

## Part F: NEST Program

There are two parts of the stormwater rules that allow the review and approval of new stormwater technologies as shown below.

15A NCAC 02H .1003(6) allows the permitting authority to approve projects that do not comply with all of the provisions of [the stormwater rules] on a case-by-case basis if the applicant demonstrate that the project provides equal or better stormwater control and equal or better protection of waters of the State than the requirements of this Section

The above provision allows stormwater staff from the state, local government or other permitted stormwater program to approve new stormwater technologies on a case-by case basis if the applicant meets the requirements of this rule item.

15A NCAC 02H .1050(15) NEW STORMWATER TECHNOLOGIES. Applicants shall have the option to request Division approval of new stormwater technologies and associated MDC. The applicant shall submit to the Division the standards for siting, site preparation, design, construction, and maintenance of the stormwater technology as well as research studies demonstrating that the stormwater technology functions in perpetuity and is equally or more protective of water quality than the requirements of this Section. In accordance with G.S. 143-215.1 and 143-215.3, the Commission may delegate the review and approval of new stormwater technologies to Division staff and the Commission or its designee may request additional information deemed necessary to evaluate the stormwater technology. If the Commission or its designee deems that the applicant has demonstrated that the new stormwater technology shall be the same or more protective than the requirements of this Section, then the Division shall approve the use of the new stormwater technology to satisfy the requirements of this Section.

The above provision gives the Division the authority to approve new stormwater technologies for use without undergoing the case-by-case scrutiny described in 02H .1003(6). This chapter explains the process for requesting and potentially receiving a “blanket” approval for a new stormwater technology.

Proprietary products that are part of a traditional SCM (for example, underdrain pipes in a bioretention cell or chamber systems in an infiltration trench) do not need to go through the NEST program provided the traditional SCM follows the appropriate MDC.

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## F-1. Performance Standards for the NEST Program

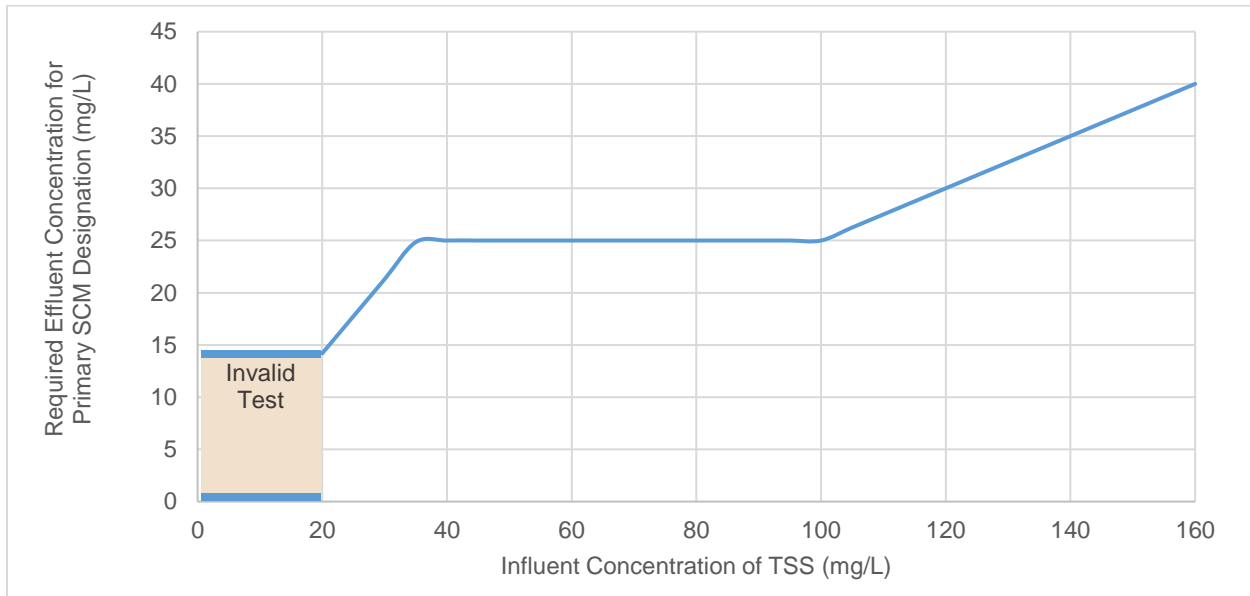
Stormwater technologies shall achieve the effluent rates listed in Table 1 below to be considered Primary SCMs.

