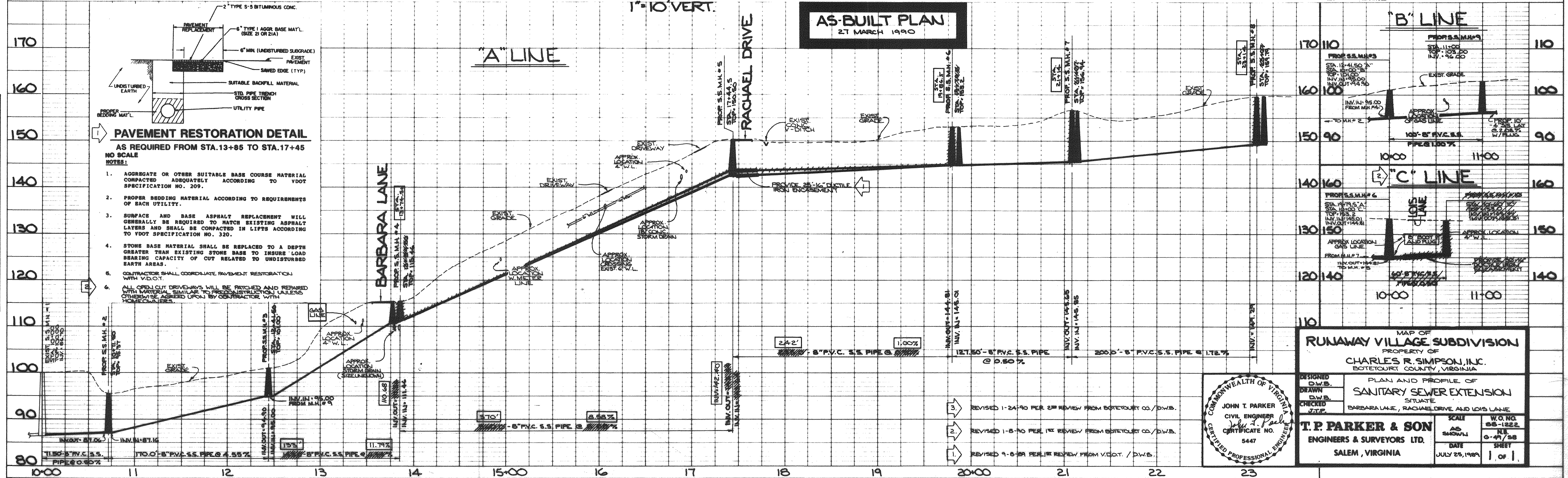


1. LOCATION OF UNDERGROUND UTILITIES IS BASED ON FIELD SURVEYS, AVAILABLE RECORDS AND UNDERGROUND LOCATOR SERVICE.
2. THE SUBJECT PROPERTY IS NOT WITHIN THE LIMITS OF THE 100 YEAR FLOOD BOUNDARY AS SHOWN ON THE FEMA FLOOD BOUNDARY MAP.

NOTE:
REFERENCE MAP OF RUNAWAY VILLAGE
BY T.P. PARKER & SON, DATED SEPTEMBER
8, 1972 AND RECORDED IN P.B. 7, PG. 48 IN
THE COUNTY OF BOTETOURT, VIRGINIA.

PLAN	SURVEYED		BY		DATE
NOTE BOOK	PROJECT	DATE	BY	DATE	DATE
No.	ALIGNED	DATE	BY	DATE	DATE
	CHECKED	DATE	BY	DATE	DATE
	PT. OF WAY CHECKED	DATE	BY	DATE	DATE

PROFILE	SURVEYED _____	BY _____	DATE _____
NOTE BOOK	PLOTTED _____		
No. _____	GRADES CHECKED _____		
	B. M.'S NOTED _____		
	STRUCTURE NOTATIONS CHECKED _____		



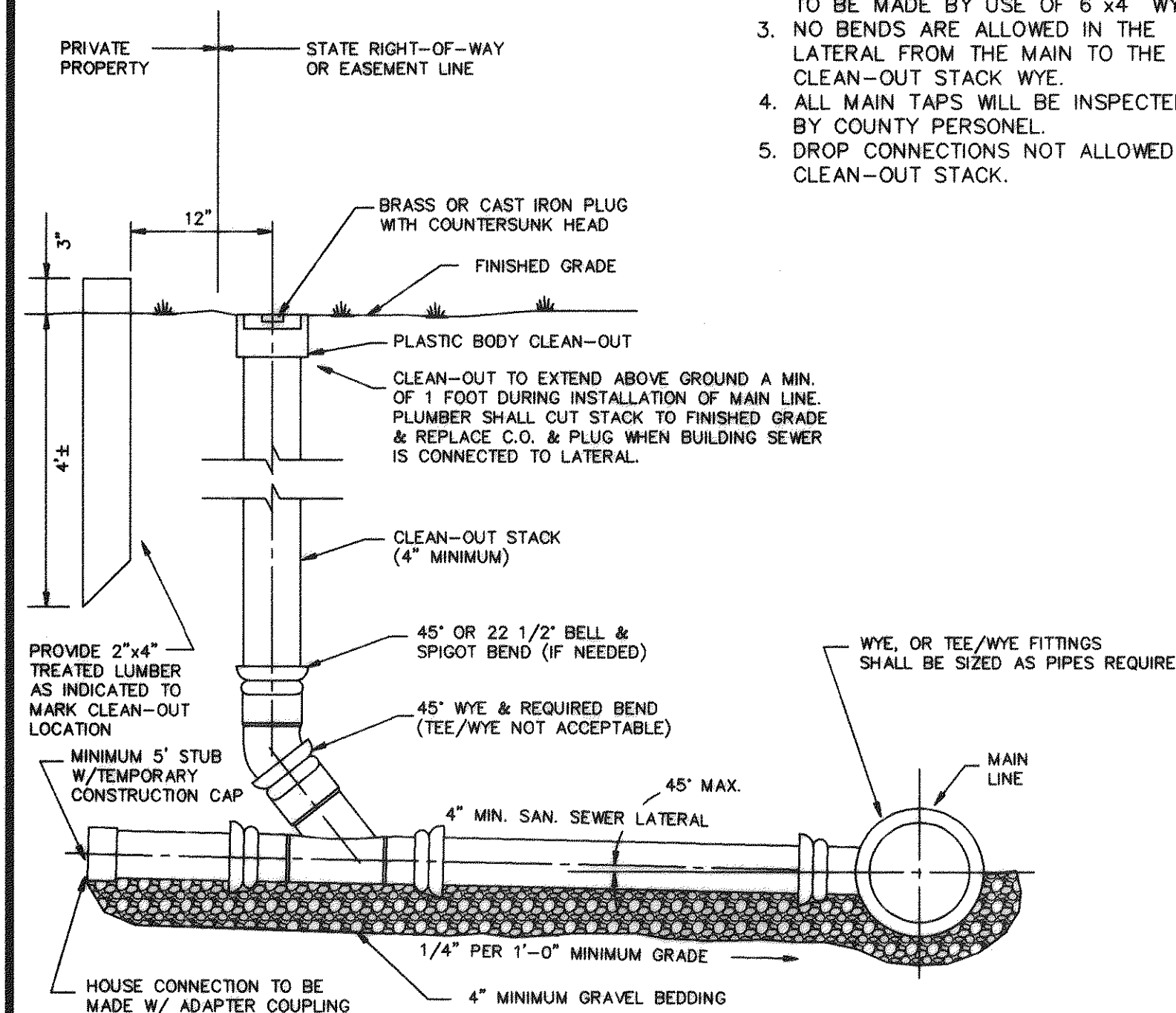
1. ALL PIPES & FITTINGS SHALL BE OF SIMILAR MATERIAL.
2. 4" CLEAN-OUT STACKS MAY BE USED ON 6" LATERALS. CHANGE OF SIZE TO BE MADE BY USE OF 6"x4" WYE.
3. NO BENDS ARE ALLOWED IN THE LATERAL FROM THE MAIN TO THE CLEAN-OUT STACK WYE.
4. ALL MAIN TAPS WILL BE INSPECTED BY COUNTY PERSONEL.
5. DROP CONNECTIONS NOT ALLOWED ON CLEAN-OUT STACK.

