

MEMORANDUM

To: RRC Members
Debbie Alke, Administrator/Aeronautics Division
D. John Blacker, Administrator/Maintenance Division
Mike Bousliman, Administrator/Information Services Division
Monte N. Brown, Operations Manager/Business Process Solutions Unit
Robert E. Burkhardt/Federal Highway Administration
Jim Currie, Deputy Director/Department of Transportation
Jeffery M. Ebert, P.E./District Administrator-Butte
Larry Flynn, Administrator/Administration Division
Loran Frazier, P.E., Administrator/Highway and Engineering Division
Jim Lynch, Director/Department of Transportation
Dennis Sheehy, Administrator/Motor Carrier Services Division
Jerry Stephens, P.E. /WTI, MSU
Sandra S. Straehl, Administrator/Rail, Transit, and Planning Division

From: Susan C. Sillick, Manager
Research Programs

Date: February 13, 2008

Subject: Summary of Minutes from the January 29, 2008 RRC Meeting

The following RRC members were present: Debbie Alke, John Blacker, Mike Bousliman, Bob Burkhardt, Jim Currie, Jeff Ebert, Larry Flynn, Loran Frazier, Jim Lynch, Dennis Sheehy, Sue Sillick, Jerry Stephens, and Sandy Straehl.

Sue introduced Jerry Stephens, P.E., from Bozeman who will represent WTI/MSU as the newest member of the Research Review Committee.

Sue asked the committee if they wanted to rate the projects the same as previous years, or rate them at today's meeting. By consensus, it was determined that rating would be done today.

1. 2008 Research Project Solicitation – Champions presented their research topics.

SUBJECT AREA	PROB NO.	PROBLEM TITLE
Planning	08.002	Impact of Canadian Economic Development on Northern Montana Highways
Engineering	08.007	Geosynthetic Stabilization of a Weak Subgrade
Engineering	08.009	Determine Erionite Occurrence in Southeastern Montana and Relationship to MDT Highway Construction, Past and Future

Engineering	08.010	Laboratory Evaluation of Subgrade Soils
Engineering	08.011	Assessment of Sediment Disturbance in Streams During Bridge Construction
Engineering	08.012	Pile Static Load Test
Engineering	08.013	GPR Analysis
Planning	08.015	Keep Encouraging Young Driver Safety Pilot Study
Engineering	08.017	Swimming and Leaping Abilities of Montana's Coldwater Fish

Impact of Canadian Economic Development on Northern Montana Highways – 08.002

Dick Turner/Rail, Transit, and Planning Division is the champion for this research topic.

This proposal is envisioned as a first phase research. The primary goal is to examine current and future developments to estimate related changes in commercial vehicle traffic volumes at the ports and their associated highway corridors. This research will help MDT assess and prioritize transportation needs and provide useful information to inform federal decisions on port operations. There are two tasks in Phase I of research.

1. **Assess existing conditions**, including:
 - Energy and other developments in Alberta, Saskatchewan and Montana;
 - Commercial transportation demand and its recent growth along paved cross-border corridors north and immediately south of US Highway 2 between the Port of Coultts-Sweet Grass and the Port of Regway-Raymond;
 - Current highway conditions; and
 - Ports of entry operational and capacity characteristics and federal issues relating to port service expansion.

2. **Estimate future commercial traffic volumes.** Future traffic volumes should be estimated using the ports' current operating schedules as well as 24-hour and other possible operation scenarios. Although energy-related development is responsible for the primary growth in this region, other sectors will also be examined. How and where is traffic expected to change?

Dennis Sheehy suggested the scope be expanded to all Montana ports and beyond oil. Bob Burkhart suggested investigating what other states have done. Larry Flynn suggested possibly looking at revenue impacts.

Loran Frazier made a motion to move this problem statement forward to a technical panel. Jim Currie seconded the motion. The motion passed.

Geosynthetics Stabilization of a Weak Subgrade – 08.007

Brian Collins, P.E./Materials Bureau is the champion for this research topic.

See 6a.

Determine Erionite Occurrence in Southeastern Montana and Relationship to MDT Highway Construction, Past and Future – 08.009

Brian Goodman/Environmental Services Bureau is the champion for this research topic.

Erionite is a naturally occurring zeolite mineral usually found in volcanic ash that has been altered by weathering and groundwater interactions. It is a microscopic, woolly fibrous mineral with properties very similar to asbestos. Serious health hazards, similar to those associated with asbestos have been identified with erionite.

