October 10, 2002 Rev.: Jan 22, 2003

\$1**81-1** GREATER THAN 0 IS-NORMAL EARTH FOUNDATION Fills up to 30'(Pipe projection above ground fine Culverts less than d= 36"

His Height of cover measured from top of drainage structure to

INSTALLATION OF PIPE CULVERTS AND STORM SEWERS

Bedding moterial in accordance with Section 302 C2 of the Road and Bridge Specifications

Bedding requirements detailed under Method Al, Projecting Condition, are applicable to

- Backfill material in accordance with Section 302.02 of the Road and Bridge Specifications

MS-19 Notes:

Culverts where d: 36"and over

follows unless otherwise noted on plans

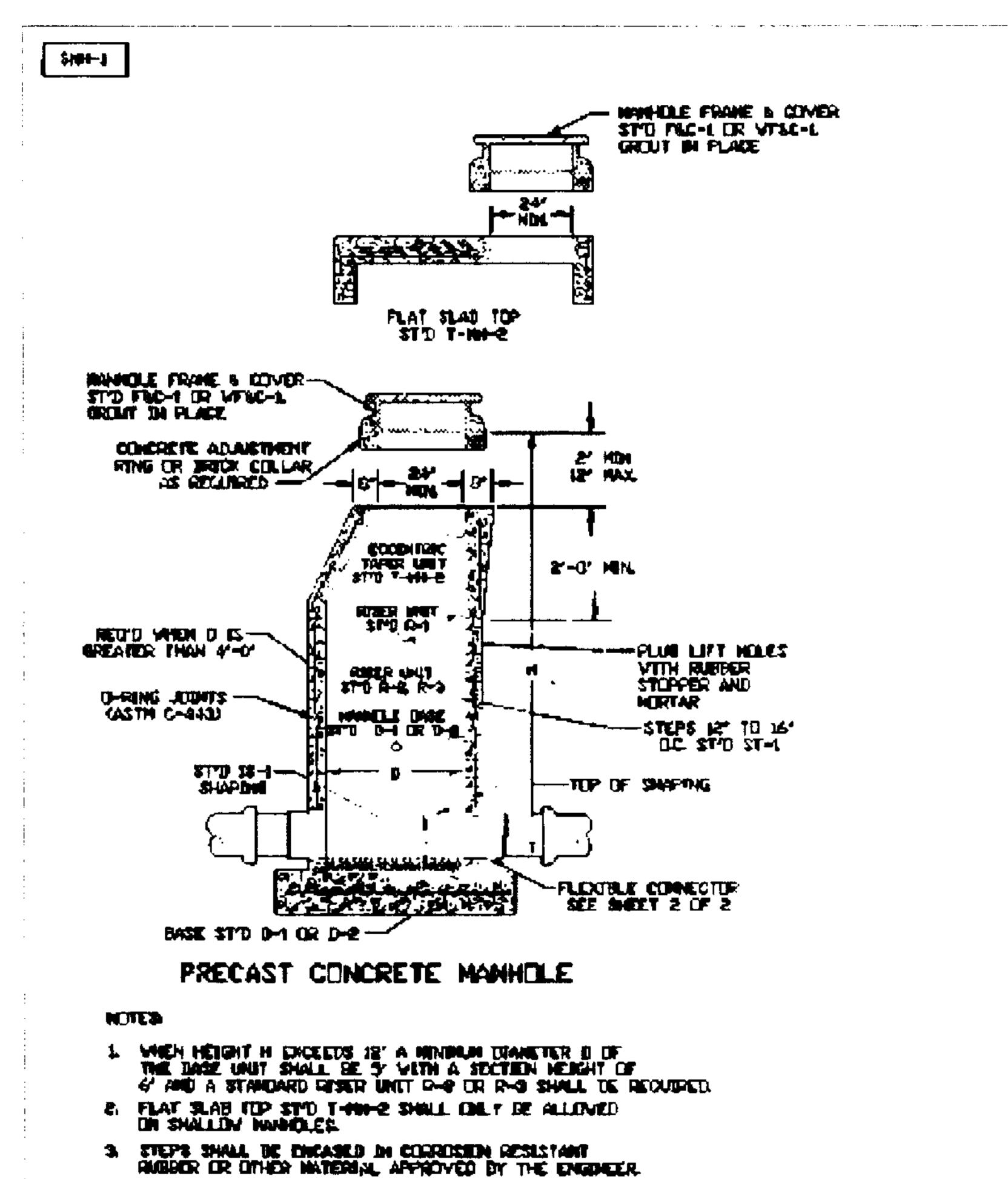
Method "A" Pipe Bedding shart be used or

