



LRRB Proposal Selection Meeting

DRAFT MINUTES

October 26, 2015

10:00 AM – 2:00 PM

MnDOT – District 3B Headquarters and Training Center

Lewis North Room

3725 12th Street North

St. Cloud, Minnesota 56303

LRRB Members Present:

Bruce Hasbargen (Chair), Beltrami County
Lyndon Robjent, Carver County
Tim Stahl, Jackson County
Paul Oehme, City of Chanhassen
Steve Koehler, City of New Ulm
Kaye Bieniek, Olmsted County
Linda Taylor, MnDOT – Research
Mitch Rasmussen, MnDOT – State Aid
Tom Ravn, MnDOT – Construction
And Innovative Contracting

Others Present:

Dave Van Deusen, MnDOT – OMRR
Brenda Thomas, U of M – CTS
Debbie Sinclair, MnDOT – Research
Hafiz Munir, MnDOT – Research
Shannon Fiecke, MnDOT – Research
Dan Sullivan, MnDOT – Research

1. Call to Order

Chair Bruce Hasbargen called the meeting to order and reviewed the purpose of the meeting. The meeting agenda was reviewed by the group. A roster update and discussion of future conferences were added by Mitch Rasmussen. An additional TRS request was added on behalf of Lyndon Robjent by Dan Sullivan. After noting these changes, the agenda was approved by Chair Hasbargen.

A motion was made by Steve Koehler, seconded by Paul Oehme, to approve the minutes of the Fall LRRB meeting on September 17, 2015. Motion approved.

Pending June Action Items

Linda Taylor reviewed pending LRRB action items. Action items not listed below were completed or included in the agenda.

June Action Item No. 4: Mitch Rasmussen will ask Nancy Stone to schedule an update meeting for the LRRB Strategic Plan.

Mitch reported that the meeting has not yet been scheduled. He said the county representative was going to Kaye Bieniek and he selected Paul Oehme as the city representative.

June Action Item No. 6: Mitch Rasmussen will follow-up on developing a work plan with Ryan Peterson for further research on Chloride Free Snow and Ice Control.

Mitch reported that he reached out to Ryan Peterson and Ryan was going to get back to him when he had time. Dan Sullivan reminded the Board that this was in response to their desire to learn more about current research on the field usage of potassium succinates and acetates after Ryan gave an update on the results of the TRS at the Summer meeting. Mitch suggested working with Ryan to find someone at Dakota County to serve as TL or be on the TAP.

Chair Hasbargen stated that he did not want to contribute to longer minutes but suggested that a little more context for the action items that remain from meetings occurring before the previous meeting would be helpful.

June Action Item No. 8: Mitch Rasmussen will develop a plan to communicate the knowledge transfer process of MnDOT systems for City and Counties to follow.

Mitch reported that it is important that we go to conferences and find out what might be helpful for the LRRB, but that we should be focusing on information that can be used by City and County practitioner. Without a filter on these “nuggets of information” they can turn into action items, as was the case with June Action No. 8. It is not clear how this fits into City and County needs or what problem it is solving. Mitch suggested that this action item be tabled.

June Action Item No. 12: Tom Ravn will follow-up with Jay Hietpas, provide the MnDOT report on Precast Concrete Pavement and recommend next steps.

Tom Ravn reported that he did provide several reports to Dan Sullivan. Covers and title pages from three reports summarizing MnDOT’s work done on Precast Concrete Pavements were included in the September meeting materials. Tom explained that in general, these pavements 1) are very expensive, 2) are only done when they could not get the cure time and 3) there is post tensioning involved. Not a lot of people are using these types of pavements and Tom did not think there was much use for them at the local level. ****THIS ACTION ITEM IS COMPLETE****

Pending September Action Items

September Action Item No. 1: Mitch Rasmussen will be sending out a note to Board members with information on a potential informal outing on Sunday prior to the TRB Annual Meeting.

