NOTES:
1. MAINTAIN VERTICAL TRENCH WALLS FROM BOTTOM OF TRENCH TO 24” ABOVE CROWN OF PIPE. TRENCH WIDTH IN THIS AREA: PIPE O.D. + 24”.

2. FOR EXCAVATIONS OVER 5 FT. DEEP, SLOPE TRENCH WALLS AS REQUIRED AND/OR PROVIDE OTHER SAFETY MEASURES IN ACCORDANCE WITH OSHA GUIDELINES.
NOTES:

1. IN UNSTABLE SOILS, PROVIDE A FOUNDATION MAT FROM THE BOTTOM OF PIPE BEDDING TO UNDISTURBED STABLE SOIL, OR 18" MAX. DEPTH. THE FOUNDATION MAT SHALL CONSIST OF TWO (2) MATS (3" MAX. EACH) OF VDOT #1 CRUSHED STONE WRAPPED IN A HIGH STRENGTH GEOTEXTILE FABRIC; LINQ INDUSTRIAL FABRICS, INC. GTF 375N OR EQUAL. MATS SHALL EXTEND FULL WIDTH OF TRENCH EXCAVATION WITH MINIMUM FABRIC. EXTEND FULL WIDTH OF TRENCH EXCAVATION WITH MINIMUM FABRIC OVERLAP OF 18".

2. FOR ALL EXCAVATIONS, SLOPE TRENCH WALLS AS REQUIRED AND/OR PROVIDE OTHER SAFETY MEASURES IN ACCORDANCE WITH OSHA GUIDELINES.
NOTES:

1. ALL JOINTS, LIFT HOLES, INLETS AND OUTLETS SHALL BE GROUTED AND SEALED INSIDE AND OUT.

2. CHANNELS AND MANHOLE "SHELF" TO BE CONSTRUCTED OF 3000 PSI CONCRETE FILL FINISHED SMOOTH WITH STEEL TROWEL. FLOW CHANNELS SHALL BE FORMED TO ALLOW INSERTION OF A ROBOTIC CAMERA.

3. INSIDE OF MANHOLE SHALL BE COATED WITH ONE COAT EPOXY COATING, COLOR GRAY. OUTSIDE SHALL RECEIVE ONE COAT COAL TAR EPOXY.

4. FOR PRECAST INLETS AND OUTLETS, PIPE TO MANHOLE CONNECTIONS SHALL BE NEOPRENE BOOT WITH STAINLESS STEEL ACCESSORIES.

5. ALL INLET OPENINGS TO EXISTING MANHOLES SHALL BE CORE-DRILLED. ANNULAR SPACE BETWEEN PIPE AND MANHOLE WALL SHALL BE COMPLETELY FILLED WITH NON-SHRINK GROUT.

6. PIPE INLETS WITHIN "CONE" SECTION ARE NOT ACCEPTABLE.

CITY STANDARDS
CONCRETE MANHOLE – TYPICAL

CITY OF CHARLOTTESVILLE
1. ALL JOINTS, LIFT HOLES, INLETS AND OUTLETS SHALL BE GROUTED AND SEALED INSIDE AND OUT.

2. CHANNELS AND MANHOLE "SHELF" TO BE CONSTRUCTED OF 3000 PSI CONCRETE FILL FINISHED SMOOTH WITH STEEL TROWEL. FLOW CHANNELS SHALL BE FORMED TO ALLOW INSERTION OF A ROBOTIC CAMERA.

3. INSIDE OF MANHOLE SHALL BE COATED WITH ONE COAT EPOXY COATING, COLOR GRAY. OUTSIDE SHALL RECEIVE ONE COAT COAL TAR EPOXY.

4. FOR PRECAST INLETS AND OUTLETS, PIPE TO MANHOLE CONNECTIONS SHALL BE NEOPRENE BOOT WITH STAINLESS STEEL ACCESSORIES.

5. ALL INLET OPENINGS TO EXISTING MANHOLES SHALL BE CORE-DRILLED. ANNULAR SPACE BETWEEN PIPE AND MANHOLE WALL SHALL BE COMPLETELY FILLED WITH NON-SHRINK GROUT.

