY MAY HAVE FERROUS SLEEVES PUT AROUND THEM AS APPROVED BY BRUNSWICK COUNTY ENGINEERING.

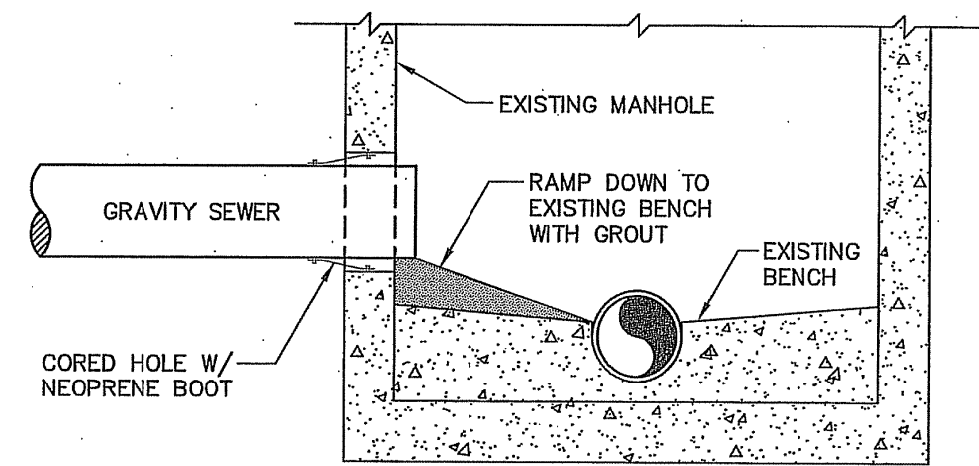
PROJECT TYPICAL DETAILS

PROJECT REFERENCE NO.	SHEET NO.
R-2603	UC-3F
DESIGNED BY: B.DIXON	
DRAWN BY: R.MOSS	
CHECKED BY: B.DIXON	
APPROVED BY:	
REVISED:	
MUNICIPAL ENGINEERING SERVICES COMPANY, PA.	04/13/2015
P.O. BOX 97 GARNER, NC 27529 (919) 772-5393	UTILITY CONSTRUCTION PLANS ONLY

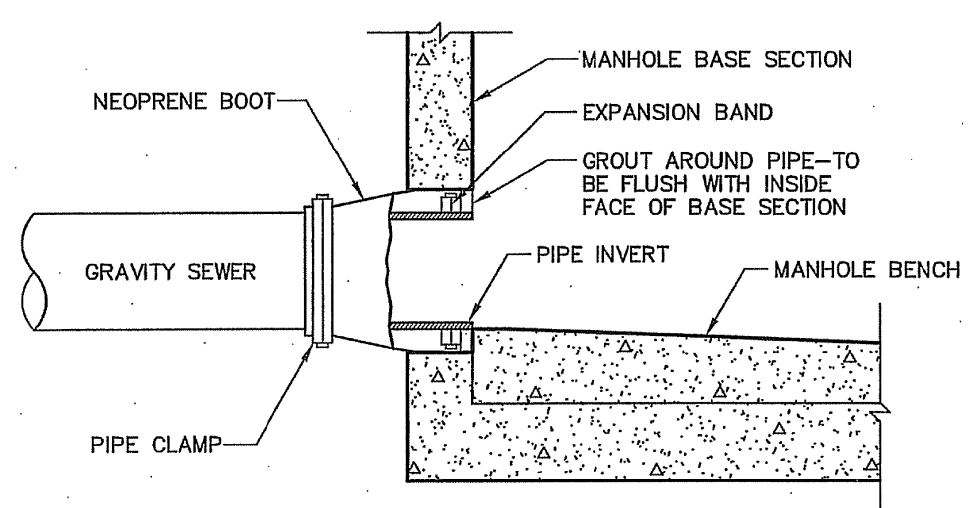
UTILITY CONSTRUCTION



STANDARD MANHOLE CHANNEL & BENCH
NOT TO SCALE
S1.003

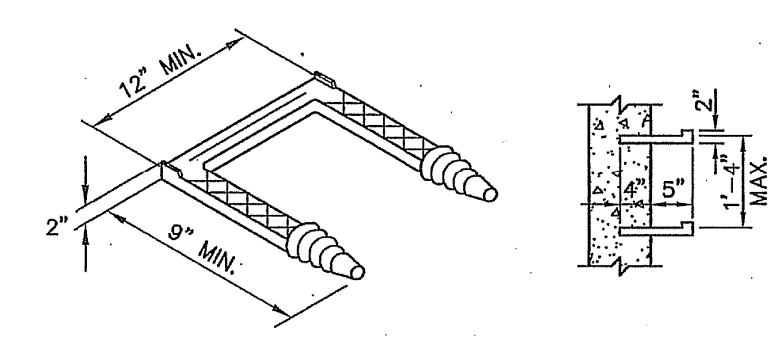


STANDARD SEWER LINE CONNECTION TO EXISTING MANHOLE
NOT TO SCALE
S1.009



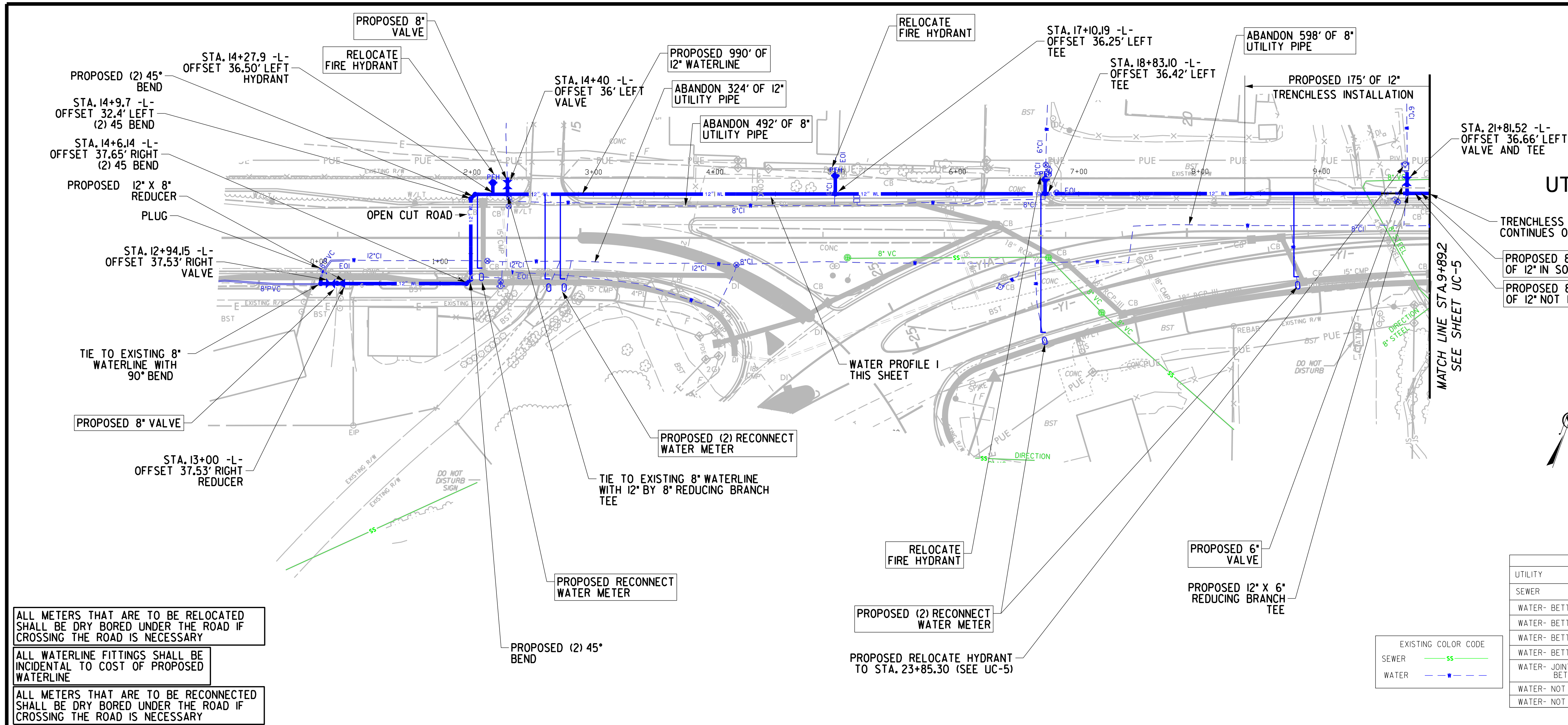
- NOTES:**
1. MATERIAL SPECIFICATIONS: NEOPRENE BOOT - ASTM C-923; PIPE CLAMP & EXPANSION CLAMP - STAINLESS STEEL, ASTM C-923.
 2. TWO PIPE CLAMPS REQUIRED FOR PIPE O.D.'S 15" AND LARGER.

STANDARD MANHOLE BOOT
NOT TO SCALE
S1.005



STANDARD MANHOLE STEP
NOT TO SCALE
S1.002

UTILITY CONSTRUCTION



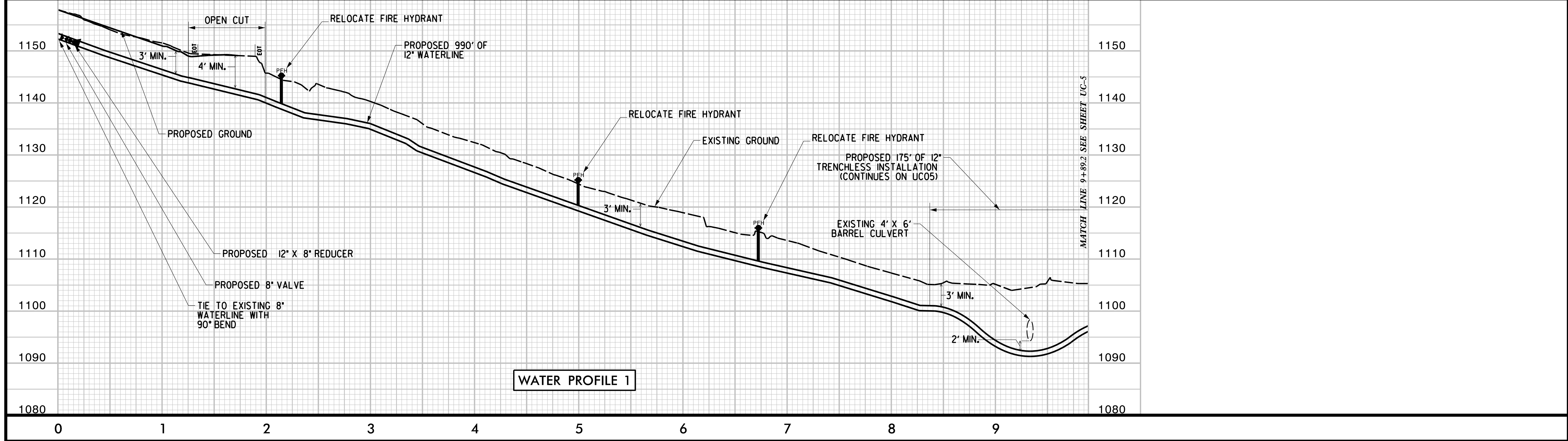
ALL METERS THAT ARE TO BE RELOCATED SHALL BE DRY BORED UNDER THE ROAD IF CROSSING THE ROAD IS NECESSARY

ALL WATERLINE FITTINGS SHALL BE INCIDENTAL TO COST OF PROPOSED WATERLINE

ALL METERS THAT ARE TO BE RECONNECTED SHALL BE DRY BORED UNDER THE ROAD IF CROSSING THE ROAD IS NECESSARY

PROPOSED COLOR CODE		
UTILITY	OWNER	COLOR
SEWER	N. WILKESBORO	Green
WATER- BETTERMENT	N. WILKESBORO	Blue
WATER- BETTERMENT	MULBERRY FAIRPLAIN	Red
WATER- BETTERMENT	BLUERIDGE	Purple
WATER- BETTERMENT	BLUERIDGE	Orange
WATER- JOINT OWNERS/ BETTERMENT	N. WILKES. / MULBERRY FP.	Yellow
WATER- NOT BETTERMENT	MULBERRY FAIRPLAIN	Teal
WATER- NOT BETTERMENT	BLUERIDGE	Brown

EXISTING COLOR CODE
 SEWER - SS
 WATER - - - -



WATER PROFILE 1

ALL WATERLINE FITTINGS SHALL BE INCIDENTAL TO COST OF PROPOSED WATERLINE

ALL METERS THAT ARE TO BE RECONNECTED SHALL BE DRY BORED UNDER THE ROAD IF CROSSING THE ROAD IS NECESSARY

ALL METERS THAT ARE TO BE RELOCATED SHALL BE DRY BORED UNDER THE ROAD IF CROSSING THE ROAD IS NECESSARY

PROPOSED 4' DIA. UTILITY MANHOLE
 PROPOSED MANHOLE 1B
 STATION 0+00.00 PROFILE 1
 Y3-LINE STATION 10+47.11
 43.17' RIGHT OF Y3-LINE

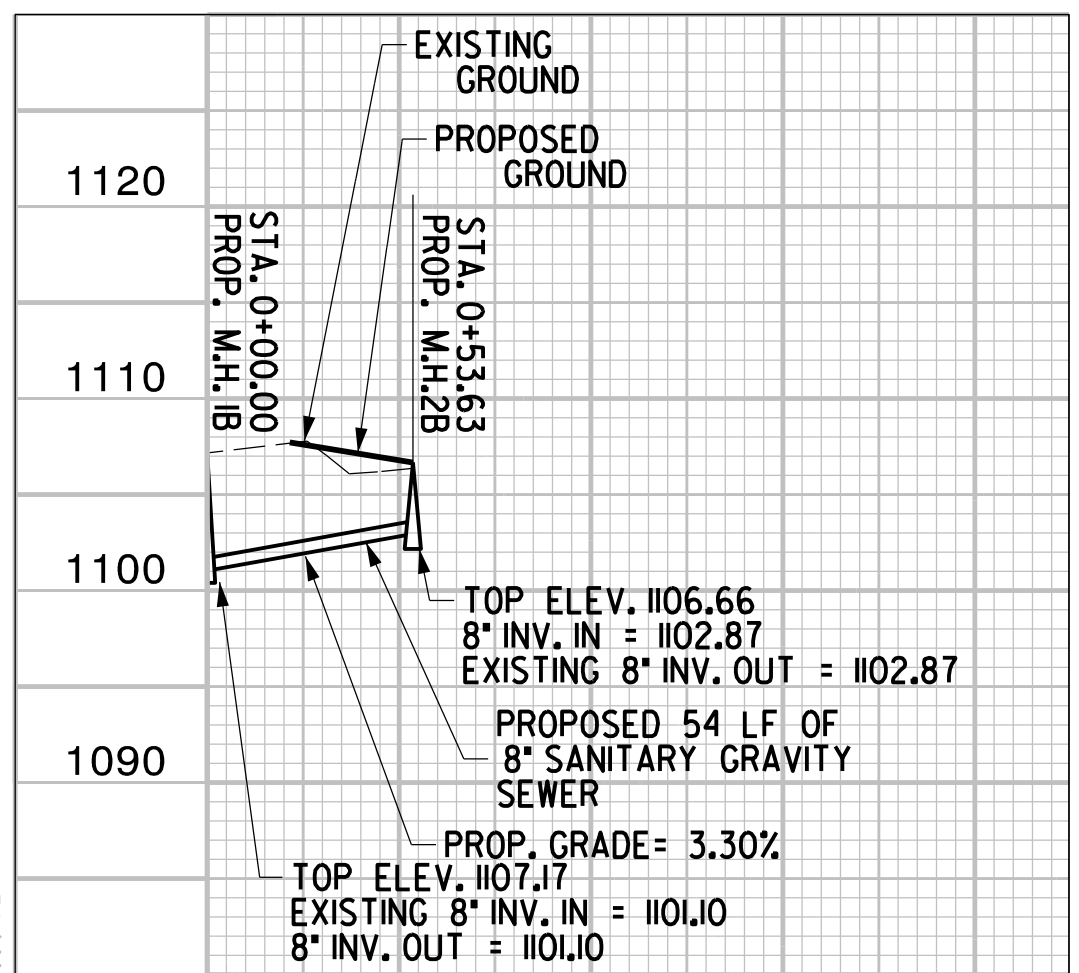
PROPOSED 54 LF OF
 8" SANITARY GRAVITY SEWER

PROPOSED 4' DIA. UTILITY MANHOLE
 PROPOSED MANHOLE 2B
 STATION 0+53.63 PROFILE 1
 Y3-LINE STATION 10+7.88
 6.59' RIGHT OF Y3-LINE