Mitch reported that this will be more informal than what Julie Skallman had done at past TRB Meetings. He has been to TRB several times and believes that his informal outing will be centered around food.

Action Item No. 1: Mitch Rasmussen will send out his contact information to attendees to get together informally at TRB. This get together will most likely be an evening event at an Italian restaurant.

September Action Item No. 2: Bruce Hasbargen will touch base with Mitch Rasmussen on whether RS needs to coordinate a get together (i.e., breakfast meeting) sometime during TRB to share/exchange feedback from the conference.

Bruce Hasbargen reported that we will not be doing this exchange.

September Action Item No. 3: Dave Van Deusen will find out when and where the NCAT Pavement Test Track Conference (Sponsor Meeting) is going to be held and get back to the group.

Dave reported that this will be held on December 9 and 10, 2015, likely somewhere near Auburn University in Alabama. The main focus will be an update on their summer construction and a tour of the facility.

September Action Item No. 4: Dave Van Deusen will identify the 2nd attendee for the AAPT Pavement Technologies Conference in March and get back to the group.

Dave reported that John Garrity is definitely going, and the 2nd attendee will be either Eddie

Johnson or Greg Johnson. Debbie Sinclair added that she would need know who is attending by December 9, 2015.

September Action Item No. 7: MnDOT RS (Dan Sullivan) will contact Mark Vizecky (MnDOT State Aid) and Jim Grothaus (LTAP) and arrange for them to work with the CEAM Traffic Safety Committee to revise the scope of the proposed project regarding frequent citizen inquiries and come back at a later meeting.

Dan reported that a meeting has been scheduled for November 3, 2015.

September Action Item No. 8: Guy Kohlhofer will work with Matt Zeller, and Joel Ullring to survey existing best practices, sponsor training and put together a resource page for concrete projects that includes construction administration and traffic management.

Dan Sullivan will follow up with Guy, Matt and Joel.

Linda suggested that it might be a good idea for the Board to consider inviting staff like Joel Ullring to future LRRB meetings if there is business associated with them.

Roster Update

Mitch Rasmussen gave an update on changes to the LRRB and RIC Rosters starting January 1, 2016. John Brunkhorst (McLeod County, County Engineer) will replace Dave Robley (Douglas County, County Engineer) and Steve Bot (City of Saint Michael, City Engineer) will replace Jeff Hulsether (City of Brainerd, City Engineer) as new RIC members. Jim Foldesi (Saint Louis County, Public Works Director, Highway Engineer) replaces Bruce Hasbargen (Beltrami County, County Engineer) as the new LRRB member.

Mitch did talk with Lyndon about serving as the future Chair of the LRRB. Chair Hasbargen asked if there were any other nominations. Hearing none, he asked for motion.

A motion was made by Chair Bruce Hasbargen, seconded by Paul Oehme, to elect Lyndon Robjent from Carver County to serve as the next Chair of the Local Road Research Board. Motion approved.

Lyndon said he was honored.

2. Budget and Administration

Budget Status Report

Debbie Sinclair reviewed the LRRB budget status spreadsheet that was included in the meeting materials for Board members' reference. This was essentially the same spreadsheet from September, but with the completed projects removed.

There is \$770,745 obligated for FY16 with \$1,564,118 available for projects in December.

2015 and 2016 LRRB & RIC Meetings

Debbie Sinclair reported that holding the December meeting at the Campus Club at Coffman Memorial Union may be in violation of MnDOT's contracting procedures because as a non-profit organization it is not considered a state facility. Space is available in the Northrup Building's Lindahl Founders Room. <http://www.northrop.umn.edu/visit/our-spaces/lindahl-founders-room>

Bruce Hasbargen felt it was good to stay on campus to be closer to the university researchers and be near restaurants and lodging. Considerable discussion on the advantage and disadvantages of multiple locations followed with several people agreeing it was best to stay on or very near campus. Tim Stahl suggested that this topic be tabled to a later time when better information was available.

