**National Road Research Alliance (Phase-II)**

**Full Solicitation**

**April 8, 2020**

**Background:**

This solicitation is for the continuation of the National Road Research Alliance for another 5 years and to combine efforts with a Veda pooled fund to increase efficiency and effectiveness of both efforts.

* NRRA Phase-I

TPF-5(341) National Road Research Alliance - NRRA

(February 2016 – February 2021)

* Veda Development

TPF-5(334) Enhancement to the Intelligent Construction Data Management System (Veta) and Implementation. Study efforts will be added to NRRA “ICT” team.

(December 2019 to December 2020)

* NRRA Phase-II

Pooled fund solicitation to continue efforts currently underway, push new initiatives and implementation.

(January 1, 2021 to December 31, 2025)

The NRRA exists to strategically implement cooperative pavement research. State agencies, industry, academia, consultants and associations work together to identify problems, complete research projects and implement results. Our goal is to help agencies nationwide achieve consistent benefits from real world road research. It also seeks to provide members a forum to discuss issues and an outdoor, real-world laboratory (MnROAD) for evaluating cutting-edge pavement technologies. The NRRA consists of five project teams: Flexible, Rigid, Geotechnical, Intelligent Construction Technologies, and Preventive Maintenance and is governed by an Executive Committee made up of two representatives from each government agency participating in the study. Each team activities include prioritization of short and long-term research, development of long-term research test sections at MnROAD and providing input for technology transfer. NRRA is made of the following team structure:

NRRA Executive Committee (Chair – Glenn Engstrom/Minnesota DOT)

The executive committee governs the pooled fund and oversees all the NRRA team’s efforts and direction. This structure, designed to foster innovation and develop implementable products for road owners, ensures high quality, relevant products based on the latest technology.

Intelligent Construction Technologies (ICT) Team (Chair – Rebecca Embacher/Minnesota DOT)

The Intelligent Construction Technologies (ICT) team is comprised of technical experts in the area of ICT. ICT includes innovative technologies for planning, design, construction, real-time quality control / monitoring, and management for the life-cycle of infrastructure construction as shown the projects below.

* Support Importing, Viewing and Analysis of Dielectric Constant Data in Veta
* Seismic Approach to Quality Management of HMA
* Evaluation of Levels 3-4 Intelligent Compaction Measurement Values (ICMV)
* Validation of Electronic Truck Delivery Ticketing of HMA Material

Flexible Team (Chair – Dan Oesch/Missouri DOT)

The flexible team is comprised of technical experts in the area of new and rehabilitation of asphalt roadways as shown the projects below.

* Developing Best Practices for Rehabilitation of Concrete with Hot Mix Asphalt (HMA) Overlays
* Cold Central Plant Recycling (CCPR)
* Longitudinal Joint Construction Performance
* Tack Coats
* Mix Rejuvenator Synthesis (Phase I)
* Cold Asphalt Recycling Technologies using Rejuvenating Asphalt Emulsion
* Innovative Practical Approach to Assessing Bitumen Compatibility as a Means of Material Specification
* Mix Rejuvenator Test Sections (Phase II)

Rigid Team (Chair – Brett Trautman/Missouri DOT)

The rigid team is comprised of technical experts in the areas of new and rehabilitation of concrete roadways. Activities include prioritization of short- and long-term research, development of long-term research test sections at MnROAD, and providing input for technology transfer as shown below.

* Repair of Joint Associated Distress Pavements
* Solutions to Mitigate Dowel/Tie-Bar Propagated Cracking
* Compacted Concrete for Local Streets
* Construction Report for Jointless FRC Roundabout in Minnesota
* Reduced Cementitious Material in Optimized Concrete Mixture
* Performance Benefits of Fiber-Reinforced Thin Concrete Pavement and Overlays
* Evaluation of Long-Term Impacts of Early Opening of Concrete Pavements
* Design and Performance of Unbonded PCC Overlays
* Performance of Concrete Overlays over Full Depth Reclamation (FDR)
* Incorporation of Joint Faulting Model into BCOA-ME
* Effect of Low and Moderate Recycled Concrete Aggregate Replacement Levels on PCC Properties

Geotechnical Team (Chair – Terry Beaudry/Minnesota DOT)

The geotechnical team is comprised of technical experts in the area of unbound materials found under pavement surfaces.

