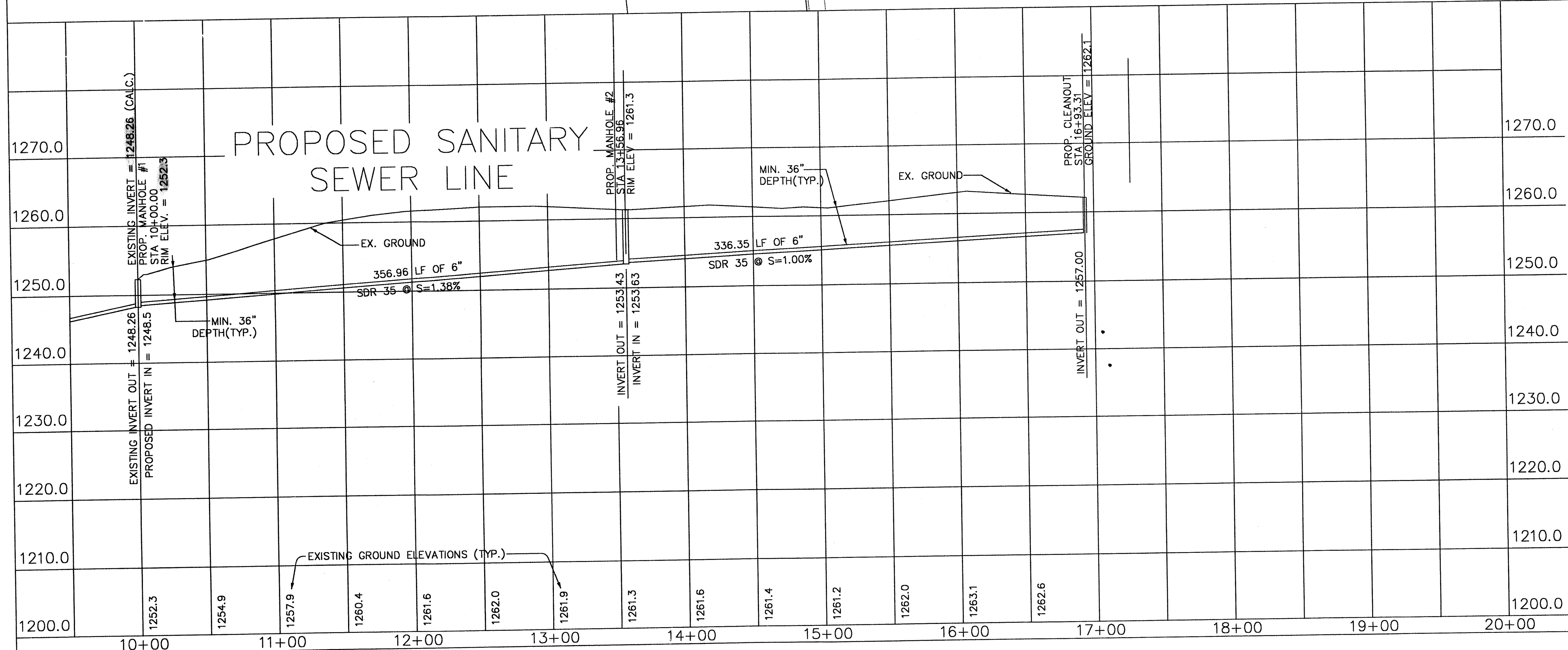
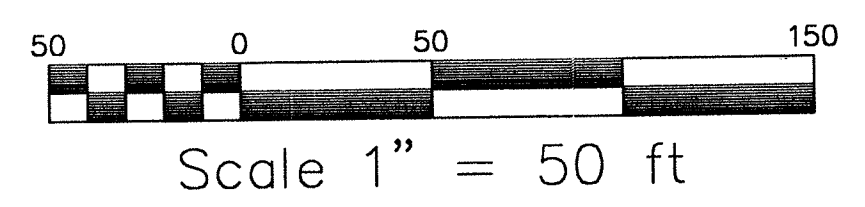


- NOTES:
1. PARTIAL TOPOGRAPHIC SURVEY PERFORMED BY MICHAEL HUFFMAN, L.S.
 2. CONTRACTOR SHALL CONTACT MISS UTILITY FOR LOCATION OF UNDERGROUND UTILITIES.
 3. CONTRACTOR SHALL VERIFY ALL UNDERGROUND UTILITIES AND THEIR ELEVATIONS.
 4. VERTICAL DATUM BASED ON PROPOSED RIM ELEVATION OF SMH #33 OF EXISTING SEWERLINE. PROPOSED PLAN ELEVATIONS PROVIDED BY BOTETOURT COUNTY.
 5. ALL SEWER DETAILS AND MATERIALS AS PER BOTETOURT SPECIFICATIONS DATED AUGUST 17, 2000.
 6. APPROXIMATE LOCATION OF WATERLINE EASEMENT ACCORDING TO PRELIMINARY PLAT BY McMURRY SURVEYORS, INC. DATED JUNE 8, 2005.



APPROVED FOR CONSTRUCTION
WATER & SEWER E&S
DATE: 9/26/05
BY: [Signature]