3. Outreach Committee Update

Mitch Rasmussen gave an update on the Outreach Committee Meeting that took place that morning from 8:00 am to 10:00 am. A summary of his update has been included with these minutes as **Attachment 1**. The following action items came out of the Outreach Committee Meeting.

Action Item No.2: Shannon Fiecke will relay a suggestion to SRF Consulting to create a video promo similar to CBS' "The World in 90 Seconds" for its upcoming presentation on available LRRB videos at the city and county engineers associations' annual meetings.

Action Item No.3: The Outreach Committee will develop a plan by March for how to systematically compile an ongoing list of all Minnesota-led presentations made at state and national transportation conferences. This is to increase information-sharing of innovative practices occurring throughout the state.

Action Item No.4: To allow for better decision-making on action items at LRRB board meetings, Mitch Rasmussen requests that LRRB members turn in trip reports at the same time as requests for reimbursement. If conference materials are posted too late to allow for this, members should wait for the information needed to finish their reports, but then turn in their report as soon as possible.

Action Item No. 5: At its next meeting, the Outreach Committee should discuss the idea of a TED Talks-type web application to showcase research-related presentations.

4. Transportation Research Synthesis (TRS) Workplans and Approval Process

Linda said MnDOT RS is looking for how the process of getting a TRS started can be streamlined. Part of the value is being able to pull it together quickly. With the signature and contracting procedures it can take several weeks to get that going.

There are three different kinds of TRSs: 1) literature searches, 2) survey state of practices, and 3) a hybrid of the first two types listed.

LRRB has not done a lot of TRSs, whereas MnDOT has done more given the number of specialty offices they have. They use TRSs when they want to find where the gaps are in the available research. At the meeting the Board decided we are going to identify an initial cost for a TRS. If the actual cost exceeds 15% of the initial cost, Research Services will send out an e-mail to the Board members for a vote.

The meeting materials included proposals for the four TRSs listed on the agenda. Dan Sullivan gave an overview of the first three TRSs on the agenda, while Lyndon Robjert reported on the fourth.

- **Developing the Right Recipe of Recycled Materials in Aggregate Bases**

The idea for this TRS came out of the Metro Area Focus Group in March 2015 and was placed as NS 410 into the yearly RFP. NS 410 was pulled from the RFP so that the results of this TRS could be made known before that research began. The proposed project had a duration of 8 months and budget of \$14,418, according to the proposal submitted by Minnesota State University, Mankato.

- **Base Stabilization Additives**

This originally came out of the December 2014 LRRB Meeting as an action item to be added to the RIC's consultant contract. It was later decided to be done as a TRS that either the RIC or the LRRB would fund. The proposed project has duration of 3-4 months and budget of \$22,825, according to the proposal submitted by Braun Intertec.

- **Best Practices for Managing Concrete Projects**

NS 399 was submitted by John Brunkhorst (McLeod County) in June of 2014 as a research project. A proposal was submitted by Dr. Jeong (Iowa State University) but the project was not selected for funding in December 2014. It was decided to be done as a TRS that either the RIC or the LRRB would fund focusing on the construction of concrete pavements. The proposed project had a duration of 3-4 months and budget of \$22,825, according to the proposal submitted by Braun Intertec.

- **Consolidated Asset Management Guide for Minnesota Local Agencies**

The idea for this project came out of the Metro Area Focus Group in March 2015 where the LRRB decided to fund this TRS directly at their Summer Meeting. The proposed project had a duration of 21 months and budget of \$9,840, according to the proposal submitted by CTC & Associates.

5. Project Proposal

Randy Neprash from Stantec gave a presentation entitled "Creating an Inventory of Stormwater BMPs to Meet the MPCA Requirements." The meeting materials included both his presentation and Stantec's proposal. The proposed project had a duration of 12 months and budget of \$90,544.