PROPOSED 8" VALVE

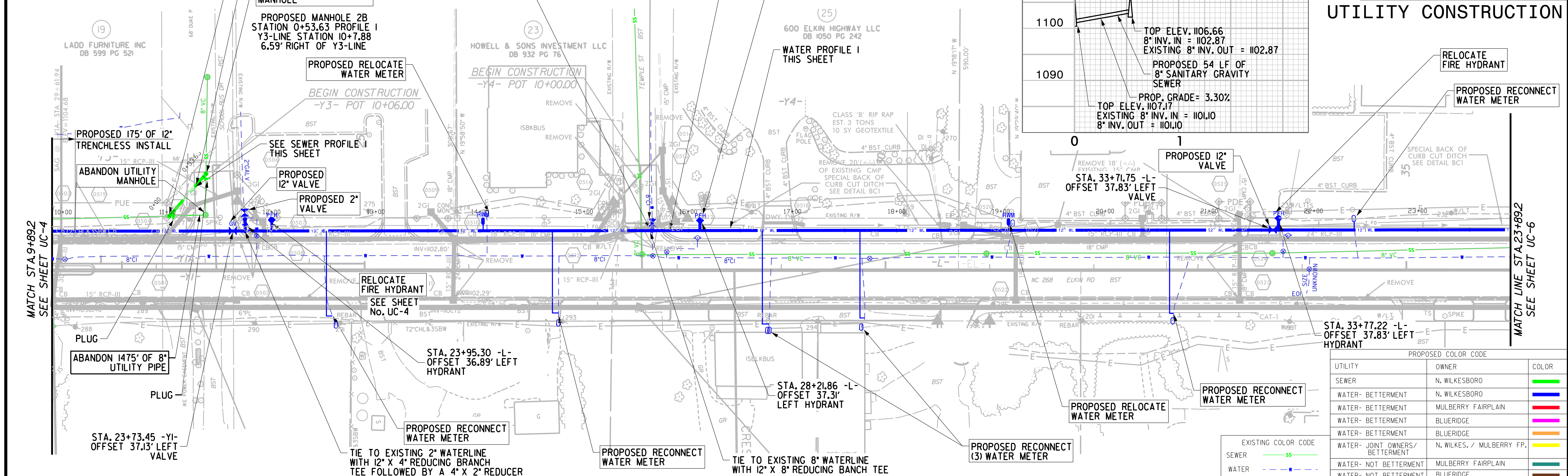
PROPOSED 1400' OF
 12" WATERLINE

SEWER PROFILE 1

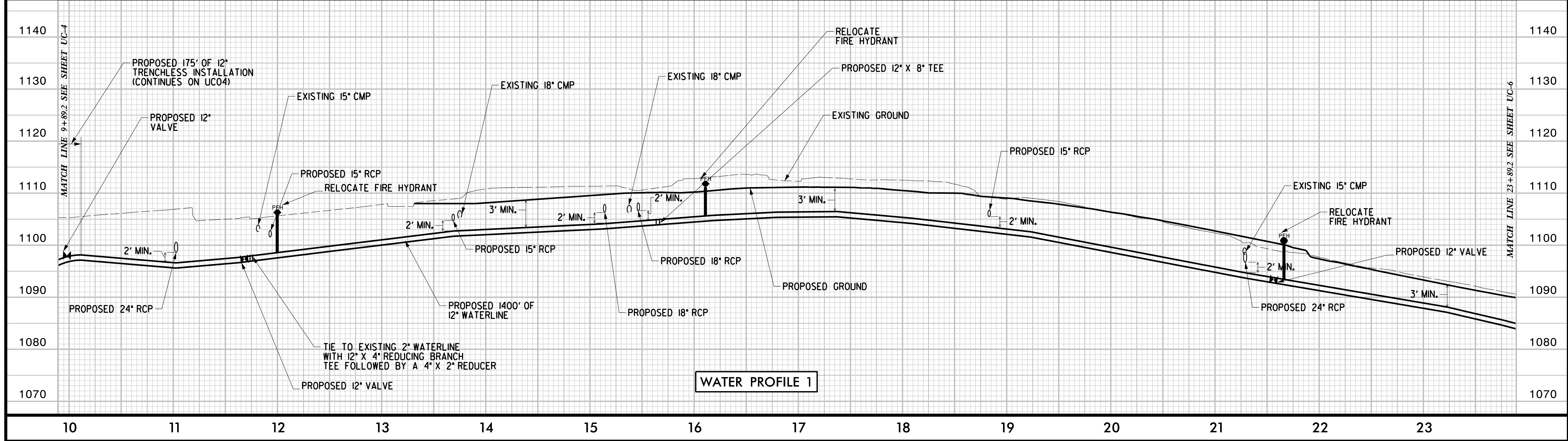


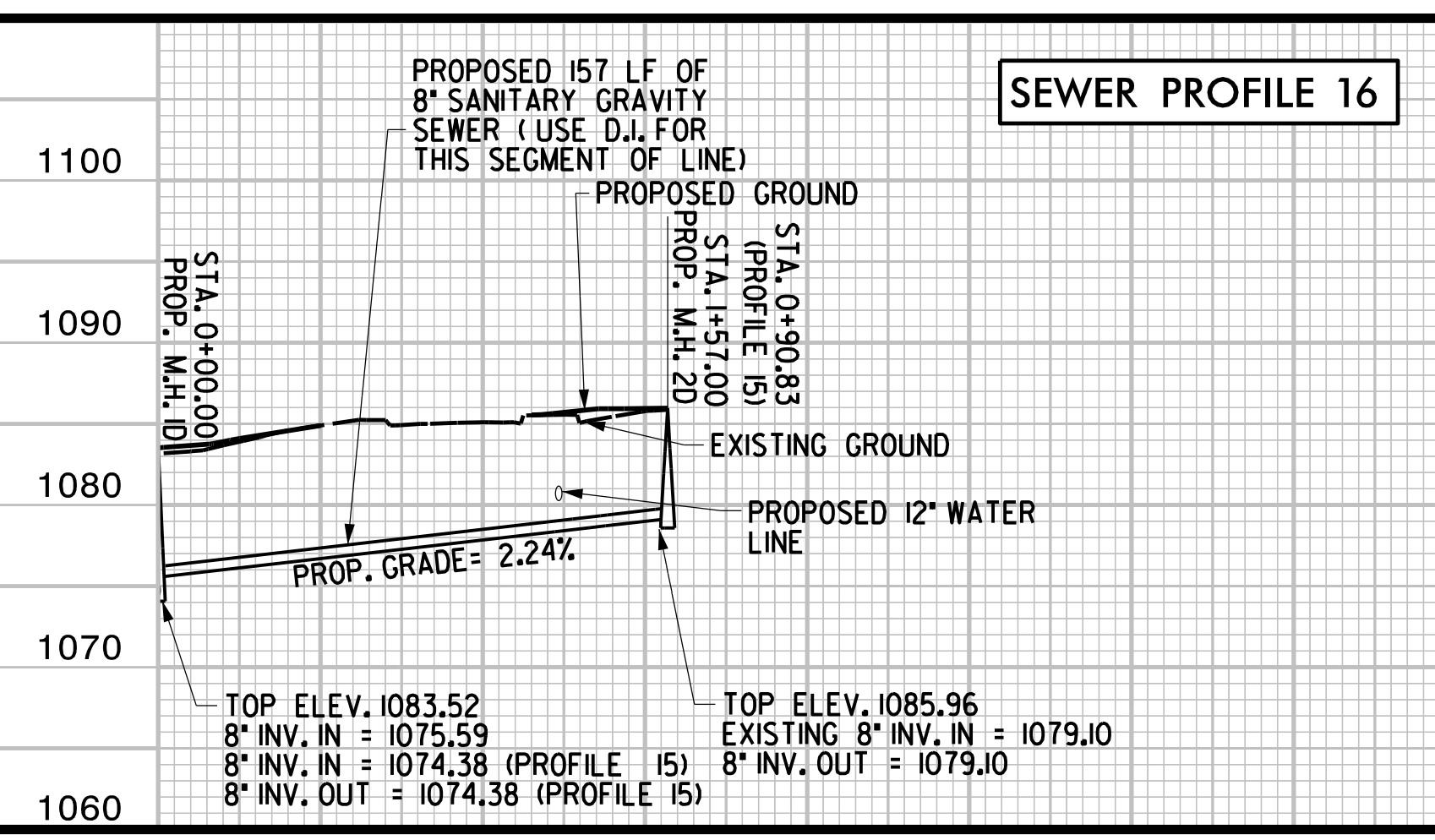
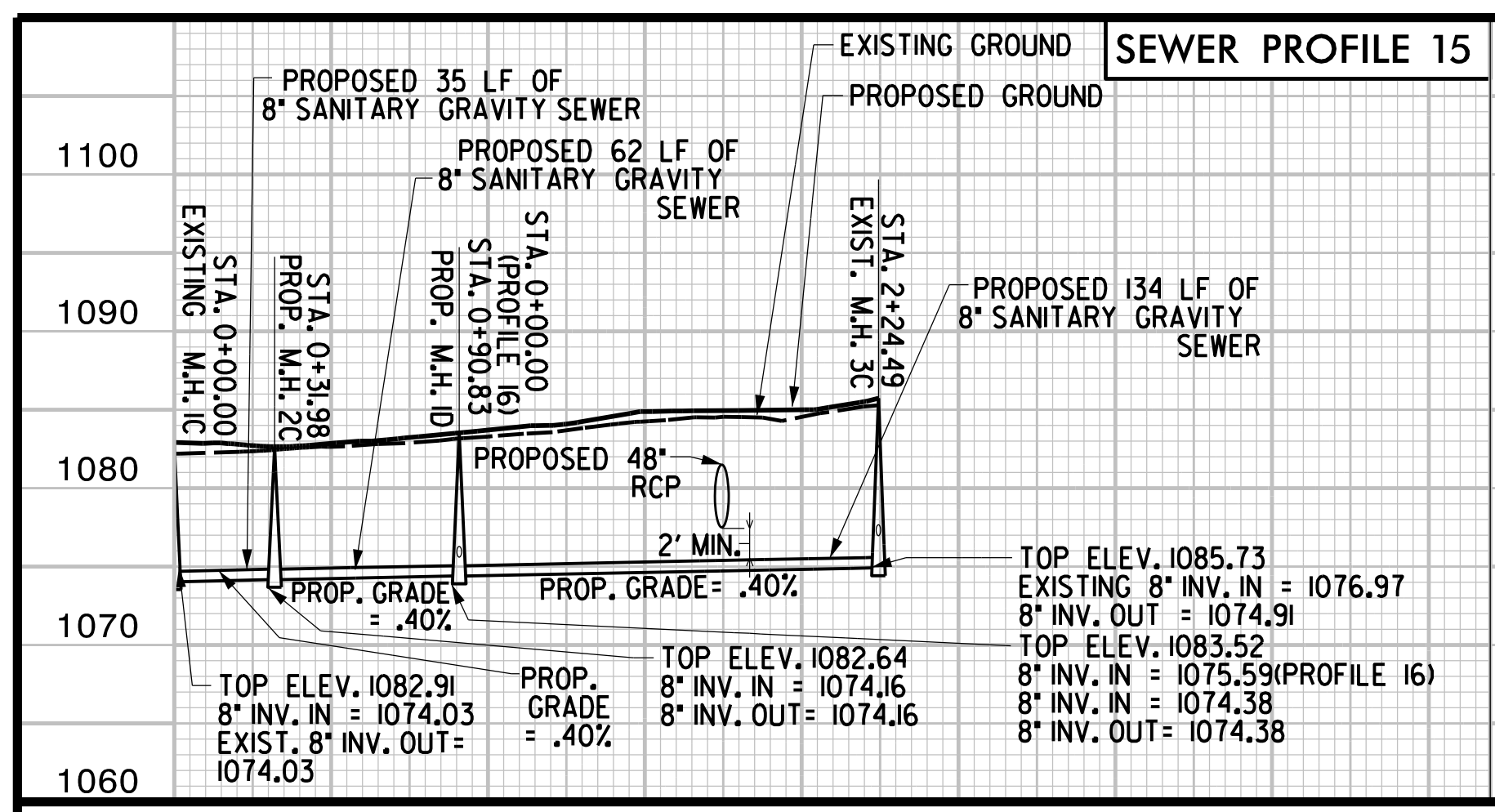
PROJECT REFERENCE NO. R-2603	SHEET NO. UC-5
DESIGNED BY: B. DIXON	
DRAWN BY: R. MOSS	
CHECKED BY: B. DIXON	
APPROVED BY:	
REVISER:	07/20/2015
MUNICIPAL ENGINEERING SERVICES COMPANY, PA. P.O. BOX 97 GARNER, NC 27529 (919) 772-5393	UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION



UTILITY	OWNER	COLOR
SEWER	N. WILKESBORO	Blue
WATER - BETTERMENT	N. WILKESBORO	Red
WATER - BETTERMENT	MULBERRY FAIRPLAIN	Green
WATER - BETTERMENT	BLUERIDGE	Yellow
WATER - BETTERMENT	BLUERIDGE	Orange
WATER - JOINT OWNERS/ BETTERMENT	N. WILKES. / MULBERRY FP.	Light Blue
WATER - NOT BETTERMENT	MULBERRY FAIRPLAIN	Light Green
WATER - NOT BETTERMENT	BLUERIDGE	Light Orange





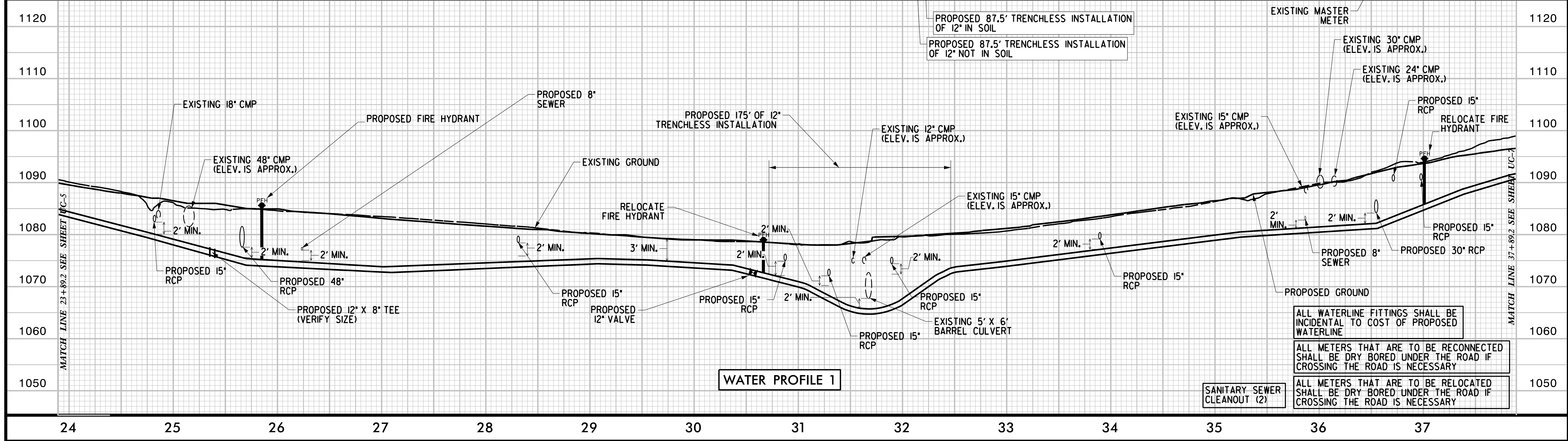
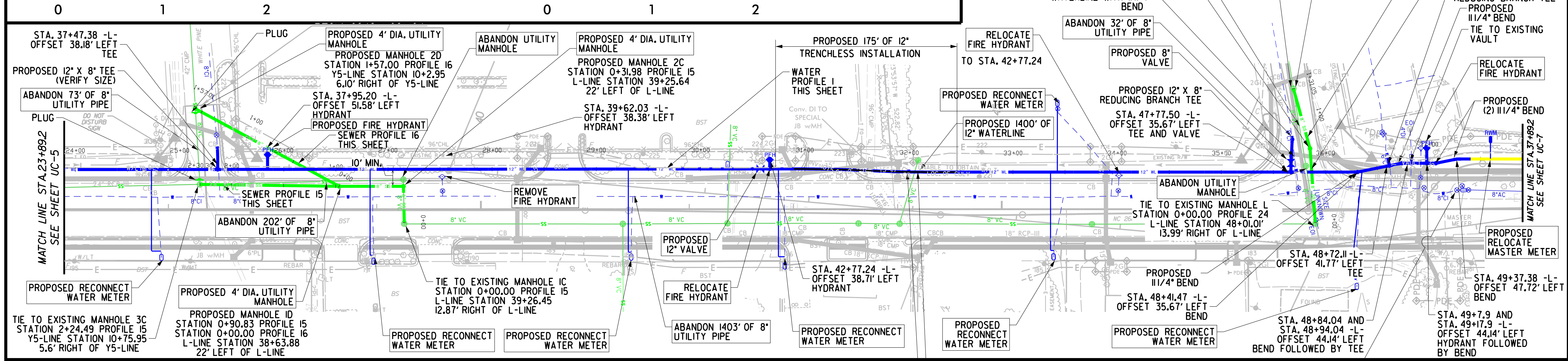
UTILITY	OWNER	PROPOSED COLOR CODE	COLOR	EXISTING COLOR CODE
SEWER	N. WILKESBORO	SS	Green	SS
WATER- BETTERMENT	N. WILKESBORO	WB	Blue	WB
WATER- BETTERMENT	MULBERRY FAIRPLAIN	WF	Red	WF
WATER- BETTERMENT	BLUERIDGE	WBL	Purple	WBL
WATER- BETTERMENT	BLUERIDGE	WBL	Orange	WBL
WATER- JOINT OWNERS/ BETTERMENT	N. WILKES. / MULBERRY FP.	WJ	Yellow	WJ
WATER- NOT BETTERMENT	MULBERRY FAIRPLAIN	WNB	Light Blue	WNB
WATER- NOT BETTERMENT	BLUERIDGE	WNB	Brown	WNB

