

MINUTES

Clear Roads 2025 Fall Technical Advisory Committee Meeting

Pooled Fund Project, TPF-5(479)

Tuesday, September 16 to Thursday, September 18, 2025 (Embassy Suites Bloomington – Minneapolis, Minnesota)

Attendees

Marcus Zimmerman – Alaska
Kevin Hensley – APWA
Rick Nelson – AASHTO
Gabe Alvarado – Arizona
AJ Johnson – California
Jim Fox – Colorado
Aiden Neely – Connecticut
Brian Hirt – CTC & Associates
Kirsten Seeber – CTC & Associates
Greg Waidley – CTC & Associates
Alastair Probert – Delaware
Jeremy McGuffey – FHWA
Ty Winther – Idaho
Brian Galloway – Illinois
Nick Evans – Indiana
Craig Bargfrede – Iowa
Jim Frye – Kansas
Eric Bowman – Kentucky
Chad Huggins – Maine
Keith Thomas – Maryland
Mark Goldstein – Massachusetts
Carl Fedders – Michigan
Brian Bolstad – Minnesota
Alex Bruch – Minnesota
Julie Dodge – Minnesota
Jed Falgren – Minnesota
Shannon Holland – Minnesota

Justin Howe – Minnesota
Joe Huneke – Minnesota
Ryan Sodd – Minnesota
Bob Vasek – Minnesota
Mike Warren – Montana
Jasmine Dondlinger – Nebraska (Chemist)
Mike Mattison – Nebraska
Andrew Lawrence – Nevada
David Gray – New Hampshire
Samantha Canulli – New Jersey
Nicole Surani – New York
Aaron Murra – North Dakota
Dean Alatsis – Ohio
Dan Whetzel – Pennsylvania
Matthew Ouellette – Rhode Island
Dan Varilek – South Dakota (Vice Chair)
Matthew Heinze – Texas
Todd Law – Vermont (Chair)
Brandy Borja – Virginia
James Morin – Washington State
Jeff Pifer – West Virginia
Emil Juni – Wisconsin
Wayne Shenefelt – Wyoming

Materials Posted

Agenda – Clear Roads Fall Meeting
Agenda – Joint Meeting
Budget
Attendees List
Research In-Progress Update

Communications Report
PDH Certificate
Expense Report and Guidelines
Hotel Confirmation Numbers
MnDOT Van Schedules

Tuesday, September 16, 2025

Introductions and Meeting Objectives – Todd Law

- Clear Roads Chair, Todd Law, facilitated member introductions and reviewed the meeting agenda.
- Jed Falgren, Minnesota State Maintenance Engineer, provided opening remarks.
- States with new representatives.
 - Jim Fox, Colorado
 - Chad Huggins, Maine
 - Sheila Johnson, Minnesota
 - Mike Warren, Montana
 - Samantha Canulli, New Jersey
 - Brandy Borja, Virginia
 - Jon Arps, Oklahoma
- States with replacements standing in for representatives.
 - Brian Galloway replacing Kristi Brod, Illinois
 - Eric Bowman replacing Randi Feltner, Kentucky
 - Keith Thomas replacing Scott Simons, Maryland
 - Nicole Surani replacing Joe Thompson, New York

Topic of Importance: Clear Roads Annual Survey of State Winter Maintenance Data

(Topic was introduced by Brian Hirt, then a group discussion followed.)

- See presentation posted on the Members Page.
- Details regarding the survey:
 - Began with the winter of 2014 / 2015.
 - Each winter includes July 1 to June 30.
 - All states are polled, not just Clear Roads states.
 - Includes an online spreadsheet tool.
 - Metrics in four areas
 - Highway system
 - Winter maintenance resources
 - Materials used
 - Costs
- Survey initiated to help members share winter maintenance data and have it all in one place.
- Because the same data is collected each year, Clear Roads now has 10 years of winter maintenance data.
 - Added the Accumulated Winter Weather Severity Index (AWSSI) beginning with the winter of 2020 / 2021.
- Thirteen states have completed the current survey thus far. Will extend the deadline and send a reminder email.

