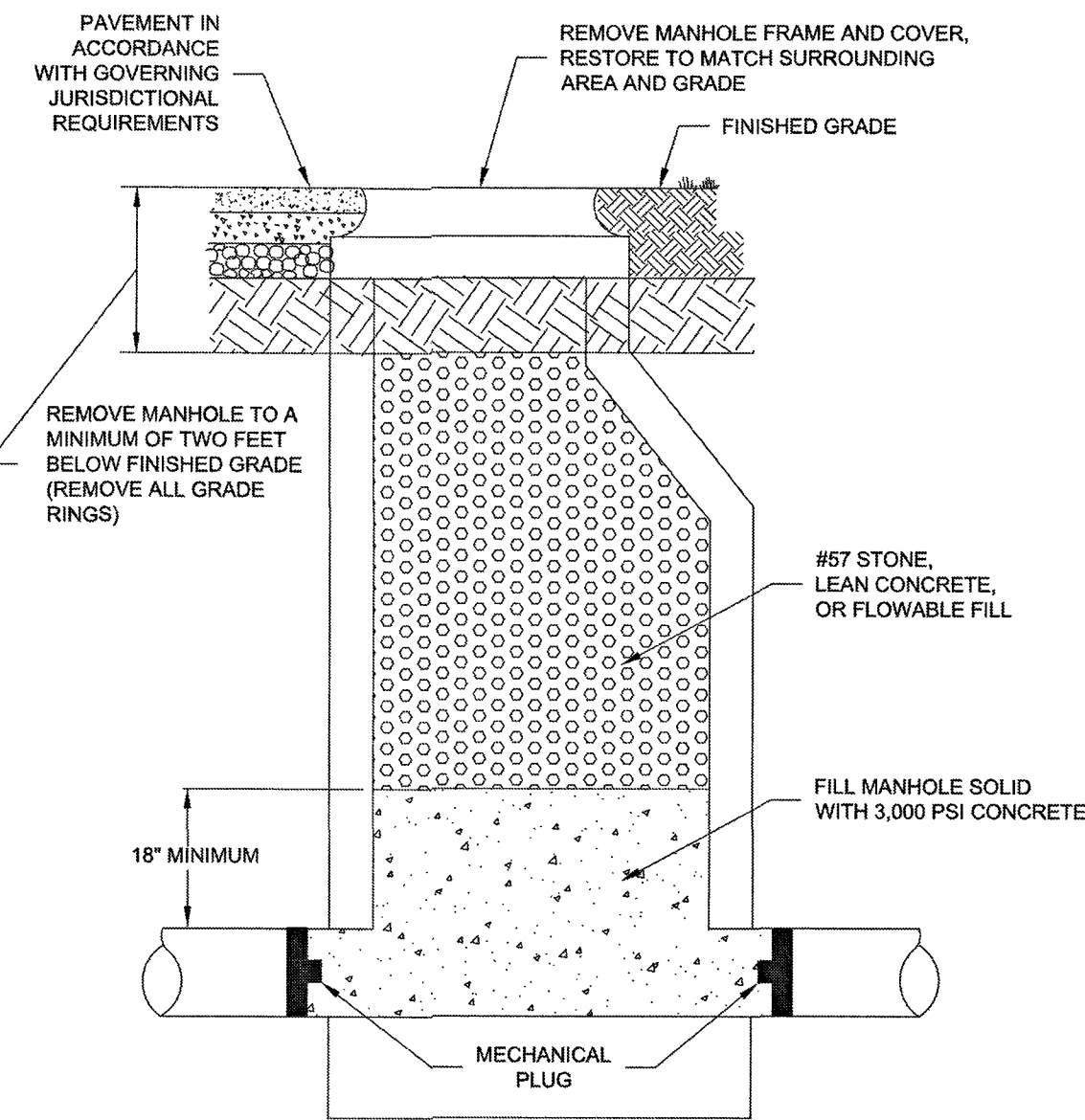


1. FOR PIPES 18" IN DIAMETER AND SMALLER SET MECHANICAL PLUGS INTO ALL PIPES ENTERING MANHOLE.
2. FOR PIPES 18" AND LARGER PROVIDE A MASONRY BULKHEAD IN LIEU OF MECHANICAL PLUGS.
3. DOWNSTREAM PIPE TO BE PLUGGED IN ACCORDANCE WITH PIPE ABANDONMENT DETAIL.



WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

SANITARY SEWER
MANHOLE ABANDONMENT

01/01/14

S-16

MINIMUM SPECIFIED TIME REQUIRED FOR A 1.0 PSIG PRESSURE DROP
FOR A SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015

PIPE DIAMETER (IN)	2 MINIMUM TIME (MIN:SEC)	3 LENGTH FOR TIME (FT)	4 TIME FOR LONGER LENGTH (SEC)	SPECIFICATION TIME FOR LENGTH (L) SHOWN (MIN:SEC)								
				100 FT	150 FT	200 FT	250 FT	300 FT	350 FT	400 FT	450 FT	
4	3:46	597	380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46	
6	5:40	398	854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	5:24	
8	7:34	298	1,520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24	
10	9:26	239	2,374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48	
12	11:20	199	3,418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38	
15	14:10	159	5,342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04	
18	17:00	133	7,692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41	
21	19:50	114	10,470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31	
24	22:40	99	13,674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33	
27	25:30	88	17,306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48	
30	28:20	80	21,366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15	
33	31:10	72	25,852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53	
36	34:00	66	30,768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46	
42	39:48	57	41,883 L	69:48	104:42	139:37	174:30	209:24	244:19	279:13	314:07	
48	45:34	50	54,706 L	91:10	136:45	182:21	227:55	273:31	319:06	364:42	410:17	
54	51:02	44	69,236 L	115:24	173:05	230:47	288:29	346:11	403:53	461:34	519:16	
60	56:40	40	85,476 L	142:28	213:41	284:55	356:09	427:23	498:37	569:50	641:04	

NOTE: IF THERE HAS BEEN NO LEAKAGE (ZERO PSIG DROP) AFTER THE HOUR OF TESTING, THE TEST SHALL BE ACCEPTED AND THE TEST COMPLETE.

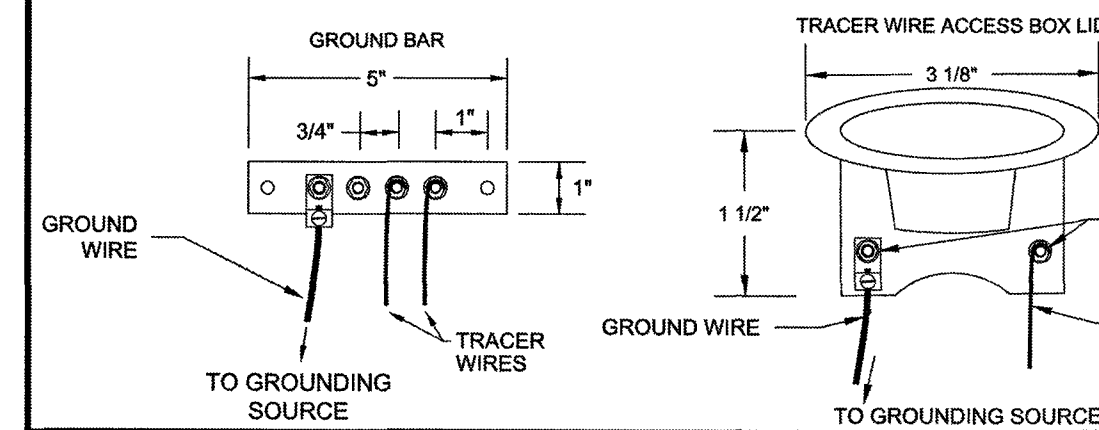
WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

