COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION

Stephen C. Brich, P.E.
Commissioner

1401 East Broad Street
Richmond, Virginia 23219

(804) 786-2701
Fax: (804) 786-2940

February 2, 2024

ADDENDUM NO. 1 TO ALL BIDDERS:

Invitation for Bids (IFB)#:	158129
Project Name:	Office Building Area Headquarters New London
Commodity:	Construction Services
Date Advertised:	January 9, 2024
For Delivery To:	Commonwealth of Virginia Department of Transportation
Bid Due:	**February 13, 2024** at 2:00 PM
Pre-Bid Date:	**January 24, 2024** at 10:00 AM

The above is hereby changed to read:

1. Addendum Number 1 including Hughes Associates Architects & Engineers Addendum Number 1 sealed by John R. Garrett, including the responses to Pre-bid Questions (231 pages) and Pre-bid Sign-in Sheet.

Note: Acknowledgement of this addendum or any subsequent addenda must be prior to the bid due date and time or signed and uploaded as an attachment with the electronic bid submission. Failure to acknowledge or submit the addendum may be grounds for declaring the bid non-responsive.

Sincerely,

Joshua Saunders

Joshua L. Saunders.
Senior Procurement Officer
Phone: 804-729-6845

Name of Firm: _____

Signature/Title _____ Date _____

HUGHES ASSOCIATES
ARCHITECTS & ENGINEERS

ADDENDUM 001

DATE:	January 30, 2024
COMM NO:	15037.012
PROJECT:	Office Building Area Headquarters New London
PROJECT CODE:	501-18041-021
TO:	John Dyer
FROM:	John R. Garrett
RE:	Pre-Bid Meeting
	IFB# 158129

The following clarifications, additions and/or changes shall be incorporated into the bidding documents, consisting of bidding requirements, conditions of the contract, drawings and specifications, dated February 1, 2023.

CONTACT INFORMATION
Hughes Associates Architects & Engineers
A Professional Organization
3800 Electric Rd Suite 300
Roanoke, VA 24018
Tel.: 540.342.4002 Fax: 540.342.2060
Contact: John R. Garrett
Email: JGarrett@hughesAE.com

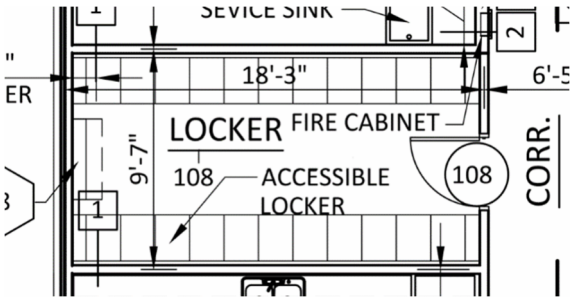
COMMONWEALTH OF VIRGINIA
1/30/2024
JOHN R. GARRETT
Lic. No. 012569
ARCHITECT

Attached are Pre-Bid Meeting notes and Pre-Bid Meeting sign-in sheet.

DRAWINGS

Item 1. Sheet A1-1

1. The Toilet Accessories listed as “By Owner” are to be furnished by the Owner and installed by the Contractor.
2. NO bench in the center of the room LOCKER 108.



Item 2. Sheet A2-1

1. Door Schedule **CHANGE** Door 109 to HDW 8, Door 110 to HDW 7.
2. Change Room Finish Schedule to indicate GWB ceiling @ 10’-0” ceiling height for Room 110 Mechanical.

Item 3. Sheet A4-1

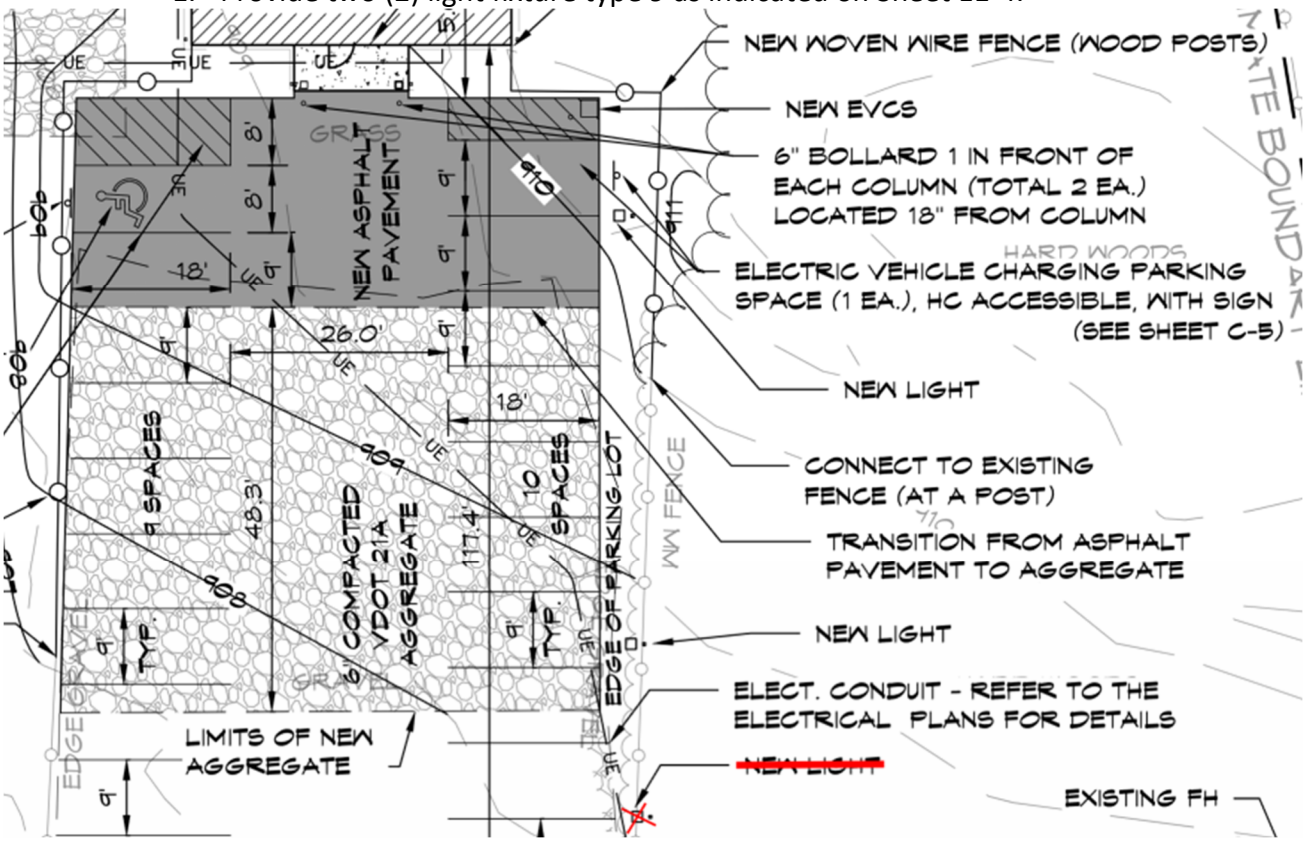
1. Wall sections A&B on A4-1 Indicate a GWB ceiling at the bottom of the trusses with the scheduled ceiling below, creating a mechanical plenum.
2. **ADD** Note to the GWB ceiling at the bottom of the trusses: 5/8” GWB with all joints mudded and taped to create a sealed mechanical plenum.

Item 4. Sheet A5-1

1. The ceiling in Mechanical Room 110 shall be the GWB at the bottom of the trusses. **CHANGE** A5-1 Reflected Ceiling Plan to indicate 10'-0” ceiling height.
2. The ceiling in the drinking fountain alcove shall be GWB with an attic access hatch as shown in section A, A5-1.

Item 5. Sheet C-2

1. Provide two (2) light fixture type 9 as indicated on Sheet E1-4.



Item 6. Phasing Plan.

The Timekeeper office shall be operational until VDOT occupies the new office building.

PROJECT MANUAL

Item 1. Section 10800
The Toilet Accessories listed as “By Owner” are to be furnished by the Owner and Installed by the Contractor

Item 1. Appendix D (Attached)
ADD Appendix D – VDOT Special Provision for Storm Water Pollution Prevention Plan (SWPPP).

HUGHES ASSOCIATES
ARCHITECTS & ENGINEERS

PROJECT SHOWING AGENDA

DATE: 24 Jan 2024
COMM NO.: 18086.012
PROJECT: New London Area Headquarters Office Building
PROJECT CODE: 501-18041-021
IFB: 158129

1. Introductions
2. Provide attendance to provide name and firm on the sign-in sheet or virtually.
3. Josh to go over IFB details
   - The deadline for submitting bids is 2:00 P.M. (EST) as determined by the Bid Officer, on February 13, 2024
   - The cutoff date for questions is 5:00 P.M. (EST), as determined by the Bid Officer, on February 7, 2024. Microsoft Teams meeting information is provided in the IFB in the Project Manual.
   - Public bid opening via teleconference at 2:00 pm on February 14, 2024
4. Standard mantra: If you heard it here and don't see it in writing, you never heard it.
5. Bid documents can be downloaded from eVA.Virginia.Gov
6. Questions related to this bid should be submitted on a copy of the Prebid Question Form DGS-30-272 to be provided by Addendum. Questions must be directed to the attention of Joshua Saunders. Contact information for directing questions to key VDOT personnel can be found on page 3 of 4 of the Bid Form. To expedite a response, a bidder may copy the architect simultaneously.
7. All responses to questions regarding changes to the bid documents will be in writing and distributed in the form of an addendum. Addendums will be distributed through eVA.Virginia.Gov. Verbal responses will not be binding. Receipt of all addendums must be acknowledged. A/E does not pre-qualify products. If it meets the specifications and intent of the drawings, the product will be deemed equivalent at the time of submittal.
8. Bidders are directed to bid on the project as designed and specified. Bids must be submitted with no conditions attached.
9. Time for Completion is 180 calendar days after notice to proceed.
10. General Review of the project.
    a. Selective Demolition of existing Timekeepers Office.
    b. Provide a new office building with associated site work and utilities
    c. Refer to the Construction Documents for details
11. Responses to questions not covered in the project manual and drawings will be addressed by an addendum.

12. Comments and Questions:
    a. VDOT will employ the services of the Testing Firm to perform the testing/inspections indicated by the “Owner’s Testing Lab” on the CO-6b. Special Inspection form. Additional testing costs for work that does not comply with the contract documents will be the contractor's responsibility.
    b. DEB will issue the building permit and perform inspections. A land disturbance permit which is issued by VDOT may be required.
    c. VDOT will review the project schedule and tree removal time of year restrictions for the roosting bat habitat to determine if a change in the contract documents is required. If required, the change will be addressed in an addendum.

HUGHES ASSOCIATES
ARCHITECTS & ENGINEERS

SIGN IN SHEET

DATE: January 24, 2024
COMM NO.: 18086.012
PROJECT: New London Area Headquarters

COPIED TO
LOCATION: 5507 Thomas Jefferson Road, Forest, VA 24551
RE:

NO.	NAME	COMPANY	PHONE	EMAIL
1	John Garrett	Hughes Associates A&E	(540)342-4002	jgarrett@hughesae.com
2	Mike O'Malley	VDOT	540-944-8141	mikel.omalley@vdot.virginia.gov
3	Tracy Connor	KNA Contracting	540-330-7900	tconnor@KNAcontracting.com
4	Todd Williams	Kenbridge Construction	434-676-8221	estimating@kenbridge.com
5	Thelma Ingle	VDOT	540.529.0339	thelma.ingle@vdot.virginia.gov
6	Ed Greer	Price Buildings	540.483.7226	edgreer@pricebuildingsinc.com
7	Bobby Gupton	Glass+Associates, Inc	434-385-8958	bobby@g-aconstruction.com
8	James Whitacre	Jamerson-Lewis	434-944-3682	jwhitacre@jamersonlewis.com
9	Chanan Markham	Anchor Electric	434-851-4995	cmarkham.anchorelectric@gmail.com
10	Jon Tibbs	THE J.E.T. GROUP, INC	434 610 6114	JTIBBS@THEJETGROUPINC.com
	Eric Lauchner	TBS Construction	540-352-8952	eric@tbsbuilds.com
	BILLY MARSHALL	KEN BRIDGE	804 461-0070	ESTIMATING@Kenbridge.com
	Isaac Bronniman	F&S Building	540 598 1518	isaac@fsbuildinginc.com

MEETING NOTES:
1.

HUGHES ASSOCIATES
ARCHITECTS & ENGINEERS

SIGN IN SHEET

DATE: January 24, 2024
COMM NO.: 18086.012
PROJECT: New London Area Headquarters

COPIED TO
LOCATION: 5507 Thomas Jefferson Road, Forest, VA 24551
RE:

NO.	NAME	COMPANY	PHONE	EMAIL
1	John Garrett	Hughes Associates A&E	(540)342-4002	jgarrett@hughesae.com
2	John Dyer	VDOT	(804) 382-3861	John.Dyer@VDOT.Virginia.gov
3				
4				
5				
6				
7				
8				
9				
10				

MEETING NOTES:
1.

APPENDIX D

Specification Section 107.16(a) contained in the following **Administrative Services Division – Capital Outlay Program Special Provision for Stormwater Pollution Prevention Plan (SWPPP)** requires that the Contractor have within the limits of the project, during land disturbance activities, an employee certified through the VDOT Erosion and Sediment Control Contractor Certification (ESCCC) Program. The ESCCC program course and examination is offered by several organizations, in conjunction with the VDOT. The program course is a one day class scheduled throughout the state at varying times during the year. The schedule for upcoming program courses is available at the following website: http://www.vdot.virginia.gov/business/locdes/ms4_stormwater_management.asp. Completion and submission of the Form C-45 - Stormwater Pollution Prevention Plan (SWPPP) and the Virginia Pollutant Discharge Elimination System (VPDES) General Permit for the Discharge of Stormwater from Construction Activities – Contractor Certification Statement, included in this special provision, shall be required prior to award of a contract for this project. This completed and certified form must be provided along with the performance and payment bonds required by the terms and conditions of the contract documents.

ADMINISTRATIVE SERVICES DIVISION – CAPITAL OUTLAY PROGRAM

SPECIAL PROVISION FOR STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

July 1, 2016

TABLE OF CONTENTS

SPECIFICATIONS **PAGE #**

STANDARDS	**STANDARD #**	**PAGE #**

STANDARDS	STANDARD #	PAGE #
Planting Details	L-5	1201.04
Planting Details	L-5	1201.05
Slope Planting Details	L-5	1201.06
Fertilizer and Mulch	L-6	1201.07

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM (IIM)	IIM #
Stormwater Management Erosion and Sediment Control Program (19 pages)	IIM-LD-11.28
Post-Development Stormwater Management (35 pages)	IIM-LD-195.8
Virginia Stormwater Management Program (18 pages)	IIM-LD-242.5
Stormwater Pollution Prevention Plan (13 pages)	IIM-LD-246.3

GENERAL INFORMATION SHEET(s)

See Drawings — See List of Drawings for Sheet(s) #

Form C-45
Rev. 10-9-2014

VIRGINIA DEPARTMENT OF TRANSPORTATION

STORMWATER POLLUTION PREVENTION PLAN (SWPPP) AND THE VIRGINIA POLLUTANT DISCHARGE ELIMINATION SYSTEM (VPDES) GENERAL PERMIT FOR THE DISCHARGE OF STORMWATER FROM CONSTRUCTION ACTIVITIES

CONTRACTOR CERTIFICATION STATEMENT

Order No.: _____ Project Number: _____

Route: _____ Contract ID. #: _____

I certify under penalty of law that I understand the terms and conditions of the project contract, plans, permits, specifications and standards related to the erosion and sediment control, stormwater management and stormwater pollution prevention plan requirements for the affected activities associated with this project, and the requirements of the VPDES General Permit for the Discharge of Stormwater from Construction Activities (the VPDES Construction Permit) , if applicable to this project, issued by the Virginia Department of Environmental Quality. The VPDES Construction Permit authorizes the storm water discharges associated with the construction activities from the project site identified and described in the bid documents and subsequent contract including any onsite or off-site support facility areas located within VDOT right of way or easement and required for the complete fulfillment of the work therein.

Signature: _____

Name: _____

Title: _____

Contracting Firm: _____

Address: _____

Phone Number: _____

* Project Address/Location: _____

_____

Certified on this date: _____

* Include any off-site support facility areas located within VDOT right of way or easement.

(Note: This form must be returned with performance and payment bonds)

CONSTRUCTION RUNOFF CONTROL INSPECTION FORM (CRCIF)
C-107 CONTRACTOR INSPECTION SHEET

Project Name/ID _____ UPC _____

Contractor _____

Inspection Date _____

Type of Inspection: (Check Appropriate Block)

(1) After Measurable Storm Event ☐ Estimated Total Rainfall of Storm Event - _____ inches

(2) Schedule 1: (7 Calendar Days/5 Business Days) ☐ *(3)* Schedule 2: (Monday and Thursday/ 4 Business Days) ☐
(4) Monthly Schedule ☐
(5) ☐ Other Describe: _____

Weather Conditions (At Time of Inspection) (Check All Appropriate)
Clear ☐ Sunny ☐ Partly Cloudy ☐ Cloudy ☐
Cold ☐ Cool ☐ Mild ☐ Hot ☐

Is there any discharge occurring from construction site at time of inspection?
Yes ☐ No ☐

If yes, is discharge compliant with the Erosion and Sediment Control Regulation and VPDES Construction Permit Requirements?
Yes ☐ No ☐

If no, describe conditions of discharge: _____

ITEM #	ESC INSPECTION QUESTIONS	N/A[1]	YES[2]	NO[3]
1	Have stabilization activities been initiated on all disturbed areas that have reached final grade or that will remain dormant for more than 14 days?	☐	☐	☐
2	Have stabilization activities been completed within 7 days of initiation?	☐	☐	☐
3	Have disposal/borrow and soil stockpiles areas been stabilized and/or protected with sediment trapping measures?	☐	☐	☐
4	Have perimeter controls been constructed as a first step prior to initiation of land disturbing activities (including clearing or grubbing)?	☐	☐	☐
5	Are perimeter and other erosion and sediment control structures and systems being maintained, inspected and repaired, as necessary, to ensure functionality?	☐	☐	☐
6	Have all land-disturbing activities occurred within the approved ESC plan area?	☐	☐	☐
7	Have earthen structures, such as dams, dikes, and diversions, been immediately stabilized upon installation?	☐	☐	☐
8	Have sediment basins and traps been constructed according to plans, specifications, and/or standards?	☐	☐	☐
9	Are all cut and fill slopes at final grade adequately stabilized?	☐	☐	☐
10	Is concentrated water flowing through adequate slope drains, flumes, or other non-erodible conveyances on cut or fill slopes?	☐	☐	☐
11	Is stormwater runoff containing sediment or turbidity being properly treated prior to discharge?	☐	☐	☐
12	Where water seeps from slope faces, has adequate drainage or erosion protection been provided?	☐	☐	☐
13	Do all operational storm sewer and culvert inlets have inlet protection in accordance with plans, specifications, and/or standards?	☐	☐	☐
14	Are constructed stormwater conveyance channels and ditches stabilized with appropriate channel lining and/or outlet protection?	☐	☐	☐
15	Is in-stream construction being conducted using measures to minimize channel impacts?	☐	☐	☐
16	Are temporary stream crossings of non-erodible material installed at locations where construction equipment must cross?	☐	☐	☐
17	Are all water quality permit requirements being adhered to?	☐	☐	☐
18	Is re-stabilization of in-stream construction areas complete before leaving the site?	☐	☐	☐
19	Are utility trenches stabilized properly according to the specifications?	☐	☐	☐
20	Is effluent from dewatering operations being filtered (including in-stream structure dewatering)?	☐	☐	☐
21	Are construction entrances installed at appropriate locations and being maintained properly?	☐	☐	☐
22	Is any sediment tracking on public roadways cleaned-up at the end of each work day?	☐	☐	☐

ITEM #	ESC INSPECTION QUESTIONS (CONTINUED)	N/A[1]	YES[2]	NO[3]
23	Have all temporary ESC measures that are no longer needed been removed and have all such areas been re-graded, as necessary, and stabilized?	☐	☐	☐
24	Are properties and waterways adjacent to the project site being adequately protected from accidental land disturbance, potential pollutant discharge, erosion, flooding, and sedimentation from the project site?	☐	☐	☐
25	Are all discharges from the construction site allowable under the VPDES construction permit?	☐	☐	☐
26	Are all ESC deficiencies from previous reports being addressed within allowable/established time frames?	☐	☐	☐
27	Is the location of the on-site rain gage identified on the record set of plans or in other appropriate SWPPP documents?	☐	☐	☐
28	Is the data from the daily observations of the rain gage being documented and included in the SWPPP in accordance with the Specifications and/or the SWPPP GIS?	☐	☐	☐
ITEM #	**POLLUTION PREVENTION (P2) INSPECTION QUESTIONS**	**N/A[1]**	**YES[2]**	**NO[3]**
29	Have all potential pollutant generating activities present on the site been identified in the SWPPP and addressed with an approved Pollution Prevention Plan?	☐	☐	☐
30	Is the person or contractor responsible for implementing and maintaining the pollution prevention practices for each potential pollutant generating support activity identified in the approved Pollution Prevention Plan?	☐	☐	☐
31	Has pollution prevention awareness been provided to appropriate personnel?	☐	☐	☐
32	Are chemicals being properly stored (e.g., under cover or within secondary containment) and handled?	☐	☐	☐
33	Are storage containers labeled to describe contents?	☐	☐	☐
34	Are construction products, materials, and wastes being properly stored, handled, and disposed of?	☐	☐	☐
35	Is the site absent of loose or uncontrolled trash and debris?	☐	☐	☐
36	Is the site absent of spills, leaks, or stains (e.g., from hydraulic hoses, vehicle/equipment maintenance and fueling operations, etc.)?	☐	☐	☐
37	Are chemicals, soaps, solvents, and wash water from construction materials (e.g., from release oils and curing compounds from hand tools) prevented from leaving the site?	☐	☐	☐
38	Is vehicle wash water free of soaps/detergents and properly treated before leaving the site?	☐	☐	☐
39	Is concrete wash-out being directed into a properly installed leak-proof container or leak-proof settling basin?	☐	☐	☐
40	Are concrete wash-out areas being properly maintained and utilized?	☐	☐	☐
41	Are all other unauthorized non-stormwater discharges prevented from leaving the site (including untreated dust control water)?	☐	☐	☐
42	Are all P2 deficiencies from previous reports being addressed within allowable/established time frames?	☐	☐	☐
ITEM #	**SWPPP UPDATE AND MODIFICATION QUESTIONS**	**N/A[1]**	**YES[2]**	**NO[3]**
43	Is the SWPPP being modified, amended and updated in accordance with the specifications and/or the SWPPP GIS?	☐	☐	☐
44	Is a record set of plans being maintained and updated to document SWPPP changes?	☐	☐	☐
45	Are modifications, amendments or updates to the SWPPP being signed by the contractor and VDOT?	☐	☐	☐

1 – N/A: Not Applicable
2 – YES: All related contract items, requirements, plans, specifications, standards, and permits pertaining to this question are being satisfied
3 – NO: See Note 1 on Sheet 4

By signing below, those persons doing so certify that the C-107 has been completed based on the actual field conditions at the time of the inspection and accurately reflects those conditions. Where no deficiencies have been identified, those signing below further certify that the construction activity is in compliance with the SWPPP and the VPDES Construction General Permit. It is encouraged that photos be taken to support findings.

CONTRACTOR: *See Note 2 on Sheet 4*				
	Name of ESCCC Person	*Signature of ESCCC Person*	*Certification Number*	*Date*
VDOT: *See Note 3 on Sheet 4*				
	Name of VDOT Certified Inspector	*VDOT Certified Inspector Signature*	*Certification Number(s)*	*Date*

Provide copies to 1.) the Contractor, 2.) the VDOT Project Inspector and 3.) the Project Engineer/ RLD (See Note 4 on Sheet 4)

CONSTRUCTION RUNOFF CONTROL INSPECTION FORM (CRCIF)
C-107 DEFICIENCY DESCRIPTION SHEET

Project Name/ID _____ UPC _____

Contractor _____

Inspection Date _____

ITEM #	STATION	DESCRIPTION OF PROBLEM, LOCATION, AND RECOMMENDED CORRECTIVE ACTION *(SEE NOTE 5)*	DATE TO BE CORRECTED BY	DATE CORRECTIVE ACTION COMPLETED

CONSTRUCTION RUNOFF CONTROL INSPECTION FORM (CRCIF)
C-107 NOTES AND ACRONYMS SHEET

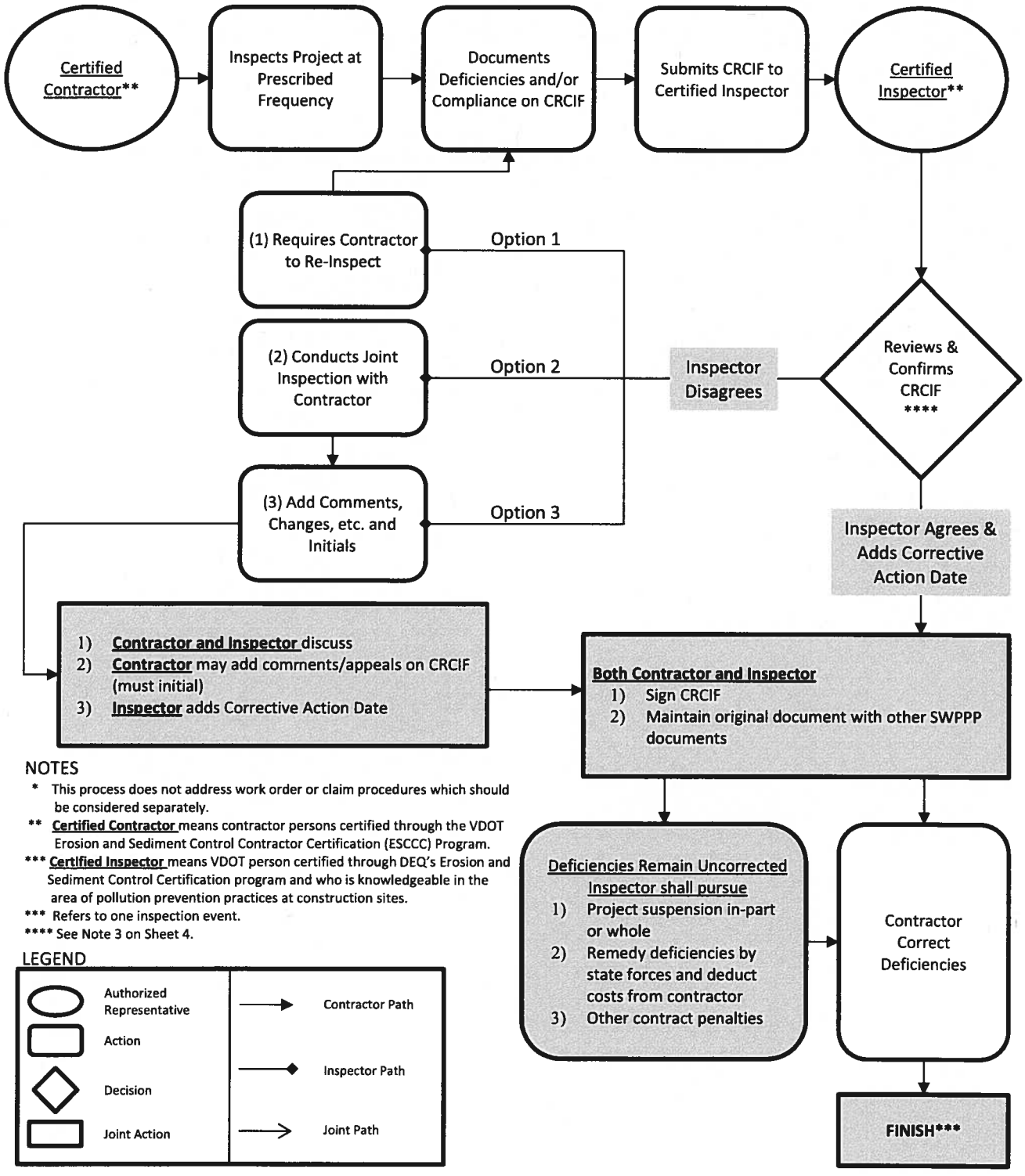
NOTES

1. If any "No" boxes are checked on the "Inspection Questions List" on Part I or if any other deficiencies of a contract specification plan item or SWPPP requirement is noted, the C-107 Deficiency Description Sheet is to be used to document the specifics of the deficiency. The description of the deficiency must contain (1) the permit condition deficiency, if applicable, (2) a description of the deficiency, (3) a corrective action deadline (should be as soon as practical and prior to the next anticipated measurable storm event but no later than seven days after the date of the site inspection that identified the deficiency) and (4) a recommended solution or approach. If this is a follow-up inspection, previous deficiencies that have been corrected must be documented as such. If conformity to specifications and plans is being achieved but the site conditions indicate that plan or specification adjustments may be needed to address environmental concerns, such conditions should be immediately referred to the designated Responsible Land Disturber (RLD) for resolution
2. The Part I inspection and report is to be completed in accordance with the inspection schedule in the specifications and signed and submitted by a Contractor employee who is certified in accordance with VDOT R&B Specification 107.16(a).
3. The Part I report is to be accepted, confirmed and signed by a VDOT employee or a consultant inspector working directly for VDOT on a CEI services contract who is certified by DEQ as an Inspector for ESC and who is knowledgeable in the area of pollution prevention practices at construction sites. Confirmation shall be in the form of a joint inspection with the Contractor ESCCC employee or an independent inspection by the VDOT Certified Inspector.
4. All original completed C-107 Forms are to be maintained with the other SWPPP documents for the land disturbing activity. Copies of this report are to be provided to the Contractor, the VDOT Project Inspector and the Project Engineer/ RLD.
5. For Part I, non-compliant, non-compliance, or deficient is defined as documented evidence of (1) off-site damage in the form of sedimentation, unauthorized dewatering or pollutant discharge, erosion, flooding, encroachment outside of the project/permit limits, or a permit condition deficiency, (2) on-site damage in the form of significant erosion, flooding, sedimentation or uncontrolled pollution discharge, or (3) a previous deficiency that has not been corrected within the specified timeframe.
6. For the purposes of this document, a day is a calendar day unless otherwise stated.
7. The weekly inspection schedule in Special Provision S107J30 dated 9/3/14 is the same as a Schedule 1 on this form. When performing inspections in accordance with the weekly schedule in S107J30 dated 09/3/14, check the Schedule 1 box on this form.

ACRONYMS

ACE	Area Construction Engineer
CEI	Construction, Engineering and Inspection
CRCIF	Construction Runoff Control Inspection Form
DEQ	Virginia Department of Environmental Quality
ESC	Erosion and Sediment Control
ESCCCC	Erosion and Sediment Control Contractor Certification
GIS	General Information Sheet
MS	Minimum Standard
P2	Pollution Prevention
R&B	Road & Bridge
RLD	Responsible Land Disturber
SWM	Stormwater Management
SWPPP	Stormwater Pollution Prevention Plan
VAC	Virginia Administrative Code
VDOT	Virginia Department of Transportation
VESCR	Virginia Erosion and Sediment Control Regulations
VPDES	Virginia Pollutant Discharge Elimination System
VSMP	Virginia Stormwater Management Program

CONSTRUCTION RUNOFF CONTROL INSPECTION FORM (CRCIF)
C-107 CHAIN OF DOCUMENTED COMMUNICATION*



NOTES

* This process does not address work order or claim procedures which should be considered separately.

** **Certified Contractor** means contractor persons certified through the VDOT Erosion and Sediment Control Contractor Certification (ESCCC) Program.

*** **Certified Inspector** means VDOT person certified through DEQ's Erosion and Sediment Control Certification program and who is knowledgeable in the area of pollution prevention practices at construction sites.

*** Refers to one inspection event.

**** See Note 3 on Sheet 4.

LEGEND

CONSTRUCTION RUNOFF CONTROL INSPECTION FORM (CRCIF)
C-107 VDOT INSPECTION SHEET

Project Name/ID _____ UPC _____

Contractor _____

Inspection Date _____
(See Note 5 on Sheet 2)

ITEM #	INSPECTION QUESTIONS	N/A	YES	NO
1	Is a copy of the signed VPDES Construction Permit coverage letter in the SWPPP?*	☐	☐	☐
2	Is a copy of the VPDES General Permit For Discharges Of Stormwater from Construction Activities contained in the SWPPP?*	☐	☐	☐
3	Are copies of the LD-445 and LD-445E forms contained in the SWPPP?*	☐	☐	☐
4	Is a copy of the LD445A form completed and posted in accordance with the SWPPP GIS requirements?*	☐	☐	☐
5	Are all ESC and P2 inspections being performed, recorded and documented in accordance with the specifications?	☐	☐	☐
6	Are corrective actions being identified, performed and documented in accordance with the specifications?	☐	☐	☐
7	Have enforcement actions been taken?	☐	☐	☐
8	If answer yes to #7, has documentation of enforcement actions been included in the SWPPP?	☐	☐	☐

ITEM #	STATION	DESCRIPTION OF PROBLEM, LOCATION, AND RECOMMENDED CORRECTIVE ACTION (NOTE 4)	DATE TO BE CORRECTED BY	DATE CORRECTIVE ACTION COMPLETED

VDOT: *See Note 3 on Sheet 2*				
	Name of VDOT ACE	*VDOT ACE Signature*		*Date*
VDOT: *See Note 3 on Sheet 2*				
	Name of VDOT Delegated Authority	*VDOT Delegated Authority Signature*	*Certification Number(s)*	*Date*

Provide copies to 1.) the Contractor, 2.) the VDOT Project Inspector and 3.) the Project Engineer/ RLD (See Note 2 on Sheet 2)

CONSTRUCTION RUNOFF CONTROL INSPECTION FORM (CRCIF)
C-107 NOTES AND ACRONYMS SHEET

NOTES

* Applies only to projects with coverage under the VPDES Construction General Permit.

1. All original completed C-107 Forms are to be maintained with the other SWPPP documents for the land disturbing activity.
2. Copies of this report are to be provided to the Contractor, the VDOT Project Inspector and the Project Engineer/ RLD.
3. The Part II inspection and report is to be completed and signed by the VDOT ACE. The ACE may delegate this responsibility to another VDOT employee or consultant inspector working directly for VDOT on a CEI services contract provided 1) the delegation is in writing, 2) the delegated person is not the same person that signs the C-107 Part I form and 3) the delegated person is certified by DEQ as an Inspector for ESC and is knowledgeable in the area of pollution prevention practices at construction sites.
4. If any "No" boxes are checked on the "Inspection Questions List" on Part II or if any other deficiencies of a contract specification plan item or SWPPP requirement is noted, the Deficiency Description Table is to be completed to document the specifics of the deficiency. The description of the deficiency must contain (1) the permit condition deficiency, if applicable, (2) a description of the deficiency, (3) a corrective action deadline (should be as soon as practical and prior to the next anticipated measurable storm event but no later than seven days after the date of the site inspection that identified the deficiency) and (4) a recommended solution or approach. If this is a follow-up inspection, previously addressed deficiencies that have been corrected must be documented as such.
5. The C107 Part II shall be completed at the initiation of the land disturbing activity and every 60 days thereafter until termination of the VPDES Construction General Permit coverage.

ACRONYMS

ACE	Area Construction Engineer
CEI	Construction, Engineering and Inspection
CRCIF	Construction Runoff Control Inspection Form
ESC	Erosion and Sediment Control
GIS	General Information Sheet
P2	Pollution Prevention
R&B	Road & Bridge
RLD	Responsible Land Disturber
SWM	Stormwater Management
SWPPP	Stormwater Pollution Prevention Plan
VDOT	Virginia Department of Transportation
VPDES	Virginia Pollutant Discharge Elimination System

VIRGINIA DEPARTMENT OF TRANSPORTATION
LOCATION AND DESIGN
VPDES CONSTRUCTION PERMIT REGISTRATION INFORMATION
AND
CHESAPEAKE BAY PRESERVATION ACT PROJECT INFORMATION [9]

CONSTRUCTION ACTIVITIES

1) Registration Information:

Date:		UPC #:	
Project #:		☐ LD-445B and LD-445C must be submitted with this form	

2) Project Location:

District:		Latitude: [1]	
Residency:		Longitude:[1]	
County/City:			

3) Project Time Frame:

Estimated project start date:	
Estimated project finish date:	

4) Support Activities:[2]

Is this activity being used to support another permitted project? Yes ☐ or No ☐	
If yes, provide the following for the primary project:	
UPC#:	
VAR10#:	

5) Project Site:[3]

Total land development area (to the nearest one hundredth acre):	
Disturbed area within the total land development area (to the nearest one hundredth acre):	

6) SWM Technical Criteria:[4]

Type of SWM Technical Criteria	Drop Down Selection

7) Receiving Waters

Receiving Waters[5]	HUC[6]

8) Municipal Separate Storm Sewer System (MS4) Considerations[7]

Is this project located within a MS4 area? Yes ☐ or No ☐	
If yes; Is the project discharging through a MS4 system? Yes ☐ or No ☐	
If yes; name of MS4 operator:	

9) Fees, Funding, and Costs:

Application fee ($):	Drop Down Selection

10) Certification Statement:

☐ By checking this box, the person named below certifies that they understand this LD-445 form and that this document and all attachments were prepared in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. The information submitted is to the best of their knowledge and belief true, accurate and complete.			
Printed Name[8]:			
Title:		Date:	

Instructional Notes for VPDES Construction Permit Registration Information Form LD-445

Note [1]: Latitude and Longitude: In decimal degrees to the nearest one ten-thousandth of a degree at the approximate center of the project.
Note [2]: Support Activities: This section is used to associate a separately permitted support facility with the primary project. If the registration information is for the primary construction project, this section is not applicable.
Note [3]: Project Site: Enter the Total Land Area of Development and the Area to be Disturbed within the Total Land Area of Development of the construction activity to the nearest one-hundredth acre. See Section 3.0 in IIM-LD-242 for Area definitions.
Note [4]: SWM Technical Criteria: Select either Part IIB or Part IIC as listed on the SWPPP information sheet.
Note [5]: Receiving Waters: List the nearest surface water that receives direct storm water discharge from the project. If the storm water directly discharges to an unnamed stream list "Unnamed Tributary to (insert the closest named stream)". There are different ways to obtain this information that include: Terrain Navigator Pro, GIS Integrator, CEDAR and DEQ's method located at the middle of this web page.
Note [6]: Hydrologic Unit Code: HUC means a watershed unit established in the most recent version of Virginia's 6th Order National Watershed Boundary Dataset. Example: Y027. See the Virginia Hydrologic Unit Explorer here.
Note [7]: MS-4: This requirement is to list all MS4 operators receiving direct runoff from the land-disturbing activity. The discharge point is defined as the location where concentrated surface runoff exits the land-disturbing activity, right-of-way or easement.

- Step 1: Determine if the project is within a MS4 area.
  - Regardless of jurisdiction, only the Census Urban Areas are regulated MS4 areas.
  - To locate the census urban areas in the VDOT GIS Integrator; key integrator/ into the address bar of InsideVDOT. Navigate to the project site by the Navigation Joystick, UPC or by latitude and longitude. For UPC: Select *Search*, and then *UPC*. For Lat & Long: Select *Search*, and then *Lat/Long*, then *Zoom to Lat/Long*. Enter the values and select *Zoom*. Once at the project site: In the Layers tab, expand *Civil Infrastructure* in the *NonVDOTLayers*. Toggle on *Census Urban Areas* to find any areas shaded with red dots. Right click on the shaded area and select *Identify Visible Layers*. Select *Census Urban Areas* at the top of the information box. Scroll down to *NAMELSAD10*. If this line reads *VA Urbanized Area*, it is a MS4 area. If it reads *VA Urban Cluster*, it is NOT a MS4 area.
  - Reminder: Arlington and Henrico Counties own and operate their own secondary road system. VDOT owns and operates the primary and interstate road systems in all jurisdictions.
- Step 2: Determine the MS4 operator's name. A listing is found at the bottom of DEQ's web page here.
- Step 3: Review the plans for discharge points into a system (ditches, storm sewer) owned and operated by a MS4 operator.
- Example #1: UPC 98831 is located in Buckingham County. Navigate to the project using one of three methods described above. Toggle on the census urban areas to find there is no census urban area shading in the project limits, therefore, UPC 98831 is not in a regulated MS4 area and there are no MS4 operators to report.
- Example #2: A 2.4 mile project located in Hanover County is partially within a census urban area, therefore it is considered within a MS4 area. The project area within the urban census area is then reviewed for concentrated storm water runoff discharge points. The runoff exits the project by roadside ditches owned and operated by VDOT. No storm water from the project is discharging

into a system owned by MS4 operator Hanover County, therefore the single reported MS4 operator is VDOT.

- Example #3: VDOT is building a 1.1 mile project located within Virginia Beach. The project is reviewed and concentrated runoff discharges into a ditch along the Interstate, a storm sewer system and local roadside ditches that are all within the census urban area. The Interstate ditch is owned and operated by VDOT, so VDOT would be reported as a MS4 operator. The storm sewer system and local ditches are owned by Virginia Beach, so Virginia Beach would also be reported as a MS4 operator.

- Example #4: A project in Salem District is located at Latitude 37.2381 and Longitude -79.9881. The project is found to be within a census urban area. The discharge points from the project are studied. The concentrated runoff exits the project by a roadside ditch owned and operated by Virginia Western Community College, a storm sewer system owned and operated by Roanoke County and roadside ditches owned and operated by VDOT. Three operators are reported; Virginia Western Community College, Roanoke County and VDOT.

- Example #5: The intersection improvement project of UPC 51927 in Greene County is checked for MS4 coverage. After navigating to the project and zooming out, red dots appear when toggling on the Census Urban Areas from the Layers tab in the VDOT GIS integrator. A Right Click displays the information box that shows *VA Urban Cluster* for Ruckersville. Urban Clusters are not MS4 areas, so there would be no MS4 operators reported.

- Example #6: A road improvement project in Henrico County involves outfalls on a primary road and two secondary roads. VDOT GIS integrator indicates the locations are within a census urban area. VDOT owns and operates the primary system and therefore would be listed as a MS4 operator. Henrico County owns and operates the secondary road system and would be listed as a MS4 operator as well.

- Remark: When discharging directly to Waters of the Commonwealth a MS4 operator is not reported.

Note [8]: Name of person completing the form.

Note [9]: Chesapeake Bay Preservation Act (CBPA) projects are defined as those projects with 2,500 square feet to one acre of land disturbance and located in a Chesapeake Bay Preservation Area as defined by the locality. These projects do not require VPDES Construction Permit coverage but are regulated under the Virginia Stormwater Management Program and require the reporting of land disturbance and BMP data. Except for line 9, this form is to be completed for all CBPA projects and submitted along with the forms for projects requiring VPDES Construction Permit coverage. Only form LD445C needs to accompany this form for the CBPA projects.

List of Abbreviations:
CBPA – Chesapeake Bay Preservation Act
CEDAR – Comprehensive Environmental Data and Reporting System
DEQ – Department of Environmental Quality
GIS – Geographic Information System
HUC – Hydraulic Unit Code
MS4 – Municipal Separate Storm Sewer System
SWM – Stormwater Management
UPC – Universal Project Code
VDOT – Virginia Department of Transportation
VPDES – Virginia Pollutant Discharge Elimination System

VIRGINIA DEPARTMENT OF TRANSPORTATION

VPDES CONSTRUCTION PERMIT CONTACT INFORMATION

Project Number/Identification:

_____

This project is covered under the General Virginia Pollutant Discharge Elimination System Permit for Discharge of Stormwater from Construction Activities (VAR10)

Permit Registration Number: _____

For information about the Stormwater Pollution Prevention Plan (SWPPP) for this activity please contact:

VDOT Contact (name)**:** _____

Phone number: _____

Email: _____

VIRGINIA DEPARTMENT OF TRANSPORTATION
LOCATION AND DESIGN
VPDES CONSTRUCTION PERMIT FEE REGISTRATION FORM

To be submitted with LD-445 form
Use LD-445BInstr for assistance in completing this form

I. VDOT Project Information

Route:		VDOT Project #	
City/County:		UPC#	

II. VDOT Accounting Distribution

Amount (1)	Account (2)	Project UPC (3)	Activity(3a)	Cost Center (4)	Department (4a)
	☐ Federal 5012680 ☐ State 5015410				

III. VDOT Contacts

District VPDES Coordinator (5)	Project Contact (6)
Name:	Name:
Address:	Address:
Phone:	Phone:

LD-445B Instructional Guide

1. **"Amount":** Will be determined according to the Fee Schedule listed below. Fee should be based on the most conservative estimate of Area to be Disturbed.
   Permit Application Fee Schedule:
   - $450.00 for projects with an Area to be disturbed of 1-5 acres.
   - $750.00 for projects with an Area to be Disturbed of 5 acres or greater.

2. **"Account":** Check one or the other.
   - 5012680 for Federally Funded projects
   - 5015410 for State Funded projects

3. **"Project UPC":** Use the 10 digit number. Example: 0000098831. Note: Either the UPC or Cost Center is used, but never both for the same charge.

   a) **"Activity":** You must provide an activity code when using a UPC number and it must be open to charges or *expected* to be open at time of funds transfer (estimated to be 2 months after date of permit application). Example: 616

4. **Cost Center (CSC) number":** Example: 11120010. Note: Either the Cost Center or the UPC is used, but never both for the same charge.

   a) **"Department":** You must provide a Department number when using a Cost Center number. Example: 12013

5. **"District VPDES Coordinator"**: If unknown, contact the District Hydraulics Section to determine whose name goes here.

6. **"Project Contact":** Typically will be the Project Manager or other designated Project Authority

Permit Modifications:

- The State Permit may be modified in accordance with Administrative Code 9VAC25-870-610 for causes listed in Administrative Code 9VAC25-870-630.

- There is a unique case when the actual land disturbance exceeds that which was originally reported on the LD-445. While there is no permit modification fee for VDOT there may be an additional permit fee assessed, which is based on the total disturbed acreage of the site.

    - Example #1: the original application reported 3.50 acres of land disturbance and was assessed a $450.00 permit fee. The project unexpectedly disturbed 6.00 acres and required a modification. The modified permit fee assessment would be $750.00 and the additional fee required from the project would be the difference of the two fee schedules listed in Line Item #1 or $300.00.
    - Example #2: the original application reported 15.50 acres of land disturbance and was assessed a $750.00 permit fee. The project unexpectedly disturbed 19.00 acres and required a modification. There is no change in the permit fee assessed.

Design-Build projects:

- If the Design-Builder contractor is responsible for the permit fee, then:
    - The Design-Builder contractor will submit a check made out to "Treasurer of Virginia".
    - The Design-Builder contractor will include the check along with the LD-445 form submission to the VDOT Project Authority.
    - The LD-445B form requires only the sections with the project information and contacts to be completed.
    - The VDOT Project Authority submits the LD-445 forms and check to the VDOT District VPDES Construction Permit Coordinator in accordance with IIM-LD-242.
    - The VDOT District VPDES Construction Permit Coordinator uploads the LD-445 forms to the InsideVDOT site and sends the check along with a copy of the LD-445B form to the VDOT Central Office VPDES Construction Permit Coordinator for processing.
    - The VDOT Central Office VPDES Construction Permit Coordinator works with the accounting personnel to deposit the check in the proper account.

VIRGINIA DEPARTMENT OF TRANSPORTATION
LOCATION AND DESIGN
EROSION AND SEDIMENT CONTROL (ESC) AND STORMWATER MANAGEMENT (SWM) CERTIFICATION FORM

From: Plan Reviewer _____

To: Project Manager _____

District: _____ Residency: _____

UPC Number: _____ VDOT Project Number: _____

Area to be Disturbed (to the nearest one-hundredth acre): _____

This form shall be completed by the Plan Reviewer and provided to the ESC/SWM Plan Designer. The ESC & SWM Plan Designer shall forward this form to the Project Authority for use in completing the application for a VPDES Construction Permit (if applicable).

This form serves to ensure that a project specific ESC Plan and SWM Plan has been designed/prepared, reviewed, and approved in accordance with the Virginia Department of Transportation's approved ESC & SWM Standards and Specifications.

ESC Plan Reviewer*

The ESC Plan for the project listed above has been reviewed and approved in accordance with the VDOT's approved ESC Standards and Specifications.

Signature: _____ Title: _____

Printed name: _____ Date: _____

*DEQ Certified Plan Reviewer for ESC or Professional Engineer, Land Surveyor, Landscape Architect or Architect with expertise in the field of ESC.

SWM Plan Reviewer**

The SWM Plan for the project listed above has been reviewed and approved in accordance with the VDOT's approved SWM Standards and Specifications.

Signature: _____ Title: _____

Printed name: _____ Date: _____

**DEQ Certified Plan Reviewer for SWM: Individuals seeking SWM certification will be considered provisionally certified for two years from the date they complete their first required training course.

VPDES Construction Permit Coverage Termination Notice
And
Chesapeake Bay Preservation Act Project Reporting Notice [1]

1. **District:** _____
2. **Residency:** _____
3. **County/City** _____
4. **Project #:** _____
5. **UPC#:** _____
6. **Project Latitude* (decimal degrees)** _____
7. **Project Longitude* (decimal degrees)** _____
8. **Permit Registration Number:** _____
9. **Requested Date of Termination:** _____
10. **Reason for terminating coverage (check one)**
    - ☐ Necessary permanent control measures (BMPs) included in the SWPPP for the site are in place and functioning effectively and final stabilization has been achieved on all portions of the site for which the operator is responsible
    - ☐ Another operator has assumed control over all areas of the site that have not been finally stabilized and obtained coverage for the ongoing discharge
    - ☐ Coverage under an alternative VPDES or State permit has been obtained.
11. **Were Permanent Control Measures (BMPs) installed with this project? (**If yes, supply the appropriate information in Section I of this form for each permanent control measure installed.)** **Y/N**
12. **Was an Alternate Permanent Control Measure (BMP), other than the purchase of nutrient credits, utilized for this project? (** If yes, supply the appropriate information in Section II for each alternate BMP utilized.)** **Y/N**
13. **Were Perpetual Nutrient Credits acquired for this project? (** If yes, supply the appropriate information in Section III of this form.)** **Y/N**

*Latitude and Longitude: In decimal degrees to the nearest one ten-thousandth of a degree at the approximate center of the project or BMP location.

** See Section VI of the SWPPP General Information Sheets for this project for BMP information.

Project RLD (Responsible Land Disturber)

I certify that this project meets the conditions checked in Item 10 above and no longer needs coverage under the VPDES General Permit for Storm Water Discharges from Construction Activities (Construction Permit).

Signature: _____

Printed Name: _____

Title: _____ **Date:** _____

Section I - Permanent Control Measures (BMPs) Installed with Project**	
a) Maintenance ID	
b) Type of Permanent Control Measure (BMP) installed	
c) Date that BMP became functional as a permanent control measure	
d) Geographic location (county or city)	
e) Latitude* (decimal degrees)	
f) Longitude* (decimal degrees)	
g) 6th Order HUC. Example: YO28	
h) Receiving water	
i) Name of Impaired Water (2)	
j) Total number of project acres that will be treated (to the nearest one-tenth of an acre)	
k) Total number of project impervious acres that will be treated (to the nearest one-tenth of an acre)	
l) Total number of project pervious acres that will be treated (to the nearest one-tenth of an acre)	
m) Maintenance ID	
n) Type of Permanent Control Measure (BMP) installed	
o) Date that BMP became functional as a permanent control measure	
p) Geographic location (county or city)	
q) Latitude* (decimal degrees)	
r) Longitude* (decimal degrees)	
s) 6th Order HUC. Example: YO28	
t) Receiving water	
u) Name of Impaired Water (2)	
v) Total number of project acres that will be treated (to the nearest one-tenth of an acre)	
w) Total number of project impervious acres that will be treated (to the nearest one-tenth of an acre)	
x) Total number of project pervious acres that will be treated (to the nearest one-tenth of an acre)	

Final approved shop drawings of Manufactured Treatment Devices (MTDs) are to be included with the BMP information submitted with the LD-445D form.

*Latitude and Longitude: In decimal degrees to the nearest one ten-thousandth of a degree at the approximate center of the project or BMP location.

** See Section VI of the SWPPP General Information Sheets for this project for BMP information. For additional BMPs include page 2 of 4 with notice of Permit Termination.

Section II – Alternate BMP's (other than nutrient credits) Utilized by Project ±	
a) Type of BMP installed	
b) Geographic location (county or city)	
c) Latitude* (decimal degrees)	
d) Longitude* (decimal degrees)	
e) 6th Order HUC. Example YO27	
f) Receiving water	
g) Name of Impaired Water (2)	
h) Total number of project acres that will be treated (to the nearest one-tenth of an acre)	
i) Total number of project impervious acres that will be treated (to the nearest one-tenth of an acre)	
j) Total number of project pervious acres that will be treated (to the nearest one-tenth of an acre)	

*Latitude and Longitude: In decimal degrees to the nearest one ten-thousandth of a degree at the approximate center of the project or BMP location.

± See Section VI of the SWPPP General Information Sheets for this project information.

Section III – Perpetual Nutrient Credits Acquired for Project ±	
a) Name of Nonpoint Nutrient Credit Generating Entity	
b) Perpetual Nutrient Credits Acquired (lbs/acre/year, to the nearest one-hundredth of a pound).	

If Nutrient Credits were purchased by others than VDOT an executed Assignment Agreement (including Nutrient Credit Bill of Sale) must be submitted with the BMP Termination information.

NC Assignment Agreement Instructions (Inside VDOT)
NC Assignment Agreement (Inside VDOT)

± See Section VI of the SWPPP General Information Sheets for this project information.

SWM Facility (BMP) Construction Certification ***	
I certify that the stormwater management facilities (BMPs) installed on this project and listed herein were constructed under my direction or supervision in accordance with a system designed to ensure that qualified personnel provided oversight and inspection of such construction. To the best of my knowledge and belief, the BMPs have been constructed in accordance with their approved plans.	
Signature:	
Printed Name:	
Title:	**Date:**
License Number:	

*** The construction of the SWM BMPs shall be certified by a professional registered in the Commonwealth of Virginia (Architect, Professional Engineer, Land Surveyor or Landscape Architect).

Note [1]: Chesapeake Bay Preservation Act (CBPA) projects are defined as those projects with 2,500 square feet to one acre of land disturbance and located in a Chesapeake Bay Preservation Area as defined by the locality. These projects do not require VPDES Construction Permit coverage but are regulated under the Virginia Stormwater Management Program and require the reporting of land disturbance and BMP data. Except for lines 8, 9 & 10 this form is to be completed for all CBPA projects and submitted along with the forms for projects reporting termination of VPDES Construction Permit coverage.

Note [2]: List the name of any impaired water to which the BMP discharges. The determination of impaired water shall be based on those streams listed as impaired in the 2012 305(b)/303(d) Water Quality Assessment Integrated Report and shall be the first named waterbody to which the BMP discharges.

VIRGINIA DEPARTMENT OF TRANSPORTATION
LOCATION AND DESIGN
STORMWATER POLLUTION PREVENTION PLAN (SWPPP) CERTIFICATION

This form is to be completed by the designated Responsible Land Disturber and submitted to the District or Central Office VPDES Permit Coordinator, as appropriate (see IIM-LD 242 and the Drainage Manual, Chapter 1). A copy of this form shall be maintained in the SWPPP document for the land disturbing activity.

DISTRICT _____ RESIDENCY _____

UPC NUMBER _____ VDOT PROJECT NUMBER _____

VPDES PERMIT REGISTRATION NUMBER _____

I certify that all information to be supplied by the contractor noted on the Stormwater Pollution Prevention Plan (SWPPP) General Information Sheets contained in the construction plan set (or other such documents) will be reviewed, approved and included with the other documents related to the SWPPP for this land disturbance activity prior to implementation of work in those areas identified by such information. I further certify that this document and all other documents related to the SWPPP, as identified on the SWPPP General Information Sheets, are maintained at the activity site, or at a location convenient to the activity site where no on-site facilities are available, and such documents will be made available for review upon request in accordance with the provisions of the General VPDES Permit for Discharges of Stormwater from Construction Activities (VAR10). Where the SWPPP documents are not stored on-site, a copy of such documents shall be in the possession of those with day to day operational control over the implementation of the SWPPP whenever they are on site.

The VDOT person responsible for the inspection of the erosion and sediment control and pollution prevention measures for this land disturbing activity is: _____, who is certified through the Virginia Department of Environmental Quality ESC Inspector Certification Program and is knowledgeable in the area of pollution prevention at construction sites.

Signature: _____

Printed Name: _____

Title: _____ Date: _____

SECTION 106 - CONTROL OF MATERIAL

106.03 - Local Material Sources (Pits and Quarries)

The requirements set forth herein apply exclusively to non-commercial pits and quarries from which materials are obtained for use on contracts awarded by the Department.

Local material sources shall be concealed from view from the completed roadway and any existing public roadway. Concealment shall be accomplished by selectively locating the pit or quarry and spoil pile, providing environmentally compatible screening between the pit or quarry site and the roadway, or using the site for another purpose after removal of the material, or restoration equivalent to the original use (such as farm land, pasture, turf, etc.). The foregoing requirements shall also apply to any pit or quarry opened or reopened by a subcontractor or supplier. However, the requirements will not apply to commercial sand and gravel and quarry operations actively processing material at the site prior to the date of the Notice of Advertisement.

The Contractor shall furnish the Engineer a statement signed by the property owner in which the property owner agrees to the use of his property as a source of material for the project. Upon completion of the use of the property as a material source, the Contractor shall furnish the Engineer a release signed by the property owner indicating that the property has been satisfactorily restored. This requirement will be waived for commercial sources, sources owned by the Contractor, and sources furnished by the Department.

Local material pits and quarries that are not operated under a local or State permit shall not be opened or reopened without authorization by the Engineer. The Contractor shall submit for approval a site plan, including, but not limited to, the following

(1) the location and approximate boundaries of the excavation;

(2) procedures to minimize erosion and siltation;

(3) provision of environmentally compatible screening;

(4) restoration;

(5) cover vegetation;

(6) other use of the pit or quarry after removal of material, including the spoil pile;

(7) the drainage pattern on and away from the area of land affected, including the directional flow of water and a certification with appropriate calculations that verify all receiving channels are in compliance with Minimum Standard 19 of the Virginia Erosion and Sediment Control Regulations;

(8) location of haul roads and stabilized construction entrances if construction equipment will enter a paved roadway;

(9) constructed or natural waterways used for discharge;

(10) a sequence and schedule to achieve the approved plan and;

(11) the total drainage area for temporary sediment traps and basins shall be shown. Sediment traps are required if the runoff from a watershed area of less than three acres flows across a disturbed area. Sediment basins are required if the runoff from a watershed area of three acres or more flows across a disturbed area. The Contractor

shall certify that the sediment trap or basin design is in compliance with VDOT Standards and Specifications, and all local, state, and federal laws. Once a sediment trap or basin is constructed, the dam and all outfall areas shall be immediately stabilized.

The Contractor's design and restoration shall be in accordance with the Contract requirements and in accordance with the requirements of the federal, state, and local laws and regulations.

If the approved plan provides for the continued use or other use of the pit or quarry beyond the date of final acceptance, the Contractor shall furnish the Department a bond made payable to the Commonwealth of Virginia in an amount equal to the Engineer's estimate of the cost of performing the restoration work. If the pit or quarry is not used in accordance with the approved plan within 8 months after final acceptance, the Contractor shall perform restoration work as directed by the Engineer, forfeit his bond, or furnish the Engineer with evidence that he has complied with the applicable requirements of the State Mining Law.

Topsoil on Department owned or furnished borrow sites shall be stripped and stockpiled as directed by the Engineer for use as needed within the construction limits of the project or in the reclamation of borrow and disposal areas.

If payment is to be made for material measured in its original position, material shall not be removed until Digital Terrain Model (DTM) or cross-sections have been taken. The material shall be reserved exclusively for use on the project until completion of the project or until final DTM or cross-sections have been taken.

If the Contractor fails to provide necessary controls to prevent erosion and siltation, if such efforts are not made in accordance with the approved sequence, or if the efforts are found to be inadequate the Department will withdraw approval for the use of the site and may cause the Contractor to cease all contributing operations and direct his efforts toward corrective action or may perform the work with state forces or other means as determined by the Engineer. If the work is not performed by the Contractor, the cost of performing the work, plus 25 percent for supervisory and administrative personnel, will be deducted from monies due the Contractor.

Costs for applying seed, fertilizer, lime, and mulch; restoration; drainage; erosion and siltation control; regrading; haul roads; and screening shall be included in the Contract price for the type of excavation or other appropriate items.

If the Contractor fails to fulfill the provisions of the approved plan for screening or restoring material sources, the Department may withhold and use for the purpose of performing such work any monies due the Contractor at the time of the final estimate. The Contractor shall be held liable for penalties, fines, or damages incurred by the Department as a result of his failure to prevent erosion or siltation and take restorative action.

After removing the material, the Contractor shall remove metal, lumber, and other debris resulting from his operations and shall shape and landscape the area in accordance with the approved plan for such work.

(a) **Sources Furnished by the Department:** Sources furnished by the Department will be made available to the Contractor together with the right to use such property as may be required for a plant site, stockpiles, and haul roads. The Contractor shall confine his excavation operations to those areas of the property specified in the Contract.

The Contractor shall be responsible for excavation that shall be performed in order to furnish the specified material.

(b) **Sources Furnished by the Contractor:** When the Contractor desires to use local material from sources other than those furnished by the Department, he shall first secure

the approval of the Engineer. The use of material from such sources will not be permitted until test results have been approved by the Engineer and written authority for its use has been issued.

The Contractor shall acquire the necessary rights to take material from sources he locates and shall pay all related costs, including costs that may result from an increase in the length of the haul. Costs of exploring, sampling, testing, and developing such sources shall be borne by the Contractor. The Contractor shall obtain representative samples from at least two borings in parcels of 10 acres or less and at least three additional borings per increment of 5 acres or portion thereof to ensure that lateral changes in material are recorded. Drill logs for each test shall include a soil description and the moisture content at intervals where a soil change is observed or at least every 5 feet of depth for consistent material. Samples obtained from the boring shall be tested by an approved laboratory for grading, Atterberg limits, CBR, maximum density, and optimum moisture. The Department will review and evaluate the material based on test results provided by the Contractor. The Department will reject any material from a previously approved source that fails a visual examination or whose test results show that it does not conform to the Specifications or specific contract requirements.

106.04 - Disposal Areas

Unsuitable or surplus material shown on the plans shall be disposed of as specified herein. Material not used on the project shall be disposed of by the Contractor off the right of way. The Contractor shall obtain the necessary rights to property to be used as an approved disposal area. For the purpose of this Specification an approved disposal area is defined as that which is owned privately, not operated under a local or State permit and has been approved by the Department for use in disposing of material not used on the project.

When neither unsuitable nor surplus material is shown on the plans, the Contractor shall dispose of it as shown herein.

Prior to the Department approving a disposal area, the Contractor shall submit a site plan. The plan shall show:

(1) the location and approximate boundaries of the disposal area;

(2) procedures to minimize erosion and siltation;

(3) provision of environmentally compatible screening;

(4) restoration;

(5) cover vegetation;

(6) other use of the disposal site;

(7) the drainage pattern on and away from the area of land affected, including the directional flow of water and a certification with appropriate calculations that verify all receiving channels are in compliance with Minimum Standard 19 of the Virginia Erosion and Sediment Control Regulations;

(8) location of haul roads and stabilized construction entrances if construction equipment will enter a paved roadway;

(9) constructed or natural waterways used for discharge;

(10) a sequence and schedule to achieve the approved plan and;

(11) the total drainage area for temporary sediment traps and basins shall be shown. Sediment traps are required if the runoff from a watershed area of less than three acres flows across a disturbed area. Sediment basins are required if the runoff from a watershed area of three acres or more flows across a disturbed area. The Contractor shall certify that the sediment trap or basin design is in compliance with VDOT Standards and Specifications~~,~~ all local, state, and federal laws. Once a sediment trap or basin is constructed, the dam and all outfall areas shall be immediately stabilized.

Disposal areas shall be cleared but need not be grubbed. The clearing work shall not damage grass, shrubs, or vegetation outside the limits of the approved area and haul roads thereto. After the material has been deposited, the area shall be shaped to minimize erosion and siltation of nearby streams and landscaped in accordance with the approved plan for such work or shall be used as approved by the Engineer. The Contractor's design and restoration shall conform to the requirements of the contract and federal, state, and local laws and regulations.

If the Contractor fails to provide and maintain necessary controls to prevent erosion and siltation, if such efforts are not made in accordance with the approved sequence, or if the efforts are found to be inadequate, the Department will withdraw approval for the use of the site and may cause the Contractor to cease all contributing operations and direct his efforts toward corrective action or may perform the work with state forces or other means as determined by the Engineer. If the work is not performed by the Contractor, the cost of performing the work, plus 25 percent for supervisory and administrative personnel, will be deducted from monies due the Contractor.

The Contractor shall furnish the Engineer a statement signed by the property owner in which the owner agrees to the use of his property for the deposit of material from the project. Upon completion of the use of the property as an approved disposal area, the Contractor shall furnish the Engineer a release signed by the property owner indicating that the property has been satisfactorily restored. This requirement will be waived for commercial sources, sources owned by the Contractor, and sources furnished by the Department.

Material encountered by the Contractor shall be handled as follows:

(a) **Unsuitable material** for the purpose of this Specification is defined as material having poor bearing capacity, excessive moisture content, extreme plasticity or other characteristics as defined by the Engineer that makes it unacceptable for use in the work and shall be disposed of at an approved disposal area or landfill licensed to receive such material.

(b) **Surplus material** as shown on the plans shall be disposed of by flattening slopes, used to fill in ramp gores and medians, or if not needed, disposed of at an approved disposal area or a landfill licensed to receive such material.

Surplus material stockpile areas on the right-of-way shall be cleared but need not be grubbed. The clearing work shall not damage grass, shrubs, or vegetation outside the limits of the approved area and the haul roads thereto. Placement of fill material shall not adversely affect existing drainage structures. If necessary, modified existing drainage structures, as approved by the Engineer, shall be paid for in accordance with the Contract Documents. Within 7 days after the material has been deposited, the area shall be shaped and stabilized to minimize erosion and siltation.

(c) **Organic materials** such as, but not limited to, tree stumps and limbs (not considered merchantable timber), roots, rootmat, leaves, grass cuttings, or other similar materials shall be chipped or shredded and used on the project as mulch, given away, sold as firewood or mulch, burned at the Contractor's option if permitted by local ordinance, or disposed of at a facility licensed to receive such materials. Organic material shall not be buried in state rights of way or in an approved disposal area.

(d) **Rootmat** for the purpose of this Specification is defined as any material that, by volume, contains approximately 60 percent or more roots and shall be disposed of in accordance with (c) herein.

(e) **Inorganic materials** such as brick, cinder block, broken concrete without exposed reinforcing steel, or other such material shall be disposed of at an approved disposal area or landfill licensed to receive such materials. If disposed of in an approved disposal area, the material shall have enough cover to promote soil stabilization in accordance with the requirements of Section 303 and shall be restored in accordance with other provisions of this Section.

(f) **Excavated rock** in excess of that used within the project site in accordance with the requirements of Section 303 shall be treated as surplus material.

(g) **Other materials** such as, but not limited to, antifreeze, asphalt (liquid), building forms, concrete with reinforcing steel exposed, curing compound, fuel, hazardous materials, lubricants, metal, metal pipe, oil, paint, wood or metal from building demolition, or similar materials shall not be disposed of at an approved disposal area but shall be disposed of at a landfill licensed to receive such material.

Section 106.08—Storing Materials

Chemicals, fuels, lubricants, bitumens, paints, raw sewage, and other potential pollutant-generating materials as determined by the Engineer or defined in the VPDES *General Permit For Discharge of Stormwater From Construction Activities* shall not be stored within any flood-prone area unless no other location is available. A flood-prone area is defined as the area adjacent to the main channel of a river, stream or other waterbody that is susceptible to being inundated by water during storm events and includes, but is not limited to, the floodplain, the flood fringe, wetlands, riparian buffers or other such areas adjacent to the main channel. If stored in a flood-prone area, the material shall be stored in one or more secondary containment structures with an impervious liner and be removed entirely from the flood-prone area at least 24 hours prior to an anticipated storm event that could potentially inundate the storage area. Any storage of these materials outside of a flood-prone area that is in proximity to natural or man-made drainage conveyances where the materials could potentially reach a river, stream, or other waterbody if a release or spill were to occur, must be stored in a bermed or diked area or inside a secondary containment structure capable of preventing a release. Any spills, leaks or releases of such materials shall be addressed in accordance with Section 107.16(b) and (e) of the Specifications. Accumulated rain water shall be pumped out of impoundment or containment areas into approved filtering devices. All proposed pollution prevention measures and practices must be identified by the Contractor in his Pollution Prevention Plan as required by the Specifications, other contract documents and/or the VDPES *General Permit for Discharge of Stormwater from Construction Activities.*

SECTION 107—LEGAL RESPONSIBILITIES

107.01 - Laws To Be Observed

The Contractor shall keep fully informed of federal, state, and local laws, bylaws, ordinances, orders, decrees, and regulations of governing bodies, courts, and agencies having any jurisdiction or authority that affects those engaged or employed on the work, the conduct of the work, or the execution of any documents in connection with the work. The Contractor shall observe and comply with such laws, ordinances, regulations, orders, or decrees and shall indemnify and hold harmless the Commonwealth and its agents, officers, or employees against any claim for liability arising from or based on their violation, whether by himself, his agents, his employees, or subcontractors. The Contractor shall execute and file the documents, statements, and affidavits required under any applicable federal or state law or regulation required by or affecting his bid or Contract or prosecution of the work there under. The Contractor shall permit examination of any records made subject to such examination by any federal or state law or by regulations promulgated there under by any state or federal agency charged with enforcement of such law.

In accordance with the *Code of Virginia* (Virginia Public Procurement Act), the Contractor shall make payment to all subcontractors, as defined in the Code, within seven days after receipt of payment from the Department; or shall notify the Department and subcontractor in writing of his intention to withhold all or a part of the amount due along with the reason for nonpayment.

In the event payment is not made as noted, the Contractor shall pay interest in accordance with the terms of the General Conditions of the Construction Contract, unless otherwise provided in the Contract, to the subcontractor on all amounts that remain unpaid after seven days except for the amounts withheld as provided in this Section.

These same requirements shall be included in each subcontract and shall be applicable to each lower-tier subcontractor.

107.02—Permits, Certificates, and Licenses.

General

The Contractor shall conform to the permit conditions as shown in the contract documents. Construction methods shall confirm to the stipulations of the permit and/or certification conditions. The Contractor shall assume all obligations and costs incurred as a result of complying with the terms and conditions of the permits and certificates.

If any of the permits shown herein are applicable to the project, the contract documents will indicate such and the applicable permit conditions will be included in the contract documents.

a) **Virginia Department of Environmental Quality – VPDES General Permit For Discharge of Stormwater From Construction Activities (VPDES Construction Permit)**: All construction activities undertaken by or for VDOT involving land disturbances equal to or exceeding one acre must be covered by the VPDES Construction Permit. According to IIM-LD-242 and Section 107.16 of the Specifications, VDOT is responsible for securing VPDES Construction Permit coverage for all applicable land disturbing activities performed on VDOT rights of way or easements, including off-site support facilities that are located on VDOT rights of way or easements that directly relate to the construction site activity. The Contractor shall be responsible for securing VPDES Construction Permit coverage for support facilities that are not located on VDOT rights of way or easements.

