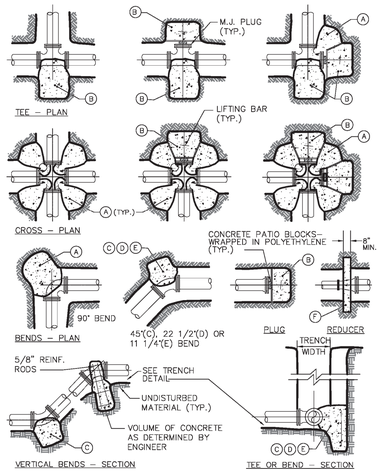


THRUST BLOCK SCHEDULE
SQUARE FEET OF CONCRETE THRUST
BLOCKING BEARING ON UNDISTURBED MATERIAL

REACTION TYPE		PIPE SIZE 4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
TEST PRESSURE 200 PSIG	Ⓐ	5.12	10.58	18.19	27.37	38.71	52.00	67.26	84.47	103.64	147.87
	Ⓑ	3.62	7.48	12.87	19.35	27.37	36.77	47.56	59.73	73.29	104.56
	Ⓒ	2.77	5.72	9.85	14.81	20.95	28.14	36.40	45.72	56.09	80.03
	Ⓓ	1.41	2.92	5.02	7.55	10.68	14.35	18.56	23.31	28.60	40.80
	Ⓔ	0.71	1.47	2.52	3.79	5.37	7.21	9.32	11.71	14.37	20.56
	Ⓕ	–	3.86	9.25	15.73	23.75	29.29	40.08	46.86	53.93	77.19

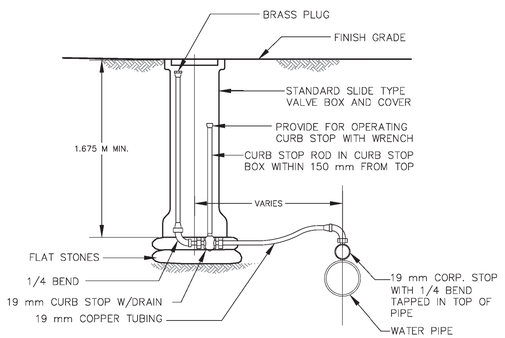
NOTES:
1. THRUST RESTRAINT IS REQUIRED FOR ALL TEES, BENDS, REDUCERS, CAPS, PLUGS, OR CROSSES.
2. POUR THRUST BLOCKS AGAINST UNDISTURBED MATERIAL. WHERE TRENCH WALL HAS BEEN DISTURBED, EXCAVATE LOOSE MATERIAL AND EXTEND THRUST BLOCK TO UNDISTURBED MATERIAL. NO JOINTS SHALL BE COVERED WITH CONCRETE.
3. ON BENDS AND TEES, EXTEND THRUST BLOCKS FULL LENGTH OF FITTING.
4. PLACE CONCRETE PATIO BLOCKS IN FRONT OF ALL PLUGS BEFORE POURING THRUST BLOCK.
5. PRE–FORMED AND PRE–POURED THRUST BLOCKS ARE NOT ACCEPTABLE.
6. THE USE OF A MECHANICAL JOINT RESTRAINT SYSTEM DOES NOT REDUCE THE REQUIREMENTS SHOWN IN THIS DETAIL.
7. ALL FITTINGS SHALL BE WRAPPED IN POLYETHYLENE OR BUILDING PAPER PRIOR TO INSTALLATION OF CONCRETE RESTRAINT.
8. IF THREADED ROD IS USED, IT SHALL BE ANSI A242 FY50 PIPE RESTRAINT NUTS TO MATCH AWWA C111.
9. SIZES FOR REDUCERS SHOWN ARE BASED ON THE SMALLEST AVAILABLE RUN SIZE FOR A GIVEN PIPE SIZE.
10. INSTALL LIFT HOOKS INTO THRUST BLOCKS AT END CAPS AND PLUGS.
11. TEST PRESSURE TO BE 200 PSI MIN. AT LOW END OF THE TEST SECTION. SQUARE FEET OF CONCRETE THRUST BLOCKING FOR OTHER TEST PRESSURES IS DIRECTLY PROPORTIONAL TO THE ABOVE TABLE. FOR INSTANCE, AT 300 PSI TEST PRESSURE, THE NUMBERS SHOWN IN THE ABOVE TABLE ARE MULTIPLIED BY 1.5. SEE BELOW FOR EXAMPLE CALCULATION.
12. THRUST BLOCK AREA IS BASED ON A SOIL BEARING STRENGTH OF 1500 LBS/SF AND A SAFETY FACTOR OF 1.5. MULTIPLY THE BEARING AREA FROM ABOVE (WITH CONSIDERATION OF TEST PRESSURE) AND MULTIPLY BY THE FOLLOWING FACTORS TO DETERMINE BEARING AREA REQUIRED FOR VARIOUS SOIL CONDITIONS:

SOIL TYPE	BEARING CAPACITY (LB/SF)	FACTOR
SOFT CLAY	1,000	1.50
SILT	1,500	1.00
SANDY SILT	3,000	0.50
SAND	4,000	0.38
SANDY GRAVEL	5,000	0.30
SANDY CLAY	6,000	0.25
GRAVEL W/ ROCK	7,000	0.21
HARD CLAY	9,000	0.17

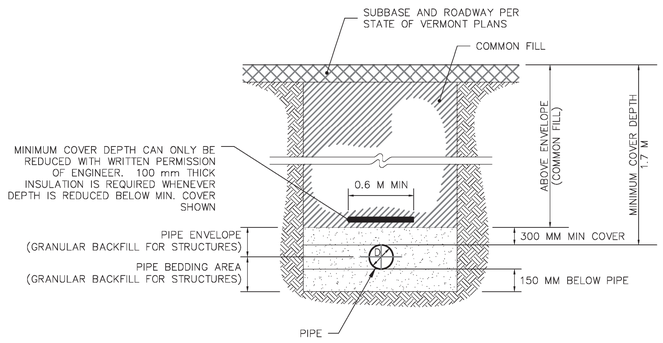
EXAMPLE: AN 8–INCH 90° BEND IN SANDY GRAVEL SOILS, TEST PRESSURE OF 200 PSI:

AREA REQUIRED = 18.19SF x 1 x 0.30 = 5.46SF

THRUST BLOCK DETAILS AND NOTES
NOT TO SCALE

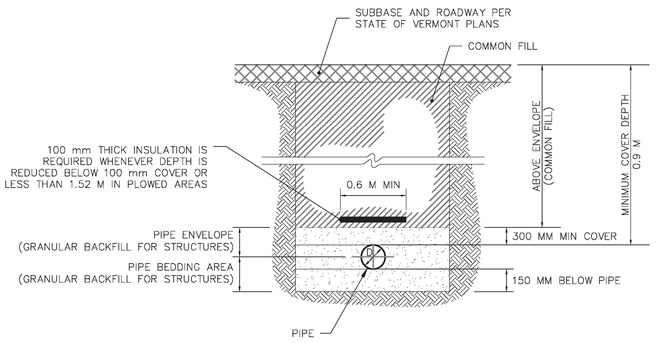


TYPICAL INSTALLATION-TRAVEL WAY FOR MANUAL AIR RELEASE OR CHLORINATION INJECTION
NOT TO SCALE



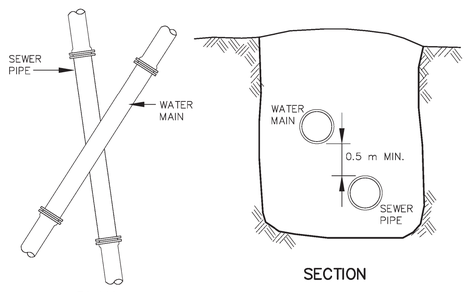
WATER MAIN TYPICAL TRENCH DETAIL
NOT TO SCALE

NOTES:
1. REFER TO SPECIFICATIONS FOR PAVEMENT THICKNESS REQUIREMENTS.
2. REFER TO THE SPECIFICATIONS FOR COMPACTION, PAY LIMITS, AND SPECIALTY MATERIALS FOR BEDDING, ENVELOPE, AND GRAVELS.
3. IF THE EXCAVATED MATERIAL BECOMES TOO WET DUE TO WEATHER CONDITIONS OR DUE TO IMPROPER HANDLING PROCEDURES AND CANNOT BE REUSED FOR BACKFILL, THE MATERIAL SHALL BE SUFFICIENTLY DRIED OR MIXED WITH DRY MATERIAL TO OBTAIN PROPER MOISTURE CONTENT AT NO CHARGE TO THE OWNER.
4. BACKFILL IN ACCORDANCE WITH VERMONT AOT STANDARD SPECIFICATION SUBSECTION 628.14