(SF) SILT FENCE
(IP) INLET PROTECTION
(PS) PERMANENT SEEDING

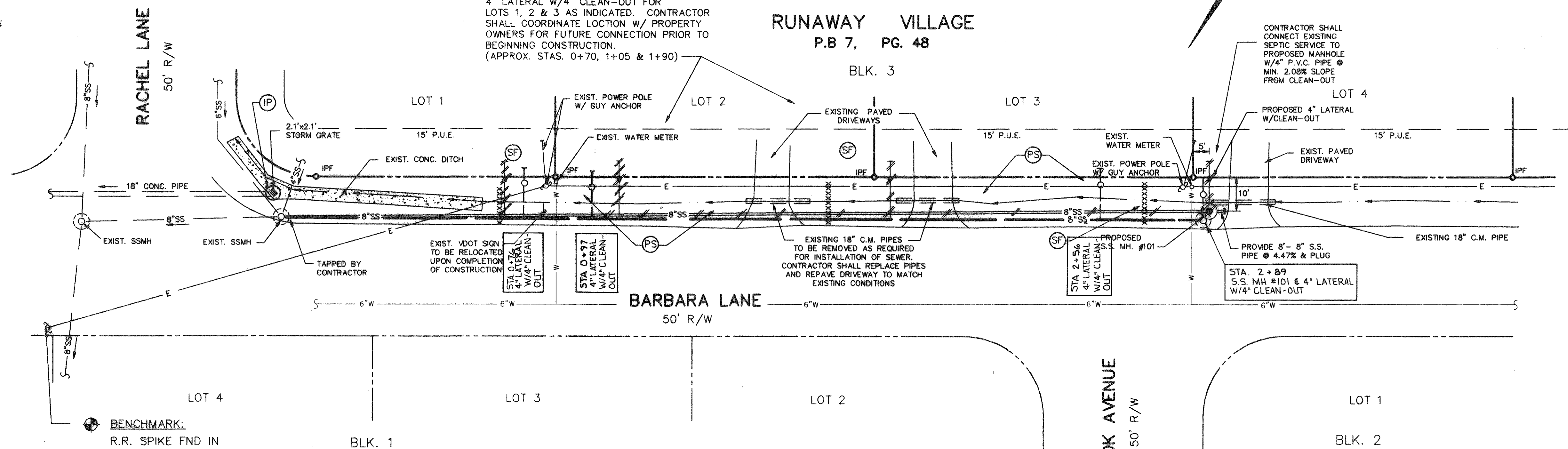
NOTE: CONNECTION OF PROPOSED 4" LATERAL SERVICE TO EXISTING RESIDENTIAL SERVICE SHALL BE MADE BETWEEN THE HOME AND THE EXISTING SEPTIC TANK. TANK TO BE PROPERLY SEALED AND TAKEN OUT OF SERVICE.

NOTE: CONTRACTOR SHALL PROVIDE
4" LATERAL W/4" CLEAN-OUT FOR
LOTS 1, 2 & 3 AS INDICATED. CONTRACTOR
SHALL COORDINATE LOCATION W/ PROPERTY
OWNERS FOR FUTURE CONNECTION PRIOR TO
BEGINNING CONSTRUCTION.
(APPROX. STAS. 0+70, 1+05 & 1+90)

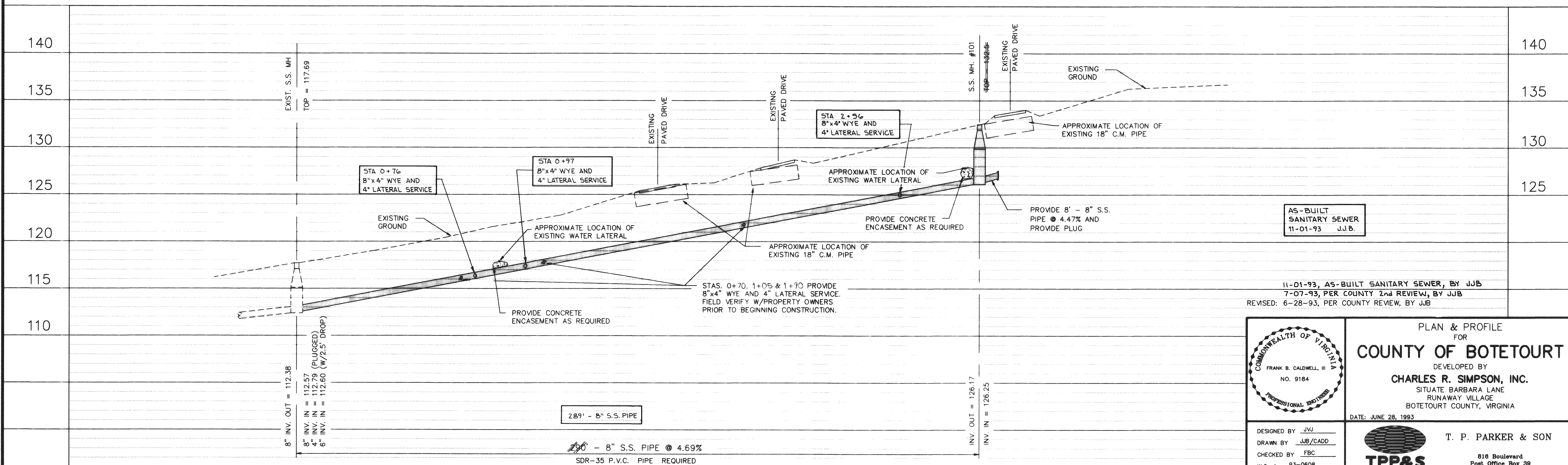
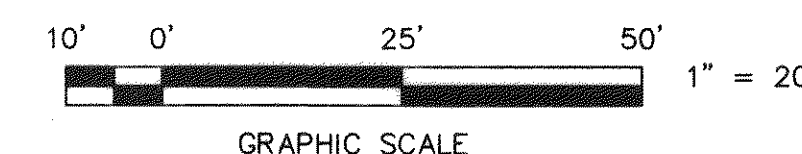
CONTRACTOR SHALL
CONNECT EXISTING
SEPTIC SERVICE TO
PROPOSED MANHOLE
W/4" P.V.C. PIPE @
MIN. 2.08% SLOPE
FROM CLEAN-OUT



