

TIP PROJECT: U-5765

T.I.P. NO.	SHEET NO.
U-5765	UC-1



VICINITY MAP N.T.S.

UC PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITY CONSTRUCTION PLANS
MECKLENBURG COUNTY

LOCATION: NC-73 FROM WEST CATAWBA AVENUE TO I-77

TYPE OF WORK: UTILITY CONSTRUCTION

BEGIN CONSTRUCTION

END TIP CONSTRUCTION

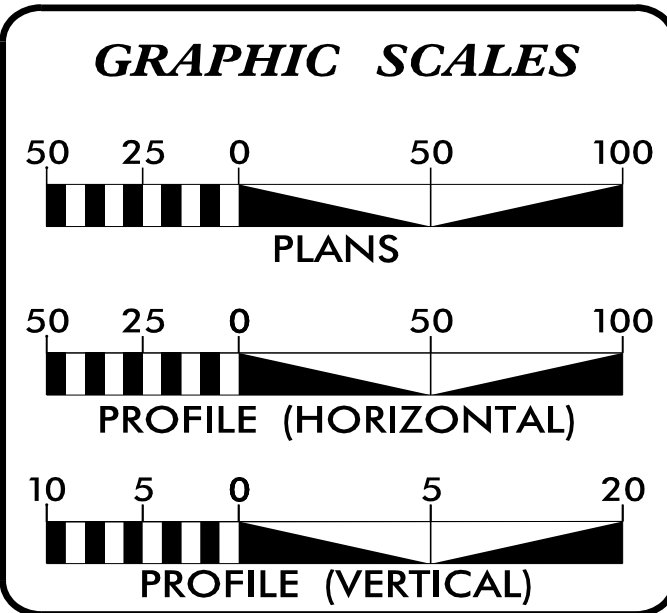
END TIP CONSTRUCTION

END TIP CONSTRUCTION

NCDOT CONTACT:
SEAN EPPERSON, P.E.
NCDOT - DIVISION 10
716 W. MAIN STREET
ALBEMARLE, NC 28001

OWNER:	CONTACT INFORMATION LOGAN HEDRICK (980) 253-4390 LOGAN.HEDRICK@CI.CHARLOTTE.NC.US
PROJECT ENGINEER:	MATTHEW SHOESMITH, P.E. (704) 954-7490 MATTHEW.SHOESMITH@KIMLEY-HORN.COM 200 SOUTH TRYON STREET, SUITE 200 CHARLOTTE, NORTH CAROLINA 28202

DOCUMENT NOT CONSIDERED FINAL
UNTIL ALL SIGNATURES ARE COMPLETED



SHEET NO.:	INDEX OF SHEETS DESCRIPTION:
UC-1	TITLE SHEET
UC-2A	UTILITY PERMIT
UC-2B	UTILITY SYMBOLOGY
UC-3	UTILITY NOTES
UC-3A THRU UC-3K	UTILITY DETAILS
UC-4 THRU UC-10	UTILITY CONSTRUCTION SHEETS
UC-11 THRU UC-18	UTILITY PROFILE SHEETS

WATER AND SEWER
OWNERS ON PROJECT

- (1) WATER - CHARLOTTE WATER
(2) SANITARY SEWER - CHARLOTTE WATER

AUGUST 2026

PREPARED IN THE OFFICE OF

Kimley»Horn © 2019

NC LICENSE #F-0102
421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, NORTH CAROLINA 27601
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Matthew Shoesmith, P.E.	CONSULTANT CONTACT #1
Sophia Johnston, P.E.	CONSULTANT CONTACT #2

SEAL

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
MATTHEW A. SHOESMITH
P.E.
024670
8/28/2026



**DIVISION OF HIGHWAYS
UTILITIES UNIT**
1555 MAIL SERVICES CENTER
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Kelvin Martin, E.I.	REGIONAL UTILITIES ENGINEER
Nabil Hamdan	SENIOR UTILITIES ENGINEER
Kyle Pleasant	UTILITIES AREA COORDINATOR

5/14/99

5/14/99

PREPARED BY:

Kimley»Horn

200 SOUTH TRYON STREET, SUITE 200
CHARLOTTE, NC 28202

PROJECT REFERENCE NO.

U-5765

SHEET NO.

UC-1A

DESIGNED BY: SJJ

DRAWN BY: SJJ

CHECKED BY: MAS

APPROVED BY: MAS

REVISED:

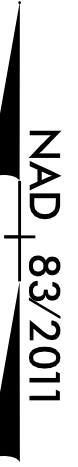
NORTH CAROLINA
DEPARTMENT OF
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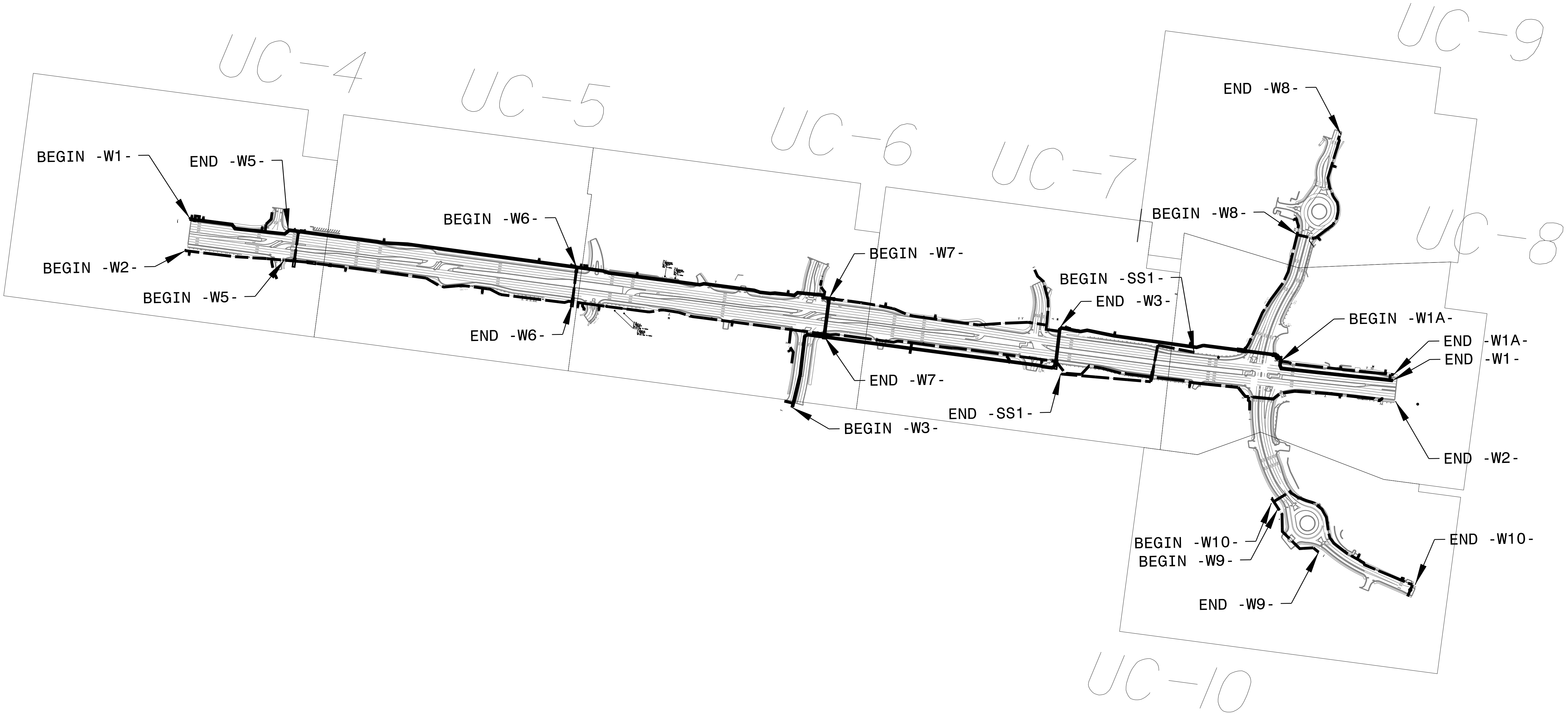
8/28/2026

UTILITY CONSTRUCTION
PLANS ONLY

Matthew S. Johnson
Professional Engineer
No. 027670
Matthew A. Sholes
Professional Engineer
No. 027670



UTILITY CONSTRUCTION



WATERLINE KEY SHEET N.T.S

5/14/99

SHEET UC-4

Test Hole	Description	Cover	Top Elev
1	1" PLASTIC GASLINE	1.89	765.19
1	1.5" FIBER OPTIC CONDUIT	2.55	764.53
2	10" COATED STEEL GASLINE	6.06	767.24
3	10" COATED STEEL GASLINE	3.65	769.46
4	15" RCP STORM PIPE	6.74	759.53
4A	1.5", 1", 1.75" DIRECT BURIED FIBER OPTIC LINES	3.33	762.95
5	2" PLASTIC GASLINE	3.03	764.74
6	4" PLASTIC GASLINE	2.84	764.5
7	2" CONDIT FOR TRAFFIC CONTROL	0.79	765.58
8	1" PLASTIC GASLINE	2.66	763.14
9	10" COATED STEEL GASLINE	6.87	761.39
10	10" STEEL GASLINE	3.04	765.4

SHEET UC-5

Test Hole	Description	Cover	Top Elev	Notes
11	1.5", 1" PVC IRRIGATION LINE	1.14	738.76	-
11	2" FIBER OPTIC CONDUIT	5.86	734.04	-
12	3/4" TELEPHONE/F.O. CONDUITS	4.09	735.79	-
12A	2" FIBER OPTIC CONDUIT	3.42	736.73	-
13	2" FIBER OPTIC CONDUIT, 1" DIRECT BURIED FIBER OPTIC LINE	3.23	737.96	-
14	GASLINE	14	728.63	CREW DUG TO REFUSAL
15	GASLINE	8	729.56	CREW DUG TO REFUSAL

SHEET UC-6

Test Hole	Description	Cover	Top Elev	Notes
16	GASLINE	7.8	716.74	CREW DUG TO REFUSAL
17	2.5, 1.5 PVC IRRIGATION LINE, 2.2" FIBER OPTIC CONDUITS	4.8	720.86	-
18	-	-	-	NO SIGNAL ON GASLINE
18A	2" TRAFFIC CONTROL CONDUIT	1.9	722.59	-
18A	GASLINE	6.26	718.23	UNKNOWN SIZE & MATERIAL DUE TO SOIL CONDITIONS
19	2" FIBER OPTIC CONDUIT	5.79	717.96	-

SHEET UC-7

Test Hole	Description	Cover	Top Elev	Notes
20	2" PLASTIC GASLINE	2.4	701.31	-
21	2.2.5" FIBER OPTIC CONDUITS	3.53	698.27	-
22	3/4" FIBER OPTIC CONDUITS	2.16	699.69	NO SIGNAL ON GASLINE
23	1" DIRECT BURIED TELEVISION LINE	3.24	697.25	NO SIGNAL ON GASLINE

SHEET UC-8

Test Hole	Description	Cover	Top Elev	Notes
24	2" FIBER OPTIC CONDUIT	1.62	699.78	-
25	0.5, 0.75 DIRECT BURIED FIBER OPTIC	2.46	703.14	-
26	4" PLASTIC GASLINE	2.92	702.37	-
27	2.6" ELECTRIC CONDUITS	2.14	703.97	-
27A	2" FIBER OPTIC CONDIT	2	703.7	-
28	2" FIBER OPTIC CONDUIT	1.62	703.12	-
29	30" WIDE PRE-CAST CONCRETE TELEPHONE/F.O. DUCT BANK	6.92	697.44	-
30	GASLINE TRACER WIRE	6	698.67	GASLINE NOT FOUND, BELIEVED TO BE NORTH OR SOUTH OF TRACER WIRE
31	0.5" DIRECT BURIED FIBER OPTIC LINE	2.12	699.85	-
32	2" DIRECT BURIED TELEPHONE LINE	2.44	699.88	-
33	2" PLASTIC GASLINE	3.66	706.39	-

PREPARED BY:

Kimley »Horn

200 SOUTH TRYON STREET, SUITE 200
CHARLOTTE, NC 28202

PROJECT REFERENCE NO.

U-5765

SHEET NO.

UC-1B

DESIGNED BY: SJJ

DRAWN BY: SJJ

CHECKED BY: MAS

APPROVED BY: MAS

REVISED:

NORTH CAROLINA
DEPARTMENT OF
TRANSPORTATION

UTILITIES ENGINEERING SEC.
PHONE: (919) 707-6690
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8/28/2026

UTILITY CONSTRUCTION
PLANS ONLY

PROFESSIONAL
ENGINEER

Matthew S. Hines
027670

THE ENGINEER
JAMES A. SHOLSKY

UTILITY CONSTRUCTION

SHEET UC-9

Test Hole	Description	Cover	Top Elev
37	2.1" DIRECT BURIED ELECTRIC LINES	3.37	707.65

SHEET UC-10

Test Hole	Description	Cover	Top Elev
34	2.6" ELECTRIC CONDUITS, 2.5 DIRECT BURIED TELEPHONE LINE	3.98	733.43
35	2" DIRECT BURIED TELEPHONE LINE	7.53	735.86
36	2.5 PLASTIC GASLINE	4.56	740.66



APPLICATION FOR PERMIT FOR WATER MAIN EXTENSION

PROJECT NAME: NCDOT RELOCATION FOR U-5765

CLTWater PROJECT NO.: CPM-60-25-270

PROJECT DESCRIPTION: Water Line and Appurtenances Relocation for 8", 12", 24", and 36" sizes.

DESIGNED BY: FIRM: KIMLEY-HORN AND ASSOCIATES

ENGINEER: MATTHEW SHOESMITH

ADDRESS: 200 SOUTH TRYON STREET #200
CHARLOTTE, NORTH CAROLINA 28202

PHONE: (704) 333-5131

THIS APPLICATION IS MADE UNDER AND IN FULL ACCORD WITH THE PROVISIONS OF CHAPTER 130A-317 OF THE NORTH CAROLINA GENERAL STATUTES, AND SUCH OTHER STATUTES AS RELATED TO PUBLIC WATER SYSTEMS. CLTWater HAS BEEN GRANTED AUTHORITY TO ISSUE PERMITS FOR EXTENSION OF WATER MAINS PURSUANT TO 15A NCAC 18C.1801. THE APPLICANT AGREES THAT NO SIGNIFICANT CHANGE OR DEVIATION FROM THE PLANS AND SPECIFICATIONS APPROVED BY CLTWater WILL BE MADE WITHOUT THE WRITTEN CONSENT AND APPROVAL OF CLTWater OR ITS AUTHORIZED REPRESENTATIVE. A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF NORTH CAROLINA SHALL SUBMIT A STATEMENT REFLECTING THAT ADEQUATE OBSERVATIONS DURING AND UPON COMPLETION OF CONSTRUCTION INDICATES THAT CONSTRUCTION WAS COMPLETED IN ACCORDANCE WITH APPROVED PLANS AND SPECIFICATIONS.

