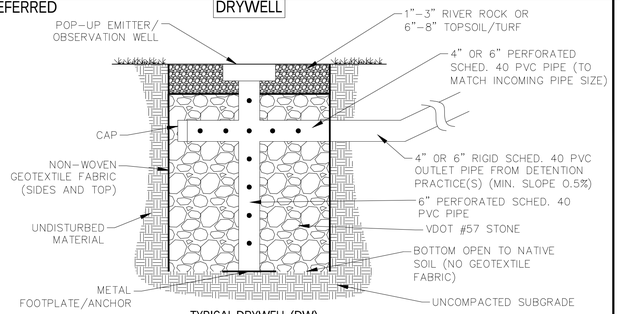
PERMITTED OUTLET PROTECTION - DETAILS

PREFERRED DRYWELL



TYPICAL DRYWELL (DW)
N.T.S.

DW NOTES:

1. MAXIMUM DRAINAGE AREA FOR SINGLE DW OUTLET= 2,500 SQ. FT., AND ONLY 4" AND 6"-DIAMETER SCHED. 40 PVC PIPES MAY CONNECT TO A DW OUTLET.
2. STANDARD DW OUTLET DIMENSIONS SHOULD BE LENGTH= WIDTH= DEPTH (BELOW TOP OF SURFACE LAYER)= 3 FT.
3. DW OUTLETS MUST BE SET BACK A MINIMUM OF 10 FT. FROM ANY BUILDING OR DOWNGRADIENT PROPERTY LINE, AND 5 FT. FROM ANY OTHER PROPERTY LINE.
4. PERFORATED PIPES MUST HAVE 3/8-INCH PERFORATIONS AT A MINIMUM OF 6-IN. ON CENTER ALONG FOUR LENGTHWISE ROWS EVENLY-SPACED AROUND THE PIPE CIRCUMFERENCE, AND A MINIMUM OF TWO PERFORATIONS PER FT. OF PIPE ROW. NO PERFORATIONS ARE ALLOWED WITHIN THREE INCHES OF THE TOP AND BOTTOM OF THE GRAVEL BACKFILL.
5. FILTER FABRIC MUST BE A NEEDLED, NON-WOVEN, POLYPROPYLENE GEOTEXTILE WITH FLOW RATE OF > 110 GAL./MIN./SQ. FT. (E.G., GEOTEX 351 OR EQUIVALENT). HEAT-SET OR HEAT-CALENDARED FABRICS ARE NOT PERMITTED.
6. FINISHED GRADE ELEVATION AT DW OUTLET MUST BE BELOW THE DISCHARGE CONTROL ELEVATION OF EVERY CONNECTED FACILITY.
7. MULTIPLE FACILITIES MAY DRAIN TO SINGLE DW OUTLET, SUBJECT TO LIMITATIONS STATED IN NOTE 1. ALL CONNECTIONS MUST BE SHOWN ON DRAINAGE AREA MAPS.

SCOUR/EROSION PROTECTION

SCOUR/EROSION PROTECTION AT DAYLIGHTED OUTLETS – NOTES:

