North Carolina Department of Transportation

NCDOT Post-Construction Stormwater Program

Post-Construction Stormwater Controls for Roadway and Non-Roadway Projects

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Change Management Table

Revision	Revision Date	Details
0	April 2014	Original issuance
1	May 2022	Updated text and figures to include new procedures for the pSMP, NC-SELDM Catalog, and submitting documentation. Also updated references to other guidance documents and the Department's renewed NPDES permit.

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Acronyms/Abbreviations

ATLAS	Advancing Transportation through Linkages, Automation, and Screening
BMP	Best Management Practice
BUA	Built-Upon Area
CA	Critical Areas
CAMA	Coastal Area Management Act
CE	Categorical Exclusion
CWA	Clean Water Act
EA	Environmental Assessment
EAU	Environmental Analysis Unit
ECAP	Environmental Coordination and Permitting
EPU	Environmental Policy Unit
EIS	Environmental Impact Statement
EMC	Environmental Management Commission
FHWA	Federal Highway Administration
GIS	Geographical information system
GREEN	Guided Reduction of Excess Environmental Nutrients
GS	NC General Statues
HPR	Hydraulic Planning Report
HQW	High Quality Waters
HSP	Highway Stormwater Program
I&M	Inspection and Maintenance
IPD	Integrated Project Delivery
IRVM	Integrated Roadside Vegetation Management
LID	Low Impact Development
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer Systems
NC-SELDM	North Carolina Stochastic Empirical Loading and Dilution Model
NCAC	North Carolina Administrative Code
NCDEQ	North Carolina Department of Environmental Quality
NCDEMLR	North Carolina Division of Energy, Mineral, Land Resources
NCDOT	North Carolina Department of Transportation

Acronyms/Abbreviations

NCDOT-JLSLAT	NCDOT-Jordan Lake Stormwater Load Accounting Tool
NCWRC	North Carolina Wildlife Resources Commission
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
ORW	Outstanding Resource Waters
PCN	Pre-construction Notification
PCSP	Post Construction Stormwater Program
PDN	Project Delivery Network
PFDS	Precipitation Frequency Data Server
POC	Parameter(s) of Concern
pSMP	Preliminary Stormwater Management Plan
REU	Roadside Environmental Unit
ROSS	Retrofits Site Selection Program
ROW	Right-of-Way
SA	Water Classification for Market Shellfishing, Salt Water
SEPA	State Environmental Policy Act
SMP	Stormwater Management Plan
SPPP	Stormwater Pollution Prevention Plan
STIP	State Transportation Improvement Program
T&E	Threatened and Endangered
TMDL	Total Maximum Daily Load
TS4	Transportation Separate Storm Sewer System
TR	Trout
URL	Uniform resource locator
USACE	United States Army Corps of Engineers
USEPA	United State Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
UWL	Unique Wetlands
WSW	Water Supply Watersheds

Definitions

Best Management Practice (BMP)

Per NCDOT's NPDES Permit, Best Management Practices are:

> *Measures or practices used to reduce the amount of pollution entering surface waters. BMPs can be structural or non-structural and may take the form of a process, activity, physical structure or planning.*

See also 'stormwater control measure or structural BMP', 'non-structural BMP', and 'Toolbox BMP' below.

Built-Upon Area (BUA)

NC General Statues (G.S.) 143-214.7 (b2) states:

> *For purposes of implementing stormwater programs, "built-upon area" means impervious surface and partially impervious surface to the extent that the partially impervious surface does not allow water to infiltrate through the surface and into the subsoil. "Built-upon area" does not include a slatted deck; the water area of a swimming pool; a surface of number 57 stone, as designated by the American Society for Testing and Materials, laid at least four inches thick over a geotextile fabric; a trail as defined in G.S. 113A-85 that is either unpaved or paved as long as the pavement is porous with a hydraulic conductivity greater than 0.001 centimeters per second (1.41 inches per hour); or landscaping material, including, but not limited to, gravel, mulch, sand, and vegetation, placed on areas that receive pedestrian or bicycle traffic or on portions of driveways and parking areas that will not be compacted by the weight of a vehicle, such as the area between sections of pavement that support the weight of a vehicle. The owner or developer of a property may opt out of any of the exemptions from "built-upon area" set out in this subsection. For State stormwater programs and local stormwater programs approved pursuant to subsection (d) of this section, all of the following shall apply:*
>
> *(1) The volume, velocity, and discharge rates of water associated with the one-year, 24-hour storm and the difference in stormwater runoff from the predevelopment and post-development conditions for the one-year, 24-hour storm shall be calculated using any acceptable engineering hydrologic and hydraulic methods.*
>
> *(2) Development may occur within the area that would otherwise be required to be placed within a vegetative buffer required by the Commission pursuant to G.S. 143-214.1 and G.S. 143-214.7 provided the stormwater runoff from the entire impervious area of the development is collected, treated, and discharged so that it passes through a segment of the vegetative buffer and is managed so that it*

Definitions

otherwise complies with all applicable State and federal stormwater management requirements.

(3) The requirements that apply to development activities within one-half mile of and draining to Class SA waters or within one-half mile of Class SA waters and draining to unnamed freshwater tributaries shall not apply to development activities and associated stormwater discharges that do not occur within one-half mile of and draining to Class SA waters or are not within one-half mile of Class SA waters and draining to unnamed freshwater tributaries.

New BUA

A net increase in a built-upon area within a project boundary. The project boundary includes all areas associated with a project where surface coverage is permanently modified.

Coastal Counties

Include Beaufort, Bertie, Brunswick, Camden, Carteret, Chowan, Craven, Currituck, Dare, Gates, Hertford, Hyde, New Hanover, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Tyrrell, and Washington (refer to 15A North Carolina Administrative Code (NCAC) 02H .1002(6)).

Critical Area

15A NCAC 02B .0202 defines critical area as:

The area adjacent to a water supply intake or reservoir where risk associated with pollution is greater than risk associated with pollution from the remaining portions of the watershed. The boundary of a critical area is defined as:

(a) extending either 1/2 mile in a straight line fashion upstream from and draining to the normal pool elevation of the reservoir in which the intake is located or to the ridge line of the watershed, whichever is nearest the normal pool elevation of the reservoir;

(b) extending either 1/2 mile in a straight line fashion upstream from and draining to the intake (or other appropriate downstream location associated with the water supply) located directly in the stream or river (run-of-the-river) or to the ridge line of the watershed, whichever is nearest the intake; or

(c) extending a different distance from the reservoir or intake as adopted by the Commission during the reclassification process pursuant to Rule .0104 of this Subchapter.

Maximum Extent Practicable

The Federal Register, Volume 64, page 68754, December 8, 1999, states:

> *Maximum extent practicable (MEP) is the statutory standard that establishes the level of pollutant reductions that operators of regulated municipal separate storm sewer systems (MS4s)* [or a transportation separate storm sewer system (TS4) in NCDOT's case] *must achieve. The Clean Water Act (CWA) requires that NPDES permits for discharges from MS4s 'shall require controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques and system, design, and engineering methods.'" CWA Section 402 (p) (3) (B) (iii).*

MEP for transportation projects consists of the following:

- Establishment of stormwater treatment goals and documenting these objectives in the preliminary stormwater management plan (pSMP).
- The team develops preliminary designs for the project to achieve the stormwater treatment goals.
- Site constraints impacting the attainment of the stormwater treatment goals are identified and documented.
- The project team updates the designs to include feasible best management practices in light of any site constraints.
- The feasible best management practices are documented in the final stormwater management plan (SMP).

Non-Roadway Project

For the purposes of this guidance, a non-roadway project is any new NCDOT facility or any modification to an existing facility and that does not otherwise qualify as new road development. New non-roadway development projects are generally not located within the linear NCDOT right-of-way (ROW). These projects can include new construction or upgrades to existing maintenance yards, rest areas, welcome centers, office buildings, training facilities, parking lots, or other non-roadway facilities. Any ingress or egress drives or streets within the NCDOT-owned project boundaries are also considered part of the non-roadway project and should not be separated out as a roadway project.

Non-structural BMPs

Per NCDOT's NPDES Permit:

> *Non-structural BMPs are preventive actions that involve management and source controls such as: (1) Policies and ordinances that provide requirements and standards to direct growth to identified areas, protect sensitive areas such as wetlands and riparian areas, maintain and/or increase open space, provide buffers along water bodies, minimize impervious surfaces, and/or minimize disturbance of soils and vegetation; (2) policies or ordinances that encourage infill development in higher density urban areas, and areas with existing storm sewer infrastructure; (3) education programs for developers and the public about minimizing water quality impacts; (4) other measures such as minimizing the percentage of impervious area after development, use of measures to minimize directly connected impervious areas, and source control measures often thought of as good housekeeping, preventive maintenance and spill prevention.*

Outfall

Outfall means a point source as defined by 40 CFR 122.2 at the point where a separate storm sewer system discharges to waters of the United States and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream or other waters of the United States and are used to convey waters of the United States.

Outlet

In the context of NCDOT projects, outlet typically refers to the point where stormwater discharges from a drainage structure into another conveyance or onto the landscape without a continuing conveyance. It can also be used to refer to the downstream end of a pipe or culvert.

Roadway Project

For the purposes of this guidance, a roadway project is any new roadway construction, new weigh stations, roadway widening, or other roadway-related activity occurring within the NCDOT ROW or easement. Examples of new roadway development include new location roadway projects, the addition of new acceleration and deceleration lanes, new bridges and culverts, new median crossovers, and new sidewalks within the NCDOT ROW.

Special Waters

For the purposes of this guidance, special waters are limited to waters with habitat for aquatic threatened and endangered (T&E) species or surface water classifications based on NCDEQ regulations for Critical Areas (CA), High Quality Waters (HQWs), Outstanding Resource Waters (ORWs), Market Shellfish waters (SA), Trout Waters (Tr) or Unique Wetlands (UWL).

Stormwater Control Measure or Structural BMPs

Per NCDOT's NPDES Permit:

> *Stormwater Control Measure or "SCM," also known as a structural "Best Management Practice" or "BMP," means a permanent device that is designed, constructed, and maintained to remove pollutants from stormwater runoff by promoting settling or filtration; or to mimic the natural hydrologic cycle by promoting infiltration, evapo-transpiration, post-filtration discharge, reuse of stormwater, or a combination thereof.*

Toolbox BMP

A structural or non-structural BMP included in the current edition of the NCDOT Best Management Practices Toolbox, also known as the BMP Toolbox.

Travel Lane

For the purposes of this guidance, a travel lane is a roadway segment with a 10 feet minimum width, designed for automobile/truck traffic and to increase the capacity of the transportation facility. Travel lanes do not include turn lanes as turn lanes are intended to increase the safety and level of service of the transportation facility as opposed to increasing capacity. Travel lanes also do not include acceleration or deceleration lanes, nor shoulders.

Vegetated Buffer

Means an area of natural or established vegetation directly adjacent to surface waters. The width of the buffer is measured horizontally from the normal pool elevation of the impounded structures, from the top of bank of each side of streams or rivers, and from the mean high water line of tidal waters, perpendicular to the shoreline. Riparian buffer protection rules may apply to vegetated buffer areas and the appropriate authorizations must be acquired where applicable. In areas not located in riparian buffer areas, the vegetated buffer may be cleared or graded, but must be planted with and maintained in grass or any other vegetative or plant material.

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The North Carolina Department of Transportation (NCDOT) implements a Post Construction Stormwater Program (PCSP) in accordance with the Department's National Pollutant Discharge Elimination System (NPDES) permit. The primary objective of the PCSP is to manage stormwater from new NCDOT development and re-development for projects which result in a net increase in built-upon area (BUA) by requiring structural and non-structural practices to protect water quality, reduce pollutant loading, and minimize post-construction impacts to water quality. As part of the PCSP, NCDOT implements post-construction best management practices (BMP) for discharges, controls runoff from new development and redevelopment, and implements the approved NCDOT Best Management Practices Toolbox, also known as the BMP Toolbox, as well as defining Toolbox implementation and training.

This document supersedes the 2014 PCSP and integrates the PCSP workflows into NCDOT's new Project Delivery Network (PDN) and to make decisions about stormwater management goals earlier in the planning and design process. The updated PCSP workflows clarify this goal-setting process. For roadway projects adding new BUA located in the drainage basins of selected special waters[1], BMPs from the BMP Toolbox (called Toolbox BMPs) are selected to reinforce the protection of water quality in these watersheds. For projects which involve drainage design in other watersheds, a new tool, the North Carolina Stochastic Empirical Loading and Dilution Model (NC-SELDM) Catalog, should be used to determine the stormwater treatment goals for the project at each stream crossing. Developed in conjunction with the US Geological Survey (USGS), the SELDM Catalog assesses potential water quality impacts based on site-specific data and the project's preliminary design plans. The project's stormwater treatment goals are documented in the preliminary Stormwater Management Plan (pSMP). An updated component to NCDOT's existing Stormwater Management Plan (SMP), the pSMP serves as a record and reference for the PCSP participating groups, or stakeholders. Workflows for non-roadway projects have also been updated, providing guidance for how projects adding new BUA in selected regulated watersheds should incorporate stormwater controls.

If it is determined that Toolbox BMPs are needed for roadway or non-roadway projects, hydraulic design engineers can use another new tool, the BMP Decision Support Matrix,

[1] Special waters are limited to waters with habitat for aquatic threatened and endangered (T&E) species or surface water classifications based on NCDEQ regulations for Critical Areas (CA), High Quality Waters (HQWs), Outstanding Resource Waters (ORWs), Market Shellfish waters (SA), Trout Waters (Tr) or Unique Wetlands (UWL).

to help identify Toolbox BMPs which are appropriate for the project's site characteristics. NCDOT's BMP Toolbox is then used to provide detailed guidance on design requirements for BMPs and was developed to specifically address NCDOT's linear system. Final design decisions are documented in the final SMP. When implemented on roadway and non-roadway projects, these tools are expected to provide a standardized approach to implementing Toolbox BMPs that address site-specific needs.

There are many participating groups engaged in NCDOT activities and decision-making that impact post-construction stormwater management; these participating groups include NCDOT project managers and staff, consultants, and regulatory agencies. In addition, NCDOT implements many different types of projects which can originate from the State Transportation Improvement Program (STIP), the division level, or from one of many other business units. Therefore, post-construction stormwater management required to protect water quality and maintain permit compliance is established on a project-by-project basis through a collaborative process involving the applicable participating groups. This document provides guidance to participating groups on the general decision-making process, applicable regulatory programs, minimum measures, and documentation required to achieve compliance with the PCSP for projects that involve new BUA.

Chapter 1 of this guidance document introduces the guiding principle of the PCSP, the participating groups, the applicable regulatory programs, and the general approach for project compliance with the PCSP. Chapters 2 and 3 provide guidance on workflows and the general process to facilitate compliance with the PCSP for roadway and non-roadway projects, respectively. The workflows describe the processes for implementing BMPs to the maximum extent practicable (MEP) to protect water quality and include minimum measures, which are practices considered for implementation on all projects, in addition to structural controls as required. Chapter 4 provides requirements for project-specific documentation, which preserves stormwater management decisions and verifies compliance with the program. In addition to the PCSP, other NPDES programs benefit water quality. These programs, which help to sustain the outcome of the PCSP, are discussed in Chapter 5.

1.1 Introduction and Applicability

The North Carolina Department of Transportation (NCDOT) is required by its National Pollutant Discharge Elimination System (NPDES) permit (NCS000250) to maintain a Post-Construction Stormwater Program (PCSP). This program establishes the management strategies for stormwater runoff from NCDOT (also referred to as Department) development and redevelopment for a new built-upon area (BUA) by requiring structural and non-structural best management practices (BMPs) to protect water quality, reduce pollutant loading, and minimize post-construction impacts to water quality from projects as defined in the PCSP manual. This PCSP manual applies to projects that result in a net increase in BUA. This manual has been updated to define NCDOT's current practices to implement the PCSP, including defining the implementation of the approved NCDOT BMP Toolbox and post-construction stormwater control measures.

The PCSP manual also provides guidance to participating groups involved in NCDOT roadway and non-roadway projects and facilitates communication between engineers, designers, regulatory agents, and other stakeholders (participating groups). This document provides overarching guidance for evaluating the stormwater management needs of a project site, encourages measures for reducing pollutant loading, promotes drainage design for conveying runoff in a diffuse and non-erosive manner, and provides BMP implementation guidance for projects that require treatment of stormwater pollutants.

1.2 PCSP Guiding Principle

NCDOT's Mission and its Environmental Stewardship Policy identify the underlying principles of the PCSP. NCDOT's Environmental Stewardship Policy outlines the Department's commitment to planning, designing, constructing, maintaining, and managing an interconnected transportation system while striving to preserve and enhance natural and cultural resources. The policy outlines the following responsibilities that are a part of NCDOT's day-to-day operations:

NCDOT's Mission

Connecting people, products, and places safely and efficiently with customer focus, accountability and environmental sensitivity to enhance the economy and vitality of North Carolina.

- Safeguarding the public's health by conducting our business in an environmentally responsible manner.
- Demonstrating our care for and commitment to the environment.
- Recognizing that our customers expect NCDOT to provide mobility and a quality of life that includes the protection of the natural resources and the cultural, social, and economic values of their community.

The Highway Stormwater Program (HSP) was developed in 1998 to protect and improve water quality while fulfilling NCDOT's mission of providing and supporting a safe and integrated transportation system that enhances the state. The HSP operates with the following guiding principles:

- Comply with NPDES stormwater permit requirements by managing and reducing stormwater pollutants from roadways and industrial areas.
- Design sustainable programs that can be effectively managed, implemented and integrated into NCDOT.
- Develop solutions that improve program delivery, are proactive, form partnerships, have technical merit, and are fiscally responsible.

In line with NCDOT's Mission and the Environmental Stewardship Policy, NCDOT employs a collaborative, interdisciplinary, and holistic approach to post-construction stormwater. Existing processes among stakeholders are leveraged to produce post-construction stormwater outcomes that are protective of the state's water resources while balancing the needs of the public, state, and federal agencies as well as the environment. The collaborative process involves stakeholders in the decision-making process; therefore, the overall project outcome achieves consensus on the best comprehensive solution.

The stakeholders involved in PCSP decision-making are the PCSP participating groups. PCSP participating groups include the entities within and outside of NCDOT responsible for project planning, design, construction, and maintenance. PCSP participating groups are listed in Table 1.1.

Table 1.1. PCSP Participating Groups

PCSP Participating Groups*	Description (See Footnote for PCSP Function)
NCDOT Hydraulics Unit	Responsible for a broad range of activities related to hydraulic and surface drainage for roadway construction and activities.[1,2,5,6]

Table 1.1. PCSP Participating Groups, cont.

