



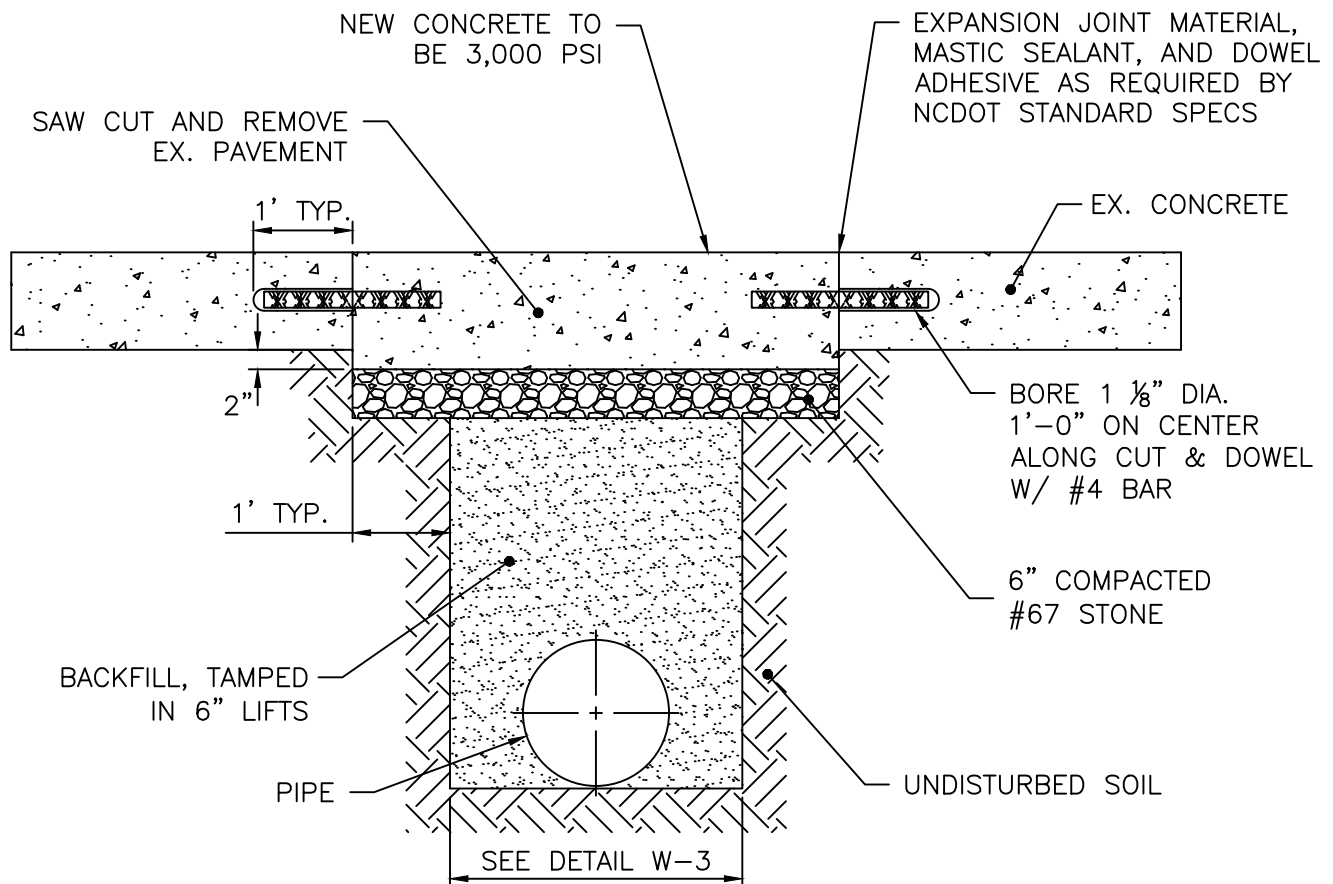
Raleigh Water

STANDARD WATER DETAILS

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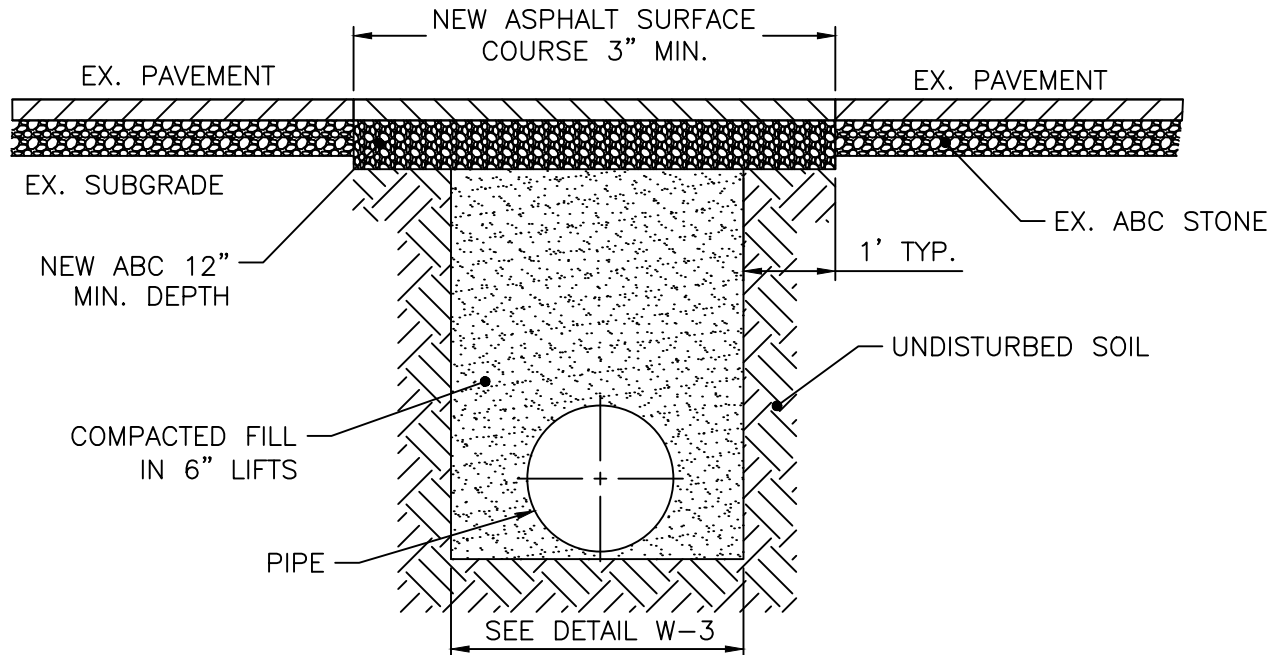


NOTES:

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.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 05/11/20	NOT TO SCALE
	STANDARD CONCRETE PAVEMENT PATCH	
	W-1	



NOTES:

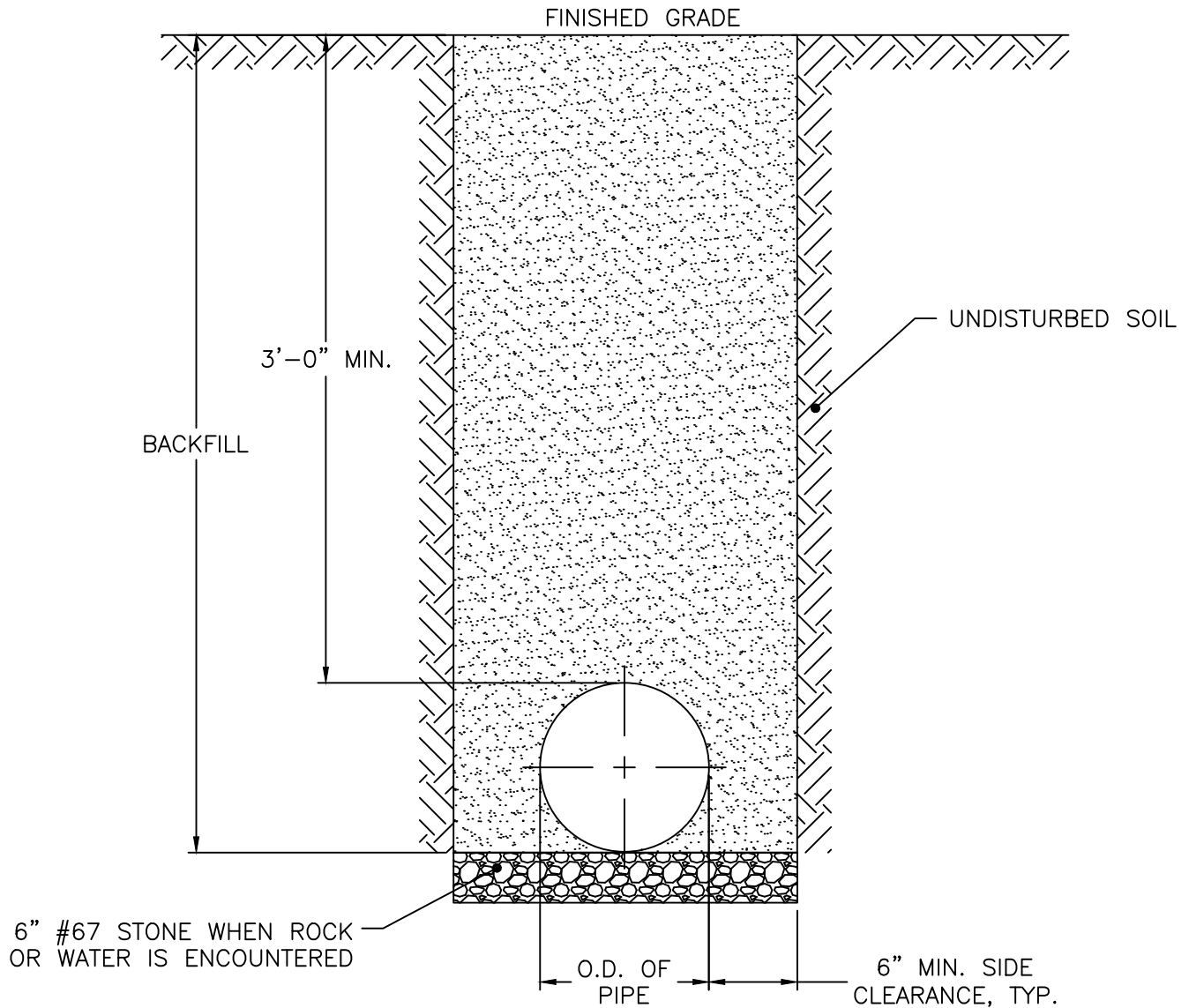
1. THE PAVEMENT CUT SHALL BE DEFINED BY A STRAIGHT EDGE AND CUT WITH AN APPROPRIATE SAW CUT MACHINE.
2. THE TRENCH SUBGRADE MATERIAL SHALL BE BACKFILLED WITH SUITABLE MATERIAL AND COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY AASHTO T 99 AS MODIFIED BY NCDOT.
3. THE FINAL 12" 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.
4. THE ENTIRE THICKNESS/ VERTICAL EDGE OF CUT SHALL BE TACKED.
5. THE SAME DEPTH OF PAVEMENT MATERIAL WHICH EXISTS SHALL BE REINSTALLED, BUT IN NO CASE SHALL THE ASPHALT BE LESS THAN 3" THICK.
6. THE ASPHALT PAVEMENT MATERIAL SHALL BE INSTALLED AND COMPACTED THOROUGHLY WITH A SMOOTH DRUM ROLLER TO ACHIEVE A SMOOTH LEVEL PATCH.
7. SEE DETAIL W-3 FOR ADDITIONAL TRENCH AND PIPE BEDDING DETAILS.
8. NO HAND PATCHING ALLOWED.
9. PAVEMENT CUTS WITHIN NCDOT ROW SHALL CONFORM TO THE APPROVED ON SITE ENCROACHMENT PERMIT.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 05/11/20	NOT TO SCALE
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STANDARD ASPHALT PAVEMENT PATCH

W-2

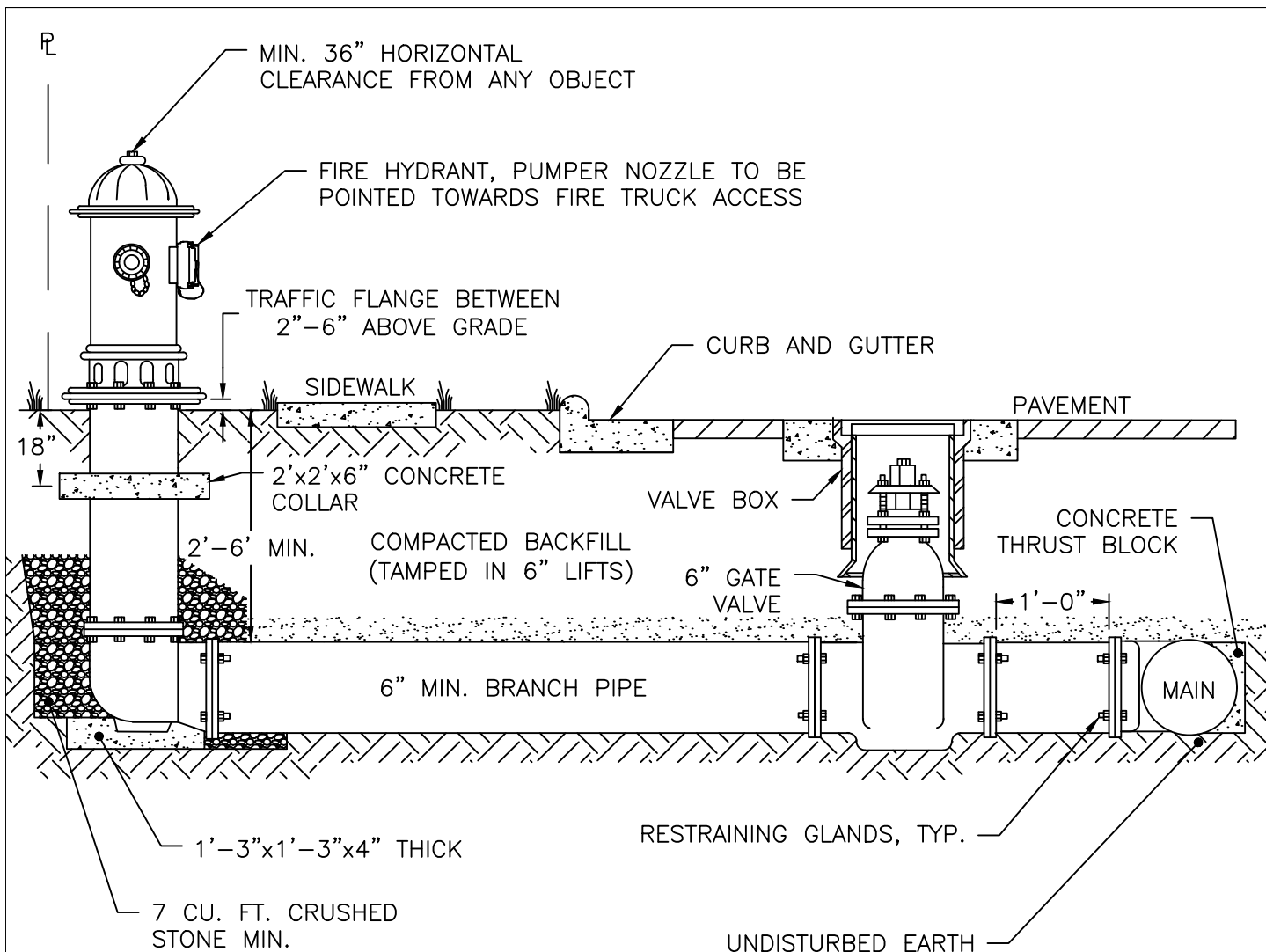


NOTES:

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

REVISIONS	DATE: 05/11/20	NOT TO SCALE
	TRENCH BOTTOM DIMENSIONS AND BACKFILLING REQUIREMENTS FOR DUCTILE IRON	
	W-3	

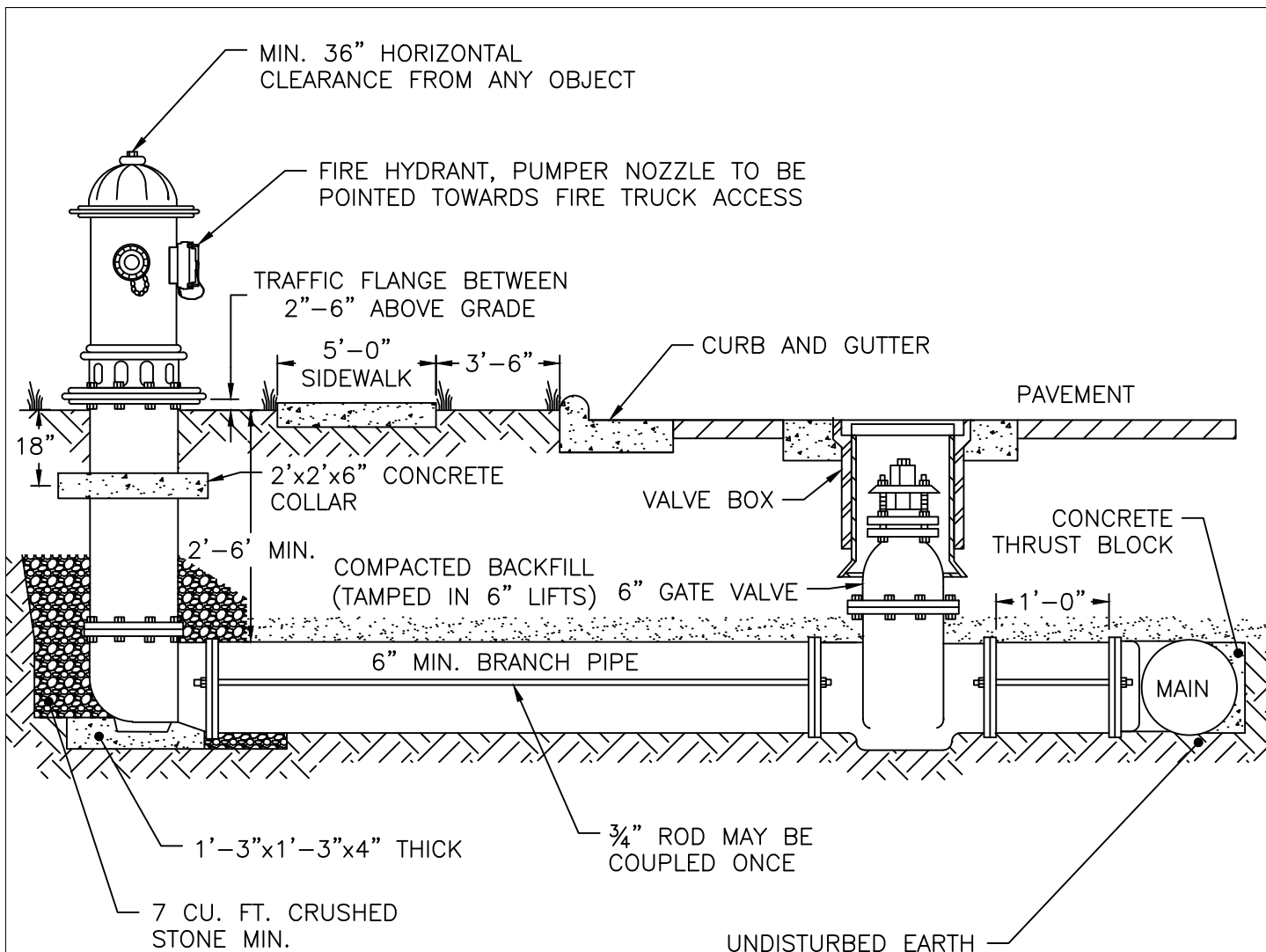


NOTES:

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.