1. THE MINIMUM EROSION PROTECTION AT A DAYLIGHTED OUTLET IS GRASS, WHICH IS ANY GRASS COVER EXISTING OR ESTABLISHED BEFORE OUTLET PIPE INSTALLATION. THEN, IN THE ORDER OF INCREASING EROSION PROTECTION: SELECT EXISTING GRASS OR SOD (TURF/SOD), SMALL ROCK AS RIPRAP (SMALL ROCK), AND EXISTING IMPERVIOUS SURFACE (EXIST. IMP.), COMPRISE THE ALLOWED EROSION PROTECTION PRACTICES FOR DAYLIGHTED OUTLETS.
2. TURF/SOD IS SOD OR EXISTING GRASS COMPRISED OF GRASS-LEGUME MIXTURE, KENTUCKY BLUEGRASS, TALL FESCUE, REED CANARY GRASS, OR BERMUDA GRASS.
3. SMALL ROCK IS A MIXTURE OR BLEND OF 3" TO 5" STONE OR RIVER ROCK USED FOR RIPRAP PROECTION. SEE THE SMALL ROCK RIPRAP DETAILS, THIS SHEET.
4. EXIST. IMP. IS AN EXISTING CONCRETE OR ASPHALT SURFACE IN GOOD CONDTION.
5. THE REQUIRED MINIMUM LENGTH (IN THE DIRECTION OF FLOW) & WIDTH OF THE EROSION PROTECTION AREA ARE 6 X PIPE DIA. (AND NO LESS THEN 24") & 4 X PIPE DIA., RESPECTIVELY, FOR GRASS & EXIST. IMP., AND 5 X PIPE DIA. & 3 X PIPE DIA., RESPECTIVELY, FOR TURF/SOD.
6. THE MINIMUM REQUIRED EROSION PROTECTION FOR EACH FACILITY & PIPE SLOPE (FOR AT LEAST THE FINAL 20' OF OUTLET PIPE) IS PROVIDED IN THE TABLE BELOW. A HIGHER LEVEL OF EROSION PROTECTION, AS INDENTIFIED IN THE TABLE, MAY BE SUBSTITUTED FOR A LOWER LEVEL PRACTICE.
7. THERE SHALL BE NO SLOPE (0.0% GRADE) ALONG THE LENGTH OF THE EROSION PROTECTION AREA OR APRON IN THE DIRECTION OF FLOW, AND THERE SHALL BE NO OVERFALL OR DROP-OFF AT THE END OF THE APRON.

MINIMUM REQUIRED EROSION PROTECTION AT DS END OF OUTLET PIPE							
PIPE SLOPE:	0.50%	1.00%	2.00%	3.00%	4.00%	5.00%	
EC PRACTICE	MAXIMUM CONTRIBUTING IMPERVIOUS AREA (SF)						
GRASS	2500	1500	700	400	200	200	UPB1
TURF/SOD	2500	2500	2500	2500	2500	2500	
SMALL ROCK	2500	2500	2500	2500	2500	2500	
EXIST. IMP.	2500	2500	2500	2500	2500	2500	
GRASS	5500	1500	700	400	200	200	UPB2
TURF/SOD	5500	5500	5500	5500	3500	2000	
SMALL ROCK	5500	5500	5500	5500	5500	5500	
EXIST. IMP.	5500	5500	5500	5500	5500	5500	
GRASS	2000	700	300	300	200	200	RG
TURF/SOD	5500	5500	4500	2000	1500	1000	
SMALL ROCK	5500	5500	5500	5500	5500	5500	
EXIST. IMP.	5500	5500	5500	5500	5500	5500	
GRASS	6000	2000	700	N/A	N/A	N/A	UPD
TURF/SOD	25000	25000	10000	6000	4000	3000	
SMALL ROCK	25000	25000	25000	25000	25000	25000	
EXIST. IMP.	25000	25000	25000	25000	25000	25000	

MINIMUM REQUIRED OUTLET PIPE DIAMETER

	MINIMUM REQUIRED SCHEDULE 40 PVC OUTLET PIPE DIAMETER						
	PIPE SLOPE: 0.5%	1.00%	2.00%	3.00%	4.00%	5.00%	
	DIA. (IN)	MAXIMUM CONTRIBUTING IMPERVIOUS AREA (SF)					
UPB1	4	2500					
UPB2	4	3000	4500	5500	5500	5500	5500
	6	5500	5500	N/A			
RG	4	1000	1500	2500	3000	3500	4500
	6	4000	5500	5500	5500	5500	5500
	8	5500	N/A				
UPD	4	3500	5000	7000	9000	11000	12000
	6	11000	16000	23000	25000	25000	25000
	8	25000	25000	25000	N/A		