PERMIT NO. _____

APPROVED: _____ DATE _____

CHARLES BLISS, P.E., CHIEF ENGINEER
CHARLOTTE WATER
5100 BROOKSHIRE BLV

COMPLETE NAME AND ADDRESS OF ENGINEERING DESIGN FIRM:
KIMLEY-HORN AND ASSOCIATES
200 SOUTH TRYON STREET #200
CHARLOTTE, NORTH CAROLINA 28202

TELEPHONE (704) 333-5131

A circular professional engineer seal for the State of North Carolina. The outer ring contains the text "NORTH CAROLINA" at the top and "MATTHEW A. SHOEMAKER" at the bottom. The inner ring contains the text "PROFESSIONAL" at the top and "ENGINEER" at the bottom. In the center, the word "SEAL" is positioned above the license number "027670". The seal is surrounded by a decorative border of small, evenly spaced dots.

PLANT FLOW ALLOCATION RECORDED BY: _____

PERMIT APPROVED BY: _____

CHARLES BLISS, P.E., CHIEF ENGINEER

PREPARED BY:	PROJECT REFERENCE NO.	SHEET NO.
Kimley » Horn 200 SOUTH TRYON STREET, SUITE 200 CHARLOTTE, NC 28202	U-5765	UC-2A
	DESIGNED BY:	
	DRAWN BY:	
	CHECKED BY:	
	APPROVED BY:	
	REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION		
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151		UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
U-5765	UC-2B

UTILITIES PLAN SHEET SYMBOLS

PROPOSED WATER SYMBOLS

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

PROPOSED SEWER SYMBOLS

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

PROPOSED MISCELLANEOUS UTILITIES SYMBOLS

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

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

EXISTING UTILITIES SYMBOLS

Power Pole	
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	AATUR
End of Information	E.O.I.

*Underground Power Line	P
*Underground Telephone Cable	T
*Underground Telephone Conduit	TC
*Underground Fiber Optics Telephone Cable	T FO
*Underground TV Cable	TV
*Underground Fiber Optics TV Cable	TV FO
*Underground Gas Pipeline	G
Aboveground Gas Pipeline	A/G Gas
*Underground Water Line	W
Aboveground Water Line	A/G Water
*Underground Gravity Sanitary Sewer Line	SS
Aboveground Gravity Sanitary Sewer Line	A/G Sanitary Sewer
*Underground SS Forced Main Line	FSS
Underground Unknown Utility Line	UTL
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)

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 CHARLOTTE WATER
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, PUBLIC WATER SUPPLY SECTION. ALL SEWER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL AND NATURAL 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 AND THE UTILITY OWNER. 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 A MINIMUM OF ONE WEEK PRIOR TO SERVICE INTERRUPTIONS AND TESTING. 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 ADDITONAL 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 OR AT NIGHT IF NECESSARY.
9. ALL UTILITY MATERIALS SHALL BE APPROVED PRIOR TO DELIVERY TO THE PROJECT. SEE 1500-7, " SUBMITTALS AND RECORDS" IN SECTION 1500 OF THE STANDARD SPECIFICATIONS.

PROJECT SPECIFIC NOTES:

1. ALL NECESSARY LICENSES AND PERMITS SHALL BE OBTAINED BY THE CONTRACTOR AT ITS EXPENSE, UNLESS PREVIOUSLY OBTAINED BY THE OWNER AND PROVIDED AT THE PRECONSTRUCTION CONFERENCE.
2. DEVIATION FROM THESE PLANS AND NOTES WITHOUT THE PRIOR WRITTEN CONSENT OF THE UTILITY OWNER OR THEIR REPRESENTATIVE OR THE ENGINEER MAY BE CAUSE FOR THE WORK TO BE UNACCEPTABLE.
3. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY SHOULD ANY FIELD CONDITIONS BE ENCOUNTERED THAT VARY FROM THE INFORMATION PROVIDED IN THE CONTRACT DOCUMENTS. ANY NECESSARY FIELD REVISIONS ARE SUBJECT TO REVIEW & APPROVAL OF AN AMENDED PLAN &/OR PROFILE BY THE UTILITY OWNER PRIOR TO CONSTRUCTION.
4. CONTRACTOR SHALL COORDINATE ALL WORK WITH UTILITY OWNER AT LEAST 48 HOURS PRIOR TO THE START OF CONSTRUCTION, OR AS OTHERWISE SPECIFIED HEREIN.
5. UNLESS OTHERWISE INDICATED, ALL PROFILE ELEVATIONS ARE ALONG THE PIPE CENTERLINE.
6. CONTRACTOR SHALL NOTIFY PROPERTY OWNERS AND TENNANTS AT LEAST 7 DAYS PRIOR TO CONSTRUCTION THAT CONSTRUCTION ACTIVITY WILL TAKE PLACE IN THEIR AREA.
7. CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS FOR ALL UTILITY CONSTRUCTION PRIOR TO PLACING THE PIPELINE(S) IN SERVICE
8. PIPE ALIGNMENT SHOWN IS BASED ON STANDARD DUCTILE IRON MECHANICAL JOINT FITTINGS. JOINT DEFLECTIONS SHALL NOT EXCEED 75 PERCENT OF MANUFACTURER'S RECOMMENDED DEFLECTION. CONTRACTOR SHALL ADJUST PIPELINE ALIGNMENT AND DEFLECT JOINTS AS NECESSARY TO ACCOMMODATE THE STANDARD BENDS SHOWN.
9. MINIMUM PIPE COVER FOR DISTRIBUTION WATER MAINS SHALL BE 3 FEET.
10. ALL PRESSURIZED FITTINGS SHALL BE DUCTILE IRON RESTRAINED MECHANICAL JOINT WITH PRESSURE RATING EQUAL TO OR HIGHER THAN HOST PIPE, UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
11. ALL MECHANICAL JOINTS SHALL BE FITTED WITH WEDGE-TYPE MECHANICAL RESTRAINT ACCESSORY KITS DESIGNED FOR THE INTENDED USE AND MATERIAL, AS APPROVED BY UTILITY OWNER.

PREPARED BY:
Kimley»Horn
200 SOUTH TRYON STREET, SUITE 200
CHARLOTTE, NC 28202

PROJECT REFERENCE NO.
U-5765

SHEET NO.
UC-3

DESIGNED BY: SJJ
DRAWN BY: SJJ
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APPROVED BY: MAS
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PHONE: (919) 707-6690
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8/28/2026

UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION

GENERAL SEQUENCE:

1. FOR EACH WATER LINE AND SEWER LINE RELOCATION, THE CONTRACTOR SHALL PROVIDE THE UTILITY OWNER WITH A DETAILED INSTALLATION, CONNECTION, AND SERVICE INTERRUPTTION PLAN FOR APPROVAL AT LEAST SEVEN (7) DAYS PRIOR TO THE RELOCATION. AT A MINIMUM, EACH PLAN SHALL ADDRESS THE FOLLOWING:

A. SEQUENCE OF CONSTRUCTION OPERATIONS.

B. PROCEDURE FOR FLUSHING, TESTING, AND DISINFECTION OF ALL AFFECTED PIPING AND VALVES, AS REQUIRED BY THE UTILITY OWNER.

C. PHASING AND SCHEDULE FOR ALL CONNECTIONS, INCLUDING PLANNED SERVICE OUTAGES, DURATION, AND CONTINGENCY PLAN.
2. NO INTERRUPTION OF SERVICE WILL BE PERMITTED UNTIL THE FOREGOING PLAN HAS BEEN APPROVED BY THE UTILITY OWNER. THE UTILITY OWNER'S PERSONNEL SHALL WITNESS THE OPERATION OF THE UTILITY OWNER'S EXISTING FACILTITIES INVOLVED IN THE INTERRUPTIONS OF SERVICE.
3. PLANNED SERVICE CONNECTION INTERRUPTIONS SHALL LAST NO LONGER THAN 8 HOURS UNLESS OTHERWISE APPROVED BY THE UTILITY OWNER. ALL INTERRUPTIONS OF SERVICES SHALL BE COORDINATED WITH AND SCHEDULED AT TIMES ACCEPTABLE TO THE UTILITY OWNER.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE CHARLOTTE WATER INSPECTOR TO NOTIFY CUSTOMERS AFFECTED. INTERRUPTIONS SHALL BE SCHEDULED AT A TIME MOST CONVENIENT TO THE PUBLIC. THE CONTRACTOR SHALL PROVIDE THE CHARLOTTE WATER INSPECTOR WITH ALL NECESSARY INFORMATION (LOCATION, DURATION, AND NATURE OF INTERRUPTION) AT LEAST FOURTEEN (14) DAYS PRIOR TO THE PROPOSED WORK. CHARLOTTE WATER INSPECTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH WATER CUSTOMERS TO DETERMINE ACCEPTABLE DATES AND TIMES OF SHUTDOWNS.
5. EXISTING WATER VALVES MAY BE USED AT THE UTILITY OWNER'S DISCRETION FOLLOWING A SUCCESSFUL TEST SHUTDOWN OF THE EXISTING WATER SYSTEM AT EACH OF THE PROPOSED TIE IN POINTS. CLTW WILL COORDINATE AND PERFORM THE TEST SHUTDOWN FOLLOWING ACCEPTANCE OF THE SERVICE INTERRUPTION PLAN.



PREPARED BY:

Kimley»Horn

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200 SOUTH TRYON STREET, SUITE 200
CHARLOTTE, NC 28202

PROJECT REFERENCE NO.

U-5765

SHEET NO.

UC-3C

DESIGNED BY:

DRAWN BY:

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UTILITY CONSTRUCTION
PLANS ONLY

8/28/2026

UTILITY CONSTRUCTION

16" AND SMALLER MAIN

24"-30" MAIN

NO. DESCRIPTION:

1. 90° VERTICAL BEND - BRASS OR S.S.

2. 90° HORIZONTAL BEND - BRASS OR S.S.

3. (2) 24" PADS OR PRECAST 24" CIRCULAR PADS.

4. 24" X 24" X 6" CONCRETE PAD VALVE OR 24" DIAMETER PRECAST PAD.

5. VALVE BOX ASSEMBLY. SEE STANDARD DETAIL.

6. 2" SERVICE SADDLE W/ CC TAPER TREAD OUTLET.

7. 2" BALL CORPORATION STOP WITH TEE HEAD OPERATING NUT.

8. 2" GATE VALVE FOR 2" AIR RELEASE.

9. 2" PIPING - SCHEDULE 40 RED BRASS OR STAINLESS STEEL.

10. 2" DUCTILE IRON FUSION BONDED EPOXY COATED) THREADED COUPLING (FNPT).

NOTES:

A. ARV TO BE PLACED A MIN. OF 18" OFFSET FROM THE WATER MAIN, AND SHALL BE BOC. IN PLANTING STRIP OR IN ROAD SHOULDER OR SIDEWALK, AND WITH VALVE BOX ASSEMBLY PARALLEL TO THE ROAD.

B. AIR RELEASES TO BE INSTALLED AT ALL HIGH POINTS AS DIRECTED BY THE ENGINEER.

C. AIR RELEASE SHALL NOT BE LOCATED IN ROADWAY PAVEMENT.

D. ON 16" AND SMALLER PIPE, 2" ASSEMBLY REQUIRED.

E. ON 24" TO 30" PIPE, USE 6" AIR RELEASE HYDRANT. AT LEAST TWO VALVES REQUIRED - ONE AT TEE AND ONE AT. SEE ASSEMBLY ON RIGHT.

F. VALVE & B.O. SHALL NOT BE PLACED IN ROAD DITCH.

G. TRACER WIRE INSTALLED PER CLTW TRACER WIRE DETAIL AS APPLICABLE.

NO. DESCRIPTION:

1. 6" MJ X MJ GATE VALVE.

2. STANDARD 3 WAY FIRE HYDRANT ASSEMBLY PER STANDARD DETAIL (PAINTED BLUE).

3. 6" RJ DIP.

4. FOSTER ADAPTER.

5. 6" RMJ 90° BEND (VERTICAL).

6. VALVE BOX ASSEMBLY. SEE STANDARD DETAIL.

7. #57 WASHED STONE-ENCASEMENT.

8. CONCRETE HYDRANT COLLAR. CAST IN PLACE 3" DIAMETER BY 6" THICK. REINFORCE WITH #4 REBARS.

9. 6" SWIVEL OUTLET FIRE HYDRANT TEE.

10. CONCRETE BLOCK - 8" X 16" SOLID CONCRETE BLOCK.

NOTES:

A. AIR RELEASE HYDRANT SHALL BE PLACED PER THE FIRE HYDRANT STANDARD DETAIL REQUIREMENTS.

B. AIR RELEASES TO BE INSTALLED AT ALL HIGH POINTS AS DIRECTED BY THE ENGINEER.

C. ON 24" AND 30" PIPE, USE 6" AIR RELEASE HYDRANT.

D. TRACER WIRE INSTALLED PER CLTW TRACER WIRE DETAIL AS APPLICABLE.

E. SEE FIRE HYDRANT STD DETAIL FOR INSTALLATION REQUIREMENTS.

F. HYDRANT EXTENSIONS SHALL BE LIMITED TO 1 EACH PER HYDRANT.

NO SCALE

1.0

DATE

04/2024

DETAIL

10.2.2

NO. DESCRIPTION:

1. RUN X 8" SWIVEL OR RMJ OUTLET TEE.

2. 90° BEND (RMJ).

3. 8" RMJ GATE VALVE WITH FOSTER ADAPTER.

4. 8" RJ DIP.

5. 8" RMJ GATE VALVE AT FH WITH FOSTER ADAPTER.

6. HIGH VELOCITY FIRE HYDRANT, 6" BOC OR 4" BACK OF DITCH CENTERLINE. FIRE HYDRANT SHALL BE PAINTED OSHA SAFETY BLUE. PUMP NOZZLES SHALL BE PARALLEL TO THE ROADWAY / CURB.

7. VALVE BOX ASSEMBLY. SEE STANDARD DETAIL.

8. CONCRETE HYDRANT COLLAR. CAST IN PLACE 3" DIAMETER BY 6" THICK. REINFORCE WITH #4 REBARS.

9. MINIMUM 9 CUBIC FEET OF #57 WASHED STONE PROPORTIONALLY AROUND FH SHOE. DO NOT COVER WEEP HOLE. ENCAPSULATE WASHED STONE WITH FILTER FABRIC.

10. 8" X 16" SOLID CONCRETE BLOCK.

11. FOSTER ADAPTER.

12. #4 REBARS.

NOTES:

A. ALL PIPE AND FITTINGS TO BE RESTRAINED JOINT DIP WITH FACTORY RESTRAINED JOINT FITTINGS OR MJ FITTINGS WITH WEDGE ACTION RESTRAINT.

