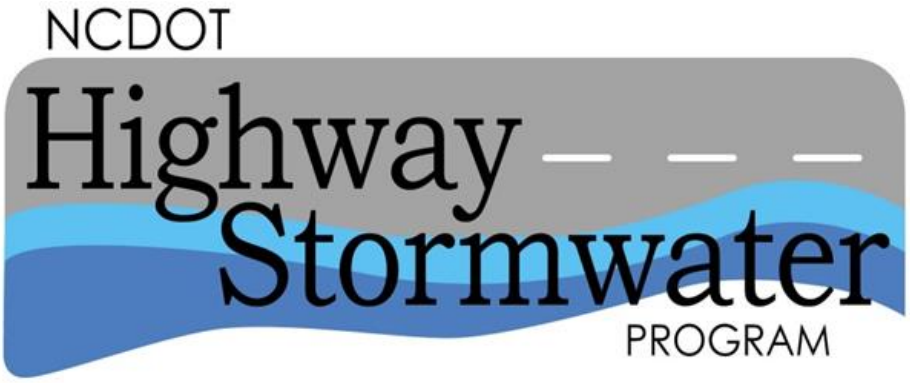
Annual Report

Term IV, Year 7:
July 1, 2021 – June 30, 2022



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

August 31, 2022

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This report was prepared and submitted to be compliant with North Carolina Department of Transportation's (NCDOT's) National Pollutant Discharge Elimination System (NPDES) stormwater discharge permit (NCS000250) requirement under Part 4.2 of the permit issued May 1, 2022 (Term V permit). This annual report includes an assessment of the activities performed under the permit for the period July 1, 2021 – June 30, 2022. Whereas NCDOT's new permit was issued late in the period covered by this annual report, North Carolina Department of the Environment Quality (NCDEQ) agreed that this annual report should assess compliance with the previous permit and can be submitted in this format. Therefore, this report has been designated to cover Year 7 of NCDOT's Term IV permit (see below for more details). All permit section references in Chapters 2-15 refer to the Term IV permit. This annual report does not include specific annual reporting metrics identified in NCDOT's draft Transportation Separate Storm Sewer System - Stormwater Management Plan (TS4SMP) which was submitted to NCDEQ on July 29, 2022.

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 and I-77 Mobility Partners are also covered under this permit. The I-77 Mobility Partners Stormwater Management Program Report is included in Appendix A of this report.

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.

NCDEQ administratively extended NCDOT's NPDES permit due to the Coronavirus pandemic. During this permit year NCDOT continued to work with NCDEQ on the NPDES permit renewal process. This included development of new draft permit language and incorporation of NCDEQ's updated format for the permit. As noted above, the final permit was issued on May 1, 2022. NCDOT is currently working with NCDEQ to finalize its TS4SMP that details the Department's Highway Stormwater Program (HSP) best management practices (BMPs), measurable goals, and reporting metrics. It is important to note that this process change and the issuance of NCDOT's new NPDES permit may impact the Program Area Considerations for Permit Year 2023 listed in this Annual Report.

Note: due to the ongoing Coronavirus pandemic some planned permit program activities were canceled, postponed, or modified to accommodate circumstances. Examples include in-person meetings or training activities being moved to online formats, delayed retrofit BMP construction due to supply chain issues, and various other project delays. NCDOT continues to strive forward with collaboration and implementation of the permit program requirements during this unprecedented crisis.

Select Accomplishments for Year 7 of Permit Term IV (July 1, 2021 – June 30, 2022)

A few examples of accomplishments achieved by NCDOT during Year 7 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 completed work with its USGS project partners to lay the technical foundation for the update of its Post-Construction Stormwater Program (PCSP), which was approved by NCDEQ in May 2022. The updated PCSP is sequenced with the Department's Integrated Project Delivery (IPD) initiative along with other policy and guidance updates as part of the project delivery network (PDN) version 2.1, released in July 2022. The PDN processes move stormwater management planning earlier in the project delivery process and provide a system of defining project specific treatment expectations which are documented in a new preliminary stormwater management plan (pSMP). The Department completed its partnership with USGS in the development of a tool, based off USGS' Stochastic Empirical Loading and Dilution Model (SELDM), to aid in defining the stormwater treatment expectations for a project. The tool, known as the NC-SELDM Catalog, was released in December 2021 along with video-based training modules for the stormwater practitioner. The Department has also introduced a new summary sheet for stormwater control measures to be included within roadway construction plans. This will aid the tracking of these devices from design through construction, and into inspection and maintenance phases of the devices' life cycle.

- **BMP Toolbox Design Manual** – NCDOT continues work on a major update to the Department's Stormwater Best Management Practices Toolbox design manual. As part of the process of updating the manual the Department has completed a peer state review of best management practices at the national level. Findings from the peer state review, the Department's Stormwater Research Program, and field trials of new designs as part the Retrofit Program will be considered for incorporation into the Toolbox. The updated manual is expected to be submitted for NCDEQ review in late 2022. Following NCDEQ approval of the BMP Toolbox on-demand training videos will be made available to designers.

- **Stormwater Control Measure (SCM) Inspection and Maintenance Program** – NCDOT continued the process initiated in PY2021 for non-routine SCM repairs. Roadside Environmental Unit (REU) Central and consultant staff assisted Division staff by performing SCM inspections and preparing detailed scopes of work and cost estimate bid packets for SCMs that were not functioning as intended. Division Roadside Environmental staff coordinated with contractors and other Division staff performing the non-routine SCM repairs. REU Central staff continued to coordinate with Division staff to assess inspection needs for various controls and educate new staff members.

- **Vegetation Management Program** – Central Roadside held TEAMS meetings with the 14 statewide Roadside Department employees. These hour-long training sessions were held on January 25th, February 15th, and March 15th. Throughout the year, staff attended various other trainings that offered pesticide recertification credits. These training included various NC Cooperative Extension sponsored pesticide trainings held regionally, the 2022 Southern Farm Show held at the NC State Fairgrounds (February 2-4), NCVMA Field Day (May 19, 2022), NC State University Turfgrass Field Day (August 11, 2021), a one-day Roadside Unit

Training (December 6th), and the NC Vegetation Management Association Annual Conference (Dec. 7 – 9, 2021). The sessions, approved by NCDA&CS, provided pesticide recertification training, including discussions of pesticide recertification requirements, applications, methods, aquatic subcategory, pesticide handling, and compliance of NPDES pesticide storage facilities.

- **Construction Program** – NCDOT continues to operate under its delegated authority granted by the NC Sedimentation Control Committee. NCDOT's Construction Program continues to review and approve erosion & sediment control (ESC) plans, implement, and maintain standard specifications and project special provisions, provide guidance on ESC/stormwater issues, perform inspections and monitoring of construction projects, maintain NCDOT's reclamation process, and provide ESC/stormwater training materials to contractors/ consultants. The following inspections were performed by REU Field Operations staff in permit year 2021 (PY2021) for each category of land disturbing activity: 3,164 contract construction projects, 202 maintenance projects, 7 vertical construction projects, 408 bridge maintenance projects, and 109 resurfacing projects. NCDEQ performed its standard annual review with NCDEMLR staff and recommended the Delegation be continued which was approved by the NC Sediment Control Commission.

- **Industrial Activities Program** – NCDOT continues to implement and maintain Stormwater Pollution Prevention Plans (SPPPs) at 204 industrial facilities. NCDOT staff conducted 28 internal site reviews, provided online and in-person training to Division staff and contractors, and continued to assist Divisions on SPPP implementation.

- **Litter Management** – In 2021 NCDOT greatly enhanced its public education program related to Anti-Litter messages with new social media posts, press releases, and new creative public service announcements (videos and radio broadcasts). NCDOT partnered with County Music Star Luke Combs and various NC Athletic Organization coaches and mascots to develop these PSAs to help educate and encourage NC residents to not litter, secure their loads, and work together to keep NC clean. NCDOT also developed a new Swat-A-Litterbug phone application to make it easier for the public to report litterers from their mobile phones. NCDOT also formed a Litter Task Force in PY2021 consisting of NCDOT staff with representatives from various governmental and business organizations within the Triangle area to evaluate litter education programs, leverage available resources, develop new initiatives to promote anti-litter messages to the public, and target new audiences. The NCDOT Litter Management Program still suffered from issues created by the Coronavirus pandemic and related budgetary crisis. NCDOT and our partner organizations have continued to re-engage and have picked up over 9 million pounds of litter from January 1, 2021, through the end of August 2021. Spring and fall Litter Sweep 2021 were also back on after postponements related to the pandemic.

- **Internal Education Program** – In PY2022, NCDOT inaugurated its Communicating Lessons, Exchange Advice, Record (CLEAR) Program, an internally-developed knowledge

management program to promote cross-unit communication, sharing of best practices, and organizational enhancements through an easy-to-use technical platform. To develop CLEAR, NCDOT sponsored a research project by the U.S. Department of Transportation's John A. Volpe National Transportation Systems Center (Volpe Center) to interview seven other state departments of transportation to assess the current state of the practice for implementing innovation and knowledge management (KM) programs. The CLEAR program won the American Association of State Highway and Transportation Officials' (AASHTO's) State Transportation Innovation Councils (STIC) Excellence Award in 2021. CLEAR's first presentation was the Bridge Stormwater Runoff Management and Design training presented by HSP Staff.