The Contractor shall be responsible for all costs to obtain VPDES Construction Permit coverage for all support facilities (both on-site and off-site) not included in the construction plans or contract documents for the project. The Department will not be responsible for any inconvenience, delay, or loss experienced by the Contractor as a result of his failure to gain access to any support facility areas at the time contemplated.

b) **Other Permits, Certificates and Licenses**: Except as otherwise specified herein, the Contractor shall procure all necessary permits, certificates or licenses that have not been obtained by the Department. The Contractor shall pay all charges, fees, and taxes and shall comply with all conditions of the permits, certificates or licenses.

Construction or excavation material shall not be stored within the waterway or wetlands. Cofferdams, stream channel retaining structures and all necessary dikes shall be constructed of non-erodible materials or if specified in the permit(s), faced with coarse non-erodible materials. If faced with non-erodible material, filter cloth shall be placed between the granular fill and riprap in accordance with Section 245, 204, 303.03 and 414. Temporary structures shall be removed from the waterway with minimal disturbance of the streambed. Discharge of dredge or fill material shall be placed in accordance with the best management practice, project permits and all applicable laws and regulations. Dredged or fill material shall be removed to an approved, contained, upland location in accordance with Section 106.04. The disposal area will be of sufficient size and capacity to properly contain the dredge material, to allow for adequate dewatering and settling of sediment, and to prevent overtopping. The disposal area shall be stabilized prior to placement of dredge material.

The Contractor activities shall not substantially disrupt the movement of those species of aquatic life indigenous to the water body including those species that normally migrate through the area. The Contractor to the maximum extent practicable shall not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of the water. The Contractor shall avoid and minimize all temporary disturbances to surface waters during construction. The Contractor shall remove any temporary fill in its entirety and the affected areas returned to their preexisting elevation conditions within 30 days of completing work, which shall include re-establishing pre-construction contours, and planting or seeding with appropriate wetland vegetation according to cover type (emergent, scrub/shrub, or forested). The Contractor shall perform all work activities during low-flow conditions and shall isolate the construction area via the implementation of nonerodible cofferdams, sheetpiling, stream diversions or similar structures.

The Contractor shall accomplish all construction, construction access (e.g., cofferdams, sheetpiling, and causeways) and demolition activities associated with this project in a manner that minimizes construction or waste materials from entering surface waters. Access roads and associated bridges or culverts shall be constructed to minimize the adverse effects on surface waters. Access roads constructed above preconstruction contours and elevations in surface waters must be bridged or culverted to maintain surface flows. All utility line work in surface waters shall be performed in a manner that minimizes disturbance, and the area shall be returned to its original contours and restored within 30 days of completing work in the area.

The Contractor shall 1) stockpile excavated material in a manner that prevents reentry into the stream, 2) restore original streambed and streambank contours, 3) revegitate barren areas, and 4) implement strict erosion and sediment control measures throughout the project period.

The Contractor shall provide fill material that is clean and free of contaminants in toxic concentrations or amounts in accordance with all applicable laws and regulations. The Contractor shall comply with all applicable FEMA-approved state or local floodplain management requirements.

The Contractor shall adhere to any time-of-year restriction conditions as required by state and federal permitting agencies. No in-stream work shall be permitted during in-stream time-of-year restriction.

The Contractor shall prohibit wet or uncured concrete from entry into surface waters. The Contractor shall not dispose of excess or waste concrete in surface waters and prevent wash water from discharging into surface waters. The Contractor shall employ measures to prevent spills of fuels or lubricants into state waters. All pollution prevention measures and practices proposed by the Contractor shall be identified in the Contractor's Pollution Prevention Plan as required by the Specifications, other contract documents and/or the VPDES *General Permit For Discharge of Stormwater From Construction Activities.*

The Contractor shall not violate the water quality standards as a result of the construction activities. The Contractor shall not alter the physical, chemical, or biological properties of surface waters and wetlands or make them detrimental to the public health, to animal or aquatic life, to the uses of such waters for domestic or industrial consumption, for recreation, or for other uses.

The Contractor shall not proceed with work covered by a permit until the work is released in writing by the Engineer.

If the Department has not released work covered by a U.S. Army Corps of Engineers permit and the Contractor has completed all other work within the limits of the project, the Contractor shall so advise the Engineer in writing. Upon receipt of the notification, the Engineer will evaluate the status of the project and advise the Contractor within 45 days of the portion of the project that is acceptable under the terms of the Specifications and General Conditions of the Construction Contract. If the Engineer determines that all of the work except that encumbered by the permit application is acceptable under the requirements of the Specifications and General Conditions of the Construction Contract, the Contractor will be notified accordingly. The Department or the Contractor may then elect to continue or terminate the remaining portion of the Contract.

The party electing to terminate the Contract shall so advise the other party in writing after the 45-day period. The terms of contract termination will be in accordance with the requirements of the General Conditions of the Construction Contract. No compensation will be made for delays encountered or for work not performed except for an extension of time as determined in accordance with the requirements of the General Conditions of the Construction Contract.

The Contractor shall submit a request to the Engineer in writing if he wants to deviate from the plans or change his proposed method(s) regarding any proposed work located in waterways or wetlands. Such work may require additional environmental permits. If the Engineer determines that the activities are necessary for completion of the work, the Contractor shall furnish the Engineer all necessary information pertaining to the activity. The Contractor shall be responsible for designing and supplying all plans, sketches and notes necessary to acquire any permit modification required for changes in the proposed construction methods. Such information shall be furnished at least 180 days prior to the date the proposed changed activity is to begin. For other than the VPDES *General Permit For Discharge of Stormwater From Construction Activities,* the District Environmental Manager will apply for the necessary permits modifications to the permits obtained by the Department. The Contractor shall not begin the activity until directed to do so by the Engineer. Additional compensation will not be made for delay to the work or change in the Contractor's proposed methods that result from jurisdiction agency review or disapproval of Contractor's proposed methods.

If additional permits are required to perform dredging for flotation of construction equipment or for other permanent or temporary work as indicated in the Contractor's accepted plan of operation, but have not been obtained by the Department, the Contractor shall furnish the Engineer, at least 75 days prior to the proposed activity, all necessary information pertaining to the proposed activity in order for the Department to apply for the permits. The Contractor shall not begin the proposed

activity until the additional permits have been secured and the Engineer has advised the Contractor that the proposed activity may proceed.

The Contractor shall permit representatives of state and federal environmental regulatory agencies to make inspections at any time in order to insure that the activity being performed under authority of the permit(s) is in accordance with the terms and conditions prescribed herein.

107.16 - Environmental Stipulations

By signing the bid, the bidder shall have stipulated (1) that any facility to be used in the performance of the Contract (unless the Contract is exempt under the Clean Air Act as amended [42 U.S.C. 1857, et seq., as amended by P.L. 91-604], the Federal Water Pollution Control Act as amended [33 U.S.C. 1251 et seq. as amended by P.L. 92-500], and Executive Order 11738 and regulations in implementation thereof [40 C.F.R., Part 15]) is not listed on the EPA's List of Violating Facilities pursuant to 40 C.F.R. 15.20; and (2) that the Department will be promptly notified prior to the award of the Contract if the bidder receives any communication from the Director, Office of Federal Activities, EPA, indicating that a facility to be used for the Contract is under consideration to be listed on the EPA's List of Violating Facilities.

No separate payment will be made for the work or precautions described herein except where provided for as a specific item in the Contract or except where provision has been made for such payment in these Specifications.

Reference is made in various subsections of this section to Tidewater, Virginia. For the purposes of identifying the affected regions assigned to this designation and the requirements therein Tidewater, Virginia is defined as the Counties of Accomack, Arlington, Caroline, Charles City, Chesterfield, Essex, Fairfax, Gloucester, Hanover, Henrico, Isle of Wight, James City, King George, King and Queen, King William, Lancaster, Mathews, Middlesex, New Kent, Northampton, Northumberland, Prince George, Prince William, Richmond, Spotsylvania, Stafford, Surry, Westmoreland and York and the Cities of Alexandria, Chesapeake, Colonial Heights, Fairfax, Falls Church, Fredericksburg, Hampton, Hopewell, Newport News, Norfolk, Petersburg, Poquoson, Portsmouth, Richmond, Suffolk, Virginia Beach and Williamsburg.

a) **Erosion and Siltation**: The Contractor shall exercise every reasonable precaution, including temporary and permanent soil stabilization measures, throughout the duration of the project to control erosion and prevent siltation of adjacent lands, rivers, streams, wetlands, lakes, and impoundments. Soil stabilization and/or erosion control measures shall be applied to erodible soil or ground materials exposed by any activity associated with construction, including clearing, grubbing, and grading, but not limited to local or on-site sources of materials, stockpiles, disposal areas and haul roads.

   The Contractor shall comply with the requirements of Sections 301.02 and 303.03 of the Specifications. Should the Contractor as a result of negligence or noncompliance, fail to provide soil stabilization in accordance with these specifications, the cost of temporary soil stabilization in accordance with the provisions of Section 303 of the Specifications shall be at the Contractor's expense. If the delay in stabilizing an exposed area of land is due to circumstances beyond the Contractor's control, the Department will be responsible for the expense.

   Temporary measures shall be coordinated with the work to ensure effective and continuous erosion and sediment control. Permanent erosion control measures and drainage facilities shall be installed as the work progresses.

   For projects that disturb 10,000 square feet or greater of land or 2,500 square feet or greater in Tidewater, Virginia, the Contractor shall have within the limits of the project during land disturbance activities, an employee certified by the Department in erosion

and sediment control who shall inspect erosion and sediment control and pollution prevention practices, devices and measures for proper installation and operation and promptly report their findings to the Inspector. Failure on the part of the Contractor to maintain appropriate erosion and sediment control or pollution prevention devices in a functioning condition may result in the Engineer notifying the Contractor in writing of specific deficiencies. Deficiencies shall be corrected immediately or as otherwise directed by the Engineer. If the Contractor fails to correct or take appropriate actions to correct the specified deficiencies within 24 hours (or as otherwise directed) after receipt of such notification, the Department may do one or more of the following: require the Contractor to suspend work in other areas and concentrate efforts towards correcting the specified deficiencies, withhold payment of monthly progress estimates, or proceed to correct the specified deficiencies and deduct the entire cost of such work from monies due the Contractor. Failure on the part of the Contractor to maintain a Department certified erosion and sediment control employee within the project limits when land disturbance activities are being performed will result in the Engineer suspending work related to any land disturbance activity until such time as the Contractor is in compliance with this requirement.

(b) **Pollution:**

1. **Water:** The Contractor shall exercise every reasonable precaution throughout the duration of the project to prevent pollution of rivers, streams, and impoundments. Pollutants such as, but not limited to, chemicals, fuels, lubricants, bitumens, raw sewage, paints, sedimentation, and other harmful material shall not be discharged into or alongside rivers, streams, or impoundments or into channels leading to them. The Contractor shall provide the Engineer a contingency plan for reporting and immediate actions to be taken in the event of a dump, discharge, or spill within eight hours after he has mobilized to the project site.

   Construction discharge water shall be filtered to remove deleterious materials prior to discharge into state waters. Filtering shall be accomplished by the use of a standard dewatering basin or a dewatering bag or other measures approved by the Engineer. Dewatering bags shall conform to the requirements of Section 245 of the Specifications. During specified spawning seasons, discharges and construction activities in spawning areas of state waters shall be restricted so as not to disturb or inhibit aquatic species that are indigenous to the waters. Neither water nor other effluence shall be discharged onto wetlands or breeding or nesting areas of migratory waterfowl. When used extensively in wetlands, heavy equipment shall be placed on mats. Temporary construction fills and mats in wetlands and flood plains shall be constructed of approved nonerodible materials and shall be removed by the Contractor to natural ground when the Engineer so directs.

   If the Contractor dumps, discharges, or spills any oil or chemical that reaches or has the potential to reach a waterway, he shall immediately notify all appropriate jurisdictional state and federal agencies in accordance with the requirements of Section 107.01 and 107.16(e) of the Specifications and the VPDES *General Permit For Discharge of Stormwater From Construction Activities* and shall take immediate actions to contain, remove, and properly dispose of the oil or chemical.

   Solids, sludges or other pollutants removed in the course of the treatment or management of pollutants shall be disposed of in a manner that prevents any pollutant from such materials from entering surface waters in compliance with all applicable state and federal laws and regulations.

Excavation material shall be disposed of in approved areas above the mean high water mark shown on the plans in a manner that will prevent the return of solid or suspended materials to state waters. If the mark is not shown on the plans, the mean high water mark shall be considered the elevation of the top of stream banks.

Constructing new bridge(s) and dismantling and removing existing bridge(s) shall be accomplished in a manner that will prevent the dumping or discharge of construction or disposable materials into rivers, streams, or impoundments.

Construction operations in rivers, streams, or impoundments shall be restricted to those areas where identified on the plans and to those that must be entered for the construction of structures. Rivers, streams, and impoundments shall be cleared of falsework, piling, debris, or other obstructions placed therein or caused by construction operations. Stabilization of the streambed and banks shall occur immediately upon completion of work or if work is suspended for more than 14 days.

The Contractor shall prevent stream constriction that would reduce stream flows below the minimum, as defined by the State Water Control Board, during construction operations.

If it is necessary to relocate an existing stream or drainage facility temporarily to facilitate construction, the Contractor shall design and provide temporary channels or culverts of adequate size to carry the normal flow of the stream or drainage facility. The Contractor shall submit a temporary relocation design to the Engineer for review and acceptance in sufficient time to allow for discussion and correction prior to beginning the work the design covers. Costs for the temporary relocation of the stream or drainage facility shall be included in the Contract price for the related pipe or box culvert, unless specifically provided for under another Pay Item. Stabilization of the streambed and banks shall occur immediately upon completion of, or during the work or if the work is suspended for more than 14 days.

Temporary bridges or other minimally invasive structures shall be used wherever the Contractor finds it necessary to cross a stream more than twice in a 6 month period, unless otherwise authorized by water quality permits issued by the U. S. Army Corps of Engineers, Virginia Marine Resources Commission or the Virginia Department of Environmental Quality for the Contract.

2. **Air:** The Contractor shall comply with the provisions of the Contract Documents and the State Air Pollution Control Law and Rules of the State Air Pollution Control Board, including notifications required therein.

   Burning shall be performed in accordance with all applicable local laws and ordinances and under the constant surveillance of watchpersons. Care shall be taken so that the burning of materials does not destroy or damage property or cause excessive air pollution. The Contractor shall not burn rubber tires, asphalt, used crankcase oil, or other materials that produce dense smoke. Burning shall not be initiated when atmospheric conditions are such that smoke will create a hazard to the motoring public or airport operations. Provisions shall be made for flagging vehicular traffic if visibility is obstructed or impaired by smoke. At no time shall a fire be left unattended.

Asphalt mixing plants shall be designed, equipped, and operated so that the amount and quality of air pollutants emitted will conform to the rules of the State Air Pollution Control Board.

Emission standards for asbestos incorporated in the EPA's National Emission Standards for Hazardous Air Pollutants apply to the demolition or renovation of any institutional, commercial, or industrial building, structure, facility, installation, or portion thereof that contains friable asbestos or where the Contractor's methods for such actions will produce friable asbestos.

3. **Noise:** The Contractor's operations shall be performed so that exterior noise levels measured during a noise-sensitive activity shall not exceed 80 decibels. Such noise level measurements shall be taken at a point on the perimeter of the construction limit that is closest to the adjoining property on which a noise sensitive activity is occurring. A *noise-sensitive activity* is any activity for which lowered noise levels are essential if the activity is to serve its intended purpose and not present an unreasonable public nuisance. Such activities include, but are not limited to, those associated with residences, hospitals, nursing homes, churches, schools, libraries, parks, and recreational areas.

   The Department may monitor construction-related noise. If construction noise levels exceed 80 decibels during noise sensitive activities, the Contractor shall take corrective action before proceeding with operations. The Contractor shall be responsible for costs associated with the abatement of construction noise and the delay of operations attributable to noncompliance with these requirements.

   The Department may prohibit or restrict to certain portions of the project any work that produces objectionable noise between 10 P.M. and 6 A.M. If other hours are established by local ordinance, the local ordinance shall govern.

   Equipment shall in no way be altered so as to result in noise levels that are greater than those produced by the original equipment.

   When feasible, the Contractor shall establish haul routes that direct his vehicles away from developed areas and ensure that noise from hauling operations is kept to a minimum.

   These requirements shall not be applicable if the noise produced by sources other than the Contractor's operation at the point of reception is greater than the noise from the Contractor's operation at the same point.

(c) **Forests:** The Contractor shall take all reasonable precautions to prevent and suppress forest fires in any area involved in construction operations or occupied by him as a result of such operations. The Contractor shall cooperate with the proper authorities of the state and federal governments in reporting, preventing, and suppressing forest fires. Labor, tools, or equipment furnished by the Contractor upon the order of any forest official issued under authority granted the official by law shall not be considered a part of the Contract. The Contractor shall negotiate with the proper forest official for compensation for such labor, tools, or equipment

(d) **Archeological, Paleontological, and Rare Mineralogical Findings:** In the event of the discovery of prehistoric ruins, Indian or early settler sites, burial grounds, relics, fossils, meteorites, or other articles of archeological, paleontological, or rare mineralogical interest during the prosecution of work, the Contractor shall act immediately to suspend work at the site of the discovery and notify the Engineer. The Engineer will immediately notify the proper state authority charged with the responsibility of investigating and

evaluating such finds. The Contractor shall cooperate and, upon the request of the Engineer, assist in protecting, mapping, and removing the findings. Labor, tools, or equipment furnished by the Contractor for such work will be paid for in accordance with the requirements of the Contract Documents. Findings shall become the property of the Commonwealth unless they are located on federal lands, in which event they shall become the property of the U.S. government.

When such findings delay the progress or performance of the work, the Contractor shall notify the Engineer in accordance with the provisions of the Contract Documents.

(e) **Storm Water Pollution Prevention Plan and VPDES General Permit for the Discharge of Stormwater from Construction Activities**

A Stormwater Pollution Prevention Plan (SWPPP) identifies potential sources of pollutants which may reasonably be expected to affect the stormwater discharges from the construction site and any on-site or off-site support facilities located on VDOT rights of way and easements. The SWPPP also describes and ensures implementation of practices which will be used to minimize or prevent pollutants in such discharges.

The SWPPP shall include, but not be limited to, the approved Erosion and Sediment Control (ESC) Plan, the approved Stormwater Management (SWM) Plan (if applicable), the approved Pollution Prevention Plan and all related Specifications and Standards and notes contained within all contract documents and shall be required for all land-disturbing activities that disturb 10,000 square feet or greater, or 2,500 square feet or greater in Tidewater, Virginia.

Land-disturbing activities that disturb one acre or greater require coverage under the Department of Environmental Quality's VPDES General Permit for the Discharge of Stormwater from Construction Activities (hereafter referred to as the VPDES Construction Permit). According to IIM-LD-242, VDOT will apply for and secure VPDES Construction Permit coverage for all applicable land disturbing activities on VDOT rights of way or easements for which it has contractual control, including off-site (outside the project limits) support facilities on VDOT rights of way or easements that directly relate to the construction activity.

The Contractor shall be responsible for securing VPDES Construction Permit coverage and complying with all permit conditions for all support facilities that are not located on VDOT rights of way or easements.

The required contents of a SWPPP for those land disturbance activities requiring coverage under the VPDES Construction Permit are found in Section II of the permit.

While a SWPPP is an important component of the VPDES Construction Permit, it is only one of the many requirements that must be addressed in order to be in full compliance with the conditions of the permit.

The Contractor and all other persons that oversee or perform activities covered by the VPDES Construction Permit shall be responsible for reading, understanding, and complying with all of the terms, conditions and requirements of the permit and the project's SWPPP including, but not limited to, the following:

1. Project Implementation Responsibilities

   The Contractor shall be responsible for the installation, maintenance, inspection, and, on a daily basis, ensuring the functionality of all erosion and sediment control measures and all other stormwater runoff control and pollution prevention

measures identified within or referenced within the SWPPP, the construction plans, the specifications, all applicable permits, and all other contract documents.

The Contractor shall be solely responsible for the temporary erosion and sediment control protection and permanent stabilization of all borrow areas and soil disposal areas located outside of VDOT right of way or easement.

The Contractor shall prevent or minimize any stormwater or non-stormwater discharge that will have a reasonable likelihood of adversely affecting human health or public and/or private properties.

2. Certification Requirements

In addition to satisfying the personnel certification requirements contained in Section 107.16(a) of the Specifications, the Contractor shall certify his activities by completing, signing, and submitting Form C-45 VDOT SWPPP Contractor Certification Statement to the Engineer at least 7 days prior to commencing any project related land-disturbing activities, both within the project limits and any support facilities located on VDOT rights of way or easements outside the project limits.

3. SWPPP Requirements for Support Facilities

VDOT will secure VSMP Construction Permit coverage for support facilities located on VDOT rights of way or easements according to IIM-LD-242. The Contractor shall be responsible for securing separate VSMP Construction Permit coverage for support facilities that are not located on VDOT rights of way or easements.

Support facilities shall include, but not be limited to, borrow and disposal areas, construction and waste material storage areas, equipment and vehicle washing, maintenance, storage and fueling areas, storage areas for fertilizers, fuels or chemicals, concrete wash out areas, sanitary waste facilities and any other areas that may generate a stormwater or non-stormwater discharge directly related to the construction site.

The Contractor shall develop and enforce a Spill Prevention Control and Countermeasure (SPCC) Plan conforming to 40 CFR 112 if the aggregated volume of Oil stored within the project limits at any one time is greater than 1320 gallons. Oil, in this context, shall be defined according to 40 CFR 112. The aggregated volume includes that of both stationary and portable storage facilities but does not include individual storage containers with less than a 55 gallon capacity. The contractor shall include the SPCC Plan as a part of his Pollution Prevention Plan for the project.

Support Facilities located on VDOT rights of way or easements:

a. For those support facilities located within the project limits but not included in the construction plans for the project, the Contractor shall develop a SWPPP according to IIM-LD-246 which shall include, where applicable, an erosion and sediment control plan according to IIM-LD-11, a stormwater management plan according to IIM-LD-195 and a pollution prevention plan, according to these Specifications and the SWPPP General Information Sheet notes in the construction plans or other such contract documents. All plans developed shall be reviewed and approved by appropriate personnel certified through DEQ's ESC and

SWM Certification program and shall be submitted to the Engineer for review and approval. Once approved, the Engineer will notify the Contractor in writing that the plans are accepted as a component of the Project's SWPPP and VPDES Construction Permit coverage (where applicable) and shall be subject to all conditions and requirements of the VPDES Construction Permit and all other contract documents. No land disturbing activities can occur in the support area(s) until written notice to proceed is provided by the Engineer.

b. For support facilities located outside the project limits and not included in the construction plans for the project, the Contractor shall develop a SWPPP according to IIM-LD-246 which shall include, where applicable, an erosion and sediment control plan according to IIM-LD-11, a stormwater management plan (where applicable) according to IIM-LD-195, a pollution prevention plan according to these specifications and the SWPPP General Information Sheet notes in the construction plans or other such contract documents and all necessary documents for obtaining VPDES Construction Permit coverage according to IIM-LD-242. All plans developed shall be reviewed and approved by appropriate personnel certified through DEQ's ESC and SWM Certification program and and shall be submitted to the Engineer for review and approval. Once approved by the Engineer, VDOT will secure VPDES Construction Permit coverage according to IIM-LD-242. After VDOT secures VPDES Construction Permit coverage for the support facility, the Engineer will notify the Contractor in writing. The support facility shall be subject to all conditions and requirements of the VPDES Construction Permit and all other contract documents. No land disturbing activities can occur in the support area(s) until written notice to proceed is provided by the Engineer.

4. Inspection Procedures

a. Inspection Requirements

The Contractor shall be responsible for conducting site inspections according to the requirements herein. Site inspections shall include erosion, sediment control, and pollution prevention practices and facilities; all areas of the site disturbed by construction activity; all on-site support facilities; and all off site support facilities within VDOT right of way or easement. The Contractor shall document such inspections by completion of Form C-107, Construction Runoff Control Inspection Form, according to the directions contained within the form. Inspections shall be conducted using one of the following schedules:

- Schedule 1 - At least once every 7 calendar days (equivalent to the once every five business days schedule in the VPDES *General Permit for Discharge of Stormwater from Construction Activities*) and within 48 hours following any measureable storm event. If a measureable storm event occurs when there are more than 48 hours between business days, the Contractor shall perform his inspection no later than the next business day. The Contractor shall install a rain gage at a central location on the project site for the purposes of determining the occurrence of a measureable storm event. Where the project is of such a length that one rain gage may not provide an accurate representation of the occurrence of a measurable storm event over the entire

project site, the Contractor shall install as many rain gages as necessary to accurately reflect the amount of rainfall received over all portions of the project. The Contractor shall observe all rain gages no less than once each business day at the time prescribed in the SWPPP General Information Sheet notes in the construction plans or other contract documents to determine if a measureable storm event has occurred. The procedures for determining the occurrence of a measurable storm event are identified in the SWPPP General Information Sheet notes in the construction plans or other contract documents.

- Schedule 2 - At least each Monday and Thursday (equivalent to the once every four business days schedule in the VPDES *General Permit for Discharge of Stormwater from Construction Activities*). Where Monday or Thursday is a non-business day, the inspection may be performed on the next business day afterward. In no case shall the inspections be performed less than once every four business days.

The inspection schedule (1 or 2) is to be selected prior to the beginning of land disturbance. Once an inspection schedule is selected, it shall be defined in the appropriate note in the SWPPPP General Information Sheets contained in the construction plan set and shall be used for the duration of the project.

A business day is defined as Monday through Friday excluding State holidays. A measurable storm event is defined as one producing 0.25 inches of rainfall or greater over a 24 hour time period.

For those areas of the site that have been temporarily stabilized or where land disturbing activities have been suspended due to continuous frozen ground conditions and stormwater discharges are unlikely, the inspection schedule may be reduced to once per month. If weather conditions (such as above freezing temperatures or rain or snow events) make stormwater discharges likely, the Contractor shall immediately resume the regular inspection schedule. Those definable areas where final stabilization has been achieved will not require further inspections provided such areas have been identified in the project's Stormwater Pollution Prevention Plan.

b. Corrective Actions

If a site inspection identifies an existing control measure that is not being maintained properly or operating effectively or an existing control measure that needs to be modified or locations where an additional control measure is necessary or any other deficiencies in the erosion and sediment control and pollution prevention plan, corrective action(s) shall be completed as soon as practical and prior to the next anticipated measurable storm event but no later than seven days after the date of the site inspection that identified the deficiency.

5. Unauthorized Discharges and Reporting Requirements

The Contractor shall not discharge into state waters sewage, industrial wastes, other wastes or any noxious or deleterious substances nor shall he otherwise alter the physical, chemical, or biological properties of such waters that render

such waters detrimental for or to domestic use, industrial consumption, recreational or other public uses.

(1) Notification of non-compliant discharges

The Contractor shall immediately notify the Engineer upon the discovery of or the potential of any unauthorized, unusual, extraordinary, or non-compliant discharge from the land construction activity or any of support facilities located on VDOT right of way or easement. Where immediate notification is not possible, such notification shall be not later than 24 hours after said discovery.

(2) Detailed report requirements for non-compliant discharges

The Contractor shall submit to the Engineer within 5 days of the discovery of any actual or potential non-compliant discharge a written report describing details of the discharge to include a description of the nature and location of the discharge, the cause of the discharge, the date of occurrence, the length of time that the discharge occurred, the volume of the discharge, the expected duration and total volume if the discharge is continuing , a description of any apparent or potential effects on private and/or public properties and state waters or endangerment to public health, and any steps planned or taken to reduce, eliminate and prevent a recurrence of the discharge. A completed Form C-107 shall be included in such reports.

6. Changes and Deficiencies

The Contractor shall report to the Engineer when any planned physical alterations or additions are made to the land disturbing activity or deficiencies in the project plans or contract documents are discovered that could significantly change the nature of or increase the potential for pollutants discharged from the land disturbing activity to surface waters and that have not previously been addressed in the SWPPP.

7. Amendments, Modifications, Revisions and Updates to the SWPPP

a. The Contractor shall amend the SWPPP whenever site conditions, construction sequencing or scheduling necessitates revisions or modifications to the erosion and sediment control plan, the pollution prevention plan or any other component of the SWPPP for the land disturbing activity or onsite support facilities,

b. The Contractor shall amend the SWPPP to identify any additional or modified erosion and sediment control and pollution prevention measures implemented to correct problems or deficiencies identified through any inspection or investigation process.

c. The Contractor shall amend the SWPPP to identify any new or additional person(s) or contractor(s) not previously identified that will be responsible for implementing and maintaining erosion and sediment control and pollution prevention devices.

d. The Contractor shall update the SWPPP to include:

(1) A record of dates when, major grading activities occur, construction activities temporarily or permanently cease on a portion of the site and stabilization measures are initiated.

(2) Documentation of replaced or modified erosion and sediment control and pollution prevention controls where periodic inspections or other information have indicated that the controls have been used inappropriately or incorrectly.

(3) Identification of areas where final stabilization has occurred and where no further SWPPP or inspection requirements apply.

(4) The date of any prohibited discharges, the discharge volume released, and what actions were taken to minimize the impact of the release.

(5) A description of any measures taken to prevent the reoccurrence of any prohibited discharge.

(6) A description of any measures taken to address any issues identified by the required erosion and sediment control and pollution prevention inspections.

e. The Contractor shall update the SWPPP no later than seven days after the implementation and/or the approval of any amendments, modifications or revisions to the erosion and sediment control plan, the pollution prevention plan or any other component of the SWPPP.

f. Revisions or modifications to the SWPPP shall be approved by the Engineer and shall be documented by the Contractor on a designated plan set (Record Set) according to IIM-LD-246. All updates to the SWPPP shall be signed by the Contractor and the VDOT Responsible Land Disturber (RLD).

g. The record set of plans shall be maintained with other SWPPP documents on the project site or at a location convenient to the project site where no on site facilities are available.

107.18 - Sanitary Provisions

The Contractor shall provide and maintain in a neat, sanitary condition such accommodations for the use of employees as may be necessary to comply with the requirements of the state and local Board of Health or other bodies or tribunals having jurisdiction.

SECTION 202—FINE AGGREGATE

202.01—Description

These specifications cover material for use as fine aggregate in hydraulic cement concrete, mortar, asphalt concrete, and asphalt surface treatments.

202.02—Materials

Fine aggregate is classified herein in accordance with its occurrence or method of manufacture as natural sand or stone sand. Natural sand shall consist of grains of hard, sound material, predominantly quartz, occurring in natural deposits or in loosely bound deposits, such as sandstone conglomerate. Stone sand shall consist of sound crushed particles of approved Grade A stone, essentially free from flat or elongated pieces, with sharp edges and corners removed.

Fine aggregates for use in hydraulic cement concrete that are obtained from more than one source shall not be used alternately or mixed without the consent of the Engineer.

202.03—Detail Requirements

(a) **Grading:** Grading shall conform to the requirements of Table II-1. Tests will be performed in accordance with the requirements of AASHTO T27.

(b) **Soundness:** Soundness shall conform to the requirements of Table II-2. Tests will be performed in accordance with the requirements of AASHTO T103 or T104.

(c) **Organic Impurities:** When fine aggregate is to be used in hydraulic cement concrete, the percentage of organic impurities shall conform to the requirements of AASHTO T21; however, material producing a darker color than that specified in AASHTO T21 may be accepted in accordance with the requirements of AASHTO M6.

(d) **Void Content:** Void content will be tested in accordance with the requirements of VTM-5.

(e) **Deleterious Material:** The amount of deleterious material in sands shall be not more than the following:

Material	% by Weight	AASHTO Test Method
Clay lumps	0.25	T112
Shale, mica, coated grains, soft or flaky particles	1.0	T113
Organic material	0	T21
Total material passing No. 200 sieve by washing[1]		T11 and T27
For use in concrete subject to abrasion	3	
For other concrete	5	

[1]In the case of stone sand, if the material passing the No. 200 sieve is dust of fracture, essentially free from clay and shale, the percentages shown for use in concrete subject to abrasion and in other concrete may be increased to 5.0 percent and 7.0 percent, respectively.

TABLE II-1
Fine Aggregate

Amounts Finer Than Each Laboratory Sieve (Square Opening) (% by Weight)								
Grading	**3/8 in.**	**No. 4**	**No. 8**	**No. 16**	**No. 30**	**No. 50**	**No. 100**	**No. 200**
A	Min. 100	95-100	80-100	50-85	25-60	5-30	Max. 10	
B	Min. 100	94-100					Max. 10	
C	Min. 100	94-100				Max. 25		

TABLE II-2
Soundness

Use	**Max. Soundness Loss (%)**	
	Magnesium Sulphate (5 Cycles)	**Freeze and Thaw (100 Cycles)**
Hydraulic cement concrete	18	8
Asphalt concrete surfaces and surface treatments	25	15
Asphalt concrete bases	30	15

SECTION 203—COARSE AGGREGATE

203.01—Description

These specifications cover material for use as coarse aggregate in hydraulic cement concrete, asphalt concrete, asphalt surface treatments, and drainage.

203.02—Materials

Coarse aggregate shall consist of crushed stone, crushed slag, crushed or uncrushed gravel with clean, hard, tough, and durable pieces free from adherent coatings and deleterious amounts of friable, thin, elongated, or laminated pieces; soluble salts; or organic materials.

(a) **Crushed hydraulic cement concrete** will be permitted for use as a coarse aggregate provided it conforms to the physical requirements specified herein and shows no adverse chemical reaction. Crushed hydraulic cement concrete will not be permitted in the following: (1) reinforced cement concrete, (2) in combination with other materials in contact with geotextile fabric when such fabric is used as a drainage item, and (3) in backfill or bedding for perforated pipe.

(b) **Crushed gravel** shall consist of particles of which at least 80 percent by weight shall have at least one face fractured by artificial crushing. Tests will be performed in accordance with the requirements of VTM-15.

(c) **Blast furnace slag** shall be relatively free from foreign minerals and glassy or spongy pieces. It shall weigh at least 70 pounds per cubic foot, dry rodded, for size No. 68 and smaller and at least 65 pounds per cubic foot, dry rodded, for larger sizes. Tests will be performed in accordance with the requirements of AASHTO T19. When used in asphalt surface treatments, blast furnace slag shall contain not more than 10 percent nonporous material and shall have an absorption of at least 3 percent. Tests will be performed in accordance with the requirements of AASHTO T85.

(d) **Crushed glass** shall consist of particles of curbside-collected or waste glass. It shall be free from sources of glass that include automotive glass, lead crystal, TV monitors, lighting fixtures and electronics applications. Non-glassy material associated with curbside collection (paper, capping materials, etc.), excluding fragments of broken ceramics and pottery, shall be limited to 5 percent by weight using a gravimetric determination, and including loss on ignition performed in accordance with the requirements of ASTM D2974. One hundred percent of the crushed glass shall pass the 9.5 mm (3/8 inch) sieve with less than 5 percent passing the No. 200 sieve. Crushed glass shall not be used in hydraulic cement concrete, asphalt, base/subbase, or exposed shoulder applications.

TABLE II-3
Sizes of Open-Graded Coarse Aggregates

Amounts Finer Than Each Laboratory Sieve (Square Openings) (% by Weight)															
Va. Size No.	**4 in.**	**3½ in.**	**3 in.**	**2½ in.**	**2 in.**	**1½ in.**	**1 in.**	**¾ in.**	**½ in.**	**3/8 in.**	**No. 4**	**No. 8**	**No. 16**	**No. 50**	**No. 100**
1	Min. 100	90-100		25-60		Max. 15		Max. 5							
2			Min. 100	90-100	35-70	Max. 15		Max. 5							
3				Min. 100	90-100	35-70	0-15		Max. 5						
357				Min. 100	95-100		35-70		10-30		Max. 5				
5						Min. 100	90-100	20-55	Max. 10	Max. 5					
56						Min. 100	90-100	40-85	10-40	Max. 15	Max. 5				
57						Min. 100	95-100		25-60		Max. 10	Max. 5			
67							Min. 100	90-100		20-55	Max. 10	Max. 5			
68							Min. 100	90-100		30-65	5-25	Max. 10	Max. 5		
7								Min. 100	90-100	40-70	Max. 15	Max. 5			
78								Min. 100	90-100	40-75	5-25	Max. 10	Max. 5		
8									Min. 100	85-100	10-30	Max. 10	Max. 5		
8P									Min. 100	75-100	5-30	Max. 5			
9										Min. 100	85-100	10-40	Max. 10	Max. 5	
10										Min. 100	85-100				10-30

203.03—Detail Requirements

(a) **Grading:** Open-graded aggregates shall conform to the requirements of Table II-3. Tests will be performed in accordance with the requirements of AASHTO T27.

(b) **Soundness:** Soundness shall conform to the requirements of Table II-4. Tests will be performed in accordance with the requirements of AASHTO T103 or T104. The requirement for soundness test for crushed glass is waived due to its preclusion from the applications shown in Table II-4.

(c) **Abrasion Loss:** Abrasion loss shall conform to the requirements of Table II-5. Tests will be performed in accordance with the requirements of AASHTO T96 on aggregate with a grading the most nearly identical with the grading to be used in the work.

(d) **Deleterious Material:** The amount of deleterious material shall be not more than the following:

Material	% by Weight	AASHTO Test Method
Coal and lignite	0.25	T113
Clay lumps	0.25	T112
Material passing No. 200 sieve by washing[1]	1.00	T11

[1]When the material passing the No. 200 sieve by washing is dust of fracture, the percentage of deleterious material may be increased to 1.50 percent.

TABLE II-4
Soundness

Use	Max. Soundness Loss (%)	
	Magnesium Sulphate (5 Cycles)	Freeze and Thaw (100 Cycles)
Hydraulic cement concrete	12	5
Asphalt surface courses	15	6
Asphalt and aggregate bases	20	7
Select material (Type I) and subbase	30	12

TABLE II-5
Abrasion

Use	Max. Los Angeles Abrasion Loss (%)	
	100 Rev.	500 Rev.
Grade A stone	9	40
Grade B stone	12	45
Grade C stone	14	50
Slag	12	45
Gravel	12	45

(e) **Flat and Elongated Particles:** Coarse aggregate to be used as a riding surface during construction activities or as the riding surface after construction shall contain not more than 30 percent by mass of aggregate particles retained on and above the 3/8-inch sieve having a maximum to minimum dimensional ratio greater than 5 as determined in accordance with the requirements of ASTM D4791.

SECTION 204—STONE FOR MASONRY, RIPRAP, POROUS BACKFILL, AND GABIONS

204.01—Description

These specifications cover aggregate materials used to protect ground slopes from erosion or wave action and those used for drainage, generally behind a backwall or abutment.

204.02—Detail Requirements

(a) **Stone for rubble or mortar rubble masonry** shall be sound, durable, and free from seams, cracks, and other structural defects and shall be minimum Grade C stone free from rounded, worn, or weathered surfaces.

(b) **Stone for riprap and bedding** shall be sound, durable, and free from seams, cracks, and other structural defects. Riprap stone and bedding exposed to the wave action of water shall be of igneous or metamorphic origin. Riprap bedding shall be crushed stone, minimum Grade B.

(c) **Porous backfill** shall be aggregate size No. 78 or No. 8, a minimum Grade B. Crushed glass meeting the gradation requirements specified in Section 203.02(d) of the Specifications can be directly substituted for size No. 78 and 8 aggregates.

(d) **Gabion stone** shall be durable and free from seams and cracks. Weathered stone shall not be used. Stone shall weigh between 4 and 30 pounds except that approximately 5 percent of the individual stones may weigh less than 4 or more than 30 pounds. At least 50 percent of the stone shall weigh more than 10 pounds.

SECTION 214—HYDRAULIC CEMENT

214.01—Description

These specifications cover cements that harden when mixed with water. The various types have special characteristics to be used as denoted in other parts of these specifications.

214.02—Detail Requirements

(a) **Blended hydraulic cement** shall conform to the requirements of AASHTO M240, Type I(P) or Type I(S).

(b) **Portland cements** shall conform to the requirements of AASHTO M85 except as follows:

1. The SO_3 content as specified in AASHTO M85 will be permitted, provided supporting data specified in AASHTO M85 are submitted to the Department for review and acceptance prior to use of the material.

2. Type I and Type II cement shall contain not more than 1.0 percent alkalies (% Na_2O + % $0.658K_20$).

(c) **Expansive hydraulic cement** shall conform to the requirements of ASTM C 845 Type K.

SECTION 215—HYDRAULIC CEMENT CONCRETE ADMIXTURES

215.01—Description

These specifications cover materials that are chemical or organic elements that may be added to a concrete mixture, when permitted elsewhere in these specifications, to achieve some desired effect.

215.02—Materials

(a) **Air-entraining admixtures** shall conform to the requirements of AASHTO M154.

(b) **Water-reducing and retarding admixtures** shall conform to the requirements of AASHTO M194, Type D, and shall be free from water-soluble chlorides.

Use of water-reducing and retarding admixtures that have not been tested for compatibility with the brand, type, source, and quantity of cement proposed for use will not be permitted until tests have been performed in accordance with the requirements of VTM-16 and the test results conform to the requirements of Table I therein.

(c) **Water-reducing admixtures** shall conform to the requirements of AASHTO M194, Type A, and shall be free from water-soluble chlorides.

(d) **Accelerating admixtures** shall conform to the requirements of AASHTO M194, Type C or E.

(e) **High-range water-reducing and high-range water-reducing and retarding admixtures** shall conform to the requirements of AASHTO M194, Type F or G, and shall be free from water-soluble chlorides.

(f) **Calcium chloride** shall conform to the requirements of AASHTO M144, Type 2.

(g) **Pozzolan** shall conform to Section 241 of the Specifications.

(h) **Granulated iron blast-furnace slag** shall conform to the requirements of ASTM C989, Grade 100 or 120.

(i) **Silica fume** shall conform to the requirements of AASHTO M307.

(j) **Corrosion inhibitor** shall contain a minimum 30 percent solution of calcium nitrate or other approved material.

(k) **Metakaolin** shall conform to the requirements of AASHTO M321.

215.03—Detail Requirements

Approved admixture(s) shall be used in concrete in the proportions recommended by the manufacturer to obtain the optimum effect where seasonal, atmospheric, or job conditions dictate its use.

Only admixtures (a) through (e) that appear on the Department's approved products list shall be used. Initial approval will be based on independent laboratory data submitted by the

manufacturer. Following initial approval of concrete admixtures, the manufacturer shall annually certify to the Engineer in writing that the material currently being furnished is identical in both composition and chemical concentrations with the material for which the laboratory tests were performed. If the Contractor proposes to use an admixture that differs in concentration from the acceptance sample, a certificate shall be required from the manufacturer stating that the chemical composition of the material is essentially the same as that of the approved mixture.

When placing concrete by pumping is authorized, the use of pump-aid admixtures approved by the Department will be allowed provided they are used in accordance with the manufacturer's recommendations.

SECTION 216—WATER FOR USE WITH CEMENT OR LIME

216.01—Description

These specifications cover water for use in mixing with cement or lime.

216.02—Detail Requirements

Water shall be clean, clear, and free from oil, acid, salt, alkali, organic matter, or other deleterious substances.

Water that has been approved for drinking purposes may be accepted without testing for use in hydraulic cement concrete, cement, or lime stabilization. Water from other sources and pumping methods shall be approved by the Engineer before use.

The acidity or alkalinity of water will be determined colorimetrically or electrometrically. Water shall have a pH between 4.5 and 8.5. When subjected to the mortar test in accordance with the requirements of AASHTO T26, water shall produce a mortar having a compressive strength of at least 90 percent of a mortar of the same design using distilled water.

Wash water from hydraulic cement concrete mixer operations will be permitted to be reused in the concrete mixture provided it is metered and is 25 percent or less of the total water. The total water shall conform to the acceptance criteria of ASTM C1602, Tables 1 and 2. A uniform amount of wash water shall be used in consecutive batches, with subsequent admixture rates adjusted accordingly to produce a workable concrete conforming to the requirements of the Specifications.

SECTION 218—HYDRAULIC CEMENT MORTAR AND GROUT

218.01—Description

These specifications cover hydraulic cement mortar and grout used in bonding units together, filling voids, and making surface repairs.

218.02—Materials

(a) **Hydraulic cement** shall conform to the requirements of Section 214.

(b) **Fine aggregate** shall conform to the requirements of Section 202.

(c) **Water** shall conform to the requirements of Section 216.

(d) **Admixtures** shall conform to the requirements of Section 215.

218.03—Detail Requirements

Hydraulic cement mortar and grout shall consist of a mixture of hydraulic cement, fine aggregate, water, and admixtures as specified herein.

Hydraulic cement mortar and grout shall contain from 3 to 7 percent entrained air. Air-entrained hydraulic cement may be used. Hydraulic cement mortar and grout shall be mixed with the minimum amount of water necessary to obtain the required consistency.

(a) **Hydraulic cement mortar** shall consist of 1 part hydraulic cement, 2 1/2 parts fine aggregate by weight, and sufficient water to produce a stiff mixture. Grading C fine aggregate shall be used.

(b) **Nonshrink mortar** shall consist of 1 part hydraulic cement, 2 parts fine aggregate by weight, a set retarder or other admixture that will reduce the amount of required mixing water, and sufficient water to produce a stiff mixture. Grading C fine aggregate shall be used.

(c) **Hydraulic cement grout** shall consist of 1 part hydraulic cement, 2 parts fine aggregate by weight, and sufficient water to produce a free-flowing mixture. Grading A or C fine aggregate shall be used.

(d) **High-strength grout and mortar** shall consist of a prepackaged, nonshrink hydraulic cement mixture conforming to the requirements of ASTM C1107 modified by the following: the grout/mortar shall develop a 7-day compressive strength of at least 4,000 pounds per square inch when tested in accordance with the requirements of ASTM C109 and a 7-day bond strength of at least 1,000 pounds per square inch when tested in accordance with the requirements of VTM-41, except that epoxy shall not be used to develop the bond.

SECTION 223—STEEL REINFORCEMENT

223.01—Description

These specifications cover steel items designed to give added flexural strength to hydraulic cement concrete or to control and reduce cracking.

223.02—Detail Requirements

(a) **Reinforcement:**

1. **Welded wire fabric** shall conform to the requirements of ASTM A185. When used in continuously reinforced pavement, wire fabric shall be deformed and furnished in flat sheets and shall conform to the requirements of ASTM A497, high yield of 70,000 pounds per square inch.

SECTION 232—PIPE AND PIPE ARCHES

232.01—Description

These specifications cover materials used for the conveyance of water, including drainage, storm water, sanitary systems, and waste water.

232.02—Detail Requirements

Concrete, corrugated steel and polyethylene pipe shall only be supplied from manufacturers currently having an approved Quality Control Plan on file with the Department.

(a) **Concrete Pipe:**

1. **Concrete pipe for culverts and sewers** shall be circular or elliptical in cross-section, either plain concrete or reinforced concrete, and of the modified tongue-and-groove design in sizes up to and including 18 inches in internal diameter and either standard or modified reinforced tongue-and-groove in sizes above 18 inches in internal diameter. Pipe shall conform to the specified AASHTO requirements except that pipe having an internal diameter of 36 inches or less shall be manufactured without lift holes. Pipe larger than 36 inches in internal diameter may be manufactured with lift holes provided the holes are created by molding, forming, coring, or other methods to be cylindrical or conical in shape and are sufficiently smooth to permit plugging with an elastomeric or other approved plug type.

   a. **Plain concrete culvert pipe** shall be composed of hydraulic cement, water, and mineral aggregates conforming to the requirements of b(3) and b(4) herein. Pipe shall conform to the following:

Min. Inside Diameter (in)	Min. Wall Thickness (in)	Groove Depth (in)	Crushing Strength (lb/lin ft)
12	1 3/4	1 3/4	1,800
15	2	1 3/4	2,125
18	2	1 3/4	2,400
21	2 3/4	2	2,700
24	3	2 1/4	3,000

   Pipe shall also comply with the requirements of AASHTO M170 for manufacture, finish, marking, inspection, and rejection.

   b. **Reinforced concrete culvert pipe:**

      (1) **Circular pipe** shall conform to the requirements of AASHTO M170, class as specified, or AASHTO M242. Circular pipe that does not have values listed in the AASHTO M170 design tables for diameter, wall thickness, compressive strength, and reinforcement shall be certified in accordance with the requirements of the Contract Documents. Pipe conforming to the requirements of AASHTO M242 shall also be certified in accordance with the requirements of the Contract Documents.

      (2) **Elliptical pipe** shall conform to the requirements of AASHTO M207, class as specified. Elliptical pipe that does not have values listed in the AASHTO M207

design tables for wall thickness, compressive strength, and reinforcement shall be certified in accordance with the requirements of the Contract Documents.

(3) **Fine aggregate** shall conform to the requirements of Section 202 for quality except that the void content, grading, and uniformity shall be controlled as necessary to produce the specified level of strength and absorption.

(4) **Coarse aggregate** shall conform to the requirements of Section 203 for Grade A crushed stone or gravel.

(5) **Positioning of reinforcement** when two layers of wire or bar reinforcement are used shall be such that welded joints are at an angle of approximately 60 degrees to each other.

(6) **Strength tests** shall be performed by the three-edge bearing method in accordance with the requirements of AASHTO T280 or by control cylinders tested in accordance with ASTM C31 and C39 or by the testing of cores in accordance with ASTM C42. Control cylinders for acceptance testing shall be cured under the same conditions as the concrete the cylinders represent. Hand cast pipe and end sections may be tested in accordance with the requirements of ASTM C31 and C39. Concrete pipe may be shipped after reaching 85 percent of design strength as determined by control cylinders or cores.

(7) **Absorption tests** shall be performed in accordance with the requirements of AASHTO T280 on specimens of broken pipe or cores.

2. **Concrete pipe for underdrains** shall conform to the requirements of AASHTO M86, Class I, and the perforation requirements of AASHTO M175, Type I, except that spalls shall be not more than 1 1/2 inches in diameter or 3/16 inch in depth and shall not adjoin. When used as combination underdrains, pipe shall not be perforated.

   Porous concrete pipe for underdrains shall conform to the requirements of AASHTO M176, standard strength.

3. **Concrete pipe for water lines, water mains, and sanitary sewers:**

   a. **Concrete pressure pipe** (steel cylinder) shall conform to the requirements of AWWA C300, AWWA C301, or AWWA C303 for the size, minimum working pressure, protective coating, seal coat, and type of joint as specified.

   b. **Nonreinforced concrete sanitary sewer pipe** shall conform to the requirements of AASHTO M86 for the class specified.

   c. **Reinforced concrete water pipe** (noncylinder) shall conform to the requirements of AWWA C302 for size, minimum working pressure, seal coat, protective coating, and type of joint specified.

   d. **Reinforced concrete sanitary sewer pipe** shall conform to the requirements of AASHTO M170 for the class specified.

(b) **Cast Iron and Ductile Iron Pipe and Fittings:**

1. **Cast iron pipe** shall conform to the requirements of ASTM A888 for the class specified.

2. **Ductile iron pipe** shall conform to the requirements of AWWA C151 for size, joint type, class, type of coating and lining as specified, and minimum working pressure if applicable. Flanged joints shall conform to the requirements of AWWA C115.

3. **Fittings** for cast iron and ductile iron pipe for water lines, water mains, and sanitary sewers shall conform to the requirements of AWWA C110 (ANSI A21.10) or AWWA C153 (ANSI A21.53) for size, joint type, pressure rating, and type of coating and lining as specified.

4. **Cement mortar linings** shall conform to the requirements of AWWA C104 (ANSI A21.4).

(c) **Steel Pipe:**

1. **Corrugated steel culvert pipe and pipe arches** shall conform to the requirements of AASHTO M36 except that helically formed pipe shall be tested in accordance with the requirements of AASHTO T249 at the rate of one test per week per corrugation machine per work shift. Records of such test shall be maintained for a period of 24 months. Pipe shall be fabricated from materials conforming to AASHTO M218 for galvanized pipe, AASHTO M274 for aluminum coated pipe, AASHTO M246 for polymer coated pipe and AASHTO M289 for aluminum zinc alloy coated pipe. Steel spiral rib pipe shall be of smooth wall spiral rib construction. When connecting bands or flared end sections are required, helically formed pipe shall have rerolled ends with a minimum of two annular corrugations. End sections shall be produced in accordance with the general requirements of AASHTO M36 from materials conforming to the applicable requirements of AASHTO M218 for use with galvanized pipe, AASHTO M274 for use with aluminum-coated or polymer coated pipe, or AASHTO M289 for use with aluminum zinc alloy-coated pipe.

   Pipe sections shall be joined with annular corrugated bands, hugger bands, or maxidimple bands conforming to the requirements of AASHTO M36 and shall be designed to form a leak-resistant joint. Maxidimple bands shall have two rows of circumferential dimples spaced approximately 4 to 6 inches on center. Coupling band widths shall be at least 7 inches for pipe 12 through 30 inches in diameter and 10 1/2 inches for pipe 36 through 120 inches in diameter. Coupling bands shall be not more than 0.109 inch (12 gage) and not less than 0.052 inch (18 gage) in thickness, and the thickness shall be equal to the pipe thickness or up to two numerical thicknesses lighter than the pipe thickness. (*Example:* For 12-gage pipe, coupling bands may be 12, 14, or 16 gage.) Coupling bands shall have the same metallic or polymer coating as the pipe sections on which they are connecting.

2. **Corrugated steel pipe for underdrains** shall conform to the requirements of AASHTO M36.

3. **Black and galvanized steel pipe:**

   a. **Black steel pipe for bridge deck drains and drainage systems** shall conform to the requirements of ASTM A53, extra strong (Schedule 80), with a wall thickness of at least 0.337 inch except that the hydrostatic test will not be required.

   b. **Galvanized steel pipe for handrails** shall conform to the requirements of ASTM A120 or ASTM A53 for standard or extra strong pipe as indicated except that the hydrostatic test will not be required.

c. **Black and galvanized steel pipe for miscellaneous items** shall conform to the requirements of ASTM A53 except that the hydrostatic test will be required only when the pipe is used as pressure pipe.

4. **Smooth wall pipe (jacked or casing for general use):**

   a. **Steel encasement pipe** shall conform to the requirements of ASTM A139 with a minimum wall thickness of 0.500 inch or ASTM A53 Standard Weight Class and shall have beveled edges suitable for welding or be threaded. The hydrostatic test for such pipe will be waived.

   b. **Pipe for jacking** shall be of sufficient strength, diameter and wall thickness to accomplish the specific task and shall be approved by the Engineer.

5. **Steel water pipe, flanges, and fittings:**

   a. **Steel pipe** shall conform to the requirements of AWWA C200 for the minimum design working pressure, wall thickness, and type of pipe ends as specified. The protective coating shall conform to the requirements of AWWA C203 for coal tar protective coating, and the lining shall conform to the requirements of AWWA C205 for cement mortar lining.

   b. **Flanges** shall conform to the requirements of AWWA C207 as specified for pressure rating and size.

   c. **Fittings** shall conform to the requirements of AWWA C208.

6. **Galvanized steel water pipe and fittings:**

   a. **Galvanized steel pipe** shall conform to the requirements of ASTM A53, Schedule 40 or 80, for the size; method of manufacture; type, plain or threaded; couplings; and class specified.

   b. **Fittings** shall be galvanized malleable iron conforming to the requirements of ASTM A47. Threads shall conform to the requirements of ANSI B2.1.

7. **Concrete-lined corrugated steel pipe** shall conform to the requirements of Section 232.02(c)1. and shall be fabricated from material conforming to AASHTO M274 for aluminum coated pipe. The concrete lining shall be at least 1/8 inch in thickness over the inside crest of corrugation. Concrete for the lining shall be composed of cement, sand, and water, mixed to produce a dense, homogeneous lining.

   Pipe sections shall be connected using a hugger band with O-rings. After pipe is installed, the separation between pipe sections shall be filled with a cement grout. After finishing, the area shall be sprayed with a liquid membrane-forming compound.

8. **Polymer coated steel pipe** shall conform to the requirements of Section (c)1 herein. Polymer coating material shall conform to AASHTO M246 and be composed of polyethylene and acrylic acid copolymer. Polymer coating shall have a minimum thickness of 0.01 inch and shall be applied to both sides of the pipe material. Polymer coating shall be labeled with the brand name of the material and the manufacture in accordance with AASHTO M246.

9. **Corrugated steel double wall pipe** shall conform to the requirements of Section (c)1 herein. Corrugated steel double wall pipe shall consist of a standard corrugated steel exterior shell that meets the structural requirements for the pipe and a smooth

interior steel liner. The interior liner is to be continuously attached to the exterior shell along the lock seam. The interior liner is to have a minimum thickness of 0.052 inches. Both the exterior shell and the interior liner are to have a polymer coating applied to both sides of the pipe material in accordance with Section (c)9, herein.

(d) **Structural Plate Pipe, Pipe Arches, and Arches:** Pipe, pipe arches, and arches shall conform to the requirements of AASHTO M167 for corrugated steel pipe and AASHTO M219 for aluminum alloy pipe.. When asphalt coating is required, it shall be an asphalt mastic applied to the structure after assembly. The asphalt mastic shall conform to the requirements of and be applied in accordance with the requirements of AASHTO M243.

(e) **Aluminum Alloy Pipe:**

1. **Corrugated aluminum alloy culvert pipe and pipe arches** shall conform to the requirements of AASHTO M196. Material used to produce end sections for use with corrugated aluminum alloy pipe shall conform to the requirements of AASHTO M196.

   Aluminum spiral rib pipe used for storm drains shall conform to the requirements of AASHTO M196 except that it shall be of smooth wall, spiral ribbed construction. Connecting bands for aluminum drainpipe shall conform to the thickness and the corrugations or rib of the pipe to which they are connecting.

2. **Corrugated aluminum alloy pipe underdrains** shall conform to the requirements of AASHTO M196, Type III. When used as combination underdrains, pipe shall not be perforated.

(f) **Vitrified Clay Pipe and Fittings:** Pipe and fittings shall conform to the requirements of AASHTO M65, extra strength, or, for sanitary sewer, may conform to the requirements of ASTM C700, extra strength. Joints for sanitary sewer shall conform to the requirements of ASTM C425. Plain and perforated clay pipe for drain fields shall conform to the requirements of ASTM C700, extra strength.

(g) **Polyvinylchloride (PVC) Pipe:**

1. **PVC water and pressure sewer pipe** shall conform to the requirements of AWWA C-900, PC-150, for water facilities and ASTM D1785 for pressure sewers and shall have a pressure rating of at least 150 pounds per square inch.

2. **PVC gravity sewer pipe** shall conform to the requirements of ASTM D3034; SDR35; ASTM F794, Series 46; or ASTM F949.

3. **PVC ribbed pipe for culverts and storm drains** shall conform to the requirements of AASHTO M304 or ASTM F949.

4. **PVC underdrains** shall conform to the requirements of ASTM F758, Type PS 28, or ASTM F949.

(h) **Glass Fiber-Reinforced Epoxy Pipe and Fittings:** Pipe and fittings shall conform to the requirements of ASTM D2996, ASTM D2997, or AWWA C950 with a continuous rating of at least 150 pounds per square inch at 150 degrees F for pipe, fittings, and adhesive joints.

(i) **ABS Pipe:**

1. **ABS semiround underdrain pipe with top shield** shall be at least 4 5/8 inches in diameter with drain holes 1/4 or 3/8 inch in diameter drilled at least 7/8 inch apart under

the roof line. Pipe shall weigh at least 0.80 pound per foot. When used as combination underdrains, pipe shall not be perforated.

2. **ABS sewer pipe and fittings** shall conform to the requirements of ASTM D2680 for the type of joints specified and shall have a pressure rating of at least 150 pounds per square inch.

(j) **Polythylene (PE) Pipe:**

1. **PE corrugated underdrain pipe** shall conform to the requirements of AASHTO M252. Pipe shall be supplied in individual lengths with no lengths shorter than 10 feet. Coil pipe will be permitted only in 4-inch or 6-inch diameters provided it is machine installed. If the pipe starts to recoil during installation, the Contractor shall cease operations until a method of anchoring the pipe in the trench is approved. When used as combination underdrain or outlet pipe, the pipe shall be smooth wall, nonperforated.

2. **PE corrugated culvert pipe** shall conform to the requirements of AASHTO M294. PE pipe used for storm drains and entrances shall conform to the requirements of classification Type S. For all other applications, PE pipe shall be Type C or S.

3. **PE pipe and fittings** shall conform to the requirements of AWWA C-901 for water mains and ASTM D2239, Grade P34, for sanitary sewers and shall have a pressure rating of at least 150 pounds per square inch.

(k) **Copper Water Pipe or Tubing:** Copper water pipe or tubing shall conform to the requirements of ASTM B88 and shall have the cast or wrought pattern. Fittings for concealed soft drawn pipe may be the flared mechanical type. Unions shall be the ground joint type.

(l) **Polybutylene Pipe and Fittings:** Pipe and fittings shall conform to the requirements of AWWA C902 for water mains and ASTM F809 for sanitary sewers.

(m) **Polypropylene (PP) Pipe:**

1. **PP corrugated culvert and storm drain pipe** shall conform to the requirements of AASHTO MP 21-11, and shall be double wall pipe (Type S) for nominal diameters of 12 inches through 30 inches, inclusive, and shall be triple wall pipe (Type D) for nominal diameters of 36 inches through 48 inches, inclusive. Polypropylene Pipe less than 12 inches and greater than 48 inches in diameter will not be allowed. Fittings and joining systems shall also meet the requirements of the AASHTO MP 21-11.

SECTION 240—LIME

240.01—Description

These specifications cover lime to be used as a stabilizer or soil conditioner.

240.02—Detail Requirements

(a) **Hydrated lime** shall conform to the requirements of ASTM C207, Type N, except that the average percentage of calcium oxide shall be at least 93. Single test results shall not be below 90 percent.

(b) **Hydraulic lime** shall conform to the requirements of ASTM C141.

(c) **Agricultural lime:**

1. **Ground limestone** shall be of such fineness that at least 86 percent will pass a No. 20 mesh screen, at least 47 percent will pass a No. 60 mesh screen, and at least 28 percent will pass a No. 100 mesh screen. Material shall have a calcium carbonate equivalent of at least 85 percent.

2. **Pulverized limestone** shall be of such fineness that at least 90 percent will pass a No. 20 mesh screen and at least 66 percent will pass a No. 100 mesh screen. Material shall have a calcium carbonate equivalent of at least 85 percent.

(c) **Lime for soil stabilization** shall be quicklime or hydrated lime conforming to the requirements of AASHT0 M216.

SECTION 241—FLY ASH

241.01—Description

These specifications cover fly ash (burnt coal residue) used as an additive in hydraulic cement concrete or as a soil stabilizer.

241.02—Detail Requirements

(a) **Fly ash used in hydraulic cement concrete** shall conform to the requirements of ASTM C618, Class F or Class C.

(b) **Fly ash used in lime stabilization** shall conform to the requirements of ASTM C593. Bulk material may be used as approved by the Engineer.

SECTION 242—FENCES

242.01—Description

These specifications cover material specifications for temporary silt fences, geotextile fabric silt barriers, and filter barriers used for erosion control.

242.02—Detail Requirements

(a) **Temporary Silt Fences, Geotextile Fabric, Silt Barriers, and Filter Barriers:**

1. **Geotextile fabric** shall conform to the requirements of Section 245.

2. **Posts for temporary silt fences** shall be a nominal 2 1/2 by 2 1/2 inch or 3 inch diameter No. 2 Southern pine, a nominal 2 by 2 inch oak, or steel having a weight of at least 1.25 pounds per linear foot and a length of at least 5 feet.

3. **Supports for temporary filter barriers** shall be a nominal 1 by 2 inch or 1 1/2 inch diameter No. 2 Southern Pine or oak or steel having a weight of at least 1.00 pound per linear foot and a length of at least 2.5 feet.

SECTION 244—ROADSIDE DEVELOPMENT MATERIALS

244.01—Description

These specifications cover the various materials, such as fertilizers, seeds, plants, sod, and mulch, for use in landscaping and materials used for soil retention to help prevent erosion.

244.02—Detail Requirements

(a) **Herbicides:** Herbicides shall be registered with the Virginia Department of Agriculture and Consumer Services in accordance with the Virginia Pesticide Law and shall be supplied in the manufacturer's containers clearly labeled as to the composition, brand, and name and address of the manufacturer.

1. **Herbicide for control of broadleaf weeds** shall contain at least 3 pounds of 2,4-D as an oil-soluble, water-emulsifiable amine salt. It shall have a shelf life of at least 2 years and shall be homogeneous with slight agitation. The type of amine salt and the actual acid equivalent per gallon shall be shown on the container.

2. **Herbicide for stump treatment** shall be dicamba CST and shall be applied in accordance with the manufacturer's registered label.

(b) **Topsoil:**

1. **Class A topsoil:** Class A topsoil shall be stockpiled topsoil that has been salvaged in accordance with the requirements of Section 303.04(a). It shall be the original layer of the soil profile formed under natural conditions, technically defined as the "A" horizon or as defined by the United States Department of Agriculture–Natural Resources Conservation Service (USDA–NRCS) Soil Survey Division. It shall be free from refuse and any other materials toxic to plant growth and subsoil, stumps, viable noxious weeds, roots, brush, rocks, clay lumps, or similar objects larger than 3 inches in any dimension.

2. **Class B topsoil:** Class B topsoil shall be topsoil furnished from sources outside the project limits and shall be the original top layer of a soil profile formed under natural conditions, technically defined as the "A" horizon or as defined by USDA–NRCS Soil Survey Division. It shall consist of natural, friable, loamy soil without admixtures of subsoil or other foreign materials and shall be free of viable noxious weed seed, plant propagules, brush, rocks or other litter, and rocks greater than 3 inches in any

dimension. It shall have demonstrated by evidence of healthy vegetation growing or having grown on it prior to stripping that it is well drained and does not contain substances toxic to plants. The Contractor shall submit a source of materials for topsoil on the project prior to use. The Department reserves the right to reject any topsoil material not complying with the requirements of this specification.

The allowable pH range for Class B topsoil for use in establishing sod or turf shall be 5.5 to 7.0.

Class B topsoil shall be a "sandy loam," "loamy sand," or "sandy clay loam" soil as defined by the USDA Soil Textural Classification System with an organic matter content between 1 and 8 percent or as approved in writing by the Engineer.

3. **Testing and documentation:** The Contractor shall submit the following test reports to the Engineer for Class B topsoil prior to use. Testing shall be completed by an independent commercial soils testing laboratory:

   a) **Soil analysis** of topsoil including pH factor, mechanical analysis (composition), salinity, percentage of organic content, and soil classification based thereon.

   b) **Recommendations** on type and quantity of additives required to establish a satisfactory pH and bring the supply of nutrients to a level satisfactory for sustaining turf and/or for use as a soil mix for planting if applicable.

(c) **Seeds:** Kinds and varieties of seeds shall be delivered to the project in separate sacks bearing a green seed label denoting that the seed was inspected and approved by the Virginia Crop Improvement Association. Open bags will not be accepted for use. Seeds shall be mixed under the observation of the Engineer on the project or at other approved locations. Seeds shall comply with applicable state and federal seed laws and contract requirements. Seed shall not be used until approved by the Engineer.

Seed shall be subject to inspection by Virginia State Seed Regulatory Inspectors of the Virginia Department of Agriculture and Consumer Services.

Seed tests shall be completed within the 9-month period prior to the beginning of the area scheduled seeding period during which the seed is to be used.

Seed shall not be or have been stored in an enclosure where herbicides, kerosene, or other material detrimental to seed germination is stored.

Noxious weed seeds, as defined by the rules and regulations adopted for enforcement of the Virginia Seed Law, will not be permitted. The number of restricted noxious weed seeds shall be not more than the number per ounce or per pound of noxious weed seeds specified in the rules and regulations of the Virginia Seed Law.

The tag from each sack of seed shall be signed by the Contractor and delivered to the Engineer after each sack is completely used.

(d) **Fertilizers:** Fertilizer shall be uniform in composition, free flowing, and suitable for application with approved equipment. The fertilizer shall be delivered to the project in bags or other convenient containers, each fully labeled, and shall conform to all applicable state and federal laws and regulations. Additional nutrients shall be added only when specified in the contract documents. Fertilizer shall be subject to testing by the Virginia Department of Agriculture and Consumer Services. The Department

reserves the right to reject fertilizer materials that do not comply with the requirements of these specifications or to be compensated in an amount as decided by the Engineer for failure of complying with the requirements of the Virginia Fertilizer Law. Other fertilizer products and rates may be substituted with the prior written approval from the Engineer.

A copy of the material safety data sheet (MSDS) shall be provided to the Department for each type of fertilizer supplied with each fertilizer delivery. Any fertilizer delivery that is not accompanied by the appropriate MSDS will be rejected.

1. **Fertilizer for seeding, sodding, sprigging, and plugging** shall have a guaranteed 1-2-1 ratio and a nitrogen, phosphorous, and potassium (NPK) analysis as detailed in the plans with a minimum 30 percent of the nitrogen from a slow release or slowly soluble source with the remainder of the nitrogen from urea or ammonium nitrate. The following types of slow release or slowly soluble nitrogen fertilizers may be used: urea formaldehyde (UF) (ureaform, methylene urea, and methylene diurea/dimethylene triurea); isobutylidene diurea (IBDU); sulfur-coated urea (SCU); and polycoated urea (PCU). UF products shall have a minimum activity index of 40 percent. The IBDU minimum size guide number shall be 230. All UF and IBDU products shall indicate the slow release/slowly available nitrogen source on the fertilizer analysis label as water-insoluble nitrogen. PCU and SCU shall have a minimum 3-month release duration for the total product. The phosphorous content of the fertilizer shall be triple superphosphate or diamonnium phosphate. The potassium content of the fertilizer shall be potassium chloride, commonly known as muriate of potash. Slow release or slowly soluble fertilizers may be applied with a hydraulic seeder except for SCU. Fertilizer shall be applied in accordance with the requirements of Section 603.

2. **Fertilizer for planting plants** shall have a guaranteed 1-2-1 ratio and a 15-30-15 analysis with a minimum of 40 to 50 percent of the nitrogen from one of the following slow release or slowly soluble sources, with the remainder of the nitrogen from urea or ammonium nitrate:soluble UF, SCU, and PCU. The UF products shall have a minimum activity index of 40 percent. SCU and PCU shall have a minimum 3-month release duration for the total product. Slow release or slowly soluble fertilizers shall be applied as a dry surface application as shown in the Department's *Road and Bridge Standards,* Volume II, Landscape Section.

(e) **Lime:** Lime shall be agricultural grade ground limestone. Agricultural grade pulverized or pelletized lime products may be substituted at no additional cost to the Department.

The material source shall be registered with and approved by the Virginia Department of Agriculture and Consumer Services in accordance with the Virginia Agricultural Lime Law and shall conform to the requirements of Section 240. All lime shall be subject to testing by the Virginia Department of Agriculture and Consumer Services. Other lime products may be substituted with approval from the Engineer.

(f) **Inoculating Bacteria for Treating Leguminous Seeds:** Bacteria shall be a pure culture of nitrogen-fixing bacteria selected for maximum vitality. Cultures shall be not more than 1 year old and shall be subject to the approval of the Engineer.

