

Radford University MS4 Program Plan

General VPDES Permit No. VAR 040136

Effective Date: July 1, 2013

Expiration Date: June 30, 2018

Facilities Management
P.O. Box 6909
Radford, VA 24142

Submittal Date:

June 30, 2016

Submitted To:

Jay Roberts
Virginia Department of
Environmental Quality

Submitted BY:

Neal Thompson
Radford University
Recycling Corridnator

Introductory Note

This document is to provide the Department of Environmental Quality (DEQ) with the required MS4 program for Radford University to meet the required application and initial program schedule. Below is a brief history of the program and its purpose.

Radford University has held MS4 General Permit VAR040136 since 2013. At the end of each five- year term, the University must submit a new program plan to the Virginia Department of Environmental Quality (DEQ).

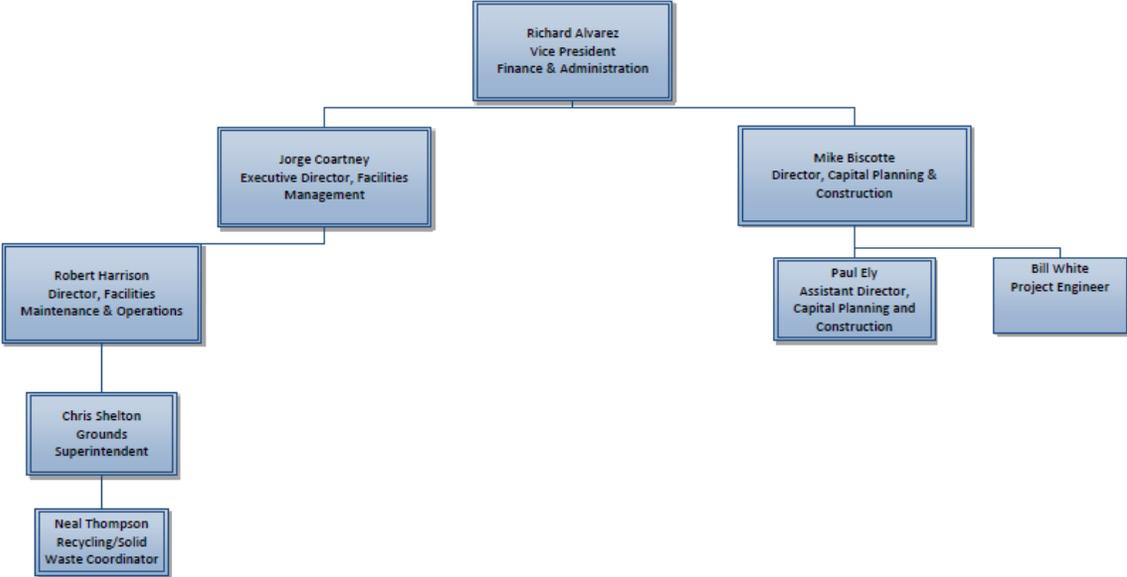
With approval from DEQ, this plan establishes guidelines for the Radford University Stormwater Management Program for the next Permit cycle. The following document is Radford University's program Plan Submission for 2013-2018 permit cycle.

Permit Requirements mandate six minimum control measures for the program (Public Education and Outreach, Public Involvement and Participation, Illicit Discharge Detection and Elimination, Construction Site Stormwater Runoff Control, Post – Construction Stormwater Management and Pollution Prevention and good Good Housekeeping). Facilities Management has developed best management practices in order to comply with the minimum control measure requirements and all other requirements outlined in the permit.

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Facilities Management



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Introduction

This document serves as the Registration Statement for Radford University per 9VAC25-870-370 General Permit for Discharges of Stormwater from Small MS4s. The Registration Statement serves as an overview of Radford University's MS4 Program Plan for the duration of the 2013-2018 permit cycle. Any revisions to this plan will be justified in writing and submitted to DEQ for review. The document follows the sequencing established in the permit.

General Registration Statement Information

Information pertaining to 4VAC50-60-1230 B 1-6:

- **Name:** Radford University
- **Type:** University
- **Address:** Radford University – Facilities Management (Armstrong Complex), 804 East Main Street (Physical) 501 Stockton St (Delivery)
- **Water ways currently receiving discharge:**
 - NE57 -New River- IMPAIRED: polychlorinated biphenyls (PCBs).
- **Estimated Drainage Area discharging to any impaired surface waters:**
 - Approximately 80 acres of the campus drain directly to the New River.
- **Physically Interconnected MS4s:**
 - City of Radford – VAR040135

VAR040136 B 9 - A list of all existing signed agreements between the operator and any applicable third parties where the operator has entered into an agreement in order to implement minimum control measures:

- Thompson & Litton is under contract with RU to perform erosion and sediment control inspection and record keeping in conformance with state standards.

VAR040136 B 10 - The name, address, telephone number and email address of either the principal executive officer or ranking elected official as defined in **9VAC25-870-370**:

Principle Executive Officer:

Title: Chief financial officer and vice president for finances and administration

Name: Richard Alvarez

801 East Main Street

Radford, VA 24142

Phone: (540) 831-5000

Email: ralvarez@radford.edu

VAR040136 B 11 -The name, position title, address, telephone number, and email address of any duly authorized representative as defined in 9VAC25-870-370:

Duly Authorized Representative:

Title: Executive Director, Facilities Management

Name: Jorge Coartney

801 East Main Street

Radford, VA 24142

Phone: (540) 831-7802

Email: jcoartne@radford.edu

Description of Drainage Area

Approximately 80 acres of the campus drain directly to the New River while 114 acres drain to the City of Radford municipally separate storm water sewer system. A small 6 acre portion drains to a ditch along the Norfolk Southern Railroad. The City storm system and Norfolk Southern Railroad ditch also flow into the New River.

Virginia's section of the New River Watershed Boundary Dataset (NWBD) for this drainage area is NE-57. The adjacent section of the New River is included on the state's Final 2012 305(b)/303(d) integrated Report as impaired for fish consumption due to high levels of polychlorinated biphenyls (PCBs). This section of the New River is identified assessment Unit VAW-N18R-NEW01A00 within impaired area VAW-N18R-01. A TMDL to address the impairments is scheduled for 2018: Therefore no TMDL loads have been allocated at this time.

MCM #1: Public Education and Outreach

Radford University operates a Stormwater Management Program in compliance with the Virginia General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4 General Permit). In accordance with Section II.B.1 of the permit, Radford University implements a Public Education and Outreach Program on Stormwater impacts.

For the 2013-2018 MS4 permit cycle, Radford University has identified three initial target audiences and high priority water quality issues. Consistent with the MS4 General Permit, the Program considers the following goals:

- ***Increase the knowledge of Radford University students, faculty, and staff about the steps that can be taken to reduce Stormwater pollution, placing priority on reducing impacts to impaired waters and other local water pollution concerns;***
- ***Increase Radford University’s students, faculty, and staff knowledge of hazards associated with illegal discharges and improper disposal of waste, including pertinent legal implications.***
- ***Implement a diverse program with strategies that are targeted towards audiences most likely to have significant Stormwater impacts.***

These goals are intended to be met as part of an iterative program that will measure effectiveness of the Program by assessing the level of knowledge, over time, of the public that is defined as residents and staff.

VAR040136 Section II C 1-6 The Program is designed consistent with the MS4 General Permit to:

1. ***Identify three high-priority water quality issues and provide rationale for the selection of each issue;***

High Priority Water Quality Issue	Rationale
Vehicle maintenance (Petroleum Releases)	Approximately 4,035 parking passes are issued annually. Parking pass breakdown per group are as follows. On-Campus Students 1,340. Off Campus students 1,195. Faculty/staff 1,500 Because of this large number of vehicles traveling to campus the potential for illicit discharges of automotive fluids is significant.
Trash elimination and Recycling	Aquatic litter and debris are a highly pervasive and visible form of pollution that has harmful impacts on wildlife and human health. Aquatic ecosystems—streams, rivers, wetlands, and estuaries—are under considerable pressure from human activities.
Pet Waste	Pets and urban Wildlife are major sources of water contamination because pet waste contains harmful bacteria and parasites. Dog feces can contain fecal coliform bacteria, which can spread diseases like Giardia, Salmonella, Campylobacter; causing serious illness in humans

2. Identify and estimate the population size of the target audience who is most likely to have significant impacts on each water quality issue;

(Information provided by Radford University Institutional Research)

Target Audience	Population 2016	Rationale
On- Campus Students	2,948	On- campus students are likely to impact stormwater in their everyday interactions with the campus community. Their greatest area of impact is trash management, including the disposal of batteries, electronics, trash, cigarette butts, and food waste
Off- Campus Students	6,518	Off- campus Students frequent campus due to classes, sporting events and activities. As a result, they have potential to impact stormwater. The area of concern is trash management, pet waste and petroleum release from vehicles.
Faculty / Staff	1,675	Faculty / Staff are most likely long-term members of the campus community and as such can be crucial advocates for stormwater management. Many employees deal with operations which use chemicals and equipment that have the potential to impact stormwater. Others are in a position to teach the student population about stormwater pollution prevention and facilitate research opportunities.

3. Develop the relevant message and associated educational and outreach materials for distribution to the target audiences.

- Radford University has identified three initial target audiences and high priority water quality issues. These audiences and issues will be the focus of the Public Outreach and Education Program during the permit cycle.

4. Provide for Public Participation during public education and outreach program development.

- Radford University will have 4 events please see Appendix (1) Public Education and outreach plan.

5. Annually conduct sufficient education and outreach activities designed to reach 20% of each high priority issue.

- Radford University will strive to reach 20% of each target audience annually through a variety of mechanisms including internet & social media, table events and projects.

6. Provide for the adjustment of target audiences and messages including education material and delivery mechanisms to reach target audiences in order to address any observed weaknesses of shortcomings.

- At the end of each reporting year, Radford University will evaluate the effectiveness of its public outreach and education efforts. Any observed weakness or short comings found during the evaluation will be appropriately addressed.

VAR040136 Section II B 1 f The MS4 Program Plan shall describe how the conditions of this permit shall be updated in accordance with Table 1.

Radford University will develop a Public Outreach and Education Plan for the 2013-2018 MS4 permit cycle. This plan will discuss how the aforementioned target audiences and high priority water quality

issues will be addressed during the permit cycle. Radford University will strive to complete the Public Outreach and Education Plan by the summer of 2017 and will give a progress update in the annual report submission. The final copy of the Public Outreach and Education Plan will be available at Radford University Facilities Management website

Annual Reporting Requirements

Per VAR040136 Section II B 1 g, each annual report shall include:

- 1. List of education and outreach activities conducted during the reporting period for each high priority water quality issue, the estimated number of people reached, and an estimated percentage of the target audience or audiences reached.*

- 2. List of education and outreach activities that will be conducted during the next reporting period for each high priority water quality issue, the estimated number of people that will be reached, and an estimated percentage of the target audience or audiences that will be reached.*

MCM #2: Public Participation/Involvement

During the 2013-2018 permit cycle, Radford University's MS4 Program Plan will be updated at least once a year in conjunction with annual reports. An updated MS4 Program Plan will be maintained on Radford University Sustainability website. Copies of each annual report will be posted on Radford University Sustainability within 30 days of submittal and will remain online for the duration of the permit cycle. At the end of each reporting year, Radford University will evaluate the effectiveness of its public outreach and education efforts. Any observed weaknesses or shortcomings found during the evaluation will be addressed and solutions will be proposed. This evaluation will be included in each MS4 Annual Report

VAR040136 Section II B 2 a (2) – Public Involvement:

a) Maintain an updated MS4 Program Plan on the Radford University Sustainability website.

- Radford University will annually evaluate and update its MS4 Program Plan in conjunction with each annual report. The updated MS4 Program Plan will be maintained on Radford University's Sustainability website.

b) Post Copies of each annual report on the Radford University Sustainability website.

- A copy of each MS4 Annual Report will be posted on the Radford University Sustainability website within 30 days of submittal and will remain online for the duration of the MS4 permit cycle.

c) Notify the public and provide for receipt of comment of the proposed MS4 Program Plan that will be submitted with the registration statement.

- Radford University will post a copy of the proposed MS4 Program Plan on the Radford University Sustainability website. A campus notice will be sent out to the University community to notify them that the proposed plan is available online and open to public comment. Any comments received will be reviewed by Radford University facilities management and addressed in the appropriate annual report.

VAR040136 Section II B 2 b Public Participation Participate, through promotion, sponsorship, or other involvement, in a minimum of four local activities annually.

- Radford University will satisfy this requirement through a variety of activities on campus and in surrounding communities. These activities will be addressed in the Public Participation written procedures described in VAR040136 Section II B 2 c.

VAR040136 Section II B 2 c The MS4 Program Plan shall include written procedures for implementing this program.

- Radford University will develop written procedures for the Public Involvement and Participation portion of the Radford University MS4 Program. These will be created in conjunction with the development of the Public Education and Outreach Plan. See Appendix (1) A progress update will be given in the Annual Report.

Annual Reporting Requirements

Per VAR040136 Section II B 2 d, each MS4 Annual Report shall include:

1. *A web link to the MS4 Program Plan and annual report.*
2. *Documentation of compliance with the public participation requirements of this section*

During the 2013-2018 MS4 permit cycle, Radford University will update its current IDDE Program in order to meet the requirements stated in VAR040136 Section II B 3. At the end of each reporting year, Radford University will evaluate the effectiveness of its IDDE public education efforts and response procedures. Any observed weaknesses or shortcomings found during the evaluation will be appropriately addressed.

VAR040136 Section II B 3 a Maintain an accurate storm sewer system map and information table and shall update it in accordance with Table 1.

- Radford University will strive to update its storm sewer system map to meet the requirements set forth in the 2013-2018 MS4 permit see (appendix 3). A progress report will be given in each annual report. The final storm sewer system map will be made available as part of the annual report.

VAR040136 Section II B 3 b Effectively prohibit, through ordinance or other legal mechanism, non-stormwater discharges into the storm sewer system to the extent allowable under federal, state, or local law or regulation.

- During the 2013-2018 MS4 permit cycle, Radford University will evaluate its methods for prohibiting non-stormwater discharges for effectiveness. Once this evaluation is complete, Radford University will set goals for modification and implementation. Progress updates for the evaluation and any necessary modifications will be given in future MS4 Annual Reports.

VAR040136 Section II B 3 c Develop and implement written procedures to detect, identify, and address non-stormwater discharges, including illegal dumping, to the small MS4.

