

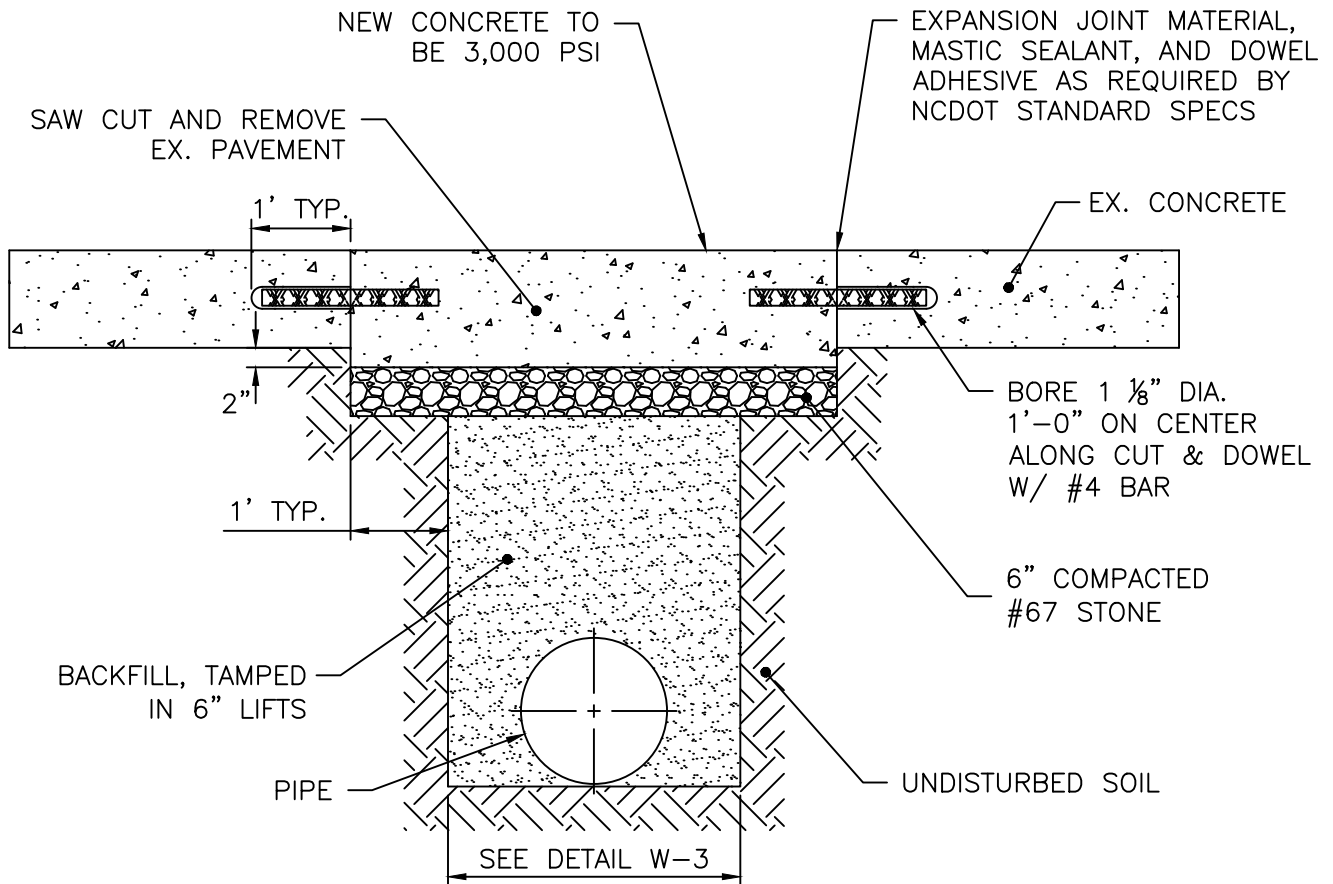


# Appendix B

## Standard Details



Raleigh  
Water



**NOTES:**

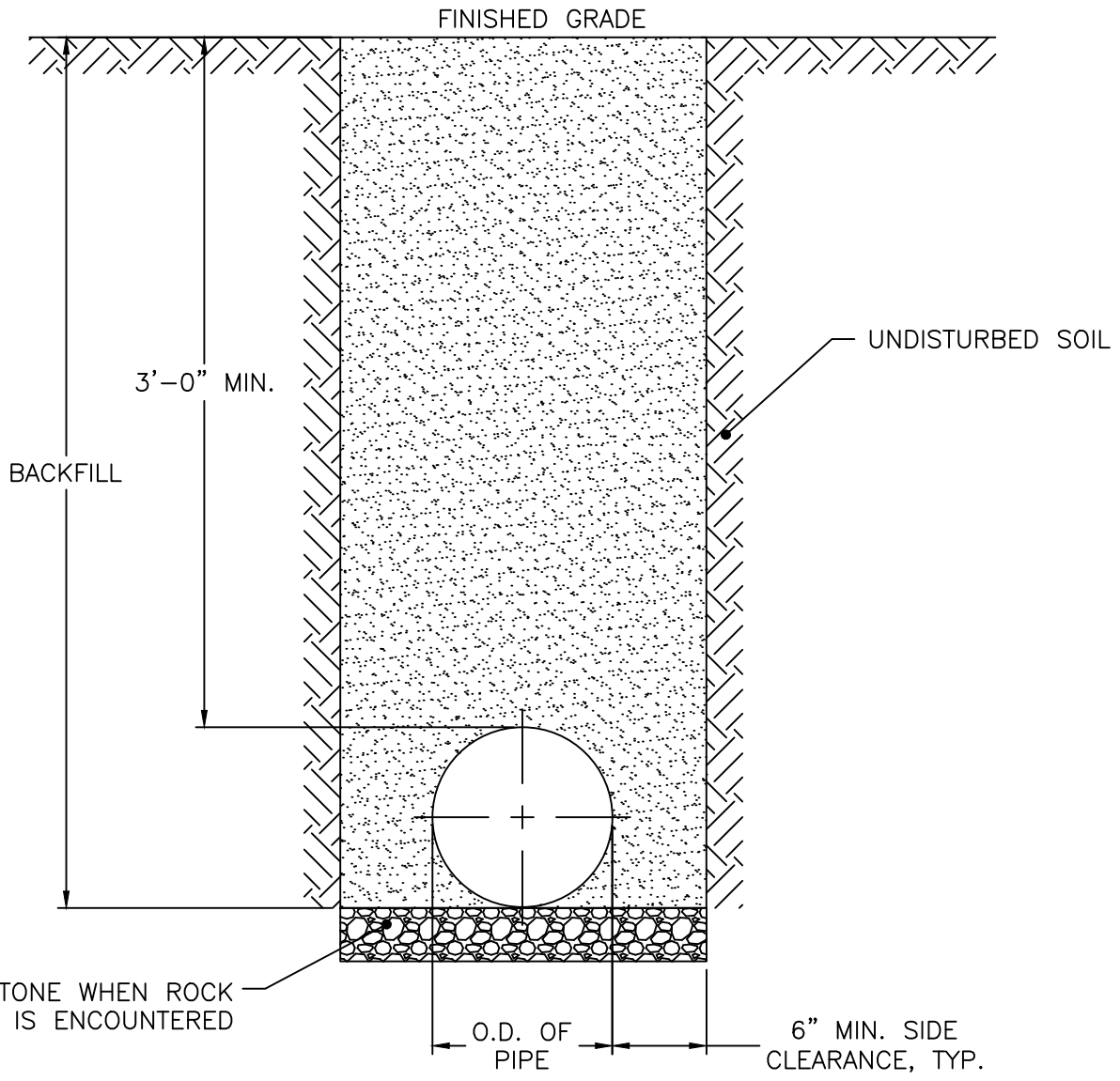
1. SEE DETAIL W-3 FOR ADDITIONAL TRENCH AND PIPE BEDDING DETAILS.
2. PAVEMENT CUTS WITHIN NCDOT ROW SHALL CONFORM TO THE APPROVED ON SITE ENCROACHMENT PERMIT.
3. THE PAVEMENT CUT SHALL BE DEFINED BY A STRAIGHT EDGE AND CUT WITH AN APPROVED SAW CUT MACHINE.
4. THE TRENCH SUBGRADE MATERIAL SHALL BE BACKFILLED WITH SUITABLE MATERIAL AND COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY AASHTO T 99 AS MODIFIED BY NCDOT.
5. THE FINAL 6" OF FILL SHALL CONSIST OF ABC MATERIAL COMPACTED TO AT LEAST 100% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY AASHTO T 180 AS MODIFIED BY NCDOT.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
	STANDARD CONCRETE PAVEMENT PATCH	
	<b>W-1</b>	

SEE TRANSPORTATION DETAIL  
T-10.05.1 FOR ASPHALT REPAIR

SEE TRANSPORTATION DETAIL  
T-10.05.2 FOR ASPHALT REPAIR EXTENTS

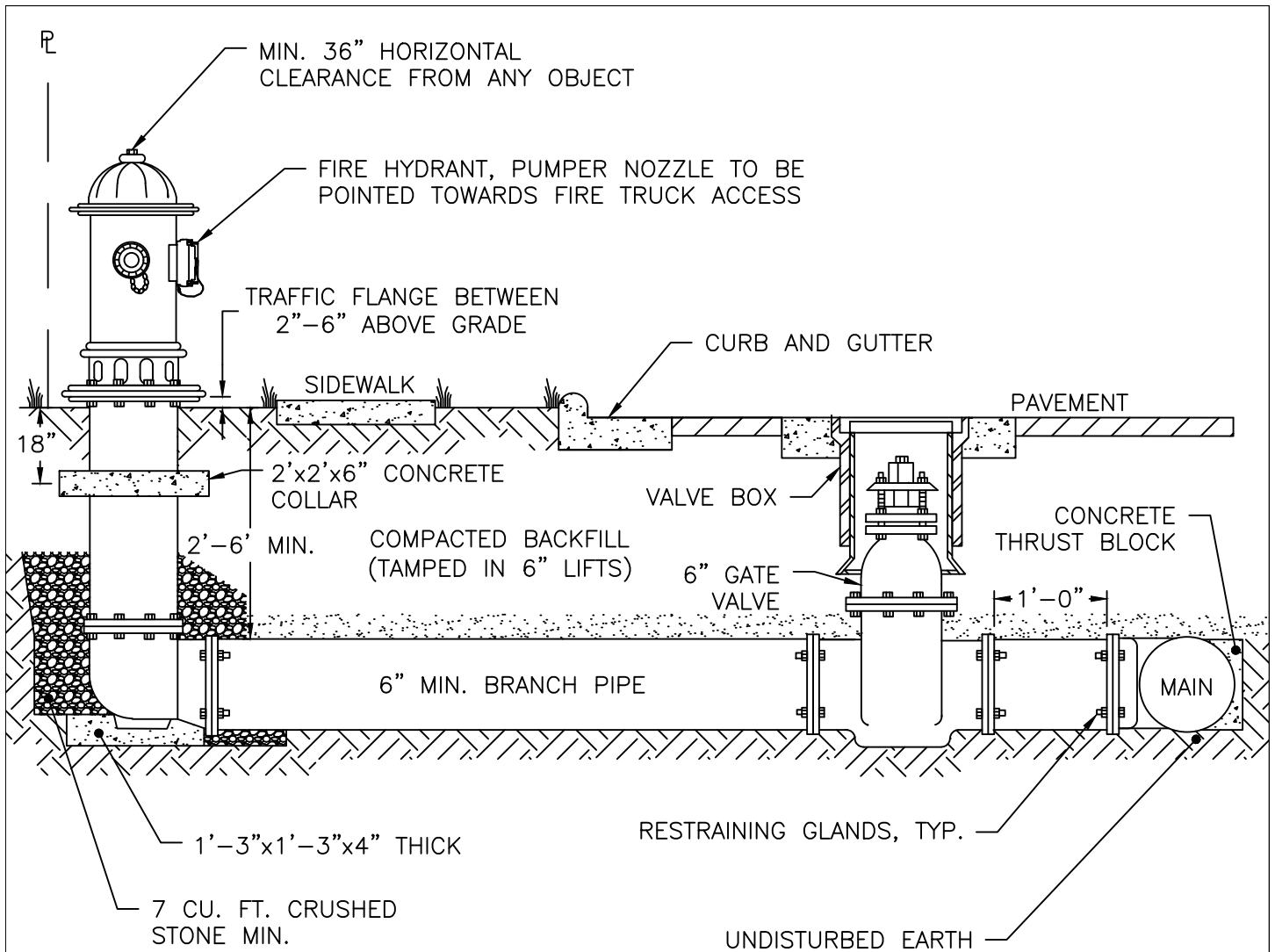
<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
	STANDARD ASPHALT PAVEMENT PATCH	
	<b>W-2</b>	



NOTES:

1. TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
2. NO ROCKS OR BOULDERS 4" OR LARGER TO BE USED IN BACKFILL.
3. ALL BACKFILL MATERIAL SHALL BE SUITABLE NATIVE MATERIAL.
4. BACKFILL SHALL BE TAMPED IN 6" LIFTS.
5. ACHIEVE 95% COMPACTION IN BACKFILL.

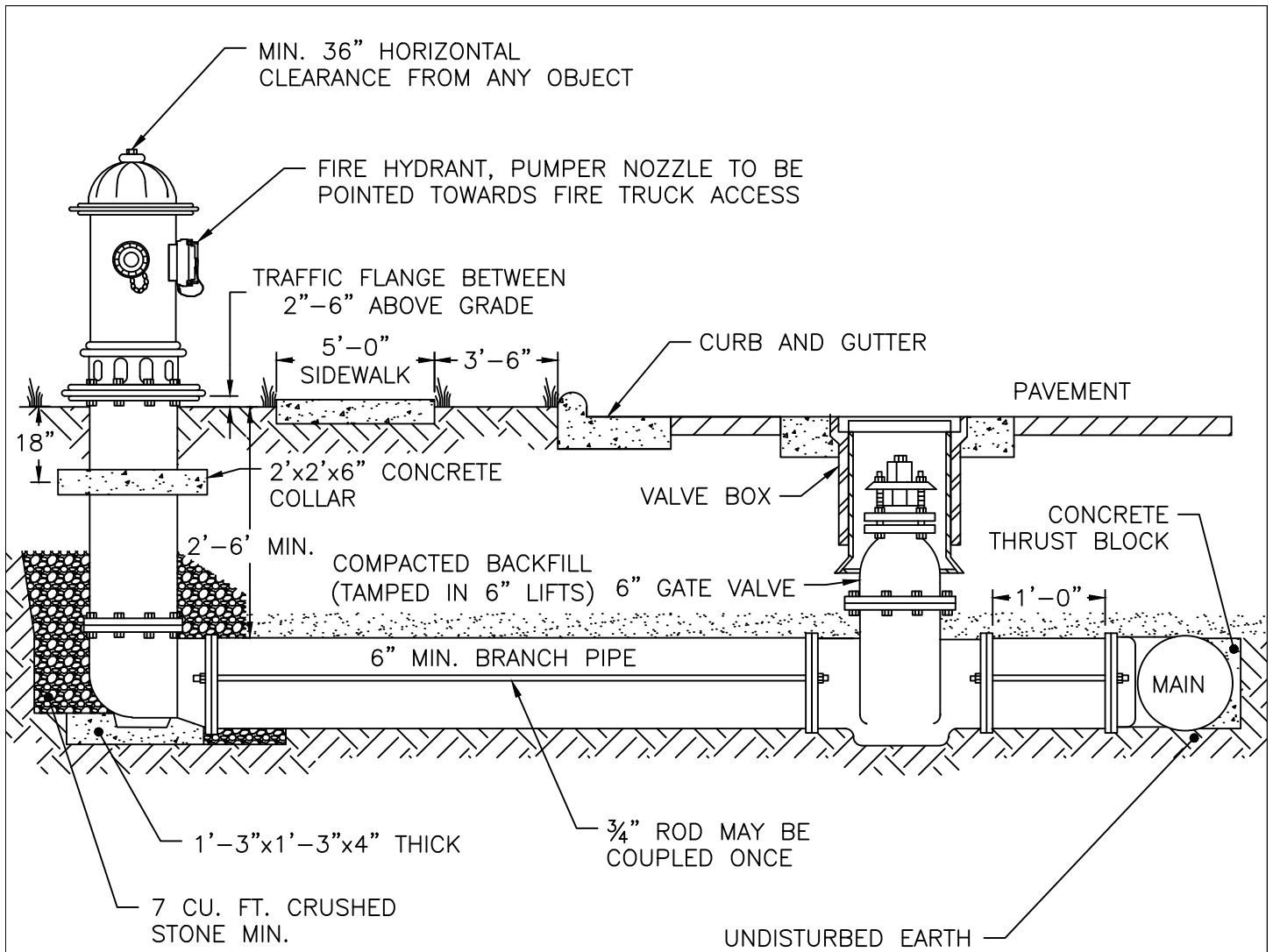
<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	DATE: 05/24/2024	<i>NOT TO SCALE</i>
	TRENCH BOTTOM DIMENSIONS AND BACKFILLING REQUIREMENTS FOR DUCTILE IRON	
<b>W-3</b>		



**NOTES:**

1. FIRE HYDRANT SHALL BE AS MANUFACTURED: MUELLER, AMERICAN DARLING, KENNEDY OR CLOW.
2. BRANCH PIPE SHALL BE DUCTILE IRON AWWA C150.
3. 6" GATE VALVE SHALL BE AWWA C500 OPEN LEFT.
4. RODS AND BOLTS SHALL BE  $\frac{3}{4}$ " 316 STAINLESS STEEL.
5. FIRE HYDRANTS WILL BE INSTALLED IN TRUE VERTICAL POSITION.
6. RODS SHALL NOT BE COUPLED MORE THAN ONCE. IF THE LENGTH FROM THE VALVE TO THE HYDRANT EXCEEDS 20' THEN A MECHANICAL RESTRAINING GLAND WITH A REBAR CAGE SHALL BE INSTALLED NO MORE THAN 10' FROM HYDRANT AND POURED IN CONCRETE.
7. FIRE HYDRANTS TO BE LOCATED IN ROW OR 2.5 FOOT EASEMENT (ON ALL SIDES OF HYDRANT) FOOT EASEMENT ADJACENT TO ROW.
8. ANYTIME SITE WORK, CONSTRUCTION, ROAD WORK, OR ANY OTHER WORK CHANGES THE GRADE OF THE FIRE HYDRANT, THE PERSON RESPONSIBLE FOR THE WORK IS RESPONSIBLE FOR ADJUSTING THE FIRE HYDRANT TO STAY WITHIN COMPLIANCE.

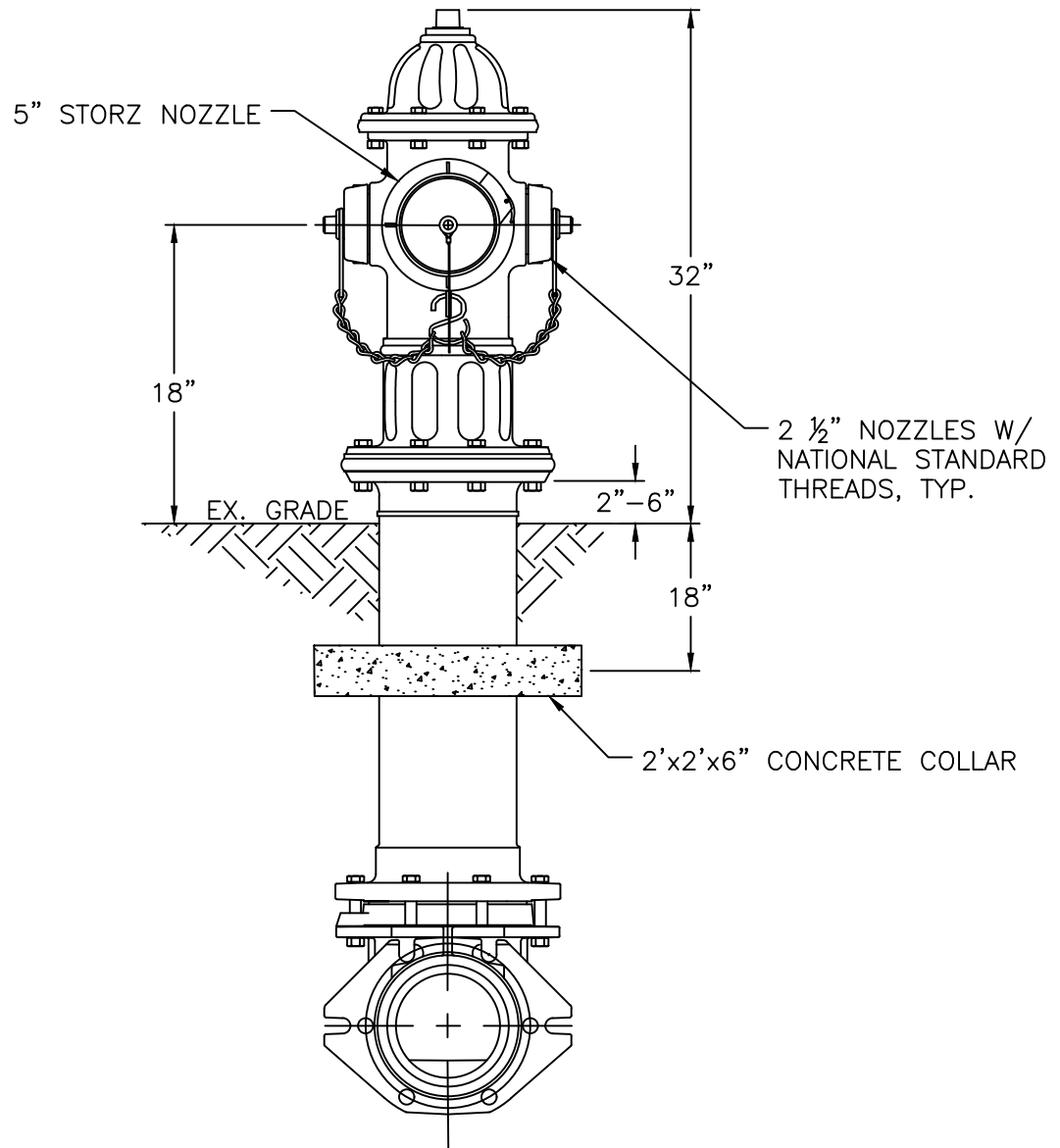
<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
	STANDARD FIRE HYDRANT INSTALLATION (RESTRAINT GLANDS)	
	<b>W-4</b>	



**NOTES:**

1. FIRE HYDRANT SHALL BE AS MANUFACTURED: MUELLER, AMERICAN DARLING, KENNEDY OR CLOW.
2. BRANCH PIPE SHALL BE DUCTILE IRON AWWA C150.
3. 6" GATE VALVE SHALL BE AWWA C500 OPEN LEFT.
4. RODS AND BOLTS SHALL BE 3/4" 316 STAINLESS STEEL.
5. FIRE HYDRANTS WILL BE INSTALLED IN TRUE VERTICAL POSITION.
6. RODS SHALL NOT BE COUPLED MORE THAN ONCE. IF THE LENGTH FROM THE VALVE TO THE HYDRANT EXCEEDS 20' THEN A MECHANICAL RESTRAINING GLAND WITH A REBAR CAGE SHALL BE INSTALLED NO MORE THAN 10' FROM HYDRANT AND POURED IN CONCRETE.
7. FIRE HYDRANTS TO BE LOCATED IN ROW OR 2.5 FOOT EASEMENT (ON ALL SIDES OF HYDRANT) FOOT EASEMENT ADJACENT TO ROW.
8. ANYTIME SITE WORK, CONSTRUCTION, ROAD WORK, OR ANY OTHER WORK CHANGES THE GRADE OF THE FIRE HYDRANT, THE PERSON RESPONSIBLE FOR THE WORK IS RESPONSIBLE FOR ADJUSTING THE FIRE HYDRANT TO STAY WITHIN COMPLIANCE.

CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	STANDARD FIRE HYDRANT INSTALLATION (RESTRAINT RODS)	
	<b>W-4A</b>	



**NOTES:**

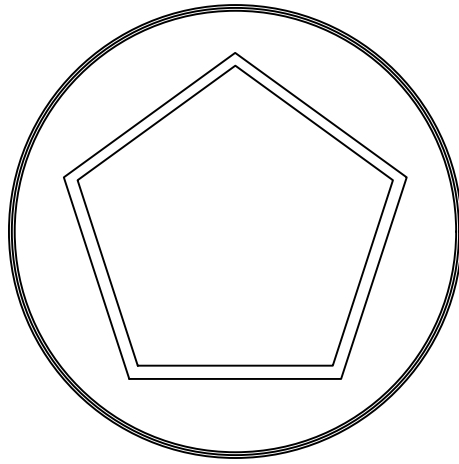
1. ALL PUBLIC FIRE HYDRANTS IN THE CITY OF RALEIGH AND THE MERGER TOWNS OF GARNER, ROLESVILLE, WAKE FOREST, KNIGHTDALE, WENDELL AND ZEBULON SHALL BE PAINTED CHROME YELLOW WITH HIGH REFLECTIVE ALUMINUM SILVER CAPS, BONNETS AND OPERATING NUTS.
2. ALL PRIVATE FIRE HYDRANTS SHALL BE RED.

**CITY OF RALEIGH  
STANDARD DETAIL**

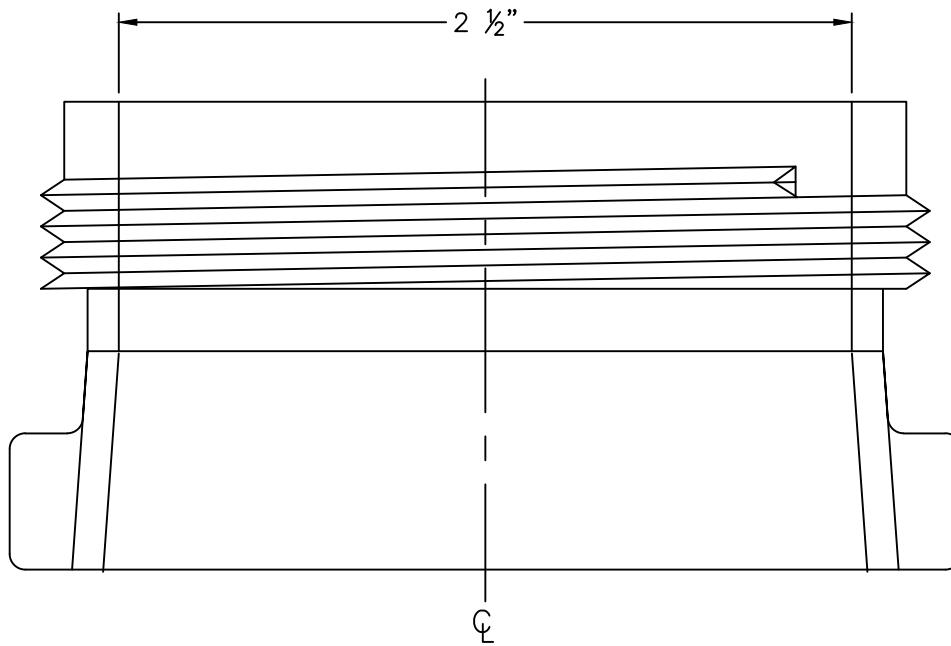
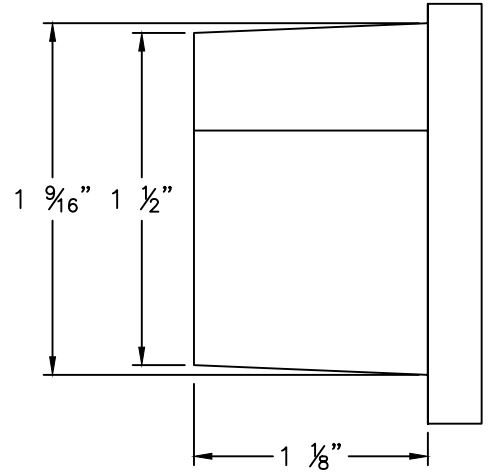
REVISIONS	DATE: 05/24/2024	NOT TO SCALE

STANDARD FIRE HYDRANT WITH  
5" STORZ PUMPER NOZZLE

**W-5**



1  $\frac{9}{16}$ " OPERATION NUT



2  $\frac{1}{2}$ " NATIONAL STANDARD OUTLET THREADS

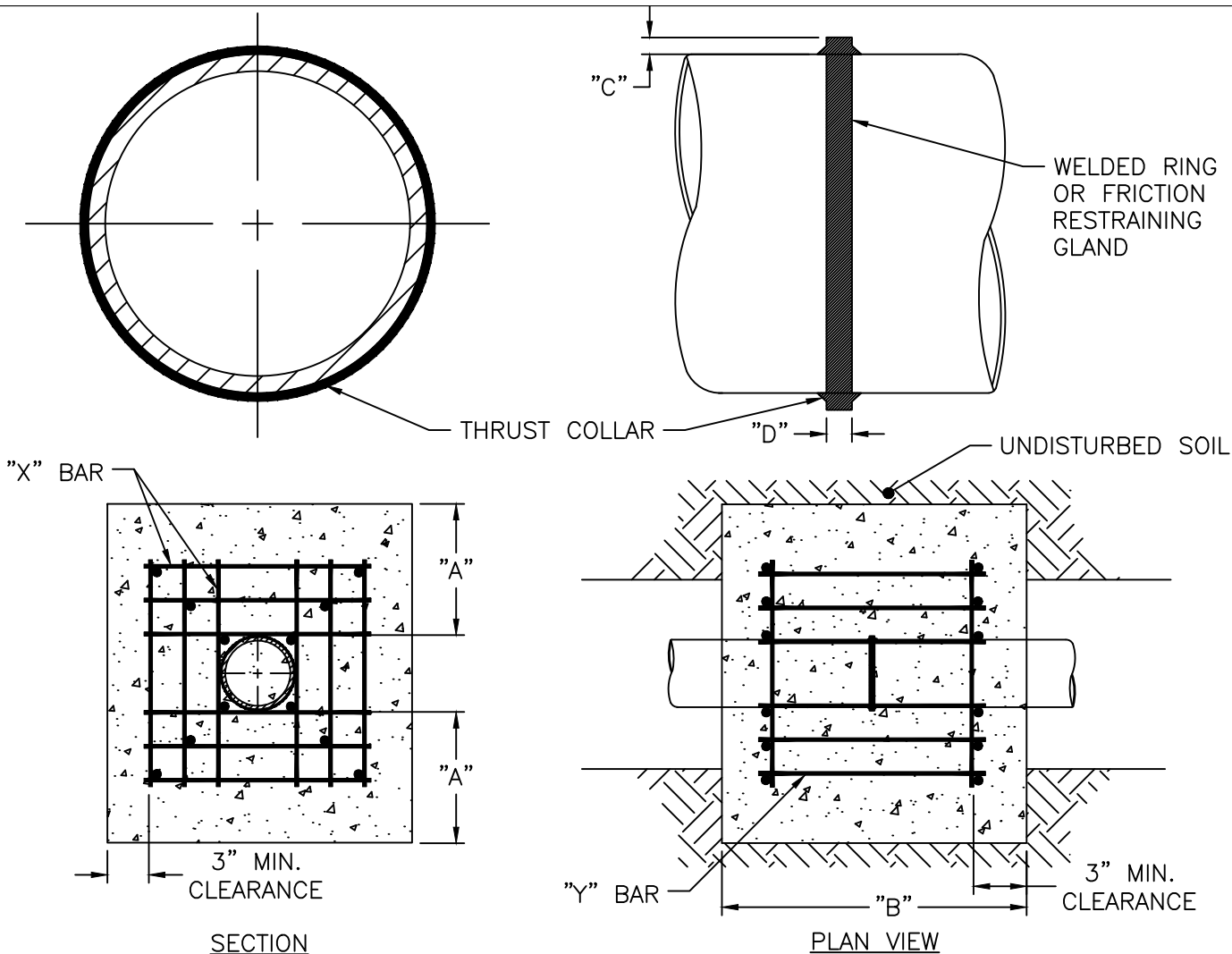
**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS      DATE: 05/24/2024      NOT TO SCALE

HYDRANT OPERATING NUT  
AND 2  $\frac{1}{2}$ "  
OUTLET THREADS

**W-6**





REINFORCING REQUIREMENTS

I.D. PIPE	REBAR SIZE	"X" BAR LENGTH	"X" BAR WEIGHT	"Y" BAR LENGTH	"Y" BAR WEIGHT	NO. REQUIRED
6"-36"	#5	2'-2"+ O.D. PIPE	1.043 LBS/FT	1'-1"	1.1 LBS. EACH	X-24 Y-12
≥48"	#6	3'-0"+ O.D. PIPE	1.502 LBS/FT	1'-3"	1.9 LBS. EACH	X-24 Y-12

THRUST COLLAR AND THRUST SCHEDULE

I.D. PIPE	"A"	"B"	"C"	"D"
6"-16"	1'-4"	1'-7"	2"	3/8"
20"-24"	1'-4"	1'-7"	3"	1/2"
30"-36"	1'-4"	1'-7"	4"	5/8"
≥48"	1'-8"	1'-9"	6"	7/8"

NOTES:

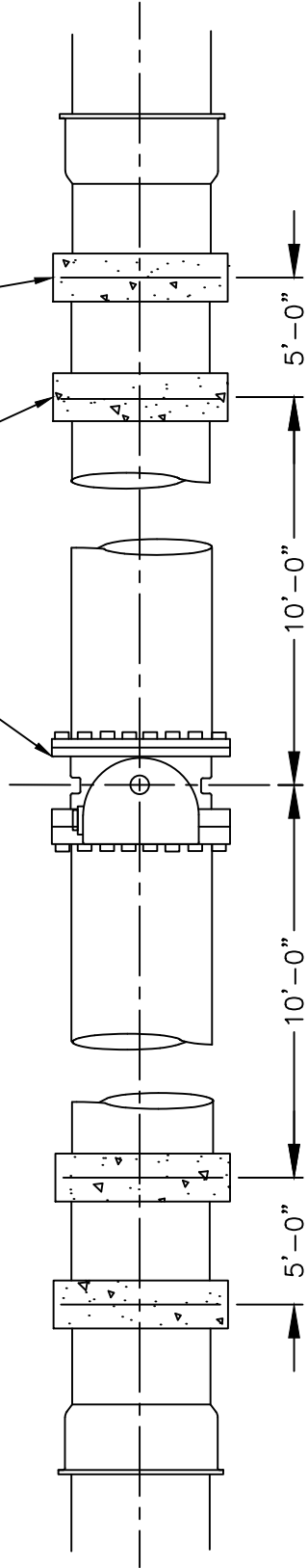
1. SEE DETAIL W-9 FOR THRUST BLOCK LOCATIONS.
2. CONCRETE SHALL BE 3,000 PSI AND TRANSIT MIXED.
3. REINFORCING BARS SHALL BE DEFORMED AND TIED TOGETHER.
4. TRENCH BOTTOM WIDTH IN VICINITY OF THRUST BLOCK INSTALLATION SHALL BE THE MINIMUM WIDTH AS SHOWN ON DETAIL W-3.
5. BACKFILL TAMPED IN 6" LIFTS, SEE DETAIL W-3.
6. THRUST COLLAR MUST BE FACTORY WELDED ON BOTH SIDES ALONG BOTH EDGES OF COLLAR AROUND CIRCUMFERENCE.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	THRUST BLOCKING DESIGN DATA FOR WATER MAINS	
	<b>W-7</b>	

16" MAIN - 1 THRUST BLOCK  
 REQUIRED, ON MAINS GREATER THAN  
 16" 2 THRUST BLOCKS REQUIRED

STANDARD THRUST BLOCK,  
 SEE DETAIL W-7

VALVE



THRUST BLOCKING AT VALVES 16" AND LARGER

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS

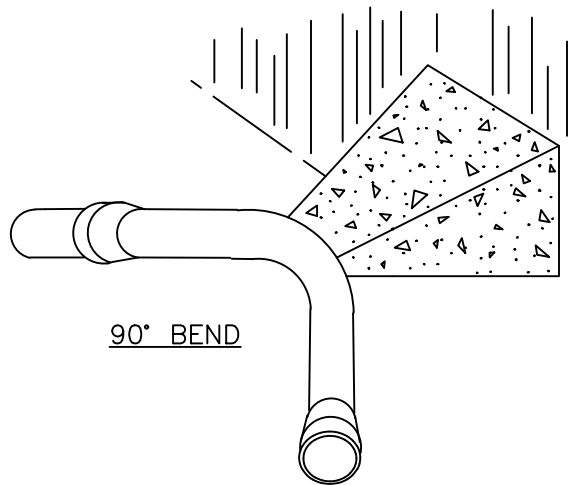
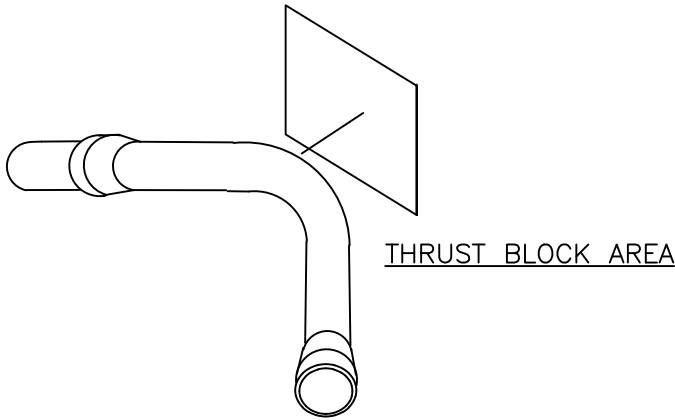
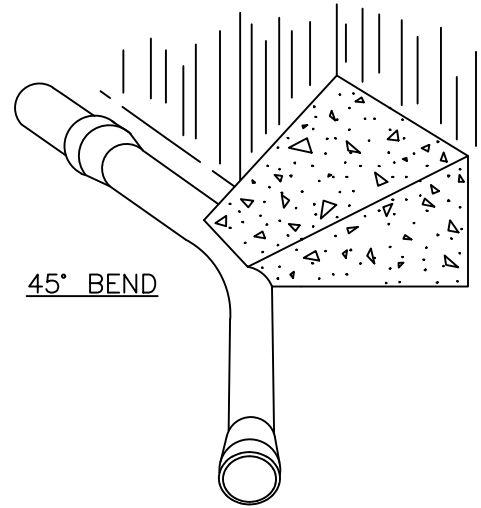
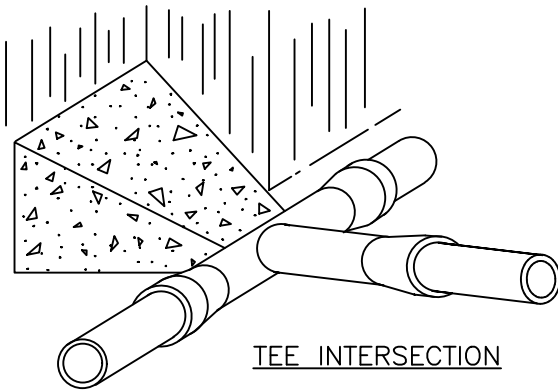
DATE: 05/24/2024

NOT TO SCALE

STANDARD THRUST BLOCKING  
 INSTALLATION FOR 16" AND LARGER  
 VALVES AND DEAD END MAINS

**W-8**

THRUST BLOCKING



NOTES:

1. CONCRETE SHALL BE 3,000 PSI.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
3. TRENCHES SHALL CONFORM TO DETAIL W-3.
4. SEE DETAIL W-10 & W-11 (THRUST BLOCK TABLES) FOR AREA OF CONCRETE REQUIRED.
5. ALL BENDS AND INTERSECTIONS SHALL HAVE CONCRETE THRUST BLOCKING.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
	THRUST BLOCKING VIEWS	
	<b>W-9</b>	

REACTION BEARING AREAS FOR HORIZONTAL WATER PIPE BENDS  
BASED ON TEST PRESSURE OF 200 PSI

ALL AREAS GIVEN IN SQUARE FEET

SIZE OF BEND	DEGREE OF BEND	STATIC THRUST IN POUNDS	MODERATELY DRY CLAY 4,000 LBS/FT <sup>2</sup>	SOFT CLAY 2,000 LBS/FT <sup>2</sup>	1,600 LBS/FT <sup>2</sup> GRAVEL/COARSE SAND	8,000 LBS/FT <sup>2</sup> DRY CLAY (ALWAYS DRY)	SAND, COMPACT FIRM 8,000 LBS/FT <sup>2</sup>	SAND-CLEAN DRY 4,000 LBS/FT <sup>2</sup>	SOIL 1,000 LBS/FT <sup>2</sup> QUICKSAND (VERY POOR)	ROCK-POOR 10,000 LBS/FT <sup>2</sup>
6"	11 ¼°	1,108	1	1	1	1	1	1	2	1
	22 ½°	2,207	1	2	2	1	1	1	3	1
	45°	4,328	2	3	3	1	1	2	5	1
	90°	7,996	2	4	5	1	1	2	8	1
	PLUG	5,655	2	3	4	1	1	2	6	1
8"	11 ¼°	1,970	1	1	2	1	1	1	2	1
	22 ½°	3,922	1	2	3	1	1	1	4	1
	45°	7,694	2	4	5	1	1	2	8	1
	90°	14,215	4	8	9	2	2	4	15	2
	PLUG	10,053	3	5	6	2	2	3	10	1
12"	11 ¼°	4,433	2	3	3	1	1	2	5	1
	22 ½°	8,826	3	5	6	2	2	3	9	1
	45°	17,312	5	9	11	3	3	5	18	2
	90°	31,983	8	16	19	4	4	8	32	4
	PLUG	22,619	6	12	14	3	3	6	23	3
16"	11 ¼°	7,881	2	4	5	1	1	2	8	1
	22 ½°	15,691	4	8	10	2	2	4	16	2
	45°	30,779	8	16	19	4	4	8	31	4
	90°	56,861	15	29	35	8	8	15	57	6
	PLUG	40,213	10	21	25	5	5	10	41	5

NOTES:

- REACTION BEARING AREAS ARE IN SQUARE FEET MEASURED IN A VERTICAL PLANE IN THE TRENCH SIDE AT AN ANGLE OF 90° TO THE THRUST VECTOR.
- USE 6" 90° BEND VALUE FOR HYDRANTS FOR ADDITIONAL SAFETY FACTOR.

**CITY OF RALEIGH  
STANDARD DETAIL**

REVISIONS      DATE: 05/24/2024      NOT TO SCALE

THRUST BLOCKING DESIGN  
QUANTITY TABLE

**W-10**

REACTION BEARING AREAS FOR HORIZONTAL WATER PIPE BENDS  
BASED ON TEST PRESSURE OF 200 PSI

ALL AREAS GIVEN IN SQUARE FEET

SIZE OF BEND	DEGREE OF BEND	STATIC THRUST IN POUNDS	MODERATELY DRY CLAY 4,000 LBS/FT <sup>2</sup>	SOFT CLAY 2,000 LBS/FT <sup>2</sup>	1,600 LBS/FT <sup>2</sup> GRAVE/COARSE SAND	8,000 LBS/FT <sup>2</sup> DRY CLAY (ALWAYS DRY)	SAND, COMPACT FIRM 8,000 LBS/FT <sup>2</sup>	SAND-CLEAN DRY 4,000 LBS/FT <sup>2</sup>	SOIL 1,000 LBS/FT <sup>2</sup> QUICKSAND (VERY POOR)	ROCK-POOR 10,000 LBS/FT <sup>2</sup>
24"	11 ¼°	17,734	5	9	11	3	3	5	18	2
	22 ½°	35,305	9	18	22	5	5	9	36	4
	45°	69,252	18	35	42	9	9	18	70	7
	90°	127,936	32	64	77	16	16	32	128	113
	PLUG	90,478	23	46	55	12	12	23	91	10
30"	11 ¼°	27,709	7	14	17	4	4	7	2	3
	22 ½°	55,163	14	28	34	7	7	14	56	6
	45°	108,206	28	55	65	14	14	28	109	11
	90°	199,900	50	100	120	25	25	50	200	20
	PLUG	141,372	36	71	85	18	18	36	142	15
36"	11 ¼°	39,901	10	20	24	5	5	10	40	4
	22 ½°	79,439	20	40	48	10	10	20	30	8
	45°	155,816	39	78	94	20	20	39	156	16
	90°	287,855	72	144	172	36	36	72	288	29
	PLUG	203,575	51	102	122	26	26	51	204	21
48"	11 ¼°	70,935	18	36	43	9	9	18	71	8
	22 ½°	141,218	36	71	85	18	18	36	142	15
	45°	277,007	70	139	166	35	35	70	277	28
	90°	511,742	128	256	320	64	64	128	512	52
	PLUG	361,911	91	181	217	46	46	91	362	37

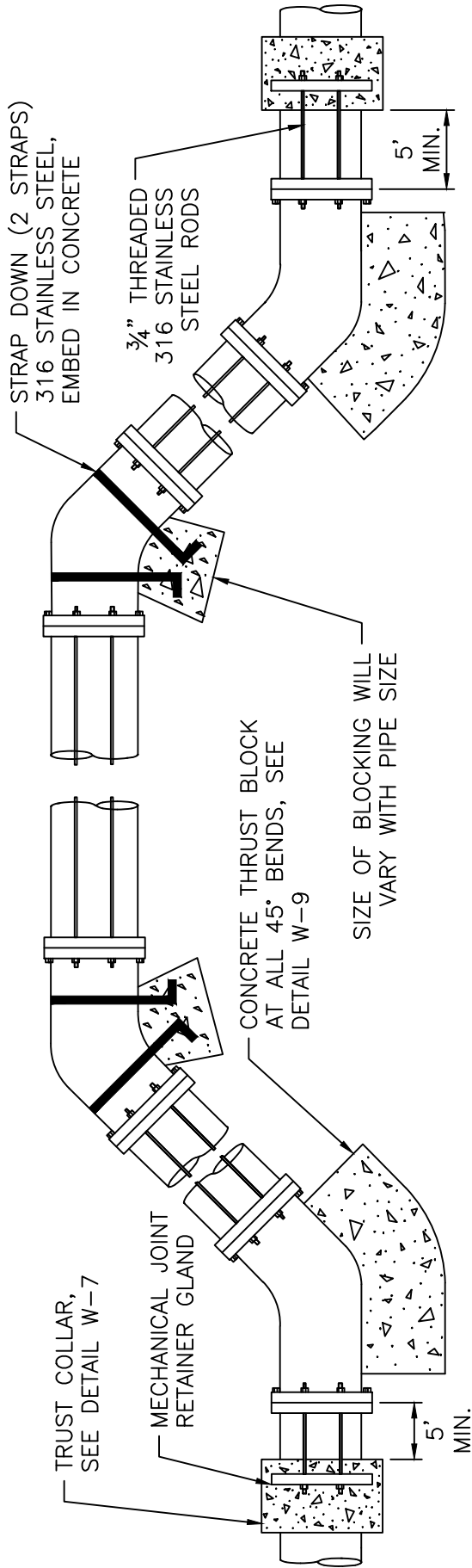
NOTES:

- REACTION BEARING AREAS ARE IN SQUARE FEET MEASURED IN A VERTICAL PLANE IN THE TRENCH SIDE AT AN ANGLE OF 90° TO THE THRUST VECTOR.
- USE 6" 90° BEND VALUE FOR HYDRANTS FOR ADDITIONAL SAFETY FACTOR.

**CITY OF RALEIGH  
STANDARD DETAIL**

<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
	THRUST BLOCKING DESIGN QUANTITY TABLE	
	<b>W-11</b>	

TOP OF GROUND



STRAP REQUIREMENTS

SIZE OF 45° BEND	STATIC TRUST IN POUNDS	NO. OF RODS REQUIRED	STRAP WIDTH	STRAP THICKNESS
6"	4,328	2	1"	3/16"
8"	7,694	4	1.5"	3/16"
12"	17,312	4	2"	1/4"
16"	30,779	8	2"	1/2"
24"	69,252	8	4"	1/2"

ROD REQUIREMENTS

PIPE DIA	RODDING	RJ GLANDS	THRUST COLLAR	THRUST BLOCKING
<12"	X	X	X	
≥12"	X	X	X	X

RESTRAINT REQUIREMENTS

"X" DENOTES REQUIRED RESTRAINT.

NOTES:

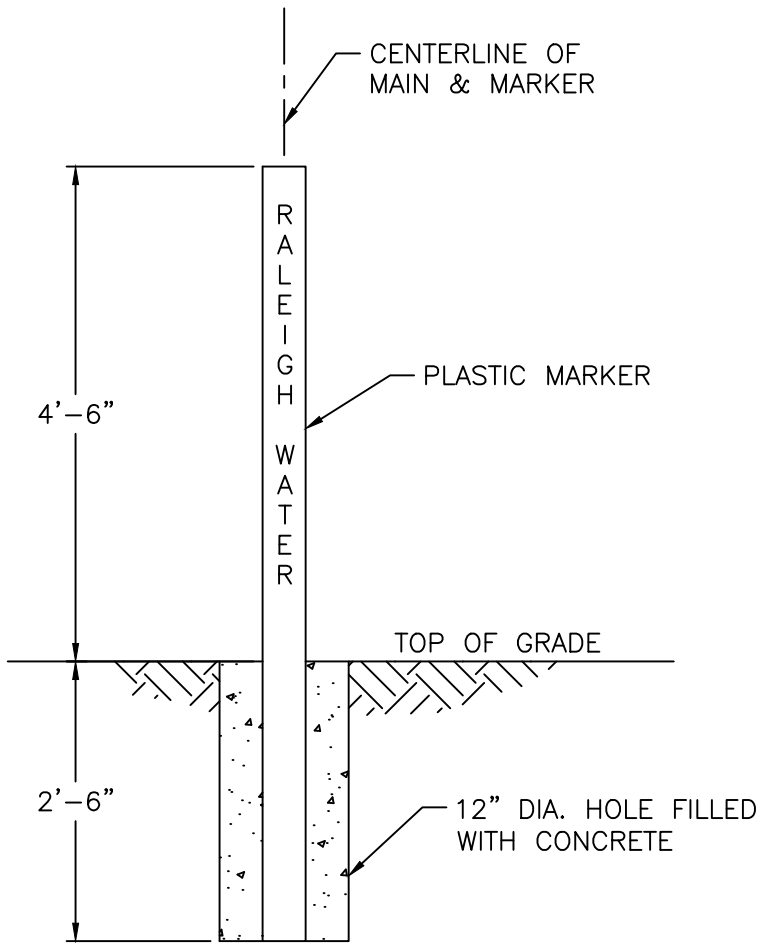
1. STEEL RODS AND BOLTS SHALL BE 3/4" 316 STAINLESS STEEL.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT BENDS.
3. RESTRAINED MECHANICAL GLANDS TO BE USED AT ALL FITTINGS.
4. MUST USE DUCTILE IRON EYE BOLTS WHERE NECESSARY.
5. 3' MINIMUM COVER MUST BE MAINTAINED.
6. EXTERNAL RESTRAINT REQUIRED. INTEGRAL BELL RESTRAINT REQUIRES DIRECTOR'S APPROVAL.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS      DATE: 05/24/2024      NOT TO SCALE

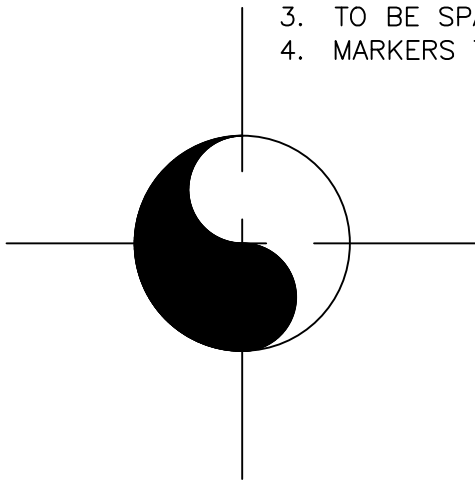
STANDARD VERTICAL BEND

**W-12**



NOTES:

1. POTABLE WATER MARKER TO BE BLUE IN COLOR.
2. POTABLE WATER MARKER TO BE LABELED "RALEIGH WATER"
3. TO BE SPACED ALONG CENTERLINE OF MAIN EVERY 300 FEET.
4. MARKERS TO BE ROUND AND 4" IN DIAMETER.



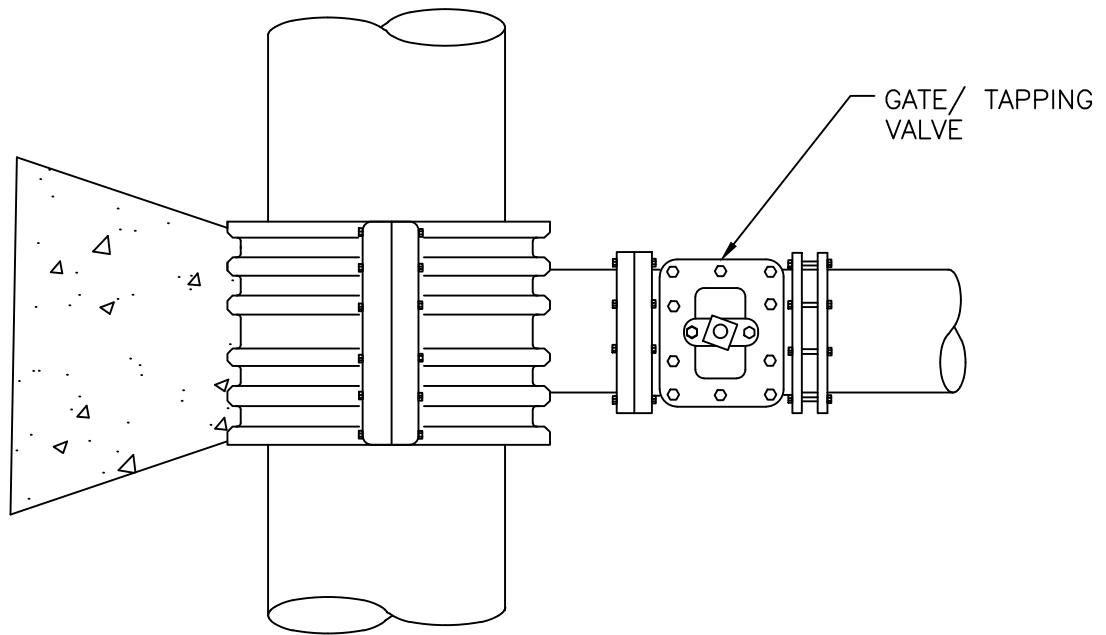
WATER MAIN

**CITY OF RALEIGH**  
**STANDARD DETAIL**

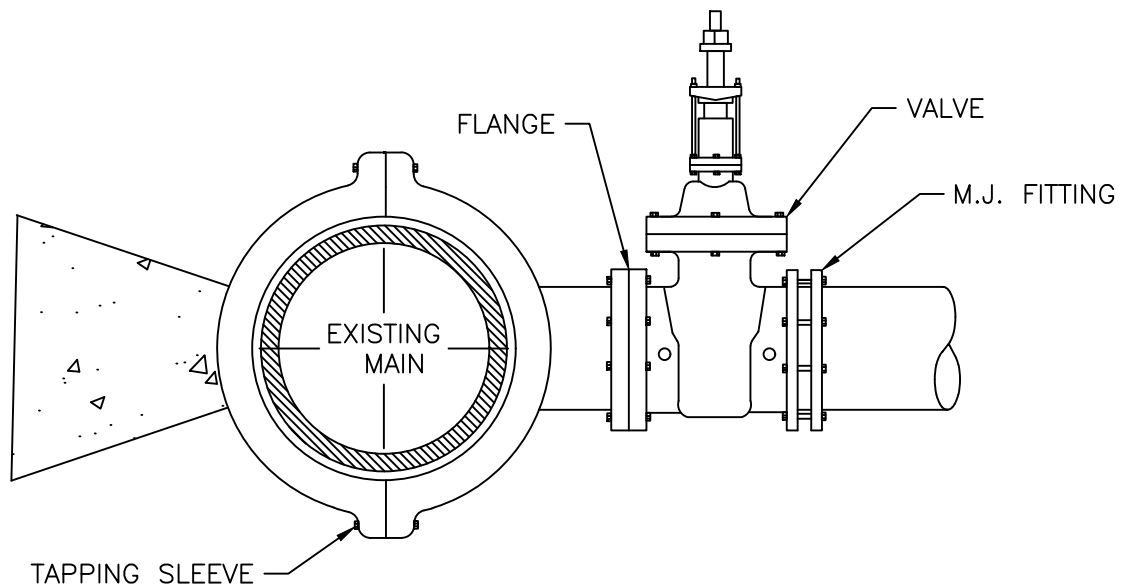
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
------------------	-------------------------	---------------------

	MAIN & VALVE MARKER FOR POTABLE WATER IN EASEMENTS	
--	--	--

**W-13**



TOP VIEW



SIDE VIEW

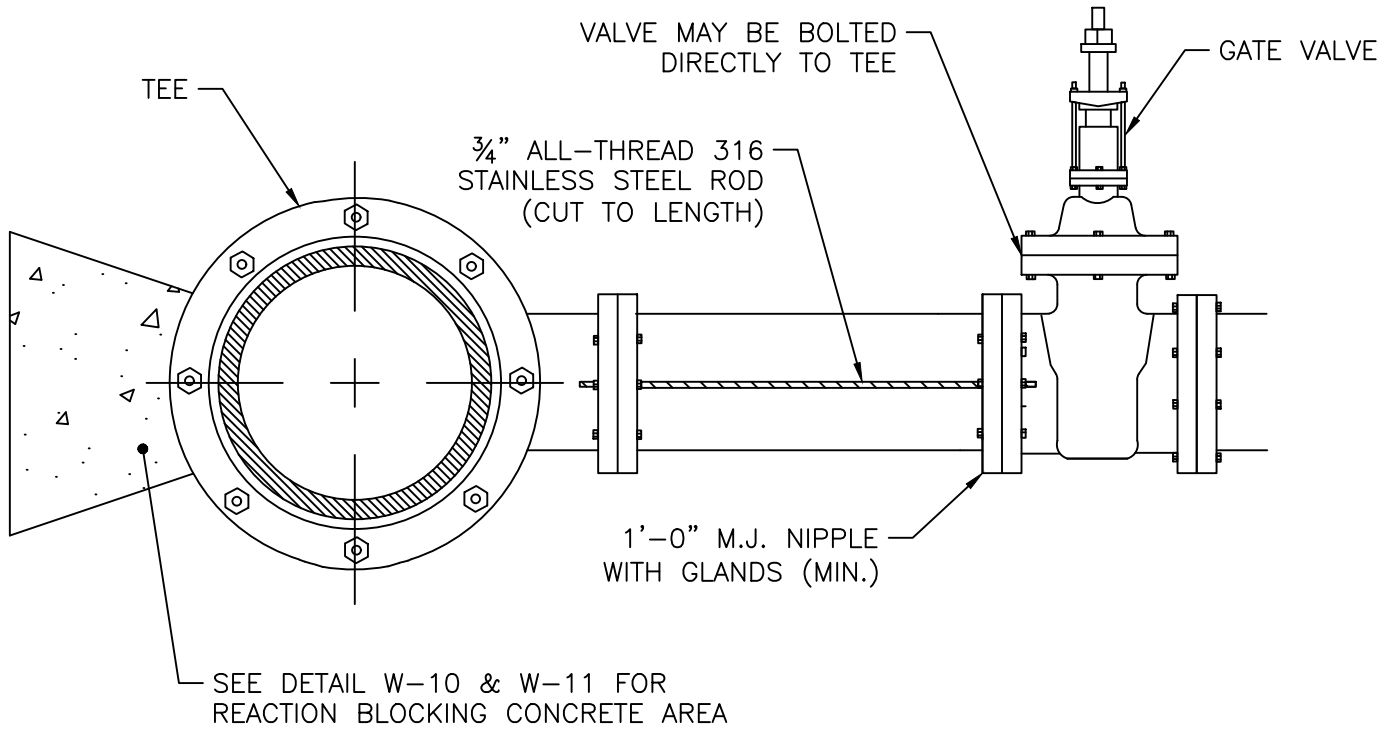
**NOTES:**

1. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
2. SEE DETAIL W-10 & W-11 (REACTION BLOCK TABLES) FOR AREA OF CONCRETE REQUIRED.
3. 3,000 PSI SOLID CONCRETE SHALL BE USED AS FOOTING FOR DUCTILE IRON PIPE.
4. FULL CIRCUMFERENCE SLEEVE, STAINLESS STEEL MATERIAL REQUIRED.

**CITY OF RALEIGH  
STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	4"–24" STANDARD TAPPING SLEEVE AND VALVE ASSEMBLY	
W-14		





ROD REQUIREMENTS

BRANCH SIZE	NO. OF RODS
4"	2
6"	2
8"	4
12"	4
16"	6
24"	6
30"	8
36"	8

- NOTES:
1. STEEL RODS AND BOLTS SHALL BE 3/4" 316 STAINLESS STEEL.
  2. SEE DETAIL W-10 AND W-11 (THRUST BLOCK TABLES) FOR CONCRETE.
  3. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL FITTINGS.
  4. THIS RODDING REQUIREMENT DOES NOT APPLY TO FIRE HYDRANTS.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	DATE: 05/24/2024	<i>NOT TO SCALE</i>
	VALVE RESTRAINT AT TEES AND CROSSES FOR LINES (4"-24")	
<b>W-15</b>		

VALVE SIZE	MH DIA.
16"	5'
24"	6'
≥30"	8'

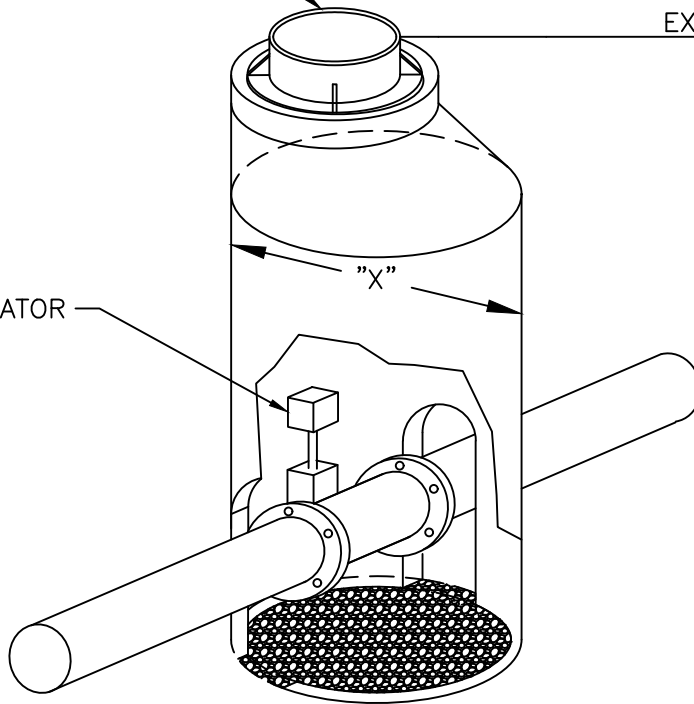
NOTES:

1. USE STANDARD PRECAST ECCENTRIC TOP.
2. BASE SECTION SHALL BE OF "DOG HOUSE" TYPE TO FIT OVER MAIN.
3. PROVIDE A MIN. OF 12" OF #67 STONE FOR POSITIVE DRAINAGE IN BOTTOM OF MANHOLE.
4. GROUT RISER/BASE SECTION AS NECESSARY.
5. MANHOLE LID SHALL SAY "WATER".
6. FLAT TOP MAY BE USED IN NON-PAVED AREAS WHEN NECESSARY TO MATCH GRADE.

ECCENTRIC TOP WITH COVER  
OPENING OVER ACTUATOR

EXISTING GRADE

NUT TYPE ACTUATOR

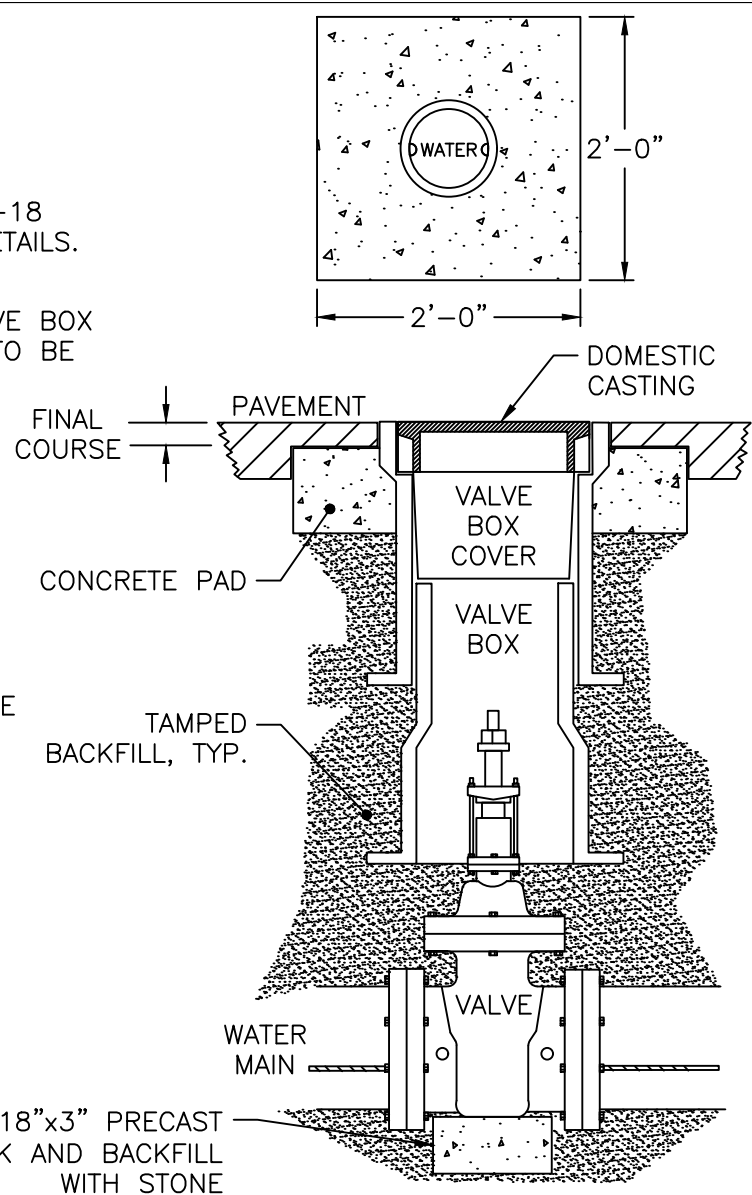
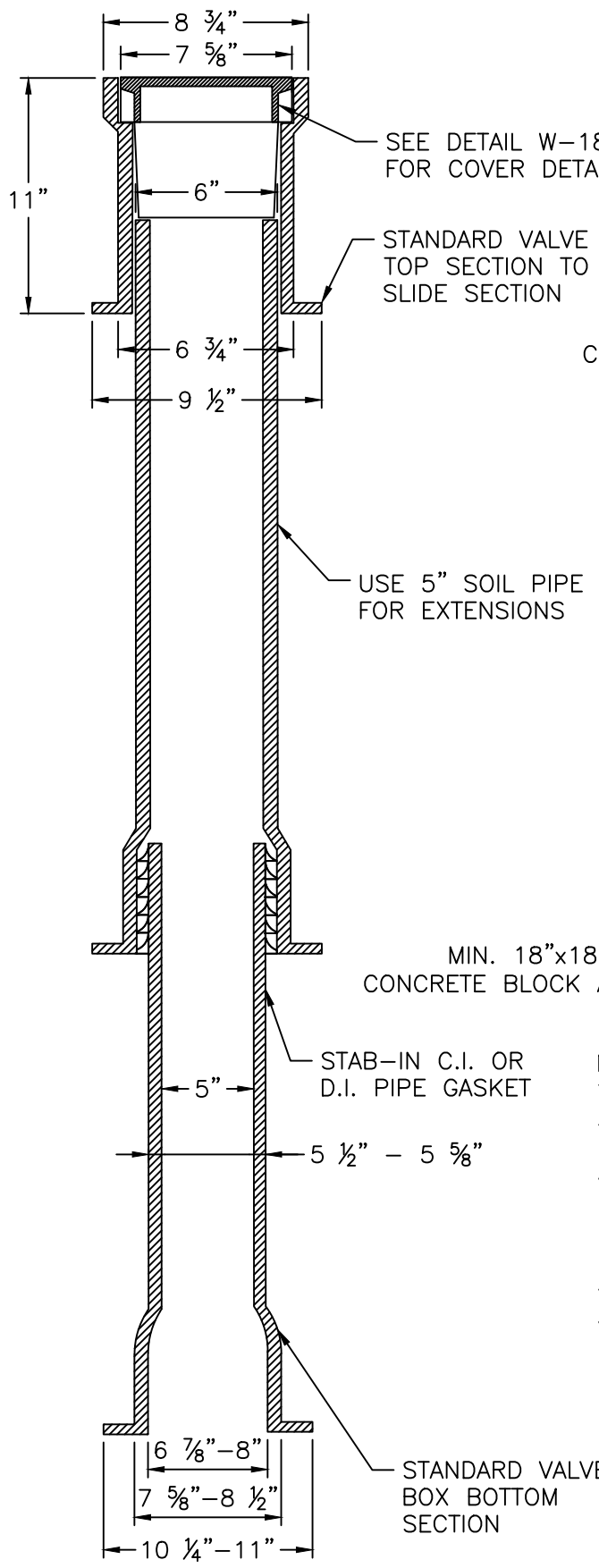


**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS      DATE: 05/24/2024      NOT TO SCALE

BUTTERFLY VALVE MANHOLE  
FOR 16" & LARGER MAINS

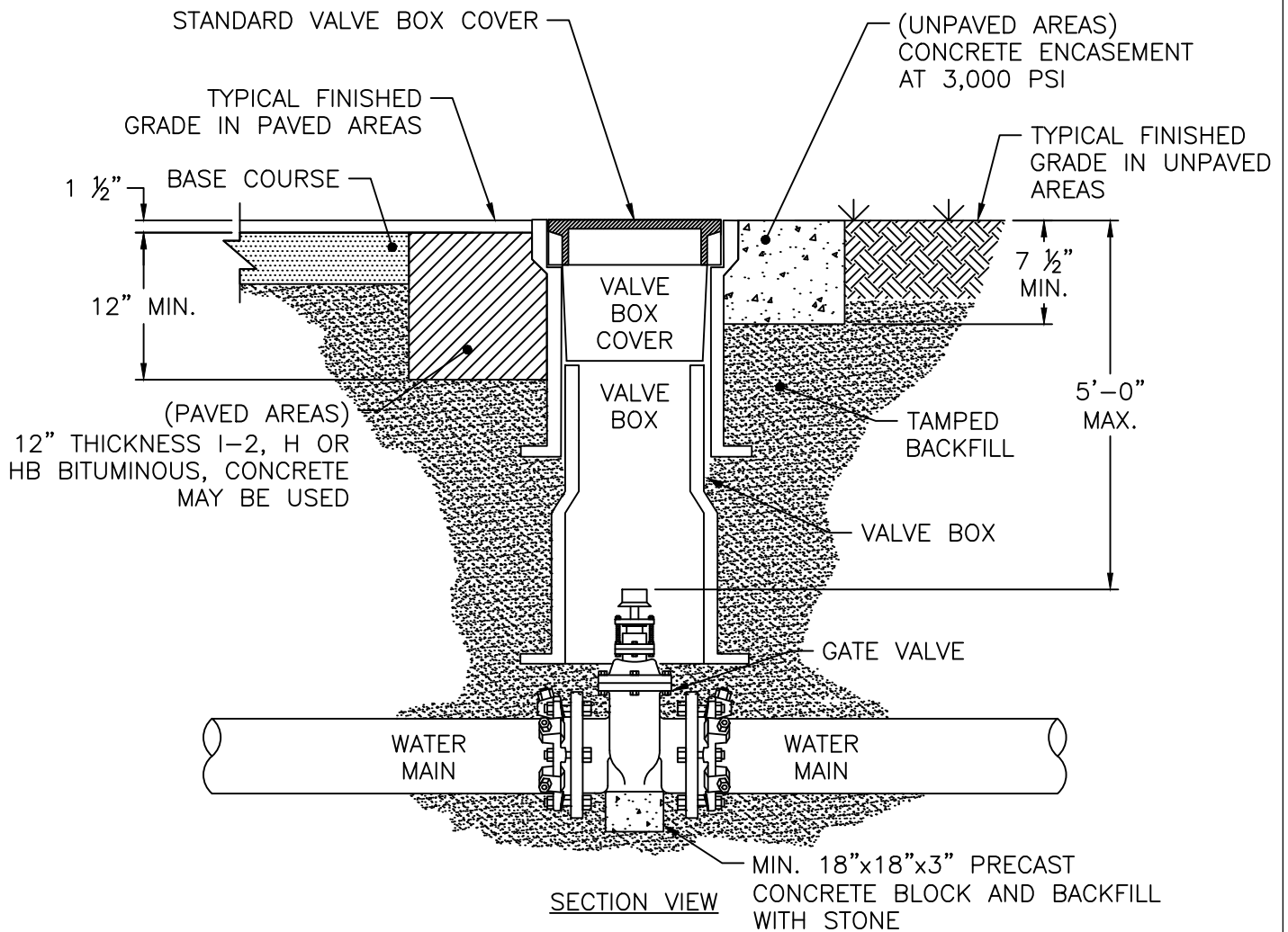
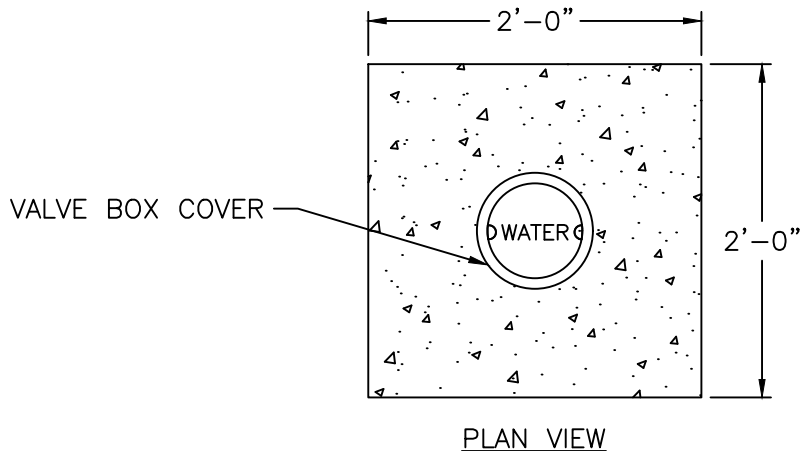
**W-16**



- NOTES:
1. VALVE BOX NOT TO CONTACT WATER MAIN
  2. ALL TRAFFIC CASTINGS MUST BE CLASS 35 OR GREATER.
  3. FOR ALL VALVES OVER 10' DEEP, A VALVE STEM EXTENSION MUST BE USED TO BRING TO A DEPTH OF NO MORE THAN 5', EXTENSION MUST BE A MINIMUM OF 1" SOLID STOCK.
  4. TOTAL VALVE BOX WEIGHT: MINIMUM OF 85 LBS.
  5. 2'x2'x6" CONCRETE PAD REQUIRED ON ALL VALVES. NO PRECAST CONCRETE DOUGHNUT ALLOWED.

