

## **Standard Details**

The following pages contain the standard details for the Carolina Crossroads project for the City of Columbia and the associated utility relocations. Any changes to these details will require the approval of the City of Columbia.

For items not covered in this set of standard details, Design Build Contractor shall use City's standard details contained in the City of Columbia Engineering Regulations Manual or the Design Build Contractor's Engineer of Record can recommend details pending approval by the City of Columbia.

# CITY OF COLUMBIA 2020

## WATER & SEWER

### CONSTRUCTION DETAILS

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#### WATER DETAILS

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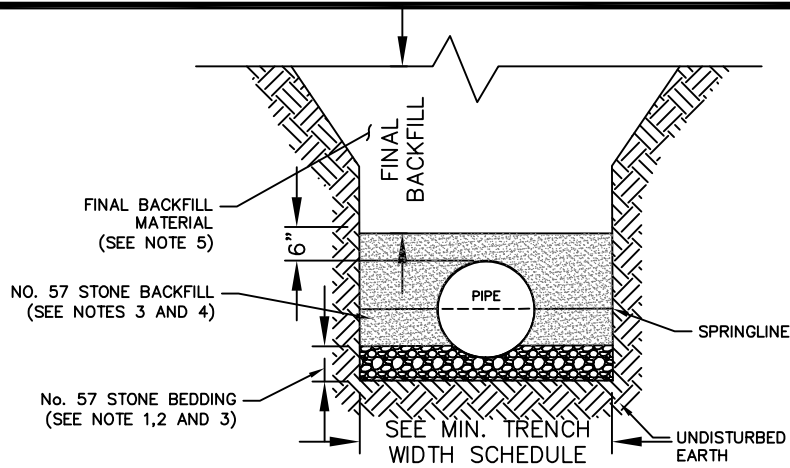


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## CITY OF COLUMBIA

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COLUMBIA SOUTH CAROLINA 29217



MINIMUM TRENCH WIDTH SCHEDULE				
PIPE SIZE I.D.	12" OR LESS	12" TO 21"	24" TO 30"	33" TO 54"
TRENCH WIDTH (W/O SHORING)	36"	I.D. + 24"	I.D. + 30"	I.D. + 30"
TRENCH WIDTH (W/ SHORING)	48"	I.D. + 36"	I.D. + 42"	I.D. + 42"

## MINIMUM BEDDING FOR WATER MAIN DETAIL

NOT TO SCALE

### NOTES:

1. BEDDING DEPTH SHALL BE 6" MINIMUM FOR PIPE DIAMETER LESS THAN 12".
2. DEPTH FOR REMOVAL OF UNSUITABLE MATERIAL SHALL GOVERN DEPTH OF BEDDING MATERIAL BELOW THE PIPE. THE DESIGN-BUILD CONTRACTOR'S ENGINEER OF RECORD, WITH CITY'S CONCURRENCE, SHALL DETERMINE IN THE FIELD THE AMOUNT OF UNSUITABLE MATERIAL REQUIRED TO REACH A SUITABLE FOUNDATION.
3. THE PIPE BEDDING SHALL BE CONSOLIDATED No. 57 STONE BACKFILL IN 6" LAYERS TO THE BOTTOM OF THE PIPE. THEN BACKFILLED WITH NO. 57 STONE CONSOLIDATED IN 6" LAYERS TO THE SPRINGLINE OF THE PIPE.
4. BELL HOLES SHALL BE DUG TO PERMIT THE ENTIRE STRAIGHT BARREL OF THE PIPE TO REST ON THE UNDISTURBED SOIL OR BEDDING MATERIAL.
5. FINAL BACKFILL MATERIAL (BELOW SHALL GOVERN UNLESS MORE STRINGENT REQUIREMENTS APPLY)
  - A. AREAS OUTSIDE THE SCDOT, COUNTY, AND CITY RIGHT-OF-WAYS: FINAL BACKFILL MATERIAL SHALL MEET THE REQUIREMENTS OF AASHTO M145 GROUP CLASSIFICATION A1-A6 AND BE COMPACTED IN SUFFICIENT DEPTHS TO MEET A MINIMUM COMPACTION OF 90% STANDARD PROCTOR WITH AN ALLOWABLE  $\pm 5\%$  OF OPTIMUM MOISTURE CONTENT.
  - B. AREAS INSIDE THE SCDOT, COUNTY, AND CITY RIGHT-OF-WAYS: FINAL BACKFILL MATERIAL SHALL MEET THE REQUIREMENTS OF AASHTO M145 GROUP CLASSIFICATION A1-A3 AND BE COMPACTED IN 6" LAYERS TO A MINIMUM COMPACTION OF 95% STANDARD PROCTOR WITH AN ALLOWABLE  $\pm 5\%$  OF OPTIMUM MOISTURE CONTENT.
  - C. UNDER PAVEMENT: FINAL BACKFILL MATERIAL SHALL MEET REQUIREMENTS OF AASHTO M145 GROUP CLASSIFICATION A1 AND BE COMPACTED IN 6" LAYERS TO A MINIMUM COMPACTION OF 98% STANDARD PROCTOR WITH AN ALLOWABLE  $\pm 5\%$  OF OPTIMUM MOISTURE CONTENT.
  - D. UNDER SCDOT PAVEMENT; (TO THREE FEET FROM EDGE OF PAVEMENT: FINAL BACKFILL MATERIAL SHALL BE SCDOT EXCAVATABLE (200 PSI MAX) FLOWABLE FILL FOR ALL SCDOT ROADWAYS.
  - E. UNDER DRIVEWAYS: FINAL BACKFILL MATERIAL SHALL MEET REQUIREMENTS OF AASHTO M145 GROUP CLASSIFICATION A1-A3 AND BE COMPACTED IN 6" LAYERS TO A MINIMUM COMPACTION OF 98% STANDARD PROCTOR WITH AN ALLOWABLE  $\pm 5\%$  OF OPTIMUM MOISTURE CONTENT.
  - F. USE OF NATIVE MATERIAL: NATIVE MATERIAL MAY BE USED IN FINAL BACKFILL ONLY WHEN MATERIAL MEETS THE REQUIREMENTS AS OUTLINED ABOVE.

