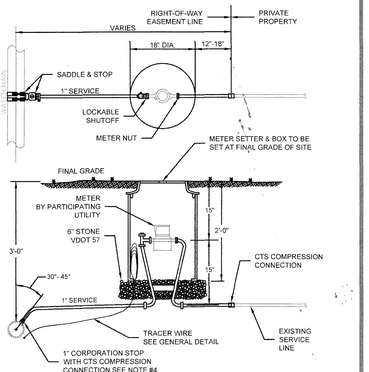
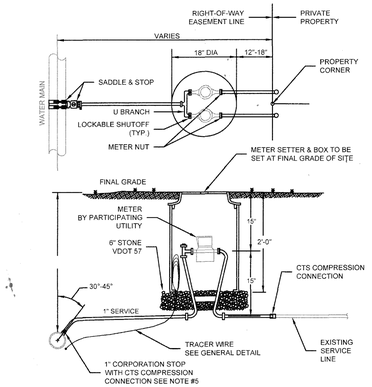
1. SETTER TO BE A.Y. McDONALD 720-215WXDD33, FORD VBT2-15W-11-33 OR APPROVED EQUAL.
2. SADDLES MUST BE USED WITH ALL PLASTIC & DUCTILE IRON PIPE. SERVICE SADDLES SHALL BE USED IN ACCORDANCE WITH WATER DISTRIBUTION PIPING SPECIFICATION. SERVICE SADDLES FOR PLASTIC PIPE SHALL BE POWERSEAL 3417, OR 3412AS, ROMAC 202S, OR 306, OR FORD METER FS202 OR FS303. FOR DUCTILE IRON PIPE USE THE ABOVE OR POWERSEAL 3413, ROMAC 202 OR FORD METER F202.
3. METER BOX SHALL BE CARSON/MID-STATES PLASTICS, INC. PLASTIC BOX WITH FORD "A" DOMESTIC SERIES FRAME WITH A NICOR DOMESTIC 12.25 CX LID WITH SENSUS RECESS, ADS CORRUGATED HDPE BOX WITH FORD "A" DOMESTIC SERIES FRAME WITH A NICOR DOMESTIC 12.25 CX LID WITH SENSUS RECESS OR APPROVED EQUAL. METER BOX SHALL NOT BE PLACED IN AREAS SUBJECT TO VEHICULAR TRAFFIC. IF TRAFFIC BEARING BOX IS REQUIRED, DESIGN ENGINEER SHALL CONSULT WITH PARTICIPATING UTILITY TO DETERMINE SITE SPECIFIC REQUIREMENTS.
4. CORPORATION STOP SHALL BE FORD FB1000-4-G-NL, MUELLER B-25008 OR APPROVED EQUAL.
5. SERVICE SHALL BE "K" TYPE COPPER, OR COPPER TUBE SIZE POLYETHYLENE (PE) 4710, SDOR-9 (200 psi).
6. WHENEVER SIDEWALK EXISTS OR IS PROPOSED, MODIFY METER LOCATION AS DIRECTED.



WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

SINGLE RESIDENTIAL WATER SERVICE (REPLACEMENT OF EXISTING SERVICE) — 05/05/17 — W-2

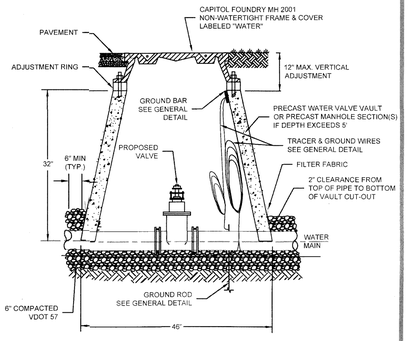
1. SETTER TO BE A.Y. McDONALD 720-215 WXDD33, FORD VBT2-15W-11-33 OR APPROVED EQUAL.
2. SADDLES MUST BE USED WITH ALL PLASTIC DUCTILE IRON PIPE. SERVICE SADDLES SHALL BE USED IN ACCORDANCE WITH WATER DISTRIBUTION PIPING SPECIFICATION. SERVICE SADDLES FOR PLASTIC PIPE SHALL BE POWERSEAL 3417, OR 3412AS, ROMAC 202S, OR 306, OR FORD METER F202 OR FS303. FOR DUCTILE IRON PIPE USE THE ABOVE OR POWERSEAL 3413, ROMAC 202 OR FORD METER F202.
3. METER BOX SHALL BE CARSON/MID-STATES PLASTICS, INC. PLASTIC BOX WITH FORD "A" DOMESTIC SERIES FRAME WITH A NICOR DOMESTIC 12.25 CX LID WITH SENSUS RECESS, ADS CORRUGATED HDPE BOX WITH FORD "A" DOMESTIC SERIES FRAME WITH A NICOR DOMESTIC 12.25 CX LID WITH SENSUS RECESS OR APPROVED EQUAL. METER BOX SHALL NOT BE PLACED IN AREAS SUBJECT TO VEHICULAR TRAFFIC. IF TRAFFIC BEARING BOX IS REQUIRED, DESIGN ENGINEER SHALL CONSULT WITH PARTICIPATING UTILITY TO DETERMINE SITE SPECIFIC REQUIREMENTS.
4. WHENEVER SIDEWALK EXISTS OR IS PROPOSED, MODIFY METER LOCATION AS DIRECTED.
5. CORPORATION STOP SHALL BE FORD FB1000-4-G-NL, MUELLER B-25008 OR APPROVED EQUAL.
6. SERVICE SHALL BE "K" TYPE COPPER, OR COPPER TUBE SIZE POLYETHYLENE (PE) 4710, SDOR-9 (200 psi).



WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

DOUBLE RESIDENTIAL WATER SERVICE (REPLACEMENT OF EXISTING SERVICE) — 05/05/17 — W-4E

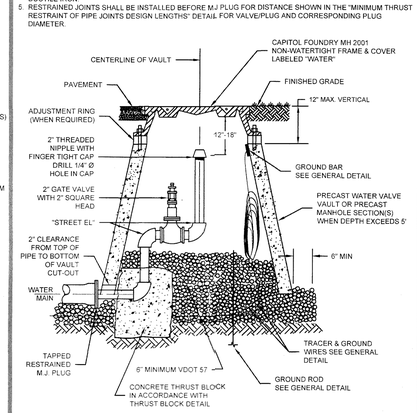
1. FILTER FABRIC TO BE INSTALLED BETWEEN BOTTOM OF PIPE AND STONE BEDDING. FABRIC TO EXTEND VERTICALLY A MINIMUM OF 6" FROM BOTTOM OF VAULT (FULL CIRCUMFERENCE).



WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

WATER LINE VALVE & VAULT — 01/01/14 — W-9

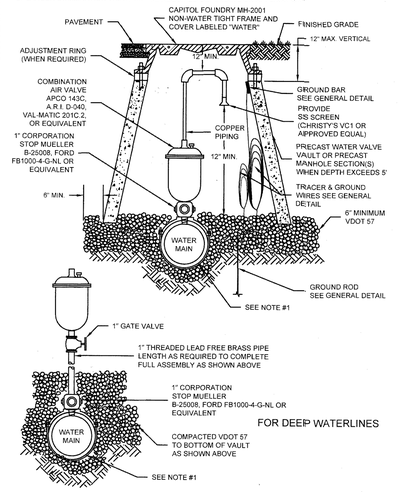
1. WHEN APPROVED BY PARTICIPATING UTILITY, FIRE HYDRANT ASSEMBLIES MAY BE USED AS PERMANENT END OF LINES.
2. DETAIL FOR UP TO 8" MAINS. LARGER LINES SEE WATER SYSTEM DESIGN STANDARDS FOR MIN. FLUSHING VALVE REQUIREMENTS.
3. THE END OF A PIPELINE SHALL NOT TERMINATE IN A PAVED AREA OR UNDER A CONCRETE CURB & GUTTER.
4. THE PIPING AND "STREET ELS" BETWEEN THE MAIN LINE AND 2" GATE VALVE SHALL BE LEAD FREE BRASS OR DUCTILE IRON.
5. RESTRAINED JOINTS SHALL BE INSTALLED BEFORE MJ PLUG FOR DISTANCE SHOWN IN THE "MINIMUM THRUST RESTRAINT OF PIPE JOINTS DESIGN LENGTHS" DETAIL FOR VALVE/PLUG AND CORRESPONDING PLUG DIAMETER.



WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

PERMANENT END OF LINE BLOW-OFF ASSEMBLY — 02/10/15 — W-10

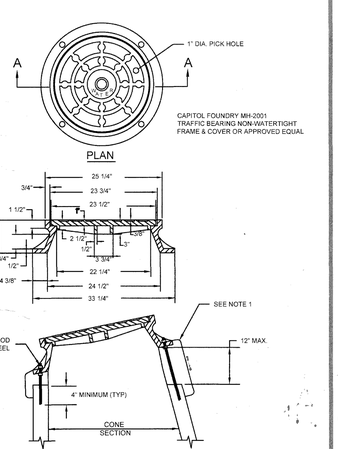
1. SEE RESIDENTIAL WATER SERVICE DETAIL FOR SADDLE REQUIREMENTS.
2. LARGER COMBINATION VALVE MAY BE REQUIRED DEPENDING ON APPLICATION.



WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

COMBINATION AIR VALVE ASSEMBLY — 02/10/15 — W-13

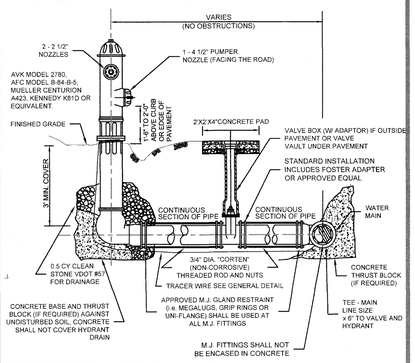
1. USE MODERATELY STIFF MIX OF NON SHRINK GROUT. SAND, AND 1/2" AND LESS DIAMETER GRAVEL WITH 28 DAYS, STRENGTH AT MINIMUM 3,000 P.S.I.
2. MIX IS TO BE FORCED INTO ALL GROOVES AND UNDER FLANGE OF FRAME AND LEFT AT OR ABOVE TOP OF FLANGE.
3. DO NOT BACKFILL AROUND FRAME AND COVER, FOR 48 HOURS AFTER CONCRETE IS PLACED. THE USE OF HIGH EARLY STRENGTH CEMENT WOULD REDUCE TIME TO (24 HRS.)
4. RESTRICT TRAFFIC LOAD FOR A MINIMUM OF 24 HOURS.



WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

VAULT FRAME AND COVER — 01/01/14 — W-16

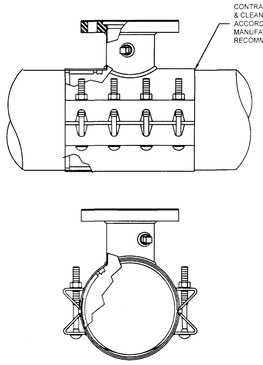
1. PUBLIC HYDRANTS SHALL BE PAINTED SILVER WITH AN OIL-BASED PAINT. PRIVATE HYDRANTS SHALL ALSO BE PAINTED SILVER WITH AN OIL-BASED PAINT UNLESS OTHERWISE SPECIFIED BY THE JURISDICTIONAL FIRE MARSHALL.
2. FIRE HYDRANT SHALL BE INSTALLED 2' MIN. AND 4' MAX. FROM BACK OF CURB OR 6' MIN. AND 12' MAX. FROM EDGE OF PAVEMENT WHEN CURB IS NOT PRESENT. FIRE HYDRANT TO BE INSTALLED WITHIN RIGHT-OF-WAY OR EASEMENT LINE.
3. AREA AROUND HYDRANT AT A RADIUS OF 4' TO BE LEVEL AND UNOBSTRUCTED.
4. WATERPROOF BAGS OR OUT OF SERVICE RINGS SHALL BE PLACED OVER ALL NEWLY INSTALLED FIRE HYDRANTS.
5. HYDRANT ASSEMBLIES SHALL BE RODDED AND RESTRAINED WITH APPROVED M.J. GLAND RESTRAINTS. HIGH PRESSURE (OVER 150 PSI) ALSO REQUIRES CONCRETE THRUST BLOCKS AS SHOWN BELOW.
6. IF DURING CONSTRUCTION THE SEASONAL WATER LEVEL IS NOTED TO BE ABOVE THE DRAIN OUTLETS OF THE PROPOSED HYDRANT. THE PARTICIPATING UTILITY WILL BE NOTIFIED IMMEDIATELY SO THAT THE HYDRANT CAN BE RELOCATED TO A SUITABLE LOCATION, OMITTED, OR THE DRAIN HOLE PLUGGED.
7. TWO WRAPS OF TRACER WIRE SHALL BE WRAPPED AROUND BASE OF HYDRANT.
8. APPROVED MODELS - AVK MODEL 2780, AFC MODEL B-84-B-5, MUELLER CENTURION A423, KENNEDY K81D OR EQUIVALENT.
9. WHERE HYDRANT LATERAL(S) IS APPROVED BY THE PARTICIPATING UTILITY TO BE LONGER IN LENGTH, MAKING THE CONTINUOUS SECTION OF PIPE ON EACH SIDE OF THE GATE VALVE UNFEASIBLE, RESTRAINED PIPE JOINTS SHALL BE INSTALLED BETWEEN THE TEE AND GATE VALVE IN LIEU OF RODDING. HOWEVER, A RODDED CONTINUOUS SECTION OF PIPE SHALL ALWAYS BE INSTALLED BETWEEN THE GATE VALVE AND HYDRANT.



WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

FIRE HYDRANT ASSEMBLY — 02/10/15 — W-17

1. TAPPING SLEEVE SHALL BE POWERSEAL MODEL 3490 TYPE 304 STAINLESS STEEL WITH CARBON STEEL FLANGE. ROMAC'S MODEL SST III. FORD MODEL FTSS WITH CARBON STEEL FLANGE OR APPROVED EQUIVALENT. SLEEVE SHALL BE RATED AT 100 PSI OVER WORKING PRESSURE AND MUST HAVE A TEST PLUG.
2. TAPPING VALVE SHALL BE AVK RESILIENT SEATED GATE VALVE SERIES 25 MJFL, MUELLER T-2360 RESILIENT WEDGE TAPPING VALVE WITH MJFL, OR AFC SERIES 2500 RESILIENT WEDGE TAPPING VALVE WITH MJFL. VALVE SHALL BE RATED AT 250 PSI.
3. TAPPING SLEEVE AND VALVE SHALL BE FULL PORT TO ACCEPT FULL SIZE SHELL CUTTER.
4. STEEL FLANGE SHALL MEET AWWA C207.
5. SIZE-ON-SIZE TAPPING NOT ALLOWED UNLESS APPROVED BY PARTICIPATING UTILITY.



WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

TAPPING SLEEVE AND VALVE — 01/01/14 — W-21

INSTALLATION OF DUCTILE IRON WATER MAINS
TABLE 3 AWWA C600-05
Maximum Joint Deflection Full Length of Pipe - Push on Type Joint

		Maximum Offset - S* (Inches)		Approximate Radius of Curve - R* Produced by Succession of Joints	
Nominal Pipe Size (inches)	Deflection Angle - θ (degree)	Joint Length 18-Feet	Joint Length 20-Feet	Joint Length 18-Feet	Joint Length 20-Feet
3	5°	19	21	205	230
4	5°	19	21	205	230
6	5°	19	21	205	230
8	5°	19	21	205	230
10	5°	19	21	205	230
12	5°	19	21	205	230
14	3°	11	12	340	380
16	3°	11	12	340	380
18	3°	11	12	340	380
20	3°	11	12	340	380
24	3°	11	12	340	380
30	3°	11	12	340	380

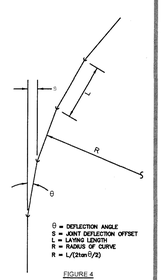
* SEE FIGURE 4

For 14-inch and larger push-on joints, maximum deflection angle may be larger than shown above. Consult the manufacturer.

INSTALLATION OF DUCTILE IRON WATER MAINS
TABLE 4 AWWA C600-05
Maximum Joint Deflection Full Length of Pipe - Mechanical Joint Pipe

		Maximum Offset - S* (Inches)		Approximate Radius of Curve - R* Produced by Succession of Joints	
Nominal Pipe Size (inches)	Deflection Angle - θ (degree)	Joint Length 18-Feet	Joint Length 20-Feet	Joint Length 18-Feet	Joint Length 20-Feet
3	8°-18"	31	35	125	140
4	8°-18"	31	35	125	140
6	7°-07"	27	30	145	160
8	5°-21"	20	22	195	220
10	5°-21"	20	22	195	220
12	5°-21"	20	22	195	220
14	3°-35"	13.5	15	285	320
16	3°-35"	13.5	15	285	320
18	3°-00"	11	12	340	380
20	3°-00"	11	12	340	380
24	2°-23"	9	10	450	500

* SEE FIGURE 4.



θ = DEFLECTION ANGLE
S = JOINT DEFLECTION OFFSET
L = LAYING LENGTH
R = RADIUS OF CURVE
R = L/(2tan θ/2)

FIGURE 4

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

DUCTILE IRON PIPE DEFLECTION ALLOWANCE TABLES — 01/01/14 — W-22

WESTERN VIRGINIA WATER AUTHORITY
ENGINEERING SERVICES
601 S JEFFERSON ST, SUITE 300
ROANOKE, VA 24011
540-853-5700

COMMONWEALTH OF VIRGINIA — W. NICHOLAS ROBERTSON — Lic. No. 042052204 — PROFESSIONAL ENGINEER — 8/4/17

KEITHWOOD WATERLINE CIP REPLACEMENT

WATER DETAILS

Rev	Description	Date	By

Designed: WNR
Drawn: NSS, DRJ
Checked: WNR
Approved: WNR
Date: 08/04/2017
Project: CIP-045

5
Sheet 5 of 5