TAC discussion– see the rough unabridged version of the minutes on the Members Page.

Business Roundtable

- Mowing strategies prior to winter operations. (Dan Varilek, South Dakota)
- Snow and ice programs and trees. (AJ Johnson, California)
- Using salt without prewet. (Brian Galloway, Illinois)
- Third party connected vehicle data. (Aidan Neely, Connecticut)
- [NCHRP 10-147: Protocols for Evaluating Liquid Deicer Proprieties and Performance](#)
 - Jasmine Dondlinger and Randi Feltner are on the panel.
 - First meeting in DC at the end of October.
 - Update on this at the fall 2026 meeting in Portland.

- TRB Annual Meeting – The Standing Committee on Winter Maintenance Response to Weather Events (AKJ17) asks for CR updates every year.
 - Keith Thomas, Maryland, could attend and present. Clear Roads can fund his expenses.
 - Brian Hirt can always present, if no members are able to attend.
- Iowa’s discussions with Google regarding its tendency to detour interstate traffic onto secondary roads. (Craig Bargfrede, Iowa)

Topic of Importance: Performance Measures in Snow and Ice Control Operations

(Topic will be introduced by several members then a group discussion will follow)

- [NCHRP 20-44-\(37\) Workshops on Performance Measures in Snow and Ice Control Operations](#).
 - Todd Law, Vermont, is on the panel.
- Two workshops. First was a pilot with northeast states. Second was nationwide – AZ, IA, MN, MO, NV, ND, OR and WI.
- Project duration: March 2022 to September 2024.

TAC discussion– see the rough unabridged version of the minutes on the Members Page.

Update on Projects in Progress

[21-07: Determining the Migration of Chloride-Based Deicers through Different Soil Types](#)

- **Subcommittee Members:** Aidan Neely, Patti Caswell, Mark Goldstein, James Morin, Joe Thompson, Nick Evans, Matt Kraushar, Sheila Johnson
- **Investigator:** Washington State University
- **Contract End Date:** October 2025. Requesting no-cost time extension to April 30, 2026.
- **Status:** We have made significant progress and concluded the execution of the vertical and horizontal column experiments which are the final stages of the experiment. We have also completed all elemental testing of soil column effluent solutions. However, few test points from the horizontal soil columns may be added during the data analysis and result interpretation that is actively being done.

For proper context, we encountered unprecedented significant delays in the experiment execution which included the fabrication of our soil columns. To compensate for this delay, we requested the fabrication of additional soil columns to increase the number of tests we could run concurrently. Then, as expected under field conditions, soil column experiments involving beet juice got clogged periodically and this required intense maintenance to allow for continued flow and to attain our targeted pore volume for proper data analysis. We typically collected 10 pore volumes of leachates before ending each soil column test. This added significantly to the delay in experiment execution.

In addition, we encountered difficulties with different equipment to measure the chemical composition of the soil column effluent solutions (leachates). The high concentration of the solution was a hinderance coupled with the element selectiveness of the ion-selective electrode. This also resulted in a significant delay in project execution time as several data points that have been measured had to be retested multiple times. We found equipment that was efficient for the measurement of all elements of interest in our effluent solutions about two months ago and we intensified testing to complete the analysis of 230 leachates, i.e., 230 data points.

We are also at the final stages of validating our predictive model based on our test results. The multi-regression model turned out to be inappropriate for the type of data we have. We managed to develop a reliable model using Machine Learning instead.

In summary, we are currently on Task 5 and Task 6, which largely involves data analysis and

interpretation of results. We are on track to wrap up this fall and present our findings to the project panel and to deliver the 1-pager and the final report by end of the year.