APPROVED METHOD FOR EXTENSION OF VALVE BOX

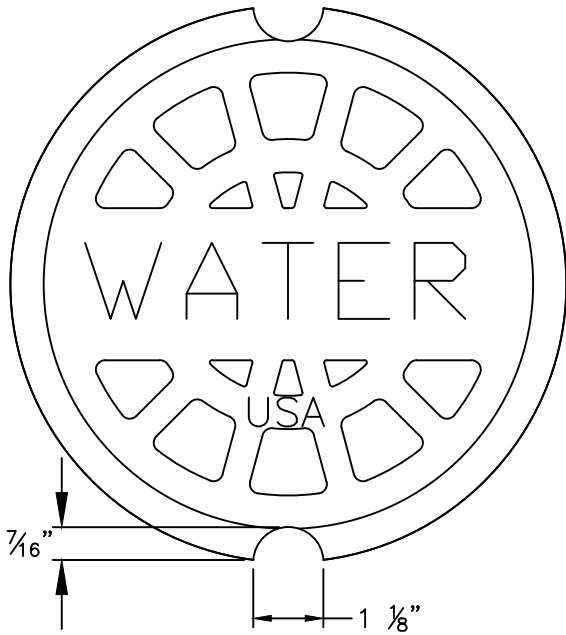
CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	VALVE BOX INSTALLATION AND EXTENSION	
	<b>W-17</b>	



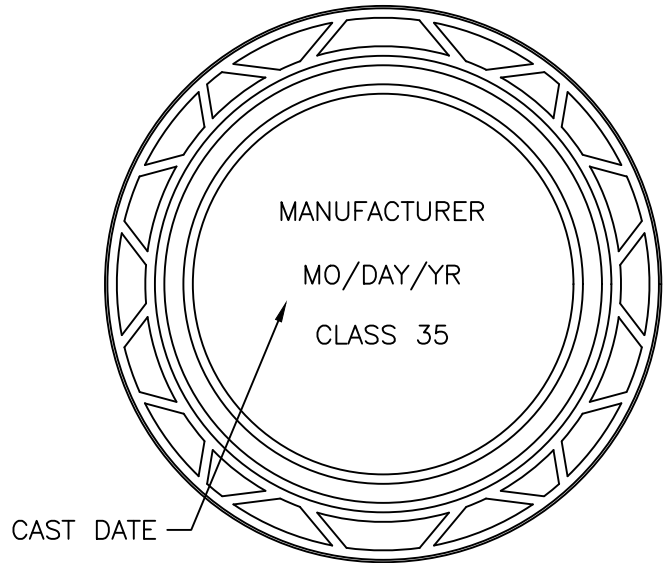
NOTES:

1. ONLY MANUFACTURED VALVE BOX EXTENSIONS SHALL BE ALLOWED.
2. VALVE OPERATING NUT MUST BE EXTENDED SO THAT THE DEPTH IS NO GREATER THAN 5' FROM THE SURFACE USING A MANUFACTURER APPROVED EXTENSION KIT.
3. PRECAST CONCRETE ENCASEMENT IS ALLOWED OUTSIDE OF PAVED AREAS.
4. VALVE BOX SHOULD NOT CONTACT MAIN OR VALVE.

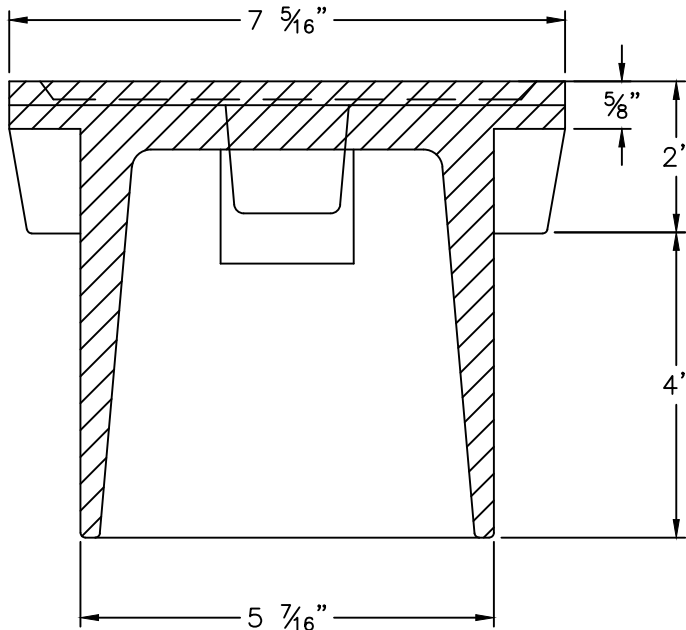
CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	VALVE AND BOX INSTALLATION	
<b>W-17A</b>		



PLAN VIEW



BOTTOM VIEW

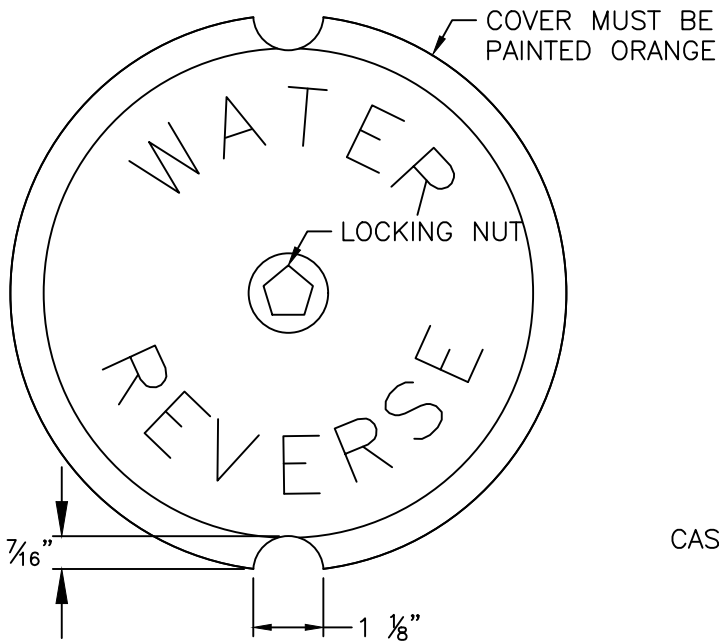


SECTION VIEW

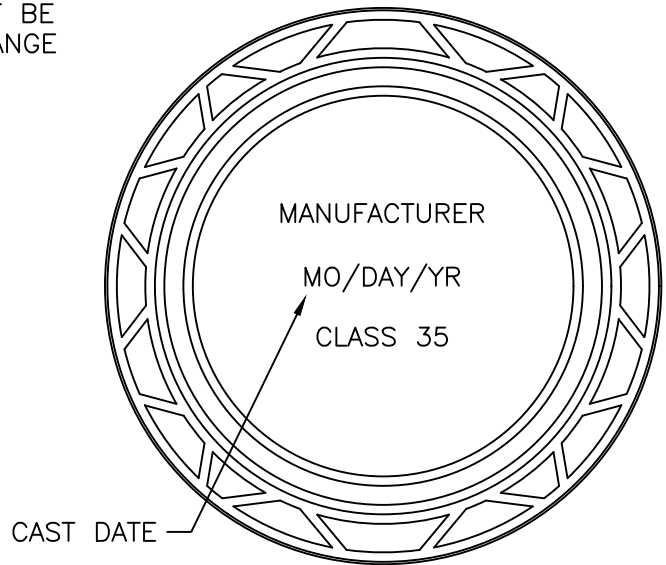
**NOTE:**

1. "WATER" LETTERING MUST BE 1" RAISED (RECESSED FLUSH).
2. VALVE COVER SHALL BE DOMESTICALLY CAST.
3. COVER MUST HAVE A MINIMUM WEIGHT OF 25 POUNDS.
4. COVER MUST BE CLASS 35 OR GREATER.
5. COVER MUST MEET OR EXCEED AASHTO H-20 LOAD REQUIREMENTS.

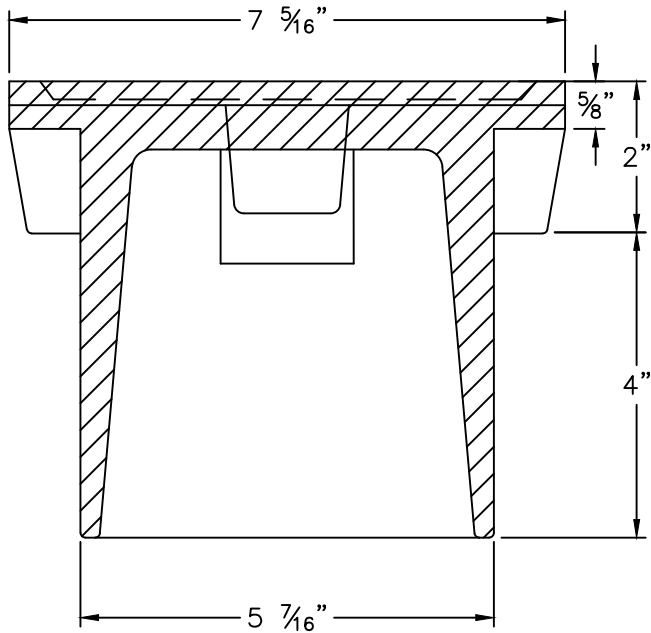
<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
	5 1/4" VALVE BOX DROP LID WITH 4" SKIRT	
	<b>W-18</b>	



PLAN VIEW



BOTTOM VIEW



SECTION VIEW

NOTE:

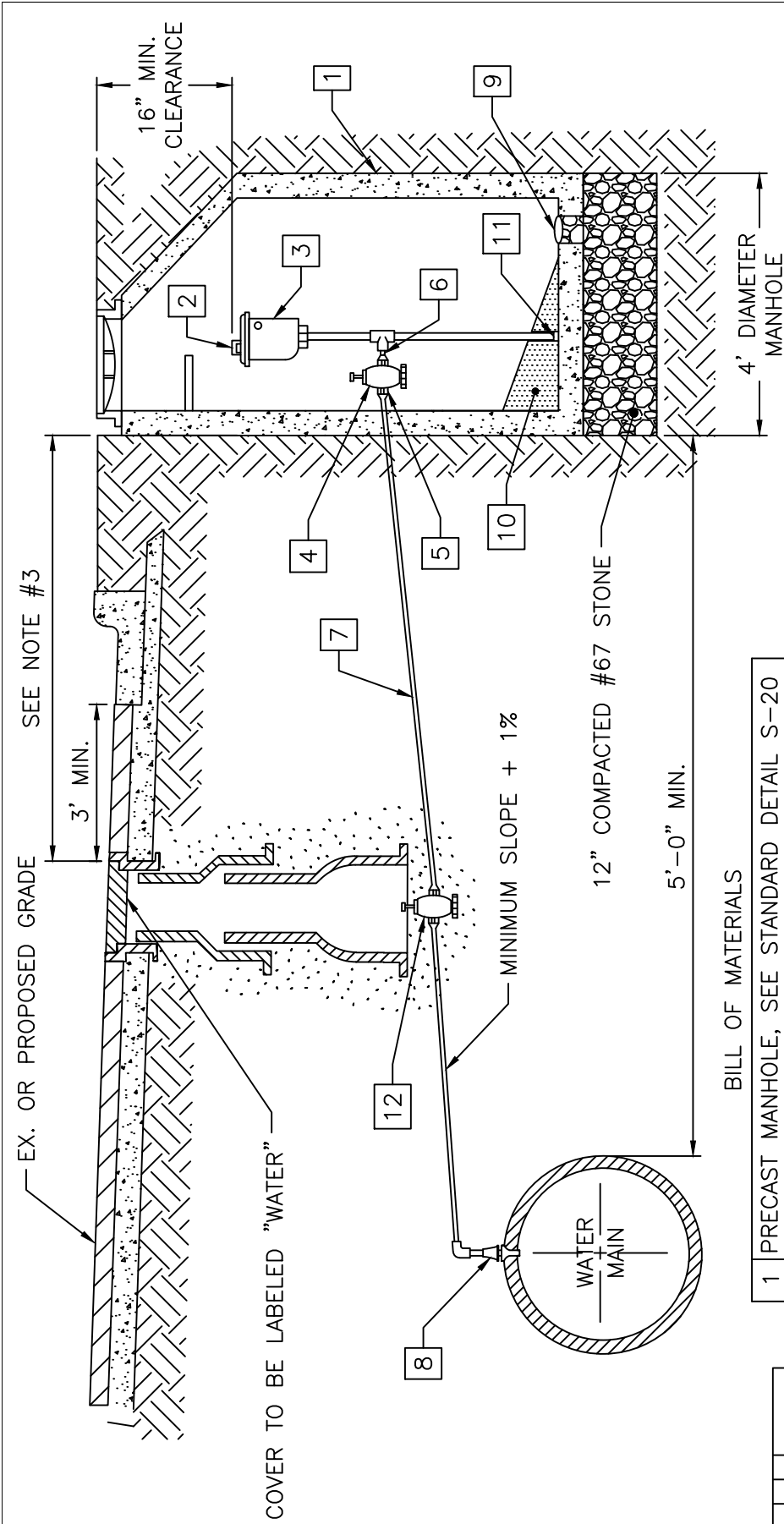
1. "WATER" AND "REVERSE" LETTERING MUST BE 1" RAISED (RECESSED FLUSH).
2. VALVE COVER SHALL BE DOMESTICALLY CAST.
3. COVER MUST HAVE A MINIMUM WEIGHT OF 25 POUNDS.
4. COVER MUST BE CLASS 35 OR GREATER.
5. COVER MUST MEET OR EXCEED AASHTO H-20 LOAD REQUIREMENTS.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS      DATE: 05/24/2024      NOT TO SCALE

REVERSE TAP 5 1/4"  
VALVE BOX DROP LID  
WITH 4" SKIRT

**W-18A**



- NOTE:
1. AIR VALVE TO BE P-20 WITH VACUUM CHECK BY CRISPIN OR VAL MATIC VM 45.
  2. THE AIR RELEASE MANHOLE SHALL BE INSTALLED IN THE SHOULDER OR AS DIRECTED BY THE ENGINEER.
  3. FOR MAINS LOCATED OUTSIDE OF STREET RIGHT-OF-WAYS THE MAXIMUM DISTANCE BETWEEN THE MANHOLE AND THE VALVE BOX SHOULD BE 3 FEET.
  4. MAIN SHALL BE DEEP ENOUGH TO ACCOMMODATE INSTALLATION AS SHOWN.
  5. SEE DETAIL W-3 TO INSURE PROPER BACKFILL.

**BILL OF MATERIALS**

1	PRECAST MANHOLE, SEE STANDARD DETAIL S-20
2	TRASH HOOD
3	2" AIR RELEASE VALVE
4	2" CURB STOP BALL VALVE
5	ADAPTER
6	2" MECHANICAL JOINT BRASS PIPE AND FITTINGS
7	2" TYPE "k", SOFT COPPER WITH FLARED ELBOW
8	CORPORATION COCK
9	6" DIAMETER DRAIN
10	GROUT, 1/8" TO 1'-0" MIN. SLOPE TO DRAIN
11	PIPE CAP
12	2" GATE VALVE

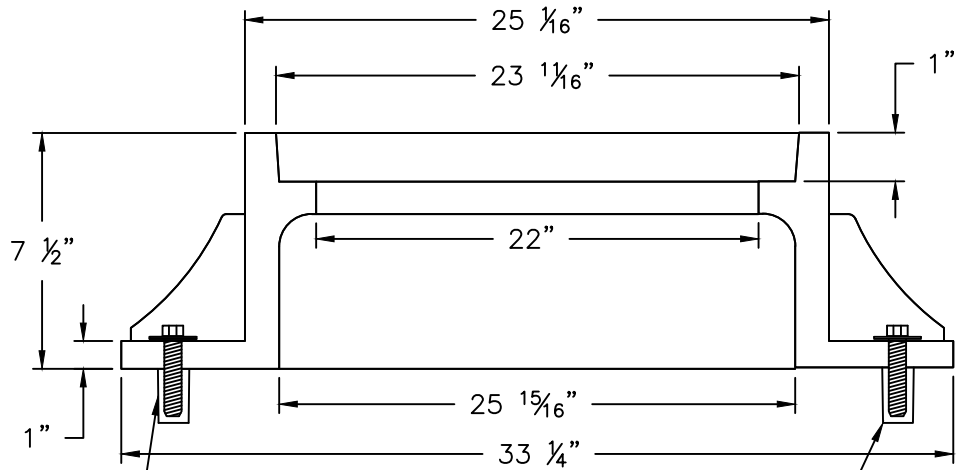
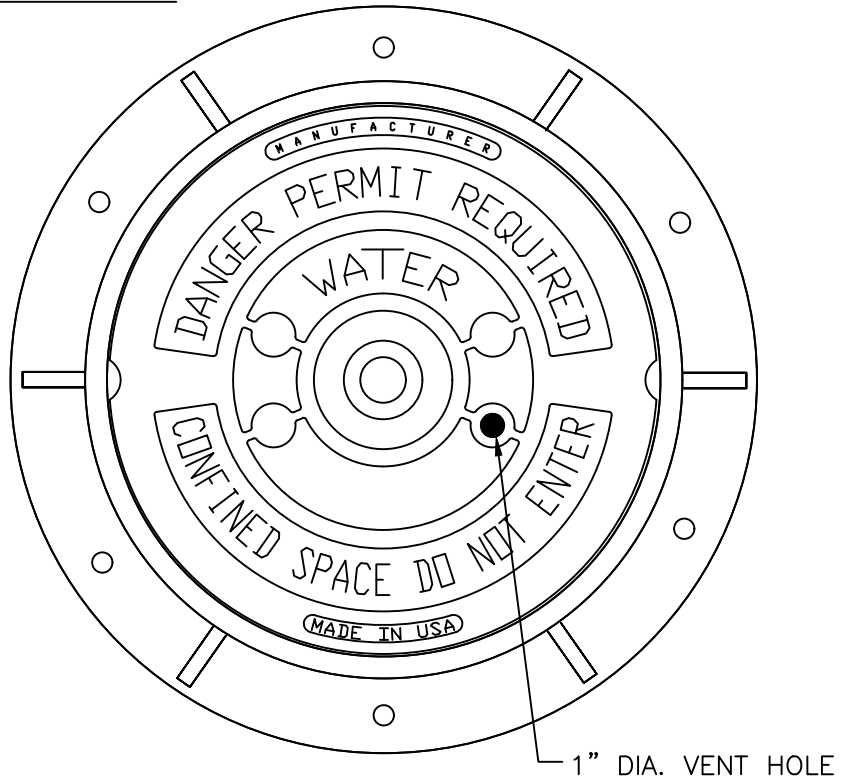
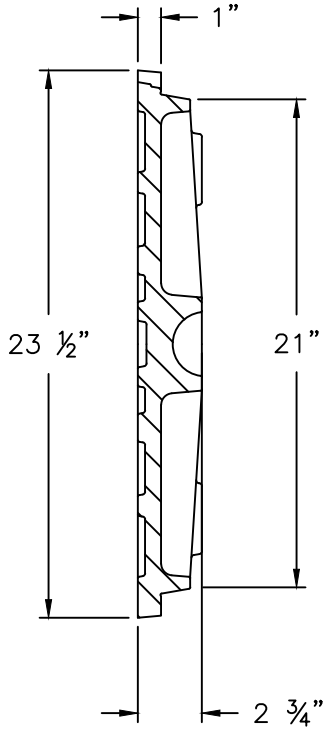
**CITY OF RALEIGH  
STANDARD DETAIL**

REVISIONS      DATE: 05/24/2024      NOT TO SCALE

WATER AIR RELEASE VALVE

**W-19**

MANHOLE FRAME AND COVER



LAGSHIELDS MAY ONLY BE USED  
IN ROADWAY APPLICATIONS

5/8"x3" LAGSHIELD IN HOLE DRILLED INTO  
CONE OR RING WITH ANCHOR SUNK TO  
DESIGN DEPTH, AND 3/8"x3" HOT DIPPED  
GALVANIZED LAG BOLT AND WASHER

NOTES:

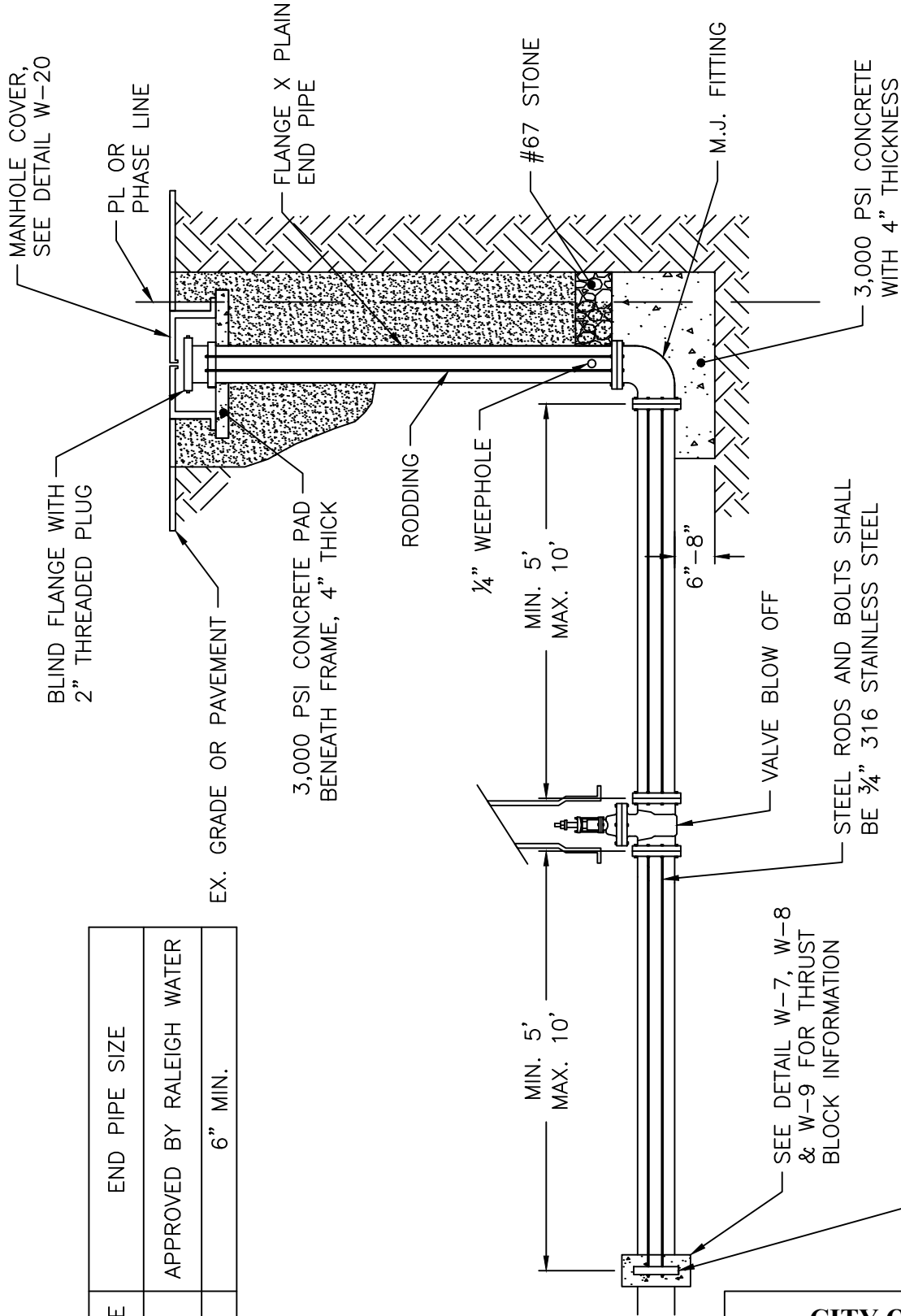
1. ALL MANHOLE FRAMES SHALL BE DOMESTICALLY CAST.
2. FRAME SHALL BE A MINIMUM WEIGHT OF 182 LBS.
3. COVER SHALL WEIGH A MIN. OF 120 LBS.
4. MANHOLES WITHIN PAVED SURFACES SHALL BE CONSTRUCTED ACCORDANCE WITH DETAIL S-29.

CITY OF RALEIGH  
STANDARD DETAIL

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
		STANDARD MANHOLE COVER
		<b>W-20</b>



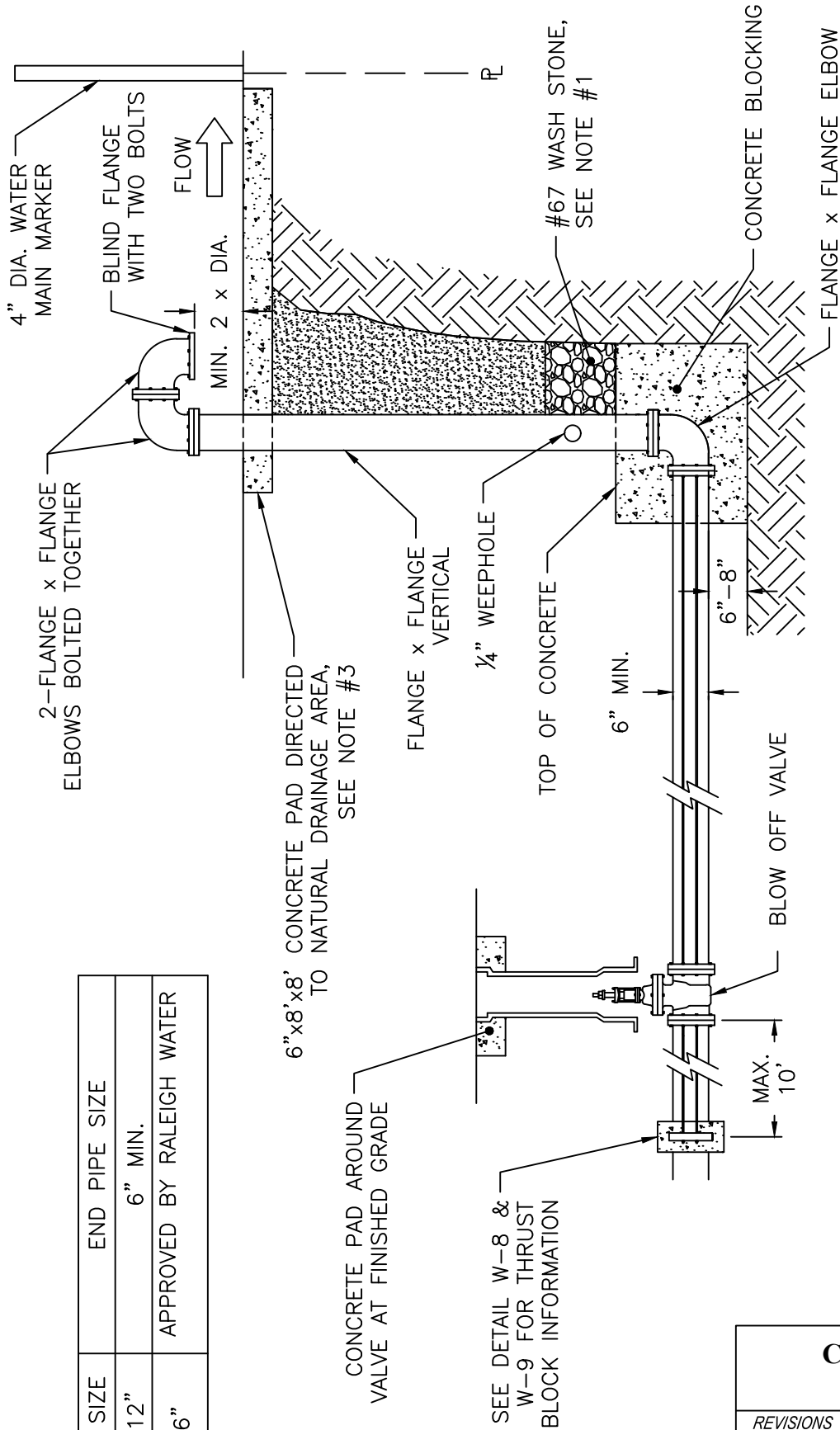
MAIN SIZE	END PIPE SIZE
6"-12"	APPROVED BY RALEIGH WATER
≥16"	6" MIN.



NOTE:  
NO ROD COUPLINGS ALLOWED.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	TEMPORARY WATER MAIN BLOW OFF ASSEMBLY	
<b>W-21</b>		

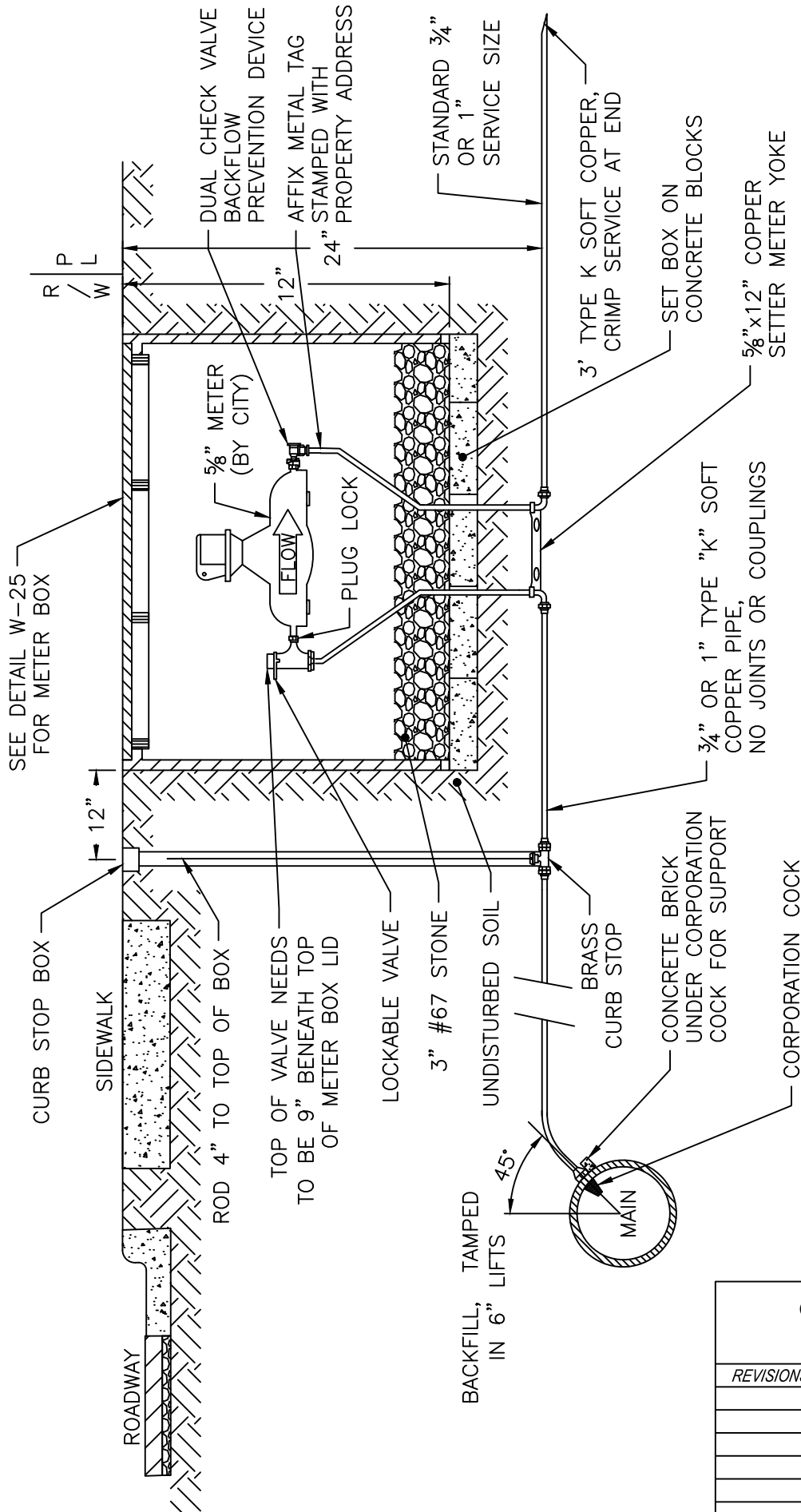
MAIN SIZE	END PIPE SIZE
6" - 12"	6" MIN.
≥16"	APPROVED BY RALEIGH WATER



**NOTES:**

1. DRILL 1/4" WEEP HOLE FOR STACK DRAINAGE INTO STONE.
2. DOUBLE 3/4" BRIDLE RODS ON BOTH SIDES.
3. A RIP-RAP SWALE FROM FROM CONCRETE SPLASH PAD TO POSITIVE DRAINAGE AREA IS REQUIRED.
4. BOTTOM 90° ELBOW SHALL HAVE BLIND FLANGE ATTACHED WITH TWO BOLTS.
5. INSTALL WATER MAIN MARKER AT R/W OR P/L TO LOCATE MAIN.
6. BURIED 3/4" RODS AND BOLTS TO BE 316 STAINLESS STEEL.
7. END PIPE SIZE 6" MIN. OR AS APPROVED BY PUBLIC UTILITIES.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
PERMANENT WATER MAIN BLOW OFF ASSEMBLY		
<b>W-22</b>		



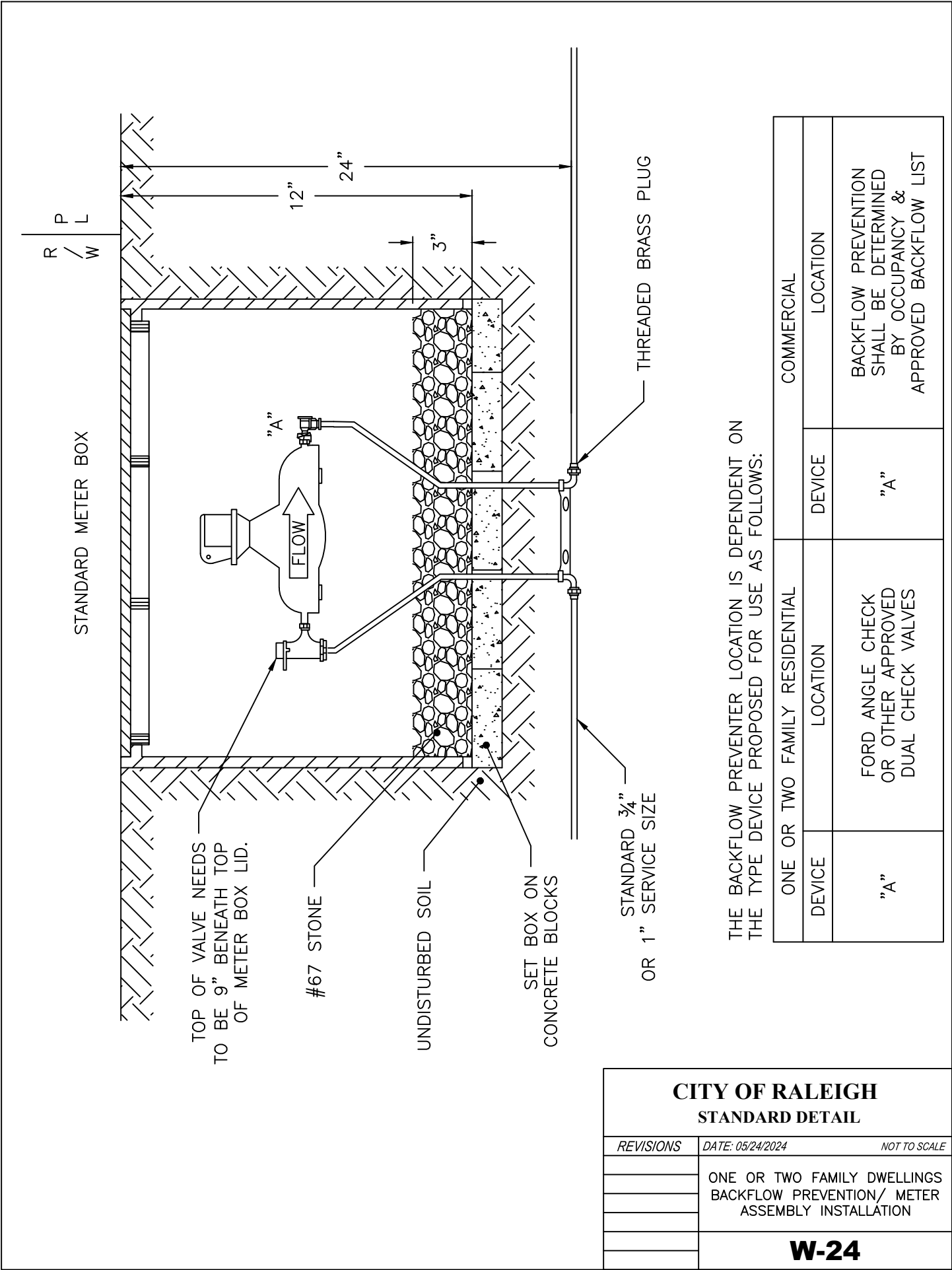
- NOTES:
1. WATER METER AS MANUFACTURED BY SENSUS, OR SCHLUMBERGER. METER TO BE PROVIDED BY RALEIGH WATER.
  2. DIRECT TAP ALLOWED ON MAINS NO LARGER THAN 16" LINE.
  3. METER BOX TO BE LOCATED IN R/W ADJACENT TO PROPERTY OR IN APPROVED EASEMENT ADJACENT TO R/W.
  4. WHEN THE GRADE CHANGES ON EXISTING SERVICES, A COPPER RESETTER CAN BE USED TO ADJUST TO GRADE. COPPER RESETTERS ARE PROHIBITED ON NEW SERVICES.
  5. CURB STOP BOX SHALL HAVE PLUG STYLE LID WITH PENTAGON BOLT, 1-1/4" STEEL UPPER SECTION, AND ARCH STYLE BASE. STEEL STATIONARY ROD TO BE PROVIDED FOR CURB STOP OPERATION.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
-----------	------------------	--------------

STANDARD 3/4" & 1" WATER SERVICE INSTALLATION

**W-23**



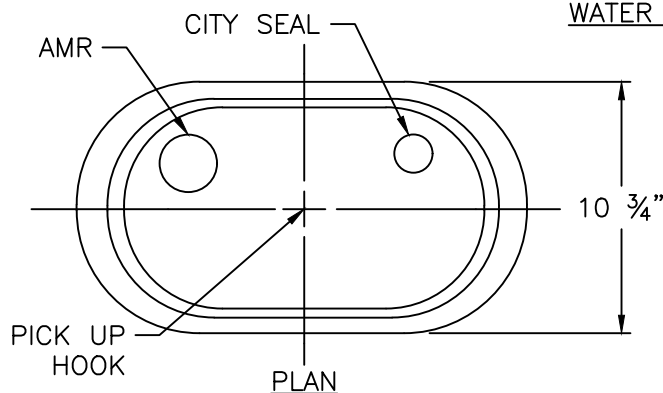
THE BACKFLOW PREVENTER LOCATION IS DEPENDENT ON THE TYPE DEVICE PROPOSED FOR USE AS FOLLOWS:

ONE OR TWO FAMILY RESIDENTIAL		COMMERCIAL	
DEVICE	LOCATION	DEVICE	LOCATION
"A"	FORD ANGLE CHECK OR OTHER APPROVED DUAL CHECK VALVES	"A"	BACKFLOW PREVENTION SHALL BE DETERMINED BY OCCUPANCY & APPROVED BACKFLOW LIST

**CITY OF RALEIGH**  
**STANDARD DETAIL**

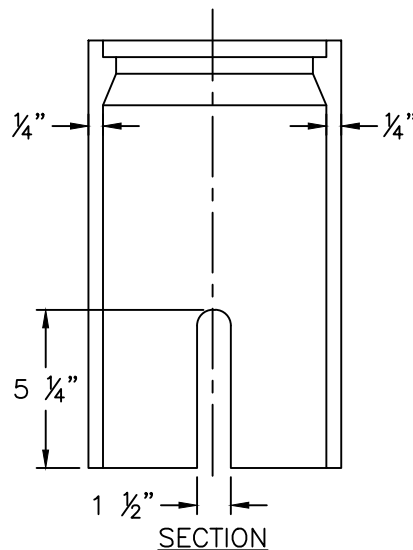
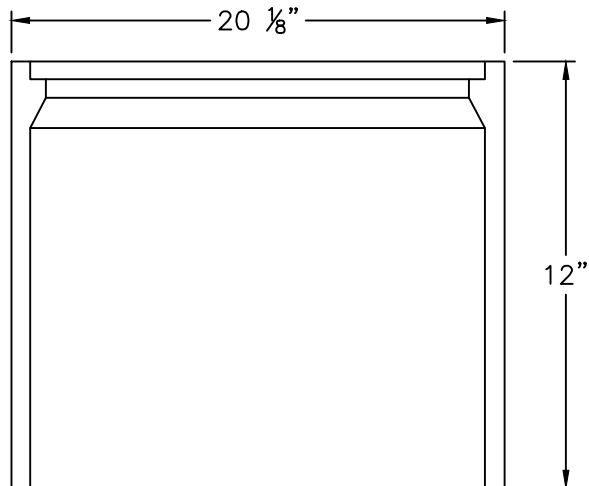
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
ONE OR TWO FAMILY DWELLINGS BACKFLOW PREVENTION/ METER ASSEMBLY INSTALLATION		
<b>W-24</b>		

### WATER METER BOX



#### NOTES:

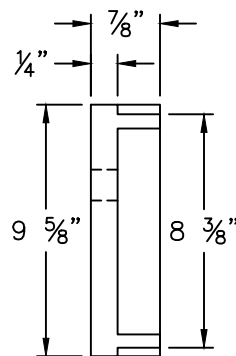
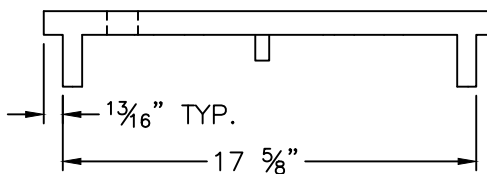
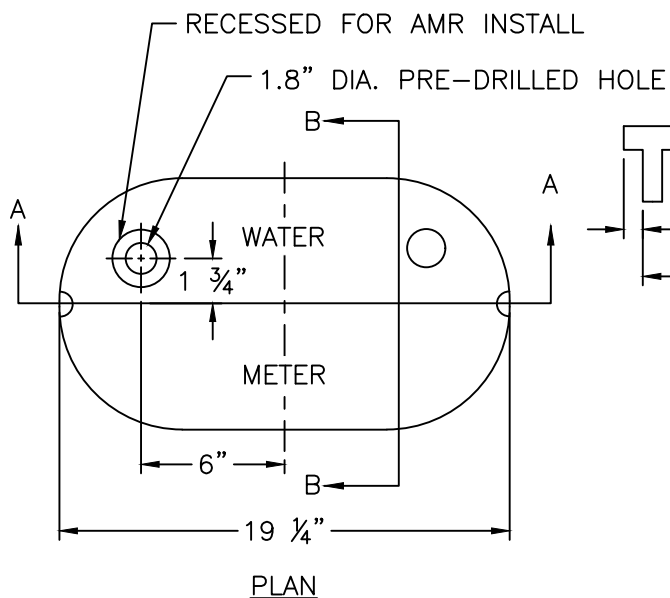
- 1. COVER WEIGHT: 13 LBS  $\pm$  5%.
- 2. LIDS TO BE COATED WITH BITUMINOUS COAL TAR COATING.
- 3. HOLE SHALL BE FITTED WITH A METAL GROMMET.
- 4. BOXES AND LIDS MUST BE MANUFACTURED FROM THE SAME DOMESTIC FOUNDRY.
- 5. HEIGHT ADJUSTMENTS ALLOWED BY PRECAST RISERS OR BRICK AND MORTAR. DRY STACKING OF BLOCK IS NOT ALLOWED.



ELEVATION

SECTION

### WATER METER COVER



SECTION A-A

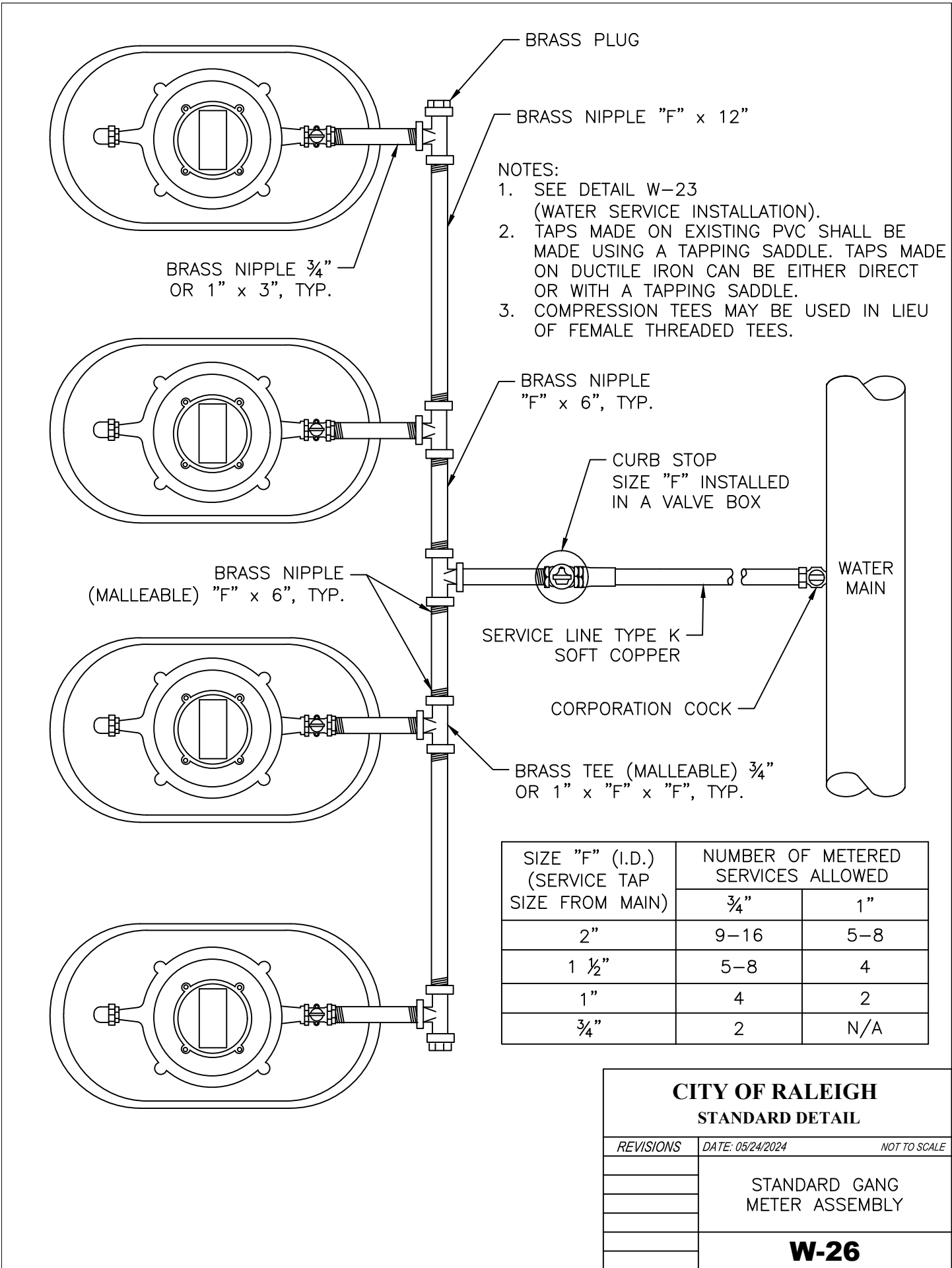
SECTION B-B

### CITY OF RALEIGH STANDARD DETAIL

REVISIONS      DATE: 05/24/2024      NOT TO SCALE

WATER METER BOX

**W-25**



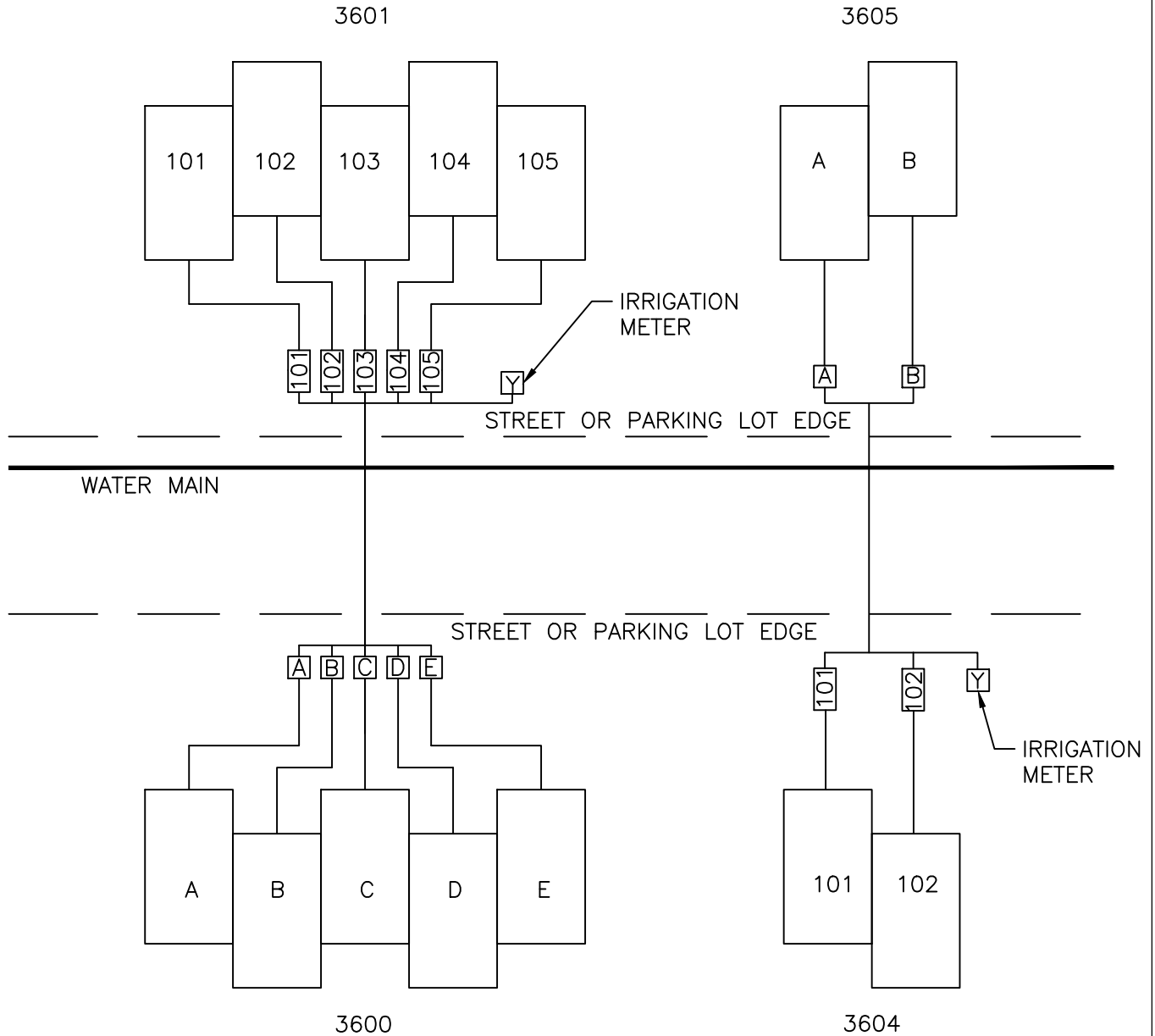
**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS      DATE: 05/24/2024      NOT TO SCALE

STANDARD GANG  
METER ASSEMBLY

**W-26**

ODD NUMBERED ADDRESS



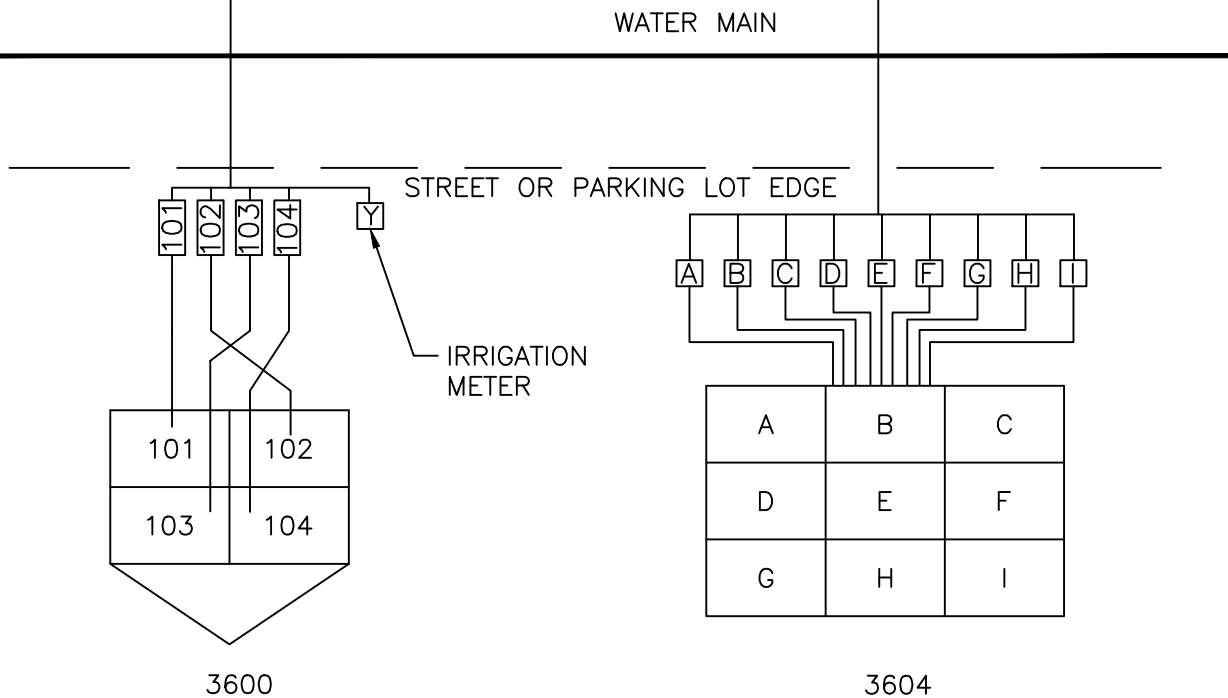
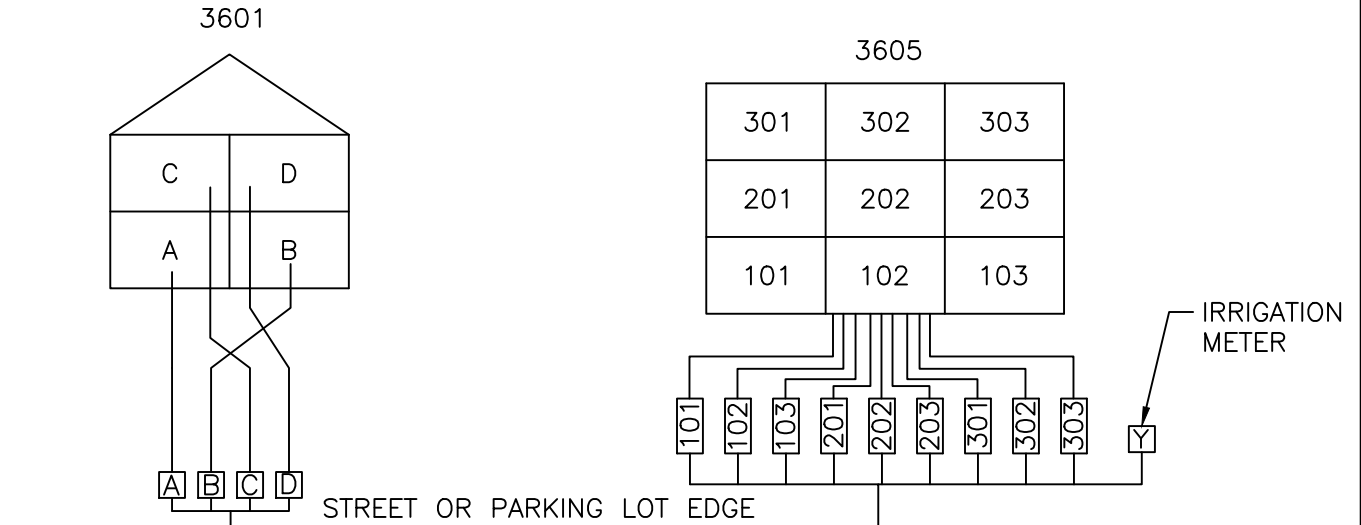
EVEN NUMBERED ADDRESS

NOTES:

1. EVEN NUMBERED UNITS: METERS SHALL BE SET TO BE READ RIGHT TO LEFT (WHEN FACING BUILDING).
2. ODD NUMBERED UNITS: METERS SHALL BE SET TO BE READ LEFT TO RIGHT (WHEN FACING BUILDING).
3. IF IRRIGATION METER IS INCLUDED, IT SHALL BE THE LAST METER IN NUMBERING SEQUENCE.
4. UNIT 'Y' (FOR YARD METER) SHALL BE USED TO INDICATE IRRIGATION METER.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
	GANG METER ADDRESSING SINGLE STORY BUILDING	
	<b>W-27</b>	

ODD NUMBERED ADDRESS



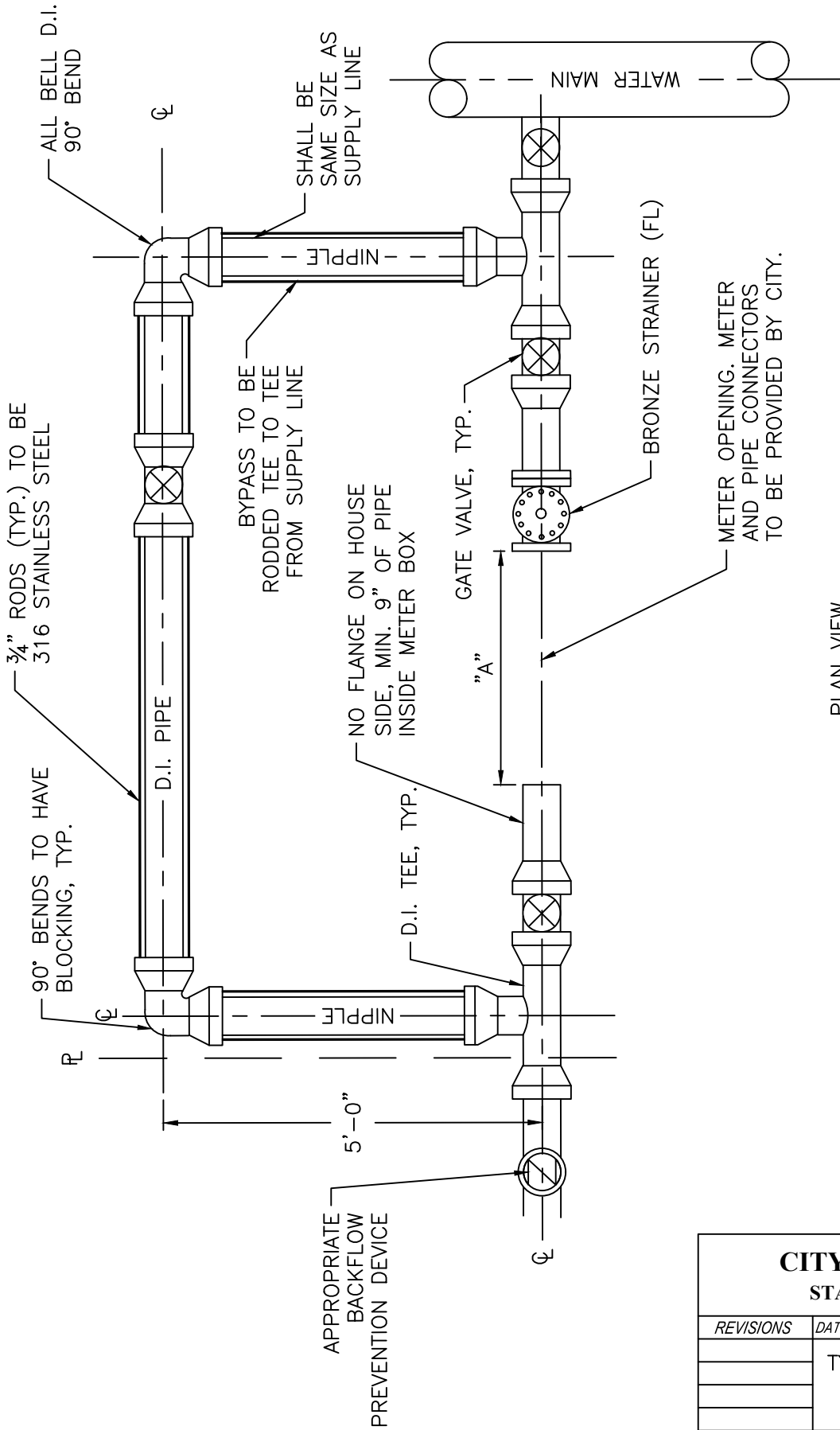
EVEN NUMBERED ADDRESS

NOTES:

1. EVEN NUMBERED UNITS: METERS SHALL BE SET TO BE READ RIGHT TO LEFT (WHEN FACING BUILDING).
2. ODD NUMBERED UNITS: METERS SHALL BE SET TO BE READ LEFT TO RIGHT (WHEN FACING BUILDING).
3. IF IRRIGATION METER IS INCLUDED, IT SHALL BE THE LAST METER IN NUMBERING SEQUENCE.
4. UNIT 'Y' (FOR YARD METER) SHALL BE USED TO INDICATE IRRIGATION METER.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
	GANG METER ADDRESSING MULTI-STORY BUILDING	
	<b>W-28</b>	



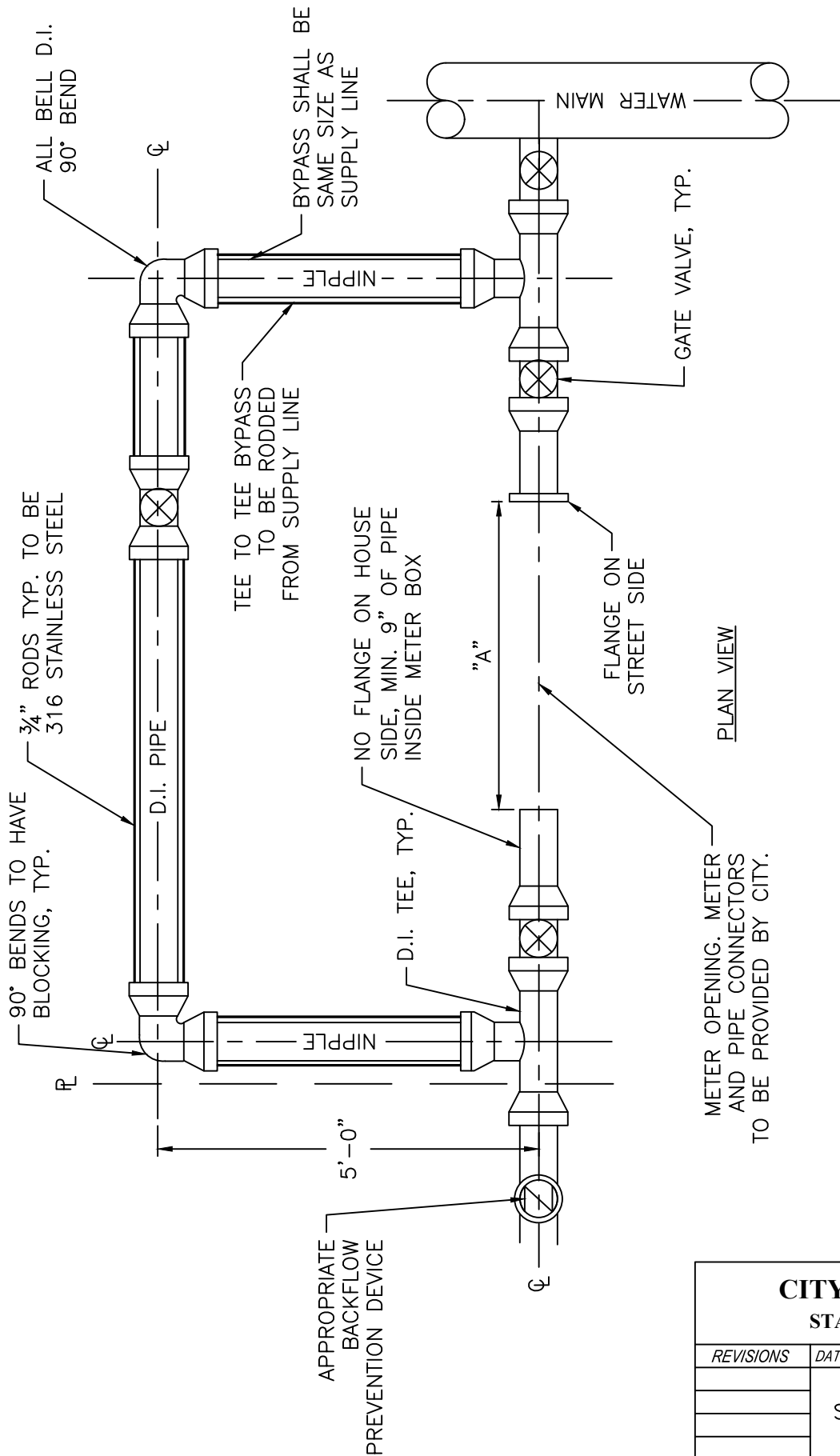


PLAN VIEW

"A"	
METER SIZE	METER OPENING
4" METER	28"
6" METER	35"
8" METER	39"

- NOTES:
1. DOMESTIC METERS ONLY.
  2. ALL FITTINGS ARE TO BE MECHANICAL JOINT, U.N.O.
  3. BRONZE STRAINERS SHALL HAVE NON-THREADED BOLT HOLES.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	TYPICAL 4"-8" DOMESTIC WATER METER BYPASS INSTALLATION	
<b>W-29</b>		



"A"

METER SIZE	METER OPENING
6" METER	46"
8" METER	54"
10" METER	69"

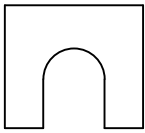
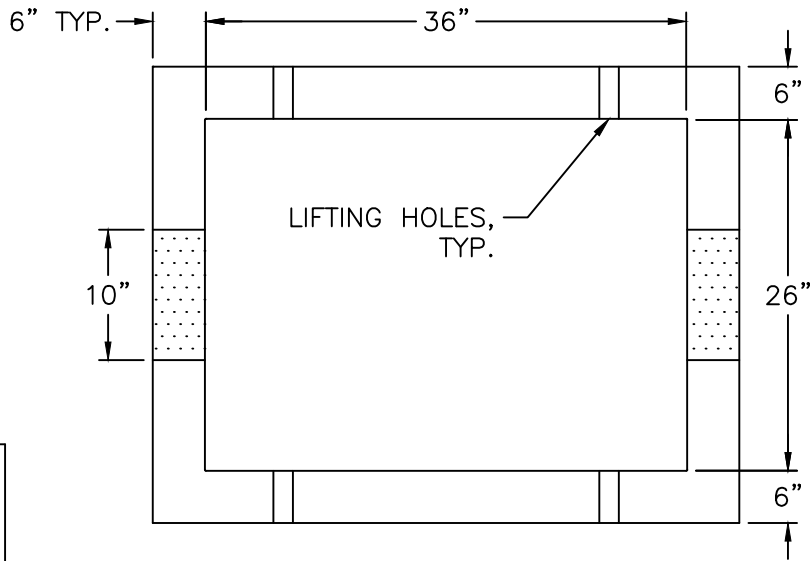
METER OPENING. METER AND PIPE CONNECTORS TO BE PROVIDED BY CITY.