**Table 1: TSS Removal Standards for Primary SCMs**

Median Influent EMC	Applicable Performance Standard <sup>1,2</sup>
< 20 mg/L	<u>Invalid test</u>
20 – 35 mg/L	≥ 29% removal
35 – 100 mg/L	≤ 25 mg/L
100 mg/L	≥ 75% removal

- <sup>1</sup> The median effluent EMC requirements may also be considered on a total load basis for SCMs that reduce runoff volume. Divide the performance standard by [100% – (% of runoff reduced)] to determine the corresponding load-based standards.
- <sup>2</sup> Primary SCMs comply with the above standards as demonstrated through research studies. Proposed new stormwater technologies shall be held to this same standard.

**Figure 2: Required Performance Standard for Primary SCMs**



## F-2. NEST Program Steps

The process for a NEST to be considered by the Division shall be as follows:

- (a) The applicant shall submit a NEST Program Application to the Division that includes the items listed in Section F-3.
- (b) The Division shall accept the device into the NEST Program if it finds that the application is complete and that the NEST has the capability of meeting the performance standard in Section F-1. The Division shall notify the applicant in writing that the device has been accepted into the NEST Program.
- (c) The NEST shall be installed on the proposed research sites and an entity other than the applicant shall conduct monitoring in accordance with Section F-4. Research that has already been conducted may be used to demonstrate that the NEST achieves the performance standard in Section F-1 provided that the research meets all of the requirements in Section F-4.
- (d) The applicant shall submit a NEST Final Report pursuant to Section F-5 to the Division for review.
- (e) The Division shall review the NEST Final Report and determine whether the applicant has demonstrated that the NEST will meet the performance standards stated Section F-1.
- (f) If the NEST Final Report is approved, then the Division shall list the device on its web site as an approved NEST. The web site shall include the MDC and pollutant removal credit associated with the NEST.
- (g) If a device is accepted into the NEST Program but the applicant does not complete monitoring within 36 months after the date on which the applicant was notified of acceptance, then the Division shall be deemed to have been withdrawn.
- (h) During the application, monitoring, reporting, and evaluation processes, NEST may not be used as an SCM to meet the requirements of this Section on any sites other than the research sites.

### F-3. NEST Program Application

The following information shall be provided to the Division when an applicant applies to the NEST Program.

- (a) a NEST Program Application Form. This form is available at the end of this chapter and shall include the following information:
  - (i) the name, address and contact information of the applicant;
  - (ii) the name, credentials, address and contact information of the entity conducting the research;
  - (iii) stormwater project number, if applicable;
  - (iv) the density of the entire project and of each drainage area;
  - (v) the name and certification information on the laboratory that will be used;
  - (vi) information about applicability of other State and federal environmental permits to the project including CAMA Major Development Permits, NPDES, Sedimentation and Erosion Control Plan, and Section 404/401 permits; and
  - (vii) a description of the NEST that will be used on the project,
- (b) a description of physical, chemical, and/or biological treatment mechanisms employed;
- (c) design drawings with dimensions for the test sites;
- (d) a description of construction materials, including a description of any components of the treatment system that may contain nutrients or metals that might contribute to increased pollutant concentrations in the effluent;
- (e) proposed MDC for the NEST that include all requirements for siting; site preparation, design, and construction; and maintenance activities and frequencies that are necessary to insure that the device meets the stated pollutant removal rates in perpetuity, including the following:
  - (i) a description of any pretreatment requirements or recommendations;
  - (ii) a description of all sizing methodology and technical design specifications based on a design maintenance frequency no more frequent than once per year;
  - (iii) a description of bypass provisions incorporated in the equipment or installation; and
  - (iv) maintenance procedures.
- (f) expected treatment capabilities, including existing monitoring studies that have been performed on the NEST;
- (g) a description of the research site that will be used to demonstrate the NEST's effectiveness as a stormwater treatment device, including the Hydrologic Soil Group on the site;

- (h) a Quality Assurance Project Plan conforming to the requirements in Section F-4, describing the monitoring procedures and protocols that will be used; and
- (i) a timeframe for completion of the monitoring and for submittal of the report to the Division for review.