- **External Education Program** – In this permit year, NCDOT continued its new social media program to educate the public on stormwater and litter issues impacting NC, originally implemented in PY2021. NCDOT REU Central and Litter Management staff worked with NCDOT's Office of Communications on a series of social media posts which included 29 posts pertaining to the Highway Stormwater Program and 45 posts recognizing the Department's Adopt-A-Highway volunteers. The social media posts resulted in 3,898 average impression of post and 9,354 total engagements. NCDOT staff also worked with Historically Black Colleges and Universities (HCBU)/ Minority Institutions of Higher Education (MIHE) staff to conduct a virtual educational workshop session for the WakeEd Summer STEM Session teachers. NCDOT presented on how the Department manages stormwater runoff from its existing roadway and non-roadway facilities and ongoing construction projects, how NCDOT employs various stormwater pollution prevention practices for its projects, and described what young citizens can do to protect NC waters.

- **Research Program** – NCDOT completed two final reports including: NCDOT 2017-27 *Storm Water Infiltration and Pollinator Habitat Zones Along Highways* and NCDOT 2018-02 *Selection, Installation and Evaluation of Zoysiagrass*. NCDOT continued managing multiple on-going stormwater-related research projects which are detailed in Section 13 of this report.

- **NCDOT Hosts the 2022 National Stormwater Practitioners Forum** – On April 11-14, 2022, NCDOT hosted the 2022 National Stormwater Practitioners Forum. With the support of FHWA, NCDOT assembled state DOT stormwater program managers from across the nation for a four-day peer exchange to discuss emerging issues, best management practices, and new technologies. NC State University hosted a field trip to the Sediment & Erosion Control Research and Education Facility where participants learned about the latest research findings on construction and post-construction stormwater treatment methods.

Considerations for Permit Year 2023 (PY2023)

NCDOT received its renewed NPDES permit from NCDEQ on May 1, 2022. The TS4SMP, which effectively serves as a five-year business plan outlining the major activities to be performed to comply with the

permit along with annual reporting metrics, is currently under review by NCDEQ. It is the intent of NCDEQ that the reporting metrics serve as the basis of future annual reports. Hence, this PY2022 annual report will be the last one produced by NCDOT in this narrative format. Future annual reports will be significantly more streamlined.

Highway Stormwater Program staff are currently integrating the changes to the various permit compliance programs. NCDOT anticipates many programs will remain substantially similar to the current programs. However, several permit programs will require significant changes or new programs will need to be developed such as:

- **TS4 Mapping Program** - This program will effectively replace the existing field outfall inventory program. The permit requires NCDOT to develop a new program to map the components of its drainage system. The required components include pipes, catch basins, open channels, outfalls, and flow direction. Mapping is required in the Phase I municipalities which include: Charlotte, Winston-Salem, Greensboro, Durham, Raleigh, and Fayetteville/Cumberland Co area. Future permits may require mapping in Phase II communities.

- **Spill Response Program** - The permit requires NCDOT to develop and implement spill response procedures for non-roadway facilities. Although the Department has long had spill response procedures, they previously were not covered under the NPDES permit. Coverage under the permit may necessitate more consolidated documentation and training.

- **Fecal Coliform Reduction Program** - The permit requires NCDOT to take specific actions at its non-road facilities including connecting on-site wastewater systems to publicly owner treatment works where feasible, stormwater pollution prevention training of wastewater facility operators, and maintaining pet waste stations.

- **Litter Management Program** - The permit requires NCDOT to continue litter pickup activities, but requires new actions such as quarterly litter inspections, identification of litter hotspots, and implementation of BMPs to prevent the discharge of litter at hotspots.

- **TS4 Operation and Maintenance Program** - The permit requires NCDOT to develop and implement a TS4 operations & maintenance (O&M) program designed to reduce the discharge of stormwater pollutants including particulates, sediment, litter, and debris. The Department is required to identify high priority areas for implementation of BMPs to reduce pollutants. Improved O&M documentation is required.

- **As-Built Policy** - The permit requires the Department to develop a policy directing the preparation and storage of as-built drawings for stormwater control measures on TIP projects as well as retrofits.

- **TMDL Program** - The permit provides greater flexibility for how NCDOT complies with EPA-approved total maximum daily load (TMDL) calculations, but greatly expands the number of

TMDL waters NCDOT must respond to by now including TMDLs which do not name NCDOT as a significant contributor of the pollutant of concern.

Program Summaries

Tables

Appendix

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AAH	Adopt-A-Highway
AASHTO	American Association of State Highway and Transportation Officials
AMP	Assessment and Monitoring Plan
ATLAS	Advancing Transportation through Linkages Automation and Screening
BMP	Best Management Practice
BUA	Built Upon Area
CFR	Code of Federal Regulations
CLEAR	Communicate Lessons, Exchange Advice, Record
DWR	Department of Water Resources
EE	External Education
EMC	Environmental Management Commission
ESC	Erosion and Sediment Control
FHWA	Federal Highway Administration
FIP	Field Inventory Protocol
GIS	Geospatial Information System
GREEN	Guided Reduction of Excess Environmental Nutrients
HBCU	Historically Black Colleges and Universities
HSP	Highway Stormwater Program
I&M	Inspection and Maintenance
IA	Industrial Activities
IDDEP	Illicit Discharge Detection and Elimination Program
IE	Internal Education
IPD	Integrated Project Delivery
IRMA	Industrial Roadway Maintenance Activities
JLOW	Jordan Lake One Water
LID	low impact development
LOS	Level of Service
MIHE	Minority Institutions of Higher Education
NBSS	Nature-based Stormwater Solutions
NCAC	North Carolina Administration Code
NCAPWA	North Carolina chapter of the American Public Works Association
NCCF	NC Coastal Federation
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
NCDWR	North Carolina Department of Water Resources
NCSU	North Carolina State University

NCTA	North Carolina Turnpike Authority
NCVMA	North Carolina Vegetation Management Association
NFWF	National Fish and Wildlife Federation
NPDES	National Pollutant Discharge Elimination System
PCSP	Post Construction Stormwater Program
PDN	Project Delivery Network
PEF	Professional Engineering Firm
PENC	Professional Engineers of North Carolina
PSA	Public Service Announcement
pSMP	Preliminary Stormwater Management Plan
REU	Roadside Environmental Unit
ROSS	Retrofit Opportunity Site Selection
SAH	Sponsor-A-Highway
SCM	Stormwater Control Measure
SCMS	Stormwater Control Management System
SECREF	Sediment and Erosion Control Research and Education Facility
SELDM	Stochastic Empirical Loading and Dilution Model
SMP	Stormwater Management Plan
SPCA	Sedimentation Pollution Control Act
SPCC	Spill Prevention Control and Countermeasure
SPPP	Stormwater Pollution Prevention Plan
SSIP	Stormwater System Inventory and Prioritization
STEM	Science, Technology, Engineering, and Math
STIC	State Transportation Innovation Councils
STORMDATA	Stormwater Research Monitoring Database
TMDL	Total Maximum Daily Load
TRB	Transportation Research Board
TS4	Transportation Separate Storm Sewer System
UNRBA	Upper Neuse River Basin Association
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WLA	Waste Load Allocation

1.0 Introduction

The Highway Stormwater Program (HSP) was established in 1998 to manage North Carolina Department of Transportation's (NCDOT's) compliance with its statewide Phase I National Pollutant Discharge Elimination System (NPDES) stormwater permit. The Term IV NPDES permit authorized 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.

To implement its Term IV permit, NCDOT has organized the HSP into thirteen (13) main NPDES program areas. These programs will change, as necessary, to address the Term V permit. The HSP also manages NCDOT's implementation of the stormwater requirements in the Jordan and Falls Reservoir watersheds in compliance with state nutrient load reduction rules for state and federal entities. 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 7 of permit Term IV, covering the period of July 1, 2021, through June 30, 2022.

The Department's Term IV 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)
- PY2020: July 1, 2019 – June 30, 2020 (Year 5 of the Term IV permit)
- PY2021: July 1, 2020 – June 30, 2021 (Year 6 of the Term IV permit)
- PY2022: July 1, 2021 – June 30, 2022 (Year 7 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 a 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 training workshops for NCDOT Divisions and during various Division meetings. In PY2022, NCDOT HSP staff provided IDDEP training to NCDOT employees as part of NCDOT's Stormwater Pollution Prevention Plan and Spill Prevention Control and Countermeasure Plan Training Workshops when appropriate. Due to the Coronavirus crisis, NCDOT postponed large in-person training workshops and instead conducted several online training sessions and small in-person training sessions at facilities for staff in several Divisions. NCDOT continues to post Illegal Dumping educational posters and IDDEP brochures at maintenance facilities. NCDOT's IDDEP Field Report and the "Illegal Discharge: Know What to Do" brochures are also available to NCDOT employees. See External Education (EE) for additional details on other stormwater educational material distributions to the 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.

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 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 PY2022, NCDOT identified and investigated eight new potential illicit discharges and illegal dumps across the state, which resulted in four verified and reported to NCDEQ.

Considerations for Permit Year 2023

NCDOT will continue to maintain the established IDDEP procedures in PY2023. NCDOT will continue to provide guidance to Divisions on roadside spills and make improvements on electronic reporting of potential IDDEPs. 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 and 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 PY2022.