SANITARY SEWER LATERAL
SCALE: 1"=1'-0"



SCALES: HORIZ. 1" = 20'
VERT. 1" = 5'



COMMONWEALTH OF VIRGINIA

FRANK B. CALDWELL, III

NO. 9184


PROFESSIONAL ENGINEER

PLAN & PROFILE
FOR
COUNTY OF BOTETOURT
DEVELOPED BY
CHARLES R. SIMPSON, INC.
SITUATE BARBARA LANE
RUNAWAY VILLAGE
BOTETOURT COUNTY, VIRGINIA

DATE: JUNE 28, 1993

DATE: JUNE 28, 1993

DESIGNED BY JVJ
DRAWN BY JJB/CADD
CHECKED BY FBC
W.O. # 93-0608
N.B. RUNAWAY VILLAGE
TAX NO. 107B-6-3
LOTS 1-5



TPP&S
ENGINEERS
SURVEYORS
PLANNERS

T. P. PARKER & SON
816 Boulevard
Post Office Box 39
Salem, Virginia 24153
Telephone: 703-387-1153
FAX: 703-389-5767

1. PROTECTION OF WORK, PROPERTY AND PERSONS

- 1.1 THE CONTRACTOR WILL BE RESPONSIBLE FOR INITIATING, MAINTAINING AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. HE WILL TAKE ALL NECESSARY PRECAUTIONS FOR THE SAFETY OF, AND WILL PROVIDE THE NECESSARY PERSONS WHO MAY BE AFFECTED THEREBY, ALL THE WORK AND ALL THE MATERIALS OR EQUIPMENT TO BE INCORPORATED THEREIN, WHETHER IN STORAGE ON OR THE SITE, AND OTHER PROPERTY AT THE SITE ADJACENT THERETO, INCLUDING TREES, SHRUBS, LAWNS, WALKS, PAVEMENTS, ROADWAYS, STRUCTURES, AND UTILITIES NOT DESIGNATED FOR REMOVAL, RELOCATION, OR REPLACEMENT IN THE COURSE OF CONSTRUCTION.
- 1.2 THE CONTRACTOR WILL COMPLY WITH ALL APPLICABLE LAWS, ORDINANCES, RULES, REGULATIONS, AND ORDERS OF ANY PUBLIC BODY HAVING JURISDICTION. HE WILL ERECT AND MAINTAIN, AS REQUIRED BY THE CONDITIONS AND PROGRESS OF THE WORK, ALL NECESSARY SAFEGUARDS FOR SAFETY AND PROTECTION. HE WILL NOTIFY OWNERS OF ADJACENT UTILITIES WHEN PROSECUTION OF THE WORK MAY AFFECT THEM. THE CONTRACTOR WILL REMEDY ALL DAMAGE, INJURY, OR LOSS TO ANY PROPERTY CAUSED, DIRECTLY OR INDIRECTLY, IN WHOLE OR IN PART, BY THE CONTRACTOR, ANY SUBCONTRACTOR OR ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY ANY OF THEM OR ANYONE FOR WHOSE ACTS OF THEM BE LIABLE, EXCEPT DAMAGE OR LOSS ATTRIBUTABLE TO THE FAULT OF THE CONTRACT DOCUMENTS OR TO THE ACTS OF THE DEVELOPER OR THE ENGINEER OR ANYONE EMPLOYED BY EITHER OF THEM OR ANYONE FOR WHOSE ACTS EITHER OF THEM MAY BE LIABLE, AND NOT ATTRIBUTABLE, DIRECTLY OR INDIRECTLY, IN WHOLE OR IN PART, TO THE FAULT OR NEGLIGENCE OF THE CONTRACTOR.
- 1.3 IN EMERGENCIES AFFECTING THE SAFETY OF PERSONS OR THE WORK OR PROPERTY AT THE SITE OR ADJACENT THERETO, THE CONTRACTOR, WITHOUT SPECIAL INSTRUCTION OR AUTHORIZATION FROM THE ENGINEER OR DEVELOPER, SHALL ACT TO PREVENT THREATENED DAMAGE, INJURY, OR LOSS. HE WILL GIVE THE ENGINEER PROMPT WRITTEN NOTICE OF ANY SIGNIFICANT CHANGES IN THE WORK OR DEVIATION FROM THE DOCUMENTS CAUSING SUCH DAMAGE THEREBY, AND A CHANGE ORDER SHALL THEREUPON BE ISSUED COVERING THE CHANGES AND DEVIATIONS INVOLVED.

2. EXISTING UTILITIES

- 2.1 EXISTING UTILITIES ARE INDICATED ON THE DRAWINGS IN ACCORDANCE WITH AVAILABLE RECORDS. THE DRAWINGS MAY NOT REPRESENT ALL UTILITIES THAT MAY BE ENCOUNTERED OR THE EXACT LOCATIONS OF THE UTILITY SYSTEMS.
- 2.2 BEFORE ANY WORK IS STARTED, THE CONTRACTOR SHALL CONTACT "MISS UTILITY LOCATOR SERVICE", 1-800-552-7001, SO THAT ALL CORPORATIONS, COMPANIES, INDIVIDUALS OWNING AND LOCAL AUTHORITIES OWNING, MAINTAINING, OR REGULATING CONDUITS, WIRES, AND PIPES RUNNING TO OR ON THE WORK SITE MAY MAKE ADJUSTMENTS TO THE EXISTING UTILITY AS MAY BE REQUIRED.
- 2.3 POWER POLES, TELEPHONE POLES, AND GAS LINES SHALL BE PROTECTED FROM DAMAGE BY THE CONTRACTOR IN ACCORDANCE WITH THE UTILITY OWNER'S INSTRUCTION. ANY DAMAGE CAUSED BY THE CONTRACTOR OR THE CONTRACTORS CONSTRUCTION OPERATIONS WILL BE CORRECTED AT THE CONTRACTORS EXPENSE.

