

ALL COSTS GIVEN ARE COMPLETE IN PLACE				
DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
CLEARING & GRUBBING	LS		\$	\$
EXCAVATION	CY			
EMBANKMENT	CY			
FENCING	LF			
STRUCTURES				
ACCESS ROAD				
AS-BUILTS				
SUB-TOTAL				\$
10% CONTINGENCY				\$
TOTAL PROJECT COST				\$

WATER

SPECIFIC APPLICATION

This method of inlet protection is applicable where heavy concentrated flows or but not where ponding around the structure might cause excessive inconvenience to adjacent structures and unprotected areas.

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

IP GRAVEL AND WIRE MESH DROP INLET SEDIMENT F

1. DESIGN OF DETENTION BASINS SHALL CONFORM TO THE REQUIREMENTS OF THE COUNTY OF ROCKAIDE DRAINAGE STANDARDS (REF. SECTIONS 503.02, 503.03, AND 505.02). THE DESIGN OF THE FACILITY AND PREPARATION OF AS-BUILT PLANS SHALL BE BY A CERTIFIED PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE COMMONWEALTH OF VIRGINIA.
2. ACCESS TO THE FACILITY MUST BE PROVIDED IN ACCORDANCE WITH THE COUNTY OF ROCKAIDE DESIGN AND CONSTRUCTION STANDARDS FOR DETENTION PONDS, LATEST EDITION.
3. IF THE FACILITY IS OVER FOUR (4) FEET DEEP, TAKES OVER TWO (2) HOURS TO DRAIN, OR THE INTERIOR SLOPE EXCEEDS 3 (H): 1 (V), A PERMANENT FENCING MAY BE REQUIRED. ADDITIONALLY IF THE FACILITY IS IN A CONGESTED AREA OR WILL IN ANY WAY POSE A HAZARD TO THE GENERAL PUBLIC, FENCING MAY BE REQUIRED. FENCING SHALL BE A MINIMUM OF SIX (6) FEET HIGH, A MINIMUM OF STANDARD NINE GAUGE LINK FENCE, AND MUST HAVE ONE OR MORE LOCKING DOUBLE GATES (MINIMUM TEN FEET WIDE) FOR ACCESS.
4. DETENTION PONDS SHALL BE BONDED IN ACCORDANCE WITH THE ROCKAIDE COUNTY BONDING POLICY FOR SUBDIVISION AND SITE DEVELOPMENT. A SEPARATE BOND FOR DETENTION FACILITY WILL BE REQUIRED AND ADMINISTERED APART FROM THE SUBDIVISION DEVELOPMENT BOND. REFERENCE ESTIMATE -- THIS SHEET.
5. REFERENCE THE COUNTY OF ROCKAIDE DESIGN AND CONSTRUCTION STANDARDS FOR DETENTION PONDS, LATEST EDITION, FOR ACCEPTANCE AND MAINTENANCE OF THE FACILITY. 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 A QUALIFIED SOIL TESTING LABORATORY
 - E. LOCATION AND ELEVATION OF BENCHMARK.
6. ONE FOOT MINIMUM FREEBOARD REQUIRED FOR THE 100 YR WATER SURFACE ELEVATION.

1. SITE PREPARATION SHALL BE IN ACCORDANCE WITH THE COUNTY OF RANCHO DEQUEEN SPECIFIC AND CONSTRUCTION STANDARDS FOR DETENTION PONDS, LATEST EDITION.
2. SLOPES STEEPER THAN 3 TO 1 (HORIZONTAL TO VERTICAL) SHALL BE BENCH 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:
 - A. SHALL BE COMPACTABLE
 - B. SHALL BE WITHIN AN ACCEPTABLE RANGE OF MOISTURE CONTENT WHICH IS READY TO COMPACT
 - C. SHALL NOT BE HIGHLY SUSCEPTIBLE TO VOLUME CHANGE (SHRINKAGE OR SWELL) OR SETTLEMENT
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 CM) IN DIAMETER.
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 $\pm 5\%$ OF THE OPTIMUM MOISTURE CONTENT. COMPACTION OF THE FILL SHALL BE PERFORMED WITH APPROVED EQUIPMENT. COMPACTION OF THE LAYERS SHALL BE CONTINUOUS AND UNIFORM.
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 RANCHOQUEEN 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 ACHIEVED.
8. ANTI-SLEEP COLLARS SHALL BE INSTALLED IN ACCORDANCE WITH THE 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 SEED.
10. THE MINIMUM SLOPE OF THE BASIN "FLOOR SHALL BE ONE (1) PERCENT GRADED TO DRAIN TO THE PRACTICAL SPILLWAY.

