

FACTOR OF SAFETY = 1.5											
PIPE SIZE	PIPE MATL	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND	VALVE/PLUG (NOTE 2)	TEE (NOTE 3)	REDUCER (NOTE 4)	45° VERT.	22 1/2° VERT.	11 1/4° VERT.
6"	D.I.	28'	21'	17'	14'	50'	26'	26'	21'	10'	5'
8"	D.I.	36'	21'	8'	4'	65'	41'	27'	27'	13'	7'
10"	D.I.	43'	21'	9'	5'	77'	53'	26'	32'	16'	8'
12"	D.I.	51'	21'	10'	5'	77'	67'	27'	36'	18'	9'
6"	PVC	29'	21'	6'	3'	78'	25'	40'	32'	16'	8'
8"	PVC	37'	21'	8'	4'	102'	49'	43'	42'	21'	10'
10"	PVC	44'	21'	9'	5'	122'	68'	41'	51'	25'	12'
12"	PVC	51'	21'	11'	6'	143'	89'	42'	60'	29'	15'

1. ALL JOINTS SHALL BE RESTRAINED ON BOTH SIDES OF THE FITTING AND DOCUMENTED BY THE INSPECTOR FOR THE LENGTH SHOWN UNLESS OTHERWISE INDICATED.

2. RESTRAINED LENGTH SHOWN REFERS TO ANY DESIGNED OR POTENTIAL LINE STOP, INCLUDING ALL GATE VALVES.

3. RESTRAINED LENGTH SHOWN REFERS TO THE BRANCH LINE ONLY. THE CONTINUOUS PIPE LENGTH OF THE MAIN RUN SHALL BE A MINIMUM OF 10' ON EACH SIDE OF THE TEE.

4. RESTRAINED LENGTH SHOWN IS BASED ON REDUCING PIPE DIAMETER TO ONE SIZE SMALLER THAN PIPE LISTED (ANY OTHER DIAMETER REDUCTION WILL REQUIRE ADDITIONAL CALCULATIONS BEFORE INSTALLATION). RESTRAINED LENGTH SHOWN IS UPSTREAM ON THE LARGE SIDE OF THE REDUCER.

5. 12" AND SMALLER DIAMETER: IF UNDER 150 PSI WORKING PRESSURE, RESTRAINED JOINT(S) ARE TO BE USED. IF EQUAL TO OR OVER 150 PSI WORKING PRESSURE, BOTH THRUST BLOCK(S) AND RESTRAINED JOINT(S) SHALL BE USED.

LARGER THAN 12" DIAMETER: IF UNDER 100 PSI WORKING PRESSURE, RESTRAINED JOINT(S) ARE TO BE USED. IF EQUAL TO OR OVER 100 PSI WORKING PRESSURE, BOTH THRUST BLOCK(S) AND RESTRAINED JOINT(S) SHALL BE USED (UNLESS OTHERWISE APPROVED BY THE PARTICIPATING UTILITY).

