STORMWATER MANAGEMENT COST ESTIMATE ALL COSTS GIVEN ARE COMPLETE IN PLACE QUANTITY DESCRIPTION UNIT COST TOTAL COST UNIT CLEARING & GRUBBING LS \$1000.00 | \$ 1000.00 EXCAVATION CY 120 300.00 2.50 **EMBANKMENT** CY 4.50 540.00 120 FENCING 410 2050.00 LF 5.00 1500.00 STRUCTURES 1500.00 ACCESS ROAD 520.00 520.00 AS-BUILTS SUB-TOTAL \$ 5910.00 10% CONTINGENCY TOTAL PROJECT COST 6500.00 STORM WATER POND DETAIL -TOP OF DAM = 1228.75 TOP OF DI-7= 1227.10 --✓ SPILLWAY = 1227.25 100 YR WSE = 1227.72 WIDTH OF DAM AT 100 YR WSE = 10.5' 25 YR WSE = 1227.232:1 SLOPE 10 YR WSE = 1226.39 36" CONC. RISER W/20" ORIFICE INV = 1220.50 RIP-RAP LINING (D50=8")-

505050505050505050

SPILLWAY DESIGN

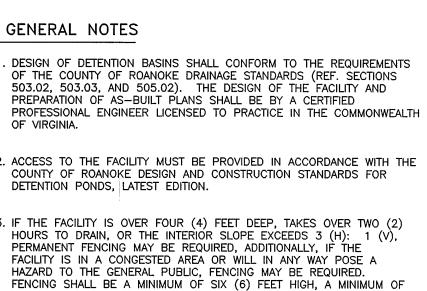
GEO TEXTILE-

WITH SEDIMENT

SPECIFIC APPLICATION

to adjacent structures and unprotected areas.

* Gravel shall be VDOT #3, #357 or #5 coarse aggregate.



STANDARD NINE GAUGE LINK FENCE, AND MUST HAVE ONE OR MORE LOCKING DOUBLE GATES (MINIMUM TEN FEET WIDE) FOR ACCESS.

. DETENTION PONDS SHALL BE BONDED IN ACCORDANCE WITH THE ROANOKE COUNTY BONDING POLICY FOR SUBDIVISION AND SITE DEVELOPMENT. A SEPARATE BOND FOR THE DETENTION FACILITY WILL BE REQUIRED AND ADMINISTERED APART FROM THE SUBDIVISION DEVELOPMENT BOND. REFERENCE ESTIMATE - THIS SHEET.

REFERENCE THE COUNTY OF ROANOKE DESIGN AND CONSTRUCTION STANDARDS FOR DETENTION PONDS, LATEST EDITION, FOR ACCEPTANCE AND MAINTENANCE OF THE FACILITY. CERTIFIED AS-BUILTS ARE REQUIRED AND MUST INCLUDE:

- A. DIMENSIONS OF THE FACILITY B. VOLUME @ MAXIMUM DEPTH
- C. ELEVATIONS OF STRUCTURES, SPILLWAYS, AND TOP
- D. MATERIALS VERIFICATION INCLUDING RESULTS OF DENSITY TESTS CONDUCTED BY AN INDEPENDENT SOIL TESTING LABORATORY E. LOCATION AND ELEVATION OF BENCHMARK.
- 6. ONE FOOT MINIMUM FREEBOARD REQUIRED FOR THE 100 YR WATER SURFACE ELEVATION.

CONSTRUCTION NOTES

ROANOKE DESIGN AND CONSTRUCTION STANDARDS FOR DETENTION PONDS,

2 ACRES OR LESS OF DRAINAGE AREA:

(DOWNSTREAM VIEW)

FILTER CLOTH ·

(OPTIONAL)

COARSE AGGREGATE

SPECIFIC APPLICATION

inconvenience or damage to adjacent structures and unprotected areas.

* Gravel shall be VDOT #3, #357 or 5

This method of inlet protection is applicable at curb inlets where ponding in front of the structure is not likely to cause

