

NEW MEXICO DEPARTMENT OF TRANSPORTATION

RESEARCH BUREAU

Innovation in Transportation

Information and Instructions for
Preparing Proposals in the
NMDOT Research Program

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Instruction Manual

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Information and Instructions
For Preparing Proposals
in the
NMDOT Research Program

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Sequence of Events in the ***NMDOT Research Program***



Research Project Solicitation

The Research Bureau and Research Advisory Committees conduct Research Project Solicitation (RPS) to identify issues of concern and problems for research.



Problem Statements

Following review by the Research Advisory Committees and final approval by the Research Oversight Committee, the Technical Panel develops Problem Statements which identify issues and research needs.



Invitation to Propose

Problem Statements are refined and incorporated into an *Invitation to Propose* (ITP). The Research Bureau issues ITPs to interested Institutions of Higher Education.



Selection of Proposal

Proposals are received by the Research Bureau and forwarded to the Selection Committee for review. The Selection Committee evaluates each proposal and rates according to objective criteria.



Execution of Contract

The institution with the winning proposal is invited to contract negotiations. Scope, schedule, budget and deliverables are finalized, and the contract is executed.

I. General Information

This manual consists of four sections, for the respective purposes of (1) describing the Transportation Research Program of NMDOT and its administration by the Research Bureau, (2) describing the sequence of events leading to research, (3) describing the administrative duties of the Research Bureau, and (4) setting forth the specific instructions for preparing and submitting proposals and other documentation on NMDOT research projects.

NMDOT Research Program

Effective, organized and well-executed research often provides the means to address the increasingly complex transportation problems encountered by NMDOT. While some of these problems are resolved at the local level by district personnel and organizational subunits, many are best addressed through a systematic program of coordinated research.

The NMDOT Research Program is organizationally located under the Planning Division of Programs and Infrastructure. The program is supported through state and federal funds, and receives the full cooperation and support of the Federal Highway Administration (FHWA). Administration of the program is guided by a *Research Oversight Committee* (ROC) composed of representatives from NMDOT executive staff, and FHWA. The ROC sets research priorities and authorizes specific research initiatives.

Each year the ROC meets at regular intervals to evaluate the research program and to consider research requests that have been brought forth by three *Research Advisory Committees* (RACs). These RACs are staffed by department personnel representing each of the Offices of the Deputy Secretaries: 1) *Programs and Infrastructure*; 2) *Highway and Transportation Operations*; and 3) *Business Support*. While proposals for research are accepted from a variety of sources, only those that have internal NMDOT support and sponsorship are submitted for consideration by the Research Oversight Committee. Requests for research initiatives are submitted to the Research Bureau for review and preparation, and then on to one of the three RACs for consideration and prioritization. Research requests that are ultimately approved by the ROC are programmed and incorporated into the next Fiscal Year Research Work Program, which is reviewed and approved by FHWA, and constitutes the binding scope of work for the year.

In consultation with *Technical Panel* members assigned to each project, the Research Bureau develops *Invitations to Propose* (ITPs), which set forth the problem statement and invites interested parties to submit proposals to address the problem. These ITPs are issued to university representatives with a current *Research Interest Form* on file, and the most meritorious proposal received is selected by an independent *Selection Committee*. Winning consultants are invited for contract negotiations, followed by contract development, contract execution, conduct of research and implementation of results. Each research project is guided by a *Technical Panel* composed of department personnel with expertise in the subject area, while surveillance, administration and project management of contract work are performed by Research Bureau staff.

Administration

Policy and procedures in administration of NMDOT research are authorized by the ROC, while day-to-day activities are performed by Research Bureau staff. In addition to establishing research priorities and approving individual research initiatives, the ROC provides counsel on all matters relating to policy and procedures required for the planning and administration of the program.

The Research Bureau and Research Advisory Committees are jointly responsible for coordinating the identification of potential problem areas and for solicitation of research requests from various organizational areas within their respective Offices through a formal *Research Project Solicitation* (RPS) process. RAC members compile, review and consider research project proposals, and from these develop a prioritized list for consideration and approval by the ROC. Following completion of the research project, these RACs oversee the implementation of findings and recommendations.

All NMDOT research is organized into ten broad research fields which represent the core areas of transportation research. For each approved project, a *Sponsor* and *Advocate* are identified from within NMDOT. The Sponsor is a District Engineer, Division Director or Bureau Chief who certifies that the proposed research is meaningful, worthwhile, necessary and consistent with the goals of the organizational unit they represent. The Advocate is an NMDOT employee with interest and expertise in the subject area, who agrees to spearhead the project, serves as chairperson of the Technical Panel, participates in proposal selection and contract negotiation, attends quarterly meetings, reviews and approves project deliverables, and ensures that results from the research effort are appropriately implemented.

Each approved research project is guided by the *Technical Panel*, typically composed of the Advocate, other Department employees with an interest in the research subject, and Research Bureau staff. Depending on the nature of the research, representation from FHWA and/or the Highway Operations Support Bureau on the Technical Panel may be requested. The Technical Panel is responsible for (a) developing an operational plan for attainment of research project objectives, including estimates of cost and time requirements; (b) drafting definitive statements of objectives for research projects within appropriate time and budget constraints; (c) developing Invitations to Propose; (d) negotiating contracts between NMDOT and the successful offeror; (e) reviewing progress of research; (f) providing guidance regarding technical aspects of the research; (g) reviewing and evaluating project reports (including the final report) for compliance with project objectives and suitability for publication; and (h) making recommendations for implementation of research results and/or continuation of studies.

II. Sequence of Events for Research

Research Project Solicitation

Several times each year, the Research Bureau, in consultation with Research Advisory Committees, conducts *Research Project Solicitation* (RPS) activities. The RPS is designed to encourage broad participation from department personnel in identifying problems and in suggesting research projects to solve these problems. Other entities and private individuals may

also suggest research during this open solicitation period, however only those ideas which have internal NMDOT sponsorship will move forward for consideration by the ROC. Each research proposal is screened by the Research Bureau, which performs a preliminary literature review to ensure that the project has not been duplicated through earlier projects or by other research agencies. The Research Bureau then assembles the Technical Panel, refines the objectives, determines the duration and cost estimate, and prepares the proposal for consideration by the ROC. During the fourth quarter of each fiscal year, projects which have been compiled during the preceding year are reviewed and re-evaluated by the ROC, and a determination is made as to which of these proposals will be approved and incorporated into the forthcoming Annual Work Program for consideration and approval by FHWA.

Research Interest Form

To ensure that all Institutions of Higher Education (IHEs) that choose to participate in the NMDOT Research Program are given an opportunity to respond to ITPs, the Research Bureau compiles and maintains a database containing the contact information of university representatives and their areas of research interest. Annual submittal of the Research Interest Form is required, and is used to generate ITP distribution lists. University representatives who wish to receive a copy of ITPs issued by the Research Bureau are responsible for ensuring that their contact information: name, institution represented, phone number, e-mail address, mailing address and specific categories of transportation research interest (see Attachment A for a list of research categories, and Attachment B for an example of the Research Interest Form) is current and on file in the offices of the Research Bureau.

Problem Statements

From the selection of approved projects as authorized by the ROC with concurrence from FHWA, and in cooperation with the project Technical Panel, problem statements are refined and developed by the Research Bureau. These problem statements provide a broad overview of the research question, and set forth minimum criteria. Each problem statement will vary, and will typically be composed of (1) Project Title; (2) Background; (3) Research Question; (4) Objective; (5) Product or Service to be Delivered; (6) Project Tasks; and (7) Maximum Budget and Time Frame tables.

Invitation to Propose

Following development of problem statements, the Research Bureau will prepare and issue an *Invitation to Propose* (ITP) to representatives of state universities who are registered in the consultant database. This may consist of one or more individual problem statements for which interested parties may submit a response. The ITP will consist of the problem statement, guidelines for submission, submittal deadline and other relevant information. It should be noted that issuing an ITP in no way commits funding from NMDOT for the subject project, and that NMDOT reserves the right to withdraw any portion of the ITP, at any time, at its own discretion. Proposals received from offerors are considered privileged and confidential documents, and will not be disclosed to third parties. In-state Institutions of Higher Education are typically given the right of first refusal for submitting proposals in response to ITPs.

Specific requirements for form and content of proposals are documented in Section IV of this Manual. Proposals not in strict compliance with these requirements, proposals submitted after the submission due date, and proposals that exceed the posted *Not to Exceed* amount will be considered non-responsive. At the sole discretion of the Research Bureau, ITPs may be issued at any time to solicit proposals from interested consultants, issuance of which does not impose any obligation whatsoever on the Department.

Pre-Proposal Meetings

At the sole discretion of the Research Bureau, a pre-proposal meeting may be scheduled for the purpose of discussing project objectives in greater detail and providing information on proposal requirements. These meetings will typically be coordinated by the Research Bureau, and conducted by project Advocates and Technical Panels. Interested consultants are strongly encouraged to attend these meetings.

Selection Committee

Responsive proposals for research projects will be forwarded for evaluation by the Selection Committee. The Selection Committee is an independent panel composed of voting members typically comprised of Technical Panel members, a non-voting representative from FHWA, and a non-voting *Process Observer* appointed by the Planning Division Director. The Selection Committee evaluates each proposal according to objective rating criteria. Following selection of the winning proposal, recommendations for contract award are forwarded for review and approval by Research Bureau Chief, the Planning Division Director, the Program Divisions Director, the Programs and Infrastructure Divisions Director and the Deputy Secretary of Programs and Infrastructure. On request, the Department will provide the means for de-briefing to unsuccessful offerors, to advise which areas of the proposal were deemed to be deficient. Selection criteria will be provided in the ITP, and may consist of some or all of the following: (1) Specialized Research and Technical Competence; (2) Technical/Financial Resources; (3) Proposal Content and Quality; and (4) Past Performance. In the event that the offeror is currently performing contract research work with NMDOT, a current work penalty may be assessed.

Contract Negotiation and Execution

Following selection of the winning proposal, the successful offeror will be invited to contract negotiation. This negotiation will consist of mutual agreement of specific project scope, tasks, milestones, schedule, budget and deliverables. The negotiation will typically consist of representation from the successful offeror (which may also include administrative staff), the Project Manager and Technical Panel members. Depending on the nature of the contract, representatives from FHWA and/or staff from the Highway Information Support Bureau may be invited to participate in contract negotiation. Negotiation between the parties is restricted to project-specific contract elements of scope, tasks, budget, milestones and deliverables.

