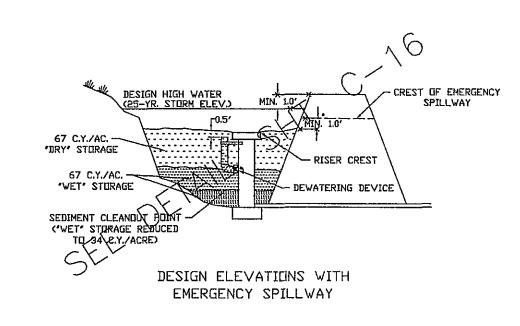
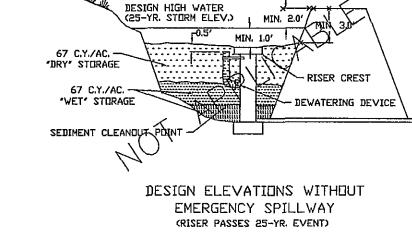
## STORMWATER MANAGEMENT COST ESTIMATE ALL COSTS GIVEN ARE COMPLETE IN PLACE DESCRIPTION QUANTITY UNIT COST TOTAL CAS LS CLEARING & GRUBBING EXCAVATION EMBANKMENT FENCING STRUCTURES ACCESS ROAD AS-BUILTS SUB-TOTAL 10% CONTINDENCY ΧΏΤΑL PROJECT COST

## SEDIMENT BASIN SCHEMATIC **ELEVATIONS**





SPECIFIC APPLICATION

to adjacent structures and unprotected areas.

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

## GENERAL NOTES

- DESIGN OF DETENTION BASINS SHALL CONFORM TO THE REQUIREMENTS OF THE COUNTY OF ROANDKE 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
- ACCESS TO THE FACILITY MUST BE PROVIDED IN ACCORDANCE WITH THE COUNTY OF ROANDKE 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), 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 DNE DR MORE LOCKING DOUBLE GATES (MINIMUM TEN FEET WIDE) FOR ACCESS.
- . DETENTION PONDS SHALL BE BONDED IN ACCORDANCE WITH THE ROANDKE 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.
- 5. REFERENCE THE COUNTY OF ROANOKE DESIGN AND CONSTRUCTION STANDARDS FOR DETENTION PUNDS, 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
- MATERIALS VERIFICATION INCLUDING RESULTS OF DENSITY TESTS CONDUCTED BY AN INDEPENDENT SOIL TESTING LABORATORY
- E. LOCATION AND ELEVATION OF BENCHMARK.
- 6. DNE FOOT MINIMUM FREEBOARD REQUIRED FOR THE 100 YR WATER SURFACE ELEVATION

# CONSTRUCTION NOTES

- . SITE PREPARATION SHALL BE IN ACCORDANCE WITH THE COUNTY OF RDANDKE DESIGN AND CONSTRUCTION STANDARDS FOR DETENTION PONDS,
- 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 SDILS, IN GENERAL
- SHALL BE COMPACTABLE SHALL BE WITHIN AN ACCEPTABLE RANGE OF MOISTURE CONTENT WHICH IS READILY CONTROLLED C. SHALL NOT BE HIGHLY SUSCEPTIBLE TO VOLUME CHANGE