The proposed research is to:

1. Identify material sources in southeastern Montana which may be associated with the Arikaree formation. Known locations of the Arikaree Formation in Montana are limited to the area in the vicinity of Ekalaka and south to Alzada in Carter County. Further identify material sources which may have been used in highway construction the past or which may be used in the future.
2. Sample and analyze the material sources identified above for the presence of erionite. Also identify and test the portions of MDT right-of-way which may have been excavated through or constructed using material containing erionite.
3. If erionite is present in the aggregate sources and/or MDT right-of-way, develop procedures and Special Provisions which will reduce or eliminate the use of material containing erionite as a construction material.

It was suggested DPHHS be included on the Technical Panel.

Loran Frazier made a motion to move this problem statement forward to a technical panel. Jim Currie seconded the motion. The motion passed.

Laboratory Evaluation of Subgrade Soils – 08.010

Lee Grosch, P.E./Materials Bureau is the champion for this research topic.

Many soils in Montana pose significant problems for constructability and long-term pavement performance. The current method (R-value testing) used by the Department for quantifying the suitability of these soils for subgrade strength may yield unsatisfactory results. Other investigatory techniques may yield more consistent and reliable results, which will improve pavement performance and save significant construction and maintenance funds.

The proposed research for this project includes a comprehensive literature review of the state of the practice in current testing used in subgrade evaluation. Additionally, it is recommended that several problem soils be evaluated using California Bearing Ratio and Resilient Modulus testing. Lacustrine silts from Montana's glacial lakes are particularly problematic; however, expansive clays derived from Cretaceous shales in the Eastern regions of the state also warrant evaluation. If greater reliability and ability to distinguish problem subgrade soils is found with one of these methods, this research should conclude with recommendations to augment current MDT testing with more reliable test method. Research into the practicality of implementing the proposed test method should be included in the conclusions.

Loran Frazier made a motion to move this problem statement forward to a technical panel. Jim Currie seconded the motion. The motion passed.

Assessment of Sediment Disturbance in Streams during Bridge Construction – 08.011

Bonnie Steg/Environmental Services Bureau is the champion for this research topic. Pat Basting/Environmental, Missoula represented Bonnie at this meeting.

Research proposed is for the U.S. Geological Survey (USGS) to obtain concurrent suspended-sediment samples and turbidity measurements, bed-material size data, and flow measurements at multiple bridge locations across Montana scheduled for repair or construction activities. The bridges would be located on various stream types representing a range of geomorphic settings and channel characteristics in order to develop a database describing the degree of construction-related sediment disturbance in channels of varying size, substrate, and hydrologic characteristics. Suspended-sediment concentrations would be documented quantitatively at one transect upstream and multiple transects downstream from the bridge to comparatively assess the progression from natural background condition to incremental spatial variations in sediment disturbance. Sampling would be conducted twice during the day: 1) during a period of active construction and 2) shortly after (within 1-3 hours) construction activities have ceased for the day. The differences in suspended-sediment concentrations during and shortly following construction activities would provide a measure of the duration of construction-related effects on suspended-sediment concentrations.

The USGS and others have demonstrated a correlation often exists between suspended sediment concentration and turbidity. An additional component of this study would include measurements of turbidity at the construction sites to further develop this correlation and create a surrogate for suspended sediment. Work done by Newcombe and others with the Ministry of Environment, British Columbia, has developed standards for severity of ill effects on fisheries related to suspended sediment concentration, turbidity, and duration of exposure. The data collected as part of this effort could be compared to the standards developed by Newcombe.

After compilation of data from a wide range of stream types over 2-3 years, correlations between flow, suspended-sediment concentrations and loads, turbidity, and channel substrate can be examined. This data can be used to evaluate the relative vulnerability of different stream types to construction-related sediment increased above background conditions and the potential for adverse impacts on aquatic life, recreation, or other beneficial water uses. After enough stream types are sampled, the information could be presented to the Montana Department of Environmental Quality to aid in developing numeric standards that would represent realistic compliance goals that could be easily verified by onsite measurements of turbidity or analysis of water samples for suspended-sediment concentration.

John Blacker asked if flow and precipitation events would be taken into consideration. Loran Frazier asked about taking measurements above the construction. Jim Lynch asked if the data taken in association with the construction project will be compared to data taken on streams without construction projects. These suggestions will be presented to the Technical Panel.

Jeff Ebert made a motion to move this problem statement forward to a technical panel. Dwane Kailey seconded the motion. The motion passed.

