



FY2019 LOCAL ROAD RESEARCH BOARD

At-A-Glance

July 1, 2018, through June 30, 2019 | LRRB.ORG



Welcome to the Local Road Research Board At-A-Glance for Fiscal Year 2019

Our Mission

The mission of the LRRB is to serve local road practitioners through the development of new initiatives, the acquisition and application of new knowledge, and the exploration and implementation of new technologies.

Our research ideas come from local Minnesota transportation practitioners like you. **Contact us anytime at lrrb.org.** We'll let you know whether current solutions to your problem exist or help you take your idea to the next stage of consideration for funding.



2019 Local Road Research Board: (from left) Lyndon Robjent (chair), Carver County; Tim Stahl, Jackson County; Laurie McGinnis, University of Minnesota Center for Transportation Studies; Kevin Western, MnDOT Bridges & Structures; Paul Oehme, City of Lakeville; Katie Walker, MnDOT Research & Innovation; Mitch Rasmussen, MnDOT State Aid; Kaye Bieniek, Olmsted County; and Kent Exner, City of Hutchinson. Not pictured: Jim Foldesi, St. Louis County.

Join a Technical Advisory Panel

Participating on a Technical Advisory Panel (TAP) ensures that research results fit your needs and are applied in the most productive way in the field. Participation involves helping guide researchers, attending a limited number of meetings (in person or remotely) and reviewing research results. To participate on a TAP, contact any board member.



2019 Research Implementation Committee (RIC): (first row, from left) Steve Bot, City of St. Michael; Kaye Bieniek (LRRB liaison), Olmsted County; Ben Worel, MnDOT Materials & Road Research; Hafiz Munir, MnDOT Research & Innovation; John Brunkhorst, McLeod County; and Kelvin Howieson, MnDOT State Aid; (second row) Guy Kohlhofer, Dodge County; Kristine Elwood, MnDOT State Aid; Stephanie Malinoff, University of Minnesota Center for Transportation Studies; Mike Flaagan (chair), Pennington County; and Will Manchester, City of Minnetonka.

To ensure that we are responding to city and county needs, we have implemented the following process for selecting new projects:

1. **October prescreening meetings:** LRRB representatives hold sessions at State Aid prescreening meetings, where city and county engineers discuss their research and technology transfer needs.
2. **December email survey:** City and county engineers prioritize the ideas generated from the prescreening meetings.
3. **January city/county association meetings:** We report on the ideas collected in step 1 and prioritized in step 2.
4. **February to December proposal development:** We work with local practitioners to develop need statements for the top ideas. The LRRB issues requests for proposals and selects proposals to fund.

Making a Difference

The Local Road Research Board (LRRB) has been bringing innovations to local Minnesota researchers since 1959. Here are examples of how the LRRB is improving current practices.

Optimal Sight Distances at Rural Intersections

Unsignalized rural intersections are a major source of severe crashes. Using a state-of-the-art driving simulator, researchers investigated drivers' ability to judge traffic speed and gaps between cars at varying sight distances. They found that 1,000 feet of sight distance was ideal. This measure will guide decisions in locating the stop line on a minor road (which should be as close as possible to the major road) and clearing brush and trees near intersections. [Report 2019-34](#)



Streamlining Project Delivery with CIM Digital Tools



A new report provides comprehensive steps that local agencies can take to begin to adopt the digital tools of civil integrated

management (CIM), which efficiently uses shared digital data across multiple construction stages. The study also demonstrates how a traditional project would have progressed using CIM, saving time and money with the new technologies. [Report 2019-36](#)

An image on the cover of this report shows aerial control points used to guide an unmanned aerial vehicle to perform a survey along Marsh Lake Road. The image above compares a 6-inch resolution (resampled) height-map (left) to 1-meter resolution Minnesota lidar (right) along that road.

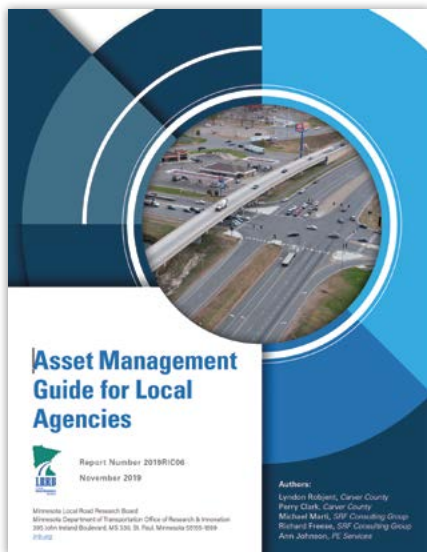
In the News



A July 2019 **Roads & Bridges** article featured LRRB's rural road research, including designs for quieter rumble strips and other low-cost safety improvements.

