

| BENDS | 6" | 8" | 10" | 12" | 14" | 16" |
|-------------|-----|-----|------|------|------|------|
| 6"-11 1/4" | 8" | 15" | 24" | 36" | 48" | 60" |
| 6"-22 1/2" | 8" | 19" | 36" | 54" | 72" | 90" |
| 6"-45" | 8" | 30" | 54" | 81" | 108" | 135" |
| 6"-90" | 8" | 30" | 54" | 81" | 108" | 135" |
| 8"-11 1/4" | 8" | 20" | 36" | 54" | 72" | 90" |
| 8"-22 1/2" | 8" | 25" | 45" | 67" | 90" | 112" |
| 8"-45" | 8" | 31" | 54" | 81" | 108" | 135" |
| 8"-90" | 8" | 31" | 54" | 81" | 108" | 135" |
| 12"-11 1/4" | 12" | 30" | 54" | 81" | 108" | 135" |
| 12"-22 1/2" | 12" | 35" | 63" | 94" | 126" | 158" |
| 12"-45" | 12" | 41" | 72" | 108" | 144" | 180" |
| 12"-90" | 12" | 41" | 72" | 108" | 144" | 180" |
| 16"-11 1/4" | 16" | 38" | 66" | 99" | 132" | 165" |
| 16"-22 1/2" | 16" | 47" | 78" | 117" | 156" | 195" |
| 16"-45" | 16" | 55" | 90" | 135" | 180" | 225" |
| 16"-90" | 16" | 55" | 90" | 135" | 180" | 225" |
| 20"-11 1/4" | 20" | 44" | 78" | 117" | 156" | 195" |
| 20"-22 1/2" | 20" | 53" | 90" | 135" | 180" | 225" |
| 20"-45" | 20" | 61" | 102" | 153" | 204" | 255" |
| 20"-90" | 20" | 61" | 102" | 153" | 204" | 255" |
| 24"-11 1/4" | 24" | 50" | 90" | 135" | 180" | 225" |
| 24"-22 1/2" | 24" | 59" | 102" | 153" | 204" | 255" |
| 24"-45" | 24" | 67" | 114" | 171" | 228" | 285" |
| 24"-90" | 24" | 67" | 114" | 171" | 228" | 285" |
| 30"-11 1/4" | 30" | 58" | 96" | 144" | 192" | 240" |
| 30"-22 1/2" | 30" | 67" | 108" | 162" | 216" | 270" |
| 30"-45" | 30" | 75" | 120" | 180" | 240" | 300" |
| 30"-90" | 30" | 75" | 120" | 180" | 240" | 300" |

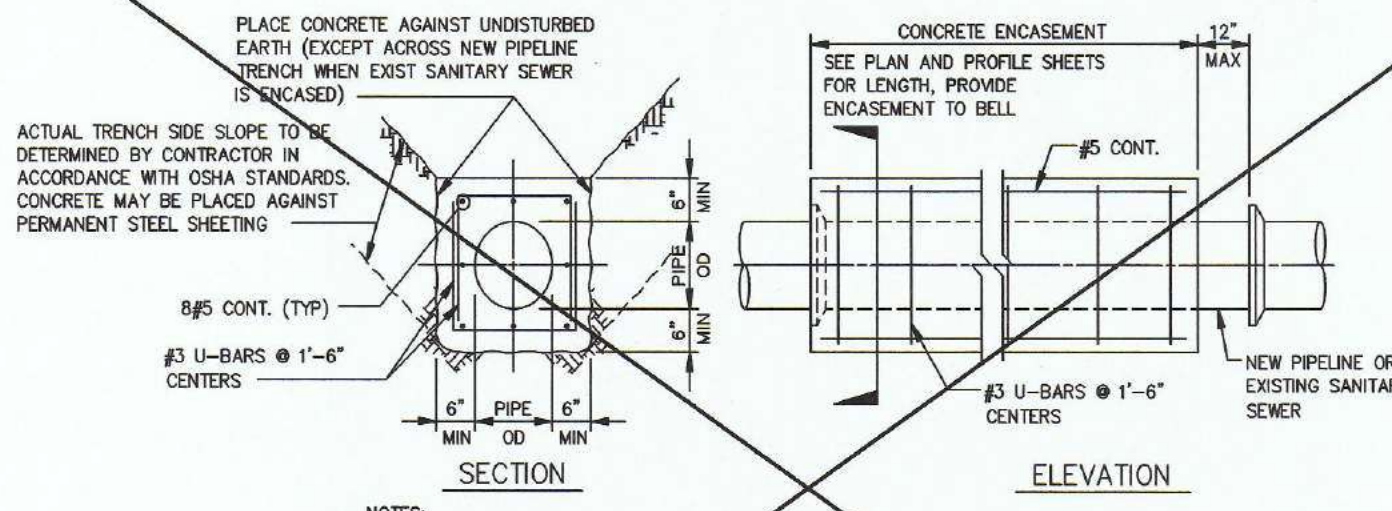
NOTES:
 1. 2" & 4" FITTINGS EQUIVALENT TO 6" FITTINGS.
 2. TAPPING SLEEVES TO HAVE BACKING BLOCKS SAME SIZE AS REQUIRED FOR TEES.
 3. "TL" = TOTAL LENGTH OF FITTING MINUS CLEARANCE FOR BELLS.