PROJECT REFERENCE NO. R-2603
SHEET NO. UC-6

DESIGNED BY: B. DIXON
DRAWN BY: R. MOSS
CHECKED BY: B. DIXON
APPROVED BY: [Signature]
REVISED: [Signature]

MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.
 P.O. BOX 97
 GARNER, NC. 27529
 (919) 772-5393

UTILITY CONSTRUCTION PLANS ONLY
 07/22/2015



ALL WATERLINE FITTINGS SHALL BE INCIDENTAL TO COST OF PROPOSED WATERLINE

ALL METERS THAT ARE TO BE RECONNECTED SHALL BE DRY BORED UNDER THE ROAD IF CROSSING THE ROAD IS NECESSARY

ALL METERS THAT ARE TO BE RELOCATED SHALL BE DRY BORED UNDER THE ROAD IF CROSSING THE ROAD IS NECESSARY

ALL WATERLINE FITTINGS SHALL BE INCIDENTAL TO COST OF PROPOSED WATERLINE

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ALL METERS THAT ARE TO BE RELOCATED SHALL BE DRY BORED UNDER THE ROAD IF CROSSING THE ROAD IS NECESSARY

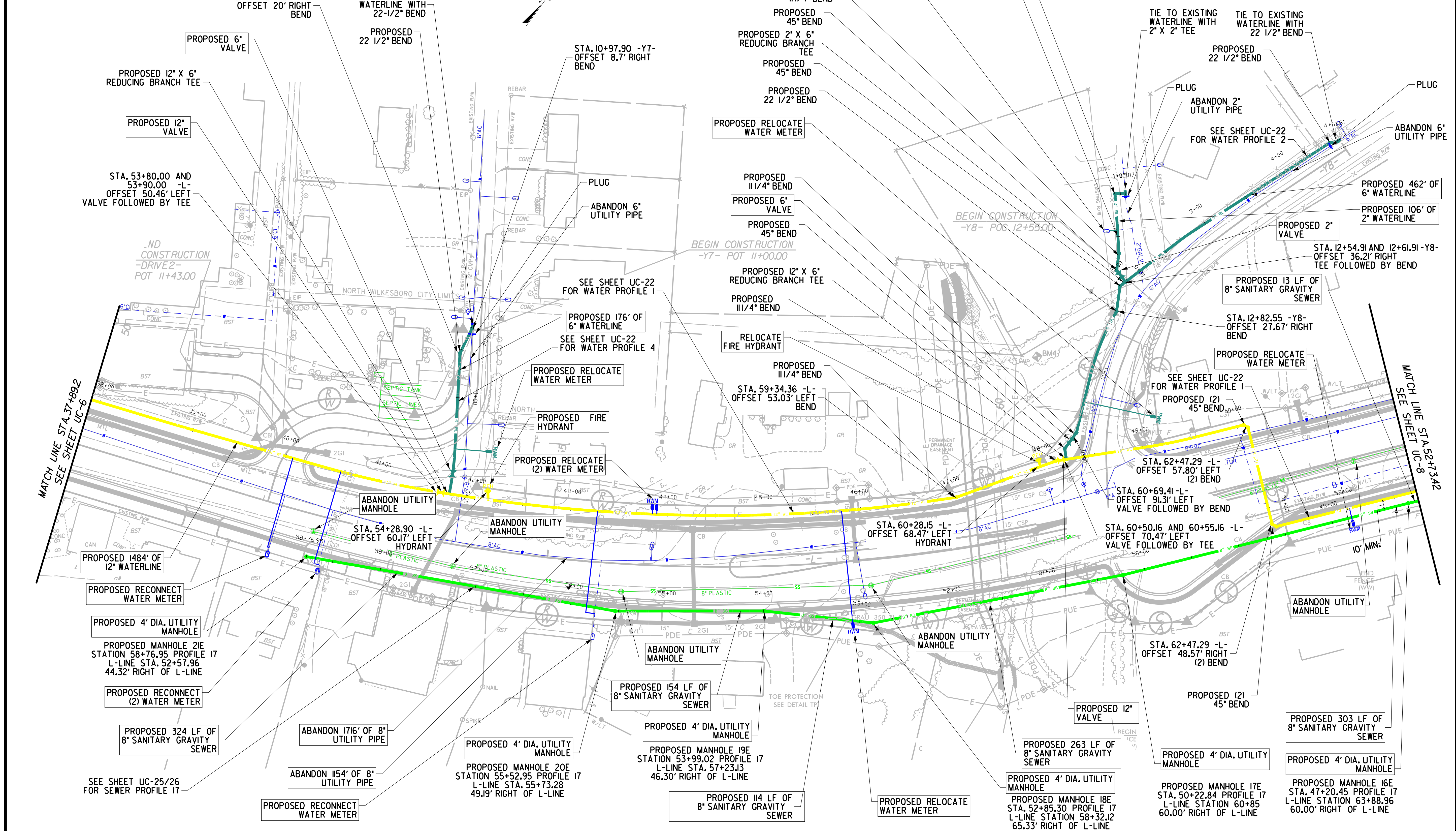
SANITARY SEWER CLEANOUT (7)

PROPOSED COLOR CODE		
UTILITY	OWNER	COLOR
SEWER	N. WILKESBORO	GREEN
WATER- BETTERMENT	N. WILKESBORO	BLUE
WATER- BETTERMENT	MULBERRY FAIRPLAIN	RED
WATER- BETTERMENT	BLUERIDGE	PINK
WATER- BETTERMENT	BLUERIDGE	ORANGE
WATER- JOINT OWNERS/ BETTERMENT	N. WILKES. / MULBERRY FP.	YELLOW
WATER- NOT BETTERMENT	MULBERRY FAIRPLAIN	TEAL
WATER- NOT BETTERMENT	BLUERIDGE	BROWN

EXISTING COLOR CODE	
SEWER	SS
WATER	SS

PROJECT REFERENCE NO. R-2603	SHEET NO. UC-7
DESIGNED BY: B. DIXON	
DRAWN BY: R. MOSS	
CHECKED BY: B. DIXON	
APPROVED BY:	
REVISER:	
MUNICIPAL ENGINEERING SERVICES COMPANY, P.A. P.O. BOX 97 GARNER, NC 27529 (919) 772-5393	
UTILITY CONSTRUCTION PLANS ONLY	

UTILITY CONSTRUCTION



ALL WATERLINE FITTINGS SHALL BE INCIDENTAL TO COST OF PROPOSED WATERLINE

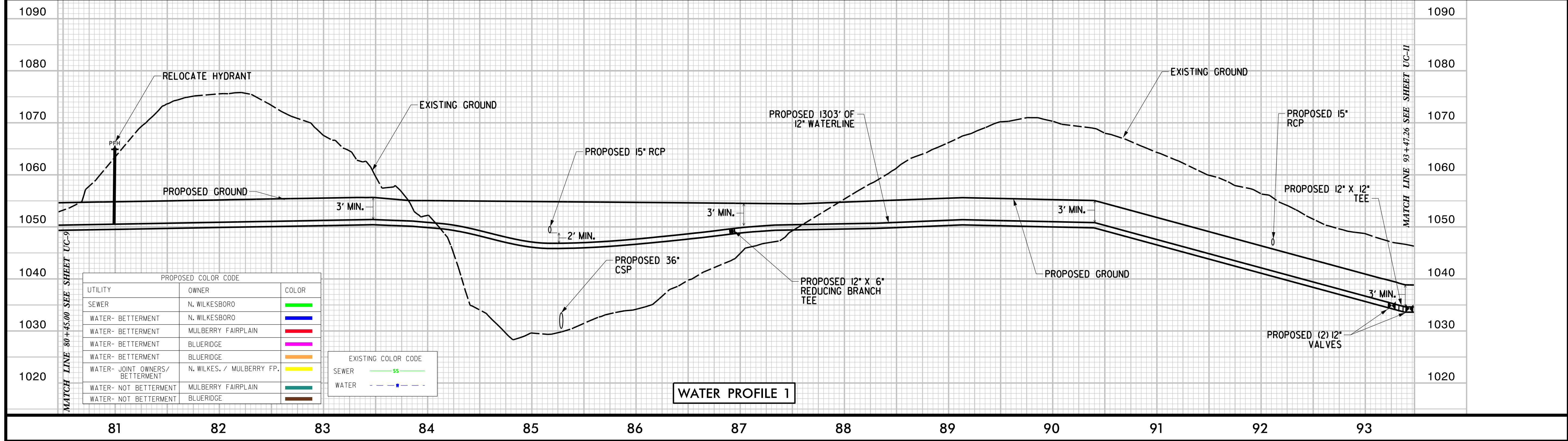
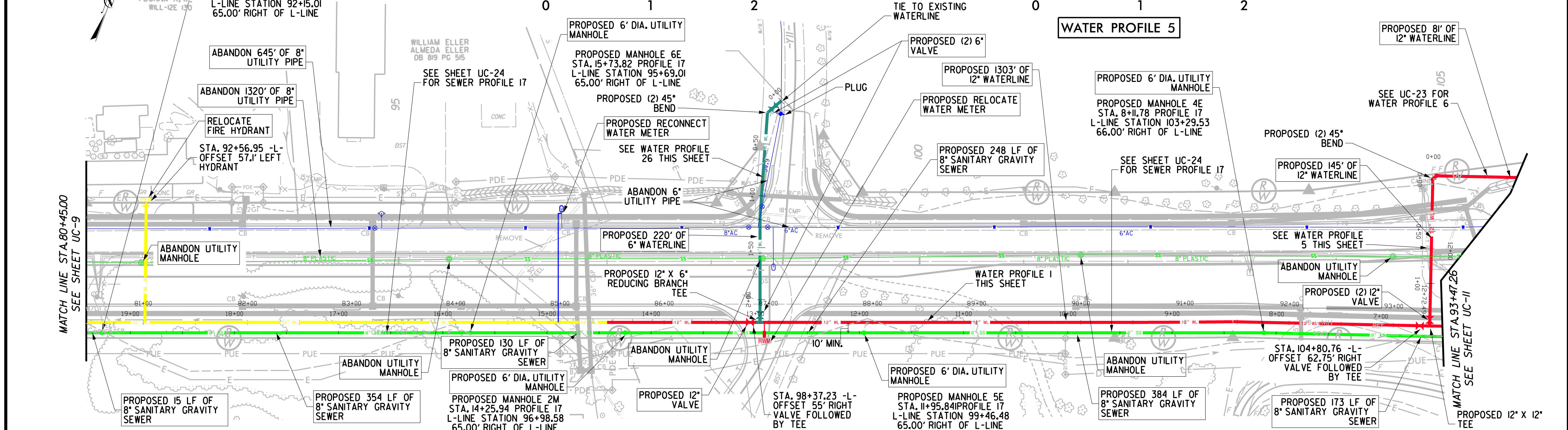
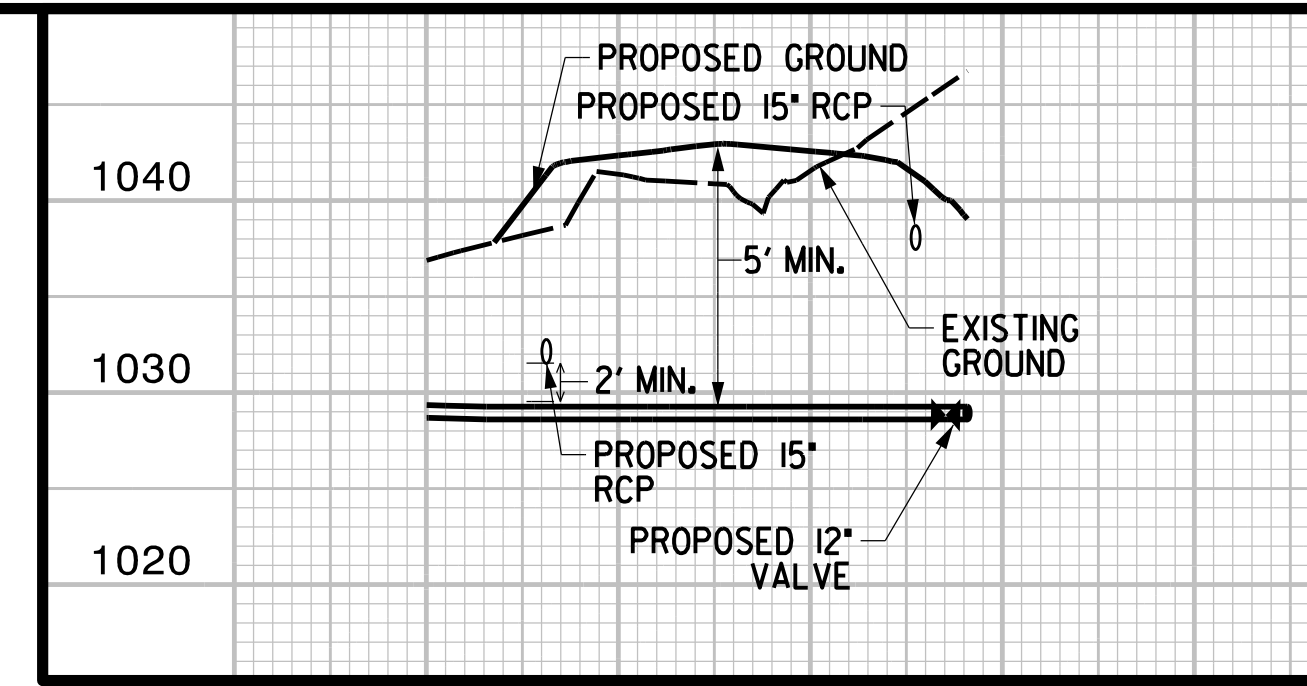
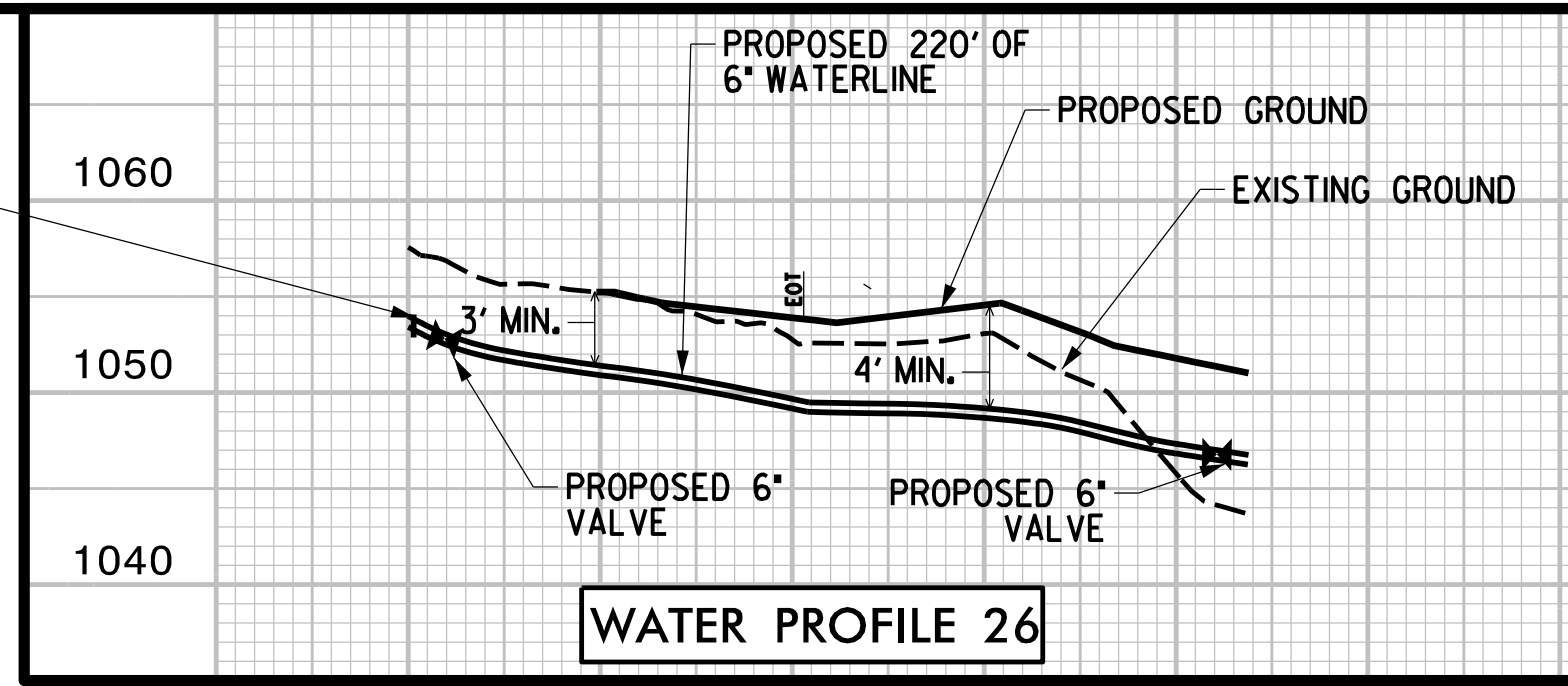
ALL METERS THAT ARE TO BE RECONNECTED SHALL BE DRY BORED UNDER THE ROAD IF CROSSING THE ROAD IS NECESSARY