22-04: Evaluation of Direct Liquid Application of Salt Brine vs Granular Salt as Measured through Various Performance and Safety Metrics

- **Subcommittee Members:** Emil Juni, Matthew Heinze, AJ Johnson, Carl Fedders, Joe Thompson, Jeff Pifer, Paul Denkler, Joe Huneke, Sheila Johnson
- **Investigator:** University of Wisconsin – Madison
- **Contract End Date:** December 2025
- **Status:** Literature Review, Survey, Field Testing Protocol, and Data Collection (Tasks 1 – 4) are complete. Project team met on August 5th to review the data collection effort. The analysis of the data (Task 5) was submitted and posted on September 1st for subcommittee review and comment. [*Looking at pavement friction and vehicle speed. Comparing divided roadways treated with salt and salt brine. Measuring time to friction, bare pavement, return to speed, etc. Found no significant difference between salt and salt brine.*] Scheduling a project meeting to review and discuss the analysis in late September / early October. Final report / webinar to be delivered in November.

23-01: Development of a Public Service Announcement Library

- **Subcommittee Members:** David Gray, Dan Varilek, Julie Stevenson (PIO; SD), Ty Winther, Ellen Mattila (PIO; ID), Emil Juni, Jeff Pifer, Randi Feltner, Wayne Shenefelt, Sheila Johnson
- **Investigator:** Montana State University
- **Contract End Date:** March 2026
- **Status:** Survey (Task 2) and Review of Existing Materials (Task 3) are complete. Project chair and PI co-presented the draft communications package (Task 4) at the 2025 spring meeting. Project team met in August to finalize the comments to Task 4. Research team is finalizing edits to that first communications package and beginning work on Task 5 (Develop Communications Packages for Other Topics), which will focus on deicers. An online meeting to review the deicers package with the entire Clear Roads TAC will be scheduled for early October.

23-02: Quantifying the Economic Value of Snow and Ice Operations Success

- **Subcommittee Members:** Mark Goldstein, Randi Feltner, Emil Juni, Joe Thompson, Marcus Zimmerman, Ty Winther, Matthew Heinze, Paul Denkler, Sheila Johnson
- **Investigator:** AECOM Technical Services
- **Contract End Date:** December 2025
- **Status:** The Literature Review; Survey of Needs, Gaps, and Practices; and Data Inputs and Methodology (Tasks 2 – 4) are complete. Task 5 (Tool Development and Documentation) has been delivered, and an additional six months has been added to this project to allow time for the project subcommittee to test the tool and provide comments. This testing will need to be completed, and any comments submitted to the research team by October.

23-03: Updating the Impact of Capital Projects Decision Support Tool

- **Subcommittee Members:** Todd Law, Emil Juni, Brandy Borja, Joe Thompson, Chad Huggins, Paul Denkler, Mark Goldstein, Matthew Oullette, Sheila Johnson
- **Investigator:** University of Vermont
- **Contract End Date:** December 2025
- **Status:** The project team met on May 13 to review / demo the tool. Continued calculating increases in vehicle-hours of travel per pass, service time, and salt use, as well as the potential need for additional trucks or different types of equipment from the new capital projects. Began development of the final decision-support tool for testing. Expect to soon receive a memo

summarizing Task 2 (Updates to the Tool Data) and the draft tool (Task 3) for Clear Roads to test.

Clare Nelson recently became the PI, taking over from Jim Sullivan. Clare demonstrated the tool via remote connection with Teams. She is looking for AVL data from additional states. The following states indicated an ability to share this data: Nebraska, Iowa, New Hampshire, Idaho, South Dakota, and Washington.

ACTION ITEM: Greg will send an email to those who said they had data to share and copy Clare.

23-04: Using Vegetation Management Practices Near Roads to Leverage the Benefits of Solar Radiation

- **Subcommittee Members:** Aidan Neely, Jessica Andrews, James Morin, Mike Warren, Joe Thompson, David Gray, Dan Whetzel, Joe Huneke, Rick Nelson, Sheila Johnson
- **Investigator:** Bolton & Menk, Inc.
- **Contract End Date:** January 2026
- **Status:** The research team has completed field site monitoring, conducted UAV survey of the site, worked with county maintenance staff to obtain their truck data, compiled and analyzed data, contacted survey respondents to obtain additional information, and is currently analyzing this data. [*Finding that there are benefits for having unshaded sections of roadways. Roads with no shade cleared 25% faster Radiation is even across the roadway on cloudy days.*] A draft outline for the guidance document has been developed and shared with the Clear Roads subcommittee for review and comment.