CITY OF RALEIGH STANDARD DETAIL

REVISIONS	DATE: 01/17/23	NOT TO SCALE
	STANDARD FIRE HYDRANT INSTALLATION (RESTRAINT GLANDS)	
	W-4	



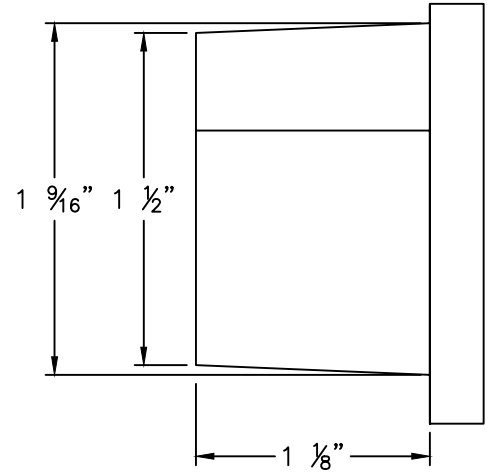
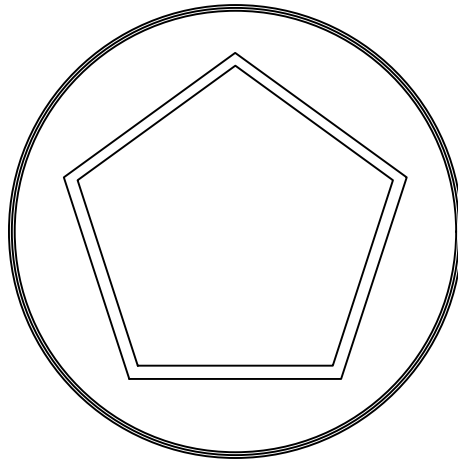
NOTES:

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.

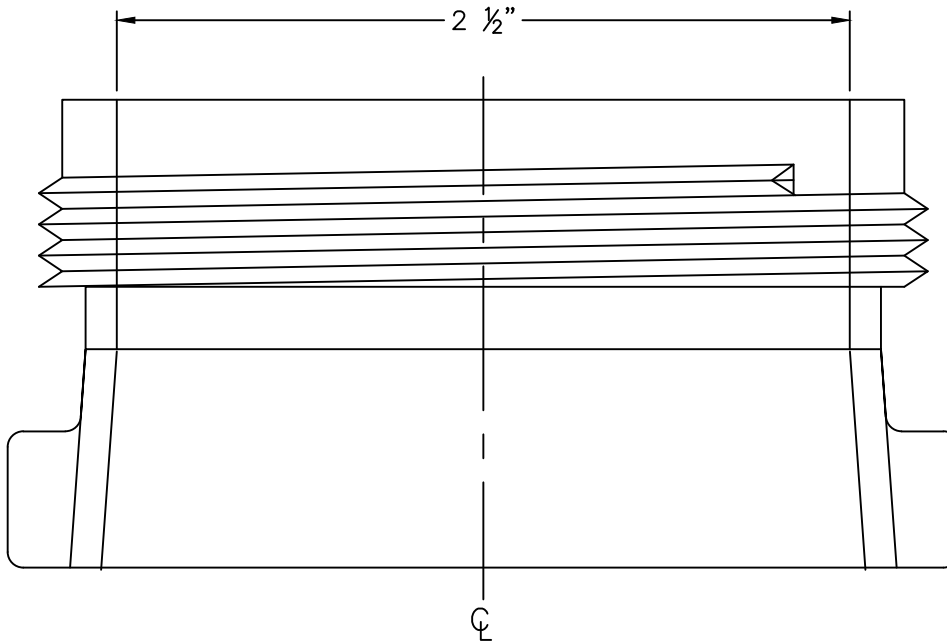
CITY OF RALEIGH STANDARD DETAIL

REVISIONS	DATE: 01/17/23	NOT TO SCALE
	STANDARD FIRE HYDRANT INSTALLATION (RESTRAINT RODS)	
	W-4A	

W-5



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



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

CITY OF RALEIGH
STANDARD DETAIL

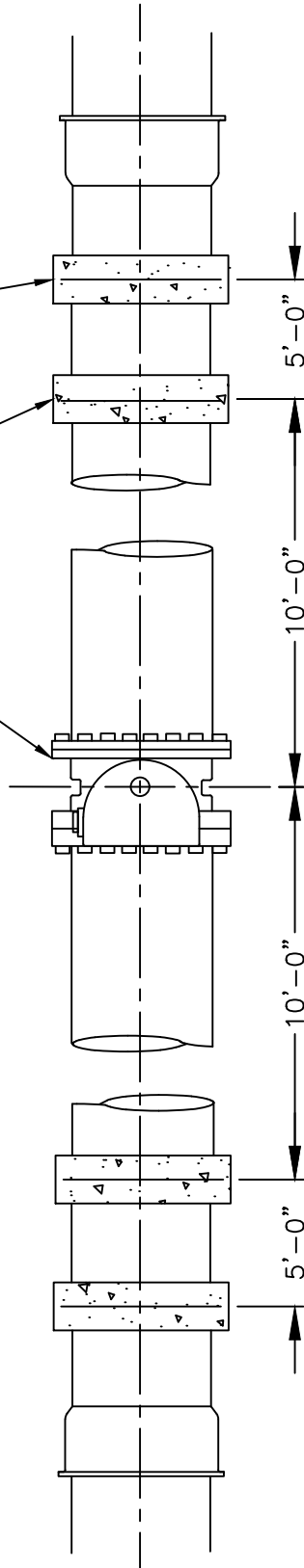
REVISIONS	DATE: 05/11/20	NOT TO SCALE
	HYDRANT OPERATING NUT AND 2 $\frac{1}{2}$ " OUTLET THREADS	
	W-6	

<i>REVISIONS</i>	<i>DATE: 05/11/20</i>	<i>NOT TO SCALE</i>
	THRUST BLOCKING DESIGN	
	DATA FOR WATER MAINS	
	W-7	

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

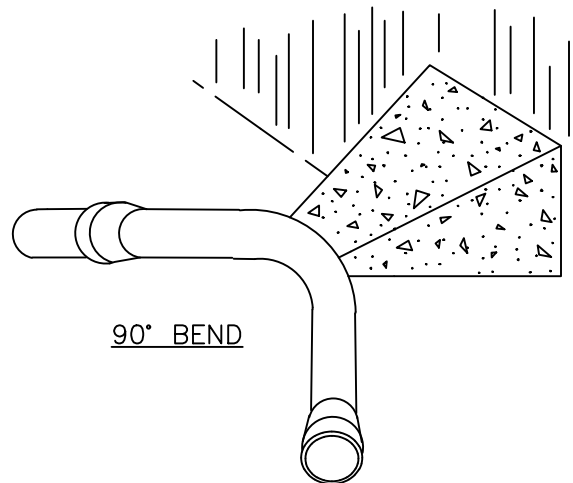
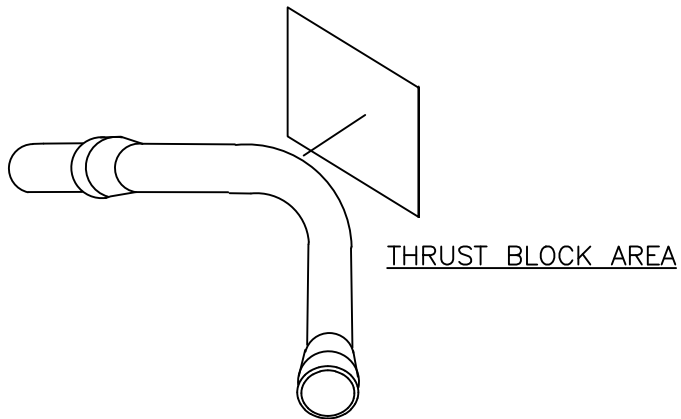
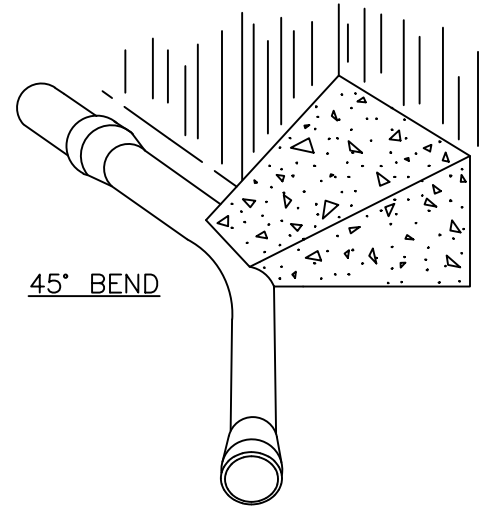
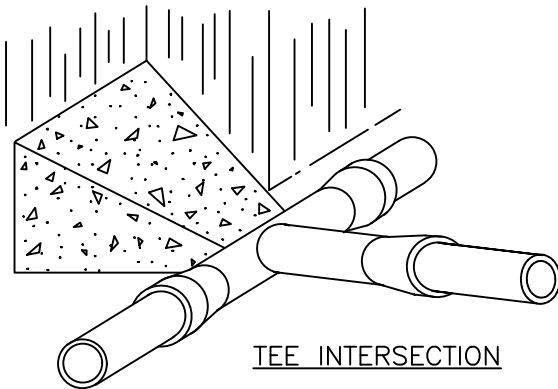
CITY OF RALEIGH
STANDARD DETAIL

REVISIONS DATE: 05/11/20 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.

CITY OF RALEIGH STANDARD DETAIL

REVISIONS	DATE: 05/11/20	NOT TO SCALE
	THRUST BLOCKING VIEWS	
		W-9

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 ²	SOFT CLAY 2,000 LBS/FT ²	1,600 LBS/FT ² GRAVEL/COARSE SAND	8,000 LBS/FT ² DRY CLAY (ALWAYS DRY)	SAND, COMPACT FIRM 8,000 LBS/FT ²	SAND—CLEAN DRY 4,000 LBS/FT ²	SOIL 1,000 LBS/FT ² QUICKSAND (VERY POOR)	ROCK—POOR 10,000 LBS/FT ²
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: 05/11/20	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 ²	SOFT CLAY 2,000 LBS/FT ²	1,600 LBS/FT ² GRAVE/COARSE SAND	8,000 LBS/FT ² DRY CLAY (ALWAYS DRY)	SAND, COMPACT FIRM 8,000 LBS/FT ²	SAND—CLEAN DRY 4,000 LBS/FT ²	SOIL 1,000 LBS/FT ² QUICKSAND (VERY POOR)	ROCK—POOR 10,000 LBS/FT ²
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

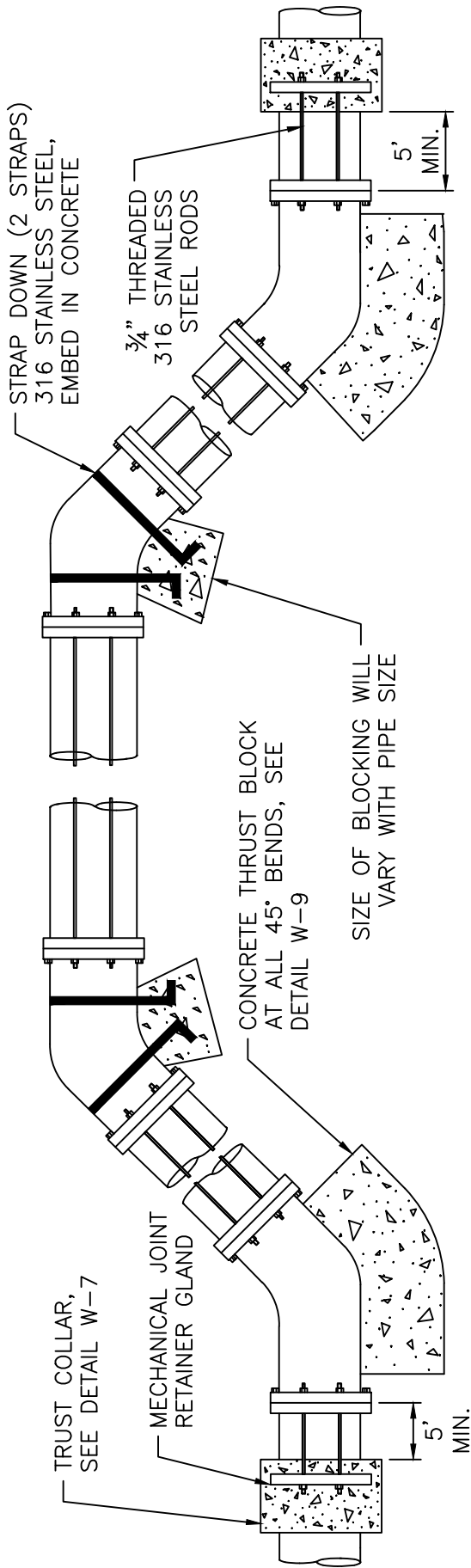
NOTES:

- 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: 05/11/20	NOT TO SCALE
	THRUST BLOCKING DESIGN QUANTITY TABLE	
	W-11	

TOP OF GROUND



ROD REQUIREMENTS			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"

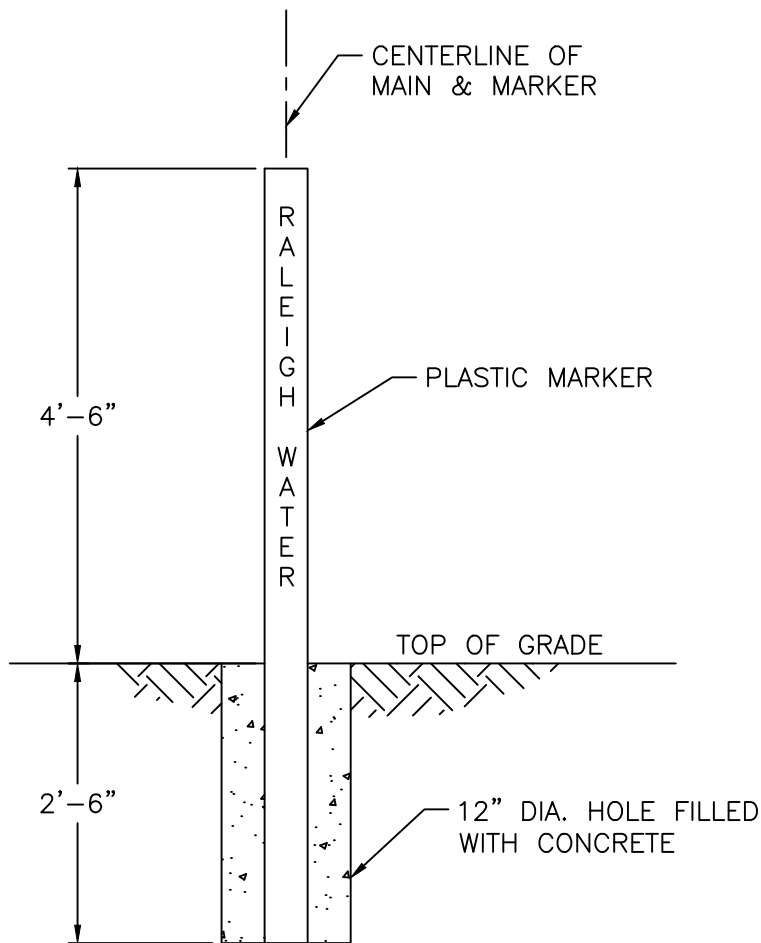
RESTRAINT REQUIREMENTS				
PIPE DIA	RODDING	RJ GLANDS	THRUST COLLAR	THRUST BLOCKING
<12"	X	X	X	
≥12"	X	X	X	X

"X" DENOTES REQUIRED RESTRAINT.

