

TRUMBULL COUNTY SANITARY ENGINEER'S STANDARD WATER DETAILS

GENERAL

ALL WORK MUST CONFORM TO THE REQUIREMENTS AND DIRECTIONS OF THE TRUMBULL COUNTY SANITARY ENGINEERING DEPARTMENT. THE CONTRACTOR MUST CONFORM TO ALL FEDERAL, STATE AND LOCAL REQUIREMENTS, LAWS, RESOLUTIONS OR ORDINANCES RELATING TO PERMITS, SAFETY, INSURANCE WORK CONDITIONS, WORKMEN'S COMPENSATION, PATENTS, TAXES, USE OF HIGHWAYS OR STREETS AND SHALL SAVE HARMLESS FROM DAMAGES, LIABILITY OR CLAIMS THE COUNTY OF TRUMBULL.

EXCAVATION

THE CONTRACTOR SHALL EXCAVATE TO A WIDTH AND DEPTH SUFFICIENT TO ACCOMODATE THE PIPE LAYING. THE EXCAVATION SHALL BE ADEQUATELY BRACED AND SUPPORTED TO PROTECT WORKMEN AND ADJACENT STRUCTURES AND PAVEMENTS. BACKFILL SHALL BE MADE AS SHOWN OR DIRECTED. MAXIMUM PERMISSIBLE TRENCH WIDTHS SHALL BE AS FOLLOWS:

6" - 24" = NOMINAL PIPE DIAMETER + 2'-0"
27" - 30" = NOMINAL PIPE DIAMETER + 2'-6"
36" AND OVER = NOMINAL PIPE DIAMETER + 3'-0"

CONCRETE

CONCRETE USED IN THE WORK SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:

	CLASS A WITH REINFORCING	CLASS B NON-REINFORCED
SACKS OF CEMENT/CU.YD.	6.5	5
MAXIMUM SLUMP	5 INCHES	6 INCHES
28 DAY STRENGTH	4000 P.S.I.	2000 P.S.I.

AIR ENTRAINED CEMENT SHALL BE USED.

WATER MAIN PIPE

ALL DUCTILE IRON PIPE SHALL BE EQUAL TO A.W.W.A. SPECIFICATION #A 21.51 - THICKNESS CLASS 51. THICKNESS CLASS 52 MAY BE REQUIRED BY THE SANITARY ENGINEER IN CASES OF SEVERE TRENCH LOADING OR BENDING STRESS ON THE PIPE. DUCTILE IRON PIPE JOINTS SHALL BE RUBBER - GASKET JOINTS EQUAL TO THE MECHANICAL JOINT OR PUSH ON JOINT AS SPECIFIED BY A.W.W.A. SPECIFICATION #C111-79 OR A.N.S.I. SPECIFICATION #21.11-79. DUCTILE IRON PIPE SHALL HAVE A SINGLE COAT OF CEMENT LINING IN ACCORDANCE WITH A.W.W.A. / A.N.S.I. SPECIFICATION #C104 / #A21.4-80. CEMENT LINING SHALL BE GIVEN A SEAL COAT OF AN APPROVED ASPHALTIC MATERIAL. ALL NUTS AND BOLTS SHALL BE PAINTED WITH 2 COATS OF KOPPERS #50 COAL TAR PITCH PAINT OR AN APPROVED EQUAL. IN SOME SOIL CONDITIONS DUCTILE IRON PIPE AND FITTINGS MAY BE REQUIRED TO BE WRAPPED OR BAGGED IN POLYETHYLENE FILM 8 MIL OR .2MM DETERMINED BY THE SANITARY ENGINEER.

WATER MAINS UP TO 12" IN DIAMETER MAY BE POLYVINYL CHLORIDE (P.V.C). P.V.C. PIPE SHALL BE EQUAL TO A.W.W.A. SPECIFICATION #C900-75 OR #C909-PC (ULTRA-BLUE), CLASS 150. PIPE SHALL HAVE A DR OF 18 IN COMPLIANCE WITH A.W.W.A. SPECIFICATION #C900, P.V.C. PRESSURE PIPE FOR WATER WITH OUTSIDE DIMENSIONS EQUAL TO DUCTILE IRON PIPE SHALL HAVE AN INTEGRAL BELL END AND THE GASKET SEAL SHALL BE REINFORCED WITH A STEEL BAND OR OTHER RIGID MATERIAL. JOINTS SHALL COMPLY WITH A.S.T.M. SPECIFICATION #D3139. ALL NON-METALLIC WATER MAINS SHALL HAVE A #12 SINGLE STRAND COPPER WIRE LAID ON TOP OF THE WATER MAIN FOR THE FULL LENGTH FOR FIELD LOCATING AT A LATER DATE.

FITTINGS

MECHANICAL JOINT FITTINGS SHALL BE EQUAL TO CLOW BELL TIGHT OF U.S. "TYTON" A.S.A. SPECIFICATION #A21.10 WITH JOINTS EQUAL TO A.S.A. SPECIFICATION #A21.11.