PERMITTED PRETREATMENT PRACTICES - DETAILS

GUTTER SCREEN

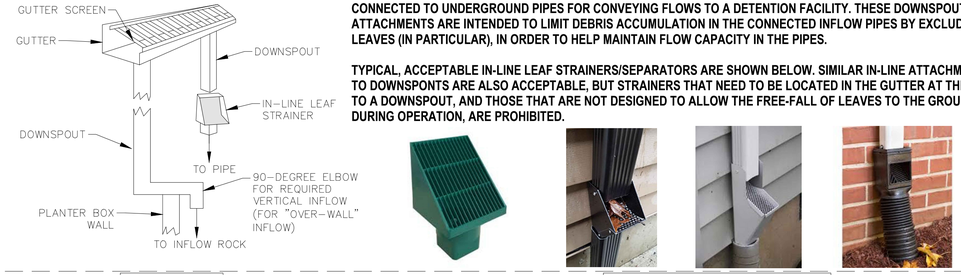
LEAF SCREENS OR MESH TOPPERS ARE REQUIRED ALONG ALL GUTTERS THAT ARE EXPECTED TO COLLECT STORMWATER FROM ROOF SEGMENTS INCLUDED IN THE DESIGN DRAINAGE AREA FOR A DETENTION FACILITY. THESE GUTTER COVERINGS ARE INTENDED TO LIMIT DEBRIS ACCUMULATION IN THE GUTTERS, IN ORDER TO HELP MAINTAIN FLOW CAPACITY TO AND THROUGH DOWNSPOUT(S).

TYPICAL, ACCEPTABLE GUTTER COVERINGS ARE SHOWN BELOW. SIMILAR COVERINGS ARE ALSO ACCEPTABLE, BUT HOODS OR REVERSE-CURVE GUARDS, OR OTHER GUTTER COVERINGS THAT ARE NOT COMPRISED OF SUITABLE SCREENING OR MESH MATERIAL, ARE PROHIBITED.

IN-LINE LEAF STRAINER/SEPARATOR

IN-LINE LEAF STRAINERS OR SEPARATORS ARE REQUIRED ALONG ALL DOWNSPOUTS THAT ARE EXPECTED TO BE CONNECTED TO UNDERGROUND PIPES FOR CONVEYING FLOWS TO A DETENTION FACILITY. THESE DOWNSPOUT ATTACHMENTS ARE INTENDED TO LIMIT DEBRIS ACCUMULATION IN THE CONNECTED INFLOW PIPES BY EXCLUDING LEAVES (IN PARTICULAR), IN ORDER TO HELP MAINTAIN FLOW CAPACITY IN THE PIPES.

TYPICAL, ACCEPTABLE IN-LINE LEAF STRAINERS/SEPARATORS ARE SHOWN BELOW. SIMILAR IN-LINE ATTACHMENTS TO DOWNSPONTS ARE ALSO ACCEPTABLE, BUT STRAINERS THAT NEED TO BE LOCATED IN THE GUTTER AT THE INLET TO A DOWNSPOUT, AND THOSE THAT ARE NOT DESIGNED TO ALLOW THE FREE-FALL OF LEAVES TO THE GROUND DURING OPERATION, ARE PROHIBITED.



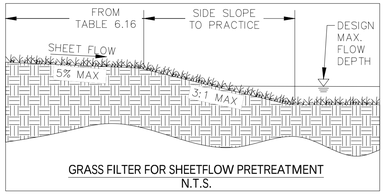
GRASS FILTER STRIP

A GRASS FILTER STRIP (GFS) IS REQUIRED TO PRETREAT SHEETFLOW INFLOW TO A RAIN GARDEN (RG) FACILITY AND SHALL NOT BE USED TO PRETREAT INFLOWS CONVEYED BY SWALES OR PIPES.

