Annual Report

Term IV, Year 4: July 1, 2018 – June 30, 2019

For Submittal to:
NC Department of Environmental Quality
Division of Energy, Mineral, and Land Resources

Submitted by:
NC Department of Transportation
NPDES Permit No. NCS000250

October 31, 2019

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Recommended for approval:

DocuSigned by:
Stephen Morgan

Stephen Morgan, PE
State Hydraulics Engineer
Hydraulics Unit

10/25/2019
Date

DocuSigned by:
David B. Harris

David Harris, PE
State Roadside Environmental Engineer
Roadside Environmental Unit

10/28/2019
Date

Tim Little, PE
Chief Engineer
North Carolina Department of Transportation

10/30/19
Date

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James H. Trogdon, III, PE
Secretary
North Carolina Department of Transportation

10/30/2019
Date

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This report is in compliance with NCDOT's National Pollutant Discharge Elimination System (NPDES) stormwater discharge permit (NCS000250) requirement under Part III Section A.1 to submit an assessment of the activities performed under the permit for the period July 1, 2018 – June 30, 2019. The NPDES permit authorizes NCDOT to discharge stormwater runoff from general roadways including weigh stations and tolling facilities, construction activities disturbing greater than one acre, borrow pits/waste piles, industrial facilities, office buildings, rest areas, and NCDOT-owned railways. Activities conducted by the North Carolina Turnpike Authority are also covered under this permit.

NCDOT integrates the environmental protection programs required by the permit with the Department's broader triple bottom line goals of accelerated delivery of the State Transportation Improvement Program (STIP), enhancing the appearance of roadway corridors, and working collaboratively with public and private sector partners to enhance the state's economic competitiveness.

Select Accomplishments for Year 4 of Permit Term IV (July 1, 2018 – June 30, 2019)

A few examples of accomplishments achieved by NCDOT during Year 4 of Permit Term IV to comply with the permit and streamline processes to support project delivery are outlined below:

- Post-Construction Stormwater Program – In this permit year NCDOT continued to lay the foundational groundwork for a future update of its Post-Construction Stormwater Program (PCSP). The updated PCSP is to be sequenced with the Department's Integrated Project Delivery (IPD) initiative. As part of this initiative NCDOT is evaluating its business processes used to develop transportation projects with the goal of improving project delivery with transparent, repeatable, and accountable processes that are effective and efficient. The IPD evaluation process underway includes all aspects of project development and design, including the incorporation of compliance with the NPDES Post-Construction Stormwater Program. During this permit year NCDOT identified processes designed to move stormwater management plan decisions earlier in the workflows. Potential benefits for considering stormwater treatment options earlier in the workflows include improved support for permitting decisions and earlier identification of potential utility and right-of-way conflicts. Also during this permit year NCDOT continued to work with its USGS partners on the Stochastic Empirical Loading and Dilution Model (SELDM) project which will support the technical water quality basis for the future updated PCSP.
- Stormwater Outfall Inventory Program – NCDOT completed its field inventory of stormwater outfalls along primary routes in the mid and upper Haw River subwatershed. Outfalls are regulated under NCDOT's NPDES permit and represent locations where runoff is discharged from a pipe or open channel into a stream, reservoir, or other waterbody. NCDOT screened each of the 546 outfalls for evidence of illicit non-stormwater discharges and inappropriate dumping of trash with the goal of helping to protect the Cities of Greensboro, Burlington, and surrounding communities' water supply. The outfall location data is also being used to identify and prioritize existing roadway areas for enhanced stormwater treatment via implementation of BMP retrofits.

- SCM Inspection and Maintenance Program – NCDOT continues to provide training on its Stormwater Control Measure Inspection and Maintenance Program to Division staff responsible for SCM inspections, including inspection protocols and use of field tablets to perform inspections. NCDOT has continued to make improvements on its post hurricane inspections of SCMs by assisting Divisions that were severely damaged by recent hurricanes. These increased efforts to identify damaged SCMS, perform post hurricane SCM inspections, and assess maintenance needs and costs associated with the damages caused by the severe storms will aid in future budgeting for SCM repairs.
- Vegetation Management Program – In addition to pesticide training that NCDOT routinely performs, NCDOT conducted a pesticide training and recertification program for the Field Operations Staff of the City of Greensboro, who provides maintenance on selected NCDOT rights of way. The training session discussed NCDOT's vegetation management program including herbicide selection; NCDOT's wildflower program and herbicidal weed control measures; pesticide recommendations for ornamentals, turfgrass systems, and aquatic applications; understanding special use labels; herbicide equipment calibration for vegetation managers; public relations for pesticide application programs; useful ornamentals in the landscape; NPDES stormwater permit compliance through NCDOT's Highway Stormwater Program; and pesticide storage and spill prevention and response.
- External Education Program – NCDOT introduced Ava and Oliver of the Litter League, two animated ants appearing on NCDOT's social media with a mission to remind children and adults that no one likes a litter bug and encouraging clean up though twitter messages, stickers, and temporary tattoos. NCDOT also released a new Litter Bug, Linnie, who replaced the previous SWAT-A-Litterbug character. These characters are displayed on bookmarks and activity/color sheets.
- Research Program - NCDOT completed two draft reports providing recommendations for optimizing new and existing swales and bioswales within NCDOT rights-of-way. The associated research improved NCDOT's understanding of how trapezoidal shaped swales, forebays and checkdams can reduce pollutant loads in discharges, as well as how length and slope affect performance.

Considerations for Permit Year 2020 (PY2020)

In the upcoming permit year NCDOT will continue to advance its goals of accelerating the pace of project delivery and enhancing authority for project decision making at the Division level. Initiating implementation of the recommendations from the Integrated Project Delivery initiative will begin this permit year which will provide an opportunity to pilot test improvements to the Post-Construction Stormwater Program workflows. Work with our USGS partners on the SELDM project will continue throughout the year in support of the future update to the PCSP. NCDOT will also continue its work on its enterprise GIS system known as Project ATLAS and examine opportunities to integrate PCSP compliance into the ATLAS Workbench project deliverables management system. In PY2020 the Retrofit Opportunity Site Selection Program will transition from the final testing and training phases to full implementation. Targeting watersheds for retrofit opportunity identification is anticipated to occur in cooperation with partners in the Department of Environmental Quality and local governments

interested in watershed restoration planning. With financial support from FHWA NCDOT is pleased to host the National Stormwater Practitioners Workshop in the spring of 2020. This workshop will bring together state DOT NPDES program managers from across the county to exchange information and share strategies for optimizing permit compliance. NCDOT will continue to identify opportunities to expand training to effectively reach staff, contractors, and consultants, and has plans to update several training topics as described in this report. Additionally, NCDOT will continue to implement its existing stormwater management practices.

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Program Summaries

Tables

Appendix

AAH	Adopt-A-Highway
AGOL	ArcGIS Online
AMP	Assessment and Monitoring Plan
BMP	Best Management Practice
BUA	Built Upon Area
CADD	Computer-Aided Design and Drafting
CFR	Code of Federal Regulations
EE	External Education
EMC	Environmental Management Commission
ESC	Erosion and Sediment Control
ESM	Environmental Sensitivity Map
FHWA	Federal Highway Administration
FIP	Field Inventory Protocol
GIS	Geospatial Information System
GREEN	Guided Reduction of Excess Environmental Nutrients
HSP	Highway Stormwater Program
IA	Industrial Activities
I&M	Inspection and Maintenance
IDDEP	Illicit Discharge Detection and Elimination Program
IE	Internal Education
IPD	Integrated Project Delivery
IRMA	Industrial Roadway Maintenance Activities
ITRE	Institute for Transportation Research and Education
IWS	Internal Water Storage
LOS	Level of Service
MEP	Maximum Extent Practical
MPE	Multi-Sensor Precipitation Estimate
NCAC	North Carolina Administration Code
NCDA&CS	North Carolina Department of Agriculture & Customer Services
NCDEMLR	North Carolina Division of Energy, Minerals and Land Resources
NCDENR	North Carolina Department of Environment and Natural Resources (historical name for NCDEQ)
NCDEQ	North Carolina Department of Environmental Quality
NCDOT	North Carolina Department of Transportation
NCDOT-JLSLAT	NCDOT Jordan Lake Stormwater Nutrient Loading Accounting Tool
NCLTAP	North Carolina Local Technical Assistance Program
NCSU	North Carolina State University
NCTA	North Carolina Turnpike Authority
NCVMA	North Carolina Vegetation Management Association
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System

OEI	Office of Education Initiatives
PCSP	Post Construction Stormwater Program
PEF	Professional Engineering Firm
PPE	Personal Protection Equipment
REU	Roadside Environmental Unit
RoF	Report of Findings
ROSS	Retrofit Opportunity Site Selection
ROW	Right of Way
RPC	Retrofit Project Cycle
SELDM	Stochastic Empirical Loading and Dilution Model
SECREF	Sediment and Erosion Control Research and Education Facility
SCMS	Stormwater Control Management System
SMP	Stormwater Management Plan
SPCC	Spill Prevention Control and Countermeasure
SPPP	Stormwater Pollution Prevention Plan
SSIP	Stormwater System Inventory and Prioritization
STEM	Science, Technology, Engineering, and Math
STORMDATA	Stormwater Research Monitoring Database
TMDL	Total Maximum Daily Load
TS4	Transportation Separate Storm Sewer System
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WLA	Waste Load Allocation

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1.0 Introduction

The Highway Stormwater Program (HSP) was established in 1998 to manage the Department's compliance with its statewide Phase I National Pollutant Discharge Elimination System (NPDES) stormwater permit. The NPDES permit authorizes the North Carolina Department of Transportation (NCDOT) to discharge stormwater runoff from the following activities:

- General roadway including weigh stations and tolling facilities
- Construction activities disturbing greater than one acre
- Borrow pits/waste piles (including mines)
- Industrial facilities with the following activities
    - Ferry terminals and maintenance
    - Vehicle and equipment maintenance
    - Pesticide and fertilizer storage
    - Salt and deicing chemical storage
    - Material storage areas
    - Asphalt and concrete plants (NCDOT owned and operated only)
    - Rail maintenance
- Non-roadway non-industrial facilities (i.e., office buildings and rest areas)
- General railway

This permit also covers the following sub-organizations:

- All similar activities of the North Carolina Turnpike Authority (NCTA), for all NCTA projects across the state.
- All similar activities of the I-77 Mobility Partners, for the I-77 corridor.

In order to implement the permit, NCDOT has organized the HSP into thirteen (13) main NPDES program areas. The HSP also manages NCDOT's implementation of the stormwater requirements for state and federal entities in the Jordan and Falls Reservoir watersheds in compliance with state nutrient load reduction rules. Annual reporting requirements for these two watersheds can be found in Section 15 of this report and is allowed by 15A North Carolina Administration Code (NCAC) 02B .0271 (8)(c) and 15A NCAC 02B .0281 (11)(d).

Compliance activities associated with the NPDES permit and the Jordan and Falls Reservoir watersheds are managed by the Hydraulics Unit and the Roadside Environmental Unit and are implemented by business units across NCDOT.

This annual report describes the various achievements and compliance activities by program area for Year 4 of permit Term IV, covering the period of July 1, 2018 through June 30, 2019.

The Department's NPDES permit was reissued in the fall of 2015 (effective October 1, 2015). Since this is the fourth permit, NCDOT refers to it as the Term IV permit. With this reissuance, the reporting period

for the annual report was changed to align with the Department's fiscal year to facilitate planning. Throughout this document, reporting years are referred to as Permit Year 20xx (or PY20xx) to denote the following time frames:

- PY2015: September 1, 2014 – August 31, 2015 (Year 5 of the previous Term III permit)
- PY2016: July 1, 2015 – June 30, 2016 (Year 1 of the Term IV permit)
- PY2017: July 1, 2016 – June 30, 2017 (Year 2 of the Term IV permit)
- PY2018: July 1, 2017 – June 30, 2018 (Year 3 of the Term IV permit)
- PY2019: July 1, 2018 – June 30, 2019 (Year 4 of the Term IV permit)

2.0 Illicit Discharge Detection and Elimination Program

NPDES Permit Part II.A

Objectives and Measurable Goals

The program objectives are to:

i. Implement an Illicit Discharge Detection and Elimination Program (IDDEP) to detect illicit discharges, spills, and illegal dumping into the NCDOT transportation separate storm sewer system (TS4).

ii. NCDOT shall implement appropriate procedures and actions to report illicit spills, discharges and illegal dumping for appropriate enforcement or other action by North Carolina Department of the Environment Quality (NCDEQ).

Management Measures	Measurable Goals
(a) Provide illicit discharge identification training.	NCDOT shall provide annual training for appropriate staff and contractors. Training shall include identification and reporting of illicit discharges and illegal dumping.
(b) Perform illicit discharge inspections.	NCDOT shall perform inspections for illicit discharges to the stormwater drainage system and illegal dumping activities when performing other work on the NCDOT system. Inspections shall be documented when illicit discharges are verified.
(c) Maintain a standard point of contact.	NCDOT shall maintain a standard reporting format and contact for all complaints and reports of illicit discharges.
(d) Report illicit discharges.	NCDOT shall investigate all reports of illicit discharges or illegal dumping. NCDOT shall report verified illicit discharges to the appropriate NCDEQ Regional Office within 30 days of verification.
(e) Maintain a tracking database.	NCDOT shall maintain a tracking database for reports of illicit discharges.

Program Overview

The IDDEP was developed and implemented to detect and eliminate illicit discharges/spills and illegal dumping into the NCDOT TS4. The program provides training of NCDOT staff and contractors on performing inspections, identification of illicit discharges and illegal dumping, and reporting to NCDEQ. NCDOT maintains a tracking database and standard point of contact for the program.

NCDOT continues to maintain its IDDEP to detect illegal dumping, spills, and discharges along the state's roadway system. NCDOT employees participate in training to help enable identification of potential illegal dumping, spills, and discharges when performing other work on the NCDOT system, as well as instruction on reporting them to the HSP IDDEP Manager, who acts as the primary point of contact for the program.

