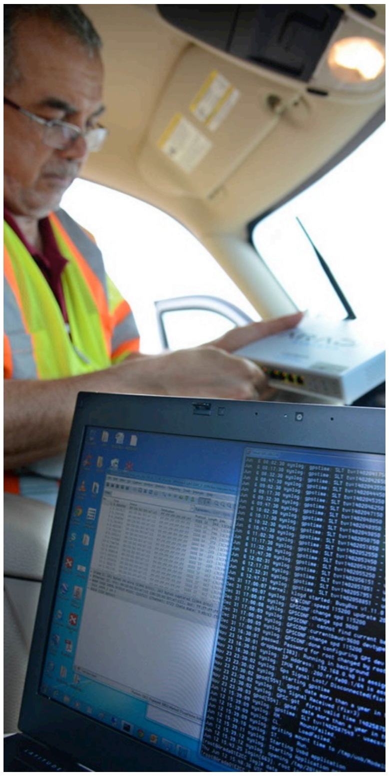



UNIVERSITY HANDBOOK • 2016

THE RESEARCH AND TECHNOLOGY IMPLEMENTATION OFFICE

TEXAS DEPARTMENT OF TRANSPORTATION

Chapter 1
Introduction

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Section 1
TxDOT Research Program

Research and Technology Implementation Office

TxDOT's Cooperative Research and Implementation Program is managed by the Research and Technology Implementation Office (RTI). The Program provides for TxDOT to contract with Texas state-supported institutions of higher education, through a competitive process, to improve Texas transportation.

Products from the research program include devices, analytical tools, new materials, new or improved specifications, improved testing methods, as well as less tangible concepts such as knowledge, or guidance. Research products impact virtually every area of TxDOT's core operations. Dividends may be in terms of lives saved, more efficient operations, improved services, or cost savings. A key to the success of the program is that it draws upon the expertise of department personnel from across the state. The research conducted must closely align with the goals and priorities of TxDOT.

Research and Implementation Projects are managed by RTI's Project Managers (PM). The PMs work with TxDOT subject matter experts to form a TxDOT Project Team. This team works closely with the University Project Supervisor.

TxDOT Mission, Goals, Values, and Priorities

Mission Statement

Work with others to provide safe and reliable transportation solutions for Texas.

Goals

- Maintain a safe system: Reduce crashes and fatalities on the system through innovations, technology, and public awareness. Maintain and preserve the transportation assets of the state of Texas.
- Address congestion: Partner with local officials to develop and implement congestions mitigation plans in Texas. Ensure consideration of all modes of transportation in the development of more reliable solutions for moving people and goods.
- Connect Texas communities: Support efficient multimodal options that serve the transportation needs of metropolitan, urban, and rural communities and their economies. Improve freight movement, enhance international trade, and expand access to markets to support the economic competitiveness of Texas.
- Become best-in-class state agency: Ensure the agency deploys its resources responsibly and has a customer service mindset. Focus on work environment, safety, succession planning, and training to develop a great workforce.

Values

- Trust - We strive to earn and maintain the confidence of our partners and the people of Texas.
- Integrity - We honor our commitments and keep our word.
- Responsibility - We are accountable to the people of Texas for carrying out our mission and roles.
- Excellence - We do our work at a high level of quality.
- Service - We do what we do for the benefit of the people of Texas.

TxDOT Priorities

- Be the safest DOT in the United States
- Further strengthen and enhance our relationship with MPOs, local governments and other key stakeholders
- Act as a resource for transportation funding
- Research transportation technology solutions
- Develop innovative maintenance approaches that reduce costs and improve and preserve transportation system conditions
- Develop effective information systems.

Section 2
Conduct

Non-Discrimination

As stated in TxDOT's Research Manual, it is TxDOT's policy that no person shall on the grounds of race, color, national origin, sex, age, or disability be excluded from participation in or be denied the benefits of, or otherwise be subjected to discrimination, under any TxDOT program, including the research program. This policy is reflected in the Cooperative Research and Implementation Agreement (CRIA)

Gratuities and Lobbying

By signing the CRIA Agreement, your university, or university system, agreed not to offer gifts to TxDOT employees or to influence (lobby) Federal employees. These provisions are contained in Articles of each CRIA.

