





**20.0 STANDARDS AND SPECIFICATIONS FOR VEGETATIVE STABILIZATION**

**DEFINITION**

Using vegetation as cover for barren soil to protect it from forces that cause erosion. Vegetative stabilization specifications are used to determine the establishment of vegetation on exposed soil. When soil is stabilized with vegetation, the soil is less likely to erode and more likely to allow infiltration of rainfall, thereby reducing sediment loads and runoff to downstream areas, and improving wildlife habitat and visual resources.

**WHERE PRACTICE APPLIES**

This practice shall be used on denuded areas as specified on the plans and may be used on highly erodible or critically eroding areas. This specification is divided into Temporary Seeding, to quickly establish vegetative cover for short duration (up to one year), and Permanent Seeding, for long term vegetative cover. Examples of applicable areas for Temporary Seeding are Temporary Soil Stockpiles, cleared areas being left idle between construction phases, earth dikes, etc. and for Permanent Seeding are Lawns, dunes, cut and fill slopes and other areas where permanent stabilization and staging areas, etc.

**EFFECTS ON WATER QUALITY AND QUANTITY**

Planting vegetation in disturbed areas will have an effect on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, precipitation, and groundwater recharge. Vegetation, over time, will increase organic matter content and improve the water holding capacity of the soil and subsequent plant growth. Vegetation will help reduce the movement of sediment, nutrients, and other chemicals carried by runoff to receiving waters. Plants will also help protect groundwater supplies by assimilating those substances present within the root zone. Sediment control devices must remain in place during grading, seeded preparation, seeding, mulching and vegetative establishment to prevent large quantities of sediment and associated chemicals and nutrients from washing into surface waters.

**SECTION 1 - VEGETATIVE STABILIZATION METHODS AND MATERIALS**

- Site Preparation**
  - Install erosion and sediment control structures (either temporary or permanent) such as diversions, grade stabilization structures, silt fences, waterways, or sedimentation control basins.
  - Perform all grading operations at right angles to the slope. Final grading and shaping is not usually necessary for temporary seeding.
  - Schedule required soil tests to determine soil amendment composition and application rates for sites having disturbed areas over 5 acres.
- Soil Amendment (Fertilizer) Specifications**
  - Soil tests must be performed to determine the exact ratios and application rates for both lime and fertilizer on sites having disturbed areas over 5 acres. Soil analysis may be performed by the University of Maryland Cooperative Extension Laboratory. Soil samples taken for engineering purposes may also be used for chemical analysis.
  - Fertilizers shall conform to a recognized commercial fertilizer. Soil samples taken for engineering purposes may also be used for chemical analysis.
  - Manure may be substituted for fertilizer with prior approval from the appropriate approval authority. Fertilizers shall all be delivered to the site fully labeled according to the applicable state fertilizer law and shall bear the name, trade name or trademark and warranty of the producer.
  - Lime materials shall be ground limestone (hydrated or burnt lime) but may be substituted which contains at least 50% total oxides (calcium oxide plus magnesium oxide). Limestone shall be ground to such fineness that at least 50% will pass through a #100 mesh sieve and 90-100% will pass through a #20 mesh sieve.
- Incorporate lime and fertilizer into the top 3-5" of soil by disking or other suitable means.**
  - Seeded Preparation**
    - Seeded preparation shall consist of loosening soil to a depth of 3" to 5" by means of suitable agricultural or construction equipment, such as disc harrows or chisel plows or rippers mounted on tracked equipment. After the soil is loosened it should not be rolled or scraped smooth, but left in the roughened condition. Seeded areas (larger than 30') should be marked leaving the surface in an irregular condition with ridges running parallel to the contour of the slope.
    - Apply fertilizer and lime as prescribed on the plans.
  - Permanent Seeding**
    - Minimum soil pH shall be between 6.0 and 7.0.
    - Soil shall contain less than 500 parts per million nitrogen.
    - Soil shall contain less than 400 lbs per acre but enough fine grained material (0.075 mm) plus clay to provide the capacity to hold a moderate amount of moisture. An exception is if low-nitrogen or serecia lepedeza is to be planted, then a sandy soil (50% silt plus sand) can be accepted.
    - Soil shall contain at least 1.5% minimum organic matter by weight.
    - Soil must contain sufficient pore space to permit adequate root penetration. If these conditions cannot be met by soils shown on the plans, the contractor shall, in accordance with Section 21.0 Standard and Specification for Topsoil, amend the soil to conform with the drawings and specifications in a true and even grade. Then, serecia lepedeza or other suitable species to a depth of 3-5" to permit bonding of the topsoil to the surface area and to create horizontal erosion check slots to prevent topsoil from sliding down a slope.
    - Apply soil amendments as per soil test or as included on the plans.
    - Mix soil amendments into the top 3-5" of topsoil by disking or other suitable means. Lawn areas should be raked to smooth the surface, remove large objects like stones and branches, and resist the area for seed and application, where site conditions will not permit normal seeded preparation, loosen surface soil by dragging with a heavy chain or other equipment to roughen the surface. Slopes steeper than 3:1 should be tracked by a dozer leaving the soil in an irregular condition with ridges running parallel to the contour of the slope. The top 3-5" of soil should be loose and friable. Seeded loosening may not be necessary on newly disturbed areas.

