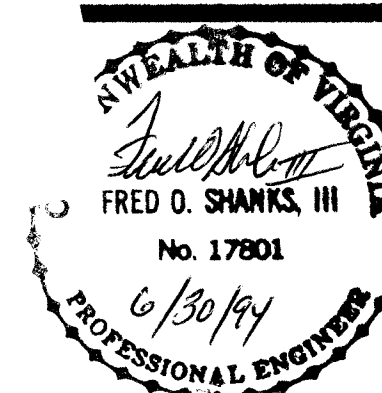
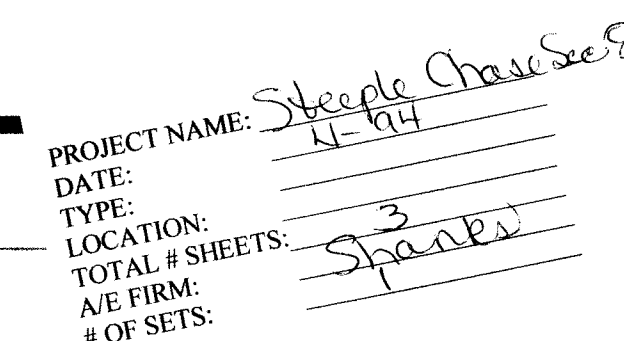




SHANKS ASSOCIATES, P.C. - ENGINEERS-SURVEYORS-PLANNERS

3433 LUCK AVENUE BOANOCK VIRGINIA 24011 (203) 343-6685

SANITARY SEWER & EROSION CONTROL PLAN

STEEPLECHASE. SECTION 8

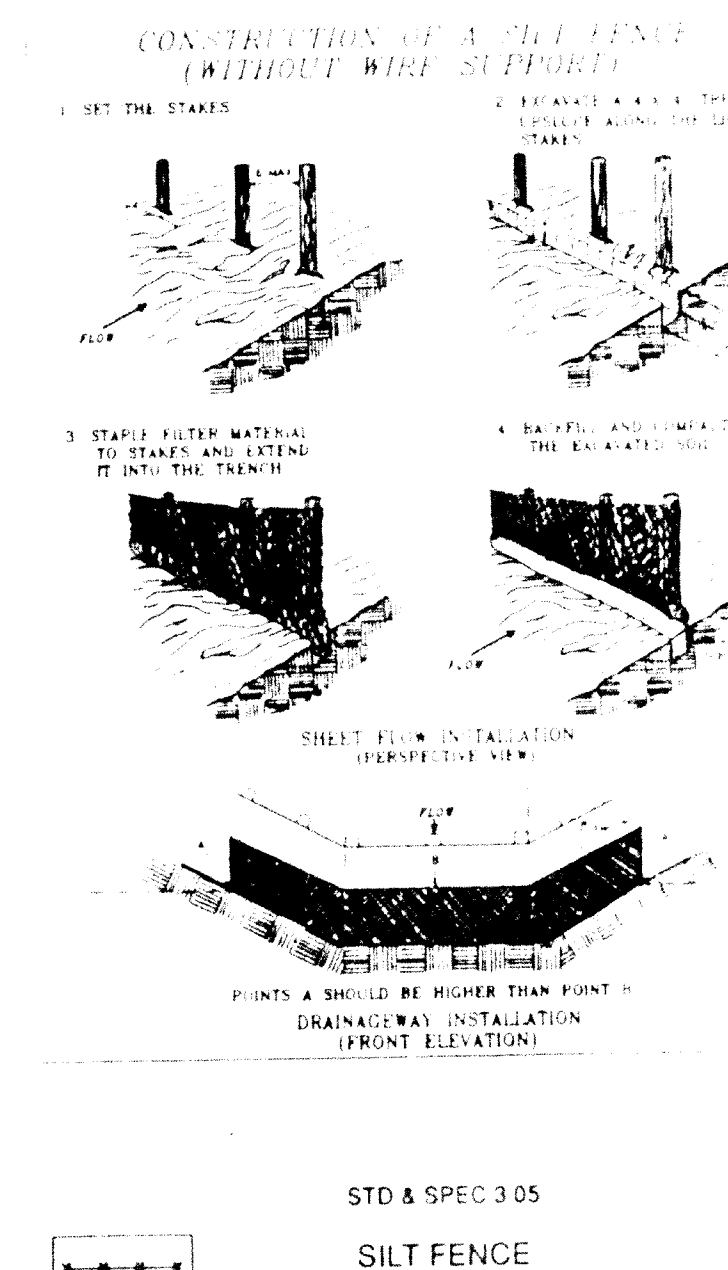
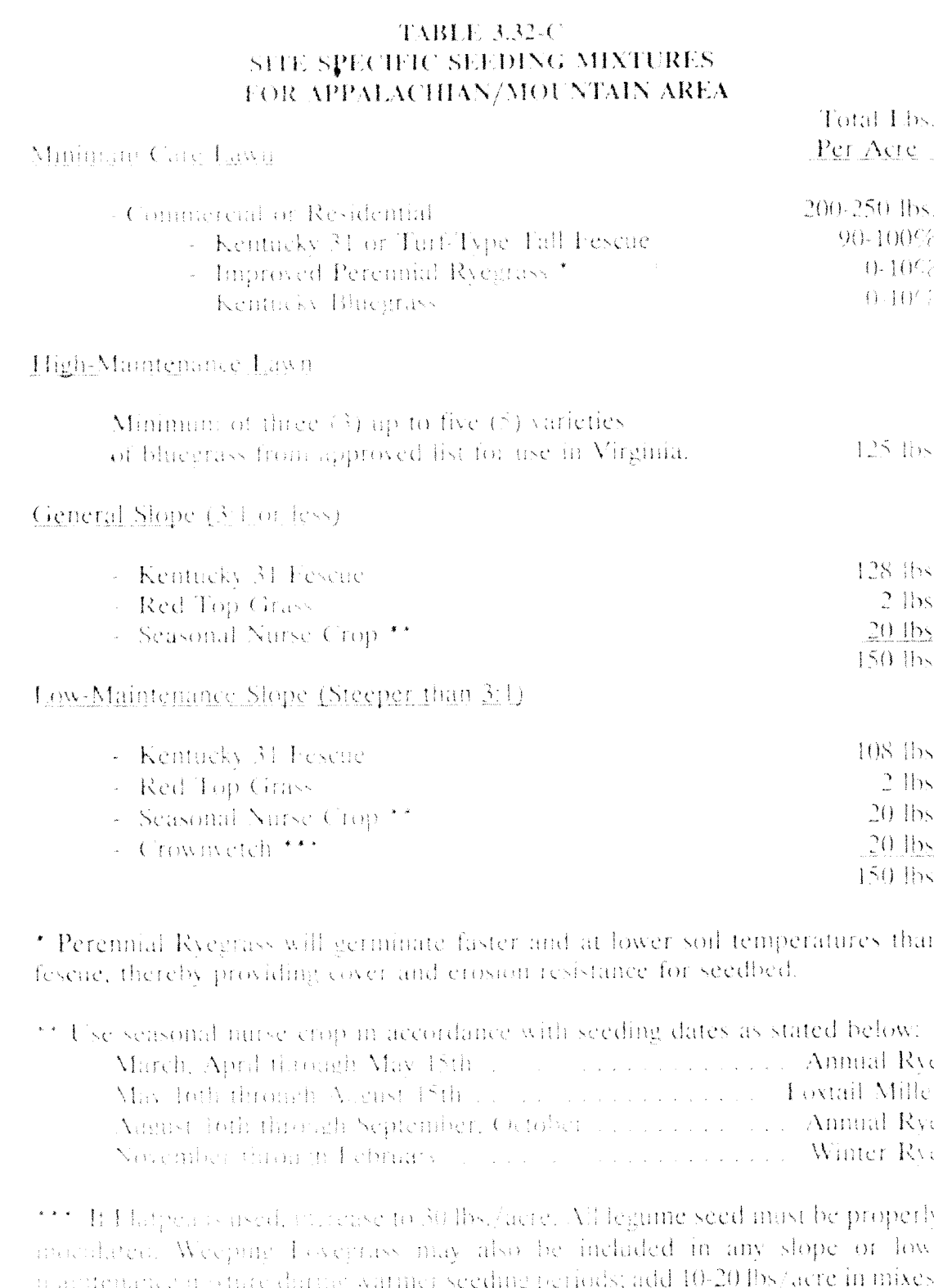
DATE:
4-15-94

DRAWN BY
K.L.B.

