RESEARCH REQUEST FOR PROPOSAL (RRFP) #25-02

QUANTIFYING AND MINIMIZING MICROPLASTICS FROM EROSION CONTROL MATERIALS

POSTED DATE: 5/8/2025; CLOSING DATE: 6/6/2025

PROJECT INFORMATION	
Funds:	$130,000
Estimated Contract Term:	18 months
Projected Start Date:	September 22, 2025
Deadline for Submitting Proposal:	4:30:00 PM (local time) 6/6/2025
Submit Proposal via Email to:	research@getipass.com

BACKGROUND

Microplastics are considered a Contaminant of Emerging Concern (CEC) and are the subject of ongoing and global scientific investigations. Recent findings have shown detrimental impacts on aquatic organisms and human health. Microplastic particles contain any number of 16,000 plastic chemicals and come from a wide range of known and unknown sources such as wastewater effluent, agricultural runoff and landscape products including fabrics, tackifiers in mulch and erosion control blankets. More studies are needed on the sources, pathways and effects of CECs and their effects on human health and the environment.

The Tollway takes a comprehensive approach to stormwater management and has constructed 54 miles of bioswales (roadside best management practices to treat stormwater). The Illinois State Geologic Survey (ISGS) has assisted in gathering 10 years of water chemistry data in Tollway bioswales specific to the treatment and removal of roadway pollutants. Data has showed reductions in heavy metals, chlorides, excess nutrients and total suspended sediment. To minimize impacts on local watersheds, design

engineers are required to follow guidance in the Tollway's Erosion Control and Landscape Manual, the Illinois Urban Manual, and the IEPA's National Pollutant Discharge Elimination System (NPDES) ILR10 Construction General Permit. This Guidance requires construction sites to protect exposed slopes and quickly restore work zones with seed and erosion control blanket made of straw, coconut or wood (excelsior) fibers stitched into a matt with photo-degradable plastic netting. According to the Manufactures and the Illinois Urban Manual, erosion control blanket is selected based on site criteria such as slope steepness, shear stress, and longevity (or duration until deteriorated). Manufactures specifications are also referenced to ensure performance. Groups such as the International Erosion Control Agency (IECA), ISO and ASTM help to standardize testing for materials including the blanket's ability to facilitate seed germination or photo-degradability of the plastic netting. The performance of erosion control blankets or hydraulic mulches is crucial to Tollway operations, and the guidance provided to designers on how to specify the appropriate material type is essential. In 2023, for example, the Illinois Tollway installed over 30 acres of erosion control blanket on construction projects. If extrapolated over the previous 15-year capital program, this could equate to 450 acres of blanket used towards controlling soil erosion and growing vegetation along the roadside. Developing research has shown that even recyclable plastics and photo-degradable plastics are a hazard to natural ecosystems.

Water pollution from soil erosion has been well studied, but pollution potential from the breakdown of plastic netting has not yet been quantified. Construction sites have sediment runoff rates 10 to 20 times higher than agricultural lands, so effective erosion control is critical. Polypropylene netting is used in large quantities along roadways to help vegetation grow. With time and UV exposure, nets break down and have a lower specific gravity then water. This can release buoyant microplastics into stormwater runoff. Another negative affect from stitched blanket is the entanglement of wildlife like snakes or turtles. In 2024, 13 State DOT's have enacted policies to utilize more "wildlife friendly" materials or technologies. While there are studies quantifying the microplastic releases of polypropylene, none have yet quantified the problem specific to erosion control materials.

The use of plastics in erosion control is well documented, along with the active measures different agencies are taking to reduce the impacts to wildlife from entanglement. That said, a comprehensive study to quantify the microplastics problem while evaluating alternative products or practices is needed in order for the Tollway to justify a change in practices and reduce plastic use. Performance characteristics have been defined and compared across manufactures and a spectrum of erosion blankets bound with synthetic netted plastics, natural fibers, and fused "netless" wood fiber erosion control blankets. However, little has been done to directly compare hydraulically applied "Spray On" products in this same context to provide a use case for the former products as a direct replacement within the same category.