This method of inlet protection is applicable where heavy flows are expected and where an overflow capability and ease of maintenance are desirable.

NO.	TITLE	KEY	SYMBOL	NO.	TITLE	KEY	SYMBOL
3.01	SAFETY FENCE	(SAF)		3.20	ROCK CHECK DAMS	(CD)	
3.02	TEMPORARY GRAVEL CONSTRUCTION ENTRANCE	(CE)		3.21	LEVEL SPREADER	(LS)	
3.03	CONSTRUCTION ROAD STABILIZATION	(CRS)		3.22	VEGETATIVE STREAMBANK STABILIZATION	(VSS)	
3.04	STRAW BALE BARRIER	(STB)		3.23	STRUCTURAL STREAMBANK STABILIZATION	(SSS)	
3.05	SILT FENCE	(SF)		3.24	TEMPORARY VEHICULAR STREAM CROSSING	(VSC)	
3.06	BRUSH BARRIER	(BB)		3.25	UTILITY STREAM CROSSING	(USC)	
3.07	STORM DRAIN INLET PROTECTION	(IP)		3.26	DEWATERING STRUCTURE	(DS)	
3.08	CULVERT INLET PROTECTION	(CIP)		3.27	TURBIDITY CURTAIN	(TC)	
3.09	TEMPORARY DIVERSION DIKE	(DD)		3.28	SUBSURFACE DRAIN	(SD)	
3.10	TEMPORARY FILL DIVERSION	(FD)		3.29	SURFACE ROUGHENING	(SR)	
3.11	TEMPORARY RIGHT-OF-WAY DIVERSION	(RWD)		3.30	TOPSOILING	(TO)	
3.12	DIVERSION	(DV)		3.31	TEMPORARY SEEDING	(TS)	
3.13	TEMPORARY SEDIMENT TRAP	(ST)		3.32	PERMANENT SEEDING	(PS)	
3.14	TEMPORARY SEDIMENT BASIN	(SB)		3.33	SODDING	(SO)	
3.15	TEMPORARY SLOPE DRAIN	(TSD)		3.34	BERMUDA GRASS AND ZOYSIAURASS ESTABLISHMENT	(ZM)	
3.16	PAVED FLUME	(PF)		3.35	MULCHING	(MU)	
3.17	STORMWATER CONVEYANCE CHANNEL	(SCC)		3.36	SOIL STABILIZATION BLANKETS AND MATTING	(SE, ZF)	
3.18	OUTLET PROTECTION	(OP)		3.37	TREES, SHRUBS, VINES AND GROUND COVERS	(VEG)	
3.19	RIPRAP	(RR)		3.38	TREE PRESERVATION AND PROTECTION	(TP)	
				3.39	DUST CONTROL	(DC)	

Figure 10-10 illustrates the design of a rock check dam. The top-left diagram shows a cross-section of the dam with a 3' height, a 6' crest width, and a 2:1 slope. It includes a filter cloth (optional) and coarse aggregate. The top-right diagram shows a downstream view of the dam with a 3' height, a 6' crest width, and a 2:1 slope. It includes a filter cloth (optional) and coarse aggregate. The bottom-left diagram shows a cross-section of the dam with a 3' height, a 6' crest width, and a 2:1 slope. It includes a filter cloth (optional) and coarse aggregate. The bottom-right diagram shows a downstream view of the dam with a 3' height, a 6' crest width, and a 2:1 slope. It includes a filter cloth (optional) and coarse aggregate. The diagrams are labeled with 'FLOW' and 'CD'.

SPECIFIC APPLICATION

This method of inlet protection is applicable at curb inlets where ponding in front of the structure is not likely to cause inconvenience or damage to adjacent structures and unprotected areas.

