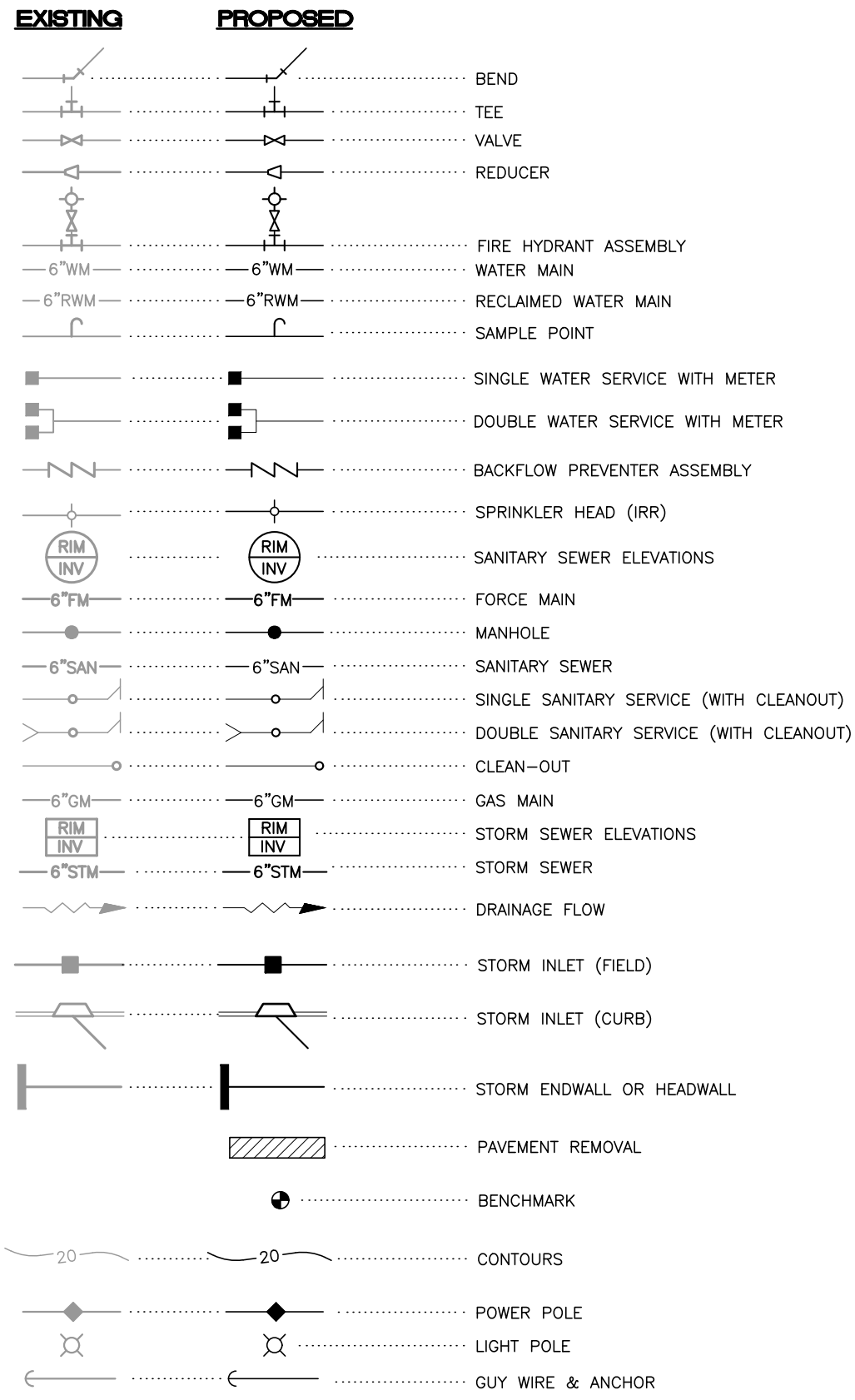
XVI. **STANDARD GENERAL DETAILS**

GENERAL DETAILS

DRAWING INDEX



UTILITIES
ENGINEERING DIVISION

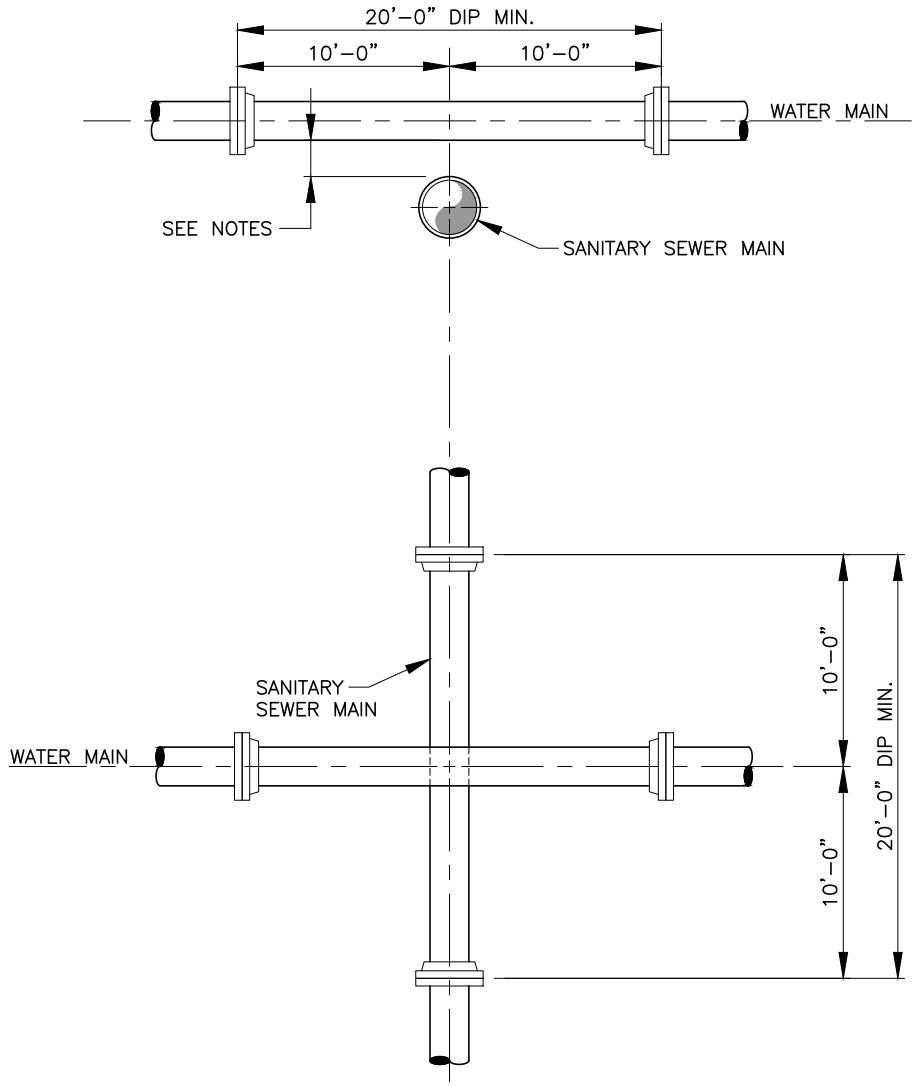
BOYNTON BEACH UTILITIES DEPARTMENT CONSTRUCTION STANDARDS & DETAILS

SYMBOLS LEGEND

NOT TO SCALE

EFF. DATE 05/24

PAGE NUMBER G–1

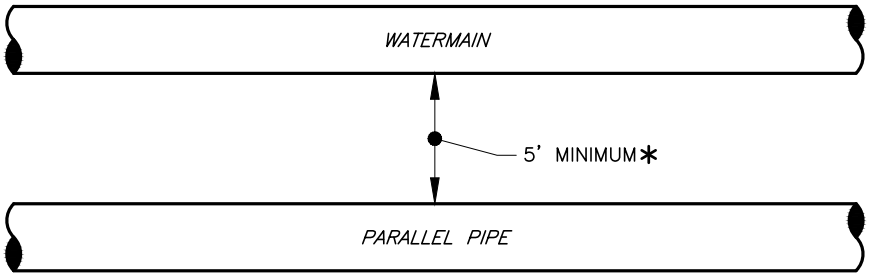


NOTE:

REFER TO DETAILS G–2A AND G–2B FOR HORIZONTAL AND VERTICAL SEPERATION REQUIREMENTS.

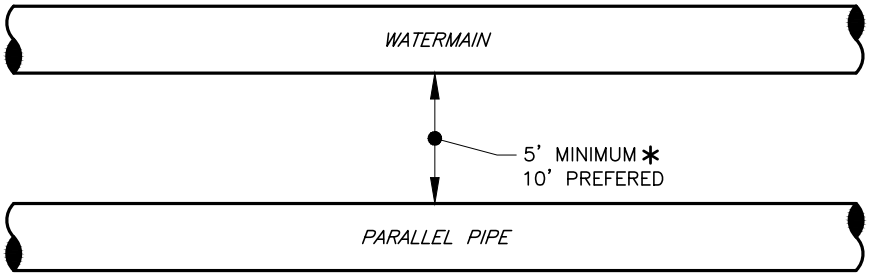
SEWER LATERAL CROSSING WATER MAINS:

- SEWER SERVICE LATERALS SHALL CROSS UNDER WATER MAINS WITH A MINIMUM VERTICAL SEPARATION OF EIGHTEEN (18) INCHES. IF EIGHTEEN (18) INCHES VERTICAL SEPARATION CANNOT BE MAINTAINED, THE WATER MAIN SHALL BE DIP AND THE SANITARY LATERAL C–900 SDR18 OR BETTER AND THE MINIMUM SEPARATION SHALL BE SIX (6) INCHES.
- WHEN IT IS NOT POSSIBLE FOR THE WATER MAIN TO CROSS OVER THE SEWER SERVICE LATERAL A MINIMUM SEPARATION OF AT LEAST TWELVE (12) INCHES MUST BE MAINTAINED. THE WATER MAIN SHALL BE DIP AND THE SEWER LATERAL SHALL BE C–900 SDR18 OR BETTER.

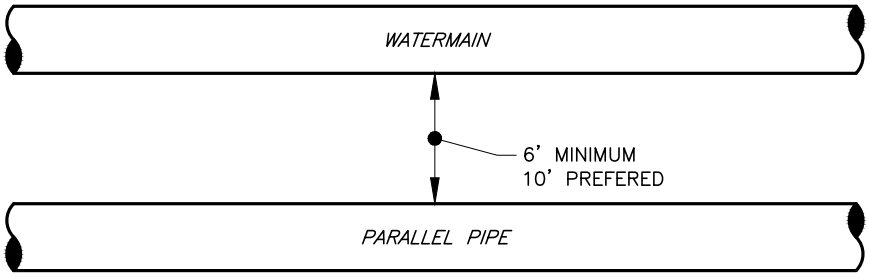


* CAN MAKE EXCEPTION CASE BY CASE

CASE NUMBER ONE:
WATER MAIN PARALLEL TO STORM WATER DRAIN, STORM WATER FORCEMAIN, AND RECLAIMED WATER (PART III OF F.A.C. 62-610).



CASE NUMBER TWO:
WATER MAIN PARALLEL TO VACUUM SEWER.



CASE NUMBER THREE:
WATER MAIN PARALLEL TO GRAVITY SEWER AND WASTEWATER FORCEMAIN.

NOTE:
THIS DETAIL REPRESENTS THE REQUIRED SEPARATION OF WATERMAINS TO OTHER PIPING SYSTEM, AS REQUIRED BY F.A.C. 62-555.314 AND WHICH SHALL PREVAIL OVER THESE DETAILS.

UTILITIES ENGINEERING DIVISION

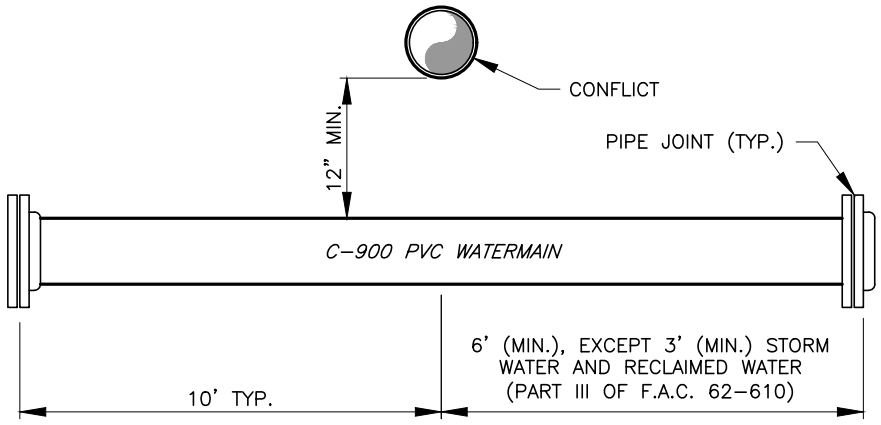
BOYNTON BEACH UTILITIES DEPARTMENT CONSTRUCTION STANDARDS & DETAILS

HORIZONTAL SEPARATION DETAIL

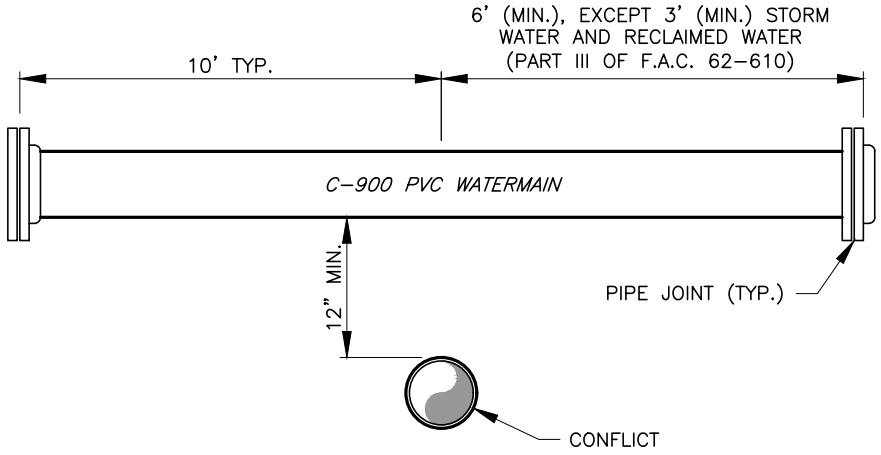
NOT TO SCALE | EFF. DATE 05/24

PAGE NUMBER G-2A

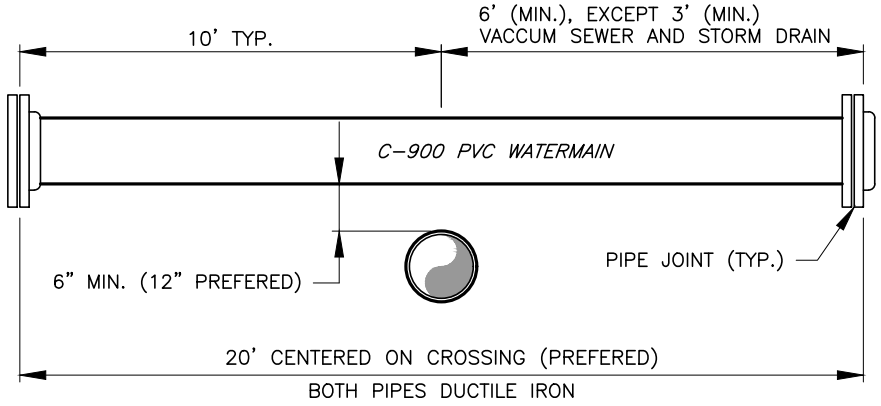
CASE NUMBER ONE:
WATER MAIN UNDER STORM WATER DRAIN, STORM WATER FORCEMAIN, SEWER FORCEMAIN, GRAVITY SEWER, OR RECLAIMED WATERMAIN



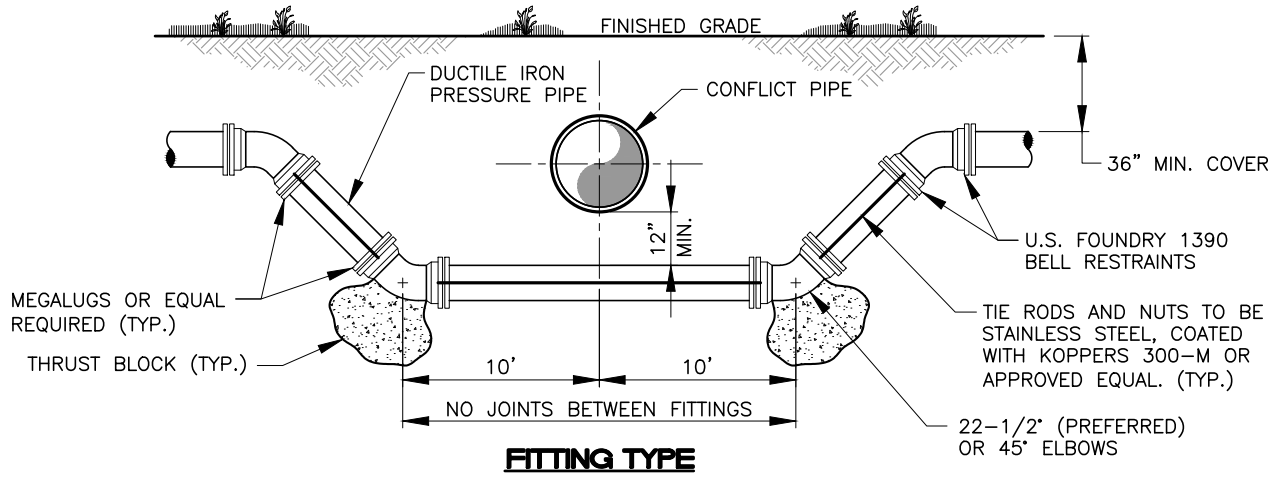
CASE NUMBER TWO:
WATERMAIN OVER STORM WATER FORCEMAIN, SEWER FORCE MAIN, OR RECLAIMED WATER.