PROPOSED SEWER EXTENSION
IN
JOHN LOWMAN SUBDIVISION
SEPTEMBER 26, 2005

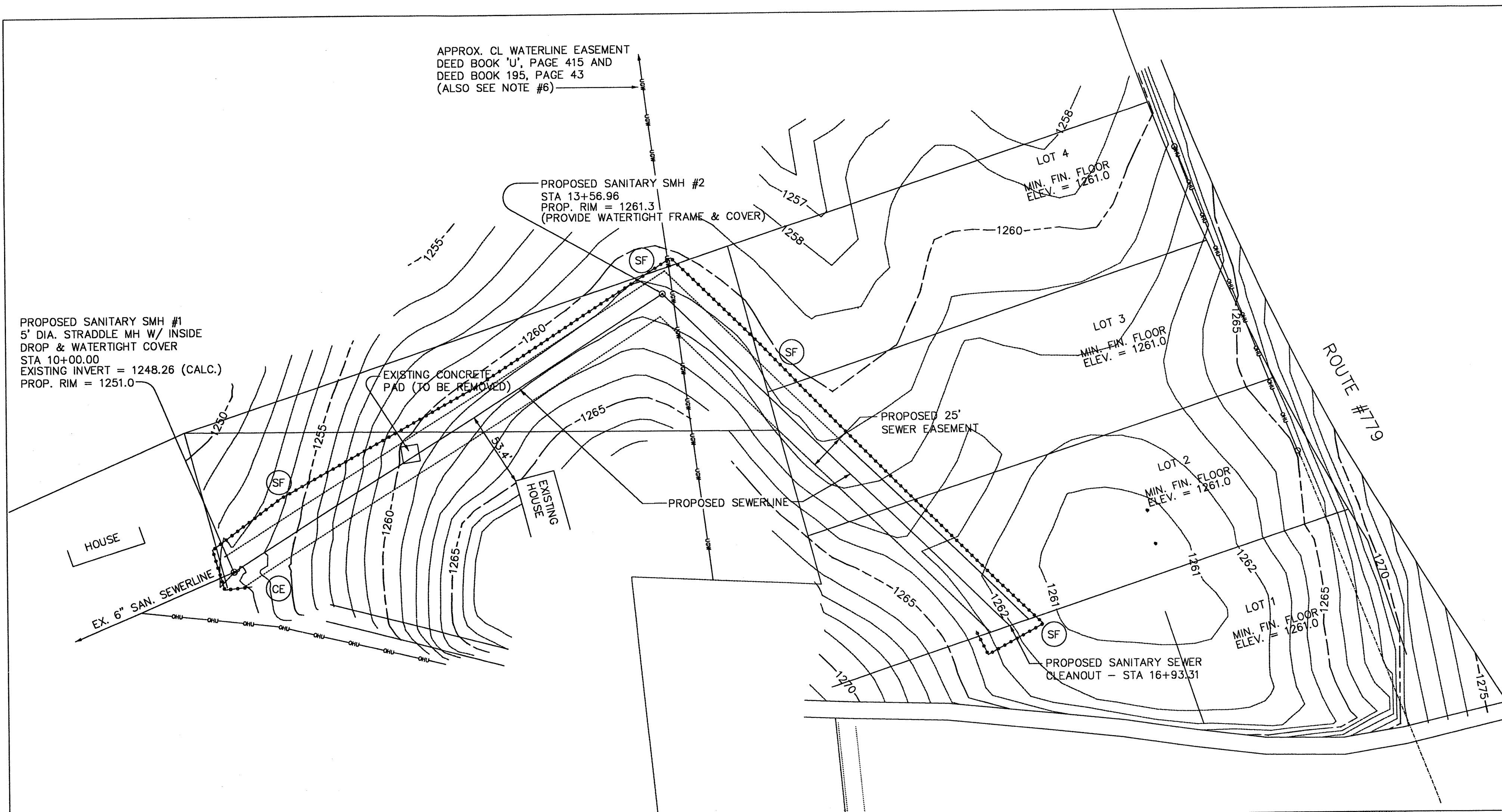
SURVEYOR
MICHAEL D. HUFFMAN
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CONTACT PERSON:
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ENGINEER
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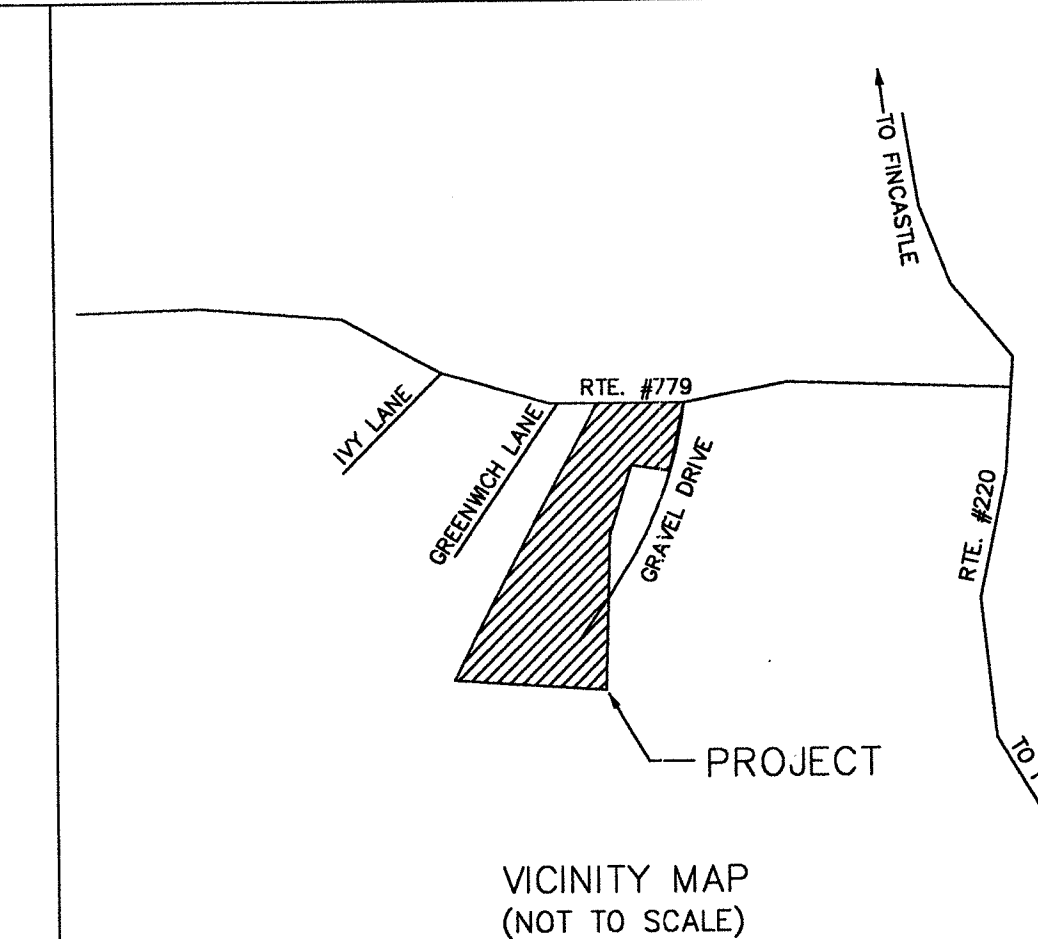
CONTRACTOR
HALLMARK CONST., INC.
221 SIMMONS DRIVE
CLOVERDALE, VA. 24077
CONTACT PERSON:
JOHN LOWMAN
(540)992-2028

SHEET 1 OF 3

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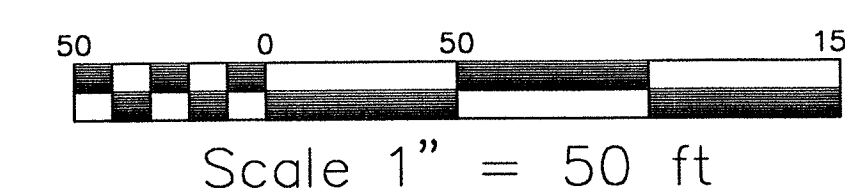