(g) **Mulch:** Mulch shall conform to the following unless otherwise approved in writing by the Engineer:

1. **Mulch for seeding** (vegetative) shall consist of dry straw or hay, free from noxious weeds. Mulch shall be reasonably bright in color and shall not be musty, moldy, caked, decayed, or dusty.

2. **Wood cellulose fiber mulch for hydraulic seeding** shall consist of specially prepared wood cellulose processed into a uniform fibrous physical state. Mulch shall be dyed green or contain a green dye in the package that will provide an appropriate color to facilitate visual inspection of the uniformly spread slurry. Mulch, including dye, shall not contain germination-inhibiting or growth-inhibiting factors. Mulch shall be manufactured and processed so that it will remain in uniform suspension in water under agitation and will blend with seed, fertilizer, and other additives to form a homogeneous slurry. Mulch shall form a blotterlike ground cover, on application, having moisture absorption and percolation properties and shall cover and hold grass seed in contact with the soil without inhibiting the growth of grass seedlings. Field and equipment performance determinations by the Department shall be prerequisites for the approval of a source of supply for mulch.

   The manufacturer shall provide certification that the mulch conforms to the following:

Property	Value
Fiber or particle size	
Length	To approximately 0.39 inch (10 mm)
Thickness or diameter	Approximately 0.04 inch (1 mm)
Net dry weight content (VTM-47)	Minimum stated on bag
pH range (TAPPI T509 or ASTM D 778)	4.0 to 8.5
Ash content (TAPPI T413 or ASTM D 586)	Maximum 7.0%
Water-holding capacity (VTM-46)	Minimum 90%

   Mulch shall not contain elements or compounds at concentration levels that will be phytotoxic.

   In addition to making field performance determinations, the Department may sample and perform such other tests on mulch to ensure that it conforms to these specifications. Only those materials that have been evaluated by the Department and that appear on its list of approved sources of supply will be accepted.

   Mulch shall be delivered in packages of uniform weight bearing the name of the manufacturer, the net weight, and an additional statement of the net dry weight content.

3. **Wood chips** processed from clearing and grubbing operations may be used for mulch on seeded areas as directed by the Engineer. Wood chips shall be not more than 3/8 inch in thickness or 6 square inches in area.

4. **Mulch for individual planting pits and planting beds** shall be double-shredded hardwood mulch aged for at least 1 year and brown in color. A representative sample shall be submitted to the Engineer for approval prior to delivery to the work site.

(h) **Sod:** Sod shall be cultivated material conforming to the requirements of the State Board of Agriculture for state-approved sod or the State Sod Certification Agency for state-certified sod. Root development shall be such that standard size pads will support their own weight and retain their size and shape when suspended vertically from a firm grasp on the uppermost 10 percent of the area. The top growth of sod shall be mowed so that the height of the grass will be 2 to 3 inches at the time of the stripping operation. Sod may be furnished in any standard pad width and length provided the dimensions do not vary from the average by more than 5 percent. Sod shall be machine stripped at a uniform soil thickness of at least 1 inch. Broken, torn, or irregularly shaped pads will be rejected.

(i) **Trees, Shrubs, Vines, and Other Plants:** The botanical and common name of plants shall be in accordance with the latest edition of *Standardized Plant Names,* prepared by the Editorial Committee of the American Joint Committee on Horticultural Nomenclature in effect on the date of the Notice of Advertisement.

1. **Quality and size:** Plants shall conform to the requirements of the current *American Standard for Nursery Stock* (ANSI Z-60.1) by the American Nursery and Landscape Association and these specifications.

   Plants shall be representative of their normal species and varieties; shall have well-furnished branch systems and vigorous fibrous root systems characteristic of their respective kinds; shall be grown in a state-approved, certified nursery; and shall bear evidence of proper nursery care, including adequate transplanting and root pruning. Plants shall comply with state and federal laws governing inspection for plant diseases and insect infestation and shall be free from insect pests, plant diseases, disfiguring knots, stubs, sunscald, bark abrasions, or any other form of damage or objectionable disfigurements.

   When a minimum and maximum size or range is specified, an average size shall be furnished. Plants shall not be pruned before delivery or cut back from larger sizes to conform to the sizes specified. Sizes furnished shall be those specified at the time of delivery and before the usual pruning at the time of planting. Nursery-grown trees shall be free from cuts of limbs that are not healed and cuts more than ¾ inch that have not completely callused over. Plants from cold storage will not be accepted. Deciduous plants, except those grown in containers, shall be dormant when planted.

2. **Digging and protection:** Digging shall be in accordance with the current *American Standards for Nursery Stock* and done in a manner that will avoid damage to or loss of roots, but roots that are cut shall be cleanly cut. Balled and burlapped plants shall be properly dug and protected to preserve the natural earth in contact with the roots. Manufactured balls or processed balls will not be accepted. Balls shall be firmly wrapped and tied with approved materials. Balled plants will not be accepted if the ball is broken, cracked, or loose. After plants are dug, their roots shall be protected from damage. Roots of bare root plants shall be kept moist at all times. Bare root plants shall be further protected by wrapping in wet straw, moss, burlap, or other approved material.

3. **Plantable pots:** In lieu of using burlap with balled plants, plants may be dug as specified herein and placed in plantable pots. Pots shall be constructed of organic, biodegradable material that will readily decompose in soil and shall not be smaller in any dimension than the size specified for balled and burlapped root systems. At the time of planting, the lip or rim of pots shall be broken away, and drainage holes shall be provided as directed. Plants with balls that have been grown in pots or with loose stems will be rejected.

4. **Container-grown plants:** In addition to the requirements of the *American National Standard for Nursery Stock*, container-grown plants shall conform to the following:

   a. The space between the rim or top of the container and the soil line within the container shall not be more than 1½ inches for the 1-gallon and 2-gallon sizes and not more than 2½ inches for the 5-gallon size.

   b. Encircling roots shall not have grown in such a manner that they will cause girdling of the trunk or stems.

c. Roots shall have been grown in the soil medium for a minimum of 6 months extending to the limits of the container on all sides and from top to bottom.

5. **Collected plants:** Collected plants from wild or native stands shall not be used without the written permission of the Engineer unless specified on the plans. Wild or native plants shall be clean, sound stock and free from injury, and the quality of the plants shall be similar to that specified for nursery-grown material. Stock shall have sufficient root systems to ensure successful transplanting. Balls, when specified, shall be tight and well formed.

6. **Clumps:** Clumps shall be dug from good soil that has produced a fibrous root system typical of the nature of the plant and shall have earth and incidental vegetation adhering to roots.

(j) **Miscellaneous Planting Materials:**

1. **Twine** for wrapping balled and burlapped trees shall be made of an organic material, biodegradable twine, at least two-ply.

2. **Composted yard waste** shall be dark brown or black in color and consist of decomposed leaves, branches, and grass clippings. Prior to delivery, the Contractor shall submit to the Engineer for approval, a sample of the composted yard waste and a test report from an independent laboratory verifying that the material conforms to the following analysis:

- pH = 5.5 dry–8.0 wet
- Moisture Content = 35%–45%
- Particle Size = Pass through a 1-inch screen or smaller
- Stability = Stable to highly stable, thereby providing nutrients for plant growth
- Maturity/Growth Screening = Aged (cured) for a minimum of 6 months, reach thermophilic (113—158 degrees F) temperature ranges following a minimum of two successive turnings of the compost, and pass maturity tests or demonstrate its ability to enhance plant growth
- Soluble Salt Concentration = 3.0 dS/m (mmhos/cm) or less
- Nutrient Content: Nitrogen = 0.5%–3.5%
- Phosphorous = 0.2–4.0%
- Potassium = 0.3%–2.0%
- Density = Not more than 1,250 pounds per cubic yard.

The Contractor shall submit the following information to the Engineer 30 days prior to the date the compost is shipped to the construction site:

a. A vendor's certificate or affidavit attesting that the "Composted Yard Waste" complies with the requirements of this specification.

b. A test report from an independent certified laboratory verifying that the material complies with the requirements for use as specified by the Virginia Department of Environmental Quality and United States Environmental Protection Agency/40 CFR Part 503 Regulations February 1993 with regard to heavy metal content and restrictive use of biosolids.

c. A 2-gallon sample of the material for visual inspection. In addition, the test report shall indicate that the compost material is free of viable weed seed, plant propagules, and harmful pathogens. Non-organic materials such as concrete, plastic, metal, glass, paper products, chemically treated plywood, plywood, pressboard, and organic pine by-products will not be accepted. The Engineer reserves the right at any time to test and reject compost material that does not comply with the requirements of this specification. Other compost products may be substituted with the written approval of the Engineer.

3. **Hoticultural Grade Perlite** shall be a fine-to-medium grade, non-organic volcanic mineral identified as Perl-Lome having closed air cells and surface cavities, expanded to form a granular, snow-white material, 5 to 20 times its original volume. Perlite shall have a weight of 5 to 8 pounds per cubic foot. Prior to delivery, the Contractor shall submit to the Engineer for approval, a sample of the perlite and a manufacturer's test report or product certification verifying that the material complies with the following analysis and gradation:

   pH = 6.5 to 7.5
   Nutrient Content = Sterile.

Standard Sieve or Micron Size	Perlite Gradation	
	Fine	Medium
+16 mesh	10% maximum	60% maximum
+100 mesh	60% minimum	85% minimum

4. **Burlap used for wrapping the tree ball** shall be made of an organic biodegradable material.

5. **Water** used in watering plants shall be obtained from fresh water sources and shall be free from chemicals and other toxic substances harmful to plants. Brackish water shall not be used. The source of water will be subject to the approval of the Engineer.

6. **Staking and guying materials** shall be 14-gage galvanized steel wire. Hose shall be corded rubber, ½ inch or ¾ inch, and solid green in color. Turnbuckles shall be galvanized steel or zinc-coated steel. Stakes for anchoring trees and shrubs shall be 2 inch by 2 inch rough dressed hardwood in the appropriate length and reasonably free of knots. Trees and shrubs shall be anchored in accordance with Section 1200 of the Department's *Road and Bridge Standards* unless otherwise indicated on the plans. Other staking, guying, and anchoring methods and materials specifically designed for securing trees and shrubs may be substituted with prior approval in writing from the Engineer or as designated on the plans.

7. **Below-ground tree anchors** shall be below-grade steel stabilizers capable of fixing the root ball in place until the tree has established itself in place. Prior to ordering material, the Contractor shall furnish the Engineer manufacturer's product data for the type of anchoring system he proposes to supply for review.

8. **Tree protection tubes** shall be constructed from flexible UV-inhibited polyethylene, polypropylene, or similar material designed to speed photosynthesis, promote seedling growth, and reduce planting stress by trapping moisture, thereby raising relative humidity and ambient temperature inside the tube. Tree tubes shall protect the tree seedlings from animals, wind desiccation, small rodents, chemical sprays, and insects. The design of the tree tubes shall not be detrimental to the establishment and growth of the seedling or young tree. Tree tube designs shall be capable of accommodating tree growth for at least 3 years after planting.

(k) **Soil Retention Coverings:**

1. **Jute mesh** shall be a uniform, open, plain weave of undyed and unbleached single layer jute yarn. The yarn shall be loosely twisted and shall not vary in thickness by more than its normal diameter. Jute mesh shall be new, and its length shall be marked on each roll.

   Between strands lengthwise, openings shall be 0.60 inch ± 25 percent. Between strands crosswise, openings shall be 0.90 inch ± 25 percent. Jute mesh shall weigh 0.9 pound per square yard ± 5 percent.

2. **Soil retention mats** shall consist of a machine-produced mat of wood fibers, wood excelsior, or manmade fiber that shall intertwine or interlock. Matting shall be nontoxic to vegetation and germination of seed and shall not be injurious to the unprotected skin of the human body.

   Mats shall be of consistent thickness, with fiber evenly distributed over its entire area, and covered on the top and bottom side with netting having a high web strength or covered on the top side with netting having a high web strength and machine sewn on 2-inch centers along the longitudinal axis of the material. Netting shall be entwined with the mat for maximum strength and ease of handling.

3. **Soil stabilization mats** shall be from the Department's approved products list for the site conditional use(s) specified.

(l) **Fencing and Steel Posts for Protection of Landscape**: When specified on the plans, fencing to delineate areas of landscaping to be protected shall be 40 inches in height, international orange, high-visibility, plastic (polyethylene) web fencing. Fence posts shall be conventional metal "T" or "U" posts 6 feet in length. The plastic fencing shall be securely fastened to the posts in a manner approved by the Engineer. The plastic fencing shall have the following physical qualities:

Tensile Yield = Average 2,000 pounds per 4-foot width (ASTM D 638)

Ultimate Tensile Yield = Average 2,900 pounds per 4-foot width (ASTM D 638)

Elongation at Break (%) = Greater than 1000% (ASTM D 638)

Chemical Resistance = Inert to most chemicals and acids.

SECTION 245—GEOSYNTHETICS

245.01—Description

These specifications cover artificial fiber textile products to be used in transportation construction work.

245.02—Detail Requirements

Geosynthetics shall include a label that clearly shows the manufacturer or supplier name, style name, and roll number. The shipping document shall include documentation to comply with the requirements of Section 245.03.

Each geosynthetic roll shall be wrapped or otherwise packaged in a manner that will protect the geosynthetic, including the ends of the roll, from damage due to shipment, water, sunlight, and contaminants. The protective wrapping shall be maintained during periods of shipment and storage.

During storage, geosynthetics rolls shall be elevated off the ground and adequately covered to protect them from the following: site construction damage; precipitation; extended ultraviolet radiation including sunlight; chemicals that are strong acids or strong bases; flames including welding sparks; temperatures in excess of 160 degrees F; and other environmental conditions that may damage the physical property values of the geosynthetic. Geosynthetics that are not properly protected may be subject to rejection.

245.03—Testing and Documentation

Each geosynthetic material provided to the project shall be tested to determine conformance with the material properties specified herein within 24 months of submission. Test results reported from AASHTO's National Transportation Product Evaluation Program—Laboratory Results of Evaluations on Geotextile and Geosynthetics may be used. The Contractor shall provide certification of the material in accordance with the requirements of AASHTO M288, Section 5, Certification, and copies of the test results. This testing, however, will not be the sole basis for acceptance.

The Contractor shall be responsible for ensuring that each roll of geosynthetic delivered to the project includes a certificate from the manufacturer showing manufacturer name, product name, style number or identifier, roll number, chemical composition of the filaments or yarns, any other pertinent information to fully describe the product, and a signature or attest of a person having legal authority to bind the manufacturer.

VDOT will sample and test the geosynthetics for acceptance to verify conformance with this specification. Sampling shall be performed in accordance with the requirements of ASTM D4354, Procedure C. For tests not conducted by VDOT, acceptance may be based on the manufacturer's certifications as a result of testing by the manufacturer of quality assurance samples obtained using the procedure for ASTM D4354 Procedure B Sampling for Manufacturer's Quality Assurance (MQA) Testing. A lot size shall be considered to be the shipment quantity of the given product or a truckload of the given product, whichever is smaller, but in no case shall lot size exceed 250,000 square feet.

Property values, with the exception of apparent opening size (AOS) and panel vertical strain, in these specifications represent minimum average roll values (MARV) in the

weakest principal direction (i.e., average test results of any roll in a lot sampled for conformance or quality assurance testing shall meet or exceed the minimum values provided herein). Values for AOS and panel vertical strain represent maximum average roll values.

Tests shall be performed in accordance with the methods referenced in this specification for the indicated application. The number of specimens to test per sample is specified by each test method. Geotextile product acceptance shall be based on conformance to the requirements of ASTM D4759. Product acceptance is determined by comparing the average test results of specimens in a given sample to the specification MARV.

(a) **Geotextile Fabric for Use in Silt Fences, Silt Barriers, or Filter Barriers:** Geotextile shall function as a vertical, permeable interceptor designed to remove suspended soil from overland water flow. Fabric shall filter and retain soil particles from sediment-laden water to prevent eroding soil from being transported off the construction site by water runoff. Fabric shall contain ultraviolet inhibitors and stabilizers to provide at least 6 months of expected, usable construction life at a temperature of 0 degrees F to 125 degrees F. The tensile strength of the material after 6 months of installation shall be at least 50 percent of the initial strength.

Physical Property	Test Method	Requirements
Filtering efficiency	VTM-51 or ASTM D5141-11	Min. 75%
Flow rate	VTM-51 or ASTM D5141-11	Min. 0.2 gal/ft^2/min

In addition to these requirements, the geotextile shall comply with the requirements of AASHTO M288 for temporary silt fence property requirements, Table 7, Temporary Silt Fence Property Requirements, for grab strength and ultraviolet stability.

The Contractor shall be responsible for supplying test results on each lot of silt fence geotextile for filtering efficiency, flow rate, and grab strength. These results shall be from a GAI-accredited laboratory, which also is specifically accredited by GAI in tests ASTM D5141 and ASTM D4632. Passing test results submitted by the Contractor are not sufficient for acceptance, as VDOT shall also conduct verification testing.

(b) **Geotextile for Use as Riprap Bedding Material:** Geotextile shall comply with the requirements of AASHTO M288 for separation geotextile properties, Table 3, for apparent opening size and ultraviolet stability and geotextile strength property requirements, Table 1, Class 2, for grab strength and puncture strength.

(c) **Geotextile Fabric for Use in Drainage Systems (Drainage Fabric):** Drainage fabric shall be nonwoven and clog resistant, suitable for subsurface application, and thermally and biologically stable.

The geotextile shall retain at least 75 percent of its ultimate strength when subjected to substances having a pH of a minimum of 3 and a maximum of 12 for a period of 24 hours.

Physical Property	Test Method	Requirements
Permittivity	ASTM D4491	Min. 0.5 sec^{-1}
Apparent opening size	ASTM D4751	Max. No. 50 sieve

In addition to these requirements, the geotextile shall comply with the requirements of AASHTO M288 for strength requirements, Table 1, Class 3, for grab strength.

(d) **Geotextile for Use in Stabilization:** These are geotextiles used in saturated and/or unstable conditions to provide the functions of separation and reinforcement.

1. **Subgrade Stabilization Fabric:**

Physical Property	Test Method	Requirements
Apparent opening size	ASTM D 4751	Max. No. 20 sieve

In addition to this requirement, the geotextile shall comply with the requirements of AASHTO M 288 for strength property requirements, Table 1, Class 3, for grab strength, tear strength, and puncture strength.

2. **Embankment Stabilization Fabric Up to 6 Feet High:**

Physical Property	Test Method	Requirements
Apparent opening size	ASTM D 4751	Max. No. 20 sieve
Seam strength	ASTM D 4632	90% specified grab strength

In addition to this requirement, the geotextile shall comply with the requirements of AASHTO M288 for strength property requirements, Table 1, Class 1 for grab strength, tear strength, and puncture strength.

(e) **Prefabricated Geocomposite Pavement Underdrain:** Prefabricated geocomposite pavement underdrain shall consist of a polymeric drainage core encased in a nonwoven filter fabric envelope having sufficient flexibility to withstand bending and handling without damage. Prefabricated geocomposite pavement underdrain shall conform to the following:

1. **Core:** The drainage core shall be made from an inert, polymeric material resistant to commonly encountered chemicals and substances in the pavement environment and shall have a thickness of not less than 3/4 inch.

Physical Properties	Test Method	Requirements
Compressive strength panel vertical strain and core area change	ASTM D1621/D2412	Min. 40 psi at 20% deflection
Panel vertical strain and core area change at 22.7 psi	ASTM D6244	Max. 10% for core area and panel height
Water flow rate)after 100 hr at 10 psi normal confining pressure gradient of no more than 0.1)	ASTM D4716	Min. 15 gal/min/ft width for 12-in specimen length

The core shall retain at least 75 percent of its ultimate strength when subjected to temperatures of 0 degree F and 125 degrees F, respectively, for a period of 24 hours.

2. **Filter Fabric:** Geotextile shall be bonded to and tightly stretched over the core. Geotextile shall not sag or block the flow channels, shall have a life equivalent to that of the core material, and shall conform to the requirements of (c) herein.

(f) **Geocomposite Wall Drains:** Prefabricated geocomposite wall drain shall consist of a polymeric drainage core encased in a nonwoven filter fabric envelope having sufficient flexibility to withstand bending and handling without damage. Geocomposite wall drains shall conform to the following:

1. **Core:** The drainage core shall be made from an inert, polymeric material resistant to commonly encountered chemicals and substances in the roadway.

Physical Property	Test Method	Requirements
Compressive strength at 20% deflection	ASTM D1621/D2412	Min. 40 psi
Water flow rate (after 100 hr at 10 psi normal confining pressure and gradient of no more than 0.1)	ASTM D4716	Min. 15 gal/min/ft width (for 12-in specimen length)

The core shall retain at least 75 percent of its ultimate strength when subjected to temperatures of 0 degree F and 125 degrees F for a period of 24 hours.

2. **Filter Fabric:** Geotextile shall be bonded to and tightly stretched over the core. Geotextile shall not sag or block the flow channels, shall have a life equivalent to that of the core material, and shall conform to the requirements of (c) herein.

(g) **Geomembrane Moisture Barrier:** Geomembrane moisture barrier shall be resistant to biological attack. Geomembrane shall be constructed of PVC, shall have a thickness of 30 mils, and shall conform to the requirements of the PVC Geomembrane Institute 1197 material specification for PVC geomembrane or shall conform to the following requirements:

Physical Property	Test Method	Requirements
Thickness	ASTM D5199	Min. 30 mils
Tensile (1-in strip)	ASTM D882	Min. 130 kip/ft
Tear (Die C)	ASTM D1004	Min. 200 lbf
Puncture	ASTM D4833	Min. 620 lbf

(h) **Dewatering Bag:** A nonwoven geotextile sewn together to form a bag that can be used in lieu of a de-watering basin for the purpose of filtering out suspended soil particles. The bag shall be capable of accommodating the water flow from the pump without leaking at the spout and seams.

Physical Property	Test Method	Requirements
Grab strength @ Elongation >50%(CRE/Dry)	ASTM D4632	Min. 250 lb (min)
Seam strength	ASTM D4632	90% Specified grab strength
Puncture	ASTM D4833	Min. 150 lb
Mullen burst	ASTM D3786	Min. 450 psi
Flow rate	ASTM D4491	Min. 0.189 $ft^3/sec/ft^2$(min)
Permittivity	ASTM D4491	Min. 1.2 sec^{-1}
UV resistance	ASTM D4355	Min. 70% at 500 hr
AOS	ASTM D4751	Max. 100 sieve

(i) **Paving Geosynthetics:** Paving geosynthetics shall be used as an interlayer between pavement layers. Specific application of these paving geosynthetics shall be determined by the Engineer.

1. **Geotextile Paving Fabric:** The geotextile shall conform to the requirements of AASHTO M288 Paving Fabric Property Requirements, Section 9.

Pavement Reinforcing Mat: The geotextile shall meet the requirements of ASTM D7239 Geosynthetic Paving Mat, Type 1.

SECTION 301—CLEARING AND GRUBBING

301.01—Description

This work shall consist of clearing, grubbing, removing, and disposing of vegetation, debris, and other objects within the construction limits except for vegetation and objects that are designated to be preserved, protected, or removed in accordance with the requirements of other provisions of these specifications.

301.02—Procedures

If approved by the Engineer, the Contractor may clear and grub to accommodate construction equipment within the right of way up to 5 feet beyond the construction limits at his own expense. The Contractor shall install erosion and siltation control devices prior to beginning clearing or grubbing operations and such devices shall be functional before upland land-disturbing activities take place.

The surface area of earth material exposed by grubbing, stripping topsoil, or excavation shall be limited to that necessary to perform the next operation within a given area. Grubbing of root mat and stumps shall be confined to that area of land which excavation or other land disturbance activities shall be performed by the Contractor within 14 days following grubbing.

Stumps, roots, other perishable material, and nonperishable objects that will be less than 5 feet below the top of earthwork within the area directly beneath the pavement and shoulders shall be removed. However, such material and objects that will be 5 or more than 5 feet below the top of earthwork within the area directly beneath the pavement and shoulders and all such material and objects beneath slopes of embankments shall be left in place unless removal is necessary for installation of a structure. The top of stumps left in place shall be not more than 6 inches above the existing ground surface or low water level.

Vegetation, structures, or other items outside the construction limits shall not be damaged. Trees and shrubs in ungraded areas shall not be cut without the approval of the Engineer.

Combustible cleared and grubbed material shall be disposed of in accordance with the following:

(a) **Trees, limbs, and other timber having a diameter of 3 inches and greater** shall be disposed of as saw logs, pulpwood, firewood, or other usable material; however, treated timber shall not be disposed of as firewood. Not more than 2 feet of trunk shall be left attached to grubbed stumps.

When specified that trees or other timber is to be reserved for the property owner, such material shall be cut in the lengths specified and piled where designated, either within the limits of the right of way or not more than 100 feet from the right-of-way line. When not

reserved for the property owner, such material shall become the property of the Contractor.

(b) **Material less than 3 inches in diameter** shall be used to form brush silt barriers when located within 500 feet of the source of such material when specified on the plans or where directed by the Engineer. Material shall be placed approximately 5 feet beyond the toe of fill in a strip approximately 10 feet wide to form a continuous barrier on the downhill side of fills. Where selective clearing has been done, material shall be piled, for stability, against trees in the proper location. On the uphill side of fills, brush shall be stacked against fills at approximately 100-foot intervals in piles approximately 5 feet high and 10 feet wide. Any such material not needed to form silt barriers shall be processed into chips having a thickness of not more than 3/8 inch and an area of not more than 6 square inches and may be stockpiled out of sight of any public highway for use as mulch.

SECTION 303—EARTHWORK

303.01—Description

This work shall consist of constructing roadway earthwork in accordance with these specifications and in conformity with the specified tolerances for the lines, grades, typical sections, and cross sections shown on the plans or as established by the Engineer. Earthwork shall include regular, borrow, undercut, and minor structure excavation; constructing embankments; disposing of surplus and unsuitable material; shaping; compaction; sloping; dressing; and temporary erosion and siltation control work.

303.02—Materials

(a) **Borrow excavation** shall consist of approved material required for the construction of the roadway and shall be obtained from approved sources outside the project limits. Borrow excavation shall conform to the requirements of AASHTO M57 and the requirements herein.

(b) **Materials for temporary silt fences, geotextile fabric silt barriers, and filter barriers** shall conform to the requirements of Sections 242.02(c) and 245.03(a).

(c) **Geotextile materials used for embankment stabilization** shall conform to the requirements of Section 245.03(e).

(d) **Mulch** shall conform to the requirements of Section 244.02(g).

(e) **Seed** shall conform to Section 244.02(c) of the Specifications.

303.03—Erosion and Siltation Control and Stormwater Pollution Prevention

Erosion, siltation and stormwater pollution shall be controlled through the use of the devices and methods specified herein, identified in other contract documents or as is otherwise necessary. The Engineer reserves the right to require other temporary measures not specifically described herein or in other contract documents to correct an erosion, siltation or pollution condition.

Erosion and sediment control and pollution prevention devices and measures shall be maintained in a functional condition at all times. Temporary and permanent erosion and sediment control and pollution prevention measures shall be inspected and deficiencies

corrected in accordance with the requirements of Section 107.16(e) of the Specifications. In addition, the Contractor shall make a daily review of the location of silt fences, filter barriers and other perimeter controls to ensure that they are properly located for maximum effectiveness. Where deficiencies are found, corrections shall be made in accordance with the requirements of Section 107.16(e) of the Specifications or as directed by the Engineer.

When erosion and sediment control devices function by using wet storage, sediments shall be removed when the wet storage volume has been reduced by 50 percent. Sediments shall be removed from dewatering basins when the excavated volume has been reduced by 50 percent. Sediments shall be removed from all other erosion and sediment control devices when capacity, height, or depth has been reduced by 50 percent. Removed sediment shall be disposed of in accordance with the requirements of Section 106.04 of the Specifications. Sediment deposits remaining in place after the device is no longer required shall be removed or dressed to conform to the existing grade. The site shall be prepared and seeded in accordance with the requirements of Section 603 of the Specifications.

Geotextile fabric that has decomposed or has become ineffective and is still needed shall be replaced. Temporary erosion and sediment control devices except brush silt barriers shall be removed within 30 days after final site stabilization or after the temporary devices are no longer needed as determined by the Engineer.

(a) **Earth Berms and Slope Drains:** The top of earthwork shall be shaped to permit runoff of rainwater. Temporary earth berms shall be constructed and compacted along the top edges of embankments to intercept runoff water. Temporary Berms and temporary dikes are to be stabilized immediately following installation. Temporary slope drains shall be provided to intercept runoff and adequately secured to prevent movement. Slope drains may be flexible or rigid but shall be capable of being readily shortened or extended. A portable flume shall be provided at the entrance to temporary slope drains.

(b) **Soil Stabilization:** Soil stabilization shall be initiated on any portion of the project where clearing, grading, excavation or other land disturbing activities have permanently ceased or where land disturbing activities have been temporarily suspended for an anticipated duration of greater than 14 days, or upon completion of grading operation for a specific area. Soil stabilization shall begin as soon as practicable but no later than the next business day (Monday through Friday excluding State holidays) following the day when land disturbing activities temporarily or permanently cease. Initiation of stabilization activities includes, but is not limited to 1) prepping the soil for vegetative or non-vegetative stabilization, 2) applying mulch or other non-vegetative product to exposed soil, 3) seeding or planting the exposed area 4) starting any of the above activities on a portion of the area to be stabilized but not on the entire area or 5) finalizing arrangements to have the stabilization product fully installed within the time frame for completing stabilization. Temporary or permanent soil stabilization shall be completed within 7 days after initiation. Areas excluded from this requirement include areas within 100 feet of the limits of ordinary high water or a delineated wetland which shall be continuously prosecuted until completed and stabilized immediately upon completion of the work in each impacted area. Soil stabilization includes: temporary and permanent seeding, riprap, aggregate, sod, mulching, and soil stabilization blankets and matting in conjunction with seeding. The applicable type of soil stabilization shall depend upon the location of areas requiring stabilization, time of year (season), weather conditions and stage of construction operations.

Cut and fill slopes shall be shaped and topsoiled where specified. Seed and mulch shall be applied in accordance with the requirements of Section 603 of the Specifications as the work progresses in the following sequence:

1. Slopes whose vertical height is 20 feet or greater shall be seeded in three equal increments of height. Slopes whose vertical height is more than 75 feet shall be seeded in 25-foot increments.

2. Slopes whose vertical height is less than 20 but more than 5 feet shall be seeded in two equal increments.

3. Slopes whose vertical height is 5 feet or less may be seeded in one operation.

Areas that cannot be seeded because of seasonal or adverse weather conditions shall be mulched to provide some protection against erosion to the soil surface. Mulch shall be applied in accordance with the requirements of Section 603.03(e) of the Specifications and paid for in accordance with the requirements of Section 603.04 of the Specifications. Organic mulch shall be used, and the area then seeded as soon as weather or seasonal conditions permit in accordance with the requirements of Section 603.03 of the Specifications. Organic mulch includes: straw or hay, fiber mulch, wood cellulose, or wood chips conforming to the requirements of Section 244.02(g) of the Specifications.

(c) **Check Dams:** As an initial item of work, required check dams shall be constructed at 25-foot intervals, unless otherwise shown on the plans, below the outfall end of drainage structures.

Synthetic check dams recorded in the Department's Approved List may be substituted for Standard EC-4, Rock Check Dams, Type II, with the approval of the Engineer at no additional cost to the Department. Synthetic check dams shall be installed in accordance with the manufacturer's recommendation.

(d) **Baled Straw Silt Barriers:** Baled straw silt barriers may be substituted for temporary filter barriers with the approval of the Engineer in noncritical areas, such as pavement areas and rock locations where filter barriers cannot be installed in accordance with the plans and specifications and locations where the Engineer determines that streams and water beds will not be affected.

(e) **Temporary Silt Fences, Geotextile Fabric Silt Barriers, and Filter Barriers:**

1. **Temporary silt fences:** Fences shall be erected at locations shown on the plans or determined by the Engineer. Geotextile fabric used for silt fences shall be provided, and posts shall not be spaced more than 6 feet apart. Posts shall be uniformly installed with an inclination toward the potential silt load area of at least 2 degrees but not more than 20 degrees. Attaching fabric to existing trees will not be permitted.

   Fabric shall be firmly secured to the post or wire fence. The bottom of the fabric shall be entrenched in the ground in a minimum 6-inch by 6-inch trench. Temporary silt fence may also be entrenched using a slicing method with a minimum of 8 inches sliced into the ground. Fabric may be spliced only at support posts and with an overlap of at least 6 inches. The top shall be installed with a 1-inch tuck or reinforced top end section. The height of the finished fence shall be a nominal 29 inches.

2. **Geotextile fabric silt barriers:** Existing fences or brush barriers used along the downhill side of the toe of fills shall have geotextile fabric attached at specified locations as shown on the plans. The bottom of the fabric shall be entrenched in the ground in a minimum 6-inch by 6-inch trench, and the top shall be installed with a 1-inch tuck or reinforced top end section. Temporary fabric silt barriers may also be entrenched using a slicing method with a minimum of 8 inches sliced into the ground.

   Brush barriers shall be installed prior to any major earth-disturbing activity and trimmed sufficiently to prevent tearing or puncturing fabric. Fabric shall be fastened securely to the brush barrier or existing fence. A 6-inch overlap of fabric for vertical and horizontal splicing shall be maintained and tightly sealed.

3. **Temporary filter barriers:** Barriers shall consist of geotextile fabric and shall be securely fastened to wood or metal supports that are spaced at not more than 3-foot intervals and driven at least 12 inches into the ground. At least three supports shall be used. The bottom of the fabric shall be entrenched in the existing ground in a minimum 4-inch by 4-inch trench.

   Temporary filter barriers may also be entrenched using a slicing method with a minimum of 6 inches sliced into the ground. The top of the fabric shall be installed with a 1-inch tuck or reinforced top end section. The height of the finished temporary filter barrier shall be a nominal 15 inches.

   Temporary filter barriers shall be installed at temporary locations where construction changes the earth contour and drainage runoff as directed or approved by the Engineer.

   After removal and disposal of the temporary silt fence, geotextile fabric silt barrier, and temporary filter barrier, the area shall be dressed and stabilized with a permanent vegetative cover or other approved permanent stabilization practice approved by the Engineer.

(f) **Sediment Traps and Sediment Basins:** Once a sediment trap or basin is constructed, the earthen embankment and all outfall areas shall be stabilized immediately.

(g) **Erosion Control Mulch:** This work shall consist of furnishing and applying mulch as a temporary erosion control treatment on slopes exposed to the elements but not at final grade during the period from December 1 to March 1 for periods of up to 30 days prior to final grading or to areas to receive stabilization or paved surfaces within 6 months in accordance with this provision and as directed by the Engineer.

Mulch shall be applied to exposed slopes requiring mulch or to areas to be stabilized or paved, within 48 hours after performance of grading operations. Straw or hay mulch shall be applied on bare slope areas at the rate of approximately 3 tons per acre (1.24 pounds per square yard). Straw or hay mulch shall be applied at a uniform thickness in such a manner that not more than 10 percent of the soil surface will be exposed. Straw or hay mulch shall be anchored to the slope surface by one of the following methods: spraying with cellulose fiber mulch at the rate of 750 pounds per acre (0.15 pound per square yard); disking or punching the mulch partially into the soil; using approved netting; or using other materials or methods approved by the Engineer. The Contractor may use more than one method on the same project.

(h) **Temporary Diversion Dike:** This work shall consist of constructing temporary diversion dikes at the locations designated on the plans and in accordance with the

plan details and the Specifications, stabilizing with seed and mulch, maintaining, removing when no longer required, and restoration of the area.

Temporary diversion dikes shall be installed as a first step in land-disturbing activities and shall be functional prior to downslope land disturbance. The dike shall be constructed to prevent failure in accordance with Section 303.04 of the Specifications. Seeding and mulch shall be applied to the dike in accordance with Section 603 of the Specifications immediately following its construction. The dikes should be located to minimize damages by construction operations and traffic.

The Contractor shall inspect the temporary diversion dikes after every storm and repairs made to the dike, flow channel, outlet, or sediment trapping facility, as necessary. Once every two weeks, whether a storm event has occurred or not, the measure shall be inspected and repairs made if needed. Damages to the dikes caused by construction traffic or other activity must be repaired before the end of the working day.

303.04—Procedures

Loose rock 3 inches or larger shall be removed from the surface of cut slopes.

When slides occur, the Contractor shall remove and dispose of material as directed by the Engineer.

Where required, surface ditches shall be placed at the top of cut slopes or at the foot of fill slopes and at such other points not necessarily confined to the right of way or shown on the plans and shall be of such dimensions and grades as directed by the Engineer.

Prior to the beginning of grading operations in the area, necessary clearing and grubbing shall be performed in accordance with the requirements of Section 301.02.

(a) **Regular Excavation:** Existing foundations and slabs located within the construction limits shall be removed and disposed of in a location approved by the Engineer. In lieu of removal, foundations and slabs located 5 feet or more below the proposed subgrade may be broken into particles not more than 18 inches in any dimension and reoriented to break the shear plane and allow for drainage.

Balance points shown on the plans are theoretical and may vary because of actual field conditions.

Regular excavation shall consist of removing and disposing of material located within the project limits, including widening cuts and shaping slopes necessary for preparing the roadbed; removing root mat; stripping topsoil; cutting ditches, channels, waterways, and entrances; and performing other work incidental thereto. The Engineer may require materials in existing pavement structures to be salvaged for use in traffic maintenance.

Undrained areas shall not be left in the surface of the roadway. Grading operations shall be conducted so that material outside construction limits will not be disturbed.

Where rock or boulders are encountered, the Contractor shall excavate and backfill in accordance with the plans and contract documents.

Where the project has been designed and slopes have been staked on the assumption that solid rock will be encountered and the Contractor fails to encounter solid rock at the

depth indicated, he shall cease excavation in the area and immediately notify the Engineer. If it is necessary to redesign and restake slopes, any additional excavation necessary will be paid for at the contract unit price per cubic yard.

Topsoil stockpiled for later use in the work shall be stored within the right of way unless the working area is such that the presence of the material would interfere with orderly prosecution of the work. Stockpile areas outside the right of way shall be located by the Contractor at his expense. Topsoil used in the work shall be removed first from stockpiles located on private property. Surplus topsoil remaining on private property after completion of topsoiling operations shall be moved onto the right of way and stockpiled, shaped, and seeded as directed by the Engineer.

Stripping topsoil shall be confined to the area over which grading is to be actively prosecuted within 14 calendar days following the stripping operation. Grading operations shall be confined to the minimum area necessary to accommodate the Contractor's equipment and work force engaged in the earth moving work.

(b) **Borrow Excavation:** The Contractor shall make his own arrangements for obtaining borrow and pay all costs involved in accordance with the provisions of Section 106.03.

When borrow is obtained from sources within the right of way and the excavation is performed simultaneously with regular excavation, borrow excavation will be designated as regular excavation. Material secured by widening cuts beyond slope stakes, when taken from previously excavated slopes, will be designated as borrow excavation. When such a procedure is approved, slopes shall be uniform and no steeper than shown on the plans.

Borrow excavation areas shall be bladed and left in a shape to permit accurate measurements after excavation has been completed.

CBR values, stipulated for borrow excavation, shall apply to the uppermost three feet of fill below the top of earthwork. Borrow excavation, installed below the top three feet shall consist of suitable fill material, available from regular excavation or borrow excavation, as defined and of a quality consistent with project requirements.

(c) **Undercut Excavation:** Undercut excavation shall consist of removing and disposing of unsuitable material located within the construction limits in accordance with the requirements of Section 303.06(a)3.

Undercut excavation shall be disposed of in accordance with the requirements of Section 106.04.

(d) **Minor Structure Excavation:** Minor structure excavation shall consist of removing material necessary to accommodate the structure, such as box or arch culverts, including pipe arches, structural plate arches, structural plate pipe, pipe culverts, and storm drains with a span(s) or opening(s) of 48 inches or greater. Minor structure excavation shall also include dewatering, sheeting, bracing, removing existing structures, and backfilling. Removing existing structures shall also include foundations that might be necessary to clear the site.

(e) **Removing Unsuitable Material:** Where excavation to the finished graded section results in a subgrade or slopes of unsuitable material, such material shall be excavated below the grade shown on the plans or as directed by the Engineer. Areas so excavated shall be backfilled with approved material in accordance with (f) herein.

Excavation for structures shall be carried to foundation materials satisfactory to the Engineer regardless of the elevation shown on the plans. If foundation material is rock, the Contractor shall expose solid rock and prepare it in horizontal beds for receiving the structure. Loose or disintegrated rock and thin strata shall be removed. Excavated material, if suitable, shall be used for backfilling around the structure or constructing embankments.

Material shown on the plans as unsuitable and during construction found to be suitable for use shall first be used in embankments where needed in lieu of borrow.

Unsuitable material shall be disposed of in accordance with Section 106.04.

(f) **Backfill for Replacing Undercut Excavation:** Backfill shall be composed of regular excavation, borrow, select material, subbase material, or other material as directed by the Engineer. Backfilling operations shall be performed in accordance with (g) herein.

(g) **Backfilling Openings Made for Structures:** Backfill shall be suitable material removed for the structure, although the Engineer may require that backfill material be obtained from a source within the construction limits entirely apart from the structure or other approved material. The opening to be backfilled shall be dewatered prior to backfilling. Backfill shall not be placed against or over cast-in-place box culverts or other structures until the top concrete slab section(s) has been in place 14 days, exclusive of days on which the average high-low ambient temperature is below 40 degrees F in the shade or until the concrete control cylinder(s) has attained a compressive strength equal to 93 percent of the 28-day design compressive strength.

Backfill shall be compacted in horizontal layers not more than 6 inches in thickness, loose measurement, and as specified in (h) herein. Backfill shall be placed in horizontal layers such that there will be a horizontal berm of compacted undisturbed material behind the structure for a distance at least equal to the remaining height of the structure or wall to be backfilled. Backfill shall be placed in a manner to deter impoundment of water and facilitate existing drainage. Backfill around piers in areas not included in the roadway prism shall be constructed in uniformly compacted layers. However, density requirements will be waived.

Box culverts shall not be opened to construction equipment traffic until concrete has attained 100 percent of the 28-day design compressive strength and has a backfill cover of at least 4.0 feet. The minimum height of backfill cover required to protect pipe culverts from construction equipment shall be in accordance with Standard Drawing PC-1 for the type and size specified.

Where only one side of abutments, wingwalls, piers, or culvert headwalls can be backfilled, care shall be taken that the area immediately adjacent to the structure is not compacted to the extent that it will cause overturning or excessive pressure against the structure. When both sides of a concrete wall or box structure is to be backfilled, operations shall be conducted so that the backfill is always at approximately the same elevation on both sides of the structure.

Openings subject to flooding shall be backfilled as soon as practicable or as directed by the Engineer.

(h) **Embankments:** Work shall consist of constructing roadway embankments; placing and compacting approved material within roadway areas where unsuitable material has been removed; and placing and compacting approved material in holes, pits, utility trenches, basements, and other depressions within the roadway area.

Embankment shall be constructed with approved material and placed so as to be uniformly compacted throughout. Embankment shall be placed adjacent to structures in the same manner as for backfill as described in (g) herein. Embankment shall not contain muck, frozen material, roots, sod, or other deleterious material. Embankment shall not be placed on frozen ground or areas covered with ice or snow.

Unsuitable material used in widening embankments and flattening embankment slopes shall be placed in uniform layers not more than 18 inches in thickness before compaction. Each layer of material placed shall be compacted to the extent necessary to produce stable and reasonably even slopes.

Wherever rock excavation is available on the project, an 8 to 15-inch layer of such materials shall be dump spread over the lower region of embankments in the immediate vicinity of stream crossings and used to cover ditches, channels, and other drainage ways leading away from cuts and fills. However, drainage ways shall be prepared to receive the rock excavation to the extent necessary to avoid reducing their cross section. If rock excavation is not available on the project, rip-rap, jute mesh or soil retention mats shall be used as the covering material and shall be installed in accordance with the requirements of Section 606.03(c). Limits of the area to be covered will be as noted on the plans or as directed by the Engineer.

Wherever sufficient right of way exists, surplus materials shall be used to widen embankments and flatten slopes as directed by the Engineer.

Rock excavation may be placed on slopes by uniform end dumping of the material from along the top of the embankment or as directed by the Engineer. Slopes that are covered with rock excavation shall not receive topsoil or seed.

When geotextile drainage fabric is required under rock fills, preparation shall be as specified in Section 245.

The Contractor shall schedule excavation and embankment work in a manner that will minimize the quantity of unsuitable material for which more than one handling is required prior to final placement. Therefore, the provisions for additional payment for each rehandling of material specified in Section 303.06(a) will not apply to placing unsuitable material for widening embankments and flattening embankment slopes.

The surface area directly beneath the pavement and shoulders on which embankments of less than 5 feet in depth are to be constructed shall be denuded of vegetation. These areas shall be scarified and compacted to a depth of 6 inches to the same degree as the material to be placed thereon.

Areas that contain material unsuitable as foundations for embankments shall be undercut and backfilled in accordance with (e) and (f) herein.

Embankments to be placed over saturated areas that will not support the weight of hauling equipment may be constructed by end dumping successive loads in a uniformly distributed layer of a thickness capable of supporting the hauling equipment while subsequent layers are placed. The nose, or leading edge, of the embankment shall be maintained in a wedge shape to facilitate mud displacement in a manner that will prevent its entrapment in the embankment. The front slope of the embankment shall be maintained steeper than 2:1. The use of compacting equipment will not be required on the original course. However, the remainder of the embankment shall be constructed in layers and compacted in accordance with these specifications.

When geotextile for embankment stabilization is required, it shall be placed as shown on the plans. Geotextile shall be spliced by sewing double-stitched seams with stitching spaced ¼ inch to ½ inch apart or as shown on the plans.

Once geotextile for embankment stabilization is placed, the initial lift of material to be placed atop shall be free draining and shall be end dumped onto the geotextile and spread to the thickness as shown on the plans. Free-draining material shall be any material of which 15 percent or less passes the No. 200 sieve. If the geotextile becomes punctured or torn, the Contractor shall repair the area with geotextile lapped at least 3 feet all around the damaged area.

Existing slopes shall be continuously benched where embankments are constructed one-half width at a time; against slopes of existing embankments or hillsides; or across existing embankments, hillsides, and depressions at a skew angle of 30 degrees or more or the existing slopes are steeper than 4:1. For slopes steeper than 4:1 but not steeper than 1-1/2:1, the bench shall be at least 6 feet in width. For slopes steeper than 1-1/2:1 but less than 1/2:1, the bench shall be at least 4 feet in width. Benching shall consist of a series of horizontal cuts beginning at the intersection with the original ground and continuing at each vertical intersection of the previous cut. Material removed during benching operations shall be placed and compacted as embankment material.

When excavated material consists predominantly of soil, embankment shall be placed in successive uniform layers not more than 8 inches in thickness before compaction over the entire roadbed area. Each layer shall be compacted within a tolerance of ±20 percent of optimum moisture content to a density of at least 95 percent of the theoretical maximum density.

Material having a moisture content above optimum by more than 30 percent shall not be placed on a previously placed layer for drying unless it is shown that the layer will not become saturated by downward migration of moisture in the material.

Field density determinations will be performed in accordance with the requirements of AASHTO T191, modified to include material sizes used in the laboratory determination of density, with a portable nuclear field density testing device or by other approved methods. When a nuclear device is used, density determinations for embankment material will be related to the density of the same material tested in accordance with VTM-1 or VTM-12 and a control strip will not be required.

As the compaction of each layer progresses, continuous leveling and manipulating shall be performed to ensure uniform density. Prior to placement of subsequent layers, construction equipment shall be routed uniformly over the entire surface of each layer or the layer shall be scarified to its full depth in the area where the equipment is routed.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in layers of the thickness prescribed without crushing, pulverizing, or further breaking down the pieces resulting from excavation methods, such material may be placed in the embankment in layers that are not thicker than the approximate average size of the larger rocks. Rock not more than 4 feet in its greatest dimension may be placed in an embankment to within 10 feet of the subgrade. The remainder of the embankment to within 2 feet of the subgrade shall not contain rock more than 2 feet in its greatest dimension. Each layer shall be constructed so that rock voids are filled with rock spalls, rock fines, and earth. Rock shall be placed, manipulated, and compacted in uniform layers. However, density requirements may be waived. Rock, rock spalls, rock fines, and earth shall be distributed throughout each embankment layer and manipulated as specified herein so that the voids are filled. Rock shall not be end dumped over the edges of the layer being constructed but shall be deposited on the layer

and moved ahead so as to advance the layer with a mixture of rock, rock spalls, rock fines, and earth. The 2 feet of the embankment immediately below the subgrade shall be composed of material that can be placed in layers of not more than 8 inches before compaction and compacted as specified herein for embankments. Rock more than 3 inches in its greatest dimension shall not be placed within 12 inches of the subgrade in any embankment.

Rock, broken concrete, or other solid materials shall not be placed in embankment areas where piling is to be placed or driven.

The best material shall be reserved for finishing and dressing the surface of embankments. Work necessary to ensure the reservation of such material shall be the responsibility of the Contractor. Section 303.06(a) will not apply to subsequent handling of capping material.

CBR values, stipulated for Embankment, shall apply to the uppermost three feet of fill below the top of earthwork. Embankment, installed below the top three feet shall consist of suitable fill material, available from regular excavation, borrow excavation or embankment, as defined and of a quality consistent with project requirements.

Crushed glass shall be limited within the boundaries of the embankment as follows. Crushed glass shall be a minimum of two feet inside the side slope and contain a minimum of two feet of soil embankment cap. For those areas where crushed glass is to be incorporated into the embankment, glass may constitute up to approximately ninety percent by weight of that portion of the embankment, except where 100 percent crushed glass is used for drainage purposes (including blankets).

Crushed glass shall be blended with soil and/or soil like materials as follows:

1. The embankment shall be constructed by placing alternate four-inch layers of waste glass and soil and mixing and blending by scarification or other approved methods during compaction. The thickness of uncompacted layers of soil/glass shall be a maximum of 8 inches (loose); or

2. Pugmilled in predetermined ratios to a visually consistent blend and placed in lifts of a maximum of 8 inches (loose); or

3. As directed by the Engineer.

Compaction of the soil/glass embankment shall be to the satisfaction of the Engineer and shall be accomplished with a vibratory compactor or other approved methods. Moisture and density requirements for the soil/glass embankments shall be the same as other conventional soil embankment in accordance with the requirements of Section 303 of the Specifications.

Normal compaction procedures and requirements are to be used for compaction of the soil embankment "cap" above the crushed glass/soil blends.

(i) **Settlement Plates and Surcharge:** The Contractor shall expedite construction of embankment to provide the maximum time possible for settlement prior to completing grading operations.

1. **Settlement plates:** The base of settlement plates shall be firmly seated into original ground for the full depth of the steel fins. The base shall be leveled. The Engineer shall be provided time to obtain the elevation of the seated base and the top

elevation of the pipe extensions prior to placement of embankment material. Pipe extensions shall not be more than 4 feet in length and shall be vertically installed as the embankment is constructed such that the top of the pipe is not covered. As each extension is added, the Engineer shall be provided time to obtain the top elevation of the existing pipe and the top elevation of the new pipe extension. Pipe extensions shall be properly flagged at all times. Care shall be taken while placing and compacting embankment material around pipe extensions. Settlement plates shall be maintained until no longer required, as determined by the Engineer. Upon completion of the normal embankment plus 2 feet of the specified surcharge, the Contractor shall immediately commence placing the remaining surcharge to the limits shown on the plans or as directed by the Engineer. The remaining surcharge shall be placed in lifts of not more than 1 foot in depth and compacted uniformly with construction hauling and spreading equipment. Each lift shall be completed over the entire surcharge area before the next lift is begun.

If a settlement plate is damaged, the Contractor shall notify the Engineer immediately and promptly repair it under the observation of the Engineer to the nearest undamaged pipe. Excavation, backfill, compaction, and repair of settlement plates shall be at the Contractor's expense. The Engineer shall be provided time to obtain the top elevation of the undamaged connection and the top elevation of each subsequent pipe extension.

Settlement plates shall remain in place until settlement has been completed as indicated by elevation readings taken by the Engineer at approximately 2-week intervals. Evaluation of the readings by the Engineer will be the final and sole governing factor for releasing embankments for grading operations. Upon written release by the Engineer, extensions of settlement plate pipe shall be removed to at least 2 feet below the subgrade, the pipe capped, and the area backfilled and compacted.

2. **Surcharge:** When authorized by the Engineer, surcharge shall be removed to the subgrade and embankment slopes graded to the typical section. Removed surcharge shall be placed in roadway embankments not previously brought to grade or shall be disposed of in accordance with Section 106.04 or as directed by the Engineer.

(j) **Hydraulic Embankment:** Hydraulic embankment shall consist of dredging and pumping materials approved by the Engineer from designated areas, placing the material in embankments, and dressing and completing the embankment. Material shall be nonplastic and of such grading that not more than 7 percent will pass the No. 200 sieve.

Unless otherwise shown on the plans, material for the embankment shall not be obtained from sources closer than 300 feet from the toe of the slope of the embankment. The Engineer may reject materials considered to be unsatisfactory for use in the embankment, and such materials shall be stripped at the Contractor's expense before the embankment is built. Muck and unsuitable material shall be removed to the line, grade, and section shown on the plans. Unsatisfactory material brought to the top of the embankment shall be removed by the Contractor at his own expense, and satisfactory material shall be substituted.

In placing material in the embankment, the Contractor shall begin at the centerline and deposit material in either or both directions toward the toe of slopes. Discharge shall always be in the direction of and parallel with the centerline. The maximum distance from the bottom of the discharge pipe to the surface on which material is being deposited shall be 5 feet unless otherwise directed by the Engineer. Material shall be deposited in a manner that will maintain a higher elevation at the center of the roadway than on either side. The Contractor will not be permitted to construct retaining levees along the roadway

of such dimensions as to cause damage to the foundation of the roadway. The Contractor shall conduct operations so as to ensure the completion of an embankment that will conform to the cross section shown on the plans except that he will be permitted to flatten side slopes. However, if material is deposited on private property, the Contractor shall obtain permission in writing from the affected property owner(s). No payment will be made for material beyond the limits of the net pay section.

The embankment shall be placed so as to ensure a minimum relative density of 80 percent of the theoretical maximum density when tested in accordance with (h) herein. If the method of placing the embankment fails to produce the required density, the Contractor shall use approved methods to obtain the specified density.

The Contractor shall take all necessary precautions to prevent placing material in streams. The Contractor shall be responsible for all damage to or caused by the hydraulic embankment. The Contractor shall provide sufficient material to maintain the embankment in accordance with the typical cross section as shown on the plans or as directed by the Engineer until final acceptance.

The Contractor's plan for support of suction or discharge pipes shall be submitted to and approved by the Engineer. Traffic shall be protected by the display of warning devices both day and night. If dredging operations damage an existing traveled highway, the Contractor shall cease operations and repair damage to the highway.

(k) **Surplus Material:** Surplus material shall not be wasted or sold by the Contractor unless authorized in writing by the Engineer. When authorization has been given for surplus material to be wasted, it shall be disposed of in accordance with the requirements of Section 106.04.

Material shown on the plans as surplus material will not be considered for overhaul payment.

303.05—Tolerances

(a) **Finished grade of subgrade** shall conform to the requirements of Section 305.03(c).

(b) **Slopes** shall be graded in the following manner:

1. **Earth excavation slopes:**

   a. **Slopes steeper than 2:1** shall be grooved in accordance with the standard drawings and shall not deviate from the theoretical plane surface by more than 0.5 foot.

   b. **Slopes steeper than 3:1 up to and including 2:1** shall be rough graded in a manner to provide horizontal ridges and grooves having no more than 0.5 foot deviation from the theoretical line of the typical cross section as is accomplished by the normal operation of heavy grading equipment.

   c. **Slopes 3:1 or flatter** shall be uniformly finished and shall not deviate from the theoretical plane surface by more than 0.5 foot.

2. **Earth embankment slopes:**

   a. **Slopes steeper than 3:1** shall not deviate from the theoretical plane slope by more than 0.5 foot and shall be rough graded in a manner to provide horizontal

ridges and grooves not more than 0.5 foot from the theoretical line of the typical cross section as is accomplished by the normal operation of heavy grading equipment.

b. **Slopes 3:1 and flatter** shall be uniformly finished and shall not deviate from the theoretical plane surface by more than 0.5 foot.

3. **Rock slopes** shall not deviate from a plane surface by more than 2.0 feet and shall not deviate from their theoretical location by more than 2.0 feet measured along any line perpendicular to the theoretical slope line.

Finished excavation and embankment slopes shall not deviate from their theoretical location by more than 0.5 foot measured along any line perpendicular to the theoretical slope line.

SECTION 305—SUBGRADE AND SHOULDERS

305.03—Procedures

(c) **Finishing Subgrade:** The Contractor shall provide effective drainage for the subgrade and maintain it in a satisfactory condition until the next course is placed.

Material for subsequent courses shall not be placed until the subgrade has been checked and approved. The finished subgrade elevation shall be within ±0.04 foot of the plan elevation unless otherwise specified. When imported material is used, acceptance of the course will be based on the requirements of Section 308.04.

SECTION 308—SUBBASE COURSE

308.04—Tolerances

The thickness of the subbase course will be determined by the depth measurement of holes dug in the subbase in accordance with the requirements of VTM-38B.

Acceptance of the subbase course for the physical property of depth will be based on the mean result of tests performed on samples taken from each lot of material placed. A *lot* of material is defined as the quantity being tested for acceptance except that the maximum lot size will be 2 miles of paver application width.

A lot will be considered acceptable for depth if the mean result of the tests is within the following tolerance of the plan depth for the number of tests taken except that each individual test shall be within ±1.00 inch of the plan depth; mean of two tests, ±0.75 inch; mean of three tests, ±0.60 inch; and mean of four tests, ±0.50 inch.

If an individual depth test exceeds the ±1.00 inch tolerance, that portion of the lot represented by the test will be excluded from the lot. If the individual test result indicates that the depth of material represented by the test exceeds 1.00 inch, the Contractor will not be paid for that material in excess of the tolerance throughout the length and width represented by the test. If the individual test result indicates that the depth of the material represented by the test is deficient by more than 1.00 inch, correction of the subbase course represented by the test shall be made as specified herein.

If the mean depth of a lot of material is in excess of the allowable tolerance, the Contractor will not be paid for that material in excess of the tolerance throughout the length and width represented by the test.

If the mean depth of a lot of material is deficient by more than the allowable tolerance, correction will not normally be required and the Contractor will be paid for the quantity of material that has been placed in the lot.

For excessive depth subbase courses, when tonnage measurement is used, the rate of deduction from the tonnage allowed for payment as subbase material will be calculated at a weight of 110 pounds per square yard per inch of depth in excess of the tolerance. Areas that are deficient in depth by more than 1.00 inch and areas that do not provide a smooth uniform surface shall be scarified, material added or removed; reshaped; and recompacted to the specified density so as to conform with the depth tolerance and provide a smooth, uniform surface.

SECTION 414—RIPRAP

414.01—Description

This work shall consist of placing the specified type of riprap in accordance with the plans, Standard Drawings where applicable, and these specifications.

414.02—Materials

(a) **Riprap** shall conform to the requirements of Section 204.

(b) **Sand** shall conform to the requirements of Section 202. Grading A, B, or C sand may be used in mortared or grouted riprap.

(c) **Mortar and grout** shall conform to the requirements of Section 218.

(d) **Geotextile bedding** shall conform to the requirements of Section 245.

(e) **Welded wire fabric** shall conform to the requirements of Section 223.

414.03—Procedures

(a) **Dry Riprap:** The classes of dry riprap shall be as follows:

1. **Class I:** Stones shall weigh between 50 and 150 pounds each. At least 60 percent shall weigh more than 100 pounds, and approximately 10 percent may weigh 50 pounds or less.

2. **Class II:** Stones shall weigh between 150 pounds to 500 pounds each. At least 50 percent shall weigh more than 300 pounds, and approximately 10 percent may weigh 150 pounds or less.

3. **Class III:** Stones shall weigh from 500 pounds to 1,500 pounds each. At least 50 percent shall weigh more than 900 pounds, and approximately 10 percent may weigh less than 500 pounds.

4. **Class AI:** Stones shall weigh between 25 and 75 pounds each, except that approximately 10 percent may weigh 25 pounds or less and 10 percent may weigh 75 to 100 pounds.

Dry riprap shall be placed as follows:

Grading: Slopes shall be finished to a reasonably smooth and compact surface within a tolerance of 6 inches from the surface lines shown on the plans.

Immediately prior to placement of riprap bedding, the prepared base will be inspected. Riprap or bedding shall not be placed until the prepared base has been approved.

Bedding: Riprap bedding shall be placed on the embankment to form a backing for riprap. Riprap bedding shall be spread uniformly on the prepared base. Compaction of the bedding material will not be required, but material shall be finished to a reasonably even surface, free from mounds or depressions.

When geotextile bedding material is required, the entire perimeter of the material shall be turned down and buried at least 9 inches for anchorage. Adjacent strips of material shall run only up and down the slope and shall overlap at least 18 inches. Geotextile bedding material shall not be used on slopes greater than 1:1. If sewed, strips shall overlap at least 4 inches and shall be double stitched with a prayer seam, Type SSa 1. Damaged material shall be replaced or repaired with a patch of the same material overlapping the damaged area by at least 18 inches on all sides. Displaced material shall be repositioned, including, if necessary, removing and replacing riprap stone, at the Contractor's expense. Material shall be placed loosely so that positioning riprap will not stretch or tear it.

Placing stones: Riprap shall be placed on the embankment as soon as practicable after bedding has been finished but no later than 15 days in a manner that will produce a reasonably well-graded mass of rock with the minimum practicable percentage of voids. Riprap shall be placed to its full course thickness in one operation and in a manner to avoid displacing underlying material. Riprap stone shall not be dropped onto fabric from a height greater than 1 foot. Smaller-sized material shall not be dropped onto fabric from a height greater than 3 feet. Larger stones shall be reasonably well distributed.

Finished riprap shall be free from objectionable pockets of small stones and clusters of larger stones. Hand placing may be required to the extent necessary to secure the results specified and form uniform slopes.

A tolerance of ±1/4 of the thickness of the maximum-size stone from the lines and grades shown on the plans will be allowed in the finished surface. However, the extremes of such tolerance shall be not continuous over an area of more than 200 square feet. Riprap shall be keyed into the natural ground in an approved manner and to a depth equal to the bed thickness or to solid rock.

The desired distribution of various sizes of stones throughout the mass may be obtained by selective loading at the source, controlled dumping of successive loads during final placement, or a combination of these methods. Placing riprap by dumping into chutes or similar methods likely to cause segregation of the various sizes will not be permitted.

Riprap protection shall be maintained until the riprap is accepted by the Engineer. Displaced material shall be replaced to the lines and grades shown on the plans at the Contractor's expense.

(b) **Dumped Riprap:** The types of dumped riprap shall be as follows:

1. **Type I:** Core riprap shall be composed of compact angular pieces of derrick stone weighing from 3/4 ton to 2 tons each with an average weight of approximately 1 ton. Approximately 10 percent by weight may weigh less than 3/4 ton.

2. **Type II:** Heavy riprap shall be composed of compact angular pieces of derrick stone weighing from 3 to 10 tons each with an average weight of approximately 4 tons. Approximately 10 percent by weight may weigh less than 3 tons.

Dumped riprap shall be placed in the same manner described for dry riprap in (a) herein. Dumped riprap shall not be placed in layers.

(c) **Mortared Riprap for Slopes:** Stone shall be the same size as specified for dry riprap, Class II, and shall be selected to secure fairly large, flat-surfaced stones that will produce a true and even surface with a minimum of voids. Stone shall be placed on a slope not steeper than the natural angle of repose of the fill material. Fifty percent of the mass shall be broad flat stones placed with the flat surface uppermost and parallel to the slope. Stones shall be placed first and roughly arranged in close contact, with the larger stones placed near the base of the slope. Spaces between larger stones shall be filled with stones of suitable size, leaving the surface reasonably smooth and tight and conforming to the contour required. Stones shall be placed in a manner so as to ensure for plane surfaces a maximum variation from a true plane of not more than 1¼ inches in 4 feet. Warped and curved surfaces shall have the same accuracy as specified for plane surfaces.

As each larger stone is placed, it shall be surrounded by fresh mortar, and adjacent stones shall be shoved into contact. After larger stones are in place, spaces or openings between them shall be filled with mortar, and smaller stones shall then be placed by shoving them into position, forcing excess mortar to the surface, ensuring that each stone is carefully and firmly bedded laterally.

After the work is complete, excess mortar forced up shall be spread uniformly to fill surface voids completely. Surface joints shall then be pointed roughly with flush or shallow smooth-raked joints.

(d) **Grouted Riprap for Slopes:** Grout shall consist of 1 part hydraulic cement and 3 parts sand, thoroughly mixed with water to produce grout having a thick, creamy consistency.

Stones shall be of the same sizes and placed in the same manner as specified for dry riprap, Class I. Care shall be taken during placing to keep earth or sand from filling spaces between stones. After stones are in place, spaces between them shall be filled with grout from bottom to top and the surface swept with a stiff broom. Riprap shall not be grouted in freezing weather. In hot, dry weather, the work shall be protected from sunlight and kept moist for at least 3 days after grouting by the use of saturated burlap.

(e) **Erosion Control Stone for Culvert Outlet Protection:** Erosion Control Stone for Class AI, I, & II culvert outlet protection shall conform to the requirements for Dry Rip Rap Class AI, I, & II respectively of (a) herein for weight and shall be placed in a manner to present an irregular or rough surface.

(f) **Erosion Control Riprap:** Riprap shall consist of sound, nonerodible shot rock or rock excavation, which may be obtained from within the excavation for the typical sections on the project. Erosion control riprap rock shall be not more than 15 inches in its greatest dimension and shall contain a sufficient percentage of smaller rocks to provide a reasonably dense mass with a thickness of at least 8 inches. Riprap shall be placed where shown on the plans or as directed by the Engineer in accordance with the requirements of Section 303.04(h).

(g) **Concrete Riprap in Bags:**

1. **Wet mixture:** Riprap shall consist of Class C1 concrete in suitable burlap bags except in brackish or tidal water, where concrete shall be Class A3. Bags shall weigh approximately 100 pounds when 2/3 filled with concrete. Each bag shall be securely tied and immediately placed in the work. When used for foundation protection, bags shall be placed in accordance with the provisions governing placement of stone riprap for foundation protection as specified. When used for slope protection, riprap shall be placed in conformance with the provisions governing placement of dry riprap.

2. **Dry mixture:** Riprap shall conform generally to the requirements for wet mixtures except that the mixture shall consist of the dry ingredients and the requirements for water, consistency, and air will be waived.

   Burlap or paper bags will be permitted. Riprap shall be a rectangular solid approximately 3 inches in thickness and shall weigh approximately 80 pounds per bag. Paper bags shall be perforated throughout on approximate 1-inch centers and shall be of adequate seal, thickness, and strength to maintain the integrity of the riprap until setting of the concrete mixture. Bag compositions shall be such that bags will disintegrate without presenting environmental problems.

(h) **Stone Riprap for Foundation Protection:** Riprap for pier, abutment, and bridge spill slope protection shall conform to the requirements of the applicable specifications.

SECTION 501—UNDERDRAINS

501.01—Description

This work shall consist of constructing underdrains, using pipe, aggregate, and geosynthetics, in accordance with these specifications and in conformity to the lines and grades shown on the plans or as designated by the Engineer.

501.02—Materials

(a) **Pipe** shall conform to the requirements of Section 232.

(b) **Aggregate** shall conform to the requirements of Section 202 or 203.

(c) **Geosynthetics, to include geotextile fabric and prefabricated geocomposite pavement edgedrains**, shall conform to the requirements of Section 245.

501.03—Procedures

(a) **Excavation:** The trench shall be excavated so that the walls and bottom are free of loose and jagged material. Large depressions shall be filled with sandy material, and sharp contours and rises shall be leveled. Excavated material shall be handled in a way that prevents contamination with the aggregate used to backfill the trench for the underdrain.

(b) **Placing Geosynthetics:** When geotextile fabric or prefabricated geocomposite pavement edgedrain (PGPE) is required, it shall be placed as shown on the plans. Torn or punctured fabric shall be replaced at the Contractor's expense. Splices, when required for PGPE, shall be made using splice kits furnished by the manufacturer and in

accordance with the manufacturer's written instructions. Spliced joints shall not damage the panel, shall not impede the open flow area of the panel, and shall maintain the vertical and horizontal alignment of the drain within 5 percent. Splices shall be made in such a manner as to prevent infiltration of the backfill or any fine material into the water flow channel.

(c) **Installing Pipe:** Perforated pipe shall be placed with the perforations facing downward on a bed of aggregate material. Pipe sections shall be joined with appropriate couplings. Semi-round underdrain pipe shall be placed with the rounded section down.

Wherever the depth of the trench is modified to a lesser depth than shown on the standard drawings, concrete or corrugated pipe shall be used.

Pipe shall be placed with the bell end upgrade. Open joints shall be wrapped with the same geotextile used for lining the excavation.

Upgrade ends of pipe, except for combination underdrains, shall be closed with suitable plugs. Where an underdrain connects with a manhole or catch basin, a suitable connection shall be made through the wall of the manhole or catch basin.

After the Engineer has approved the pipe installation, aggregate backfill material shall be placed and compacted. Pipe and covering at open joints shall not be displaced during subsequent operations.

Outlet pipes shall be installed at the low points of a sag.

Endwalls for outlet pipes shall be placed on a prepared surface that has been compacted to comply with the requirements of Section 303.04. If settlement of the endwall occurs, the Contractor shall make necessary repairs at his expense.

Prior to final acceptance of the underdrain system, the Contractor shall conduct a video inspection of the installed system in accordance with the requirements of VTM-108.

(d) **Combination Underdrain Outlets:** Pipe shall be placed in the trench with sections securely joined. After the Engineer has approved pipe installation, the trench shall be backfilled with aggregate material in layers not more than 6 inches in depth and thoroughly compacted.

(e) **Inspection Ports:** Inspection ports shall be installed on the PGPE at a rate of two per mile of installed PGPE or a minimum of four per project. Inspection ports shall meet and be installed in accordance with the manufacturer's specification. The Department will use these ports in conjunction with a borscope camera as part of the basis for acceptance of the PGPE. The Department will perform inspection after PGPE installation but prior to paving of the shoulder. Bends, water flow restrictions, J-shaped panels, tears in the geotextile, debris in pipes, and sags are unacceptable and shall be removed and replaced at no cost to the Department.

SECTION 601—SELECTIVE TREE REMOVAL, TRIMMING, AND CLEANUP

601.01—Description

This work shall consist of selective cutting and disposing of trees, shrubs, and vegetation to improve sight distance, create open vistas, or improve the appearance and condition of trees. This shall be accomplished by removing and disposing of rubbish and fallen and undesirable trees and shrubs, selective pruning, and spraying stumps with an approved herbicide to prevent sprouting.

601.02—Materials

Herbicide shall conform to the requirements of Section 244.02(a).

601.03—Procedures

Trees and stumps shall be cut in such a manner that remaining stumps are not higher than 4 inches above the ground. Loose roots more than 1 inch in diameter and more than 1 foot in length shall be removed. Only those living trees and shrubs selected by the Engineer shall be removed. Trees to be removed shall be felled in a manner that will not damage the trees and shrubs to be preserved.