INTERNAL WATER PRESSURE 6" through 12"=200 psi
 INTERNAL WATER PRESSURE 16" through 30"=210 psi
 BEARING PRESSURE OF SOIL=2000 psi

BACKING BLOCKS
 NOT TO SCALE

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**BACKING BLOCK
 DETAILS AND LOCATIONS**



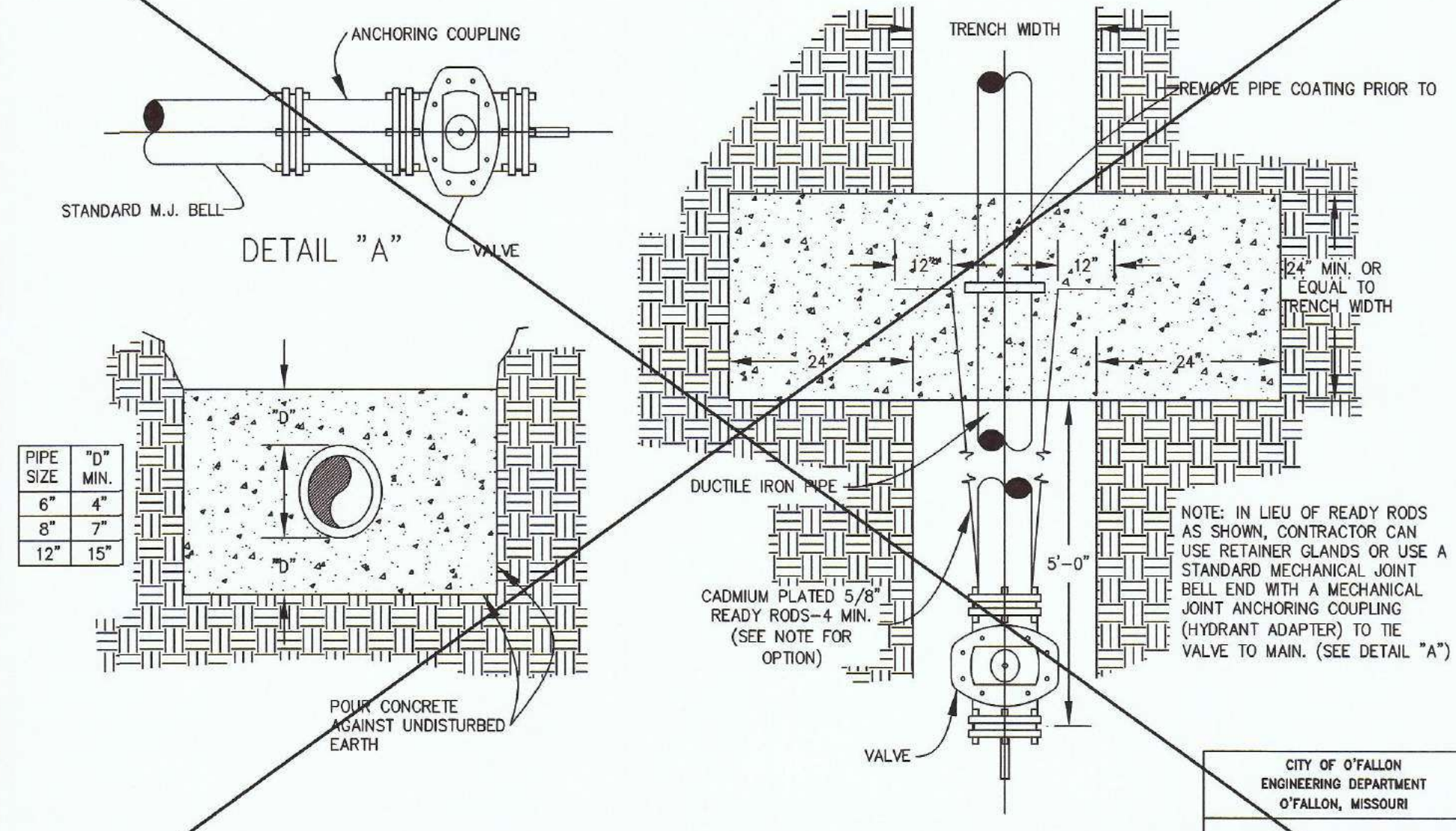
PLACE CONCRETE AGAINST UNDISTURBED EARTH (EXCEPT ACROSS NEW PIPELINE TRENCH WHEN EXIST SANITARY SEWER IS ENCASED)