ES&C LEGEND	
(CE)	CONSTRUCTION ENTRANCE
(CIP)	CULVERT INLET PROTECTION
(SF)	SILT FENCE

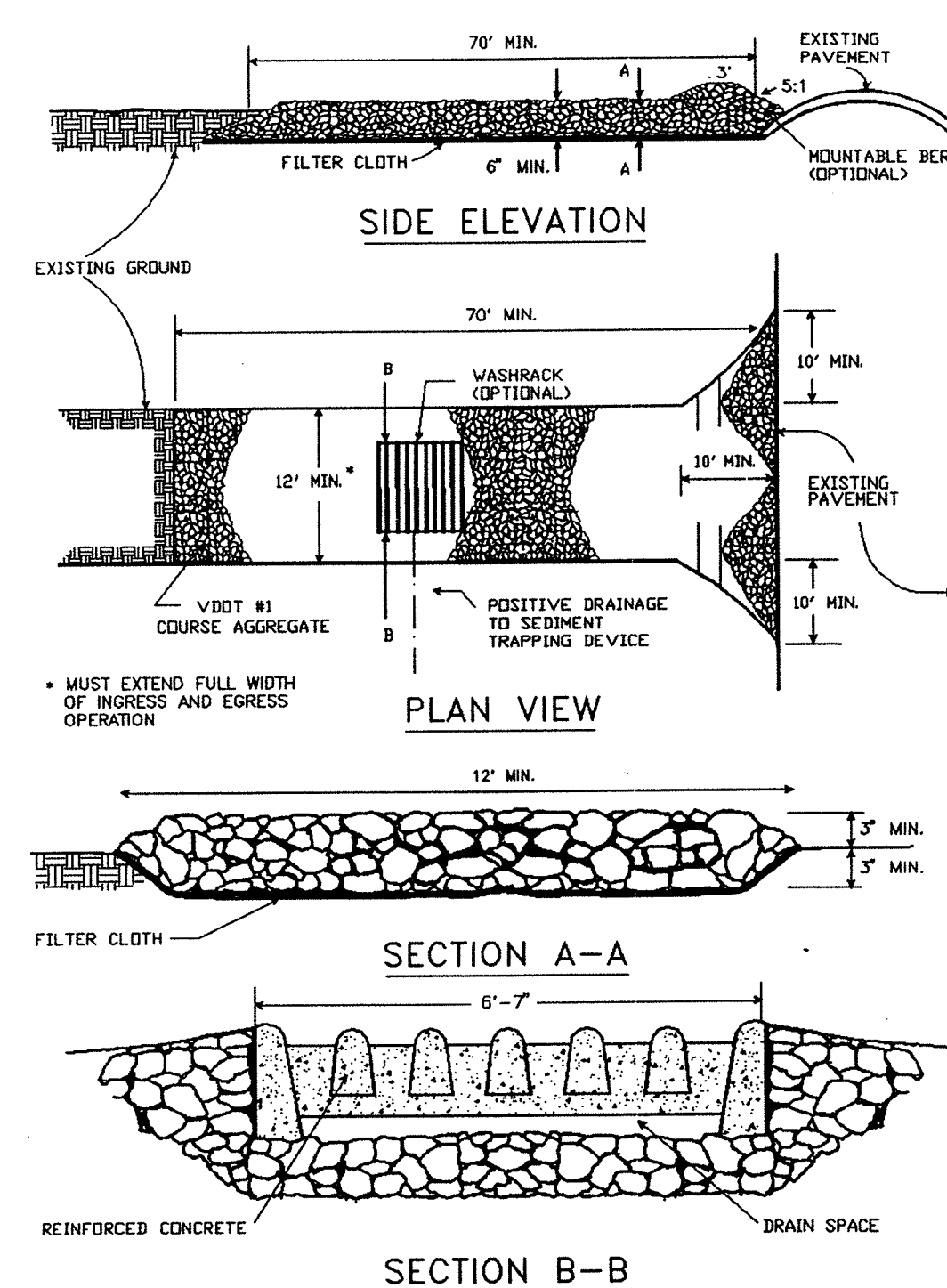


ES&C NOTES:

1. THIS PLAN SHOWS ES&C MEASURES WHICH ARE TO BE CONSTRUCTED DURING PROJECT CONSTRUCTION BUT DOES NOT NECESSARILY SHOW ALL ES&C MEASURES NEEDED. THE CONTRACTOR SHALL TAKE INTERMEDIATE MEASURES NEEDED TO COMPLY WITH THE "VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK", LATEST EDITION.
2. REFER TO BOTETOURT COUNTY SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL DETAILS AND DESIGN DATA.
3. ALL DISTURBED AREAS NOT PAVED OR BUILT UPON SHALL BE SEEDED IN ACCORDANCE WITH THE PERMANENT SEEDING (PS) MIXTURE SHOWN IN SPECIFICATIONS. DISTURBED AREAS THAT WILL NOT BE BROUGHT TO FINAL GRADE WITHIN 30 DAYS, SHALL BE SEEDED IN ACCORDANCE WITH STATE MINIMUM STANDARD, 3.31 - TEMPORARY SEEDING (TS).
4. ALL EROSION AND SEDIMENT CONTROL MEASURES SHOWN HEREON SHALL COMPLY WITH THE "VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK", LATEST EDITION.
5. CONTRACTOR SHALL REMOVE ALL ES&C MEASURES AT COMPLETION OF PROJECT, RESTORE CONSTRUCTION ENTRANCE AREA TO PRIOR EXISTING CONDITIONS, PER SPECIFICATIONS.

