

**[PLEASE NOTE THE MDT RESEARCH PROJECTS PROGRAM
IS A CONTRACT PROGRAM, NOT A GRANT PROGRAM]**

Title

by

Name

Position

Affiliation

A proposal prepared for the

Montana Department of Transportation

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Note: Figure titles go below figures.

PROBLEM STATEMENT

Concisely express your understanding of the problem presented. If the proposal is in response to an RFP or Scope of Work, do not repeat the wording of the RFP or Scope of Work; rather, demonstrate your insight into the problem.

BACKGROUND SUMMARY

Include background information on the research topic. Summarize the findings of a preliminary literature search and state the relationship of the proposed study to prior and current research. TRB's Transportation Research International Documentation (TRID, <http://trid.trb.org/>) and Research in Progress (RiP, <http://rip.trb.org/>) databases should be searched as a part of this preliminary literature search. The summary should reveal your understanding of underlying principles and should clearly indicate your appreciation of the problem. The importance of this part of the proposal should not be underestimated. A comprehensive background summary ensures all aspects of the research topic have been adequately considered so new research can build upon prior work rather than duplicate it.

BENEFITS AND BUSINESS CASE

Identify potential benefits expected from the research. Describe how the research results can be used, and by whom, to improve transportation practice. Possible benefits are:

- ★ Cost savings (both MDT and the affected public);
- ★ Increased safety;
- ★ Improved service; and
- ★ Improved procedures.

The business case for the scope of work must be included in the proposal. The business case is the reason for initiating this project, need for the results of this project, and description of the value and benefits of the project. The business case addresses such items as: will the problem continue unless research is done; can or should the research be postponed to another year; what real world costs are associated with the problem; does future State activity depend upon this research; what savings in money or time might result from the research; what improvements could be made from the research (safety, efficiency, services); would the research be completed prior to a major implementation (timeliness); who will benefit from this research project; and what area within the Department will benefit from or be affected by this research.

OBJECTIVES

State the technical objectives of the study. Explain and justify any deviations from the objectives listed in the RFP or Scope of Work, if applicable.

RESEARCH PLAN

Describe how the objectives will be achieved through a complete, logical and innovative plan. Use the task descriptions given in the RFP or Scope of Work, if applicable, as a basis for developing the research plan. Specifically identify the tasks that will be performed. Explain and justify any deviations from the tasks listed in the RFP or Scope of Work, if applicable.

To the extent possible, identify major operational activities and relate these activities to staffing requirements, time schedules, and cost estimates. Describe how the activities will be carried out. Research methodology shall be described in the greatest level of detail that the researcher's understanding of the problem permits and to permit evaluation of the probability of success in achieving the objectives.

The plan should also describe the technical basis of the research. Describe the following and other such items, as appropriate:

- ★ Principles of theories to be used;
- ★ Significant variables to be tested;
- ★ Analytical and statistical procedures;
- ★ Experimental and testing procedures;
- ★ Evaluation criteria;
- ★ Inspection and survey methods;
- ★ Controls to be used;
- ★ IT components; and
- ★ Material, procedure, or device development.

If appropriate, the research plan should include the development of performance measures such as a cost/benefit analysis for the research and potential implementation. Also, as appropriate, the research plan should include the development of a technology transfer/communication plan.

Ongoing communication between the research team and MDT staff and project QA/QC are critical to the success of the project. The proposal must include a description of the steps the research team will take to ensure QA/QC and regular communication occurs with MDT's Research Programs staff and the Technical Panel throughout the project.

The plan will include a kick-off meeting. The project kick-off meeting serves to ensure everyone involved in the research project is informed of the contractual obligations, scope of work, deliverables, project milestones, time table, and appropriate office policies and procedures. This meeting will also provide an opportunity to clarify technical issues or concerns with the project.

Also the plan should include a final presentation. An overview of the project will be provided with detailed discussions on the findings and recommendations. This presentation will possess strong technical components and in-depth discussions focusing primarily on the research and implementation.

In addition, the plan should include an implementation meeting to be facilitated by the project's Principal Investigator and will include the project Technical Panel and others as appropriate. The purpose of the meeting is to review the Principal Investigator's implementation recommendations to determine which will be implemented as is, with changes, and which will not be implemented. The discussion will include other items, not mentioned in the project final report, to be implemented, as well as a determination of any unmet research needs. The Principal Investigator will document this discussion in the form of an implementation report, with the following sections: Introduction and Purpose, Implementation Summary, and Implementation Recommendations (includes Principal Investigator's recommendations and MDT response). It may be possible to combine the implementation meeting with the final project presentation.