6. PIPE INLETS WITHIN "CONE" SECTION ARE NOT ACCEPTABLE.

7. AMERICAN DUCTILE IRON PIPE CAN FURNISH 4"-64" PROTOCO 401 CERAMIC EPOXY-LINED DUCTILE IRON PIPE AND FITTINGS. THIS THIRD-PARTY-DESIGNED AND -APPLIED LINING IS AMINE-CURED WITH NOVALAC AND CERAMIC QUARTZ PIGMENT FOR AN APPROXIMATELY 40-MIL-THICK, HIGH-BUILD LINING.

8. ALL 4"-16" FASTITE FITTINGS ARE FUSION-BONDED-EPOXY LINED AND COATED. FUSION-BONDED EPOXY IS FURNISHED IN ACCORDANCE WITH AWWA C116.
**NOTES:**

1. **ALL JOINTS, LIFT HOLES, INLETS AND OUTLETS SHALL BE GROUTED AND SEALED INSIDE AND OUT.**

2. **CHANNELS AND MANHOLE “SHELF” TO BE CONSTRUCTED OF 3000 PSI CONCRETE FILL FINISHED SMOOTH WITH STEEL TROWEL. FLOW CHANNELS SHALL BE FORMED TO ALLOW INSERTION OF A ROBOTIC CAMERA.**

3. **INSIDE OF MANHOLE SHALL BE COATED WITH ONE COAT EPOXY COATING, COLOR GRAY. OUTSIDE SHALL RECEIVE ONE COAT COAL TAR EPOXY.**

4. **FOR PRECAST INLETS AND OUTLETS, PIPE TO MANHOLE CONNECTIONS SHALL BE NEOPRENE BOOT WITH STAINLESS STEEL ACCESSORIES.**

5. **ALL INLET OPENINGS TO EXISTING MANHOLES SHALL BE CORE–DRILLED. ANNULAR SPACE BETWEEN PIPE AND MANHOLE WALL SHALL BE COMPLETELY FILLED WITH NON–SHRINK GROUT.**

6. **PIPE INLETS WITHIN “CONE” SECTION ARE NOT ACCEPTABLE.**

7. **DROP PIPE, TEE AND 90 DEGREE BEND TO BE DUCTILE IRON PIPE OR PVC SDR 35.**


9. **ALL 4” –16” FASTITE FITTINGS ARE FUSION–BONDED–EPOXY LINED AND COATED. FUSION–BONDED EPOXY IS FURNISHED IN ACCORDANCE WITH AWWA C116.**
NOTES:
1. INTERIOR DROP CONNECTIONS MAY ONLY BE INSTALLED WHERE APPROVED BY THE DEPARTMENT OF PUBLIC WORKS.
2. INLET OPENING SHALL BE CORE-DRILLED. VOID AROUND OUTSIDE OF PIPE TO BE COMPLETELY FILLED WITH NON-SHRINK GROUT. PIPE INLET OPENING WITHIN "CONE" SECTION IS NOT ACCEPTABLE.
3. ONLY ONE INTERIOR DROP CONNECTION MAY BE INSTALLED PER 48" DIAMETER MANHOLE.
4. HEIGHT OF VERTICAL STACK SHALL NOT BE LESS THAN TWO FEET.
5. DROP STACK TO BE DUCTILE IRON OR SDR 35 PVC PIPE CONNECTED TO DROP FITTING WITH STANDARD GASKETED JOINT. PIPE SIZE OF DROP STACK SHALL MATCH INCOMING PIPE.
6. VERTICAL STACK WILL BE STRAPPED TO MANHOLE AT EACH PIPE JOINT. STRAPS SHALL BE STAINLESS STEEL.
7. SHAPE INVERT AS NEEDED TO PROVIDE SMOOTH TRANSITION FROM DROP CONNECTION DISCHARGE POINT TO MANHOLE INVERT.
8. DROP STACK SHALL NOT BE INSTALLED WITHIN 60' OF MANHOLE STEPS.
9. AMERICAN DUCTILE IRON PIPE CAN FURNISH 4"–64" PROTECTO 401 CERAMIC EPOXY-LINED DUCTILE IRON PIPE AND FITTINGS. THIS THIRD-PART-DESIGNED AND -APPLIED LINING IS AMINE-CURED WITH NOVALAC AND CERAMIC QUARTZ PIGMENT FOR AN APPROXIMATELY 40-MIL-THICK, HIGH-BUILD LINING.
10. ALL 4"–16" FASTITE FITTINGS ARE FUSION-BONDED-EPOXY LINED AND COATED. FUSION-BONDED EPOXY IS FURNISHED IN ACCORDANCE WITH AWWA C116.
5/8" RAISED LETTERS
IN RECESSED AREA