Accomplishments

Ongoing IDDEP Training – As required by Internal Education (IE) Program Management Measures (a) and (b) and IDDEP Management Measure (a), NCDOT HSP staff continues to provide training to NCDOT employees on how to recognize and report illicit discharges and illegal dumping activities. IDDEP training is provided in conjunction with other training events, including the annual spring training workshops for each NCDOT Division, and during various Division meetings. In PY2019, NCDOT HSP staff provided IDDEP training to NCDOT employees as part of NCDOT's Stormwater Pollution Prevention Plan and Spill Prevention, Control and Countermeasures Training Workshops. NCDOT continues to post Illegal Dumping educational posters and IDDEP brochures at maintenance facilities. Hardcopies of NCDOT's IDDEP Field Report and the "Illegal Discharge: Know What to Do" brochures are provided to NCDOT employees at various meetings. NCDOT also distributed IDDEP brochures through the NC State Fair. See External Education (EE) for additional details on other stormwater educational material distributions to the general public or Adopt-A-Highway volunteers. These materials are related to litter, illicit discharges, and illegal dumping, and help raise awareness on reporting illicit discharges and illegal dumping found on NCDOT roadways.

Spill Response Survey – NCDOT presented the results of its completed Spill Response Survey to NCDOT Division staff during its annual spring SPPP training workshops in PY 2019. The purpose of the survey was to document response procedures and identify spill response best management practices being utilized across the state.

Tracking and Reporting Illicit Discharges – NCDOT continues to maintain its IDDEP tracking system for identified illicit connections and illegal dump sites found within the NCDOT transportation separate storm sewer system (TS4). In addition, NCDOT continues to implement IDDEP identification and reporting as part of its Field Inventory Program in the Stormwater System Inventory and Prioritization Program. When an illegal discharge is identified within the NCDOT TS4, an IDDEP Field Report form is used to capture applicable information. HSP staff or the Division staff that identifies the discharge or dump site perform a preliminary investigation following NCDOT safety procedures to verify the material makeup of the illicit discharge or illegally dumped materials. Once the site has been investigated and verified, the Division notifies the IDDEP Manager, who then reports the discharge to the appropriate NCDEQ Regional Office within 30 days of the illicit discharge identification date.

In PY 2019, NCDOT identified and followed up on eight new potential illicit discharges and illegal dumps across the state, which resulted in two verified and reported to DEQ.

Considerations for Permit Year 2020

NCDOT will continue to maintain the established IDDEP procedures in Permit Year 2020. NCDOT plans to follow-up with Division staff by providing updated guidance based on results from the Spill Response Survey, which will include standardizing the protocols for handling roadside spills. NCDOT plans to develop a mobile friendly web-based method for reporting potential IDDEPs and continues to evaluate the use of video-based training for IDDEP. NCDOT will continue to routinely evaluate the program's internal processes for effectiveness and to help the HSP target certain areas that may need additional IDDEP education or coordination assistance.

3.0 Stormwater System Inventory and Prioritization Program

NPDES Permit Part II.B.1

Objectives and Measurable Goals

The program objectives are to:

i. Maintain the statewide NCDOT stormwater outfall inventory for the purpose of supporting other permit programs.
ii. Maintain a stormwater outfall geospatial information system (GIS) data layer to map and prioritize sensitive water crossings.
iii. Maintain a field inventory procedure to be used for NCDOT/ DEMLR identified priority areas.

Management Measures	Measurable Goals
(a) Maintain a stormwater outfall inventory of existing stormwater outfalls to sensitive waters.	NCDOT will maintain a GIS-based implicit stormwater outfall inventory to include outfalls from primary and secondary roadways.
(b) Include in the inventory implicit outfalls from newly completed construction projects.	The stormwater outfall inventory shall be updated annually to include implicit outfalls from newly completed construction projects.
(c) Include outfalls for NCDOT industrial facilities in the inventory.	The stormwater outfall inventory shall be updated annually to include changes or additions to previously inventoried NCDOT industrial facilities.
(d) Field outfall inventory procedure for priority areas.	NCDOT will maintain the field outfall inventory procedure. The annual report shall document implementation of the procedure, identify future priority areas, and define a schedule for implementing the procedure within the identified priority areas.

Program Overview

NCDOT implemented a Stormwater System Inventory and Prioritization (SSIP) Program to support other permit programs with information regarding NCDOT's TS4 system. SSIP activities include maintaining a stormwater system GIS map which prioritizes sensitive water crossings, and developing and implementing a Field Inventory Procedure (FIP) for priority areas identified collaboratively by NCDOT and NCDEQ. During its Term II permit (April 2005-March 2010), NCDOT developed a geospatial processing methodology to estimate the locations of outfalls, establishing a baseline inventory. This inventory of implicit outfalls is updated annually.

Accomplishments

The stormwater outfall inventory is updated using the following three processes:

- Implicit outfalls are updated using geospatial processing to identify locations where roads cross streams.

- Industrial outfalls are updated using changes reported by NCDOT's industrial facilities.
- Field-verified outfalls are captured using the FIP.

Table 1 lists the total number of outfalls inventoried by program cumulatively from its inception through PY2016, PY2017, PY2018, and PY2019.

Table 1. Outfalls Identified from PY2016 through PY2019

Outfall Type	Total Inventoried PY2016	Total Inventoried PY 2017	Total Inventoried PY 2018	Total Inventoried PY 2019
Implicit Outfalls	117,661	118,024	118,154	116,087
Industrial Outfalls	588	601	610	629
Field Verified Outfalls	250	949	1,327	1873

Middle-Upper Haw River Subwatershed Outfall Collection – In PY2019 the HSP completed an FIP Tier 1a collection of outfalls on primary routes in the middle and upper Haw River subwatershed. The Tier 1a inventory includes locations of true outfalls to waters of the state at or within the right of way (ROW). This collection effort resulted in 546 explicit outfalls identified this permit year. These data collection efforts also support the Guided Reduction of Excess Environmental Nutrients (GREEN) Program discussed in more detail in Section 15.0.

FIP Tier 1a Database Schema Update –NCDOT enacted revisions to the FIP GIS database schema in order to streamline the data collection process and improve the consistency of the collected data. The new database schema was incorporated into its first project during data collection for the middle and upper Haw River subwatershed Project progress and feedback from field staff indicated that resultant efficiency gains during data collection were significant.

Integration of ArcGIS Online and Collector for ArcGIS – In addition to database schema changes, the HSP began leveraging ArcGIS Online in order to host and deploy an active FIP inventory database. This change allowed the use of Collector for ArcGIS on an iOS-based tablet in the field and gave NCDOT a real-time operating picture of data collection efforts via a web map. This new workflow was successfully integrated into the Middle-Upper Jordan Lake Outfall collection project completed during PY2019.

Updates to NCDOT Environmental Sensitivity Map (ESM) Layers – In PY2019 the HSP completed updates to the Industrial Outfall and Stormwater Control layers that are incorporated into NCDOT's ESM database. Data was converted from tabular form into spatial layers in a personal geodatabase and then reviewed for error reporting. Processing of the data resulted in 629 Industrial Outfall locations.

Considerations for Permit Year 2020

NCDOT's Field Inventory Program anticipates performing additional data collection efforts during PY2020. NCDOT anticipates working with NCDEQ to identify an appropriate 5r watershed for future inventory. NCDEQ has recently developed an online watershed restoration plan protocol to encourage

the development of Category 5r management plans in lieu of near-term total maximum daily load (TMDL) development. Implementing the FIP in a Category 5r watershed could contribute to the development of a watershed restoration plan in subsequent years.

4.0 BMP Retrofits Program

NPDES Permit Part II.B.2

Objectives and Measurable Goals

The program objectives are to:

i. Develop, implement and support the NCDOT program to be consistent with NPDES post-construction control measures and support development of the BMP Toolbox.
ii. Use retrofits to address pollutant loading from existing NCDOT activities.
iii. Retrofits should not be associated with meeting the requirements of any other NCDEMLR or NCDWR program, unless otherwise allowed.

Management Measures	Measurable Goals
(a) Identify appropriate retrofit sites.	Identify a minimum of fourteen (14) potential retrofits per year.
(b) Implement retrofits.	Maintain a program to implement retrofits. Complete a total of seventy (70) retrofits over the 5-year period of this permit. The retrofits will be appropriate for the identified pollutants of concern. Include in the annual report the number of retrofits completed.

Program Overview

NCDOT has implemented a best management practices (BMP) Retrofits Program that is consistent with NPDES post-construction control practices. It incorporates both structural and non-structural stormwater retrofits to address pollutant loading from existing NCDOT activities and to evaluate new stormwater controls. Retrofits implemented under the program are not associated with meeting the requirements of any other NCDEQ program, unless otherwise allowed. Each year, potential sites are evaluated and selected for retrofits under this program. The Retrofits Program collaborates with the Research and BMP Toolbox Programs to design, construct, and assess new and innovative BMP types or components.

Accomplishments

Six (6) BMP retrofits listed in Table 2 were completed during the reporting period from July 1, 2018 to June 30, 2019.

Table 2. BMP Retrofits Completed During the Reporting Period

Identification No.	BMP Type	County	Location
IM-5-92-FB-3389	Filtration Basin	Wake	I-540 & SR 1005 (Six Forks Rd.)
IM-5-92-FB-3390	Filtration Basin	Wake	I-540 & SR 1005 (Six Forks Rd.)
IM-5-92-FB-3391	Filtration Basin	Wake	I-540 & SR 1005 (Six Forks Rd.)
IM-5-92-DDB-3392	Dry Detention Basin	Wake	I-540 & SR 1005 (Six Forks Rd.)
IM-5-92-FB-3395	Filtration Basin	Wake	I-540 & SR 2000 (Falls of Neuse Rd.)
IM-5-92-FB-3396	Filtration Basin	Wake	I-540 & SR 2000 (Falls of Neuse Rd.)

All Wake County projects are within the Falls Lake Watershed. The following BMPs located in Wake County were pulled from the Six Forks Rd. construction contract: D-5-92-BS-3393 (Bioswale) & D-5-92-BS-3394 (Bioswale).

Designs for the following BMP retrofits identified in Table 3 were completed and are now in the construction phase. The construction phase includes the Bidding and Letting process through construction completion.

Table 3. BMP Retrofits Currently Under Construction

Identification No.	BMP Type	County	Location
D-3-65-IS-3405	Infiltration Swale	New Hanover	NC 132 (College Rd)
D-3-65-IS-3406	Infiltration Swale	New Hanover	NC 132 (College Rd)

Additionally, HSP staff has identified and evaluated several potential site locations during the permit year for future installation of a BMP retrofit. All potential sites are stored within files on the NCDOT Hydraulics Unit servers. Target areas for new BMP retrofits include the Falls Lake Watershed and various impaired waters located within the three geographic regions of North Carolina. After construction, BMP retrofits are tracked in NCDOT's Stormwater Management System (SCM) along with other BMPs.

Retrofit Opportunity Site Selection (ROSS) Program - In PY2018 NCDOT developed a plan which envisioned a new program designed to identify potential locations for retrofit BMPs. The vision for the program was described in the 2018 Annual Report. In PY2019 NCDOT initiated implementation of the plan to create the information technology components of the ROSS program and provide program documentation and training. During this permit year NCDOT made substantial progress in developing the ESRI Survey 123 and Collector mobile field applications along with the geodatabase schema designed to store the program's data. In PY2020 NCDOT will complete testing of the applications,

finalize the program documentation, conduct training, and formally integrated the ROSS program into Retrofit Program workflows. The ROSS Program is anticipated to improve the efficiency of delivering the Retrofit Program by removing retrofit site selection from the critical path.

Considerations for Permit Year 2020

As noted above NCDOT anticipates completing development of the ROSS program and begin identifying potential retrofit opportunities per the program's protocols. NCDOT in partnership with NCDEQ, the City of Raleigh, the Town of Cary, and interested citizens are developing a watershed action plan for the Walnut Creek watershed. It is anticipated that the one of the first areas the ROSS program will be implemented will be in the Walnut Creek watershed in support of the plan's water quality restoration goals. Retrofit opportunities identified by the ROSS program will be shared with the project partners. In PY2019 NCDOT initiated discussions with the Town of Kure Beach and the NC Coastal Federation to explore options for constructing dune infiltration chambers at select ocean outfalls within the Town. An engineering feasibility report was prepared for the Town by its contractor and NCDOT was asked to review the findings. Retrofitting the ocean outfalls with infiltration chambers appears to be feasible and the Town intends to apply for grant funding. NCDOT intends to write a letter of support which the Town will include with its application. In PY2020 NCDOT intends to continue discussions with the Town to determine whether NCDOT can play a role in retrofitting the ocean outfalls.

On March 11, 2019 NCDOT met with representatives of DEMLR's Stormwater Permitting Program and DWR Transportation Permitting Program to discuss rebuilding constructed wetlands which were severely damaged by Hurricane Florence. The wetlands receive stormwater runoff from NC-24 in Cape Carteret. The wetlands are owned and operated under a conservation easement by three non-profit organizations. DEMLR agreed that NCDOT could claim retrofit credit for its part in re-constructing the wetlands contingent upon NCDOT ensuring that mechanisms were put in place for inspection and maintenance per NCDOT's permit requirements. In PY2020 NCDOT intends to finalize a permanent drainage easement with the three parties and advance work on permitting, design, and possibly construction.

NCDOT has agreed in concept to partner with the NC Coastal Federation to develop a watershed restoration plan for the New Port River in Carteret County. The goal of the plan is to reduce the frequency of closures to shellfish harvesting through targeted stormwater retrofits and other management options. Assuming development of the plan moves forward the New Port River watershed will be programed as a target area for implementation of the ROSS program.