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

The diagram illustrates a curb inlet with a gravel filter and wire mesh. Labels include: GRAVEL FILTER, RUNOFF WATER, 12", WIRE MESH, FILTERED WATER, SEDIMENT, CONCRETE GUTTER, 12", CURB INLET, and GRAVEL CURB INLET SEDIMENT FILTER.

able
re
tenance

SEDIMENT-LADEN RUNOFF

AS REQUIRED

DEPTH BELOW TOP OF INLET:
MIN. 1' - MAX. 2'

MAX. SLOPE 2:1

DEEP HOLES FOR DEWATERING

LARGER PARTICLES WILL SETTLE

STORM WATER WITH LARGER PARTICLES REMOVED

DRAIN INLET

(IP) EXCAVATED DROP INLET SEDIMENT TRAP

(IP) EXCAVATED DROP INLET SEDIMENT TRAP

TITLE	KEY	SYMBOL
WATER CHECK DAMS	(CD)	
WHEEL SPREADER	(LS)	
ARTIFICIAL STREAMBANK STABILIZATION	(VSS)	
NATURAL STREAMBANK STABILIZATION	(SSS)	
PERMANENT VEHICULAR STREAM CROSSING	(VSC)	
TEMPORARY STREAM CROSSING	(JSC)	
SEEDING STRUCTURE	(DS)	
ERODIBILITY CURTAIN	(TC)	
SURFACE DRAIN	(SD)	
SOIL ROUGHENING	(SR)	
TOPSOILING	(TO)	
PERMANENT SEEDING	(TS)	
TEMPORARY SEEDING	(PS)	
HYDRO SEEDING	(SO)	
HYDRO SEEDING	(B/M)	
HYDRO SEEDING	(MU)	
HYDRO SEEDING	(SE)	
HYDRO SEEDING	(VEG)	
HYDRO SEEDING	(TP)	
HYDRO SEEDING	(DC)	

Diagram illustrating the four types of diversion structures:

- DD** (Temporary Diversion Dike): A dike structure with a height of 15' MIN. and a width of 4.5' MIN.
- FD** (Temporary Fill Diversion): A fill structure with a width of 4.5' MIN.
- RWI** (Temporary Right-of-Way Diversion): A structure with a width of 4.5' MIN.
- DV** (Diversion): A structure with a width of 4.5' MIN.

The diagram also shows a cross-section of a riverbed with a compacted soil layer and a flow direction indicated by an arrow labeled "FLOW".

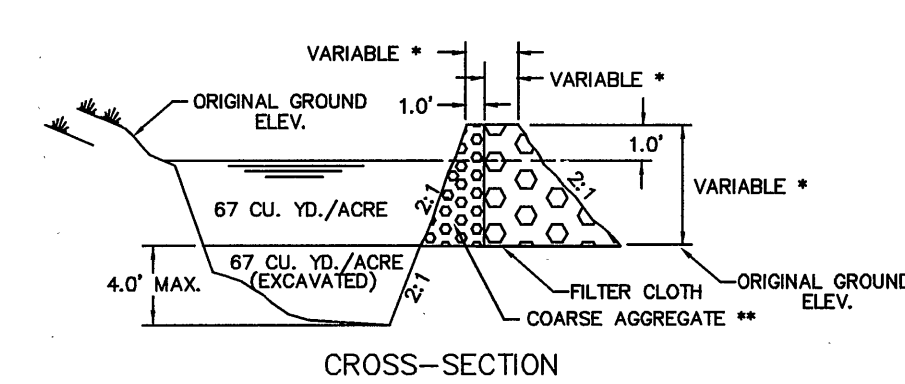
OP OUTLET PROTECTION

NOTES

1. Apron lining may be rip-rap, grouted rip-rap, or concrete.
2. L_o is the length of rip-rap apron as calculated using plates 1.36d and 1.70d.
3. $d = 1.5$ times the maximum stone diameter, but not less than 6".

NOTES

1. Apron lining may be rip-rap, grouted rip-rap, or concrete.
2. L_a is the length of the rip-rap apron as calculated using plates 1.36d and 1.36e.
3. $d = 1.5$ times the maximum stone diameter, but not less than 6".