files up to 30' (No projection of pipe above

- . Permanent or temporary soil stabilization shall be applied to denuded areas within seven (7) days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within seven (7) days to denuded areas that may not be at final grade but will remain dormant for longer than 30 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.
- During construction of the project, soil stockpiles and borrow areas shall be stabilized or protected with sediment trapping measures. The applicant is responsible for the temporary protection and permanent stabilization of all soil stockpiles on site as well as borrow areas and soil intentionally transported from the project site.
- A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized. Permanent vegetation shall not be considered established until a ground cover is achieved that is uniform, mature enough to survive and will inhibit erosion.
- . Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment shall be constructed as a first step in any land disturbing activity and shall be made functional before upslope land disturbances take place.
- . Stabilization measures shall be applied to earthen structures such as dams, dikes and diversions immediately after installation.
- Surface runoff from disturbed areas that is comprised of flow from drainage. areas greater than or equal to three acres shall be controlled by a sediment basin. The sediment basin shall be designed and constructed to accommodate the anticipated sediment loading from the land disturbing activity. The outfall device or system design shall take into account the total
- drainage area flowing through the disturbed area to be served by the basin. . Cut and fill slopes shall be designed and constructed in a manner that will minimize erosion. Slopes that are found to be eroding excessively within one year of permanent stabilization shall be provided with additional slope stabilizing measures until the problem is corrected.
- 8. Concentrated runoff shall not flow down cut or fill slopes unless contained within an adequate temporary or permanent channel, flume or slope drain structure.
- Whenever water seeps from a slope face, adequate drainage or other protection shall be provided.
- All storm sewer inlets that are made operable during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.
- Before newly constructed stormwater conveyance channels or pipes are made operational, adequate outlet protection and any required temporary or permanent channel lining shall be installed in both the conveyance channel. and receiving channel.
- When work in a live watercourse is performed, precautions shall be taken to minimize encroachment, control sediment transport and stabilize the work area to the greatest extent possible during construction. Non-erodible material shall be used for the construction of causeways and cofferdams. Earthen fill may be used for these structures if armored by non-erodible cover
- . When construction vehicles must cross a live watercourse more than twice in any six-month period, a temporary stream crossing constructed of nonerodible material shall be provided.
- All applicable federal, state and local regulations pertaining to working in or crossing live watercourses shall be met.
- The bed and banks of a watercourse shall be stabilized immediately after.
- work in the watercourse is completed. Underground utility lines shall be installed in accordance with the following standards in addition to other applicable criteria

