

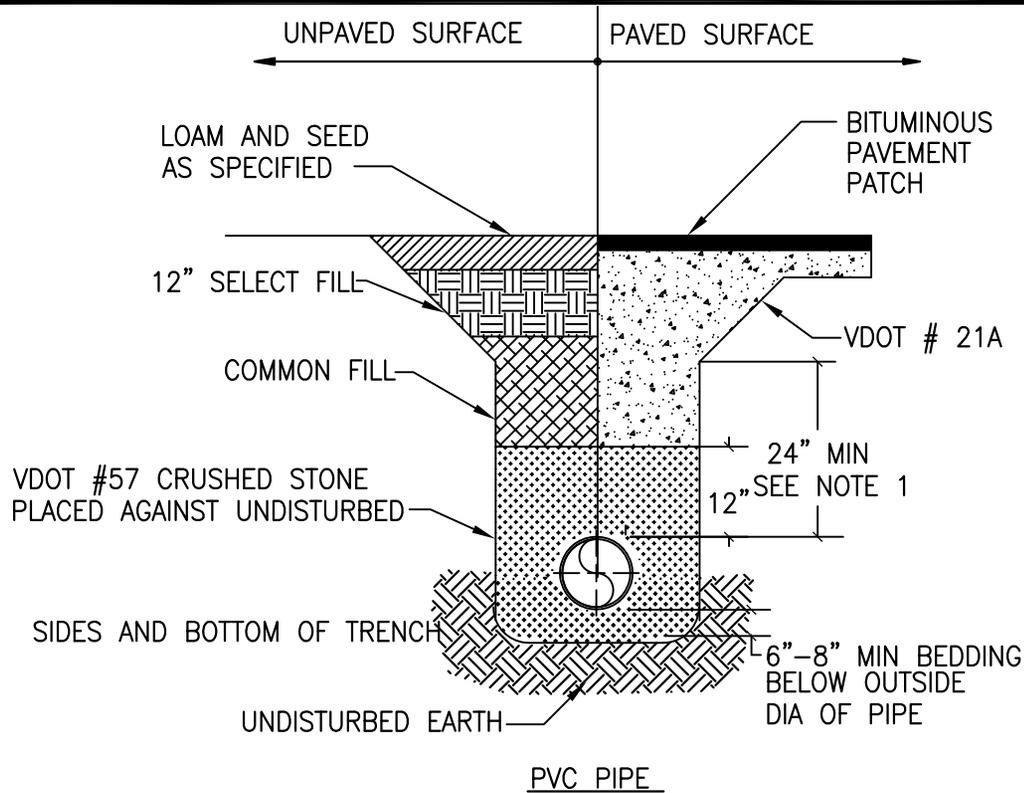
# **APPENDIX D**

## **SANITARY SEWER SYSTEM**

### **DETAILS**

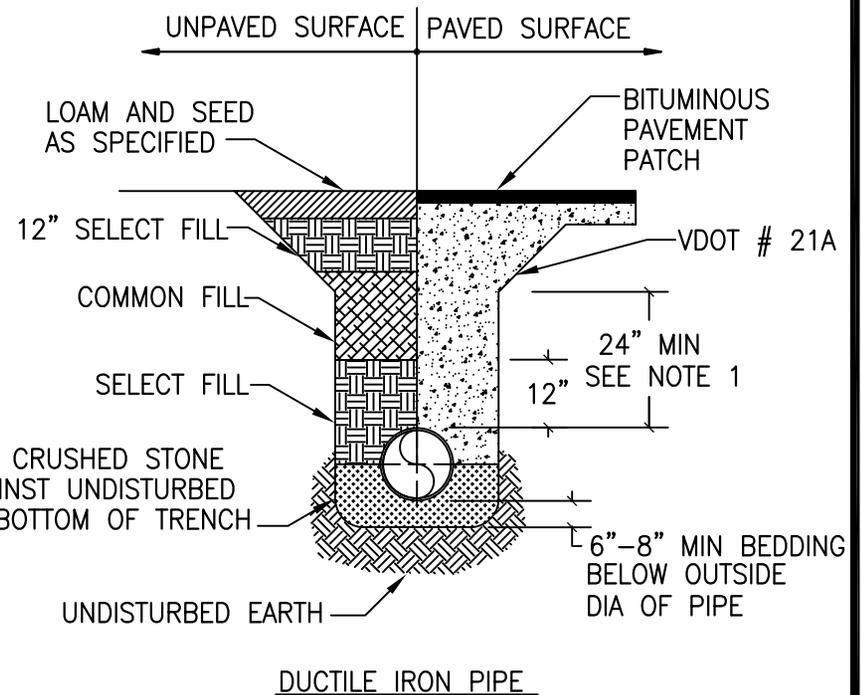
#### **CITY OF CHARLOTTESVILLE, VIRGINIA**

WW 1.0	Pipe Trenching and Bedding--Typical
WW 1.1	Pipe Trench and Bedding--Unstable Soil
WW 2.0	Concrete Manhole -- Typical
WW 2.1	Drop Manhole Type "A"
WW 2.2	Drop Manhole Type "B"
WW 2.3	Interior Drop Manhole
WW 2.4	Manhole Frame & Cover
WW 2.5	Watertight Manhole Frame & Cover
WW 2.6	Doghouse Manhole Installation
WW 2.8	New Pipe Connection at Manhole
WW 3.0	Steel Casing Installation Under Roadways
WW 3.1	Steel Casing Installation Under Railways
WW 3.2	Pipe Casing Requirements
WW 4.0	Stream Crossing
WW 4.1	Concrete Encasement
WW 5.0	Sewer Lateral Connection — Typical
WW 5.1	Cleanout Detail
WW 5.2	Sanitary Sewer Lateral Connection for CIPP Lined Pipe
WW 5.3	Service Lateral Replacement
WW 6.0	Concrete Anchor
WW 6.1	Concrete Pier
WW 7.0	Manhole Abandonment
WW 7.1	Sewer Lateral Abandonment at Manhole
WW 7.2	Sewer Lateral Abandonment at Main
WW 8.0	Rehab of Existing Manhole
WW 8.1	Typical Point Repair
WW 8.2	Rehab of Manhole Frame and Cover
WW 9.0	Aerial Creek Crossing with Concrete Piers
WW 9.1	Reinforced Concrete Anchor Pier
WW 9.2	Reinforced Concrete Pier
WW 9.3	Pier Footing on Rock
WW 9.4	Pipe Straps for Piers



NOTES:

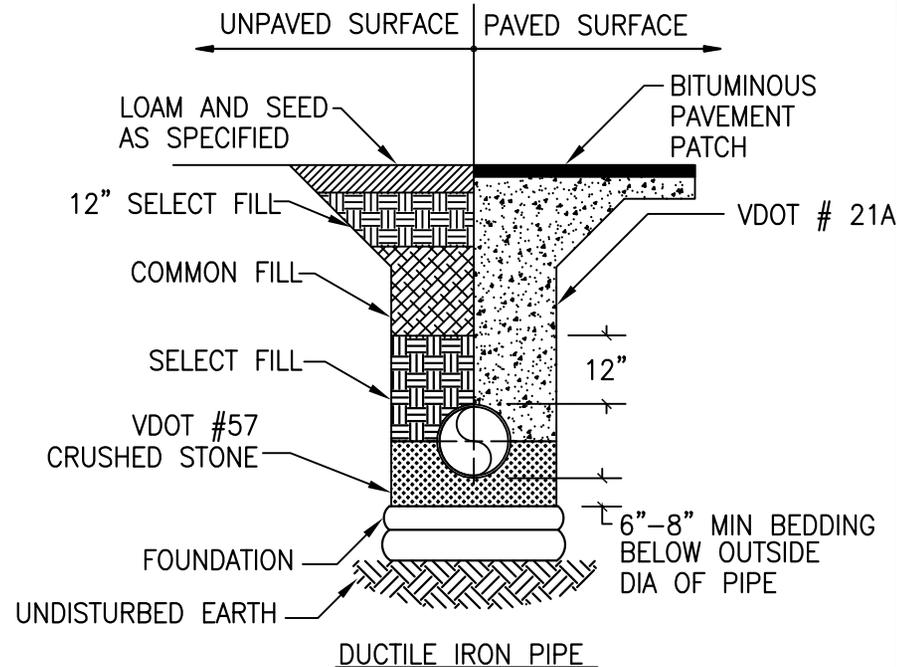
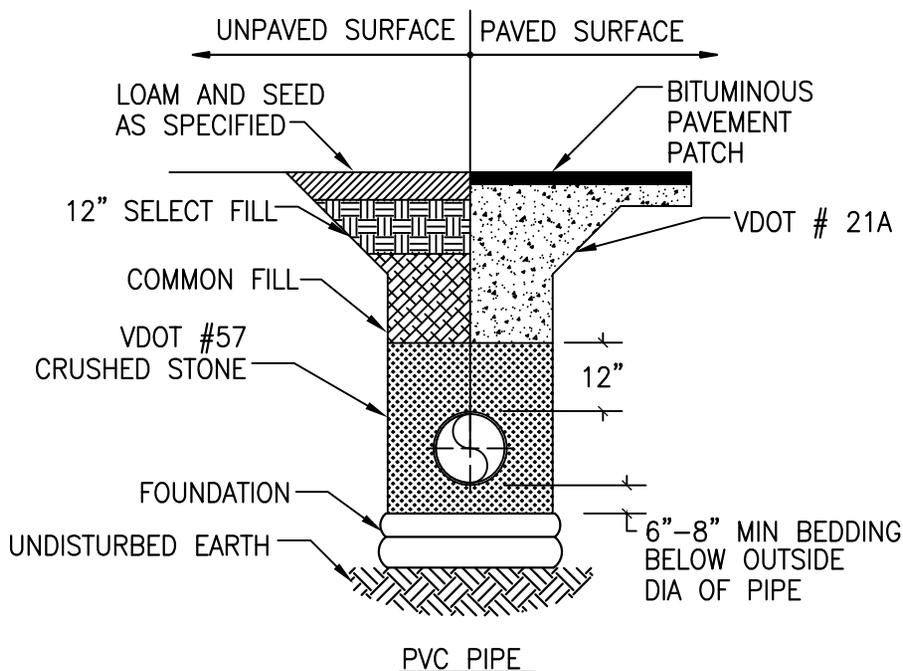
1. MAINTAIN VERTICAL TRENCH WALLS FROM BOTTOM OF TRENCH TO 24" ABOVE CROWN OF PIPE. TRENCH WIDTH IN THIS AREA: PIPE O.D. + 24".
2. FOR EXCAVATIONS OVER 5 FT. DEEP, SLOPE TRENCH WALLS AS REQUIRED AND/OR PROVIDE OTHER SAFETY MEASURES IN ACCORDANCE WITH OSHA GUIDELINES.
3. ROCK SHALL BE REMOVED TO A MINIMUM OF 6-INCH CLEARANCE AROUND THE BOTTOM AND 12-INCH MINIMUM CLEARANCE TO THE SIDES OF PIPE.



CITY OF CHARLOTTESVILLE

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CITY STANDARDS	
PIPE TRENCHING AND BEDDING - TYPICAL	
SCALE: N.T.S.	STANDARD NUMBER: WW 1.0



NOTES:

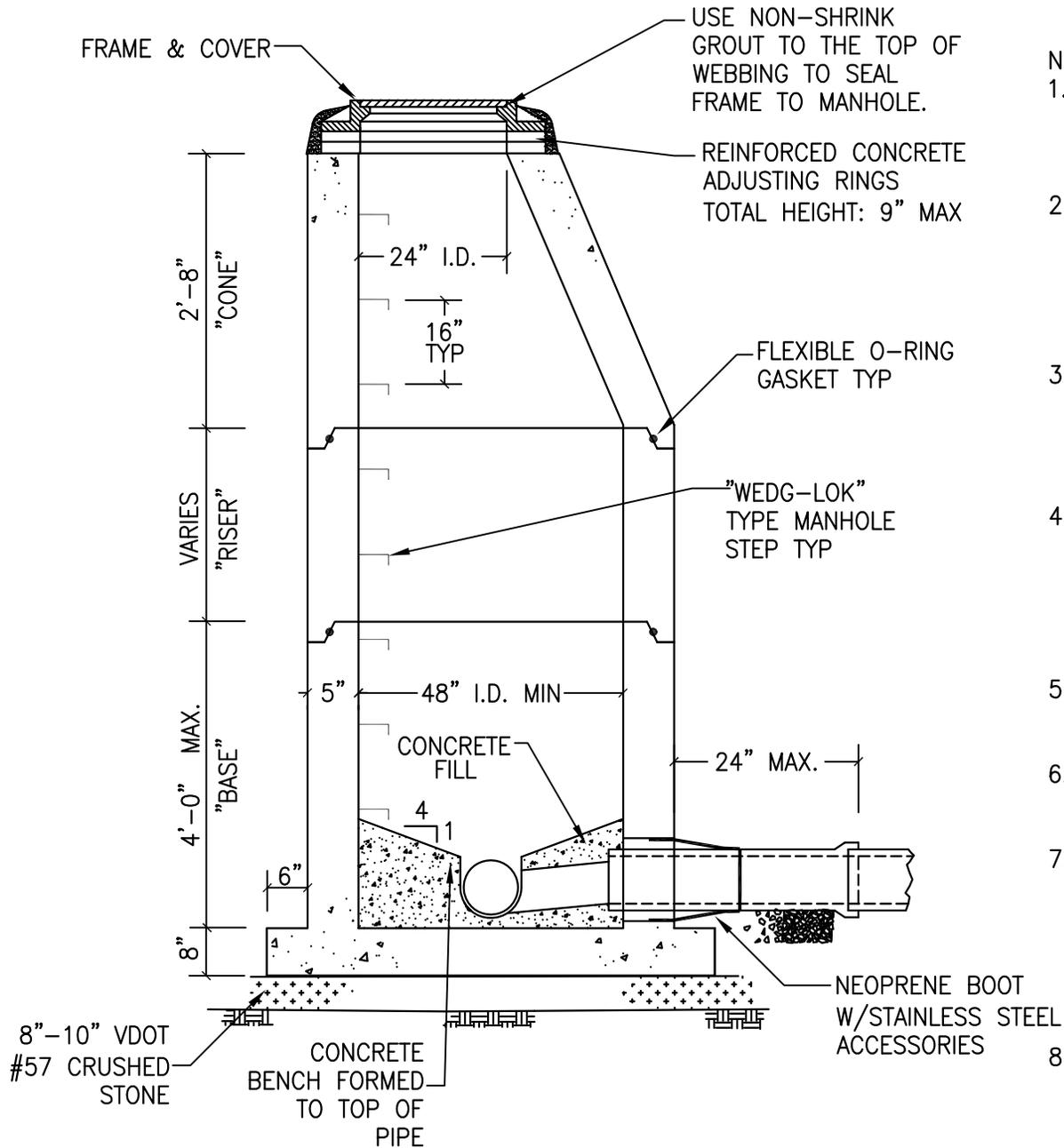
1. IN UNSTABLE SOILS, PROVIDE A FOUNDATION MAT FROM THE BOTTOM OF PIPE BEDDING TO UNDISTURBED STABLE SOIL, OR 18" MAX. DEPTH. THE FOUNDATION MAT SHALL CONSIST OF TWO (2) MATS (9" MAX. EACH) OF VDOT #1 CRUSHED STONE WRAPPED IN A HIGH STRENGTH GEOTEXTILE FABRIC; LINQ INDUSTRIAL FABRICS, INC. GTF 375N OR 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.



CITY OF CHARLOTTESVILLE

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REVISION	DATE

CITY STANDARDS	
PIPE TRENCH AND BEDDING – UNSTABLE SOIL	
SCALE: N.T.S.	STANDARD NUMBER: WW 1.1



NOTES:

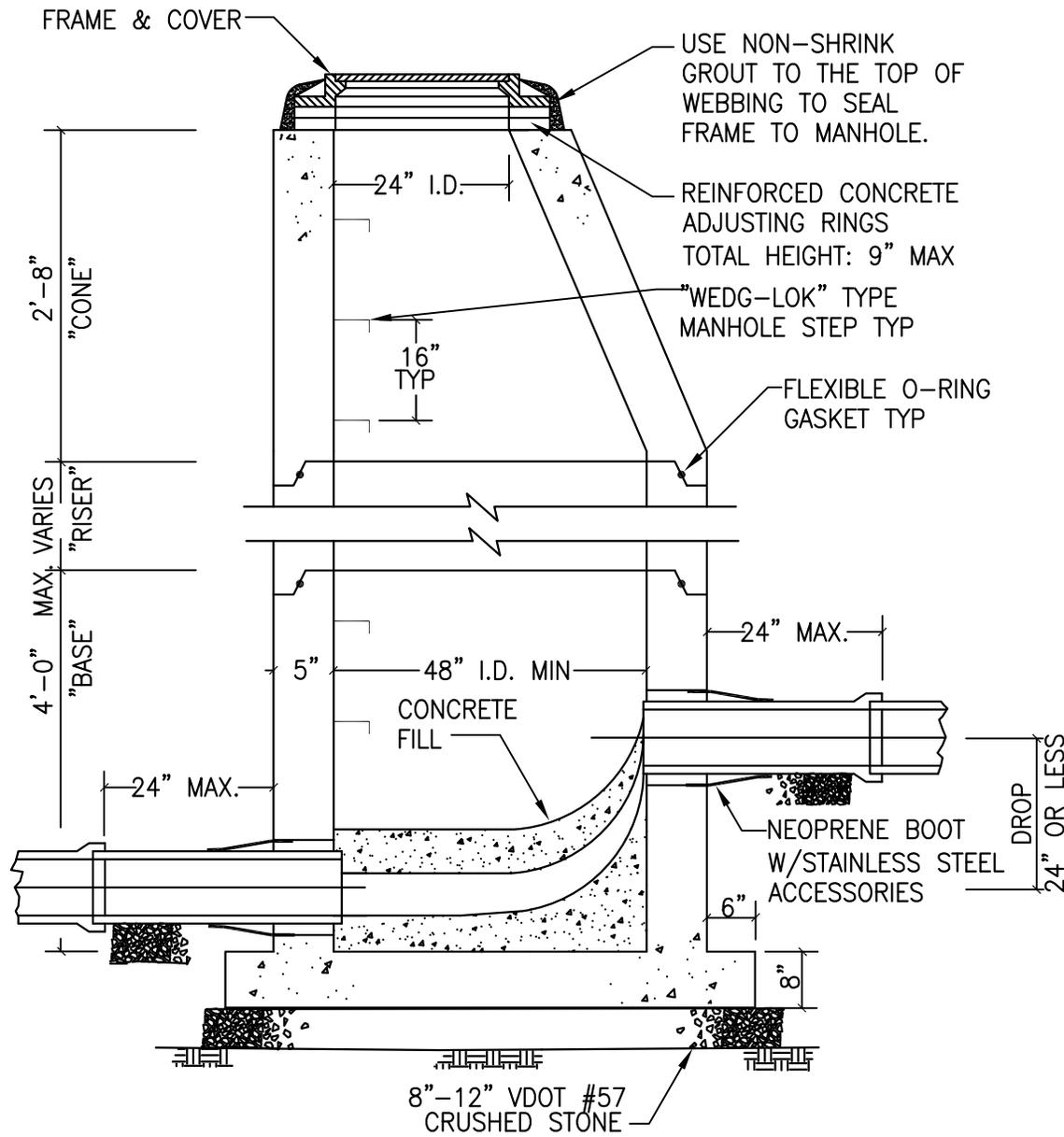
1. ALL JOINTS, LIFT HOLES, AND ANNULAR SPACES IN INLETS AND OUTLETS SHALL BE GROUTED AND SEALED INSIDE AND OUT.
2. CHANNELS AND MANHOLE "SHELF" TO BE CONSTRUCTED OF 3000 PSI CONCRETE FILL FINISHED SMOOTH WITH STEEL TROWEL. FLOW CHANNELS SHALL BE FORMED TO ALLOW INSERTION OF A ROBOTIC CAMERA.
3. MANHOLE EXTERIOR SHALL RECEIVE ONE COAT COAL TAR EPOXY. MANUAL ON-SITE EXPOXY COATING OF MANHOLE INTERIOR MAY BE REQUIRED IN SOME SITUATIONS.
4. FOR INLETS AND OUTLETS IN EXISTING OR REHABBED MANHOLES, OPENINGS SHALL BE CORE DRILLED AND PIPE TO MANHOLE CONNECTIONS SHALL BE NEOPRENE BOOT WITH STAINLESS STEEL ACCESSORIES.
5. PIPE INLETS WITHIN "CONE" SECTION ARE NOT ACCEPTABLE.
6. PIPES ENTERING MANHOLES SHALL BE ALIGNED WITH CENTER OF MANHOLE BOTTOM.
7. MANHOLE SHALL BE ORDERED WITH MINIMUM GRADE ADJUSTMENT. ORDER BASE, RISER, AND CONE HEIGHTS TO STACK OUT MANHOLE AS CLOSE AS POSSIBLE TO GRADE. MAXIMUM ADJUSTMENT SHALL BE 9 INCHES UNLESS APPROVED OTHERWISE.
8. FOLLOWING INSTALLATION, LIFT HOOKS ARE TO BE REMOVED.