DUCTILE IRON FITTINGS SHALL BE EQUAL TO A.W.W.A. / A.N.S.I. SPECIFICATION #C110-77 / #A21.10 FOR MECHANICAL OR PUSH ON JOINTS WHICH SHALL CONFORM TO A.W.W.A. / A.N.S.I. SPECIFICATION #C111 / #A21

ALL FITTINGS, VALVES, HYDRANTS, ETC... SHALL BE BLOCKED WITH CLASS "B" CONCRETE BLOCKING AS INDICATED ON THE FOLLOWING DETAIL SHEETS AND HAVE MECHANICAL RESTRAINING DEVICES INSTALLED. EBAA #200 PV OR EQUIVALENT FOR P.V.C. PIPE OR EBAA MEGALUG SYSTEM OR EQUIVALENT FOR DUCTILE IRON PIPE.

GATE VALVES

GATE VALVES SHALL BE PLACED AT VARIOUS LOCATIONS ALONG A WATER MAIN AND IT'S INTERSECTIONS TO ALLOW FOR LOGICAL AND EFFICIENT TRANSPORT OF WATER THROUGHOUT THE WATER SYSTEM. GATE VALVES SHALL ALSO BE PLACED TO ALLOW FOR EASY REPAIRS SHOULD A WATER MAIN BE DAMAGED. A WATER MAIN MUST END WITH A GATE VALVE AND AT LEAST TWO LENGTHS OF PIPE AFTER THE VALVE. THE MAIN LINE MUST THEN BE PROPERLY CAPPED AND BLOCKED. THIS IS TO ALLOW FOR EASY EXTENSION OF THE WATER MAIN.

ALL VALVES 3" AND OVER SHALL CONFORM TO THE A.W.W.A. SPECIFICATIONS FOR GATE VALVES FOR ORDINARY WATER WORKS SERVICE - STANDARD #C500-80. GATE VALVES SHALL BE MUELLER SERIES #A-2360/#A-2380 OR EQUIVALENT. ALL VALVES SHALL OPEN BY TURNING COUNTER-CLOCKWISE OR TO THE LEFT.

GATE VALVES SHALL BE IRON-BODY WITH FUSION EPOXY COATED INTERIOR AND EXTERIOR SURFACES THAT MEETS OR EXCEEDS ALL APPLICABLE REQUIREMENTS OF ANSI/AWWA C550 STANDARD AND IS CERTIFIED TO ANSI/NSF 61, BRONZE MOUNTED DOUBLE DISC WITH BRONZE SEATS, NON-RISING BRONZE STEM CAPABLE OF OPERATING AT A WORKING PRESSURE OF 200 PSI. ALL 2" AND SMALLER GATE VALVES SHALL BE MADE OF THE BEST QUALITY BRASS OR BRONZE, SOLID WEDGE, NON-RISING STEM GATE VALVES WITH SCREWED ENDS AND SHALL OPEN BY TURNING TO THE LEFT.

BONNET BOLTS AND NUTS, STUFFING BOX BOLTS AND NUTS AND WRENCH NUT CAP SCREW SHALL BE TYPE 304 STAINLESS STEEL.

VALVE BOXES SHALL BE EQUAL IN ALL RESPECTS TO BINGHAM & TAYLOR 5-1/4" SHAFT 3-PIECE SCREW VALVE BOX, FIG.#4906-CATALOG #8. THE COVER SHALL HAVE THE WORD "WATER" MARKED ON THE TOP. WASH GRAVEL SHALL BE USED AROUND THE VALVE BOX SETTING.

THE VALVE BOX SHALL BE SO SET THAT IT DOES NOT REST ON THE VALVE. NO SURFACE LEADS SHALL BE TRANSMITTED TO THE VALVE OR TO THE MATER MAIN. THERE SHALL BE AT LEAST TWO INCHES OF EARTH BETWEEN THE VALVE AND THE VALVE BOX. AFTER BACKFILLING, IF BOX IS FOUND TO BE NOT TO GRADE OR NOT PLUMB IT SHALL BE DUG UP AND RESET.

NOTE: IF A VALVE IS GREATER THAN FIVE (5) FEET DEEP, A ROD EXTENSION IS REQUIRED WITH SET SCREWS AND BOLTS.

FIRE HYDRANTS

FIRE HYDRANTS SHALL BE MUELLER CENTURION COMPRESSION TYPE OR EQUIVALENT. HYDRANTS SHALL MEET THE FOLLOWING SPECIFICATIONS:

TEST PRESSURE (HYDRANTS SHALL BE SHOP TESTED @)	300 P.S.I.
MECHANICAL JOINT BASE ELBOW	6 IN.
DEPTH OF BURY	5.0 FT.
SIZE OF HOSE CONNECTION	2 1/2 IN.
NUMBER OF HOSE CONNECTIONS	2
THREADS FOR PUMPER AND HOSE CONNECTIONS	NATIONAL STANDARD
SIZE OF PUMPER CONNECTION	4 1/2 IN.
NUMBER OF PUMPER CONNECTIONS	1
SIZE OF VALVE OPENING (MIN)	4 1/2 IN.
CHAINED CAPS	3

HYDRANTS SHALL OPEN TO THE LEFT, COUNTER CLOCKWISE, WITH TOP NUT AND NOZZLE CAPS BEING PENTAGON SHAPED. HYDRANT SHALL BE EQUIPPED WITH A BREAKING RING LOCATED TWO INCHES ABOVE THE GROUND AND SHALL BE SHOP PAINTED YELLOW AS THE STANDARD COLOR.