DESIGNED BY
K.L.B.

CHECKED BY
K.L.B.

SCALE
1" = 50'



ERATION CONTROL MEASURES

All erosion and sediment control measures shall be accomplished in strict accordance with the Standards and Specifications of the Virginia Division of Transportation Manual, latest edition.

Erosion control measures shall be the first step of construction.

The Contractor shall inspect all erosion control measures periodically and after every work stoppage, delay, rainy season, rains or cleanup shall be made immediately and at no extra cost.

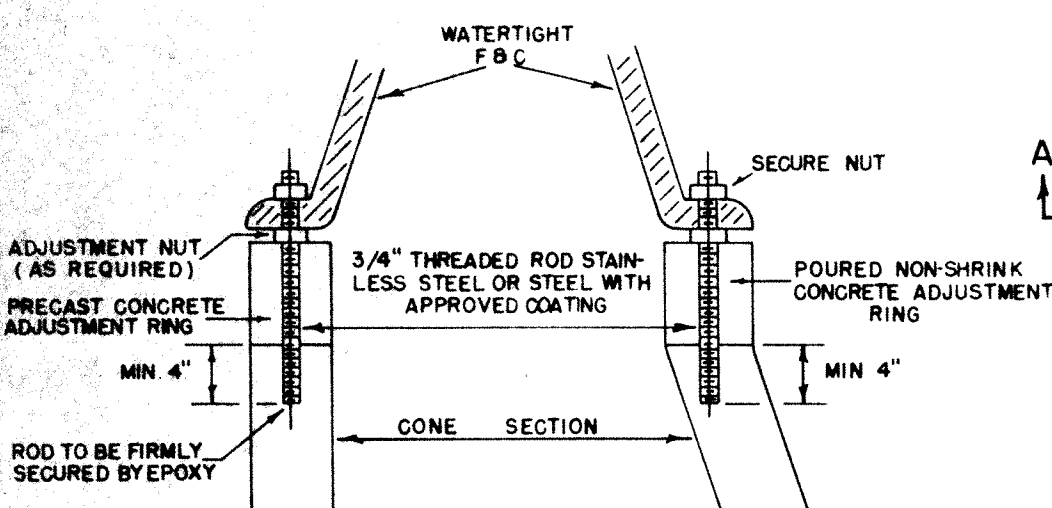
The approving authority may add, to, delete, reselect, or otherwise modify certain measures where field conditions warrant. The Contractor shall be responsible for the measures that will be required. The approving authority shall not be responsible.

EROSION and SEDIMENT CONTROL DEVICES
LEGEND

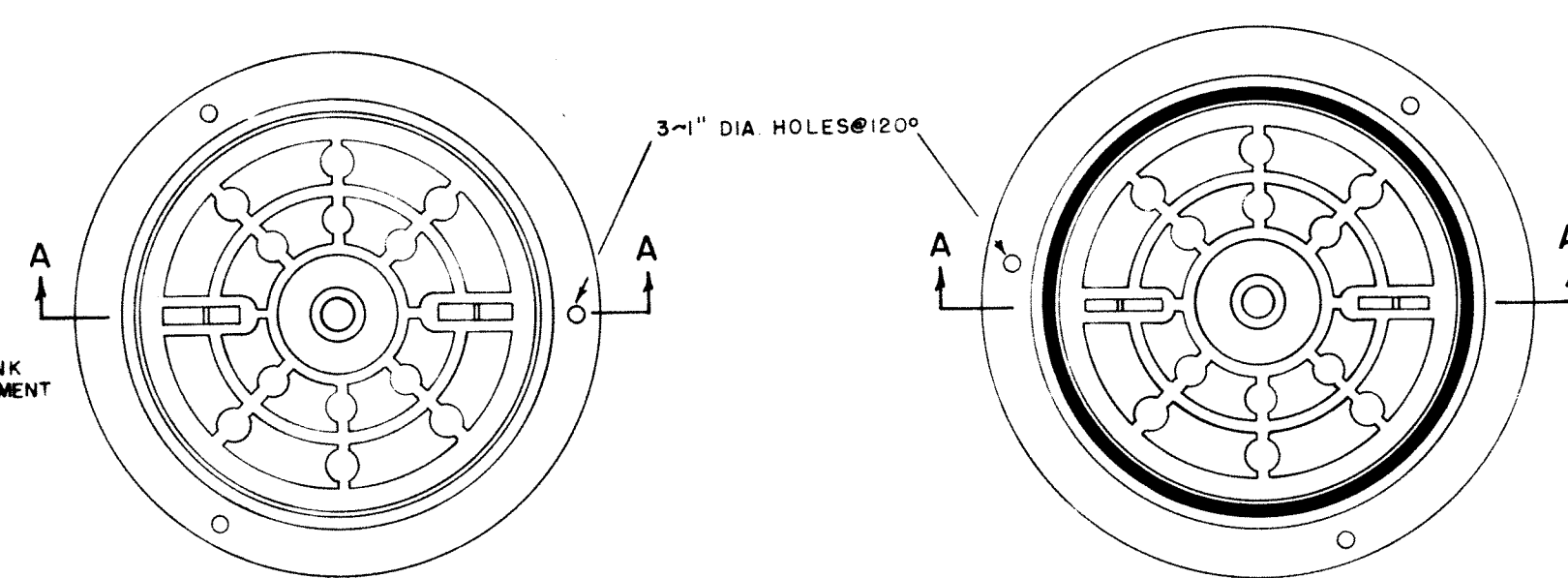
KEY	DEVICE TITLE
CE	Construction Entrance
CS	Construction Road Stabilization
EF	Silt Fence
IP	Inlet Protection
FD	Fill Diversion
ST	Sediment Trap
SB	Sediment Basin
MC	Stormwater Conveyance Channel
OP	Outlet Protection
RR	Riprap
CD	Check Dam
SR	Surface Roughening
TS	Temporary Seeding
PS	Permanent Seeding
ML	Mulching

SHEET NUMBER
1 OF 3
JOB NUMBER
694003

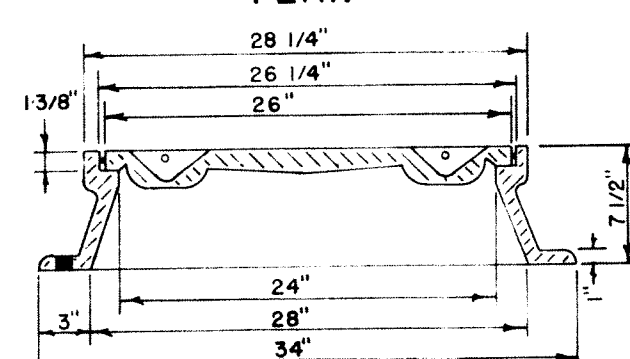
DEWEY BROTHERS, INC. MH-RCR-3000 EC OR EQUIVALENT
DEWEY BROTHERS, INC. MH-RCR-3000 W OR EQUIVALENT
(where watertight specified)