SOIL COMPACTION OR DISTURBANCE IN THE PROPOSED GFS AREA SHOULD BE MINIMIZED. IF THIS IS UNAVOIDABLE, THE AREA'S SOIL PERMEABILITY SHOULD BE RESTORED BY TILLING OR BY OTHER EFFECTIVE MEANS. GFS AREAS SHOULD BE SEEDED, AND NOT SODDED, IN ORDER TO ESTABLISH DEEPER ROOTS AND AVOID THE MUCK SOIL OFTEN FOUND IN SOD. THE GFS VEGETATION MAY CONSIST OF TURF GRASSES OR MEADOW GRASSES THAT MUST ACHIEVE A COVERAGE OF AT LEAST 90% BY THE END OF THE SECOND GROWING SEASON. THE GFS VEGETATION MUST BE WELL ESTABLISHED BEFORE THE RELEASE OF THE CONSERVATION DEPOSIT.

Table 6.16 Pretreatment Filter Strip Sizing FROM PFM

Inflow Surface	Impervious				Pervious			
Maximum Inflow Approach Length	35 ft.		75 ft.		75 ft.		150 ft.	
Filter Strip % Slope (6% max)	≤ 2	≥ 2	≤ 2	≥ 2	≤ 2	≥ 2	≤ 2	≥ 2
Minimum Filter Strip Legth (Feet)	10	15	20	25	10	12	15	18



GRASS FILTER FOR SHEETFLOW PRETREATMENT
N.T.S.

MINIMUM REQUIRED INFLOW PIPE DIAMETER

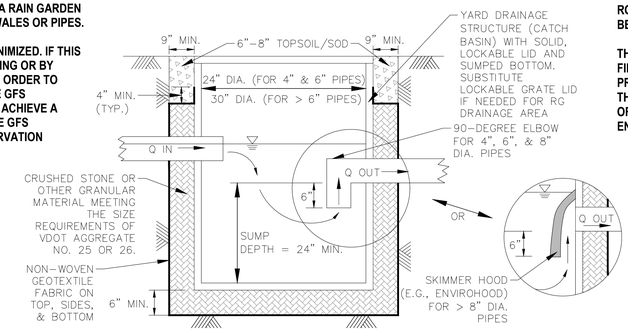
	MINIMUM REQUIRED SCHEDULE 40 PVC INFLOW PIPE DIAMETER						
	PIPE SLOPE: 0.5%	1.00%	2.00%	3.00%	4.00%	5.00%	
	DIA. (IN)	MAXIMUM CONTRIBUTING IMPERVIOUS AREA TO PIPE (SF)					
UPB1	4	700					N/A
UPB2	4	700					N/A
	6	2000			N/A		
RG *	4	400	600	800	1000		
	6	1000	1500				
UPD	4	700	1000	1500	1500	2000	2000
	6	2000	3000	4000	5000	6000	7000
	8	4000	6000	9000	11000	13000	15000
	10	8000	12000	17000	21000	25000	25000
	12	14000	20000	25000	25000	N/A	
	15	25000	25000	N/A			

*PERVIOUS PORTION OF DA MUST BE NO MORE THAN 2 X IA FOR RG PIPE

DEBRIS TRAP

A DEBRIS TRAP IS REQUIRED ALONG ALL FACILITY INFLOW PIPES THAT CONVEY ANY STORMWATER FROM PERVIOUS AND/OR NON-ROOF IMPERVIOUS AREAS, IN ORDER TO HELP MAINTAIN PIPE CAPACITY. THE TRAP MUST BE LOCATED DOWNSTREAM FROM ANY PIPE CONNECTIONS TO A MAIN INFLOW LINE, AND IN AN EASILY ACCESSIBLE AREA TO FACILITATE MAINTENANCE.

THE DEBRIS TRAP IS COMPRISED OF A SUMPED CATCH BASIN THAT INCORPORATES A DOWNTURNED 90-DEGREE ELBOW OR SKIMMER HOOD ON THE BASIN OUTFLOW PIPE.