3. SITE PREPARATION AND SOIL EROSION

- 3.1 THE CONTRACTOR SHALL FURNISH ALL EQUIPMENT, TOOLS, MATERIAL, ACCESSORIES, AND LABOR REQUIRED TO CLEAR THE SITE OF ALL SURFACE MATERIALS, STRUCTURES, TREES AND VEGETATION TO ALLOW THE COMPLETION OF THE WORK.
- 3.2 THE CONTRACTOR SHALL CLEAR THE WORK AREA OF ALL TREES, BRUSH, AND OTHER DEBRIS PROTRUDING THROUGH THE GROUND SURFACE. ALL DEBRIS SHALL BE COMPLETELY REMOVED FROM THE SITE AND DISPOSED OF IN AN APPROVED MANNER AT A SITE PROVIDED BY THE GENERAL CONTRACTOR.
- 3.3 ALL ORNAMENTAL TREES AND SHRUBS WITHIN THE WORK AREA SHALL BE CAREFULLY UPROOTED, STORED, AND REPLANTED AFTER CONSTRUCTION IS COMPLETE, UNLESS OTHERWISE DIRECTED. ORNAMENTAL TREES AND SHRUBS WHICH DO NOT SURVIVE FOR A PERIOD OF AT LEAST ONE (1) YEAR SHALL BE REPLACED AT THE CONTRACTORS EXPENSE.
- 3.4 ALL EROSION CONTROL AND SEDIMENTATION CONTROL DEVICES SHALL BE INSTALLED AND MAINTAINED BY THE CONTRACTOR AS REQUIRED TO ASSURE PROPER EROSION AND SEDIMENTATION CONTROL. ALL EROSION CONTROL METHODS AND DETAILS SHALL COMPLY WITH THE LATEST EDITION OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.
- 3.5 DURING THE CONSTRUCTION AND WARRANTY PERIOD AND PRIOR TO THE REMOVAL OF THE EROSION CONTROL DEVICES, THE CONTRACTOR SHALL AT ALL TIMES MAINTAIN SUCH DEVICES BY AT LEAST DAILY INSPECTION. ADDITIONALLY, THE CONTRACTOR SHALL VISIT THE SITE DURING AND IMMEDIATELY AFTER A PERIOD OF PRECIPITATION TO INSPECT, CORRECT, MAINTAIN AND OTHERWISE ENSURE THE EFFECTIVE OPERATION OF THE EROSION CONTROL PLAN.
- 3.6 UPON COMPLETION OF THE FINAL GRADING THE CONTRACTOR SHALL SEED THE ENTIRE AREA WITHIN SEVEN (7) DAYS IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND THESE SPECIFICATIONS.
- 3.7 FOLLOWING COMPLETION OF ALL WORK AND STABILIZATION OF ALL AREAS AND AFTER IT HAS BEEN DETERMINED THAT EROSION OR SEDIMENTATION IS NO LONGER OCCURRING ON THE SITE OR AT ITS BOUNDARIES AND THAT DRAINAGE FLOWS ARE FUNCTIONING ACCORDING TO ORIGINAL CONDITIONS, THE CONTRACTOR MAY THEN BEGIN TO REMOVE THE TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES. THIS WORK SHALL BE DONE IN A CAREFUL, NEAT, AND ORGANIZED MANNER.

4. PIPE MATERIALS

- 4.1 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 SPECIFICATION A21-50 AND SPECIFIED TO ANSI SPECIFICATION A21-11, CLASS 50 PIPE SHALL BE MINIMUM STRENGTH USED IN ALL SEWER APPLICATIONS.
- 4.2 PVC SEWER PIPE SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM DESIGNATION 3034-77 (SDR-35). GRAVITY SEWER PIPE SHALL BE UNPLACETOIZED POLYVINYL CHLORIDE WITH INTEGRAL RUBBER RING WALL BELL AND SPIGOT JOINTS FURNISHED IN 12.5' AND 20' NOMINAL LENGTHS. INSTALLATION OF PVC GRAVITY SEWER PIPE AND FITTINGS SHALL BE IN ACCORDANCE WITH ASTM DESIGNATION 2321 AND MANUFACTURERS RECOMMENDATIONS. PVC SEWER PIPE SHALL BE STORED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS ON FLAT, EVEN SURFACES AND SHALL REMAIN RACKED ON THE PALLETS AS DELIVERED TO THE JOB SITE UNTIL SUCH TIME AS THE TRENCH IS READY FOR PLACEMENT OF THE PIPE. I.E. PIPE SHALL NOT BE STRUNG OUT ON THE JOB SITE.
- 4.3 SERVICE CONNECTIONS SHALL BE POLYVINYL CHLORIDE (PVC) SEWER PIPE CONFORMING TO ASTM DESIGNATION 3034-77 (SDR-35) OR SCHEDULE 40 PVC PIPE CONFORMING TO ASTM DESIGNATION 1785-76 AND SHALL BE USED BETWEEN THE SEWER MAIN AND THE CLEANOUT. THE PVC SDR-35 JOINTS SHALL BE MADE WITH BONDED-IN-BELL ELASTOMERIC SEAL. THE SCHEDULE 40 PVC JOINTS SHALL BE MADE WITH A SOLVENT WELD BELL AND SPIGOT JOINT USING PVC PIPE CLEANER AND GLUE AS SUPPLIED BY THE MANUFACTURER. NO-HUB PIPE SHALL NOT BE PERMITTED.