Paul Oehme was concerned about on-going maintenance of the site. Randy replied that this was not factored into the proposal, adding that the MPCA's Wiki-format Storm Water Manual requires continual updating. Hafiz Munir reminded the Board members that this issue has come up as a Needs Statement for the past three years. Randy concluded that the real "game changer" in whether or not this project will be a success was the publication of several NCHRP state-of-the-art documents he mentioned that all focused on roads.

6. Project Update

Doug Gransburg from Iowa State University gave a presentation entitled "Major Equipment Life Cycle Cost Analysis (INV 950) and the PowerPoint were included in the meeting materials.

Dan Sullivan forwarded this spreadsheet tool to the Board members in August 2015. Steve Koehler asked how this spreadsheet would be used. Lyndon thought it was complicated and too much work, but that was prior to seeing the presentation. Linda Taylor wondered if there was a way to simplify the worksheet. Tim Stahl said choosing the discount rate was also an issue when they made this presentation to RIC. Chair Hasbargen wanted to know if there was something that could be done to make it more useful.

Action Item No. 6: Tim Stahl will add Major Equipment Life Cycle Cost Analysis (INV 950) to the list of RIC projects where they will beta test the spreadsheet, discuss future implementation, follow-up with City of Minneapolis and recommend next steps.

7. FY17 Proposal Rating & Selection

Hafiz Munir updated the group on the 2015 RFP Process. There were a total of 16 needs statements (11 from MnDOT and 5 from LRRB) sent out with the RFP. NS 411 was withdrawn. Of the 30 proposals received, 24 were from the University of Minnesota, four were from Iowa State University, one was from Texas A&M University and one was from Montana State University. After much discussion over deciding on which proposals to hear, the Board chose to hear the proposals listed in **Attachment 2**.

8. Trip Reports

Kaye Bieniek presented her thoughts on “Can Traffic Signs be Too Bright on Low Volume Roads?” from TRB’s Conference on Low Volume Roads held in Pittsburgh in July.

Action Item No.: 7: Dave Van Deusen will follow-up with MnROAD to see if there are thresholds for light pollution on scenic routes and if there is an upper limit for sign reflectivity.

The Board was asked to review their old Trip Reports and get back to Dan Sullivan with any potential action items to put on a future list. Otherwise the items should be dropped.

9. Funding Requests

Creating an Inventory of Stormwater BMPs to Meet the MPCA Requirements

Steve Koehler said that it’s a strong proposal and thinks Randy would do an excellent job. Paul Oehme commented that it was a great proposal adding only that he was concerned with the updating of the website as the material becomes “dated” quickly. The RIC would like to see this project implemented and perhaps it could be housed on the State Aid website.

A motion was made by Tim Stahl, seconded by Lyndon Robjent, to fund the proposal submitted by Stantec to Create an Inventory of Stormwater BMPs to Meet the MPCA Requirements in the amount of \$90,544. Motion approved.

TRS: Consolidated Asset Management Guide for Minnesota Local Agencies

Lyndon stated the proposal met his needs at a reasonable cost.

A motion was made by Lyndon Robjent, seconded by Tim Stahl, to fund the proposal submitted by CTC & Associates to develop a TRS for Consolidated Asset Management Guide for Minnesota Local Agencies in the amount of \$9,840. Motion approved.

TRS: Developing the Right Recipe of Recycled Materials in Aggregate Bases

This project needs to be funded because it will lay out the next steps for future research to be done.

A motion was made by Lyndon Robjent, seconded by Bruce Hasbargen, to fund the proposal submitted by Minnesota State University, Mankato to develop a TRS for Developing the Right Recipe of Recycled Materials in Aggregate Bases in the amount of \$14,418. Motion approved.

TRS: Best Practices for Managing Concrete Projects

Several Board members have been through the process of getting their technicians comfortable with this practice. They did not feel that this was needed by all Minnesota counties or cities. The Board recommended that this be a conversation that cities and counties should be having with the industry. If training is desired, the Concrete Pavement Association of Minnesota (CPAM) is available to do this.