PCSP Participating Groups*	Description (See Footnote for PCSP Function)
NCDOT Project Management Unit (PMU)	Responsible for overall project management and coordination.[1,2,3,5,6]
NCDOT Environmental Policy Unit (EPU)	Leads compliance efforts for the National Environmental Policy Act (NEPA) and State Environmental Policy Act (SEPA). Drives Merger Process and assists in permit acquisition.[1,5,6]
NCDOT Environmental Analysis Unit (EAU)	Leads studies and analyses for natural and human environmental studies. Submits permit applications for projects from Central Office and some Divisions.
NCDOT Roadway Design Unit	Responsible for the preparation of roadway design plans and engineering cost estimates for all centrally let highway construction projects.[1,2]
NCDOT Structures Management Unit	Develop structural general drawings and structural plans for road and bridge projects.[1,2]
NCDOT Division of Highways (Divisions)	14 transportation divisions responsible for roadway planning, design, construction, and maintenance activities.[1,2,3,4,5]
NCDOT Roadside Environmental Unit (REU)	Responsible for a wide range of activities for the highway system to enhance the environment, including activities related to BMP operation and maintenance.[3,4,5]
Engineering Consultants and Contractors	Companies contracted through NCDOT for design and/or construction services.[1,2,3,5,6]
Federal Highway Administration	Provides stewardship over the construction, maintenance, and preservation of the Nation's highways, bridges, and tunnels.[6]
U.S. Army Corps of Engineers	Builds and maintains infrastructure as well as regulates activities covered by the CWA.[6,7]
U.S. Environmental Protection Agency	Provides a regulatory framework for state and local governments and performs enforcement activities related to regulatory compliance. Oversees the CWA.[6,7]
NC Department of Environmental Quality	Regulates stormwater programs; issues and enforces permits. Key Divisions include Energy, Mineral, and Land Resources; Coastal Management; and Water Resources[6,7]
U.S. Fish and Wildlife Service	Participates in the conservation of species through the Endangered Species Act.[6,7]
National Marine Fisheries Service	Responsible for the management, conservation, and protection of living marine resources within the United States.[6,7]

Table 1.1. PCSP Participating Groups, cont.

PCSP Participating Groups*	Description (See Footnote for PCSP Function)
N.C. Wildlife Resources Commission	Conserves and sustains the state's fish and wildlife resources through research, scientific management, wise use, and public input.[6,7]
N.C. Department of Natural and Cultural Resources	Oversees the state's resources for the arts, history, libraries, and nature.[6,7]
U.S. Coast Guard	Maritime security, search and rescue, and law enforcement service branch of the US Armed Forces. Involved with permitting bridges and activities in Section 10 Waters.[6,7]
U.S. Forest Service	Manages public lands in national forests and grasslands.[6,7]
Tennessee Valley Authority	Provides electrical service, owns and operates hydroelectric dams, reservoirs, and associated infrastructure in North Carolina.[6,7]
National Park Service	Manages the parks of the National Park System.[6,7]
Metropolitan Planning Organizations	Policy-making organizations made up of representatives from local government and governmental transportation authorities. Ensures existing and future expenditures of governmental funds for transportation projects and programs are based on a continuing, cooperative, and comprehensive planning process.[6]
Rural Planning Organizations	Associations of local governments involved in local and regional transportation planning. Advises the NCDOT on rural transportation policy.[6]
Eastern Band of Cherokee Indians	Governs lands within the Qualla Boundary in western North Carolina.[6]

* For division-managed projects, roles may be performed by Division staff or their consultants. Throughout this file, all NCDOT participating groups may be referred to as NCDOT Project Team.
[1]Avoidance and minimization; [2]BMP design; [3]BMP construction; [4]BMP maintenance; [5]Permit applications; [6]Merger process; [7]Regulator

The specific participating groups that are involved in a given project depend on a number of factors, such as project type (roadway or non-roadway), scope, potential impacts, and permitting requirements. Each project is managed on a case-by-case basis, where NCDOT facilitates the process of soliciting appropriate participating group involvement. The participating groups work in concert to arrive at project-specific outcomes that support PCSP guiding principles and comply with required state and federal regulations.

Some projects, such as larger State Transportation Improvement Program (STIP) projects, go through the Merger Process, which is designed to efficiently implement the project development and permitting processes. The process was agreed to by the U.S. Army Corps of Engineers (USACE), the Department of Environmental Quality (NCDEQ), the Federal Highway Administration (FHWA), and NCDOT and is supported by other stakeholder agencies and local units of government. The Merger Process facilitates discussion among participating groups to reach consensus on ways to promote meeting the regulatory requirements of Sections 404 and 401 of the Clean Water Act (CWA) during the National Environmental Policy Act (NEPA)/State Environmental Policy Act (SEPA) decision-making phase for projects. The process helps to document how diverse participating group mandates and regulations are balanced during the shared decision-making process, which results in agency representatives reaching a consensus-based decision.

1.3 State and Federal Regulations that may apply to NCDOT Projects

There are a variety of state and federal regulations that may involve post-construction stormwater requirements for NCDOT roadway and non-roadway projects. These regulations are designed to protect water quality and intended uses of surface waters. A list of programs and regulations that may impact NCDOT projects is provided in Table 1.2. An abbreviated summary of selected regulations is provided below; regulations should be consulted directly for more details. New regulations may be introduced after the publication of this PCSP manual. It is the hydraulic design engineer's and planner's responsibility to review new regulations for applicability to NCDOT and the project. The hydraulic design engineer and planner should use regulations posted to the NC Office of Administrative Hearings website (https://www.oah.nc.gov/) to verify they have the most recent versions and carefully review the applicability sections of regulations to verify they apply to their project.

Table 1.2. Programs and Regulations that may impact Post-Construction Stormwater Management on NCDOT Projects

Regulation/Requirement	Reference
Classifications and Water Quality Standards Applicable to Surface Waters and Wetlands of North Carolina	15A NCAC 02B .0100, .0200, .0300

Table 1.2. Programs and Regulations that may impact Post-Construction Stormwater Management on NCDOT Projects, cont.

Regulation/Requirement	Reference
– Details policies for antidegradation and establishing water quality standards, and documents stream classifications. Sets stormwater discharge standards for water supply (WS)-I, WS-II, WS-III and WS-IV watersheds.	
Jordan Water Supply Nutrient Strategy – Water quality standards for the B. Everett Jordan Reservoir to reduce nitrogen and phosphorus loads to the watershed. Required NCDOT to develop a Stormwater Management Program for the Jordan Lake watershed which among other things established a program for post-construction stormwater runoff for roadway widening and new development, applicable to roadway and non-roadway projects under the control of NCDOT. Additional details can be found in NCDOT's *Stormwater Management Program for New Development in the Jordan Lake Watershed*, also known as the Jordan GREEN Program. – Diffuse flow of runoff shall be maintained in the riparian buffer by dispersing concentrated flow prior to its entry into the buffer.	15A NCAC 02B .0262, .0263, .0267, .0271, .0272, .0273, .0274
Other Rules for Riparian Buffer Protection	15A NCAC 02B .0610, .0611
Catawba River Basin: Protection and Maintenance of Existing Riparian Buffers – Water quality standards to protect the Catawba River mainstem below Lake James and along mainstem lakes from and including Lake James to the North Carolina and South Carolina border in the Catawba River Basin. – Stormwater runoff through the riparian buffer shall meet dispersed flow as defined in 15A NCAC 02H .1002. There are some exceptions that are allowable or allowable upon authorization.	15A NCAC 02B .0614
Water Supply Watersheds (WSW): Exclusions and Special Cases – NCDOT projects covered by the NPDES NC000250 permit are excluded from WSW regulations at 15A NCAC 02B .0620-.0624, as are selected projects by others constructed to NCDOT standards and conveyed to NCDOT. – Under this rule, NCDOT projects covered by the NPDES NC000250 permit are also exempt from 15A NCAC 02B .0721 (Randleman Lake Stormwater Management Requirements).	15A NCAC 02B .0622
General Nutrient Strategy regulations	15A NCAC 02B .0701, .0703
Neuse River Basin: Protection and Maintenance of Existing Riparian Buffers – Stormwater runoff through the riparian buffer shall meet dispersed flow as defined in 15A NCAC 02H .1002. There are some exceptions that are allowable or allowable upon authorization. – NCDOT is not subject to 15A NCAC 02B .0711 (Neuse Nutrient Strategy Stormwater Management Requirements).	15A NCAC 02B .0714

Table 1.2. Programs and Regulations that may impact Post-Construction Stormwater Management on NCDOT Projects, cont.

Regulation/Requirement	Reference
Randleman Lake Water Supply Watershed: Protection and Maintenance of Riparian Areas – Stormwater runoff through the riparian buffer shall meet dispersed flow as defined in 15A NCAC 02H .1002. There are some exceptions that are allowable or allowable upon authorization.	15A NCAC 02B .0720, .0724
Tar-Pamlico River Basin: Protection and Maintenance of Existing Riparian Buffers – Stormwater runoff through the riparian buffer shall meet dispersed flow as defined in 15A NCAC 02H .1002. There are some exceptions that are allowable or allowable upon authorization. – NCDOT is not subject to 15A NCAC 02B .0731 (Tar-Pamlico Nutrient Strategy Stormwater Management Requirements).	15A NCAC 02B .0730, .0734
401 Water Quality Certification – A Water Quality Certification from NCDEQ is required for federally-permitted or licensed activities, including construction or operation of a facility which may result in discharges into navigable waters. – Most General Certifications do not allow bridge deck drains to discharge directly into the stream unless written approval is obtained. An SMP must be submitted as part of the permit application.	15A NCAC 02H .0500
Post Construction Stormwater Management – NCDOT projects covered by the NPDES NC000250 permit are excluded from post-construction stormwater management regulations at 15A NCAC 02H .1000, as are selected projects by others constructed to NCDOT standards and conveyed to NCDOT. Rules at 15A NCAC 02H .1000 are also known as the state stormwater program. – Under this rule, NCDOT projects covered by the NPDES NC000250 permit are except from the following rules: o Coastal Counties 15A NCAC 02H .1019. o Non-Coastal County High Quality Waters (HQWs) and Outstanding Resources Waters (ORW) 15A NCAC 02H .1021. – As of August 1, 2013, NCDEQ consolidated state stormwater permitting under 15A NCAC 02H .1000 for NCDOT projects under the requirements of the PCSP.	15A NCAC 02H .1001
Isolated Waters and Isolated Wetlands – This regulation may apply if a project requires review by the NCDEQ Division of Water Resources and is placing fill in isolated wetlands that are not subject to Section 404 permitting. – NCDOT is compliant with the conditions of the Isolated Waters and Isolated Wetlands permit (IWGP100000) if projects are designed in compliance with NCDOT's NPDES Permit.	15A NCAC 02H .1300

Table 1.2. Programs and Regulations that may impact Post-Construction Stormwater Management on NCDOT Projects, cont.

Regulation/Requirement	Reference
Discharges to Federally Non-Jurisdictional Wetlands and Federally Non-Jurisdictional Classified Surface Waters – Discharges to wetlands and surface waters not regulated by federal regulations may be regulated by NCDEQ under this Section.	15C NCAC 02H .1400
Coastal Area Management Act – Established to help preserve the land and water resources of coastal counties. Establishes and defines Areas of Environmental Concern.	NC G.S. 113A-7
Endangered Species Act – If a Threatened or Endangered aquatic species is present within a project area the USFWS may request additional treatment standards or stormwater measures to protect water quality. This is typically on a case-by-case basis.	Endangered Species Act of 1973
Considerations for Federally-listed Threatened or Endangered Aquatic Species – If a Threatened or Endangered aquatic species is present within a project area the NCWRC may request additional treatment standards or stormwater measures to protect water quality. This is typically on a case-by-case basis.	15A NCAC 02B .0110
Stormwater Outlet Protection – Establishes Maximum Permissible Velocities for stormwater outfalls based upon a 10-year storm.	15A NCAC 04B.0109
Local Planning and Development Regulation: Stormwater Control – NCDOT is exempt from the application of a local government's stormwater control regulation to NCDOT projects that are covered under any NPDES permit issued to the Department.	NC G.S. 160D-925
Counties: Stormwater Control – NCDOT is exempt from the application of a county's stormwater control regulation to NCDOT projects that are covered under any NPDES permit issued to the Department	NC G.S. 153A-454

1.4 Layout of the PCSP

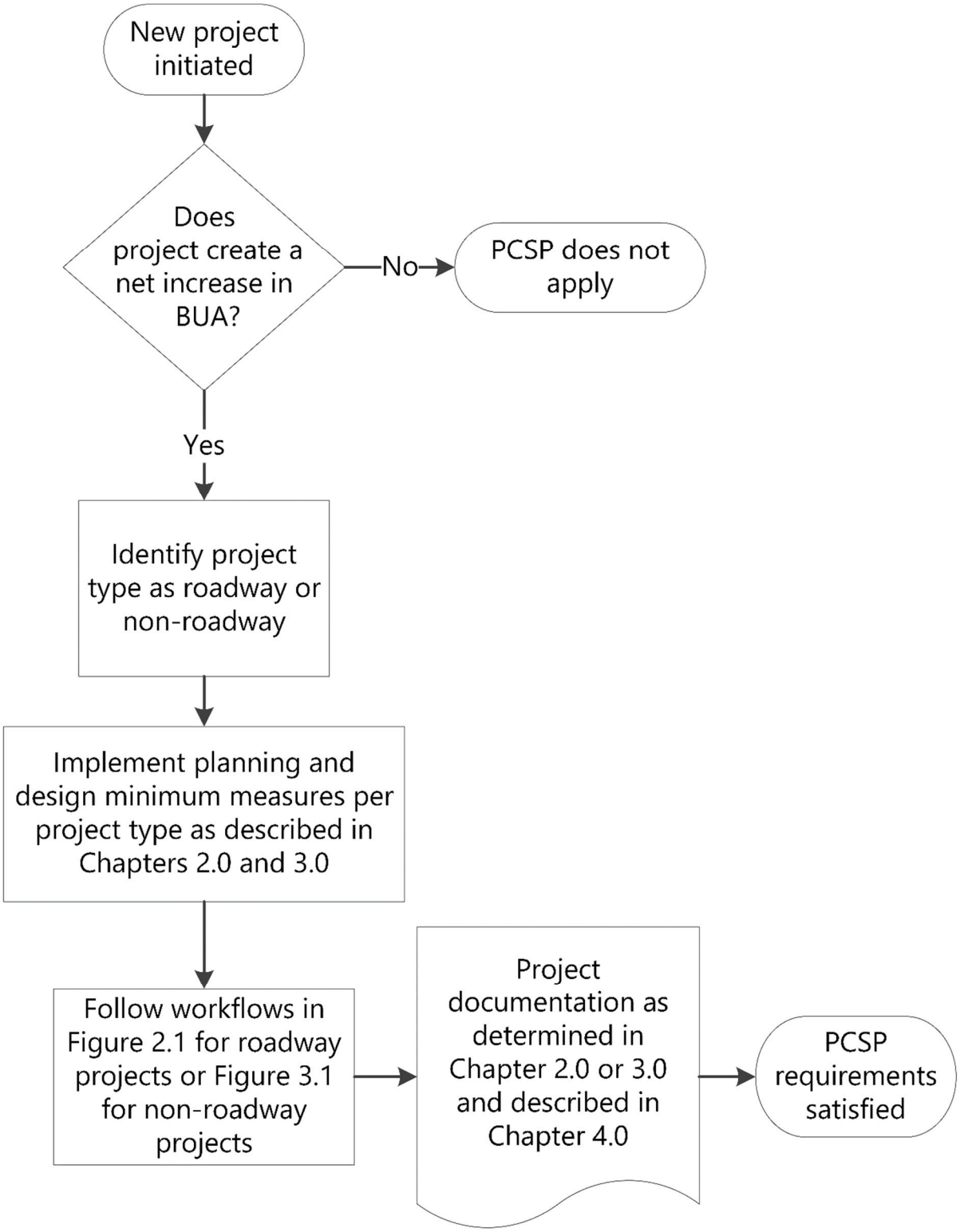
There are two primary categories of project types in the PCSP: roadway and non-roadway. Roadway projects require an approach to allow for customized solutions to meet the environmental protection needs of a project because of the constrained, linear nature of these projects. Non-roadway projects are implemented similarly to parcel-type development, in that they are generally subject to prescriptive stormwater management criteria. Roadway projects are covered in Chapter 2 while non-roadway projects are covered in Chapter 3.

Both roadway and non-roadway projects follow the same basic workflow for compliance with the PCSP. See Figure 1.1 for a depiction of the basic PCSP workflow. The PCSP applies only if the project will be creating new BUA.

Regardless of project type or workflow, minimum stormwater management measures are implemented on all projects. Minimum measures are actions taken on every project, during both planning and design phases, that protect water quality, minimize pollutant loading, and minimize post-construction impacts to water quality. Many of the minimum measures embody the low impact development (LID) and green infrastructure concepts of conservation and use of on-site natural features to retain or treat runoff close to the source.

The hydraulic design engineer should then carefully review the respective workflows for roadway projects (Figure 2.1) or non-roadway projects (Figure 3.1) to determine the next steps and if a project-specific preliminary Stormwater Management Plan (pSMP) and a final Stormwater Management Plan (SMP) are required. However, a project-specific pSMP and/or SMP may also be completed if deemed necessary by an applicable participating group in order to document stormwater management decisions. The implementation of minimum measures on a project, as described in Chapters 2 and 3 of this guidance document, will serve as the programmatic SMP for projects that do not require project-specific documentation.

Figure 1.1 Basic PCSP Workflow



1.5 Integration of PCSP with other NCDOT Guidance

NCDOT maintains several guidance documents which direct the development of roadway and non-roadway projects. These documents are intended to be used in conjunction with each other, with each providing more details on selected topics as applicable to the project. Additionally, NCDOT has implemented a program known as the Merger Process to streamline project development and permitting processes. The guidance documents, as well as the Merger Process, listed in Table 1.3 are related to the implementation of post-construction structural BMPs. A brief description is provided for each. Unless specified otherwise, the guidance documents and program below are applicable to both roadway and non-roadway projects.

Table 1.3 NCDOT Guidance Documents and Program Related to Post-Construction Stormwater BMPs

Guidance Documents and Program	Relevant Document / Program Description
Integrated Project Delivery (IPD) Project Delivery Network (PDN)	The PDN lays out a management protocol to provide consistency and transparency throughout the project delivery process, enabling project teams to improve reliability and efficiency. The PDN outlines the stages, activities, tasks, deliverables, and references to accomplish these ends. PCSP-related stages described in the PDN include stages 2HY1, 2HY2, 3HY1, and 5HY1.
Guidelines for Drainage Studies and Hydraulic Design (aka Hydraulic Guidelines*)*	The Hydraulic Guidelines include design policies, procedures, methods, forms, and tools needed to develop the hydrologic and hydraulic designs for NCDOT projects. Although Chapter 13 of the Hydraulic Guidelines discusses the PCSP and water quality regulations in general, detailed instructions for the assessment of impacts to water quality are in the PCSP manual.
PCSP Post-Construction Stormwater Controls for Roadway and Non-Roadway Projects (aka PCSP manual*)*	The PCSP manual directs the hydraulic design engineer and planner to the appropriate protocols for assessing potential water quality impacts from discharges which may affect design and should be considered during planning and design stages. Some aspects of water quality, such as threatened and endangered species, are addressed elsewhere.

Table 1.3 NCDOT Guidance Documents and Program Related to Post-Construction Stormwater BMPs, cont.

Guidance Document	Relevant Document Description
North Carolina Stochastic Empirical Loading and Dilution Model (NC-SELDM) Catalog	The NC-SELDM Catalog assesses potential water quality impacts based on site-specific data from the USGS StreamStats website and the project's preliminary design plans. It is used to establish the minimum stormwater treatment goals for a project at each applicable stream crossing.
BMP Decision Support Matrix	The BMP Decision Support Matrix can be consulted to identify potential Toolbox BMP types to address parameter(s) of concern (POCs) that are identified from the waterbody's classification or its impairment. This information will have already been documented in the "Waterbody Information" tab of the pSMP. The BMP Decision Support Matrix can also be consulted for preliminary guidance on BMP suitability to siting constraints and other implementation considerations.
Stormwater Best Management Practices Toolbox (aka BMP Toolbox)	The BMP Toolbox provides detailed guidance on design requirements for BMPs and was developed to specifically address NCDOT's linear system. The BMP Toolbox can be used for both roadway and non-roadway projects.
Merger Process	Merger is a process to streamline the project development and permitting processes, agreed to by the USACE, NCDEQ, FHWA and NCDOT and supported by other stakeholder agencies and local units of government. The Merger Process is used for Section 404/401 permitting, and the concurrence points noted in the PCSP manual are part of the Merger Process.

