

1. BEDDING, HAUNCHING AND INITIAL BACKFILL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THIS DETAIL AND MANUFACTURER'S RECOMMENDATION.

2. ALL PVC PIPE SHALL BE BEDDED IN COMPACTED VDOT #57 OR #59 STONE, OR CRUSHER RUN.

3. IN AREAS SUBJECT TO VEHICULAR TRAFFIC, BEDDING STONE AND FILL SHALL BE PLACED IN 6" LIFTS FROM BOTTOM OF TRENCH TO 1" ABOVE THE PIPE AND THE REMAINING SHALL BE PLACED IN 12" LIFTS AND SHALL BE COMPACTED TO AT LEAST 90% OF MAXIMUM DENSITY AS DETERMINED BY ASTM D 1556.

4. BEDDING REQUIREMENTS FOR DUCTILE IRON WATER LINE ARE DEPENDENT ON MANUFACTURER'S BEDDING CRITERIA.

5. ALL EXCAVATIONS SHALL COMPLY WITH OSHA TECHNICAL MANUAL, CHAPTER 2, TITLED "EXCAVATIONS: HAZARD RECOGNITION IN TRENCHING AND SHORING".

6. THE TRACER WIRE SHALL BE PLACED ALONG THE LOWER QUADRANT OF THE PIPE. THE WIRE SHALL NOT TOUCH THE PIPE, BUT SHALL BE A MAXIMUM OF 6" FROM THE PIPE. NON-METALLIC SPACERS MAY BE USED TO MAINTAIN A SET DISTANCE FROM THE UTILITY.

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL
BEDDING AND BACKFILL OUTSIDE OF PAVED AREAS
01/01/12 G-11

1. BEDDING, HAUNCHING AND INITIAL BACKFILL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THIS DETAIL AND MANUFACTURER'S RECOMMENDATION.

2. ALL PVC PIPE SHALL BE BEDDED IN COMPACTED VDOT #57 OR #59 STONE, OR CRUSHER RUN.

3. IN AREAS SUBJECT TO VEHICULAR TRAFFIC, BEDDING STONE AND FILL SHALL BE PLACED IN 6" LIFTS FROM BOTTOM OF TRENCH TO 1" ABOVE THE PIPE AND THE REMAINING SHALL BE PLACED IN 12" LIFTS AND SHALL BE COMPACTED TO AT LEAST 90% OF MAXIMUM DENSITY AS DETERMINED BY ASTM D 1556.

4. BEDDING REQUIREMENTS FOR DUCTILE IRON WATER LINE ARE DEPENDENT ON MANUFACTURER'S BEDDING CRITERIA.

5. ALL EXCAVATIONS SHALL COMPLY WITH OSHA TECHNICAL MANUAL, CHAPTER 2, TITLED "EXCAVATIONS: HAZARD RECOGNITION IN TRENCHING AND SHORING".

6. THE TRACER WIRE SHALL BE PLACED ALONG THE LOWER QUADRANT OF THE PIPE. THE WIRE SHALL NOT TOUCH THE PIPE, BUT SHALL BE A MAXIMUM OF 6" FROM THE PIPE. NON-METALLIC SPACERS MAY BE USED TO MAINTAIN A SET DISTANCE FROM THE UTILITY.

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL
BEDDING AND BACKFILL UNDER PAVEMENT AND IN RIGHT-OF-WAY
01/01/12 G-12

1. TRAFFIC BEARING BOX AND LID REQUIRED IN TRAFFIC AREAS (CAPITOL FOUNDRY V8-1P5).

2. ALL PIPE AND FITTINGS SHALL BE OF SIMILAR MATERIAL.

3. ALL PIPE SHALL BE OF SAME SIZE.

4. NO BENDS ARE ALLOWED IN THE LATERAL FROM THE MAN TO THE CLEANOUT STACK TEE.

5. ALL MAIN LINE TAPS ON ACTIVE MAINS SHALL BE PERFORMED BY PARTICIPATING UTILITY.

6. PIPING ON PRIVATE SIDE OF CLEANOUT TO BE INSTALLED PER GOVERNING JURISDICTION REQUIREMENTS.

7. MINIMUM LATERAL SIZE: 4" FOR RESIDENTIAL SERVICE, 6" FOR NON-RESIDENTIAL SERVICE.

8. MINIMUM COVER FOR ALL SEWER LATERALS SHALL BE THREE (3) FEET.

9. PROPERTY OWNER RESPONSIBLE FOR INSTALLING CLEANOUT ON PROPERTY LINE (IN ACCORDANCE WITH THIS DETAIL) WHEN MAINTENANCE OCCURS.