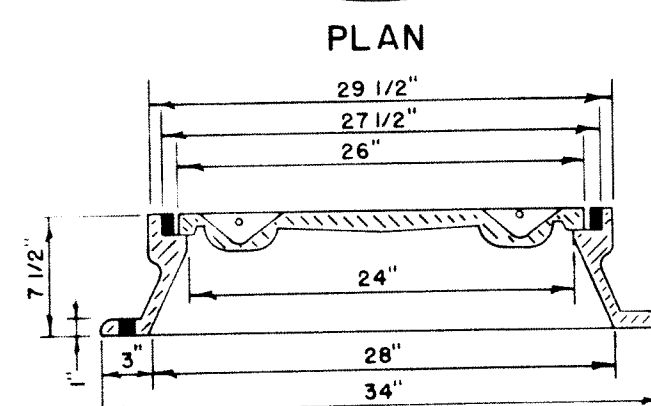
SECTION



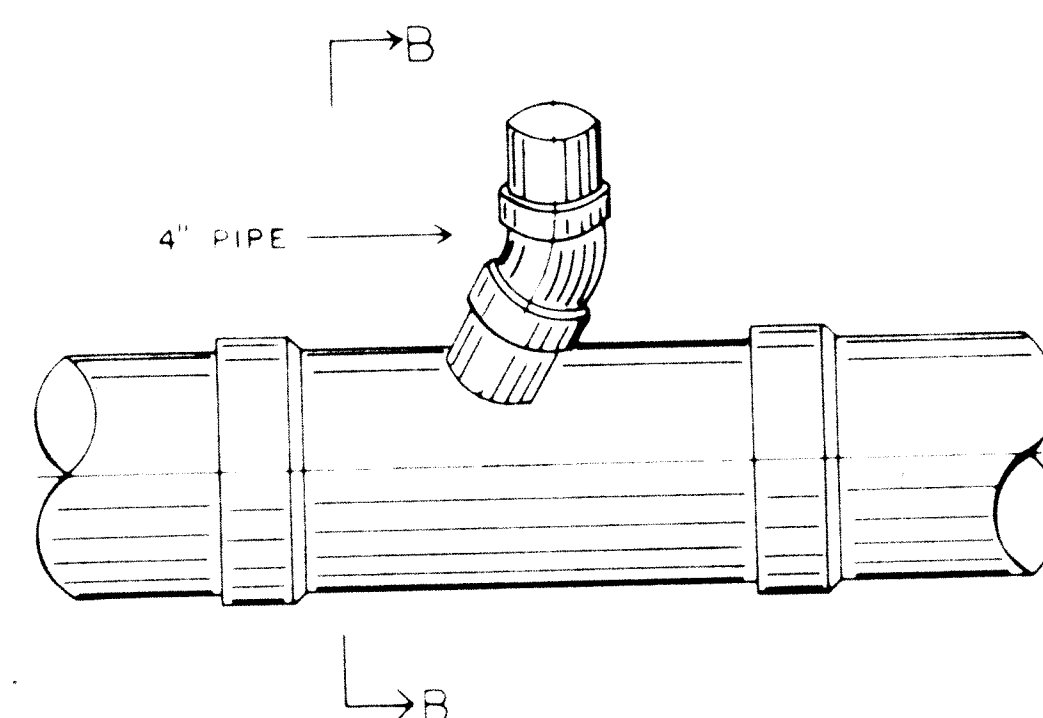
PLAN



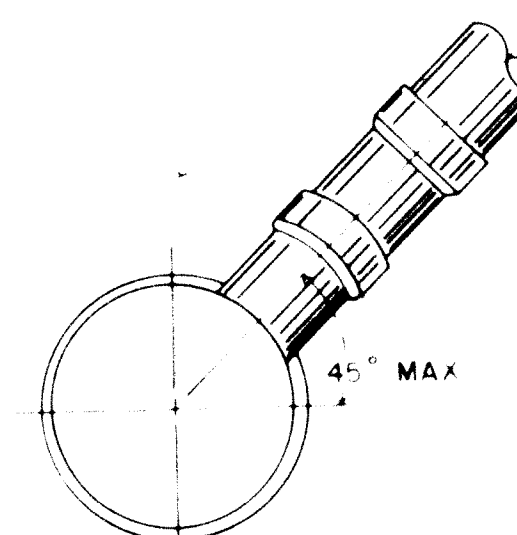
SECTION A-A



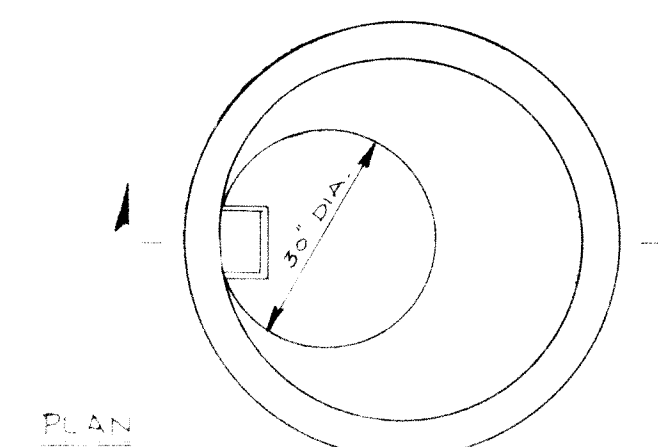
SECTION A-A



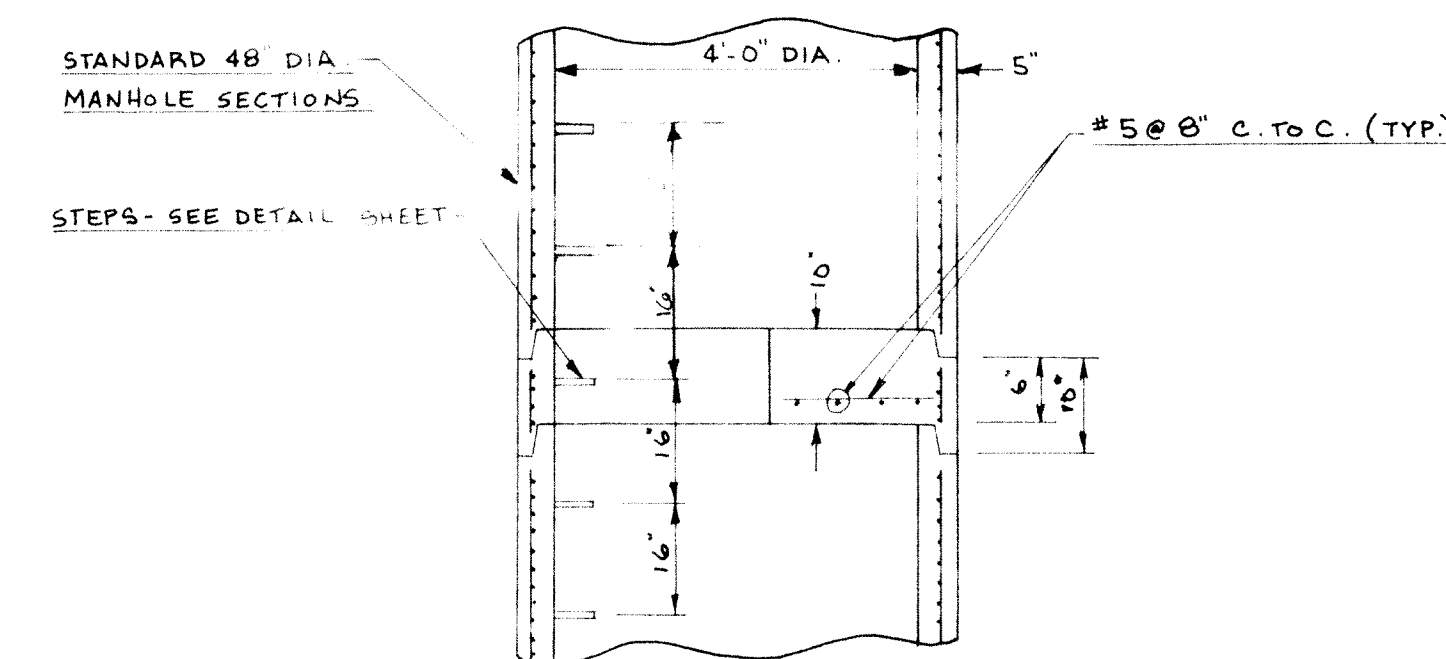
SERVICE CONNECTION "WYE"