B. REFERENCE STANDARD DETAIL FOR AVG. #12 GAUGE SOLID COPPER TRACER WIRE WITH BLUE 30 MILS HDPE INSULATION.

C. SEE CONSTRUCTION PLANS FOR LOCATION OF HYDRANTS.

D. AIR RELEASE HYDRANTS SHALL BE INSTALLED AT ALL HIGH POINTS AS DIRECTED BY THE ENGINEER.

E. EXTENSION KITS REQUIRE THE APPROVAL OF THE ENGINEER. HYDRANT EXTENSION KITS SHALL BE LIMITED TO 1 EACH PER HYDRANT. DO NOT CAST THE CONCRETE COLLAR ON THE EXTENSION JOINT.

DEPTH OF COVER (D)

PIPE DIAMETER (IN)

MINIMUM DEPTH (FT)

30 5.0

36 5.0

42 5.5

48 5.5

54 5.5

60 5.5

64 5.5

NO SCALE

1.0

DATE

04/2024

DETAIL

10.2.3

NO. DESCRIPTION:

1. FIRE HYDRANT.

2. KUPFERLE #9700-Y HYDRANT AUTO FLUSHER (YELLOW) (INCLUDING #8-19).

3. 6 MILS HDPE PLASTIC FILM (54" X 54") - SEE NOTE C.

4. 16" X 16" X 2" PATIO PAVERS - CONCRETE - 8 EA - SEE NOTE C.

5. HYDRANT STORZ NOZZLE WIRED OUT-OF-SERVICE RING (O.D. = 12.5", I.D. = 7.0", t = 0.05").

6. CAMPBELL BLU-KROME 1/4" PROOF COIL CHAIN 5 LF.

7. LOCKING NOZZLE COLLAR - KUPFERLE #9708-Y WITH PADLOCK.

8. 2 1/2" FIRE HYDRANT NOZZLE COUPLING.

9. KUPFERLE ADAPTER.

10. 2" THREADED NIPPLE.

11. 2" X 2" X 2" TEE FIP THREAD.

12. PLUG/TAP.

13. WATER SAMPLE VALVE.

14. BRASS WATER SAMPLING BIBB.

15. 2" SOLENOID CONTROL VALVE, P-220 SERIES.

16. MANUAL FLOW CONTROL KNOB.

17. HUNTER DIGITAL PROGRAMMABLE CONTROLLER WITH 9 VOLT LITHIUM BATTERY.

18. 2" FIP OUTLET (MAY BE HARD PIPED FOR DISCHARGE).

19. REMOVABLE DIFFUSER PLATE WITH 4 BOLTS/NUTS.

20. PADLOCK (PROVIDED BY CLTW).

NOTES:

A. AUTO FLUSHER IS INTENDED FOR WARM WEATHER USE. ASSEMBLY SHOULD BE REMOVED DURING COLD WEATHER MONTHS TO AVOID DAMAGE DUE TO FREEZING.

B. MANUAL FLUSHING REQUIRED TO MAINTAIN WATER QUALITY DURING COLD WEATHER MONTHS.

C. SHOWN AS TEMPORARY APPLICATION - IF PERMANENT INSTALLATION - REPLACE NO. 3 AND NO. 4 WITH CAST IN PLACE CONCRETE PAD - MIN. 4" X 4" X 4" THICK WITH WIRE REINFORCEMENT. FLUSH WITH FINISH GRADE.

NO SCALE

1.0

DATE

04/2024

DETAIL

10.3.1

CLTW PUBLIC FIRE HYDRANTS

PRIVATE FIRE HYDRANTS (NOT FOR PUBLIC WATER TRUCK USE)

CLTW / GFD COLOR LEGEND

CLTW / GFD COLOR

SHADE

OSHA SAFETY YELLOW

OSHA SAFETY BLUE

OSHA SAFETY PURPLE

OSHA SAFETY RED

OSHA SAFETY GREEN

OSHA SAFETY WHITE

CLTW AND CHARLOTTE FIRE DEPARTMENT STANDARDS COLOR SCHEME FOR CLTW PUBLIC FIRE HYDRANTS

CLTW AND CHARLOTTE FIRE DEPARTMENT STANDARDS COLOR SCHEME FOR PRIVATE FIRE HYDRANTS

INDUSTRY STANDARD - NOT ADOPTED OR USED BY CLTW/GFD

INDUSTRY STANDARD - NOT ADOPTED OR USED BY CLTW/GFD

NO SCALE

1.0

DATE

04/2024

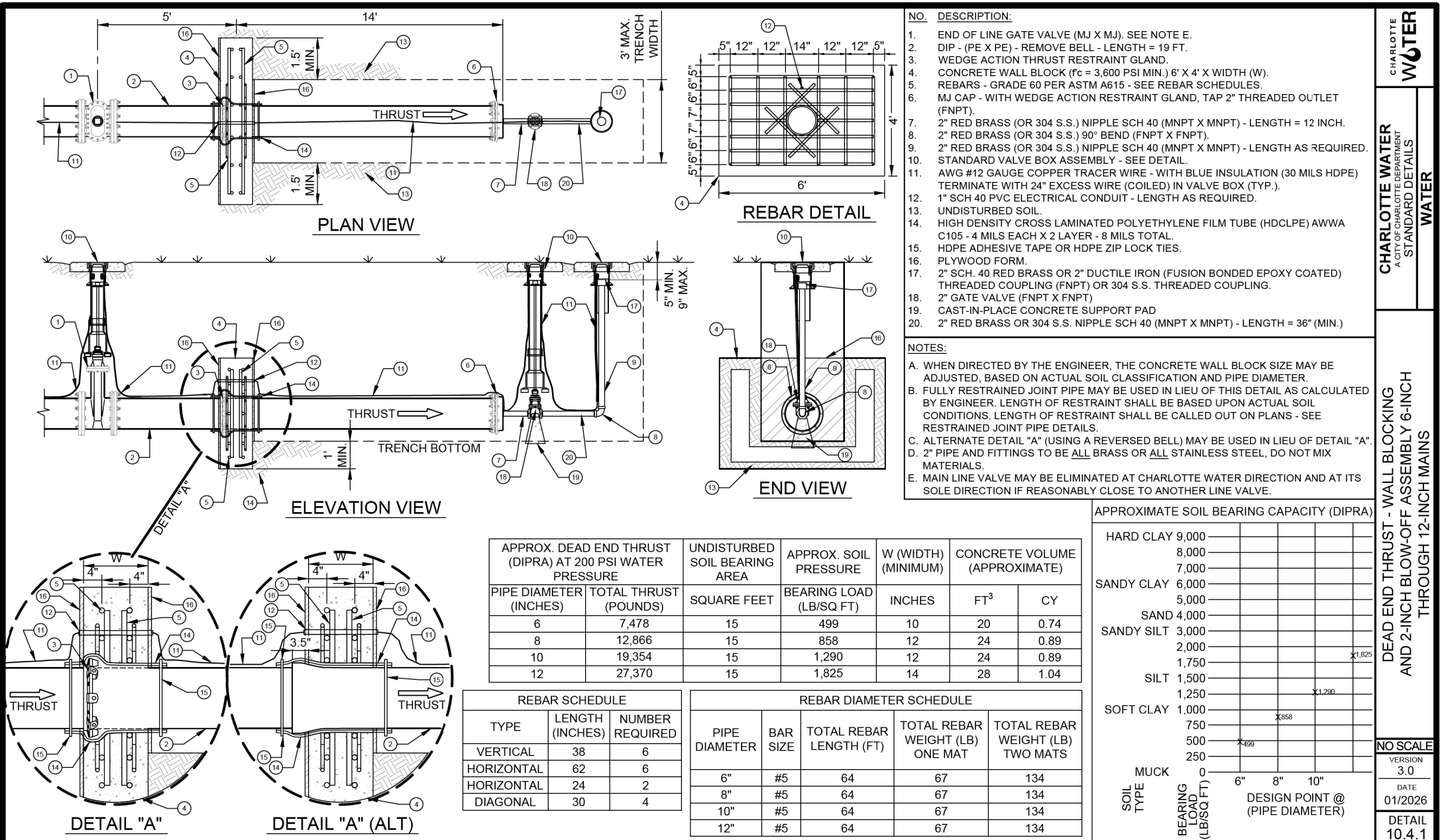
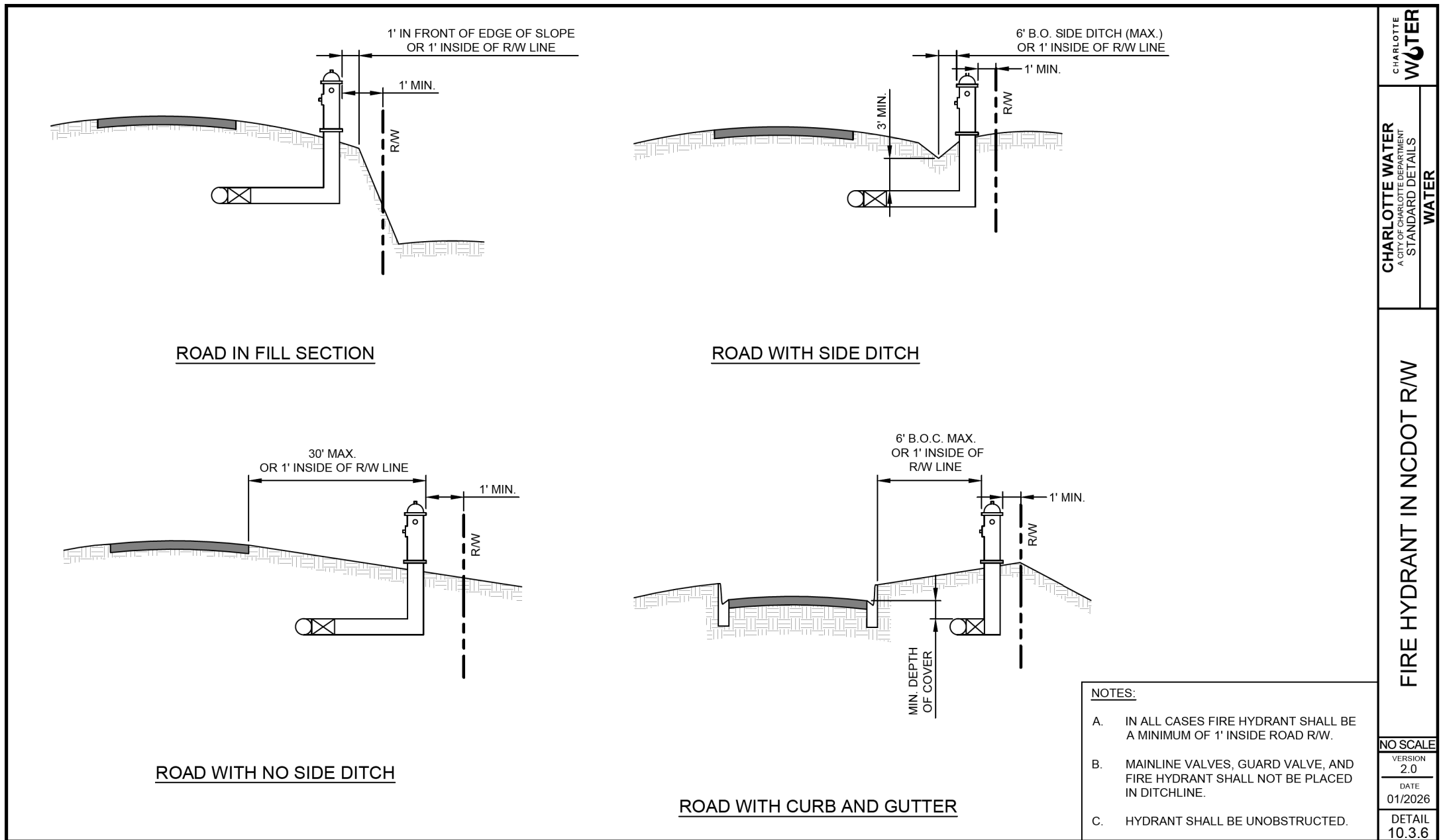
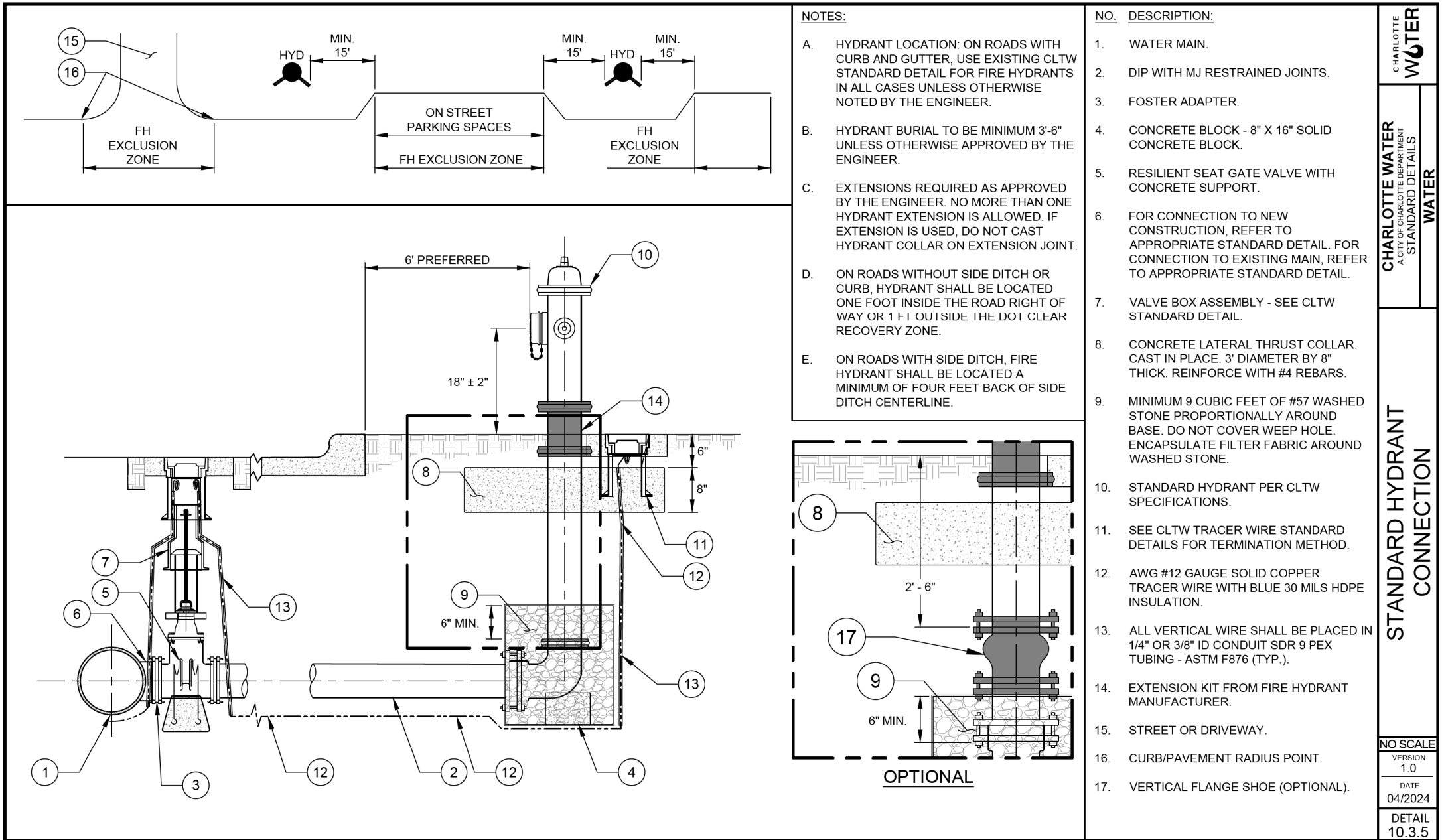
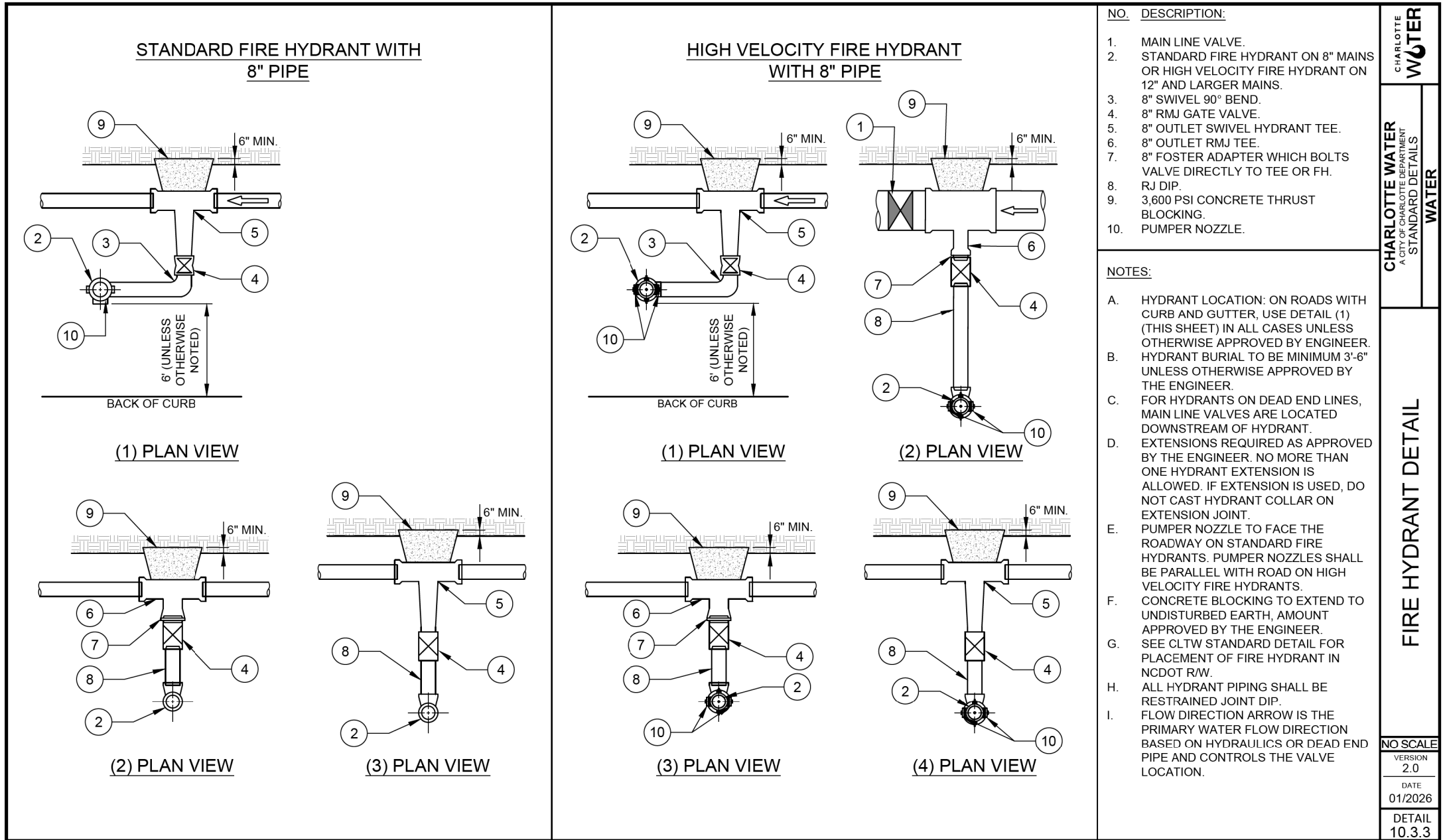
DETAIL