Debris shall be disposed of by burning or chipping or in accordance with the requirements of Section 106.04. Burning shall be performed in accordance with the requirements of Section 107.16. Fires shall be located and supervised so that they will not spread or damage vegetation. A mechanical chipper may be used, and the resulting chips spread thinly and uniformly within the immediate area or disposed of as directed by the Engineer.

(a) **Treating Stumps:** Stumps of living trees and shrubs shall be coated with an herbicide solution within 48 hours after they are cut. The exposed surface of stumps and exposed live roots shall be saturated with herbicide to the point of runoff.

(b) **Trimming:** Branches and limbs that affect sight distance or the open vista and dead or diseased branches and limbs more than 2 inches in diameter that will hinder the healthy normal growth of trees shall be removed as designated by the Engineer. Cuts shall be made flush at the collar of the supporting trunk or limb.

SECTION 602—TOPSOIL

602.01—Description

This work shall consist of applying topsoil in accordance with the requirements of these specifications and in conformity with the depths and limits shown on the plans or as established by the Engineer.

602.02—Materials

(a) **Class A topsoil** shall conform to the requirements of Section 244.02(b)1.

(b) **Class B topsoil** shall conform to the requirements of Section 244.02(b)2.

602.03—Procedures

(a) **Submittals:** When Class B topsoil is specified, the Contractor shall submit soil test reports to the Engineer for Class B topsoil in accordance with the requirements of Section 244.02(b).

(b) **Preparing Areas to Receive Topsoil:** Unless otherwise designated on the plans or directed by the Engineer, areas designated to receive topsoil shall be graded, shaped,

and then scarified or tilled by disking, harrowing, or other approved methods to a depth of approximately 2 inches. Topsoil shall be applied only when the subsoil is in a loose, friable condition. Subsoil on slopes that have been horizontally grooved in accordance with the plans shall not be loosened.

(c) **Applying Topsoil:** The loose depth of topsoil shall be sufficient to allow the area to conform to the elevations shown on the plans after topsoil settles. After topsoil has been applied, large clods, hard lumps, and stones larger than 3 inches in diameter; brush; roots; stumps; litter; and foreign material shall be removed from the area. Where residential or commercial yards exist, the size of the large clods, hard lumps, and stones shall not exceed 3/4 inch in diameter. Such areas shall be hand raked to provide a smooth yard suitable for mowing by a yard mower. When the topsoiling operation is complete, the area shall be in a condition to receive seed, sod, or plants without further soil preparation. Areas shall be seeded within 7 calendar days after topsoiling is completed.

SECTION 603—SEEDING

603.01—Description

This work shall consist of furnishing and applying fertilizer, lime, mulch, and seed in the quantities specified for areas designated on the plans or selected by the Engineer.

603.02—Materials

(a) **Seed** shall conform to the requirements of Section 244.02(c).

(b) **Fertilizer** shall conform to the requirements of Section 244.02(d).

(c) **Lime** shall conform to the requirements of Section 244.02(e).

(d) **Mulch** shall conform to the requirements of Section 244.02(g).

603.03—Procedures

Unless otherwise specified, seeding operations shall be performed at the times specified in Sections 303.03(b) and 602.03(b). Seeding operations shall not be performed when the ground is frozen or when soil or weather conditions would prevent proper soil preparation and subsequent operations. When hydroseeding is performed, nozzles or sprays shall not be directed toward the ground in a manner that will cause erosion or runoff. The Contractor shall notify the Engineer at least 48 hours prior to beginning seeding operations.

(a) **Applying Lime:** Lime shall be uniformly applied to areas to be seeded at the rate of 2 tons per acre. Any approved method may be used.

(b) **Preparing Soil:** After lime is applied, areas to be seeded shall be prepared in accordance with the following: Slopes 3:1 or flatter shall be loosened to a depth of approximately 3 inches by disking, harrowing, or other approved methods. Loosening of soil on excavated slopes steeper than 3:1 will not be required except to eliminate hard or crusted surfaces. Shoulders and embankment slopes steeper than 3:1 shall be loosened to a depth of

approximately 1 inch. Clods, loose stones, and other foreign material larger than 3 inches in any dimension shall be removed and disposed of in accordance with the requirements of Section 106.04 or as approved by the Engineer. Gullies, washes, and disturbed areas that develop subsequent to final dressing shall be repaired before they are seeded.

Topsoil, when specified, shall be applied in accordance with the requirements of Section 602.

(c) **Applying Fertilizer:** When dry fertilizer is used, it shall be applied uniformly to the seeding areas at the time of seeding at the rate of 300 pounds of fertilizer per acre (approximately 45 pounds of nitrogen per acre or 1.0 pound of nitrogen per 1,000 square feet) or as directed by the Engineer. Slow release and slowly soluble fertilizer may be applied through a hydraulic seeder except for sulfur-coated urea (SCU). The method of application for fertilizer products will be approved by the Engineer prior to application of the fertilizer. When applied in liquid form or mixed with water, fertilizer shall provide the same value of nutrients per acre as specified for dry fertilizer. Fertilizer applied in liquid form shall be constantly agitated during application.

(d) **Applying Seed:** Regular seeding shall consist of uniformly applying seed, fertilizer, and mulch on prepared areas.

Overseeding shall consist of applying seed and fertilizer on areas prepared as directed by the Engineer.

Where temporary seeding is employed as a means of soil stabilization it shall consist of applying seed, fertilizer, and mulch in accordance with the rates specified in the plans or in Section 603.03 of the Specifications to stabilize areas on which grading operations are anticipated to be suspended for durations greater than 14 days. Where temporary seeding is required or directed by the Engineer, the cost for removal of vegetation once grading operations resume shall be included in the price of seeding.

For hydroseeding, seed shall be put in the mixture slowly to result in a uniform mixture before application. Hydroseeding mixtures shall be constantly agitated from the time of mixing until application on the seed bed and used within 8 hours from the beginning of mixing.

If special seed is required in addition to the regular mixture, it will be furnished by the Department and shall be applied with the regular mixture at the Contractor's expense.

Leguminous seeds shall be inoculated or treated with approved cultures as specified by the manufacturer or directed by the Engineer before they are applied or mixed with other seeds to be applied. Seed shall be applied within 24 hours after treatment. When the hydroseeding method is used, leguminous seeds shall be treated with 5 times the amount of inoculant recommended by the manufacturer.

(e) **Applying Mulch:** Mulch shall be applied in a separate application within 48 hours after completion of the seeding operation. When straw or hay mulch is used, it shall be applied on seeded areas at the rate of approximately 2 tons per acre. When wood cellulose fiber mulch is used, it shall be uniformly applied at the rate of approximately 1,500 pounds net dry weight per acre. Mulch will not be required on overseeded areas.

Straw and hay mulch shall be applied to a uniform thickness in such a manner that not more than 10 percent of the soil surface will be exposed at the conclusion of the mulching operations. Wet straw or wet hay shall not be used. Straw or hay mulch shall be anchored to the seeded surface by spraying with wood cellulose fiber mulch at the rate of 750 pounds per acre; spraying with an emulsified asphalt at the rate of at least 100 gallons per ton of

mulch in a manner that will protect adjacent property and pedestrian traffic areas; disking or punching the mulch partially into the soil; using approved netting; or using other materials or methods approved by the Engineer. The Contractor may use more than one method on the same project.

SECTION 604—SODDING

604.01—Description

This work shall consist of preparing sod beds; furnishing and placing sod; and furnishing and applying lime, fertilizer, topsoil, and water at locations designated on the plans or by the Engineer.

604.02—Materials

(a) **Sod** shall conform to the requirements of Section 244.02(h).

(b) **Fertilizer** shall conform to the requirements of Section 244.02(d).

(c) **Lime** shall conform to the requirements of Section 244.02(e).

604.03—Procedures

(a) **Preparing Sod Beds:** Soil on which sod is to be placed shall be shaped to an even surface and graded to such an elevation that sod and adjacent surfaces will have a smooth contour.

Lime shall be uniformly applied to areas designated to receive sod at the rate of approximately 2 tons per acre.

Fertilizer shall be uniformly applied to areas designated to receive sod at the rate of 16 1/2 pounds of 15-30-15 fertilizer, or an equivalent quantity of 1-2-1 fertilizer, and 10 pounds of ureaformaldehyde per 1,000 square feet. Following application of lime and fertilizer, the soil shall be thoroughly cultivated to a depth of 2 to 3 inches and sprinkled with sufficient water to moisten the cultivated soil.

(b) **Placing Sod:** Sod shall not be placed between June 1 and September 1 or at any time the ambient temperature is below 32 degrees F. Frozen sod shall not be placed, and sod shall not be placed on frozen soil. Sod shall be placed by hand, and joints shall tightly abut without overlapping. Open joints and gaps shall be plugged with sod that has been cut to the size and shape of the opening.

Sod shall be placed on sloping areas beginning at the bottom of the slope. Sod shall be placed in horizontal strips with the long edges of rectangular pads parallel to the contour. When practicable, horizontal joints shall be reasonably straight and vertical joints staggered. In areas where sod pads may be displaced by foot traffic during sodding operations, ladders or treaded planks shall be used.

Sod placed on slopes steeper than 2:1 shall be anchored in place with wood stakes driven flush with the top of the sod. Stakes shall be at least 8 inches in length with a cross-sectional area of approximately 1 square inch. The number and spacing of stakes shall be adequate to hold sod securely in place. Special attention shall be given to anchoring sod placed in drainage ditches, channels, and swales.

After sod has been placed, joints and gaps that were too small to be effectively plugged with sod shall be filled with loamy topsoil.

Sodded areas shall be watered thoroughly and rolled or tamped to press the root system of the sod into full contact with underlying soil.

Sodded areas shall be kept watered to maintain the life and growth of the sod until final acceptance.

SECTION 605 – PLANTING

605.01--Description

This work shall consist of furnishing and planting trees, shrubs, vines, and other plants of the kinds, sizes, and quantities specified on the plans or by the Engineer and maintaining and replacing plants as specified herein.

605.02--Materials

(a) **Plants** shall conform to the requirements of Section 244.02(i).

(b) **Drainage stone** shall conform to the requirements of Section 204.

(c) **Composted Yard Waste** shall conform to the requirements of Section 244.02 (j).

(d) **Geotextile Drainage Fabric** shall conform to the requirements of Section 245.

(e) **Topsoil** shall conform to the requirements of Section 244.02(b)

(f) **Horticultural Grade Perlite** shall conform to the requirements of Section 244.02(j).

(g) **Tree Tubes** shall conform to the requirements of Section 244.02(j)

(h) **Tree Anchors, Staking and Guying Materials** shall conform to the requirements of Section 244.02(j)

(i) **All other Misc. Planting Materials** shall conform to the requirements of Section 244.02(j) and 244.02(k).

605.03--Procedures

(a) **Documentation of Confirmed Order:** The Contractor shall submit documentation to the Engineer of a confirmed order of all plant materials 60 days in advance of the proposed planting operation. The documentation shall list the source(s) of supply, all species by common and botanical name, specific variety, and cultivar in the sizes reserved. When special requirements are listed on the planting summary sheet, such as "Specimen Quality," or "Specimen Street Tree", etc., the documentation shall certify that the species reserved meet those specific

requirements. Once the Documentation of Confirmed Order is received, the Engineer reserves the right to require sample photographs of materials to be supplied. The Engineer also reserves the right to inspect and approve the selection of plant materials at the source of supply prior to delivery. In the event that specific materials are not available, the Contractor shall submit a request for substitutions in accordance with the requirements of (e) herein.

(b) **Planting Season:** The Planting Season shall be from November 1, through March 31, unless otherwise identified on the plans. The Contractor shall notify the Engineer 48 hours prior to beginning work. All sources of supply, materials, construction schedule, and methods of construction shall be approved by the Engineer prior to beginning work on the project. Plants requiring either spring or fall planting only will be designated on the plans.

(c) **Sources of Supply:** All plants shall be obtained from a nursery certified by a "Certificate of Registration" in accordance with The Virginia Department of Agriculture and Consumer Services (VDACS), or by a comparable agency responsible for nursery inspection and issuance of a "Certificate of Registration" from the State of origin. A copy of the certification shall accompany each separate delivery of plant materials to the project site, and shall be submitted to the Engineer.

(d) **Inspecting and Identifying Plants:** Plants will be inspected and identified in accordance with the *Standardized Plant Names* prepared by the Editorial Committee of the American Joint Committee on Horticultural Nomenclature. The Engineer may inspect plants at any time and place. Plants will be inspected immediately prior to being planted. If plants are installed prior to inspection and found to be unsatisfactory, they shall be replaced with approved plants at the Contractor's expense.

(e) **Substitutions:** No change in the quantity, size, kind, or quality of plants from those specified will be permitted without the written approval of the Engineer. When requesting permission to substitute, the Contractor shall submit to the Engineer written evidence in accordance with the requirements of (a) herein that the specified plants are not available and shall suggest substitute plants that conform to the requirements of the Contract. The Contractor shall indicate the reduced cost, if any, that will accrue to the Department as a result of the substitution. The Engineer may delete plants from the Contract in lieu of approving substitutions.

(f) **Layout:** Plant locations and outlines of bed areas to receive plants shall be staked or marked by the Contractor and will be inspected by the Engineer for approval prior to plant installation. The Contractor shall notify the Engineer a minimum of 48 hours prior to scheduling the inspection. Planting shall not be permitted until the Engineer has approved the staking layout. Unforeseen conditions such as the location of traffic signs, utilities and drainage items may necessitate adjustments in plant locations, and such adjustments will only be permitted when approved in writing by the Engineer.

(g) **Delivery:** The Contractor shall notify the Engineer at least 48 hours in advance of the anticipated delivery date for plants. A legible copy of the invoice showing the kinds and sizes of plants in each shipment shall be submitted to the Engineer. A copy of the current Certificate of Nursery Inspection from the State of origin shall accompany each shipment of plants.

(h) **Labeling:** Plant material delivered to the project shall be legibly identified with a waterproof label as to the genus, species, and size of the plants. When plants are in bales, bundles, boxes, or other containers, a legible label indicating the genus, species, size, and quantity of the plants shall be attached to each container. A

minimum of 10 percent of each species in each shipment shall be so labeled. Failure to comply with this identification labeling will be cause for rejection.

(i) **Transporting and Protecting:** Plants transported to the project in open vehicles shall be covered with suitable covers securely fastened to the body of the vehicle. Closed vehicles shall be adequately ventilated to prevent overheating plants. Plants shall be kept moist, fresh, and protected at all times.

(j) **Storing:** When plants are to be stored, they shall be stored at a location approved by the Engineer. Plants stored for more than 30 days shall not be used unless approved by the Engineer. Unless the Engineer approves other methods of storage, bare-root plants that are not planted within 24 hours after delivery shall be heeled-in in a moist trench dug in the ground. Bundles shall be opened, and plants shall be separated and placed singly in the trench with the roots spread in a natural position. Roots of each layer of plants shall be immediately covered in a manner satisfactory to the Engineer with moist, pulverized soil; moist sawdust; or other approved material. Root-covering materials shall be kept moist at all times. Shade shall be provided as directed by the Engineer. At the discretion of the Engineer, balled material, container-grown material, and plants in plantable pots that are not planted within 48 hours of delivery shall have their root zone protected by wet sawdust or other approved material. Rejected plants shall be removed from the storage area within 24 hours of rejection or, with the written approval of the Engineer, may be marked with yellow paint or otherwise made readily identifiable. If rejected plants have not been removed or acceptably marked within 24 hours, the use of plants from the storage area will not be allowed until rejected plants have been removed or identified by marking.

(k) **Planting:**

1. **Underground and Aboveground Conditions:** It shall be the responsibility of the Contractor to have marked, the location of all underground utilities with Ticket Information Exchange (TIE) / (Miss Utility) and all other applicable underground utility providers such as sewer and water service, and VDOT traffic signal cable prior to digging. The Contractor shall be responsible for locating and working around aboveground utilities. If underground obstructions or any other unforeseen subsurface or above surface conditions that could interfere with a utility or become detrimental to plant growth are encountered, the Engineer may require that plant pits be enlarged or relocated or that the plants be deleted from the contract.

2. **Planting Trees or Shrubs on Slopes Steeper than 3:1:** Drainage requirements for trees or shrubs on slopes steeper than 3:1 will be determined by percolation tests, with no more than 3 tests per slope, as designated by the Engineer. Slopes for this test are determined from cut and fill slopes shown on the cross sections. Percolation testing shall consist of the following: The Contractor shall auger holes that are 12 inches in diameter and 24 inches in depth. Three holes shall be distributed across the slopes vertically and horizontally. The Contractor shall fill the holes with water and allow them to drain. If soil is extremely dry, fill holes twice and allow to drain. Fill holes again and measure rate at which water percolates into the soil. Water in holes should recede at the rate of 2 inches per hour (minimum) or pit modification for improving drainage shall be required.

3. **Preparing Planting Pits for Trees and Shrubs:** Planting pits shall be excavated to meet the minimum requirements VDOT Road and Bridge Standards unless otherwise indicated on the plans by detailed drawings. Sides of pits that become plastered or glazed shall be scarified. Surplus excavation

and unsuitable material shall be disposed of in accordance with the requirements of Section 106.04 or as otherwise approved in writing by the Engineer. Preparation of the planting medium (soil mix) shall utilize 3 parts of the original excavated soil from the digging operation thoroughly mixed with 1 part composted yard waste, except where linear or oversize planting pits are specified on the plans.

If the Contractor determines that the original excavated soil is not suitable for reusing with amendments for achieving an acceptable growing medium, the Contractor shall notify the Engineer. The Engineer shall make a determination as to the quality of the soil, and if found to be unacceptable; will direct the Contractor to use topsoil or composted yard waste for use in the soil mix. In such cases, the planting pit, and unsuitable soils surrounding the pit shall be removed as directed by the Engineer. The Engineer reserves the right to have the original soil tested prior to making a determination for replacement.

4. **Preparing Plant Beds:** Plant beds shall be prepared by the Contractor in accordance with the following:

   a) Plant bed preparation shall only be required on slopes of 3:1 or flatter. Where grass and weeds are present, the Contractor shall treat the designated bed area(s) with a broad spectrum grass and weed killing herbicide at least two weeks prior to beginning bed preparation, or physically remove turf and weeds immediately before bed preparation. The entire area of the plant bed shall be cultivated to a depth of 4 inches by a rotary cultivator or other approved method. The Contractor shall then apply composted yard waste at a depth of three inches over the entire plant bed and re-till to form a homogenous soil medium. Soil shall be cultivated so that there are no clods larger than 2 inches in diameter.

   b) Any remaining grass, sod, and weeds shall be removed from the bed. Rocks over 3 inches in diameter, clods, roots, and other objectionable material remaining on the surface shall be removed and disposed of in accordance with the requirements of Section 106.04 or as approved in writing by the Engineer. Individual planting pits shall not be dug until after the bed is prepared to the satisfaction of the Engineer.

   c) Upon completion of planting, the bed shall be hand raked to an even surface and neatly edged with a "V" cut edge located a minimum of 12 inches from the root ball of plants along the outer edge of the bed. Mulch shall be applied to the entire bed area. On certain projects where mulched beds around large quantities of plant materials are used to control weed growth and are not intended as a prepared soil medium, tilling and application of composted organic material throughout the plant bed shall be waived when beds are labeled on the plans as "Bed Preparation Not Required".

5. **Linear Planting Pit:** Areas labeled on the plans and details as "Linear Planting Pit" shall be excavated to the horizontal and vertical dimensions indicated on

the plans to receive soil mixture. Soil mixture shall consist of 1 part composted yard waste, and 1 part horticultural grade perlite, unless otherwise indicated in the contract documents, and shall include any necessary excavation required for installation of plant underdrain systems. Plant underdrain system(s), as applicable, shall be indicated on the plans, listed as a pay item and installed in accordance with plan details.

Soil mix for linear planting pits shall be installed in 6 inch lifts, lightly compacted by foot or other approved method, and moistened prior to proceeding with next lift. If settlement occurs prior to planting, additional soil mix shall be added at the direction of the Engineer. Prior to planting the Contractor shall till the linear planting pit to a depth of 4 inches, hand rake the area and adjust the grade adjacent to curb or sidewalk to receive 3 inches of mulch.

6. **Oversize Planting Pit:** shall be prepared in accordance with the plan details at locations shown on the plans. Backfill shall consist of one-half part native soil excavated from the plant pit, and one-half part composted yard waste. If native soil is determined by the Engineer to be unsuitable, 100 percent composted yard waste shall be used. If settlement occurs prior to planting, additional soil mix shall be added at the direction of the Engineer. After planting the planting pit shall be neatly edged except when the planting pit falls within a larger bed area.

7. **Installing Trees and Shrubs:** Balled and burlapped and containerized plant materials shall be installed in plant pits in accordance with the requirements of the VDOT Road and Bridge Standards, unless otherwise indicated on the plans. Bare roots of plants shall be spread out in a natural position. Broken or bruised roots shall be pruned. After positioning plants in the planting pit and prior to backfilling, root ball wrapping materials, except metal root ball cages shall be cut and dropped to the bottom of the pit. Root ball wrapping materials shall not be removed from under the root ball. Metal root ball cages shall be cut and removed to a minimum of 6 inches below finished grade. Wrapping materials within root ball cages shall be cut or unwrapped to the same elevation as the cage. All other wrapping materials such as tags, twine and colored marking ribbon shall be removed from the plant unless otherwise directed by the Engineer. The soil mixture shall then be filled in around roots and lightly tamped. Light tamping around root balls shall be performed using a method approved by the Engineer. Foot tamping will be permitted in the bottom of pits before plants are installed, around root balls when there is ample room to accommodate the foot without damage to the ball, and in the planting of bare-root plants after roots have been covered with the soil.

   Backfill material in pits shall be saturated with water. The amount of water applied and method of application shall be approved by the Engineer. Failure to water properly at the time each plant is installed will be cause for rejection of the plant. Frozen backfill material shall not be used.

   Potted plants shall not be removed from their container until immediately before planting. Containers shall be removed by approved methods that will not damage roots or loosen soil balls. The sides of containerized materials shall be scarified prior to planting.

   When planted, watered, and fully settled, plants shall be vertical and shall stand at a height flush with the height of which they were growing.

8. **Handling Plants during Planting:** Roots of bare-root plants shall be kept covered with moist burlap or other approved material prior to planting. Forest tree seedlings and forest tree transplants shall be carried in a container filled with sufficient mud to puddle roots. When seedling roots have been coated with a protective material, the seedlings shall be protected in accordance with the U.S. Forest Service's recommendations relative to treatment of seedling roots while seedlings are being planted. Plants will be rejected if their roots are exposed to drying conditions at any time.

(l) **Forming Water Rings and Saucers:** Immediately after the installation of each plant, a saucer shall be formed around the plant pit. Soil used to form the saucer shall be compacted by tamping to prevent runoff of water from the pit. Saucers shall measure 4 to 6 inches in width, and 2 to 3 inches in height after tamping. Saucers will not be required for forest tree seedlings, or forest tree transplants. Water rings and saucers shall be formed on the wetland trees and shrubs planted on slopes and upland areas adjacent to the wetland.

(m) **Applying Mulch:** Mulch shall be applied uniformly to a 3-inch depth over the entire area of the plant pit or plant bed within 48 hours after completion of planting. Re-mulching at the terminus of the establishment period shall be applied at a depth of 1-1/2 inches. Mulch shall be anchored in a manner satisfactory to the Engineer. Mulch shall not be required for wetland trees and shrubs, or upland forest tree seedlings. Mulch shall be applied to wetland trees and shrubs on slopes and upland areas adjacent to the wetland.

(n) **Staking, Guying, Anchoring:** Each plant shall be staked and guyed or secured with below ground tree anchors immediately following planting, unless otherwise indicated in the Planting Plan Summary and General Notes. Below ground tree anchors shall be used when specified on detailed drawings in the plans. Staking and guying shall be required for wetland trees and shrubs on slopes and upland areas adjacent to the wetland.

(o) **Pruning:** Plants that have been freshly pruned before delivery will be rejected. If necessary, plants shall be pruned either immediately before or within 48 hours after they are planted. Pruning of trees and shrubs to be planted on projects shall consist of removing dead, diseased, broken or other branches deemed injurious to the health of the plant, and for removal of sprouts and sucker growth. Care shall be taken to preserve the natural character of the plant. Pruning shall be performed with tools and equipment in excellent working condition that are specifically designed for the appropriate work. All pruning shall be performed in accordance with the current American National Standards Institute (ANSI A300) and as directed by the Engineer. All debris removal including disposal from the pruning operation shall be the responsibility of the Contractor.

(p) **Pit Drains:** Pit drains or plant underdrain systems shall be installed as shown on the plans.

(q) **Tree Tubes:** This work shall consist of installing tree tubes on all seedling trees in accordance with the manufacturer's recommendations, the plans and product specifications.

605.04—Care of Plants

Plant care shall begin immediately after each plant is satisfactorily installed and shall continue until final acceptance. Care shall include but not be limited to replacing displaced mulch, repairing and reshaping water rings or saucers, maintaining stakes and guys as originally installed, watering when needed or as directed by the Engineer, and performing any other work required to keep plants in a healthy condition. Dead, defective, or rejected plants shall be immediately removed and replaced in accordance with the requirements of Section 605.05(b)4.

605.05--Establishment Period

(a) **Beginning of Establishment Period:** The establishment period shall begin on a date following completion of the planting (spring or fall), when the Contractor receives written confirmation from the Engineer, that all work has been completed in accordance with the requirements of this Section and the plans, and that all plants are living, healthy and in a viable growing condition as determined by the Engineer. Plants that are replaced in order to meet these initial specifications are not considered as "plant replacements."

(b) **Establishment Period:** The establishment period shall continue through a minimum of one growing season, and shall terminate on the date determined in writing by the Engineer. During the establishment period, the Contractor shall do all work necessary to keep the plants in a healthy growing condition, including, but not limited to the following:

1. **Watering:** The Contractor shall prepare and submit to the Engineer a schedule for watering in accordance with the frequency listed on the project summary sheet. However, the Contractor shall be responsible for watering as frequently as is necessary to maintain an adequate supply of moisture within the root zone of all plantings at all times or if there is less than 1 inch of rainfall in a seven day period during the months of April through September. Water shall not be applied at a force that will displace soil or mulch. Quantities and frequency of watering shown on the plans are for minimum estimating purposes only.

    a) The Engineer may require the use of watering needles or other approved methods to prevent displacement of soil, mulch and runoff of water. The Engineer may make periodic inspections to ascertain the adequacy of the Contractor's watering and the moisture content of the soil.

    b) The quantity of water supplied shall not be in excess of that normally required to ensure optimum growing conditions. Watering shall not commence until methods and equipment have been approved by the Engineer. The Engineer may require or suspend watering at any time.

2. **Notification and Scheduling:** When notified by the Engineer that watering is required, the Contractor shall begin watering within 48 hours with sufficient labor and equipment and shall continue to water daily where and as directed, without delays or interruptions, to ensure that the root zone does not become dry at any time. In the event the Contractor fails to begin watering operations

within 48 hours after notification, the Engineer may proceed with adequate forces, equipment, and materials to perform the watering operations and the entire cost of the watering operations will be deducted from monies due the Contractor.

3. **All establishment period maintenance work**, except watering, shall begin within 7 working days after the Engineer notifies the Contractor that the establishment period has begun.

4. **Plant Replacements:** Between the beginning and ending dates of the establishment period, plants that are dead, defective, or otherwise not in a healthy growing condition as determined by the Engineer shall be removed immediately at the Contractor's expense. Plant replacements shall be made once in the spring if required (Between March 1 and March 31), and once in the fall if required (Between November 1 and December 31), as necessary to replace dead or defective plant materials as directed by the Engineer.

5. **Stakes, and Guys, and/or Below Ground Tree Anchors** shall be repaired or replaced immediately as needed. Stakes and Guys shall be removed when no longer required as directed by the Engineer. Tree anchors shall remain in place.

6. **Eroded Saucer Rings** shall be repaired or replaced as needed and/or as directed by the Engineer.

7. **Mulch** shall be redressed as needed and/or as directed by the Engineer throughout the establishment period.

8. **Re-mulching**: When established as a separate pay item, remulching shall be reapplied to all individual plants and plant beds prior to the terminus of the establishment period at a rate of approximately 1 1/2 inch depth, uniformly over all individual plant pits and plant beds, and/or as directed by the Engineer.

9. **Vegetation Control** shall consist of the control and/or removal of weeds, grass and root growth from plant beds and mulched areas around individual plants. Such weeding shall be performed once in the month of May, June, July, August, and September for a total of five weeding operations over the duration of the establishment period. The Contractor shall submit a schedule for vegetation control for approval by the Engineer prior to the Contractor beginning vegetative control operations.

    a) Removal of weeds, grass and root growth may be completed by hand or through the application of "pre-emergent" and "post emergent" herbicides as approved by the Engineer. All herbicide applications shall be performed by certified pesticide applicators in accordance with the requirements of Section 601. Additional weeding may be performed when requested by the Engineer and with written agreement from both parties. The Engineer also reserves the right to delete individual weeding cycles at no cost to the Department when necessary. The Contractor shall be responsible for replacing plants that are damaged or that die due to the application of herbicide treatments.

    b) When herbicides are used for post emergent weed control, the weeds shall be cut to a height of 6 inches or as recommended by the manufacturer if necessary, prior to applying the herbicide. The Engineer reserves the right to change the frequency or delete specific areas

scheduled for weed control. Other pesticides, adjuvants and plant growth regulators may be used when approved by the Engineer.

c) Turf maintenance which includes grass and other vegetation around individual plant pits, between groups of plant pits that are 15 feet on center or less, and around the perimeter of plant beds shall be cut to a height of approximately 4 inches. For each individual plant pit, group of plant pits, and plant beds, a perimeter extending 5 feet in width shall be maintained around the outermost plant pits and edge of beds where grass and other vegetation is present, and where such areas exist within the right-of-way or construction easement. Mowing shall be performed once in each month of May through September. Additional mowing may be performed when requested by the Engineer. The Engineer reserves the right to delete individual mowing cycles when deemed necessary by the Engineer.

10. **Additional Work**, including pruning of dead, broken or diseased branches, and seasonal spraying with approved insecticides and fungicides, shall be performed to ensure plant survival as approved or directed by the Engineer.

(c) **Termination of Establishment Period:** Any dead, missing, or defective plants shall be replaced as directed by the Engineer prior to termination of the establishment period. The Engineer shall be notified within 48 hours prior to beginning the replacement work.

The establishment period shall end on a date established by the Engineer, when the Contractor receives written notification from the Engineer that confirms all the requirements of (b) herein have been satisfactorily completed.

605.06--Guarantee

The Contractor's performance bond, furnished in accordance with the requirements of the Contract Documents, shall provide for necessary maintenance during the establishment period and replacements in kind, or with a substitute acceptable to the Engineer, for plants that are not in a healthy growing condition or that have died back to the crown or beyond the normal pruning limit.

SECTION 606—SOIL RETENTION COVERINGS

606.01—Description.

This work shall consist of furnishing and placing protective coverings for soil retention, including seed, fertilizer, lime, topsoil, and water, in accordance with the requirements of these specifications and in conformity to the dimensions, lines, and grades shown on the plans or as established by the Engineer.

606.02—Materials.

Materials shall conform to the requirements of Section 244.02(k).

606.03—Procedures.

(a) **Preparing Areas:** Two inches of topsoil shall be applied to the area to be covered. Drainage channels shall be shaped in accordance with the cross section shown on the plans and shall be rolled or tamped to compact soil in place before final shaping.

During shaping operations, a seedbed approximately 3/4 inch in depth shall be provided.

Stones, roots, and other objects that will prevent protective covering from making close contact with the seedbed shall be removed before covering is installed.

(b) **Applying Seed:** Seed shall be applied in accordance with the requirements of Section 603 except that mulch will not be required. Seed, fertilizer, and lime shall be applied prior to installation of protective coverings.

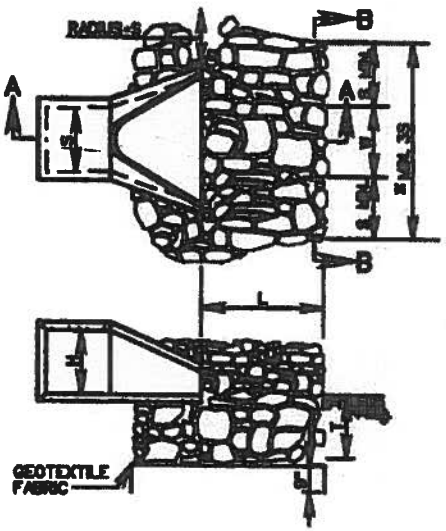
Seeded areas adjacent to the channel or ditch that are disturbed during installation of covering shall be uniformly reshaped, reseeded, and mulched at the Contractor's expense.

(c) **Installing Soil Retention Coverings:** Coverings shall be installed in accordance with the standard drawings and manufacturer's recommendations.

(d) **Watering:** After coverings are installed, seeded areas shall be watered sufficiently to saturate the seedbed. Water shall be applied in a spray, and no additional watering will be required.

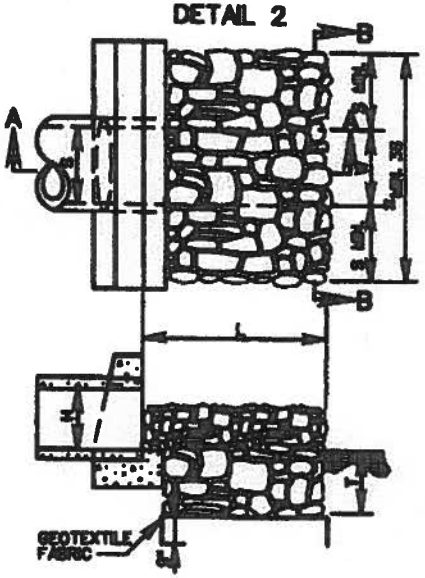
EC-1

DETAIL 1



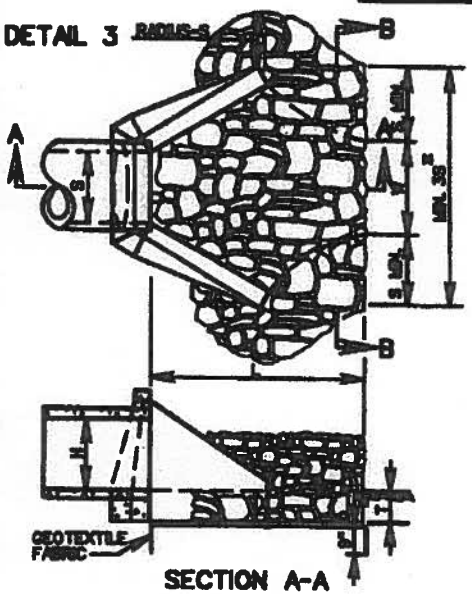
SECTION A-A

DETAIL 2

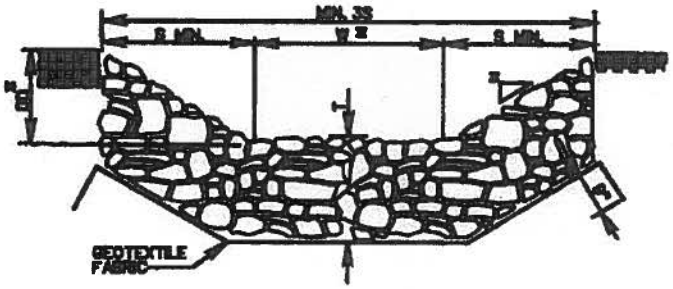


SECTION A-A

DETAIL 3



SECTION A-A



SECTION B-B

TYPE OF OUTLET PROTECTION MATERIAL		MAXIMUM OUTLET VELOCITY (FOR DESIGN STORM)	MINIMUM "T" (INCHES)
CLASS A1	CLASS A1 DRY RIPRAP	8 fps	18
CLASS I	CLASS I DRY RIPRAP	14 fps	24
CLASS II	CLASS II DRY RIPRAP	19 fps	36

NOTES:

1. FOR MULTIPLE LINE INSTALLATIONS, DIMENSION S IS TO GOVERN THE PROTECTION OUTSIDE THE CHANNEL WIDTH (W).
2. ON ANY INSTALLATION REQUIRING CULVERT OUTLET PROTECTION WHERE NO ENDWALL OR ENDSECTION IS SPECIFIED ON THE PLANS, CONSTRUCTION IS TO BE IN ACCORDANCE WITH DETAIL 2 SHOWN ABOVE.
3. GEOTEXTILE FABRIC TO BE INSTALLED UNDER CLASS A1, I, AND II MATERIALS IN ACCORDANCE WITH THE SPECIFICATIONS.
4. S = DIAMETER OF CIRCULAR CULVERT OR SPAN FOR BOX, ELLIPTICAL OR ARCH CULVERT. H = DIAMETER OF CIRCULAR CULVERT OR RISE/HEIGHT FOR BOX, ELLIPTICAL OR ARCH CULVERT.
5. USE TYPICAL SECTION SHOWN ON PLANS FOR SIDE SLOPE, BOTTOM WIDTH AND DEPTH OF CHANNEL OR MATCH EXISTING DITCH OR NATURAL GROUND.

OUTLET PROTECTION MINIMUM LENGTH (L)	
TYPE A INSTALLATION	3H
TYPE B INSTALLATION	6H

SPECIFICATION REFERENCE
204 245 303 414

CULVERT OUTLET PROTECTION

VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT
ROAD AND BRIDGE STANDARDS

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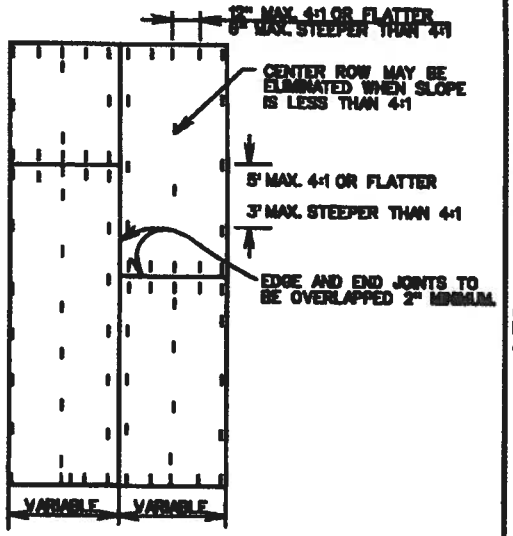
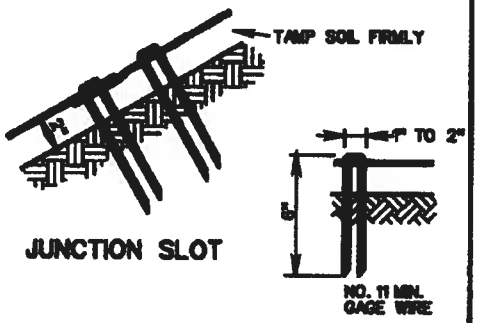
	TS3.01

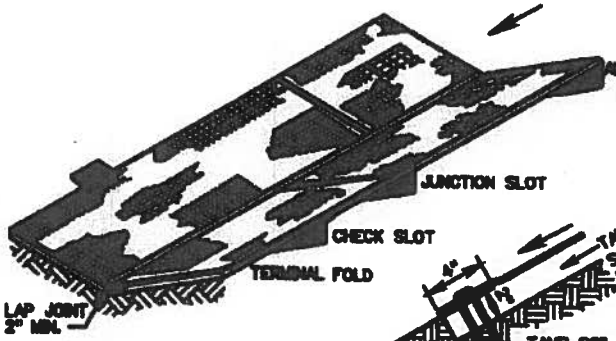
EC-2

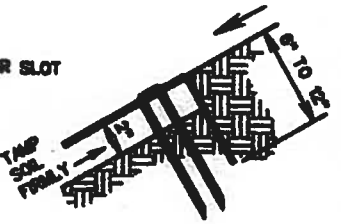


SOIL RETENTION MAT

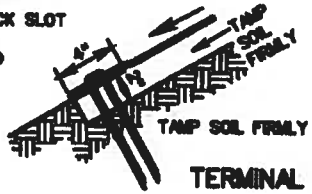


JUNCTION SLOT

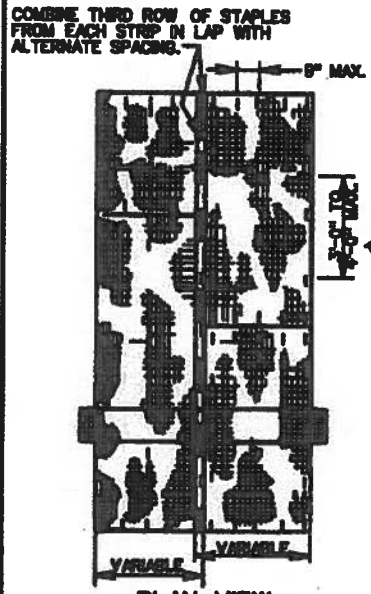




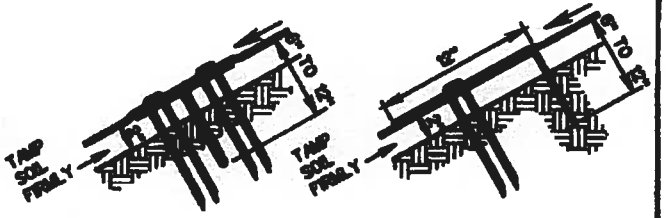
ANCHOR SLOT



TERMINAL FOLD

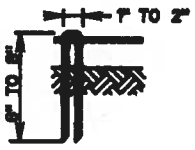


PLAN VIEW
STAPLING DIAGRAM



CHECK SLOT

JUNCTION SLOT



JUTE MESH

NOTES:

1. APPROXIMATE 200 STAPLES REQUIRED PER 4' X 225' ROLL.
2. ANCHOR SLOTS, JUNCTION SLOTS AND CHECK SLOTS TO BE BURIED 6" TO 12" AND VARIABLE.
3. MAX. SPACING C-C CHECK SLOTS 100' SLOPE 4% OR LESS 50' SLOPE STEEPER THAN 4%.
4. STAPLES FORMED FROM NO. 8 STEEL WIRE 6" STAPLE MINIMUM LENGTH FOR SANDY SOIL 8" STAPLE MINIMUM LENGTH FOR OTHER SOIL.

GENERAL NOTES:

1. BASIS OF PAYMENT TO BE SQUARE-YARDS OF PROTECTIVE COVERING COMPLETE IN PLACE. PROTECTIVE COVERING IS TO BE LOCATED AS INDICATED ON THE PLANS IN ACCORDANCE WITH THE DIMENSIONS SPECIFIED ON TYPICAL SECTION.
2. "T-TOP" STAPLES OR OTHER MANUFACTURER'S DESIGN APPROVED BY THE ENGINEER MAY BE SUBSTITUTED FOR THE STAPLES SHOWN.
3. JUTE MESH OR SOIL RETENTION MAT IN ACCORDANCE WITH THE SPECIFICATIONS MAY BE USED AT THE OPTION OF THE CONTRACTOR.
4. WIDTH OF MATERIAL MAY VARY FROM MINIMUM DIMENSION BY INCREMENTS OF 4 OR 5 FEET.
5. FOR SOURCES OF APPROVED MATERIAL SEE VDOT'S APPROVED PRODUCTS LIST FOR STD. EC-2 MATERIAL.

VDOT
ROAD AND BRIDGE STANDARDS

SHEET 1 OF 1 | REVISION DATE
113.02

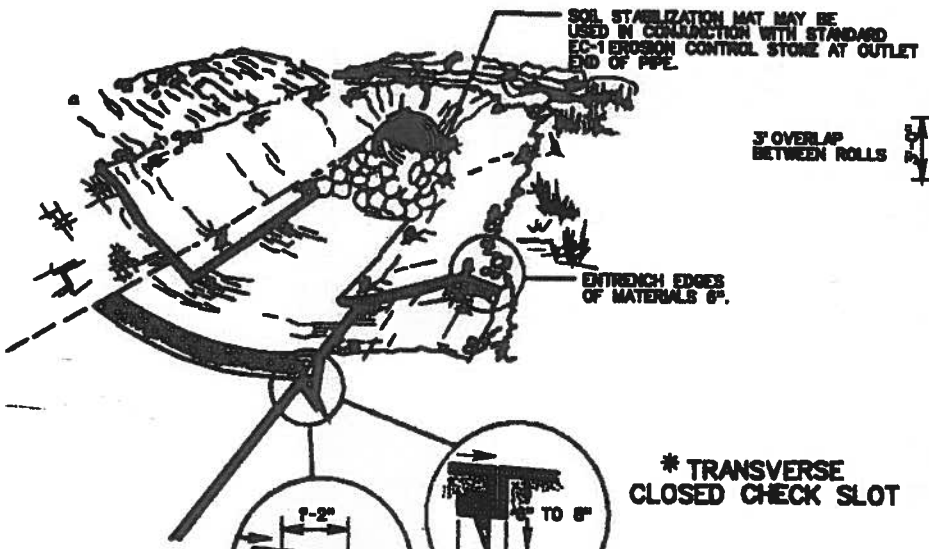
PROTECTIVE COVERING INSTALLATION CRITERIA

VIRGINIA DEPARTMENT OF TRANSPORTATION

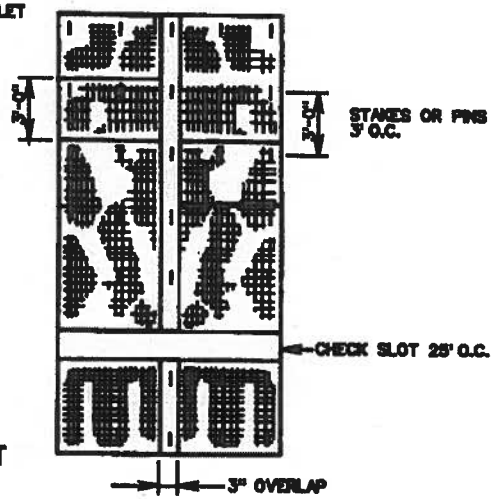
SPECIFICATION REFERENCE
244
606

EC-3

TYPICAL INSTALLATION AT END OF PIPE



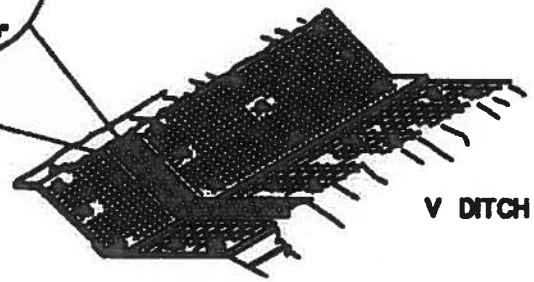
STAKING DETAIL



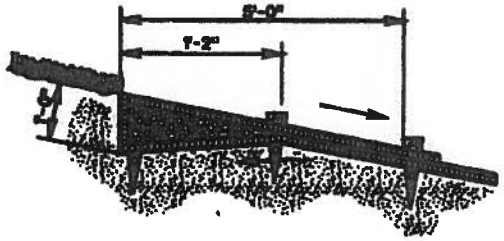
* TRANSVERSE CLOSED CHECK SLOT

* TRANSVERSE OPEN CHECK SLOT

* TRANSVERSE CHECK SLOT TO BE CONSTRUCTED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION FOR PREFERRED INSTALLATION.



V DITCH



UPSTREAM AND DOWNSTREAM TERMINAL

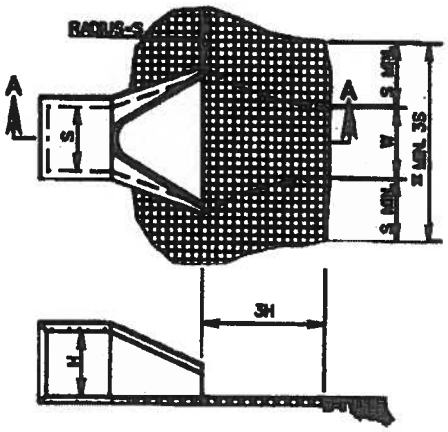
NOTES:

1. STAKES SHALL BE WOOD OR METAL AS RECOMMENDED BY THE MANUFACTURER AND SHALL BE A MINIMUM OF 12" IN LENGTH. IN SANDY SOILS METAL STAKES A MINIMUM OF 18" IN LENGTH SHALL BE USED.
2. SOIL STABILIZATION MAT TYPE A AND B ARE TO BE IN ACCORDANCE WITH THE APPROVED PRODUCTS LIST.
3. SOIL STABILIZATION MAT SHOULD BE INSTALLED TO THE SHOULDER BREAK POINT OR EXISTING GROUND THEN EMBEDDED 6". MATERIAL ON BOTH SIDES OF THE DITCH SHALL BE INSTALLED TO THE SAME ELEVATIONS.
4. IF MORE THAN 3 LINES OF MATERIAL ARE REQUIRED PARALLEL TO THE ℄ OF THE DITCH, MATERIAL SHALL BE INSTALLED PERPENDICULAR TO THE CENTER LINE OF THE DITCH, STARTING AT THE LOWEST ℄ ELEVATION OF THE DITCH.
5. FOR SOURCES OF APPROVED MATERIALS SEE VDOT'S APPROVED PRODUCTS LIST FOR ST'D. EC-3, TYPE A OR B.

SPECIFICATION REFERENCE	SOIL STABILIZATION MAT DITCH INSTALLATION TYPE A OR B VIRGINIA DEPARTMENT OF TRANSPORTATION	VDOT ROAD AND BRIDGE STANDARDS
244 606		REVISION DATE: SHEET 1 OF 3 113.03

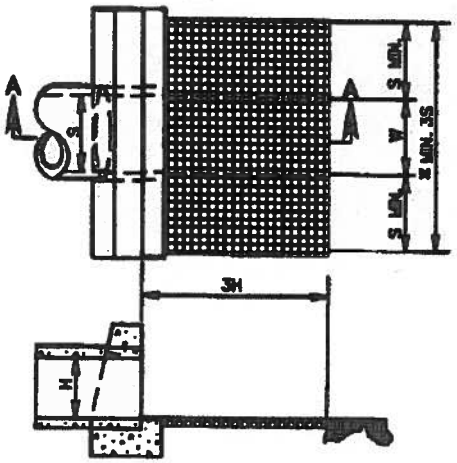
EC-3

DETAIL 1



SECTION A-A

DETAIL 2



SECTION A-A

NOTES:

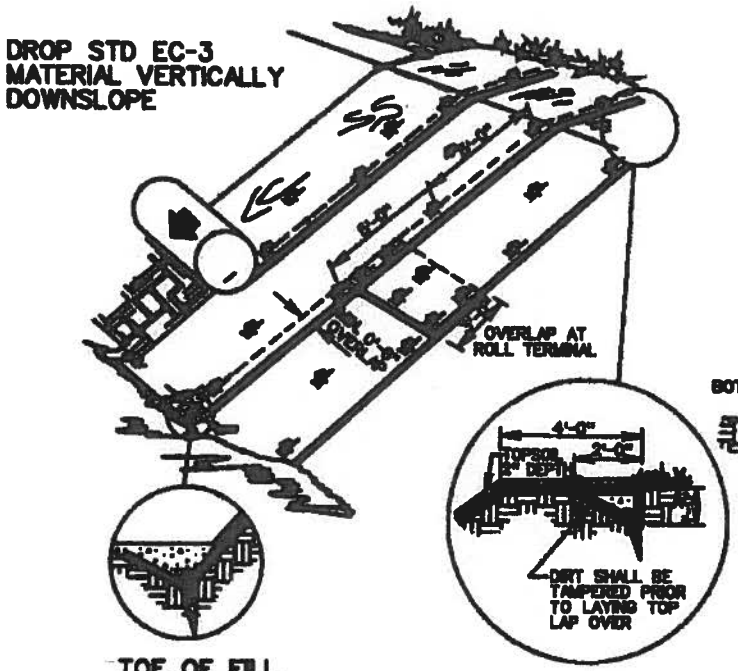
1. FOR MULTIPLE LINE INSTALLATIONS, DIMENSION S IS TO GOVERN THE PROTECTION OUTSIDE THE CHANNEL WIDTH (W).
2. ON ANY INSTALLATION REQUIRING CULVERT OUTLET PROTECTION WHERE NO ENDWALL OR ENDSECTION IS SPECIFIED ON THE PLANS, CONSTRUCTION IS TO BE IN ACCORDANCE WITH DETAIL 2 SHOWN ABOVE.
3. SOIL STABILIZATION MAT TYPE B SHALL BE USED FOR CULVERT OUTLET PROTECTION WHERE THE OUTLET VELOCITY IS 6 FPS OR LESS FOR THE DESIGN STORM AND THE TOTAL HYDRAULIC OPENING IS LESS THAN 7 SQUARE FEET. IF THE TOTAL HYDRAULIC OPENING IS 7 SQUARE FEET OR GREATER, OR THE DESIGN STORM OUTLET VELOCITY IS GREATER THAN 6 FPS USE STANDARD EC-1.
4. S = DIAMETER OF CIRCULAR CULVERT OR SPAN FOR BOX, ELLIPTICAL OR ARCH CULVERT.
   H = DIAMETER OF CIRCULAR CULVERT OR RISE/HEIGHT FOR BOX, ELLIPTICAL OR ARCH CULVERT.

≠ USE TYPICAL SECTION SHOWN ON PLANS FOR SIDE SLOPE, BOTTOM WIDTH AND DEPTH OF CHANNEL OR MATCH EXISTING DITCH OR NATURAL GROUND.

VDOT ROAD AND BRIDGE STANDARDS		SOIL STABILIZATION MAT CULVERT OUTLET PROTECTION INSTALLATION VIRGINIA DEPARTMENT OF TRANSPORTATION	SPECIFICATION REFERENCE
SHEET 2 OF 3	REVISION DATE		204 245 303 414
113.04			

EC-3

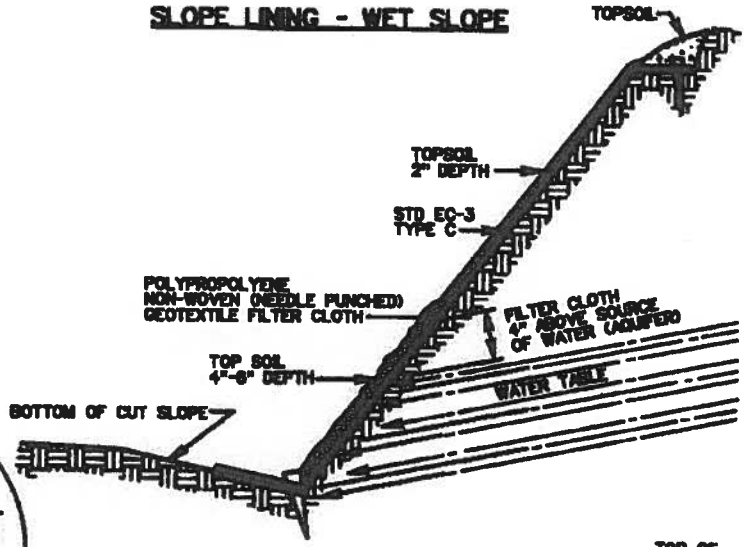
FILL SLOPE SECTION



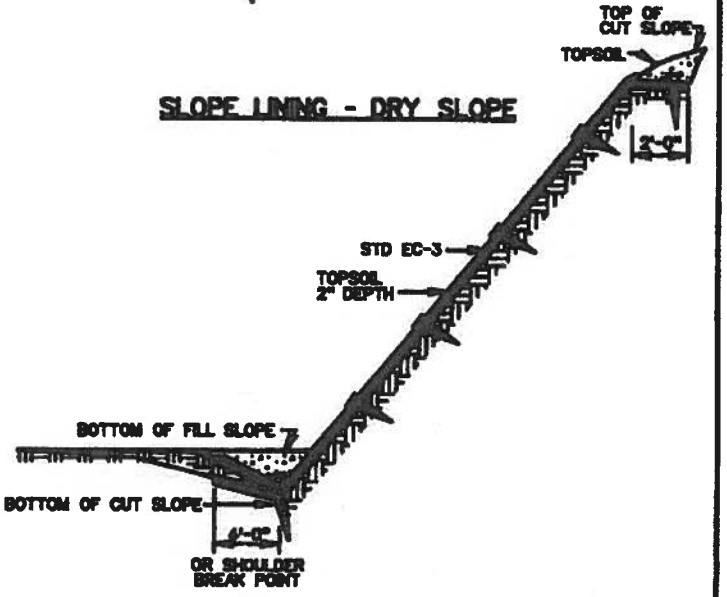
TOE OF FILL
MAINTAIN SLOPE ANGLE

BERM
TRENCH INTO BERM AND PROGRESS DOWNSLOPE

SLOPE LINING - WET SLOPE



SLOPE LINING - DRY SLOPE



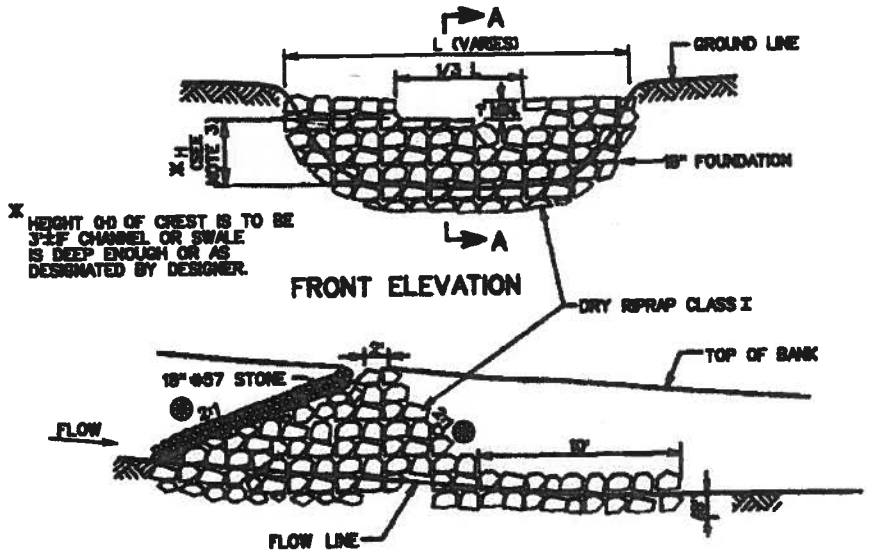
NOTE:

1. SLOPE SURFACE SHALL BE SMOOTH AND FREE OF ROCKS, LUMPS OF DIRT, GRASS, AND STICKS. MAT SHALL BE PLACED FLAT ON SURFACE FOR PROPER SOIL CONTACT.
2. STAKES SHALL BE WOOD OR METAL AS RECOMMENDED BY THE MANUFACTURER AND SHALL BE A MINIMUM OF 18 INCHES IN LENGTH.
3. BASIS OF PAYMENT SHALL BE SQUARE YARDS OF STANDARD EC-3 (TYPE C) IN PLACE.
4. SOIL STABILIZATION MAT TYPE C SHALL BE IN ACCORDANCE WITH THE APPROVED PRODUCT LIST.
5. TOPSOIL SHALL BE SPREAD TO A UNIFORM THICKNESS PRIOR TO APPLICATION OF SEED AND MULCH.
6. FOR SOURES OF APPROVED MATERIALS SEE VDOT'S APPROVED PRODUCTS LIST FOR STD. EC-3, TYPE C MATERIALS.
7. SLOPES 1½:1 AND FLATTER SHALL BE BACKFILLED WITH TOPSOIL AT 2 INCH DEPTH. SEED SHALL BE APPLIED TO THE TOPSOIL AND MULCHED WITH TYPE I MULCH.
8. SLOPES STEEPER THAN 1½:1 SHALL BE SEEDED IMMEDIATELY PRIOR TO INSTALLATION OF STD. EC-3 TYPE C MATERIAL.

SPECIFICATION REFERENCE	SOIL STABILIZATION MAT - SLOPE INSTALLATION TYPE C	VDOT ROAD AND BRIDGE STANDARDS
244 606	VIRGINIA DEPARTMENT OF TRANSPORTATION	REVISION DATE: SHEET 3 OF 3 — 113.05

EC-4

TYPICAL DETAIL FOR ROCK CHECK DAM TYPE I



X HEIGHT (X) OF CREST IS TO BE 3'± IF CHANNEL OR SWALE IS DEEP ENOUGH OR AS DESIGNATED BY DESIGNER.

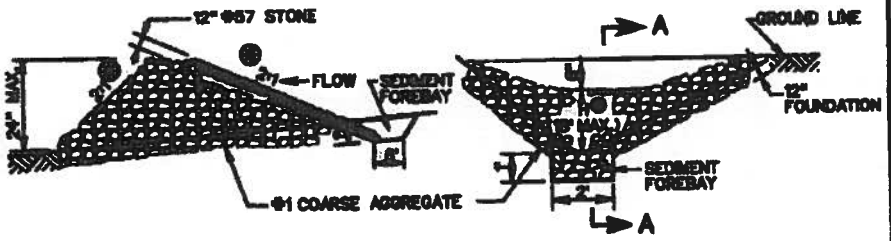
SECTION A-A

SUGGESTED ROCK CHECK DAM SPACING

L = H/S WHERE:
H = HEIGHT OF DAM CREST IN FEET
S = CHANNEL SLOPE IN FT/FT
L = CHECK DAM SPACING IN FEET; THE DISTANCE SUCH THAT POINTS A AND B ARE OF EQUAL ELEVATION

CHECK DAM SPACING , L TO BE DETERMINED FROM THE EQUATION. IN STEEP SLOPE AREAS THE CHECK DAM SPACING IS NOT TO BE LESS THAN 25'.

TYPICAL DETAIL FOR ROCK CHECK DAM TYPE II



SECTION A-A FRONT ELEVATION

NOTES:

1. ROCK CHECK DAMS THAT ARE DESIGNATED ON THE PLANS AS A STORMWATER MANAGEMENT (SWM) ITEM ARE TO BE LEFT IN PLACE AS A PERMANENT INSTALLATION.
2. WHERE DRAINAGE AREAS EXCEED 1 ACRE OR DITCH GRADE EXCEEDS 3%, A TEMPORARY SEDIMENT FOREBAY SHALL BE INSTALLED WITH MINIMUM DIMENSIONS OF 12" DEPTH, 2' WIDTH AND 6' LENGTH.
3. IF CHECK DAMS IS LOCATED INSIDE CLEAR ZONE AND ADJACENT TO A TRAVELWAY, SLOPE FACING ON COMING TRAFFIC IS TO BE 6:1 AND MAXIMUM H IS TO BE 12".
4. ALTERNATIVE MATERIALS ON VDOT'S SPEL LIST MAY BE SUBSTITUTED AT NO ADDITIONAL COST TO THE DEPARTMENT.
5. SEE STANDARD EC-5 FOR DETAILS FOR ROCK CHECK DAMS IN ROADSIDE DITCHES
6. CHECK DAM SHALL NOT BE USED FOR LOCATIONS IN LIVE STREAM.

VDOT
ROAD AND BRIDGE STANDARDS

ROCK CHECK DAMS TYPE I & II

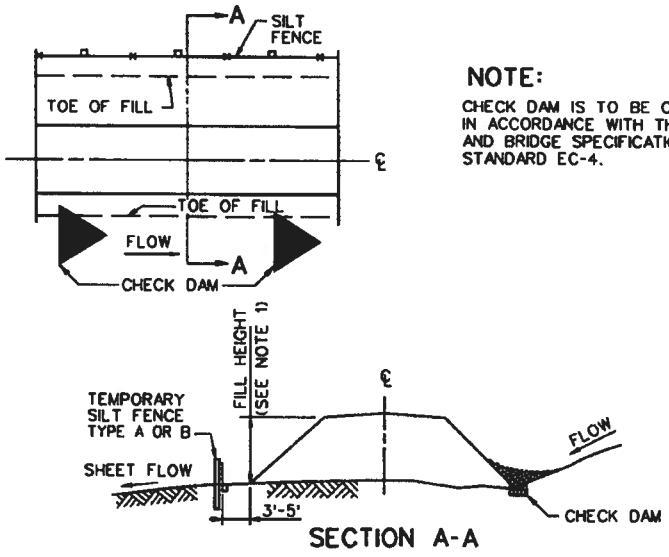
VIRGINIA DEPARTMENT OF TRANSPORTATION

SHEET 1 OF 1	REVISION DATE
113.08	

SPECIFICATION REFERENCE
107
303

EC-5

TYPICAL DETAIL FOR TEMPORARY SILT FENCE/CHECK DAM AT TOE OF FILL

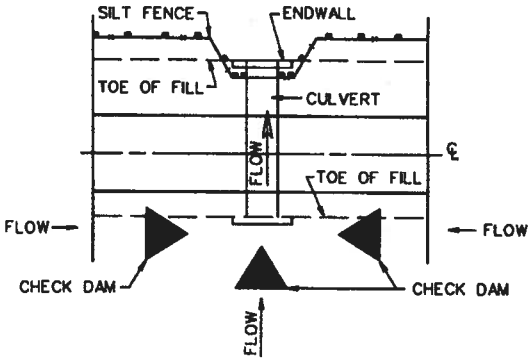


SECTION A-A

NOTE:

CHECK DAM IS TO BE CONSTRUCTED IN ACCORDANCE WITH THE ROAD AND BRIDGE SPECIFICATIONS, AND STANDARD EC-4.

TYPICAL DETAIL FOR TEMPORARY SILT FENCE/CHECK DAM AT CULVERT



NOTE:

CHECK DAM IS TO BE CONSTRUCTED IN ACCORDANCE WITH THE ROAD AND BRIDGE SPECIFICATIONS, AND STANDARD EC-4.

NOTES FOR SILT FENCE TYPE A & B:

1. USE OF TYPE A SILT FENCE IS LIMITED TO A FILL HEIGHT OF 20 FEET OR LESS. TYPE B SILT FENCE MUST BE USED WHERE THE FILL HEIGHT EXCEEDS 20 FEET.
2. ALL POSTS SHALL BE DRIVEN 24" MIN. INTO THE GROUND AND SHALL EXTEND 6" ABOVE THE FILTER FABRIC (TYPE A) OR WIRE FENCE (TYPE B). WOODEN POSTS SHALL BE OAK AND HAVE MIN. DIMENSIONS OF 2" BY 2". STEEL POSTS SHALL HAVE A MINIMUM WEIGHT OF 1.33 POUNDS PER LINEAR FOOT.
3. GEOTEXTILE FABRIC SHALL BE EMBEDDED 12" INTO THE GROUND (6" VERTICALLY AND 6" HORIZONTALLY ALONG THE BOTTOM OF TRENCH) AS SHOWN IN DETAILS A(2) & B(2) ON SHEETS 2 AND 3.
4. SLICING IS AN APPROVED ALTERNATIVE TO TRENCHING FOR ANCHORING THE GEOTEXTILE FABRIC INTO THE GROUND SHOWN IN DETAILS A(2) & B(2) ON SHEETS 2 AND 3. SLICING SHALL BE ACCOMPLISHED IN ACCORDANCE WITH SECTION 303 OF THE ROAD AND BRIDGE SPECIFICATIONS.
5. WHEN TWO SEPARATE SECTIONS OF GEOTEXTILE FABRIC ADJOIN EACH OTHER, THEY SHALL OVERLAP BY 6" AND BE DOUBLE FOLDED.
6. GEOTEXTILE FABRIC SHALL BE FASTENED SECURELY TO THE POSTS (TYPE A & B) AND WIRE FENCE (TYPE B ONLY). THE ATTACHMENTS TO THE WIRE FENCE SHALL BE MADE WITH TIES SPACED EVERY 24" HORIZONTALLY AT BOTH THE TOP AND VERTICAL MIDPOINT OF THE GEOTEXTILE FABRIC.
7. WIRE FENCE (TYPE B ONLY) SHALL BE FASTENED SECURELY TO THE FENCE POSTS WITH WIRE TIES AND EMBEDDED A MINIMUM OF 2" IN THE GROUND.
8. WIRE FENCE (TYPE B ONLY) SHALL BE A MINIMUM OF 14 GAUGE WELDED WIRE WITH A MESH SPACING OF 2" BY 4". ALTERNATIVE MESH SPACING MAY BE APPROVED BY THE ENGINEER, BUT MUST BE NO MORE THAN 6" BY 6".
9. FOR AREAS REQUIRING TYPE B SILT FENCE, A MINIMUM LENGTH OF 100 LINEAR FEET SHALL BE INSTALLED.
10. AS AN ALTERNATIVE TO UTILIZING TYPE B SILT FENCE, TWO ROWS OF TYPE A SILT FENCE MAY BE PLACED PARALLEL TO EACH OTHER WITH 3' TO 5' BETWEEN THE TWO ROWS. THIS OPTION MAY BE USED AT ALL LOCATIONS SPECIFYING TYPE B SILT FENCE UNLESS OTHERWISE PROHIBITED BY THE PLANS. SEE DETAIL ON SHEET 3 (BOTTOM RIGHT).
11. MATERIALS FOR ALL SILT FENCE SHALL CONFORM TO THE REQUIREMENTS OF SECTION 242 OF THE VDOT ROAD & BRIDGE SPECIFICATIONS.