• SEE PLATE 3.13-1

CLASS I RIP-RAP

COARSE AGGREGATE **

Length(ft) = $\frac{6 \times \text{Drainage Area (ac.)}}{100}$

DIVERSION DIKE

0'

FILTER CLOTH

EXCAVATED AREA

** COARSE AGGREGATE SHALL BE VDOT #3, #57, 0" #5

(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.

[illegible]

ALL COSTS GIVEN ARE COMPLETE IN PLACE				
DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
CONSTRUCTION ENTRANCE	EA	1	\$ 1,200.00	\$ 1,200.00
SILT FENCE	LF	1000	3.00	3,000.00
INLET PROTECTION	EA	1	150.00	150.00
CULVERT INLET PROTECTION	EA	2	250.00	500.00
DIVERSION DIKE/SCC	LF	750	3.00	2,250.00
TEMPORARY ROW DIVERSION	LF	90	3.00	270.00
SEDIMENT TRAP	EA	1	1,500.00	1,500.00
SEDIMENT BASIN	EA	2	2,500.00	5,000.00
CHECK DAM	EA	14	250.00	3,500.00
PERMANENT SEEDING	AC	5.6	1,000.00	5,600.00
TEMPORARY SEEDING	AC	5.6	500.00	2,800.00
MULCHING	AC	5.6	250.00	1,400.00
RIP-RAP	CY	15.4	50.00	770.00
BLANKET MATTING	SY	5,680	1.50	8,520.00
SUB-TOTAL				\$ 36,400.00
10% CONTINGENCY				\$ 3,600.00
TOTAL PROJECT COST				\$ 40,000.00

1. 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.
3. 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 PRACTICAL.
4. IN NO CASE DURING CONSTRUCTION SHALL WATER RUNOFF BE DIVERTED OR ALLOWED TO FLOW TO LOCATIONS WHERE ADEQUATE PROTECTION HAS NOT BEEN PROVIDED.
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.
6. 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 SHALL BE UTILIZED ON ALL EROSION CONTROL PLANS SUBMITTED TO ROANOKE COUNTY.

TYPE A	TYPE B (SLOPES 3:1 OR STEEPER)
15 OCTOBER TO 1 FEBRUARY K-31 FESCUE @ 5 LB / 1000 SF BORZY WINTER RYE @ 1/2 LB / 1000 SF	15 MARCH TO 1 MAY GROWN VETCH @ 1/2 LB / 1000 SF PERENNIAL RYEGRASS @ 1/2 LB / 1000 SF RED TOP @ 1/8 LB / 1000 SF
1 FEBRUARY TO 1 JUNE K-31 FESCUE @ 5 LB / 1000 SF ANNUAL RYE @ 1/2 LB / 1000 SF	15 AUGUST TO 1 OCTOBER GROWN VETCH @ 1/2 LB / 1000 SF PERENNIAL RYEGRASS @ 1/2 LB / 1000 SF RED TOP @ 1/8 LB / 1000 SF
1 JUNE TO 1 SEPTEMBER 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	
LIME: 140 LB / 1000 SF FULVERIZED AGRICULTURAL LIMESTONE	
FERTILIZER: 5-20-10 @ 25 LB / 1000 SF 38-0-0 @ 7 LB / 1000 SF	
MULCH: IF REQUIRED, SHALL BE USED OVER ALL SEEDED AREAS AND SHALL BE APPLIED IN ACCORDANCE WITH SECTION 1.75 OF THE VIRGINIA EROSION 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, LIME/FASTER SEEDER, OR HYDROSEEDER ON A FIRM, FRAGILE, SEEDBED. MAXIMUM SEEDING DEPTH SHALL BE 1/4 INCH.	
TOTAL DISTURBED AREA = 6.1 AC. = 266,500 SQ. FT.	

1	ENGR. & INSPEC.	04-10-93
2	ENGR. & INSPEC.	08-05-93
3	ENGR. & INSPEC.	10-27-93
4		
5		
6		
NO.	REVISIONS	DATE

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

SHEET
9 OF 11