PLAN VIEW

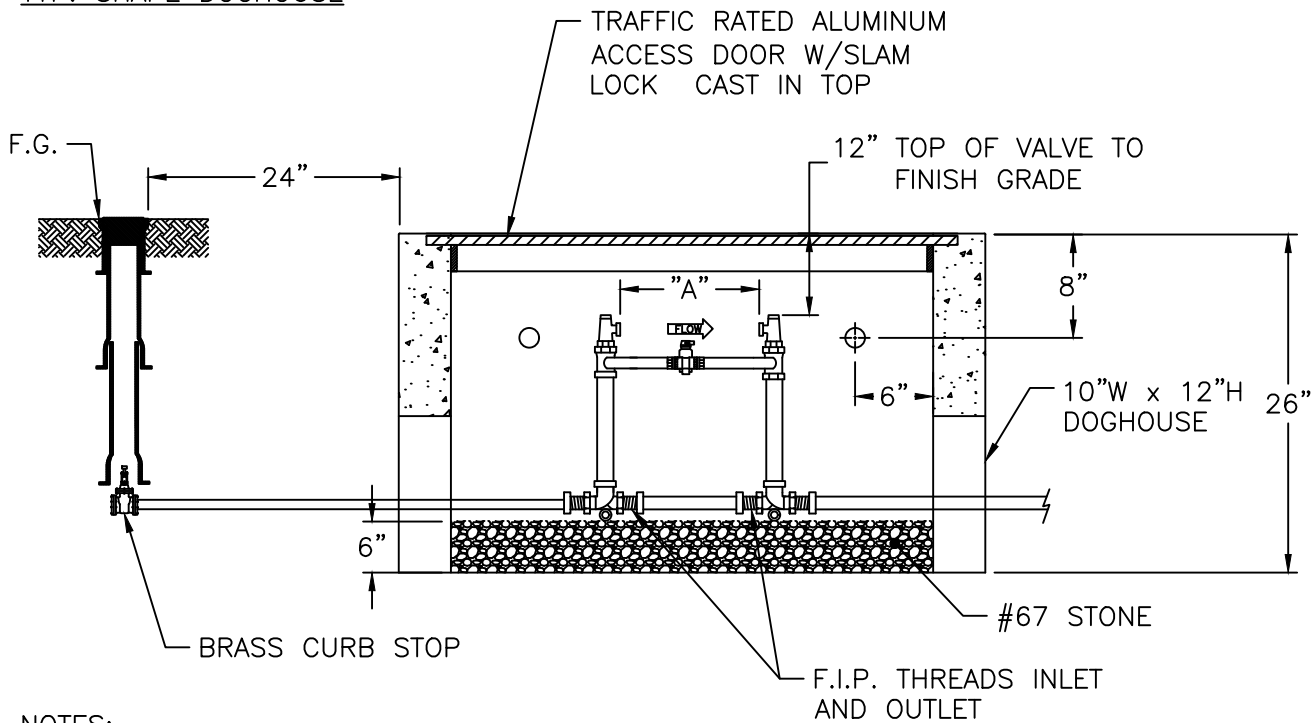
- NOTES:
1. ALL FITTINGS ARE TO BE MECHANICAL JOINT.
  2. SERVICE LINE FOR 10" METER SHALL BE 12".

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	TYPICAL 6"-10" FIRE SERVICE AND DOMESTIC METER W/ BYPASS	
<b>W-30</b>		



TYP. SHAPE DOGHOUSE



NOTES:

1. METER AS MANUFACTURED BY SENSUS OR NEPTUNE. METER TO BE PROVIDED BY RALEIGH WATER.
2. BACKFILL TAMPED IN 6" LIFTS.
3. REINFORCEMENT: #4 @ 6" O.C.E.W.
4. CONCRETE: 4,000 PSI @ 28 DAYS.
5. ALL RPZ BACKFLOW PREVENTION DEVICES MUST BE INSTALLED PRIOR TO METER BEING SET.
6. ALL COPPER SETTERS ARE TO HAVE A BALL TYPE SHUT OFF VALVE ON BOTH SIDES OF COPPER SETTER WITH HIGH RISE BYPASS THAT IS MANUFACTURED BY FORD, MUELLER, OR AY McDONALD (NO EXCEPTIONS).
7. HEIGHT ADJUSTMENTS ALLOWED BY PRECAST RISERS OR BRICK AND MORTAR. DRY STACKING OF BLOCK IS NOT ALLOWED.

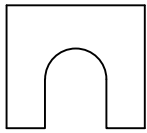
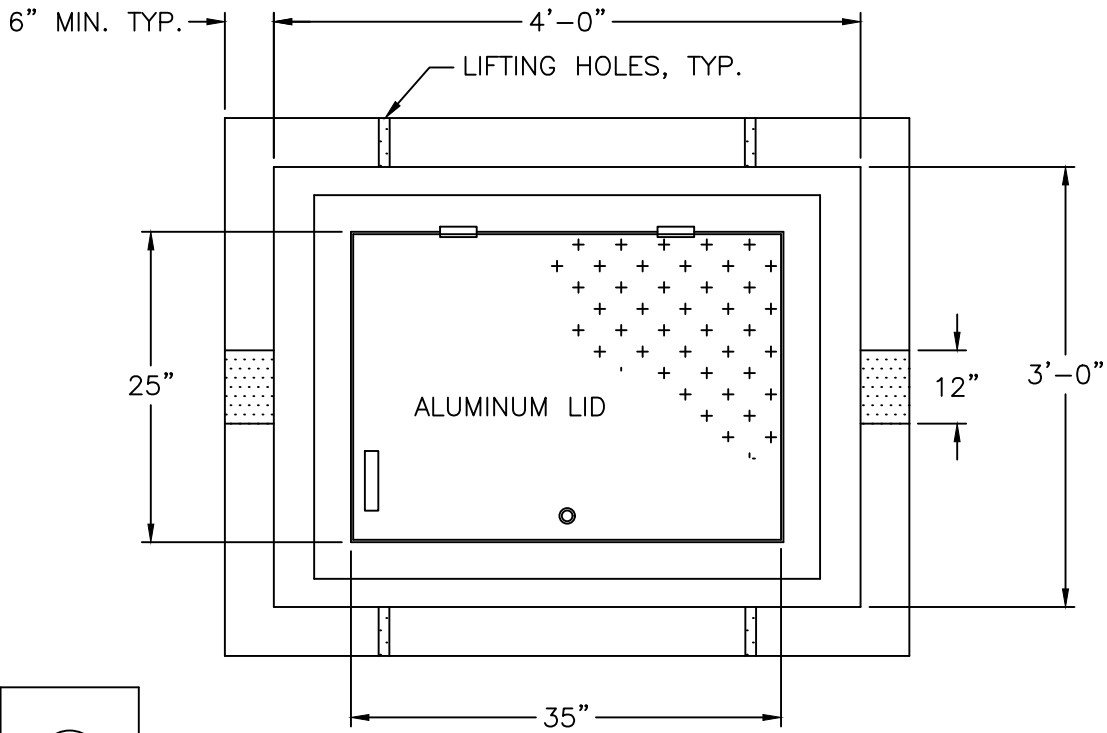
"A"

1 1/2" METER	13 1/4"
2" METER	17 1/4"

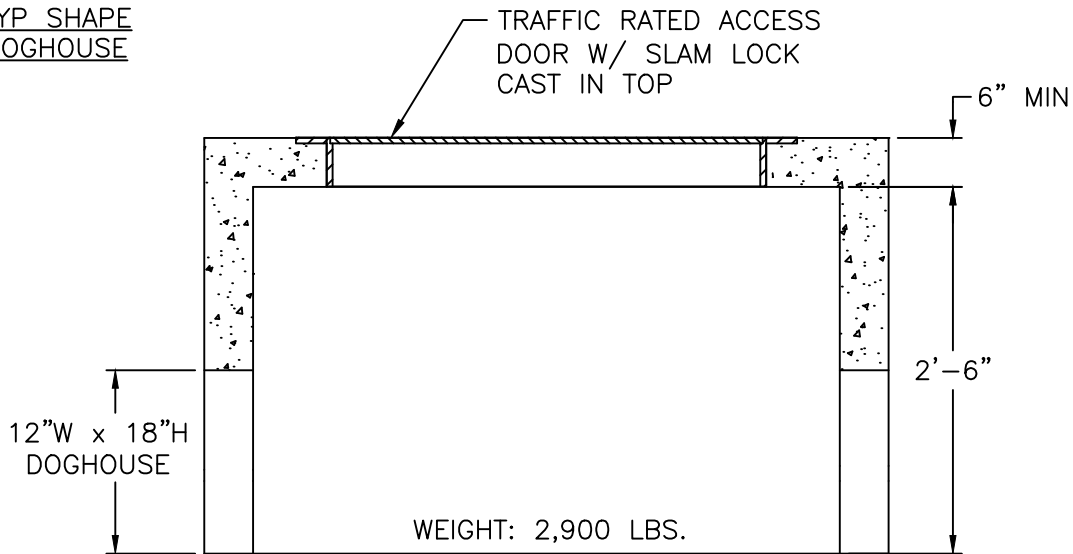
**\*\* TRAFFIC RATED VAULT WALL THICKNESS**

**CITY OF RALEIGH  
STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	TYPICAL 1 1/2"-2" WATER METER BOX INSTALLATION	
<b>W-31</b>		



TYP SHAPE  
DOGHOUSE



NOTES:

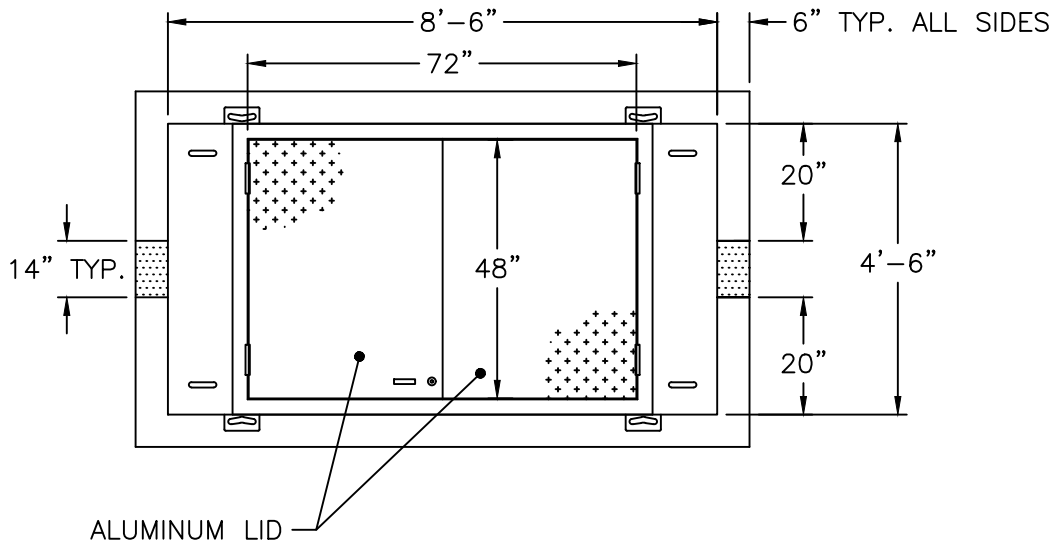
1. REINFORCEMENT: #4 @ 6" O.C.E.W.
2. CONCRETE: 4,000 PSI @ 28 DAYS.
3. 6" OF #67 STONE SHALL BE PLACED IN BOTTOM OF VAULT.
4. METER FLANGE SHALL BE PLACED 42" BELOW FINISHED GRADE.
5. HEIGHT ADJUSTMENTS ALLOWED BY PRECAST RISERS OR BRICK AND MORTAR. DRY STACKING OF BLOCK IS NOT ALLOWED.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

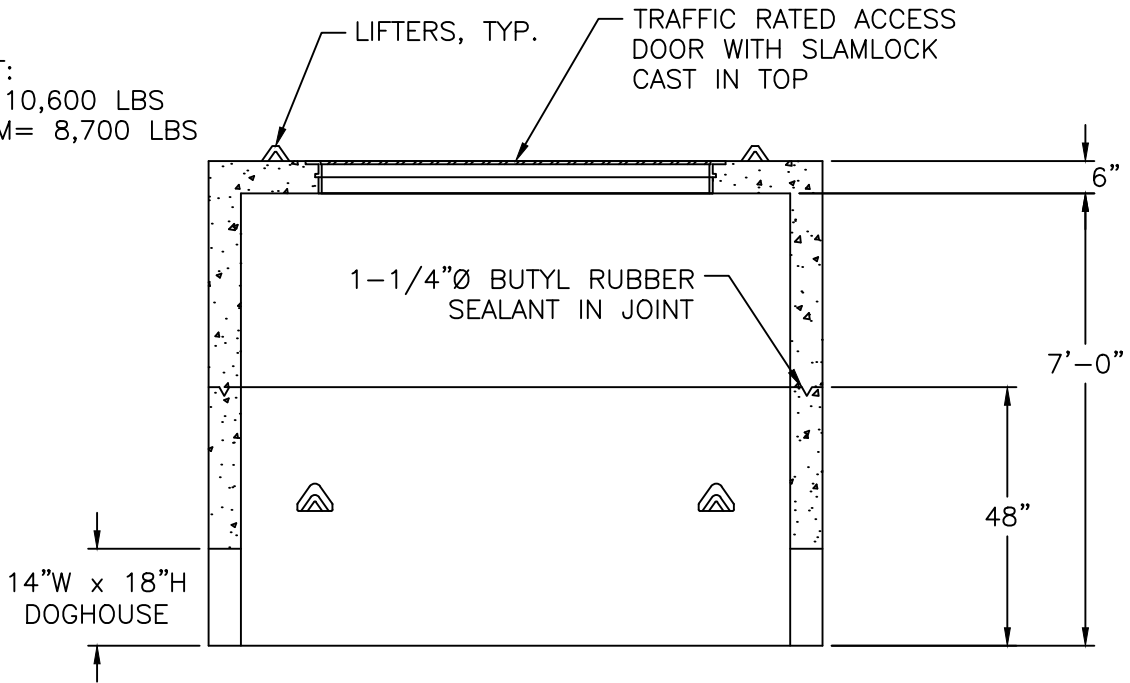
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
-----------	------------------	--------------

TYPICAL 4" WATER  
METER VAULT

**W-32**



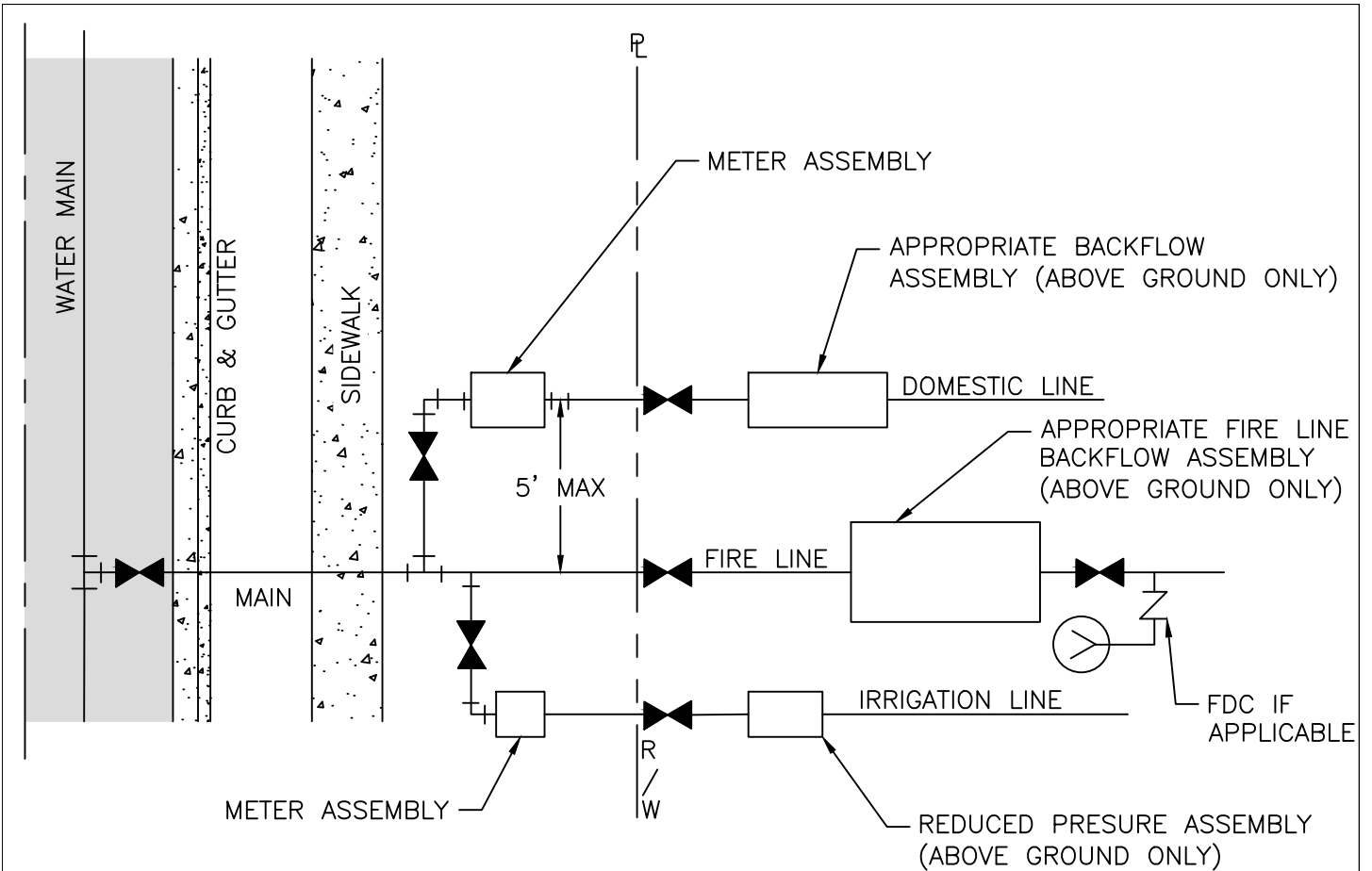
WEIGHT:  
 TOP= 10,600 LBS  
 BOTTOM= 8,700 LBS



NOTES:

1. REINFORCEMENT: #4 @ 6" O.C.E.W.
2. CONCRETE: 4,000 PSI @ 28 DAYS.
3. 6" OF #67 STONE SHALL BE PLACED IN BOTTOM OF VAULT.
4. METER FLANGE SHALL BE PLACED 49" BELOW FINISHED GRADE.
5. HEIGHT ADJUSTMENTS ALLOWED BY PRECAST RISERS OR BRICK AND MORTAR. DRY STACKING OF BLOCK IS NOT ALLOWED.

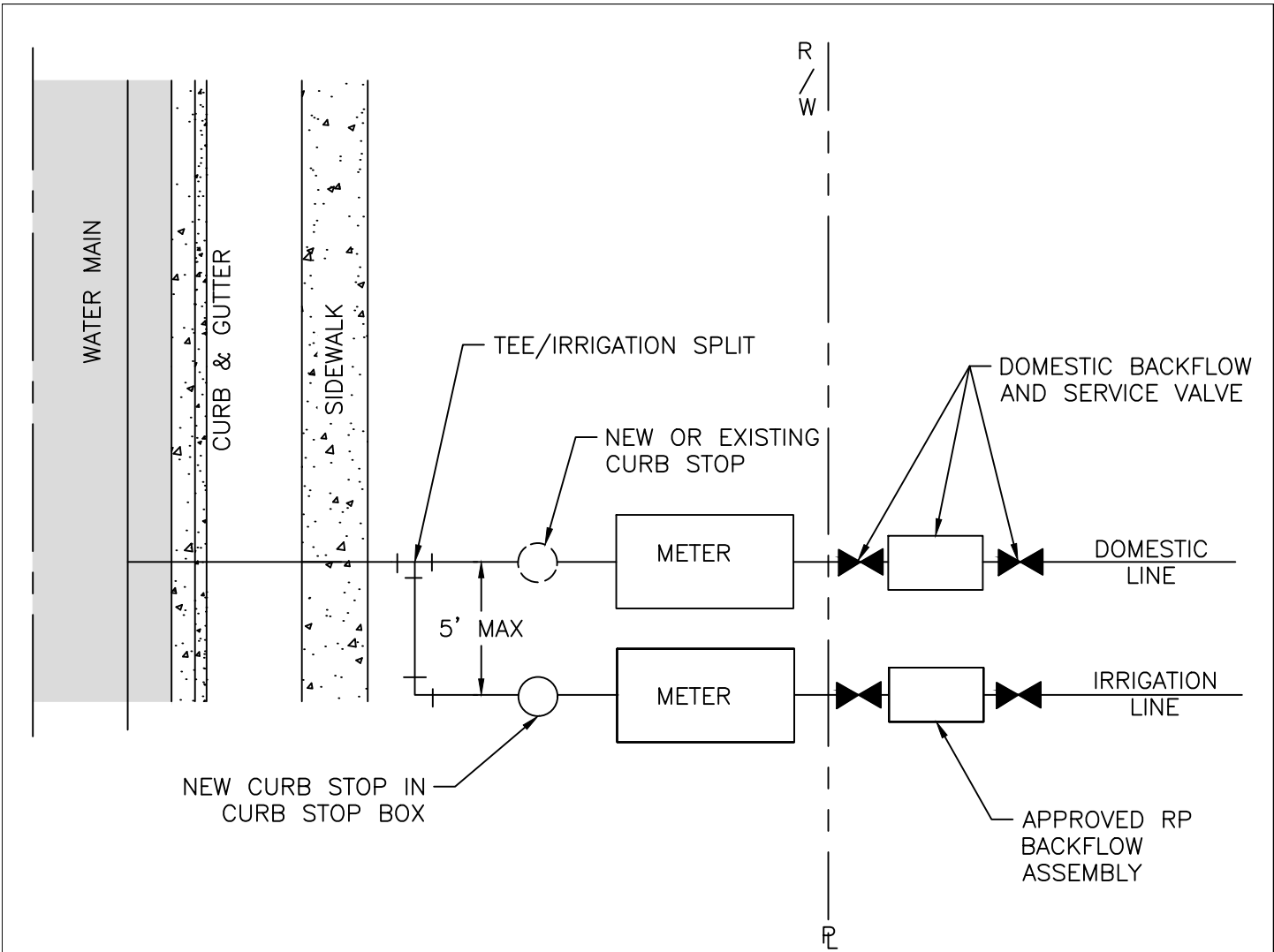
<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	DATE: 05/24/2024	<i>NOT TO SCALE</i>
	TYPICAL 6" THRU 10" WATER METER VAULT	
<b>W-33</b>		



**NOTES:**

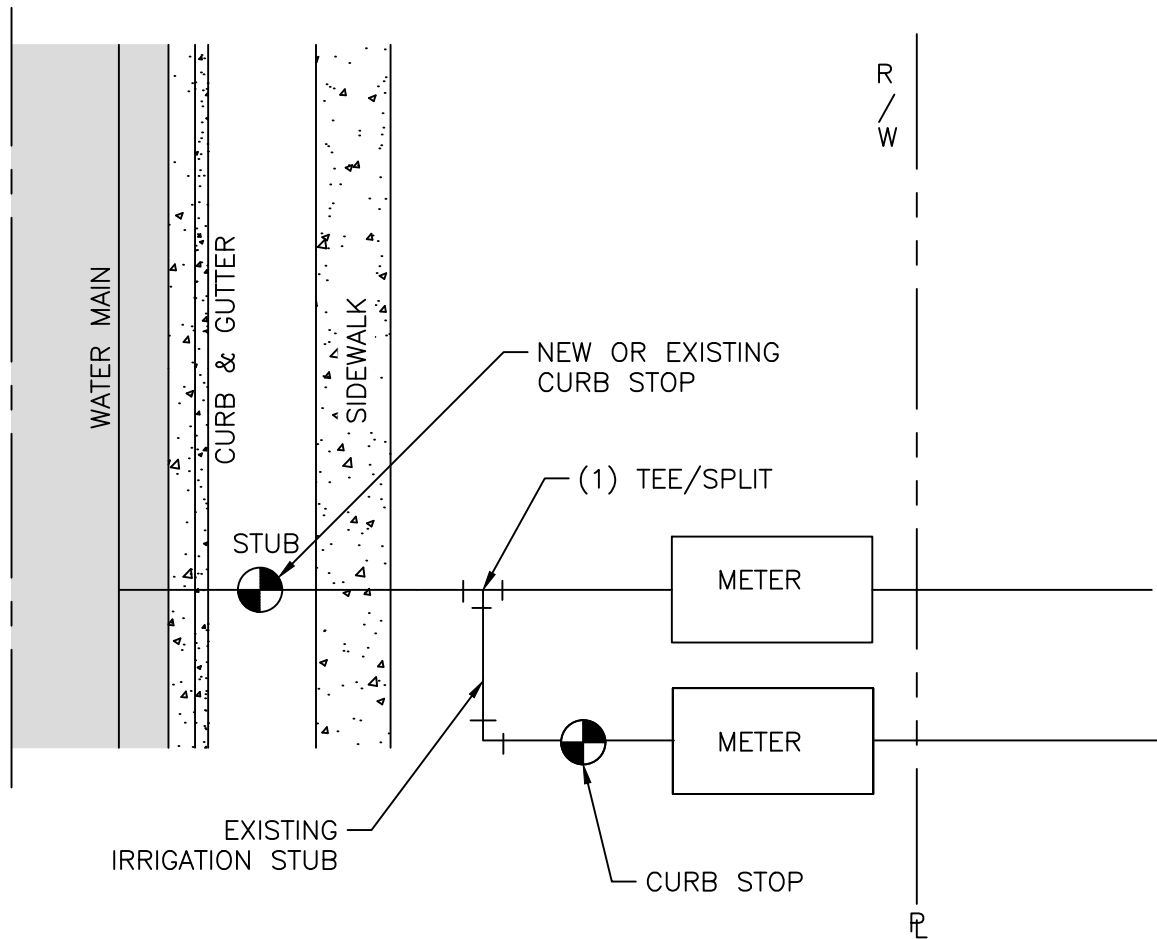
1. SERVICE TAPS FOR 2" AND SMALLER DOMESTIC SERVICES MAY BE BY CORPORATION COCKS. LARGER SERVICES WILL REQUIRE A TEE AND GATE VALVE OR TAPPING SLEEVE AND VALVE ASSEMBLY AND 90° BEND.
2. DOMESTIC SERVICE TAPS SHALL BE ALLOWED ONLY ON 6" OR LARGER FIRE LINES BEFORE THE BACKFLOW ASSEMBLY.
3. ONE DOMESTIC TAP PER FIRE LINE ON STREET SIDE OF BACKFLOW.
4. FIRE LINE SHALL HAVE A FIRE HYDRANT OR BLOW OFF ASSEMBLY AT ITS END TO FACILITATE FLUSHING WHEN NEEDED.
5. IRRIGATION METER SHALL BE LOCATED ON THE SIDE OF DOMESTIC METER WITH INCREASING ADDRESSES.
6. THE CONTAINMENT BACKFLOW ASSEMBLY SHALL BE INSTALLED WITHIN 50 LINEAR PIPING FEET OF THE METER OR RIGHT-OF-WAY FOR FIRE SERVICE LINES.
7. DOMESTIC/IRRIGATION BACKFLOW RISER/STANDPIPE SHALL BE OF APPROVED MATERIALS AS LISTED IN NC PLUMBING CODE.
8. THE RP RELIEF VALVE SHALL BE A MINIMUM OF 12" ABOVE ANY MATERIAL (MULCH INCLUDED) OR GRADE.
9. A SERVICE VALVE IS REQUIRED AFTER THE METER BUT BEFORE THE BACKFLOW ASSEMBLY FOR MAINTENANCE AND REPLACEMENT PURPOSES.
10. THE INSTALLATION MUST ALSO MEET ALL CODE REQUIREMENTS PER THE NC PLUMBING CODE.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
	FIRE, DOMESTIC & IRRIGATION OPTIONS SCHEMATIC	
	<b>W-34</b>	



- NOTES:
1. IRRIGATION METER SHALL BE LOCATED ON THE SIDE OF DOMESTIC METER WITH INCREASING ADDRESSES.
  2. REQUIRED CONTAINMENT BACKFLOWS ARE TO BE INSTALLED WITHIN 50 LINEAR PIPING FEET OF THE METER OR RIGHT-OF-WAY FOR FIRE SERVICE LINES AND MEET INSTALLATION REQUIREMENTS AS LISTED IN APPENDIX A: GUIDELINES AND REQUIREMENTS OF THE CROSS CONNECTION AND HYDRANT METER PROGRAM.
  3. BACKFLOW RISER/STANDPIPE SHALL BE OF COPPER OR BRASS.
  4. THE RP RELIEF VALVE SHALL BE A MINIMUM OF 12" ABOVE ANY MATERIAL (MULCH INCLUDED) OR GRADE.
  5. A SERVICE VALVE IS REQUIRED BEFORE AND AFTER THE BACKFLOW ASSEMBLY FOR MAINTENANCE AND REPLACEMENT PURPOSES.
  6. ENCLOSURE MUST BE ASSE 1060 APPROVED AND HAVE ADEQUATE DRAINAGE.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
	IRRIGATION TAP ON NEW AND EXISTING SERVICES	
	<b>W-35</b>	



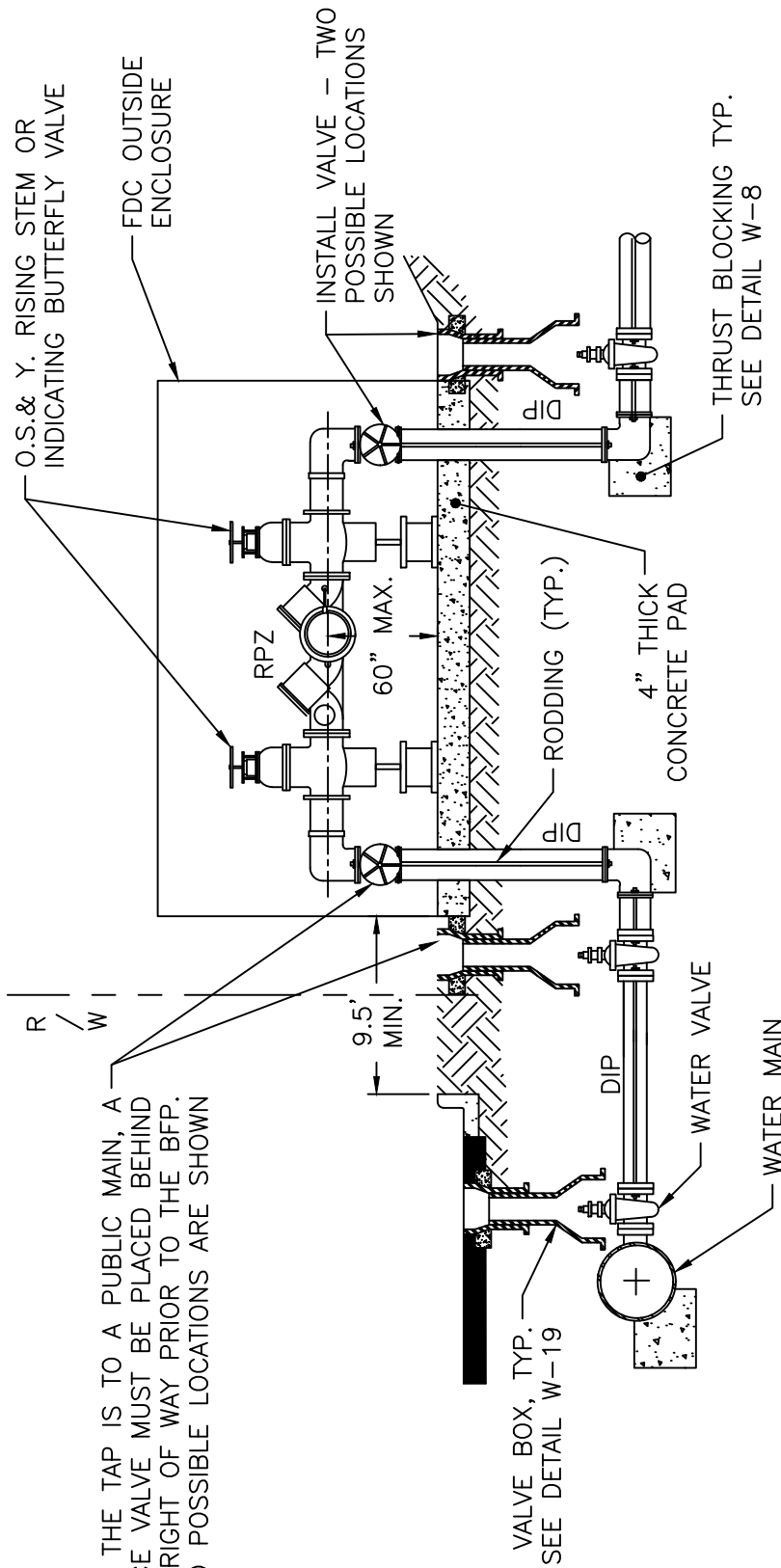
**NOTES:**

1. REMOVE TEE FITTINGS AND REPAIR STUB WITH CURB STOP & VALVE BOX IF NOT EXISTING.
2. WORK TO BE PERFORMED BY LICENSED UTILITY CONTRACTOR, STUB PERMIT INSPECTION REQUIRED.
3. FOR REPAIR OF EXISTING SERVICE, ONE BRASS COMPRESSION COUPLING AND TYPE K COPPER TO BE USED AS NEEDED FOR REPAIR.
4. REMOVE METER BOX AND PIPING. PRIOR TO TERMINATION THE METER DIVISION/UTILITY BILLING MUST BE CONTACTED FOR METER REMOVAL & ACCOUNT CLOSURE.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
	IRRIGATION METER TERMINATION	
	<b>W-35A</b>	



IF THE TAP IS TO A PUBLIC MAIN, A SERVICE VALVE MUST BE PLACED BEHIND THE RIGHT OF WAY PRIOR TO THE BFP. TWO POSSIBLE LOCATIONS ARE SHOWN



NOTES:

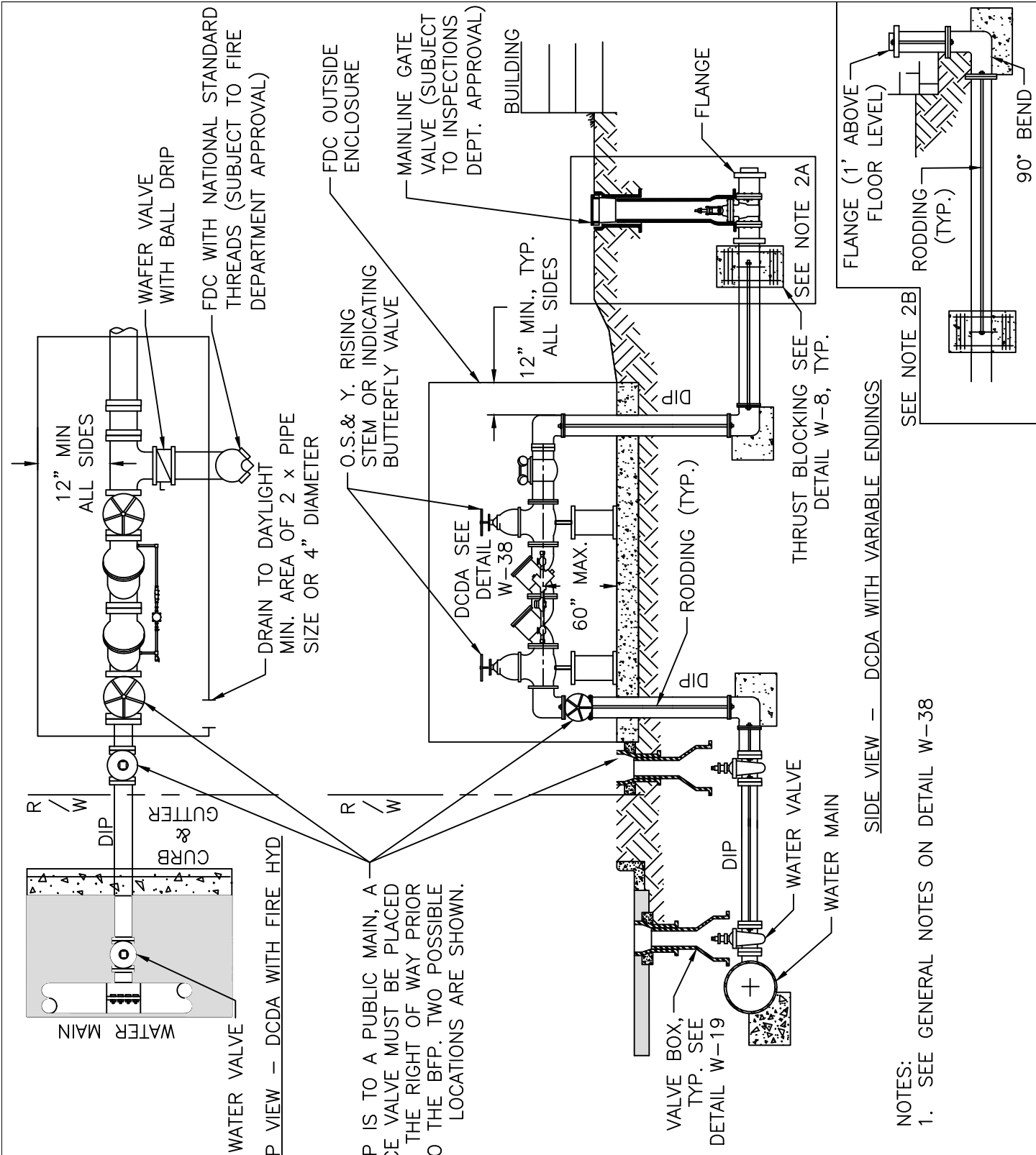
1. ENCLOSURE MUST BE ASSE 1060 APPROVED AND HAVE ADEQUATE DRAINAGE.
2. CONTAINMENT RPZ/RPDA BACKFLOW ASSEMBLIES ARE TO BE INSTALLED WITHIN 50 LINEAR PIPING FEET OF THE METER OR RIGHT-OF-WAY FOR FIRE SERVICE LINES AND MEET INSTALLATION REQUIREMENTS AS LISTED IN APPENDIX A: GUIDELINES AND REQUIREMENTS OF THE CROSS CONNECTION AND HYDRANT METER PROGRAM.
3. NO VALVE IN THE EXISTING SYSTEM SHALL BE OPERATED WITHOUT FOLLOWING THE PROCEDURE OUTLINED IN THE RALEIGH WATER PUBLIC UTILITY DESIGN MANUAL. THE CONTRACTOR SHALL NOTIFY RALEIGH WATER'S DISTRIBUTION DIVISION AT 919-996-3245 TO REQUEST THE OPERATION OF ANY VALVE.
4. RESIDENTIAL LAWN IRRIGATION R.P. ASSEMBLIES THAT ARE REMOVED TO PREVENT FREEZING IN THE WINTER MONTHS MUST BE CAPPED OFF. ALL ABOVE GROUND ASSEMBLIES, EXCEPT RESIDENTIAL LAWN IRRIGATION ASSEMBLIES, MUST BE PROTECTED FROM FROST.
5. ALL CONTAINMENT BACKFLOW ASSEMBLIES MUST BE ASSE AND USC APPROVED.
6. STEEL RODS AND BOLTS SHALL BE 3/4" 316 STAINLESS STEEL.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS      DATE: 05/24/2024      NOT TO SCALE

REDUCED PRESSURE ZONE  
AND REDUCED PRESSURE  
DETECTOR ASSEMBLY

**W-36**

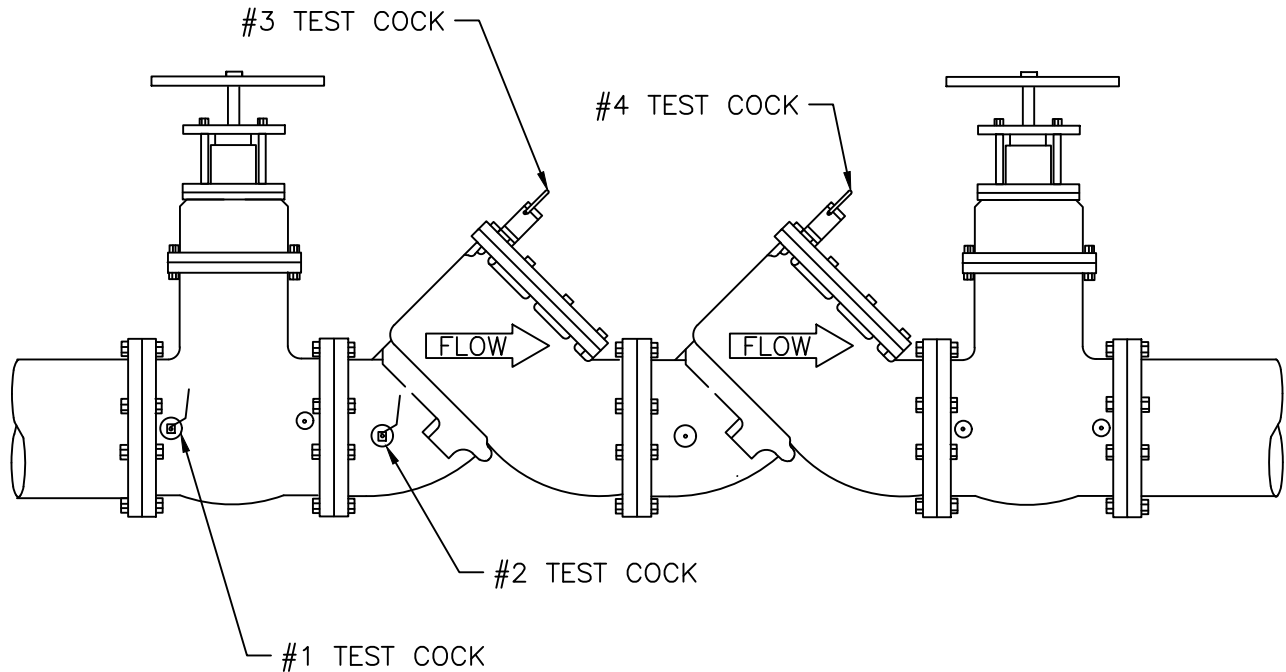


IF THE TAP IS TO A PUBLIC MAIN, A SERVICE VALVE MUST BE PLACED BEHIND THE RIGHT OF WAY PRIOR TO THE BFP. TWO POSSIBLE LOCATIONS ARE SHOWN.

SIDE VIEW - DCDA WITH VARIABLE ENDINGS

NOTES:  
1. SEE GENERAL NOTES ON DETAIL W-38

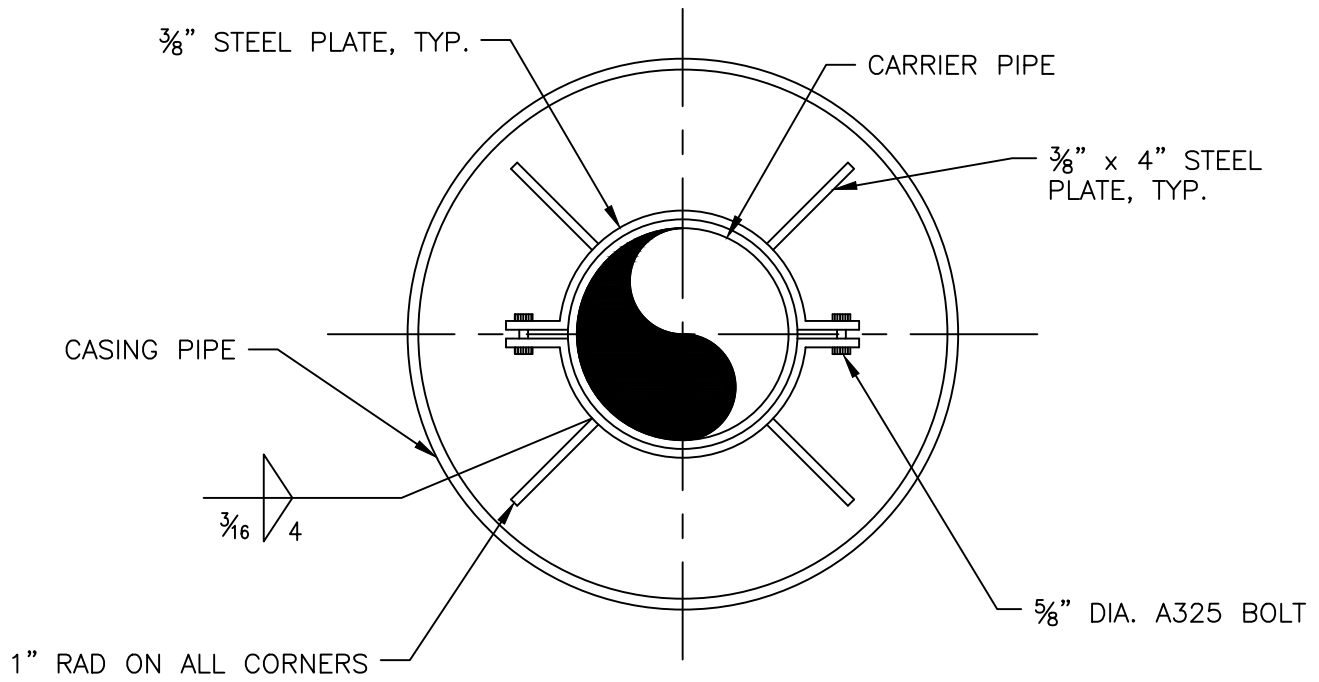
<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
TYPICAL DOUBLE CHECK VALVE AND DOUBLE CHECK DETECTOR ASSEMBLY		
<b>W-38</b>		



GENERAL NOTES:

1. SHUT-OFF VALVES, CHECK VALVES, AND TEST COCKS SHALL BE STANDARD TO THE APPROVED BACKFLOW ASSEMBLY.
2. ALL LARGE (2 1/2"–10") ASSEMBLIES TO BE SUPPORTED BY A CRADLE.
3. ENCLOSURE FOUNDATIONS SHALL BE CONSTRUCTED OF 4" OF CONCRETE OR 6" OF STONE.
4. ASSEMBLIES MUST BE ON CURRENT APPROVAL LIST.
5. 2 1/2" AND LARGER ASSEMBLIES SHALL BE FUSION BONDED EPOXY COATED INCLUDING SHUTOFF VALVES.
6. ENCLOSURE MUST BE ASSE 1060 APPROVED AND HAVE ADEQUATE DRAINAGE.
7. CONTAINMENT RPZ/RPDA BACKFLOWS ARE TO BE INSTALLED WITHIN 50 LINEAR PIPING FEET OF THE METER OR RIGHT-OF-WAY FOR FIRE SERVICE LINES AND MEET INSTALLATION REQUIREMENTS AS LISTED IN APPENDIX A: GUIDELINES AND REQUIREMENTS OF THE CROSS CONNECTION AND HYDRANT METER PROGRAM.
8. NO VALVE IN THE EXISTING SYSTEM SHALL BE OPERATED WITHOUT FOLLOWING THE PROCEDURE OUTLINED IN THE RALEIGH WATER PUBLIC UTILITY DESIGN MANUAL. THE CONTRACTOR SHALL NOTIFY RALEIGH WATER'S DISTRIBUTION DIVISION AT 919-996-3245 TO REQUEST THE OPERATION OF ANY VALVE.
9. ALL CONTAINMENT BACKFLOW ASSEMBLIES MUST BE ASSE AND USC APPROVED.
10. STEEL RODS AND BOLTS SHALL BE 3/4" 316 STAINLESS STEEL.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
	STANDARD DOUBLE CHECK VALVE ASSEMBLY	
	<b>W-38</b>	



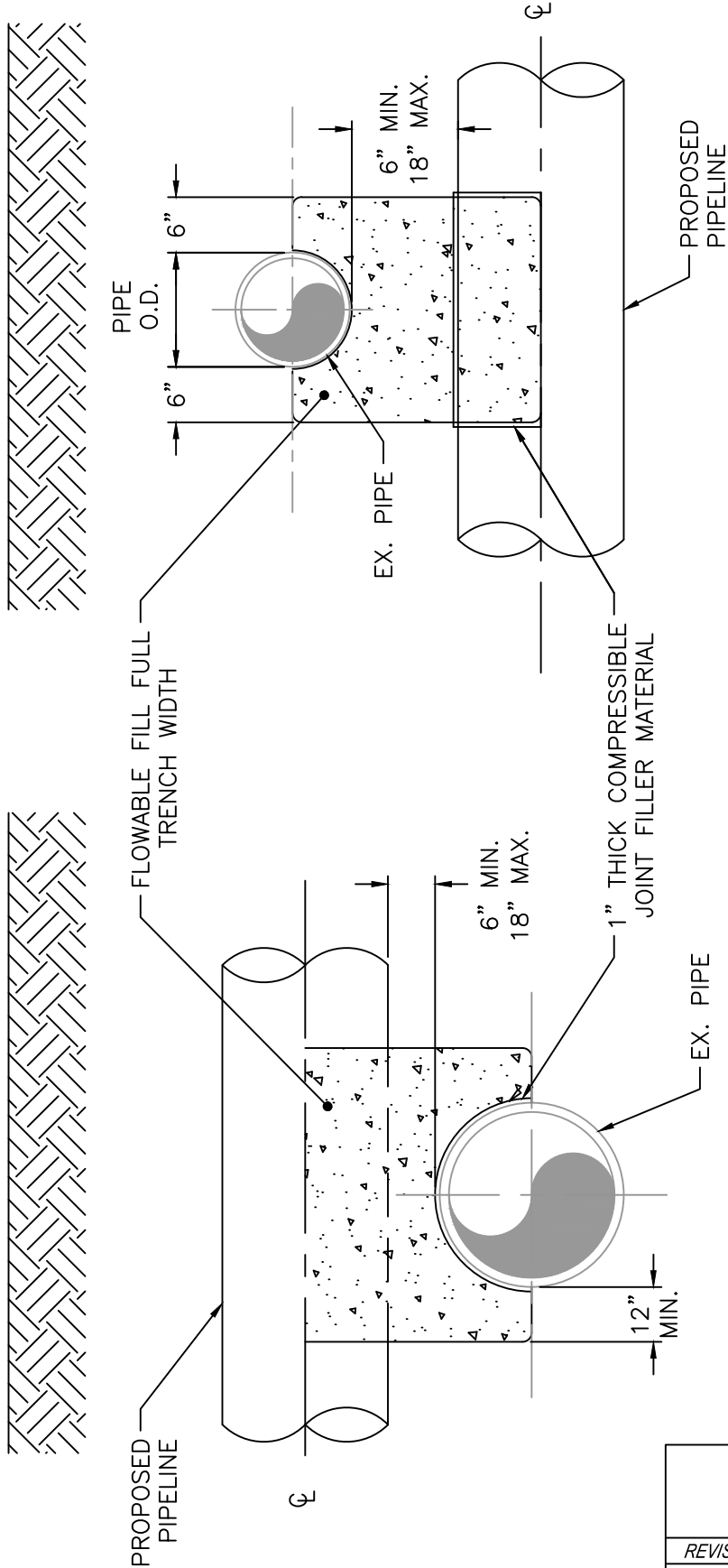
NOTE:  
 USE A MINIMUM OF TWO SPIDERS PER PIPE JOINT ONE FOURTH OF THE PIPE JOINT LENGTH IN FROM BOTH THE BELL AND SPIGOT ENDS.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
-----------	------------------	--------------

PIPE ALIGNMENT GUIDE

**W-40**



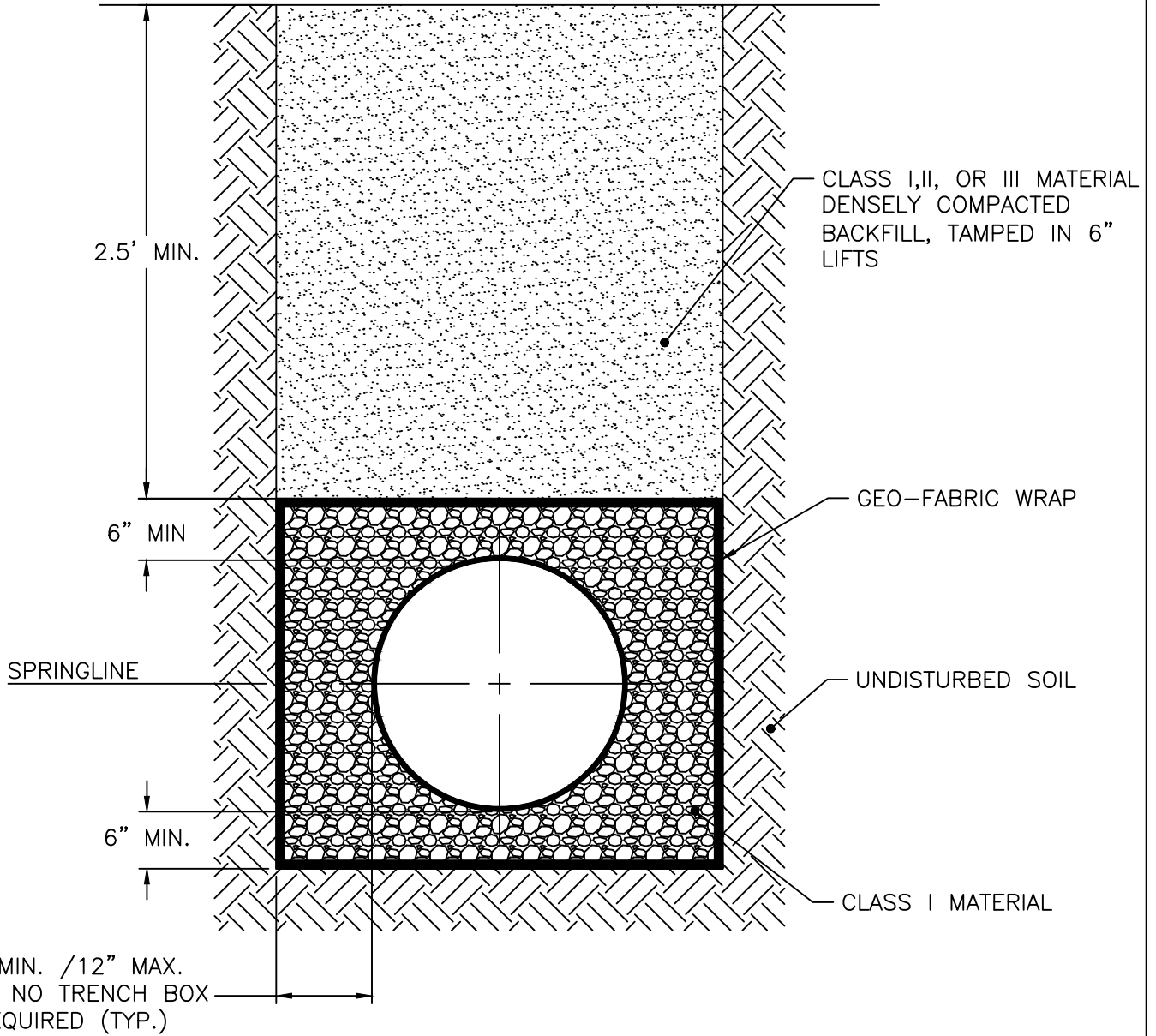
PROPOSED PIPELINE UNDER EXISTING PIPE

PROPOSED PIPELINE OVER EXISTING PIPE

NOTE:  
NO ENCASEMENT REQUIRED FOR SPACE  
GREATER THAN 18" FOR WATER LINES.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	CONCRETE CRADLE PROTECTION FOR WATER LINE CROSSINGS	
	<b>W-41</b>	

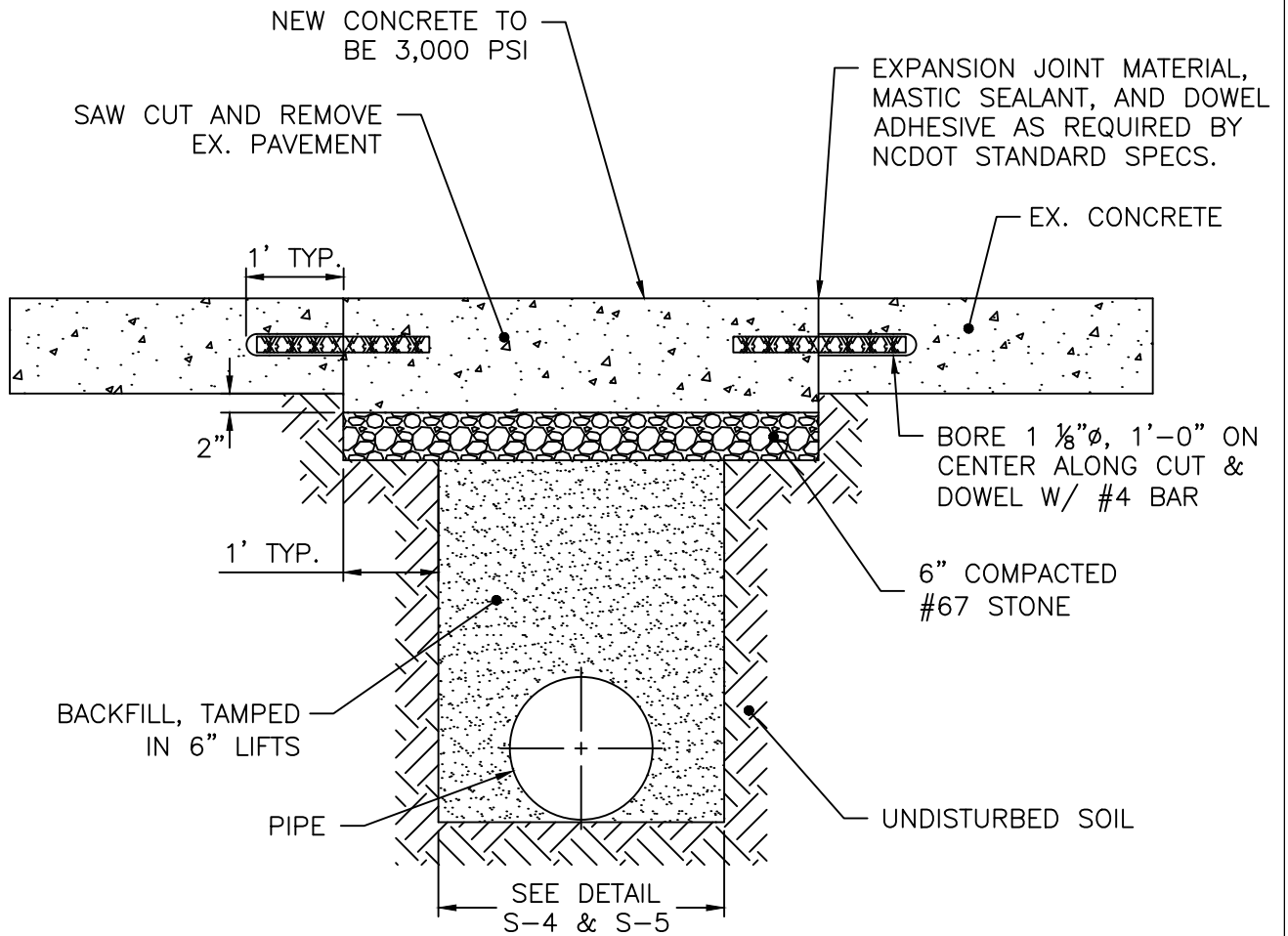


**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
-----------	------------------	--------------

	STANDARD BEDDING DETAIL FOR CCFRPM PIPES
--	---

**S-1**



**NOTES:**

1. SEE DETAIL S-4 & S-5 FOR ADDITIONAL TRENCH AND PIPE BEDDING DETAILS.
2. PAVEMENT CUTS OVER 5'-0" IN WIDTH SHALL BE REINFORCED TO NCDOT OR MERGER COMMUNITY STANDARDS.
3. PAVEMENT CUTS SHALL BE MADE WITH AN APPROPRIATE SAW CUT MACHINE.
4. THE TRENCH SUBGRADE MATERIAL SHALL BE BACKFILLED WITH SUITABLE MATERIAL AND COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY AASHTO T 99 AS MODIFIED BY NCDOT.
5. THE FINAL 6" OF FILL SHALL CONSIST OF ABC MATERIAL COMPACTED TO AT LEAST 100% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY AASHTO T 180 AS MODIFIED BY NCDOT.

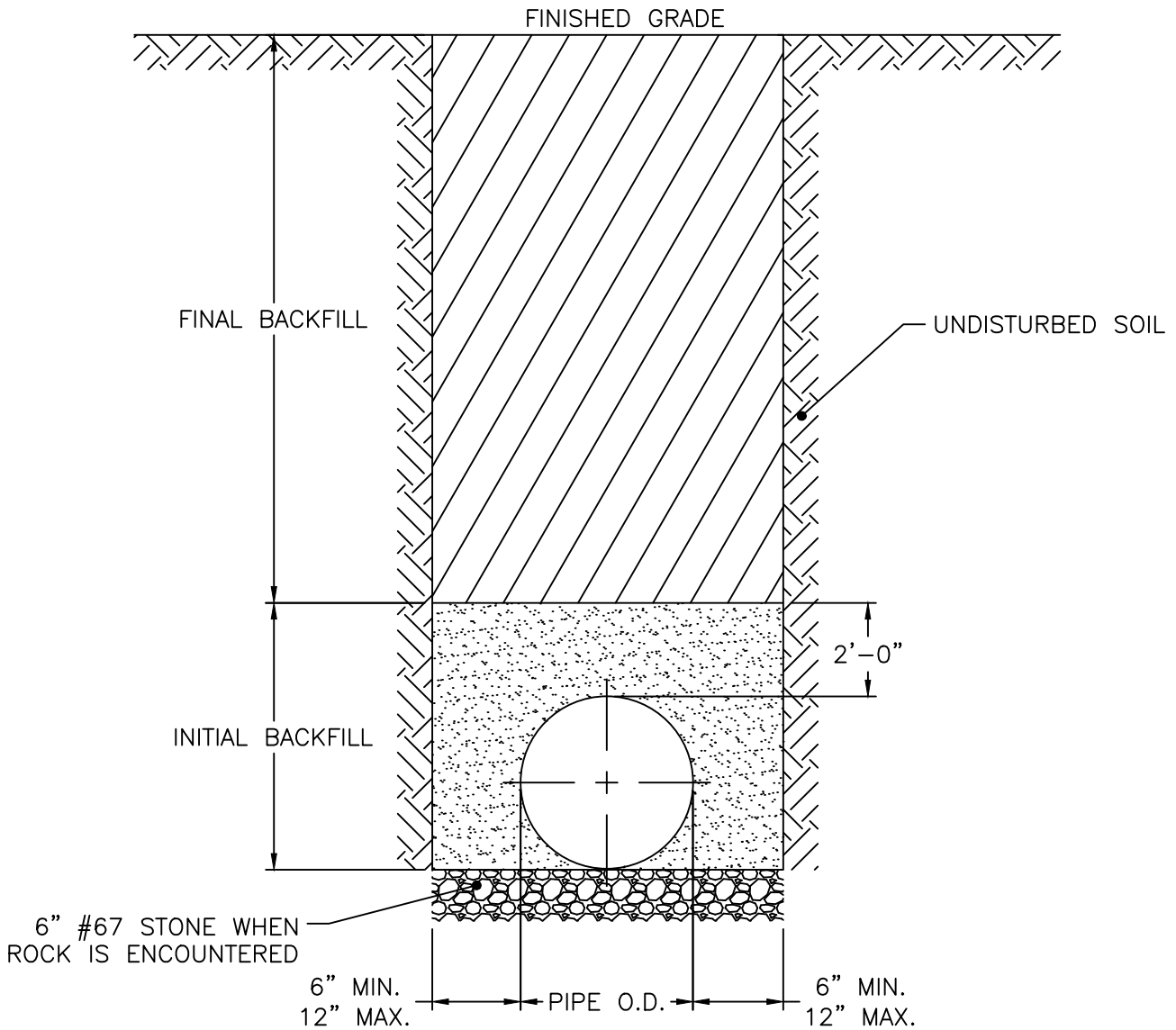
<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
	STANDARD CONCRETE PAVEMENT PATCH	
	<b>S-2</b>	

SEE TRANSPORTATION DETAIL  
T-10.05.1 FOR ASPHALT REPAIR

SEE TRANSPORTATION DETAIL  
T-10.05.2 FOR ASPHALT REPAIR EXTENTS

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
	STANDARD ASPHALT PAVEMENT PATCH	
	<b>S-3</b>	

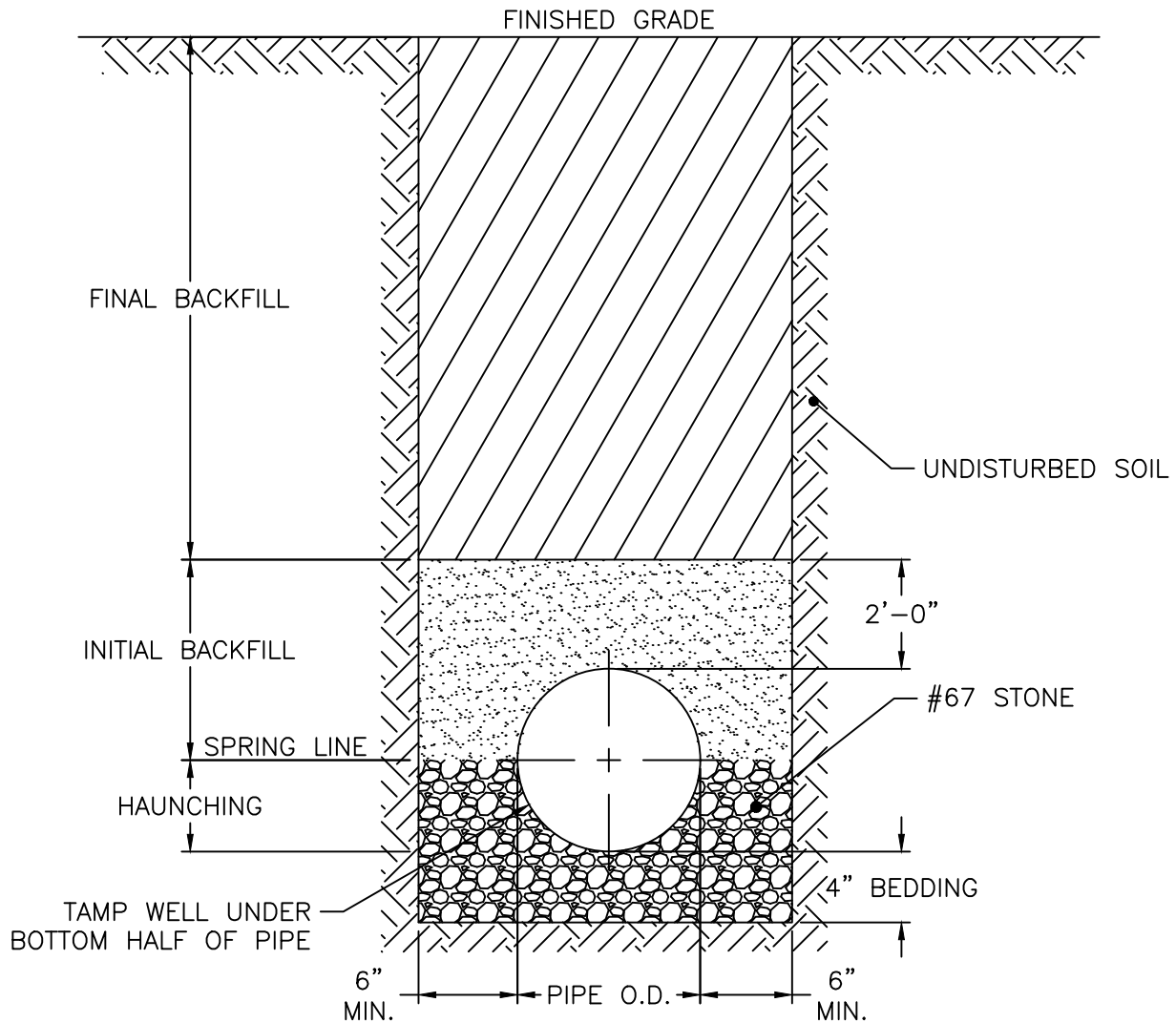




**NOTES:**

1. FOR TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
2. NO ROCKS OR BOULDERS 4" OR LARGER TO BE USED IN INITIAL BACKFILL.
3. ALL BACKFILL MATERIAL SHALL BE SUITABLE NATIVE MATERIAL.
4. BACKFILL SHALL BE TAMPED IN 6" LIFTS IN TRAFFIC AREAS, 12" IN NON-TRAFFIC AREAS.
5. ACHIEVE 80% COMPACTION IN NON-TRAFFIC AREAS, AND 95% COMPACTION IN TRAFFIC AREAS.
6. IF IN EASEMENT, 4" TOPSOIL AND 12" CLEAN SELECT FILL MAY BE REQUIRED.
7. NO BOULDERS 8" IN DIAMETER OR GREATER ALLOWED IN FINAL BACKFILL.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
	TRENCH BOTTOM DIMENSIONS & BACKFILLING REQUIREMENTS FOR DUCTILE IRON	
<b>S-4</b>		



TYPICAL TRENCH BOTTOM DIMENSIONS FOR SDR 35 PVC GRAVITY PIPE

**NOTES:**

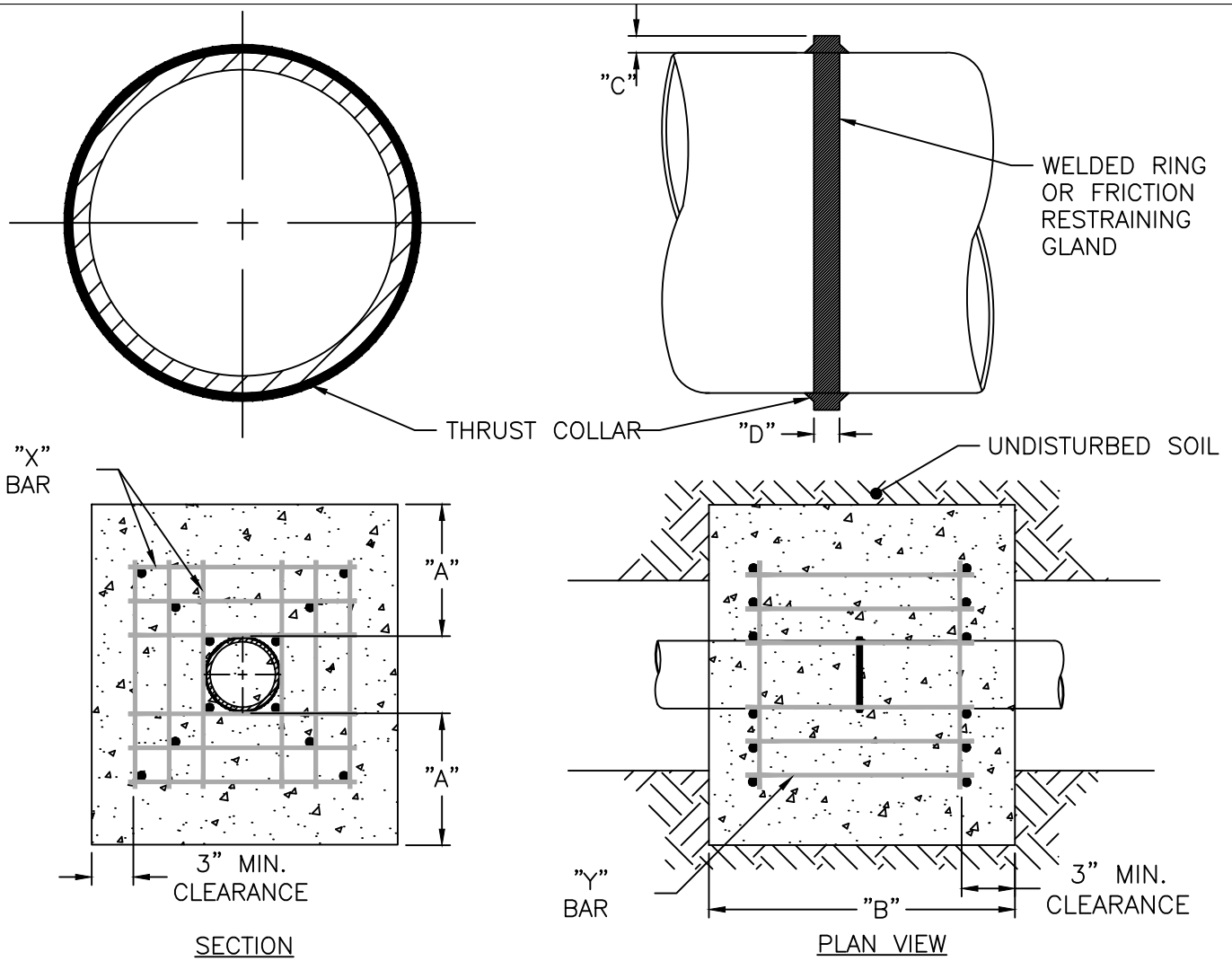
1. FOR TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
2. NO ROCKS OR BOULDERS, 4" OR LARGER, TO BE USED IN INITIAL BACKFILL.
3. ALL BACKFILL MATERIAL SHALL BE SUITABLE NATIVE MATERIAL.
4. BACKFILL SHALL BE TAMPED IN 6" LIFTS IN TRAFFIC AREAS, 12" IN NON-TRAFFIC AREAS.

