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<td>SEWER CLEANOUT</td>
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CONCRETE ENCASEMENT

NOTES:
1. WHERE THE TRENCH BOTTOM IS IN ROCK, IT SHALL BE EXCAVATED TO A MINIMUM OF 8" BELOW THE BOTTOM OF THE PIPE BACKFILLED WITH BEDDING MATERIAL.

2. WHERE PIPE FOUNDATIONS ARE YIELDING, PIPE SHALL BE BEDDED ON A MINIMUM OF 8" BEDDING MATERIAL.

3. INITIAL AND COMPACTED BACKFILL SHALL MEET THE REQUIREMENTS OF SECTION 520.03 OF THE VDOT SPECIFICATIONS, CRUSHED GLASS CONFORMING TO THE SIZE REQUIREMENTS FOR CRUSHER RUN AGGREGATE SIZE 25 OR 26 AND MEETING THE REQUIREMENTS OF SECTION 520.03 OF THE VDOT SPECIFICATION MAY BE USED AS BACKFILL MATERIAL.

CONCRETE CRADLE

CONCRETE CAP

FOR PIPE LESS THAN 12" THE TRENCH WIDTH MAY BE 36" MAXIMUM.
NOTE:
PAINT ALL EXPOSED STEEL WITH TWO COATS OF A WATERPROOF BITUMASTIC COMPOUND.
ALL CONCRETE SHALL BE CLASS A3.

PLAN

SIDE VIEW

PLAN

HORIZONTAL BENDS 90°

11 1/4° - 45°

HORIZONTAL BENDS

UPPER VERTICAL BENDS

TEES

PLUGS

HORIZONTAL BENDS 90°

A BEND

BEND

CONCRETE REACTION BLOCK

POUR TO UNDISTURBED EARTH

CONCRETE REACTION BLOCK

POUR TO UNDISTURBED EARTH

CONCRETE REACTION BLOCK

POUR TO UNDISTURBED EARTH

NOTE:

REVISION DATE

SHEET 1 OF 3

ROAD AND BRIDGE STANDARDS

VIRGINIA DEPARTMENT OF TRANSPORTATION

(1402.01)

WATER AND SANITARY SEWER FACILITIES

WATERPROOF BITUMASTIC WITH TWO COATS OF A PAINT ALL EXPOSED STEEL

BLOCK REACTION CONCRETE OR CAP PLUG

EARTH UNDISTURBED POUR TO

EARTH UNDISTURBED POUR TO

EARTH UNDISTURBED POUR TO

EARTH UNDISTURBED POUR TO

EARTH UNDISTURBED POUR TO

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<th>TEES TURNED UP</th>
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<tr>
<td>BRANCH SIZE</td>
</tr>
<tr>
<td>D</td>
</tr>
<tr>
<td>DIA.</td>
</tr>
<tr>
<td>4&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
</tr>
<tr>
<td>10&quot;</td>
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<tr>
<td>12&quot;</td>
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**REACTION BLOCK - STRAIGHT SLOPING PIPE**

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<tr>
<th>SIZE</th>
<th>4&quot;</th>
<th>6&quot;</th>
<th>8&quot;</th>
<th>12&quot;</th>
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<tr>
<td>&quot;D&quot;</td>
<td>12&quot;</td>
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<td>&quot;L&quot;</td>
<td>18&quot;</td>
<td>21&quot;</td>
<td>24&quot;</td>
<td>27&quot;</td>
<td>30&quot;</td>
<td>33&quot;</td>
<td>36&quot;</td>
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**NOTE:**

The straight run pipe shall be provided with anchor blocks spaced thus:

- Angle "A"  
  - 0° - 10°: Anchor blocks not needed  
  - 10° - 16°: Spacing @ 100'  
  - 16° - 20°: Spacing @ 60'

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**SPECIFICATION REFERENCE**

(WATER AND SANITARY SEWER FACILITIES)

VIRGINIA DEPARTMENT OF TRANSPORTATION
**NOTES:**

1. RETAINER GLANDS ARE REQUIRED AT EACH FITTING.

2. ALL PIPE AND FITTINGS SHALL BE DUCTILE IRON, MECHANICAL JOINT, CLASS 52 (MIN). WATER MAIN AND FITTINGS SHALL BE CEMENT MORTAR LINED.