## **F-4. NEST Monitoring Requirements**

The following monitoring requirements shall be met:

- (a) A minimum of two sites shall be monitored to demonstrate the performance of the NEST. A minimum of one site shall be located within the state of North Carolina. The second site shall be in an area with similar soils, climate, and weather patterns as found in North Carolina. If one or more of the research sites is in Hydrologic Soil Group A soils, then the technology may be approved for use in Hydrologic Soil Group A only;
- (b) The monitoring shall include sampling of the NEST's performance for a minimum of 15 storm events over the course of a one-year period, with a minimum of three storm events in each season. Storm events monitored must be a minimum of 0.10 inches of rainfall;
- (c) Full storm hydrograph flow-weighted composite sampling of both the influent and effluent shall be monitored. The median influent concentration of Total Suspended Solids (TSS) shall be between 50 and 150 mg/L;
- (d) Seventy percent or more of the hydrograph's volume shall be represented by the sample collection for each storm event;
- (e) In addition to TSS, the following parameters shall be monitored: Total Kjeldahl Nitrogen (TKN), nitrate, Total Phosphorus (TP), and runoff volume into and out of the NEST. Other parameters may be monitored if the applicant is seeking approval for removal rates of those pollutants; and
- (f) Sampling, laboratory analysis, and data interpretation shall be conducted by an independent third party. The laboratory that is used shall be certified in accordance with Section .0800 of this Subchapter.

## **F-5. NEST Final Report**

The following items shall be included in the NEST Final Report that the applicant submits to the Division:

- (a) as-built plans and details showing the site and the NEST from all monitoring sites;
- (b) a certification from the entity conducting the research that the Quality Assurance Project Plan approved by the Division was complied with during the conduct of the trial installations;

- (c) raw water quality data, including reports from the laboratory;
- (d) summary of water quality data and removal calculations;
- (e) influent and effluent volume data from each discrete storm event;
- (f) storm event information, including storm depth, date, duration, antecedent period, peak five-minute rainfall intensity;
- (g) a summary and interpretation of the monitoring results;
- (h) statistical analysis of the monitoring data;
- (i) proposed runoff volume reduction rates for the NEST as well as proposed effluent concentration credits for Total Nitrogen (TN) and TP. In addition, proposed effluent concentrations for any other pollutants that have been monitored as part of the NEST Program; and
- (j) a final list of MDC in the report, with notes on whether the MDC have changed since initial enrollment in the NEST Program.

## F-6. Division Action on the Final Report

As a part of this evaluation, the Division shall consider whether the test period loading was representative of likely installation conditions, the reported maintenance activities during the test period, and whether additional pre-treatment measures are necessary in most potential installations. The Division shall take one of the following actions within 90 days of receiving the NEST Final Report:

- (a) If the NEST final report demonstrates that the NEST meets the performance standard in Section F-1, then the Division shall allow the NEST to be used as an SCM to meet the requirements of this Section. NESTs that have demonstrated compliance with Section F-1 shall receive a letter of final approval from the NCDEQ. After obtaining final approval, the proponent of the NEST shall draft a chapter on the NEST design for Part D of the [Stormwater Design Manual](#) and a chapter on the NEST's pollutant removal capabilities for Part D of the [Stormwater Credit Manual](#).
- (b) If the NEST final report is inconclusive about whether the NEST meets the performance standard in Section F-1, then the Division shall require additional research studies before the NEST may be approved to be used as an SCM to meet the requirements set forth in this Section. The additional research studies shall comply with Section F-4, and a second NEST final report that complies Section F-5 shall be submitted to the Division for review and approval.
- (c) If the NEST final report demonstrates that the NEST does not meet the performance standard in Section F-1, then the Division shall take the following actions:
  - (i) The Division shall consider whether the NEST may be approved as a secondary SCM that could be used in conjunction with a primary SCM on a site;