(SHRINKAGE OR SWELL) OR SETTLEMENT

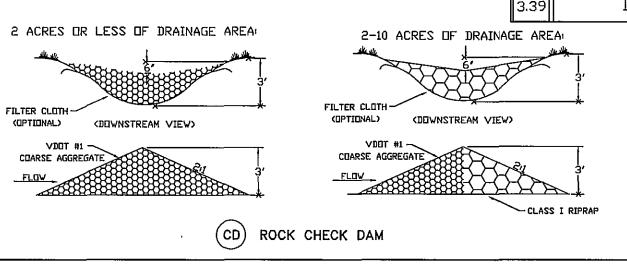
- 4. FILL MATERIALS CONTAINING ROCKS LARGER THAN SIX (6) INCHES (15.2 CM) SHALL NOT BE USED. THE UPPERMOST TWO (2) FEET (6) CM) SHALL NUT HAVE ANY RUCK LARGER THAN TWO (2) INCHES (5.1 CM> IN DIAMETER.
- 5. THE APPROVED FILL SHALL BE PLACED IN EIGHT (8) INCH (20 CM) LOUSE LIFTS. EACH LIFT SHALL BE SPREAD IN UNIFORM LAYERS. FILL SOIL SHALL BE UTILIZED ONLY WITHIN A MOISTURE RANGE +/- 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 SDILS 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
- 8. ANTI-SEEP CULLARS SHALL BE INSTALLED IN ACCURDANCE 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 SEEDED.
- 10. THE MINIMUM SLOPE OF THE BASIN 'FLOOR SHALL BE ONE (1) PERCENT GRADED TO DRAIN TO THE PRINCIPAL SPILLWAY.

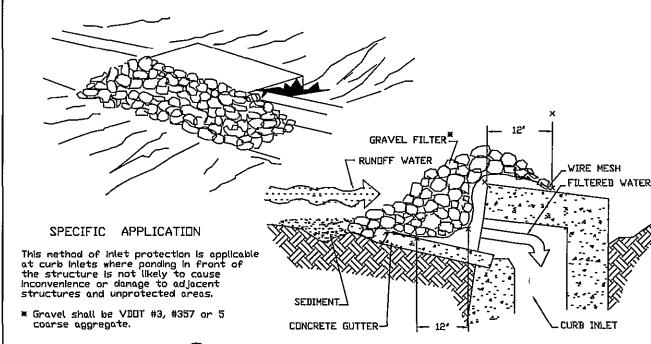
are desirable.

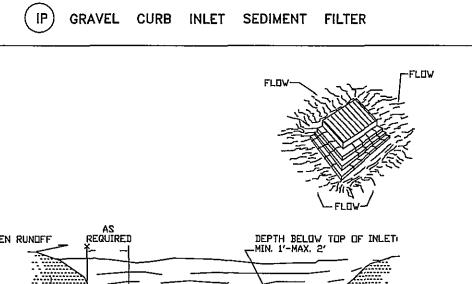
SPECIFIC APPLICATION

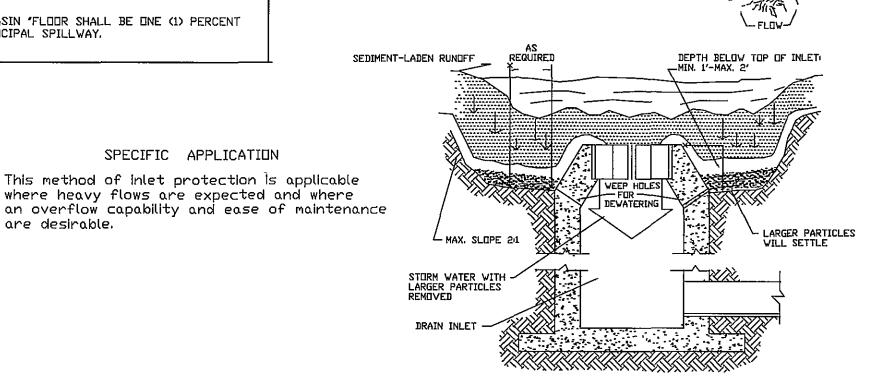
This method of inlet protection is applicable where heavy flows are expected and where