- Radford University will develop IDDE written procedures to be used during IDDE and Outfall Reconnaissance Inventory (ORI) investigations. These written procedures will satisfy the requirements set forth in **VAR040136 Section II B 3** and can be found in Radford University's MS4 Program plan on appendix 4. All potential illicit discharges will be documented and all illicit discharge documentation and photographic evidence from each discharge will be saved.

VAR040136 Section II B 3 d Promote, publicize, and facilitate public reporting of illicit discharges into or from MS4s.

- Currently, Radford University staff and students are able to report spills and illicit discharges to the Facilities Management office at 540-813-7800 or to Radford University Police Department at 540-831-5500. Radford University Stormwater Management Fact Sheet on detecting and responding to illicit discharges can be found on (appendix 4) Progress updates for any necessary IDDE reporting modifications will be given in future MS4 Annual Reports.

Annual Reporting Requirements

Per 9VAC25-890-40 Section II B 3 f, each annual report shall include:

1. *A list of any written notifications of physical interconnection given by the operator to other MS4s.*
2. *The total number of outfalls screened during the reporting period, the screening results, and detail of any follow-up necessary based on screening results.*
3. *Summary of each investigation conducted by the operator of any suspected illicit discharge. Each summary will include the following:*

- i. Date that the suspect discharge was observed or reported or both*
- ii. How the investigation was resolved, including any follow-up*
- iii. Resolution of the investigation and the date the investigation was closed*

Minimum Control Measure 4 – Construction Site Runoff Control

The Radford University Annual Standards and Specifications for Erosion and Sediment Control (ESC) and Stormwater Management (SWM) are integral components of Radford University's design, construction, and maintenance of the University's facilities and campuses. The Radford University Annual Standards and Specifications for ESC and SWM are administered by Radford University Facilities Management and apply to all design, construction, and maintenance activities on property owned by Radford University, either by its internal workforce or contracted to external entities, where such activities are regulated by the Virginia ESC Law and Regulations or the Virginia SWM Act and VSMP Regulations. The Radford University Annual Standards and Specifications for ESC and SWM are submitted to the Virginia Department of Environmental Quality (DEQ) for review and approval on an annual basis. Radford University shall ensure that project-specific plans are developed and implemented in accordance with the Radford University Annual Standards and Specifications for ESC and SWM. Radford University will evaluate the effectiveness of its construction site runoff control efforts. Any observed weaknesses or shortcomings found during the evaluation will be appropriately addressed. This evaluation will be included in each MS4 Annual Report.

VAR040136 Section II B 4 e – MS4 Program Requirements for Construction Site Stormwater Runoff Control:

(1) Description of the legal authorities utilized to ensure compliance with the minimum control measures in Section II related to construction site stormwater runoff control such as ordinances, permits, orders, specific contract language, and multijurisdictional agreements.

- a. Radford University currently utilizes the following to ensure compliance with Minimum Control Measure 4 – Construction Site Stormwater Runoff Control:
 - i. Radford University Annual Standards and Specifications for ESC and SWM
 - ii. Radford University MS4 Program
 - iii. General Permit for Discharges of Stormwater from Construction Activities
 - iv. Memorandums of Understanding (MOU): project-by-project basis
 - v. Memorandums of Agreement (MOA): project-by-project-basis

*This list will be updated on an as-needed basis. Projects outside of Radford University's main campus may be subject to local ordinances.

(2) Written plan review procedures and all associated documents utilized in plan review;

- o During the 2013-2018 MS4 permit cycle, Radford University will ensure that the established written plan review procedures are up-to-date. Upon completion, the final plan review written procedures will be added to the MS4 Program Plan.

(3) For the MS4 operators who obtain department-approved standards and specifications, a copy of the current standards and specifications;

- o Copy of current Radford University Annual Standards and Specifications for ESC and SWM will be added to the annual MS4 report. Please see appendix 2

(4) Written inspection procedures and all associated documents utilized in inspections including the inspection schedule;

- During the 2013-2018 MS4 permit cycle, Radford University will evaluate its current written procedures for inspections in order to determine if any modifications are necessary. Progress updates will be given in future MS4 Annual Reports. The final version of the inspection written procedures and any necessary supporting documentation will be added to the Radford University MS4 Program.

(5) Written procedures for compliance and enforcement, including a progressive compliance and enforcement strategy, where appropriate;

- Radford University does not have regulatory enforcement capabilities – DEQ has this responsibility – therefore no written procedures will be developed for enforcement. Compliance procedures can be found in the Radford University Annual Standards and Specifications for ESC and SWM.

(6) Roles and Responsibilities of each of the operator's departments, divisions, or subdivisions in implementing Minimum Control Measure 4 – Construction Site Stormwater Runoff Control;

- During the 2013-2018 MS4 permit cycle, Radford University will compile a list of roles and responsibilities for Radford University departments and divisions that are involved in the implementation of Minimum Control Measure 4 – Construction Site Stormwater Runoff Control. Progress updates for this effort will be given in future MS4 Annual Reports.

Annual Reporting Requirements

Per VAR040136 Section II B 4 f, each annual report shall include:

1. Total number of regulated land-disturbing activities
2. Total disturbed acres
3. Total number of inspections performed
4. A summary of the enforcement actions taken

Minimum Control Measure 5 – Post-Construction Stormwater Management

During the 2013-2018 MS4 permit cycle, Radford University will update its current program for Post-Construction Stormwater Management in order to meet the requirements stated in VAR040136 Section II B 5. In the interim, Radford University will continue to implement its current program until the program is updated to meet the conditions of the 2013-2018 MS4 Permit. At the end of each reporting year, Radford University will evaluate the effectiveness of its public outreach and education efforts. Any observed weaknesses or shortcomings found during the evaluation will be appropriately addressed. This evaluation will be included in each MS4 Annual Report.

VAR040136 Section II B 5 d MS4 Program Plan Requirements. The operator’s MS4 program plan shall be updated in accordance with Table 1 in this section to include;

- (1) List of applicable legal authorities related to Post-Construction Stormwater Management in new development and development on prior developed lands***
 - Please see appendix (2) Radford University’s AS&S
- (2) Written policies and procedures utilized to ensure that stormwater management facilities are designed and installed in accordance with Section II B 5 b***
 - Radford University will insure that design standards adhere to requirements from the AS&S
- (3) Written inspection policies and procedures utilized in conducting inspections***
 - Radford University has added all (SMF’s) to our AiM work order database. Inspections will be self-populated.
- (4) Written procedures for inspection and maintenance of operator-owned stormwater management facilities.***
 - These procedures are part of the outfall and SMF annual inspections conducted by Gay and Neel in conjunction with Facilities.
- (5) Roles and responsibilities of each of the operator’s departments, divisions, or subdivisions in implementing Minimum Control Measure 5 – Post-Construction Stormwater Management.***
 - Inspections – Neal Thompson, Facilities Maintenance and Operations
 - Maintenance – Chris Shelton, Facilities Maintenance and Operations
 - Construction – Mike Biscotte , Facilities Planning and Construction

Radford University MS4 Program items from VAR040136 Section II B 5 d are covered under the current Radford University Annual Standards and Specifications for ESC and SWM as well as the current O&M Program for Radford University Stormwater Management Facilities. Radford University will update its MS4 Program Plan to include the items from VAR040136 Section II B 5 d outlined above. A progress update will be given in the Annual Report submission. These documents can be made available, upon request.

VAR040136 Section II B 5 e Maintain an updated electronic database of all known operator- owned stormwater management facilities that discharge into the MS4.

- Radford University will update its current stormwater management facilities electronic database to include all information required in 9VAC25-890-40 Section II B 5 e (1) - (9). An updated copy of this database will be provided with the Annual Report submission. This electronic database will be updated annually and included in each Annual Report submission.

Annual Reporting Requirements

Each Annual Report will include:

1. *Current list of Stormwater Management Facilities*
2. *Number of inspections performed*
3. *Number of enforcement actions taken to ensure long-term maintenance*

Minimum Control Measure 6 – Pollution Prevention/Good Housekeeping

During the 2013-2018 MS4 permit cycle, Radford University will update its current program for Pollution Prevention/Good Housekeeping in order to meet the requirements stated in VAR040136 Section II B 6. At the end of each reporting year, Radford University will evaluate the effectiveness of its public outreach and education efforts. Any observed weaknesses or shortcomings found during the evaluation will be addressed and solutions will be proposed. This evaluation will be included in each MS4 Annual Report.

VAR040136 Section II B 6 a Develop and implement daily operational procedures designed to minimize or prevent pollutant discharge from municipal operations.

- Radford University will develop (SOP) written procedures designed to minimize or prevent pollutant discharge from daily operations, equipment maintenance, and the application, storage, transport, and disposal of pesticides, herbicides, and fertilizers. These written procedures will be utilized, as appropriate, as part of employee training. The status of written procedure development will be included Annual Report submissions

VAR040136 Section II B 6 b Municipal facility pollution prevention and good housekeeping.

(1) Identify all municipal high priority facilities within 12 months of permit coverage.

- Radford University will develop selection criteria to use in the identification of municipal high priority facilities. Once the selection criteria are developed, Radford University will perform site inspections of facilities that have the potential to be high priority facilities

(2) Identify which of the municipal high priority facilities have a high potential of chemicals or other materials to be discharged in stormwater.

- Radford University has determine which high priority facilities have a high potential to discharge chemicals or other materials into the storm sewer system. The high priority facilities are identified as Bulk Storage Area, Vehicle and Equipment Maintenance Area and Vehicle Fueling Area at Radford University facilities management. All high priority/high potential facilities will be required to have a Stormwater Pollution Prevention Plan (SWPPP). A list of all the high priority/high potential facilities will be provided in the Annual Report submission

(3) Develop and implement specific SWPPPs for all high priority facilities identified as having a high potential for the discharge of chemicals and other materials in stormwater.

- Radford University will begin the process of developing SWPPPs for all the high priority/high potential facilities identified. The progress of SWPPP development and implementation will be reported in each MS4 Annual Report submission. Radford University will strive to have all necessary SWPPPs developed and implemented by June 30, 2017. A copy of each SWPPP will be kept at each facility and will be appropriately updated and utilized as part of staff training required in Section II B 6 d.

Nutrient Management

VAR040136 Section II B 6 c (1)

Implement Nutrient Management plans that have been developed by a certified nutrient management planner on all lands owned or operated by Radford University where nutrients are applied to a contiguous area greater than one acre.

- a) *Identify all applicable lands where nutrients are applied to a contiguous area of more than one acre within 12 months of permit coverage.*
 - Radford University will determine if any additional lands will require NMPs and/or if any of the current turf and landscape NMPs need to be updated. A final list of turf and landscape NMPs will be provided annual report submission. A latitude and longitude for each piece of land will be included in the final list.

- b) *Implement turf and landscape NMPs on all lands where nutrients are applied to contiguous area of more than one acre, within 60 months of permit coverage.*
 - If it is determined that additional turf and landscape NMPs need to be developed and/or any existing NMPs need to be modified, Radford University will begin the process. Progress updates regarding NMP modification and development will be given in each MS4 Annual Report submission.

VAR040136 Section II B 6 d (1-9) *Conduct training for employees and develop an annual written training plan including a schedule of training events that ensures implementation of the training requirements.*

- Radford University employees who are identified as Fertilizer applicators will attend annual Training which will outline training schedules and implementation of training requirements. The Annual Training Plan will be added to the MS4 Program and updated annually.

Annual Reporting Requirements

Per VAR040136 Section II B 6 g, each annual report shall include the following:

1. A summary report on the development and implementation of the daily operational procedures

2. A summary report on the development and implementation of the required SWPPPs

3. A summary report on the development and implementation of the nutrient management plans that includes:
 - The total acreage of lands where nutrient management plans are required
 - The total acreage of lands upon which nutrient management plans have been implemented

4. A summary report on the required training, including a list of training events, the training date, the number of employees attending training and the objective of the training.

Appendix (1)

Public Education and Outreach Plan

(Effective July 1, 2017)

Radford University operates a Stormwater Management Program in compliance with the Virginia General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4 General Permit VAR04). In accordance with Section II.B.1 of the permit, Radford University implements a Public Education and Outreach Program on stormwater impacts.

For the 2013-2018 MS4 permit cycle, Radford University has identified three initial target audiences and high priority water quality issues. Consistent with the MS4 General Permit, the Program considers the following goals:

MCM 1 b.1 Increase the knowledge of Radford University students, faculty, and staff about the steps that can be taken to reduce stormwater pollution, placing priority on reducing impacts to impaired waters and other local water pollution concerns;

MCM 1 b. 2 Increase Radford University’s students, faculty, and staff knowledge of hazards associated with illegal discharges and improper disposal of waste, including pertinent legal implications.

MCM 1 b. 3 Implement a diverse program with strategies that are targeted towards audiences most likely to have significant stormwater impacts.

These goals are intended to be met as part of an iterative program that will measure effectiveness of the Program by assessing the level of knowledge, over time, of the Public that is defined as residents and staff. The Program is designed consistent with the MS4 General Permit.

MCM 1 c. 1 Identify three high-priority water quality issues and provide rationale for the selection of each issue; Radford University’s high-priority water quality issues for the (PEOP) are provided below. Based on measures of effectiveness for each, any may be replaced or refined with approval of the Department of Environmental Quality (DEQ) as part of an iterative stormwater program.

High Priority Water Quality Issue	Rationale
Vehicle maintenance (Petroleum Releases)	Approximately 4,035 parking passes are issued annually. Parking pass breakdown per group are as follows. On-Campus Students 1,340. Off Campus students 1,195. Faculty/staff 1,500 Because of this large number of vehicles traveling to campus the potential for illicit discharges of automotive fluids is significant.
Trash elimination and Recycling	Aquatic litter and debris are a highly pervasive and visible form of pollution that has harmful impacts on wildlife and human health. Aquatic ecosystems—streams, rivers, wetlands, and estuaries—are under considerable pressure from human activities.
Pet Waste	Pets and urban wildlife are major sources of water contamination because pet waste contains harmful bacteria and parasites. Dog feces can contain fecal coliform bacteria, which can spread diseases like Giardia, Salmonella, and Campylobacter, causing serious illness in humans.

