



**New Jersey Department of Transportation
Bureau of Research
RESEARCH PROJECT
Request for Proposal
2019-2020 Program**

Project Title: Evaluation of Coefficients Related to Runoff from Roadway Projects
Posting No.: 2019-02
Date of RFP Announcement: 1/3/2019
Closing Date: 2/12/2019

Proposals must be prepared in accordance with NJDOT's *Supplemental and Proposals guidelines*. Please visit <https://www.state.nj.us/transportation/refdata/research/guidelines.shtm> for the most current version.

1 - RESEARCH PROBLEM STATEMENT AND OBJECTIVES

1.1 Problem Statement

NJDOT is seeking research that will help us:

- Determine runoff from land uses/land cover for types of land uses (grass ROW, bare soil ROW, gravel, and porous asphalt) associated with hydrological soil groups A, B, C, and D along roadway projects

1.2 Research Objectives

Runoff calculations are currently performed using the National Resources Conservation Service (NRCS) and Rational Method. The current methods have existing coefficients that do not sufficiently distinguish runoff from different types of surfaces utilized in roadway design.

This research will evaluate and develop coefficients and factors for runoff analysis to reflect conditions associated with roadway projects. This research project will evaluate and develop the following factors and coefficient: Runoff Curve Numbers (RCN) for the NRCS Method and Runoff Coefficients (C) for the Rational/Modified Rational Methods. The following land uses must be evaluated within this research project:

1. Porous pavement without infiltration (different gravel bed depths).
2. Vegetated areas within right-of-way (ROW), median, and/or under guiderails.
3. Unvegetated areas with polyester matting within ROW, median, and/or under guiderails.
4. Gravel areas (with different gradations and depths).

The project will be broken up into two parts.

Part 1: The researcher will develop the necessary field and laboratory testing necessary to support the new coefficients. This includes research of existing literature, coordination with USDA NRCS for consistency with the latest data and methods in the National Engineering Handbook and development of lab and field test protocols. The researcher will present the testing procedures to NJDOT and other hydrologic professionals for comments and adjustment. Adjustments to the testing based on the comments will be reflected in the testing under Part 2.



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Part 2: The researcher will coordinate all laboratory and field-testing, will utilize the results to incorporate the information into runoff equations, and will coordinate with appropriate agencies so that the results can be utilized with the National Engineering Handbook.

Part 1 Tasks:

- Compile existing research and methodologies for determining runoff based on the NRCS and Rational Methods for the land uses listed above. Updates to the NRCS runoff methodologies must be included.
- Coordinate with the NRCS/NEH and or CN revision team. Determine what would be required for NRCS to endorse the results of the project for incorporation into the NEH.
- Develop field-testing criteria for Hydrologic Soil Groups (HSG) at a minimum of 2 locations for each HSG in New Jersey for NJDOT consultants to perform at DOT sites to correlate the research data with field conditions for porous HMA, gravel, grass and bare soil. Provide technical guidance and support for NJDOT consultants.
- Present the recommended lab and field-testing methods to NJDOT and other hydrologic professionals. Revise the test procedures so that they are acceptable to NJDOT program manager.

Part 2 Tasks:

- Test permeability and runoff characteristics of gravel, porous hot mix asphalt (HMA), grass and bare soil to develop runoff coefficients at lab and/or controlled installation. Oversee the work of the DOT consultants at DOT sites for consistency with testing procedures. Sufficient testing must be performed to translate the results from hydrologic soil group (HSG) A through D and for different rainfall/storm frequencies. The research should include testing the material in a controlled installation, either at the location of the research facility or through another or research facility that has land uses installed (e.g., US Environmental Protection Agency [EPA] Research and Development, Edison, NJ)
- Correlate the results of researcher tests with tests at DOT sites performed by consultants who are participants in this project.
- Develop empirical equations or models to provide alternate factors and coefficients (CN values, Rational coefficient, Manning's sheet flow value, Initial Abstraction) for runoff. These equations must address for various conditions, such as HSG, slopes, soil compaction, gravel gradation/thickness, permeability, etc.
- Develop a manual, program/spreadsheet, or tables to incorporate the findings into stormwater runoff calculations. These methods must be coordinated with NRCS to ensure consistency with the National Engineering Handbook.



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- Provide a draft report to demonstrate how the testing methodology will address the different site conditions listed above, the laboratory and field testing methodology used, the results of the tests, and recommended values or methods to establish more accurate runoff coefficients.
- Present the results of research and proposed methodology for CN value determination a minimum of 3 times for comments.
- Based on the comments received from customer and NJDOT project managers, the report will be revised and resubmitted in final form along with any programs, equations, or models to establish the RCN or C values. The researcher will publish the results in a peer-reviewed journal describing the research, the results and proposed methods to adjust CN values. The researcher will send a report to NRCS to request their concurrence on the use of methods developed to adjust the runoff calculations.

1-3. Type of Contract

It is proposed that if the Issuing Office enters into a contract because of this Request for Proposal (RFP), it will be a **Cost Reimbursement, Deliverable-Based** contract containing the Standard Contract Terms and Conditions.



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2 - BUDGET and CONTRACT TIME

The **TOTAL** project budget shall not exceed **\$400,000 US Dollars**. The PI must provide the anticipated research study duration based on the proposed tasks. Consideration should be given to potential impediments so that adjustments are incorporated into the schedule minimizing the need for time extensions. Contract time shall include sufficient time for the procurement of subcontractors, as well as no less than three months for Final Report review and acceptance. Please be advised that going forward, new task orders having permissible justification will be allowed no more than one time extension with the advent of 2 CFR 200.

A 18 - 24 month total project duration is preferred.

Please provide a Gantt chart schedule with deliverables delineated. The project will be broken up into two parts, 6 months for part 1, 18 months for part 2.

3 - Oral Presentations. Oral presentations may be requested as part of this RFP. If required, you will be notified by the Bureau of Research to schedule your oral presentation. They will be held at NJDOT headquarters in Trenton, NJ, attended by the Technical Advisory Panel (TAP), and be limited to no more than an hour, including time for questions and answers.

4 – DEADLINE

Proposals (10 single-bound copies) are due at the NJDOT Bureau of Research no later than **4:00 p.m. on February 12, 2019.**

Approximate Start Date: May 13, 2019. The official start date is the date that the Bureau of Research obtains a signature from the Assistant Commissioner.

5 – CONTACTS

Interested parties shall send all questions related to this RFP to the Bureau Manager by sending an e-mail to Research.Bureau@dot.nj.gov or by phone (609-530-5966) prior to **January 13, 2019**. Questions on this topic **shall not** be directed to any Research Project Manager, Research Customer, or any other NJDOT person. All questions must be received **on or before January 13, 2019 in order to be answered.**

A pre-proposal meeting may be scheduled with interested parties upon the request of *more than one* Institution of Higher Education. **This must be requested on or before January 13, 2019.**



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PROPOSAL DELIVERY INSTRUCTIONS:

For private, paid messenger services such as Federal Express, DHL, UPS, etc., or for hand-carried deliveries:

RFP No. 2019-02 PROPOSAL-NJDOT
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For U.S. Postal Service mail:

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