**CITY OF RALEIGH  
STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
-----------	------------------	--------------

TRENCH BOTTOM DIMENSIONS & BACKFILLING REQUIREMENTS FOR PVC GRAVITY SEWER MAIN
--

**S-5**



REINFORCING REQUIREMENTS

THRUST COLLAR, AND THRUST SCHEDULE

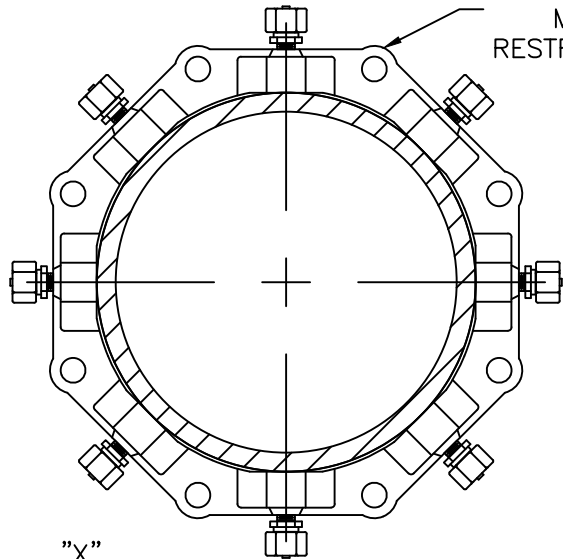
I.D. PIPE	REBAR SIZE	"X" BAR LENGTH	"X" BAR WEIGHT	"Y" BAR LENGTH	"Y" BAR WEIGHT	NO. REQUIRED
6"-36"	#5	2'-2" + O.D. PIPE	1.043 LBS/FT	1'-1"	1.1 LBS. EACH	X-24 Y-12
≥48"	#6	3'-0" + O.D. PIPE	1.502 LBS/FT	1'-3"	1.9 LBS. EACH	X-24 Y-12

I.D. PIPE	"A"	"B"	"C"	"D"
6"-16"	1'-4"	1'-7"	2"	3/8"
20"-24"	1'-4"	1'-7"	3"	1/2"
30"-36"	1'-4"	1'-7"	4"	5/8"
≥48"	1'-8"	1'-9"	6"	7/8"

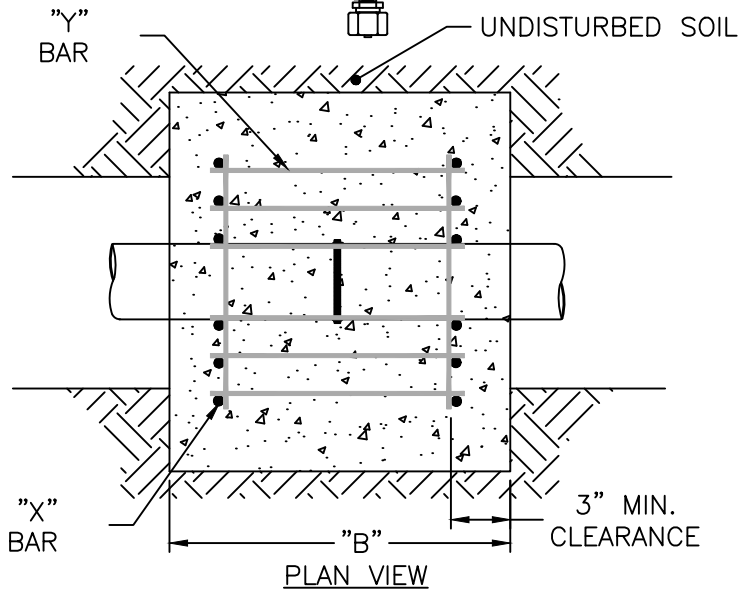
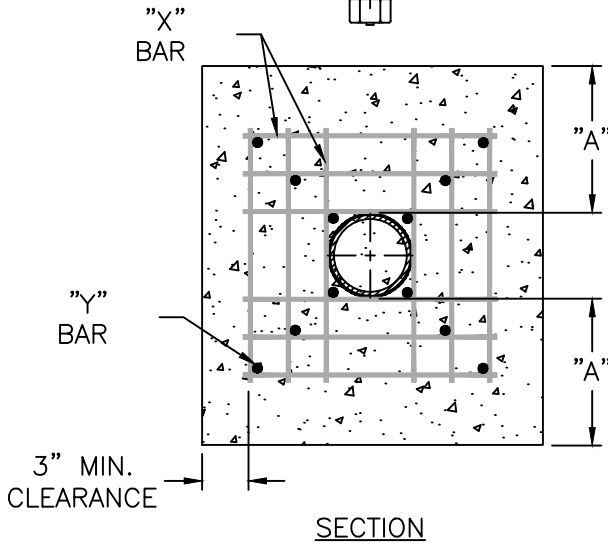
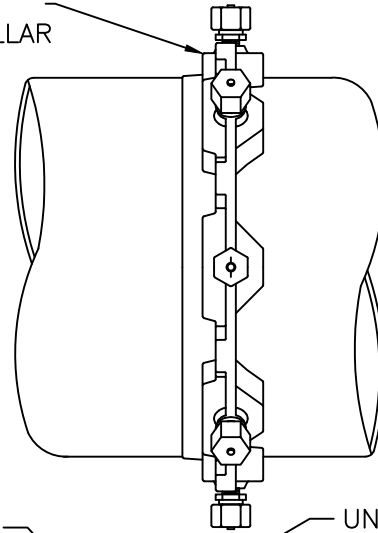
NOTES:

1. CONCRETE SHALL BE 3,000 PSI AND TRANSIT MIXED.
2. REINFORCING BARS SHALL BE DEFORMED AND TIED TOGETHER.
3. TRENCH BOTTOM WIDTH IN VICINITY OF THRUST BLOCK INSTALLATION SHALL BE THE MINIMUM WIDTH AS SHOWN ON DETAIL S-4 & S-5.
4. BACKFILL TAMPED IN 6" LIFTS, SEE DETAIL S-4 & S-5.
5. THRUST COLLAR MUST BE FACTORY WELDED ON BOTH SIDES ALONG BOTH EDGES OF COLLAR AROUND CIRCUMFERENCE.
6. IN LIEU OF WELDED RING, FRICTION RESTRAINING GLANDS ARE PERMITTED.

<b>CITY OF RALEIGH</b>	
<b>STANDARD DETAIL</b>	
REVISIONS	DATE: 05/24/2024 <span style="float: right;">NOT TO SCALE</span>
	RESTRAINING COLLAR DESIGN DATA FOR SEWER FORCE MAIN
	<b>S-6</b>



MECHANICAL RESTRAINING COLLAR



REINFORCING REQUIREMENTS

I.D. PIPE	REBAR SIZE	"X" BAR LENGTH	"X" BAR WEIGHT	"Y" BAR LENGTH	"Y" BAR WEIGHT	NO. REQUIRED
6"-36"	#5	2'-2" + O.D. PIPE	1.043 LBS/FT	1'-1"	1.1 LBS. EACH	X-24 Y-12
≥48"	#6	3'-0" + O.D. PIPE	1.502 LBS/FT	1'-3"	1.9 LBS. EACH	X-24 Y-12

THRUST COLLAR, AND THRUST SCEDULE

I.D. PIPE	"A"	"B"	"C"	"D"
6"-16"	1'-4"	1'-7"	2"	3/8"
20"-24"	1'-4"	1'-7"	3"	1/2"
30"-36"	1'-4"	1'-7"	4"	5/8"
≥48"	1'-8"	1'-9"	6"	7/8"

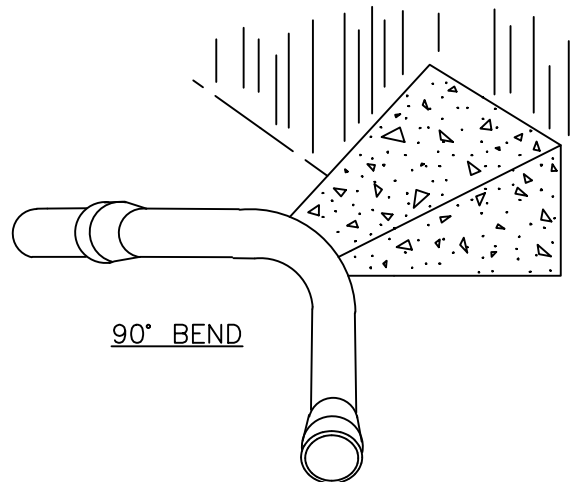
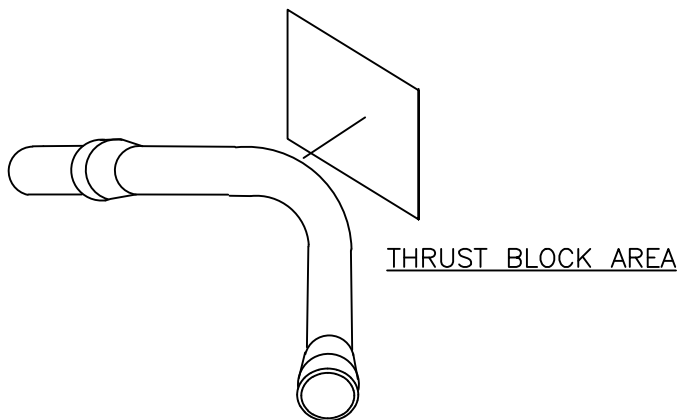
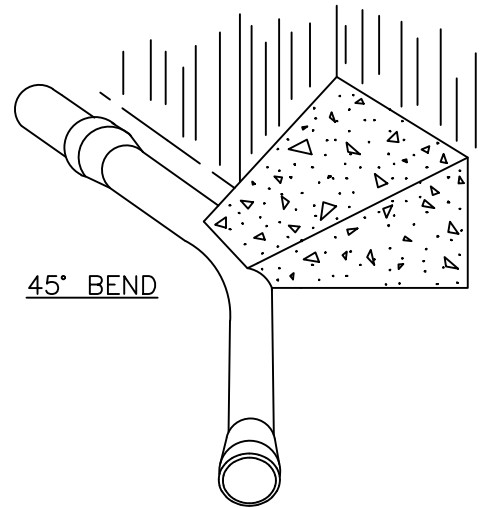
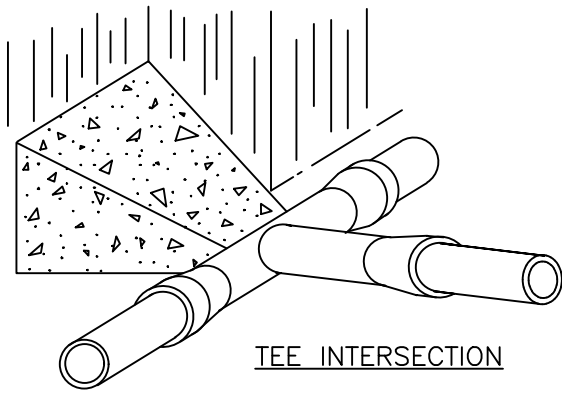
NOTES:

1. CONCRETE SHALL BE 3,000 PSI AND TRANSIT MIXED.
2. REINFORCING BARS SHALL BE DEFORMED AND TIED TOGETHER.
3. TRENCH BOTTOM WIDTH IN VICINITY OF THRUST BLOCK INSTALLATION SHALL BE THE MINIMUM WIDTH AS SHOWN ON DETAIL S-5.
4. BACKFILL TAMPED IN 6" LIFTS, SEE DETAIL S-4 & S-5.
5. MECHANICAL RESTRAINING COLLAR SHALL BE AS MANUFACTURED BY MEGA-LUG OR EQUAL.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
RESTRAINING COLLAR DESIGN DATA FOR PVC FORCE MAINS		
<b>S-6A</b>		

THRUST BLOCKING



NOTES:

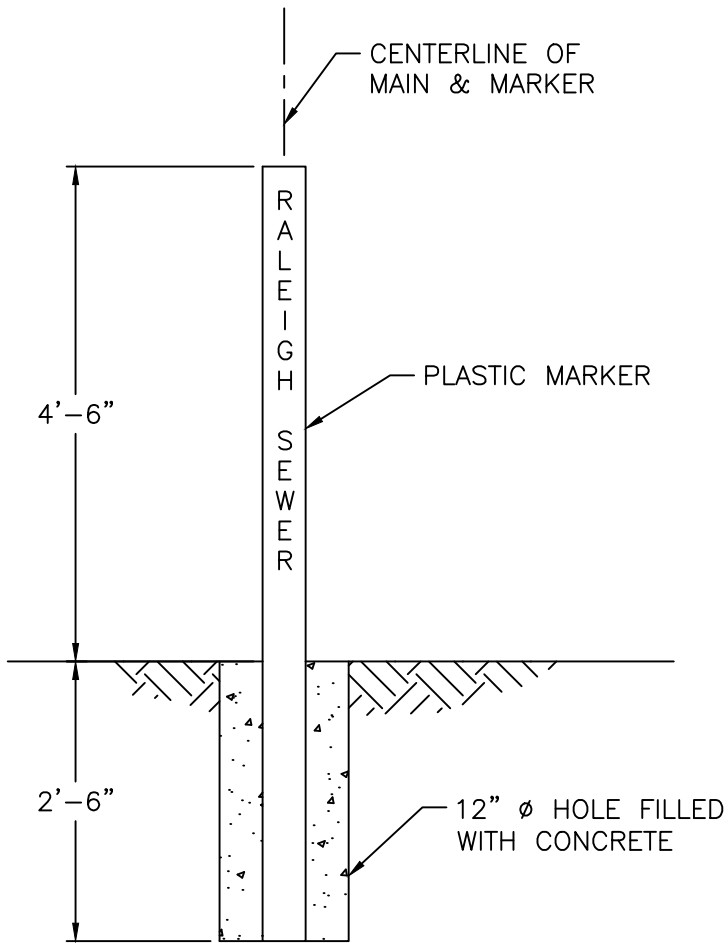
1. CONCRETE SHALL BE 3,000 PSI.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
3. TRENCHES SHALL CONFORM TO DETAIL S-4 & S-5.
4. SEE DETAIL W-10 & W-11 (THRUST BLOCK TABLES) FOR AREA OF CONCRETE REQUIRED.
5. ALL BENDS AND INTERSECTIONS SHALL HAVE CONCRETE THRUST BLOCKING.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS      DATE: 05/24/2024      NOT TO SCALE

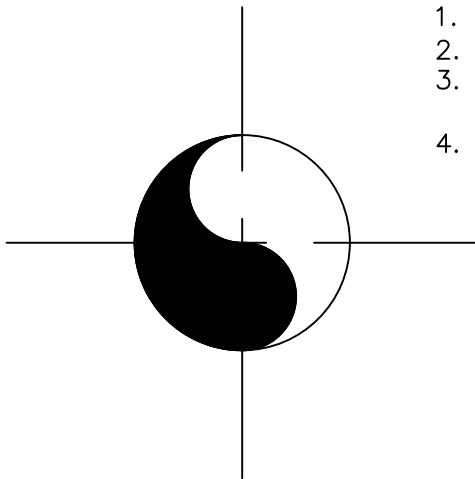
THRUST  
BLOCKING VIEWS

**S-7**



NOTES:

1. PLASTIC MARKER SHALL BE GREEN IN COLOR.
2. MARKERS SHALL BE LABELED "RALEIGH SEWER".
3. TO BE SPACED EVERY 300 FEET ON EACH SIDE OF ANY ROADWAY OR JUNCTION.
4. MARKERS SHALL BE ROUND, 4" IN DIAMETER.



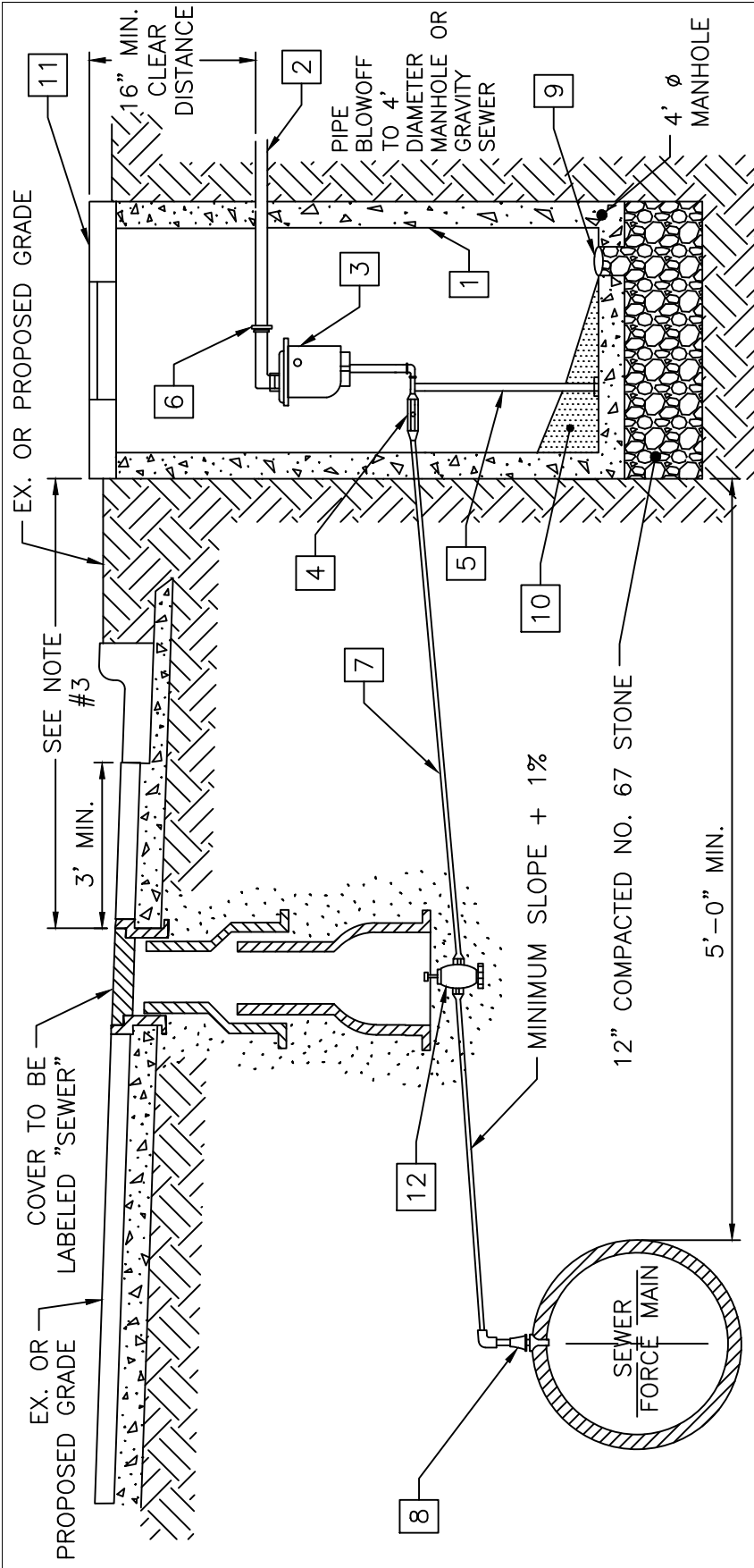
SEWER FORCE MAIN

**CITY OF RALEIGH**  
**STANDARD DETAIL**

<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
------------------	-------------------------	---------------------

	MAIN MARKER FOR SEWER FORCE MAINS IN EASEMENTS	
--	--	--

**S-8**



NOTES:

1. AIR RELEASE/VACUUM VALVE TO BE A.R.I. FLOW CONTROL MODEL SAAR SHORT VERSION D-025 SS (STAINLESS STEEL).
2. THE AIR RELEASE MANHOLE SHALL BE INSTALLED IN THE SHOULDER OR AS DIRECTED BY THE ENGINEER.
3. FORCE MAINS LOCATED OUTSIDE OF STREET RIGHT-OF-WAYS THE MAXIMUM DISTANCE BETWEEN THE MANHOLE AND THE VALVE BOX SHOULD BE THREE (3) FEET.
4. MAIN SHALL BE DEEP ENOUGH TO ACCOMMODATE INSTALLATION AS SHOWN.
5. SEE DETAIL S-4 & S-5 TO INSURE PROPER BACKFILL.

BILL OF MATERIALS

1	PRECAST MANHOLE W/ FLAT TOP
2	BLOW OFF PIPE SCD 80 PVC
3	AIR RELEASE VALVE
4	2"-SS BALL VALVE
5	PIPE STAND SUPPORT SS
6	2" UNION SCD 80 PVC
7	2" TYPE "K", SOFT COPPER WITH FLARED ELBOW
8	CORPORATION COCK
9	6" DIAMETER DRAIN
10	GROUT, 1/8" TO 1'-0" MIN. SLOPE TO DRAIN
11	36" x 30" HALLIDAY HATCH, ALUM.
12	2" GATE VALVE

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
SEWER FORCE MAIN AIR RELEASE VALVE		
<b>S-9</b>		

AERIAL PIPE CROSSING GENERAL NOTES:

1. ALL MATERIALS UTILIZED ON THESE DETAIL SHEETS SHALL CONFORM TO THE APPROPRIATE SECTIONS OF THE CITY OF RALEIGH PUBLIC UTILITIES HANDBOOK UNLESS NOTED OTHERWISE HEREIN.

2. RESTRAINED JOINT PIPE AND FITTINGS SHALL CONSIST OF BOLTED RETAINER RINGS AND WELDED RETAINER BARS OR BOLTLESS TYPE WHICH INCLUDE DUCTILE IRON LOCKING SEGMENTS AND RUBBER RETAINERS. BOLTS FOR RESTRAINED JOINTS (IF APPLICABLE) SHALL CONFORM TO ANSI B18.2. RESTRAINED PIPE AND FITTINGS SHALL BE FLEX-RING OR LOK-RING TYPE JOINTS AS MANUFACTURED BY AMERICAN CAST IRON PIPE CO.; TR FLEX AS MANUFACTURED BY US PIPE, SUPER-LOCK AS MANUFACTURED BY CLOW, BOLT-LOK OR SNAP-LOK AS MANUFACTURED BY GRIFFIN PIPE PRODUCTS, OR EQUAL.

3. CONCRETE PROPERTIES SHALL BE AS FOLLOWS:
- A. CONCRETE COMPRESSIVE STRENGTH = 4,000 PSI
  - B. NOMINAL SLUMP = 4 INCHES
  - C. WATER/CEMENTITIOUS MATERIALS RATIO = 0.45 (MAX)
  - D. AIR CONTENT = 6% \* 1.5%

CONCRETE SHALL BE COMPOSED OF CEMENT, WATER, COARSE AGGREGATES, FINE AGGREGATES AND AIR. CEMENT SHALL BE TYPE I/II OR II IN ACCORDANCE WITH ASTM C-150. MATERIAL REQUIREMENTS FOR ALL FINE AND COARSE AGGREGATES SHALL CONFORM TO ASTM C-33. COARSE AGGREGATE SHALL BE SIZE No. 57 OR 67. AN APPROVED CLASS 'F' FLYASH MAY BE SUBSTITUTED FOR AN EQUAL AMOUNT OF CEMENT BY WEIGHT UP TO 25%.

4. ALL EXPOSED CONCRETE CORNERS SHALL BE CHAMFERED  $\frac{3}{4}$ ".

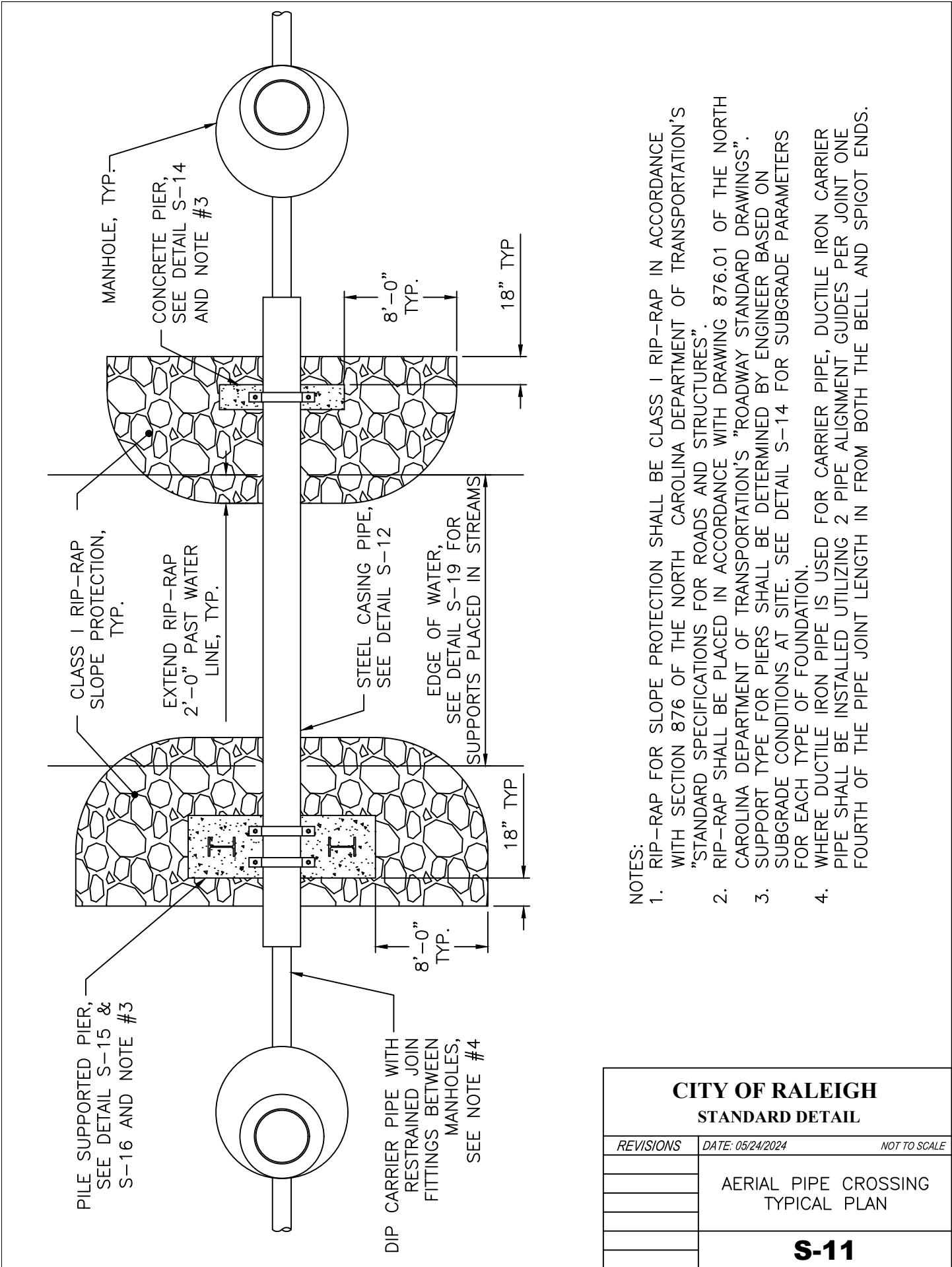
5. CONVENTIONAL REINFORCING STEEL SHALL CONFORM TO ASTM A615 GRADE 60 AND SHALL BE PLACED IN ACCORDANCE WITH "RECOMMENDED PRACTICE FOR PLACING REINFORCING BARS" (LATEST EDITION) AS PUBLISHED BY THE CONCRETE REINFORCING INSTITUTE. SPLICES SHALL BE CLASS 'B' CONFORMING TO THE PROVISIONS OF ACI 318 - "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE".

6. NEOPRENE BEARING PADS SHALL BE FORMED FROM PREVIOUSLY UNVULCANIZED, 100% VIRGIN NEOPRENE, WITH DUROMETER HARDNESS = 50.

7. PILES SHALL BE STRUCTURAL STEEL HP12x53 PILES AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM A36. PILES SHALL BE DRIVEN TO DEPTHS REQUIRED TO OBTAIN AN ULTIMATE BEARING CAPACITY OF NOT LESS THAN TWO TIMES THE DESIGN LOADING OF 30 TONS. PILES SHALL PENETRATE A MINIMUM OF FIFTEEN FEET INTO UNDISTURBED SOIL. IN DRIVING PILES, A METHOD APPROVED BY THE ENGINEER SHALL BE USED WHEREBY THE HEAD OF THE PILE IS NOT DAMAGED. IF REQUESTED BY THE ENGINEER, PILES SHALL BE TESTED TO DETERMINE THE ULTIMATE CAPACITY OF THE PILES. THE METHOD OF LOAD TESTING SHALL CONFORM TO ASTM D1143 AND THE NORTH CAROLINA STATE BUILDING CODE. WHERE PILES ARE EXPOSED, PILES SHALL BE PAINTED AND/OR COATED IN ACCORDANCE WITH THE CITY SPECIFICATIONS.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
	AERIAL PIPE CROSSING GENERAL NOTES	
	<b>S-10</b>	

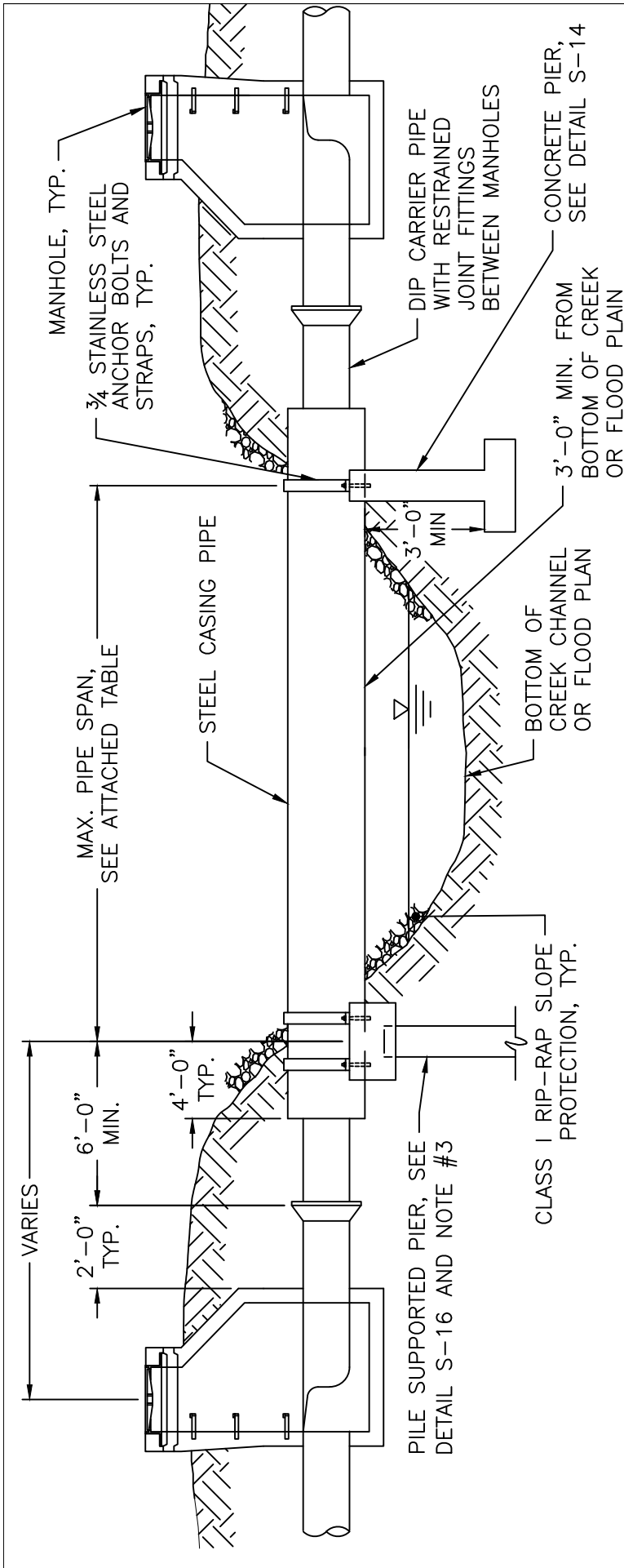




**NOTES:**

1. RIP-RAP FOR SLOPE PROTECTION SHALL BE CLASS I RIP-RAP IN ACCORDANCE WITH SECTION 876 OF THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES".
2. RIP-RAP SHALL BE PLACED IN ACCORDANCE WITH DRAWING 876.01 OF THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION'S "ROADWAY STANDARD DRAWINGS".
3. SUPPORT TYPE FOR PIERS SHALL BE DETERMINED BY ENGINEER BASED ON SUBGRADE CONDITIONS AT SITE. SEE DETAIL S-14 FOR SUBGRADE PARAMETERS FOR EACH TYPE OF FOUNDATION.
4. WHERE DUCTILE IRON PIPE IS USED FOR CARRIER PIPE, DUCTILE IRON CARRIER PIPE SHALL BE INSTALLED UTILIZING 2 PIPE ALIGNMENT GUIDES PER JOINT ONE FOURTH OF THE PIPE JOINT LENGTH IN FROM BOTH THE BELL AND SPIGOT ENDS.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
AERIAL PIPE CROSSING TYPICAL PLAN		
<b>S-11</b>		



NOTES:

1. STEEL PIPE SHALL BE EITHER SPIRAL WELDED OR SMOOTH WALL SEAMLESS WITH A MINIMUM YIELD STRENGTH OF 35,000 PSI. PAINTING AND LINING SHALL BE AS REQUIRED BY THE CITY OF RALEIGH PUBLIC UTILITIES HANDBOOK.
2. DUCTILE IRON PIPE SHALL BE SUPPORTED WITH TWO SPIDERS AT EVERY JOINT WITHIN THE CASING PIPE USING APPROVED PIPE ALIGNMENT GUIDE. SEE DETAIL S-39. ALL JOINTS SHALL BE RESTRAINED JOINT. SEE NOTE #2 ON DETAIL S-10.
3. SUPPORT TYPE FOR PIERS SHALL BE DETERMINED BY ENGINEER BASED ON SUBGRADE CONDITIONS AT SITE. SEE DETAIL S-14 FOR SUBGRADE PARAMETERS FOR EACH TYPE OF FOUNDATION. SEE DETAIL S-19 FOR SUPPORTS PLACED WITHIN STREAM.
4. BOTTOM OF PIPE TO BE AT A MINIMUM OF 1' ABOVE THE 25 YEAR FLOOD ELEVATION.

ALLOWABLE SPANS FOR STEEL CASING PIPE

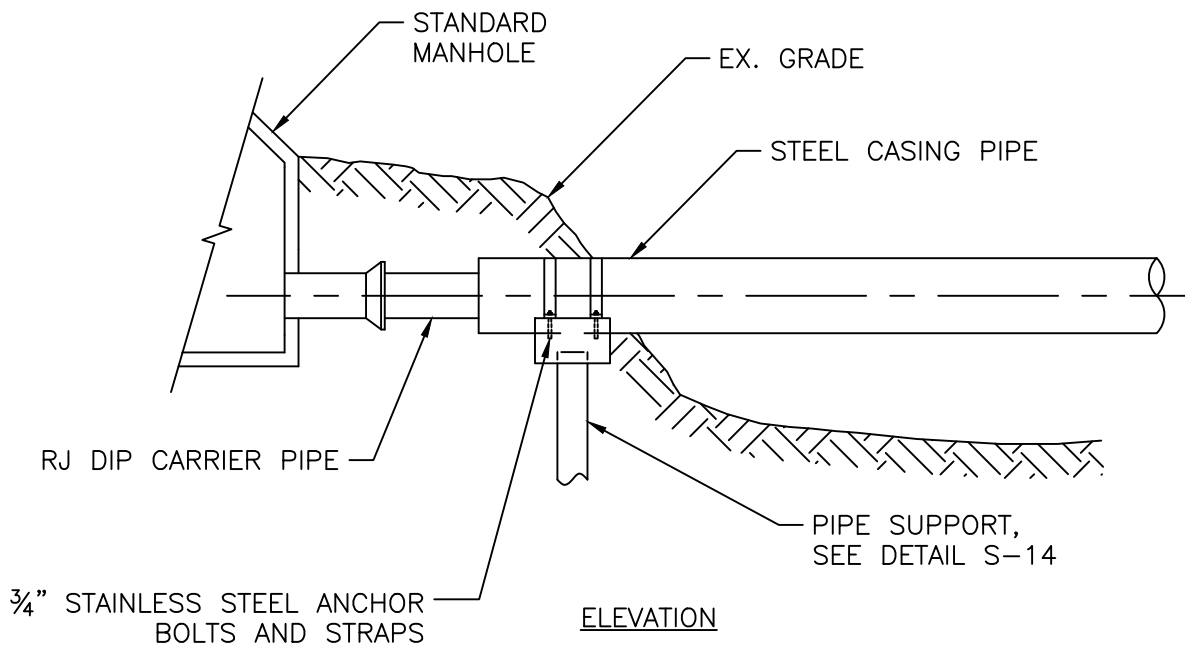
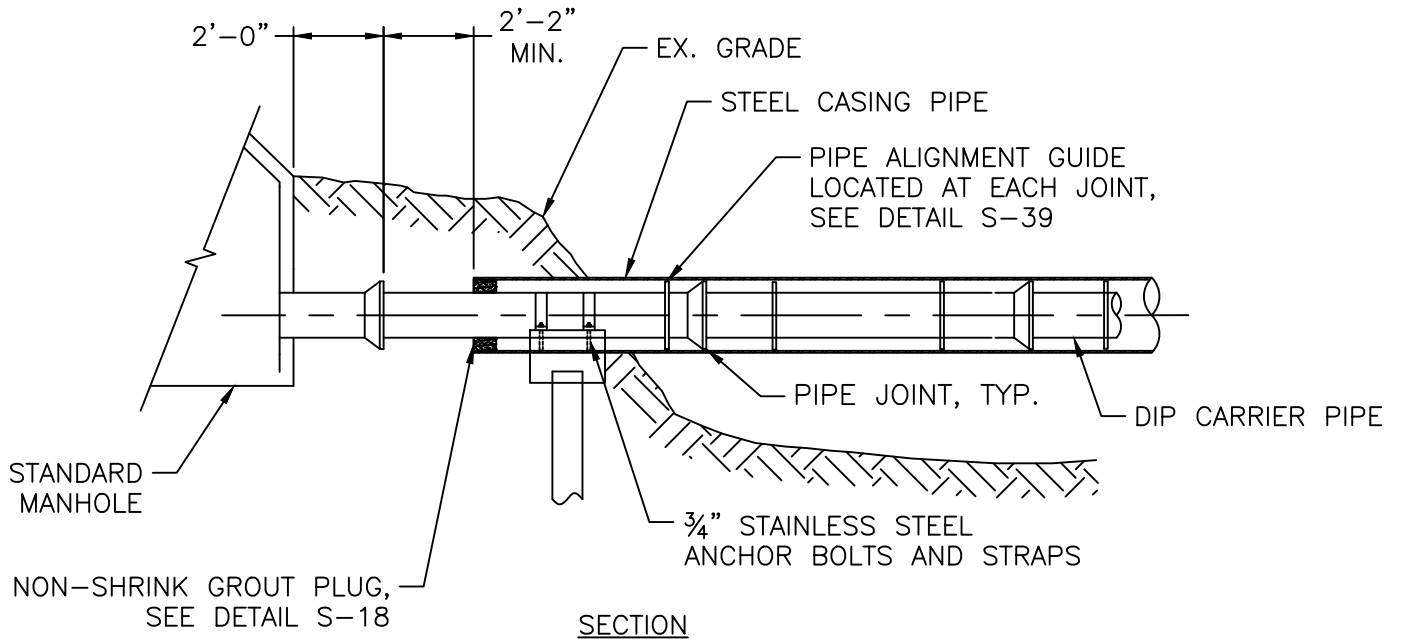
CARRIER PIPE, DIP DIAMETER (IN.)	CASING PIPE, STEEL DIAMETER (IN.)	MIN. CASING PIPE WALL THICKNESS (IN.)	ALLOWABLE SPAN (FT.)
6	14	0.3750	40
8	16	0.3750	45
10	18	0.3750	50
12	20	0.3750	50
14	24	0.3750	55
16	26	0.3750	55
18	30	0.3750	60
20	32	0.3750	60
24	36	0.4375	65
30	42	0.4375	65
36	48	0.5000	65
42	56	0.5000	65

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS      DATE: 05/24/2024      NOT TO SCALE

AERIAL PIPE  
CROSSING STEEL CASING  
PIPE ELEVATION

**S-12**

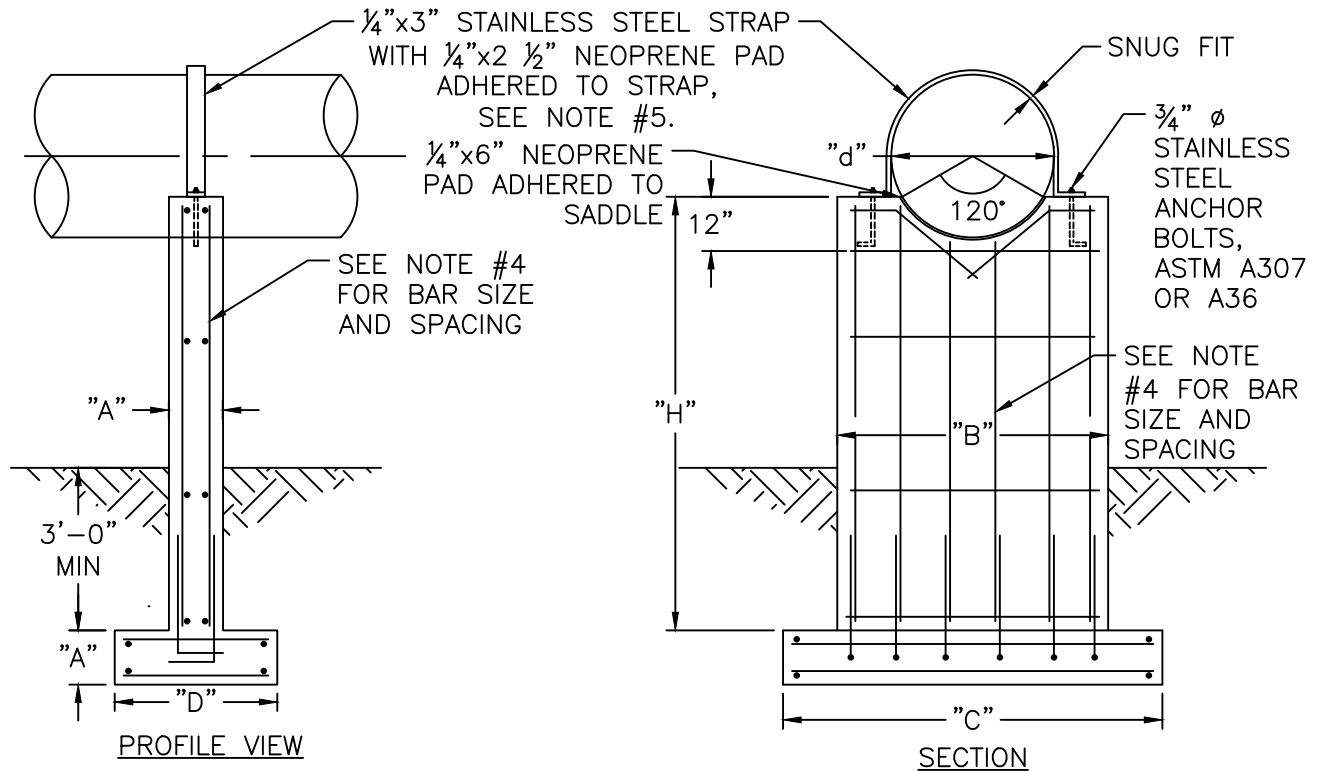


**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE

AERIAL PIPE CROSSING  
 TYPICAL PIPE SECTION  
 AND ELEVATION

**S-13**



CASING PIPE DIA. "d" (IN.)	"H" (FT.)	THICKNESS "A" (IN.)	PIER WIDTH "B"	FOOTING LENGTH "C"	FOOTING WIDTH "D"
6-12	≤6	12	2'-4"	5'-6"	3'-0"
	8	12		6'-3"	
	10	12		6'-8"	
	12	12		7'-2"	
14-20	≤6	12	3'-0"	8'-0"	3'-0"
	8	12		9'-0"	
	10	12		9'-10"	
	12	14		10'-6"	
22-28	≤6	14	3'-8"	8'-9"	4'-0"
	8	14		10'-0"	
	10	14		11'-0"	
	12	14		11'-10"	
30-36	≤6	18	4'-4"	9'-0"	4'-0"
	8	18		10'-6"	
	10	18		11'-6"	
	12	18		12'-4"	
38-48	≤6	18	5'-4"	9'-6"	5'-0"
	8	18		11'-0"	
	10	18		12'-0"	
	12	18		12'-10"	
51-56	≤6	18	6'-4"	9'-10"	5'-0"
	8	18		11'-4"	
	10	18		12'-4"	
	12	18		13'-2"	

NOTES:

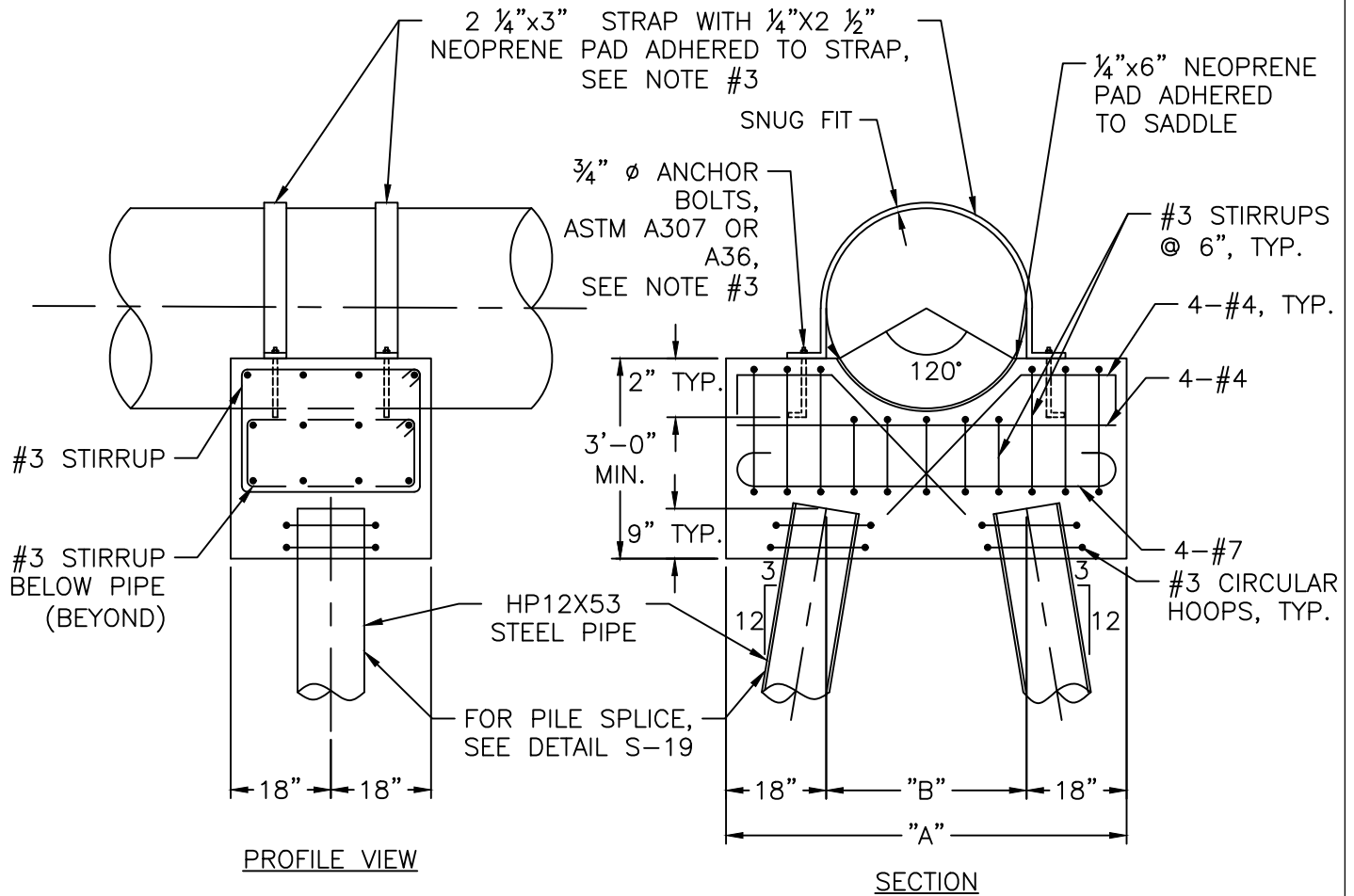
- SHALLOW FOUNDATION DESIGN SHOWN THIS DETAIL IS BASED ON THE FOLLOWING PARAMETERS:
  - ALLOWABLE SOIL BEARING CAPACITY = 2,000 PSF
  - CONCRETE COMPRESSIVE STRENGTH = 4,000 PSI
  - GRADE 60 REINFORCING STEEL
  - MAX. STREAM VELOCITY = 10 FT/SEC
  - MAX. SUPPORT HEIGHT (H) = 12'-0"
 IF FIELD CONDITIONS REQUIRE ANY DEVIATION FROM THESE PARAMETERS, THE FOUNDATION DESIGN SHALL BE REVIEWED BY THE ENGINEER.
- IF SUBGRADE AT LOCATION OF SUPPORTS IS DEEMED UNABLE TO WITHSTAND 2,000 PSF BEARING PRESSURE, A PILE SUPPORTED FOUNDATION SHALL BE UTILIZED AS PER DETAIL S-15.
- IF BEDROCK IS ENCOUNTERED WHICH WILL PREVENT 3- FEET MIN. COVER OVER FOOTING, DOWELS SHALL BE DRILLED INTO BEDROCK PRIOR TO PLACING FOUNDATION, SEE DETAIL S-17.
- TWELVE-INCH AND FOURTEEN-INCH THICK PIERS AND FOOTINGS SHALL BE REINFORCED WITH #5 BARS AT 12 INCHES O.C. IN EACH DIRECTION ON EACH FACE. EIGHTEEN-INCH WIDE PIERS AND FOOTINGS SHALL BE REINFORCED WITH #7 BARS AT 12 INCHES O.C. IN EACH DIRECTION ON EACH FACE.
- EIGHTEEN-INCH THICK PIERS SHALL REQUIRE TWO STRAPS OVER THE PIPE INSTEAD OF ONE (AS SHOWN).
- WHEN CONCRETE SUPPORTS ARE REQUIRED TO BE LOCATED WITHIN A STREAM AND ARE NOT COVERED WITH BLACKFILL, SEE DETAIL S-19 FOR MODIFICATIONS TO UPSTREAM FACE SUPPORT.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS DATE: 05/24/2024 NOT TO SCALE

AERIAL PIPE CROSSING  
CONCRETE PIER DETAIL

**S-14**



WIDTH OF PILE CAP

CASING PIPE DIAMETER (IN.)	TOTAL WIDTH "A"	PILE SPACING "B"
≤ 36	6'-0"	3'-0"
38-42	6'-6"	3'-6"
45-51	7'-3"	4'-3"
54-60	8'-0"	5'-0"

NOTES:

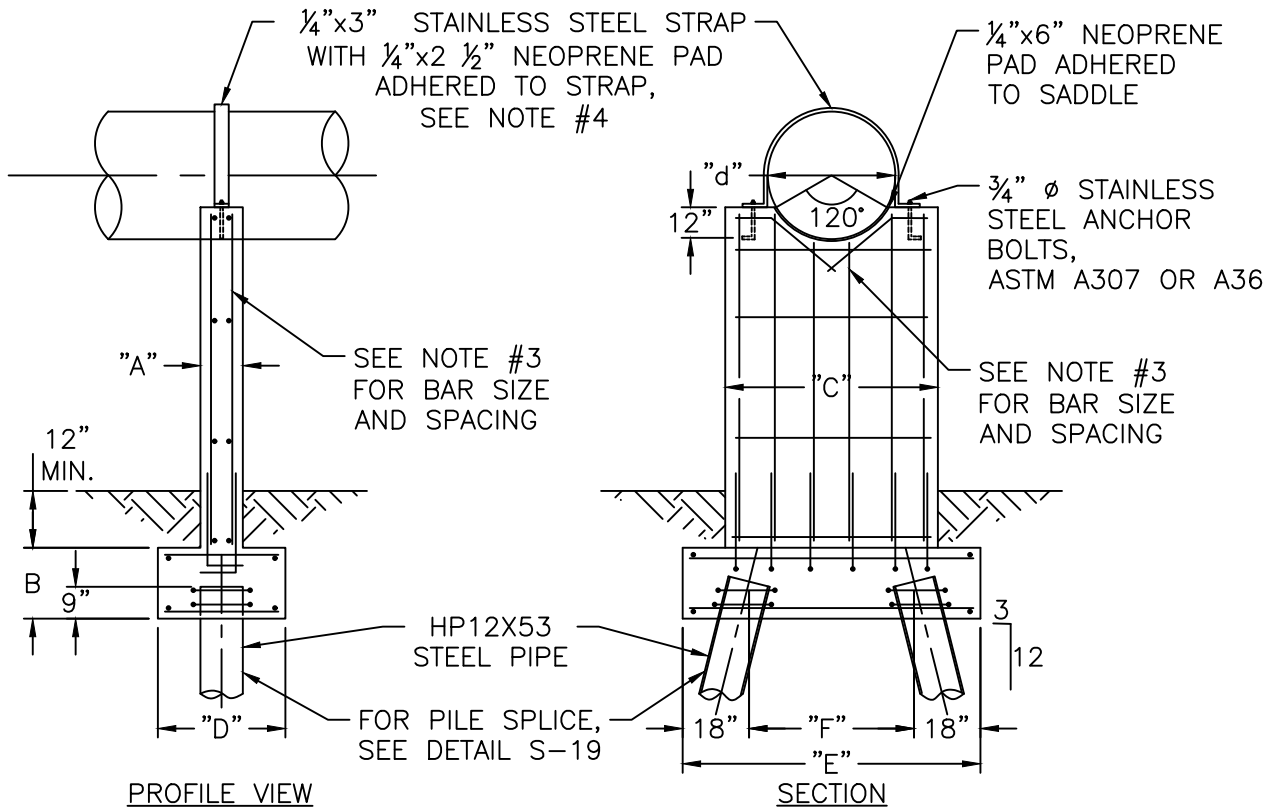
- PILE SUPPORTED FOUNDATION DESIGN SHOWN ON THIS DETAIL IS BASED UPON THE FOLLOWING PARAMETERS:
  - MINIMUM CAPACITY OF HP12x53 PILE = 30 TONS
  - CONCRETE COMPRESSIVE STRENGTH = 4,000 PSI
  - GRADE 60 REINFORCING STEEL
  - MAXIMUM STREAM VELOCITY = 10 FT/SEC
 IF FIELD CONDITIONS REQUIRE ANY DEVIATION FROM THESE PARAMETERS, FOUNDATION DESIGN SHALL BE REVIEWED BY THE PROJECT ENGINEER.
- LENGTH OF PILES SHALL BE AS REQUIRED TO DEVELOP 30 TON CAPACITY BY EITHER END BEARING, FRICTION, OR A COMBINATION OF END BEARING AND FRICTION. AS A MINIMUM, PILES SHALL BE DRIVEN AT LEAST 15 FEET INTO UNDISTURBED SOIL.
- ANCHOR BOLTS AND STRAPS SHALL BE STAINLESS STEEL.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS      DATE: 05/24/2024      NOT TO SCALE

AERIAL PIPE CROSSING  
PIPE CAP DETAIL

**S-15**



CASING PIPE DIA. "d" (IN.)	PIER THICKNESS "A" (IN.)	FOOTING THICKNESS "B" (IN.)	PIER WIDTH "C"	FOOTING WIDTH "D"	FOOTING LENGTH "E"	PILE SPACING "F"
6-12	12	20	2'-4"	3'-0"	6'-0"	3'-0"
14-20	12	20	3'-0"	3'-0"	8'-0"	5'-0"
22-28	18	26	3'-8"	4'-0"	8'-9"	5'-9"
30-36	18	26	4'-4"	4'-0"	9'-0"	6'-0"
38-48	18	26	5'-4"	5'-0"	9'-6"	6'-6"
51-60	18	26	6'-4"	5'-0"	9'-10"	6'-10"

**NOTES:**

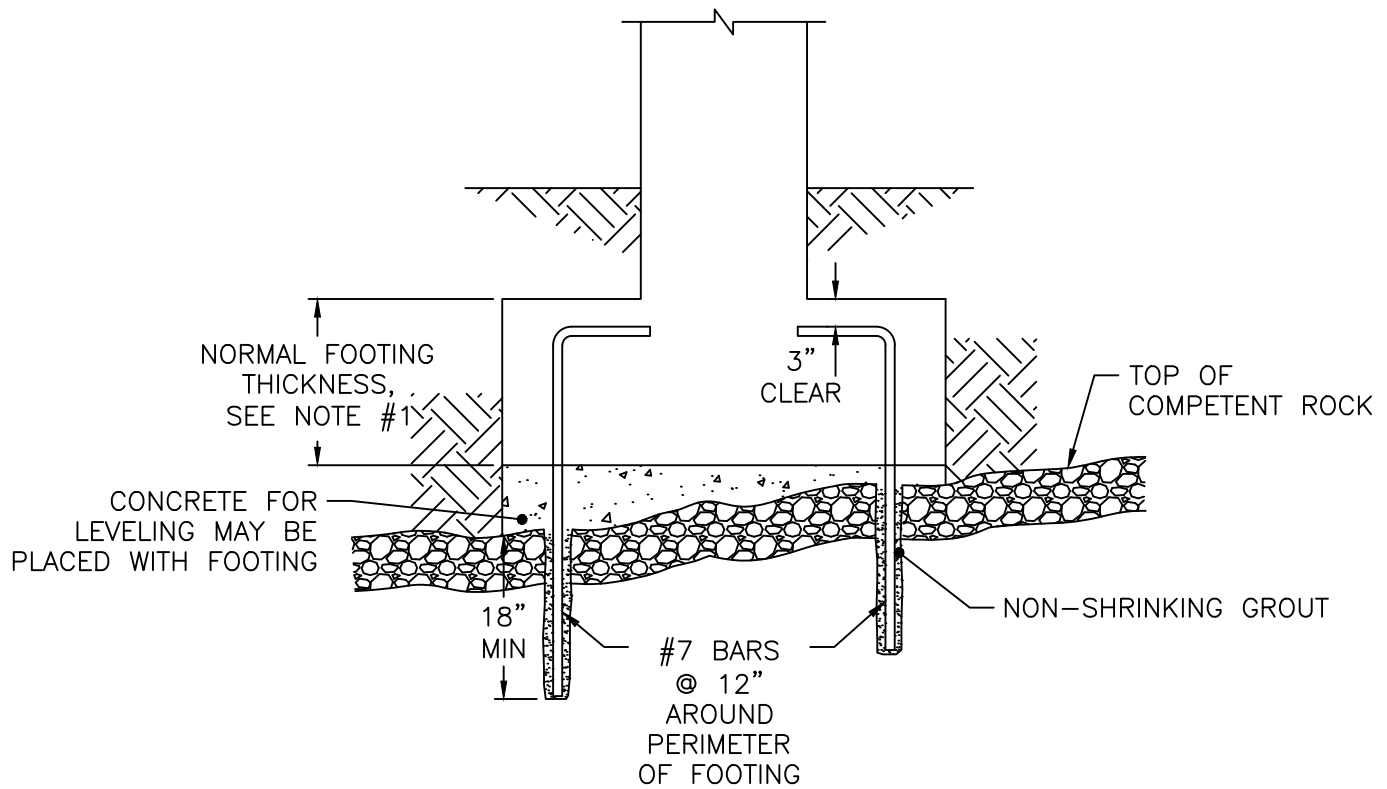
1. PILE SUPPORTED PIER FOUNDATION DESIGN SHOWN ON THIS DETAIL IS BASED ON THE FOLLOWING PARAMETERS:

- A. MINIMUM CAPACITY OF HP12x53 PILE = 30 TONS
- B. CONCRETE COMPRESSIVE STRENGTH = 4,000 PSI
- C. GRADE 60 REINFORCING STEEL
- D. MAXIMUM STREAM VELOCITY = 10 FT/SEC

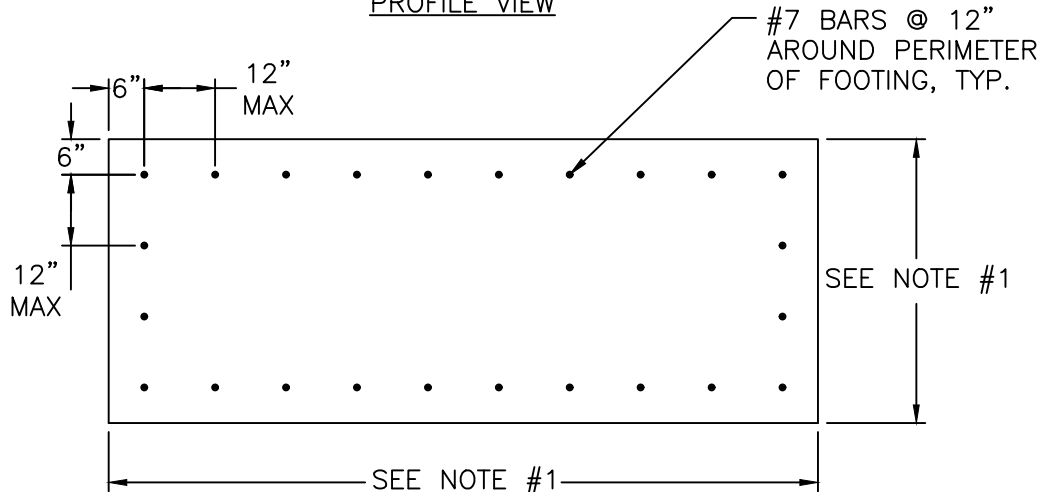
IF FIELD CONDITIONS REQUIRE ANY DEVIATION FROM THESE PARAMETERS, THE FOUNDATION DESIGN SHALL BE REVIEWED BY THE ENGINEER.

- 2. LENGTH OF PILES SHALL BE AS REQUIRED TO DEVELOP 30 TON CAPACITY BY EITHER END BEARING, FRICTION OR A COMBINATION OF END BEARING AND FRICTION. AS A MINIMUM, PILES SHALL BE DRIVEN AT LEAST 15 FEET INTO UNDISTURBED SOIL.
- 3. TWELVE-INCH AND FOURTEEN-INCH WIDE PIERS SHALL BE REINFORCED WITH #5 BARS AT 12 INCHES O.C. IN EACH DIRECTION ON EACH FACE. EIGHTEEN-INCH WIDE PIERS SHALL BE REINFORCED WITH #7 BARS AT 12 INCHES O.C. IN EACH DIRECTION ON EACH FACE. FOOTINGS SHALL BE REINFORCED TYPICALLY TO PIERS.
- 4. EIGHTEEN-INCH WIDE PIERS SHALL REQUIRE TWO STRAPS OVER THE PIPE INSTEAD OF ONE (AS SHOWN).
- 5. WHEN CONCRETE SUPPORTS ARE REQUIRED TO BE LOCATED WITHIN A STREAM AND ARE NOT COVERED WITH BACKFILL, SEE DETAIL S-19 FOR MODIFICATIONS TO UPSTREAM FACE OF SUPPORT.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
	AERIAL PIPE CROSSING PILE SUPPORTED PIER DETAIL	
<b>S-16</b>		



PROFILE VIEW



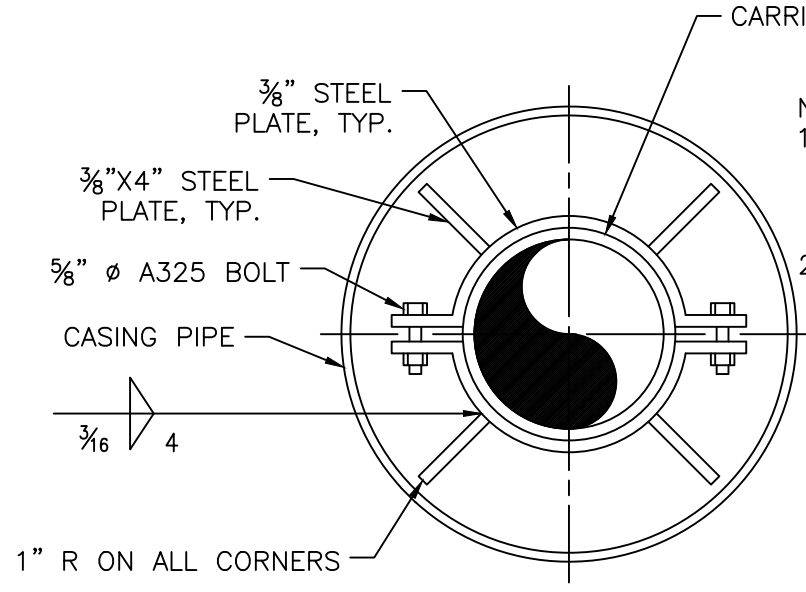
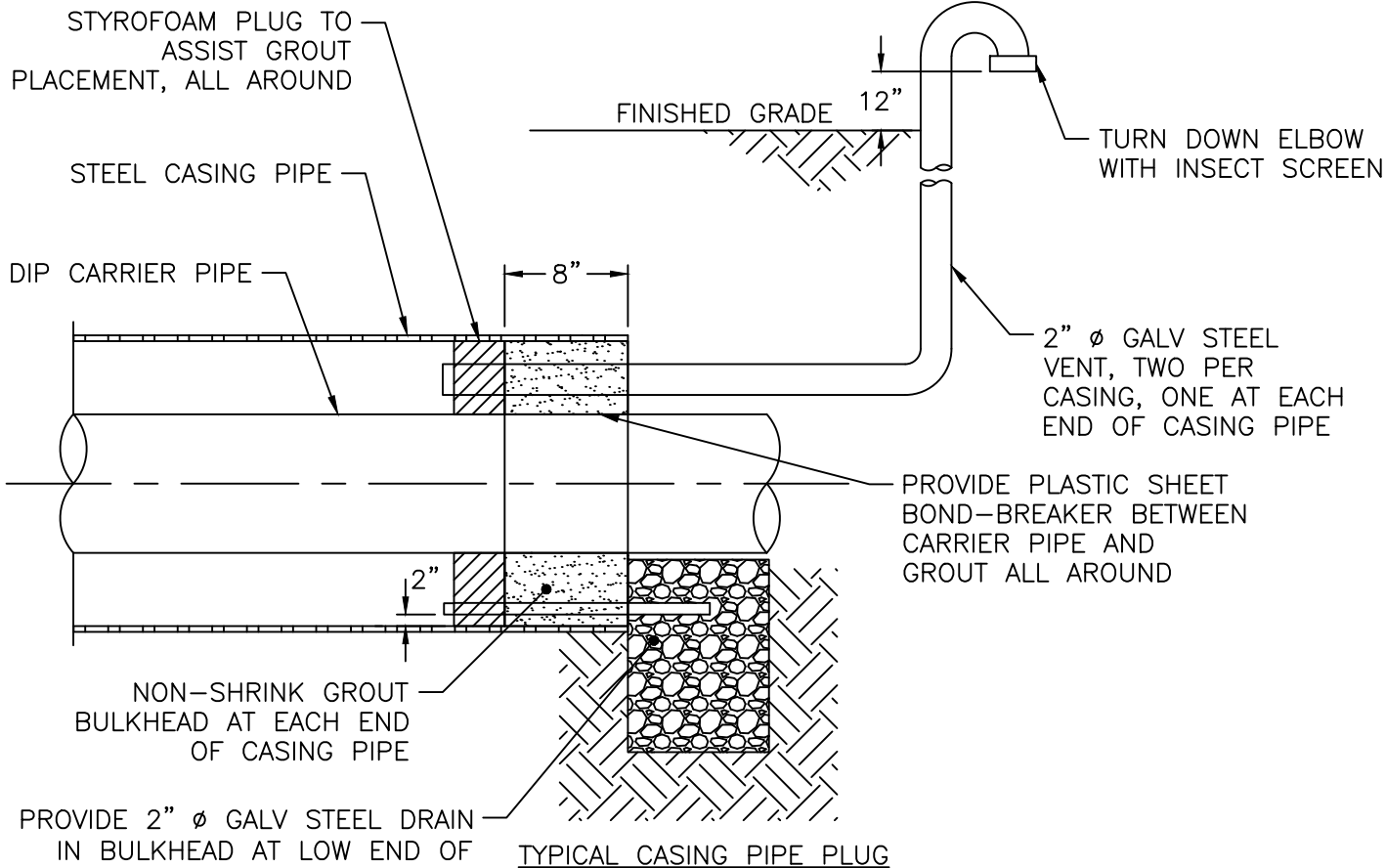
PLAN VIEW

NOTES:

1. GEOMETRY OF FOOTING SHALL MATCH GEOMETRY OF CONCRETE PIERS WITH HEIGHT OF 6 FEET OR LESS AS PER DETAIL S-14.
2. NON-SHRINK GROUT SHALL BE "EUCO-N-S" BY THE EUCLID CHEMICAL COMPANY; "MASTERFLOW 713" BY MASTER BULDERS, OR EQUAL.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	AERIAL PIPE CROSSING CONCRETE PIER ON BEDROCK	
<b>S-17</b>		

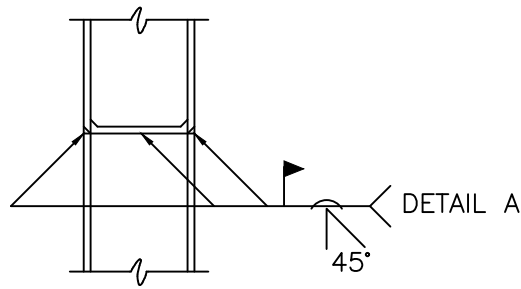


- NOTES:
- NON-SHRINK GROUT SHALL BE "EUCO-N-S" BY THE EUCLID CHEMICAL COMPANY; "MASTERFLOW 713" BY MASTER BUILDERS, OR EQUAL.
  - USE A MINIMUM OF 2 SPIDERS PER JOINT PLACED ONE FOURTH OF THE PIPE JOINT LENGTH IN FROM BOTH THE BELL AND SPIGOT.