ANY EXTENSIONS SHALL BE OF THE SAME MANUFACTURER AS THE HYDRANT.

HYDRANT LOCATION SHALL BE IN ACCORDANCE WITH ODOT'S LOCATION AND DESIGN MANUAL, VOLUME 1, SECTION 600-ROADSIDE DESIGN. HYDRANTS TO BE INSTALLED AS SHOWN ON THE STANDARD WATER DETAILS WITH A WASHED GRAVEL DRAINAGE POCKET AND SHALL CONTAIN NO STONES LARGER THAN TWO (2) INCHES IN DIAMETER. #57 SLAG IS NOT TO BE USED. THE HYDRANT SHALL BE SET PLUMB AND THE NOZZLES SHALL FACE IN THE DIRECTION ORDERED BY THE COUNTY.

SERVICE CONNECTIONS

SERVICE LINES SHALL BE TYPE "K" COPPER AS PER A.S.T.M. SPECIFICATION #B-88 OR 200 P.S.I. PLASTIC #3408 DR9. CORPORATION STOPS SHALL BE EQUAL TO MUELLER #P-25008 WITH RUBBER SEALING RINGS AND TIGHTENING CLAMP. CURB STOPS SHALL BE EQUAL TO MUELLER #P-25209 WITH TIGHTENING CLAMPS. CURB BOX SHALL BE EQUAL TO BUFFALO PIPE & FOUNDRY COMPANY #93E. IRON SERVICE SADDLE SHALL BE FORD FC101, FC102, OR EQUAL. THE SADDLE SHALL HAVE A 2" MIN. WIDTH STAINLESS STEEL BAND WITH STAINLESS STEEL BOLTS, AN EPOXY COATED SADDLE BODY, AND A CC THREADED CORPORATION FITTING. SERVICE LINES SHALL INCLUDE 12 GAUGE SOLID (COPPER) COATED (INSULATED) TRACER WIRE.

LOOPING

WHENEVER THE T.C.S.E. DEEMS IT NECESSARY, WATER MAINS SHALL BE EXTENDED BEYOND THE LIMITS OF THE PROJECT AND LOOPED TO IMPROVE WATER SERVICE AND/OR ELIMINATE WATER QUALITY ISSUES.

STERILIZATION

STERILIZATION SHALL COMPLY WITH A.W.W.A. STANDARD SPECIFICATION #C651-68.

LOCATIONS AND SEPARATIONS

LOCATE WATER PIPE AT LEAST 10 FEET AWAY, HORIZONTALLY, FROM SEWER PIPES. THE DISTANCE SHALL BE MEASURED EDGE TO EDGE. WHEN IT IS NOT PRACTICAL TO MAINTAIN A 10 FOOT SEPARATION, THE TCSE DEPARTMENT MAY ALLOW DEVIATION, IF SUPPORTED BY DATA FROM THE DESIGN ENGINEER. THEN, THE WATER LINE MAY BE INSTALLED CLOSER TO THE SEWER. IF SO, THE SEWER MUST BE LOCATED IN A SEPARATE TRENCH OR ON AN UNDISTURBED EARTH SHELF LOCATED ON ONE SIDE OF THE WATER MAIN AND AT AN ELEVATION SO THE BOTTOM OF THE WATER MAIN IS AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER PIPE.

IF IT IS IMPOSSIBLE TO MEET PROPER HORIZONTAL AND VERTICAL SEPARATIONS AS DESCRIBED ABOVE, BOTH THE WATER MAIN AND SEWER MUST BE CONSTRUCTED OF SLIP-ON OR MECHANICAL JOINT PIPE COMPLYING WITH TCSE DESIGN SPECIFICATIONS AND BE PRESSURE TESTED TO 150 PSI TO ASSURE WATER TIGHTNESS NOT BEFORE 30 DAYS.

CROSSINGS

WATER MAINS CROSSING SEWERS SHALL BE LAID WITH A MINIMUM VERTICAL DISTANCE OF 18 INCHES BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF THE SEWER. THIS SHALL BE THE CASE WHERE THE WATER MAIN IS EITHER ABOVE OR BELOW THE SEWER. THE CROSSINGS SHALL BE ARRANGED SO THAT THE WATER MAIN JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER JOINTS. WHERE THE WATER MAIN CROSSES UNDER A SEWER, ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED FOR THE SEWER TO MAINTAIN LINE AND GRADE.

IF IT IS IMPOSSIBLE TO MEET PROPER HORIZONTAL SEPARATION, EITHER THE WATER MAIN OR THE SEWER LINE MAY BE ENCASED IN A WATERTIGHT CARRIER PIPE WHICH EXTENDS 10 FEET ON BOTH SIDES OF THE CROSSING, MEASURED PERPENDICULAR TO THE OTHER LINE. THE CARRIER PIPE SHALL BE OF MATERIALS APPROVED BY TCSE FOR USE IN WATER MAIN CONSTRUCTION.

