Thrust per psi of Water Pressure (Coefficient)

PIPE SIZE	DEAD END OR TEE	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND
2	4	5	3	2	1
3	7	10	6	3	2
4	13	18	10	5	3
6	21	40	22	11	6
8	59	84	39	20	10
10	79	112	61	31	16
12	112	160	87	45	23
14	154	219	119	61	31
16	200	285	155	79	40
18	253	361	196	100	51
20	313	446	242	123	62
22	378	539	292	149	75
24	450	642	348	177	90

Bearing Strength of Soils

SOIL TYPE	SAFE BEARING LOAD, LBS./SQ. FT.
Muck	0
Soft Clay	1,000
Medium Clay or Sand	2,500
Compacted Sand	3,000
Hard Clay	6,000
Shale	10,000

NOTES:

1. A Properly Designed Mechanical Restraint System Using Mega-Lugs by EBAA Iron or Approved Equal May be Used in Lieu of Concrete Blocking.

2. No Concrete Blocking Shall be Used if a Mechanical Restraint System is Shown on the Plans.

3. An Allowance for Water Hammer of 50% of the Pressure Condition Shall be Made in Sizing all Thrust Blocks Unless Otherwise Directed. For Bends in Which the Resultant Thrust is Horizontal or Downward, The Area of Undisturbed Trench Backing for Thrust Blocks Shall be in Accordance with the Following Formula:

$$\text{Sq. Ft. of Undisturbed Trench Backing} = \frac{\text{Pressure Condition} \times 1.5 \times \text{Coefficient}}{\text{Safe Bearing Load of Soil}}$$

EXAMPLE: 90° Bend, 8" Line, 100 psi Line Pressure, Medium Clay

$$\text{Sq. Ft. of Trench Backing} = 100 \times 1.5 \times \frac{84}{2{,}500} = 5.0 \text{ Sq. Ft.}$$

4. The Minimum Area of Trench Backing for Thrust Blocks Shall be 1.0 Sq. Ft. Regardless of Size Given by Formula.

5. For Vertical Bends in Which the Resultant Thrust is Upward, the Thrust Block Shall be Sized in Accordance with the Following Formula:

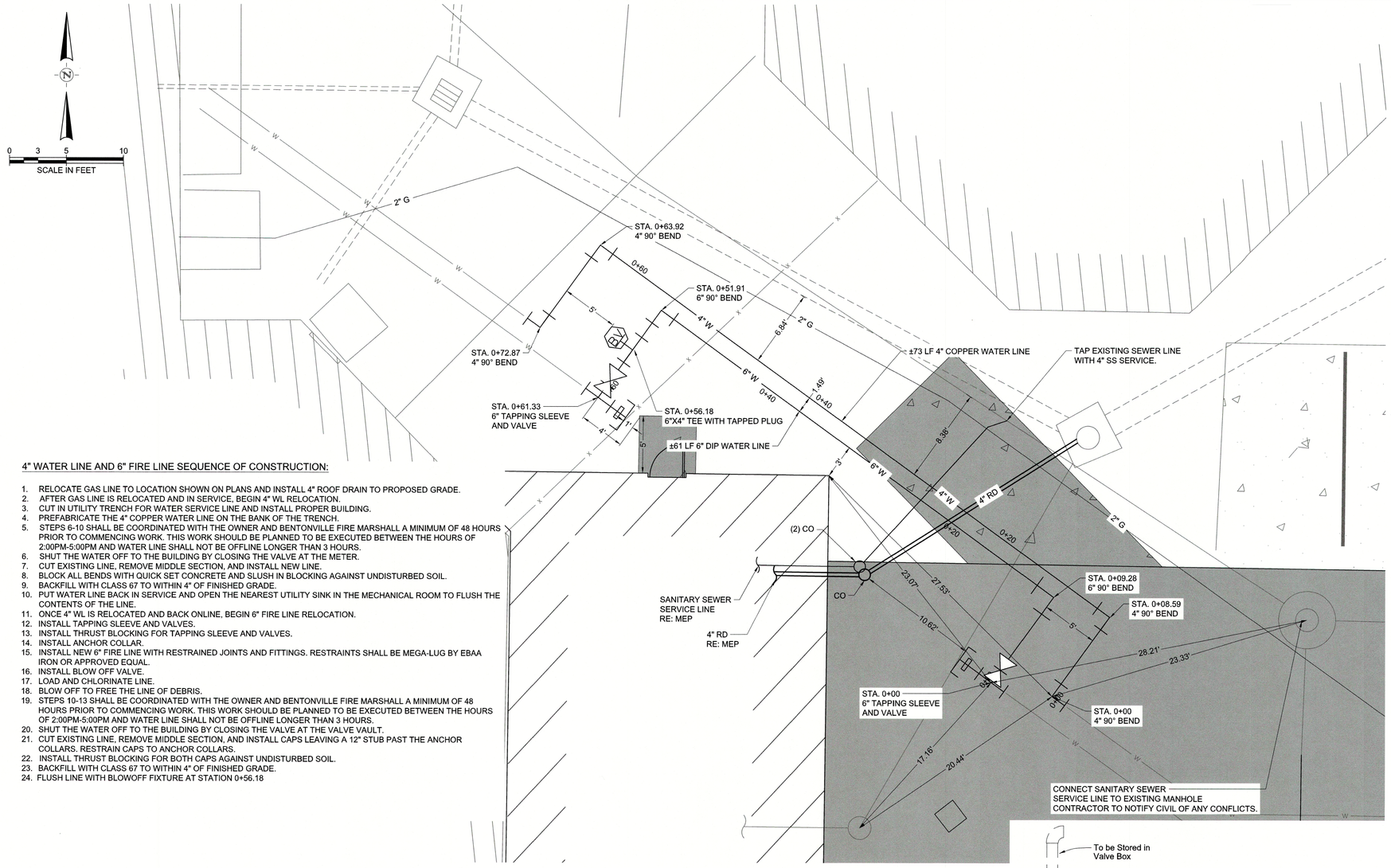
$$\text{Size of Block (Cu. Ft.)} = \frac{\text{Pressure Condition} \times 1.5 \times \text{Coefficient}}{150}$$