1.6 Using the PCSP to Determine the Maximum Extent Practicable Treatment

BMPs are selected for each receiving water on a project to reduce impacts of parameters of concern (POCs) as identified by surface water classification, regulation, or other relevant guidance with the goal of protecting surface water quality. BMPs are implemented to the maximum extent practicable (MEP) to provide flexibility to optimize reductions in stormwater pollutants within the unique project context for each project. While the federal CWA requires that NPDES permittees provide controls to reduce the discharge of pollutants to the MEP, it does not provide a precise definition of MEP (see the Definitions List for specific language). This allows each permittee the flexibility to identify management practices for non-structural controls, as well as design and engineering practices associated with structural controls, to address their particular

activities in order to reduce stormwater pollutants on a location-by-location basis. However, the US Environmental Protection Agency (USEPA) established some characteristics of MEP (Federal Register, Volume 64, page 68754, December 8, 1999) when it revised the NPDES program for stormwater discharges, in that the MEP:

- Is satisfied by compliance with an NPDES permit;
- Should include consideration of conditions of receiving waters, beneficial uses of receiving water, hydrology, geology, climate, specific local concerns, and other aspects, such as those included in a comprehensive stormwater management plan (if existing);
- Should consider the current ability to finance the program or project, and the capacity to perform operation and maintenance;
- Should consider all measures, including non-structural measures, as a whole to assess their ability to address the pollutants;
- May be different for different regulated areas; and
- Is a reiterative process and should continually adapt to current conditions and BMP effectiveness.

Therefore, MEP is not just stormwater control requirements, but the system and methods used to implement and manage effective controls to meet water quality objectives. Application of MEP is a location-by-location exercise. However, examples of considerations applicable to NCDOT include the following:

- Right-of-way (ROW) conflicts such as acquisition of property for the sole purpose of stormwater controls
- Protection of established mature trees and buffers that provide water quality and ecological benefits
- Topography limitations that include steep slopes and cut sections that compromise the function and long-term operation of stormwater controls as well as increase cost of construction
- Geological limitations that include rock, high ground water table, poor soil, and karst geology
- Environmental justice
- Utility conflicts
- Excessive costs to construct or maintain a control
- Applicability and effectiveness of non-structural controls

The above factors should be considered in the decision-making process when implementing BMPs.

Establishing MEP for NCDOT projects is summarized by the following activities:

- Establish project-specific stormwater treatment goals and document these objectives in the pSMP. The Hydraulics Unit, in partnership with USGS developed, the NC-SELDM Catalog tool and the BMP Decision Support Matrix to assist the engineer in the identification of appropriate stormwater treatment goals for each project stream crossing.
- Design the project to achieve the stormwater treatment goals
- Identify and document site constraints that could impact achievement of the stormwater treatment goals.
- Design the feasible best management practices, given any site constraints.
- Document the feasible best management practices in the final SMP.

As noted above, the MEP can include structural and non-structural BMPs. Non-structural controls implemented through the HSP are discussed in more detail in Chapter 5. Tools available to help identify the MEP when implementing structural BMPs include the PCSP Manual, BMP Toolbox, BMP Decision Support Matrix, pSMP, NC-SELDM Catalog, and the SMP. Upon final design, documentation of the MEP is made in the final SMP. These documents are introduced in Chapter 1.4 and discussed further in Chapter 4 of this document.

In addition to the PCSP, the NPDES permit requires the implementation of several other programs that benefit water quality. These programs, which are discussed in Chapter 5, integrate with each other, along with the pre-construction and post-construction phases of the PCSP, to provide guidance to NCDOT staff and contractors to understand the Department's approach to stormwater management and to help sustain the outcome of the PCSP. For example, the SCM Inspection and Maintenance (I&M) Program promotes the proper continuing function of structural BMPs so that they continue to treat stormwater as intended. Additionally, in the post-construction environment, the BMP Retrofit Program identifies sites with the potential to contribute pollutant loading and implements BMPs to mitigate the pollution potential. The other permit programs described in Chapter 5 highlight the comprehensive and holistic approach NCDOT takes to post-construction stormwater.

1.7 How to Use This Document

This document is intended to provide guidance to the participating groups that are involved in the NCDOT PCSP for roadway and non-roadway projects. The processes for compliance with roadway and non-roadway projects are presented in Chapter 2 and Chapter 3, respectively. First, participating groups should identify whether their project

adds new BUA. If it does, next determine if the project is a roadway or non-roadway project and proceed to the appropriate chapter. Each chapter presents the workflow process to achieve compliance, appropriate BMP Toolbox implementation, and any documentation requirements. For more detailed documentation and documentation retention requirements, the user is directed to Chapter 4. Chapter 5 provides information on NPDES programs that help to sustain the project-specific outcomes of the PCSP. Appendix A and Appendix B contain guidelines for selected watersheds, as directed by appropriate workflows, while Appendix C provides resources to support compliance with the PCSP.

PCSP participating groups should also consult other NCDOT guidance documents as they move through the PCSP process.

2.1 Introduction

The NPDES permit requires that the PCSP manage post-construction stormwater from new BUAs[2]. The majority of new BUAs introduced into the NCDOT Transportation Separate Storm Sewer System (TS4) are from roadway development. New roadway development is generally defined as any new roadway construction, new weigh stations, roadway widening, or other roadway-related activity occurring within the NCDOT ROW or easement which results in a net increase in built-upon area. Examples of new roadway development include new location roadway projects, addition of new acceleration and deceleration lanes, new bridges and culverts, new median crossovers, and new sidewalks within the NCDOT ROW. Development projects that consist of industrial facilities, maintenance yards, rest areas, parking lots, and other building facilities are considered non-roadway projects and are addressed in Chapter 3 of this document.

New Roadway Development Project Examples[3]

- New location roadways
- Roadway widening
- New acceleration/deceleration lanes
- Interchange modifications
- New bridges or culverts
- Bridge or culvert replacements
- Median crossovers
- Sidewalks within NCDOT ROW
- Bus shelters within NCDOT ROW
- Weigh Stations
- Borrow and waste sites associated with NCDOT road construction

To provide a PCSP that is protective of surface waters and allows for unique project-specific solutions, the stormwater management approach is determined on a project-by-project basis. Each project will consider the implementation of BMPs that are protective of the receiving stream within the context of mobility and the needs of the human environment. Provided the responsible parties from the PCSP participating groups follow the process and document decisions as outlined in this chapter, the resultant approach is considered protective to the MEP and is in compliance with the PCSP.

[2] The PCSP does not apply to projects that result in no *net* increase in built-upon area. However, these projects may still have environmental requirements associated with other permits and approvals.

[3] This table provides examples of new roadway development projects and is not intended to be an exhaustive list.

2.2 PCSP Process for Roadway Projects

Regardless of whether a roadway project goes through the Merger Process or is managed by the NCDOT Central Office Units or through a division office, the PCSP process for that project remains the same. The PCSP roadway process is provided in Figure 2.1. Each step within Figure 2.1 is discussed in more detail below.

Planning Phase
PCSP Participating Groups

- EAU, EPU or Division personnel who handles environmental permitting of division managed projects
- NCDOT Project Team
- Regulatory Agencies

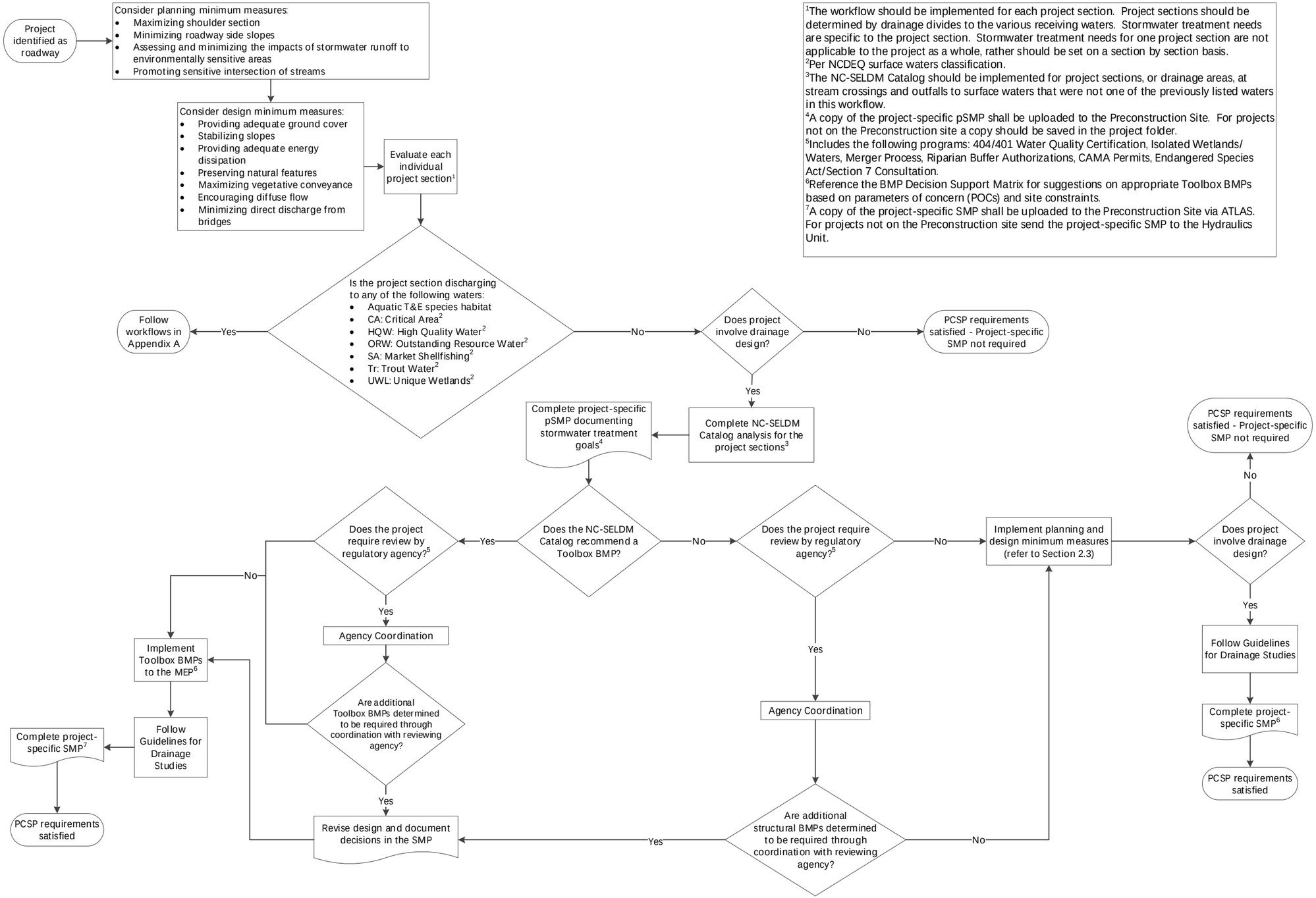
2.3 Minimum Measures for Roadway Projects

2.3.1 Planning Phase Minimum Measures

For all roadway projects, the PCSP project planning phase is defined as the period between establishing the purpose and need for the roadway project through avoidance and minimization of impacts to the selected preferred alternative. For projects that go through the NEPA/Section 404 Merger Process, the PCSP planning phase refers to the project period between *Concurrence Point 1 – Purpose and Need and Study Area Defined* and *Concurrence Point 4A – Avoidance and Minimization*. Information on the Merger Process is available on the Connect NCDOT website. During the Planning Phase of a roadway project, the applicable PCSP participating groups must consider any applicable and relevant planning minimum measures and maximize their implementation appropriately.

The PCSP participating groups should consider each minimum measure for potential and appropriate inclusion to the MEP on a project-by-project basis, throughout all locations within a project. The inclusion of minimum measures should be compared against other design requirements and safety concerns to the MEP. The PCSP participating groups should consider whether implementation would adversely affect safety of the travelling public, impact critical environmental features such as wetlands, or increase project cost beyond a practical measure. Consideration of these minimum measures, even if the result is none of the measures can be implemented, is adequate for compliance with the PCSP.

Figure 2.1 Overall PCSP Process for Roadway Development



[1]The workflow should be implemented for each project section. Project sections should be determined by drainage divides to the various receiving waters. Stormwater treatment needs are specific to the project section. Stormwater treatment needs for one project section are not applicable to the project as a whole, rather should be set on a section by section basis.
[2]Per NCDEQ surface waters classification.
[3]The NC-SELDM Catalog should be implemented for project sections, or drainage areas, at stream crossings and outfalls to surface waters that were not one of the previously listed waters in this workflow.
[4]A copy of the project-specific pSMP shall be uploaded to the Preconstruction Site. For projects not on the Preconstruction site a copy should be saved in the project folder.
[5]Includes the following programs: 404/401 Water Quality Certification, Isolated Wetlands/ Waters, Merger Process, Riparian Buffer Authorizations, CAMA Permits, Endangered Species Act/Section 7 Consultation.
[6]Reference the BMP Decision Support Matrix for suggestions on appropriate Toolbox BMPs based on parameters of concern (POCs) and site constraints.
[7]A copy of the project-specific SMP shall be uploaded to the Preconstruction Site via ATLAS. For projects not on the Preconstruction site send the project-specific SMP to the Hydraulics Unit.

Maximizing Shoulder Section

Definition:
Selecting a typical section with a shoulder that allows diffuse flow.
Merger Concurrence Points 1/2

Grass shoulder sections allow stormwater to directly run off of the roadway without the impediment of a curb and gutter. Allowing runoff to remain in a diffuse flow pattern encourages passive stormwater treatment as runoff travels over vegetated areas adjacent to the roadway. In addition, this avoidance and minimization practice can reduce erosive peak flow rates associated with concentrated flows.

Key Considerations

- Grass shoulder sections are most appropriate for post-construction stormwater treatment when the adjacent land to the roadway is grassed or otherwise vegetated. This practice may not be practical for areas with development adjacent to the roadway and may not be desired by municipalities.
- In some cases, such as roadway projects adjacent to wetlands and bridges, curb and gutter systems may be requested by environmental agencies or be required by NCDOT policy.
- Curb and gutter may be more appropriate in areas with highly erodible soils.

Minimizing Roadway Side Slopes

Definition:
Selecting the mildest side slope possible to maintain diffuse flow conditions.
Merger Concurrence Points 1/2

Gentle and flat roadside slopes are required to maintain sheet flow of runoff. In areas where sheet flow is encouraged, erosion prevention and stormwater treatment occur as runoff travels in a diffuse flow pattern over the roadway slope through reduction of runoff velocity, physical filtration, and infiltration.

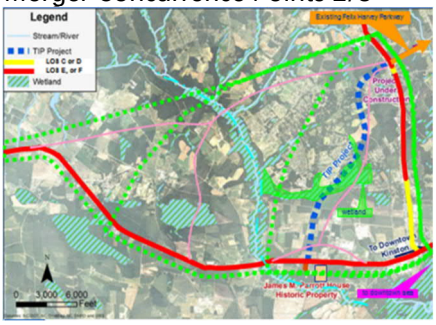
Key Considerations

- Flexibility in determining the roadside slope is limited in many cases. For example, in areas where the project impacts wetlands.
- Implementation of this minimum measure should not be allowed to significantly impact the project cost.

Assessing and Minimizing the Impacts of Stormwater Runoff to Environmentally Sensitive Areas

Definition:
Selecting alignments or design options that minimize impacts to sensitive areas.

Merger Concurrence Points 2/3



When evaluating various alternative corridors (new locations) or design options (widening and other improvements), consider the alternative or option that avoids high quality or otherwise environmentally sensitive areas. These areas include habitats for protected, threatened, and endangered species; sensitive streams; and jurisdictional wetlands. If total avoidance of an environmentally sensitive area is not feasible, the alternative or design options considered should be ones that minimize impacts.

Key Considerations

- Many factors are considered when selecting the preferred alternative for either the roadway corridor or improvement design option. The final selection must fulfill the purpose and need of the roadway project and balance potential impacts on the human and natural environment.
- Environmentally sensitive areas include nutrient sensitive waters, outstanding resource waters, high quality waters, jurisdictional wetlands, waters with an existing impairment, and all waters in Coastal Area Management Act (CAMA) counties.

Promoting Sensitive Crossing of Streams

Definition:
Selecting alignments that minimize the impacts related to stream crossings.

Merger Concurrence Points 2/2A

When a new location or widening project must involve the crossing of a stream or other natural environmental resource, many opportunities exist to minimize impacts from stormwater runoff. An alignment that minimizes the impacts to the stream should be selected. Typically, an alignment that intersects the feature as perpendicularly as possible will promote minimization of stream impacts. From a stormwater perspective, minimizing the necessary length of a bridge facilitates containing runoff on the bridge deck to prevent the direct discharge of runoff into the stream.

Key Considerations

- Many factors are considered when selecting locations for crossing streams on proposed corridors. Other potential impacts to the human and natural environment may motivate selection of a crossing where not all impacts can be minimized. The hydraulic structure must be adequate to promote the integrity of the stream and floodplain and minimize impacts to wetlands.

The pSMP will serve as a record and reference to establish the stormwater treatment goals for the project. Review of this guidance and appropriate consideration of planning minimum measures is considered adequate for compliance. While no specific documentation of planning minimum measures is required in the PCSP, it is encouraged to capture any specific documentation of considerations or decisions in the avoidance and minimization tracking tool on the ATLAS (ATLAS stands for Advancing Transportation through Linkages, Automation, and Screening) workbench.

2.3.2 Drainage Design Phase Minimum Measures

Drainage Design Phase PCSP Participating Groups

- NCDOT Project Team
- Hydraulic Design Engineers
- Roadway Design Engineers
- Regulatory Agencies

In the PCSP, the drainage design phase of the roadway project refers to the period between avoidance and minimization of impacts for the preferred alternative or design option and the preparation of the project drawings and completion of final drainage designs. For projects that go through the Merger Process, the PCSP drainage design phase refers to the project period between *Concurrence Point 4B – 30% Hydraulic Review* and *Concurrence Point 4C – Permit Drawing Review.* It is during this period of the project that the hydraulic design engineer implements design minimum measures and drainage area-specific stormwater pollution prevention and treatment BMPs as applicable, feasible, and/or required.

Similar to the project planning minimum measures, the design minimum measures should be implemented to the MEP. Implementation of design minimum measures should follow decisions made during the project planning phase. Widespread implementation of these measures is encouraged wherever practical on the project. However, the degree of implementation does not dictate compliance with the PCSP. Documentation of the location where design minimum measures are implemented is not required for compliance with the PCSP. However, documentation of implemented design minimum measures is encouraged in the project-specific SMP if one is required for the project.

Providing Adequate Ground Cover

Definition:
Selecting appropriate ground cover to minimize erosion.

Merger Concurrence Points 4B/4C

A dense and vigorous vegetative cover provides cost-effective protection to surficial soils from the erosive impacts of rainfall and runoff, maintains good soil moisture, and increases soil porosity to improve infiltration.

Key Considerations:

- Different species of vegetation have varying permissible velocities.
- Steeper slopes require more vigorous vegetative cover, temporary soil stabilization measures, and longer establishment periods.
- Planting season and regional climatic and soil variations will also affect vegetation selection.

Stabilizing Embankments and Drainage Ditches

Definition:
Minimizing erosion on slopes and providing stable drainage ditches for stormwater runoff.

