

APPENDIX E

Developer Installed Water Main

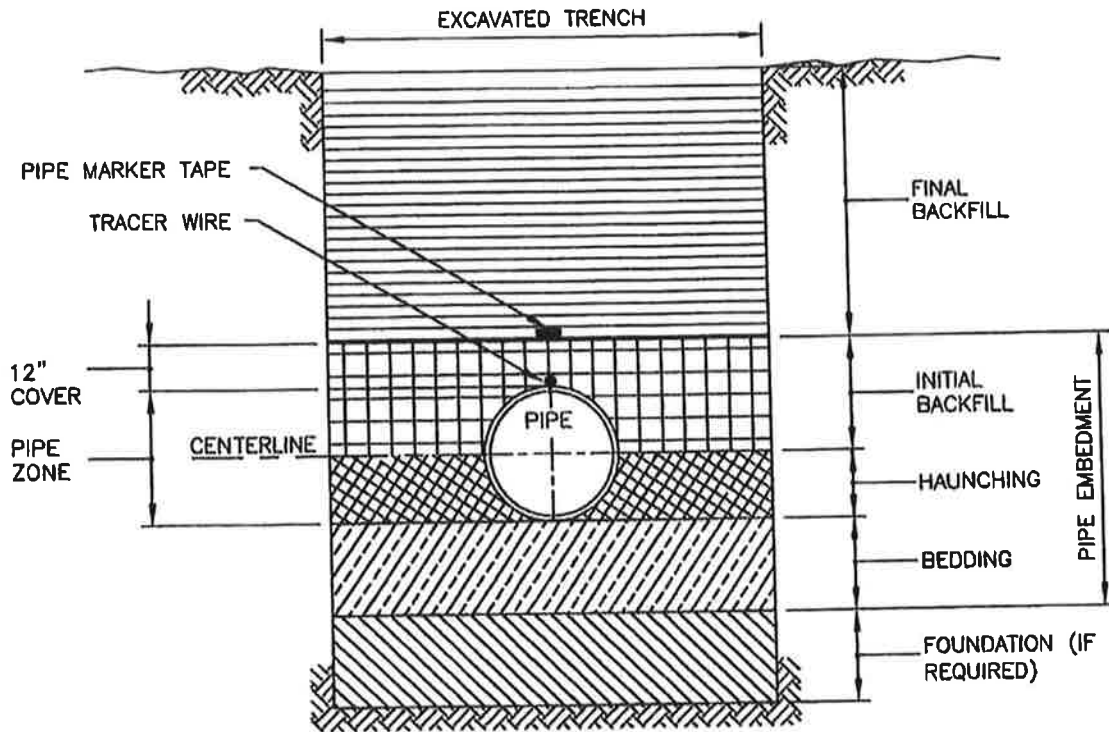
Standard Detail Drawings for Developer Installed Water Main Packet

STANDARD DETAIL DRAWINGS
FOR DEVELOPER INSTALLED WATER MAIN PACKET

INDEX OF DRAWINGS

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1.	PIPE TRENCH TERMINOLOGY
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5.	THRUST BLOCK AT HORIZONTAL BENDS (EXCEEDING 3 FEET THICKNESS)
6.	DEAD END AND CROSS BLOCKING DETAILS
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21.	WATER QUALITY SAMPLING DEVICE
22.	TRACER SYSTEM DETAIL
23.	POLYWRAP INSTALLATION





TRENCH TERMINOLOGY

FOUNDATION: A FOUNDATION IS NECESSARY ONLY WHEN NATIVE SOILS ARE UNSTABLE. FOR SUCH CONDITIONS, THE TRENCH IS OVER-EXCAVATED AND A LAYER OF SUPPORTIVE MATERIAL IS PLACED AND COMPACTED TO PROVIDE A FIRM FOUNDATION FOR THE SUBSEQUENT PIPE EMBEDMENT MATERIALS.

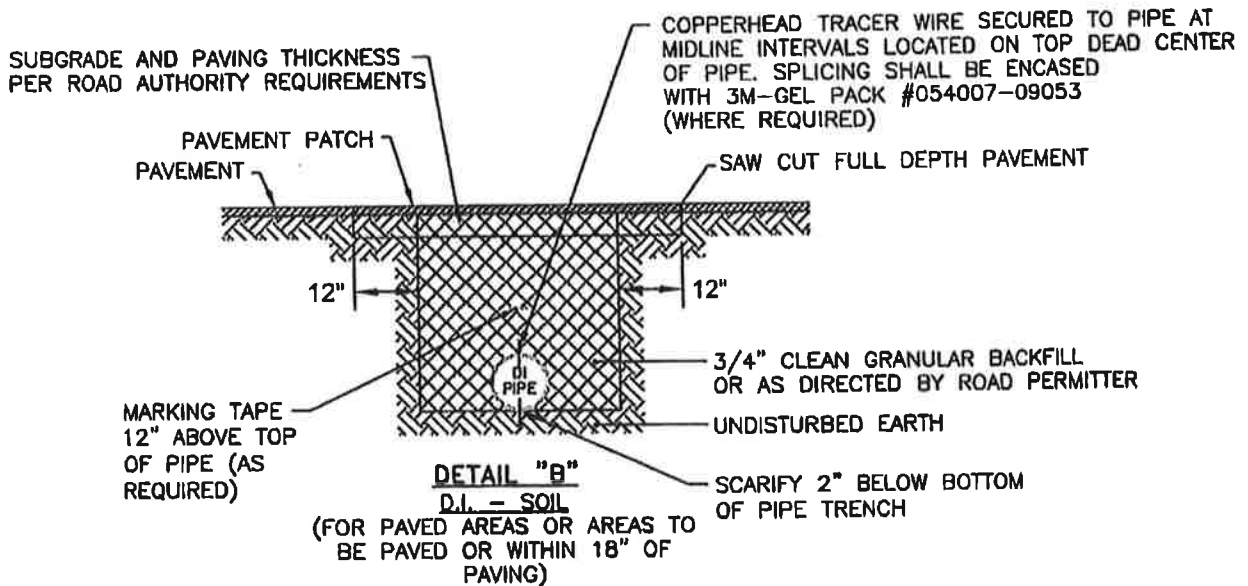
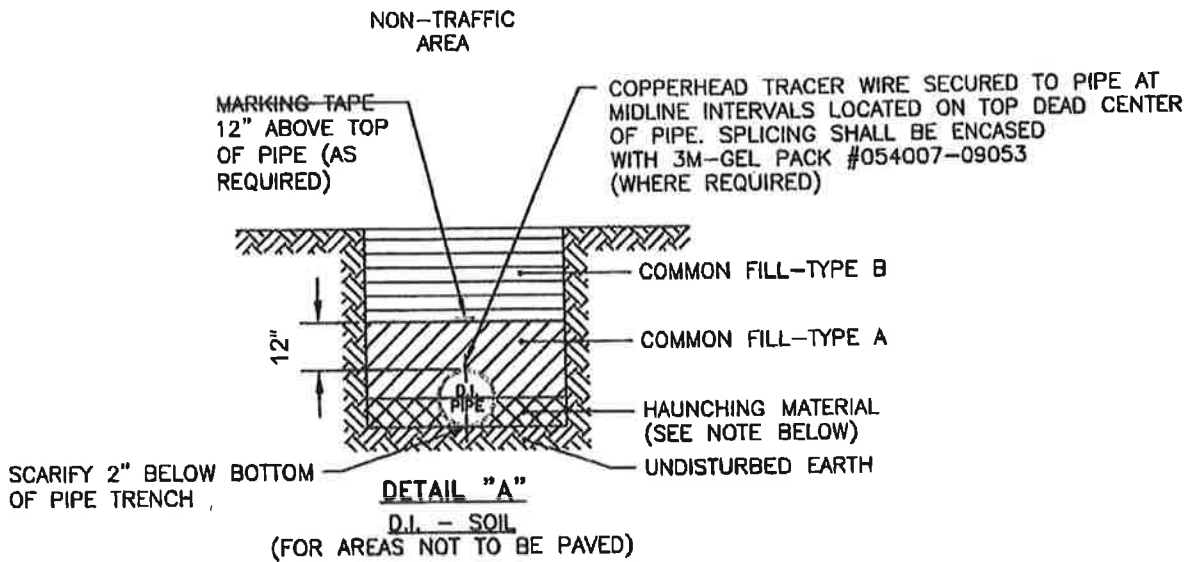
EMBEDMENT: THIS ZONE IS THE MOST IMPORTANT IN TERMS OF PIPE PERFORMANCE. IT IS DIVIDED INTO THE FOLLOWING SUB ZONES:

- **BEDDING:** TYPICALLY SIX INCHES OF SUPPORTIVE, COMPACTED MATERIAL. THIS ZONE PROVIDES EVEN SUPPORT FOR THE PIPE AND BRINGS IT TO GRADE. *
- **HAUNCHING:** EXTENDS FROM THE BOTTOM OF THE PIPE TO THE CENTERLINE OF THE PIPE. IT PROVIDES THE MOST RESISTANCE TO PIPE DEFLECTION. SPECIFYING PROPER MATERIALS AND COMPACTION ARE MOST IMPORTANT FOR THIS ZONE. IN MOST CASES NATIVE MATERIAL IS ACCEPTABLE. MATERIAL SHALL BE FREE OF ROCKS AND BE PLACED BY HAND TO PROTECT POLYETHYLENE ENCASING.
- **INITIAL BACKFILL:** EXTENDS FROM THE SPRINGLINE TO A POINT ABOVE THE TOP OF THE PIPE. THIS ZONE PROVIDES SOME PIPE SUPPORT AND HELPS TO PREVENT DAMAGE TO THE PIPE DURING PLACEMENT OF THE FINAL BACKFILL. THE COVER EXTENDS FROM THE TOP OF THE PIPE TO THE TOP OF THE INITIAL BACKFILL. THE DEPTH OF COVER SHOULD BE AS MUCH AS NECESSARY TO PROTECT THE PIPE DURING PLACEMENT OF THE FINAL BACKFILL. TWELVE INCHES IS A COMMON DEPTH OF COVER.

FINAL BACKFILL: THIS ZONE EXTENDS FROM THE TOP OF THE INITIAL BACKFILL TO THE TOP OF THE TRENCH. THIS ZONE HAS LITTLE INFLUENCE ON PIPE PERFORMANCE, BUT CAN BE IMPORTANT TO THE INTEGRITY OF ROADS AND STRUCTURES.

* UNLESS OTHERWISE DIRECTED BY COMPANY, OR FIELD CONDITIONS REQUIRE, BEDDING IS NOT REQUIRED FOR DUCTILE IRON MAIN. CONTRACTOR SHALL SCARIFY 2" BELOW BOTTOM OF PIPE.

REVISIONS		AMERICAN WATER STANDARD CIVIL PIPE TRENCH TERMINOLOGY DETAIL	
06-22-09 ADDED TRACER WIRE		AMERICAN WATER VOORHEES, NJ 08043	
		AMERICAN WATER 213 CARRIAGE LANE DELRAN, NJ 08075	
		AMERICAN WATER ★	
DRAWN BY RJB PROJECT ENG'R APPROVED		DATE 10-03-07 PROJECT IP	USE DIMENSIONS ONLY SCALE N.T.S.
USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES		0201-0601-SD53	



NOTE: SEE SPECIFICATION SECTION 02210 FOR DESCRIPTION OF BACKFILL AND BEDDING MATERIAL.

NOTES:

1. CAUTION MUST BE EXERCISED TO ENSURE PROPER PLACEMENT OF EMBEDMENT MATERIAL UNDER THE HAUNCHES OF THE PIPE. NATIVE SOIL IS ACCEPTABLE UNLESS DIRECTED BY COMPANY.
2. POLYETHYLENE ENCASING ON ALL D.I. PIPE, FITTINGS, VALVES & APPURTENANCES IN CORROSIVE SOILS.

REVISIONS

06-22-09
TEXT TERM "OPTIONAL"
REMOVED AND TEXT
5'-0" REPLACED WITH
TEXT MIDLINE.

AMERICAN WATER STANDARD
CIVIL
TRENCH - D.I. PIPE IN SOIL
DETAIL

AMERICAN WATER
VOORHEES, NJ 08043

AMERICAN WATER ENG. CENTER
213 CARRAGE LANE
DELRAN, NJ 08075



AMERICAN WATER

DRAWN BY RJB
PROJECT ENGR
APPROVED

DATE 10-03-07
PROJECT 1P

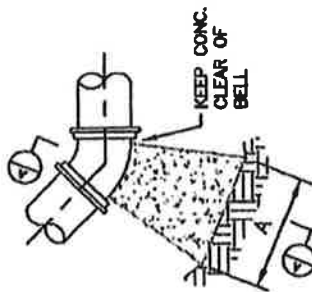
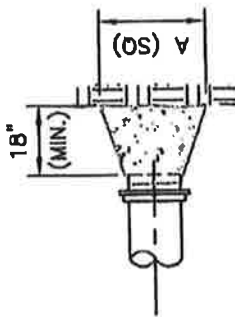
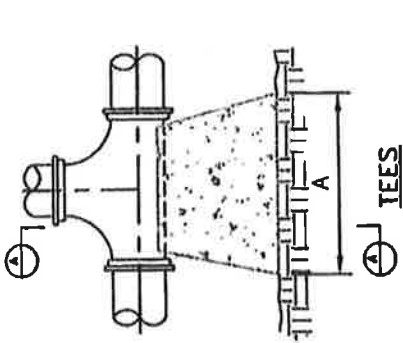
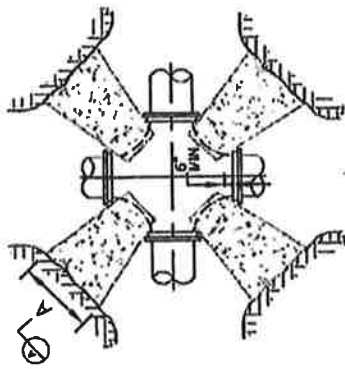
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SCALE N.T.S.

USE APPROVED DRAWINGS ONLY
FOR CONSTRUCTION PURPOSES

0201-0601-SD55

NOTES:

- COVER TOP OF PIPE SHALL BE BELOW FROST LINE OR 30" MINIMUM, 72" MAXIMUM ACCORDING TO REGULATORY REQUIREMENTS. IF GRADING PLANS RECEIVED BY THE ENGINEER/OWNER WITH THE REQUEST FOR WATER MAIN LAYOUT, INDICATE ADJUSTMENTS TO EXISTING GRADE, THEN PIPE SHALL BE INSTALLED TO MEET MINIMUM AND MAXIMUM COVER FROM PROPOSED GRADES SHOWN ON SAID PLANS.
- THRUST BLOCKS SHALL BE BUILT AGAINST UNDISTURBED SOIL WITH ADEQUATE BACKING TO PREVENT MOVEMENT OF FITTING.
- NO THRUST BLOCKS TO BE PLACED IN SEWER LATERAL DITCHES.
- THRUST BLOCKING MUST FIT IN EASEMENT, IN SOME CASES ADDITIONAL RESTRAINT MAY BE REQUIRED.
- BASED ON 200 PSI (150 PSI STATIC PRESSURE PLUS 50 PSI WATER HAMMER) AND 2000 PSF SOIL BEARING.
- POLYETHYLENE ENCASUREMENT ON ALL D.I. PIPE AND FITTINGS.
- PIPE JOINTS AND BOLTS MUST BE ACCESSIBLE.
- ALLOW SUFFICIENT CLEARANCE BETWEEN CONCRETE AND BOLTS FOR FUTURE MAINTENANCE.
- ALL ANCHOR BOLTS SHALL BE COR-BLUE, MINIMUM 1/2" DIAMETER. COAT EXPOSED ROD WITH ASPHALT CEMENT AFTER CONCRETE HAS SET.
- ALL M.J. AND FLG. FITTINGS TO RECEIVE THRUST BLOCKS SHALL HAVE THE FASTENER AREAS FELT WRAPPED AND TAPED PRIOR TO THE CONCRETE POUR TO ALLOW FUTURE ACCESS TO THE FASTENERS AT THE JOINTS.
- THRUST BLOCKING DETAILS ARE SHOWN HERE FOR TYPICAL INSTALLATIONS. IN SOME CASES, ADDITIONAL RESTRAINT MAY BE REQUIRED.
- PORTLAND CEMENT CONCRETE USED FOR THRUST BLOCKS SHALL BE MIN 3000 PSI CONCRETE.
- FOR UNSTABLE SOIL CONDITIONS, CHECK WITH ENGINEER FOR THRUST BLOCK DIMENSIONS.
- FOR MAIN SIZES GREATER THAN 16", SEE ENGINEER FOR THRUST BLOCK DIMENSIONS.