EXAMPLE: 11-1/4° Vertical Bend w/ Upward Thrust, 16" Pipe, 100 psi
(Soil Type is not Considered)

$$\text{Size of Block} = \frac{100 \times 1.5 \times 40}{150} = 40 \text{ Cu. Ft.}$$

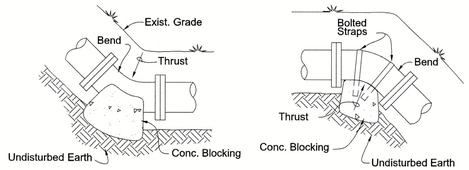
6. The Straps for Vertical Bends Shall be of Galvanized Steel with Minimum Dimensions of 3/16" x 2-1/2". The Length of the Straps Shall be Sufficient to Provide for 12 inches of Embedment of Each End into the Concrete Block. The End 2 inches of the Strap Shall be Bent at 90 Degrees to the Axis of the Strap to Provide for Anchorage. Costs of Straps is to be Included in the Unit Price for Concrete Blocking.

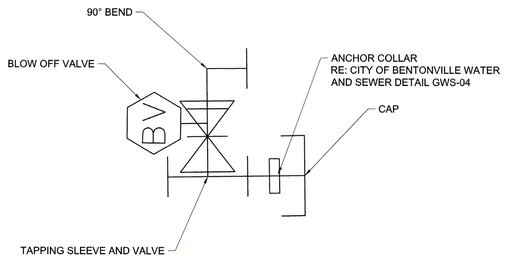
WS- 20: CONCRETE BLOCKING DATA



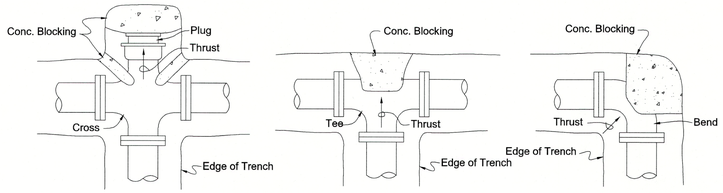
4" WATER LINE AND 6" FIRE LINE SEQUENCE OF CONSTRUCTION:

1. RELOCATE GAS LINE TO LOCATION SHOWN ON PLANS AND INSTALL 4" ROOF DRAIN TO PROPOSED GRADE.
2. AFTER GAS LINE IS RELOCATED AND IN SERVICE, BEGIN 4" WL RELOCATION.
3. CUT IN UTILITY TRENCH FOR WATER SERVICE LINE AND INSTALL PROPER BUILDING.
4. PREFABRICATE THE 4" COPPER WATER LINE ON THE BANK OF THE TRENCH.
5. STEPS 6-10 SHALL BE COORDINATED WITH THE OWNER AND BENTONVILLE FIRE MARSHALL A MINIMUM OF 48 HOURS PRIOR TO COMMENCING WORK. THIS WORK SHOULD BE PLANNED TO BE EXECUTED BETWEEN THE HOURS OF 2:00PM-5:00PM AND WATER LINE SHALL NOT BE OFFLINE LONGER THAN 3 HOURS.
6. SHUT THE WATER OFF TO THE BUILDING BY CLOSING THE VALVE AT THE METER.
7. CUT EXISTING LINE, REMOVE MIDDLE SECTION, AND INSTALL NEW LINE.
8. BLOCK ALL BENDS WITH QUICK SET CONCRETE AND SLUSH IN BLOCKING AGAINST UNDISTURBED SOIL.
9. BACKFILL WITH CLASS 67 TO WITHIN 4" OF FINISHED GRADE.
10. PUT WATER LINE BACK IN SERVICE AND OPEN THE NEAREST UTILITY SINK IN THE MECHANICAL ROOM TO FLUSH THE CONTENTS OF THE LINE.
11. ONCE 4" WL IS RELOCATED AND BACK ONLINE, BEGIN 6" FIRE LINE RELOCATION.
12. INSTALL TAPPING SLEEVE AND VALVES.
13. INSTALL THRUST BLOCKING FOR TAPPING SLEEVE AND VALVES.
14. INSTALL ANCHOR COLLAR.
15. INSTALL NEW 6" FIRE LINE WITH RESTRAINED JOINTS AND FITTINGS. RESTRAINTS SHALL BE MEGA-LUG BY EBAA IRON OR APPROVED EQUAL.
16. INSTALL BLOW OFF VALVE.
17. LOAD AND CHLORINATE LINE.
18. BLOW OFF TO FREE THE LINE OF DEBRIS.
19. STEPS 10-13 SHALL BE COORDINATED WITH THE OWNER AND BENTONVILLE FIRE MARSHALL A MINIMUM OF 48 HOURS PRIOR TO COMMENCING WORK. THIS WORK SHOULD BE PLANNED TO BE EXECUTED BETWEEN THE HOURS OF 2:00PM-5:00PM AND WATER LINE SHALL NOT BE OFFLINE LONGER THAN 3 HOURS.
20. SHUT THE WATER OFF TO THE BUILDING BY CLOSING THE VALVE AT THE VALVE VAULT.
21. CUT EXISTING LINE, REMOVE MIDDLE SECTION, AND INSTALL CAPS LEAVING A 12" STUB PAST THE ANCHOR COLLARS. RESTRAIN CAPS TO ANCHOR COLLARS.
22. INSTALL THRUST BLOCKING FOR BOTH CAPS AGAINST UNDISTURBED SOIL.
23. BACKFILL WITH CLASS 67 TO WITHIN 4" OF FINISHED GRADE.
24. FLUSH LINE WITH BLOWOFF FIXTURE AT STATION 0+56.18

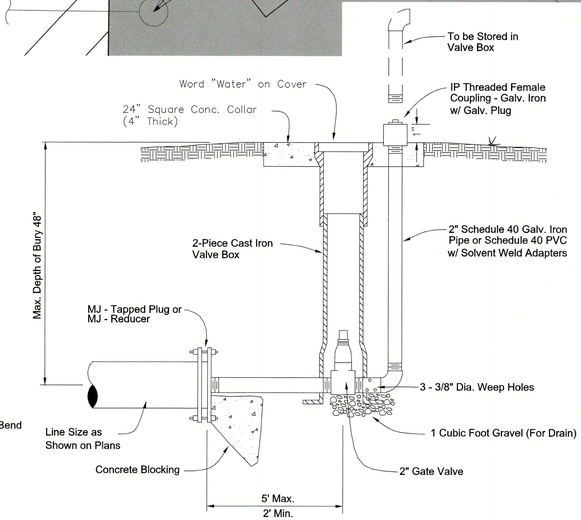




TYPICAL CONNECTION



WS-10: BLOCKING FOR BENDS, CROSSES & TEES



WS- 50: BLOWOFF VALVE

STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
No.10443
DOUGLAS C. MELTON, JR.
The Original Signed and Sealed Document is on file at the Office of Record

ISSUED FOR BID

HightJackson ASSOCIATES
5201 W Village Parkway, Suite 300 | Rogers, Arkansas 72758 | (479) 464-4965 | www.hjarch.com

SALLYPORT AND MEDICAL
BENTON COUNTY DETENTION CENTER
BENTONVILLE, AR

DRAWN BY: KES
CHECK BY: DCM
ISSUE DATE: 06/10/2024
PROJECT NO.: 57132.001
REVISION DATES:

UTILITY RELOCATION PLAN

halff
2407 SE COTTONWOOD ST., SUITE 1
BENTONVILLE, ARKANSAS 72712
TEL. (479) 273-2209

SHEET C5.1

CITY PROJECT: LSD24-0017