Conflict of Interest

Members of research committees may have no direct or indirect financial interest in any project they are evaluating or managing. Nor may they have family, personal, or business relationships with university employees that would create a conflict of interest, or the appearance of a conflict of interest, between their duties as a member of a research committee and their personal or business interests.

Each Project Team member and all RTI employees are expected to disclose any potential conflicts of interest. Each situation is then evaluated and structured to avoid true or apparent conflicts of interest.

Disclosures

Public disclosure of any final data generated or produced in the course of executing the contracts may not be disclosed if the Sponsor Agency reasonably determines that the premature disclosure of such data would adversely affect public safety, the protection of intellectual property rights of the institution of higher education, publication rights in professional scientific publications, or valuable confidential information of the institution of higher education or a third party; or

(2) adopt a rule that is based on research conducted under a contract entered into with an institution of higher education unless the agency:

(A) has made the results of the research and all data supporting the research publicly available; or

(B) reasonably determines that the premature disclosure of such data would adversely affect public safety, the protection of intellectual property rights of the institution of higher education, publication rights in professional scientific publications, or valuable confidential information of the institution of higher education or a third party.

Section 3
Using this Handbook

Using this Handbook

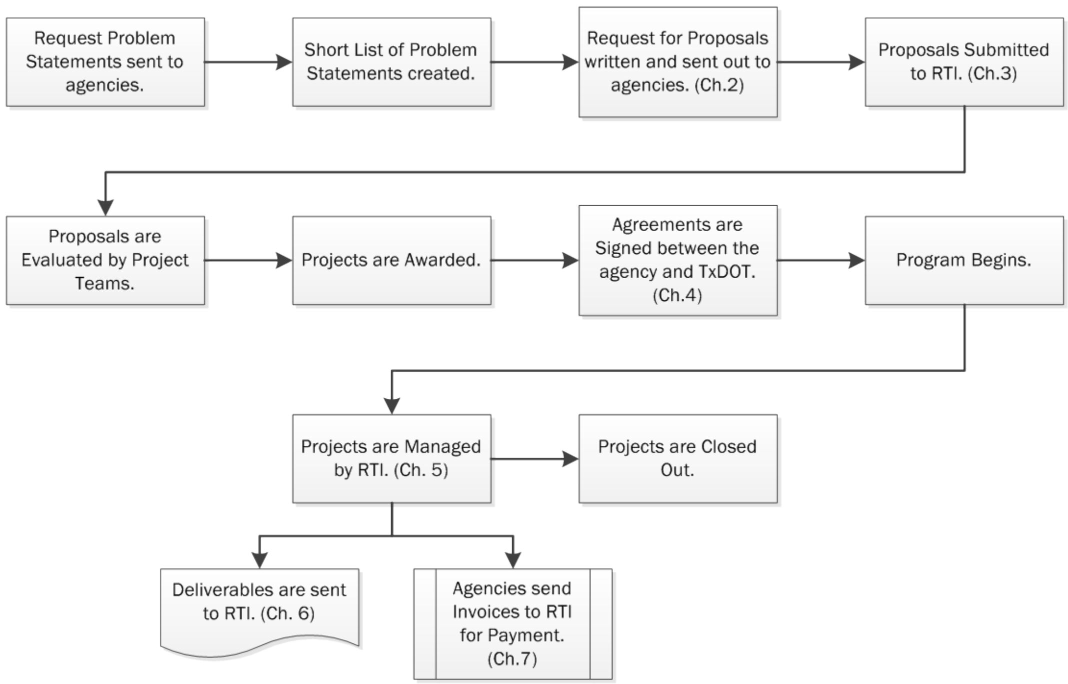
This handbook, TxDOT's *Research Manual*, and the Cooperative Research and Implementation Agreement (CRIA) outline the program policies and provide an overview of TxDOT's technical research program.

