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PROJECT TYPICAL DETAILS

Stantec
Stantec Consulting Services Inc.
521 E. Morehead St
Suite 425
Charlotte, NC 28202
Tel. (704) 329-0900
Fax. (704) 329-0905
www.stantec.com
License No. F-0672

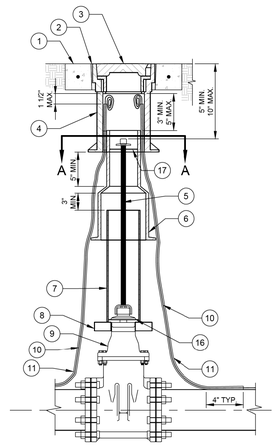
PROJECT REFERENCE NO.	SHEET NO.
W-5710X	UC-3B
DESIGNED BY: TK	
DRAWN BY: TK	
CHECKED BY: XMD	
APPROVED BY:	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE:(919)707-6690 FAX:(919)250-4151	UTILITY CONSTRUCTION PLANS ONLY

NORTH CAROLINA PROFESSIONAL SEAL 034415 ENGINEER XIAOLIN DENG
Signature: Xiaolin Deng
Date: 8/7/2025

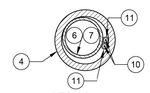
UTILITY CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

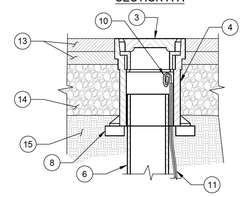
TRANSYSTEMS
1 Glenwood Avenue
Raleigh, NC 27603
Tel:919.789.9977
Fax:919.789.9591
License: F-0453



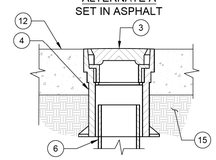
USING PVC OR DIP STANDPIPE



SECTION A-A



ALTERNATE A
SET IN ASPHALT



ALTERNATE B
CAST IN CONCRETE

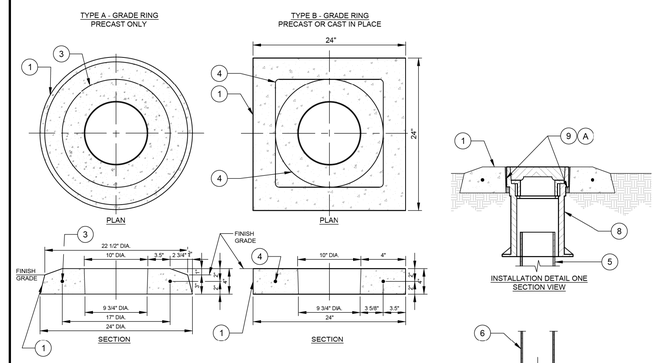
NO. DESCRIPTION:

1. 24" X 24" PRECAST (OR CAST IN PLACE) CONCRETE PAD OR 24" DIAMETER PRECAST PAD.
2. NON - SHRINK GROUT - FILL ANNULAR SPACE.
3. VALVE BOX COVER.
4. CAST IRON VALVE BOX.
5. EXTENSION STEM AS REQUIRED. SEE NOTES.
6. VALVE BOX BOTTOM SECTION.
7. 6" DIP OR C900 PVC STANDPIPE.
8. STANDARD CONCRETE BRICK - 2 EACH.
9. GATE VALVE (OR BALL VALVE, AS APPLICABLE).
10. AWG #12 GAUGE COPPER TRACER WIRE WITH 30 MIL HDPE BLUE INSULATION, TERMINATE WITH 24 INCH EXCESS WIRE (COILED) AT VALVE BOX (TYP.).
11. 1/4" OR 3/8" ID CONDUIT - SDR 10 PEX TUBING - ASTM F 976.
12. CONCRETE (ROADWAY, DRIVEWAY OR SIDEWALK).
13. ASPHALT PAVEMENT.
14. COMPACTED AGGREGATE BASE COURSE (CABC) OR ASPHALT BASE COURSE.
15. COMPACTED SUBGRADE.
16. PLASTIC VALVE CENTERING DISK (EX: PLASTIC POSI-CAP VALVE BOX ALIGNER DISK) REQUIRED TO KEEP VALVE BOX ALIGNED DURING BACK FILLING.
17. ALUM OR STEEL CENTERING DISK.