**PERMANENT SEEDING NOTES**

- All disturbed areas shall be stabilized as follows:
  - If grading is completed outside of the seeding season, seeding shall be performed in accordance with these specifications.
  - When straw mulch is used, it shall be spread over all seeded areas at the rate of 2 tons/acre. Mulch shall be applied to a uniform loose depth of between 1" and 2". Mulch applied shall have a uniform distribution and depth so that the soil surface is not exposed. If a mulch anchoring tool is to be used, the rate shall be increased to 2.5 tons/acre.
  - Wood cellulose fiber used as a mulch shall be applied at a net dry weight of 1500 lbs. per acre. The wood cellulose fiber shall be mixed with water, and the mixture shall contain a maximum of 50 lbs. of wood cellulose fiber per 100 gallons of water.
- Securing Straw Mulch Anchoring: Mulch anchoring shall be performed immediately following mulch application to minimize loss by wind or water. This may be done by one of the following methods listed by preference, depending upon size of area and erosion hazard:
  - A mulch anchoring tool is a tractor drawn implement designed to punch and anchor mulch into the soil surface a minimum of two (2) inches. This practice is most effective on large areas and is limited to flatter slopes where equipment can operate safely. If used on sloping hills, this practice should be used on the contour if possible.
  - Lightweight plastic netting may be stapled over the mulch according to the manufacturer's instructions. The wood cellulose fiber shall be mixed with water and the mixture shall contain a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water.
  - Application of liquid binders should be better at the edges where wind catches mulch, such as ridges and crest of banks. The remainder of the area should be applied after binder application. Synthetic binders such as Acrylic URE Slope-Bond, URE-70 Petrol, Terra Tex II, Terra Tack AB or other approved equal may be used at rates recommended by the manufacturer to anchor mulch.
  - Lightweight plastic netting may be stapled over the mulch according to the manufacturer's recommendations. Netting is usually available in rolls 4' to 12' feet wide and 300 to 3,000 feet long.
- Incremental Stabilization - Cut Slopes**
  - All cut slopes shall be dressed, prepared, seeded and mulched with the work program. Slopes shall be excavated and stabilized in equal increments not to exceed 15'.
    - Excavate and stabilize all temporary walkways, side ditches, or berms that will be used to access the slope.
    - Perform Phase I excavation, dress and stabilize.
    - Perform Phase II excavation, dress and stabilize. Overseed Phase I areas as required.
    - Perform final phase excavation, dress and stabilize. Overseed previously seeded areas as necessary.