CITY OF CHARLOTTESVILLE

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CITY STANDARDS	
CONCRETE	
MANHOLE - TYPICAL	
SCALE: N.T.S.	STANDARD NUMBER: WW 2.0



NOTES:

1. ALL JOINTS, LIFT HOLES, AND ANNULAR SPACES IN 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. MANHOLE EXTERIOR SHALL RECEIVE ONE COAT COAL TAR EPOXY. MANUAL ON-SITE EXPOXY COATING OF MANHOLE INTERIOR MAY BE REQUIRED IN SOME SITUATIONS.
4. FOR INLETS AND OUTLETS IN EXISTING OR REHABBED MANHOLES, OPENINGS SHALL BE CORE DRILLED AND PIPE TO MANHOLE CONNECTIONS SHALL BE NEOPRENE BOOT WITH STAINLESS STEEL ACCESSORIES.
5. PIPE INLETS WITHIN "CONE" SECTION ARE NOT ACCEPTABLE.
6. PIPES ENTERING MANHOLES SHALL BE ALIGNED WITH CENTER OF MANHOLE BOTTOM.
7. MANHOLE SHALL BE ORDERED WITH MINIMUM GRADE ADJUSTMENT. ORDER BASE, RISER, AND CONE HEIGHTS TO STACK OUT MANHOLE AS CLOSE AS POSSIBLE TO GRADE. MAXIMUM ADJUSTMENT SHALL BE 9 INCHES UNLESS APPROVED OTHERWISE.
8. FOLLOWING INSTALLATION, LIFT HOOKS ARE TO BE REMOVED.



CITY OF CHARLOTTESVILLE

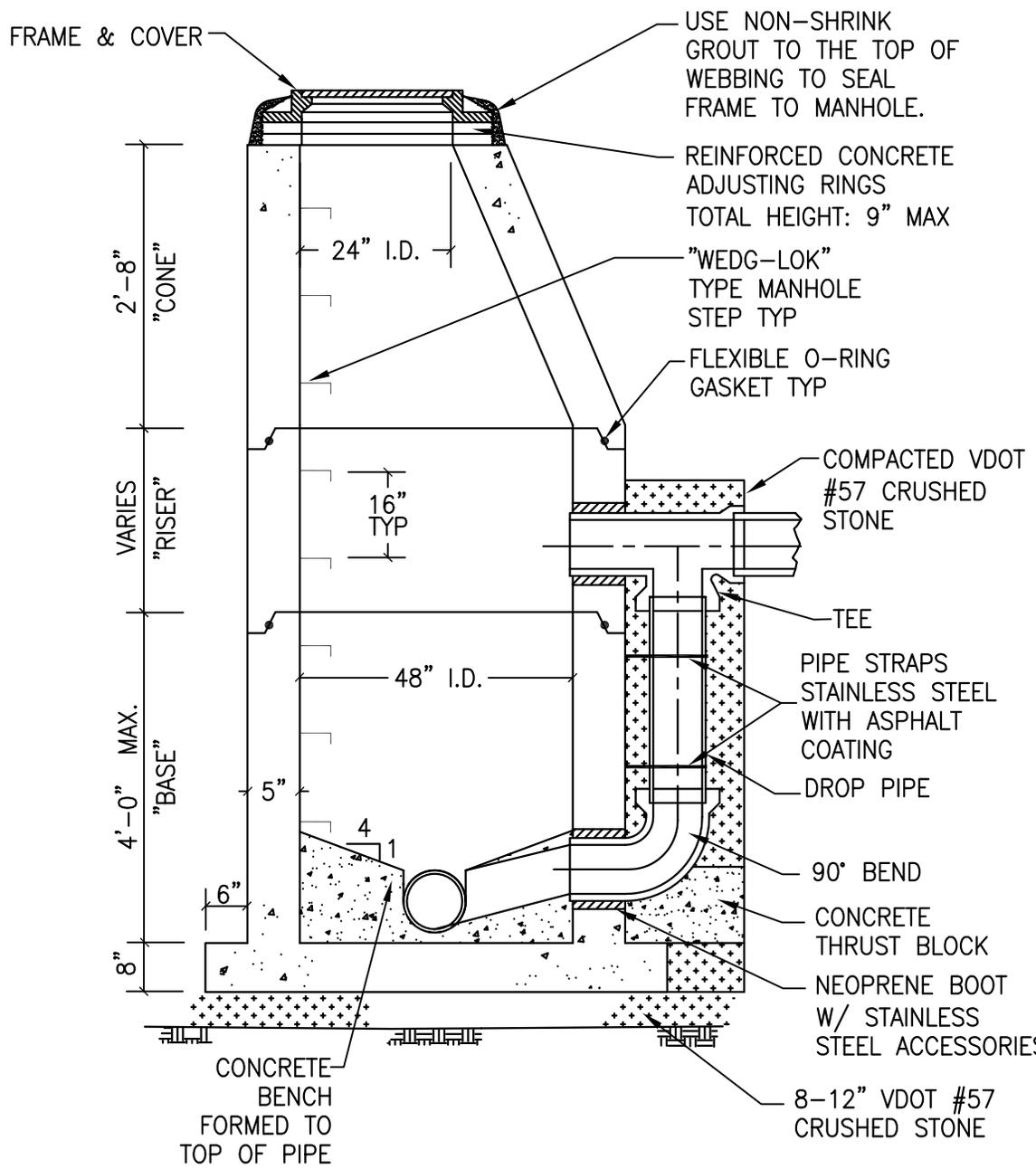
MAY	2012
REVISION	DATE

CITY STANDARDS

DROP MANHOLE TYPE "A"

SCALE: N.T.S.

STANDARD NUMBER: WW 2.1



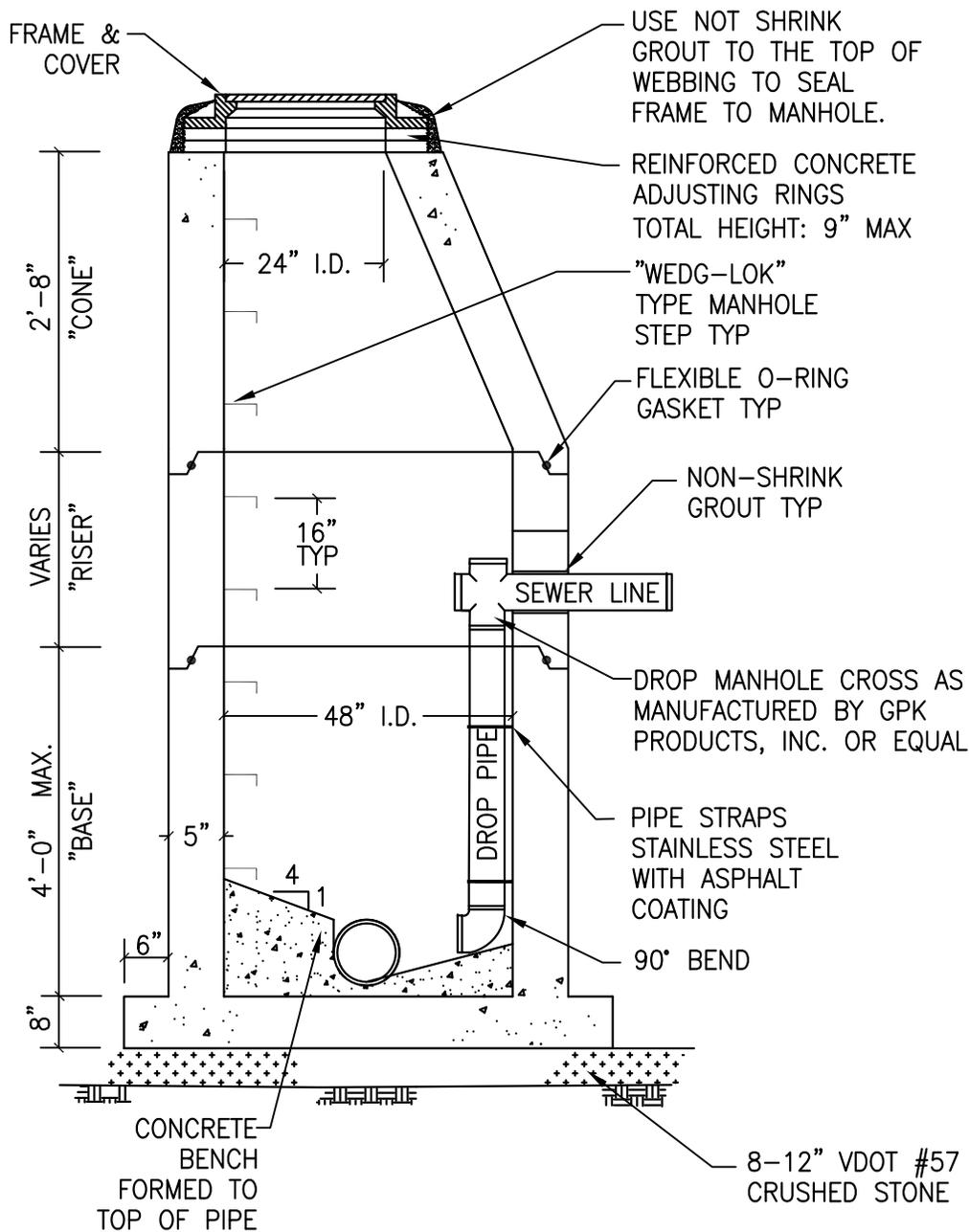
- NOTES:
1. ALL JOINTS, LIFT HOLES, AND ANNULAR SPACES IN INLETS AND OUTLETS SHALL BE GROUTED AND SEALED INSIDE AND OUT.
  2. CHANNELS AND MANHOLE "SHELF" TO BE CONSTRUCTED OF 3000 PSI CONCRETE FILL FINISHED SMOOTH WITH STEEL TROWEL. FLOW CHANNELS SHALL BE FORMED TO ALLOW INSERTION OF A ROBOTIC CAMERA.
  3. MANHOLE EXTERIOR SHALL RECEIVE ONE COAT COAL TAR EPOXY. MANUAL ON-SITE EXPOXY COATING OF MANHOLE INTERIOR MAY BE REQUIRED IN SOME SITUATIONS.
  4. FOR INLETS AND OUTLETS IN EXISTING PRECAST OR REHABBED MANHOLES, OPENINGS SHALL BE CORE DRILLED AND PIPE TO MANHOLE CONNECTIONS SHALL BE NEOPRENE BOOT WITH STAINLESS STEEL ACCESSORIES.
  5. PIPE INLETS WITHIN "CONE" SECTION ARE NOT ACCEPTABLE.
  6. PIPES ENTERING MANHOLES SHALL BE ALIGNED WITH CENTER OF MANHOLE BOTTOM.
  7. MANHOLE SHALL BE ORDERED WITH MINIMUM GRADE ADJUSTMENT. ORDER BASE, RISER, AND CONE HEIGHTS TO STACK OUT MANHOLE AS CLOSE AS POSSIBLE TO GRADE. MAXIMUM ADJUSTMENT SHALL BE 9 INCHES UNLESS APPROVED OTHERWISE.
  8. FOLLOWING INSTALLATION, LIFT HOOKS ARE TO BE REMOVED.
  9. DROP PIPE, TEE AND 90 DEGREE BEND TO BE DUCTILE IRON PIPE OR PVC SDR-26 TO MATCH MAIN LINE MATERIAL.



CITY OF CHARLOTTESVILLE

APR	2013
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CITY STANDARDS	
DROP MANHOLE TYPE "B"	
SCALE: N.T.S.	STANDARD NUMBER: WW 2.2



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 26 PVC PIPE CONNECTED TO DROP FITTING WITH STANDARD GASKETED JOINT. PIPE SIZE AND MATERIAL OF DROP STACK SHALL MATCH INCOMING PIPE.
6. VERTICAL STACK WILL BE STRAPPED TO MANHOLE AT EACH PIPE JOINT NO MORE THAT 6" FROM EACH JOINT. STRAPS SHALL BE STAINLESS STEEL WITH ASPHALT COATING.
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. PIPES ENTERING MANHOLES SHALL BE ALIGNED WITH CENTER OF MANHOLE BOTTOM.



CITY OF CHARLOTTESVILLE

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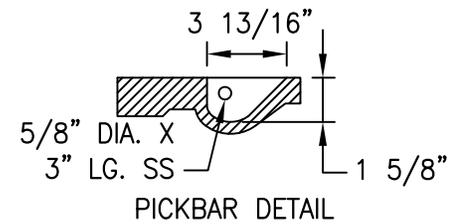
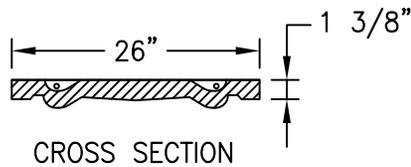
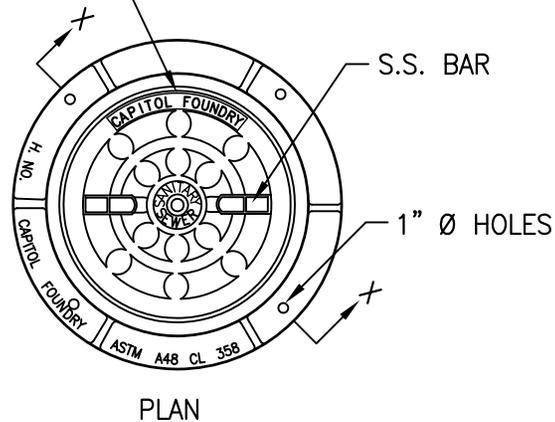
CITY STANDARDS

INTERIOR DROP MANHOLE

SCALE: N.T.S.

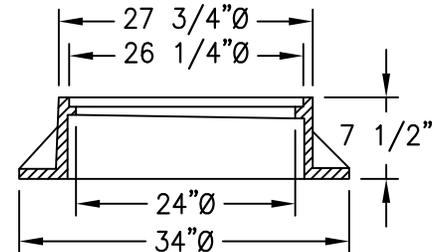
STANDARD NUMBER: WW 2.3

5/8" RAISED LETTERS  
IN RECESSED AREA



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)



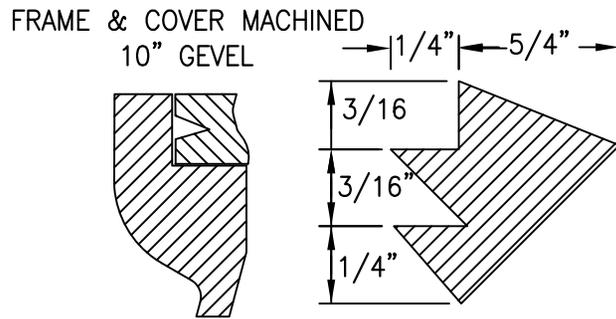
CITY OF CHARLOTTESVILLE

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CITY STANDARDS  
**MANHOLE FRAME  
AND COVER**

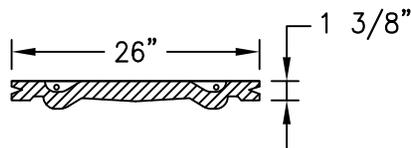
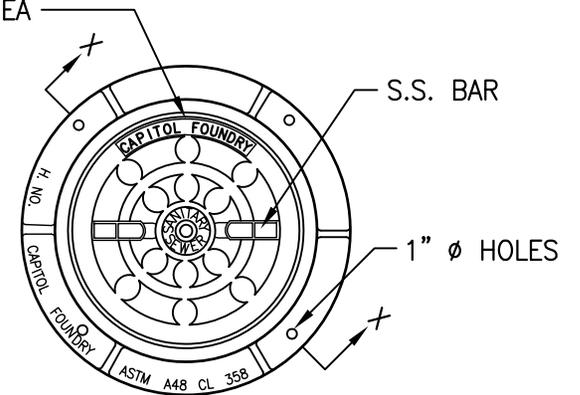
SCALE: N.T.S. | STANDARD NUMBER: WW 2.4

AVAILABLE IN 4"  
TALL FRAME

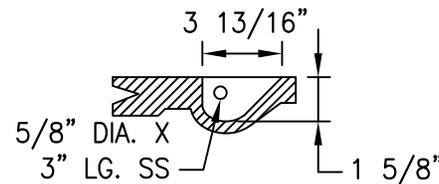


WATER TIGHT DETAIL  
(RUBBER GASKET)

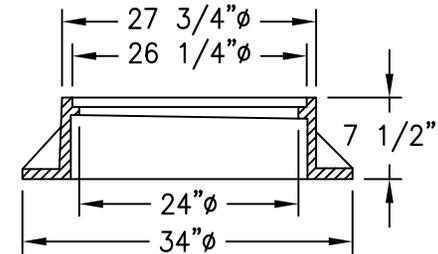
5/8" RAISED LETTERS  
IN RECESSED AREA



CROSS SECTION



PICKBAR DETAIL



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.