Table 1. Outfalls Inventoried Through PY2022

Outfall Type	Total Outfalls in Inventory
Implicit Outfalls	116,737
Industrial Outfalls	669
Field Verified Outfalls	1,974

Maintain NCDOT Environmental Sensitivity Map Layers – In PY2022 HSP staff maintained its Environmental Sensitivity Map data layers, which includes outfall inventory data. NCDOT also continued its work on integrating the functionality of the Environmental Sensitivity Map into ATLAS' Environmental Features Map. ATLAS, which stands for Advancing Transportation through Linkages Automation and Screening, is NCDOT's new tool to streamline project development by integrating GIS tools, applications, and data. Once the new Environmental Features Map is fully functional the Environmental Sensitivity Map will be retired.

Field Inventory Work – NCDOT continued to maintain its field inventory protocol as developed under the previous permit. No new priority areas were identified in PY2022.

Considerations for Permit Year 2023

Significant changes NCDOT's Stormwater System Inventory Program were included in the new Term V NPDES permit. In PY2023, the program will be integrated into the IDDE Program. NCDOT's efforts for mapping its inventory will focus on planning for the anticipated changes and implementation of the Best Management Practices (BMPs) outlined in the TS4SMP.

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 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

One BMP retrofit listed in Table 2 was added during the reporting period from July 1, 2021, to June 30, 2022. Construction of this retrofit was completed in April 2022. This retrofit will be added to the inspection and maintenance phase once vegetation establishment has been accepted.

Table 2. BMP Retrofits Added During the Reporting Period

Identification No.	BMP Type	County	Location
D-5-39-SW-3802	Submerged Gravel Wetland	Granville	I-85/Gate 1 Rd. Interchange

Two BMP retrofits listed in Table 3 are currently under construction during the reporting period from July 1, 2021, to June 30, 2022. Construction began in May 2022.

Table 3. BMP Retrofits Currently in the Construction Phase

Identification No.	BMP Type	County	Location	Number of Retrofits
D02-C016-0021-0022	Constructed Wetlands	Carteret	NC24 & Anita Fonte & Youpon Drive	2

The total number of retrofits NCDOT has been required to implement since the beginning of its Term I permit (effective June 8, 1998) until Year 7 of the Term IV permit is 308. This number of retrofits includes those additional 28 retrofits interpreted by NCDOT to be required during the two-year administrative extension of the Term I permit between April 1, 2003, and April 1, 2005. To date, NCDOT has implemented a total of 309 structural and non-structural retrofits since the beginning of its Term I permit. This total of 309 retrofits includes 24 retrofits built within the Falls Lake Watershed as part of the Falls Lake Rules compliance. Table 4 lists BMP retrofits which were under design during the reporting period. The scheduled design completion date for most of these projects was affected by delays associated with the Coronavirus and associated budgetary challenges.

Table 4. BMP Retrofits Currently in the Design Phase

Identification No.	BMP Type	County	Location	Number of Retrofits
D02-C016-0007-0019; 0022-0023	Bio-Retention Cells	Carteret	Cedar Street	14
D05-C039-0003-0005	Submerged Gravel Wetlands	Granville	I-85 & Gate 1 Road	2
D03-C071-0004	Chambers	Pender	Olde Point Loop Road.	1
D05-C039-0006-0010	Bioswale	Granville	I-85 NB & SB	5

Additionally, HSP staff has identified and evaluated several potential site locations during the permit year for future installation of a BMP retrofit. NCDOT maintains the data on all potential BMP retrofit sites. 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 Control Management System (SCMS) along with other BMPs.

For the Falls Lake Watershed, NCDOT HSP performed a combination desktop and field investigation to identify potential retrofit opportunities within the watershed. This investigation focused on non-structural natured-based practices. Field sites visits were conducted on sites identified during the desktop analysis. These field sites yielded 46 sites for further review/consideration.

In PY2022 NCDOT began testing, tuning, and upgrading its Retrofit Opportunity Site Selection (ROSS) program.

Considerations for Permit Year 2023

In PY2023 NCDOT anticipates completing testing of the applications, finalizing the program documentation, conducting further training, and formally integrating the Retrofit Opportunity Site Selection (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.

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. In PY2022 38 potential retrofit opportunities were identified via the ROSS Program's desktop evaluation protocols. In PY2023 these opportunities will be further evaluated, and a portion will be examined in more detail via the ROSS Program's field evaluation protocols. Retrofit opportunities identified by the ROSS program will be shared with the project partners.

NCDOT intends to evaluate potential field sites identified within the Falls Lake Watershed investigation for moving forward to retrofit development.

NCDOT will continue its partnership 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.

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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. 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. NCDOT is currently working on an update to the Toolbox with anticipated release in late 2022.

Accomplishments

Implementation of the BMP Toolbox is an ongoing process. NCDOT continues to make the Toolbox and related materials, such as the NC-SELDM Catalog and BMP Decision Support Matrix, available to design engineers within NCDOT and for professional engineering firms (PEFs) which provide design services. An update to the BMP Toolbox, including addition of numerous new chapters, is planned for release in late 2022. NCDOT completed a peer states review of low impact development (LID) guidance and practices in

PY2022. The peer review included documents from 13 states plus Washington D.C. Findings from the LID peer review are being used as design considerations and potential practices for inclusion in the NCDOT BMP Toolbox update. The 2014 NCDOT Stormwater BMP Toolbox and BMP Decision Support Matrix are available on the Highway Stormwater Program's website.

Considerations for Permit Year 2023

NCDOT will continue its focus on improvement of Toolbox implementation practices by making the Toolbox and other related tools available to designers, contractors, and inspectors involved in BMP design and construction. NCDOT will continue its efforts in updating the BMP Toolbox with additional chapters on new BMP types. Concurrently, training materials will be produced in association with these new chapters. 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 structural 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 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 Stormwater Control 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 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

Approximately 30 new SCMs were added to the inventory during the reporting period and several SCMs were removed due to site changes resulting from new construction in PY2022. NCDOT continues to add new SCMs as new projects are built or as part of the Retrofits Program.

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 performing inspections. A total of 565 SCMs were inspected in PY2022.

The SCMs that typically require annual inspections include: Bioembankment, Biofiltration Conveyance, Bioretention Basin, Cistern, Dry Detention Basin, Filtration Basin, Floating Wetland Island, Green Roof, Hazardous Spill Basin, Infiltration Basin, Infiltration Chamber, Level Spreader, Living Shoreline, Permeable Pavement, Rain Garden, Sand Filter, Stormwater Wetland, Bioswale, Wet Swale, Infiltration Swale, Grass Swale, Wet Detention Basin, and Wet Vault. Based on the PY2022 LOS assessment, NCDOT continues to maintain an overall rating above a C for its SCMs on both primary and secondary roadways.

Post Hurricane/ Extreme Event Inspections of SCMs

NCDOT continues its efforts to mitigate the devastating effects caused by hurricanes. REU Central and the Division staff continue coordinating closely on addressing additional needs that arise from other large storm events.

I&M Training of Division Staff

NCDOT provides training to Division staff on the I&M program including inspection and maintenance protocols, processes to enter data into SCMS and use of the I&M Manual. Some in-person individual training was performed for Division staff during various SCM inspections or field meetings in PY2022. REU Central maintains documentation for the training performed by HSP staff to Division Roadside Environmental Engineers, Field Operations Engineers, and other applicable staff, who then maintain documentation for any additional training of Division employees that they perform.

Maintaining the I&M Manual

NCDOT continued to maintain its I&M Manual to provide users inspection and maintenance guidance for SCMs. An update of the manual is underway and anticipated to be published in 2023.

Maintaining SCMS Database

NCDOT continued to maintain its SCMS database. NCDOT also continues to locate and upload relevant construction drawings, images, and applicable maintenance agreements for its SCM 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 or when maintenance needs arise. NCDOT continued to make progress this permit year in getting documents scanned and uploaded to SCMS.

SCM Repairs

During this permit year NCDOT has made a strong effort to repair SCMs that had an LOS rating below C. NCDOT made considerable progress on instituting several new processes for non-routine SCM repairs. REU Central and HSP consultant staff assisted Division staff by performing SCM inspections and preparing detailed scopes of work and cost estimate bid packets for SCMs that were not functioning as intended. In PY2022, six such bid packets were approved with 33 SCMs repaired and 10 additional SCMs under active repair or contract. Division Roadside Environmental staff coordinated with contractors and other Division staff performing the non-routine SCM repairs.

Considerations for Permit Year 2023

In PY2023, NCDOT plans to continue preparing SCM repair scopes of work and bid packets for SCMs that are not functioning as required and coordinating with Division staff on completing SCM repairs. As repairs are completed NCDOT will upload redline documentation (marked-up drawings representing as-built conditions) to SCMS to assist future inspection and maintenance efforts. NCDOT will continue to evaluate the I&M Program processes to improve overall program efficiencies. Additionally, NCDOT will continue to inspect and maintain SCMs, train appropriate staff on SCM I&M techniques, and upload construction plans and documents to SCMS as they become available. HSP staff will also continue to assist Division staff with SCM maintenance and repairs.

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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 BMPs to protect water quality, reduce pollutant loading, and minimize post-construction impacts to water quality. 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. NCDOT's PCSP guidance document was first approved by NCDEQ in 2014. The Post-construction Stormwater Controls for Roadway and Non-Roadway Projects was updated and approved by NCDEQ in May 2022.