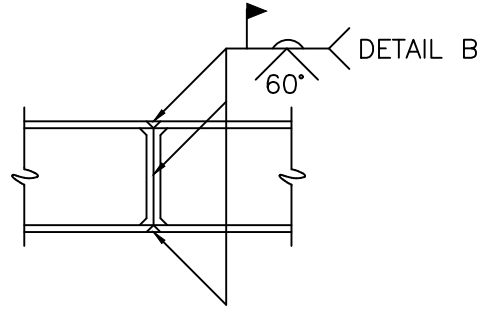
PIPE ALIGNMENT GUIDE

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	AERIAL PIPE CROSSING CASING PIPE DETAILS	
<b>S-18</b>		

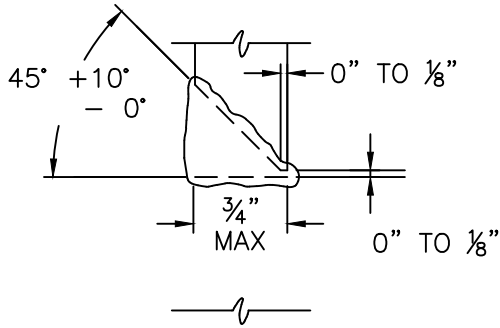




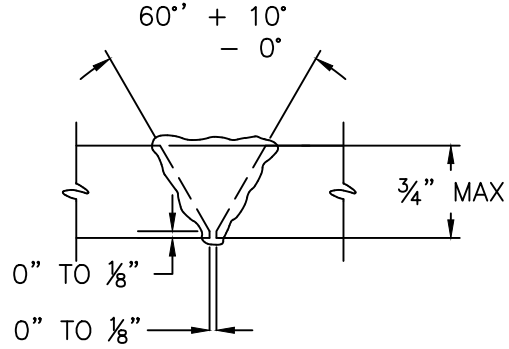
COLUMN VERTICAL



\* COLUMN HORIZONTAL OR VERTICAL



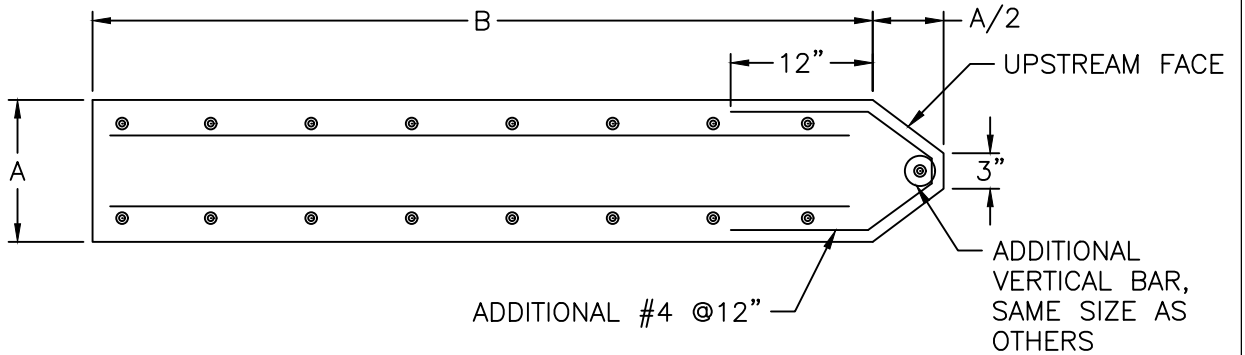
DETAIL A



DETAIL B

\* POSITION OF COLUMN DURING WELDING

STEEL PILE SPLICE



PLAN - CONCRETE SUPPORT NOSING  
(WHEN EXPOSED TO STREAM FLOW)

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS DATE: 05/24/2024 NOT TO SCALE

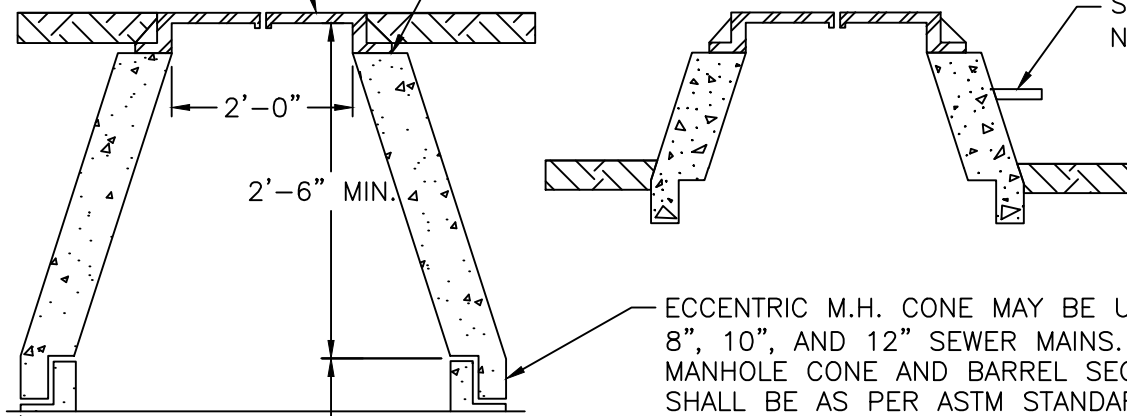
AERIAL PIPE  
CROSSING CONCRETE  
SUPPORT DETAILS

**S-19**

SEE DETAIL S-25 FOR  
MANHOLE FRAME AND COVER

NEW MANHOLES USE A BUTYL  
SEALANT BETWEEN FRAME AND  
MANHOLE TOP SECTION WHEN  
SECURING FRAME TO MANHOLE TO  
PROVIDE A WATER TIGHT SEAL

STEP, SEE  
NOTE #3



ECCENTRIC M.H. CONE MAY BE USED ON  
8", 10", AND 12" SEWER MAINS.  
MANHOLE CONE AND BARREL SECTIONS  
SHALL BE AS PER ASTM STANDARDS

"O" RING SEAL  
OR RAM-NECK  
RUBBER BOOT

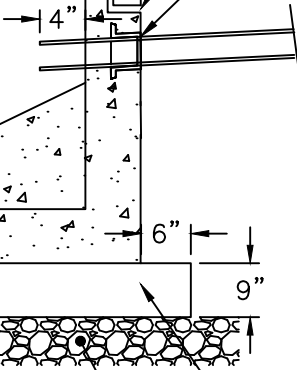
NOTES:

1. LATERAL INVERT SHALL NOT BE LOWER THAN MAIN SPRING LINE.
2. MANHOLE SHALL BE 3' ABOVE 100 YEAR FLOOD PLAIN OR SEALED AND VENTED TO 3' ABOVE 100 YEAR FLOOD PLAIN.
3. WHEN MANHOLE TOPS ARE IN EXCESS OF 3' ABOVE GRADE, OUTSIDE STEPS MUST BE PROVIDED. SEE DETAIL S-28 FOR STEP.
4. IN NON TRAFFIC AREAS, TOP OF FRAME AND COVER SHALL BE INSTALLED A MIN. OF 1' ABOVE FINISHED GROUND SURFACE.

SHELF  
SLOPE 60°

4'-6' DIA.  
AS REQUIRED

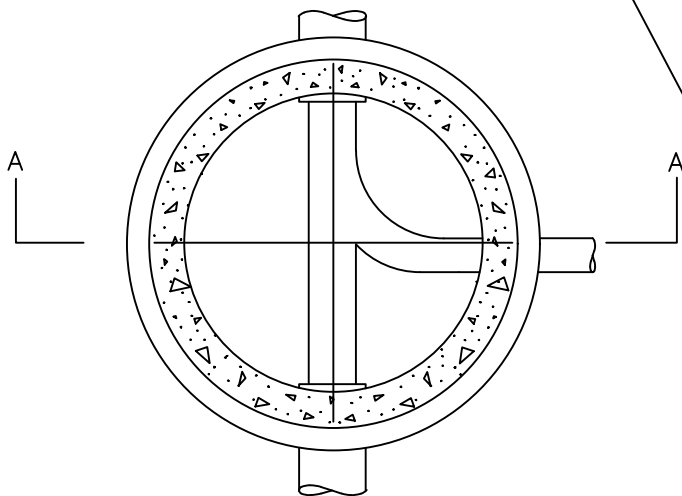
VARIABLE



SECTION A-A

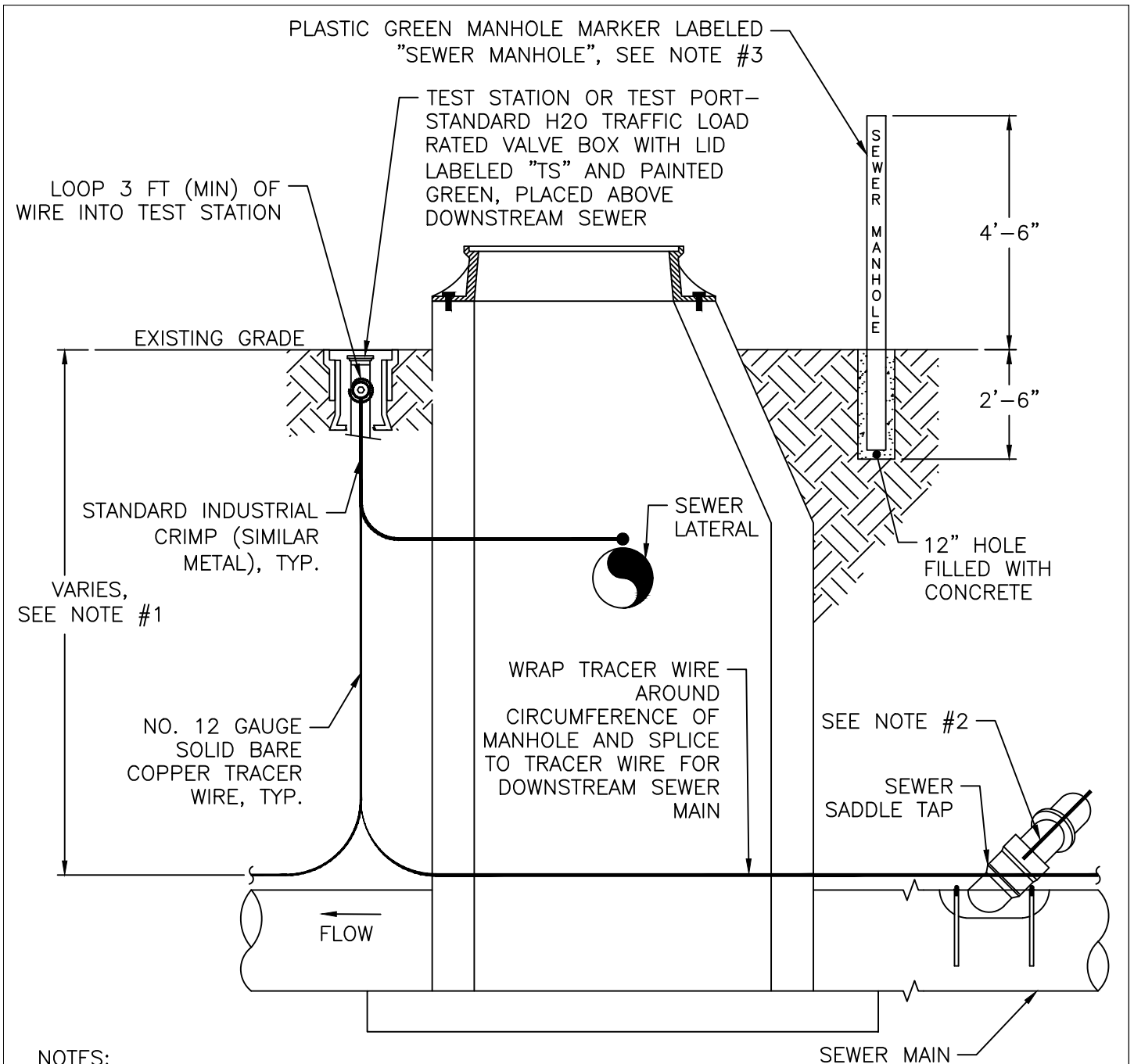
SEE SEWER  
DESIGN SECTION

MIN. 9" COMPACTED #67 STONE BASE TO  
BE INSTALLED UNDER NEW MANHOLE.



**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
		STANDARD PRECAST SANITARY SEWER MANHOLE
		<b>S-20</b>

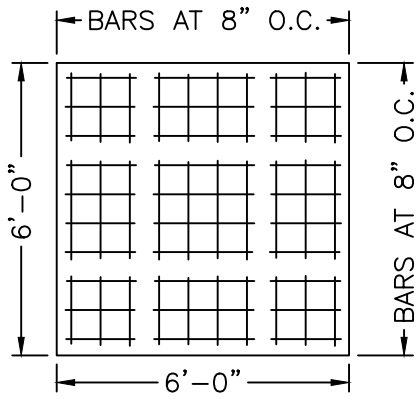


**NOTES:**

1. THE TRACER WIRE SHALL BE CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. FOR GRAVITY MAIN AND OR LATERAL INSTALLATIONS LESS THAN 8 FT, THE TRACING WIRE SHALL BE ATTACHED TO THE PIPE. TRACER WIRE SHALL BE LAID FLAT AND SECURELY AFFIXED TO THE PIPE AT 10 FOOT INTERVALS. FOR GRAVITY MAIN AND OR LATERAL INSTALLATION DEEPER THAN 8 FT, THE TRACING WIRE SHALL BE INSTALLED AT A DEPTH OF 7-8 FT. THE WIRE SHALL BE PROTECTED FROM DAMAGE DURING THE EXECUTION OF THE WORK. NO BREAKS OR CUTS IN THE TRACER WIRE SHALL BE PERMITTED.
2. WHERE LATERAL TAPS ARE MADE BY SERVICE SADDLES, THE TRACER WIRE SHALL NOT BE ALLOWED TO BE PLACED BETWEEN THE SADDLE AND MAIN.
3. MANHOLE MARKERS SHALL BE PLACED ADJACENT TO MANHOLES AT THE DISCRETION OF OWNER OR OWNER'S REPRESENTATIVE.

**CITY OF RALEIGH  
STANDARD DETAIL**

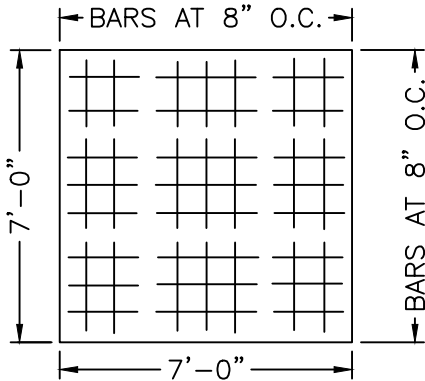
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	GRAVITY SEWER MAIN TRACER WIRE AND MANHOLE MARKER	
	<b>S-20A</b>	



REINFORCED CONC. FOOTING  
FOR 4' PRECAST MANHOLE

BILL OF MATERIAL FOR 4' MANHOLE BASE

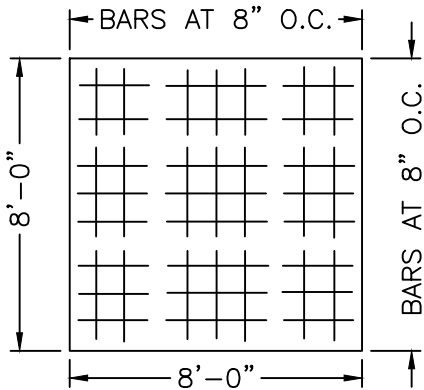
BAR SIZE	BAR LENGTH	NO. OF BARS	BAR WT. (LBS.)
#5	5'-6"	18	103
CL. "A" CONCRETE TOTAL CU. YDS.			1.0



REINFORCED CONC. FOOTING  
FOR 5' PRECAST MANHOLE

BILL OF MATERIAL FOR 5' MANHOLE BASE

BAR SIZE	BAR LENGTH	NO. OF BARS	BAR WT. (LBS.)
#5	6'-6"	20	136
CL. "A" CONCRETE TOTAL CU. YDS.			1.4



REINFORCED CONC. FOOTING  
FOR 6' PRECAST MANHOLE

BILL OF MATERIAL FOR 6' MANHOLE BASE

BAR SIZE	BAR LENGTH	NO. OF BARS	BAR WT. (LBS.)
#5	7'-6"	24	165
CL. "A" CONCRETE TOTAL CU. YDS.			1.8

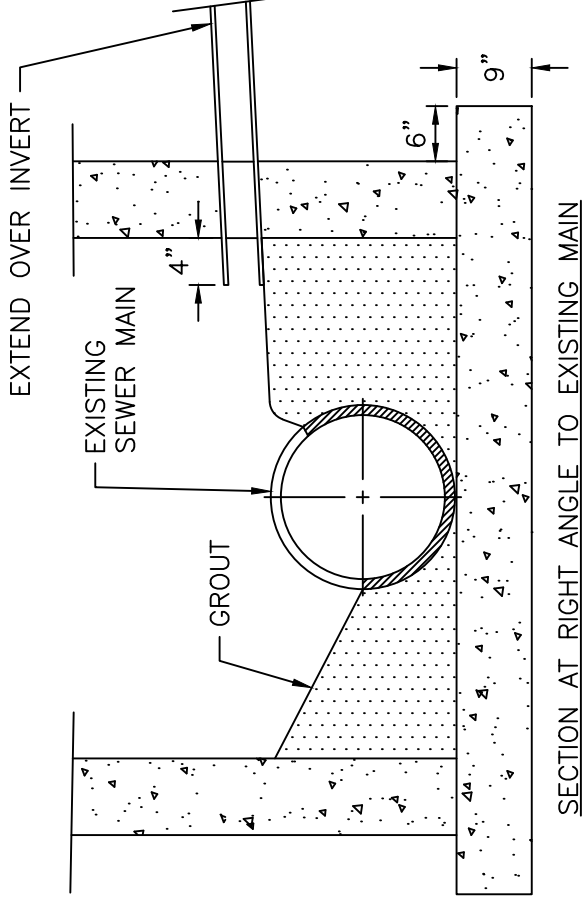
**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS      DATE: 05/24/2024      NOT TO SCALE

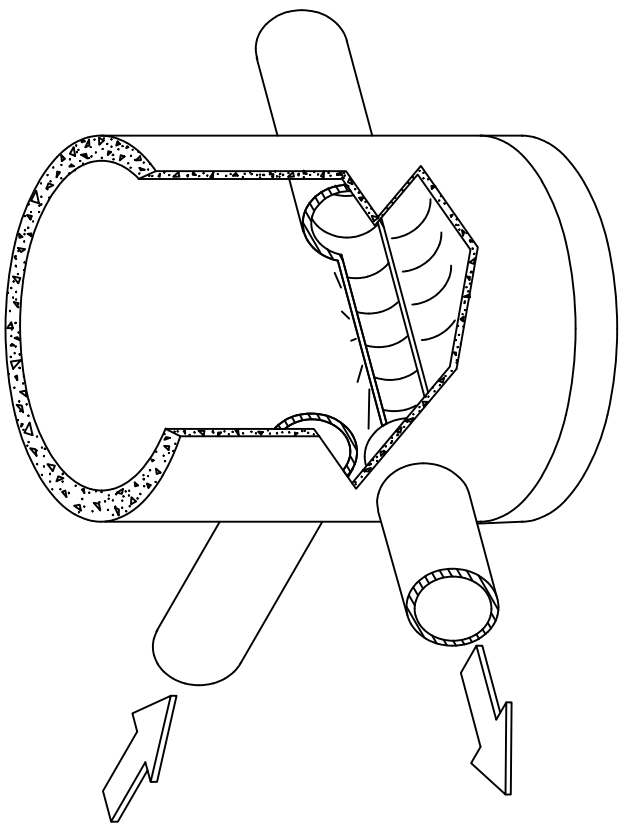
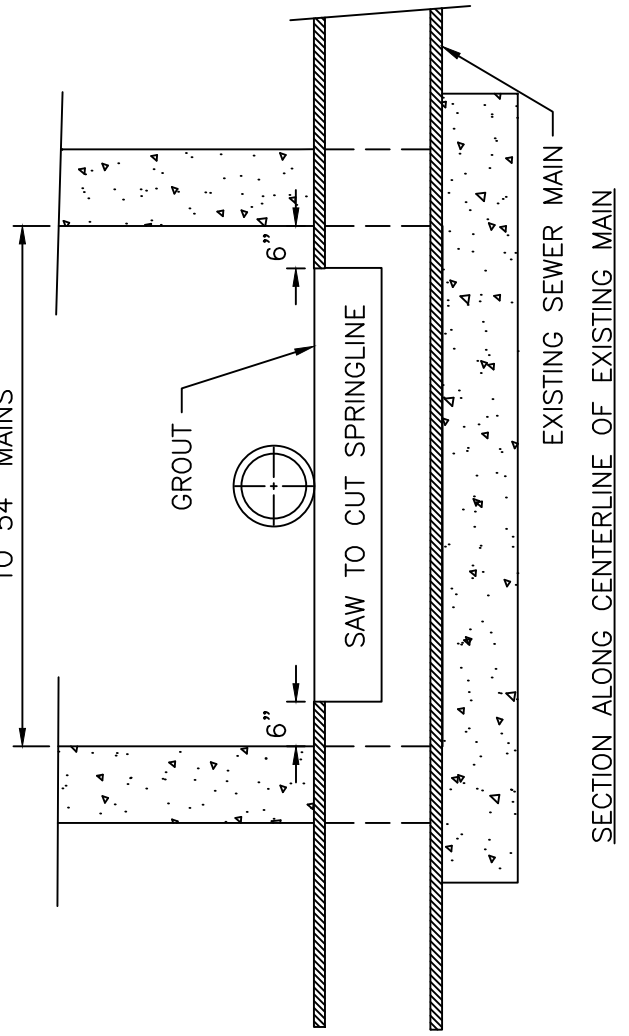
EXTENDED BASE OR  
CAST-IN-PLACE REINFORCED  
CONCRETE BASE

**S-21**

\* ALL BASES ARE MINIMUM 9" THICK

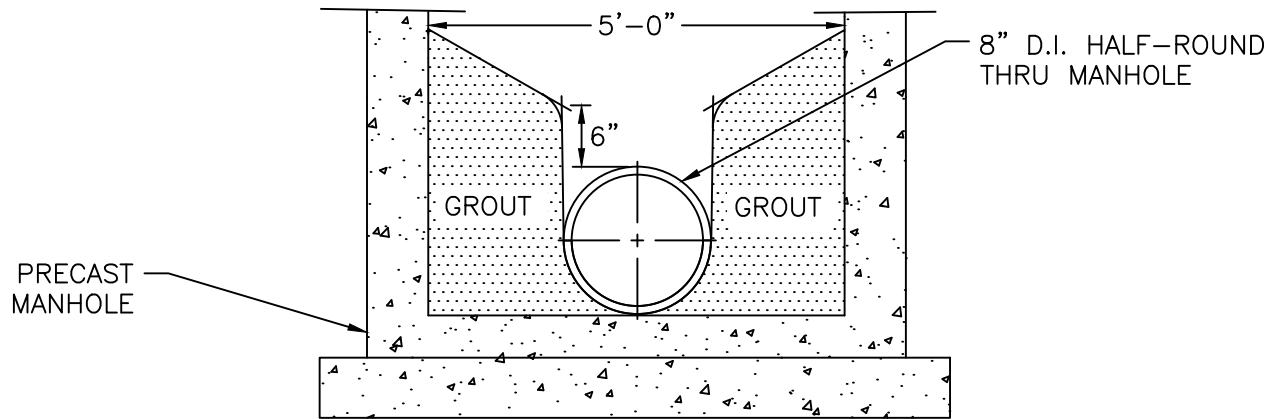


4'-0" FOR 8" TO 12"  
 MAINS 5'-0" FOR 15" TO  
 30" MAINS 6'-0" FOR 36"  
 TO 54" MAINS

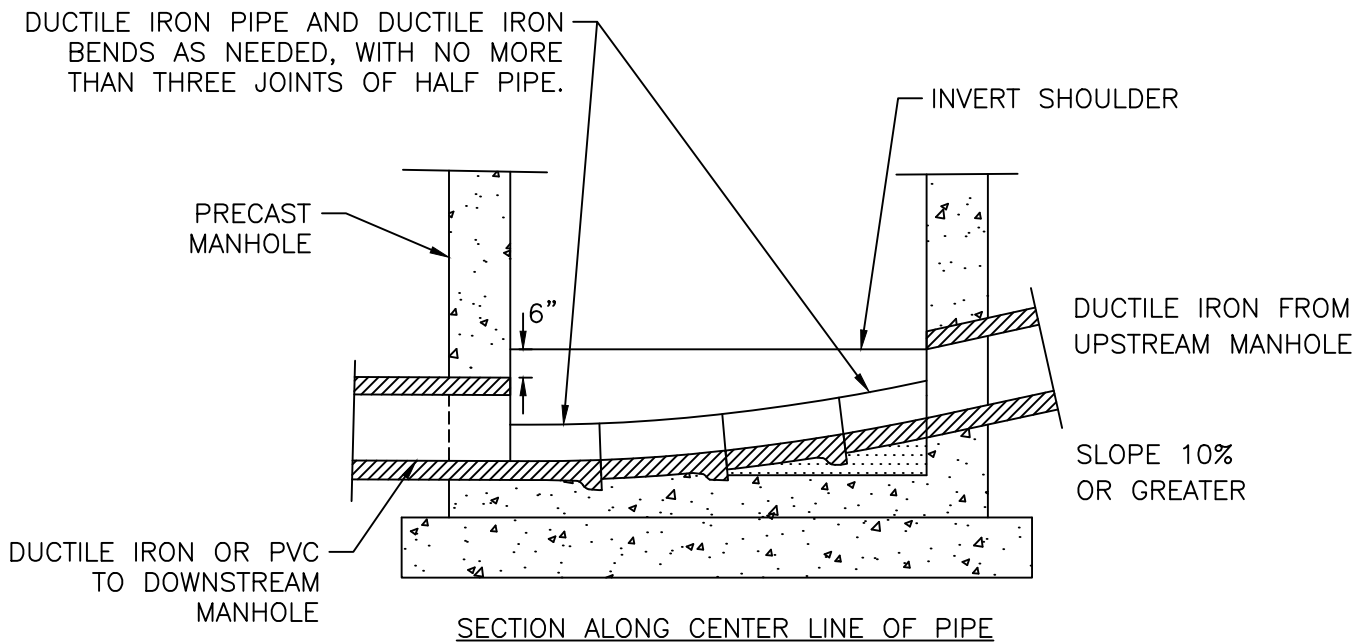


- NOTES:
1. FLOW SHALL BE MAINTAINED DURING CONSTRUCTION.
  2. THIS DETAIL TO BE USED WHEN A 6" OR LARGER LATERAL NECESSITATES CONSTRUCTION OF A NEW MANHOLE.
  3. SEE DETAIL S-20 FOR PRECAST MANHOLES.
  4. THE CONTRACTOR SHALL PROVIDE A MINIMUM 9" COMPACTED #67 STONE BASE.
  5. FOR USE ON DIP, CONCRETE, AND PVC ONLY.
  6. (NOT ALLOWED ON VCP) SEE DETAIL S-21 FOR REINFORCING OF POURED IN-PLACE BASE.

CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	STANDARD MANHOLE INSTALLATION OVER EXISTING SEWER MAIN	
	<b>S-22</b>	



SECTION AT RIGHT ANGLE TO CENTER LINE OF PIPE



SECTION ALONG CENTER LINE OF PIPE

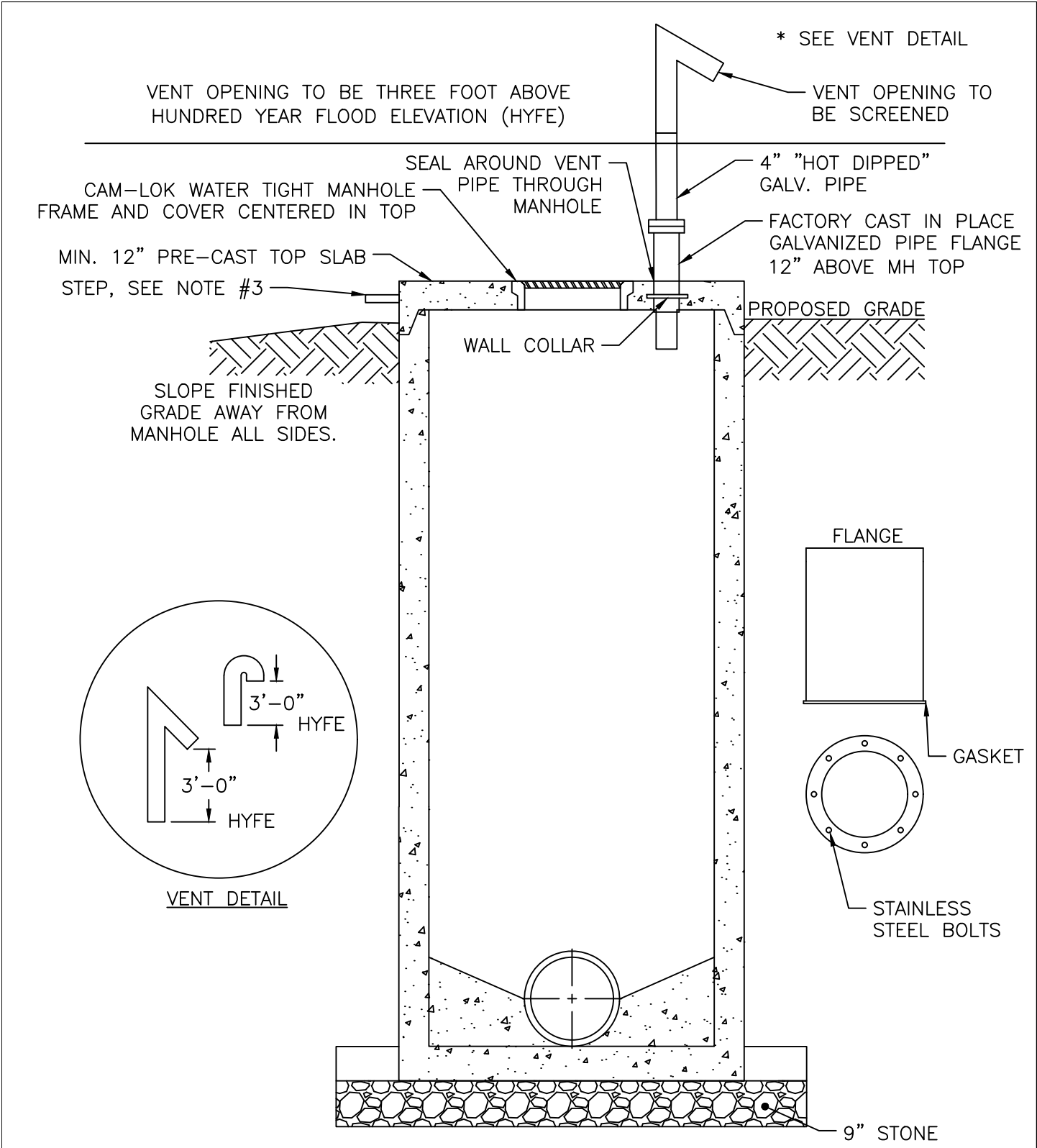
NOTE:  
 NO HORIZONTAL ALIGNMENT CHANGE  
 CAN BE MADE WITHIN THIS MANHOLE  
 TYPE. USE ON GRADES 10% OR GREATER.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS DATE: 05/24/2024 NOT TO SCALE

STANDARD HIGH VELOCITY  
 MANHOLE INVERT

**S-23**

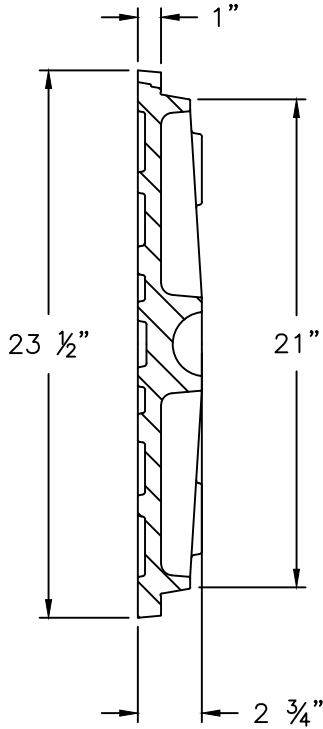


NOTES:

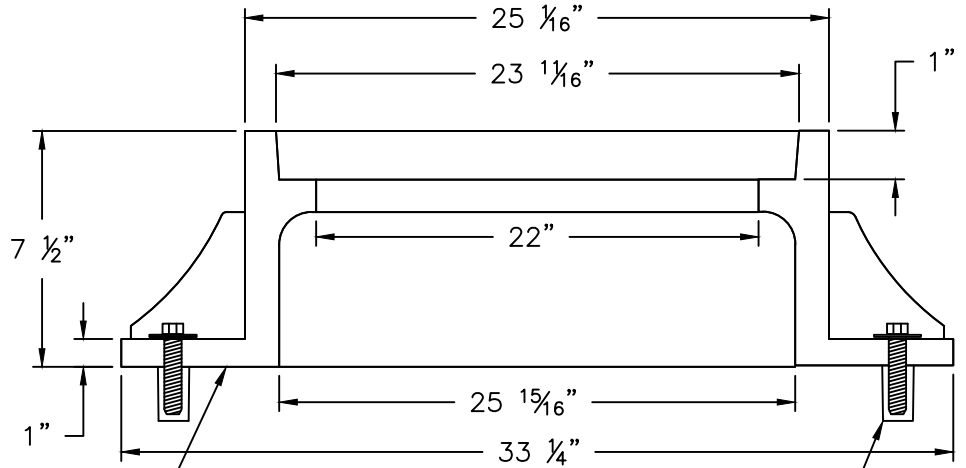
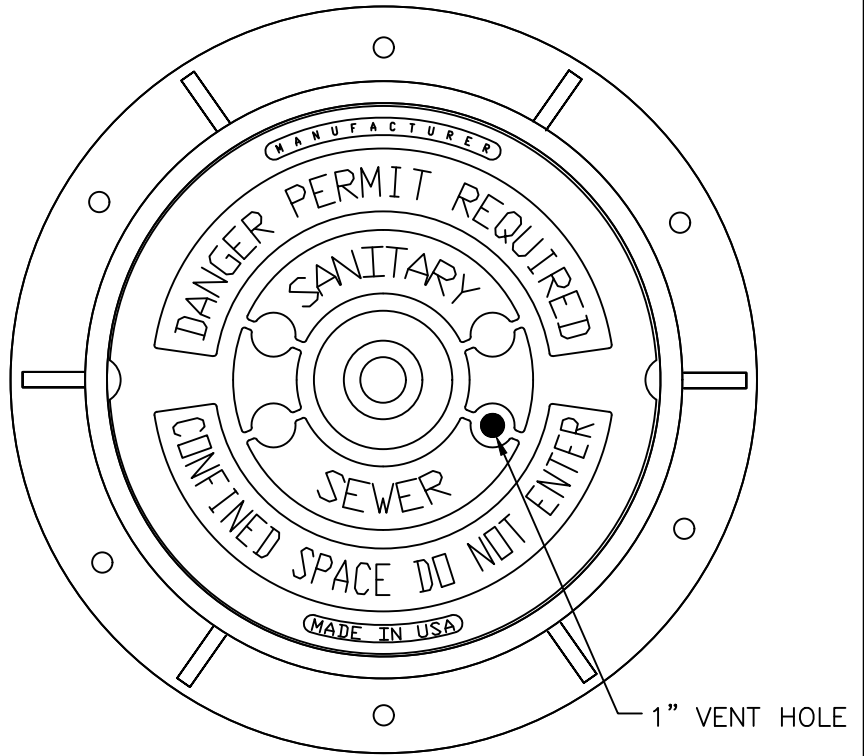
1. VENT MUST BE FACTORY WELDED, FABRICATED, AND "HOT DIPPED" GALVANIZED.
2. HYFE- HUNDRED YEAR FLOOD ELEVATION.
3. WHEN MANHOLE TOPS ARE IN EXCESS OF 3' ABOVE GRADE, OUTSIDE STEPS MUST BE PROVIDED. SEE DETAIL S-28 FOR STEP.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	STANDARD SEAL TIGHT MANHOLE WITH VENTED STACK	
<b>S-24</b>		

MANHOLE FRAME AND COVER



COVER 120 LBS. MINIMUM



BUTYL-NEK OR APPROVED SEALANT BETWEEN FRAME AND COVER

5/8"x3" LAGSHIELD IN HOLE DRILLED INTO CONE OR RING WITH ANCHOR SUNK TO DESIGN DEPTH, AND 3/8"x3" HOT DIPPED GALVANIZED LAG BOLT AND WASHER

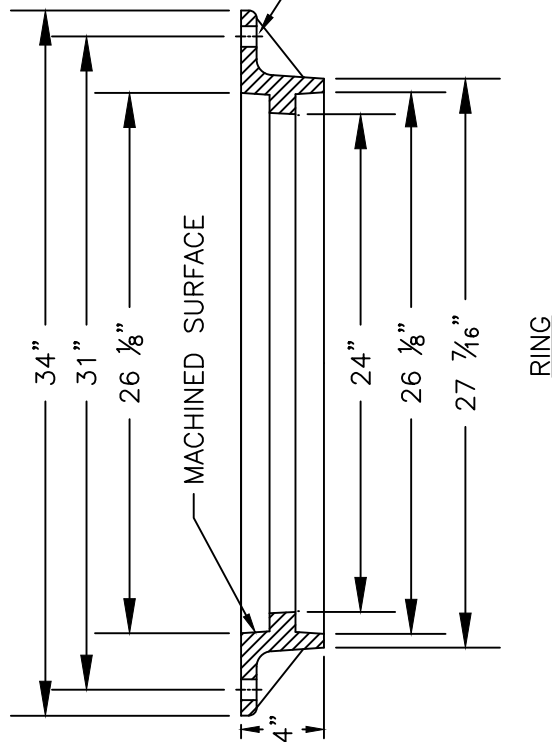
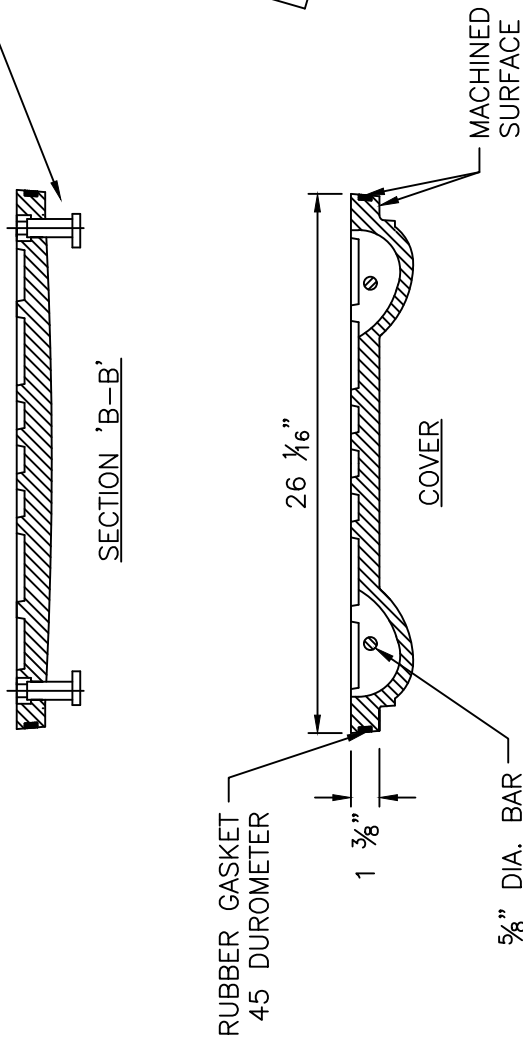
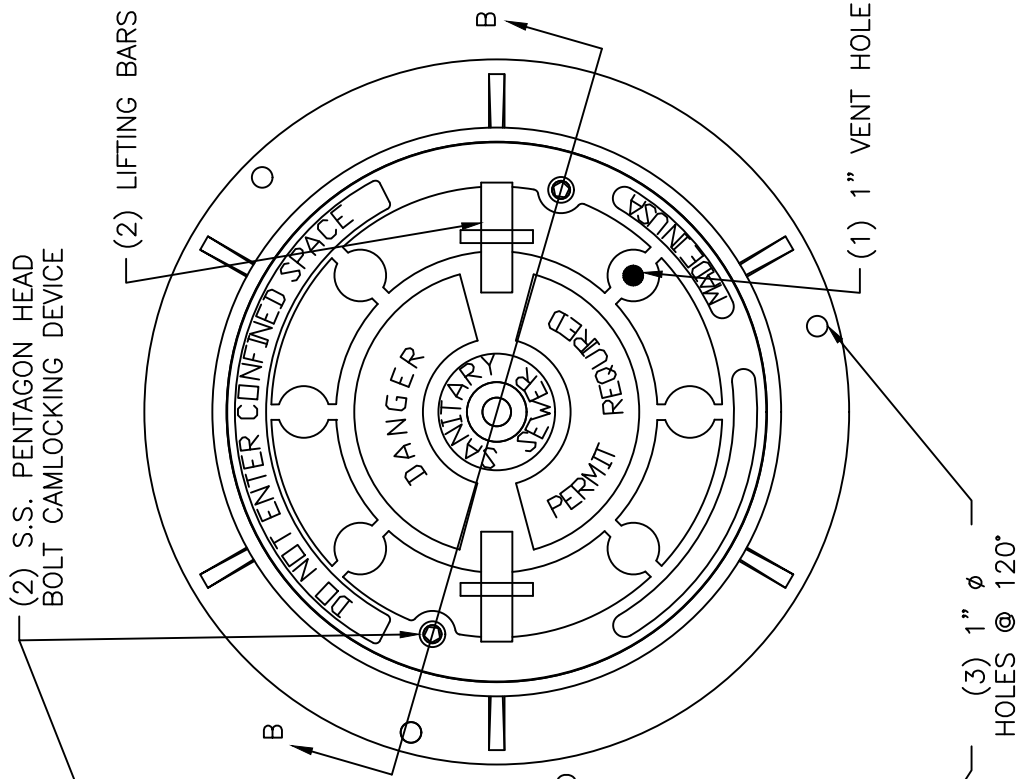
NOTES:

1. ALL MANHOLE FRAMES SHALL BE DOMESTICALLY CAST.
2. FRAME SHALL BE A MINIMUM WEIGHT OF 182 LBS. WITHIN PUBLIC ROW AND 160 LBS. WITHIN EASEMENTS.
3. COVER SHALL WEIGH A MIN. OF 120 LBS.
4. ALL MANHOLE FRAMES OUTSIDE OF PAVED SURFACES SHALL BE BOLTED TO THE CONE SECTION OR RING WITH A MINIMUM OF 4 BOLTS PER FRAME.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
		STANDARD MANHOLE COVER
		<b>S-25</b>





NOTE: COVER REQUIRED WHEN WATER TIGHT MANHOLE SPECIFIED.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
-----------	------------------	--------------

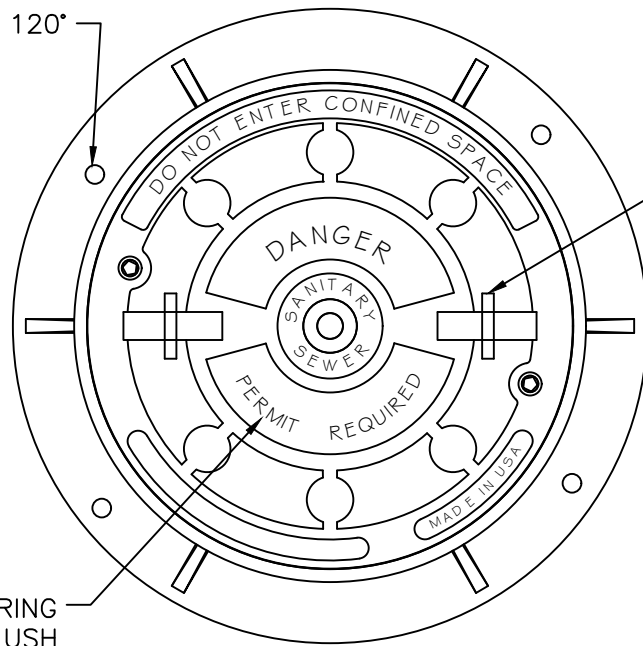
FLAT MANHOLE COVER

**S-25A**

(4) 1"  $\phi$  HOLES @ 120°

MINIMUM AVG. WEIGHT:

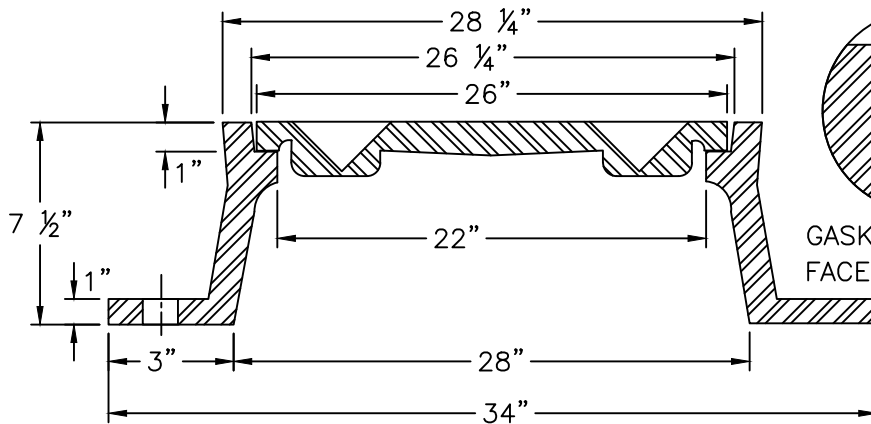
- FRAME 182 LBS
- COVER 160 LBS
- TOTAL 342 LBS



(2) LIFTING BARS

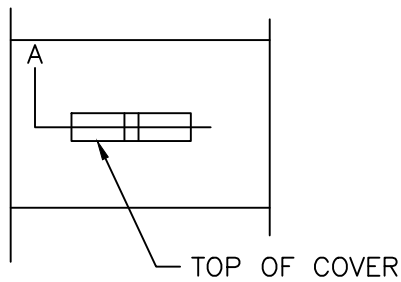
1" LETTERING RECESSED FLUSH

PLAN

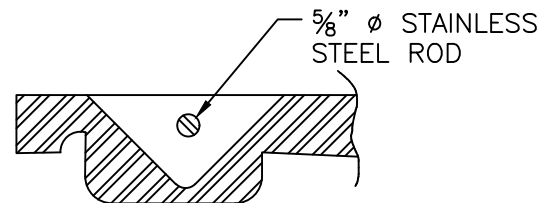


GASKET IN VERTICAL FACE OF COVER

FRAME MUST BE ANCHORED IN ACCORDANCE WITH DETAIL S-25



TOP OF COVER



SECTION A

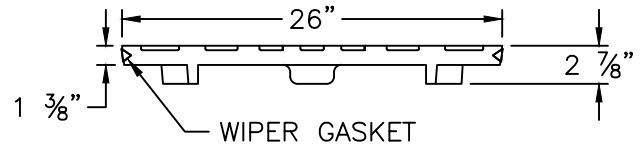
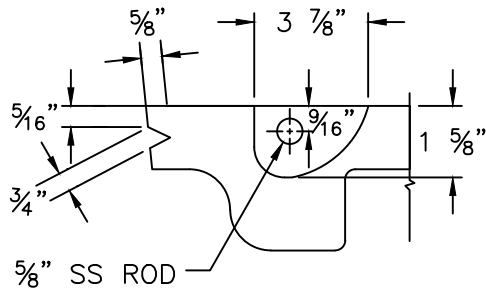
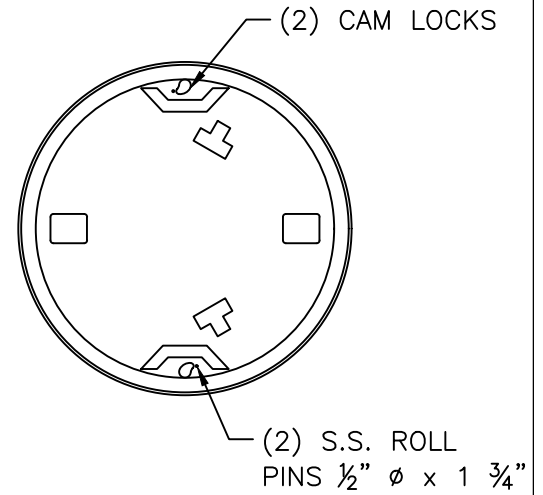
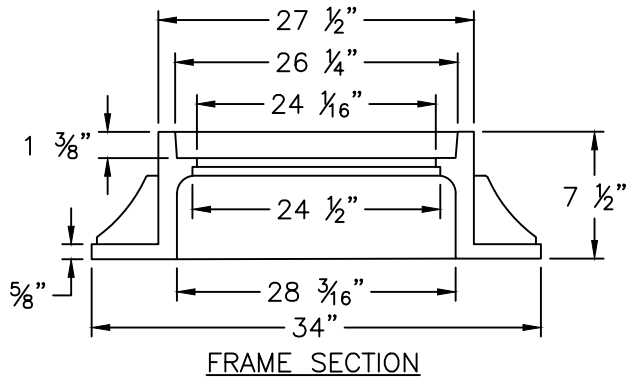
TYPICAL LIFTING DEVICE

**CITY OF RALEIGH  
STANDARD DETAIL**

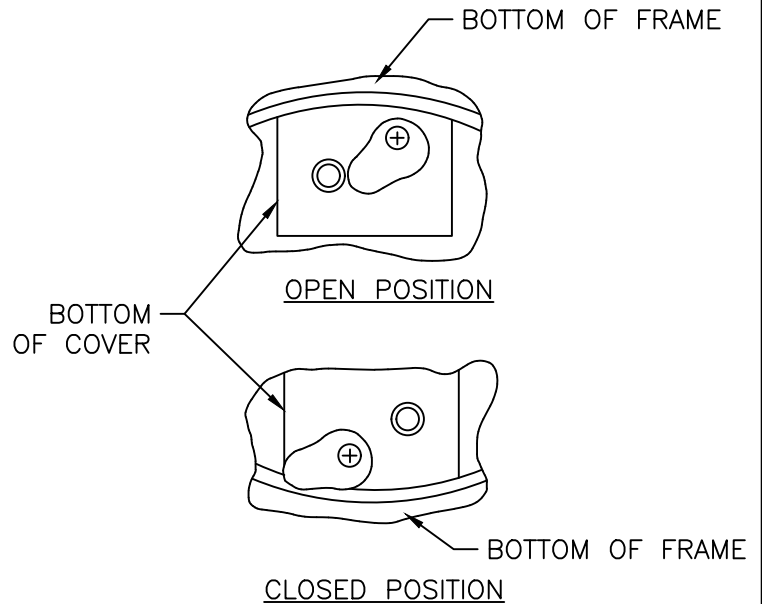
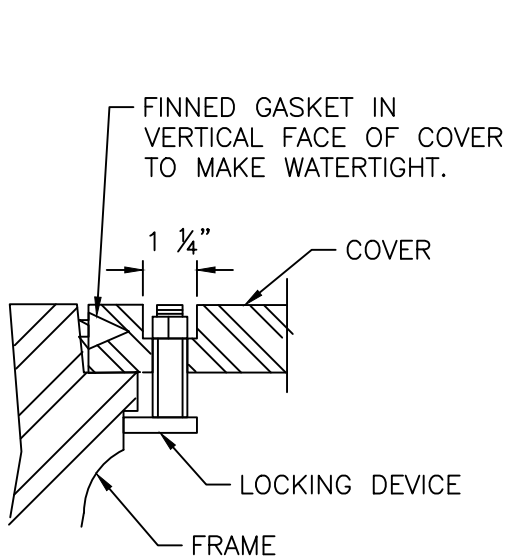
REVISIONS      DATE: 05/24/2024      NOT TO SCALE

MANHOLE FRAME AND  
WATERTIGHT COVER

**S-26**



TYPICAL CAM LOCK MANHOLE



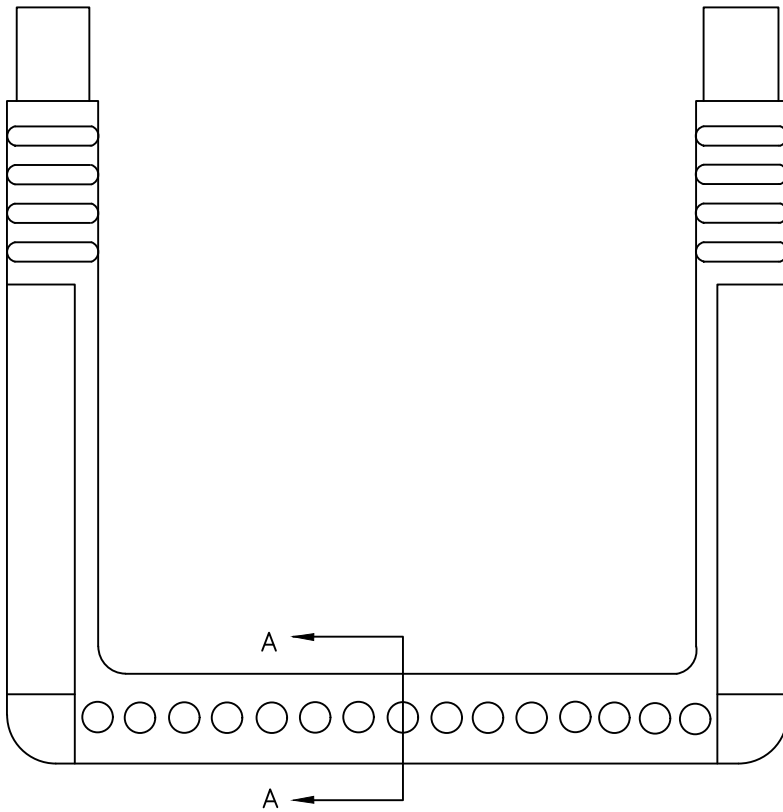
TYPICAL LOCKING DEVICE

**NOTE:**

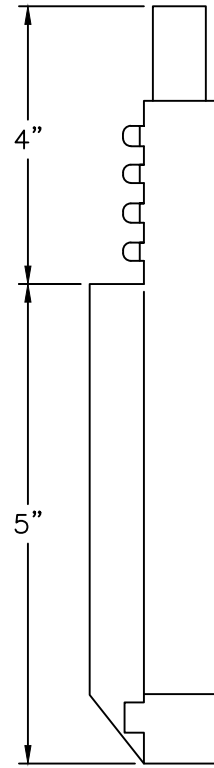
1. WHEN WATERTIGHT NOT SPECIFIED, TOP SHALL HAVE ONE 1" VENT HOLE.
2. STANDARD: PENTAGON HEAD S.S. OPTIONAL: S.S. HEX HEAD BOLT.
3. RING MUST BE ANCHORED IN ACCORDANCE WITH DETAIL S-25.

**CITY OF RALEIGH  
STANDARD DETAIL**

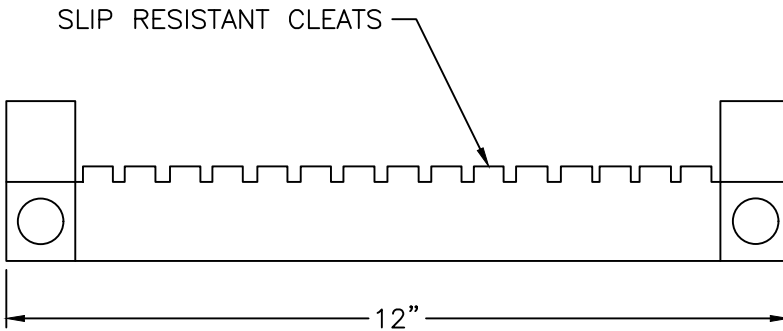
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	WATERTIGHT MANHOLE FRAME WITH CAM LOCK COVER	
	<b>S-27</b>	



PLAN



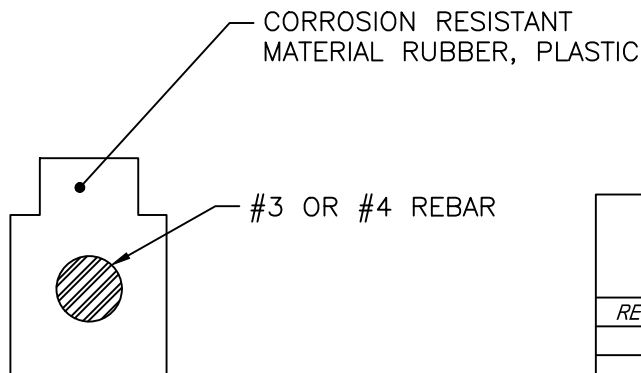
SIDE ELEVATION



ELEVATION

SLIP RESISTANT CLEATS

12"



SECTION A - A

CORROSION RESISTANT MATERIAL RUBBER, PLASTIC

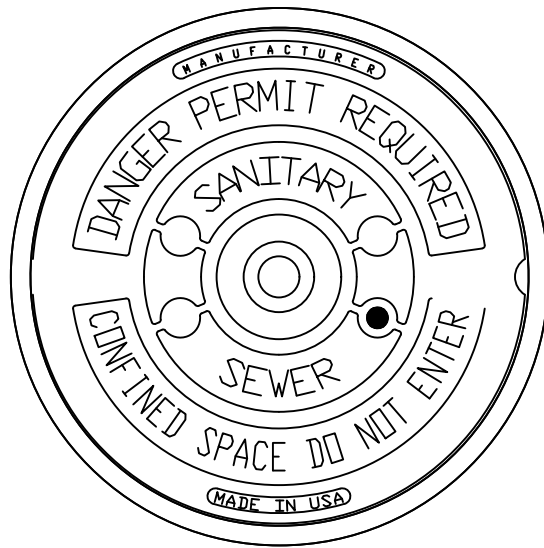
#3 OR #4 REBAR

**CITY OF RALEIGH**  
**STANDARD DETAIL**

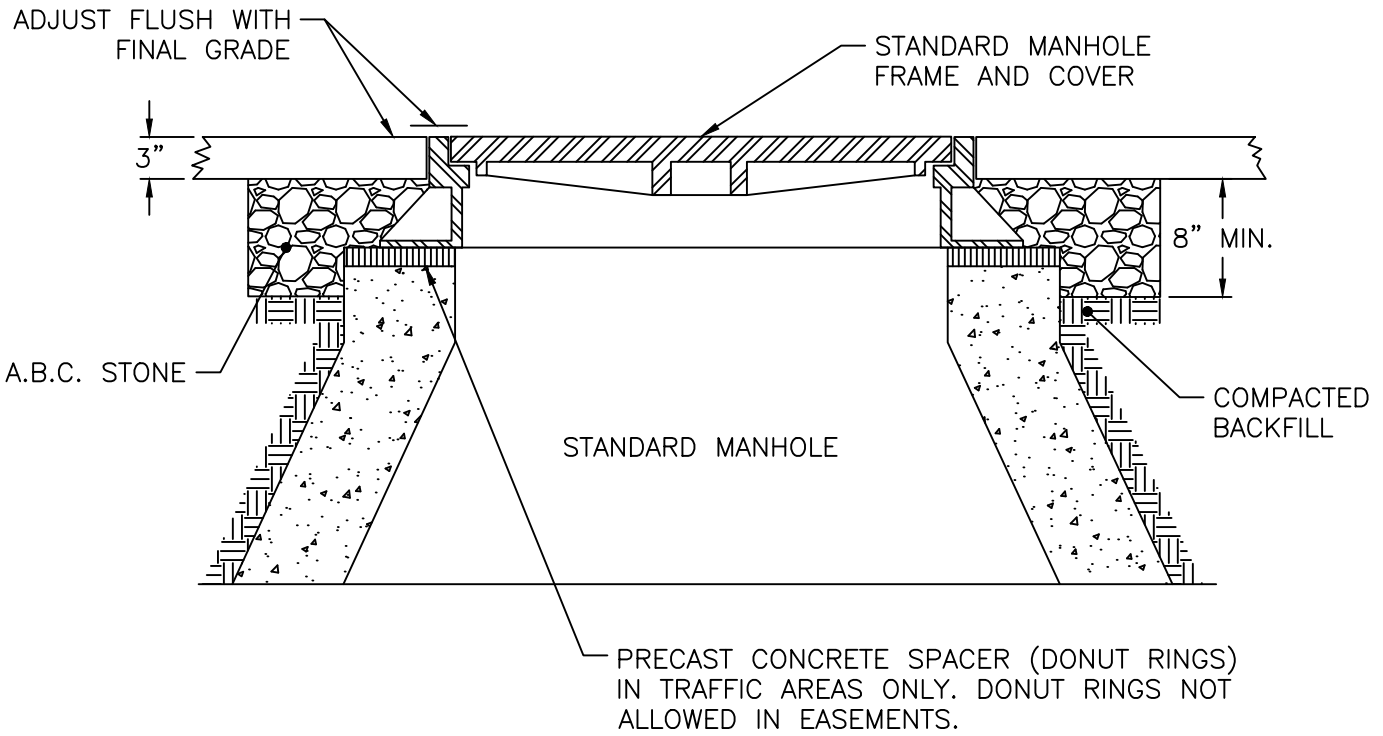
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
-----------	------------------	--------------

	STANDARD SLIP RESISTANT MANHOLE STEP DETAIL
--	---

**S-28**



PLAN



SECTION

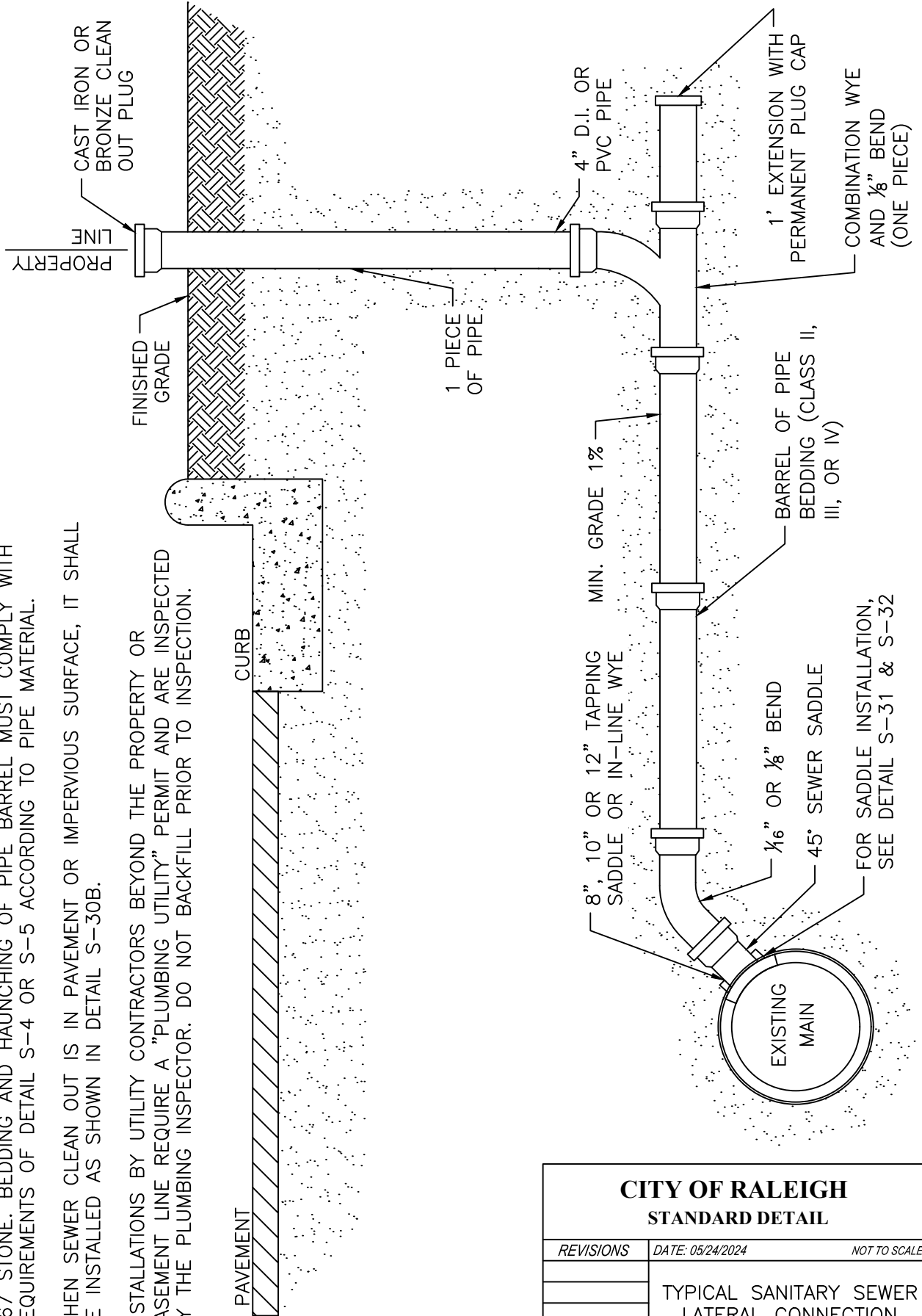
**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	STANDARD MANHOLE FRAME AND COVER DETAIL WITHIN FRAME SURFACE	
	<b>S-29</b>	

NOTES:

1. THE FULL LENGTH OF THE SERVICE DITCH SHALL BE COMPACTED IN 6" LIFTS WITH MECHANICAL TAMP. ALL TAPS WILL BE MADE USING MECHANICAL TAPPING MACHINE. FOR PVC INSTALLATIONS, SADDLE AND BEND MUST BE BEDDED IN #67 STONE. BEDDING AND HAUNCHING OF PIPE BARREL MUST COMPLY WITH REQUIREMENTS OF DETAIL S-4 OR S-5 ACCORDING TO PIPE MATERIAL.
2. WHEN SEWER CLEAN OUT IS IN PAVEMENT OR IMPERVIOUS SURFACE, IT SHALL BE INSTALLED AS SHOWN IN DETAIL S-30B.
3. INSTALLATIONS BY UTILITY CONTRACTORS BEYOND THE PROPERTY OR EASEMENT LINE REQUIRE A "PLUMBING UTILITY" PERMIT AND ARE INSPECTED BY THE PLUMBING INSPECTOR. DO NOT BACKFILL PRIOR TO INSPECTION.

\* SERVICE LATERAL MATERIAL AS REQUIRED

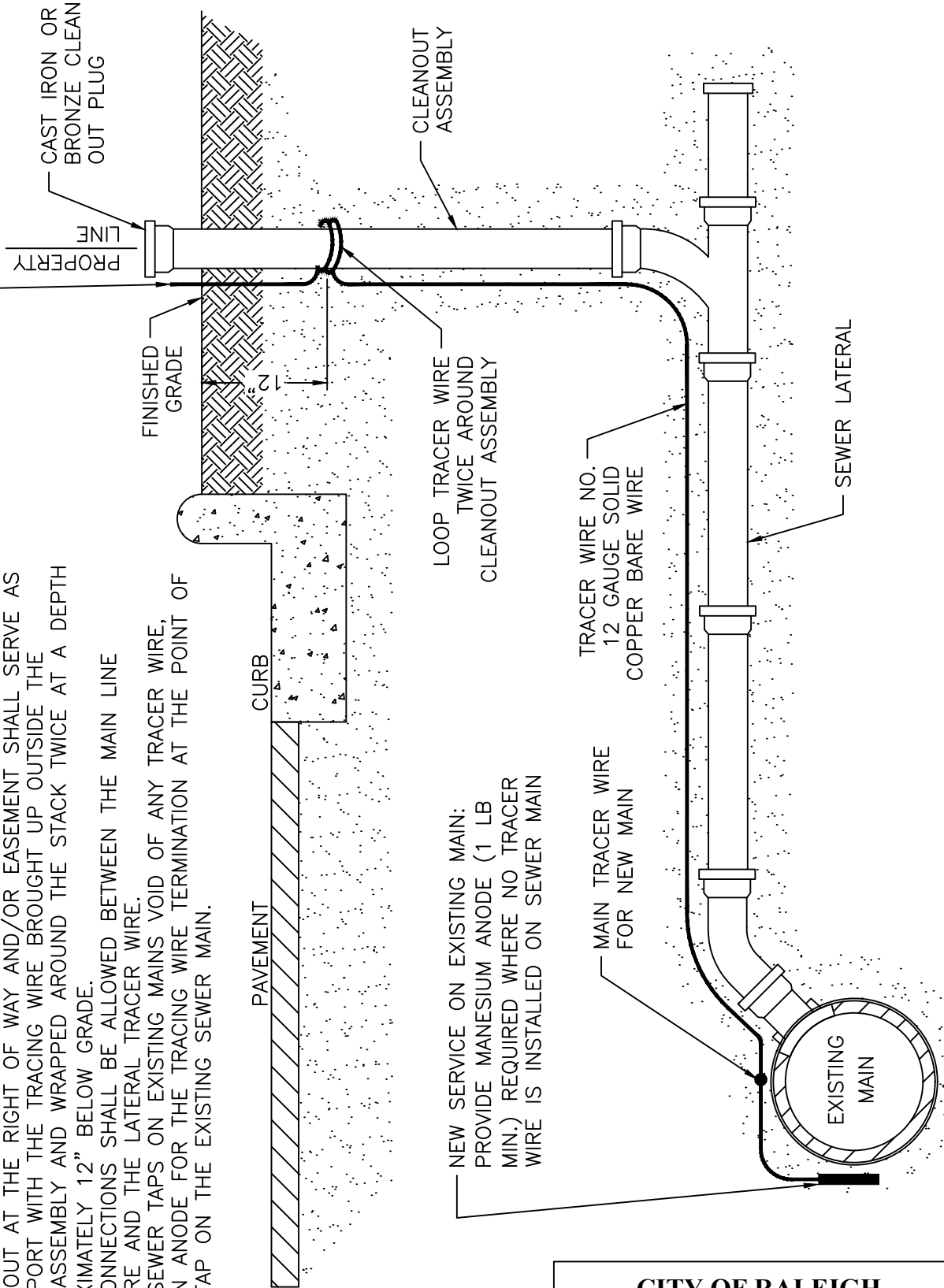


CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
TYPICAL SANITARY SEWER LATERAL CONNECTION		
<b>S-30</b>		

**NOTES:**

1. THE TRACER WIRE SHALL BE CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. WHERE JOINTS ARE NECESSITATED IN THE WIRE, THE JOINTS SHALL BE SECURELY BONDED TOGETHER WITH AN APPROVED INDUSTRIAL CRIMP CONNECTOR TO PROVIDE ELECTRICAL CONTINUITY. CRIMPS SHALL BE SIMILAR METAL.
2. THE CLEANOUT AT THE RIGHT OF WAY AND/OR EASEMENT SHALL SERVE AS THE TEST PORT WITH THE TRACING WIRE BROUGHT UP OUTSIDE THE CLEANOUT ASSEMBLY AND WRAPPED AROUND THE STACK TWICE AT A DEPTH OF APPROXIMATELY 12" BELOW GRADE.
3. SPliced CONNECTIONS SHALL BE ALLOWED BETWEEN THE MAIN LINE TRACER WIRE AND THE LATERAL TRACER WIRE.
4. FOR NEW SEWER TAPS ON EXISTING MAINS VOID OF ANY TRACER WIRE, PROVIDE AN ANODE FOR THE TRACING WIRE TERMINATION AT THE POINT OF THE NEW TAP ON THE EXISTING SEWER MAIN.