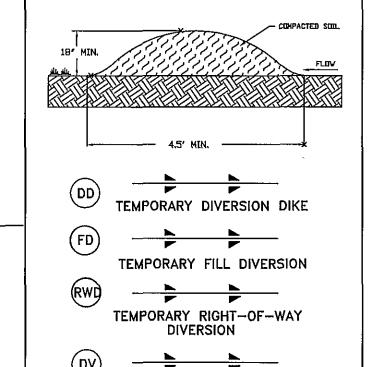
#### SYMBOL SYMBUL TITLE TITLE <del>-</del> 3.01 SAFETY FENCE ROCK CHECK DAMS TEMPORARY GRAVEL LEVEL SPREADER 3.02 CONSTRUCTION ENTRANCE CONSTRUCTION ROAD VEGETATIVE STREAMBANK 3.03 STABILIZATION STABILIZATION TRUCTURAL STREAMBANK 3,04 STRAW BALE BARRIER STABILIZATION FEMPORARY VEHICULAR 3.05 SILT FENCE STREAM CROSSING BRUSH BARRIER <del>600000000</del> UTILITY STREAM CROSSING STORM DRAIN 3,07 DEWATERING STRUCTURE INLET PROTECTION 3,08 CULVERT INLET PROTECTION(C TURBIDITY CURTAIN TEMPORARY DIVERSION DIKE (DI SUBSURFACE DRAIN ----(SR)-----TEMPURARY FILL DIVERSION(F SURFACE ROUGHENING TEMPORARY RIGHT-OF-WAY € <del>-</del>(11)<del>---</del> TOPSOILING DIVERSION ----(TS)-----TEMPORARY SEEDING 3.12 DIVERSION ----PS-----TEMPORARY SEDIMENT TRAP PERMANENT SEEDING TEMPORARY SEDIMENT BASIN (S: SODDING BERMUDA GRASS AND TEMPORARY SLOPE DRAIN ZOYSIAURASS ESTABLISHMEN **→** PAVED FLUME MULCHING 3.16 STORMWATER CONVEYANCE SOIL STABILIZATION BLANKETS AND MATTING CHANNEL TREES, SHRUBS, VINES **←** OUTLET PROTECTION AND GROUND COVERS TREE PRESERVATION <del>----</del>(TP)----RIPRAP AND PROTECTION DUST CONTROL











CROSS-SECTION

(SF) CONSTRUCTION OF A SILT FENCE

Section A-A

(OP) OUTLET PROTECTION

**#** 10' IF WIRE IS

USED.

6' IF WIRE IS

Section A-A <u>Pipe Outlet</u> To <u>Well-Defined Chan</u>nel

Apron lining may be rip-rap, grouted rip-rap, or concrete.
 La is the length of the rip-rap apron as calculated using

stone diameter, but not less

plates 1.36d and 1.36e.

3. d = 1.5 times the maximum

GENERAL EROSION AND SEDIMENT CONTROL NOTES

ES-1: 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 AND VIRGINIA REGULATIONS VR 625-02-00 EROSION AND SEDIMENT CONTROL

ES-2: THE PLAN APPROVING AUTHORITY MUST BE NOTIFIED ONE WEEK PRIOR TO THE PRE- CONSTRUCTION CONFERENCE, ONE WEEK PRIOR TO THE COMMENCEMENT OF LAND DISTURBING ACTIVITY, AND ONE WEEK PRIOR TO THE FINAL INSPECTION.

ES-3: ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN CLEARING.

ES-4: A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN SHALL BE MAINTAINED ON THE SITE AT ALL TIMES.

ES-5: PRIOR TO ISSUANCE OF A LAND DISTURBANCE PERMIT BY ROANOKE COUNTY, THE OWNER SHALL PROVIDE DOCUMENTATION OF AN EXISTING LAND DISTURBING PERMIT(S) THAT WOULD BE ASSOCIATED OR REQUIRED FOR ANY OFF-SITE BORROW OR WASTE AREAS; WHETHER LOCATED WITHIN THE COUNTY LIMITS OR NOT.

ES-6: THE CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE PLAN APPROVING AUTHORITY.

ES-7: 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.

ES-8: DURING DEWATERING OPERATIONS, WATER WILL BE PUMPED INTO AN APPROVED FILTERING DEVICE.

ES-9: THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES PERIODICALLY AND AFTER EACH RUN-OFF PRODUCING RAINFALL EVENT. ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.

BAL-1: ALL ASPHALT AREAS WILL BE STABILIZED WITH BASE STONE WITHIN 30 DAYS OF FINAL GRADING.