CONCRETE ENCASEMENT
 NO SCALE

NOTES:
 1. AT LOCATIONS WHERE THE TRANSMISSION MAIN CROSSES AN EXIST SANITARY SEWER, SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
 2. WHEN THE PIPELINE IS PROTECTED WITH POLYETHYLENE TUBE ENCASEMENT, THE CONCRETE ENCASEMENT IS TO COVER THE POLYETHYLENE ENCASEMENT.

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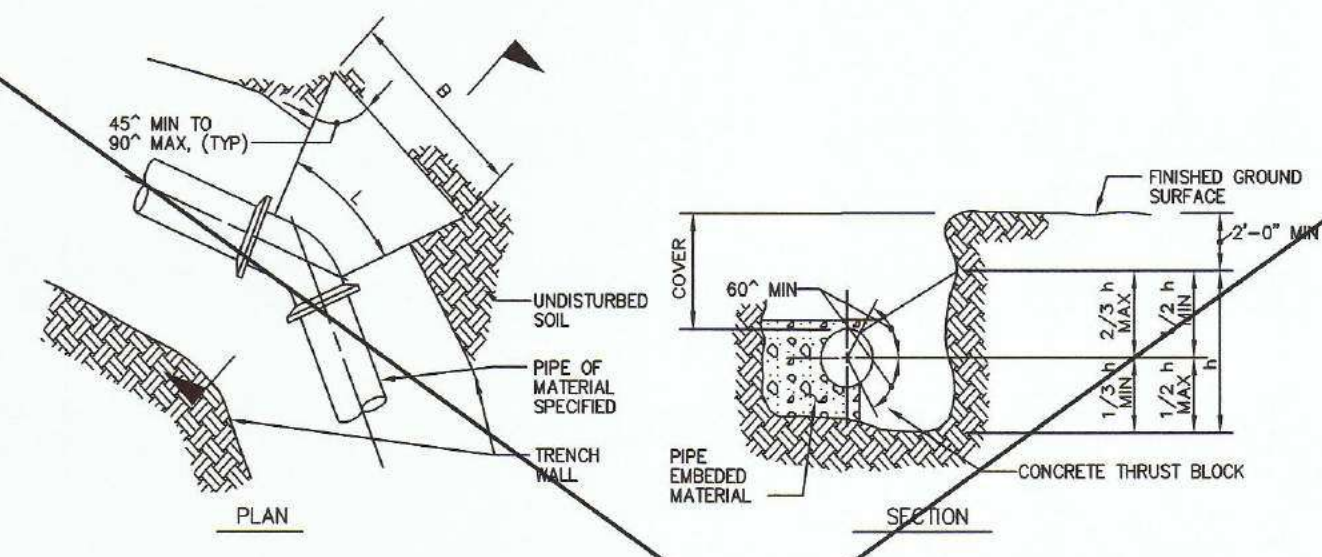
**CONCRETE ENCASEMENT
 DETAILS**