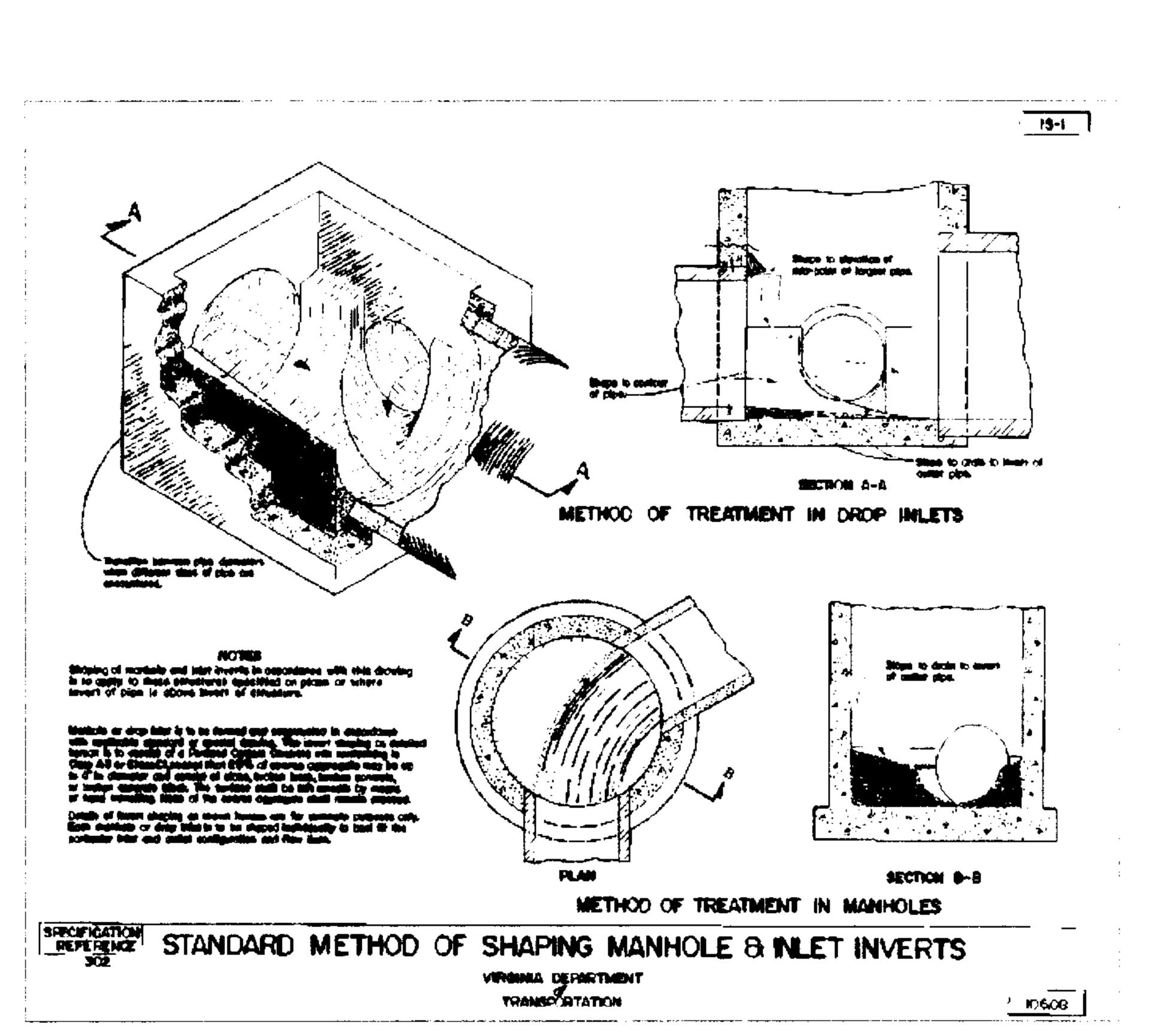
a. No more than 500 linear feet of trench may be opened at one time.