10.3.2

50 25 0 50 100



UTILITY CONSTRUCTION



PREPARED BY:

Kimley»Horn
200 SOUTH TRYON STREET, SUITE 200
CHARLOTTE, NC 28202

PROJECT REFERENCE NO.

U-5765

SHEET NO.

UC-3E

DESIGNED BY:

DRAWN BY:

CHECKED BY:

APPROVED BY:

REVISED:

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NORTH CAROLINA
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ENGINEER
Matthew S. Alexander
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8/28/2026

UTILITY CONSTRUCTION
PLANS ONLY

UTILITY CONSTRUCTION

6" THROUGH 12" WATER MAINS

RESTRAINED PIPE LENGTH REQUIREMENTS		
PIPE DIAMETER (INCHES)	REQUIRED RESTRAINED LENGTH: BARE DIP (FEET)	POLYWRAPPED DIP (FEET)
6	169	242
8	219	312
10	264	377
12	309	441

DESIGN BASIS:
DIPRA THRUST RESTRAINT DESIGN FOR DIP*
VERSION 3.3 DATED 05/09/2003
LAYING CONDITION: TYPE 2
SOIL DESIGNATION: SILT 1
DEPTH OF COVER: 3' MINIMUM
DESIGN PRESSURE: 200 PSI
SAFETY FACTOR: 2.0

2" WATER MAINS

APPROX. DEAD END THRUST (DIPRA) AT 200 PSI WATER PRESSURE		UNDISTURBED SOIL BEARING AREA		APPROX. SOIL PRESSURE BEARING LOAD (LBS/SQ FT)	
PIPE DIAMETER (INCHES)	THRUST (POUNDS)	SQUARE FEET			
2	724	0.89			813

APPROXIMATE SOIL BEARING CAPACITY (DIPRA)
HARD CLAY 9,000
SANDY CLAY 6,000
SAND 4,000
SANDY SILT 3,000
SILT 2,000
SOFT CLAY 1,000
MUCK 500
SOIL TYPE BEARING CAPACITY (LBS/SQ FT) DESIGN POINT (B) (PIPE DIAMETER)
5' MIN. 9' MAX.

PLAN VIEW

ELEVATION VIEW

END VIEW

NO. DESCRIPTION:

1. 2" SDR 9 HDPE PIPE OR PVC (IPS)
2. 2" BUTT FUSED HDPE X S.S. THREADED ADAPTOR OR FOR PVC USE 2" HARCO MALE ADAPTER (BELL X MALE NPT)
3. 2" GATE VALVE (FNPT X FNPT)
4. 2" RED BRASS OR S.S. NIPPLE - SCH 40 - (MNPT X MNPT), L = 36" (MIN.)
5. 2" RED BRASS OR S.S. 90° BEND (FNPT X FNPT)
6. 2" RED BRASS OR S.S. NIPPLE - SCH 40 - (MNPT X MNPT) - LENGTH AS REQUIRED

7. 2" THREADED COUPLING (FNPT X FNPT) - RED BRASS OR S.S. OR DUCTILE IRON (F.B.E.)
8. STANDARD VALVE BOX ASSEMBLY - SEE CLTW STD. DETAIL
9. CAST-IN-PLACE CONCRETE SUPPORT PAD
10. PRECAST CONCRETE SOLID BLOCK (16" X 8" X 4")
11. AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH BLUE INSULATION (30MIL HDPE) - TERMINATE WITH 24" EXCESS WIRE (COILED) IN VALVE BOX (TYP.)
12. UNDISTURBED OR COMPACTED SOIL - 100% STANDARD PROCTOR
13. DUCTILE IRON PIPE - RESTRAINED - LENGTH AS REQUIRED - SEE CLTW STD. DETAILS
14. MJ CAP WITH WEDGE ACTION RESTRAINT GLAND, TAP 2" THREADED OUTLET (FNPT)
15. 2" RED BRASS OR S.S. NIPPLE - SCH 40 (MNPT X MNPT), L = 12" (MIN.)

CHARLOTTE WATER

STANDARD DETAILS

WATER

NO SCALE

VERSION 2.0

DATE 01/20/25

DETAIL 10.5.4

PLAN

ELEVATION

NO. DESCRIPTION:

1. RESTRAINED MJ CAP W/ 2" NPT THREADED OUTLET OR WATER MAIN SIZE BY 4" ECCENTRIC REDUCER
2. SCH 40 S.S. NIPPLE (NPT THREADED-FL) 12"
3. 4" GATE VALVE (FL-MJ) RESTRAINED
4. DIP SHORT (PE-PE) 12"
5. 4" 90° BEND (MJ-PE) RESTRAINED
6. 4" 90° BEND (MJ-MJ) RESTRAINED
7. 4" 90° BEND (MJ-MJ) RESTRAINED
8. 4" DIP (PE-SCREW-ON FL) RESTRAINED
9. 4" FLANGE W/ 2" NPT THREADED OUTLET
10. 4" X 2" NPT THREADED BRASS BUSHING
11. 2" PVC SCREW-IN PLUG-NPT THREADED
12. STD VALVE BOX ASSEMBLY
13. VALVE EXTENSION AS REQUIRED (SEE APPROPRIATE STD. DETAILS)
14. DISTANCE TO CENTERLINE OF 4" THREADED OUTLET MAY VARY FROM CENTER WITH SIZE, MANUFACTURER, AND TYPE OF CAP OR PLUG
15. 2" SDR STAND PIPE 90° BEND W/ 6" SHORT THREADED PIPE
16. CONCRETE PAD (SEE APPROPRIATE STD. DETAIL) - OMIT WHEN IN PAVEMENT
17. PLASTIC METER BOX PER STD. DETAIL - RELACE W/ REINFORCED CONCRETE PAD W/ WATER FRAME & COVER PER APPROPRIATE STD. DETAILS WHEN IN PAVEMENT
18. CONCRETE THRUST COLLAR (3' X 3' X 6")
19. REINFORCE W/ #4 BARS @ 6" O.C. EACH WAY
20. 6" #7 CRUSHED STONE
21. #57 CRUSHED STONE BEDDING
22. ALL THREAD T-HEAD BOLT (LOOKING UP)
23. 4 (TYP.) CONDOT STD. CONCRETE BRICK ON DIAGONAL AT E.A. 90° CORNER - OMIT WHEN FRAME & COVER IS USED
24. PIPE & FITTINGS SHALL BE RESTRAINED:
5' (MIN.) - 5' (MAX.)

#10 THROUGH #25, EXCLUDING #22, SHALL BE "SAME" ON ALTERNATE MATERIALS LIST.

NO. ALTERNATE MATERIALS:
1. SAME
2. 4" SDR9 NIPPLE (S.S. NPT THREADED-MALE MJ ADAPTOR) 12"
3. 4" GATE VALVE (MJ-MJ)
4. 4" SDR9 NIPPLE (MALE MJ ADAPTOR-MALE MJ ADAPTOR) 24"
5. OMIT
6. OMIT
7. 4" 90° BEND (MJ-MJ) RESTRAINED
8. 4" SDR9 SHORT (MALE MJ ADAPTOR - FEMALE S.S. NPT THREADED ADAPTOR)
9. OMIT

NOTES:
A. BASED ON PROJECT SPECIFIC REQUIREMENT. TEMPORARY FIRE HYDRANT TO BE PAINTED BLUE. IF PERMANENT FIRE HYDRANT INSTALLED WITH TEE PER STANDARD DETAIL.

CHARLOTTE WATER

STANDARD DETAILS

WATER

NO SCALE

VERSION 2.0

DATE 01/20/25

DETAIL 10.5.5

PLAN

ELEVATION

NO. DESCRIPTION:

1. RUN X 12" RMJ TEE
2. 12" 45° BEND MJ-MJ FITTINGS WITH FOSTER ADAPTORS (ROTATE AS REQ'D)
3. 12" 11 1/2° BEND MJ-MJ FITTINGS WITH FOSTER ADAPTORS
4. 12" X 8" REDUCER MJ-MJ FITTINGS WITH FOSTER ADAPTORS (OR) 8" X 18" DIP SHORT (OR) 8" X 13" SWIVEL ADAPTER
5. 8" GATE VALVE (RMJ-RMJ)
6. 8" 45° BEND MJ-MJ FITTINGS WITH FOSTER ADAPTOR
7. 8" RJ DIP (PE-PE) LENGTH AS REQ'D
8. 8" GATE VALVE (RMJ-RMJ)
9. HIGH VELOCITY FIRE HYDRANT PAINTED OSHA SAFETY BLUE - W/ TWO HOSE & TWO STORZ PUMPER NOZZLES AND 8" SHOE CONNECTION (INSTALLATION PER THE FH STANDARD DETAIL)
10. VALVE BOX ASSEMBLY W/ VALVE EXTENSION ASSEMBLY (AS REQ'D) PER CLTW STD. DETAILS
11. MINIMUM 9 CUBIC FEET OF #57 WASHED STONE PROPORTIONALLY AROUND BASE. DO NOT COVER WEEP HOLE. ENCAPSULATE FILTER FABRIC AROUND WASHED STONE
12. COMPACTED BEDDING STONE - #57 WASHED STONE TO MIDPOINT OF MAIN & 8" ABOVE B.O. PIPING
13. ALL PIPE & FITTINGS SHALL BE RESTRAINED. FITTINGS 12" & SMALLER SHALL CONFORM TO AWWA C-153 FOR COMPACT FITTINGS
14. FOSTER ADAPTOR

NOTES:
A. RJ PIPE AND FITTINGS MAY BE FACTORY RESTRAINED JOINTS IN PLACE OF MJ FITTINGS.