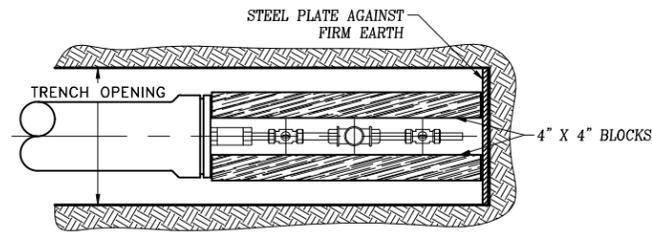
TESTING

ALL WATER MAINS SHALL BE SUBJECT TO BOTH A HYDROSTATIC AND A BACTERIOLOGICAL TEST. THE BACTERIA TEST SHALL BE TAKEN BY A REPRESENTATIVE OF THE TRUMBULL COUNTY SANITARY ENGINEER. HYDROSTATIC TESTING SHALL BE DONE IN THE PRESENCE OF A REPRESENTATIVE OF THE TRUMBULL COUNTY SANITARY ENGINEER AND SHALL COMPLY WITH A.W.W.A. STANDARD SPECIFICATION #C600.

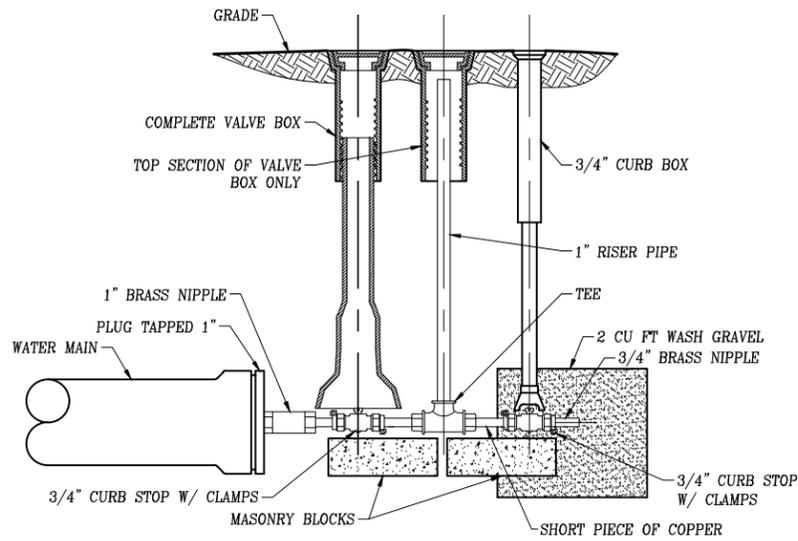
CLEAN-UP AND RESTORATION

THE ENTIRE AREA OF WORK SHALL BE CLEANED UP, RE-SEEDED AND RESTORED SO THAT UPON COMPLETION OF THE WORK, THE AREA IS IN A CONDITION EQUAL TO OR BETTER THAN IT WAS PRIOR TO THE START OF WORK.

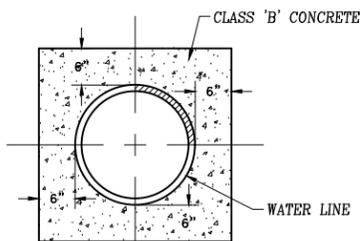
TRUMBULL COUNTY SANITARY ENGINEER'S STANDARD WATER DETAILS



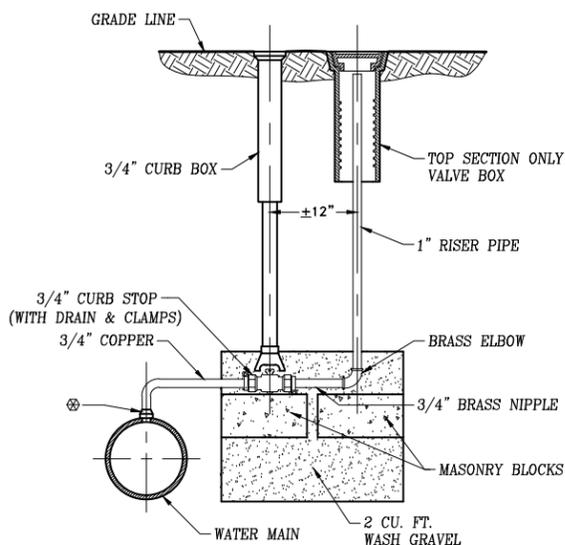
PLAN



TYPICAL DETAIL OF
DEAD END BLOW-OFF

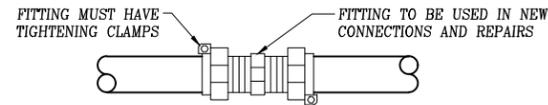


TYPICAL DETAIL 'Y'