A **St. Paul pedestrian safety campaign** yielded [extensive coverage from media outlets](#), including KSTP, the *Star Tribune* and Pioneer Press.

New Resources for Local Agencies

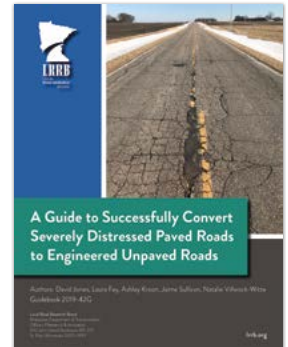


◀ Asset Management Guide for Local Agencies

This guide includes steps on how to implement an asset management plan covering pavements, roads and bridges, culverts, sidewalks, signals, signs, culverts and other infrastructure. [Guide 2019RIC06](#)

A Guide to Successfully Convert Severely Distressed Paved Roads to Engineered Unpaved Roads ▶

A comprehensive information source—with accompanying webinar—provides effective practices for converting selected low-volume roads to acceptable unpaved surfaces. [Guide 2019-42](#)



◀ Best Practices for Boulevard Turf Design and Maintenance

A new guide and video present best practices for successfully establishing and maintaining new turf on boulevards after construction. Three formats—a technical guide, two-page flyer and video—provide guidance for designers, contractors and homeowners. [Guide 2019RIC09](#)

Best Practices for Managing Utility Congestion Within Rights of Way ▶

This resource helps agencies better manage the planning, installation and accurate mapping of under-and above-ground utility services. [Guide 2019RIC20G](#)



Request a Transportation Research Synthesis

A Transportation Research Synthesis (TRS) is a short-turnaround research report that you can request to answer your research question. A TRS can summarize completed and in-progress research or report about the state of practice among your peers in Minnesota and other states. For more information or to request a TRS, visit mndot.gov/research/TRS.html.

[TRS 1806](#), Local Agency Permit Fee Policies for Oversize/Overweight Vehicles, surveyed states and counties about their permit fee policies to help Minnesota move toward a unified, statewide permitting process for oversize/overweight vehicles.

Three new case studies offer recommendations to agencies in different stages of applying geographic information system (GIS) tools for asset management.



A spreadsheet-based tool and accompanying guidebook provide an easy-to-use, customizable resource for inventorying gravel roads, tracking maintenance and planning for future needs. [Report 2019RIC03](#)

Also, a new training course on light surface treatment (LST) for gravel roads provides information on how to select the right LST and when to apply it.

Training Course 2019RIC04

A recent [manual update](#) includes new guidance and decision trees on crack sealing. The LRRB has also developed a soon-to-be-released new chapter on five pavement preservation techniques: rejuvenators, cape seal, scrub seal, slurry seal and thinlays.

This updated [workshop](#) curriculum focuses on the management and maintenance of trail pavement and includes other elements, such as vegetation, drainage, signing and striping, lighting and amenities.



Addressing Citizen Requests for Traffic Safety Concerns

Alternate Design Methods to Renew Lightly Traveled Paved Roads

Base Stabilization Guidance and Additive Selection for Pavement Design and Rehabilitation

Fleet Management Tools for Local Agencies

Modernizing Road Construction Plans and Documentation

Pothole Prevention and Innovative Repair

Slope Stabilization Guide for Minnesota Local Government Engineers

Synopsis of Recycled Asphalt Pavement (RAP) Material

Traffic Generating Development and Roadway Life Consumption Tool

We recently completed an extensive analysis of our current practices, including stakeholder surveys. This resulted in a five-year strategic plan that refines LRRB's vision and improves processes and operations. Read more at lrrb.org/strategic-plan.



LRRB Research

Active Projects in FY2019

COMMON FUNDING SOURCES

LRRB	Local Road Research Board
SRP	MnDOT State Research Program
SP&R	State Planning & Research (FHWA)

 Find active and completed projects under the "Research" tab at lrrb.org.