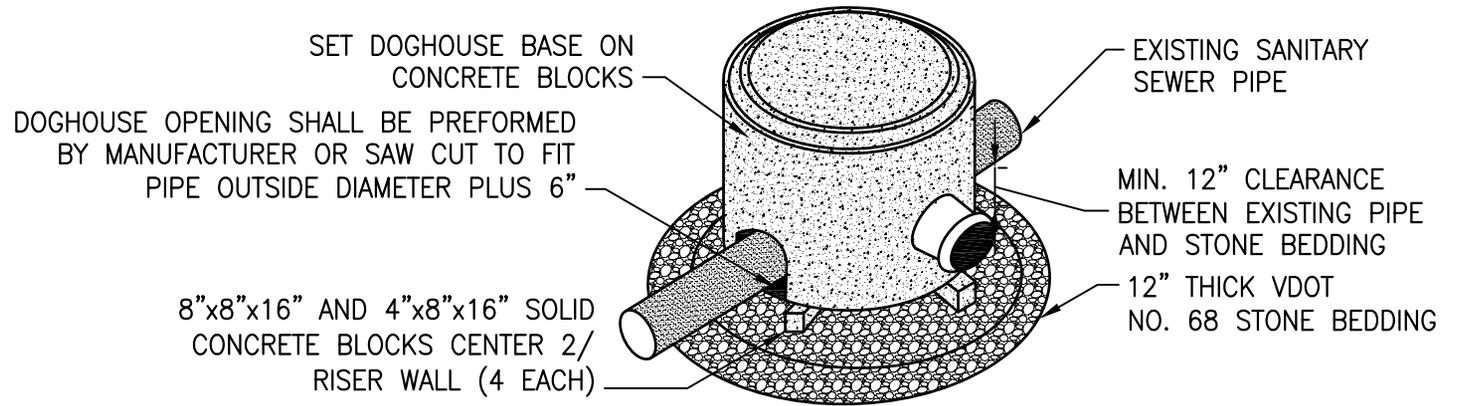


CITY OF CHARLOTTESVILLE

JULY	2011
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CITY STANDARDS  
WATERTIGHT MANHOLE  
FRAME AND COVER

SCALE: N.T.S. | STANDARD NUMBER: WW 2.5



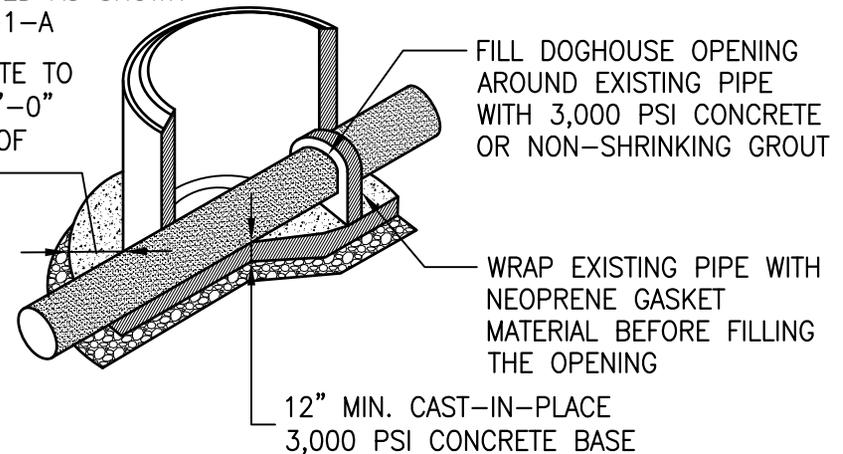
DOGHOUSE MANHOLE BASE

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



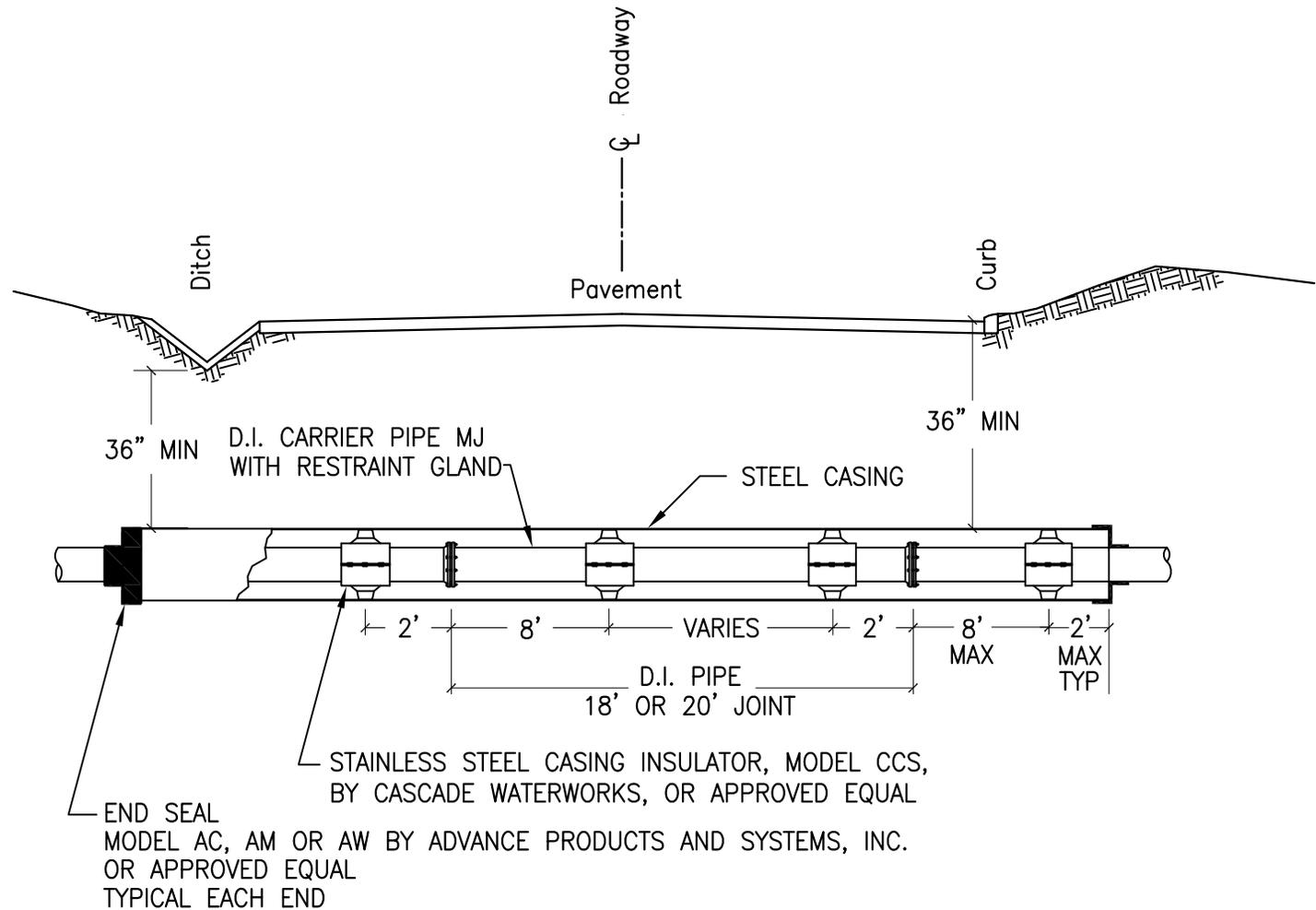
FOUNDATION SECTION VIEW



CITY OF CHARLOTTESVILLE

JULY	2011
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CITY STANDARDS	
TYPICAL MANHOLE SHOWING "DOGHOUSE" INSTALLATION	
SCALE: N.T.S.	STANDARD NUMBER: WW 2.6



NOTES:

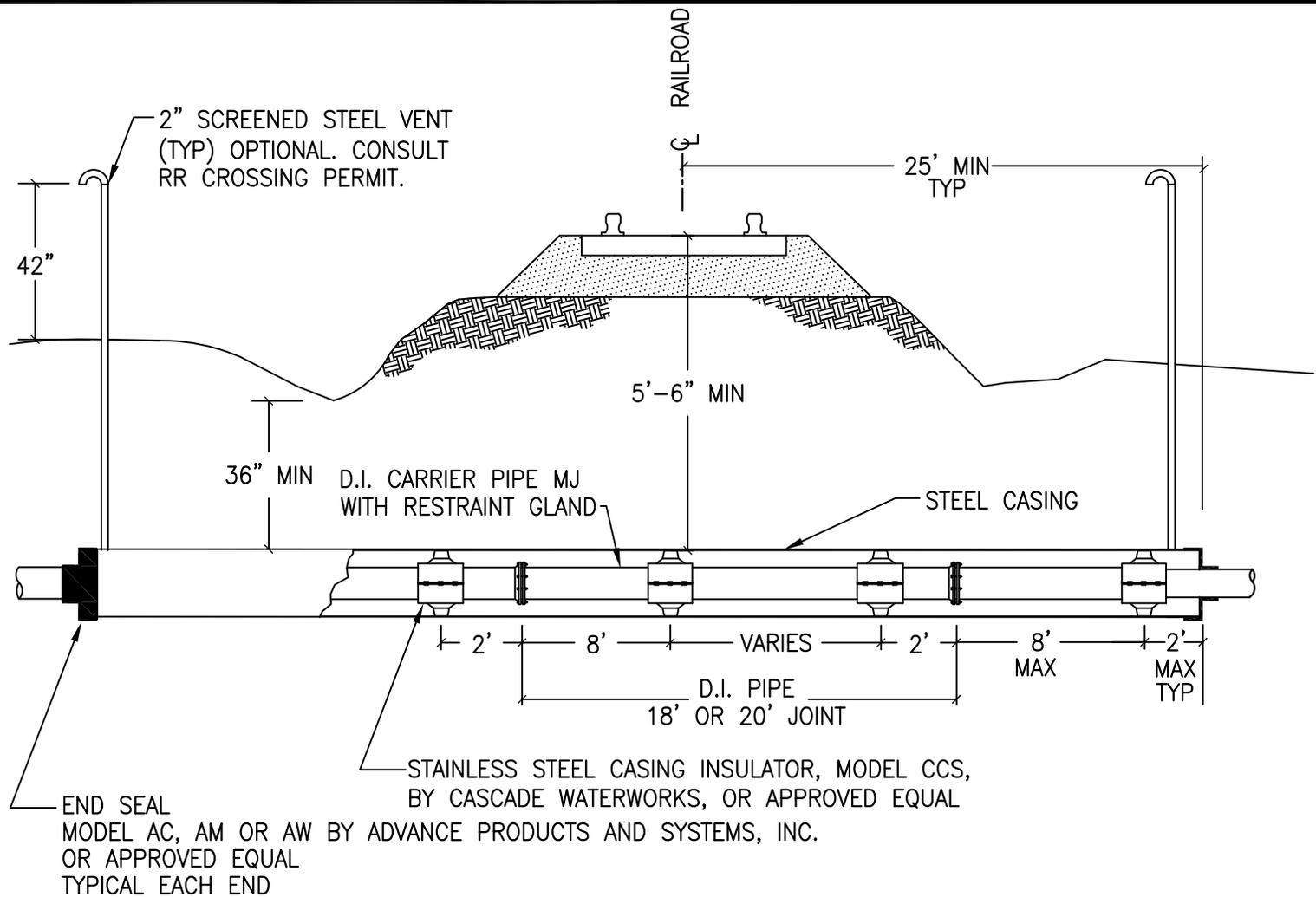
1. STEEL CASING TO EXTEND TO BACK OF CURB, DITCH, SIDEWALK, ETC. OR A MINIMUM OF 5' BEYOND THE EDGE OF PAVEMENT, WHICHEVER IS GREATER.
2. REFERENCE DRAWING WW 3.2 FOR MINIMUM STEEL CASING SIZE AND WALL THICKNESS.
3. PROPRIETARY RESTRAINED JOINT PIPE MAY BE SUBSTITUTED FOR MECHANICAL JOINT PIPE WITH RESTRAINT GLANDS WHERE APPROVED BY THE CITY.
4. APPROVED EQUAL CASING INSULATORS SHALL BE SPACED PER MANUFACTURER'S INSTRUCTIONS. (MIN 2 PER JOINT.)
5. CARRIER PIPE SHALL BE CENTERED WITHIN CASING.



CITY OF CHARLOTTESVILLE

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CITY STANDARDS	
STEEL CASING INSTALLATION UNDER ROADWAYS	
SCALE: N.T.S.	STANDARD NUMBER: WW 3.0



NOTES:

1. ALSO REFERENCE THE AREMA MANUAL FOR RAILWAY ENGINEERING - CHAPTER 1, PART 5.4.
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, MIN 2 PER JOINT.
5. CARRIER PIPE SHALL BE CENTERED WITHIN CASING.



CITY OF CHARLOTTESVILLE

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CITY STANDARDS	
STEEL CASING INSTALLATION UNDER RAILWAYS	
SCALE: N.T.S.	STANDARD NUMBER: WW 3.1

PIPE CASING			
CARRIER PIPE DIA.	MIN. PIPE CASING DIA.	MINIMUM WALL THICKNESS	
		CRITERIA WITHIN RAILROAD RIGHT-OF-WAY	CRITERIA WITHIN CITY OR VDOT RIGHT-OF-WAY
		STEEL	STEEL
6"	20"	0.375"	0.250"
8"	20"	0.375"	0.250"
10"	24"	0.375"	0.250"
12"	24"	0.375"	0.250"
14"	30"	0.500"	0.375"
16"	30"	0.500"	0.375"
18"	36"	0.563"	0.375"
20"	36"	0.563"	0.375"
24"	48"	0.688"	0.500"
30"	48"	0.688"	0.500"

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.



CITY OF CHARLOTTESVILLE

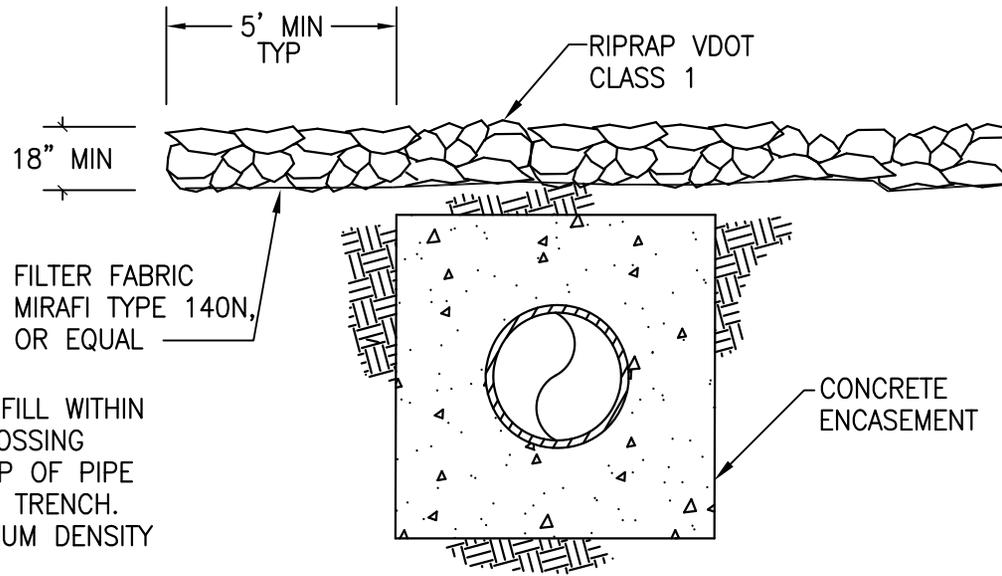
JULY	2011
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CITY STANDARDS

PIPE CASING REQUIREMENTS

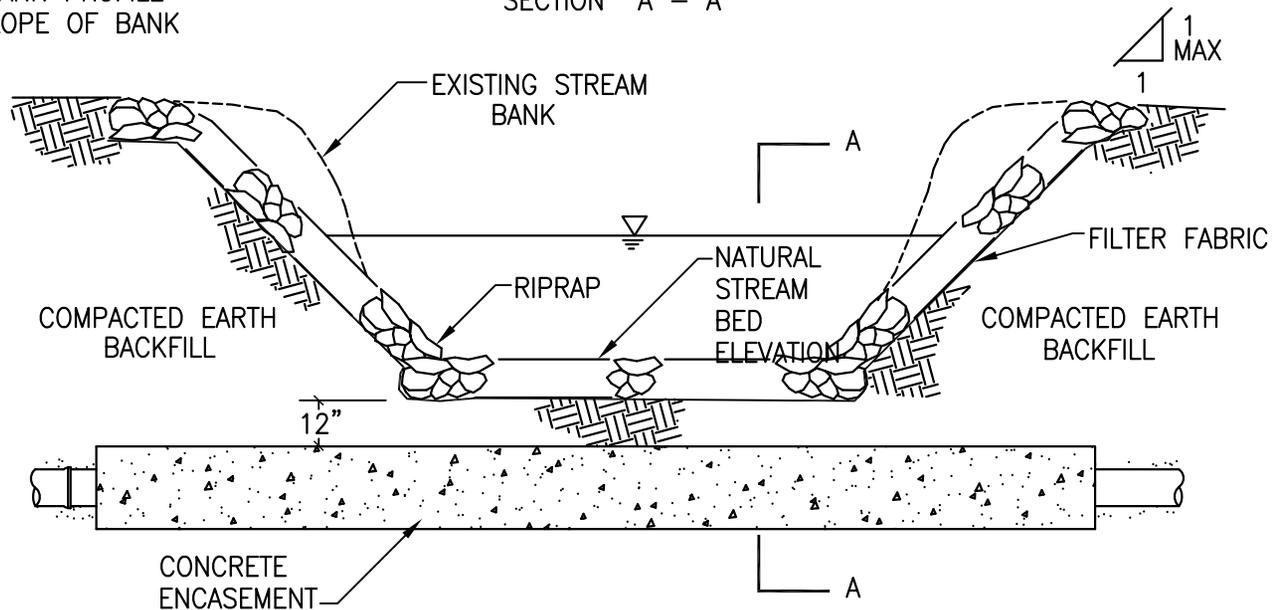
SCALE: N.T.S.

STANDARD NUMBER: WW 3.2



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.



CITY OF CHARLOTTESVILLE

JULY 2011

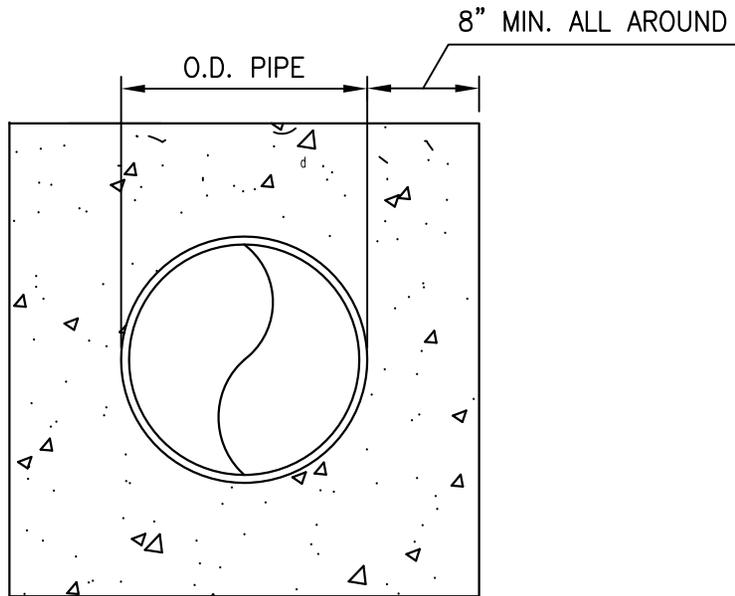
CITY STANDARDS

STREAM CROSSING

REVISION DATE

SCALE: N.T.S.