CHARLOTTE WATER

STANDARD DETAILS

WATER

NO SCALE

VERSION 3.0

DATE 01/20/26

DETAIL 10.5.6

1.5"-12" PIPE

16" AND LARGER PIPE (USE FRAME AND COVER)

NO. DESCRIPTION:

1. WATER MAIN
2. GATE VALVE (OR BALL VALVE, AS APPLICABLE) FOR 1.5" 2" WATER LINES, VALVE BOX ASSEMBLY - SEE CLTW STANDARD DETAIL
3. TRACER WIRE - TERMINATION WITH 24" NEATLY COILED WIRE
4. TRACER WIRE - CONTINUOUS AWG #12 GAUGE SOLID COPPER HOPE
5. INSTALLATION TRACER WIRE WITH 30 MILS BLUE INSULATION
6. ALL VERTICAL WIRE SHALL BE PLACED IN 1/4" OR 3/8" ID CONDUIT SDR 9 PEX TUBING - ASTM F876 (TYP.)
7. CONCRETE BEARING BLOCK FOR 10-INCH AND LARGER GATE VALVES
8. POLYETHYLENE WRAP BARRIER SHALL BE PRESENT BETWEEN BEARING BLOCK AND VALVE - WRAP SHALL BE MINIMUM TWO LAYERS OF 4 MILS THICK HDLPE
9. FRAME AND COVER. REFER TO APPROPRIATE STANDARD DETAILS
10. EXTENSION STEM ASSEMBLY. SEE APPROPRIATE STANDARD DETAIL
11. VALVE LOCK BOX - FURNISHED BY CLTWATER
12. 24" PVC PIPE - C905 - DR18, OR DIP - CAST IN
13. 12" (MIN.) DIP (OR C900 PVC0 RISER PIPE 20" MAXIMUM)

NOTES:
A. MJ ADAPTER KIT SHALL INCLUDE BOLTS AND NUTS, GRADE 3 OR HIGHER
B. CLTW ALLOWS THE INSTALLATION OF DIFFERENT PIPE MATERIALS ON EITHER SIDE OF THE GATE VALVE. INSTALL TRANSITIONS PER APPROPRIATE STANDARD DETAIL
C. IF VALVE OPERATING NUT IS MORE THAN 3" BELOW FINISHED GRADE, PROVIDE EXTENSION STEM WITH STANDARD 2" SQUARE OPERATING NUT IN TOP SECTION OF VALVE BOX. SEE STANDARD DETAIL.

CHARLOTTE WATER

STANDARD DETAILS

WATER

NO SCALE

VERSION 1.0

DATE 04/20/24

DETAIL 10.6.5

PREPARED BY:

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PROJECT REFERENCE NO. U-5765SHEET NO. UC-3F

DRAWN BY:CHECKED BY:APPROVED BY:REVISED:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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UTILITY CONSTRUCTION PLANS ONLY



UTILITY CONSTRUCTION

NO. DESCRIPTION:

1. CONTROLLED DENSITY FILL SURROUNDING BOT PIPES, MIN. 6" THICK.

2. PROPOSED CONCRETE CRADLE NEAR JOINT (EACH SIDE). MINIMUM REBAR REINFORCEMENT (#4 REBAR) #4 BARS AT 12" CENTER-TO-CENTER EACH WAY. TYPICAL. 3" CLEAR FROM FACE OF CONCRETE.

3. PIPE (ABOVE).

4. PIPE (BELOW).

5. MIN. 8" COMPACTED STONE BEDDING (#57).

6. BOTTOM OF CRADLE TO BE AT LEAST 6" BELOW THE BOTTOM PIPE.

THIS CONCRETE CRADLE DETAIL SHALL BE USED WHEN DIMENSION IS LESS THAN 18"

CHARLOTTE WATER STANDARD DETAILS

WATER

CONCRETE CRADLE DETAIL

NO SCALE

VERSION 1.0

DATE 04/20/24

DETAIL 10.9.3

NO. DESCRIPTION:

1. PROPOSED RJ DIP WATER MAIN - PREFERRED LOCATION.

2. PROPOSED RJ DIP WATER MAIN - OPTIONAL LOCATION.

3. ROAD WITH CURB AND GUTTER OR EDGE OF PAVEMENT.

4. CULVERT PIPE OR BOX.

5. CULVERT WING WALL (CULVERT AND HEADWALL).

6. CULVERT FOOTING.

7. CONCRETE ENCASMENT - SEE STANDARD DETAIL - REQUIRED.

8. CONCRETE ENCASMENT - SEE STANDARD DETAIL - REQUIRED WHEN 30" COVER ON PIPE CAN NOT BE MAINTAINED L₆ (MIN.) OR AS DETERMINED BY THE ENGINEER.

9. 8 MILS HOPE PLASTIC FILM (HDCLPE PER ASTM C105-4MILS EACH LAYER). SEPARATE CONCRETE ENCASMENT FROM CULVERT AND HEADWALL.

10. DISTANCE AS INDICATED ON CONSTRUCTION PLANS.

11. PIPE MAY BE LOCATED TO 12" OF HEADWALL - CONCRETE ENCASMENT SHALL NOT BOND TO CULVERT OR HEADWALL - SEE NO. 9.

12. 5" MINIMUM BELOW CREEK BED.

Bx. BENDS - AS REQUIRED.

TYPICAL PLAN VIEW

TYPICAL ELEVATION VIEW

SECTION VIEW

CHARLOTTE WATER STANDARD DETAILS

WATER

WATER MAIN LOCATIONS AT CULVERTS USING CONCRETE ENCASMENT 6-INCH THROUGH 24-INCH MAINS

NO SCALE

VERSION 1.0

DATE 04/20/24

DETAIL 10.10.3

MINIMUM RESTRAINED LENGTH FOR PREFERRED LOCATION #1		
PIPE DIAMETER (INCHES)	LR (FEET)	TOTAL RESTRAINED LENGTH (FEET)
6	100	200 + LC
8	125	250 + LC
10	155	310 + LC
12	180	360 + LC
16	230	460 + LC
18	250	500 + LC
20	275	550 + LC
24	315	630 + LC

LC = CULVERT WIDTH (OUT TO OUT) - FEET

NO. DESCRIPTION:

1. DUCTILE IRON PIPE.

2. HOPE ADHESIVE TAPE OR HOPE ZIPLOCK TIE.

3. CONCRETE ENCASMENT (F_c = 3,000 PSI MIN.).

4. STONE STABILIZATION MATERIAL - AS REQUIRED.

5. HIGH DENSITY CROSS LAMINATED POLYETHYLENE FILM (HDCLPE) - 4 MILS. - TUBE - AWWA C105.

6. HIGH DENSITY CROSS LAMINATED POLYETHYLENE FILM (HDCLPE) - 4 MILS. - TUBE - AWWA C105.

7. 1" DIAMETER SCH. 40 STEEL ELECTRICAL CONDUIT.

8. AWG #12 GAUGE SOLID COPPER TRACER WIRE WITH BLUE INSULATION - (30 MILS HOPE).

PLAN VIEW

ELEVATION VIEW

SECTION VIEW

CHARLOTTE WATER STANDARD DETAILS

WATER

CONCRETE ENCASMENT 6-INCH THROUGH 64-INCH MAINS

NO SCALE

VERSION 1.0

DATE 04/20/24

DETAIL 10.10.4

PIPE DIAMETER (INCHES)	WIDTH (W) (MINIMUM) (INCHES)	HEIGHT (H) (MINIMUM) (INCHES)	CONCRETE VOLUME APPROX. PER L.F.	
			FT ³ / LF	CY / LF
4	31	25	4.26	0.16
6	33	27	4.93	0.18
8	36	30	6.95	0.22
10	38	32	6.77	0.25
12	40	34	7.49	0.28
16	44	38	8.96	0.33
20	49	43	11.09	0.41
24	53	47	12.67	0.47
30	60	54	15.91	0.59
36	66	60	18.50	0.69
42	74	68	23.14	0.86
48	80	74	26.04	0.96
54	88	82	31.04	1.15
60	92	86	33.24	1.23
64	96	90	35.48	1.31

NO. DESCRIPTION:

1. PROPOSED RJ DIP WATER MAIN - PREFERRED LOCATION.

2. PROPOSED RJ DIP WATER MAIN - OPTIONAL LOCATION.

3. ROAD WITH CURB AND GUTTER OR EDGE OF PAVEMENT.

4. CULVERT PIPE OR BOX.

5. CULVERT WING WALL.

6. CULVERT FOOTING.

7. STEEL ENCASMENT PIPE.

8. DISTANCE AS INDICATED ON CONSTRUCTION PLANS.

9. 5" MIN. BELOW CREEK BED - MINIMUM.

10. STEEL ENCASMENT PIPE - INSTALLATION BY DRY BORE METHOD OR HORIZONTAL DRILL METHOD.

Bx. BENDS - AS REQUIRED.