Other meetings may be deemed necessary by MDT or the research team and should be included in the proposal.

All meetings should be included in the proposal. The research team is responsible for preparing meeting materials and submitting these materials to the MDT Research Project Manager at least two weeks in advance of the meeting. Likewise, the research team is responsible for submitting meeting notes for technical panel review no later than two weeks following the meeting.

Any instrument (survey, interview questions, etc.) and the specific contact list will need to be reviewed and approved in advance by the project Technical Panel.

If test methods are to be developed as a part of this project and proposed as national standards, the order of submittal shall be first to American Association of State Highway and Transportation Officials (AASHTO), in cooperation with MDT. If the test method or specification is not adopted through the AASHTO process, the research team will be free to submit to the American Society for Testing and Materials (ASTM) or other national standard organizations. See http://materials.transportation.org/Documents/Research/How_to_AASHTO_Materials_Standards.pdf for document on How to Turn Materials Related Research into a Formal AASHTO Materials Standard Specification.

MDT INVOLVEMENT

Describe any assistance that may be required from MDT and the timeframe(s) in which this assistance is required. Include such items as:

- ★ Traffic control;
- ★ Construction;
- ★ Highway maintenance;
- ★ Drilling and sampling;
- ★ Access to transportation facilities, including such items as: MDT headquarters, MDT district offices, field locations;
- ★ Space at MDT headquarters or district offices, including such items as: office space, network access, computer equipment;
- ★ Information/Data request from MDT staff;
- ★ Access to written information or databases; and
- ★ Interviews.

PRODUCTS

List the products that will be delivered during the research project. All products required for implementation must be included as project deliverables. Deliverables might include:

- ★ Reports
 - Progress reports
 - Task reports
 - Final report, with cover photo
 - Project summary report (text and graphics only; see example http://www.mdt.mt.gov/other/webdata/external/research/docs/reconfig/project_summary.pdf)
 - Implementation report (text and graphics only; see example http://www.mdt.mt.gov/other/webdata/external/research/docs/research_proj/seismic/phas_eiii/implementation_report_feb13.pdf)
 - Performance measures report (includes both qualitative and quantitative performance measures, as appropriate; see example http://www.mdt.mt.gov/other/webdata/external/research/docs/research_proj/seismic/PERFORMANCE_MEASURES_REPORT.PDF)
- ★ Technology transfer/communication plan,
- ★ TRNews Research Pays Off article,
- ★ IT Components,
- ★ Manuals,
- ★ Photographs,
- ★ Video or other audio/visual materials,
- ★ Training materials,
- ★ Guidebooks
- ★ Specifications, and
- ★ Detail drawings.

Unless otherwise directed in the RFP or Scope of Work, if applicable, always include the following items as products:

- ★ Progress reports (generally quarterly, but also may be monthly or bimonthly, primarily speak to budget and schedule; quarterly progress reports are due by the end of the month following the reporting period; monthly or bimonthly are due by the 15th of the month following the reporting period);
- ★ Task reports (more oriented toward technical progress and accomplishments; these reports must be written with sufficient detail such that they could be a chapter in the final report; due by the end of the month following completion of the task);

- ★ Final report cover page photo (JPG format);
- ★ Final report, including an implementation plan and cost/benefit analysis, as applicable;
- ★ Project summary report;
- ★ Implementation meeting and report; and
- ★ Final presentation.

Reports must be clear, concise, and submitted in MS Word and Adobe PDF format and follow the report writing requirements at http://www.mdt.mt.gov/other/webdata/external/research/docs/report_guidelines.pdf. Make sure the latest version is used.

Products are expected to be of exceptional quality. Draft deliverables are the research team's vision of the complete and final deliverables. All draft deliverables must be spell checked and reviewed by a person. All proposals must address deliverable quality and how quality will be guaranteed (i.e., use of editing staff and/or peer reviewer).

IMPLEMENTATION

MDT research projects are intended to produce results that will be applied. Describe how the research results can be applied by MDT. To the extent possible, include the following:

- ★ Describe the form in which the findings may be reported, such as a mathematical model, a laboratory test procedure, or a design technique. Describe these results in terms of the user (e.g., practicing engineer, administrator).
- ★ Identify who would logically be responsible for applying the research results, such as the American Association of State Highway and Transportation Officials (AASHTO), FHWA, MDT, or a particular office within MDT.
- ★ Identify specific standards or practices that might be affected by the research findings, such as AASHTO or MDT specifications, MDT policies and procedures, legislation, or fiscal requirements.
- ★ Submit an implementation plan tied to performance measures. If an IT component is part of the implementation submit a work plan for update and maintenance.
- ★ Describe activities necessary for successful implementation.
- ★ Describe the criteria for judging the progress and consequences of implementation.
- ★ Provide an estimate of the costs of implementation.
- ★ Identify the long-term implementation activities and costs.
- ★ Identify barriers of implementation and how these barriers might be reduced or eliminated.
- ★ If the findings of a study are not suitable for immediate application in practice, the proposal should specify additional steps needed before application can occur (e.g., additional research, field testing, changes in policy, etc.).