CASE NUMBER THREE:
WATERMAIN OVER STORM DRAIN, VACUUM SEWER, OR GRAVITY SEWER



NOTE:
THIS DETAIL REPRESENTS THE REQUIRED SEPARATION OF WATERMAINS TO OTHER PIPING SYSTEM, AS REQUIRED BY F.A.C. 62-555.314 AND WHICH SHALL PREVAIL OVER THESE DETAILS.



FITTING TYPE

NOTE:

TWO FORMS OF RESTRAINT ARE REQUIRED FOR DEFLECTIONS

NOTES:

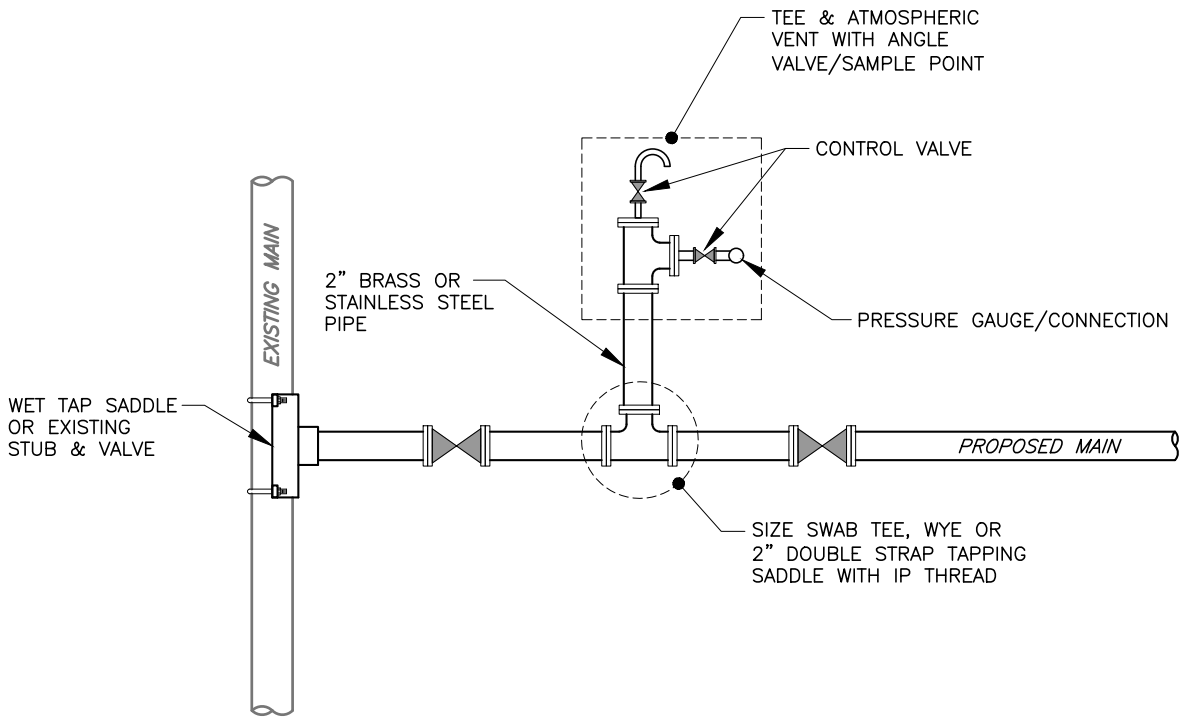
1. FITTINGS SHALL BE RESTRAINED WITH MEGALUGS, TIE RODS AND NUTS. TIE RODS AND NUTS SHALL BE EQUAL IN DIAMETER TO TEE BOLTS AND NUTS.
2. THE FITTING TYPE CROSSING IS PREFERRED.
3. DO NOT EXCEED 75% OF MANUFACTURERS RECOMMENDED MAXIMUM JOINT DEFLECTION FOR DUCTILE IRON PIPE. NO DEFLECTION AT THE JOINT IS ALLOWED FOR P.V.C. PIPE.
   - BENDING OF P.V.C. PIPE SHALL NOT EXCEED THE FOLLOWING PARAMETERS.'

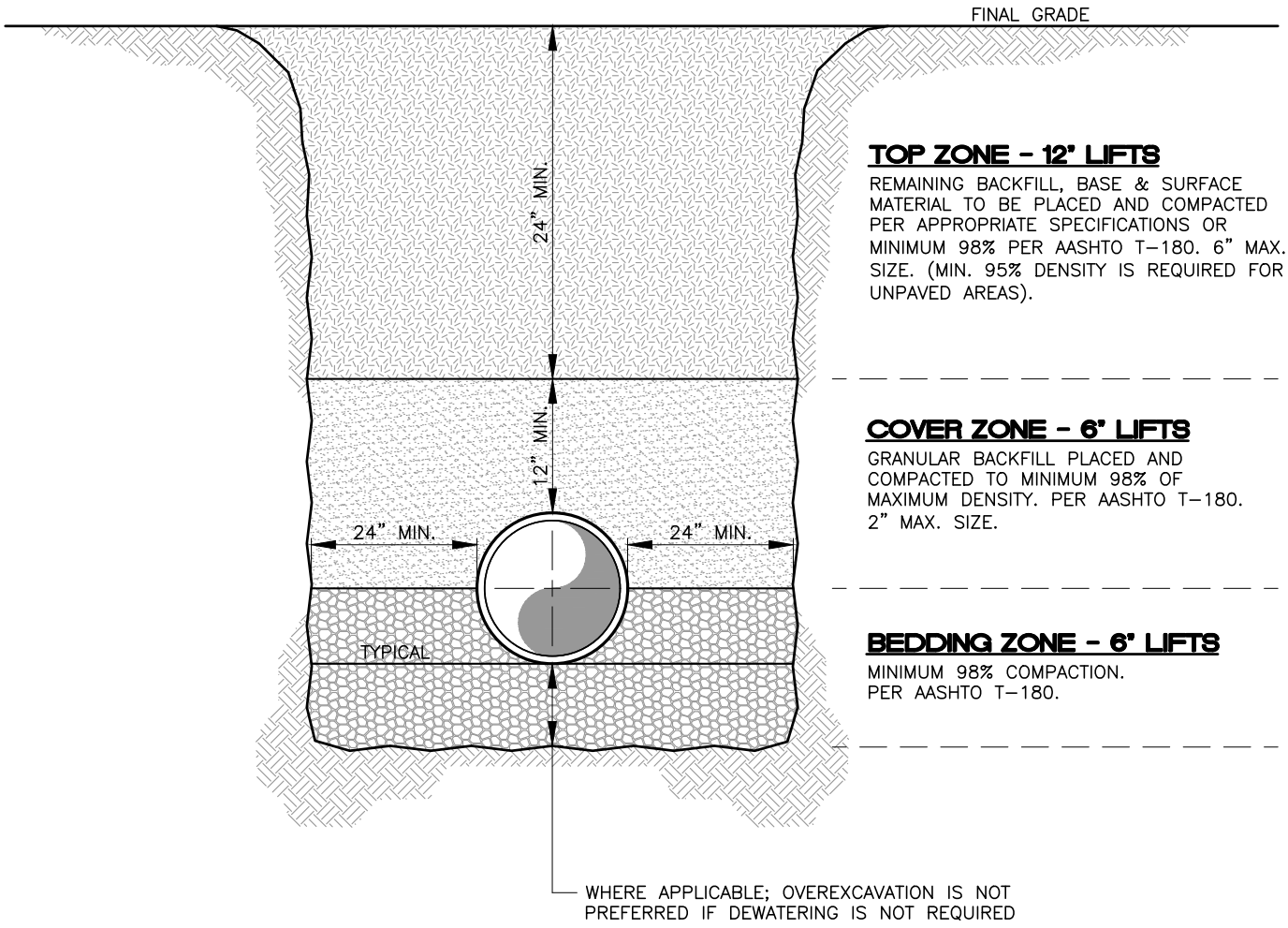
PVC PIPE SIZE (INCH)	MIN. ALLOWED RADIUS (FT.)	MAX. DEFLECTION (INCH) PER 20' LENGTH
6"	300	8"
8"	400	6"
10"	600	4"
12"	600	4"

4. ALL EXPOSED TIE STEEL SHALL BE COATED WITH COAL-TAR EXPOXY.
5. DEFLECTIONS ARE NOT PERMITTED. ONLY OFFSETS.

NOTES:

1. THIS METHOD SHALL BE COMPLIED WITH WHEN CONNECTING TO A PORTION OF AN EXISTING WATER MAIN, (ONE THAT HAS ALREADY BEEN BACTERIOLOGICALLY CLEARED OR IS IN USE) WHETHER BY TAPPING TEE & VALVE OR BY CONTINUATION OF A PLUGGED STUB–OUT WITH AN EXISTING GATE VALVE.
2. WHEN A TAPPING TEE & VALVE IS INSTALLED, A PRESSURE/LEAKAGE TEST SHALL BE PERFORMED ON THE ASSEMBLY IN THE PRESENCE OF AN AUTHORIZED DEPARTMENT REPRESENTATIVE PRIOR TO PERFORMING THE ACTUAL TAP.
3. ALL TAPS ON PIPE 6" IN DIAMETER & LARGER SHALL BE INSTALLED AT THE CENTER/MIDDLE OF A LENGTH OF PIPE, IF POSSIBLE.
4. DOUBLE VALVING PERMITS PHYSICAL CONNECTION TO AN EXISTING LINE.
5. THE TWO (2) INCH MAY BE USED FOR FEEDING CHLORINE SOLUTIONS & FOR ATMOSPHERIC VENT DURING PRESSURE/LEAKAGE TESTS AND SOURCE SAMPLE POINT.
6. UNDER NO CIRCUMSTANCES WILL VALVES BE OPERATED BY OTHER THAN DEPARTMENT EMPLOYEES.
7. ALL WATER MAINS SHALL BE THOROUGHLY "SWABBED & FLUSHED" IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS, PRIOR TO PRESSURE/LEAKAGE TESTING. THE PROCEDURE SHALL BE DONE ONLY IN THE PRESENCE OF AN AUTHORIZED DEPARTMENT REPRESENTATIVE.
8. EXCEPT DURING "SWABBING & FLUSHING" VALVES CANNOT & SHALL NOT BE OPENED UNTIL AFTER AN APPROVED PRESSURE/LEAKAGE TEST, BACTERIOLOGICAL CLEARANCE, CERTIFICATION BY THE ENGINEER–OF–RECORD & RELEASE FROM THE PALM BEACH COUNTY PUBLIC HEALTH UNIT.
9. DISINFECTION & BACTERIOLOGICAL CLEARANCES SHALL COMPLY WITH CURRENT AWWA PROCEDURES, THE DEPARTMENT, PALM BEACH COUNTY PUBLIC HEALTH DEPARTMENT, AND FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION REQUIREMENTS.
10. 2" BRASS OR STAINLESS STEEL PIPE SHALL BE ABANDONED AFTER TESTING HAS BEEN COMPLETED. TEE OR SADDLE SHALL BE PLUGGED & CAPPED UNDER INSPECTION
11. CITY INSPECTOR SHALL BE PRESENT AT THE TIME OF SAMPLING.





NOTES:

1. BEDDING SHALL CONSIST OF IN-SITU GRANULAR MATERIAL OR WASHED AND GRADED LIMEROCK 3/8"-7/8" SIZING, ONLY AT THE DIRECTION OF THE CITY'S REPRESENTATIVE. UNSUITABLE IN-SITU MATERIALS SUCH AS MUCK, DEBRIS AND LARGER ROCKS SHALL BE REMOVED.
2. THE PIPE SHALL BE FULLY SUPPORTED FOR ITS ENTIRE LENGTH WITH APPROPRIATE COMPACTION UNDER THE PIPE HAUNCHES.
3. THE PIPE SHALL BE PLACED IN A DRY TRENCH.
4. BACKFILL SHALL BE FREE OF UNSUITABLE MATERIAL SUCH AS LARGE ROCK, MULCH AND DEBRIS.
5. DENSITY TESTS ARE REQUIRED EACH LIFT ABOVE THE PIPE AT INTERVALS OF 100' MAXIMUM IN PUBLIC RIGHTS OF WAY & 200' MAXIMUM IN UTILITY EASEMENTS.
6. THE DEVELOPER/CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE TRENCH SAFETY LAWS AND REGULATIONS.
7. SEE SEPARATE DETAIL FOR "ROAD CROSSING PIPE INSTALLATION UNDER EXISTING ROADWAY."
8. THE AFFECTED AREA SHALL BE RESTORED TO EQUAL OR BETTER CONDITION AS REQUIRED.
9. EXCAVATION SIDE SLOPE SHORING, ETC SHALL CONFORM TO O.S.H.A. STANDARDS. COMPACT TRENCH BACKFILL TO 98% OF MAXIMUM DENSITY IN ACCORDANCE WITH AASHTO-T180.
10. 6 INCH WIDE MAGNETIC CAUTION TAPE SHALL BE INSTALLED 18" ABOVE THE CROWN OF THE PIPE.

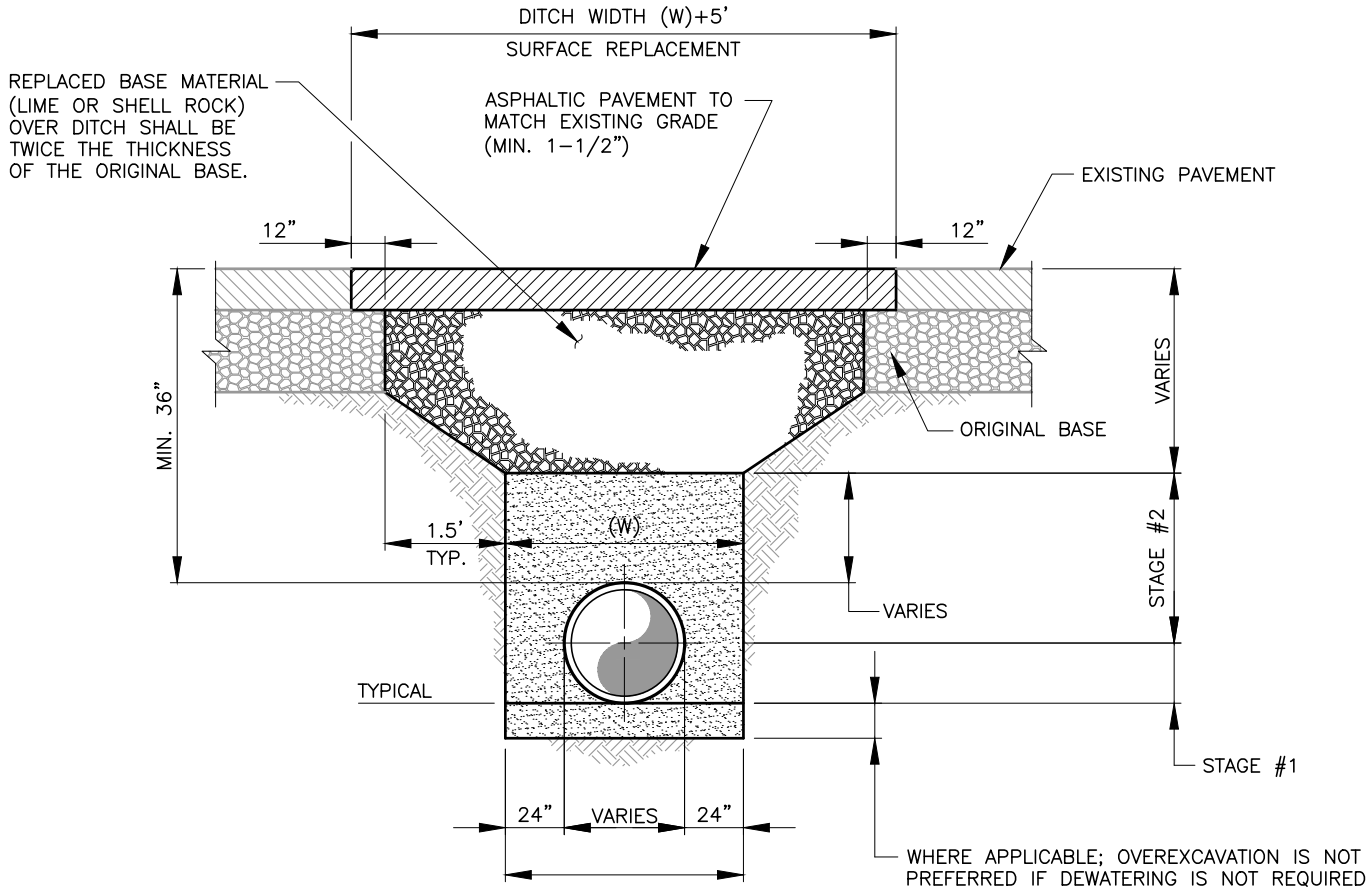
UTILITIES ENGINEERING DIVISION

BOYNTON BEACH UTILITIES DEPARTMENT CONSTRUCTION STANDARDS & DETAILS

TYPICAL TRENCH DETAIL

NOT TO SCALE | EFF. DATE 05/24

PAGE NUMBER G-5



DENSITY PROCEDURES:

THE BACKFILL FOR THE FIRST AND SECOND STAGES SHALL BE PLACED IN 6" LAYERS (COMPACTED THICKNESS) AND SHALL BE COMPACTED TO 98% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-180.

STAGE #1

THE CONTRACTOR SHALL PROVIDE ADEQUATE COMPACTED FILL BENEATH THE HAUNCHES OF THE PIPE, USING MECHANICAL TAMPS SUITABLE FOR THIS PURPOSE. THIS COMPACTION APPLIES TO THE MATERIAL PLACED BENEATH THE HAUNCHES OF THE PIPE AND ABOVE ANY BEDDING REQUIRED.

STAGE #2

THE CONTRACTOR SHALL OBTAIN A WELL-COMPACTED BED AND FILL ALONG THE SIDES OF THE PIPE AND TO A POINT INDICATING THE TOP OF SUB-GRADE MATERIAL.