STRADDLE BLOCK DETAIL
 NOT TO SCALE

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**STRADDLE BLOCK
 DETAILS**



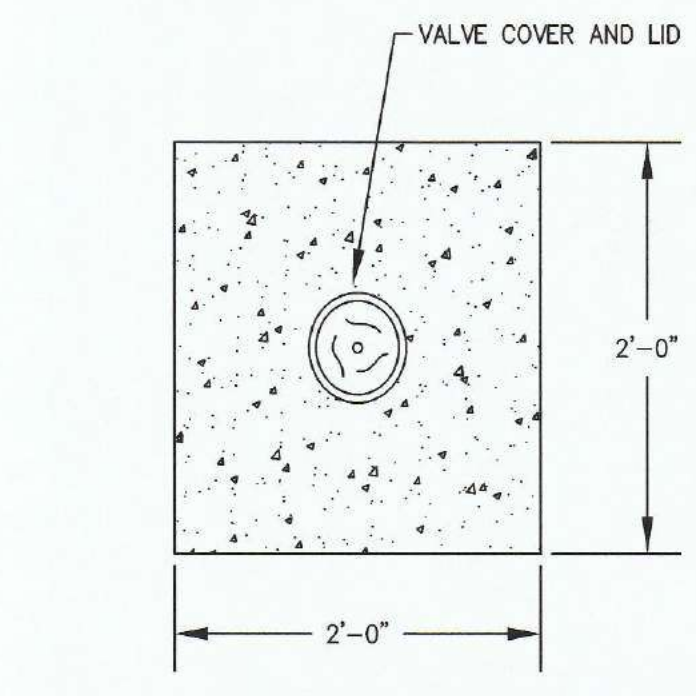
NOTES:
 1. AREA OF BLOCK, A = Bxh. BLOCK AREAS ARE SHOWN ON GENERAL LAYOUT OR TABLE.
 2. B = h = A/4, EXCEPT WHERE TOP OF BLOCK IS WITHIN 2 FEET FROM GROUND SURFACE, THEN B = A/4.
 3. MINIMUM BLOCK DIMENSION (B & h) SHALL BE AT LEAST 60 OF PIPE OR 1 FOOT FOR PIPE 10" OR LESS.
 4. THE BOTTOM OF THE BLOCK SHALL EXTEND AT LEAST TO THE BOTTOM OF THE TRENCH IN ALL CASES.
 5. LIFTING LENGTH MINUS CLEARANCE FOR BELLS.
 6. DETAIL IS SHOWN FOR CAST IRON PIPE. DETAIL IS SIMILAR FOR OTHER TYPES OF PIPE.
 7. DIMENSIONS FOR THRUST BLOCKS FOR FIRE HYDRANT ASSEMBLY ARE SHOWN FIRE HYDRANT ASSEMBLY DETAIL.

| SIZE | BEND | THRUST AREA | B | H |
|------|---------|-------------|------|------|
| 16" | 22 1/2" | 4 SF | 2' | 2' |
| 16" | 45" | 8 SF | 2.8' | 2.8' |

CONCRETE THRUST BLOCKING
 NOT TO SCALE

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**CONCRETE THRUST
 BLOCKING DETAILS**