ALL METERS THAT ARE TO BE RELOCATED SHALL BE DRY BORED UNDER THE ROAD IF CROSSING THE ROAD IS NECESSARY

SANITARY SEWER CLEANOUT (4)

PROJECT REFERENCE NO. R-2603	SHEET NO. UC-10
DESIGNED BY: B.DIXON	
DRAWN BY: R.MOSS	
CHECKED BY: B.DIXON	
APPROVED BY:	
REVISD:	07/20/2015
MUNICIPAL ENGINEERING SERVICES COMPANY, P.A. P.O. BOX 97 GARNER, NC 27529 (919) 772-5393	
UTILITY CONSTRUCTION PLANS ONLY	

UTILITY CONSTRUCTION



ALL WATERLINE FITTINGS SHALL BE INCIDENTAL TO COST OF PROPOSED WATERLINE

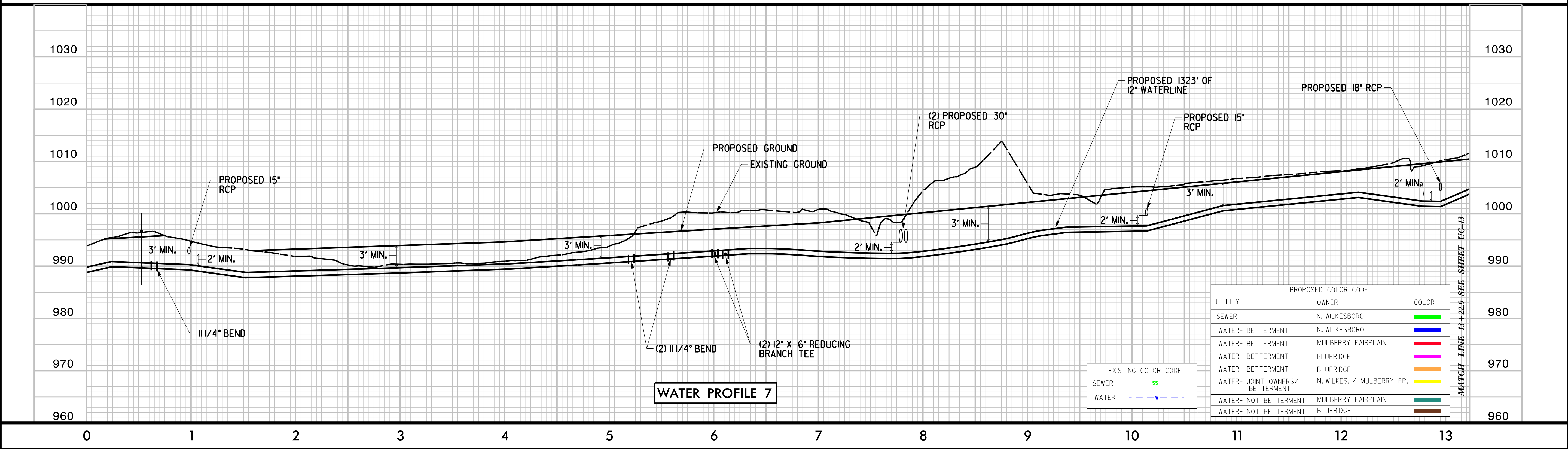
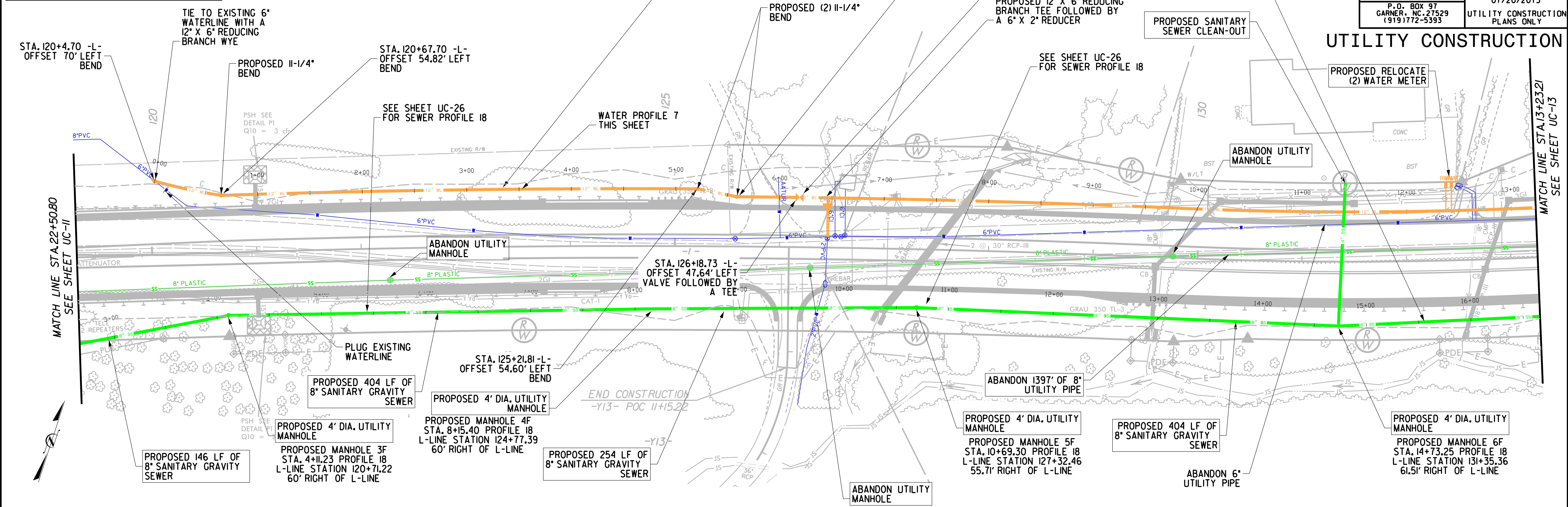
SANITARY SEWER CLEANOUT (I)

ALL METERS THAT ARE TO BE RECONNECTED SHALL BE DRY BORED UNDER THE ROAD IF CROSSING THE ROAD IS NECESSARY

ALL METERS THAT ARE TO BE RELOCATED SHALL BE DRY BORED UNDER THE ROAD IF CROSSING THE ROAD IS NECESSARY

PROJECT REFERENCE NO. R-2603	SHEET NO. UC-12
DESIGNED BY: B. DIXON	
DRAWN BY: R. MOSS	
CHECKED BY: B. DIXON	
APPROVED BY:	
REVISED:	
MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.	07/20/2015
P.O. BOX 97 GARNER, NC 27529 (919) 772-5393	UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION



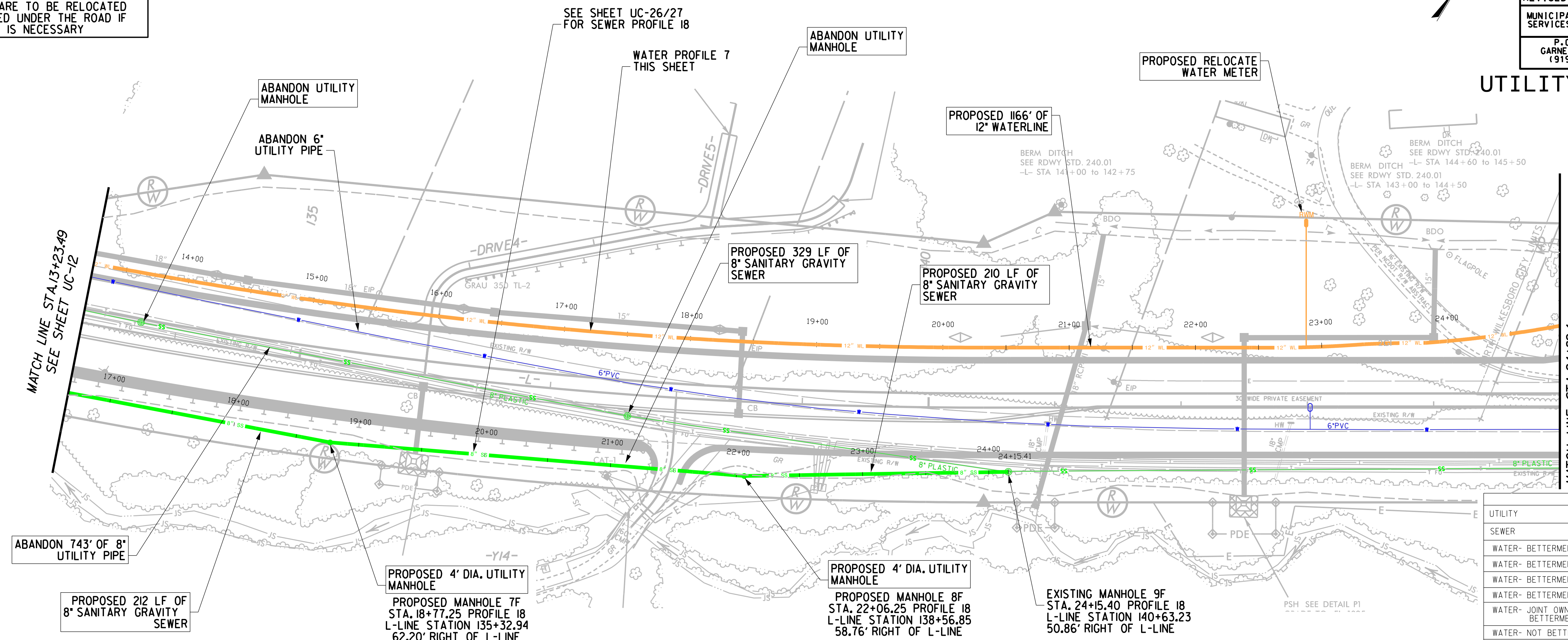
ALL WATERLINE FITTINGS SHALL BE INCIDENTAL TO COST OF PROPOSED WATERLINE

ALL METERS THAT ARE TO BE RECONNECTED SHALL BE DRY BORED UNDER THE ROAD IF CROSSING THE ROAD IS NECESSARY

ALL METERS THAT ARE TO BE RELOCATED SHALL BE DRY BORED UNDER THE ROAD IF CROSSING THE ROAD IS NECESSARY

PROJECT REFERENCE NO. R-2603	SHEET NO. UC-13
DESIGNED BY: B.DIXON	
DRAWN BY: R.MOSS	
CHECKED BY: B.DIXON	
APPROVED BY:	
REVISER:	04/13/2015
MUNICIPAL ENGINEERING SERVICES COMPANY, PA. P.O. BOX 97 GARNER, NC 27529 (919) 772-5393	UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION

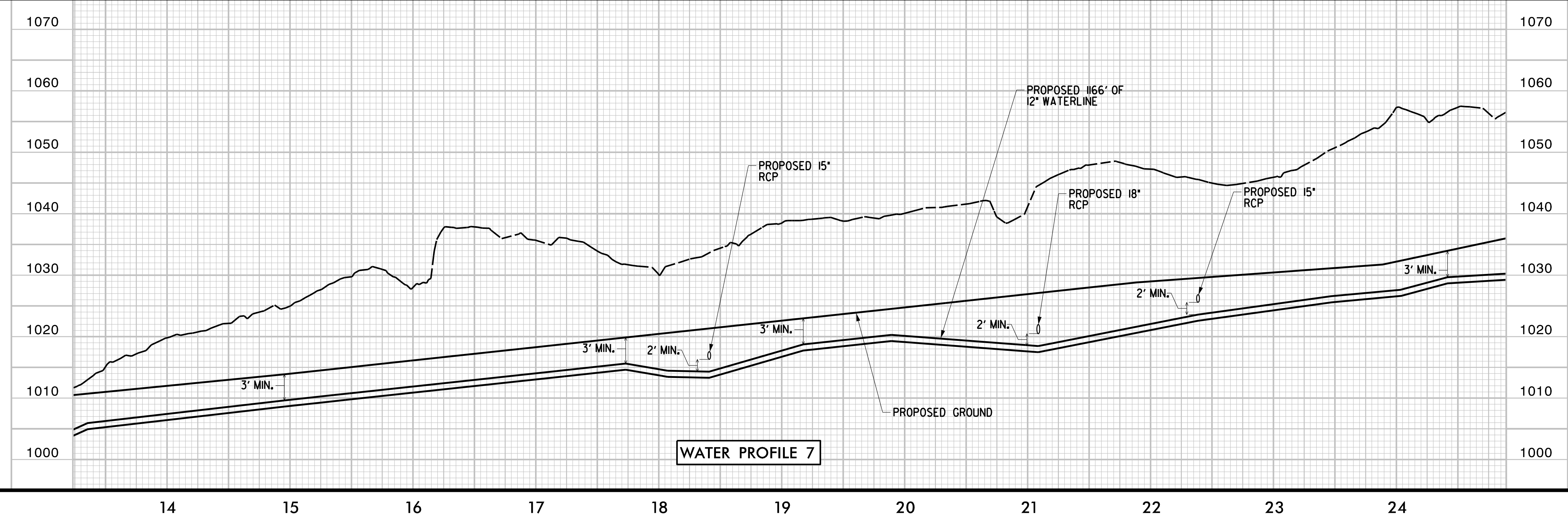


EXISTING COLOR CODE

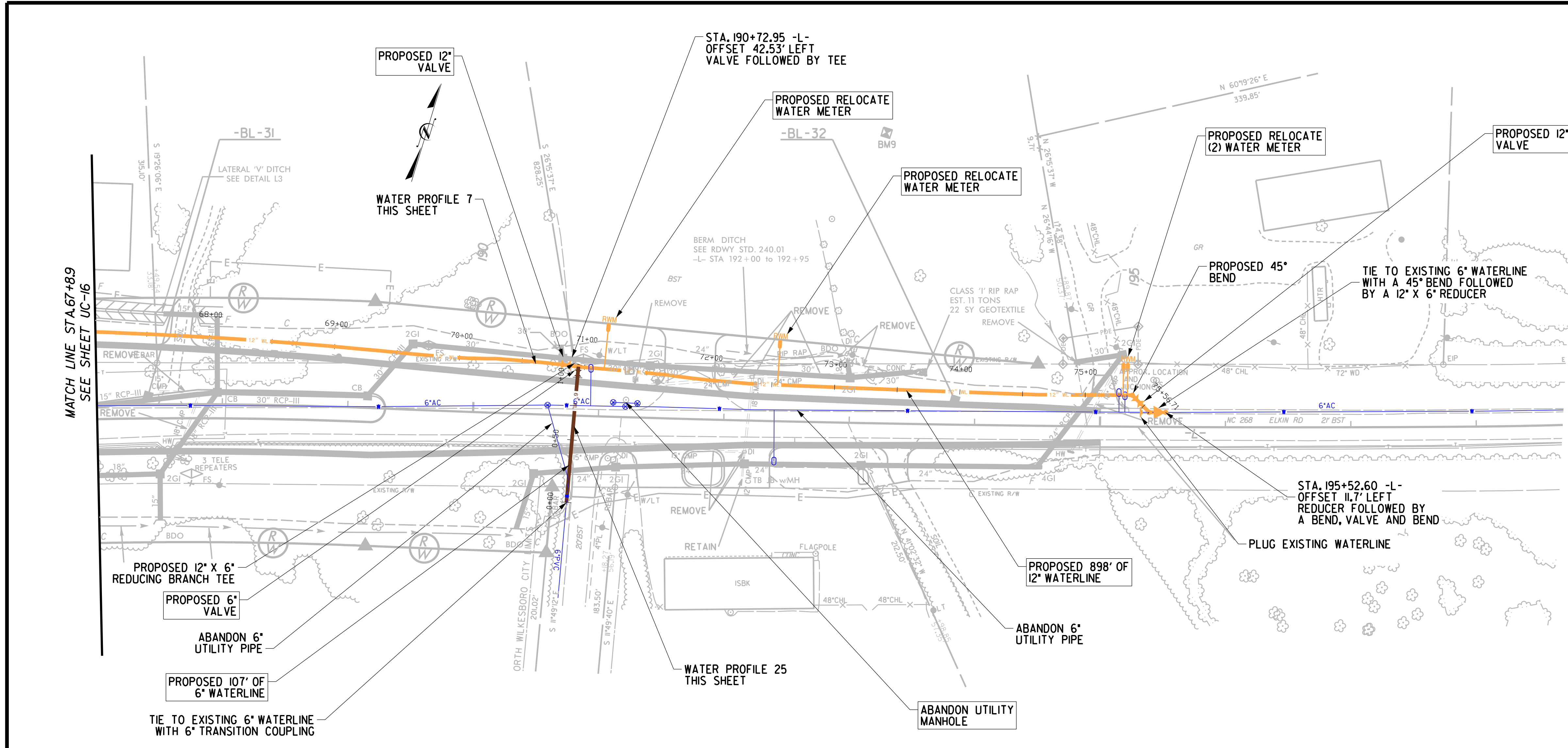
SEWER	SS
WATER	---

PROPOSED COLOR CODE

UTILITY	OWNER	COLOR
SEWER	N. WILKESBORO	Green
WATER - BETTERMENT	N. WILKESBORO	Blue
WATER - BETTERMENT	MULBERRY FAIRPLAIN	Red
WATER - BETTERMENT	BLUERIDGE	Purple
WATER - BETTERMENT	BLUERIDGE	Orange
WATER - JOINT OWNERS/ BETTERMENT	N. WILKES. / MULBERRY FP.	Yellow
WATER - NOT BETTERMENT	MULBERRY FAIRPLAIN	Teal
WATER - NOT BETTERMENT	BLUERIDGE	Brown