Contract boilerplate elements including provisions for taxes, insurance, copyrights, disadvantaged business requirements, etc. will not be subject to negotiation during these

meetings. It is the Consultant's responsibility to ensure that personnel attending these negotiations are empowered to serve as representatives of their employer in this capacity.

Following successful negotiation, the Research Bureau will prepare a contract for signature between the parties. The contract will be considered fully executed on the date on which the final signature is obtained. In the event that contract negotiation is unsuccessful, NMDOT reserves the right to offer the contract to the next highest ranking proposer, or to withdraw the ITP. Upon execution of the contract, material revisions will be made only through duly processed contract amendments.

Notice to Proceed

Upon execution of contracts, the Research Bureau will issue a *Notice to Proceed* (NTP) letter to the Consultant. The NTP will provide formal authorization for the Consultant to initiate work, and will include a summary of the contractually required deliverables and due dates. Under no circumstances will the Consultant be authorized to perform billable work prior to receipt of the NTP. Following the NTP, the assigned Research Bureau project manager will schedule a *Kick-Off Meeting* between the parties to discuss project objectives and expectations for the first quarter.

Conduct of Research

Following receipt of the NTP letter, the Consultant is expected to conduct research as stipulated in the contract. While each project is different and subject to unique requirements, most contracts contain common required deliverables, including a) quarterly progress reports and meetings; b) interim reports for projects of duration greater than twelve (12) months; c) an implementation plan; d) a multimedia presentation; and e) a final report.

The research project is expected to be a cooperative effort between the Consultant and the project Technical Panel, and as such, quarterly reports and meetings are considered critical to the successful conduct of research. Quarterly reports and other deliverables will be subject to review and approval by the Technical Panel, which serves to guide the project and ensure meaningful, implementable results. A primary deliverable common to virtually all projects is the *Implementation Plan*, which serves as a guidebook for use by Department staff in implementing the findings and recommendations resulting from the research. The Consultant and the Technical Panel are jointly responsible for development of an effective Implementation Plan, and the appropriate Research Advisory Committee chairperson will oversee the implementation of results as directed by the project Advocate.

III. Research Administration

Research Oversight Committee

Policies and procedures in administering the NMDOT Research Program are set forth by the *Research Oversight Committee* (ROC). While the Research Bureau carries out the day-to-day activities including contract administration, project development, coordination of RPS activities

and performance of internal research, the ROC sets the strategic priorities, approves individual research initiatives and authorizes the Annual Work Program for each state fiscal year.

Research Advisory Committees

Three (3) *Research Advisory Committees* (RACs), representing each of the Offices of the Deputy Secretary, are established to participate in identifying transportation issues and soliciting research requests. Each RAC is headed by a chairperson, and collectively these chairpersons constitute the *C-RAC*. In cooperation with these RACs, the Research Bureau coordinates regular RPS activities as a means to formally compile problem statements and research requests. RAC members review and prioritize these project proposals within their respective areas, and the *C-RAC* prioritizes all of these requests in their entirety for consideration and approval by the Research Oversight Committee.

Sponsors and Advocates

In order to ensure that suggested research is consistent with strategic priorities and organizational goals, and to ensure that research results are implemented, each project is required to have a *Sponsor* and an *Advocate*. The Sponsor is typically a NMDOT Division Director, District Engineer or Bureau Chief who certifies that the project is necessary and in conformance with the strategic priorities of the respective organizational sub-unit. The Advocate is a department employee with expertise or interest in the research subject area who agrees to serve as chairperson of the Technical Panel over the duration of the research project. The Advocate coordinates project meetings and activities with Technical Panel members, participates in quarterly meetings, reviews deliverables, and ensures implementation of research results.

Technical Panels

Each research project is assigned to a *Technical Panel* composed of NMDOT employees. On occasion, this panel may include representation from non-NMDOT employees. At a minimum, the Technical Panel includes the Advocate (typically the individual who suggested the research), and Department employees with an interest in the research subject area. Depending upon the nature of the research, representation from FHWA and/or the Highway Operations Support Bureau may be requested to serve on the panel. The responsibility of the Technical Panel is to craft the research problem statement, participate in proposal selection and contract negotiations, guide the research, review and approve project deliverables including the final report, participate in the development of implementation plans, and ensure implementation of results. Guidelines for the roles and responsibilities of Technical Panel members are provided in the *Technical Panel Handbook*, included as Attachment J to this Manual.

Principal Investigator

The research is considered to be under the direction of the Principal Investigator (P.I.) identified in the proposal. Because it is presumed that the P.I. had the major role in determining the scope of work and setting it forth in the proposal, it is expected that the P.I. will be available and responsible for the duration of the contract period. Replacement of the P.I. is therefore subject to

approval from the Department. Likewise, the research team is presumably uniquely qualified to complete project objectives, and any replacement or withdrawal of personnel will require prior approval. This requirement does not extend, however, to students or employees whose role is primarily one of support.

Annual Work Program

From the selection of proposed research initiatives resulting from regularly scheduled RPS activities, the ROC reviews and approves projects for the forthcoming fiscal year within the fiscal constraints of available funding. These projects constitute the basis for the Annual Work Program, which is submitted for review and approval by FHWA. On approval of the Annual Work Program, Research Bureau staff prepare and issue *Invitations to Propose* (ITPs) to registered university consultants at in-state Institutions of Higher Education (IHEs). These ITPs may include one, some, or all of the projects in the Annual Work Program, with each project individually subject to submission of a proposal from interested IHEs.

Quarterly Progress Meetings and Reports

Once a contract has been executed, quarterly progress reports will be submitted by the university Consultant (Principal Investigator) of the IHE to the Research Bureau project manager, who forwards these reports to for review by Technical Panel members. Quarterly meetings with the Principal Investigator and/or research team are required, during which progress is evaluated by the Technical Panel. These meetings are required to be conducted within two weeks following submission of quarterly reports, and serve as an opportunity for the parties to discuss:

- Findings and recommendations as reflected in quarterly progress reports.
- Research activities performed during the previous quarter.
- Plans for the forthcoming quarter.
- Potential delays to project completion.
- Budget and schedule issues.
- Other relevant project information.
- Travel and equipment needs.

Quarterly progress reports will document project activities during the previous quarter and plans for the forthcoming quarter. Quarterly progress reports are required to include, as a minimum:

- Discussion of research activities performed during the previous quarter.
- Discussion of plans for the forthcoming quarter.
- A summary of research findings and recommendations as appropriate.
- Documentation of activities, including travel, equipment and labor, in sufficient detail to permit verification of allowability of charges reflected in quarterly billing statements.
- A statement of adherence to budget and any expected requirement for budget modification.
- A statement of adherence to schedule and deliverable due dates, including any conditions that may affect compliance with these requirements.
- Disclosure of any conditions that may affect compliance with contract requirements.

Quarterly progress reports are due on the last day of the state fiscal quarter, regardless of the contract execution date.

Quarterly Billing Statements

During conduct of research, the IHE shall submit quarterly billing statements to the Research Bureau Administrator. Quarterly billing statements shall include documentation of all costs and expenditures in sufficient detail so as to permit the Research Bureau Administrator and project manager to verify the accuracy and allowability of these charges. Billing statements shall be accompanied by receipts for expenditures and other documentation as requested by the Department to adequately document and verify the allowability of invoiced costs. In the event that the quarterly billing statement is insufficient, the Research Bureau Administrator will notify the IHE of the deficiency within fifteen (15) days of receipt of the billing, and payment will not be made until the deficiency has been corrected. Quarterly billing statements are due no later than sixty (60) days after the last day of the state fiscal quarter. The final billing will be due no later than ninety (90) days after the contract expiration date.

In the event that the IHE chooses to report labor costs on a percentage distribution basis as outlined in 2 CFR 220, quarterly billing statements shall be accompanied by a certified statement from the Principal Investigator or Responsible Official that labor costs charged therein accurately reflect the percentage of time for which work was performed during the given billing period. This *Level of Effort* (LOE) certification is to be submitted on university letterhead, affixed with the original signature of the Principal Investigator or Responsible Official. Example wording for this certification is as follows:

“This is to certify that labor costs charged on the attached invoice (INSERT invoice number) for Contract Number COXXXX, (INSERT CONTRACT NUMBER), research project number (INSERT RESEARCH PROJECT NUMBER) totaling \$XXXX.XX (INSERT TOTAL SALARY AMOUNT) accurately reflects the percentage of time expended on the project by the Contractor employees during this billing period.”

Federal Requirements

Research sponsored in part or in whole by federal funds will be subject to applicable federal requirements. Governing regulations include, but are not limited to

- 2 CFR 220 *“Cost Principles for Institutions of Higher Education”*
- 49 CFR 18 *“Uniform Administrative Requirements for Grants and Cooperative Agreements with States and Local Governments”*
- 49 CFR 19 *“Uniform Administrative Requirements for Grants and Agreements with Institutions of Higher Education, Hospitals and Non-Profit Organizations”*
- OMB Circular A-133 *“Audits of State, Local Governments and Non-Profit Organizations”*

Facilities and Administrative Costs

On federally participating research projects, Facilities and Administrative (F&A) rates will be administered in accordance with applicable federal regulations. Depending upon the nature of the contractual relationship between the state and the IHE, the IHE may serve as a *vendor* or as a *subrecipient*.

- The IHE is considered a vendor when the nature of the research is performing work in accordance with specific objectives determined by NMDOT. The default F&A rate for vendor-type contracts has been established by NMDOT as 20%.
- A federal subrecipient relationship is one where a thing of value is transferred to a subrecipient by means of a legal instrument to carry out a public purpose authorized by law, instead of acquiring property or services. For subrecipient-type contracts, the F&A rates negotiated between the IHE and its federal cognizant agency will apply. The IHE will provide NMDOT with certification of current federally negotiated F&A rates during negotiation proceedings for subrecipient-type contracts. If current F&A rates have not been negotiated between the IHE and its federal cognizant agency, a provisional rate will be established in accordance with 2 CFR 220.

It is anticipated that the majority of research contracts between the state and the IHE will be of the vendor variety; however the nature of the contractual relationship will be determined on a case-by-case basis.

Adherence to Research Objectives and Budget Estimates

The proposal submitted by the institution and approved by the Selection Committee becomes the binding scope of work in the contract with NMDOT. It is not the intent of the NMDOT Research Program, however, to limit the Principal Investigator's flexibility in conducting research that is consistent with the general scheme of the proposal. Therefore, the Principal Investigator and the Research Bureau are expected to manage the expenditure of approved funds in a manner consistent with the overall objectives without necessarily adhering to the estimate for each category of costs in the original budget. Modifications to budget line items, where appropriate and as approved by the Department, will be effected through an administrative *Budget Modification Letter*. However, the approved total funds may not be exceeded, and anticipated major changes in the original estimate must be discussed in advance with the Research Bureau. The Research Bureau must be notified when promising new leads or unproductive lines of inquiry are discovered, especially if they might lead to significant deviations from the objectives of the original research.