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. Historically, stormwater management decisions have occurred in the latter part of project development, which can result in project delays and increased costs. Through NCDOT's recent Integrated Project Delivery (IPD) initiative, the HSP has been able to move some of the stormwater management decisions steps up in the process, which has been documented in the Project Delivery Network (PDN) version 2.0 released in June 2021. The HSP continues to solidify these processes in the PCSP through an update of the PCSP guidance document released in May 2022. The updated guidance document incorporates an updated summary of regulations applicable to NCDOT projects, integrates the PDN process, and refers engineers to the BMP Decision Support Matrix released in PY2021.

Additionally, the PCSP guidance document directs engineers in the use of the Preliminary Stormwater Management Plan (pSMP) and the Stormwater Management Plan (SMP). The SMP, originally introduced in PY2018, was updated in PY2022 (December 2021) to include the pSMP which is developed during the preliminary hydraulic recommendation phase and specifically identifies characteristics of waterbodies that will be crossed during the project. The pSMP establishes the stormwater treatment goals, which helps inform subsequent drainage design decisions and establish reasonable expectations for design engineers and regulatory approvers. At the end of the design phase, the SMP is then used to summarize project stormwater management information including post-construction stormwater BMPs selected to mitigate stormwater impacts. The SMP also includes an automated stormwater control summary table for inclusion in construction plans. This will help aid in the transition of stormwater controls from design through construction and into the inspection and maintenance phase of its life cycle.

SELDM Modeling – 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 has continued to work with the US Geological Survey (USGS) to use the Stochastic Empirical Loading and Dilution model (SELDM) for this purpose. Under the NCDOT/USGS joint agreement initiated in PY2019, the USGS has worked to complete a three-year project of running approximately 75,000 project scenarios to determine risk to water quality. The results have been used to develop a catalog of project scenarios with BMP implementation recommendations in planning stages to provide better guidance and direction, as well as providing consistency across a more regionalized NCDOT. The NC-SELDM Catalog and associated training materials were released in PY2022 (December 2021). The NC-SELDM Catalog will be a major component in supporting stormwater management decisions early in the project development phase and was documented in the May 2022 PCSP guidance document update.

NCDOT has been working to improve project delivery through an initiative called Integrated Project Delivery. This process is a multi-disciplinary effort to examine and improve processes to deliver projects in a more efficient and timely manner. The Hydraulics Unit and the HSP worked with the IPD team to move stormwater management decisions earlier in the project development process. Improved stormwater management planning will establish expectations for achieving environmental goals earlier in the process and provide consistency for designers and regulatory agencies alike. Additional benefits include reducing the likelihood of project delays due to permitting conflicts in the latter phases of project development. These processes have been documented in the PDN Version 2.0 released in June 2021.

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

Considerations for Permit Year 2023

The planned focus for PY2023 will be on continuing 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 worked with the IPD effort to improve efficiency and streamline project delivery and documented those processes in the PDN version 2.0. NCDOT will continue to review, revise, and develop guidance to accompany the PDN. It is envisioned that key deliverables from these processes will be tracked through the ATLAS Workbench project deliverables management system.

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 – NCDOT conducted three virtual statewide Roadside Pesticide Training Sessions: January 25th, February 15th, and March 15th for Division staff. Throughout the year, staff attended various other training that offered pesticide recertification credits. These training included various NC Cooperative Extension sponsored pesticide trainings held regionally, the 2022 Southern Farm Show held at the NC State Fairgrounds (February 2-4), NCVMA Field Day (May 19, 2022), NC State University Turfgrass Field Day (August 11, 2021), a one-day Roadside Unit Training (December 7th), and the NC Vegetation Management Association Annual Conference (Dec. 8 – 9, 2021).These sessions, approved by NCDA&CS, provided pesticide recertification training for NCDOT's 238 employees with active pesticide licenses., including discussions of pesticide recertification requirements, applications, methods, aquatic subcategory, pesticide handling, and compliance of NPDES pesticide storage facilities.

NCDOT staff continue to play an active role in the distribution of research information and professional development within the vegetation management industry by participating as Directors and Advisors to the North Carolina Vegetation Management Association (NCVMA). On December 8-9, 2021, approximately 120 NCDOT staff participated in a NCVMA Annual Conference which focused on the latest vegetation management techniques relating to managing NC roadsides. Additionally, 70 staff attended the Turfgrass Field Day at Lake Wheeler Lab in Raleigh on August 11, 2021, which included integrated pest management, cultural practices, irrigation technologies, aquatic weed management, and weed control and vegetation practice demonstrations.

Also, NCDOT's certified pesticide applicators continue to obtain their pesticide recertification credits throughout the year. NCDOT REU annually requests from NCDA&CS the list of NCDOT employees with active pesticide licenses each year to verify employee licenses. Through the statewide training in March 2021, REU was able to verify that those NCDOT employees managing pesticide applications possess a valid NCDA&CS Pesticide License. NCDOT REU staff utilize Survey 123 to perform semi-annual inspections of NCDOT's pesticide facilities.

Vegetation Management Program Implementation – The REU vegetation management programs have been largely reinstituted from cutbacks due to Covid and the budgetary crisis. NCDOT staff and contractors began regular litter pickups to occur with standard statewide mowing cycles. NCDOT REU staff resumed quarterly inspections of roadways using the Survey 1-2-3 platform to document and assess vegetation management performance statewide.

NCDOT's Wildflower Program has been focused on maintaining perennial and NC native beds and some new annual plantings were implemented. NCDOT REU staff continued to provide training and support for Division staff regarding for species selection and management techniques.

Considerations for Permit Year 2023

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 recertification credits to NCDOT Roadside Environmental staff. A REU breakout training session is scheduled for December 7, 2022, just prior to the NCVMA Annual Conference to be held on December 8-9, 2022.

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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 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 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 2019 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 following the applicable regulations.

Accomplishments

Continued Implementation of the Program – NCDOT continues to operate under its delegated authority granted by the NC Sedimentation Control Committee for PY2022. 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. Table 5 below summarized the number of individuals completing each course.

Table 5. ESC/Stormwater Certification Program Through PY2022

Outfall Type	Number of Individuals Completing, Inception to Date	Number of individuals with active certificates
Level I certified ESC stormwater inspectors/ installers	8,482	963
Level II certified ESC stormwater site managers	11,526	4,315
Level III certified ESC designers	1,469	637

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 and completes an ESC/Stormwater Inspection Report. These weekly inspections by project inspectors 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 in PY2022 – The following inspections were performed by REU during PY2022 (July 1, 2021, to June 30, 2022) for each category of land disturbing activity:

- Contract Construction Projects: 3,164
- Maintenance Projects: 202
- Vertical Construction Projects: 7
- Bridge Maintenance Projects: 408
- Resurfacing Projects: 109

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 2023

NCDOT anticipates continuing to implement its full Construction Program in compliance with the NPDES permit to control potential impacts to water quality from land disturbance at construction projects, borrow pits, and waste piles. NCDOT 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 training materials. NCDOT will continue its Construction Program in compliance the permit requirements under the Department's recently reissued NPDES permit.

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 an SPPP for each covered industrial activity and related facility.	NCDOT shall maintain and implement a site-specific 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 an 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/summer and once in the fall/winter.

Accomplishments

During PY2022, 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 NCDOT 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, the Global TransPark, 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 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, drainage modifications, or other changes in industrial operations or staffing. There were no new facilities added or existing facilities removed during this permit year.

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 28 internal reviews performed during this permit year. Internal reviews typically include an evaluation of the facility's SPPP/SPCC Plan, review of documentation of completed tasks, an interview with the SPPP Team Leader and various Team Members and discussions of site-specific changes or needs for the facility, and an in-depth site inspection of the facility. 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. Baseline BMPs such as good housekeeping, preventative maintenance, and spill prevention practices are reviewed with attendees. Other topics, such as qualitative monitoring, BMP implementation, and lessons learned are also covered during training.

NCDOT HSP staff continues to provide Level II Advanced SPPP/SPCC Training to SPPP Team Leaders for NCDOT industrial facilities 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, and IDDEP procedures. The Level I and II training approach adopted by NCDOT HSP has been effective for many years by providing more targeted training where it is needed most.

Considerations for Permit Year 2023

In addition to integrating the new permit requirements into its program, NCDOT will continue to maintain and implement site-specific SPPPs at its industrial facilities in PY2023. NCDOT staff will also continue to assist Division personnel by providing both in-person training sessions (as well as virtual trainings, providing guidance on SPPP BMPs at industrial facilities, performing site reviews at selected facilities, and supporting Division staff with other aspects of the Industrial Activities Program as needs arise. NCDOT will continue to evaluate the program to identify new opportunities for improvement and to help the HSP target certain areas that may need additional assistance. NCDOT also anticipates continuing work on updating its training materials, which includes online training.

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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

In PY2022, NCDOT inaugurated its Communicating Lessons, Exchange Advice, Record (CLEAR) Program, an internally developed knowledge management program to promote cross-unit communication, sharing of best practices, and organizational enhancements through an easy-to-use technical platform. To develop CLEAR, NCDOT sponsored a research project by the U.S. Department of Transportation's John A. Volpe National Transportation Systems Center (Volpe Center) to interview seven other state departments of transportation to assess the current state of the practice for implementing innovation and knowledge management (KM) programs. The CLEAR program won the American Association of State Highway and Transportation Officials' (AASHTO's) State Transportation Innovation Councils (STIC) Excellence Award in 2021. CLEAR's first presentation was the Bridge Stormwater Runoff Management and Design training described in Table 6 below.