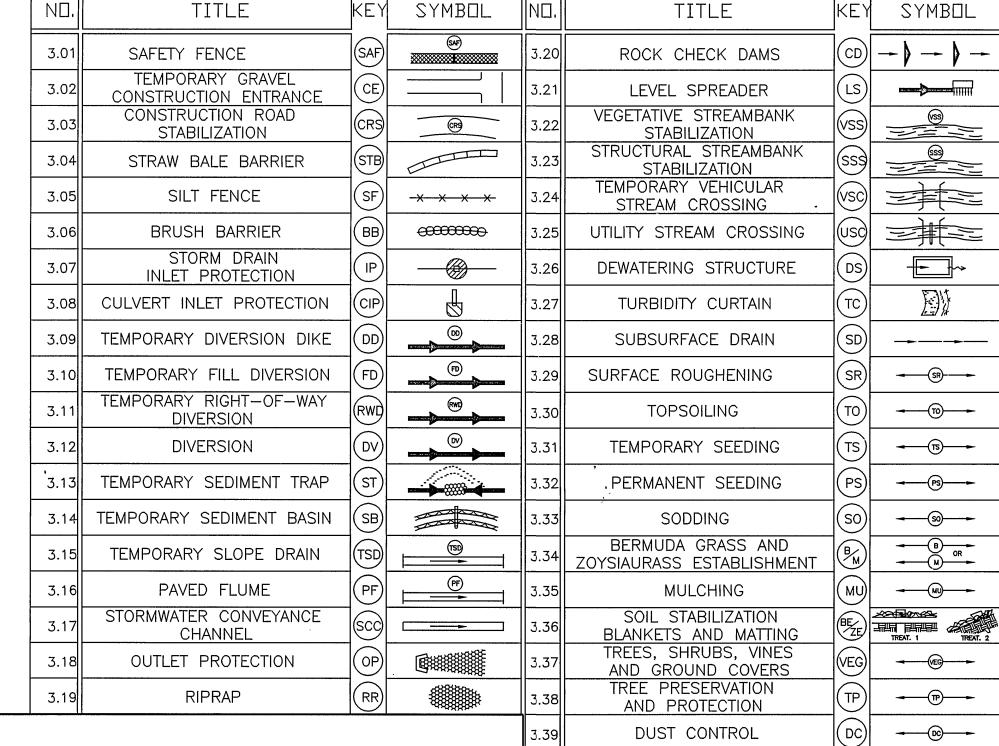
SEDIMENT-LADEN RUNOFF

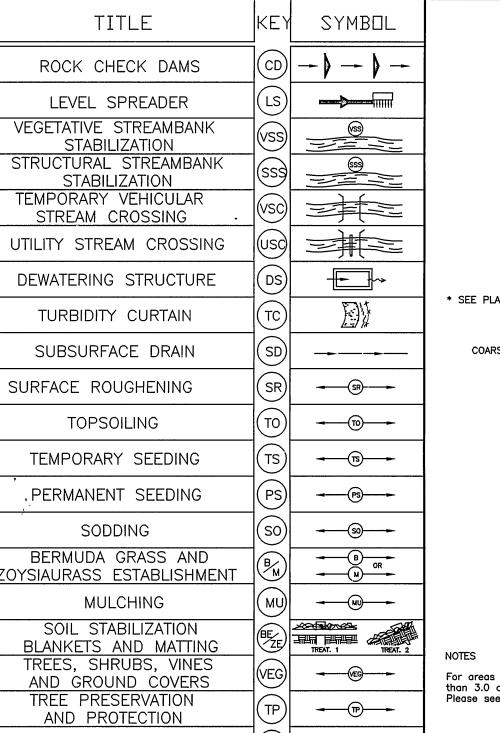
STORM WATER WITH LARGER PARTICLES REMOVED

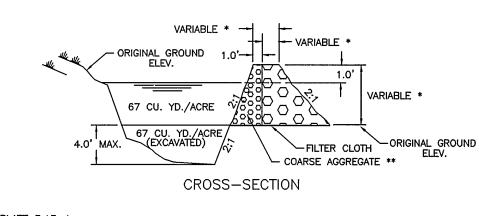
- 2. SLOPES STEEPER THAN 3 TO 1 (HORIZONTAL TO VERTICAL) SHALL BE BENCHED OR STEPPED PRIOR TO PLACING FILL ON THEM.
- 3. ON-SITE FILL MATERIAL OR BORROW FILL MATERIAL MAY BE UTILIZED. FILL MATERIAL SOILS, IN GENERAL:
- SHALL BE WITHIN AN ACCEPTABLE RANGE OF MOISTURE CONTENT WHICH IS READILY CONTROLLED
- 4. FILL MATERIALS CONTAINING ROCKS LARGER THAN SIX (6) INCHES (15.2 CM) SHALL NOT BE USED. THE UPPERMOST TWO (2) FEET (61 CM) SHALL NOT HAVE ANY ROCK LARGER THAN TWO (2) INCHES (5.1