Bridges & Structures

LRRB Identifier	Title	Report #/ Status	Investigator	Technical Liaison	End Date	Funding Source	Total Cost
INV 976	Development and Integration of Advanced Timber Bridge Inspection Techniques for NBIS—Purchase Equipment and Train Users	In Progress	Victor Krause, University of Minnesota Duluth	David Conkel, Peter Wilson	1/20/20	LRRB	\$42,794
INV 983	Cost-Competitive Timber Bridge Designs for Long-Term Performance	In Progress	Don Fosnacht, University of Minnesota Duluth	David Conkel	8/31/20	LRRB	\$212,883
INV 1009	Field Investigation of Bridge Deck Reinforced With GFRP Rebar	In Progress	Behrouz Shafei, Iowa State University	Paul Rowekamp	2/29/20	LRRB, SRP	\$88,000
INV 1035	Anchorage of Epoxy-Coated Rebar Using Chemical Adhesives	2019-07	Ben Dymond, University of Minnesota Duluth	Joseph Black	4/30/19	LRRB	\$42,210
INV 1035	Debonded Strands in Prestressed Concrete Bridge Girders	2019-30	Cathy French, University of Minnesota	Brian Homan	7/31/19	LRRB	\$35,000
INV 1035	Deterioration of Mixed Rebar and Fiber-Reinforced Concrete Bridge Decks	2019-09	Ben Dymond, University of Minnesota Duluth	Nickolas Haltvick	4/30/19	LRRB	\$34,400

Environmental

LRRB Identifier	Title	Report #/ Status	Investigator	Technical Liaison	End Date	Funding Source	Total Cost
INV 984	Expanding the Success of Salt-Tolerant Roadside Turfgrasses Through Innovation and Education	In Progress	Eric Watkins, University of Minnesota	Dwayne Stenlund	2/29/20	LRRB	\$168,974
INV 1006	Regional Optimization of Roadside Turfgrass Seed Mixtures	2019-01	Eric Watkins, University of Minnesota	Dwayne Stenlund	1/31/19	LRRB, SRP	\$142,346
INV 1007	Minnesota Guide for Stream Connectivity and Aquatic Organism Passage Through Culverts	2019-02	Matt Hernick, University of Minnesota	Nicole Bartelt	2/28/19	LRRB, SRP, SP&R	\$164,353
INV 1016	Permeable Pavement for Road Salt Reduction	In Progress	John Gulliver, University of Minnesota	Richard McCoy	8/31/20	LRRB	\$197,835
INV 1017	Iron-Enhanced Swale Ditch Checks for Phosphorus Retention	2019-27	John Gulliver, University of Minnesota	Beth Neuendorf	8/31/19	LRRB, SRP	\$200,036
INV 1027	Characterization of Runoff Quality From Paved Low-Volume Roads and Optimization of Treatment Methods	In Progress	John Gulliver, University of Minnesota	John Welle	11/30/20	LRRB	\$192,527
INV 1038	Regional Optimization of Roadside Turfgrass Seed Mixtures—Phase II: Regional Field Trials and Economic Analysis	In Progress	Eric Watkins, University of Minnesota	Dwayne Stenlund	8/31/22	LRRB	\$467,139
INV 1039	Design and Construction of Infiltration Facilities	In Progress	John Gulliver, University of Minnesota	Dwayne Stenlund	8/31/21	LRRB	\$238,572
INV 1041	Assessing Culverts in Minnesota: Fish Passage and Storm Vulnerability	In Progress	Jessica Kozarek, University of Minnesota	Nicole Bartelt	7/31/21	LRRB	\$158,374

Environmental [cont.]

LRRB Identifier	Title	Report #/ Status	Investigator	Technical Liaison	End Date	Funding Source	Total Cost
INV 1059	Wet Pond Maintenance for Phosphorus Retention	In Progress	John Gulliver	Leslie Stovring	6/30/22	LRRB, SRP	\$222,467
INV 1060	Reuse of Regional Waste in Sustainably Designed Soils	In Progress	Marsha Patelke, University of Minnesota Duluth	Dwayne Stenlund	7/31/21	LRRB	\$197,406

NEWLY FUNDED: Cost-Effective Roadside Revegetation Methods to Support Insect Pollinators; Evaluate Effectiveness of Storm Ponds and Wetlands for Water Quality