Pile Static Load Test – 08.012

Cameron Kloberdanz, P.E./Materials Bureau is the champion for this research topic.

In recent years MDT has been using Pile Driving Analyzer (PDA) tests to estimate the capacity of piles during driving and for determining the acceptability of the final tip elevation. MDT needs to verify the estimated capacity against the actual capacity of the piles with a Static Load Test. Results on several recent projects have been questionable and this testing will increase the PDA testing's reliability.

The proposed research is to conduct Static Load Testing on piles driven into representative soil and rock conditions found in Montana and compare the results to the PDA tests performed during driving. Testing can be performed on MDT bridge projects using production piles or as a stand alone project.

It was asked what makes this research vs. being an operational issue. The response was FHWA won't allow project funding to pay for this testing because they feel it is research. John Blacker, Dennis Sheehy, and Jim Currie voted against this problem statement because they believe FHWA should pay for testing with project funds.

Loran Frazier made a motion to move this problem statement forward to a technical panel. Jeff Ebert seconded the motion. The motion passed. Voting against the proposal were Jim Currie, Dennis Sheehy, Larry Flynn, and John Blacker.

GPR (Ground Penetrating Radar) Analysis – 08.013

Jon Watson, P.E. / Materials Bureau is the champion for this research topic.

The purpose of this research is to improve confidence in GPR analysis by investigating several different surfacing section combinations, and comparing what we believe to be in-place with what was actually or visually there. This should help the NDT unit produce more reliable GPR analysis results.

Sandy Straehl made a motion to move this problem statement forward to a technical panel. Loran Frazier seconded the motion. The motion passed.

Keep Encouraging Young Driver Safety Pilot Study – 08.015

Sandy Straehl/Rail, Transit, and Planning Division is the champion for this research topic. David Huff/OPI presented the research topic to the RRC.

In this pilot study, a multidisciplinary group of researchers, policy makers, and practitioners will develop, adapt, and pilot parent-teen homework assignments for use with the driver education curriculum. Homework assignments will utilize the evidence-based strategies to increase parent involvement by including them in programmatic efforts; promoting parent establishment of strict initial expectations for young driver safety; exposing parents to goal-oriented persuasion; and clearly defining parent roles and responsibilities and inviting parents to participate. This pilot study will then survey the parents at the end of the class to evaluate the process and the homework and capture their thoughts and feeling about being involved with homework in driver education and suggestions for improvements.

The findings from this study will have implications for research, practice, and policy beyond this study. The proposed project will be conducted across Montana and will include majority and minority groups, urban and rural areas, and high income and low income areas; thus, findings from this study will inform research, practice, and policy of all types – independent, public, private – and at all levels – state, regional, community. It will provide valuable information about whether integrating parent involvement into driver education is practical and effective within different environments and for different population groups, as well as whether it is an effective approach for increasing parent supervision, restriction, and monitoring of teenage driving and reducing young driver risk. Any and all intervention and data collection materials developed in this study will be available to those who want them.

Loran Frazier made a motion to move this problem statement forward to a technical panel. Jim Currie seconded the motion. The motion passed.

Swimming and Leaping Abilities of Montana's Coldwater fish – 08.017

Deb Wambach/ Environmental Services Bureau is the champion for this research project.

Credible swimming and leaping ability information is the missing link in MDT's ability to tie hydraulic and physical conditions at an existing or planned culvert to the fish passage characteristics of that culvert.

This research would undertake a combination of replicated field and lab studies. The species of fish used in the trials should reflect the coldwater species of interest in Montana. If lab trials are used (indoor or outdoor) the trials should be conducted in a manner that represents natural stream conditions as closely as possible. The trials should be designed to arrive at statistically appropriate probabilistic-based estimates of leaping and swimming abilities by size class for the species of interest.

Jim Lynch suggested the title should be changed. It was also suggested that FWP be on the Technical Panel.

Jim Currie made a motion to move this problem statement forward to a technical panel. Loran Frazier seconded the motion. The motion passed.

2. **Budget Report** – No discussion
3. **Research Project – current listing** – No discussion

3a. Growing Smart in Transportation and Development: Tools for State and Local Decision Makers – Request for Scope of Work Approval-in-Concept

Hal Fossum/Transportation Planning met with the RRC to request a Scope of Work Approval-in-Concept for this project on behalf of the Technical Panel, so an RFP can be issued.