- (ii) The Division shall not allow the NEST to be used as a stand-alone SCM to meet the requirements set forth in this Section on future projects; and
- (iii) The Division shall allow the continued use of the NEST on the research sites provided that the NEST Final Report establishes that the NEST discharges at a median effluent concentration for TSS of 35 mg/L or less or reduces the annual cumulative load of TSS by 65% or greater. If the NEST does not meet this performance standard, then it shall be replaced at the research sites by an approved SCM that is designed, constructed, and maintained in accordance with 15A NCAC 02H .1050 through .1062.

## NEW STORMWATER TECHNOLOGIES (NEST) APPLICATION FORM

### A. APPLICANT INFORMATION

I have read and understood Part F: New Stormwater Technologies of the Stormwater Design Manual.

1. Applicant name: \_\_\_\_\_

2. Applicant contact information

Street Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: (\_\_\_\_) \_\_\_\_\_ Fax: (\_\_\_\_) \_\_\_\_\_

Email: \_\_\_\_\_

### B. NEST INFORMATION

1. Name of NEST: \_\_\_\_\_

2. Description of the chemical, physical and biological process the NEST uses:  
 \_\_\_\_\_

3. Description of the construction materials, including a description of any components of the treatment system that may contain nutrients or metals that might contribute to increased pollutant concentrations in the effluent:  
 \_\_\_\_\_

4. Expected treatment capabilities of the NEST, including existing monitoring studies:  
 \_\_\_\_\_

### C. RESEARCH SITE #1 INFORMATION

1. Name of research site #1: \_\_\_\_\_

2. Address of research site #1 (street address): \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

3. Description of research site #1 (including percentage built-upon area):  
 \_\_\_\_\_

4. Stormwater permit number (if applicable): \_\_\_\_\_

5. Other permits for research site #1 (if applicable): \_\_\_\_\_



6. Name and credentials of researcher: \_\_\_\_\_

7. Research contact information:

Street Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: (\_\_\_\_) \_\_\_\_\_ Fax: (\_\_\_\_) \_\_\_\_\_

Email: \_\_\_\_\_

**D. RESEARCH SITE #2 INFORMATION**

1. Name of research site #2: \_\_\_\_\_

2. Address of research site #2 (street address): \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

3. Description of research site #2 (including percentage built-upon area):  
 \_\_\_\_\_

4. Stormwater permit number (if applicable): \_\_\_\_\_

5. Other permits for research site #2 (if applicable): \_\_\_\_\_

6. Name and credentials of researcher: \_\_\_\_\_

7. Research contact information:

Street Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: (\_\_\_\_) \_\_\_\_\_ Fax: (\_\_\_\_) \_\_\_\_\_

Email: \_\_\_\_\_

**E. SUBMITTAL REQUIREMENTS**

We require a hard copy and an electronic copy of the submittal package.

Submit the electronic copy to: [stormwater@ncdenr.gov](mailto:stormwater@ncdenr.gov)

Submit the hard copy to: NEST Program  
 NCDEQ | DEMLR | Stormwater Program  
 1612 Mail Service Center, Raleigh, NC 27699-1612

**Initial each item below to indicate that the required information is provided in the application package:**

*Initials*

- \_\_\_\_\_ 1. One hard copy and one electronic copy of this application form, fully completed.
- \_\_\_\_\_ 2. One hard copy and one electronic copy of the design drawings with dimensions for the test sites.
- \_\_\_\_\_ 3. One hard copy and one electronic copy of proposed Minimum Design Criteria (MDC) for the NEST, including all requirements for site preparation, design, construction and maintenance. Please be sure to include a description of any pretreatment requirements or recommendation, a description of all sizing methodology and technical specifications based on a maintenance frequency of no less than one year, and a description of the bypass provisions.
- \_\_\_\_\_ 4. One hard copy and one electronic copy of the Quality Assurance Project Plan conforming to the requirements of Section F-4.
- \_\_\_\_\_ 5. One hard copy and one electronic copy of the timeframe for installation, monitoring and submittal of the final report.