10. LOWEST SERVED FINISHED FLOOR ELEVATION SHALL BE A MINIMUM OF THREE FEET (3') ABOVE THE TOP OF THE MAIN AT THE POINT WHERE THE SERVICE LATERAL CONNECTS TO THE MAIN.

11. WHEN CONNECTING TO EXISTING LATERAL, USE FERRIS FLEXIBLE COUPLING.

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL
SANITARY SEWER LATERAL
01/01/12 S-6

1. TAPPING SLEEVE SHALL BE POWERLESS MODEL 3480 TYPE 304 STAINLESS STEEL WITH CARBON STEEL FLANGE. ROMAC'S MODEL SST II, FORD MODEL FTBS WITH CARBON STEEL FLANGE OR APPROVED EQUIVALENT. SLEEVE SHALL BE RATED AT 100 PSI OVER WORKING PRESSURE AND MUST HAVE A TEST PLUG.

2. TAPPING VALVE SHALL BE ANK RESISTANT SEATED GATE VALVE SERVICE 25 MPN OR MUELLER T-2400 RESILIENT WEDGE TAPPING VALVE WITH MPN. VALVE SHALL BE RATED AT 250 PSI.

3. TAPPING SLEEVE AND VALVE SHALL BE FULL PORT TO ACCEPT FULL SIZE SLEEVE CUTTER.

4. STEEL FLANGE SHALL MEET AWWA C207.

5. SEE CASE-BY CASE TAPPING NOT ALLOWED UNLESS APPROVED BY PARTICIPATING UTILITY.

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL
TAPPING SLEEVE AND VALVE
01/01/12 W-21

1. ALL METERS ARE TO BE PROVIDED AND INSTALLED BY PARTICIPATING UTILITY AT OWNER/DEVELOPER'S EXPENSE. METER BOX, SERVICE, AND BETTER TO BE FURNISHED AND INSTALLED BY OWNER/DEVELOPER IN ACCORDANCE WITH THE MINIMUM REQUIREMENTS SHOWN BELOW.

2. SADDLES MUST BE USED WITH ALL PLASTIC & DUCTILE IRON PIPE. SERVICE SADDLES SHALL BE USED IN ACCORDANCE WITH WATER DISTRIBUTION PIPING SPECIFICATION. SERVICE SADDLES FOR PLASTIC PIPE SHALL BE POWERLESS 3417, OR 3412A, ROMAC 2020, OR 3412, OR FORD METER F2022 OR F2030. FOR DUCTILE IRON PIPE, USE THE ABOVE, OR POWERLESS 3413, ROMAC 2020 OR FORD METER F202.

3. CORPORATION STOP SHALL BE FORD 11000-4-0, MUELLER H-1000 OR APPROVED EQUAL.

4. METER BOXES LOCATED IN AN AREA SUBJECT TO VEHICULAR TRAFFIC SHALL BE CONCRETE WITH H-20 RATED TRAFFIC BEARING HATCH. ALL OTHER METER BOXES MAY BE CARSON/MD-STATES PLASTICS, INC. PLASTIC BOX WITH FORD 4251 (ELECTRIC HATCH LID) OR A.Y. McDONALD MODEL THW350-2 CAST IRON BASE & COVER OR APPROVED EQUAL.

5. SERVICE SHALL BE 1/2" TYPE COPPER OR P.E. 4710, CTS O.D., MINIMUM CELL CLASS 45474E AND 45474D.

6. COPER METER TEE TO BE FORD, A.Y. ACCONARD OR APPROVED EQUAL WITH ANGLE DUAL CHECK VALVE AND BYPASS HAVING LOCKABLE SHUTOFF VALVE.

7. SERVICES REQUIRING METERS LARGER THAN 1/2" SHALL BE REVIEWED BY THE PARTICIPATING UTILITY ON A CASE BY CASE BASIS.

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL
COMMERCIAL WATER SERVICE METER SIZES 5/8" - 2"
01/01/12 W-5

1. TRACER WIRES SHALL BE INSTALLED USING MANHOLES, VALVE BOXES OR VAULTS, WATER METERS AND FIRE HYDRANTS AS ACCESS POINTS.