EXTEND TRACER WIRE TO JUST BELOW CLEAN OUT PLUG



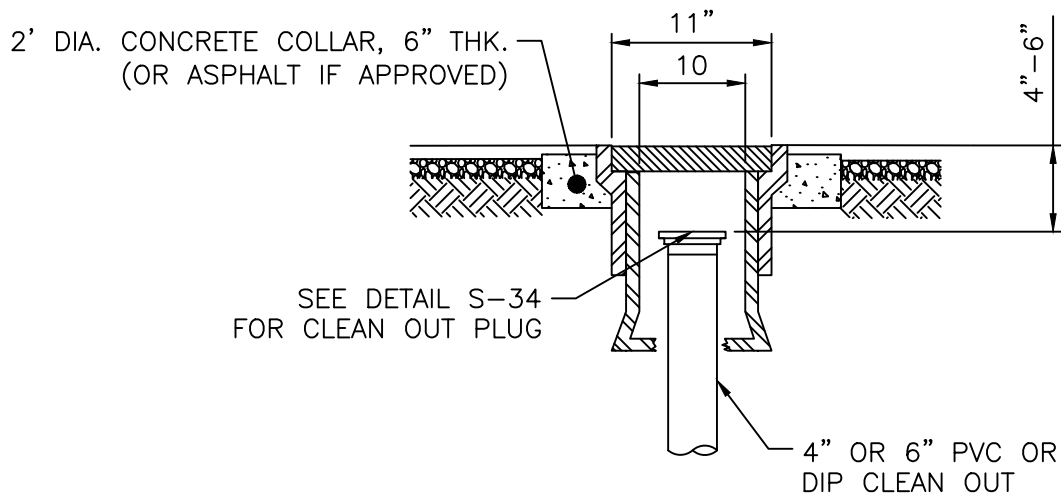
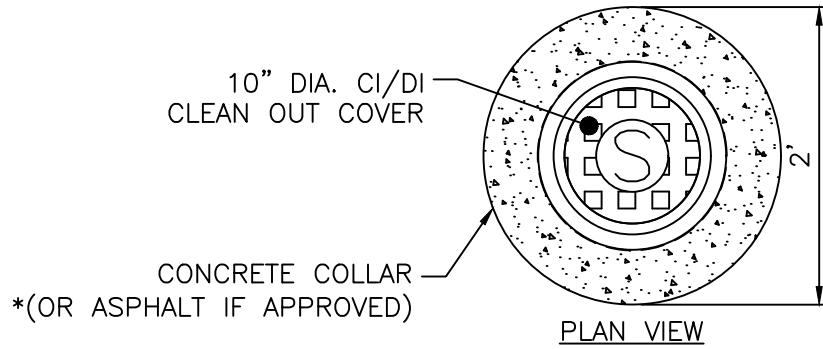
NEW SERVICE ON EXISTING MAIN:  
 PROVIDE MANESIUM ANODE (1 LB  
 MIN.) REQUIRED WHERE NO TRACER  
 WIRE IS INSTALLED ON SEWER MAIN

**CITY OF RALEIGH  
 STANDARD DETAIL**

REVISIONS      DATE: 05/24/2024      NOT TO SCALE

TYPICAL SANITARY SEWER  
 LATERAL TRACER WIRE

**S-30A**



SECTION VIEW

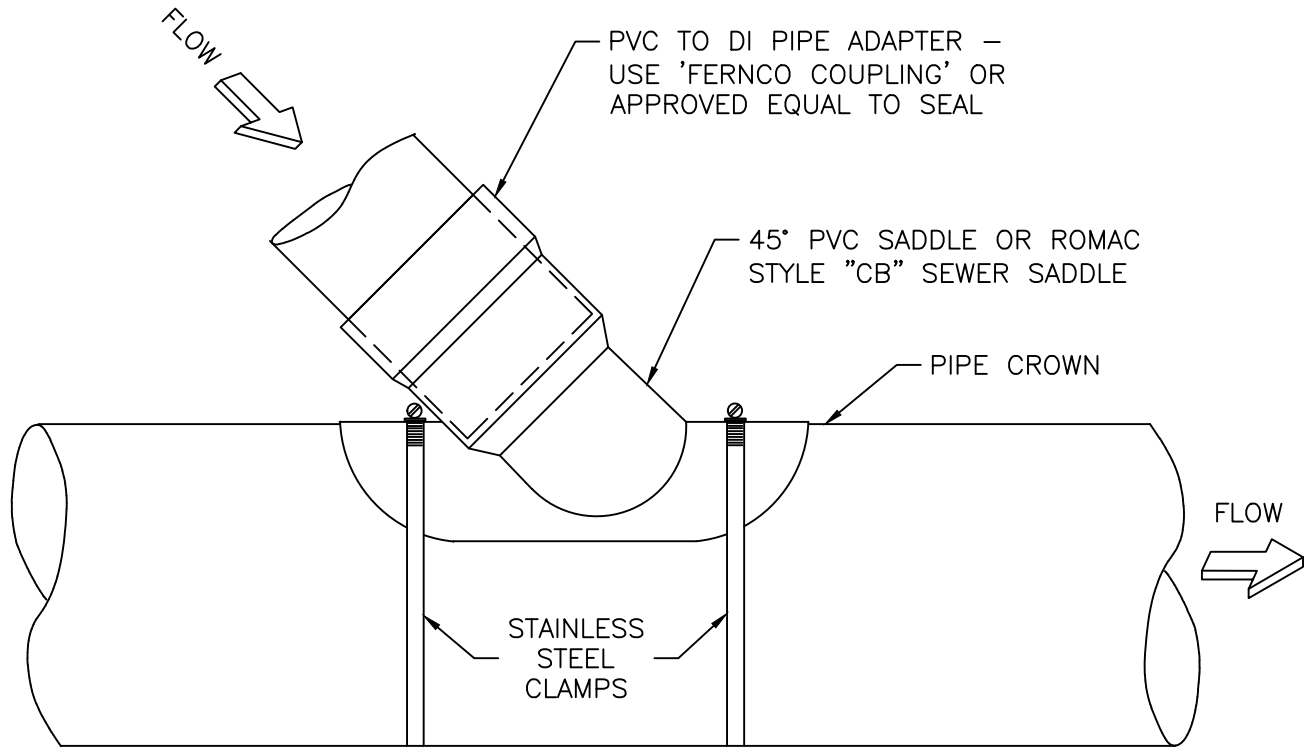
**CITY OF RALEIGH  
STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
-----------	------------------	--------------

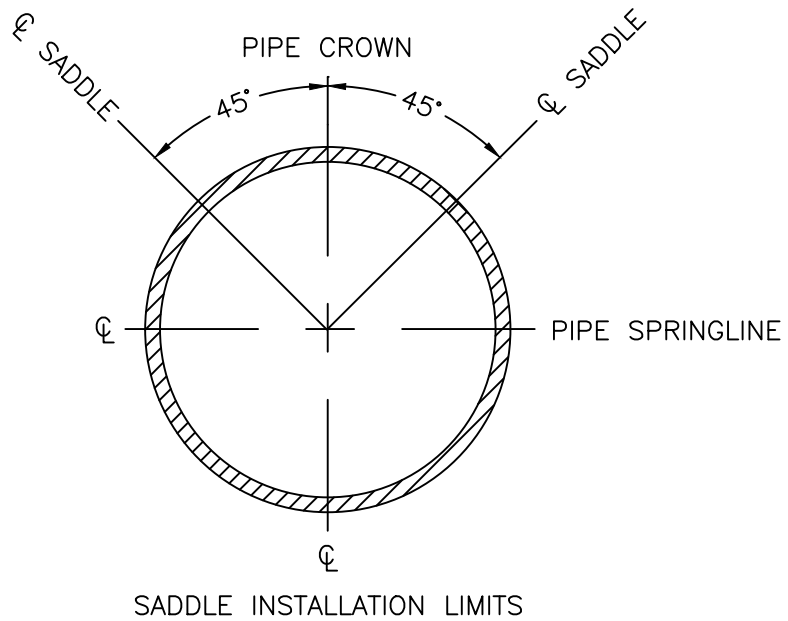
	TRAFFIC RATED CLEAN OUT STRUCTURE
--	--------------------------------------

**S-30B**





BACKFILL UNDER PVC SADDLE, ADAPTOR, AND CAST IRON  
BEND WITH #67 STONE AS SHOWN ON DETAIL S-4.

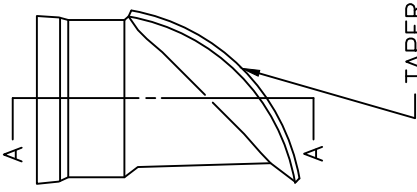
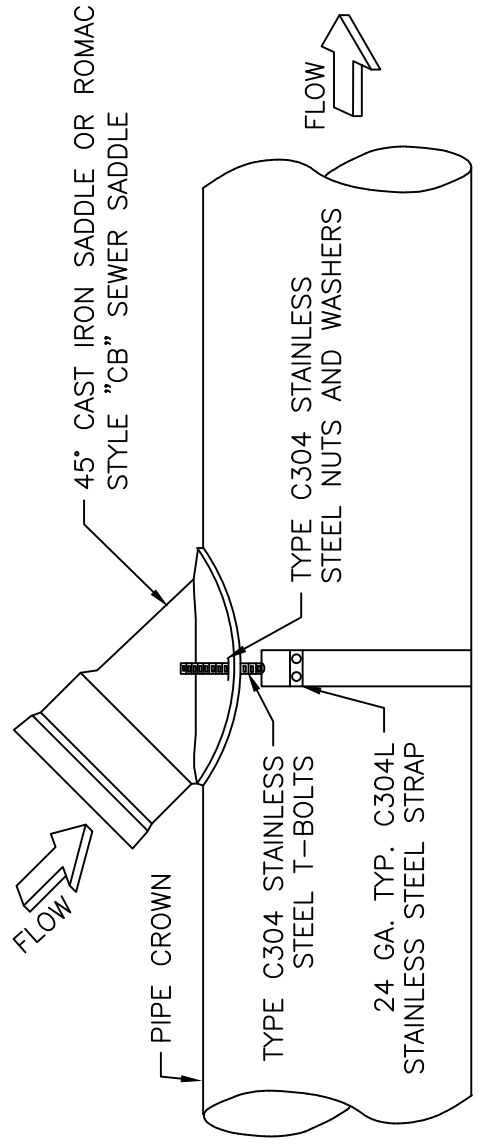
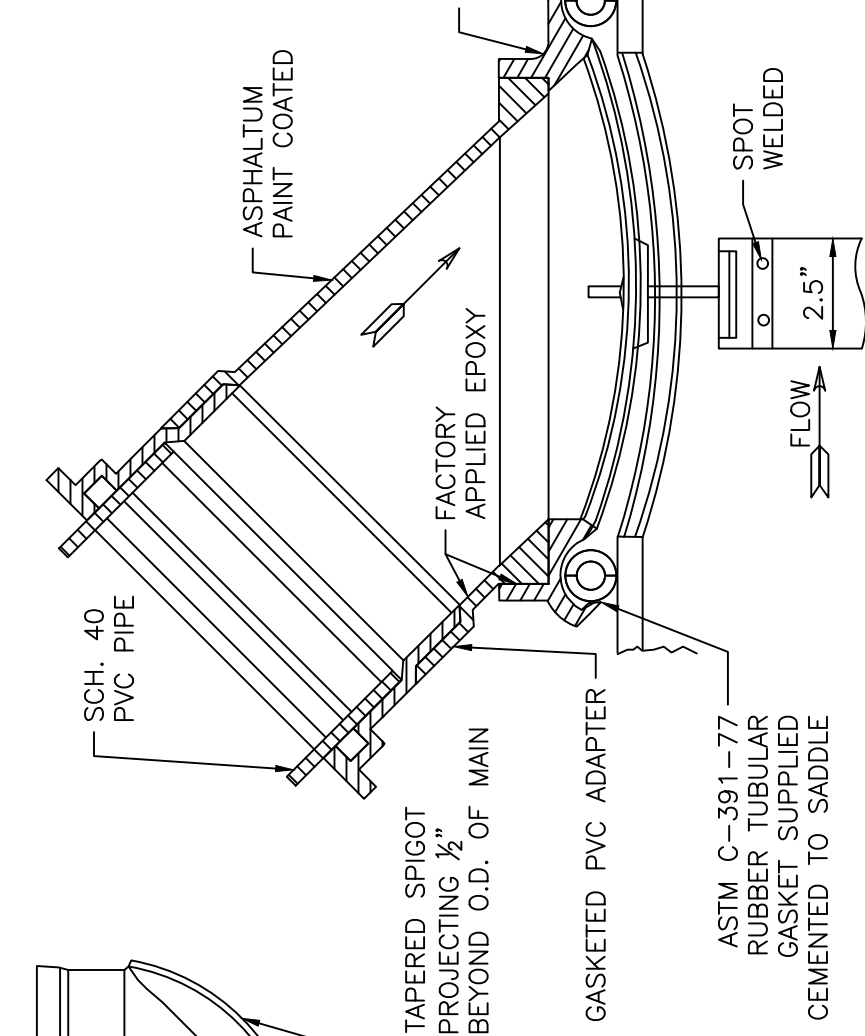
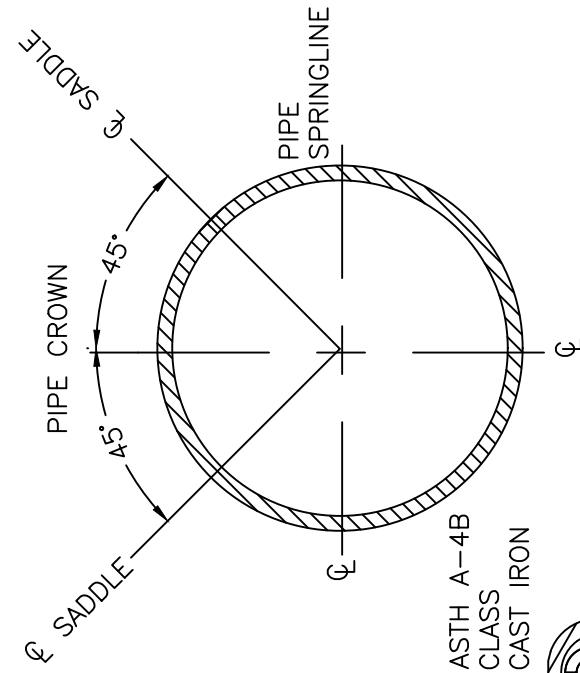


**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS      DATE: 05/24/2024      NOT TO SCALE

LATERAL SADDLE  
INSTALLATION DETAIL  
FOR PVC PIPE

**S-31**

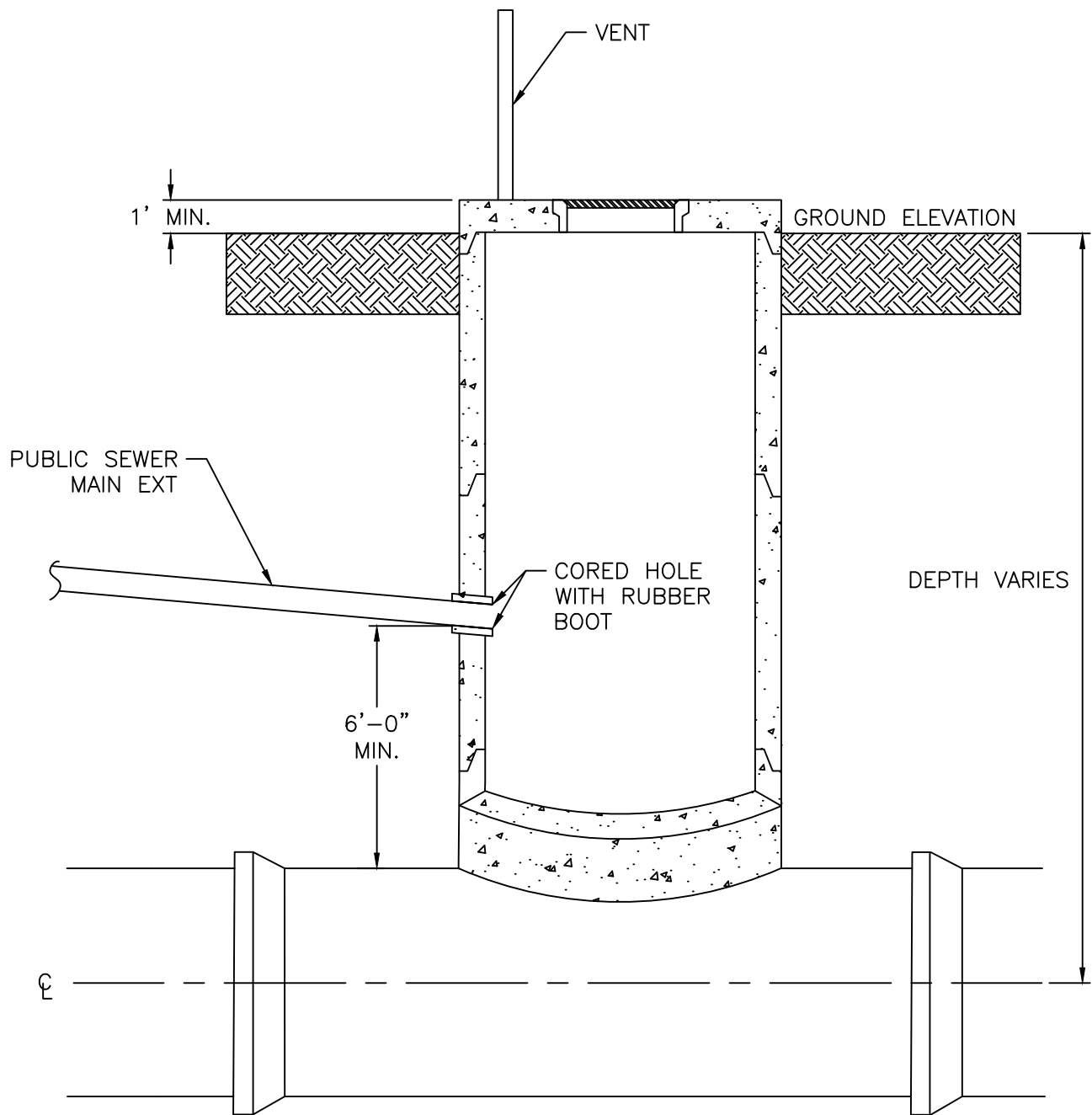


SADDLE INSTALLATION LIMITS

NOTE:  
SADDLE TO BE GENECO  
E40 OR EQUAL.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	LATERAL SADDLE INSTALLATION FOR VCP AND DUCTILE IRON PIPE	
	<b>S-32</b>	

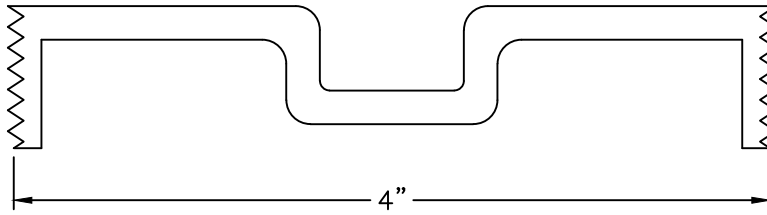


**NOTES:**

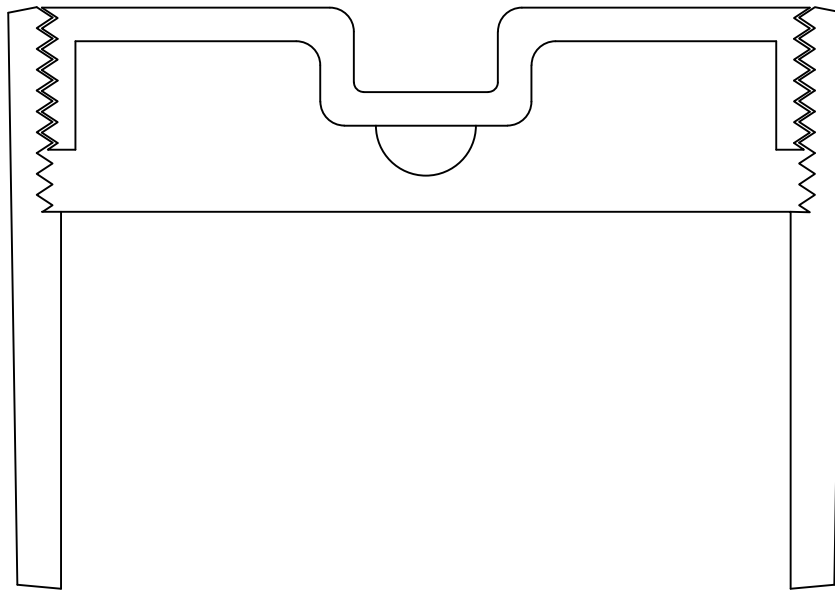
1. HOLE SHALL BE CORED IN RISER SECTION FOR PUBLIC SERVICE MAIN EXTENSION.
2. RUBBER BOOT SHALL BE UTILIZED ON ALL CORES.
3. CORES SHALL BE IN CENTER OF RISER SECTION.
4. CONNECTION TO TEE MANHOLE MUST BE MADE BY CONTRACTOR APPROVED BY CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT.

**CITY OF RALEIGH  
STANDARD DETAIL**

<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
	MAIN EXTENSION TO TIE INTO TEE MANHOLE	
<b>S-33</b>		



STANDARD 4" BRONZE CLEANOUT PLUG



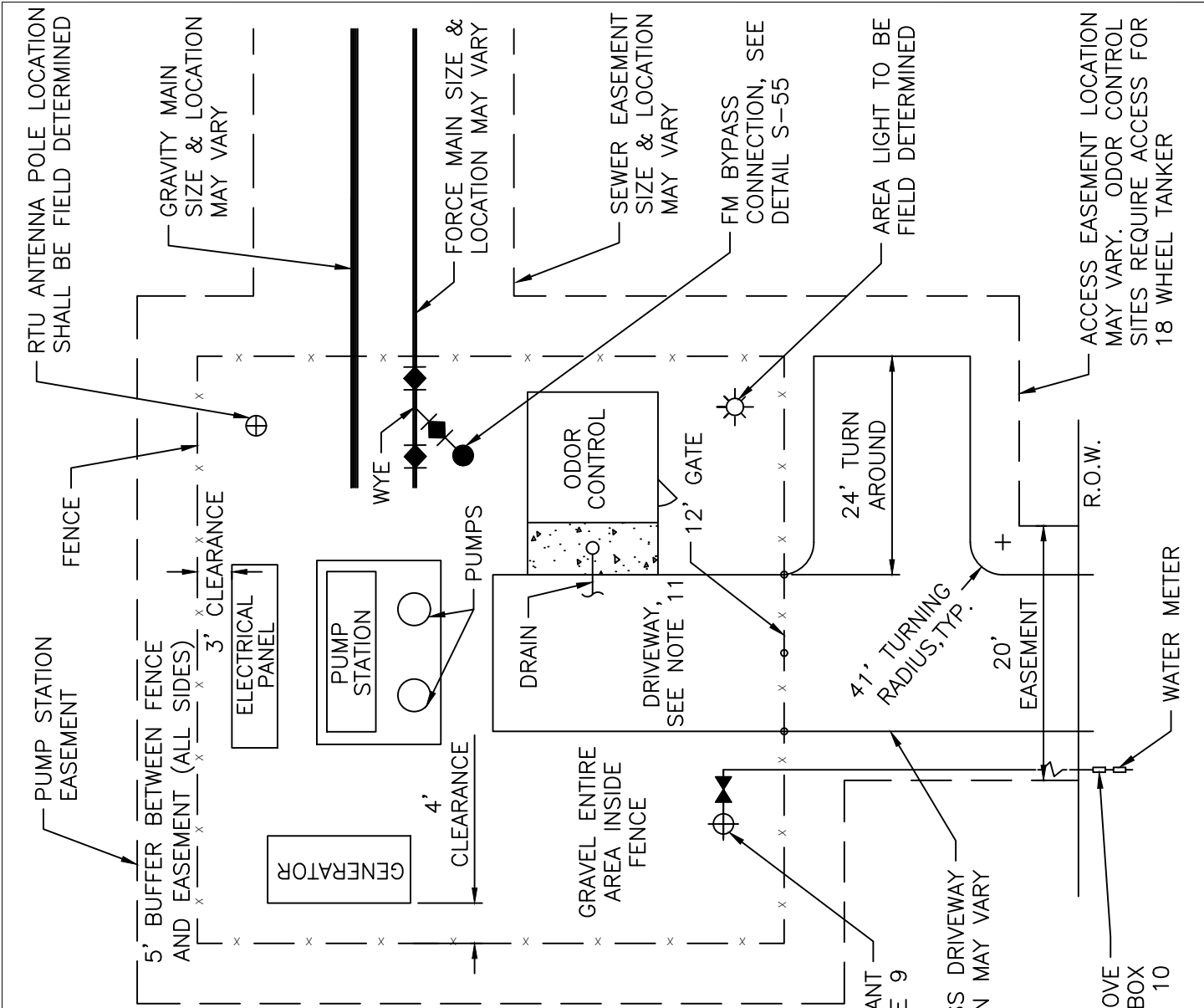
CLEANOUT FERRULE WITH PLUG

STYLES ACCEPTED:  
 INVERTED NUT  
 RAISED NUT

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
	4" CLEANOUT PLUG	
<b>S-34</b>		

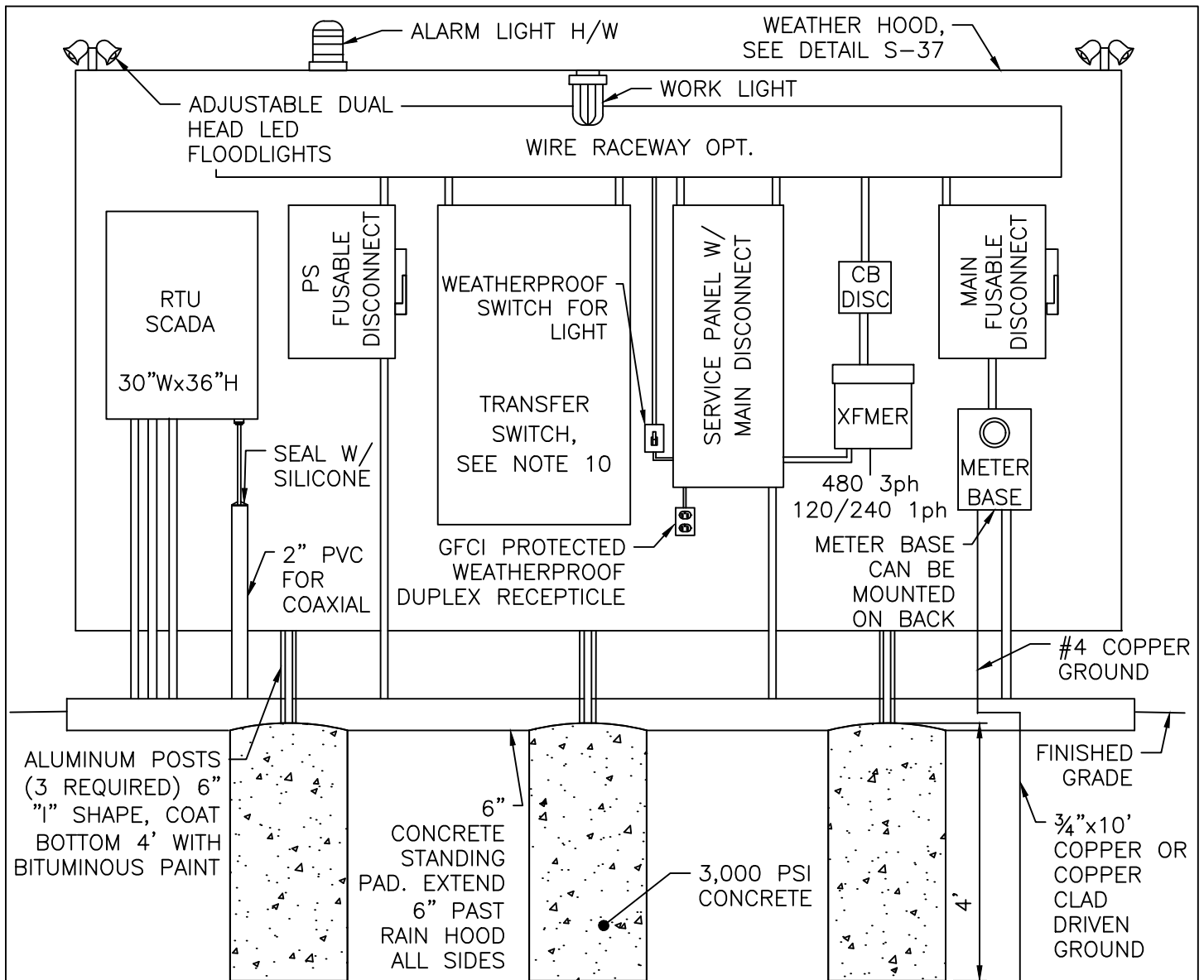
**NOTES:**

1. PUMP STATION MUST MEET ALL ZONING SET-BACK REQUIREMENTS.
2. PUMP STATION MUST MEET ALL LANDSCAPING REQUIREMENTS.
3. WATER SERVICE FOR YARD HYDRANT MUST HAVE RPZ BACKFLOW PROTECTION. SIZE OF SERVICE MAY VARY.
4. PUMP STATION EASEMENT TO BE 70'x70' MINIMUM.
5. EQUIPMENT LOCATIONS MAY VARY.
6. 5' BUFFER SHALL BE REQUIRED BETWEEN FENCE AND EASEMENT LINE.
7. FOR ELECTRICAL PANEL, REFER TO DETAIL S-36 & S-37.
8. SEE CITY SPECIFICATION 32-10-00 (PAVEMENT AND APPURTENANCES). PAVEMENT SHALL HAVE CAPACITY TO BEAR 88K G.V.W.
9. IF NO ODOR CONTROL BUILDING, INSTALL YARD HYDRANT AS SHOWN. IF ODOR CONTROL BUILDING IS PRESENT, INSTALL HOSE BIBB ON ODOR CONTROL BUILDING IN LIEU OF YARD HYDRANT.
10. IF ODOR CONTROL BUILDING IS PRESENT, RPZ SHALL BE LOCATED INSIDE THE BUILDING.
11. ASPHALT OR CONCRETE DRIVEWAY AT CITY DISCRETION. DIVERT STORMWATER AWAY FROM PUMP STATION



**CITY OF RALEIGH  
STANDARD DETAIL**

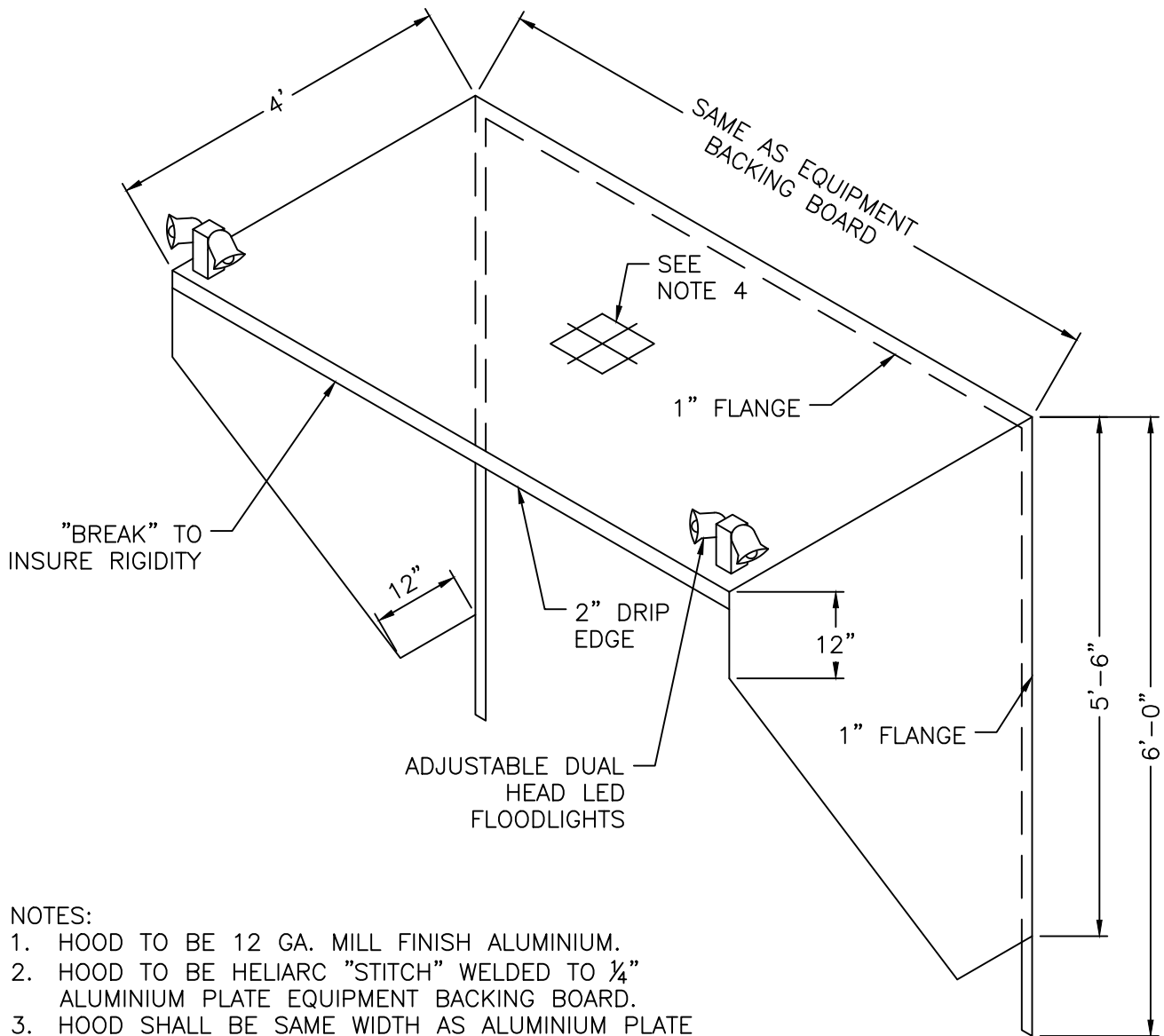
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
MINIMUM REQUIREMENTS FOR PUMP STATIONS		
<b>S-35</b>		



**NOTES:**

1. BACKING PLATE TO BE 1/4" ALUMINUM. MOUNT TO "1" BEAM POSTS WITH STAINLESS STEEL NUTS, BOLTS, AND WASHERS.
2. ALL ELECTRICAL WORK SHALL CONFORM TO LATEST NATIONAL, STATE AND LOCAL CODES AND REQUIREMENTS.
3. SHOW CONDUIT SIZE AND RUNS WITH WIRE SIZE AND NUMBER ON PUMP STATION PLANS.
4. PANEL LAYOUT IS SCHEMATIC ONLY. ADJUST AS NEEDED TO ACCOMMODATE EQUIPMENT. MAINTAIN 4" MIN. CLEARANCE BETWEEN PANELS AND SIDE SHIELDS.
5. ALL ENCLOSURES SHALL BE NEMA 4X RATED AND LOCKABLE.
6. ENCLOSURES SHALL BE MOUNTED TO ALUMINUM BACKING PLATE WITH NYLON SPACERS & STAINLESS STEEL NUTS, BOLTS & WASHERS.
7. CONDUIT SHALL BE RIDGID ALUMINUM OR GALVANIZED. MEYERS HUBS SHALL BE USED AT ALL PANEL CONNECTIONS.
8. NO EQUIPMENT SHALL BE MOUNTED LESS THAN 36" ABOVE FINISHED GRADE. MIN. CLEARANCE FROM WORK LIGHT TO STANDING PAD SHALL BE 6'-6".
9. CONDUITS FROM WET WELL SHALL HAVE AN AIR GAP FROM TERMINATING CABINET.
10. INSTALL AN AUTOMATIC TRANSFER SWITCH IF A GENERATOR IS INSTALLED. INSTALL A MANUAL TRANSFER SWITCH IF A PERMANENT DRY PRIME BYPASS BACK UP PUMPING SYSTEM IS INSTALLED. ADD A MELTRIC PLUG OR EQUAL TO THE MANUAL TRANSFER SWITCH FOR CONNECTION TO A PORTABLE GENERATOR.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
	PUMP STATION ELECTRICAL PANEL	
<b>S-36</b>		

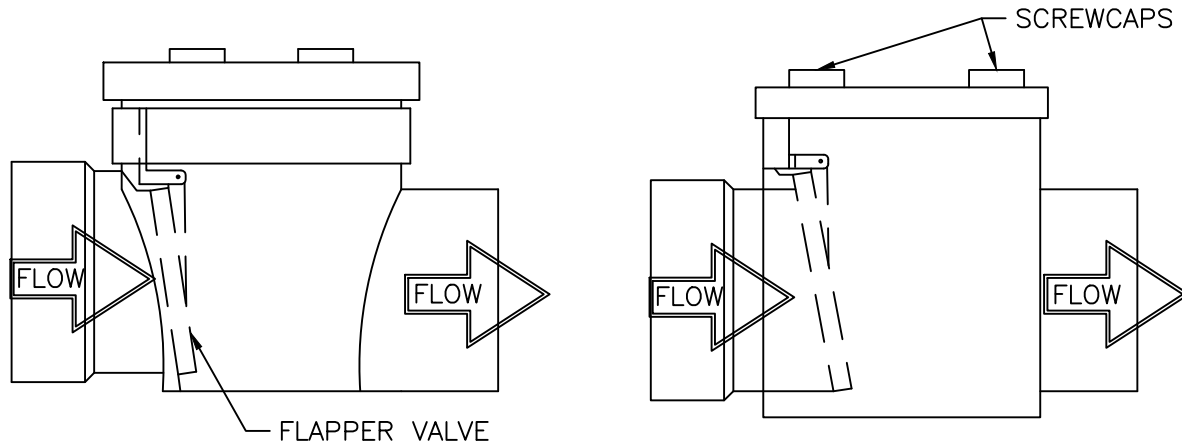


NOTES:

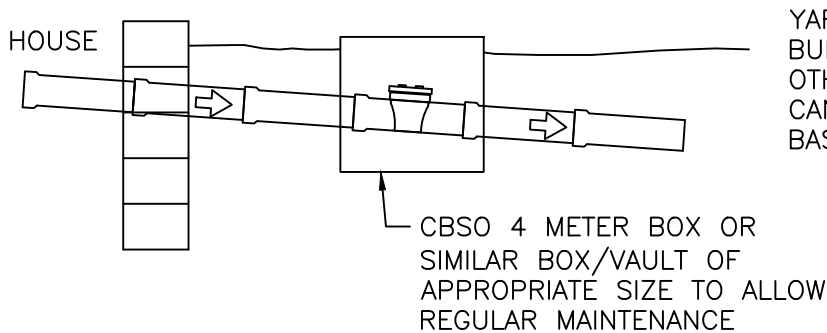
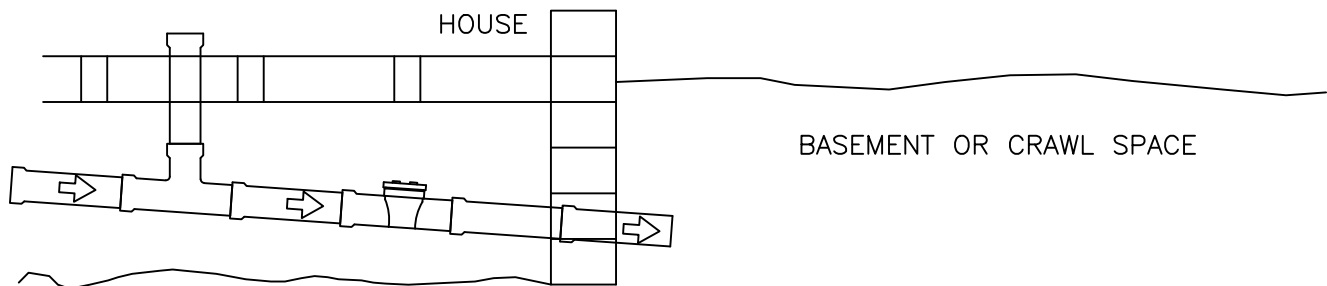
1. HOOD TO BE 12 GA. MILL FINISH ALUMINIUM.
2. HOOD TO BE HELIARC "STITCH" WELDED TO 1/4" ALUMINIUM PLATE EQUIPMENT BACKING BOARD.
3. HOOD SHALL BE SAME WIDTH AS ALUMINIUM PLATE EQUIPMENT BACKING BOARD.
4. PROVIDE MOUNTING TABS FOR WORK LIGHT BOX.

CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	WEATHER HOOD FOR ELECTRICAL EQUIPMENT	
	<b>S-37</b>	

TYPICAL SANITARY SEWER SERVICE BACKWATER VALVE STYLES:



TYPICAL BACKWATER VALVE INSTALLATIONS:



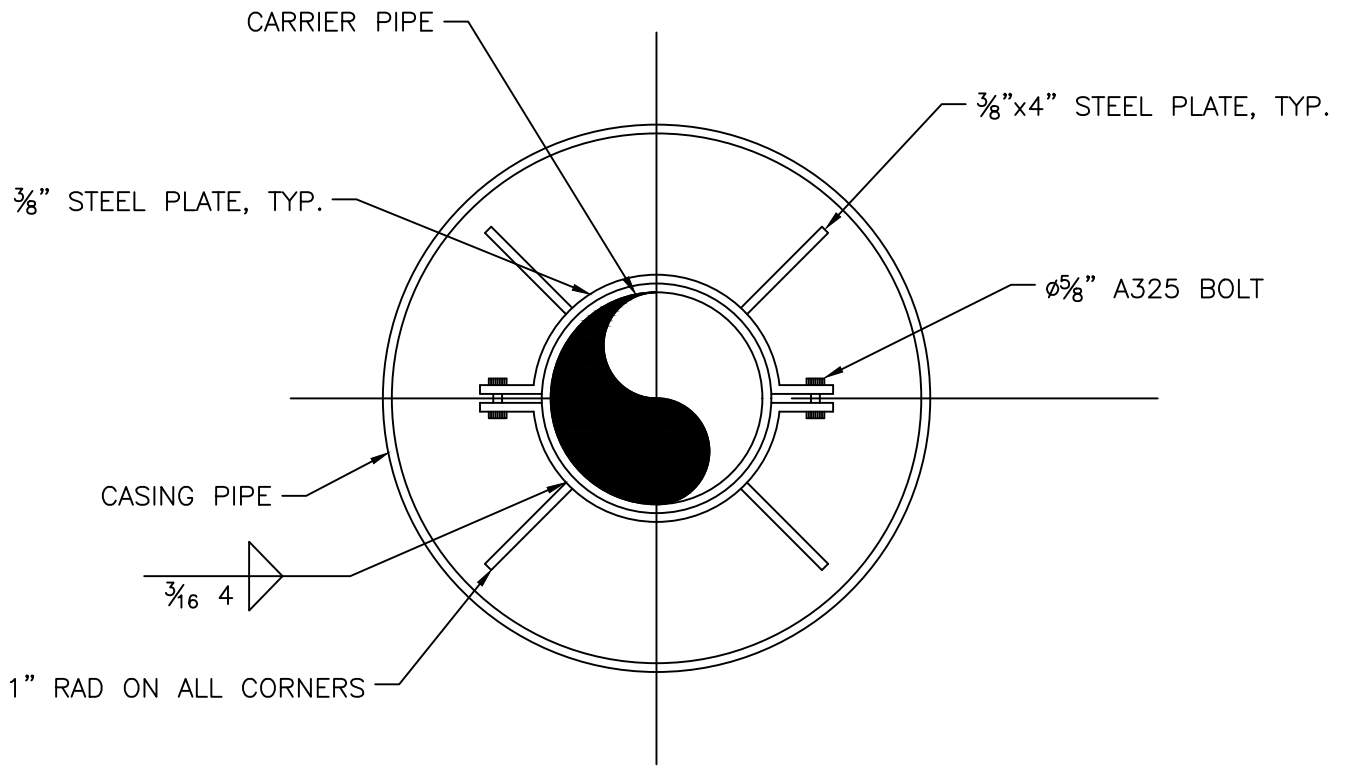
YARD/VAULT INSTALLATION FOR BUILDINGS BUILT ON SLAB AND OTHER LOCATIONS WHERE VALVE CANNOT BE INSTALLED IN BASEMENT OR CRAWL SPACE.

NOTES:

1. INSTALLATIONS OF GREATER THAN 4' IN DEPTH MAY REQUIRE MANHOLE.
2. VALVES MUST BE INSTALLED IN A LOCATION AT WHICH THEY CAN BE CLEANED AND SERVICED REGULARLY.

CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	TYPICAL SANITARY SEWER SERVICE BACKWATER VALVE INSTALLATION	
	<b>S-38</b>	





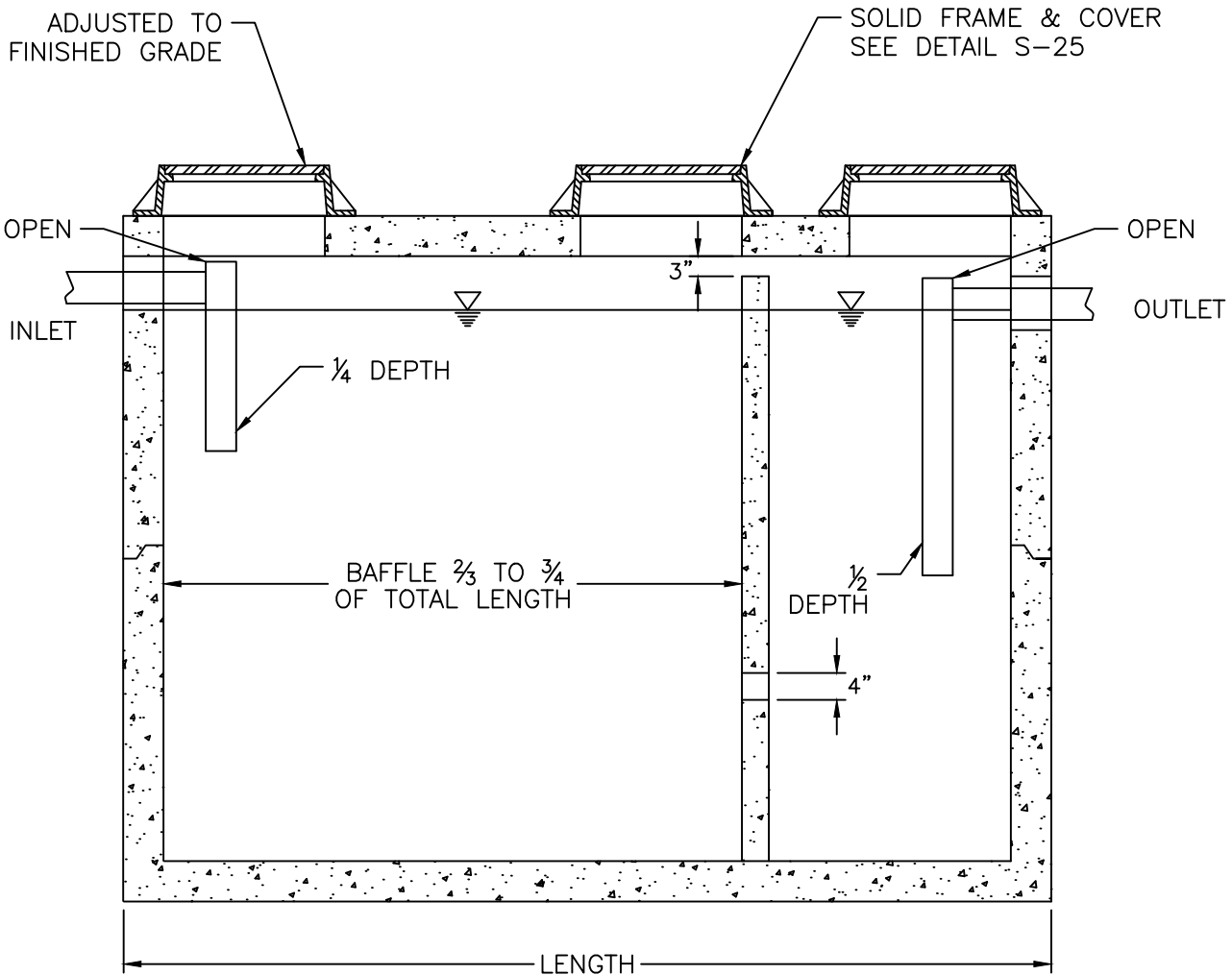
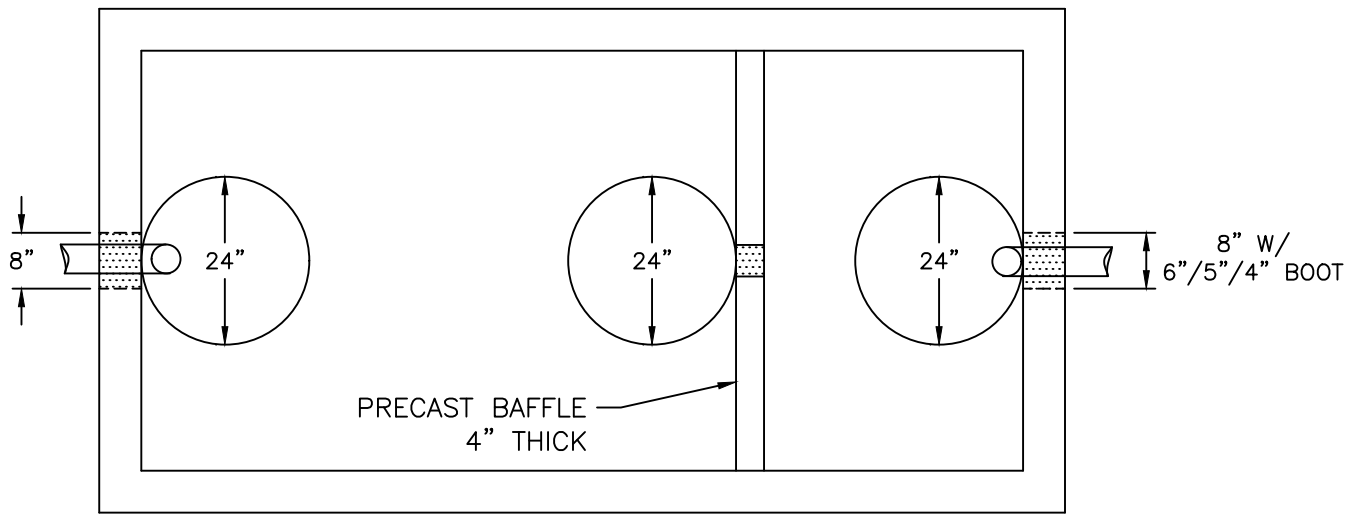
NOTE:  
 USE A MINIMUM OF TWO SPIDERS PER PIPE JOINT ONE FOURTH OF THE  
 PIPE JOINT LENGTH IN FROM BOTH THE BELL AND SPIGOT ENDS.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
-----------	------------------	--------------

PIPE ALIGNMENT GUIDE

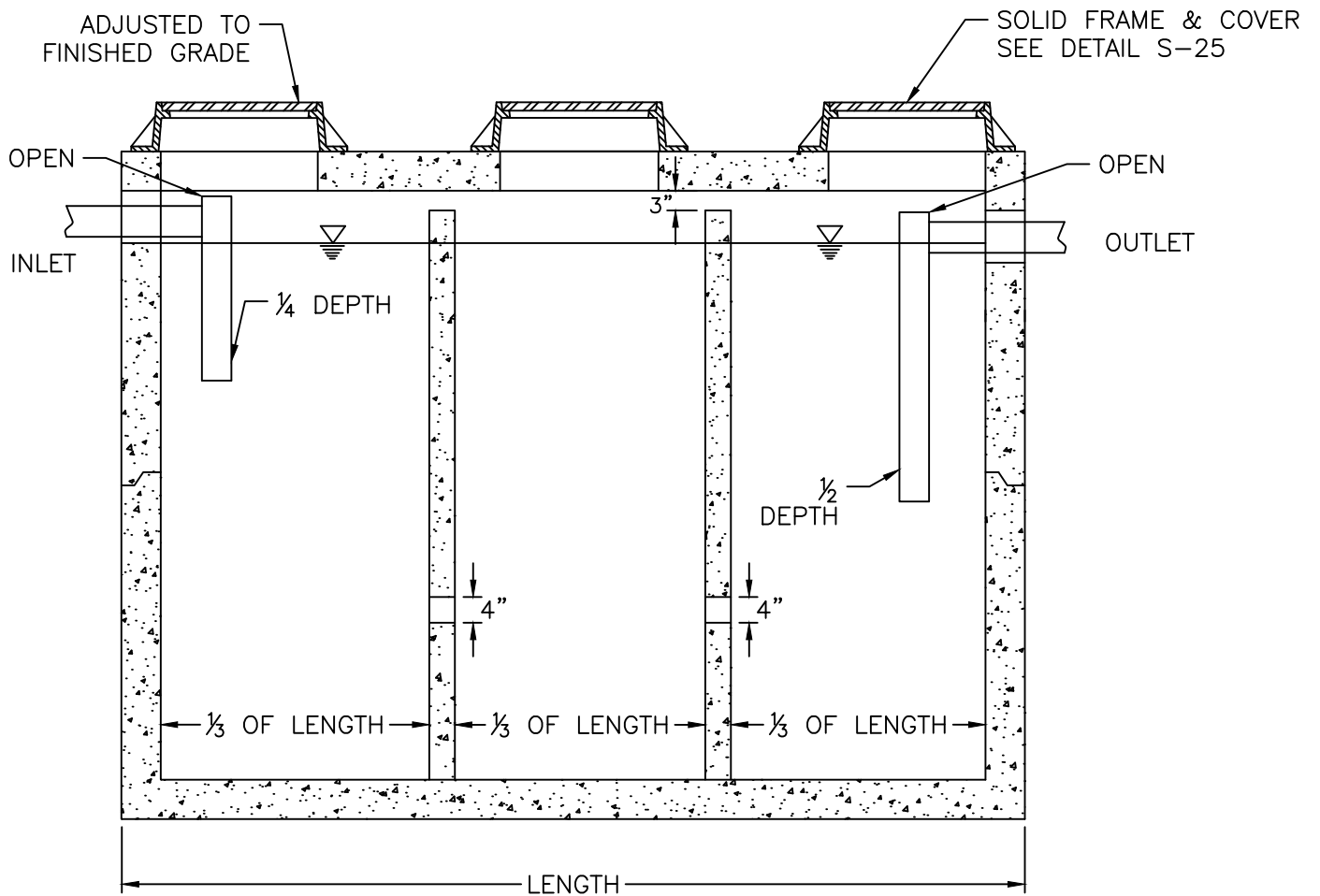
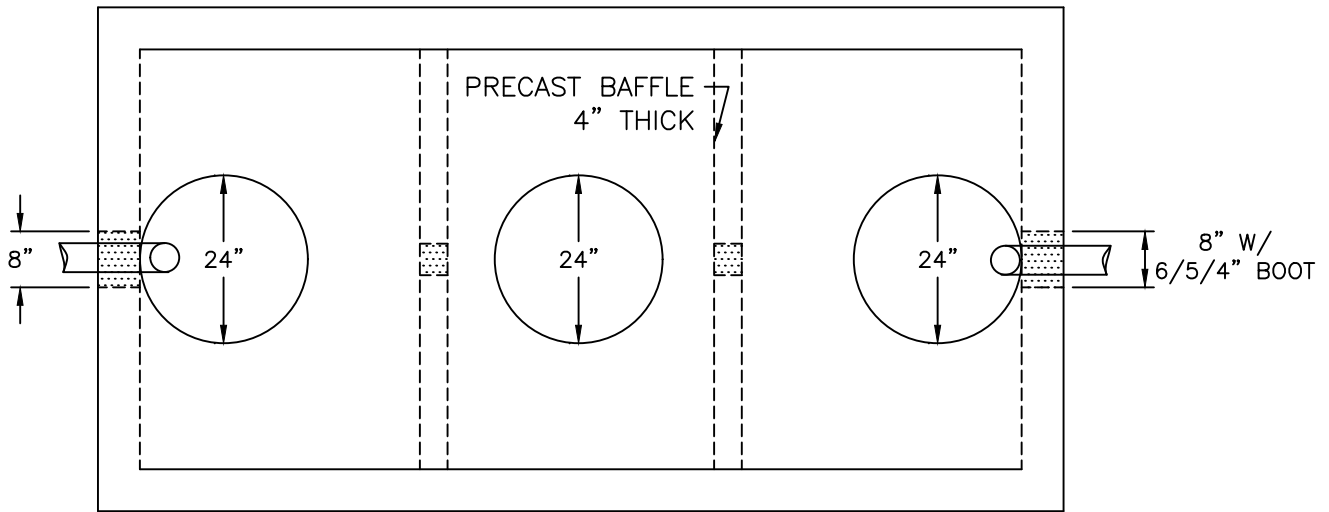
**S-39**



- NOTES:**
1. REINFORCEMENT: H-20 BRIDGE LOADING (TRAFFIC RATED).
  2. CONCRETE: 4,000 PSI @ 28 DAYS.
  3. EARTHCOVER: 0' TO 5' MAX.
  4. HDPE ALLOWED IN LIEU OF CONCRETE. MEET SAME LOADING REQUIREMENTS.

**CITY OF RALEIGH  
STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
1,000 GALLON GREASE INTERCEPTOR		
<b>S-40</b>		



**NOTES:**

1. REINFORCEMENT: H-20 BRIDGE LOADING (TRAFFIC RATED).
2. CONCRETE: 4,000 PSI @ 28 DAYS.
3. EARTHCOVER: 0' TO 5' MAX.
4. HDPE ALLOWED IN LIEU OF CONCRETE. MEET SAME LOADING REQUIREMENTS.

**CITY OF RALEIGH  
STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
<b>1,000 GALLON OIL-WATER-SAND SEPARATOR</b>		
<b>S-40A</b>		

LOCALLY AVAILABLE SIZES	
INTERCEPTORS CAPACITY (GAL.)	SEPARATORS CAPACITY (GAL.)
300	1,000
550	1,200
750	1,600
1,000	
1,200	
1,500	
2,000	
2,500	
3,000	
4,000	
5,000	
6,000	
8,000	

NOTES:

1. BAFFLE WALLS LOCATED AT A DISTANCE FROM INLET WALL  $\frac{2}{3}$  TO  $\frac{3}{4}$  OF THE TOTAL LENGTH OF THE INTERCEPTOR OR SEPARATOR AS SHOWN ON DETAIL S-40. BAFFLE WALLS LOCATED AT A DISTANCE APPROXIMATELY OF  $\frac{1}{3}$  OF THE TOTAL LENGTH OF THE SEPARATOR AS SHOWN ON DETAIL S-40A.
2. EACH INTERCEPTOR OR SEPARATOR SHALL HAVE INLET AND OUTLET TEES. THE OUTLET TEE SHALL EXTEND 50% INTO THE LIQUID DEPTH. THE INLET TEE SHALL EXTEND 25% INTO THE LIQUID DEPTH. INLET AND OUTLET TEES MUST BE OPEN TO ALLOW THE COLLECTION OF F.O.G. SAMPLE.
3. ACCESS OPENINGS OVER EACH COMPARTMENT WITHIN THE INTERCEPTOR OR SEPARATOR SHALL BE 24 INCHES IN DIAMETER AND CONTAIN PICK HOLES. ALL COVERS SHALL BE CONSTRUCTED OF CAST IRON OR EQUIVALENT TRAFFIC BEARING MATERIAL. MANHOLE COVERS MUST EXTEND TO FINISH GRADE AND BE INSTALLED TO EXCLUDE THE ENTRANCE OF STORMWATER INTO THE INTERCEPTOR OR SEPARATOR.
4. FULL SIZE DUAL SWEEP CLEANOUTS SHALL BE INSTALLED ON THE INLET AND OUTLET SIDES OF THE INTERCEPTOR OR SEPARATOR.
5. INTERCEPTORS AND SEPARATORS MUST BE VENTED IN ACCORDANCE WITH THE NC STATE PLUMBING CODE.
6. CONCRETE: 4,000 PSI @ 28 DAYS.
7. DESIGN: ACI 318 BUILDING CODE  
 ASTM C1613-06 FOR GREASE INTERCEPTORS  
 ASTM C913-02 FOR WATER AND WASTEWATER STRUCTURES  
 ASTM C890-06 FOR MINIMAL STRUCTURAL DESIGN LOADING
8. INTERCEPTORS AND SEPARATORS SHALL BE DESIGNED TO WITHSTAND AN H-20 WHEEL LOAD.
9. INTERCEPTORS OR SEPARATORS MADE OF POLYETHYLENE OR FIBERGLASS SHALL INCLUDE A MINIMUM 12,000 PSI TENSILE STRENGTH, 19,000 PSI FLEXURAL STRENGTH, AND 800,000 PSI FLEXURAL MODULUS.
10. ALL INTERCEPTORS AND SEPARATORS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS.

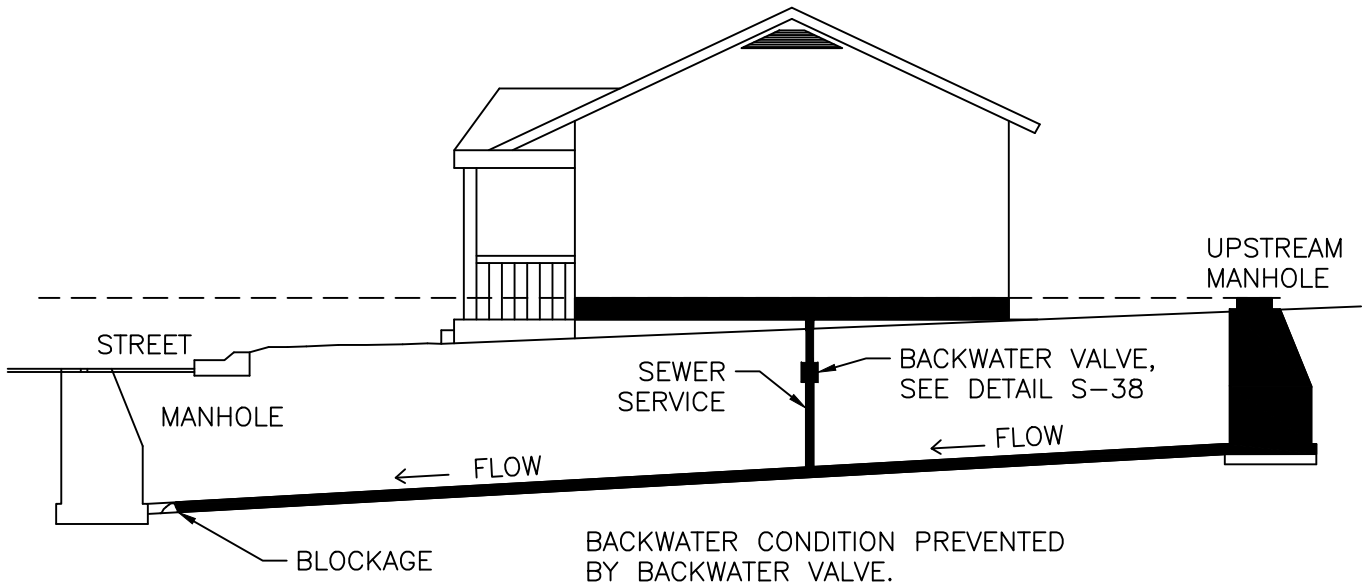
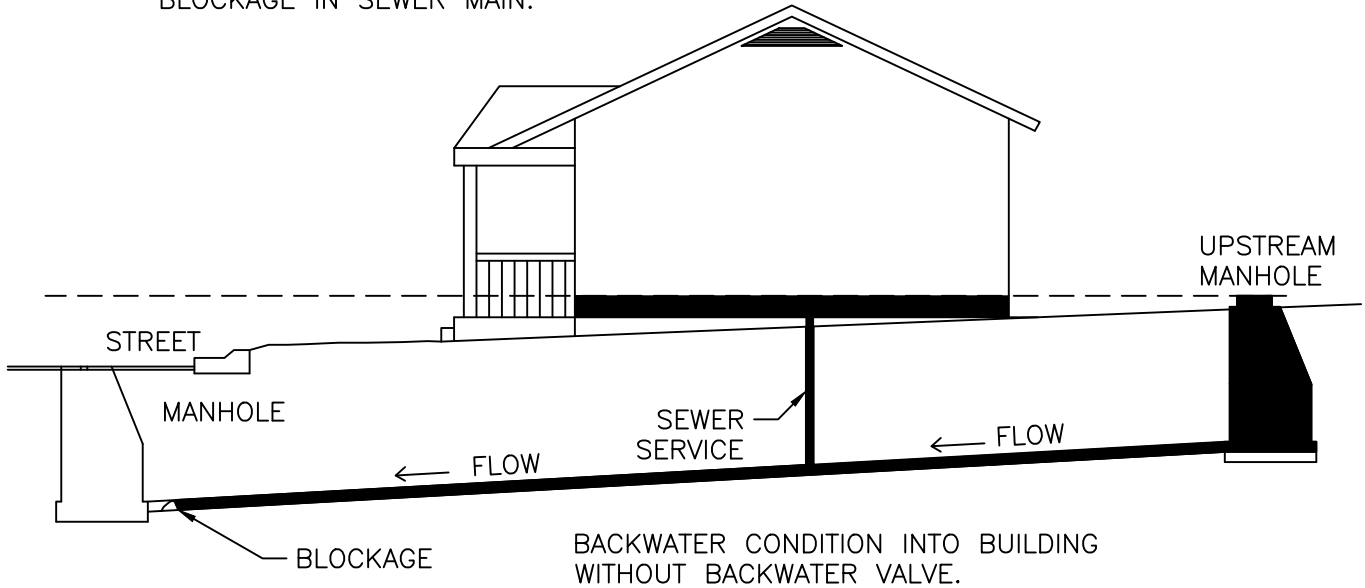
**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
-----------	------------------	--------------

	DIMENSIONS: GREASE INTERCEPTORS & OIL-WATER SAND SEPARATORS
--	---

**S-41**

BUILDING WITH NEXT UPSTREAM MANHOLE  
HIGHER THAN THE LOWEST DRAIN AND  
BLOCKAGE IN SEWER MAIN.



**CITY OF RALEIGH**  
**STANDARD DETAIL**

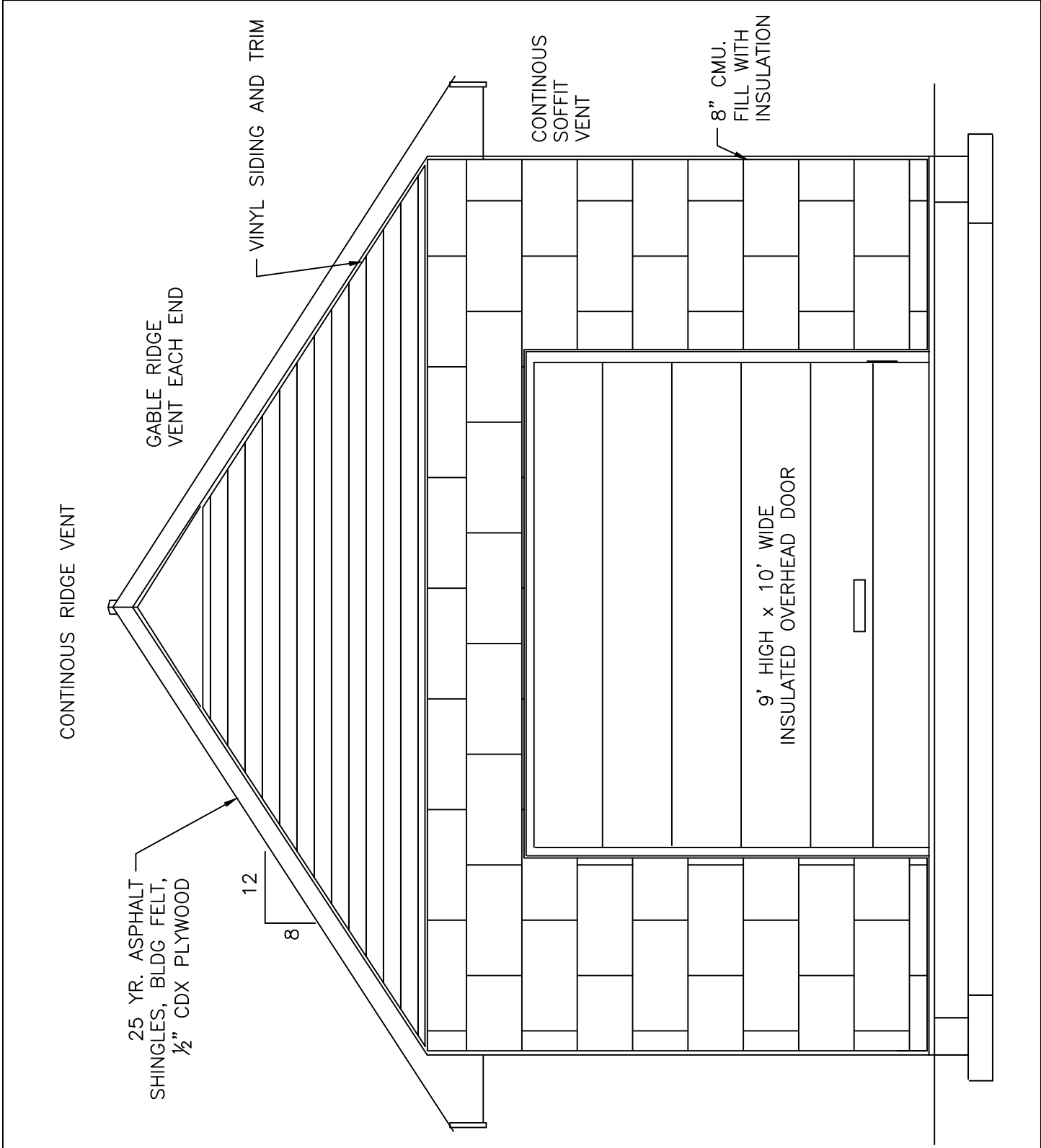
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
-----------	------------------	--------------

	TYPICAL SEWER SERVICE REQUIRING BACKWATER VALVE
--	---

**S-42**

NOT USED

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
		NOT USED
		<b>S-43</b>



- NOTES:
1. NOT TO SCALE.
  2. THIS IS A RENDERING ONLY. BUILDING PLANS MUST BE APPROVED.

**CITY OF RALEIGH  
STANDARD DETAIL**

<i>REVISIONS</i>	<i>DATE: 05/24/2024</i>	<i>NOT TO SCALE</i>
------------------	-------------------------	---------------------

	STANDARD ODOR CONTROL BLDG. FRONT ELEVATION
--	--

**S-44**

CONTINUOUS RIDGE VENT

25 YR. ASPHALT  
SHINGLES, BLDG FELT,  
1/2" CDX PLYWOOD

8" CMU.  
FILL WITH  
INSULATION

3'x7' 18GA.  
INS. STEEL  
DOOR

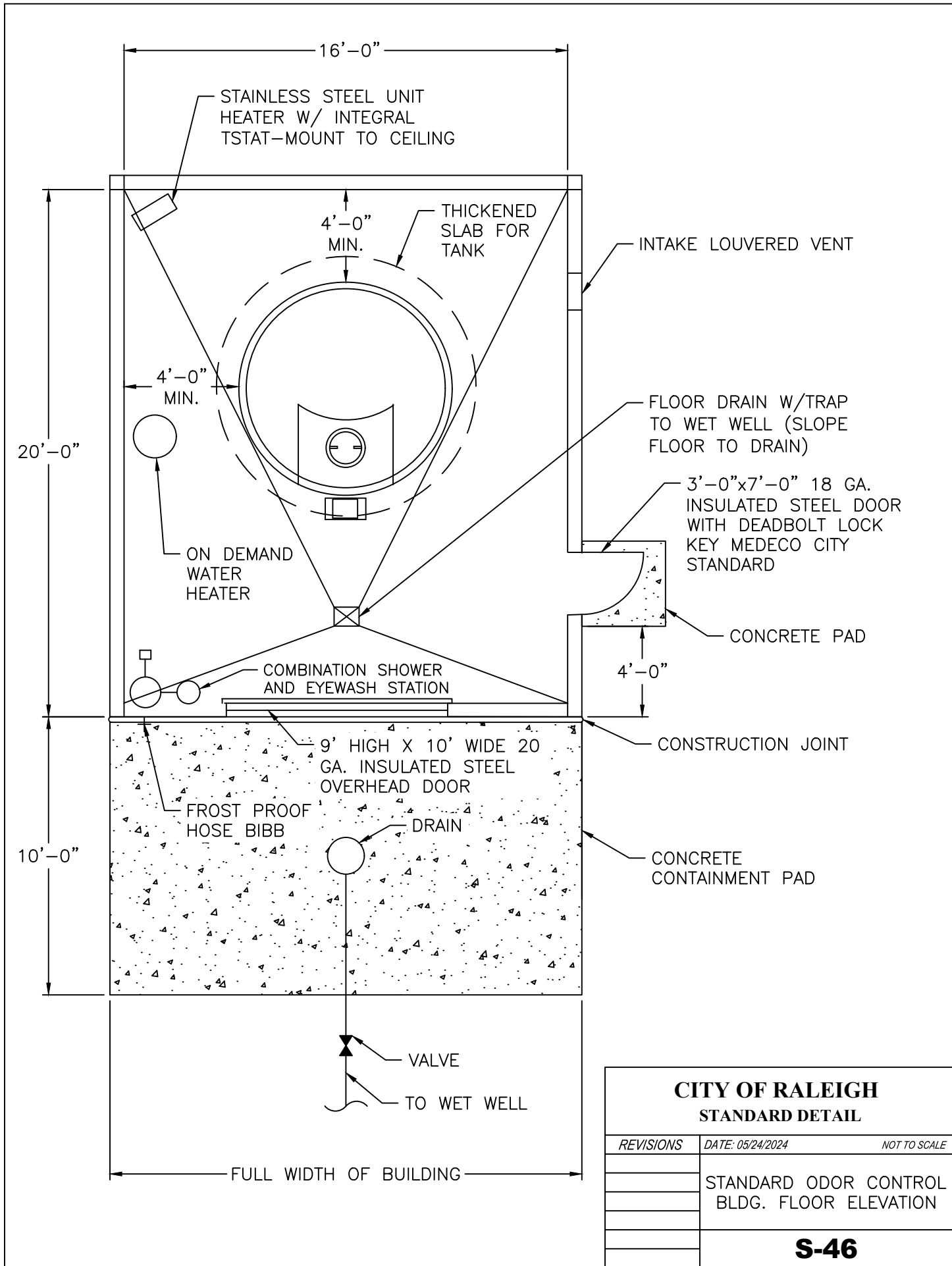
**CITY OF RALEIGH  
STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
-----------	------------------	--------------

STANDARD ODOR CONTROL  
BLDG. SIDE ELEVATION

**S-45**





STAINLESS STEEL UNIT  
HEATER W/ INTEGRAL  
TSTAT—MOUNT TO CEILING

4'-0"  
MIN.