SECTION B-B



PLAID



STANDARD 48" DIA.
MANHOLE SECTIONS

STEPS - SEE DETAIL SHEET

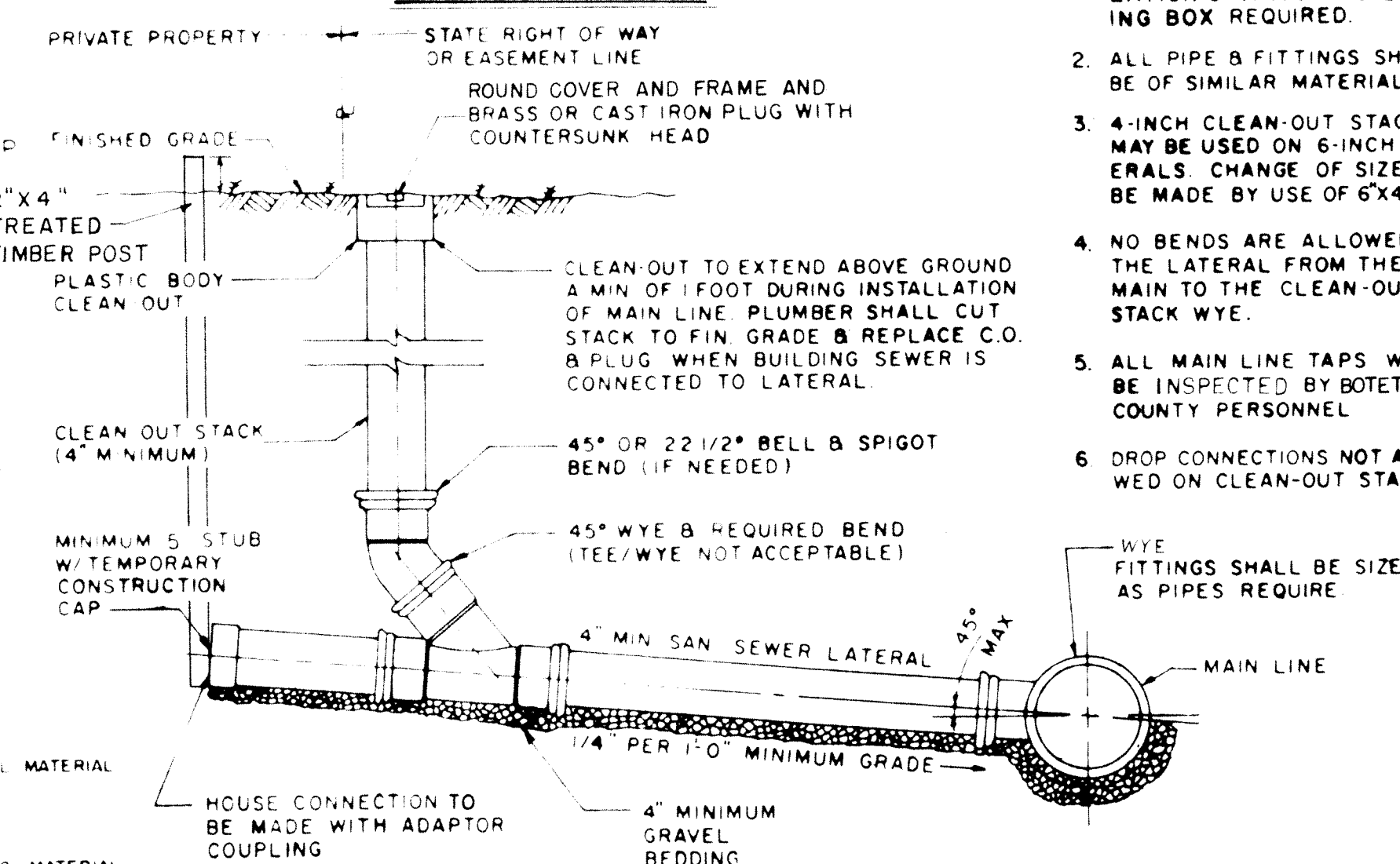
NOTES

- 1) 4000 PSI CONCRETE
- 2) GRADE 60 STEEL
- 3) SAFETY SLAB TO BE USED PER CONTRACT DOCUMENTS

NOTES

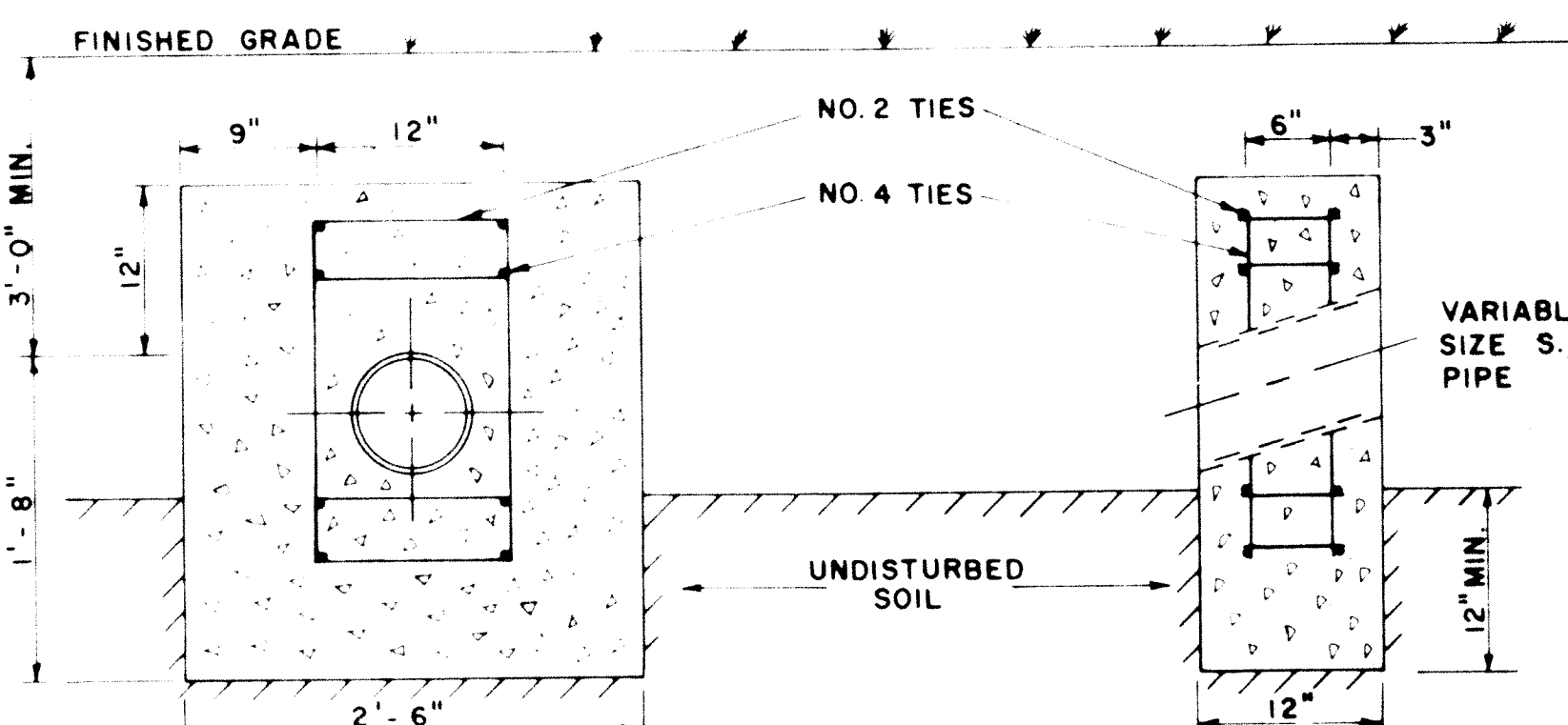
1. IN TRAFFIC AREAS INSTALLATION OF A TRAFFIC BEARING BOX REQUIRED
2. ALL PIPE & FITTINGS SHALL BE OF SIMILAR MATERIAL.
3. 4-INCH CLEAN-OUT STACKS MAY BE USED ON 6-INCH LATERALS. CHANGE OF SIZE TO BE MADE BY USE OF 6X4 WYE
4. NO BENDS ARE ALLOWED IN THE LATERAL FROM THE MAIN TO THE CLEAN-OUT STACK WYE.
5. ALL MAIN LINE TAPS WILL BE INSPECTED BY BOTETOURT COUNTY PERSONNEL
6. DROP CONNECTIONS NOT ALLOWED ON CLEAN-OUT STACK.