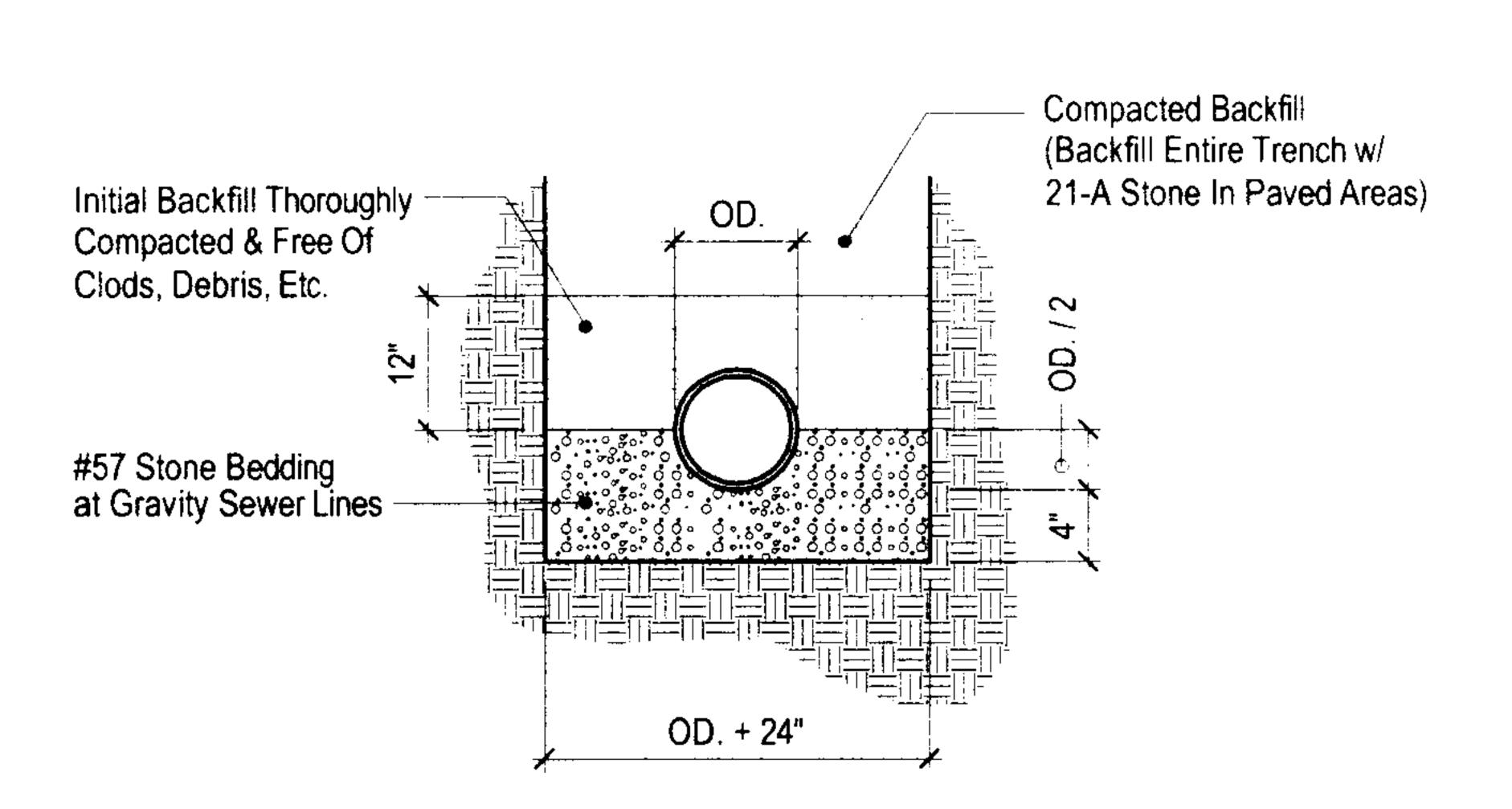
- b. Excavated material shall be placed on the uphill side of trenches. c. Effluent from dewatering operations shall be filtered or passed through an approved sediment trapping device, or both, and discharged in a manner that does not adversely affect flowing streams or off-site
- d. Material used for backfilling trenches shall be properly compacted in
- order to minimize erosion and promote stabilization. e. Restabilization shall be accomplished in accordance with these
- Applicable safety regulations shall be complied with. . Where construction vehicle access routes intersect paved or public roads provisions shall be made to minimize the transport of sediment by vehicular tracking onto the paved surface. Where sediment is transported onto a payed or public road surface, the road surface shall be cleaned thoroughly at the end of each day. Sediment shall be removed from the roads by shoveling or sweeping and transported to a sediment control disposal area. Street washing shall be allowed only after sediment is removed in this manner. This provision shall apply to individual development lots as well as to larger land-
- disturbing activities. 18. All temporary erosion and sediment control measures shall be removed within 30 days after final site stabilization or after the temporary measures are no longer needed, unless otherwise authorized by the local program Trapped sediment and the disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation.
- 19. Properties and waterways downstream from development sites shall be protected from sediment deposition, erosion and damage due to increases in volume, velocity and peak flow rate of stormwater runoff for the stated frequency storm of 24 hour duration.



STEPS SHALL BE CHITTED WHEN SPECIFIED IN THE PLANS.