MCM 1 c. 2 Identify and estimate the population size of the target audience who is most likely to have significant impacts on each water quality issue;

(Population information provided by Radford University Institutional Research)

Target Audience	Population 2016	Rationale
On- Campus Students	2,948	On- campus students are likely to impact stormwater in their everyday interactions with the campus community. Their greatest area of impact is trash management, including the disposal of batteries, electronics, trash, cigarette butts, and food waste
Off- Campus Students	6,518	Off- campus Students frequent campus due to classes, sporting events and activities. As a result, they have potential to impact stormwater. The area of concern is trash management, Pet waste and petroleum release from vehicles.
Faculty / Staff	1,675	Faculty / Staff are most likely long-term members of the campus community and as such can be crucial advocates for stormwater management. Many employees deal with operations which use chemicals and equipment that have the potential to impact stormwater. Others are in a position to teach the student population about stormwater pollution prevention and facilitate research opportunities.

MCM 1 c. 3 Identify the relevant message and associated educational and outreach materials for distribution to the target audiences;

Electronic Outreach (i.e., Campus Email, stormwater website, Facebook and Twitter)

Program Description: Issue “RU Connected” electronic news letter to students, alumni, faculty, and staff containing a stormwater related article semi-annually. Provide the University community with electronic outreach mediums to access information regarding stormwater management and methods to improve local watershed health. Radford University will posting notices by including education articles and public participation event reports in the newsletter about campus sustainability events related to stormwater. Stormwater webpage containing public participation topics with a link to the “sustainability” page entitled “Stormwater Management (MS4).” The page contains links to documents containing a list of MS4 outfalls, outfall location maps, annual reports, the MS4 permit, the Registration Statement narrative and BMP listing, campus stormwater drainage map and MS4 Program Plan”
 RU Green” Facebook “Sustainable RU” Twitter Use these promote clean water initiatives

Measurable Goals: Post Stormwater articles. Track the number of emails and record the reached from each target audience.

Schedule of Activities:

- **Vehicle maintenance email flyer,** World Water Monitoring Day September 18
- **Trash elimination and Recycling email flyer,** America Recycles Day November 15
- **Pet Waste email flyer,** Earth-day April 22

Responsible Party: Facilities Management

MCM 2. –Public Involvement / Participation (Radford University Students & Staff)

2.1: Offer annually four public participation events

Program Description: Educate the University about stormwater issues and pollution prevention techniques by participating in campus-sponsored events.

Measurable Goals: Participate in a total of 4 campus, community, or academic public outreach events each year. Track the number of outreach materials distributed at each event. Estimate the number of people from each target audience reached.

Schedule of Activities:

1. SGA Adopt a Spot trash pick-up along Tyler Avenue
2. New River Clean-up August 2017
3. New River Regional Household Hazardous Waste Collection Day, April 2017
4. Sustainability Week Information booth on our 3 water quality issues. September 2017

Responsible Party: Facilities Management



Appendix 2

Annual Standards and Specifications

for

Erosion and Sediment Control

and

Stormwater Management

FY 2017

(July 1, 2016 – June 30, 2017)

Revision 1 – 28 April 2017

INTRODUCTION

The Radford University (RU) Annual Standards and Specifications (AS&S) for Erosion and Sediment Control (ESC) and Stormwater Management (SWM) are integral components of RU's design, construction, maintenance, and management of the campus facilities and land. The RU Annual Standards and Specifications for ESC and SWM have been developed to provide information regarding RU's implementation in accordance with the Virginia Stormwater Management Act (§62.1-44.15:24. to :50), the Virginia Stormwater Management Program (VSMP) Regulations (9VAC25-870), the Virginia Erosion and Sediment Control Law (§62.1-44.15:51 to :66), the Virginia Erosion and Sediment Control Regulations (9VAC25-840), and the Virginia Erosion and Sediment Control Certification Regulations (9VAC25-850).

The RU Annual Standards and Specifications for ESC and SWM shall apply to all design, construction, and maintenance activities undertaken by RU, either by its internal workforce or contracted to external entities, where such activities are regulated by the Virginia ESC Law and Regulations or the Virginia SWM Act and VSMP Permit Regulations. During any inspections of RU's land disturbing activities by DEQ, EPA and other such environmental agencies, compliance with the RU Annual Standards and Specifications for ESC and SWM, the Virginia ESC Law and Regulations, and the Virginia SWM Act will be expected.

The RU Annual Standards and Specifications for ESC and SWM are submitted to the Virginia Department of Environmental Quality (DEQ) for review and approval on an annual basis. RU shall ensure that project specific plans are developed and implemented in accordance with these Annual Standards and Specifications. This submittal constitutes RU's commitment to execute all provisions contained herein on our regulated land disturbing activities and land development projects. As such, this submittal will be made available and utilized as an operational guidance by all appropriate RU and DEQ personnel. The RU Annual Standards and Specifications for ESC and SWM are available for download as PDF files at: <https://www.radford.edu/content/facilities-planning/home.html>.

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1.0 ANNUAL STANDARDS AND SPECIFICATIONS ADMINISTRATION

- 1.1 All projects involving land-disturbing activity subject to the Virginia Erosion and Sediment Control Law (§62.1-44.15:51 to :66), and the Virginia Erosion and Sediment Control Regulations (9VAC25-840) shall be bound by the RU Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management as approved by DEQ. All projects involving land-disturbing activity subject to the Virginia Stormwater Management Act (§62.1-44.15:24. to :50) and the VSMP Regulations (9VAC25-870) shall be bound by the RU Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management as approved by DEQ.
- 1.2 The RU Annual Standards and Specifications for ESC and SWM are composed of general specifications for ESC and SWM. The general specifications for erosion and sediment control (ESC) and storm water management (SWM) that apply to the land-disturbing activities listed in Section 1.1 above include by reference the following:
 - 1.2.1 Virginia Stormwater Management Act (§62.1-44.15:24. To :50);
 - 1.2.2 Virginia Erosion and Sediment Control Law (§62.1-44.15:51. to :66);
 - 1.2.3 Virginia Erosion and Sediment Control Regulations (9VAC25-840);
 - 1.2.4 Virginia Erosion and Sediment Control Certification Regulations (9VAC25-850);
 - 1.2.5 Virginia Stormwater Management Program Regulation (9VAC25-870);
 - 1.2.6 Reports and Recordkeeping (9VAC25-870-126)
 - 1.2.7 General Permit for Discharges of Construction Stormwater from Construction Activities (9VAC25-880)
 - 1.2.8 Virginia Erosion and Sediment Control Handbook, 1992, as amended;
 - 1.2.9 Virginia Stormwater Management Handbook, 1999, as amended;
 - 1.2.10 Technical Bulletins, as amended, on the Virginia DEQ website at <http://www.deq.virginia.gov/Programs/Water/StormwaterManagement/Publications.aspx>.
 - 1.2.11 Stormwater, and, Erosion and Sediment Control Guidance Memos, as amended, on the Virginia DEQ website at: <http://www.deq.virginia.gov/Programs/Water/Laws,Regulations,Guidance/Guidance/StormwaterManagementGuidance.aspx>.
 - 1.2.12 Virginia Stormwater BMP Clearinghouse at: <http://www.vwrrc.vt.edu/swc/>.

- 1.3 Any land-disturbing activity carried out in a locality with a local ESC program with more stringent regulations than those of the state program shall be consistent with the requirements of the local program. SWM projects shall, to the maximum extent practicable, meet the technical requirements of the local stormwater management program, in addition to the technical requirements noted above.
- 1.4 Site-Specific ESC plans shall be prepared for all projects involving a regulated land-disturbing activity as defined in §62.1-44. Site-specific ESC plans shall be submitted to the RU Facilities Planning and Construction Office for review. Prior to starting a land-disturbing project, as defined in §62.1-44, the project must have approval issued by the RU Facilities Planning and Construction Office.

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- 1.5 Site-Specific SWM plans shall be prepared for all projects involving a regulated land-disturbing activity that requires a Virginia Stormwater Management General Permit for Discharges from Construction Activities (VSMP) or land-disturbing activity contained within a watershed of a regional water quality stormwater management facility. Site-specific SWM plans shall be submitted to the RU Facilities Planning and Construction Office for review and approval. Prior to starting a land-disturbing project requiring a SWM Plan, the project must have an approval issued by the RU Facilities Planning and Construction Office.
- 1.6 The RU Facilities Planning and Construction Office may request DEQ to grant a project-specific variance or exception, in terms of ESC and SWM respectively, to the RU Annual Standards and Specifications for ESC and SWM. All requested variances and exceptions are to be considered unapproved until written approval from DEQ is received. Variance requests will be considered freestanding of this RU Annual Standard and Specifications on an individual project-specific basis. Refer to Section 7.0 for more information on variances and exceptions.
- 1.7 Whenever a land-disturbing activity involves activity at a separate location (including but not limited to borrow and disposal areas) RU Facilities Planning and Construction Office may either:
- 1.7.1 Consider the off-site activity as being part of the proposed land-disturbing activity; or
 - 1.7.2 If the off-site activity is already covered by an approved erosion and sediment control plan, the RU Facilities Planning and Construction Office may require the applicant to provide proof of the approval and to certify the plan will be implemented in accordance with the Act and Regulations.

For off-site land-disturbing activities that are not within RU's jurisdiction and have not received plan approval, the applicant shall describe any off-site land-disturbing activities that may occur (borrow sites, disposal areas, easements, etc.); identify the Owner of the off-site area and the entity responsible for plan review; include a statement that any off-

site land-disturbing activity associated with the project must have an approved ESC Plan; and submit documentation of the approved ESC Plan for each of these sites.

- 1.8 Modifications to an approved erosion and sediment control plan and/or stormwater management plan shall be allowed only after review and written approval by the RU Facilities Planning and Construction Office.

The RU Facilities Planning and Construction Office may require that an approved plan be amended, within a time prescribed by the RU Facilities Planning and Construction Office, to address any deficiencies noted during inspection.

Modifications that require updates to the general permit (i.e. land disturbance increase, change in permit holder, permit fee changes, etc.) shall be coordinated by the RU Facilities Planning and Construction Office with DEQ, upon approval of the modifications. The applicant shall be responsible for amending the SWPPP to reflect

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changes to the approved erosion and sediment control plan and/or stormwater management plan.

2.0 **DEFINITIONS**

“*Administrator*” means the VSMP authority including the Radford University staff person or department responsible for administering the VSMP on behalf of the agency.

“*Applicant*” means any person submitting an application for a permit or requesting issuance of a permit.

“*Best management practice*” or “*BMP*” means schedules of activities, prohibitions of practices, including both structural and nonstructural practices, maintenance procedures, and other management practices to prevent or reduce the pollution of surface waters and groundwater systems from the impacts of land-disturbing activities.

“*Control measure*” means any best management practice or stormwater facility, or other method used to minimize the discharge of pollutants to state waters.

“*Clean Water Act*” or “*CWA*” means the federal Clean Water Act (33 U.S.C Sec. 1251 et seq.) formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972, Public Law 92-500, as amended by Public Law 95-217, Public Law 95-576, Public Law 96-483, and public Law 97-117, or any subsequent revisions thereto.

“*Department*” means the Department of Conservation and Recreation.

“*Development*” means land disturbance and the resulting landform associated with the construction of facilities or structures or the clearing of land for non-agricultural purposes.

“*General permit*” means the state permit titled GENERAL PERMIT FOR DISCHARGES OF STORMWATER FROM CONSTRUCTION ACTIVITIES found in Appendix 2-C, 9VAC25-

880 of the Regulations authorizing a category of discharges under the CWA and the Act within a geographical area of the Commonwealth of Virginia.

“Land Disturbance” or “land-disturbing activity” (Erosion and Sediment Control) means any man-made change to the land surface that may result in soil erosion from water or wind and the movement of sediments into state waters or onto lands in the Commonwealth, including but not limited to clearing, grading, excavating, transporting, and filling of land, except that the term shall not include those exemptions specified in Art. 62.1-44.15:51.

“Land disturbance” or “land-disturbing activity” (Stormwater Management) means a man-made change to the land surface that potentially changes its runoff characteristics including clearing, grading, or excavation, except the term shall not include those exemptions specified in Art. 62.1 – 44.15:34.

“Layout” means a conceptual drawing sufficient to provide for the specified stormwater management facilities required at the time of approval.

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“Minor modification” means an amendment to an existing general permit before its expiration not requiring extensive review and evaluation including, but not limited to, changes in EPA promulgated test protocols, increasing monitoring frequency requirements, changes in sampling locations, and changes to compliance dates within the overall compliance schedules. A minor general permit modification or amendment does not substantially alter general permit conditions, substantially increase or decrease the amount of surface water impacts, increase the size of the operation, or reduce the capacity of the facility to protect human health or the environment.

“Operator” means the owner or operator of any facility or activity subject to regulation.

“Permit” or “VSMP Authority Permit” means an approval to conduct a land-disturbing activity issued by the Administrator for the initiation of a land-disturbing activity, and which may only be issued after evidence of general permit coverage had been provided.

“Permittee” means the person to whom the VSMP Authority Permit is issued.

“Person” means any individual; corporation; partnership; association; state; municipality; commission; political subdivision of a state governmental body including federal, state, or local entity as applicable; any interstate body; or any other legal entity.

“Regulations” means the Virginia Stormwater Management Program (VSMP) Permit Regulations, 9VAC25-870, as amended.

“Site” means the land or water area where any facility or land-disturbing activity is physically located or conducted, including adjacent land used or preserved in connection with the facility or land-disturbing activity.

“State” means the Commonwealth of Virginia.

“*State Board*” means the Virginia Soil and Water Conservation Board.

“*State permit*” means an approval to conduct a land-disturbing activity issued by the State Board in the form of a state stormwater individual permit or coverage issued under a state general permit or an approval issued by the State Board for stormwater discharges from an MS4. Under these state permits, the Commonwealth imposes and enforces requirements pursuant to the federal Clean Water Act and regulations, the Virginia Stormwater Management Act, and the Regulations.

“*State Water Control Law*” means Chapter 3.1 (Sec. 62.1-44.2 et seq.) of Title 62.1 of the code of Virginia.

“*State waters*” means all water, on the surface and under the ground, wholly or partially within or bordering the Commonwealth or within its jurisdiction, including wetlands.

“*Stormwater*” means precipitation that is discharged across the land surface or through conveyances to one or more waterways and that may include stormwater runoff, snow melt runoff, and surface runoff and drainage.

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“*Stormwater management plan*” means a document(s) containing material describing methods for complying with the requirements of the AS & S.

“*Stormwater Pollution Prevention Plan*” or “*SWPPP*” means a document that is prepared in accordance with good engineering practices and that identifies potential sources of pollutants that may reasonably be expected to affect the quality of stormwater discharges from the construction site, and otherwise meets the requirements of the AS & S. In addition, the document shall identify and require the implementation of control measures, and shall include, but not be limited to, the inclusion of or the incorporation by reference of, an approved erosion and sediment control plan, an approved Stormwater management plan, and a pollution prevention plan.