S.S. BAR

1" Ø HOLES

PLAN

26"
1 3/8"

CROSS SECTION

3 13/16"

5/8" DIA. X

3" LG. SS

PICKBAR DETAIL

1 5/8"

NOTES:
1. CAPITOL FOUNDRY OF VA. MODEL MH-3000 24" MANHOLE FRAME AND COVER WITH RAISED LETTERS MARKED "SANITARY SEWER" OR APPROVED EQUAL.

2. ALL MANHOLES WITHIN THE 100-YEAR FLOODPLAIN OR LOCATED IN AREAS SUBJECT TO LOCALIZED FLOODING ARE TO HAVE WATERTIGHT FRAME AND COVER (SEE DETAIL WW 2.5)
NOTES:

1. ALL MANHOLES WITHIN THE 100-YEAR FLOODPLAIN OR LOCATED IN AREAS SUBJECT TO LOCALIZED FLOODING ARE TO HAVE WATERTIGHT FRAMES AND COVERS.

2. STANDARD 24" X 7" TALL MANHOLE FRAME AND COVER ASTM A-48 CLASS 35B/AASHTO M105 ITEM #MH-3000*WT OR APPROVED EQUAL.
NOTES:

1. CONSTRUCT A FORMED INVERT FROM NEW SEWER LINE TO ALLOW FLOW TO THE EXISTING PIPE.

2. POUR A SHELF TO THE LOWER HALF OF THE EXISTING PIPE.

3. CUT AND REMOVE THE TOP HALF OF THE EXISTING PIPE OF THE MANHOLE WALLS AFTER THE INVERT AND SHELF HAVE BEEN FORMED, AND THE MH HAS BEEN FULLY TESTED IN ACCORDANCE WITH THESE SPECIFICATIONS.