THICKENED  
SLAB FOR  
TANK

INTAKE LOUVERED VENT

4'-0"  
MIN.

FLOOR DRAIN W/TRAP  
TO WET WELL (SLOPE  
FLOOR TO DRAIN)

20'-0"

ON DEMAND  
WATER  
HEATER

3'-0"x7'-0" 18 GA.  
INSULATED STEEL DOOR  
WITH DEADBOLT LOCK  
KEY MEDECO CITY  
STANDARD

COMBINATION SHOWER  
AND EYEWASH STATION

CONCRETE PAD

4'-0"

CONSTRUCTION JOINT

9' HIGH X 10' WIDE 20  
GA. INSULATED STEEL  
OVERHEAD DOOR

FROST PROOF  
HOSE BIBB

DRAIN

CONCRETE  
CONTAINMENT PAD

10'-0"

VALVE

TO WET WELL

FULL WIDTH OF BUILDING

**CITY OF RALEIGH  
STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
-----------	------------------	--------------

STANDARD ODOR CONTROL  
BLDG. FLOOR ELEVATION

**S-46**

CEILING MOUNT 1500W  
ELECTRIC UNIT HEATER  
W/INTEGRAL THERMOSTAT

WALL MOUNTED  
EXHAUST FAN

INTAKE  
LOUVERED  
VENT

4' INDUSTRIAL  
FLUORESCENT  
LIGHT FIXTURE

DOUBLE WALL  
CHEMICAL TANK

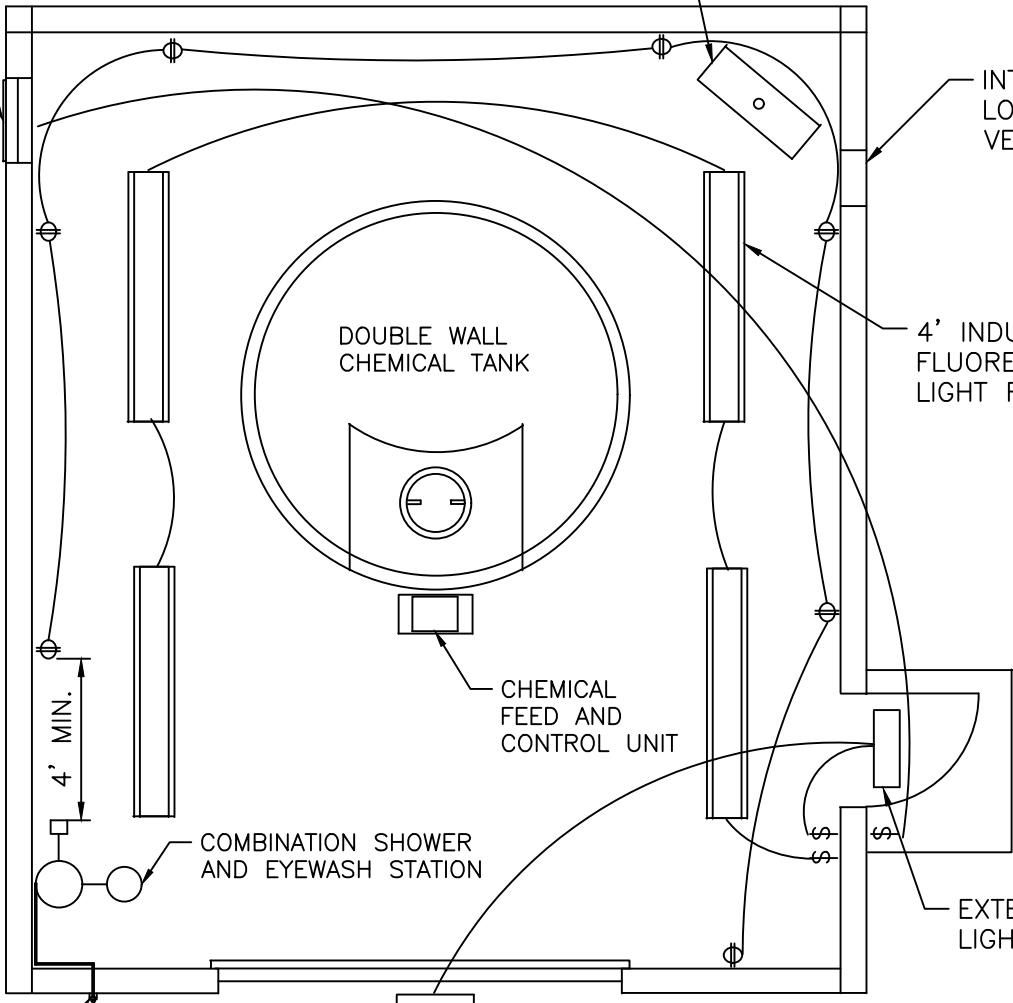
CHEMICAL  
FEED AND  
CONTROL UNIT

COMBINATION SHOWER  
AND EYEWASH STATION

EXTERIOR  
LIGHT

NON-FREEZE  
HOSE BIBB

EXTERIOR LIGHT

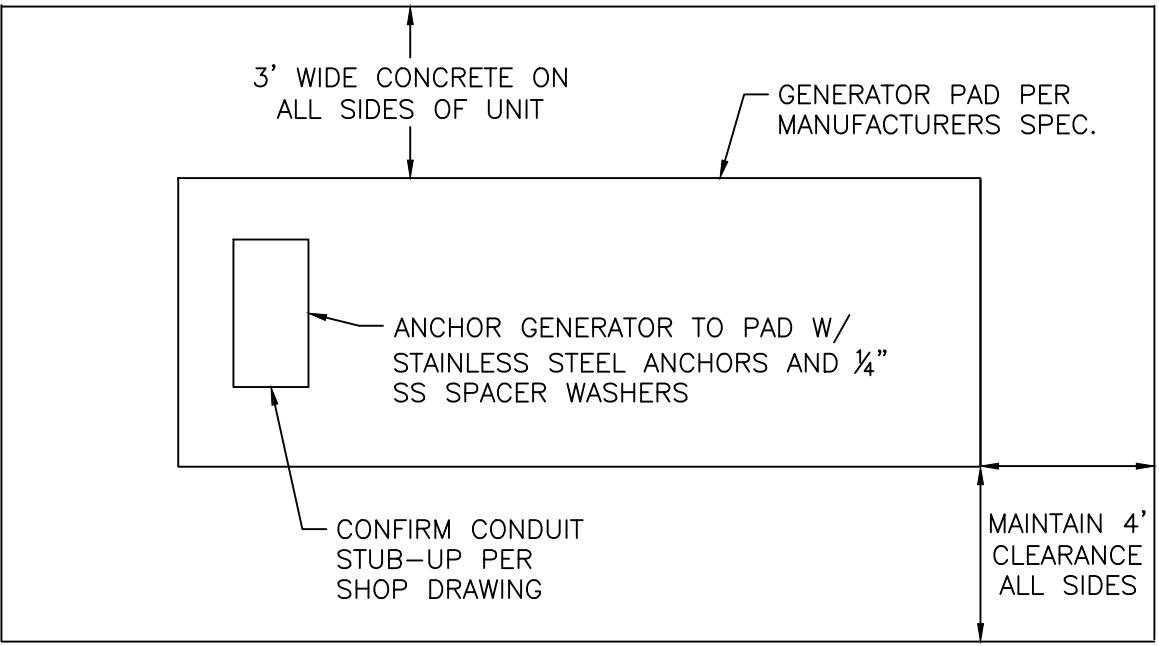
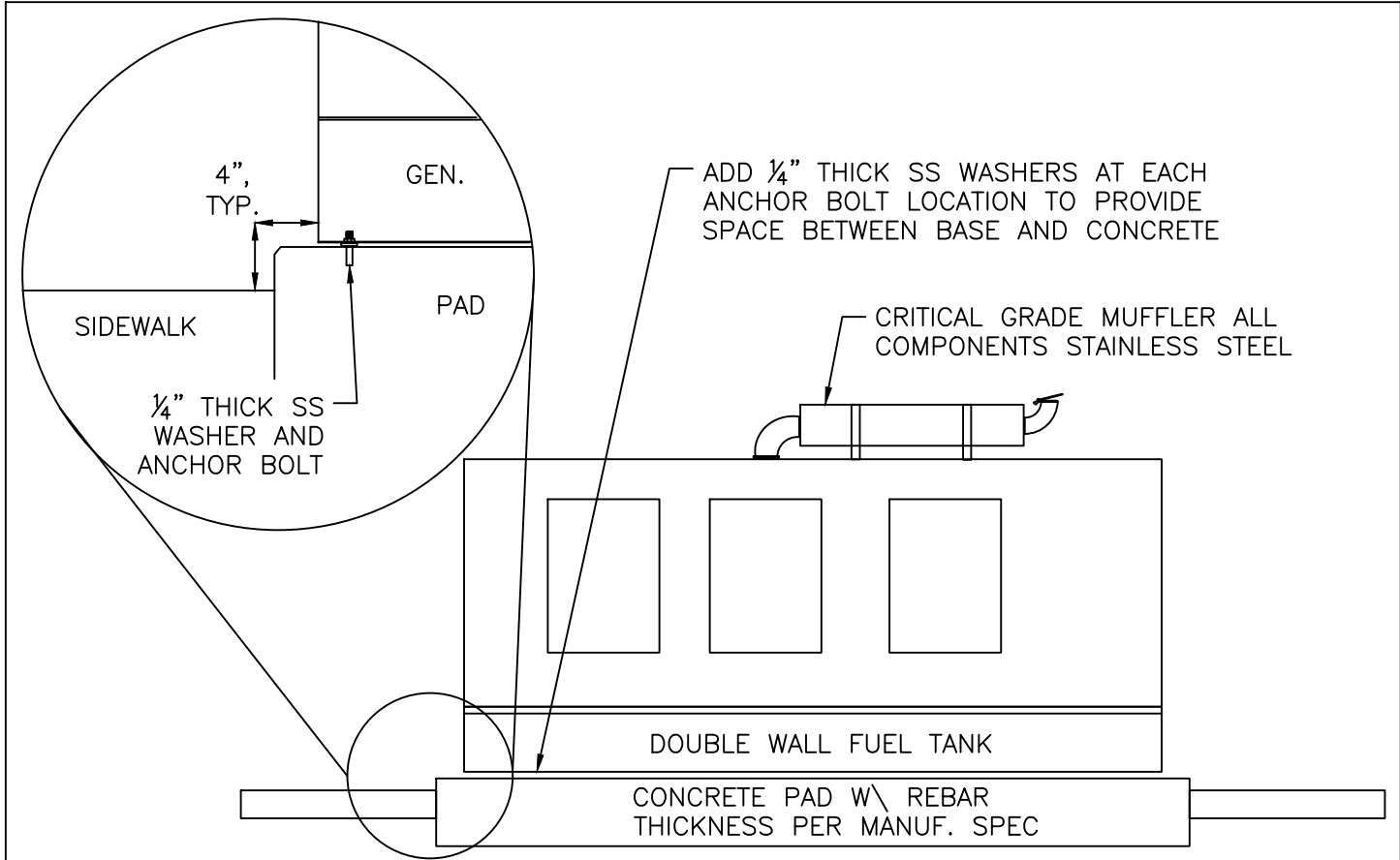


**CITY OF RALEIGH  
STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
-----------	------------------	--------------

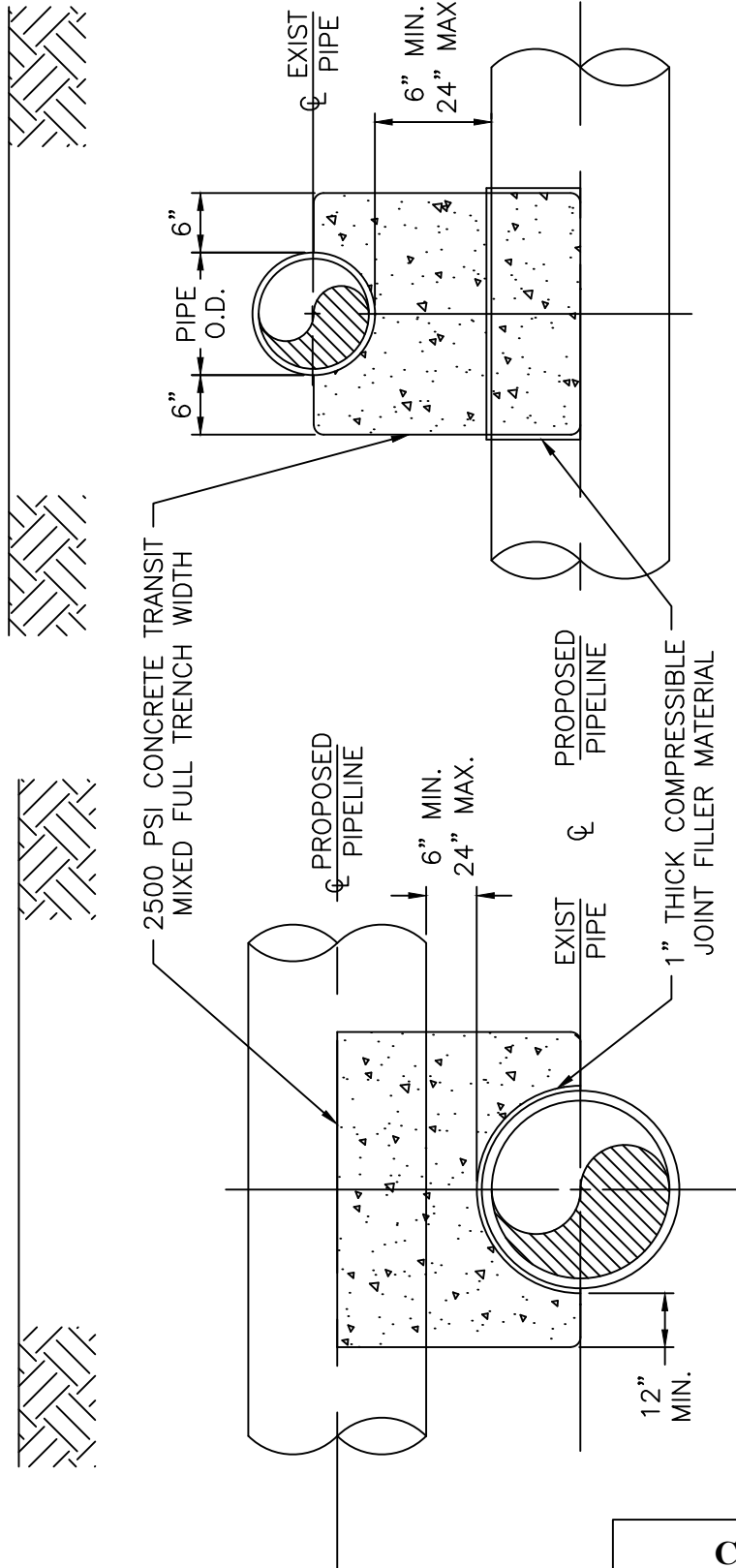
STANDARD ODOR CONTROL BLDG. MECHANICAL & ELECTRICAL
---

**S-47**



CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	GENERATOR PAD	
	<b>S-48</b>	

NOTE:  
NO ENCASEMENT REQUIRED FOR SPACE  
GREATER THAN 24" FOR SEWER LINES.



PROPOSED PIPELINE  
UNDER EXISTING PIPE

PROPOSED PIPELINE OVER  
EXISTING PIPE

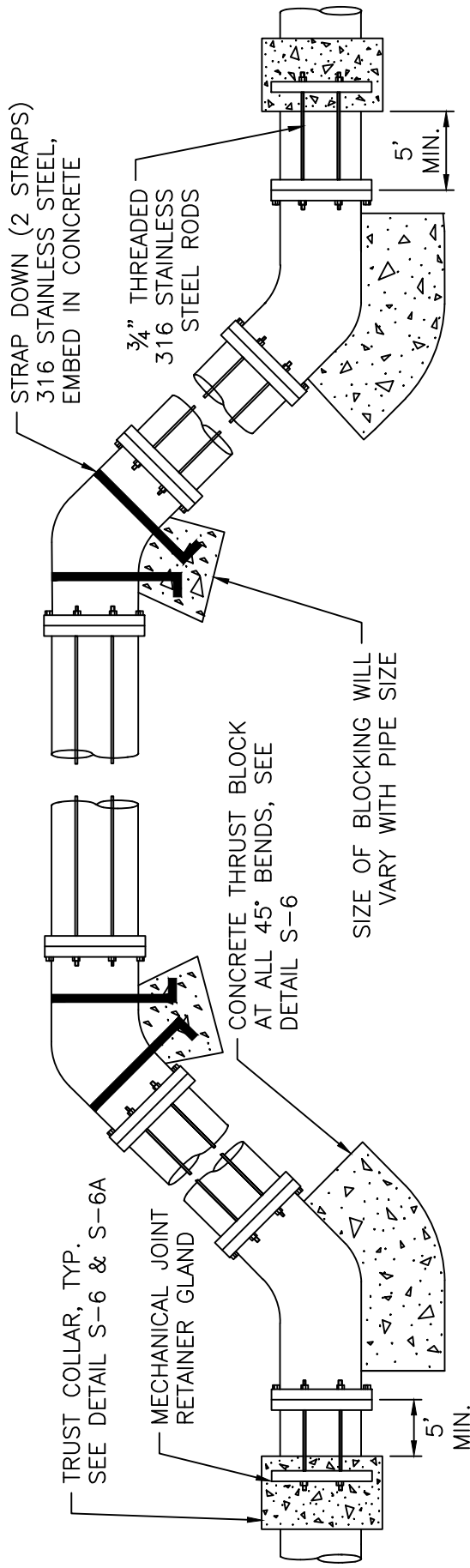
**CITY OF RALEIGH  
STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
-----------	------------------	--------------

CONCRETE CRADLE  
PROTECTION FOR SEWER  
LINE CROSSINGS

**S-49**

TOP OF GROUND



ROD REQUIREMENTS

SIZE OF 45° BEND	STATIC TRUST IN POUNDS	NO. OF RODS REQUIRED
6"	4,328	2
8"	7,694	4
12"	17,312	4
16"	30,779	8
24"	69,252	8

STRAP REQUIREMENTS

STRAP WIDTH	STRAP THICKNESS
1"	3/16"
1.5"	3/16"
2"	1/4"
2"	1/2"
4"	1/2"

RESTRAINT REQUIREMENTS

PIPE DIA	RODDING	RJ GLANDS	THRUST COLLAR	THRUST BLOCKING
<12"	X	X	X	
≥12"	X	X	X	X

"X" DENOTES REQUIRED RESTRAINT.

NOTES:

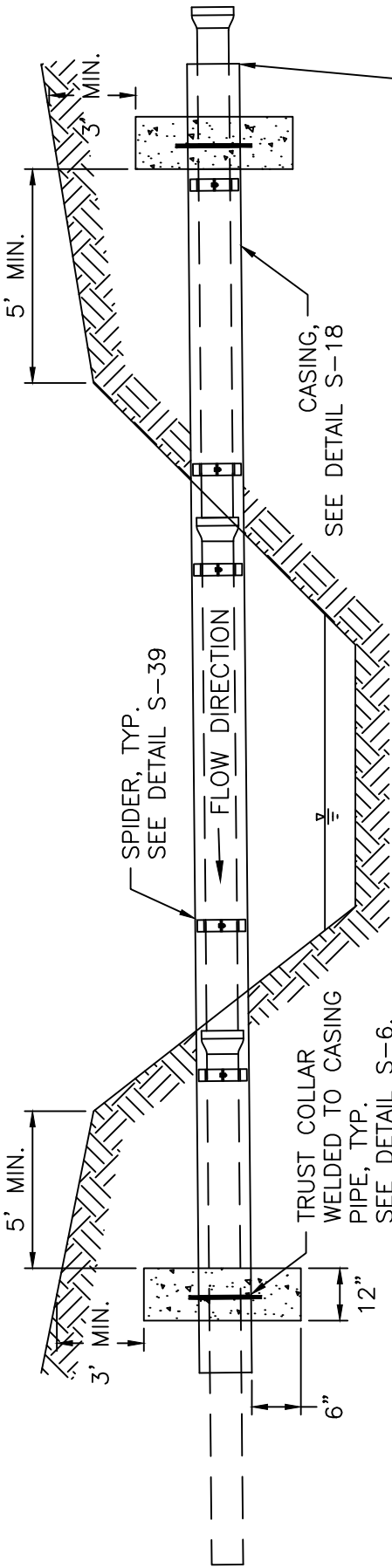
1. STEEL RODS AND BOLTS SHALL BE 3/4" 316 STAINLESS STEEL.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT BENDS.
3. RESTRAINED MECHANICAL GLANDS TO BE USED AT ALL FITTINGS.
4. MUST USE DUCTILE IRON EYE BOLTS WHERE NECESSARY.
5. 3' MINIMUM COVER MUST BE MAINTAINED.
6. EXTERNAL RESTRAINT REQUIRED. INTEGRAL BELL RESTRAINT REQUIRES DIRECTOR'S APPROVAL.

CITY OF RALEIGH  
STANDARD DETAIL

REVISIONS      DATE: 05/24/2024      NOT TO SCALE

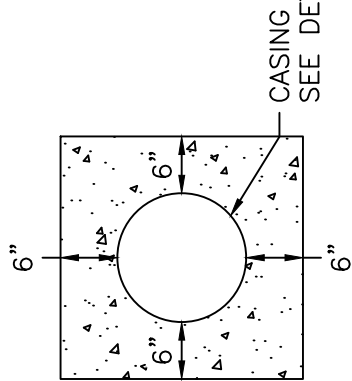
STANDARD VERTICAL BEND

**S-50**



PROFILE VIEW

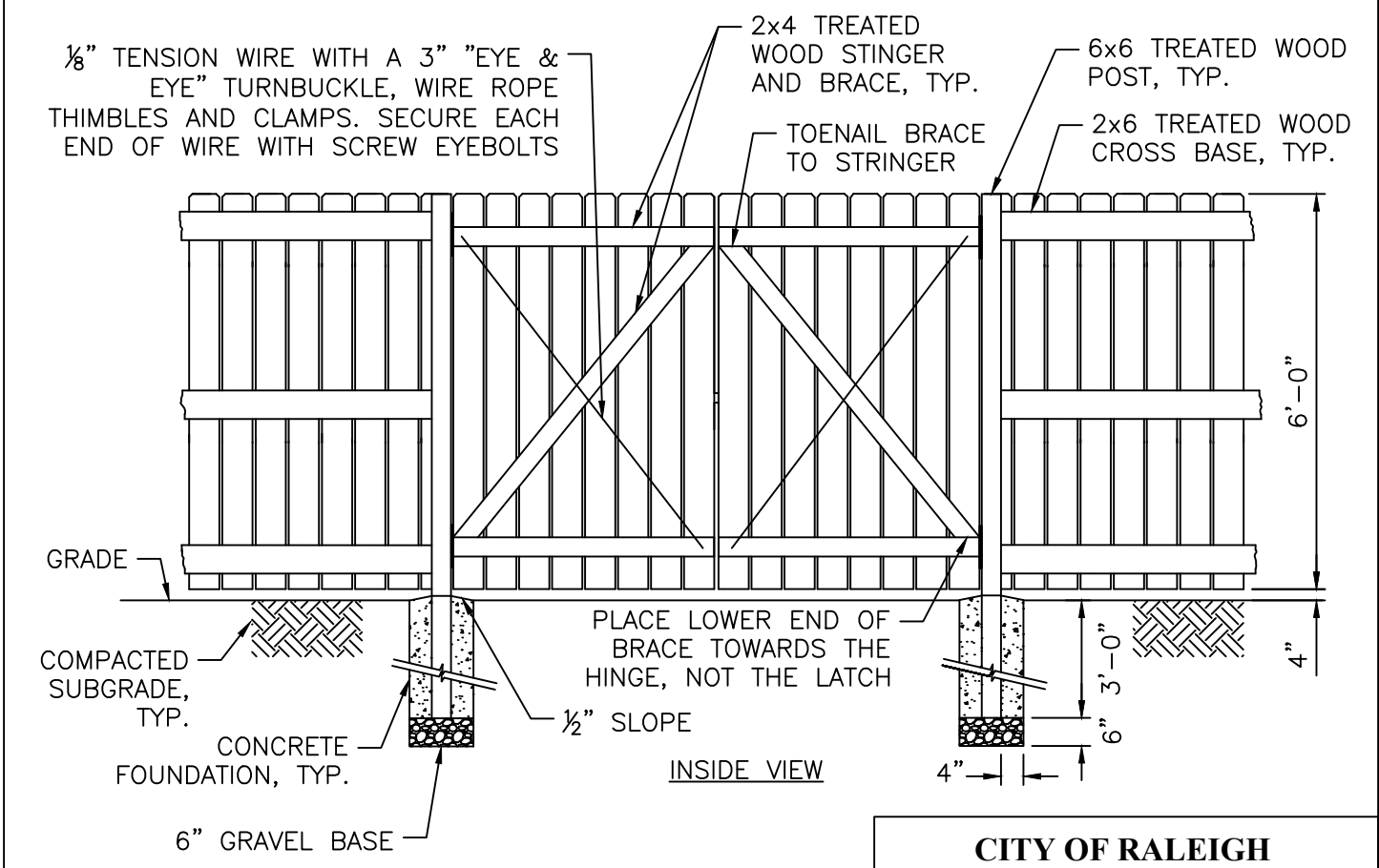
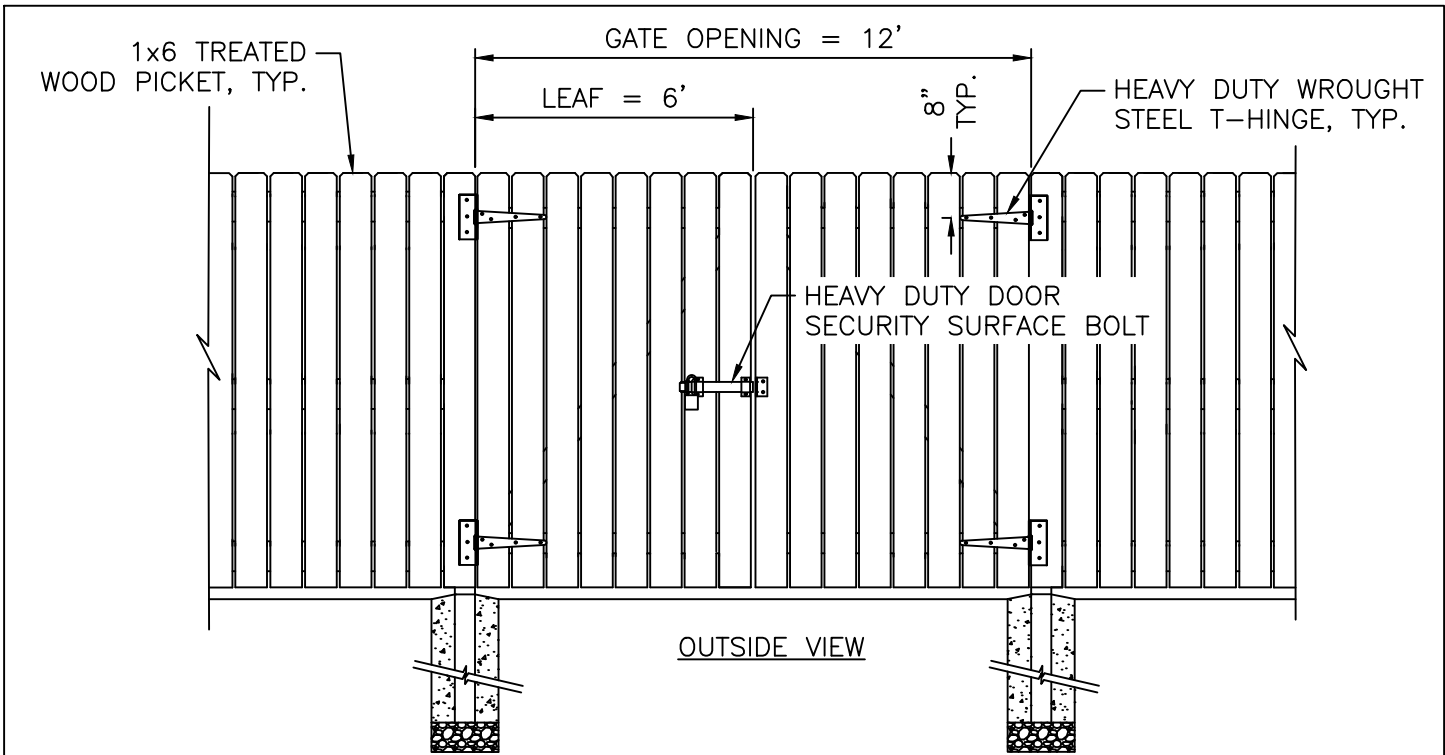
GROUT CASING ENDS, SEE DETAIL S-18. 1" DRAIN INTO WASHED STONE REQUIRED AT LOW END



CONCRETE COLLAR

- NOTES:
1. FOR CROSSINGS OF LESS THAN 10' NO CASING IS REQUIRED IF THE JOINT OF PIPE IS CENTERED ON THE CROSSING.
  2. THRUST COLLAR MAY BE FIELD WELDED ON STEEL CASING PIPE. IF NO CASING IS REQUIRED THE THRUST COLLAR MUST BE FACTORY WELDED ON DIP CARRIER PIPE.

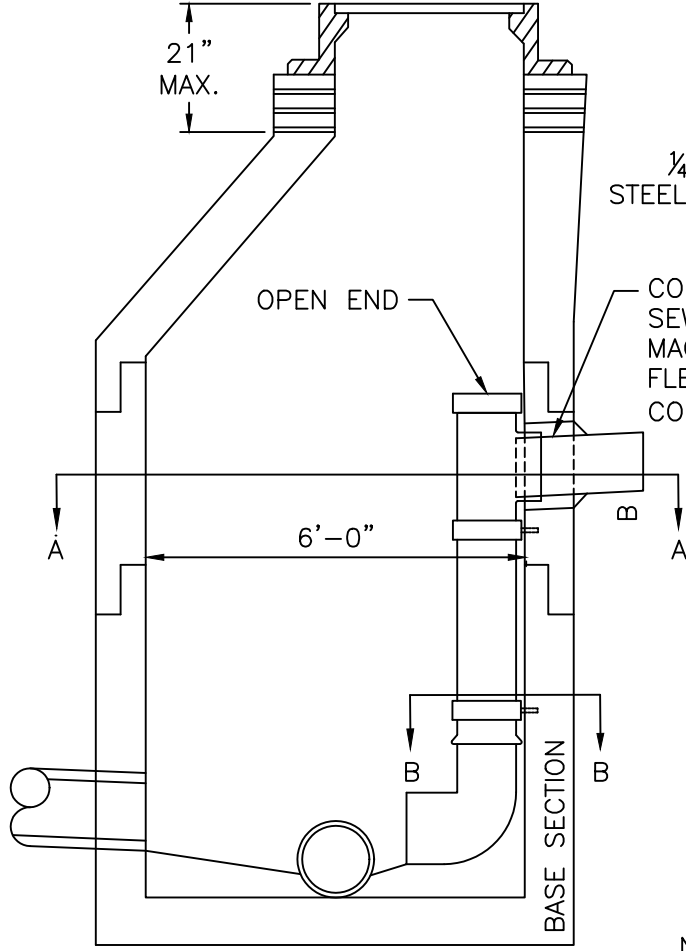
CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	AERIAL SEWER SERVICE	
<b>S-51</b>		



- NOTES:
1. INSTALL 1x6 BOARDS VERTICALLY.
  2. 2x6'S MAY SLOPE OR BE HORIZONTAL TO ACCOUNT FOR GRADE CHANGES.
  3. SPACE 1x6 BOARDS EQUALLY (3/8" MAX).

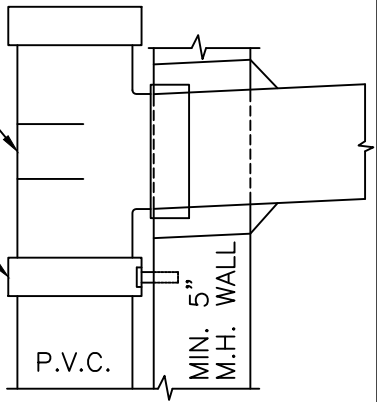
CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	WOODEN FENCE GATE	
	<b>S-52</b>	

4" MIN. VERTICAL CLEARANCE FROM MANHOLE WALL JOINT

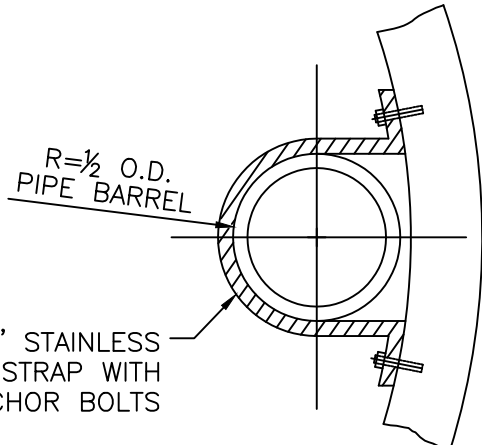


1/4"x2" STAINLESS STEEL STRAP WITH 2 ANCHOR BOLTS

CORE HOLE FOR INFLUENT SEWER WITH CORING MACHINE AND INSTALL FLEXIBLE RUBBER COUPLING, SEE NOTE #4



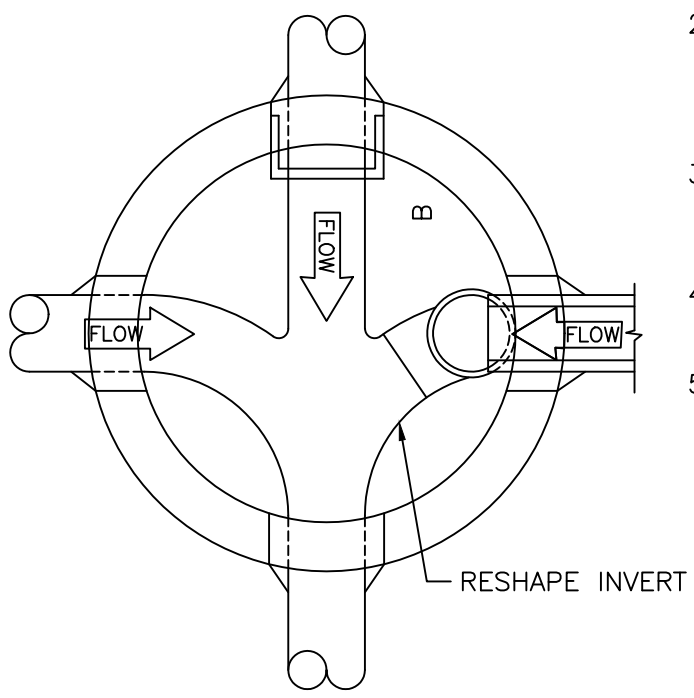
ENLARGED DETAIL



SECTION B-B

NOTES:

1. PIPE FOR INSIDE DROP SHALL BE SDR 35 PVC CONFORMING TO ASTM SPECIFICATION D3034.
2. BOTTOM BEND TO BE 90° SHORT BEND, BELL SPIGOT, OF SDR 35 PVC. SPIGOT OF BEND TO REST DIRECTLY ON EXISTING SHELF. CONSTRUCT MASONRY TROUGH FROM DROP EFFLUENT TO MAIN CHANNEL.
3. LOCATE STRAPS AT TEE AND ABOVE BELL OF 90° BEND AS SHOWN. ADD EXTRA STRAPS AS NECESSARY TO MAINTAIN MAXIMUM SPACING OF TEN FEET.
4. HOLE IN MANHOLE WALL TO BE MADE WITH A CORING MACHINE. INSTALL FLEXIBLE RUBBER COUPLING.
5. CORE HOLE SHALL NOT ENTER CONE SECTION.



SECTION A-A

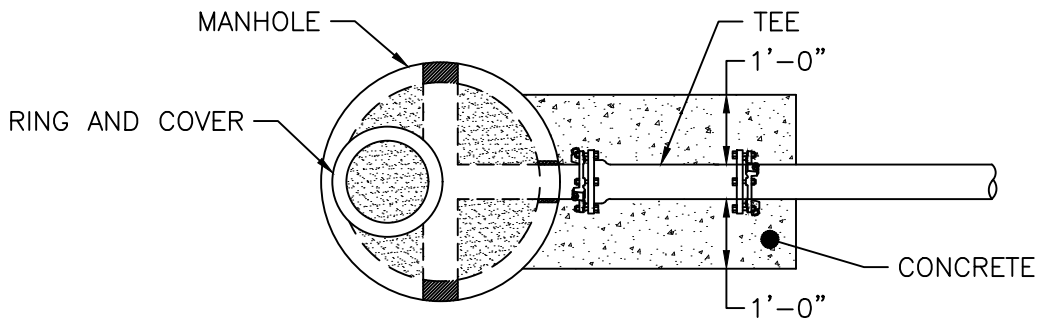
**CITY OF RALEIGH  
STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE

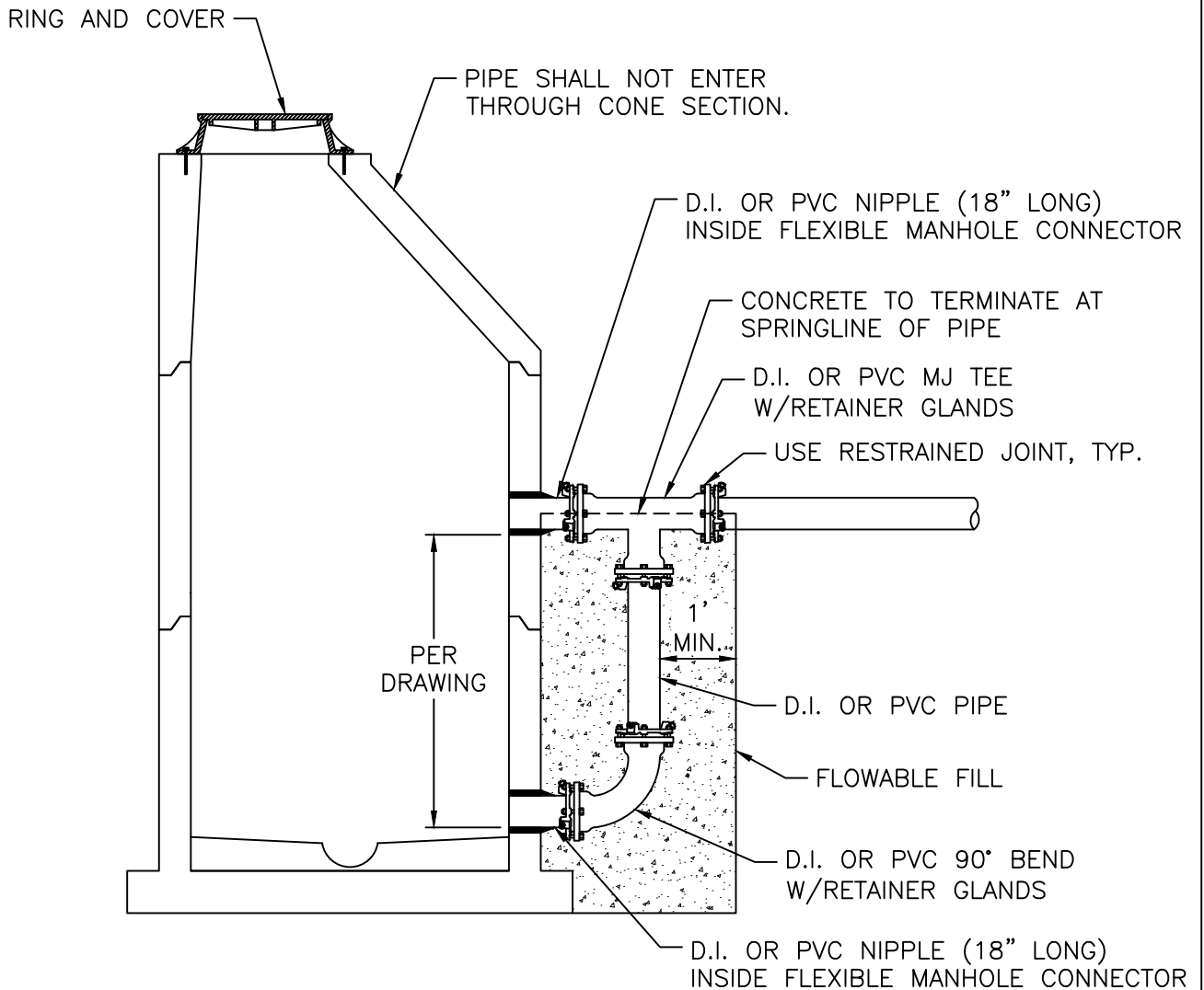
INSIDE DROP MANHOLE

**S-53**





PLAN VIEW



SECTION VIEW

NOTES:

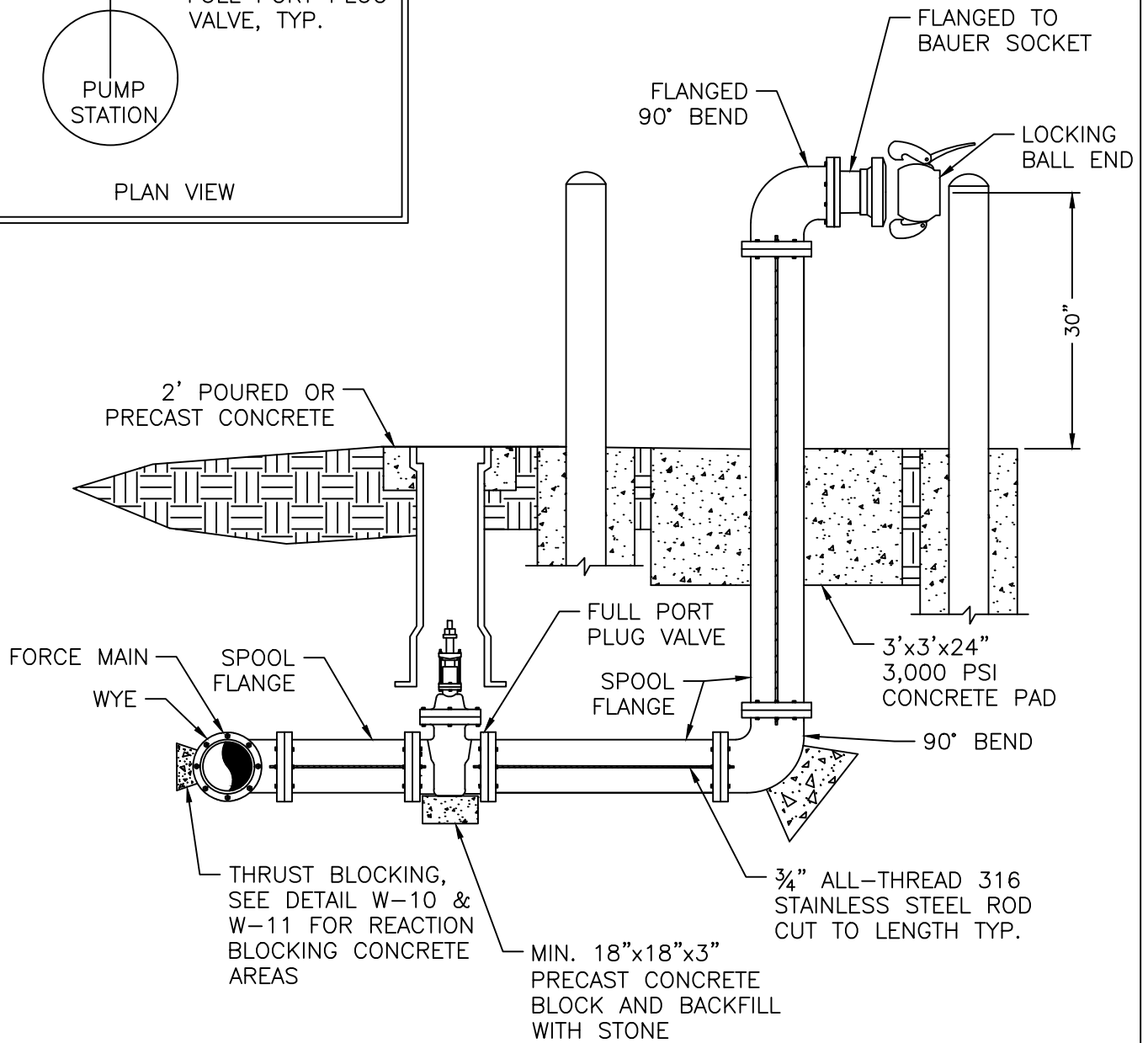
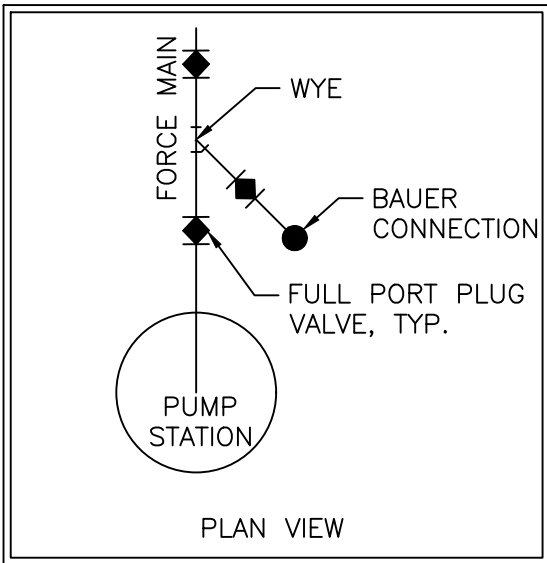
1. ENCASE ENTIRE DROP ASSEMBLY IN CONCRETE. 1' MINIMUM CONC. COVER ON EACH SIDE AND BOTTOM.

**CITY OF RALEIGH  
STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
-----------	------------------	--------------

OUTSIDE DROP MANHOLE

**S-54**

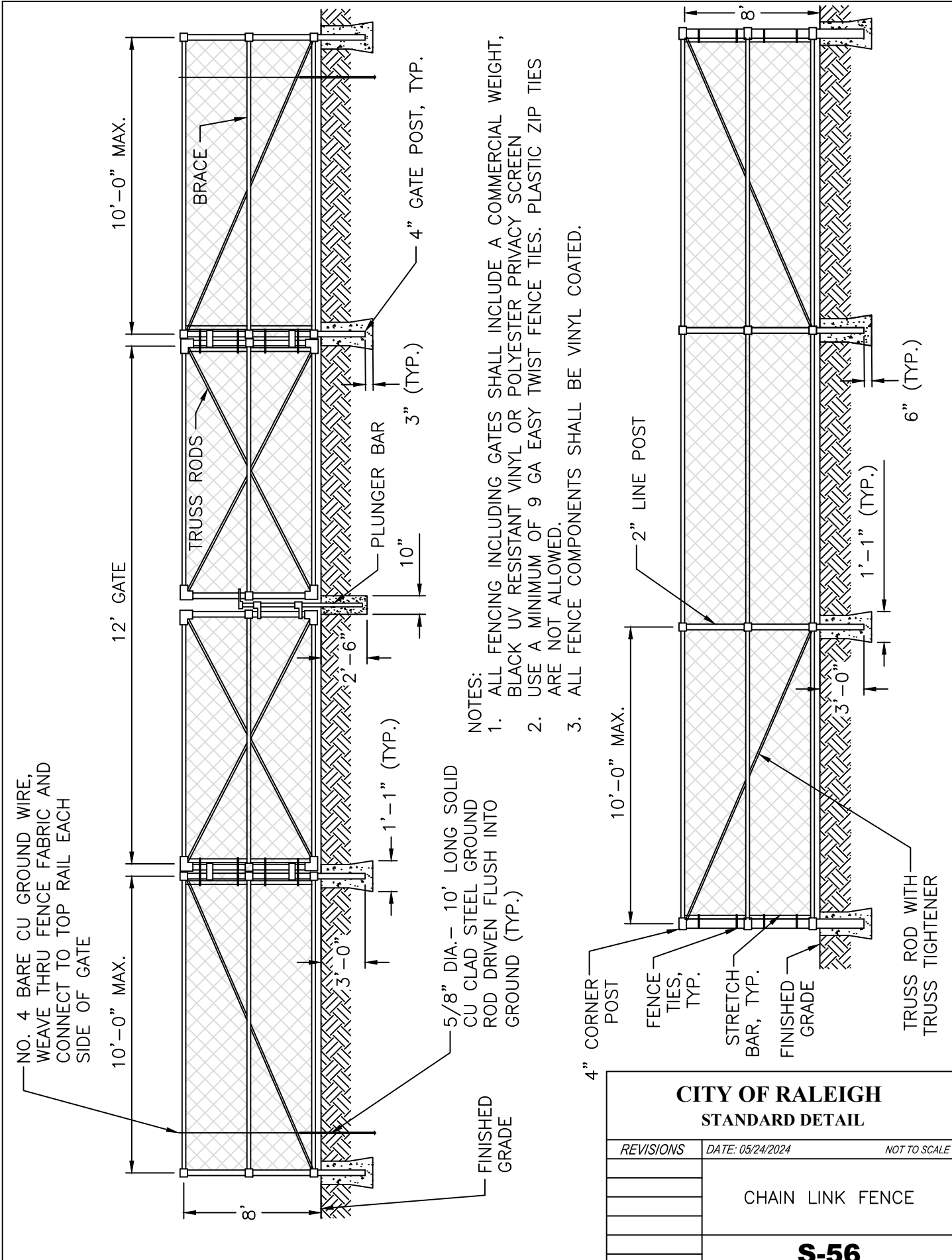


**NOTES:**

1. BYPASS DIAMETER SHALL MATCH FM DIAMETER UNLESS APPROVED BY RALEIGH WATER.
2. THE DESIGN ENGINEER SHALL LAYOUT BYPASS CONNECTION RISER TO PREVENT MAINTENANCE ACCESS CONFLICTS WITH THE PUMP STATION.

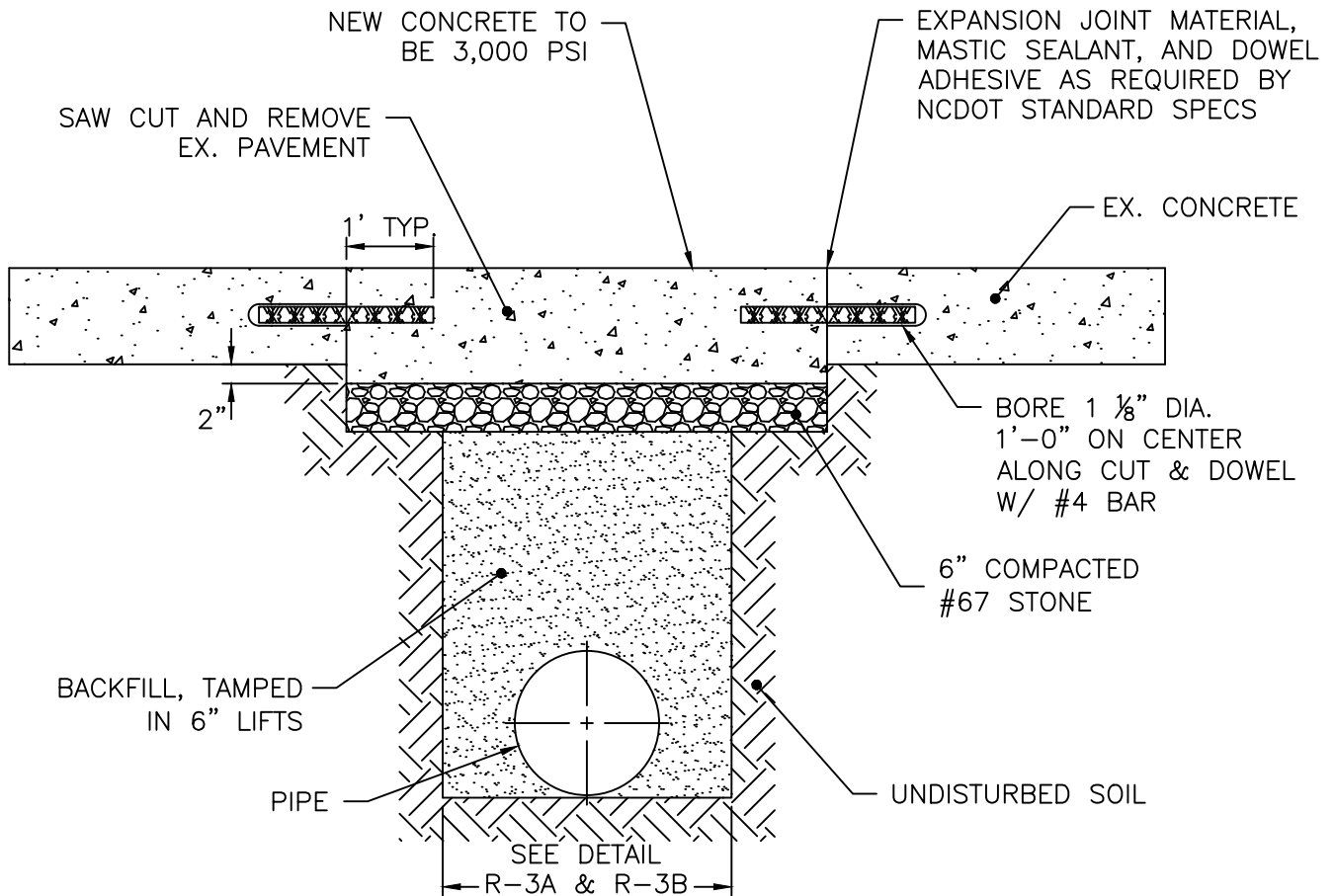
**CITY OF RALEIGH  
STANDARD DETAIL**

REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	BYPASS CONNECTION FOR PUMP STATIONS AND FORCE MAINS	
<b>S-55</b>		



- NOTES:
1. ALL FENCING INCLUDING GATES SHALL INCLUDE A COMMERCIAL WEIGHT, BLACK UV RESISTANT VINYL OR POLYESTER PRIVACY SCREEN
  2. USE A MINIMUM OF 9 GA EASY TWIST FENCE TIES. PLASTIC ZIP TIES ARE NOT ALLOWED.
  3. ALL FENCE COMPONENTS SHALL BE VINYL COATED.

CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 05/24/2024	NOT TO SCALE
	CHAIN LINK FENCE	
<b>S-56</b>		



**NOTES:**

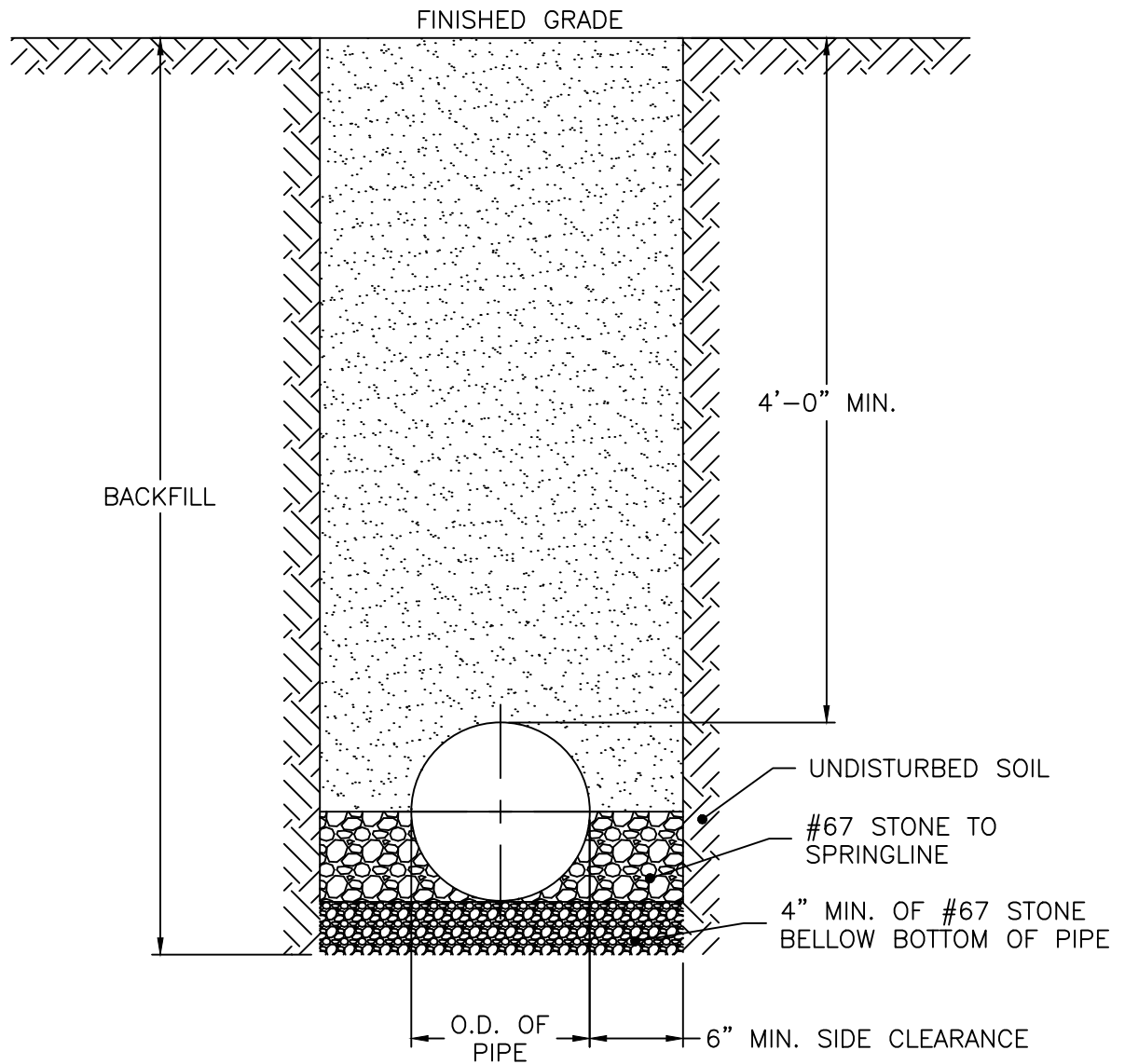
1. SEE DETAIL R-3A & R-3B FOR ADDITIONAL TRENCH AND PIPE BEDDING DETAILS.
2. PAVEMENT CUTS WITHIN NCDOT ROW SHALL CONFORM TO THE APPROVED ON SITE ENCROACHMENT PERMIT.
3. THE PAVEMENT CUT SHALL BE DEFINED BY A STRAIGHT EDGE AND CUT WITH AN APPROVED SAW CUT MACHINE.
4. THE TRENCH SUBGRADE MATERIAL SHALL BE BACKFILLED WITH SUITABLE MATERIAL AND COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY AASHTO T 99 AS MODIFIED BY NCDOT.
5. THE FINAL 6" OF FILL SHALL CONSIST OF ABC MATERIAL COMPACTED TO AT LEAST 100% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY AASHTO T 180 AS MODIFIED BY NCDOT.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
	STANDARD CONCRETE PAVEMENT PATCH	
	<b>R-1</b>	

SEE TRANSPORTATION DETAIL  
T-10.05.1 FOR ASPHALT REPAIR

SEE TRANSPORTATION DETAIL  
T-10.05.2 FOR ASPHALT REPAIR EXTENTS

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
	STANDARD ASPHALT PAVEMENT PATCH	
	<b>R-2</b>	

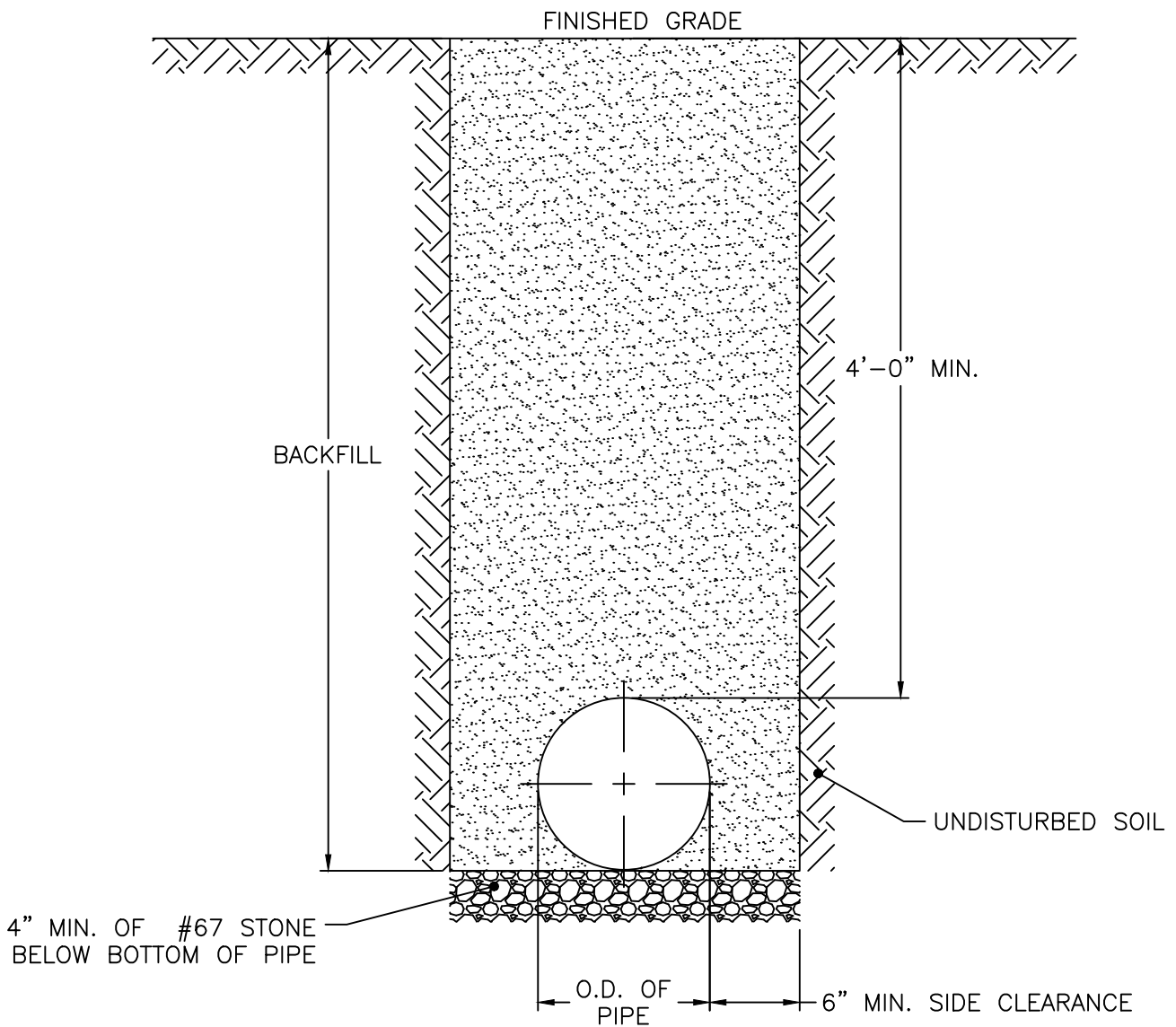


**NOTES:**

1. TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
2. NO ROCKS OR BOULDERS 4" OR LARGER TO BE USED IN BACKFILL.
3. ALL BACKFILL MATERIAL SHALL BE SUITABLE NATIVE MATERIAL.
4. BACKFILL SHALL BE TAMPED IN 6" LIFTS.
5. ACHIEVE 95% COMPACTION IN BACKFILL.

**CITY OF RALEIGH  
STANDARD DETAIL**

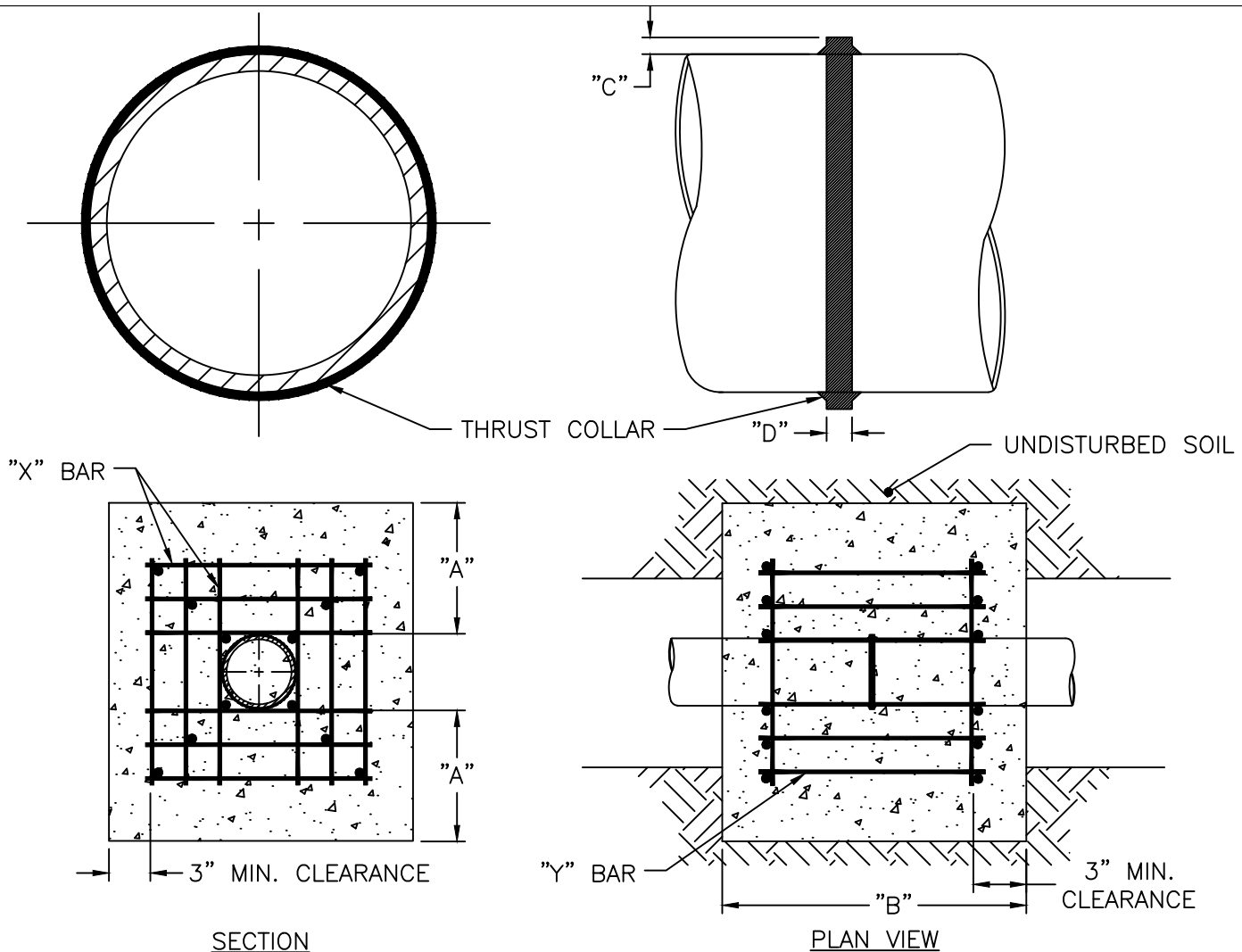
<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
	TRENCH BOTTOM DIMENSIONS AND BACKFILLING REQUIREMENTS FOR PVC REUSE MAINS	
	<b>R-3A</b>	



**NOTES:**

1. TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
2. NO ROCKS OR BOULDERS 4" OR LARGER TO BE USED IN BACKFILL.
3. ALL BACKFILL MATERIAL SHALL BE SUITABLE NATIVE MATERIAL.
4. BACKFILL SHALL BE TAMPED IN 6" LIFTS.
5. ACHIEVE 95% COMPACTION IN BACKFILL.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
	TRENCH BOTTOM DIMENSIONS AND BACKFILLING REQUIREMENTS FOR DI REUSE MAINS	
<b>R-3B</b>		



SECTION

PLAN VIEW

REINFORCING REQUIREMENTS

THRUST COLLAR AND THRUST SCHEDULE

I.D. PIPE	REBAR SIZE	"X" BAR LENGTH	"X" BAR WEIGHT	"Y" BAR LENGTH	"Y" BAR WEIGHT	NO. REQUIRED
6"-36"	#5	2'-2"+ O.D. PIPE	1.043 LBS/FT	1'-1"	1.1 LBS. EACH	X-24 Y-12
≥48"	#6	3'-0"+ O.D. PIPE	1.502 LBS/FT	1'-3"	1.9 LBS. EACH	X-24 Y-12

I.D. PIPE	"A"	"B"	"C"	"D"
6"-16"	1'-4"	1'-7"	2"	3/8"
20"-24"	1'-4"	1'-7"	3"	1/2"
30"-36"	1'-4"	1'-7"	4"	5/8"
≥48"	1'-8"	1'-9"	6"	7/8"

NOTES:

1. SEE DETAIL R-6 FOR THRUST BLOCK LOCATIONS.
2. CONCRETE SHALL BE 3,000 PSI AND TRANSIT MIXED.
3. REINFORCING BARS SHALL BE DEFORMED AND TIED TOGETHER.
4. TRENCH BOTTOM WIDTH IN VICINITY OF THRUST BLOCK INSTALLATION SHALL BE THE MINIMUM WIDTH AS SHOWN ON DETAIL R-3A.
5. BACKFILL TAMPED IN 6" LIFTS, SEE DETAIL R-3A.
6. THRUST COLLAR MUST BE FACTORY WELDED ON BOTH SIDES ALONG BOTH EDGES OF COLLAR AROUND CIRCUMFERENCE.