It is understood the research may produce unanticipated findings, making changes in the implementation plan necessary. This is acceptable. The proposal selection, however, will be greatly influenced by the practicality and direction of the implementation plan presented in the proposal.

These items should be included in more detail in the Implementation Section of the final report.

SCHEDULE

Provide a graphical presentation illustrating the scheduling of the major research tasks on a monthly or quarterly basis, as appropriate (Table 1). This chart should include all meetings and deliverables.

The MDT Research Review Committee (RRC) approves project funding. This committee meets at most once a month. Check with MDT Research staff to ensure your start date is in sync with funding approval by the RRC or indicate time by months or quarters, as appropriate, rather than dates (i.e., month 1, month 2 or quarter 1, quarter 2, etc.).

Always allow one month for MDT review of draft reports. All revised progress, task, or other interim reports must be submitted to MDT within two weeks after receipt of MDT comments. All future revisions must be submitted to MDT within one week of receipt of comments. The revised final and project summary reports must be submitted within one month of receipt of MDT comments. For all future revisions, the final and project summary reports must be submitted to MDT within two weeks of receipt of comments.

Time is of the essence. The time schedule must be realistic; do not anticipate any time extensions, barring unforeseen situations.

Table 1: Project Time Schedule

Activities	Month							
	1	2	3	4	5	6	7	8
Kick-Off Meeting								
Task A. Review of Current Ride Specification								
Task B. Literature Search								
Task C. Conduct State of Practice Survey	Develop Draft	MDT Review	Conduct Survey					
Task D. Recommendations								
Task E. Implementation Plan								
Draft Final Report						Submit		
Final Presentation								
Final Report								

*The schedule also contains monthly progress reports.

BUDGET

Show the detailed and **fully** itemized project cost for the state fiscal years by task. The state fiscal year runs from July 1 to June 30. Show all cost sharing, including in-kind. Payment is on a cost reimbursement basis, not to exceed the cost indicated in the proposal.

Include a table of key personnel with hourly pay rates and benefits itemized.

Meetings (except kick-off meeting) and all deliverables (except progress and task reports) must be itemized. If these meetings do not occur or the deliverables are deemed unnecessary, the budgeted amount will be deducted from the total contract amount.

List and itemize all travel.

No budget amendments should be anticipated.

Include a table with fully itemized by task.

See example at back of document.

STAFFING

Include pertinent background information for each member of the research team, including subconsultants, significantly participating in the project. Describe how academic, professional, and research experiences relate to the project and their role in the project. Include a summary of past accomplishments in the same or closely related problem areas. Justify each research team members' participation.

Provide a table showing the number of person-hours devoted to each task by research team members, as illustrated in Table 2. List the names of principal investigators and other key professionals who will be involved. Support personnel may be identified by classification.

Table 2: Project Staffing

Name of Principal, Professional, Employee, or Support Classification	Role in Study	Task						Percent of Time vs. Total Project Hours (total hrs./person /total project hrs.)	Percent of Time - Annual Basis (total hours/ person/ 2080 hr.)
		1	2	3	4	5	Total		
Professor A	Principal Investigator	60	60	60	60	60	300	20	14
Professor B	Co-Principal Investigator	15	25	20	20	0	80	5	4
Graduate Student 1	Field Testing	500	120	300	70	0	990	67	48
Graduate Student 2	Analysis	10	15	5	15	5	50	3	2
Editor	Report Preparation, editing, and review	5	10	5	10	20	50	3	2
TOTAL		585	230	390	175	85	1470	N/A	N/A

List current commitments of each project team member to other work in sufficient detail to permit assessment of the research team's ability to meet the proposal's commitments. List percentages of time committed to all projects, including the one described in this proposal, clearly showing the time is available for the project described in this proposal. Include a statement that the level of effort proposed for principal and professional members of the research team will not be changed without written consent of MDT.

FACILITIES

Describe the facilities available to accomplish the research. Indicate equipment necessary for completion of the research and specify any restrictions on its use.