**SEDIMENT CONTROL NOTES**

- A minimum of 48 hours notice must be given to the HOWARD COUNTY DEPARTMENT OF INSPECTIONS, LICENSES AND PERMITS, SEDIMENT CONTROL DIVISION PRIOR TO THE START OF ANY CONSTRUCTION (SDS-599).
- ALL VEGETATIVE AND STRUCTURAL PRACTICES ARE TO BE INSTALLED ACCORDING TO THE PROVISIONS OF THIS PLAN AND ARE TO BE IN CONFORMANCE WITH THE MOST CURRENT MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, AND RESOURCES TARGETS TO PROTECT INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN 31 CALENDAR DAYS FOR ALL PERMITTER SEDIMENT CONTROL STRUCTURES, DICES, FENCEPOST SLOPES AND ALL SLOPES STEEPER THAN 3:1 TO 10 DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE.
- ALL DISTURBED AREAS MUST BE STABILIZED WITHIN THE PERIOD: MAY 1 THROUGH JULY 31, SEED WITH 100 LBS PER ACRE (2.3 LBS/1000 SQ FT) OF KENTUCKY 31 TALL FESCUE FOR THE PERIOD MAY 1 THROUGH JULY 31, SEED WITH 100 LBS PER ACRE (2.3 LBS/1000 SQ FT) OF KENTUCKY 31 TALL FESCUE AND 100 LBS PER ACRE (2.3 LBS/1000 SQ FT) OF WEEPING LOVEGRASS (07 LBS/1000 SQ FT) FOR THE PERIOD NOVEMBER 1 THROUGH FEBRUARY 28, PROTECT SITE BY OPTION (1) - TWO TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING; OPTION (2) - USE 500 OZ OPTION (1) SEED WITH 100 LBS/ACRE KENTUCKY 31 TALL FESCUE AND MULCH WITH TWO TONS/ACRE WELL ANCHORED STRAW. ALL SLOPES SHOULD BE HYDROSEED.
- ALL SEDIMENT CONTROL STRUCTURES ARE TO REMAIN IN PLACE AND ARE TO BE MAINTAINED IN OPERATIVE CONDITION UNTIL PERMITS FOR THEIR REMOVAL HAS BEEN OBTAINED FROM THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.
- SITE ANALYSIS:**

INITIAL AREA OF SITE	30773 ACRES
AREA DISTURBED	0.47 ACRES
AREA TO BE ROOFED OR PAVED	0.01 ACRES
AREA TO BE VEGETATIVELY STABILIZED	0.36 ACRES
TOTAL FILL	500 CUBIC YARDS
TOTAL FILL	500 CUBIC YARDS
- OFFSITE WASTE/ROOFWATER AREA LOCATION: EMISSIONS SECT. 2, P. 10
- ANY SEDIMENT CONTROL PRACTICE MUST BE DISTURBED BY GRADING ACTIVITY FOR PLACEMENT OF UTILITIES MUST BE STOPPED ON THE SAME DAY OF DISTURBANCE.
- ADDITIONAL SEDIMENT CONTROLS MUST BE PROVIDED, IF NEEDED, BY THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.
- ON ALL SITES WITH DISTURBED AREAS IN EXCESS OF 5 ACRES, APPROVAL OF THE INSPECTION AGENCY SHALL BE REQUESTED UPON COMPLETION OF INSTALLATION OF PERMITTER SEDIMENT CONTROL STRUCTURES, BUT BEFORE PROCEEDING WITH ANY OTHER EARTH DISTURBANCE OR GRADING. OTHER BUILDING OR GRADING INSPECTION APPROVALS MAY NOT BE AUTHORIZED UNTIL THIS INITIAL APPROVAL BY THE INSPECTION AGENCY IS MADE.
- TRUCKS FOR THE CONSTRUCTION OF UTILITIES IS LIMITED TO THREE PER LENGTH OF THAT WHICH SHALL BE BACK-FILLED AND STABILIZED WITHIN ONE WORKING DAY, WHICHEVER IS SHORTER.