GENERAL NOTES:

1. REFER TO DETAIL SHEET G-6 TYPICAL TRENCH DETAIL FOR BACKFILL AND BEDDING MATERIAL SPECIFICATIONS.
2. BASE MATERIAL SHALL BE PLACED IN 6" LAYERS AND EACH LAYER COMPACTED TO 98% OF MAXIMUM DENSITY PER AASHTO T-180.
3. ASPHALTIC CONCRETE PAVEMENT JOINTS SHALL BE MECHANICALLY SAWED AT SPLICE POINT.
4. SURFACE TREATED PAVEMENT JOINTS SHALL BE LAPPED AND FEATHERED OR TOE ANCHORED.
5. SURFACE MATERIAL WILL BE CONSISTENT WITH THE EXISTING SURFACE. THE AFFECTTED AREA SHALL BE RESTORED TO EQUAL OR BETTER CONDITION.
6. THE DEVELOPER/CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE REGARDING ANY ADDITIONAL SPECIFICATIONS AS REQUIRED BY THE PROPERTY OWNER. (FDOT, COUNTY, CITY, ETC.....)
7. EXCAVATABLE "FLOWABLE FILL" WITH ULTIMATE COMPRESSIVE STRENGTH BETWEEN 50 AND 150 PSI MAY BE USED TO SUBSTITUTE FOR THE BACKFILL AND BASE MATERIALS IF APPROVED BY ENGINEER.
8. ANY DAMAGE TO TRAFFIC SIGNALIZATION EQUIPMENT SHALL BE REPAIRED BY THE PALM BEACH TRAFFIC DIVISION AT THE PERMITTEES EXSPENSE.
9. THESE SPECIFICATIONS MAY BE SUPERCEDED BY THE PERMITTING AGENCY.
10. AFFECTED DRIVEWAYS SHALL BE REPLACED IN KIND.
11. 6 INCH WIDE MAGNETIC CAUTION TAPE SHALL BE INSTALLED 18" ABOVE THE CROWN OF THE PIPE.

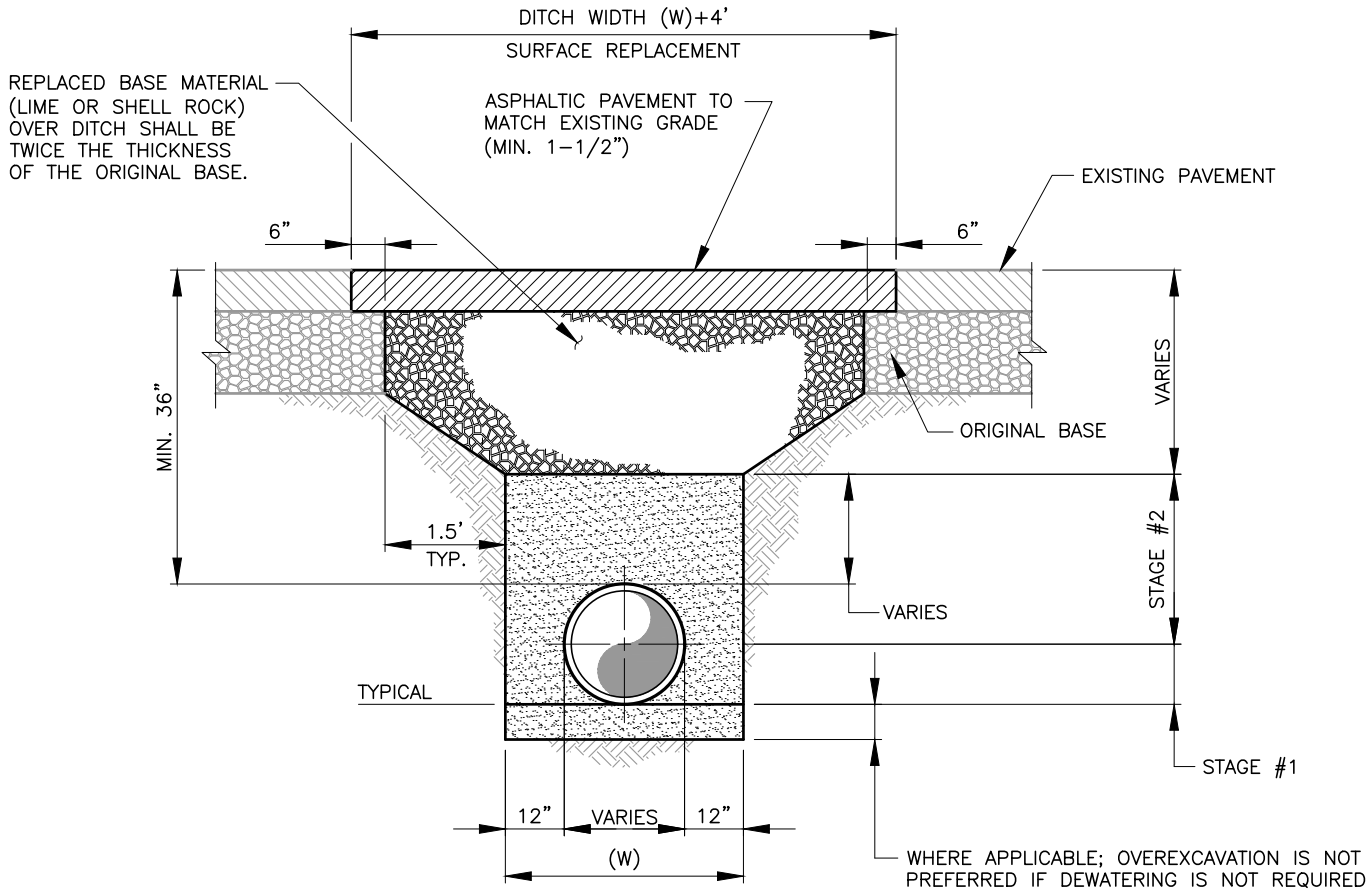
UTILITIES ENGINEERING DIVISION

BOYNTON BEACH UTILITIES DEPARTMENT CONSTRUCTION STANDARDS & DETAILS

ROAD CROSSING PIPE INSTALLATION UNDER EXISTING ROADWAY - OPEN CUT

NOT TO SCALE	EFF. DATE 05/24

PAGE NUMBER G-6



DENSITY PROCEDURES:

THE BACKFILL FOR THE FIRST AND SECOND STAGES SHALL BE PLACED IN 6" LAYERS (COMPACTED THICKNESS) AND SHALL BE COMPACTED TO 98% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-180.

STAGE #1

THE CONTRACTOR SHALL PROVIDE ADEQUATE COMPACTED FILL BENEATH THE HAUNCHES OF THE PIPE, USING MECHANICAL TAMPS SUITABLE FOR THIS PURPOSE. THIS COMPACTION APPLIES TO THE MATERIAL PLACED BENEATH THE HAUNCHES OF THE PIPE AND ABOVE ANY BEDDING REQUIRED.

STAGE #2

THE CONTRACTOR SHALL OBTAIN A WELL-COMPACTED BED AND FILL ALONG THE SIDES OF THE PIPE AND TO A POINT INDICATING THE TOP OF SUB-GRADE MATERIAL.

GENERAL NOTES:

1. REFER TO DETAIL SHEET G-6 TYPICAL TRENCH DETAIL FOR BACKFILL AND BEDDING MATERIAL SPECIFICATIONS.
2. BASE MATERIAL SHALL BE PLACED IN 6" LAYERS AND EACH LAYER COMPACTED TO 98% OF MAXIMUM DENSITY PER AASHTO T-180.
3. ASPHALTIC CONCRETE PAVEMENT JOINTS SHALL BE MECHANICALLY SAWED AT SPLICE POINT.
4. SURFACE TREATED PAVEMENT JOINTS SHALL BE LAPPED AND FEATHERED OR TOE ANCHORED.
5. SURFACE MATERIAL WILL BE CONSISTENT WITH THE EXISTING SURFACE. THE AFFECTTED AREA SHALL BE RESTORED TO EQUAL OR BETTER CONDITION.
6. THE DEVELOPER/CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE REGARDING ANY ADDITIONAL SPECIFICATIONS AS REQUIRED BY THE PROPERTY OWNER. (FDOT, COUNTY, CITY, ETC.....)
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8. ANY DAMAGE TO TRAFFIC SIGNALIZATION EQUIPMENT SHALL BE REPAIRED BY THE PALM BEACH TRAFFIC DIVISION AT THE PERMITTEES EXSPENSE.
9. THESE SPECIFICATIONS MAY BE SUPERCEDED BY THE PERMITTING AGENCY.
10. AFFECTED DRIVEWAYS SHALL BE REPLACED IN KIND.
11. 6 INCH WIDE MAGNETIC CAUTION TAPE SHALL BE INSTALLED 18" ABOVE THE CROWN OF THE PIPE.

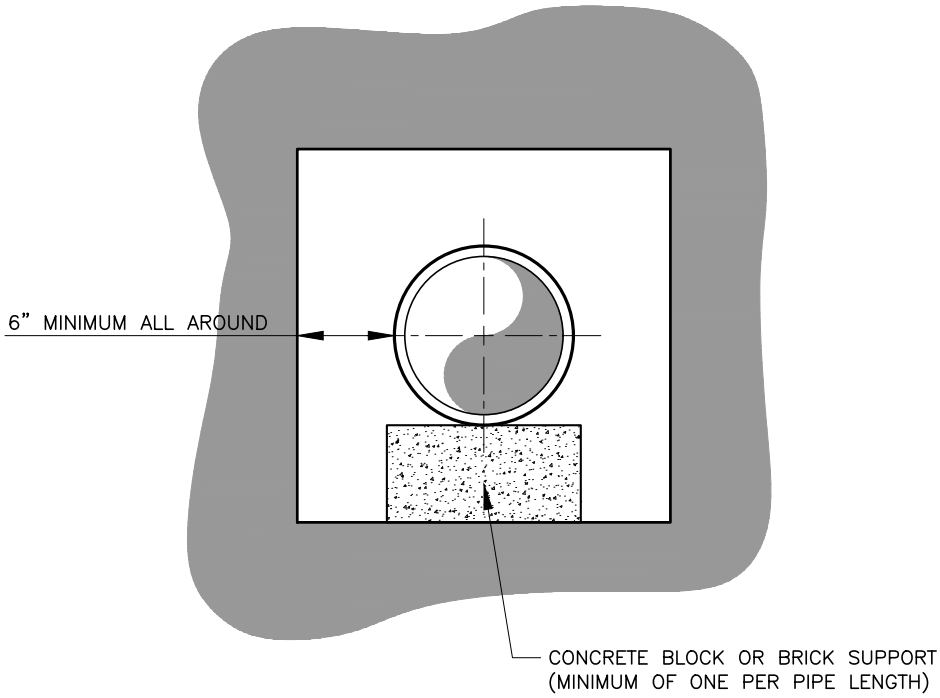
UTILITIES ENGINEERING DIVISION

BOYNTON BEACH UTILITIES DEPARTMENT CONSTRUCTION STANDARDS & DETAILS

ROAD CROSSING PIPE (12" & SMALLER) INSTALLATION UNDER EXISTING ROADWAY - OPEN CUT

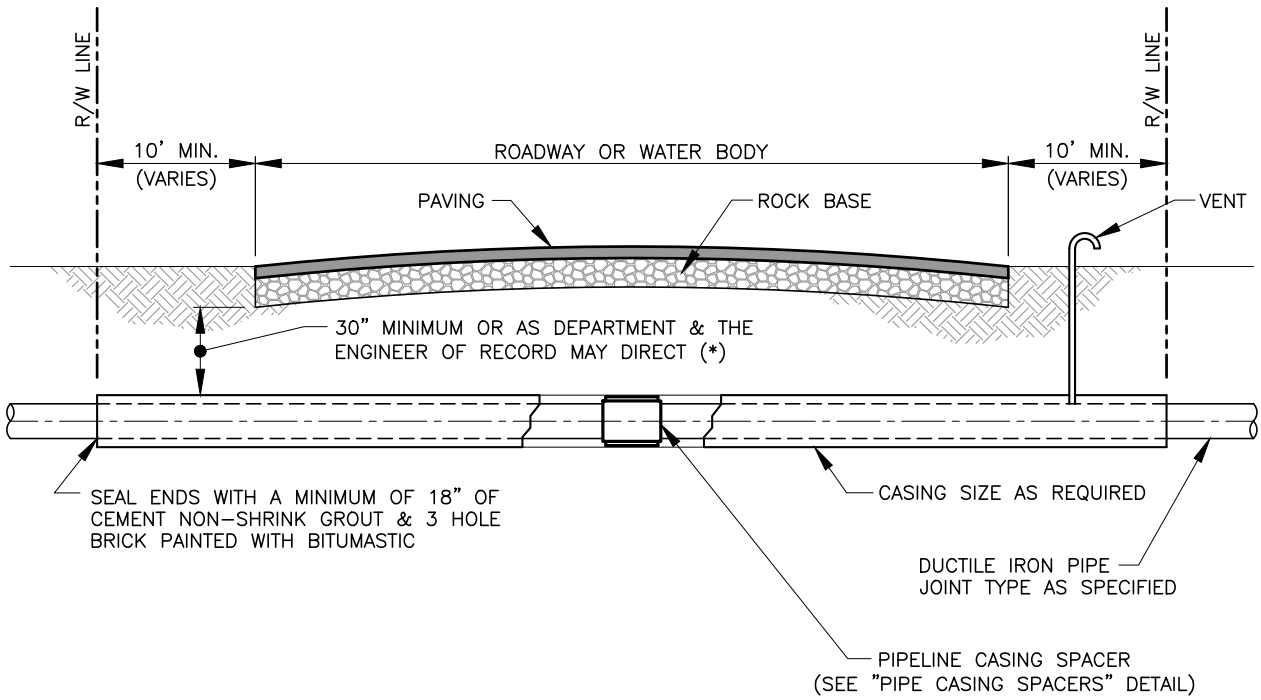
NOT TO SCALE	EFF. DATE 05/24

PAGE NUMBER G-6A



NOTES:

1. WHERE MINIMUM COVER, 30", IS NOT AVAILABLE ENCASEMENT WILL BE REQUIRED.
2. ALL CONCRETE ENCASEMENTS MUST BE FORMED AND INSPECTED BY THE DEPARTMENT INSPECTOR PRIOR TO PLACING CONCRETE AND BACKFILLING.
3. WRAP PIPE IN VISQUEEN PRIOR TO POURING ENCASEMENT.
4. AT CROSSINGS, ENCASEMENT SHALL EXTEND TEN FEET (10') ON EITHER SIDE OF CROSSING.
5. BEGINNING AND ENDING OF ENCASEMENTS SHALL NOT BE MORE THAN 6" FROM A PIPE JOINT.

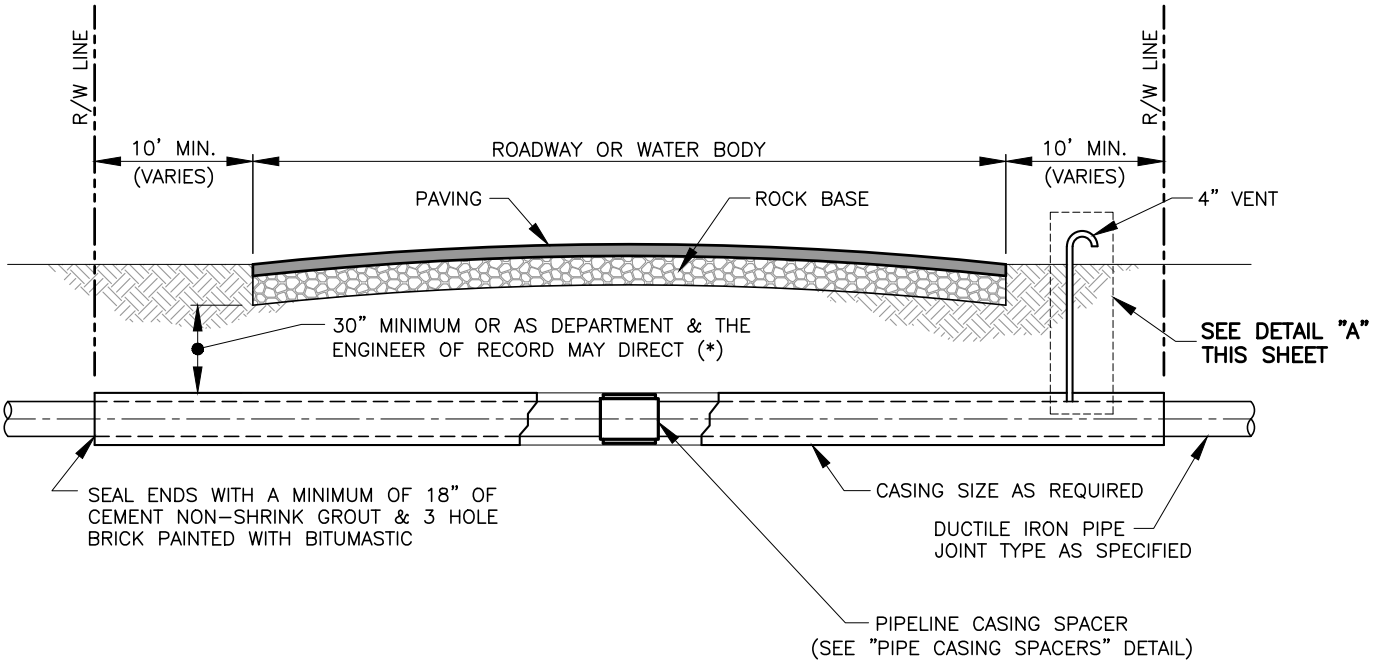


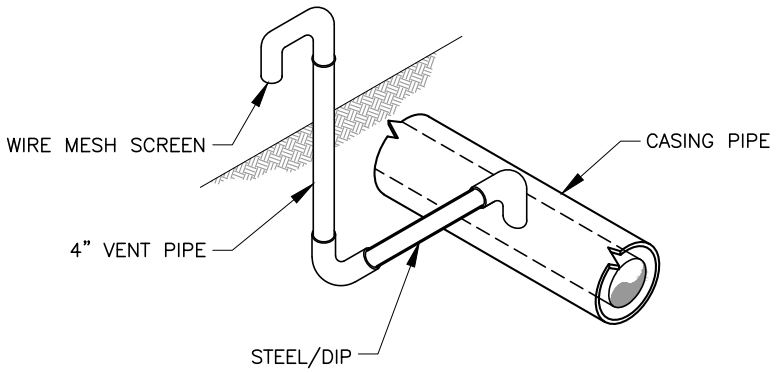
NOMINAL PIPE SIZE	STEEL CASING	THICKNESS SCHEDULE
4"	12"	.250
6"	16"	.375
8"	18"	.375
10"	20"	.375
12"	24"	.375
14"	24"	.375
16"	30"	.375
18"	30"	.375
20"	36"	.375
24"	42"	.500
30"	48"	.500
36"	54"	.500
42"	60"	.500
48"	72"	.500

NOTES:

1. A TO-SCALE DRAWING FOR EACH UTILITY MAIN JACK AND BORE IS REQUIRED. ALL RELEVANT DATA MUST BE SHOWN (LENGTH AND SIZE OF CASING, PIPE CONFLICTS, ELEVATIONS, ETC.)