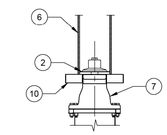
NOTES:

A. STANDPIPE TO BE CENTERED OVER VALVE NUT AND SHALL NOT BEAR ON VALVE BODY. PROVIDE CLEARANCE BETWEEN BRICK AND THE VALVE.
C. WHEN OPERATING NUT DEPTH EXCEEDS 3' BELOW FINISHED GRADE, PROVIDE EXTENSION STEM WITH STANDARD 2" SQUARE OPERATING NUT IN TOP SECTION OF VALVE BOX. SEE STANDARD DETAIL.
D. VALVE BOX ASSEMBLY SHALL CONSIST OF NO MORE THAN 2 VERTICAL SECTIONS - 1 VALVE BOX, AND 1 - STANDPIPE RISER SECTION.
E. CONCRETE PADS SHALL NOT BE USED IN PAVEMENT (CONCRETE OR ASPHALT), SIDEWALKS OR DRIVEWAYS.
F. VALVE BOX ASSEMBLY SHALL BE INSTALLED SO IT DOES NOT APPLY IMPACT LOADING TO THE VALVE.

CHARLOTTE WATER
CHARLOTTE WATER STANDARD DETAILS WATER
VALVE BOX ASSEMBLY INSTALLATION- 12" AND SMALLER VALVES
NO SCALE | VERSION 1.0 | DATE 04/2024 | DETAIL 10.1.3



INSTALLATION DETAIL ONE
SECTION VIEW



INSTALLATION DETAIL TWO
SECTION VIEW

NO. DESCRIPTION:

1. CONCRETE GRADE RING.
2. PLASTIC VALVE CENTERING DISK (EX: PLASTIC POSI-CAP VALVE BOX ALIGNER DISK) REQUIRED TO KEEP VALVE BOX ALIGNED DURING BACK FILLING. REQUIRED FOR ALL VALVES.
3. #4 REBAR – 17" DIAMETER.
4. #4 REBAR – LENGTH = 68", OR (ALTERNATE -17" DIAMETER).
5. VALVE BOX BOTTOM SECTION.
6. 6" DIAMETER C900 PVC PIPE.
7. GATE VALVE – 12" OR SMALLER.
8. TOP SECTION OF VALVE BOX.
9. FILL ANNULAR SPACE WITH NON SHRINK GROUT.
10. CONCRETE SUPPORT BRICK - 2 EACH.

NOTES:

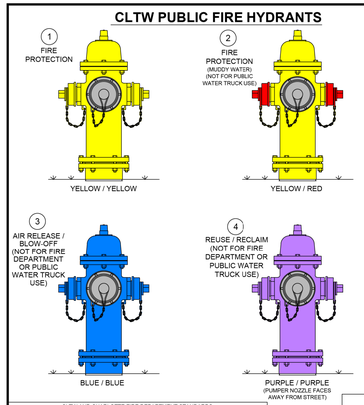
A. FOR PRECAST GRADE RINGS – FILL VOID BETWEEN GRADE RING AND CAST IRON VALVE BOX TOP SECTION WITH NON-SHRINK GROUT.
B. FOR CAST-IN-PLACE GRADE RINGS – TOP SECTION OF CAST IRON VALVE BOX SHALL BE CAST IN THE CONCRETE.
C. TYPE A GRADE RINGS SHALL BE REQUIRED ON ROAD SHOULDERS WITHOUT CURB.
D. FOR INSTALLATION DETAIL TWO – ONLY ONE VALVE BOX ASSEMBLY (NO. 5 OR NO. 6) SHALL BE REQUIRED. VALVE BOX ASSEMBLY SHALL NOT REST ON THE VALVE, AND SHALL BE CENTERED ON THE VALVE OPERATING NUT AS SHOWN.
E. TOP SECTION/LID SHALL BE FLUSH WITH GRADE RING TO AVOID TRIPPING HAZARD.
F. FOR LOCATIONS WHERE A STANDARD PRECAST GRADE RING DOES NOT FIT, IT CANNOT BE CUT TO FIT AND A CAST IN PLACE CONCRETE PAD MUST BE POURED IN PLACE.

DESIGN REQUIREMENTS:

a. CONCRETE – f'c = 4,000 PSI (PRECAST), OR 3,600 PSI (CAST-IN-PLACE).
b. STEEL REINFORCEMENT – REBARS – GRADE 60 (60,000 PSI) – ASTM A-615, OR WELDED WIRE FABRIC – ASTM A-185.