MANHOLE ABOVE BASE SHALL BE CONSTRUCTED AS SHOWN ON FIGURE S-1-A

ALLOW CONCRETE TO FLOW A MIN. 1'-0" BEYOND BASE OF STRUCTURE

FILL DOGHOUSE OPENING AROUND EXISTING PIPE WITH 3,000 PSI CONCRETE OR NON-SHRINKING GROUT

WRAP EXISTING PIPE WITH NEOPRENE GASKET MATERIAL BEFORE FILLING THE OPENING

12" MIN. CAST-IN-PLACE 3,000 PSI CONCRETE BASE

FOUNDATION SECTION VIEW

CITY STANDARDS
TYPICAL MANHOLE SHOWING "DOGHOUSE" INSTALLATION

REVISION DATE
SCALE: N.T.S.
STANDARD NUMBER: WW 2.6
NOTES:
1. STEEL CASING TO EXTEND TO BACK OF CURB, DITCH, SIDEWALK, ETC. OR A MINIMUM OF 5’ BEYOND THE EDGE OF PAVEMENT, WHICHEVER IS GREATER.
2. REFERENCE DRAWING WW 3.2 FOR MINIMUM STEEL CASING SIZE AND WALL THICKNESS.
3. PROPRIETARY RESTRAINED JOINT PIPE MAY BE SUBSTITUTED FOR MECHANICAL JOINT PIPE WITH RESTRAINT GLANDS WHERE APPROVED BY THE CITY.
4. APPROVED EQUAL CASING INSULATORS SHALL BE SPACED PER MANUFACTURER’S INSTRUCTIONS.
5. CARRIER PIPE SHALL BE CENTERED WITHIN CASING.
NOTES:
1. ALSO REFERENCE THE AREA MANUAL FOR RAILWAY ENGINEERING – PART 5, PIPELINES.
2. REFERENCE DRAWING WW 3.2 FOR MINIMUM STEEL CASING SIZE AND WALL THICKNESS.
3. PROPRIETARY RESTRAINED JOINT PIPE MAY BE SUBSTITUTED FOR MECHANICAL JOINT PIPE WITH RESTRAINT GLANDS WHERE APPROVED BY THE CITY.
4. APPROVED EQUAL CASING INSULATORS SHALL BE SPACED PER MANUFACTURER’S INSTRUCTIONS.
5. CARRIER PIPE SHALL BE CENTERED WITHIN CASING.
### PIPE CASING

<table>
<thead>
<tr>
<th>CARRIER PIPE DIA.</th>
<th>MIN. PIPE CASING DIA.</th>
<th>MINIMUM WALL THICKNESS</th>
<th>CRITERIA WITHIN RAILROAD RIGHT-OF-WAY</th>
<th>CRITERIA WITHIN CITY OR VDOT RIGHT-OF-WAY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>STEEL</td>
<td>STEEL</td>
</tr>
<tr>
<td>6&quot;</td>
<td>20&quot;</td>
<td>0.375&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8&quot;</td>
<td>20&quot;</td>
<td>0.375&quot;</td>
<td>0.250&quot;</td>
<td></td>
</tr>
<tr>
<td>10&quot;</td>
<td>24&quot;</td>
<td>0.375&quot;</td>
<td>0.250&quot;</td>
<td></td>
</tr>
<tr>
<td>12&quot;</td>
<td>24&quot;</td>
<td>0.375&quot;</td>
<td>0.250&quot;</td>
<td></td>
</tr>
<tr>
<td>14&quot;</td>
<td>30&quot;</td>
<td>0.500&quot;</td>
<td>0.375&quot;</td>
<td></td>
</tr>
<tr>
<td>16&quot;</td>
<td>30&quot;</td>
<td>0.500&quot;</td>
<td>0.375&quot;</td>
<td></td>
</tr>
<tr>
<td>18&quot;</td>
<td>36&quot;</td>
<td>0.563&quot;</td>
<td>0.375&quot;</td>
<td></td>
</tr>
<tr>
<td>20&quot;</td>
<td>36&quot;</td>
<td>0.563&quot;</td>
<td>0.375&quot;</td>
<td></td>
</tr>
<tr>
<td>24&quot;</td>
<td>48&quot;</td>
<td>0.688&quot;</td>
<td>0.500&quot;</td>
<td></td>
</tr>
<tr>
<td>30&quot;</td>
<td>48&quot;</td>
<td>0.688&quot;</td>
<td>0.500&quot;</td>
<td></td>
</tr>
</tbody>
</table>

### NOTES:

1. SLOPES THROUGH BORES SHALL NOT BE BASED ON MINIMUM GRADE.

2. INCREASE THICKNESS OF CASING 0.125" WHERE BORE LENGTH EXCEEDS 125 FEET.

3. A MINIMUM OF 0.375" THICKNESS IS REQUIRED WHEN GROUND COVER OVER PIPE EXCEEDS 15 FEET.

4. WHERE RESTRAINING DEVICES ARE REQUIRED FOR THE CARRIER PIPE, THE CASING PIPE DIAMETER SHALL BE INCREASED AS NECESSARY.
NOTE:
1. Compacted earth backfill within extents of stream crossing shall extend from top of pipe encasement to top of trench. Compact to 95% maximum density per ASTM D 698.