SAFETY SLAB



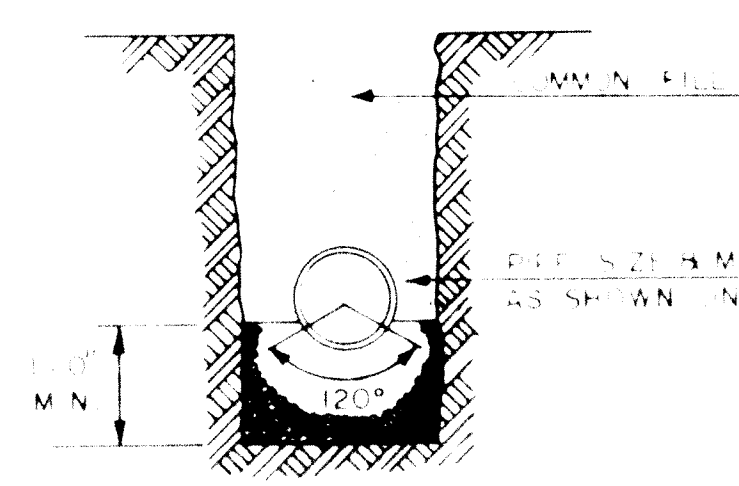
SANITARY SEWER LATERAL

SCALE 1" = 1'-0"

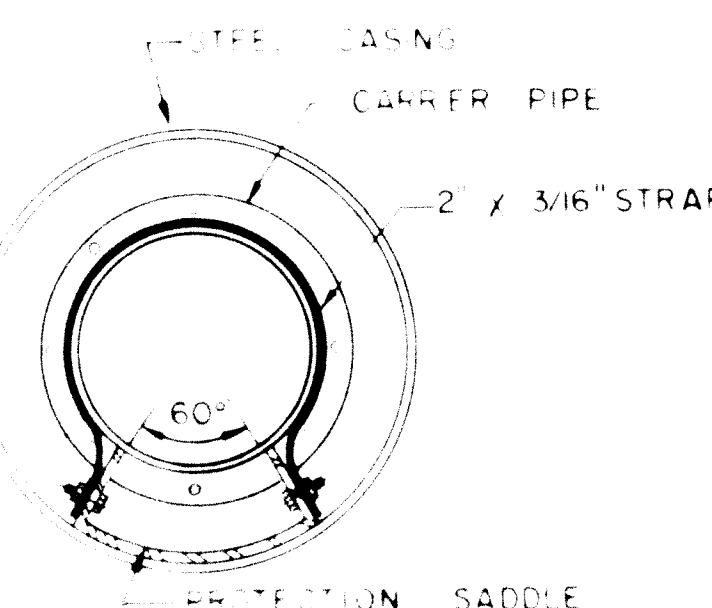


ANCHOR BLOCK

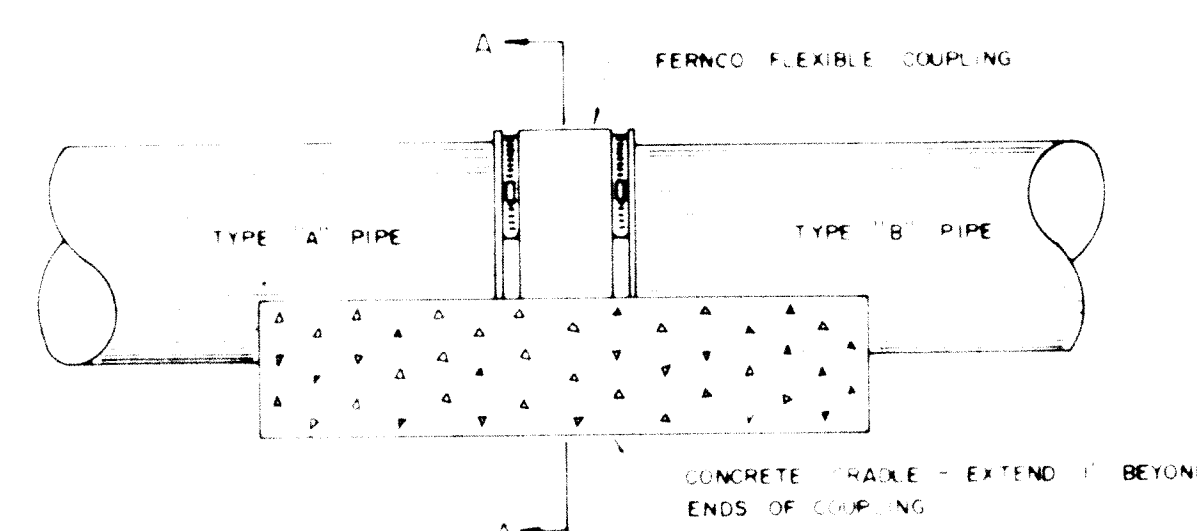
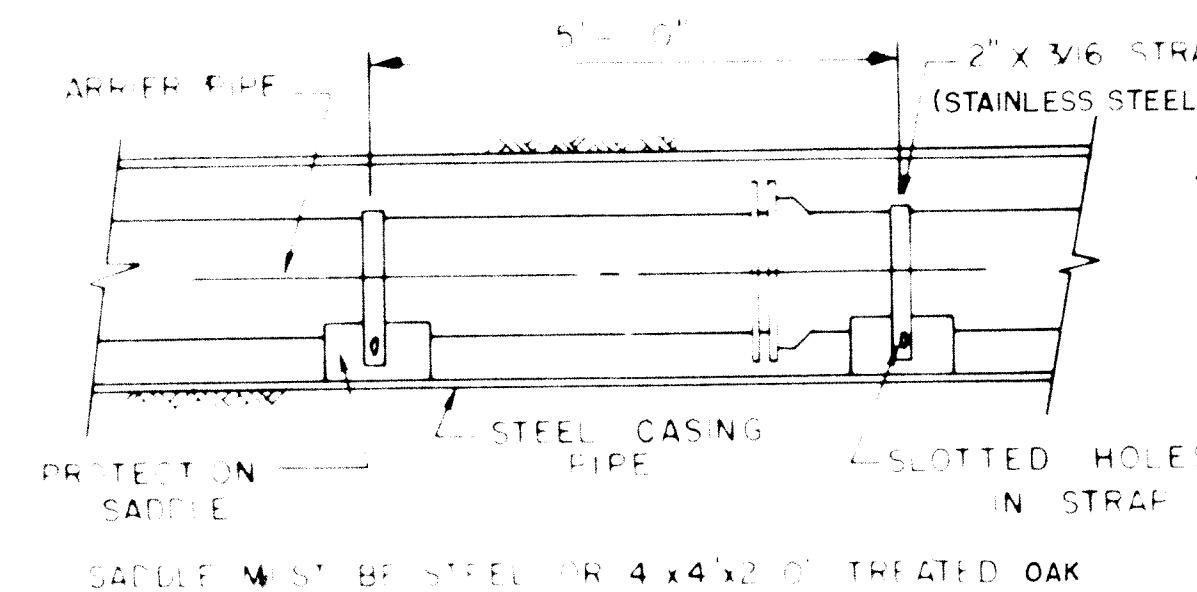
SCALE: 1" = 1' - 0"