Researchers are expected to be fully capable of completing the proposed research prior to contracting. This includes having any necessary equipment on hand or acquiring the use of such equipment, such as through a lease agreement, and the expertise to obtain valid results. If additional equipment is proposed, identify and explain the need for it in the budget estimate and be prepared to develop a request for approval; all equipment purchases require approval by the Federal Highway Administration (FHWA) as per 2CFR200.

National or state laboratory and technician certifications for activities relevant to the research project should be provided in the proposal. In the instance the SOW, RFP, or the nature of the research requires laboratory and/or technician certification the proposer does not have at the time of submittal, the proposal will communicate the efforts to be made to obtain certification or committee approval to conduct testing with the proposed technicians and laboratories. Nonexpendable supplies and equipment purchased with MDT funds are MDT property and will be delivered to MDT when the project is complete.

REFERENCES

Cite references as per

http://www.mdt.mt.gov/other/research/external/docs/report_guidelines.pdf.

BUDGET.EXAMPLE

Table 1- proposed budget by Fiscal Years

Item	State Fiscal Year			Federal Fiscal Year		
	2013-2014	2014-2015	2015-2016	2013-2014	2014-2015	2015-2016
Salary, X	\$877	\$10,450	\$6,957	\$2,295	\$12,979	\$3,105
Salary, Y	\$679	\$6,346	\$4,787	\$1,775	\$7,710	\$2,401
Stipend, Graduate Student	\$0	\$17,850	\$0	\$3,484	\$14,280	\$0
Wages, Graduate Student	\$1,918	\$7,870	\$0	\$3,836	\$5,904	\$0
Wages, Graduate Student	\$0	\$2,952	\$0	\$0	\$2,952	\$0
Total Benefits	\$720	\$9,342	\$4,286	\$2,250	\$10,136	\$2,010
In Country Travel	\$0	\$10,010	\$0	\$0	\$10,010	\$0
Indirect Costs (49.5%)	\$2,076	\$32,085	\$7,935	\$6,751	\$31,666	\$3,720
Graduate Student Tuition	\$0	\$16,192	\$0	\$3,114	\$12,954	\$0
Total	\$6,270	\$113,097	\$23,965	\$23,505	\$108,591	\$11,236

Table 2. Proposed Budget by Task and Deliverables

Task	Amount
Task 1: Kick-off Meeting	\$1,066
Task 2: Literature Review	\$5,204
Task 3: Survey of State Experiences	\$9,995
Task 4: Develop Data Collection Plan	\$29,564
Task 5: Execute Approved Data Collection Plan	\$80,741
Task 6: Draft Report and Presentation	\$11,189
Task 7: Final Report and Presentation	\$5,573
Total	\$143,332

Table 3. Proposed Budget Summary*

Item	Amount State FY	Amount Federal FY
Salary, X	\$18,284	\$18,379
Salary, Y	\$11,812	\$11,886
Stipend, Graduate Student Assistant	\$17,850	\$17,764
Wages, Graduate Student Assistant	\$9,788	\$9,740
Wages, Graduate Student Assistant	\$2,952	\$2,952
Total Benefits	\$14,348	\$14,396
In Country Travel	\$10,010	\$10,010
Indirect Costs (49.5%)	\$42,096	\$42,137
Graduate Student Tuition Remission	\$16,192	\$16,068
Total	\$143,332	\$143,332

Don't Need
Federal Fiscal
Year Info

Table 4. Pay and Benefit Rates for Key Personnel

Key Person	Role	Hourly Rate	Fringe@.365	Indirect@.495	Burdened
X	PI	\$73.58	\$26.86	\$49.72	\$150.16
Y	Co-PI	\$56.90	\$20.77	\$38.45	\$116.12

Travel and other expenses need to be delineated as shown below

Airfare (3 people)	750	3	2,250
Lodging (2 rooms)/night	100	8	800
Per Diem (5 days)/person	56	15	840
Rental car	350	1	350
Fuel for rental car	50	1	50
TOTAL			4,290

<i>Trip 2: Before period</i>	Unit Cost (\$)	Quantity	Total Cost (\$)
Airfare (2 people)	750	2	1,500
Lodging (1 room)/night	100	4	400
Per Diem (5 days)/person	56	10	560
Rental car	350	1	350
Fuel for rental car	50	1	50
TOTAL			2,860

<i>Trip 3: Before period</i>	Unit Cost (\$)	Quantity	Total Cost (\$)
Airfare (2 people)	750	2	1,500
Lodging (1 room)/night	100	4	400
Per Diem (5 days)/person	56	10	560
Rental car	350	1	350
Fuel for rental car	50	1	50
TOTAL			2,860

TOTAL TRAVEL **\$10,010**