BAL-2: PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN 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.

BAL-3: THE LOCAL APPROVING AUTHORITY AND OTHER INTERESTED AGENCIES SHALL MAKE A CONTINUING REVIEW AND EVALUATION OF THE METHODS USED FOR THE OVERALL EFFECTIVENESS OF THE EROSION CONTROL PROGRAM. AN APPROVED EROSION AND SEDIMENT CONTROL PLAN MAY BE AMMENDED BY THE APPROVING AUTHORITY OF ON SITE INSPECTION INDICATED THAT THE APPROVED CONTROL MEASURES ARE NOT EFFECTIVE IN CONTROLLING EROSION AND SEDIMENTATION OR IF BECAUSE OF CHANGED CIRCUMSTANCES, THE APPROVED PLAN CANNOT BE CARRIED OUT.

BAL-4: ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARDS. SPECIFICATIONS AND DETAILS OF THE LATEST EDITION OF THE VIRGINIA EROSION CONTROL HANDBOOK (THE HANDBOOK) BY THE VIRGINIA SOIL AND WATER CONSERVATION COMMISSION. EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE MAINTAINED SO THAT SEDIMENT CARRYING RUNOFF FROM THE SITE WILL NOT ENTER STORM DRAINAGE FACILITIES OR ADJOINING PROPERTIES AND RIGHTS-OF-WAY.

BAL-5: ALL CONSTRUCTION TRAFFIC SHALL ENTER AND EXIT THE SITE VIA THE CONSTRUCTION ENTRANCES.

#### EROSION-SILTATION CONTROL COST ESTIMATE

ITEM	QUANTIT	Y UNIT COST	TOTAL
SAFETY FENCE	200 LF	\$3.00 per LF	\$600.00
CONSTRUCTION ENTRANCE	1 EA	\$1,200.00 per EA	\$1,200.00
CONST. ROAD STABILIZATION	2460 LF	\$4.00 per LF	\$9,840.00
SILT FENCE	1840 LF	\$3.00 per LF	\$5,520.00
INLET PROTECTION	26 EA	\$150.00 per EA	\$3,900.00
CULVERT INLET PROTECTION	3 EA	\$250.00 per EA	\$750.00
TEMPORARY SEEDING	19.8 AC	\$500.00 per AC	\$9,900.00
DIVERSION	1970 LF	\$3.00 per LF	\$5,910.00
RIGHT-OF-WAY DIVERSION	65 LF	\$5.00 per LF	\$325.00
SEDIMENT BASIN	Lump Sum		\$15,000.00
RIP-RAP	4 EA	\$500.00 per CY	\$2,000.00
CHECK DAM	1 EA	\$250.00 per EA	\$250.00
TOPSOIL STOCKPILING	Lump Sum		\$2,500.00
TEMPORARY SEEDING	21.7 AC	\$500.00 per AC	\$10,850.00
PERMANENT SEEDING	21.7 AC	\$1,000.00 per AC	\$21,700.00
MULCHING	21.7 AC	\$250.00 per CY	\$5,425.00
SOIL STABILIZATION MATTING	1500 SY	\$1.50 per SY	\$2,250.00
DUST CONTROL	Lump Sum		\$1,500.00
		SUB-TOTAL	\$99,420.00
		10% CONTINGENCY	\$9,940.00

THIS ESTIMATE IS FOR BONDING PURPOSES ONLY. ACTUAL QUANTITIES AND COSTS MAY VARY, BASED ON ACTUAL FIELD CONDITIONS AND CURRENT ECONOMIC CONDITIONS.

PERMANENT SEEDING MIXTURE

15 OCTOBER TO 1 FEBRUARY

K-31 FESCUE @ 5 LB / 1000 SF

BORZY WINTER RYE @ 1/2 LB / 1000 SF

PERENNIAL RYEGRASS @ 1/2 LB / 1000 SF

140 LB / 1000, SK MULVERIZED 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 AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION,

LATEST EDITION. ADDITIONAL SEEDING TO BE PERFORMED AS REQUIRED

CULTIPACKER SEEDER, OR HYDROSEEDER ON A FIRM, FRIABLE, SEEDBED.