* Improve Material Inputs into ME Design Properties for Reclaimed HMA & Concrete Aggregates
* Environmental Impacts on the Performance of Pavement Foundation Layers - Phase I
* Subgrade Design for New and Reconstructed
* Permeability of Base Aggregate and Sand
* Mechanistic Load Restriction Decision Platform for Pavement Systems Prone to Moisture Variations
* Determining Pavement Design Criteria for Recycled Aggregate Base and Large Stone Subbase
* Large-Aggregate Granular Materials (3-6+ inch) Used as Bases or Sub-bases

Preventive Maintenance Team (Chair – Jerry Geib/Minnesota DOT)

The preventive maintenance team is comprised of technical experts in the area maintenance of concrete and asphalt roadways.

* Pavement preservation approaches for lightly surfaced roadways
* Effective Long Lasting Partial Depth Joint Repairs for Challenging Conditions
* Service Life Enhancement of Substrates Overlaid with Thin Overlays
* Concrete Pavement Restoration (CPR) for Bonded Concrete Overlays of Asphalt
* Surface Characteristics of Diamond Ground PCC Surfaces
* Spray on Rejuvenator Synthesis
* Maintaining Poor Pavements
* Bio-Materials Maintenance Treatments
* Spray on Rejuvenator Test Sections

**Objectives:**

Primary objectives of the National Road Research Alliance (NRRA Phase-II) are:

* Implementation and technology transfer of NRRA Phase-I research efforts and other common interests;
* Continue to fund and support research and implementation efforts of common interest;
* Continue the communication with both its government agencies along with its associate members (industry, associations, consultants, academia);
* Continued utilization of MNROAD to conduct structured construction, field testing and evaluation of pavement materials, equipment and methods under real-world conditions;
* Establish industry standards and develop performance measure for improving pavement performance;
* Develop and/or revise specifications and recommendations;
* Studying and promoting innovative techniques and technologies that will save agencies money, improve safety and increase efficiency;
* Supporting technology transfer by developing practical field guides, best practices, and training curriculum to promote the results of research projects;
* Conduct cost-benefit analysis to ensure that new technologies, materials or methods contribute to operational efficiencies;
* Support the exchange of information and ideas through collaborative research efforts that provide opportunities for public agencies to share experiences.
* Identify and prioritize common road related research needs to address regional and national issues that are built on existing efforts such as FHWA’s PCC and HMA Roadmaps as well as the Foundation for Pavement Preservation Roadmap;
* Fund high priority, readily implementable research projects though research contracts and university partnerships;
* Leverage knowledge, skills, and resources from participating partners to advances pavement research and implementation efforts while developing the workforce of the future.

Support technology transfer that highlights the implementation of research results and the associated benefits.

**Scope of Work:**

The scope of work for this pooled fund project is:

* Members provide the prioritized research needs, project development and design by way of the research project teams;
* Members provide funding for high priority, readily implementable research projects;
* Members receive timely results on NRRA research projects through communication products that emphasize lessons learned and implementation;
* Assistance in putting research results into practice through technology transfer events;
* NRRA members support committees that meet periodically throughout the year to determine priorities, develop strategies to address the priorities, and execute action plans;

**Membership:**

NRRA members help shape research and MnROAD research program by guiding the selection of research projects, disseminating research results, and helping agencies implement results. NRRA will be also incorporating the Veda pooled fund as shown in the three memberships available:

Government Agency (Full) Members (2 tiers, based on state’s allotted SPR $)

Members have a seat of the executive committee and all research teams. The executive committee executes decision-making about MnROAD construction and research objectives, determine budgets and timelines, and select and participate in project teams. Membership includes travel funding for NRRA meetings and conferences.

* State SPR larger than MN ($150k/yr)
* State SPR smaller than MN ($75k/yr)

Government Agency (ICT Team Only) Members (25K/yr)

Members have a seat on the ICT technical team only and the funding provided will be directed to that effort. This option allows past Veda pooled fund members join NRRA and continue their efforts.

Associate Members ($2k/yr)

Provide expertise throughout the research process by giving input on long-term technology trends, identifying innovative solutions to research problems, and determining the viability of research results by actively participating in projects. Members also have an opportunity to provide materials for testing and to propose design approaches based on field experience. Academia benefits include research and data analysis opportunities to support faculty sabbaticals and student projects.

Requesting Funding

Current NRRA#1 – FY16,17,18,19,20 (5 years)

Future NRRA#2 - FY21, 22, 23, 24, 25 (5 years)

Please visit the project page at <http://www.dot.state.mn.us/mnroad/partners/index.html> for additional information.