SPECIFICATION REFERENCE
107 242 245 303

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

TEMPORARY SILT BARRIERS

SILT FENCE (TYPE A & B) AND BRUSH BARRIER

VIRGINIA DEPARTMENT OF TRANSPORTATION

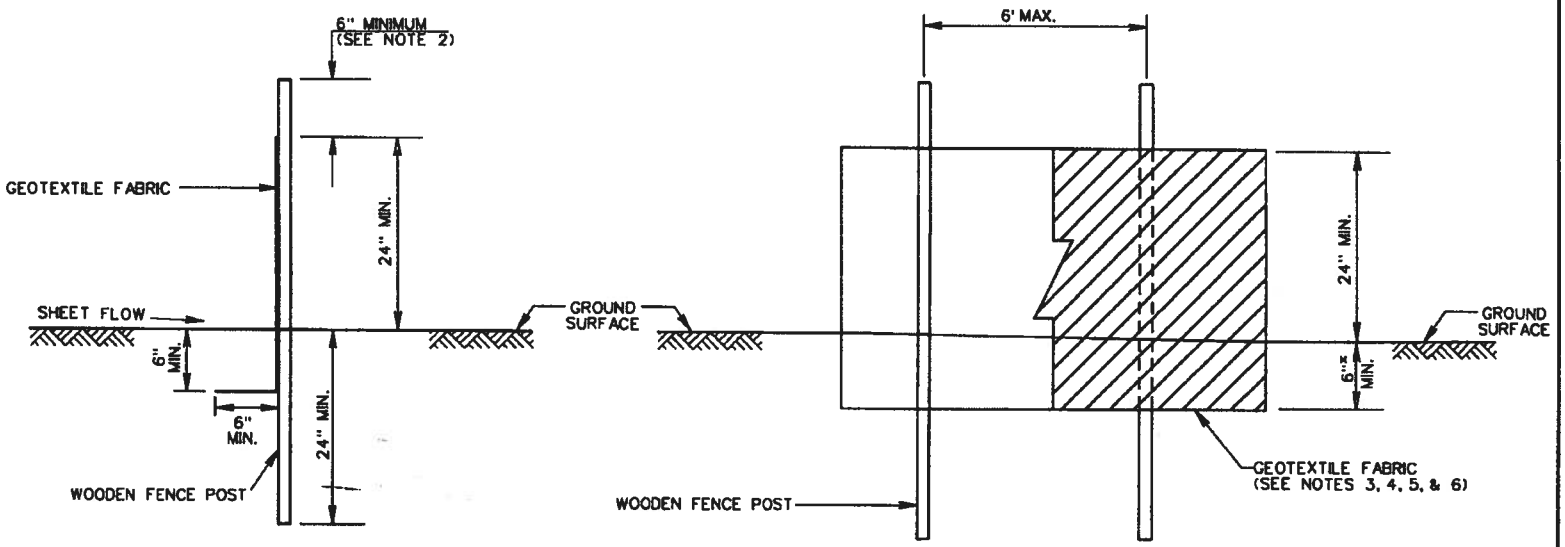
VDOT
ROAD AND BRIDGE STANDARDS

REVISION DATE	SHEET 1 OF 4
08/14	113.07

EC-5

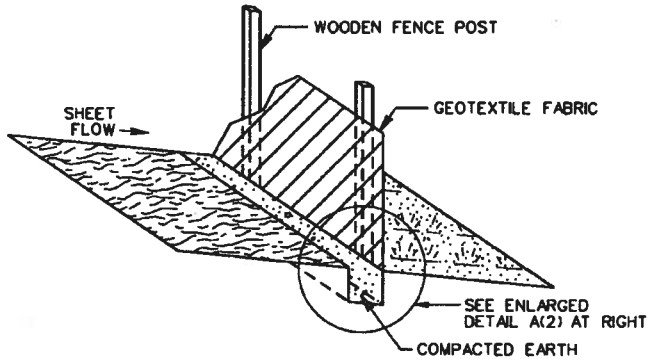
SILT FENCE TYPE A

SEE SHEET 1 FOR NOTES

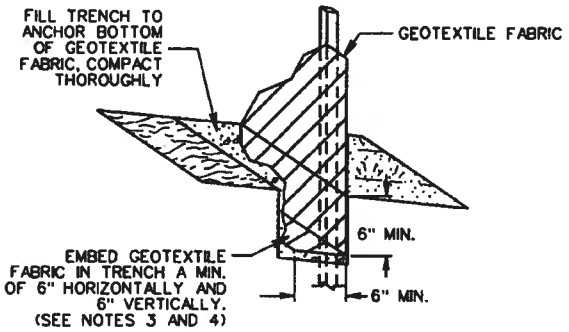


SECTION VIEW

PROFILE VIEW



DETAIL A(1)



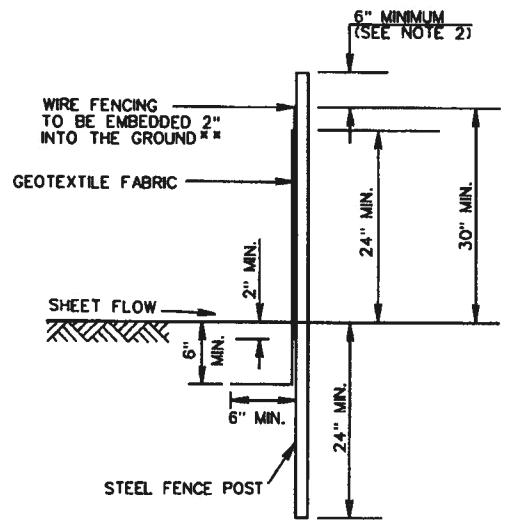
DETAIL A(2)

VDOT ROAD AND BRIDGE STANDARDS	A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.	SPECIFICATION REFERENCE
SHEET 2 OF 4 / REVISION DATE 08/14	**TEMPORARY SILT BARRIERS**	107
113.07A	**SILT FENCE (TYPE A & B) AND BRUSH BARRIER**	242
	VIRGINIA DEPARTMENT OF TRANSPORTATION	245
		303

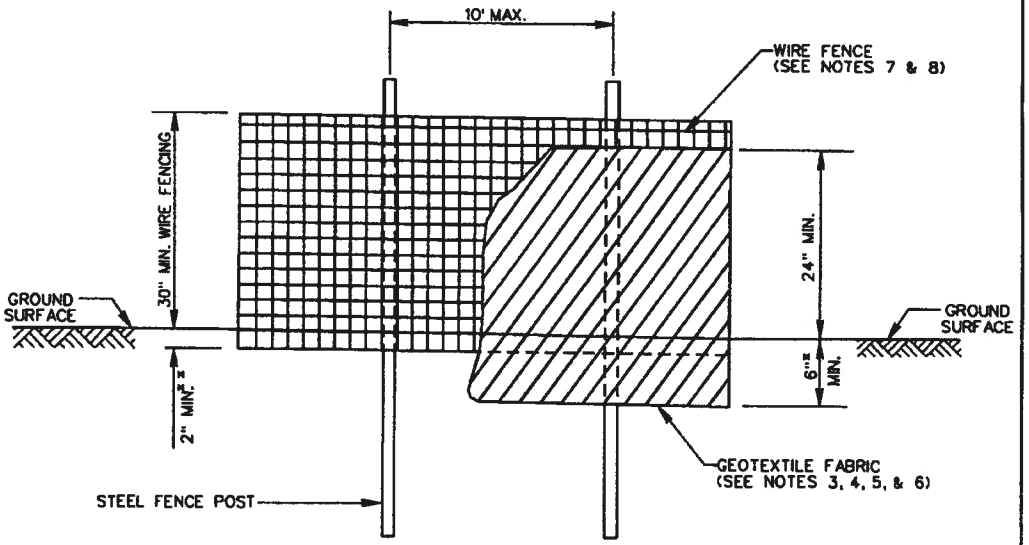
SILT FENCE TYPE B

SEE SHEET 1 FOR NOTES

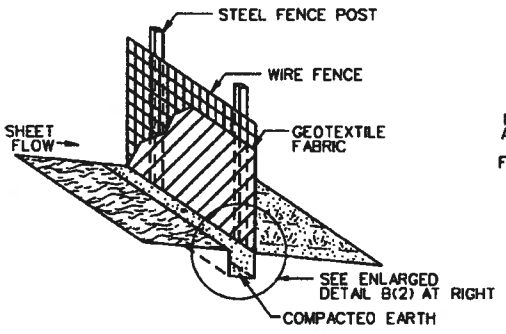
EC-5



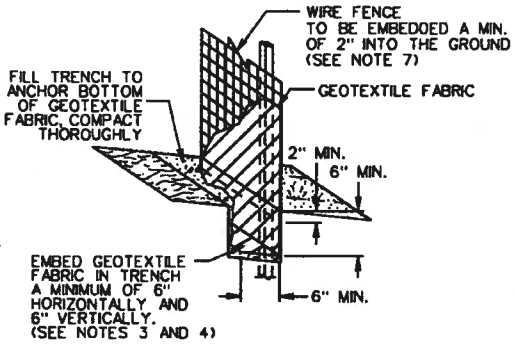
SECTION VIEW



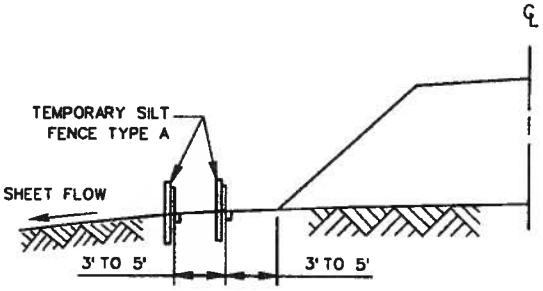
PROFILE VIEW



DETAIL B(1)



DETAIL B(2)



ALTERNATIVE SILT FENCE TYPE B

(SEE NOTE 10)

SPECIFICATION REFERENCE
107 242 245 303

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

TEMPORARY SILT BARRIERS

SILT FENCE (TYPE A & B) AND BRUSH BARRIER

VIRGINIA DEPARTMENT OF TRANSPORTATION

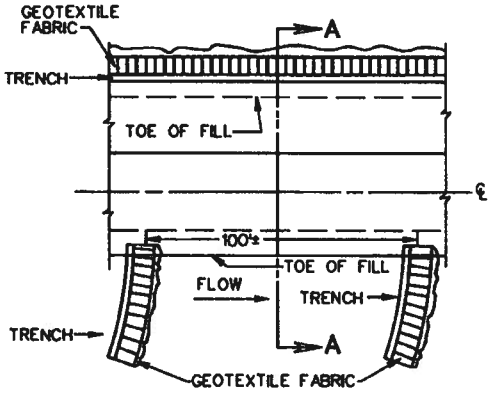
VDOT

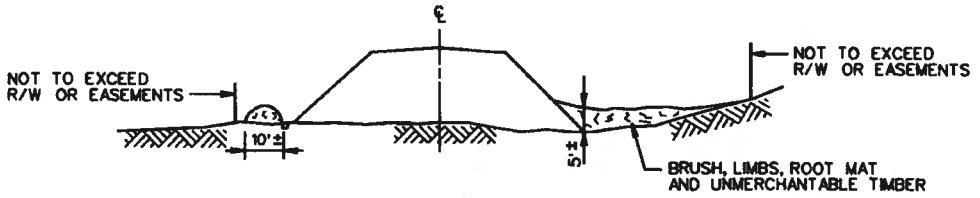
ROAD AND BRIDGE STANDARDS

REVISION DATE	SHEET 3 OF 4
08/14	113.07B

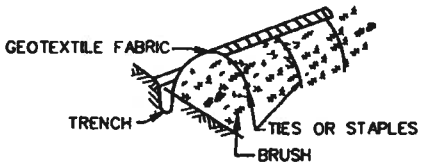
EC-5

SILT BARRIERS
TYPICAL DETAIL FOR BRUSH BARRIER
(TO BE USED AT ALL APPLICABLE LOCATIONS)

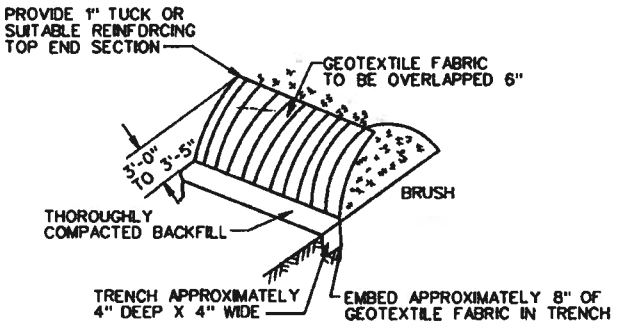




SECTION A-A



BACK ISOMETRIC



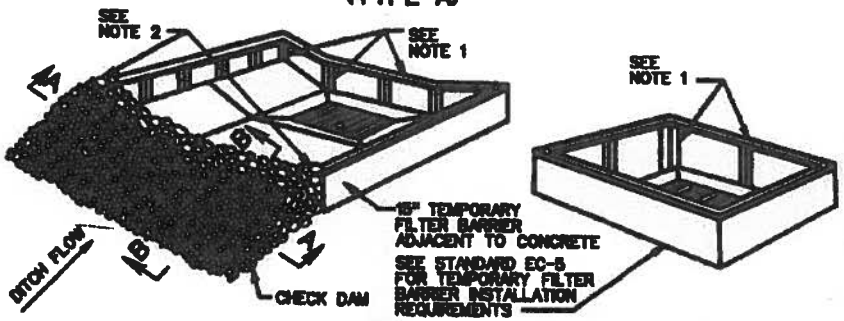
FRONT ISOMETRIC

NOTES:

1. BRUSH BARRIERS SHALL BE CONSTRUCTED AT LOCATION SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. BRUSH SHALL BE PILED AGAINST EXISTING TREES TO PREVENT MOVEMENT OF BARRIER. BRUSH SHALL BE PILED AS TIGHTLY AS POSSIBLE AND WEIGHTED DOWN BY UNMERCHANTANTABLE LOGS.
2. GEOTEXTILE FABRIC CONFORMING TO THE ROAD AND BRIDGE SPECIFICATIONS SHALL BE INSTALLED AS DETAILED ABOVE. GEOTEXTILE FABRIC MAY ALSO BE ATTACHED TO EXISTING FENCES WHEN SPECIFIED ON THE PLANS OR DIRECTED BY THE ENGINEER.
3. NO BRUSH WILL BE DESTROYED OR REMOVED FROM THE PROJECT UNTIL ALL BRUSH SILT BARRIERS ARE IN PLACE AND HAVE BEEN INSPECTED AND APPROVED BY THE ENGINEER.
4. DIMENSIONS SHOWN ARE APPROXIMATE ONLY.

VDOT ROAD AND BRIDGE STANDARDS		TEMPORARY SILT BARRIERS	SPECIFICATION REFERENCE
SHEET 4 OF 4	REVISION DATE	SILT FENCE (TYPE A & B), AND BRUSH BARRIER	107 303
113.08	08/14	VIRGINIA DEPARTMENT OF TRANSPORTATION	

INLET PROTECTION (TYPE A)

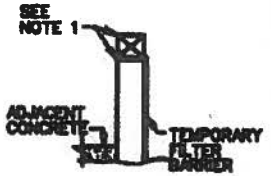


TYPICAL TREATMENT FOR DROP INLET WITH CONCRETE GUTTER

SECTION A-A

* IF CHECK DAM IS LOCATED INSIDE CLEAR ZONE AND ADJACENT TO A TRAVELWAY, SLOPE FACING ON COMING TRAFFIC IS TO BE 6:1 AND MAXIMUM H IS TO BE 12".

TYPICAL TREATMENT FOR DROP INLET WITHOUT CONCRETE GUTTER



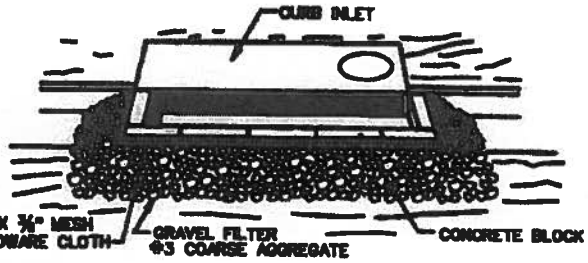
SECTION B-B

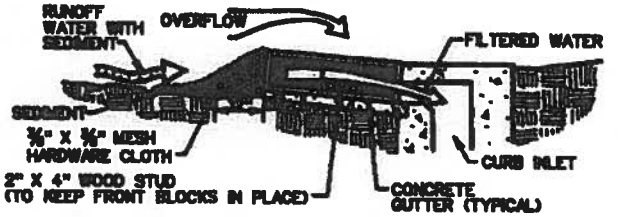
NOTES

1. POSTS AND TOP RAIL SHALL BE A NOMINAL 2¼" X 2¼" OR A 3" DIA. NO. 2 SOUTHERN PINE, A NOMINAL 2" X 2" OAK, OR STEEL HAVING A MIN. WEIGHT OF 1.25 LBS. PER LINEAR FOOT AND A MIN. LENGTH OF 5' FOR TEMPORARY SILT FENCES.
2. END OF FILTER BARRIER TO BE EMBEDDED INTO AGGREGATE.
3. IF A DROP INLET IS LOCATED IN A SAG IN THE DITCH GRADE, A CHECK DAM IS REQUIRED FOR EACH SIDE OF THE INLET THAT RECEIVES DITCH FLOW.
4. WHERE DRAINAGE AREAS EXCEED ONE ACRE OR DITCH GRADE EXCEEDS 3%, A TEMPORARY SEDIMENT FOREBAY SHALL BE INSTALLED WITH MINIMUM DIMENSIONS OF 12" DEPTH, 2' WIDTH AND 6' LENGTH.

INLET PROTECTION (TYPE B)

EC-6





SECTION VIEW

SPECIFIC APPLICATION

THIS METHOD OF INLET PROTECTION IS APPLICABLE AT CURB INLETS WHERE AN OVERFLOW CAPABILITY IS NECESSARY TO PREVENT EXCESSIVE PONDING IN FRONT OF THE STRUCTURE.

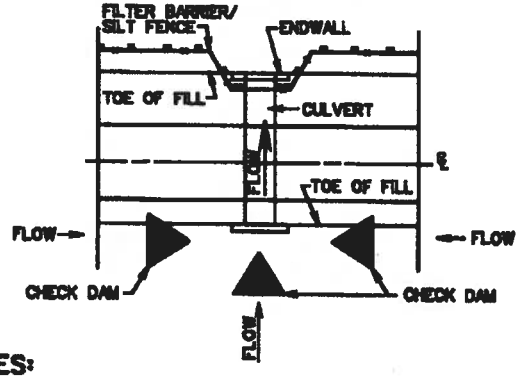
NOTE:

GEOTEXTILE PRODUCTS DESIGNED TO BE INSERTED INTO GRATED DROP INLETS OR DESIGNED TO COVER THE SLOTS OF SLOT DROP INLETS, THAT HAVE BEEN APPROVED FOR USE ON VDOT PROJECTS AND ARE FOUND ON VDOT'S SPEL LIST, MAY BE SUBSTITUTED FOR THE DROP INLET PROTECTION DEVICES DETAILED HEREON.

SPECIFICATION REFERENCE	INLET PROTECTION (TYPE A AND B)	VDOT ROAD AND BRIDGE STANDARDS
107 242 303	VIRGINIA DEPARTMENT OF TRANSPORTATION	REVISION DATE: SHEET 1 OF 2 113.09

EC-6

TYPICAL DETAIL FOR INSTALLATION OF TEMPORARY FILTER BARRIER/SILT FENCE/CHECK DAM AT CULVERT

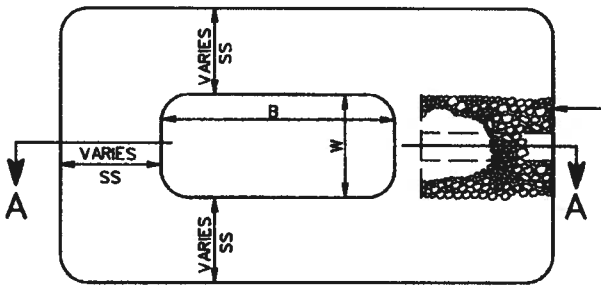


NOTES:

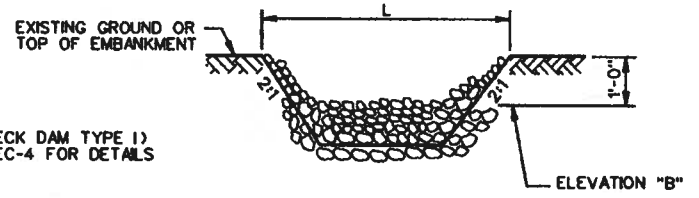
1. IF ANY PORTION OF FILL IS GREATER THAN 5', SILT FENCE IS REQUIRED. IF FILL HEIGHT IS LESS THAN 5', FILTER BARRIER IS REQUIRED.
2. ROCK CHECK DAM IS TO BE CONSTRUCTED IN ACCORDANCE WITH THE ROAD AND BRIDGE SPECIFICATIONS, AND STANDARD EC-4.
3. FILTER BARRIER/SILT FENCE IS TO BE INSTALLED IN ACCORDANCE WITH THE ROAD AND BRIDGE SPECIFICATIONS, AND STANDARD EC-5.

* INSTALLATION DETAIL ONLY - ROCK CHECK DAMS, FILTER BARRIER, AND SILT FENCE TO BE PAID FOR IN ACCORDANCE WITH THE ROAD AND BRIDGE SPECIFICATIONS.

VDOT ROAD AND BRIDGE STANDARDS		INLET PROTECTION (TYPE C) VIRGINIA DEPARTMENT OF TRANSPORTATION	SPECIFICATION REFERENCE
SHEET 2 OF 2	REVISION DATE		107 242 303
113.10			



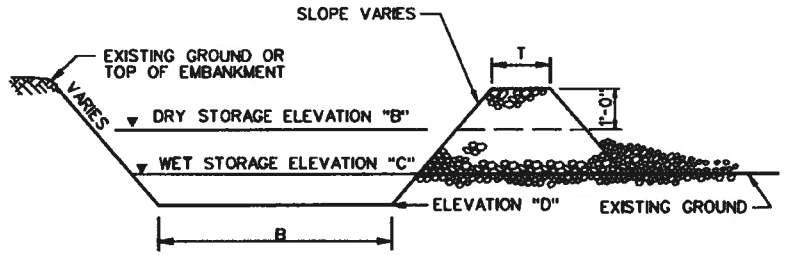
PLAN VIEW OF TEMPORARY SEDIMENT TRAP



TYPICAL SECTION THRU WEIR
(ROCK CHECK DAM TYPE 1)

NOTES:

1. CHECK DAM IS SHOWN FOR ILLUSTRATION ONLY AND IS NOT INCLUDED IN PAYMENT FOR SEDIMENT TRAP.
2. THE SEDIMENT STORAGE VOLUME SHALL BE 134 CUBIC YARDS/ACRE OF TOTAL CONTRIBUTING DRAINAGE AREA AND SHALL CONSIST OF HALF IN THE FORM OF WET STORAGE AND HALF IN THE FORM OF DRY STORAGE.
3. SEE PLANS FOR DIMENSIONS AND ELEVATIONS.

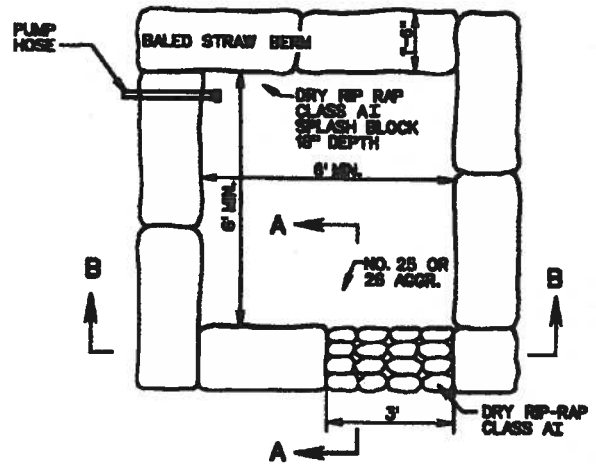


TYPICAL SECTION (A-A) THRU
TEMPORARY SEDIMENT TRAP

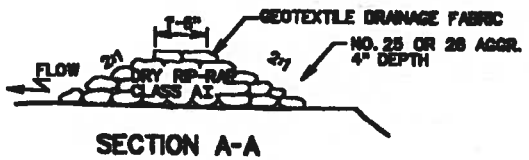
SPECIFICATION REFERENCE	TYPICAL SEDIMENT TRAP	VDOT ROAD AND BRIDGE STANDARDS
107 303	VIRGINIA DEPARTMENT OF TRANSPORTATION	REVISION DATE 01/13 · SHEET 1 OF 1 · 113.11

EC-6

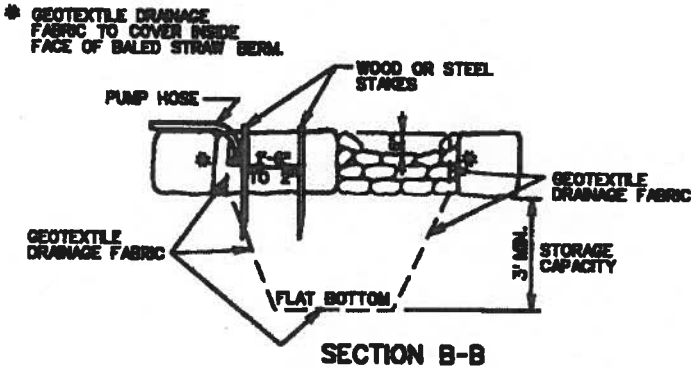
TYPICAL DEWATERING BASIN



PLAN



SECTION A-A

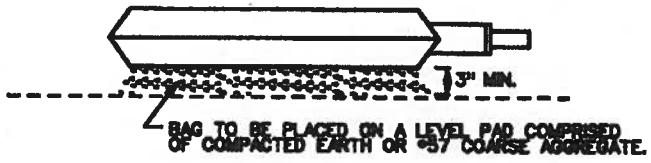


SECTION B-B

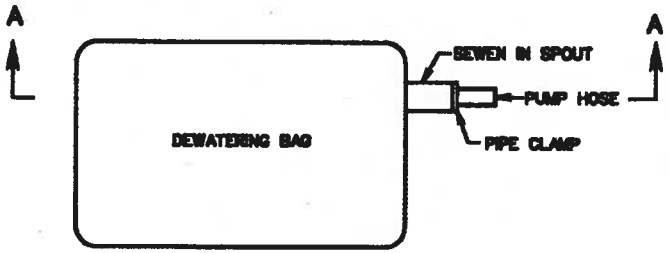
NOTES:

1. DEWATERING BASIN SIZE SHALL BE DETERMINED BY THE FORMULA 18 X GAL./MIN. OF PUMP = CU. FT. OF STORAGE CAPACITY.
2. THIS WORK SHALL CONSIST OF THE CONSTRUCTION OF A DEWATERING BASIN FOR THE PURPOSE OF RECEIVING SEDIMENT-LADENED WATER PUMPED FROM A CONSTRUCTION SITE TO ALLOW FOR FILTRATION BEFORE IT REENTERS THE WATERWAY. PUMPING INTO THESE BASINS SHALL CEASE WHEN THE FLOW FROM THE BASIN BECOMES SEDIMENT-LADENED.
3. SURFACE WATER FLOW SHALL BE DIVERTED AROUND THIS DEVICE.
4. THE OUTFALL FROM THE BASIN(S) SHALL HAVE A STABILIZED CONVEYANCE TO RECEIVING WATERS.
5. ONCE THE DEWATERING BASIN BECOMES FILLED TO HALF OF THE STORAGE CAPACITY, ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED DISPOSAL AREA OUTSIDE OF THE 100-YEAR FLOODPLAIN UNLESS OTHERWISE APPROVED ON THE PLANS.
6. SEDIMENT CONTROL DEVICES ARE TO REMAIN IN PLACE UNTIL ALL DISTURBED AREAS ARE STABILIZED AND THE ENGINEER APPROVES THEIR REMOVAL. GROUND CONTOURS SHALL BE RETURNED TO THEIR ORIGINAL CONDITION UNLESS SPECIFICALLY APPROVED OTHERWISE BY THE ENGINEER.
7. SYNTHETIC PRODUCTS THAT HAVE BEEN APPROVED FOR USE ON VDOT PROJECTS AND FOUND ON VDOT'S SPEL LIST MAY BE USED IN LIEU OF THIS DESIGN. HOWEVER, VDOT WILL ONLY COMPENSATE THE CONTRACTOR UP TO THE BID PRICE PER EACH AT EACH SITE.

TYPICAL SYNTHETIC PRODUCT



SECTION A-A



PLAN

VDOT
ROAD AND BRIDGE STANDARDS

SHEET 1 OF 1
113.12

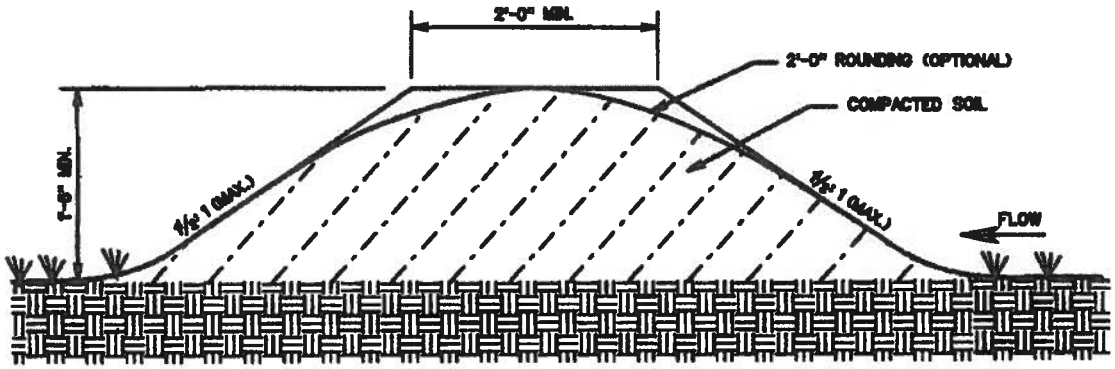
REVISION DATE

DEWATERING BASIN

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE
107
303

EC-9



TEMPORARY DIVERSION DIKE

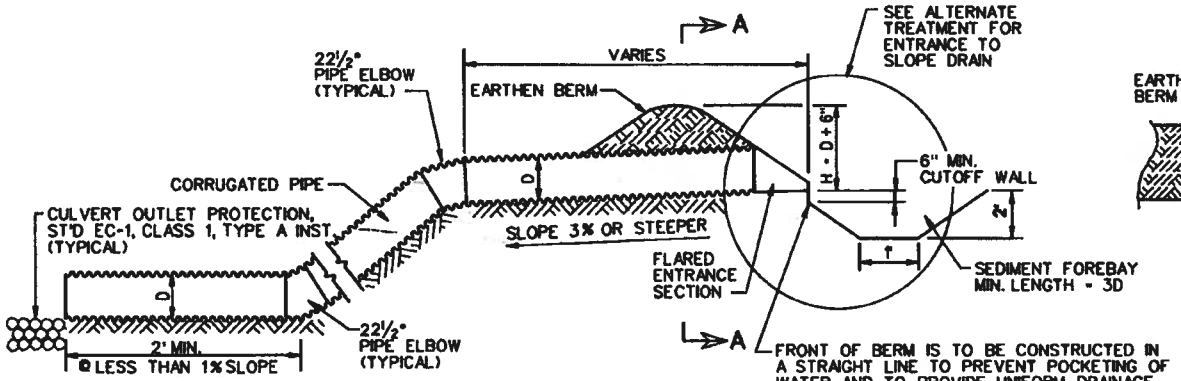
NOTE:

1. THE CHANNEL CREATED BEHIND THE DIKE SHALL HAVE A POSTIVE GRADE TO A STABILIZED OUTLET. THE CHANNEL SHALL BE STABILIZED, AS NECESSARY, TO PREVENT EROSION.
2. TEMPORARY DIVERSION DIKE WILL BE MEASURED AND PAID FOR IN ACCORDANCE WITH SECTION 303 OF THE SPECIFICATIONS.

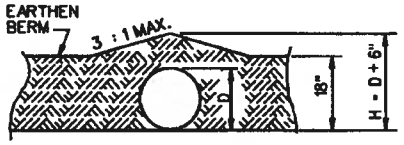
SPECIFICATION REFERENCE	TEMPORARY DIVERSION DIKE	VDOT ROAD AND BRIDGE STANDARDS
303	VIRGINIA DEPARTMENT OF TRANSPORTATION	REVISION DATE: SHEET 1 OF 1; 113.13

EC-10

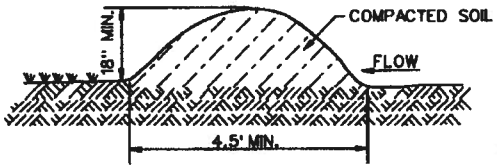
TEMPORARY BERM & SLOPE DRAIN



PROFILE



SECTION A-A



EARTHEN BERM

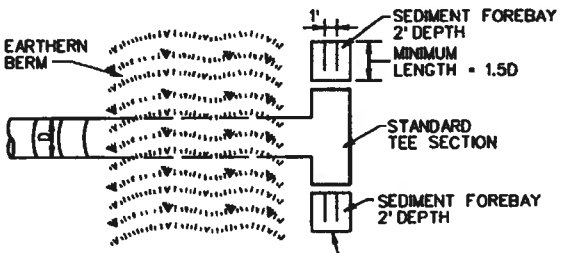
EARTHEN BERM SHALL BE INSTALLED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS OR AS DIRECTED BY THE ENGINEER.

SIZE OF SLOPE DRAIN	
MAXIMUM DRAINAGE AREA (ACRES)	MINIMUM PIPE DIAMETER, D (IN.)
0.5	12
1.5	18
2.5	21
3.0	24

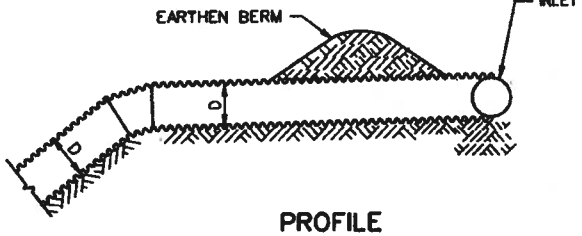
NOTES

1. SLOPE DRAIN SHALL BE SECURELY STAKED TO THE SLOPE, AT 10' (OR LESS) INTERVALS.
2. THE SLOPE DRAIN SECTIONS SHALL BE SECURELY FASTENED TOGETHER AND HAVE WATER TIGHT FITTINGS.

ALTERNATE ENTRANCE TREATMENT



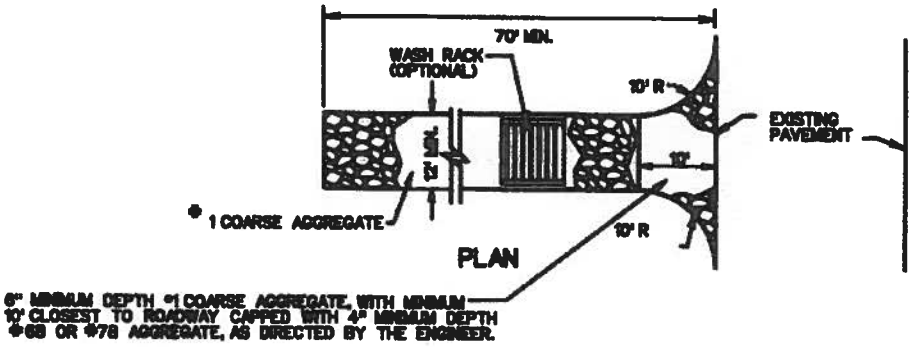
PLAN VIEW

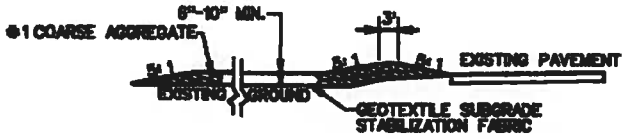


PROFILE

VDOT ROAD AND BRIDGE STANDARDS		TEMPORARY BERM & SLOPE DRAIN	SPECIFICATION REFERENCE
SHEET 1 OF 1	REVISION DATE 01/13	VIRGINIA DEPARTMENT OF TRANSPORTATION	107 303
113.14			

MINIMUM REQUIREMENTS FOR STABILIZED CONSTRUCTION ENTRANCE





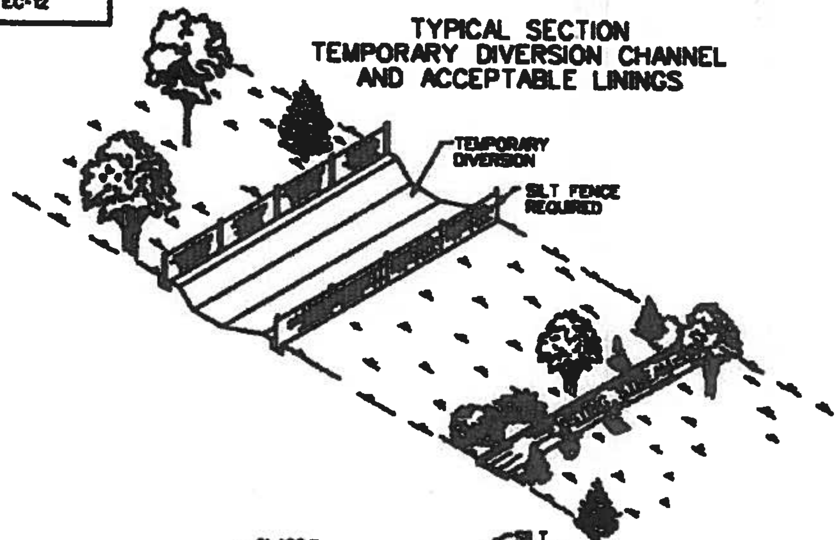
PROFILE

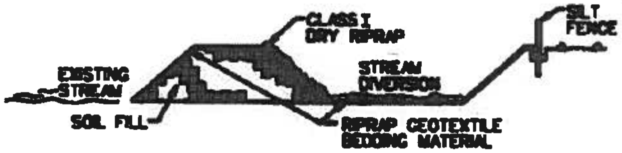
1. SURFACE WATER SHALL BE PIPED UNDER THE CONSTRUCTION ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
2. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT OF WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHT OF WAY SHALL BE REMOVED IMMEDIATELY.
3. WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT OF WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
4. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER HEAVY USE AND EACH RAIN.

SPECIFICATION REFERENCE	STABILIZED CONSTRUCTION ENTRANCE	VDOT ROAD AND BRIDGE STANDARDS
107 303	VIRGINIA DEPARTMENT OF TRANSPORTATION	REVISION DATE: SHEET 1 OF 1 113.15

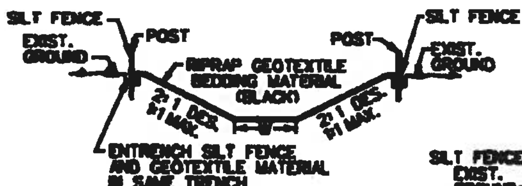
EC-12

TYPICAL SECTION
TEMPORARY DIVERSION CHANNEL AND ACCEPTABLE LININGS

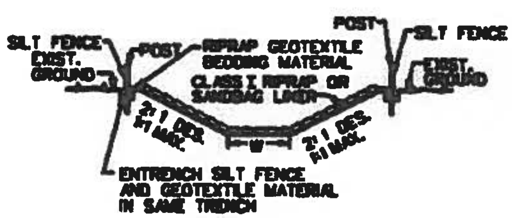




DAM DETAIL



CLASS A LINING



CLASS B LINING

BOTTOM WIDTH OF TEMPORARY DIVERSION CHANNEL SHALL APPROXIMATE THE BOTTOM WIDTH OF THE NATURAL STREAM CHANNEL.

STREAM DIVERSION GENERAL NOTES

SLOPES

MAXIMUM STEEPNESS OF SIDE SLOPES SHALL BE 2:1. DEPTH AND GRADE MAY BE VARIABLE, DEPENDENT ON SITE CONDITIONS, BUT SHALL BE SUFFICIENT TO ENSURE CONTINUOUS FLOW OF WATER IN THE DIVERSION.

EXCAVATION

NO EXCAVATED MATERIAL SHALL BE STORED OR STOCKPILED NEXT TO THE DIVERSION OR IN SUCH A MANNER THAT SILTATION OF THE STREAM COULD OCCUR.

PIPE CULVERTS

PIPE CULVERT(S) MAY BE USED TO DIVERT A STREAM PROVIDED THEY ARE PROPERLY SIZED TO SAFELY CARRY THE FLOW OF A [illegible] YEAR STORM EVENT. UNDERSIZED PIPES SHALL BE USED FOR NO LONGER THAN 72 HOURS PROVIDED THAT THE THREAT OF RAIN CAN BE REASONABLY PREDICTED WITHIN THAT TIME PERIOD AND THEY ARE APPROVED BY THE ENGINEER.

WHEN THE CONTRACTOR USES PIPE CULVERTS IN LIEU OF THE DIVERSION CHANNEL OR A PORTION OF THE CHANNEL, PAYMENT WILL BE MADE BASED ON THE PRICE BID FOR THE QUANTITIES SHOWN ON THE PLANS FOR TEMPORARY DIVERSION CHANNEL EXCAVATION AND TEMPORARY DIVERSION CHANNEL LINING CLASS SPECIFIED.

LINING

THE CONTRACTOR SHALL HAVE THE OPTION OF USING A HIGHER CLASS OF LINING THAN THAT SPECIFIED ON THE PLANS. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR USING THE HIGHER CLASS.

STREAM DIVERSION LINERS SHALL BE SECURED AT THE UPSTREAM AND DOWNSTREAM ENDS WITH NON-ERODIBLE WEIGHTS SUCH AS EROSION CONTROL STONE. THESE WEIGHTS SHALL ALLOW NORMAL FLOW OF THE STREAM. [illegible] SHALL NOT BE USED AS STREAM DIVERSION WEIGHTS. WEIGHTS MAY ALSO BE NEEDED ALONG THE STREAM DIVERSION'S LENGTH.

STREAM DIVERSION LINERS SHALL BE ENTRENCHED AT THE TOP OF THE DIVERSION SLOPES (SLOPE BREAKS) WITH A LINE OF SILT FENCE.

PROTECTIVE COVERING (EC-3) STAPLES OR NON-ERODIBLE WEIGHTS SHALL BE USED [illegible] STREAM DIVERSION LINERS TO THE [illegible] SLOPES OF THE DIVERSION. [illegible] STAPLES SHALL NOT BE USED ON THE DIVERSION'S BOTTOM OR SIDE SLOPES.

STREAM DIVERSION LINERS SHALL BE [illegible] WHEN A SINGLE OR CONTINUOUS LINER IS NOT AVAILABLE OR IS IMPRACTICAL. OVERLAPS SHALL BE PLACED SUCH THAT CONTINUOUS FLOW OF THE STREAM IS MAINTAINED. AT UPSTREAM [illegible] SECTION BY A MINIMUM OF [illegible] SHALL BE MADE SUCH THAT A LINER IS PLACED IN THE STREAM DIVERSION BOTTOM FIRST AND ADDITIONAL PIECES OF LINER ON THE SLOPES OVERLAP THE BOTTOM PIECE BY A MINIMUM OF [illegible].

GENERAL

THE DOWNSTREAM PLUG SHALL BE REMOVED PRIOR TO THE UPSTREAM PLUG WHEN A STREAM DIVERSION IS USED FOR THE TRANSPORT OF WATER.

NON-ERODIBLE MATERIALS INCLUDING BUT NOT LIMITED TO EROSION CONTROL STONE, CONCRETE BARRIERS, SANDBAGS, PLYWOOD, OR SHEET PILING SHALL BE USED BOTH TO DIVERT THE STREAMS AWAY FROM THEIR ORIGINAL CHANNELS AND TO PREVENT OR REDUCE WATER BACKUP INTO A CONSTRUCTION AREA.

STREAMS MAY BE DIVERTED THROUGH AN EXISTING OR INCOMPLETE STRUCTURE PROVIDED THEY WILL NOT [illegible] COME INTO CONTACT WITH [illegible] PARTIALLY OR WHOLLY HARDENED, SILTED, OR OTHERWISE CONTAMINATED.

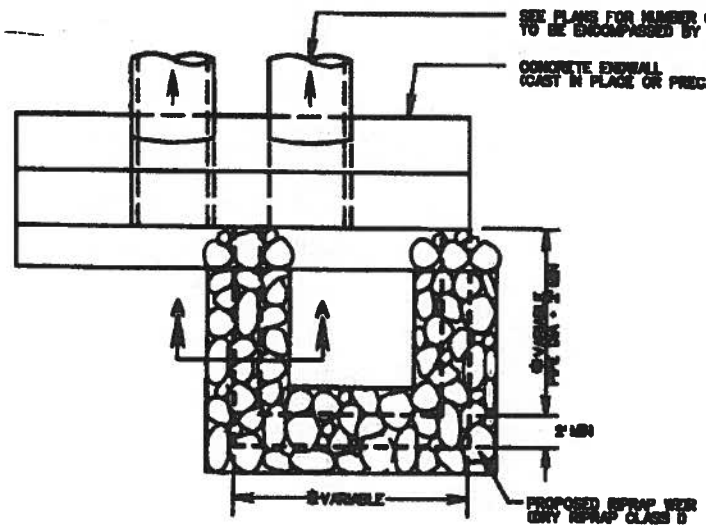
STREAMS MAY BE REDIRECTED UPON COMPLETION OF THE DRAINAGE [illegible] INTO [illegible] TO [illegible] THE [illegible] SHALL BE SEALED OFF AT THE DOWNSTREAM END AND THEN BACKFILLED.

ONCE STARTED, ANY WORK TO RELOCATE A STREAM (PLUGS) SHALL NOT BE DISCONTINUED UNTIL IT IS COMPLETED.

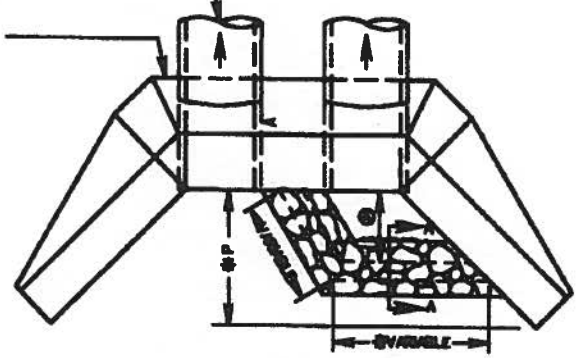
ANY DEVIATIONS TO THE ABOVE NOTED STREAM DIVERSION DESIGN, INSTALLATION, OR MAINTENANCE SHALL BE APPROVED BY THE ENGINEER.

VDOT ROAD AND BRIDGE STANDARDS	TEMPORARY DIVERSION CHANNEL	SPECIFICATION REFERENCE
SHEET 1 OF 1 / 113.15	VIRGINIA DEPARTMENT OF TRANSPORTATION	302
REVISION DATE 4/08		303
		414

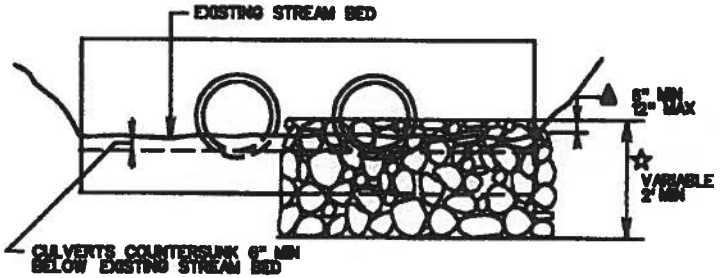
EC-13



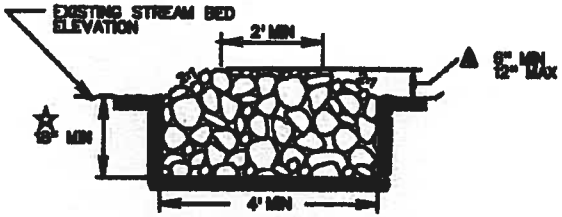
PLAN VIEW
(ENDWALL WITHOUT WINGS)



PLAN VIEW
(ENDWALL WITH WINGS)



END VIEW



TYPICAL SECTION A-A

LEGEND

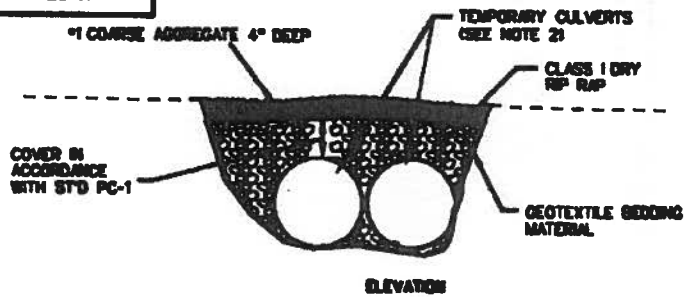
- Ⓐ 6" MINIMUM OR ½ P.
- ✱ DIMESION VARIES ACCORDING TO PIPE SIZE, SKEW AND ENDWALL DIMENSIONS
- ☆ DEPTH OF FOUNDATION TO BE VARIABLE ACCORDING TO SITE CONSTRAINTS OR AS DIRECTED BY THE ENGINEER
- ▲ THE PROPOSED HEIGHT OF THE RIPRAP WEIR, FROM THE EXISTING STREAM BED TO THE TOP OF WEIR, IS TO BE SPECIFIED ON THE ROADWAY PLANS. "K" DIMENSION (HEIGHT OF WEIR ABOVE STREAM BED) CAN BE A MINIMUM OF 6" OR ANY VARIABLE DIMENSION TO A MAXIMUM OF 12".

NOTES:

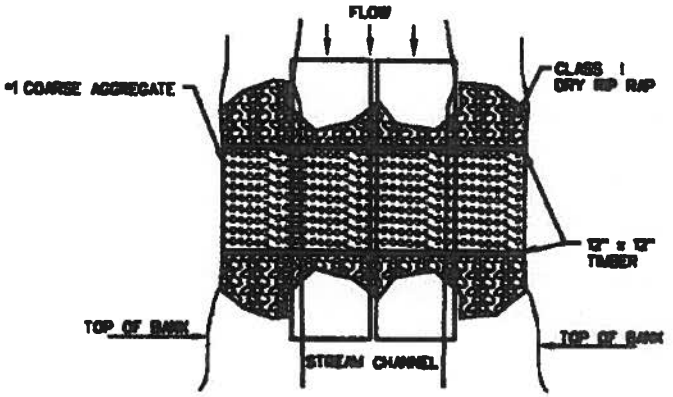
1. THE TOP WIDTH OF THE WEIR IS VARIABLE AND IS TO BE ADJUSTED AS NEEDED TO DIRECT THE LOW FLOW TO THE BARREL(S) DESIGNATED ON THE PLANS.
2. FOR SKEWED ENDWALLS, RIPRAP WEIR SIDES ARE TO BE CONSTRUCTED PARALLEL WITH PIPE SKEW.
3. REFER TO APPLICABLE ENDWALL STANDARD DRAWING FOR DIMENSIONS NOT SHOWN HEREIN
4. BASIS OF PAYMENT: TO BE PAID FOR AS SQ.YDS. OR TONS OF DRY RIPRAP CLASS I

SPECIFICATION REFERENCE	RIPRAP WEIRS	VDOT ROAD AND BRIDGE STANDARDS
107 303	LOW FLOW DIVERSION FOR MULTIPLE LINE CULVERT INSTALLATIONS VIRGINIA DEPARTMENT OF TRANSPORTATION	REVISION DATE SHEET 1 OF 1 113.17

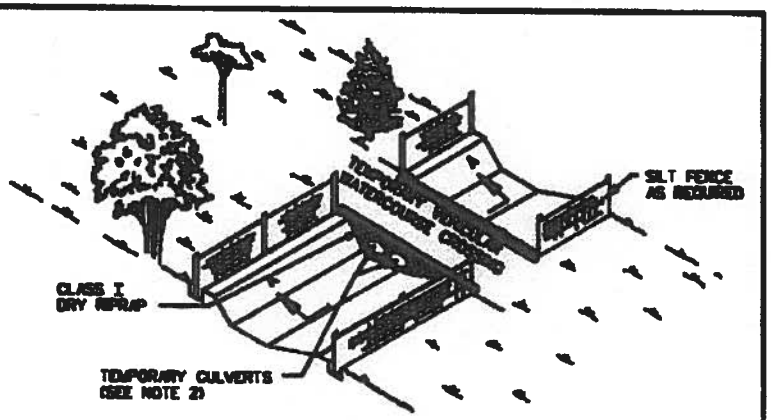
EC-14

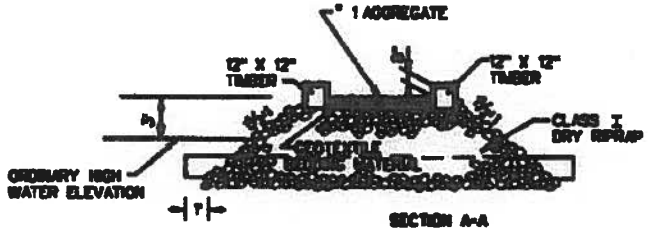


ELEVATION



PLAN VIEW





SECTION A-A

NOTE:

1. THE CULVERT(S) SHALL BE SIZED TO CONVEY THE FLOW OF A TWO YEAR STORM EVENT. THE ELEVATION OF THE TWO YEAR EVENT SHALL BE AT OR BELOW THE LOWEST SURFACE ELEVATION OF THE CROSSING. THE REQUIRED HYDRAULIC OPENINGS SHOULD BE DETERMINED USING THE APPROPRIATE HYDROLOGIC/HYDRAULIC DESIGN TECHNIQUES. A TEMPORARY VEHICULAR WATERCOURSE CROSSING SHOULD ONLY BE UTILIZED WHERE THE DRAINAGE AREA IS NO GREATER THAN 1 SQUARE MILE. THE DEPTH OF STONE COVER OVER THE CULVERT(S) SHALL BE IN ACCORDANCE WITH STANDARD PC-1.

2. AN ALTERNATIVE TEMPORARY VEHICULAR WATERCOURSE CROSSING DESIGN MAY BE USED PROVIDED IT IS SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL IN ACCORDANCE WITH ROAD AND BRIDGE SPECIFICATIONS 105.10 AND 107.02.

VDOT
ROAD AND BRIDGE STANDARDS

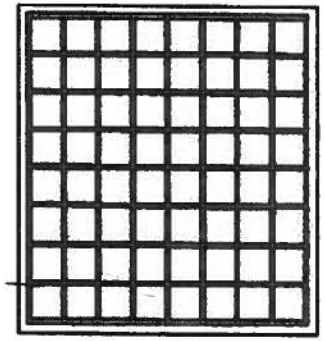
TEMPORARY VEHICULAR WATERCOURSE CROSSING

SHEET 1 OF 1	REVISION DATE
113.18	4/09

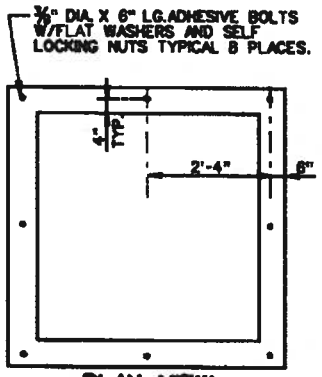
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE
302
303
414

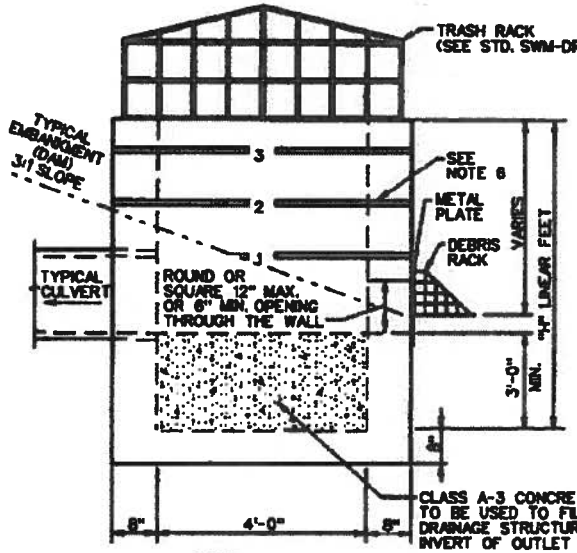
SWM-1



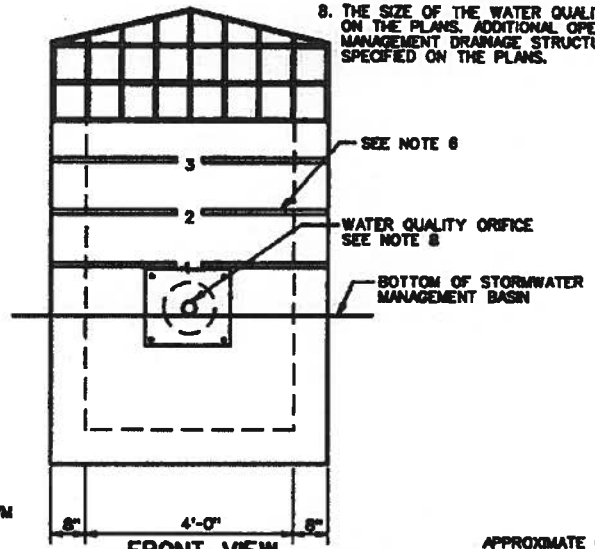
PLAN VIEW



PLAN VIEW
(TRASH RACK NOT SHOWN)



SIDE VIEW
SWM DRAINAGE STRUCTURE



FRONT VIEW
(DEBRIS RACK NOT SHOWN)

NOTES:

1. COST OF TRASH RACK AND DEBRIS RACK ARE TO BE INCLUDED IN THE BID PRICE FOR THE STORMWATER MANAGEMENT DRAINAGE STRUCTURE.
2. STRUCTURE MAY BE PRECAST OR CAST IN PLACE. SEE SHEET 2 OF 3 FOR DETAILS ON PRECAST STRUCTURE.
3. WEEP HOLES SHALL NOT BE PROVIDED.
4. STEPS ARE TO BE PROVIDED WHEN HEIGHT OF STRUCTURE IS 4'-0" OR GREATER ABOVE INVERT OF OUTLET PIPE. FOR STEP DETAILS SEE STANDARD ST-1.
5. FOR DETAILS ON METAL PLATE, DEBRIS RACK AND TRASH RACK SEE STANDARD SWM-DR.
6. MARK HEIGHT OF STRUCTURE, IN BLACK, WITH 4" HIGH NUMERALS AND 1" WIDE HORIZONTAL STRIPES AT 1' INTERVALS FROM INVERT OF WATER QUALITY ORIFICE (ALL VISIBLE SIDES).
7. THE PERMANENT STORMWATER MANAGEMENT DRAINAGE STRUCTURE, STANDARD SWM-1 MAY BE MODIFIED WHERE THE STORMWATER MANAGEMENT BASIN IS TO BE USED AS A TEMPORARY SEDIMENT BASIN DURING PROJECT CONSTRUCTION. SEE STANDARD SWM-DR, SHEET 1 OF 5, FOR TEMPORARY MODIFICATION DETAILS.
8. THE SIZE OF THE WATER QUALITY ORIFICE SHALL BE SPECIFIED ON THE PLANS. ADDITIONAL OPENINGS IN THE STORMWATER MANAGEMENT DRAINAGE STRUCTURE TO BE PROVIDED WHEN SPECIFIED ON THE PLANS.

APPROXIMATE QUANTITIES
CAST-IN-PLACE CLASS A-3 CONCRETE TO BE USED.
MAXIMUM DEPTH (H) TO BE 12'-8".

PIPE SIZE	12"	15"	18"	24"	30"	36"	42"
MINIMUM DEPTH H	5'-0"	5'-3¼"	5'-6½"	6'-1"	6'-7½"	7'-2"	7'-8½"
CU. YDS. CONCRETE	2.665	2.773	2.878	3.078	3.624	3.437	3.598

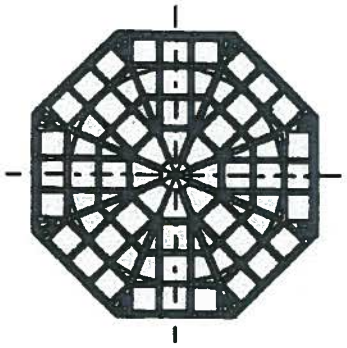
INCREMENT PER FOOT OF ADDITIONAL DEPTH "H" = 0.461 CU. YDS.

SPECIFICATION REFERENCE	CAST IN PLACE STORMWATER MANAGEMENT DRAINAGE STRUCTURE	VDOT ROAD AND BRIDGE STANDARDS
302	VIRGINIA DEPARTMENT OF TRANSPORTATION	REVISION DATE 08/10 · SHEET 1 OF 3 · 114.01

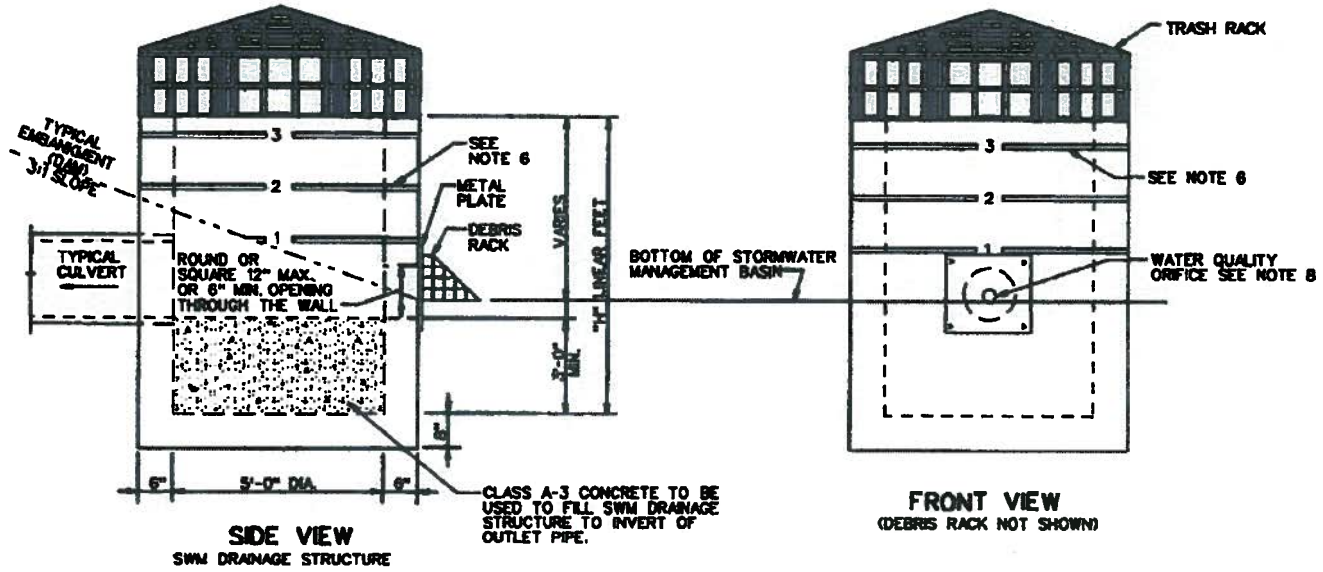
SWM-1

NOTES:

1. COST OF TRASH RACK AND DEBRIS RACK ARE TO BE INCLUDED IN THE PRICE BID FOR THE STORMWATER MANAGEMENT DRAINAGE STRUCTURE.
2. STRUCTURE MAY BE PRECAST OR CAST IN PLACE. SEE SHEET 1 OF 3 FOR DETAILS ON CAST IN PLACE STRUCTURE.
3. WEEP HOLES SHALL NOT BE PROVIDED. ANY LIFT HOLES SHALL BE PLUGGED.
4. STEPS ARE TO BE PROVIDED WHEN HEIGHT OF STRUCTURE IS 4'-0" OR GREATER ABOVE INVERT OF OUTLET PIPE. FOR STEP DETAILS SEE STANDARD ST-1.
5. SEE STANDARD SWM-DR FOR DETAILS ON PLATE, DEBRIS RACK AND TRASH RACK.
6. MARK HEIGHT OF STRUCTURE, IN BLACK, WITH 4" HIGH NUMERALS AND 1" WIDE HORIZONTAL STRIPES AT 1' INTERVALS FROM INVERT OF WATER QUALITY ORIFICE (ALL VISIBLE SIDES).
7. THE PERMANENT STORMWATER MANAGEMENT DRAINAGE STRUCTURE, STANDARD SWM-1 MAY BE MODIFIED WHERE THE STORMWATER MANAGEMENT BASIN IS TO BE USED AS A TEMPORARY SEDIMENT BASIN DURING PROJECT CONSTRUCTION. SEE STANDARD SWM-DR, SHEET 1 OF 5 FOR TEMPORARY MODIFICATION DETAILS.
8. THE SIZE OF THE WATER QUALITY ORIFICE SHALL BE SPECIFIED ON THE PLANS. ADDITIONAL OPENINGS IN THE STORMWATER MANAGEMENT DRAINAGE STRUCTURE TO BE PROVIDED WHEN SPECIFIED ON THE PLANS.



PLAN VIEW



SIDE VIEW
SWM DRAINAGE STRUCTURE

FRONT VIEW
(DEBRIS RACK NOT SHOWN)

VDOT
ROAD AND BRIDGE STANDARDS

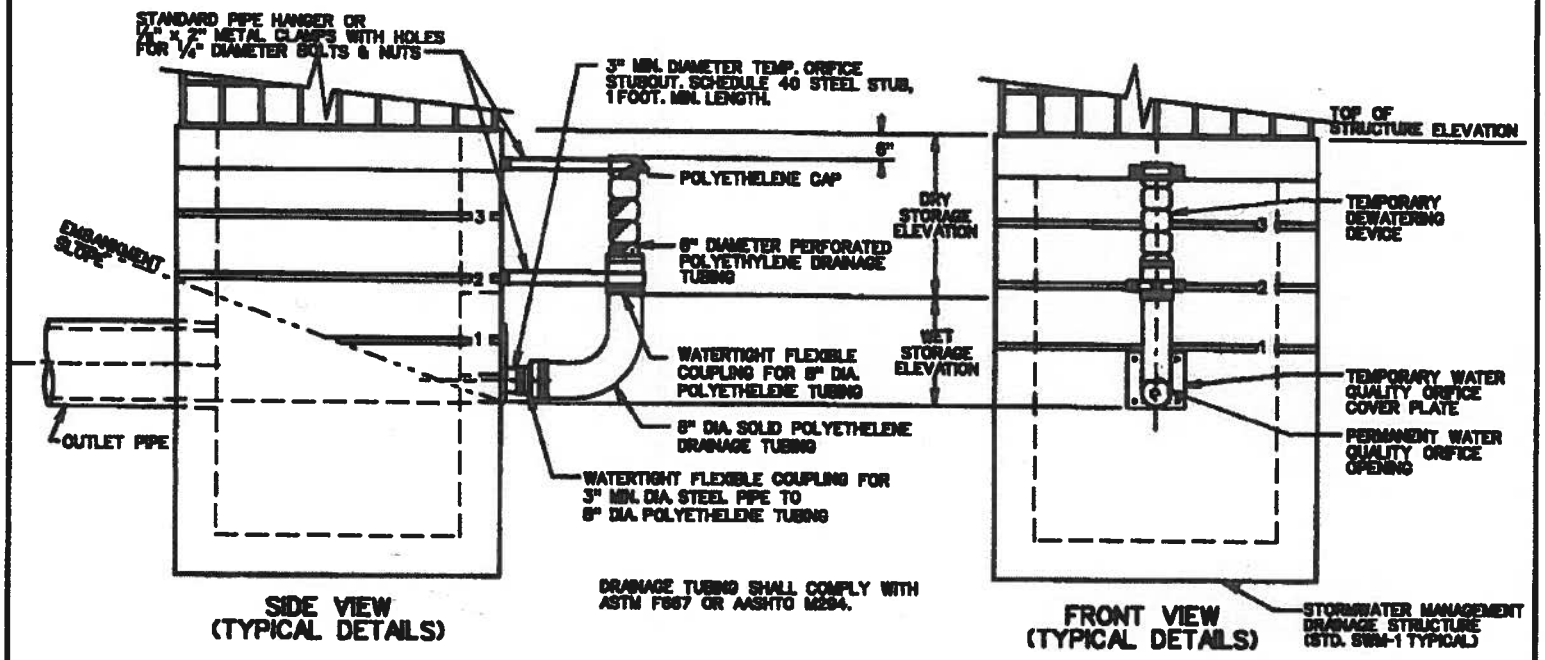
PRECAST STORMWATER MANAGEMENT DRAINAGE STRUCTURE

VIRGINIA DEPARTMENT OF TRANSPORTATION

SHEET 2 OF 3	REVISION DATE
114.02	08/10

SPECIFICATION REFERENCE
105
302

SWM-DR

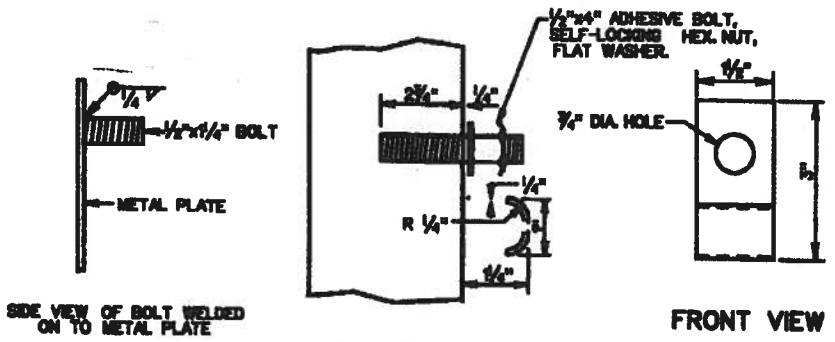


NOTES:

1. THESE DETAILS ARE TO BE USED TO MODIFY THE PERMANENT STORMWATER MANAGEMENT DRAINAGE STRUCTURE WHERE THE STORMWATER MANAGEMENT BASIN IS TO BE USED FOR A TEMPORARY SEDIMENT BASIN DURING PROJECT CONSTRUCTION.
2. GRADE STORMWATER MANAGEMENT BASIN AS SHOWN IN PLANS.
3. ALL OPENINGS (IF ANY) IN SIDE OF STRUCTURE (OTHER THAN PERMANENT WATER QUALITY ORIFICE) ARE TO BE COVERED WITH SOLID METAL PLATES WHILE THE BASIN IS BEING USED FOR SEDIMENT CONTROL.
4. DEWATERING DEVICE AND COMPONENTS AND TEMPORARY METAL PLATES (IF ANY), AS SHOWN IN THE DETAIL, ARE TO BE REMOVED AND PERMANENT STEEL PLATE WITH WATER QUALITY ORIFICE IS TO BE INSTALLED WHEN BASIN IS NO LONGER NEEDED FOR SEDIMENT CONTROL.
5. SIMILAR DEVICE MAY ALSO BE USED ON OTHER STORMWATER MANAGEMENT DRAINAGE STRUCTURES.
6. COST OF TEMPORARY DEWATERING DEVICE AND TEMPORARY METAL PLATES (IF ANY) SHALL BE INCLUDED IN THE BID PRICE FOR STORMWATER MANAGEMENT DRAINAGE STRUCTURE.
7. THE TEMPORARY 6" DIA. POLYETHELENE DRAINAGE TUBING IS TO BE SOLID FOR THE LENGTH BELOW WET STORAGE ELEVATION AND IS TO BE PERFORATED ABOVE THE WET STORAGE ELEVATION. THE COUPLING IS TO BE WATERTIGHT.