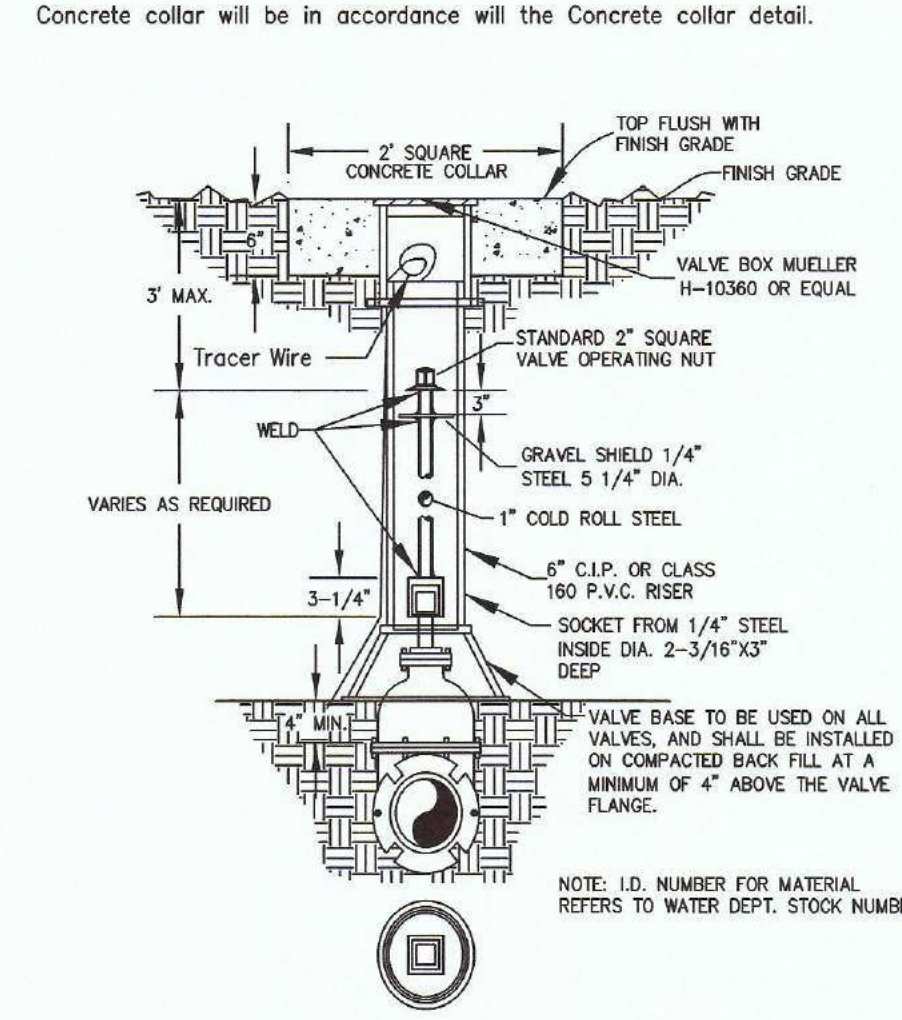


**TOP VIEW
 CONCRETE COLLAR**
 NOT TO SCALE

NOTE: 1. Concrete collar joint pattern is required in paved areas such as roadways, driveways, sidewalks or other areas of paved surfaces.
 2. Concrete collars are optional in other non-paved areas.

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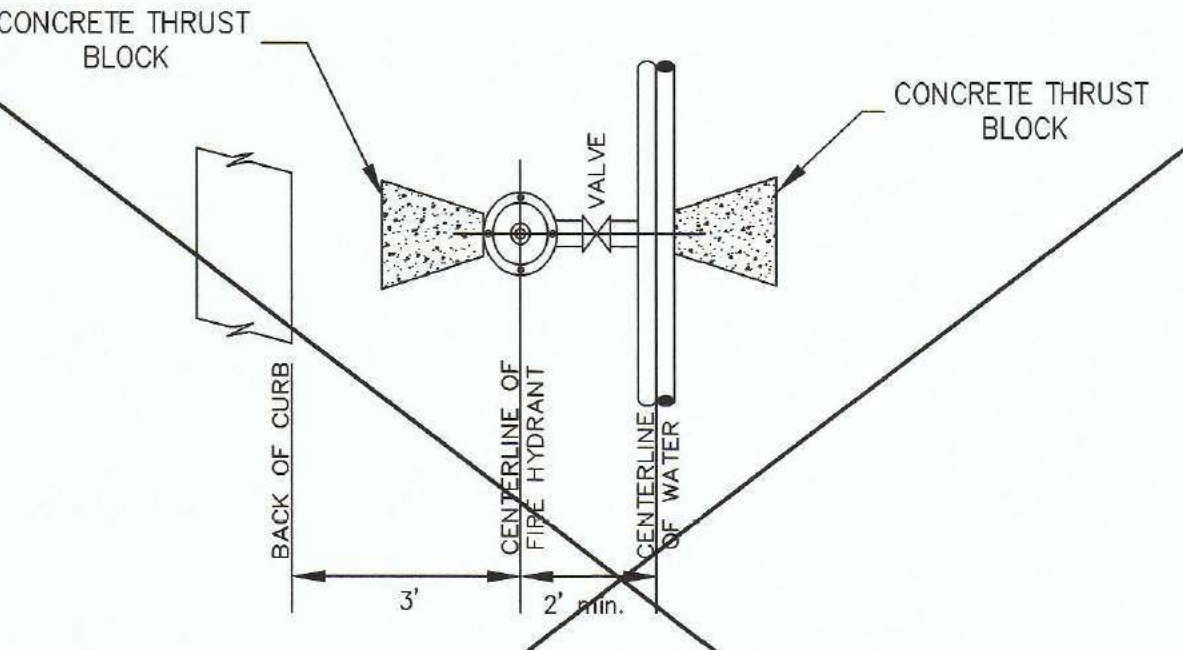
**CONCRETE
 COLLAR DETAIL**