2. (*) DEPTH SHALL BE 36" MINIMUM WITHIN PALM BEACH COUNTY AND FDOT RIGHT-OF-WAYS.





DETAIL "A"

NOMINAL PIPE SIZE	STEEL CASING	THICKNESS SCHEDULE
4"	12"	.250
6"	16"	.375
8"	18"	.375
10"	20"	.375
12"	24"	.375
14"	24"	.375
16"	30"	.375
18"	30"	.375
20"	36"	.375
24"	42"	.500
30"	48"	.500
36"	54"	.500
42"	60"	.500
48"	72"	.500

NOTES:

1. A TO-SCALE DRAWING FOR EACH UTILITY MAIN JACK AND BORE IS REQUIRED. ALL RELEVANT DATA MUST BE SHOWN (LENGTH AND SIZE OF CASING, PIPE CONFLICTS, ELEVATIONS, ETC.)
2. (*) DEPTH SHALL BE 36" MINIMUM WITHIN PALM BEACH COUNTY AND FDOT RIGHT-OF-WAYS.

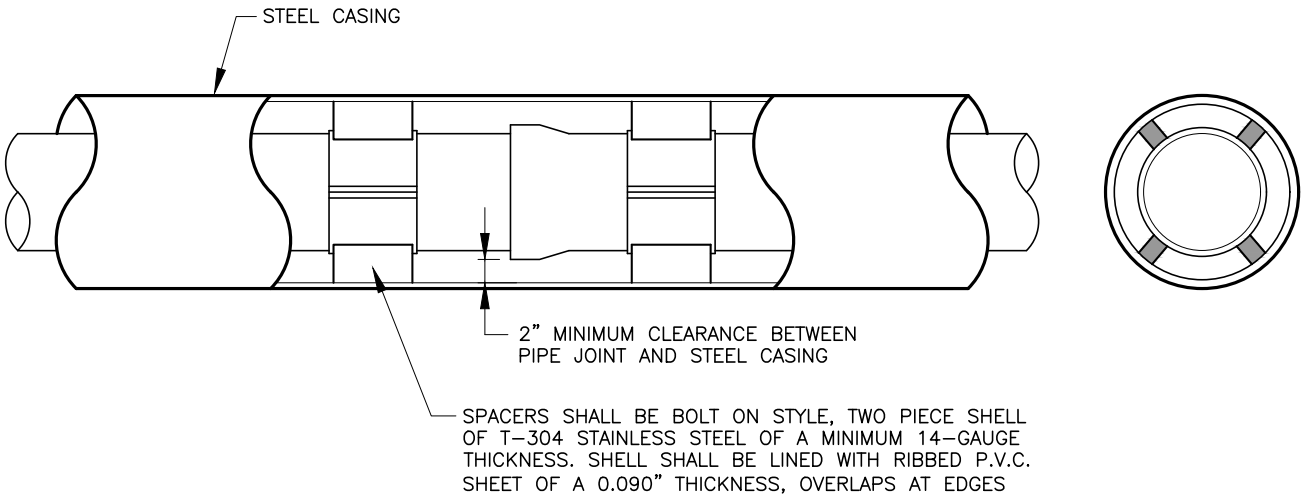
UTILITIES ENGINEERING DIVISION

BOYNTON BEACH UTILITIES DEPARTMENT CONSTRUCTION STANDARDS & DETAILS

CASING VENT OFFSET

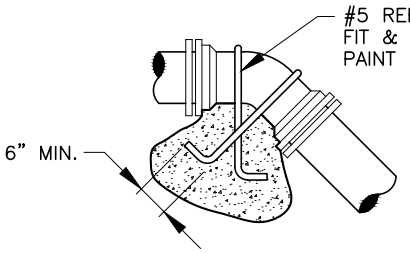
NOT TO SCALE | EFF. DATE 05/24

PAGE NUMBER G-8A

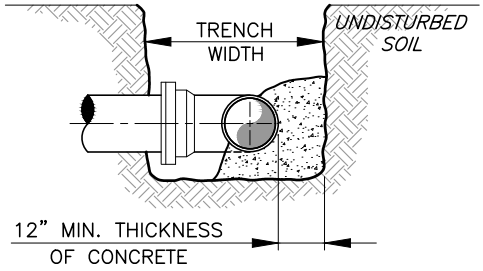


NOTES:

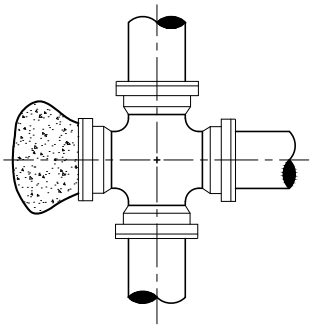
1. APPROVED RESTRAINED MECHANICAL JOINTS SHALL BE USED FOR ALL PIPE DIAMETERS.
2. FOR PIPE 18" DIAMETER AND ABOVE PIPE SHALL HAVE US FOUNDRY 1390 FRICTION BELL RESTRAINT OR APPROVED EQUAL.
3. INSTALL STAINLESS STEEL PIPE CASING SPACERS PER MANUFACTURERS RECOMMENDATIONS (CASCADE MFG. CO. OR APPROVED EQUAL).
4. PIPE CASING SPACERS SHALL BE POSITIONED AT 10' OR PER MANUFACTURERS RECOMMENDATIONS.
5. ALTERNATE METHODS OF PIPE SUPPORT WITHIN THE CASING MUST BE APPROVED BY DEPARTMENT PRIOR TO INSTALLATION.



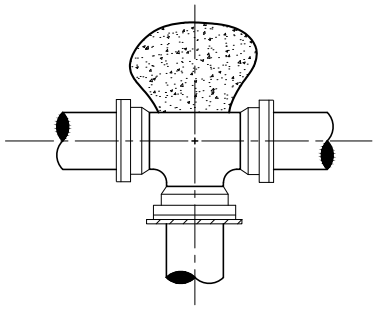
DEADMAN



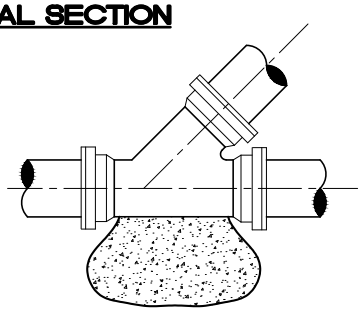
TYPICAL SECTION



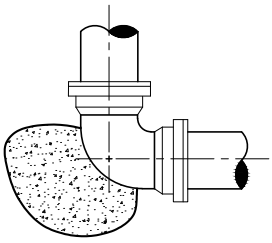
CROSS WITH PLUG



TEE



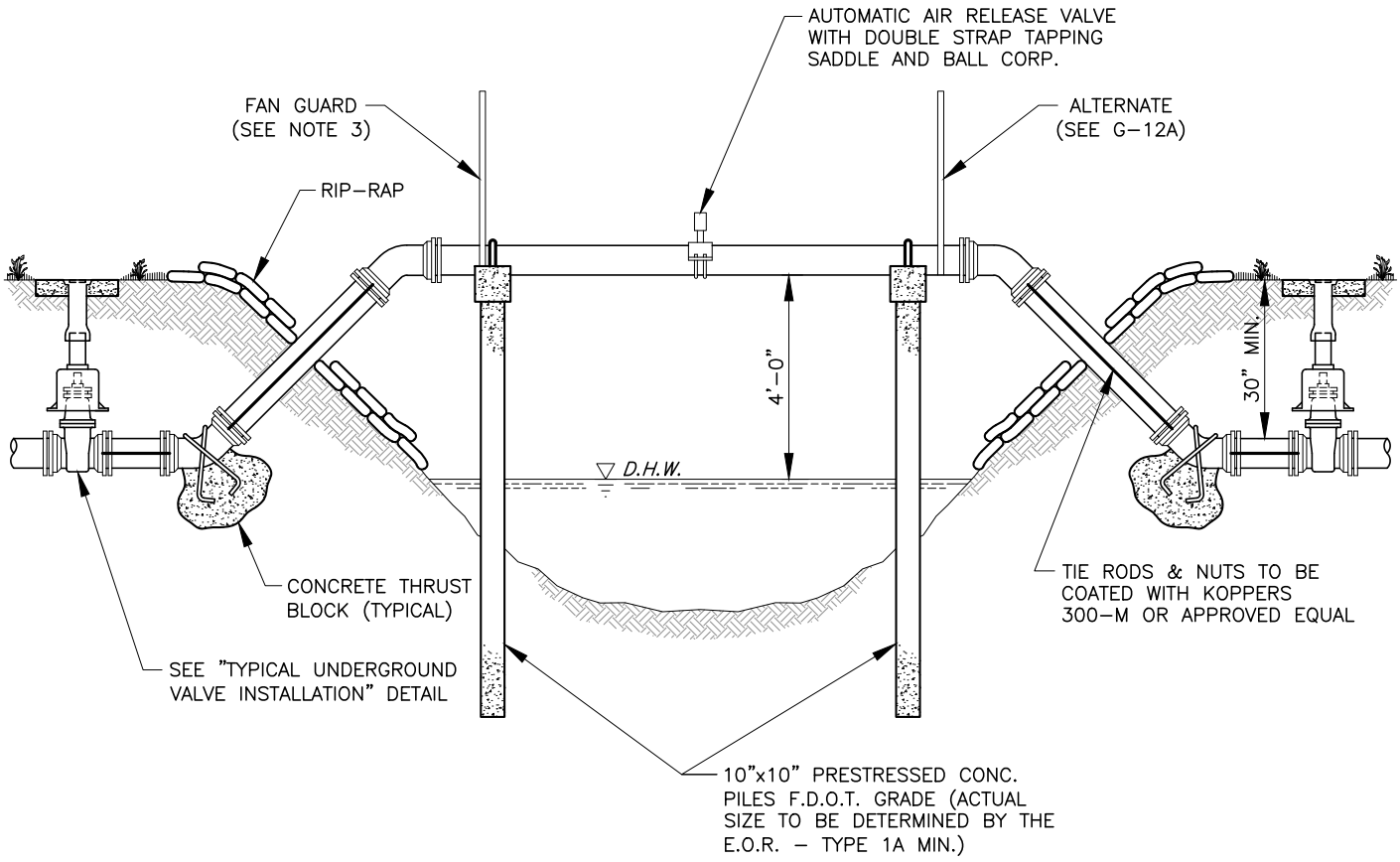
WYE



BEND

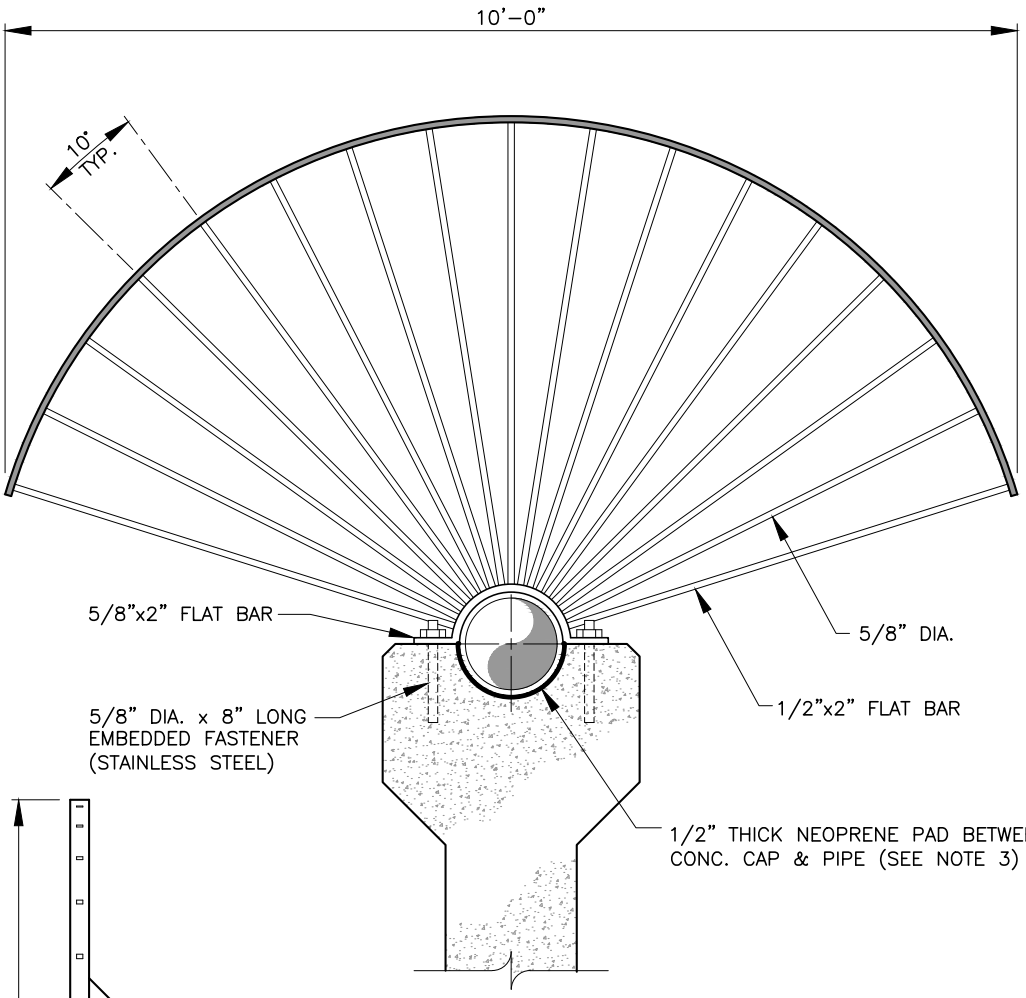
PIPE	THRUST BLOCK AREA REQ'D	PIPE	THRUST BLOCK AREA REQ'D	REMARKS	NOTE:
4"	2.0 SQ. FT.	20"	37.0 SQ. FT.	VALUES ARE FOR 90° BEND, BASED ON 2000 P.S.F. SAFE BEARING LOAD AND PIPE PRESSURE OF 150 P.S.I. FOR OTHER SOILS & PRESSURES THE AREA REQUIRED IS IN DIRECT PROPORTION	FOR OTHER FITTINGS USE THE FOLLOWING FACTORS. TEE: 100% 45° BEND: 71% 22 1/2° BEND: 39% 11-1/4°: BEND 20% DEAD END: 100%
6"	4.0 SQ. FT.	24"	53.0 SQ. FT.		
8"	6.6 SQ. FT.	27"	80.0 SQ. FT.		
10"	10.0 SQ. FT.	30"	98.0 SQ. FT.		
12"	14.0 SQ. FT.	36"	127.0 SQ. FT.		
14"	18.6 SQ. FT.				
16"	24.0 SQ. FT.				
18"	30.0 SQ. FT.				

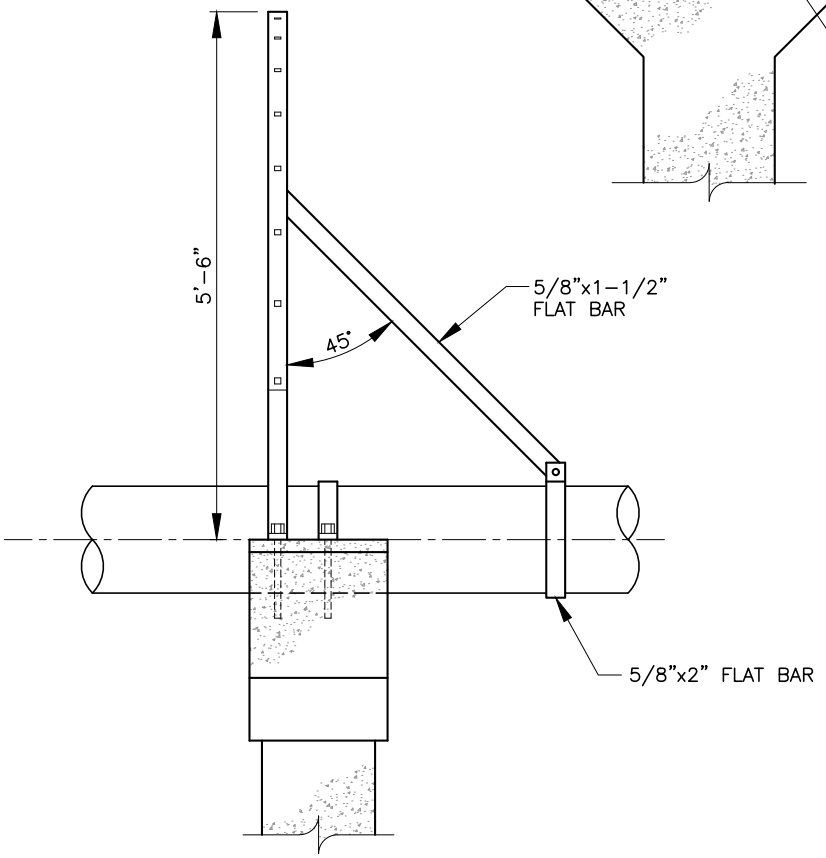
1. THRUST BLOCKS SHALL BE FORMED AND POURED AGAINST UNDISTURBED SOIL. KEEP "T" BOLTS CLEAR OF CONCRETE, WRAPPED IN VISQUEEN FOR FUTURE ACCESS, WITH A MINIMUM OF 12" THICKNESS BETWEEN THE FITTING AND THE SOIL.
2. BEFORE POURING, PLUGS SHALL BE WRAPPED WITH VISQUEEN AND A BOARD PLACED IN FRONT.
3. CONCRETE SHALL BE 2500 P.S.I. MINIMUM (28 DAY STRENGTH).
4. FITTINGS 16" AND LARGER SHALL HAVE MECHANICAL RESTRAINT, AND THRUST BLOCKS.
5. THE ENGINEER OF RECORD SHALL CALCULATE THE SIZE OF THE DEADMAN REQUIRED AS WELL AS ANY INSTALLATION WHICH IS NOT COVERED BY THE ABOVE.