5. EXCAVATION

- 5.1 EXCAVATION SHALL CONFORM TO THE LINES AND GRADES SHOWN ON THE PLANS. THE WIDTH OF EXCAVATION FOR TRENCHES SHALL BE A MINIMUM OF 24" WIDER THAN THE OUTSIDE DIAMETER OF THE PIPE. EXCAVATION SHALL NOT BE CARRIED BELOW THE ESTABLISHED GRADE AND ANY EXCAVATION BELOW THE REQUIRED LEVEL SHALL BE BACKFILLED WITH GRANULAR MATERIAL AND THOROUGHLY TAMPED, ALL AT THE CONTRACTORS EXPENSE. THE CONTRACTOR SHALL DO ALL SHEETING, BRACING, AND SHORING NECESSARY TO PERFORM THE WORK, TO PROTECT EXISTING STRUCTURES AND TO PROTECT EXCAVATIONS AS REQUIRED UNDER THE VIRGINIA OSHA REGULATIONS. COMPLIANCE WITH THE PROVISIONS OF THE OVERHEAD HIGH VOLTAGE LINE SAFETY ACT IS REQUIRED.
- 5.2 DEWATERING EQUIPMENT SHALL BE SIZED TO MAINTAIN THE TRENCH IN A DE-WATER CONDITION FOR PIPE LAYING AND BACKFILLING. PIPE LAYING WILL BE PERMITTED ONLY WHEN THE DEPTH OF WATER IS MAINTAINED BELOW THE BEDDING MATERIAL.
- 5.3 NOT MORE THAN FIVE HUNDRED FEET (500') OF TRENCH SHALL BE OPENED IN ADVANCE OF THE COMPLETED PIPE LAYING. THE TRENCH WALLS SHALL BE KEPT VERTICAL WHENEVER POSSIBLE BUT THE TRENCH WALL MAY BE SLOPED ABOVE THE TOP OF THE PIPE FOR SAFETY REASONS. EXCAVATION AT MANHOLES AND SIMILAR STRUCTURES SHALL BE SUFFICIENT TO HAVE A MINIMUM OF TWELVE INCHES (12") IN THE CLEAR BETWEEN THEIR OUTER SURFACE AND THE EMBANKMENT OR SHEETING.
- 5.4 ALL BLASTING OPERATIONS MUST BE IN ACCORDANCE WITH EXISTING ORDINANCES AND REGULATIONS. AFTER BLASTING OR OTHER APPROVED METHODS OF REMOVAL, NO PROJECTION OF ROCK SHALL REMAIN NEARER THAN SIX INCHES (6") OF ANY PART OF THE SEWER PIPE WHEN LAID, NOR SHALL PROJECT BEYOND THE LINES AND GRADES OF MASONRY STRUCTURES, NO BLASTING SHALL BE DONE WITHIN FORTY FEET (40') OF A TESTED OR COMPLETED SEWER. THE ENDS OF SEWERS ADJACENT TO BLASTING SHALL BE COVERED TO AVOID RECEIVING DEBRIS.
- 5.5 WHENEVER THE FOUNDATION MATERIAL IS UNSUITABLE, IT SHALL BE EXCAVATED TO A STABLE FOUNDATION AND GRANULAR MATERIAL WITH A MAXIMUM SIZE OF ONE AND ONE HALF INCHES (1-1/2") SHALL BE PLACED IN SIX INCH (6") LAYERS UNTIL THE TRENCH BOTTOM HAS BEEN STABILIZED, THEN THE STANDARD GRANULAR BEDDING MATERIAL SHALL BE PLACED AS HEREINBEFORE SPECIFIED.

6. BACKFILL

- 6.1 BACKFILL SHALL BEGIN AT THE TOP OF THE STANDARD GRANULAR BEDDING AND SHALL BE PLACED IN TWO (2) ONE FOOT (1') LAYERS OVER THE PIPE AND SHALL BE MANROUGHLY TAMPED TO NINETY-FIVE PERCENT (95%) OF THE MAXIMUM THEORETICAL COMPACTION AS DETERMINED BY A STANDARD PROCTOR ON THE MATERIAL. THE REMAINDER OF THE BACKFILL SHALL BE IN TWO FOOT (2') LAYERS PROPERLY TAMPED. BACKFILL MATERIAL SHALL BE FREE OF PERISHABLE MATERIAL, FROZEN CLODS, STICKY MASSES OF CLAY AND OTHER UNSUITABLE MATERIAL. PIECES LARGER THAN TWO INCHES (2") SHALL NOT BE USED IN THE BACKFILL WHICH IS WITHIN TWO FEET (2') OF THE PIPE.
- 6.2 BACKFILL IN AREAS NOT SUBJECTED TO VEHICULAR TRAFFIC SHALL NOT BE COMPACTED TO SUCH A DEGREE THAT ANY SUBSIDENCE WILL NOT BE OBJECTIONABLE NOR DETRIMENTAL TO NORMAL USE. BACKFILL AND REPLACEMENT IN EXISTING OR PROPOSED ROADS SHALL BE EXECUTED IN FULL ACCORDANCE WITH THE REQUIREMENTS OF THE VIRGINIA DEPARTMENT OF TRANSPORTATION STANDARDS. ALL SURPLUS MATERIALS SHALL BE DISPOSED OF IN APPROVED AREAS PROVIDED BY THE CONTRACTOR. NO STONE OR ROCK LARGER THAN EIGHT INCHES (8") IN ITS GREATEST DIMENSION WILL BE USED IN THE BACKFILLING OF SEWER LINES OR MANHOLES.

7. PIPE INSTALLATION

- 7.1 ALL PIPE AND FITTINGS SHALL BE CAREFULLY HANDLED WITH NON-METALLIC SLINGS OR OTHER DEVICES TO PREVENT DAMAGE TO PROTECTIVE COATINGS OR JOINTS. LIFTING EQUIPMENT SHALL BE SATISFACTORILY RATED TO HANDLE THE PIPE SIZES USED. PIPE SHALL NOT BE DUMPED OR DROPPED INTO THE TRENCH. EACH SECTION OF PIPE SHALL BE THOROUGHLY INSPECTED FOR DEFECTS BEFORE BEING LOWERED INTO THE TRENCH. PIPE SHALL BE LAID TRUE TO LINE AND GRADE WITH BELLS UPSTREAM AND SHALL BE JOINTED TOGETHER SUCH THAT THE COMPLETED PIPE WILL HAVE A SMOOTH INVERT. THE STANDARD BEDDING SHALL BE SHAPED TO THE CURVATURE OF BOTH THE BELL AND BARREL OF THE PIPE. THE TRENCH SHALL BE KEPT FREE OF WATER WHILE THE WORK IS IN PROGRESS. THE TRENCH SHALL BE KEPT CLEAN AND SO THAT PROPER JOINTS CAN BE MADE. AS THE WORKS PROGRESSES, THE INTERIOR OF THE PIPE SHALL BE CLEARED OF DIRT, CEMENT, OR OTHER SUPERFLUOUS MATERIAL EXCEPT AS REQUIRED FOR USE OF A LASER LEVEL. THE EXPOSED END OF ALL PIPE AND FITTINGS SHALL BE FULLY CLOSED TO PREVENT EARTH, WATER OR OTHER SUBSTANCES FROM ENTERING THE PIPE.

8. SERVICE CONNECTIONS

- 8.1 SDR 35 AND SCHEDULE 40 PVC PIPE CONNECTIONS FOR THIS PROJECT SHALL BE MADE TO THE MANHOLE USING INSIDE DROP CONNECTIONS WHEN INDICATED. A SEWER CLEANOUT THE SAME SIZE AS THE SERVICE LINE SHALL BE INSTALLED AS INDICATED ON THE PLANS.
- 8.2 SEWER SERVICE CONNECTIONS FROM THE MANHOLE TO THE CLEANOUT SHALL BE INSTALLED WITH THE SAME CARE AS THE SEWER MAIN. PROPER EXCAVATION, SLOPE OF PIPE AND STANDARD GRANULAR BEDDING SHALL BE PROVIDED THROUGHOUT. ALL SEWER PIPE JOINTS SHALL BE CAPABLE OF RESISTING A HYDROSTATIC PRESSURE OF FIFTEEN (15) PSI.