TYPICAL PLAN VIEW

TYPICAL ELEVATION VIEW

SECTION VIEW

CHARLOTTE WATER STANDARD DETAILS

WATER

WATER MAIN LOCATIONS AT CULVERTS USING STEEL CASING PIPE 6-INCH THROUGH 24-INCH MAINS

NO SCALE

VERSION 1.0

DATE 04/20/24

DETAIL 10.10.5

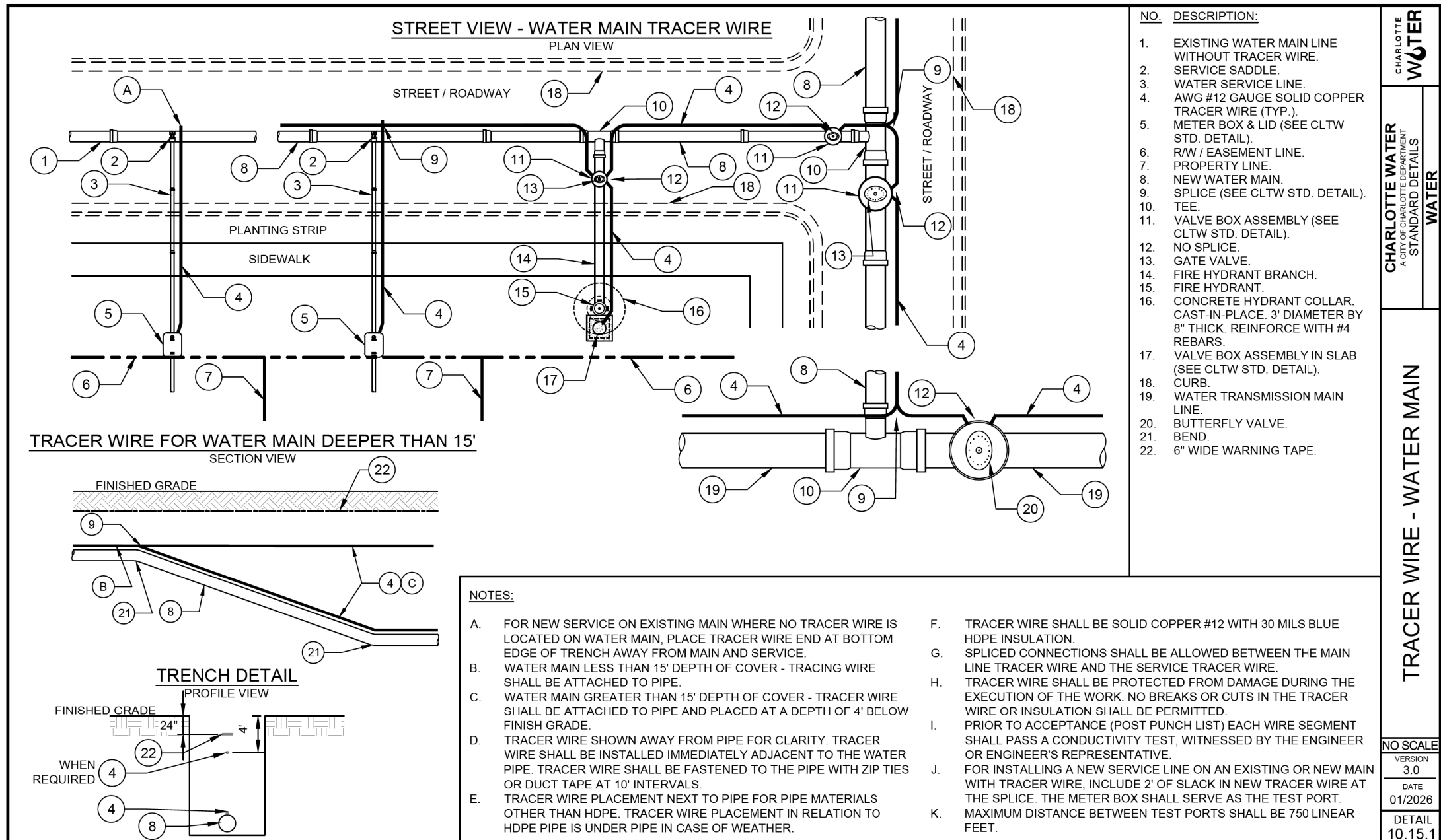
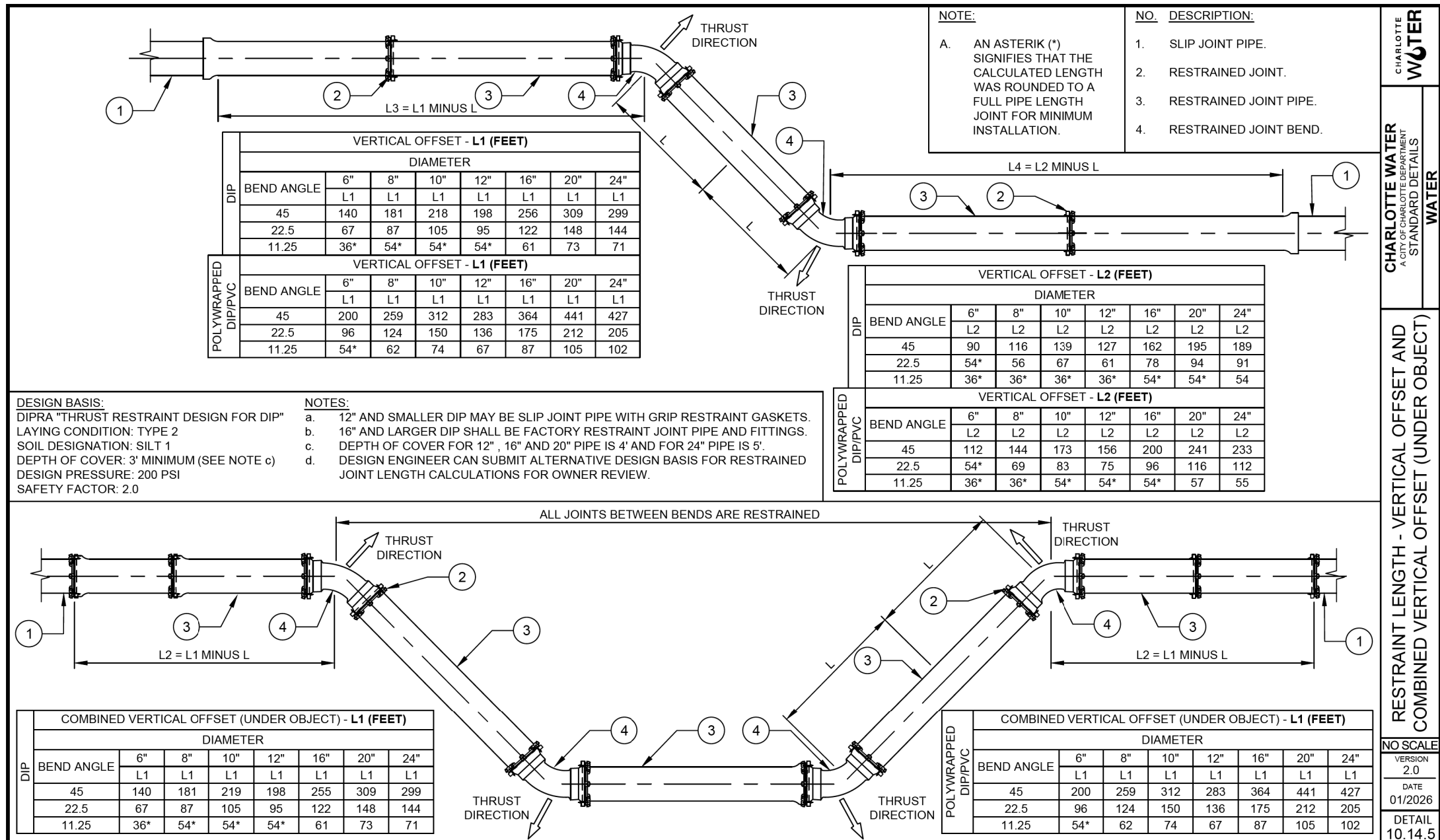
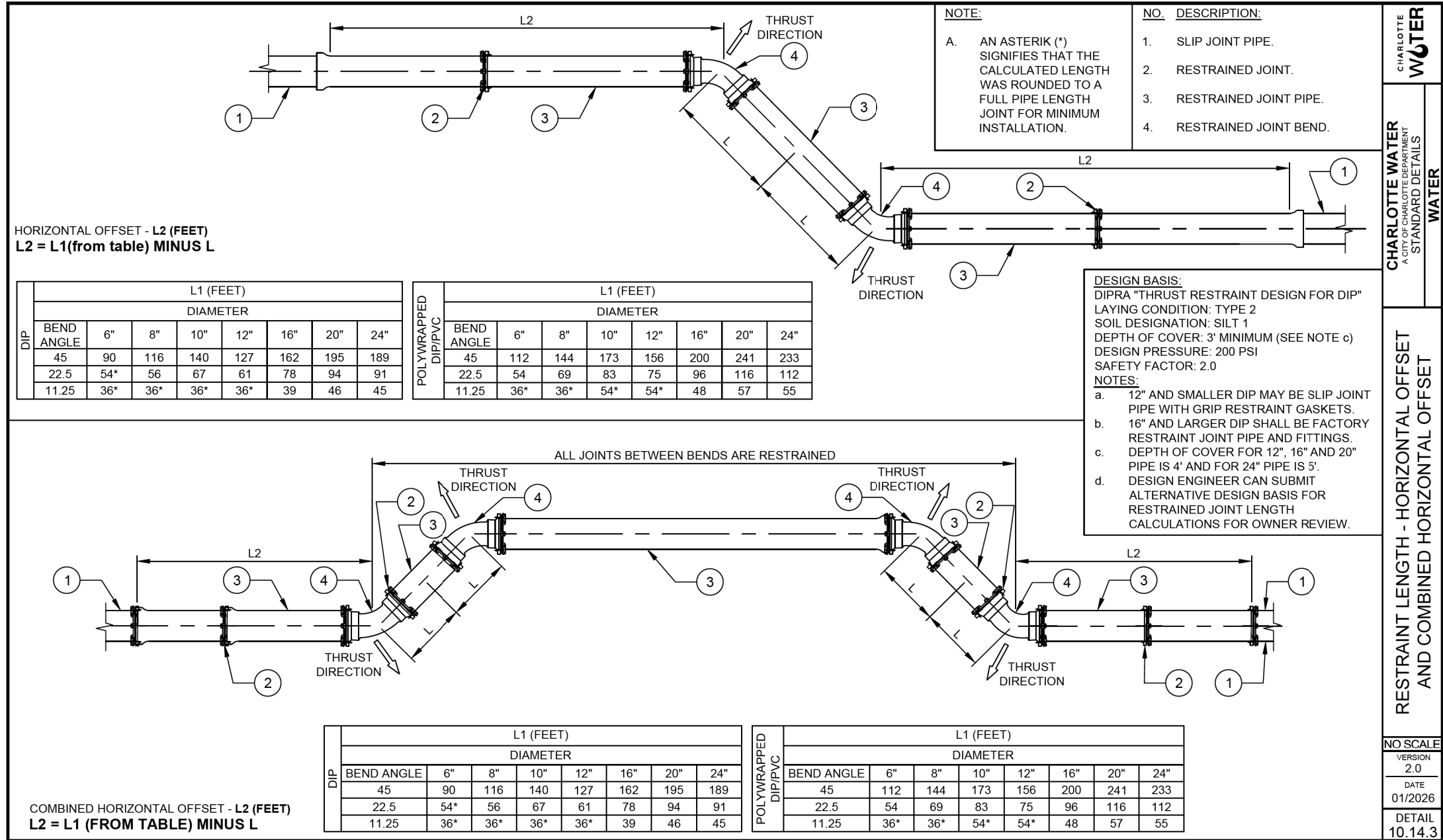
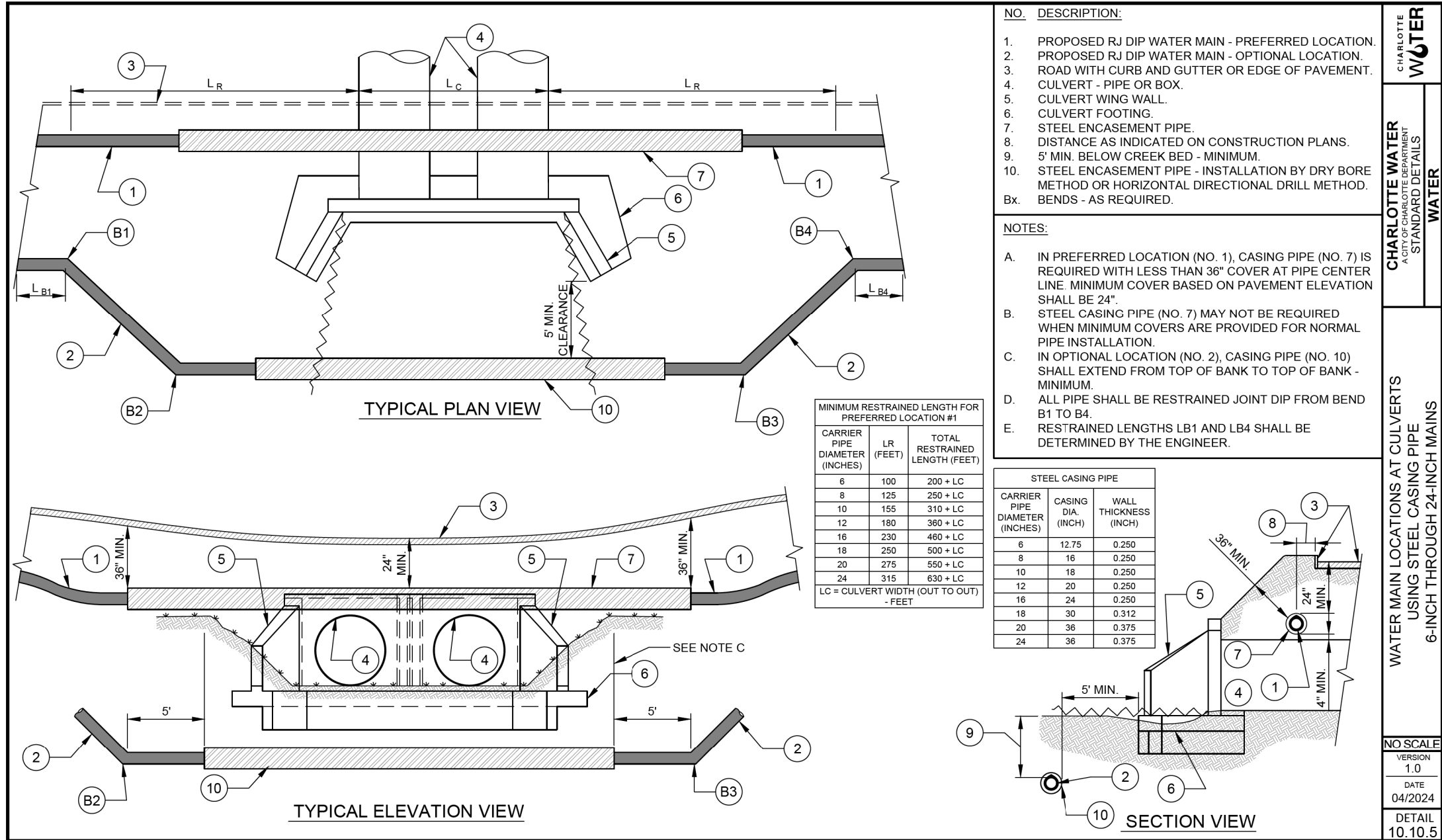
MINIMUM RESTRAINED LENGTH FOR PREFERRED LOCATION #1		
CARRIER PIPE DIAMETER (INCHES)	LR (FEET)	TOTAL RESTRAINED LENGTH (FEET)
6	100	200 + LC
8	125	250 + LC
10	155	310 + LC
12	180	360 + LC
16	230	460 + LC
18	250	500 + LC
20	275	550 + LC
24	315	630 + LC

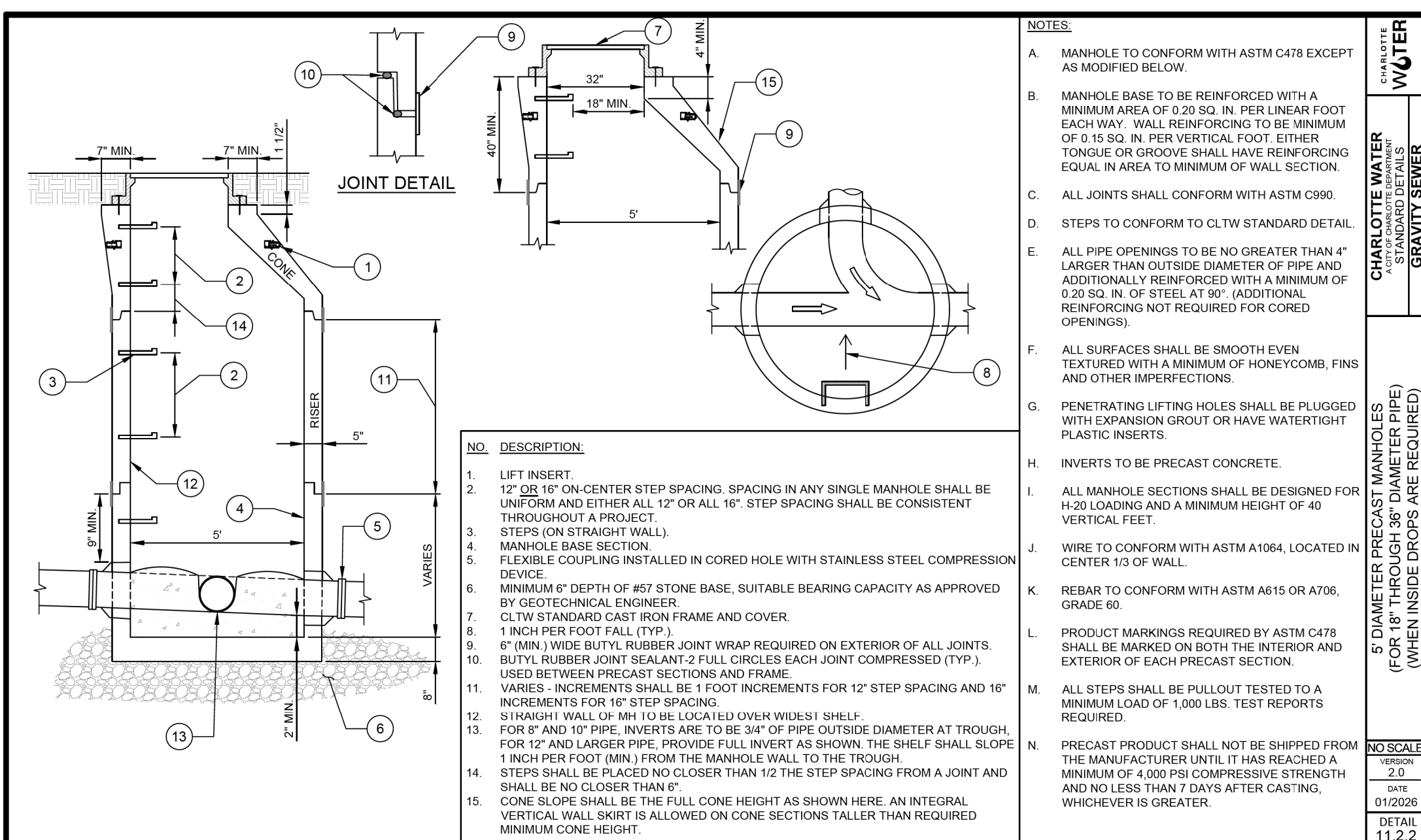
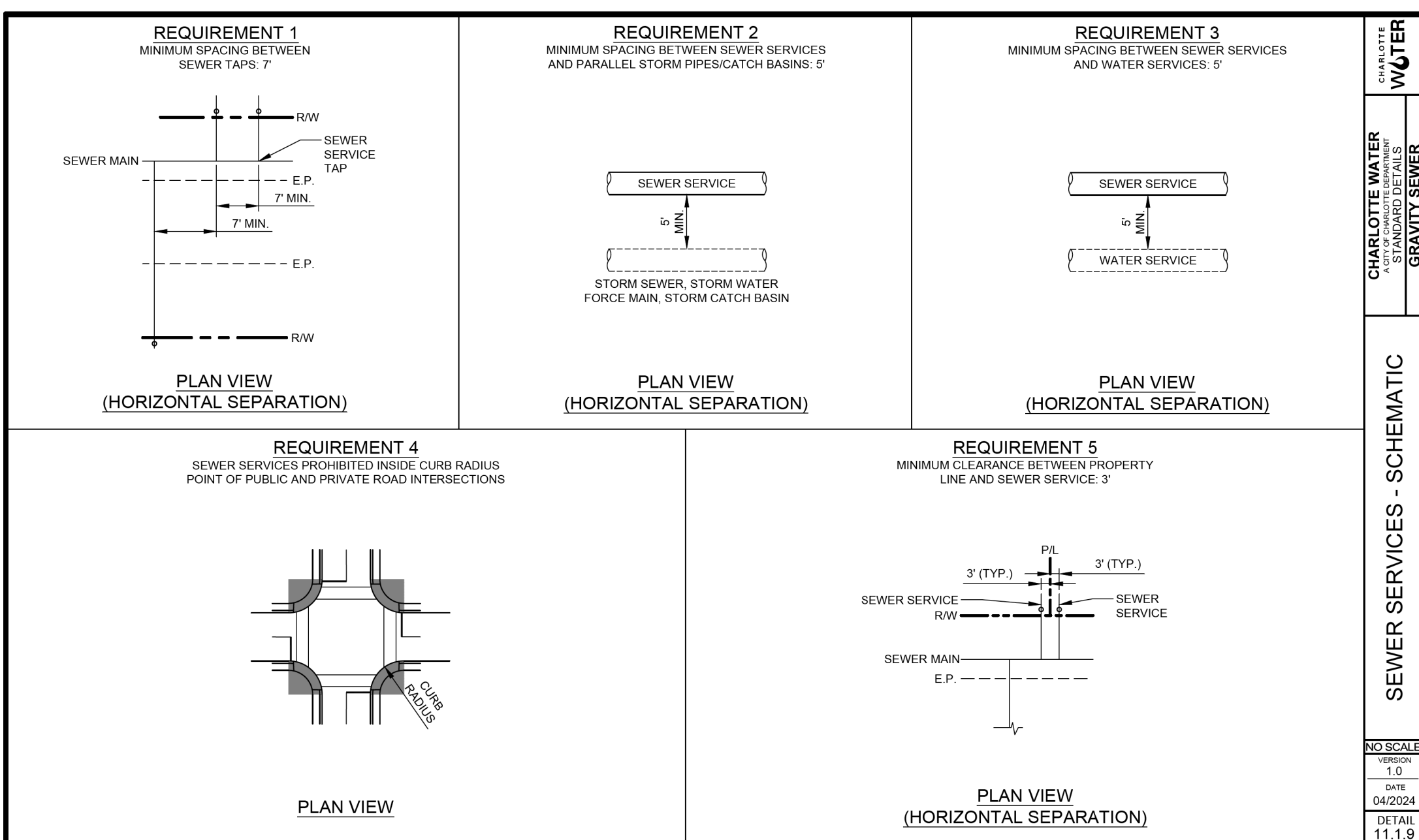
LC = CULVERT WIDTH (OUT TO OUT) - FEET

STEEL CASING PIPE		
CARRIER PIPE DIAMETER (INCHES)	CASING DIA. (INCH)	WALL THICKNESS (INCH)
6	12.75	0.250
8	16	0.250
10	18	0.250
12	20	0.250
16	24	0.250
18	30	0.312
20	36	0.375
24	36	0.375



UTILITY CONSTRUCTION





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PROJECT REFERENCE NO.