WATER DETAIL # 1

MINIMUM BEDDING  
FOR WATER MAIN

SHEET 1 OF 1

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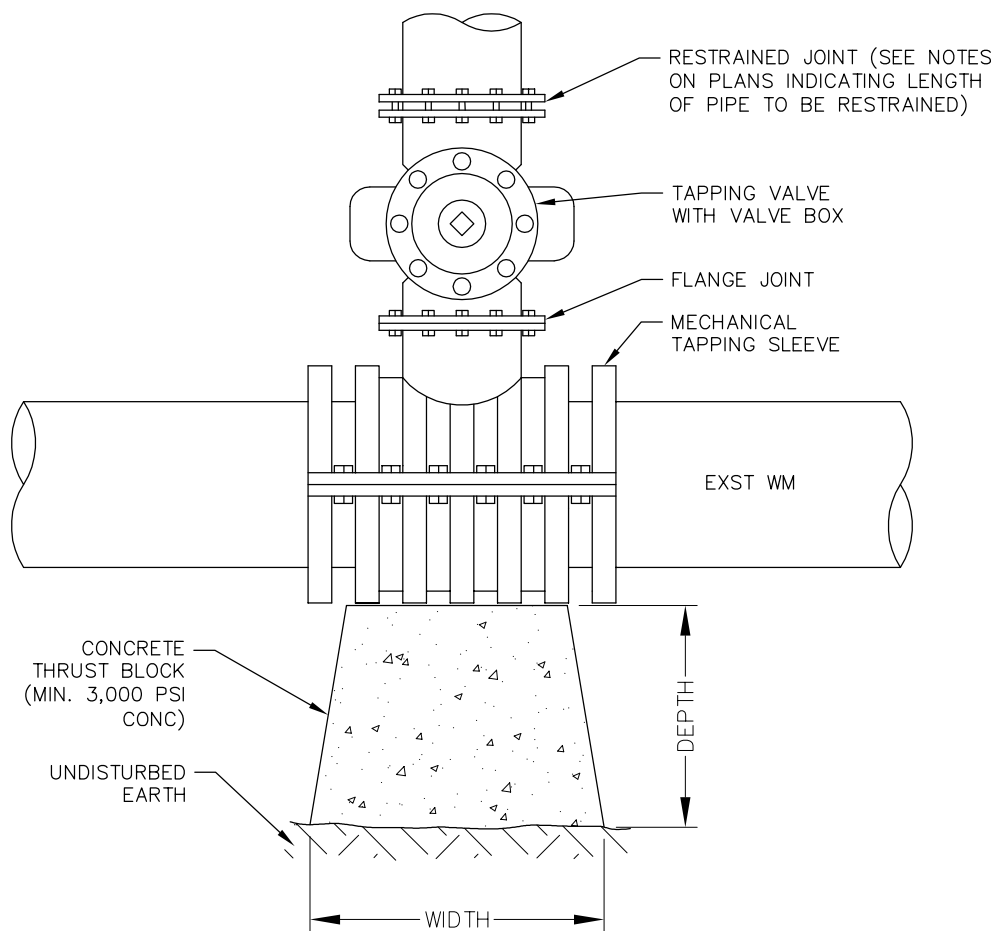
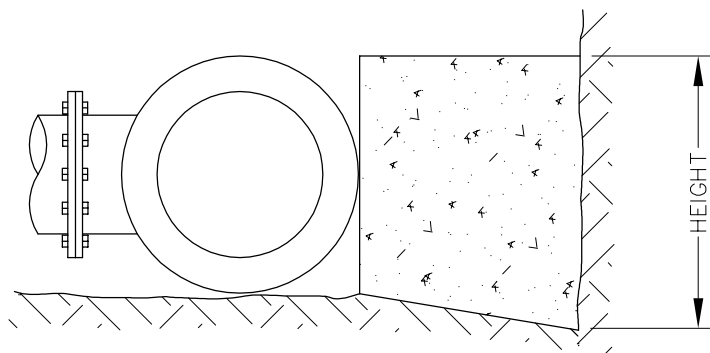


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## TYPICAL TAPPING SLEEVE AND VALVE DETAIL # 6

NOT TO SCALE

### NOTES:

1. BASED ON 100 PSI STATIC PRESSURE PLUS AWWA WATER HAMMER ALLOWANCE
2. ALL BEARING SURFACES TO BE CARRIED TO UNDISTURBED GROUND WITH 2000 PSF BEARING CAPACITY
3. THRUST BLOCKS TO BE USED AT ALL LINES OPERATING UNDER PRESSURE.
4. KEEP ALL PIPING JOINTS CLEAR OF THRUST BLOCKS.
5. POOR SOIL A-4-A-8, SILTY SOILS, CLAYS, MUCK, AND PEAT WILL REQUIRE LARGER THRUST BLOCKS.

WATER DETAIL # 6

TYPICAL TAPPING SLEEVE  
AND VALVE

SHEET 1 OF 1

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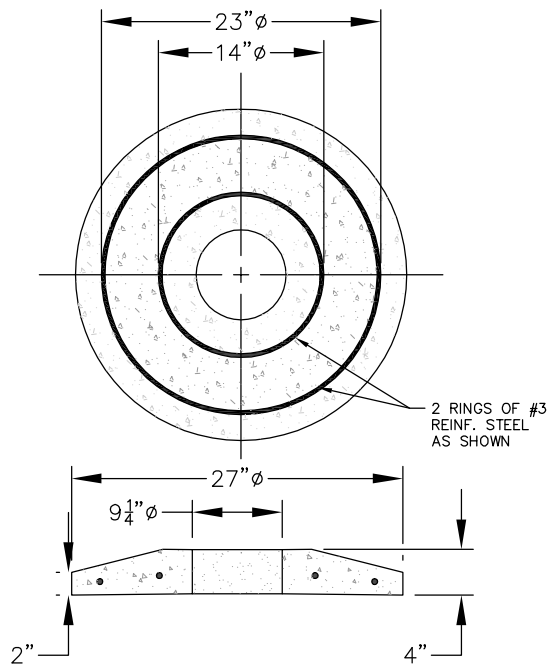


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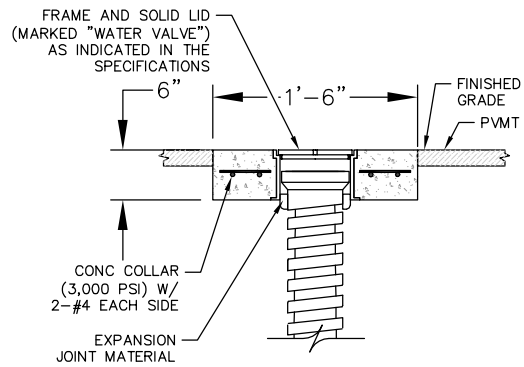
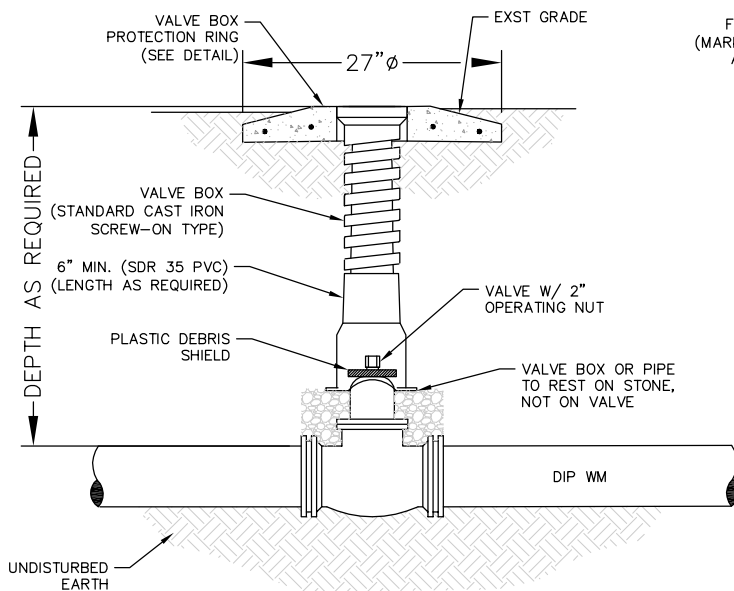
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## CONCRETE PROTECTION RING DETAIL

NOT TO SCALE



## PAVED AREAS

## GATE VALVE AND VALVE BOX DETAIL # 7

NOT TO SCALE

### NOTES:

- FOR UNPAVED LOCATIONS, A CONCRETE VALVE BOX PROTECTOR RING SHALL BE PROVIDED AND INSTALLED FLUSH WITH GRADE. PROTECTOR RING PAD IS NOT REQUIRED FOR VALVE LOCATED IN THE ROADWAY, UNLESS SHOWN OR NOTED OTHERWISE.
- FOR NEW CONSTRUCTION, THE VALVE BOX SHALL BE ADJUSTED TO MIDRANGE TO ALLOW FOR FUTURE BOX ADJUSTMENTS. ROUTE LOCATE WIRES THROUGH THE ADJUSTMENT SECTION OF BOX OR DRILL 3/8" HOLE IN THE BOX TOP SECTION. THE LOCATE WIRES SHALL BE CONNECTED TOGETHER WITH WIRE NUT.
- GATE VALVES SHALL OPEN LEFT.
- PROVIDE A WHITE OR BLACK PLASTIC DEBRIS SHIELD WHICH INSTALLS BELOW THE OPERATING NUT. SHIELD SHALL BE BY AFC, BOXLOK OR APPROVED EQUAL.