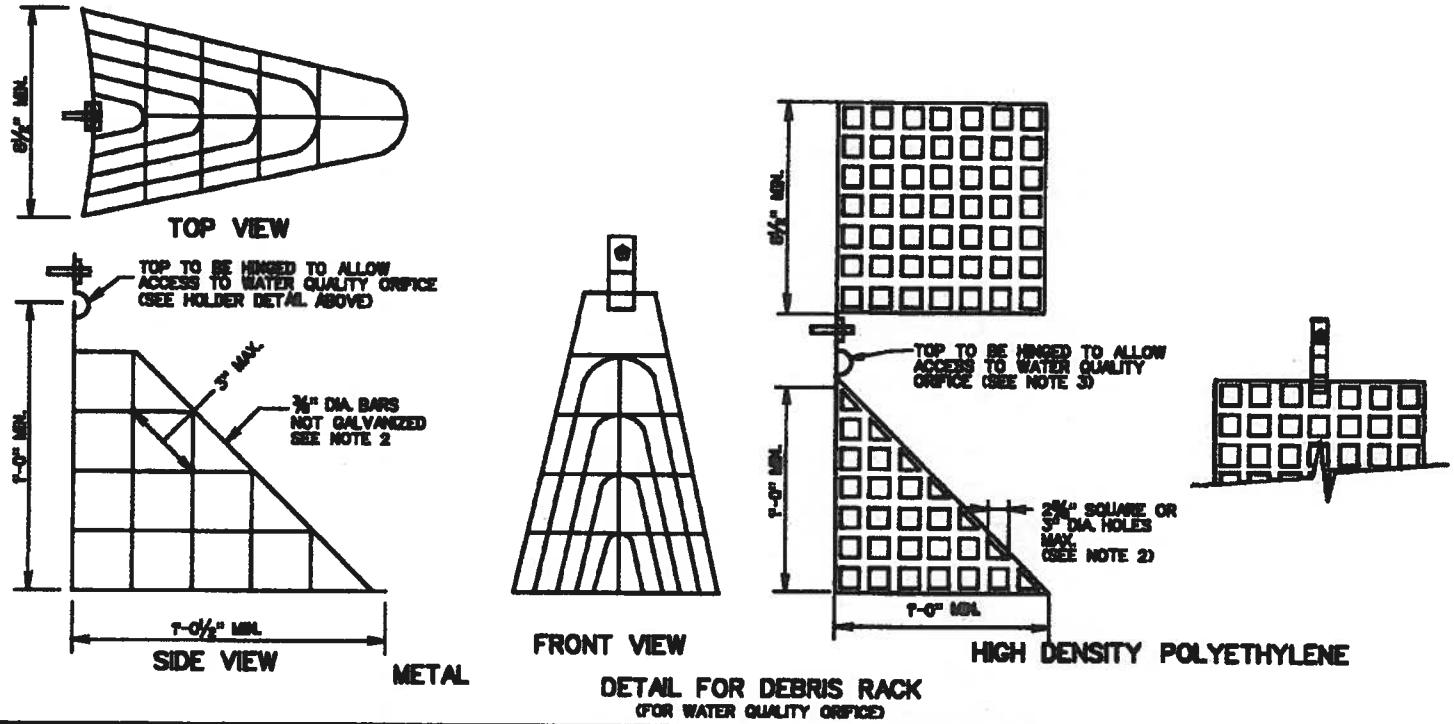
VDOT ROAD AND BRIDGE STANDARDS		STORMWATER MANAGEMENT (SWM) DETAILS	SPECIFICATION REFERENCE
SHEET 1 OF 5	REVISION DATE	VIRGINIA DEPARTMENT OF TRANSPORTATION	302
114.04			

SWM-DR



DETAIL FOR DEBRIS RACK HOLDER

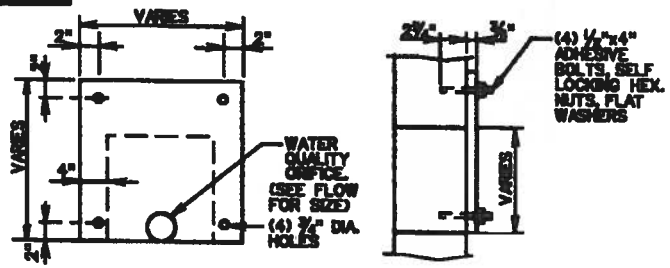
1. COST OF DEBRIS RACK, METAL PLATE, AND DEBRIS RACK HOLDER TO BE INCLUDED IN THE BID PRICE FOR THE SWM DRAINAGE STRUCTURE.
2. DEBRIS RACK MAY BE FABRICATED FROM WELDED ¾" DIAMETER BARS OR ½" THICK HIGH DENSITY POLYETHYLENE. METAL COMPONENTS OF DEBRIS RACK MUST NOT BE GALVANIZED.
3. DEBRIS RACK TO BE HINGED AS SHOWN OR CONTRACTOR MAY SUBSTITUTE A COMPARABLE DESIGN AS APPROVED BY THE ENGINEER.
4. THE LOCATION OF THE DEBRIS RACK HOLDER MAY BE ADJUSTED FOR VARIABLE CONDITIONS. WHEN HOLDER BOLT IS LOCATED ON THE METAL PLATE THE ½" DIA. BOLT LENGTH IS TO BE REDUCED ¼" LG. AND WELDED TO THE PLATE. DEBRIS RACK HOLDER AND ALL HARDWARE IS TO BE GALVINIZED.



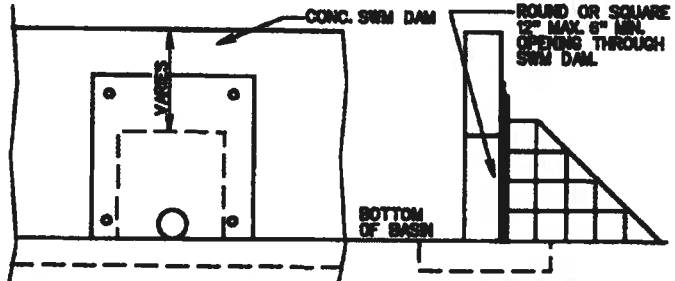
DETAIL FOR DEBRIS RACK
(FOR WATER QUALITY ORIFICE)

SPECIFICATION REFERENCE	STORMWATER MANAGEMENT (SWM) DETAILS	VDOT ROAD AND BRIDGE STANDARDS
302	DEBRIS RACK, METAL PLATE, WATER QUALITY ORIFICE, CONCRETE CRADLE (FOR SWM DRAINAGE STRUCTURES, SWM RISER PIPES AND SWM DAMS) VIRGINIA DEPARTMENT OF TRANSPORTATION	REVISION DATE: SHEET 2 OF 5 114.05

SWM-DR



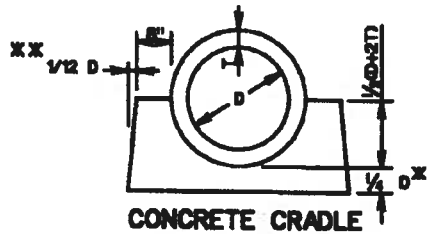
SWM DAM METAL PLATE DETAIL
(NOT GALVANIZED)



DETAIL FOR METAL PLATE AND WATER QUALITY ORIFICE

SIDE VIEW OF SWM DAM WITH DEBRIS

TYPICAL SWM DAM



CONCRETE CRADLE

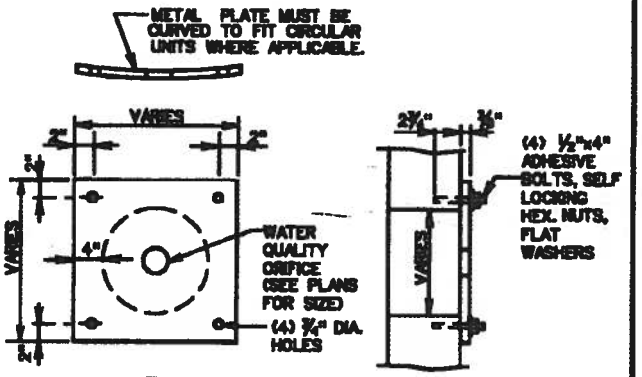
PIPE SIZE INCHES	CRADLE BOTTOM WIDTH (INCHES)	CRADLE HEIGHT (INCHES)	CRADLE TOP WIDTH (INCHES)	INCREMENT, IN CUBIC YARDS, PER LINEAR FOOT OF PIPE
12	34	14	32	0.093
15	38	15.75	35.5	0.110
18	42	17.5	39	0.129
24	50	21	46	0.186
30	58	26	53	0.233
36	66	31	60	0.307
42	74	36	67	0.390

X CONCRETE SHALL BE CLASS A3 BUT NOT LESS THAN 6"

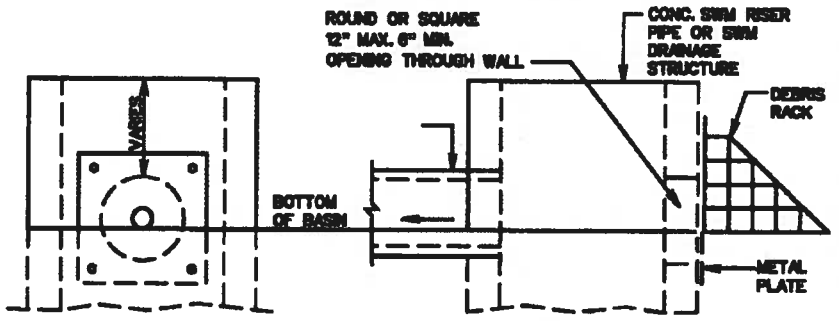
XX IF THE PIPE IS LAID IN AN EXCAVATED TRENCH, THEN THE SIDE WALLS MAY CONFORM TO THE TRENCH SHAPE OR THE TRENCH MAY BECOME THE CRADLE FORM.

CONCRETE CRADLE IS TO BE INSTALLED UNDER THE ENTIRE LENGTH OF CULVERT AT EACH STORMWATER MANAGEMENT BASIN.

CONCRETE CRADLE IS TO BE PAID FOR AS MISCELLANEOUS CONCRETE AND SUMMARIZED IN CUBIC YARDS FOR EACH PIPE LOCATION



METAL PLATE DETAIL
(NOT GALVANIZED)



DETAIL FOR METAL PLATE AND WATER QUALITY ORIFICE

SIDE VIEW WITH DEBRIS RACK

TYPICAL SWM DRAINAGE STRUCTURE

VDOT
ROAD AND BRIDGE STANDARDS

SHEET 3 OF 5

REVISION DATE

114.08

STORMWATER MANAGEMENT (SWM) DETAILS

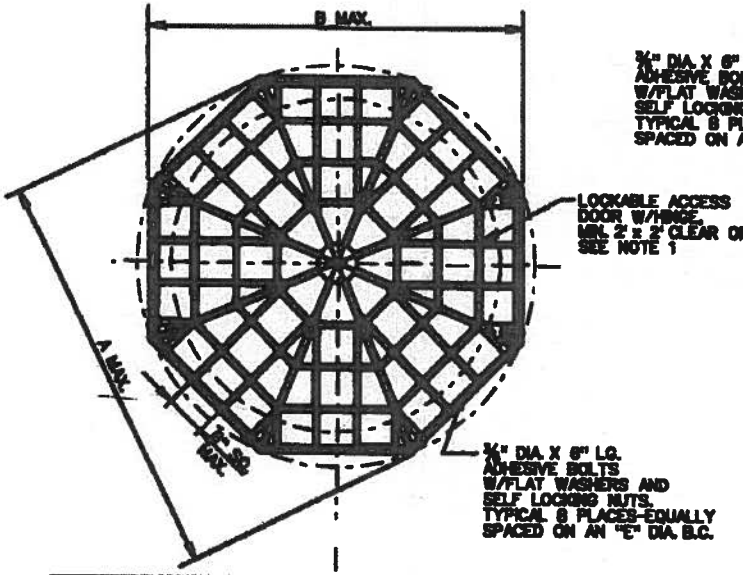
DEBRIS RACK, METAL PLATE, WATER QUALITY ORIFICE, CONCRETE CRADLE (FOR SWM DRAINAGE STRUCTURES, SWM RISER PIPES AND SWM DAMS)

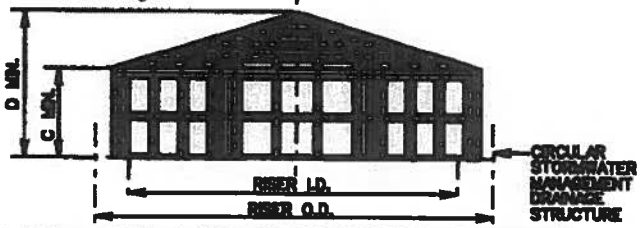
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

302

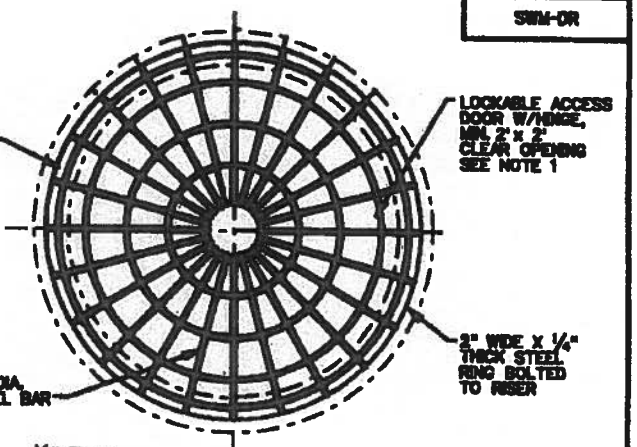
SWM-DR

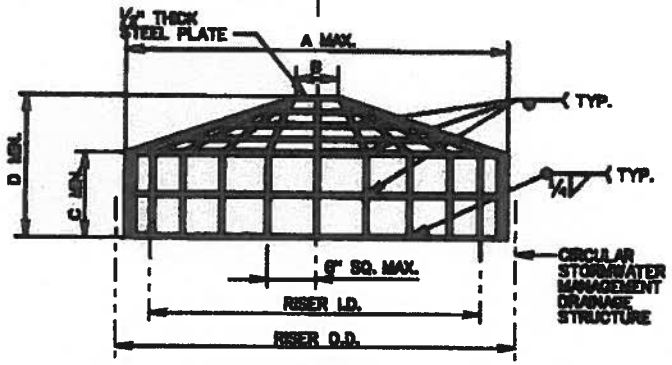




RISER		DIMENSION					APPROX.
I.D.	O.D.	A	B	C	D	E	WT. (LBS.)
24	30	31	25⅝	7	11	27	24
36	44	45	41⅛	13	19	40	58
48	58	58	54⅛	13	21	53	88
60	72	73	67⅞	17	29	66	135
72	86	87	80⅝	23	35	79	204
84	100	101	93¾	25	39	92	286
96	114	116	108¼	22	38	105	308

HIGH DENSITY POLYETHYLENE





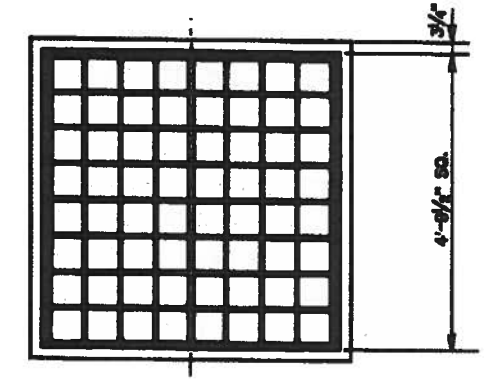
RISER		DIMENSION						APPROX.
I.D.	O.D.	A	B	C	D	E	SEGMENT	WT. (LBS.)
24	30	30	6	7	10	27	15	46
36	44	42	6	13	18	40	22	82
48	58	55	9	13	20	53	29	120
60	72	68	9	17	26	66	36	169
72	86	81	9	23	34	79	42	227
84	100	94	12	25	37	92	48	290
96	114	107	12	22	36	105	56	341

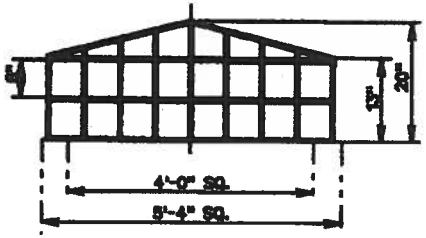
METAL

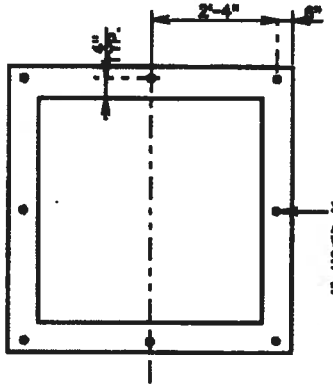
NOTES:
1. A HINGED, LOCKABLE ACCESS DOOR SHALL BE PROVIDED ON ALL TRASH RACKS IF THE TOTAL WEIGHT OF THE TRASH RACK IS GREATER THAN 75 LBS OR IF THE TRASH RACK IS TO BE PLACED ON A SWM-1 WITH AN "H" DIMENSION GREATER THAN 7'-2".
2. ANTI-VORTEX PLATE IS TO BE USED WHEN SPECIFIED ON THE PLANS. COST OF FURNISHING AND PLACING THE ANTI-VORTEX PLATE IS TO BE INCLUDED IN THE BID PRICE FOR THE STRUCTURE.

SPECIFICATION REFERENCE	STORMWATER MANAGEMENT DETAILS TRASH RACK FOR SWM DRAINAGE STRUCTURES	VDOT ROAD AND BRIDGE STANDARDS
302	VIRGINIA DEPARTMENT OF TRANSPORTATION	REVISION DATE: SHEET 4 OF 5
		114.07

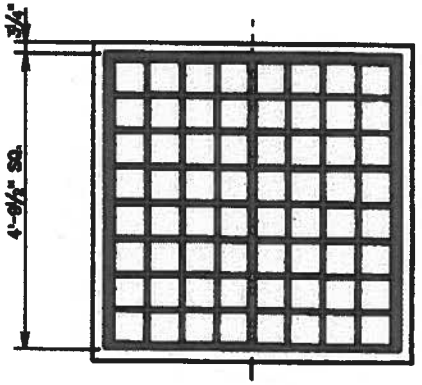
SWM-DR

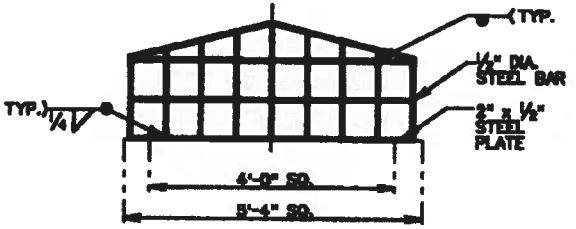






¾" DIA X 8" LG. ADHESIVE BOLTS W/FLAT WASHERS AND SELF LOCKING NUTS TYPICAL 8 PLACES-EQUALLY SPACED ON AN "E" DIA. B.C.





NOTE:
A HINGED, LOCKABLE ACCESS DOOR WITH A MINIMUM 2' x 2' CLEAR OPENING, SHALL BE PROVIDED ON ALL TRASH RACKS.

HIGH DENSITY POLYETHYLENE

APPROX. WT. (LBS.)
95

METAL (STEEL)

APPROX. WT. (LBS.)
188

VDOT
ROAD AND BRIDGE STANDARDS

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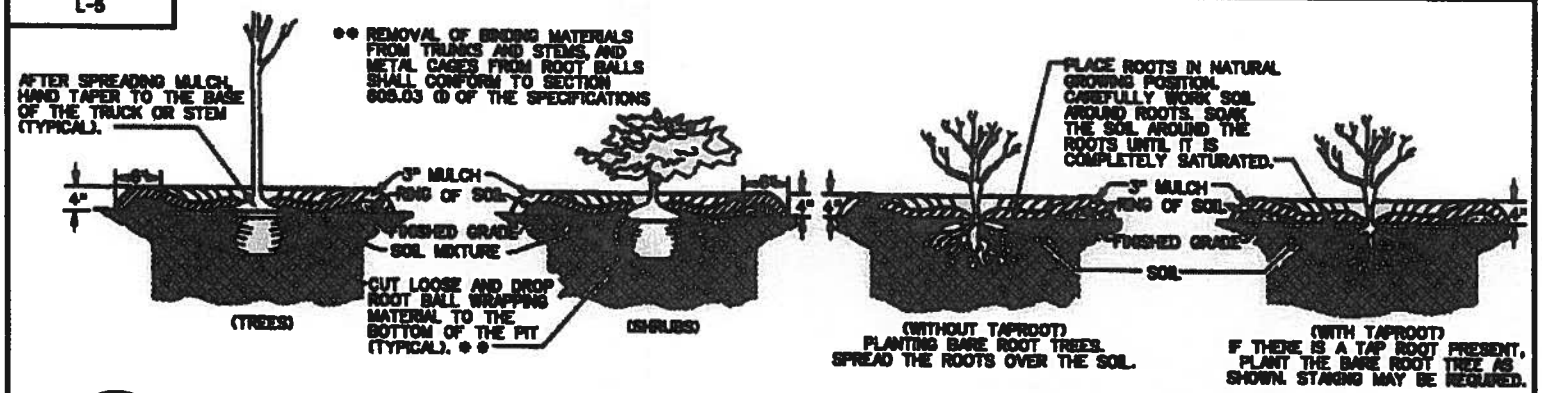
114.08	

STORMWATER MANAGEMENT DETAILS TRASH RACK FOR SWM DRAINAGE STRUCTURES

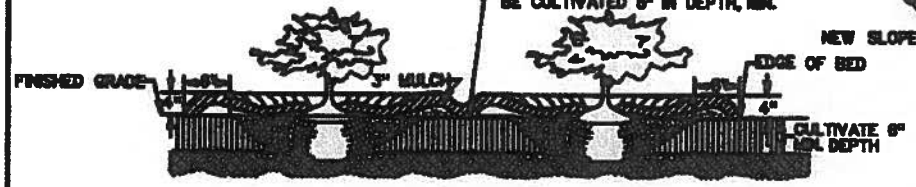
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE
302

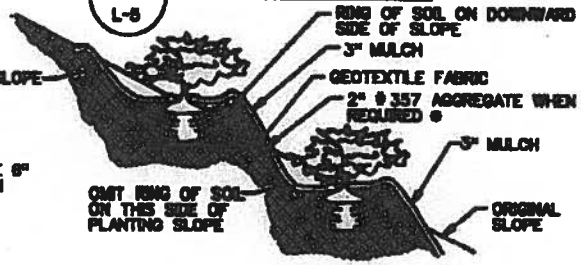
L-5



1 / L-5 BALLED & BURLAPPED, & CONTAINER PLANTS



2 / L-5 BARE ROOT PLANTS



3 / L-5 BED PLANTING

- WHEN A PORTION OF A PLANT BED EXTENDS INTO AN AREA STEEPER THAN 4:1, CULTIVATION OF THAT PORTION SHALL BE OMITTED AND THE ENTIRE AREA BETWEEN PLANTS SHALL BE MULCHED TO BLEND IN WITH THE CULTIVATED BED.
- PLANTING BEDS (CULTIVATED AND NON-CULTIVATED) SHALL BE CUT TO A MAXIMUM 4" IN HEIGHT BY MOWING, AND SHALL AFTERWARDS BE TREATED WITH HERBICIDE AS APPROVED AND DIRECTED BY THE ENGINEER AT LEAST 2 WEEKS PRIOR TO CULTIVATION, PLANTING, OR MULCHING.
- WHEN BARE ROOT PLANTS ARE USED IN BEDS, SHRUB AND ROOT PLACEMENT SHALL CONFORM TO DETAIL 2 / L-5.
- SFM FOLLOWING BED DESIGNATION STANDS FOR SQUARE FEET OF MULCH AT THE INDICATED QUANTITY.

4 / L-5 SLOPE PLANTING

- WHEN BARE ROOT PLANTS ARE USED ON SLOPE, SHRUB AND ROOT PLACEMENT SHALL CONFORM TO DETAIL 2 / L-5.
- ON SLOPES STEEPER THAN 3:1, THE FRONT CENTER OF THE PIT SHALL BE MODIFIED WHEN REQUIRED * TO INCLUDE A "V" CUT THE FULL DEPTH OF THE PIT. THE PIT SHALL BE DUG 2" DEEPER THAN SHOWN ON THE SUMMARY SHEET AND BACKFILLED WITH 2" OF #357 AGGREGATE, DAYLIGHTED TO THE SLOPE FACE AND COVERED WITH GEOTEXTILE FABRIC PRIOR TO BACKFILLING WITH SOIL MIXTURE.

* SEE NOTE FOR PIT DRAINAGE MODIFICATION FOR SLOPE PLANTING SHEET 1201.08.

GENERAL NOTES:

1. SEE LANDSCAPE SUMMARY SHEET FOR PIT SIZES.
2. ROOT BALL SHALL BE POSITIONED LEVEL WITH FINISHED GRADE. SOIL MIXTURE SHALL TAPER ONTO BUT NOT OVER TOP OF THE ROOT BALL. MULCH SHALL EXTEND AT THE PROPER DEPTH OVER THE ENTIRE ROOT BALL AND PLANTING PIT, AND SHALL BE HAND TAPERED TO THE BASE OF ALL TRUNKS AND STEMS AFTER SPREADING.
3. THIS RULE SHALL GOVERN WITH THE FOLLOWING EXCEPTIONS:
   A. SLOPE PLANTINGS - SEE SLOPE PLANTING DETAILS.
   B. INCLUSION OF PIT DRAINAGE SYSTEM - POSITION TOP OF ROOT BALL THE SAME AS FINISHED GRADE.
   C. TREE GRATE PLANTING - SEE TREE GRATE PLANTING DETAILS IN PLANS.

VDOT
ROAD AND BRIDGE STANDARDS

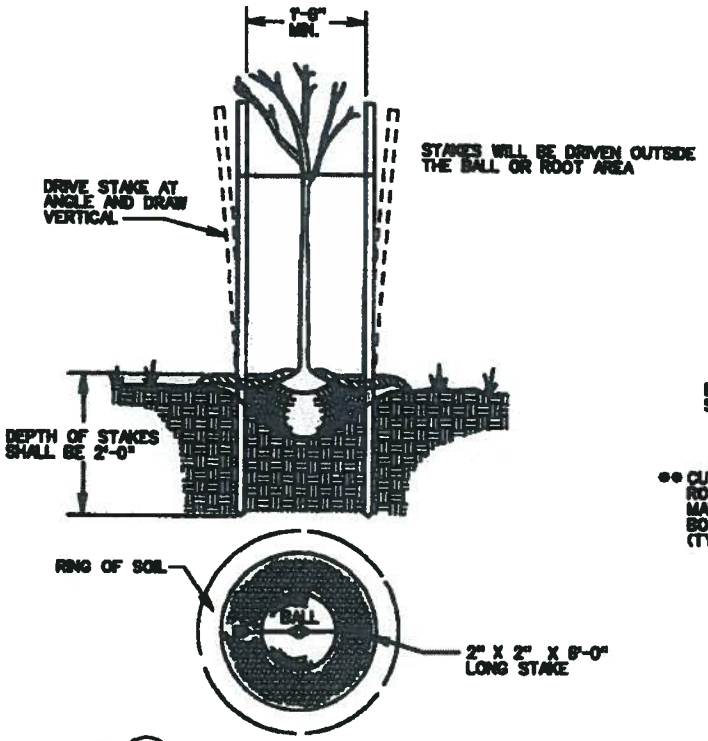
PLANTING DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

SHEET 1 OF 1	REVISION DATE
1201.04	

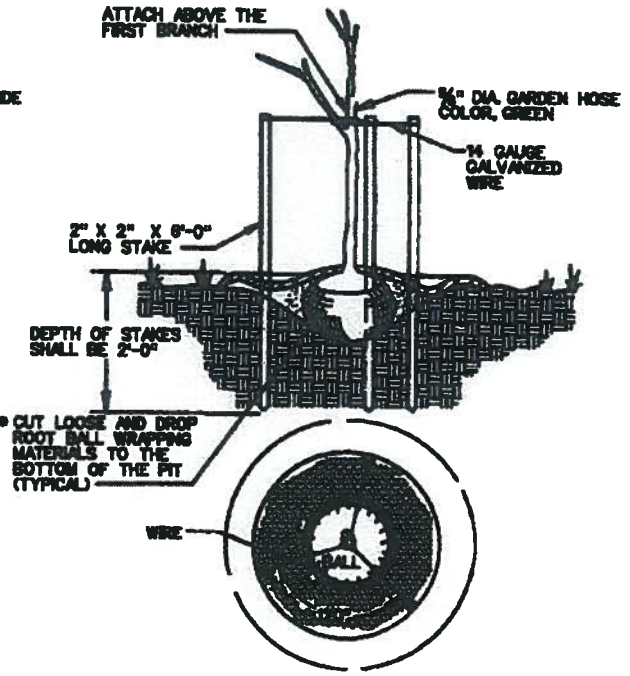
SPECIFICATION REFERENCE
603
245
203

STAKING, GUYING



(8 / L-5) **DOUBLE STAKING & STAKE PLACEMENT**

DECIDUOUS TREES LESS THAN 2" IN CALIPER
EVERGREEN TREES LESS THAN 4 FEET IN HEIGHT
SHRUBS 4 FEET OR MORE IN HEIGHT.



(8 / L-5) **TRIPLE - GUYING**

DECIDUOUS TREES 2" IN CALIPER OR GREATER
EVERGREEN TREES 4 FEET IN HEIGHT OR GREATER

GENERAL NOTES

1. ALL DECIDUOUS TREES OVER 4 FT. IN HEIGHT AND ALL EVERGREEN TREES OVER 4 FT. IN HEIGHT OR TALLER SHALL BE STAKED AND GUYED WITH 3 STAKES AS SHOWN.
2. MULTIPLE STEMMED DECIDUOUS TREES 4 FT. IN HEIGHT SHALL BE STAKED WITH 3 STAKES IN SUCH A MANNER AS TO STABILIZE 3 MAINSTEMS.
3. THE WOOD STAKES SHALL BE 2"X2"X8'-0" LONG DRESSED HARDWOOD AND DECAY RESISTANT.

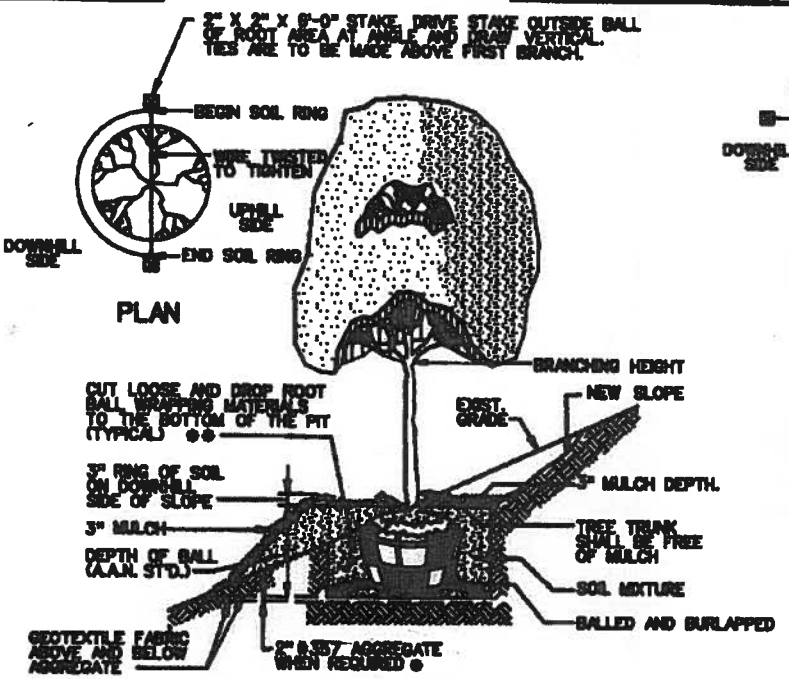
THE WIRE TIES SHALL BE 14 GAUGE GALVANIZED WIRE AND BE PROVIDED WITH A ONE FOOT PIECE OF GREEN RUBBER HOSE PLACED TO PREVENT INJURY TO THE BARK. THERE SHOULD BE A 1" - 3" SWAY IN THE TREE (THE WIRES SHOULD NOT BE PULLED TIGHT) FOR BEST ESTABLISHMENT. OTHER ANCHORING METHODS AND MATERIALS MAY BE APPROVED FOR USE BY THE ENGINEER.

●● REMOVAL OF BINDING MATERIALS FROM TRUNKS AND STEMS, AND METAL CAGES FROM ROOT BALLS SHALL CONFORM TO THE CURRENT ROAD & BRIDGE SPECS.

SPECIFICATION REFERENCE	PLANTING DETAILS	VDOT ROAD AND BRIDGE STANDARDS
605 244	VIRGINIA DEPARTMENT OF TRANSPORTATION	REVISION DATE SHEET 1 OF 1 1201.05

L-6

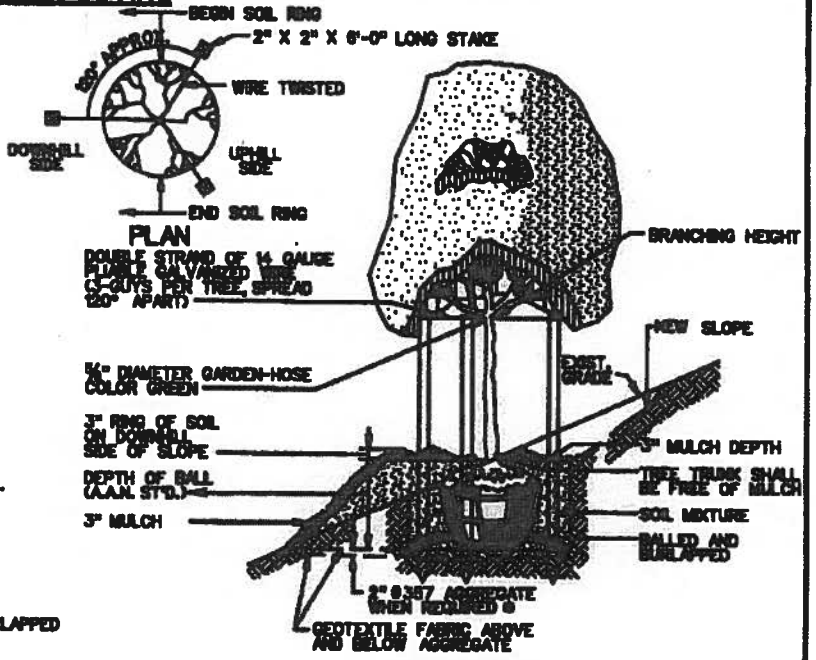
PLANTING, STAKING, GUYING



ELEVATION
DOUBLE STAKING & STAKE PLACEMENT

(8 / L-6)

DECIDUOUS TREES LESS THAN 2" IN CALIPER
EVERGREEN TREES LESS THAN 4' IN HEIGHT
AND SHRUBS 4' OR MORE IN HEIGHT



ELEVATION
TRIPLE GUYING

(9 / L-6)

DECIDUOUS TREES 2" IN CALIPER OR GREATER
EVERGREEN TREES 4' IN HEIGHT OR GREATER

GENERAL NOTES

1. ALL DECIDUOUS TREES 2" IN CALIPER OR MORE, AND ALL EVERGREEN TREES OVER 4' IN HEIGHT SHALL BE STAKED OR GUYED AS SHOWN.
2. MULTIPLE STEMMED DECIDUOUS TREES OVER 4' IN HEIGHT SHALL BE STAKED WITH 3 STAKES IN SUCH A MATTER AS TO STABILIZE 3 MAINSTEMS
3. THE WOOD STAKES SHALL BE CONSTRUCTION GRADE, ROUGH OR DRESSED, OF SOUND HARDWOOD, DECAY RESISTANT, AND OF THE SIZE INDICATED IN THE DETAILS.
4. THE WIRE TIES SHALL BE 14 GAUGE GALVANIZED WIRE OR OTHER APPROVED MATERIAL AND BE PROVIDED WITH A 1' PIECE OF GREEN RUBBER HOSE PLACED TO PREVENT INJURY TO THE BARK. THERE SHOULD BE A 1" - 2" SWAY IN THE TREE (THE WIRES SHOULD NOT BE PULLED TIGHT) FOR BEST ESTABLISHMENT. OTHER ANCHORING METHODS AND MATERIALS MAY BE APPROVED FOR USED BY THE ENGINEER.
5. ON SLOPES STEEPER THAN 3:1, THE FRONT CENTER OF THE PIT SHALL BE MODIFIED WHEN REQUIRED @ TO INCLUDE A 10' CUT THE FULL DEPTH OF THE PIT. THE PIT SHALL BE DUG 3" DEEPER THAN SHOWN IN CUT SURFACE AREA AND BACKFILLED WITH 3" OF #57 AGGREGATE (MEASURED TO THE SLOPE FACE) AND COVERED WITH GEOTEXTILE FABRIC PRIOR TO BACK- FILLING WITH SOIL MIXTURE.

* PIT DRAINAGE MODIFICATION FOR SLOPE PLANTING (WHEN REQUIRED)

** REMOVAL OF BINDING MATERIALS FROM TRUNK AND STEMS AND METAL CAGES FROM ROOT BALLS SHALL CONFORM TO SECTION 603.03 (I) OF THE SPECS.

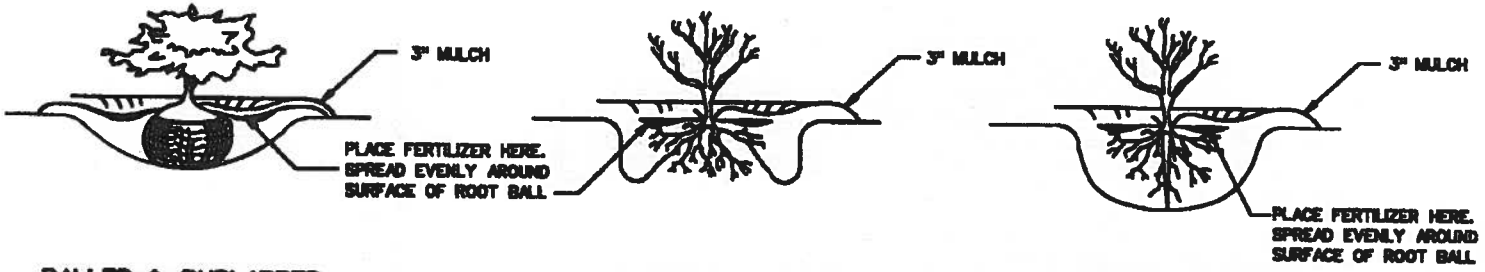
A. PRIOR TO THE PLANTING ON A SLOPE THE CONTRACTOR SHALL TEST NO MORE THAN 3 PITS FOR PERCOLATION.

B. PERCOLATION TEST SHALL CONSIST OF FILLING THE PIT WITH APPROXIMATELY 5" OF WATER. THE ENGINEER SHALL DETERMINE IF PIT DRAINAGE IS REQUIRED.

C. PAYMENT FOR AGGREGATE, GEOTEXTILE FABRIC, AND PIT MODIFICATION WILL BE MADE IN ACCORDANCE WITH THE ROAD AND BRIDGE SPECS.

VDOT ROAD AND BRIDGE STANDARDS		SLOPE PLANTING DETAILS	SPECIFICATION REFERENCE
SHEET 1 OF 1	REVISION DATE	VIRGINIA DEPARTMENT OF TRANSPORTATION	203 215 603
1201.06			

FERTILIZER PLACEMENT



BALLED & BURLAPPED & CONTAINER PLANTS

BARE ROOT PLANTS WITHOUT TAPROOT

BARE ROOT PLANTS WITH TAPROOT

FERTILIZER MATERIALS

FERTILIZER MATERIALS SHALL CONFORM TO THE SECTION 244.02 (d) OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS.

THE FOLLOWING INFORMATION SHALL BE SHOWN ON A TAG ATTACHED TO FERTILIZER BAG:

1. THE NAME AND ADDRESS OF MANUFACTURER
2. NAME OF MATERIAL
3. NUMBER OF NET POUNDS OF READY MIXED MATERIALS IN THE PACKAGE
4. CHEMICAL COMPOSITION AND ANALYSIS
5. GUARANTEED ANALYSIS (VA. DEPARTMENT OF AGRICULTURE)

MULCHING MATERIALS

BARK SHALL BE DOUBLE SHREDDED HARDWOOD BARK, DISEASE FREE, BROWN IN COLOR AND SHALL CONFORM TO THE NATIONAL BARK AND SOIL PRODUCER ASSOC. STANDARDS FOR CLASSIFICATION, PARTICLE SIZE, PERCENTAGE WOOD CONTENT, MOISTURE RETENTION AND PH RATING. OTHER MULCH MATERIAL MAY BE USED WITH APPROVAL FROM THE ENGINEER.

FERTILIZER RATES

2 OUNCES PER VINE AND GROUND COVER UP TO ONE GALLON CONTAINER.

8 OUNCES PER SHRUB BARE ROOT OR ONE GALLON CONTAINER.

16 OUNCES PER SHRUB, BALLED AND BURLAPPED OR 2 THROUGH FIVE GALLON CONTAINER.

24 OUNCES PER TREE UNDER 2" CALIPER (INCLUDES MULTI-STEMMED AND EVERGREEN TREES UNDER 8')

32 OUNCES PER TREE OVER 2" CALIPER (INCLUDES MULTI-STEMMED AND EVERGREEN TREES OVER 8' IN HEIGHT)

THE FERTILIZER SHALL BE APPLIED AS A SURFACE APPLICATION. SPREAD EVENLY OVER TOP OF THE ROOT BALL AND PLANT PIT SOIL PRIOR TO MULCHING.

FERTILIZER SHALL NOT BE MIXED WITH THE SOIL MIXTURE.

APPROVED MULCHES

TYPE	DEPTH
DOUBLE SHREDDED HARDWOOD BARK	3"

SPECIFICATION REFERENCE	FERTILIZER AND MULCH	VDOT ROAD AND BRIDGE STANDARDS
603 244	VIRGINIA DEPARTMENT OF TRANSPORTATION	REVISION DATE: SHEET 1 OF 1
		1201.07

VIRGINIA DEPARTMENT OF TRANSPORTATION

LOCATION AND DESIGN DIVISION

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: STORMWATER MANAGEMENT EROSION AND SEDIMENT CONTROL PROGRAM	NUMBER: IIM-LD-11.28
SPECIFIC SUBJECT: PROGRAM ADMINISTRATION AND MINIMUM REQUIREMENTS FOR THE DEVELOPMENT AND IMPLEMENTATION OF EROSION AND SEDIMENT CONTROL AND POST CONSTRUCTION STORMWATER MANAGEMENT PLANS	DATE: JULY 22, 2013
	SUPERSEDES: IIM-LD-11.27
APPROVAL:	B. A. Thrasher, P.E. State Location and Design Engineer Approved July 22, 2013

Changes are shaded.

CURRENT REVISION

- This memorandum has been revised in accordance with recommendations from the Virginia Department of Conservation and Recreation's annual review. On sheet 7, paragraph 4.2, the reference to a "Tributary Strategy Plan" has been deleted. On sheet 9, paragraph 5.1, "steep slopes" has been added; "silt traps" have been deleted.
- References to the Department of Conservation and Recreation (DCR) have been changed to the Department of Environmental Quality (DEQ).

EFFECTIVE DATE

- This memorandum is effective upon receipt.

BACKGROUND

- Program administration details and instructions on the development of erosion and sediment control plans for Standard, Minimum, No Plan, SAAP, Capital Outlay and State Force Construction/Maintenance Projects are contained in this IIM.

- Instructions pertaining to the design criteria and procedures for incorporating erosion and sediment control features into an erosion and sediment control plan and an example of an erosion and sediment control plan for a "No Plan" project are contained in Appendix 10B-1 and 10C-1 in Chapter 10 of the latest version of the VDOT Drainage Manual.

ACRONYMS

- The following acronyms are used within this document:

  - ACE – Area Construction Engineer
  - CA – Contract Administrator
  - CEP – Concurrent Engineering Process
  - DEQ - Department of Environmental Quality
  - DCR – Department of Conservation and Recreation
  - EPA – Environmental Protection Agency
  - ESC – Erosion and Sediment Control
  - ESCCC – Erosion and Sediment Control Contractor Certification
  - FI – Field Inspection
  - HDA – Hydraulic Design Advisory
  - IIM – Informational and Instructional Memorandum
  - PFI – Preliminary Field Inspection
  - PM – Project Manager
  - RA – Residency Administrator
  - R&B – Road and Bridge
  - RLD – Responsible Land Disturber
  - RLDA – Regulated Land Disturbance Activity
  - SLS – Straight Line Sketch
  - SWM – Stormwater Management
  - SWPPP – Stormwater Pollution Prevention Plan
  - TMDL – Total Maximum Daily Load
  - VDOT – Virginia Department of Transportation
  - VSMP – Virginia Stormwater Management Program
  - VTCA – Virginia Transportation Construction Alliance

1.0 PROGRAM ADMINISTRATION

1.1 VDOT receives an annual approval of its ESC Standards and Specifications from DEQ. By its annual approval of VDOT's ESC Standards and Specifications, DEQ authorizes VDOT to administer its ESC Program in accordance with the Approved ESC Standards and Specifications, on all regulated land disturbance activities undertaken by the Department.

1.2 VDOT's Approved ESC Standards and Specifications shall apply to all plan design, construction and maintenance activities undertaken by VDOT, either by its internal workforce or contracted to external entities, where such activities are regulated by the Virginia ESC Law and Regulations. During any inspections of VDOT land disturbing activities by DEQ, EPA and other such environmental agencies, compliance with the VDOT's Approved ESC Standards and Specifications (and all parts thereof) will be expected. A standard, specification or product not contained or referenced in VDOT's Approved ESC Standards and Specifications can not be used unless it is submitted to and approved by DEQ either as a revision to the Approved ESC Standards and Specifications or a project specific variance.

1.3 Statewide use of standards, specifications or products not contained in VDOT's DEQ Approved ESC Standards and Specifications will require a revision to the Approved ESC Standards and Specifications. Any revisions to the Approved ESC Standards and Specifications shall be reviewed and approved by DEQ prior to implementation by VDOT. Such review and approval shall be coordinated by the VDOT State Stormwater Program Administrator in the VDOT Central Office with the DEQ Regulatory Programs Manager in the DEQ Central Office Stormwater Management Division.

1.4 Where determined necessary to meet an individual project need, VDOT may request DEQ to grant a project specific variance to the Approved ESC Standards and Specifications.

1.4.1 All requests for project specific variances for those projects being designed in a VDOT District Office shall be coordinated by the District Hydraulics Engineer with the appropriate DEQ Regional Office staff. All variance requests shall be accompanied by complete details and documentation, including justification for the requested variance. Copies of any variance requests, approvals and related correspondence are to be sent to the DEQ Regulatory Programs Manager in the DEQ Central Office Stormwater Management Division and the VDOT State Stormwater Program Administrator in the VDOT Central Office. If the VDOT District Office and the DEQ Regional Office can not come to agreement on a specific request, or if additional review is necessary, the assistance of the DEQ or VDOT Central Office can be requested.

1.4.2 All requests for project specific variances for those projects being designed in the VDOT Central Office shall be coordinated by the VDOT State Hydraulics Engineer with the DEQ Regulatory Programs Manager. All variance requests shall be accompanied by complete details and documentation, including justification for the requested variance. Copies of any variance requests, approvals and related correspondence are to be sent to the VDOT State Stormwater Program Administrator.

1.4.3 All requested variances are to be considered unapproved until written approval from DEQ is received.

1.4.4 All approved variances shall be listed in Note 1 in Section II of the SWPPP General Information Sheets in the construction plans (or other such documents) for the land disturbing activity (see latest version of IIM-LD-246).

1.4.5 All documentation for and approval of requested variances shall be retained in the appropriate (i.e. design, construction, etc.) files of the proposed activity.

1.4.6 The VDOT State Stormwater Programs Administrator shall maintain a file of all requested and approved variances.

1.5 Non linear projects, such as those administered by the VDOT's Capital Outlay Program, are encouraged to utilize VDOT's Approved ESC Standards and Specifications in the development of the ESC Plan for such projects. Where deemed impractical to use VDOT's Approved ESC Standards and Specifications and when approved by the VDOT State Stormwater Program Administrator, DEQ's ESC Standards and Specifications, as outlined in the Virginia Erosion and Sediment Control Regulations and Handbook, may be utilized in combination with VDOT's Approved ESC Standards and Specifications to develop ESC Plans for non linear projects. Such projects include, but are not limited to, new and/or additions/modifications to Rest Areas, District or Residency Office complexes, Area Maintenance Headquarters/Repair Shops and buildings on the right of way or associated with bridges/piers/tunnels, spreader/tailgate/wash rack sites, holding ponds or containment pads, fuel dispensing facilities, security facilities and drainage improvements to building/parking sites and structures.

2.0 DEQ CERTIFICATIONS

2.1 The Virginia ESC Law and Regulations require that the ESC Program administration and the ESC Plan design, implementation and inspection activities be conducted by DEQ certified personnel for all Regulated Land Disturbance Activities.

2.2 VDOT's ESC Program will be administrated by a DEQ Certified Program Administrator.

2.2.1 The Program Administrator shall be the person within the Department who has been designated to have overall responsibility for administration of VDOT's ESC Program.

2.2.2 The DEQ Program Administrator Certification is acquired by satisfying the DEQ eligibility/training requirements and passing the DEQ Program Administrator Exam or by possessing a DEQ Combined Administrator Certification.

2.2.3 The State Stormwater Program Administrator in the Central Office Location and Design Division is currently designated as VDOT's ESC Program Administrator.

2.3 The Virginia ESC Regulations require that each RLDA be overseen by a DEQ certified RLD.

2.3.1 The DEQ RLD Certification is required for the VDOT person who has general oversight of the construction phase of a specific RLDA.

2.3.2 The RLD for a specific RLDA must be identified prior to beginning any land disturbance activity (see note 5 in Section I of the SWPPP General Information Sheets referenced in the latest version of IIM-LD-246).

2.3.3 The DEQ RLD Certification is acquired by passing the DEQ RLD Exam or by possessing a DEQ Combined Administrator, Program Administrator, Plan Reviewer or Inspector Certification or by possessing a Professional Engineer, Land Surveyor, Landscape Architect or Architect License pursuant to Chapter 4, Title 54.1, of the Code of Virginia.

2.4 The proposed ESC Plan for each RLDA must be reviewed and approved by a DEQ Certified ESC Plan Reviewer to ensure that the ESC Plan has been developed in accordance with VDOT's Approved ESC Standards and Specifications or variances authorized thereto.

2.4.1 The DEQ Plan Reviewer Certification is required for any person that has responsibility for reviewing and approving the proposed erosion and sediment control plan for a specific RLDA.

2.4.2 The Certified Plan Reviewer shall be a VDOT employee, or an employee of an engineering consulting firm under contract to VDOT, who has expertise in drainage design and erosion and sediment control design.

2.4.3 The DEQ Plan Reviewer Certification is acquired by satisfying the DEQ eligibility/training requirements and passing the DEQ Plan Reviewer Exam or by possessing a DEQ Combined Administrator Certification or by possessing a Professional Engineer, Land Surveyor, Landscape Architect or Architect License pursuant to Chapter 4, Title 54.1, of the Code of Virginia.

2.5 A DEQ ESC Inspector Certification is required for those persons having responsibility for ensuring the proper implementation of, or compliance with, the proposed ESC Plan and VDOT's Approved ESC Standards and Specifications, or variances authorized thereto, throughout the construction phase of the RLDA. The ESC Law and Regulations also require that inspections of ESC facilities be conducted by a DEQ certified ESC Inspector.

2.5.1 The Certified Inspector shall be a VDOT employee or an employee of an engineering consulting firm under contract to VDOT and who is so identified on the SWPPP Certification form LD-445E (see latest version of IIM-LD-246).

2.5.2 The DEQ Inspector Certification is acquired by satisfying the DEQ eligibility/training requirements and passing the DEQ Inspector Certification Exam or by possessing a DEQ Combined Administrator Certification.

2.6 It shall be the responsibility of the Project Authority to ensure that those staff with the appropriate DEQ Certifications (RLD, Plan Reviewer or Inspector) perform the functions required by the ESC Law and Regulations and noted in Sections 2.3 through 2.5 of this document.

2.6.1 For the purposes of this document, the Project Authority is defined as that person with overall responsibility of a land disturbing activity or a specific phase of a land disturbing activity.

2.6.2 The Project Authority for preconstruction (design) activities is typically the PM, Residency CA, RA or other such person responsible for the preconstruction phase of the land disturbing activity. This person shall ensure that the proposed ESC Plan has been reviewed and approved by a DEQ Certified Plan Reviewer.

2.6.3 The Project Authority for actual land disturbance (construction) activities is typically the ACE, RA or other such person responsible for the construction phase of the land disturbing activity. This person shall ensure that the RLDA has an assigned DEQ Certified RLD and that the implementation of the ESC Plan, including inspection requirements, is being overseen/conducted by a DEQ Certified Inspector.

3.0 VDOT TRAINING/CERTIFICATIONS

3.1 Where land disturbing activities occurring within VDOT right of way are regulated under the Virginia ESC Law and Regulations, Section 107.16(a) of the 2007 VDOT R&B Specifications requires that all contractors performing such land disturbing activities have a person certified by the VDOT in erosion and sediment control within the project limits. This certification requirement is mandatory for all contractors performing land disturbing activities under contracts managed by VDOT, including PPTA and Design Build agreements. For contractors performing land disturbing activities on VDOT right of way under a Land Use Permit, the certification requirements of Section 107.16(a) shall apply if the area of land disturbance within the VDOT right of way exceeds that noted in Sections 4.3 and 4.4 of this document.

EXCEPTION – Those contractors performing maintenance related land disturbing activities under a hired equipment contract whose work is directly supervised by VDOT personnel.

3.1.1 Successful completion of the Department's "Erosion and Sediment Control Contractor Certification" course satisfies the certification requirements of Section 107.16 (a) of the 2007 VDOT R&B Specifications.

3.1.2 The ESCCC is a joint training effort between the VDOT and the VTCA. The VDOT develops the course material and the VTCA administers the training, testing and issuance of certifications.

3.2 The VDOT "In Stream Maintenance Training" course is required training for all VDOT personnel performing or supervising maintenance activities, where such activities are regulated under the Virginia ESC Law and Regulations.

3.2.1 The "In Stream Maintenance Training" course is developed and administered by the VDOT's Central Office Environmental Division.

3.2.2 The "In Stream Maintenance Training" course consists of several modules that are targeted toward best management practices for working in and around streams and other environmentally sensitive areas and controlling erosion and sedimentation associated with land disturbance on maintenance activities.

3.2.3 The "In Stream Maintenance Training" course is designed to be conducted at the local level (i.e., Residency, Area Maintenance Headquarters, etc.) by the Residency Environmental Specialist or other such person. The modules can be taught individually in short group meetings or several modules can be combined and taught at a more formal training session. A web based training option is available in the VDOT University Virtual Campus.

4.0 POLICY/GENERAL GUIDELINES

4.1 Requirements of the Virginia ESC Regulations and the VDOT ESC Standards and Specifications, as approved by the DEQ and described herein, shall be incorporated into all erosion and sediment control designs and shall be enforced on all Regulated Land Disturbance Activities managed by VDOT.

4.2 When requested by DEQ, and where deemed practical by VDOT, projects located in jurisdictions with more stringent ESC technical criteria than that contained in the Virginia ESC Law and Regulations shall be designed to meet the more stringent criteria. The local criteria may be part of a locally adopted State approved program or may be part of a watershed initiative related to the protection of a water supply, a TMDL implementation plan. It will be the responsibility of the ESC Plan Designer to demonstrate, through appropriate analysis and documentation, that the local requirements are not practical for the project under consideration. Early coordination should occur between the ESC Plan Designer and the local ESC program authority in order to identify any such requirements.

4.3 Any maintenance or construction activity disturbing 2,500 square feet (232 m^2) or greater within the area of Tidewater, Virginia, as defined in the Virginia Chesapeake Bay Preservation Act, must have a project specific ESC Plan developed and implemented in accordance with the VDOT's Approved ESC Standards and Specifications. Tidewater, Virginia is defined as the Counties of Accomack, Arlington, Caroline, Charles City, Chesterfield, Essex, Fairfax, Gloucester, Hanover, Henrico, Isle of Wight, James City, King George, King and Queen, King William, Lancaster, Matthews, Middlesex, New Kent, Northampton, Northumberland, Prince George, Prince William, Richmond, Spotsylvania, Stafford, Surry, Westmoreland and York and the Cities of Alexandria, Chesapeake, Colonial Heights, Fairfax, Falls

Church, Fredericksburg, Hampton, Hopewell, Newport News, Norfolk, Petersburg, Poquoson, Portsmouth, Richmond, Suffolk, Virginia Beach and Williamsburg.

4.4 Any maintenance or construction activity disturbing 10,000 square feet (929 m^2) or greater in areas other than those within Tidewater, Virginia (as defined in Section 4.3 of this document) must have a project specific ESC Plan developed and implemented in accordance with VDOT's Approved ESC Standards and Specifications.

4.5 The Virginia ESC Law defines land disturbance as any land change which may result in soil erosion from water or wind and the movement of sediments into state waters or onto lands of the Commonwealth, including, but not limited to, clearing, grading, excavating, transporting and filling of land.

4.6 The blading/dragging/grading associated with the maintenance of the travel surface of an unpaved roadway is considered a land disturbance.

4.7 VDOT shall be responsible for ensuring compliance with its approved ESC Standards and Specifications by private entities (i.e., agents, contractors, subcontractors, consultants) conducting regulated land disturbance activities on projects managed by VDOT, including those constructed under the Public/Private Transportation Act (PPTA), the Design/Build process and the Capital Outlay Program.

4.8 When not included in the proposed ESC Plan for the RLDA, the contractor must provide an ESC Plan in accordance with Section 106 of the 2007 VDOT R&B Specifications for borrow pit sites and disposal area sites utilized exclusively to obtain or dispose of project materials. Any such ESC Plan provided by the contractor must comply with VDOT's Approved ESC Standards and Specifications. Where required, the contractor must design, construct and maintain sediment traps and/or basins at these sites. The contractor shall supply supporting calculations for sediment trap and/or basin design and calculations demonstrating compliance with the Virginia ESC Regulation MS-19 for an adequate receiving channel. All information provided by the contractor should be reviewed by the District Hydraulics Engineer or other appropriate VDOT personnel to ensure accuracy, the use of appropriate methodology and compliance with VDOT's Approved ESC Standards and Specifications, Virginia ESC Law and Regulations, and VSMP Construction Permit Conditions (where applicable).

5.0 MINIMUM REQUIREMENTS FOR ALL EROSION AND SEDIMENT CONTROL PLANS

5.1 The ESC Plan shall include a plan view depicting (using appropriate plan symbols and notes) locations where specific measures are needed in order to control erosion

and sediment deposition within the RLDA limits. Specific erosion and sediment control measures include, but are not limited to, protective linings for ditches and steep slopes, pipe outlet protection, filter barrier, silt fence, check dams, sediment traps, sediment basins, diversion berms and ditches, etc. The ESC Plan should be based on the existing field conditions at the time of design, the anticipated sequence of construction, and the site conditions expected as the RLDA is brought to final grade.

5.2 Erosion and Sediment Control Plan Information:

General information related to the ESC Plan is to be documented utilizing the notes in Section I, II and III of the SWPPP General Information Sheets (see the latest version of IIM-LD-246). Information required to complete the SWPPP notes will be developed by the ESC Plan Designer with assistance from District Hydraulics or Residency staff as needed.

5.3 Sequence of Construction
The proposed ESC Plan shall be developed in conjunction with the proposed Sequence of Construction Plan and should denote the required erosion and sediment controls for the intended sequence of major construction activities. In planning the sequence of construction, consideration should be given to elimination or minimization of the need for major erosion and sediment control facilities, such as sediment basins, by strategic planning of the construction timing and location of erosion and sediment control measures, grading operations, temporary and permanent channels and drainage facilities. Any changes to the proposed sequence of construction plan that could potentially cause a significant change to the proposed ESC or related Drainage Plan shall be submitted to the ESC Plan Designer/Hydraulics Engineer for evaluation of impacts.

5.4 Contents of ESC Plan
Details of the RLDA'S ESC Plan may be shown on, but is not limited to, the plan, profile, typical section and detail sheets of the construction plan set or other such documents. The ESC Plan shall, at a minimum, contain the following information:

5.4.1 Section I, II and III notes of the SWPPP General Information Sheets (see latest version of IIM-LD-246).

5.4.2 Limits of clearing and grading (plan view and typical section).

5.4.3 Location of temporary and permanent erosion and sediment control and related permanent stormwater management features (plan view).

5.4.4 Construction details for any temporary or permanent erosion and sediment control or related permanent stormwater management features if different from the VDOT R&B Standards and Specifications.

5.4.5 Location of any surface waters, wetland features, or other environmentally sensitive/critical areas within or immediately adjacent to the RLDA area. (Such features located within close proximity of the project, yet outside the limits of the construction plans or other such documents, shall be described in Note 6 in Section I of the SWPPP General Information Sheets (see latest version of IIM-LD-246).

5.4.6 Appropriate existing and proposed topographic features.

6.0 PLAN DEVELOPMENT PROCESS

6.1 Concurrent Engineering Process for Plan Development

The CEP for plan development incorporates the principles of teamwork, flexibility, and milestones. The development, review, and approval of the project specific erosion and sediment control plan is included in the CEP milestones as follows:

6.1.1 Scoping Stage
The ESC Plan Designer/Hydraulics Engineer shall identify any local ESC or related SWM technical criteria or watershed initiatives that may influence the ESC or related post construction SWM design of the project. This should include early coordination with the local ESC/SWM program authority to assess any potential impacts on the project design.

6.1.2 PFI/Public Hearing Stage
The ESC Plan Designer/Hydraulics Engineer shall develop preliminary ESC and associated post construction SWM Plans (see the latest version of IIM-LD-195 for information on the technical criteria and requirements for permanent SWM facilities) and show locations of all major erosion and sediment control, permanent stormwater management, and/or drainage facilities on the plans that may affect the required right of way. Members of the project team shall provide comments, as appropriate, to the ESC Plan Designer/Hydraulics Engineer regarding the preliminary plan, including any pertinent information that might affect the final design of the ESC or post construction SWM Plan.

6.1.3 FI Stage
Prior to the FI, the ESC Plan Designer/Hydraulics Engineer shall develop final ESC and associated post construction SWM plans and show final design locations, sizes, and other plan details as necessary to accurately determine the right-of-way and/or easement requirements, and to determine whether the selected ESC Plan Concept (see Section 6.5 of this document) is appropriate. The ESC and related post construction SWM Plan design shall address any comments or recommendations from the Public Hearing process as accepted/incorporated by the Project Manager (or other such project

authority). This phase of the ESC and related post construction SWM Plan design process provides all the necessary information needed to conduct a thorough Field Inspection. Members of the project team shall provide comments, as appropriate, to the ESC Plan Designer/Hydraulics Engineer regarding the proposed ESC and post construction SWM Plan.

6.1.4 ESC Plan Design Completion
After FI and prior to the Right of Way stage, the ESC Plan Designer/Hydraulics Engineer shall incorporate all changes, deletions, and/or additions into the ESC and related post construction SWM Plan resulting from any FI and/or Quality Control Review comments or plan revisions. The ESC and post construction SWM Plan shall be carefully reviewed for compliance with the approved VDOT ESC and SWM Standards and Specifications and the VSMP Construction Permit (where applicable) including, but not limited to, the types of proposed measures, means of access for maintenance, and required right of way and/or easements.

6.1.5 ESC & SWM Plan Design Certification
Prior to the Pre-Advertisement Conference (or similar project meeting), the ESC Plan Designer/Hydraulics Engineer shall have the ESC and related post construction SWM Plan reviewed by a DEQ Certified ESC Plan Reviewer. The ECS Plan Reviewer shall verify that the ESC and related post construction SWM Plan for the project is in compliance with the VDOT Approved ESC and SWM Standards and Specifications. Any comments by the Plan Reviewer shall be addressed with the ESC Plan Designer/Hydraulics Engineer. Once all comments have been reconciled, the ESC Plan Reviewer completes, signs and forwards the ESC & SWM Plan Design Certification Form (LD-445C) to the ESC Plan Designer/Hydraulics Engineer. The ESC Plan Designer/Hydraulics Engineer provides the completed LD-445C form to the Project Manager (or other such project authority) for use in the VSMP Construction Permit Application Process (see the latest version of IIM-LD-242), if applicable. A copy of the completed LD-445C form is to be retained with the other documentation for the proposed ESC Plan.

6.2 Plan Development Process for "No Plan" Projects and Special Advertisement and Award Process (SAAP) Projects

6.2.1 A "No Plan" project is defined as an assembly of letter size sketches and narratives depicting the project's location, typical cross section, estimated quantities and any other specific details necessary (i.e., ESC and/or post construction SWM plans) for the construction of the project. Any "No Plan" project that disturbs 2,500 square feet (232 m^2) or greater in Tidewater, Virginia or 10,000 square feet (929 m^2) or greater elsewhere within the State must have a project specific ESC Plan. A project developed under the "No Plan" concept is one that generally requires little or no survey, engineering or hydraulic analysis in order to produce the necessary contract documents. Any required right of way is generally acquired through donations in lieu of the purchase/condemnation process. See Appendix A of the *VDOT Road Design Manual* for additional information on the "No Plan" concept.

6.2.2 "SAAP" Projects are defined as those advertised under the Special Advertisement and Award Process. The "No Plan" concept is generally used to produce the required contract documents. "SAAP" projects generally have one or more of the following characteristics:

- They require little or no preliminary engineering.
- They are standard maintenance repair contracts (e.g., bridge, guardrail or concrete pavement repairs).
- They are standard incidental construction and/or improvement projects of limited scope.
- The work being performed involves a singular function or specialty work (e.g., bridge painting, pavement markings or pipe installation).

Any "SAAP" project that disturbs 2,500 square feet (232 m^2) or greater in Tidewater, Virginia or 10,000 square feet (929 m^2) or greater elsewhere within the State must have a project specific ESC Plan.

6.2.3 During the early stages of the preparation of the contract assembly for any "SAAP" or "No Plan" Project, the Contract Administrator (CA) (or other such project authority) should conduct a Scoping Meeting to determine what is needed on the project in order to comply with the VDOT Approved ESC and SWM Standards and Specifications. This should include filling out form LD-439 to the extent possible.

The Scoping Meeting should include the CA, the District L&D Engineer and/or Hydraulics Engineer, and the appropriate District Environmental Section personnel in order to accurately determine the project requirements.

6.2.4 The CA, with the assistance of the District Hydraulics Engineer, or other appropriately qualified personnel, shall prepare a preliminary Straight Line Sketch (SLS) in accordance with the instructions on Form LD-438.

6.2.5 Upon completion of the Preliminary SLS, the CA shall coordinate with the appropriate personnel in the District Hydraulics Section and other appropriate District/Residency sections to schedule a Field Review. The following data should be made available to all Field Review participants:

- A completed form LD-439.
- A Vicinity Map – United States Geological Survey (USGS) Topographical Map and County Road Map showing the location and limits of the proposed project.
- A SLS of the project prepared in accordance with the instructions on form LD-438, showing the project limits and the approximate location of proposed drainage items and erosion and sediment control items.

6.2.6 If during the Field Review it is found that such items as permanent stormwater management facilities, drainage improvements, temporary sediment basins or temporary sediment traps are required, the District Hydraulics Section will determine and request the necessary survey data, and provide engineering support in the development of the SLS to ensure consistency with the VDOT Approved ESC and SWM Standards and Specifications.

6.2.7 Upon completion of the design of any required permanent stormwater management facilities, drainage improvements, or sediment trapping facilities, the District Hydraulics Section will provide the CA with final comments, recommendations and plan details.

6.2.8 Final approval of the SLS:

- Upon incorporation of all the required revisions, a DEQ Certified ESC Plan Reviewer shall make a final review of the ESC and post construction SWM Plan (if applicable). Once any Plan Reviewer comments have been reconciled with the ESC Plan Designer/Hydraulics Engineer, the Plan Reviewer shall complete and sign the LD-445C Erosion and Sediment Control and Stormwater Management Certification form and forward it to the CA for use in the VSMP Construction Permit Application Process (see the latest version of IIM-LD-242), if applicable. A copy of the completed LD-445C form is to be retained with the other documentation for the proposed ESC Plan.

- The CA will incorporate the final SLS into the contract assembly.

- Thereafter, any significant change to the project that may impact the ESC, post construction SWM, or Drainage Plan will require resubmission of the revised SLS to the ESC Plan Designer and/or District Hydraulics Engineer for review and approval prior to implementation.

6.2.9 The final version of the SLS, the SWPPP General Information Sheets (See latest version of IIM-LD-246) and any Construction Notes will serve as the ESC and post construction SWM Plan for the project. During the construction phase of the project, a copy of the ESC and post construction SWM Plan (Record Set) and all other SWPPP documents shall be kept on the project site and in the project file at the appropriate District/Residency Office as documentation that all policies and procedures have been addressed with regards to the post construction SWM, ESC and SWPPP requirements of the project. During construction, any authorized changes to the proposed ESC Plan necessitated by unforeseen conditions or other circumstances shall be documented on the Record Set in accordance with Section 107.16(e) of the 2007 VDOT R&B Specifications.

6.3 Plan Development Process for State Force Construction Projects

6.3.1 State Force Construction Projects include land-disturbing activities that are performed with state force equipment and/or hired equipment.

6.3.2 Residency personnel are to contact the Residency Environmental Specialist and/or the District Hydraulics Engineer to review any State Force Construction Projects to determine if the proposed work is of a magnitude that may require drainage improvements, an ESC Plan, a post construction SWM Plan, and/or a SWPPP. If it is determined that any of these items are needed, the same procedures outlined in Section 6.2 of this document shall be followed.

6.4 Plan Development Process for Minimum Plan and Standard Plan Construction Projects

6.4.1 Minimum Plan projects are those that require a limited amount of survey information in order to perform the necessary engineering studies and to provide the information required to secure the necessary rights of way. The minimum amounts of detail needed to address environmental requirements and to construct the project are provided in a standard plan assembly format. See Appendix A of the *VDOT Road Design Manual* for additional information on the Minimum Plan concept.

6.4.2 Standard Plan Projects are those that require complete survey information in order to perform the necessary detailed engineering studies and to develop a complete and detailed construction plan assembly.

6.4.3 Projects developed under the Minimum and Standard Plan concepts must have an ESC plan and a SWPPP (see the latest version of IIM-LD-246) if they exceed the land disturbance threshold amounts noted in Sections 4.3 and 4.4 of this document. In addition, such projects may also require a post construction SWM Plan (see the latest version of IIM-LD-195 for applicability and technical criteria and requirements). These plan assemblies should be developed consistent with the steps identified under the Concurrent Engineering Plan Development process described in Section 6.3 of this document.

6.5 The ESC Plan shall be developed utilizing either a single phase or a multiple phase concept. The decision as to which concept to use in the development of the ESC Plan for each specific RLDA shall be determined by the ESC Plan Designer/Hydraulics Engineer and the Project Manager (or other such project authority) during the initial stages of plan development.

6.5.1 Single Phase ESC Plan Concept

6. 5.1.1 The Single Phase ESC Plan concept may be used on minor construction projects where all of the erosion and sediment control measures can be clearly depicted on the construction plan sheet (e.g., rural secondary project, minor urban widening project, bridge and approach project, etc.)

6.5.1.2 The ESC Plan shall address both those items requiring installation prior to the beginning of grubbing operations or the installation of major drainage structures and those items to be installed as grading operations and installation of minor drainage facilities progress. The ESC Plan shall contain or be accompanied by, at a minimum, all those items identified in Section 5.4 of this document (Contents of an ESC Plan).

6.5.1.3 In addition to standard plan symbols, supplemental notes/narratives may be used to clearly define the intent and purpose of the proposed erosion and sediment control measures and to define their sequence of installation. Some standard construction notes and symbols have been developed and are included as a part of the VDOT CADD Cell and Custom Line Style Library and the Geopak Road Plan View Labeler.

6.5.2 Multiple Phase ESC Plan Concept

6.5.2.1 The Multiple Phase ESC Plan concept shall be used on construction projects where additional plan sheet(s) are needed in order to clearly depict the erosion and sediment control measures required at the various stages of construction (e.g., rural multi-lane roadway projects, major urban roadway projects, roadway projects on new locations, roadway projects through environmentally sensitive areas, etc.).

6.5.2.2 In addition to standard plan symbols, supplemental notes/narratives may be used to clearly define the intent and purpose of the proposed erosion and sediment control measures and to define their installation sequencing. Some standard construction notes and symbols have been developed and are included as a part of the VDOT CADD Cell and Custom Line Style Library and the Geopak Road Plan View Labeler.

6.5.2.3 Projects may be developed using the Multiple Phase concept on only those portions of the project that require greater detail and clarity than that provided by the Single Phase concept (e.g., construction in environmentally sensitive areas or major waterway areas, areas where plan clutter reduces the ability to clearly show the erosion and sediment control items, and where grading operations are required prior to installation of major temporary ESC measures or permanent drainage improvements).

6.5.2.4 At a minimum, the multiple phase ESC Plan should be developed in two phases:

- Phase I for those items that need to be installed prior to the beginning of grubbing operations or the installation of major drainage structures.

- Phase II for those items that need to be installed as grading operations and installation of minor drainage facilities progress.

6.5.2.5 Projects with complex grading operations and/or sequence of construction plans may warrant additional ESC Plan Phases to clearly identify all required ESC items.