LOW-PRESSURE AIR TESTING TABLE

01/01/14

UN18-6-88

1. TRACER WIRES SHALL BE INSTALLED USING MANHOLES, TRACER WIRE ACCESS BOXES, VALVE BOXES OR VAULTS, WATER METERS AND FIRE HYDRANTS AS ACCESS POINTS.
2. FOR WATER AND SEWER INSTALLED BY OPEN TRENCHING, HORIZONTAL DIRECTIONAL DRILLING, OR PIPE BURSTING, TRACER WIRE SHALL BE NEPTCO TRACE-SAFE WATER BLOCKING TRACER WIRE OR APPROVED EQUAL. TRACER WIRE SHALL BE A 18 AWG SOLID COPPER CONDUCTOR WITH VETURENE INSULATION SURROUNDED BY A CORE MATERIAL COMPRISED OF HIGH-TENSILE, WOVEN POLYESTER WITH WATER BLOCKING YARNS ENCAPSULATED IN AN ABRASION RESISTANT (GREEN OR BLUE) 30 MIL HOPE JACKET. TRACER WIRE SHALL HAVE A MINIMUM TENSILE STRENGTH OF 1,600 LBS. AND SHALL NOT CONDUCT AN ELECTRICAL CURRENT IF STRUCK BY LIGHTNING. SPLICES SHALL ONLY BE MADE WITH GEL FILLED CONNECTORS DESIGNED FOR WIRE WITH A WOVEN POLYESTER FIBER CORE SUCH AS NEPTCO TRACE-SAFE WATER BLOCKING CONNECTORS OR APPROVED EQUAL. SPLICES SHALL BE MADE IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
3. SPLICES AT THE ENDS OF TRACER WIRE, INTERMITTENT ACCESS POINTS, SHALL BE MADE USING NEPTCO TS-19-IL WATER BLOCKING BUTT SPLICE CONNECTORS OR APPROVED EQUAL.
4. AT ALL ACCESS POINTS, TRACER WIRE SHALL BE SPLICED USING NEPTCO TS-12-19-IL WATER BLOCKING BUTT SPLICE CONNECTORS OR APPROVED EQUAL. 12 AWG COPPER TRACER WIRE WITH 30 MIL HOPE JACKET SHALL BE CONNECTED IN THE 12 AWG OPENING OF THE BUTT SPLICE CONNECTOR, EXTENDED UP INTO THE ACCESS POINT STRUCTURE, AND ATTACHED TO THE GROUND BAR PER NOTE #12 OR LID TERMINALS PER NOTE #13. AT ALL ACCESS POINTS, EACH DIRECTION OF PIPE SHALL HAVE AN INDEPENDENT TRACER WIRE FEED EXTENDED TO GROUND BAR OR LID TERMINALS TO ALLOW FOR DIRECTIONALLY INDUCING CURRENT DURING LOCATING. THE 12 AWG COPPER TRACER WIRE SHALL BE OF ADEQUATE LENGTH TO EXTEND FIVE (5) FEET ABOVE THE TOP OF STRUCTURE.
5. WHERE HOPE PIPE IS INSTALLED WITHOUT STEEL CASING PIPE, SUCH AS A DIRECTIONALLY DRILLED CROSSINGS, AND CONNECTED TO DUCTILE IRON PIPE ON EACH END, TRACER WIRE SHALL BE INSTALLED ALONG FULL LENGTH OF HOPE PIPE WITH AN ACCESS POINT INSTALLED AT EACH HOPE/DUCTILE IRON TRANSITION. TRACER WIRE SHALL BE CONNECTED TO THE ACCESS POINT IN ACCORDANCE WITH THIS DETAIL.
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 FIVE-HUNDRED (500) FEET AND PLACED IN A WATER METER BOX OR A DRAINAGE & WATER SOLUTIONS, INC. (OR APPROVED EQUAL) ALL CAST IRON TRACER WIRE ACCESS 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 AWG COPPER WIRE AND SHALL BE OF ADEQUATE LENGTH TO EXTEND A MINIMUM OF (5) FIVE FEET BEYOND THE TOP OF THE STRUCTURE. THE END OF THE GROUND WIRE SHALL CONNECT TO THE GROUND BAR OR LID TERMINAL USING A BURNDY KABU MECHANICAL TERMINAL LUG.
11. A GROUND ROD SHALL BE INSTALLED AT EACH LOCATION WHERE GROUND WIRE SURFACES AND CONNECTS TO GROUND BAR OR LID TERMINAL. GROUND ROD SHALL BE COPPER COATED WITH A MINIMUM DIAMETER OF .562" AND SHALL BE BURIED A MINIMUM OF FOUR (4) FEET INTO THE GROUND.
12. THE GROUND BAR SHALL BE STAINLESS STEEL AND SHALL BE ATTACHED USING SS 1" X 1/2" SS HEX TAPCON. THE FOLLOWING SHALL BE INSTALLED IN (4) FOUR CENTER HOLES: 10-32SS NUTS, #10 SS WASHERS AND 10-32 X 1/2" SS PHILLIPS. THE FOURTH HOLE SHALL HAVE A BURNDY KABU MECHANICAL TERMINAL LUG FOR THE #6 AWG GROUND WIRE. THE ASSEMBLY CAN BE ACQUIRED AT RGS INDUSTRIAL SUPPLY, INC. (540-353-0883) - CLAMP RFG-11. THE ENDS OF THE TRACER WIRES SHALL BE PLACED IN THE GROUND BAR AS SHOWN BELOW.
13. IF USING TRACER WIRE ACCESS BOX AS ACCESS POINT, GROUND BAR WILL NOT BE REQUIRED. THE REMOVABLE LID ON THE ACCESS BOX SHALL CONTAIN TWO SCREW TERMINALS. THE 12 AWG COPPER TRACER WIRE SHALL BE BROUGHT UP IN ACCESS BOX AND CONNECTED TO ONE OF THE SCREW TERMINALS. IF MORE THAN ONE TRACER WIRE IS NECESSARY TO ACCOUNT FOR TOTAL NUMBER OF PIPE DIRECTIONS AT ACCESS BOX, MULTIPLE TRACER WIRES SHALL BE CONNECTED TO THAT SAME SCREW TERMINAL. THE #6 AWG COPPER GROUND WIRE SHALL BE CONNECTED FROM THE GROUND ROD TO THE REMAINING SCREW TERMINAL WITH THE USE OF A BURNDY KABU MECHANICAL TERMINAL LUG. WIRES SHALL BE CONNECTED AS SHOWN BELOW. TRACER WIRE AND GROUND WIRE SHALL BOTH BE OF ADEQUATE LENGTH TO EXTEND FIVE (5) FEET ABOVE THE TOP OF ACCESS BOX.
14. TWO WRAPS OF TRACER WIRE SHALL BE WRAPPED SNUGLY AROUND BASE OF HYDRANT. WIRE SHALL NOT BE LEFT IN A WAY THAT WOULD INTERFERE WITH MOWING AROUND HYDRANT.