WATER DETAIL # 7

GATE VALVE AND VALVE BOX

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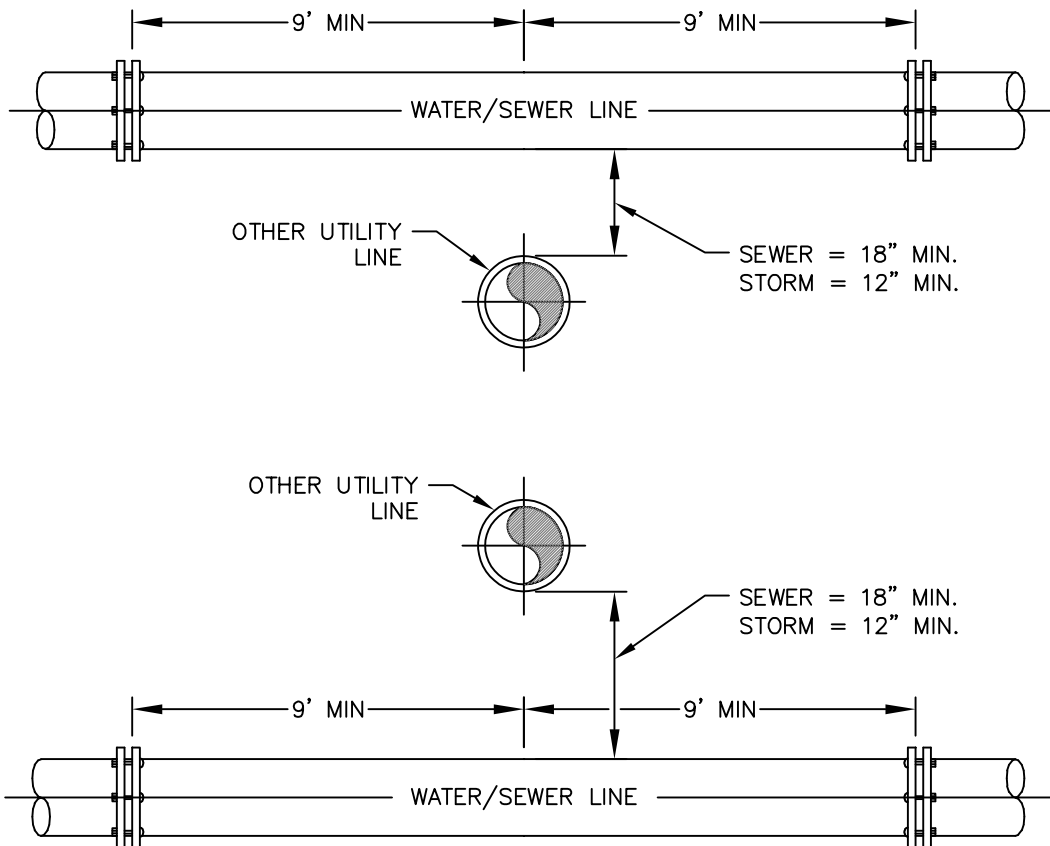


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## WATER AND SEWER UTILITY CROSSING DETAIL

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### NOTES:

1. WHERE A WATER OR SEWER LINE CROSSES UNDER AN EXISTING UTILITY, ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED FOR THE EXISTING UTILITY TO PREVENT DAMAGE TO THE WATER OR SEWER MAIN. DETAILS OF STRUCTURAL SUPPORT AT EACH LOCATION SHALL BE INCLUDED IN THE DESIGN PLANS.
2. IF CLEARANCE OF OTHER UTILITY IS LESS THAN 18", USE EXCAVATABLE FLOWABLE FILL ENCASEMENT ON DIP. DIP SHALL HAVE POLYETHYLENE ENCASEMENT PRIOR TO FLOWABLE FILL BEING POURED.

WATER DETAIL # 10

WATER AND SEWER/STORM  
CROSSING

SHEET 1 OF 1

### REVISION

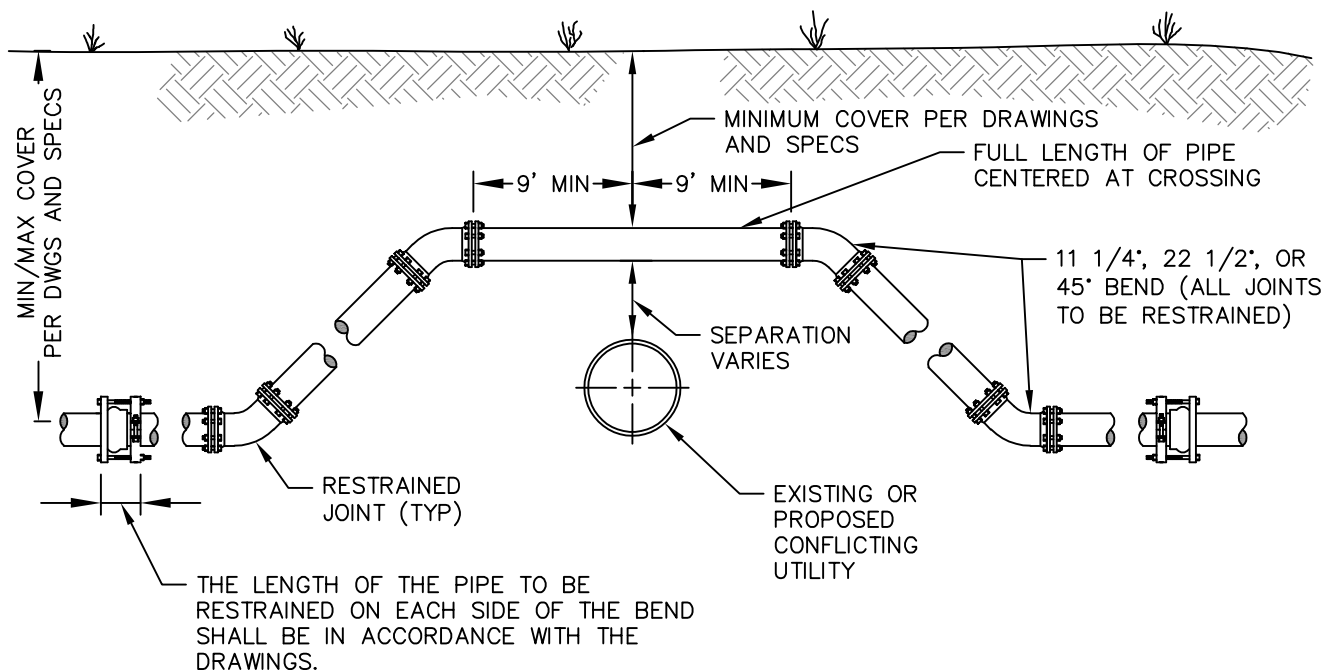
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## ADJUSTMENT OVER EXISTING UTILITIES DETAIL

NOT TO SCALE

### NOTES:

1. THE SOILS BETWEEN THE NEW MAIN AND THE CONFLICT PIPE SHALL BE COMPACTED IN 6" LAYERS TO A MINIMUM COMPACTION OF 98% STANDARD PROCTOR WITH AN ALLOWABLE  $\pm 5\%$  OF OPTIMUM MOISTURE CONTENT.
2. ARV MAY BE REQUIRED TO RELEASE ACCUMULATED AIR.