24-01: Toxicity Standards for the QPL

- **Subcommittee Members:** Patti Caswell, Jasmine Dondlinger, Jim Fox, Jessica Andrews, Randi Feltner, Shannon Holland, Sheila Johnson
- **Investigator:** Montana State University
- **Contract End Date:** September 2026
- **Status:** Project kickoff meeting was May 6. A project meeting was held on August 20 to update the subcommittee on progress made over the summer. Found over 100+ data sources to review. There is a lot of information on chlorides, but we want to learn more about acetates and organics.

24-02: Effective Pretreatment Methods for Events Beginning as Rain

- **Subcommittee Members:** Matthew Heinze, Randi Feltner, Dan Whetzel, Emil Juni, Dean Alatsis, Samantha Canulli, AJ Johnson, Brandy Borja, Roger Matthews, Sheila Johnson
- **Investigator:** University of Minnesota
- **Contract End Date:** July 2027
- **Status:** State of Minnesota was involved in negotiations for the master contract (occurs once every five years) with the University of Minnesota, which is why it took longer to execute this contract. Project contract (work order) was signed August 26. The project kickoff meeting was conducted on September 8 where the project scope and timeline was discussed. All testing will be conducted within a lab.

24-03: Salt Management Training for Non-DOT End Users

- **Subcommittee Members:** Scott Simons, Mike Mattison, Aidan Neely, Brandy Borja, Matthew Ouellette, Paul Denkler, Samantha Canulli, Sheila Johnson
- **Investigator:** University of Minnesota
- **Contract End Date:** May 2026

- **Status:** The Literature Review (Task 2) is complete. Survey questions and the format of the survey within Qualtrix have been approved by the project subcommittee and sent out to the Snow & Ice Listserv on September 11. Website will be developed. Will be maintained on the Minnesota LTAP website (Lesswintersalt.com). LTAP will update the website. It will be translated into Spanish.

24-S1: Predictive Methods to Update the Road Report

- **Subcommittee Members:** Randi Feltner, Dan Whetzel, Craig Bargfrede, Joe Huneke, Joe Thompson, Chad Huggins, Wayne Shenefelt, Joe Huneke, Sheila Johnson
- **Investigator:** CTC & Associates
- **End Date:** March 2026
- **Status:** Synthesis project kickoff meeting was held on September 12 where the project scope and draft survey questions were discussed.

24-S2: Snow & Ice, 2030 – Be Ready for Change within the Snow & Ice Fighting Industry

- **Subcommittee Members:** Mark Goldstein, AJ Johnson, Andy Lawrence, Carl Fedders, Marcus Zimmerman, Aaron Murra, Matthew Heinze, Chad Huggins, Mike Warren (MT), Jeremy McGuffey, Sheila Johnson
- **Investigator:** CTC & Associates
- **End Date:** December 2025
- **Status:** Synthesis project kicked off in early June, which included discussion of the scope of work and draft survey questions. The scope / survey questions were revised and approved in early July. The survey was incorporated into SurveyMonkey and the survey's format was tested / approved by the end of July. The survey was distributed in mid-August with a deadline of September 5. So far, 16 responses from 13 states.

24-S3: Status on the Update of AVL/GPS for Winter Operations

- **Subcommittee Members:** Jim Frye, Jessica Andrews, Randi Feltner, Paul Denkler, David Gray, Dean Alatsis, Carl Fedders, Alastair Probert, Joe Huneke, Sheila Johnson
- **Investigator:** CTC & Associates
- **End Date:** March 2026
- **Status:** Synthesis project kickoff meeting where the project scope and draft survey questions will be discussed needs to be rescheduled for after the fall meeting.