5.0 BMP Toolbox for Post-Construction Runoff Program

NPDES Permit Part II.B.3

Objectives and Measurable Goals

The program objectives are to:

i. Maintain and update as necessary a BMP Toolbox to aid in the siting, design, and construction of stormwater quality BMPs with guidance on the suitability of each for NCDOT applications.
ii. Evaluate BMPs for applicability to a linear highway system.

Management Measures	Measurable Goals
(a) Maintain a BMP Toolbox.	Maintain a stormwater BMP Toolbox to provide design guidance for post-construction stormwater control measures. The BMP Toolbox will include appropriate uses/anticipated applications and design criteria. Proprietary BMPs will be evaluated in keeping with NCDEMLR requirements for permitting new stormwater technologies.
(b) Update the toolbox as necessary	As necessary, evaluate new BMP types or design components for potential updates to the BMP Toolbox. If applicable to NCDOT applications, the BMP Toolbox will be updated to include this new information.
(c) Submit proposed BMP Toolbox revisions to NCDEMLR for approval.	New guidance on proposed BMPs will be submitted for NCDEMLR approval prior to implementation.

Program Overview

NCDOT developed the BMP Toolbox to aid in the siting, design, and construction of stormwater quality BMPs with guidance on the suitability of each for NCDOT applications. New guidance developed for inclusion in the BMP Toolbox must be approved by NCDEQ. The original version of the Toolbox was completed in 2008 and updates were published in PY2015. Recent efforts have included developing tools to aid personnel involved in the construction of BMPs in order to promote successful implementation of Toolbox BMPs. NCDOT continues to evaluate other BMP technologies to assess their practical need in the NCDOT TS4 and inclusion in the BMP Toolbox. The Toolbox Program works collaboratively with the NCDOT's Research and Retrofits Programs to evaluate research on existing and new BMP types for potential manual inclusion. If considered for inclusion, proprietary BMPs will be evaluated in keeping with the current NCDEQ policy on new stormwater treatment technologies.

Accomplishments

Implementation of the BMP Toolbox is an ongoing process. NCDOT continues to make the Toolbox and related materials available to design engineers within NCDOT and for professional engineering firms (PEFs) which provide design services. In addition to the Toolbox itself, NCDOT has distributed a Field Guide and standardized Computer-Aided Design and Drafting (CADD) drawings. The field guide is a

compact flip-style field reference intended to provide contractors, NCDOT inspection technicians, and Division staff guidance for construction of BMPs. The CADD drawings are libraries of standard construction details used to develop design plans, including structural BMPs. These tools are available on NCDOT's website. Additionally, the hard copies of the Field Guide were distributed at the 2019 Preconstruction Conference.

Considerations for Permit Year 2020

NCDOT will continue its focus on improvement of Toolbox implementation practices by making the Toolbox, Field Guide, and CADD library available to designers, contractors, and inspectors involved in BMP construction. NCDOT has developed numerous project special provisions for components used in stormwater controls. These provisions will be reviewed and revised into a library to further standardization efforts. Training and implementation of the Toolbox will continue under the Post-Construction Stormwater Program. In addition, the Toolbox program will continue to work in conjunction with the Research Program to evaluate new BMPs technologies for consideration for future inclusion in the Toolbox Manual.

6.0 BMP Inspection and Maintenance Program

NPDES Permit Part II.B.4

Objectives and Measurable Goals

The program objectives are to:

i. Maintain a BMP Inspection and Maintenance Program to aid in the inspection, operation, and maintenance of BMPs.
ii. Maintain and update as necessary the BMP Inspection and Maintenance Manual.

Management Measures	Measurable Goals
(a) Evaluate new BMP inspection and maintenance needs.	Evaluate new BMPs included in the BMP Toolbox or otherwise needed for inspection and maintenance needs. The evaluation will include consideration of the BMP type, typical siting conditions, and expected function.
(b) Maintain BMP Inspection and Maintenance Manual.	Maintain written procedures outlining the inspection and maintenance requirements for various types of stormwater BMPs. Written procedures will outline the regular inspection frequency, and include an inspection checklist, "how-to" instructions for regular maintenance, evaluation and reporting procedures for non-routine maintenance, and an inspection and maintenance tracking mechanism. As modifications are needed, update the Manual to address needed changes to inspection and maintenance techniques.
(c) Implement a BMP Inspection and Maintenance Program.	Implement a BMP Inspection and Maintenance Program. The program will include annual training for appropriate NCDOT staff and contractors.
(d) BMP Inspection and Maintenance information.	BMP Inspection and Maintenance Program information will be made available upon request to NCDEMLR.

Program Overview

NCDOT implemented a BMP Inspection and Maintenance (I&M) Program to aid in the inspection, operation, and maintenance of BMPs (also referred to as SCMs). As part of the program, NCDOT maintains and updates a Stormwater Control Inspection and Maintenance Manual as needed. The Manual includes written procedures outlining the inspection and maintenance of stormwater SCMs, including establishing the inspection frequency for each SCM type. It also includes inspection checklists and provides instructions for routine and non-routine maintenance. The program assists NCDOT in better managing their stormwater infrastructure assets. When new SCMs are added to the BMP Toolbox, the I&M Program will evaluate them for inspection and maintenance needs and develop new chapters for the I&M Manual if needed. The program also oversees a comprehensive database system called the Stormwater Control Management System (SCMS), which maintains an inventory of NCDOT's

stormwater SCMs and tracks their inspection and maintenance records. The I&M Program coordinates training for staff and contractors with other program areas, as necessary.

Accomplishments

Inventory Maintained and Annual Inspections Completed

Table 4 shows the total number of BMPs in each Division in NCDOT's SCMS inventory. Eighty-one (81) new stormwater devices were added to the inventory during the reporting period and a few were removed due to site changes resulting from new construction in PY2019. NCDOT continues to add new controls as new projects are built or as part of the Retrofits Program.

Post Hurricane Inspections of SCMs

NCDOT has increased its efforts to mitigate the devastating effects caused by hurricanes. Since Hurricanes Matthew (2016), Florence (2018), and Michael (2018) have impacted NC, the Department has conducted post-hurricane inspections of SCMs by HSP staff and contractors to assess maintenance needs in hurricane-affected areas of the state. NCDOT's increased efforts to identify damaged SCMs will allow for better budgeting in order to make the repairs needed to various SCMs before and after the storms. REU Central and the Divisions staff have been coordinating closely on addressing additional needs that have arisen due to large storm events. Additionally, some of the recent lessons-learned from performing post hurricane inspections have been incorporated into our I&M Program training initiatives.

Table 4. NCDOT's Inspection and Maintenance Program Inventory Update

NCDOT Division	Number of Stormwater Devices*
1	85
2	189
3	139
4	212
5	616
6	55
7	139
8	121
9	46
10	84
11	52
12	71
13	78
14	37
Total	**1,924**

*Includes structural and non-structural BMPs in the SCMS inventory as of June 30, 2019

Division personnel are responsible for conducting field inspections of those stormwater control measure types requiring inspection and assigning a Level of Service (LOS) for each device. This year the HSP staff, along with their consultant, assisted several Divisions in conducting SCM inspections using SCMS on a mobile platform. A total of 987 BMPs were inspected in PY2019 (between July 1, 2018 and June 30,

2019). A total of 937 inventoried SCMs were not required to be inspected or were too new to be inspected; this includes approximately 700 pre-formed scour holes included in SCMS that are not required to be inspected annually, as well as approximately 200 non-structural controls (e.g., Pet Waste Stations), and approximately 40 recently added new controls that have yet to be inspected. Based on the 2019 LOS assessment, NCDOT continues to maintain an overall rating above a C for its SCMs on both primary and secondary roadways.

I&M Training of Division Staff

Annual training on the I&M program was provided to the Division staff responsible for SCM inspections. The training covered the program elements, including how to use the I&M manual, inspection protocols, and processes to enter data into SCMS, including use of tablets to perform inspections. Additionally, staff were exposed to other available education materials including videos and individual training for each division on how to conduct an SCM inspection. REU Central maintains documentation for the training performed by HSP staff to Division Roadside Environmental Engineers and Field Operations Engineers, who then maintain documentation for any additional training of Division employees that they perform.

Expanding the I&M Manual

The SCM inventory includes some SCM types which NCDOT has very few individual devices in place. These devices include green roofs, floating wetlands, bio-embankments, rain gardens, infiltration chambers, and sand filters. In PY2019, NCDOT initiated a new chapter for its I&M Manual, made of one or two-page factsheets for these SCM types. The fact sheets will provide users a graphical sketch and a brief description of the device followed by inspection and maintenance guidance for each component of the device.

NCDOT also continued work on its swale study this year. The goal of this study is to evaluate the status of swale maintenance and determine an appropriate inspection frequency. The study distinguishes between engineered swales and vegetated conveyances. Once completed, the results will be shared with appropriate NCDOT staff and any updated guidance will be incorporated into the I&M Manual.

Expanding Information available in SCMS

NCDOT continues to locate and upload relevant construction drawings for its inventory in the SCMS database, making the information readily available to staff. Being able to review the details of the intended device design is especially beneficial during inspections. Significant progress was made this permit year in scanning and uploading these documents.

Considerations for Permit Year 2020

This coming year, NCDOT plans to finalize the new factsheet-style chapter and revisions to the swale chapter of the I&M Manual. Additionally, NCDOT intends to initiate a new bioswale chapter. Additions to the I&M Manual will be distributed to applicable Division staff. NCDOT will continue to evaluate its post hurricane inspection processes to improve overall program efficiencies. Additionally, NCDOT will continue to inspect and maintain stormwater control devices, train appropriate staff on I&M techniques, and upload additional construction drawings to SCMS as they become available.

7.0 Post-Construction Stormwater Program

NPDES Permit Part II.B.5

Objectives and Measurable Goals

The program objectives are to:

i. In cooperation with NCDEQ, implement a post-construction stormwater program to regulate stormwater from new NCDOT development and redevelopment for new built upon area (BUA) by requiring structural and non-structural BMPs to protect water quality, reduce pollutant loading, and minimize post-construction impacts to water quality.

Management Measures	Measurable Goals
(a) Implement a Post-Construction Stormwater Program.	Implement a Post-Construction Stormwater Program (PCSP) to control runoff from new NCDOT development and redevelopment. The PCSP shall define implementation of the approved NCDOT BMP Toolbox and post-construction stormwater control measures.
(b) Submit revisions to the Post-Construction Stormwater Program to NCDEMLR for approval.	NCDOT updates and/or revisions shall be submitted to NCDEMLR for approval prior to implementation.

Program Overview

The PCSP is designed to promote improvements to stormwater runoff from new NCDOT development and redevelopment for new BUA. The PCSP requires structural and non-structural best management practices to protect water quality, reduce pollutant loading, and minimize post-construction impacts to water quality. An updated PCSP guidance document was approved by NCDEQ in 2014. The PCSP defines how post-construction controls in the approved BMP Toolbox should be implemented for projects and describes a training program for NCDOT staff and contractors to implement the BMP Toolbox and to incorporate watershed quality strategies.

Accomplishments

NCDOT continues to implement the PCSP through the routine use of PCSP guidance and the BMP Toolbox to promote the appropriate selection, design and documentation of BMPs. The PCSP is implemented on all roadway and non-roadway projects initiated by the NCDOT that increase BUA. Briefly, steps associated with applying the PCSP include: evaluating the stormwater management needs of a project site; implementing minimum measures, providing drainage design for conveying runoff in a diffuse and non-erosive manner, and if needed, designing additional structural BMPs to treat stormwater pollutants; communication between designers, regulatory agents, and other stakeholders on the intended approach; and documentation of the process through the Stormwater Management Plan (SMP).

Minimum measures are actions taken on every project, during both planning and design phases, that protect water quality. NCDOT developed four infographic posters in PY2019 that highlight the following minimum measures: maximizing should sections, providing adequate energy dissipation, utilizing natural features and drainage pathways, and maximizing vegetative conveyance. These infographic posters were distributed through NCDOT's website and at the March 26-27, 2019 NCDOT Preconstruction Conference.

SELDM Modeling and BMP Selection Matrix - NCDOT implements a wide variety of projects, and each one presents a set of unique parameters for consideration when evaluating implementation of post-construction BMPs. . NCDOT is working with the US Geological Survey (USGS) to use the Stochastic Empirical Loading and Dilution model (SELDM) for this purpose. Training on the NC-SELDM was provided to Hydraulics Unit staff in August of 2018. Also, the NCDOT/USGS joint agreement has been initiated, where the USGS will complete a three year project of running approximately 55,000 project scenarios to determine risk to water quality. The results will be used to develop a catalog of project scenarios with BMP implementation recommendations in planning stages to provide better guidance and direction for improvements in efficiency in project development, as well as providing consistency across a more regionalized NCDOT.

In addition to tools related to SELDM, NCDOT is developing a BMP decision matrix to enhance BMP selection on projects. The matrix will provide designers with BMP selection guidance to meet project-specific needs through the application of sound engineering judgement. By not being overly prescriptive, the decision matrix will provide designers the flexibility to meet unique project requirements. In summation, the BMP decision matrix will help to provide consistency and standardization of projects while providing options for the best fit on a project-by-project basis.

I-26 Widening and Connector Projects (I-4400, I-4700, & I-2513) – As part of project development the State Hydraulics Engineer issued two memoranda, one for each project, intended to improve the hydraulic design team's understanding of what defines Maximum Extent Practical (MEP) in the context of stormwater treatment in the project areas with endangered species. The memos describe a hierarchical decision making and documentation process which sets the expectation for how the stormwater management plans for these projects will be prepared. NCDOT will be gathering feedback from the designers on this decision-making process for consideration for future updates to the PCSP.

Refer to the IE Program for more information related to PCSP training activities.