3. FOR 12" AND SMALLER LINES, MECHANICAL JOINT OFFSET FITTINGS MAY BE USED IN LIEU OF THE 45º BENDS SHOWN SUBJECT TO THE APPROVAL OF THE ENGINEER. IF USED, THE OFFSETS MUST RESULT IN THE CLEARANCES SHOWN BEING MET OR EXCEEDED.

4. RODS MAY BE INSERTED THROUGH BOLT HOLES IN LIEU OF USING TIE-BOLTS. IF USED, KEEPER NUT & WASHER MUST BE INSTALLED BEHIND GLAND.

5. BOLT HOLES ARE SHOWN AS NORMALLY PROVIDED IN MECHANICAL JOINT FITTINGS, I.E. STRADLING THE VERTICAL AXIS WHEN FITTING IS POSITIONED FOR A HORIZONTAL CHANGE OF DIRECTION. FITTINGS WITH BOLT HOLES OTHERWISE ORIENTED SHOULD NOT BE USED IN ROODED ASSEMBLIES.

6. TIE BOLTS AND THREADED RODS SHALL BE $\frac{3}{8}$" WITH A MINIMUM YIELD STRENGTH OF 7500 POUNDS EACH, SPACE SYMMETRICALLY AROUND PIPE.

7. NUMBER OF RODS MAY BE REDUCED TO 50X OF THE NUMBER INDICATED AT L/2 FROM THE BEND AND BEYOND. TWO RODS MINIMUM REQUIRED PER JOINT.

8. ALL RODS AND FASTENERS SHALL BE GIVEN TWO COATS OF ASPHALTIC PAINT AFTER ASSEMBLY.

9. EXISTING D.I. PIPE SHALL BE REPLACED WITH AN 8' MINIMUM LENGTH OF D.I. PIPE AT BOTH ENDS OF THE OFFSET AND RETAINER GLANDS INSTALLED.

10. THE EXISTING PIPING SHALL HAVE ALL JOINTS WITHIN THE LENGTH "L" RESTRAINED BY ADDING A SPLIT RING RETAINER GLAND ("MEG-A-LUG" OR EQUAL) WITH BOLTS TO THE M.J. BELL.

11. LENGTH "L" IN FEET SHALL CONFORM TO THE TABLE ABOVE.

12. SPLIT RING RETAINER GLANDS ARE FOR USE ON DUCTILE IRON MECHANICAL JOINT PIPE ONLY. IF EXISTING PIPE IS ANY OTHER MATERIAL, REMOVE AND REPLACE WITH D.I. MECHANICAL JOINT PIPE FOR THE LENGTH "L" SPECIFIED.

**DESIGN CONDITIONS**

PRESSURE - 150 PSI

TYPE SOIL - SILT

DEPTH OF COVER - 3 FEET

ROD STRESS - 25,000 PSI
SECTION

ENCASEMENT PIPE WITH CARRIER PIPE

NOTES:
1. TIMBER SKIDS SHALL BE LOCUST, CYPRESS, PRESERVATIVE TREATED HARDWOOD, NEOPRENE, NYLON, PLASTIC OR OTHER MATERIAL OF HIGH ABRASION RESISTANCE AND A LOW FRICTION COEFFICIENT APPROVED BY THE ENGINEER. PRESERVATIVE FOR TIMBER SKIDS SHALL CONFORM TO SECTION 236 OF THE SPECIFICATIONS.

2. METAL STRAPS AND CLIPS HOLDING BLOCKING TO CARRIER PIPE SHALL BE STAINLESS STEEL WITH A MINIMUM CROSS SECTION OF 0.014 SQ. IN. STRAP SPACING SHALL BE A MINIMUM OF TWO (2) BANDS PER SKID LENGTH.

3. STEEL ENCASEMENT PIPE SHALL BE GRADE B AND SHALL CONFORM TO SECTION 232.02 (C)5 OF THE SPECIFICATIONS OR AS SPECIFIED.

