

## State Planning and Research Program Quarterly Report

**PROJECT TITLE:** *Determining the Migration of Chloride-Based Deicers through Different Soil Types*

**OBJECTIVES:** This project aims to achieve a clear, quantitative picture about the physicochemical properties of various types of soils (texture-based, commonly used in the areas of interest) and migration behavior of selected deicers through these soil types.

**PERIOD COVERED:** October 1 – December 31, 2024

**PARTICIPATING AGENCIES:** Minnesota Department of Transportation, Clear Roads Technical Advisory Committee, Washington State University, and Roadtech, Inc.

**PROJECT MANAGER:**

Hafiz Munir / Tom Peters

**SP&R PROJECT NO:**

MnDOT No. 1047792

**PROJECT IS:**

     Planning

  X   Research & Development

**LEAD AGENCY:** MnDOT

**PRINCIPAL INVESTIGATOR:**

Xianming Shi, Ph.D., P.E., WSU

Federal Project No.

TPF-5(353)

**ANNUAL BUDGET:**

\$99,980

**PROJECT EXPENDITURES TO DATE:**

\$90,980

### **WORK COMPLETED:**

*Project Management:* The PI submitted the quarterly progress report in Oct. 2024. A no-cost time extension was filed during the last quarter and approved by MnDOT; see the new timeline on the next page. Note that the new end date of this project is April 30, 2025. We were a few months behind schedule due to unanticipated challenges including significant delays in having horizontal soil columns manufactured at the university workshop and the transition of the WSU PI (Xianming Shi) from WSU to University of Miami (but he will remain affiliated with WSU for one more year starting mid-August 2024).

**Task 1.** Literature Review and Survey (100% complete).

**Task 2.** Developing the Testing Plan (100% complete).

**Task 3:** Execution of the Testing Plan (90% complete). We are executing Task 4 alongside and compiling results simultaneously. We generated more test results incorporating Task 3 and Task 4 (additional lab testing using the beet juice/salt brine blend). We reviewed these results to ensure their replicability and had to recalibrate the chloride sensor and re-test the chloride ion concentration in all the leachate samples to maintain the scientific rigor.

**Task 4.** Execution of the Testing Plan- additional lab testing using the beet juice/salt brine blend (50% complete).

**Task 5.** Preparing one-page fact sheet (2% complete)– This will be done immediately after Task 3 and 4 are completed.

### **SUMMARY OF ACTIVITIES EXPECTED TO BE PERFORMED NEXT QUARTER:**

Work in the coming quarter will consist of project management as well as the completion of Task 3 (Execution of Specific Tests) and Task 4 and initiation of Task 5 and Task 6 (Final Report and Webinar).

**STATUS AND COMPLETION DATE:**

The updated project timeline is as follows. We are about three months behind this schedule and likely will request another three-month no-cost time extension due to unanticipated issue with the chloride sensor data and continued delay in having the horizontal columns made at the College of Engineering shop (these two issues have been addressed and will be addressed by Jan. 31, 2025, respectively).

Task	Current Task Start Date	Current End Date for Task Approval	Revised Task Start Date	Revised Due Date to Submit Draft Deliverables	Revised End Date for Task Approval
1	06/01/2022	03/31/2023	No Change	No Change	No Change
2	12/01/2022	03/31/2023	No Change	No Change	No Change
3	04/01/2023	04/30/2024	No Change	11/30/2024	12/31/2024
4	03/01/2024	06/30/2024	08/01/2024	11/30/2024	12/31/2024
5	04/01/2024	07/31/2024	09/01/2024	12/31/2024	01/31/2025
6	05/01/2024	10/31/2024	11/01/2024	02/28/2025	04/30/2025