TRS: Base Stabilization Additives

The Board decided that this should be referred to the RIC to be included with their plans for next year if the funding is available.

A motion was made by Tim Stahl, seconded by Paul Oehme to table this item and have it be an RIC project. Motion approved.

Action Item No.: 8: Tim Stahl will bring the need for a TRS on Base Stabilization Additives to the RIC.

10. Round Robin

Mitch Rasmussen

System Preservation Guide: The pilot counties needed some additional time to present the findings to their Boards. There is still money leftover and they would like to use that to make the guide more user-friendly, however this will require an amendment for the time extension. If there is a desire to do further implementation this will require extra money. There is potential for cost-sharing between the State Aid Administration account, the LRRB and the RIC.

Tim Stahl

The RIC meets on Thursday, October 29 to go over the RFP for the new consultant contract.

Steve Koehler

Congratulations to Lyndon. If you need any help please let the Board members know.

Dan Sullivan

If anyone knows of a strong candidate (city or county engineer in D3) to serve as the TL for the Greater Minnesota Focus Group, please let Mitch Rasmussen know soon. The PI (Brenda Thomas) wants to get moving on that project.

Brenda Thomas

Could not find any other available conference rooms for THIS December (2015) so it will be between the Lindahl Founder's Room and the MnDOT Training Center in Arden Hills. She will explore other options for NEXT December (2016).

A motion was made by Steve Koehler, seconded by Lyndon Robjent, to hold the December 2015 LRRB Meeting in the Lindahl Founder's Room in the U of M's Northrup Building. Motion approved.

11. Adjourn

The meeting was adjourned by Chair Hasbargen.

Summary of Action Items

LRRB October 2015 Meeting Minutes

- Action Item No. 1** Mitch Rasmussen will send out his contact information to attendees to get together informally at TRB. This get together will most likely be an evening event at an Italian restaurant.
- Action Item No. 2** Shannon Fiecke will relay a suggestion to SRF Consulting to create a video promo similar to CBS' "The World in 90 Seconds" for its upcoming presentation on available LRRB videos at the city and county engineers associations' annual meetings.
- Action Item No. 3** The Outreach Committee will develop a plan by March for how to systematically compile an ongoing list of all Minnesota-led presentations made at state and national transportation conferences. This is to increase information-sharing of innovative practices occurring throughout the state.
- Action Item No. 4** To allow for better decision-making on action items at LRRB board meetings, Mitch Rasmussen requests that LRRB members turn in trip reports at the same time as requests for reimbursement. If conference materials are posted too late to allow for this, members should wait for the information needed to finish their reports, but then turn in their report as soon as possible.
- Action Item No. 5** At its next meeting, the Outreach Committee should discuss the idea of a TED Talks-type web application to showcase research-related presentations.
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- Action Item No. 8** Tim Stahl will bring the need for a TRS on Base Stabilization Additives to the RIC.

Attachment 1

Outreach Committee Update

LRRB October 2015 Meeting Minutes

Mitch Rasmussen, MnDOT State Aid Engineer, gave an update on the Outreach Committee meeting that occurred before the Board meeting.

Videos

Three new videos, funded by the LRRB, are now available on its YouTube channel:

- 1) Roundabout Myths (two versions),
- 2) Winter Chemicals for Local Agencies and
- 3) Rumble Strips: Saving Lives in Minnesota.

Two videos are in the works:

- The script is being finalized for a video on ineffective specialty signs
- A video tutorial on new guidelines for using flashing yellow arrows is being produced, which will be posted to YouTube with a note that it's intended for a technical audience. SRF recently videotaped a training class for this tutorial.