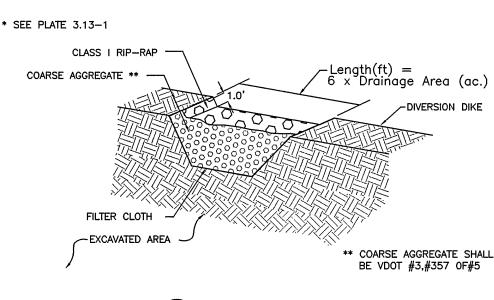
(SHRINKAGE OR SWELL) OR SETTLEMENT

- 5. THE APPROVED FILL SHALL BE PLACED IN EIGHT (8) INCH (20 CM) LOOSE LIFTS. EACH LIFT SHALL BE SPREAD IN UNIFORM LAYERS. FILL SOIL SHALL BE UTILIZED ONLY WITHIN A MOISTURE RANGE OF +/- 5% OF THE OPTIMUM MOISTURE CONTENT. COMPACTION OF THE FILL SHALL BE PERFORMED WITH APPROVED EQUIPMENT. COMPACTION
- 6. EMBANKMENT MATERIAL IN FILL AREAS SHALL BE PLACED IN LIFTS NOT EXCEEDING EIGHT (8) INCHES AND SHALL BE COMPACTED TO A MINIMUM 95% DENSITY IN ACCORDANCE WITH SECTION 303 OF THE VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS.
- 7. FIELD DENSITY TESTS ARE TO BE CONDUCTED BY AN INDEPENDENT SOILS TESTING LABORATORY UNDER THE DIRECTION OF A QUALIFIED GEOTECHNICAL ENGINEER. THE RESULTS OF THESE TESTS SHALL BE SUBMITTED TO THE COUNTY OF ROANOKE WITH AS-BUILT PLANS AS A CONDITION OF ACCEPTANCE OF THE FACILITY BY THE COUNTY. FIELD DENSITY TESTS, AS DIRECTED BY THE ENGINEER SHALL BE PERFORMED PERIODICALLY TO DETERMINE THE DEGREE OF COMPACTION. ANY AREAS FAILING TO MEET THE ABOVE REQUIREMENTS SHALL BE REWORKED AND/OR RECOMPACTED UNTIL THE REQUIRED DEGREE OF COMPACTION IS
- REQUIREMENTS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.
- 9. ALL DISTURBED AREAS SHALL BE COVERED WITH FOUR (4) INCHES OF TOPSOIL AND SEEDED.
- 10.THE MINIMUM SLOPE OF THE BASIN "FLOOR SHALL BE ONE (1) PERCENT









(ST) SEDIMENT TRAP

For areas less than 3.0 acres. For areas larger than 3.0 acres, A SEDIMENT TRAP, is required Please see Va' ESC manual for design.

EROSION-SILTATION CONTROL COST ESTIMATE

ALL COSTS GIVEN ARE COMPLETE IN PLACE

DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
CONSTRUCTION ENTRANCE	EA		\$	\$
SILT FENCE	LF	1500	3.50	5250
INLET PROTECTION	EA			
TEMPORARY DIVERSION DIKE	LF			
TEMPORARY FILL DIVERSION	LF			
SEDIMENT TRAP	EA			
CHECK DAM	EA			
PERMANENT SEEDING	1000 SF	30	30.00	900.00
OUTLET PROTECTION	EA	1	350	350
SEDIMENT BASIN	EA			
SUB-TOTAL				\$ 6500
10% CONTINGENCY				\$ 650
TOTAL PROJECT COST				\$ 7150

- 1. SITE PREPARATION SHALL BE IN ACCORDANCE WITH THE COUNTY OF
- SHALL NOT BE HIGHLY SUSCEPTIBLE TO VOLUME CHANGE
- OF THE LAYERS SHALL BE CONTINUOUS AND UNIFORM.
- 8. ANTI-SEEP COLLARS SHALL BE INSTALLED IN ACCORDANCE WITH THE
- GRADED TO DRAIN TO THE PRINCIPAL SPILLWAY.

are desirable.