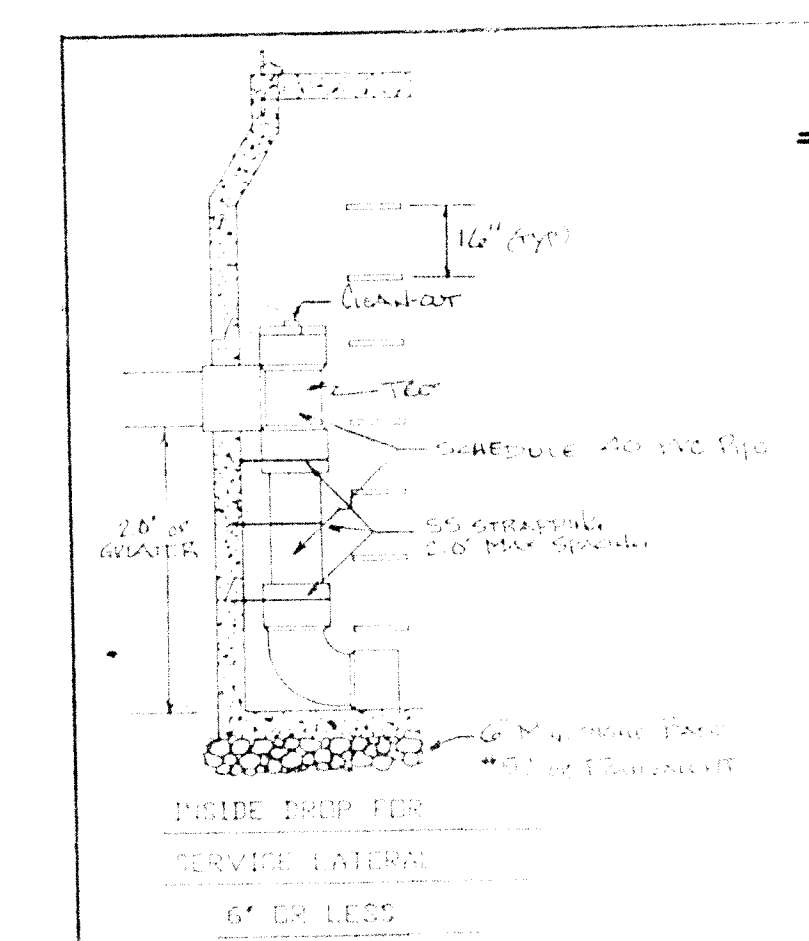
STONE CRADLE



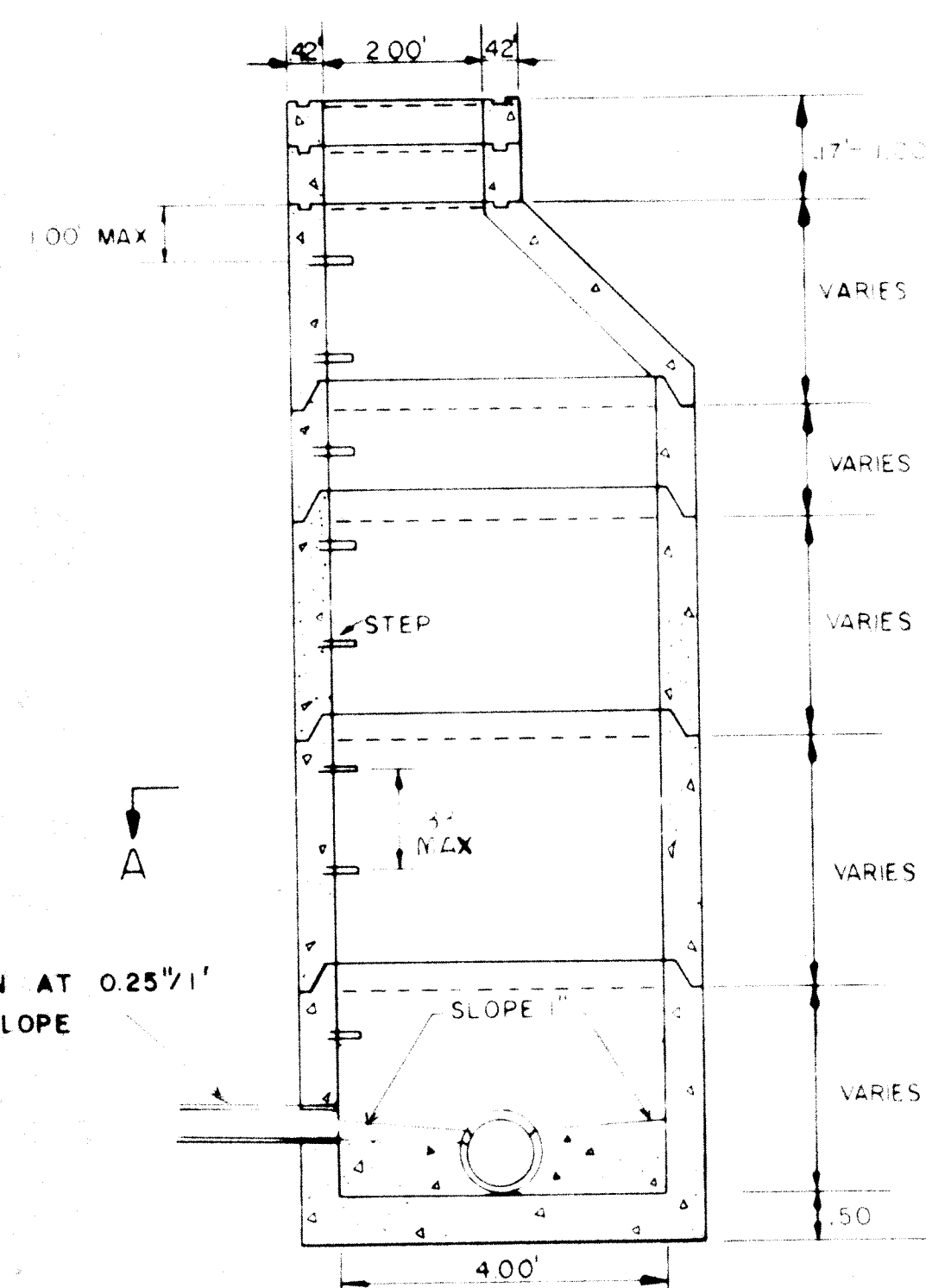
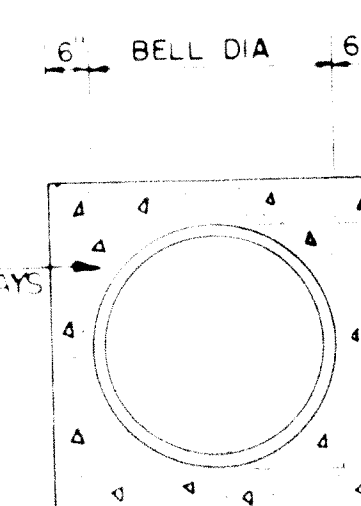
BORING AND CASING