Microplastic detection guidance and plastic-related legislation is advancing quickly in Illinois including: SB0058, SB1531, SB1872, HB3278, HB1370, HB1600, HB2516. Illinois was the first state to ban consumer products that created the potential for microplastic release directly into the environment (Senate Bill 2727). Illinois continues to be proactive in reducing the release of plastics into the environment and the Illinois Tollway Environmental Unit has interest in staying ahead of legislation, advancing science and understanding all environmental impacts of roadway operations.

OBJECTIVE

Identify sampling methods and help determine the Illinois Tollway's contribution to CECs in freshwater rivers and streams. Quantify the release of microplastics from erosion control materials over time in field conditions or a simulated lab setting. Evaluate or recommend potential alternatives to plastic netted products. Establish performance advantages and cost analysis of plastic free products. Results of this study could help refine landscape design criteria and support the Illinois Tollway's next capital plan guiding principles of Sustainability and Innovation.

RESEARCH TASKS AND REQUIRED DELIVERABLES

Several tasks are envisioned for completing this research project, as described below:

A. Literature review to determine CEC sampling procedures from states that are further along in the data gathering process and sampling protocols for transportation related CEC's (i.e.: microplastics, PFAS and 6PPD) including the States of Michigan, Maine, and California. Summarize existing and emerging research trends for the effects of CECs on freshwater river ecosystems. Obtain and review Tollway Environmental reports including chloride reduction strategy, annual MS4 report, and bioswale monitoring of soil, water, wildlife and plant biotic reports.

    a. Review any Illinois Pollution Control Board statements and existing and future State legislation pertaining to CECs and call out those that may affect future Tollway operations.
    b. Summarize Transportation-based research regarding CEC pollution or plastic-netted erosion control blankets or hydraulically applied mulches as a source of microplastic pollution from Transportation related organizations like the National Cooperative Highway Research Program (NCHRP), Federal Highway Administration – Intelligent Construction Technologies (FHWA-ICT), Transportation Research Board (TRB).
    c. Review and briefly summarize applicable Global Transportation Industry trends or applicable emerging research such as the Norwegian Institute for Water Research.

B. Attend a project kick-off meeting online to meet the Technical Review Panel (TRP) who will provide feedback throughout the project. Use this initial feedback to refine the project scope and develop a data gathering survey for landscape suppliers, manufacturers, and/or users of erosion control products as well as local watershed coordinators to help determine potential sources of CECs. Review manufacturer specifications (i.e.: Western Green or ErosionTECH) and/or conduct short interviews to become familiar with potential sources, trends in erosion control product use, and determine alternative (net-free) product effectiveness for use in facilitating and accelerating vegetation growth.

C. Utilize information from the Tollway's ArcGIS Online asset management system to review locations of stormsewer outfalls throughout 12 counties in northern Illinois.

This includes 493 total outfalls, 47 that are downstream from a POTW or WWTP, as well as 10 outfalls determined to be near critical waterways which have been inspected annually for 8 years. The Tollway can also provide information such as material use quantities, locations, and/or photo reports of recent construction contracts that installed plastic-netted erosion blanket as needed for the study.

a. Create a research plan that includes field research or a desktop analysis to determine likely sources, measurement methods, and/or the Tollway's contribution to the microplastic problem. This could include comparing the Tollway's outfall locations to the IEPA 303d list for impairments, reviewing WWTP reporting near Tollway's critical outfalls or other meaningful scientific contributions. It should be noted that WWTP permits in Illinois were amended in 2024 to include PFAS Special Condition Language. A local watershed including WWTPs that are considering CEC sampling is the DuPage River Salt Creek Watershed.