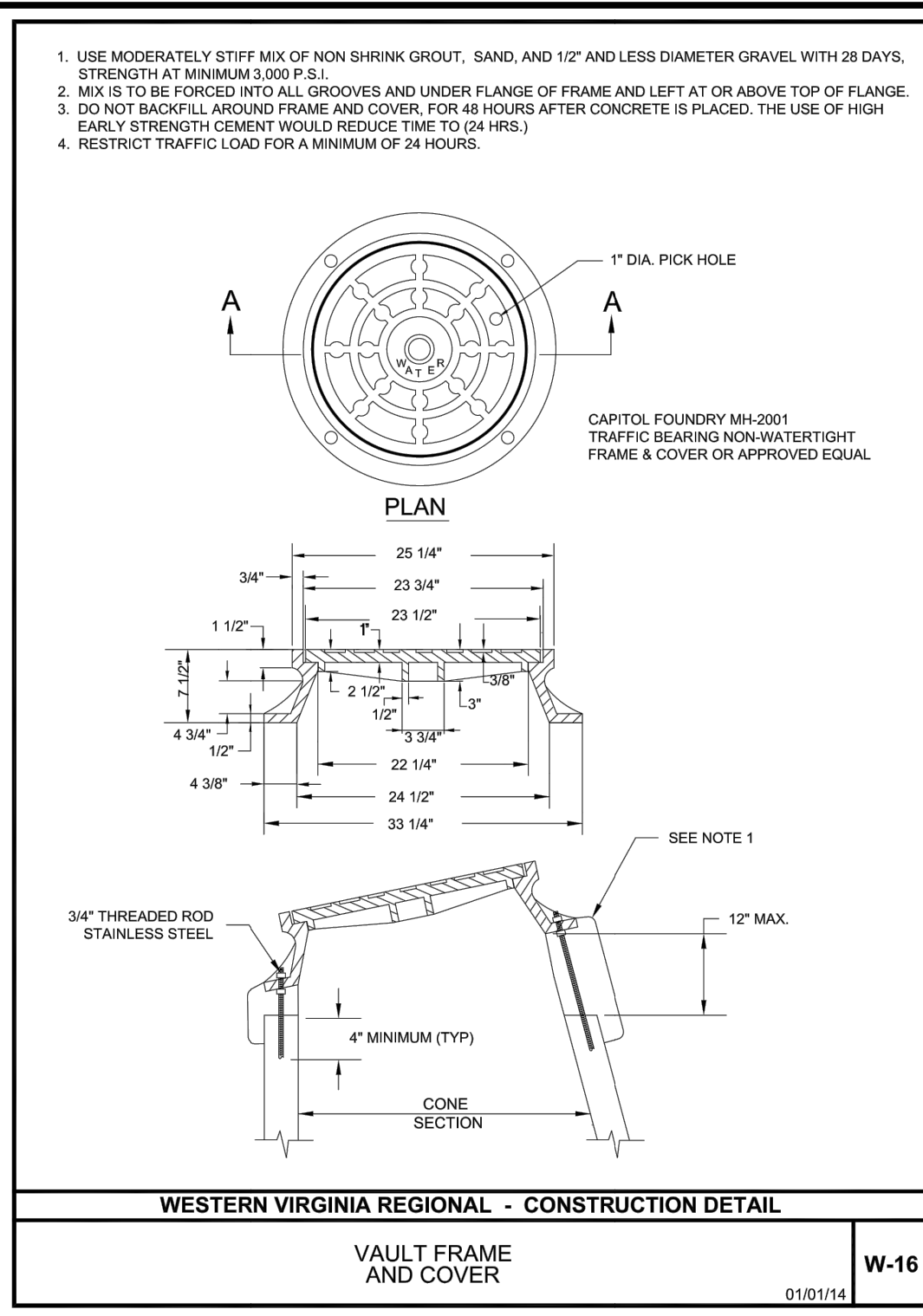
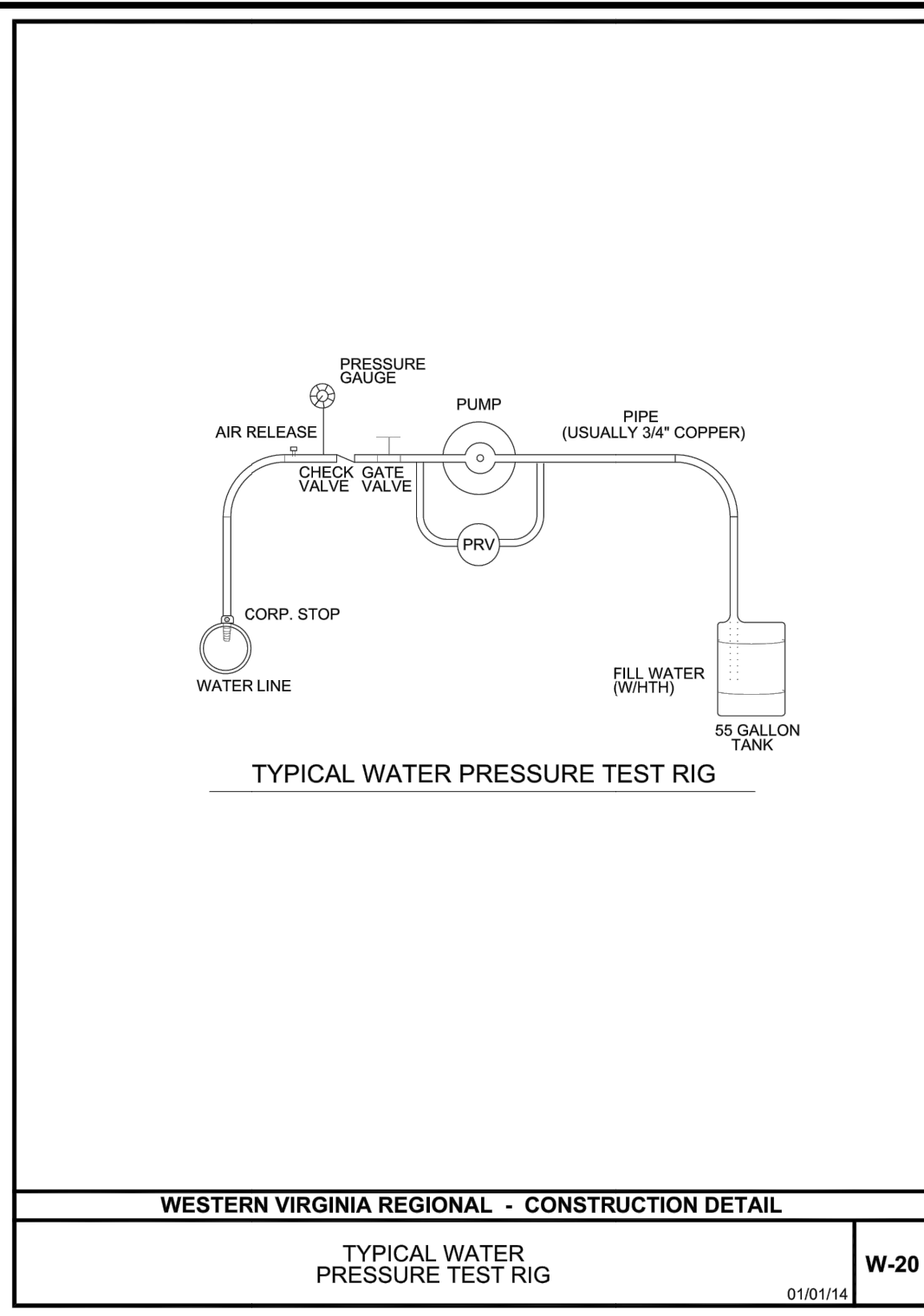
6. FOR RESTRAINED JOINT PIPING REQUIREMENTS AT FITTING R.J. PVC AND R.J. DIP MAY BE USED INTERCHANGEABLY WITH APPROVAL FROM PARTICIPATING UTILITY. CONTRACTOR MUST PLAN ACCORDINGLY FOR THE DIFFERENCE IN PVC AND DIP BELL AND SPIGOT DIMENSIONS.