Merger Concurrence Points 4B/4C

Slope stabilization measures are implemented where the slope of the embankment or overbank area is such that vegetated ground cover may not be enough to prevent erosion. Riprap slopes and permanent erosion control matting are both examples of post-construction slope stabilization measures.

Drainage ditches can be utilized to collect roadway runoff and provide a stable means for transporting stormwater to prevent erosion. Ditch geometry can also be configured to promote passive stormwater treatment by increasing flow area to reduce flow velocity.

Key Considerations:

- Riprap used for slope stabilization should be selected so that the gradient of the slope to be stabilized is less than the riprap's natural angle of repose.
- Selection of slope stabilization technique should consider ways to reduce costs and long-term maintenance needs. The hydraulic structure must be adequate to minimize impacts to the integrity of the stream and floodplain and minimize impacts to wetlands.
- Drainage ditch design should account for allowable velocity and shear stress of the soil and vegetation on site.
- Available ROW or easement may limit the size and geometry of proposed ditches.

Providing Adequate Energy Dissipation

Definition:
Reducing the energy of flowing runoff by slowing velocity and encouraging diffuse flow, thereby reducing erosion and scour potential.

Merger Concurrence Points 4B/4C

Runoff collected from impervious surfaces can travel at velocities that may create local scour or more widespread erosion downstream of the discharge point. Energy dissipators are implemented at transitions between impervious and pervious surfaces and at concentrated flow outlets to reduce the kinetic energy of water to prevent erosion. Common energy dissipators include preformed scour holes and rock aprons.

Key Considerations:

- Energy dissipators should be designed to reduce velocity to a non-erosive rate for the downstream ground cover.
- Stormwater runoff from BUA that is directed into any wetlands shall flow into and through these wetlands at a non-erosive velocity as estimated for a 10-year storm event. Refer to NCDOT's "Guidelines for Drainage Studies and Hydraulic Design" for more information.

Utilizing Natural Features and Drainage Pathways

Definition:
Utilizing existing natural features on a project that help achieve stormwater management goals.

Merger Concurrence Points 4B/4C

Existing natural features and drainage pathways on a project can help maintain predevelopment runoff characteristics with minimum modification of existing drainage patterns. Examples of this technique include dispersing runoff through existing wooded and vegetated areas, using naturally depressed areas for runoff storage, and using existing, natural runoff channels for conveyances to maintain existing flow patterns.

Key Considerations:

- When dispersing runoff through natural features, such as wooded and vegetated areas, the stability of the existing ground cover should be evaluated for erosion potential.
- The natural topography should match the final graded needs of the BMP to which this management measure is being applied.
- In most cases, energy dissipation and practices that promote diffuse flow will be needed.
- When using a natural feature for stormwater management, some modifications may be required.

Maximizing Vegetative Conveyance

Definition:
Selecting swales and filter strips for stormwater conveyance wherever possible.

Merger Concurrence Points 4B/4C

Incorporating vegetation into the drainage system reduces flow velocity while also promoting sedimentation, filtration, and infiltration. Maximizing vegetative conveyance is a minimum measure where vegetated features are preferentially selected for runoff conveyance to take advantage of these passive stormwater treatment benefits. Examples of maximizing vegetative conveyance include selecting a swale over pipe conveyance and selecting vegetated options for channel linings where appropriate.

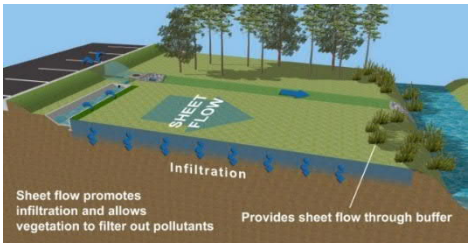
Key Considerations:

- When pipe structures are necessary to collect runoff from the roadway (such as in curb and gutter sections), every effort should be made to direct runoff from the pipe outlet to vegetated areas. Proper energy dissipation and transitions should be implemented.
- To the extent possible, the designer should maintain the predevelopment drainage areas and flow patterns to support greater use of vegetative conveyance. Consolidating drainage areas may preclude vegetative conveyance due to the increased discharges and velocities.
- Evaluate vegetated options for channel linings before considering “hardened” lining types.

Encouraging Diffuse Flow

Definition:
Designing the drainage system to minimize concentrated flow of runoff and maintain diffuse flow conditions.

Merger Concurrence Points 4B/4C



Encouraging diffuse flow is a design-based BMP where unconcentrated flow is encouraged, whenever possible in the drainage design, to take advantage of vegetated features. Implementing graded embankments and the use of preformed scour holes to transition from pipes to overland flow are examples of encouraging diffuse flow.

Key Considerations:

- Gentle and flat roadside slopes are required to maintain diffuse flow. In areas where steeper slopes are implemented, encouraging diffuse flow may not be practical.
- In-situ soil type, stability, and other factors related to erosive probability should be evaluated prior to implementing diffuse flow conditions.

Minimizing Direct Discharge from Bridges

Definition:
Selecting bridge configurations and drainage designs that avoid directly discharging runoff to receiving streams.

Merger Concurrence Points 4B/4C

Generally, direct discharge of bridge deck runoff to receiving streams via deck drains should be minimized to the MEP. By routing runoff to the bridge end, other minimum measures such as maximizing vegetative conveyance and energy dissipation can be implemented. For select bridge crossings a dispersed direct discharge may be an appropriate balance of environmental protection and cost control. However, these situations are expected to be limited and typically require a written exemption from 404/401 permit conditions.

Key Considerations:

- Appropriate collection, conveyance, and BMPs should be provided where deck conveyance reaches the end of the bridge.
- Existing well-vegetated areas around the bridge are ideal release areas for runoff and should influence the location of discharge points when possible.
- Use of dispersed discharge may be an appropriate BMP in certain situations with a written exemption from 404/401 permit conditions if applicable.
- Safety of the traveling public must always be the foremost design concern. The designer should carefully follow NCDOT's allowable spread design criteria.

2.4 Implementation of Toolbox BMPs for Roadway Projects

Toolbox BMPs are engineering solutions implemented on-site or enhancements of existing on-site features, that provide passive treatment of pollutants in runoff and are included in NCDOT BMP Toolbox. Hydraulic design engineers should follow the Overall PCSP Process for Roadway Development shown in Figure 2.1, in conjunction with the NC-SELDM Catalog, to identify if Toolbox BMPs may be necessary for each stream crossing on the project. Typically, Toolbox BMPs are only necessary for the protection of water quality under two conditions:

- For sections of roadway projects discharging to special waters, the hydraulic design engineer is directed to Appendix A to determine if structural BMPs are needed. Special waters are limited to waters with habitat for aquatic threatened and endangered (T&E) species or surface water classifications based on NCDEQ regulations for Critical Areas (CA), High Quality Waters (HQWs), Outstanding Resource Waters (ORWs), Market Shellfish waters (SA), Trout Waters (Tr) or Unique

Wetlands (UWL). If projects in these areas include one or more new travel lanes and disturb an area greater than or equal to one acre, structural BMPs are required.

- For all other project sections not draining to special waters, but involving drainage design, the hydraulic design engineer should use the NC-SELDM Catalog to determine if a Toolbox BMP may be necessary.

See Chapter 4 for more discussion of the NC-SELDM Catalog and the BMP selection process.

For NCDOT projects, approved Toolbox BMPs and their design criteria are provided in the BMP Toolbox available on the Connect NCDOT website. If a project team wishes to use a structural BMP that is not listed in the BMP Toolbox, a request for use may be made to the State Hydraulics Engineer or delegated representative. The request should include information on the proposed design criteria and how the BMP will provide stormwater treatment. The State Hydraulics Engineer will approve or disapprove the use of the BMPs not listed in the BMP Toolbox on a project-by-project basis (this shall be documented in the project-specific SMP).

For projects with an increase in new BUA, the workflow shown in Figure 2.1 should be followed to determine whether a Toolbox BMP would be beneficial and appropriate on a roadway project. For projects that require regulatory review, a coordination meeting between applicable members of the PCSP participating groups should be held to reach agreement on the proposed approach and satisfaction of the MEP requirement (see Chapter 2.5 for more discussion). If it has been determined that one or more Toolbox BMP(s) might be appropriate on a roadway project, the hydraulic design engineer should use sound engineering judgment in selecting the appropriate BMP. Information to aid selection can be found in the NCDOT's BMP Toolbox and the BMP Decision Support Matrix, among other resources. The PCSP does not provide a prescriptive BMP selection process for roadway projects in order to allow for project-specific solutions. The PCSP participating groups are expected to consider the unique characteristics of both the proposed roadway project, the receiving waters, and conditions at the specific stream crossing, then develop a shortlist of BMPs for consideration on a project-by-project basis.

Once potential Toolbox BMPs have been selected for consideration, their implementation to the MEP should be evaluated based on site-specific engineering analysis. If implementing a BMP is not feasible given the design criteria listed in the BMP Toolbox, the designer should first consider whether deviating from criteria could provide a treatment or pollution prevention benefit at a reduced degree yet remain protective of

water quality standards. The decision of whether this approach would provide a benefit to the receiving waterbody is part of the collaborative process with regulatory agencies for projects that require regulatory review. For projects that do not require regulatory review, the hydraulic design engineer should use sound engineering judgment when considering the implementation of BMPs to the MEP.

The result of the process of evaluating Toolbox BMPs to the MEP may result in the outcome that site constraints make the implementation of Toolbox BMPs impractical or infeasible. Information on evaluating the feasibility of BMPs can be found in the BMP Toolbox. Generally, the following considerations (in addition to those listed in Chapter 1.4 of this document) may be considered acceptable reasons for certain Toolbox BMP infeasibility on a roadway project:

- Physical site limitations – available ROW, steep slopes, soil instability, impacts to other cultural resources, and high-water tables
- Geographic and geotechnical limitations – karst topography, shallow bedrock, unstable soils, proximity to wetlands, shorelines, riverfronts, steep slopes, proximity to homes or other buildings, and FEMA regulated floodways
- Hydraulic limitations – lack of available hydraulic head, high water table, low hydraulic conductivity
- Environmental or health risk limitations – existing soil or water contamination
- Maintenance limitations – site restrictions that prevent access, long term costs of operation

2.5 Projects Requiring Regulatory Review

Regulatory Review PCSP Participating Groups

- NCDOT Project Team
- Regulatory Agencies

When a project requires review by a regulatory agency, the participating groups coordinate to evaluate the project-specific context to implement BMPs to the MEP. Since these projects require regulatory review for compliance with state and federal regulations, they undergo significant internal and external reviews which result in outcomes that are protective of surface waters. Roadway projects that require permits, exclusions, approvals, or other regulatory review, will also be evaluated for the need and appropriate application of Toolbox BMPs. Regulatory programs that, if applicable to the project, may require regulatory review and impact post-construction stormwater planning and design are listed in Table 2.1. Other environmental programs that may require regulatory review are discussed in NCDOT's Project Delivery Network (PDN).

Table 2.1 Programs that may impact Post-Construction Stormwater*

Program/Requirement
404/401 Water Quality Certification
Endangered Species Act/Section 7 Consultation
Merger Process
Riparian Buffer Authorizations
CAMA Permits
Isolated Wetlands/Waters
Federal Energy Regulatory Commission (FERC)
US Department of Transportation Act of 1966 Section 4(f)
National Historic Preservation Act Section 106
Land and Water Conservation Act Section 6(f)

* Not intended to be an exhaustive list.

In the process of confirming compliance with each of the above programs, regulatory agency representatives review project plans and characteristics and evaluate potential impacts to receiving surface waters before issuing approval. During this process, regulatory agencies have an opportunity to review stormwater management efforts. Therefore, issuance of a permit, authorization, certification, or approval associated with any of the above-listed programs is considered documentation of PCSP compliance for a roadway project and confirmation that the BMPs selected meet MEP. PCSP documentation should record the regulation that requires each structural BMP to be included in the final design.

As it applies to the PCSP, this regulatory review process starts with the hydraulic design engineer proposing treatment goals in the pSMP through the process shown in Figure 2.1. The pSMP is reviewed with regulatory agencies and a determination made if additional BMPs are needed. For Merger projects, the pSMP review should occur during *Concurrence Point 4A – Avoidance and Minimization* to gain concurrence. The pSMP should be revised, if necessary, to document the regulator requirement, including specific regulations, for additional stormwater treatment. Reaching concurrence on the pSMP implies that the PCSP participating groups agree that the planned BMPs will protect water quality to the MEP. Once concurrence between the PCSP participating groups is reached, the design phases moves forward with an evaluation of project constraints and design incorporation.

As the project progresses, the Toolbox BMPs should be implemented to the MEP in the design of the project. Other guidance documents, including the Guidelines for Hydraulic Studies, should be followed when finalizing the design. The SMP is developed to reflect

the design and, if required, is submitted with the regulatory review packages using one of the following methods, depending on the other regulatory permits required by the project:

- For projects requiring a 404/401 Water Quality Certification with stormwater management conditions as part of the General Certification, the SMP is provided to NCDEQ as an attachment to the Pre-construction Notification (PCN) Form or the Individual Permit application. Review of the SMP is performed concurrent with the approval of the 401 Water Quality Certification.
- For projects requiring a Riparian Buffer Authorization, the SMP is submitted with the PCN form to NCDEQ for review.
- For projects requiring other regulatory approvals, the SMP is submitted with the appropriate application forms to the reviewing regulatory agency.

If a project requires more than one of the authorizations listed above, the pSMP may be reviewed for compliance with the conditions of each of those permits by one or more regulatory representatives prior to the SMP being finalized.

2.6 Projects Not Requiring Regulatory Review

Non-Regulatory Review PCSP Participating Groups
• NCDOT Project Team • Hydraulics Unit

Projects that do not require regulatory review differ from projects that require regulatory review in that coordination with regulatory agencies is not required and the project outcome is not likely to be driven through a collaborative process with regulatory agencies. These projects are not subject to the regulatory review associated with the programs listed in Table 2.1 and should follow the workflow provided in Figure 2.1.

2.7 Documentation Requirements

Following Figure 2.1 and Appendix A will inform the hydraulic design engineer if a pSMP and/or an SMP are required for their specific project. The pSMP documents the stormwater treatment goals for the project, noting which Toolbox BMPs are proposed for implementation to the MEP, and where they will be located.

After determination of necessary Toolbox BMPs has been finalized, and upon completion of BMP design, the SMP should be updated to reflect the final agreed upon decisions and submitted with applicable permit review packages. All Toolbox BMPs implemented for the project must be documented in the SMP regardless of why they are being implemented.

Additionally, the hydraulic design engineer should confirm that the EAU – Environmental Coordination and Permitting (ECAP) Section (or Division Environmental Officer) has retained copies of exclusion letters, permits, and approvals for all other applicable environmental permits. Issuance of these items conveys that the applicable regulatory agencies have reviewed the SMP and deem the post-construction stormwater management approach appropriate for the protection of surface water quality standards. See Chapter 4 for discussion regarding these additional documents.

For projects where a project-specific pSMP nor an SMP is required per Figure 2.1 or Appendix A, the hydraulic design engineer may still choose to document stormwater management decisions for a project using these tools.

Both the pSMP and SMP are part of the SMP form, available on the Connect NCDOT website. Additional information on the pSMP and SMP can be found in Chapter 4 of this document, the NCDOT *Guidelines for Drainage Studies and Hydraulic Design,* and on the Connect NCDOT site.

3.1 Introduction

The NPDES permit, which requires that the PCSP manage stormwater from new BUA, also includes non-roadway projects. New non-roadway development is defined as any new NCDOT facility or any modification to an existing facility that results in a net increase in BUA and that does not otherwise qualify as new road development. New non-roadway development projects are generally not located within the linear NCDOT ROW. These projects can include new construction or upgrades to existing maintenance yards, rest areas, welcome centers, office buildings, training facilities, parking lots, or other non-roadway facilities. Any ingress or egress drives or streets within the NCDOT-owned project boundaries are also considered part of the non-roadway project and should not be separated out as a roadway project.

New Non-Roadway Development Project Examples[4]

- Rest Areas
- Maintenance Yards
- Office Buildings
- Training Facilities
- Parking Lots
- Railroad Facilities
- Material Testing Laboratories
- Material Storage Facilities

Unlike NCDOT roadway projects, non-roadway projects are similar to most parcel-based development in that more prescriptive stormwater management criteria apply to these projects. Figure 3.1 details the processes for complying with regulations and programs applicable to the watersheds in which the non-roadway project is located. Following the process laid out in Figure 3.1 is required in order to comply with the PCSP for non-roadway projects.

3.2 PCSP Process for Non-Roadway Projects

Non-roadway projects can originate from many different groups within NCDOT's organization, such as one of the 14 highway divisions, Facilities Management Unit, Rail Division, Ferry Division, Bicycle and Pedestrian Transportation Division, or be part of a STIP project (e.g., rest area). Regardless of the source of the project, all hydraulic design engineers will follow the same process for compliance with the PCSP.

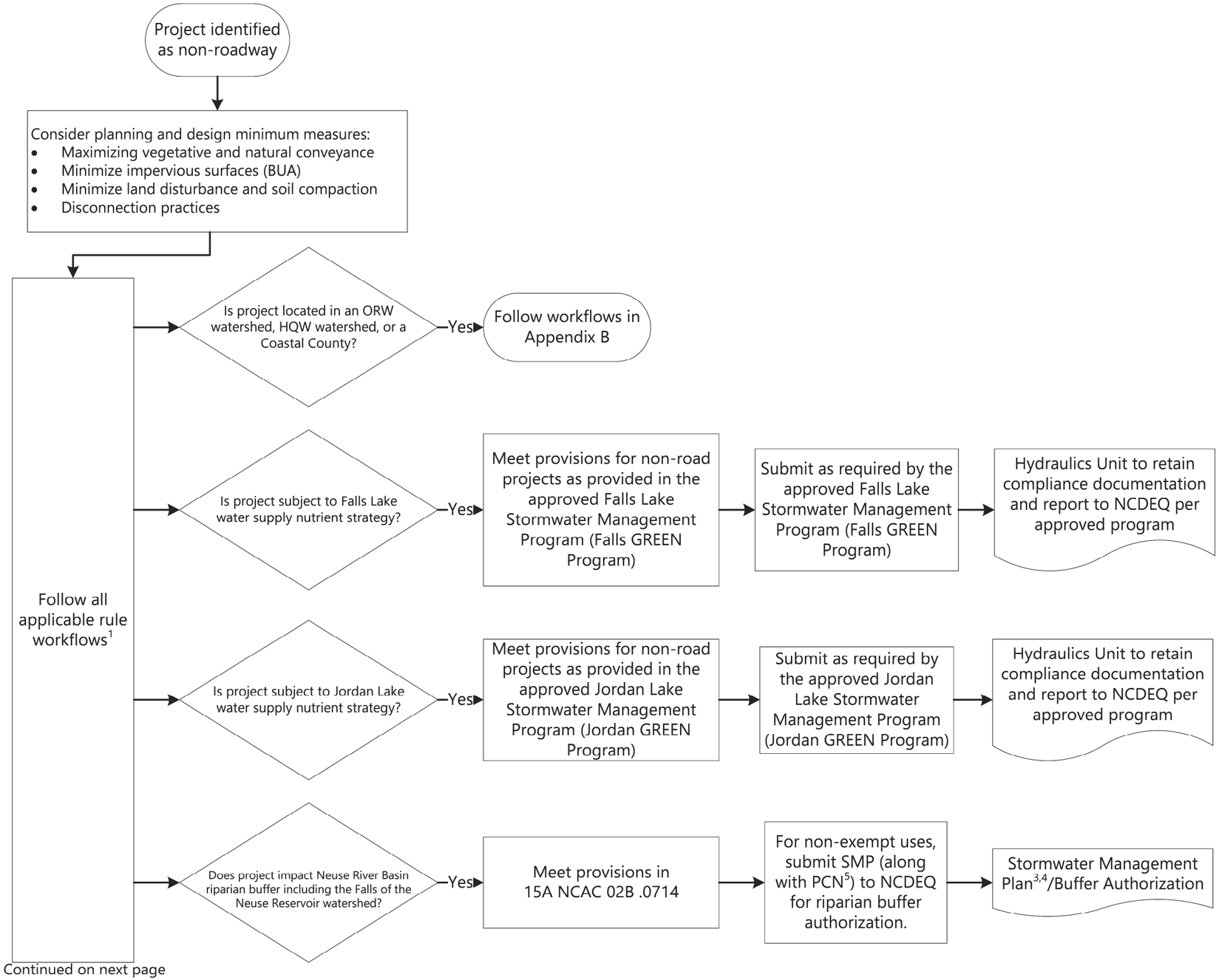
Non-Roadway Participating Groups

- NCDOT Units, Divisions
- Hydraulics Unit
- Regulatory Agencies
- Facilities Management

[4] This table provides examples of new non-roadway development projects and is not intended to be an exhaustive list. Project examples assume a net increase of new built-upon area.