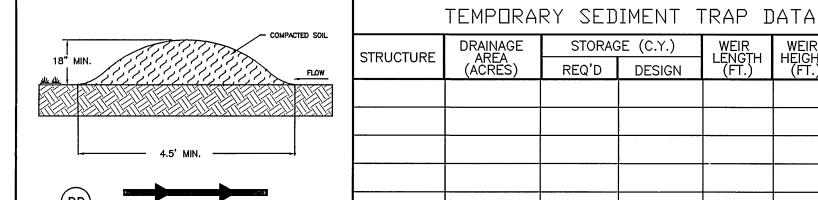
SPECIFIC APPLICATION

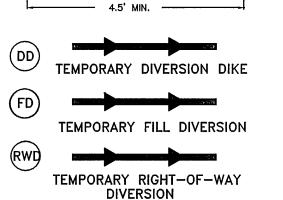
This method of inlet protection is applicable

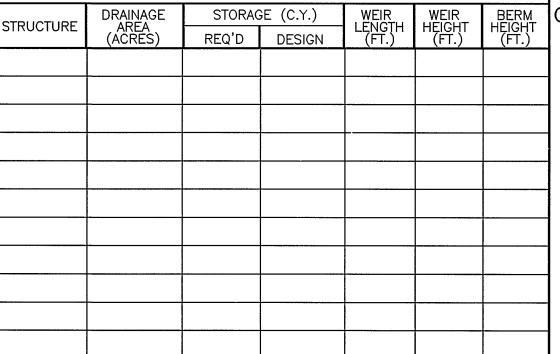
where heavy flows are expected and where

an overflow capability and ease of maintenance

GRAVEL (12"MIN. DEPTH)

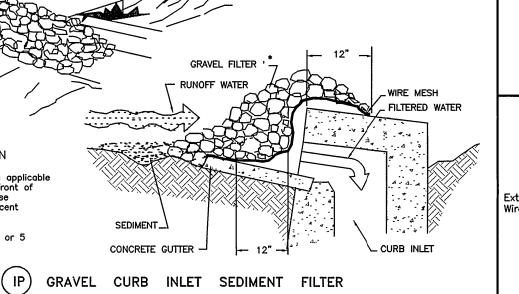






GENERAL EROSION AND SEDIMENT CONTROL NOTES

- I. ALL SOIL EROSION & SEDIMENT CONTROL MEASURES SHALL BE ACCOMPLISHED IN STRICT ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS CONTAINED IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.
- 2. THE APPROVING AUTHORITY MAY ADD TO, DELETE, RELOCATE, CHANGE, OR OTHERWISE MODIFY CERTAIN EROSION AND SEDIMENT CONTROL MEASURES WHERE FIELD CONDITIONS ARE ENCOUNTERED THAT WARRANT SUCH MODIFICATIONS.
- ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES AS SHOWN ON THE PLAN SHALL BE PLACED IN ADVANCE OF THE WORK BEING PERFORMED, AS FAR AS
- 4. IN NO CASE DURING CONSTRUCTION SHALL WATER RUNOFF BE DIVERTED OR ALLOWED TO FLOW TO LOCATIONS WHERE ADEQUATE PROTECTION HAS NOT BEEN
- 5. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LEAVE THE SITE ADEQUATELY PROTECTED AGAINST EROSION, SEDIMENTATION, OR ANY DAMAGE TO ANY ADJACENT PROPERTY AT THE END OF EACH DAY'S WORK.
- 5. FOR THE EROSION CONTROL KEY SYMBOLS SHOWN ON THE PLANS, REFER TO THE VIRGINIA UNIFORM CODING SYSTEM FOR EROSION AND SEDIMENT CONTROL PRACTICES CONTAINED IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION. THESE SYMBOLS AND KEYS ARE TO BE UTILIZED ON ALL EROSION CONTROL PLANS SUBMITTED TO ROANOKE COUNTY.



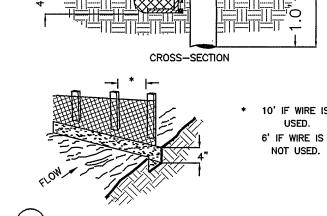
2-10 ACRES OF DRAINAGE AREA:

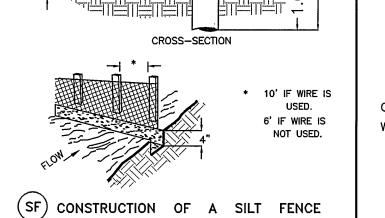
FILTER CLOTH

(OPTIONAL)