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

MINIMUM THRUST RESTRAINT OF PIPE JOINTS DESIGN LENGTHS

02/10/15

W-19



INSTALLATION OF DUCTILE IRON WATER MAINS

TABLE 3 AWWA C800-05

Maximum Joint Deflection Full Length of Pipe - Push on Type Joint

Nominal Pipe Size (Inches)	Deflection Angle - θ (degree)	Maximum Offset - S" (Inches)			
		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 C800-05

Maximum Joint Deflection Full Length of Pipe - Mechanical Joint Pipe

Nominal Pipe Size (Inches)	Deflection Angle - θ (degree)	Maximum Offset - S" (Inches)			
		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°-0°	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°-0°	11	12	340	380
20	3°-0°	11	12	340	380
24	2°-23°	9	10	450	500

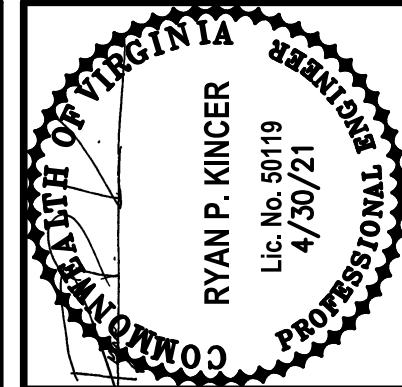
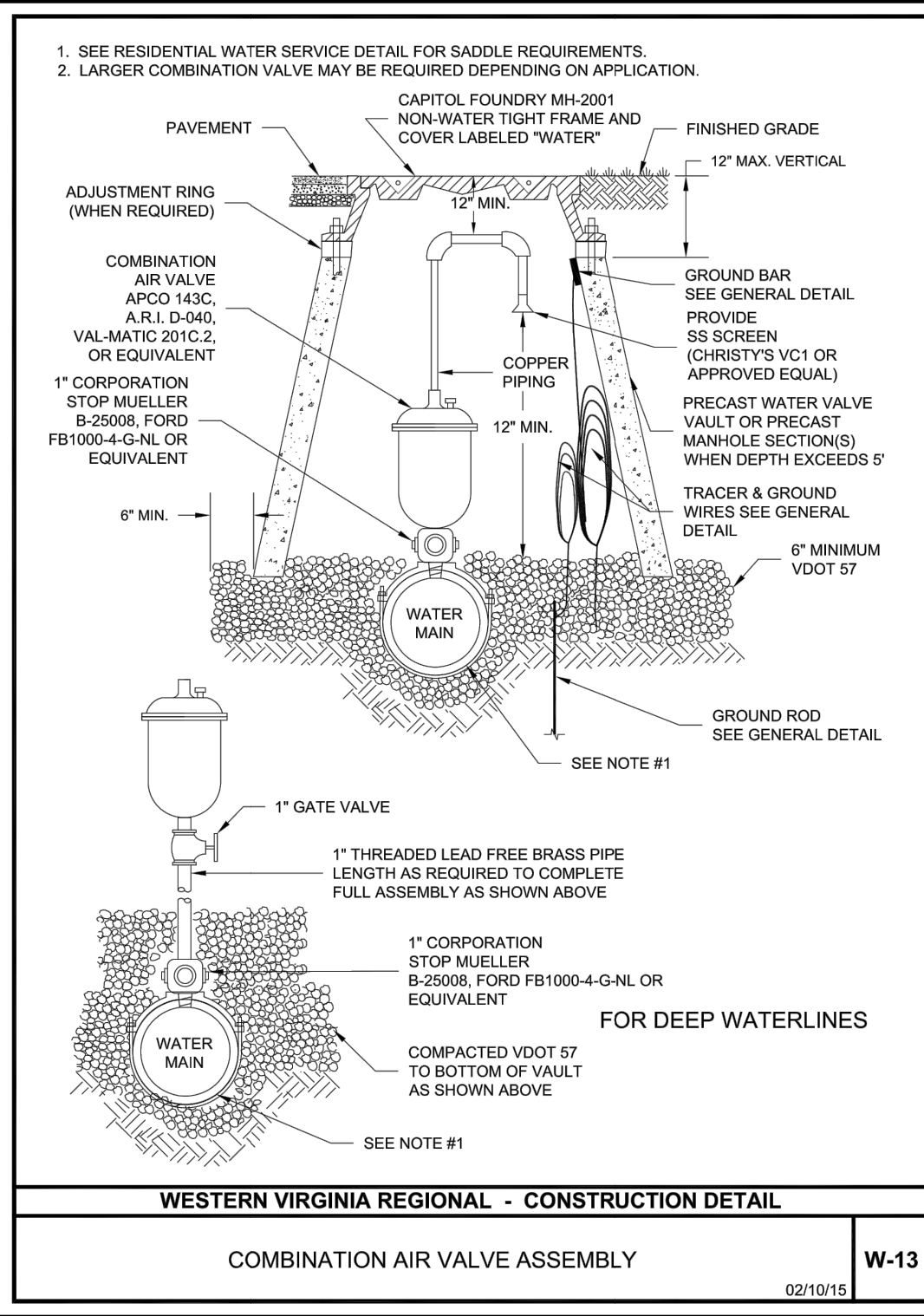
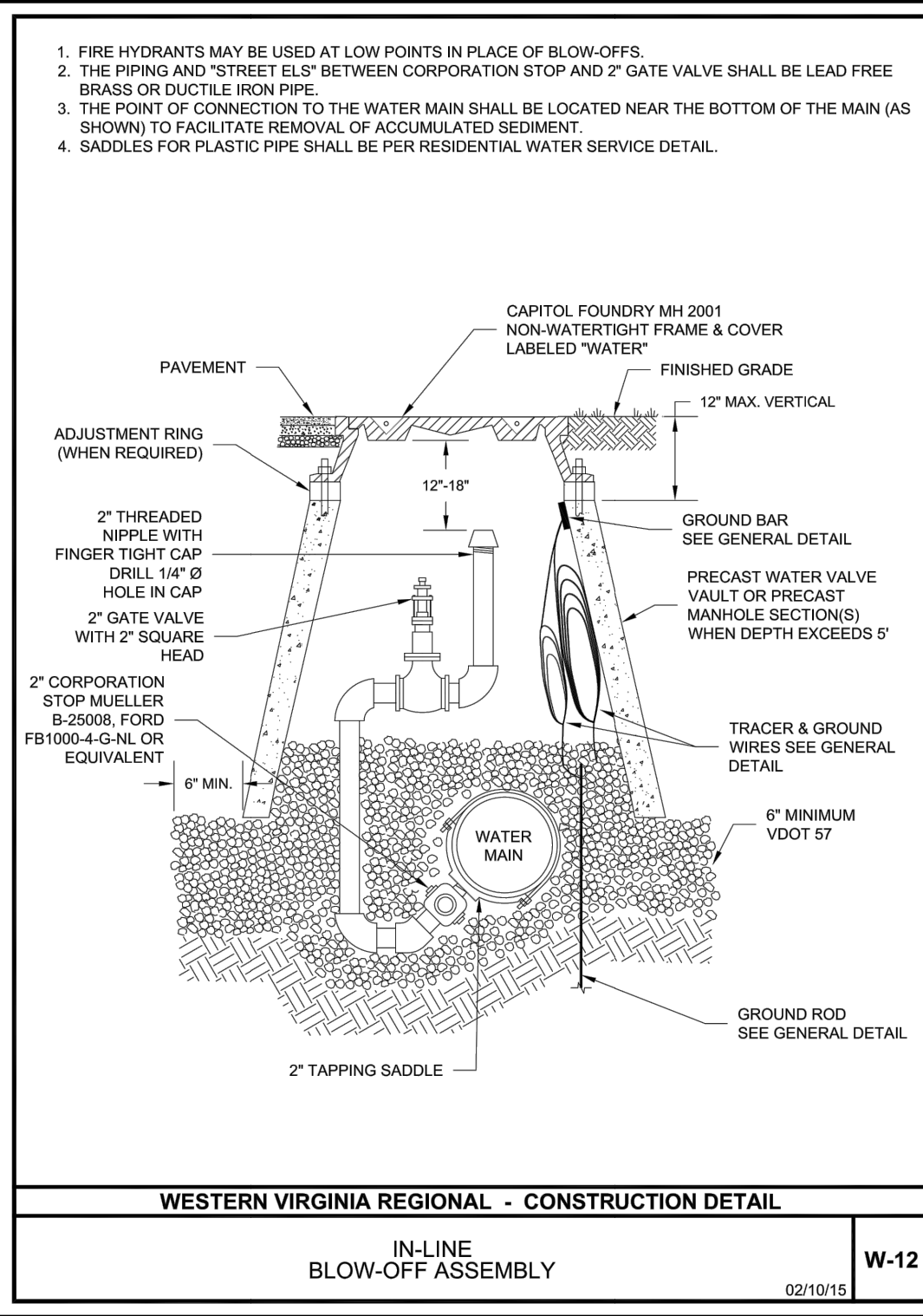
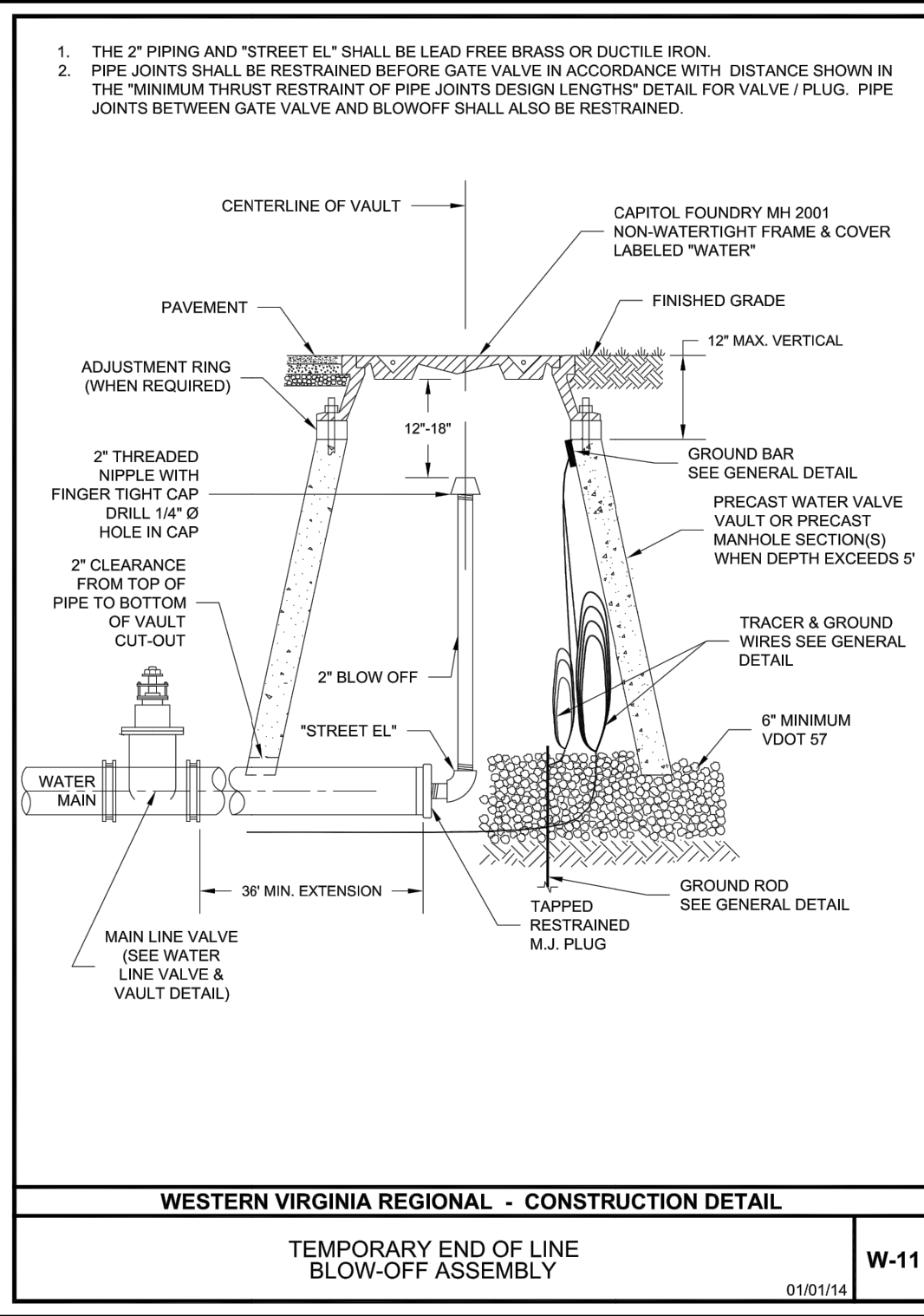
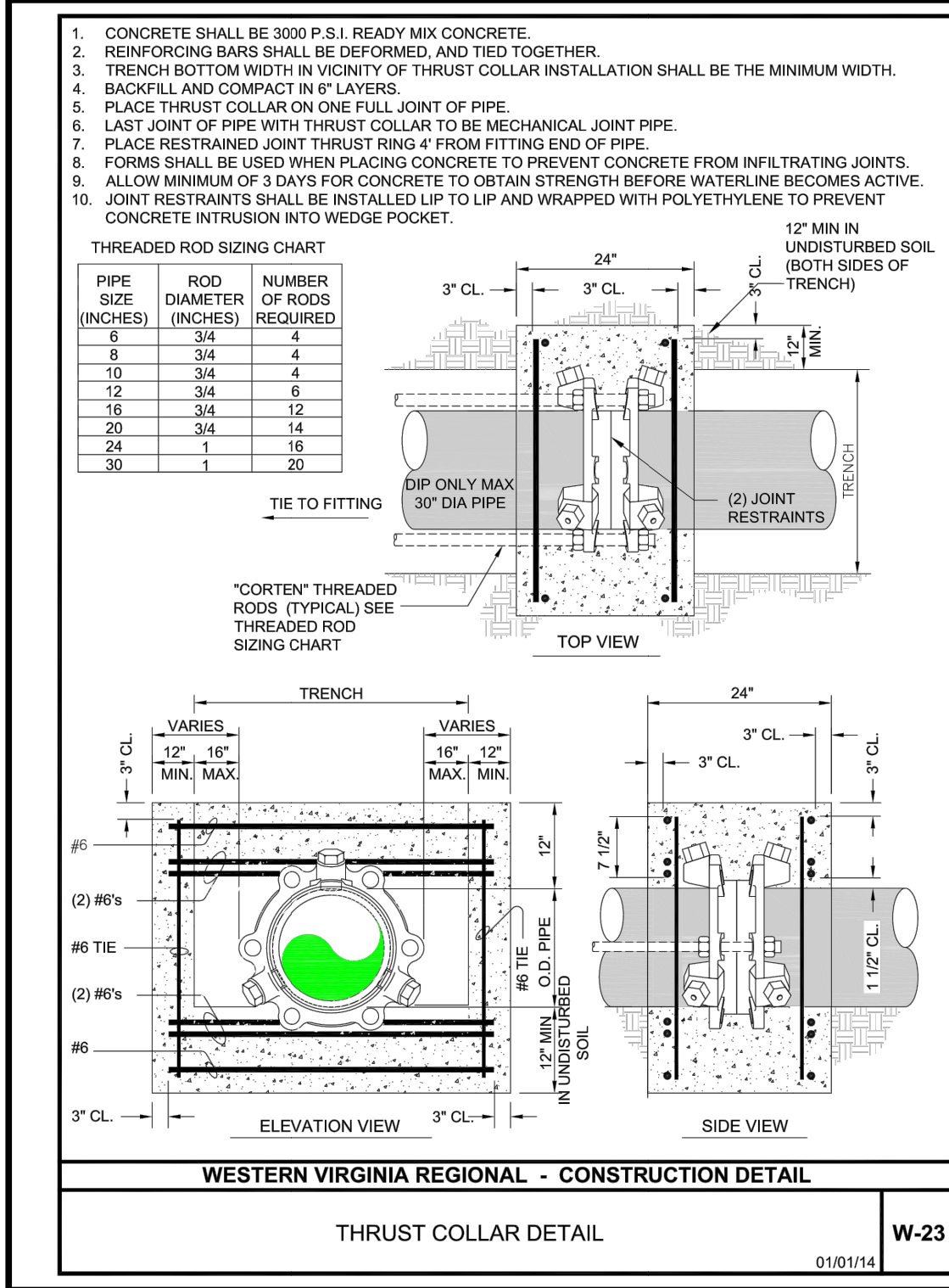
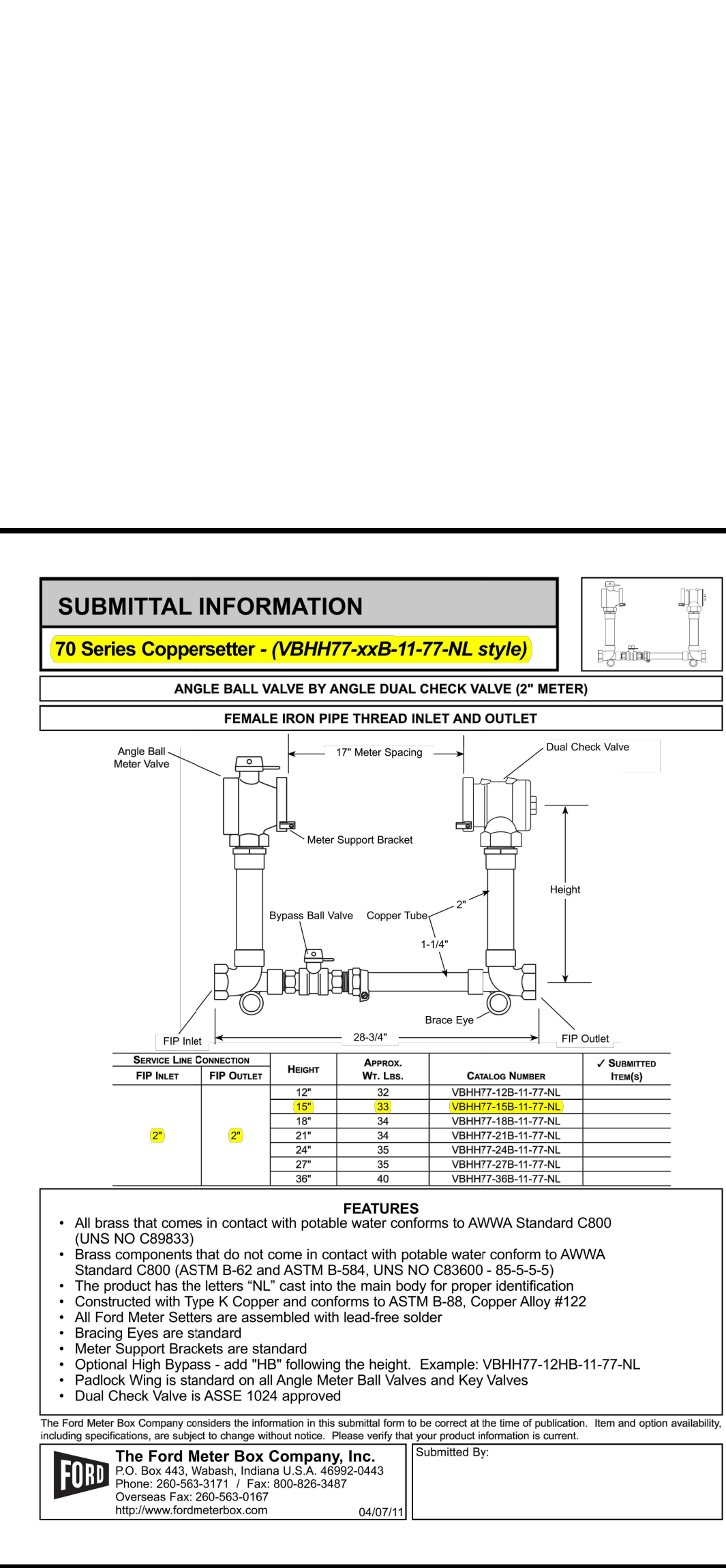
* SEE FIGURE 4.