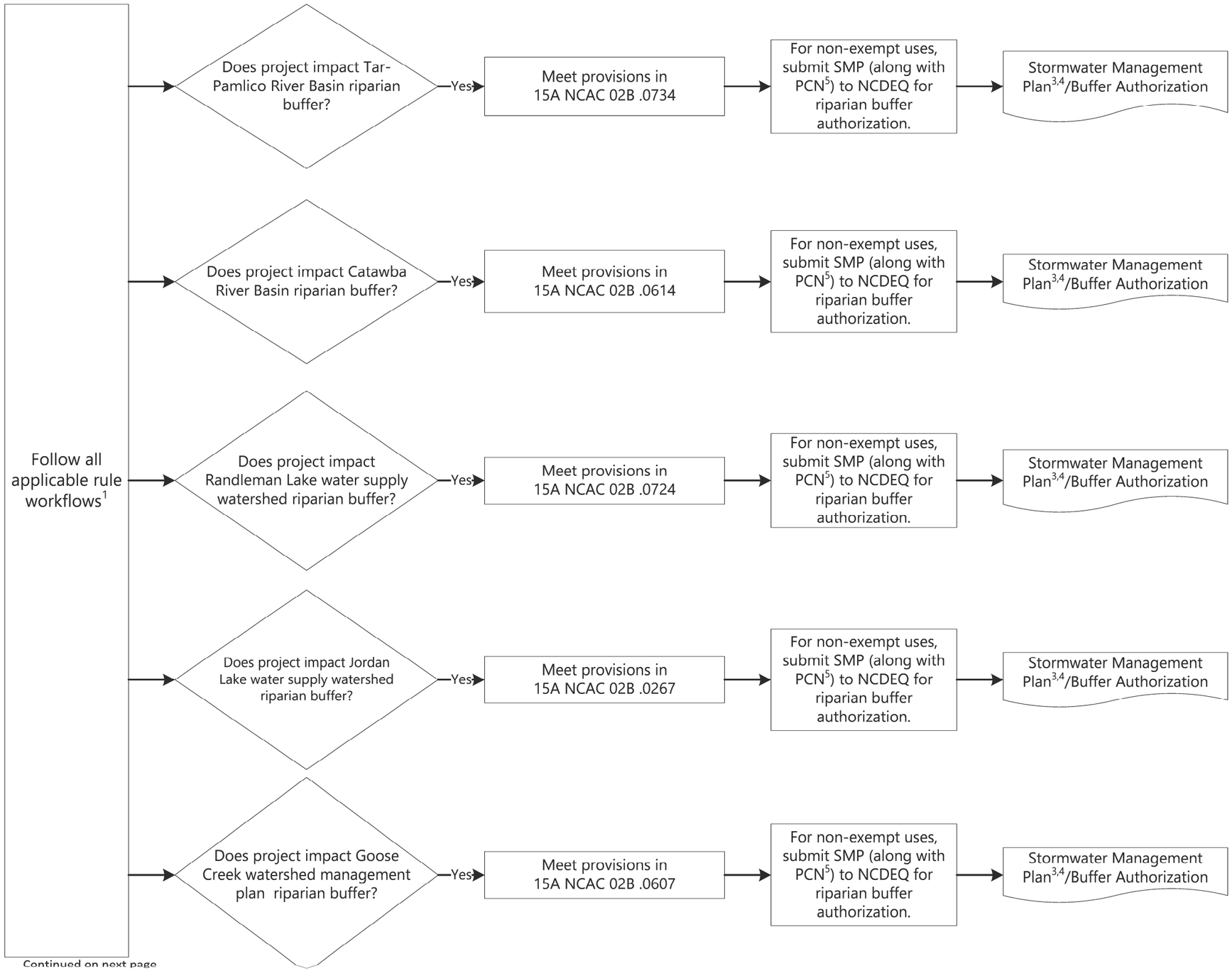
There are many regulatory programs requiring permits, authorizations, certifications, or approvals that include post-construction stormwater requirements. A list of programs that may impact non-roadway projects is provided in Table 1.2 in Chapter 1. The programs listed in Table 1.2 were designed to protect water quality and best uses of the receiving stream. Therefore, receiving permits, authorizations, certifications, or approvals from these programs is deemed protective of water quality standards. In addition to the post-construction requirements of these programs and guidelines, minimum measures are also considered for implementation on all projects involving new BUA.

Figure 3.1 PCSP Process for Non-Roadway Development



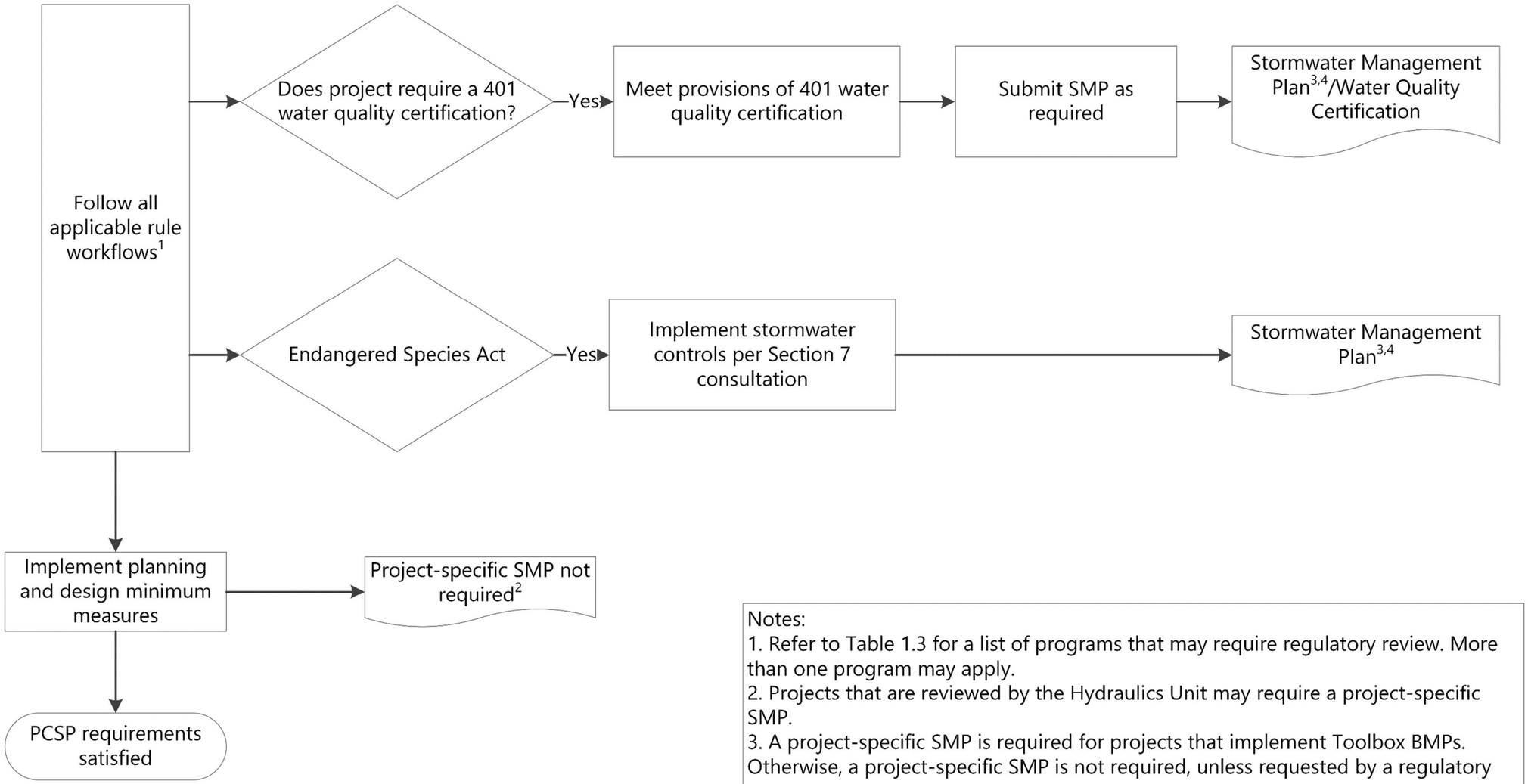
Continued on next page

Figure 3.1 PCSP Process for Non-Roadway Development, continued



Continued on next page

Figure 3.1 PCSP Process for Non-Roadway Development, continued



Notes:
1. Refer to Table 1.3 for a list of programs that may require regulatory review. More than one program may apply.
2. Projects that are reviewed by the Hydraulics Unit may require a project-specific SMP.
3. A project-specific SMP is required for projects that implement Toolbox BMPs. Otherwise, a project-specific SMP is not required, unless requested by a regulatory agency.
4. Copies of the SMP should be saved in the project folder and sent to the Hydraulics Unit per instructions in the SMP form.
5. Pre-Construction Notification.

3.3 Minimum Measures for Non-Roadway Projects

Planning and design minimum measures are implemented on every non-roadway project. Implementation of minimum measures on projects that are not subject to state stormwater program requirements, PCSP guidelines, or otherwise do not implement structural BMPs is considered protective of water quality and adequate for compliance with the PCSP. No specific documentation is required for projects that only implement minimum measures. Examples of minimum measures NCDOT strives to implement on non-roadway projects are provided below.

Maximizing Vegetative and Natural Conveyance

Definition:
Preserving natural flow paths, utilizing existing vegetative features, directing stormwater flows across vegetated areas, and selecting vegetated swales for conveyance of flows.

Incorporating vegetation into the drainage design promotes infiltration, sedimentation, and filtration through natural processes. Maximizing vegetative and natural conveyance is a minimum measure where vegetated features, natural or existing and/or engineered, are preferentially selected for runoff conveyance to take advantage of the stormwater treatment benefits. Examples of this minimum measure include selecting a swale over pipe conveyance and selecting vegetated options for channel linings where appropriate, or site selection and project siting considerations that utilize natural flow paths in lieu of engineered conveyances.

Key Considerations:

- To the extent possible, the designer should maintain small drainage areas to support greater use of vegetative conveyance.
- If existing drainage features are utilized, the designer should check the stability of features receiving flow. Appropriate energy dissipation should be provided if necessary.
- Evaluate vegetated options for channel linings before considering other lining types.

Minimize Impervious Surfaces (BUA)

Definition:
Use design practices to reduce impervious surfaces such as roads and parking areas.

Impervious surfaces reduce infiltration and increase runoff rate and volume. Reducing the amount of impervious cover provides direct stormwater benefit by decreasing pollutant loading and reducing treatment needs. Parking areas can be minimized by considering the use of smaller parking stalls, providing overflow parking areas with pervious paving materials, or alternative designs, such as one-way aisles with slanted parking stalls. Road area can be reduced by considering narrower travel lanes and examining alternative design options to reduce road length.

Key Considerations:

- Safety of the travelling public must always be the foremost design concern. Safe roadway width and safe traffic flow patterns should be maintained.

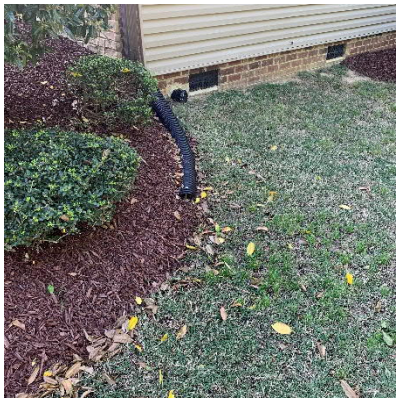
Minimize Land Disturbance and Soil Compaction

Definition:
Minimize site footprint and soil compaction through planning and design practices.

Minimizing land disturbance can improve water quality by preserving existing vegetation and conserving natural areas and open spaces to maintain natural infiltration rates. Overly compacted soils lose valuable stormwater functions such as cycling nutrients, minimizing runoff and erosion, and adsorbing and filtering pollutants. Soil compaction can be minimized by specifying elements of construction on design plans to improve standard construction practices such as limiting construction traffic locations to delineated access routes outside of proposed infiltration areas (grass swales, natural areas, etc.). Soil compaction can also be reduced by minimizing stockpiling and material storage areas. Soils should be considered for restoration with proper post-construction tilling in order to improve permeability. Disturbed area can be further reduced through design practices. Siting buildings, roads, and other relevant infrastructure to fit into existing topography can reduce site grading and removal of existing vegetation. Valuable natural or environmentally sensitive areas should be identified and preserved during the design process. These areas should be marked on permits, plans, and at the construction site so that they can be preserved.

Key Considerations:

- Safety of the travelling public must always be the foremost design concern. Appropriate roadway alignments and profiles should be maintained.
- Consideration should be given to not impede construction practices such that costs are negatively impacted.

Disconnection Practices	
Definition: Discharge impervious surfaces to pervious receiving areas instead of to stormwater conveyance systems. 	Disconnection practices promote treating stormwater close to the source. Integrating small scale practices throughout the site and treating close to the source help reduce or eliminate the need for a centralized structural stormwater control measure. Roof drains, roadways, and other impervious areas should be disconnected from stormwater conveyance systems wherever feasible. For example, roof drains can discharge to vegetated or infiltrative areas, or integrate with another BMP, such as a cistern. Roads with shoulder sections that run off into vegetated areas should be considered in lieu of curb and gutter systems. Key Considerations • Connecting to stormwater conveyances may be more appropriate in areas with highly erodible soils.

3.4 Implementation of Toolbox BMPs for Non-Roadway Projects

After consideration of planning and design minimum measures, appropriate BMP(s) should be evaluated for non-roadway projects based upon site-specific needs. If the project is located in selected watersheds, requires a 401 water quality certification, or is subject to the Endangered Species Act, as outlined in Figure 3.1, the hydraulic design engineer should follow that workflow to determine appropriate BMPs. If the project is not subject to any of these requirements, the hydraulic design engineer should appropriate minimum measures. In all cases, when BMPs are planned, site-specific characteristics such as site configuration, drainage patterns, cost, and maintenance requirements should be considered.

Approved BMPs and their design criteria provided in the BMP Toolbox may be used on non-roadway projects as well as roadway projects. The BMP Toolbox and the BMP Decision Support Matrix are available on the Connect NCDOT website. For BMPs not included in the BMP Toolbox, approval from State Hydraulics Engineer is required prior to implementation. Coordination of BMP selection with the Hydraulics Unit is strongly encouraged for every project in order to discuss operation and maintenance issues and to coordinate efforts with other NPDES programs as needed.

The hydraulic design engineer shall also consult with the Hydraulics Unit in cases where the required BMP design criteria cannot be met. In some instances, deviation from design criteria is needed due to site constraints or other factors. While selected BMPs are implemented to the MEP, requirements for non-roadway projects are more prescriptive, so appropriate site planning is important in order to provide for BMPs.

For projects requiring regulatory review, the hydraulic design engineer should identify applicable stormwater controls with the appropriate reviewing agencies to reach agreement on the design approach. See Chapter 3, Section 3.5 for additional discussion.

3.5 Projects Requiring Regulatory Review

In addition to consideration and application of the minimum measures, non-roadway projects subject to specific stormwater programs and guidelines as identified in Figure 3.1 may be required to implement Toolbox BMPs or other stormwater controls to the MEP. These stormwater programs and guidelines are designed to protect the intended uses of sensitive or significant waters in North Carolina. Regulators have an opportunity to review the potential impacts to surface waters during the review of permit packages required for receipt of permits, authorizations, certifications, and approvals with these programs. Therefore, issuance of a permit, authorization, certification, or approval associated with any of the stormwater programs and guidelines is considered confirmation from regulatory agencies that stormwater management efforts are appropriately protective of surface waters. In addition, any permits, authorizations, certifications, or approvals are considered documentation of PCSP compliance for a non-roadway project.

The applicable participating groups must coordinate to verify which post-construction stormwater rules apply to their project and collaborate on project-specific solutions, as well as identify permitting and submission requirements. Guidance is provided in Figure 3.1 on program, submission, and documentation requirements. In the event of overlapping rules, generally, the most stringent rules shall apply. A pSMP is not required for non-roadway projects, but the PCSP participating groups may choose to develop one to facilitate review and discussion if preferred.

Upon completion of the consultation, agreed-upon Toolbox BMPs or stormwater controls to be implemented for the project must be documented in the SMP. The final SMP should be provided to the regulatory agency if required or requested. In addition to the SMP, the hydraulic design engineer should confirm that copies of exclusion

letters, permits, authorizations, certifications, and approvals for all other applicable environmental permits have been retained in the project files. Issuance of these items conveys that appropriate authorities have reviewed the SMP and deem the post-construction stormwater management approach appropriate for the protection of surface water quality standards.

See additional information in Chapter 4.

3.6 Projects Not Requiring Regulatory Review

Non-roadway projects which do not require regulatory review may still require Toolbox BMPs in addition to implementing minimum measures where feasible. Figure 3.1 directs the hydraulic design engineer to determine appropriate requirements and external guidance which must be followed for some stormwater programs. The applicable participating groups are encouraged to coordinate with the Hydraulics Unit to verify which design criteria apply to their project, the application of BMPs to the MEP, and information to be provided in the SMP. Participating groups have the option to consult with NCDEQ on a case-by-case basis as needed to promote the protection of water quality standards.

For projects where Toolbox BMPs are needed, a project-specific SMP must be completed. The Toolbox BMPs implemented for the project should be documented in the SMP. Any site-specific constraints that resulted in deviations from BMP Toolbox design standards should also be documented in the SMP and a description should be provided of how the implemented structural BMPs protect water quality standards.

3.7 Documentation Requirements

A pSMP is not required for non-roadway projects but can be used to facilitate conversations within the PCSP participating groups, if preferred. For projects that plan to implement Toolbox BMPs or other stormwater controls, an SMP must be completed. For projects requiring regulatory review, provide the SMP to the appropriate regulatory agencies for review if required or requested. After determination of necessary Toolbox BMPs or other stormwater controls has been finalized, the SMP should be updated to reflect the final agreed-upon decisions. Details regarding Toolbox BMPs should be documented in the SMP regardless of why they are being implemented. See additional information regarding documentation requirements in Chapter 4 of the PCSP manual and instructions for submitting the SMP in the SMP form.

In addition to the SMP, the hydraulic design engineer should confirm that the Natural Environment Lead (or the Division Environmental Officer) has retained copies of exclusion letters, permits, authorizations, certifications, and approvals for all other applicable environmental permits, as discussed in Chapter 4. Issuance of these items conveys that appropriate authorities have reviewed the SMP and deem the post-construction stormwater management approach appropriate for the protection of surface water quality standards.

