



Montana Department of Transportation  
PO Box 201001  
Helena, MT 59620-1001

## **Memorandum**

To: RRC Members  
Mike Bousliman, Administrator/Information Services Division  
Kevin Christensen/Chief Operations Officer  
Larry Flynn, Administrator/Administration Division  
David Kack, Director/WTI  
Dwane Kailey, Administrator/Highways and Engineering Division  
Shane Mintz, Administrator/Glendive District  
Bob Seliskar/FHWA  
Jon Swartz, Administrator/Maintenance Division  
Mike Tooley/Director  
Duane Williams, Administrator/Motor Carrier Services Division  
Pat Wise/Deputy Director  
Lynn Zanto, Administrator/Rail, Transit, and Planning Division

From: Susan C. Sillick, Manager  
Research Programs

Date: July 7, 2020

Subject: June 1, 2020 RRC Meeting Notes

### **Action items are in red.**

**RRC Members Present:** Mike Bousliman, Kevin Christensen, David Kack, Dwane Kailey, Shane Mintz, Sue Sillick, Jon Swartz, Mike Tooley, Duane Williams, Pat Wise, and Lynn Zanto.

**Others Present:** Stephanie Brandenberger, Vaneza Callejas, Bobbi deMontigny, Danae Gianetti, Jeff Jackson, Lenci Kappes, Oak Metcalfe, Rod Nelson, Mary Gayle Padmos, Gabe Priebe, Chad Richards, Kirsten Seeber, Laura Stanley, Matt Ulberg, Bob Vosen and Joe Wiegand

#### **1. Innovation Partnering:** Discussion with WTI

David Kack, Director of the Western Transportation Institute, attended this meeting to discuss how MDT staff can apply innovative technologies from WTI to solve issues. When folks are meeting face-to-face again, he would like to bring several WTI staff to Helena to meet with MDT staff to find out the top two to three issues their departments are addressing. He wants MDT staff to be aware of WTI's resources and how they can help.

Laura Stanley, Associate Professor at Montana State University, presented on one of WTI's innovations, which is the use of virtual and mixed reality for planning purposes (slides attached). The idea is to bring the planning process to the public. The goals are to tell a better

story, increase civic participation and support, engage a more diverse demographic, improve the understating of proposed changes, garner greater buy-in throughout the process, and maximize benefits and costs. Laura showed a demonstration of the [Zappar](#) app, which she hopes to demo in person in the future.

Lynn Zanto asked about the inputs that go into the Zappar app and if it is currently being used for transportation projects. Laura Stanley explained that the developer inputs the rendering of the street or area into the app, which can be done via a smartphone. The app has not yet been used for transportation projects but is being used in manufacturing and healthcare.

Pat Wise suggested that David Kack and his staff attend the next face-to-face RRC meeting. Dwane Kailey would like to keep in communication with David Kack Lynn expressed interest in the Zappar app. David Kack and Denae Gianetti could come to Helena to have a brainstorming session with the group.

**2. 2021 FFY Work Plan (see attached): Champions will present their funding requests.**

All pooled fund projects require an annual evaluation form, but only projects requesting funds also include a funding request form. The champions requesting funding will present today. The remaining pooled fund projects are funded through FFY 2021 or 2022, as indicated in the attached work plan. The TPF-5(349 (WAQTC) project will be funded as long as the pooled fund exists, unless, based on the annual evaluation form, the RRC decides otherwise.

Similarly, the AASHTO Technical Services Programs (TSPs) are funded as long as they exist unless, based on the annual evaluation forms, the RRC decides otherwise.

The Research Programs 2021 FFY solicitation results are listed in the attached. The projects in red have a champion and sponsor. The last project in red (Alkali-Silica Reactivity in the State of Montana: Phase II Aggregate Testing) is on hold until the next solicitation. Champions will present today.

The champions for two pooled funds will present today.

**POOLED FUNDS**

**TPF-5(399) Improving the Quality of Pavement Distress and Transverse Profile Data Collection and Analysis**

Mary Gayle Padmos requested \$15,000/year for the next three years (2021-2023 FFY). MDT has been a partner in this study for the last three years. The study has 10 in-progress or completed research projects. This pooled fund is leading development of uniform specifications and requirements for collection equipment required to support FHWA reporting. Knowledge MDT has gained, or will gain, from participation includes a standard data format, traverse profile specifications, and a guide for writing purchase orders for either data collection services or equipment.

## **TPF-5(437) Technology Transfer Concrete Consortium (TCCC)**

Oak Metcalfe, standing in for Matthew Needham, requested \$12,000/year for three years (2021-2023 FFY). MDT has been a partner in this study for the last three years. MDT staff has gained valuable information from the study and it is a high priority for the Materials Section and the Department. Benefits from the study include regional and national contacts/listserv, training and training reference manuals, development of new training programs, technical briefs, new ideas, and a reduction of repetitive research.