2. Match existing bank profile except where slope of bank exceeds 1 to 1.
NOTES:
1. CONCRETE TO BE MINIMUM 3000 PSI.
2. PIPE ENCASEMENT TO BE USED ONLY WHERE SPECIFIED ON PLANS.
"WYE" TYPE FITTING.
TEE BRANCH SHALL BE
SAME SIZE AS
LATERAL (4" MIN)

NOTES:

1. USE DUCTILE IRON PIPE FROM SEWER MAIN
   TO CLEANOUT IF LESS THAN 3.5 FT. COVER
   EXISTS.

2. SEWER LATERAL TAPPED INTO EXISTING
   SEWER MAIN SHALL BE CONNECTED USING
   A ROMAC PIPE SADDLE (STYLE SB), OR
   APPROVED EQUALLY. ALL TAPS SHALL BE
   CORE-DRILLED.

3. LATERAL SHALL NOT PROTRUDE INTO SEWER
   MAIN.

4. WHERE THE DISTANCE "A" IS SUCH THAT
   MORE THAN ONE PIPE JOINT IS REQUIRED
   AND THE PIPE SLOPE EXCEEDS 20%.
   CONTRACTOR SHALL PROVIDE ANCHORAGE IN
   ACCORDANCE WITH DRAWING WW 6.0.

5. SEWER LATERAL CONNECTIONS INTO
   EXISTING MANHOLES SHALL BE IN
   ACCORDANCE WITH DETAIL DRAWINGS WW
   2.0, WW 2.1, WW 2.2, OR WW 2.3 AS
   APPLICABLE.

6. IF MAIN LINE IS LINED, SEE DETAIL WW 5.2.
NOTE: CLEANOUT TO BE SAME SIZE AND MATERIAL AS SEWER LINE.
NOTES:
1. REFER TO THIS DETAIL TO CONNECT NEW SERVICE LATERALS AFTER THE SEWERS HAVE BEEN LINED WITH CIPP. THE DETAIL SHALL BE USED WHEN RECONNECTING SERVICES FOLLOWING PIPE BURSTING. IN THAT SITUATION, ALL REFERENCES TO CIPP IN THIS DETAIL SHALL BE HOPE.
2. NEATLY CUT THE EXISTING SEWER WITH A CUTTER SPECIFICALLY DESIGNED FOR CUTTING THAT SPECIFIC PIPE MATERIAL TO EXPOSE THE CIPP. FOR VCP AND CONCRETE SEWERS, USE A CHAIN CUTTER TO NEATLY SCORE THE PIPE AND THEN BREAK THE PIPE AWAY. REGARDLESS OF THE CUTTER USED, USE EXTREME CAUTION TO PREVENT DAMAGE TO THE CIPP. REPAIR ANY DAMAGE AS APPROVED BY THE ENGINEER.
3. STRAP-ON SADDLE SHALL BE A ROMAC "CB" SADDLE AS MANUFACTURED BY ROMAC INDUSTRIES, INC. OR APPROVED EQUAL. ANY PROPOSED EQUIVALL SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL. SADDLE SHALL BE PROVIDED FOR THE SPECIFIC TYPE OF LATERAL PIPE BEING INSTALLED.
4. CAREFULLY REMOVE THE EXISTING LATERAL TO LIMIT DAMAGE TO THE CIPP, INCREASE THE OPENING IN THE CIPP AS NECESSARY AND TO PROVIDE A CIRCULAR OPENING, BRUSH THE CIPP IN THE OPENING SMOOTH TO REMOVE ALL BURRRS, INSTALL STRAP-ON SADDLE, AND REPLACE LATERAL TO THE SPECIFIED LIMITS. WHERE POSSIBLE, IMPROVE THE CONFIGURATION OF THE CONNECTION.
5. IF THE CIPP IS DAMAGED FROM OVERCUTTING THE NEW SERVICE CONNECTION, THEN THE NEXT LARGER SIZE HOLE SHALL BE CUT, AND A SERVICE SADDLE WITH A BELL REDUCER SHALL BE INSTALLED FOR CONNECTING BACK TO THE NEW SERVICE DIAMETER.
6. SUPPORT THE EXISTING SEWER DURING THIS WORK AS NECESSARY.
7. DEFECTS IDENTIFIED FROM THE POST-CIPP CCTV INSPECTIONS SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE ENGINEER.
ANCHORS SHALL BE SPACED AS SHOWN ON PLAN