D. Set up and carry out a meaningful research project that helps to establish the Illinois Tollway as a leader in the Transportation Industry to advance science and quantify the microplastic release problem from landscape materials and other roadway operations, as well as to suggest simple and cost-effective strategies for minimizing use of potential CEC sources and/or suggest vegetation growing best practices or material alternatives. Develop guidance for CEC sampling methodology and provide a recommendation for alternative practices that are plastic free, wildlife friendly, cost effective and will reduce pollution while creating flexibility for Illinois Tollway landscape designers.

Deliverables that will be required throughout this project will include:

- Quarterly progress reports, in electronic format, containing a summary of effort performed during the quarter and expected progress for the following quarter including percent of remaining schedule and budget.
- A guidance document for sampling stormwater outfalls for microplastics and/or other CECs in the form of a white paper, cut sheet or SOP.
- A PowerPoint or short video presented to the Technical Review Panel at the completion of the Literature Review (or in months 6-9) providing literature review summary and an update of initial project development.
- Final report, in electronic format, summarizing the results and recommendations developed as a result of this research effort as contained in the Tasks A-D documents described above. A draft final report shall be submitted 45 days prior to the end date of the research contract. The Tollway will review and provide comments and feedback within 15 days of receipt of the draft final report. Then, the researcher shall have 30 days to address the comments and questions, make revisions, and resubmit the final report.
- An electronic copy (pdf) of all reports shall be submitted.

  

INSTRUCTIONS FOR SUBMITTING A PROPOSAL

The proposal shall be prepared in accordance with the guidelines presented in Appendix A. The contact name/email and due date are presented on the first page. All potential Principal Investigators (PIs) should read and understand the responsibilities of Illinois Tollway Principal Investigators, which are presented in Appendix B.

Technical questions regarding the research project or questions regarding the RRFP procedures should be submitted to research@getipass.com by 2:00:00 p.m. (local time) on 5/22/2025. Technical questions that are received by 2:00:00 p.m. (local time) on 5/22/2025 will have the question and answers posted on the Tollway's website at least 3 days before the proposal due date.

SPECIAL CONDITIONS FOR REVIEWING PROPOSALS AND AWARDING ILLINOIS TOLLWAY FUNDS

Please note that the following three conditions will be applied in reviewing all proposals received and in awarding Tollway funds:

1) The award of this project is contingent upon the availability of funds at the time of award.
2) Tollway research projects are entered into through an Intergovernmental Agreement. Therefore, the lead institution in a successful proposal is required to meet the definition of a "public agency" pursuant to Illinois' Intergovernmental Cooperation Act (5 Ill. Comp. Stat. 220) in order to enter into an Intergovernmental Agreement to complete the project. Prior to notification of a successful proposal, the Tollway may request the lead institution's W-9 form to verify compliance with this requirement.
3) The lead institution must perform at least 35% of the work (budgeted costs).

APPENDIX A:
GUIDELINES FOR PREPARING A PROPOSAL FOR THE ILLINOIS TOLLWAY

Please use the following format for submitting a Tollway proposal for consideration. Please limit your total proposal to 5 pages in length (not including the Cover/Summary Page or optional Appendices), ensure file size is less than 5 MB, and use a font size no smaller than 10. We suggest Arial font with 1.5 spacing between lines.

1. Cover/Summary Page

Use the cover page included in Appendix C.

2. Research Plan

The research plan should describe in a specific and straightforward manner the proposed approach for solving the problem described in the problem statement. The research plan should be subdivided into the following sections:

(a) Introduction, including Research Idea Statement

Provide an introduction to the proposal and a concise overview of the research approach. Outline the objectives of the research project and explain the questions that will be answered by the research.

(b) Research Approach/Work Plan

Include the details of how the investigator will carry out the project and accomplish the project objectives. Itemize the tasks to be completed, explaining each in sufficient detail so the reviewers understand what will be done for each task and what will be produced or completed with each task.

(c) Anticipated Research Results

Specifically state the anticipated research results and deliverables.