**TEMPORARY SEEDING NOTES**

- APPLY TO 2 TONS PER ACRE (20 TO 30 LBS./1000 SQ FT) OF UNIMPROVED SMALL GRASS SEED IMMEDIATELY AFTER SEEDING. ANCHORING TOOL OR 200 GALLONS PER ACRE OF GALLIUM SOFT FOR ENHANCED ASPHALT ON FLAT AREAS ON SLOPES OF FEET OR HIGHER. USE 340 GALLONS PER ACRE OF GALLIUM SOFT FOR ANCHORING.
- INSPECTION: INSPECT ALL SEEDING AREAS AND MAKE NECESSARY REPAIRS, REPLACEMENTS AND RESEEDINGS.
- FOR PUBLIC ROADS SUBSTITUTE CHEMICAL CROWNCOAT AT 15 LBS/ACRE AND KENTUCKY 31 TALL FESCUE AT 40 LB/ACRE AS THE SEEDING REQUIREMENT. OPTIMUM SEEDING DATE FOR THIS MIXTURE IS MARCH 1 TO APRIL 30.
- APPLY TO GRADED OR CLEARED AREAS LIKELY TO BE RECONSTRUCTED OR SHORT-TERM VEGETATIVE COVER IS NEEDED.
- SEEDING PREPARATION: LOOSEN UPPER THREE INCHES OF SOIL BY RAKING, DISING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING. IF NOT PREVIOUSLY LOOSENED.
- APPLY 600 LBS. PER ACRE 10-10-10 FERTILIZER OR LBS./1000 SQ FT.
- SEEDING: FOR THE PERIODS MARCH 1 THROUGH APRIL 30, AND AUGUST 1 THROUGH OCTOBER 15, SEED WITH 100 LBS PER ACRE (2.3 LBS/1000 SQ FT) OF KENTUCKY 31 TALL FESCUE AND 100 LBS PER ACRE (2.3 LBS/1000 SQ FT) OF WEEPING LOVEGRASS (07 LBS/1000 SQ FT) FOR THE PERIOD NOVEMBER 1 THROUGH FEBRUARY 28, PROTECT SITE BY OPTION (1) - TWO TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING; OPTION (2) - USE 500 OZ OPTION (1) SEED WITH 100 LBS/ACRE KENTUCKY 31 TALL FESCUE AND MULCH WITH TWO TONS/ACRE WELL ANCHORED STRAW. ALL SLOPES SHOULD BE HYDROSEED.
- APPLY 1 TO 2 TONS PER ACRE (70 TO 90 LBS./1000 SQ FT) OF UNIMPROVED SMALL GRASS SEED IMMEDIATELY AFTER SEEDING. ANCHORING TOOL OR 200 GALLONS PER ACRE OF GALLIUM SOFT FOR ENHANCED ASPHALT ON FLAT AREAS ON SLOPES OF FEET OR HIGHER. USE 340 GALLONS PER ACRE OF GALLIUM SOFT FOR ANCHORING.
- INSPECTION: REFER TO THE 1998 MARYLAND STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL, FOR RATE AND METHODS NOT COVERED.

**STANDARDS AND SPECIFICATIONS FOR TOPSOIL**

**Definition**

Placement of topsoil over a prepared subsoil prior to establishment of permanent vegetation.

**Purpose**

To provide a suitable soil medium for vegetative growth. Soils of concern have low moisture content, low nutrient levels, low pH, materials toxic to plants, and/or unacceptable soil gradation.

**Conditions Where Practice Applies**

- This practice is limited to areas having 2:1 or flatter slopes where:
  - The texture of the exposed subsoil/parent material is not adequate to produce vegetative growth.
  - The soil material is so shallow that the rooting zone is not deep enough to support plants or furnish confining supplies of moisture and plant nutrients.
  - The original soil to be vegetated contains material toxic to plant growth.
  - The soil is so acidic that treatment with limestone is not feasible.
- For the purpose of these Standards and Specifications, areas having slopes steeper than 2:1 require special consideration and design for adequate stabilization. Areas having slopes steeper than 2:1 shall have the appropriate stabilization shown on the plans.

**Construction and Material Specifications**

- Topsoil salvaged from the existing site may be used provided that it meets the standards as set forth in these specifications. Typically, the depth of topsoil to be salvaged for a given soil type can be found in the representative soil profile section in the Soil Survey published by USNR-SSS in cooperation with Maryland Agricultural Experiment Station.
- Topsoil Specifications - Soil to be used as topsoil must meet the following:
  - Topsoil shall be a loam, sandy loam, clay loam, silt loam, sandy clay loam, loamy sand. Other soils may be used if recommended by an agronomist or soil scientist and approved by the appropriate approval authority. Regardless, topsoil shall not be a mixture of contrasting textured subsoils and shall contain less than 5% by volume of nodules, stones, slag, coarse fragments, gravel, sticks, roots, trash, or other materials larger than 1 1/2" in diameter.
  - Topsoil must be free of plants or plant parts such as bermuda grass, quackgrass, Johnson grass, nutcase, poison ivy, thistle, or others as specified.
  - Where the subsoil is either highly acidic or composed of heavy clays, ground limestone shall be spread at the rate of 4-8 tons/acre (200-400 pounds per 1,000 square feet) prior to the placement of topsoil. Lime shall be distributed uniformly over designated areas and worked into the soil in conjunction with tillage operations as described in the following procedures.

For sites having disturbed areas over 5 acres:

- Place topsoil (if required) and apply soil amendments as specified in 20.0 Vegetative Stabilization - Section 1 - Vegetative Stabilization Methods and Materials.

