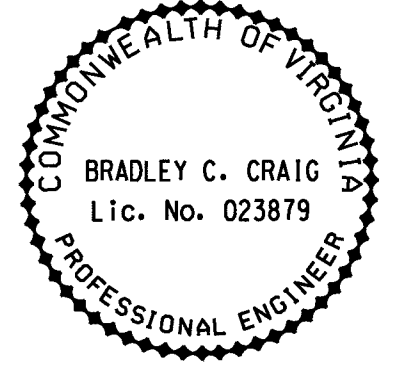


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MATERIAL NOTES

- [1] DUCTILE IRON PIPE SHALL BE CENTRIFUGALLY CAST MANUFACTURED IN ACCORDANCE WITH ANSI SPECIFICATION A21.51, LATEST REVISION, AND SHALL BE CEMENT MORTAR LINED IN ACCORDANCE WITH ANSI SPECIFICATION A21.4-80. SLIP JOINT OR MECHANICAL JOINT PIPE SHALL BE USED FOR GRAVITY SEWERS. SLIP JOINT PIPE SHALL BE DESIGNED IN ACCORDANCE WITH ANSI STANDARD A21-50 AND SPECIFIED ACCORDING TO ANSI STANDARD A21-11. CLASS 51 PIPE SHALL BE MINIMUM STRENGTH USED IN ALL SEWER APPLICATIONS. GASKETS SHALL BE FURNISHED BY THE MANUFACTURER AND INSTALLED IN ACCORDANCE WITH HIS RECOMMENDATIONS. DUCTILE IRON PIPE SHALL BE USED IN EXPOSED PIPE INSTALLATIONS, AND WHERE APPROVED BY THE ENGINEERING/UTILITY DEPARTMENT WHEN OTHER PIPE MATERIALS ARE SUBJECT TO CRUSHING.
1. AMERICAN CAST IRON PIPE COMPANY
 2. U.S. PIPE AND FOUNDRY COMPANY
 3. GRIFFIN PIPE PRODUCTS
 4. MCWANE CAST IRON PIPE COMPANY
- A. BEDDING AND BACKFILL SHALL BE IN ACCORDANCE WITH DETAIL G-01 SHOWN ON SHEET 8(7).
- [2] THE CONTRACTOR SHALL HAVE THE OPTION OF USING POLYVINYL CHLORIDE (PVC) PIPE IN PLACE OF DUCTILE IRON PIPE FOR SEWER PIPE WHERE A SPECIFIC PIPE MATERIAL IS NOT CALLED OUT ON THE PLANS. PVC SEWER PIPE SHALL BE AS FOLLOWS:
- A. ULTRA-RIB PIPE MEETING ASTM F-794 WITH A STIFFNESS FACTOR OF 46 MAY BE USED. INSTALLATION SHALL BE IN STRICT COMPLIANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS. ALL FITTINGS USED SHALL BE DESIGNED SPECIFICALLY FOR PIPE USED AND BE APPROVED FOR USE BY SAME MANUFACTURER OF PIPE. CONNECTIONS TO MANHOLES SHALL BE MADE BY MANUFACTURER'S RECOMMENDED METHODS AND APPROVED BY ENGINEERING/UTILITY DEPARTMENT.
 - B. DUCTILE IRON SEWER PIPE SHALL BE THE SAME AS SPECIFIED IN MATERIAL NOTE *1.
 - C. CONTRACTOR SHALL INSTALL TRACER WIRE FOR ALL NON-METALLIC PIPE. SEE DETAIL G-05 ON SHEET 8(7).
- [3] PIPE FOR SANITARY SEWER FORCE MAINS SHALL BE AS FOLLOWS:
- A. PVCO PIPE MEETING THE AWWA SPECIFICATION C909 FOR DR 18, PRESSURE CLASS 150 MAY BE USED FOR AREAS WHERE PRESSURE PIPE IS SPECIFIED. INSTALLATION OF PVCO PIPE SHALL BE APPROVED BY BOTETOURT COUNTY.
 - B. PIPE FOR SEWER FORCE MAINS SHALL CONFORM TO ASTM D 2241 AND SHALL HAVE A STANDARD DIMENSION RATIO (SDR) OF 18 AND SHALL HAVE A WORKING PRESSURE RATING OF 200 PSI, MINIMUM.
 - C. CONTRACTOR SHALL INSTALL TRACER WIRE FOR ALL NON-METALLIC PIPE. SEE DETAIL G-05 ON SHEET 8(7).
- [4] APPROVED AUTOMATIC AIR RELEASE VALVES SHALL BE INSTALLED AT THE HIGH POINTS IN THE SYSTEM AS SHOWN ON THE DRAWINGS. EACH ASSEMBLY SHALL CONSIST OF A RISER PIPE, GATE VALVE, FITTINGS, AND A PRECAST CONCRETE MANHOLE CONE SECTION (INCLUDING FRAME AND COVER). FORCE MAIN VACUUM/AIR RELEASE VALVE SHALL BE CRISPIN MODEL S20 OR EQUAL WITH A 1/2" ORIFICE AND 2-INCH SCREENED INLET FURNISHED WITH BACKFLUSHING ATTACHMENT. SEE DETAIL SS-22 ON SHEET 8(7).