This handbook provides the framework and policies under which related procedures are developed. This handbook establishes the procedures that implement the policies expressed in the Research Manual. By signing a CRIA, each university, or university system, agrees to TxDOT procedures. This handbook presents those procedures to universities active in TxDOT's research program.

Section 4
RTI Program Overview

Program Overview

The diagram below is an outline of the Program Overview



Chapter 2
Request for Proposals (RFP)

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Section 1
Request for Proposals

Process

The following information captures the process in TxDOT's Research and Technology Implementation Program RFP.

Request and Receive Problem Statements

- RTI sends call for Problem Statements
- Problem Statement forms are completed
- Problem Statement forms are submitted to RTI

Select Project Team and Projects for RFP

- RTI categorizes problem statements and submits to Districts/Divisions/Offices
- TXDOT District, Division, Office (DDO) develops and prioritizes problem statements
- DDO proposes project teams for each prioritized problem statement
- RTI receives list of project teams and prioritized problem statements
- RTI prepares list of prioritized problem statements for Project Review Board (PRB) review
- Project Review Board (PRB) recommends which problem statements to go to RFP

Prepare and Post RFP

- RTI prepares RFP documentation.
- RTI Posts RFP.
- RTI Hosts Pre-Proposal meetings.
- Research Institutes prepare and submit proposals. Proposals not received by the proposal deadline will not be accepted.

Receive and Evaluate Proposals

- RTI receives proposals
- RTI prepares evaluation documentation
- Project Teams review and score proposals

- RTI compiles proposal scores and submits to PRB

Award Projects

- PRB reviews and recommends projects for award
- RTI notifies university liaisons and TxDOT stakeholders of awarded projects

The University Liaison is your point of contact for RFP information and for submitting proposals to RTI.

Requirements

Proposals are only accepted from eligible proposers and following a RFP. Each RFP must be submitted prior to the deadline within the RFP.

Each proposal must meet the following requirements to be accepted for evaluation:

- Submittal prior to the deadline
- Proposal requirements (See Chapter 3, Proposal Requirements)
- Project requirements - Project Statement (PS)/Implementation Project Recommendation (IPR)
- Use of current RTI Forms (see your Liaison for current forms)
- Submittal via email to RTI.

Section 2
Eligible Proposers

Eligible Proposers

Proposals are only accepted from Texas state-supported Universities. Proposals that include partnerships with other entities will be considered when the appropriate expertise is not available from a Texas state-supported University. Proposals are not accepted which include research team members with late deliverables (deliverables that have not met the due date on the deliverable table, or missed a deliverable deadline provided in correspondence by RTI).

Joint Proposals with Texas State Supported Universities

Joint proposals include two or more state-supported universities and must have a researcher (or principal investigator) designated by the team as the Project Supervisor (PS).

Subcontracting

If an entity other than a Texas state-supported university joins your research team, your university is responsible for those consequent subcontracts, including out-of-state universities or private entities.

Section 3
Communications with TxDOT

Project Team Non-Disclosure Agreement

Each member of the Project Team signs a non-disclosure agreement (NDA), agreeing not to respond to researcher questions during the open period of the RFP; except at a pre-proposal meeting.

The NDA includes the status of proposals to university research teams.

Throughout the RFP

During the open period of the RFP (from issuance to the due date), questions about RTI's policies or procedures associated with the RFP may ONLY be posed to the contact person named in the RFP or emailed to RTIMain@txdot.gov.

For questions regarding scope, submit to the point of contact named on the Project Statement or ask the question during the Pre-proposal meeting, or emailed to RTIMain@txdot.gov.

Announcement of Selections

RTI announces the project awards after proposals are approved to University Liaisons and TxDOT stakeholders.

Proposal Review Comments

RTI will forward the reviewer comments and scores for each proposal to the each University's lead liaison after all contracts are executed.

Chapter 3
Proposal Requirements

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Section 1
Submission Format and Deadline

Required Format for Submission

Current Forms – Proposals should be submitted on current RTI forms. Current RTI forms are sent to university liaisons for distribution, and can also be downloaded off the RTI website:

- Form ProbStat Research Problem Statement
- Form ProjStat, Research Project Statement
- Form IPR, Implementation Project Recommendation

Electronic Format – All proposals are required to be submitted in PDF format (1 PDF file per proposal). The file can be submitted:

- By email to RTI if the email and attachment together are smaller than 15 megabytes
- Larger files can be sent to RTI through TxDOT's drop box service, available at https://ftp.dot.state.tx.us/dropbox.