NOTES:

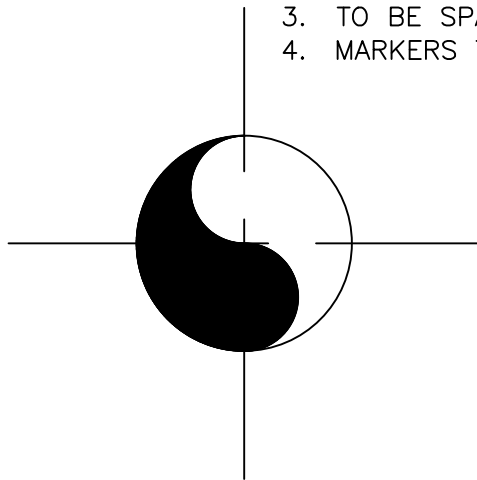
1. STEEL RODS AND BOLTS SHALL BE 3/4" 316 STAINLESS STEEL.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT BENDS.
3. RESTRAINED MECHANICAL GLANDS TO BE USED AT ALL FITTINGS.
4. MUST USE DUCTILE IRON EYE BOLTS WHERE NECESSARY.
5. 3' MINIMUM COVER MUST BE MAINTAINED.
6. EXTERNAL RESTRAINT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

CITY OF RALEIGH		
STANDARD DETAIL		
REVISIONS	DATE: 05/11/20	NOT TO SCALE
	STANDARD VERTICAL BEND	
	W-12	



NOTES:

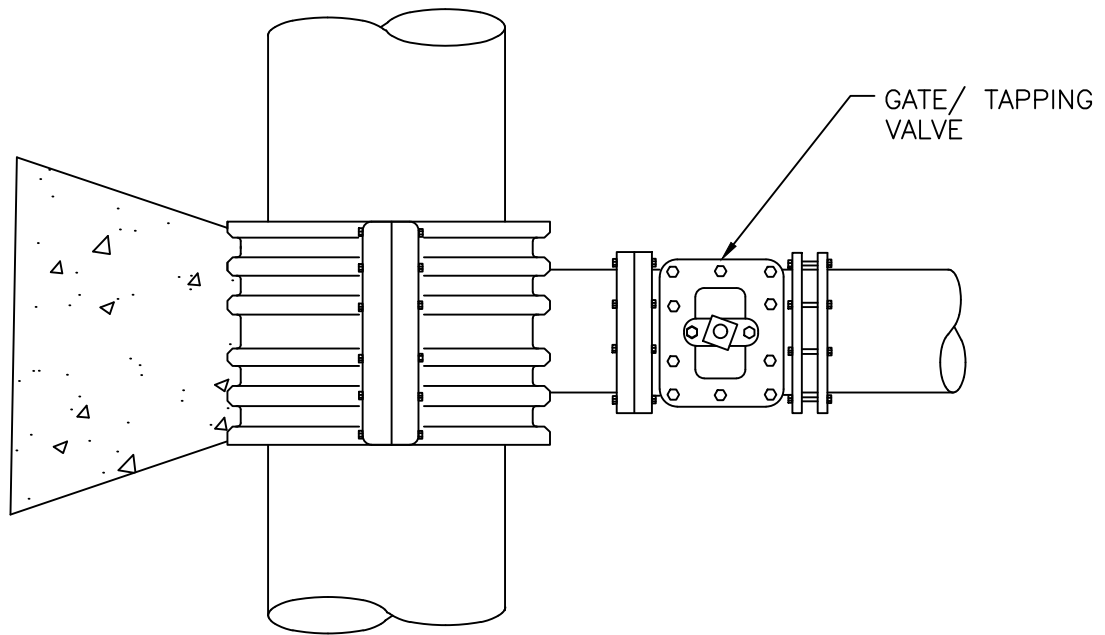
1. POTABLE WATER MARKER TO BE BLUE IN COLOR.
2. POTABLE WATER MARKER TO BE LABELED "RALEIGH WATER"
3. TO BE SPACED ALONG CENTERLINE OF MAIN EVERY 300 FEET.
4. MARKERS TO BE ROUND AND 4" IN DIAMETER.



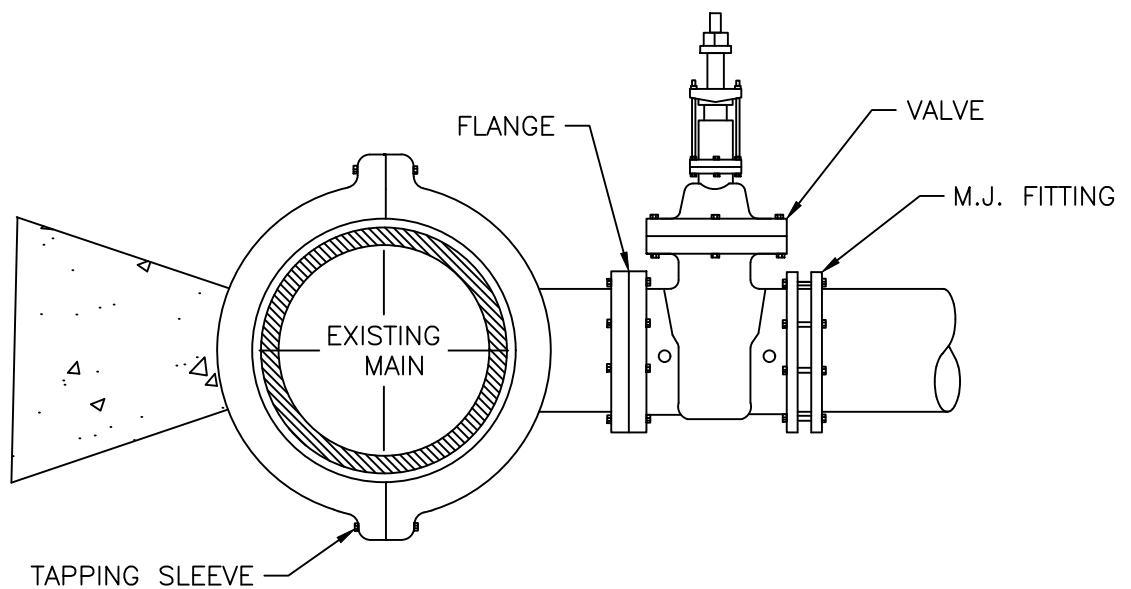
WATER MAIN

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 05/11/20	NOT TO SCALE
	MAIN & VALVE MARKER FOR POTABLE WATER IN EASEMENTS	
		W-13



TOP VIEW



SIDE VIEW

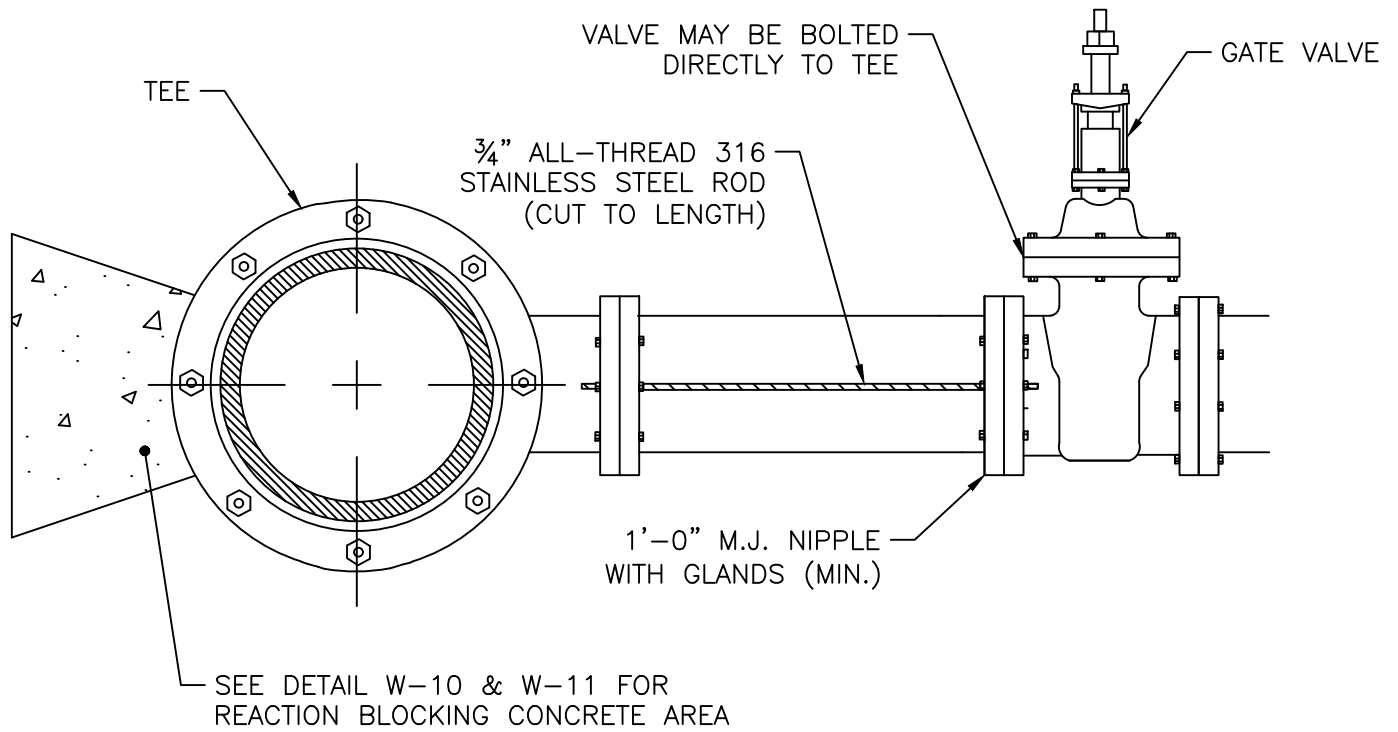
NOTES:

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.

**CITY OF RALEIGH
STANDARD DETAIL**

REVISIONS	DATE: 05/11/20	NOT TO SCALE
	4"-24" STANDARD TAPING 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 $\frac{3}{4}$ " 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.

CITY OF RALEIGH STANDARD DETAIL

REVISIONS	DATE: 01/17/23	NOT TO SCALE
	VALVE RESTRAINT AT TEES AND CROSSES FOR LINES (4"-24")	
	W-15	

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

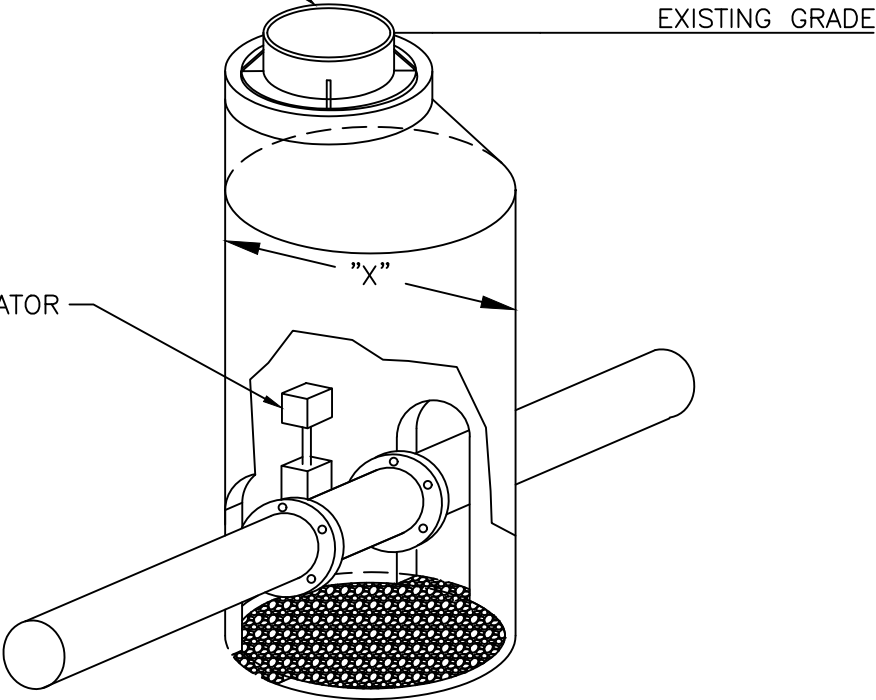
NOTES:

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

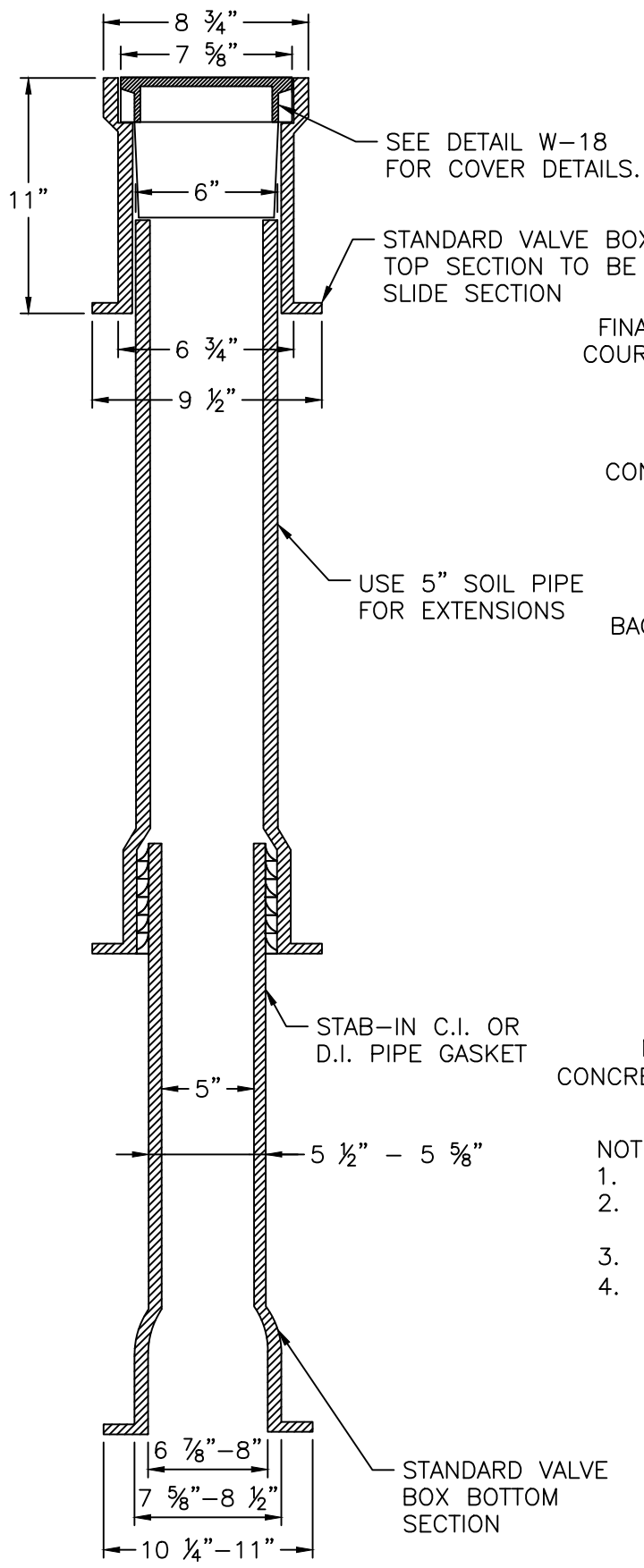


CITY OF RALEIGH
STANDARD DETAIL

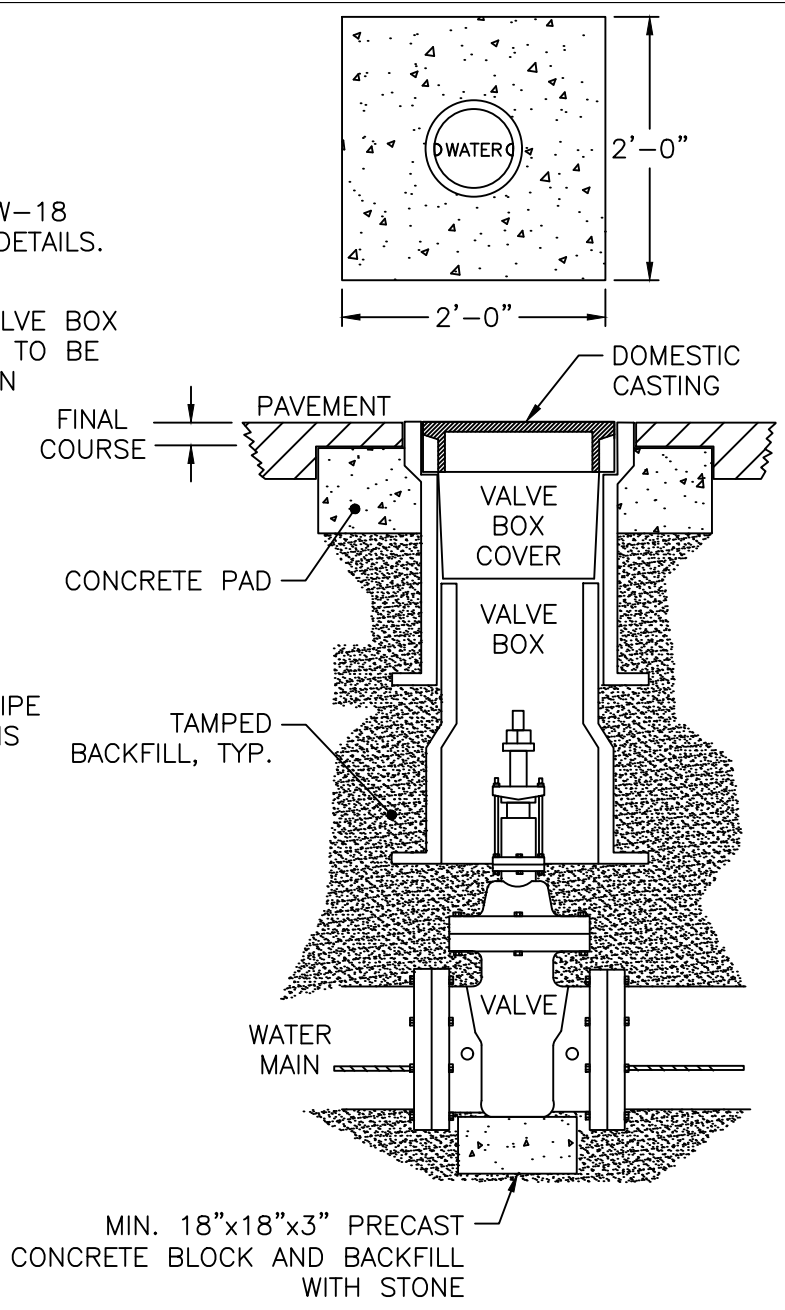
REVISIONS	DATE: 05/11/20	NOT TO SCALE
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	BUTTERFLY VALVE MANHOLE FOR 16" & LARGER MAINS

W-16

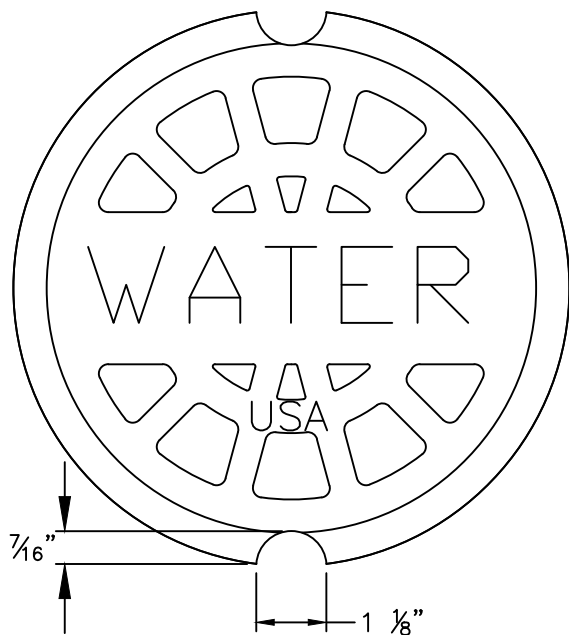


APPROVED METHOD FOR
EXTENSION OF VALVE BOX

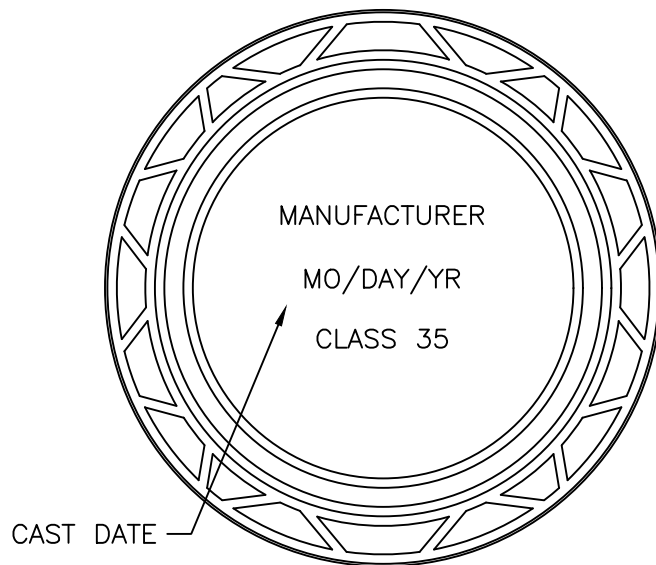


- NOTES:
1. VALVE BOX NOT TO CONTACT WATER MAIN
 2. ALL TRAFFIC CASTINGS MUST BE CLASS 35 OR GREATER.
 3. TOTAL VALVE BOX WEIGHT: MINIMUM OF 85 LBS.
 4. 2'x2'x6" CONCRETE PAD REQUIRED ON ALL VALVES. NO PRECAST CONCRETE DOUGHNUT ALLOWED.