For projects where Toolbox BMPs were not implemented and minimum measures are adequate for protection of water quality standards, no specific documentation is required unless requested by a regulatory agency or the hydraulic design engineer otherwise chooses to document stormwater management decisions for a project.

4.1 Introduction

Because the stormwater management outcome is often project-specific, a critical component of the PCSP is documenting adherence to the established goals and requirements at the project level. The primary function of adequate record-keeping is to document agreed-upon stormwater management decisions and justifications made by the appropriate PCSP participating groups for each project. These records then provide for easily accessible PCSP-related information, which facilitates proper assessment of NPDES permit compliance during periodic regulatory audits of the stormwater program.

Given that post-construction stormwater management for NCDOT projects is not a one-size-fits-all solution and that project requirements are established and addressed on a case-by-case basis, the required PCSP documentation will consist of a variety of documents. PCSP documentation requirements are provided in Chapter 2, Section 2.7 for roadway projects and in Chapter 3, Section 3.7 for non-roadway projects. In general, no project-specific PCSP documentation is required if a project meets all of the following three criteria: the project does not require regulatory review; the project does not meet or exceed the appropriate roadway or non-roadway thresholds established in Appendix A and Appendix B, respectively; and the project does not involve or change existing drainage design. Figures 2.1 and 3.1 specify when no documentation for PCSP compliance is required.

For all other NCDOT projects, project-specific SMPs must be developed and retained for each project, along with their associated attachments, as discussed below. Project specific pSMPs are also required for roadway projects. pSMPs and SMPs are specific to NCDOT and should not be confused with SMPs mentioned as requirements for other environmental programs. The pSMP should be developed concurrently with the Hydraulic Planning Report (HPR). The Post-Construction Stormwater Program (PCSP) workflows and the NC-SELDM Catalog are used to establish stormwater treatment goals for the project at each receiving water. These preliminary stormwater treatment goals are documented in the pSMP as part of planning activity 2HY1 in NCDOT's Project Delivery Network. As the hydraulic design engineer progresses through the design process for the project, the final determination of the need and feasibility of BMPs is documented in the SMP. Hence, the PCSP, BMP Toolbox, pSMP and SMP work as a system to ensure the protection of water quality standards for new built-upon area.

In addition to the pSMP and SMP, there are many other forms of project-specific documentation that, if applicable to the project, should be retained to document

compliance with the PCSP including permits, authorizations, certifications, variances, and other regulatory approvals.

This chapter provides further guidance on the purpose and preparation of project-specific SMPs, summarizes other forms of project-specific PCSP compliance documents, and discusses documentation retention and retrieval requirements.

4.2 Preliminary Stormwater Management Plan

The purpose of the pSMP is to establish stormwater treatment goals for roadway projects early in the hydraulic planning process in order to inform subsequent drainage design decisions, as well as decisions by other disciplines such as Right-of-Way, Utility Coordination and Design, Geotechnical, etc. A pSMP is completed as part of activity 2HY1 in the Project Delivery Network anytime an SMP is needed, per the PCSP manual guidance. Detailed instructions for the preparation of the pSMP are available on the "Overview" and "Guidance" tabs of the SMP form. To facilitate the project workflow, the pSMP consists of the tabs "General Project Information" and "Waterbody Information" of the SMP form.

The pSMP is used to document characteristics of waterbodies in the project area, and record from the determination of need for stormwater BMPs as established by the PCSP workflows and the NC-SELDM Catalog. Once the "General Project Information" and "Waterbody Information" tabs are complete, the pSMP establishes the stormwater treatment goals for the project, which helps inform subsequent drainage design decisions and establish reasonable expectations for hydraulic design engineers and, if applicable, regulatory approvers.

4.3 NC-SELDM Catalog

Completion of the pSMP includes a preliminary determination if Toolbox controls are needed for each project stream crossings of, or outfall to the receiving waters, based on guidance from Figure 2.1 for roadway projects and Figure 3.1 for non-roadway projects. It should be noted that the hydraulic design engineer must evaluate each blueline stream crossing as shown on the StreamStats application which may be different than the major stream crossings reported in the Hydraulic Planning Report (HPR). To aid in the preliminary BMP selection, NCDOT collaborated with the US Geological Survey (USGS) to develop a North Carolina version of USGS's Stochastic Empirical Loading and Dilution Model (SELDM) using stream data from North Carolina waterbodies. This model evaluated the potential risk to water quality from post-

construction roadway runoff by modeling over 70,000 roadway projects and receiving stream characteristics to develop a streamlined NC-SELDM Catalog. Using data from StreamStats and preliminary design plans, the NC-SELDM Catalog outputs a preliminary determination that either a direct discharge may be acceptable, minimum measures are sufficient, or a BMP Toolbox control measure may be necessary. The NC-SELDM determination for each crossing or outfall should be documented under the "General Project Narrative" section of the "General Project Information" tab in the pSMP. The NC-SELDM Catalog includes a "Detailed Instructions" tab for guidance on its use. The NC-SELDM Catalog may also be helpful to evaluate outfalls that have a potential to impact the receiving waters even if not located at stream crossings, such as outfalls from roads running parallel to streams.

The NC-SELDM Catalog assessment at each project stream crossing or outfall, results in one of three output responses. These are indicated below along with a description of actions the hydraulic design engineer should consider.

- The NC-SELDM Catalog output of DirectDischarge indicates a low likelihood that runoff from the transportation facility will degrade water quality in the receiving stream. This can be useful information when evaluating whether a distributed direct discharge from a long bridge may be appropriate, for instance. Even if stormwater discharges are not predicted to impact water quality, the hydraulic design engineer is still expected to implement minimum measures where feasible. Additionally, the hydraulic design engineer may also select a Toolbox BMP if site-specific considerations not factored into the NC-SELDM Catalog analysis (e.g., channel instability) warrant such an approach.
- The NC-SELDM Catalog output of MinimumMeasures indicates a possibility that runoff from the transportation facility could degrade water quality, but minimum measures as described in Chapters 2 and 3 are expected to be sufficient to mitigate the risk. This can be useful information if the hydraulic design engineer is uncertain as to the level of treatment needed at the crossing. An output of MinimumMeasures does not prevent the hydraulic design engineer from selecting a practice from the BMP Toolbox manual if site-specific conditions warrant such an approach.
- The NC-SELDM Catalog output of BMPtoolbox indicates a possibility that runoff from the transportation facility could degrade water quality and one or more practices from the BMP Toolbox manual should be considered for the crossing. This information can be useful in the early stages of hydraulic design for planning ROW or permanent drainage easement needs to facilitate long term maintenance. This information also assists the engineer in planning for additional field data collection, e.g., seasonal high water table, infiltration rates, or other design parameters. The hydraulic design engineer should consult the BMP Decision Support Matrix to

identify potential BMP types to address parameter(s) of concern that are identified from the waterbody's classification or its impairment. This information will have already been documented in the "Waterbody Information" tab of the pSMP. The BMP Decision Support Matrix can also be consulted for preliminary guidance on BMP suitability to siting constraints and other implementation considerations.

As noted above, the pSMP, through the use of PCSP workflows and the NC-SELDM Catalog, establishes the stormwater quality treatment goals for the project at each crossing or outfall to assist in planning for the hydraulic design. It is important to note, however, that the NC-SELDM catalog output does not factor in certain site-specific parameters, such as the susceptibility of the receiving channel to erosive flows, which may significantly affect stormwater management decisions. Hence, the hydraulic design engineer should consider the pSMP as a planning tool and not the final determination for compliance with the NPDES permit, 401 certification, or rule 15A NCAC 04B .0109 for Stormwater Outlet Protection.

4.4 Stormwater Management Plans

The SMP, when finalized, documents the stormwater control measures applied to the project and establishes the project's compliance with the MEP standard. Chapter 2, Section 2.7 and Chapter 3, Section 3.7 provide guidance as to when an SMP is required for projects and what type of information should be included in the SMP for each type of project (i.e., roadway and non-roadway). The SMP is a comprehensive document that summarizes project information, potential impacts, post-construction source control, and treatment measures selected to mitigate impacts. The SMP serves the following purposes:

- Demonstrates that stormwater runoff from the project site does not threaten water quality, controls runoff by minimizing built-upon surfaces, diverts stormwater away from surface waters as much as possible, and employs BMPs to minimize water quality impacts as required.
- Communicates how post-construction stormwater controls function and the reasoning behind the selection of BMPs.
- Catalogs proposed locations and other information on BMPs for future use.

Information in the pSMP should be used as a resource as the hydraulic design engineer progresses from development of the preliminary hydraulic recommendations (activity 2HY1) through the complete hydraulic design (activity 3HY1) within NCDOT's Project Delivery Network, to the final drainage design. As part of activity 3HY1, a final SMP should be prepared for NCDOT projects across the state that add built-upon area or

involve the replacement of an existing bridge with a culvert. The SMP includes a 'Bridge to Culvert' worksheet (tab) which prompts the engineer to document information typically important for project permitting such as avoidance and minimization efforts, aquatic life passage, culvert alignment, and outlet velocities. For projects which include one or more structural stormwater BMPs, worksheets (tabs) are provided in the SMP which allow the hydraulic design engineer to enter the pertinent design information specific to each BMP.

When the results of the NC-SELDM Catalog indicate minimum measures or practices from the BMP Toolbox are recommended for any specific highway-stream crossing, the hydraulic design engineer is required to evaluate the application of these controls while developing the preliminary drainage design. The hydraulic design engineer should be aware that any deviation from the results of the pSMP or design guidelines in the PCSP Manual or BMP Toolbox will need to be documented in the final SMP form upon completion of design. The hydraulic design engineer should document in detail in the SMP the reasons that the recommendations of the pSMP were not able to be followed. Similarly, if a BMP design deviates from the criteria in the BMP Toolbox, the hydraulic design engineer should document in the SMP the justification for the design deviation, such as any project constraints or other considerations. Additionally, any determinations made with the resource agencies should be recorded in the SMP. The SMP is the NPDES permit compliance document of record for the MEP standard. In the context of NCDOT's Hydraulic Guidelines, implementation of project commitments plus implementation of the PCSP constitutes attainment of the MEP standard for reducing the discharge of pollutants from NCDOT projects.

In addition to the stormwater controls recommended through the pSMP, additional controls should be considered as mitigation measures for outlets that are determined to be critical to downstream receiving areas as discussed in the outlet analysis section in Chapter 10, Section 10.5.3 of the Hydraulic Guidelines. Coordination with the Roadway Design, Geotechnical, Right-of-Way, Utility Coordination and Design and other disciplines may be needed to complete stormwater control designs without delaying project delivery. These controls should also be documented in the SMP.

See the "Overview" tab of the SMP form for instructions on submitting the SMP. The pSMP and the final SMP should be maintained as two separate documents in the project files.

4.4.1 Resources for Developing the pSMP, NC-SELDM Catalog, and SMP

Before developing the pSMP and NC-SELDM Catalog for a project (if required), the hydraulic design engineer should gather all available resources. Table 4.1 describes some recommended resource documents but is not an all-inclusive list. These resources contain information pertaining to environmental designations of surface waters, potential environmental impacts of proposed roadway alternatives, and any environmental commitments NCDOT has agreed to as part of the Merger Process. Guidance documents in Table 1.2 should also be referred to when developing the pSMP and NC-SELDM Catalog documents. Additionally, the documents in Table 1.2 and Table 4.1 can be used to finalize the SMP. Resources used to complete the pSMP and SMP should be recorded in those documents.

Table 4.1 Useful Resources for Developing the pSMP and NC-SELDM Catalog and Completing the SMP

Resource	Responsible PCSP Participating Group	Description
Final Environmental Impact Statement (EIS), Environmental Assessment (EA), or Categorical Exclusion (CE)	EPU or NCDOT Division Project Manager	These documents, also referred to as the *environmental documents*, outline the human, environmental, and cultural impacts (or lack thereof) expected from the project. These documents are necessary to obtain any required federal permits.
Project Special Commitments, aka Green Sheets	EPU or NCDOT Division Project Manager	These sheets, typically part of the EIS or EA, list any environmental commitments agreed to by NCDOT and other agencies. The green sheets may stand alone and are kept with the design plans throughout construction of the project.
Preliminary Hydraulic Planning Report (HPR)	Hydraulics Unit	This report is developed for all projects in the project planning phase and provides recommendations for the design of major drainage structures. It establishes design parameters, risks, assumptions, avoidance and minimization measures, and existing stormwater treatment devices; and provides preliminary hydraulic recommendations for major crossings (such as bridge or culvert) on a project.

Table 4.1 Useful Resources for Developing the pSMP and NC-SELDM Catalog and Completing the SMP, cont.

Resource	Responsible PCSP Participating Group	Description
Meeting minutes from merger screening and concurrence point meetings	EPU, NCDOT Division Project Manager, and Hydraulics Unit	For merger projects, meeting minutes are prepared for the merger screening and concurrence point meetings. These minutes summarize all meeting discussions and provide a history of project planning decisions.

4.4.2 SMP Form Content

A brief description of each section of the SMP tool is provided in Table 4-2. As noted above, the pSMP consists of the tabs "General Project Information" and "Waterbody Information" of the SMP form.

Table 4.2 SMP Tool Content Summary

Overview
This section of the SMP form provides an introduction and gives general instructions for completing the pSMP and the SMP.
Guidance
This section of the SMP form contains detailed guidance for each element contained in the form. The hydraulic design engineer can reference this section to answer frequently asked questions about terms and parameters used with the SMP.
General Project Information
In this section of the SMP, the hydraulic design engineer should include information about the environmental designations of the project site, a description of the existing roadway (if any), and a description of the proposed project. This information should support the stormwater management decisions outlined in the Best Management Practices section of the SMP and provide a historical record of the site condition at the time of the project design. Information about the project location, including the river basin(s) and if it's located in a CAMA county, is also recorded here. Finally, information pertaining to the existing roadway characteristics and the proposed project description, such as surrounding land use, roadway typical sections, and the added BUA, should also be noted in this section.

Table 4.2 SMP Tool Content Summary, cont.

Waterbody Information
Significant environmental designations that apply to the project site, such as the surface water bodies crossed by the project, should be included in this section. These include specific stream identification numbers, surface water classifications, riparian buffer protection rules, total maximum daily loads (TMDLs) or 303(d)-listed streams, and whether the project is under the jurisdiction of the CAMA. Additionally, details about the inclusion of bridges and deck drain discharges are included in this section.
Best Management Practices
The SMP form includes several additional sections for the documentation of specific types of structural BMPs, with additional tabs for other Toolbox BMPs and non-Toolbox BMPs. Information about structural BMPs planned for the project should be provided in the applicable tab. The BMPs should be identified in these sections by station and sheet number. To aid in design, checklists, located in Appendix A of the BMP Toolbox, have been developed for each approved BMP type. Design criteria are also summarized within the SMP form in a bulleted list at the top of each BMP section. At the bottom of each BMP section, the designer should include comments or design assumptions as to how the BMP functions to improve water quality, why this BMP was selected, if and why any BMP did not meet the minimum design criteria, and any project-specific information pertaining to the BMP (e.g., how BMP location may impact performance).

4.5 Other Project-Specific PCSP Compliance Documents

In addition to the pSMP and SMP, there are other forms of project-specific documentation that should be maintained to confirm compliance with the PCSP on a project-by-project basis. These documents include exclusion letters, permits, authorizations, certifications, variances, and other regulatory approvals that involve post-construction stormwater management for new BUA. These documents and any other documentation of final PCSP decisions and associated regulatory approval should be retained and managed as discussed in Chapter 4, Section 4.4. Table 4.3 below lists some of the regulatory approval documents that may involve post-construction stormwater management; also provided in the table are the PCSP participating group(s) expected to maintain records for each document. While not exhaustive, this summary exemplifies the types of documents that should be retained for document compliance with the PCSP for specific projects.

Table 4.3 Forms of Project-Specific PCSP Compliance Documentation

Document	Responsible PCSP Participating Group(s)	Description/Purpose
NCDOT Jordan/Falls Lake Stormwater Load Accounting Tool (JLSLAT)	Hydraulics Unit	In accordance with the Jordan Lake Rules, Falls Lake Rules, and NCDOT's Guided Reduction of Excess Environmental Nutrients (GREEN) Program, non-roadway projects that rely on the use of NCDOT-JLSLAT should be certified by a North Carolina licensed professional; the certification will affirm that the tool was used in conformity with the Environmental Management Commission (EMC)-approved version or another method acceptable to NCDEQ. Site plan and NCDOT-JLSLAT reviews will be supervised through NCDOT's Hydraulics Unit.
401 Water Quality Certification	EAU –ECAP Section or Highway Divisions	Stormwater conditions and requirements may be included as part of General Certifications GC4132, GC4135, GC4136, GC4139, GC4140, and GC4141.
Isolated and other Non-404 Jurisdictional Wetlands and Waters Permit	EAU – ECAP Section or Highway Divisions	Stormwater conditions and requirements are included in the State General Permit for Impacts to isolated and other Non-404 Jurisdictional Wetlands and Waters Permit number IWGP100000
Coastal Area Management Act (CAMA) Permit	EAU – ECAP Section or Highway Divisions	Projects located in the coastal counties may require a CAMA permit if impacts to Areas of Environmental Concern (AECs) occur from the proposed project. A description of existing and proposed storm water management or treatment systems is required as part of the permit application.
Categorical Exclusion (CE)	PMU, EPU, Structures Management Unit, or Highway Divisions	CEs are actions which, based on past experience, do not involve significant environmental impacts and do not require the preparation of an EA or an EIS. While the list of approved CE activities does not include specific stormwater actions, as part of the preparation of the CE document, potential stormwater issues and applicable permits will be identified based on preliminary mapping.

Table 4.3 Forms of Project-Specific PCSP Compliance Documentation, cont.

Document	Responsible PCSP Participating Group(s)	Description/Purpose
Environmental Assessment (EA)	EPU or Highway Divisions	An EA is a document prepared to satisfy the requirements of the NEPA. An EA is prepared for actions that are not CEs and that do not clearly require the preparation of an EIS. The EA includes the need for the proposal, alternative courses of action, environmental impacts of the proposed action, and a listing of agencies and persons consulted. If applicable, the EA will identify potential stormwater issues and applicable permits based on preliminary mapping.
Environmental Impact Statement (EIS)	EPU or Highway Divisions	An EIS is a document prepared to satisfy the requirements of the NEPA. An EIS is prepared when FHWA determines that the action is likely to cause significant impacts on the environment. Based on both agency expertise and issues raised by the public, NCDOT prepares a Draft EIS with a full description of the affected environment, a reasonable range of alternatives, and an analysis of the impacts of each alternative. The Draft EIS is followed by the Final EIS, and then a Record of Decision. If applicable, the Draft EIS will list potential stormwater issues and applicable permits based on the preliminary mapping.

4.6 PCSP Documentation Retention and Retrieval

Documenting compliance with the PCSP involves maintaining records of compliance documents as outlined by this guidance and based on the record retention policies set forth in NCDOT's NPDES stormwater permit, which requires that records of documentation for all monitoring, measurements, inspections, maintenance activities, and training must be kept for a minimum of five years.

Documents associated with project-specific PCSP compliance should be maintained within the ATLAS Workbench, with other digital project files, or at another accessible location for a minimum time period of five years from the completion of the project. SMPs should be retained indefinitely.

Project completion should be established on a project-by-project basis and is generally defined as the date when a project transitions from the construction phase to the post-construction (or maintenance) phase. This date could be established based on the concurrence with certain events, including the final acceptance of a contractor's work by

NCDOT, the removal of temporary erosion and sediment control measures, or some other event that signifies project completion.

