REQUEST FOR PROPOSAL (RFP) #15-01

ENHANCED DETENTION BASIN DESIGN FOR REDUCING CHLORIDE CONCENTRATION

POSTED DATE: 03/25/15; CLOSING DATE: 04/30/15

PROJECT INFORMATION

Funds: $50,000  
Estimated Contract Term: 1 Year  
Projected Start Date: August 1, 2015  
Deadline for Submitting Proposals: April 30, 2015  
Submit Proposals via Email to: Steven Gillen at sgillen@getipass.com

BACKGROUND

Detention basins have been one of the most widely used Best Management Practices (BMP) for controlling stormwater runoff. To ensure that the detention facilities meet the criteria for the required volume and the allowable release rate, the Tollway Drainage Design Manual specifies the final design be analyzed using a hydrograph routing method. The Manual also indicates that the maintenance (e.g., cleaning) requirements for the detention basin should be identified during the design process to maintain the quality of the stormwater. However, detention basin monitoring data currently available through the International Stormwater BMP Database does not support chloride peak attenuation and achieving the water quality has typically been based upon U.S. Geological Survey (USGS) models and estimated reduction in chloride concentration.

Tollway monitoring of newly constructed detention basins during snow melt and spring rainfall revealed that the chloride concentration remains elevated for several months after deicing practices have ceased. With chloride continuing to be a water quality
concern in the State of Illinois and with the potential for future revisions of the water quality standards by the Illinois Environmental Protection Agency (IEPA) being more restrictive, it would be beneficial if the detention basins could be designed to minimize the chloride concentration. It is hypothesized that the source of chloride may be associated with the undissolved salt deposited at the bottom of the forebay or within the detention basin. Therefore, salt deposition and stratification as well as mixing of chloride-laden water in the detention basins need to be considered in the design enhancements. If the detention basins can be designed to reduce the chloride concentration, it is envisioned that potential savings from avoiding regulatory delays and maintenance would be significant.

OBJECTIVE

The objectives of this research are (1) to characterize the chloride content within the detention basins to confirm the deposition and stratification of chloride, and (2) to propose and evaluate potential design enhancements and/or operational concepts that would reduce the duration of elevated chloride concentration.

RESEARCH TASKS AND REQUIRED DELIVERABLES

The research shall be divided into four tasks, as described below:

Task 1: Review of available literature and Tollway’s current design criteria – Conduct a thorough review of available literature regarding the distribution, influent/effluent characteristics of chloride in detention ponds, as well as any other relevant literature identified by the researcher. In addition, Tollway’s current design criteria and operational procedures relevant to detention basins shall be reviewed.

Task 2: Identify the detention basins to be monitored and develop a sampling plan – Study the Tollway’s available detention basin monitoring data and identify the detention basins to be monitored for this research. In addition, develop a sampling plan for assessing both the stratification and seasonal deposition of chloride in detention basins and forebays. The sampling plan shall consider, but is not limited to, the following:

- Vertical and lateral aqueous sampling to assess the distribution of chloride concentration.
- Collecting grab samples from the inlet and outlet of the detention basins to measure chloride content.
- Continuous monitoring of temperature, specific conductance\(^1\), and flow rates at the inlet and outlet of the detention basins.

\(^1\) Correlation between specific conductivity and chloride content has been developed by the Illinois State Geological Survey and documented in the following publications:
d) Sampling of floor and sidewall soil sediments.

Task 3: Execution of the sampling plan and data analysis – Execute the sampling plan developed under Task 2. Test the collected samples and analyze data. Summarize the results and report the findings.

Task 4: Develop modifications to the existing design methodology – Based on the lessons learned from Tasks 1 through 3, develop implementable modifications to the design methodology and/or operational concepts that may reduce the chloride concentration in detention basins.

Task 5: Provide final recommendations – Based on the study results and findings gained through previous tasks, provide final recommendations for the enhanced design methodology and operational concepts.

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.

- Final report, in electronic format, summarizing the results and recommendations developed as a result of this research effort. The Final Report shall contain the findings from Task 1 (Literature Review), results from Task 3 sampling and testing, the modified design methodology developed in Task 4, and the recommendations developed in Task 5. 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.

- A one-page technical briefing document summarizing the results of the research effort.


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 RFP procedures should be submitted to Steven Gillen, via email at sgillen@getipass.com. Technical questions received by the Tollway and answers will be posted on the Tollway website as they are received.

SPECIAL CONDITIONS FOR REVIEWING PROPOSALS AND AWARDING ILLINOIS TOLLWAY FUNDS

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

1) In reviewing and evaluating the proposals received from this solicitation, preference will be given to Illinois public universities over others.

2) The award of this project is contingent upon the availability of funds at the time of award.
APPENDIX A: GUIDELINES FOR PREPARING PROPOSALS FOR THE ILLINOIS TOLLWAY

Please use the following format for submitting Tollway proposals for consideration. Please limit your total proposal to 15 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 IDOT 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. Please plan on submitting the draft final report to the Tollway for initial editing at least three months before the end date for the project.

7. **Itemized Budget**

Provide an itemized budget for the entire project, including the cost of personnel, consultants, subcontracts, equipment, materials, travel, overhead/indirect costs and cost share (match). Please itemize equipment and travel requests, especially any requested out-of-state travel or planned attendance at conferences. If you anticipate having a sub-award for extra support from outside your agency, please be aware that the sub-award cannot exceed 50% of the total project budget without prior approval.

8. **Cooperative Features (if appropriate)**

If assistance or cooperation is required from other agencies, 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 proposal/work plan and multi-year line-item budget, consistent with the Illinois Tollway RFP for the newly-approved research project.

2. Meet with the Technical Review Panel (TRP) and revise the project proposal/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 quarterly meetings of the TRP 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 three months before the end date for the project, submit the draft final report to the Tollway for preliminary editing (prior to submission to the TRP).

10. After the Tollway returns the edited draft final report, submit the report to the TRP chair for review and work with the TRP chair to finalize the content of the report.

11. Re-submit the final report to the Tollway for publication. The Tollway will post the final report to the Tollway website and will arrange to publish the final report.

12. 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.
13. 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 #15-01

ENHANCED DETENTION BASIN DESIGN FOR REDUCING
CHLORIDE CONCENTRATION

DUE April 30, 2015
TO sgillen@getipass.com

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