STANDARD NUMBER: WW 4.0



NOTES:

1. CONCRETE TO BE MINIMUM 3000 PSI.
2. PIPE ENCASEMENT TO BE USED ONLY WHERE SPECIFIED ON PLANS.



CITY OF CHARLOTTESVILLE

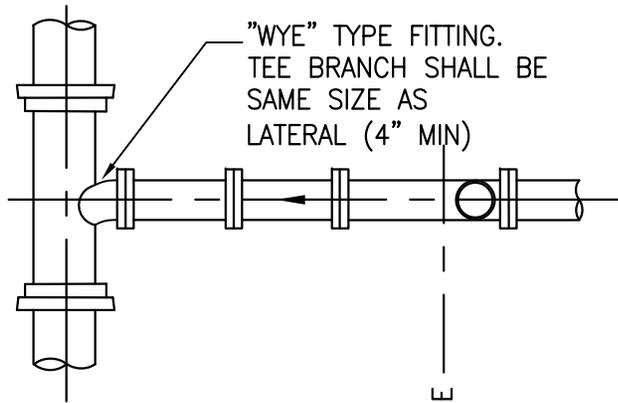
JULY	2011
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CITY STANDARDS

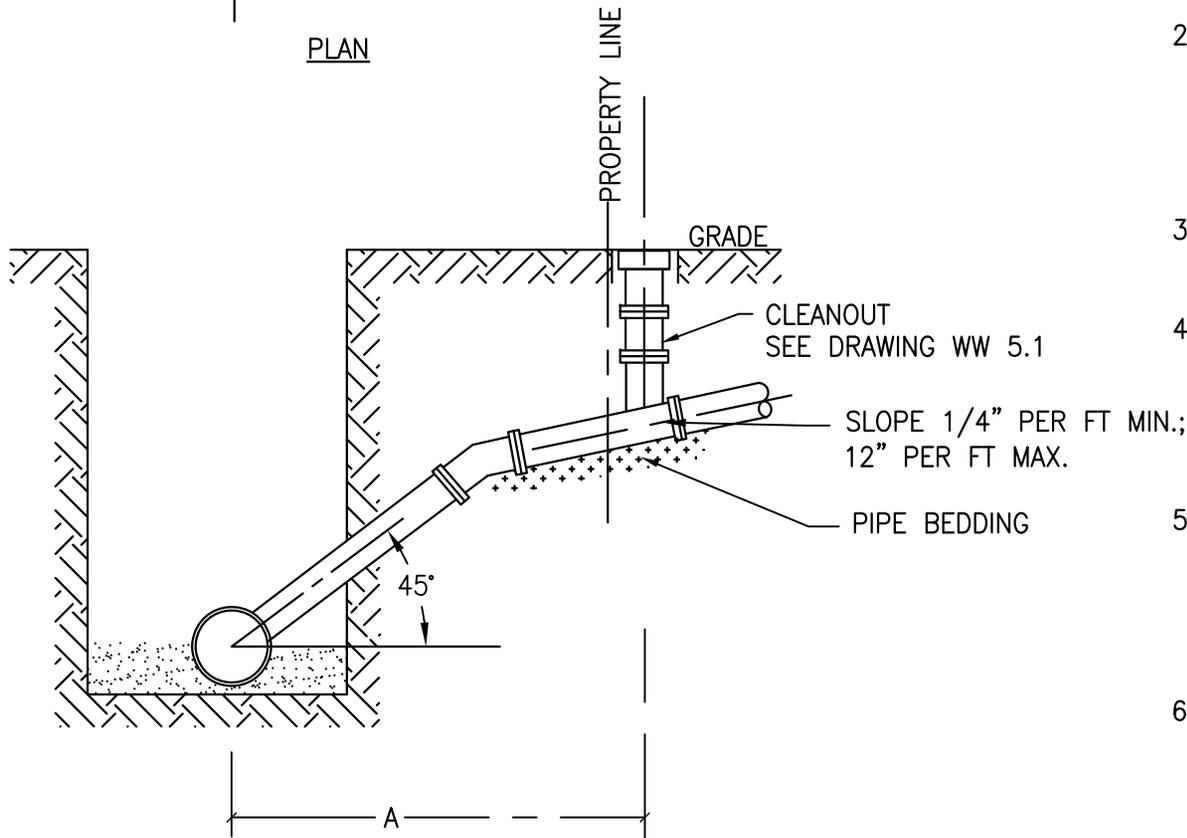
CONCRETE ENCASEMENT

SCALE: N.T.S.

STANDARD NUMBER: WW 4.1



PLAN



ELEVATION

NOTES:

1. USE DUCTILE IRON PIPE FROM SEWER MAIN TO CLEANOUT IF LESS THAN 2.5 FT. COVER EXISTS.
2. SEWER LATERAL TAPPED INTO EXISTING SEWER MAIN SHALL BE CONNECTED USING A ROMAC PIPE SADDLE (STYLE SB) ,OR APPROVED EQUAL. 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.

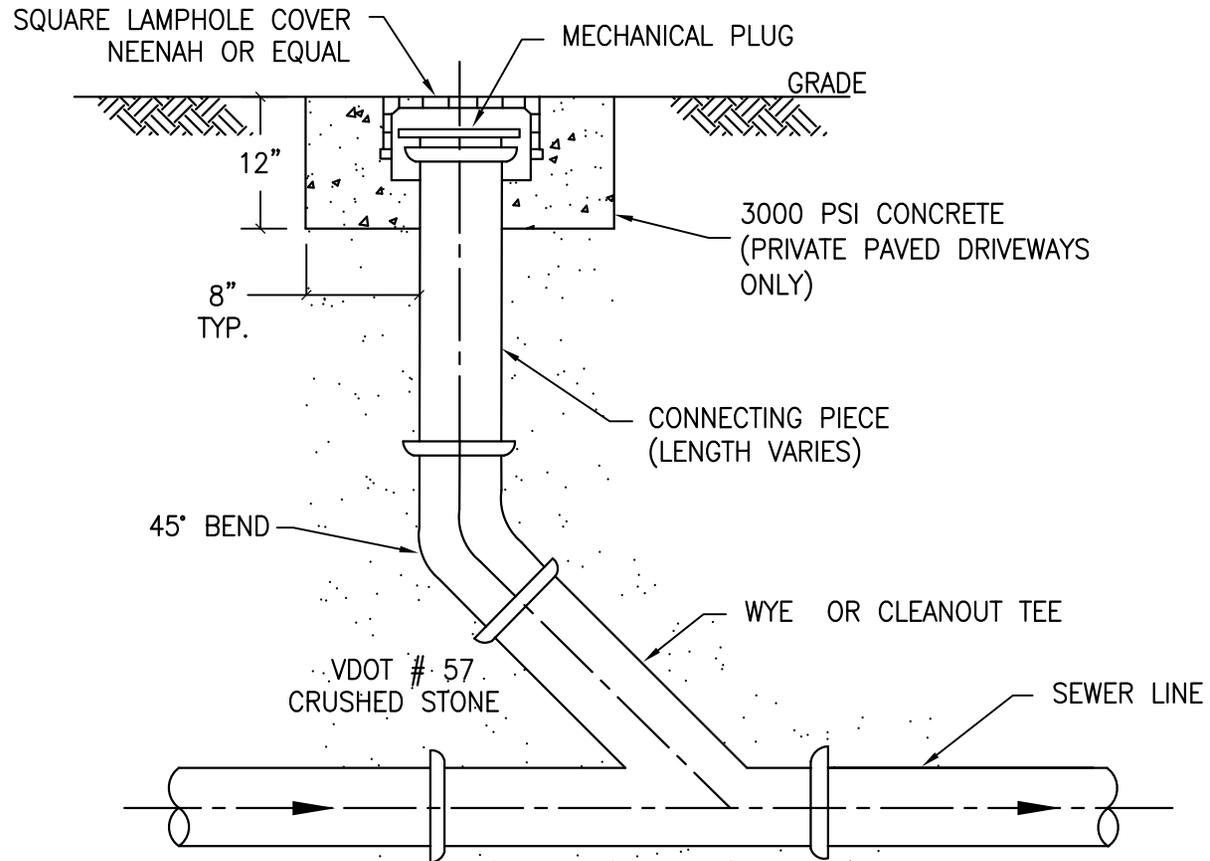


CITY OF CHARLOTTESVILLE

JUN	2014
REVISION	DATE

CITY STANDARDS	
SEWER LATERAL CONNECTION – TYPICAL	
SCALE: N.T.S.	STANDARD NUMBER: WW 5.0

NOTE: CLEANOUTS IN PAVED OR CONCRETE SHALL BE TRAFFIC RATED.



NOTE: CLEANOUT TO BE SAME SIZE AND MATERIAL AS SEWER LINE.



CITY OF CHARLOTTESVILLE

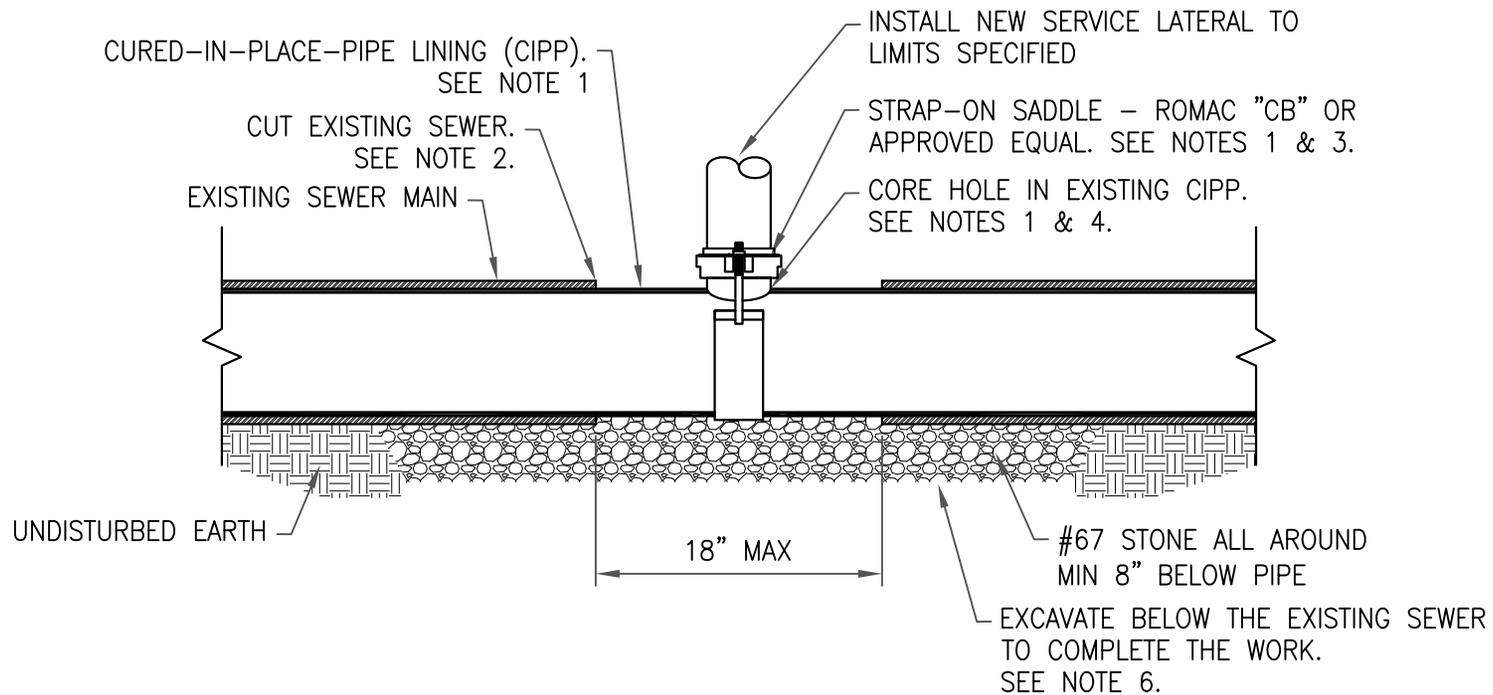
JAN	2011
REVISION	DATE

CITY STANDARDS

CLEANOUT DETAIL

SCALE: N.T.S.

STANDARD NUMBER: WW 5.1



NOTES:

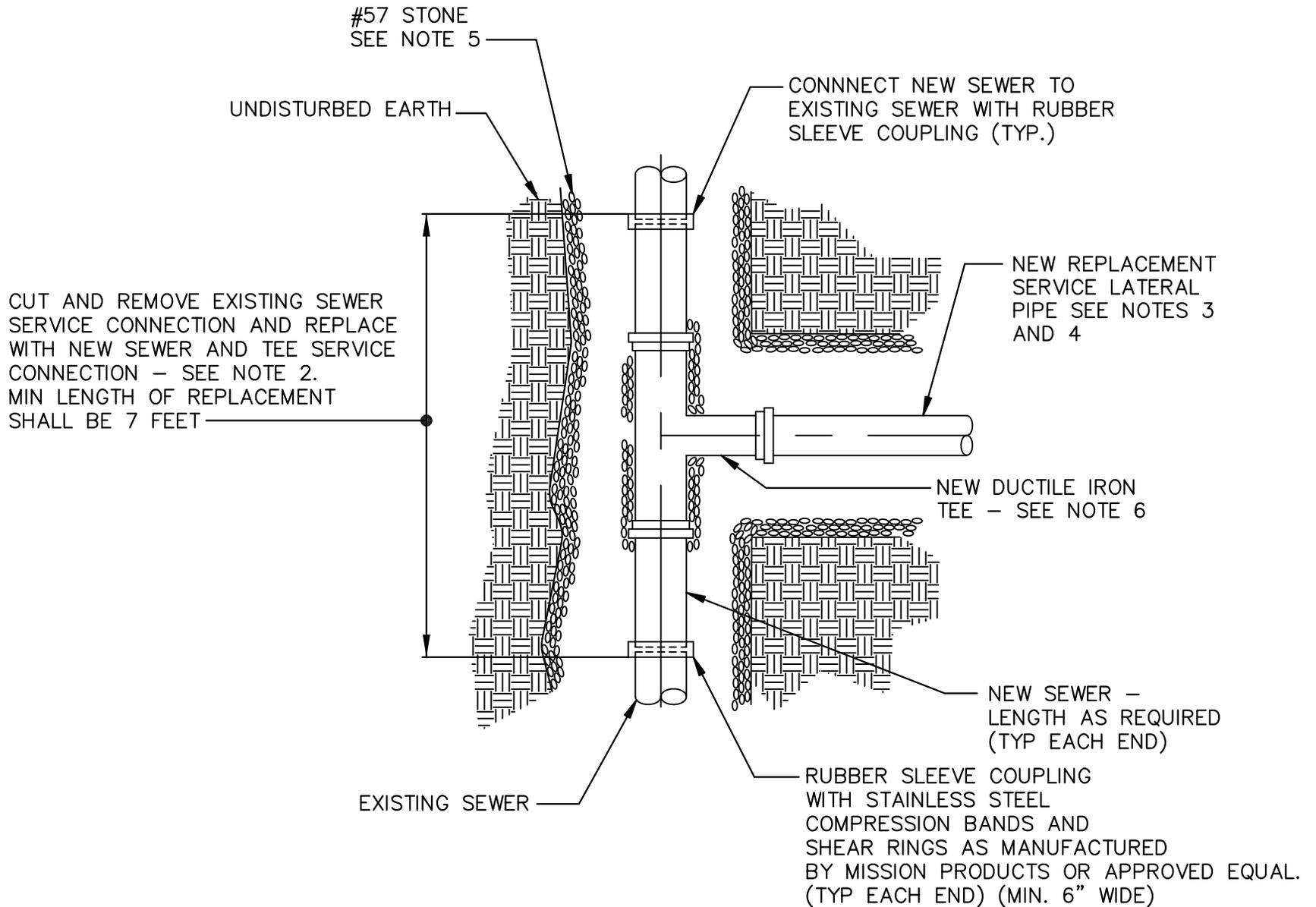
1. REFER TO THIS DETAIL TO CONNECT NEW SERVICE LATERALS AFTER THE SEWERS HAVE BEEN LINED WITH CIPP. THE DETAIL SHALL BE USED WHEN RECONNECTING SERVICES FOLLOWING PIPE BURSTING. IN THAT SITUATION, ALL REFERENCES TO CIPP IN THIS DETAIL SHALL BE HDPE.
2. NEATLY CUT THE EXISTING SEWER WITH A CUTTER SPECIFICALLY 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 EQUALL 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 BURRS, 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.



CITY OF CHARLOTTESVILLE

JULY	2011
REVISION	DATE

CITY STANDARDS	
SANITARY SEWER LATERAL CONNECTION FOR CIPP LINED PIPE	
SCALE: N.T.S.	STANDARD NUMBER: WW 5.2



CITY OF CHARLOTTESVILLE

JULY 2011

CITY STANDARDS

SERVICE LATERAL REPLACEMENT

(PAGE 1 of 2)

REVISION DATE

SCALE: N.T.S.

STANDARD NUMBER: WW 5.3

NOTES:

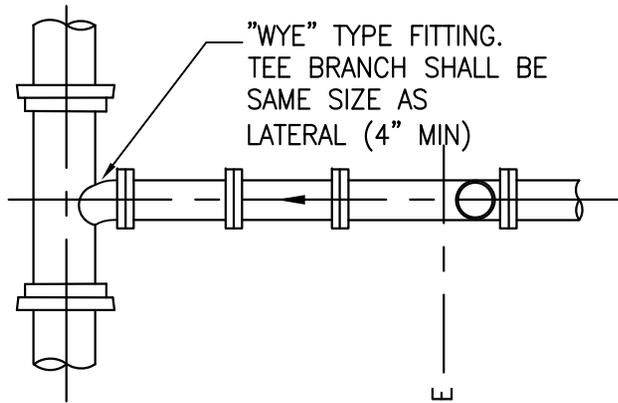
1. REPLACE EXISTING SERVICE LATERALS WHERE SPECIFIED BY THE ENGINEER. REPLACEMENT TO INCLUDE THE TEE AND 6 FEET OF SERVICE LATERAL TO RECONNECT TO THE EXISTING LATERAL. THE ENGINEER WILL DETERMINE WHICH SERVICES TO REPLACE FROM REVIEW OF TELEVISION INSPECTIONS.
2. INSTALL THE NEW SEWER AT A CONSTANT SLOPE BETWEEN THE TWO EXISTING PIPE ENDS.
3. INSTALL FITTINGS, ADAPTERS AND RUBBER SLEEVE COUPLINGS AS NECESSARY TO CONNECT NEW TEE AND SERVICE LATERAL. NEW LATERALS AND TEE BRANCHES SHALL BE THE SAME SIZE AS THE EXISTING LATERAL.
4. NEW SERVICE LATERAL SHALL BE INSTALLED AT THE EXISTING LATERAL SLOPE AND IN THE EXISTING LATERAL LOCATION. CONNECT NEW LATERAL TO EXISTING LATERAL WITH RUBBER SLEEVE COUPLINGS WITH STAINLESS STEEL COMPRESSION BANDS AND SHEAR RINGS AS MANUFACTURED BY MISSION PRODUCTS. BYPASS FLOWS FROM THE LATERAL DURING CONSTRUCTION TO MAINTAIN SEWER SERVICE. DISPOSE OF EXISTING LATERAL PIPE MATERIAL OFFSITE.
5. INSTALL AND COMPACT #57 CRUSHED STONE TO A MIN OF 1 FOOT ABOVE THE TOP OF THE NEW SEWER PIPE, TEE, FITTINGS AND SERVICE LATERAL PIPES. IN PAVED AREAS, THE ENGINEER MAY SPECIFY THAT THE TRENCH BE BACKFILLED WITH IMPORTED #21A STONE FROM TOP OF STONE TO PAVEMENT. RESTORE SURFACE TO MATCH EXISTING CONDITIONS.
6. INSTALL FITTINGS AS NECESSARY TO RETURN THE NEW LATERAL TO THE EXISTING LATERAL ELEVATION. ALL TEES SHALL BE DUCTILE IRON.
7. CONTRACTOR SHALL TELEVISE THE MAIN SEWER AFTER THE SERVICE LATERAL IS REPLACED TO VERIFY PROPER INSTALLATION. THERE SHALL BE NO OFFSET OR MISALIGNED JOINTS. THE COST FOR THE CCTV INSPECTION SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE SERVICE LATERAL REPLACEMENT.