Considerations for Permit Year 2020

The planned focus for the PY2020 will be on continuing to work on initiatives to improve tools for PCSP compliance and ultimately improve project outcomes related to post-construction stormwater. NCDOT will also continue to identify opportunities to raise awareness and provide training. NCDOT has initiated the Integrated Project Delivery (IPD) effort to improve efficiency and streamline project delivery. As part of that effort, HSP is working diligently with the IPD team to incorporate aspects of the PCSP earlier in the project development process. It is envisioned that key deliverables from this process will be tracked through the ATLAS Workbench project deliverables management system. Additionally, efforts to update

the PCSP to align with evolving project processes and to improve workflows related to post-construction stormwater management will continue.

8.0 Vegetation Management Program

Objectives and Measurable Goals

NPDES Permit Part II.B.6

The program objectives are to:

i. Manage application of pesticides, fertilizers, and other vegetation management materials to minimize pollutant potential of stormwater runoff.
ii. Use only approved vegetation management materials.

Management Measures	Measurable Goals
(a) Implement appropriate pest control methods and practices.	Continue to consult with North Carolina Department of Agriculture and Consumer Services (NCDA&CS) and North Carolina State University (NCSU), as needed, in selecting appropriate pest control methods and implementation practices. NCDOT will maintain and update the NCDOT Roadside Vegetation Management Manual as new technology and procedures are adopted by NCDOT.
(b) Use appropriate vegetation management materials as identified in the measurable goal.	Restrict pesticide and fertilizer usage to those materials approved by the US Environmental Protection Agency (USEPA)/NCDA&CS. Pesticide and fertilizer shall be used in accordance with label restrictions.
(c) Provide training on vegetation management.	Provide annual training for vegetation management personnel and contractors, or require equivalent training for contractors. The training shall consist of appropriate uses and applications of pest control methods used by NCDOT. This training shall be designed to increase awareness of proper mowing techniques, release of biological and chemical agents, appropriate spill response, the correct use and handling of products and the potential for water quality impacts.

Program Overview

Through the Vegetation Management Program, NCDOT manages application of pesticides, fertilizers, and other vegetation management materials to minimize pollutant potential of stormwater runoff. Management measures of the permit include implementing appropriate pest control practices through consultation with the NCDA&CS and NCSU, using appropriate vegetation management materials (only those approved by USEPA or the NCDA&CS), updating NCDOT's Vegetation Management Manual as new technology and procedures are developed, and providing training to staff and contractors regarding the appropriate uses and applications of pest control methods used by NCDOT.

Accomplishments

Vegetation Management Research – Annually, NCDOT sponsors new research to enhance the Department's vegetation management program, including the facilitation of research in vegetation

management practices to improve vegetative cover, incorporating new technologies, and other management techniques. See Section 13, discussing the Research Program, for additional information.

Ongoing Vegetation Management Training and Professional Development – The annual Roadside Environmental Unit (REU) Vegetation Management Conference was held in December 2018. Topics at the conference, attended by approximately 150 NCDOT staff, included pesticide handling, stormwater management, mapping pesticide application areas, managing chemical drift, and wildflower management.

NCDOT relies on agreements with municipalities to maintain selected SCMs and rights of way. This year, NCDOT conducted a pesticide training and recertification program for the Field Operations Staff of one of its partners, the City of Greensboro. The training session discussed NCDOT's vegetation management program including herbicide selection; NCDOT's wildflower program and herbicidal weed control measures; pesticide recommendations for ornamentals, turfgrass systems, and aquatic applications; understanding special use labels; herbicide equipment calibration for vegetation managers; public relations for pesticide application programs; useful ornamentals in the landscape; NPDES stormwater permit compliance through NCDOT's Highway Stormwater Program; and pesticide storage and spill prevention and response. During the event, NC Cooperative Extension Service staff provided additional training on proper personal protection equipment (PPE) and product utilization safety for pesticide handling.

Furthermore, NCDOT staff continue to play an active role in the distribution of research information and professional development within the VM industry by participating as Directors and Advisors to the North Carolina Vegetation Management Association (NCVMA). During the NCVMA conference held in December 2018, NCDOT staff presented "Managing Today's Roadsides in North Carolina", discussing the herbicide chemistry currently used to support mechanical vegetation management operations, and the digital technology used to track herbicide application to for proper placement, and to minimize drift. Additionally, researchers supported by NCDOT presented on weed management at aquatic sites and how to increase control of herbicide applications. Approximately 75 NCDOT employees attended the conference. Pesticide recertification credits were collected by NCDOT's certified pesticide applicators.

Considerations for Permit Year 2020

In the coming permit year, NCDOT will continue to implement its Vegetation Management Program to minimize associated impacts on water quality and provide training to applicable staff. NCDOT will continue to evaluate opportunities to provide training assistance to staff and contractors. This training includes offering additional pesticide recertifications credits to NCDOT Roadside Environmental staff.

9.0 Construction Program

NPDES Permit Part II.C.1 (Sediment and Erosion Control Program)
NPDES Permit Part II.C.2 (Borrow Pit/Waste Pile Activities)
Objectives and Measurable Goals

The program objectives are to:

i. Continue to control development activities disturbing one or more acres of land surface including activities by NCDOT contractors.
ii. Require construction site operators to implement appropriate erosion and sediment control practices.
iii. Require site inspection and enforcement of control measures.
iv. Establish requirements for construction site operators to control waste that may cause adverse impacts to water quality such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site.
v. Continue to implement sediment and erosion control measures and reclamation plans on all borrow pit and waste pile projects, including activities at Ferry Terminals associated with dredging activities and contractor owned or leased borrow pits associated with NCDOT projects in keeping with the sediment and erosion control program delegated by the North Carolina Sediment Control Commission.

Management Measures	Measurable Goals
(a) Maintain the delegation agreement with NCDEQ NCDEMLR Erosion and Sediment Control (ESC) Program on an annual basis.	Implementation of the NCDENR Division of Energy, Mineral and Land Resources Erosion and Sediment Control Program delegated to NCDOT by the Sedimentation Control Commission in February, 1991, and as may be subsequently amended, for NCDOT construction projects and implementation of the applicable requirements of General Permit NCG010000 effectively meets the objectives above by permitting and controlling development activities disturbing one or more acres of land surface and those activities less than one acre that are part of a larger common plan of development. This program is authorized under the Sediment Pollution Control Act of 1973 and Chapter 4 of Title 15A of the North Carolina Administrative Code. This program includes procedures for public input, sanctions to ensure compliance, requirements for construction site operators to implement appropriate erosion and sediment control practices, review of site plans which incorporates consideration of potential water quality impacts, and procedures for site inspection and enforcement of control measures. This program has been delegated to and implemented by NCDOT.

Management Measures	Measurable Goals
(a) Maintain compliance with the applicable requirements of the General Permit NCG010000.	NCDOT shall incorporate the applicable requirements of NCG010000, the North Carolina General Permit to Discharge Stormwater under the NPDES associated with construction activities issued August 3, 2011 and as may be subsequently amended, into its delegated Erosion and Sediment Control Program, pursuant to "NCDOT Applicable Requirement from NPDES General Permit No. NCG010000 for Construction Activities and Guidance for Complying with Those Applicable Requirements" in the memorandum dated June 9, 2014 or as updated.
(b) Implement erosion and sediment control measures on all non-commercial borrow pits/waste piles.	NCDOT shall implement erosion and sediment control measures on all non-commercial borrow pit and waste pile projects. The measures utilized shall be in keeping with the erosion and sediment control program established by the North Carolina Sedimentation Control Commission.
(c) Implement approved reclamation plans on all non-commercial borrow pits/waste piles.	NCDOT shall implement the approved reclamation plan on all non-commercial borrow pit/waste pile projects. The reclamation measures utilized shall be in keeping with the reclamation program established by the North Carolina Mining and Energy Commission.
(d) Borrow Pit Discharge Management Program	NCDOT in coordination with NCDEMLR will implement the Borrow Pit Discharge Management Program. This process will consist of the following tasks: • Implement appropriate management measures to treat borrow pit wastewater for given conditions. • Implement an inspection and maintenance program. • Maintain training material and instruct field personnel overseeing borrow pit operations. • Evaluate and implement appropriate new/innovative technologies.

Program Overview

NCDOT implements its Construction Program to control potential impacts to water quality from land disturbance at construction sites and from borrow pit and waste pile activities. The Erosion and Sediment Control (ESC) Program, which was delegated to NCDOT by the Sedimentation Control Commission in February 1991, incorporates the requirements of General Permit NCG010000 and includes implementation of appropriate erosion and sediment controls on construction projects. The delegation agreement allows for the Department to review and approve ESC plans based on compliance with Sedimentation Pollution Control Act (SPCA), water quality regulations, and permit conditions associated with each project. The agreement also authorizes the Department to perform compliance inspections for land disturbing activities associated with highway construction. Although the Commission delegates compliance inspection to the Department, it did not grant enforcement

authority. Since the Department cannot issue a fine to itself, a series of policies and procedures were developed to correct compliance issues with highway and maintenance construction projects. These include procedures for public input, daily and monthly project inspections, and corrective actions. Refer to the Department's 2018 Annual Report for a more detailed description of NCDOT's Construction Program conformance with the NCG010000 permit.

NCDOT operates under its exemption from the Mining Act for borrow pits provided all materials are used "in connection with the construction, repair, and maintenance" of our road system. Therefore, all provisions for ESC and stabilization with ground cover for waste/borrow sites fall under the conditions of NCDOT's delegated program under the Mining Act and SPCA. Currently, NCDOT requires reclamation plans for all non-commercial waste/borrow sites. These plans address temporary erosion control, staged seeding and mulching, fertilizer topdressing, and permanent stabilization. Final inspections are conducted on all waste/borrow sites at project completion or prior to project completion if property owners elect to resume/commence agricultural land disturbing activities on the site(s). Reclamation sites that require dewatering operations will require an evaluation to determine setbacks to minimize the risk of impacts to adjacent jurisdictional areas. Effluent from dewatering operations will be monitored and the appropriate management procedures will be used to make sure NCDOT is in compliance with the applicable regulations.

Accomplishments

Ongoing Erosion and Sediment Control Training Updates – NCDOT completed a revision to the Erosion and Sediment Control Level III (Design of Erosion and Sediment Control Plans) syllabus in PY2018.

Continued Implementation of the Program – NCDOT continues to operate under its delegated authority granted by the NC Sedimentation Control Committee for 2018. NCDOT continues to implement its Construction Program, which includes reviewing and approving ESC plans, implementing and maintaining standard specifications and project special provisions, providing guidance on ESC/ stormwater issues, performing inspections and monitoring of construction projects, maintaining NCDOT's reclamation process, and providing ESC/ stormwater training materials to contractors/consultants. NCDOT continues to identify new technologies to improve the effectiveness of current construction-related stormwater control measures. Additionally, NCDOT continues to invest substantial financial resources into research efforts that will improve existing practices and procedures associated with NCDOT's Construction Program. Two keystones of the program include ongoing training certifications and inspections:

Certifications - The Biological & Agricultural Engineering and Soil Science Departments at NCSU are partnering with NCDOT to offer an ESC / Stormwater Certification Program. The certification program provides the required personnel training to ensure compliance with erosion and sediment control/stormwater provisions on NCDOT projects. NCDOT requires all contractors and consultants to have a certified supervisor and foreman to oversee operations on NCDOT projects to ensure compliance with SPCA as well as other environmental regulations. Three different levels of certifications are available and each one must be renewed every three years. As of June 30, 2019, active certificates for

each level include: 1183 Level I certified ESC stormwater inspectors/installers; 5102 Level II certified ESC stormwater site managers; and 868 Level III certified ESC designers.

Inspections - NCDOT is responsible for two types of inspections on each project: NPDES Self-Monitoring and SPCA Self-Inspections. NPDES Self-Monitoring and SPCA Self-Inspections are conducted at least weekly or after 1.0" of rainfall by a project inspector under guidance from the office of the resident engineer for design-build or contract construction, or from the office of the county or district engineer for maintenance projects. If needed, construction activities on-site can be halted to address ESC issues. REU Field Operations staff inspects NCDOT projects monthly. These weekly inspections and monthly REU inspections are used to ensure proper ESC measure installation, maintenance, and effectiveness as well as ground cover requirements. These reviews ensure the proper ESC measures are in place for the phase of grading, and that necessary field revisions are implemented to minimize the risk of sedimentation damage Each project is evaluated for overall compliance with the NPDES permit, NCG010000, and SPCA.

Inspections Performed Annually - The following inspections were performed during PY2019 (July 1, 2017 to June 30, 2019) for each category of land disturbing activity:

- Contract Construction Projects 4,763
- Maintenance Projects 194
- Vertical Construction Projects 27
- Bridge Maintenance Projects 844
- Resurfacing Projects 60

Updates to the BMPs for Construction and Maintenance Activities Manual and Erosion and Sediment Control Design and Construction Manual – NCDOT has initiated updates to two of its manuals which provide guidance on construction activities. The *Best Management Practices for Construction and Maintenance Activities* manual provides broad guidance on practices to protect water quality during the planning, preconstruction, and construction phases. The ESC Design and Construction Manual provides more detailed information on designing ESC controls. Updates to these manuals will reflect input from NCDOT's Division and Field Operations staff, as well as updating material specifications due to changes in the construction and ESC industries in the past few years.

Ongoing Research in Erosion and Sediment Control – Annually, NCDOT sponsors new research to minimize impacts of construction activities. See Section 13, discussing the Research Program, for additional information.

Considerations for Permit Year 2020

NCDOT anticipates completing the updates to the BMP for Construction and Maintenance manual in the coming permit year. Although the ESC Design Manual updates are also underway, NCDOT anticipates releasing the next version in 2021 due to the extensive updates that will be incorporated. NCDOT also continues to evaluate opportunities to provide additional training content, including ongoing evaluations of the use of ESC training videos and continued development of the ESC Level III materials.