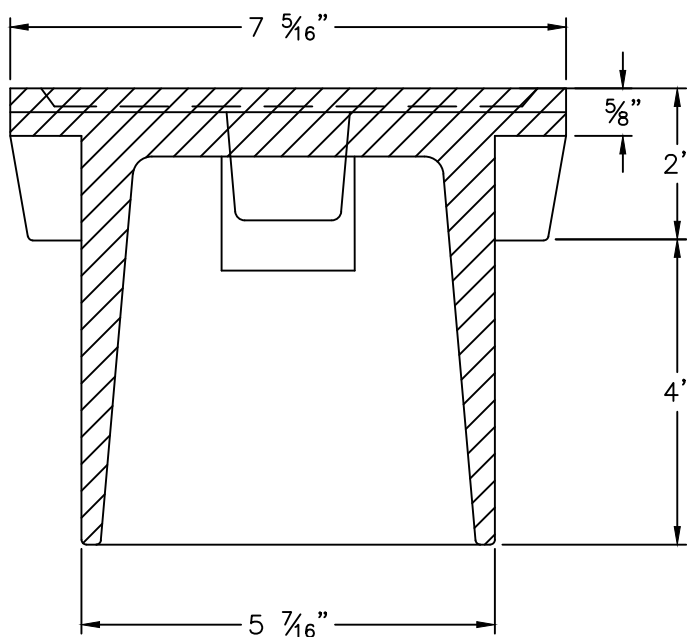
CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 05/11/20	NOT TO SCALE
	VALVE BOX INSTALLATION AND EXTENSION	
	W-17	



PLAN VIEW



BOTTOM VIEW



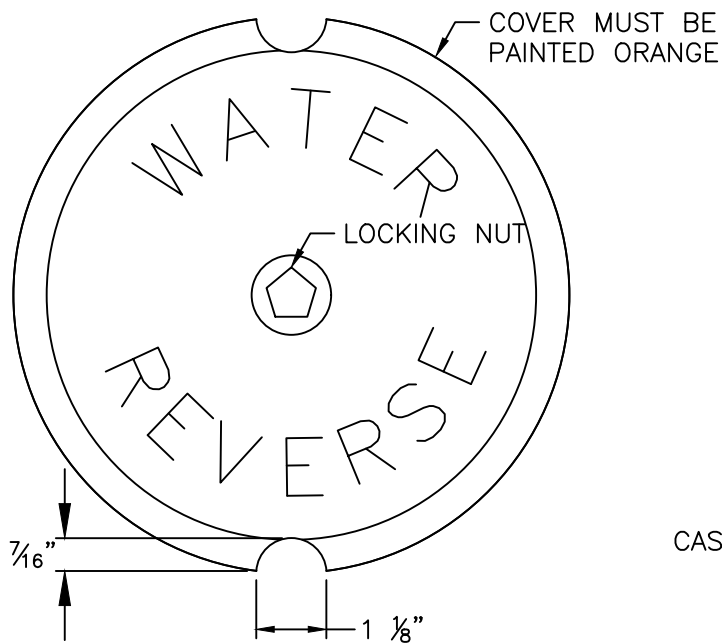
SECTION VIEW

NOTE:

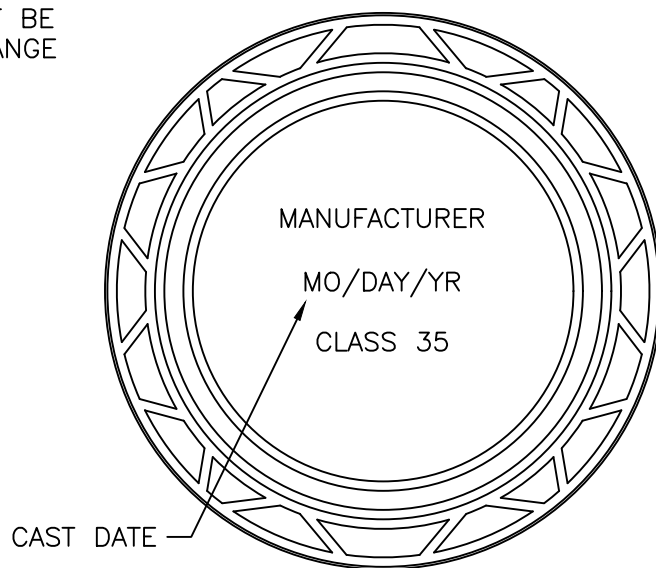
1. "WATER" LETTERING MUST BE 1" RAISED (RECESSED FLUSH).
2. VALVE COVER SHALL BE DOMESTICALLY CAST.
3. COVER MUST HAVE A MINIMUM WEIGHT OF 25 POUNDS.
4. COVER MUST BE CLASS 35 OR GREATER.
5. COVER MUST MEET OR EXCEED AASHTO H-20 LOAD REQUIREMENTS.

**CITY OF RALEIGH
STANDARD DETAIL**

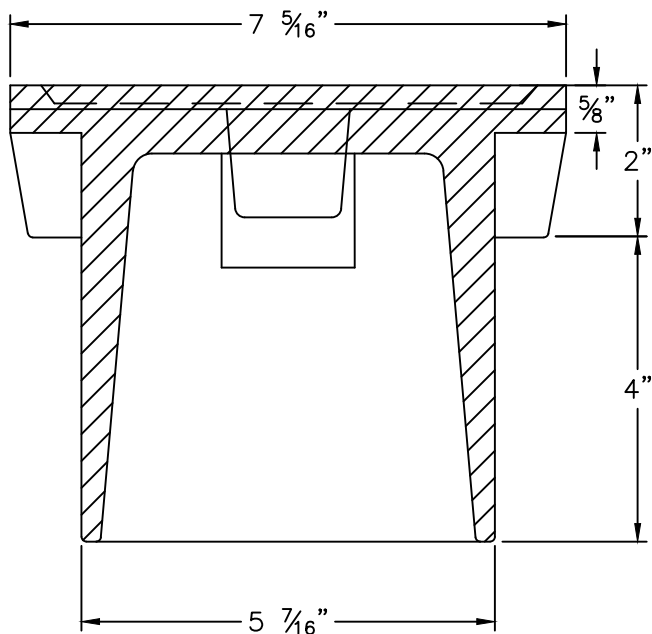
REVISIONS	DATE: 05/11/20	NOT TO SCALE
	5 1/4" VALVE BOX DROP LID WITH 4" SKIRT	
	W-18	



PLAN VIEW



BOTTOM VIEW



SECTION VIEW

NOTE:

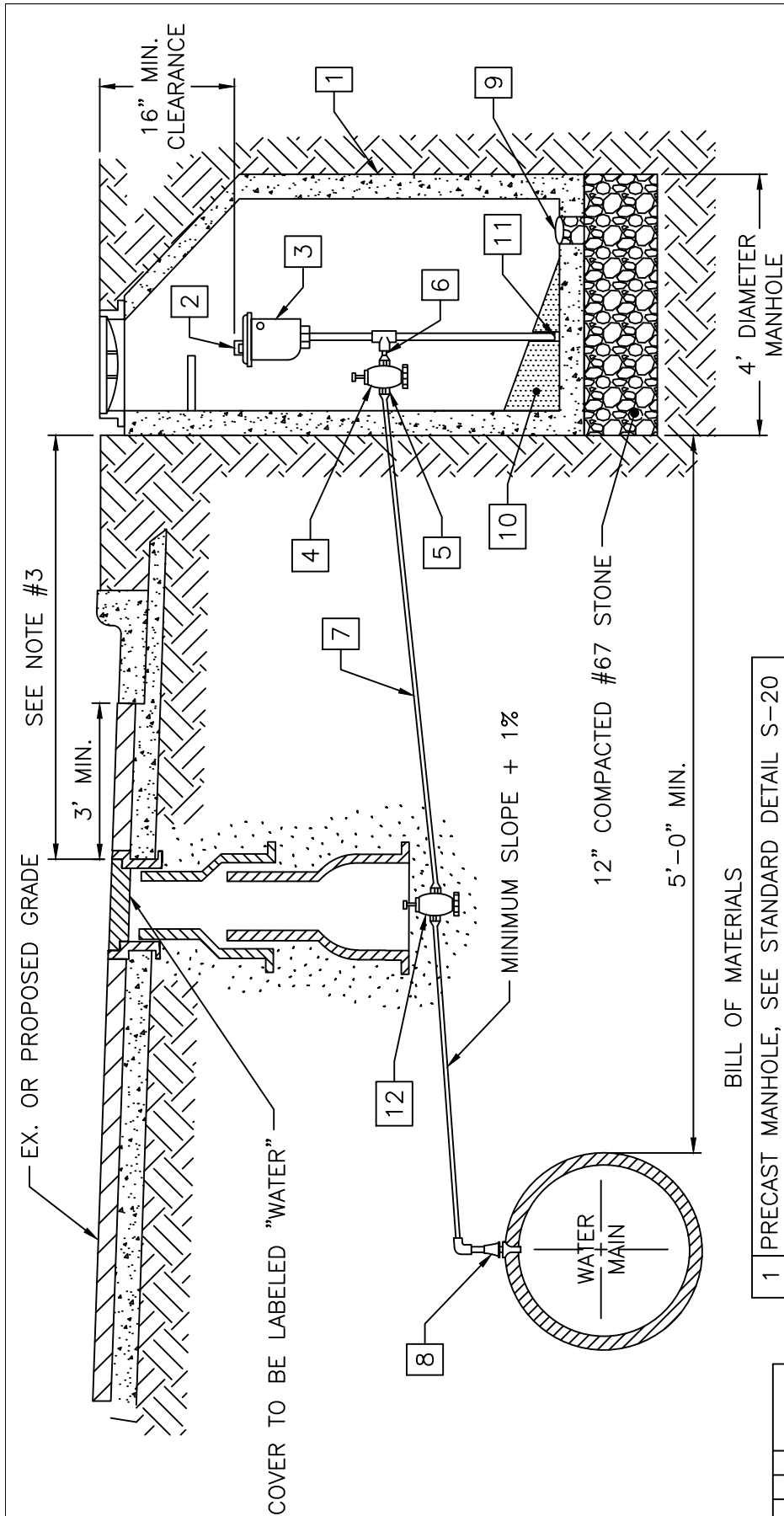
1. "WATER" AND "REVERSE" LETTERING MUST BE 1" RAISED (RECESSED FLUSH).
2. VALVE COVER SHALL BE DOMESTICALLY CAST.
3. COVER MUST HAVE A MINIMUM WEIGHT OF 25 POUNDS.
4. COVER MUST BE CLASS 35 OR GREATER.
5. COVER MUST MEET OR EXCEED AASHTO H-20 LOAD REQUIREMENTS.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS DATE: 01/17/23 NOT TO SCALE

REVERSE TAP $5 \frac{1}{4}$ "
VALVE BOX DROP LID
WITH 4" SKIRT

W-18A



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

NOTE:

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

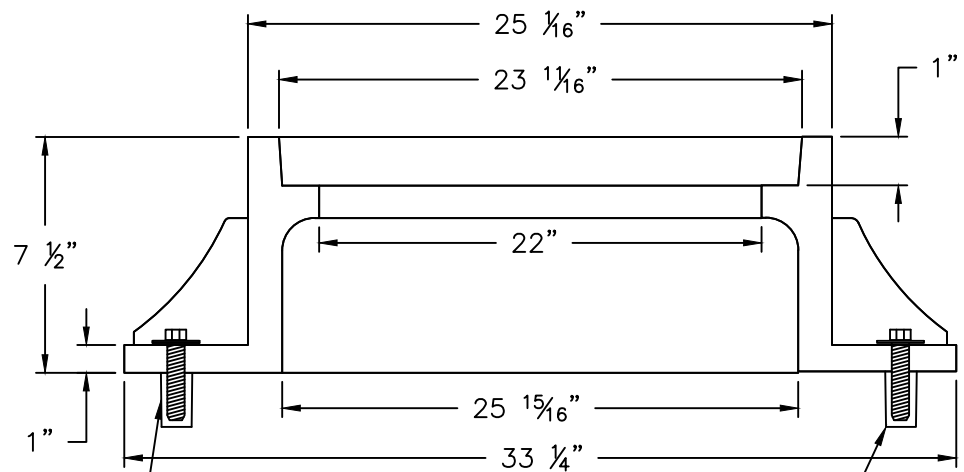
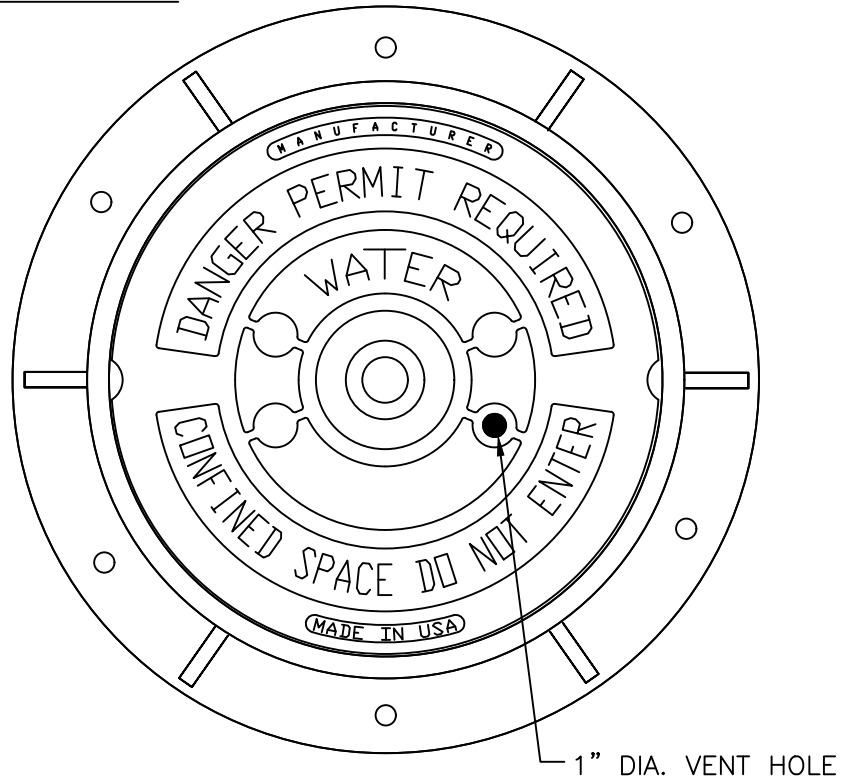
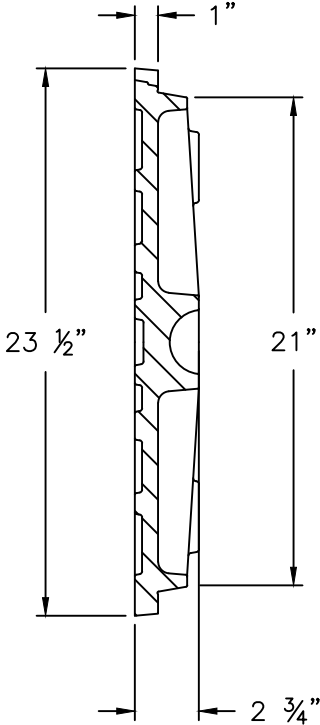
CITY OF RALEIGH STANDARD DETAIL