BENDS



SECTION A
BENDS, TEES & CROSSES

PIPE SIZE	90 DEGREE BENDS			45 DEGREE BENDS			11.25 DEGREE BENDS			22.5 DEGREE BENDS			TEES/PLUGS		
	AREA (sq ft)	"A"	"B"	AREA (sq ft)	"A"	"B"	AREA (sq ft)	"A"	"B"	AREA (sq ft)	"A"	"B"	AREA (sq ft)	"A"	"B"
6	5.3	42"	18"	2.9	23"	15"	0.7	6"	6"	1.5	12"	18"	3.7	30"	18"
8	9.2	56"	24"	5.0	30"	24"	1.3	8"	8"	2.5	15"	24"	6.4	36"	24"
10	13.8	66"	30"	7.9	36"	30"	1.9	9"	9"	3.8	18"	30"	9.7	46"	30"
12	19.4	78"	36"	10.6	42"	36"	2.7	11"	11"	5.3	21"	36"	13.8	55"	36"
14	26.0	89"	42"	14.0	48"	42"	3.6	12"	12"	7.2	25"	42"	18.5	63"	42"
16	33.7	101"	48"	18.3	55"	48"	4.7	14"	14"	9.4	28"	48"	23.9	72"	48"

Area in square feet "A" and "B" in inches.
Bearing table area is based on 200 psi maximum with soil bearing capacity of 2000 lbs/square foot.
For higher water pressures or lower soil pressures, consult Engineer for adjustments.
Bearing table area does not include a safety factor.
A safety factor and additional bearing area may be required as directed by the Engineer.

**AMERICAN WATER STANDARD
CIVIL
THRUST BLOCK
DETAILS**

AMERICAN WATER
VOORHEES, NJ 08043

AMERICAN WATER ENGINEERING
3908 CHANCE ROAD
MOUNT LAUREL, NJ 08054

DRAWN BY EJR
PROJECT DWG#
APPROVED

DATE 10-25-07
SCALE 1/8"=1'-0"
FOR CONSTRUCTION ONLY

USE APPROVED DRAWINGS ONLY
FOR CONSTRUCTION PURPOSES

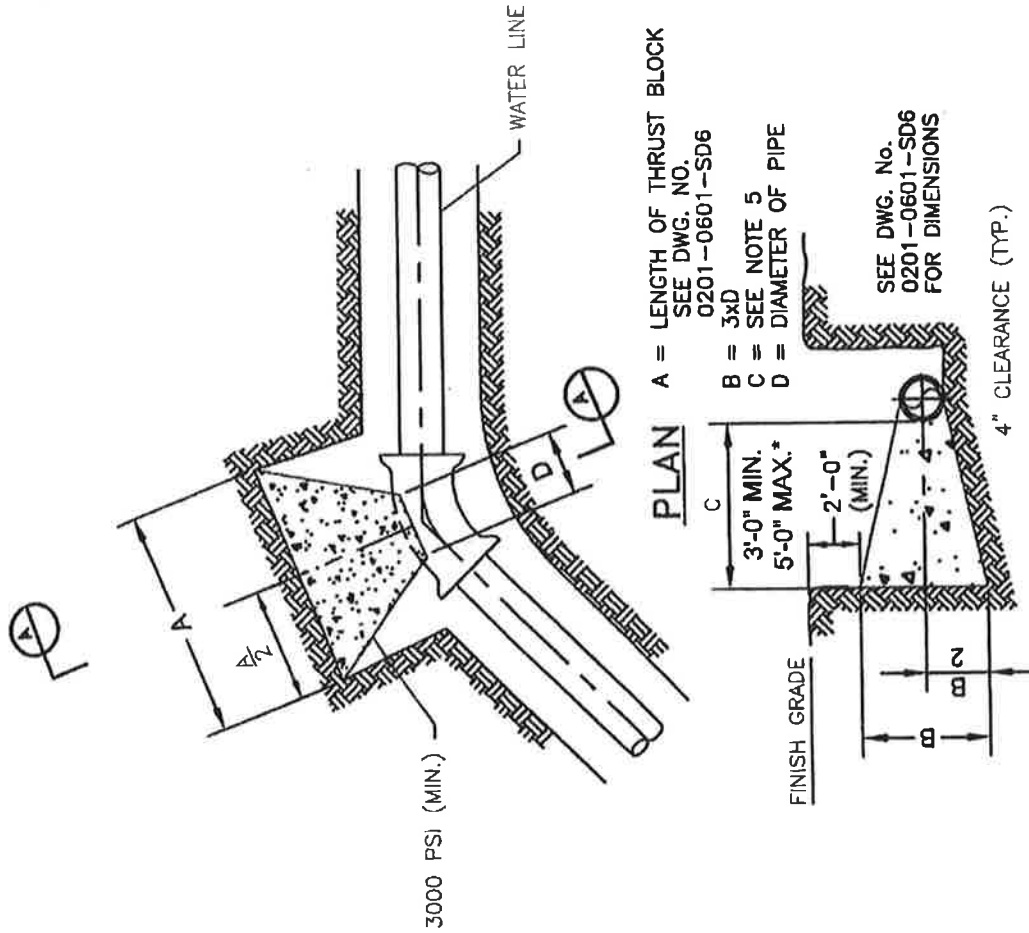
0201-0601-SD6

FOR COMMENTS

SHT. 3

GENERAL NOTES:

- COVER OVER TOP OF PIPE SHALL BE BELOW FROST LINE OR 30" MINIMUM IN NON-FROST AREAS OR ACCORDING TO REGULATORY REQUIREMENTS. IF GRADING PLANS RECEIVED BY THE ENGINEER/OWNER WITH THE REQUEST FOR WATER MAIN LAYOUT, INDICATE ADJUSTMENTS TO EXISTING GRADE. THEN PIPE SHALL BE INSTALLED TO MEET MINIMUM AND MAXIMUM COVER FROM PROPOSED GRADES SHOWN ON SAID PLANS.
- THRUST BLOCKS SHALL BE BUILT AGAINST UNDISTURBED SOIL WITH ADEQUATE BACKING TO PREVENT MOVEMENT OF FITTING.
- NO THRUST BLOCKS TO BE PLACED IN SEWER LATERAL DITCHES..
- THRUST BLOCKING MUST FIT IN EASEMENT, IN SOME CASES ADDITIONAL RESTRAINT MAY BE REQUIRED.
- DIMENSION "C" BASED ON MINIMUM BEARING AREA, 18" MINIMUM.
- POLYETHYLENE ENCASEMENT ON ALL D.I. PIPE AND FITTINGS.
- PIPE JOINTS AND BOLTS MUST BE ACCESSIBLE.
- ALL ANCHOR BOLTS SHALL BE COR-BLUE, MINIMUM 1/2" DIAMETER. COAT EXPOSED ROD WITH APPROVED MATERIAL AFTER CONCRETE HAS SET.
- ALLOW SUFFICIENT CLEARANCE BETWEEN CONCRETE AND BOLTS FOR FUTURE MAINTENANCE.
- ALL M.J. AND FLG. FITTINGS TO RECEIVE THRUST BLOCKS SHALL HAVE THE FASTENER AREAS FELT WRAPPED AND TAPED PRIOR TO THE CONCRETE POUR TO ALLOW FUTURE ACCESS TO THE FASTENERS AT THE JOINTS.
- THRUST BLOCKING DETAILS ARE SHOWN HERE FOR TYPICAL INSTALLATIONS. IN SOME CASES, ADDITIONAL RESTRAINT MAY BE REQUIRED.
- PORTLAND CEMENT CONCRETE USED FOR THRUST BLOCKS SHALL BE 3000 PSI CONCRETE MINIMUM.



* SPECIAL DESIGN REQUIRED IF GREATER THAN 5'-0"

REVISIONS
06-22-09
REMOVED #4 BAR
REFERENCES

AMERICAN WATER STANDARD
CIVIL
THRUST BLOCK AT HORIZONTAL BENDS
(EXCEEDING 3 FT. IN THICKNESS) - DETAIL

AMERICAN WATER
VOORHEES, NJ 08043

AMERICAN WATER
213 CARRIDGE LAKE
DELMAR, NJ 08075

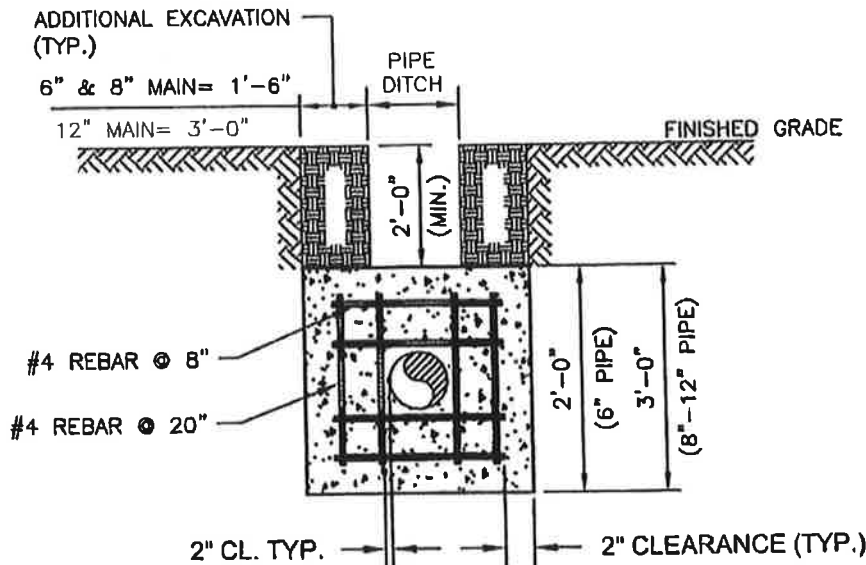
DESIGNED BY: SLE
PROJECT ENGR. RESP. ENGINEER: 00-01-03
PROJECT IP
APPROVED
SCALE: N.T.S.

USE APPROVED DRAWINGS ONLY
FOR CONSTRUCTION PURPOSES

0201-0601-SD20

FOR COMMENTS

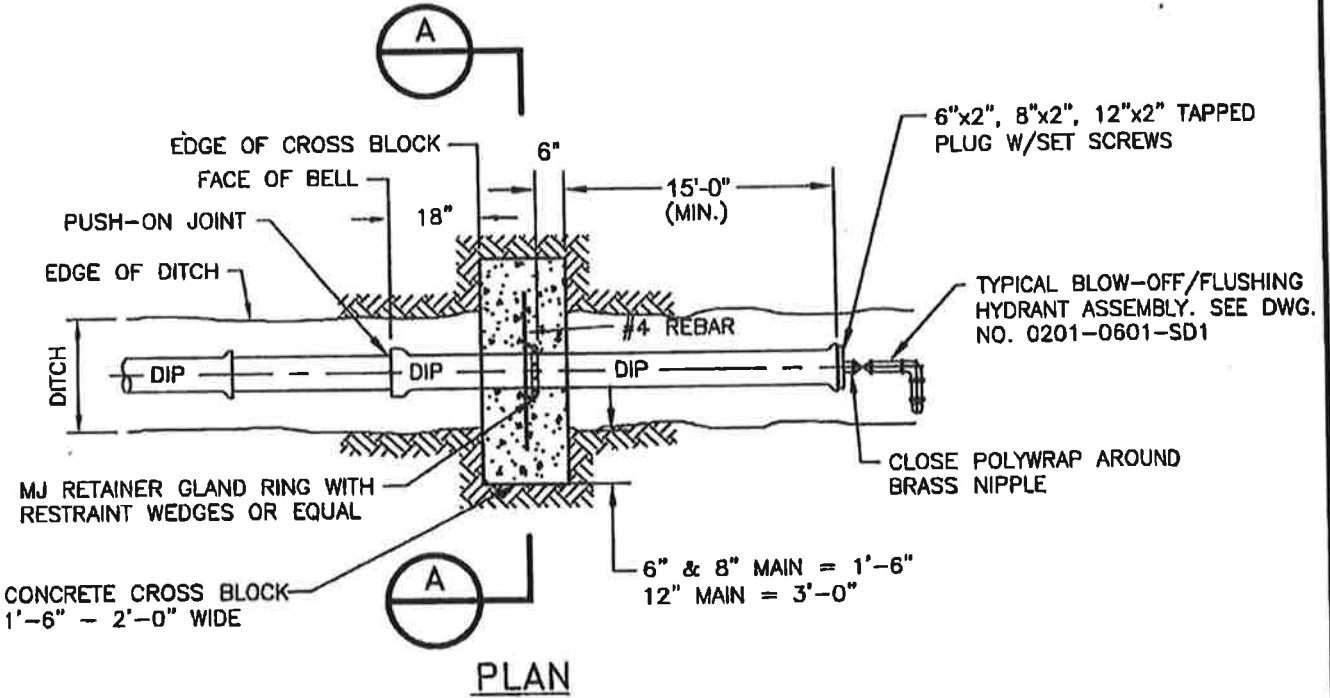
SHT. 5



NOTE: CENTER BLOCK ON PIPE

UNDISTURBED SOIL

SECTION A-A



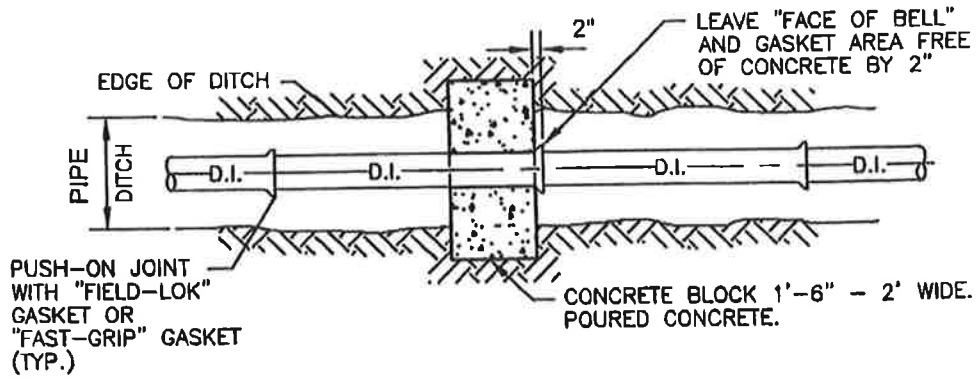
PLAN

NOTE:

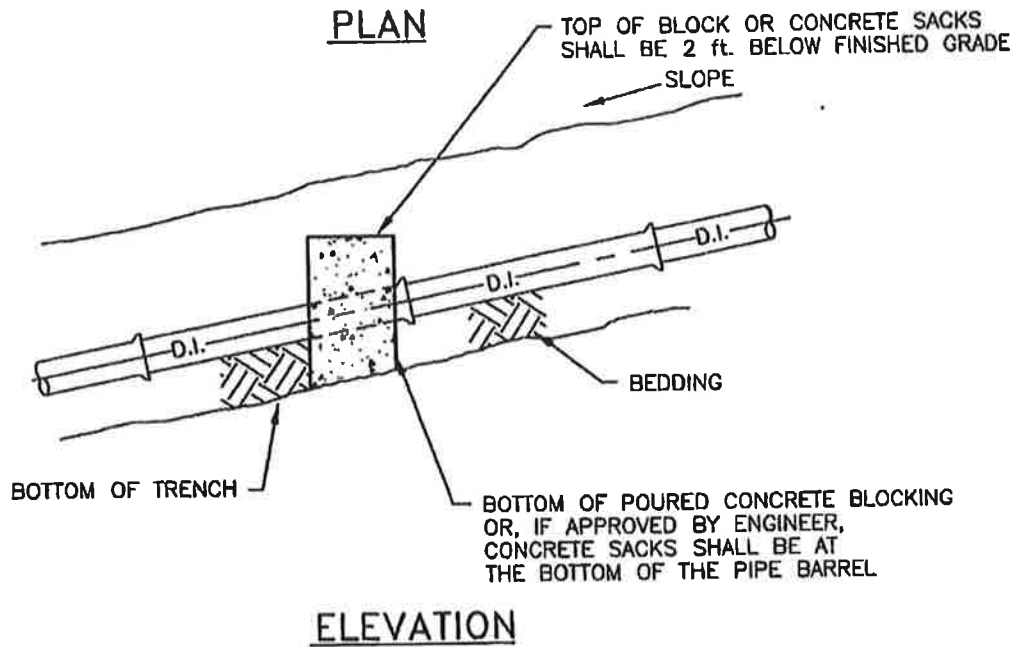
1. ONE RETAINER GLAND RING WITH RESTRAINT WEDGES SHALL BE INSTALLED TOWARDS BELL.
2. DO NOT USE RESTRAINED JOINT GASKETS.

REVISIONS
06-22-09 TEXT "PVC" CHANGED TO "DIP" AND 2" DIMENSION CHANGED TO 18"

AMERICAN WATER STANDARD CIVIL DEAD-END AND CROSS BLOCKING DETAIL	
AMERICAN WATER VOORHEES, NJ 08043	
AMERICAN WATER ENO. CENTER 215 CARRIAGE LANE DELRAN, NJ 08075	★ AMERICAN WATER
DRAWN BY RJB PROJECT ENG'R APPROVED	DATE 10-03-07 PROJECT # USE DIMENSIONS ONLY SCALE N.T.S.
USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES	0201-0601-SD13



DITCH CHECK FOR SLOPES
GREATER THAN 3.5:1



NOTE:

FIELD-LOK GASKET IS THE PREFERRED OPTION OF RESTRAINED JOINT.

REVISIONS

**AMERICAN WATER STANDARD
CIVIL
DITCH CHECK FOR SLOPES
GREATER THAN 3.5:1 - DETAIL**

AMERICAN WATER
VOORHEES, NJ 08043

AMERICAN WATER ENGINEERING
3808 CHURCH ROAD
MOUNT LAUREL, NJ 08054

★
AMERICAN WATER

DRAWN BY RJB
PROJECT ENG'R
APPROVED

DATE 08-03-08
PROJECT IP

USE DIMENSIONS ONLY
SCALE N.T.S.

USE APPROVED DRAWINGS ONLY
FOR CONSTRUCTION PURPOSES

0201-0601-SD18

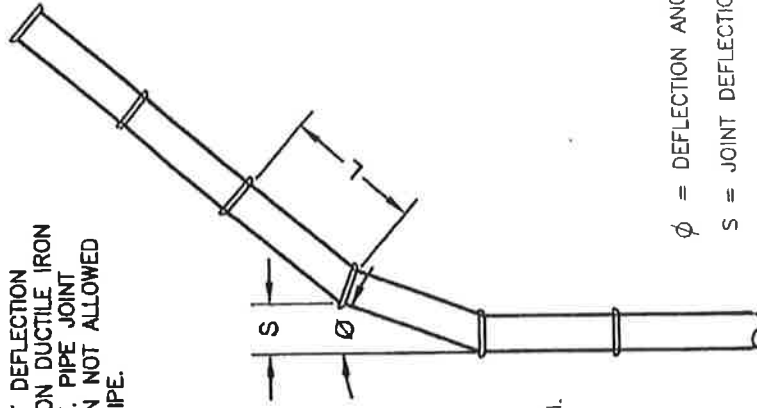
MAXIMUM JOINT DEFLECTION
FULL-LENGTH PIPE-PUSH-ON TYPE JOINT PIPE

MAXIMUM JOINT DEFLECTION DUCTILE IRON PUSH ON PIPE			APPROXIMATE RADIUS OF CURVATURE - R PRODUCED BY SUCCESSION OF ANGLED JOINTS		
NOMINAL PIPE SIZE INCHES	DEFLECTION ANGLE DEGREES	MAX OFFSET - S INCHES	FEET		
			L=18 FT	L=20 FT	L=20 FT
3	4	15	17	256	285
4	4	15	17	258	285
6	4	15	17	256	285
8	4	15	17	256	285
10	4	15	17	256	285
12	4	15	17	256	285
14	4	9	10	256	285
16	2.5	9	10	428	476
18	2.5	9	10	428	476
20	2.5	9	10	428	476
24	2.5	9	10	428	476

MAXIMUM JOINT DEFLECTION DUCTILE IRON PUSH ON PIPE			APPROXIMATE RADIUS OF CURVATURE - R PRODUCED BY SUCCESSION OF ANGLED JOINTS		
NOMINAL PIPE SIZE INCHES	DEFLECTION ANGLE DEGREES	MAX OFFSET - S INCHES	FEET		
			L=18 FT	L=20 FT	L=20 FT
3	4	15	17	256	285
4	4	15	17	258	285
6	4	15	17	256	285
8	4	15	17	256	285
10	4	15	17	256	285
12	4	15	17	256	285
14	4	9	10	256	285
16	2.5	9	10	428	476
18	2.5	9	10	428	476
20	2.5	9	10	428	476
24	2.5	9	10	428	476

NOTE:

- PIPE JOINT DEFLECTION ALLOWED ON DUCTILE IRON PIPE ONLY. PIPE JOINT DEFLECTION NOT ALLOWED ON PVC PIPE.



ϕ = DEFLECTION ANGLE
 S = JOINT DEFLECTION OFFSET
 L = LAYING LENGTH
 R = RADIUS OF CURVE
 $R = \frac{L}{2 \tan \frac{\phi}{2}}$

NOTE:

*L-STANDARD LENGTH OF PIPE SECTION.

AMERICAN WATER STANDARD
PIPE CURVE GEOMETRY
DETAIL

AMERICAN WATER
VOORHEES, NJ 08043

AMERICAN WATER ENGINEERING
2801 CHURCH ROAD
MOUNT LAUREL, NJ 08054

DRAWN BY RAB
PROJECT ENGR
APPROVED



AMERICAN WATER
USE DIMENSIONS ONLY
SCALE N.T.S.

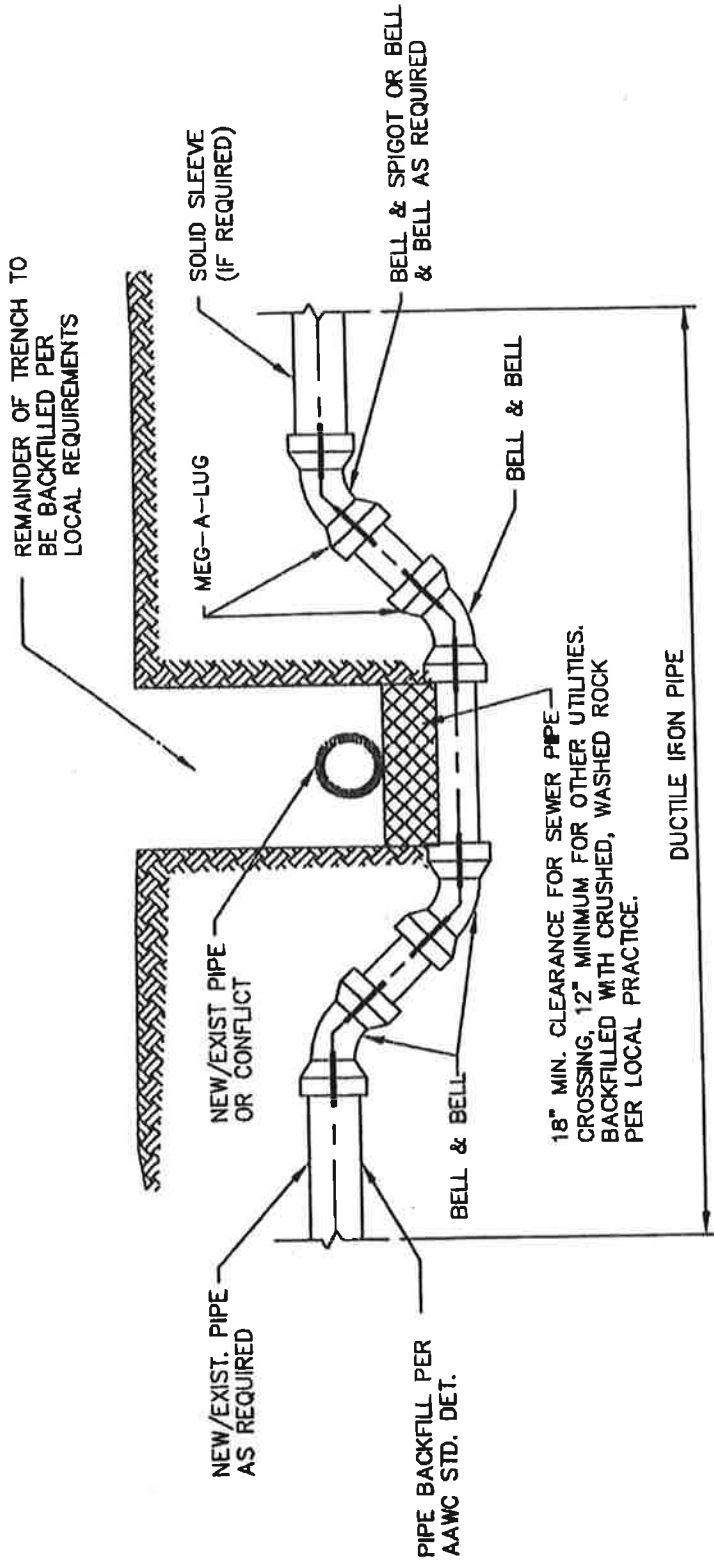
DATE 04-06-08
PROJECT #

USE APPROVED DIMENSIONS ONLY
FOR CONSTRUCTION PURPOSES

0201-0601-SD32

FOR COMMENTS

SHT. 8



LEGEND:

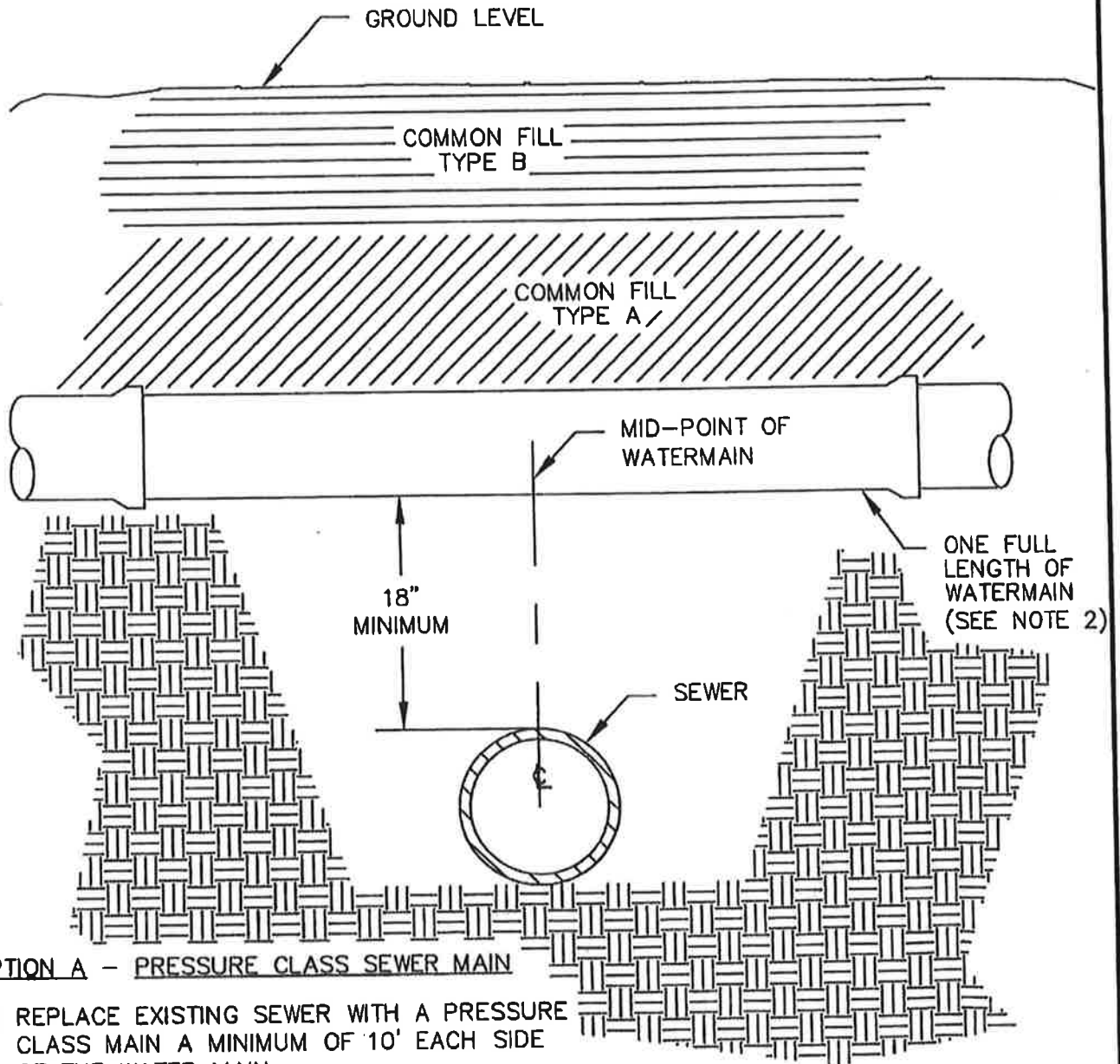
RESTRAINED JOINT

NOTES:

1. ALL PIPE TO BE JOINT RESTRAINED.
2. PIPE IS TO BE DUCTILE IRON, MINIMUM PRESSURE CLASS 350.
3. ALL DUCTILE IRON PIPE SHALL BE POLYETHYLENE WRAPPED FOR THE ENTIRE LENGTH.
4. BEGIN/END RESTRAINED JOINT STATIONING TO BE SHOWN ON THE APPROVED CONSTRUCTION DRAWINGS. ALL BENDS & FITTINGS SHALL HAVE STATIONING AND ELEVATION SHOWN ON THE APPROVED CONSTRUCTION DRAWINGS. THE BOTTOM ELEVATION OF THE CONFLICT AND THE TOP ELEVATION OF THE DUCTILE IRON PIPE AT THE CENTERLINE OF THE CONFLICT SHALL BE SHOWN ON THE APPROVED CONSTRUCTION DRAWINGS.
5. SEPARATION REQUIREMENTS SHALL BE FOLLOWED WITH REGARD TO CONFLICT PIPE.