10.0 Industrial Activities Program

NPDES Permit Part II.D.1 and 2

Objectives and Measurable Goals

The program objectives are to:

i. Maintain and implement a Stormwater Pollution Prevention Plan (SPPP or Plan) for each facility with an industrial activity that is covered by this permit.
ii. Develop and implement a Plan prior to operation of any new industrial facilities.
iii. Evaluate the effectiveness of the industrial Stormwater Pollution Prevention Plans (SPPP) for each industrial facility.
iv. Perform required qualitative monitoring at stormwater discharge points or outfalls identified in the SPPPs or during supplemental inspections for new sources and discharges as required.

Management Measures	Measurable Goals
(a) Maintain and implement a SPPP for each covered industrial activity and related facility.	NCDOT shall maintain and implement a site specific Stormwater Pollution Prevention Plan (SPPP) for each covered facility with an industrial activity. For new activities or facilities, the SPPP shall be developed and implemented prior to operation. New Activities and facilities shall be identified in the annual report and include a brief description and location information.
(b) Perform visual monitoring at each facility.	Qualitative monitoring shall be performed at each industrial stormwater outfall twice per year, once in the spring (April - June) and once in the fall (September - November). Qualitative monitoring requires an inspection of each stormwater outfall or discharge point for the following parameters: color, odor, clarity, floating solids, suspended solids, foam, oil sheen, and erosion at or immediately below the stormwater discharge point or outfall, and other obvious indicators of stormwater pollution. Qualitative monitoring is for the purpose of evaluating the effectiveness of the SPPP. No analytical tests are required. NCDOT will pursue correction of stormwater quality where qualitative monitoring indicates degradation of quality in comparison to previous monitoring events.

Program Overview

As part of the Industrial Activities (IA) Program, NCDOT maintains and implements a SPPP for each facility with an industrial activity that is covered by the NPDES permit. NCDOT SPPPs describe potential pollution sources at each facility and provide BMPs to minimize potential impacts on stormwater from on-site industrial activities. The Spill Prevention Control and Countermeasure (SPCC) Plan requirements of Title 40 of the Code of Federal Regulations, part 112 (40 CFR 112) have been fully integrated into the SPPPs to emphasize oil spill prevention and response practices at NCDOT industrial facilities. In addition,

NCDOT must conduct qualitative monitoring for each stormwater discharge point or outfall through site inspections at each industrial facility at least twice per year, once in the spring and once in the fall.

Accomplishments

During PY2019, NCDOT continued to implement and refine various program activities including maintaining SPPPs, conducting audits, and providing the on-going education needed to keep employees aware of the requirements. A summary of the key activities completed in the past year is provided below.

SPPP Implementation – NCDOT continues to maintain and implement 204 site-specific SPPPs at its industrial facilities, which include county maintenance yards, equipment shops, ferry terminals and a ferry maintenance facility, roadside environmental shops, traffic services shops, bridge maintenance yards, a rail maintenance facility, and remote salt and material storage locations. NCDOT SPPPs describe potential pollution sources and structural BMPs at each facility and provide non-structural BMPs to minimize potential impacts on stormwater from on-site industrial activities. NCDOT SPCC Plans, which were incorporated into SPPPs, describe spill prevention measures, inspections of SPCC-regulated oil containers, and spill response and notification procedures. Additionally, NCDOT includes qualitative monitoring requirements and documentation of the resulting observations at its industrial stormwater discharge points/outfalls in the SPPPs.

During the permit year, SPPP updates were performed for various NCDOT industrial facilities because of changes to the facilities, such as new buildings or changes in covered activities and staffing. Additionally, new SPPPs were developed for the Chowan County Material Storage Yard, Gaston County Salt Storage Yard, and Tyrrell County Material Storage Yard in order to improve the stormwater management of the facilities separate from the main County Maintenance Yards. The material storage facilities are used for equipment parking and material stockpiling. Additionally, facility was removed (Alleghany County Salt Storage Yard), since the facility is no longer actively used by NCDOT.

NCDOT emphasizes employee training to meet part of the SPPP requirements, utilizing many unique approaches to train Division personnel on stormwater pollution prevention, good housekeeping, and spill prevention. NCDOT uses videos for initial or annual refresher training, individual or group training sessions, posters and handouts for program reminders, and NCDOT's Industrial & Roadway Maintenance Activities (IRMA) BMP Guidance Manual for training briefings at the Division level.

NCDOT continues to utilize its SPPP website to help manage and track SPPP/SPCC implementation at each industrial facility. The SPPP website allows Industrial Activities program managers and Division-level engineers to track the overall program implementation and also allows personnel at each facility to document SPPP/ SPCC task completion, including qualitative monitoring of stormwater discharges, facility inspections, employee training, and BMP implementation.

Ongoing Internal Maintenance Yard Review – NCDOT continues to conduct internal reviews of NCDOT maintenance yards throughout the state, including 31 internal reviews performed during this permit year. Each internal review includes an evaluation of the facility's SPPP/SPCC Plan, review of

documentation of completed tasks, an interview with the SPPP Team Leader and discussion of site-specific changes or needs for the facility, and an in-depth site inspection of the maintenance yard. Verbal BMP recommendations are provided during the internal review followed by written BMP recommendations. HSP staff later perform post site review follow-ups with Division staff to coordinate on the BMP recommendations, especially for any long-term construction-related projects or structural BMPs that require significant funding to implement the BMP. The internal reviews also serve as an opportunity to gather appropriate site data to fully update the SPPP/SPCC Plans when needed.

The primary goals of the internal maintenance yard reviews are to help the Divisions identify potential stormwater pollution concerns, evaluate their SPPP/SPCC Plan implementation, and provide additional BMP recommendations if needed. The internal reviews also aid Division management in prioritizing any major stormwater related expenditures. The internal reviews also serve as additional one-on-one stormwater pollution prevention training for facility staff which supplements other annual training they receive.

Level I General Awareness Training & Level II Advanced Training - NCDOT HSP staff continues to provide annual SPPP/SPCC training for NCDOT's Division personnel, which includes regional training workshops and individual training sessions. Baseline BMPs such as good housekeeping, preventative maintenance, and spill prevention practices were reviewed with attendees. Other topics, such as qualitative monitoring, innovative BMPs, and lessons learned are also covered during training.

Level II Advanced SPPP/SPCC Training was provided in the afternoons to SPPP Team Leaders (typically County Maintenance Engineers) for each NCDOT industrial facility and other key team members. The topics vary each year for the advanced training. The instructors also reviewed IRMA BMP Guidance Manual topics, spill prevention and cleanup updates, IDDEP procedures, and nutrient management guidance for Division staff located in Jordan Lake and Falls Lake watersheds.

The Level I and II training approach adopted by NCDOT HSP over the last several years has been extremely effective by providing more targeted training to address where it is needed most.

Considerations for Permit Year 2020

NCDOT will continue to maintain and implement site-specific SPPPs at its industrial facilities in PY2020. NCDOT staff will also continue to assist Division personnel by conducting training workshops, providing guidance on structural SPPP BMPs at industrial facilities, performing site reviews at selected facilities, and supporting the divisions with other aspects of the Industrial Activities Program as needs arise. NCDOT will continue to routinely evaluate the program to identify any new opportunities for improvement and to help the HSP target certain areas that may need additional assistance, including updating the IRMA BMP Guidance Manual, developing IA Programmatic videos, and providing educational posters and other materials.

11.0 Internal Education Program

NPDES Permit Part II.E.1

Objectives and Measurable Goals

The program objectives are to:

i. Implement a program to train NCDOT staff and contractors about the importance of stormwater quality.
ii. The training should include topics such as spill control, chemical application, illicit discharges and illegal dumping, etc.

Management Measures	Measurable Goals
(a) Provide pollution prevention awareness training for construction workers.	NCDOT shall provide annual stormwater pollution awareness training for appropriate NCDOT personnel and contractors involved in construction and maintenance activities. NCDOT may require contractors to have equivalent training in lieu of NCDOT-provided training. Training shall include general stormwater awareness, NPDES stormwater permit NCG010000 implementation, identification of stormwater pollution potential, appropriate spill response actions and contacts for reporting spills and illicit discharges/illegal dumping.
(b) Provide pollution prevention awareness training for maintenance workers.	NCDOT shall maintain a program of annual stormwater pollution awareness training for appropriate NCDOT maintenance staff. NCDOT shall also maintain an ongoing awareness program for Adopt-A-Highway volunteers and prison inmate laborers. NCDOT may require contractors to have equivalent training in lieu of NCDOT-provided training. Training shall include general stormwater awareness, identification of stormwater pollution potential and appropriate contacts for reporting spills and illicit discharges/illegal dumping.
(c) Provide pollution prevention awareness training for NCDOT staff.	NCDOT shall provide annual Stormwater Pollution Prevention Plan training for appropriate NCDOT staff. Training shall include general stormwater pollution awareness, site-specific Stormwater Pollution Prevention Plan awareness, and reporting/documentation procedures.
(d) BMP Implementation Training	NCDOT shall provide training to appropriate NCDOT personnel on implementation of post-construction BMPs in keeping with the Toolbox, Inspection and Maintenance Manual, and the Post-Construction Stormwater Program. NCDOT may require contractors to have equivalent training in lieu of NCDOT-provided training.
(e) Maintain Internal Education and Involvement Plan.	Maintain the Internal Education and Involvement Plan. The plan shall include the requirements for the measurable goals above.

Program Overview

The IE Program was implemented to provide planning, oversight and tracking of stormwater quality training for NCDOT staff and contractors. The NPDES permit requires training for construction and maintenance workers along with general pollution prevention training, specifying several education topics for each as noted above. Additionally, selected other programs have specific educational requirements which are supported by the IE Program. The IE Program works closely with other HSP program areas to monitor training activities and to provide support for training development.

Accomplishments

Over the reporting period, HSP team members provided training to NCDOT employees and contractors, and continued to develop their knowledge of stormwater management through participation in conferences, webinars and technical trainings. Table 6 summarizes the types of training received by NCDOT staff and provided by NCDOT and other entities.

Table 5. Summary of Internal Education Training Activities

Training / Trainee(s)	Description	Training Provider
SPPP-SPCC Plan Implementation Training/Division Staff	Conducted nine (9) workshops in PY2019. Workshops included Level II advanced training sessions for SPPP Tram Leaders/Team Members. The instructors also reviewed IRMA BMP Guidance Manual topics, spill prevention and cleanup updates, and IDDEP procedures including the recently completed Hazardous Spill Survey results. This training was tracked through NCDOT's Learning Management System (LMS).	NCDOT REU
National Hydraulic Engineering Conference/Hydraulic Unit Staff	One staff attended conference and presentations on stream stability, water quality, stormwater management, climate change, scour, modeling, and related areas. The conference also featured demonstrations, field trips, and short courses targeting hydraulic engineers, NPDES specialists, roadway designers, and other professionals.	AASHTO, TRB, and other DOT professionals
North Carolina Water Resources Association/ Consultants and Contractors	NCDOT presented an overview on December 8, 2018, entitled *Hydraulics* Unit 2.0. The presentation provided an overview of recent initiatives the Hydraulics Unit is undertaking, including: • nutrient management using a OneWater approach • resilient design and flood prediction & warning system • spray pipe liner evaluation • new class of stormwater BMP • bioswale design tool • improved bioretention media mix specification	NCDOT

Training / Trainee(s)	Description	Training Provider
	• assessing the impacts of highway runoff using the USGS SELDM model • alternatives to TMDLs • BMP construction inspection field guide, and • stormwater dissolved metals sampling methodology	
ACEC/NC NCDOT Joint Transportation Conference/NCDOT staff, contractors and consultants	This state-wide conference focuses on new developments and sharing lessons learned on a wide range of HSP staff presented on "NCDOT's Post Construction Stormwater Program (PCSP) - What Does It Mean for You?"	NCDOT and consultants
ITRE/NCLTAP Training Pesticide Training Recertification/City of Greensboro Field Staff	Pesticide training and recertification for City of Greensboro Field Operations Staff. See the Vegetation Management section for more details.	NCDOT REU and NC Cooperative Extension Service
Wildflower Program Implementation/NCDOT Division Staff	On April 30, 2019, REU Staff presented to NCDOT staff on new herbicide applications for weed control, Wildflower Program implementation, funding, species review, and application tracking technology.	NCDOT REU
SCM Construction Inspection Training and Certification / REU and Contractors	Workshop held on July 17, 2018 focusing on proper techniques and materials used in SCM construction, including proper phasing of construction, inspection of materials upon delivery, proper construction practices, and field testing to verify green infrastructure and low impact development (LID) practices are properly constructed and function as they are designed.	NCSU
AASHTO Community of Practice Webinar on Stormwater BMP Maintenance and Operations	Webinar held on October 18, 2018 which provided an overview of how DOTs manage and implement their programs for maintaining stormwater treatment facilities. The webinar identified issues that deserve research and went over how to develop recommendations and suggestions on actions to assist and improve stormwater BMP maintenance programs.	AASHTO
APWA Conference	The 23rd annual APWA-NC Stormwater Management Conference will be held this year at Winston-Salem's Twin City Quarter, at the Benton Convention Center, October 21 - 23, 2018. This statewide event focused on progressive stormwater management and related water resources topics.	APWA NC