4. CARRIER PIPE SHALL BE PUSHED OR PULLED THROUGH THE ENCASEMENT PIPE SO THAT JOINTS ARE ALWAYS BEING COMPRESSED.

5. CARRIER PIPE SHALL BE WRAPPED WITH TAR PAPER AT MASONRY PLUG.

6. MASONRY PLUG SHALL BE WATERTIGHT.

7. CONCRETE PIPE FOR H-20 LIVE LOAD AS PER STANDARD PB-1.

8. ENCASEMENT PIPE SHALL BE BEDDED IN ACCORDANCE WITH STANDARD PB-1.

CONCRETE OR STEEL ENCASEMENT PIPE

SPECIFICATION REFERENCE
232
236
VIRGINIA DEPARTMENT OF TRANSPORTATION

ROAD AND BRIDGE STANDARDS
REVISION DATE
1404.01
SHEET 1 OF 1
RETURN BEND

2" PIPE
(BLACK IRON OR
GALV. STEEL)
(I.D. = 2.060")
(O.D. = 2.375")

FINISH GRADE

BIRD SCREEN

RUSTPROOF MALLEABLE
IRON SINGLE-BOLT
HOSE CLAMPS

Flexible connection
(2½" I.D. EXTRA HEAVY
RUBBER HOSE)

1" PRE-MOULDING
FIBER CAULKING
AROUND PIPE

AGGREGATE #25, #26,
OR CRUSHED GLASS
MEETING #25 OR #26
GRADATION REQUIREMENTS.

OFFSET AS REQUIRED

Notes:
WRAP CONNECTION IN POLYETHYLENE
AND PLASTER WITH ROOFING CEMENT
OR ASPHALTIC MATERIAL.

STANDARD LEAK DETECTOR
LD-1
VALVE BOX AND VALVE MANHOLE
(WATER AND SANITARY SEWER FACILITY)

NOTE:
1. CAST IRON SHALL CONFORM TO ASTM A-48M CLASS 30S.
VALVE BOX AND VALVE MANHOLE
(WATER AND SANITARY SEWER FACILITIES)

WATER, SEWER OR AS SPECIFIED

APPROXIMATE WEIGHTS
FRAME 115 ± 12 LBS.
COVER 50 ± 3 LBS.
TOTAL 165 ± 15 LBS.

2" DIAMETER

1/2" RIBS

6" MAX.
12" MIN.

VM-1

6" MAX.
12" MIN.
2" MIN.
8" MAX.

STANDARD MH-1 FRAME AND COVER
WITH "WATER" IN LIEU OF VDOT.

FINISH GRADE

STANDARD T-MH-2

BY-PASS VALVE
SHALL HAVE STANDARD
VB-1 TYPE "A" OR
"B" VALVE BOX

VARIEABLE MINIMUM COVER 4 1/2"

STANDARD R-1
RISER IF
NECESSARY

STEPS (ST'D. ST-1)

8" BRICK OR
STANDARD B-2
PRECAST UNIT

MORTAR BEVEL 45°
ALL AROUND

CLASS A3 CONCRETE
POURED IN PLACE
OR PRECAST
STANDARD B-2

VM-1

16 1/4"

14"

5°

5°

17 3/4"

16 1/2"

1/2"

14 1/2"

2 3/4"

2 1/2"

VB-1
FIRE HYDRANT

TYPE 1 RESTRAINT

NOTES:
RODS MAY BE INSERTED THROUGH BOLT HOLES
IN LIEU OF USING TIE-BOLTS. IF USED,
KEEPER NUT & WASHER MUST BE INSTALLED
BEHIND GLAND.