NOTES:

1. ALL EXPOSED PIPE SHALL BE DUCTILE IRON WITH FLANGED FITTINGS. ALL HARDWARE SHALL BE PAINTED AS SPECIFIED.
2. SPAN LENGTHS AS REQUIRED BY PERMITTING AGENCY.
3. FAN GUARDS ARE REQUIRED. SEE "TYPICAL FAN GUARD" DETAIL.
4. PIPE SHALL BE CRADLED ON NEOPRENE, 1/2" THICK MINIMUM.
5. TIE–DOWN STRAPS SHALL FIT PROPERLY AND SECURE PIPE IN CRADLE.
6. PIPE CRADLE IN CAP SHALL CONTACT 1/2 CIRCUMFERENCE OF PIPE.
7. CONSTRUCTION DRAWINGS SHALL SHOW ULTIMATE CANAL SECTION AND RELEVANT ELEVATIONS AND DISTANCES ON THIS DETAIL.
8. PIPE SHALL BE RESTRAINED FOR A MINIMUM DISTANCE OF 60' FROM EACH BOTTOM DEFLECTION.
9. STAINLESS STEEL (316) REQUIRED FOR ALL STRAPS, SADDLES, FLANGE BOLTS, AND OTHER HARDWARE FOR INSTALLATIONS OVER BRACKISH OR MARINE WATERS (ANTI–GALL COMPOUND TO BE USED WHEN ASSEMBLING STAINLESS STEEL NUTS AND BOLTS.)
10. PILES SHALL BE SET A MINIMUM OF 10' INTO FIRM SAND. LENGTH OF SPAN WILL DETERMINE NUMBER OF PILES REQUIRED.
11. AERIAL CROSSING TO BE FIELD COATED AS FOLLOWS: 1ST COAT IS PLY–MASTIC EPOXY (BEIGE COLOR). 2ND COAT IS PLY–THAN 890 HS (BRIGHT WHITE COLOR FOR WATER MAIN). 2ND COAT SHALL BE PANTONE PURPLE FOR RECLAIMED WATER MAIN, BEIGE FOR FORCE MAIN, AND OLIVE GREEN FOR RAW WATER MAIN.
12. THREAD AREAS OF BALL CORP. STOP SHALL BE COMPLETELY SPIRAL WRAPPED WITH TWO WRAPS OF TEFLON TAPE.
13. PILE LIFT CABLE IN CONCRETE PILES SHALL BE REMOVED BELOW SURFACE; HOLE SHALL BE FILLED WITH VINYL BASED EPOXY CEMENT.





NOTES:

1. FAN GUARDS SHALL BE PLACED AT EACH END OF CANAL CROSSING.
2. FAN GUARD AND ALL MOUNTING BRACKETS TO BE HOT DIP STAINLESS STEEL AND MOUNTING HARDWARE TO BE STAINLESS STEEL.
3. 1/2" THICK NEOPRENE PAD TO INSULATE PIPE FROM CONTACT WITH ALL MOUNTING HARDWARE, FAN GUARD HARDWARE, AND CONCRETE SURFACES.

UTILITIES ENGINEERING DIVISION

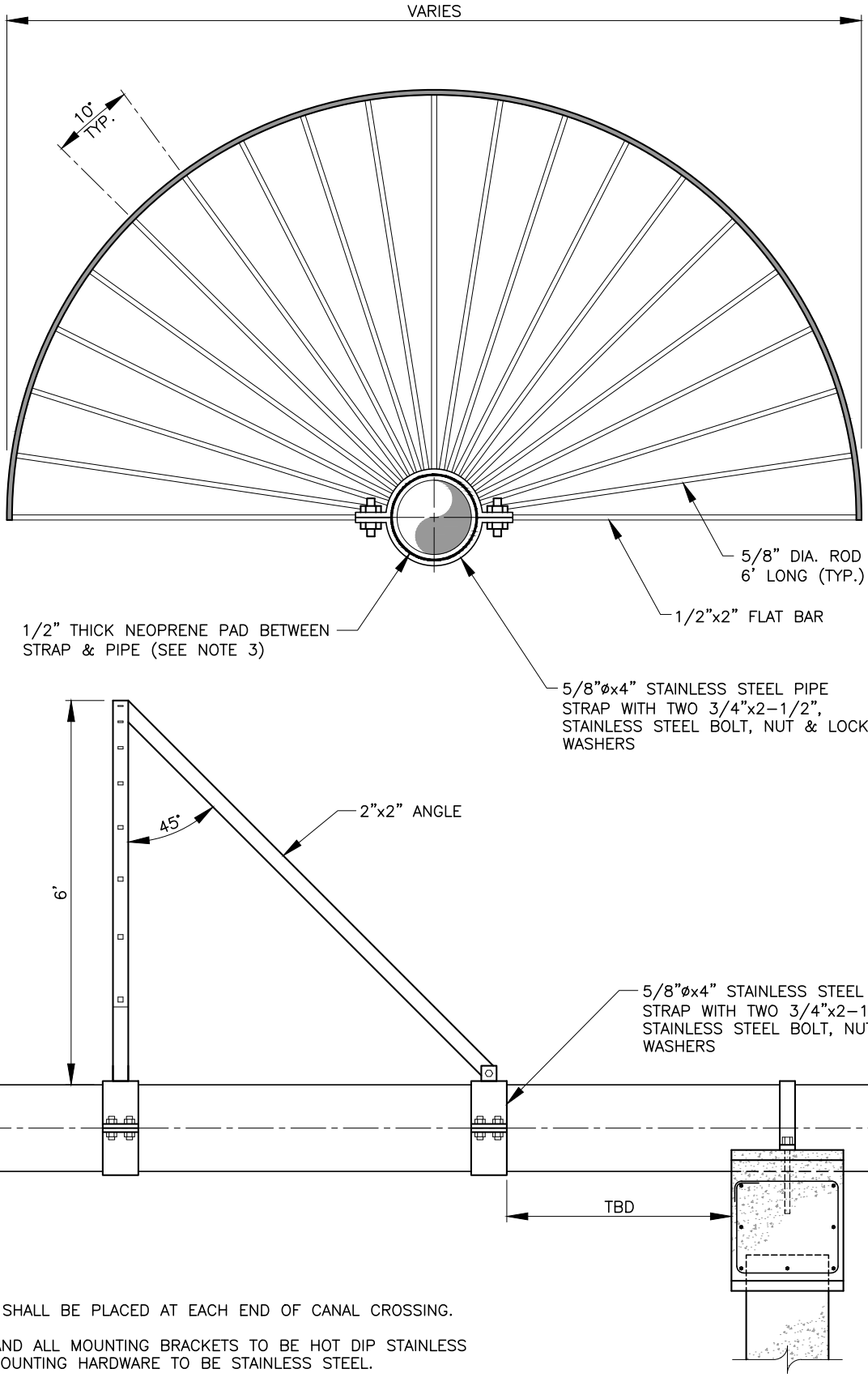
BOYNTON BEACH UTILITIES DEPARTMENT CONSTRUCTION STANDARDS & DETAILS

TYPICAL FAN GUARD

NOT TO SCALE

EFF. DATE 05/24

PAGE NUMBER G-12



NOTES:

1. FAN GUARDS SHALL BE PLACED AT EACH END OF CANAL CROSSING.
2. FAN GUARD AND ALL MOUNTING BRACKETS TO BE HOT DIP STAINLESS STEEL AND MOUNTING HARDWARE TO BE STAINLESS STEEL.
3. 1/2" THICK NEOPRENE PAD TO INSULATE PIPE FROM CONTACT WITH ALL MOUNTING HARDWARE AND FAN GUARD HARDWARE.

UTILITIES
ENGINEERING DIVISION

BOYNTON BEACH UTILITIES DEPARTMENT CONSTRUCTION STANDARDS & DETAILS

ALTERNATE FAN GUARD

NOT TO SCALE	EFF. DATE 05/24

PAGE NUMBER
G-12A

MAINS OUTSIDE OF A WELLFIELD PROTECTION ZONE

MAXIMUM QUANTITY OF WATER (GALLONS PER HOUR) THAT MAY BE SUPPLIED TO MAINTAIN PRESSURE WITHIN 5 P.S.I. OF THE SPECIFIED TEST PRESSURE.
(MECHANICAL OR PUSH–ON JOINT, 18 FT. NOMINAL LENGTHS, PER 1000 FT. OF PIPE)

PIPE DIAMETER	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"
AVERAGE TEST PRESSURE: 150 PSI	0.10	0.14	0.18	0.27	0.37	0.46	0.55	0.64	0.73	0.83	0.92	1.10	1.38

NOTES:

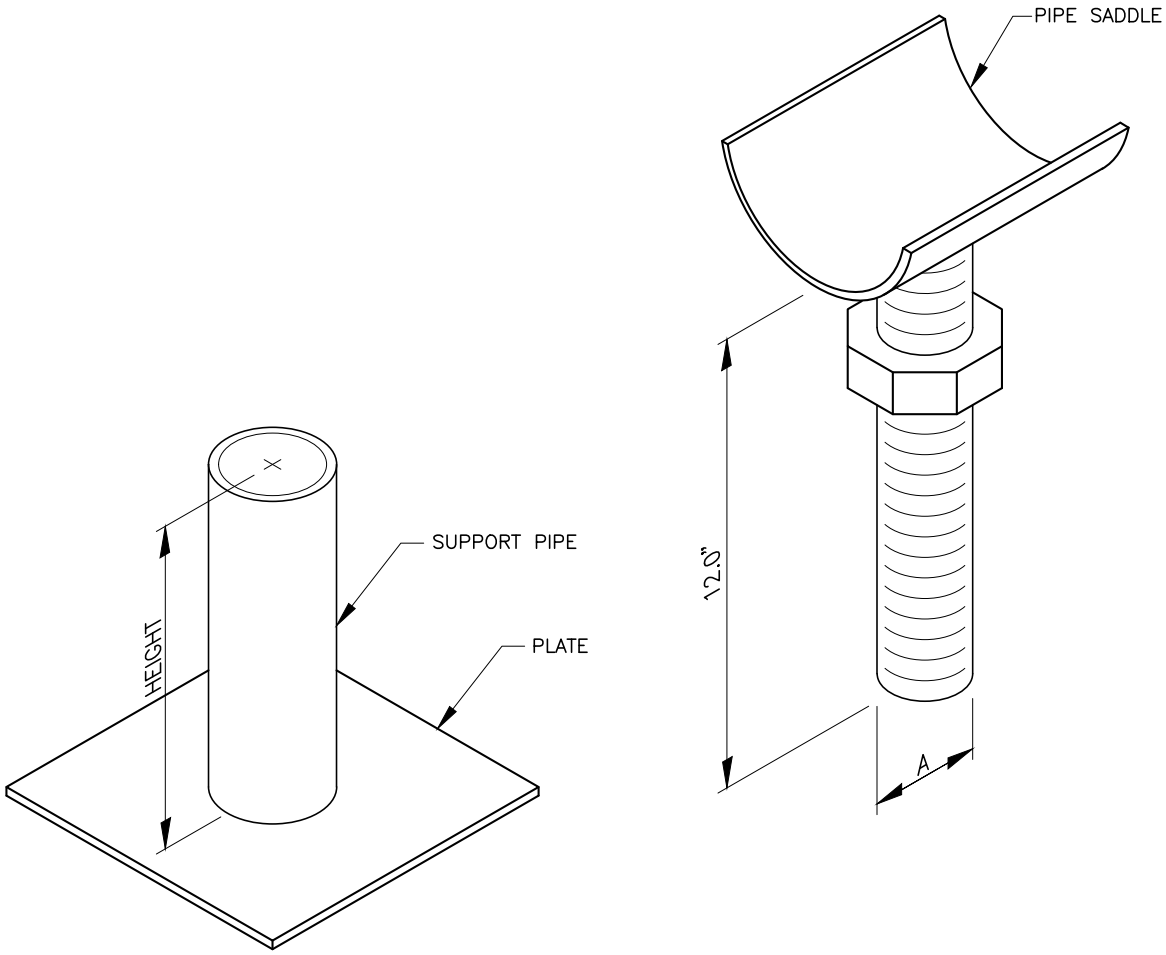
1. TO OBTAIN THE MAXIMUM QUANTITY OF WATER FOR PIPE WITH 20 FT. NOMINAL LENGTHS, MULTIPLY THE QUANTITY CALCULATED FROM THE TABLE BY 0.9
2. THE MAXIMUM QUANTITY OF ADDED WATER FOR A PIPELINE IS CALCULATED BY MULTIPLYING THE QUANTITY PER HOUR AS OBTAINED FROM THE ABOVE TABLE, BY THE DURATION OF THE TEST IN HOURS,AND BY THE TOTAL LENGTH OF THE LINE BEING TESTED DIVIDED BY 1,000. IF THE LINE UNDER TEST CONTAINS SECTIONS OF VARIOUS DIAMETERS, THE MAXIMUM QUANTITY ADDED WILL BE THE SUM OF THE COMPUTED QUANTITIES FOR EACH SIZE.
3. MAXIMUM TEST LENGTH = 2,000 FEET PER SECTION.
4. THIS STANDARD SHALL REFLECT ANY REVISION OF A.W.W.A. C–600. HOWEVER, THE MAXIMUM QUANTITY OF WATER ADDED SHALL NOT EXCEED 50% OF THE RECOMMENDED LIMIT PER APPLICABLE AWWA C–600 STANDARD (FORMULA BASIS).
5. STANDARD TEST PRESSURE = 155 P.S.I.
6. FORMULA BASIS: $\dfrac{L = (S) \times (D) \times (P)^{1/2}}{148{,}000}$

   L = MAXIMUM QUANTITY OF WATER TO BE ADDED (GALLONS PER HOUR)
   S = LENGTH OF PIPE TESTED (FEET)
   D = DIAMETER OF PIPE (INCHES)
   P = TEST PRESSURE (P.S.I.)
7. PRESSURE TEST DURATION TO BE MIN. 2 HOURS.