24-S4: Best Practices for Research Implementation

- **Subcommittee Members:** Mike Mattison, Dan Whetzel, Craig Bargfrede, Scott Simons, Todd Law, Dean Alatsis, Andy Lawrence, Kevin Hensley, Clark Moe, Sheila Johnson
- **Investigator:** CTC & Associates
- **End Date:** December 2025
- **Status:** Synthesis project kicked off in early June, which included discussion of the scope of work and draft survey questions. The scope / survey questions were revised and approved in mid-July. The survey was incorporated into SurveyMonkey and the survey's format was tested, revised, and approved by mid-August. The survey was distributed in late-August with a deadline of September 12. So far, 11 states have completed the survey.

Clear Roads Budget – Greg Waidley

- All FFY25 transfers in.
- Meeting costs down since 2024 bc \$50,000 transferred to CTC contract. CTC now contracts with the hotels and pays for everything directly. MnDOT used to contract with the hotels.
- \$60,000 from TPF-5(353) was transferred to TPF-5(479).

Recently Completed Project Report – Mike Mattison

Grip Sensor Technology and Salt Applications (CR 21-01)

- Mike reviewed the final report and project outcomes.
- Mike would like to see a guidance document be developed from this project. The final report is research heavy and needs more practical applications.

Wednesday, September 17, 2025

[See separate Joint Meeting Minutes.]

Thursday, September 18, 2025

Future Meetings

2026

Spring Meeting: Lexington, KY. Week of April 20.

- Contracted with the Hyatt Regency, 401 W. High Street.

Fall Meeting: Portland, ME. Week of September 14.

- Back up: Mystic, CT.

2027

Spring Meeting: Boise, ID. Week of April 19.

- Back up: Spokane, WA.

Fall Meeting: Deadwood, SD. Week of September 13.

- Back up: Ohio.

2028

Spring Meeting: Wichita, KS. Week of April 17.

- Back up: Morgantown, WV.

Fall Meeting: Oakland, CA. Week of September 11.

- Back up: Morgantown, WV.

2029

Spring Meeting: New Jersey. Week of April 16.

Fall Meeting: Mystic, CT. Week of September 17.

FHWA Update

- Presented by Jeremy McGuffey
- See *Fall 2025 Industry Reports* under TAC Meeting Presentations on the members page.

APWA Update – Kevin Hensley

- Presented by Kevin Hensley
- See *Fall 2025 Industry Reports* under TAC Meeting Presentations on the members page.

AASHTO Winter Weather Management TSP Update

- Presented by Jed Falgren.
- See *Fall 2025 Industry Reports* under TAC Meeting Presentations on the members page.

Joint Meeting Wrap-up/Debrief

- Mike M – Feels it was kind of a peer exchange. Different areas of expertise sharing. Good thing. Would like it to happen more often than less often. The opportunity to have these kinds of discussions is good for everyone.
- Todd L – Topics came from Craig B. Clear Roads and Aurora should decide on the topics that are

most important to the groups.