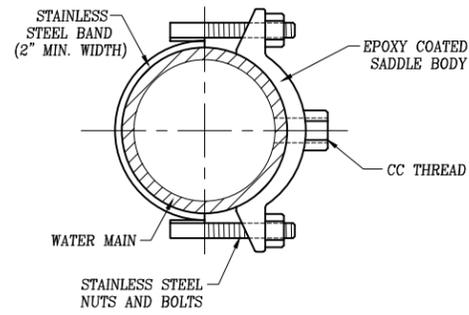
TYPICAL MANUAL AIR RELEASE DETAIL

NOTE - FITTING COMING OUT OF TAPPING COLUMN SHOULD BE BRASS



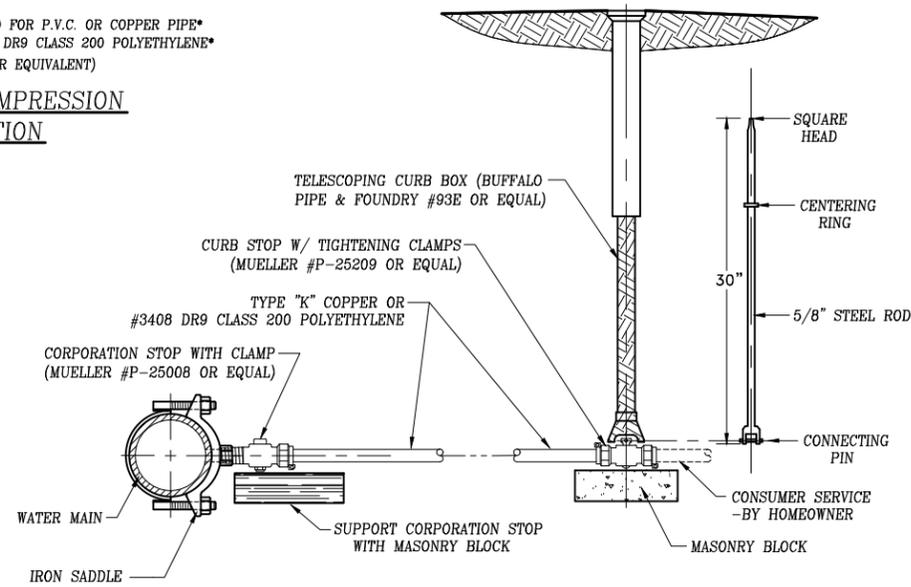
NOTE: FITTING MUST BE TYPE WHICH CAN BE USED FOR P.V.C. OR COPPER PIPE
STAINLESS STEEL STIFFENER MUST BE USED FOR DR9 CLASS 200 POLYETHYLENE
(IE. FORD COMPRESSION FITTING OR EQUIVALENT)

LONG SERVICE LINE COMPRESSION
FITTING CONNECTION



IRON SADDLE

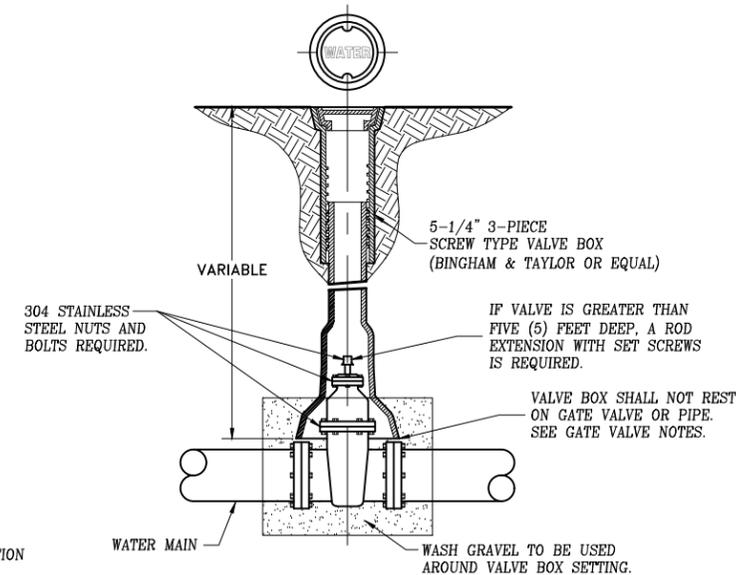
(FORD FC101, FC102, OR EQUAL)



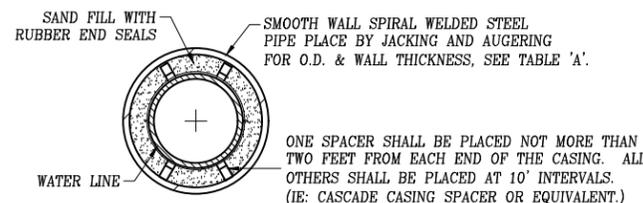
STAINLESS STEEL STIFFENER MUST BE USED FOR DR9 CLASS 200 POLYETHYLENE

STANDARD SERVICE CONNECTION

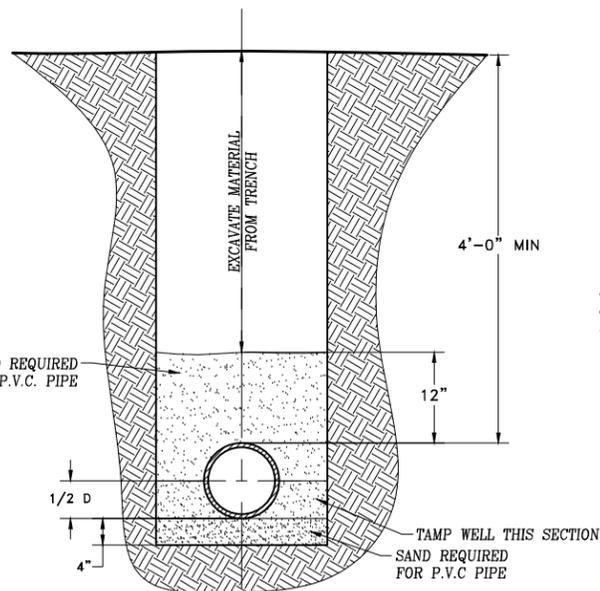
CORPORATION STOPS ARE TO BE INSTALLED HORIZONTAL (i.e. 9:00 OR 3:00)