“*Total maximum daily load*” or “*TMDL*” means the sum of the individual waste load allocations for point sources, load allocations for nonpoint sources, natural background loading, and a margin of safety. TMDL’s can be expressed in terms of either mass per time, toxicity, or other appropriate measure. The TMDL process provides for point versus nonpoint source trade-offs.

“*Virginia Stormwater Management Act*” or “*Act*” means Article 2.3, Sec. 62.1-44.15:24 to:50, of Chapter 3.1 of Title 62.1 of the Code of Virginia.

“*Virginia Stormwater BMP Clearinghouse website*” means a website that contains detailed design standards and specifications for control measures that may be used in Virginia to comply with the requirements of the Virginia Stormwater Management Act and associated regulations.

“*Virginia Stormwater Management Program*” or “*VSMP*” means a program approved by the State Board after September 13, 2011, that has been established by a locality to manage the quality and quantity of runoff resulting from land-disturbing activities and shall include such items as local ordinances, rules, permit requirements, annual standards and specifications,

policies and guidelines, technical materials, and requirements for plan review, inspection, enforcement, and evaluation consistent with the requirements of this article and associated regulations.

“*Virginia Stormwater Management Program authority*” or *VSMP authority*” means an authority approved by the State Board after September 13, 2011, to operate a Virginia Stormwater Management Program.

3.0 ANNUAL STANDARDS AND SPECIFICATIONS PERSONNEL

The RU Facilities Planning and Construction Office shall be the plan approving authority for RU Projects and the DEQ certified administrator of the RU Annual Standards and Specifications for ESC and SWM. The following is a breakdown in responsibilities and titles in terms of the RU Annual Standards and Specifications for ESC and SWM. The following personnel are assigned and/or delegated authority related to ensuring compliance with the RU Annual Standards and Specifications for ESC and SWM. Responsibilities may be combined in terms of staffing resources only if the person responsible for the task(s) is qualified per Section 1.2.4.

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- 3.1 DEQ Certified ESC and SWM Administrator shall have overall management and coordination responsibilities for the RU Annual Standards and Specifications for ESC and SWM.
- 3.2 DEQ Certified ESC Plan Reviewer shall be an employee or agent of RU responsible for reviewing plans for compliance with the RU Annual Standards and Specifications for ESC and applicable laws and regulations with an emphasis on ESC components.
- 3.3 DEQ Certified SWM Plan Reviewer shall be an employee or agent of RU responsible for reviewing plans for compliance with the RU Annual Standards and Specifications for SWM and applicable laws and regulations with an emphasis on stormwater management components.
- 3.4 DEQ ESC and SWM Inspector shall be an employee or agent of RU responsible for inspecting erosion and sediment control, stormwater management, VSMP permits, SWPPP, and MS4 practices to ensure compliance with all applicable laws, regulations, and the RU Annual Standards and Specifications for ESC and SWM.
- 3.5 DEQ Responsible Land Disturber (RLD) shall hold a valid Responsible Land Disturber Certificate as issued by DEQ.
- 3.6 DEQ Certifications shall be in accordance with the Virginia Erosion and Sediment Control and Stormwater Management Certification Regulations (9VAC25-850).

4.0 ANNUAL STANDARDS AND SPECIFICATIONS IMPLEMENTATION

ESC and SWM plans shall comply with the RU Annual Standards and Specifications for ESC and SWM, the Virginia Erosion and Sediment Control Law (§62.1-44.15:51. to :66), the Virginia

Erosion and Sediment Control Regulations (9VAC25-840), the Virginia Stormwater Management Act (§62.1-44.15:24. to :50), and the Virginia Stormwater Management Program (VSMP) Regulations (9VAC25-870). Refer to Section 1.2 for more information on general specifications. Prior to commencement of a land-disturbing project, the project must have received approval for the plan from the RU Facilities Planning and Construction Office. The RU Facilities Planning and Construction Office will have 30 days to review the plan and provide written comments.

4.1 **Submittals**

- 4.1.1 ESC and SWM plans and narratives (ESC and SWM plans), reports, certifications, and record documents shall be submitted to the RU Facilities Planning and Construction Office for review and approval. All submittals shall be in accordance with the RU Annual Standards and Specifications for ESC and SWM. The submittal must include the appropriate information and data necessary to support the licensed professional's work.
- 4.1.2 Two sets of plans (1 full size and 1 half size) may be submitted initially. Five full size sets are required for approval. All submittals should be delivered to:
Radford University
Facilities Planning and Construction Office
501 Stockton Street
Radford, VA 24142

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- 4.1.3 The RU Facilities Planning and Construction Office will retain one set of the approved plans.
- 4.1.4 Design Submittal and Plan Review Checklists
 - 4.1.4.1 ESC and SWM plans, to include narrative, calculations, design standard and specifications, plan sheets (drawings) and other supporting information, shall be submitted to the RU Facilities Planning and Construction Office for review and approval prior to any land-disturbing activities. The submittal shall include a design that is in accordance with the RU Annual Standards and Specifications for ESC and SWM. The submittal must include the appropriate information, all calculations relevant to the Plan, ESW/SWM Plan Preparer/Reviewer Checklist, and other appropriate information and documentation necessary to support the designer's work.
 - 4.1.4.2 An ESW/SWM Plan Preparer/Reviewer Checklist is provided in Appendix A of this document. Many items listed on the checklists may not apply to any given design and it is therefore up to the designer to indicate items as "not applicable" or "NA" as appropriate.

4.2 **Re-submittals**

- 4.2.1 For all second and subsequent submittals, the submitting professional shall include a cover letter with explanations as to how each review comment is addressed and references the relevant drawing sheet or narrative location. In addition, significant changes in the plan shall be listed as part of the cover letter.

The cover letter may warrant additional comments/discussion depending upon the previous review comments or changes in the plan.

4.3 **Final Report**

- 4.3.1 A final report shall be submitted to the RU Facilities Planning and Construction Office for review and approval prior to close-out of the project for any and all permanent Best Management Practices (BMPs) associated with the project. Construction inspections and surveys, performed by a licensed professional, shall be required at each stage of installation during construction as necessary for a licensed professional(s) to certify that the stormwater management facility and associated conveyance systems have been built in accordance with the approved plan and design specifications. The final report shall include incremental surveys/drawings, final survey/drawings, photographs, construction logs, inspection reports, geotechnical testing reports, soil reports, certification of materials, and all other applicable documentation to demonstrate the facilities were constructed in accordance with the approved plans and specifications. The final report shall include the appropriate checklists provided in the Stormwater Management Handbook. The final report shall include a signed statement by a licensed professional(s) that the stormwater management facilities have been built in accordance with the approved plans and specifications.
- 4.3.2 If the facility system or conveyance system or both have not been constructed and installed in accordance with the approved plan, then the licensed professional(s) responsible for certifying the as-built condition shall immediately notify the RU Project Manager and the Director of the RU Facilities Planning

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and Construction Office. Generally, there are two potential options when the system(s) are not constructed in accordance with the approved plan.

- 4.3.2.1 Option 1: Re-construct the system(s) in accordance with the approved plan. It will be necessary to repeat the inspections, surveys, and documentation process such that the licensed professional shall certify the system(s) are constructed in accordance with the approved plan. It shall be the licensed professional's responsibility to certify as-built condition of the system(s) meets the quantitative and qualitative controls of the approved plan.
- 4.3.2.2 Option 2: Perform calculations and analysis, based on the licensed professional's surveys, data, inspections, and other applicable documentation necessary to verify the as-built conditions meet the RU Annual Standards and Specifications for ESC and SWM. The licensed professional(s) shall certify the as-built condition of the system meets the quantitative and qualitative controls, as prescribed by the approved RU Annual Standards and Specifications for ESC and SWM, and submit the final report as required in Section 4.3.

4.4 **Plan Reviews**

- 4.4.1 Plan reviews shall be conducted by personnel certified in accordance with the Virginia Erosion and Sediment Control and Stormwater Management Certification Regulations (9VAC25-850 et seq. as amended). Plan reviews shall

ensure compliance with the RU Annual Standards and Specifications for ESC and SWM.

4.5 **Inspections**

- 4.5.1 ESC and SWM Inspector(s) is responsible for ensuring the implementation of the project is in accordance with the project ESC and SWM plan and other environmental commitments. Refer to Section 6.0 for more information on inspections.
- 4.5.2 The Responsible Land Disturber (RLD) shall be in charge of and responsible for carrying out a regulated "land-disturbing activity." The RLD shall attend the pre-construction meeting and sign the approved ESC and SWM plan.
- 4.5.3 The licensed professional(s) is responsible for collecting, surveying, and documenting that stormwater management and conveyance systems are in accordance with the approved plan.

4.6 **Changes and Amendments to Approved Plans**

- 4.6.1 An approved plan may be changed by the RU Facilities Planning and Construction Office in the following cases:
 - 4.6.1.1 Where inspection has revealed the plan is inadequate to satisfy applicable regulations; or
 - 4.6.1.2 Where the person responsible for carrying out the approved plan finds that because of changed circumstances or for other reasons the approved plan cannot be effectively carried out, and proposed amendments to the plan, consistent with the requirements of this article, are agreed to by the plan-approving authority and the person responsible for carrying out the plan.

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- 4.6.2 Revisions to an approved ESC and SWM Plan must be submitted in writing to the RU Facilities Planning and Construction Office. Revisions shall not be considered approved until written notice is provided. Revisions must comply with the RU Annual Standards and Specifications for ESC and SWM.

5.0 **CONSTRUCTION PLANS (DRAWINGS) REQUIREMENTS**

- 5.1 Construction plans must be compliant with the stormwater technical criteria for water quantity and water quality (9VAC25-870).
- 5.2 Please note that Erosion & Sediment Control Technical Bulletin No. 4 Nutrient Management for Development Sites updates the vegetative cover standards and specifications 3.31 Temporary Seeding, 3.32 Permanent Seeding, 3.33 Sodding, and 3.34 Bermuda grass & Zoysia grass of the 1992 Virginia Erosion and Sediment Control Handbook, in accordance with the 1995 Virginia Nutrient Management Standards and Criteria. Specifically, the vegetation standards and specifications have been updated to reflect that no more than one (1) pound of water soluble nitrogen per 1,000 square feet is to be applied on construction sites in a 30 day period.
- 5.3 Only VESCH control measures will be utilized.
 - 5.3.1 Non-VESCH control measures, best management practices (BMP), and specifications may be included in the Annual Standards and Specifications

submission but their use may be further reviewed and approved by the applicable DEQ Regional Office on a project-specific basis.

- 5.3.2 For all non-VESCH and proprietary control measures, please include all applicable practical information including definition, purpose, conditions where practice applies, planning considerations, design criteria, construction specifications, design tables and plates, and maintenance and inspections. Non-VESCH and proprietary control measures shall be installed per the manufacturer's instructions and with the intent of the VESCH specifications.
- 5.3.3 Should non-VESCH control measures fail to effectively control soil erosion, sediment deposition, and non-agricultural runoff, then VESCH control measures shall be utilized.
- 5.4 Complete ESC and SWM Plan drawings and standard details shall be provided in the construction plans and are referenced below as ESC/SWM construction drawings.
- 5.5 Minimum standards 1 through 19 (9VAC25-840-40) shall be listed in the construction drawings.
- 5.6 Construction sequence of operations shall be provided on the construction plans with staged implementation of erosion and sediment control measures for each phase. The area which may be disturbed in each phase shall be set forth in the construction plans.
- 5.7 ESC/SWM construction drawings shall provide information on the maintenance of BMP's or reference the narrative section that contains the information.
- 5.8 ESC/SWM construction drawings shall provide information on the post-construction maintenance of BMPs or reference the narrative section that contains the information.
- 5.9 ESC/SWM construction drawings shall include manufacturer's recommendation on maintenance and inspection of manufactured BMP's so long as the manufacturer's recommendation is in compliance with the requirements listed in Section 1.2
- 5.10 ESC/SWM construction drawings shall provide information on the post-construction inspections required for each BMP or reference the narrative section that contains the information. SWM BMP's shall have unique identifications and the identifications shall

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be referenced/used in all documentation, such as, but not limited to, SWPPP narrative, ESC and SWM plans, and calculations.

- 5.11 Profiles shall be included for storm sewer systems and conveyance channels. The profile shall include the final surface, channel/pipe, and hydraulic grade line. Surcharges shall be clearly indicated on the profile.
- 5.12 The amount of disturbed area listed per phase and proposed net increase in impervious area shall be listed on the ESC/SWM construction drawings.

6.0 INSPECTIONS

- 6.1 RU shall perform periodic inspections, at a minimum, every two weeks and within 48 hours of a rainfall event producing runoff. In addition, inspections shall be made during or immediately following initial installation of erosion and sediment controls and at the completion of the project. RU is responsible for and shall ensure compliance with the approved plan and the RU Annual Standards and Specifications for ESC and SWM. RU shall perform post-construction inspections for stormwater management facilities as indicated in the approved Plan.

- 6.2 Licensed professional(s) shall perform inspections and surveys as necessary to support certification that each permanent stormwater management facility and conveyance system are constructed in accordance with the approved plan.
- 6.3 DEQ shall perform random site inspections to assure compliance with the Virginia Erosion and Sediment Control Law (§62.1-44.15:51 to :66), the Virginia Erosion and Sediment Control Regulations (9VAC25-840), the Virginia Stormwater Management Act (§62.1-44.15:24. to :50), and the Virginia Stormwater Management Program (VSMP) Regulations (9VAC25-870).

6.4 **Erosion and Sediment Control Inspections**

- 6.4.1 RU, as the Annual Standards and Specifications holder, is required to conduct inspections at the “periodic” frequency as defined in 9VAC25-840-60B. The inspection report provided in Appendix B shall be completed by RU, or an agent of RU, on each site inspection visit. All measures shown on the plan shall be inspected. All problems and violations shall be documented on the inspection report. Inspection reports shall specify a required corrective action for each problem or violation noted and a date the corrective action must be completed. Repeat violations not corrected within the time frames noted on the inspection reported will be forwarded to DEQ for enforcement action.
- 6.4.2 The Responsible Land Disturber (RLD) for projects larger than 1 acre is required to conduct inspections per 9VAC25-840-60.A, and in accordance with the specific maintenance requirements of each control measure as laid out in the Virginia Erosion and Sediment Control Handbook. The inspection reports shall be maintained on-site and shall be available for review by RU, DEQ, and other regulatory agencies.