Alternative for Permanent Seeding - Instead of applying the full amounts of lime and commercial fertilizer, composted sludge and amendments may be applied as specified below:

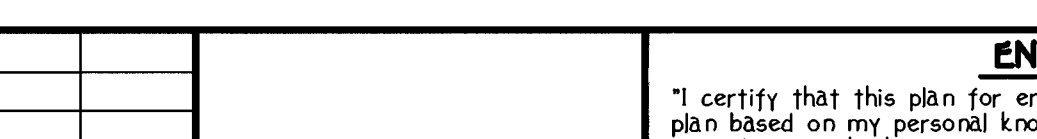
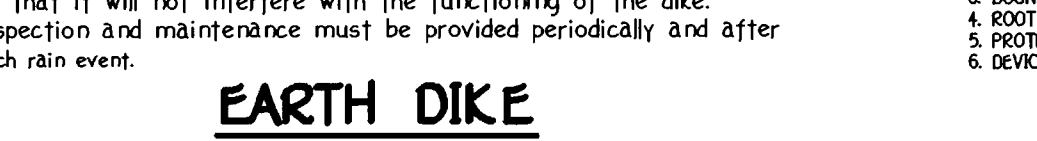
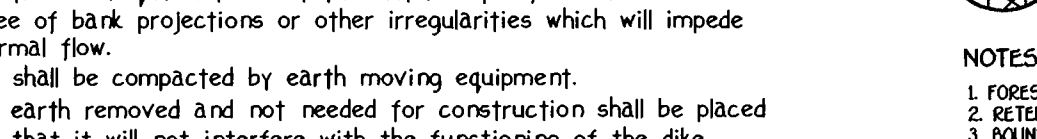
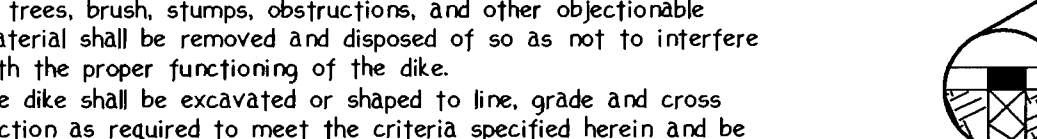
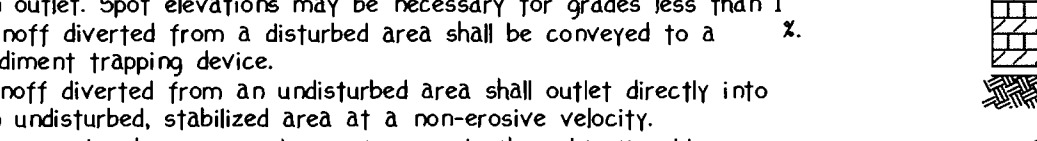
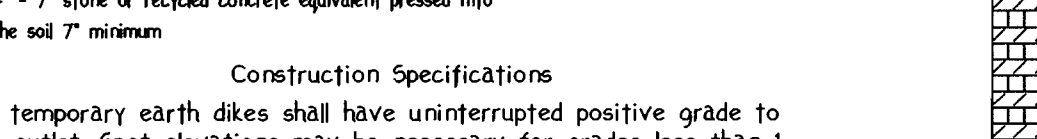
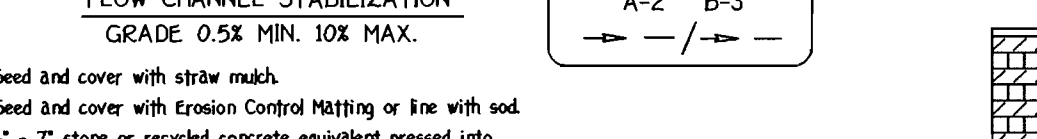
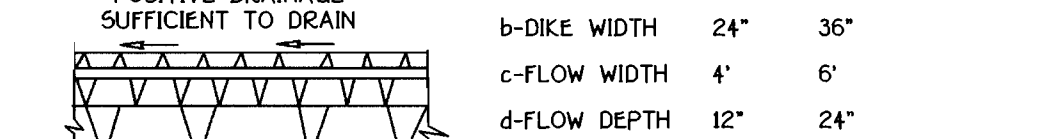
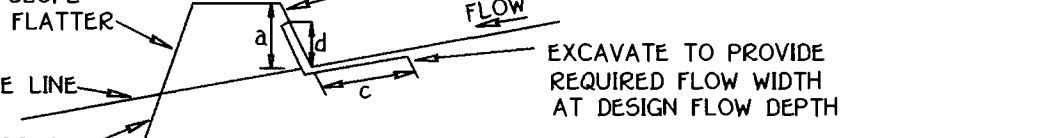
- Composted sludge (material) for use as a soil conditioner for sites having disturbed areas over 5 acres shall be tested to prescribe amendments and for sites having disturbed areas under 5 acres shall conform to the following requirements:
  - Composted sludge shall be supplied by, or originate from, a person or persons that are permitted (at the time of acquisition of the compost) by the Maryland Department of the Environment under COMAR 26.03.02.
  - Composted sludge shall contain at least 1 percent nitrogen, 1.5 percent phosphorus, and 0.2 percent potassium and have a Ph of 7.0 to 8.0. If compost does not meet these requirements, the appropriate constituents must be added to meet the requirements prior to use.
  - Composted sludge shall be applied at a rate of 1 to 1.1 ton/1,000 square feet.
- Composted sludge shall be amended with a potassium fertilizer applied at the rate of 4 lb/1,000 square feet, and 1/3 the normal lime application rate.