CHARLOTTE WATER
CHARLOTTE WATER STANDARD DETAILS WATER
VALVE BOX - CONCRETE GRADE RINGS (12" AND SMALLER VALVES - ONLY) (2" AIR RELEASES AND BLOW OFFS)
NO SCALE | VERSION 1.0 | DATE 04/2024 | DETAIL 10.1.5

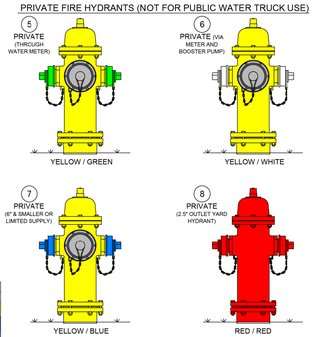
CLTW PUBLIC FIRE HYDRANTS



CLTW / CFD COLOR LEGEND	
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					
FIRE HYDRANT CLASSIFICATION:	BARREL	SQUARE TOP / BONNET	STORZ PUMPER NOZZLE	IRON PUMPER NOZZLE	IRON HOSE NOZZLE
1 - FIRE PROTECTION	OSHA SAFETY YELLOW	OSHA SAFETY YELLOW	OSHA SAFETY YELLOW	OSHA SAFETY YELLOW	OSHA SAFETY YELLOW
2 - FIRE PROTECTION MUDDY FLOW	OSHA SAFETY YELLOW	OSHA SAFETY YELLOW	NOT PAINTED	OSHA SAFETY RED	OSHA SAFETY RED
3 - AIR RELEASE	OSHA SAFETY BLUE	OSHA SAFETY BLUE	NOT PAINTED	OSHA SAFETY BLUE	OSHA SAFETY BLUE
3 - BLOW-OFF	OSHA SAFETY BLUE	OSHA SAFETY BLUE	NOT PAINTED	OSHA SAFETY BLUE	OSHA SAFETY BLUE
4 - REUSE / RECLAIM	OSHA SAFETY PURPLE	OSHA SAFETY PURPLE	NOT PAINTED	OSHA SAFETY PURPLE	OSHA SAFETY PURPLE

PRIVATE FIRE HYDRANTS (NOT FOR PUBLIC WATER TRUCK USE)



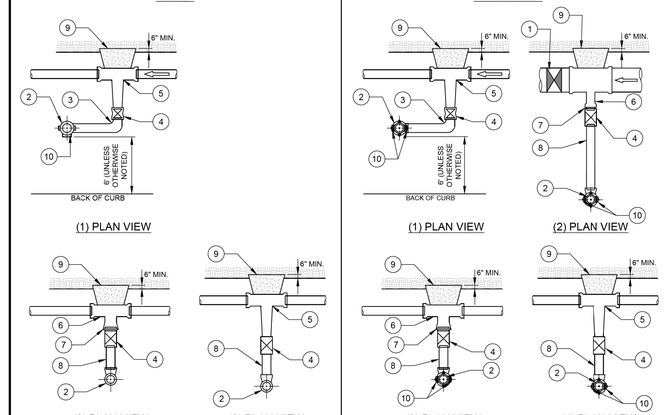
NOTES:
A. PUBLIC FIRE HYDRANTS ARE (1) CONNECTED DIRECTLY TO CLTW DISTRIBUTION SYSTEM, (2) OWNED AND MAINTAINED BY CLTW, AND (3) LOCATED WITHIN THE ROAD RIGHT-OF-WAY OR CLTW MAIN EASEMENT.
B. PRIVATE FIRE HYDRANTS ARE NON-PUBLIC FIRE HYDRANTS, INCLUDING HYDRANTS (1) SERVED VIA CLTW METER, (2) SERVED VIA PRIVATE WATER SYSTEM, AND ARE (3) LOCATED OUTSIDE THE ROAD RIGHT-OF-WAY AND (4) PRIVATELY OWNED AND MAINTAINED.

CHARLOTTE FIRE DEPARTMENT STANDARDS COLOR SCHEME FOR PRIVATE FIRE HYDRANTS					
CLASSIFICATION:	BARREL	TOP / BONNET	STORZ PUMPER NOZZLE	IRON PUMPER NOZZLE	IRON HOSE NOZZLE
5 - PRIVATE THROUGH WATER METER	OSHA SAFETY YELLOW	OSHA SAFETY YELLOW	NOT PAINTED	OSHA SAFETY GREEN	OSHA SAFETY GREEN
6 - PRIVATE via METER AND FIRE BOOSTER PUMP	OSHA SAFETY YELLOW	OSHA SAFETY YELLOW	NOT PAINTED	OSHA SAFETY WHITE	OSHA SAFETY WHITE
7 - PRIVATE (8-INCH AND SMALLER MAIN OR LIMITED SUPPLY)	OSHA SAFETY YELLOW	OSHA SAFETY YELLOW	NOT PAINTED	OSHA SAFETY BLUE	OSHA SAFETY BLUE
8 - PRIVATE (2.5-INCH OUTLET YARD HYDRANT)	OSHA SAFETY RED	OSHA SAFETY RED	N/A	N/A	OSHA SAFETY RED