Delivery Methods and Locations – The acceptable methods and addresses for delivery of proposals are included in the RFP instructions distributed by RTI. Proposals must be received before the deadline.

Other Critical Reminders:

- Submit only 1 PDF file for each proposal
- **Researchers** – Submit proposals through the University Liaison
- **Resubmitting a proposal** – The last submission by email before the deadline will be taken as the proposal
- Do not send a proposal to an individual's email address in RTI

Meeting the Deadline

- **Timeframe –** The date and time proposals are due is set by RTI and is stated in the RFP instructions.
- **Responsibility for Delivery of Proposals** – The University is responsible for ensuring the timely arrival of each proposal at RTI. Proposals received after the deadline will not be accepted.

- **Confirmation of Receipt** – RTI confirms receipt of proposals received to the email address that sent the file. TxDOT's email system does not provide an automated return receipt and it does not reply to messages sent to non-existent email addresses to alert the error. If the confirmation is not received, check to make sure the proposal was sent to the right email address.

Section 2
Required Documents

Overview

The documents listed below are required in the submitted proposal in the following order:

- Cover Page (on an RTI form)
- Itemized Budget, Exhibit A (on an RTI form)
- Project Description, Exhibit B, consisting of:
  - Project Abstract,
  - Implementation,
  - Work Plan,
  - Assistance or Involvement by TxDOT,
  - Deliverables Table (on an RTI form), and
  - Schedule of Research Activities (on an RTI form)
- Background and Significance of Work
- Research Staff and Facilities

The Project Agreement's pages are numbered as one document, beginning with "1 of X". The correct page order is in Chapter 3, Section 2, Overview.

Incomplete proposals will not be accepted. Documents beyond those listed above will not be accepted. Examples (not all inclusive) of additional documents that will not be accepted include:

- Reference Lists – If submitted, include in Background and Significance of Work.
- Resumes – Include all relevant information on the Research Staff and Facilities form.
- Letters of intent from subcontractors or suppliers.

Required documents are discussed in detail in the remainder of this chapter.

Section 3
Cover Page

Elements of the Cover (Signature) Page

The Cover Page serves as the signature page for a Project Agreement and should always be prepared using the current RTI form. Each Cover Page includes the elements discussed below.

- **Fiscal Year** –This is the fiscal year when the project is activated.
- **Heading** – Labels the document as a "Project Agreement" and identifies the performing agency(s), with the lead agency listed first.
- **Research or Implementation Project** – Check the appropriate box to indicate the type of project.
- **Project Number** is the project number from the Project Statement included in the RFP.
- **Document Date** is the date the document is prepared. This uniquely identifies this version of the agreement, and will be referenced when the final Project Agreement is activated. The date initially entered here is the date the proposal is prepared. That date must be changed if the proposed Project Agreement is modified before execution.
- **Project Title** is the project title from the Project Statement included in the RFP.
- **First Paragraph** specifies the general terms and conditions under which the Project Agreement is made, identifies the contracting parties, and identifies the project as included in an Annual Program, or as an Independent Project. Check the appropriate box and enter the performing agency(s).
- **Part I. Project Description** paragraph incorporates Exhibit B, the description of the specific work needed, into the Project Agreement. Do not make changes to this language.
- **Part II. Project Duration and Performance Period** states that project work is not approved, and that no work should be performed, for any fiscal year, until RTI issues either an initial or continuation Activation Letter to the university. Only insert a proposed Project Termination Date to be considered during proposal review. This date sets the proposed project duration.
- **Part III. Project Budget** includes an estimated total project budget for each performing agency, for each proposed fiscal year. A detailed budget for each agency for each fiscal year is attached as Exhibit A. The Budget incorporates all Exhibit As into the Project Agreement. If there is a discrepancy between the total budget on an

Exhibit A for any agency and the amount shown on the Cover Page for that agency, the amount on the Cover Page will be used during the initial evaluation of the proposal.