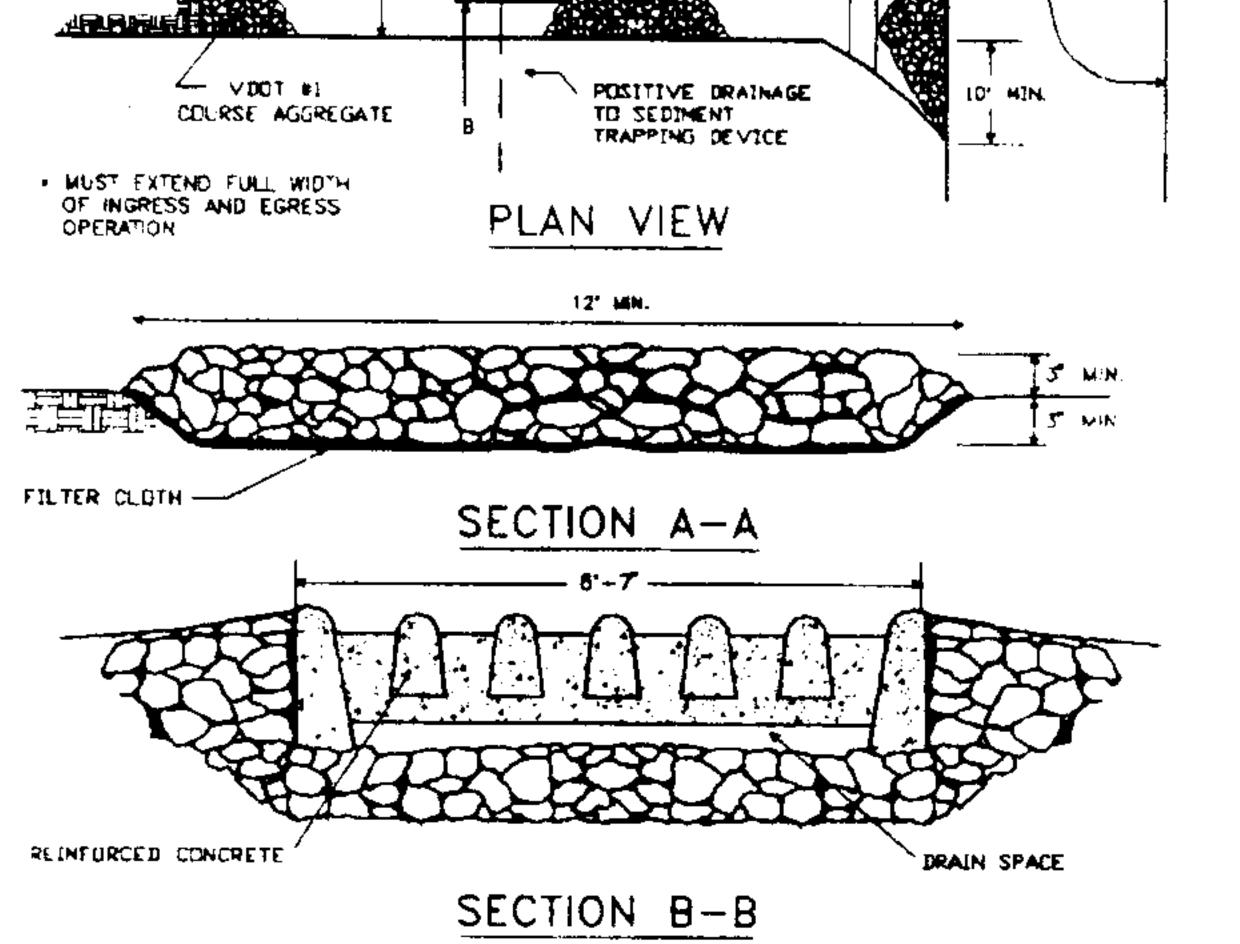
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