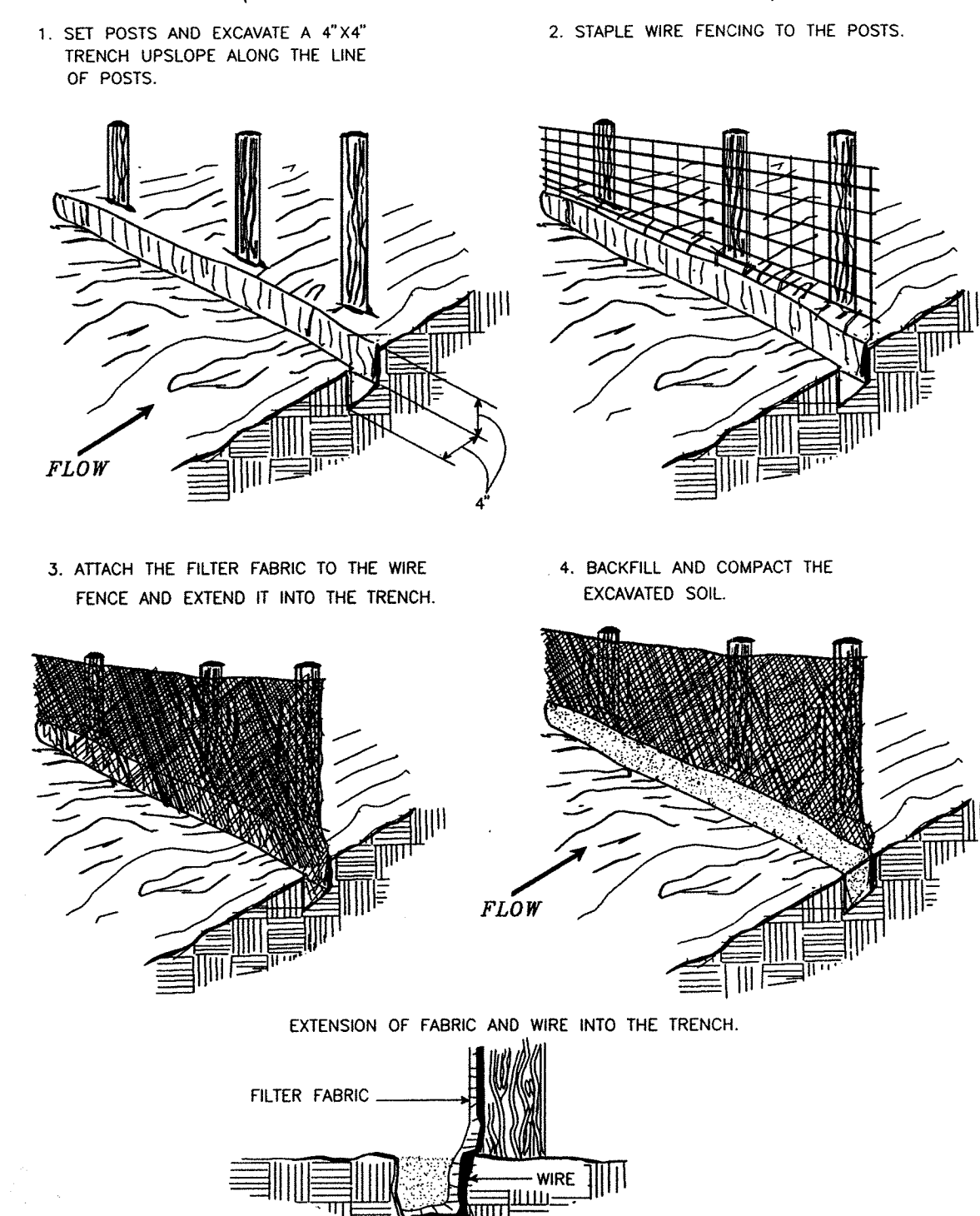


STONE CONSTRUCTION ENTRANCE



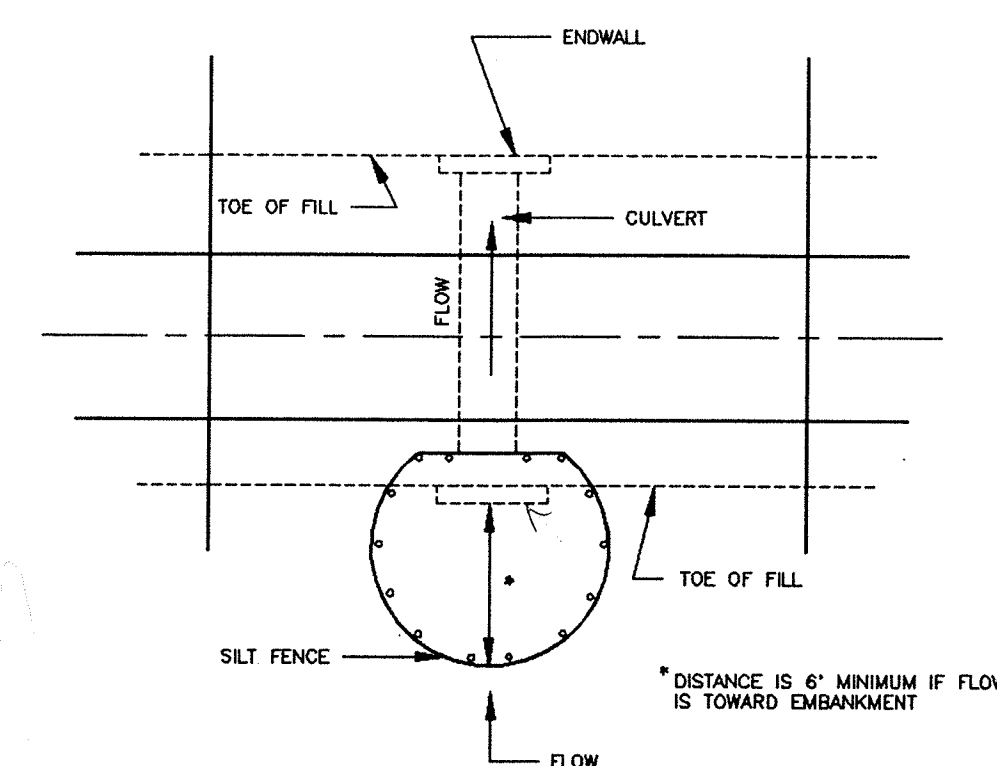
(SEE SECTION 3.02 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.)

CONSTRUCTION OF A SILT FENCE (WITH WIRE SUPPORT)

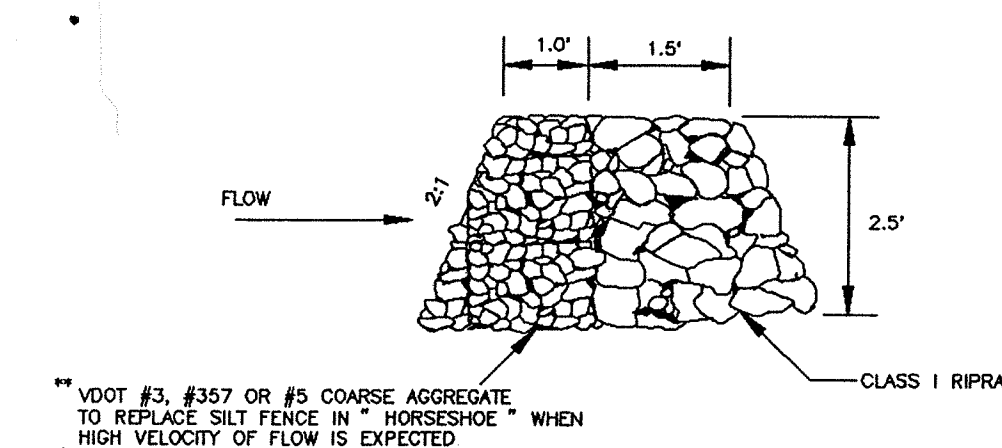


(SEE SECTION 3.05 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.)

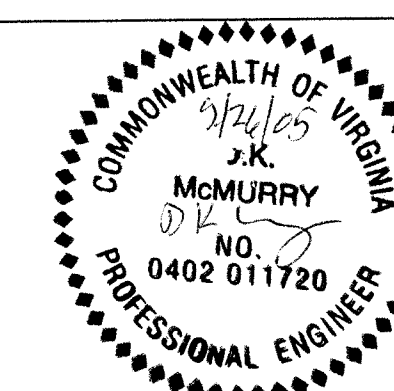
SILT FENCE CULVERT INLET PROTECTION



OPTIONAL STONE COMBINATION **



(SEE SECTION 3.08 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.)



EROSION & SEDIMENT CONTROL PLAN

FOR
PROPOSED SEWER EXTENSION
IN
JOHN LOWMAN SUBDIVISION
SEPTEMBER 26, 2005

SURVEYOR

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CONTRACTOR

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221 SIMMONS DRIVE
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CONTACT PERSON:
JOHN LOWMAN
(540)992-2028

NOTES:

1. ALL CONSTRUCTION DETAILS TO BE IN ACCORDANCE WITH BOTETOURT COUNTY STANDARDS AND DETAILS.
2. SANITARY SEWER LATERAL DETAILS - 2"x4" TREATED TIMBER POST IS TO BE INSTALLED LOCATED AT THE END CAP ON THE STUB OUT AND IS TO EXTEND 24 INCHES ABOVE FINISHED GRADE.
3. ALL SANITARY SEWER LATERALS TO BE 4-INCH DIAMETER PVC SCHEDULE 40 PIPE.
4. ALL SEWER SYSTEM COMPONENTS SHALL BE INSTALLED IN ACCORDANCE WITH CURRENT BOTETOURT COUNTY STANDARDS.
5. ALL SEWER PIPES (MAINS AND SERVICE LINES) SHALL HAVE BOTH MAGNETICALLY LOCATABLE DETECTION WIRE AND OR TAPE AND WARNING TAPE. MAGNETICALLY LOCATABLE DETECTION WIRE AND OR TAPE SHALL BE INSTALLED AT SAME ELEVATION OF SPRING LINE OF PIPE. WARNING TAPE (CAUTION!! BURIED SEWER PIPE BELOW) TO BE INSTALLED NO MORE THAN 18 INCHES ABOVE TOP OF THE PIPE.
6. ALL SEWER CROSSINGS WITH OTHER UTILITIES LINES SHALL BE CONCRETE ENCASED WHERE VERTICAL SEPARATION BETWEEN UTILITY LINES IS 18 INCHES OR LESS.
7. SEWER NOTES - THE FIRST SANITARY SEWER CLEAN-OUT SHALL BE LOCATED NO FURTHER THAN 10 FEET FROM THE SEWER MAIN LINE OR SEWER MANHOLE.
8. RECORD DRAWINGS / FIELD RED LINE DRAWINGS TO BE MAINTAINED BY THE SITE SUPERINTENDENT.
9. SEWER CONNECTION FEES WILL BE BASED UPON THE FEE STRUCTURE CURRENTLY IN PLACE AT THE TIME OF SEWER SERVICE APPLICATION SUBMITTAL. OWNER / DEVELOPER MUST MAKE APPLICATIONS AND PAY ALL APPLICABLE CONNECTION FEES PRIOR TO ISSUANCE OF ANY BUILDING PERMITS.
10. THE CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING TO BE ATTENDED BY NO LESS THAN THE FOLLOWING: BOTETOURT COUNTY REPRESENTATIVES, CONTRACTOR REPRESENTATIVE INCLUDING THE PROPOSED SEWER CONTRACTOR SITE SUPERINTENDENT, DESIGN ENGINEER OR DESIGN REPRESENTATIVE, ANY MATERIAL SUPPLIERS OR SUBCONTRACTORS THAT THE SEWER CONTRACTOR FEELS NECESSARY TO ATTEND.
11. SANITARY SEWER TESTING - DEVELOPER TO PROVIDE VIDEO CAMERA INSPECTION AND DOCUMENTATION PRIOR TO CONCLUSION OF 1 YEAR WARRANTY PERIOD. VIDEO CAMERA INSPECTION WORK TO BE PERFORMED NO SOONER THAN 6 MONTHS AFTER THE DATE OF SYSTEM ACCEPTANCE BY BOTETOURT COUNTY AND NO LATER THAN 8 MONTHS AFTER THE DATE OF SYSTEM ACCEPTANCE BY BOTETOURT COUNTY. ONE (1) COPY OF THE VIDEO TAPE TO BE PROVIDED TO BOTETOURT COUNTY. VIDEO CAMERA INSPECTION WORK TO BE COORDINATED WITH BOTETOURT COUNTY SUCH THAT COUNTY PERSONNEL CAN BE PRESENT DURING VIDEO INSPECTION OPERATIONS.
12. SANITARY SEWER TESTING - DEVELOPER TO PROVIDE 1 YEAR WARRANTY FOR ALL LINES PRIOR TO CONVEYANCE TO BOTETOURT COUNTY WITH WARRANTY DATE BEGINNING AT THE DATE OF SYSTEM ACCEPTANCE BY BOTETOURT COUNTY.
13. DEVELOPER SHALL PROVIDE SANITARY SEWER LINE TESTING IN ACCORDANCE WITH SEC. 4, No. 3 (A-H) OF THE BOTETOURT COUNTY WATER AND SEWER CONSTRUCTION STANDARDS AND SPECIFICATIONS FOR LOW PRESSURE AIR TESTING PROCEDURES.
14. ALL TESTING SHALL BE DOCUMENTED BY THE DESIGN ENGINEER OR DESIGN REPRESENTATIVE.
15. ALL TESTING SPECIFICATIONS FOR SEWER SYSTEM SHALL BE IN ACCORDANCE WITH BOTETOURT COUNTY STANDARDS AND DETAILS.
16. ALL SANITARY SEWER SHOP DRAWINGS / CUT SHEETS SHALL BE SUBMITTED BY THE CONTRACTOR TO BOTH THE ENGINEER AND BOTETOURT COUNTY FOR APPROVAL PRIOR TO INSTALLATION. BOTETOURT COUNTY WILL REQUIRE THREE (3) COMPLETE SETS OF SHOP DRAWINGS FOR REVIEW.
17. SEWER CONNECTION FEES WILL BE BASED UPON THE FEE STRUCTURE IN PLACE AT THE TIME THE SEWER CONNECTION APPLICATION IS SUBMITTED. OWNER / DEVELOPER MUST MAKE APPLICATIONS AND PAY ALL APPLICABLE CONNECTION FEES PRIOR TO ISSUANCE OF ANY BUILDING PERMITS.
18. ALL SEWER PIPES (MAINS AND SERVICE LINES) SHALL HAVE BOTH MAGNETICALLY LOCATABLE DETECTION WIRE AND OR TAPE AND WARNING TAPE. MAGNETICALLY LOCATABLE DETECTION WIRE AND OR TAPE SHALL BE INSTALLED AT THE SAME ELEVATION AS THE SPRING LINE OF THE PIPE. WARNING TAPE (CAUTION!! BURIED SEWER / WATER PIPE BELOW) TO BE INSTALLED NO MORE THAN 18 INCHES ABOVE THE TOP OF THE PIPE.
19. NO PLANTINGS TO BE PERMITTED IN SEWER EASEMENTS.
20. NO PLANTINGS OR OTHER OBSTRUCTIONS SHALL BE PERMITTED TO BE INSTALLED WITHIN 10 FEET OF SEWER CLEANOUTS.

SANITARY SEWER TESTING:

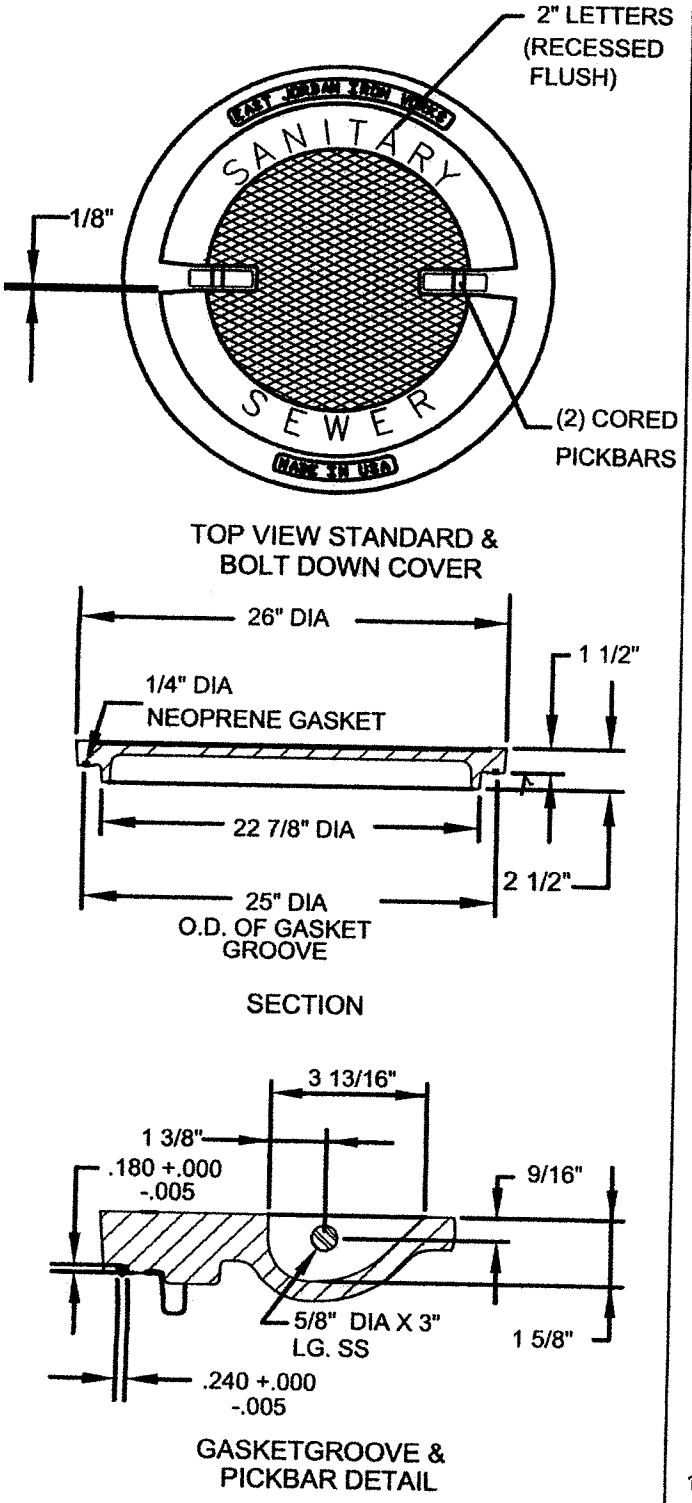
- A. AIR TESTING:
1. THE CONTRACTOR SHALL PLUG THE PIPE AND SHALL CONDUCT A LOW PRESSURE AIR TEST TO DETERMINE THE ACCEPTABILITY OF THE COMPLETED WORK. THE CONTRACTOR SHALL FURNISH ALL MEN, MATERIALS AND SUPPLIES NECESSARY TO ASSIST IN THE CONDUCTING OF THE TESTS. THE PRESSURE TESTS SHALL CONFORM TO UNI-B-6-90 AND ASTM F-1417.
 2. PLUG TEST: PNEUMATIC PLUGS SHALL HAVE A SEALING LENGTH EQUAL TO OR GREATER THAN THE DIAMETER OF THE PIPE. TESTED PLUGS SHALL RESIST INTERNAL TEST PRESSURES WITHOUT REQUIRING EXTERNAL BRACING OR BLOCKING. PLUGS SHALL BE TESTED PRIOR TO INSTALLATION IN A PIPE RUN. A JOINT OF PIPE SHOULD BE SEALED AT BOTH ENDS WITH THE PLUGS TO BE USED IN THE SEWER TEST. AIR SHALL BE INTRODUCED INTO THE PLUGS TO 25 PSIG. THE SEALED PIPE SHALL BE PRESSURIZED TO 9 PSIG. THE PLUGS SHALL WITHSTAND THIS PRESSURE WITHOUT BRACING OR MOVEMENT. NO PERSONNEL SHALL BE ALLOWED IN THE ALIGNMENT OF THE PIPE DURING PLUG TESTING.
 3. LINE PRESSURIZATION: THE LINE SEGMENT TO BE TESTED SHALL BE PLUGGED AND TESTED TO 4.0 PSI GREATER THAN THE GROUNDWATER BACKPRESSURE BUT NOT TO EXCEED 9 PSI. THE LINE PRESSURE SHALL BE ALLOWED TO STABILIZE FOR AT LEAST 2 MINUTES. UPON STABILIZATION, THE AIR SUPPLY HOSE SHALL BE DISCONNECTED FROM THE CONTROL PANEL. THE CONTINUOUS MONITORING PRESSURE GAUGE SHALL THEN BE OBSERVED WHILE THE PRESSURE DECREASES TO NOT LESS THAN 3.5 PSI GREATER THAN THE AVERAGE BACK PRESSURE OF ANY GROUNDWATER OVER PIPE.
 4. PRESSURE LOSS TIMING: AT A READING OF 3.5 PSI GREATER THAN THE AVERAGE BACK PRESSURE OF ANY GROUNDWATER OVER THE PIPE, THE TIMING SHALL COMMENCE WITH A STOPWATCH THAT IS AT LEAST 99.8 PERCENT ACCURATE. THE TIME (TO THE NEAREST SECOND) SHALL BE NOTED FOR THE PRESSURE TO DROP 1.0 PSIG.
 5. TEST TIME CRITERIA: ALL TEST TIMES SHALL BE CALCULATED USING RAMSEIER'S EQUATION $T=0.085 \cdot D^5 \cdot K / Q$; WHERE: T=SHORTEST TEST TIME ALLOWED FOR AIR PRESSURE TO DROP 1.0 PSIG, IN SECONDS; K=0.000419 D⁵ L, BUT NOT LESS THAN 1.0; Q=0.0015 CUBIC FEET / MINUTE / SQUARE FEET OF INTERNAL SURFACE; D=NOMINAL PIPE DIAMETER, IN INCHES; L=LENGTH OF PIPE BEING TESTED, IN FEET. ACCORDINGLY, MINIMUM TEST TIMES SHALL BE:
3.8 MINUTES FOR 4 INCH (L<597 ft.)
5.7 MINUTES FOR 6 INCH (L<398 ft.)
7.6 MINUTES FOR 8 INCH (L<298 ft.)
11.3 MINUTES FOR 12 INCH (L<199 ft.)
 6. ACCEPTABILITY: IF THE ELAPSED TIME TO DROP 1.0 PSIG IS LESS THAN THE TEST TIME CRITERIA ESTABLISHED ABOVE, THEN THE AIR LOSS SHALL BE CONSIDERED EXCESSIVE AND THE SECTION OF PIPE HAS FAILED THE TEST. CONTRACTOR SHALL, AT HIS OWN EXPENSE LOCATE THE SOURCE OF THE LEAKAGE, REPAIR OR REPLACE ALL DEFECTIVE MATERIALS AND/OR WORKMANSHIP, AND RE-TEST UNTIL SATISFACTORY RESULTS ARE OBTAINED.
 7. DEFLECTION TESTING FOR PVC PIPE: ALL PVC GRAVITY SEWER LINES SHALL BE SUBJECT TO VERTICAL DEFLECTION TESTING USING A 60-IN-60 MANDREL NO SOONER THAN 2 WEEKS FOLLOWING COMPLETION OF BACKFILL AND COMPACTION OF THE TRENCH. MAXIMUM PERMISSIBLE DEFLECTION SHALL BE 5% OF THE PIPE'S INTERNAL DIAMETER. A NINE ARM MANDREL WITH A PROVING RING SIZED AT 5% LESS THAN THE ASTM DIMENSION FOR THE PIPE AND A LENGTH EQUAL TO THE NOMINAL DIAMETER OF THE PIPE BEING TESTED. THE MANDREL SHALL BE PULLED THROUGH THE SEWER LINE MANUALLY. ANY SEWER NOT PASSING THE MANDREL TEST SHALL BE CORRECTED UNTIL THE TEST IS PASSED.
 8. MANHOLE VACUUM TESTING: INSTALLATION OF VACUUM EQUIPMENT AND INDICATING DEVICES SHALL BE IN ACCORDANCE WITH EQUIPMENT SPECIFICATIONS AND PERFORMANCE INFORMATION AS PROVIDED BY THE MANUFACTURER AND ACCEPTABLE TO THE ENGINEER.
 9. A MEASURED VACUUM OF 10 INCHES OF MERCURY SHALL BE ESTABLISHED IN THE MANHOLE. THE TIME FOR THE VACUUM DROP TO NINE INCHES OF MERCURY SHALL BE RECORDED.
 10. THE MINIMUM ELAPSED TIME FOR A FOUR FOOT DIAMETER MANHOLE SHALL BE IN ACCORDANCE WITH THE FOLLOWING:

MANHOLE DEPTH	MIN. ELAPSE TIME FOR A PRESSURE CHANGE OF 1" MERCURY
10ft. OR LESS	60 SECONDS
>10ft. BUT <15ft.	75 SECONDS
>15ft. BUT <25ft.	90 SECONDS