In calendar year 2021 NCDOT initiated a new Post Construction Assessments program. The objective of the program is to bring together the design team, NCDOT personnel, and contractors to review lessons learned and best practices related to the construction of a select group of projects. A wide variety of issues are discussed including drainage and BMP implementation challenges. These lessons are shared across various NCDOT Divisions and Units to improve knowledge transfer. During calendar years 2021 & 2022 to date, 14 projects have had post constructions assessments performed.

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. The table below summarizes the types of training received by NCDOT staff and provided by NCDOT and other entities.

The Coronavirus altered the Department's training initiatives in PY2020 onward. Seeing the value in the ability to reach larger audiences, NCDOT has adopted a blended approach of both in-person classes as well as online trainings for professional development and to disseminate HSP training to Division staff and contractors. This blended approach has allowed NCDOT staff and contractors to engage and disseminate awareness training to broader audiences and more intensive trainings to focused staff involved in stormwater operations.

Table 6. Summary of Internal Education Training Activities

Training	Description	Training Provider
NC-SELDM Catalog Training	Upon release of the NC-SELDM Catalog (see discussion in Section 7) in January 2022, NCDOT and USGS developed four training videos on the use of the model. These trainings are available through the NC Learning Center.	NCDOT Hydraulics Unit staff and Non-NCDOT Professionals
Bridge Stormwater Runoff Management and Design	On February 9, 2022, NCDOT provided a web-based lunch and learn training which summarized the Department's research into stormwater runoff, applicable regulations, and summarized applicable guidance documents. The presentation also discussed use of the NC-SELDM Catalog, pSMP, SMP, and BMP Decision Support Matrix when selecting stormwater BMPs for bridge deck runoff.	NCDOT Hydraulics Unit staff and Non-NCDOT Professionals
Hydraulic Guidelines Updates	On April 26th, 2022, NCDOT delivered a web-based lunch and learn training summarizing updates to the Guidelines for Drainage Studies and Hydraulic Design manual. The presentation included an overview of the Stormwater Management chapter.	NCDOT Hydraulics Unit staff and Non-NCDOT Professionals
River Course 101: Stream Morphology Assessment	NCDOT Hydraulics Unit staff attended the 3-day workshop River Course 101: Stream Morphology Assessment on May 10 – 12, 2022.	NCSU – Barbara Doll, Gregory Jennings, and Jack Kurki-Fox

Table 6. Summary of Internal Education Training Activities, continued

Training	Description	Training Provider
Federal Highway Administration's (FHWA) Stormwater Community of Practice Summit, April 2022	For several years, NCDOT has participated in FHWA's Stormwater Community of Practice, a collaboration of DOTs to share lessons learned. This year's summit was hosted by NCDOT in Raleigh, NC. NCDOT presented on the process of developing and implementing its SCM Inspection and Maintenance Program. Other topics discussed and their presenters included: USGS – the SELDM program; New Hampshire DOT – Winter BMPs; USEPA – Stormwater Resources; and CalTrans – TMDLs.	DOTs including NCDOT's Hydraulic Unit staff
SPPP-SPCC Plan Implementation Training/Division Staff	Conducted 8 training sessions which included online and in-person training in PY2022 to assist with implementing SPPP/SPCC Plans at NCDOT facilities. Training typically included plan reviews, facility inspection procedures, changes to facilities, SPPP Site Plan updates, illicit discharge detection and elimination, and BMP implementation such as good housekeeping, spill prevention, and exposure minimization.	NCDOT REU
NCVMA Annual Conference	North Carolina Vegetation Management Association (NCVMA) Annual Conference on December 8-9, 2021, which focused on latest vegetation management techniques, including pertaining to managing today's roadsides in North Carolina. Approximately 70 DOT staff attended in-person.	Non-NCDOT Professionals
American Council of Engineering Companies/NC NCDOT Joint Transportation Conference	NCDOT REU Field Operations staff attended conference; participated in multiple presentations.	Non-NCDOT Professionals

Table 6. Summary of Internal Education Training Activities, continued

Training	Description	Training Provider
I&M Program SCMS Training	NCDOT REU staff provided I&M training to Division 7, 8 Roadside Environmental staff, including SCMS training, inspection training, and assessing SCM maintenance needs and repairs.	NCDOT REU
NCSU Level III Certification Workshop	NCDOT REU personnel attended the Level III Certification Workshop held by NCSU on June 8, 2021, and December 1, 2021.	NCSU
NCSU Level II Certification Workshop	NCDOT REU personnel attended the Level II Certification Workshop, self-paced and online which was completed February 8, 2022.	NCSU
NCSU Stormwater SCM Inspection & Maintenance Certification	NCDOT REU personnel attended the Stormwater SCM Inspection & Maintenance Certification workshop held by NCSU on January 27 & 28, 2022.	NCSU
NCSU Stormwater SCM Inspection & Maintenance Re-Certification	NCDOT HSP personnel attend the Stormwater SCM Inspection & Maintenance Re-Certification workshop held by NCSU on November 16, 2021.	NCSU
The Action Plan for Nature-Based Stormwater Strategies	Hydraulics Unit staff and representatives from the NC Coastal Federation and McAdams delivered a webinar on 8/20/2021 sponsored by PENC on the Action Plan for Nature Based Stormwater Strategies, which outlines strategies for implementing nature-based stormwater strategies for Roadways, other New Development, Existing Development, and Working Lands. 77 persons attended the webinar.	NCDOT, McAdams, NC Coastal Federation

Table 6. Summary of Internal Education Training Activities, continued

Training	Description	Training Provider
Coastalreview.org Article: State DOT's stormwater design manual set for major update	HSP staff worked with a journalist with the Coastal Review to prepare an article on how NCDOT manages stormwater within its right-of-way and future plans to improve stormwater treatment technologies. The article was published and is available online.	NC Coastal Federation
Unmanned Aircraft Systems field demo training	NCDOT Hydraulics Unit staff attended this field demonstration. Staff observed and practiced using various drones which could be used for Hydraulics Unit work, stormwater inspection activities.	NCDOT Division of Aviation
NC Coastal Federation (NCCF): NC Coastal Microplastics Forum	Presentations held on 7/15/2021 of how plastics are entering our environment and food chain, what others are doing, and what we can do to help.	NCCF - multiple presenters; Ana Zivanovic-Nenadovic (NCCF), Dr. Richard Venditti (NCSU), Dr. Marielis Zambrano (NCSU), Emily Sutton (Haw Riverkeeper), Dr. Susanne Brander (Oregon State Univ.), Dr. Scott Coffin (California State water Resources Control Board), Sarah Morath (WFU), Sarah Latshaw (NOAA), Julie Patton Lawson (Wash. DC Mayor's office), Todd Miller (NCCF)
Transportation Research Board (TRB) Standing Committed on Hydrology, Hydraulics, and Stormwater (AKD50) Presentations	Various presentations: Plastics-Neuse River Study; NC State Stormwater Research on Submerged Gravel Wetlands; AKR20 & AKD50 Collaboration - Tools and Technology for Roadside Landscape Asset Management; 6-PPDQ and Toxic Roadway Runoff	Barbara Doll (NCSU), Bill Hunt (NCSU), Ray Willard (Wisconsin DOT), Dr. Ed Jolodziej and Dr. Jen McIntyre (U of Washington)

Table 6. Summary of Internal Education Training Activities, continued

Training	Description	Training Provider
Roadsides as Transportation Assets - Georgia Case Study	Webinar described a unique 18-mile section of highway in Georgia called The Ray. The Ray serves as a research facility to test new technologies such as nature-based stormwater solutions, solar pavement, automatic tire tread and pressure sensor technology, and other carbon zero innovations.	TRB - Matthew Quirey
Promoting Livings Shorelines for Erosion Control - A Workshop for Real Estate Professionals	Presented different types of living shorelines, benefits and limitations of use, design methods, and permitting. Also presented case study examples.	Whitney Jenkins (DCM), Tracy Skrabal (NCCF), Spencer Rogers (NC Sea Grant), Tara MacPherson (DCM), Dru Harrison (New Hanover County Soil & Water Conservation District), Rachel Bisesi (NCCF)
North Carolina chapter of the American Public Works Association (NCAPWA) Stormwater Conference	Multiple presentations attended (see agenda) and presentation (9/27/2021) on updates to the Highway Stormwater Program.	Varies; Andy McDaniel
PCSP update brainstorming meeting	Presentation of the PCSP and related tools and resources. Followed by an open discussion of updating the PCSP, needs, concerns, etc.	NCDOT-Hydraulics Andy McDaniel, Brian Lipscomb
PENC Lunch-N-Learn Webinar: New Tools & Guidance Under Development at NCDOT's Hydraulics Unit	NCDOT is engaged in a department wide initiative to improve the delivery of transportation projects. As a result of this initiative the Hydraulics Unit is updating many of its processes and guidance documents, including the stormwater design manual.	PENC Lunch-N-Learn webinar
AECOM Webinar: Global Perspectives and Industry Trends on Nature-Based Solutions	Presentation on numerous nature-based solutions for a variety of water quality and quantity needs.	Barry Harding, CPG
NCWRA webinar: Evaluation of Natural Infrastructure for Flood Mitigation	Discussion of various NBS for water quantity control. Large focus on water farming.	Dr. Barbara Doll (NCSU)