## **MDT SOLICITATION**

### **21-009: Safety Evaluation of Sinusoidal Centerline Rumble Strips**

Gabe Priebe, as project champion, attended this meeting to request funding.

This project will investigate the effectiveness of sinusoidal centerline rumble strips (SCLRS) in lowering the number of observed crashes. Conventional centerline rumble strips (CLRS) reduce crashes but produce external noise when traversed, about which the public has expressed concern.

While there are many studies on the noise-reducing capacity of SCLRS, the safety of these rumble strips has not been studied to any great extent. This project would include the evaluation of SCLRS on a total of 600 miles of roadway on multiple routes in the Missoula District. The project will gather 3-5 years of crash data using safety performance functions to see if SCLRS are as effective as conventional CLRS.

The total project budget is \$222,000. The estimated project period is 44-66 months.

### **21-011: Effective Wildlife Fences through Better Functioning Barriers at Access Roads and Jump-Outs**

Joe Weigand, as project champion, attended this meeting to request funding.

The purpose of this project is to investigate barrier types that are likely to keep pawed species out of the fenced road corridor at access roads, and to provide more effective wildlife jump-outs. The project will investigate lowering the effective height of jump-outs in order to increase the use of jump-outs by wildlife that are caught in the fenced road corridor, while continuing to discourage animals from jumping up into the fenced road corridor. This project will help make a large investment by MDT and taxpayers to be more effective.

The total project budget for MDT is \$69,000. The Nevada DOT, via a pooled fund study they lead, will contribute \$115,000 to the study. The estimated project period is 29 months.

Lynn Zanto asked if MDT Maintenance staff would install the field equipment for this project. Bob Vosen, Maintenance, indicated that his staff may be able to assist with installation if they are available. WTI understands that they are ultimately responsible for installation and will seek volunteer help when needed.

#### **21-012: Artificial Intelligence (AI) Based Tool to Estimate Contract Time**

Chad Richards, as project champion, attended this meeting to request funding.

The goal of this study is to provide MDT with a robust decision support tool that can estimate project duration or contract time with reliable accuracy for a new highway project.

The project will develop an in-house tool, which the design folks will use to determine a time calculation for a project construction schedule. The tool would be updateable. Designers would upload projects as they are contracted to allow the tool to analyze them over the long term. The tool would allow the design staff to do contract time calculations earlier in the design process to forecast dollars and construction times better. This would optimize the letting schedule to meet the needs of the contractors. Also, construction projects would be staggered so that everything would not happen at the same time.

Chad Richards investigated using a Microsoft tool for this purpose, which would require training time and resources. The proposed tool would require minimal training and would not be a large burden for the designers to determine contract times.

The total project budget is \$167,000. The estimated project period is 18 months.

#### **21-014: Exploration of UHPC Applications for Montana Bridges**

Lenci Kappes, as project champion, attended this meeting to request funding.

The main purpose of this project is to build on previous research, which showed that Ultra-High Performance Concrete (UHPC) can be created using materials found in Montana. This project will investigate UHPC applications including thin-bonded overlays for bridge decks, patching, and reinforcing/replacing deteriorating members.

The total project budget is \$178,000. The estimated project period is 24 months.

#### **21-016: Feasibility of Non-Proprietary Ultra-High Performance Concrete (UHPC) for Use in Highway Bridges in Montana: Implementation**

Lenci Kappes, as project champion, attended this meeting to request funding.

This project is the implementation phase of 17-010: Feasibility of Non-Proprietary Ultra-High Performance Concrete (UHPC) for Use in Highway Bridges in Montana. The project's purpose is to place UHPC material into a construction project. It will be placed in longitudinal joints and pile-to-pile cap connections on a pair of Montana bridges. This project will assist in developing material specifications for UHPC in Montana, will document any potential difficulties in its use, and demonstrate the benefits of using this material in this application for future bridge projects.

The total project budget is \$111,000. The estimated project period is 24 months.

Since there is adequate funding to approve all projects, Dwane Kailey made a motion to fund all proposed projects. Jon Swartz seconded the motion and all present RRC members voted in favor. The motion passed.

**Research staff will move these projects forward to technical panels.**

### 3. **Budget Report**

The LTAP workplan was previously approved by the RRC via email ballot. The new workplan begins on July 1, 2020.

No discussion.

### 4. **Research Projects – current listing**

No discussion.