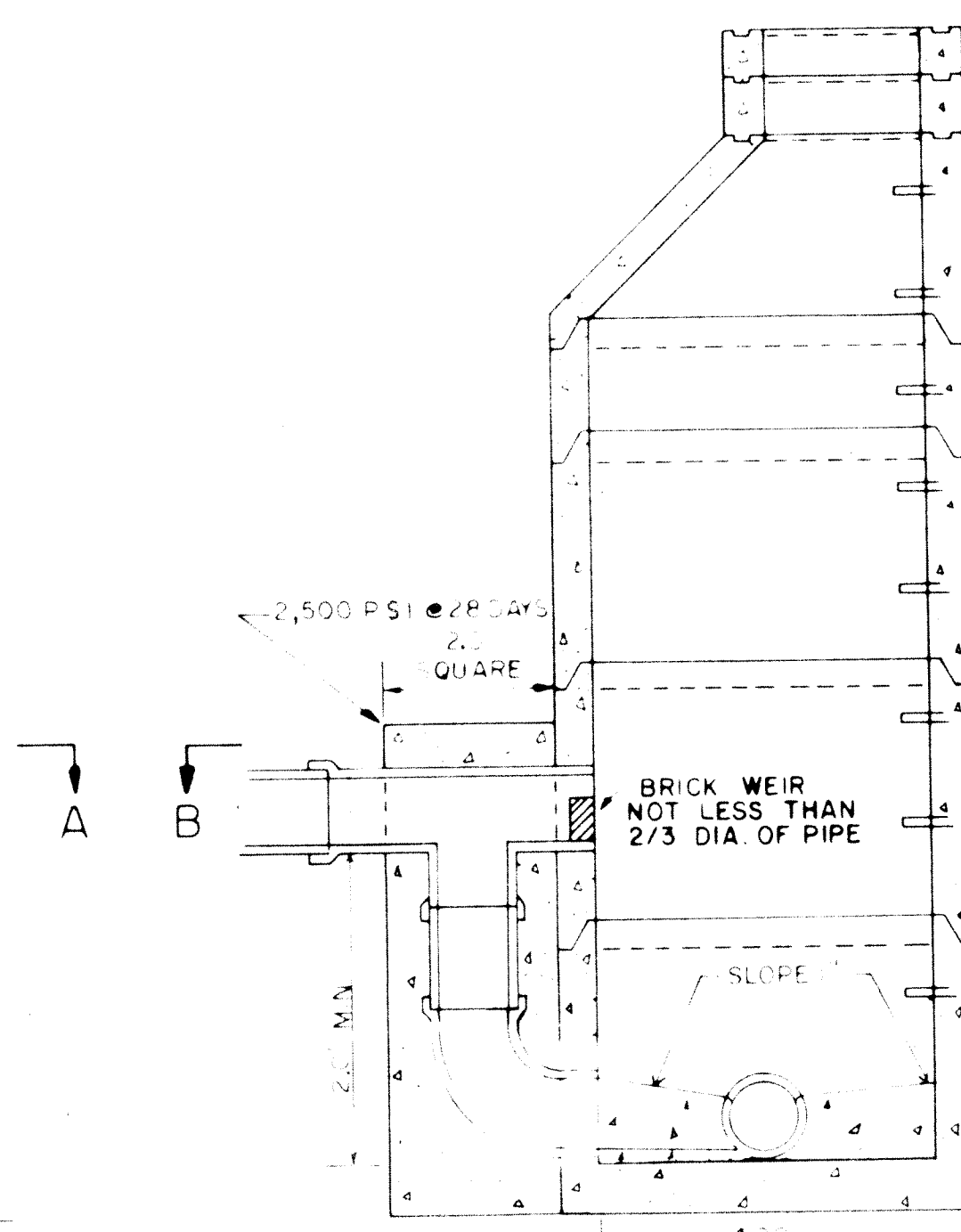
SIDE VIEW



CONCRETE ENCASED PIPE

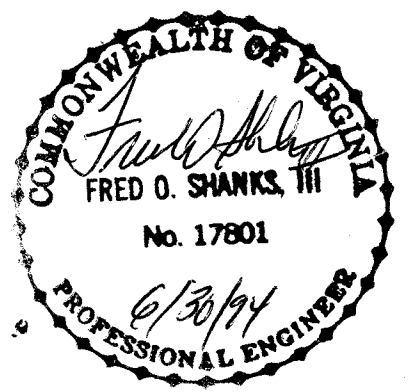


STANDARD MANHOLE



DROP MANHOLE

SANITARY SEWER DETAILS
SHANKS ASSOCIATES, P.C.
ENGINEERS · SURVEYORS · PLANNERS
313 LUCK AVENUE ROANOKE, VIRGINIA 24011
(703) 343-6685



GENERAL CONDITIONS

The Contractor shall be responsible for notifying the County of at least 48 hours prior to starting any work on this project. All work shall be subject to inspection by County inspectors and design engineer. The Contractor shall obtain all necessary permits.

The Contractor shall include in applicable bid price the cost of protecting and uncovering all sewer manholes and all valve boxes after surface treatment of roads and adjusting them to final road grades, if necessary. The Contractor shall be responsible for clearing out sewer mains for final inspection, if necessary.

The location of existing utilities across or along the line of proposed work is not necessarily shown in the plans and where shown, is approximate. The Contractor shall, on his own initiative and at extra cost, locate all underground lines and structures as necessary. The Contractor shall be responsible for any damage to underground lines and structures. The Contractor shall comply with the State Water Works Regulations, Section 12.05.03 where lines cross.

Contractor shall call "Miss Utility" at 1-800-552-7001 prior to construction.

Power lines and poles, telephone lines and poles, and gas lines shall be protected from damage in accordance with the utility owners' instructions. The Contractor is responsible for protecting the utility owners, obtaining the proper protective measures for each individual construction location and for protecting utilities from damage. Any damage caused by the Contractor or the Contractor's construction operations shall be repaired by the Contractor at his expense.

Existing roads, shoulders, and ditches shall be protected from damage. Damage resulting from operations under this contract shall be repaired or replaced by the Contractor at his own expense.

All trenches within existing or future Virginia Department of Transportation right-of-way shall be compacted in six inch layers.

Minimum cover over top of pipe shall be three (3) feet.

The Contractor shall notify the County of any field revisions or corrections to the approved plans prior to such construction.

All lines to be staked prior to construction.

Contractor to coordinate with engineer to provide As-Built Plans.

All construction shall be in accordance with approved construction practices of the applicable trades.

Unless otherwise specified herein, all construction shall be in accordance with the latest edition of AWWA standards.

EROSION CONTROL

Utility construction is subject to all provisions set forth in the approved Erosion and Sedimentation Control Plan. The Contractor shall be responsible for obtaining a copy of the Plan, including the Narrative Report prior to construction.

Throughout construction, temporary measures shall control erosion and minimize siltation of adjacent properties, streets, and drainage ways.

Construction and personal vehicles shall be cleaned of mud and debris prior to leaving the site.

Failure of the Contractor to control erosion and siltation may cause the owner to take actions necessary to accommodate the requirements of the County. The cost of such action, including engineering fees, will be deducted from monies due the Contractor for other work.

EXCAVATION, STABILIZATION & BEDDING

TRENCHING

The Contractor shall comply with the latest revisions of the Virginia Occupational Safety and Health Act and the Virginia Construction Industry as adopted by the Safety and Health Codes Commission of Virginia.

The materials and methods of construction required for trench stabilization and pipe bedding shall be in accordance with the latest revisions of the applicable Virginia Department of Transportation and American Society for Testing Materials standards.

The Contractor shall excavate all materials encountered to the line and grade indicated and the trenches and ditches detailed on the drawings along the alignment shown.

Excavation, unless otherwise specified, shall be open cut. The Contractor shall open no more than two hundred (200) feet of trench in advance of the laying of pipe unless approved by the Engineer. Any water that accumulates in the trenches shall be removed promptly.

Trenches shall be excavated in straight lines and shall be accurately graded in order to establish a true elevation for the invert of the pipe.

The width of trenches, from existing grade to one (1) foot above the top of the pipe shall be of sufficient width to permit the proper installation of bracing, shoring or sheeting.

The sides of the trenches shall be excavated as vertical as practical.

Excavation for structures shall be sufficient to leave at least twelve (12) inches clearance between the structure and the sides of the trench or any required bracing, shoring, or sheeting.

The trench bottom shall be excavated to provide a firm, stable, and uniform support for the full length of pipe. Any part of the trench bottom excavated below the required grade shall be backfilled to grade and compacted to provide firm pipe support. Large rocks, boulders, and large stones shall be removed to provide a firm, stable, and uniform support for the full length of pipe. The trench bottom shall be excavated to provide a firm, stable, and uniform support for the full length of pipe. The trench bottom shall be excavated to provide a firm, stable, and uniform support for the full length of pipe. The trench bottom shall be excavated to provide a firm, stable, and uniform support for the full length of pipe.

The bottom of trenches for gravity pipelines shall be excavated to a minimum overdepth of four (4) inches below the bottom of the pipe to provide for improved pipe bedding material for the entire length of the pipeline, including service connections, except in rock, where bedding shall be six inches deep. The bedding shall be shaped so that the bottom quadrant of the pipe lies on the bed.

Excavated materials suitable for backfill shall be stockpiled in an orderly manner at a sufficient distance from the sides of the trench in order to avoid overloading the banks of the trench and to prevent slides or cave-ins.

Unless otherwise directed by the owner or engineer, surplus excavated material shall be removed from the site and disposed of by the Contractor, at his own expense.

TRENCH STABILIZATION

Trench stabilization material shall be #2 coarse aggregate as specified in Section 203 of the 1987 Virginia Department of Transportation (VDOT) Road and Bridge Specifications.

Wherever excessively wet or unsuitable material is encountered in the trench bottom, such material shall be removed and backfilled with trench stabilization material, which shall be graded to allow for the compacted bedding material.

COMPACTED BEDDING MATERIAL

Bedding material shall be #57 coarse aggregate, or #55 or #56 crushed run aggregate, each as specified in Section 203 of the 1987 VDOT Road and Bridge Specifications.