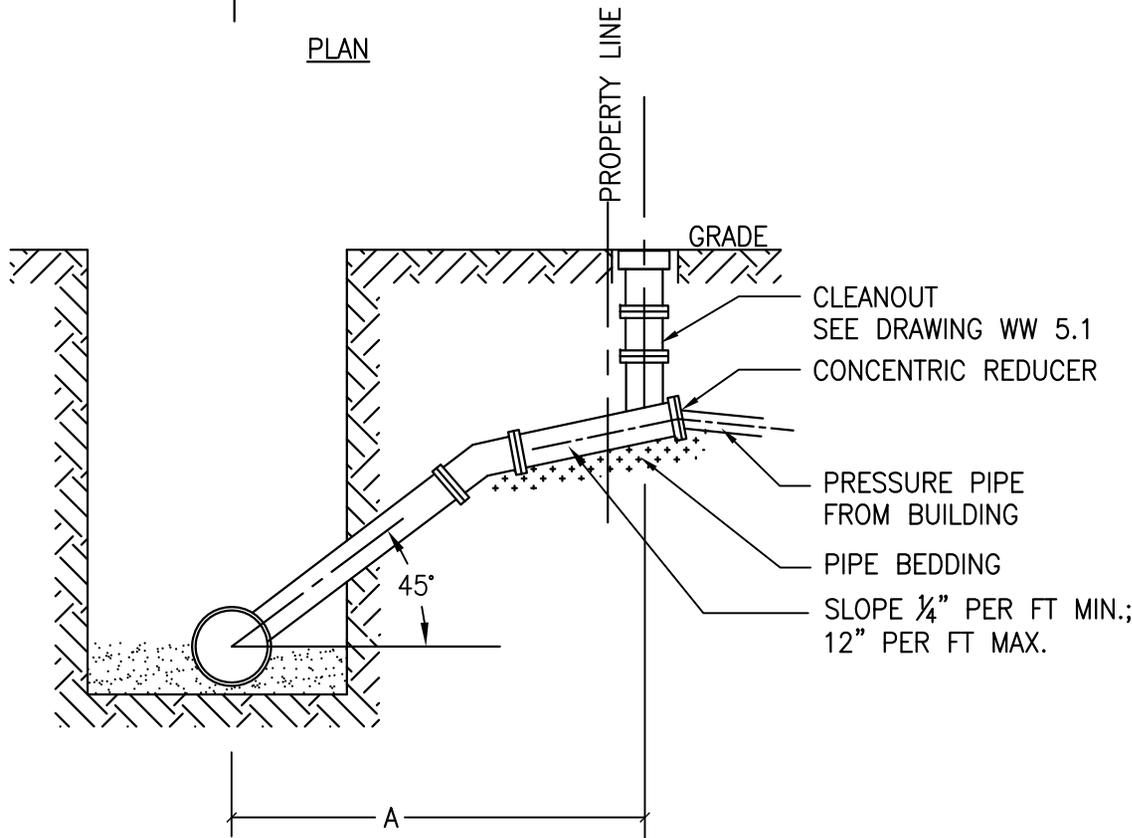
CITY OF CHARLOTTESVILLE

JULY	2011
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CITY STANDARDS	
SERVICE LATERAL REPLACEMENT	
(PAGE 2 of 2)	
SCALE: N.T.S.	STANDARD NUMBER: WW 5.3



PLAN



ELEVATION

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 EQUAL. 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.
7. SANITARY LATERAL LINES INSTALLED IN THE RIGHT OF WAY MUST FLOW BY GRAVITY.

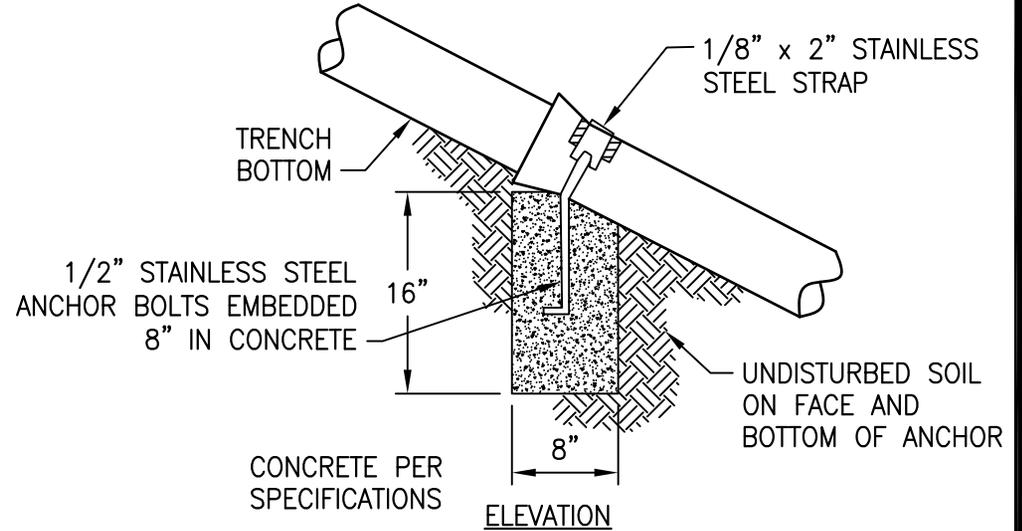
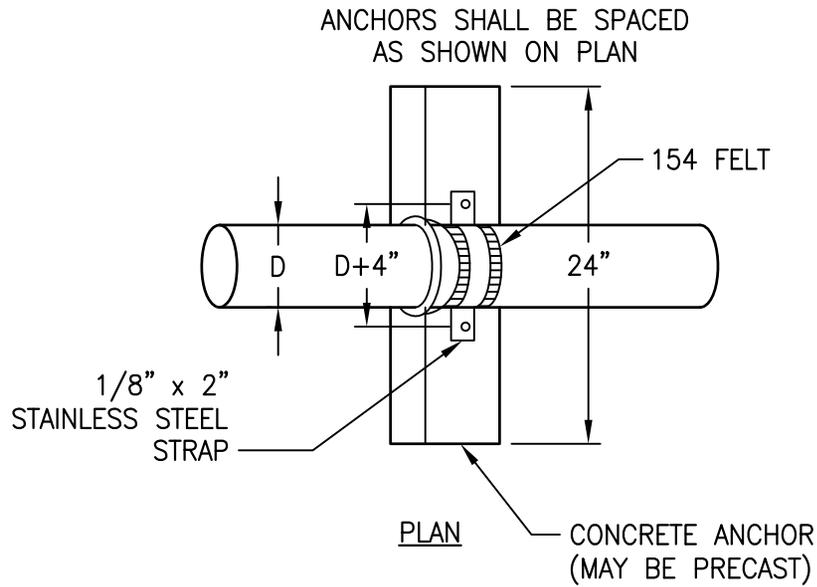


CITY OF CHARLOTTESVILLE

FEB	2013
REVISION	DATE

CITY STANDARDS  
**PRESSURIZED SEWER  
 LATERAL CONNECTION**

SCALE: N.T.S. | STANDARD NUMBER: WW 5.4



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

JULY 2011

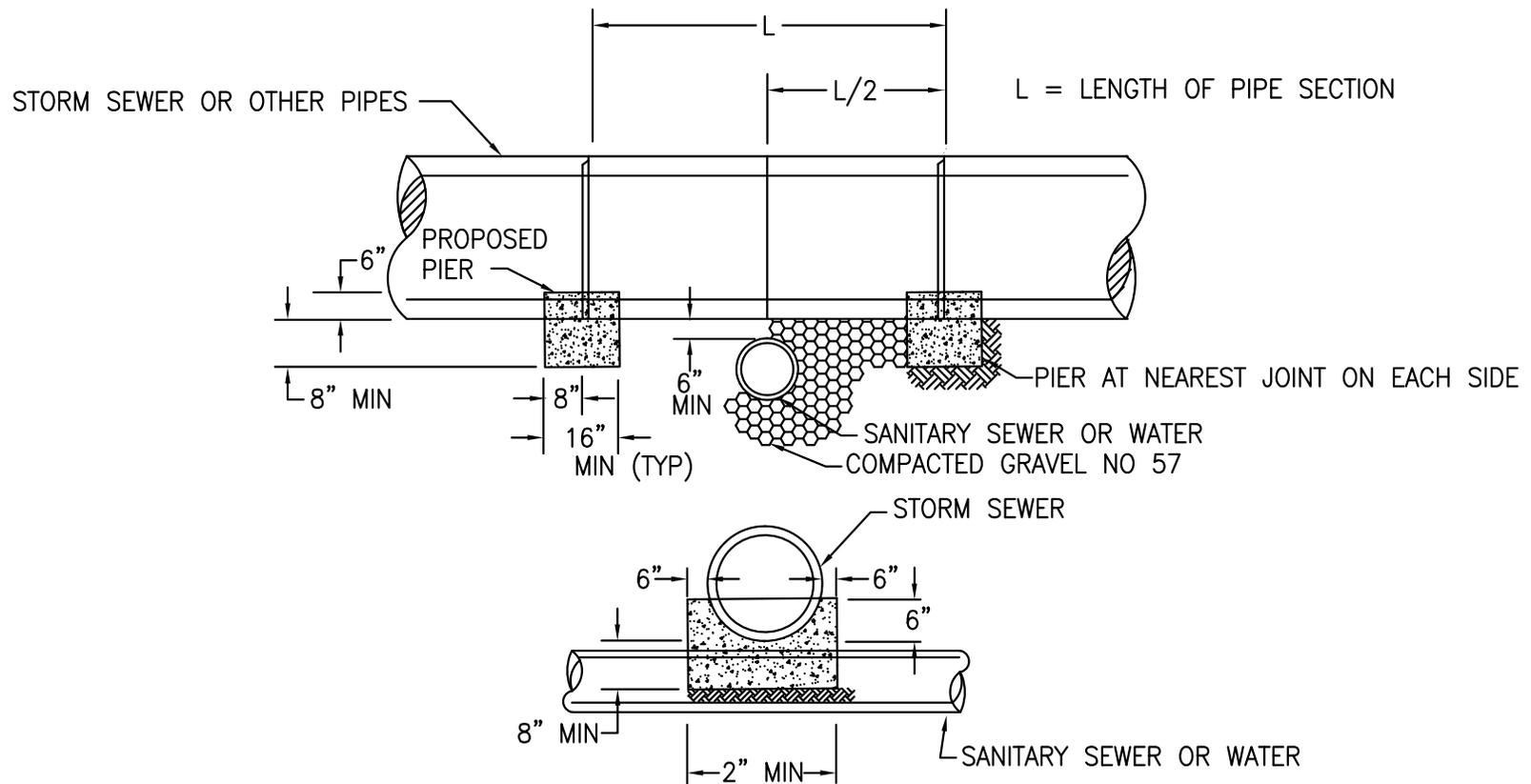
CITY STANDARDS

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.



CITY OF CHARLOTTESVILLE

JULY 2011

CITY STANDARDS

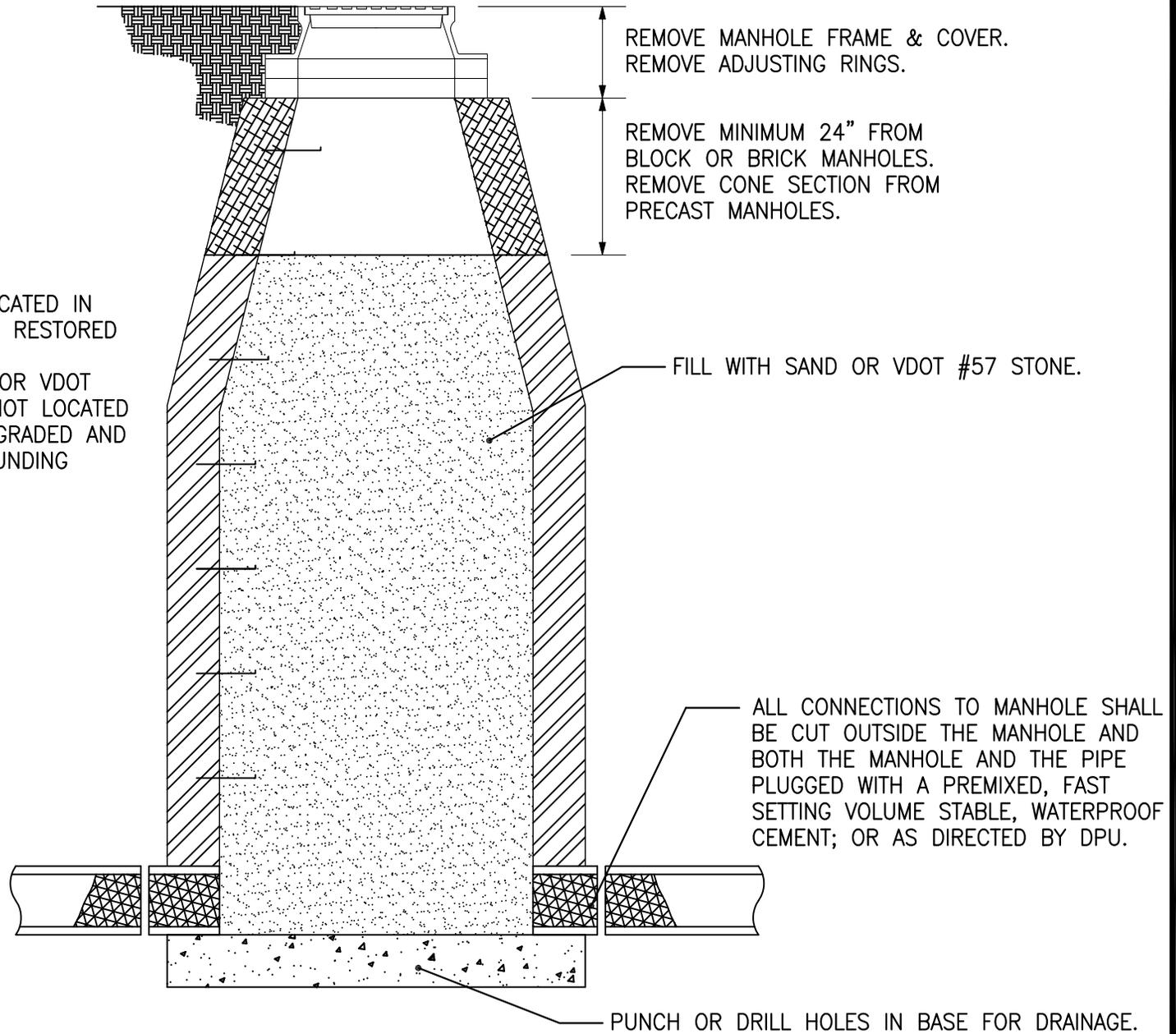
CONCRETE PIER

REVISION DATE

SCALE: N.T.S.

STANDARD NUMBER: WW 6.1

NOTE: WHERE MANHOLE IS LOCATED IN PAVEMENT, PAVEMENT WILL BE RESTORED IN ACCORDANCE WITH CITY OF CHARLOTTESVILLE STANDARDS OR VDOT STANDARDS. FOR MANHOLES NOT LOCATED IN PAVEMENT, AREA WILL BE GRADED AND RESTORED SIMILAR TO SURROUNDING CONDITIONS.