WATER DETAIL # 11

ADJUSTMENT OVER  
EXISTING UTILITIES

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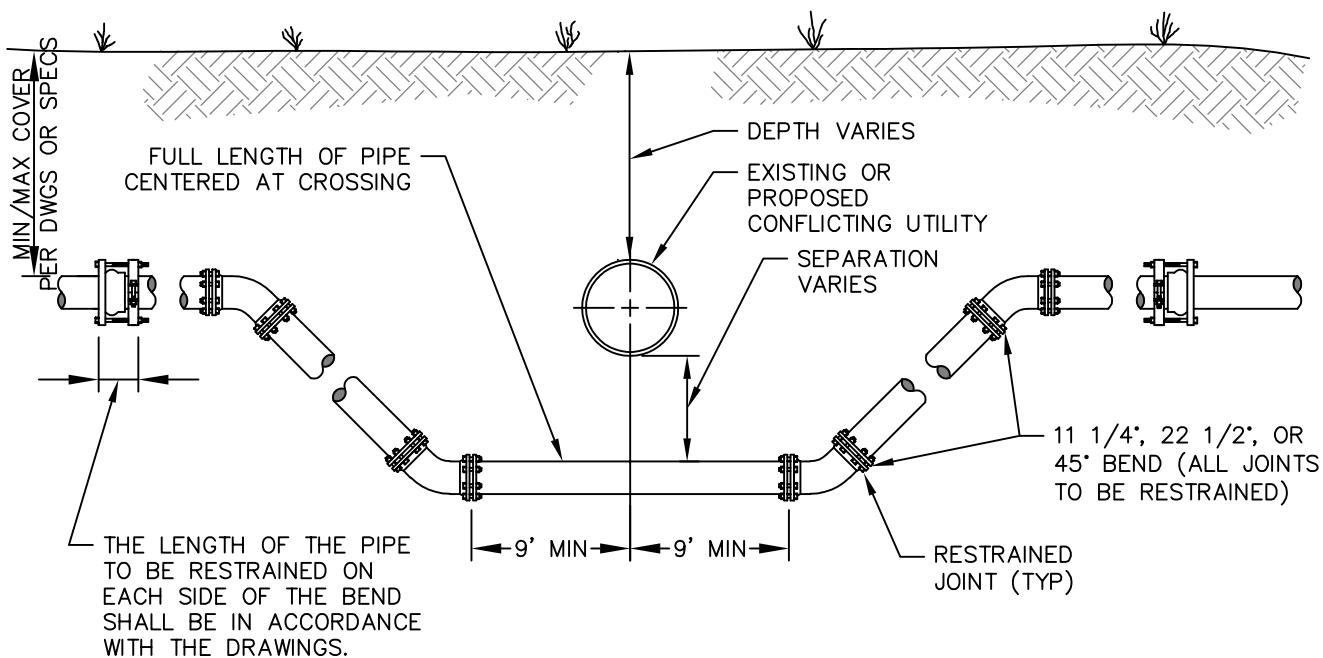
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## ADJUSTMENT UNDER EXISTING UTILITIES DETAIL

NOT TO SCALE

### NOTES:

1. THE SOILS BETWEEN THE NEW MAIN AND THE CONFLICT PIPE SHALL BE COMPACTED IN 6" LAYERS TO A MINIMUM COMPACTION OF 98% STANDARD PROCTOR WITH AN ALLOWABLE  $\pm 5\%$  OF OPTIMUM MOISTURE CONTENT.
2. ARV MAY BE REQUIRED TO RELEASE ACCUMULATED AIR.

WATER DETAIL #12

ADJUSTMENT UNDER  
EXISTING UTILITIES

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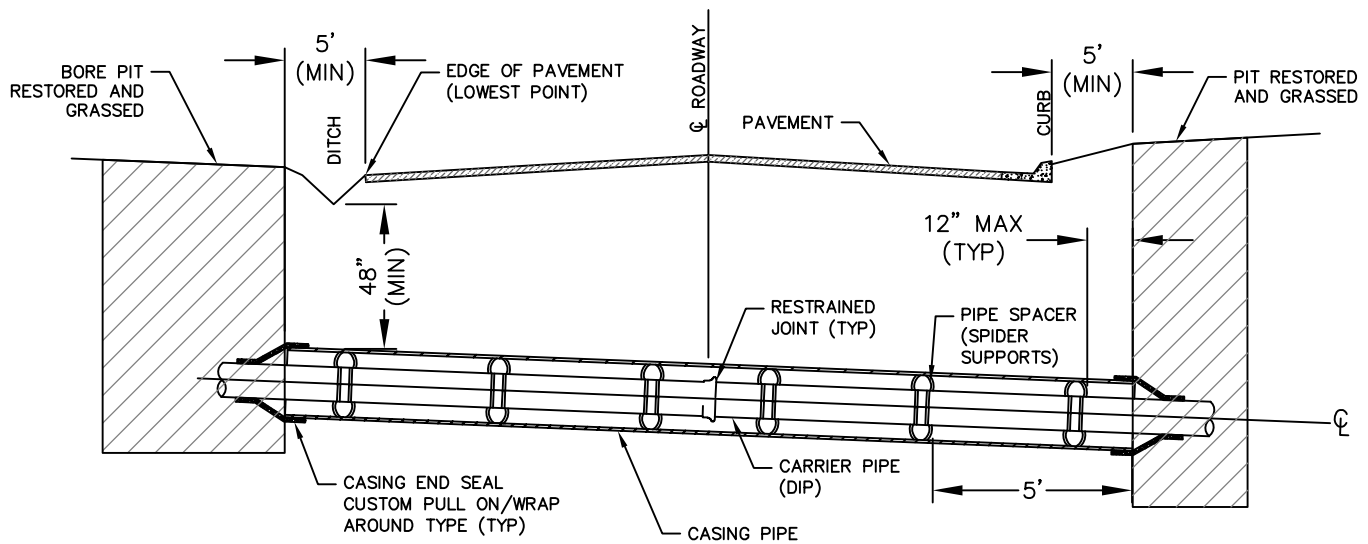
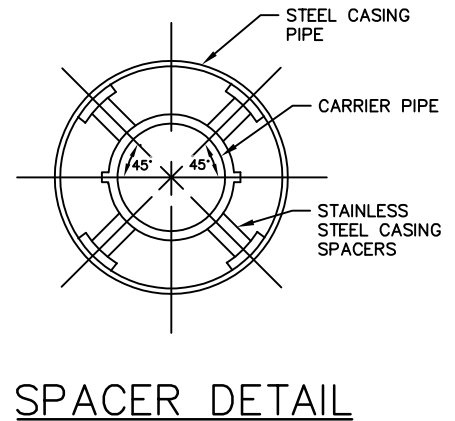
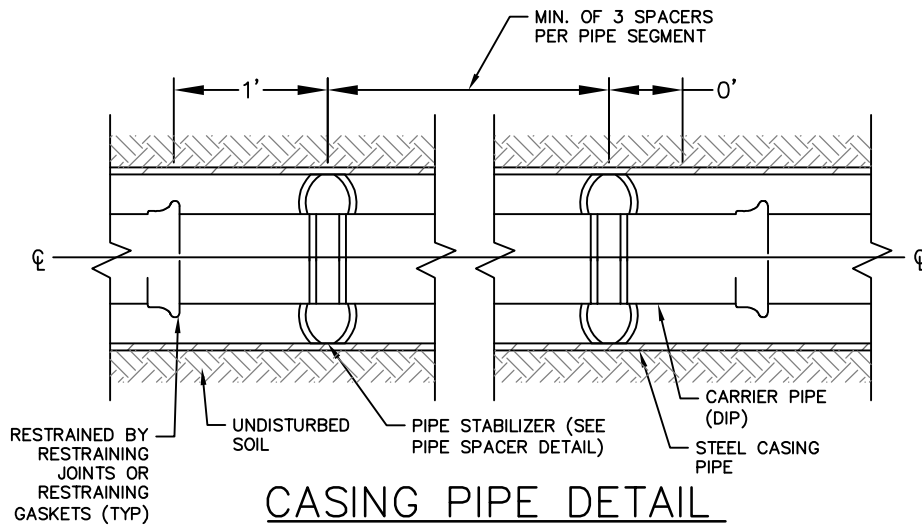
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## BORE AND JACK AND CASING DETAIL