6.5 **Stormwater Management Inspections**

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- 6.5.1 RU, as the Annual Standards and Specifications holder, is required to conduct inspections as stated in section §62.1-44.15:37A. The Responsible Land Disturber is required to conduct inspections per 9VAC25-880 Part II F. Inspections shall be conducted by qualified, certified personnel. The inspection report provided in Appendix B is designed to be customized according to the BMP’s and conditions at each site and shall be completed on each site inspection visit. A number shall be assigned to all stormwater BMP’s on the site plan and these numbers shall correspond to the BMP numbers listed on the inspection sheet. Specific areas that will require continuous inspections shall be numbered on the site plan and these numbers shall correspond to the numbers listed on the inspection sheet. A brief description of the BMP or area shall then be listed in the site-specific section of the inspection report. Specific structural BMP’s such as construction site entrances, sediment ponds, or specific areas with silt fence must be numbered and listed. Non-structural BMPs or areas that will be inspected (such as trash areas, material storage areas, temporary sanitary waste areas, etc.) must also be numbered and listed

- 6.5.2 The Inspector shall walk the site by following the site map and numbered BMP's/areas for inspection and note whether the overall site issues have been addressed. Any required corrective actions and the completion date and responsible person for the correction shall be noted in the Corrective Action Log.
- 6.5.3 If there are no non-compliance issues/problems, then the inspector shall certify that the site is in compliance with the SWPPP, permit, regulations, and laws.

6.6 Permanent BMP Inspections

- 6.6.1 Permanent BMP's (stormwater management facilities) shall be inspected, photographed, and surveyed throughout the construction process and at the completion of the project such that a licensed professional(s) shall lawfully certify the BMP's are constructed in accordance with the approved Plan. The licensed professional(s) shall assume full responsibility for the certification and the information on which the certification is based. A licensed professional shall prepare and submit a final report to the RU Facilities Planning and Construction Office for approval (refer to Section 4.0).

6.7 Post-construction Inspections

- 6.7.1 Post-construction (long-term) inspections shall be made in accordance with the RU Annual Standards and Specifications for ESC and SWM, and manufacturer's recommendation, when applicable. These inspections shall be performed by a DEQ certified inspector.

7.0 VARIANCES and EXCEPTIONS

- 7.1 Variances and Exceptions to regulations must ensure protection of off-site properties and resources from damage. Economic hardship is not sufficient reason to request a variance or an exception. The following information needs to be included in variance requests:

- 7.1.1 Introduction
- 7.1.2 Project Description
- 7.1.3 Minimum Standards Variance Requests

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- 7.1.4 Existing Conditions and Adjacent Areas
- 7.1.5 Soil Characterization
- 7.1.6 Critical and Sensitive Areas (Karst, wetland, etc...)
- 7.1.7 Mitigation
 - 7.1.7.1 ESC Measures
 - 7.1.7.2 Permanent Stabilization
 - 7.1.7.3 Vegetative Restoration
 - 7.1.7.4 Maintenance
 - 7.1.7.5 Critical and Sensitive Areas
 - 7.1.7.6 Self-Inspection, Reporting and DEQ-Certified Personnel

- 7.2 For a variance to become part of project specific ESC plans, a written variance request must be submitted by the RU Facilities Planning and Construction Office for review and approval by DEQ. This request must include an explanation of the reasons for requesting the variance and describe the specific site conditions necessitating the request. The request must also include a detailed description of the alternative ESC practice and justification that the practice meets the intent of the Minimum Standard for which the variance is sought (Ref. 9VAC25-840-50).
- 7.3 For an exception to become part of specific SWM plans, a written exception request must be submitted by the RU Facilities Planning and Construction Office for review and approval by DEQ. This request must include an explanation of the reasons for requesting the exception and describe the specific site conditions necessitating the request. The request must also include a detailed description of the alternative SWM practice and justification that the practice meets the intent of the minimum standard or technical criteria or both for which the exception is sought (Ref. 9VAC25-840-50).
- 7.4 **ESC/SWM Variance and Exception Request Policy and Procedures**
 - 7.4.1 The RU Facilities Planning and Construction Office shall coordinate the review and approval of all requested exceptions and variances with DEQ's ESC/SWM Program representative(s).
 - 7.4.2 All requests for project specific exceptions and variances to the RU Annual Standards and Specifications for ESC and SWM shall be sent by the design professional to the RU Facilities Planning and Construction Office and shall be accompanied by complete details and documentation, including justification for the requested variance and impacts associated with the variance request. The design professional shall complete the form included in Appendix C.
 - 7.4.3 The RU ESC/SWM Administrator (or representative) will review the request and determine if the request should be sent to DEQ for further consideration. If the Administrator determines the request should not be sent to DEQ, then the request shall be considered denied.
 - 7.4.4 Exception and variance requests will be sent by the RU Facilities Planning and Construction Office to the DEQ Central Office for review and approval, if determined to be appropriate.
 - 7.4.5 All requested variances shall be considered unapproved until written approval from DEQ is received.
 - 7.4.6 All approved variances shall be listed in the General Notes section of the ESC & SWM plans for land disturbing activities and included in the Narrative.

8.0 LAND-DISTURBING ACTIVITIES

- 8.1 **Proposed Land-Disturbing Activities**
 - 8.1.1 A list of regulated land-disturbing activities under contract and expected to be under contract during the referenced time period is included in Appendix D.
 - 8.1.2 RU will provide the following information on any regulated land-disturbing activity to DEQ Central Office no less than two weeks prior to the start of the activity.
 - 8.1.2.1 Project name or project number (any associated CGP permit number)

- 8.1.2.2 Project location (including nearest intersection, latitude and longitude, access point)
- 8.1.2.3 On-site project manager and contact information
- 8.1.2.4 Responsible Land Disturber (RLD) name and contact information
- 8.1.2.5 Project description
- 8.1.2.6 Acreage of disturbance for the project
- 8.1.2.7 Estimated disturbed acreage for individual projects must be reported in the following manner:
 - 8.1.2.7.1 Linear Projects – beginning and ending coordinates, or
 - 8.1.2.7.2 Site Development – central to polygon or point coordinates.

Note: Coordinates may be reported by UTM (x, y, zone, and datum) or state plane (x, y, zone, and datum).
- 8.1.2.8 Project start and finish date.
- 8.1.2.9 Any variances/exemptions/waivers associated with this project.

8.2 Project Tracking and Notification

- 8.2.1 RU shall track regulated land-disturbing activities.
- 8.2.2 RU land-disturbing activities will be updated quarterly with project information as related to ESC and SWM.

9.0 LONG-TERM MAINTENANCE:

- 9.1 Project-specific plans (plan sheets and narrative) shall contain information on long-term maintenance of BMP’s. The following information shall be printed on the approved stormwater management plans:
 - 9.1.1 A description of requirements for maintenance and maintenance inspection of the stormwater management facilities and a recommended schedule of maintenance inspection and maintenance.
 - 9.1.2 The identification of a person or persons who will be responsible for maintenance inspection and maintenance.
 - 9.1.3 The maintenance inspection schedule and maintenance requirements should be in accordance with the Virginia BMP Clearinghouse, the Virginia SWM Handbook, the MS4 permit (if applicable) and/or the manufacturer’s specifications.
 - 9.1.4 Clearly depict the types of land cover on the site (i.e. different type of hatching for each land cover), including the acreage for each cover type. The acreage should be labeled in all the subareas. Provide a table that adds the land cover up by type on the sheet.
 - 9.1.5 Draw metes and bounds all the way around any conserved open space.
 - 9.1.6 Label any conserved open space as “Runoff Reduction Compliance Forest / Open Space.”
 - 9.1.7 Include the following note on the sheet: “The Runoff Reduction Compliance Forest / Open Space area shown here shall be maintained in a forest / open space

manner until such time an amended storm water management plan is approved by the VSMP Authority.”

- 9.2 RU shall track stormwater management facilities and associated watersheds.
- 9.3 The RU BMP will be updated quarterly with information as related to the BMP.
- 9.4 Stormwater Pollution Prevent Plans (SWPPP’s) shall be made available on-line.
- 9.5 RU shall inspect BMP’s per the schedules included in the narratives or on the plans or both.
- 9.6 RU shall perform maintenance of BMP’s per the schedules included in the narratives or on the plans or both and as necessary to maintain the BMP’s necessary function.

10.0 DEQ OVERSIGHT INFORMATION

- 10.1 Enforcement
 - 10.1.1 SWM – § 62.1-44.15:27.F. Enforcement shall be administered by the Department and the Board where applicable in accordance with the provisions of this article.
 - 10.1.2 ESC – § 62.1-44.15:54.E and § 62.1-44.15:56.G. The Department and the Board, where applicable, shall provide project oversight and enforcement as necessary and comprehensive program compliance review and evaluation. The Department may take enforcement actions in accordance with this article and related regulations.
- 10.2 Complaints and Inspections
 - 10.2.1 SWM – § 62.1-44.15:31.C. The Department shall perform random site inspections or inspections in response to a complaint to assure compliance with this article, the Erosion and Sediment Control Law, and regulations adopted thereunder.
- 10.3 Fees
 - 10.3.1 SWM – § 62.1-44.15:31.D. The Department shall assess an administrative charge to cover the costs of services rendered associated with its responsibilities pursuant to this section.
 - 10.3.2 ESC – § 62.1-44.15:55.D. The Board shall have the authority to enforce approved specifications and charge fees equal to the lower of (i) \$1,000 or (ii) an amount sufficient to cover the costs associated with standard and specification review and approval, project inspections, and compliance.
- 10.4 Please note that DEQ is the authority and issuance and termination of Construction General Permits shall go through the Department.
 - 10.4.1 Registration Statement – 9VAC25-880-50
 - 10.4.2 Notice of Termination – CGP Part I.F.
 - 10.4.3 AS&S Entity Information Form – see Appendix E.
- 10.5 Discretionary Requirements:

- 10.5.1 Inspection reports conducted by RU as well as complaint logs and complaint responses may be required to be submitted to DEQ.
- 10.5.2 RU may be required to provide weekly e-reporting to the Department's applicable regional office:
 - 10.5.2.1 Inspection reports;
 - 10.5.2.2 Pictures;
 - 10.5.2.3 Complaint logs and complaint responses; and
 - 10.5.2.4 Other compliance documents



APPENDIX A

PART 1 – ESC/SWM PLAN PREPARER/REVIEWER CHECKLIST

ESC/SWM PLAN PREPARER/REVIEWER CHECKLIST

Page 1 of 7

The Erosion and Sediment Control (ESC) and Storm Water Management (SWM) Plan consists of the narrative (including any supporting calculations) and the plan sheets, as noted below.

GENERAL

Complete set of plans - Include all sheets pertaining to the site grading and stormwater and any activities impacting erosion and sediment control and drainage:

-
-
- Existing conditions
- Demolition
-
- Site grading

-
-
- Erosion and sediment control
- Storm sewer systems
-
-
- Stormwater management facilities
- Utility layout
-
- Landscaping
-
-
- On-site and off-site borrow and disposal areas that do not have separate approved ESC Plans
- Calculations
- (Note – For water quality please include the Virginia Runoff Reduction Method Spreadsheet and the associated calculations.)

Professional's seal - The designer's original seal, signature, and date are required on the cover sheet of each narrative and each set of plan sheets. A facsimile is acceptable for subsequent plan sheets.

Number of plan sets - Two sets of ESC and/or SWM Plans may be submitted initially. Five sets are required for approval. Distribution of the approved plans will be as follows:

- 1 – RU Facilities Planning and Construction Office
- 1 – RU Project Manager
- 1 – Design Engineer
- 1 – Contractor
- 1 – Plan Reviewer / Inspector

Variances - Variances requested at the time of plan submission are governed by Section 9VAC25-840-50 of the Virginia Erosion and Sediment Control Regulations and the RU Annual Standards and Specifications for ESC and SWM.

Completed Plan Preparer / Reviewer Checklist - Include a completed and signed ESC/SWM Plan Preparer/Reviewer Checklist.

EROSION AND SEDIMENT CONTROL MINIMUM STANDARDS

Page 2 of 7

All Minimum Standards must be addressed.

Yes No NA

All Minimum Standards have been listed on a construction sheet?

- MS-1 Have temporary and permanent stabilization been addressed in the narrative?
 Are practices shown on the plan?
 Temporary and permanent seed specifications?
 Lime and fertilizer?
 Mulching?
 Blankets/Matting?
 Pavement/Construction Road Stabilization?
- MS-2 Has stabilization of soil stockpiles, borrow areas, and disposal areas been addressed in the narrative and on the plan?
 Have sediment trapping measures been provided?
- MS-3 Has the establishment and maintenance of permanent vegetative stabilization been addressed?
- MS-4 Does the plan specifically state that sediment-trapping facilities shall be constructed as a first step in land-disturbing activities?
- MS-5 Does the plan specifically state that stabilization of earthen structures is required immediately after installation? Is this noted for each measure on the plan?
- MS-6 Are sediment traps and sediment basins specified where needed and designed to the Annual Standards and Specifications?
- MS-7 Have the design and temporary/permanent stabilization of cut and fill slopes been adequately addressed? Is Surface Roughening provided for slopes steeper than 3:1?
- MS-8 Have adequate temporary or permanent conveyances (paved flumes, channels, slope drains) been provided for concentrated stormwater runoff on cut and fill slopes?
- MS-9 Has water seeping from a slope face been addressed (e.g., subsurface drains)?
- MS-10 Is adequate inlet protection provided for all operational storm drain and culvert inlets?

Yes No NA

- MS-11 Are adequate outlet protection and/or channel linings provided for all stormwater conveyance channels and receiving channels? Is there a schedule indicating:
 Dimensions of the outlet protection? Lining? Size of riprap?
 Cross section and slope of the channels? Type of lining? Size of riprap, if used?
- MS-12 Are in-stream protection measures required so that channel impacts are minimized?
- MS-13 Are temporary stream crossings of non-erodible material required where applicable?
- MS-14 Are all applicable federal, state and local regulations pertaining to working in or crossing live watercourses being followed?

MS-15 Has immediate re-stabilization of areas subject to in-stream construction (bed and banks) been adequately addressed?

MS-16 Have disturbances from underground utility line installations been addressed?

No more than 500 linear feet of trench open at one time?

Effluent from dewatering filtered or passed through a sediment-trapping device?

Proper backfill, compaction, and re-stabilization?

MS-17 Is the transport of soil and mud onto public roadways properly controlled? (i.e., construction entrances, wash racks, transport of sediment to a trapping facility, cleaning of roadways at the end of each day, no washing before sweeping and shoveling)

MS-18 Has the removal of temporary practices been addressed?