- **Total Project Budget** is the total of the proposed annual project budgets for all performing agencies. Once the project is activated, this can be changed only by modification of the Project Agreement. If there is a discrepancy between the annual budgets shown and the total project budget, this will be resolved before a Project Agreement is executed.

- **Part IV. Project Supervision** identifies the Project Supervisor, who also specifies the lead agency on a joint project. Other primary researchers on the project should also be identified, including at least one researcher from each performing agency. The lead researcher at each agency may be identified as that agency's Principal Investigator (PI). Information about each researcher, including contact information, is also required.

- **Part V. No Waiver** incorporates all the applicable provisions of the CRIA into the Project Agreement.

- **Approved (Performing Agency)** is a signature block for each university on the project, including each signatory's official title and agency.

- **Approved** (**TxDOT)** is a signature block is included for the Responsible TxDOT officials, to execute the agreement for TxDOT.

- **Page Numbering** should begin with "1". The project agreement, which includes several different sections, is numbered as one document, beginning with "1 of X". The correct page order is in Chapter 3, Section 2, Overview.

Information for these items is found on the Project Statement, IPR, or in the RFP message:

- Fiscal Year
- Research or Implementation Project
- Project Number and Title
- Annual Program or Independent Project

No section should be removed from the form; unused lines in parts III and IV may be left blank. Do not change the standard language on the RTI form.

Section 4
Exhibit A

Overview

Each Each proposal will include a separate **Itemized Budget – Exhibit A** for each performing agency(s) on a project, for each year of the proposed project. “Total Project Cost” on each Itemized Budget sets the maximum contract amount between TxDOT and that performing agency – for that fiscal year.

Estimating Individual Cost Items

Each Itemized Budget should include the best estimates available for individual cost items (see Chapter 4 for changing and modifying an itemized budget).

Heading Elements on an Itemized Budget

The elements discussed below are included at the top of each Itemized Budget – Exhibit A. Some of the information comes from the project document attached to the RFP. Some are developed at the university(s).

From the Project Statement or Implementation Project Recommendation:

- Fiscal Year (identify the state fiscal year covered by the budget page)
- Project Number – Leave blank at proposal submission.

Developed by The University(s):

- Agency – The name of the university for whom the budget is proposed.
- Indirect Rate – The limit on this rate is controlled by Article 12 in the CRIA.
- Revision Date – Leave this field blank in a proposal, as the original document date of each Itemized Budget is taken from the document date on the Cover Page of the proposed agreement. When the university makes a change within the budget that does not require TxDOT approval, such as moving funds from one cost item to another, a revised Itemized Budget may be sent to RTI, for RTI’s information, with the date of the revision noted here.

Direct Costs

Include only those costs specifically identifiable to the project, or allocated to the project through a method that has been reviewed and approved for federally funded projects.

- Salaries and Wages – Show estimated budget totals for salaries and wages for full and part-time personnel under these categories:

  – Professional

  – Sub-professional and technical

  – Clerical

Under the Itemization column, show the % of work time each professional is expected to spend on the project during the fiscal year.

- Fringe Benefits – Calculate these by the university's policies. They are typically calculated as a percentage of salaries and wages.

- Expendable Goods and Supplies – Although not required, itemizing significant costs may help explain a large budget in this category. Following are examples of items that may be included, as long as they are directly identifiable with the project:

  – Office supplies, including reproduction supplies

  – Minor parts and materials

  – Minor equipment

  – Electrical, plumbing, and building supplies

  – Laboratory supplies

- Operating & Other Expenses – Several different types of costs may be included here. Show the expenses as either "included" or "excluded" from Modified Total Direct Costs. This determination is made based on OMB Circular A-21 or 2 CFR 200, as noted on Exhibit A.

Included in Modified Total Direct Costs – some common items include:

  – Travel – Includes private car mileage, meals/lodging costs, public transit fare, etc. Itemize and describe both in-state and out-of-state travel to the best extent at the time of the proposal. Whether or not out-of-state travel is shown on the project budget, specific case-by-case approval must be requested through RTI in advance of the travel, unless the Project Agreement specifies otherwise.