UTILITY CONSTRUCTION



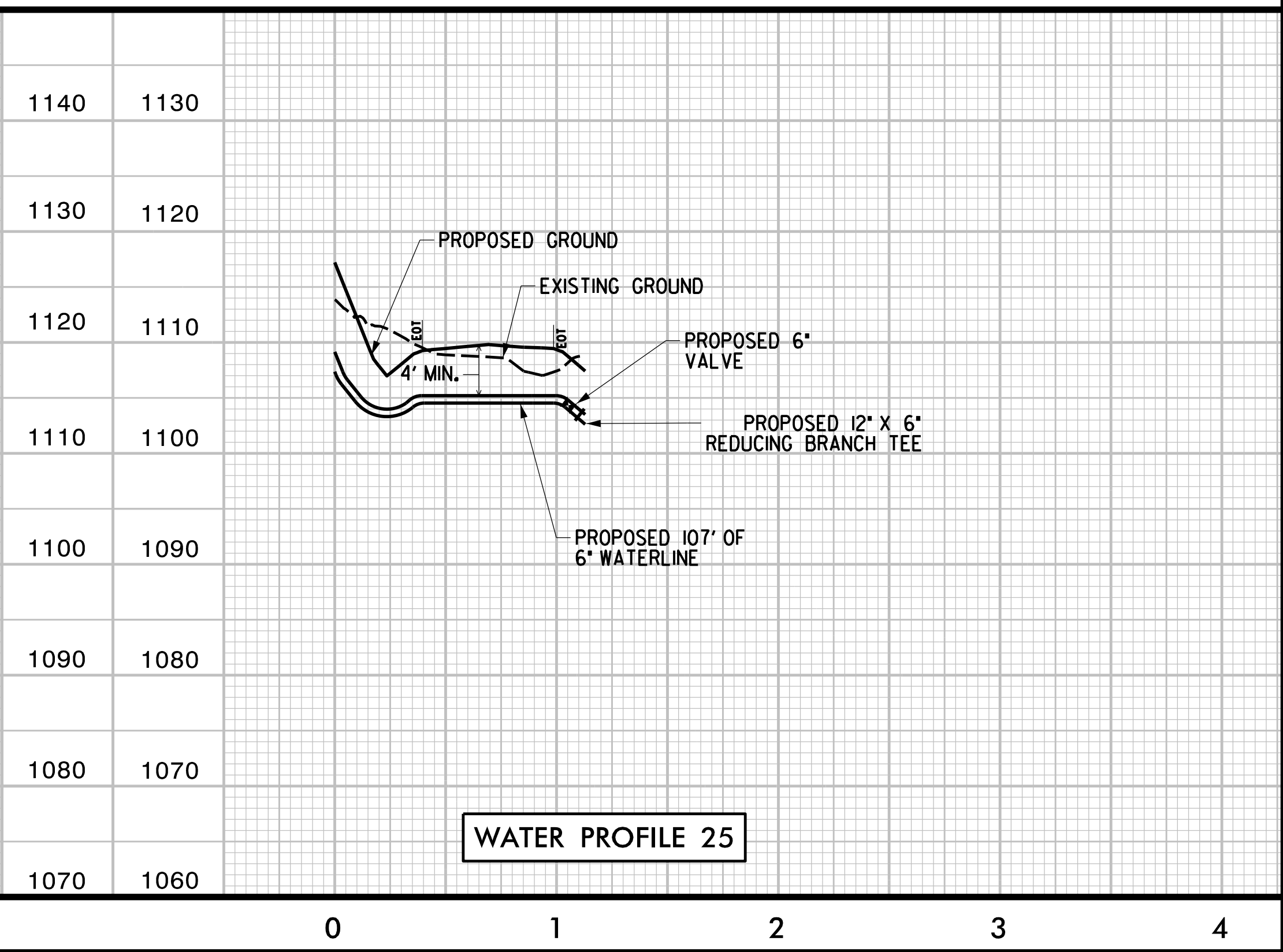
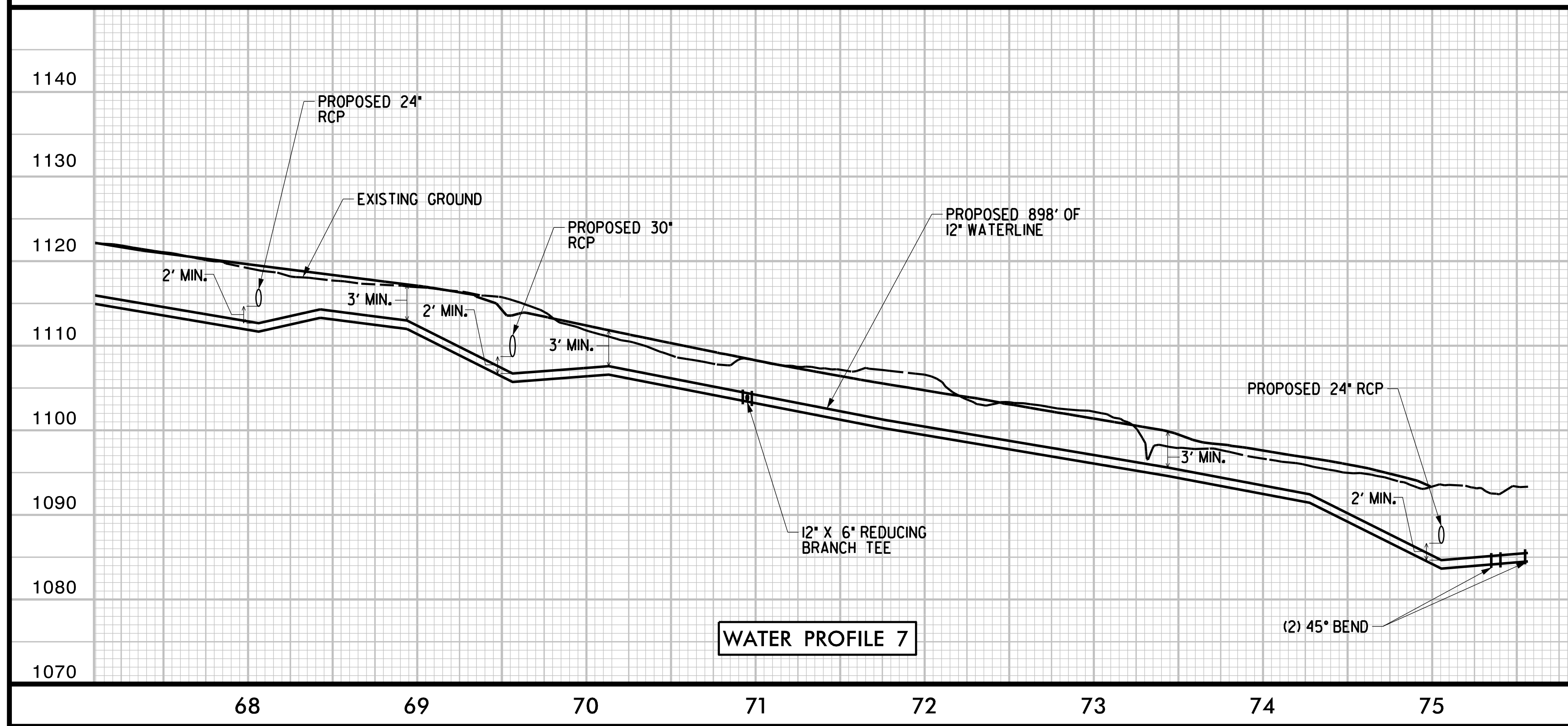
EXISTING COLOR CODE		
SEWER		SS
WATER		

PROPOSED COLOR CODE		
UTILITY	OWNER	COLOR
SEWER	N. WILKESBORO	
WATER- BETTERMENT	N. WILKESBORO	
WATER- BETTERMENT	MULBERRY FAIRPLAIN	
WATER- BETTERMENT	BLUERIDGE	
WATER- BETTERMENT	BLUERIDGE	
WATER- JOINT OWNERS/ BETTERMENT	N. WILKES. / MULBERRY FP.	
WATER- NOT BETTERMENT	MULBERRY FAIRPLAIN	
WATER- NOT BETTERMENT	BLUERIDGE	

ALL WATERLINE FITTINGS SHALL BE INCIDENTAL TO COST OF PROPOSED WATERLINE

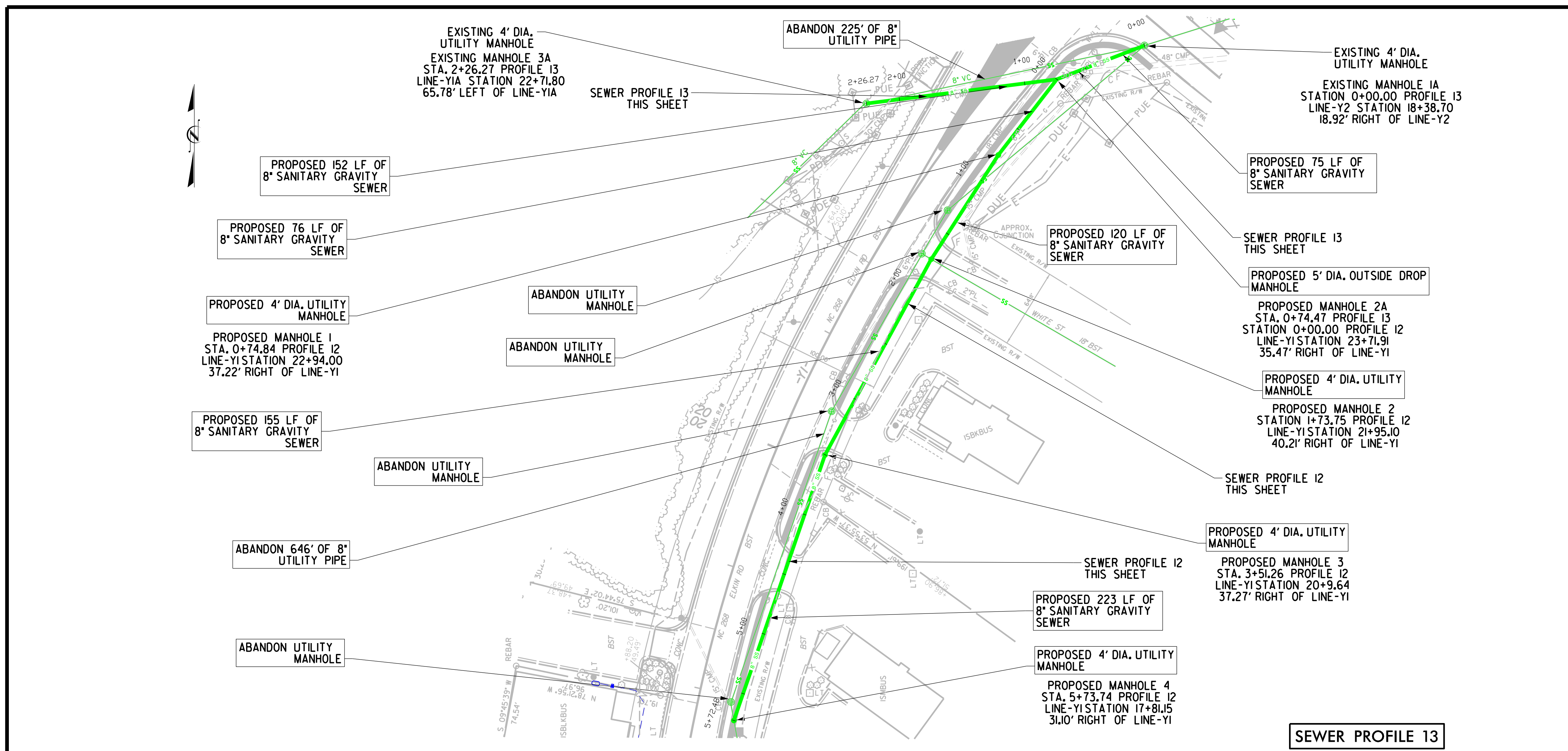
ALL METERS THAT ARE TO BE RECONNECTED SHALL BE DRY BORED UNDER THE ROAD IF CROSSING THE ROAD IS NECESSARY

ALL METERS THAT ARE TO BE RELOCATED SHALL BE DRY BORED UNDER THE ROAD IF CROSSING THE ROAD IS NECESSARY



PROJECT REFERENCE NO.	SHEET NO.
R-2603	UC-18
DESIGNED BY: B. DIXON	
DRAWN BY: R. MOSS	
CHECKED BY: B. DIXON	
APPROVED BY:	
REVISER:	MUNICIPAL ENGINEERING SERVICES COMPANY, PA.
P.O. BOX 97 GARNER, NC 27529 (919) 772-5393	UTILITY CONSTRUCTION PLANS ONLY