TYPE 2 RESTRAINT

NOTES:
1. HYDRANTS TO BE SET WITH BURY LINE
   POSITIONED AT GRADE WITH NOZZLES SET
   AS INDICATED ABOVE.
2. WHEN SET BEHIND CURB THE HOSE
   NOZZLES ARE TO BE PARALLEL OR AT
   RIGHT ANGLES TO THE CURB, WITH
   THE PUMPER NOZZLE FACING THE
   CURB.
3. BOWL OF THE HYDRANT TO BE BLOCKED
   AGAINST UNDISTURBED EARTH WITH CLASS
   A3 CONCRETE OR AS DIRECTED BY THE
   ENGINEER.
4. FIRE HYDRANTS SHALL HAVE TWO 2½"
   HOSE NOZZLES AND THE SIZE OF THE
   PUMPER NOZZLE & TYPE OF OPERATING
   NUT SHALL BE AS SPECIFIED ON THE
   PLANS.
NOTE:
DETAIL IS FOR ¾" THRU 1" DISC METERS

C.I./D.I. TAP INSTALLATION
HAND TAMPED UP TO SERVICE TUBING
ADAPTER
CORP. STOP
WATER MAIN
C.P. PIPE 45°

P.V.C. TAP INSTALLATION
SINGLE STRAP SERVICE CLAMP
CORPORATION STOP W-COMPRESSION FITTING
P.V.C. WATER MAIN

WATER METER BOX
FOR ¾" THRU 1" METER
CAST IRON SHALL CONFORM TO ASTM A-48 CLASS 30S
ALL COPPER FITTINGS SHALL BE FLARED TYPE

WATER METER BOX AND BOX
(WATER SERVICE LINES)
VIRGINIA DEPARTMENT OF TRANSPORTATION
NOTES:

1. ALL BLOW-OFFS SHOULD BE PLACED IN A POSITION TO ASSURE NATURAL DRAINAGE.

2. EITHER TYPE "A" OR TYPE "B" BLOW-OFF MAY BE USED AT DEAD OR SAG SITUATION.

3. BLOW-OFF PIPE SHALL BE THREADED BLACK IRON OR GALVANIZED STEEL PIPE.

4. SIZE OF BLOW-OFF SHALL BE SPECIFIED ON THE PLANS.
NOTES:

1. TAP FOR AIR RELEASE VALVE SHALL BE STANDARD THREADED TAP OR SADDLE TAP DEPENDING ON MANUFACTURER’S RECOMMENDATION FOR TYPE AND THICKNESS OF PIPE ENCOUNTERED.

2. GRAVEL BEDDING MAY BE USED IN PLACE OF CONCRETE IN NON-TRAFFIC AREAS AT DESCRITION OF ENGINEER.

3. PIPE SHALL BE BLACK IRON / GALVANIZED PIPE.

4. IF 4” OR 6” PVC PIPE IS USED, SADDLE IS REQUIRED FOR CORPORATION STOP.

5. ALL COPPER FITTINGS WILL BE FLARE TYPE.
NOTES:

1. WHEN HEIGHT H EXCEEDS 12" A MINIMUM NOMINAL DIAMETER D OF THE BASE UNIT SHALL BE 5" WITH A SECTION HEIGHT OF 6" AND A STANDARD RISER UNIT R-2 OR R-3 SHALL BE REQUIRED.
2. FLAT SLAB TOP STANDARD T-MH-2 SHALL ONLY BE ALLOWED ON SHALLOW MANHOLES.
3. STEPS SHALL BE ENCASED IN CORROSION RESISTANT RUBBER OR OTHER MATERIAL APPROVED BY THE ENGINEER.
4. STEPS SHALL BE OMITTED WHEN SPECIFIED IN THE PLANS.
5. SEE STANDARD SHEET NUMBER 106.07, VOLUME I, FOR ADDITIONAL MANHOLE DETAILS.