6.5.2.6 Generally, the Phase I and the Phase II plan details (including associated narratives or notes) should each be depicted on a separate plan sheet following the applicable construction plan sheet (e.g., Construction Plan Sheet 5, Profile Sheet 5A, ESC Phase I Plan Sheet 5B, ESC Phase II Plan Sheet 5C).

6.5.2.7 When found appropriate, the Phase I and Phase II plan details may be depicted on a single plan sheet following the applicable construction plan sheet (e.g., Construction Plan Sheet 5, Profile Sheet 5A, ESC Phase I & II Plan Sheet 5B).

6.5.2.8 In general, when utilizing a separate plan sheet for the Phase I and the Phase II plan details, erosion and sediment control items (including protective linings in permanent ditches and channel relocations) depicted on the Phase I Plan Sheet should not be duplicated on the Phase II Plan Sheet. Temporary erosion and sediment control items depicted on the Phase I & II Plan Sheets should not be duplicated on the Construction Plan Sheet. Permanent drainage improvements identified for completion in Phase I, such as culverts, channels, etc, should also be shown on the Phase II plan.

6.5.2.9 The ESC Phase I Plan Sheet shall, at a minimum, depict the following:

- Existing contours and appropriate existing hydraulic and topographic features as referenced in the Survey File.
- Proposed centerline, edges of pavement and construction limits.
- Permanent drainage culverts, temporary diversion channels and permanent channel relocations (including any protective linings required) involving natural drainage ways that would be constructed or installed prior to the start of grading operations.
- Temporary Sediment Basins (including grading contours, if applicable) that are to be constructed in the initial phases of the grading operations.
- Permanent stormwater management basins (including grading contours, if applicable) that will be utilized as temporary sediment basins and that are to be constructed in the initial phases of the grading operations.
- Diversion dikes, berm ditches and other perimeter ditches (including any required protective linings) that need to be installed prior to the start of grubbing or other earth moving operations.

- Temporary sediment traps, filter barriers, silt fences, rock check dams, turbidity curtains and any other perimeter controls that need to be installed prior to the start of grubbing or other earth moving operations.
- Any necessary construction notes/narratives (to include the need/location for items not typically shown on the plan view such as temporary slope drains, construction entrances, etc.).

6.5.2.10 The Phase II Plan Sheet shall, at a minimum, depict the following:

- Proposed centerline, edges of pavement and construction limits.
- Any permanent drainage culverts and channel relocations involving natural drainage ways installed under the Phase I Plan.
- Temporary sediment basins and permanent stormwater management basins installed under the Phase I Plan.
- All culverts, storm sewer pipe, drop inlets and associated drainage structures that will be installed as grading operations progress.
- All required protective ditch linings (e.g., Standard EC-2 or EC-3, concrete, riprap, etc.), paved flumes and associated structures that will be installed as grading operations progress.
- Temporary sediment traps, filter barriers, silt fences, rock check dams, drop inlet silt traps, and any other erosion and sediment control measures needed to be installed as grading operations progress.

- Any necessary construction notes/narratives (to include the need/location for items not typically shown on the plan view such as temporary slope drains, construction entrances, etc.).

6.5.2.11 The following drainage items from the Phase I and II Plan Sheets shall be depicted on the Construction Plan Sheet:

- Permanent drainage culverts, storm sewer systems, drop inlets and associated structures.
- Permanent channel relocations involving natural waterways.
- Permanent stormwater management facilities.
- Rock checkdams that will be left in place after construction to serve as a permanent stormwater management structure.

7.0 COMPUTATIONS

7.1 All computations to support the ESC and related post construction SWM Plan, and the drainage design plan, including the drainage area map, shall be developed in accordance with the instructions contained in the VDOT Drainage Manual, Hydraulic

Design Advisories, related Informational and Instructional Memoranda, and Drainage Design Memoranda, and shall be made part of the project file and the SWPPP for the land disturbance activity.

8.0 FIELD REVISIONS AND EVALUATIONS

8.1 The ESC Plan must be fully and effectively implemented throughout the entire construction phase of the project.

8.2 During the construction phase of the project, the Project Engineer the Project ESC Inspector, and the contractor shall continuously evaluate the project for areas that may require the deletion/addition/modification of the proposed erosion and sediment control measures/plan in order for the project to remain in compliance with the approved VDOT ESC Standards and Specifications, the Virginia ESC Law and Regulations, and the VSMP Construction Permit conditions (where applicable). Changes in the proposed ESC Plan may be needed due to unforeseen site conditions, contractor scheduling, changes in the proposed sequence of construction or other factors unknown at the time of the development of the proposed ESC Plan.

8.2.1 Minor changes to the proposed ESC Plan (e.g., deletion/addition/modification to non-engineered items such as filter barrier, silt fence, check dams, inlet protection, etc.) may be approved/authorized by the VDOT DEQ Certified Inspector and/or the designated RLD for the activity.

8.2.2 When changes to the proposed ESC Plan require detailed hydrologic/hydraulic engineering analysis/calculations (e.g., deletion/addition/modification to engineered items such as sediment traps, sediment basins, etc.), the Project Engineer and/or the Project ESC Inspector shall coordinate a site inspection with the District Hydraulics Engineer and/or the ESC Plan Designer/Hydraulics Engineer. The site inspection should be used to assemble detailed notes, sketches, and photographs to formally document the need for ESC Plan changes. The ESC Plan Designer and/or Hydraulics Engineer will provide the appropriate engineering analysis to document the required changes and to ensure the ESC Plan's continued compliance with the approved VDOT ESC Standards and Specifications, Virginia ESC Law and Regulations, and VSMP Construction Permit conditions (where applicable).

8.2.3 Any authorized changes to the proposed ESC Plan must be noted on a designated plan set (Record Set) which shall be retained on the project site and made available upon request (see Section 107.16(e) of the 2007 VDOT R&B Specifications).

8.3 During the construction phase of the project, the Project Engineer and/or the Project ESC Inspector will periodically, upon request, provide the ESC Plan Designer and/or Hydraulics Engineer with a detailed evaluation report that notes the success or failure of the proposed erosion and sediment control measures depicted in the construction plans (or other such documents) and/or the implementation of different measures as a result of new technologies/products. The VDOT Stormwater Program Administrator is to be provided a copy of all such reports.

9.0 MAINTENANCE

9.1 Maintenance of the erosion and sediment control items must be continually provided during the duration of the land disturbance activity.

9.2 The inspection and maintenance of all temporary and permanent erosion and sediment controls shall be conducted in accordance with Sections 107.16 and 303.03 of the 2007 VDOT R&B Specifications.

9.3 Accumulated sediment shall, at a minimum, be removed from erosion and sediment control facilities in accordance with Section 303.03 of the 2007 VDOT R&B Specifications.

10.0 STANDARD FORMS

LD-438	Guidelines for Development of Erosion and Sediment Control and Stormwater Management Plans for Projects with Straight Line Sketches
LD-439	Drainage Information Sheet
LD- 445C	Erosion and Sediment Control and Stormwater Management Plan Certification Form

For the current version of these forms, see the VDOT site at:
http://vdotforms.vdot.virginia.gov/ .

VIRGINIA DEPARTMENT OF TRANSPORTATION

LOCATION AND DESIGN DIVISION

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: POST-DEVELOPMENT STORMWATER MANAGEMENT	NUMBER: IIM-LD-195.8
SPECIFIC SUBJECT: MINIMUM REQUIREMENTS FOR THE ENGINEERING, PLAN PREPARATION AND IMPLEMENTATION OF POST-DEVELOPMENT STORMWATER MANAGEMENT PLANS	DATE: JULY 15, 2014
	SUPERSEDES: IIM-LD-195.7
APPROVAL:	B. A. Thrasher, P.E. State Location and Design Engineer Approved July 15, 2014

CURRENT REVISION

- Changes have been made throughout this IIM to reflect changes in the Virginia Stormwater Management Program Law and Regulations. Stormwater Program Advisories SWPA 12-01 thru 12-04 have been incorporated into this IIM.
- Shading has been omitted due to the number of changes in this memorandum.
- This IIM addresses the technical criteria contained in Part IIC of the VSMP Regulations which includes, for linear projects, the Performance/Technology Based criteria for water quality and MS19 for erosion and flood control in the downstream receiving channel. The technical criteria contained in Part IIB of the VSMP Regulations, which includes the Run-Off Reduction Method for water quality and Energy Balance Equation for erosion and flood control in the downstream receiving channel, will be addressed in a future guidance document.

EFFECTIVE DATE

- Unless identified otherwise within this IIM, the information contained in this IIM is effective upon receipt.

ACRONYMS

- BMP – Best Management Practice
- BSD – Better Site Design
- CBPA – Cheaspeake Bay Preservation Area
- DCR – (The) Department of Conservation and Recreation
- DEQ – (The) Department of Environmental Quality
- ESC – Erosion and Sediment Control
- EPA – (The) Environmental Protection Agency
- FEMA – Federal Emergency Management Agency
- HUC - Hydrologic Unit Code
- IIM – Instructional and Informational Memorandum
- LID – Low Impact Development
- MS – Minimum Standard
- MS4 – Municipal Separate Storm Sewer System
- PAC – Pre-Advertisement Conference
- R&B – Road and Bridge
- RFP – Request for Proposal
- R/W – Right-of-Way
- SWM – Stormwater Management
- SWCB – Soil and Water Conservation Board
- SYIP – Six Year Improvement Program
- TMDL – Total Maximum Daily Load
- SWPPP – Stormwater Pollution Prevention Plan
- VAC – Virginia Administrative Code
- VDOT – (The) Virginia Department of Transportation
- VPDES – Virginia Pollutant Discharge Elimination System
- VSMP – Virginia Stormwater Management Program
- WQV – Water Quality Volume

DEFINITIONS

- Adequate Channel – A channel that meets the technical criteria contained in Section 5.2 and 5.3 of this IIM.
- Average Land Cover Condition – A measure (in percent) of the average amount of impervious area within a watershed. For regulatory purposes, this value is assumed to be 16% statewide.
- Channel – A natural or manmade waterway (includes culverts and storm sewer systems).
- Discharge Point – The location at which stormwater and/or a pollutant leaves the project area.
- Department – The Virginia Department of Transportation.
- HUC6 - A watershed unit established in the most recent version of Virginia's 6th Order National Watershed Boundary Dataset.

- Impervious Surface or Cover - A surface composed of any material that significantly impedes or prevents natural infiltration of water into soil. Impervious surfaces include, but are not limited to, roofs, buildings, streets, parking areas, and any concrete, asphalt, or compacted gravel surface.
- Impervious Area – The area (square feet or acres) of the site composed of an impervious surface.
- Land-Disturbing Activity or Land Disturbance - A manmade change to the land surface that potentially changes its runoff characteristics including any associated clearing, grading or excavation.
- Linear Development Projects – Those land-disturbing activities linear in nature such as, but not limited to, highway construction/maintenance projects/activities, construction/maintenance of stormwater channels and stream restoration projects.
- MS4 General Permit - General Permit For Discharges Of Stormwater From Small Municipal Separate Storm Sewer Systems.
- Non-Linear Projects – Those land-disturbing activities not considered linear in nature such as, but not limited to, parking lots, rest areas and District/Residency/Area Headquarter complexes.
- Offsite – Areas located outside of the VDOT right of way, easement or property boundary.
- Onsite - Areas located inside of VDOT right of way, easement or property boundary.
- Outfall – The location where concentrated stormwater leaves the project area.
- Pre-development - Those conditions that exist prior to commencement of the proposed land-disturbing activity/project.
- Pre-development Impervious Area - The amount of impervious area within the site prior to commencement of the proposed land-disturbing activity/project.
- Pre-development Percent Impervious - The amount of pre-development impervious area within the site divided by the total area of the site times 100.
- Post-development - Those conditions that will, or are expected to, exist after completion of the proposed land-disturbing activity/project.
- Post-development Impervious Area - The amount of impervious area within the site that will or is expected to exist after completion of the proposed land-disturbing activity/project.
- Post-development Percent Impervious - The amount of post-development impervious area within the site divided by the total area of the site times 100.
- Receiving Channel – The drainage facility that receives the stormwater run-off from the proposed land-disturbing activity.
- Regulated Land Disturbance Activities – Those activities that disturb one (1) acre or greater except in those areas designated as a Chesapeake Bay Preservation Area in which case the land disturbance threshold is 2500 square feet or greater (unless the activity is specifically exempted by the VSMP Law and/or Regulations).
- Roadway Section – The traveled way and associated shoulders, ditches, sidewalks, multi-use/shared use paths, back (cut) slopes and fore (fill) slopes
- Site – The area of proposed land disturbance (e.g., the construction limits) plus any R/W acquired in support of the proposed land disturbance activity/project. Any support areas within existing or proposed VDOT R/W associated with the proposed land disturbance activity/project and identified in the pre-construction SWPPP for the proposed land disturbance activity/project shall also be considered a part of the site. Permanent easements and/or other property acquired through the R/W acquisition

process in conjunction with the proposed land disturbance activity/project may be considered a part of the site and utilized in the determination of the post-development water quality requirements provided such property will remain under the ownership/control of the VDOT and providing such property is so identified/designated on the proposed land disturbance activity/project plans and is legally encumbered for the purpose of stormwater management.

- Traveled Way – That portion of the roadway section, exclusive of shoulders, designated for vehicular use.
- Watershed – The surface area, measured in a horizontal plane, draining to a specific point in a channel, stream, river or other such watercourse. Also referred to as "Drainage Area" or "Drainage Basin".

REFERENCES

The following editions apply when referenced in this IIM:

- Virginia SWM Handbook – First Edition (1999) Volume I and II.
- Virginia ESC Handbook – Third Edition (1992).

1.0 PROGRAM BACKGROUND

1.1 Acts of the General Assembly, the SWCB and DCR in 2011 and 2012 have resulted in the issuance of revised/update Virginia Stormwater Management Program Law and Regulations and Virginia Erosion and Sediment Control Law and Regulations. The general application of the VSMP Law and Regulations to VDOT operations is addressed in this IIM. The general application of the ESC Law and Regulations to VDOT operations is addressed in the current version of IIM-LD-11.

1.2 Effective July 1, 2013, the DCR Stormwater Program was transferred to DEQ. This included the regulatory areas of ESC, post-development SWM, construction permitting, MS4 permitting and Chesapeake Bay preservation. The sections of the Virginia Administrative Code (VAC) referenced herein reflect new numbering as a result of the program transfer.

1.3 Further information regarding the various law and regulations may be obtained from DEQ at: http://www.deq.state.va.us/Programs/Water/StormwaterManagement.aspx .

2.0 PROGRAM OBJECTIVE

2.1 Post-development Stormwater Management

To inhibit the deterioration of the aquatic environment by instituting a post-development SWM program that maintains both the water quantity and quality post-development runoff characteristics, as nearly as practicable, equal to or better than pre-development runoff characteristics.

2.2 Erosion and Sediment Control

To effectively control soil erosion, sediment deposition, and post-development runoff in order to protect downstream properties from erosion and flooding, and to minimize onsite soil erosion and transportation of sediment off the project site.

3.0 PROGRAM ADMINISTRATION

3.1 VDOT requests an annual approval of its ESC and SWM Standards and Specifications from DEQ. By its annual approval of VDOT's ESC and SWM Standards and Specifications, DEQ authorizes VDOT to administer its ESC and SWM Program in accordance with the approved ESC and SWM Standards and Specifications on all regulated land disturbance activities performed by or for VDOT (see Section 21.0 of this IIM for further information on VDOT's Approved ESC and SWM Standards and Specifications).

3.2 VDOT's Approved ESC and SWM Standards and Specifications shall apply to all plan design, construction and maintenance activities administered by VDOT and performed either by its internal workforce or contracted to external entities, where such activities are regulated by the Virginia ESC and VSMP Law and Regulations. During any inspections of VDOT land-disturbing activities by DEQ, EPA and other such regulatory agencies, compliance with the VDOT's Approved ESC and SWM Standards and Specifications (and all parts thereof) will be expected.

4.0 POLICY/GENERAL GUIDELINES

4.1 The VSMP Regulations are applicable to all land-disturbing activities where one acre or greater (2,500 square feet or greater in a designated CBPA) of land is disturbed, except routine maintenance operations that are performed to maintain the original line and grade, hydraulic capacity or original construction of the project (see Section 2.5 of the current IIM-LD-242 for additional information on the exemption for routine maintenance activities).

4.2 The VSMP Regulations are applicable to all regulated land-disturbing activities, both construction and maintenance, administered by VDOT and performed either by its internal workforce or contracted to external entities, including those developed/constructed under the Public/Private Transportation Act (PPTA), the Design/Build (DB) process and the Capital Outlay Program.

4.3 For the purposes of compliance with the VSMP Regulations, the following land-disturbing activities are <u>not</u> considered VDOT projects:

1. Roadway projects occurring on non-VDOT R/W, such as subdivision streets, industrial access roads, locality funded/administered projects, etc., which are designed and constructed by other parties and which are eligible for acceptance into the state roadway system for operations and/or maintenance by VDOT after completion of construction.
   The water quality/quantity requirements for the portions of these types of projects that will be operated and/or maintained by VDOT shall comply (at a minimum) with the requirements in Part II of the VSMP Regulations (9VAC25-870-62 et. seq.).

2. Land-disturbing activities occurring within the existing R/W of VDOT owned and/or operated roadway facilities that are a part of an offsite development and which are allowed by agreement and/or the issuance of a VDOT Land Use Permit and which are designed and constructed by other parties.
   Such land-disturbing activities shall be considered a part of overall offsite development plan (i.e., common plan of development) and any SWM requirements for areas inside of VDOT R/W shall be accounted for in the SWM plan for the offsite development.
   The water quality/quantity requirements for the portions of these types of projects that will be operated and/or maintained by VDOT shall comply (at a minimum) with the requirements in Part II of the VSMP Regulations (9VAC25-870-62 et. seq.).
   The plans for the offsite development shall document how and where the SWM requirements for the land-disturbing activities occurring on areas that will be operated and/or maintained by VDOT are being accomplished. This information is to be retained in the appropriate file(s) in the applicable VDOT District or Residency Office, until such time it is no longer valid.

3. Projects involving roadways that are owned and/or operated by VDOT and which include land-disturbing activities occurring inside and/or outside of existing R/W and which are funded by VDOT transportation revenue but whose construction contracts are administered by Federal Agencies, other State Agencies or localities (County, City or Town) and which will be turned over to VDOT for operations and/or maintenance after completion of construction.
   The water quality/quantity requirements for the portions of these types of projects that will be operated and/or maintained by VDOT shall comply (at a minimum) with the requirements in Part II of the VSMP Regulations (9VAC25-870-62 et. seq.).

4.3.1 The design of BMPs to be installed by others on any VDOT R/W, and/or which will be turned over to VDOT for operation and maintenance after construction is completed, shall be subject to the review and approval by VDOT. This process should occur prior to the issuance of a Land Use Permit (where one is required). The construction of BMPs installed by others on any VDOT R/W, and/or which will be turned over to VDOT for operation and maintenance, shall be subject to the review and approval by VDOT prior to the release of the Land Use Permit surety (where applicable) or prior to VDOT's acceptance of the facility for operation and

maintenance. Design and construction information for any BMPs accepted by VDOT for operation and maintenance shall be forwarded to the District Infrastructure Manager and the District Hydraulics Engineer in order to process for inclusion in the L&D and Maintenance Divisions' BMP Databases. The appropriate section of the LD-445D form is to be used for reporting the BMP information.

4.4 Prior to the issuance of a VDOT Land Use Permit for land-disturbing activities occurring inside the R/W of VDOT owned and/or operated roadway facilities or prior to the acceptance of a roadway facility into the state roadway system for VDOT operations and/or maintenance, those activities identified in Section 4.3 of this IIM, and which occur within a designated MS4 area or within a watershed with an approved TMDL plan, shall be reviewed by the appropriate VDOT personnel (typically Central Office or District Location and Design Hydraulics staff) for compliance with the conditions of the VDOT's MS4 Permit and/or the approved TMDL plan and the requirements of the VDOT Implementation Plan for its MS4 Permit conditions. Those activities found not to comply with the conditions of VDOT's MS4 Permit, or an approved TMDL plan, or the VDOT MS4 Implementation Plan requirements, shall not be issued a Land Use Permit, nor be accepted into the state system of roadways, until such compliance is demonstrated to the satisfaction of VDOT.

4.5 The potential post-development impact of any changes to the land surface should be based on the ultimate post-development condition of the site considering a mature vegetative cover where applicable. Impacts should not be based on the temporary surface changes that occur during construction activities. The temporary surface changes occurring during construction activities are addressed by compliance with the Virginia ESC Regulations.

4.6 Milling and/or overlaying or other such rehabilitation of an existing impervious surface is not considered a land disturbance activity in determining compliance with the VSMP Regulations, but any associated shoulder or ditch grading would be considered in the calculation of the total land disturbance quantity for the proposed activity (see Section 4.1 of this IIM for the exemption for routine maintenance operations).

4.6.1 Where a project contains the milling and/or overlaying or other such rehabilitation of an existing impervious surface in conjunction with other improvements (e.g., adding additional lanes to a roadway facility), the milling and/or overlaying or other such rehabilitation of the existing impervious surface can be considered as routine maintenance and not included as a part of the construction "site" for the purposes of defining compliance with the VSMP Regulations provided that:

1. The milling and/or overlaying or other such rehabilitation of the existing impervious surface could be accomplished as a distinct and separate operation, and
2. Any rehabilitation of the existing impervious surface maintains existing horizontal and vertical alignment, and
3. The milling and/or overlaying or other such rehabilitation of the existing impervious surface is, for the most part, continuous throughout the project limits.

- Example 1 - Adding one lane to the outside of the south bound lanes of a 2 mile section of Route 81 and milling and overlaying the existing two south bound lanes within the project limits. In this case, since the milling and overlaying of the existing pavement is consistent throughout the project limits, and since it could have been done independently of the construction of the additional lane, it would be considered routine maintenance and not include as a part of the construction "site" for the purposes of defining compliance with the VSMP Regulations.

- Example 2 – Widening a two mile section of an existing two lane roadway to add another travel lane on each side of the existing pavement with the existing pavement being removed and replaced in some locations (due to minor changes in vertical alignment) throughout the project limits and milled and overlaid in other locations. Since the milling and overlaying is sporadic and not continuous throughout the project limits, its area would not be considered routine maintenance and would need to be included in the construction "site" area for the purposes of defining compliance with the VSMP Regulations.

4.7 When requested by a locality's VSMP Authority, VDOT projects located in jurisdictions that have adopted more stringent SWM technical criteria than that required by the VSMP Regulations (as identified in this IIM) shall be designed, to the largest extent practicable, to meet the locality's more stringent criteria provided such requests are received prior to the completion of the project's plans for use in the public participation phase of a project (or other such phase where no public participation process is required). The local SWM criteria may be part of a locally adopted DEQ approved SWM program or may be part of a watershed initiative related to the protection of a water supply or a TMDL implementation plan. If it is found that the more stringent local SWM requirements are not practicable for the VDOT project, it will be the responsibility of the SWM Plan Designer to provide documentation to the locality's VSMP Authority to demonstrate such. Early coordination should occur between the SWM Plan Designer and the local VSMP Authority, in order to identify any such potential requirements/requests.

5.0 TECHNICAL CRITERIA

5.1 Part II of the VSMP Regulations (9VAC25-870-40 et. seq.) provides technical criteria to address stream channel erosion, flooding and water quality.

5.1.1 Part IIB (9VAC25-870-62 et. seq.) contains the "new" technical criteria that include the Runoff Reduction methodology (for determining compliance with water quality requirements) and the Energy Balance Equation (for determining compliance with stream channel flooding and erosion requirements). Part IIB technical criteria are applicable to non-grandfathered projects (see Section 19.1 of this IIM for additional information on grandfathered projects).

5.1.2 Part IIC (9VAC25-870-93 et. seq.) contains the "old" technical criteria that include the Performance/Technology-Based methodology (for determining compliance with water quality requirements) and MS19 criteria (for determining compliance with stream channel flooding and erosion requirements). Part IIC technical criteria are applicable to grandfathered projects (see Section 19.1 of this IIM for additional information on grandfathered projects).

5.1.3 The requirements for compliance with the Part IIC technical requirements are addressed in this IIM. The requirements for compliance with the Part IIB technical requirements will be addressed in a future guidance document.

5.2 Stream Channel Erosion (Part IIC)

5.2.1 Properties and receiving waterways downstream of any land-disturbing activity shall be protected from erosion and damage due to changes in stormwater flows and hydrologic characteristics, including but not limited to, changes in runoff volume, velocity, frequency, duration, and peak flow rate.

5.2.2 Requirements for stream channel erosion control shall be governed by the Virginia ESC Regulation MS19 for an adequate receiving channel for stormwater discharges.

5.2.3 Receiving channels shall be reviewed for adequacy based upon the following criteria:

1. Natural channels shall be analyzed by the use of a post-development peak discharge from a 2-year storm to verify that stormwater will not cause erosion of the channel bed and banks, and
2. All previously constructed man-made channels shall be analyzed by the use of a post-development peak discharge from a 2-year storm to verify that the stormwater will not cause erosion of the channel bed or banks.

5.2.4 When utilizing an existing culvert or storm sewer pipe as the outfall for stormwater runoff from the project site, the receiving channel at the outlet end of the existing culvert or storm sewer pipe shall be analyzed for adequacy in accordance with Section 5.2.3 based on the type of receiving channel (natural or man-made).

5.2.5 If existing natural or previously constructed man-made receiving channels are not adequate, then one of the following measures must be implemented:

1. Improve the receiving channel to a condition where the post-development peak runoff rate from a 2-year storm will not cause erosion to the channel bed or banks or to the point where the drainage area within the channel complies with the requirements of Section 5.2.9 of this IIM, or

2. Develop a site design that will not cause the pre-development peak runoff rate from a 2-year storm to increase (i.e., post development 2 year peak discharge is equal to or less than pre-development 2 year peak discharge) when runoff discharges into a natural channel or will not cause the pre-development peak runoff rate from a 10- year storm to increase (i.e., post development 10-year peak discharge is equal to or less than pre-development 10-year peak discharge) when runoff discharges into a man-made channel, or

3. Provide a combination of channel improvements, stormwater detention or other measures to prevent downstream erosion.

5.2.6 Where determined necessary by the SWM Plan Designer or requested by DEQ, water quantity control for the 1-year storm may be required if there are existing or anticipated erosion concerns downstream of the project site. Such determination or request shall be made prior to the public participation phase of the project (or other such phase when no public participation process is required). Control of the 1-year storm requires detaining the volume of runoff from the entire drainage area and releasing that volume over a 24-hour period. See the Virginia SWM Handbook, Volume I, Page 1-23 and Volume II, Pages 5-38 thru 5-41 for additional information.

5.2.7 Pre-development conditions for both offsite and onsite areas shall be those that exist at the time when the final receiving channel analysis is performed. All land cover shall be assumed to be in "good" condition regardless of actual conditions existing at the time the analysis is performed.

5.2.8 Post-development conditions for offsite areas shall be determined the same as in Section 5.2.7 of this IIM. Post-development conditions for the on-site areas shall be determined based on the proposed project plans and any known future plans of development within the project site.

5.2.9 One Percent (1%) Rule - If it can be demonstrated that the total drainage area to the point of analysis within the receiving channel is 100 times greater than the contributing drainage area from within the project site, the receiving channel may be considered adequate, with respect to the stability (erosion) requirements, without further analysis.

5.3 Flooding (Part IIC)

5.3.1 Properties and receiving waterways downstream of any land-disturbing activity shall be protected from localized flooding due to changes in stormwater flows and hydrologic characteristics including, but not limited to, changes in runoff volume, velocity, frequency, duration, and peak flow rate.

5.3.2 For non-linear projects, the 10-year post-development peak rate of runoff from the site shall not exceed the 10-year pre-development peak rate of runoff.

5.3.3 For linear projects, requirements for downstream flooding control shall be governed by the Virginia ESC Regulation MS19 for adequate receiving channel for stormwater discharges.

5.3.3.1 Receiving channels shall be reviewed for adequacy based upon the following criteria:

1. Natural channels shall be analyzed by the use of a post-development peak discharge rate from 2-year storm to verify that stormwater will not overtop the channel banks, and

2. All previously constructed man-made channels shall be analyzed by the use of a post-development peak discharge rate from a 10-year storm to verify that the stormwater will not overtop the channel banks, and

3. Existing culvert and storm sewer systems, utilized as stormwater outfalls for the development site, shall be analyzed by the use of a post-development peak discharge rate from a 10-year frequency storm to verify that the stormwater will be contained within the pipe or storm sewer system.

5.3.3.2 When utilizing an existing culvert or storm sewer pipe as the outfall for stormwater runoff from the project site, the receiving channel at the outlet end of the existing culvert or storm sewer pipe shall be analyzed for adequacy in accordance with Section 5.3.3.1 based on the type of receiving channel (natural or man-made).

5.3.3.3 If existing natural or previously constructed man-made receiving channels or existing culvert or storm sewer pipe systems are not adequate, then one of the following measures must be implemented:

1. Improve the channel to a condition where the post-development peak runoff rate from a 10-year storm will not overtop the channel banks or to the point where the drainage area within the channel complies with the requirements of Section 5.3.3.4 of this IIM, or

2. Improve the culvert or storm sewer system to a condition where the post-development peak runoff rate from a 10-year storm is contained within the appurtenances, or

3. Develop a site design that will not cause the pre-development peak run-off rate from a 2-year storm to increase (i.e., post development 2-year peak discharge is equal to or less than pre-development 2-year peak discharge) when runoff from the site discharges into a natural channel or will not cause the pre-development peak runoff rate from a 10-year storm to increase (i.e., post development 10-year peak discharge is equal to or less than pre-development 10-year peak discharge) when runoff from the site discharges into a man-made channel or a culvert/storm sewer system, or

4. Provide a combination of channel/culvert/storm sewer system improvements, stormwater detention or other measures in order to prevent downstream flooding.

5.3.3.4 One Percent (1%) Rule - If it can be demonstrated that the total drainage area to the point of analysis within the receiving channel is 100 times greater than the contributing drainage area from within the project site, the receiving channel may be considered adequate, with respect to the flooding requirements, without further analysis.

5.3.3.5 Pre-development conditions for both the offsite and onsite areas shall be those that exist at the time when the final receiving channel analysis is performed. All land cover shall be assumed to be in good condition regardless of actual conditions existing at the time the analysis is performed.

5.3.3.6 Post-development conditions for offsite areas shall be determined the same as in Section 5.3.3.5 of this IIM. Post-development conditions for the on-site areas shall be determined based on the proposed project plans and any known future plans of development within the project site.

5.4 Water Quality Control (Part IIC)

5.4.1 Unless otherwise exempt, a water quality control plan that provides compliance with the VSMP Regulations Part IIC technical criteria shall be developed for each grandfathered VDOT land-disturbing activity exceeding the land disturbance thresholds noted in Section 4.1 of this IIM (see Section 19.1 of this IIM for additional information on grandfathered projects).

5.4.2 Compliance with the water quality criteria may be achieved by applying the performance-based criteria (recommended) or the technology-based criteria methodology. Discussion and application of each of these methodologies, as they relate to VDOT land-disturbing activities, is found in Sections 5.4.5 and 5.4.6 of this IIM. Additional discussion and application of these methodologies can be found in Volumes I and II of the Virginia SWM Handbook.

5.4.3 Evaluation of water quality requirements may be performed considering the site area at each individual stormwater discharge (outfall) point from the proposed land disturbing-activity/project or may be performed considering the site area for the entire limits of the proposed land-disturbing activity/project.

5.4.4 Where the proposed land-disturbing activity/project drains to more than one HUC6, the required pollutant load reductions shall be applied independently within each HUC6 unless reductions are proposed to be achieved under a project specific or a comprehensive SWM plan developed in accordance with Section 9VAC25-870-92 of the VSMP Regulations.

5.4.5 Performance-Based Criteria

5.4.5.1 The calculated post-development pollutant load from the site shall be compared to the calculated pre-development pollutant load from the site based upon the average land cover condition or the existing site condition as related to the site's percent impervious.

5.4.5.2 The site's percent impervious shall be determined as follows:

- For pre-development conditions - The amount of pre-development impervious area within the site divided by the total area of the site times 100.

- For post-development conditions - The amount of post-development impervious area within the site divided by the total area of the site times 100.

5.4.5.3 A BMP shall be located, designed, and maintained to achieve the target pollutant removal efficiencies specified in Table 1 for the purposes of reducing the post-development pollutant load from the site to the required level based upon the following four applicable land development situations for which the performance-based criteria apply:

1. Situation 1 consists of land-disturbing activities where the pre-development percent impervious cover of the site is less than or equal to the average land cover condition (16%) and the proposed improvements will create a total post-development percent impervious cover of the site which is less than the average land cover condition (16%).

    - Water Quality Requirement: No reduction in the post-development pollutant discharge from the site is required.

2. Situation 2 consists of land-disturbing activities where the pre-development percent impervious cover of the site is less than or equal to the average land cover condition (16%) and the proposed improvements will create a total post-development percent impervious cover of the site which is greater than the average land cover condition (16%).

    - Water Quality Requirement: The post-development pollutant discharge from the site shall not exceed the pre-development pollutant discharge from the site based on the average land cover condition (16%).

3. Situation 3 consists of land-disturbing activities where the pre-development percent impervious cover of the site is greater than the average land cover condition (16%).

- Water Quality Requirement: The post-development pollutant discharge from the site shall not exceed (a) the pre-development pollutant discharge from the site less 10% or (b) the pollutant discharge based on the average land cover condition (16%), whichever is greater.

4. Situation 4 consists of land-disturbing activities where the pre-development impervious cover of the site is served by an existing BMP that addresses water quality.

- Water Quality Requirement: The post-development pollutant discharge from the site shall not exceed the pre-development pollutant discharge from the site based on the existing percent impervious cover of the area being served by the existing BMP. The existing BMP shall be shown to have been designed and constructed in accordance with proper design standards and specifications, and to be in proper functioning condition.

5.4.6 Technology-Based Criteria

- The stormwater runoff from the impervious cover of the land-disturbing activity shall be treated by an appropriate BMP as specified in Table 1 based on the applicable post-development percent impervious cover of the site.

- When the applicable percent impervious cover of the site is less than the statewide "average land cover condition" of 16%, no water quality BMPs are required. (Exception - Where a locality has established a lower "average land cover condition" than the statewide average, the provisions of Section 4.7 of this IIM shall govern.)

5.4.6.1 The applicable post-development percent impervious cover of the site shall be as follows:

- For linear development projects:
  - "Old" criteria - The net increase in impervious area of the site (total post-development impervious area of the site minus the total pre-development impervious area of the site) divided by the total post-development area of the site times 100.
  - "New" criteria – See Section 5.4.5.2 of this IIM.

  See Section 19.3 of this IIM for applicability of "old" and "new" criteria to VDOT projects.

- For Non- Linear Projects – See Section 5.4.5.2 of this IIM.

5.4.6.2 The water quality volume for any required BMP shall be based on the total post-development impervious area draining to the BMP from within the R/W of the proposed project/activity and from within any VDOT R/W adjacent to the proposed project/activity (see Section 19.4 of this IIM for applicability of this requirement to current VDOT projects).

TABLE 1
BMP SELECTION TABLE

Water Quality BMP	Target Phosphorus Removal Efficiency	Applicable Percent Impervious Cover of Site
Vegetated filter strip	10%	16-21%
Grassed swale	15%	
Constructed wetlands	30%	22-37%
Extended detention (2xWQV)	35%	
Retention basin I (3xWQV)	40%	
Bioretention basin	50%	38-66%
Bioretention filter	50%	
Extended detention-enhanced	50%	
Retention basin II (4xWQV)	50%	
Infiltration (1xWQV)	50%	
Sand filter	65%	67-100%
Infiltratration (2xWQV)	65%	
Retention basin III (4xWQV with aquatic bench)	65%	
Manufactured BMP Systems Hydrodynamic Structures *	20%	
Manufactured BMP Systems Filtering Structures *	50%	
Filterra™ Biorention Filter System **	74%	

* See the Virginia SWM Handbook for approved systems. Other systems meeting the definition of a hydrodynamic or filtering structure must be approved by the DEQ prior to use.

** See Technical Bulletin No.6 in the Virginia SWM Handbook.

5.4.7 Alternative BMPs

5.4.7.1 BMPs included on the Virginia SWM BMP Clearing House website http://vwrrc.vt.edu/swc/ may be used with the Performance-Based water quality criteria. Unless otherwise approved by DEQ, the maximum removal efficiency allowed for the BMP will be that shown for phosphorus removal by treatment and any removal efficiency associated with phosphorus removal by runoff reduction will not be allowed.

5.4.7.2 Other alternative BMPs not included in Table 1 of this IIM or the Virginia SWM BMP Clearing House website may be allowed at the discretion and approval of DEQ.

5.4.7.3 Approval to use alternative BMPs is to be coordinated between the VDOT District or Central Office SWM Plan Designer and the DEQ Regional Stormwater Program Manager. The VDOT State Stormwater Management Program Administrator and the DEQ Central Office Director of the Office of Water Permits shall be copied on any correspondence related to a request for approval of the use of any alternative BMPs.

5.4.8 Use of LID and BSD practices are encouraged to the maximum extent practicable in order to reduce the stormwater runoff impacts of the proposed development. LID practices include, but are not limited to, the preservation/protection of riparian buffers, wetlands, steep slopes, mature trees, flood plains, woodlands and highly permeable soils. BSD practices include, but are not limited to, reduction of impervious cover, conservation of natural areas and the more effective use of pervious areas to treat stormwater runoff.

5.4.9 When the 1-year storm is detained for 24 hours (in accordance with Section 5.2.6 of this IIM) there will be no need to provide additional or separate storage for the WQV if it can be demonstrated that the WQV will be detained for approximately 24 hours.

5.4.10 Off-site Water Quality Compliance Options

5.4.10.1 Where the water quality requirements for the land development activity cannot be satisfied onsite, offsite options may be used to achieve compliance with the requirements of the VSMP Regulations.

5.4.10.2 Offsite compliance options allowed for use in meeting required phosphorus load reductions include one or more of the following:

1. Offsite controls utilized in accordance with a comprehensive SWM plan adopted pursuant to Section 4VAC25-870-69 of the VSMP regulations for the local watershed within which a project is located (e.g., a regional SWM facility).

2. A locality pollutant loading pro rata share program established pursuant to § 15.2-2243 of the Code of Virginia or similar local funding mechanism (e.g., a stream restoration fund).

3. The Nonpoint Nutrient Offset Program established pursuant to § 62.1-44.15:35 of the Code of Virginia (i.e., the purchase of phosphorus credits from a Nutrient Credit Bank).
4. Any other offsite option approved by DEQ.
5. When VDOT has additional properties located within the same HUC6 or upstream HUC6 of the land-disturbing activity or within the same watershed as determined by DEQ, SWM facilities located on those properties may be utilized to meet the required phosphorus load reductions from the land-disturbing activity.

5.4.10.3 VDOT may utilize offsite options identified in Section 5.4.10.2 of this IIM if the project meets any one of the following conditions:

1. The activity will disturb less than five acres of land (100% offsite compliance allowed).
2. The activity's post-developed phosphorus load reduction requirement is less than 10 pounds per year (100% offsite compliance allowed).
3. At least 75% of the required phosphorus load reductions can be achieved onsite (up to 25% offsite compliance allowed).
4. If at least 75% of the activity's required phosphorus load reductions cannot be achieved onsite, then the required phosphorus load reductions may be achieved, in whole or in part, through the use of offsite compliance options (up to 100% offsite compliance may be allowed) provided VDOT can demonstrate to the satisfaction of the DEQ that:
   (1) Alternative site designs have been considered that may accommodate onsite BMPs, and
   (2) Onsite BMPs have been considered in alternative site designs to the maximum extent practicable, and
   (3) Appropriate onsite BMPs will be implemented, and
   (4) Full compliance with post-development nonpoint nutrient runoff compliance requirements cannot practicably be met onsite,

5.4.10.4 Offsite options shall not be allowed:

1. Unless the selected offsite option achieves the necessary phosphorus load reductions prior to the commencement of the construction of the proposed project. Where the offsite option will be constructed as a part of the proposed VDOT project, the offsite option must be completed and functional prior to the completion of the VDOT project, or
2. In violation of local water quality-based limitations at the point of discharge that are consistent with the determinations made pursuant to a TMDL Implementation Plan, contained in a MS4 Program Plan approved by DEQ or as otherwise may be established or approved by DEQ.

5.4.11 The following information is taken from Part IIC of the VSMP Regulations and/or the Virginia SWM Handbook.

5.4.11.1 The selected BMP shall be located, designed, and maintained to perform at the target pollutant removal efficiency specified in Table 1 of this IIM. Design standards and specifications for the non-proprietary BMPs in Table 1 that meet the required target pollutant removal efficiency are available in the Virginia SWM Handbook.

5.4.11.2 Extended Detention Basins and Extended Detention Basins Enhanced require a WQV based on 1 inch of runoff from the greater of either the post-development impervious area of the site or the post-development impervious area within VDOT R/W draining to the BMP.

5.4.11.3 Extended Detention Basins and Extended Detention Basins Enhanced require a 30-hr drawdown time for the required WQV. The calculation procedure for the drawdown time and orifice sizing can be found in the Virginia SWM Handbook Volume II, Pages 5-33 through 5-38.

5.4.11.4 In order to facilitate maintenance activities, sediment forebays are to be incorporated into the design of Extended Detention Basins and Extended Detention Basins Enhanced. The volume of the forebay is to be 0.1 inch – 0.25 inches times the impervious area treated by the facility or 10% of the required detention volume. Additional information can be found in the Virginia SWM Handbook Volume I, Pages 3.04-1 through 5.

5.4.11.5 Where the overflow (emergency) spillway is incorporated as a part of the dam/embankment, it shall be stabilized utilizing rip rap, concrete or other non-erodible material.

5.4.11.6 Suggested details for the Extended Detention Basin can be found in the Virginia SWM Handbook Volume I, Pages 3.07-4 and 5. The riprap lined low flow channel through the basin is not recommended due to maintenance considerations.

5.4.11.7 Suggested details for the Extended Detention Basin Enhanced can be found in the Virginia SWM Handbook Volume I, Pages 3.07-6 and 7. The geometric shape of the facility may need to be more symmetrical than that shown in order to facilitate construction of the basin to the dimensions needed.

5.4.11.8 Non-structural practices including, but not limited to, minimization of impervious areas and curbing requirements, open space acquisition, floodplain management, and protection of wetlands may be utilized as appropriate in order to at least partially satisfy water quality requirements. Approval to use such non-structural measures is to be secured in advance from DEQ and is to be coordinated between the VDOT State Stormwater Management Program Administrator and the DEQ Central Office Director of the Office of Water Permits.

6.0 OTHER DESIGN CRITERIA / CONSIDERATIONS

6.1 The analysis to demonstrate compliance with the requirements of Section 5.2 and 5.3 of this IIM (MS19 of the Virginia ESC Regulations) shall be performed in accordance with the procedures noted in the DEQ Technical Bulletin No. 1 (Stream Channel Erosion Control Policy Guidance).

6.2 Increased volumes of sheet flow due to the proposed development that may potentially cause erosion and sedimentation on adjacent property shall be diverted to a stable outfall, an adequate channel, pipe or storm sewer system or to an appropriate SWM facility.

6.3 All onsite channels (including culverts and storm sewer systems) must be designed/verified to be adequate in accordance with Sections 5.2 and 5.3 of this IIM (MS19 of the Virginia ESC Regulations).

6.4 Impounding structures (dams) that are not covered by the Virginia Dam Safety Regulations shall be designed in accordance with Section 12.0 of this IIM and reviewed for floodplain impacts during the passage of the 100-year storm event.

6.5 Outflows from SWM facilities shall be discharged into an adequate receiving channel as defined in Section 5.2 and 5.3 of this IIM (MS19 of the Virginia ESC Regulations).

6.6 Existing swales being utilized as natural or man-made outfall conveyances for pre-development runoff will be considered as channels and, if the swale satisfactorily meets the criteria contained in Section 5.2 and 5.3 of this IIM (MS19 of the Virginia ESC Regulations) for the post-development runoff, it will be considered an adequate receiving channel.

6.7 Construction of SWM impoundment structures within a FEMA designated 100-year flood plain shall be avoided whenever possible. When this is unavoidable, a thorough review shall be made to ensure that the SWM facility will operate effectively for its intended purpose during the passage of the 10-year flood event on the flood plain. All SWM facility construction within a designated 100-year flood plain shall be in compliance with all applicable regulations under the FEMA's National Flood Insurance Program. The SWM facility shall be reviewed for any potential impacts to the 100-year flood event characteristics of the floodplain and designed for structural stability during the passage of the 100-year flood event on the flood plain.

6.8 Construction of SWM facilities within a sinkhole is prohibited. If SWM facilities are required along the periphery of a sinkhole, the design of such facilities shall comply with the guidelines in the latest IIM-LD-228 (Sinkholes) and the DEQ's Technical Bulletin No. 2 (Hydrologic Modeling and Design in Karst) and applicable sections of the Virginia SWM Handbook.

6.9 Design of any SWM facilities with permanent water features (proposed or potential) located within five (5) miles of a public use or military airport is to be reviewed and coordinated in accordance with Section A-6 of the VDOT Road Design Manual.

7.0 VDOT PARTICIPATION IN REGIONAL FACILITIES

7.1 There are many cases where it is more feasible to develop one major SWM facility to control a large watershed area rather than a number of small individual facilities controlling small drainage areas within the large watershed. The concept of regional SWM facilities is endorsed by VDOT provided that certain requirements are met.

7.1.1 Development and/or use of regional SWM facilities must be a joint undertaking by VDOT and the local governing body. The site must be part of a master SWM Plan developed and/or approved by the local VSMP Authority and/or DEQ and any agreements related to the VDOT use of these facilities must be consummated between VDOT and the local governing body. VDOT may enter into an agreement with a private individual or corporation provided the local governing body has a DEQ approved SWM program that complies with the VSMP Regulations and the proper agreements for maintenance and liability of the regional facility have been executed between the local governing body and the private individual or corporation and any such agreements are referenced in the agreement between VDOT and the private individual or corporation.

7.1.2 When VDOT agrees to the use an existing or future VDOT roadway embankment as an impounding structure for a regional facility, the roadway embankment must be designed or retrofitted appropriately for such use. The VDOT R/W line will normally be set at the inlet face of the main drainage structure. The local government would be responsible for the maintenance and liabilities outside of the VDOT R/W area and VDOT would accept the same responsibilities inside the VDOT R/W area.

7.1.3 The design of regional SWM facilities must address any mitigation needed to meet the water quality and quantity requirements of any known future VDOT projects within the contributing watershed. Regional SWM facilities located upstream of a proposed VDOT roadway shall provide sufficient mitigation for any water quality and quantity impacts of runoff from the proposed roadway project which may not pass through the proposed facility.

7.2 Any questions or concerns related to the the use of an off-site regional SWM facility to satisfy the VDOT post-development SWM requirements should be discussed between the SWM Plan Designer and the appropriate DEQ regional office prior to entering into any agreements with either private or public entities.

8.0 MULTI-USE SWM BASINS

8.1 SWM basins may function as both quantity control and quality control facilities. Some basins may only be needed for quality control.

8.2 SWM basins may be utilized as temporary sediment basins during the construction phase of the project, and if so, the design of the SWM basin will need to address this dual function. The design that is needed for a permanent SWM basin may need to be altered to provide additional temporary sediment storage volume that is in excess of the required WQV. For design purposes, the two volumes (WQV and temporary sediment storage volume) should not be added together, but rather the larger of the two should govern the basin's design.

8.2.1 The additional volume needed for temporary sediment storage may be provided by excavating the bottom of the basin lower than that required for the WQV. The basin's permanent outlet control structure can be temporarily altered to serve as the control structure for the temporary sediment basin (see Standard SWM-DR of VDOT's R&B Standards and the Virginia ESC Handbook). When the project is nearing completion, and the basin is no longer needed for temporary sediment control, the basin can be converted to satisfy the permanent SWM basin requirements by regrading (excavating and/or filling) and removing any temporary control structure appurtenances.

9.0 PLAN PREPARATION, IMPLEMENTATION AND CERTIFICATIONS

9.1 Complete (C) and Minimum (M) plan projects shall show SWM measures in the plan assembly as directed in the latest version of IIM-LD-11, the VDOT Drainage Manual and the VDOT Road Design Manual.

9.2 No-plan (N) and other types of projects (including maintenance activities) that have an abbreviated plan assembly must conform to the requirements of the VSMP Regulations and VPDES General Construction Permit where the land disturbance value exceeds the applicable land disturbance thresholds for such. For the definition of these types of projects, and the procedures for addressing the SWM plan details for such projects, see the latest version of IIM-LD-11, the VDOT Drainage Manual and the VDOT Road Design Manual.

9.3 The plan design details for BMPs shall be appropriately sealed and signed by a person registered in the Commonwealth of Virginia as a professional architect, engineer, land surveyor or landscape architect.

9.4 The review and approval of SWM plan designs shall be performed by a person certified through DEQ's SWM Plan Reviewer certification program. The form LD-445C shall be used to certify the plan review and approval process.

9.5 The inspection of SWM BMPs during their construction/installation phase shall be performed by a person certified through DEQ's SWM Inspector certification program. Inspection forms specific to the BMP(s) being constructed/installed shall be used to document the inspection process.

9.5 The certification that the BMP(s) were constructed in accordance with their plan details and that the BMP(s) have been made functional shall be performed by a person registered in the Commonwealth of Virginia as a professional architect, engineer, land surveyor or landscape architect. The form LD-445D shall be used to document this certification process.

10.0 FOUNDATION DATA FOR SWM BASINS

10.1 Foundation data (a soil boring) for the base of the dam should be requested for all SWM basins in order to determine if the native material will support the dam and prevent ponded water from seeping under the dam. An additional boring near the center of the basin should also be requested if:

1. Excavation from the basin may, potentially, be used to construct the dam, or
2. There is potential for rock to be encountered in the area of excavation, or
3. A high water table is suspected that may alter the performance of the SWM basin.

10.2 For large basins, more than one boring for the dam and one boring for the area of the basin may be needed. The number and locations of the borings are to be determined by the VDOT SWM Plan Designer/Hydraulics Engineer and/or the VDOT District Materials Engineer.

10.3 The foundation data for the SWM basin should be requested by the VDOT SWM Plan Designer/Hydraulics Engineer at the same time that the request for culvert foundation data is initiated.

11.0 RIGHT OF WAY/PERMANENT EASEMENTS

11.1 Permanent SWM facilities may be placed in fee R/W or in permanent easements.

11.1.1 It is recommended that all permanent SWM features (dams, risers, storage area etc.) be placed within fee R/W initially. Outfall ditches and similar features may initially be placed in permanent easements.

11.1.2 The final decision on R/W versus permanent easement should be made prior to the R/W (or similar) phase of the project development process based on information obtained at the Field Inspection, Design Public Hearing and/or other such plan review milestones.

11.2 VDOT will generally be amenable to the desires of the affected landowners regarding the fee R/W/permanent easement issue.

11.3 The multiple use of property for SWM facilities and other features, such as utilities, is permissible. The decision on such use must be made on a case-by-case basis.

11.4 Permanent easements and/or other properties acquired through the R/W acquisition process, and which are considered a part of the "site" in determining the post-development SWM requirements for the project, are to remain under the ownership/control of VDOT for the life of the project and such property is to be identified/designated on the plans and legally encumbered for the purpose of SWM.

12.0 DESIGN DETAILS FOR SWM BASINS

12.1 The following details are to be incorporated into the design of VDOT SWM basins in order to be in compliance with the VSMP Regulations and the Virginia SWM Handbook. These details address concerns with seepage through the dam and along the culvert due to the ponding of water in the basins for durations greater than that associated with typical culvert installations.

12.1.1 The foundation material under the dam and the material used for the embankment of the dam shall be an AASHTO Type A-4 or finer and/or meet the approval of the VDOT Materials Division. If the native material is not adequate, the foundation of the dam is to be excavated and backfilled with a minimum of 4 feet, or the amount recommended by the VDOT Materials Division. The backfill and embankment material must meet the soil classification requirements identified previously in this section or the design of the dam may incorporate a trench lined with a membrane (such as bentonite penetrated fabric or an HDPE or LDPE liner). Such designs shall be reviewed and approved by the VDOT Materials Division before use.

12.1.2 The pipe culvert under or through the dam is to be reinforced concrete pipe with rubber gaskets. The pipe and gaskets are to comply with the following VDOT Road and Bridge Specifications:

- Pipe - Section 232 (AASHTO M170)
- Gasket - Section 212 (ASTM C443)

12.1.3 A concrete cradle is to be used under the pipe through the dam in order to prevent seepage. The concrete cradle is to begin at the riser or inlet end of the pipe and extend the full length of the pipe (see Standard SWM-DR of VDOT's R&B Standards).

12.1.4 If the height of the dam is greater than 15', or if the basin includes a permanent water pool, the design of the dam is to include a homogenous embankment with seepage controls or zoned embankment, or similar design in accordance with the Virginia SWM Handbook and recommendations from the VDOT Materials Division.

12.1.5 The top width of the dam is to be 10' minimum in order to facilitate both construction and maintenance operations.

12.1.6 The side slopes of the basin should to be no steeper than 3:1 to facilitate mowing and maintenance inspections/operations.

12.1.7 The longitudinal slope along the bottom of the basin should be no greater than 2%, nor less than 0.5%.

12.1.8 The depth of the basin from the lowest bottom elevation to the primary outflow point (top of riser or invert of orifice or weir) should be no more than 3 feet in order to reduce the hazard potential. If the depth needs to be more than 3 feet, fencing (or other means to limit access) of the basin site should be considered.

12.1.9 The primary control structure (riser or weir) should be designed to operate in weir flow conditions for the full range of design flows. Where this is not possible or feasible, and the control structure will operate in orifice flow conditions at some point within the design flow range, an anti-vortex device, consistent with the design recommendations in the Virginia SWM Handbook, shall be utilized.

12.1.10 The length-to-width ratio (L:W) of the basin should be about 3:1, with the widest part of the basin at the outlet end. If the ratio is less than about 2:1, and if there is concern that the velocity of flow through the basin will be high, consideration should be given to using baffles within the basin, to reduce velocity and increase flow time through the basin.

13.0 PERIMETER CONTROLS

All SWM basins should be reviewed for the needs of fencing, barricades and no trespassing signs in accordance with the following guidelines.

13.1 Fencing

13.1.1 Fencing of SWM basins is normally not required and should not be considered for most basins due to:

1. Insignificant Hazard – For detention basins (no permanent water pool), significant ponding of water in the basin should only occur with very heavy rainfall events and the maximum ponded depth should typically be no more than about 3 feet. Ponds and lakes are almost never fenced, even though they may be located in subdivisions and have deep, permanent water pools.

2. Limits Maintenance Operations – Fencing could hinder the performance of both routine and long term maintenance operations. Fencing could become damaged during major maintenance operations and have to be repaired or replaced.

13.1.2 Fencing of SWM basins may be needed and should be considered when:

1. The basin is deep with a maximum ponded depth greater than about 3' and/or has steep internal side slopes with 2 or more sides steeper than 3:1, or
2. The basin is in close proximity to schools, playgrounds or similar areas where children may be expected to frequent, or
3. It is recommended by the VDOT Field Inspection Review Team (or other such plan reviewing group), the VDOT Residency Administrator or the City/County (where the City/County will assume maintenance responsibility).

13.1.3 Where fencing is proposed, access gate(s) of sufficient size to accommodate maintenance equipment are to be provided. Appropriate security mechanisms for the gates are to be provided to prevent/deter unauthorized entry.

13.2 Barricades - For non-fenced basins, a chain barricade (see Standard CR-1 of VDOT's R&B Standards) or gate may be needed across the vehicular entrance to prohibit non-authorized access if there is a concern with illegal dumping or other undesirable activities at the site.

13.3 Signs - "No Trespassing" signs shall be considered for use on all basins, whether fenced or unfenced, and should be recommended, as needed, by the VDOT Field Inspection Review Team or other such plan reviewing group.

14.0 MAINTENANCE

Requirements for maintenance of SWM facilities, the schedule for inspection and maintenance operations, and the identification of persons responsible for the maintenance will be addressed in the VDOT Maintenance Division's BMP Inspection Manual.

15.0 REPORTING

15.1 The VSMP MS4 and Construction Permits require the VDOT to report information to the DEQ such as the location, type, acres treated and the affected receiving waters of all SWM facilities (BMPs) installed.

15.1.1.1 A database resides on the VDOT Central Office Location & Design Division's internal web site to record the required BMP data for all VDOT owned and/or operated facilities.

15.2.1 It shall be the responsibility of the Central Office VSMP Construction Permit Coordinator to ensure that the required information is logged into the database for all post-development BMPs that are installed on VDOT maintained and/or operated roadways.

15.2.2 BMP information is to be logged into the data base when the VSMP Permit Termination Notice Form (LD-445D) is submitted with the required BMP information (see the latest version of IIM-LD-242 and IIM-LD-246).

16.0 PLAN DETAILS

16.1 Stormwater Management Drainage Structure – R&B Standard SWM-1

- To be used at all applicable locations where a riser type of control structure is desired.
- At locations where a riser type structure is desired, but a Standard SWM-1 structure will not satisfy site specific characteristics, a special design structure is to be utilized with appropriate details developed and included in the construction documents.

16.2 Stormwater Management Dam

- To be used at locations where a wall-type control structure is desired (includes modifications to standard endwalls). Normally used where shallow depths of ponding are desired/required.
- Appropriate details are to be developed and included in the construction documents for individual locations to fit site specific conditions.

16.3 Stormwater Management Details – Road and Bridge Standard "SWM-DR"

- Includes details for debris rack, trash rack, concrete cradle, water quality orifice and modifications for use of SWM facility as a temporary sediment basin.

- Specify at each SWM facility location requiring any of the noted items.

- The location and the size of the water quality orifice or any other required openings in the control structure shall be specified in the description/details for the control structure for each SWM facility.

16.4 Access

- A means of access for inspection and maintenance personnel and equipment shall be provided at each SWM facility location. The Standard PE-1 details shown in VDOT's Road and Bridge Standards should be used for vehicular entrances.

- A turnaround area is to be provided at or near the terminus of each vehicular entrance.

- An appropriate all weather surface material shall be provided for each vehicular entrance.

- See Section 13.0 of this IIM for requirements for access control.

17.0 METHOD OF MEASUREMENT – BASIS OF PAYMENT

17.1 Stormwater Management Drainage Structure – Road and Bridge Standard SWM-1 and other similar types of control structures.

- Basis of payment to be linear feet (LF) measured from invert of structure to top of concrete. Price bid includes cost of trash rack, debris rack and holder, temporary dewatering device and temporary metal plates.

17.2 Stormwater Management Dam

- Basis of payment to be cubic yards (CY) of Concrete Class A3 Miscellaneous and pounds (LBS) of Reinforcing Steel.

17.3 Concrete Cradle

- Basis of payment to be cubic yards (CY) of Concrete Class A3 Miscellaneous.

17.4 Excavation for SWM facilities will be measured and paid for as cubic yards (CY) of Stormwater Management Basin Excavation.

17.5 Fill material needed for dams or berms will be measured and paid for as cubic yards of Regular Excavation, Borrow Excavation or Embankment, as appropriate.

17.6 The Grading Diagram and/or the Grading Summary is to reflect how the cubic yards of Stormwater Management Basin Excavation and cubic yards of Embankment or Borrow, if needed, are to be distributed.

18.0 STORMWATER MANAGEMENT SUMMARY

18.1 All drainage items related to the construction of SWM facilities shall be summarized, by location, in the Drainage Summary for the project.

18.2 All incidental items related to the construction of SWM facilities shall be summarized, by location, in the Incidental Summary for the project.

18.3 Stormwater Management Excavation and Borrow or Embankment, if needed, are to be included in the totals on the Grading Diagram and/or Summary.

19.0 SPECIAL CONSIDERATIONS

19.1 GRANDFATHERING

19.1.1 For those land disturbance activities regulated under of the VSMP Regulations, Part II of the regulations (9VAC25-870-40 et. seq) contains both the "new" technical criteria (Part IIB) and the "old" technical criteria (Part IIC) for water quality and stream channel erosion and flood protection (water quantity) requirements (see Section 5.0 of this IIM for information on the old and new technical criteria).

19.1.2 Section 9VAC 25-870-48 in Part II of the VSMP Regulations provides provisions for locality, state and federal projects to be grandfathered under the "old" technical criteria provided certain conditions are met. For the purposes of grandfathering, projects are defined as activities (construction or maintenance) with defined limits and designated PE, RW and/or Construction accounts. Location studies, coordinator studies and other such studies and lump fund accounts are not considered projects and are not eligible for consideration under the grandfathering provisions.

19.1.3 For a VDOT project/activity to be grandfathered it must fit into one of the following two categories:

1. Project specific bonds must have been issued prior to July 1, 2012. Projects/activities meeting this requirement may be grandfathered indefinitely and can use the "old" technical criteria (VSMP Regulations - Part IIC – 9VAC25-870-93 et. seq.) to satisfy VSMP compliance requirements for water quantity and quality.

2. Funding (PE, RW or Construction) must have been allocated to the project/activity prior to July 1, 2012 (i.e., allocation in SYIP in FY13 or prior) and construction activity on the project must physically begin prior to July 1, 2019 (beginning the installation of erosion and sediment perimeter controls will be considered beginning the construction activity).

   Projects/activities meeting these requirements may be grandfathered and can use the "old" technical criteria (VSMP Regulations- Part IIC - 9VAC25-870-93 et. seq.) to satisfy VSMP compliance requirements for water quantity and quality.

   Note: Grandfathered projects may use the "new" technical criteria (VSMP Regulations- Part IIB - 9VAC25-870-62 et. seq.). However, in doing so, the design details and efficiency of the BMPs must be in accordance with the information on DEQ's BMP Clearing House Website.

19.1.4 For Design/Bid/Build (D/B/B) projects, the beginning of construction activity (as defined in Section 19.1.3 of this IIM) typically occurs within five to six months after advertisement; therefore, those D/B/B projects with an advertisement date of January 1, 2019 or after should not be considered a candidate for grandfathering.

19.1.5 For Design/Build (D/B) projects, beginning of construction activity (as defined in Section 19.1.3 of this IIM) typically occurs within 18 months following issuance on a Request for Proposal (RFP); therefore, those D/B projects with an RFP issuance date of January 1, 2018 or after should not be considered a candidate for grandfathering.

19.1.6 The construction schedule for projects/activities being considered for grandfathering and the use of the "old" technical criteria (VSMP Regulations – Part IIC - 9VAC25-870-93 et. seq.) should be carefully evaluated to make certain that the beginning of construction (as defined Section 19.1.3 of this IIM) can/will occur prior to July 1, 2019, as there will be no exceptions granted by DEQ for this requirement.

19.1.7 If a project/activity is grandfathered and the post-development SWM plan for the project/ activity is based on the "old" technical criteria (VSMP Regulations- Part IIC - 9VAC25-870-93 et. seq.) because it is anticipated that the beginning of construction (as defined Section 19.1.3 of this IIM) will be prior to July 1, 2019 but for some reason the schedule "slips" and construction will not begin by that date, the post-development SWM plan for the project/activity must be revised to incorporate any additional BMPs or offsite drainage system improvements to satisfy the "new" technical criteria (VSMP Regulations - Part IIB - 9VAC 25-870-62 et. seq.) requirements for both water quality and water quantity. Additional BMPs or offsite drainage system improvements necessary to satisfy the requirements of the "new" technical criteria may require the project/activity to have to revisit the public participation and/or the environmental review process.

19.1.8 The status of a project/activity with regards to the grandfathering provision shall be noted using the appropriate note(s) in Section IV of the SWPPP General Information Sheets. A list of all projects/activities within each District Office designated to be grandfathered shall be maintained by each respective District L&D Engineer and shall be available upon request by the State L&D Engineer, the Assistant State L&D Engineers, the State PMO Director or the State Stormwater Management Program Administrator. The "Grandfathered Project List" shall include the following information for each project:

- County or City
- Project Number
- UPC Number
- Type of Project (D/B/B, D/B, etc.)
- Brief Description of Project
- Potential or actual Construction Advertisement (D/B/B) or RFP issuance (D/B) date

19.1.9 Upon the publication of an updated SYIP, each District L&D Engineer shall have all projects/activities on their "Grandfathered Project List" reviewed to verify the validity of the grandfathered status of each project based on the most current date of the anticipated beginning of construction (as defined in Section 19.1.3 of this IIM) and/or advertisement or RFP issuance date. The "Grandfathered Project List" and the appropriate notes in SWPPP General Information Sheets shall be updated/revised to reflect any changes to the grandfathered status of a project/activity.

19.2 LINEAR PROJECT OUTFALLS

19.2.1 The exemption in the VSMP Law for "less than one acre of land disturbance per outfall" for linear projects was eliminated on July 1, 2012. As a result, all land disturbing activities where the total land disturbance is one acre or greater (2,500 square feet or greater in a designated CBPA) requires compliance with the water quality criteria in the VSMP Regulations and requires VSMP Construction Permit coverage, if applicable (see Section 4.1 of this IIM for the exemption for routine maintenance activities).

19.2.2 Land-disturbing activities previously qualifying for the "less than one acre of land disturbance per outfall" exemption typically were those activities where the total amount of land disturbance was small or where the total amount of land disturbance was distributed among multiple outfalls and where there was minimal impact anticipated to downstream receiving waters. Because of this, the following guidance has been agreed to by VDOT and DEQ for VDOT regulated linear development projects/activities where less than one acre of land disturbance will occur per outfall or watershed and where there will be insignificant increases in peak flow rates as a result of the proposed activity and where there are no existing or anticipated flooding or erosion problems downstream of the discharge point(s):

1. Water quality requirements shall be achieved within the proposed land-disturbing activity/project limits provided such can be accomplished without the acquisition of additional R/W or easement.

2. Any water quality requirements not achieved within the land-disturbing activity/project limits may be achieved offsite in accordance with Section 5.4.10 of this IIM provided such can be accomplished without the acquisition of additional R/W or easement.

3. For any applicable land-disturbing activity/project where the total water quality requirements (pollutant load reductions) cannot be achieved utilizing the provisions of 1 and 2 of this Section, the activity/project may be granted an exception by DEQ, in accordance with the provisions of Section 9VAC 25-870-57 of the VSMP Regulations and Section 20.0 of this IIM for that portion of the water quality requirements determined to be unachievable.

19.3 DETERMINATION OF PERCENT IMPERVIOUS AND WATER QUALITY REQUIREMENTS

19.3.1 Effective October 1, 2012, all proposed VDOT regulated land-disturbing activities/projects that had not begun the construction advertisement stage (e.g., PAC for Design/Bid/Build (D/B/B) projects or Request for Proposal (RFP) for Design/Build (D/B) projects) were required to have their post-development SWM plan evaluated or re-evaluated using the total post-development impervious area of the site (new criteria), in lieu of the post-development net increase in impervious area of the site (old criteria), to determine the activity/project's percent impervious and corresponding water quality requirements.

19.3.2 If using the new criteria results in an increase in the water quality requirements for the proposed land-disturbing activity/project from that determined using the old criteria, the additional water quality requirements shall be incorporated into the post-development SWM plan for the proposed land-disturbing activity/project based on the following:

1. Category 1 activities are those proposed land-disturbing activities/projects that had not completed the public hearing/willingness notice stage of plan development as of October 1, 2012. These activities/projects are required to fully incorporate any additional water quality requirements into their proposed post-development SWM plan.

2. Category 2 activities are those proposed land-disturbing activities/projects that had completed the public hearing/willingness notice stage of plan development but had not begun the construction advertisement stage as of October 1, 2012. These activities/projects are required to incorporate any additional water quality requirements into their proposed post-development SWM plan to the maximum extent practicable without impacting (increasing) the existing or proposed R/W footprint and without impacting (delaying) the construction schedule.

19.3.3 For Category 2 land-disturbing activities/projects, any revisions to the proposed post-development SWM plan to address additional water quality requirements should be reasonable and practicable and be applied in a logical and common sense approach. Any additions or modifications to the proposed post-development SWM plan should utilize standard BMPs typically associated with the specific type of project (i.e., rural or urban). For example, proposing to install a large number of manufactured BMPs on a rural secondary roadway project may, theoretically, satisfy the water quality requirement "numbers" but, in reality, may be neither reasonable nor practical.

19.3.4 The following steps are to be followed in the evaluation or re-evaluation process for Category 2 land-disturbing activities/projects:

1. Determine the additional water quality requirements in accordance with the procedures and guidance in this IIM, then
2. Explore all reasonable BMP alternatives to achieve any additional water quality requirements within the existing or proposed R/W footprint for the proposed land-disturbing activity/project or within adjacent/other VDOT R/W, or through the use of an offsite option (see Section 5.4.10 of this IIM), then
3. Determine/select which BMP alternatives can be feasibly incorporated into the activity/project's proposed post-development SWM plan without impacting (delaying) the construction schedule, then
4. Incorporate the selected water quality BMPs into the project's proposed post-development SWM plan, then
5. After completing steps 1 through 4, any activities/projects not able to achieve 100% of the required pollutant load reduction shall have their activity/project files and SWPPP documented with the following information:
   - The total water quality requirements for the activity/project based on the new criteria (as defined in this section)
   - The additional water quality requirements for the activity/project based on the difference between the old and new criteria (as defined in this section)
   - The BMP alternatives investigated
   - The BMP alternatives selected
   - The reasons why certain BMPs were selected or not selected
   - The amount/percent of the total water quality requirements achieved and/or not achieved.

19.4 BMP WATER QUALITY VOLUME

19.4.1 The effective date for implementing the criteria contained in Section 5.4.6.2 of this IIM regarding water quality volume of the BMP was November 12, 2010. The extent of the implementation of this criteria was to be based on the type of project and the project development status (stage) as of the implementation date in accordance with the following:

1. Design/Bid/Build Projects

   - Full implementation for projects that had not been advertised for a Public Hearing/Willingness or progressed beyond a similar phase (where no Public Hearing/Willingness is required).

   - Full implementation for projects that had been advertised for a Public Hearing/Willingness or progressed beyond a similar phase (where no Public Hearing/Willingness is required) but which had to repeat that process because of reasons other than changes related to Section 5.4.6.2 of this IIM.

   - Implementation to the extent practicable within the identified R/W requirements except where the project construction schedule would have been compromised in doing so for projects that had been advertised for a Public Hearing/Willingness or progressed beyond a similar phase (where no Public Hearing/Willingness is required) but which had not progressed to the PAC or similar phase (based on the normal time schedule for such).

   - Projects that were at the PAC or similar phase as of the implementation date were exempt from any type of implementation.

2. PPTA Projects

   - Full implementation for projects that had not been advertised for a Public Hearing/Willingness and where a contract had not been executed with the selected Concessionaire.

   - Full implementation for projects where a contract had not been executed with the selected Concessionaire and the project had been advertised for a Public Hearing/Willingness but which had to repeat that process because of reasons other than changes related to Section 5.4.6.2 of this IIM.

   - Implementation to the extent practicable within the identified R/W requirements except where the project construction schedule would have been compromised in doing so for projects that had been advertised for a Public Hearing/Willingness but where a contract with the selected Concessionaire had not been executed.

   - Projects where a contract had been executed with the selected Concessionaire were exempt from any type of implementation.

3. Design Build Projects

   - Full Implementation for projects that had not been advertised for a Public Hearing/Willingness and where an RFP had not been advertised.