Table 6. Summary of Internal Education Training Activities, continued

Training	Description	Training Provider
SCM Field Tour	Site visitation of multiple SCMs with explanation of SCM, parts of each SCM, what it is used for. Discussion of if SCM is working correctly, why/why not, what could be done to fix it and answer any questions.	Steve Sykes
SWS – IECA – Exploring Sediment Control During Inclement Weather Events	Discussion of various EC devices that work well in certain climates/storm events (heavy rain, snow, drought, etc.) and how maintenance needs may change due to weather.	Storm Water Solutions (SWS)
Miscellaneous webinar training/NCDOT staff and contractors	NCDOT staff and contractors reviewed numerous stormwater related webinars or training opportunities including, but not limited to, the following examples: NCDEQ WOW Webinars (multiple 1-hour webinars occurring on a monthly basis); StormwaterONE webinar on "Prepping Construction Stormwater Controls for Winter Weather"; USEPA webinar on "Putting the Brakes on Water Pollution:	Non-NCDOT Professionals (varies)
Miscellaneous webinar training/NCDOT staff and contractors, continued	A story of industry and government collaboration for copper-free brakes"; Invisible Structures webinar on "Erosion and Sediment: A Dirty Mess or Opportunity for Thoughtful Management"; Profile Products virtual presentation on "Topic: The 5 Fundamentals of Sustainable Vegetation" continued	Non-NCDOT Professionals (varies)

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, and Construction Programs.

Considerations for Permit Year 2023

In PY2023, NCDOT will continue providing training on the components of the Highway Stormwater Program and the Department's NPDES permit. NCDOT is continuing to explore the development of additional training materials for various HSP program areas, including SPPP, I&M, ESC, and PCSP. NCDOT anticipates continuing to develop more online training content in PY2023, e.g. webinars, Lunch n' Learns, and collaboration with the CLEAR program, with the intent to disseminate even more online training to NCDOT staff and contractors in the next few years.

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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 continued to engage with various education partners/ organizations to promote stormwater pollution prevention awareness education for school aged children. Activities performed in PY2022 which targeted youth education include:

- NCDOT REU & HSP staff worked with HCBU/MIHE staff to conduct an educational workshop session for the WakeEd Summer Science, Technology, Engineering, and Math (STEM) Session teachers on July 15, 2021. NCDOT presented on how the Department manages stormwater runoff from its existing roadway and non-roadway facilities and ongoing construction projects, how NCDOT employs various stormwater pollution prevention practices for its projects, and described what young citizens can do to protect NC waters. The sessions also provided an overview of how NCDOT has worked with Wake County schools' stormwater-related curriculum over the years by leading tours of the schools' stormwater drainage systems and presenting on the importance of stormwater quality. NCDOT also highlighted site-specific pollution concerns and storm drainage mapping for attendees' schools. 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.

- Supplied Stormwater worksheets, Stormwater Flash Facts, Litter Law fliers, Swat-A-Litterbug Cards, car litterbags with a stormwater litter prevention message and "Do Not litter" bumper stickers through packaged requested by teachers.

Website Maintained – NCDOT maintains relevant HSP information for the public on several website pages. General Stormwater Management and Illicit Discharge Detection and Elimination Program information, Anti-Litter information, and sample Stormwater Lesson Plans for teachers and a *Litter Activity Book* are all found on NCDOT.gov pages.

More detailed HSP information and content geared for NCDOT business partners is maintained on its *Connect NCDOT* website. Separate pages were created for key products of the program. Products include many documents such as the BMP Toolbox and the Erosion and Sediment Control Design and Construction Manual.

NCDOT's website stormwater related content provides information intended to educate public users about the HSP's various program areas. Links to related websites are also provided. NCDOT periodically updates the content on these websites with new information.

Social Media Posts – NCDOT REU and Litter Management staff worked with the Office of Communications to create posts to go on NCDOT's official social media accounts on Facebook, Twitter, and Instagram, press releases, and new creative public service announcement videos and radio broadcasts in PY2022. NCDOT developed the outreach materials by teaming with Country Music Star

Luke Combs and various NC Athletic Organization coaches and mascots for anti-litter messages. Posts were created to highlight the Adopt-A-Highway (AAH) program and the HSP. There were 45 AAH posts and 29 Highway Stormwater Program posts in PY2022 across all three platforms. The AAH posts have been highlighting different AAH groups across the state that are actively picking up litter along NCDOT's roadways. Years of service and amount of litter picked up were advertised in the posts. The Stormwater posts have been following a campaign titled "Have You Seen This?" This campaign highlighted different Stormwater and Erosion and Sediment Control devices that are frequently placed along NCDOT roadways. These posts were used to educate the public on various pollution prevention measures employed by NCDOT to protect NC's surface waters.

Table 7 below shows the average number of Impressions (how many feeds these posts appeared on), and how many Engagements (likes, comments, shares) there were for the posts within PY2022 for both Stormwater and Litter Management social media posts.

Table 7. NCDOT Stormwater and Litter Management Social Media Posts

Program Area	Topic Content	Average Impression per Post	Total Engagements
Adopt-A-Highway	Recognizing AAH volunteer groups, Litter Sweep, and AAH interactions	3,725	5,254
Stormwater	Drone technology, Stormwater runoff, Filtration Basins, Pet Waste, BFC, Little Alamance, Stormwater Wetlands, Drop Inlets, Silt fences, WDBs	4,070	4,100
	TOTALS:	**3,898**	**9,354**

Litter Management – NCDOT's Litter Management continues to build on its successful on-going activities. Through various on-going anti-litter programs, NCDOT distributed the following stormwater-related items:

- 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.

- In 2021, NCDOT litter removal expenditures and work rebounded from the previous year's Coronavirus pandemic and associated budgetary constraints. NCDOT crews, contractors and volunteers collected 13,103,445 pounds of litter from roadways, compared to 3,391,710 pounds collected in 2020.

- 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.

- NCDOT continues to maintain its Swat-A-Litterbug phone application, first released in February 2021. The app allows the public to report litterers from their mobile phones. NCDOT also continues to issue Swat-A-Litterbug letters to offenders who were spotted littering by the public. Table 8 below summarized the mailings over the past few years.

Table 8. Summary of Swat-A-Litterbug Letters Mailed through Public Involvement Notifications

Year	Number of Swat-A-Litterbug Letters Mailed
2021	Approximately 5,000
2020	3,243
2019	8,085
2018	8,610
2017	10,660
2016	9,250
2015	8,416
2014	7,800

Adopt-A-Highway (AAH) – This statewide program is a mutually beneficial partnership between the department and community volunteers. The volunteers participating in the AAH program include businesses, individuals, schools, civic organizations, and professional, religious, and social groups. Participants agree to support local roadside litter removal by adopting a two-mile stretch of roadway and volunteering their time to pick up the litter at least four times a year. In calendar year 2021, the AAH Program cost $619,241. Program costs include administration, sign installation, bag removal, and provision of safety vests, bags, and gloves. There were 10,655 man-hours charged to this program in 2021. At the close of 2021, there were 9,394 road miles adopted by 4,845 AAH groups. The volunteer cleanup efforts of the AAH program saved the state's taxpayers millions of dollars. Volunteers reported working 87,823 hours and picked up 951,555 pounds of litter.

Sponsor-A-Highway (SAH) Program - NCDOT’s Sponsor-A-Highway (SAH) Program was initiated in 2011 as a public-private partnership. The SAH Program provides a means for businesses, individuals, and other organizations to participate in beautifying and environmentally enhancing North Carolina roadways, while having the advantage of advertising their company name at the same time, by hiring third party service providers to collect roadside litter. At the close of 2021, SAH service providers maintained 675 sponsored one-mile segments, which was an increase from the 608 segments maintained in 2020. Some sponsors have multiple segments. Each segment is cleaned monthly. SAH service providers recovered 836,760 pounds of litter from NC roadways in 2021.

Litter Reduction Partnerships – NCDOT partners with several organizations to promote litter reduction. In 2009, NCDOT began to educate drivers of small pickup trucks and trailers of the danger associated with litter being blown from uncovered or unsecured vehicles. Keep NC Beautiful partnered with NCDOT and now manages the program with funding from third party donors. NCDOT continues to support the program through bulk pricing of tarps for distribution to the public.

Litter Management and HSP Outreach Materials – In PY2022 NCDOT provided many types of outreach materials to engage children and the public about the Highway Stormwater Program, Swat-A-Litterbug, and several of the other litter programs. Materials were distributed through various local events and mailings, from NCDOT Welcome Centers or Division offices, and from NCDOT's website by teachers requesting packets for their classrooms.

NCDOT developed anti-litter characters Ava and Oliver, encourage actions to create a healthy, clean environment. Linnie, the Litter Bug, is not such a good role model. These characters are displayed on bookmarks, stickers, and activity/color sheets. NCDOT's Litter Management programs also distributed thousands of car litter bags and other litter prevention handouts, fliers and brochures through Visitor and Welcome Centers, Earth Day events, and upon request, to numerous groups. The car litter bag's graphics promote the message that littering is illegal.

Press Releases – NCDOT also for the first time began publishing press releases for every million pounds of litter collected, which has further spread awareness on how much work NCDOT puts forth to remove litter from our roadways.