REVISIONS 06-22-09 ADDED NOTE 5.	AMERICAN WATER STANDARD CIVIL VERTICAL REALIGNMENT OF WATER MAINS DETAIL
	AMERICAN WATER VOORHEES, NJ 08043
AMERICAN WATER ENGINEERING 3906 CHURCH ROAD MOUNT LAUREL, NJ 08054	DATE 06-22-09 PROJECT DWG# PRODUCT #
DRAWN BY PLS PROJECT ENG# APPROVED	AMERICAN WATER USE DIMENSIONS ONLY SCALE N.T.S.
USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES	0201-0601-SD42
FOR COMMENTS	

WATER MAIN CROSSING OVER SEWER



OPTION A - PRESSURE CLASS SEWER MAIN

- 1.) REPLACE EXISTING SEWER WITH A PRESSURE CLASS MAIN A MINIMUM OF 10' EACH SIDE OF THE WATER MAIN.

OPTION B - WATER MAIN INSTALLATION

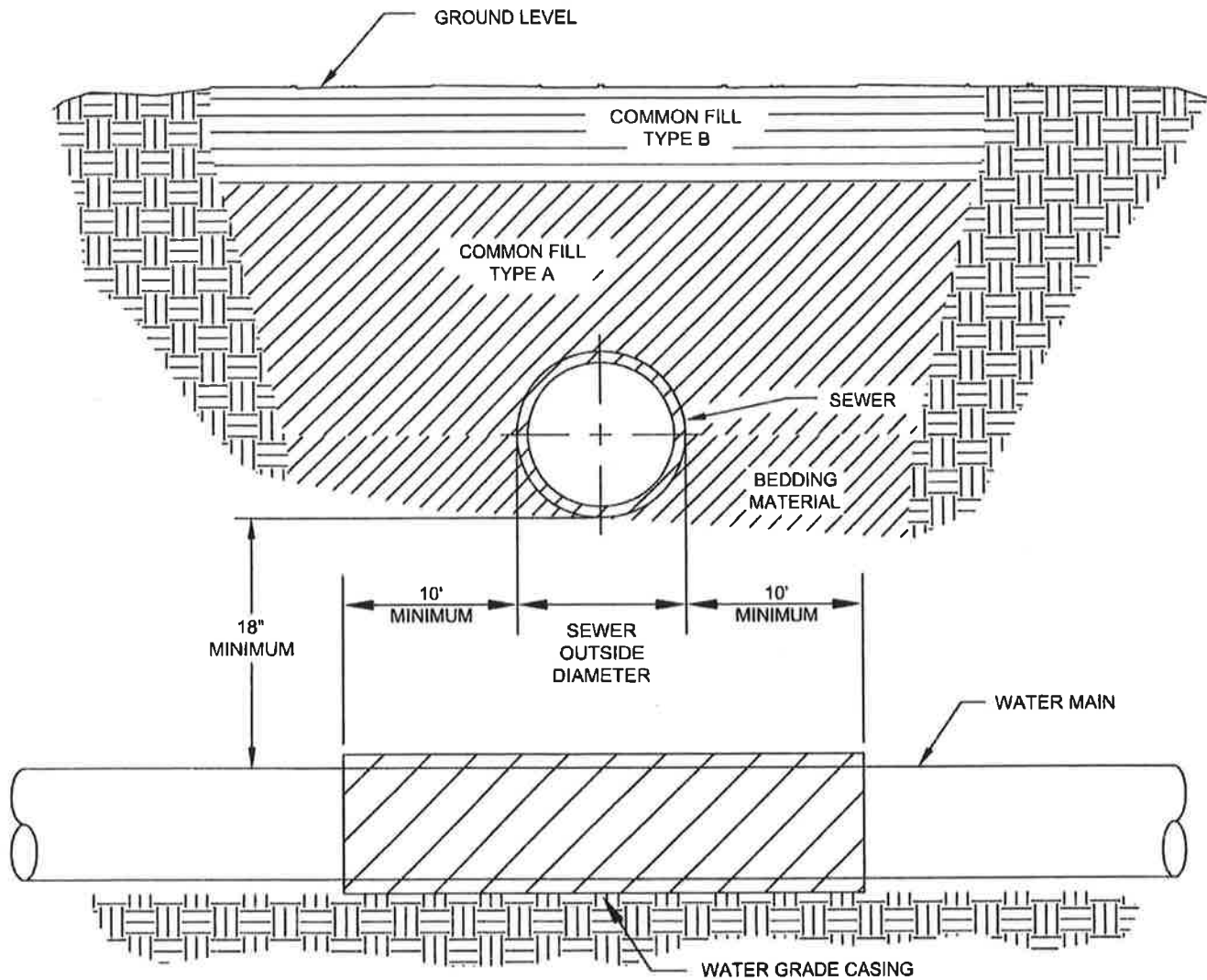
- 1.) MID-POINT OF ONE FULL LENGTH OF WATER MAIN IS TO BE CENTERED ABOVE SEWER LINE.
- 2.) PROVIDE ADEQUATE SUPPORT FOR THE WATER MAIN TO PREVENT DAMAGE DUE TO SETTLEMENT.

NOTES:

- 1.) FOLLOW TRENCH MATERIAL DETAIL WHEN BACK-FILLING WATER MAIN.
- 2.) THE SELECTED OPTION MUST BE APPROVED BY AN IL-AWC REPRESENTATIVE.

AMERICAN WATER STANDARD CIVIL WATER MAIN CROSSING OVER SEWER DETAIL	
AMERICAN WATER BELLEVILLE, IL 62223	
AMERICAN WATER ENO. CENTER 100 NORTH WATER WORKS DR. BELLEVILLE, IL 62223	 AMERICAN WATER
DRAWN BY JWM PROJECT ENO'R APPROVED	DATE 01-05-01 PROJECT IP USE DIMENSIONS ONLY SCALE N.T.S.
USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES	XXXX-XXXX-XXXX

WATER MAIN CROSSING UNDER SEWER



OPTION A - PRESSURE CLASS SEWER MAIN

1. REPLACE EXISTING SEWER WITH A PRESSURE CLASS MAIN IN LIEU OF CASING THE WATER MAIN.
2. THE SEWER SHALL BE REPLACED A MINIMUM OF 10' EACH SIDE OF THE WATERMAIN.

OPTION B - WATER MAIN CASING INSTALLATION

1. PROVIDE ADEQUATE SUPPORT FOR THE EXISTING SEWER TO PREVENT DAMAGE DUE TO SETTLEMENT.

NOTES:

1. FOLLOW TRENCH MATERIAL DETAIL WHEN BACK-FILLING WATER MAIN.
2. THE SELECTED OPTION MUST BE APPROVED BY AN IL-AWC REPRESENTATIVE.

AMERICAN WATER STANDARD CIVIL WATER MAIN CROSSING UNDER SEWER DETAIL

ILLINOIS AMERICAN WATER
BELLEVILLE, IL 62223

ILLINOIS AMERICAN WATER ENG.
100 N. WATER WORKS DRIVE
BELLEVILLE, IL 62223



AMERICAN WATER

DRAWN BY JWM
PROJECT ENGR
APPROVED

DATE 01-05-01
PROJECT IP

USE DIMENSIONS ONLY
SCALE N.T.S.

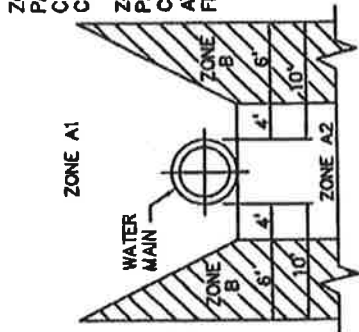
USE APPROVED DRAWINGS ONLY
FOR CONSTRUCTION PURPOSES

0201-0601-IH10B

SPECIAL CONSTRUCTION REQUIREMENTS

WHERE REQUIRED WATER MAIN SEPARATION FROM SEWER CANNOT BE MAINTAINED

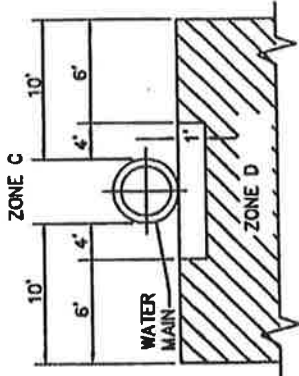
PARALLEL CONSTRUCTION



ZONE A1
PARALLEL CONSTRUCTION CLOSE TO PIPE

ZONE B
PARALLEL CONSTRUCTION AT LEAST 4' FROM PIPE

PERPENDICULAR CONSTRUCTION



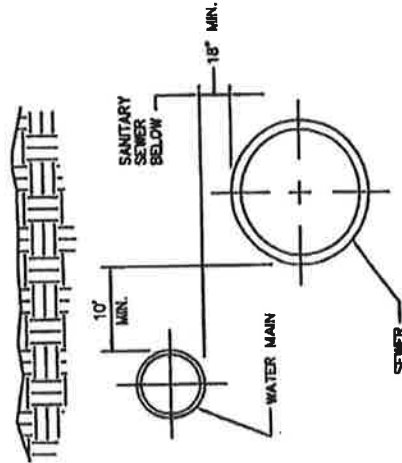
ZONE C

IF AN EXISTING SEWER IS LOCATED WITHIN ZONES A1, A2, B, C, OR D OF A PROPOSED WATER MAIN, THE FOLLOWING SPECIAL REQUIREMENTS APPLY:

ZONE

- A. NO WATER MAINS SHALL BE CONSTRUCTED WITHOUT SPECIAL PERMISSION FROM THE APPROPRIATE HEALTH OR ENVIRONMENTAL REGULATOR.
- B. IF THE SEWER DOES NOT MEET ZONE B REQUIREMENTS, THE WATER MAIN SHALL BE OF PRESSURE CLASS 200 PIPE FOR PVC AND CLASS 350 FO D.I. PIPE. SEWER SHALL BE CONSTRUCTED EQUAL TO WATER PIPE AND TESTED FOR WATER TIGHTNESS.
- C. NO WATER MAINS SHALL BE CONSTRUCTED WITHOUT SPECIAL PERMISSION FROM THE HEALTH REGULATOR. IF PERMISSION IS GRANTED, THE SEWER PIPE SHALL BE ENCASED AND/OR REPLACED WITH WATER MAIN GRADE PIPE AND THE WATER MAIN SHALL BE OF CLASS 200 PIPE OR EQUIVALENT.

PARALLEL CONSTRUCTION



REQUIRED SEPARATION BETWEEN WATER MAINS AND SANITARY SEWERS

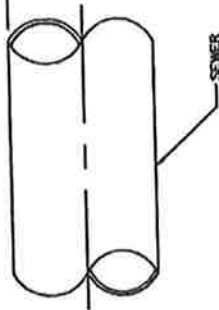
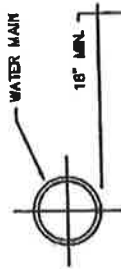
BASIC SEPARATION REQUIREMENTS:

WATER MAINS AND SEWERS SHOULD BE SEPARATED AS FAR AS IS REASONABLE IN BOTH THE HORIZONTAL AND VERTICAL DIRECTIONS WITH SEWERS LOWER THAN WATER MAINS.

PARALLEL CONSTRUCTION: THE HORIZONTAL DISTANCE BETWEEN PRESSURE WATER MAINS AND SEWERS SHALL BE AT LEAST 10 FEET

PERPENDICULAR CONSTRUCTION (CROSSING): PRESSURE WATER MAINS SHALL BE AT LEAST 18" ABOVE SANITARY SEWERS WHERE THESE LINES MUST CROSS.

PERPENDICULAR CONSTRUCTION



AMERICAN WATER CIVIL SPECIAL REQUIREMENTS FOR WATER MAIN - DETAIL

REVISIONS
06-22-09
REVISED NOTE C,
REMOVED NOTE D,
REMOVED #4 REBAR AND
CONCRETE DETAIL

AMERICAN WATER VOORHEES, NJ 08043

AMERICAN WATER ENGINEERING
1000 MOUNTAIN ROAD
MOUNT LAUREL, NJ 08054

DATE 06-05-08
PROJECT #
DRAWN BY RLB
PROJECT ENG'R
APPROVED

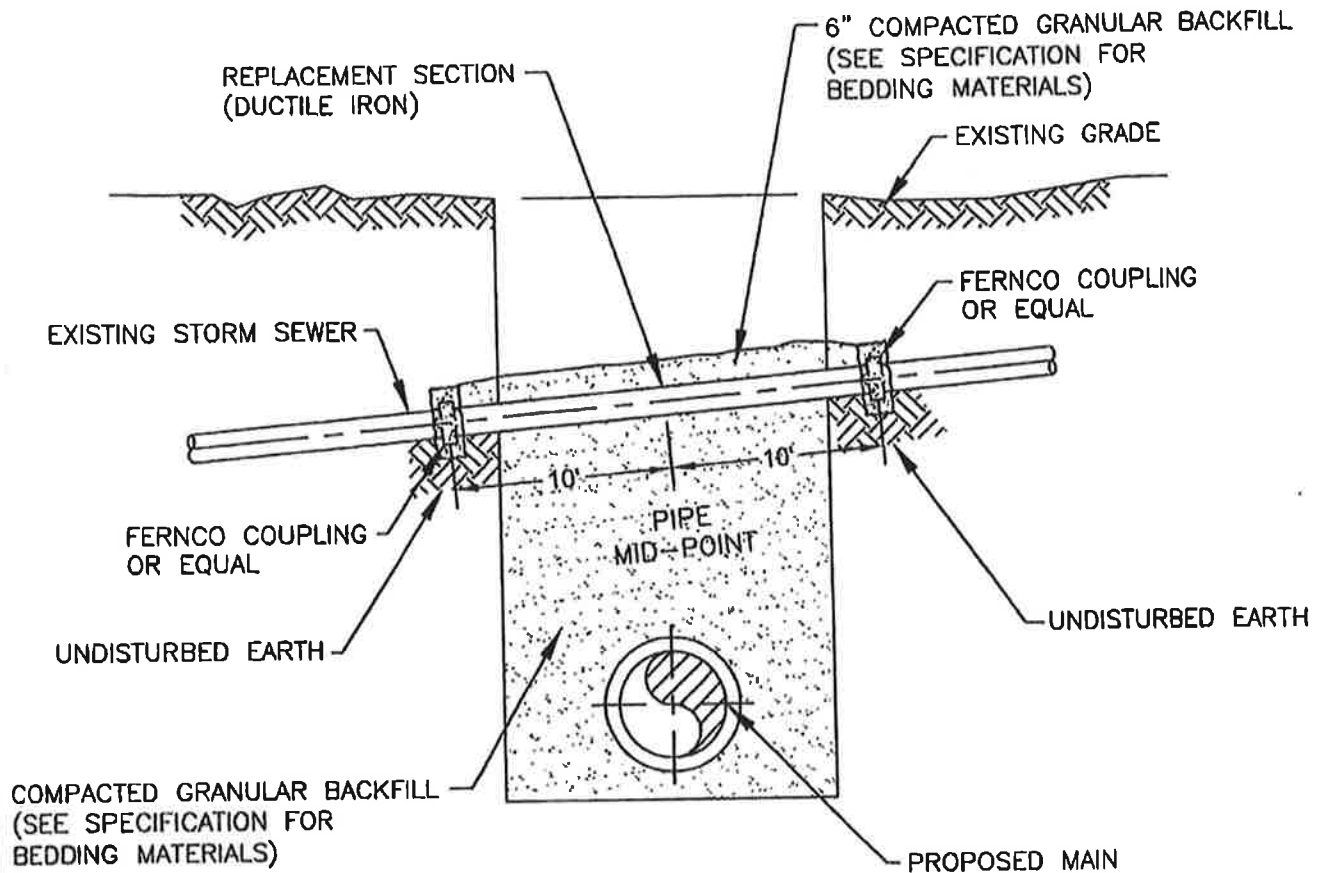


AMERICAN WATER
USE EMERGENCY ONLY
SCALE N.T.S.