9. MANHOLES

- 9.1 MANHOLES SHALL BE CONSTRUCTED WITH MANHOLE FRAMES, COVERS AND STEPS. THE FRAMES AND COVERS SHALL BE DEWEY BROTHERS, INC., MH-RCR-3000W WATER TIGHT. LOCATIONS AND TYPE OF MANHOLE VENTS WILL BE AS INDICATED ON THE PLANS. 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 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.
- 9.2 COVERS SHALL BE FURNISHED WITH MEANS OF LIFTING. COVERS THAT ROCK UNDER NORMAL LOAD, WILL BE REJECTED. FRAMES SHALL BE BOLT-DOWN TYPE, WITH A COLD APPLIED JOINT SEALER PLACED BETWEEN FRAME AND MANHOLE. CARE SHALL BE TAKEN SO AS NOT TO DAMAGE THE GASKET DURING CONSTRUCTION.
- 9.3 STEPS FOR MANHOLES SHALL BE MADE OF FIBERGLASS CONSTRUCTION, CAST IRON OR STEEL AND SHALL HAVE A PLASTIC COATING. STEPS SHALL BE SPACED TWELVE INCHES (12") APART. FIRST AND LAST STEP TO BE WITHIN TWENTY FOUR INCHES (24") OF COVER OR BOTTOM OF MANHOLE. PRECAST CONCRETE MANHOLES SHALL CONSIST OF PRECAST REINFORCED BASE SECTION WITH POURED UNIFORM BOTTOM INVERTS. THE BOTTOM INVERT SHALL BE THE SAME SIZE OF THE CONNECTING PIPE AND OF SUCH SHAPE TO PERMIT TESTING PLUGS TO BE INSTALLED IN THE PIPE.
- 9.4 THE PRECAST BASE SECTION SHALL BE INSTALLED ON A COMPACTED STABILIZED FOUNDATION OF BEDDING MATERIAL AT LEAST SIX INCHES (6") IN DEPTH. THE PRECAST MANHOLE SECTIONS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM DESIGNATION C478, LATEST EDITION. 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.
- 9.5 A COLD APPLIED JOINT SEALER SHALL BE USED TO MAKE A UNIFORM WATER TIGHT JOINT AND BE PLACED ON THE INTERIOR AND EXTERIOR OF EACH JOINT. NO MORTAR JOINTS ARE PERMITTED. IN ADDITION, MANHOLE SECTIONS SHALL BE COATED ON THE EXTERIOR WITH KOPPERS BITUMASTIC NUMBER 300-M TAR EPOXY, MINIMUM DRY FILM THICKNESS OF 16 MILS. AS MANUFACTURED BY THE KOPPERS COMPANY, INC., PITTSBURGH, PENNSYLVANIA, OR EQUAL. THE BITUMINOUS WATERPROOFING MAY BE SHOP OR FIELD APPLIED.
- 9.6 WHERE ADJUSTING RINGS ARE REQUIRED TO MEET SPECIFIED GRADE, THE MAXIMUM HEIGHT/THICKNESS AND MINIMUM NUMBER OF RINGS SHALL BE USED. ADJUSTING RINGS SHALL NOT BE USED FOR ADJUSTMENTS OVER TWELVE INCHES (12").