NOT TO SCALE

### NOTES:

1. STEEL CASING LENGTH SHALL BE IN ACCORDANCE WITH SCDOT "A POLICY FOR ACCOMMODATING UTILITIES ON HIGHWAY RIGHTS-OF-WAY OR "RAILROAD SPECIFICATIONS FOR PIPELINE OCCUPANCY" AND THE SPECIFICATIONS.
2. CASING PIPE AND CARRIER PIPE DIAMETERS SHALL BE DETAILED IN THE DESIGN PLANS IN ACCORDANCE WITH THE SPECIFICATIONS.
3. USE SPIDER SUPPORTS (SEE DETAIL) TO MOVE CARRIER PIPE INTO CASING PIPE. SPACING OF SPIDERS WILL BE DICTATED BY THE LENGTH OF CASING PIPE AND NUMBER OF JOINTS OF CARRIER PIPE AND SHALL BE DETAILED IN THE DESIGN PLANS.
4. MINIMUM OF 3 SPACERS PER JOINT OF PIPE.
5. A MINIMUM OF 48" OF COVER SHALL BE REQUIRED WHEN IN SCDOT RIGHTS-OF-WAY.

WATER DETAIL # 17

BORE AND JACK AND CASING

SHEET 1 OF 1

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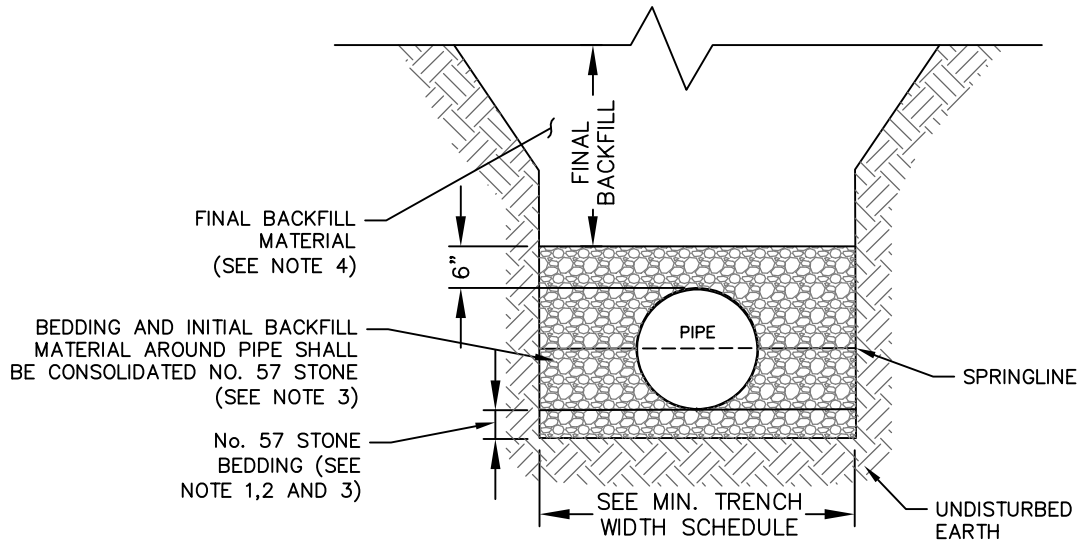
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MINIMUM TRENCH WIDTH SCHEDULE				
PIPE SIZE I.D.	12" OR LESS	12" TO 21"	24" TO 30"	33" TO 54"
TRENCH WIDTH (W/O SHORING)	36"	I.D. + 24"	I.D. + 30"	I.D. + 30"
TRENCH WIDTH (W/ SHORING)	48"	I.D. + 36"	I.D. + 42"	I.D. + 42"

## MINIMUM BEDDING FOR GRAVITY AND FORCE SEWER MAIN DETAIL

### NOTES:

NOT TO SCALE

- BEDDING DEPTH SHALL BE 6" MINIMUM FOR PIPE DIAMETER LESS THAN 12".
- DEPTH FOR REMOVAL OF UNSUITABLE MATERIAL SHALL GOVERN DEPTH OF BEDDING MATERIAL BELOW THE PIPE. THE DESIGN-BUILD CONTRACTOR'S ENGINEER OF RECORD, WITH CITY CONCURRENCE, SHALL DETERMINE IN THE FIELD THE AMOUNT OF UNSUITABLE MATERIAL REQUIRED TO REACH A SUITABLE FOUNDATION.
- THE PIPE BEDDING SHALL BE CONSOLIDATED NO. 57 STONE IN 6" LAYERS TO THE BOTTOM OF THE PIPE. THEN BACKFILLED WITH NO. 57 STONE CONSOLIDATED IN 6" LAYERS TO THE SPRINGLINE OF THE PIPE.
- FINAL BACKFILL MATERIAL
  - AREAS OUTSIDE THE SCDOT, COUNTY, AND CITY RIGHT-OF-WAYS: FINAL BACKFILL MATERIAL SHALL MEET THE REQUIREMENTS OF AASHTO M145 GROUP CLASSIFICATION A1-A6 AND BE COMPACTED IN SUFFICIENT DEPTHS TO MEET A MINIMUM COMPACTION OF 85% STANDARD PROCTOR WITH AN ALLOWABLE  $\pm 5\%$  OF OPTIMUM MOISTURE CONTENT.
  - AREAS INSIDE THE SCDOT, COUNTY, AND CITY RIGHT-OF-WAYS: FINAL BACKFILL MATERIAL SHALL MEET THE REQUIREMENTS OF AASHTO M145 GROUP CLASSIFICATION A1-A3 AND BE COMPACTED IN 6" LAYERS TO A MINIMUM COMPACTION OF 95% STANDARD PROCTOR WITH AN ALLOWABLE  $\pm 5\%$  OF OPTIMUM MOISTURE CONTENT.
  - UNDER ROADWAY PAVEMENT (TO THREE FEET FROM EDGE OF PAVEMENT): FINAL BACKFILL MATERIAL SHALL BE SCDOT EXCAVATABLE (200 PSI MAX) FLOWABLE FILL FOR ALL SCDOT ROADWAYS.
  - UNDER DRIVEWAYS: FINAL BACKFILL MATERIAL SHALL MEET REQUIREMENTS OF AASHTO M145 GROUP CLASSIFICATION A1-A3 AND BE COMPACTED IN 6" LAYERS TO A MINIMUM COMPACTION OF 98% STANDARD PROCTOR WITH AN ALLOWABLE  $\pm 5\%$  OF OPTIMUM MOISTURE CONTENT.
  - USE OF NATIVE MATERIAL: NATIVE MATERIAL MAY BE USED IN FINAL BACKFILL ONLY WHEN MATERIAL MEETS THE REQUIREMENTS AS OUTLINED ABOVE.