TYPICAL VALVE SETTING WITH
3-PIECE SCREW TYPE BOX



TYPICAL DETAIL 'X'
HIGHWAY AND RAILROAD CROSSING

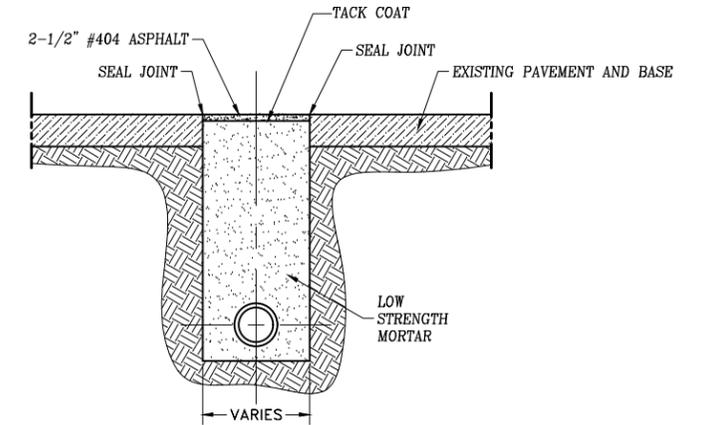


DETAIL OF REQUIRED
BACKFILL

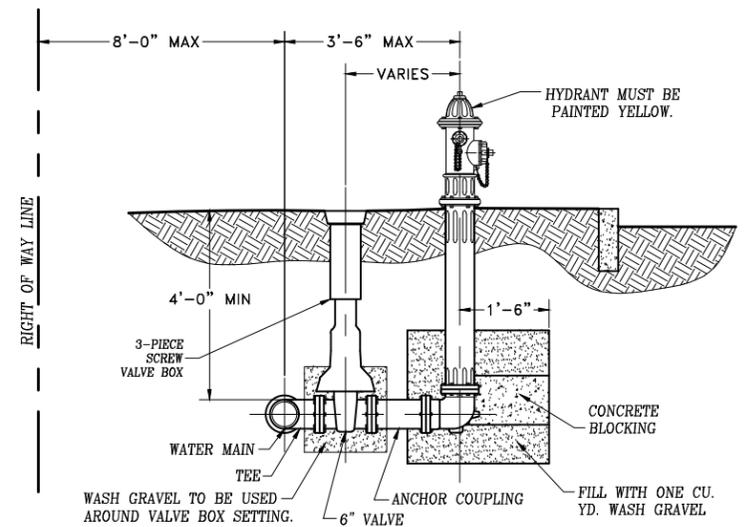
NOTE: FOR DUCTILE IRON PIPE USE CLEAN, NATIVE BACKFILL AS APPROVED BY THE INSPECTOR.

TABLE "A"

WATER LINE DIA	CASING O. D. (MIN)	CASING WALL THICKNESS
6"	14"	0.250
8"	16"	0.250
10"	18"	0.250
12"	20"	0.250
16"	30"	0.375

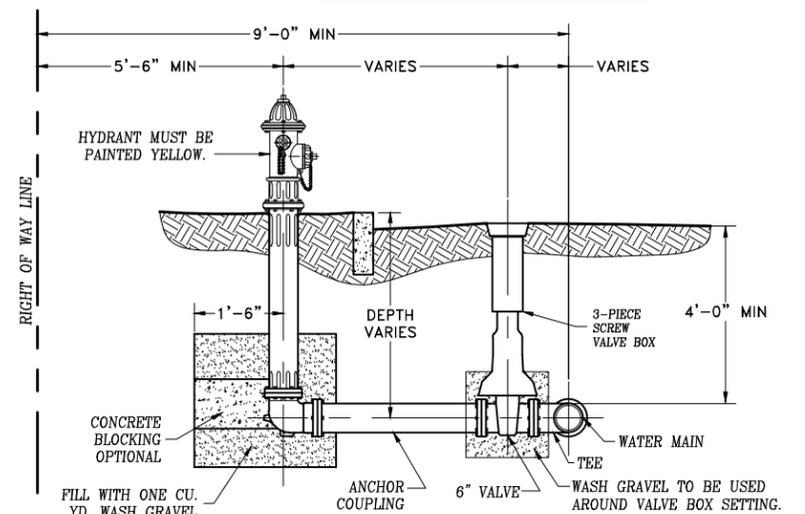


REPAIR OF TYPICAL CUTS THROUGH
TRUMBULL COUNTY ROADS



NOTE: HYDRANT LOCATION SHALL BE IN ACCORDANCE WITH ODOT'S LOCATION AND DESIGN MANUAL, VOLUME 1, SECTION 600-ROADSIDE DESIGN.