PIPE, JOINTS, FITTINGS AND APPURTENANCES

GENERAL

All materials and appurtenances for this work new, top quality, and shall be furnished, delivered, erected, connected, and finished in every detail as specified or indicated. All materials found defective, regardless of the circumstances, shall be replaced with new material at the expense of the Contractor.

The materials specified shall comply with the latest revisions of the applicable American Society of Testing Materials (ASTM), American Water Works Association (AWWA), American National Standards Institute (ANSI), and/or the Virginia Department of Transportation (VDOT).

OPTIONAL PIPE SELECTIONS

The Contractor shall install only one (1) type of pipe between structures. Where existing pipe is to be replaced or extended, the same type of pipe is to be installed. All pipe is to be installed in strict accordance with the recommendations of the manufacturer.

Water lines shall be either PVC AWWA C-900 DR 18 (min.) or ductile iron ANSI/AWWA C151 Class 52 for 12" diameter or smaller and Class 51 for 16" diameter and larger, at the Contractor's option, unless specifically indicated otherwise.

Sanitary sewer lines shall be either PVC ASTM D-3034 PSM SDR 35 concrete ASTM C-144 Class 5, or ductile iron ANSI/AWWA C151 Class 52 (min.), at the Contractor's option, unless specified or indicated otherwise.

JOINTS, COUPLINGS, AND APPURTENANCES

PVC pipes and fittings shall be bell and spigot type joints. The bell and spigot joint shall be sealed with a water-tight gasket conforming to ASTM D 3212. The joints shall be in strict accordance with the recommendation of the pipe manufacturer.

Ductile iron pipe and fittings shall be either mechanical or bell and spigot type joints as specified or indicated. Fittings shall conform with AWWA C 100 (ANSI 12.10). Joints shall be made with a single watertight rubber gasket manufactured in accordance with AWWA C 111 (ANSI 21.1). The joints shall be in strict accordance with the recommendation of the pipe manufacturer. The pipe and fittings shall be continuous, coated and cement lined in accordance with AWWA C 100 (ANSI 12.10).

Gate valves shall be iron-body, bronze-mounted, double-disc, parallel-seat, cutting screw, hand-wheel, non-rising stem, with 8 inch square operating nut for valve vault service, all in accordance with AWWA Standard C500 (latest revision). Connections shall be suitable for the pipe with which it is used. The valve shall be suitable for 200 p.s.i., water working pressure and shall be tested at twice the rated working pressure. Gate valves shall be installed in valve vaults and equipped with a two inch square operating nut, marked with the word "OPEN" and an arrow and shall close by turning clockwise.

Sanitary sewer service connections shall include all four (4) inch diameter pipe as specified or indicated.

All other materials and appurtenances are to be in accordance with the details shown on the plans and in strict accordance with the recommendation of the manufacturer.

SEPARATION OF POTABLE WATER AND SANITARY SEWER LINES

PARALLEL INSTALLATION

Water lines shall be laid at least ten (10) feet horizontally from a sewer or sewer manhole whenever possible. Horizontal separation shall be measured outside to outside. Where ten (10) feet of horizontal separation is not practical, the water line may be laid closer provided that: (1) the bottom of the water line shall be at least eighteen (18) inches above the bottom-most crown of the sewer or (2) the sewer shall be constructed of AWWA approved ductile iron water pipe pressure tested at 50 p.s.i., which shall be subject to backfilling and the sewer manhole shall be of watertight construction and tested in place.

CROSSING

Water lines crossing sewers shall have a vertical separation of at least eighteen (18) inches, measured outside to outside, between the bottom of the water line and the top of the sewer line. Where eighteen (18) inches of vertical separation is not practical: (1) Sewers passing over or under water lines shall be constructed of ductile iron AWWA water pipe and (2) water lines passing under sewers shall be protected by providing: (a) an eighteen (18) inch vertical separation, measured outside to outside, between the bottom of the sewer pipe and the top of the water line and (b) adequate structural support for the sewer to prevent excessive deflection of the joints and the settling and breaking of the water line and (c) the joints for the water line be spaced at equal distance from the crossing point of the sewer.

The Contractor shall comply with State Water Works Regulations, Section 12.05.03 where lines cross.

WATER MAIN INSTALLATION

The water mains shall be laid and maintained at the required lines and grades and fittings and valves at the required locations.

Deflection of the line of pipe, either in the vertical or horizontal plane, shall not exceed either AWWA standards or the recommendations of the manufacturer.

All plugs, except mechanical joint plugs used at connection points for pipe, shall be of the type specified or indicated. Hydrant assemblies shall be supported by thrust blocking as indicated. Valves for connection of future lines shall be anchored in the water main with rods.

DISINFECTION OF WATER MAINS

1. Pipe shall be disinfected, tested, and flushed in accordance with AWWA Standard C600 (latest revision).

2. Pipe shall be disinfected, tested, and flushed in accordance with AWWA Standard C600 (latest revision).

No tested section of water line shall be approved to deliver water until a written laboratory report has been received, and tested section shall be marked with the specified requirements as required by the Contractor and retested until the results of the water sampling are received. The repairs and alterations shall be in accordance with the recommendations of the manufacturer.

The water main shall be disinfected and tested in accordance with AWWA Standard C600 (latest revision).

Disinfection as described in AWWA C600 shall be done. Five (5) gram chlorine tablets shall be used in 3.25 g available chlorine per gallon of water. The tablets shall be placed in the pipe at the rate of one tablet per 100 feet of pipe. The following number of tablets shall be used for the given pipe size shall be used for an initial dose of 0.5 mg/l.

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BACKFILLING

GENERAL

All material for the compaction of backfill shall be in accordance with the latest revisions of the applicable American Society of Testing Materials (ASTM), American Association of State Highway and Transportation Officials (AASHTO), and Virginia Department of Transportation (VDOT) standards.

The expense of obtaining and compacting earth backfill material shall be included in the Contractor's fee.

The Contractor shall comply with all Local and State erosion and sediment control ordinances and requirements and all approved Erosion and Sediment Control Plans and measures pertaining to this project. It is the Contractor's responsibility to obtain copies of the approved plans.

Backfilling shall not be done in freezing weather and shall not be accomplished with frozen material. No fill shall be made where the material in the trench is already frozen.

The Contractor shall at all times during the construction, and at its completion for final inspection, keep the trench, excavation, or other parts of the work free from accumulated water.

JOB CONDITIONS

Prior to placing backfill, all organic material (rubbish, debris, or other unsuitable material) within the trench shall be removed. All concrete forms shall be removed. All shoring and sheeting shall be removed or cut off at the elevation stipulated by the Engineer.

Prior to placing backfill, the trench, the installed pipe, inlets, and manholes shall be visually inspected by the Engineer.

Backfill material shall be placed in uniform horizontal layers and thoroughly compacted with proper mechanical or hand operated tampers.

Backfill material shall be placed and compacted to work in not severely sloping material, or to displace the alignment of the pipe, inlets, or manholes. Backfill material shall be worked under the sides of the pipe to provide satisfactory haunching.

Backfill shall not be placed or compacted against cast-in-place concrete until it has obtained sufficient strength to withstand the backfill pressure placed upon it.

No completion of backfilling, all excess soil, stones, and debris shall be disposed on site as directed by the Owner and at no additional expense.

BACKFILL MATERIAL

Materials for backfill shall be approved excavated material or approved subgrade material obtained from other sources. All material shall be approved by a Soils Engineer.

Material shall consist of durable natural granular material or gravel aggregates free of organic material, loam, debris, excess clinkers, pavement, boulders, or other objectionable material which cannot be thoroughly compacted. Backfilling shall be done in such a way to prevent dropping of material directly on the pipe. The Contractor shall be responsible for grading the backfill to the required depth and shall be responsible for grading the backfill to the required depth and shall be responsible for grading the backfill to the required depth.

Backfill shall be placed in layers not greater than three (3) feet and shall be specified in horizontal layers. No particles with a diameter greater than two (2) inches shall be placed in the initial backfill from the top of the improved bedding to a point two (2) feet over the top of the pipe. No rock particles with a diameter or dimension greater than six (6) inches shall be placed in the remainder of the backfill. Excavated rock particles with a diameter or dimension greater than six (6) inches shall be considered unsuitable material.

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