10. ACCEPTANCE TESTS

- 10.1 TESTS FOR DISPLACEMENT OF BURIED SANITARY SEWERS: AFTER THE TRENCH HAS BEEN BACK-FILLED AND COMPACTED AND COVER OVER THE PIPELINE HAS BEEN BROUGHT TO FINISH GRADE, PIPELINES WILL BE TESTED AS FOLLOWS: LIGHT WILL BE FLASHED BETWEEN MANHOLES, OR IF MANHOLES HAVE NOT BEEN CONSTRUCTED, BETWEEN THE LOCATIONS OF THE MANHOLES, BY MEANS OF A FLASHLIGHT OR BY REFLECTING LIGHT WITH A MIRROR. POOR ALIGNMENT, DISPLACED PIPE, OR OTHER DEFECTS SHALL BE REMEDIED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
- 10.2 TESTS FOR DEFLECTION OF FLEXIBLE GRAVITY PIPES:
 - A. FLEXIBLE GRAVITY DRAINS ARE DRAINS CONSTRUCTED OF PVC GRAVITY PIPES. PIPELINES SHALL BE MEASURED FOR VERTICAL RING DEFLECTION WITHIN FIFTEEN (15) DAYS AFTER COMPLETION OF BACKFILL. MAXIMUM RING DEFLECTION OF THE PIPELINE UNDER LOAD SHALL BE LIMITED TO FIVE PERCENT (5%) OF THE VERTICAL INTERNAL PIPE DIAMETER. PIPE EXCEEDING THIS DEFLECTION SHALL BE RELAD OR REPLACED, AND RETESTED BY THE CONTRACTOR, AT NO ADDITIONAL COST TO THE OWNER.
 - B. TESTS FOR DEFLECTION SHALL BE MADE WITH A DEFLECTOMETER THAT PRODUCES A CONTINUOUS RECORD OF PIPE DEFLECTION, OR BY PULLING A MANDREL, SPHERE, OR PIN-TYPE GO/NO-GO DEVICE THROUGH THE PIPELINE. THE DIAMETER OF THE GO/NO-GO DEVICE SHALL BE NINETY-FIVE PERCENT (95%) OF THE UNDEFLECTED INSIDE OF THE PIPE.
- 10.3 AIR TESTING SHALL BE USED. TEST METHODS AND ACCEPTABILITY CRITERIA SHALL BE IN ACCORDANCE WITH THE UNI-BELL LOW PRESSURE AIR TEST. AIR TESTING OF GRAVITY LINES SHALL BE REQUIRED FOR ALL TYPES AND OF ALL PIPE AND MATERIALS.
- 10.4 MANHOLES SHALL BE TESTED BY EXFILTRATION OR VACUUM TESTING. INFLATABLE STOPPERS SHALL BE USED TO PLUG ALL LINES INTO AND OUT OF THE MANHOLE BEING TESTED INCLUDING ANY VENT LINE. THE STOPPERS SHALL BE POSITIONED IN THE LINES FAR ENOUGH FROM THE MANHOLE TO INSURE TESTING TO THOSE PORTIONS OF THE LINES NOT AIR TESTED. THE MANHOLE SHALL BE FILLED TO THE TOP OF THE MANHOLE COVER FRAME WITH WATER. A TWENTY-FOUR (24) HOUR SOAK SHALL BE FOLLOWED BY FIVE (5) MINUTE TESTING PERIOD. THERE SHALL BE NO LEAKAGE DETECTED DURING A ONE (1) HOUR TEST PERIOD. VACUUM TESTS SHALL BE MADE WITH A VACUUM OF 10" HG. THE TIME FOR THE VACUUM TO DROP FROM 10" TO 9" HG MUST BE LESS THAN SIXTY (60) SECONDS FOR ALL SIZE AND DEPTH OF MANHOLES.
- 10.5 THE CONTRACTORS WILL FURNISH WEIRS, STAND PIPES, PIPE PLUGS, WATER, PRESSURE GAUGES, STOP WATCHES, AIR COMPRESSORS, VACUUM PUMP, HOSE AND SUCH MATERIALS AND ASSISTANCE AS REQUIRED TO PERFORM THESE TESTS. ALL ACCEPTANCE TESTS SHALL BE CONDUCTED BY THE CONTRACTOR IN THE PRESENCE OF A PROFESSIONAL ENGINEER.
- 10.6 ACCEPTANCE TESTS SHALL NOT BE MADE UNTIL THE SANITARY SEWER, MANHOLES AND PROPOSED SEWER SERVICE CONNECTIONS, AS SHOWN ON THE APPROVED SEWER PLANS, HAVE BEEN INSTALLED, THE SEWER TRENCHES BACKFILLED AND COMPACTED TO FINISH SUBGRADE. THE CONTRACTOR MAY MAKE ANY OTHER TESTS AT ANY TIME HE DEEMS NECESSARY TO SELF CHECK HIS WORK.
- 10.7 ALL SANITARY SEWERS, INCLUDING MANHOLES, SHALL BE INSPECTED PRIOR TO ACCEPTANCE TESTING, AND ANY WATER LEAKAGE INTO THE SYSTEM SUFFICIENT TO CONSTITUTE ANY NOTICEABLE TRICKLE OR DRIBBLE, SHALL FIRST BE CORRECTED AND ELIMINATED PRIOR TO UNDERTAKING THE ACCEPTANCE TEST.
- 10.8 WHENEVER IT HAS BEEN NECESSARY TO CONSTRUCT UNDERDRAINS OR PLACE GRAVEL UNDER PIPE LINES IN ORDER TO DEWATER THE TRENCH DURING CONSTRUCTION OF THE SEWERS, THE ACCEPTANCE TEST METHODS AND PLUMBS WHICH HAVE BEEN USED IN THE DEWATERING PROCESS) HAVE BEEN DISCONNECTED OR DRAINS HAVE BEEN TAKEN OUT OF SERVICE.
- 10.9 THE CONTRACTOR SHALL SCHEDULE ALL ACCEPTANCE TESTS WITH A PROFESSIONAL ENGINEER AT LEAST FORTY-EIGHT (48) HOURS IN ADVANCE. EACH SECTION OF COMPLETED SEWER SHALL BE TESTED FROM MANHOLE TO MANHOLE. NO SEWERS OR SEWER SERVICE CONNECTIONS ARE TO BE EXCLUDED FROM THIS TESTING PROCEDURE.

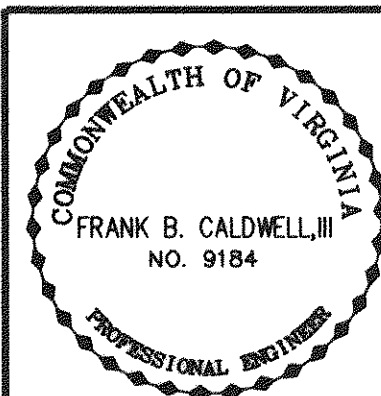
ACCEPTANCE TESTS CONTINUED:

- 10.10 THE TEST PROCEDURE SHALL BE CONDUCTED IN THE FOLLOWING MANNER: (VACUUM TESTS OF MANHOLES IS GENERALLY THE INVERSE OF THE LOW PRESSURE AIR TEST OF SEWER LINES)
 - A. LOW PRESSURE AIR TESTING PROCEDURE:
 1. THE CONTRACTOR SHALL THOROUGHLY CLEAN AND REMOVE ALL DEBRIS, SILT, EARTH OR OTHER MATERIALS FROM THE SEWER PRIOR TO ACCEPTANCE TESTING.
 2. PREPARED TEST PLUGS SHALL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR WITHIN THE PIPE AT EACH MANHOLE. EACH PLUG MUST BE SELF SUSTAINING AND NO BRACING WILL BE PERMITTED
 3. IF THE PIPE TO BE TESTED IS EXPECTED TO BE BELOW THE GROUND WATER TABLE, THE CONTRACTOR SHALL EITHER:
 - A. INSTALL A SMALL DIAMETER PERFORATED VERTICAL PIPE FROM INVERT ELEVATION OF THE SEWER TO THE SURFACE PRIOR TO BACKFILLING.
 - B. INSERT A PIPE PROBE BY BORING OR DRIVING INTO THE BACKFILLING MATERIAL ADJACENT TO THE INVERT ELEVATION OF THE PIPE, AND DETERMINE THE DEPTH OF THE GROUND WATER LEVEL ABOVE THE PIPE INVERT IMMEDIATELY PRIOR TO ACCEPTANCE TESTING THE SEWER.
 - C. ALL GAUGE PRESSURES IN THE TEST SHALL BE INCREASED BY THE AMOUNT OF THIS BACK PRESSURE DUE TO GROUND WATER OVER THE INVERT OF THE PIPE
 - D. IN LIEU OF THE ABOVE WATER DEPTH DETERMINATION, THE CONTRACTOR MAY ADD THREE (3) PSI TO THE GAUGE PRESSURE IN THE TESTS.
 4. THE CONTRACTOR SHALL ADD AIR SLOWLY TO THE PORTION OF THE PIPE UNDER TEST UNTIL THE INTERNAL AIR PRESSURE IS RAISED TO 4.0 PSI. GAUGE PLUG THE GROUND WATER PRESSURE.
 5. AS A SAFETY PRECAUTION, NO ONE SHALL BE ALLOWED IN THE MANHOLE AFTER THE AIR PRESSURE IS INCREASED IN THE SEWER LINE. IF THE INSPECTOR SUSPECTS THAT THE TEST PLUG MAY BE LEAKING, THE PRESSURE FIRST SHALL BE RELIEVED BEFORE ANY ADJUSTMENTS ARE MADE TO ELIMINATE AIR LEAKAGE AT THE PLUG
 6. THE CONTRACTOR SHALL ALLOW THE AIR TEMPERATURE TO STABILIZE FOR AT LEAST TWO TWO (2) MINUTES WITH THE PIPE SUBJECTED TO AN INTERNAL PRESSURE OF 4.0 PSI BY ADDING ONLY THE AMOUNT OR AIR TO MAINTAIN THE PRESSURE.
 7. AFTER THE TEMPERATURE STABILIZATION, THE TEST WILL BEGIN. IF THE INTERNAL AIR PRESSURE DECREASES, THE TIME REQUIRED FOR THE PRESSURE TO DROP FROM 3.5 TO 2.5 PSI GAUGE WILL BE OBSERVED AND RECORDED. THE TIME INTERVAL SHALL BE COMPARED WITH THE ESTABLISHED STANDARDS IN ACCORDANCE WITH TABLE 1 OF TIME AND LENGTH FOR VARIOUS DIAMETERS OF THE SEWER.
 8. PIPE WHICH FAILS TO MAINTAIN THE STIPULATED PRESSURE FOR A PERIOD EQUAL TO OR GREATER THAN THE HOLDING TIME SHOWN IN TABLE 1 SHALL BE DEEMED NOT TO HAVE PASSED THE LOW AIR PRESSURE AIR TEST AND IS UNSATISFACTORY FOR ACCEPTANCE BY THE COUNTY. ANY SEWER THAT FAILS TO PASS THIS TEST SHALL BE REPLACED BY THE CONTRACTOR. A SINGLE REPAIR CLAMP SHALL BE ALLOWED BETWEEN MANHOLES TO FACILITATE THE REPLACEMENT PIPE TO CORRECT DEFECTIVE MATERIALS OR WORKMANSHIP.