Considerations for Permit Year 2023

The EE Program plans to continue fostering relationships with education partners such as the HCBUs/MIHE staff to leverage their expertise and resources. Stormwater and litter related social media posts will continue to be posted on NCDOT's various social media platforms. NCDOT will also continue press releases, PSAs, and other initiatives to spread anti-litter messages. The EE program will continue to evaluate options for extending the educational opportunities throughout the state including evaluating expanded use of Public Involvement Tools during planning.

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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 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. 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.

Note: Many NCDOT research projects that were scheduled to begin in 2021 were delayed due to the Coronavirus pandemic. Most ongoing research projects experienced delays in PY2022 due to Coronavirus-related university policies to protect the health of students, staff, and faculty.

Table 9. Research Projects Active in PY2022

Research Project Number and Name	Project Objective
NCDOT 2019-01 Enhancing Integrated Roadside Vegetation Management Along North Carolina Roadsides through Characterizing Herbicide Fate	This project targets vegetation management along NC roadsides encompassing comprehensive management programs. Synthetic pesticides are an integral component of roadside vegetation management but must be utilized without adversely affecting adjacent plants or vegetation including agricultural crops as well as environmental and human health. The research includes an assessment of existing practices as well as evaluation of new instrumentation and technology. Specifically, the research will assess current vegetation management programs and practices and their effect on air and water quality, identify BMPs to minimize potential off-target movement, and devise training material for NCDOT field personnel to understand how to prevent and identify off-target movement.
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. This project was granted an extension due to Coronavirus pandemic; anticipated conclusion of project is October 2022.

Table 9. Research Projects Active in PY2022

Research Project Number and Name	Project Objective
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 a Sediment and Erosion Control Research and Education Facility (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. This project was granted an extension due to Coronavirus pandemic; anticipated conclusion of project PY2023.
NCDOT 2020-61 Updates and Maintenance of the Precipitation Alert and Visualization Tool in Support of NCDOT Stormwater Quality Monitoring	This project implemented enhancements to the Multi-sensor Precipitation Estimates tool, including incorporating precipitation frequency estimates from the National Oceanic and Atmospheric Administration 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 2021-02 Evaluating Maintenance Requirements and Water Quality Benefits of Alternative Vegetated and Non-Vegetated Linings in Roadside Swales	The objective of this project is to evaluate water quality performance of alternatively lined swales. Swales are usually constructed with turf grass and other low-lying grasses. However, there are many circumstances when grass-lined swales are impractical. This project will look at water quality performance for rock lined swales, and swales lined with native deep-rooted grasses. Additionally, this research will seek to assign a manning's roughness coefficient by deep-rooted grasses to flow. Data from previously conducted experiments will serve as a basis to compare the performance of alternative swale linings.

Table 9. Research Projects Active in PY2022

Research Project Number and Name	Project Objective
NCDOT 2021-04 Evaluating Biochar as a Multi-Beneficial and Cost-Effective Soil Amendment Option for Maximal Stormwater Infiltration	The overall goal of this research is to evaluate the cost-effective use of biochar for maximal stormwater infiltration and runoff quality in amended soils and assess its ability to provide social and ecological co-benefits resulting from healthy landscapes. The effectiveness of a suite of biochars will be assessed over a range of application rates and clay soils native to North Carolina.
NCDOT 2022-03 Optimizing Pesticide Applications Along NC Roadsides	NCDOT's Integrated Roadside Vegetation Management Program includes the use of herbicides to ensure safe travel routes for motorists and preserve road system infrastructure. Various climatic and edaphic conditions have the potential to cause off-target herbicide movement during or following an application along roadsides. This research will evaluate pesticide application practices, air sampling techniques, and visual crop injury and yield reduction to determine the impact of herbicide application and potential movement along roadsides.
NCDOT 2022-04 Low-Cost Visual Sensing of Stormwater Outlet Flow	This project aims to implement and validate a long-term, low-cost, and accurate computer vision-based technology to monitor pipe outlet flow in the field. Researchers will create a topology of cases in the field of pipe outlet flow (flush and perched), from which a computer vision method for measuring pipe outlet flow will be developed and validated. Researchers will then perform field validation of a computer vision method for measuring outlet flow pipe structure and evaluate the effects of outlet pipe type and pipe material on flow measurement algorithm performance. This project will also generate a set of recommendations and best practices for installing camera systems for monitoring stormwater outlet infrastructure, including camera hardware specifications, camera installation considerations, and data management practices.

Recently Completed Studies

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

- NCDOT 2017-27 *Storm Water Infiltration and Pollinator Habitat Zones Along Highways*. This project explored the possibilities of managing soils on new and existing roadside areas to reduce runoff through increased infiltration. This was pursued through several greenhouse studies, controlled field plots at three sites monitored for three years, and several installations on existing roadside areas. Tillage was very beneficial for improving infiltration in compacted soil, often by a factor of 3X or more. Incorporating compost at the rate tested, 5cm incorporated into 15cm of soil, often had additional benefits but not always. Improved vegetation establishment and resistance to compaction may result from the compost treatment. Traffic from tractor mowers can reduce or eliminate the infiltration benefits,

however. Wildflowers as a substitute for grass can provide greater infiltration potential, in part because mowing traffic is reduced from four times per year to once. Two perennials (Lanceleaf coreopsis and blanketflower) were found to be resilient in both field plots and under different soil conditions in the greenhouse tests, and would be highly recommended based on their ability to grow and develop robust root systems.

- NCDOT 2018-02 *Selection, Installation and Evaluation of Zoysiagrass.* This project evaluated select breeding lines from the NCSU's turfgrass breeding program and commercially available zoysiagrass cultivars to determine the most economical establishment method for roadside conditions. Overall, results from this research suggest that zoysiagrass can be established on NC roadsides with minimal inputs but additional research is needed to refine the methods to increase sprigging success. The final report was issued to NCDOT in January 2021.

Considerations for Permit Year 2023

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 NCDOT 2023-13, *Management of Mud and DGS During Highway Construction and Maintenance.* This project will evaluate emerging technologies to prevent vehicular trackout of soil at construction sites and management techniques for diamond grinding slurry to reduce risk of the concrete materials coming into contact with stormwater in construction sites.

- Project NCDOT 2023-15, Predicting Resilience and Reducing Failure of SCMs to Extreme Storm Events. This project will attempt to gain an understanding of what peak flow mitigation/flood control NCDOT SCMs currently provide, and evaluate various design improvements to provide further mitigation.

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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 of concern 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 PY2022 accomplishments included continued collaboration with NCDWR's Modeling and Assessment Branch, support for modeling studies addressing impairments in the Turkey Creek and Virginia Creek watersheds, developing partnerships in the Walnut Creek watershed, and involvement in nutrient and watershed modeling studies throughout the state.

NC TMDLs Approved in 2022 – NCDWR developed TMDLs to address fecal coliform bacteria impairment in Virginia Creek (Waterbody IDs: 18-87-9-1; 18-87-9a; 18-87-9b). The Virginia Creek watershed is located in the White Oak River basin near the North Carolina coast in Pender County and is approximately 10.4 square miles in size. Virginia Creek is located within the shellfish area designated B-8 by the North Carolina Division of Marine Fisheries. Prior to TMDL model development, NCDOT developed GIS-based estimates of NCDOT imperviousness and right-of-way in the watershed. This information was used by NCDWR to assign a portion of the TMDL to NCDOT. The TMDLs assign WLAs to NCDOT (NCDOT is the only NPDES-permitted discharge in the watershed) but do not identify NCDOT as a significant contributor to impairment. As described by the TMDL, NCDOT will continue to implement measures required by the permit, including IDDE, post-construction controls, management of hydraulic encroachments, sediment and erosion control, BMP retrofits, stormwater pollution prevention for industrial facilities, research, and education programs.

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. As was done in the previous permit year, in PY2022 this communication involved continued coordination meetings to cover ongoing DWR initiatives related to

addressing impairments through a TMDL or TMDL alternative. This collaboration advances the Department's initiatives for complying with TMDLs and supporting TMDL alternatives that address water quality impairments throughout the state.

Turkey Creek TMDL Alternative Modeling Support – Turkey Creek (White Oak River Basin) is located along the North Carolina coast near the town of Holly Ridge in Onslow County. Portions of Turkey Creek are currently rated as prohibited or conditionally approved closed shellfish growing areas according to North Carolina Division of Marine Fisheries. In May 2021, NCDWR notified NCDOT of a partnership with the NC Coastal Federation to address sources of impairment through a TMDL alternative approach. The approach is anticipated to include source assessments and watershed modeling. In an effort to support the NCDWR, NCDOT developed GIS datasets of state-maintained right-of-way and impervious areas in the watershed. These GIS datasets were provided to NCDWR in August 2021 along with a memorandum summarizing the procedures used to develop the information.

Virginia Creek TMDL Modeling Support – Virginia Creek (White Oak River Basin) is located along the North Carolina coast near the town of Holly Ridge in Pender County. Portions of Virginia Creek are currently rated as prohibited or conditionally approved closed shellfish growing areas according to North Carolina Division of Marine Fisheries. In June 2021, NCDWR notified NCDOT of upcoming water quality modeling and potential TMDL development in the Virginia Creek watershed. Virginia Creek is included on North Carolina's 303(d) Impaired Waters List due to monitoring performed by the Division of Marine Fisheries to determine areas suitable for shellfish harvesting. In an effort to support the NCDWR, NCDOT developed GIS datasets of state-maintained right-of-way and impervious areas. These GIS datasets, along with a memorandum summarizing the procedures used to develop the information, were provided to NCDWR in August 2021.