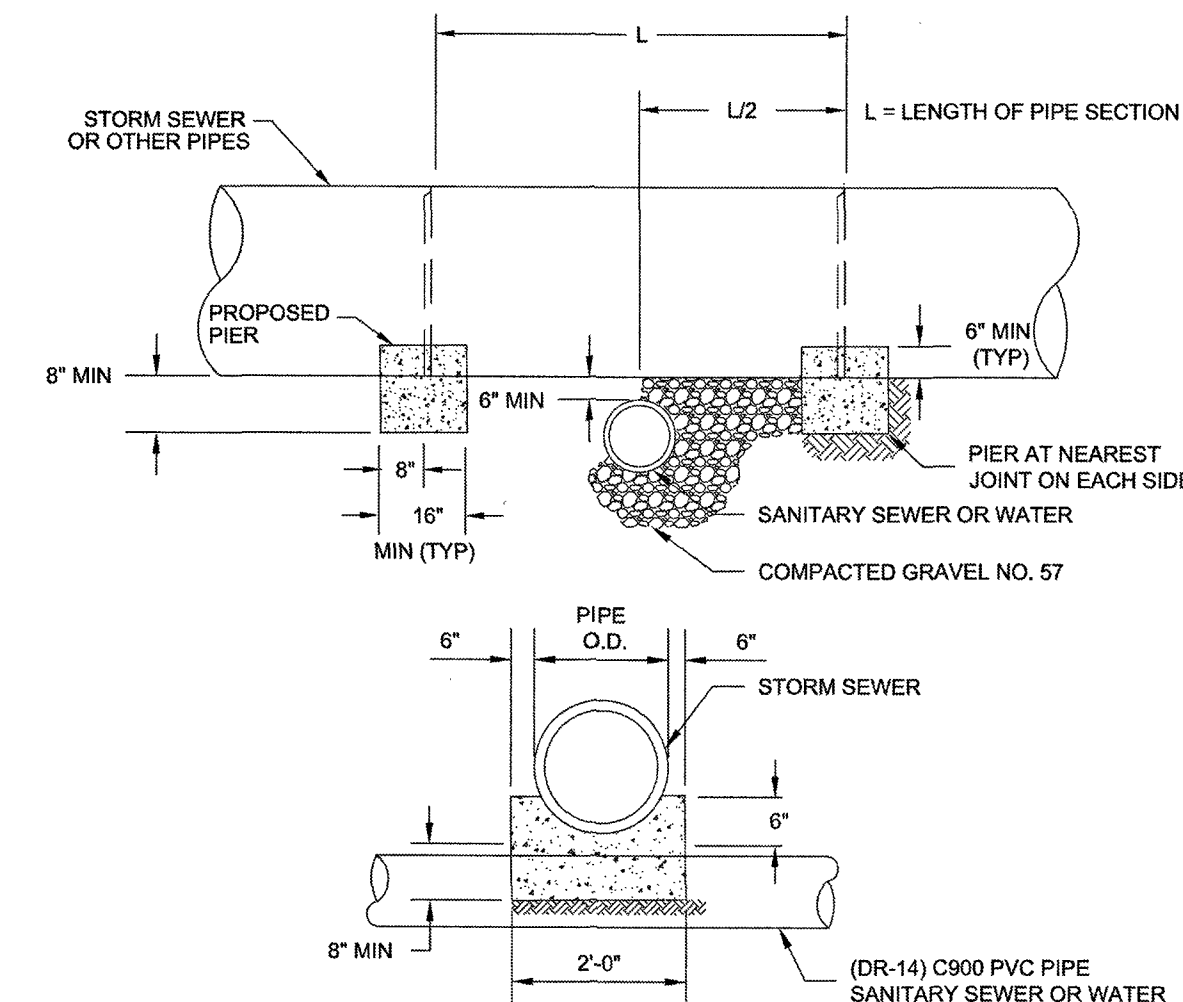
WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