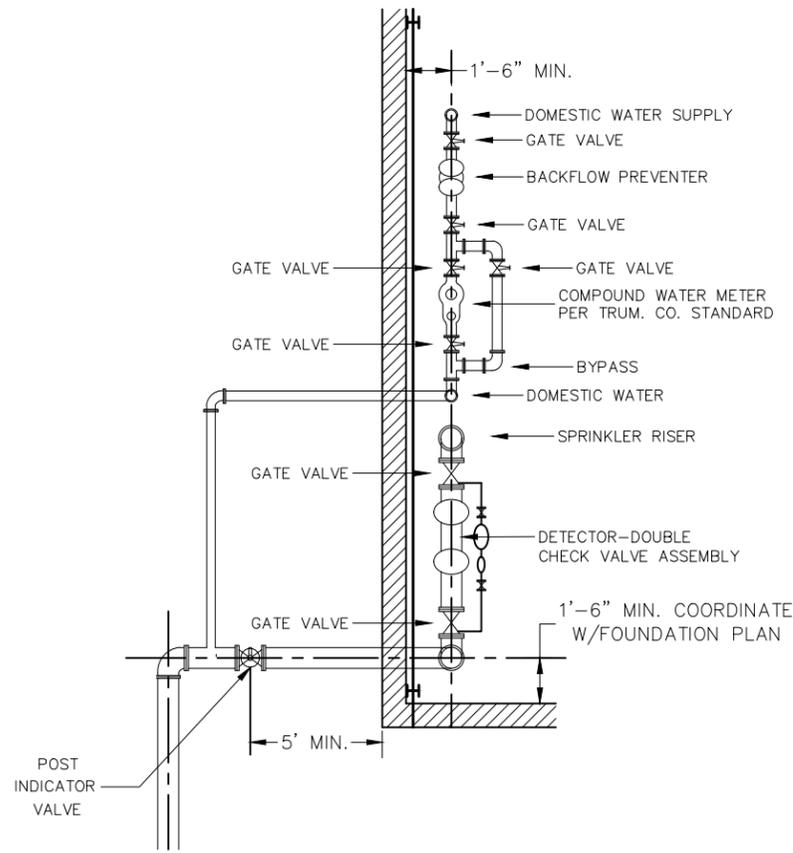
SPECIAL HYDRANT SETTING



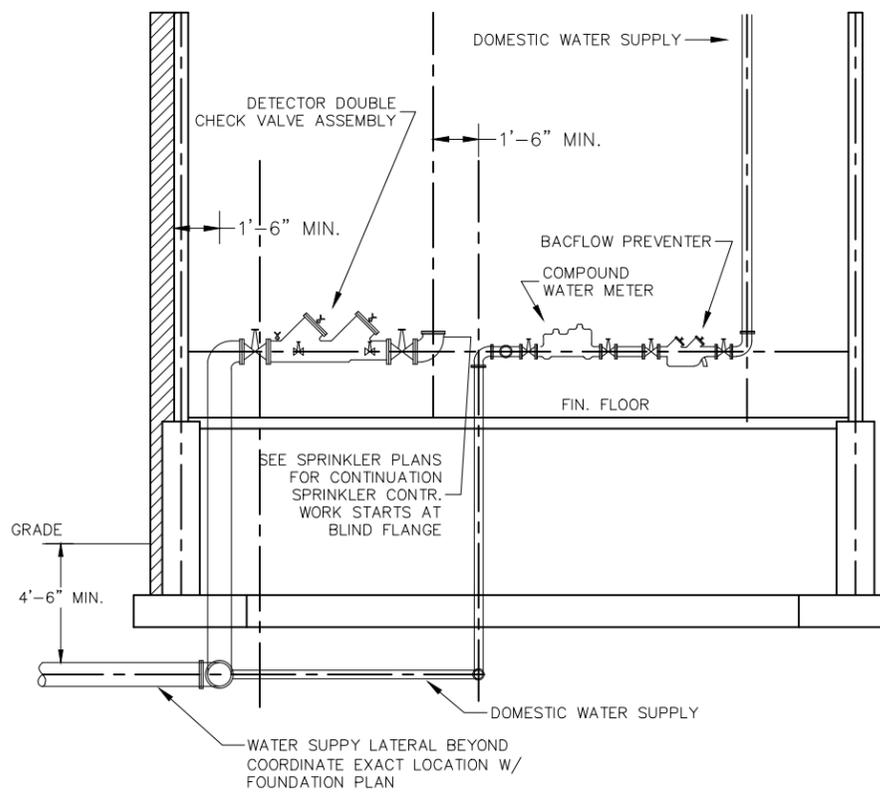
NOTE: HYDRANT LOCATION SHALL BE IN ACCORDANCE WITH ODOT'S LOCATION AND DESIGN MANUAL, VOLUME 1, SECTION 600-ROADSIDE DESIGN.

STANDARD HYDRANT SETTING

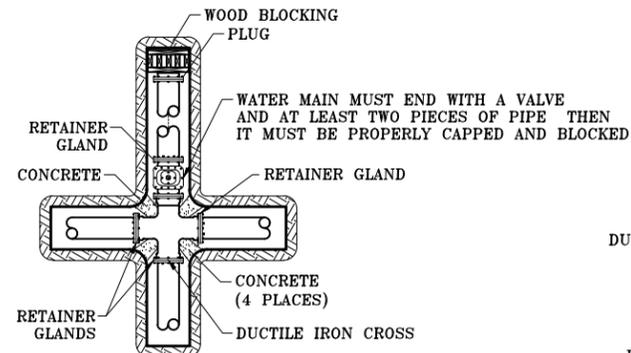
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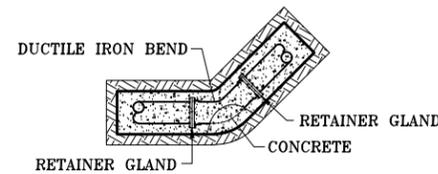
DETAIL OF FIRE SUPPRESSION SYSTEM