Maintenance Operations

LRRB Identifier	Title	Report #/ Status	Investigator	Technical Liaison	End Date	Funding Source	Total Cost
INV 645	Best Practices: Corridor Management/Maintenance of Paved Recreational Trails	2019RIC10, 2019RIC10S, 2019RIC10T	Michael Marti, SRF Consulting Group, Inc.	Steven Bot	12/31/19	LRRB	\$46,959
INV 645	Best Practices for Boulevard Turf Design Maintenance	2019RIC09, 2019RIC09H	Michael Marti, SRF Consulting Group, Inc.	Paul Oehme	12/31/19	LRRB	\$42,978
INV 645	Best Practices to Manage Effects of Settlement and Heave at Catch Basins and Manholes	In Progress	Derek Tompkins, American Engineering Testing, Inc.	Steven Bot	10/31/20	LRRB	\$59,676
INV 645	New Pavement Preservation Techniques: Micro, Thinlay, Etc.	2019RIC11	Michael Marti, SRF Consulting Group, Inc.	Joel Ulring	12/31/19	LRRB	\$40,940
INV 645	Personal Protection Equipment Poster and Website	Completed	Mindy Carlson, University of Minnesota Center for Transportation Studies	John Brunkhorst	12/31/18	LRRB	\$21,000
INV 1015	Optimized Taconite-Based Pavement Repair Compound and Deployment System	2019-46	Lawrence Zanko, University of Minnesota Duluth	Perry Collins	12/31/19	LRRB	\$100,000
INV 1029	Cost-Benefit Analysis of the Effectiveness of Crack Sealing Techniques	2019-26, 2019-26A	Manik Barman, University of Minnesota Duluth	Daniel Knappek	6/30/19	LRRB	\$108,504
INV 1034	Adaptive Management to Improve Deicing Operations	In Progress	Larry Baker, University of Minnesota	Ross Bintner	7/31/20	LRRB	\$204,000
INV 1047	Techno-Economic Analysis of Implementing Hybrid Electric Utility Vehicles in Municipal Fleets	In Progress	Will Northrop, University of Minnesota	Kevin Schlangen	2/29/20	LRRB	\$100,767
INV 1065	Implementation of Lane Boundary Guidance System for Snowplow Operations	In Progress	Max Donath, University of Minnesota	Daniel Rowe	10/31/21	LRRB, SRP	\$283,622

NEWLY FUNDED: Benefit-Cost of Applying a Higher Asphalt Film Thickness (AFT) vs. Doing a Chip Seal at One Year; Effectiveness of Fog Seal on Chip Sealed Low-Volume Roads; Mitigating Frost Dips Over Newly Installed Centerline Culverts

Materials & Construction

LRRB Identifier	Title	Report #/ Status	Investigator	Technical Liaison	End Date	Funding Source	Total Cost
INV 645	Construction Inspection and Documentation Training Course	In Progress	Stephanie Malinoff, University of Minnesota Center for Transportation Studies	Rollin Larson	5/31/20	LRRB	\$137,338
INV 645	Gravel Road Management Tools	2019RIC03, 2019RIC03S	Michael Marti, SRF Consulting Group, Inc.	Michael Flaagan	12/31/19	LRRB	\$18,021
INV 645	Current Practices for Lightly Surfaced Roadway: Workshop and Materials	2019RIC04	Michael Marti, SRF Consulting Group, Inc.	John Brunkhorst	12/31/19	LRRB	\$16,216
INV 971	Optimal RAP Content for Minnesota Gravel Roads	2019-11	Charles Jahren, Iowa State University	Joel Ulring	2/28/19	LRRB	\$92,538
INV 981	Field Investigation of Stabilized Full-Depth Reclamation (SFDR)	2018-33	Charles Jahren, Iowa State University	Guy Kohlhofer	1/31/19	LRRB, SRP	\$126,991

Materials & Construction [cont.]