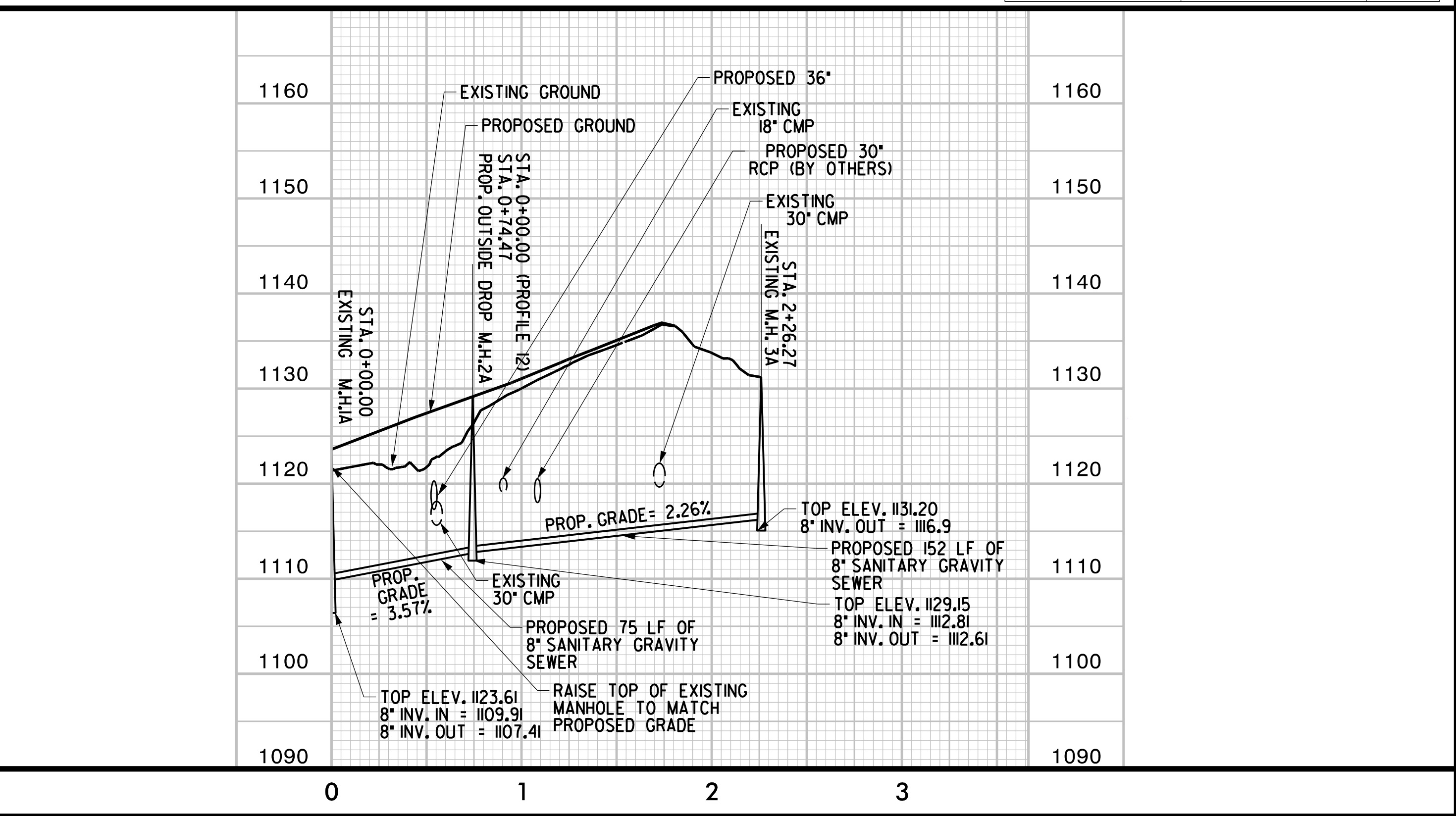
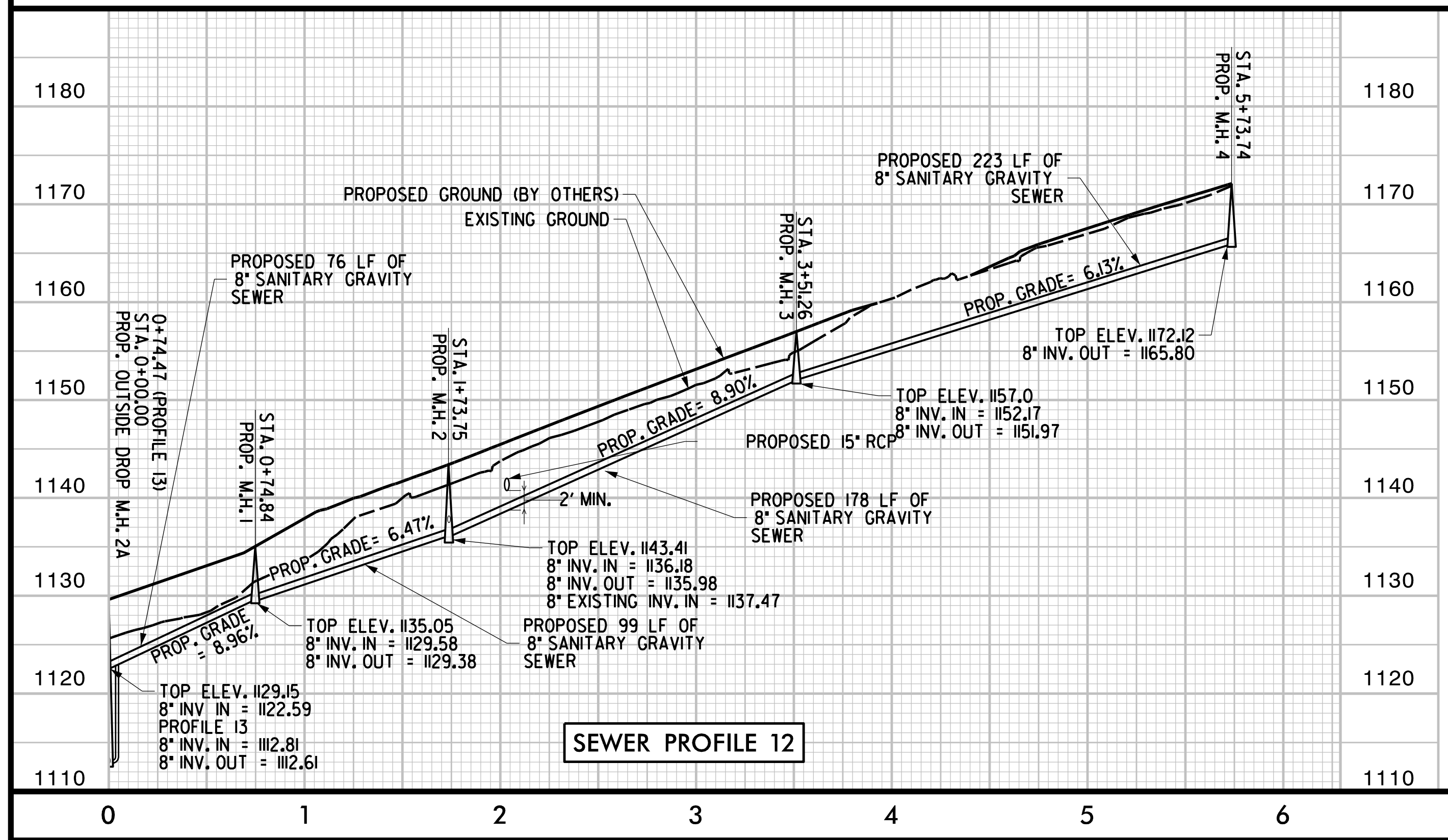
UTILITY CONSTRUCTION



SANITARY SEWER CLEANOUT (3)

PROPOSED COLOR CODE		
UTILITY	OWNER	COLOR
SEWER	N. WILKESBORO	—
WATER- BETTERMENT	N. WILKESBORO	—
WATER- BETTERMENT	MULBERRY FAIRPLAIN	—
WATER- BETTERMENT	BLUERIDGE	—
WATER- BETTERMENT	BLUERIDGE	—
WATER- JOINT OWNERS/ BETTERMENT	N. WILKES. / MULBERRY FP.	—
WATER- NOT BETTERMENT	MULBERRY FAIRPLAIN	—
WATER- NOT BETTERMENT	BLUERIDGE	—

SEWER PROFILE 13



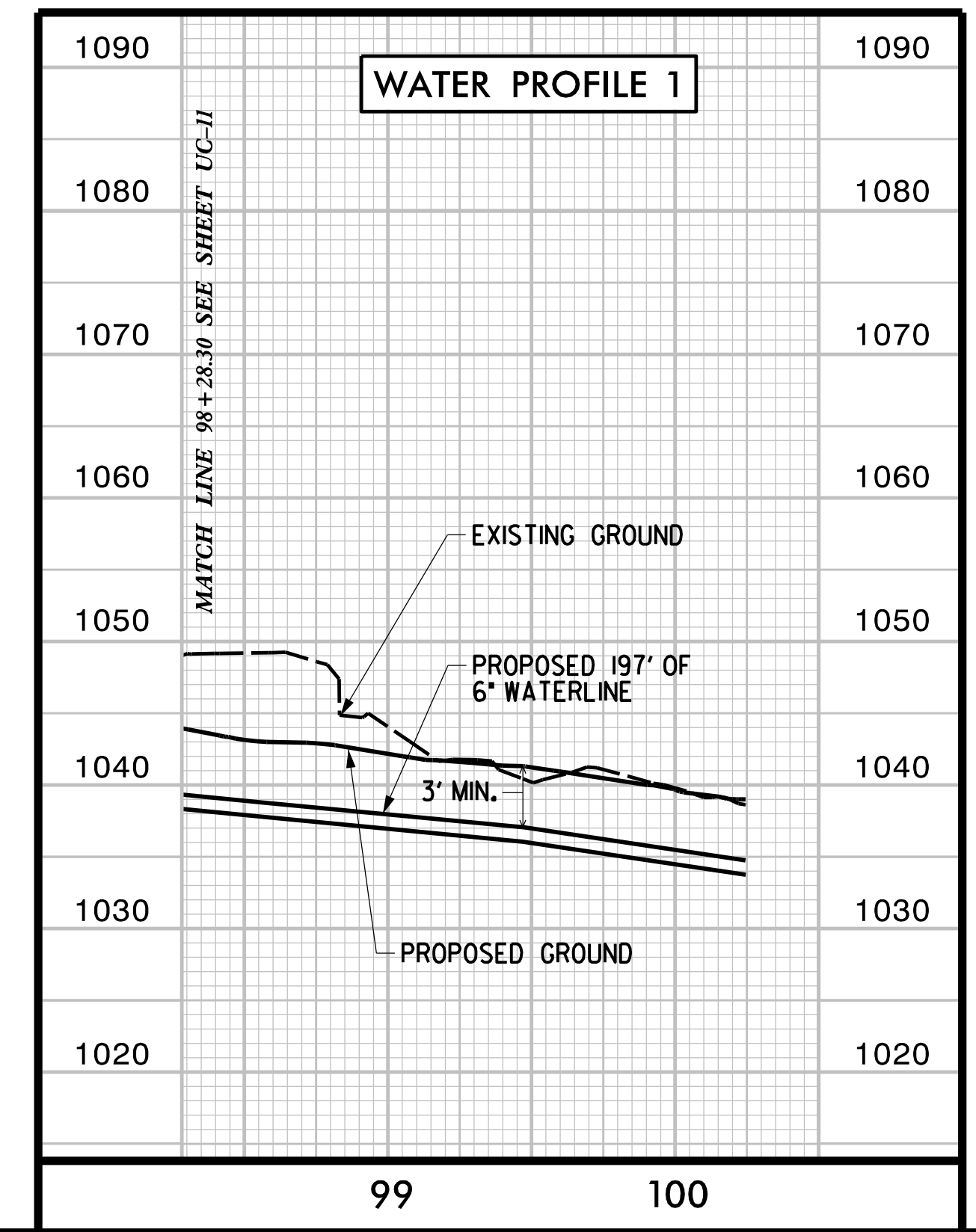
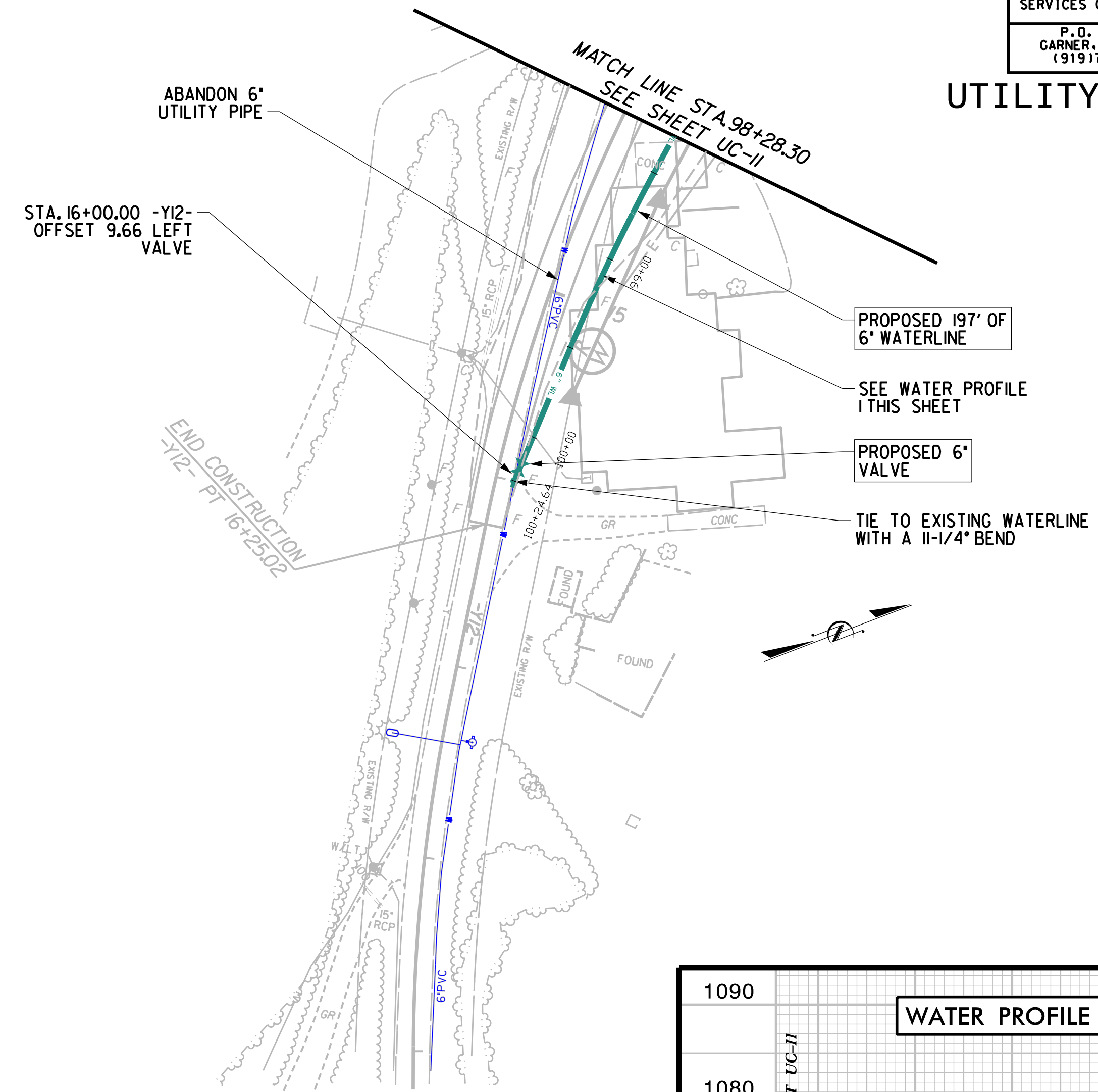
ALL WATERLINE FITTINGS SHALL BE INCIDENTAL TO COST OF PROPOSED WATERLINE

ALL METERS THAT ARE TO BE RECONNECTED SHALL BE DRY BORED UNDER THE ROAD IF CROSSING THE ROAD IS NECESSARY

ALL METERS THAT ARE TO BE RELOCATED SHALL BE DRY BORED UNDER THE ROAD IF CROSSING THE ROAD IS NECESSARY

PROJECT REFERENCE NO.	SHEET NO.
R-2603	UC-19
DESIGNED BY: B.DIXON	
DRAWN BY: R.MOSS	
CHECKED BY: B.DIXON	
APPROVED BY:	
REVISED:	
MUNICIPAL ENGINEERING SERVICES COMPANY, PA.	04/13/2015
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UTILITY CONSTRUCTION

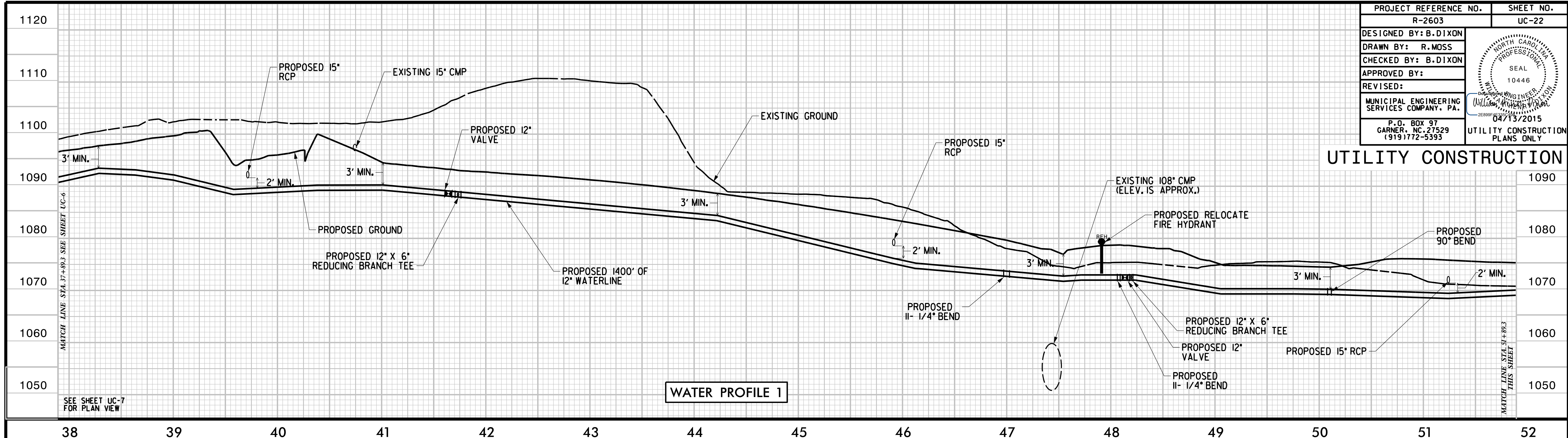


PROPOSED COLOR CODE		
UTILITY	OWNER	COLOR
SEWER	N. WILKESBORO	Green
WATER- BETTERMENT	N. WILKESBORO	Blue
WATER- BETTERMENT	MULBERRY FAIRPLAIN	Red
WATER- BETTERMENT	BLUERIDGE	Pink
WATER- BETTERMENT	BLUERIDGE	Orange
WATER- JOINT OWNERS/ BETTERMENT	N. WILKES. / MULBERRY FP.	Yellow
WATER- NOT BETTERMENT	MULBERRY FAIRPLAIN	Teal
WATER- NOT BETTERMENT	BLUERIDGE	Brown

EXISTING COLOR CODE	
SEWER	SS (Solid Green)
WATER	SS (Dashed Blue)