Several videos still require Technical Advisory Panels and consultants assigned:

- Cost of Rough Roads
- Truck Weight Compliance. This will be a teaching tool for law enforcement and others responsible for truck weight enforcement and be part of Greg Hayes' Minnesota Truck-Weight Education Program.
- J-Turns Video Update (**June Action Item No. 9**) - The Outreach Committee is planning that this video also feature other alternative intersection design options and be targeted at local officials and businesses. It will explain the purpose of various designs and also highlight success stories.
- Commercial Driver's License Requirements for Local Vehicles. Jim Grothaus has agreed to be the Technical Liaison for this video.

The Outreach Committee is recommending additional videos be produced on the following subjects with any funds remaining from the aforementioned productions and possibly an additional allocation:

- Enhanced Pedestrian Crossing Options, such as the HAWK system.
- An educational video about civil engineering careers geared toward middle school and early high school-age students. The current video, which will be revised, had focused on college students who are finishing engineering school. This wasn't very effective since these students have often already chosen their career path or have a job offer.

The Outreach Committee also recommended using SRF Consulting to make a presentation at the next city and county engineer conferences on available LRRB videos and how they can be used. A board member suggested SRF Consulting consider creating something like CBS's "The World In 90 Seconds" for the presentation to city and county engineers.

Action Item No.2: Shannon Fiecke will relay a suggestion to SRF Consulting to create a video promo similar to CBS' "The World in 90 Seconds" for its upcoming presentation on available LRRB videos at the city and county engineers associations' annual meetings.

The Outreach Committee also decided to require video production consultants develop a distribution plan as part of their contracts. This plan will identify the intended audience and who should be receive copies of the video. There is currently no mechanism in place for distribution, outside of providing notice to county engineers, who may decide to distribute them, Rasmussen said.

Previous Action Items

Rasmussen updated the board on action items from the June 2015 meeting, which were assigned to the Outreach Committee:

June Action Item No. 9: *The Outreach Committee will develop a plan, which may include a video, to promote what is currently being done with alternative intersection design around the state.*

Please see J-Turns video update (above).

June Action Item No. 10: *The Outreach Committee will develop a plan to promote what is being done on pavement patching and repair at the MnROAD Test Track facility.*

The Outreach Committee had been asked to develop a plan to promote innovative patching and repair techniques used at MnDOT (a suggestion that came out of a trip report on a MnDOT District 7 presentation at TRB). The Outreach Committee recommended LRRB instead assemble an ongoing summary of presentations made on innovative transportation techniques at local and national conferences. This would provide a presenter's contact information and links to any presentation materials. The thought behind this is that new and innovative transportation practices are often not being shared amongst peers across the state, not just in the area of patching and repair.

Action Item No.3: The Outreach Committee will develop a plan by March for how to systematically compile an ongoing list of all Minnesota-led presentations made at state and national transportation conferences. This is to increase information-sharing of innovative practices occurring throughout the state.

June Action Item No. 8: *Mitch Rasmussen had been asked to develop a plan to communicate the knowledge transfer process of MnDOT systems for cities and counties to follow.*

Mitch Rasmussen reported that the Outreach Committee determined this idea did not appear to be very beneficial for city and county engineers. He said that ideas like this, which come out of conference trip reports, could be more fully vetted if LRRB members turned in their trip reports sooner. Trip report "nuggets" often turn into action items since there is often not much time for discussion at LRRB board meetings, Rasmussen said.

Action Item No.4: To allow for better decision-making on action items at LRRB board meetings, Mitch Rasmussen requests that LRRB members turn in trip reports at the same time as requests for reimbursement. If conference materials are posted too late to allow for this, members should wait for the information needed to finish their reports, but then turn in their report as soon as possible.

Outreach Contract

The Outreach Committee decided to post a new RFP for LRRB's website, which expires in August 2016. The current contract is 66 percent complete. It was determined that the current contract involves a lot of duplicative work and Research Services could manage the posting of web content if a company was hired to develop and host the website. A decision on the contract will be required by the June Outreach meeting. Lyndon Robjent suggested a TED Talks-type app (searchable by keywords) be created for the LRRB website to feature transportation research presentations.