TRACER WIRE
FOR NON-METALLIC
PRESSURE PIPE

01/01/14

G-4

1. PIER REQUIRED WHEN STORM DRAIN OR OTHER PIPES CROSSES OVER THE OTHER UTILITY WITH A VERTICAL CLEARANCE OF LESS THAN 18".
2. PIER TO BE BUILT ON UNDISTURBED EARTH.
3. CONCRETE TO BE READY MIX, CLASS A3.



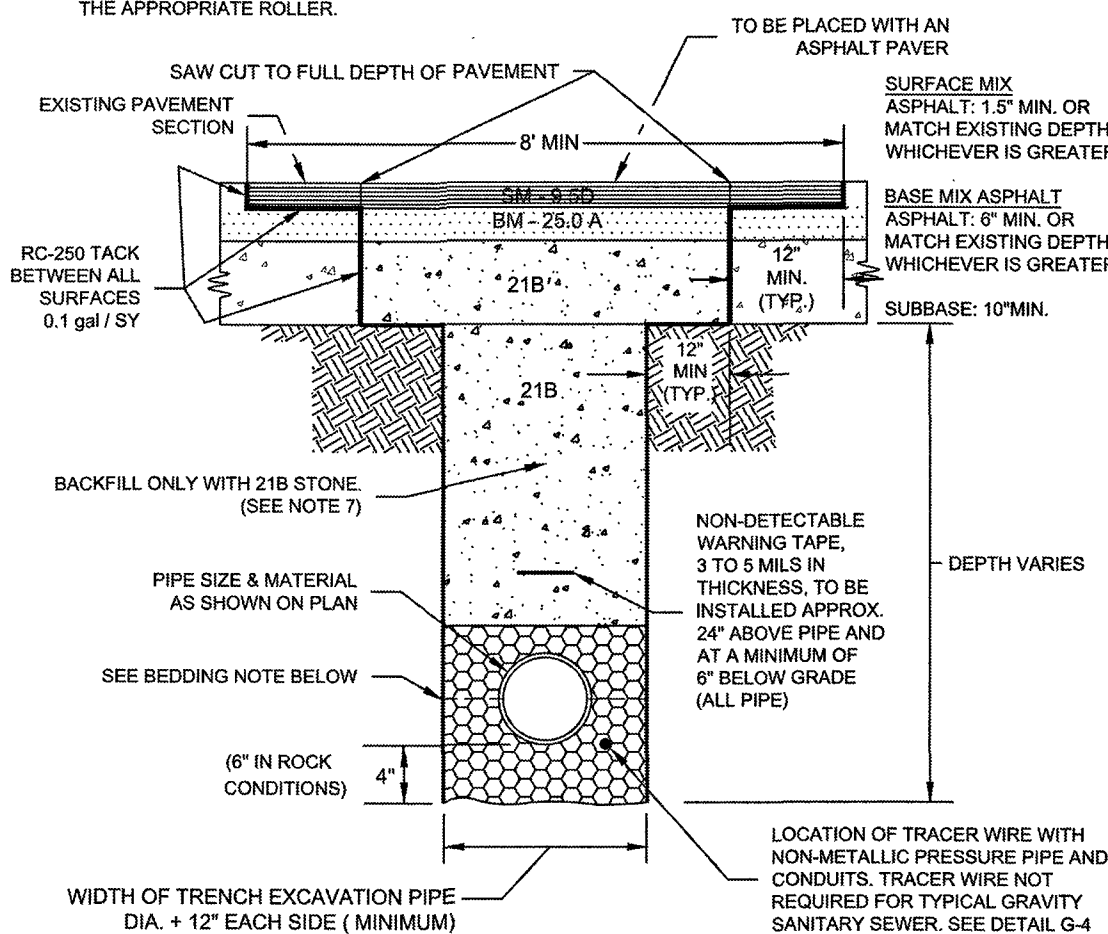
WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