LRRB Identifier	Title	Report #/ Status	Investigator	Technical Liaison	End Date	Funding Source	Total Cost
INV 986	Performance Monitoring of Olmsted CR 117/104 and Aggregate Base Material Update	In Progress	Kyle Hoegh, MnDOT Office of Materials & Road Research	Kaye Bieniek	6/30/20	LRRB	\$44,000
INV 1013	Comparison of Performances of Structural Fibers and Development of a Specification for Using Them in Thin Concrete Overlays	2018-29	Manik Barman, University of Minnesota Duluth	Maria Masten	8/31/18	LRRB, SP&R, SRP	\$153,792
INV 1023	Experimental and Computational Investigations of High-Density Asphalt Mixtures	2019-41	Mihai Marasteanu, University of Minnesota	Eddie Johnson	9/30/19	LRRB, SRP	\$150,935
INV 1028	Is Seal Coating Counterproductive or Not?	In Progress	Brian Arman, American Engineering Testing, Inc.	Steven Bot	2/28/19	LRRB	\$14,923
INV 1028	Is Seal Coating Counterproductive or Not? (Evaluation of Stripping Under Chip Seals—Phase 2)	In Progress	Zhanping You, Michigan Technological University	Steven Bot	12/31/20	LRRB	\$140,508
INV 1040	Development of Pavement Condition Forecasting for Web-Based Asset Management for County Governments	In Progress	Bradley Wentz, North Dakota State University	Bruce Hasbargen	4/30/20	LRRB	\$92,831
INV 1045	Life-Cycle Civil Integrated Management (CIM) Advancements in Preliminary Design Building Information Modeling (BIM) for Infrastructure	2019-36	Chris Trboyevich, SRF Consulting Group, Inc.	Lyndon Robjent	10/31/19	LRRB	\$99,955
INV 1046	Innovative Materials and Advanced Technologies for a Sustainable Pavement Infrastructure	In Progress	Jia-Liang Le, University of Minnesota	Juan Pinero	8/31/20	LRRB	\$151,514
INV 1057	Evaluating Effective Asphalt Content (AC) in Cold In-Place Recycling Mixtures	2019-43	Daniel Wegman, Braun Intertec Corporation	Wayne Stevens	3/31/20	LRRB	\$34,998
INV 1067	Construction Incentives: Are They Working?	In Progress	Mohamed Diab, Minnesota State University, Mankato	Fausto Cabral Neto	7/31/21	LRRB	\$88,620
INV 1069	Optimizing Asphalt Mixture Designs for Low-Volume Roads of Minnesota	In Progress	Manik Barman, University of Minnesota Duluth	Joel Ulring	7/31/21	LRRB	\$161,333
NEWLY FUNDED: Full-Depth Reclamation (FDR) for Urban and Suburban Street Application; Performance of Overlays: Mill and Overlay—BMP; Pavement Performance of Overlays and New Construction Related to Ride Quality and Reflective Cracking							

Multimodal

LRRB Identifier	Title	Report #/ Status	Investigator	Technical Liaison	End Date	Funding Source	Total Cost
INV 645	FY2018 ADA Workshops for Local Agencies	Completed	Mindy Carlson, University of Minnesota Center for Transportation Studies	Kristine Elwood	8/31/19	LRRB	\$125,000
INV 645	Guidance for Bicycle Facility Selection and Design	In Progress	Michael Marti, SRF Consulting Group, Inc.	Chad Millner	4/30/20	LRRB	\$62,994
INV 645	Pedestrian Crosswalk Policy Development Guidelines	In Progress	Anita Benson, Stonebrooke Engineering, Inc.	Marc Culver	2/29/20	LRRB	\$58,901
INV 1044	Quantifying the Impacts of Complete Streets: The Case of Richfield	In Progress	Zhirong Jerry Zhao, University of Minnesota	Jack Broz	10/31/20	LRRB	\$103,834
INV 1049	Guidance for Separated/Buffered Bike Lanes With Delineators	In Progress	John Hourdos, University of Minnesota	Paul Oehme	12/31/20	LRRB	\$90,578

NEWLY FUNDED: Guidelines for Safer Pedestrian Crossings: Understanding the Factors That Positively Influence Vehicles Yielding to Pedestrians at Unsignalized Intersections; Pedestrian Engineering and Enforcement at Signalized Intersections