2. FOR WATER OR SEWER INSTALLED BY OPEN TRENCHING, TRACER WIRE SHALL BE COPPERHEAD INDUSTRIES COPPER CLAD STEEL DIRECT BURY #14 AWG SOLID (0.041" DIAMETER), STEEL CORE SOFT DRAWN HIGH STRENGTH TRACER WIRE, 2000 AVERAGE TENSILE BREAK LOAD, 30 MIL HIGH MOLECULAR WEIGHT, HIGH DENSITY (GREEN OR BLUE) POLYETHYLENE JACKET COMPLYING WITH ASTM D-1248, 30 VOLT RATING. A HEAVIER GAUGE MAY BE REQUIRED FOR DEPTHS EXCEEDING 50 FEET.

3. FOR WATER OR SEWER INSTALLED BY HORIZONTAL DIRECTIONAL DRILLING METHOD, TRACER WIRE SHALL BE PLACED ALONG THE LOWER QUADRANT OF THE PIPE. THE WIRE SHALL NOT TOUCH THE PIPE, BUT SHALL BE A MAXIMUM OF 6" FROM THE PIPE. NON-METALLIC SPACERS MAY BE USED TO MAINTAIN A SET DISTANCE FROM THE UTILITY.

4. SPICES SHALL BE MADE USING COPPERHEAD INDUSTRIES SNAKE BITE SPLICE KIT PART 85C-01, OF THE APPROPRIATE COLOR, 3/4" DIRECT BURY SPLICE KIT (DBY), OR EQUIVALENT.

5. TRACER WIRE SHALL BE LONG ENOUGH TO EXTEND A DISTANCE OF FIVE (5) FEET BEYOND THE STRUCTURE.

6. AS-BUILTS SHALL SHOW TRACER WIRE(S) LOCATION AND ACCESS POINT(S).

7. THE TRACER WIRE SHALL BE PLACED ALONG THE LOWER QUADRANT OF THE PIPE. THE WIRE SHALL NOT TOUCH THE PIPE, BUT SHALL BE A MAXIMUM OF 6" FROM THE PIPE. NON-METALLIC SPACERS MAY BE USED TO MAINTAIN A SET DISTANCE FROM THE UTILITY.

8. WHERE LINES ARE GREATER THAN SIX (6) FEET IN DEPTH, WIRE SHALL BE BROUGHT TO THE SURFACE EVERY ONE-HUNDRED (100) FEET AND PLACED IN A WATER METER BOX OR APPROVED JUNCTION BOX.

9. THE TRACER WILL BE TESTED BY THE PARTICIPATING UTILITY AS PART OF THE PROJECT'S FINAL ACCEPTANCE.

10. THE GROUND WIRE SHALL BE #6 GAUGE COPPER WIRE AND SHALL BE OF ADEQUATE LENGTH TO EXTEND A MINIMUM OF FIVE (5) FEET BEYOND THE TOP OF STRUCTURE. THE END OF GROUND WIRE SHALL CONNECT TO THE GROUND BAR USING A BURIED KAMU MECHANICAL CABLE LUG.

11. A GROUND ROD SHALL BE INSTALLED AT EACH LOCATION WHERE GROUND WIRE SURFACES AND CONNECTS TO GROUND BAR. GROUND ROD SHALL BE COPPER COATED, MINIMUM DIAMETER OF 5/8", AND SHALL BE BURIED A MINIMUM OF FOUR (4) FEET INTO THE GROUND.

12. GROUND SHALL BE STAINLESS STEEL AND SHALL BE ATTACHED USING SS 1/4" X 1 1/4" SS HEX TAPCON. THE FOLLOWING SHALL BE INSTALLED IN 4 (FOUR) CENTER HOLES: 10-32 SS NUTS, #10 SS WASHERS AND 10-32 X 3/4 SS PHILLIPS. THE FOURTH HOLE SHALL HAVE A BURIED CONNECTOR KAMU FOR THE #6 GAUGE GROUND WIRE. THE ASSEMBLY SHALL BE COVERED AT MAGIC CITY SUPPLY - CLAMP REC-1. THE ENDS OF THE TRACER WIRE SHALL BE PLACED IN THE GROUND BAR AS SHOWN.

13. TWO WRAPS OF TRACER WIRE SHALL BE WRAPPED SMOOTHLY AROUND BASE OF HYDRANT. WIRE SHALL NOT BE LEFT HANGING THAT WOULD INTERFERE WITH MOVING AROUND HYDRANT.