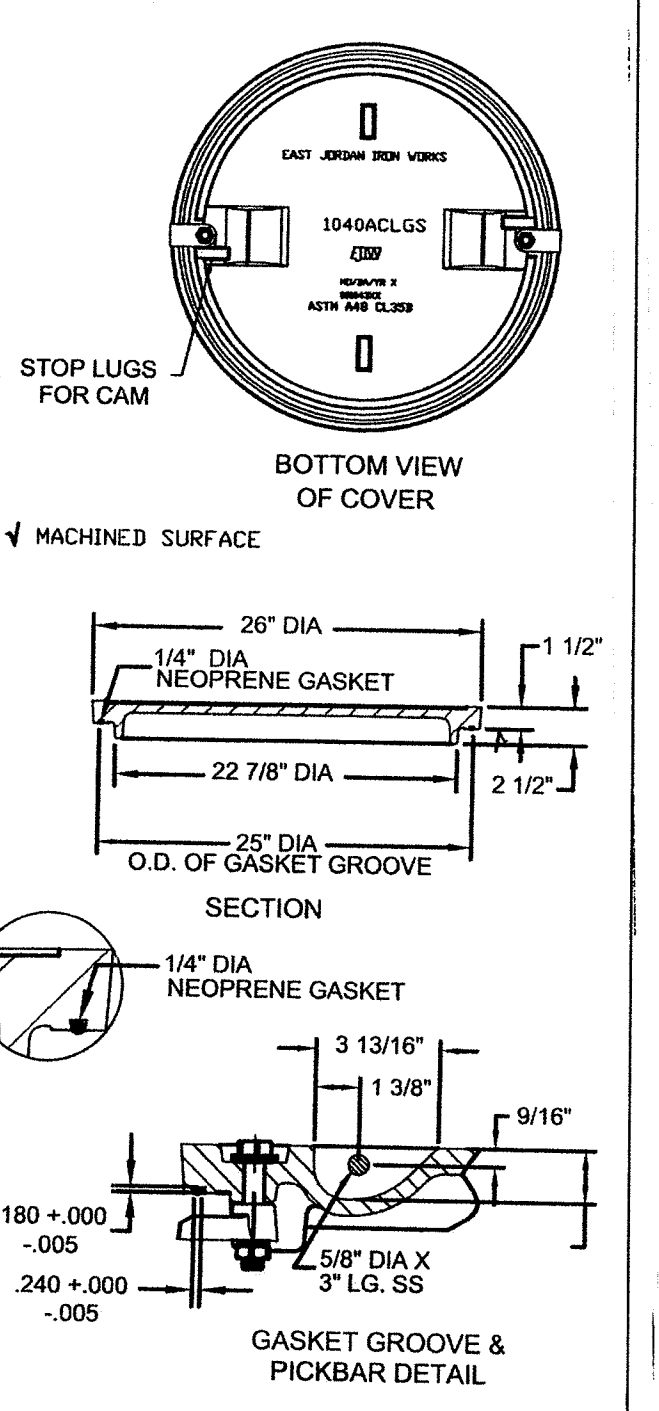
FOR MANHOLES FIVE FEET IN DIAMETER, ADD AN ADDITIONAL 15 SECONDS. FOR MANHOLES SIX FEET IN DIAMETER, ADD AN ADDITIONAL 30 SECONDS TO THE TIME REQUIREMENTS FOR FOUR FOOT DIAMETER MANHOLES.

3. IF THE MANHOLE FAILS THE TEST, NECESSARY REPAIRS SHALL BE MADE AND THE VACUUM TEST AND REPAIRS SHALL BE REPEATED UNTIL THE MANHOLE PASSES THE TEST.

4. IF A MANHOLE JOINT MASTIC OR GASKET IS PULLED OUT DURING THE TEST, THEN THE MANHOLE SHALL BE DISASSEMBLED AND THE MASTIC OR GASKET REPLACED.



STANDARD MANHOLE COVER



BOLT-DOWN MANHOLE COVER

MANHOLE DETAILS
SHOWING
STANDARD MANHOLE COVER
AND
BOLT-DOWN MANHOLE COVER
(SEE DRAWING IN BOTETOURT COUNTY WATER AND SEWER CONSTRUCTION STANDARDS AND SPECIFICATIONS.)