(d) Applicability of Results to Illinois Tollway Practice

Describe how the anticipated research results can be used to improve Tollway practices.

3. Qualifications and Accomplishments of the Research Team

Identify who will perform the research and provide a brief explanation of each researcher's qualifications to perform the research. Please provide examples of similar research that the proposed individuals have performed.

4. Other Commitments of the Research Team

Briefly outline the other commitments of the proposed principal and co-principal investigators to demonstrate that both will be able to fulfill the commitments of the proposal.

5. Equipment and Facilities

Describe the facilities and equipment available to undertake the research proposal.

6. Time Requirements

Describe the time that will be required to complete the research proposal, including final report preparation, Tollway editing, review of the report by the Technical Review Panel (TRP), and final review/publishing of the report. Include a timeline for each task.

7. Itemized Budget

Provide an itemized budget for each of the Phases of the project and for the entire project, including the cost of personnel, consultants, subcontracts, equipment, materials, travel, overhead/indirect costs and cost share (match). The Illinois Tollway believes that an overhead/indirect rate of 20% is reasonable and competitive. Justification shall be provided if an indirect cost rate in excess of 20% is used. Please itemize equipment and travel requests, especially any requested out-of- state travel or planned attendance at conferences.

8. Cooperative Features (if appropriate)

If assistance or cooperation is required from other sectors, public or private, to complete this proposed research, describe the plans for securing this assistance.

9. Appendices (if appropriate)

You may include such things as statements regarding previous work on the problem or related problems, abstracts of related projects, a bibliography or list of references, or materials describing the submitting organization.

APPENDIX B:
RESPONSIBILITIES OF ILLINOIS TOLLWAY PRINCIPAL INVESTIGATORS

1. Prepare and submit a project work plan and multi-year line-item budget, consistent with the Tollway RRFP for the newly-approved research project.

2. Meet with the Technical Review Panel (TRP) and revise the project work plan and multi-year budget, as agreed with the TRP.

3. Assist the TRP chair in preparing an Implementation Planning Worksheet and work throughout the project to identify the expected benefits of the research, e.g., construction savings, operation and maintenance savings, increased lifecycle, safety, etc.

4. Carry out the project as agreed with the TRP or notify the TRP if any problem develops regarding the project.

5. Provide online quarterly progress reports to the TRP chair for review and approval.

6. Attend TRP meetings to provide project updates and answer TRP members' questions about the project.

7. Provide the TRP a synopsis of the project's implementation potential as well as implementation strategies. In conjunction with the TRP, develop Implementation activities/ tools such as draft specifications, policy guidelines, software, and training on new test/ practice/ equipment/ software and develop an implementation cost estimate, if applicable.

8. Near the completion of the research project, draft a final research report in accordance with the Tollway report format. (The timeline for the work plan must allow adequate time to prepare the report, typically three months.)

9. At least 45 days before the end date for the project, submit the draft final report to the Tollway for review and work with the TRP chair to finalize the content of the report.

10. Re-submit the final report to the Tollway for publication. The Tollway will post the final report to the Tollway website.

11. The publication or release of all work products, any information that is deemed confidential by the Tollway, or information which includes patentable results may not be published/ released without the Tollway's approval.

12. Include the Illinois Tollway acknowledgement statement and disclaimer statement (available on the Tollway website) in all publications and presentations regarding research sponsored partially or fully by the Tollway.

APPENDIX C:
PROPOSAL COVER SHEET FOR SOLICITATION #25-02

QUANTIFYING AND MINIMIZING MICROPLASTICS FROM EROSION CONTROL MATERIALS

DUE: 6/6/2025
TO: research@getipass.com

Submitted by: (Include Name and Address of Organization)	
Proposed Investigator(s):	
Corresponding Investigator Name:	
Corresponding Investigator Phone:	
Corresponding Investigator Fax:	
Corresponding Investigator Email:	
Submission Date:	