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL
TRACER WIRE FOR NON-METALLIC PRESSURE PIPE
01/01/12 G-4

PLAN VIEW

MANWAY ACCESS DETAIL

TABLE 1
Minimum Spacing Between Pipe

PIPE SPAN (IN)	MINIMUM SPACING (IN)
Up to 48"	24"
48" to 66"	36"
66" to 144"	36"

TABLE 2
Guidelines for Minimum Cover for Heavy Construction Equipment

PIPE SPAN (IN)	18-50	50-75	75-110	110-150
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
128-144	3.5	4.0	4.5	4.5

LANE ENTERPRISES, INC.
WAFFLE HOUSE
ROANOKE COUNTY, VA
BALZER & ASSOCIATES, INC.
48" DETENTION BASIN
DATE: 9/20/2013

INSTALLATION NOTES

- Minimum spacing between pipe shall be as shown in Table 1 to conform with ASTM A796. Circular material used for pipe bedding and backfill shall conform to ASTM A798, Section 9.
- Placement of bedding and backfill material for pipe shall meet requirements of ASTM A798, Section 10.
- Minimum cover for H20/H25 loading, measured from top of pipe to bottom of flexible pavement or top of rigid pavement shall be the greater of 12" or 1/8 pipe diameter or span.
- Minimum cover over the top of the pipe for heavy construction loads shall be as shown in Table 2.
- Length of riser pipe must be field cut to final grade by contractor.
- Length of attached pipe stubs are determined by Lane Enterprises based on fabrication standards or shipping criteria.
- Manholes or catch basins placed over CSP riser pipe shall be installed by the contractor in a manner that avoids wheel loads on a riser and system pipe. (See Detail)
- Upper portion of riser pipe shall be installed with a sleeve around the CD of the pipe. The sleeve shall be sufficiently rigid so as to avoid deformation when concrete is placed against the sleeve. Sleeve shall allow minimum settlement of concrete collar without any load being applied to riser pipe.
- Manhole or catch basin frame shall be sized so that wheel load applied to frame is transferred to concrete collar around riser.

MANWAY ACCESS DETAIL

TABLE 1
Minimum Spacing Between Pipe

PIPE SPAN (IN)	MINIMUM SPACING (IN)
Up to 48"	24"
48" to 66"	36"
66" to 144"	36"

TABLE 2
Guidelines for Minimum Cover for Heavy Construction Equipment

PIPE SPAN (IN)	18-50	50-75	75-110	110-150
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
128-144	3.5	4.0	4.5	4.5

LANE ENTERPRISES, INC.
WAFFLE HOUSE
ROANOKE COUNTY, VA
BALZER & ASSOCIATES, INC.
48" DETENTION BASIN
DATE: 9/20/2013

1. PUBLIC HYDRANTS SHALL BE PAINTED SILVER WITH AN OIL-BASED PAINT AND PRIVATE HYDRANTS SHALL BE PAINTED WHITE WITH AN OIL-BASED PAINT.

2. FIRE HYDRANT SHALL BE INSTALLED 7' MIN. AND A MAX. FROM BACK OF CURB OR 6' MIN. AND 12' MAX. FROM EDGE OF PAVEMENT WHEN CURB IS NOT PRESENT. FIRE HYDRANT TO BE INSTALLED WITHIN RIGHT-OF-WAY OR EASEMENT LINE.

3. AREA AROUND HYDRANT AT A RADIUS OF 4' TO BE LEVEL AND UNOBSTRUCTED.

4. WATERPROOF BAGS OR OUT OF SERVICE RINGS SHALL BE PLACED OVER ALL NEWLY INSTALLED FIRE HYDRANTS.

5. HIGH PRESSURE (OVER 120 PSI) REQUIRES THE USE OF ALL 3 RESTRAINTS.

6. IF DURING CONSTRUCTION THE SEASONAL WATER LEVEL IS NOTED TO BE ABOVE THE DRAIN OUTLETS OF THE PROPOSED HYDRANT, THE PARTICIPATING UTILITY WILL BE NOTIFIED IMMEDIATELY SO THAT THE HYDRANT CAN BE RELOCATED TO A SUITABLE LOCATION, OMITTED, OR THE DRAIN HOLE PLOUGGED.

7. TWO WRAPS OF TRACER WIRE SHALL BE WRAPPED AROUND BASE OF HYDRANT.

8. APPROVED MODELS - AVK MODEL 2780, AFC MODEL B-84-B, MUELLER CENTURION A423, KENNEDY K810 EQUIVALENT.

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL
FIRE HYDRANT ASSEMBLY
W-17

1. MATERIALS AND FABRICATION IN ACCORDANCE WITH ASTM C478-09.

2. WHEN USED AS SAMPLING MANHOLE FLOW SHALL PASS STRAIGHT THROUGH, I.e., 180°.

3. STEPS SHALL BE VERTICALLY ALIGNED. FIRST STEP SHALL BE WITHIN 12" OF CURB, BOTTOM STEP SHALL BE WITHIN 24" OF BOTTOM OF MANHOLE.