SEWER DETAIL # 19

MINIMUM BEDDING FOR  
GRAVITY SEWER MAIN

SHEET 1 OF 1

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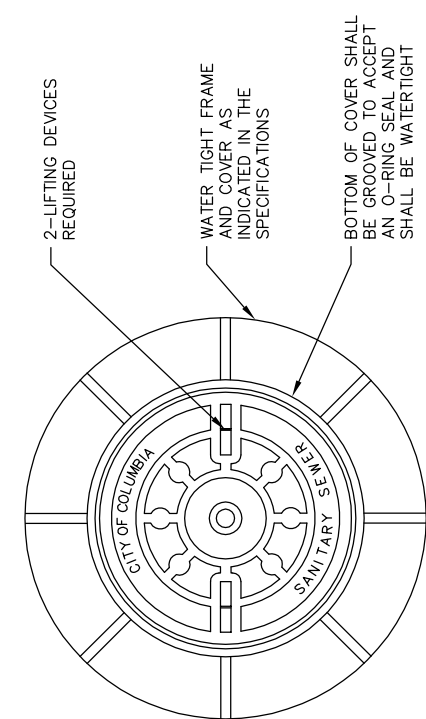
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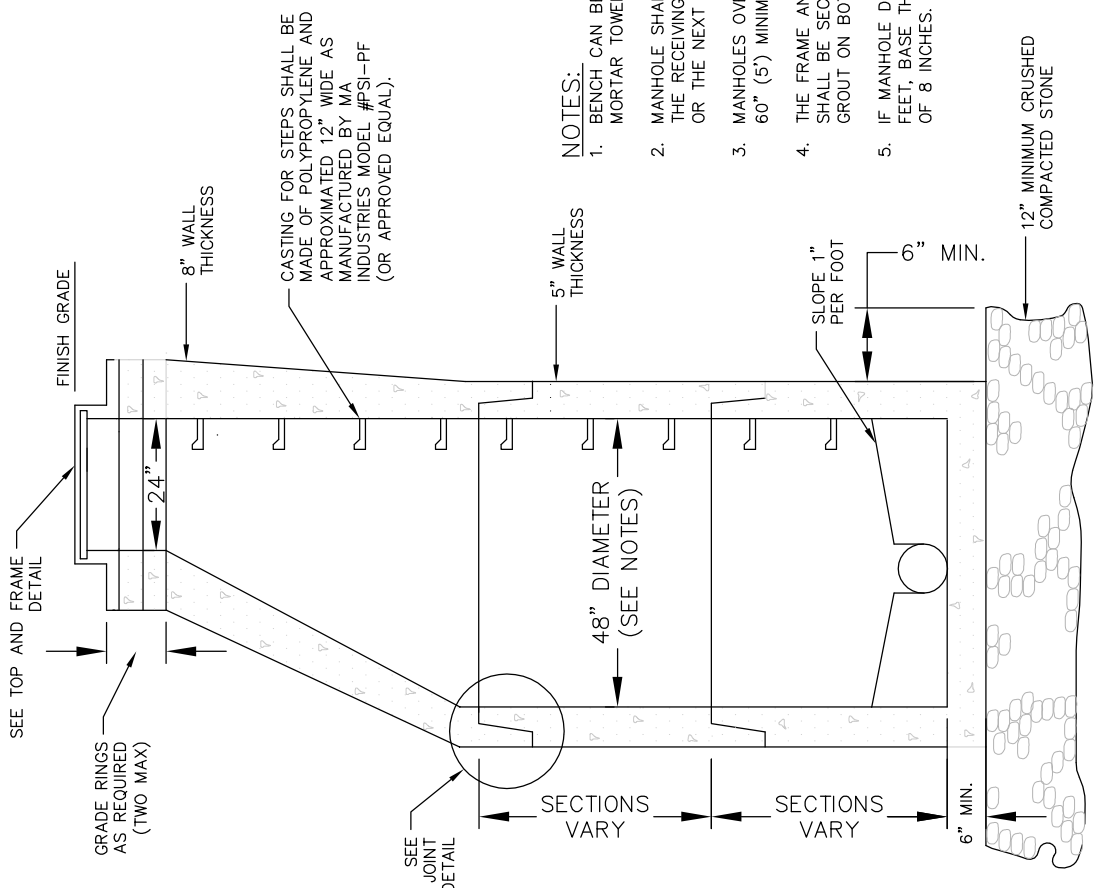
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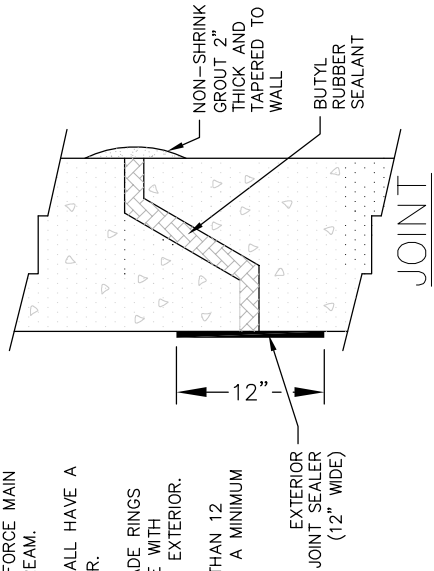


## TOP AND FRAME



### NOTES:

1. BENCH CAN BE PRECAST, OR BRICK AND MORTAR TOWELED SMOOTH.
2. MANHOLE SHALL BE UNLINED UNLESS IT IS THE RECEIVING MANHOLE FOR A FORCE MAIN OR THE NEXT MANHOLE DOWNSTREAM.
3. MANHOLES OVER 12 FT. DEEP SHALL HAVE A 60" (5') MINIMUM INSIDE DIAMETER.
4. THE FRAME AND COVER AND GRADE RINGS SHALL BE SECURED TO THE CONE WITH GROUT ON BOTH THE INTERIOR & EXTERIOR.
5. IF MANHOLE DEPTH IS GREATER THAN 12 FEET, BASE THICKNESS SHALL BE A MINIMUM OF 8 INCHES.