0201-0601-SD43

FOR COMMENTS

SHT. 10C



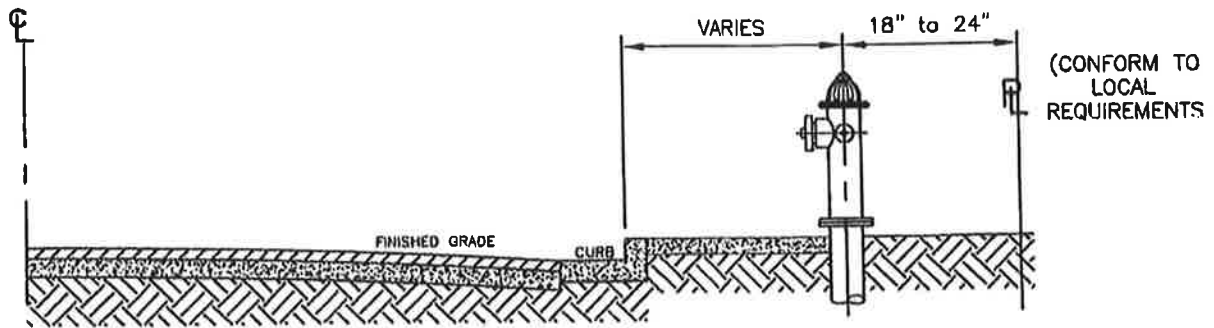
1. IF THE EXISTING STORM SEWER IS DAMAGED OR REMOVED DURING CONSTRUCTION IT SHALL BE REPLACED ACROSS THE TRENCH SUCH THAT THE CONCRETE COLLARS ARE SUPPORTED ON UNDISTURBED EARTH.

2. THE CONCRETE COLLAR SHALL BE FORMED AT A JOINT WITH THE EXISTING HOUSE LATERAL USING FERNCOM COUPLINGS.

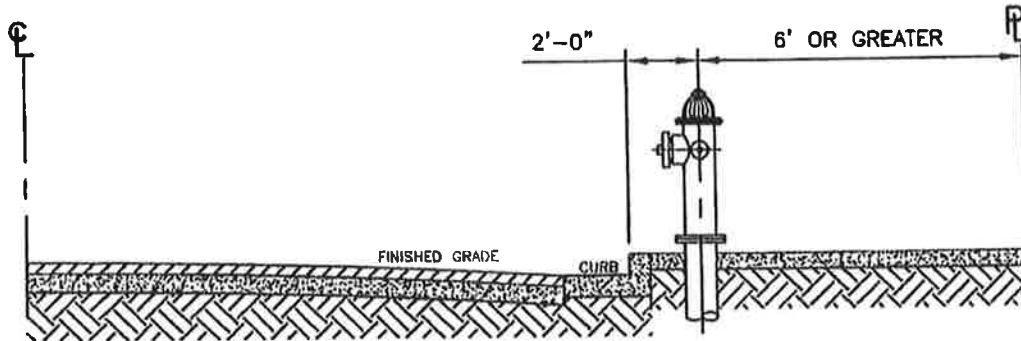
3. THE REPLACEMENT SECTION SHALL BE CLASS 350 DUCTILE IRON PIPE WITH AND INSIDE DIAMETER EQUAL TO THE EXISTING PIPE. ANSI/AWWA C151/A21.51 DUCTILE IRON PIPE SHALL BE USED AS A MINIMUM STANDARD.

4. WHEN THE STORM SEWER OWNER HAS REQUIREMENTS WHICH ARE MORE STRINGENT, THE CONTRACTOR SHALL CONFORM TO THE MORE STRINGENT REQUIREMENTS AND MAKE NO CLAIM FOR ADDITIONAL COMPENSATION OR AN EXTENSION OF TIME BECAUSE OF SUCH REQUIREMENTS.

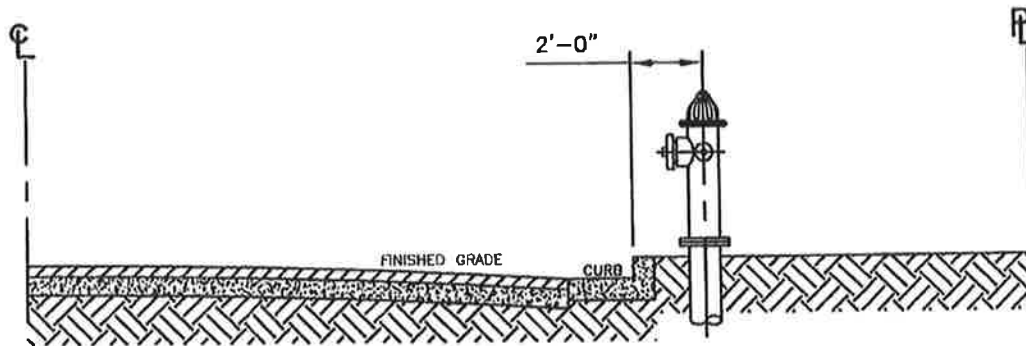
REVISIONS 06-22-08 ADDED PIPE CENTER LINE DIMENSION	AMERICAN WATER STANDARD CIVIL STORM SEWER REPLACEMENT DETAIL	
	AMERICAN WATER VOORHEES, NJ 08043	
	AMERICAN WATER ENG. CENTER 213 CARRIAGE LANE DELRAN, NJ 08075	★ AMERICAN WATER
	DRAWN BY RJB PROJECT ENG'R APPROVED	DATE 10-03-07 PROJECT IP USE DIMENSIONS ONLY SCALE N.T.S.
	USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES	0201-0601-SD44



CASE 1 WHEN SIDEWALKS ARE ADJACENT TO CURB, HYDRANTS SHALL BE CENTERED AT BACK OF SIDEWALK.



CASE 2 WHEN SIDEWALKS ARE CONSTRUCTED WITH WIDTHS GREATER THAN 6' FROM CURB FACE TO OUTSIDE EDGE OF SIDEWALK, HYDRANTS SHALL BE PLACED 24" FROM THE CURB FACE.

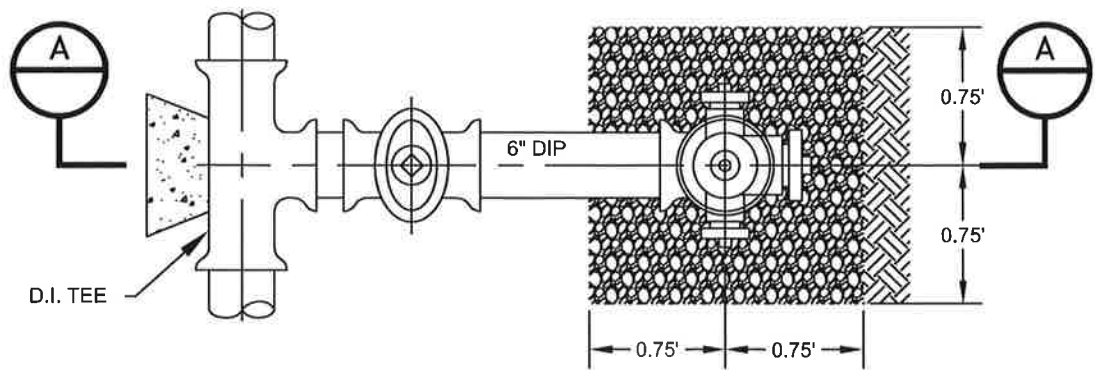
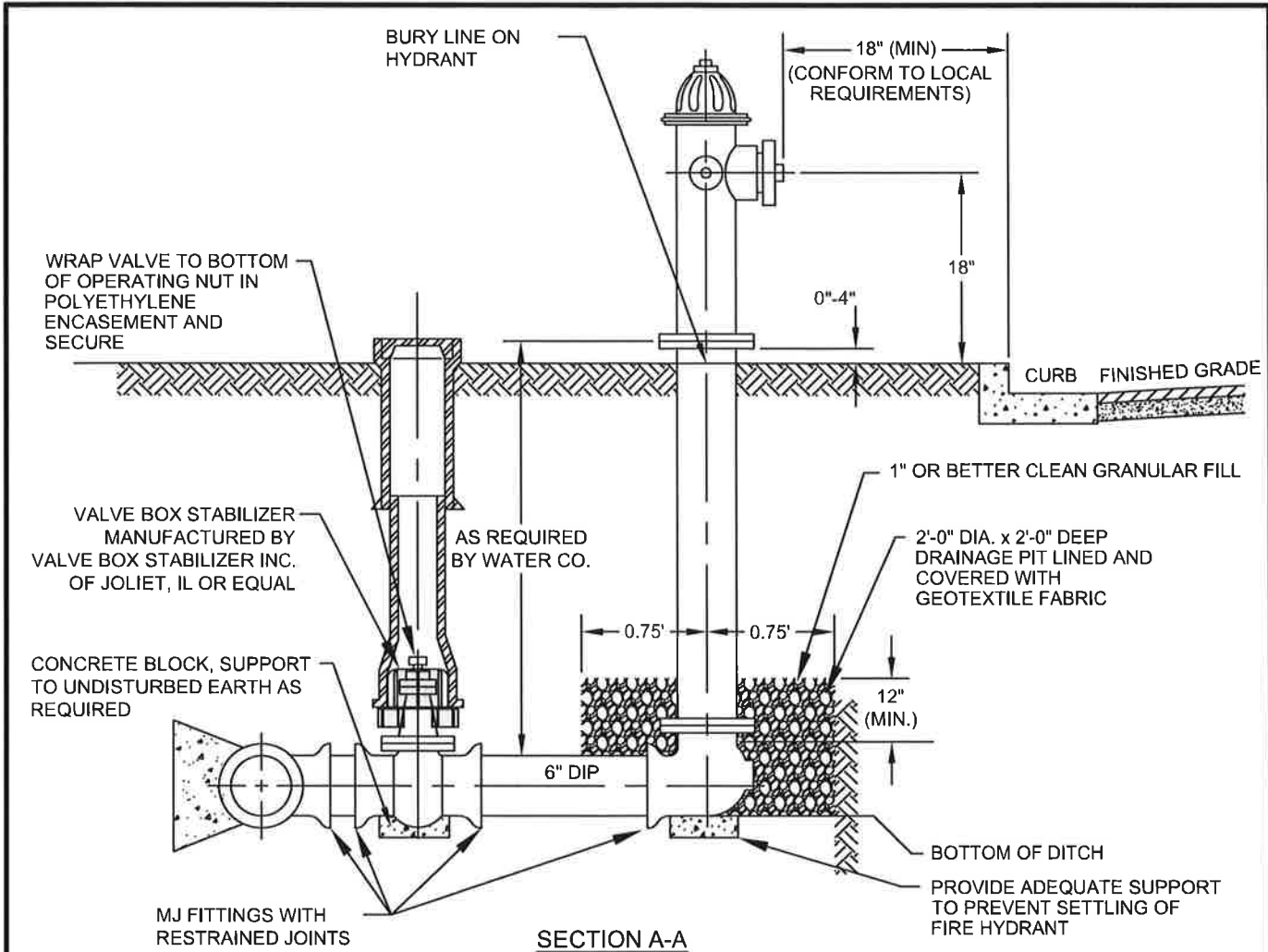


CASE 3 WHEN INVERTED SHOULDER SECTION IS PERMITTED AND CURB, GUTTER AND SIDEWALKS ARE WAVED, THE HYDRANT SHALL BE CENTERED 24" BEHIND THE EDGE OF PAVEMENT.

NOTES:

1. REQUIREMENTS OF LOCAL AUTHORITY HAVING JURISDICTION SHALL PREVAIL. IN THEIR ABSENCE, THE INSTALLATIONS SHOWN MAY BE USED.
2. EXACT HYDRANT LOCATION TO BE FIELD DETERMINED BY LOCAL AUTHORITY HAVING JURISDICTION.

REVISIONS	AMERICAN WATER STANDARD CIVIL FIRE HYDRANT LOCATION DETAIL	
	AMERICAN WATER VOORHEES, NJ 08043	
	AMERICAN WATER ENG. CENTER 213 CARRIAGE LANE DELRAN, NJ 08075	 AMERICAN WATER
	DRAWN BY RJB PROJECT ENG'R APPROVED	DATE 10-03-07 PROJECT P USE DIMENSIONS ONLY SCALE N.T.S.
USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES		XXXX-XXXX-XXXX

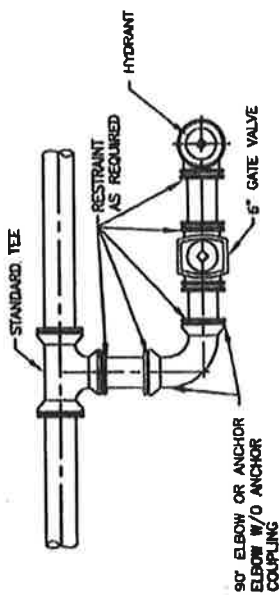


PLAN
FIRE HYDRANT DETAIL-STANDARD
 N.T.S.

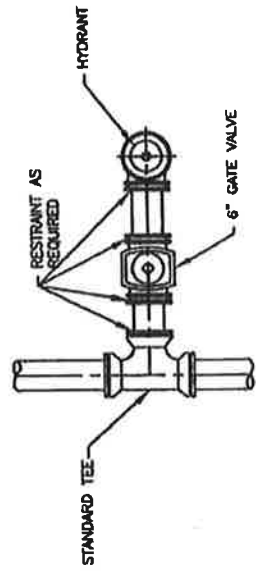
- NOTES:**
1. CONTRACTOR TO SUBMIT RESTRAINED DESIGN.
 2. PAINT HYDRANT TO BURY LINE (AND CAN BE DONE PRIOR TO INSTALLATION)
 3. APPLY TOUCH UP PAINT AS REQUIRED AFTER INSTALLATION.
 4. OPTION IS TO USE DI MJ SWIVEL TEE TO CONNECT DIRECTLY TO MJ 6" HYDRANT VALVE.
 5. DI TEE AND VALVE CAN BE REPLACED WITH A TAPPING SLEEVE AND VALVE.
 6. THE USE OF AN ANCHOR TEE IS ACCEPTABLE.

06-22-09
 ADDED NOTES 5, AND 6.
 04-08-11
 ADDED VALVE BOX
 STABILIZER.