Have the removal of accumulated sediment and the final stabilization of the resulting disturbed areas been addressed?

MS-19 Are properties and waterways downstream from development adequately protected from sediment deposition, erosion, and damage due to increases in volume, velocity and peak flow rate of stormwater runoff? Have adequate channels been provided on-site?

Is concentrated stormwater runoff leaving the development site discharged to an adequate natural or man-made receiving channel, pipe or storm sewer system?

Are calculations provided to verify the adequacy of all channels and pipes?

If existing natural receiving channels or previously constructed man-made channels or pipes are not adequate, have provisions been made to prevent downstream erosion?

Have increased volumes of sheet flows that may cause erosion or sedimentation on adjacent property been diverted to a stable outlet, adequate channel, pipe or pipe system, or to a detention facility?

Variances requested at the time of plan submission are governed by Section 9VAC25- 840-50 of the Virginia Erosion and Sediment Control Regulations.

All Minimum Standards have been listed on a plan set.

NARRATIVE

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Project description - Briefly describe the nature and purpose of the land-disturbing activity.

Provide the area (acres) to be disturbed. This disturbed area shall include laydown, access and any other area that may be disturbed during the course of the project.

Provide the existing impervious area and the increase, or decrease, in impervious area (acres).
 Estimated schedule for the project (duration from start to finish).

Ultimate developed condition of the site.

Existing site conditions - A description of the existing topography (% slopes), ground cover, and drainage (on-site and receiving channels).

Provide the size of drainage areas in pre-development and post-development conditions.
Discuss any existing drainage or erosion problems and how they are to be corrected.

Adjacent areas - A description of all neighboring areas such as residential developments, agricultural areas, streams, lakes, roads, etc., that might be affected by the land disturbance. Discuss any environmentally sensitive areas and any possible problems during and after construction (traffic issues, dust control, increases in runoff, etc.).

Off-site areas - Describe any off-site land-disturbing activities that may occur (borrow sites, disposal areas, easements, etc.). Identify the owner of the off-site area and the locality responsible for plan review. Include a statement that any off-site land-disturbing activity associated with the project must have an approved ESC plan. Submit documentation of the approved ESC plan for each of these sites.

Soils - Provide a description of the soils on the site, giving such information as soil name, mapping unit, erodibility, permeability, surface runoff, and a brief description of depth, texture and soil structure.

Indicate references for soil information.
Provide a copy of the soil survey map.

Critical areas - A description of areas on the site that have potentially serious erosion problems or that are sensitive to sediment impacts (e.g., steep slopes, watercourses, wet weather / underground springs, etc.). Discuss any area(s) of the project which may become critical during the project.

Erosion and sediment control measures - A description of the structural and vegetative methods that will be used to control erosion and sedimentation on the site. Controls should satisfy applicable minimum standards and specifications in Chapter 3 of the 1992 Virginia Erosion and Sediment Control Handbook (VESCH).

Management strategies / Sequence of construction - Address management strategies, the sequence of construction, and any phasing of installation of ESC measures.

Permanent stabilization - A brief description, including specifications, of how the site will be stabilized after construction is completed. List any soil testing requirements.

Maintenance of ESC measures - A schedule of regular inspections, maintenance, and repair of erosion and sediment control structures should be set forth. List who will be responsible for ESC maintenance during the course of the project.

Calculations for temporary erosion and sediment control measures - For each temporary ESC measure, provide the calculations required by the standards and specifications. All calculations

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showing pre-development and post-development runoff should be provided including any worksheets, assumptions and engineering decisions.

Stormwater management considerations - Will the development of the site cause an increase in peak runoff rates? Will the increase in runoff cause flooding or channel degradation downstream? Describe the strategy to control stormwater runoff:

- Provide exhibits showing the drainage divides, the direction of flow, and the size (acreage) of each of the site drainage areas that discharge runoff off-site, both existing and proposed.
- Provide calculations for pre- and post-development runoff from these drainage areas.
- Ensure that Minimum Standard 19 is satisfied for each off-site receiving channel, including those that receive runoff from stormwater management facilities.
-
- Provide calculations for the design of each permanent stormwater management facility. Ensure that increased volumes of sheet flows are diverted to a stable outlet, to an adequate channel, pipe or pipe system, or to a stormwater management facility.
- Provide adequacy calculations (capacity and erosion resistance) for all on-site stormwater conveyances in accordance with the next checklist item.
- Provide a table with the following information for each stormwater management BMP: BMP Type, Geographic Location (Northing/Easting), Total Acres Treated by Facility, Impervious Acres Treated, and Pervious Acres Treated.

Calculations for permanent stormwater conveyances - For each permanent stormwater conveyance or structure, provide the following design calculations, as applicable:

- Drainage area map with time of concentration (T_C) path shown and points of analysis with worksheets.
-
-

T_C calculation/nomograph
Locality IDF curve

Composite runoff coefficient or RCN calculation
Peak runoff calculations

TR-55 worksheets

Stormwater conveyance channel design calculations
Storm drain and storm sewer system design calculations

Hydraulic Grade Line if any pipe in the system is more than 90% full for a 10-year storm
Culvert design calculations

Drop inlet backwater calculations
Curb inlet length calculations

Water quality calculations for BMPs including worksheets
Energy balance method documentation

VRRM compliance spreadsheet

Maintenance of SWM Facilities – Provide the following for each permanent stormwater management facility:

A description of the requirements for maintenance of the facility and a recommended schedule of maintenance inspection and maintenance.

The identification of the person or persons who will be responsible for maintenance inspection and maintenance.

The maintenance inspection schedule and maintenance requirements should be in accordance with the Virginia BMP Clearinghouse, the Virginia SWM Handbook, the MS4 permit (if applicable) and/or the manufacturer's specifications.

Clearly depict the types of land cover on the site (i.e. different type of hatching for each land cover) including the acreage for each cover type. The acreage should be labeled in all of the

subareas. Provide a table that adds the land cover up by type on the sheet. Draw metes and bounds all the way around any conserved open space.

Label any conserved open space as “The Runoff Reduction Compliance Forest / Open Space.”

- Include the following note on the sheet: “The Runoff reduction Compliance Forest / Open Space area shown here shall be maintained in a forest / open space manner until such time an amended storm water management plan is approved by the VSMP Authority.”

Water Quality – Is the plan in compliance with the water quality criteria, or, other current best management practices found at the Virginia Stormwater BMP Clearinghouse (<http://www.vwrrc.vt.edu/swc/>)? Provide supporting calculations. For each best management practice with a checklist, include a completed Design and Plan Review Checklist from Appendix 3 of the Virginia Stormwater Management Handbook.

Specifications for erosion and sediment control measures - For each erosion and sediment control measure employed in the plan, include in the Narrative at a minimum the following sections from the standard and specification in the VESCH: Construction Specifications, Installation, and Maintenance. Include any approved variances or revisions to the standards and specifications.

Specifications for stormwater and stormwater management structures - Provide specifications for stormwater and stormwater management structures, i.e., pipe materials, pipe bedding, stormwater structures.

Page numbers – Number the pages of the narrative and the calculations.

General Information – Narrative contains project specific information, and where appropriate general information has been modified to represent the project specific information and situation.

SITE PLAN

Vicinity map - A small map locating the site in relation to the surrounding area. Include any landmarks that might assist in locating the site.

Indicate north - The direction of north in relation to the site.

Limits of disturbance – Areas that are to be cleared and graded and areas to be protected during construction. This disturbed area shall include laydown, access and any other areas that may be disturbed during the course of the project. Provide notes on how areas will be marked and for areas NOT to be disturbed.

Existing contours - The existing contours of the site shall be shown as dashed light lines and elevation labeled adequately.

Final contours and elevations - Changes to the existing contours, including final drainage patterns. Note the finished floor elevation (FFE) of all buildings on site, including basements. Proposed contour lines shall be solid and bolder than existing contour lines.

Profile of storm drainage system – Proposed storm drainage components shall be provided in a profile. Pipe diameter, material, inverts, stationing, percent slope, proposed and existing grade, etc. shall be included as part of the profile.

Existing vegetation - The existing tree lines, grassed areas, or unique vegetation.

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Soils Map – The boundaries of different soil types, K-factor and soil survey classifications.

Existing drainage patterns – The dividing lines and the direction of flow for the different drainage areas. Include the size (acres) of each drainage area.

Proposed drainage patterns – The dividing lines and the direction of flow for the different drainage areas. Include the size (acres) of each drainage area.

Critical areas – Note on the plan all critical areas with potentially serious erosion problems.

Site development – Show all improvements such as buildings, parking lots, access roads, utility construction, etc. Show all physical items that could affect or be affected by erosion, sediment, and drainage.

Landscape plan - Include a plan showing location and plant selection for landscaped areas.

Location of practices – Show the locations of erosion and sediment control and stormwater management practices used on the site. Use standard symbols and abbreviations from the ESC and SWM handbooks. A legend denoting symbols, line uses and other special characters shall be provided.

Off-site areas - Include any off-site land-disturbing activities (e.g., borrow sites, disposal areas, etc.) not covered by a separate approved ESC Plan. Discuss who has final authority for off-site areas and who will be responsible for stabilization.

Detail drawings – Show detail drawings of all SWM and ESC practices implemented. Any structural practices used that are not found in the ESC handbook or local handbooks should be explained and illustrated with detail drawings. Details should be provided which are clearly dimensioned and reflect the ability to be “built” in the field according to proper design criteria.

Erosion and sediment control notes - At a minimum, include the erosion and sediment control notes found in Table 6-1 on page VI-15 of the 1992 *Virginia Erosion and Sediment Control Handbook*. Note that the Virginia Erosion and Sediment Control Regulations are found in section "9VAC25-840" of the Code of Virginia. Ensure that all applicable Minimum Standards not covered elsewhere in the plan have been addressed. Include a note that any off-site land-disturbing activity associated with the project must have an approved ESC Plan.

Minimum Standards – Minimum Standard 1 through Minimum Standard 19 shall be included in the plan set.

Legend - Provide a complete listing of all ESC measures used, including the VESCH uniform code symbol and the standard and specification number. Include any other items necessary to identify pertinent features in the plan.

Property lines and easements - Show all property and easement lines. For each adjacent property, list the deed book and page number and the property owner's name and address.

Print Professional's Name

Professional's Signature

Date



APPENDIX B

ESC/SWM INSPECTION FORM INSPECTION REPORT

Project	Name:	Project	Authority:
RLD	Name:	RLD	No.:
Project Location:		Project No:	

Inspector Name: _____	Inspection Date: _____	Time: _____
Date of Most Recent Precipitation Event: _____	Equivalent rainfall _____	

-
-
-

Pre-Construction Conference Clearing & Grubbing Rough Grading

STAGE OF CONSTRUCTION

-
-
-

*Building Construction
Finish Grading Final Stabilization*

-
-
-

Construction of SWM Facilities Maintenance of SWM Facilities Other

Item#	State/Local Regulation ⁽¹⁾	Violation		Description and Location of Problem/Violation ⁽²⁾ , Required or Recommended Corrective Actions, and Other Comments/Notes
		Initial	Repeat	

1. Refers to applicable regulation found in the most recent publication of the *Virginia Erosion and Sediment Control Regulations* (9VAC25-840), *Virginia Stormwater Management Permit Regulations* (9VAC25-870), or Annual Standards and Specifications for ESC & SWM
2. Note whether or not off-site damage resulting from the problem/violation was evident during the inspection.

REQUIRED CORRECTIVE ACTION DEADLINE DATE: _____ **Re-inspection Date:** _____
 (DD/MM/YY) (DD/MM/YY)

The required corrective action deadline date applies to all violations noted on this report. If listed violation(s) currently constitute non-compliance and/or required corrective actions are not completed by the deadline, a **NOTICE TO COMPLY**, **STOP WORK ORDER**, and/or other enforcement actions may be issued to the entity responsible for ensuring compliance on the above project.

Inspector: _____

Signature

Date

Acknowledgement of on-site report receipt:

Print Name

Signature

Date

This report will be provided to the following parties via mail, fax, or e-mail within 24 hours of inspection:

Sheet ____ of ____



APPENDIX C

VARIANCE/EXCEPTION REQUEST FORM VARIANCE/EXCEPTION REQUEST

Requested by: _____ Date: _____
 Street Address: _____
 City/Town/Zip: _____ Telephone #: _____
 #: Fax #: E-mail address: _____ Introduction:

Project Description:

Minimum Standards Variance Requests:

Exiting Conditions and Adjacent Areas:

Soil Characterization:

Critical and Sensitive Areas (Karst, wetland, etc.):

Mitigation (EPC Measures; Permanent Stabilization; Vegetative Restoration, Maintenance; Critical and Sensitive Areas; Self Inspection, Reporting and DEQ Certified Personnel):

Designers Signature:

Date:

Signature of applicant:

Date:

*Providing supporting documentation (sketches, calculations, etc...) as necessary to support request
(NOTE: All approved Variance Requests will be considered part of the Erosion and Sediment Control Plan.)*



APPENDIX D

REGULATED LAND-DISTURBING ACTIVITIES

Regulated Land-Disturbing Activities

RU will provide the following information on any regulated land-disturbing activity to DEQ Central Office no less than two weeks prior to the start of the activity.