Since SMPs serves as the historical record for PCSP decisions made for the project and are also used to catalog proposed locations and other information for post-construction stormwater controls, these documents should be retained indefinitely, or as long as reasonably possible.

In addition, compliance documents associated with the PCSP should be easily retrievable within a reasonable amount of time. The latest versions of documents for active projects should be evident and easily accessible within the document management system. For completed or archived projects, it is acceptable to retain only final versions of documents to facilitate efficient file organization and management.

Both digital and paper formats are acceptable for storing and maintaining records of compliance documentation; however, digital records are strongly encouraged. If documents are maintained digitally, these records should be stored in a location that conforms to NCDOT electronic backup protocols.

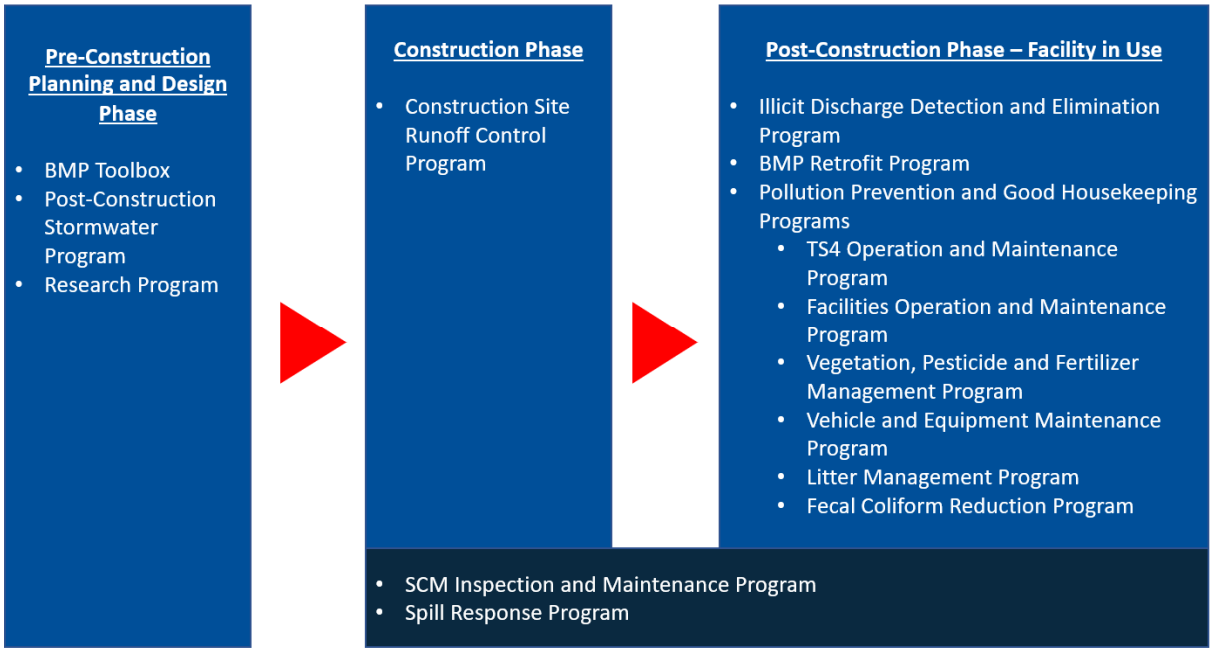
5.1 Introduction

As noted in Chapter 1, existing surface water quality regulations and processes, along with the Department's NPDES permit, necessitate the implementation of the PCSP. Additionally, NCDOT's Mission, as stated in Chapter 1, Section 1.2, identifies environmental sensitivity as a core practice in NCDOT activities, further promoting the principle of the PCSP.

Compliance with the PCSP is sustained by these commitments and through oversight of the Department's activities by regulatory and resource agencies, such as NCDEQ. These actions include review and approval of this document (including subsequent updates) and periodic evaluations of NCDOT's compliance that are performed by NCDEQ. Additionally, NCDOT reports on the status of its PCSP annually through its NPDES reporting requirements.

The PCSP is one of several processes which NCDOT implements to benefit water quality. Other programs associated with the Department's HSP also contribute to ongoing water quality benefits on both roadway and non-roadway projects. These programs, referenced in Figure 5.1 and described below, combined with the pre-construction and post-construction phases of the PCSP, provide guidance to NCDOT staff and contractors and help them understand the department's approach to stormwater management.

Figure 5.1 Highway Stormwater Programs Integration with PCSP



5.2 BMP Retrofit Program

The purpose of the BMP Retrofit Program is to support NCDOT's efforts to be consistent with NPDES post-construction control measures and to use retrofits to address pollutant loading from existing NCDOT roadway and non-roadway facilities. The Retrofit Program directly protects water quality by control and treatment of pollutants of concern with structural and non-structural solutions.

BMP retrofit projects are identified through several processes, including coordination with divisions (which are most aware of the condition and functionality of facilities in their designated area), other NCDOT units, and through desktop analysis. The Retrofits Site Selection Program (ROSS)utilizes geographical information system (GIS) technologies to identify and evaluate potential retrofit sites. The ROSS program promotes consistent, predictable, and sustainable identification of potential retrofits. In general, once potential retrofit opportunities are identified, projects are evaluated according to a predetermined implementation strategy that considers metrics such as project type (structural vs. non-structural), cost, credit status, water quality impacts, opportunity for innovation or research, and project feasibility. If the assessment is positive, control measures are designed and implemented. The implementation of retrofits focuses on providing innovative solutions through collaboration with the Research and Toolbox Programs. Retrofits often test new control techniques or new techniques to design and implement components of a control. The research program provides an opportunity to study and quantify the effectiveness of these approaches. If found to be beneficial, the new approach can be integrated into the *NCDOT Stormwater Best Management Practice (BMP) Toolbox,* also known as the *BMP Toolbox,* and the Retrofit Program can provide feedback on parameters such as cost and constructability.

5.3 BMP Toolbox

The NCDOT BMP Toolbox is designed to aid NCDOT staff and contractors on the siting and construction of BMPs, and it is the primary source of design guidance. NCDEQ reviews and approves the BMP Toolbox. Potential controls (including those used in the Retrofits Program) are regularly evaluated for applicability to NCDOT projects, and if accepted, will be included in subsequent Toolbox updates. Existing controls in the BMP Toolbox are also evaluated on an ongoing basis to promote the use of the latest design trends from research and field experience. Revisions or updates to the BMP Toolbox are submitted to NCDEQ for review.

The Toolbox integrates the findings of the HSP's Research and Retrofit Programs and promotes regulatory compliance by providing implementation guidance for NCDEQ-approved controls. The BMP Toolbox outlines the purpose and appropriate application of BMPs to the transportation system, in addition to documenting the water quality benefits provided by each control. The BMP Toolbox also includes checklists for each BMP type to facilitate standard calculations necessary to design stormwater controls and to document the design process. This information is used during the planning and design phases for the PCSP.

Additional guidance documents were developed to aid in the application of the Toolbox. The BMP Decision Support Matrix provides designers with summary BMP selection criteria combined with parameters of concern, removal efficiency, site constraints, and other implementation characteristics. The BMP Decision Support Matrix aids designers in selecting the appropriate BMP for the project to address parameter(s) of concern that are identified from the waterbody's classification or its impairment. In addition, a Stochastic Empirical Loading and Dilution Model (SELDM) was developed in conjunction with the United States Geological Survey (USGS). The NC-SELDM Catalog is a user-friendly, Excel™-based tool that was built by running over 70,000 project scenarios to arrive at environmentally conservative estimates of the level of treatment needed to avoid water quality degradation. Users input project information to arrive at a suggested treatment approach, which may include the implementation of Toolbox BMPs.

Additionally, the BMP Toolbox integrates with the SCM Inspection and Maintenance (I&M) Program by sharing design information to facilitate operation and maintenance and identifying new BMPs that must be added to the I&M.

As one of its management measures, the PCSP defines the implementation of the BMP Toolbox and a training program to support its implementation.

5.4 Construction Site Runoff Control Program

Implementation of the Construction Site Runoff Control Program, also known as the Construction Program, occurs between the planning and design phases of a project and the project's post-construction period. The primary focus of NCDOT's Construction Program is to minimize NCDOT's construction-related water quality impacts to the environment on sites that disturb greater than one acre of land and borrow pit and waste pile projects; however, sediment and erosion control techniques are routinely

used on smaller projects as well. These techniques reduce deposits of sediments in receiving waters, which can smother benthic organisms and fish beds, as well as affect fish populations.

The Construction Program is based upon the Sedimentation Pollution Control Act of 1973, Chapter 4 of Title 15A of the North Carolina Administrative Code and the subsequent 1974 NCDOT Delegated Erosion and Sedimentation Agreement, and incorporates the applicable requirements of NCGO1, the NC Construction General Permit. Emphasis is placed on meeting the compressed time schedule of seven days for groundcover on perimeter construction stormwater controls and steep slopes. All other slopes and exposed areas will strive to meet the 14 day requirement for groundcover following completion of any phase of grading. Therefore, phased plans for land clearing and establishing vegetative cover, as well as routing interaction with NCDOT's Vegetation Management Section and its associated Pollution Prevention and Good Housekeeping Programs, are critical. See below for more details.

Although NCDOT's Construction Program goes beyond just the construction of stormwater controls, proper construction techniques for BMPs are necessary to facilitate the post-construction success of control and its ability to function as designed. Therefore, NCDOT incorporates information into the BMP Toolbox about construction concerns (e.g., excessive compaction on infiltration rate), and may include critical details about the stormwater controls in the design plans in order to communicate with the construction staff. NCDOT also developed a Field Guide for Post-Construction Stormwater Best Management Practices to provide construction guidance on key features and parts of BMPs. Each chapter describes a specific type of BMP and provides photographic examples of good and not-desired construction practices. The field guide is intended to serve as a resource for NCDOT construction employees, contractors, and other entities concerned with the construction of stormwater BMPs.

In addition, components of the SCM I&M Program, which are discussed below, are initiated during the construction period.

5.5 Pollution Prevention and Good Housekeeping Programs

The Pollution Prevention and Good Housekeeping (PP/GH) Programs consists of several subprograms intended to implement non-structural BMPs to minimize potential

environmental impacts from the operation of NCDOT's roadways and non-roadway facilities. These subprograms include:

- SCM I&M Program
- Spill Response Program
- Collection System Operation and Maintenance Program
- Facilities Operation and Maintenance Program
- Pesticide and Fertilizer Management Program
- Vehicle and Equipment Maintenance Program
- Litter Management Program
- Fecal Coliform Reduction Program

Many of the non-structural BMPs implemented under these programs include routine inspections and maintenance of NCDOT facilities and procedures such as to minimize the potential for negative impacts. More information for a few selected programs closely related to the PCSP are provided below.

5.5.1 SCM Inspection and Maintenance Program

Structural post-construction controls must be maintained on a regular basis in order to operate as designed for their functional lifespan. Therefore, NCDOT has implemented the Stormwater Control Measures I&M Program, which assists in managing both structural and non-structural stormwater controls. Before the close-out of the construction phase, NCDOT

Verification of Adequate BMP Construction

BMPs on NCDOT's roadway and non-roadway projects pass through the planning, design, construction, and post-construction phases and several HSP programs as described in this document. The following steps are involved in making sure the final, constructed BMP is adequate:

- Planning: Toolbox BMPs are selected to protect specific sensitive habitats identified during the corridor selection process.
- Design: Minimum measures are implemented on all projects. Additional Toolbox BMPs are implemented where required to address water quality or control water quantity on a project.
- Construction: Frequent inspections during construction verify the BMPs (including minimum measures) are constructed in order to function as intended. If needed, in-field modifications may be made to address unforeseen issues, but the function and intent of a control is maintained to the MEP. If the control was required under state or federal stormwater regulations, a review and approval from the regulatory agency are sought and a collaborative solution is found before proceeding.
- Inspection and Maintenance: Upon final construction, the minimum measures and structural BMPs are inspected to verify they are functioning as intended prior to acceptance into the I&M Program. Afterward, the controls are routinely inspected and maintenance is performed as needed to sustain performance.

staff involved with the I&M Program will review newly constructed post-construction controls, including those converted from construction BMPs and minimum measures, to assess if they are functioning as intended. If necessary, repairs or modifications are made to post-construction controls before the construction team (either a contractor or NCDOT staff) is released. The control is then documented in the Stormwater Control Management System, a statewide database used to track and record the inspections and subsequent maintenance that is performed on each control.

The HSP has also developed a *Stormwater Control Inspection and Maintenance Manual*, which provides instructions on the inspection and maintenance of structural controls in NCDOT's BMP Toolbox and additional controls that are common in the NCDOT ROW. The manual includes detailed inspection checklists for different types of structural stormwater controls, which allows the inspector to grade the control for functionality and assign a level-of-service. Sediment accumulation, bank erosion, blocked weirs, and litter are among some of the considerations in the grading scale. Controls with low level-of-service grades are prioritized for maintenance, ranging from simple maintenance to significant repairs.

Furthermore, NCDOT periodically holds workshops for staff involved in design, construction, and maintenance to discuss lessons learned and new techniques. This cross-communication has resulted in modifications to design techniques and better understanding of unique construction approaches, which improve the long-term functionality of BMPs.

5.5.2 Spill Response Program

NCDOT maintains a Spill Response Program for its non-roadway facilities that store and/or use materials that have the potential to contaminate stormwater runoff if spilled. NCDOT maintains written spill response procedures and trains staff on these procedures. Spill response practices are primarily applied through the Spill Prevention Control and Countermeasure (SPCC) Plan implemented for facilities with over 1,320 gallons of oil storage capacity.

5.5.3 Collection System Operation and Maintenance Program

The Vegetation Management Section, within the Department's Roadside Environmental Unit (REU), is responsible for developing procedures for the establishment and maintenance of NCDOT's vegetated areas as part of the Collection System Operation and Maintenance Program. This includes turf grasses and other ground covers for

erosion control, ornamental plantings, and existing vegetation along roadway ROWs and non-roadway facilities. Vegetative cover reduces impacts to stormwater quality by increasing stormwater infiltration, trapping sediment within the vegetated area, and reducing erosion.

Under this subprogram, NCDOT also implements an Integrated Roadside Vegetation Management (IRVM) Program to control vegetation, reduce noxious and invasive weeds, and promote wildflowers and rare species. Implementation of the IRVM includes the use of cultural or mechanical control methods to minimize herbicide and fertilizer applications, which directly reduce potential negative impacts to stormwater. Cultural techniques include the selection of native plants or vegetative seed mixes that are appropriate to the season of planting and geographical location of the project. This practice promotes the establishment of a vegetative cover that will be more self-sustaining and require less fertilizer and mowing management. Mechanical controls, which include mowing and trimming of plants to maintain line of sight, promoting roadway safety as well as aesthetics, also are often adequate controls to limit chemical applications. The cultural vegetation management techniques are also routinely used during construction activities to facilitate sediment and erosion control.

5.5.4 Facilities Operation and Maintenance Program

Some non-roadway facilities maintained by the Department house NCDOT's roadway maintenance activities, deicing programs, material storage, and equipment repair activities. These facilities must maintain Stormwater Pollution Prevention Plans (SPPP) which documents the good housekeeping and pollution prevention strategies specific to each location to reduce or avoid impacts on stormwater quality. Often, post-construction structural BMPs are used to control or treat stormwater runoff from these facilities and are documented in the SPPPs. The HSP assists the county maintenance yards to develop and implement their SPPPs, including inspection and educational activities. Through the SPPPs, the industrial facilities contribute to reducing stormwater impacts.

5.5.5 Vegetation, Pesticide, and Fertilizer Management Program

Primarily, NCDOT manages vegetation through a selection of appropriate plant varieties and consideration of site-specific characteristics such as soil productivity, slopes, and safety needs. Vegetation is used to help stabilize soils, preventing erosion as well as improving safety, roadside beautification and protecting Federally threatened and

endangered plant species found along the rights of way. Physical means are used to manage overgrown vegetation, such as mowing and tree trimming to maintain adequate line-of-site for safety purposes.

As a last resort, application of chemical herbicides is used to control vegetation. Under REU's Vegetation, Pesticide and Fertilizer Management Program, herbicides are selected to be most effective with the least environmental impact and are applied in a safe manner by trained and certified staff when the pest plant is in a controllable stage. When feasible, herbicide application is combined with mowing or other direct application techniques, resulting in strategic application directly to the plants which reduces spray application and the potential for over-spray.

5.5.6 Vehicle and Equipment Maintenance Program

NCDOT implements a Vehicle and Equipment Maintenance Program so that its vehicles and equipment are fully functional and safe to operate, as well as to prevent and minimize contamination of stormwater runoff from areas used for vehicle and equipment maintenance activities. NCDOT has an extensive preventative maintenance (PM) program managed by NCDOT's Equipment Unit for state-owned and operated vehicles and equipment. The PM program involves NCDOT staff and/or contractors performing and documenting regular inspections and tests of its vehicles and equipment and operational systems whose failure has the potential to release pollutants into the environment. The PM program is designed to reduce vehicle and equipment breakdowns and failures by making proper and timely adjustments, repair, or replacement of equipment or parts. NCDOT's PM standard operating procedures include both run-time preventative maintenance and other regularly scheduled inspections, cleaning, and minor repairs of vehicles and equipment to prevent and minimize fluid leaks that could contaminate stormwater runoff. NCDOT Equipment Unit staff are trained in proper PM procedures, as well as pollution prevention and good housekeeping practices.

5.5.7 Litter Management Program

This program also identifies events of illegal dumping on NCDOT roadway and non-roadway facilities and coordinates the removal and proper disposal of materials recovered. Several sections within REU oversee and facilitate the removal of solid and hazardous wastes dumped on the roadside by travelers, including the Adopt-A-Highway Program, Division Roadside Maintenance crews, and the Hazardous Waste Engineering

group. Each of these programs uses controls such as visual inspections, litter removal, and educational programs for the public and NCDOT staff.

5.5.8 Fecal Coliform Reduction Program

NCDOT's Fecal Coliform Reduction Program includes various measures to control or minimize, to the maximum extent practicable, sources of fecal coliform from NCDOT non-roadway facilities. NCDOT has installed and maintains numerous Pet Waste Stations at NCDOT Rest Areas, Welcome Centers, and Ferry Terminals for the public to use. NCDOT also has procedures to manage on-site domestic wastewater treatment systems and processes to connect sanitary discharges to public owned treatments works, if feasible.

5.6 Illicit Discharge, Detection and Elimination Program

Through its Illicit Discharge, Detection, and Elimination (IDDE) Program, NCDOT further reduces impacts to stormwater through the identification of illicit discharges and coordination with NCDEQ to eliminate them where appropriate. Illicit discharges are non-stormwater discharges that are not otherwise permitted under the NPDES program. Examples include improper disposal of wastewater, car wash wastewaters, oil or radiator flushing, laundry wastewaters, auto, and household toxins, used oil, and chemical solvents. The benefit of the identification of illicit discharges is the protection of water quality by eliminating these potential hazards and unregulated flows.

As part of the IDDE Program, NCDOT also maintains a TS4 Mapping Program, including existing stormwater outfalls to sensitive waters and outfalls from new construction projects and NCDOT industrial facilities to all surface waters and wetlands. The inventory is used in the PCSP and other permit programs, especially in the identification of outfalls in sensitive waters.