4. FRAME AND COVER SHALL BE PROPERLY ALIGNED WITH THE 2 FOOT OPENING OF THE MANHOLE STRUCTURE AND ROLLED IN PLACE.

5. FLAT TOP MANHOLES MAY ONLY BE SUBSTITUTED WITH THE PERMISSION OF THE PARTICIPATING UTILITY.

6. FLEXIBLE JOINT MANHOLE CONNECTION SHALL BE AS MANUFACTURED BY PRE-SEAL GASKET CORPORATION OR EQUAL.

7. GROUT ANNUAL SPACE BETWEEN PIPE AND PRECAST MANHOLE ON INSIDE OF MANHOLE.

8. WHEN REPLACING AN EXISTING MANHOLE OR INSTALLING A NEW PRECAST MANHOLE ON AN EXISTING SEWER, A MINIMUM OF SIX FEET (6') OF EXISTING PIPE SHALL BE REMOVED AND REPLACED WITH NEW MATERIAL ON INLET AND OUTLET OF MANHOLE.

9. MANHOLES WHERE THE INVERT IS LOWER THAN THE NORMAL GROUNDWATER ELEVATION (I.E., ALONG CREEKS, RIVERS, LOW-LYING AREAS, ETC.) SHALL HAVE A FULL EXTERIOR COATING AND JOINT WRAP APPLIED IN ADDITION TO JOINT SEALANT. (SEE NOTES 10 & 11)

10. IF REQUIRED EXTERIOR VERTICAL WALL SURFACES SHALL BE FACTORY COATED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION. COATING SHALL BE HIGH BUILD COAT, TAR EPOXY MEETING ASTM D1227. COATING SHALL BE APPLIED IN TWO COATS TO A MINIMUM TOTAL THICKNESS OF 16 MILS. ASTM D1227. COATING SHALL BE APPLIED IN TWO COATS TO A MINIMUM TOTAL THICKNESS OF 16 MILS. SEAL SHALL AGGRESSIVELY BOND TO CONCRETE AND METAL STRUCTURES.

11. IF REQUIRED ALL MANHOLES SHALL UTILIZE AN EXTERNAL FRAME AND JOINT SEAL AT ALL JOINTS AND AT THE FRAME/CHIMNEY INTERFACE. SEAL SHALL BE MADE OF EPDM RUBBER IN ACCORDANCE WITH ASTM D412 OR POLYOLEFIN BACKED EXTERIOR JOINT WRAP IN ACCORDANCE WITH ASTM B-1745, C-877, AND C-890. EDM SEAL SHALL HAVE A MINIMUM THICKNESS OF 90 MILS. POLYOLEFIN BACKED EXTERIOR JOINT WRAP SHALL HAVE A BACKING BAND ELEMENT WITH MINIMUM THICKNESS OF 1 MILS. AND BUTYL ROLLER ADHESIVE WITH MINIMUM THICKNESS OF 80 MILS. SEAL SHALL AGGRESSIVELY BOND TO CONCRETE AND METAL STRUCTURES.

12. FOR PIPE LARGER THAN 15 INCHES IN DIAMETER THE MINIMUM INSIDE DIAMETER OF THE MANHOLE SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS BASED ON PIPE SIZE AND ANGLE BETWEEN INLET AND OUTLET PIPING.

ADJUSTMENT RINGS IF NECESSARY (1" MAX ADJUSTMENT) SEE FRAME & COVER DETAILS

BUTYL MASTIC JOINT SEALER OR GASKETS MEETING ASTM C443 AND ASTM D2747 TESTING STANDARD (NO HOT TAP)

MINIMUM SLOPE FOR SERVICE CONNECTION 4"=14" PER 1'-0" 8"=10" PER 1'-0"

PRECAST HOLE WITH FLEXIBLE BOOT & STAINLESS STEEL BAND

3/4" SS THREADED ROD (IF ADJUSTMENT RINGS ARE REQUIRED)

SECTION A-A

RISER SECTIONS (IF ADJUSTMENT RINGS ARE REQUIRED)

BASE HEIGHT VARIES

STONE BASE (8" MIN. DEPTH) #57 OR EQUIVALENT

MANHOLE INVERT

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL
4" STANDARD MANHOLE FOR PIPE 15" OR SMALLER (FOR DEPTHS UP TO 15 FEET)
01/01/12 S-1