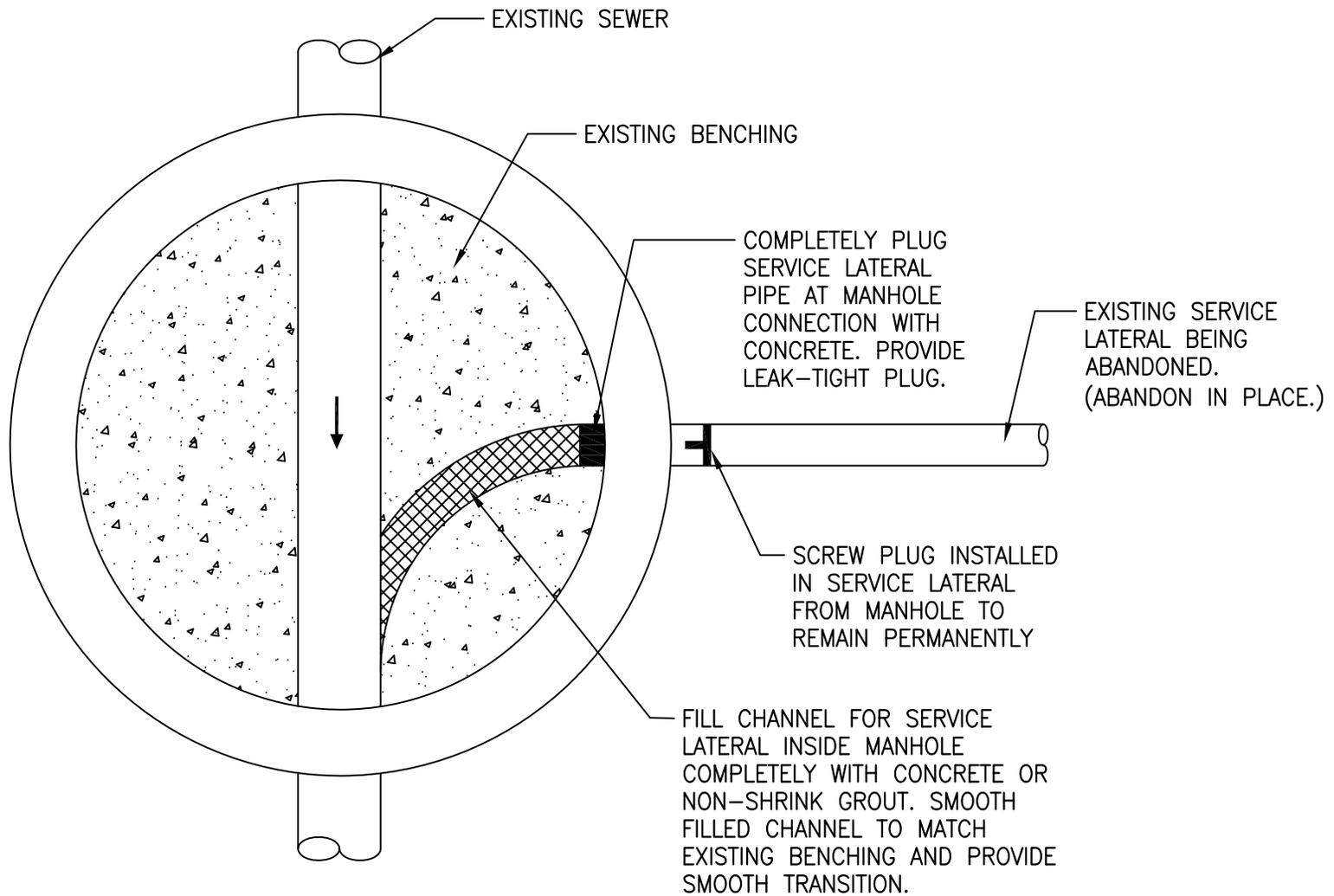


CITY OF CHARLOTTESVILLE

JULY	2011
REVISION	DATE

CITY STANDARDS  
**MANHOLE  
 ABANDONMENT**

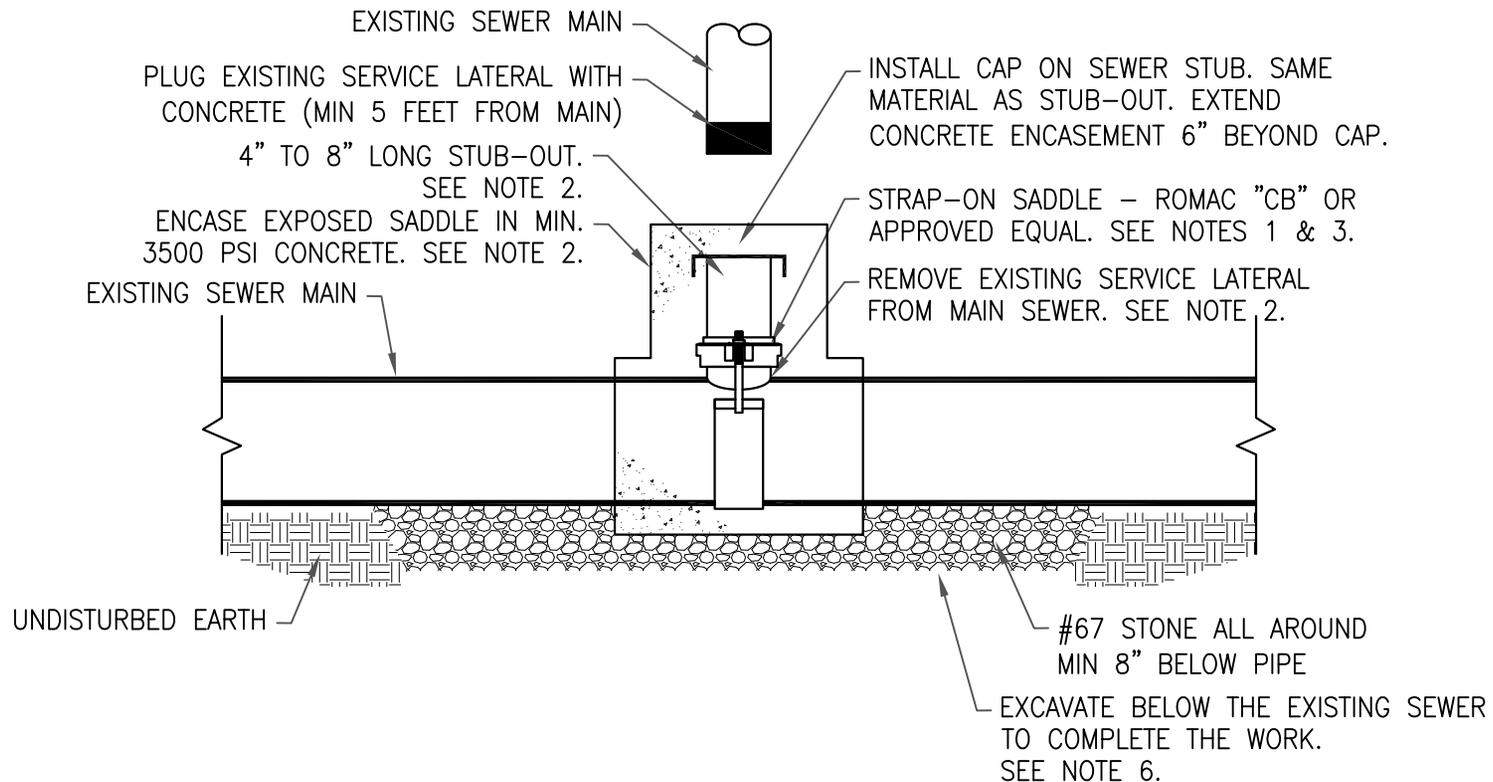
SCALE: N.T.S. | STANDARD NUMBER: WW 7.0



CITY OF CHARLOTTESVILLE

JAN	2012
REVISION	DATE

CITY STANDARDS	
SEWER LATERAL ABANDONMENT AT MANHOLE	
SCALE: N.T.S.	STANDARD NUMBER: WW 7.1



NOTES:

1. REFER TO THIS DETAIL WHEN ABANDONING EXISTING SERVICE LATERALS. SERVICE LATERALS SHALL BE ABANDONED WHEN A NEW LATERAL IS BEING INSTALLED TO SERVE A PROPERTY AND THE NEW LATERAL IS BEING CONNECTED TO THE THE MAIN SEWER AT A DIFFERENT LOCATION, A BUILDING IS BEING DEMOLISHED, OR AS DIRECTED BY UTILITIES ENGINEER. CONTACT PUBLIC UTILITIES (434-970-3800) A MINIMUM OF 48 HOURS IN ADVANCE FOR INSPECTION PRIOR TO BACKFILL.
2. TO ABANDON THE EXISTING SERVICE LATERAL AT THE MAIN SEWER, CAREFULLY REMOVE THE LATERAL FROM THE MAIN SEWER, CUT THE EXISTING LATERAL AT LEAST 5 FEET FROM THE MAIN SEWER, PLUG THE REMAINING PIPE END WITH CONCRETE, INSTALL A SADDLE PER NOTE 3 AND 4" TO 8" LONG STUB-OUT. INSTALL A CAP ON THE STUB-OUT AND ENCASE THE SADDLE, STUB-OUT AND CAP IN MIN. 3500 PSI CONCRETE - ENCASEMENT TO EXTEND TO 8" EACH SIDE OF THE LATERAL/SADDLE AND 6" BEYOND THE CAP. BACKFILL AS SPECIFIED.

IF THE EXISTING MAIN SEWER IS DAMAGED DURING THE REMOVAL OF THE EXISTING LATERAL AND THE SADDLE CONNECTION WILL NOT WORK AS DETERMINED BY CITY PERSONNEL, A POINT REPAIR SHALL BE PERFORMED ON THE MAIN SEWER PER DETAIL WW 8.1.

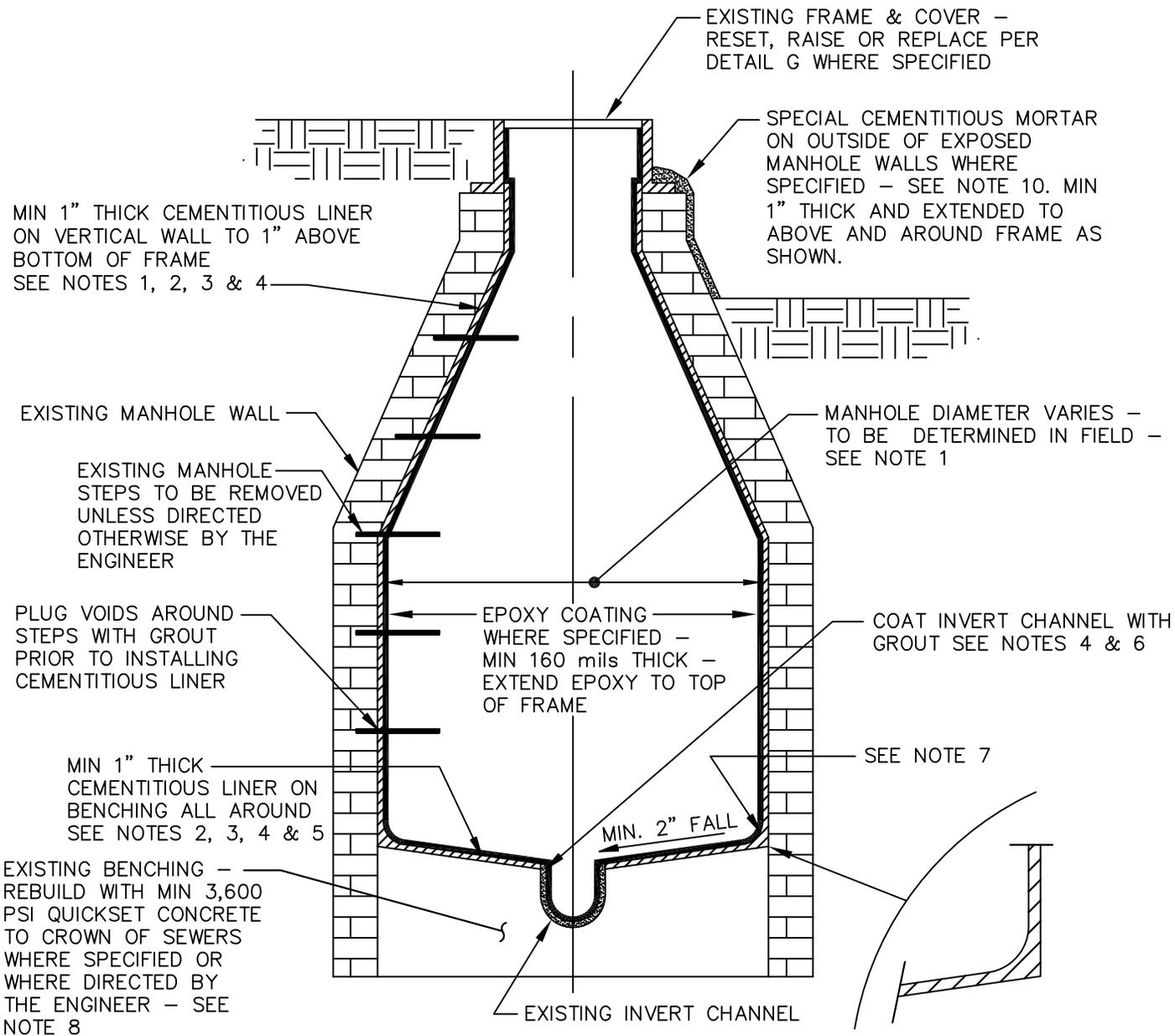
3. SUPPORT THE EXISTING SEWER DURING THIS WORK.



CITY OF CHARLOTTESVILLE

JAN	2012
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CITY STANDARDS	
SEWER LATERAL ABANDONMENT AT MAIN	
SCALE: N.T.S.	STANDARD NUMBER: WW 7.2



CITY OF CHARLOTTESVILLE

JULY 2011

CITY STANDARDS

REHAB OF EXISTING MANHOLE  
(PAGE 1 of 2)

REVISION DATE

SCALE: N.T.S.

STANDARD NUMBER: WW 8.0

NOTES:

1. MANHOLE SHOWN IS A TYPICAL SHAPE. HOWEVER, MANHOLE SHAPES WILL VARY. CONTRACTOR SHALL DETERMINE ACTUAL SHAPE. UNIT PRICES BID SHALL COVER ANY SHAPE.
2. BID ITEMS ARE INCLUDED FOR COATING EXISTING 4-FOOT, 5-FOOT, AND 6-FOOT DIAMETER MANHOLES WITH ANY SPECIFIED MATERIAL AND WITH HYDROGEN-SULFIDE RESISTANT MATERIAL. THE ENGINEER WILL SPECIFY THE REQUIRED MATERIAL FOR EACH MANHOLE. EPOXY SHALL BE APPLIED EITHER TO THE MANHOLE WALL DIRECTLY OR ON TOP OF THE CEMENTITIOUS MORTAR WHERE SPECIFIED.
3. CEMENTITIOUS LINER AND/OR EPOXY SHALL NOT BE INSTALLED UNTIL ALL MAIN SEWER, SERVICE LATERAL WORK WITHIN THE MANHOLE, AND OTHER MANHOLE REHABILITATION WORK IS COMPLETED.
4. CONTRACTOR SHALL PROPERLY PREPARE SURFACE PRIOR TO LINING IN STRICT ACCORDANCE WITH THE LINING MANUFACTURER'S RECOMMENDATIONS AND THE SPECIFICATIONS. ALL MATERIAL REMOVED DURING THE PREPARATORY WORK INCLUDING PRESSURE CLEANING SHALL BE REMOVED FROM THE MANHOLE AND DISPOSED OF OFFSITE - NO MATERIAL SHALL BE ALLOWED TO ENTER THE SEWERS. IN ADDITION, NO CHEMICALS USED FOR CLEANING OR OTHER OPERATIONS SHALL BE ALLOWED TO ENTER THE SEWER. CEMENTITIOUS LINING SHALL BE MONOLITHICALLY SPRAY-APPLIED IN ONE PASS AND TROWELED SMOOTH AFTER APPLICATION. EPOXY SHALL BE SPRAY-APPLIED IN ONE OR TWO PASSES.  
  
CONTRACTOR SHALL PROVIDE BYPASS PUMPING AS REQUIRED WHILE REHABILITATING MANHOLES. BYPASS PUMPING MUST BE PERFORMED WHEN COATING THE INVERT CHANNELS WITH GROUT AND/OR EPOXY. NO MATERIAL SHALL BE ALLOWED TO ENTER THE SEWERS.
5. PROVIDE ADDITIONAL CEMENTITIOUS MATERIAL AS NECESSARY TO PROVIDE A MINIMUM 2" FALL FROM THE MANHOLE WALL TO THE INVERT CHANNEL. ANY AND ALL ADDITIONAL CEMENTITIOUS MATERIAL REQUIRED TO PROVIDE THE 2" FALL SHALL BE INCIDENTAL TO THE WORK AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE CEMENTITIOUS COATING. THE CONTRACTOR IS ADVISED THAT MOST OF THE EXISTING BENCHES ARE FLAT. PROVIDE CHANNEL IN BENCHING FOR SEWERS ENTERING MANHOLES ABOVE BENCHING. CHANNEL TO PROVIDE SMOOTH TRANSITION TO MAIN INVERT CHANNEL.

6. COAT INVERT CHANNELS WITH A QUICKSET NON-SHRINK GROUT TO PROVIDE A CONSTANT SLOPE BETWEEN INLET AND OUTLET SEWERS WHEN SPECIFIED/REQUIRED BY THE ENGINEER. PROVIDE ADDITIONAL MATERIAL AS NECESSARY TO PROVIDE A UNIFORM INVERT CHANNEL THROUGH THE MANHOLE. THE WIDTH OF THE UNIFORM CHANNEL SHALL BE EQUAL TO THE INCOMING AND OUTGOING PIPE DIAMETERS. THE FINISHED CHANNEL SHALL BE SMOOTH AND FREE OF BURRS THAT WILL CATCH TOILET PAPER, DEBRIS, RAGS, ETC. SEE NOTE 8.  
  
COAT CHANNELS WITH EPOXY WHEN EPOXY COATING IS SPECIFIED.
7. AT WALL/BENCH INTERFACE, INSTALL ADDITIONAL CEMENTITIOUS MATERIAL TO PROVIDE A SMOOTH TRANSITION FROM THE WALL TO THE BENCH AS SHOWN. MATERIAL SHALL BE MONOLITHICALLY APPLIED WITH THE WALL AND BENCH MATERIAL.
8. THE ENGINEER WILL SPECIFY MANHOLE BENCHES AND INVERT CHANNELS THAT ARE REQUIRED TO BE RE-BUILT. THE ENGINEER WILL DETERMINE SUCH WORK BASED ON MANHOLE INSPECTIONS. RE-BUILDING MAY BE REQUIRED IF THERE IS NO BENCHING, AND NO DEFINED INVERT CHANNEL OR IF THE EXISTING INVERT CHANNEL IS MORE THAN 6 INCHES WIDER THAN THE INCOMING AND OUTGOING PIPE DIAMETERS. EXISTING INVERT CHANNELS THAT ARE LESS THAN 6 INCHES WIDER THAN THE INCOMING/OUTGOING PIPE DIAMETERS SHALL BE NARROWED TO PROVIDE A UNIFORM CHANNEL PER NOTE 6 AS PART OF THE MANHOLE REHABILITATION WORK AND AT NO ADDITIONAL COST. BENCHES AND INVERTS SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND DETAILS. SEE NOTE 6.
9. ALL MANHOLES COATED WITH CEMENTITIOUS MORTAR SHALL BE VACUUM TESTED IN ACCORDANCE WITH ASTM C-1244 EXCEPT THAT THE MINIMUM TEST TIME SHALL BE 1 MINUTE. VACUUM TESTING SHALL BE PERFORMED AFTER ALL MANHOLE REHABILITATION WORK IS COMPLETE. TESTING SHALL INCLUDE VACUUM TESTING THE FRAME-CHIMNEY INTERFACE. CONTRACTOR TO PERFORM ALL MANHOLE REHABILITATION WORK NECESSARY IN ORDER TO PASS THE VACUUM TEST. THE CONTRACTOR SHALL REPAIR ALL LEAKS AND SHALL RE-TEST MANHOLES THAT FAIL THE VACUUM TEST REGARDLESS OF THE REASON FOR THE FAILURE (INCLUDING LEAKS AT THE FRAME-CHIMNEY SEAL) AT NO ADDITIONAL COST TO THE OWNER.

ALL MANHOLES COATED WITH EPOXY SHALL BE SPARK TESTED AS SPECIFIED.