Training / Trainee(s)	Description	Training Provider
2018 Innovative Erosion & Sediment Control Design Workshop/ REU and Contractors	Erosion and Sediment Control Design Workshop on December 4, 2018, which focused on considerations for construction – designing functional construction stormwater managements plans for roadway projects.	NCDOT
Annual Roadside Environmental Training/ Roadside Employees	Annual Roadside Environmental Training; Stormwater Training on December 4, 2018.	NCDOT
NCVMA Conference/ REU Employees	North Carolina Vegetation Management Association (NCVMA) Conference on December 5, 2018 which focused on managing today's roadsides in North Carolina.	NCDOT
I&M Training for Division 4 REU staff	Classroom training on the I&M Program was provided on February 19, 2019 which included an overview of the IM Manual, review of the SCMS and a field component where inspections were conducted with staff as a refresher training activity.	NCDOT
I&M Training for Division 9 REU staff	Classroom I&M training was provided on May 5, 2019, which included an overview of the I&M program, review of the I&M Manual and SCM types, a review of the SCMS website, and field inspections of multiple controls throughout Division 9.	NCDOT
Soil Infiltration Best Management Practices, Research Update, and Measurement Devices	The session conducted on May 9, 2019 provided an overview of stormwater BMPs which utilize infiltration as a pollutant removal and volume reduction mechanism. BMPs discussed included vegetated conveyances, dune infiltration chambers, bioswales, biofiltration conveyance, bioembankments, optimized dry detention basins, and pollinator habitat zones. Soils mapping resources were presented along with a discussion on the difference between instantaneous infiltration rates versus saturated hydraulic conductivity. The advantages and disadvantages of the various soil infiltration measuring devices were presented including: single ring infiltrometer, double ring infiltrometer, tension disc infiltrometer, hood infiltrometer, mini disk infiltrometer, Guelph permeameter, compact constant head permeameter (Amoozemeter), and the modified Philip-Dunne infiltrometer.	NCDOT
I&M Program Webinar/Division Roadside	Conducted webinar on July 8, 2019 and provided an update on the following items: Upcoming DEQ audit of NCDOT's NPDES Stormwater Permit, I&M Program	NCDOT

Training / Trainee(s)	Description	Training Provider
Environmental Engineers and staff	requirements, 2018 Hurricane season follow-up/ lessons learned & briefing on upcoming hurricane season, Maintenance/Repairs of SCMs with LOS=D or F, adding new SCMs and Uploading Plans/Documents to SCMS, and Other SCM I&M Program items.	
Miscellaneous Webinar training/NCDOT staff and contractors	NCDOT staff and contractors reviewed numerous other webinars or training opportunities including topics such as: NCAFM Webinar on Floodplain Management Regulations, a Forester University Webinar titled Stormwater Goes Green; The Benefit and Health of Trees in Green Stormwater Infrastructure, and a FHWA Webinar on 2D Hydraulic Modeling Forum, a Case Study.	Non-NCDOT Professionals

In addition to the formal training events, team members continued internal outreach efforts within NCDOT. Additional details on IE and training are described in the Accomplishments sections for IDDEP, Industrial Activities, Vegetation Management, Construction, and Research Programs.

Considerations for Permit Year 2020

In PY2020, NCDOT will continue providing training on the components of the Highway Stormwater Program and the Department's NPDES permit. NCDOT is exploring the development of additional training materials for various HSP program areas, including SPPP, E&SC, and PCSP.

12.0 External Education Program

NPDES Permit Part II.E.2

Objectives and Measurable Goals

The program objectives are to:

i. Implement a program to educate the public about the importance of stormwater quality, and what they could do to support it.
ii. Maintain diverse educational materials to engage and educate the public from different social, economic and age groups.
iii. Encourage public involvement in NCDOT stormwater quality programs.

Management Measures	Measurable Goals
(a) External Education and Involvement Plan.	Maintain the External Education and Involvement Plan. The plan shall include the requirements for the measurable goals below.
(b) Provide pollution prevention awareness educational materials to general public.	Provide stormwater pollution prevention awareness information to the general public.
(c) Maintain a public education website	Maintain a public education website to document NCDOT pollution prevention programs and promote stormwater quality. The website will include information on stormwater quality, stormwater projects and activities, and ways to contact stormwater management program staff.
(d) Develop educational partnerships.	Work with NCDENR and other agencies to promote and distribute public education materials.
(e) Continue public involvement programs.	Continue the Adopt-a-Highway Program. Additional programs may also be developed.

Program Overview

NCDOT implemented the External Education (EE) Program to educate the public about the importance of stormwater quality, including awareness of the impacts of chemical application, illicit discharges and illegal dumping and other activities that may add pollutants to stormwater runoff. The EE Program encourages public involvement in NCDOT stormwater quality programs and maintains diverse educational materials to engage and educate the public from different social, economic and age groups. As part of the EE Program, NCDOT maintains an EE and Involvement Plan, a public education website, and an area on its website, *Connect NCDOT*, to distribute stormwater educational materials. The program actively seeks partnerships with other NCDOT Divisions, other state agencies, and organizations with shared outreach goals.

Accomplishments

The HSP EE activities this year continued to strengthen the Department's educational partnerships while maintaining on-going efforts started in previous years.

Education Partnerships – HSP staff had an eventful year and saw fruitful evidence that their engagement with the schools is making an impact on stormwater awareness. Activities performed in PY2019 which targeted youth education include:

- NCDOT HSP staff conducted educational sessions for WakeEd Summer STEM (Science, Technology, Engineering, and Math) 2018 Session teachers on July 26, 2018. NCDOT presented on how the Department manages stormwater runoff on post-construction projects; erosion and sediment control for construction projects; and stormwater pollution prevention at industrial facilities. The presentation also included an overview of how NCDOT has worked with Wake County elementary and middle schools' stormwater-related curriculum by leading tours of the schools' stormwater drainage systems and presenting on the importance of stormwater quality. NCDOT also reviewed site-specific pollution concerns and stormwater drainage mapping for attendees' schools and provided the teachers with site-specific posters showing their school's storm drainage system. The potential for detrimental impacts to surface waters from litter, wildlife, and people was discussed, along with how students can help prevent stormwater pollution and littering. During the training session, NCDOT provided packets of stormwater activity books, stormwater flash cards, anti-litter stickers, pencils, bookmarks, and litter bags for the teachers to share with their students. After receiving the training, teachers broke into groups to prepare and present skits related to car washing, littering, pet waste, and storm drains using props provided by NCDOT.
- NCDOT presented to three 4th grade science classes at Norwood Elementary school in Stanly County. The presentation covered NCDOT stormwater management, jobs in water quality, stormwater pollution prevention, local watershed graphics and drainage patterns to the ocean. After the classroom session, students performed a "field inspection" of school grounds where erosion, evidence of pollution, potential pollutants and drainage patterns were noted and discussed, under the leadership of NCDOT staff.
- NCDOT gave a presentation to 34 senior design students at NCSU on nutrient management in the ROW, and the role of retrofits and research in support of nutrient management.
- On May 7, 2019 NCDOT sponsored a Research and Innovation Summit at NC A&T University. Representatives from the Highway Stormwater Program gave a presentation on how the Department uses its research program to improve permit compliance, better manage stormwater, disseminate stormwater research findings to others, and a vision for future research needs.
- NCDOT participated in the West Pender Elementary School Career Day. Staff shared their experiences as stormwater engineers and handed out materials including: anti-litter brochures, stickers, tattoos, pencils, bookmarks, activity booklets, magnets, etc.; stormwater activity

booklets, bookmarks, wooden rulers, stormwater flashcard facts, brochures, etc.; wildflower/pollinator program bookmarks, stickers, tattoos, activity booklet, information, etc.

- Supplied Stormwater worksheets, Stormwater Flash Facts, Litter Law fliers, Swat-A-Litterbug Cards, car litterbags with a stormwater litter prevention message and "No litter" bumper stickers through packaged requested by teachers. Over 149,500 students have received these materials over the last 15 years NCDOT has provided these teacher kits.
- On March 25, 2019, HSP staff presented consecutive sessions to three 1st grade classes at Wildwood Forest Elementary School (teachers and 68 students). The presentations provided information on NCDOT's Highway Stormwater Program but also included: general stormwater pollution and litter awareness training, specific information about the school's storm drainage system and receiving streams, identifying areas of erosion at the school, and stormwater best management practices applicable to 1st grade students.
- On March 12, 2019, HSP staff conducted a site visit and presented to students at York Elementary School in Raleigh. The presentation included information on NCDOT's Highway Stormwater Program and included an overview of stormwater pollution issues and litter problems. Students that attended the session are part of an after-school club called the Creekkeepers that clean and monitor the tributary that runs through the nearby Brookhaven Nature Park.

Website Maintained – The HSP maintained its publicly facing website on *Connect NCDOT,* which is periodically updated with new information. The site provides information intended to educate public users about the HSP's various program areas. Separate pages were created for key products of the program. Products include many documents – such as the Erosion and Sediment Control Manual – which are provided to the public through this site. Links to related websites, such as the sample lesson plans prepared by NCDOT's Office of Education Initiatives (OEI) as part of the Summer STEM workshop (mentioned previously), are posted on the *Connect NCDOT* website under "Educator Resources".

Partnership with Office of Litter Management – HSP continued to build on successful on-going activities with HSP's first partner in EE – the Office of Litter Management. Through various on-going programs, NCDOT distributed the following stormwater-related items:

- Gave out educational materials at the State Fair which included: litter prevention and stormwater activity pages, stormwater fact sheets, Swat-A-Litterbug cards, stickers, pencils, temporary tattoos, car litter bags which could supply more than 6,000 students in grades K-12.
- Provided gloves, safety vests, and garbage bags to NCDOT Maintenance Offices to be distributed to Adopt-A-Highway volunteers and Litter Sweep participants. The garbage bags are reversible with orange and blue sides, so that recyclables can be collected in bags with blue exteriors.
- Coordinated 99,891 man-hours from volunteers in the Adopt-a-Highway program in 2018, resulting in 950,580 pounds of litter removal. There were 304,560 pounds of litter picked

up under the Sponsor-A-Highway Program, a related litter management program. Due to a new Litter Management reporting system that went into effect in February 2018, other volunteers were able to report their cleanings and reported picking up 28,200 pounds of litter in 2018. At the end of 2018, there were 9,144 miles or road adopted by 4,572 Adopt-A-Highway (AAH) groups.

- Posted “Keep NC Clean & Green” litter prevention signs along state roadways and at various Rest Areas and Welcome Centers. In addition to the "Keep NC Clean & Green" signs, there are "Littering Is Illegal" signs posted across the state.
- Continued to issue Swat-A-Litterbug letters to offenders who were spotted littering by the public. The table below summarized the mailings over the past few years.

Table 6. Summary of Swat-A-Litterbug Letters Mailed through Public Involvement Notifications

Year	Number of Swat-A-Litterbug Letters Mailed
2018	8,610
2017	10,660
2016	9,250
2015	8,416
2014	7,800

Adopt-a-Highway (AAH) Celebrates 30 Years – The AAH program began its 30th year of operation in 2018. Each year the AAH groups are recognized for their consecutive years of service beginning with 10-years and at years 15, 20 and 25. In 2018, more than 350 AAH groups received awards for their years of volunteer service to the program.

New Litter Management Outreach Materials – In PY2019 NCDOT featured many new items to engage children and the general public about the Highway Stormwater Program, Swat-a-Litterbug, and several of the other programs. Materials were distributed through the North Carolina State Fair, local events and mailings, and the NCDOT website by teachers requesting packets for their classrooms.

One of the more exciting additions in 2018, was the introduction of Ava and Oliver of the Litter League. Two animated ants appearing on NCDOT’s social media with a mission to remind children and adults that no one likes a litter bug and encouraging clean up though twitter messages, stickers, and temporary tattoos. NCDOT also released a new Litter Bug, Lenny, who replaced the previous SWAT-A-Litterbug character. These characters are displayed on Bookmarks and activity/color sheets. New wooden rulers were also produced the message “Measure Up! Don’t Litter” or “Clean Water Rules” along with the Highway Stormwater Program logo.

Considerations for Permit Year 2020

The EE Program plans to continue fostering relationships with education partners such as the Office of Education Initiatives in order to leverage their expertise and resources. The EE program will continue to evaluate options for extending the educational opportunities throughout the state.

13.0 Research Program

NPDES Permit Part II.F

Objectives and Measurable Goals

The program objectives are to:

i. Conduct research with faculty and staff at state universities or other designated institutions that result in independent quantitative assessment of stormwater from NCDOT permitted activities and/or measure structural BMP effectiveness.

ii. Conduct research to enhance or improve existing practices or develop new methods or processes to meet future permit requirements.

Management Measures	Measurable Goals
(a) Research Plan	Maintain a Research Plan. The Plan shall be in keeping with the guidelines established by the Federal Highway Administration (FHWA) Evaluation and Management of Highway Runoff Water Quality Manual (FHWA-PD-96-032) and FHWA's National Highway Runoff and Data methodology Synthesis (FHWA-EP-03-054), or any updates. The Research Program will include: 1) A description of the Research Program and process for requesting funding. *2)* A process that identifies research needs that will evaluate program improvement areas.
(b) Submit the Research Plan to NCDEMLR.	Modifications to the NCDOT Research Program shall be submitted to NCDEMLR.
(c) Implement the Research Plan	NCDOT shall continue to perform and sponsor research to fulfill the Research Plan.

Program Overview

The Research Program's primary mission is to support all aspects of the HSP through development of practical solutions to stormwater management. NCDOT conducts research with faculty and staff at state universities or other designated institutions that result in independent quantitative assessment of stormwater from NCDOT's permitted activities and/or measure structural BMP effectiveness. NCDOT also conducts research to enhance or improve existing practices, and to develop new methods or processes to meet future permit requirements. As part of the program, NCDOT maintains a Research Plan that describes the processes to request funding, to evaluate effectiveness of structural BMPs and to identify research needs. Additionally, NCDOT has continued to add data to its Stormwater Research Monitoring Database (STORMDATA).

Accomplishments

NCDOT has continued to identify and implement research projects in collaboration with various universities as required by the permit. Several elements of the HSP have been guided by research data, such as the development of NCDOT-specific stormwater load accounting tools for the Jordan Lake and Falls Lake watersheds. NCDOT continues to evaluate data gaps in its program and identify research projects to close these gaps both through the Department's annual research cycle, through out-of-cycle funding and using technical assistance agreements, as detailed in the NCDOT Research Plan.

Ongoing Research – Each year, NCDOT identifies potential research gaps, solicits calls for proposals and awards research grants, which typically span 2-4 years. The table below provides a list of research projects that were active during the permit year. A complete list of current and ongoing research projects can be found on the website for NCDOT's Research and Development unit.