MAINS WITHIN A WELLFIELD PROTECTION ZONE

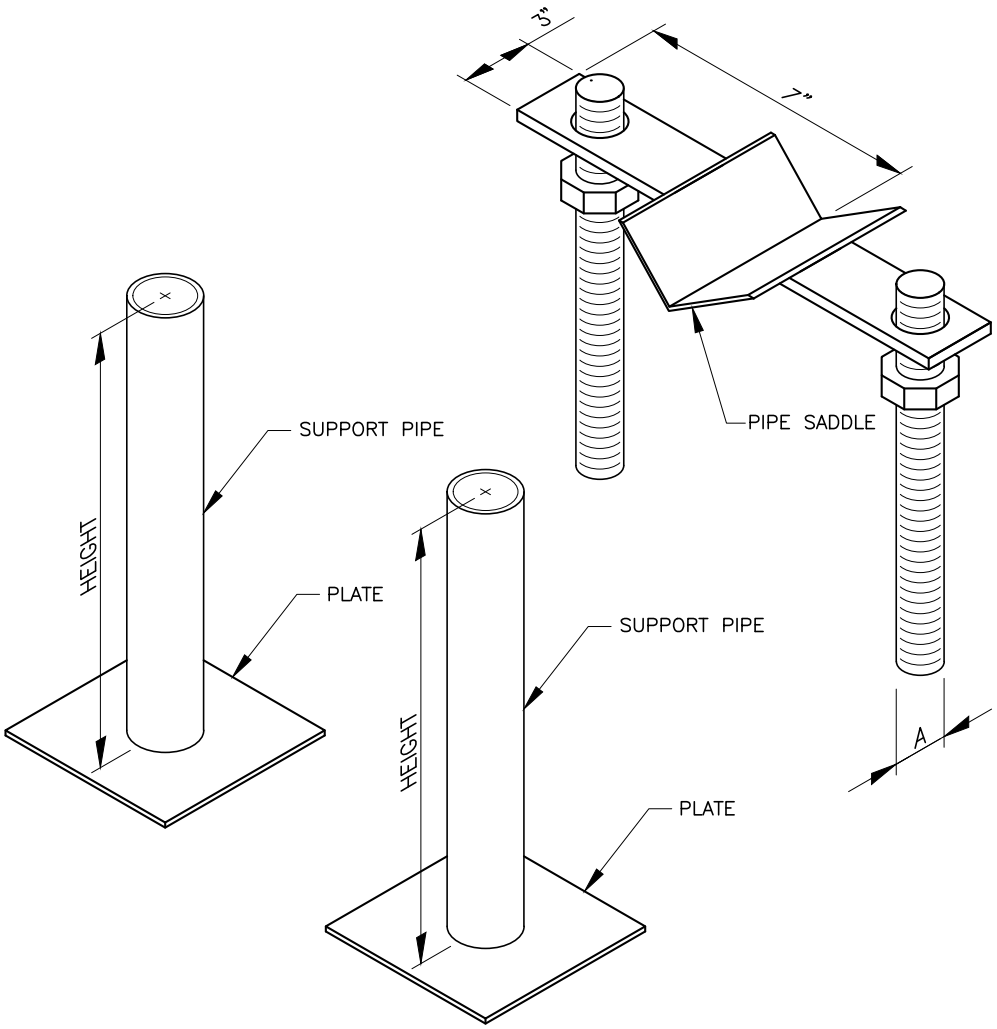
NOTE:

PALM BEACH COUNTY DEPARTMENT OF ENVIROMENTAL RESOURCE MANAGEMENT STANDARDS FOR PRESSURE TESTING WITHIN A PROTECTED WELLFIELD SHALL APPLY. (REFER TO ULDC, ART. 9, SEC. 9.3)



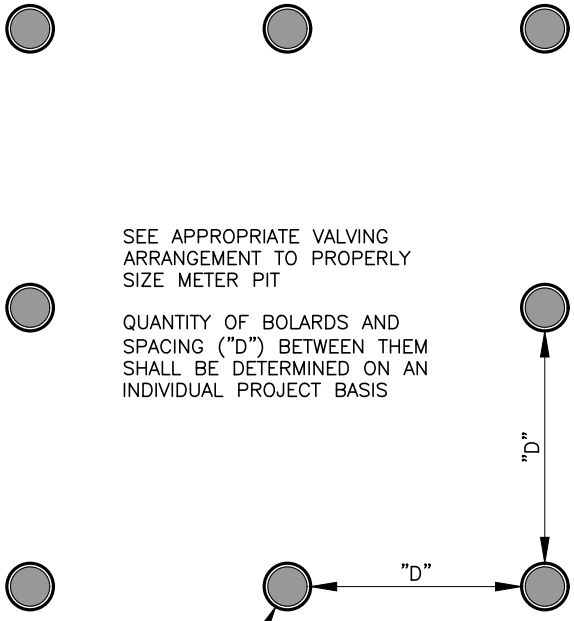
PIPE SIZE	A	SUPPORT PIPE	SADDLE	PLATE	HEIGHT
3"	3/4"	1"	1/4"x2"	4"x4"	1'-0"
4"	3/4"	1"	1/4"x2"	4"x4"	1'-0"
6"	3/4"	1"	1/4"x2"	4"x4"	1'-0"
8"	3/4"	1"	1/4"x2"	4"x4"	1'-0"
10"	1"	1-1/4"	3/8"x3"	6"x6"	1'-0"
12"	1"	1-1/4"	3/8"x3"	6"x6"	1'-0"
14"	1"	1-1/4"	3/8"x3"	6"x6"	1'-0"
16"	1-1/4"	1-1/2"	1/2"x3"	6"x6"	1'-0"
18"	1-1/4"	1-1/2"	1/2"x3"	6"x6"	1'-0"

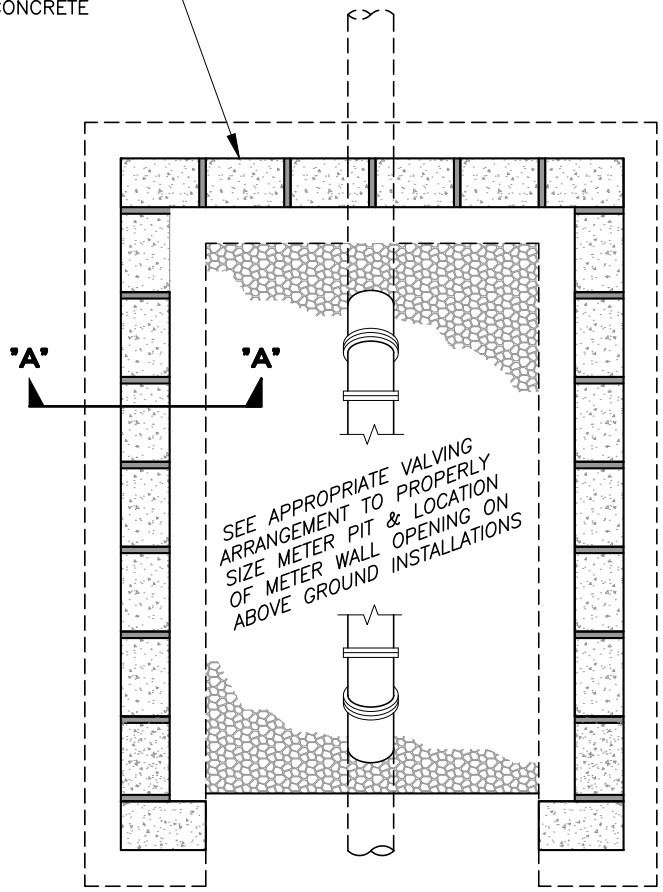
NOTE:
SUPPORT PIPE AND BASE PLATE TO BE STAINLESS STEEL. SHOP DRAWINGS SHALL BE SUBMITTED TO THE DEPARTMENT FOR APPROVAL.

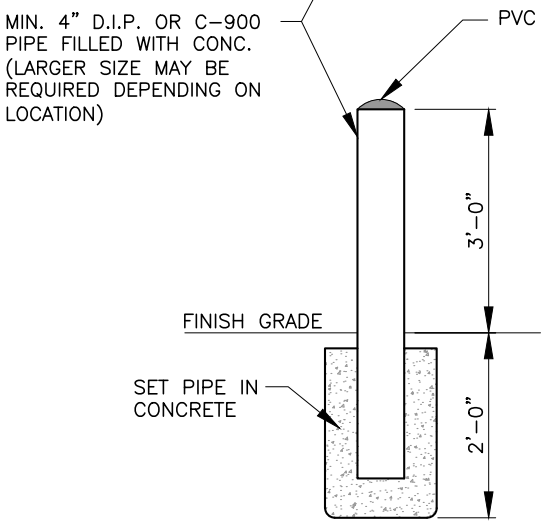


PIPE SIZE	A	SUPPORT PIPE	SADDLE	PLATE	HEIGHT
3"	3/4"	1"	1/4"x2"	4"x4"	2'-6"
4"	3/4"	1"	1/4"x2"	4"x4"	2'-6"
6"	3/4"	1"	1/4"x2"	4"x4"	2'-6"
8"	3/4"	1"	1/4"x2"	4"x4"	2'-6"
10"	1"	1-1/4"	3/8"x3"	6"x6"	2'-6"
12"	1"	1-1/4"	3/8"x3"	6"x6"	2'-6"
14"	1"	1-1/4"	3/8"x3"	6"x6"	2'-6"
16"	1-1/4"	1-1/2"	1/2"x3"	6"x6"	2'-6"
18"	1-1/4"	1-1/2"	1/2"x3"	6"x6"	2'-6"

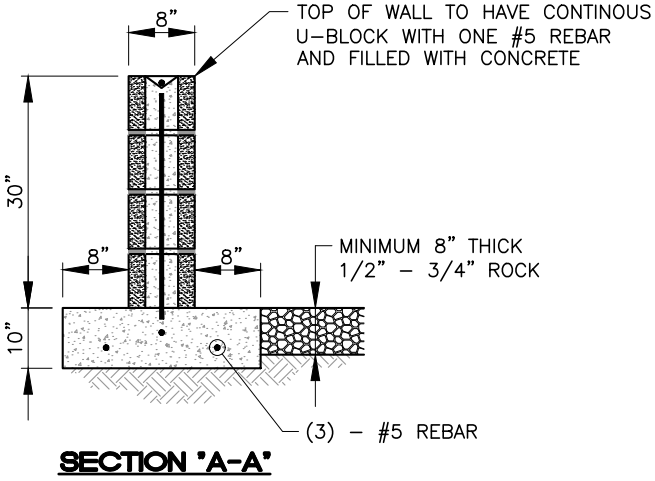
NOTE:
SUPPORT PIPE AND BASE PLATE TO BE STAINLESS STEEL. SHOP DRAWINGS SHALL BE SUBMITTED TO THE DEPARTMENT FOR APPROVAL.







OPTION "A"
PROTECTIVE PIPE BOLLARDS



SECTION "A-A"

OPTION "B"
SCREENING WALL

BLOCK FOOTER TO BE A MINIMUM OF 12" FROM PIPE ASSEMBLY AND SIDE WALLS TO BE A MINIMUM OF 36" FROM PIPE ASSEMBLY

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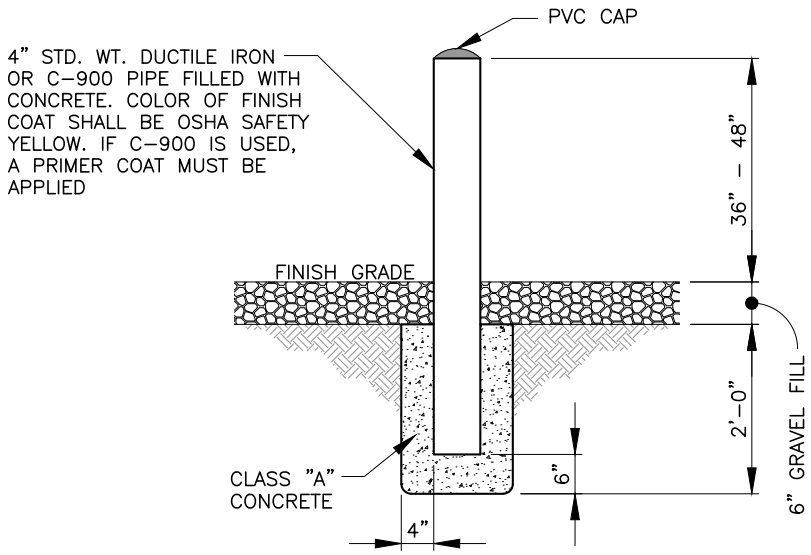
UTILITIES ENGINEERING DIVISION

BOYNTON BEACH UTILITIES DEPARTMENT CONSTRUCTION STANDARDS & DETAILS

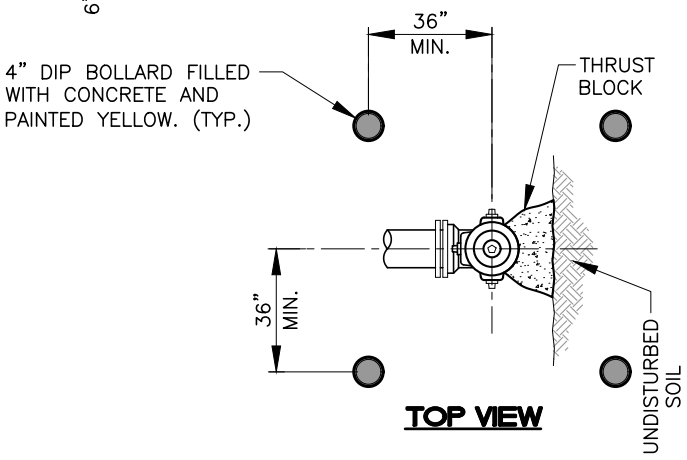
PROTECTIVE ENCLOSURES FOR ABOVE GROUND DEVICES

NOT TO SCALE	EFF. DATE 05/24

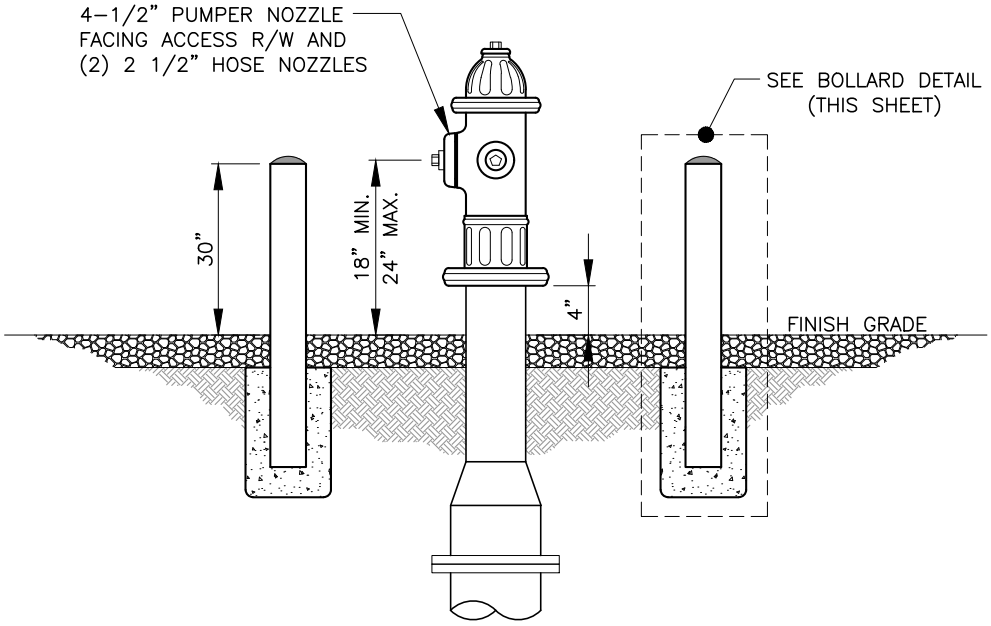
PAGE NUMBER **G-15**



BOLLARD DETAIL



TOP VIEW



SECTION

FIRE HYDRANT INSTALLATION WITH BOLLARDS

NOTE:

BOLLARDS ARE REQUIRED FOR HYDRANTS WITH LESS THAN 5 FEET TO BACK OF CURB.

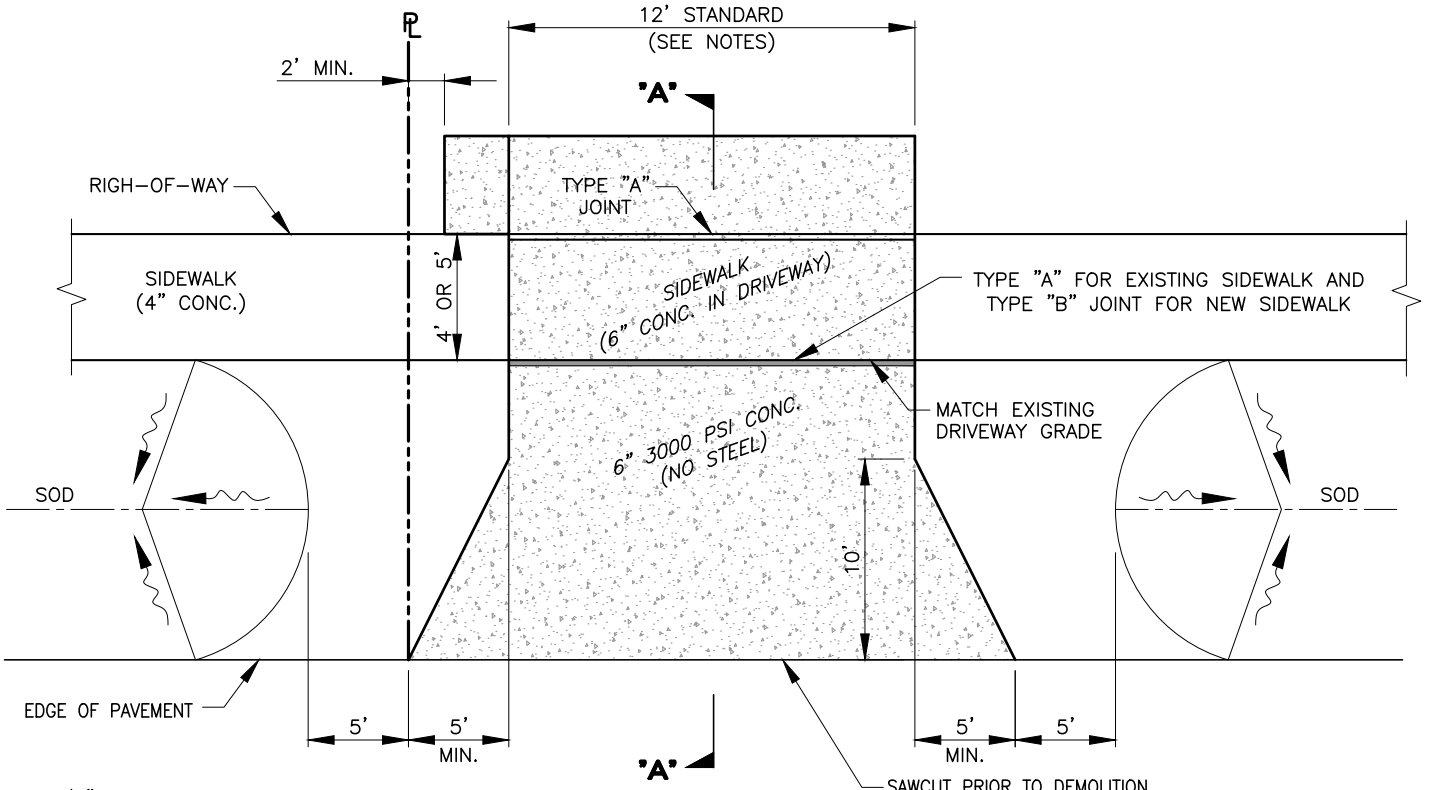
MINIMUM LENGTH OF PIPE (FEET) TO BE RESTRAINED

(SOURCES: EBAA IRON RESTRAINT LENGTH CALCULATION PROGRAM FOR PVC PIPE, RELEASE 3.1, AND DIPRA THRUST RESTRAINT FOR DUCTILE IRON PIPE, RELEASE 3.2)