REVISIONS DATE: 05/11/20 NOT TO SCALE

WATER AIR RELEASE VALVE

W-19

MANHOLE FRAME AND COVER



LAGSHIELDS MAY ONLY BE USED
IN ROADWAY APPLICATIONS

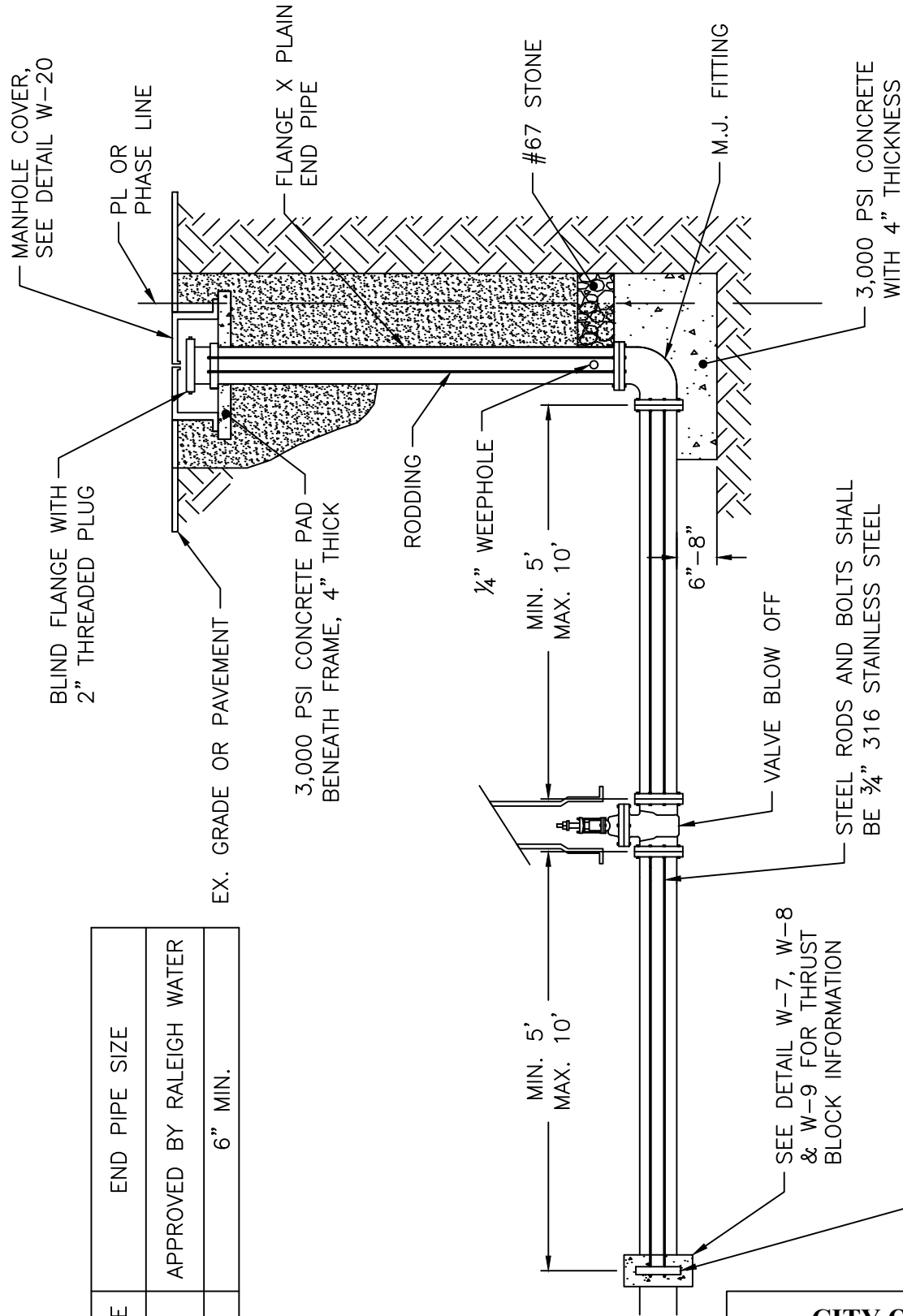
5/8"x3" LAGSHIELD IN HOLE DRILLED INTO
CONE OR RING WITH ANCHOR SUNK TO
DESIGN DEPTH, AND 3/8"x3" HOT DIPPED
GALVANIZED LAG BOLT AND WASHER

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: 05/11/20	NOT TO SCALE
	STANDARD MANHOLE COVER	
	W-20	

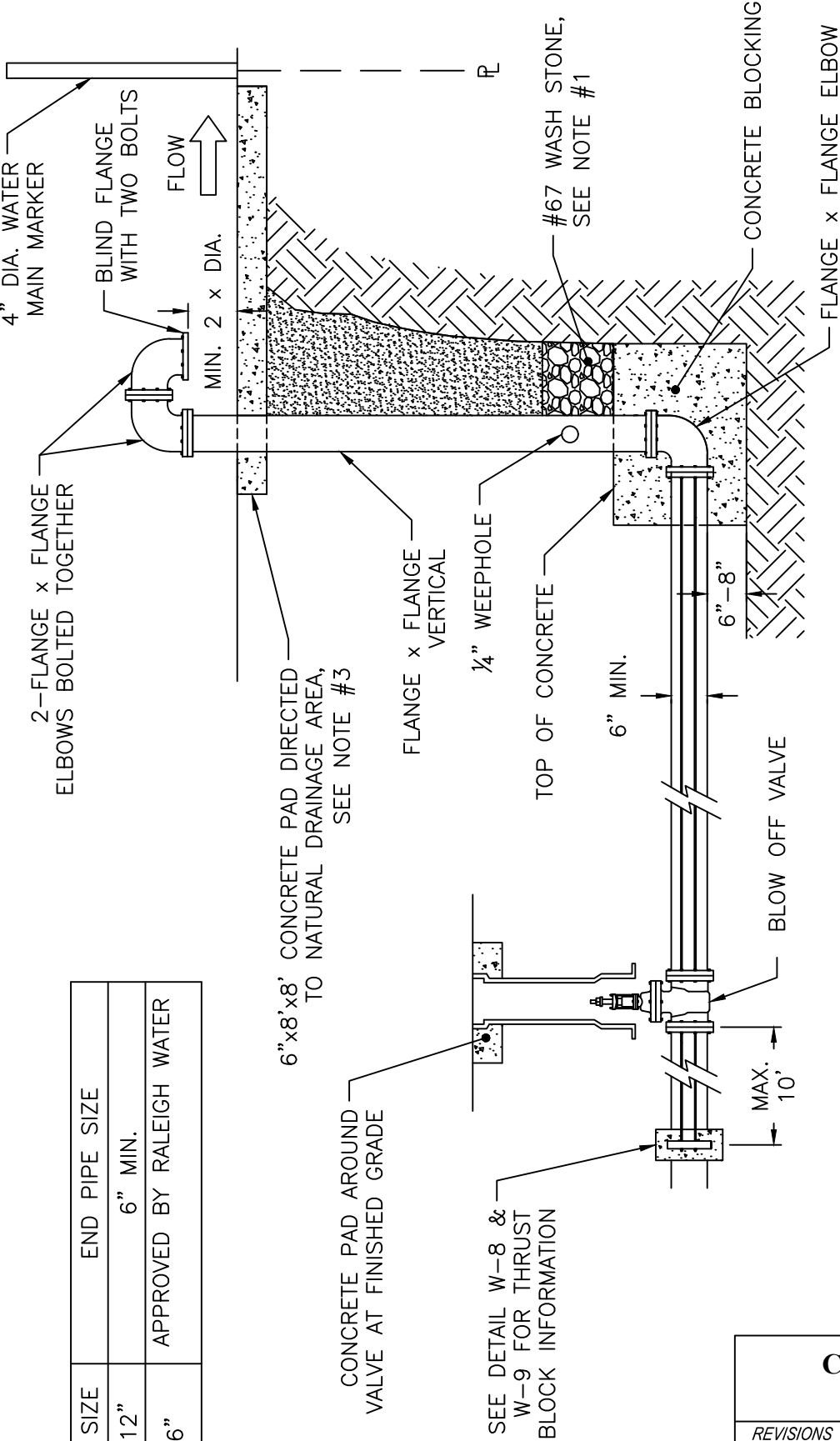
MAIN SIZE	END PIPE SIZE
6"-12"	APPROVED BY RALEIGH WATER
≥16"	6" MIN.



NOTE:
NO ROD COUPLINGS ALLOWED.

CITY OF RALEIGH STANDARD DETAIL		
REVISIONS	DATE: 05/11/20	NOT TO SCALE
	TEMPORARY WATER MAIN BLOW OFF ASSEMBLY	
	W-21	

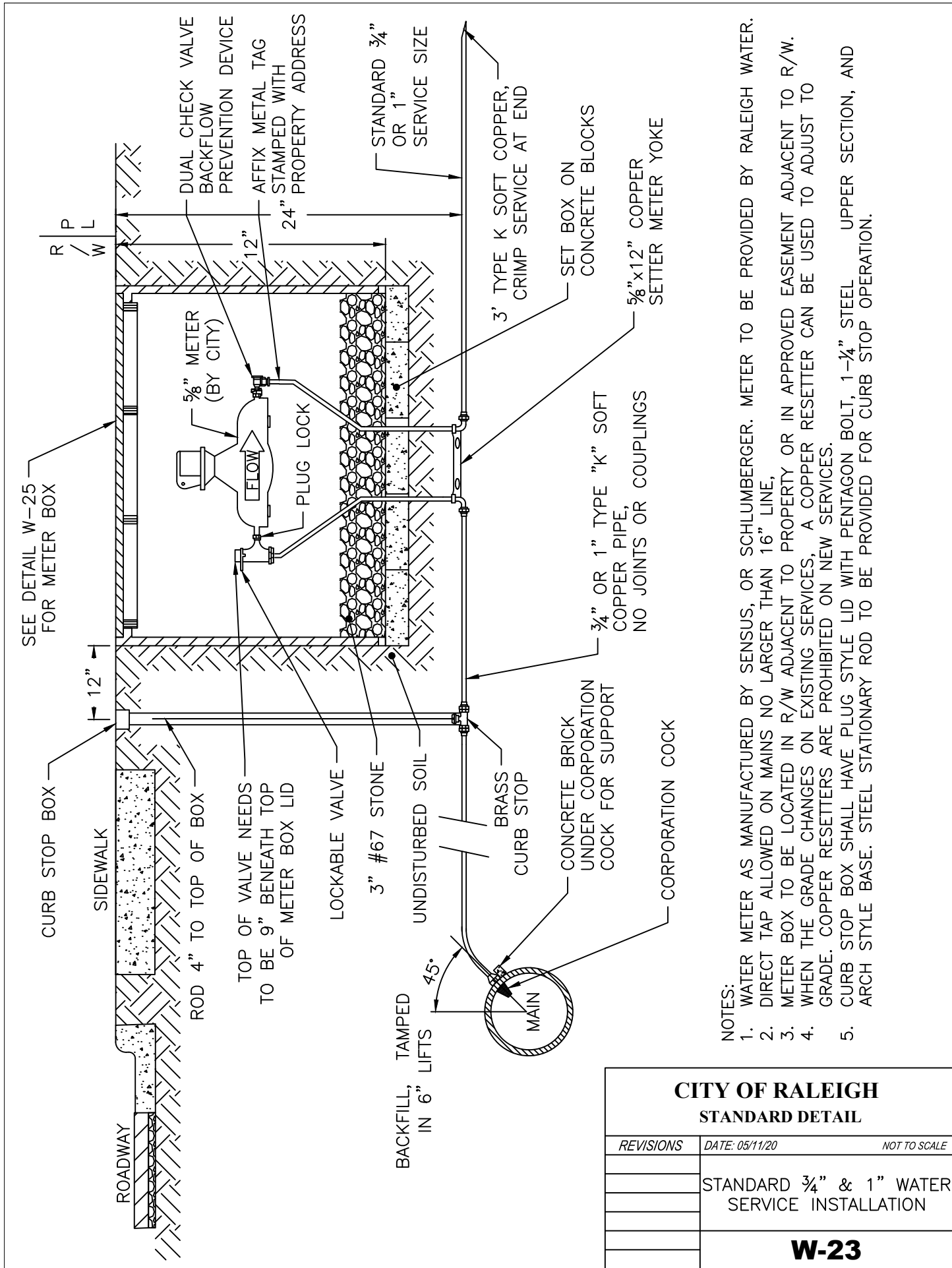
MAIN SIZE	END PIPE SIZE
6"-12"	6" MIN.
≥16"	APPROVED BY RALEIGH WATER



NOTES:

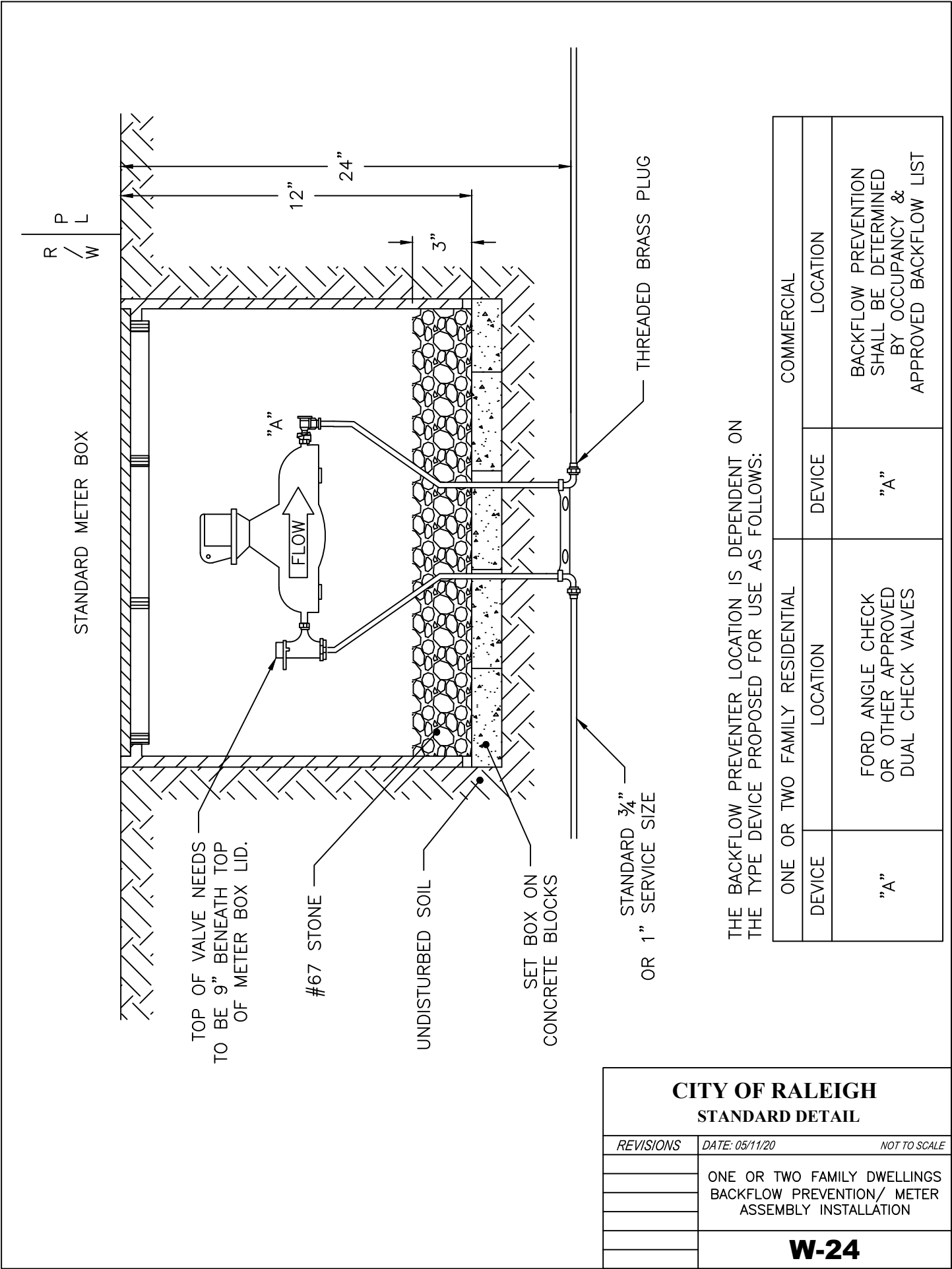
1. DRILL 1/4" WEEP HOLE FOR STACK DRAINAGE INTO STONE.
2. DOUBLE 3/4" BRIDLE RODS ON BOTH SIDES.
3. A RIP-RAP SWALE FROM FROM CONCRETE SPLASH PAD TO POSITIVE DRAINAGE AREA IS REQUIRED.
4. BOTTOM 90° ELBOW SHALL HAVE BLIND FLANGE ATTACHED WITH TWO BOLTS.
5. INSTALL WATER MAIN MARKER AT R/W OR P/L TO LOCATE 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.

CITY OF RALEIGH		
STANDARD DETAIL		
REVISIONS	DATE: 05/11/20	NOT TO SCALE
	PERMANENT WATER MAIN BLOW OFF ASSEMBLY	
	W-22	



- 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: 05/11/20	NOT TO SCALE
	STANDARD 3/4" & 1" WATER SERVICE INSTALLATION	
	W-23	



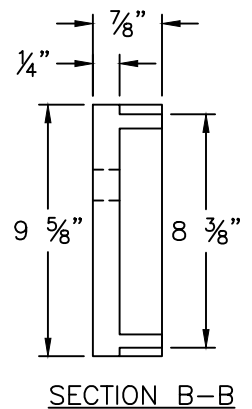
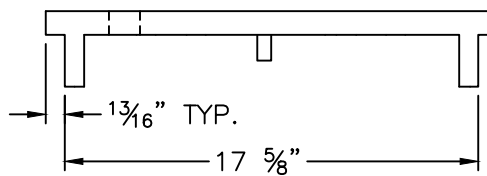
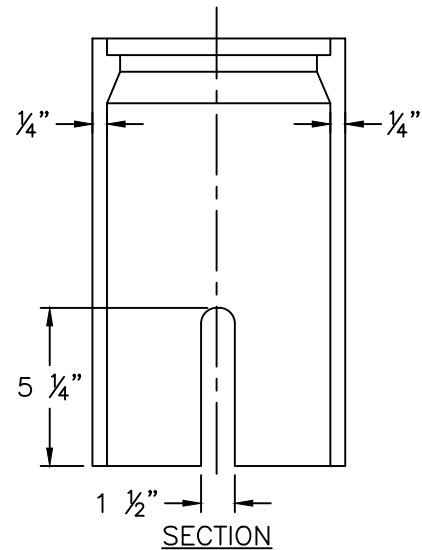
THE BACKFLOW PREVENTER LOCATION IS DEPENDENT ON THE TYPE DEVICE PROPOSED FOR USE AS FOLLOWS:

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

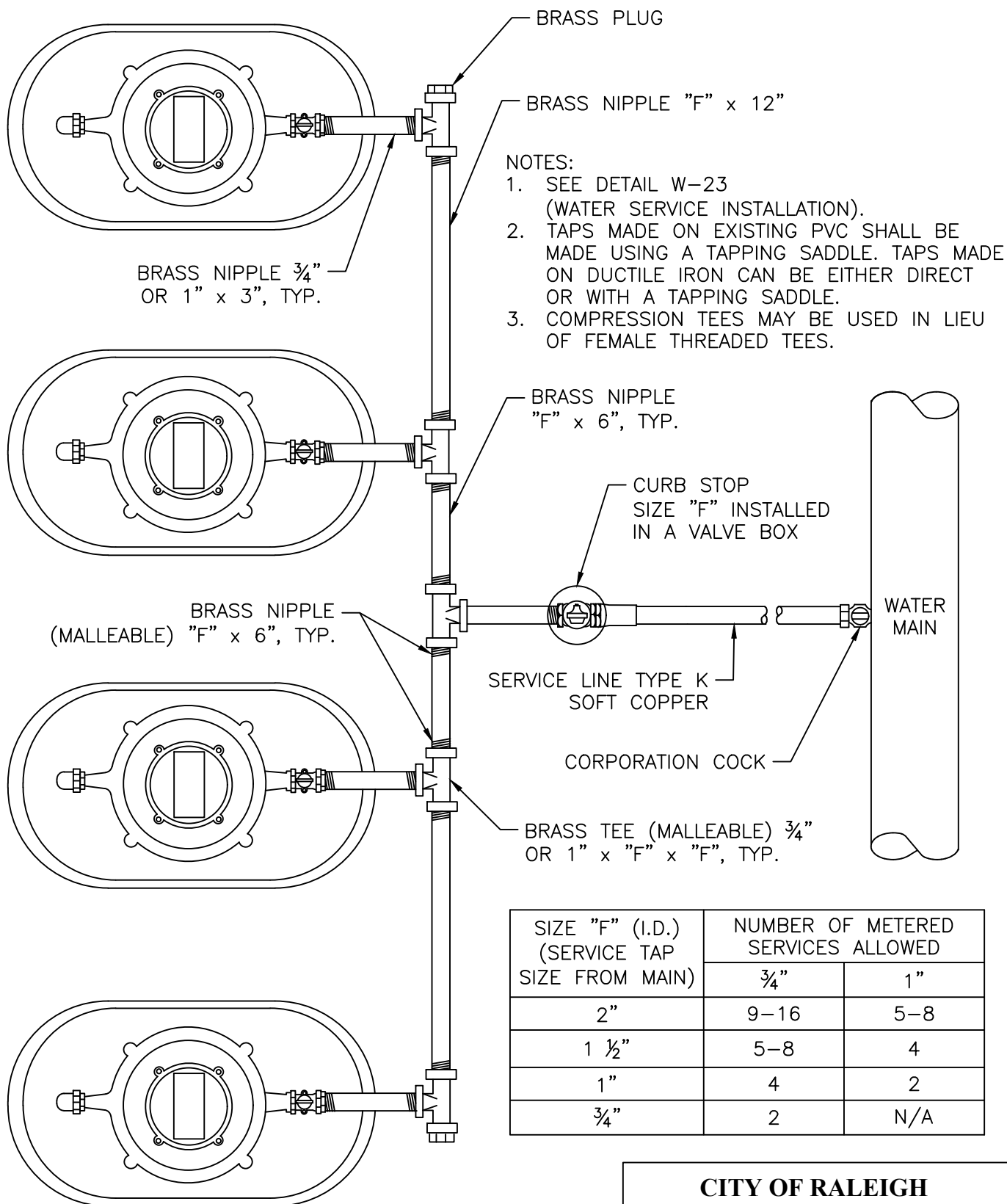
CITY OF RALEIGH		
STANDARD DETAIL		
REVISIONS	DATE: 05/11/20	NOT TO SCALE
	ONE OR TWO FAMILY DWELLINGS BACKFLOW PREVENTION/ METER ASSEMBLY INSTALLATION	
	W-24	

Diagram illustrating the Plan view of a water meter assembly. The diagram shows a horizontal oval shape representing the meter body. Two circular components are labeled "CITY SEAL" and "AMR". A vertical line passes through the center, and a horizontal line also passes through the center. A dimension line on the right indicates a width of 10 $\frac{3}{4}$ " inches. A label "PICK UP HOOK" points to a small hook-like feature on the left side. The word "PLAN" is centered below the diagram.

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.



CITY OF RALEIGH STANDARD DETAIL		
<i>REVISIONS</i>	<i>DATE: 05/11/20</i>	<i>NOT TO SCALE</i>
	WATER METER BOX	
	W-25	

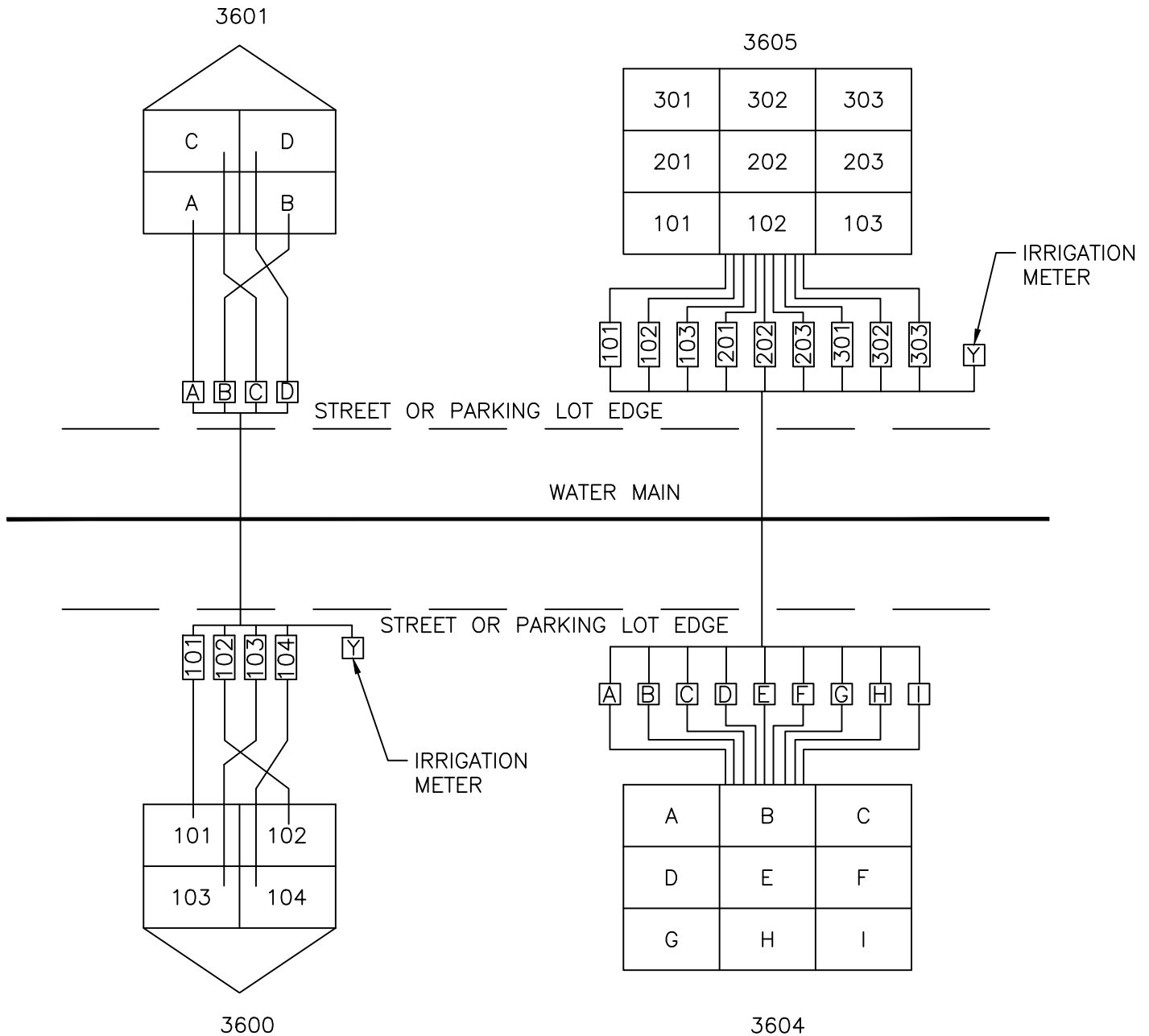


SIZE "F" (I.D.) (SERVICE TAP SIZE FROM MAIN)	NUMBER OF METERED SERVICES ALLOWED	
	$\frac{3}{4}$ "	1"
2"	9-16	5-8
1 $\frac{1}{2}$ "	5-8	4
1"	4	2
$\frac{3}{4}$ "	2	N/A

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 05/11/20	NOT TO SCALE
	STANDARD GANG METER ASSEMBLY	
	W-26	

ODD NUMBERED ADDRESS



NOTES:

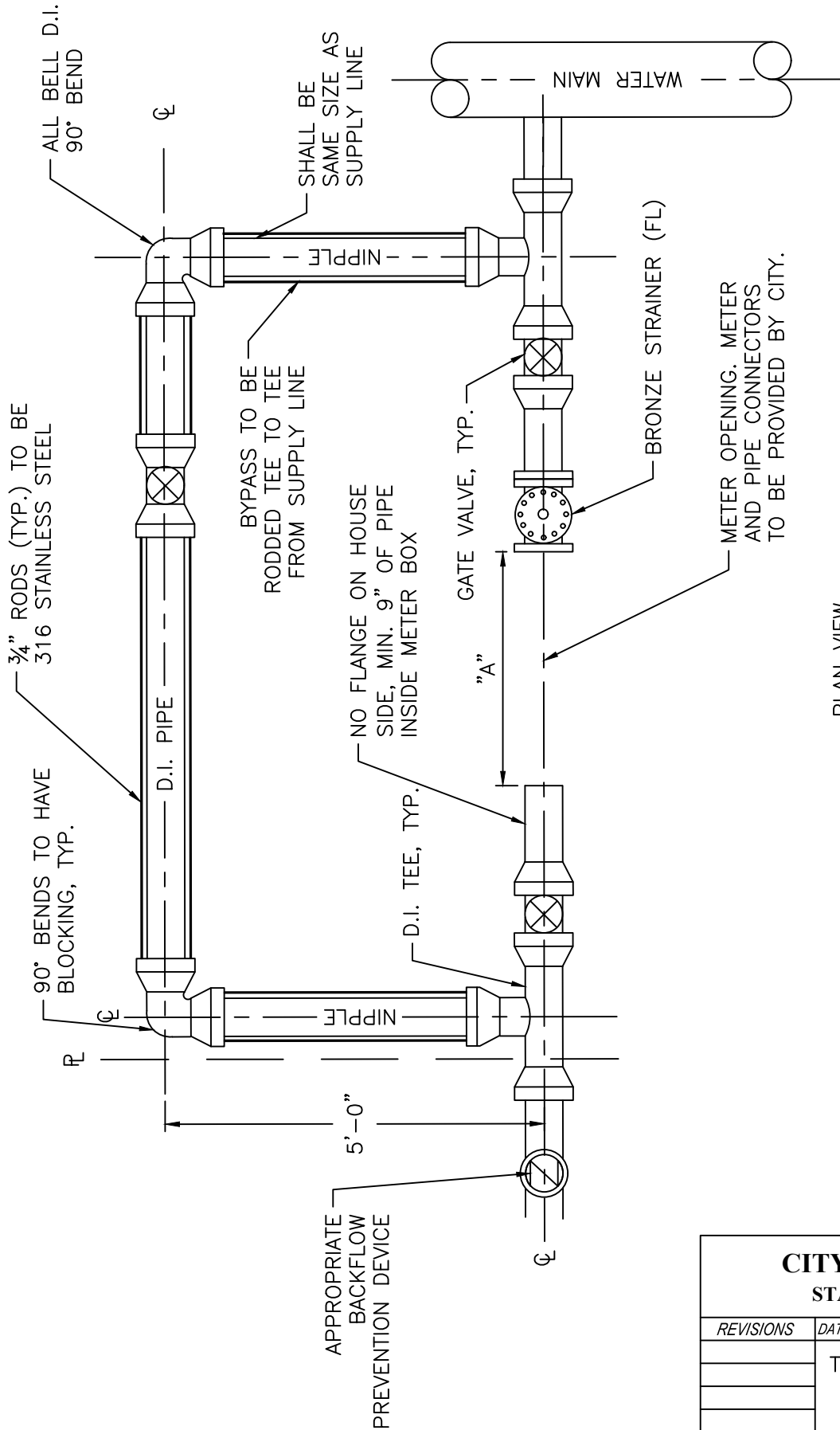
1. EVEN NUMBERED UNITS: METERS SHALL BE SET TO BE READ RIGHT TO LEFT (WHEN FACING BUILDING).
2. ODD NUMBERED UNITS: METERS SHALL BE SET TO BE READ LEFT TO RIGHT (WHEN FACING BUILDING).
3. IF IRRIGATION METER IS INCLUDED, IT SHALL BE THE LAST METER IN NUMBERING SEQUENCE.
4. UNIT 'Y' (FOR YARD METER) SHALL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

CITY OF RALEIGH **STANDARD DETAIL**

REVISIONS DATE: 05/11/20 NOT TO SCALE

GANG METER ADDRESSING
MULTI-STORY BUILDING

W-28



PLAN VIEW

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

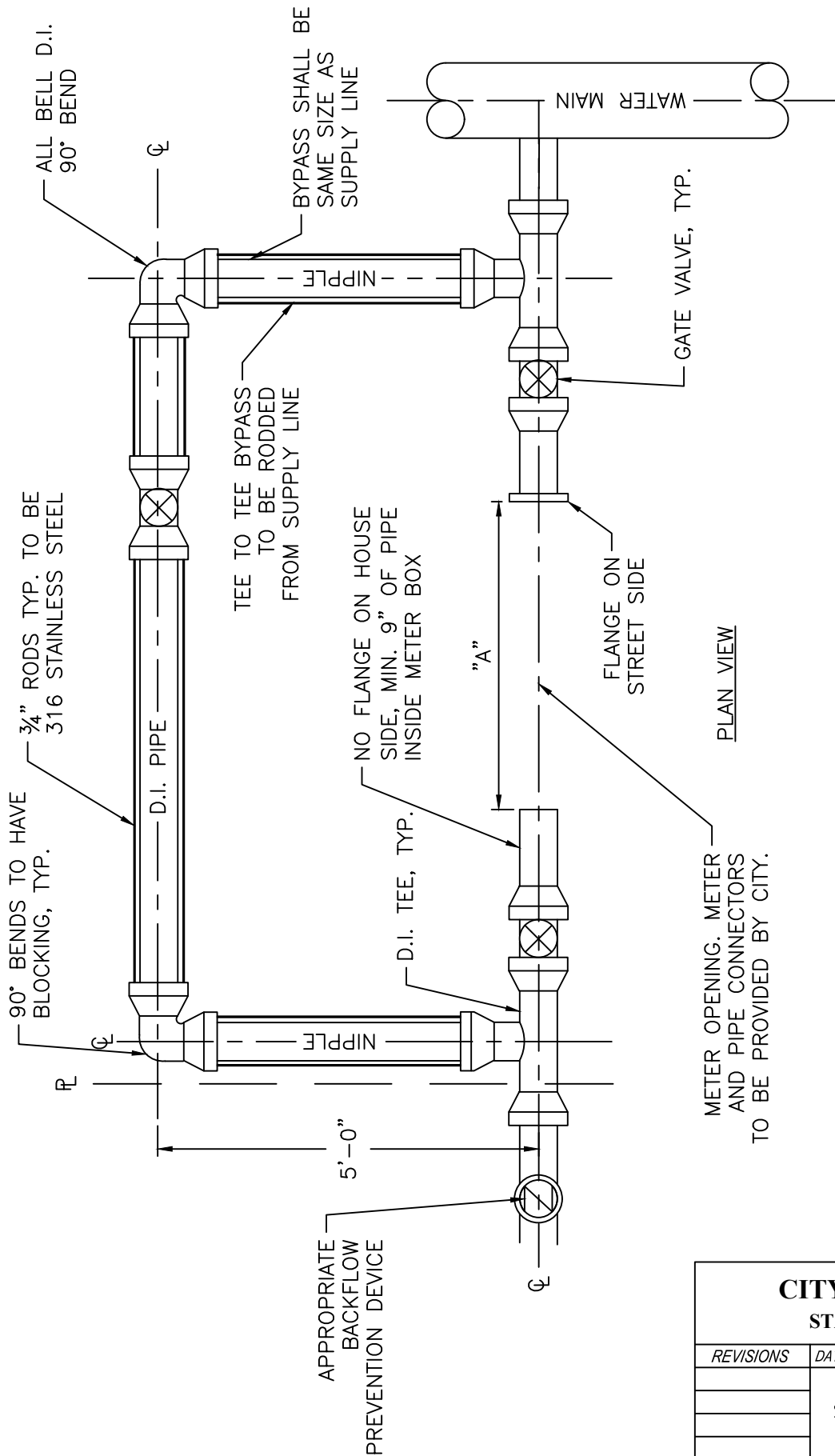
- NOTES:
1. DOMESTIC METERS ONLY.
 2. ALL FITTINGS ARE TO BE MECHANICAL JOINT, U.N.O.
 3. BRONZE STRAINERS SHALL HAVE NON-THREADED BOLT HOLES.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS DATE: 05/11/20 NOT TO SCALE

TYPICAL 4"-8" DOMESTIC
WATER METER
BYPASS INSTALLATION

W-29

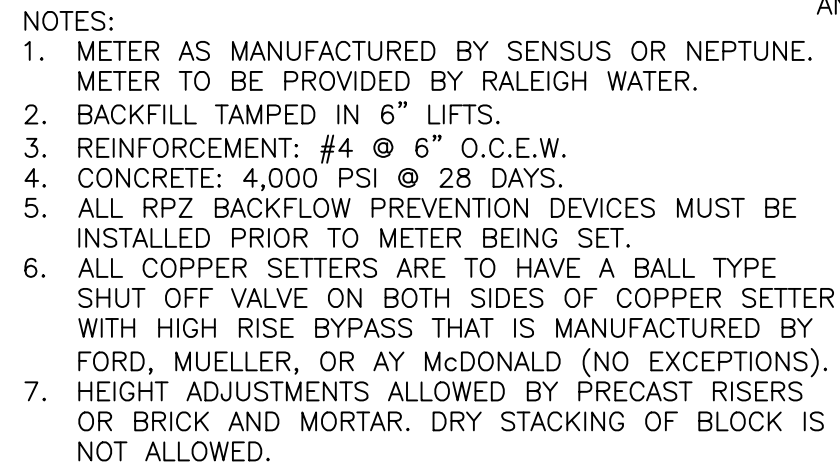


"A"

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

- 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: 05/11/20 NOT TO SCALE
	TYPICAL 6"-10" FIRE SERVICE AND DOMESTIC METER W/ BYPASS
W-30	