The IHE must notify the Research Bureau immediately upon discovery of conditions that require reallocation of budget within cost categories, and provide adequate justification. When the total amount to be reallocated is less than the greater of 10% of the contract amount or \$1000, the Research Bureau will prepare a *Budget Modification Letter* to be approved and signed by the Research Bureau Chief. When the total amount to be reallocated is more than the greater of 10% of the contract amount or \$1000, the Research Bureau will prepare a *Budget Modification Letter*

to be approved and signed by the Department's Programs and Infrastructure Divisions Director or designee.

Advance Approvals

The following expenditures will require prior written approval even though they may be included in a proposal:

1. Equipment.
2. Travel to scientific or technical meetings.
3. Subcontracts.

The Principal Investigator shall notify the Project Manager in writing of plans to attend scientific or technical meetings no later than the end of the state fiscal quarter preceding the meeting, and shall obtain written authorization from the Research Bureau Chief. If travel is approved, reimbursement will be made on a pro-rated basis for those portions of the meeting that are directly relevant to the project from which funding is requested.

Equipment purchased through research contracts must be project related, and purchases must be authorized in advance by the Research Bureau Chief. At the sole discretion of the Department, ownership of equipment purchased through research contracts may be transferred to the Department at the conclusion of the project. Detailed receipts for authorized equipment purchases and travel expenses must be provided before these costs will be reimbursed.

Subcontracting

Written approval is required in advance for subcontracts even though provision for such may be made in the proposal. If not provided in the proposal, an itemized budget and justification for the proposed subcontractor are required when submitting the subcontract for approval.

Final Reports

Eight (8) preliminary draft copies of the final report are due in the Research Bureau no later than thirty (30) days prior to the expiration of the contract for review by the Technical Panel and Research Bureau staff, with comments transmitted to the P.I. no later than fifteen (15) days prior to contract expiration. The P.I. will then transmit eight (8) printed and bound copies of the final report, completed in conformance with requirements outlined in the Research Bureau *Style Manual* (see Attachment I) no later than the contract expiration date. These copies shall be accompanied by an electronic version of the document transmitted on CD.

Final acceptance of reports is based on the following criteria:

1. Fulfillment of objectives as set forth in the contract.
2. Adequacy of documentation.
3. Clarity of presentation.

Based on the acceptance review, a decision is made concerning publication of the report over the Research Bureau website. Such publication will be made at the sole discretion of NMDOT.

Multimedia Presentations

In addition to the final report, a web-ready multimedia presentation of the project is required. The Technical Panel, Research Bureau staff and the P.I. will discuss the requirements and details of the presentation prior to completion by the P.I. This presentation may include drawings, photographs, video and other media which sufficiently describes the details of the project, and shall be crafted to appeal to a broad audience with varying degrees of education and knowledge in the subject area. A draft of this presentation will be due thirty (30) days prior to the contract expiration date, and the final product shall be submitted along with the final report. This presentation is expected to be in Microsoft Powerpoint© file format.

Implementation Plans

Each research project will require an Implementation Plan as a separate deliverable. This plan will serve as a guidebook by Department personnel to implement the research findings and recommendations. The P.I. will discuss requirements for an Implementation Plan with the Technical Panel during conduct of research, and a preliminary Implementation Plan will be due thirty (30) days prior to contract expiration. The final Implementation Plan shall be submitted along with the final report and multimedia presentation.

Copyrights

All data, written materials, computerized software including programs, databases and spreadsheets, and other information prepared as required under NMDOT Research Program contracts, and the copyrights therein, shall be owned by NMDOT unless otherwise agreed between the parties. All copyrightable materials obtained through Research Bureau contracts will be subject to editorial revision and publication at the sole discretion of the Department.

Disposition of Equipment

Disposition of equipment acquired with project funds will be determined by NMDOT. The IHE may be given the opportunity to retain the equipment after completion of the project. Equipment purchased under Research Bureau contracts must be project-specific, and prior approval from the Research Bureau will be required. In the event that equipment vests with the IHE after the conclusion of the contract, recordkeeping requirements in accordance with applicable federal regulations will apply.

Data Rights

NMDOT reserves the right to duplicate, use, and disclose in any manner and for any purpose all data, whether delivered to NMDOT or not, under the contract and to authorize others to do so.

IV. Instructions for Preparing and Submitting Proposals

General

Proposals for specific research projects are accepted only in response to a formal *Invitation to Propose* issued by the Research Bureau. At the present time, the NMDOT Research Program is one of applied research, and funds will not be directed toward unsolicited proposals, regardless of merit. Projects approved by the Research Oversight Committee are structured to seek remedies for pressing problems that exist statewide, and proposals are accepted only from institutions already having a demonstrated capability and experience in the subject area. Further, this capability is a prerequisite for performing contract research – capability cannot be developed at project expense.

Proposals must include all of the elements of essential content in the order described herein. Proposals not meeting these explicit requirements, and proposals that exceed the posted *Not to Exceed* amount will be considered non-responsive and will be subject to disposal in accordance with Department policy. Proposers are urged to follow these requirements explicitly in order to avoid possible reduction of points or rejection of the proposal.

Proposals become the property of NMDOT; they are treated as privileged documents, and will be subject to disposal in accordance with Department policy following review by the Selection Committee.

Deadlines

The deadline for receiving proposals as shown in each *Invitation to Propose* is rigid, and extensions will not be granted. Proposers may withdraw their proposals at any time. For consideration, proposals must be received in the offices of the Research Bureau by the deadline shown in the *Invitation to Propose*. Proposals received after the posted deadline will be considered non-responsive and will be subject to disposal in accordance with Department policy.

Transmittal

Proposal documents must be transmitted in a single bound volume which contains all relevant information. A transmittal letter is not required, however if an institution chooses to include a transmittal letter, it is cautioned to avoid including vital proposal information, as this information will not be forwarded to the Selection Committee. Brochures, pamphlets and other descriptive materials pertaining to the institution may be included as an appendix. CD ROMs, flash drives, computer diskettes, videotapes and DVDs will be accepted only if specifically called for in the ITP.

Acknowledgement

Acknowledgement of receipt of proposals will be made if requested and if a stamped, self addressed postcard is included by the sender in the proposal package. The Research Bureau will notify institutions whose proposals have been rejected for consideration as soon as possible, conveying the reason(s) for the rejection.

Presentation

Proposers are advised to be concise in their single volume presentation. Extraneous, irrelevant material will detract from the quality of the presentation. Proposers are urged to use both sides of the page and use the lightest bond weight allowing such practice. Page margins should be ½ to 1 inch, and all pages shall be numbered; use 10, 11 or 12 point font.

Organization

All proposal information shall be presented in eight (8) copies of a single-bound volume that has been checked sufficiently to ensure completeness and accuracy of detail. The following information, in the order shown below, is necessary for a proposal to be considered responsive:

1. Cover
2. Summary Page
3. Table of Contents
4. Scope of Work (including implementation)
5. Qualifications of the Research Team
6. Accomplishments of the Research Team
7. Other Commitments of the Research Team
8. Equipment and Facilities
9. Time Requirements
10. Itemized Budget
11. Cooperative Agreements (if appropriate)
12. Appendices (if appropriate)

Items 4 through 12 should be separated with tabbed or color-coded dividers to facilitate quick location of information by Selection Committee members.

Details of Essential Content

1. *Cover* – The cover of the proposal shall be either paper or cardstock and shall be light-colored, non-glossy material capable of accepting rubber stamp ink without smearing. The cover shall contain the NMDOT Research Project Number, the project title, the name of the submitting institution, the date, and a “Limited Use Document” clause; copies shall be numbered sequentially from one to eight in the upper right-hand corner.

2. *Summary Page* – The summary page shall immediately follow the cover and shall include the information shown in Attachment E.
3. *Table of Contents* – Self-explanatory.
4. *Scope of Work* – The scope of work shall adequately detail the proposed conduct of research, including the submission of a final report. The plan should describe in a specific and straightforward manner the proposed approach to the solution of the problem described in the problem statement. Methodology shall be described in sufficient detail to permit evaluation by the Selection Committee of the probability of success in achieving project objectives. The scope of work shall be subdivided into the following sections: a) Introduction; b) Research Approach; c) Anticipated research results, including a discussion of implementation.
5. *Qualifications of the Research Team* – Name, address, telephone number and pertinent background information must be provided for the P.I. bearing primary responsibility for the research. The same information must be provided for other research team members who participate to a significant degree in the project. The proposal must describe how the research team members' academic, research, or industrial experiences relate to the project.
6. *Accomplishments of the Research Team* – Proposals shall contain a summary of the past accomplishments of the research team in similar projects. When prior projects are listed, the proposal shall include the name and contact information of the reference. Project Technical Panel members will contact references as necessary. Proposers are cautioned that failure to provide adequate documentation of accomplishments, including contact information for prior projects, may result in a significant reduction of the overall proposal score.
7. *Other Commitments of the Research Team* – Proposals shall contain a summary listing of current organizational and personal commitments to other work in sufficient detail to indicate that all individuals participating in the research will be able to meet the commitments of the proposal. Staff-hour commitments and percentage of time committed to other work for each member of the proposed research team shall be specified. See Attachment F for an example of a Time Commitment Summary. This summary sheet is required for each member of the research team for proposals to be considered responsive.
8. *Equipment and Facilities* – This section shall include a description of the facilities available to carry out the research and an itemization of available equipment necessary to complete the research. Any equipment or facilities which are required to complete the research but which are not readily available should be noted.
9. *Time Requirements* – The time required to complete the project shall be specified. Non-conformance with the time frame specified in the project statement will not be grounds for rejection; however the proposer must justify any significant differences. A schedule shall be included that shows each individual phase or task and the duration of the phase

or task, including start and end times. The timetable should clearly define the points of time where reports and deliverables are due.

10. *Itemized budget* – The estimated cost for the project should be based on the proposed performance period. The budget shall reflect task or phase costs. Proposals with budgets exceeding the amount shown on the ITP will be rejected. Budgets shall be itemized according to the following representative cost categories as appropriate:

- a. Salaries and Wages
- b. Fringe Benefits
- c. Consultants
- d. Subcontracts
- e. Equipment
- f. Materials and Services
- g. Communications and Shipping
- h. Travel
- i. Facilities and Administration

These cost categories are illustrative, and may vary between institutions. Budget attachments should include a comprehensive listing of common IHE budget items regardless of whether these are used on a particular project. If an unexpected expenditure is required, budget may be adjusted within available funding in accordance with budget modification provisions as provided herein. Addition of budget items not included in the original budget attachment will require a formal contract amendment.