## PRECAST MANHOLE DETAIL #20

NOT TO SCALE

### NOTES:

1. SEE SPECIFICATIONS FOR MANHOLE RING AND COVER.
2. SEAL ALL EXTERNAL JOINTS WITH MASTIC SEALANT. SEE SPECIFICATIONS.

SEWER DETAIL # 20

PRECAST MANHOLE

SHEET 1 OF 1

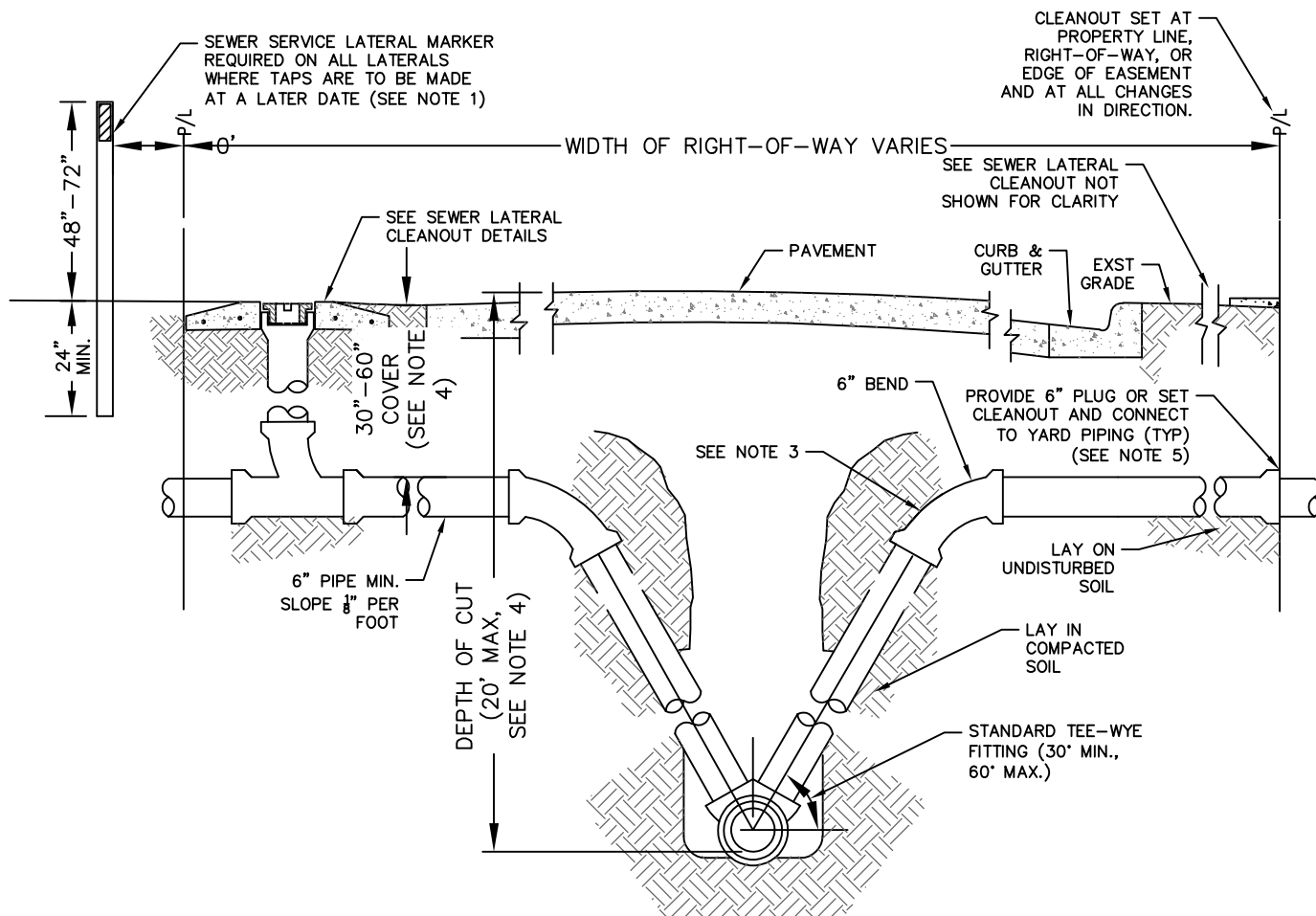
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## SEWER SERVICE LATERAL SECTION VIEW DETAIL

NOT TO SCALE

### NOTES:

1. FOR SEPTIC TANK PHASE-OUT, A SEWER SERVICE LATERAL MARKER IS REQUIRED FOR ALL LATERALS WHICH ARE "NOT IN USE". SEWER SERVICE LATERAL MARKER SHALL BE, A LANDSCAPE TIMBER OR 3x3 MIN. P.T. POST (TOP PAINTED GREEN) SHALL BE INSTALLED TO MARK THE LOCATION OF THE 6" PLUG.
2. THE MINIMUM SIZE OF ALL HOUSE LATERALS SHALL BE 6 INCHES. THE MAXIMUM LENGTH OF A HOUSE LATERAL SHALL BE 60 FEET (LENGTH BETWEEN SEWER MAIN TO CUSTOMERS PROPERTY LINE).
3. ALL SEWER SERVICE LATERAL PIPE AND FITTINGS (INCLUDING THE TEE-WYE FITTING) WITH A "DEPTH OF CUT" EQUAL OR GREATER THAN 12 FEET, SHALL BE DIP, PRESSURE CLASS 350, LINED IN ACCORDANCE WITH THE SPECIFICATIONS.
4. THE SEWER SERVICE LATERAL SHALL BE CONSTRUCTED AT A DEPTH TO ALLOW A GRAVITY CONNECTION BY THE CUSTOMER, WHERE POSSIBLE (CONTINGENT UPON MEETING THE CUSTOMER'S ON-SITE CONDITIONS AND LOCAL CONSTRUCTION STANDARDS). A LATERAL REQUIRING MORE THAN 60" OF COVER MUST BE APPROVED, PRIOR TO CONSTRUCTION, BY THE DESIGN-BUILD CONTRACTOR'S ENGINEER RECORD WITH CITY CONCURRENCE.
5. CONNECTION TO EXISTING YARD PIPING (TO BE LOCATED PRIOR TO INSTALLING THE TEE BRANCH) SHALL BE MADE WITH A FLEXIBLE ADAPTER COUPLING (FERNCO OR EQUAL).

SEWER DETAIL # 21

SEWER SERVICE LATERAL  
SECTION VIEW

SHEET 1 OF 1

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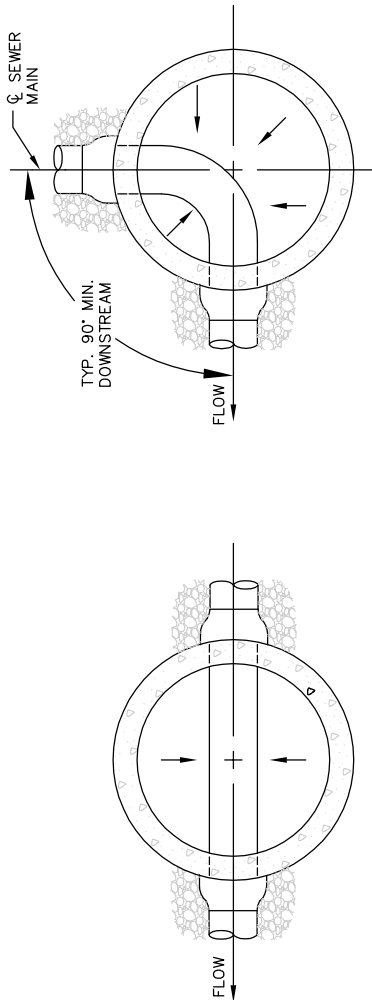
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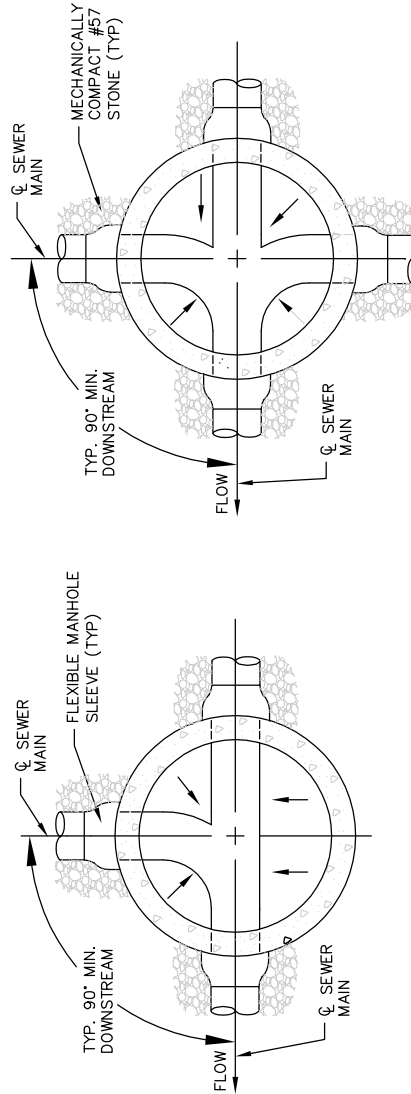
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STANDARD MANHOLES SCHEDULE OF GOVERNING DIMENSIONS				
PIPE SIZE	ANGLE Δ	INSIDE DIAMETER	"R"	"X"
8" TO 15"	0° TO 90°	4'-0" *	2'-0"	0"
16" TO 30"	0° TO 90°	5'-0"	2'-0"	6"
36" TO 42"	0° TO 60°	6'-0"	3'-0"	9"
36" TO 42"	60° TO 90°	6'-0"	3'-0"	1'-2"
48" OR LARGER	0° TO 45°	7'-0"	4'-0"	6"
48" OR LARGER	45° TO 90°	8'-0"	3'-0"	1'-3"