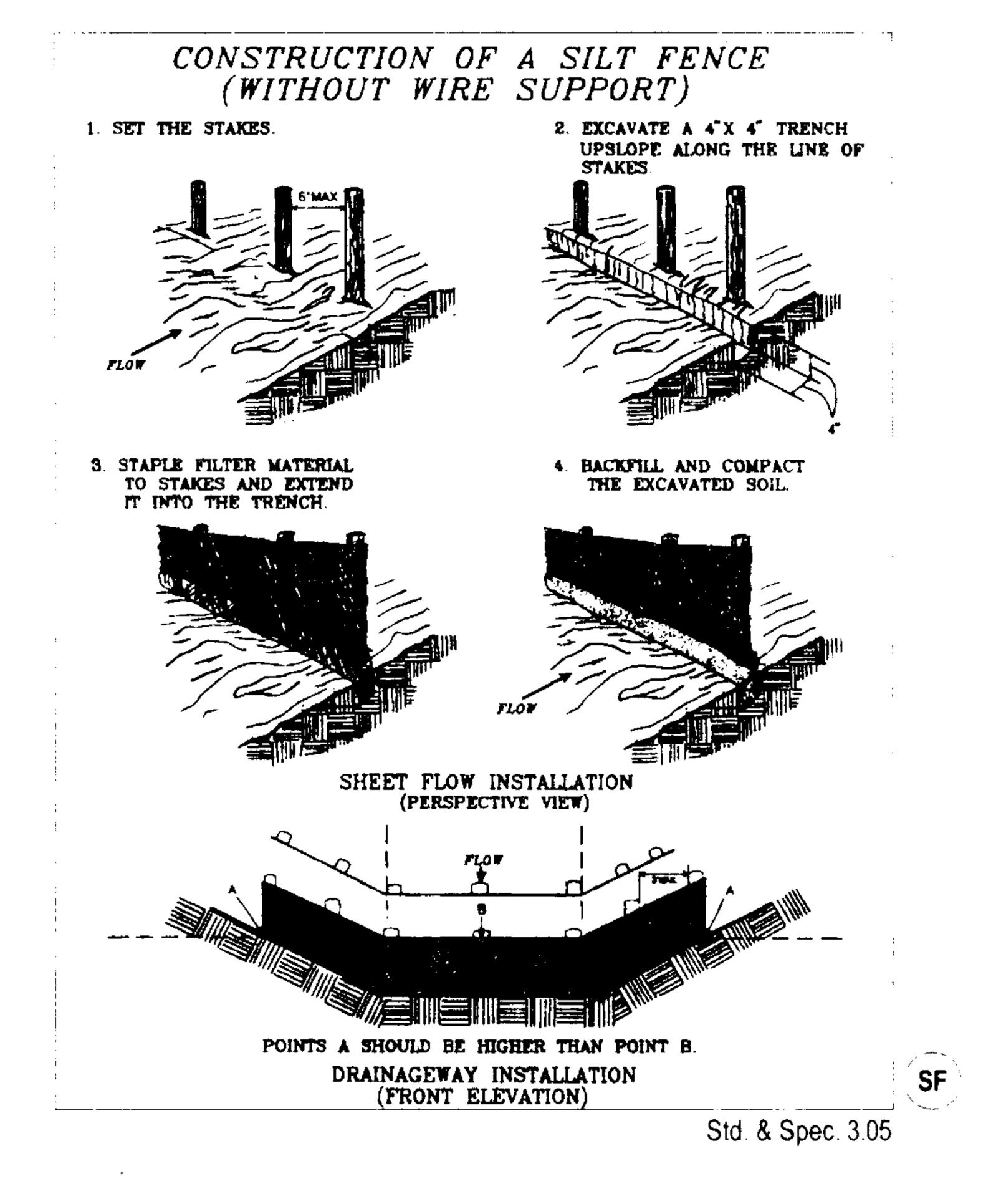