The provisions of 2 CFR 220 should be consulted in consideration of allowable direct and indirect costs. All fiscal, budget and other pertinent data must be bound with the single-volume proposal.

11. *Cooperative Features* – If assistance in the form of personnel, data, or equipment is required from other public or private agencies, a description of the plan for obtaining this assistance will be required. Such cooperative features may include paid subcontractors, unpaid volunteers, donations or loans of equipment or data, and agreements to provide access to roads, bridges and other facilities. A letter of intent from agencies or individuals should be included in the proposal. Failure to disclose necessary assistance or lack of resources to complete project objectives will be grounds for summary disqualification of the proposal, even after the proposal has been selected.

12. *Appendices* - Appendices may include such items as statements concerning previous work on this problem or related problems, abstracts of related projects, a bibliography or list of references, or descriptive brochures or materials describing the institution's organization and capabilities in general terms. Any pertinent material not specifically mentioned previously may be included as an appendix.

Intellectual Property

Institutions of Higher Education are cautioned that submittal of research ideas or project proposals does not constitute presumptive grounds for intellectual property rights protection. Specifically, identification of a potential topic of research or submission of an idea for a research project, whether solicited or unsolicited, does not, by itself, convey intellectual property rights protection.

Project proposals received in response to Invitations to Propose are considered privileged documents and will not be disseminated beyond the Selection Committee prior to selection of the winning proposal. However, it is expected that the selected proposal will constitute the binding scope of work from which the contract will be developed, and no inference to intellectual property rights to information contained in project proposals should be made.

If an Institution of Higher Education has questions or concerns regarding intellectual property rights considerations, these should be discussed with the Research Bureau Chief as early as possible.

Attachment A NMDOT Research Categories

- *Administration & Finance*- Improvements in policy and information transfer
- *Construction*- Improvements in construction methodology
- *Design*- Highway, structure, and intermodal system design
- *Environment*- Environmental impacts of transportation activities
- *Maintenance*- Transportation maintenance activities
- *Materials*- Improvements in construction materials
- *Multimodal*- Modal connectivity and operations
- *Planning*-Forecasting, modeling, and inter-agency collaboration
- *Safety*- Improvements to transportation safety and security
- *Structures* - Bridge design, construction and maintenance

-
- *Special Projects*-All other areas of research
 - *Technology Transfer* – Acquisition of promising new technologies

Attachment B Sample Research Interest Form

New Mexico Department of Transportation
Research Bureau

Research Interest Form

Name of University _____
 Organizational Unit* _____
 Address _____

 Contact Person _____
 Phone No./Email _____

* If more than one organizational unit is responding, a separate form for each will be required.

In the table below, designate your area(s) of interest

√	Research Area	Description
	Administrative	Improvements in policy and information transfer
	Construction	Improvements in construction methodology
	Design	Highway and intermodal system operation
	Environmental	Environmental impacts of transportation activities
	Maintenance	Transportation maintenance activities
	Materials Science	Improvements in construction materials
	Multimodal	Modal connectivity and operations
	Planning	Forecasting, modeling, and inter-agency collaboration
	Safety	Improvements to transportation safety
	Structures	Bridge design, construction and maintenance

** Signature Date

**Signature of this form indicates an interest by the university consultant to receive invitations to respond to requests for proposals for research projects identified by NMDOT in the indicated subject area(s). Invitations to submit proposals will be provided only to those respondents which have indicated an interest in performing research in the subject area(s) identified on this form. Only respondents with this form on file will be invited to submit proposals for NMDOT research projects.

Note: This form is active for one state fiscal year and must be resubmitted annually.

Attachment C Example *Invitation to Propose*

NEW MEXICO DEPARTMENT OF TRANSPORTATION

RESEARCH BUREAU

Innovation in Transportation

INVITATION TO PROPOSE

**Development of Watercourse
Aggradation/Degradation
Risk Index for New Mexico**

**Project Number:
NM10DSN-02**

New Mexico Department of Transportation
Research Bureau
7500B Pan American Freeway NE
Albuquerque, NM 87109

APRIL 1, 2009



**New Mexico Department of Transportation
Transportation Research Bureau**

Invitation to Propose

**Development of Watercourse Aggradation/Degradation
Risk Index for New Mexico
(NM10DSN-02)**

The Research Bureau of the New Mexico Department of Transportation is seeking a qualified Principal Investigator (PI) to provide research services to develop a stream aggradation/degradation risk index and GIS map for New Mexico. The primary focus of the project will be to create a field-verified aggradation/degradation risk index that will be used by NMDOT engineers in the design of drainage structures that cross waterways within the state's 83 USGS Hydrologic Units.

The PI will determine the primary factors contributing to aggradation and degradation and develop a Risk Index (RI) based on these factors. Factors may include, but are not limited to, geology, topography, and area of the watershed; magnitude, intensity, duration, distribution, and season of precipitation; vegetation cover and land use; surface erosion; hydraulic properties of the stream channel; and size and gradation of sediment.

Historically, NMDOT engineers have used a bulking factor to add capacity above the greatest anticipated flow (in cubic feet per second) through a structure. The origins of the bulking factor are uncertain and there is no evidence that it is based on scientific data or principles.

The goal of the research is to create an index and a map, which drainage engineers can use to define the type and size of drainage structures more accurately, without over- or under-designing structures. By designing appropriately sized structures, the NMDOT will save funding in the long term by avoiding cost of overdesigning and overbuilding and by minimizing expenditure of emergency funds when structures fail.

Interested parties are invited to submit proposals in response to this *Invitation to Propose*.

To be considered for evaluation, proposals must conform to the requirements of the most recent edition of the "*Information and Instructions for Preparing Proposals in the NMDOT Transportation Research Program*" manual ("Manual"). This document is incorporated by reference into Research Bureau professional services agreements and is contractually binding. Copies of this manual are available from the NMDOT Research Bureau upon request and at the Bureau's website: http://nmshtd.state.nm.us/upload/images/Research/Information_and_Instructions_07_12_07.pdf.

Proposals must be received in the offices of the NMDOT Research Bureau no later than 2:00 pm on May 15, 2009.

Respondents are advised that proposals not in conformance with submission requirements, proposals with a cost estimate in excess of the posted *Not to Exceed* amount, and proposals received after the deadline will be considered non-responsive.

Project Title: **Development of Watercourse Aggradation/Degradation Risk Index for New Mexico**

Project No.: **NM10DSN-02**

Available Funds: Not to exceed \$150,000

Estimated Project Duration: 24 Months from Contract Execution Date

BACKGROUND:

Alluvial streams and rivers are dynamic; they continually change shape, position, and dimension. Sediment transport and stream aggradation/degradation are natural processes. These processes may become problematic when a perennial or ephemeral waterway is constricted by a drainage structure such as a bridge or culvert. During the high rainfall months (aka monsoon season), flash floods may occur. These events can spawn massive amounts of sediment transport. Moreover, in some regions of New Mexico sandy soil of alluvial fans contributes heavily to sediment transport and stream aggradation after flash floods. Drainage engineers need to include a scientifically based risk of aggradation/degradation in their drainage design calculations.

RESEARCH QUESTIONS:

- 1. Will development of an Aggradation/Degradation Risk Index, based on qualitative and quantitative analyses of pertinent factors for a given watercourse within a given watershed, as a replacement guide for the current “bulking factor” drainage structure design practice provide a uniformly rational (scientific) basis of application to the design process?*
- 2. What factors and at what weight (or importance) must be included in this Index?*
- 3. How can NMDOT engineers apply the Index in the design of drainage structures?*

OBJECTIVES:

1. Develop a statewide Aggradation/Degradation Risk Index that designers can use to quantitatively and qualitatively estimate the risk of streambed changes at existing and proposed drainage structures.
2. Verify the Index through field testing at six sites representative of the range of risk.
3. Create a GIS map of New Mexico that assigns a Risk Index Factor to, as examples, either NRCS soil shape files, USGS HUC (Hydrologic Unit Code) basins or other units.

PRODUCT OR SERVICE TO BE DELIVERED:

- A. Aggradation/Degradation Risk Index
- B. Statewide Aggradation/Degradation Risk GIS Map (paper and electronic formats)

- C. Quarterly Reports which are to be reviewed by the NMDOT's Drainage Bureau.
- D. Final Report which are to be reviewed by the NMDOT's Drainage Bureau.
- E. Implementation Plan
- F. Multimedia Report: As a separate deliverable, the Contractor shall provide a web-ready multimedia report to include photographs, illustrations, graphs, maps and other visual aids as appropriate, detailing the work performed during this research project, as agreed between the parties. This report shall be of sufficient quality and detail so as to adequately convey project information to the general public.

TASKS:

The following are suggested tasks. The Contractor may adapt these tasks as necessary to meet stated objectives and provide the deliverables listed above.

Task-1. Develop a methodology to answer the research questions.

Task-2. Identify the major factors that lead to stream aggradation or degradation in New Mexico.

Task-3. Synthesize data and maps from existing sources.

Task-4. Develop an aggradation/degradation risk index and refine methodology based on field verification of six sites that are representative of a broad range of aggradation and/or degradation.

Task-5. Develop a Statewide GIS map of Aggradation/Degradation Risk Index.

Task-6. Develop a User Manual for the Index and Map so Drainage Design Engineers can apply the information to the design process.

Task-7. Develop an implementation plan, with budget, that adequately details the steps necessary for implementation of the research results.

Task-8. Complete quarterly, final, and multimedia reports.

Task-9. Conduct a two-hour training session for the NMDOT Drainage Design Bureau that demonstrates the use of the Index and Map in drainage design.

DELIVERABLES:

- A. *Detailed methodology for development of the Aggradation/Degradation Risk Index.*
- B. *Aggradation/Degradation Risk Index.* The Index will be delivered on compact disc as an EXCEL spreadsheet with weighted formulas for each factor that contributes to aggradation and

degradation. A *User Guide* will be provided in Microsoft Word format. Data from six sites included in the research project will be included as examples of how to use the index in drainage design.