  – Other – Includes costs such as reference materials and books, registration fees, and maintenance and repair of equipment, equipment rental, freight, and postage.

Excluded from Modified Total Direct Costs – some common items include:

  – Tuition – paid in lieu of either partial or total salary. (Allowable for graduate students only.)

  – "Other" costs, which per OMB Circular A-21 or 2 CFR 200cannot be included in Modified Total Direct Costs.

- Subcontracts – Include each subcontractor and a brief description of what they will do. The first $25,000 of each subcontract is subject to indirect costs. A subcontract is defined as any contract or procurement of engineering or other professional services arranged between the university and an entity not a part of that university is considered a subcontract. This definition is intended to cover the types of work that university researchers might typically perform; not all service purchases. For instance, copier or automotive repair, printing or similar services that administratively support research and specialized testing wou ld not typically fall under this definition.

- Equipment – Include each item of equipment or other tangible items to be purchased under the project for which the item or system cost is $5,000 or more. A system is defined as two or more items purchased which will be combined to form a single, functional unit. Include specifications over the standard on included equipment and which tasks it is expected to be used.

Also include information, as needed, to help explain how the specific equipment item relates to the project. For instance, if the individual item is a component of a larger system, state what system it will be a part of. If the item is a product, or part of a product, shown on the Deliverables Table, state what deliverable it represents.

- Total Direct Costs – The total of all cost categories listed above. Using the RTI (Excel) form, calculates the total.

Indirect Costs

Indirect costs include facility and administrative costs of the university that are not specifically identifiable with a particular project. These costs are calculated as a percentage of modified total direct costs, as defined on the Itemized Budget – Exhibit A form.

Exhibit A should show indirect costs calculated with the university's federally approved indirect cost rate, and with the amount charged to the TxDOT project. The maximum percentage that can be charged to TxDOT on a university project is set in the CRIA. The difference between these two numbers is shown as the university's contribution to the project.

Total Project Cost

The total is derived from total direct costs plus total indirect costs charged to the project. Using the RTI (Excel) form calculates the total, based on individual costs entered on the form. Review the total to make sure the data was entered in the correct cells on the form, and that the total is calculated correctly.

If there is a discrepancy between line item amounts and "total project cost" on an Exhibit A, the amount shown as "total project cost" will be used during evaluation of the proposal. Any discrepancies will be resolved before a Project Agreement is executed. The proposer could be required to reduce line items amounts so “total project cost” does not exceed the annual funding approved

Section 5
Exhibit B

Overview

The **Project Description– Exhibit B** is comprised of several sections. All pages in Exhibit B should display a footer with the proposal number (changed to project number after award) and consecutive page numbers. The required sections, should be presented in the order discussed within Chapter 3, Section 2, Overview.

Taken together, sections in Exhibit B:

- present the essence of the project,
- describe the work to be performed,
- establish the deliverables due to TxDOT, and
- establish the schedule for completion of project work.

When preparing Exhibit B:

- respond directly, completely, and concisely to the Project Statement distributed in the RFP, clearly communicate how the project will be conducted,
- include substance.
- Refer to the submitting agency as the 'Performing Agency' and TxDOT as the 'Receiving Agency.'

Project Abstract

Each proposal should contain a project abstract that summarizes the project objectives and tasks. The abstract should be no more than 200 words and is prepared free form (no RTI form needed). This section of the selected proposal will become part of the Project Agreement; the Abstract should be direct. To minimize ambiguous language, use contractual phrases which are definitive, such as – "this project shall", rather than "we propose to" or "the proposed project will."

The primary value of the abstract is to clearly and succinctly describe the project. The ability to succinctly summarize the work proposed to do help demonstrate the understanding of the project.

For successful proposals, the abstract is used to enter a project description into relevant databases, including.