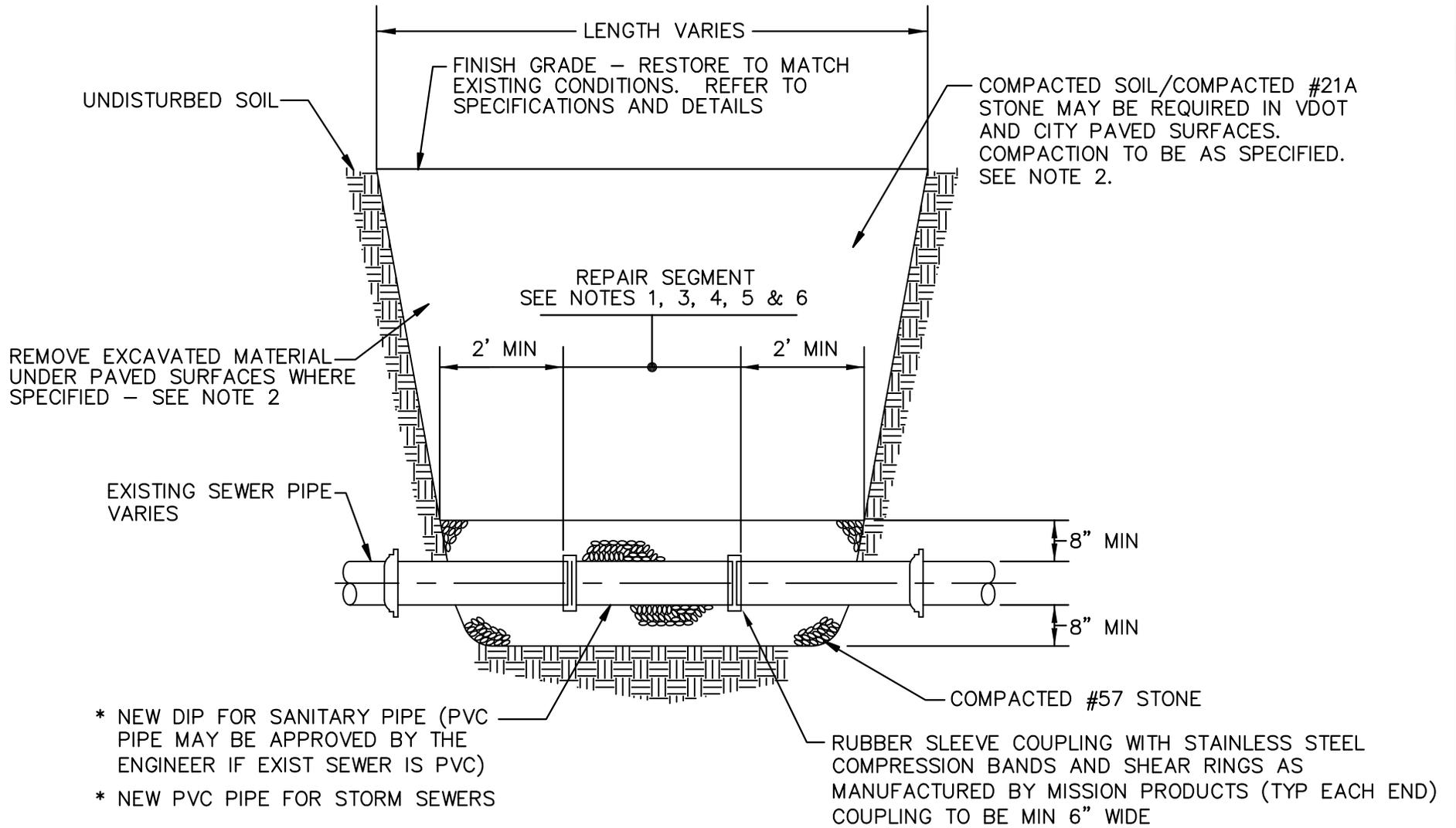
10. THE ENGINEER WILL SPECIFY MANHOLES TO RECEIVE AN EXTERIOR COATING OF MORTAR. THE MORTAR SHALL BE SPECIALLY DESIGNED FOR INSTALLATION ON VERTICAL, EXPOSED SURFACES AS RECOMMENDED BY THE MORTAR MANUFACTURER. THE MORTAR SHALL BE USED TO REPAIR BROKEN OR CRACKED MORTAR AND TO PATCH HOLES IN EXPOSED WALLS. ALL OLD, CRACKED MORTAR SHALL BE COMPLETELY REMOVED AND THE SUBSTRATE SURFACE SHALL BE CLEAN AND DRY PRIOR TO INSTALLING NEW, 1-INCH THICK MORTAR. MORTAR TO BE HB2 REPAIR MORTAR BY THOROC, SIKATOP 123 BY SIKA CORPORATION OR APPROVED EQUAL.



CITY OF CHARLOTTESVILLE

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CITY STANDARDS	
REHAB OF EXISTING MANHOLE	
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CITY OF CHARLOTTESVILLE

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CITY STANDARDS

TYPICAL POINT REPAIR

(PAGE 1 of 2)

SCALE: N.T.S.

STANDARD NUMBER: WW 8.1

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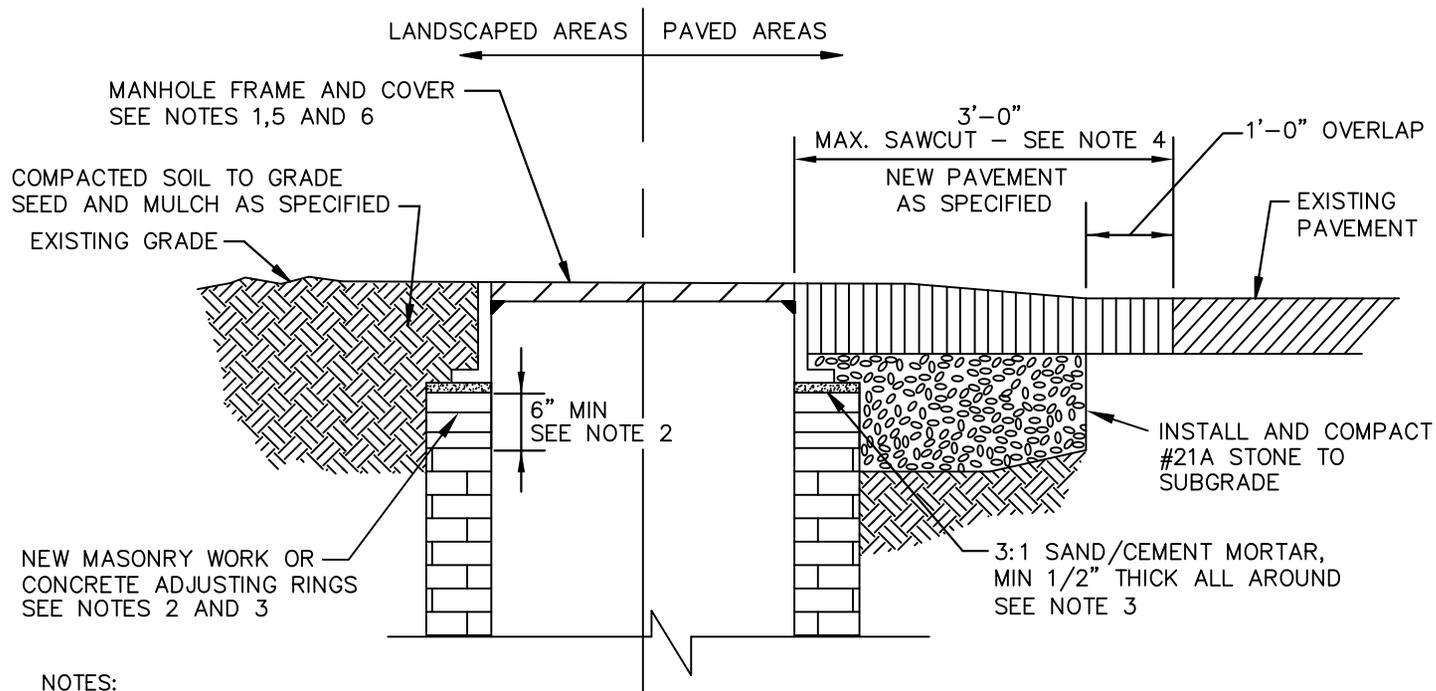
1. THE SEQUENCE OF WORK FOR PERFORMING REPAIRS SHALL BE AS FOLLOWS:
  - A. BYPASS PUMP FLOWS AROUND REPAIR SEGMENT OR PLUG LINE THE ENTIRE TIME THE REPAIR IS BEING MADE.
  - B. EXCAVATE TO AT LEAST 8" BELOW EXISTING SEWER.
  - C. NEATLY CUT EXISTING SEWER AT EACH END OF REPAIR SEGMENT AND REMOVE EXISTING SEWER COMPLETELY.
  - D. INSTALL #57 STONE TO SEWER INVERT ELEVATION AND COMPACT.
  - E. INSTALL NEW SEWER AT A CONSTANT SLOPE BETWEEN THE TWO EXISTING PIPE ENDS. CONNECT THE NEW SEWER TO THE EXISTING WITH A MISSION COUPLING OR APPROVED EQUAL. REMOVE STONE BEDDING AS REQUIRED TO INSTALL PIPE AND COUPLINGS AND FILL VOIDS UNDER PIPE WITH STONE.
  - F. RETURN FLOW THROUGH PIPE.
  - G. BACKFILL AND COMPACT AS SHOWN.
2. UNDER VDOT AND CITY PAVED SURFACES, THE ENGINEER MAY SPECIFY THAT THE CONTRACTOR REMOVE THE EXCAVATED SOIL AND DISPOSE OF IT OFFSITE AND IMPORT #21A STONE FOR BACKFILLING FROM TOP OF #57 STONE TO PAVEMENT SUBGRADE. MEET ALL VDOT AND CITY REQUIREMENTS. DO NOT PLACE ANY SOIL ON PAVED SURFACES DURING THE WORK.
3. SERVICE LATERALS LOCATED WITHIN REPAIR SEGMENTS SHALL BE CONNECTED TO NEW SEWER WITH A DUCTILE IRON TEE-WYE. SEE DETAIL NO. F.
4. LENGTH OF REPAIR SEGMENT SHALL BE DETERMINED AND/OR APPROVED BY THE ENGINEER.
5. MAIN SEWER SHALL BE INSPECTED VIA CLOSED CIRCUIT TELEVISION (CCTV) AFTER PERFORMING REPAIR TO VERIFY PROPER ALIGNMENT OF NEW SEWER AND PROPER CONNECTION TO EXISTING SEWER. ANY OFFSET JOINTS OR MISALIGNMENT SHALL BE CORRECTED PRIOR TO ACCEPTANCE BY THE ENGINEER. THE CCTV INSPECTION TAPE AND LOG SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL AND SHALL CLEARLY SHOW EACH PIPE CONNECTION AND ANY CONNECTING SERVICE LATERAL. THE COST FOR THE CCTV INSPECTION SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE POINT REPAIR.
6. REFER TO DETAIL NO. E FOR CONNECTING TO MANHOLES.



CITY OF CHARLOTTESVILLE

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CITY STANDARDS	
TYPICAL POINT REPAIR	
(PAGE 2 of 2)	
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**NOTES:**

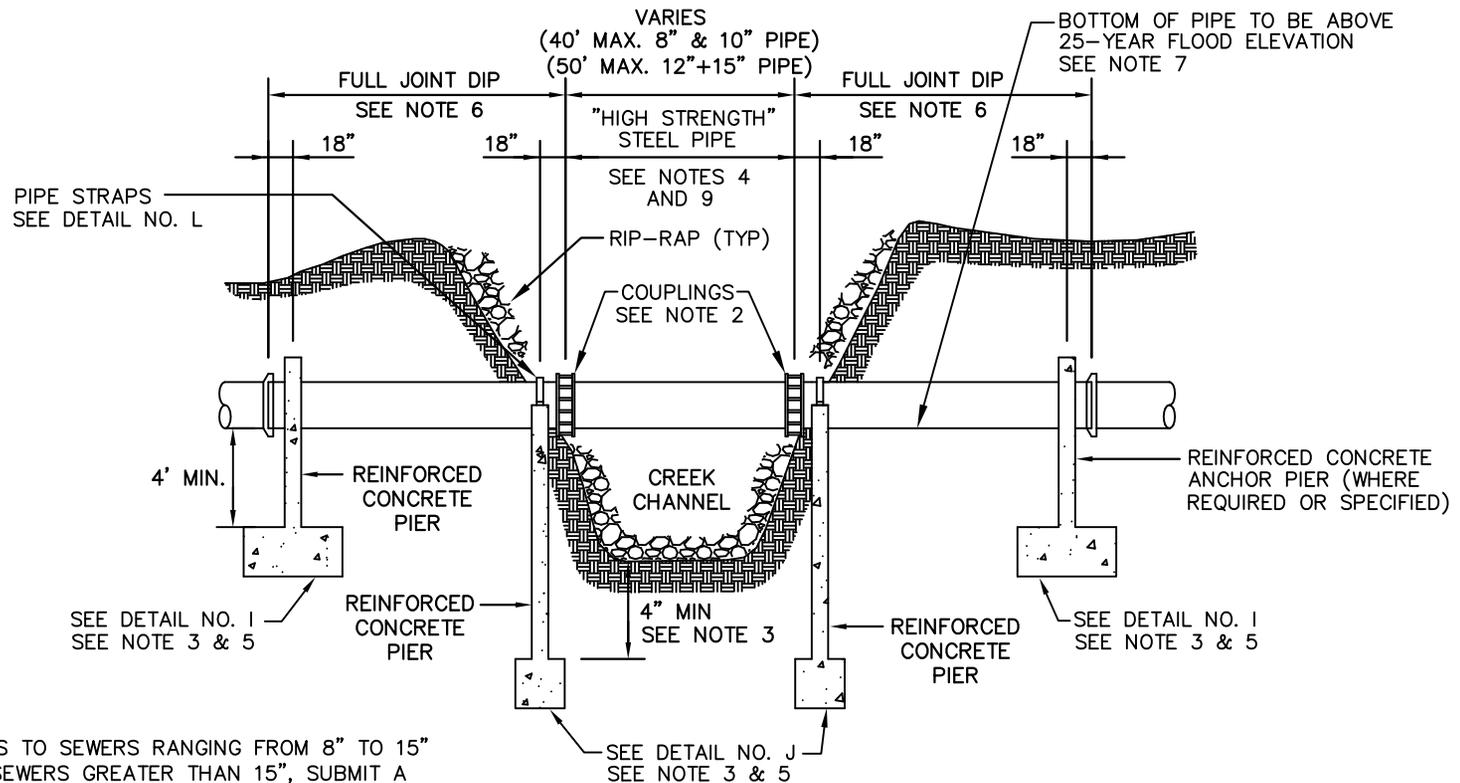
1. CONTRACTOR SHALL REFER TO THIS DETAIL WHEN RAISING MANHOLES AND WHEN RESETTING OR REPLACING EXISTING FRAMES AND COVERS. ALL REHABILITATION OF FRAMES AND COVERS SHALL BE COMPLETED PRIOR TO OTHER MANHOLE REHABILITATION WORK. THIS DETAIL ILLUSTRATES MANHOLES AT GRADE. FOR FRAME AND COVERS ABOVE GRADE, WORK SHALL BE IN ACCORDANCE WITH THIS DETAIL AND ALL OTHER REQUIREMENTS IN THE STANDARD SPECIFICATIONS AND DETAILS.
2. CONTRACTOR TO REMOVE AT LEAST 6" OF EXISTING BRICK AND/OR MATERIAL PRIOR TO INSTALLING NEW MASONRY OR CONCRETE ADJUSTING RINGS TO PROVIDE A NEW SOLID SURFACE FOR SEATING THE FRAME AND TO PROVIDE A LEAK-TIGHT SEAL.
3. REMOVE ALL LOOSE BRICKS AND MORTAR AND PROVIDE A SMOOTH LEVEL SURFACE PRIOR TO INSTALLING MASONRY OR CONCRETE ADJUSTING RINGS. BRUSH SURFACE WITH STIFF WIRE BRUSH PRIOR TO PLACING MORTAR.
4. IN PAVED AREAS, PAVEMENT SHALL BE SAW-CUT NEATLY IN A SQUARE AROUND EXISTING MANHOLES.
5. MANHOLE COVER TO BE FLUSH WITH EXISTING GRADE UNLESS NOTED OTHERWISE.
6. ALL NEW FRAME AND COVERS (WHERE REQUIRED) SHALL BE SOLID OR WATERTIGHT AS SPECIFIED BY THE ENGINEER.
7. REFER TO THE STANDARD SPECIFICATIONS AND DETAILS FOR FURTHER REQUIREMENTS.



CITY OF CHARLOTTESVILLE

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CITY STANDARDS	
REHAB OF MANHOLE FRAME AND COVER	
SCALE: N.T.S.	STANDARD NUMBER: WW 8.2



**NOTES:**

1. THIS DETAIL APPLIES TO SEWERS RANGING FROM 8" TO 15" IN DIAMETER. FOR SEWERS GREATER THAN 15", SUBMIT A DETAILED DESIGN FOR REVIEW AND APPROVAL.
2. COUPLING SHALL BE LONG BODY TYPE, AND COMPLETELY EXPOSED. COUPLINGS TO BE AS MANUFACTURED BY DRESSER INDUSTRIES – STYLE 62 TRANSITION COUPLING OR APPROVED EQUAL. CENTER RING LENGTH FOR 8" AND SMALLER PIPE TO BE 5". CENTER RING LENGTH FOR 10" TO 15" PIPE TO BE 7". THE CENTER RING, GLANDS, BOLTS AND NUTS SHALL RECEIVE ONE COAT OF SHOP PRIMER.
3. FOOTING DEPTH SHALL BE TO SUITABLE GRADE AS DETERMINED BY THE ENGINEER, BUT SHALL NOT BE LESS THAN AS SHOWN (EXCEPT WHEN PIER IS ANCHORED TO SOLID ROCK).
4. STEEL PIPE MUST BE SEAMLESS OR STRAIGHTSEAM. SPIRAL WELD IS NOT ALLOWED. THE INSIDE DIAMETER OF THE STEEL PIPE TO MATCH THE INSIDE DIAMETER OF THE DUCTILE IRON PIPE. STEEL PIPE TO BE COATED PER THE SPECIFICATIONS. USE DUCTILE IRON PIPE FOR NARROW CREEK CHANNELS – SEE NOTE 9.

5. REFER TO DETAIL NO. K FOR PIERS ON SOLID ROCK.
6. DUCTILE IRON PIPE TO EXTEND TO NEXT MANHOLE. NO PIPE TRANSITIONS BETWEEN MANHOLES SHALL BE ALLOWED.
7. CREEK CROSSINGS MAY REQUIRE A PERMIT FROM STATE AND FEDERAL REGULATORY AGENCIES. WHERE THE PIPE BOTTOM CAN NOT BE INSTALLED ABOVE THE 25-YEAR FLOOD ELEVATION, SPECIAL APPROVAL MUST BE GIVEN BY THE CITY AND/OR REGULATORY AGENCIES.
8. THE CREEK UPSTREAM AND DOWNSTREAM OF THE AERIAL CROSSING MAY NEED STRAIGHTENED FOR PROPER INSTALLATION OF THE PIERS. APPROVAL MAY BE REQUIRED FROM REGULATORY AGENCIES TO STRAIGHTEN CREEK. STABILIZE ALL DISTURBED BANKS WITH RIP-RAP.
9. STANDARD DUCTILE IRON PIPE CAN BE USED FOR CREEK CROSSINGS IF THE CROSSING IS 18 FEET OR LESS. LONG SPAN DUCTILE IRON PIPE AS RECOMMENDED BY THE MANUFACTURER CAN BE USED FOR CROSSINGS 38 FEET AND LESS.