- C. *Aggradation/Degradation Risk Map*. The state map shall be presented in electronic ArcGIS shape file and jpeg formats and hard copy. An accompanying electronic Microsoft Word file and hard copy document will explain how to read the map and use it in drainage design.
- D. *Final Report*. The final report shall adequately document the activities performed during this project in sufficient detail to justify findings and recommendations. The report shall be in conformance with the provisions of the “Information and Instructions for Preparing Proposals in the NMDOT Transportation Research Program” manual (rev. July 2007).
- E. *Implementation Plan*. The implementation plan shall include a detailed description of the steps necessary to effectively and efficiently deploy the recommended mitigation methods with minimal delay. The implementation plan shall provide recommendations for evaluating the effectiveness of the selected aggradation mitigation methods.
- F. *Multimedia Report*. The Contractor shall provide a multimedia report to include photographs, illustrations, graphs and other visual aids as appropriate, detailing the work performed during this research project, as agreed between the parties. This report shall be of sufficient quality and detail so as to adequately convey project information to the general public.

EVALUATION FACTORS

The Selection Committee will rate proposals using the following evaluation criteria:

1. *Specialized Research and Technical Competence* – This criterion includes an evaluation of the unique abilities and competencies of the research team as they relate to the research problem. Consideration is given to the qualifications and accomplishments, as well as other commitments, of the research team. (100 points).
2. *Technical and Financial Resources* – This criterion relates to the organizational capacity of the institution, including availability of equipment and other resources. (100 points).
3. *Quality and Content* – Proposals will be rated on factors relating to presentation, including conformance with style requirements, organization, clarity and quality of the research plan. (125 points).
4. *Current Work Penalty* – A reduction in points will be assessed commensurate with the amount of NMDOT contract research work currently performed by the institution.
5. *Past Performance* – The history of performance on past projects by members of the research team will be evaluated. In the event that no history on NMDOT research projects is available, the Selection Committee may choose to evaluate performance on projects conducted elsewhere. (100 points).

NMDOT

Project Number

< insert appropriate project number, e.g. NM08MNT-01 >

Project Title

< as shown on ITP >

< DATE >

LIMITED USE DOCUMENT

This proposal is for use by the New Mexico Department of Transportation in selection of an institution to perform work under the NMDOT Research Program. Following selection, this document is to be returned to the NMDOT Research Bureau. This proposal is regarded as fully privileged, and its contents may not be disseminated.

< NAME OF INSTITUTION >

Attachment E Example Proposal Summary Page

Summary Page

< NMDOT Project Number - as listed on ITP >

< NMDOT Project Title - as listed on ITP >

Proposing Institution: < Insert name of institution, address and telephone no. >

Person Submitting Proposal: < Name and title >

Proposal Written By: < Name and Title >

Proposal Date: < Date >

Principal Investigator: < Name and title, telephone no., e-mail address >

Administrative Officer: < Name and title, telephone no., e-mail address >

Proposed Contract Period: < Months >

Total Contract Amount: < \$\$ >

Facilities and Administration Rate: < % >

Attachment F Example Time Commitment Summary Page

Name: _____				
Role in Project: _____				
Semester	Percent Time Teaching	Percent Time Other Research, Commitments, & Leave	Percent Time Available for This Project	Total Time (All rows must add up to 100%.)
Fall 2009				100%
Spring 2010				100%
Summer 2010				100%
Fall 2010				100%
Spring 2011				100%
Summer 2011				100%

Name: _____				
Role in Project: _____				
Semester	Percent Time Teaching	Percent Time Other Research, Commitments, & Leave	Percent Time Available for This Project	Total Time (All rows must add up to 100%.)
Fall 2009				100%
Spring 2010				100%
Summer 2010				100%
Fall 2010				100%
Spring 2011				100%
Summer 2011				100%

Attachment G Example Contract Budget

ATTACHMENT "B" - Budget and Salaries

SALARIESFRINGE BENEFITS		
611XXX	- Faculty	
	Regular	\$0.00
	Temporary/9 mo Summer	\$14,488.00
	Federal	
	Sub-total Faculty	\$14,488.00
*613XXX	- Non-Exempt Administrative Support	
	Regular	\$0.00
	Temporary	\$0.00
	Federal	
	Sub-total Non-Exempt Admin Support	\$0.00
614XXX	- Exempt/Technical	
	Regular	\$0.00
	Temporary	
	Federal	
	Sub-total Exempt	\$0.00
616XXX	- Technical	
	Regular	\$0.00
	Temporary	
	Federal	
	Sub-total Technical	\$0.00
*619200	- Overtime	\$0.00
*619300	- Supplemental Compensation	\$0.00
618XXX	- Undergraduate Students	\$0.00
618600	- Graduate Students	\$20,760.00
	Sub-total Salaries	\$35,248.00
620XXX	-Fringe Benefits	
30.0%	Regular	\$0.00
16.0%	Non-Regular	\$2,318.08
29.0%	Federal	\$0.00
2.6%	Graduate Students	\$539.76
0.5%	Under-graduate Students	\$0.00
	Sub-total Fringe Benefits	\$2,857.84
Subtotal Salaries and Fringe Benefits		\$38,106.00
TRAVEL		
722XXX	- In-State travel	\$2,000.00
723XXX	- Out-of-State travel	\$0.00
724XXX	- Foreign	\$0.00
Subtotal Travel		\$2,000.00
SUPPLIES		
73XXXX	- Non-Capitalized Supplies/Equipment	\$0.00
* 731XXX	- Office Supplies	\$1,200.00
732XXX	- Non-Office Supplies	\$100.00
* 733XXX	- Print/Photo Supplies	\$0.00
* 734XXX	- Medical Supplies	
735XXX	- Athletic Supplies	
736XXX	- Feed/Seed/Fertilizer	
* 737XXX	- Food Products/Business meals	
739XXX	- Publications/Films	\$0.00
*739200	- Periodicals	\$0.00
740XXX	- Non-Capitalized Equipment (Special Purpose Equipment)	\$0.00

741XXX	- Livestock/Poultry	
744XXX	- Repair/Maintenance Parts (Special Purpose Equipment)	\$0.00
Subtotal Supplies		\$1,300.00
SERVICES		
* 7502XX	- Postage	\$0.00
* 7501XX-6XX	- Communications (Telephone, Internet/Alarm, fax, data/wireless)	\$100.00
* 7507XX	- Advertising	
* 7508XX	- Publicity/Public Relations	
* 751XXX	- Insurance	
752XXX	- Printing/Reproduction Services	\$100.00
753XXX	- Rental	\$0.00
754XXX	- Repair/Maintenance Service Special Purpose Equipment	\$0.00
* 755XXX	- Utilities	
756XXX	- Use Fees (animals)	
757XXX	- Financial Aid	
7585XX	- PPD Services (Scientific & Technical Equipment)	\$0.00
* 7585XX	- PPD Services (Non-Scientific & Non-Technical Equipment)	\$0.00
* 760XXX	- Dues, Fees, Taxes	\$0.00
761XXX	- Professional Services	\$0.00
* 7615XX	- Lectures/Honorarium	
763XXX	- Farm and Ranch Services	
765XXX	- Freight/Moving Expenses	\$100.00
766XXX	- Computer/Software Services (Special Purpose Equipment)	\$0.00
768XXX	- Non-Employee Travel	\$0.00
768900/68910	- Trainee Allowance	\$0.00
Subtotal Services		\$300.00
EQUIPMENT		
*78XXXX	- Special Purpose Capitalized Equipment	\$232,953.00
Subtotal Equipment		\$232,953.00
SUBCONTRACTS		
792100	- Subcontracts (less than or equal to \$25,000)	\$0.00
792200	- Subcontracts (greater than \$25,000)	\$0.00
792300	- PSL Awards (May be subject to F&A)	\$0.00
Subtotal Subcontracts		\$0.00
Sub-total Direct Costs		\$274,659.00
Sub-total Direct Costs Applicable to IDC Charges		\$41,706.00
798XXX	- F&A recovery (on applicable object codes only)	\$8,341.20
20.0%	- Applicable F&A rate Determined By Historic NMDOT	
TOTAL		\$283,000.20

Attachment H Example Contract Milestone Chart

Task	Milestone	1 st Quarter			2 nd Quarter			3 rd Quarter			4 th Quarter			1 st Quarter			
		NTP*	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Task 1	Task 1a	X	X	X	X												
	Task 1b		X	X	X	X	X										
	Task 1c				X	X	X	X									
	Task 1d					X	X	X									
	Task 1e					X	X										
Task 2	Task 2a				X	X	X	X	X								
Task 3	Task 3a							X	X	X	X	X	X				
Task 4	Task 4a							X	X	X	X	X	X				
	Task 4b									X	X	X	X	X			
	Task 4c						X	X	X	X	X	X	X	X	X		
Deliverables	Quarterly reports			X			X			X			X				
	Report (1)						X										
	Report (2)						X										
	Report (3)																X
	Report (4)																X
	Report (5)																X