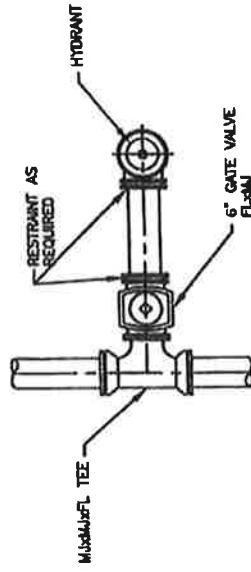
AMERICAN WATER STANDARD CIVIL DRY BARREL FIRE HYDRANT DETAIL	
<small>AMERICAN WATER VOORHEES, NJ 08043</small>	
<small>AMERICAN WATER ENGINEERING 3906 CHURCH ROAD MOUNT LAUREL, NJ 08054</small>	
<small>DRAWN BY: RJB PROJECT ENGR APPROVED</small>	<small>AMERICAN WATER USE DIMENSIONS ONLY SCALE: N.T.S.</small>
<small>USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES</small>	0201-0601-SD31



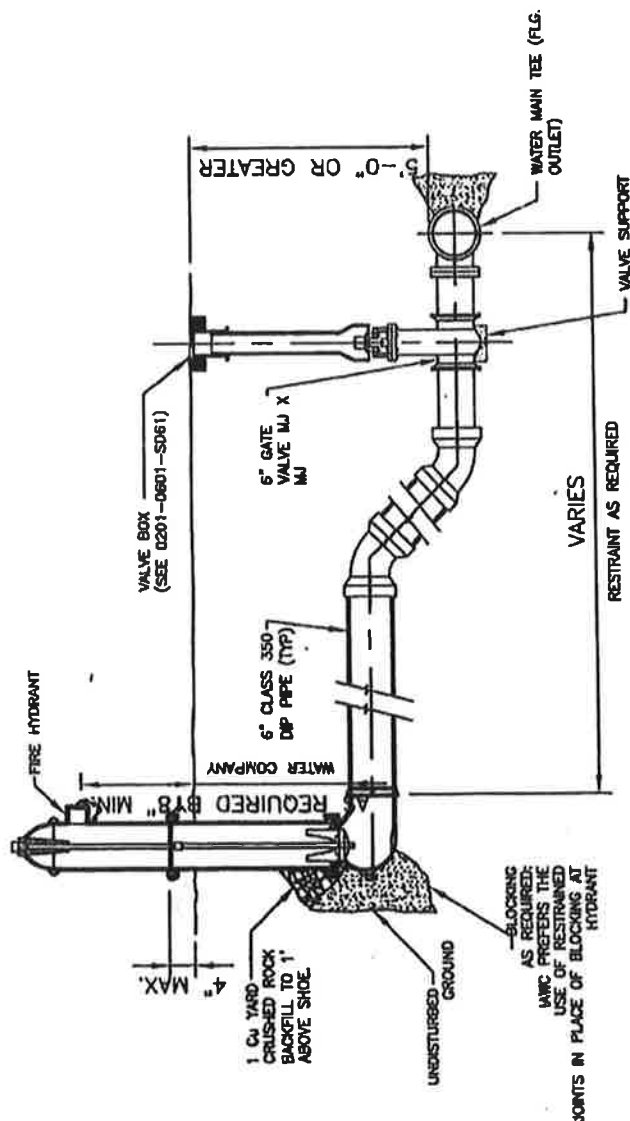
INSTALLATION PARALLEL TO MAIN



INSTALLATION PERPENDICULAR TO MAIN



INSTALLATION PERPENDICULAR TO MAIN WITH MJXFLANGE TEE

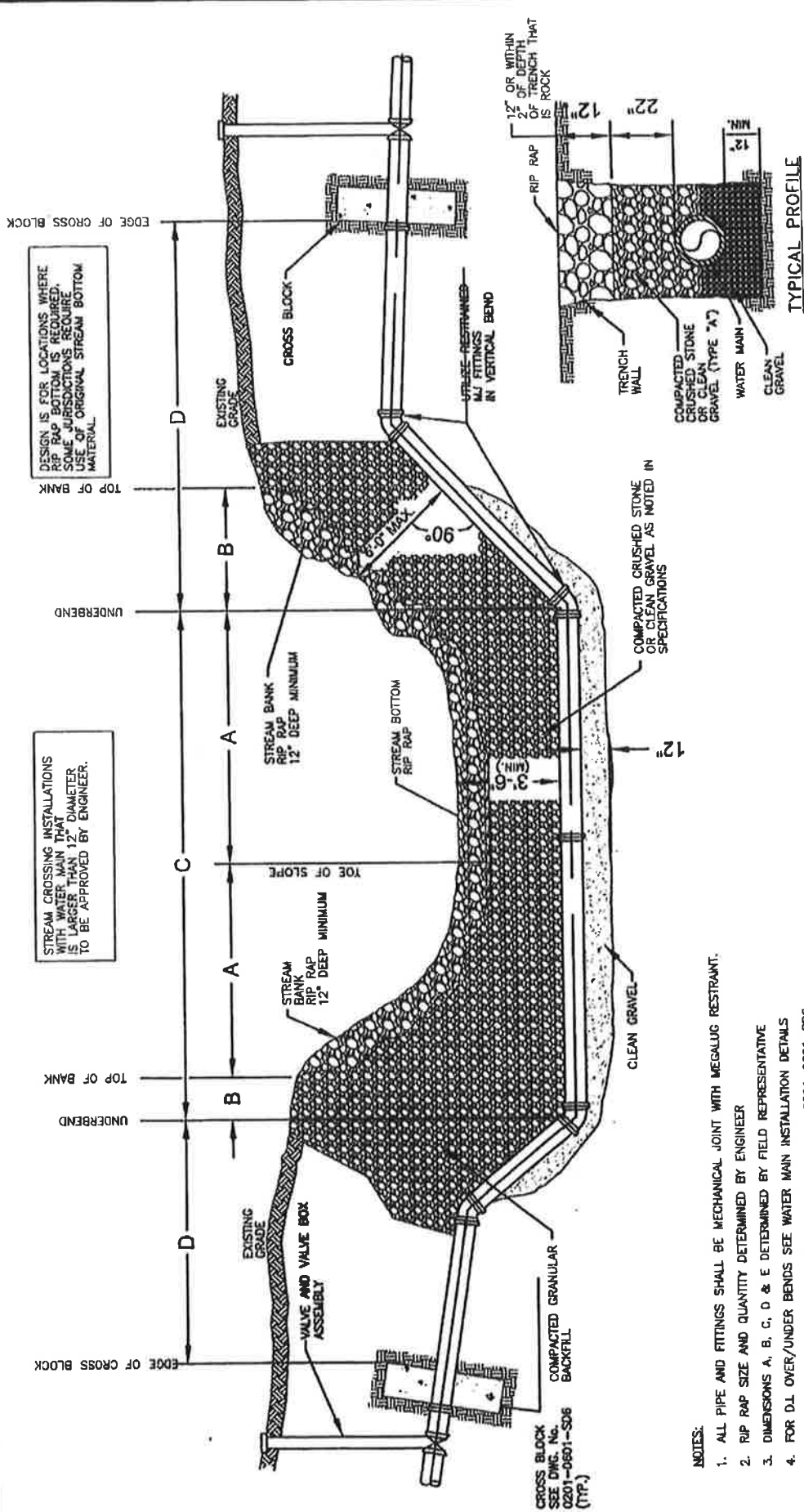


DEEP MAIN INSTALLATION
 (ALTERNATIVE IS HYDRANT BARREL WITH DEEPER BURY OR BARREL EXTENSIONS PER ENGINEER'S RECOMMENDATIONS.)

NOTES:

1. THESE SCHEMATICS DISPLAY ALTERNATIVE LAYOUTS AND DETAIL OF RESTRAINT HAS NOT BEEN PROVIDED HERE.
2. ALL FITTINGS SHALL BE MJ FOR HYDRANT ALTERNATIVES SHOWN.

REVISES	AMERICAN WATER STANDARD CIVIL FIRE HYDRANT LAYOUT - ALTERNATIVES DETAIL
AMERICAN WATER 213 CARBIDE LANE BLOOM, NJ 08075	AMERICAN WATER USE DIMENSIONS ONLY SCALE N.T.S.
DATE 08-01-83 DRAWN BY GJB PROJECT ENGR APPROVED	0201-0601-SD33
USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES	FOR COMMENTS
	SHT. 14



DESIGN IS FOR LOCATIONS WHERE RIP RAP BOTTOM IS REQUIRED. SOME JURISDICTIONS REQUIRE USE OF ORIGINAL STREAM BOTTOM MATERIAL.

STREAM CROSSING INSTALLATIONS WITH WATER MAIN THAT IS LARGER THAN 12" DIAMETER TO BE APPROVED BY ENGINEER.

AMERICAN WATER STANDARD CIVIL
ALLUVIUM STREAM BOTTOM
STREAM CROSSING - DETAIL

AMERICAN WATER
 VOORHEES, NJ 08043

AMERICAN WATER ENGINEERING CENTER
 213 CARRIAGE LANE
 DELLAVAN, NJ 08075

DESIGNED BY: J.B.B.
 PROJECT ENGINEER APPROVED

DATE: 08-01-03
 USE DIMENSIONS ONLY
 SCALE: N.T.S.

USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES

0201-0601-SD38

FOR COMMENTS

SHT. 15

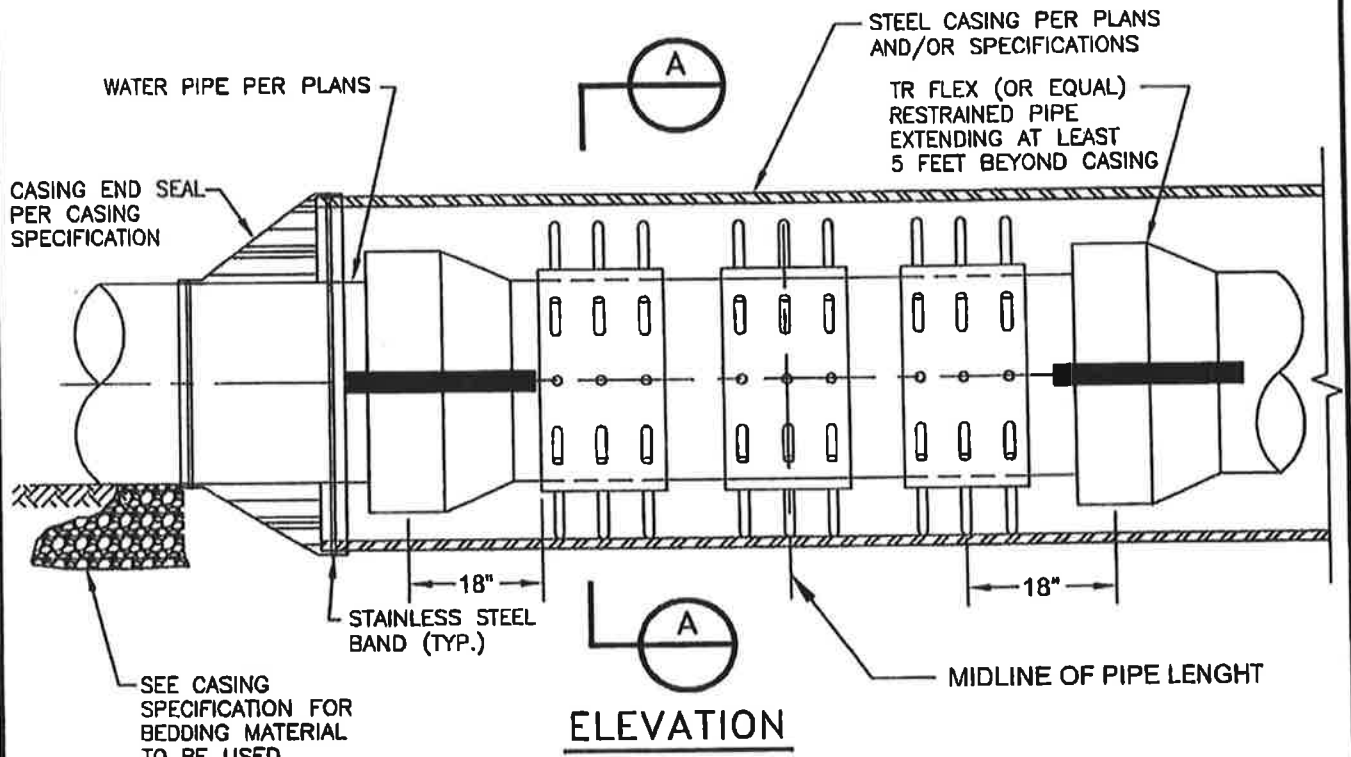
REVISIONS

06-22-09
 ADDED NOTE 9 AND MOVED VALVE AND VALVE BOX ASSEMBLIES.

- NOTES:
1. ALL PIPE AND FITTINGS SHALL BE MECHANICAL JOINT WITH MEGALUG RESTRAINT.
 2. RIP RAP SIZE AND QUANTITY DETERMINED BY ENGINEER
 3. DIMENSIONS A, B, C, D & E DETERMINED BY FIELD REPRESENTATIVE
 4. FOR D.I. OVER/UNDER BENDS SEE WATER MAIN INSTALLATION DETAILS
 5. FOR CONCRETE THRUST RESTRAINT SEE DRAWING No. 0201-0601-SD6.
 6. VALVE BOXES SHALL BE ACCESSIBLE AND NOT SUBJECT TO FREQUENT FLOODING. VALVE LOCATION TO BE DETERMINED BY ENGINEER.
 7. TR FLEX RESTRAINT JOINT OR EQUAL IS REQUIRED FOR 20 INCH DIAMETER AND LARGER. NON-VERTICAL FIELD CUT JOINTS SHALL BE COMPLETED WITH A GRIPPER RING ON THE SPRIGOT END FOR THE JOINT PER MFG. RECOMMENDATIONS. MEGA-LUG TO BE USED ON VERTICAL INSTALLATIONS. VERIFY DESIGN WITH ENGINEER.
 8. PIPE SHALL BE KEPT CLEAN AND DRY AT ALL TIMES DURING INSTALLATION.
 9. THE USE OF HOPE PIPE IS AN ACCEPTABLE ALTERNATIVE TO STREAM CROSSINGS.

NOTES:

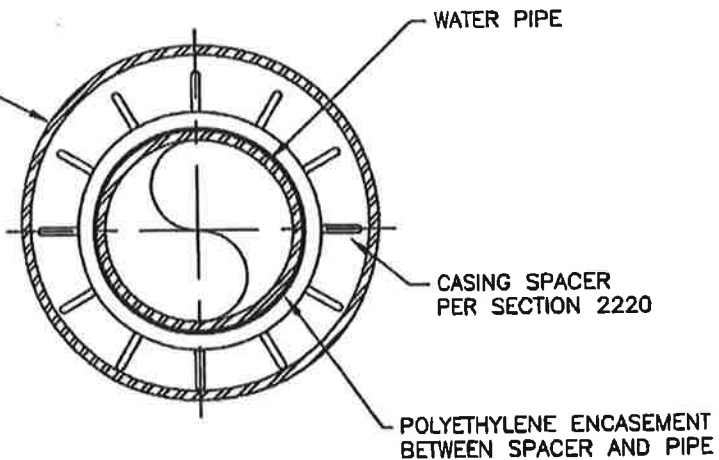
1. THIS STANDARD APPLICABLE FOR 4" DIA. AND LARGER PIPE.