(CD) ROCK CHECK DAM

COARSE AGGREGATE



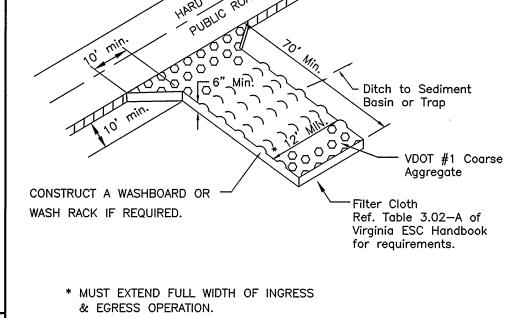


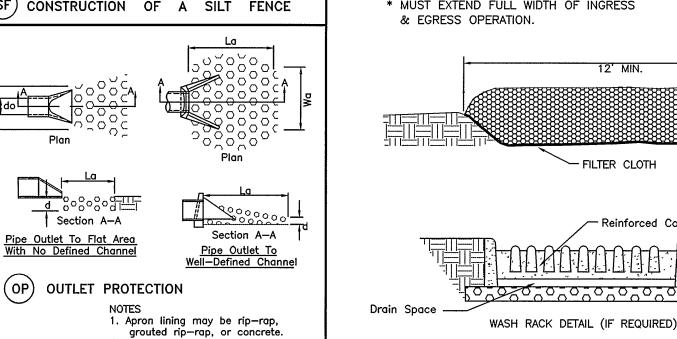
2. La is the length of the rip-

3. d = 1.5 times the maximum

rap apron as calculated using plates 1.36d and 1.36e.

stone diameter, but not less







TYPE B (SLOPES 3:1 OR STEEPER) CROWN VETCH @ 1/2 LB / 1000 SF PERENNIAL RYEGRASS @ 1/2 LB / 1000 SF K-31 FESCUE @ 5 LB / 1000 SF BORZY WINTER RYE @ 1/2 LB / 1000 S RED TOP @ 1/8 LB / 1000 SF 1 FEBRUARY TO 1 JUNE K-31 FESCUE @ 5 LB / 1000 SF 15 AUGUST TO 1 OCTOBER ANNUAL RYE @ 1/2 LB / 1000 SF CROWN VETCH @ 1/2 LB / 1000 SF PERENNIAL RYEGRASS @ 1/2 LB / 1000 SF RED TOP @ 1/8 LB / 1000 SF

K-31 FESCUE @ 5 LB / 1000 SF GERMAN MILLET @ 1/2 LB / 1000 SF 1 SEPTEMBER TO 15 OCTOBER K-31 FESCUE @ 5 LB / 1000 SF ANNUAL RYE @ 1/2 LB / 1000 SF

JUNE TO 1 SEPTEMBER

140 LB / 1000 SF PULVERIZED AGRICULTURAL LIMESTONE

IF REQUIRED, SHALL BE USED OVER ALL SEEDED AREAS AND SHALL BE APPLIED IN ACCORDANCE WITH SECTION 1.75 OF THE VIRGINIA EROSION MULCH:

AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION. SOIL CONDITIONING: INCORPORATION OF LIME AND FERTILIZER, SELECTION OF CERTIFIED SEED, MULCHING, MAINTENANCE OF NEW SEEDLINGS, AND RESEEDING SHALL BE IN ACCORDANCE WITH SPECIFICATIONS CONTAINED WITHIN THE VIRGINIA SOIL EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION. ADDITIONAL SEEDING TO BE PERFORMED AS REQUIRED

BY THE INSPECTOR. SEED APPLICATION: APPLY SEED UNIFORMLY WITH A CYCLONE SEEDER, DRILL, CULTIPACKER SEEDER, OR HYDROSEEDER ON A FIRM, FRIABLE, SEEDBED. MAXIMUM SEEDING DEPTH SHALL BE 1/4 INCH.

WVWA ID# 6PUQAN

TOTAL DISTURBED AREA = 1.23 AC. = 54,000 SQ. FT.

DEPARTMENT ENGINEERING AND INSPECTIONS

This method of inlet protection is applicable where heavy concentrated flows are expected, but not where ponding around the structure might cause excessive inconvenience or damage

(IP) GRAVEL AND WIRE MESH DROP INLET SEDIMENT FILTER

1	ENGR. & INSPEC.	04-10-93
2	ENGR. & INSPEC.	08-05-93
3	ENGR. & INSPEC.	10-27-93
4		
5		
6		
ΝО.	REVISIONS	DATE
~	and a constant and a constant and a constant	

COUNTY OF ROANOKE

EXCAVATED DROP INLET SEDIMENT TRAP

LARGER PARTICLES

DATE: 11/02/93 SCALE: NO SCALE (G:\CAD\DETAILS\EROS) DRAWING BY: CLN,AF DESIGNED BY: APPROVED BY: GWS,III

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE

> BEAR ROCK SUBDIVISION **EROSION & SEDIMENT CONTROL** STORMWATER MANAGEMENT DETAILS

5 OF 6