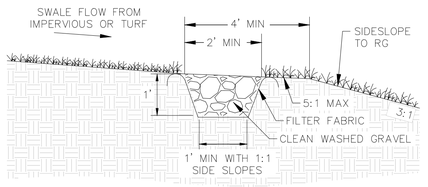


DEBRIS TRAP FOR INFLOW PIPE DRAINING ANY "NON-ROOF" AREA
N.T.S.

GRAVEL DIAPHRAGM

A GRAVEL DIAPHRAGM SHALL BE USED AS A FLOW SPREADER AT THE DOWNSTREAM END OF ANY CONTRIBUTING SWALE PRIOR TO DISCHARGE INTO A RAIN GARDEN (RG) FACILITY, IN ORDER TO PROMOTE PRETREATMENT SEDIMENTATION AND SHEETFLOW INFLOW.

A PEA GRAVEL DIAPHRAGM IS CREATED BY EXCAVATING A 2-FOOT WIDE AND 1-FOOT DEEP TRENCH THAT RUNS ON THE SAME CONTOUR AT THE TOP OF THE RG SLOPE, AND EXTENDS (CENTERED ON THE SWALE) FOR AT LEAST TWICE THE WIDTH OF THE SWALE. IF THE CONTRIBUTING DRAINAGE AREA IS STEEP (6% SLOPE OR GREATER), THEN LARGER STONE (CLEAN BANK-RUN GRAVEL THAT MEETS VDOT #57 GRADE) SHOULD BE USED IN THE DIAPHRAGM.



GRAVEL DIAPHRAGM FOR SWALE INFLOW TO RG
N.T.S.

SCOUR/EROSION PROTECTION

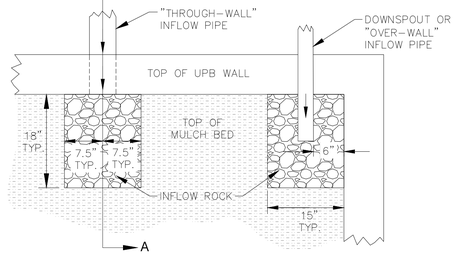
SCOUR AND EROSION PROTECTION AT ALL POINTS OF CONCENTRATED INFLOW INTO A RAIN GARDEN (RG) SHALL BE THE SAME AS THAT IDENTIFIED FOR OUTLET PROTECTION, DEFINED AND DETAILED ELSEWHERE ON THIS SHEET. SO, GRASS, TURF/SOD, AND SMALL ROCK HAVE ALSO BEEN SPECIFIED FOR INFLOW PROTECTION IN THE TABLE BELOW.

UNDERGROUND PIPE DETENTION (UPD) FACILITIES DO NOT NEED INFLOW SCOUR PROTECTION, BUT THE URBAN PLANTER BOXES (UPB1 & UPB2) REQUIRE INFLOW ROCK PROTECTION AT ALL POINTS OF PIPE OR DOWNSPOUT INFLOW. INFLOW ROCK IS A MIXTURE OR BLEND OF 1" TO 3" STONE OR RIVER ROCK (AT 165 LB/CU FT) USED FOR RIPRAP PROTECTION. SEE THE INFLOW ROCK RIPRAP DETAILS BELOW.

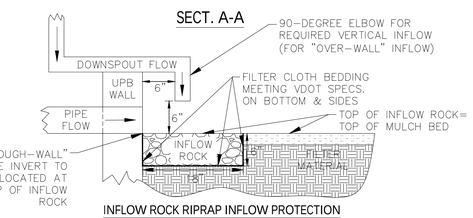
THE MINIMUM REQUIRED EROSION PROTECTION FOR EACH FACILITY & PIPE SLOPE (FOR AT LEAST THE FINAL 20' OF INFLOW PIPE) IS PROVIDED IN THE TABLE BELOW. A HIGHER LEVEL OF EROSION PROTECTION, AS IDENTIFIED IN THE TABLE, MAY BE SUBSTITUTED FOR A LOWER LEVEL PRACTICE. THERE SHALL BE NO SLOPE (0.0% GRADE) ALONG THE LENGTH OF THE EROSION PROTECTION AREA OR APRON IN THE DIRECTION OF FLOW, AND THERE SHALL BE NO OVERFALL OR DROP-OFF AT THE ENDS OF THE APRON.