Walnut Creek TMDL Alternative – NCDOT continued its participation in the development of a watershed restoration plan for Walnut Creek (Neuse River Basin) in partnership with the City of Raleigh, Town of Cary, North Carolina State University, and the Partners for Environmental Justice. The Category 4b restoration plan addresses USEPA's nine key elements that have been identified as critical for achieving water quality improvements. Portions of Walnut Creek are identified as impaired due to elevated copper, PCB (fish tissue advisory), and "fair" or "poor" fish community. In PY2022 NCDOT completed a desktop assessment of retrofit opportunities in the watershed. Thirty-eight (38) potential opportunities were identified which will be screened for field investigation in PY2023. Additionally, NCDOT worked with the Program Director for the Partners for Environmental Justice to develop a brand for the Walnut Creek Watershed Action Plan. The brand included development of content for the mission statement, vision, goals, and the website. NCDOT also assisted with creating community service projects that focus on the improvement of Walnut Creek's health, such as planting rain gardens in flood zones, partnering with Trash Task Force for trash day, recycling efforts, etc. The Walnut Creek Watershed Action Plan goals, along with strategies and progress toward achieving those goals, are documented at: https://ncdenr.maps.arcgis.com/apps/MapSeries/index.html?appid=6f81e3b1ed114d9c91c91e0bf379cbeb.

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. This reporting period NCDOT continued its coordination with UNRBA, its contractors, and DWR with a focus on identifying model scenarios to run in the future.

Southeast White Oak TMDL Compliance and Living Shoreline Project 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 in 2013, which describes the results of NCDOT's AMP implementation activities, including field exercises and SCM retrofit feasibility studies.

In early 2020, NCCF in partnership with NCDOT was awarded a grant from the National Fish and Wildlife Federation (NFWF) to construct living shores along the NC 24 corridor in the Cedar Point and Swansboro areas of Carteret and Onslow Counties, respectively. The project has been split into three projects with three distinct sites. Together these projects will combine to create over 1,600 ft of living shoreline to help protect and build resiliency into this critical highway corridor.

The first two projects consist of two sites in Cedar Point, Carteret County, with the first along the shoreline of a vulnerable section of NC 24 that has seen damage during recent hurricanes. The second site is along the shoreline of an existing NCDOT mitigation site adjacent to the NC 24 bridge over the East Channel of the White Oak River. These projects will consist of constructing oyster sills as wave break structures to protect and enhance existing marsh along with planting of additional marsh grasses where water depth allows. These projects will be administered by the NCCF. The first site is expected to begin construction in July 2022 with construction of the second following later in the fall of 2022.

The third project is in Swansboro, Onslow County along the roadway embankment shoreline of the NC 24 causeway island which splits the White Oak River channels. This project site is in a higher energy environment and will consist of constructing a granite rock sill and creation of new marsh through minimal fill and planting vegetation. This project is being administered by NCDOT Division 3 and is expected to be constructed over the fall and winter of 2022-2023.

Considerations for Permit Year 2023

NCDOT will continue to support DWR in the development of TMDLs statewide and assessments of NCDOT loading as part of those TMDLs. NCDOT will continue to support the development of a TMDL Alternative in Turkey Creek, Category 4b Plan for Walnut Creek and data needs in the Middle Cape Fear River Basin (such as NCDOT land cover). NCDOT will also support NCDWR as a stakeholder in supporting their Priority List of Waterbodies and 5r program.

The Term V permit which became effective on May 1, 2022, contained significant changes to NCDOT's TMDL related requirements. For PY2023 NCDOT will be developing and implementing compliance strategies as outlined in its TS4SMP. Implementation actions will be reported in subsequent NPDES Annual Reports.

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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.
	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 Guided Reduction of Excess Environmental Nutrients (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. 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

Falls Lake - NCDOT constructed one stormwater gravel wetland in the Falls Lake Watershed. Modeling this stormwater gravel wetland resulted in a net reduction in load of TN from 7.58 pounds per acre per year to 4.76 pounds per acre per year, a load reduction of 37% and net reduction in load of TP from 0.46 pounds per acre per year to 0.43 pounds per acre per year, a load decrease of 6%.

In PY2022 NCDOT completed a Nature-base Stormwater Solutions Action Plan for the Falls Lake watershed. The NBSS Action Plan includes a detailed desktop and field search for NBSS retrofit opportunities. The Plan focuses on the use of remnant NCDOT parcels to treat runoff and reduce nutrient loads to the watershed. Soil improvement BMPs were identified as potential practices for implementation. Using software specifically designed for this purpose, NCDOT intends to estimate the carbon footprint of selected nature-based stormwater solutions and compare against the footprint of more traditional BMPs. NCDOT intends to complete the carbon footprint analysis in PY2023.

Jordan Lake One Water - Jordan Lake One Water (JLOW) is a partnership to facilitate cooperation and integrated water resource management in the Jordan Lake watershed. The group is comprised of local governments, state government, conservation groups, universities, water utilities, agriculture, and private industry stakeholders interested in sharing the cost of water quality and quantity improvements in order to realize watershed-wide social, economic, and environmental benefits. JLOW activities are presently being coordinated with the assistance of the Triangle J Council of Governments. NCDOT is a charter member of the JLOW advisory committee which was formed to develop a workplan and begin moving forward on collaborative planning efforts. The Advisory Committee, NCDWR, and numerous

stakeholders are collaborating to develop a recommended One Water/Integrated Water Management framework for the Jordan Lake watershed as part of the Jordan Lake Nutrient Management Strategy Rules Readoption process. In PY2023 JLOW anticipated filing for incorporation as a North Carolina non-profit with the Secretary of State's Office.

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 PY2021 – 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.

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

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 PY2022, 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.

Considerations for Permit Year 2023

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. Emphasis will be placed on implementing the NBSS Action Plan in the Falls Lake watershed in PY2023. 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:
June 28, 2022	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, 2021 to June 31, 2022.

3 Section – Post-Construction Controls

I-77 MP has inspected all the Stormwater Controls (SC) in the Project, as shown in the table below, and they were all working as designed as meeting all requirement as per the approved Stormwater Management Program (SMP) in accordance with NCDOT's NPDES permit.

Asset ID	Inspection Date	Location	Results of the inspection	Maintenance Required Description
HSB000001	2/22/2022	77,NB,RS,MM,27.8	Pass	NO
HSB000002	2/22/2022	77,NB,RS,MM,28.5	Pass	NO
HSB000003	2/22/2022	77,SB,RS,MM,28.9	Pass	NO
HSB000004	2/22/2022	77,NB,RS,MM,29.0	Pass	NO
HSB000005	2/22/2022	77,SB,RS,MM,29.3	Pass	NO
HSB000006	2/22/2022	77,NB,RS,MM,29.3	Pass	NO
HSB000007	2/22/2022	77,NB,RS,MM,30.9	Pass	NO
HSB000008	2/22/2022	77,NB,RS,MM,31.0	Pass	NO
HSB000009	2/22/2022	77,NB,RS,MM,31.3	Pass	NO
HSB000010	2/22/2022	77,SB,RS,MM,31.5	Pass	NO
HSB000011	2/22/2022	77,NB,RS,MM,31.7	Pass	NO
HSB000012	2/22/2022	77,NB,RS,MM,32.1	Pass	NO
HSB000013	2/22/2022	77,NB,RS,MM,32.5	Pass	NO
HSB000014	2/22/2022	77,NB,RS,MM,32.7	Pass	NO
HSB000015	2/22/2022	77,NB,RS,MM,34.0	Pass	NO
HSB000016	2/22/2022	77,NB,RS,MM,34.5	Pass	NO
HSB000017	2/22/2022	77,NB,RS,MM,36.1	Pass	NO
HSB000018	2/22/2022	77,NB,RS,MM,24.5	Pass, Maintenance Required	Reprofiled ditch added Class B Stone
HSB000019	2/22/2022	77,SB,RS,MM,25.0	Pass	NO

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

There are no construction activities ongoing within the Project under I-77 MP responsibility. Final Completion for the Project was achieved on August 3rd of 2021. Nonetheless, within the I-77 corridor, there are construction projects managed by NCDOT that are adjacent to the I-77 MP responsibility limits, such as:

- I-277 Rehabilitation Works
- Exit 23 Gilead Rd Interchange
- I-85 Resurfacing Works
- I-77 South Rehabilitation Works.

I-77 MP assumed all procedures are following NCDOT Manuals and Guidelines in regard to Stormwater Controls and Erosion Controls in those projects.

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). The plan was reviewed on 06/01/2022 no deficiencies were noted.

I-77 Mobility Partners maintenance team successfully completed the SPPP training 06/14/2022. In addition, the SPPP best management practices are currently being implemented.

II	Conclusion
	Overall, the I-77 Mobility Partners Stormwater Management Program is already implemented, and it is being implemented following all procedures as established by NCDOT Manuals and Guidelines.

III	Point of contact person
	Updated Environmental point of contact person from I-77 Mobility Partners: Gregory A. Freeman Gfreeman@I77partners.com

Environmental Designee: Gregory A. Freeman	Signature:	Date: 07/25/2022
Approver Manager: Vicente Porta Serrano	Signature:	Date: 07/25/2022