1/8" x 2" STAINLESS STEEL STRAP

154 FELT

D D+4" 24"

PLAN

CONCRETE ANCHOR (MAY BE PRECAST)

1/2" STAINLESS STEEL ANCHOR BOLTS EMBEDDED 8" IN CONCRETE

1/8" x 2" STAINLESS STEEL STRAP

TRENCH BOTTOM

UNDISTURBED SOIL ON FACE AND BOTTOM OF ANCHOR

CONCRETE PER SPECIFICATIONS

ELEVATION

8"

16"

CONCRETE ANCHOR FOR SLOPES OVER 20%

NOTES:

1. SIDES AND BOTTOM OF CONCRETE ANCHOR TO BE POURED AGAINST UNDISTURBED EARTH.

2. SPACING OF ANCHORS:
   SLOPES:
   20% - 35%: <36 FEET CENTER-TO-CENTER
   OVER 35%: <16 FEET CENTER-TO-CENTER

CITY OF CHARLOTTESVILLE

CITY STANDARDS

CONCRETE ANCHOR

REVISION DATE

SCALE: N.T.S. STANDARD NUMBER: WW 6.0
NOTES:

1. PIER REQUIRED WHEN STORM DRAIN OR OTHER PIPES CROSS OVER THE OTHER UTILITY WITH A VERTICAL CLEARANCE OF LESS THAN 12". (LESS THAN 12" ONLY ALLOWED WITH A WAIVER FROM THE DIRECTOR OF PUBLIC WORKS)

2. PIER TO BE BUILT ON UNDISTURBED EARTH.

3. CONCRETE TO BE READY MIX, CLASS A3.
2" NIPPLE AND FINGER-TIGHT CAP

2" GATE VALVE & 2" SQUARE HEAD

"STREET EL"

CENTERLINE OF VAULT

CAPITOL FOUNDRY MH-3000 FRAME & COVER

7 1/2"

12" 18"

PRECAST WATER VALVE VAULT OR PRECAST MANHOLE SECTION(S) IF OVER 5' DEEP

6" MINIMUM BEDDING
# 8 STONE

M.J. PLUG DRILL & TAP

THRUST BLOCK

PAVEMENT
NOTES:
1. PAVEMENT CUTS SHALL BE STRAIGHT AND VERTICAL.

2. REMOVE TEMPORARY PATCH IF PRESENT. EXCAVATE COMPACTED BACKFILL AS REQUIRED TO INSTALL NEW BITUMINOUS ASPHALT. RE-COMPACT SURFACE OF BACKFILL PRIOR TO INSTALLATION OF PATCH.
NOTES:
1. TEMPORARY PAVEMENT REPAIR WILL BE REQUIRED IF PERMANENT PAVEMENT REPAIR CAN NOT BE PERFORMED WITHIN 24 HOURS OF TRENCH BACKFILLING.

2. PAVEMENT CUTS SHALL BE STRAIGHT AND VERTICAL.

3. CONTRACTOR SHALL MAINTAIN THE TEMPORARY REPAIR UNTIL PERMANENT PAVEMENT REPAIR IS MADE.