- Mike M – the openness of the questions allowed for discussion on topics that weren't in the agenda. A wider range of input on topics would be good.
- Aaron M – Keep a running list of topics to make it easy to pick topics for the joint meeting.
- Carl F – Will Aurora go to a state that isn't one of their members? Does CR need to rethink the upcoming meetings so we are at states that Aurora would travel to for a joint meeting?
 - Todd L – We are flexible and can adjust if needed. Planning for the joint meeting should begin earlier to figure out a mutual location.
- Todd L – Expand breaks to 30 minutes during the joint meeting to allow for networking.
- Do we want all the sessions with different topics or more open roundtables or longer breaks for networking?
- Keith T – Liked to be able to see what Aurora is doing since MD is not a member. Suggestion – Include breakout sessions. Give them topics to discuss and report out.
- Ty W – Would like to see more of what the DOTs are doing. Show examples of this, maybe in the breakout groups.
- Todd L – Shorten the list of topics and go into greater depth.
- Craig B – At last joint meeting, vendors were in attendance. At a social gathering, each vendor got a minute to pitch themselves to the group. Also, a location to set up booths for attendees to visit during breaks. This adds a level of complexity to planning and logistics. AASHTO has an event planner that might be able to help with this.
 - Invite agency guests. Last time – One guest for each CR or Aurora member that was paid for by either Aurora or CR.
 - Mike M – Could a state bring even more if they paid for it?
 - Rick N – If they charge a registration fee, then yes.
- Rick N – Capturing what was talked about. Did we capture the notes as good as we could have? Depends on the notes. **What do we expect as the outcome from the joint meeting?** Need to define this ahead of time so get what you want afterwards.
- Timing?
 - It was every other year prior to COVID.
 - Vote for next joint meeting format (2 years from now).
 - Joint meeting with CR, Aurora and AASHTO, no vendors or added guests – 9
 - **Joint meeting with CR, Aurora and AASHTO, with guests, no vendors – 23**
 - Joint meeting with CR, Aurora and AASHTO, with guests and vendors – 0
- Greg W – Would need to start planning for the next one in two years by spring 2026. If had it in fall 2027, CR is in SD. SD is not a Aurora state. Rick – Aurora has met in non-member states. They go to research facilities, so if they can visit a research facility at a non-member state, that would be okay.
 - Dan V – SD could handle transportation needs for both groups.

Business Roundtable

- Inclusion of the investigator on in-progress project updates. (Greg Waidley, CTC & Associates)
- Vendor opportunities with Clear Roads. (AJ Johnson, Caltrans)
- Implementation webinars – Been doing them for 2-3 years. Projects already have project closeout webinars. A state that has implemented research results would develop the content and present. Greg handles the logistics. 60-minute webinar with 30-minute presentation and 30 minutes Q&A. Upcoming implementation webinars:
 - Maintenance vehicle conspicuity – **Jeff will work on putting this together.**
 - Using GIS to Highlight Hwy Segments Sensitive to Deicing Materials – **Nicole S. will ask Joe T. See if he could conduct a webinar prior to holidays.**
 - Mechanical Rocker Test – Jasmine D.

- SSI/WSSI Training – James M.
- Salt Shed Design Template – James M.
- Measuring Efficiencies of Tow and Wing Plows – Doug M. – This one has a calculator.
- **There is an opportunity to share highlights of research projects, including tools that are available for members to use. Could share one at an in-person meeting.**
- Best Management Practices for Liquid Chloride Storage and Pumping Systems – Mark G is using some of that information. He went to Maine to check out what they are doing. **Mark could do a webinar. Timing – February or March.**
- Communications Report
 - CTC pulls the communications data together every six months.
 - 66 new subscribers. 964 on the distribution list.
 - Most visited web pages – QPL, Annual Survey of State Winter Maintenance Data, Training Resources, Request for ELDT (CDL) Training Modules and Understanding NaCl Phase Diagram
 - Most downloaded documents – Phasing Up: Upgrade to Toolkit Elevates the Snow-Clearing Game (26,954)
 - Top news posts – Minnesota Evaluated Solar-Powered Snow Fences (303 opens)
- INDOT is not using any severity indexing for storms or post-winter. Aware of Midwest Regional Climate Center ([MRCC](#)) and the annualized winter severity index. He met Beth Hall who was in the group that built that when she was with U of IL and now with Purdue. He wanted to pull in the data from MRCC in a CSV file. IN's IT staff want it as a data feed like an API. MRCC does not have an API available. Beth thought that CR and MnDOT had interest in the MRCC having an API. Purdue and MRCC is open to developing an API, but it would cost \$20k plus Purdue's overhead. He hasn't pitched this to INDOT Research area. Are there any other states that would utilize an API?
- Reviewing RFP proposals for projects – early December. Greg will send a scheduling poll for early December 2025 and January 2026 as a backup.