U-5765

SHEET NO.

UC-31

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8/28/2026

UTILITY CONSTRUCTION
PLANS ONLY



NO. DESCRIPTION:

- 5" DIAMETER STEEL OR TYPE 316 S.S. PIPE.
- SEE BOLT ON BIRD SCREEN DETAIL THIS SHEET.
- WATERTIGHT FRAME AND COVER (BOLTED DOWN).
- PIPE BRACKET FABRICATED FROM 1/4" STEEL PLATE (SEE THIS SHEET).
- PRECAST CONCRETE MANHOLE.
- 1/4" STEEL PLUG.
- TYPE 316 STAINLESS STEEL MESH BIRD SCREEN BOLTED BETWEEN TWO STAINLESS STEEL PLATES AND WELDED TO VENT PIPE AS SHOWN. USE ALL TYPE 316 STAINLESS STEEL BOLTS, NUTS AND WASHERS. SCREEN SHALL BE CONSTRUCTED OF 1/4" STAINLESS STEEL MESH BIRD SCREEN (WIRE DIAMETER 0.047").
- 11/16" DIAMETER HOLES DRILLED AS SHOWN.
- 5/8" x 4" TYPE 316 S.S. ALL THREAD ROD.
- TYPE 316 STAINLESS STEEL NUT AND WASHER WITH ANTI-SEIZE COMPOUND.
- 1/4" TYPE 304 STAINLESS STEEL SPACER PLATE.
- 1/4" TYPE 304 STAINLESS STEEL WASHER PLATES TO PLUMB VENT.

NOTES:

- 2' ABOVE 100 YEAR FLOOD ELEV. OR 6' ABOVE FRAME (WHICHEVER IS GREATER).
- 1'-3" (MAX SPACING) AVOID PLACING PIPE BRACKET AT MANHOLE JOINTS OR STEPS. MINIMUM OF 3 PIPE BRACKETS REQUIRED PER VENT PIPE.
- STEPS AND VENT INSTALLED ON STRAIGHT WALL OF MANHOLE.
- USE EPOXY ADHESIVE, IN CLEANED DRILLED HOLE.
- ANGLE AS REQUIRED TO SEAT SQUARELY ON MANHOLE.
- VENT SHALL BE ON STRAIGHT WALL SIDE AND POINT DOWNSTREAM.
- VENT AND BRACKETS SHALL BE COATED PER SPECS (INTERNAL COATING NOT REQUIRED ON S.S. PIPE).
- ALL THREAD ROD, WASHER, AND NUT SHALL BE STAINLESS STEEL.
- ACCORDING TO THE TYPE OF PRECAST MANHOLE, WASHER SPACERS MAY BE REQUIRED ON LOWER BRACKETS. VENT SHALL BE PLUMB AND STRAPS SHALL PULL VENT TIGHT AGAINST THE MANHOLE WALL.
- SEAL AROUND VENT PIPE OUTLET WITH NON-SHRINK WATERPROOF GROUT.

CHARLOTTE WATER
STANDARD DETAILS
GRAVITY SEWER

VENT PIPE - PRECAST MANHOLE

NO SCALE
REVISION
1.0
DATE
01/20/208
DETAIL
11.2.10

NO. DESCRIPTION:

- (4) - 1 INCH DIAMETER ANCHOR HOLES ON A 32 7/8" DIAMETER B.C.D.
- (4) - 1 INCH DIAMETER ANCHOR HOLES ON A 31" DIAMETER B.C.D.
- MACHINED SURFACE.
- FRAME.

NOTES:

- LOAD RATING - HEAVY DUTY.
- MATERIAL - ASTM A48 - CLASS 35 GRAY IRON.
- COATING - UNDIPPED.
- FRAME SHALL CONFORM TO DIMENSION AND WEIGHT REQUIREMENTS.
- FRAME SHALL NOT BE OUT OF ROUND.

CHARLOTTE WATER
STANDARD DETAILS
GRAVITY SEWER

TYPE A MANHOLE FRAME (CLEAR OPENING)
24-INCHES DIAMETER (CLEAR OPENING)
7 1/2 INCHES TALL

NO SCALE
REVISION
1.0
DATE
04/20/204
DETAIL
11.3.1

NO. DESCRIPTION:

- 1 INCH DIAMETER VENT HOLE.
- 1 INCH ARIAL TEXT.
- 5/8" ARIAL STYLE TEXT.
- (2) - LIFTING BARS.
- (2) - NON PENETRATING PICK HOLES.
- 5/8" TYPE 304 S.S. ROD.
- MACHINED SURFACE.
- 1 INCH SHARP FACE GOTHIC TEXT.
- 1 1/4" SHARP FACE GOTHIC TEXT.
- 3/4" SHARP FACE GOTHIC TEXT.

NOTES:

- LOAD RATING - HEAVY DUTY.
- MATERIAL - ASTM A48 - CLASS 35 GRAY IRON.
- COATING - UNDIPPED.
- COVER SHALL CONFORM TO DIMENSION AND WEIGHT REQUIREMENTS.
- COVER SHALL NOT BE OUT OF ROUND.

CHARLOTTE WATER
STANDARD DETAILS
GRAVITY SEWER

TYPE 1 MANHOLE COVER
24-INCHES DIAMETER (CLEAR OPENING)
VENTED-ONE VENT HOLE, NO GASKET, NO CAM LOCK

NO SCALE
REVISION
1.0
DATE
04/20/204
DETAIL
11.3.5

NO. DESCRIPTION:

- 1 INCH ARIAL TEXT.
- 5/8" ARIAL STYLE TEXT.
- (2) - LIFTING BARS.
- (2) - NON PENETRATING PICK HOLES.
- CAM LOCK SEE ASSEMBLY DETAIL.
- USF WEDGE LOC 5/8" HEX HEAD BOLT ALL GRADE S.S. TYPE 304.
- 5/8" TYPE 304 S.S. ROD.
- MACHINED SURFACE.
- 7/8" DIA. CAM LOCK HOLE @ 22" DIA.
- 1 1/4" SHARP FACE GOTHIC TEXT.
- 1 INCH SHARP FACE GOTHIC TEXT.
- 1 1/8" BOSS.
- BOLT HEX 5/8"-11 X 4" TYPE 304 S.S.
- WASHER 1/16" X 5/8" X 1 1/2" RUBBER.
- LOCK LUG.
- NUT HEX JAM 5/8"-11 TYPE 304 S.S.
- NUT HEX 5/8"-11 TYPE 304 S.S. NYLK.
- WASHER 5/8" ID1.50 OD TYPE 304 S.S.
- 1/4" NEOPRENE GASKET.
- 3/16" DOVETAIL GROOVE.
- 25" DIAMETER (O.D. OF GKT GROOVE).
- 3/4" SHARP FACE GOTHIC TEXT.

NOTES:

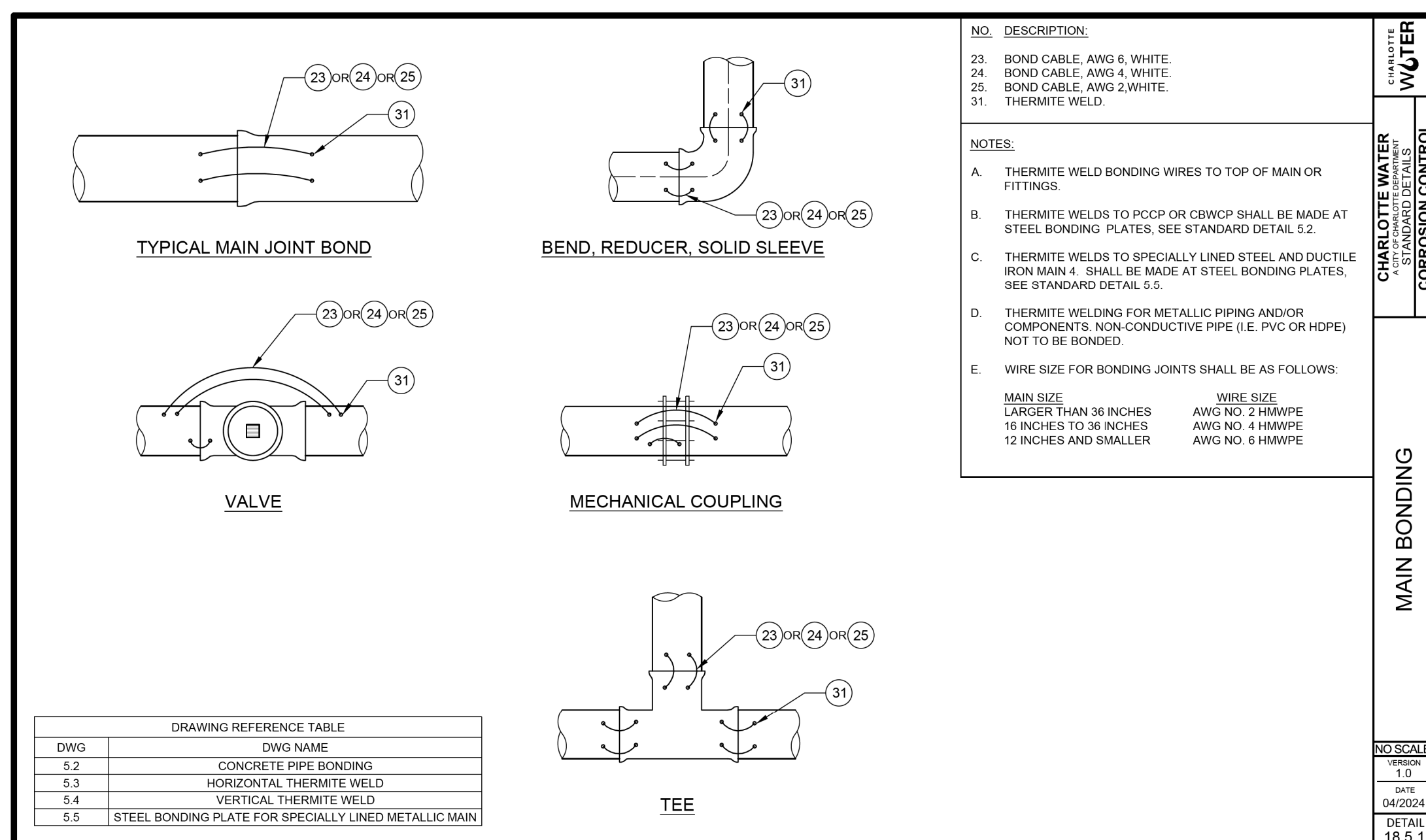
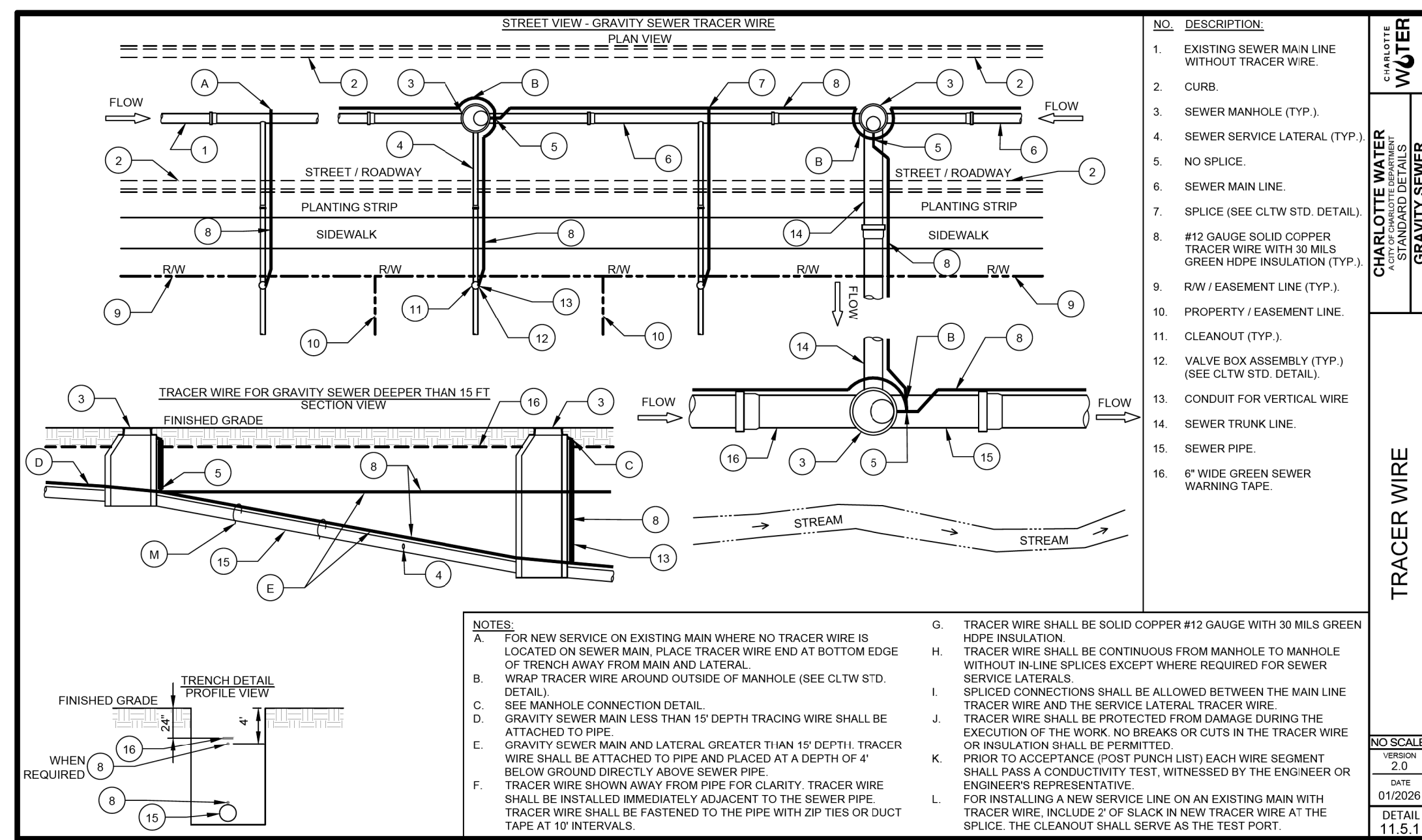
- LOAD RATING - HEAVY DUTY.
- MATERIAL - ASTM A48 - CLASS 35 GRAY IRON.
- COATING - UNDIPPED.
- COVER SHALL CONFORM TO DIMENSION AND WEIGHT REQUIREMENTS.
- COVER SHALL NOT BE OUT OF ROUND.