Policy & Planning

LRRB Identifier	Title	Report #/ Status	Investigator	Technical Liaison	End Date	Funding Source	Total Cost
INV 645	Consolidated Asset Management Guide for Local Agencies	2019RIC06	Michael Marti, SRF Consulting Group, Inc.	Lyndon Robjent	12/31/19	LRRB	\$27,002
INV 645	Geographic Information System (GIS) Tools and Applications: Integration With Asset Management	In Progress	Annette Theroux, Pro-West & Associates, Inc.	John Brunkhorst	2/29/20	LRRB	\$59,021
INV 645	Managing Utility Congestion Within the Right of Way (ROW)	2019RIC20	Bryan Nemeth, Bolton & Menk, Inc., Consulting Engineers & Surveyors	Julie Long	12/31/19	LRRB	\$59,824
INV 1020	LRRB Strategic Plan 2019-2024	2019-33	Vivek Sakhrani, CPCS Transcom, Inc.	Lyndon Robjent	7/31/19	LRRB	\$88,821
INV 1031	Investigating Inductive Loop Signature Technology for Statewide Vehicle Classification Counts	2018-31	Chen-Fu Liao, University of Minnesota	Gene Hicks	2/28/19	LRRB, SRP	\$92,820
INV 1037	Workforce Planning and Human Resource Development Strategies for Minnesota's Public Transportation Agencies	In Progress	Kenneth Bartlett, University of Minnesota	Lyndon Robjent	5/31/20	LRRB	\$137,281
INV 1043	Evaluating the Impact of Local Expenditures on State and Regional Transportation Facilities	In Progress	Zhirong Jerry Zhao, University of Minnesota	Russ Matthys	8/31/20	LRRB	\$121,668
INV 1050	A Guide to Successfully Convert Severely Distressed Paved Roads to Unpaved Roads	2019-42	Laura Fay, Montana State University, Western Transportation Institute	Tim Stahl	12/31/19	LRRB	\$100,047
INV 1058	Local Agency Permit Fee Policies for Oversize/Overweight Vehicles	TRS 1806	Patrick Casey, CTC & Associates, LLC	Rich Sanders	1/31/19	LRRB	\$9,896

NEWLY FUNDED: System Preservation Guide: A Planning Process for Local Government Management of Transportation Networks; The Impact of Deferred Maintenance in Minnesota; Expanding the Transportation Workforce in Local Agencies: Awareness-Building Activities and Development of the Training Course Roadmap for Future Civil Technicians

Traffic & Safety

LRRB Identifier	Title	Report #/ Status	Investigator	Technical Liaison	End Date	Funding Source	Total Cost
INV 924	Ineffective Specialty Signs Video for Local Agencies	Completed	Bryan Nemeth, Bolton & Menk, Inc., Consulting Engineers & Surveyors	Gary Reihl	8/31/18	LRRB, Other State Funds	\$28,569
INV 1004	Development and Demonstration of a Cost-Effective In-Vehicle Lane Departure and Advanced Curve Speed Warning System	2018-34	Imran Hayee, University of Minnesota Duluth	Victor Lund	2/28/19	LRRB	\$124,704
INV 1022	Pavement Markings—Wet Retroreflectivity Standards	In Progress	Adam Pike, Texas A&M Transportation Institute	Kenneth Johnson	11/30/19	LRRB, SRP, SP&R	\$175,062
INV 1024	Evaluation of the Effectiveness of Stop Lines in Increasing the Safety of Stop-Controlled Intersections	In Progress	John Hourdos, University of Minnesota	Nick Bauler	2/29/20	LRRB	\$150,330
INV 1025	How Locals Need to Prepare for the Future of V2V/V2I Connected Vehicles	2019-35	John Hourdos, University of Minnesota	Deb Heiser	11/30/19	LRRB	\$79,260
INV 1030	Examining Optimal Sight Distances at Rural Intersections	2019-34	Nichole Morris, University of Minnesota	Tracey Von Bargaen	9/30/19	LRRB	\$170,549
INV 1032	Personal Warning Sensor for Road Construction Workers	2019-08	Gerald Ullman, Texas A&M Transportation Institute	Milford Ulven	2/28/19	LRRB, SRP	\$17,490
INV 1033	Cloud-Based Dynamic Warning System	2019-19	Bradley Wentz, North Dakota State University	Richard West	8/31/19	LRRB	\$79,629
INV 1042	Design Standards for Unobstructed Sight Lines at Left-Turn Lanes	2019-32	David Noyce, University of Wisconsin—Madison	Kristi Sebastian	8/31/19	LRRB	\$50,008
INV 1048	Criteria and Guidelines for Three-Lane Road Design and Operation	In Progress	Gary Davis, University of Minnesota	Jack Broz	11/30/20	LRRB	\$155,559
INV 1051	Development and Demonstration of an In-Vehicle Lane Departure Warning System Using DSRC-Based V2V Communication	In Progress	Imran Hayee, University of Minnesota Duluth	Victor Lund	6/30/21	LRRB	\$133,656
INV 1052	Effectiveness of Teenage Driver Support System (TDSS) on Reducing Traffic Violation Behaviors for Teenage Drivers at the Early Time of Licensure	In Progress	Nichole Morris, University of Minnesota	Joe Gustafson	2/29/20	LRRB	\$93,928

Traffic & Safety [cont.]