References: Guideline Specifications, Soil Preparation and Soddling, MD-VA, Pub. et al., Cooperative Extension Service, University of Maryland and Virginia Polytechnic Institutes. Revised 1973.

**SEQUENCE OF CONSTRUCTION**

- OBTAIN GRADING PERMIT 7 DAYS
- INSTALL SEDIMENT AND EROSION CONTROL DEVICES AS SHOWN ON PLAN 7 DAYS
- CLEAR AND GRUB TO LIMITS OF DISTURBANCE 4 DAYS
- INSTALL TEMPORARY SEEDING 2 DAYS
- CONSTRUCT BUILDINGS 60 DAYS
- FINE GRADE SITE AND INSTALL PERMANENT SEEDING AND LANDSCAPE 14 DAYS
- REMOVE SEDIMENT CONTROL DEVICES AS UPLAND AREAS ARE STABILIZED AND PERMISSION IS GRANTED BY E/S CONTROL INSPECTOR. 7 DAYS

APPROVED FOR PRIVATE WATER AND PRIVATE SEWERAGE SYSTEMS  
 Penny Borenstein, MD, ESO 3/17/03  
 COUNTY HEALTH OFFICER  
 HOWARD COUNTY HEALTH OFFICER



**CONSTRUCTION SPECIFICATIONS**

- All temporary earth dikes shall have uninterrupted positive grade to an outlet. Spot elevations may be necessary for grades less than 1%.
- Runoff diverted from a disturbed area shall be conveyed to a sediment trapping device.
- Runoff trapped from an undisturbed area shall outlet directly into an undisturbed, stabilized area at a non-erosive velocity.
- All trees, brush, stumps, obstructions, and other objectionable material shall be removed and disposed of so as not to interfere with the proper functioning of the dike.
- The dike shall be excavated or shaped to line, grade and cross section as required to meet the criteria specified herein and be free of bark projections or other irregularities which will impede normal flow.
- Fill shall be compacted by earth moving equipment.
- All earth removed and not needed for construction shall be placed so that it will not interfere with the functioning of the dike.
- Inspection and maintenance must be provided periodically and after each rain event.

**EARTH DIKE**

NOT TO SCALE

**TREE PROTECTION DETAIL**

NOT TO SCALE

**STABILIZED CONSTRUCTION ENTRANCE**

- Length - minimum of 50' (40' for single residence lot).
- Width - 10' minimum, shall be fitted at the existing road to provide a turning radius.
- Geotextile fabric (filter cloth) shall be placed over the existing ground prior to placing stone. \*\*The plan approval authority may not require single family residences to use geotextile.
- Stone - crushed aggregate 1/2" to 3/4" or reclaimed or recycled concrete equivalent shall be placed at least 6" deep over the length and width of the entrance.
- Surface Water - all surface water flowing to or diverted toward construction entrances shall be piped through the entrance, maintaining positive drainage. Pipe installed through the stabilized construction entrance shall be protected with a mountable berm with 5:1 slopes and a minimum of 6" of stone over the pipe. Pipe has to be sized according to the drainage. When the SCE is located at a high spot and has no drainage to convey pipe will not be necessary. Pipe should be sized according to the amount of runoff to be conveyed. A 6" minimum will be required. Location - a stabilized construction entrance shall be located at every point where construction traffic enters or leaves a construction site. Vehicles leaving the site must travel over the entire length of the stabilized construction entrance.