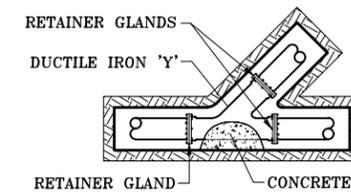
DETAIL OF FIRE SUPPRESSION SYSTEM



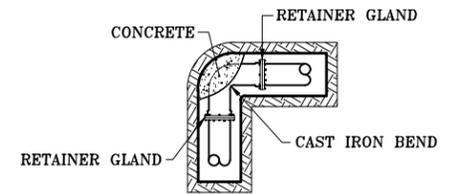
DUCTILE IRON CROSS



DUCTILE IRON BEND

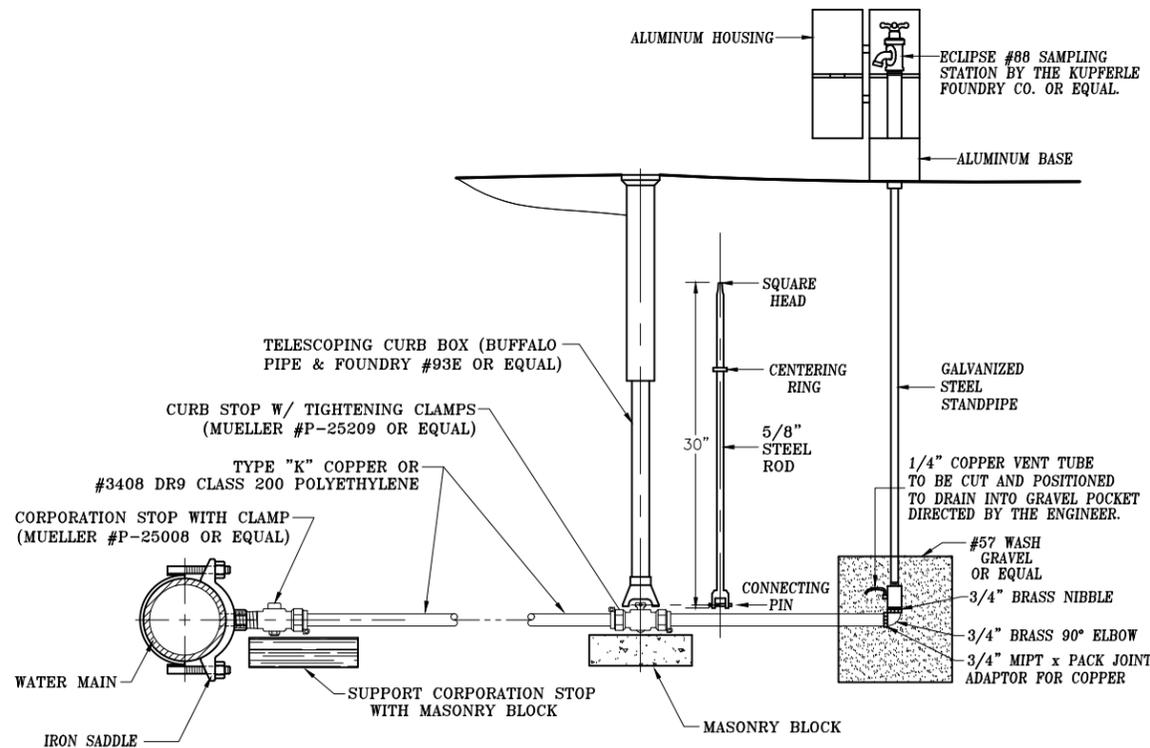


DUCTILE IRON 'Y' BRANCH



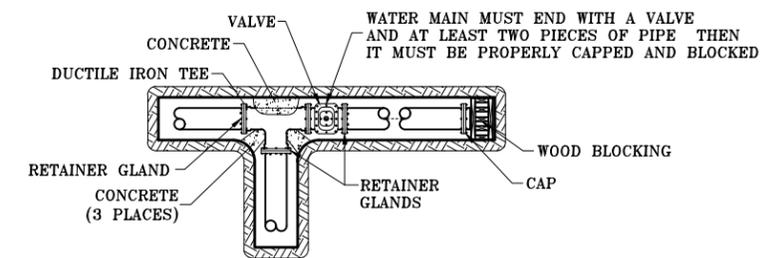
DUCTILE IRON 1/4 BEND

*** NOTE: ALL FITTINGS & VALVES MUST HAVE RETAINER GLANDS (IE: MEG-A-LUG OR EQUIVALENT) ***



STAINLESS STEEL STIFFENER MUST BE USED FOR DR9 CLASS 200 POLYETHYLENE

WATER SAMPLING STATION
CORPORATION STOPS ARE TO BE INSTALLED HORIZONTAL (i.e. 9:00 OR 3:00)



DUCTILE IRON TEE

PIPE SIZE	CONC ALLOWANCE BACKING AROUND PIPE FITTING			
	TEE	WYE	BEND	CROSS
6"-12"	7	4	3	8
14"-18"	12	7	5	14
20"-24"	20	10	8	22