TABLE 1	
PIPE SIZE	TEST TIME
3 inches	0.2 MIN./100 L.F.
4 inches	0.3 MIN./100 L.F.
6 inches	0.7 MIN./100 L.F.
8 inches	1.2 MIN./100 L.F.

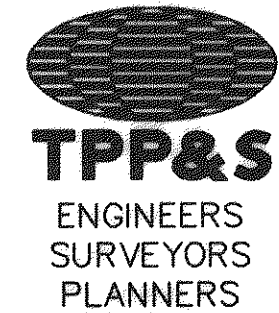
11. SEEDING AND RESTORATION

- 11.1 THE CONTRACTOR SHALL PROVIDE ALL EQUIPMENT, LABOR, MATERIALS, AND SERVICES TO SEED AND RESTORE ALL AREAS DESIGNATED ON THE PLANS OR OTHERWISE DISTURBED DURING THE PROJECT CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING ALL AREAS DISTURBED BY HIS OPERATIONS TO AN ORIGINAL OR BETTER CONDITION.
- 11.2 ALL MATERIALS SHALL BE AS SHOWN BELOW, UNLESS DIRECTED OTHERWISE
 - A. LIME - LIME SHALL BE AGRICULTURAL GRADE LIMESTONE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL AND STATE LIME LAW
 - B. FERTILIZER - FERTILIZER SHALL BE STANDARD COMMERCIAL BRAND WITH A 10-10-10 PERCENTAGE OF NITROGEN, PHOSPHATE, POTASH NUTRIENTS. FERTILIZER SHALL BE DELIVERED IN LABELED CONTAINERS CONFORMING TO ALL FEDERAL AND STATE FERTILIZER LAWS.
 - C. SEED - GRASS SEED SHALL BE 100 PERCENT KENTUCKY 31 FESCUE. SEED SHALL BE FRESH AND CLEAN WITH A PURITY OF 90 PERCENT AND GERMINATION OF 85 PERCENT
 - D. MULCH - MULCH SHALL BE CLEAN WHEAT OR OAT STRAW.
- 11.3 PRIOR TO SEEDING, THE TOPSOIL SHALL BE DISCED TO A MINIMUM DEPTH OF FOUR INCHES (4") AND CONTINUED UNTIL IT IS IN A LOOSE FRIABLE CONDITION. ALL DEBRIS AND ROCK OVER TWO INCHES (2") IN DIAMETER SHALL BE REMOVED.
- 11.4 LIME AND FERTILIZER SHALL BE APPLIED AT A RATE OF 3,500 AND 1,500 POUNDS PER ACRE RESPECTIVELY, WITH AN APPROVED SPREADER, LIME AND FERTILIZER SHALL BE MIXED INTO THE TOPSOIL BY TILLING, DISCS AND HARROWING.
- 11.5 AFTER THE TOPSOIL IS PREPARED, SEED SHALL BE APPLIED WITH MECHANICAL SPREADERS AT A RATE OF 150 POUNDS PER ACRE. FOLLOWING APPLICATION, SEED SHALL BE WORKED INTO THE SOIL TO A DEPTH OF 1/4 INCH BY APPROVED METHODS. CARE SHOULD BE TAKEN TO ASSURE THAT ALL AREAS ARE PROPERLY SEEDED. ANY BARREN AREAS SHALL BE RESEDED UNTIL A UNIFORM STAND OF GRASS IS OBTAINED.
- 11.6 IMMEDIATELY AFTER SEEDING, MULCH SHALL BE UNIFORMLY APPLIED AT THE RATE OF 2000 POUNDS PER ACRE.
- 11.7 IN LIEU OF THE ABOVE SEEDING APPLICATION, THE PROPER MIXTURE MAY BE APPLIED BY THE HYDROSEED METHOD.
- 11.8 DEVELOPED PROPERTY SUCH A WALKS, STEPS, MAILBOXES, FENCES, AND THE LIKE DISTURBED BY THE WORK SHALL BE RESTORED OR REPLACED TO THEIR ORIGINAL CONDITION. DITCHES SHALL BE RESTORED TO THEIR ORIGINAL SHAPE AND SLOPE. TEMPORARY AND/OR DAILY REPLACEMENT/RESTORATION SHALL BE ACCOMPLISHED IN ORDER THAT RESIDENTS AND THE PUBLIC WILL BE LEAST AFFECTED BY THIS CONSTRUCTION.



DESIGNED BY J.V.JUDY
DRAWN BY JVJ/CADD
CHECKED BY F.B.C.
W.O. # 93-0608
N.B. RUNAWAY VILL.
TAX NO. ----
DATE JUNE 7, 1993

**SANITARY SEWER
SPECIFICATIONS**
FOR
BOTETOURT COUNTY
SITUATE RUNAWAY VILLAGE



T. P. PARKER & SON

816 Boulevard
P.O. Office Box 39
Salem, Virginia 24153
Telephone: 703-387-1153
FAX: 703-389-5767

REVISED: 07-07-93, PIPE TESTING , by JVJ
REVISED: 06-28-93, SPECIFICATION WORDING, by JVJ