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

DUCTILE IRON PIPE DEFLECTION ALLOWANCE TABLES

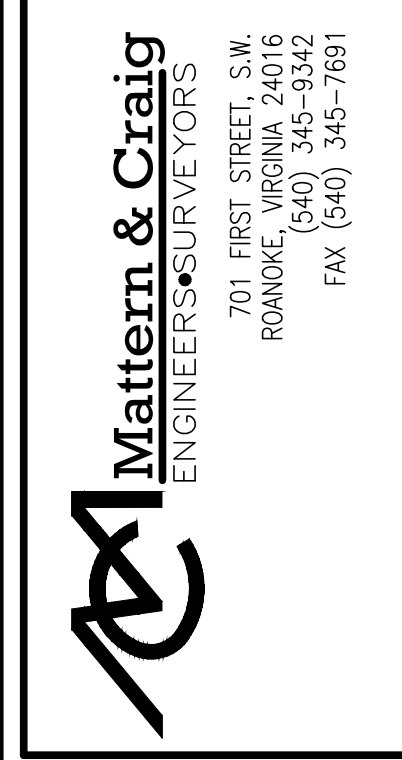
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W-22



Date	
Revisions	

Issue Date:	APR. 30, 2021
Drawn By:	RPK/MLC
Designed By:	RPK
Checked By:	BOC
Date:	4/30/21



WASHINGTON HEIGHTS WATERLINE REPLACEMENT PHASE 1

DETAILS

ROANOKE, VIRGINIA

Vertical Scale:	N/A
Horizontal Scale:	N/A
Commission Number:	4095
Sheet No.:	16