• NTP: Notice to Proceed

STYLE MANUAL

For use in preparing NMDOT Research Bureau Reports

New Mexico Department of Transportation

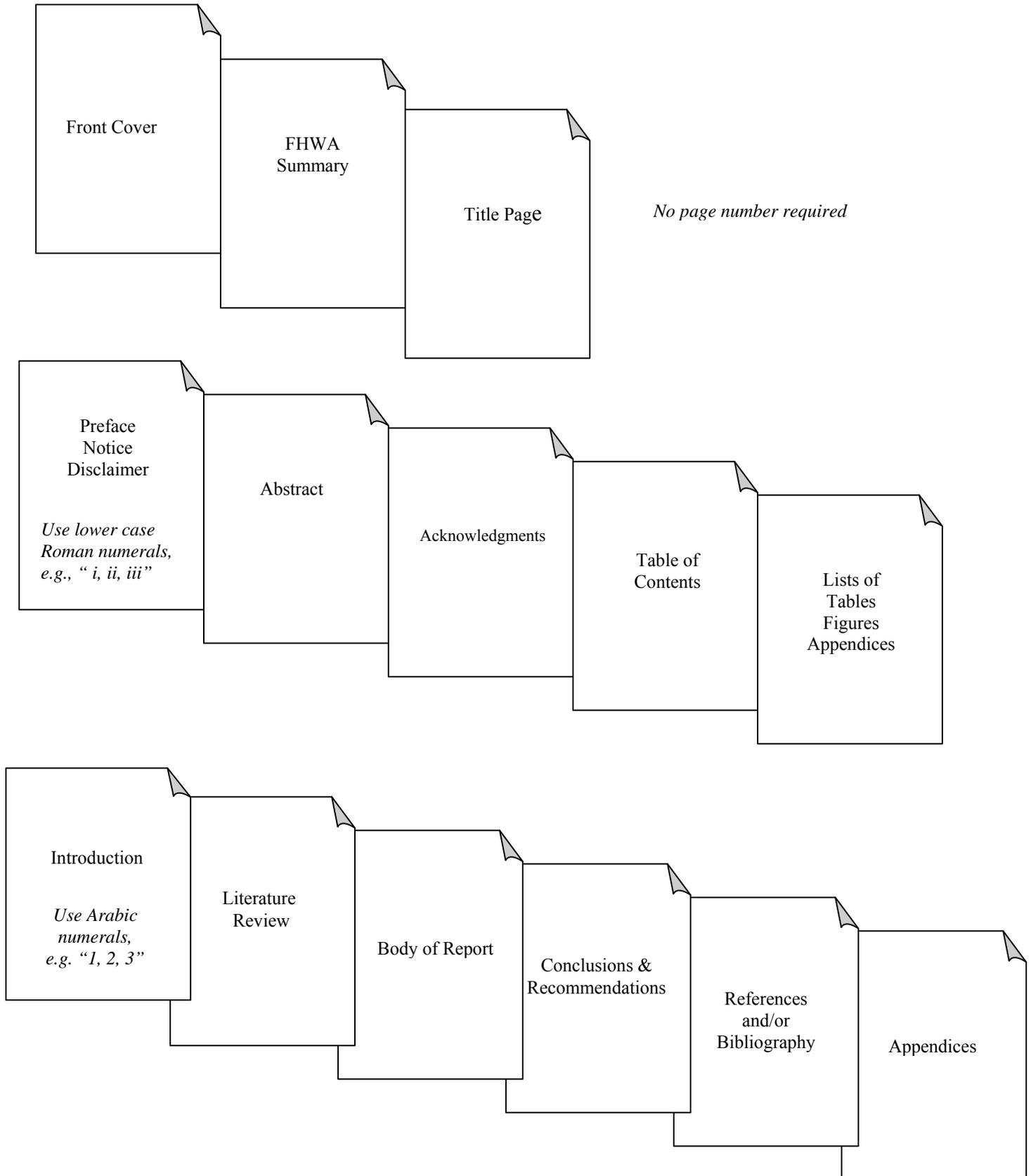


INTRODUCTION

The New Mexico Department of Transportation Research Bureau recognizes that our customers expect a high quality of research reporting. In order to assist principal investigators in preparing a clear and easy to read manuscript, the Bureau has published a Style Manual to be used by in-house researchers and contractors.

Over time publishing rules change, for example, since the advent of computers and word processing it is no longer required to insert two spaces between a period at the end of a sentence and the capital letter of the beginning of a sentence when using monospace fonts (in which all the characters have exactly the same width: e.g., courier). With the advent of computers most fonts are proportional: e.g., Times New Roman, and two spaces may be used if it improves the visual break. Therefore, in addition to the Style Manual, authors should use supplemental detailed guidelines regarding grammar, usage and formatting: e.g., William Sabin, Gregg Reference Manual, *McGraw Hill Irwin*, Tenth Edition, 2005.

ANATOMY OF A RESEARCH REPORT



MANUSCRIPTS

MANUSCRIPT SPECIFICATIONS

Manuscript Page Setup

- **Margins:** 1 inch border for each margin.
- **Word Processor:** Word 6.0 or higher. Times New Roman 12 point for body text.
- **Numbering:** Insert page numbers at lower center of each page. Set a “next page” section break after List of Appendices. At each section break remove “Link to Previous” in headers and footers to ensure correct numbering format. See “Anatomy of a Research Report” for numbering system.
- **Printing:** Single-sided for manuscripts.

MAIN HEADINGS

14 point, bold

Do not indent first line after a main heading.

Subheads: All subheads should be flush with the left margin.

FIRST-LEVEL SUBHEAD

(all capitals, boldface, on separate line)

Second-Level Subhead

(initial capitals, boldface, on separate line)

Third-Level Subhead

(initial capitals, italic, on separate line)

Fourth-Level Subhead (initial capitals, boldface, on the same line as text, with extra letter space between the subhead and text)

Fifth-Level Subhead (initial capitals, italic, on the same line as text, with extra letter space between subhead and text)

TABLE 5 Effects of All Factors.

(Insert title above the table: “TABLE” is all capitals, title is initial capitals; all type is boldface, extra space but no punctuation after number; punctuate at the end of title)

FIGURE 3 Example of Results.

(Insert caption below the figure; “FIGURE” is all capitals; title is initial capitals; all type is boldface; extra space but no punctuation after number, period at end of caption.)

Formatting Paragraphs

Single space. Do not use an extra line space between paragraphs.

Use single spacing in “**References**” with a double space between each citation.

Where a short word such as “the” or “a” occur at the end of a line but **is** the first word of a new sentence, perform a carriage return so that the sentence begins on the next line.

Justify text so that it aligns with both left and right margins.

Widows and Orphans

Widows and orphans are those words or short phrases at the end or beginning of paragraphs left to sit alone at the top or bottom of a page — separated from the rest of the paragraph. A widow is a line of text or one word at the top of a page. An orphan is a line of text or a word at the bottom of a page.

Use a minimum of two lines of text at the top and bottom of a page.

At the end of a paragraph use at least two words on the last line of the paragraph.

Tables and Figures

Figures/tables should be embedded in the text, as close as possible to the related text. Color is permissible, although authors should make sure that color tables and figures translate into black-and-white (grayscale), or make the necessary adjustments to present the tables and figures in black-and-white.

- All tabular material should be single spaced using a font no smaller than 10 points. Use the same font for all tables.
- Place titles flush left to align with the left margin of the table and highlight by using boldface. Do not submit a table with more than one part. Each part should be a single separate table with an appropriate table number and title.
- Give each column in the table a head. (In some cases, the first (stub) column may have no head). Place abbreviated measurement terms in parenthesis under the column head. All heads should be aligned in flush left format.
- To adhere to Accessibility Guidelines for the vision-impaired reader, avoid the use of “spanner” heads. For example, “Production per Year” and “Production by Day” should appear as:

Production
per Year

Production
per Day

- Insert a rule that extends across the full width of the table under the column heads
- Insert a full width rule at the end of the table (and above the footnotes, if any)

TABLE 1 Percent of total land developed during study period.

<u>Development Period</u>	<u>% Total Area Developed</u>
Prior to 1986	12
1986-90	14
1990-1996	15
1996-2000	18
Total 1986-2000	59

- Use lowercase italic superscript letters for footnotes
- When a dash (-) is used in a table, indicate its meaning in a footnote (missing data, incomplete research, data not applicable or unavailable, or problem investigated but no results)
- Check the accuracy of all totals included in tables before submitting the paper
- For use of *measurements*, see section on metrication
- Do not use dots or screens
- Do not place a box or rules frame around a finished table
- Figures should be clear and legible
 - Use the same font for all figures (Times New Roman)
 - Letters and symbols must be uniform and the same size throughout the figure (e.g., if wording on the ordinate and abscissa is in 10-point type, the symbols used to identify the data points also should be in 10 point type)
 - Line weights (except for lines indicating different data series in a graph) also must be uniform.

Metrication

Authors are encouraged to provide measurements in both SI (metric) and U.S. customary units.

The measurement unit of the original research should be followed by the equivalent conversion in parenthesis.

When converting U.S. customary measures of weight (force) and mass into SI units, express weight (force) in newtons and mass in kilograms; express poundforce per square inch (lbf/in.²) of pressure or stress in kilopascals (kPa). For SI units, use prefixes instead of powers of 10.

For tables and figures, provide only the units of the original research and show the base unit conversion in a footnote: for example, 1 mi=1.61 km. Alternatively, in figures, equivalent units may be shown on the top and right axes of data plots.

Metrication Conversion Table

When You Know	Multiply by	To Find
Length		
Inches (in)	25.4	Millimeters (mm)
Feet	0.305	Meters (m)
Yards (yd)	0.914	Meters (m)
Miles (mi)	1.61	Kilometers (km)
Area		
Square inches (in ²)	645.1	Millimeters squared (mm ²)
Square feet (ft ²)	0.093	Meters squared (m ²)
Square yards (yd ²)	0.836	Meters squared (m ²)
Acres	0.405	Hectares (ha)
Square miles (mi ²)	2.59	Kilometers squared (km ²)
Volume		
Fluid ounces (1 fl oz)	29.57	Milliliters (mL)
Gallons (gal)	3.785	Liters (L)
Cubic Feet (ft ³)	0.028	Meters cubed (m ³)
Cubic Yards (yd ³)	0.765	Meters cubed (m ³)
Mass		
Ounces (oz)	28.35	Grams (g)
Pounds (lb)	0.454	Kilograms (kg)
Short tons (2,000 lb)(T)	0.907	Megagrams (Mg)
Temperature (exact)		
Fahrenheit temperature (°F)	(F-32)/1.8	Celsius temperature (°C)
Illumination		
Foot-candles (fc)	10.76	Lux (lx)
Footlambert6s (fl)	3.426	Candela/m ² (cd/m ²)
Force and Pressure or Stress		
Poundforce (lbf)	4.45	Newtons (N)
Poundforce per square inch (psi)	6.89	Kilopascals (kPa)

Equations

All variables should be defined at first use, either in the text or in a where list associated with the equation.

1. Fractions in displayed equations should be stacked, in accordance with preferred mathematical practice.
2. If a displayed equation is numbered, use an Arabic numeral in parenthesis, placed flush right.
3. Carefully distinguish the following:
 - All capital and lowercase letters
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 - English and Greek letters such as:
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 - n and eta, b and nu,
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TRB Publications

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Book

Newland, D.E. *Random Vibrations: Spectral and Wavelet Analysis*. John Wiley and Sons, Inc., New York, 1998.

CD-ROMs

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Solaimanian, M., J. Harvey, M. Tahmoressi, and V. Tandon. Test Methods to Predict Moisture Sensitivity of Hot-Mix Asphalt Pavements. In Moisture Sensitivity of Asphalt Pavements. CD-ROM. *Transportation Research Board, National Research Council*, Washington, D.C., 2004, pp. 77-110.

Periodical

Dawley, C. B., B.L. Hogenwiede, and K.O. Anderson. Mitigation of Instability Rutting of Asphalt concrete Pavements in Lethbridge, Alberta, Canada. *Journal of Association of Asphalt Paving Technologists*. Vol. 59, 1990, pp. 481-508.

Sansalone, M., J. M. Lin, and W. B. Streett. Determining the Depths of Surface-Opening Cracks Using Impact Generated Stress Waves and Time-of-Flight Techniques. *ACI Materials Journal*, Vol. 95, No. 2, 1998, pp. 168-177.