WATER VALVE DETAIL
 NOT TO SCALE

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**WATER
 VALVE DETAIL**

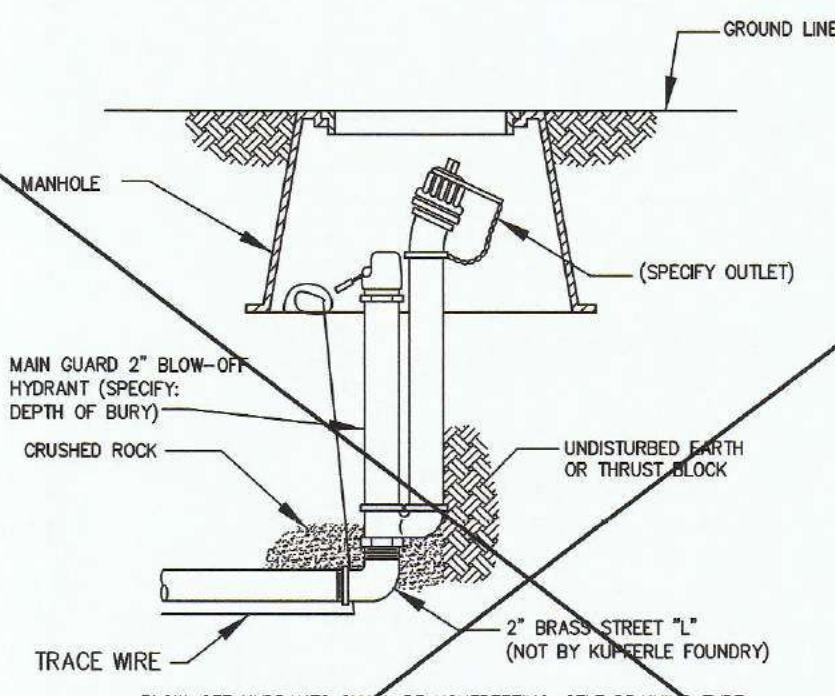


CONFIGURATION
 ALL FIRE HYDRANTS SHALL BE 3' OFF BACK OF CURB
 ALL WATER MAINS SHALL BE A MIN. OF 5' OFF BACK OF CURB

**TYPICAL WATER MAIN AND FIRE
 HYDRANT LOCATIONS**
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**WATER MAIN
 FIRE HYDRANT DETAIL**



BLow-OFF HYDRANTS SHALL BE NON-FREEZING, SELF-DRAINING TYPE WITH AN OVERALL LENGTH OF 2'. SET UNDERGROUND IN A METER BOX. THESE HYDRANTS WILL BE FURNISHED WITH A 3/4" TIP INLET, A 3/4" TURNING OPERATING ROD, AND SHALL OPEN TO THE LEFT. ALL WORKING PARTS SHALL BE OF BRONZE TO BRONZE DESIGN AND BE SERVICEABLE FROM ABOVE GRADE WITH NO DIGGING. THE INLET SHALL ALSO BE BRONZE AND BE 2-1/2" NPT. HYDRANTS SHALL BE LOCKABLE TO PREVENT UNAUTHORIZED USE AS MANUFACTURED BY KUPPERLE FOUNDRY CO., ST. LOUIS, MO, OR APPROVED EQUAL.

BLow-OFF HYDRANT
 NOT TO SCALE

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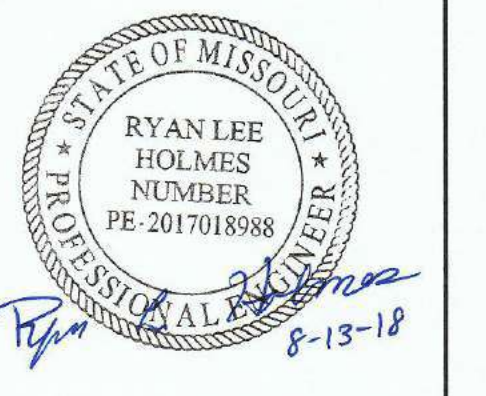
**BLow-OFF
 HYDRANT DETAIL**

PROJECT TITLE
**KNIGHTS OF COLUMBUS
 - O'FALLON**

ENGINEERING COMPANY'S INFORMATION
VOLZ
 Incorporated
 ENGINEERS
 LAND PLANNING
 LAND SURVEYING
 TRANSPORTATION
 CONSULTING
 MANAGEMENT

10849 Indian Head Indl. Blvd.
 St. Louis, Missouri 63132
 314.890.1250 Fax
 www.volzinc.com
 Authority #203

ORDER # 11344
 ENGINEER SIGNATURE BLOCK



Ryan L. Holmes
 Professional Engineer
 PE-2017018988

DEVELOPER / OWNER INFORMATION:
 Knights of Columbus - O'Fallon
 202 W. 3rd St.
 O'Fallon, MO 63366

CITY OF O'FALLON WATER DETAILS
 SHEET 1

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 CITY NO.
 DATE: 02/16/2018
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