LRRB Identifier	Title	Report #/ Status	Investigator	Technical Liaison	End Date	Funding Source	Total Cost
INV 1064	Establishing a Repeatable Method for Presenting Nontraditional Traffic Treatments to Maximize Stakeholder Support	In Progress	Nichole Morris, University of Minnesota	Scott Thompson	5/31/21	LRRB, SRP	\$237,611
INV 1064	RCI Video Project	Completed	James Douglas, Nighthawk Marketing	Scott Thompson	8/31/19	LRRB, SRP	\$20,000

NEWLY FUNDED: Assessing Pavement Markings for Automated Vehicle Readiness; Autonomous Vehicles: What Should Local Agencies Expect?; Development of a Smartphone App to Warn the Driver of Advance Curve and Unintentional Lane Departure Using GPS Technology; Driver Comprehension of Flashing Yellow Arrows; Impact of Speed Limit Changes on Urban Streets; Pedestrian User Experience at Roundabouts; Signing for Effective Roundabout Approach Speed Reduction; Taconite as a Lower Cost Alternative High Friction Surface Treatment to Calcined Bauxite for Low-Volume Roads in Minnesota; Transverse Rumble Strips at Rural Intersections

Administrative

LRRB Identifier	Title	Report #/ Status	Investigator	Technical Liaison	End Date	Funding Source	Total Cost
INV 645	LRRB Outreach and Marketing Support (2018-2019)	Completed	Rena Kuehl, SRF Consulting Group, Inc.	Shannon Fiecke	8/31/19	LRRB	\$99,886
INV 645	LRRB Outreach and Marketing Support (2019-2020)	In Progress	Rena Kuehl, SRF Consulting Group, Inc.	Shannon Fiecke	7/31/20	LRRB	\$99,965
INV 645	Research Implementation Committee—RIC Implementation of Research Findings (FY2017-2019)	Completed	Michael Marti, SRF Consulting Group, Inc.	Michael Flaagan	12/31/19	LRRB	\$523,209
INV 668	Local Technical Assistance Program (LTAP) (FY2019)	Completed	Stephanie Malinoff, University of Minnesota Center for Transportation Studies	Mitchell Rasmussen	9/30/19	LRRB, Other Federal Funds	\$450,500
INV 916	FY2019 LRRB Technical Summaries and Project Evaluation Forms (LRRB Technical Transfer Materials Development)	In Progress	Patrick Casey, CTC & Associates, LLC	Shannon Fiecke	6/30/20	LRRB	\$80,555
INV 916	LRRB 2017 Technology Transfer Material Development	Completed	Patrick Casey, CTC & Associates, LLC	Shannon Fiecke	7/31/18	LRRB	\$98,942
INV 916	LRRB Technology Transfer Materials Development (FY2018)	In Progress	Patrick Casey, CTC & Associates, LLC	Shannon Fiecke	2/29/20	LRRB	\$99,824
INV 927	LRRB Website Development and Hosting	In Progress	Patrick Casey, CTC & Associates, LLC	Shannon Fiecke	7/31/21	LRRB	\$39,462
INV 936	Research Need Statement Development for Minnesota Local Road Research Board	Completed	Rena Kuehl, SRF Consulting Group, Inc.	Mitchell Rasmussen	7/31/18	LRRB	\$51,459
INV 998	Operational Research Program for Local Transportation Groups (OPERA)	In Progress	Mindy Carlson, University of Minnesota Center for Transportation Studies	Kristine Elwood	10/31/20	LRRB	\$160,000
INV 999	Research Services & Library Report Publication Services (FY2018-2019)	Completed	Arlene Mathison, University of Minnesota Center for Transportation Studies	Shannon Fiecke	6/30/19	LRRB, SRP	\$91,812



Stay Up to Date on LRRB Research

If you don't already receive LRRB e-news via the State Aid listserv, subscribe today at LRRB.org. You can also receive alerts for any individual research project by clicking subscribe on the project's webpage.

2020 LRRB and RIC Meetings

Get up-to-date information on these meetings at lrrb.org.

LRRB Presentations at State Aid Prescreening Meetings: May

LRRB representatives attend all State Aid prescreening meetings across the state to present the results of completed research and share project updates. Research topics include design, environmental compatibility, maintenance, materials and construction, policy and planning, and traffic and operations.

RIC: March 16, MnROAD Facility, Albertville **LRRB: March 25, Water Treatment Facility, Lakeville**

The spring meeting is devoted to programming and strategy identification, with emphasis on identifying research topics for the following year. The LRRB determines ongoing funding commitments, deciding on RIC funding every other year, and approves the next year's travel budget. Information is also provided about projects completed during the past year.