Websites

References to websites should include corporate or personal authors, title of document, date of document (if available), web addresses (complete URL), and date accessed by the author.

Value Pricing Homepage. University of Minnesota, Hubert H. Humphrey Institute of Public Affairs, Minneapolis.

www.hhh.umn.edu/centers/sip/projects/conpric/index.htm.

Accessed July 15, 2002.

Guide to Developing Performance-Related Specifications. FHWA-RD-98-155, FHWA-RD98-156, FHWA-RD-98-171, Vol. III, Appendix C.

www.tfhr.gov/pavement/pccp/pacespec/. Accessed March 5, 2003.

Nemmers, C. Transportation Asset Management. *Public Roads Magazine*, July 1997,

www.tfhr.gov/pubrds/july97/tam.htm. Accessed Jan. 2002.

Unpublished Papers

References to unpublished papers presented at meetings should include name(s) of author(s); title of paper; and title, sponsor(s), location, and dates or year of meeting.

Corbett, J.J. Toward Environmental Stewardship: Charting the Course for Marine Transportation. Presented at 83rd Annual Meeting of the Transportation Research Board, Washington, D.C., 2004.

Program Manuals, Tapes or Other Documentation for Models

References to these items should cite the specific edition, the department responsible, and the year of release.

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1. Report No. NM04STR-02		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Effect of Misting Rate on Concrete Shrinkage: Interim Report for Bridge Deck Concrete Mix Design				5. Report Data	
				6. Performing Organization Code.	
7. Author(s) Kelly Silliman and Craig Newtonson				8. Performing Organization Report No.	
9. Performing Organization Name and Address New Mexico State University Box 30001, MSC 3CE Las Cruces, NM 88003-8001				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No. CO4616	
12. Sponsoring Agency Name and Address NMDOT Research Bureau 7500B Pan American Freeway PO Box 94690 Albuquerque, NM 87199-4690				13. Type of Report and Period Covered	
				14. Sponsoring Agency Code	
15. Supplementary Notes					
16. Abstract <p>Concrete shrinkage at early ages can produce shrinkage cracks that reduce durability. The curing method used during construction can have a direct effect on shrinkage. To quantify the effect of mist rate on shrinkage, five concrete slabs were placed. Each slab was misted at a different rate for four hours, beginning at the start of concrete placement. After misting was completed, the slabs were covered with wet burlap for seven days. Strains in the concrete slabs were monitored for 28 days. Previous research on early-age shrinkage has shown that providing 100% relative humidity above the concrete can reduce shrinkage by as much as 300 $\mu\epsilon$ in the first four hours. Results in this paper show that over the course of 28 days, approximately 10-15% of the 300 $\mu\epsilon$ benefit is lost to increased shrinkage. Shrinkage between four hours and 28 days increased as the mist rate was increased. Misting produces a decrease in total shrinkage of approximately 73 percent. The magnitude of this decrease indicates that misting during construction would provide substantial benefits. Therefore, a field trial and demonstration project is recommended as future work.</p>					
17. Key Words bridge deck, concrete, fogging, misting, curing			18. Distribution Statement Available from NMDOT Research Bureau		
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EFFECT OF MISTING RATE ON CONCRETE SHRINKAGE:

Interim Report for Bridge Deck Concrete Mix Design

by

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New Mexico State University

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New Mexico State University

Report NM05STR-02

A Report on Research Sponsored by

New Mexico Department of Transportation
Research Bureau

in Cooperation with
The U.S. Department of Transportation
Federal Highway Administration

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PREFACE

The research reported herein evaluates the effect of mist rate on shrinkage strains in normal sized concrete slabs exposed to weather. The purpose of this work was to investigate the effectiveness of misting or fogging during construction as a method for mitigating shrinkage cracking.

NOTICE

The United States Government and the State of New Mexico do not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the object of this report. This information is available in alternative accessible formats. To obtain an alternative format, contact the NMDOT Research Bureau, 7500B Pan American Freeway NE, Albuquerque, NM 87109 (PO Box 94690, Albuquerque, NM 87199-4690) or by telephone (505) 841-9145.

DISCLAIMER

This report presents the results of research conducted by the author(s) and does not necessarily reflect the views of the New Mexico Department of Transportation. This report does not constitute a standard or specification.

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NEW MEXICO DEPARTMENT OF TRANSPORTATION

RESEARCH BUREAU

Innovation in Transportation

Technical Panel Handbook: Instructions for Serving on NMDOT Research Project Technical Panels

Prepared by
NMDOT Research Bureau
Albuquerque, NM

In Cooperation with the
US Department of Transportation
Federal Highway Administration

**Technical Panel
Handbook**

MARCH 2009

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I. List of Acronyms

C-RAC	Chairpersons of the Research Advisory Committees
FHWA	Federal Highway Administration
IHE	Institute of Higher Education
ITP	Invitation to Propose
NCHRP	National Cooperative Highway Research Program
PI	Principal Investigator
PM	Project Manager
PO	Process Observer
RAC	Research Advisory Committee
ROC	Research Oversight Committee
SP&R	State Planning and Research
TP	Technical Panel

II. General Information: NMDOT Research Program

Effective, organized and well-executed research often provides the means to address the increasingly complex transportation problems encountered by NMDOT. While some of these problems are resolved at the local level by district personnel and organizational sub-units, many are best addressed through a systematic program of coordinated research. This research is administered by the NMDOT Research Bureau.

The Bureau is organized under the Planning Division of Programs and Infrastructure. Funding is provided by the State and the Federal Highway Administration (FHWA).

Anyone may request research on a transportation problem or issue and requests are accepted from a variety of sources. Only those requests which have internal NMDOT Sponsors and Advocates are submitted for consideration to one of the Department's three Research Advisory Committees (RACs).

Each RAC operates under its assigned NMDOT Deputy Secretary. RAC members are selected from middle management of the NMDOT. These committees review all research requests and determine which requests meet the Department's most critical research needs. Requests that meet these criteria are then refined into Research Problem Statements, prioritized, and recommended to the Chairs of the RACs (C-RAC).

The C-RAC takes these three lists and integrates them into one prioritized list that represents the whole Department's most critical research needs. After estimating the funding needed, the C-RAC presents this list to the Research Oversight Committee (ROC), which is composed of the three Deputy Secretaries and the FHWA Research Engineer.

The ROC meets at regular intervals to evaluate the research program and to consider new problem statements which have been brought forth by the C-RAC. Approved problem statements are incorporated into the Research Bureau's Annual Work Plan for approval by FHWA. At this stage the research request becomes a research project and the Research Bureau Chief assigns a Research Bureau staff member to serve as Project Manager (PM) for the project.

The Project Manager contacts the project Advocate to set up the first meeting of the Technical Panel (TP) that will guide and direct the research. The TP refines the problem statement and determines the research objectives, tasks, deliverables, cost, and timeline. These details are incorporated into an Invitation to Propose (ITP) which is sent out to qualified Institutes of Higher Education (IHE).

The Advocate names a Selection Committee which may consist of all or a portion of the TP. The Selection Committee uses established criteria to evaluate all

submitted proposals. The IHE and corresponding Principal Investigator (PI) of the winning proposal are notified and the contract negotiation meeting is scheduled.

The Project Manager, Technical Panel, and Advocate participate in the contract negotiation. The Research Bureau guides the contract through the NMDOT approval process. After the contract is executed, the Research Bureau Chief issues the Notice to Proceed letter to the PI and IHE.

After each quarter of the State fiscal year, the PI submits a written Quarterly Report. The PI, TP, and PM meet within two weeks of the end of the quarter to review quarterly progress and to address any issues or concerns.

Project Deliverables are submitted to the TP for review and comments. The TP must approve the Interim Report, Final Report, Multi-media Presentation, and Implementation Plan before the project can be closed out. All documents and materials distributed to the TP during the project will be returned to the Research Bureau at the close out meeting.

After the project is closed out, the Advocate submits written reports to the RAC, C-RAC, and ROC on implementation progress at intervals of 3, 6, and 12 months.

Administration

Policies and procedures in administration of NMDOT research are authorized by the ROC. Day-to-day activities are performed by Research Bureau staff. In addition to establishing research priorities and approving individual research initiatives, the ROC provides counsel on all matters relating to policies and procedures required for the planning and administration of the program.

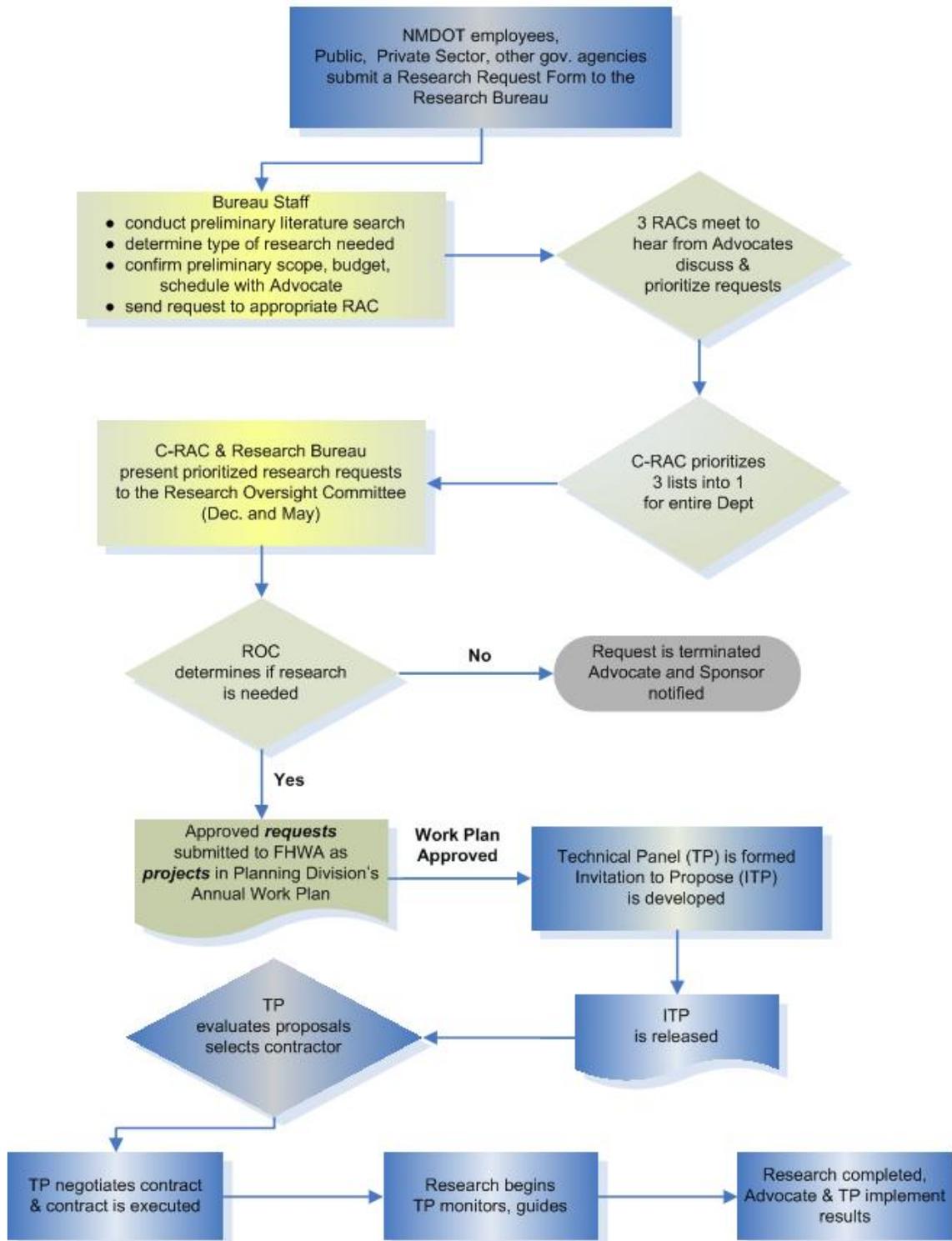
The RACs help solicit research requests from their respective offices within the NMDOT and review and determine which requests will be developed into Research Problem Statements. Each RAC prioritizes its area's research problem statements and the RAC Chairpersons determine which ones will be recommended to the ROC for funding. The RACs also oversee implementation of research results.