CHARLOTTE WATER
STANDARD DETAILS
GRAVITY SEWER

TYPE 3 MANHOLE COVER
24-INCHES DIAMETER (CLEAR OPENING)
WATERTIGHT - NO VENT HOLE GASKET, CAM LOCK

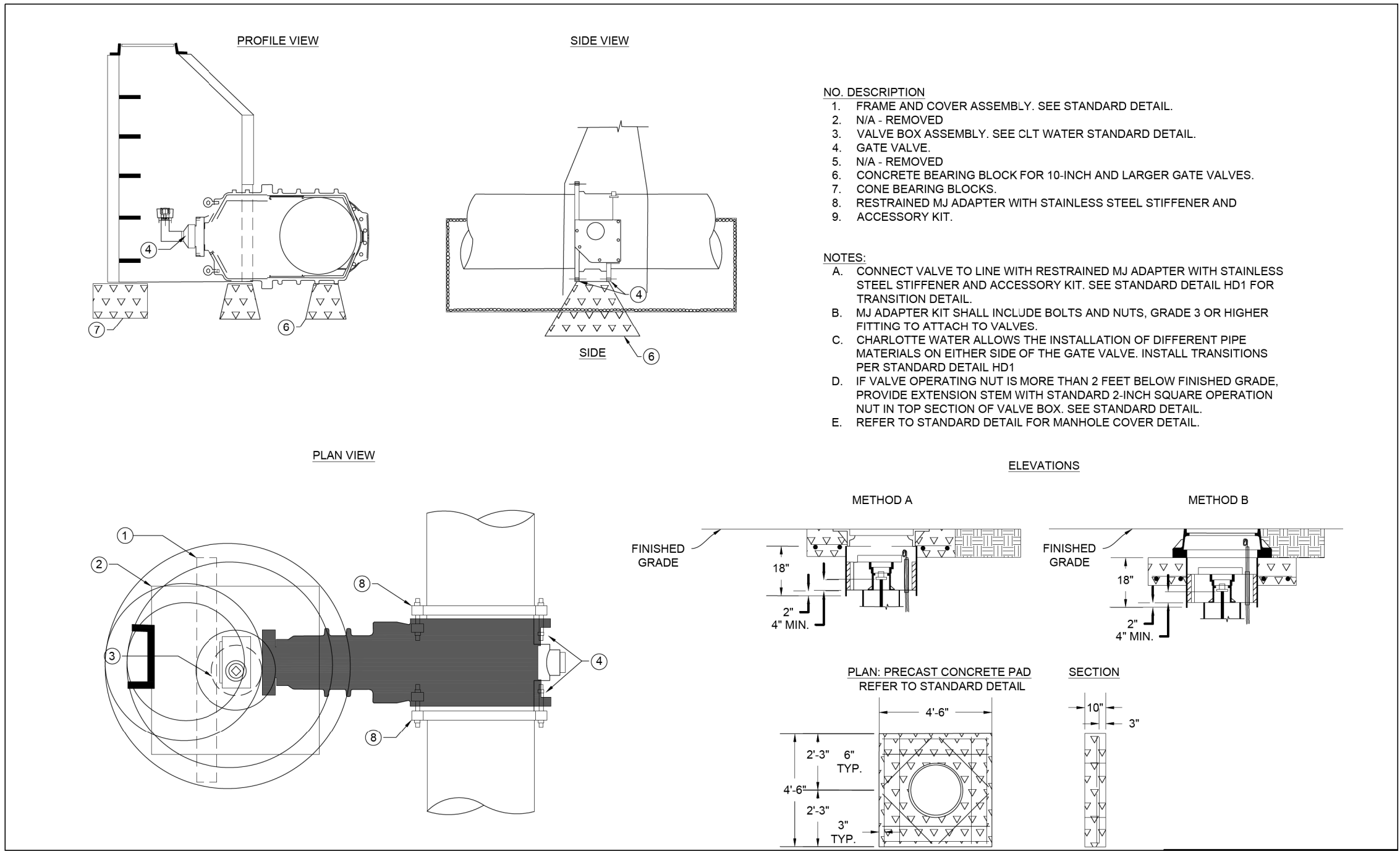
NO SCALE
REVISION
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DATE
04/20/204
DETAIL
11.3.7

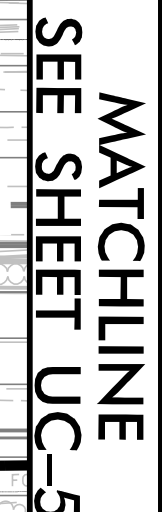
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PREPARED BY:	PROJECT REFERENCE NO.	SHEET NO.
Kimley » Horn 200 SOUTH TRYON STREET, SUITE 200 CHARLOTTE, NC 28202	U-5765	UC-3K
	DESIGNED BY:	
	DRAWN BY:	
	CHECKED BY:	
	APPROVED BY:	
	REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION		
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151		UTILITY CONSTRUCTION PLANS ONLY

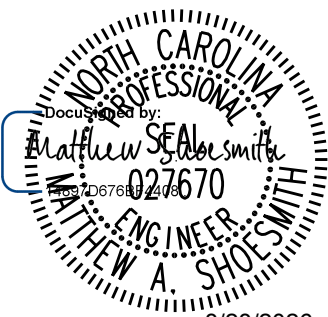
UTILITY CONSTRUCTION







PREPARED BY:
Kimley»Horn
200 SOUTH TRYON STREET, SUITE 200
CHARLOTTE, NC 28202

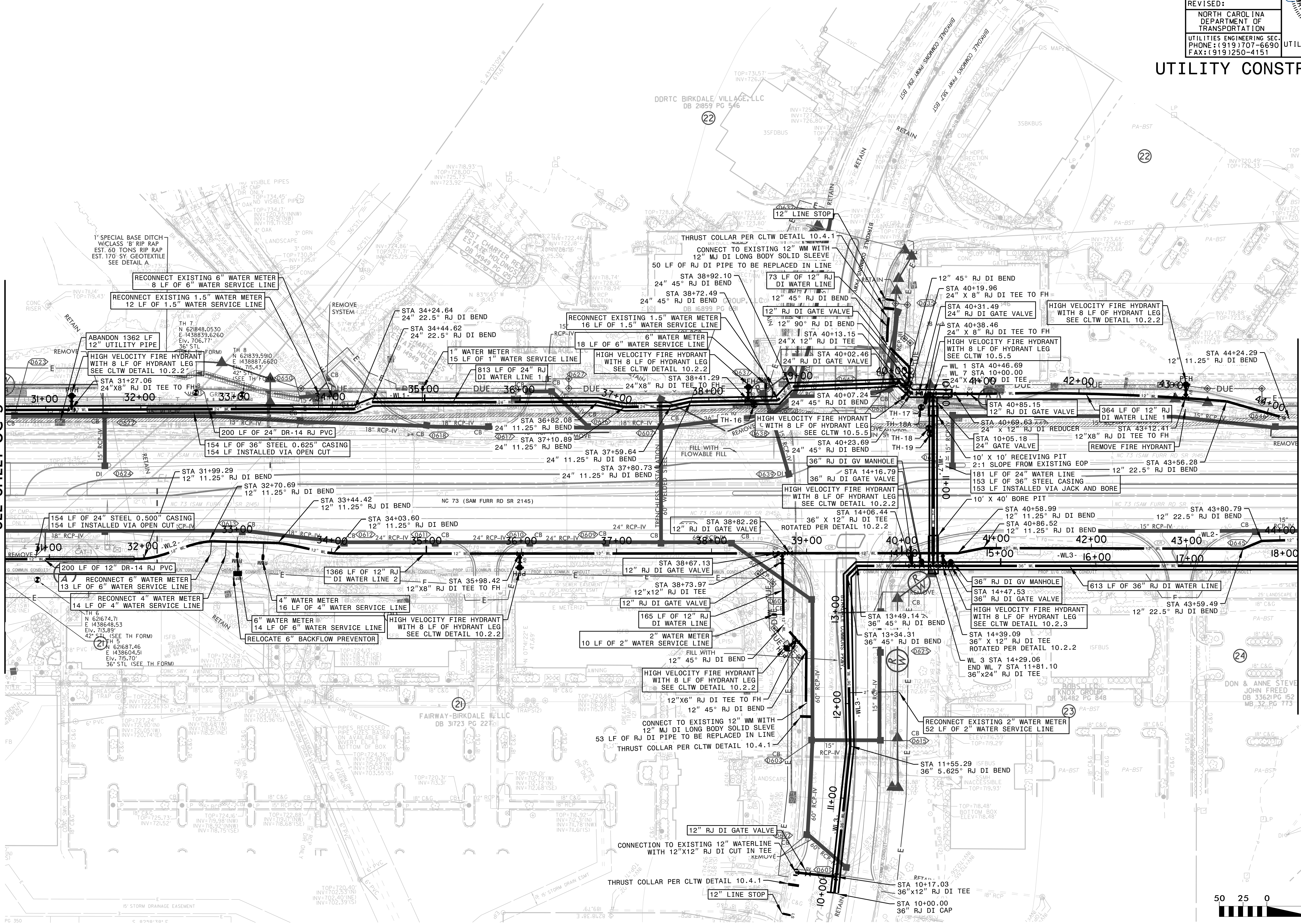
PROJECT REFERENCE NO.		SHEET NO.
U-5765		UC-6
DESIGNED BY: SJJ		
DRAWN BY: SJJ		
CHECKED BY: MAS		
APPROVED BY: MAS		
REVISED:		
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION		8/28/2026
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151		UTILITY CONSTRUCTION PLANS ONLY

UTILITY CONSTRUCTION

NAD 83/2011

MATCHLINE
SEE SHEET UC-5

MATCHLINE
SEE SHEET UC-7



5/14/2011

PREPARED BY:
Kimley»Horn
200 SOUTH TRYON STREET, SUITE 200
CHARLOTTE, NC 28202

PROJECT REFERENCE NO.
U-5765

SHEET NO.
UC-7

DESIGNED BY: SJJ

DRAWN BY: SJJ

CHECKED BY: MAS

APPROVED BY: MAS

REVISED:

NORTH CAROLINA
DEPARTMENT OF
TRANSPORTATION

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

UTILITY CONSTRUCTION
PLANS ONLY

NORTH CAROLINA
DEPARTMENT OF
TRANSPORTATION

REGISTERED PROFESSIONAL
ENGINEER
MATTHEW A. SHOLSKY
027670
8/28/2026

8/28/2026

UTILITY CONSTRUCTION

NAD 83/2011

MATCHLINE
SEE SHEET UC-6

MATCHLINE
SEE SHEET UC-8

UTILITY CONSTRUCTION

The diagram is a detailed utility construction plan for water and sewer lines. It features a network of lines with various callouts and annotations. Key elements include:

- Water Lines:** Labeled with stationing (e.g., 45+00, 46+00, 47+00, 48+00, 49+00, 50+00, 51+00, 52+00, 53+00, 54+00, 55+00, 56+00, 57+00, 58+00). Callouts specify materials and lengths, such as "18 LF OF 1\" WATER SERVICE LINE (2)", "729 LF OF 12\" RJ DI WATER LINE 1", "1470 LF OF 12\" RJ DI WATER LINE 2", "874 LF OF 36\" RJ DI WATER LINE 3", "43 LF OF 8\" RJ DI WATER LINE", "20 LF OF 24\" STEEL CASING", "20 LF OF 2\" WATER SERVICE LINE", "160 LF OF 36\" STEEL CASING", "160 LF OF 18\" SANITARY SEWER", "160 LF OF 15\" SANITARY SEWER", "160 LF OF 12\" SANITARY SEWER", "160 LF OF 10\" SANITARY SEWER", "160 LF OF 8\" SANITARY SEWER", "160 LF OF 6\" SANITARY SEWER", "160 LF OF 4\" SANITARY SEWER", "160 LF OF 3\" SANITARY SEWER", "160 LF OF 2\" SANITARY SEWER", "160 LF OF 1\" SANITARY SEWER", "160 LF OF 1/2\" SANITARY SEWER", "160 LF OF 1/4\" SANITARY SEWER", "160 LF OF 1/8\" SANITARY SEWER", "160 LF OF 1/16\" SANITARY SEWER", "160 LF OF 1/32\" SANITARY SEWER", "160 LF OF 1/64\" SANITARY SEWER", "160 LF OF 1/128\" SANITARY SEWER", "160 LF OF 1/256\" SANITARY SEWER", "160 LF OF 1/512\" SANITARY SEWER", "160 LF OF 1/1024\" SANITARY SEWER", "160 LF OF 1/2048\" SANITARY SEWER", "160 LF OF 1/4096\" SANITARY SEWER", "160 LF OF 1/8192\" SANITARY SEWER", "160 LF OF 1/16384\" SANITARY SEWER", "160 LF OF 1/32768\" SANITARY SEWER", "160 LF OF 1/65536\" SANITARY SEWER", "160 LF OF 1/131072\" SANITARY SEWER", "160 LF OF 1/262144\" SANITARY SEWER", "160 LF OF 1/524288\" SANITARY SEWER", "160 LF OF 1/1048576\" SANITARY SEWER", "160 LF OF 1/2097152\" SANITARY SEWER", "160 LF OF 1/4194304\" SANITARY SEWER", "160 LF OF 1/8388608\" SANITARY SEWER", "160 LF OF 1/16777216\" SANITARY SEWER", "160 LF OF 1/33554432\" SANITARY SEWER", "160 LF OF 1/67108864\" SANITARY SEWER", "160 LF OF 1/134217728\" SANITARY SEWER", "160 LF OF 1/268435456\" SANITARY SEWER", "160 LF OF 1/536870912\" SANITARY SEWER", "160 LF OF 1/1073741824\" SANITARY SEWER", "160 LF OF 1/2147483648\" SANITARY SEWER", "160 LF OF 1/4294967296\" SANITARY SEWER", "160 LF OF 1/8589934592\" SANITARY SEWER", "160 LF OF 1/17179869184\" SANITARY SEWER", "160 LF OF 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