Table 7. Research Projects Active in PY 2019

Research Project Number and Name	Project Objective
NCDOT 2014-18 *Investigation of Tillage and Soil Amendments to Increase Infiltration in Vegetated Stormwater Controls*	This project compares the impact of tillage on infiltration rates at various sites with different underlying soils and is discussed further in the section below on recently completed studies.
NCDOT 2014-21 *Comparing Low-Cost Methods to Stabilize Temporary Diversions and Ditches*	This project evaluates cost effective liners – jute matting, jute matting + polyacrylamide, excelsior matting, and a spray-on concrete product to reduce erosion in temporary ditches.
NCDOT 2015-16 *Evaluation of Flocculants: Optimizing Characteristics & Screening Methods*	This project evaluates flocculants to identify the factors that lead to optimal turbidity reductions and determine the best screening method that can be applied on road contraction sites.
NCDOT 2015-17 *Performance of Alternative Straw Mulch Binding Agents*	This project evaluated the effectiveness of potential tackifiers to withstand wind and rain events, and to determine effects on vegetation establishment.
NCDOT 2016-18 *Swale Design Optimization for Enhanced Application and Pollutant Removal*	This project involves pilot testing of multiple swale and bioswale design parameters/configurations in controlled plots and field sites to optimize swale and bioswale design for implementation in the linear environment. The bioswale part of the study is discussed further below.

NCDOT 2017-08 *The Effects of Contaminated Soil and Groundwater on Subsurface Utilities, Surface Water and Drainage*	This project evaluates the risk to stormwater drainage infrastructure from contaminated soils and methods to mitigate that risk by using appropriate pipe treatments applied to concrete culverts.
NCDOT 2017-27 *Storm Water Infiltration and Pollinator Habitat Zones Along Highway*	This project evaluates the differences in infiltration rates in tilled areas planted with grass versus a pollinator-friendly plant mixture, and evaluates the effects of plantings on pollinator populations, species richness, and how long infiltration improvements from tillage lasts.
NCDOT 2018-02 *Selection, Installation and Evaluation of Zoysiagrass*	This project evaluates breeding lines from the NCSU breeding program with promising commercially available zoysiagrass cultivars and evaluates potential establishment methods that require lower water during sodding than traditional methods.
NCDOT 2018-03 *Dry Retention Optimization for Enhanced Application and Pollutant Removal*	This project involves field testing and controlled plots at NCSU's Sediment and Erosion Control Research and Education Facility (SECREF) for evaluating the performance of dry detention basins and determining appropriate effluent concentrations. The study will also test the effectiveness of various enhancements to the design.
NCDOT 2018-04 *Identifying High-Risk Areas During Precipitation Events in Support of NCDOT Stormwater Quality Monitoring*	This project enhances the capabilities of NCDOT's Multi-sensor Precipitation Estimate (MPE), developed previously with the State Climate Office of NC to identify high-risk areas during or shortly after the occurrence of heavy precipitation events as specified by NCDOT engineers. For example, engineers can request notification if a selected location received rainfall greater than a selected recurrence interval, such as 25 years. These additional features will help NCDOT better prioritize and deploy resources for flood and runoff mitigation

NCDOT 2018-34 *Updates and Maintenance of the Precipitation Alert and Visualization Tool in Support of NCDOT Stormwater Quality Monitoring*	This project implemented enhancements to the MPE tool, including incorporating precipitation frequency estimates from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 to facilitate alerts when an n-year storm is reached at a project site. The enhancements also allow NCDOT to evaluate historical rainfall data on a map to identify that a given storm exceeded an n-year storm at that location.
NCDOT 2019-02 *Protocol for Outlet Analysis at Highway Sites*	This project involves an assessment of NCDOT-managed outlets to identify which characteristics affect downslope stability. Researchers will inspect 40-50 sites in the Piedmont and 20 sites in the Mountain ecoregion to assess downstream conditions from NCDOT-managed outlets and identify what factors influence downstream impacts. Impacts will be quantified by visual observation and for a subset of sites, water quality and hydrology monitoring. Based on field assessments, investigators will develop an outlet analysis protocol, create design standards for outlets that minimize erosion and cost and produce a Microsoft Excel-based tool that synthesizes the project results.
NCDOT 2019-06 *Optimization Compost Application Rates for Vegetation Health, Maximal Stormwater Infiltration, and Runoff Quality*	The purpose of this research is to determine optimum compost amendment rates for stormwater treatment and cost reduction. NCSU will first conduct a laboratory screening assessment using five soil textures representative of NC soils, a range of compost rates and two sources to determine hydraulic conductivity and water retention of the mixtures. Based on the results of this screening, NCSU will perform column tests of compost-amended media to study breakthrough curves for select nutrients and metals. In parallel, greenhouse plots of the same mixtures will be used to determine vegetation establishment over a period of 6-8 weeks. This will then be used to optimize design of field plots in SECREF to investigate impacts of compost amendment.

NCDOT 2019-07 *Evaluation and optimization of engineered media amendments for contaminant removal in stormwater runoff filtration systems*	The objective of this research is to evaluate a variety of affordable media materials that can remove multiple contaminants simultaneously and maintain high performance in runoff filtration measures under various natural conditions. Up to 25 amendments will be screened using a batch test. These will then be winnowed down through a series of different laboratory experiments to three promising amendments which will be studied in laboratory columns. The column experiments will look at a variety of factors such as the impacts of media aging, antecedent dry conditions, and variable concentrations/loads on amended media performance.

Recently Completed Studies

The following research projects had draft or final reports submitted in the current permit year.

- NCDOT completed a final report (NCDOT 2014-21) investigating tillage and soil amendments used to increase infiltration in vegetated stormwater controls. This study examined the effects of applying tillage with and without compost amendments over periods of more than two years at five sites. Tillage was also evaluated on two active roadways and compared to existing stands of grass for runoff reduction. Results indicate that bulk density and infiltration rate were no different between control and tillage, but bulk density was lower and infiltration rate was higher for tillage with compost addition compared to control. These results suggest that, unless compost is incorporated with tillage, tillage benefits relative to existing grass stands will likely be short-term. Overall, tillage BMPs can effectively reduce bulk density, increase porosity, and enhance infiltration for disturbed, new construction soils. Tillage BMPs may also be beneficial in locations with known infiltration and grass stand issues.
- NCDOT completed a draft report (NCDOT 2016-18) providing recommendations for optimizing new and existing swales and bioswales within NCDOT rights-of-way. Under this project, synthetic rainfall was applied to and tested after passing through seven full-scale bioswales under controlled conditions; natural rainfall was tested after passing through five full-scale bioswales along North Carolina roadways. This research showed the positive hydrologic and water quality treatment potential of bioswales. Results indicate that increased length and base width reduced outflow load removal efficiency for several pollutants, possibly due to diminishing marginal returns. A forebay increased load removal for TKN, $NO_{2\text{-}3}$-N, TP, OP, Cd, Cu, Pb, and total Zn. Check dams reduced load removal efficiency, while inclusion of an internal water storage (IWS) area improved load removal for $NO_{2\text{-}3}$-N, OP, and Cu.

- Additionally, NCDOT completed a second draft report on project NCDOT 2016-18, documenting the effectiveness of three key design parameters and two storm sizes on swale hydrologic and water quality performance. Initial results of the research suggest that a significantly higher TSS and phosphorus loads are removed during the larger storm size compared to a medium storm size. The results also indicate that a trapezoidal shaped swale is better at removing dissolved phosphorus from stormwater than a triangular swale.

- NCDOT completed an analysis of subsurface contaminants on installed subsurface utilities commonly employed by NCDOT (NCDOT 2017-08). This project involved an experimental and modeling study of the effect of Benzene and PCE on the durability of PVC and concrete pipes and Polychloroprene (Neoprene-CR), Acrylonitrile (nitrile) butadiene rubber (Buna-N), and fluoroelastomer rubber (FKM - Grade A VitonTM) gaskets. Modeling was performed to assess migration of contaminates to provide a better understanding of the alternation of the contaminant transport regime with the installation of pipes in contaminated subsurface media. Experimental results indicated that Benzene is more detrimental than PCE in terms of degradation of the tensile strength of PVC and rubber gasket materials. Among rubber gaskets, Viton performed the best, followed by Buna-N and Neoprene when exposed to Benzene- and PCE-saturated aqueous solutions.

- NCDOT completed a draft report summarizing field monitoring performed under NCDOT 2018-03, *Dry Retention Optimization for Enhanced Application of Pollutant Removal*. The findings of this study suggest that dry detention basin inlet pipe configuration, outlet structure orientation, soil compaction, and the presence of standing water may all impact a dry detention basin's ability to improve water quality. It also provides evidence that overgrown dry detention basins can provide pollutant removal within ranges reported in other research, while providing greater than normal volume reduction through infiltration, greater carbon sequestration, and reduce maintenance costs.

Considerations for Permit Year 2020

In the next permit year, NCDOT will continue its Research Program. Several new projects are being initiated, with results expected in 2-4 years, including:

- Project 2020-01, *Reducing the Environmental Impact of Road Construction*, will evaluate practices used to improve turbidity reduction in stormwater runoff associated with construction activities by tracking turbid discharges on active construction sites and determine the sources and potential remedies to the problem. The project goal is to evaluate current practices in the field and test modifications and additions which can provide better turbidity reduction. The project will also evaluate mixtures of different pollinator-friendly wildflower species and potential nurse crops for plant establishment and flowering. Factors in establishment such as soil amendments, seeding method, and mulches will be tested to help determine the best approaches to establishing wildflowers on low-maintenance areas.

- Project NCDOT 2020-05 (a continuation of 2017-08 described above) will assess the effectiveness of hardening infrastructure on reducing contaminant migration from the existing contaminated soils into subsurface pipes, and the stormwater the pipes convey. Specifically, the project will measure contaminant migration through Neoprene, Buna-N, and Viton gaskets at locations where such gaskets are installed, and measure contaminant migration through PVC and HDPE membranes which are used as a hardening method for wrapping concrete materials.

14.0 Total Maximum Daily Load Program

NPDES Permit Part III.C

Objectives and Measurable Goals

The program objectives are:

i. Address impaired waters identified in Total Maximum Daily Loads (TMDLs) in which NCDOT is named as a significant contributor of the pollutant and given an assigned Waste Load Allocation.

Permit Requirements	
1)	At any time during the effective dates of this permit, NCDOT will develop and implement a program ("Program") to address impaired waters identified in TMDLs in which NCDOT is named as a significant contributor of the pollutant addressed by the TMDL and that assigns NCDOT a wasteload allocation (WLA) separate from other point sources.
2)	NCDOT's Program shall summarize the locations of NCDOT outfalls that are identified in its implicit Stormwater Outfall Inventory that have the potential to discharge the TMDL pollutant of concern into the impaired segments, to their tributaries, and to segments and tributaries within the watershed contributing to the impaired segments.
3)	NCDOT's Program shall implement an Assessment & Monitoring Plan ("Plan"). The Plan shall include an evaluation of the need for additional data collection related to the NCDOT's discharge of the TMDL pollutant of concern. Additional data collection to be evaluated may include (but does not require) a supplemental inventory of NCDOT outfalls, monitoring, an assessment of the effectiveness of existing BMPs, and an assessment of non-NCDOT discharges entering NCDOT's conveyance system and negatively impacting the quality of NCDOT stormwater discharge. If the Plan proposes analytical monitoring, then it shall include a description of the sample types, frequency, and seasonal considerations, if applicable. Where appropriate, NCDOT may reduce its monitoring burden by monitoring outfalls that NCDEMLR considers substantially similar to other outfalls. The Plan may be adjusted as additional outfalls are identified.
4)	The Plan shall include a schedule for implementing the proposed assessment and monitoring activities. The Plan shall be submitted to NCDEMLR for comments no later than 12 months after notification by NCDENR that NCDOT has been assigned a WLA NCDEMLR shall complete its review of the Plan within 6 months of receiving the plan from NCDOT.
5)	NCDOT shall initiate implementation of the Plan within 6 months of receiving Plan approval from NCDEMLR. In accordance with the Plan implementation schedule, NCDOT shall provide a summary of the assessment and monitoring activities performed within a reporting period in subsequent annual reports.

Permit Requirements	
6)	Within 6 months of completing the assessment and monitoring activities outlined in the Plan, NCDOT shall submit a report of its findings to NCDEMLR. The report shall include an assessment of whether additional structural and/or non-structural BMPs are necessary to meet NCDOT's WLA. If necessary, the report will also document why BMPs are infeasible to meet the WLA and discuss BMPs to reduce the load to the maximum extent practicable. The report shall include a schedule for implementing such BMPs. Upon approval by NCDEMLR, NCDOT shall implement any approved BMPs in accordance with the schedule. Subsequent annual reports will provide updates on the implementation of the Plan.

Program Overview

As part of the TMDL Program, NCDOT has developed and implemented a program to address impaired waters identified in TMDLs in which NCDOT is named as a significant contributor of the pollutant and is assigned a WLA. The program includes preparation of assessment and monitoring plans, schedules for plan execution and submittal of findings reports to NCDEQ. The TMDL Program relies heavily on data that is collected under the Research Program to inform pollutant loading and water quality and watershed modeling decisions. TMDL compliance is supported through the Retrofits Program and its efforts to identify suitable locations for stormwater retrofits and successfully implement controls that achieve NCDOT's WLAs.

Accomplishments

Key PY2019 accomplishments included continued collaboration with NCDWR's Modeling and Assessment Branch, implementation of its Protocol for Determining Significant Contributor Status in North Carolina, developing partnerships in the Walnut Creek watershed, updates to the assessment of bacteria-reducing opportunities in the Southeast White Oak watershed, and involvement in nutrient and watershed modeling studies throughout the state.