5.7 Guided Reduction of Excess Environmental Nutrients (GREEN) Program

Nutrient reduction rules are in place for the B. Everett Jordan Reservoir (Jordan Lake) for new development, and for Falls Lake for new and existing development. As part of these rules, contributors of nutrients, including NCDOT, are required to reduce their loading of total nitrogen and total phosphorous in order to restore water quality standards in the lakes. NCDOT has chosen to develop and implement a stormwater management program in each watershed. The programs, known as Guided Reduction of Excess

Environmental Nutrients, or GREEN Programs, target the specific NCDOT roadway and non-roadway activities occurring in each watershed and the requirements of each rule. In effect, each GREEN Program establishes a PCSP program within the respective watershed and incorporates many of the same techniques described in this document for stormwater controls.

5.8 NPDES Training

Compliance with NCDOT's NPDES permit and implementation of the programs discussed above requires providing training and guidance to NCDOT employees and contractors. One focus of the training is associated with the implementation of the PCSP Program, including the appropriate selection, design, and construction of stormwater controls and their critical design components for the linear system as described in the NCDEQ-approved BMP Toolbox. Recent guidance includes an update to the SMP form to include the pSMP, the development of a BMP Decision Support Matrix, and collaboration with the USGS to develop the NC-SELDM Catalog. Additional updates to guidance and training are expected as new approved BMPs are incorporated into the BMP Toolbox.

Currently, much of the training is performed through instructional documents, presentations or workshops, and one-on-one conversations about specific projects. One-on-one BMP design training or consultation is provided on an as-needed basis and includes hydraulic design engineers from the Hydraulic Unit and contractors seeking site-specific guidance on selecting and designing BMPs. NCDOT is exploring opportunities for web-based or third-party training to reach additional staff and consultants. NCDOT anticipates that this training will cover when to use the BMP Toolbox and associated support documents, design components for approved BMPs, and the importance of considering maintenance needs and access for the long-term functionality of the BMP. This training will also review the use of NCDOT's pSMP and SMP to document site-specific characterizations, treatment goals, and final decisions for structural BMPs on applicable projects. Additionally, NCDOT anticipates highlighting the LID concepts already in its BMP Toolbox during the training.

STORMWATER MANAGEMENT FOR ROADWAY PROJECTS IN SPECIAL WATERS

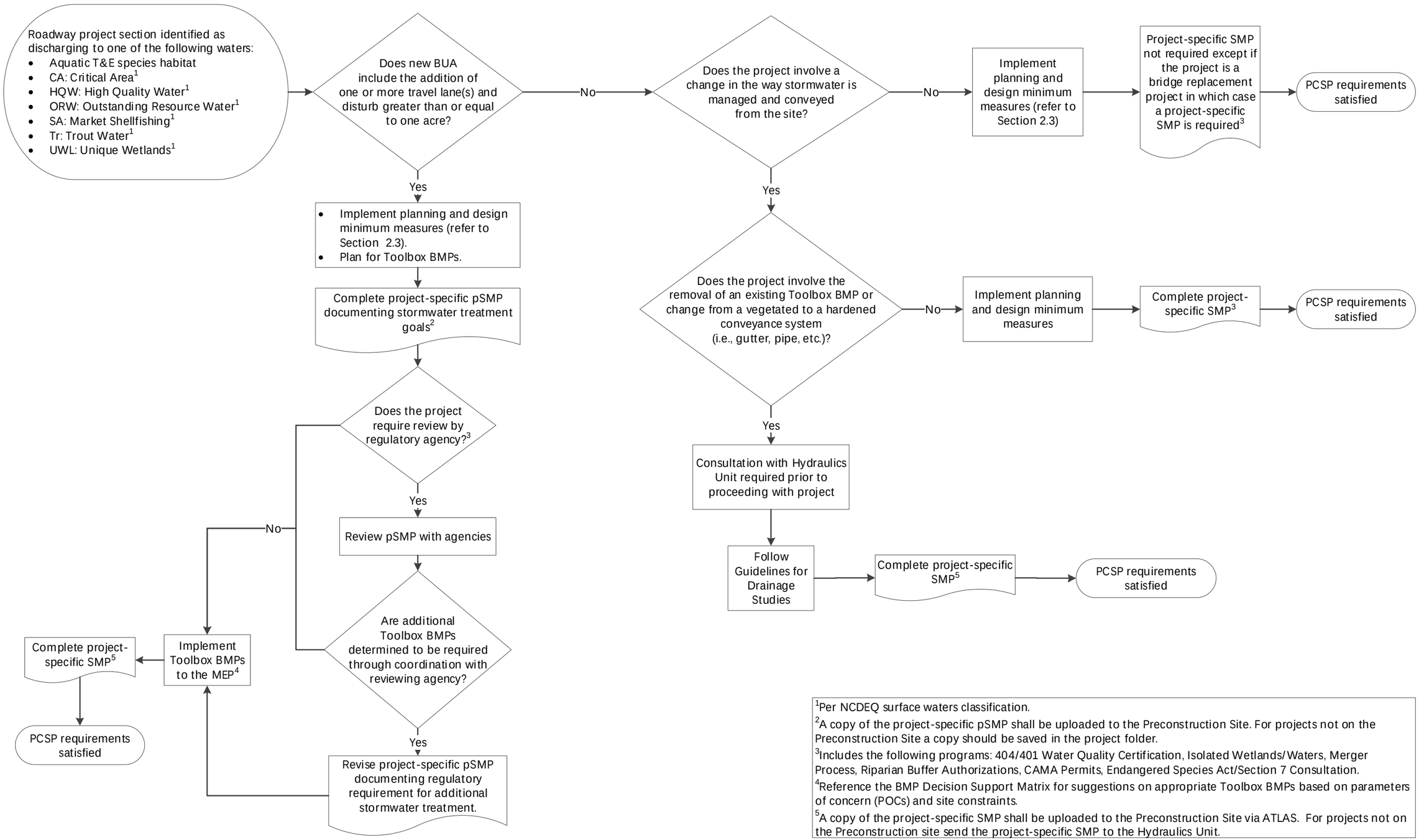
Watersheds with specific classifications and those with aquatic threatened and endangered (T&E) species habitat (or the potential for such habitat) necessitate special considerations. Watersheds with terrestrial T&E species are not included in the assessments. Watershed classifications, including nutrient sensitive waters can be identified using NCDEQ's Surface Water Classification interactive map or NCDOT's ATLAS. Watersheds with habitat for aquatic T&E species are identified in the project's EIS or EA. Other watersheds with the potential for aquatic T&E habitat are identified through use of NCDOT's ATLAS. As directed in Figure 2.1, these special waters must follow the workflow provided below. Special waters include

- Watersheds contain containing aquatic T&E species habitat[5],
- critical areas (CA),
- high quality water (HQW),
- outstanding resource waters (ORW),
- market shellfishing (SA),
- trout (Tr), and
- unique wetlands.

If the hydraulic design engineer has any questions about stormwater management for roadway projects, he/she can contact the Hydraulics Unit for more information (see Appendix C for contact information).

[5] By including watersheds with the potential for aquatic T&E habitat within a watershed, NCDOT maintains the MEP standard through the planning process. If the project is later confirmed not to have actual aquatic T&E habitat within the watershed, the goal for Toolbox BMPs previously selected to address this concern could be relaxed through the agency coordination step.

Workflow for Roadway Projects in Special Waters



[1]Per NCDEQ surface waters classification.

[2]A copy of the project-specific pSMP shall be uploaded to the Preconstruction Site. For projects not on the Preconstruction Site a copy should be saved in the project folder.

[3]Includes the following programs: 404/401 Water Quality Certification, Isolated Wetlands/Waters, Merger Process, Riparian Buffer Authorizations, CAMA Permits, Endangered Species Act/Section 7 Consultation.

[4]Reference the BMP Decision Support Matrix for suggestions on appropriate Toolbox BMPs based on parameters of concern (POCs) and site constraints.

[5]A copy of the project-specific SMP shall be uploaded to the Preconstruction Site via ATLAS. For projects not on the Preconstruction site send the project-specific SMP to the Hydraulics Unit.

Design Criteria Guidance for Non-Roadway Projects in the Coastal Counties (non-SA Waters):

The following design criteria apply to non-roadway projects in the coastal counties in non-SA waters, including projects in coastal HQW and ORW watersheds.

For projects that add more than 10,000 square feet of new BUA, or disturb one or more acres of land, or require a CAMA Major Development Permit (pursuant to G.S. 113A-118), the following design criteria shall apply:

1) Implement non-roadway planning and design minimum measures to the MEP.
2) For new BUA, infiltrate the runoff generated by 1.5 inches of rainfall by implementing BMPs provided in the BMP Toolbox to the MEP. If infiltration is not feasible, implement other BMPs provided in the BMP Toolbox to the MEP in order to treat the runoff from 1.5 inches of rainfall prior to discharge.
3) The project shall provide a 50-foot wide vegetative buffer to the MEP.
4) Stormwater runoff from BUA that is directed into any wetlands shall flow into and through these wetlands at a non-erosive velocity as estimated for a 10-year storm event. Refer to NCDOT's "Guidelines for Drainage Studies and Hydraulic Design" manual for more information. This manual is available on Connect NCDOT at the URL specified in Appendix C.

For all non-roadway projects, the drainage designer has the option to consult with the North Carolina Department of Environmental Quality (NCDEQ) on a case-by-case basis as needed to promote the protection of water quality standards.

Design Criteria Guidance for Non-Roadway Projects in the Coastal Counties (SA Waters):

The following design criteria apply to non-roadway projects in SA waters in the coastal counties.

For projects that add more than 10,000 square feet of new BUA, or disturb one or more acres of land, or require a CAMA Major Development Permit (pursuant to G.S. 113A-118), the following design criteria shall apply:

1) Implement non-roadway planning and design minimum measures to the MEP.
2) For new BUA, infiltrate the runoff generated by the 1-year, 24-hour storm event by implementing BMPs provided in the BMP Toolbox to the MEP. If infiltration is not feasible, implement other BMPs provided in the BMP Toolbox to the MEP in order to treat the runoff from 1-year, 24-hour storm event prior to discharge.

3) The project shall provide a 50-foot wide vegetative buffer to the MEP.
4) Stormwater runoff from BUA that is directed into any wetlands shall flow into and through these wetlands at a non-erosive velocity as estimated for a 10-year storm event. Refer to NCDOT's "Guidelines for Drainage Studies and Hydraulic Design" manual for more information. This manual is available on Connect NCDOT at the URL specified in Appendix C.

The 1-year, 24-hour storm event precipitation depth can be obtained from the National Oceanic and Atmospheric Administration (NOAA) website Precipitation Frequency Data Server (PFDS) at https://hdsc.nws.noaa.gov/hdsc/pfds/. From this site, select the nearest station to the project and select 'precipitation depth'. The 1-year, 24-hour storm event precipitation depth will be listed in the table provided.

For all non-roadway projects, the drainage designer has the option to consult with the NCDEQ on a case-by-case basis as needed to promote the protection of water quality standards.

Design Criteria Guidance for Non-Roadway Projects in HQW and ORW Watersheds in Non-Coastal Counties:

For projects that are within one mile of and draining to waters classified as HQW or projects that drain to waters classified as ORW and disturb one or more acres of land, the following design criteria shall apply:

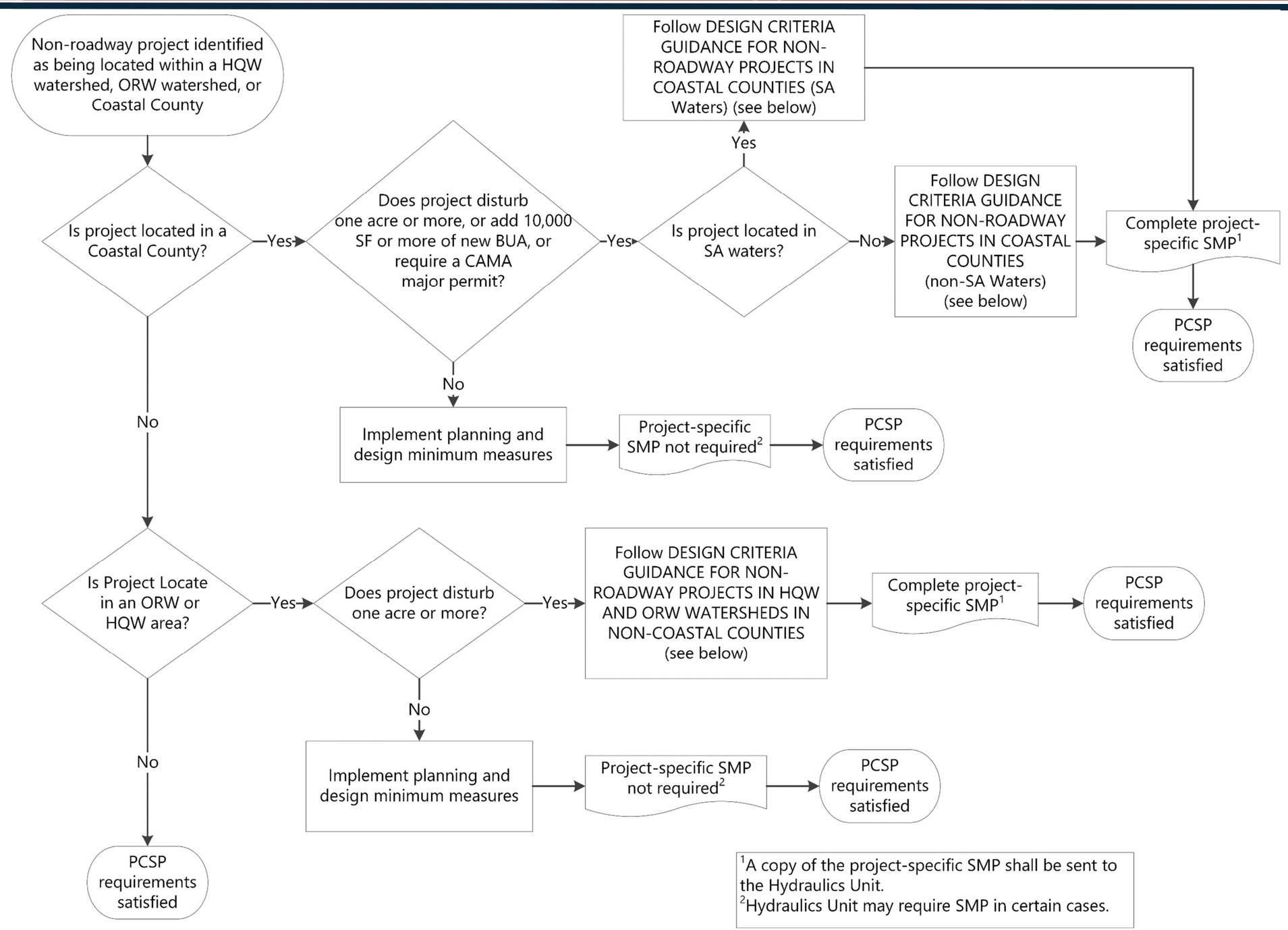
1) Implement non-roadway planning and design minimum measures to the MEP.
2) For new BUA, control and treat the runoff generated by 1.0 inch of rainfall by implementing BMPs provided in the BMP Toolbox to the MEP.
3) Provide a 30-foot wide vegetative buffer to the MEP.

If the drainage designer has any questions about stormwater management for non-roadway projects he/she can contact the Hydraulics Unit for more information.

Stormwater Management Documentation Requirements for Non-Roadway Projects:

A project-specific SMP must be completed for every project where the design criteria apply. See Chapter 4 for additional information on documentation requirements.

Stormwater Management for Non-roadway Projects in ORW Watersheds, HQW Watersheds, and Coastal Counties



For assistance with the PCSP, BMP selection or other associated topics, contact the NCDOT Hydraulics Unit:

1590 Mail Service Center
Raleigh, NC 27699-1590
919.707.6700

Ask to speak to the HSP group.

Resources	Relevant Document Description
Integrated Project Delivery (IPD) Project Delivery Network (PDN)	The PDN lays out a management protocol to provide consistency and transparency throughout the project delivery process, enabling project teams to improve reliability and efficiency. The PDN outlines the stages, activities, tasks, deliverables, and references to accomplish these ends. PCSP-related stages described in the PDN include stages 2HY1, 2HY2, 3HY1, and 5HY1.
Guidelines for Drainage Studies and Hydraulic Design (aka Hydraulic Guidelines)	The Hydraulic Guidelines include design policies, procedures, methods, forms, and tools needed to develop the hydrologic and hydraulic designs for NCDOT projects. Although Chapter 13 of the Hydraulic Guidelines discusses the PCSP and water quality regulations in general, detailed instructions for the assessment of impacts to water quality are in the PCSP manual.
PCSP Post-Construction Stormwater Controls for Roadway and Non-Roadway Projects (aka PCSP manual)	The PCSP manual directs the hydraulic design engineer and planner to the appropriate protocols for assessing potential water quality impacts from discharges which may affect design and should be considered during planning and design stages. Some aspects of water quality, such as threatened and endangered species, are addressed elsewhere.
North Carolina Stochastic Empirical Loading and Dilution Model (NC-SELDM) Catalog	The NC-SELDM Catalog assesses potential water quality impacts based on site-specific data from the USGS StreamStats website and the project's preliminary design plans. It is used to establish the minimum stormwater treatment goals for a project at each applicable stream crossing.
BMP Decision Support Matrix	The BMP Decision Support Matrix can be consulted to identify potential Toolbox BMP types to address parameter(s) of concern (POCs) that are identified from the waterbody's classification or its impairment. This information will have already been documented in the "Waterbody Information" tab of the pSMP. The BMP Decision Support Matrix can also be consulted for preliminary guidance on BMP suitability to siting constraints and other implementation considerations.

Resources	Relevant Document Description
Stormwater Best Management Practices Toolbox (aka BMP Toolbox)	The BMP Toolbox provides detailed guidance on design requirements for BMPs and was developed to specifically address NCDOT's linear system. The BMP Toolbox can be used for both roadway and non-roadway projects.
Stormwater Management Program for New Development in the Jordan Lake Watershed (aka Jordan GREEN Program)	NCDOT's GREEN Program guides the Department's compliance with Nutrient Rules for Jordan Lake and Falls Lake. The Jordan GREEN Program describes NCDOT's plan for controlling nutrient loads from roadway and non-roadway development.
Stormwater Management Program for New and Existing Development in the Falls Lake Watershed, (aka Falls GREEN Program)	NCDOT's GREEN Program guides the Department's compliance with Nutrient Rules for Jordan Lake and Falls Lake. The Falls GREEN Program describes NCDOT's plan for controlling nutrient loads from roadway and non-roadway development.
NCDOT Jordan/Falls Lake Stormwater Load Accounting Tool (NCDOT-JLSLAT)	Microsoft Excel spreadsheet used to calculate nitrogen and phosphorous load reductions from NCDOT roadway and non-roadway projects.
Stormwater Management Plan form	Microsoft Excel spreadsheet specially formatted for the documentation of stormwater management decisions on roadway and non-roadway projects. Used for both the pSMP and the final SMP.
Field Guide for Post-Construction Stormwater Best Management Practices	The Field Guide provides construction guidance on key features and parts of BMPs. Each chapter describes a specific type of BMP.
Merger Process	Merger is a process to streamline the project development and permitting processes, agreed to by the USACE, NCDEQ, FHWA, and NCDOT and supported by other stakeholder agencies and local units of government. The Merger Process is used for Section 404/401 permitting, and the concurrence points noted in the PCSP manual are part of the Merger Process.
Advancing Transportation through Linkages, Automation, and Screening (ATLAS)	ATLAS is a portal to GIS-based data needed to plan, design, and implement NCDOT projects, such as surface water classifications, river basins, and much more. It is also a central repository for project deliverables and associated data in a geospatial format that improves efficiency and communication through the life of the project.