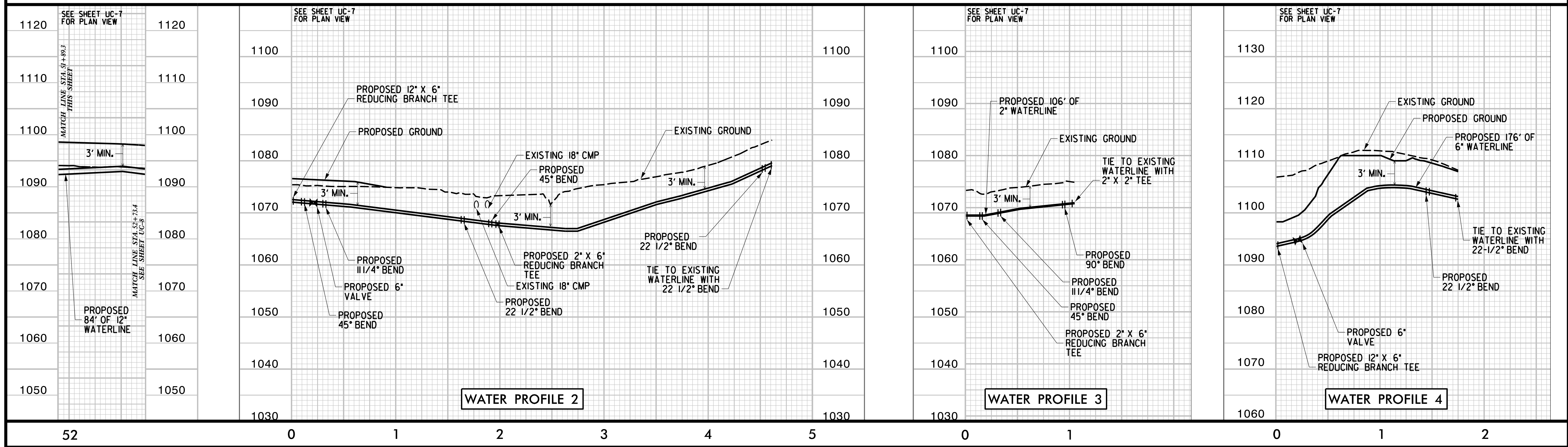
PROJECT REFERENCE NO. R-2603	SHEET NO. UC-22
DESIGNED BY: B.DIXON	
DRAWN BY: R.MOSS	
CHECKED BY: B.DIXON	
APPROVED BY:	
REVISED:	
MUNICIPAL ENGINEERING SERVICES COMPANY, P.A. P.O. BOX 97 GARNER, NC 27529 (919) 772-5393	
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UTILITY CONSTRUCTION



WATER PROFILE 1

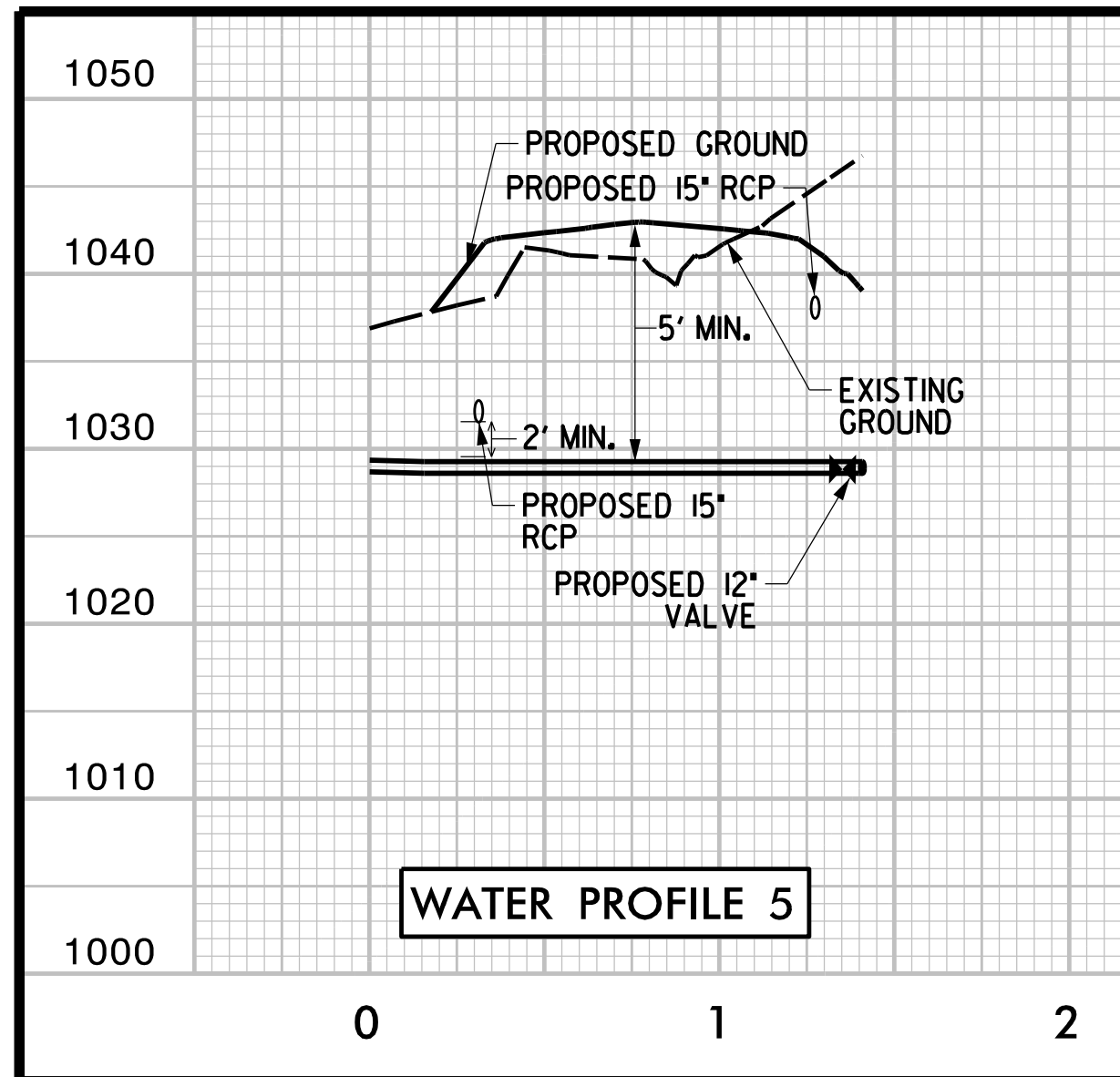
WATER PROFILE 1



WATER PROFILE 2

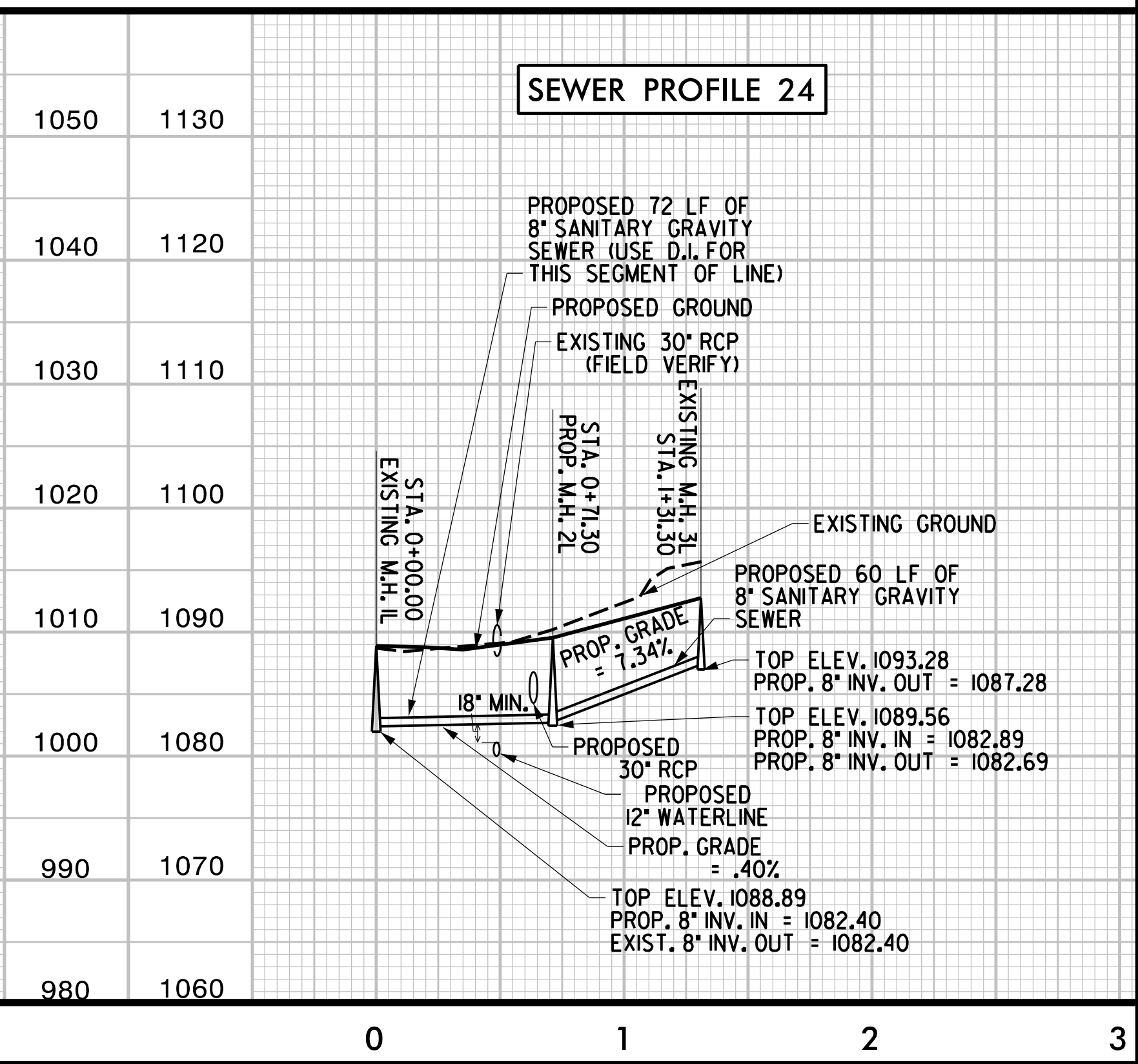
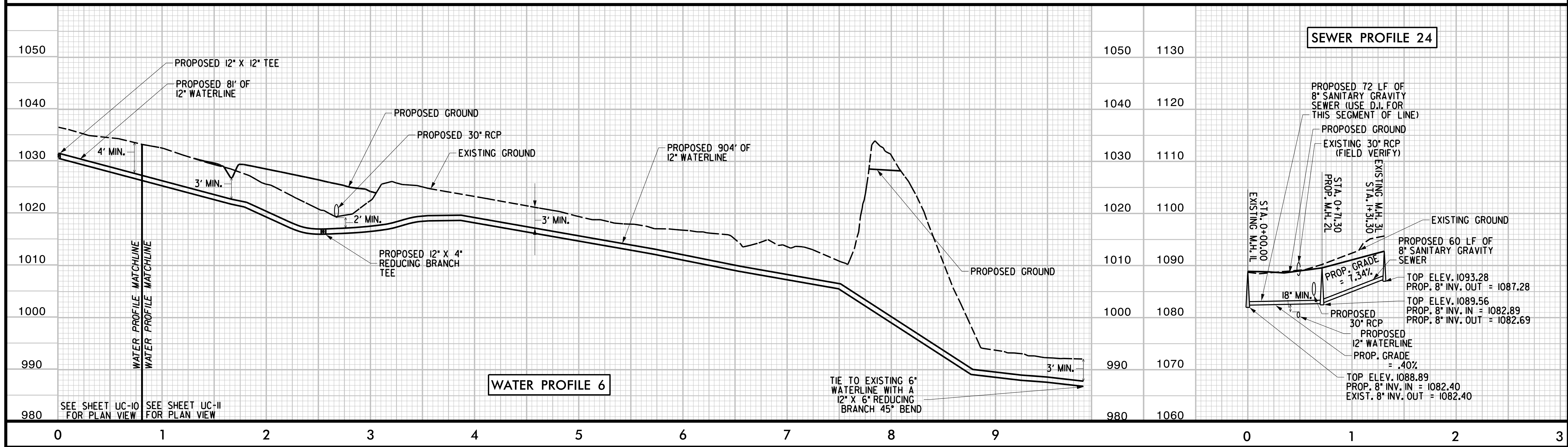
WATER PROFILE 3

WATER PROFILE 4



PROJECT REFERENCE NO. R-2603	SHEET NO. UC-23
DESIGNED BY: B. DIXON	
DRAWN BY: R. MOSS	
CHECKED BY: B. DIXON	
APPROVED BY:	
REVISER:	
MUNICIPAL ENGINEERING SERVICES COMPANY, PA.	P.O. BOX 97 GARNER, NC. 27529 (919) 772-5393
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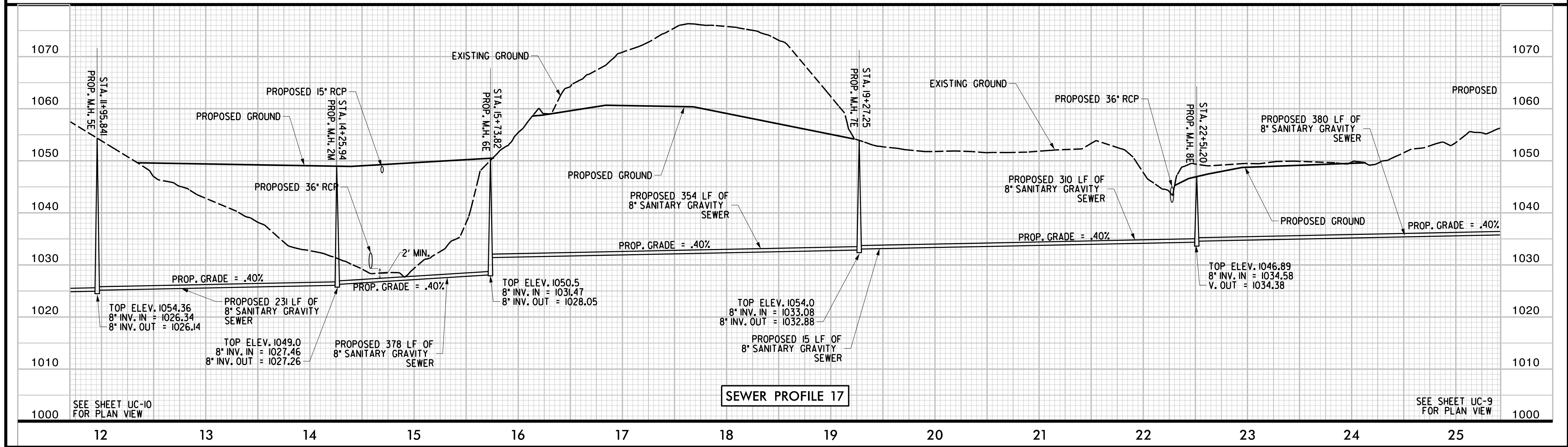
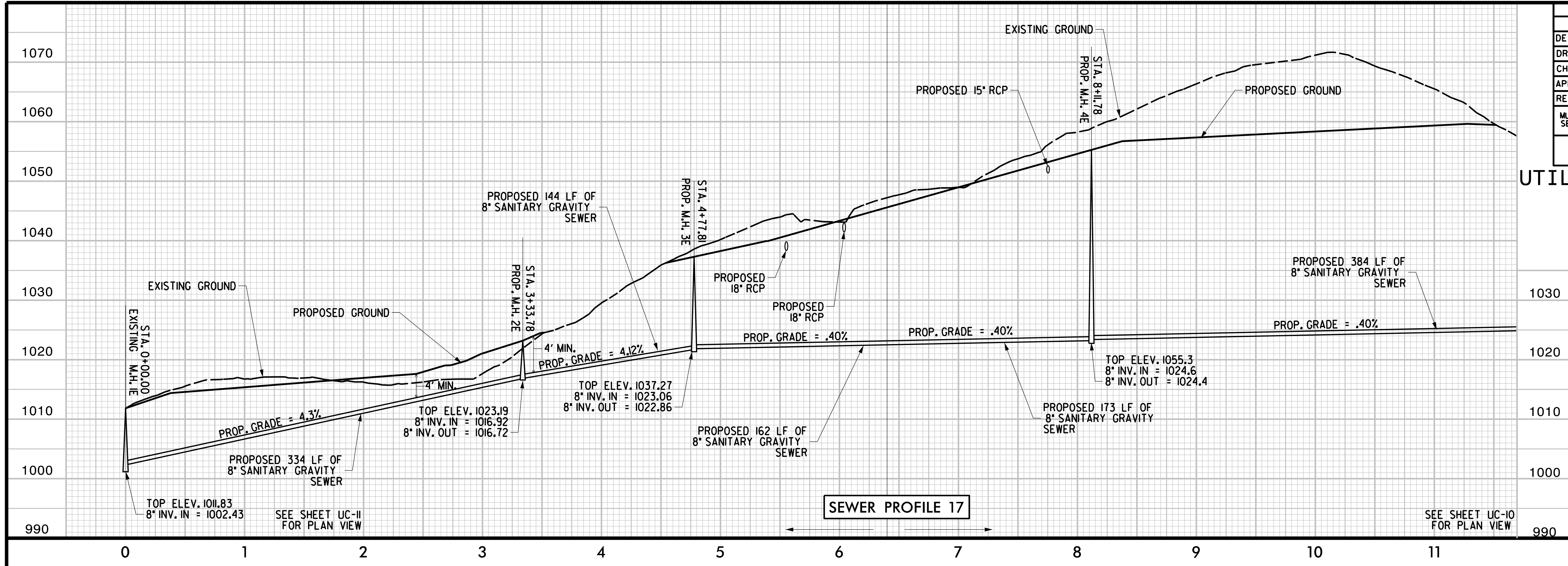
SEE SHEET UC-10 FOR PLAN VIEW
SEE SHEET UC-11 FOR PLAN VIEW