- Project name or project number
- Project location (including nearest intersection, latitude and longitude, access point)
- On-site project manager and contact information
- Responsible Land Disturber (RLD) name and contact information
- Project description
- Area of disturbance for the project
- Estimated disturbed acreage for individual projects must be reported in the following manner:
 - Linear Projects – beginning and ending coordinates, or
 - Site Development – central to polygon or point coordinates

Note: Coordinates may be reported by UTM (x, y, zone, and datum) or state plane (x, y, zone, and datum).
- Project start and finish date
- Any variances/exemptions/waivers associated with this project

Project Name	Location	Project Manager	Contact Information	RLD	Est. Start Date	Est. Completion Date
Reed and Curie Halls Renovation – Capital Project	Main Campus	Paul Ely ptely@radford.edu 540-831-7808	TBD	Less than 10,000 sf	July 2017	December 2020

Maintenance Storage Building Electrical Service Upgrade	Maintenance Area	Lou Ferguson wlferguso@radford.edu 540-831-7781	RU in-house forces	Less than 10,000 sf	June 2017	August 2017



APPENDIX E

Annual Standards and Specifications Entity Information Form

Annual Standards & Specification (AS&S) Entity Information

**General VPDES Permit for Discharges of Stormwater from Construction Activities
(VAR10) (To be completed by the AS&S Entity and submitted with the VAR10
Registration Statement)**

1. Annual Standards & Specifications Entity/Holder:		
2. AS&S Coverage Verification		
	a. Operator:	
	b. Project name:	
	c. Technical Criteria Used:	
	d. Estimated Area to be Disturbed (acres):	
3. Plan Approval Verification		
	a. Erosion & Sediment Control (ESC) Plan Reviewer Name:	
	i. ESC Plan Reviewer Certification Number:	
	b. Stormwater Management (SWM) Plan Reviewer Name:	
	i. SWM Plan Review Certification Number	

Printed Name:	Title:
Signature:	Date:

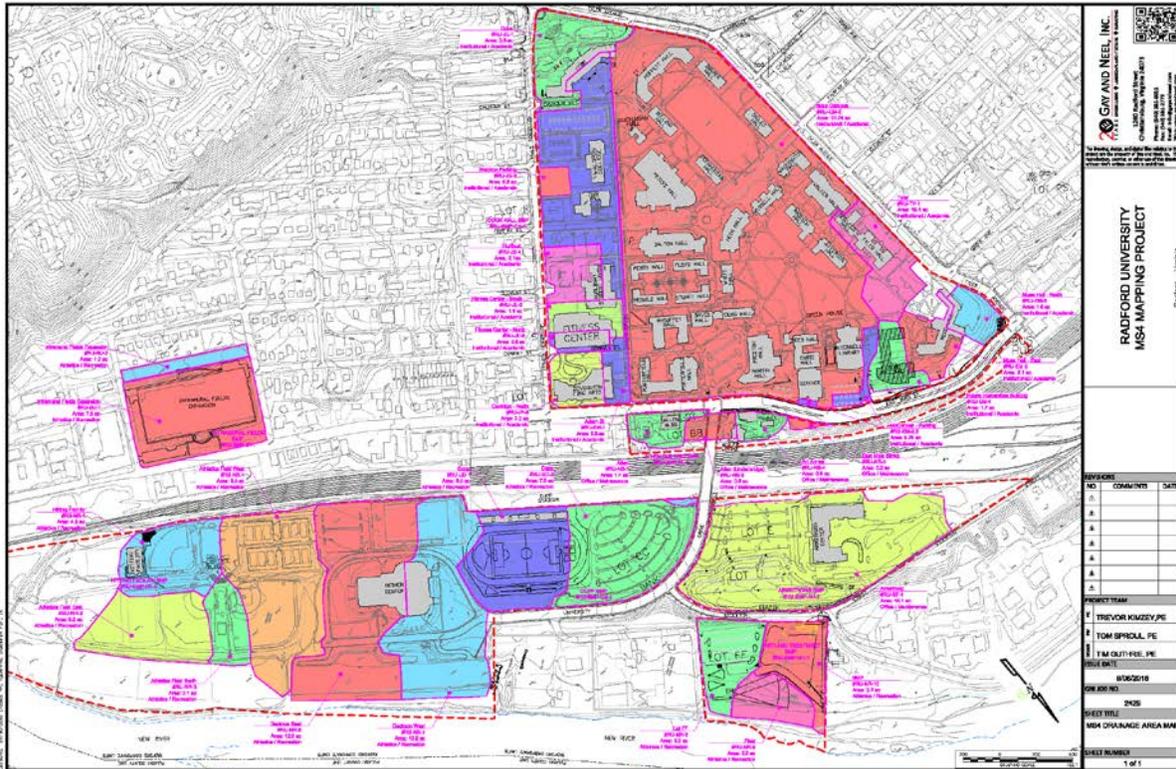
(Please sign in ink. This must be signed by an employee of the AS&S entity who has oversight of this project and is aware of its coverage under their AS&S.)

Instructions for completion:

2.a. Operator = Owner, operator, developer, person or general contractor that the AS&S holder is allowing to operate under their DEQ approved AS&S.
2.b. Project Name = Name of the construction activity as it appears on the Registration Statement.
2.c. Stormwater Management Technical Criteria = The technical criteria used for this project will be either IIB or IIC per the SWM Regulations; 9VAC25-870.
2.d. Estimated Area to Be Disturbed = Provide the estimated area (to the nearest one-hundredth acre) to be disturbed by the construction activity. Include the estimated area of land disturbance that will occur at any off-site support activity to be covered under this general permit.

**(Further questions can be directed to the Stormwater Construction General Permitting personnel;
constructiongp@deq.virginia.gov)**

Appendix 3



Street Name/Location	Outfall Number	Latitude	Longitude	Coordinate System	Data Source (Survey, Map, GPS)	Pipe Shape	Pipe Span (in)	Pipe Rise (in)	Receiving Feature	Subwatershed Area (ac)	Waterbody	HUC12	VAHUG	TMDL	Initial Reconnaissance Date	ORI Date(s)	ORI Results	Notes
Jefferson St.																		
RU-JE-1	37° 8'2.32"N	80° 32'57.90"W	Map	Round	12	12	18"	Storm Main	3.4	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	No Flow			
RU-JE-2	37° 8'2.53"N	80° 32'57.80"W	Map	Round	12	12	18"	Storm Main	0.5	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	Does not leave property - Remove			
RU-JE-3	37° 8'6.73"N	80° 32'54.07"W	Map	Round	18	18	18"	Storm Main	0.6	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	No Flow			
RU-JE-4	37° 8'11.36"N	80° 32'50.30"W	Map	Round	24	24	30"	Storm Main	2.1	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	No Flow			
RU-JE-5	37° 8'12.10"N	80° 32'49.53"W	Map	Round	15	15	30"	Storm Main	1.6	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	No Flow			
RU-JE-6	37° 8'13.49"N	80° 32'48.32"W	Map	Round	18	18	30"	Storm Main	0.8	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	No Flow			
RU-JE-7	37° 8'15.01"N	80° 32'46.85"W	Map	Round	15	15	30"	Storm Main	1.3	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	Does not leave property - Remove			
RU-JE-8	37° 8'16.14"N	80° 32'45.89"W	Map	Round	15	15	36"	Storm Main	0.7	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	No Flow			
East Main St.																		
RU-EM-1	37° 8'18.38"N	80° 32'49.63"W	Map	Round	24	24	East Main	9.8	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	No flow				
RU-EM-2	37° 8'18.67"N	80° 32'50.17"W	Map	Round	30	30	East Main	51.1	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	Flow from RU-EM-3?				
RU-EM-3	37° 8'25.05"N	80° 32'59.62"W	Map	Round	18	18	18"	Storm Main	0.7	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	Verify if leads to RU-EM-2 - Remove			
RU-EM-4	37° 8'27.80"N	80° 33'6.22"W	Map	Round	24	24	24"	Storm Main	1.7	New River - Connellys Run	50500011801	NE57	4/6/2016	4/6/2016	No flow			
RU-EM-5	37° 8'28.00"N	80° 33'7.22"W	Map	Round	15	15	24"	Storm Main	2.1	New River - Connellys Run	50500011801	NE57	4/6/2016	4/6/2016	No flow			
RU-EM-6	37° 8'27.88"N	80° 33'12.41"W	Map	Round	15	15	18"	Storm Main	0.7	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	No flow			
Tyler Avenue																		
RU-TY-1	37° 8'22.29"N	80° 33'11.09"W	Map	Round	18	18	36"	Storm Main	16.1	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	No flow			
RU-TY-2	37° 8'27.42"N	80° 33'13.12"W	Map	Round	15	15	18"	Storm Main	0.8	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	Does not Exist - Remove			
Norfolk Southern Railroad																		
RU-NS-1	37° 8'20.73"N	80° 32'48.13"W	Map	Round	54	54	54"	Storm Main	1.4	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	No flow			
RU-NS-2	37° 8'22.56"N	80° 32'51.50"W	Map	Round	24	24	Ex. RR Ditch	Unknown	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	Not Found - Verify				
RU-NS-3	37° 8'22.96"N	80° 32'52.33"W	Map	Round	18	18	Ex. RR Ditch	Unknown	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	No flow				
RU-NS-4	37° 8'24.79"N	80° 32'55.04"W	Map	Round	12	12	Ex. RR Ditch	0.9	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	No flow				
RU-NS-5	37° 8'25.50"N	80° 32'56.49"W	Map	Round	18	18	RR Ditch	0.2	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	No flow				
New River																		
RU-NR-1	37° 8'7.88"N	80° 32'11.46"W	Map	Round	36	36	Trib. Of New River	Offsite	New River - Connellys Run	50500011801	NE57	4/6/2016	4/6/2016	Stream Flow tested				
RU-NR-2	37° 8'14.88"N	80° 32'10.33"W	Map	Round	27	27	New River	9.9	New River - Connellys Run	50500011801	NE57	4/6/2016	4/6/2016	No flow				
RU-NR-3	37° 8'17.24"N	80° 32'14.77"W	Map	Round	15	15	New River	2.1	New River - Connellys Run	50500011801	NE57	4/6/2016	4/6/2016	No flow				
RU-NR-4	37° 8'19.52"N	80° 32'18.62"W	Map	Round	30	30	New River	9.5	New River - Connellys Run	50500011801	NE57	4/6/2016	4/6/2016	No flow				
RU-NR-4.5	37° 8'19.52"N	80° 32'18.62"W	Map	Round	30	30	New River	Unknown	New River - Connellys Run	50500011801	NE57	4/6/2016	4/6/2016	No flow	Found in Field			
RU-NR-5	37° 8'21.97"N	80° 32'22.07"W	Map	Round	60	60	New River	12.3	New River - Connellys Run	50500011801	NE57	4/6/2016	4/6/2016	Stream Flow Tested				
RU-NR-5.5	37° 8'21.97"N	80° 32'22.07"W	Map	Round	30	30	New River	Unknown	New River - Connellys Run	50500011801	NE57	4/6/2016	4/6/2016	No flow	Found in Field			
RU-NR-6	37° 8'24.83"N	80° 32'27.21"W	Map	Round	30	30	New River	Unknown	New River - Connellys Run	50500011801	NE57	4/6/2016	4/6/2016	No flow				
RU-NR-7	37° 8'25.09"N	80° 32'27.50"W	Map	Round	20	20	New River	10.2	New River - Connellys Run	50500011801	NE57	4/6/2016	4/6/2016	Spring Flow Tested				
RU-NR-8	37° 8'34.64"N	80° 32'41.17"W	Map	Round	24	24	New River	3.2	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	No flow				
RU-NR-9	37° 8'36.09"N	80° 32'42.66"W	Map	Round	18	18	New River	2.2	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	No flow				
RU-NR-10	37° 8'39.07"N	80° 32'45.70"W	Map	Arch	72	72	New River	3.2	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	No flow				
RU-NR-11	37° 8'37.33"N	80° 32'47.53"W	Map	Round	30	30	New River	3.2	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	No flow				
University Drive																		
RU-UD-1	37° 8'23.05"N	80° 32'34.37"W	Map	Round	36	36	36"	RCP	6.5	New River - Connellys Run	50500011801	NE57	4/6/2016	4/6/2016	No flow			
RU-UD-2	37° 8'25.83"N	80° 32'39.09"W	Map	Round	54	54	54"	RCP	7.6	New River - Connellys Run	50500011801	NE57	4/6/2016	4/6/2016	No flow			
Stockton Street																		
RU-ST-1	37° 8'33.86"N	80° 32'51.06"W	Map	Round	30	30	30"	RCP	16.1	New River - Connellys Run	50500011801	NE57	3/30/2016	3/30/2016	Discharges to Wetlands - Remove			
Burlington Street																		
RU-BU-1	37° 8'7.21"N	80° 32'29.22"W	Map	Round	18	18	24"	RCP	1.2	New River - Connellys Run	50500011801	NE57	4/6/2016	4/6/2016	No flow			
RU-BU-2	37° 8'3.59"N	80° 32'31.47"W	Map	Round	18	18	24"	RCP	7.8	New River - Connellys Run	50500011801	NE57	4/6/2016	4/6/2016	Stream Flow tested			
Athletic Fields																		
RU-AF-1	37° 8'8.85"N	80° 32'15.39"W	Map	Round	15	15	To Trib of New River	4.6	New River - Connellys Run	50500011801	NE57	4/6/2016	4/6/2016	No flow				

Appendix 4

Radford University MS4 Illicit Discharge Detection and Elimination Procedures

General VPDES Permit No VAR040136

Effective Date July 1, 2013

Expiration Date June 30, 2018

Facilities Management

P.O. Box 6909

Radford, VA 24142

Purpose/Goal

The chief purpose of these procedures is to help protect local water quality and satisfy the requirements of Minimum Control Measure No.3 of the MS4 Permit (Section II B 3 c). The procedures provide a framework for MS4s to develop and implement a comprehensive plan to identify and eliminate dry weather illicit discharges to their systems.

Adopted from Brown et al. (2004), the protocol relies primarily on visual observations and the use of field test kits and portable instrumentation during dry weather to complete a thorough inspection of the communities' storm sewers in a prioritized manner. The protocol is applicable to most typical storm sewer systems; however, modifications to materials and methods may be required to address situations such as open channels, piped stream networks, systems impacted by sanitary sewer overflows, or situations where groundwater, backwater or other conditions preclude or confound adequate inspection. The primary focus of the protocol is sanitary waste, however, toxic and nuisance discharges may also be identified. Implementation of the protocol would satisfy the relevant conditions of Minimum Control Measure No. 3, illicit discharge detection & elimination (IDDE) of the university's MS4 Permit.

Illegal dumping located at or near an outfall should be reported to Radford University Police Department (540)831-5500 or Facilities Management at (540)831-7800. Infrastructure repairs should be reported to Facilities Management at (540)831-7800

Detection

Illicit discharges can be detected in several ways: citizen complaints, during regular outfall screening, and during other routine activities conducted by staff. Procedures to be followed at the outfall do not differ greatly based on the type of detection. These procedures are discussed below.

Outfall Inspections

Outfall inspections are to be conducted when at least **48 hours** has passed since the last precipitation event, unless responding to a citizen complaint or spill. Safety precautions are to be undertaken during the inspection, including:

- Wearing protective gloves;
- Wearing protective goggles if chemical testing takes place;
- Placing traffic cones and using flashers, lights, and other traffic control measures if needed;
- Using caution on slopes and at the edge of waterbodies;
- Disposing of chemical reagents or other waste as indicated on material safety data sheets;
- Not entering manholes or storm sewers without confined space training.