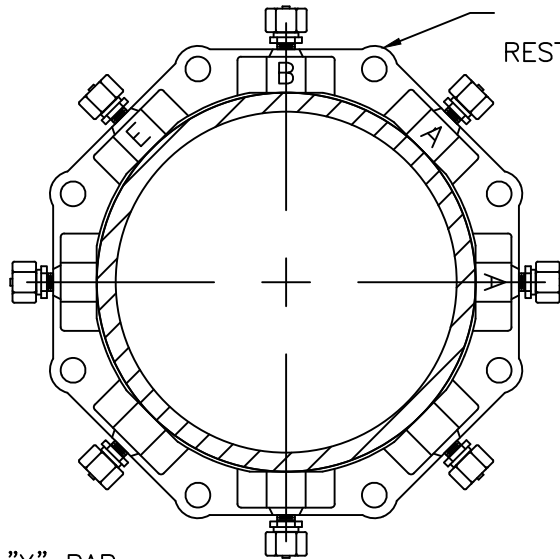
**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS      DATE: 01/18/2025      NOT TO SCALE

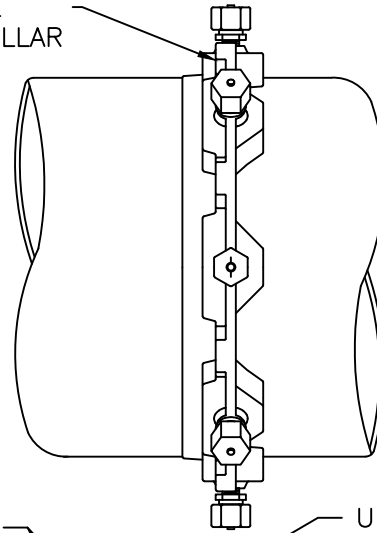
THRUST BLOCKING DESIGN  
DATA FOR DI REUSE MAINS

**R-4A**

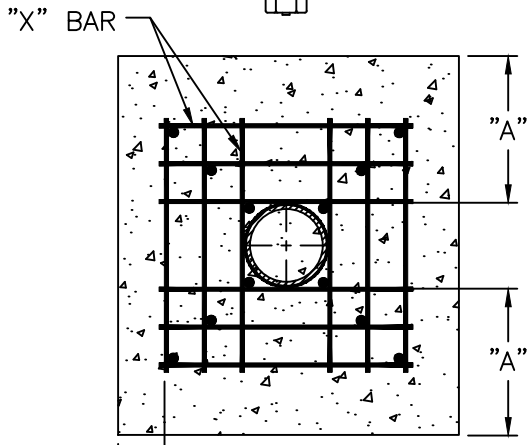




MECHANICAL RESTRAINING COLLAR

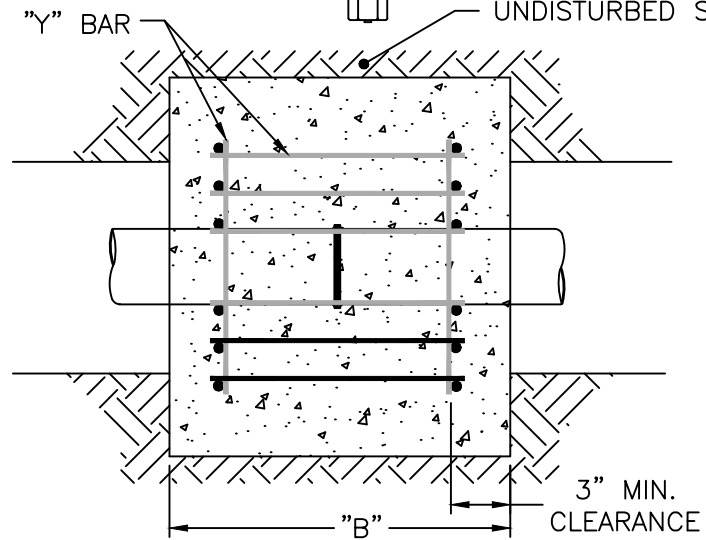


UNDISTURBED SOIL



3" MIN. CLEARANCE

SECTION



3" MIN. CLEARANCE

PLAN VIEW

REINFORCING REQUIREMENTS

I.D. PIPE	REBAR SIZE	"X" BAR LENGTH	"X" BAR WEIGHT	"Y" BAR LENGTH	"Y" BAR WEIGHT	NO. REQUIRED
6"-36"	#5	2'-2"+ O.D. PIPE	1.043 LBS/FT	1'-1"	1.1 LBS. EACH	X-24 Y-12
≥48"	#6	3'-0"+ O.D. PIPE	1.502 LBS/FT	1'-3"	1.9 LBS. EACH	X-24 Y-12

THRUST COLLAR AND THRUST SCHEDULE

I.D. PIPE	"A"	"B"
6"-16"	1'-4"	1'-7"
20"-24"	1'-4"	1'-7"
30"-36"	1'-4"	1'-7"
≥48"	1'-8"	1'-9"

NOTES:

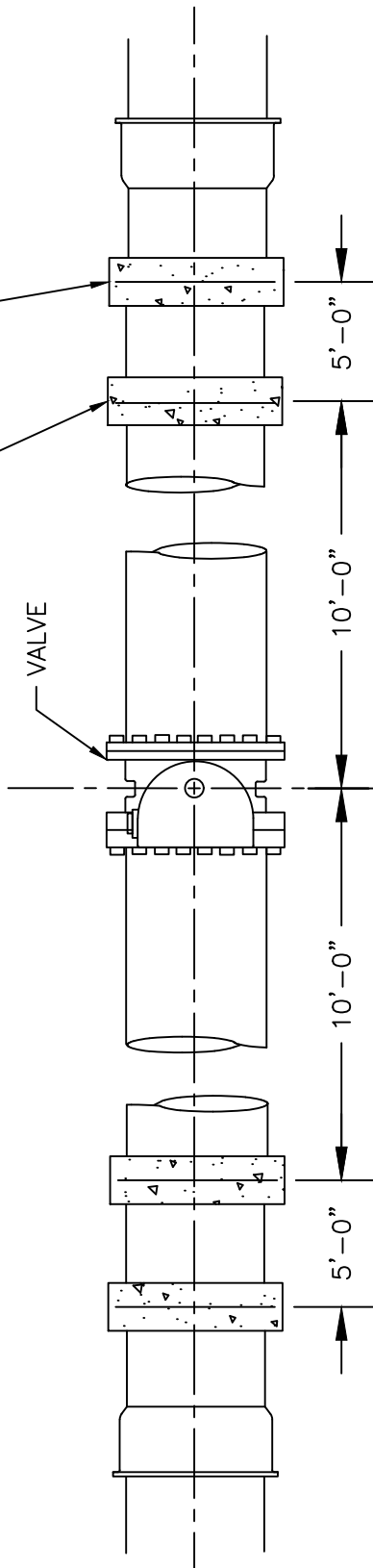
1. SEE DETAIL R-6 FOR THRUST BLOCK LOCATIONS.
2. CONCRETE SHALL BE 3,000 PSI AND TRANSIT MIXED.
3. REINFORCING BARS SHALL BE DEFORMED AND TIED TOGETHER.
4. TRENCH BOTTOM WIDTH IN VICINITY OF THRUST BLOCK INSTALLATION SHALL BE THE MINIMUM WIDTH AS SHOWN ON DETAIL R-3B.
5. BACKFILL TAMPED IN 6" LIFTS, SEE DETAIL R-3B.
6. MECHANICAL RESTRAINING COLLAR SHALL BE AS MANUFACTURED BY MEGA-LUG OR EQUAL.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	THRUST BLOCKING DESIGN DATA FOR PVC REUSE MAINS	
<b>R-4B</b>		

16" MAIN - 1 THRUST BLOCK REQUIRED, ON MAINS GREATER THAN 16" 2 THRUST BLOCKS REQUIRED.

STANDARD THRUST BLOCK, SEE DETAIL R-4A OR R-4B

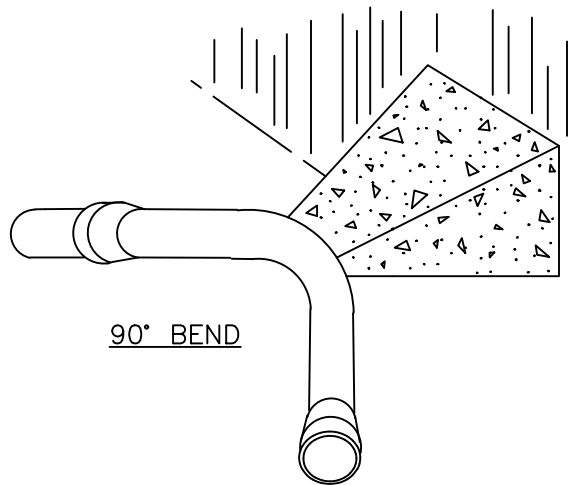
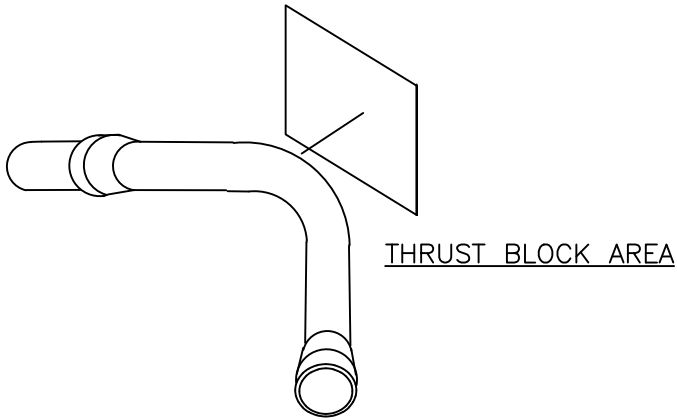
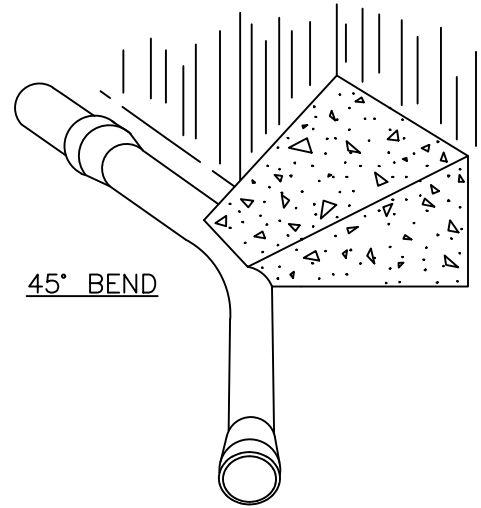
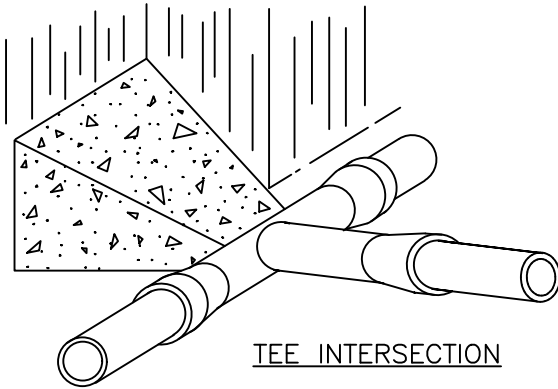


THRUST BLOCKING AT VALVES 16" AND LARGER

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	THRUST BLOCK INSTALLATION FOR 16" AND LARGER VALVES AND DEAD END REUSE MAINS	
	<b>R-5</b>	

THRUST BLOCKING



NOTES:

1. CONCRETE SHALL BE 3,000 PSI.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
3. TRENCHES SHALL CONFORM TO DETAIL R-3A & R-3B.
4. SEE DETAIL R-7 & R-8 (THRUST BLOCK TABLES), FOR AREA OF CONCRETE REQUIRED.
5. ALL BENDS AND INTERSECTIONS SHALL HAVE CONCRETE THRUST BLOCKING.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
	THRUST BLOCKING VIEWS	
	<b>R-6</b>	

REACTION BEARING AREAS FOR HORIZONTAL WATER PIPE BENDS  
BASED ON TEST PRESSURE OF 200 PSI

ALL AREAS GIVEN IN SQUARE FEET

SIZE OF BEND	DEGREE OF BEND	STATIC THRUST IN POUNDS	MODERATELY DRY CLAY 4,000 LBS/FT <sup>2</sup>	SOFT CLAY 2,000 LBS/FT <sup>2</sup>	1,600 LBS/FT <sup>2</sup> GRAVEL/ COARSE SAND	8,000 LBS/FT <sup>2</sup> DRY CLAY (ALWAYS DRY)	SAND, COMPACT FIRM 8,000 LBS/FT <sup>2</sup>	SAND-CLEAN DRY 4,000 LBS/FT <sup>2</sup>	SOIL 1,000 LBS/FT <sup>2</sup> QUICKSAND (VERY POOR)	ROCK-POOR 10,000 LBS/FT <sup>2</sup>
6"	11 ¼°	1,108	1	1	1	1	1	1	2	1
	22 ½°	2,207	1	2	2	1	1	1	3	1
	45°	4,328	2	3	3	1	1	2	5	1
	90°	7,996	2	4	5	1	1	2	8	1
	PLUG	5,655	2	3	4	1	1	2	6	1
8"	11 ¼°	1,970	1	1	2	1	1	1	2	1
	22 ½°	3,922	1	2	3	1	1	1	4	1
	45°	7,694	2	4	5	1	1	2	8	1
	90°	14,215	4	8	9	2	2	4	15	2
	PLUG	10,053	3	5	6	2	2	3	10	1
12"	11 ¼°	4,433	2	3	3	1	1	2	5	1
	22 ½°	8,826	3	5	6	2	2	3	9	1
	45°	17,312	5	9	11	3	3	5	18	2
	90°	31,983	8	16	19	4	4	8	32	4
	PLUG	22,619	6	12	14	3	3	6	23	3
16"	11 ¼°	7,881	2	4	5	1	1	2	8	1
	22 ½°	15,691	4	8	10	2	2	4	16	2
	45°	30,779	8	16	19	4	4	8	31	4
	90°	56,861	15	29	35	8	8	15	57	6
	PLUG	40,213	10	21	25	5	5	10	41	5

NOTES:

- REACTION BEARING AREAS ARE IN SQUARE FEET MEASURED IN A VERTICAL PLANE IN THE TRENCH SIDE AT AN ANGLE OF 90° TO THE THRUST VECTOR.
- USE 6" 90° BEND VALUE FOR HYDRANTS FOR ADDITIONAL SAFETY FACTOR.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
	THRUST BLOCKING DESIGN QUANTITY TABLE	
	<b>R-7</b>	

REACTION BEARING AREAS FOR HORIZONTAL WATER PIPE BENDS  
BASED ON TEST PRESSURE OF 200 PSI

ALL AREAS GIVEN IN SQUARE FEET

SIZE OF BEND	DEGREE OF BEND	STATIC THRUST IN POUNDS	MODERATELY DRY CLAY 4,000 LBS/FT <sup>2</sup>	SOFT CLAY 2,000 LBS/FT <sup>2</sup>	1,600 LBS/FT <sup>2</sup> GRAVEL/ COARSE SAND	8,000 LBS/FT <sup>2</sup> DRY CLAY (ALWAYS DRY)	SAND, COMPACT FIRM 8,000 LBS/FT <sup>2</sup>	SAND—CLEAN DRY 4,000 LBS/FT <sup>2</sup>	SOIL 1,000 LBS/FT <sup>2</sup> QUICKSAND (VERY POOR)	ROCK—POOR 10,000 LBS/FT <sup>2</sup>
24"	11 ¼°	17,734	5	9	11	3	3	5	18	2
	22 ½°	35,305	9	18	22	5	5	9	36	4
	45°	69,252	18	35	42	9	9	18	70	7
	90°	127,936	32	64	77	16	16	32	128	113
	PLUG	90,478	23	46	55	12	12	23	91	10
30"	11 ¼°	27,709	7	14	17	4	4	7	2	3
	22 ½°	55,163	14	28	34	7	7	14	56	6
	45°	108,206	28	55	65	14	14	28	109	11
	90°	199,900	50	100	120	25	25	50	200	20
	PLUG	141,372	36	71	85	18	18	36	142	15
36"	11 ¼°	39,901	10	20	24	5	5	10	40	4
	22 ½°	79,439	20	40	48	10	10	20	30	8
	45°	155,816	39	78	94	20	20	39	156	16
	90°	287,855	72	144	172	36	36	72	288	29
	PLUG	203,575	51	102	122	26	26	51	204	21
48"	11 ¼°	70,935	18	36	43	9	9	18	71	8
	22 ½°	141,218	36	71	85	18	18	36	142	15
	45°	277,007	70	139	166	35	35	70	277	28
	90°	511,742	128	256	320	64	64	128	512	52
	PLUG	361,911	91	181	217	46	46	91	362	37

NOTES:

- REACTION BEARING AREAS ARE IN SQUARE FEET MEASURED IN A VERTICAL PLANE IN THE TRENCH SIDE AT AN ANGLE OF 90° TO THE THRUST VECTOR.
- USE 6" 90° BEND VALUE FOR HYDRANTS FOR ADDITIONAL SAFETY FACTOR.

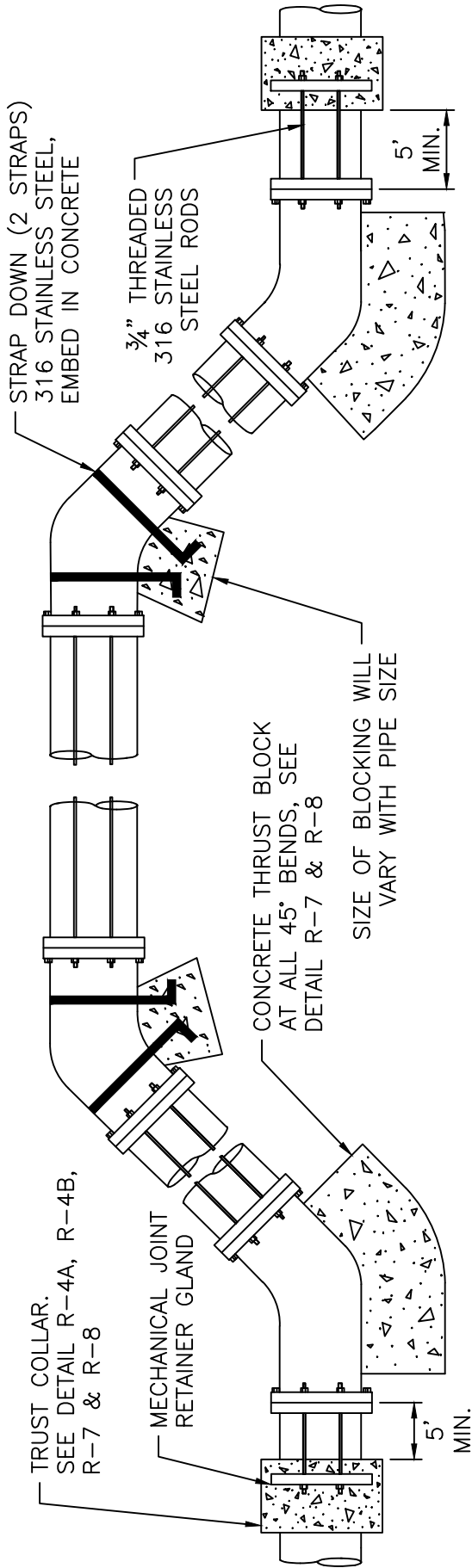
**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS      DATE: 01/18/2025      NOT TO SCALE

THRUST BLOCKING DESIGN  
QUANTITY TABLE

**R-8**

TOP OF GROUND



ROD REQUIREMENTS		STRAP REQUIREMENTS	
SIZE OF 45° BEND	STATIC TRUST IN POUNDS	NO. OF RODS REQUIRED	STRAP WIDTH
6"	4,328	2	1"
8"	7,694	4	1.5"
12"	17,312	4	2"
16"	30,779	8	2"
24"	69,252	8	4"

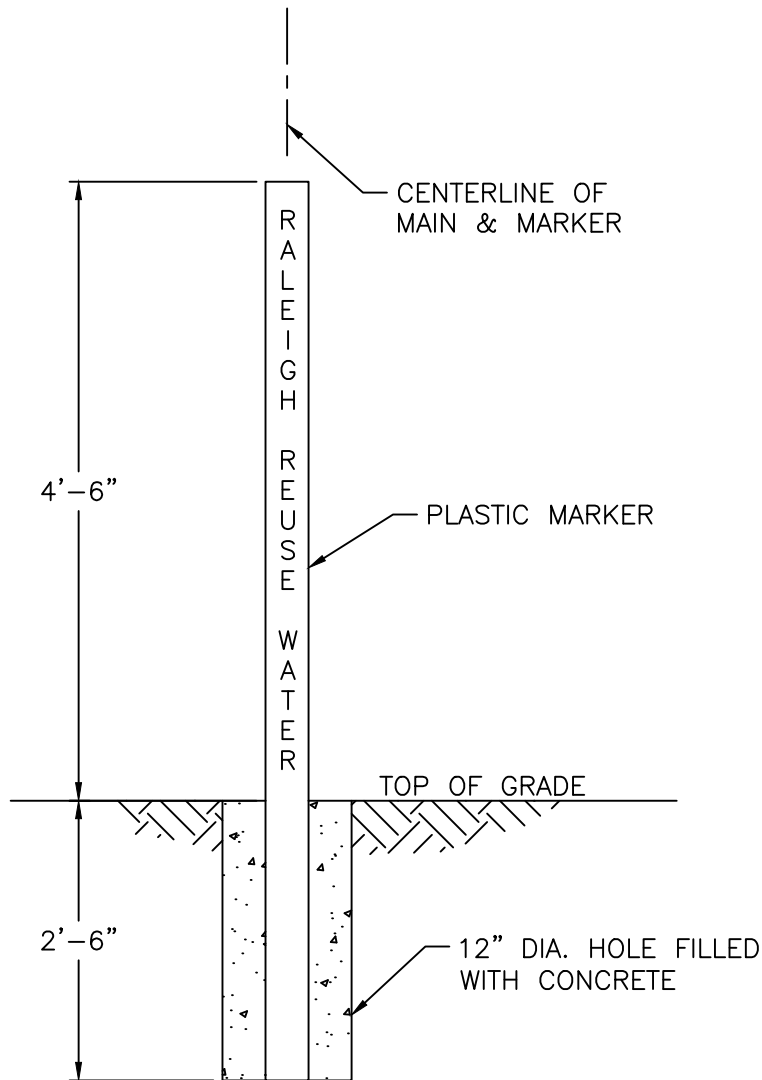
RESTRAINT REQUIREMENTS				
PIPE DIA	RODDING	RJ GLANDS	THRUST COLLAR	THRUST BLOCKING
<12"	X	X	X	
≥12"	X	X	X	X

"X" DENOTES REQUIRED RESTRAINT.

- NOTES:
1. STEEL RODS AND BOLTS SHALL BE 3/4" 316 STAINLESS STEEL.
  2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT BENDS.
  3. RESTRAINED MECHANICAL GLANDS TO BE USED AT ALL FITTINGS.
  4. MUST USE DUCTILE IRON EYE BOLTS WHERE NECESSARY.
  5. 3' MINIMUM COVER MUST BE MAINTAINED.
  6. EXTERNAL RESTRAINT REQUIRED. INTEGRAL BELL RESTRAINT REQUIRES DIRECTOR'S APPROVAL.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

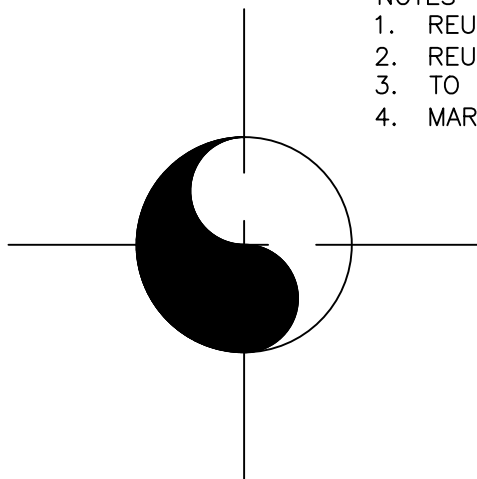
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
STANDARD VERTICAL BEND		
<b>R-9</b>		



REUSE WATER

NOTES

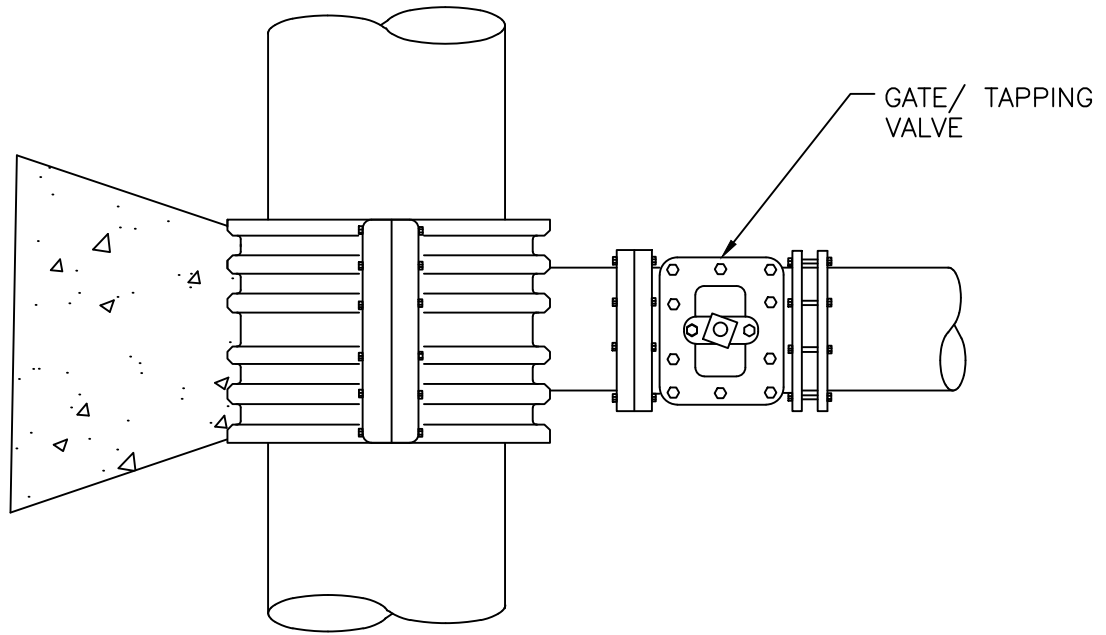
1. REUSE WATER MARKER TO BE PURPLE IN COLOR.
2. REUSE WATER MARKER TO BE LABELED "RALEIGH REUSE WATER".
3. TO BE SPACED ALONG CENTERLINE OF MAIN EVERY 300 FEET.
4. MARKERS TO BE ROUND AND 4" IN DIAMETER.



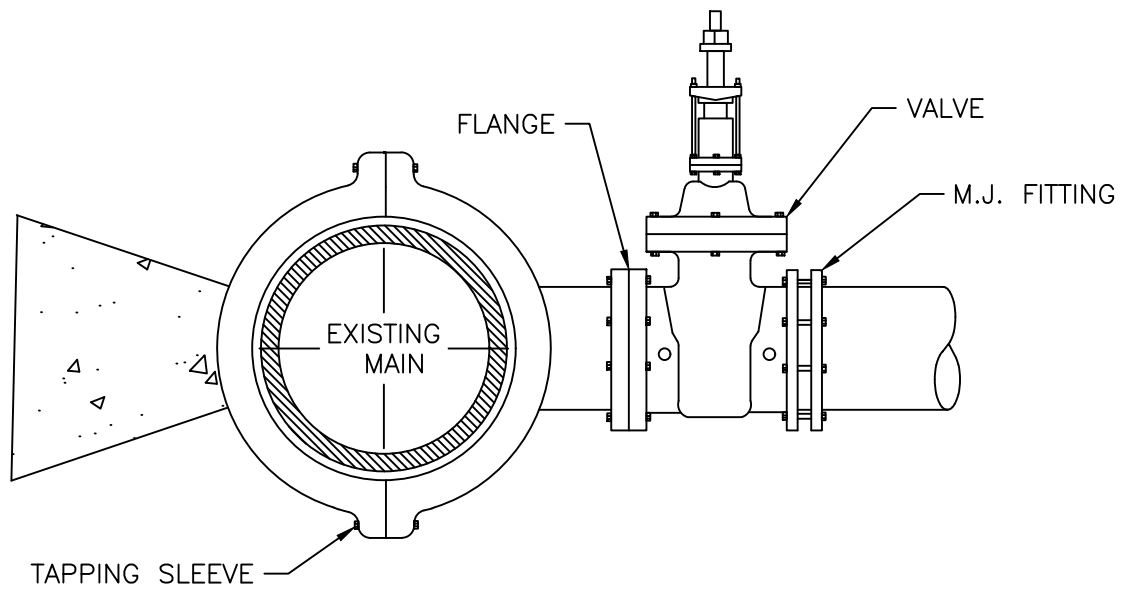
REUSE WATER MAIN

**CITY OF RALEIGH**  
STANDARD DETAIL

<i>REVISIONS</i>	<i>DATE: 01/18/2025</i>	<i>NOT TO SCALE</i>
		MAIN AND VALVE MARKERS FOR REUSE WATER IN EASEMENTS
<b>R-10</b>		



TOP VIEW



SIDE VIEW

NOTES:

1. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
2. SEE DETAIL R-7 & R-8 (REACTION BLOCK TABLES) FOR AREA OF CONCRETE REQUIRED.
3. 3,000 PSI SOLID CONCRETE SHALL BE USED AS FOOTING FOR DUCTILE IRON PIPE.

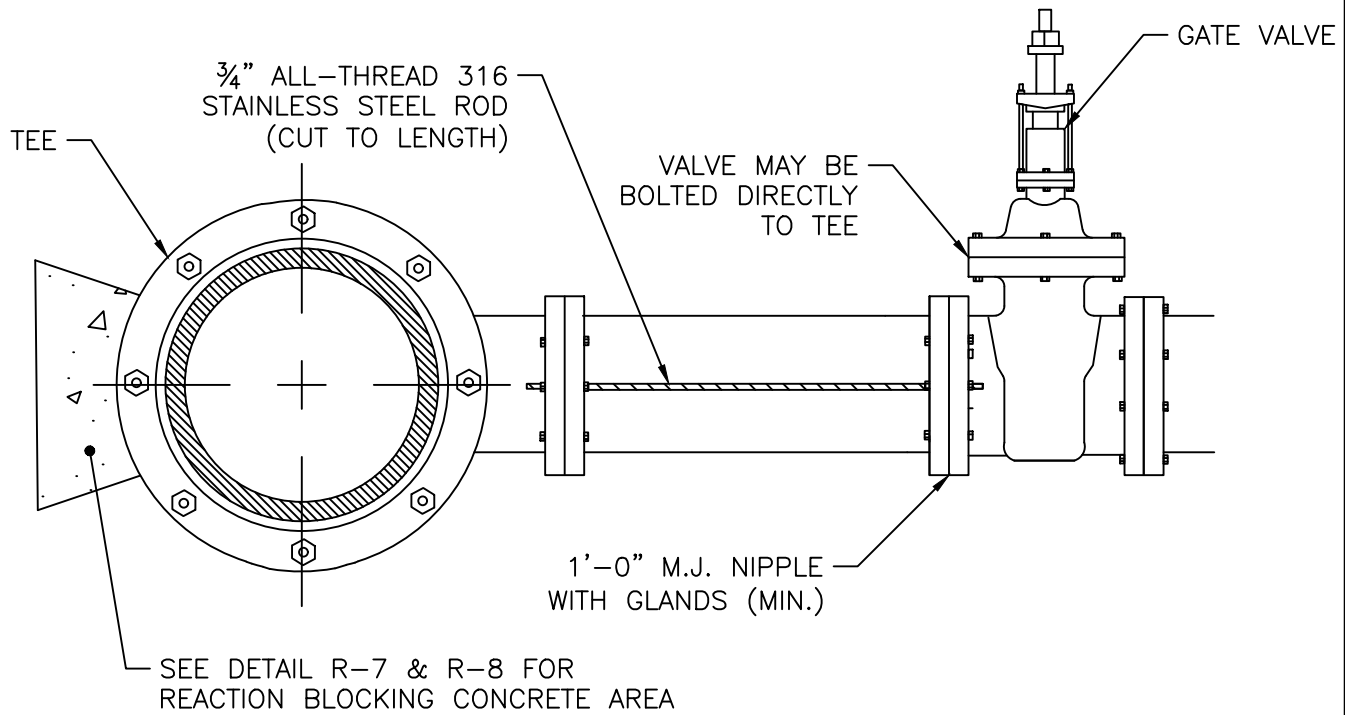
**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
-----------	------------------	--------------

4"-24" TAPPING SLEEVE  
AND VALVE ASSEMBLY

**R-11**





ROD REQUIREMENTS

NO. OF RODS	BRANCH SIZE
4"	2
6"	2
8"	4
12"	4
16"	6
24"	6
30"	8
36"	8

NOTES:

1. STEEL RODS AND BOLTS SHALL BE 3/4" 316 STAINLESS STEEL.
2. SEE DETAIL R-7 & R-8 (REACTION BLOCK TABLES) FOR AREA OF CONCRETE REQUIRED.
3. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL FITTINGS.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
-----------	------------------	--------------

	VALVE RESTRAINT AT TEES AND CROSSES FOR LINES (4"-24")
--	--

**R-12**

VALVE SIZE	MH DIA.
16"	5'
24"	6'
≥30"	8'

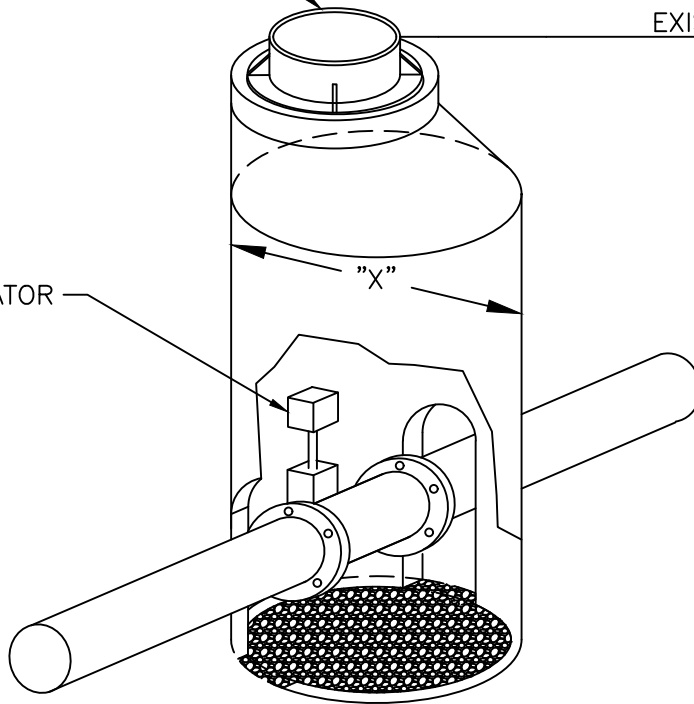
NOTES:

1. USE STANDARD PRECAST ECCENTRIC TOP.
2. BASE SECTION SHALL BE OF "DOG HOUSE" TYPE TO FIT OVER MAIN.
3. PROVIDE A MIN. OF 12" OF #67 STONE FOR POSITIVE DRAINAGE IN BOTTOM OF MANHOLE.
4. GROUT RISER/BASE SECTION AS NECESSARY.
5. MANHOLE LID SHALL SAY "REUSE".
6. FLAT TOP MAY BE USED IN NON-PAVED AREAS WHEN NECESSARY TO MATCH GRADE.

ECCENTRIC TOP WITH COVER  
OPENING OVER ACTUATOR

EXISTING GRADE

NUT TYPE ACTUATOR

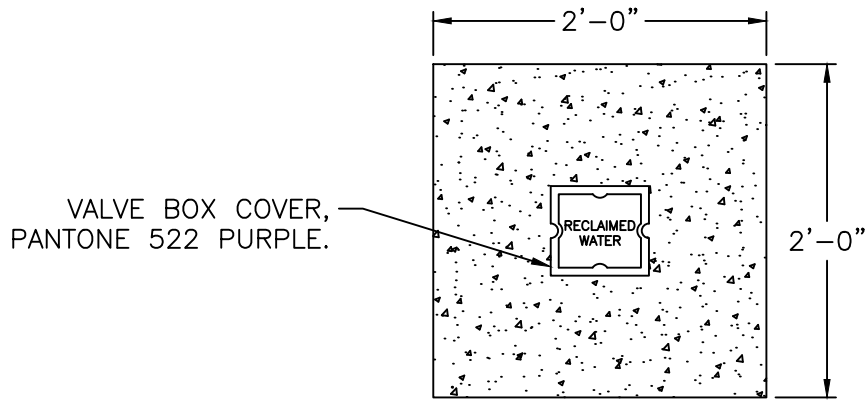


**CITY OF RALEIGH**  
**STANDARD DETAIL**

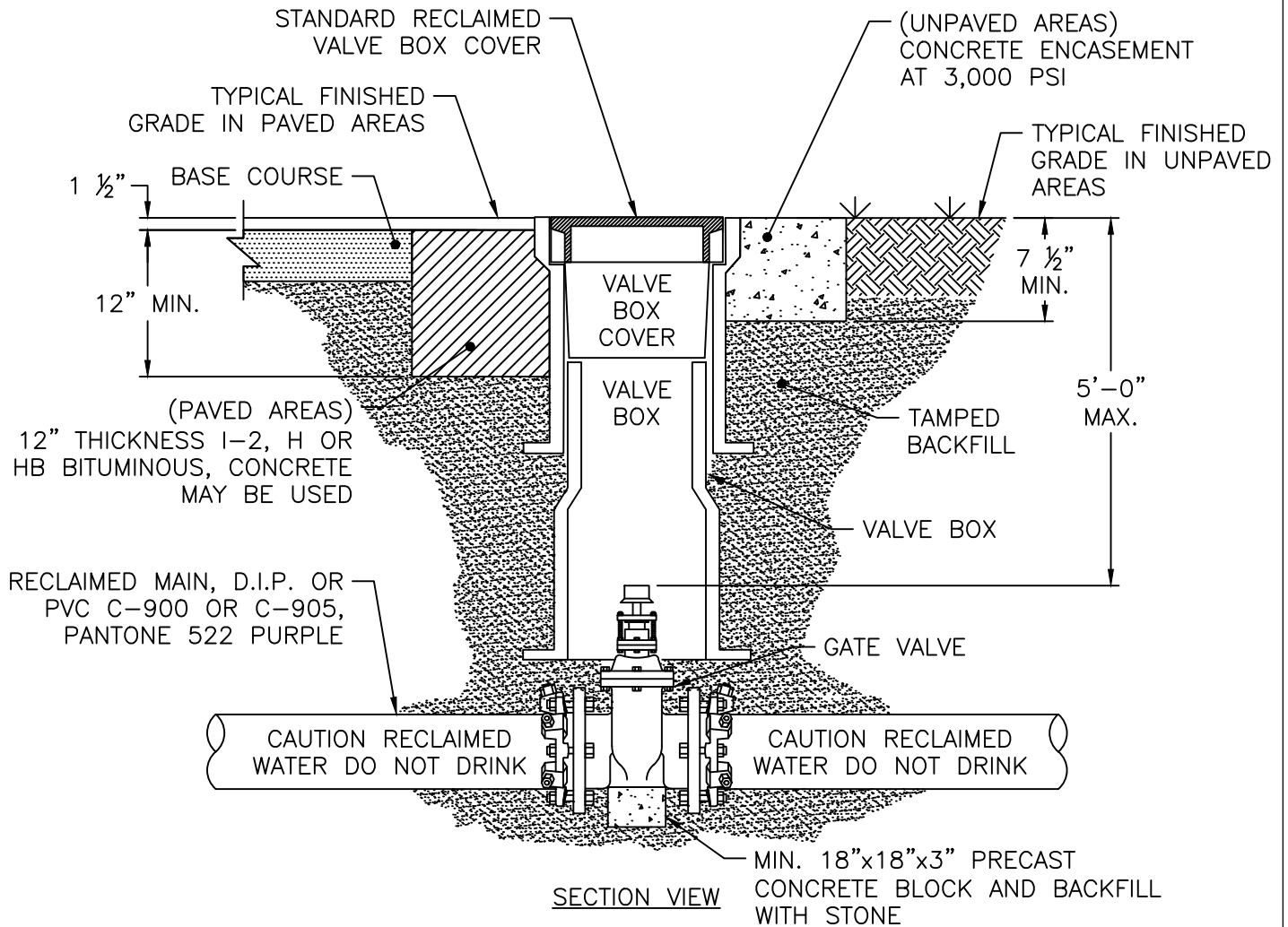
REVISIONS      DATE: 01/18/2025      NOT TO SCALE

BUTTERFLY VALVE MANHOLE  
FOR 16" AND LARGER MAINS

**R-13**



PLAN VIEW

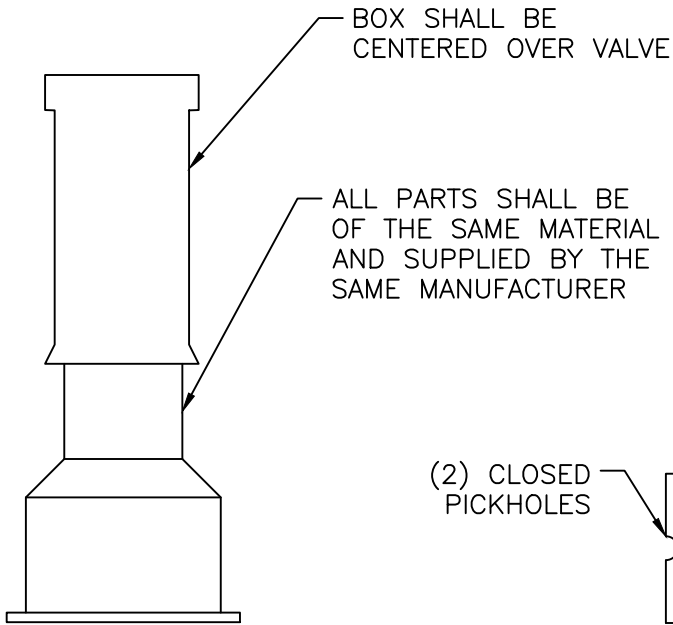


NOTES:

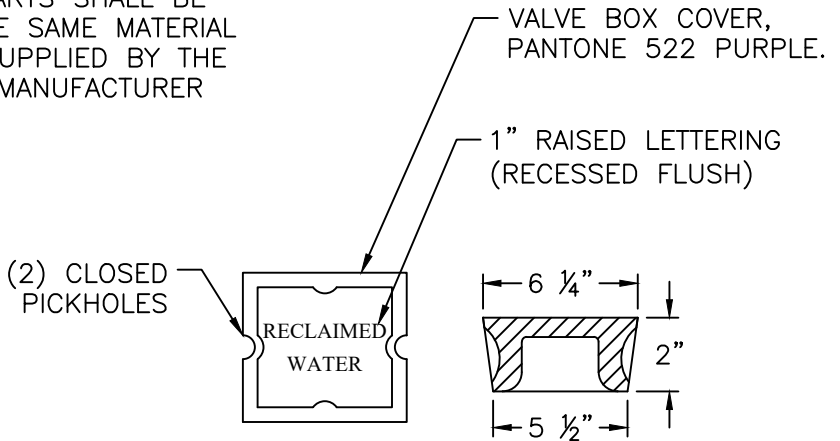
1. ONLY MANUFACTURED VALVE BOX EXTENSIONS SHALL BE ALLOWED.
2. VALVE OPERATING NUT MUST BE EXTENDED SO THAT THE DEPTH IS NO GREATER THAN 5' FROM THE SURFACE USING A MANUFACTURER APPROVED EXTENSION KIT.
3. PRECAST CONCRETE ENCASEMENT IS ALLOWED OUTSIDE OF PAVED AREAS.
4. VALVE BOX SHOULD NOT CONTACT MAIN OR VALVE.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

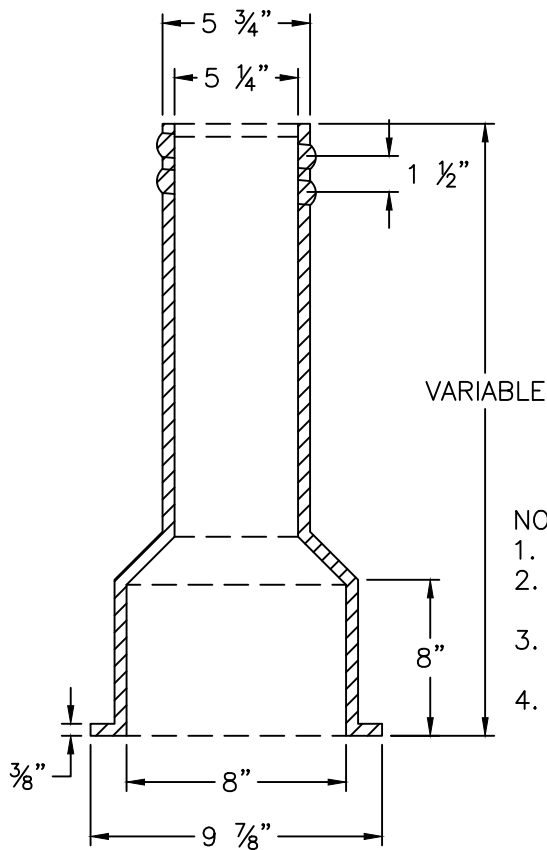
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
RECLAIMED WATER VALVE AND BOX INSTALLATION		
<b>R-14</b>		



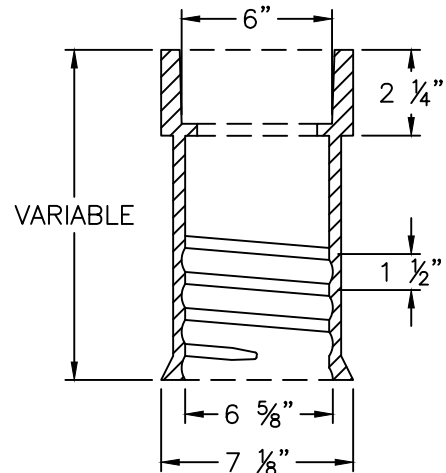
COMPLETE BOX



COVER AND LID



BOTTOM SECTION



SQUARE UPPER SECTION

NOTES:

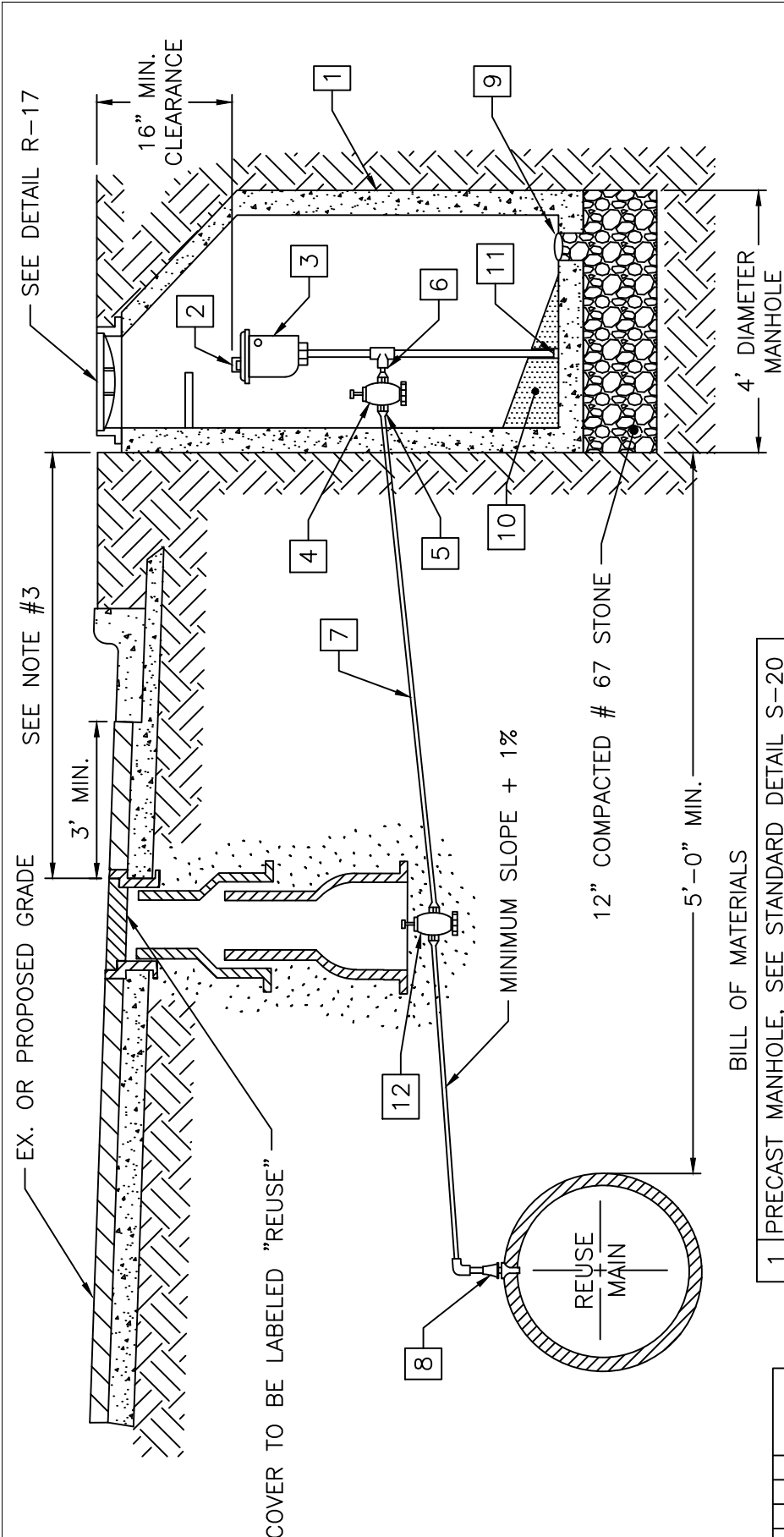
1. VALVE BOX COVER SHALL WEIGH A MINIMUM 13 LBS.
2. ENTIRE VALVE BOX ASSEMBLY & COVER SHALL BE CAST FROM CLASS 35 GRAY IRON.
3. ASSEMBLY SHALL BE DOMESTICALLY MADE AND MANUFACTURED IN THE U.S.A.
4. ASSEMBLY OTHER THAN COVER SHALL BE PAINTED BLACK.

**CITY OF RALEIGH  
STANDARD DETAIL**

REVISIONS	DATE: 01/18/2025	NOT TO SCALE
-----------	------------------	--------------

	STANDARD VALVE BOX

**R-15**



- NOTE:
1. AIR VALVE TO BE P-20 WITH VACUUM CHECK BY CRISPIN OR VAL MATIC VM 45.
  2. THE AIR RELEASE MANHOLE SHALL BE INSTALLED IN THE SHOULDER OR AS DIRECTED BY THE ENGINEER.
  3. FOR MAINS LOCATED OUTSIDE OF STREET RIGHT-OF-WAYS THE MAXIMUM DISTANCE BETWEEN THE MANHOLE AND THE VALVE BOX SHOULD BE THREE (3) FEET.
  4. MAIN SHALL BE DEEP ENOUGH TO ACCOMMODATE INSTALLATION AS SHOWN.

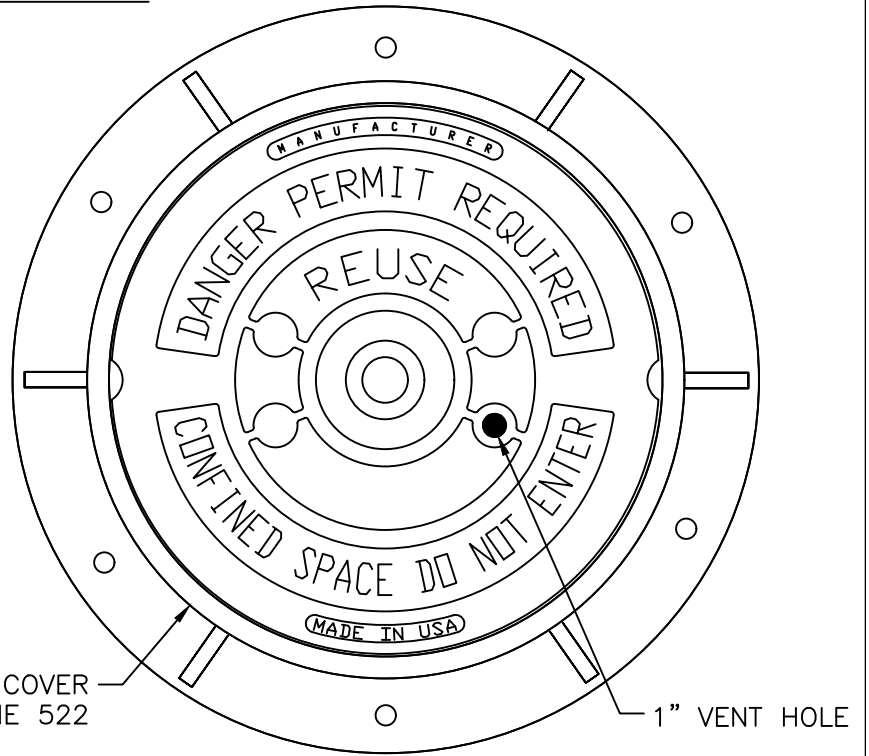
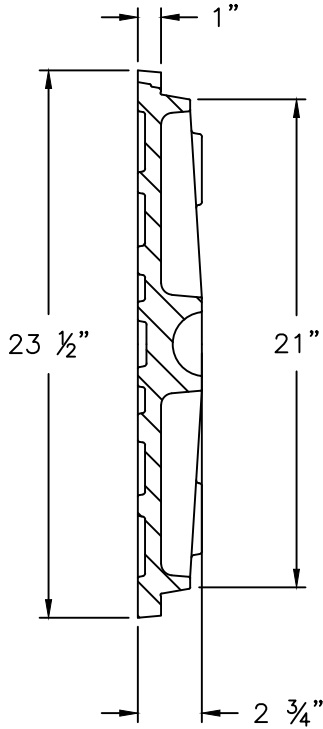
BILL OF MATERIALS

1	PRECAST MANHOLE, SEE STANDARD DETAIL S-20
2	TRASH HOOD
3	2" AIR RELEASE VALVE
4	2" CURB STOP BALL VALVE
5	ADAPTER
6	2" MECHANICAL JOINT BRASS PIPE AND FITTINGS
7	2" TYPE "K", SOFT COPPER WITH FLARED ELBOW
8	CORPORATION COCK
9	6" DIAMETER DRAIN
10	GROUT, 1/8" TO 1'-0" MIN. SLOPE TO DRAIN
11	PIPE CAP
12	2" GATE VALVE

**CITY OF RALEIGH**  
**STANDARD DETAIL**

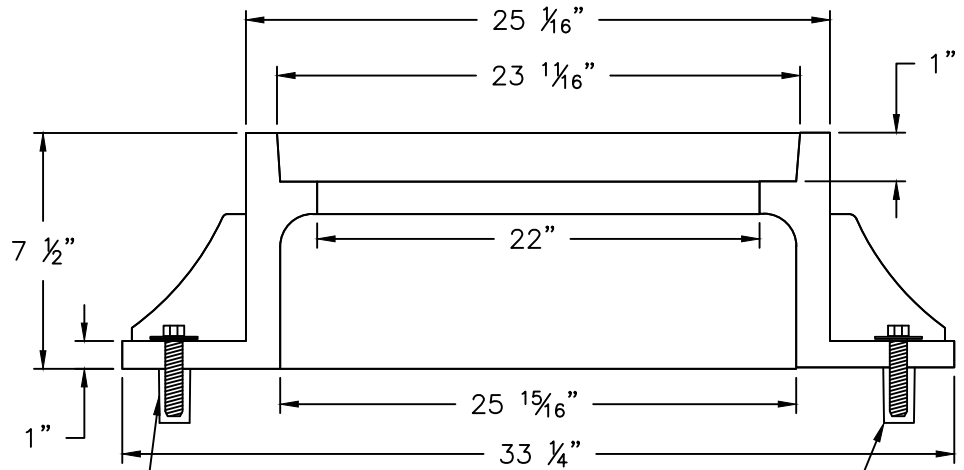
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
REUSE AIR RELEASE VALVE		
<b>R-16</b>		

MANHOLE FRAME AND COVER



PAIN'T COVER  
PANTONE 522

1" VENT HOLE



LAGSHIELDS MAY ONLY BE USED  
IN ROADWAY APPLICATIONS

5/8"x3" LAGSHIELD IN HOLE DRILLED INTO  
CONE OR RING WITH ANCHOR SUNK TO  
DESIGN DEPTH, AND 3/8"x3" HOT DIPPED  
GALVANIZED LAG BOLT AND WASHER

NOTES:

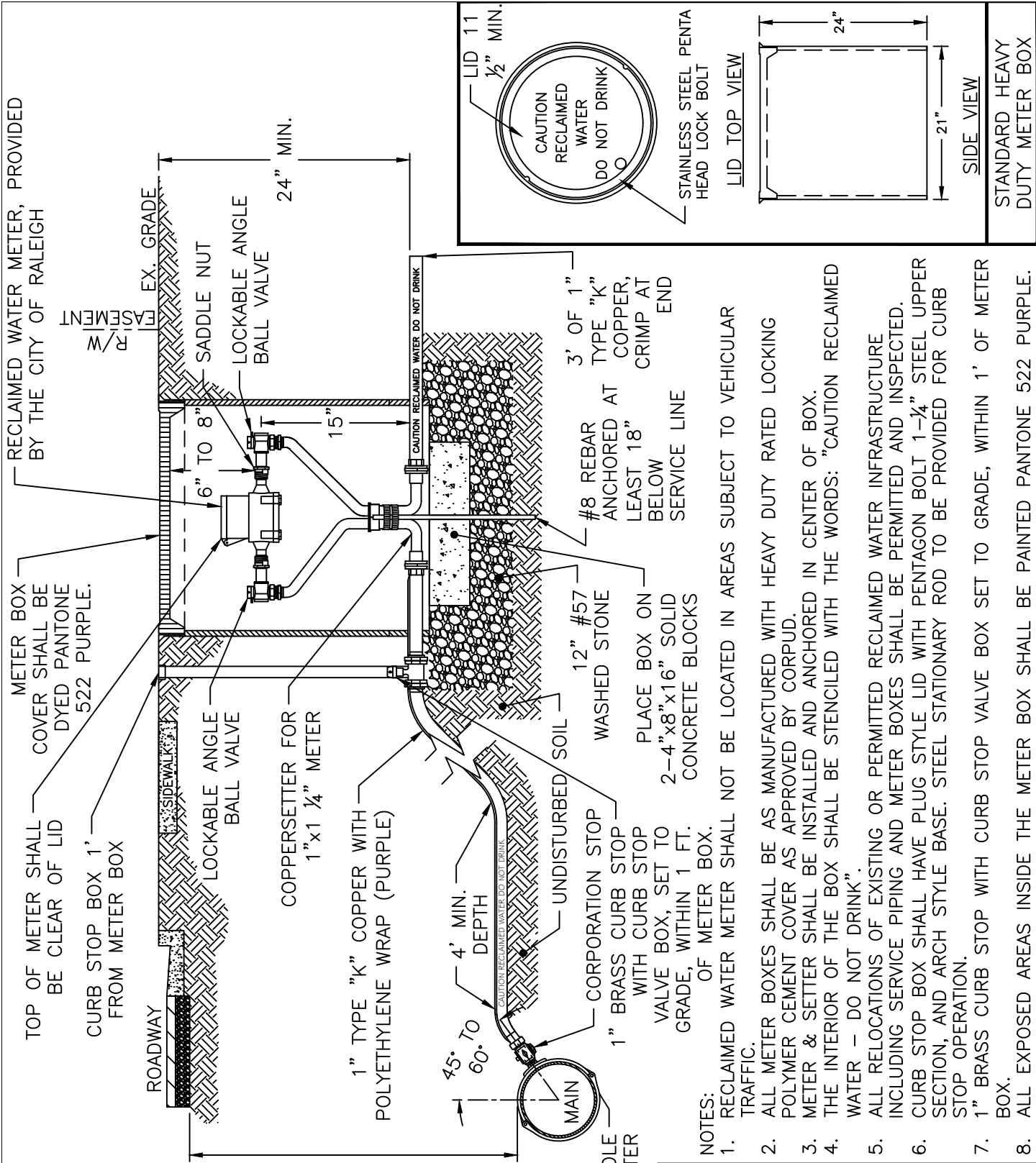
1. ALL MANHOLE FRAMES SHALL BE DOMESTICALLY CAST.
2. FRAME SHALL BE A MINIMUM WEIGHT OF 182 LBS.
3. COVER SHALL WEIGH A MIN. OF 120 LBS.
4. MANHOLES WITHIN PAVED SURFACES SHALL BE CONSTRUCTED ACCORDANCE WITH DETAIL S-29.

**CITY OF RALEIGH**  
**STANDARD DETAIL**

REVISIONS	DATE: 01/18/2025	NOT TO SCALE

STANDARD MANHOLE COVER

**R-17**



<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
STANDARD 1" RECLAIMED WATER SERVICE AND METER BOX INSTALLATION		
<b>R-18</b>		

- NOTES:
1. RECLAIMED WATER METER SHALL NOT BE LOCATED IN AREAS SUBJECT TO VEHICULAR TRAFFIC.
  2. ALL METER BOXES SHALL BE AS MANUFACTURED WITH HEAVY DUTY RATED LOCKING POLYMER CEMENT COVER AS APPROVED BY CORPUD.
  3. METER & SETTER SHALL BE INSTALLED AND ANCHORED IN CENTER OF BOX.
  4. THE INTERIOR OF THE BOX SHALL BE STENCILED WITH THE WORDS: "CAUTION RECLAIMED WATER - DO NOT DRINK".
  5. ALL RELOCATIONS OF EXISTING OR PERMITTED RECLAIMED WATER INFRASTRUCTURE INCLUDING SERVICE PIPING AND METER BOXES SHALL BE PERMITTED AND INSPECTED.
  6. CURB STOP BOX SHALL HAVE PLUG STYLE LID WITH PENTAGON BOLT 1-1/4" STEEL UPPER SECTION, AND ARCH STYLE BASE. STEEL STATIONARY ROD TO BE PROVIDED FOR CURB STOP OPERATION.
  7. 1" BRASS CURB STOP WITH CURB STOP VALVE BOX SET TO GRADE, WITHIN 1' OF METER BOX.
  8. ALL EXPOSED AREAS INSIDE THE METER BOX SHALL BE PAINTED PANTONE 522 PURPLE.

METER BOX COVER SHALL BE DYED PANTONE 522 PURPLE.

TOP OF METER SHALL BE CLEAR OF LID

CURB STOP BOX 1' FROM METER BOX

RECLAIMED WATER METER, PROVIDED BY THE CITY OF RALEIGH

CAUTION RECLAIMED WATER DO NOT DRINK

EX. GRADE

ROADWAY

SIDEWALK

SADDLE NUT

LOCKABLE ANGLE BALL VALVE

COPPER SETTER FOR 1" x 1/4" METER

1" TYPE "K" COPPER WITH POLYETHYLENE WRAP (PURPLE)

45° TO 60° DEPTH

UNDISTURBED SOIL

WASHED STONE

12" #57

PLACE BOX ON 2-4"x8"x16" SOLID CONCRETE BLOCKS

#8 REBAR ANCHORED AT LEAST 18" BELOW SERVICE LINE

3' OF 1" TYPE "K" COPPER, CRIMP AT END

CAUTION RECLAIMED WATER DO NOT DRINK

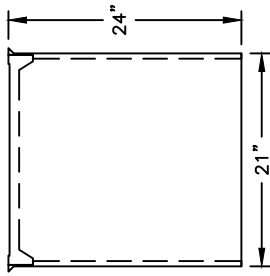
LID 11 1/2" MIN.

MAIN

SERVICE SADDLE CONTROLLED DIAMETER

CAUTION RECLAIMED WATER DO NOT DRINK

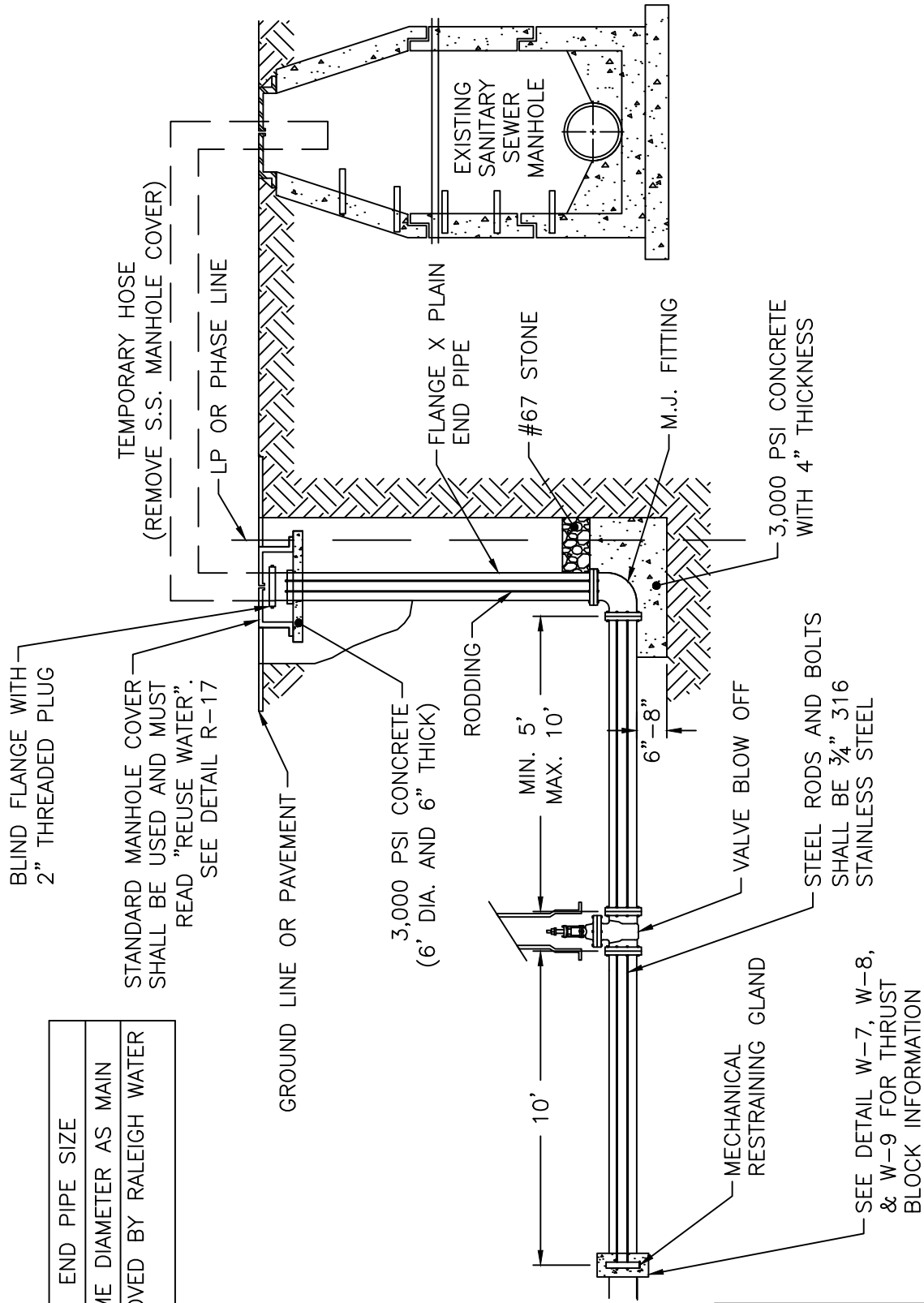
LID TOP VIEW



SIDE VIEW

STANDARD HEAVY DUTY METER BOX

MAIN SIZE	END PIPE SIZE
6" - 12"	SAME DIAMETER AS MAIN
≥ 16"	APPROVED BY RALEIGH WATER

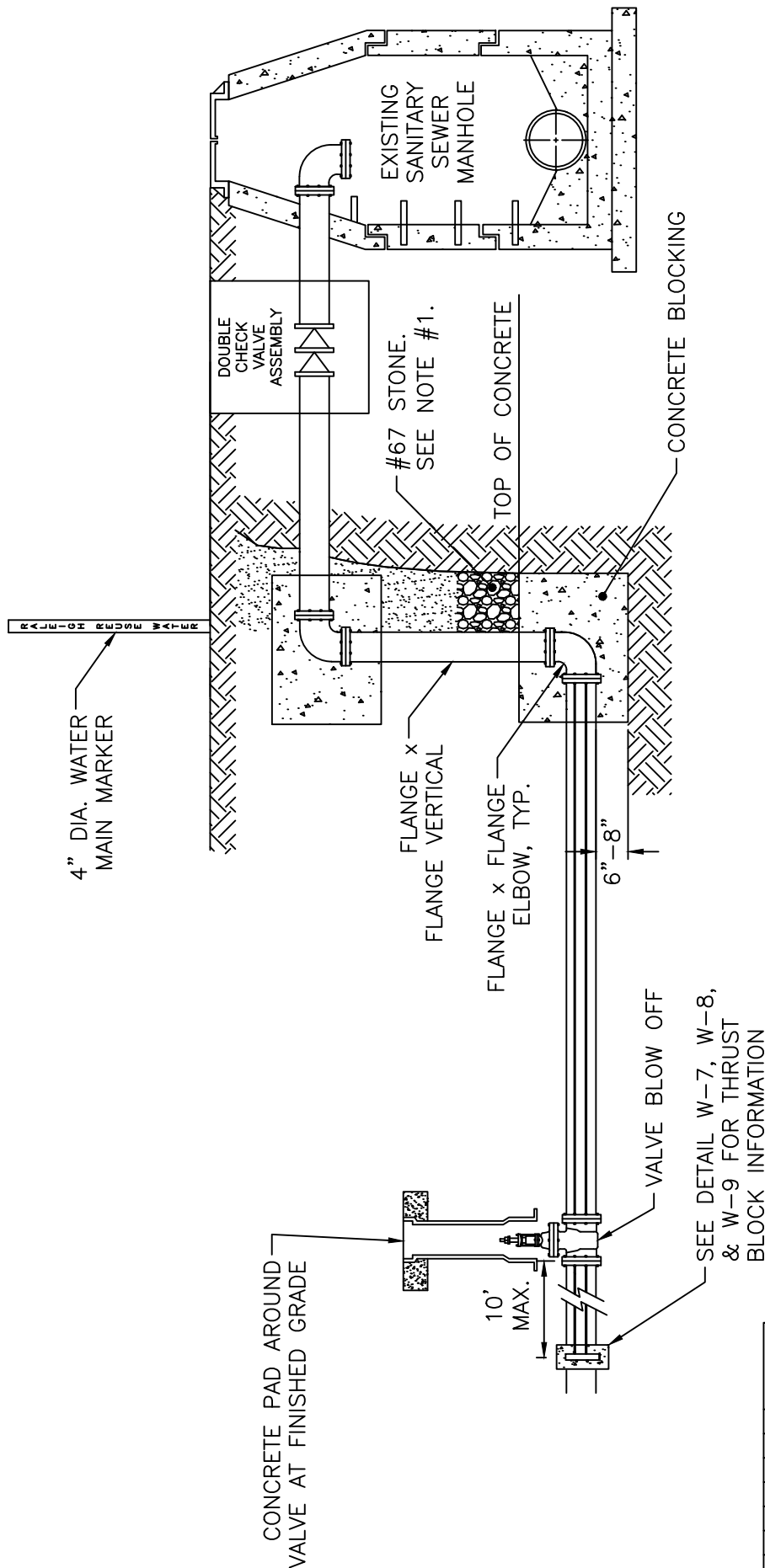


SEE DETAIL W-7, W-8,  
& W-9 FOR THRUST  
BLOCK INFORMATION

NOTE:  
NO ROD COUPLINGS ALLOWED.

<b>CITY OF RALEIGH</b>		
<b>STANDARD DETAIL</b>		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	TEMPORARY REUSE MAIN BLOW OFF ASSEMBLY	
<b>R-19</b>		





NOTES:

1. DRILL 1/4" WEEP HOLE FOR STACK DRAINAGE INTO STONE.
2. DOUBLE 3/4" BRIDLE RODS ON BOTH SIDES.
3. INSTALL WATER MAIN MARKER AT R/W OR P/L TO LOCATE MAIN.
4. 3/4" RODS AND BOLTS TO BE HOT DIPPED GALVANIZED.
5. END PIPE SIZE SHALL BE SAME AS MAIN SIZE.
6. APPROVED DOUBLE CHECK DEVICES ARE LOCATED AT END OF WATER MATERIALS SECTION.

CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 01/18/2025	NOT TO SCALE
	PERMANENT REUSE MAIN BLOW OFF ASSEMBLY	
	<b>R-20</b>	