- [5] MANHOLES:
- A. ALL NEW SANITARY SEWER MANHOLES SHALL BE PRECAST CONCRETE IN ACCORDANCE WITH ASTM-C478 CONSISTING OF PRECAST CONCENTRIC RISER REINFORCED SECTIONS, AN ECCENTRIC CONICAL OR FLAT TOP SECTION, AND A BASE SECTION CONFORMING WITH THE TYPICAL MANHOLE AS SHOWN IN DETAIL SS-01 ON SHEET 8(6). ONLY PRECAST MANHOLE SECTIONS SHALL BE USED. MANHOLES SHALL BE CONSTRUCTED WITH MANHOLE FRAMES, COVERS AND STEPS.
 - B. FRAMES AND COVERS SHALL BE EAST JORDAN IRON WORKS, INC. WATERTIGHT MANHOLE FRAME MODEL *1045Z, WATERTIGHT COVER MODEL *1040AGS AND BOLT-DOWN MANHOLE COVER MODEL *1040ACLGS. BOLT-DOWN MODEL TO BE USED IN AREAS SUBJECTED TO FLOODING OR AS DIRECTED BY BOTETOURT COUNTY. BOTETOURT COUNTY APPROVED CONCRETE MANHOLES AND FRAMES AND COVERS SHALL BE FROM MANUFACTURERS WITH A VDOT APPROVED QUALITY ASSURANCE PROGRAM. SEE DETAILS SS-05 & SS-06 ON SHEET 8(6).
 - C. CASTING SHALL BE BEST QUALITY TOUGH, GRAY IRON, FREE FROM DEFECTS, BLOW HOLES, AND OTHER IMPERFECTIONS AND SHALL MEET THE REQUIREMENTS OF ASTM DESIGNATION A-48, CLASS 20. THE CASTINGS SHALL BE SOUND, FREE TO FORM AND THICKNESS, CLEANED BY MEANS OF SAND BLAST AND NEATLY FINISHED. THE MATERIAL BEARING SURFACES SHALL BE MACHINE GROUND AND FINISHED TO INSURE SATISFACTORY SEATING. COVERS SHALL HAVE THE WORDS "SANITARY SEWER" CAST INTO THE TOP. CASTINGS SHALL RECEIVE ONE COAT OF BLACK ASPHALTUM PAINT AT THE FACTORY. LOCATIONS AND TYPE OF MANHOLE VENTS WILL BE AS INDICATED ON THE APPROVED PLANS AND AS PER DETAIL DRAWINGS. CHANGE IN LOCATION MUST BE APPROVED BY THE ENGINEERING/UTILITY DEPARTMENT.
 - D. COVERS SHALL BE FURNISHED WITH MEANS OF LIFTING. COVERS THAT ROCK UNDER NORMAL LOAD OR WILL NOT SEAT WILL BE REJECTED. FRAMES SHALL BE BOLT-DOWN TYPE, WITH BUTYL MASTIC SEALER PLACED BETWEEN FRAME AND MANHOLE. MORTAR SHALL NOT BE PERMITTED. FRAMES SHALL HAVE A NUT AND WASHER INSTALLED ON TOP AND BOTTOM TO FACILITATE MINOR ELEVATION ADJUSTMENTS. THE ADJUSTMENT SPACE BETWEEN THE BOTTOM OF THE FRAME AND THE TOP OF THE MANHOLE SECTION SHALL BE FORMED AND FILLED WITH 3000 PSI CONCRETE.
 - E. STEPS FOR MANHOLES SHALL BE MADE OF STEEL AND SHALL HAVE A PLASTIC COATING. STEPS SHALL BE SPACED 16 INCHES (16") APART. THE FIRST STEP SHALL BE WITHIN 12 INCHES (12") OF THE COVER. THE BOTTOM STEP SHALL BE WITHIN 24 INCHES (24") OF THE BOTTOM OF THE MANHOLE.
 - F. PRECAST MANHOLE SECTIONS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM DESIGNATION C478, LATEST REVISION. EACH SECTION SHALL HAVE NOT MORE THAN TWO (2) HOLES FOR THE PURPOSE OF HANDLING AND SETTING. THESE HOLES SHALL BE TAPERED AND SHALL BE PLUGGED UP WITH RUBBER STOPPERS AND AN APPROVED NON-SHRINK GROUT AFTER INSTALLATION.