MINIMUM REQUIRED EROSION PROTECTION AT DS END OF INFLOW PIPE							
PIPE SLOPE:	0.50%	1.00%	2.00%	3.00%	4.00%	5.00%	
EC PRACTICE	MAXIMUM CONTRIBUTING IMPERVIOUS AREA TO PIPE (SF)						
INFLOW ROCK	700				N/A		UPB1
INFLOW ROCK	2000			700		N/A	UPB2
GRASS	700	200	100	N/A			RG
TURF/SOD	1500	1500	1000	700	500	300	
SMALL ROCK	1500	1500	1500	1500	1500	1500	

PLANVIEW

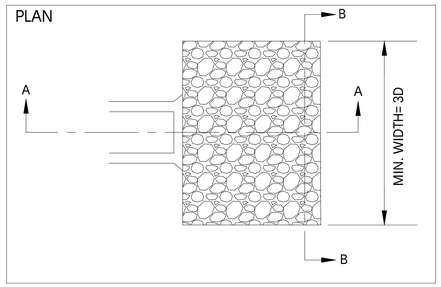


SECT. A-A

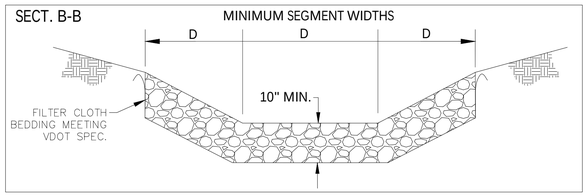


INFLOW ROCK RIPRAP INFLOW PROTECTION
N.T.S.

PLAN

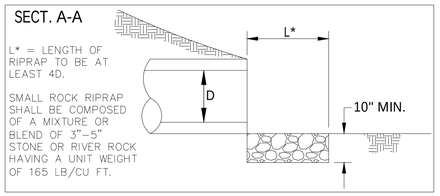


SECT. B-B



SMALL ROCK RIPRAP OUTLET PROTECTION
N.T.S.

SECT. A-A



THIS IS A MODIFIED PFM PLATE 43-6 & VDOT STANDARD EC-1. THE DIMENSIONS SHOWN AND THE SPECIFIED SMALL ROCK RIPRAP STONE ARE THE MODIFICATIONS TO THE STANDARDS. ALL OTHER PARAMETERS REMAIN AS SHOWN ON PLATE 43-6 & THE STANDARD VDOT EC-1 DRAWING.

CERTIFICATION OF NO CHANGE

I HEREBY CERTIFY THAT NO CHANGES HAVE BEEN MADE TO, OR ARE PROPOSED FOR, THE PRETREATMENT/OUTLET PROTECTION STANDARD DESIGN SHEET NOTES, SPECIFICATIONS OR DETAILS.

SIGNATURE _____

DESIGNER _____

NAME DATE

DESIGN ENGINEER / SURVEYOR

FIRM NAME:
ADDRESS:
PHONE NO: FAX NO:
PROJ. MANAGER: EMAIL:

PROFESSIONAL SEAL DATE

PROFESSIONAL SEAL DATE

PROJECT NAME

DISTRICT
FAIRFAX COUNTY, VIRGINIA

PRETREATMENT/OUTLET PROTECTION DETAILS

FAIRFAX COUNTY STANDARD DESIGN SHEETS FOR INFILL LOTS

SHEET ___ OF ___

First Draft V 1.0