The purpose of this project is to produce a toolkit of practical applications to fill gaps in local development practices. It is targeted to expanding cities and their surrounding growth areas in Montana, which range in size from less than 10,000 to over 100,000 people and have a wide range of technical expertise and planning needs. There are two objectives. First, the research will identify and transfer to local governments “off the shelf” tools now in use nationally that are practicable in Montana. Appropriate best practices currently in use within Montana should be considered. Second, it will identify gaps in national practice: promising but underdeveloped approaches that are worthy of further research and development. The work should consider at least the following specific focus areas:

- **Development and extension of local street networks.** Transportation networks are basic building blocks of development. This focus could consider, for instance,

how local jurisdictions plan for transportation systems outside their jurisdictional boundaries, avoid overreliance on dead end streets, enable streets to extend from development to development, reserve land for future transportation system improvements, and undertake basic asset management.

- **Local transportation system financing.** Local financing for transportation improvements is often challenging. This could consider financial mechanisms to support immediate and future transportation system development, including development of local impact fee programs and other strategies.

- **Assessment of development impacts on local and state roads.** Development proposals require local authorities to analyze and act on specific plans. This focus would identify tools for local authorities to evaluate the impacts of proposed developments on existing road networks, taking into consideration the need to focus local traffic on local routes and long-distance traffic on state-managed arterials and highways. For instance, the research may consider a system impact assessment process, access management, or travel demand management tools.

- **Directions for multimodal/transit development.** Multimodal and transit development is often difficult in smaller cities where settlement and traffic are relatively sparse. This focus should identify options for coordinating the location of development with expansion of inter-and-intra-urban transit, including opportunities for multimodal connectivity within urban growth areas. Options may include tools to plan for urban centers, transit-oriented development, bicycle/pedestrian facility development, or park-and-ride lots.

Jim Currie made a motion to proceed with an RFP. Sandy Straehl seconded the motion. The motion passed.

4. **Reports:** Available Upon Request

4a. **Research in Support of Container/Trailer on Flatcar in Intermodal Service on Montana's Class 1 Railroads** (05.015) – Progress Reports – July, August, September, October, November, and December 2007

4b. **Effects of Defensive Vehicle Handling Training on Novice Driver Safety: Phase 3. Year 1 Interim Report** – Progress Report – September 2007

4c. **Disparity/Availability Study** (06.010) – Progress Reports – July, August, September, October, and November 2007

4d. **Highway Project Cost Estimating Best Practices** (04.018) – Progress Reports – July, August, September, October, and November 2007

4e. **Developing a One Stop Shop for Traveler Information in Montana** (05.013) – Progress Reports – July, August, September, October, and November 2007

4f. **Bozeman Pass Wildlife Monitoring** – Progress Reports – June/July, August, September, October, November, and December 2007

4g. **Automated Cost Recovery: A Feasibility Study** – Progress Report – September 2007

4h. **Axial Capacity of Piles in Intermediate Geomaterials** – Progress Reports – August and October 2007

4i. **Business Market Analysis** – July 2007

4j. **LTAP** – Progress Reports – June and September 2007

4k. **2007 Summer Transportation Institute** – Progress Report – July 2007

4l. **2007 Summer Transportation Institute** – Final Report – FHWA/MT-07-012/6439

4m. **Mechanical-Empirical Pavement Design Guide Flexible Pavement Performance Prediction Models for Montana** – Project Summary Report 8158

4n. **Mechanistic-Empirical Pavement Design Guide Flexible Pavement Performance Prediction Models for Montana: Volume I Executive Research Summary** – Final Report FHWA/MT-07-008/8158-1

4o. **Mechanistic-Empirical Pavement Design Guide Flexible Pavement Performance Prediction Models for Montana: Volume II Reference Manual** – Final Report – FHWA/MT-07-008/8158-2

4p. **Mechanistic-Empirical Pavement Design Guide Flexible Pavement Performance Prediction Models for Montana: Volume III Field Guide** – Final Report – FHWA/MT-07-008/8158-3

4q. **Industry Best Practices for the Software Development Life Cycle** – Final Report – FHWA/MT-07-006/8117-25

5. **Contract Extensions:** None

6. **Proposals:**

6a. **Field Investigation of Geosynthetics used for Subgrade Stabilization**

Brian Collins, P.E./Materials Bureau attended the meeting and spoke in favor of the proposal, on behalf of the Technical Panel.