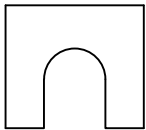
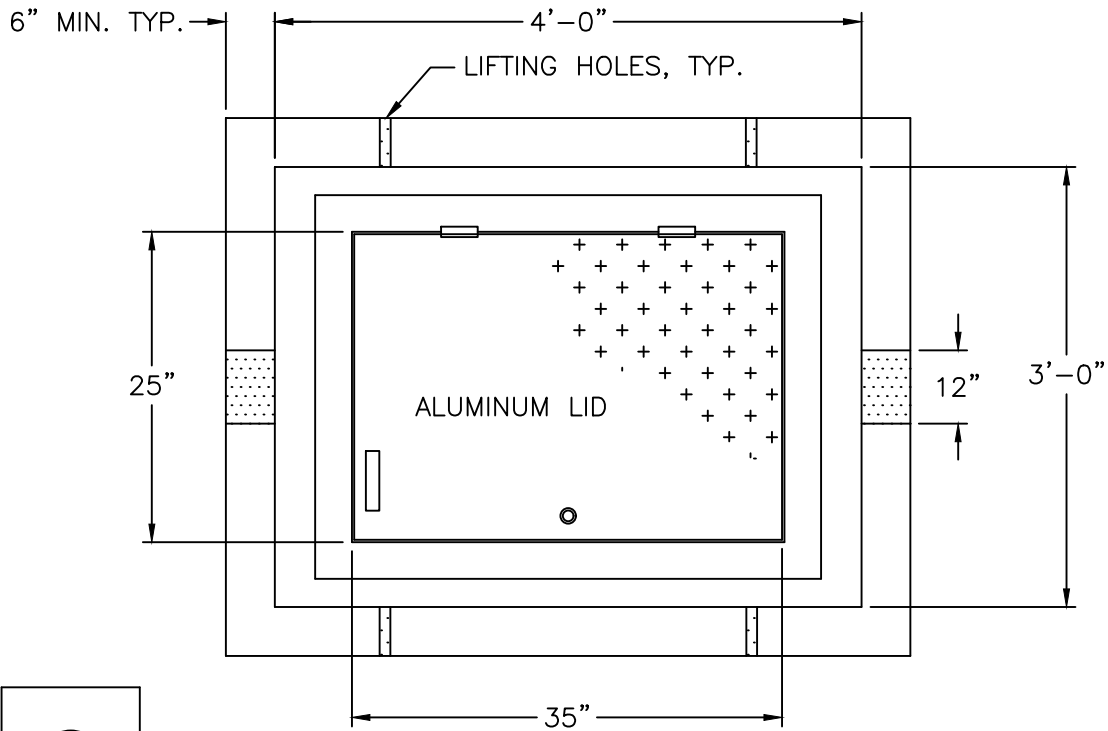


"A"	
1 ½" METER	13 ¼"
2" METER	17 ¼"

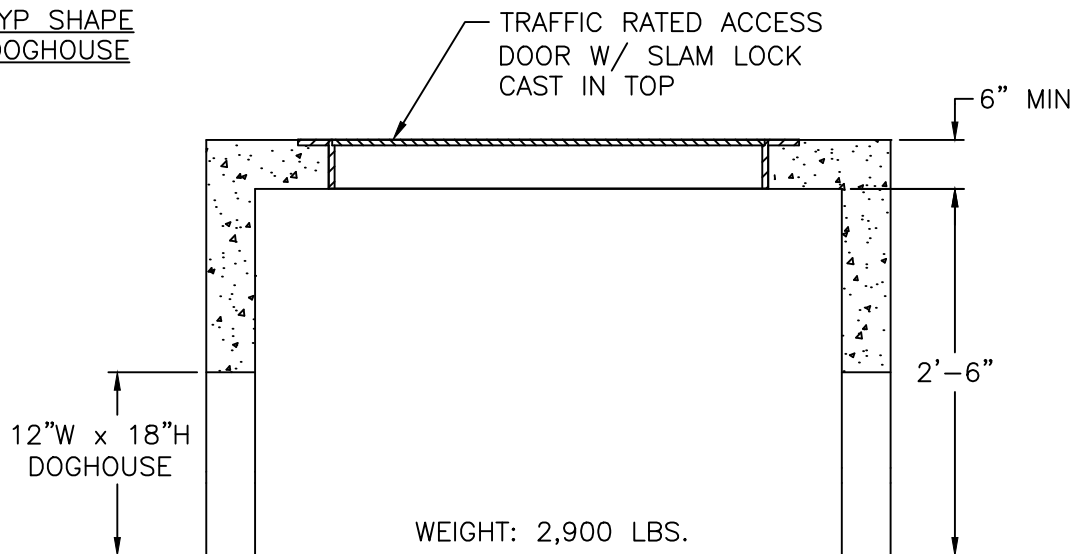
** TRAFFIC RATED
VAULT WALL THICKNESS

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 05/11/20	NOT TO SCALE
	TYPICAL 1 1/2"–2" WATER METER BOX INSTALLATION	
	W-31	



TYP. SHAPE
DOGHOUSE

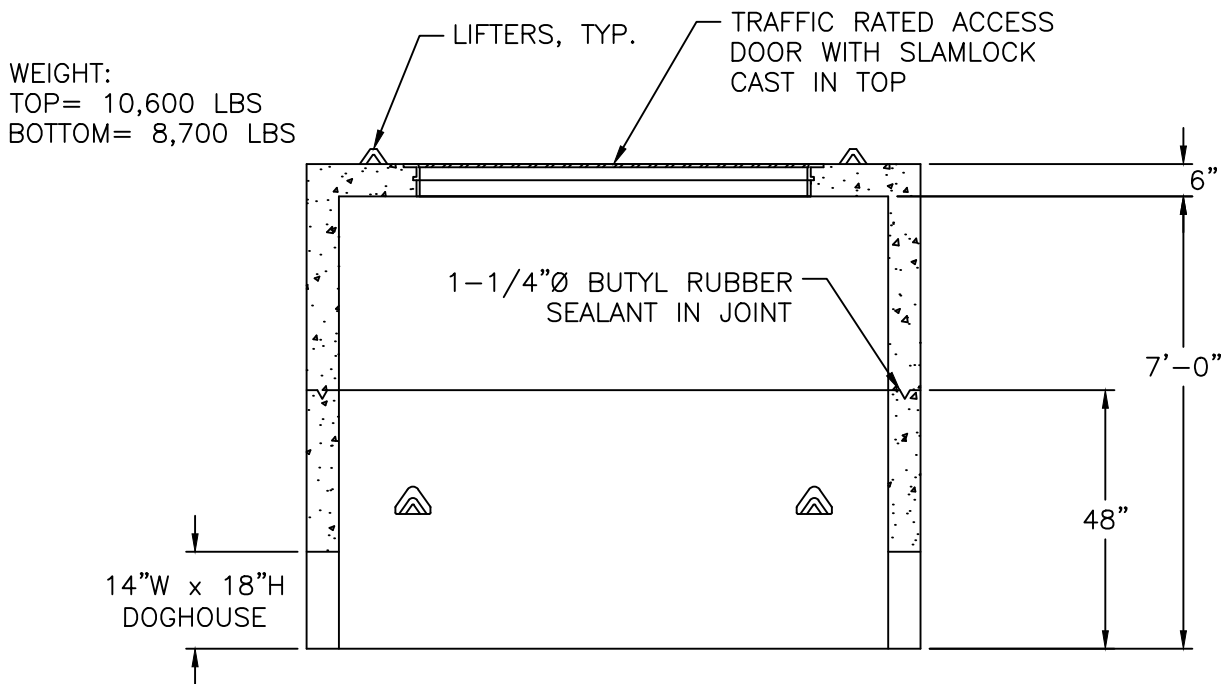


NOTES:

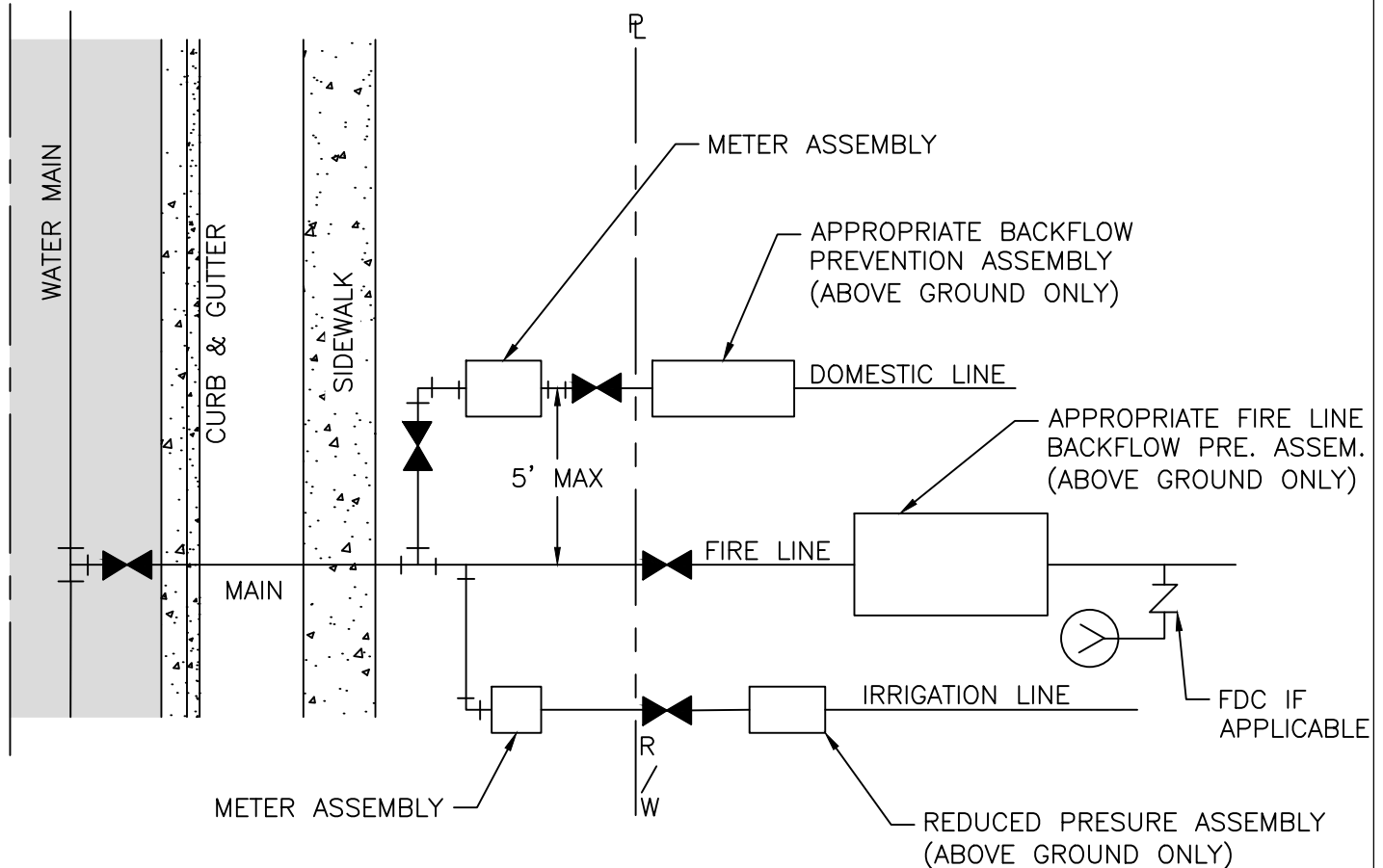
1. REINFORCEMENT: #4 @ 6" O.C.E.W.
2. CONCRETE: 4,000 PSI @ 28 DAYS.
3. 6" OF #67 STONE SHALL BE PLACED IN BOTTOM OF VAULT.
4. METER FLANGE SHALL BE PLACED 42" BELOW FINISHED GRADE.
5. HEIGHT ADJUSTMENTS ALLOWED BY PRECAST RISERS OR BRICK AND MORTAR. DRY STACKING OF BLOCK IS NOT ALLOWED.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 05/11/20	NOT TO SCALE
	TYPICAL 4" WATER METER VAULT	
	W-32	



CITY OF RALEIGH STANDARD DETAIL		
<i>REVISIONS</i>	<i>DATE: 05/11/20</i>	<i>NOT TO SCALE</i>
	TYPICAL 6" THRU 10" WATER METER VAULT	
	W-33	



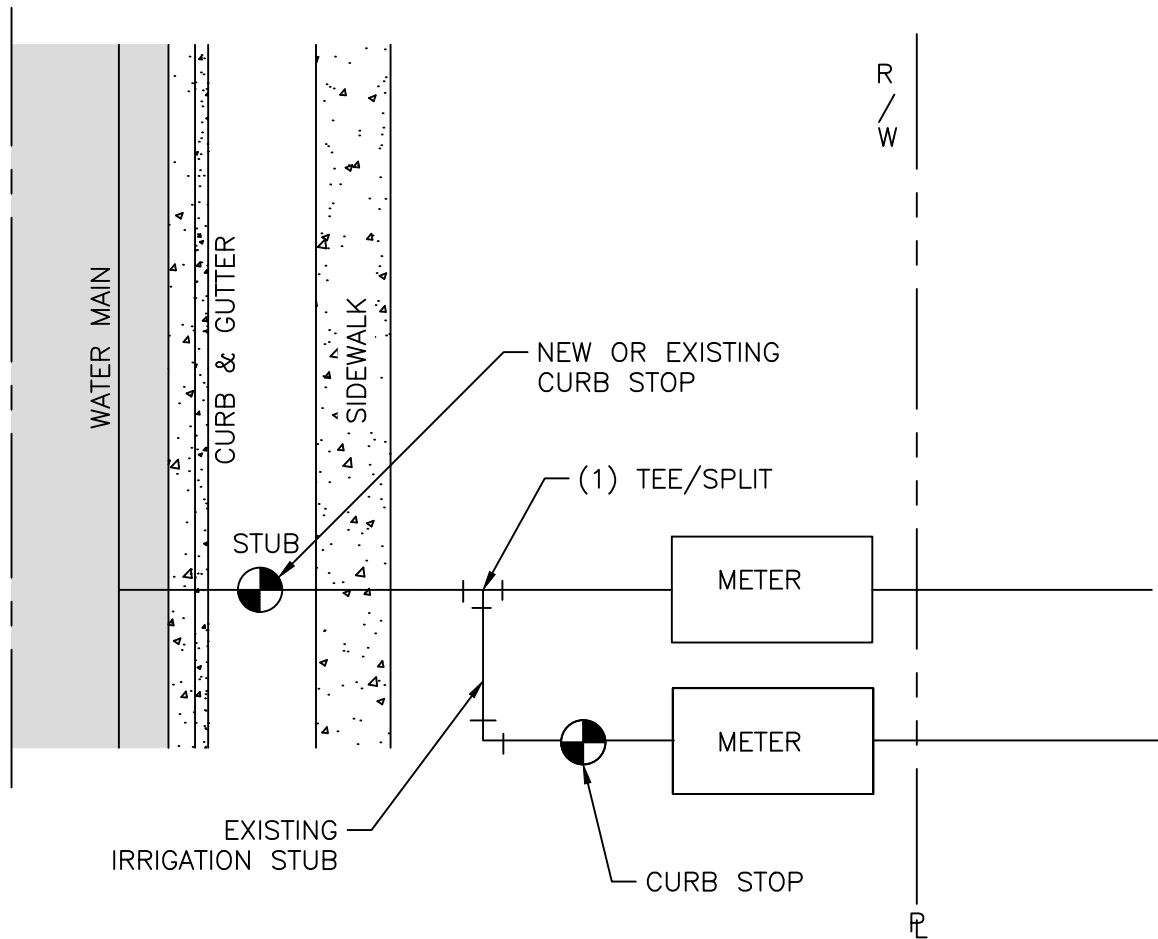
NOTES:

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 BACKFLOW SHALL BE INSTALLED NO MORE THAN 10' FROM THE METER IN A VISIBLE LOCATION.
7. DOMESTIC/IRRIGATION BACKFLOW RISER/STANDPIPE SHALL BE OF COPPER OR BRASS.
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.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 05/11/20	NOT TO SCALE
	FIRE, DOMESTIC & IRRIGATION OPTIONS SCHEMATIC	
	W-34	

W-35



NOTES:

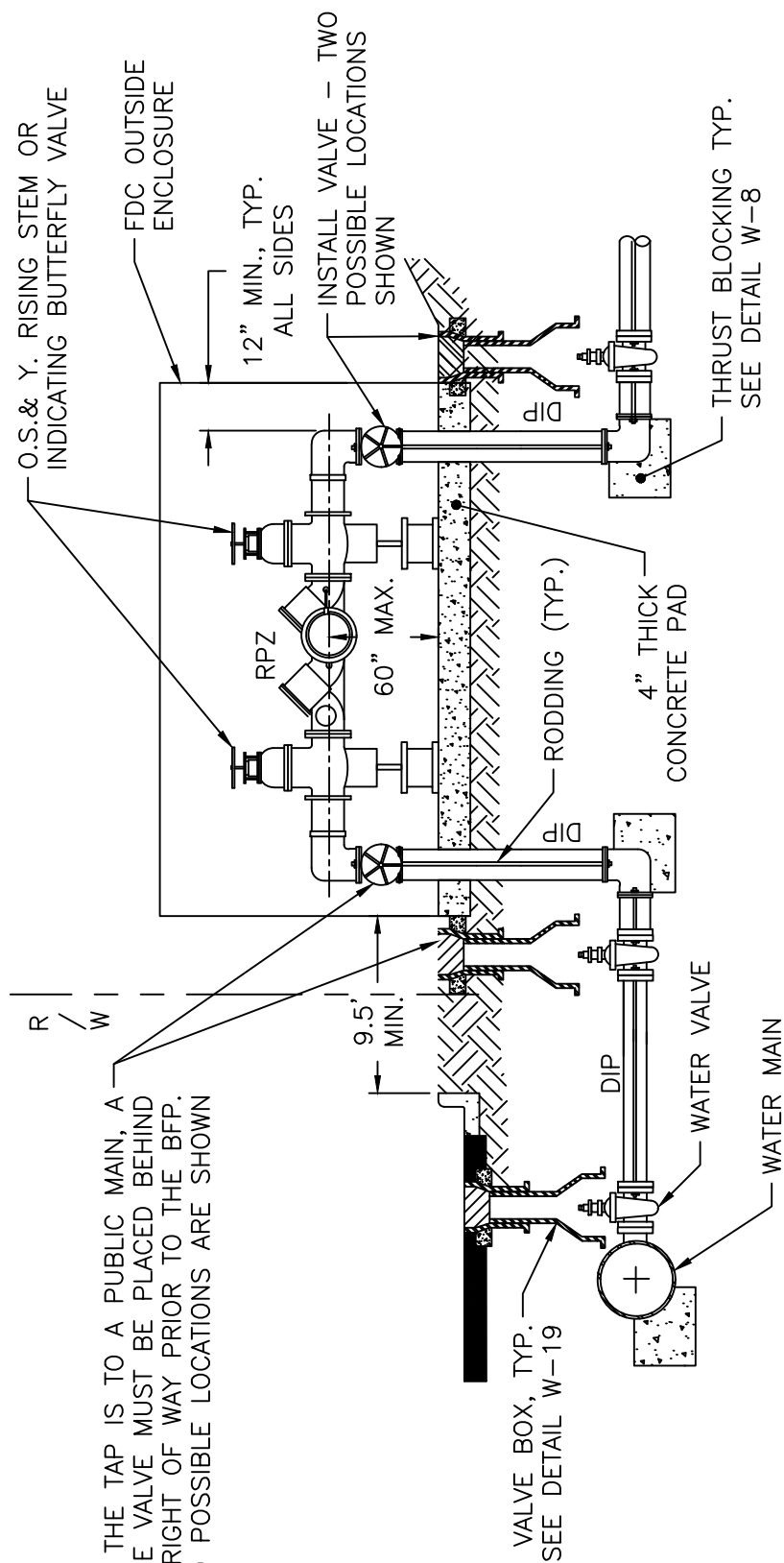
1. REMOVE TEE FITTINGS AND REPAIR STUB WITH CURB STOP & VALVE BOX IF NOT EXISTING.
2. WORK TO BE PERFORMED BY LICENSED UTILITY CONTRACTOR, STUB PERMIT INSPECTION REQUIRED.
3. FOR REPAIR OF EXISTING SERVICE, ONE BRASS COMPRESSION COUPLING AND TYPE K COPPER TO BE USED AS NEEDED FOR REPAIR.
4. REMOVE METER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