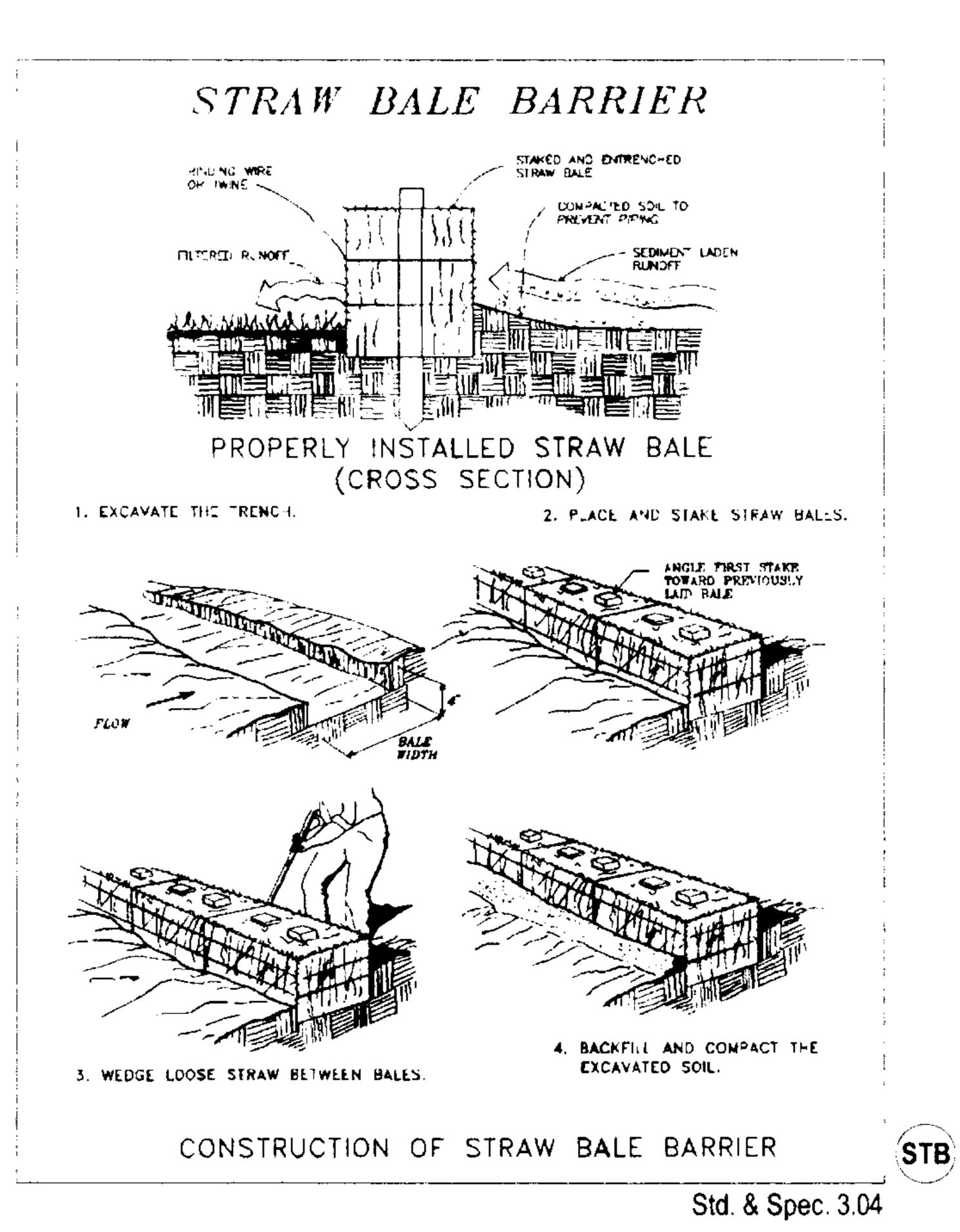
Typ. SS. Trench Not To Scale

STONE CONSTRUCTION ENTRANCE SIDE ELEVATION COURSE AGGREGATE POSITIVE DRAINAGE TO SEDIMENT TRAPPING DEVICE



Std. & Spec. 3.02





Erosion & Sediment Control Notes:

- Unless otherwise indicated, all vegetative and structural erosion and sediment control practices will be constructed and maintained according to minimum standards and specifications of the Virginia Erosion and Sediment Control Handbook (3rd edition, 1992).
- All disturbed areas are to drain to approved sediment control measures at all times during land disturbing activities and during site development until final stabilization is achieved.
- Permanent or temporary soil stabilization shall be applied to denuded areas within 7 days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within 7 days to denuded areas that may not be at final grade but will remain dormant (undisturbed) for longer than 30 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year. Soil stabilization measures include vegetative establishment, mulching and the early application of gravel base material on areas to be paved.
- All erosion and sediment control measures are to be placed prior to or as the first step in land disturbance.
- The Contractor shall inspect all erosion control measures periodically and after each runoff producing rainfall event. Any necessary repairs to maintain the effectiveness of the erosion control devices and cleanup of sedimentation are the responsibility of the Contractor and shall be made immediately.
- The Contractor shall limit site access by construction vehicles to entrances designated as construction entrance and protected by stone. Sediment shall be removed from paved areas on a daily basis.
- Stock piles of soil and other erodible materials shall be stabilized or protected with sediment trapping measures. The Contractor is responsible for the temporary protection and permanent stabilization for stockpiles on site as well as for materials transported from the project site.
- The Contractor shall monitor and take precautions to control dust including (but not limited to) use of water, mulch, or chemical dust adhesives and control of construction site traffic.
- The contractor is responsible for installation and maintenance of any additional control measures necessary to prevent erosion and sedimentation as determined necessary by the plan approving authority.
- Temporary erosion and sediment control measures are not to be removed until all disturbed areas are stabilized. After stabilization is complete, all measures shall be removed within 30 days. Trapped sediment shall be spread and seeded.