Action Item No. 5: At its next meeting, the Outreach Committee should discuss the idea of a TED Talks-type web application to showcase research-related presentations.

At-A-Glance

The Outreach Committee decided to highlight the following projects in the 2015 LRRB At-A-Glance:

- Timber Bridge Inspection Methods,
- Lighting Levels at Isolated Intersections,
- Rumble Strip Noise Study
- Younger Drivers Toolkit.

The Outreach Committee also wants to add two pages to the report in order to include a factsheet on available YouTube videos and how to use them (to be created by SRF Consulting) and a feature on the Younger Drivers Toolkit.

SRF Consulting also reviewed its work plan with the Outreach Committee, Mitch Rasmussen reported. The committee did not have time to discuss what promotional items to order for the LRRB booth at upcoming conferences. Mitch Rasmussen planned to discuss this off-line.

Attachment 2
Proposal Selection Summary
LRRB October 2015 Meeting Minutes

Need Statement #	Champion / TL	Principal Investigator	University	Project Title
431	Bruce Hasbargen Beltrami County	David Veneziano	ISU	Investigating the Necessity and Prioritizing Pavement Markings on Low Volume Roads
416	Paul Rowekamp MnDOT Bridge Office	Behrouz Shafei	ISU	Field Investigation of Bridge Deck Reinforced with GFRP Rebar
434	Bruce Hasbargen Beltrami County	Zhirong Jerry Zhao	UMN	Transportation Investment and Job Creation in Minnesota Counties
433	Dave Van Deusen MnDOT Materials MnROAD	Mihai Marasteanu	UMN	Investigation of Cracking Resistance of Asphalt Mixtures and Binders
410	Brad Estochen, Vic Lund, Rick West	John Hourdos	UMN	In-Vehicle Dynamic Curve Speed Warning at High Risk Rural Curves
410	Brad Estochen, Vic Lund, Rick West	Imran Hayee	UMD	Development and Demonstration of a Cost Effective In-Vehicle Lane Departure and Advanced Curve Speed Warning System
426	Todd Haglin MnDOT Safety	Nichole Morris	UMN	Work Zone Intrusion Report Interface Design
417	Joe Gustafson Washington County	Susan Chrysler	TTI	Signing for Effective Roundabout Approach Speed Reduction
417	Joe Gustafson Washington County	Gary A. Davis	UMN	Signing for Effective Roundabout Approach Speed Reduction
KB10 "Materials"	Perry Collins MnDOT District 1	Larry Zanko	UMD	Optimized Taconite-Based Pavement Repair Compound and Deployment System
412	Dwayne Stenlund, Kenneth Graeve MnDOT OES	Eric Watkins	UMN	Regional Optimization of Roadside Turfgrass Seed Mixtures

Need Statement #	Champion / TL	Principal Investigator	University	Project Title
432	Maria Masten MnDOT Materials Concrete Office	Manik Barman	UMD	Comparison of Performances of Structural Fibers and Development of a Specification for using Structural Fibers in Thin Concrete Overlays
KB13 "Water Quality"	Mark Maloney Shoreview Richard McCoy Robbinsdale	John Gulliver	UMN	Permeable Pavement for Road Salt Reduction
KB13 "Water Quality"	Ross Bintner City of Edina	Larry Baker	UMN	Using Adaptive Management to Reduce Road Salt and Improve Winter Vehicle Travel
414	Karla Rains MnDOT Customer Relations	Ingrid Schneider	UMN	Effective Social Media Engagement Options for Minnesota's Diversifying Population
KB13 "Water Quality"	Barbara Loida MnDOT Metro District	John Gulliver	UMN	Iron-Enhanced Swale Ditch Checks for Phosphorus Removal
413	Petra DeWall MnDOT Bridge	Jeff Marr	UMN	Minnesota Culvert Manual to Accommodate Aquatic Species Passage