TIE TO EXISTING 6" WATERLINE WITH A 12" X 6" REDUCING BRANCH 45° BEND

PROPOSED 72 LF OF 8" SANITARY GRAVITY SEWER (USE D.I. FOR THIS SEGMENT OF LINE)
 PROPOSED 60 LF OF 8" SANITARY GRAVITY SEWER
 TOP ELEV. 1093.28
 PROP. 8" INV. OUT = 1087.28
 TOP ELEV. 1089.56
 PROP. 8" INV. IN = 1082.89
 PROP. 8" INV. OUT = 1082.69
 PROPOSED 12" WATERLINE
 PROP. GRADE = .40%
 TOP ELEV. 1088.89
 PROP. 8" INV. IN = 1082.40
 EXIST. 8" INV. OUT = 1082.40

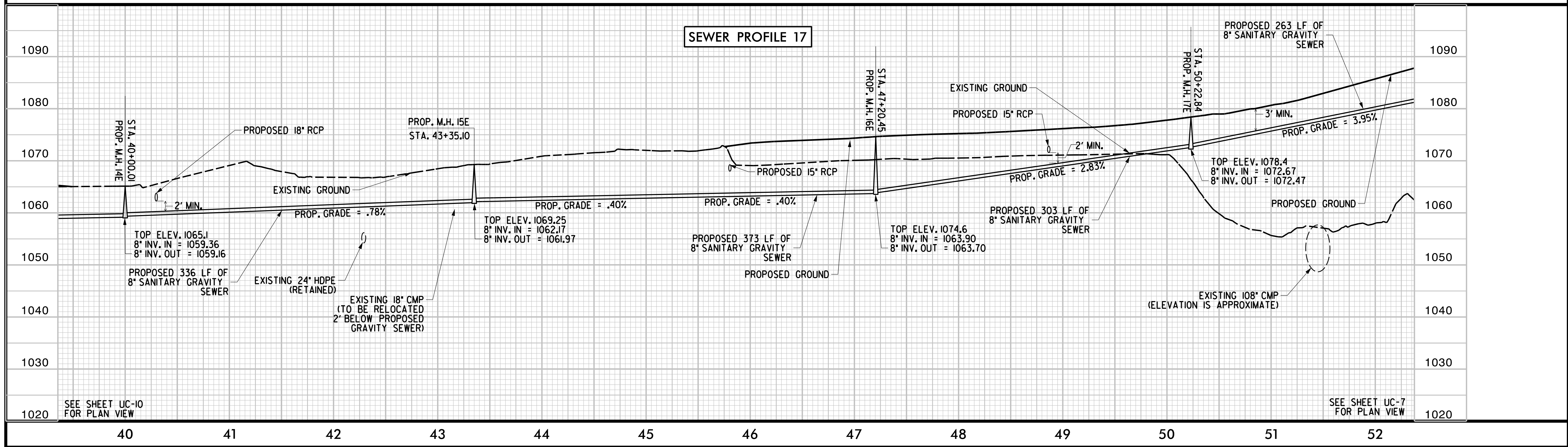
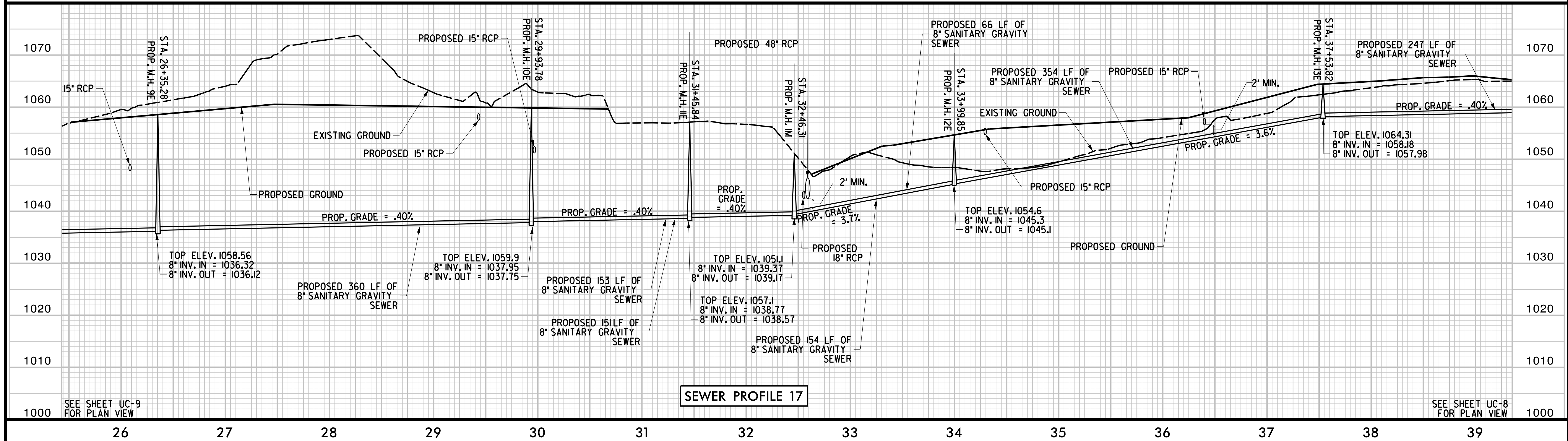
PROJECT REFERENCE NO.	SHEET NO.
R-2603	UC-24
DESIGNED BY: B.DIXON	
DRAWN BY: R.MOSS	
CHECKED BY: B.DIXON	
APPROVED BY:	
REVISED:	
MUNICIPAL ENGINEERING SERVICES COMPANY, PA.	UTILITY CONSTRUCTION PLANS ONLY
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UTILITY CONSTRUCTION



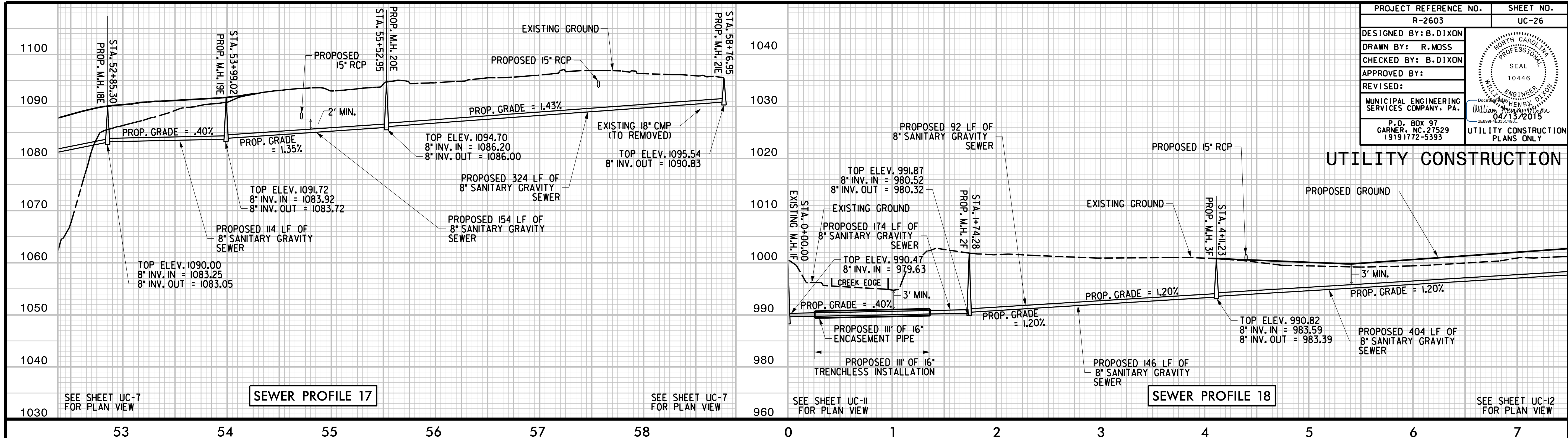
PROJECT REFERENCE NO.	R-2603	SHEET NO.	UC-25
DESIGNED BY:	B. DIXON		
DRAWN BY:	R. MOSS		
CHECKED BY:	B. DIXON		
APPROVED BY:			
REVISER:			
MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.		P.O. BOX 97 GARNER, NC 27529 (919) 772-5393	
			UTILITY CONSTRUCTION PLANS ONLY

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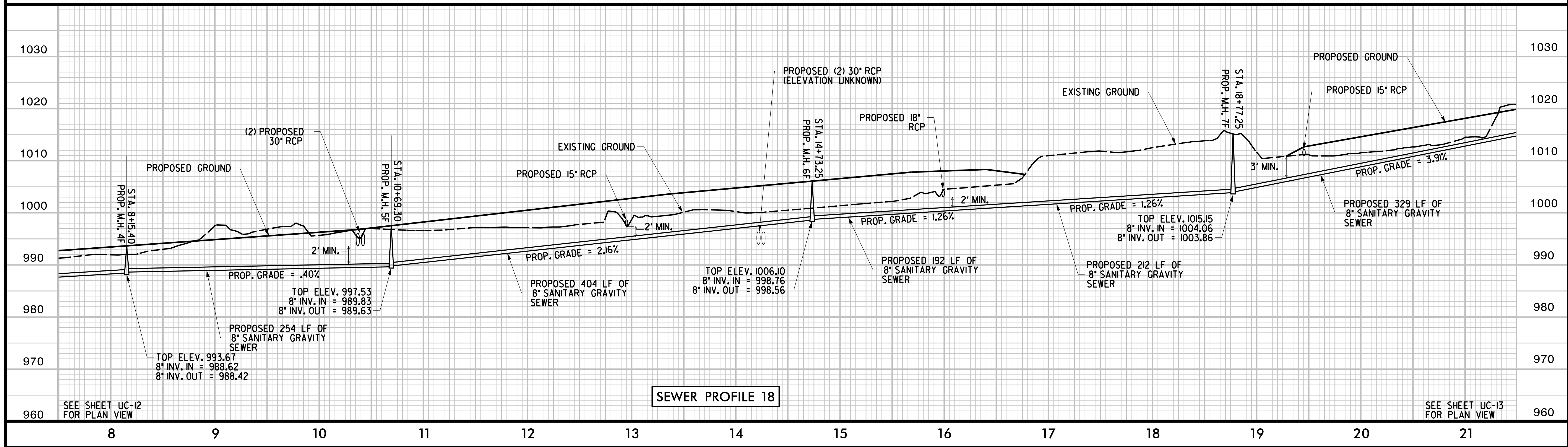


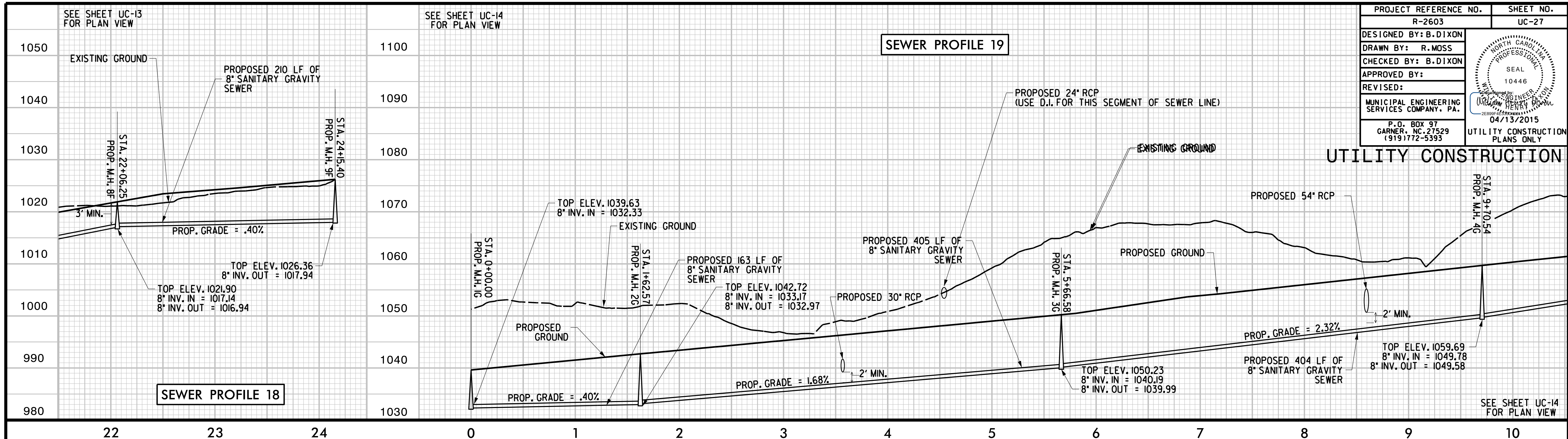
PROJECT REFERENCE NO. R-2603	SHEET NO. UC-26
DESIGNED BY: B. DIXON	
DRAWN BY: R. MOSS	
CHECKED BY: B. DIXON	
APPROVED BY:	
REVISER:	UTILITY CONSTRUCTION PLANS ONLY
MUNICIPAL ENGINEERING SERVICES COMPANY, P.A. P.O. BOX 97 GARNER, NC 27529 (919) 772-5393	

UTILITY CONSTRUCTION

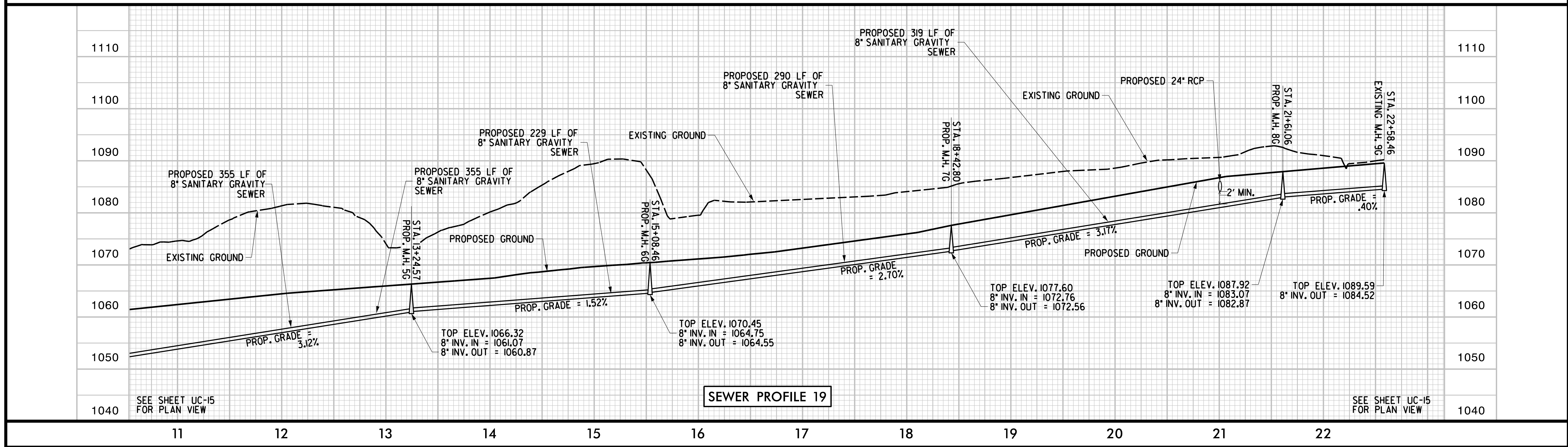


PRELIMINARY
FOR REVIEW PURPOSES ONLY
1-23-15





PROJECT REFERENCE NO. R-2603	SHEET NO. UC-27
DESIGNED BY: B. DIXON	
DRAWN BY: R. MOSS	
CHECKED BY: B. DIXON	
APPROVED BY:	
REVISER:	04/13/2015
MUNICIPAL ENGINEERING SERVICES COMPANY, P.A. P.O. BOX 97 GARNER, NC 27529 (919) 772-5393	UTILITY CONSTRUCTION PLANS ONLY



PROJECT REFERENCE NO.	SHEET NO.
R-2603	UC-28
DESIGNED BY: B. DIXON	
DRAWN BY: R. MOSS	
CHECKED BY: B. DIXON	
APPROVED BY:	
REVISER:	
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