LRRB and RIC: June 17-18, New Ulm

Each summer, LRRB and RIC members meet in a joint session to formally adopt the upcoming year's strategic plan. The meeting always takes place outside of the metro area, and when possible, LRRB staff arranges a field tour of a nearby research installation or project site. During the meeting, members use prescreening meeting feedback, themes and gaps identified in Research Road Map efforts and completed research reports to determine research needs for the upcoming request for proposal and implementation strategies for the RIC. Information is also provided about projects completed during the past year.

RIC: September 14, MnDOT Fort Snelling, St. Paul **LRRB: November 4, Sterns County Public Works Building, Waite Park**

The fall meeting focuses on prioritizing university research proposals to be presented at the LRRB project selection winter meeting. Our fall prescreening meetings held throughout the state provide you with an opportunity to discuss your needs for research and technology transfer.



Mindy Carlson, Minnesota Local Technical Assistance Program director, provides feedback on research ideas proposed for the coming year's funding cycle.

LRRB Focus Group at State Aid Prescreening Meetings: October

LRRB representatives will again hold sessions at all State Aid prescreening meetings. City and county engineers are encouraged to bring research ideas to discuss with the group. These will be collected for consideration for funding as a research or technology transfer project.

RIC: November 18, MnDOT Fort Snelling, St. Paul **LRRB: December 9-10, University of Minnesota Coffman Memorial Union, Minneapolis**

At the winter meeting, the LRRB prioritizes research needs identified throughout the previous year and decides what projects will be funded in the upcoming fiscal year. Research investigators give brief presentations to LRRB members, who can then ask questions about the proposed projects.

LRRB By the Numbers:



IN ANNUAL
FUNDING



NEW PROJECTS
EACH YEAR



ACTIVE
PROJECTS



**100+ TAP CITY/
COUNTY MEMBERS**



**12 CITY/COUNTY
BOARD/RIC MEMBERS**

A World-Class Transportation Library



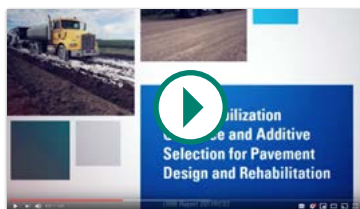
MnDOT's expert librarians are here to serve not just MnDOT employees but also Minnesota city and county engineers. Request an information search, interlibrary loan or special publication at 651-366-3791, library.dot@state.mn.us or mndot.gov/library.



The LRRB partners with the National Road Research Alliance, a multi-state pooled fund focused on solving widespread problems impacting road owners and users.

Members help direct the research program at the MnROAD pavement testing facility. For more information, see mndot.gov/mnroad/nrra.

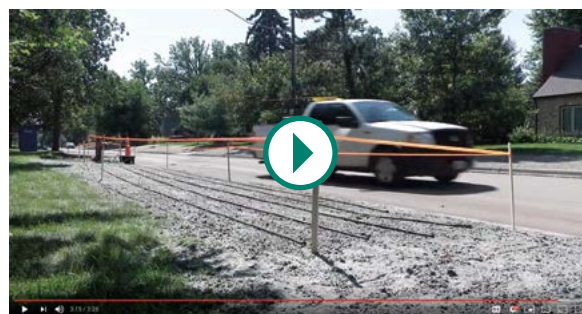
Watch LRRB Videos



The LRRB funds videos that communicate research results to transportation practitioners and the public. Check out the [LRRB YouTube channel](#).

OPERA Program for Local Agencies

Administered by the Minnesota Local Technical Assistance Program, the Operational Research Assistance (OPERA) Program funds innovative maintenance and construction methods developed and demonstrated by local agencies. Read more at mnltap.umn.edu/opera/.



A recent OPERA project tested a new irrigation system to allow more cost-effective vegetation replanting following construction projects. Watch at lrrb.org/lrrb-featured-on-edina-tv.

Recently Completed Projects

- Temporary Roadside Turf Irrigation System
- Otter Plow Cushion—Otter Tail County
- Evaluating Pickle Brine for Ice Control—Carver County
- Pollinator Habitat Along Roadsides—Washington County
- Retrofitting Bridge Approach Transition Curbs—Jackson County
- Biobased Sealant for Bridge Decks—City of Hutchinson
- Project Management With BrightWork—Carver County
- Pavement Management Software Evaluation—St. Louis County



Produced by CTC & Associates for **Minnesota Local Road Research Board,**
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