Autumn (after leaf fall) is the ideal time to conduct outfall inspections. Vegetation is less likely to obstruct views of outfalls and groundwater influences may be diminished. Outfall inspections may be conducted during other seasons, but be aware of the following:

- Winter: frozen flows, cold temperatures affecting sampling equipment, and possible effect of snow melt and/or road salt on sample results.
- Spring: high groundwater table may lead to more flowing outfalls that originate from springs.
- Summer: vegetation may obstruct outfalls, air conditioning condensate may lead to more flowing outfalls (AC condensate is not considered an illicit discharge unless deemed by the MS4 to be a “significant contributor of pollutants” (9VAC25-870-400 D 2 c 3).

At the outfall, look for visual indicators of illicit discharges like those described in Section 4. Complete the Outfall Reconnaissance Inventory (ORI) form (see Appendix C), or similar field form, to record your observations.

If the outfall is not already in the jurisdiction’s mapping system, collect GPS coordinates, and assign it a unique identifier code. Consider marking this code on the outfall with spray paint or waterproof marking stick in a prominent location such as the outfall headwall. This will help field crews identify specific outfalls in the future. New outfalls and unmapped stormwater infrastructure should be updated in the jurisdiction’s master GIS system as soon as possible after identification. Stormwater pipe mapping should note the direction of flow in addition to pipe location.

Water Sampling

If the outfall has dry weather flow, take photos and collect a water sample as follows.

If possible, collect water from the flow directly in a clean glass bottle or, for bacteria analysis, a sterile plastic bottle or bag. If using a re-usable bottle, be sure to rinse the bottle and its cap one to three times with sample water for conditioning. If a dipper, bailer, bucket, or other device is used to collect a sample, be sure that they are also conditioned with the flow prior to final collection. Collect enough water to conduct all your field and laboratory tests, plus some extra for good measure. Label each sample bag or bottle with the appropriate outfall ID, date and time of collection, and sample collector initials using a water-proof marker. (It is easier to label these BEFORE filling the containers.) Bacteria samples are to be kept on ice and processed within a certain amount of time after collection – usually within 6 hours, but refer to bacteria kit or lab instructions for specific holding times. Other lab samples may also need to be kept on ice; consult the laboratory for special instructions. See Table 2 for common holding times and methods for handling water samples for different parameters.

Parameter	Holding Time	Notes
Bacteria	6 hours	Cool, 4°C
Ammonia	Process immediately	Can preserve with sulfuric acid and hold for 28 days
Fluoride	28 days (HDPE plastic container only)	Cool, 4°C
Anionic Surfactants	2 days	Cool, 4°C

Potassium	6 months	Frozen
Total nitrogen / Total phosphorus	24 hours 30 days	Cool, 4°C Frozen below -20°C
pH	Process immediately	
Temperature	Process immediately	

Measuring Flow Rate

Flow measurements should be collected at each flowing outfall. The methods to be used are listed in priority preference below.

1. **Volume-based** – a 1-liter container jug or 5-gallon bucket is filled and the time taken to fill it is recorded with a stopwatch. Flow rate is obtained by converting liters or gallons to cubic feet and then dividing the volume by time. If the flow is difficult to obtain, a “spout” can be molded from plumber’s putty to direct the flow into the measuring container.

2. **Weir equation** – average depth of flow and wetted width are collected at the outfall and the results are input into the equation:

$$Q \text{ in cubic feet per second} = 3.1 \times \text{wetted width (feet)} \times \text{depth (feet)}^{1.5}$$

Note: This method should only be used with a free-flowing outfall (i.e. water drops out of the pipe and falls to the stream channel) and when the depth of flow is relatively uniform.

3. **Cross-sectional area** – the cross-sectional area of the water is obtained by collecting the wetted width and average depth of water and multiplying the results. Velocity is obtained by using a stopwatch to measure the time it takes for a ping pong ball or other buoyant object to flow over a known distance. The velocity measurement is repeated 3-5 times and the results averaged. Flow is obtained by multiplying cross-sectional area by velocity.

Regular inspections of outfalls are a primary part of an effective IDDE program and a regular schedule of long-term inspections for outfalls should be maintained. The MS4 Permit requires a prioritized schedule of field screening activities determined by the operator based on such criteria as age of the infrastructure, land use, historic illegal discharges, dumping, or cross connections (Section II B 3 c 1 a). If the MS4 has less than 50 outfalls, all should be screened on an annual basis. For communities with 50 or more outfalls, a minimum of 50 should be screened annually. Non-routine Inspections If an employee observes evidence of an illicit discharge during an informal or non-routine inspection, he/she should collect as much information (including photos) about the potential illicit discharge as possible then contact his/her supervisor or dispatch office so that appropriate action can be taken. A tracking sheet or spreadsheet (example provided in Table 3) can be used to collect the information observed. While it may not be reasonable to expect all field employees to have copies of the form with them at all times, there are other ways to collect the information:

- The person observing the discharge can provide the information verbally to dispatch or the supervisor, who can then complete the Illicit Discharge Tracking Sheet;
- The person can log as much information as they can recall onto the form upon returning to the office;

- A third party (such as a code enforcement officer) dedicated to inspecting and tracing illicit discharges can be sent to the location as soon as possible where the potential illicit discharge was observed to collect the necessary information directly on the form

Table 3. Illicit Discharge Tracking Sheet

<u>Date Illicit Discharge Observed & Reported:</u>	<u>Report Initiated by:</u> Phone, drop-in, contact information, etc.	<u>Locations of Discharge:</u> if known- lat/long, stream address or outfall #, nearby landmark, etc.	<u>Description of Discharge:</u> E.G- dumping wash water suds, oil, etc.	<u>Actions to be Taken:</u> Who, What, When & How...(what should be done)	<u>Results & Follow- Up of Investigation:</u> Outcome of Actions taken and any necessary follow-up (what was done)	<u>Date Investigation Resolved or Closed:</u>

It is important to collect as much information as possible at the time of initial observation because of the likelihood that a discharge may be transitory or intermittent. Initial identification of the likely or potential sources of the discharge is also very important.

Potential outfall investigation scenarios include:

1. No discharge present, no evidence of previous illicit discharge – Action: record and proceed to next outfall.
2. No discharge present, evidence of previous illicit discharge – Action: schedule for re- investigation in one month.
3. Discharge present – Action: note apparent quality of discharge, take sample for chemical analysis if necessary and appropriate, begin source tracking phase.

Drainage Area and Storm Drain Investigations

An illicit discharge investigation is to be conducted if any of the following apply:

- The overall outfall characterization as determined by the ORI is determined to be “suspect” or “obvious.”
- On-site or lab water testing results in values that exceed established thresholds. Each MS4 may refine these thresholds through local sample analysis as the program evolves. Since Ammonia is a strong all-around indicator, meters are easy to use in the field or lab, and waste disposal is easier than for the detergents/surfactants test.
- If the outfall is determined to have “potential” illicit discharges based on completion of the ORI, the outfall should be re-visited three additional times during the permit cycle to determine if an intermittent discharge may be present. Ideally, one re-visit will occur on a different day of the week than the original visit and/or at a different time of day

Table 4. Dry weather outfall screening water quality indicators

Screening Parameter	Potential Source	Threshold
Ammonia	Wastewater or industrial	>0.2 mg/l
Fluoride	Tap Water	>0.25 mg/l
Detergents	Wastewater, wash water or industrial	>0.25 mg/l
Potassium	Wastewater or Industrial	>5-6 ppm

If an illicit discharge is detected at an outfall, an investigation will be conducted to isolate the source of the discharge. These investigations should commence within days of the initial identification of any observed continuous or intermittent potential illicit discharges. Based on the MS4 Permit, potential illicit discharges from sewage or that are “significantly contaminated” must be investigated first. Potential illicit discharges that are deemed less hazardous to human health and safety (e.g., washwater) should be investigated, but as a secondary priority (Section II B 3 c 1 d).

The process for tracking a transient discharge (e.g., that enters the storm drain system directly through dumping or spills from the landscape) will follow the procedure for a Drainage Area Investigation. Tracking a continuous or intermittent discharge that likely occurs from direct or indirect entry into the storm drain system from the interaction of pipes underground will follow the procedure for a Storm Drain Investigation. Either investigation should be conducted during dry weather as described previously. Public notification may be required in either type of investigation. If right of entry onto private property is required, the jurisdiction will provide a letter/mailler to residents and property owners located in the vicinity, notifying them of the scope and schedule of investigative work, and the potential need to gain access to their property to inspect plumbing fixtures.

Drainage Area Investigation

A survey by vehicle (“windshield survey”) of the drainage area may be used to find the potential source of pollution if the discharge observed at an outfall has distinct or unique characteristics that allow crews to quickly ascertain the probable operation or business that is generating it (Brown et al, 2004). Discharges with a unique color, smell, or off-the-chart indicator sample reading may point to a specific industrial or commercial source. For example, if fuel is observed at an outfall, crews might quickly check every business operation in the drainage area that stores or dispenses fuel.

In larger or more complex drainage areas, GIS data can be analyzed to pinpoint the potential sources of a discharge. If only general land use data exist, maps can at least highlight suspected industrial areas. If more detailed SIC code data are available digitally, the GIS can be used to pull up specific hotspot operations that could be potential dischargers.

Storm Drain Investigation

Adequate storm and sanitary sewer mapping is a prerequisite to properly execute a storm drain investigation. As necessary and to the extent possible, infrastructure mapping should be verified in the field and corrected prior to investigations. This effort affords an opportunity to collect additional information such as latitude and longitude coordinates using a global position system (GPS) unit, if so desired. To facilitate subsequent investigations, tributary area delineations should be confirmed and junction manholes should be identified during this process.

Field crews strategically inspect manholes within the storm drain network system to measure chemical or physical indicators that can isolate discharges to a specific segment of the network. Once the pipe segment has been identified, on-site investigations are used to find the specific discharge or improper connection. This method involves progressive sampling at manholes in the storm drain network to narrow the discharge to an isolated pipe segment between two manholes. Field crews need to make two key decisions when conducting a storm drain network investigation— where to start sampling in the network and what indicators will be used to determine whether a manhole is considered “clean” or “dirty”.

The field crew can sample the pipe network in one of three ways:

1. Crews can work progressively up the trunk from the outfall and test manholes along the way.
2. Crews can split the trunk into equal segments and test manholes at strategic junctions in the storm drain system.
3. Crews can work progressively down from the upper parts of the storm drain network toward the problem outfall.

During a manhole inspection, manholes are opened and inspected for visual evidence of contamination. Where flow is observed, and determined to be a potential illicit discharge through visual indicators and/or use of water testing equipment, the upstream tributary storm sewer system is isolated for investigation (e.g. further flow inspection, dye testing, CCTV). No additional downstream manhole inspections are performed unless the observed flow is determined to be uncontaminated or until all upstream illicit connections are identified and removed.

Where flow is not observed, but an intermittent discharge is suspected, the MS4 Permit requires documentation of at least 3 separate investigations to observe the potential intermittent discharge, and proper documentation of those investigations (Section II B 3 c 1 e).

Another method to locate and identify intermittent discharges attempts to contain the flow when it occurs. This method will likely require confined space entry procedures for entering junction manholes. All inlets to the structure should be partially dammed for 48 hours when no precipitation is forecasted. Inlets are dammed by blocking a minimal percentage of the pipe diameter at the invert using sandbags, caulking, weirs/plates, or other temporary barriers. The manholes are thereafter re-inspected (prior to any precipitation or snow melt) for the capture of periodic or intermittent flows behind any of the inlet dams. The same visual observations and field testing is completed on any captured flow, and where contamination is identified, abatement is completed prior to inspecting downstream manholes.

Where flow is observed and does not demonstrate obvious indicators of contamination, samples are collected and analyzed and then compared with established benchmark values (see example in Table 4) to determine the likely source of the flow. This information facilitates the investigation of the upstream storm sewer system. Benchmark values may be refined over the course of investigations as the community develops a better sense of local threshold values for given indicators. In those manholes where periodic or intermittent flow is captured through damming inlets, additional laboratory testing (e.g. toxicity, metals, etc.) should be considered where an industrial discharge is suspected.

To facilitate investigations, storm drain infrastructure should possibly be cleaned to remove debris or blockages that could compromise investigations. Such material should be removed to the extent possible prior to investigations, however, some cleaning may occur concurrently as problems manifest themselves.

Isolation and confirmation of illicit sources

Where field monitoring has identified storm sewer systems to be influenced by sanitary flows or washwater, the tributary area is isolated for implementation of more detailed investigations. Additional manholes along the tributary are inspected to refine the longitudinal location of potential contamination sources (e.g. individual or blocks of homes). Targeted internal plumbing inspections, dye testing, smoke testing or CCTV inspections are then employed to more efficiently confirm discrete flow sources. More information on these techniques can be found in Brown et al (2004), and as specified by local policies and legal authority (Section II B 3 c 1 f).

Upon determination of the source, the University notifies the apparent responsible party that a violation of the stormwater ordinance exists. Voluntary compliance is the preferred response. If voluntary compliance cannot be achieved through negotiation, the program administrator may initiate formal enforcement action as specified in the local ordinance.

Post-Removal Confirmation (Section II B 3 c 1 g)

After completing the removal of illicit discharges from a sub drainage area, the sub drainage area is re-inspected to verify corrections. Depending on the extent and timing of corrections, verification monitoring can be done at the initial junction manhole or the closest downstream manhole to each correction. Verification is accomplished by using the same visual inspection, field monitoring, and damming techniques as described above.

Program Tracking, Reporting & Evaluation

The program must include a mechanism to track and document all investigations (Section II B 3 c 1 h). Table 3 or similar spreadsheet, database, or MS4 tracking program can be used for this purpose. The permit also contains specific MS4 reporting elements (Section II B 3 f). The MS4 may wish to track additional elements in order to evaluate the program and make efficiency improvements through time. Below is a list of possible tracking metrics:

- Number/% of manholes/structures inspected
- Number/% of outfalls screened
- Number/% of illicit discharges identified through:
 - visual inspections
 - field testing results
 - temporary damming (intermittent discharges)
- Number/% of homes inspected/dye tested
- Footage/% of pipe inspected by CCTV
- Number/% of illicit discharges removed
- Estimated flow/volume of illicit discharges removed
- Footage and location of infrastructure jetting/cleaning required
- Infrastructure defects identified and repaired
- Water main breaks identified and repaired
- Cost of illicit discharge removals (total, average unit costs)

References

Boston Water & Sewer Commission, 2004, A systematic Methodology for the Identification and Remediation of Illegal Connections. 2003 Stormwater Management Report, chap. 2.1.

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