NOTES AND DETAILS SHEET
FOR
PROPOSED SEWER EXTENSION
IN
JOHN LOWMAN SUBDIVISION
SEPTEMBER 26, 2005

SURVEYOR

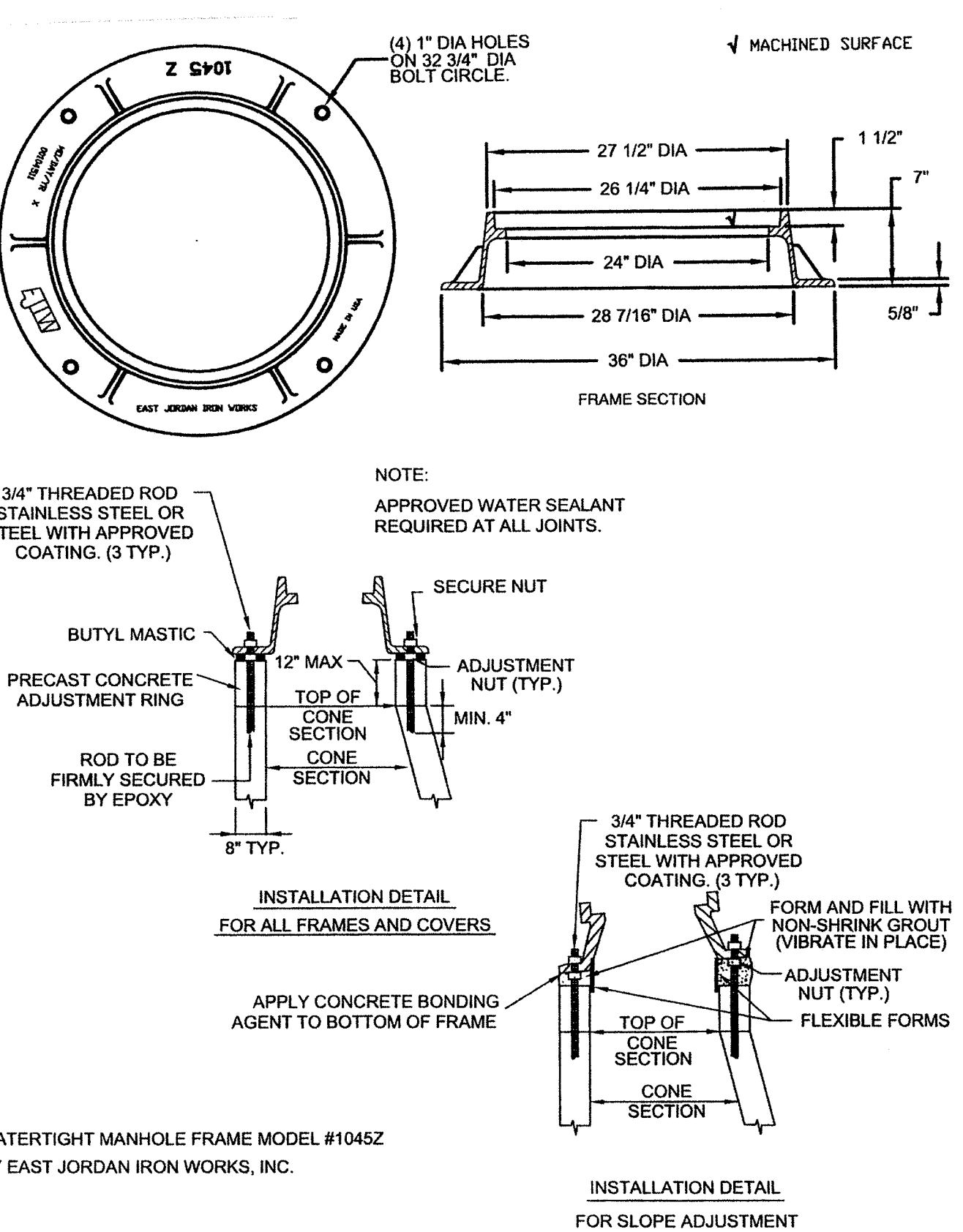
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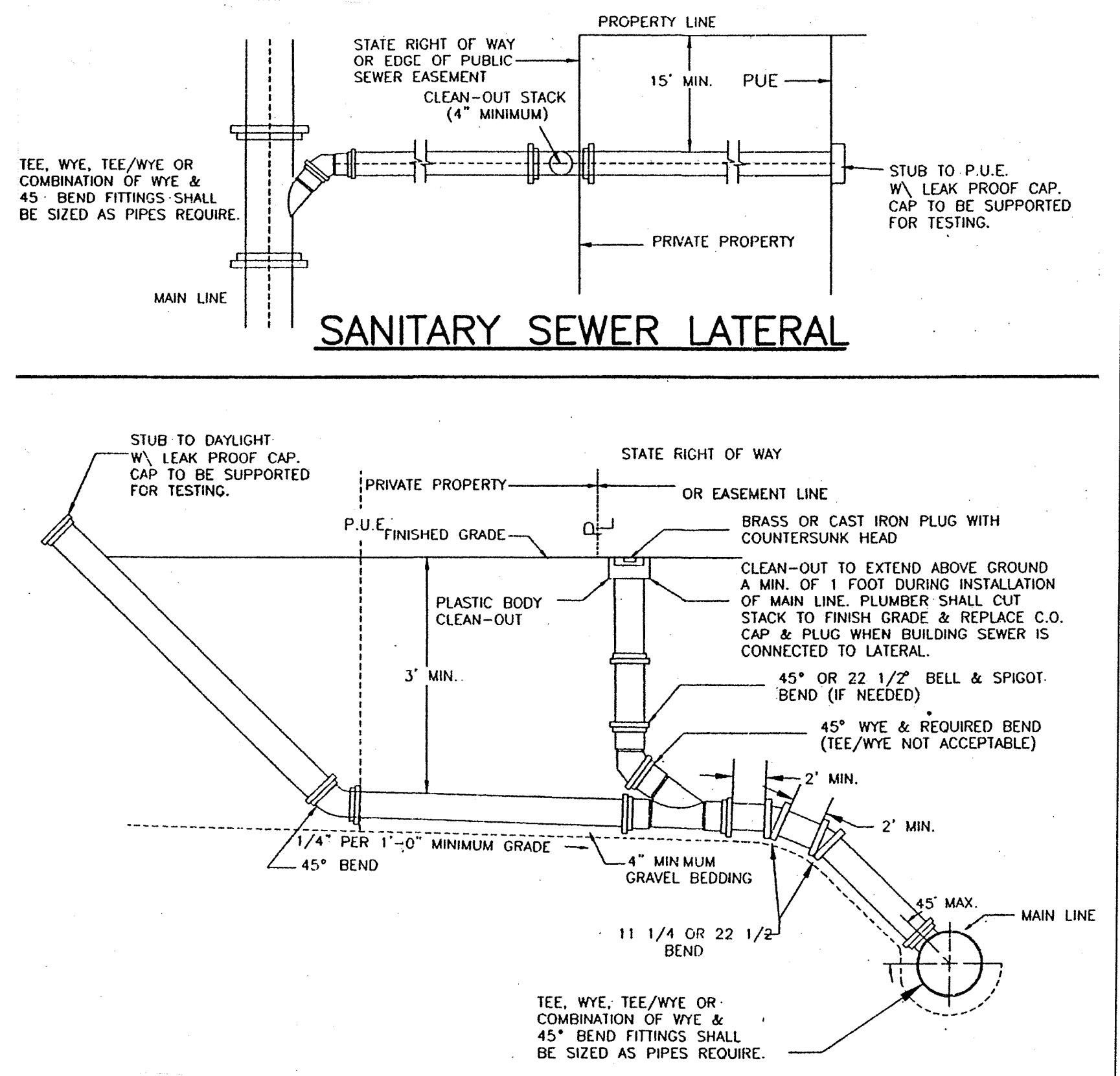
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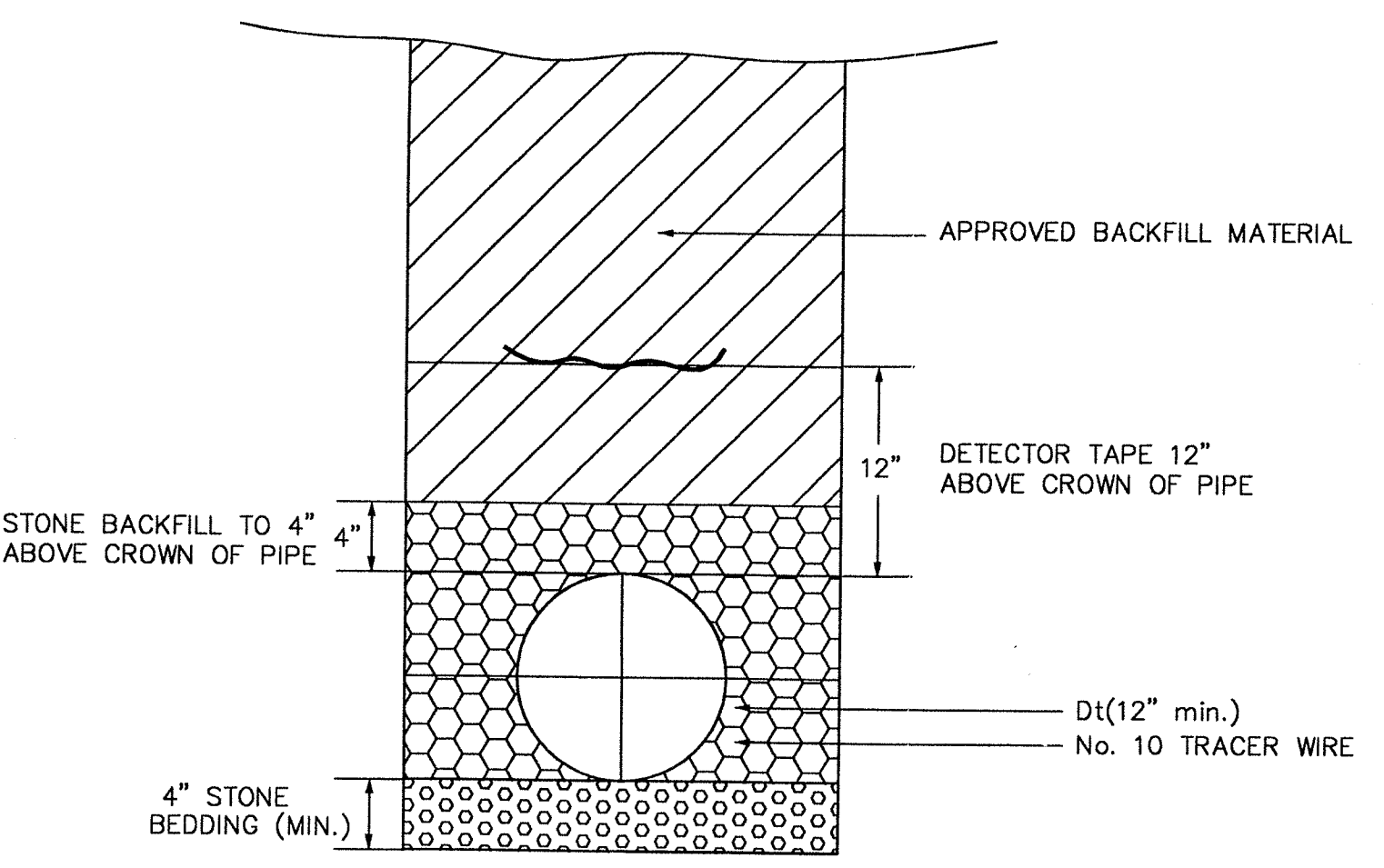


MANHOLE DETAIL
SHOWING
INSTALLATION DETAILS

(SEE DRAWING IN BOTETOURT COUNTY WATER AND SEWER CONSTRUCTION STANDARDS AND SPECIFICATIONS.)



SANITARY SEWER LATERAL DETAIL



TYPICAL TRENCH DETAIL
SHOWING
TRACERWIRE TAPE
&
DETECTION TAPE

TRENCH MUST COMPLY TO OSHA TRENCH STANDARDS 29CR-1910 BACKFILL MATERIAL TO BE EXCAVATED MATERIAL WITH ROCK PARTICLES NO LARGER THAN 2" DIAMETER WITH ABILITY TO BE COMPACTED TO 95% OF MODIFIED PROCTOR