 - G. A COLD APPLIED BUTYL MASTIC JOINT SEALER MANUFACTURED SPECIFICALLY FOR THE PURPOSE SHALL BE USED TO MAKE A WATERTIGHT JOINT BETWEEN MANHOLE SECTIONS AND/OR GRADE RINGS. MORTARED JOINTS ARE NOT PERMITTED. ALL NEW MANHOLES SHALL BE PRE-CAST CONCRETE INVERTS EXCEPT STRADDLE MANHOLE. ALL STRADDLE MANHOLES AND ALL FIELD-CONSTRUCTED INVERTS SHALL BE WITH READY MIX (3000 PSI) CONCRETE AND SHALL ONLY BE USED WITH APPROVAL OF THE ENGINEERING/UTILITY DEPARTMENT.
 - H. STANDARD MANHOLE DROP CONNECTIONS SHALL BE INSTALLED WHERE INDICATED ON THE DRAWINGS. DROP CONNECTIONS SHALL CONFORM TO THE DETAIL DRAWINGS. SEE DETAIL SS-30 ON SHEET 8(7).
 - I. THE INVERT CHANNELS OF THE MANHOLE SHALL BE SMOOTH AND SEMI-CIRCULAR IN SHAPE CONFORMING TO THE INSIDE OF THE ADJACENT SEWER SECTION. CHANGES IN DIRECTION OF FLOW SHALL BE MADE WITH A SMOOTH CURVE OF AS LARGE A RADIUS AS THE SIZE OF THE MANHOLE WILL PERMIT. INVERT BENCHES SHALL BE CONSTRUCTED OF READY MIX CONCRETE (3,000 PSI) OVER THE ENTIRE EXISTING BENCH. SEE DETAIL SS-31 ON SHEET 8(7).
 - J. ALL NEW MANHOLES SHALL BE SUPPLIED WITH AN APPROVED FLEXIBLE BOOT CONNECTION SUITABLE FOR SPECIFIED PIPE AND MANHOLE. ALL RUBBER BOOTS FOR 8 INCH (8") PIPE SHALL HAVE A MAXIMUM FLEXIBILITY OF 24" IN ANY DIRECTION FROM CENTER. BOOT FLEXIBILITY FOR PIPE SIZE'S LARGER THAN 8 INCH (8") SHALL BE PER THE MANUFACTURER'S RECOMMENDATIONS. TWENTY INCH (20") AND LARGER PIPE CONNECTIONS SHALL HAVE THE FIRST JOINT LOCATED FOUR FEET (4') FROM THE INSIDE FACE OF THE MANHOLE. FLEXIBLE JOINT MANHOLE CONNECTION SHALL BE AS MANUFACTURED BY PRES-SEAL GASKET CORPORATION, FORT WAYNE, IN; OR APPROVED EQUAL.
 - K. MANHOLES FOR SEWERS UP TO 36 INCHES SHALL HAVE AN INSIDE DIAMETER OF NOT LESS THAN FIVE FEET. THE MINIMUM DIAMETER MANHOLE FOR USE WITH AN INSIDE DROP CONNECTION SHALL BE FIVE FEET. ONLY ONE INSIDE DROP SHALL BE INSTALLED PER FIVE-FOOT DIAMETER MANHOLE.
- [6] ADJUST EXISTING SANITARY SEWER MANHOLE FRAME & COVER IN ACCORDANCE WITH SECTION 510 AND 520 OF THE ROAD AND BRIDGE SPECIFICATIONS. FRAME AND COVER SHALL BE SET FLUSH WITH THE PROPOSED GRADE INCLUDING CROSS SLOPES OF PAVEMENTS.
- [7] JACKED STEEL ENCASEMENT PIPE SHALL BE IN ACCORDANCE WITH DETAIL SS-10 ON SHEET 8(6).



Bradley C Craig
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MATTERN & CRAIG, INC
Roanoke, Virginia
(UTILITY ENGINEER)

REVISED	STATE	FEDERAL AID	ROUTE	STATE	SHEET NO.
		PROJECT		PROJECT	
	VA.		779	0779-011-247 C-501	8(2)

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

PLAN NO.	PROJECT	FILE NO.	SHEET NO.
	0779-011-247		8(2)