SANITARY SEWER MANHOLE

VIRGINIA DEPARTMENT OF TRANSPORTATION

ROAD AND BRIDGE STANDARDS

REVISION DATE SHEET 1 OF 2

1411.01
FORCE MAIN DISCHARGE
TYPE 1

FORCE MAIN DISCHARGE
TYPE 2

FLEXIBLE CONNECTION
PIPE TO PRECAST MANHOLE CONNECTIONS SHALL BE MADE WITH A FLEXIBLE BOOT.
THE BOOT SHALL MEET ASTM SPECIFICATION C-923 AND CONSIST OF NEOPRENE RUBBER,
EPDM RUBBER, OR POLYISOPRENE RUBBER WHERE PREFERENCE MAY BE GIVEN TO A
CERTAIN MATERIAL IN PROJECT SPECIFIC Instances. THE INTERNAL EXPANSION BAND TO
SECURE THE BOOT IN PLACE SHALL BE COMPOSED OF STAINLESS STEEL OR A NON-METALLIC
MATERIAL. THE EXTERNAL BAND TO CLAMP AND SEAL THE BOOT TO THE PIPE SHALL BE
CORROSION RESISTANT STAINLESS STEEL CONFORMING TO ASTM SPECIFICATION A-967.
THE PORT TO RECEIVE THE BOOT SHALL BE CORE DRILLED AND SHOULD BE MANUFACTURED
TO ALLOW FOR LATERAL AND VERTICAL MOVEMENT. ALL FIELD INSTALLATION OF PIPE THRU
MANHOLE SEAL SHALL BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS
AND SPECIFICATIONS.

SANITARY SEWER MANHOLE
WATER AND SANITARY SEWER FACILITIES
VIRGINIA DEPARTMENT OF TRANSPORTATION
**WATERTIGHT MANHOLE FRAME AND COVER**

**WATER AND SANITARY SEWER FACILITIES**

**VIRGINIA DEPARTMENT OF TRANSPORTATION**

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**SECTION A-A**

- **FRAME**: 220 ± 11 LBS.
- **COVER**: 260 ± 13 LBS.
- **TOTAL**: 480 ± 24 LBS.

**SECTION BB - BB**

- **ROUND NEOPRENE GASKET GLUED TO FRAME**: (Solvent - weld glue shall develop full strength of gasket)
- **1/4" STAINLESS STEEL BOLTS (4 REQUIRED)**

**SECTION CC - CC**

1. DETAILS NOT SHOWN ARE AS REQUIRED FOR STD F&C-1 M.H. FRAME AND COVER.
2. FRAME SHALL BE SET IN 1/4" BED OF NON-SAG JOINT SEALER & BOLTED TO THE MANHOLE CONE SECTION WITH 4 1/2" ANCHOR BOLTS.
3. CAST IRON SHALL CONFORM TO ASTM A-48, CLASS 30S.
4. SEATING SURFACES BETWEEN FRAME AND COVER SHALL BE MACHINED.
5. 1/4" X 1" CONTINUOUS NEOPRENE GASKET SHALL BE INSTALLED BETWEEN THE INNER COVER AND THE FRAME.
6. RECESSED PICK HOLE SHALL NOT EXTEND THRU THE COVER.

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**PLAN**

**CAST IRON COVER MARKED "SEWER" OR "WATER" AS APPLIES.**

**SECTION B-B**

- **CAST IRON**
  - **FRAME**: 239 ± 12 LBS.
  - **COVER**: 137 ± 7 LBS.

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**SPECIFICATION REFERENCE**

**ROAD AND BRIDGE STANDARDS**

**REVISION DATE**

1412.01
SEWER CLEANOUT

NOTES:

1. CLEANOUT MAY ALSO BE INSTALLED WITH IRON BODY SCREW WITH BRASS PLUG AND ONE INCH OF LEAD POURED IN PLACE & CAULKED ON INSIDE & OUTSIDE EDGE.

2. CLEANOUT SHALL BE SUITABLY BRACED WITH 2" x 4" CROSS PIECE EXTENDED OVER & HAVING SOLID BEARING AT LEAST ONE FOOT ON EACH SIDE OF DITCH

3. CLEANOUT WYE AND RISER SHALL BE CONSTRUCTED OF THE SAME MATERIAL AS THE MAIN UNLESS OTHERWISE SPECIFIED.

TYPE "A"

NOTES:

1. CAST IRON FRAME AND COVER SHALL BE SUFFICIENTLY TRUE TO A PLANE SURFACE, SO THAT TOPS WILL NOT ROCK.

2. CLEANOUT WYE AND RISER SHALL BE CONSTRUCTED OF THE SAME MATERIALS AS THE MAIN UNLESS OTHERWISE SPECIFIED.

TYPE "B"