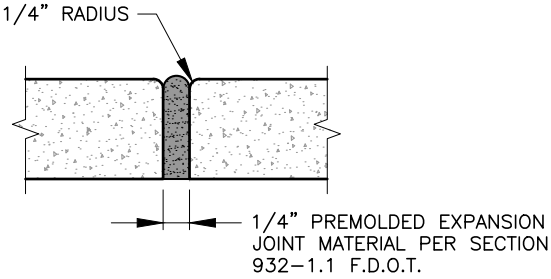
FITTING TYPE		PIPE SIZE											
		4"	6"	8"	10"	12"	16"	20"	24"	30"	36"	42"	48"
90° HORIZONTAL BEND		14	20	25	30	35	45	54	62	73	84	93	101
45° HORIZONTAL BEND		6	8	11	13	15	19	22	26	30	35	38	42
22.5° HORIZONTAL BEND		3	4	5	6	7	9	11	12	15	17	18	20
11.25° HORIZONTAL BEND		1	2	3	3	4	4	5	6	7	8	9	10
90° VERTICAL OFFSET	UPPER BEND	55	79	103	125	147	189	228	266	319	368	412	454
	LOWER BEND	22	38	49	59	69	88	106	123	145	165	184	201
45° VERTICAL OFFSET	UPPER BEND	22	32	42	51	60	77	93	109	131	151	170	187
	LOWER BEND	10	14	19	23	28	35	43	50	59	67	75	82
22.5° VERTICAL OFFSET	UPPER BEND	7	12	17	21	26	34	42	49	60	70	78	87
	LOWER BEND	2	4	6	8	10	14	17	21	25	29	33	36
11.25° VERTICAL OFFSET	UPPER BEND	3	4	6	9	11	15	19	22	28	32	37	41
	LOWER BEND	1	1	1	2	3	5	7	8	10	12	14	16
PLUG (DEAD END)		32	45	59	70	83	107	129	151	190	220	244	270
IN-LINE VALVE		32	45	59	70	83	107	129	151	100	110	125	135
TEE (BRANCH RESTRAINT)	4"x 0	23											
	6"x 0	21	35										
	8"x 0	18	34	47									
	10"x 0	16	32	46	58								
	12"x 0	13	30	44	57	69							
	16"x 0	7	26	41	55	67	90						
	20"x 0	1	21	38	52	65	88	109					
	24"x 0	1	16	34	49	62	86	108	129				
	30"x 01	8	28	44	58	83	106	127	154				
	36"x 0	1	1	22	39	54	80	103	124	153	179		
	42"x 0	1	1	15	33	49	77	100	122	151	177	201	
	48"x 0	1	1	7	27	44	73	97	120	149	176	200	222
REDUCER (LARGER PIPE RESTRAINT)	6"x 0	23											
	8"x 0	38	25										
	10"x 0	57	43	24									
	12"x 0	72	60	44	41								
	16"x 0	99	90	78	75	45							
	20"x 0	123	116	107	105	81	45						
	24"x 0	146	140	132	131	111	82	45					
	30"x 0	157	153	148	141	133	113	87	56				
	36"x 0	182	179	175	169	163	147	126	101	56			
	42"x 0	205	202	199	194	189	175	158	138	100	54		
	48"x 0	226	224	221	217	213	201	187	169	138	98	53	

NOTES:

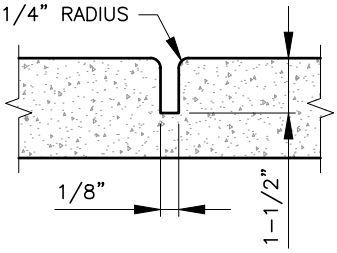
1. THE DATA IN THE ABOVE TABLE ARE BASED UPON THE FOLLOWING INSTALLATION CONDITIONS:
   - 1A: SOIL TYPE–SAND
   - 1B: TEST PRESSURE–150 PSI/200 PSI
   - 1C: DEPTH OF BURY–3'
   - 1D: TRENCH TYPE–3
   - 1E: SAFETY FACTOR–1.5
   - 1F: VERTICAL OFFSET–3'
   - 1G: MINIMUM PIPE LENGTH ALONG TEE RUN–5'
2. THE RESTRAINED PIPE LENGTHS APPLY TO DUCTILE IRON AND PVC PIPE.
3. ALL JOINTS BETWEEN UPPER AND LOWER BENDS SHALL BE RESTRAINED.
4. RESTRAINED PIPE LENGTHS APPLY TO PIPE ON BOTH SIDES OF VALVES AND FITTINGS.
5. AT DEAD END OR WHERE MAIN LINES CHANGE DIRECTION, VALVES SHALL BE RESTRAINED USING "MEGALUGS", STAINLESS STEEL TIE RODS, RESTRAINING GASKETS OR OTHER APPROVED RESTRAINT BY DEPARTMENT AT LENGTH BASED ON G–17.



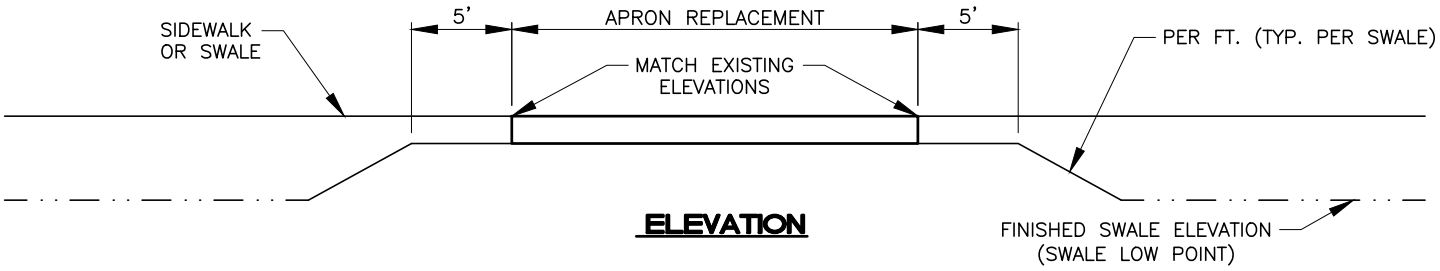
PLAN



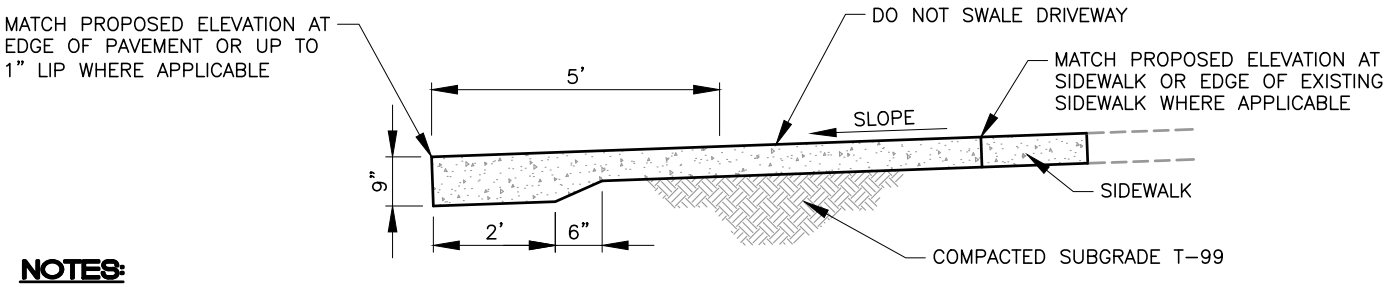
TYPE "A" JOINT



TYPE "B" JOINT



ELEVATION



SECTION A-A

NOTES:

1. 10' MINIMUM APRON WIDTH MAXIMUM 24' PER STREET FRONTAGE (FOR DOUBLE APRON OR CIRCULAR).
2. NO PAVERS OR STAMPED CONCRETE APRONS.

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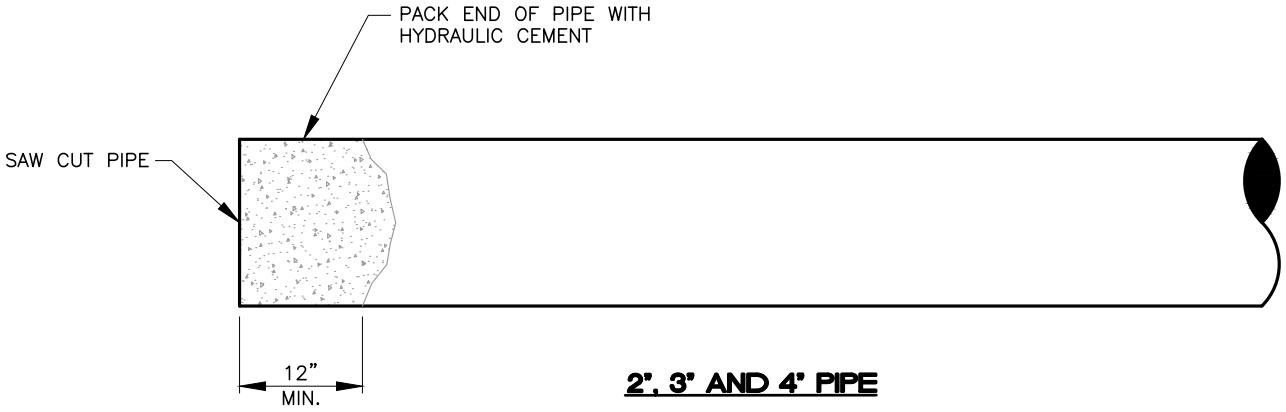
UTILITIES
ENGINEERING DIVISION

BOYNTON BEACH UTILITIES DEPARTMENT CONSTRUCTION STANDARDS & DETAILS

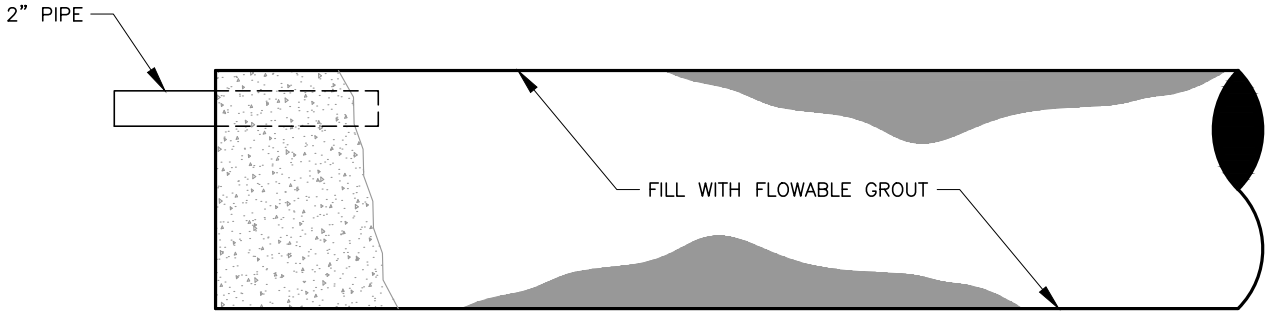
CONCRETE DRIVEWAY APRON DETAIL

NOT TO SCALE | EFF. DATE 05/24

PAGE NUMBER G-18



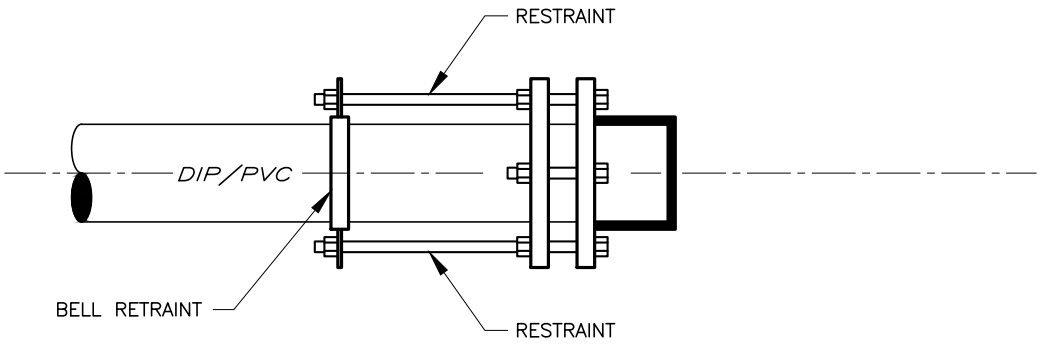
2", 3" AND 4" PIPE



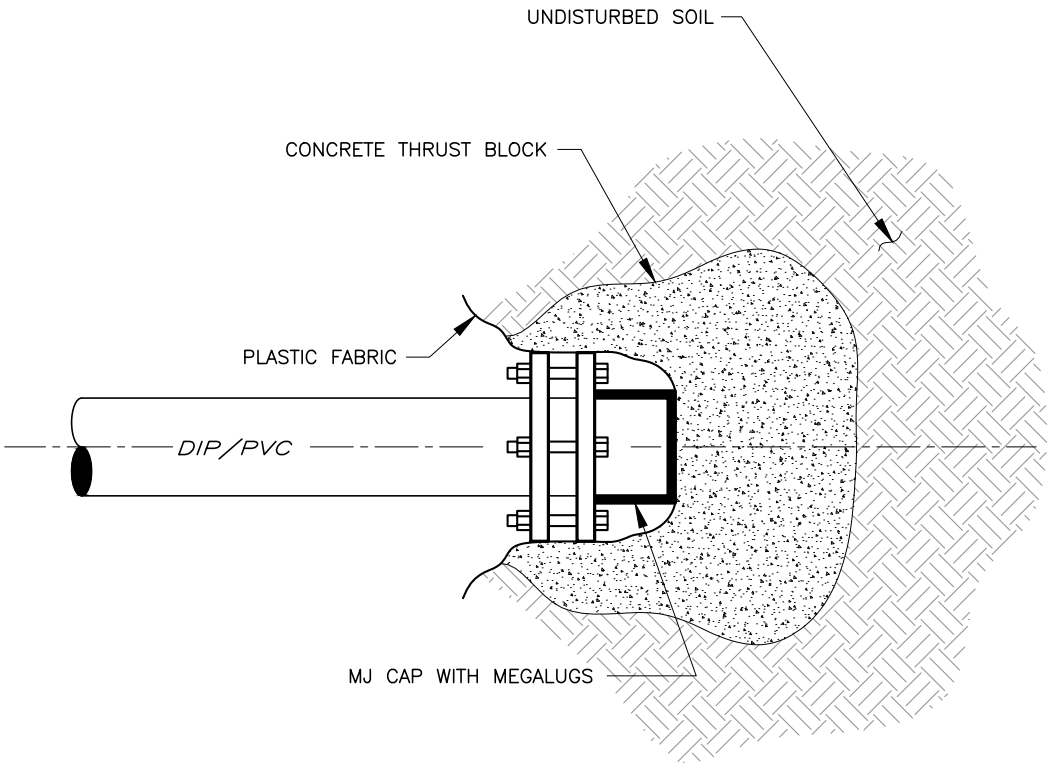
6" AND LARGER PIPE

NOTES:

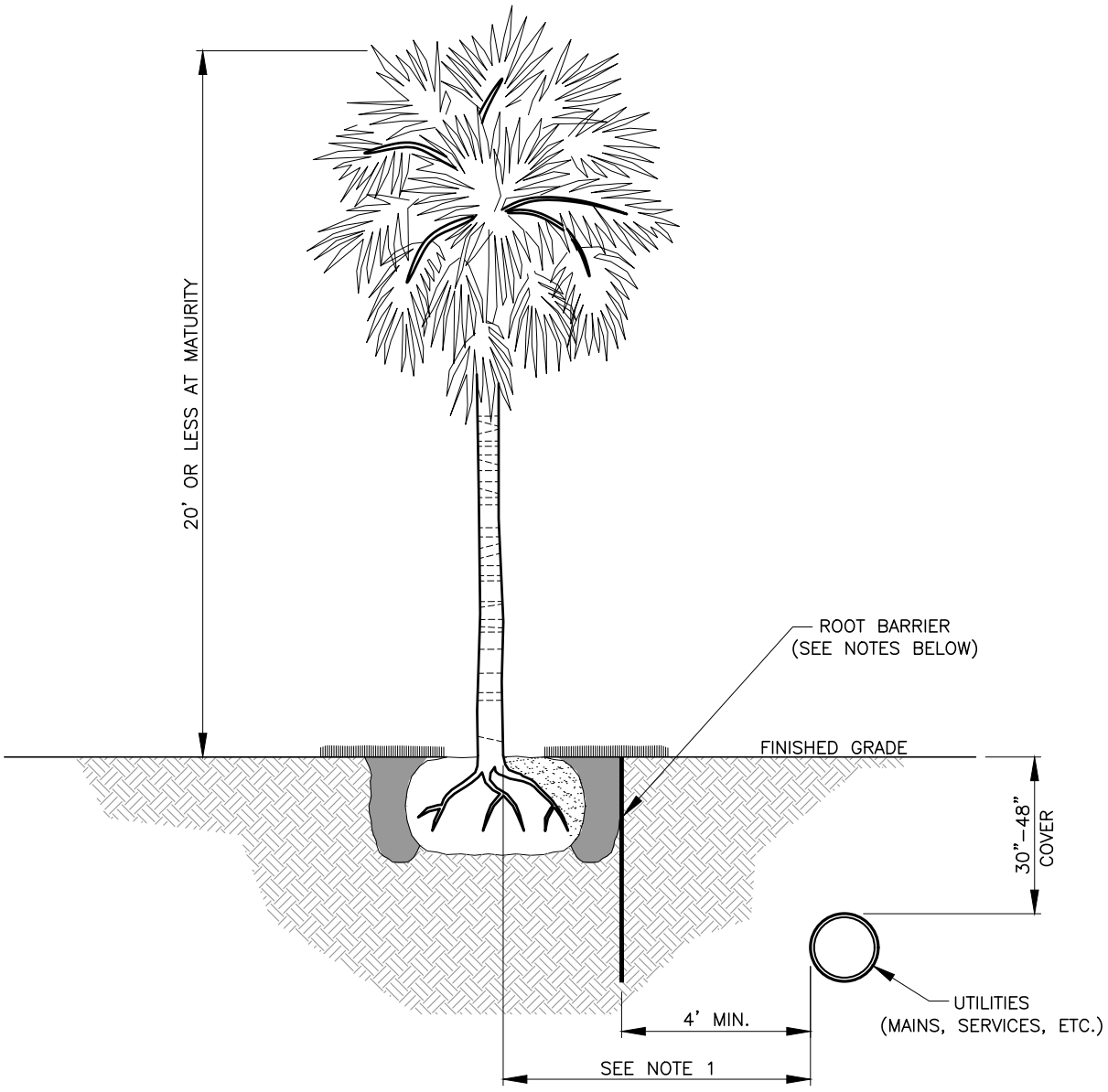
1. INSTALL 2" PIPE AT BOTH ENDS OF LINE TO BE ABANDONED. GROUT IN PLACE WITH QUICK SETTING HYDRAULIC CEMENT.
2. PUMP FLOWABLE GROUT FROM ONE END OR INTERMEDIATE POINTS ALONG THE PIPELINE UNTIL PIPE IS FILLED AS WITNESSED BY THE DISCHARGE FROM 2" PIPE(S). REMOVE 2" PIPE OR FILL WITH QUICK SETTING HYDRAULIC CEMENT.