CONCRETE PIER

01/01/14

G-8

1. THIS DETAIL APPLIES TO WATER, SEWER, ELECTRIC, BROADBAND, AND STORM SEWER.
2. BEDDING, HAUNCHING AND INITIAL BACKFILL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THIS DETAIL AND MANUFACTURER'S RECOMMENDATION.
3. ALL PVC PIPE SHALL BE BEDDED IN VDOT #57 OR #88 STONE.
4. IN VDOT ROW, THE CONTRACTOR SHALL REPLACE THE PAVEMENT AS REQUIRED AND SPECIFIED BY VDOT.
5. ALL CONSTRUCTION WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE AS SPECIFIED BY VDOT.
6. PRIOR TO CONSTRUCTION, CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS FROM VDOT.
7. IN AREAS SUBJECT TO VEHICULAR TRAFFIC, BEDDING STONE AND FILL SHALL BE PLACED IN 6" LIFTS AND SHALL BE COMPACTED TO AT LEAST 95% OF MAXIMUM DENSITY AS DETERMINED BY ASTM D 698.
8. ALL SEWER LINE PIPE SHALL BE BEDDED IN COMPACTED GRANULAR MATERIAL. BEDDING REQUIREMENTS FOR DUCTILE SEWER LINE ARE DEPENDENT ON MANUFACTURER'S BEDDING CRITERIA.
9. BENCH CUTS SHALL BE 12" MINIMUM.
10. ALL EXCAVATIONS SHALL COMPLY WITH OSHA TECHNICAL MANUAL, CHAPTER 2, TITLED "EXCAVATIONS: HAZARD RECOGNITION IN TRENCHING AND SHORING".
11. 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.
12. VDOT INSPECTOR TO BE ON SITE DURING ALL UTILITY INSTALLATIONS.
13. WHERE INTERMEDIATE COURSES (IM) EXIST IN THE FIELD, THEY SHALL BE REPLACED WITH THE SAME DEPTH AND SHALL BE PLACED UNDER THE FULL WIDTH OF THE NEW SURFACE COURSE.
14. THE BASE ASPHALT SHALL BE PLACED AT SUCH A WIDTH AS TO ALLOW THE BASE ASPHALT TO BE COMPACTED WITH THE APPROPRIATE ROLLER.

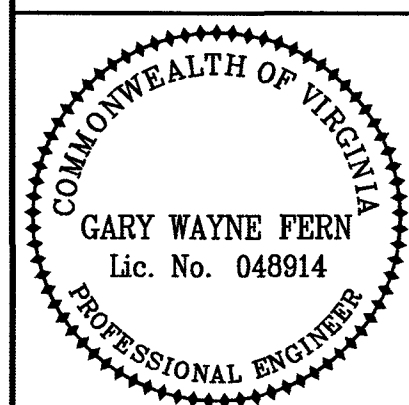


PLANTATION ROAD - CONSTRUCTION DETAIL

BEDDING AND BACKFILL
UNDER PAVEMENT AND IN RIGHT-OF-WAY

01/01/14

G-12



Whitman Requardt & Associates
Blacksburg, Virginia
UTILITY ENGINEER



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COUNTY OF ROANOKE

5204 BERNARD DRIVE
ROANOKE, VA 24018

VDOT PROJECT NUMBERS:
0115-080-R95, P101, C501 &
EN12-080-823, P101, R201, C501

VDOT UPC NUMBERS: 98220 & 103607

PLANTATION ROAD, BICYCLE, PEDESTRIAN, AND
STREETSCAPE IMPROVEMENTS PROJECT

Rev Date Description

Drawing

Sheet

DETAIL DRAWING

10(2C)