III. From Research Request to Implemented Research Project

There are many steps from research request to implemented research project. The diagram that follows illustrates this process. While the Research Bureau will accept a request for research at any time of year, the Bureau conducts several formal solicitation activities each year: a Fall Meeting of RACs; a presentation at the annual Paving and Transportation Conference (January in Albuquerque,

NM); and a presentation at the annual Engineering Conference (April in Las Cruces, NM).

Steps from Research Request to Implemented Research Project



IV. Roles and Responsibilities of Research Project Participants

Below is a list of each participant in the research project and the participant's roles and responsibilities.

a. Sponsor

In order to ensure that suggested research is consistent with strategic priorities and organizational goals, and to ensure that research results are implemented, each project is required to have a Sponsor and an Advocate. The Sponsor is a NMDOT Division Director, District Engineer or Bureau Chief who certifies that the project is necessary and in conformance with the strategic priorities of the respective organizational sub-unit.

- Certify that the research is necessary and vital to the Department.
- Give direction to research endeavor.
- Monitor research implementation.

b. Advocate

The Advocate is a department employee with expertise or interest in the research subject area who agrees to serve on the technical panel over the duration of the research project.

- Submit the research request form.
- Suggest members for the TP.
- Serve as a member and Chairperson of TP.
- Identify three or more TP members to serve as Selection Committee members.
- Communicate with all TP members regarding meetings and action items.
- Ensure that TP members attend meetings, review reports and deliverables.
- Resolve any issues among TP members.
- Implement research.
- Submit written memo detailing implementation progress to the Research Advisory Committee and the Research Oversight Committee at 3, 6, and 12 months after Project Close Out.

c. Technical Panel (TP)

Each research project is assigned a TP composed of NMDOT employees and other identified stakeholders. TP members may volunteer to serve or be directed to do so by a supervisor.

- Refine the problem statement reaching a consensus on the objectives of the research project and the tasks necessary to achieve them.
- Draft Invitation to Propose.

- Attend meetings: ITP development, pre-proposal, selection, contract negotiation, kick-off, quarterly and project close out. (TP members are responsible for bringing their packets to all meetings.)
- Evaluate proposals, select winning proposal, and return confidential documents.
- Negotiate contract.
- Guide and direct research project.
- Review and comment on Quarterly Reports.
- Attend Quarterly Meetings, offer comments, and address concerns to give direction to research.
- Participate in developing the implementation plan.
- Review, comment on, and approve all project deliverables.
- Complete Project Close Out Activities.

d. Project Manager (PM)

The PM serves an administrative function ensuring projects comply with state and federal rules and regulations governing the use of State Planning and Research (SP&R) funds.

- Assist the Advocate in developing research request forms and going through RAC, C-RAC and ROC processes.
- Contact the Advocate to assist in establishing a TP and schedule an initial meeting.
- Communicate to the TP their respective duties and responsibilities.
- Work with TP to refine the problem statement reaching a consensus on the objectives of the research project and the tasks necessary to achieve them.
- Distribute to and collect from TP confidential proposals submitted in response to the ITP.
- Draft, revise, and finalize the Invitation to Propose with input from the TP.
- Release ITP and accept vendor proposals.
- Schedule and moderate meetings: pre-proposal, proposal selection, contract negotiation, kick-off, quarterly, and project close out.
- Assist in developing and negotiating contract.
- Review invoices and approve payment.
- Distribute Quarterly, Interim, and Final Reports to TP for review and comment.
- Review and comment on all reports.
- Maintain Project Management Database, document control files, and track deliverables.
- Apply the contract terms, Bureau policies, and FHWA regulations to PIs.
- Distribute Final Reports within and outside the Department and post on the web.
- Report project progress to RAC, ROC, and FHWA.

e. Principal Investigator (PI)

Although some projects may have one or more co-investigators, the research is considered to be under the direction of the principal investigator, PI, identified in the proposal. Because it is presumed that the PI will have had the major role in determining the scope of work and setting it forth in the proposal, the PI must be available and responsible for the duration of the contract period. Replacement of the PI or another member of the research team is subject to prior approval from the Research Bureau. This requirement does not extend, however, to students or employees whose role is primarily one of support.

- Develop proposal following ITP and criteria described in the NMDOT Research Bureau's Instructions Manual.
- Provide Project Proposal, Budget and Milestones.
- Perform research objectives and activities.
- Coordinate with TP to ensure research objectives are met.
- Submit deliverables in accordance with contract timeline.
- Attend meetings: Pre-proposal, contract negotiation, kick-off, quarterly and project close out.

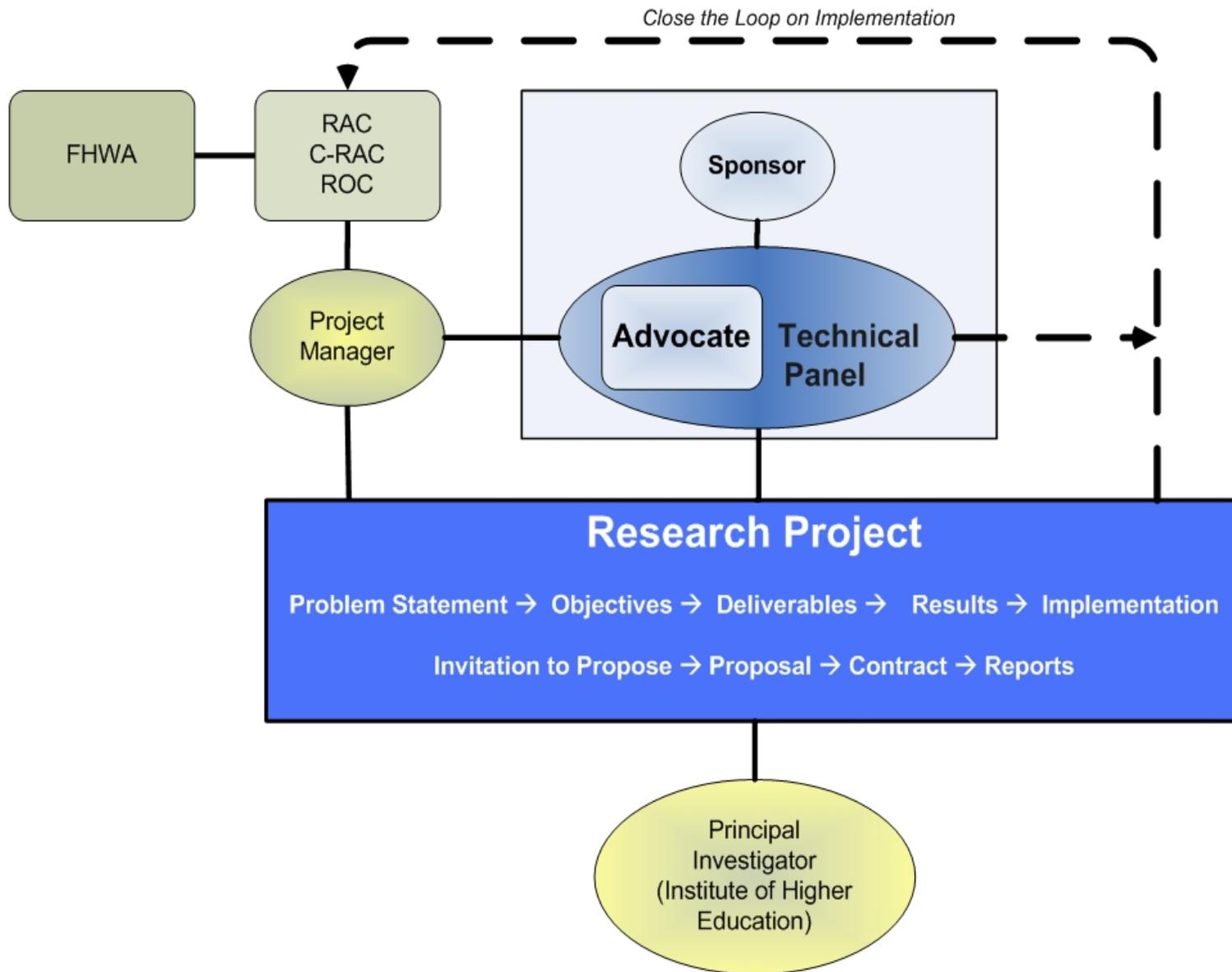
f. Federal Highway Administration (FHWA)

FHWA oversees the Research Bureau's activities and the expenditure of SP&R funds. FHWA staff may attend any meeting related to research projects. An Advocate may invite a FHWA representative to serve on the TP. As a TP member, the FHWA representative has all the rights and responsibilities of a TP member.

g. Process Observer

The Process Observer (PO) is an NMDOT employee from outside the Research Bureau who ensures fairness and equity in the selection of the winning proposal

V. Relationships among Participants in a NMDOT Research Project





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