INCORPORATION OF LIME AND FERTILIZER, SELECTION OF CERTIFIED

SEED, MULCHING, MAINTENANCE OF NEW SEEDLINGS, AND RESEEDING SHALL BE IN ACCURDANCE WITH SPECIFICATIONS CONTAINED WITHIN

HE VIRGINIA SOIL EROSION AND SEDIMENT CONTROL HANDBOOK,

SEED APPLICATION: APPLY SEED UNIFORMLY WITH A CYCLONE SEEDER, DRILL,

MAXIMUM SEEDING DEPTH SHALL BE 1/4 INCH.

TYPE B (SLOPES 31 OR STEEPER)

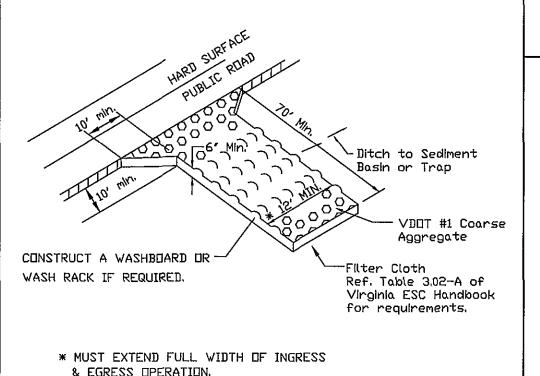
RED TOP @ 1/8 LB// 1000 SF

RÉD TOP / 1/8 LB / 1000 SF

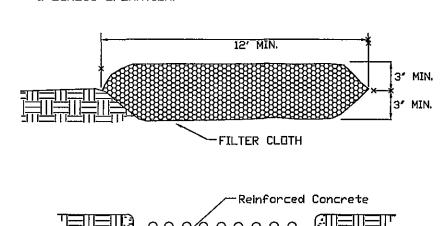
CROWN VETCH @ 1/2 LB / 1000 SF

PERENNIAL RYEGRASS @ 1/2 LB / 1000 SF

15 AUGUST TO 1 ECTOBER



& EGRESS OPERATION.



Drain Space-WASH RACK DETAIL (IF REQUIRED)

TEMPORARY GRAVEL

CONSTRUCTION ENTRANCE

TOTAL DISTURBED AREA = 21.7 AC. =

15 OCTOBER TO 1 FEBRUARY

JUNE TO 1 SEPTEMBER

MULCH

SOIL CONDITIONING

SEPTEMBER TO 15 OCTOBER

K-31 FESCUE @ 5 LB / 1000 SF ANNUAL RYE @ 1/2 LB / 1000 SK

FERTILIZER: 5-20-10 @ 25 (B) / 1000 SF 38-0-0 @ 7 LB / 1000 SF

K-31 FESCUE @ 5 LB / 1000 SF

K-31 FESCUE @ 5 LB / 1000 SF GERMAN MILLET @ 1/2 LB / 1000 SF

ANNUAL RYE @ 1/2 LB / 1000 SF

SQ. FT.

DEPARTMENT ENGINEERING AND INSPECTIONS

FILTERED

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	PER 1ST REVIEW	01/23/06
2	PER 2ND REVIEW	05/25/06
3		
4		
5		
6		
VNO.	REVISIONS	DATE

ROANOKE

EXCAVATED DROP INLET SEDIMENT TRAP

SCALE: NO SCALE	
DRAWING BY: CLN,AF	(G:\CAD\DETAILS\EROS)
DESIGNED BY:	

WOODS HILL AT RUSSLEN FARMS, SECTION '

FOXFIELD AT RUSSLEN FARMS. SECTION 5 **EROSION & SEDIMENT CONTROL** 

STORMWATER MANAGEMENT DETAILS

Sheet