INDUSTRY STANDARD - **NOT** ADOPTED OR USED BY CLTW/CFD AWWA C-502 UNIFORM COLOR SCHEME FOR FIRE HYDRANTS NFPA 291 RECOMMENDED PRACTICE FOR MARKING FIRE HYDRANTS					
CLASSIFICATION:	FLOW CAPACITY (GPM AT 20 PSI RESIDUAL)	BARREL	TOP / BONNET	PUMPER NOZZLE	HOSE NOZZLE
CLASS AA	1500 OR GREATER	CHROME YELLOW	LIGHT BLUE	LIGHT BLUE	LIGHT BLUE
CLASS A	1000 TO 1499	CHROME YELLOW	GREEN	GREEN	GREEN
CLASS B	500 TO 999	CHROME YELLOW	ORANGE	ORANGE	ORANGE
CLASS C	LESS TO 500	CHROME YELLOW	MSLU	MSLU	MSLU

CHARLOTTE WATER
CHARLOTTE WATER STANDARD DETAILS WATER
FIRE HYDRANT PAINT / COLOR SCHEMES CLTW / CHARLOTTE FIRE DEPT. STANDARDS PUBLIC AND PRIVATE HYDRANTS
NO SCALE | VERSION 1.0 | DATE 04/2024 | DETAIL 10.3.2

STANDARD FIRE HYDRANT WITH 8" PIPE



HIGH VELOCITY FIRE HYDRANT WITH 8" PIPE

NO. DESCRIPTION:

1. MAIN LINE VALVE.
2. STANDARD FIRE HYDRANT ON 8" MAINS AND HIGH VELOCITY FIRE HYDRANT ON 12" AND LARGER MAINS.
3. 8" SWIVEL 90° BEND.
4. 8" RMJ GATE VALVE.
5. 8" OUTLET SWIVEL HYDRANT TEE.
6. 8" OUTLET RMJ TEE.
7. 8" FOSTER ADAPTER WHICH BOLTS VALVE DIRECTLY TO TEE OR FH.
8. DIP WITH MJ RESTRAINED JOINTS.
9. 3,600 PSI CONCRETE THRUST BLOCKING.
10. PUMPER NOZZLE.

NOTES:

A. HYDRANT LOCATION: ON ROADS WITH CURB AND GUTTER, USE DETAIL (1) (THIS SHEET) IN ALL CASES UNLESS OTHERWISE APPROVED BY ENGINEER.
B. HYDRANT BURIAL TO BE MINIMUM 3'-6' UNLESS OTHERWISE APPROVED BY THE ENGINEER.
C. FOR HYDRANTS ON DEAD END LINES, MAIN LINE VALVES ARE LOCATED DOWNSTREAM OF HYDRANT.
D. EXTENSIONS REQUIRED AS APPROVED BY THE ENGINEER. NO MORE THAN ONE HYDRANT EXTENSION IS ALLOWED. IF EXTENSION IS USED, DO NOT CAST HYDRANT COLLAR ON EXTENSION JOINT.
E. PUMPER NOZZLE TO FACE THE ROADWAY ON STANDARD FIRE HYDRANTS. PUMPER NOZZLES SHALL BE PARALLEL WITH ROAD ON HIGH VELOCITY FIRE HYDRANTS.
F. CONCRETE BLOCKING TO EXTEND TO UNDISTURBED EARTH, AMOUNT APPROVED BY THE ENGINEER.
G. SEE CLTW STANDARD DETAIL FOR PLACEMENT OF FIRE HYDRANT IN NCDOT R/W.
H. ALL HYDRANT PIPING SHALL BE RESTRAINED JOINT DIP.
I. FLOW DIRECTION ARROW IS THE PRIMARY WATER FLOW DIRECTION BASED ON HYDRAULICS OR DEAD END PIPE AND CONTROLS THE VALVE LOCATION.
J. HIGH VELOCITY MAINS ARE CLASSIFIED AS 12" MAINS OR LARGER.
K. MAIN LINE VALVES ARE FOR MAINS 30" AND LARGER.

CHARLOTTE WATER
CHARLOTTE WATER STANDARD DETAILS WATER
FIRE HYDRANT DETAIL
NO SCALE | VERSION 1.0 | DATE 04/2024 | DETAIL 10.3.3

8/7/2025
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