### 5. **Reports:** Available (except progress reports) on Research [website](#)

- a. Alkali-Silica Reactivity in the State of Montana (18-018) – Quarterly Progress Reports
- b. Bridge Deck Cracking Evaluation (19-019) – Monthly Progress Reports
- c. Concrete-Filled Steel Tube to Concrete Pile Cap Connection – Further Evaluation/Improvement of Analysis/Design Methodologies (18-017) – Quarterly Progress Reports
- d. Consultant Research Project Managers – Monthly Progress Reports
- e. Developing a Methodology for Safety Improvements on Low-Volume Roads in Montana (19-005) – Quarterly Progress Reports
- f. Development of Deterioration Curves for Bridge Elements in Montana (20-011) - Quarterly Progress Reports
- g. Effectiveness of Highway Safety Public Education at Montana Motor Vehicle Division and Vehicle Registration Stations by Streaming a Variety of Safety Content (19-001) - Quarterly Progress Reports
- h. Evaluation of Thin Polymer Overlays for Bridge Decks (19-107) - Monthly Progress Reports
- i. Feasibility of Non-Proprietary Ultra-High Performance Concrete (UHPC) for Use in Highway Bridges in Montana – Phase 2: Field Application (18-016) – Task 2, 3 and Quarterly Progress Reports
- j. Guidelines for Chemically Stabilizing Problematic Soils (15-008) – Final Report, Technical Manual, Project Summary Report, Implementation Report, and Performance Measures Report
- k. Large-Scale Laboratory Testing of Geosynthetics in Roadway Applications (18-007) – Task 3, February 2020 Construction Conference Presentation, Annual Meeting Presentation and Quarterly Progress Report
- l. LTAP – Quarterly Progress Reports
- m. Monitoring Streamflow Using Video Equipment (19-011) - Quarterly Progress Report
- n. Regional Regression Equations Based on Channel-Width Characteristics to Estimate Peak

Flow Frequencies at Ungauged Sites Using Data Through Water Year 2011 (15-015)  
- Quarterly Progress Reports

- o. Traffic Safety Culture Pooled Fund:
  - i. Guidance for Evaluating Traffic Safety Culture Strategies – Quarterly Progress Reports
  - ii. Guidance on Messaging to Avoid Reactance and Address Moral Disengagement – Task 2 and Quarterly Progress Reports

No discussion.

6. **Proposed Research Projects:** None

7. **Implementation/Performance Measures/Technology Transfer:**

a. **Guidelines for Chemically Stabilizing Problematic Soils**

Jeff Jackson, as project champion, attended this meeting to present the results of this project and plans for implementation.

The purpose of this project was to evaluate the use of cement and lime to stabilize problematic soils, including those with high sulfates. An unconfined compressive strength of 50 psi was targeted. Two percent of lime was sufficient to increase strength above 50 psi. A new curing protocol, Humidity Controlled Accelerated Curing (HCAC) was developed, decreasing the curing time from seven days to one day. A life cycle cost analysis was conducted showing chemical stabilization is more advantageous than special borrow when durability of the treatment is high. Implementation activities are as follows:

1. Develop training materials (slides and accompanying document), which will include information learned during the original research project. This training will reiterate and emphasize that chemical stabilization is not a "silver bullet" and will require significant time and resources.
2. Provide training to construction personnel. The training will need to be in a format that non-geotechnical personnel can understand.
3. Evaluate appropriate projects where chemical stabilization might be utilized.
4. Develop a tracking spreadsheet for projects that have been evaluated to utilize the research results.

Sue Sillick noted that she submitted this project to the AASHTO Research Advisory Committee as a High Value Research Project. It was selected as one of the top four projects from AASHTO Region Four, which make up the AASHTO Research Sweet Sixteen Awards.

**Implementation activities will be tracked.**

8. **Department/Division Hot Topics – RRC Members Roundtable Discussion**

- ★ Mike Bousliman – The ITS architecture project has fallen behind schedule. The closeout presentation will be scheduled in June.

Copies: Craig Abernathy/Research Section  
Stephanie Brandenberger, P.E./Bridge Bureau  
Vaneza Callejas/Consultant Research Project Manager  
James Combs/Highways Bureau  
Ryan Dahlke/Consultant Design Bureau  
Jim Davies/Materials Bureau Chief  
Bobbi deMontigny/Research  
Lisa Durbin/Engineering Operations Bureau  
Ed Ereth/Data and Statistics Bureau  
Bill Fogarty/District Administrator-Butte District  
Jake Goettle/Highways and Engineering Division  
Jeff Jackson/Geotech and Pavements Bureau  
Paul Jagoda/Construction Engineering Services Bureau  
Janet Kenny/Grants Bureau  
Damian Krings/Highways Bureau  
Tom Martin/Environmental Services Bureau  
Rod Nelson/District Administrator-Billings  
Gabe Priebe/Traffic & Safety Bureau  
Darin Reynolds/Construction Contracting Bureau  
Dustin Rouse/Highways and Engineering Division  
Kirsten Seeber/Research Consultant  
Jim Skinner/Planning and Policy Analysis Bureau  
Rob Stapley/Right of Way Bureau  
Carol Strizich/Multimodal Planning Bureau  
Matt Ulberg/LTAP  
Bob Vosen/District Administrator-Missoula  
Jim Wingerter/District Administrator-Great Falls  
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