The use of stiff geosynthetics in unpaved roads on soft subgrade is known to provide a reinforcing benefit to the road allowing better distribution of applied loads and increased bearing capacity, especially for fill depth of less than 0.4 and subgrades with a CBR of less than 3. Overall, the reinforcing benefit of a geosynthetic can be directly seen in rut formation, with up to ten times as many standard axle passes needed than for an unreinforced road. Other non-independent benefits have also been documented: improved bearing capacity, extended service life, reduced fill thickness, and diminished deformations.

This project aims to construct test sections in the field to investigate the relative benefit of various geosynthetics available on the market to an unpaved road. A prepared and placed subgrade will provide equivalent conditions for each test section; likewise the gravel surfacing along the entire test bed will be uniform. Controlled traffic loading with frequent rut profile measurements will indicate performance benefits of each geosynthetic in the test sections. Additionally, post-traffic examination of the geosynthetic will provide invaluable information regarding the performance and installation survivability of the geosynthetics.

Jim Currie made a motion to participate in this study, committing MDT to \$86,746.00. John Blacker seconded the motion. The motion passed.

6b. Full Scale Seismic Performance Testing of U.S. Highway Bridge Column – Pooled Fund Study

Stephanie Brandenberger/Bridge attended the meeting and spoke in favor of this proposal.

Major transportation structures in the United States, such as bridges, have suffered tremendous damage due to earthquakes in recent years. Such damage limits the ability of the affected community to carry out emergency response operations, slows recovery, and strains the limited resources available for post-event reconstruction and development.

The current seismic design procedure for bridge columns in the U.S. are based on theoretical and computational models that are calibrated against experimental data. Nearly all of this data is from tests on reduced-scale specimens.

The objective of this pooled-fund study is to provide a benchmark of the seismic performance testing of the U.S. highway bridge column under full-scale shake-table tests. The results from this study will be used to evaluate and calibrate current design and analysis practices; and will be compared with previous scaled model tests to understand the scale effects.

Debbie Alke made a motion to participate in this study, committing MDT to \$20,000.00 per year for two years. Larry Flynn seconded the motion. The motion passed.

6c. Policy of Highway Drainage and Drainage Design Manual – Pooled Fund Study

Dave Hedstrom/Hydraulics attended the meeting and spoke in favor of this proposal.

In the last two and a half years, the AASHTO Technical Committee on Hydrology and Hydraulics (TCHH) has been revising the Model Drainage Manual to update its contents and to make it more users friendly, and accessible. The purpose of this pooled fund study is to facilitate this effort.

John Blacker made a motion to participate in this study, committing MDT to \$10,000.00 per year for two years. Sandy Straehl seconded the motion. The motion passed.

6d. The Impact of Wide-Base Tires on Pavement Damage: A National Study – Pooled Fund Study

Due to a lack of time, this proposal will be sent to the RRC members for consideration via an e-mail ballot.

6e. U.S. 93 South Wildlife Crossing Structure and Fencing Evaluation

This proposal was put on the agenda as a placeholder. The RPF selection committee is still in the process of clarification and is not ready to recommend this proposal for funding

7. Implementation/Technology Transfer: None

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

Bob Burkhardt/FHWA announced the Surface Transportation Environment and Planning Cooperative Research Program (STEP) are advertising a two-phase process for proposal submission and evaluation. Proposals are due electronically by 4:00 P.M. Eastern on February 15, 2008. Complete details are be found at <http://www.fhwa.dot.gov/hep/step/proposal.htm>

cc: Craig L. Abernathy/Research Programs w/attachments
Lisa Autio/Research Programs w/attachments
Kent M. Barnes, P.E./Bridge Bureau
Kevin Christensen/Highways and Engineering Division
Tim Conway, P.E./Consultant Design Bureau
Lisa Durbin/Construction Administration-Bureau
Mike Dyrdaahl/Highways and Engineering Division
Paul R. Ferry, P.E./Highways Bureau
John Horton/Right-of-Way Bureau
Paul Jagoda, P.E./Construction Engineering Bureau
Jennifer Jensen/Human Resources Division
Michael P. Johnson/District Administrator-Great Falls
Dwane Kailey, P.E./District Administrator-Missoula
Tom Martin, P.E./ Environmental Services Bureau
Ray Mengel/District Administrator-Glendive
Jeanne Nydegger/Research Programs w/attachments
Suzy Price/Contract Plans Bureau
Timothy W. Reardon/Legal Services
Stefan Streeter, P.E. /District Administrator-Billings
Matt Strizich, P.E./Materials Bureau
James A. Walther, P.E./Highways and Engineering Division
Duane E. Williams, P.E./Traffic & Safety Bureau
File