SEWER MAIN TYPICAL TRENCH DETAIL
NOT TO SCALE

NOTES:
1. REFER TO SPECIFICATIONS FOR PAVEMENT THICKNESS REQUIREMENTS.
2. REFER TO THE SPECIFICATIONS FOR COMPACTION, PAY LIMITS, AND SPECIALTY MATERIALS FOR BEDDING, ENVELOPE, AND GRAVELS.
3. IF THE EXCAVATED MATERIAL BECOMES TOO WET DUE TO WEATHER CONDITIONS OR DUE TO IMPROPER HANDLING PROCEDURES AND CANNOT BE REUSED FOR BACKFILL, THE MATERIAL SHALL BE SUFFICIENTLY DRIED OR MIXED WITH DRY MATERIAL TO OBTAIN PROPER MOISTURE CONTENT AT NO CHARGE TO THE OWNER.
4. BACKFILL IN ACCORDANCE WITH VERMONT AOT STANDARD SPECIFICATION SUBSECTION 629.14

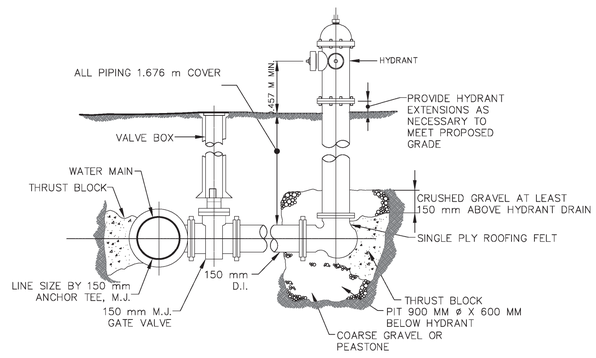


1. PARALLEL INSTALLATION: WATER MAINS SHALL BE LAID AT LEAST 3.05 M HORIZONTALLY FROM ANY EXISTING OR PROPOSED MANHOLE OR SANITARY SEWER. THIS DISTANCE CAN BE REDUCED TO 1.52 M FOR STORM SEWERS. THE DISTANCE SHALL BE MEASURED EDGE TO EDGE.

2. CROSSINGS: WATER MAINS CROSSING SEWERS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 0.5 M 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. AT CROSSINGS, ONE FULL LENGTH OF WATER PIPE SHALL BE LOCATED SO BOTH JOINTS WILL BE AS FAR THE FIRST SEWER AS POSSIBLE. IF THE SEWER MAIN IS OVER THE WATER MAIN, THE FIRST SEWER PIPE JOINTS ON EACH SIDE OF THE WATER MAIN MUST BE CONCRETE ENCASED. SPECIAL STRUCTURAL SUPPORT FOR THE WATER AND SEWER PIPES MAY BE REQUIRED. WATER MAINS SHALL NOT PASS THROUGH SEWER MANHOLES OR BE SUBMERGED IN BASINS CONTAINING SEWAGE OR OTHER GROSSLY CONTAMINATED OR HAZARDOUS MATERIAL.

3. EXCEPTION: THE SECRETARY OF THE STATE MUST SPECIFICALLY APPROVE ANY VARIANCE FROM THESE REQUIREMENTS WHEN IT IS IMPOSSIBLE TO OBTAIN THE SPECIFIED SEPARATION DISTANCES.

STORM SEWER OR SANITARY SEWER AND WATER MAIN CROSSING
NOT TO SCALE



HYDRANT ASSEMBLY DETAIL
NOT TO SCALE

NOTES:
1. IN AREAS OF HIGH GROUND WATER OR WHEN HYDRANT IS INSTALLED WITHIN 3.05 M OF A SEWER UTILITY, THE HYDRANT SHALL NOT BE EQUIPPED WITH DRAINING CAPABILITIES.

FOR CONSTRUCTION

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TIMOTHY P. KNAPP
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CIV
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REVISIONS

DATE	COMMENTS	BY

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BRIDGE #32

GENERAL DETAILS

READSBORO, VERMONT

READSBORO BRF 0105(3)
GENERAL DETAILS
SHEET __ OF __

Project #	416006
Project Mgr.	NRJ
Design by	TPK
Drawn by	TPK
Reviewed by	NRJ
Approved by	NRJ
Date	MAY 2011
Scale	AS SHOWN

C4

FILE: P:\0400 Plans\Readsboro VT\Bridge 32\416006-C4D.dwg Dec 14, 2011 - 10:00am