Erosion Control Narrative:

- . Project Description: The Owner is proposing to commence phase one of the development of Ravenswood Industrial Park. Work shall include construction of entrance road (extend Ravenswood Drive) with cul-de-sac and installation of water and sewer mains. The total area of land disturbing activities is expected to be about 1.33 acres.
- Existing Site Description: The site consists of 3 to 5 year cut-over. The site drains uniformly to the south at an average slope of about 2 %. Stormwater flows which is a tributary to the Blackwater. The wet weather branch contains wetlands which have been delineated on the plan. The Owner has obtained a permit from the COE to disturb the wetland area at the road crossing only. All future development will be designed to avoid further wetland disturbance.
- Adjacent Areas: The site is bordered on the north by commercial buildings along Crater Road and vacant woodland behind. The site is also bordered on the north by vacant industrial property, Eastwood Corporate Park III, adjacent to I-95. The site is bordered on the south by Gladdin's Automotive Shop. The site is bordered on the east by vacant industrial property and I-95. The site is bordered on the west by commercial buildings in Ravenswood Office Park and South Crater Road beyond.
- . Off-Site Areas: There should be no off site land disturbing activities associated with this
- Soils: Per review of Soil Survey of Prince George County, Virginia the soils are characterized to be primarily, type 7B, Bonneau loamy sand, hydrologic group "A", K factor = .15 to .20. however, small areas of the following soil types will be encountered as road work crosses thru the low, wetland area. Type 16, Lynchburg loam, hydrologic group "B/D", K factor = .20, and type 25A, Slagle sandy loam, hydrologic group "C", K factor = .24.
- Critical Areas: The limits of disturbance in the wetland area shall be kept to a minimum. The Contractor shall care to work inside the 50' right-of-way in the wetland area.
- Erosion and Sediment Control Measures and Sequence of Construction:
 - a. Owner shall contact the County Inspector 48 hours prior to the start of
 - work at 804-733-2608 Install construction entrance.
 - Clear and grub site and burn woodland debris.
 - Install silt fence as shown on the plan. All underbrush beyond the limits of the proposed work shall remain to serve as a natural buffer against erosion.
- e. Rough grade road, and ditches, install culverts, and water and sewer
- Install rip-rap, straw bales and rock check dams as shown on the plans.
- Fine grade, place stone sub-base. Owner may elect to pave at a later date.
- . Permanently seed and mulch all disturbed areas as noted below.
- Temporary measures, such as silt fence, shall remain in place until seeded areas are well established.
- . Permanent Stabilization: Ravenswood Drive shall be secured with gravel temporarily and asphalt paving permanently. All other areas shall be stabilized with permanent seeding. All seeded areas shall be tilled and seeded with a mixture of 75 % turf type tall fescue and 25 % perennial rye @ 200# per acre (5# per 1,000 sf). Seeded areas shall be amended with pulverized agricultural limestone @ 90# per 1,000 sf and 10-20-10 fertilizer @ 23# per 1,000 sf. After seeding the soil shall be harrowed, dragged, raked, or otherwise worked so as to cover the seeds with a layer of soil. All seeded areas shall then be mulched with straw or hay @ 2 tons per acre (70 to 90# per 1,000 square feet).
- Storm water Runoff Considerations: Ravenswood Drive extended creates about .5 acres of new impervious space. The drainage area for the wet weather branch encompasses about 50.51 acres. Therefore, the total drainage area to the point of analysis within the channel, wet weather branch, is more than one hundred times greater than the contributing drainage area of the project in question. Consequently, detention is not required for the immediate road improvements. However, it is the Owner's intention that each site detain stormwater to predeveloped rates as development progresses in the Park.
- Calculations: See calculations attached.