- Full Implementation for projects where an RFP has not been advertised and the project has been advertised for a Public Hearing/Willingness but which had to repeat that process because of reasons other than changes related to Section 5.4.6.2 of this IIM.

- Implementation to the extent practicable within the identified R/W requirements except where the project construction schedule would have been compromised in doing so for projects that had been advertised for a Public Hearing/Willingness but where an RFP had not been advertised.

- Projects where an RFP had been advertised were exempt from any type of implementation.

19.4.2 There may have been projects that did not exactly fit into any one of the categories identified in Sections 19.4.1. In those situations, a project by project decision on implementation of the water quality volume requirements contained in Section 5.4.6.2 of this IIM was to have been made. The State Hydraulics Engineer or the respective District Hydraulics Engineer should have been consulted for assistance, as needed. The expectation was that VDOT would implement the revised water quality volume requirements contained in Section 5.4.6.2 of this IIM on all current projects as of the implementation date where it was reasonable and feasible to do so.

20.0 EXCEPTION PROCESS

20.1 For those land-disturbing activities where it is determined that water quality requirements cannot be totally achieved utilizing onsite BMPs and/or offsite options (see Section 5.4.10 of this IIM), an exception for the pounds of phosphorus removal (load reduction) unachievable may be granted by DEQ provided that VDOT submits a written request to DEQ requesting the exception. Form LD-445G is to be used for this purpose. The request shall include documentation of the need for the exception. The documentation shall describe all means and methods evaluated for meeting the water quality requirements and the reasons why specific methods were determined not feasible. The documentation must also state that the exception being requested is the minimum necessary to afford relief.

20.2 Economic hardship alone is not sufficient reason to request an exception.

20.3 Any approved exception is to be documented in the SWPPP for the project/activity. The appropriate SWPPP General Information Sheet notes are to include the date the exception was approved, by whom it was approved and the amount of the exception (pounds of phosphorus).

20.3.1 Information regarding any approved exception (i.e., date approved, by whom approved and for what amount) is to be noted and included with other registration information when applying for coverage for the proposed land-disturbing activity/project under the VPDES General Construction Permit.

21.0 ANNUAL STANDARDS AND SPECIFICATIONS

21.1 VDOT submits annually its standards and specifications for ESC and SWM (the Annual ESC and SWM Standards and Specifications) to DEQ for review and approval. Upon DEQ approval, VDOT is authorized to design, construct, inspect and maintain its roadways and facilities in accordance with the Approved ESC and SWM Standards and Specifications. The annual approval covers the calendar year (January 1 to December 31). DEQ reserves the right to randomly review VDOT design plans and construction activities to ensure compliance with the Approved ESC and SWM Standards and Specifications.

21.2 VDOT's Approved ESC and SWM Standards and Specifications is a compilation of all VDOT documents related to the design, construction, inspection and maintenance of ESC measures and post-development BMPs including, but not limited to, all or a portion of the following:

- R&B Standards
- R&B Specifications, Supplemental Specifications and Special Provisions
- IIMs
- Drainage Manual
- BMP Design Manual of Practice
- Road Design Manual
- BMP Inspection Manual

21.3 VDOT's Annual ESC and SWM Standards and Specifications are housed in an on-line electronic data base which includes both current and previously approved ESC and SWM Standards and Specifications. The data base is dynamic and items within the data base may be added to, deleted or revised at any time to reflect changes or updates to VDOT's ESC and SWM Program. VDOT will notify DEQ, in writing, when changes are made to the content of the data base. DEQ will have 30 calendar days to provide any written comments they might have regarding the change. If VDOT does not receive any written comments from DEQ within the 30 calendar days after notification, the change shall be deemed approved and may be used on VDOT projects/land-disturbing activities as appropriate.

21.4 VDOT's Approved ESC and SWM Standards and Specifications are for use in the design, construction and maintenance of VDOT projects/land-disturbing activities only. Approval to use any portions of VDOT's Approved ESC and SWM Standards and Specifications on non-VDOT projects/land-disturbing activities (see Section 4.3 of this IIM) must be secured from DEQ by the project authority.

VIRGINIA DEPARTMENT OF TRANSPORTATION

LOCATION AND DESIGN DIVISION

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: VIRGINIA STORMWATER MANAGEMENT PROGRAM	NUMBER: IIM-LD-242.5
SPECIFIC SUBJECT: VIRGINIA POLLUTANT DISCHARGE ELIMINATION SYSTEM GENERAL PERMIT FOR DISCHARGES OF STORMWATER FROM CONSTRUCTION ACTIVITIES	DATE: OCTOBER 15, 2014
	SUPERSEDES: IIM-LD-242.4
APPROVAL:	B. A. Thrasher, P.E. State Location and Design Engineer Approved October 15, 2014

CURRENT REVISION

- Revisions have been made throughout this memorandum to update and clarify the requirements contained in the VPDES General Permit for Discharges of Stormwater from Construction Activities and the procedures for obtaining permit coverage.
- Shading has been omitted due to the number of changes.

EFFECTIVE DATE

- The provisions in Section 4.0 of this memorandum are effective for all projects developed/constructed under the provisions of VDOT 2007 Road and Bridge Supplemental Specification SS1D016-0913 et seq.
- All other sections of this memorandum are effective upon receipt.

ACRONYMS

- BMP – Best Management Practice
- DCR – (The) Virginia Department of Conservation and Recreation
- DEQ – (The) Virginia Department of Environmental Quality

- ESC – Erosion and Sediment Control
- ESCCC – Erosion and Sediment Control Contractor Certification
- IIM – Instructional and Informational Memorandum
- IAT – Interagency Transfer
- L&D – Location and Design
- PAC – Pre Advertisement Conference
- RLD – Responsible Land Disturber
- RLDA – Regulated Land Disturbance Activity
- SWCB – State Water Control Board
- SWM – Stormwater Management
- SWPPP – Stormwater Pollution Prevention Plan
- VDOT – (The) Virginia Department of Transportation
- VPDES – Virginia Pollutant Discharge Elimination System
- VSMP – Virginia Stormwater Management Program
- VSWCB – Virginia Soil and Water Conservation Board

1.0 BACKGROUND

1.1 Acts of the General Assembly have resulted in the enactment of the Stormwater Management Law (Section 62.1-44.15:24 et seq. of the Code of Virginia) and the issuance of the Virginia Stormwater Management Program Regulations (9 VAC 25-870-10 et seq.) for discharges of stormwater from Regulated Land Disturbing Activities. The law empowers the SWCB to regulate, permit, and control stormwater runoff in the Commonwealth and authorizes the SWCB to delegate such powers to DEQ.

1.2 Effective July 1, 2013, the Stormwater Program, including the VPDES General Permit for Discharges of Stormwater from Construction Activities was transferred from DCR to DEQ. The sections of the Code of Virginia and the Virginia Administrative Code (VAC) referenced herein reflect new numbering as a result of the program transfer.

1.3 Authorization to discharge stormwater from construction activities under the VSMP Regulations and the Virginia Stormwater Management Act is permitted through DEQ's VPDES General Permit for Discharges of Stormwater from Construction Activities VAR10 (hereafter referred to as the VPDES Construction Permit). This IIM addresses the conditions and requirements within the permit that is effective July 1, 2014 to June 30, 2019. Except for emergency related activities, coverage under the VPDES Construction Permit must be obtained prior to beginning any land disturbance on regulated activities.

2.0 APPLICATION

2.1 The VPDES Construction Permit is applicable for all RLDAs undertaken by or for VDOT including projects developed under the PPTA and Design Build process, Capital Outlay projects and non-routine maintenance activities, including those performed by state forces or hired equipment. For the purposes of this IIM, the RLDA is defined as the proposed construction or maintenance related land disturbing project or activity that generates the need for acquiring coverage under the VPDES Construction Permit.

2.2 In accordance with the instructions contained in this document, VDOT shall apply for and secure coverage under the VPDES Construction Permit for all applicable land disturbing activities over which it has contractual control or which are done by state forces. This includes any support facilities located within VDOT right of way or easement.

2.3 It shall be the responsibility of those conducting land disturbing activities on VDOT right of way or easement under agreement and/or a land use permit to secure coverage under the VPDES Construction Permit for their activities (if applicable). This includes, but is not limited to, those land disturbing activities conducted on VDOT right of way or easement by municipalities under the First Cities Program, the Locally Administered Project Program and the Transportation Enhancement Program.

2.4 Except for land disturbing activities associated with routine maintenance operations, coverage under the VPDES Construction Permit is required for all land disturbing activities that equal or exceed one acre in size.

2.4.1 For construction and maintenance related projects/activities that include non-contiguous land disturbing activities, when such land disturbing activities are one mile or more in distance apart, as measured between the closest outer limits of each adjacent land disturbing project/activity and as measured along the most direct public travelway, they shall be considered separate and individual land disturbing activities for the applicability of the VPDES Construction Permit coverage and requirements.

2.4.2 Each individual construction contract containing land disturbances requiring VPDES Construction Permit coverage shall have only one VPDES General Permit number unless the provisions of section 2.4.1 of this IIM apply.

2.4.4 Applying the provisions of section 2.4.1 and 2.4.2 of this IIM could result in one of the following situations:

1. A UPC/project number having more than one VPDES General Permit number. When this occurs, care should be taken to make sure each individual permitted site included under one UPC/project number has a distinct designation that is clearly identifiable in the construction plans or other such documents and the permit registration packet. Where general SWPPP information is the same, it will not be necessary to duplicate such information in SWPPP General Information Sheet notes in the construction plans or other such documents for each individual site.

However, where site specific information is required in the SWPPP General Information Sheet notes (e.g., project location, land disturbance values, receiving waters, etc.), such information is to be identified for each individual permitted site.

2. One VPDES General Permit number applying to multiple UPC/project numbers. Where multiple UPC/project numbers are to be covered under one permit application, the LD-445 and other applicable forms should list all the UPC/project numbers. The cost of the permit can be allocated to just one of the UPC/project numbers or can be divided among all of the UPC/project numbers, whichever the Project Authority deems most appropriate.

2.5 Routine maintenance activities are exempt from the VSMP Regulations and VPDES Construction Permit coverage regardless of the amount of land disturbance.

2.5.1 This exemption is only for those maintenance activities considered routine and only applies to the VSMP Regulations and VPDES Construction Permit Program. It does not apply to the ESC Program, other applicable SWPPP components or other policies related to upstream and downstream channel and flood impacts. An ESC Plan (including downstream channel adequacy analysis, as appropriate) and other applicable SWPPP components are required for any land disturbing activity that equals or exceeds 10,000 square feet (2,500 square feet in the area defined as Tidewater, Virginia in the Chesapeake Bay Preservation Act) regardless of any exemption under the VSMP Regulations and VPDES Construction Permit Program (see current version of IIM-LD-11 and 246 for more information on ESC Plan and SWPPP requirements).

2.5.2 Routine maintenance is defined as those activities performed to maintain the original line and grade, hydraulic capacity, or original construction of the facility. Such activities include, but are not limited to, ditch cleaning operations, shoulder grading operations, pipe replacement or rehabilitation operations, pavement milling and/or overlays, bridge deck replacement, and the normal operational procedures for maintaining the travel surface of unpaved/gravel roadways (i.e., dragging, blading, grading, etc.). When classifying a land disturbance activity as a routine maintenance, consideration should be given to the fact that changes to the size, shape, slope and material of a drainage feature (i.e., ditch, culvert, etc.) may alter the conveyance of flow, but may still maintain the original hydraulic capacity of the facility, since for certain flood events, that may include conveyance of flow over the roadway section.

2.5.3 The paving of an existing road with a compacted or otherwise impervious surface (e.g., gravel) and re-establishment of original ditches and shoulders is considered routine maintenance for the purposes of determining the applicability of the VSMP Regulations and VPDES Construction Permit coverage provided all of the following conditions are met:

1. The proposed paved area will approximate the existing compacted or otherwise impervious area.

2. There will be no changes to the existing horizontal or vertical alignment.

3. Roadside ditch work will only be performed as necessary to re-establish original line, grade or hydraulic capacity, provide positive drainage or address safety concerns.

4. Drainage pipe work will only be performed as necessary to extend existing structures, replace structurally deficient structures or address safety concerns.

2.5.4 Facilities that support the routine maintenance activity (e.g., disposal areas for surplus dirt or borrow pits) are not considered a part of the routine maintenance operation and, therefore, are not covered under the routine maintenance activity exemption. If the support facility does not otherwise have coverage under the VPDES Construction Permit, it must be evaluated for the applicability of VPDES Construction Permit and where found necessary, VPDES Construction Permit coverage must be obtained (either by VDOT or the site owner) prior to any land disturbance activities occurring at the site.

2.5.5 For any maintenance activity being classified as routine, the activity files shall be documented regarding the original and proposed line, grade, hydraulic capacity and construction of the facility. Documentation of original conditions can be in the form of old plans, photographs or other such documents depicting the original line and grade, hydraulic capacity, or original construction of the facility. Written and signed statements from those that know the history of the facility can also serve as documentation of the original conditions.

2.5.6 Where there is any question as to the application of the routine maintenance definition to a land disturbing activity, the appropriate District Hydraulics Engineer should be consulted.

3.0 LAND DEVELOPMENT AREA AND LAND DISTURBANCE AREA

3.1 The application for coverage under the VPDES Construction Permit requires the reporting of both the area of land development and the area of land disturbance.

3.1.1 The area of land development is the total VDOT owned/controlled area within the project limits identified in the construction plans or other such documents for the RLDA. The land development area would, typically, include areas such as the right of way and temporary and permanent easements, including that for any areas for support facilities identified and included as a part of the construction plans or other such documents and the registration information for VPDES Construction Permit coverage for the RLDA.

3.1.2 The area of land disturbance is the total area within the land development area that will be disturbed by the proposed activities. Land disturbance, for the purposes of applicability of the VSMP Regulations and the VPDES Construction Permit, is defined as any manmade change to the land surface that potentially changes its runoff characteristics including any clearing, grading or excavation associated with the proposed activity. Typically, the land disturbance area would be the area encompassed by the limits of the construction activity (i.e., the construction limits) for the RLDA plus any additional areas for support facilities if such areas are identified and included as a part of the construction plans or other such documents and the registration information for VPDES Construction Permit coverage for the RLDA.

3.1.3 Once VPDES Construction Permit coverage has been received, changes to the identified area of land disturbance within the identified area of land development can be made without having to re-permit the project/activity provided the additional land disturbance area, when combined with the originally reported area, does not change the VPDES Construction Permit fee previously paid to DEQ. If the additional land disturbance area does change the VPDES Construction Permit fee previously paid to DEQ, another application for permit coverage must be processed. The existing permit coverage must be terminated once new permit coverage is received.

3.1.4 A change in the identified land development area of the project/activity after receipt of VPDES Construction Permit coverage will require the processing of another application for permit coverage. The existing permit coverage must be terminated once the new permit coverage is received.

3.1.5 Because of the potential of having to submit the project/activity for new VPDES Construction Permit coverage and having to terminate the existing VPDES Construction Permit coverage when changes occur to the land development and land disturbance area, it is recommended that a liberal determination be applied when defining the area of land development and the area of land disturbance for the purposes of VPDES Construction Permit coverage.

4.0 SUPPORT FACILITIES FOR THE RLDA

4.1 ONSITE

4.1.1 Onsite support facilities are defined as those facilities such as staging areas, equipment and material storage areas, unsuitable and surplus material disposal areas, borrow areas, etc., which are located within the project limits and within the designated land development area (VDOT right of way or easement) for the RLDA.

4.1.2 Onsite support facilities are to be covered under the VPDES Construction Permit for the RLDA. The SWPPP for the onsite support facilities shall include, but is not limited to, the ESC Plan, the Pollution Prevention Plan and the post construction SWM Plan (if applicable) and shall become a component of the SWPPP for the RLDA.

4.1.3 In most instances, the identification of the locations of the onsite support facilities is the responsibility of the contractor or other such person performing/managing the land disturbing activity and the exact location and size of such areas within the limits of the RLDA are unknown until after the award of the contract for the RLDA and/or after the VPDES Construction Permit registration process for the RLDA has been completed.

4.1.4 For all onsite support facilities requiring coverage under the VPDES Construction Permit which were not identified in the construction plans or other such documents or the registration information submitted for VPDES Construction Permit coverage for the RLDA, the contractor shall develop a SWPPP, which shall include but is not limited to the ESC Plan, the Pollution Prevention Plan and the post construction SWM Plan, for such areas in accordance with the VDOT R&B Standards and Specifications, the instructions in the current version of IIM-LD 11, 195 and 246 and VDOT's Approved ESC and SWM Standards and Specifications (see Section 21.0 in the latest version of IIM-LD-195 for additional information on VDOT's Approved ESC and SWM Standards and Specifications). The contractor shall have the ESC Plan and post construction SWM Plan for the onsite support facilities reviewed and approved by a person appropriately certified through DEQ's SWM and/or ESC Plan Reviewer certification program. The form LD-445C shall be used to certify the plan review and approval process. The SWPPP, including the LD-445C form, for the onsite support facilities shall be submitted to the VDOT RLD for the RLDA for review and approval.

4.1.5 The SWPPP for the RLDA will require modification for the inclusion of the SWPPP for the onsite support facilities once such areas are identified and plans are reviewed and approved by the RLD for the RLDA (see Section 107.16(e) of the 2007 R&B Specifications (as amended) and the current version of IIM-LD-11 and 246 for additional information for modifying the SWPPP, including the approved ESC Plan and post construction SWM Plan).

4.1.6 The impact of any additional land disturbance area associated with any onsite support facilities identified in Section 4.1.4 of this IIM shall be evaluated with regards to changes in the permitting conditions noted in Section 3.1.3 and 3.1.4 of this IIM.

4.2 OFFSITE

4.2.1 Offsite support facilities are defined as those facilities such as staging areas, equipment and material storage areas, unsuitable and surplus material disposal areas, borrow areas, etc., which are located outside the project limits/land development area of the RLDA.

4.2.2 Offsite support facilities may be located within or outside of VDOT right of way or easement.

4.2.3 Offsite support facilities located within VDOT Right of way or easement

4.2.3.1 Offsite support facilities located within VDOT right of way or easement may be identified and included in the construction plans or other such documents and the VPDES Construction Permit registration information for the RLDA. More typically, the identification of the location of such areas is the responsibility of the contractor or other such person performing or managing the land disturbing activity and such areas are not included in the registration information submitted to DEQ to acquire VPDES Construction Permit coverage for the RLDA.

4.2.3.2 Those offsite support facilities not included in the construction plans or other such documents and the VPDES Construction Permit registration information for the RLDA will not be included under the VPDES Construction Permit coverage for the RLDA. Instead, such offsite support facilities exceeding the land disturbance thresholds identified in Section 2.4 of this IIM shall be required to obtain individual coverage under the VPDES Construction Permit.

4.2.3.2.1 Where multiple areas are being utilized for offsite support facilities, the land disturbance value for all the offsite support facilities located within VDOT right of way or easement for an individual RLDA shall be considered in total for the applicability of the VPDES Construction Permit coverage and requirements unless such activities meet the conditions of Section 2.4.1 of this IIM.

4.2.3.3 For all offsite support facilities located within VDOT right of way or easement requiring individual coverage under the VPDES Construction Permit, the contractor shall develop the necessary plans and documents for applying for VPDES Construction Permit coverage and VDOT shall secure the permit coverage.

4.2.3.3.1 The contractor shall develop a SWPPP, which shall include but is not limited to the ESC Plan, the Pollution Prevention Plan and the post construction SWM Plan, for such areas in accordance with the VDOT R&B Standards and Specifications, the instructions in the current version of IIM-LD 11, 195 and 246 and VDOT's Approved ESC and SWM Standards and Specifications. The contractor shall have the ESC Plan and post construction SWM Plan for the offsite support facilities reviewed and approved by a person appropriately certified through DEQ's SWM and/or ESC Plan Reviewer certification program. The form LD-445C shall be used to certify the plan review and approval process. The SWPPP, including the LD-445C form, for the offsite support facilities shall be submitted to the VDOT RLD for the RLDA for review and approval

4.2.3.3.2 The contractor shall complete, and submit to the VDOT RLD, the VPDES Construction Permit Registration Information form LD-445 and the ESC & SWM Plan Certification form LD-445C for use in applying for coverage for the offsite support facilities under the VPDES Construction Permit. The RLD for the RLDA is to be listed on the LD-445 form as the RLD for the offsite support facility.

4.2.3.3.3 The VDOT RLD for the RLDA shall review the permit application forms for accuracy and completeness. Forms with incomplete or inaccurate information will be returned to the contractor for corrective action and resubmission.

4.2.3.3.4 Once the VDOT RLD receives a complete and accurate LD-445 and LD-445C form the contractor, the VDOT RLD shall complete the VPDES Construction Permit Registration Fee form LD-445B and then forward all documents to the appropriate District VPDES Construction Permit Coordinator for processing and obtaining VPDES Construction Permit coverage for the offsite support facilities. The process and time schedule for VDOT to request VSMP Construction Permit coverage from the DEQ is outlined in Section 6.0 of this IIM.

4.2.3.4 Once issued by DEQ, the VPDES Construction Permit coverage letter with the permit registration number will be transmitted to the VDOT RLD in accordance with the procedures noted in Section 6.7 and 6.9 of this IIM. The RLD shall provide the contractor a copy of the VPDES Construction Permit coverage letter and the notice to proceed in the offsite support facility area(s). No land disturbance activity can occur at the offsite support facility area(s) until the VPDES Construction Permit coverage for such has been secured and the VDOT RLD has provided the notice to proceed. Depending upon the submission date, it could take a maximum of 90 days from the time the contractor submits complete and accurate registration information to the VDOT RLD to the time the contractor receives the authority to proceed from the VDOT RLD. The VDOT RLD shall also complete and provide the contractor a copy of the VPDES Construction Permit Contact Information form LD-445A. The contact person for the offsite support facility area shall be the same as for the RLDA.

4.2.3.5 The contractor shall post a copy the VPDES Construction Permit coverage letter with the permit registration number and the LD-445A form at each applicable offsite support facility area in accordance with the instructions contained in the SWPPP General Information Sheets and Section 7.3 of this IIM.

4.2.3.6 Once all activity at the offsite support facility area has been completed and the site stabilized in accordance with the VDOT R&B Specifications and Section 8.1.1 of this IIM, the contractor shall complete and submit the VPDES Construction Permit Termination Notice form LD-445D to the designated VDOT RLD for processing in accordance with Section 8.0 et seq. of this IIM.

4.2.3.7 For offsite support facilities not requiring coverage under the VPDES Construction permit but disturbing 10,000 square feet or greater (2,500 square feet or greater in the Tidewater area – see the current version of IIM-LD-11 for the definition of Tidewater area), the contractor shall develop and have approved a SWPPP (which shall include but is not limited to an ESC Plan, a Pollution Prevention Plan and, when applicable, a post construction SWM Plan) in accordance with Section 4.2.3.3.1 of this IIM.

4.2.4 Offsite support facilities located outside of VDOT right of way or easement.

4.2.4.1 For all offsite support facilities located outside VDOT right of way or easement, it shall be the responsibility of the contractor to develop all necessary plans and documents and secure any necessary VPDES Construction Permit coverage directly from the VSMP Authority for the area in which the support facility is located.

4.2.4.2 Plans and documents for any offsite support facility shall be developed in accordance with the requirements of the VSMP Authority for the area in which the support facility is located.

4.2.4.3 Application for coverage under the VPDES Construction Permit shall be completed in accordance with the requirements of the VSMP Authority for the area in which the support facility is located.

4.2.4.4 The contractor shall be responsible for the installation of temporary erosion and sediment control measures and the permanent stabilization of all disturbed areas at borrow and soil disposal sites associated with the RLDA regardless of the need for VPDES Construction Permit coverage at those sites. The installation of temporary erosion and sediment control measures and the permanent stabilization of all disturbed areas at such sites shall be accomplished in accordance with the requirements of the VSMP or ESC Authority for the area in which the support facility is located or the ESC Law and Regulations, whichever is more stringent.

5.0 RESPONSIBLE PARTIES

5.1 VDOT Project Authority

Responsible for initiating the VPDES Construction Permit Registration application process. This includes, but is not limited to, the following:

- Completing, or coordinating the completion of, all of the information on the VPDES Construction Permit Registration Information form LD-445 and the VPDES Construction Permit Fee Registration form LD-445B.
- Attaching the completed ESC & SWM Plan Certification form LD-445C to the permit application assembly and sending the completed assembly for each RLDA to the District or Central Office (as applicable) VPDES Construction Permit Coordinator.
- Processing the VPDES Construction Permit registration assembly for the offsite support facilities within VDOT right of way or easement and submitting completed assemblies to the District or Central Office (as applicable) VPDES Construction Permit Coordinator.

5.1.1 For the purposes of this IIM, the Project Authority for the RLDA prior to award of the construction contract or the commencement of the land disturbing activity is assumed to be that VDOT person with responsibility for oversight of the preliminary engineering aspects of the RLDA such as the Project Manager, the Residency Contract Administrator, or other such person that manages/oversees the pre-construction activities of the proposed land disturbing activity.

5.1.2 For the purposes of this IIM, once the construction contract has been awarded or the land disturbing activity has begun, the Project Authority for the RLDA is assumed to be the designated VDOT RLD.

5.2 ESC Plan Designer/Hydraulic Engineer

Responsible for preparing the ESC and post construction SWM Plan for the RLDA in accordance with VDOT's Approved ESC and SWM Standards and Specifications. This includes, but is not limited to, the following:

- Developing and ensuring that all applicable information is included on the SWPPP General Information Sheets (see the current version of IIM-LD-246).
- Assisting the Project Authority in completing the VPDES Construction Permit Registration Information form LD-445.
- Completing and submitting the Erosion and Sediment Control and Stormwater Management Plan Certification form LD-445C to the Project Authority.

5.3 VDOT District VPDES Construction Permit Coordinator

Responsible for coordinating the VPDES Construction Permit Registration application process for the District. This includes, but is not limited to, the following:

- Collecting all of the completed VPDES Construction Permit Registration application assemblies (i.e., forms LD-445, LD-445B and LD445C) and uploading them to the InsideVDOT VPDES Construction Permit web site.
- Collecting and uploading the completed Stormwater Pollution Prevention Plan Certification forms LD-445E and the VPDES Construction Permit Termination Notice forms LD-445D to the InsideVDOT VPDES Construction Permit web site.
- Attaching a copy of the VPDES Construction Permit Registration Information form LD-445 to the applicable VPDES Construction Permit coverage letter received from the Central Office VPDES Construction Permit Coordinator and forwarding both to the RLD for each specific RLDA or offsite support facility area located within VDOT right of way or easement.

5.3.1 The District VPDES Construction Permit Coordinator is the District Drainage Engineer or his/her designee.

5.4 VDOT Responsible Land Disturber (RLD)

Responsible for ensuring the implementation of the SWPPP (including the ESC, Pollution Prevention and post construction SWM Plan) for the RLDA and any onsite and offsite support facilities located within VDOT right of way or easement. This includes, but is not limited to, the following:

- Coordinating the review and approval for the SWPPP for any onsite or offsite support facilities within VDOT right of way or easement not identified in the construction plans or other such documents for the RLDA.

- Coordinating the submission of information for offsite support facilities located within VDOT right of way or easement that require VPDES Construction Permit coverage.

- Completing, signing, and forwarding, to the appropriate District VPDES Construction Permit Coordinator, the SWPPP Certification form LD-445E, certifying that all information noted on the SWPPP General Information Sheets contained in the construction plan set (or other such documents) required to be supplied by the contractor (including that for onsite support facilities) will be received and approved and included with the other SWPPP documents for the proposed RLDA prior to any land disturbance activities occurring in those areas identified by such information.

- Completing and forwarding, to the appropriate District VPDES Construction Permit Coordinator, the VPDES Construction Permit Termination Notice form LD-445D certifying that final stabilization has been achieved on all portions of the RLDA site and/or offsite support facilities within VDOT right of way or easement and (where applicable) that all permanent (post construction) SWM BMPs have been constructed in accordance with their plan design details and that the BMPs have been made operational.

- Coordinating with the appropriate VDOT District Maintenance Infrastructure Manager to obtain a Maintenance ID number for each permanent (post construction) SWM BMP and reporting such number, along with other applicable information, on the BMP information portion of the VPDES Construction Permit Termination Notice form LD-445D.

5.4.1 The RLD is the VDOT person so identified on the SWPPP General Information Sheets and satisfies the requirements of DEQ's RLD Certification Program. The certification that the BMP(s) were constructed in accordance with their plan details and that the BMP(s) have been made functional shall be performed by a person registered in the Commonwealth of Virginia as a Professional Architect, Engineer, Land Surveyor or Landscape Architect.

5.5 VDOT Central Office VPDES Construction Permit Coordinator

Responsible for compiling all VPDES Construction Permit Registration assemblies statewide and applying to DEQ for coverage under the VPDES Construction Permit for the RLDAs or offsite support facilities within VDOT right of way or easement. This includes, but is not limited, to the following:

- Submitting the VPDES Construction Permit Registration and Termination information (spread sheet) and registration fees (in the form of an IAT) to DEQ.

- Forwarding the VPDES Construction Permit coverage letters (including permit number) received from the DEQ to the District VPDES Construction Permit Coordinator.

- Providing specific project information to the Central Office L&D Administrative Section for processing the project charges and the IAT for DEQ.

- Maintaining an online database documenting pertinent information on the RLDAs and offsite support facilities within VDOT right of way or easement submitted for VPDES Construction Permit coverage.
- Inputting permanent SWM BMP data submitted with the VPDES Construction Permit Termination Notice form LD-445D into the L&D BMP Design Database.

5.5.1 The Central Office VPDES Construction Permit Coordinator is a designated person in the Central Office Location and Design Division.

6.0 VPDES CONSTRUCTION PERMIT REGISTRATION PROCEDURE

6.1 Except for emergency related work, coverage under the VPDES Construction Permit must be obtained prior to any land disturbance occurring on any proposed project/activity or offsite support facilities within VDOT right of way or easement that exceed the land disturbance threshold amount noted in Section 2.4 of this IIM. Once VDOT submits a complete and accurate registration statement (including applicable permit fee) to DEQ, DEQ must issue or deny VPDES Construction Permit coverage within 30 calendar days. The registration statement will be considered submitted once the appropriate registration information and permit fee (in the form of the IAT documentation) have been sent to DEQ by the VDOT Central Office VPDES Construction Permit Coordinator.

6.1.1 Land disturbing activities requiring VPDES Construction Permit coverage which are conducted in response to a public emergency to avoid imminent endangerment to human health or environment may commence without VPDES Construction Permit coverage provided that both of the following conditions are met:

1. DEQ is advised of the activity within seven calendar days of commencing the land disturbance activity.
2. VPDES Construction Permit coverage (if applicable) is applied for within 30 calendar days of commencing the land disturbance activity.

See Section 6.13 of this IIM for additional information related to the permitting process for emergency work.

6.2 On or before the initiation of the PAC process for a RLDA (or other appropriate stage for those activities that do not go through a formal PAC process), the VDOT Project Authority shall complete, or have the appropriate person complete, the applicable sections of the VPDES Construction Permit Registration Information form LD-445 and the VPDES Construction Permit Fee Registration form LD-445B, attach the ESC and SWM Plan Certification form LD-445C and send this assembly to the appropriate VDOT District VPDES Construction Permit Coordinator prior to the 21st day of each month.

6.2.1 For Capital Outlay projects, the VDOT Project Authority shall submit the completed permit registration assembly directly to the VDOT Central Office VPDES Construction Permit Coordinator.

6.2.2 For Public/Private Transportation Act (PPTA) and Design Build (DB) projects, the VDOT Project Authority shall submit the completed permit registration assembly to either the VDOT District VPDES Construction Permit Coordinator (where the project is being managed in the VDOT District Office) or the VDOT Central Office VPDES Construction Permit Coordinator (where the project is being managed in the VDOT Central Office).

6.3 The VDOT District VPDES Construction Permit Coordinator shall review all permit registration assemblies received for completeness and then upload all assemblies found complete to the InsideVDOT VPDES Construction Permit web site on or before the last day of each month. The VDOT District VPDES Construction Permit Coordinator will return all incomplete assemblies to the VDOT Project Authority for completion and resubmission.

6.4 The VDOT Central Office VPDES Construction Permit Coordinator shall:

- Compile all VPDES Construction Permit registration information from registration assemblies and enter appropriate data into the VPDES database.
- Create the VDOT VPDES Construction Permit Registration Report.
- Determine the total fee to be paid to the DEQ for registering the RLDAs or offsite support facilities for coverage under the VPDES Construction Permit using the VPDES Construction Permit Fee Summary Report.
- Complete and get authorized an IAT for the fee to be paid to DEQ.
- Complete the DEQ Registration Statement for Construction Permit coverage.
- Complete the cover letter for submitting information to DEQ.
- Submit all VPDES Construction Permit registration information to VDOT management for review and signature.

6.5 Once VDOT management reviews and signs the DEQ submittal package, the VDOT Central Office VPDES Construction Permit Coordinator shall submit the information to DEQ for processing. Based on the various reviews and approvals required, it could take up to 15 business days for the Central Office VDDES Construction Permit Coordinator to compile and submit the VPDES Construction Permit registration information to DEQ. To facilitate the VPDES Construction Permitting process, the submissions to DEQ will only occur only once-a-month.

6.6 Within 30 calendar days after DEQ receives the VPDES Construction Permit submittal package, DEQ will issue or deny permit coverage for each RLDA or offsite support facility area. For those RLDAs or offsite support facility areas approved for coverage, DEQ will issue a permit coverage letter to the VDOT Central Office VPDES Construction Permit Coordinator with a project specific permit registration number. Where DEQ denies coverage for any RLDA or offsite support facility area, the registration information will be returned to VDOT for revision (as appropriate) and re-submittal.

6.7 The VDOT Central Office VPDES Construction Permit Coordinator will forward the RLDA or offsite support facility area permit coverage letters to the appropriate VDOT District VPDES Construction Permit Coordinator or the VDOT Capital Outlay, PPTA or Design Build Project Authority.

6.8 Because of the many steps involved in the VPDES Construction Permit coverage process, a minimum of 90 calendar days should be allotted from the time complete registration information is submitted to the District (or Central Office) VDPES Construction Permit Coordinator to the time the permit coverage letter is forwarded to the District VPDES Construction Permit Coordinator or the VDOT Capital Outlay, PPTA or Design Build Project Authority.

6.9 The VDOT District VPDES Construction Permit Coordinator or Capital Outlay/ PPTA/Design Build Project Authority shall attach a copy of the VPDES Construction Permit Registration Information form LD-445 to each applicable RLDA or offsite support facility area VPDES Construction Permit coverage letter received and distribute both to the appropriate VDOT RLD.

6.10 The VDOT Central Office VPDES Construction Permit Coordinator shall submit copies of the LD-445B forms to the VDOT Central Office Location and Design Administrative Section in order to debit the appropriate permit registration fee from each specific RLDA.

6.11 The VDOT Central Office VPDES Construction Permit Coordinator shall maintain an online database documenting the registered RLDAs and offsite support facilities within VDOT right of way or easement and shall retain, on file, copies of the VPDES Construction Permit Registration Application information for a period of not less than 3 years after completion of the RLDA or offsite support facilities within VDOT right of way or easement and the termination of the VPDES Construction Permit coverage.

6.12 The VPDES Construction Permit Registration Application for any RLDA or offsite support facility area located within VDOT right of way or easement missing any of the submission cutoff dates (i.e., to VDOT District or Central Office VPDES Construction Permit Coordinator) will be carried forward to the next month's submission to DEQ.

6.13 The following procedures shall be followed for land disturbing activities related to emergency operations that <u>may</u> require coverage under the VPDES Construction Permit.

6.13.1 The Project Authority shall complete the Notification of Emergency Related Land Disturbing Activities form LD-445F and submit such to DEQ by mail or fax (with copies to the VDOT District and Central Office VPDES Construction Permit Coordinators) no later than seven calendar days after commencement of the land disturbing activities associated with the emergency operations.

6.13.2 Once a determination is made as to the actual land disturbance area associated with the emergency operations, those operations exceeding the land disturbance thresholds identified in Section 2.4 of this IIM shall follow the procedures in Section 6.0 et seq. of this IIM for obtaining VPDES Construction Permit coverage except for the following:

a. The application for VPDES Construction Permit coverage for the emergency operations shall be submitted to the District VPDES Construction Permit Coordinator no later than 14 calendar days following commencement the land disturbing activities associated with the emergency operations.

b. The application for VPDES Construction Permit coverage for the emergency operations shall be submitted by the District VPDES Construction Permit Coordinator to the Central Office VPDES Construction Permit Coordinator no later than 21 calendar days following commencement the land disturbing activities associated with the emergency operations.

c. The application for VPDES Construction Permit coverage for the emergency operations shall be submitted by the Central Office VPDES Construction Permit Coordinator to the DEQ no later than 30 calendar days following commencement of land disturbing activities associated with the emergency operations.

7.0 CONDITIONS OF COVERAGE UNDER THE VPDES CONSTRUCTION PERMIT

7.1 The SWPPP (see the current version of IIM-LD-246), along with a copy of the VPDES General Construction Permit, the VPDES Construction Permit Registration Information form LD-445 and the VPDES Construction Permit coverage letter showing the permit registration number, must be retained on the site of the RLDA or the offsite support facility area within VDOT right of way or easement from the commencement of any land disturbance activity to the date of permit coverage termination. Where no facilities are available at the activity site to maintain these documents, they are to be kept by or with the designated VDOT RLD at a location convenient to the activity site where they would be readily available for review upon request during normal business hours. Where the SWPPP documents are not stored at the site of the RLDA or the offsite support facility area within VDOT right of way or easement, a copy of such documents, except for the ESC and SWM engineering calculations and documentation, shall be in the possession of those with day to day operational control over the implementation of the SWPPP (e.g., the VDOT RLD, VDOT ESC Inspector, the contractor's ESCCC person, etc.) whenever they are on site.

7.2 The VPDES Construction Permit requires that the SWPPP be made available for review upon the request of DEQ, the EPA, local government officials or the operator of a municipal separate storm sewer system (MS4) receiving discharge from the RLDA or any of the RLDA's support facilities covered under the VPDES Construction Permit for the RLDA.

7.3 The VPDES Construction Permit requires that a copy of the permit coverage letter and the name and contact information for the VDOT person responsible for the land disturbing activity and the SWPPP be posted at a publicly accessible location at the activity site. The LD-445A form is to be used to identify the name and contact information for the VDOT responsible person (typically the designated RLD for the activity). A copy of the VPDES Construction Permit coverage letter and the LD-445A form are to be posted outside the project's construction office along with other Federal and State mandated information.

Where there is no construction office (e.g., a maintenance activity or an offsite support facility), a copy of the VPDES Construction Permit coverage letter and the LD-445A form are to be maintained with the other SWPPP documents for the land disturbing activity.

7.4 The VPDES Construction Permit requires that the SWPPP be made available for review by the public upon request. Such reviews shall be at a time and publicly accessible location convenient to the VDOT and shall be scheduled during normal business hours and no less than once a month (i.e., at least once a month).

7.5 Any modifications to the approved SWPPP must be implemented in accordance with Section 107.16(e) (as amended) of the VDOT R&B Specifications, the VDOT's Approved ESC and SWM Standards and Specifications, and the procedures outlined in the current version of IIM-LD-11 and IIM-LD-246.

8.0 PROCEDURE FOR TERMINATING COVERAGE UNDER VPDES CONSTRUCTION PERMIT

8.1 Upon completion of land disturbance activities at the RLDA or offsite support facility area within VDOT right of way or easement (i.e., all areas are stabilized and all permanent SWM BMPs are operational), the VDOT RLD shall coordinate with the appropriate District Maintenance Infrastructure Manager to secure a VDOT Maintenance ID Number for each BMP listed in the Permanent BMP Table A in Section VI of the SWPPP General Information Sheets for the land disturbing activity. The VDOT RLD shall complete and sign the VPDES Construction Permit Termination Notice form LD-445D. The LD-445D form (including all permanent BMP information) is to be submitted to the appropriate VDOT District VPDES Construction Permit Coordinator prior to the 21st day of the month. A copy of the LD-445D form (including all permanent BMP information) is to be sent to the VDOT District Maintenance Engineer and the Central Office Maintenance Division Administrator.

8.1.1 Since VDOT has the responsibility to maintain all of the properties it owns or operates (e.g., roadway rights of way and easements, facility properties, etc.) and since such responsibilities include maintaining land surfaces to prevent/control erosion, for the purposes of VPDES Construction Permit termination for the VDOT RLDAs or offsite support areas located within VDOT right of way or easement, the area is considered stable when all land disturbing activities have been completed and all disturbed areas not covered with a non-erodible surface have been limed, fertilized, seeded and mulched in accordance with an approved nutrient management plan.

8.2 The VDOT District VPDES Construction Permit Coordinator shall upload all LD-445D forms (including the permanent BMP information) received to the InsideVDOT VPDES Construction Permit web site on or before the last day of each month.

8.3 The VDOT Central Office VPDES Construction Permit Coordinator shall compile all VPDES Construction Permit termination information and enter the appropriate data into the VPDES database.

The VDOT Central Office VPDES Construction Permit Coordinator shall generate a VPDES Construction Permit Termination Report from the VPDES data base. The permanent BMP information is to be added to the VPDES Construction Permit Termination Report and all information is to be sent to DEQ along with the monthly VPDES Construction Permit Registration Report.

8.4 The VDOT Central Office VPDES Construction Permit Coordinator shall retain a copy of the permit termination information on file for a period of not less than 3 years after the termination date. The VDOT Central Office VPDES Construction Permit Coordinator shall also enter the permanent BMP information into the L&D BMP Design Data Base.

9.0 FORMS

LD-445	VPDES Construction Permit Registration Information
LD-445A	VPDES Construction Permit Contact Information
LD-445B	VPDES Construction Permit Fee Registration
LD-445C	ESC and SWM Plan Certification
LD-445D	VPDES Construction Permit Termination Notice
LD-445E	Stormwater Pollution Prevention Plan (SWPPP) Certification
LD-445F	Notification of Emergency Related Land Disturbing Activities

L&D forms are available through the VDOT website and can be downloaded at the following link: http://vdotforms.vdot.virginia.gov/

VIRGINIA DEPARTMENT OF TRANSPORTATION

LOCATION AND DESIGN DIVISION

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: STORMWATER POLLUTION PREVENTION PLAN	NUMBER: IIM-LD-246.3
SPECIFIC SUBJECT: STORMWATER POLLUTION PREVENTION PLAN DOCUMENTS AND COMPONENTS	DATE: AUGUST 26, 2013
	SUPERSEDES: IIM-LD-246.2
APPROVAL:	B. A. Thrasher, P.E. State Location and Design Engineer Approved August 26, 2013

CURRENT REVISION

- Changes have been made throughout this IIM to reflect new requirements in the Virginia Stormwater Management Program Regulations and to clarify requirements in the General Permit for Discharges of Stormwater from Construction Activities (the VSMP Construction Permit).
- Shading has been omitted due to the number of changes.

EFFECTIVE DATE

- These instructions are effective upon receipt.

ACRONYMS

- BMP – Best Management Practice
- DEQ – Department of Environmental Quality
- ESC – Erosion and Sediment Control
- ESCCC – Erosion and Sediment Control Contractor Certification
- IIM – Instructional and Informational Memorandum
- LD – Location and Design

- RLD – Responsible Land Disturber
- RLDA – Regulated Land Disturbance Activity
- R&B – Road and Bridge
- SWM – Stormwater Management
- SWPPP – Stormwater Pollution Prevention Plan
- VDOT – Virginia Department of Transportation
- VSMP – Virginia Stormwater Management Program

1.0 BACKGROUND

1.1 Section 107.16 (e) of the 2007 VDOT R&B Specifications requires all land disturbance activities that disturb 10,000 square feet or greater (2500 square feet or greater in the area defined as Tidewater, Virginia in the Chesapeake Bay Preservation Act) (see the latest version of IIM-LD-11) to have a SWPPP.

1.2 The VSMP General Permit for the Discharge of Stormwater from Construction Activities (hereafter referred to as the VSMP Construction Permit) also requires a SWPPP for activities covered under that permit. While a SWPPP is an important component of the VSMP Construction Permit, it is only one of the many requirements that must be addressed in order to be in full compliance with the conditions of the permit. Those persons who oversee or perform activities covered by the VSMP Construction Permit must review and understand all of the conditions and requirements contained within that permit.

1.3 Effective July 1, 2013, the DCR Stormwater Program, including the Construction Permit Program, was transferred to the DEQ. The sections of the Virginia Administrative Code (VAC) referenced herein reflect new numbering as a result of the program transfer.

2.0 SWPPP APPLICABILITY AND REQUIREMENTS

2.1.1 A SWPPP identifies potential sources of pollutants which may reasonably be expected to affect the stormwater discharges from the RLDA, and any support areas included in the VSMP Construction Permit coverage for the RLDA, and describes and ensures the implementation of practices to minimize pollutants in such discharges. For the purposes of this IIM, the RLDA is defined as the proposed construction or maintenance related land disturbing project or activity that generates the need for acquiring coverage under the VSMP Construction Permit and/or requires an ESC Plan.

2.1.2 The required contents of a SWPPP for those land disturbance activities requiring coverage under the VSMP Construction Permit are found in Section II, D of the General Permit section of the VSMP Regulations (9VAC25-880-70).

2.3 Except for the items dealing with the post construction stormwater management requirements, the majority of the items that must be addressed in the SWPPP for land disturbance activities requiring VSMP Construction Permit coverage must also be addressed for those land disturbance activities that do not require VSMP Construction Permit coverage but do require an ESC Plan in accordance with the requirements of the Virginia ESC Law and Regulations.

2.4 When the land disturbing activity requires coverage under the VSMP Construction Permit, the SWPPP must also include a copy of the VSMP Construction Permit, the VSMP Construction Permit Registration Information form LD-445, the VSMP Construction Permit Contact Information form LD-445A, the SWPPP Certification form LD-445E and the VSMP Construction Permit coverage letter received from DEQ showing a project specific permit number.

2.5 The SWPPP for the RLDA is to include any on site support facilities used exclusively for the RLDA (e.g., borrow and disposal sites, the contractor's storage and fueling areas, etc.) (see the current version of IIM-LD-242 for guidance related to SWPPP information for support facilities).

2.6 For those RLDAs requiring coverage under the VSMP Construction Permit, Section II B.1. of the General Permit section of the VSMP Regulations (9VAC25-880-70) requires the SWPPP to be signed by a person so identified in Section III K.2 of that same document. For a State Agency, that person is the principal executive officer or his designee. For VDOT projects, that authority has been delegated to the RLD for each specific RLDA.

2.7 Many of the items required in the SWPPP are inherently contained in the construction plans (or other such documents) by means of the erosion and sediment control plans and the post construction stormwater management plans and in other VDOT documents such as the R&B Standards and Specifications, which can be incorporated into the SWPPP by reference.

3.0 FORM LD-445E

3.1 For those land disturbing activities requiring coverage under the VSMP Construction Permit, the Construction Permit requires that the SWPPP for any support facilities be included in the permit coverage for the RLDA be developed and included with the SWPPP for the RLDA prior to issuance of permit coverage.

3.2 On most VDOT land disturbing activities, it is the responsibility of the contractor or other such person performing the land disturbance activity to identify the location of the support facilities and provide the SWPPP for such to the project engineer/RLD for review and approval (see the current version of IIM-LD-246 for further discussion on support facilities).

3.3 Since the VSMP Construction Permit coverage for VDOT RLDAs is normally obtained prior to the identification of the support areas, a mechanism is required whereby the project files can be documented, and DEQ can be assured, that all of the information for the support facilities, as well as other required information not available at the time the VSMP Construction Permit coverage for the RLDA is applied for, has been, or will be, included in the SWPPP for the RLDA. The mechanism to be used for this purpose will be SWPPP Certification form LD-445E.

3.3.1 Form LD-445E is also to be used to identify the VDOT person responsible for the inspection of the erosion and sediment control facilities.

3.3.2 The DEQ has approved the signature of the RLD on the LD-445E form as meeting the SWPPP signatory requirements contained in Section II B.1. of the General Permit section of the VSMP Regulations (9VAC25-880-70).

3.3.3 Form LD-445E is to be completed by the VDOT RLD for all land disturbing activities requiring VSMP Construction Permit Coverage and/or an ESC Plan/SWPPP.

3.3.4 A copy of completed form LD-445E is to be retained with the other SWPPP documents for the RLDA.

3.3.5 For those land disturbing activities requiring coverage under the VSMP Construction Permit, the VDOT RLD is to send the completed LD-445E form to the District VSMP Construction Permit Coordinator for inclusion with other VSMP Construction Permit data that is submitted monthly to the Central Office VSMP Construction Permit Coordinator.

4.0 SWPPP GENERAL INFORMATION SHEETS

4.1 In order to provide a clear understanding of what is required in a SWPPP and to provide a reference as to where those items are located within the contract/construction documents, a set of SWPPP General Information Sheets has been developed. The SWPPP General Information Sheets provide a summary of the information required in Section II D. of the General Permit section of the VSMP Regulations (9VAC25-880-70) and, where not included on the General Information Sheets, provide a reference to where that information can be found within the contract/construction documents for the RLDA (e.g., the construction plans or other such documents, the VDOT R&B Standards and/or Specifications, contractor supplied documents, etc.).

4.2 The SWPPP General Information Sheets incorporate many of the notes previously included in the ESC General Notes as well as those necessary to identify and describe the post construction stormwater management plan for the RLDA (if applicable).

4.3 The SWPPP General Information Sheets are to be included in the construction plan set (or other such documents) for all land disturbance activities requiring VSMP Construction Permit coverage and/or an erosion and sediment control plan. Completion and inclusion of the SWPPP General Information Sheets in the contract documents satisfies one of the many requirements contained in the VSMP Construction Permit. Those persons who oversee or perform activities covered by the VSMP Construction Permit must review and understand all of the conditions and requirements contained within that permit.

4.4 The SWPPP General Information Sheets are updated from time to time to clarify and/or include additional requirements as a result of changes to the VSMP Regulation, the VSMP Construction Permit or VDOT's Approved ESC and SWM Standards and Specifications. Prior to finalization of the construction plans or other such documents for a proposed land disturbance activity, the Project Manager or other such project authority is to verify that the most recent SWPPP General Information Sheets are included.

4.5 The SWPPP General Information Sheets have been developed in two formats as follows:

4.5.1 Available in the CADD sheet 2000 cell library (referenced as SWPPP1, SWPPP2 & SWPPP3) for use with those land disturbance activities that have a formal set of construction plans (i.e., those developed under a Minimum (M) Plan or Complete (C) Plan Process).

4.5.2 Available in Falcon under the Engineering Services' eng-scr directory (No Plan sub-directory) as an 8.5" X 11" letter size word document for use with those land disturbance activities developed under a No Plan (N) Process or for non-routine maintenance activities.

4.6 The SWPPP General Information Sheets are to be completed by the ESC Plan Designer, the Hydraulic Engineer or other such person who has the responsibility for developing the ESC and post construction SWM Plan (if applicable) for the RLDA.

4.7 Information required by those notes on the SWPPP General Information Sheets designated with an asterisk is to be developed/provided by the contractor. Information required by those notes on the SWPPP General Information Sheets designated with a double asterisk is to be provided/completed by the VDOT RLD.

4.8 All information/notes in Sections I through VI of the SWPPP General Information Sheets are applicable to land disturbance activities requiring coverage under the VSMP Construction Permit.

4.9 For land disturbance activities requiring an ESC Plan but exempt from the VSMP Regulations or the need for coverage under the VSMP Construction Permit, the information noted on the SWPPP General Information Sheets in Section IV and Section VI, is, typically, not applicable. Those sections, as well as any other notes/information in other sections of the SWPPP General

Information Sheets not applicable to a specific land disturbance activity should be deleted, struck through or noted as "NA" (i.e., not applicable to the land disturbance activity).

4.10 Section V of the SWPPP General Information Sheets requires a location map that clearly identifies the project location and all surface waters, such as rivers, streams, lakes, ponds, etc. (including names where applicable), within a one mile radius of the project site. Instructions for placing a location map in Section V can be found at the web addresses noted on the SWPPP General Information Sheets. Those unable to access the noted sites should contact the District or Central Office Hydraulics Section, as appropriate, for assistance. Other methods that produce the desired map may be used in lieu of those noted.

4.11 The permanent BMP information (when applicable) in Section VI is to be completed by the Hydraulic Engineer (or other such person developing the post construction SWM Plan) and is to be based on the pre-construction design. This information is to be updated when any changes to the post construction SWM Plan are authorized during the construction phase of the activity. Such changes are to be made as a formal revision to the plans. When submitting a request for termination of the VSMP Construction Permit coverage, the RLD is to use the information in the Permanent BMP table(s) in completing the BMP information section on form LD-445D.

4.12 Some of the notes on the General Information Sheets require project specific user input. Some examples of the information required are as follows:

4.12.1 Section I General

4.12.1.1 Note 1 - Activity Description (Examples)

- This roadway construction project consists of adding two additional parallel lanes to an existing two lane rural roadway facility.
- This roadway construction project consists of improving an existing urban roadway intersection by adding left turn and right turn lanes.
- This roadway construction project consists of replacement of an existing bridge with a new bridge and improvements to the existing roadway approaches.
- This roadway construction project consists of widening an existing urban street and adding additional turn lanes.
- This roadway maintenance project consists of re-grading and enlarging the roadside ditches and replacing drainage pipes along an existing rural roadway.
- This roadway maintenance project consists of re-grading the roadside ditches and replacing deteriorated drainage pipes along an existing rural roadway in order to reestablish original grade and/or hydraulic capacity.

4.12.1.2 Note 6 - Critical Areas (Example)

- There is one farm pond located 1500' north of Station 29+00 Route 602 and an existing perennial stream located 1000' east of and parallel to Route 55 between Stations 204+00 and 212+00.

4.12.2 Section II Erosion and Sediment Control

4.12.2.1 Note 1 - Variances (Example)

- A variance to decrease the height of silt fence to 26" approved by letter from the Department of Environmental Quality's Piedmont Regional Office dated July 15, 2013.

5.0 SWPPP DOCUMENTS

5.1 For VDOT RLDAs, the required documents for a SWPPP shall include, but are not limited to, the following:

1. The construction plans/documents.
2. The SWPPP General Information Sheets (with all notes completed with appropriate information).
3. The ESC Plan.
4. The post construction SWM Plan (if applicable).
5. The VDOT R&B Standards and Specifications, Supplemental Specifications, Special Provisions and Special Provision Copied Notes.
6. A copy of the VSMP General Permit For Discharges Of Stormwater From Construction Activities (the Construction Permit) (when applicable).
7. A copy of the VSMP Construction Permit coverage letter received from DEQ (when applicable).
8. A copy of the VSMP Construction Permit Registration Information form LD-445, (when applicable).
9. A copy of the SWPPP Certification form LD-445E.
10. Documents required to be developed/provided by the contractor for erosion and sediment control and stormwater pollution prevention associated with any support facilities to be included in the VSMP Construction Permit coverage for the RLDA.
11. All ESC inspection reports.
12. All ESC and SWM design computations and supporting data.
13. A Record Set of Plans (see Section 6.2 of this IIM for more information)

5.2 All documents related to the SWPPP for a RLDA (except for the ESC and SWM design computations and supporting data) shall be maintained at the activity site and shall be readily available for use by those with SWPPP implementation responsibilities. All documents related to the SWPPP for a RLDA shall be

readily available for review by others upon request during normal working business hours. SWPPP related information not included in the construction plans/documents, the VDOT R&B Standards, Specifications, Supplemental Specifications, Special Provisions or Special Provision Copied Notes and the ESC and SWM design computation files is to be kept in a designated separate paper and/or electronic file. Where no facilities are available at the activity site to maintain the SWPPP documents, they are to be kept at a location convenient to the activity site where they will be readily available for use by those with SWPPP implementation responsibilities and would be available for review by others upon request during normal business working hours. Where the SWPPP documents are not stored on site, a copy of such documents, except for the ESC and SWM engineering calculations and documentation, shall be in the possession of those with day to day operational control over the implementation of the SWPPP (e.g. the VDOT RDL, the VDOT ESC Inspector, the contractor's ESCCC person, etc.) whenever they are on site.

6.0 SWPPP COMPONENTS

6.1 The following list outlines the major components of a SWPPP, the person(s) responsible for ensuring that the component is addressed in the SWPPP for a RLDA and how that component is addressed in the construction plans or other such documents for a VDOT land disturbing activity.

6.1.1 A copy of the VSMP Construction Permit registration statement and coverage letter (when applicable).

- The RLD ensures that a copy of the VSMP Construction Permit Registration Information form LD-445, a copy of the SWPPP Certification form LD-445E and the VSMP Construction Permit coverage letter received from DEQ is maintained in the SWPPP file for the RLDA.

6.1.2 A copy the VSMP Construction Permit (when applicable).

- The RLD ensures that a copy is maintained in the SWPPP file for the RLDA. A copy of the VSMP Construction Permit can be obtained at: http://www.virginiadot.org/business/resources/LocDes/VSMP_Construction_Permit_VAR10.pdf

6.1.3 A narrative description of the nature of the construction activity, including the function of the project.

- The ESC Plan Designer incorporates project specific information into the appropriate note(s) on the SWPPP General Information Sheets for the RLDA.

6.1.4 The intended sequence and timing of activities that disturb soils at the site (e.g., grubbing, excavation, grading, utilities and infrastructure installation).

- The Contractor or other such person develops/provides project specific information. The RLD ensures that the information is maintained in the SWPPP file for the RLDA.

6.1.5 A record of the dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated.

- The Contractor or other such person develops/provides project specific information. The RLD ensures that the information is maintained in the SWPPP file for the RLDA.

6.1.6 Estimates of the total area expected to be disturbed by excavation, grading, or other construction activities.

- The ESC Plan Designer obtains the information and incorporates it into the appropriate note on the SWPPP General Information Sheets for the RLDA.

6.1.7 A description of any other potential pollutant sources, such as vehicle fueling, storage of fertilizers or chemicals, sanitary waste facilities, etc.

- The Contractor or other such person develops/provides project specific information. The RLD ensures that the information is maintained in the SWPPP file for the RLDA.

6.1.8 Identification of the nearest receiving waters at or near the construction site that will receive discharges from disturbed areas of the RLDA.

- The ESC Plan Designer determines the information and incorporates it into the appropriate note on the SWPPP General Information Sheets for the RLDA.

6.1.9 The location and description of any discharge associated with industrial activity other than construction at the site. This includes stormwater discharges from dedicated asphalt plants and dedicated concrete plants that are covered by the VSMP Construction Permit for the RLDA.

- This information is covered by a standard note on the SWPPP General Information Sheets.

6.1.10 A legible general location map (e.g., USGS quadrangle map, a portion of a city or county map, or other map) with sufficient detail to identify the location of the construction activity and surface waters within one mile of the construction activity.

- The ESC Plan Designer or the Hydraulic Engineer develops and incorporates the location map into Section V of the SWPPP General Information Sheets for the RLDA.

6.1.11 A legible site map/plan identifying the following items:

6.1.11.1 Directions of stormwater flow and approximate slopes anticipated after major grading activities.

- The ESC Plan Designer ensures that the appropriate information (e.g., grading contours, typical sections, profiles and/or cross sections) is included in the construction plans or other such documents for the RLDA.

6.1.11.2 Areas of soil disturbance and areas of the site which will not be disturbed.

- The ESC Plan Designer ensures that the appropriate information (e.g., plan view construction limits and/or typical sections/cross sections) is included in the construction plans or other such documents for the RLDA.

6.1.11.3 Locations of major structural and nonstructural control measures identified in the SWPPP, including those that will be permanent after construction activities have been completed.

- The ESC Plan Designer ensures that the appropriate information is included in the construction plans or other such documents for the RLDA.

6.1.11.4 Locations where stabilization practices are expected to occur.

- The ESC Plan Designer ensures that the appropriate information (e.g., plan view construction limits and/or typical sections/cross sections) is included in the construction plans or other such documents for the RLDA.

6.1.11.5 Locations of surface waters.

- The ESC Plan Designer ensures that the appropriate information is included in the construction plans or other such documents for the RLDA.

6.1.11.6 Locations where concentrated stormwater discharges from the construction site.

- The ESC Plan Designer ensures that the appropriate information is included in the construction plans or other such documents for the RLDA.

6.1.11.7 Locations of any support areas (e.g., material, waste, borrow or equipment storage areas) that are to be included in the permit coverage and the SWPPP for the RLDA.

- The Contractor or other such person provides project specific information. The designated RLD ensures that the information is maintained in the SWPPP file for the RLDA.

6.1.11.8 Locations of other potential pollutant sources, such as vehicle fueling, storage of chemicals, concrete wash-out areas, sanitary waste facilities, including those temporarily placed on the construction site, etc.

- The Contractor or other such person provides project specific information. The designated RLD ensures that the information is maintained in the SWPPP file for the RLDA.

6.1.11.9 Areas where final stabilization has been accomplished.

- The Contractor or other such person provides project specific information. The designated RLD ensures that the information is maintained in the SWPPP file for the RLDA.

6.1.12 The SWPPP shall include a description of all control measures that will be implemented as part of the construction activity to minimize pollutants in stormwater discharges. For each major construction activity identified, the SWPPP shall clearly describe appropriate control measures, the general sequencing during the construction process in which the control measures will be implemented, and which operator (i.e., contractor) is responsible for implementation of the control measure.

- The ESC Plan Designer/Hydraulics Engineer develops the ESC Plan and the SWPPP for inclusion in the construction plans/documents for the RLDA. The Contractor or other such person develops/provides proposed revisions to the ESC Plan and the SWPPP as necessary to meet differing field conditions or construction sequencing. The VDOT ESC Inspector reviews and the VDOT RLD approves any changes to the ESC Plan and the SWPPP. The RLD ensures that all required information is maintained in the SWPPP file and/or documented on the Record Set of Plans (see Section 6.2 of this IIM for additional information) for the RLDA in accordance with Section 107.16(e) of the 2007 Road and Bridge Specifications.

6.1.13 The SWPPP shall include a description of all erosion and sediment control measures (including supporting calculations) that will be installed during the construction process to control any potential pollutants in stormwater discharges from the construction site.

- The ESC Plan Designer develops the ESC Plan and required calculations for the RLDA. The ESC Plan is incorporated into the construction plans/documents for the RLDA. The ESC calculations are maintained in the project hydraulic files and the location of such files is documented by the ESC Plan Designer in the appropriate note on the SWPPP General Information Sheets for the RLDA.

6.1.14 The SWPPP shall describe measures to prevent the discharge of solid materials, including building materials, garbage, and debris to state waters, except as authorized by a Clean Water Act § 404 permit.

- This information is covered by a standard note on the SWPPP General Information Sheets.

6.1.15 The SWPPP shall describe control measures used to comply with applicable state or local waste disposal, sanitary sewer or septic system regulations.

- This information is covered by a standard note on the SWPPP General Information Sheets.

6.1.16 The SWPPP shall include a description of construction and waste materials expected to be stored on site, with updates as appropriate. The SWPPP shall also include a description of controls, including storage practices, to minimize exposure of the materials to stormwater and for spill prevention and response.

- The Contractor or other such person develops/provides project specific information. The designated RLD reviews and approves the information and ensures that copies of such are maintained in the SWPPP file for the RLDA.

6.1.17 The SWPPP shall include a description of, and all necessary calculations supporting, all post-construction stormwater management facilities (BMPs) that will be installed prior to the completion of the construction process to control pollutants in stormwater discharges after construction operations have been completed.

- The Hydraulic Engineer develops the post construction SWM Plan and required calculations. The post construction SWM Plan is incorporated into the construction plans/documents. The post construction SWM

calculations are maintained in the project hydraulic files and the location of such files is documented by the Hydraulic Engineer in the appropriate note on the SWPPP General Information Sheets for the RLDA.

6.1.18 The SWPPP shall include a description of pollutant sources from any applicable support areas and a description of the control measures that will be implemented at those sites to minimize pollutant discharges.

- The Contractor or other such person develops/provides project specific information. The designated RLD reviews and approves the information and ensures that copies of such are maintained in the SWPPP file for the RLDA.

6.1.19 The name and phone number of qualified personnel conducting the ESC inspections shall be included in the SWPPP.

- The VDOT RLD provides the appropriate information on SWPPP Certification form LD-445E and ensures a copy is maintained in the SWPPP file for the RLDA.

6.1.20 A report summarizing the scope of the ESC inspections, names and qualifications of personnel making the inspections, the dates of the inspections, major observations relating to the implementation of the SWPPP, and any corrective actions taken.

- The Contractor's Erosion and Sediment Control Contractor Certified (ESCCC) person conducts initial inspections and completes the Construction Runoff Control Inspection Form C-107. The VDOT Certified ESC Inspector verifies inspection information on Form C-107 and the RLD ensures that all of the C-107 forms are maintained in the SWPPP file for the RLD.

6.1.21 Where the RLDA discharges to a surface water with an approved (as of the effective date of the VSMP Construction Permit) Total Maximum Daily Load (TMDL), the pollutant identified in any Waste Load Allocation (WLA) assigned to a construction activity must be identified in the SWPPP. The SWPPP shall include strategies and control measures to ensure consistency with the assumptions and requirements of any TMDL WLA that applies to the operator's discharge.

- The TMDL and WLA information is included on the VSMP Construction Permit Registration Information form LD-445, a copy of which is to be maintained with other SWPPP documents for the RLDA. The ESC Plan Designer/Hydraulics Engineer ensures that the ESC and post construction SWM Plans consider the requirements of any applicable TMDL WLA.

6.2 Information contained in the SWPPP shall be updated as necessary by the RLD or his designee to reflect changes required due to differing field conditions and/or construction sequencing. Such changes as well as other information requiring documentation as construction activities are initiated or completed is to be maintained on or with a Record Set of Plans (the Record Plan Set).

6.2.1 The Record Set of Plans is a paper or electronic copy of the construction plans that is used to document/record the following information:

- Approved changes/modifications to the proposed ESC Plan.

- Approved changes/modifications to other components of the SWPPP.
- Required SWPPP information such as:
  - Dates of beginning and end of major grading operations.
  - Dates of initiation and completion of temporary/permanent stabilization practices.
  - Locations of material, waste, borrow or equipment storage areas included in the project's VSMP Construction Permit coverage.
  - Locations of other potential pollutant sources, such as vehicle fueling, storage of chemicals, concrete wash-out areas, sanitary waste facilities, etc., placed on the construction site.
  - Areas where final stabilization has been accomplished.

6.2.2 The Record Plan Set shall be kept current and shall reflect up to date conditions of the RLDA.

6.2.3 The Record Plan Set must be maintained at the project site and be available for review upon request (see Section 5.2 of this IIM for exceptions).

7.0 FORMS

7.1 LD-445	VSMP Construction Permit Registration Information
7.2 LD-445D	VSMP Construction Permit Termination Notice
7.3 LD-445E	Stormwater Pollution Prevention Plan (SWPPP) Certification
7.4 C-107	Construction Runoff Control Inspection Form

COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION

Stephen C. Brich, P.E.
Commissioner

1401 East Broad Street
Richmond, Virginia 23219

(804) 786-2701
Fax: (804) 786-2940

February 9, 2024

ADDENDUM NO. 2 TO ALL BIDDERS:

Invitation for Bids (IFB)#:	158129
Project Name:	Office Building Area Headquarters New London
Commodity:	Construction Services
Date Advertised:	January 9, 2024
For Delivery To:	Commonwealth of Virginia Department of Transportation
Bid Due:	**February 13, 2024** at 2:00 PM
Pre-Bid Date:	**January 24, 2024** at 10:00 AM

The above is hereby changed to read:

1. Addendum Number 2 including Hughes Associates Architects & Engineers Addendum Number 2 sealed by John R. Garrett, including the responses to Pre-bid Questions (2 pages).

2. In reference to page 1 of the Notice of Invitation for Bids, "The deadline for submitting bids is 2:00 P.M. sharp, as determined by the Bid Officer, on February 13, 2023." change to read "**The deadline for submitting bids is 3:00 P.M. sharp, as determined by the Bid Officer, on February 20, 2023**."

3. In reference to page 1 of the Notice of Invitation for Bids, "The bids will be opened publicly and read aloud beginning 2:00 PM on February 14, 2023" change to read "**The bids will be opened publicly and read aloud beginning 3:00 PM on February 21, 2023.**"

Note: Acknowledgement of this addendum or any subsequent addenda must be prior to the bid due date and time or signed and uploaded as an attachment with the electronic bid submission. Failure to acknowledge or submit the addendum may be grounds for declaring the bid non-responsive.

Sincerely,

Joshua Saunders

Joshua L. Saunders.
Senior Procurement Officer
Phone: 804-729-6845

Name of Firm: _____

Signature/Title _____ Date _____

HUGHES ASSOCIATES
ARCHITECTS & ENGINEERS

ADDENDUM 2

DATE:	February 8, 2024
COMM NO:	15037.012
PROJECT:	Office Building Area Headquarters New London
PROJECT CODE:	501-18041-021
TO:	John Dyer
FROM:	John R. Garrett
RE:	Addendum 2
	IFB# 158129

The following clarifications, additions and/or changes shall be incorporated into the bidding documents, consisting of bidding requirements, conditions of the contract, drawings and specifications, dated February 1, 2023.

CONTACT INFORMATION
Hughes Associates Architects & Engineers
A Professional Organization
3800 Electric Rd Suite 300
Roanoke, VA 24018
Tel.: 540.342.4002 Fax: 540.342.2060
Contact: John R. Garrett
Email: JGarrett@hughesAE.com

General

Item 1. Tree Removal

1. Tree removal will be performed by VDOT before the issuing of a Notice to Proceed.
2. Stump removal, which is required for new construction, will be required by the contractor.

WORKING DRAWINGS

Item 1. Sheet C-1

1. Change notes “REMOVE TREES AS NEEDED…” to “REMOVE TREE STUMPS AS NEEDED…”

Sheet C-2

1. Change notes “REMOVE TREES / ADJUST SANITARY LINE…” to “REMOVE STUMPS / ADJUST SANITARY LINE…”

Sheet C-3

2. Change notes “REMOVE TREES AS NEEDED FOR SANITARY LINE…” to “REMOVE STUMPS AS NEEDED FOR SANITARY LINE…”

PROJECT MANUAL

Item 1. Section 02110 Site Clearing

1. Revise Part 3.3C to state “Clear site of stumps, shrubs…” instead of “Clear site of trees…”

Item 2. Section 10505 LOCKERS

Add:

2.2.1.1 SOLID PLASTIC LOCKERS

A. Provide ASI Storage Solutions, Columbia Lockers, Scranton Products or equivalent.

B. Lockers: Factory assembled, made of solid plastic panels, tested in accordance with NFPA 286, homogenous color throughout.
   1. Doors: Full overlay without frame.
   2. Door Color: To be selected by Architect.
   3. Body Color: Manufacturer's standard white or light color.
   4. Type: Single-tier.
   5. Size: 18 inches wide by 24 inches deep by 72 inches high.
   6. Interior equipment:
      a. Internal shelf, mounted between 9 inches and 12 inches from top of locker.
      b. Clothes hooks: double prong hook on back wall, single-prong hook on each side wall.
   7. Number Plate: Provide each locker door, aluminum, 1/2" letters.
   8. Finish: Enamel powder coat, color as selected by architect.

C. Accessible Locker:
   1. Equip door with recessed handle
   2. Provide an additional shelf at 15 inches above finish floor.
   3. Locate hat shelf at 48 inches above finish floor.