CAP WITH BELL RESTRAINT



MJ CAP WITH MEGALUGS AND THRUST BLOCK



NOTES:

(PLEASE REFER TO WRITTEN SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS)

1. THIS DISTANCE SHALL BE 5' MINIMUM WITH ROOT BARRIER AND 10' MINIMUM IF NO ROOT BARRIER IS USED.
2. ALL ROOT BARRIERS SHALL BE 4' MINIMUM FROM ALL UTILITY DEPARTMENT FACILITIES.
3. THE INSTALLATION OF ROOT BARRIERS SHALL BE COORDINATED WITH THE UTILITY DEPARTMENT AND INSPECTED BY THE UTILITY DEPARTMENT PRIOR TO BACKFILLING. ALL ROOT BARRIERS SHALL EXTEND UP TO FINISHED GRADE.
4. ROOT BARRIERS SHALL BE MINIMUM 36" DEEP. APPROVED PRODUCTS INCLUDE "DEEP ROOT", "ROOT SOLUTIONS", AND "NDS EP SERIES".
5. ALL ROOT BARRIERS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS WRITTEN INSTRUCTIONS.

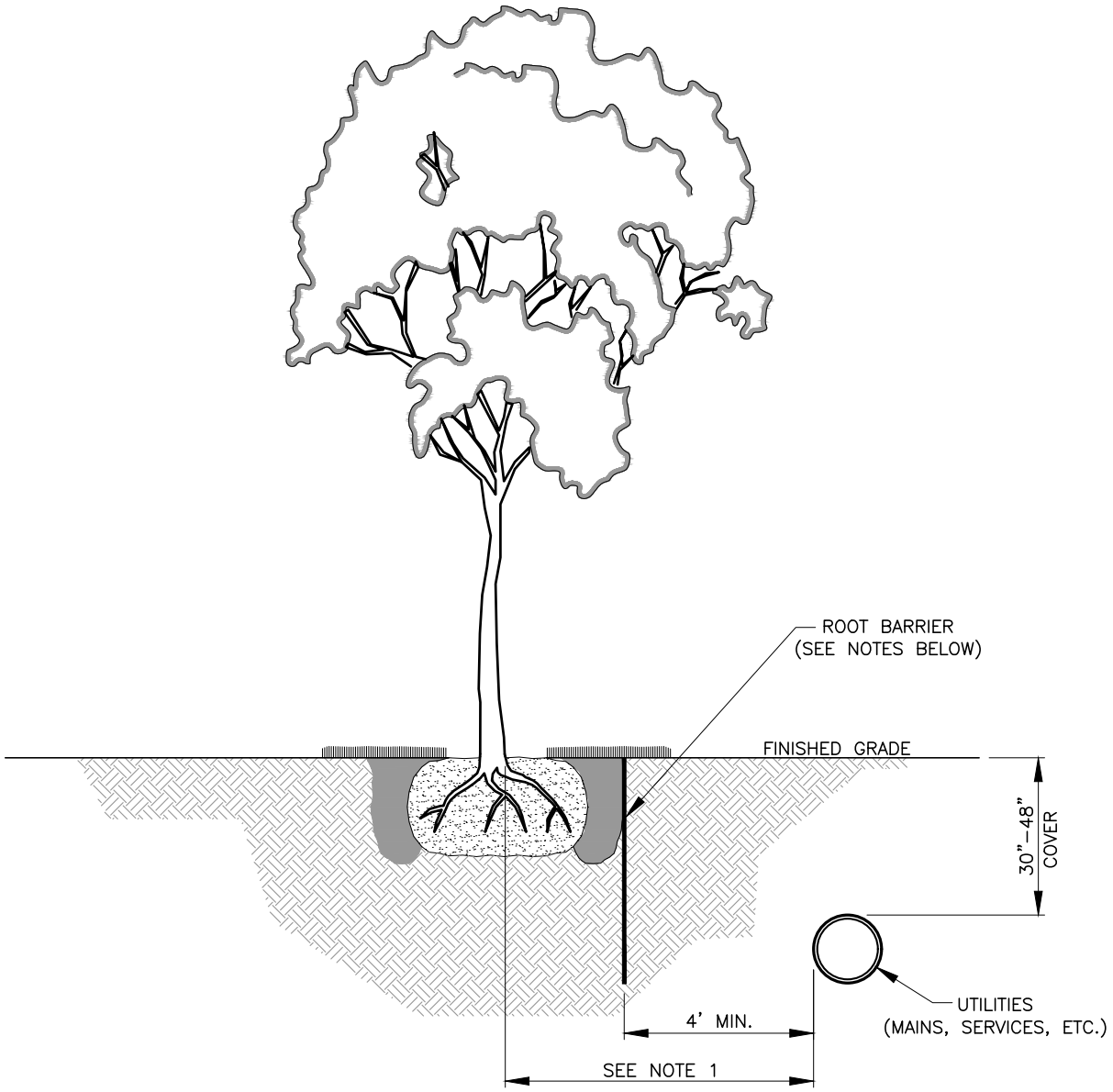
UTILITIES
ENGINEERING DIVISION

BOYNTON BEACH UTILITIES DEPARTMENT CONSTRUCTION STANDARDS & DETAILS

TYPICAL SHRUB, SMALL TREE OR PALM TREE WITH ROOT BARRIER

NOT TO SCALE	EFF. DATE 05/24

PAGE NUMBER
G-21



NOTES:

(PLEASE REFER TO WRITTEN SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS)

1. THIS DISTANCE SHALL BE 7' MINIMUM WITH ROOT BARRIER AND 15' MINIMUM IF NO ROOT BARRIER IS USED.
2. ALL ROOT BARRIERS SHALL BE 4' MINIMUM FROM ALL UTILITY DEPARTMENT FACILITIES.
3. THE INSTALLATION OF ROOT BARRIERS SHALL BE COORDINATED WITH UTILITY DEPARTMENT AND INSPECTED BY THE UTILITY DEPARTMENT PRIOR TO BACKFILLING. ALL ROOT BARRIERS SHALL EXTEND UP TO FINISHED GRADE.
4. ROOT BARRIERS SHALL BE MINIMUM 36" DEEP. APPROVED PRODUCTS INCLUDE "DEEP ROOT", "ROOT SOLUTIONS", AND "NDS EP SERIES".
5. ALL ROOT BARRIERS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS WRITTEN INSTRUCTIONS.
6. LARGE PALM TREES INCLUDE ROYAL, WASHINGTONIAN, BISMARK AND SIMILAR SIZED SPECIES.

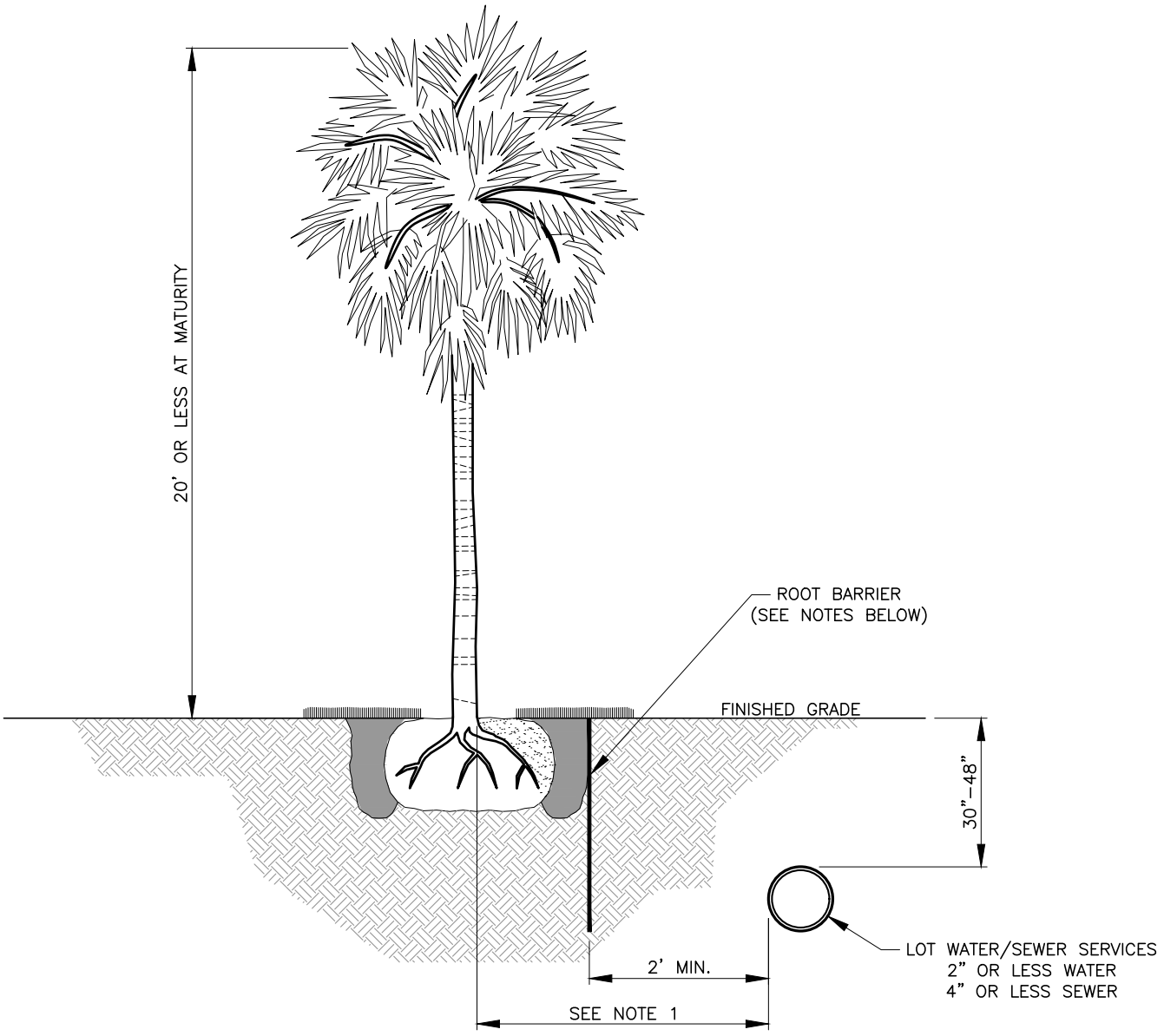
UTILITIES
ENGINEERING DIVISION

BOYNTON BEACH UTILITIES DEPARTMENT CONSTRUCTION STANDARDS & DETAILS

TYPICAL CANOPY TREE, LARGE OR EXOTIC PALM TREE WITH ROOT BARRIER

NOT TO SCALE	EFF. DATE 05/24

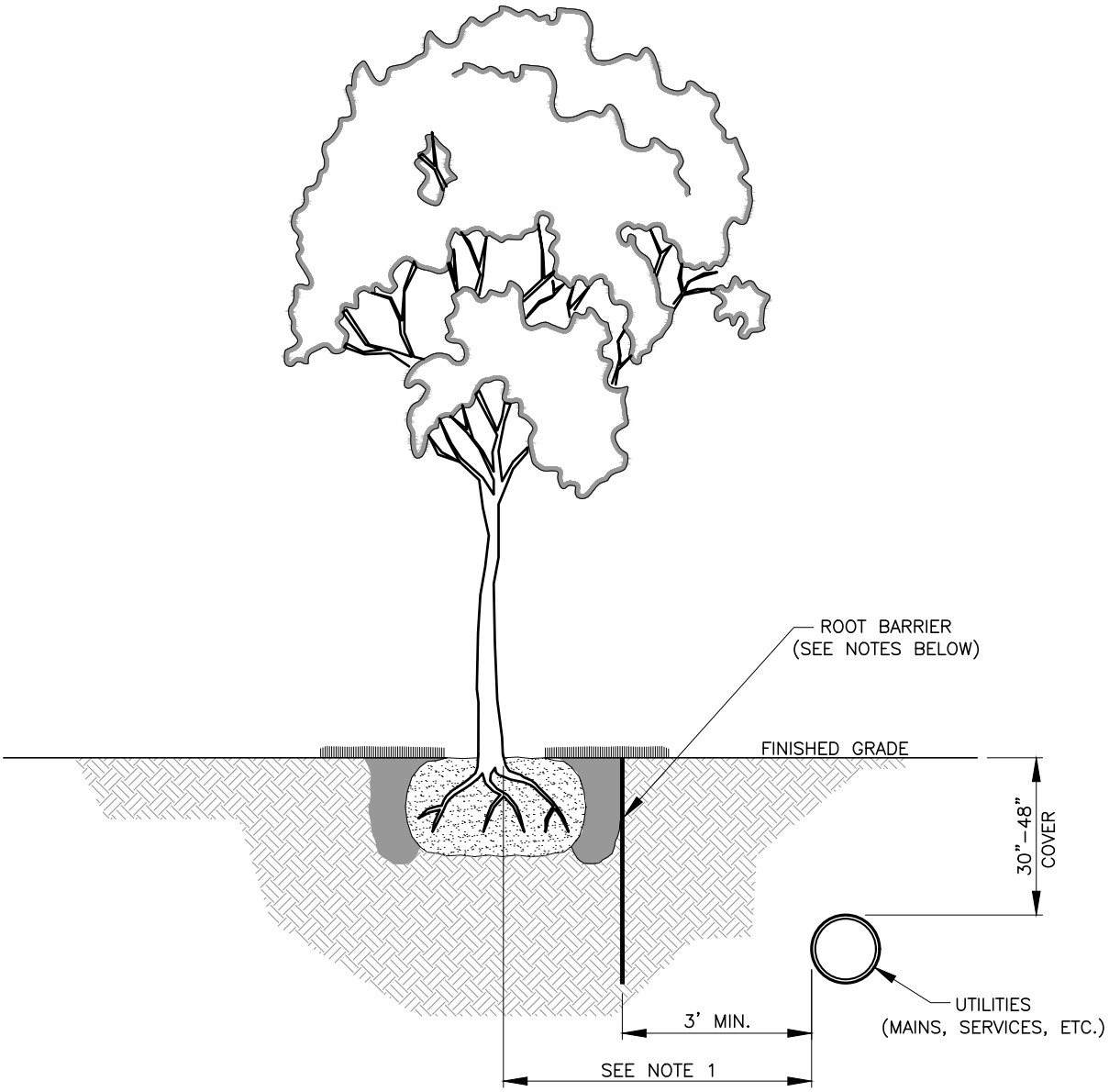
PAGE NUMBER
G-22



NOTES:

(PLEASE REFER TO WRITTEN SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS)

1. THIS DISTANCE SHALL BE 4' MINIMUM WITH ROOT BARRIER AND 7' MINIMUM IF NO ROOT BARRIER IS USED.
2. ALL ROOT BARRIERS SHALL BE 2' MINIMUM FROM ALL SINGLE FAMILY SERVICE LINES.
3. THE INSTALLATION OF ROOT BARRIERS SHALL BE COORDINATED WITH THE UTILITY DEPARTMENT AND INSPECTED BY THE UTILITY DEPARTMENT PRIOR TO BACKFILLING. ALL ROOT BARRIERS SHALL EXTEND UP TO FINISHED GRADE.
4. ROOT BARRIERS SHALL BE MINIMUM 36" DEEP. APPROVED PRODUCTS INCLUDE "DEEP ROOT", "ROOT SOLUTIONS", AND "NDS EP SERIES".
5. ALL ROOT BARRIERS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.
6. * SHRUB PLANTING SHOULD BE MINIMUM 2' FROM LINE WITH A ROOT BARRIER 1' FROM LINE FOR PROTECTION.



NOTES:

(PLEASE REFER TO WRITTEN SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS)

1. THIS DISTANCE SHALL BE 6' MINIMUM WITH ROOT BARRIER AND 10' MINIMUM IF NO ROOT BARRIER IS USED.
2. ALL ROOT BARRIERS SHALL BE 3' MINIMUM FROM ALL SINGLE FAMILY SERVICE LINES.
3. THE INSTALLATION OF ROOT BARRIERS SHALL BE COORDINATED WITH THE UTILITY DEPARTMENT AND INSPECTED BY THE UTILITY DEPARTMENT PRIOR TO BACKFILLING. ALL ROOT BARRIERS SHALL EXTEND UP TO FINISHED GRADE.
4. ROOT BARRIERS SHALL BE MINIMUM 36" DEEP. APPROVED PRODUCTS INCLUDE "DEEP ROOT", "ROOT SOLUTIONS", AND "NDS EP SERIES".
5. ALL ROOT BARRIERS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.
6. LARGE PALM TREES INCLUDE ROYAL, WASHINGTONIAN, BISMARK AND SIMILAR SIZED SPECIES.

UTILITIES
ENGINEERING DIVISION

BOYNTON BEACH UTILITIES DEPARTMENT CONSTRUCTION STANDARDS & DETAILS

PRIVATE UTILITIES SETBACK TYPICAL CANOPY TREE, LARGE PALM OR EXOTIC TREE WITH ROOT BARRIER

NOT TO SCALE	EFF. DATE 05/24

PAGE NUMBER G-24