CITY OF CHARLOTTESVILLE

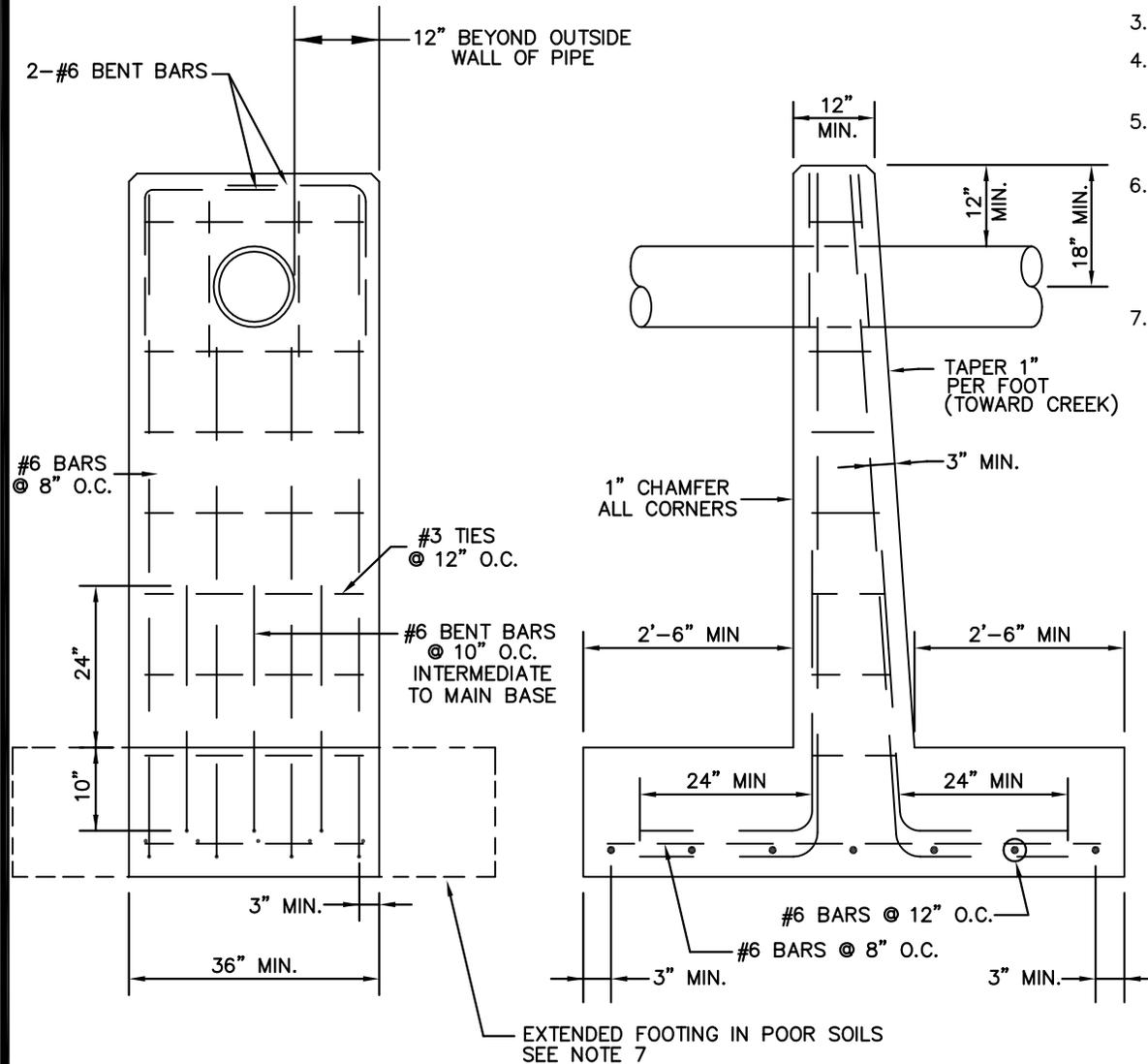
JULY	2011
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CITY STANDARDS  
**AERIAL CREEK CROSSING  
 WITH CONCRETE PIERS**

SCALE: N.T.S. | STANDARD NUMBER: WW 9.0

**NOTES:**

1. ALL CONCRETE TO BE 4000 PSI MINIMUM.
2. DEPTH AND SIZE OF PIERS TO BE DETERMINED BY THE ENGINEER.
3. FOOTING THICKNESS SAME AS BASE THICKNESS OF PIER.
4. PIERS TO BE BUILT WITH LONG SIDE OF FOOTING PERPENDICULAR TO CREEK FLOW.
5. REINFORCING STEEL TO BE PLACED WITH A MINIMUM CLEARANCE OF 3" WITH THE SURFACE OF THE CONCRETE.
6. THE CREEK UPSTREAM AND DOWNSTREAM OF THE AERIAL CROSSING MAY NEED STRAIGHTENED FOR PROPER INSTALLATION OF THE PIERS. APPROVAL MAY BE REQUIRED FROM REGULATORY AGENCIES TO STRAIGHTEN CREEK. STABILIZE ALL DISTURBED BANKS WITH RIP-RAP.
7. IN SOME INSTANCES WHEN POOR SOILS AND SUBGRADE EXIST, THE FOOTING MAY HAVE TO BE EXTENDED EACH WAY TO PROPERLY SUPPORT THE PIER. THE ENGINEER TO DETERMINE WHEN TO EXTEND THE FOOTING. LENGTH OF FOOTING TO AT LEAST EQUAL THE FOOTING LENGTH PERPENDICULAR TO THE CREEK (SHOWN IN THIS DETAIL).

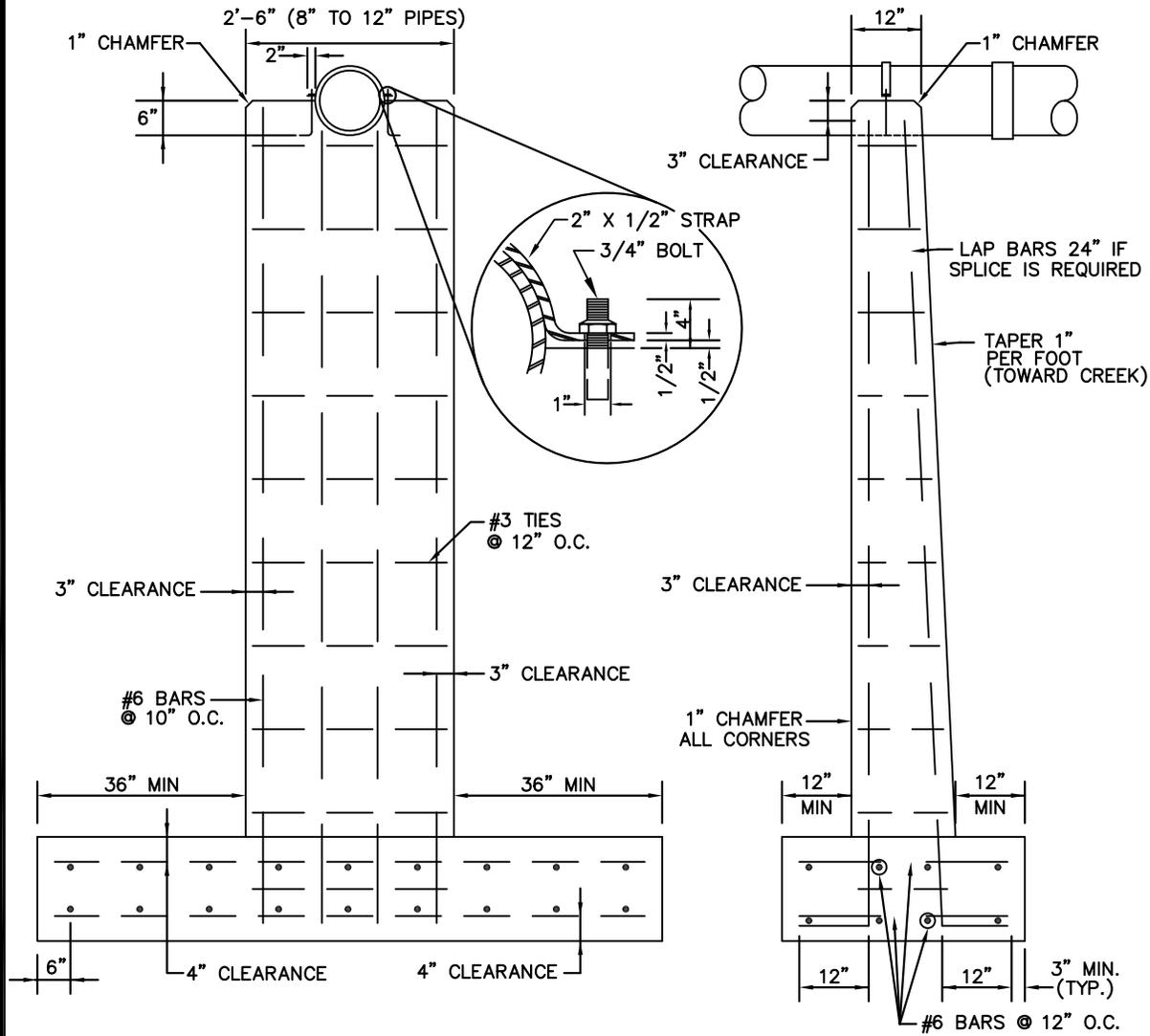


CITY OF CHARLOTTESVILLE

JULY	2011
REVISION	DATE

CITY STANDARDS  
**REINFORCED CONCRETE  
 ANCHOR PIER**

SCALE: N.T.S. | STANDARD NUMBER: WW 9.1



**NOTES:**

1. ALL CONCRETE TO BE 4000 PSI MINIMUM.
2. MAXIMUM HEIGHT OF REINFORCED CONCRETE PIERS TO BE 20'-0".
3. FOOTING THICKNESS SAME AS BASE THICKNESS OF PIER.
4. PIERS TO BE BUILT WITH LONG SIDE PARALLEL TO CREEK FLOW. SEE NOTE 8.
5. PIER TO BE CENTERED ON FOOTING WHEN PIPE IS PARALLEL TO CREEK. SEE NOTE 8.
6. PIPE TO BE SET 1/2 IN PIER AND 1/2 PROTRUDING ABOVE PIER. WHEN PIERS ARE PLACED PARALLEL TO THE FLOW OF THE CREEK AND THE PIPE IS ON A SKEW WITH THE PIER, HOLDING STRAPS MAY STILL BE PLACED AT RIGHT ANGLES TO THE PIPE, PROVIDING THE ANCHOR BOLTS ARE NOT SET WITH A CLEARANCE OF LESS THAN 2" TO THE SURFACE OF THE PIER.
7. NO REINFORCING STEEL TO BE PLACED WITH A CLEARANCE OF LESS THAN 3" TO THE SURFACE OF THE PIER.
8. IN SOME INSTANCES WHEN POOR SOILS AND SUBGRADE EXIST, THE FOOTING MAY HAVE TO BE EXTENDED EACH WAY TO PROPERLY SUPPORT THE PIER. THE ENGINEER TO DETERMINE WHEN TO EXTEND THE FOOTING. LENGTH OF FOOTING TO BE EQUAL EACH WAY.
9. THE CREEK UPSTREAM AND DOWNSTREAM OF THE AERIAL CROSSING MAY NEED STRAIGHTENED FOR PROPER INSTALLATION OF THE PIERS. APPROVAL MAY BE REQUIRED FROM REGULATORY AGENCIES TO STRAIGHTEN CREEK. STABILIZE ALL DISTURBED BANKS WITH RIP-RAP.



CITY OF CHARLOTTESVILLE

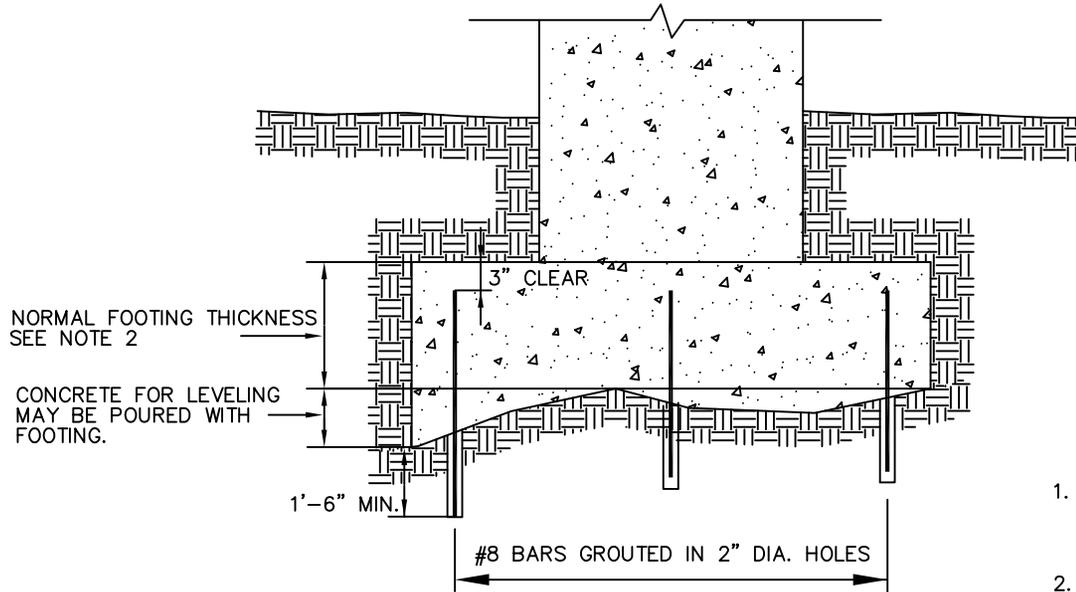
JULY	2011
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CITY STANDARDS

REINFORCED CONCRETE PIER

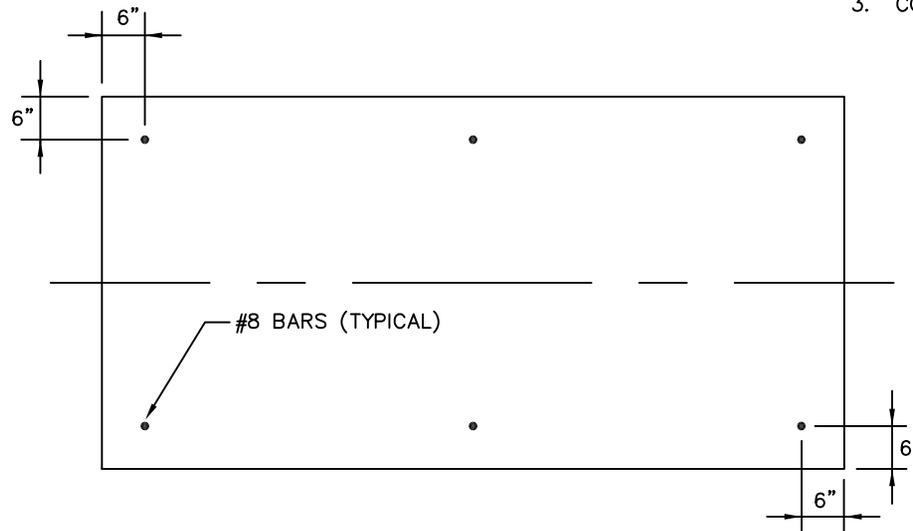
SCALE: N.T.S.

STANDARD NUMBER: WW 9.2



NOTES:

1. THIS DETAIL SPECIFIES HOW TO TIE FOOTINGS TO ROCK. REFER TO DETAIL NO. I AND J FOR REQUIRED REINFORCING IN FOOTING. MAT STEEL FOR FOOTING SHALL BE TIED TO THE DOWELS.
2. MINIMUM THICKNESS OF FOOTING ABOVE ROCK TO BE SAME AS BASE THICKNESS OF PIER.
3. CONCRETE SHALL BE 4000 PSI MINIMUM.



PLAN VIEW



CITY OF CHARLOTTESVILLE

JULY 2011

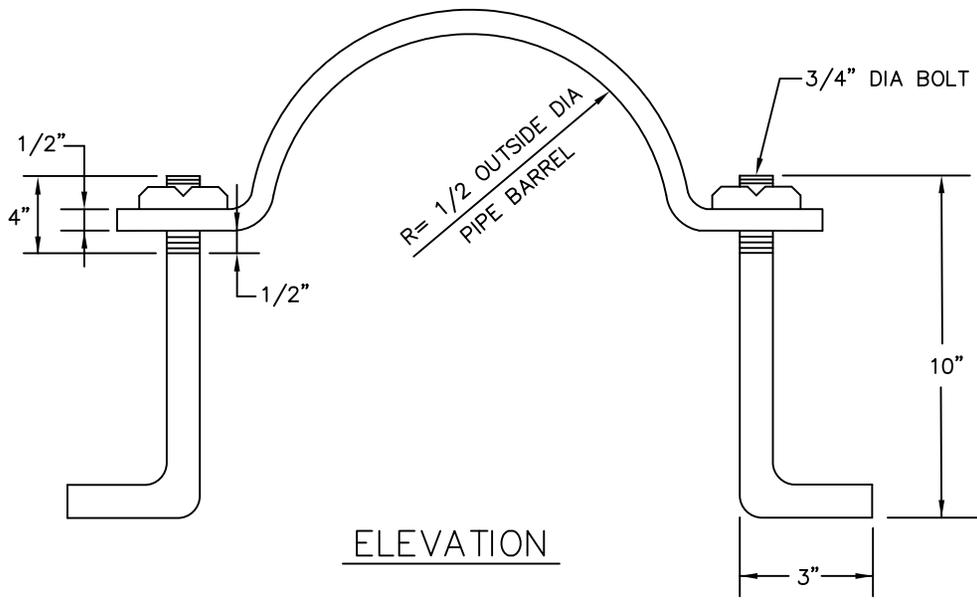
CITY STANDARDS

PIER FOOTING ON ROCK

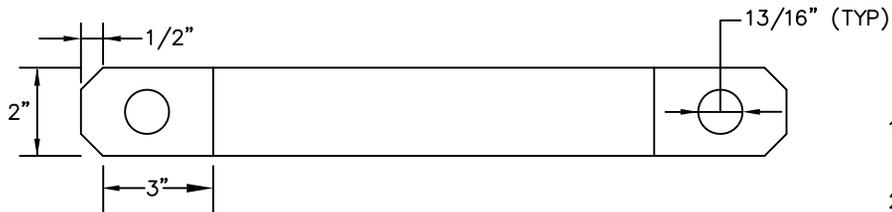
REVISION DATE

SCALE: N.T.S.

STANDARD NUMBER: WW 9.3



ELEVATION



PLAN

NOTES:

1. ANCHOR BOLTS AND STRAPS SHALL BE GALVANIZED AND HOT ASPHALT DIPPED.
2. GALVANIZED STEEL OR IRON CAN BE USED.
3. FOR PIPES 24" AND LARGER USE 1" DIA BOLTS. AND 1 1/16" DIA HOLE IN STRAP
4. HOLES TO BE DRILLED IN STRAP.
5. PROVIDE WASHERS UNDER STRAP SUCH THAT STRAP IS PULLED DOWN TIGHT.



CITY OF CHARLOTTESVILLE

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CITY STANDARDS

PIPE STRAPS FOR PIERS

SCALE: N.T.S.

STANDARD NUMBER: WW 9.4