SEE CASING SPECIFICATION FOR BEDDING MATERIAL TO BE USED

STEEL CASING SEE SPECIFICATION

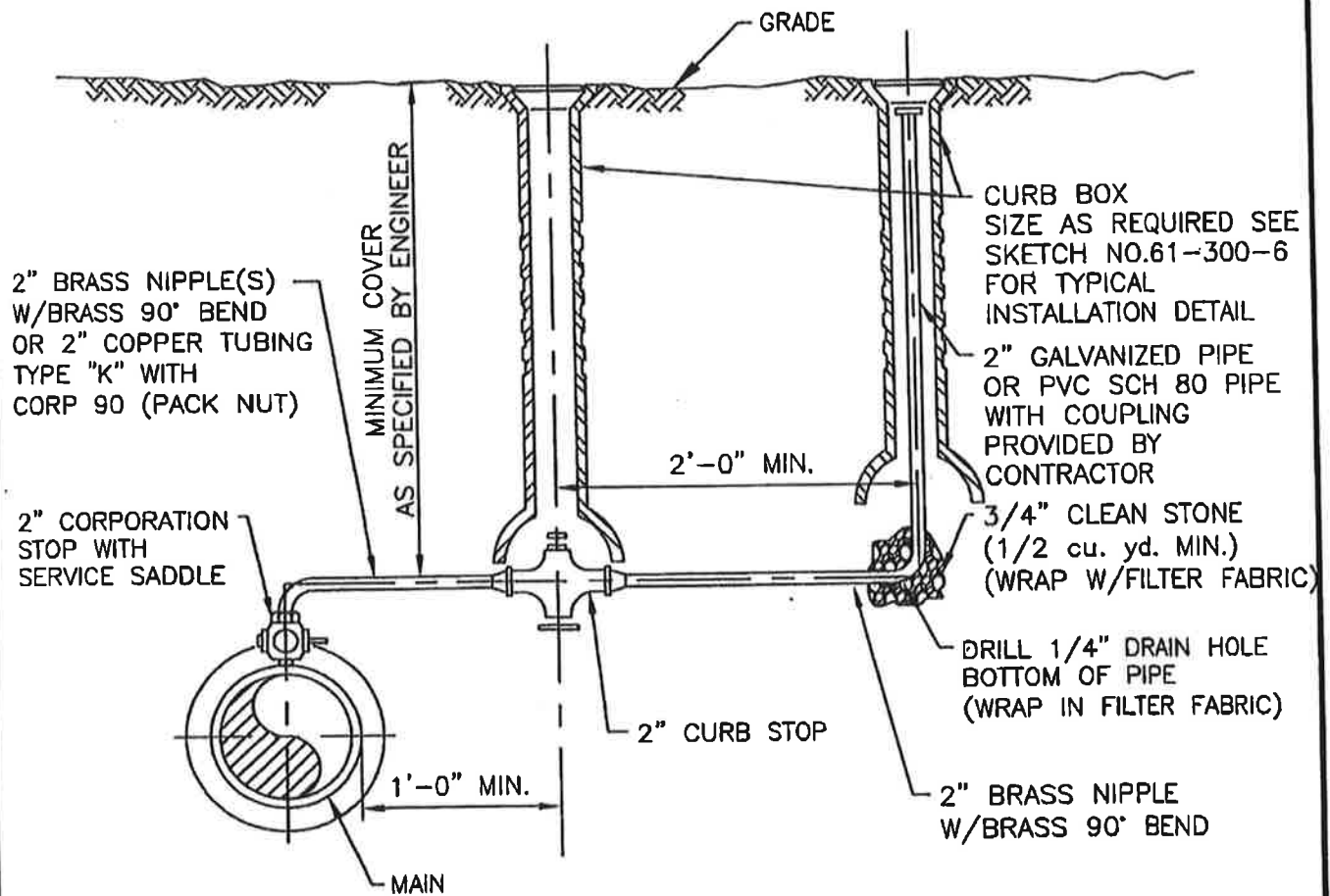
NOTE:
RESTRAINT OR EQUALS DEFINED AS REQUIRING NO SPECIAL TOOLS OR SHIMS TO REMOVE PIPE FROM CASING IN THE FUTURE



SECTION A-A

REVISIONS
06-22-09 ADDED CASING SPACER TO MIDLINE OF PIPE

AMERICAN WATER STANDARD CIVIL CASING INSTALLATION DETAIL	
AMERICAN WATER VOORHEES, NJ 08043	
AMERICAN WATER 213 CARRIAGE LANE DELRAN, NJ 08075	
DRAWN BY RJB PROJECT ENG'R APPROVED	DATE 10-03-07 PROJECT IP
AMERICAN WATER USE DIMENSIONS ONLY SCALE N.T.S.	
USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES	0201-0601-SD45



REVISIONS

AMERICAN WATER STANDARD
CIVIL
MANUEL AIR RELEASE
DETAIL

AMERICAN WATER
VOORHEES, NJ 08043

AMERICAN WATER ENG. CENTER
215 CARRIAGE LANE
DELRAN, NJ 08075



AMERICAN WATER

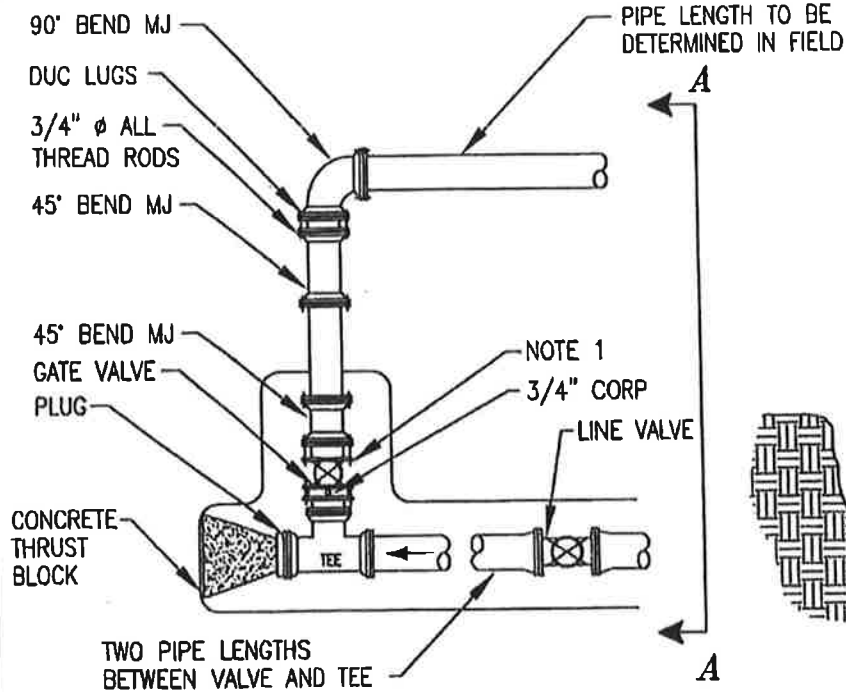
DRAWN BY RJB
PROJECT ENGR
APPROVED

DATE 07-31-08
PROJECT IP

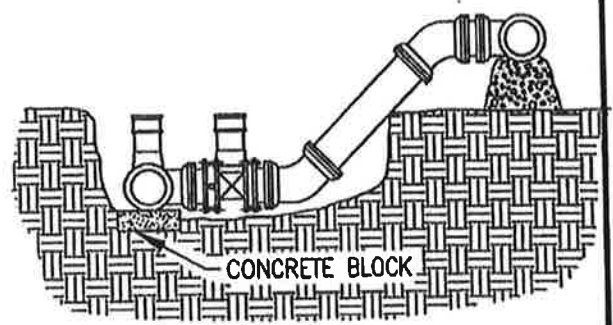
USE DIMENSIONS ONLY
SCALE N.T.S.

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FOR CONSTRUCTION PURPOSES

0201-0601-SD64

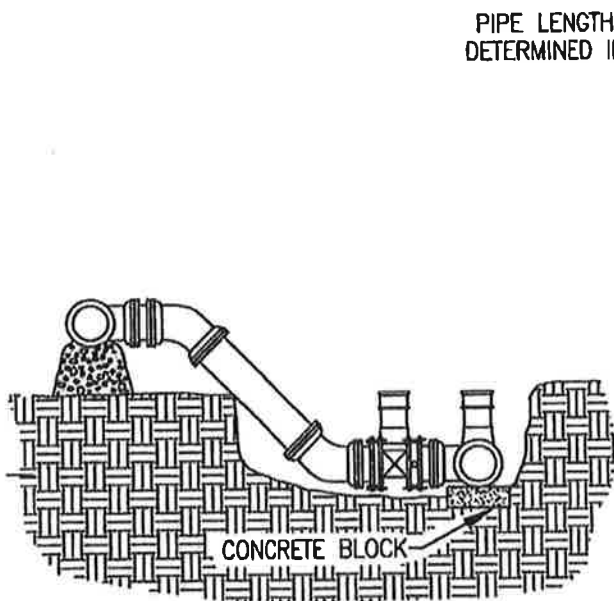


PLAN VIEW

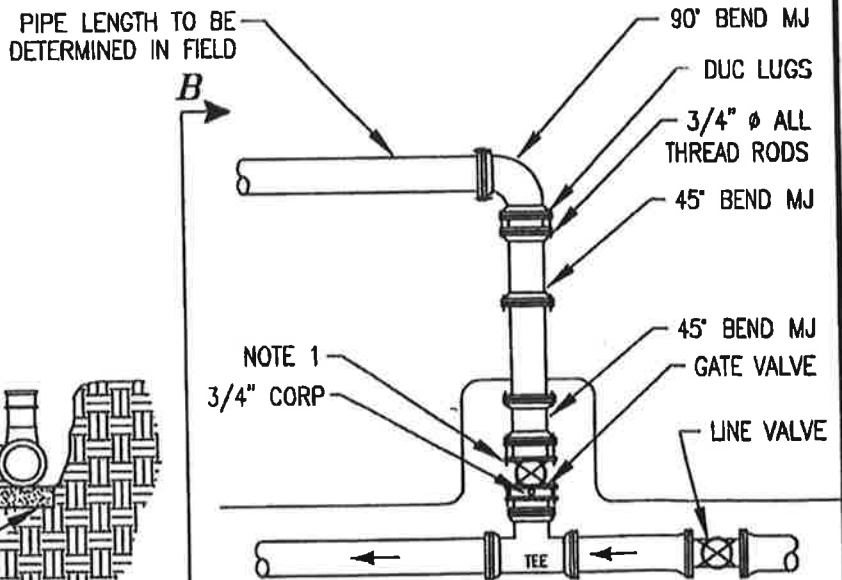


VIEW A-A

BLOW-OFF DETAIL DEAD END



VIEW B-B




PLAN VIEW

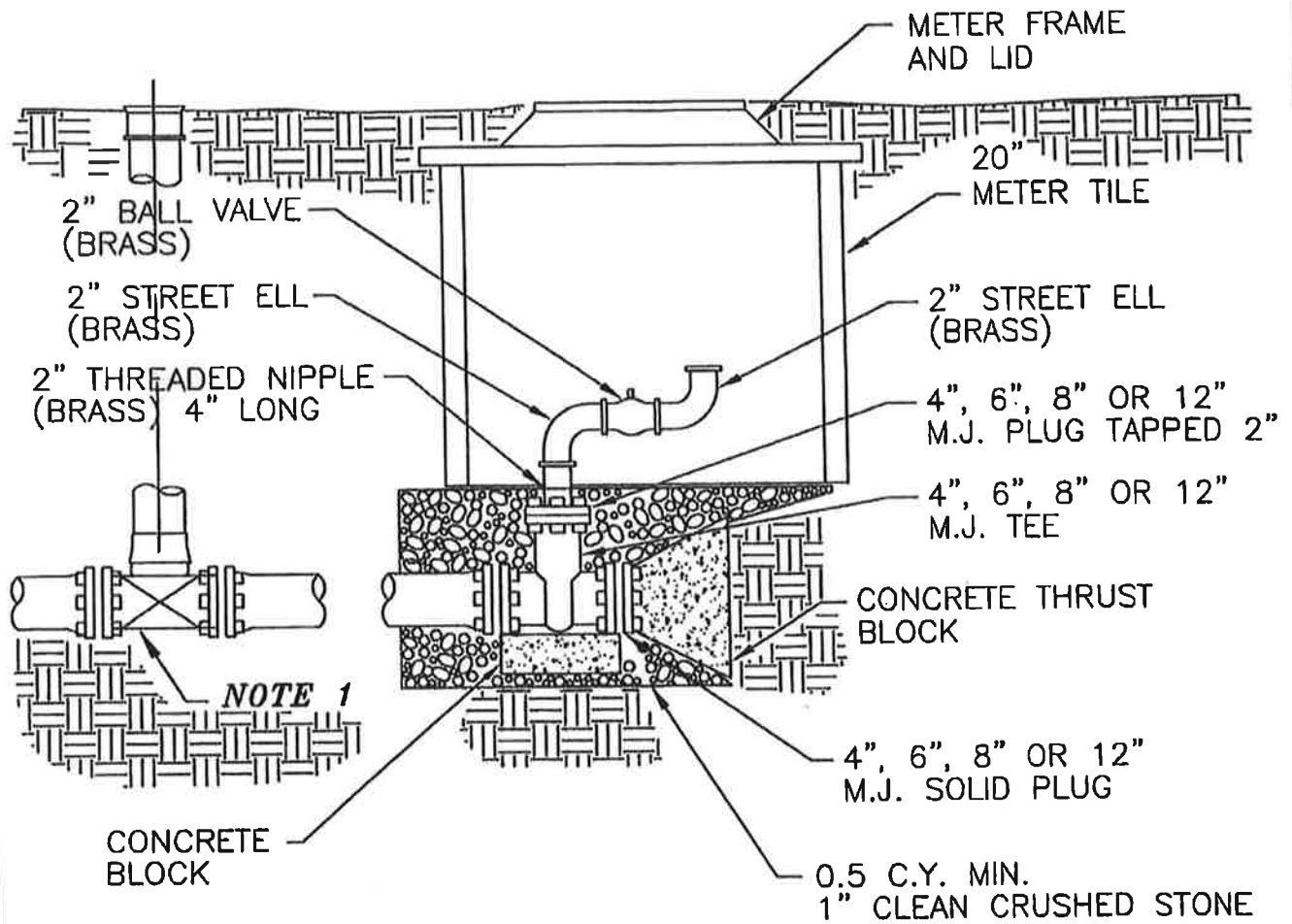
BLOW-OFF DETAIL IN LINE

NOTES:

1. INSTALL MECHANICAL JOINT PLUG IN GATE VALVE AFTER REMOVAL OF BLOWOFF ASSEMBLY.

AMERICAN WATER STANDARD CIVIL LARGE WATER MAIN - TEMPORARY BLOWOFF ASSEMBLY - DETAIL		
AMERICAN WATER BELLEVILLE, IL 62223		
AMERICAN WATER ENG. CENTER 100 NORTH WATER WORKS DR. BELLEVILLE, IL 62223		AMERICAN WATER USE DIMENSIONS ONLY SCALE N.T.S.
DRAWN BY JWM PROJECT ENG'R APPROVED	DATE 01-05-01 PROJECT #P	XXXX-XXXX-XXXX
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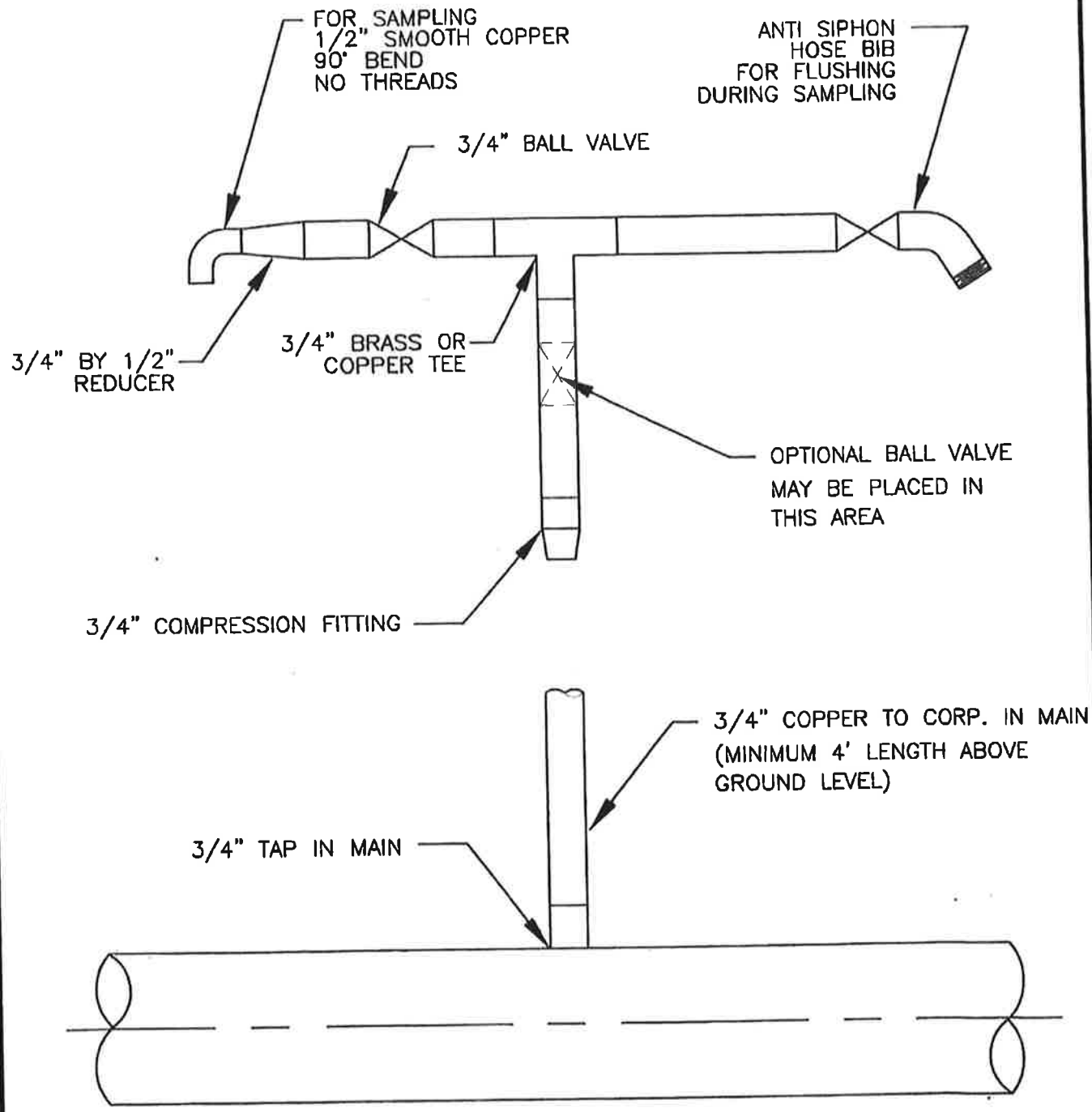
FOR COMMENTS



NOTES:

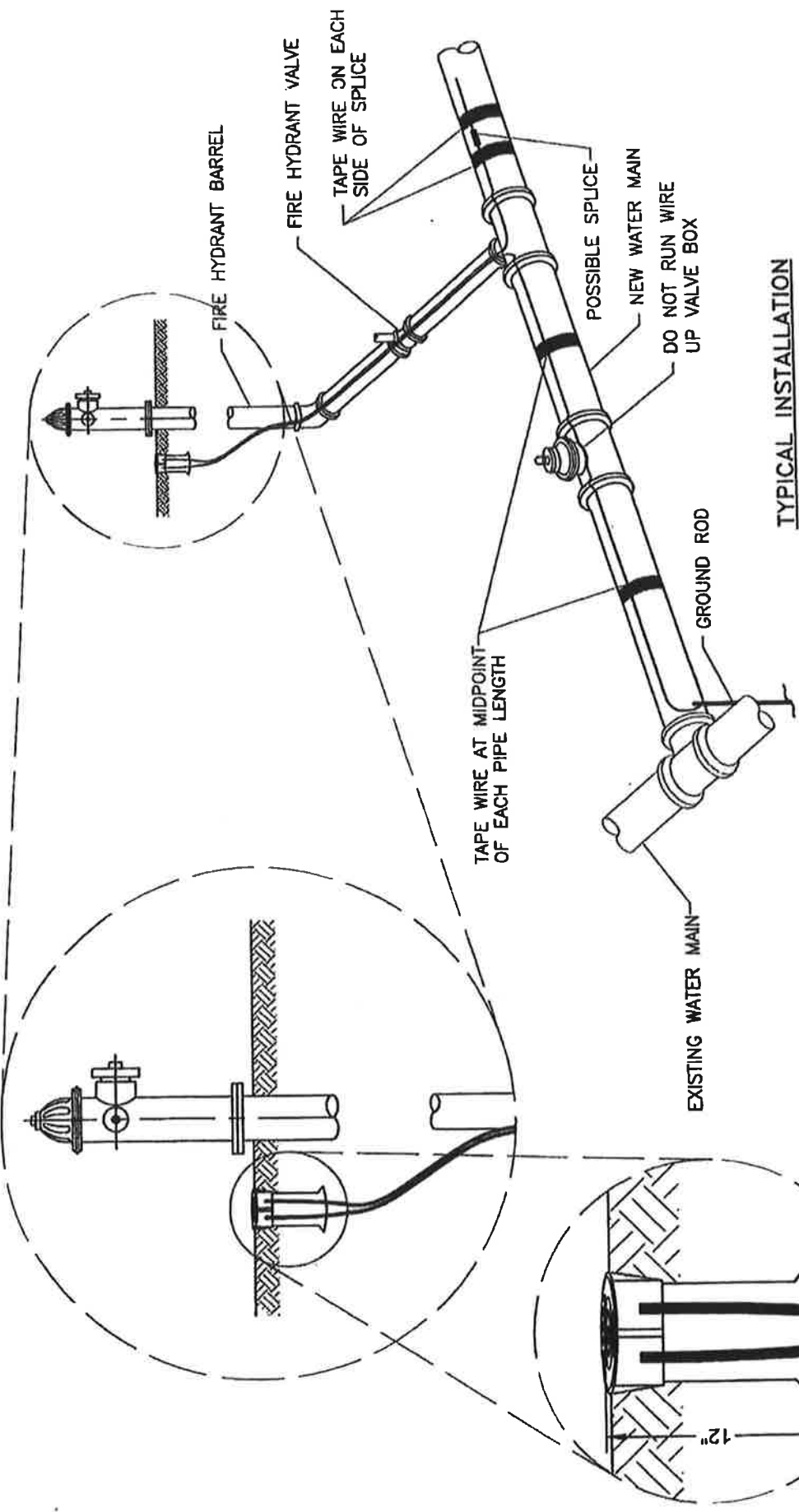
1. LINE VALVE REQUIRED ONE (1) LENGTH PRIOR TO BLOW-OFF.

AMERICAN WATER STANDARD CIVIL PERMANENT BLOWOFF ASSEMBLY (ALTERNATIVE) - DETAIL		
<small>AMERICAN WATER BELLEVILLE, IL 62223</small>		
<small>AMERICAN WATER ENG. CENTER 100 NORTH WATER WORKS DR. BELLEVILLE, IL 62223</small>		
<small>DRAWN BY JWN PROJECT ENG'R APPROVED</small>	<small>DATE 01-05-01 PROJECT ID</small>	<small>USE DIMENSIONS ONLY SCALE N.T.S.</small>
<small>USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES</small>		XXXX-XXXX-XXXX



NOTES:
 1.) PREFERRED SAMPLE DEVICE FOR NEW MAINS.
 LOCAL OFFICE MAY ALLOW AN APPROVED ALTERNATIVE.

AMERICAN WATER STANDARD CIVIL WATER QUALITY SAMPLING DEVICE DETAIL		
AMERICAN WATER BELLEVILLE, IL 62223		
AMERICAN WATER ENG. CENTER 100 NORTH WATER WORKS DR. BELLEVILLE, IL 62223	★ AMERICAN WATER	USE DIMENSIONS ONLY SCALE N.T.S.
DRAWN BY JWM PROJECT ENGR APPROVED	DATE 01-05-01 PROJECT #	
USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES		XXXX-XXXX-XXXX



TYPICAL INSTALLATION

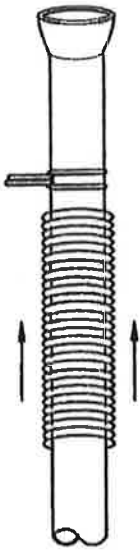
AMERICAN WATER STANDARD CIVIL TRACER SYSTEM DETAIL	
AMERICAN WATER WORKS, N.J. 08043	AMERICAN WATER USE DIMENSIONS ONLY SCALE N.T.S.
AMERICAN WATER ENGR. CENTER 215 CAROLINE LANE DELRAN, N.J. 08072	DATE: 08-01-03 PROJECT: # DRAWN BY: RJB PROJECT ENGINEER: APPROVED
USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES	XXXX-XXXX-XXXX
FOR COMMENTS	
SHT. 22	

TRACER WIRE ACCESS BOX

NOTES:

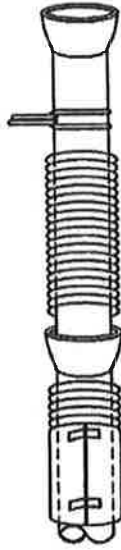
1. EXTEND TRACER WIRE UP FIRE HYDRANT BARREL TO INTERNAL TERMINALS OF TRACER WIRE STATION AND BACK DOWN.
2. CLAMP TRACER WIRE TO GROUND ROD AT SYSTEM TERMINATION POINTS.

INSTALLATION OF POLYWRAP



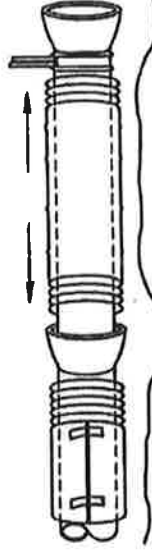
STEP-1

CLEAN 'ALL DIRT, CINDERS, ETC., FROM THE SURFACE OF THE PIPE. CUT POLYETHYLENE TWO (2) FEET LONGER THAN THE PIPE. SLIP POLYETHYLENE OVER SPIGOT END AND BUNCH AS SHOWN ABOVE.



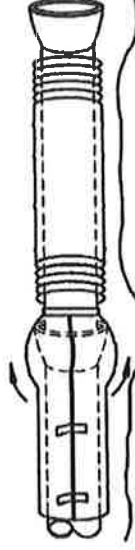
STEP-2

DIG BELL HOLES AT JOINT LOCATIONS, LOWER PIPE INTO TRENCH AND MAKE UP JOINT.



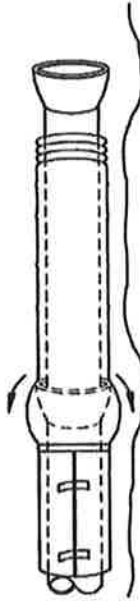
STEP-3

MOVE CABLE HOIST TO BELL END OF PIPE AND LIFT ENOUGH TO SLIP POLYETHYLENE ALONG PIPE AS SHOWN ABOVE.



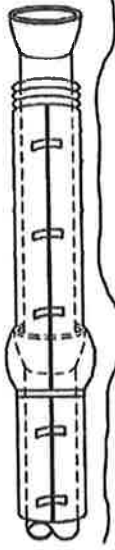
STEP-4

PULL POLYETHYLENE FORWARD FROM PREVIOUS JOINT OVER THE BELL AND SECURE IN PLACE AS SHOWN.



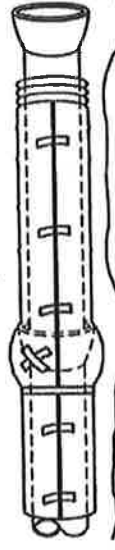
STEP-5

PULL POLYETHYLENE FORWARD FROM PREVIOUS JOINT OVER THE BELL AND SECURE IN PLACE AS SHOWN.



STEP-6

TAKE UP SLACK IN THE TUBE ALONG THE PIPE BARREL, MAKING A SNUG BUT NOT TIGHT FIT. FOLD OVER ON TOP OF PIPE AND SECURE IN PLACE ABOUT EVERY THREE (3) FEET AS SHOWN.



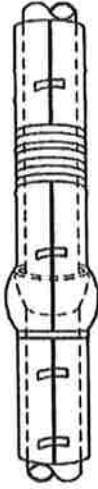
STEP-7

MAKE SURE ANY TEARS IN THE POLYETHYLENE ARE REPAIRED WITH TAPE OR ANOTHER PIECE OF POLYETHYLENE SECURED OVER THE DAMAGED AREA.

STEP-8

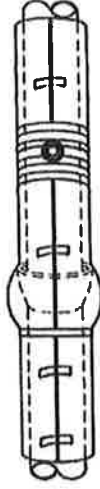
BACKFILL THE TRENCH ACCORDING TO SPECIFICATIONS. BEING CAREFUL NOT TO DAMAGE THE POLYETHYLENE WHILE TAMPING AROUND PIPE. BACKFILL SHOULD NOT CONTAIN MATERIAL THAT MIGHT DAMAGE THE POLYETHYLENE.

TAPPING POLYWRAPPED PIPE



STEP-1

WRAP TWO OR THREE LAYERS OF TAPE COMPLETELY AROUND THE PIPE WHERE THE TAPPING MACHINE WILL BE PLACED.



STEP-2

MOUNT THE TAPPING MACHINE ON THE TAPED AREA AND MAKE THE TAP DIRECTLY THROUGH THE TAPE AND POLYWRAP. INSTALL CORPORATION STOP.

STEP-3

INSPECT THE ENTIRE AREA FOR DAMAGE AND REPAIR IF NECESSARY.

STEP-4

WRAP ANY CONNECTED COPPER SERVICE LINE WITHIN THREE (3) FEET OF THE PIPE WITH POLYETHYLENE.

STEP-5

BACKFILL THE TRENCH ACCORDING TO SPECIFICATIONS. BEING CAREFUL NOT TO DAMAGE THE POLYETHYLENE WHILE TAMPING AROUND PIPE. BACKFILL SHOULD NOT CONTAIN MATERIAL THAT MIGHT DAMAGE THE POLYETHYLENE.

AMERICAN WATER STANDARD
CIVIL
POLYWRAP INSTALLATION
AND TAPPING - DETAIL

AMERICAN WATER
VOORHEES, NJ 08043

AMERICAN WATER ENGINEERING
3905 CHURCH ROAD
MOUNT LABEL, NJ 08054



AMERICAN WATER
USE DIMENSIONS ONLY
SCALE N.T.S.

DESIGNED BY D.B.
PROJECT ENGINEER
DATE 08-03-08
PROJECT #

XXXX-XXXX-SDXX

USE APPROVED DRAWINGS ONLY
FOR CONSTRUCTION PURPOSES

FOR COMMENTS

SHT. 23