\*MANHOLE DEEPER THAN 12' SHALL BE 5' MIN.



TWO-WAY INTERSECTION



THREE-WAY INTERSECTION FOUR-WAY INTERSECTION

TYPICAL STANDARD  
MANHOLE PLAN

MANHOLE PLAN AND INVERT  
DETAIL # 22

NOT TO SCALE

NOTES:

1. TROWEL SHAPE INVERTS TO BE UNIFORM AND SMOOTH.
2. ARROWS INDICATE DIRECTION OF SLOPE.

SEWER DETAIL # 22

MANHOLE PLAN AND INVERT

SHEET 1 OF 1

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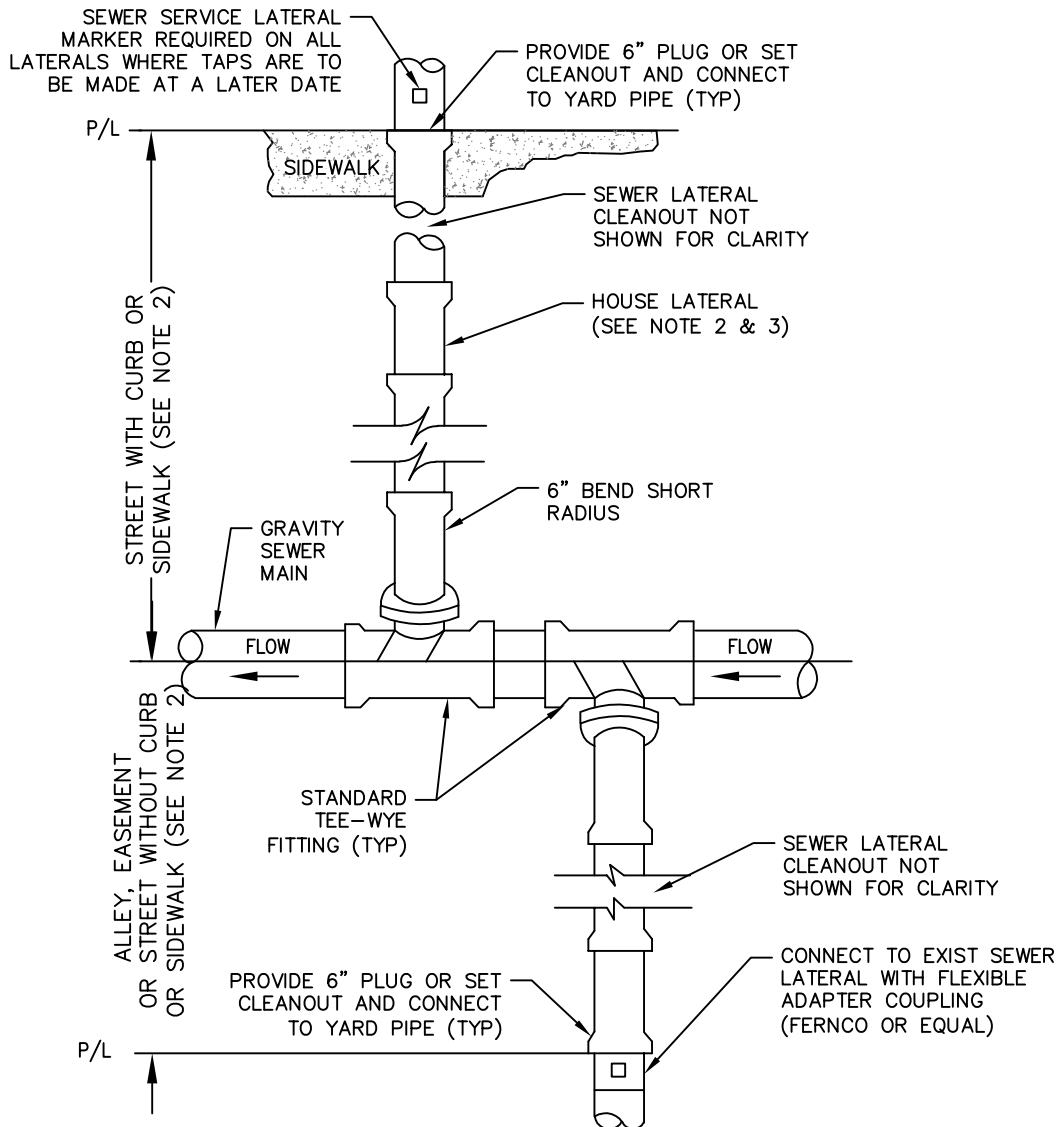


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## SEWER SERVICE LATERAL PLAN VIEW DETAIL

NOT TO SCALE

### NOTES:

1. FOR SEPTIC TANK PHASE-OUT, A SEWER SERVICE LATERAL MARKER IS REQUIRED FOR ALL LATERALS WHICH ARE "NOT IN USE". SEWER SERVICE LATERAL MARKER SHALL BE, A LANDSCAPE TIMBER OR 3x3 MIN. P.T. POST (TOP PAINTED GREEN) SHALL BE INSTALLED TO MARK THE LOCATION OF THE 6" PLUG.
2. THE MINIMUM SIZE OF ALL HOUSE LATERALS SHALL BE 6 INCHES. THE MAXIMUM LENGTH OF A HOUSE LATERAL SHALL BE 60 FEET (LENGTH BETWEEN SEWER MAIN TO CUSTOMERS PROPERTY LINE).
3. ALL SEWER SERVICE LATERAL PIPE AND FITTINGS (INCLUDING THE TEE-WYE FITTING) WITH A "DEPTH OF CUT" EQUAL OR GREATER THAN 12 FEET, SHALL BE DIP, PRESSURE CLASS 350, LINED IN ACCORDANCE WITH THE SPECIFICATIONS.

SEWER DETAIL # 23

SEWER SERVICE  
LATERAL PLAN VIEW

SHEET 1 OF 1

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