**CITY OF RALEIGH
STANDARD DETAIL**

REVISIONS DATE: 05/11/20 NOT TO SCALE

IRRIGATION METER
TERMINATION

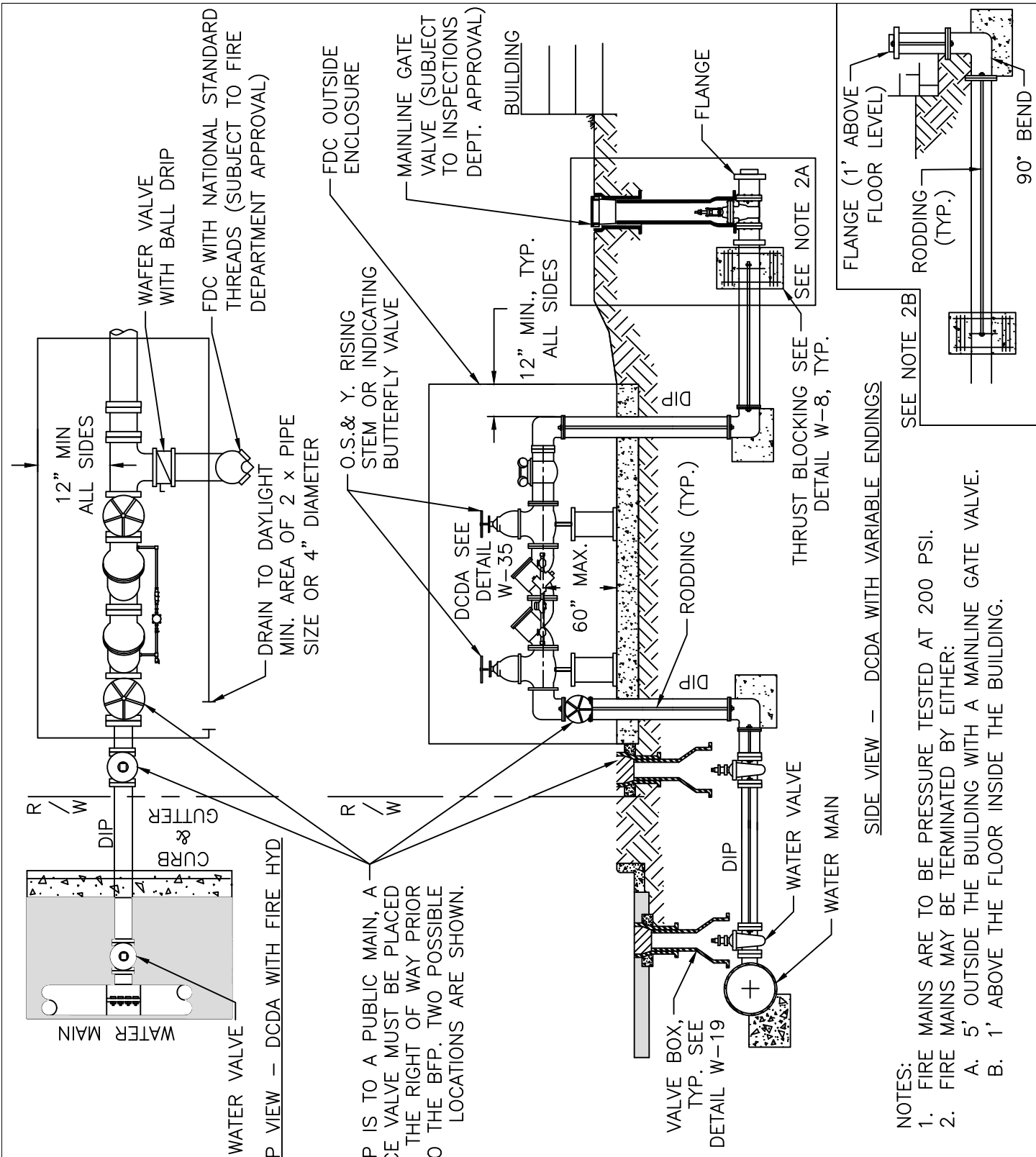
W-35A



NOTES:

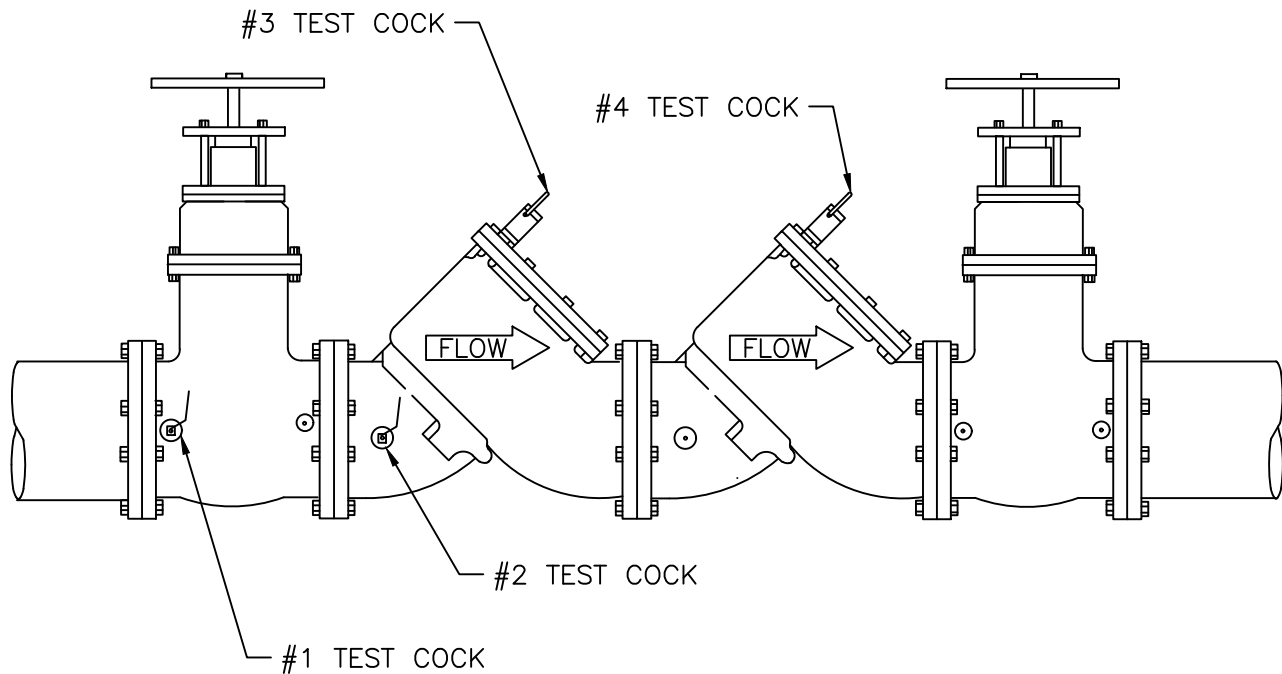
1. ALL ABOVE GROUND ENCLOSURES MUST HAVE ADEQUATE DRAINAGE (TWICE THE DIAMETER OF THE SUPPLY PIPE) TO DAYLIGHT ABOVE GRADE.
2. REDUCED PRESSURE BACKFLOW PREVENTERS MAY BE LOCATED IN A BUILDING PROVIDED THERE ARE NO OTHER UNPROTECTED TAPS BETWEEN THE MAIN AND THE BUILDING. DRAINAGE IN A BUILDING MUST BE TWICE THE DIAMETER OF THE SUPPLY PIPE.
3. ABOVE GROUND INSULATED VAULTS MUST BE ASSE 1060 APPROVED ABOVE GROUND ENCLOSURES. SEE CROSS CONNECTION MANUAL FOR ENCLOSURE FREEZE PROTECTION AND CERTIFICATION REQUIREMENTS.
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. FOR ENCLOSURE DIMENSIONS SEE DETAIL W-34.
6. STEEL RODS AND BOLTS SHALL BE $\frac{3}{4}$ " 316 STAINLESS STEEL.
7. ALL ASSEMBLIES MUST BE ON THE CURRENT APPROVAL LIST.

CITY OF RALEIGH	
STANDARD DETAIL	
REVISIONS	DATE: 05/11/20 NOT TO SCALE
	TYPICAL REDUCED PRESSURE ZONE BACKFLOW PREVENTER ASSEMBLY
	W-36



- NOTES:
1. FIRE MAINS ARE TO BE PRESSURE TESTED AT 200 PSI.
 2. FIRE MAINS MAY BE TERMINATED BY EITHER:
 - A. 5' OUTSIDE THE BUILDING WITH A MAINLINE GATE VALVE.
 - B. 1' ABOVE THE FLOOR INSIDE THE BUILDING.

CITY OF RALEIGH		
STANDARD DETAIL		
REVISIONS	DATE: 05/11/20	NOT TO SCALE
	TYPICAL FIRE MAIN DOUBLE DETECTOR CHECK VALVE ASSEMBLY	
	W-37	

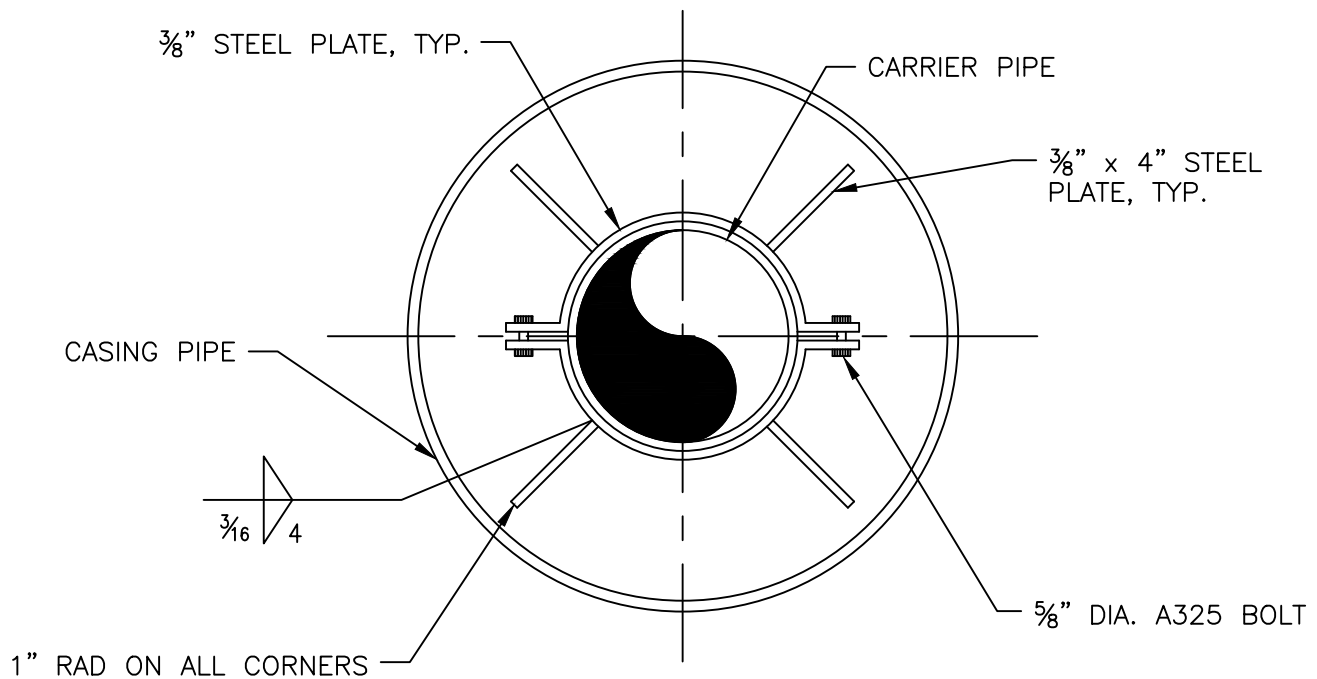


NOTES:

1. SHUT-OFF VALVES, CHECK VALVES, AND TEST COCKS SHALL BE STANDARD TO THE APPROVED BACKFLOW ASSEMBLY.
2. ALL LARGE (2 ½"–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 ½" AND LARGER ASSEMBLIES SHALL BE FUSION BONDED EPOXY COATED INCLUDING SHUTOFF VALVES.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 05/11/20	NOT TO SCALE
	STANDARD DOUBLE CHECK VALVE ASSEMBLY	
	W-38	



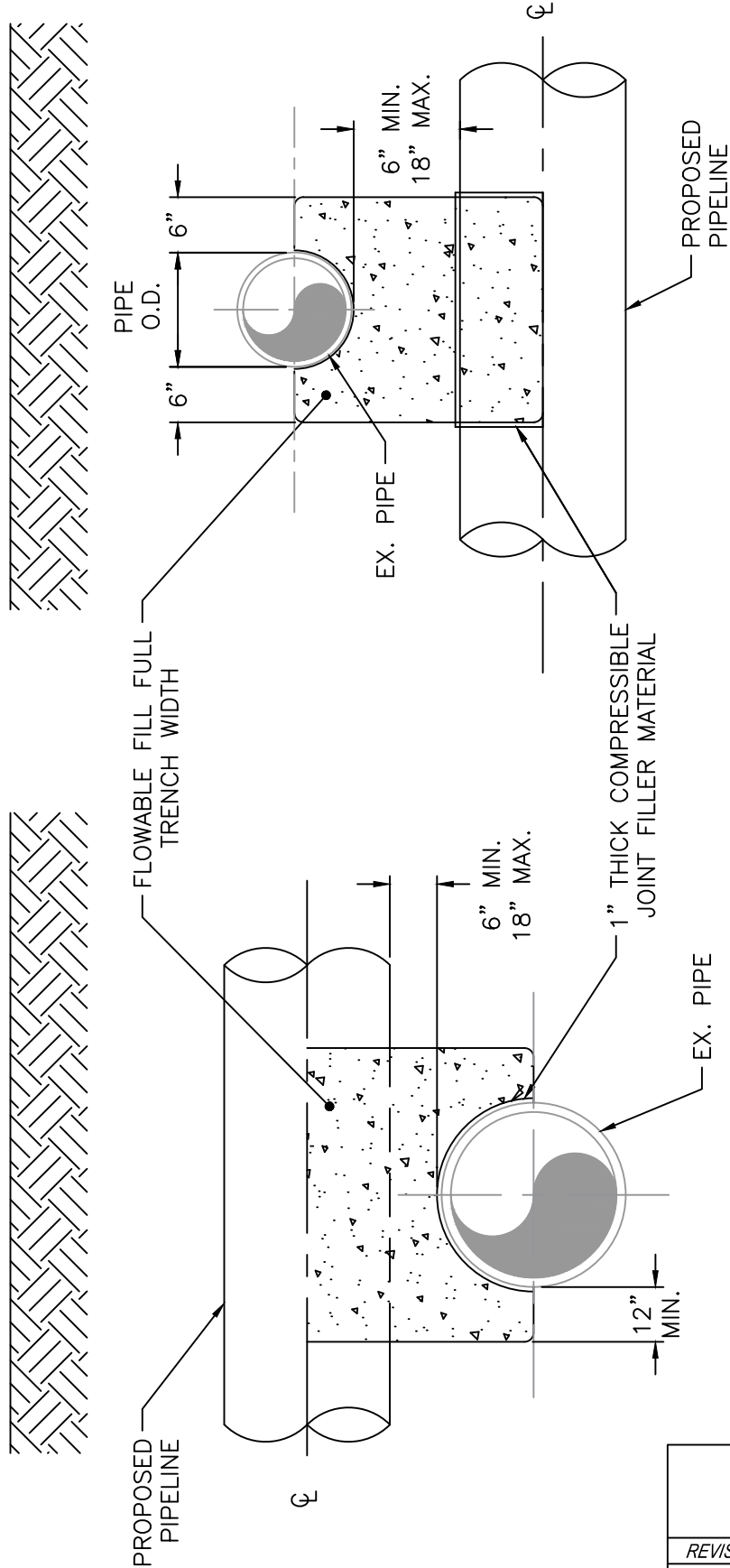
NOTE:
USE A MINIMUM OF TWO SPIDERS PER PIPE JOINT ONE FOURTH OF THE PIPE JOINT LENGTH IN FROM BOTH THE BELL AND SPIGOT ENDS.

CITY OF RALEIGH
STANDARD DETAIL

REVISIONS DATE: 05/11/20 NOT TO SCALE

PIPE ALIGNMENT GUIDE

W-40



CITY OF RALEIGH
STANDARD DETAIL

REVISIONS	DATE: 05/11/20	NOT TO SCALE
	CONCRETE CRADLE PROTECTION FOR WATER LINE CROSSINGS	
	W-41	

PROPOSED PIPELINE UNDER EXISTING PIPE

PROPOSED PIPELINE OVER EXISTING PIPE

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