NC TMDLs Approved in 2019 – No TMDLs were approved by USEPA in PY2019.

NCDWR Modeling and Assessment Collaboration – NCDOT communicates frequently with NCDWR's Modeling and Assessment Branch to ensure that NCDOT information and involvement, in support of TMDL development, is provided to NCDWR. In 2019, this communication involved a coordination meeting to cover several ongoing initiatives, including: DWR's priority list of waterbodies and approach to addressing impairments through a TMDL or TMDL alternatives (such as Category 4b and 5r approaches), a Category 5r website, and NCDWR's plan for addressing metals impairments. This collaboration advances the Department's initiatives for complying with TMDLs and supporting TMDL alternatives that address water quality impairments throughout the state.

Walnut Creek TMDL Alternative – NCDOT is participating in the development of a watershed restoration plan for Walnut Creek (Neuse River Basin) in partnership with the City of Raleigh, Town of Cary, and North Carolina State University. The restoration plan is anticipated to qualify as a Category 4b or 5r Plan and address USEPA's nine key elements that have been identified as critical for achieving water quality improvements. The project partners plan to document restoration activities, including

stormwater control retrofits and other measures taken to address impairment in Walnut Creek, through a NCDWR website dedicated to documenting progress in Category 4b and 5r watersheds. Portions of Walnut Creek are identified as impaired due to elevated copper, PCB (fish tissue advisory), and "fair" or "poor" fish community.

Falls Lake Watershed Modeling Support – In 2010, the Environmental Management Commission passed the Falls Lake Nutrient Management Strategy, requiring two stages of nutrient reductions for Falls Lake. The Falls Lake rules, as promulgated, involve significant implementation costs. Since 2011, the Upper Neuse River Basin Association (UNRBA) has been planning to reexamine the model used to develop the rules. In an effort to support the UNRBA, NCDOT developed GIS datasets of state-maintained right-of-way and impervious areas in 2019. Multiple GIS datasets were developed for modeled timeframes 2005-2007 and 2016-2018 to distinguish NCDOT road and non-road right-of-way area and impervious areas.

Southeast White Oak TMDL Compliance Update – In 2009, NCDEQ prepared a TMDL report to address fecal coliform impairments in Boathouse Creek (ID# 20-31), Hills Bay embayment (ID# 20-(18)c4) and Dublin Creek (ID# 20-30) in the White Oak River Basin. Two of these TMDLs, Boathouse Creek and Hills Bay embayment, identified NCDOT as a contributor to impairment and assigned NCDOT a unique WLA. As required under Part III, Section C of NCDOT's NPDES permit, NCDOT prepared an Assessment and Monitoring Plan (AMP) in 2011 which described NCDOT's strategy for field assessing assets and identifying load reduction opportunities in the Boathouse Creek and Hills Bay watersheds, followed by a Report of Findings (RoF) in 2013, which describes the results of NCDOT's AMP implementation activities, including field exercises and SCM retrofit feasibility studies.

Recent efforts to assess opportunities in the watershed are documented in a 2018 report titled "Southeast White Oak River Bacteria TMDL Report of Findings Update." This report describes the challenges and constraints associated with treating stormwater runoff from the NCDOT right-of-way in the Hills Bay watershed. In summary, these challenges include limited easement and right-of-way, elevated water table, presence of existing underground utilities, and location of discharge point in proximity to receiving waterbody. Based on these challenges, NCDOT has concluded at this time that no feasible retrofit options currently exist for treating bacteria within the NCDOT right-of-way in the Hills Bay Watershed. For this reason, NCDOT plans to continue to implement other NPDES permit requirements in the watershed and pursue additional opportunities as they arise. Additionally, NCDOT will continue to explore other options, such as future innovative technologies that hold promise for reducing bacteria in stormwater, as described in a 2018 SEWO report.

Considerations for Permit Year 2020

NCDOT will continue to support DWR in the development of TMDLs statewide and assessments of NCDOT loading as part of those TMDLs. NCDOT anticipates evaluating the TMDLs prepared to address impairments in Virginia Creek, Mullet Run, Turkey Creek (shellfish closure waters), and Calico Creek (chlorophyll a, dissolved oxygen, and turbidity impairments). NCDOT will continue to support the development of a Category 4b Plan for Walnut Creek and data needs in the Middle Cape Fear River Basin

(such as NCDOT land cover). NCDOT will also to support NCDWR as a stakeholder in supporting their Priority List of Waterbodies and 5r program.

15.0 Falls and Jordan Lake GREEN Programs

Jordan Lake Rules:
15A North Carolina Administration Code
02B .0262-.0273, .0311, and
NC Session Laws 2009-216, 2009-484

Falls Lake Rules:
15A NCAC 02B .0275—.0282

Requirements

Watershed	Rule Requirements
Jordan Lake	Identify NCDOT stormwater outfalls from Interstate, US, and NC primary routes.
	Identify and eliminate illegal discharges into the NCDOT's stormwater conveyance system.
	Implement a Nutrient Management Education Program for NCDOT staff and contractors engaged in the application of fertilizers on highway rights of way.
	Meet riparian buffer and diffuse flow requirements on new and widening road projects.
	Achieve sub-watershed specific nutrient reduction targets on new non-road development projects using NCDOT-JLSLAT or through another calculation method that is acceptable to NCDWR.
	Provide an estimate of, and plans for offsetting, nutrient load increases from lands developed subsequent to the baseline period but prior to implementation of the new development program (currently stayed, see below).
Falls Lake	Identify NCDOT stormwater outfalls from Interstate, US, and NC primary routes.
	Identify and eliminate illegal discharges into the NCDOT's stormwater conveyance system.
	Implement a Nutrient Management Education Program for NCDOT staff and contractors engaged in the application of fertilizers on highway rights of way.
	Meet riparian buffer and diffuse flow requirements on new and widening road projects.
	Achieve nutrient reduction targets on new non-road development projects using NCDOT-JLSLAT or through another calculation method that is acceptable to NCDWR.
	Provide an estimate of, and plans for offsetting, nutrient load increases from lands developed subsequent to the baseline period but prior to implementation of the new development program.

Watershed	Rule Requirements
	Implement six stormwater retrofit BMPs per year in the Falls Lake watershed to reduce nutrient loads until NCDOT's existing development load reduction requirements are achieved or the lake's designated uses are restored.

Program Overview

The NC Environmental Management Commission (EMC) adopted permanent nutrient management rules for Jordan Lake and Falls Lake which became effective in 2009 and 2011, respectively. In response, NCDOT initiated the GREEN Program to integrate and enhance NCDOT's stormwater and nutrient management practices and to support NCDOT's compliance with the Jordan and Falls Lake Rules.

The Jordan Lake GREEN outlines the Department's approach to managing nutrients from new development, including new and widened roads and new non-road developments. The EMC approved the Jordan Lake GREEN Program on November 8, 2012. The Rules also include retrofit requirements to reduce nutrient loads from existing NCDOT development; however, various Session Laws have delayed this requirement.

The Falls Lake GREEN addresses the Department's approach to managing nutrients from new and existing developments consisting of new and widened roads, new non-road development, and existing road and non-road development. The EMC approved the Falls Lake GREEN Program on January 9, 2014. Among other things, these regulations require NCDOT to implement new training for staff and contractors, calculate nutrient loads resulting from projects and devise controls to reduce the increased loads. Both GREEN programs are currently in effect. A notable requirement of the Falls Lake rules is the mandate for the Department to construct six retrofits per year in the watershed or implement equivalent nutrient load reduction measures.

Accomplishments

NCDOT continued to develop and implement nutrient management training programs for NCDOT staff and contractors, completed construction on six stormwater retrofits, and continues with determination of a possible twenty seven (27) new retrofit sites.

GREEN Training – NCDOT continues to offer online training videos, first introduced in PY2016, to support staff and contractors when using the NCDOT nutrient accounting tool, NCDOT Jordan Lake Stormwater Nutrient Loading Accounting Tool (NCDOT-JLSLAT), on new non-road development projects. These videos are available on the NCDOT YouTube channel.

New Non-Road Development Projects in 2019 – Over the past year NCDOT did not complete any new projects in the Jordan Lake or Falls Lake watersheds that would be subject to the non-road development rules. In the future, should new non-road development be constructed subject to the rules, the annual report at that time will include a list of projects, descriptions of the projects and stormwater control measures, project-specific copies of the NCDOT-JLSLAT and other supporting calculations, and a summary of changes in nutrient loads associated with these activities.

Litter Removal Support – In addition to its state-wide litter abatement programs discussed in the External Education section of this report, NCDOT continues to support the Clean Jordan Lake organization for their annual litter sweep on Jordan Lake.

Retrofit Projects to meet Existing Development Requirements – Six (6) stormwater BMP retrofits in the Falls Lake watershed were completed in 2019, including:

- Three (3) filtration basins and one (1) dry detention basin at the intersection of I-540 and SR 1005 (Six Forks Road) in Wake County.
- Two (2) filtration basins at the intersection of I-540 and SR 2000 (Falls of Neuse Road) in Wake County.

Modeling the 3 filtration basins and 1 dry detention basin at the intersection of I-540 and Six Forks Road resulted in a net reduction in load of TN from 7.95 pounds per acre per year to 3.31 pounds per acre per year, a load reduction of 58% and a net increase in load of TP from 0.48 pounds per acre per year to 0.60 pounds per acre per year, a load increase of 26%. Modeling the 2 filtration basins at the intersection of I-540 and Falls of Neuse Road using NCDOT-JLSLAT resulted in a net reduction in load of TN from 6.43 pounds per acre per year to 3.41 pounds per acre per year, a load reduction of 47% and a net increase in load of TP from 0.44 pounds per acre per year to 0.63 pounds per acre per year, a load increase of 43%.

If future research shows that these BMPs perform differently than assumed in the current NCDOT approved Jordan/Falls Lake Stormwater Nutrient Load Accounting Tool, NCDOT will work with NCDEQ to amend the accounting procedure accordingly.

NCDOT is not required to implement stormwater retrofits under the Jordan Lake GREEN program at this time.

Rehabilitation of Existing Stormwater Controls – NCDOT's SCMS database is used to track inspection and maintenance of structural BMPs statewide, including those located within the Jordan Lake and Falls Lake watersheds. NCDOT Division REU Engineers maintain BMPs in the Jordan and Falls Lake watersheds. In PY2019, no significant rehabilitation needs were identified or reported. As such, no nutrient load reduction/performance changes associated with significant BMP maintenance or rehabilitation are known to have occurred during this reporting year.

Summary of Outfalls from Primary Roads – As discussed in Section 3.0, NCDOT completed a Tier 1a outfall inventory in portions of the Lower Jordan Lake watershed in 2019. The inventory was conducted along primary roadways in portions of the New Hope River subwatershed and Lower Haw River subwatershed and resulted in the identification of 546 explicit outfalls. The Tier 1a inventory includes locations of true outfalls to waters of the state at or within the right-of-way boundary.

Considerations for Permit Year 2020

NCDOT will continue to implement the Department's GREEN Program and achieve requirements set forth for new and existing (Falls GREEN, only) road and non-road development in the Jordan Lake and Falls Lake watersheds. NCDOT will continue to partner with NCDWR on nutrient reduction strategies and

to engage staff and contractors on nutrient-related requirements and watershed goals through educational tools and training opportunities.

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Appendix A

I-77 Mobility Partners Stormwater Management Program Report

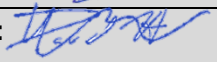
Stormwater System Report

Date of Report:	Scope of Report:	Area(s) Reported:
August 23, 2019	I-77 Mobility Partners Stormwater Management Program	I-77 Mobility Partners Facility Stormwater System & I-77 Corridor

I	Report
	1 Section – Overview/Summary In accordance with I-77 Mobility Partners Stormwater Management Program and in compliance with the Comprehensive Agreement. I-77 Mobility Partners herein provides its annual report under NCDOT's NPDES permit. This report is for a 26-mile portion of the I-77 corridor and an approximately one-third mile portion of I-277 in the City of Charlotte, and in Mecklenburg and Iredell Counties, North Carolina. From approximately MM 11 to MM 37 on I-77 both northbound and southbound. In addition, this report includes Administration & Maintenance building (Facility) which became operational on November 1, 2018 located at: 8015 W. WT Harris Blvd. Charlotte, NC 28216 **2 Section – Illicit Discharge Detection and Elimination Plan (IDDEP)** No illicit charges were detected, and no dumping occurred during the report period July 1, 2018 to June 31, 2019. **3 Section – Post-Construction Controls** I-77 MP's stormwater controls are under construction. Once it is finished they will be routinely inspected, as per the approved Stormwater Management Program (SMP) in accordance with NCDOT's NPDES permit. Moreover, they will have the necessary maintenance performed on them to be certain that they continually function as designed. **4 Section – Program for Encroachment** Encroachment is no longer a required section based on the new NPDES permit. If required, encroachments are responsibilities of NCDOT's, all encroachments are managed by NCDOT's Division Office. **5 Section – Construction Program** The project is currently under construction until Final acceptance and all temporary erosion control measures have been implemented per the approved ESPC plans. **6 Section – Industrial Facilities** I-77 Mobility Partners has developed the Stormwater Pollution Prevention Plan (SPPP) in accordance with NCDOT's NPDES permit for the Administration and Maintenance building (Facility). I-77 Mobility Partners maintenance staff successfully completed the SPPP training. In addition, the SPPP best management practices are currently being implemented.

II	Conclusion
	Overall the I-77 Mobility Partners Stormwater Management Program is in the implementation phase. In addition, a part of I-77 corridor stormwater controls are still under construction.

III	Point of contact person
	Updated Environmental point of contact person from I-77 Mobility Partners: Náyade de la Rasilla Sainz O&M Engineer nrasilla@i77partners.com

Environmental Designee: Náyade de la Rasilla	Signature: 	Date: 08/23/2019
Approver Manager: David Hannon	Signature: 	Date: 08/23/2019