- TxDOT's research database(s)
- Transportation Research Board's (TRB) Research in Progress system

Implementation (for research projects only)

The university should include a free form section by this title that presents the researcher's assessment of potential areas for application of the research findings, such as changes in specifications, standards, or department policies. If included, this section should also include an assessment of which TxDOT operations will be affected.

When preparing the implementation section, consider the project being proposed, and what the project results will look like. If including thoughts about the implementation will better explain the project or knowledge of the area, include the section.

For projects expected to produce results which could be implemented either during the progress of the project or shortly after completion, material in this section might include an assessment of several issues.

The form in which the findings would be most effectively reported

- mathematical model or formula
- laboratory test procedure
- design techniques

The organization logically responsible for application of the results

- American Association of State Highway and Transportation Officials (AASHTO)
- Federal Highway Administration (FHWA)
- Texas Department of Transportation (TxDOT) Division or District

The specific medium of practice that would be changed or developed by the findings

- AASHTO Standard Specifications
- TxDOT Standard Specifications
- special specifications

The best method to convey the research findings to operating personnel for use

- circulation of a written report
- personal contact with operating personnel
- demonstrations
- movie, slide, or videotape presentation
- field manuals
- training classes

Work Plan

The Work Plan is a free form section that should fully describe the approach researchers intend to use and specify how the project will be structured and performed.

For joint projects or projects with subcontractors, the Work Plan should specify which entity(s) will be performing the work on each task.

Ideally, each task in the Work Plan is separate and distinct. A well written Work Plan will also describe dependencies and relationships between the tasks, including the project's critical path.

The Work Plan for a research and implementation project should contain at least the following information.

- How the project and each tasks will be managed.
- Principles or theories to be used (Not included in implementation projects).
- Possible solutions to the problem.
- The device, process, material, or system to be developed or enhanced, when applicable.
- Critical experiments to test the applicability of the theory or the item developed.
- Data analysis and statistical procedures.

Proprietary techniques owned by the university can, and should be discussed in a way that demonstrates the researchers' knowledge and skill without revealing any proprietary information owned by the university.

The Work Plan should not include additional information about the background and significance of the project, or researchers' qualifications. That information belongs in other sections of the proposal. The ability to describe a clear, complete and concise Work Plan helps demonstrate the management skills and knowledge of the project.

Each task in the Work Plan should highlight the expected deliverable or outcome from the work performed in the task and cross reference to the deliverables table. The deliverables can be in the form of white papers, work products (excel spreadsheets, instructor manuals, models, enhanced or developed systems, devices), seminars, close out meets, and technical reports to name a few.

Technical Memos are numbered sequentially by task number.

Tech Memo Numbering Example:	Multiple Tech Memos Example:
Task 1 - Tech Memo 1	1.1, 1.2, 1.3
Task 2 - Product 1, Product 2	2
Task 3 - Tech Memo 3	3.1, 3.2

Assistance or Involvement by TxDOT

In this section, describe any TxDOT assistance the university(s) expects, other than project oversight normally provided by the Project Team of advisors. Include the relevant task number(s) in the description where the TxDOT assistance will be needed. If no assistance will be needed, other than that normally provided by the Project Team, state "none" in this section.

Be specific so TxDOT can realistically estimate the cost of assistance requested. The cost of this assistance must be found to be affordable and feasible for the project to be approved.

TxDOT assistance may include items such as core drilling, traffic control, testing, materials and supplies, providing data files, or maps. The cost of this assistance is covered by TxDOT directly and is not included in the university's budget.

TxDOT assistance does not include purchasing equipment or large quantities of materials. Such purchases should be included in the university's project budget. Reasonable TxDOT assistance would not include building or operating a test facility or a commitment of significant TxDOT staff time for data analysis or direct participation in work tasks.

If the university(s) expects to need and operate TxDOT equipment on the project, the following language must be included in this section before a Project Agreement can be executed:

> "If it becomes necessary under this agreement for any agent or employee of the Performing Agency to operate a vehicle owned by TxDOT, the Performing Agency shall assume all risks of operation, including the risks of damage to the vehicle, damage to any other vehicle, and injury to any person. To the extent permitted by law, the Performing Agency shall indemnify and hold harmless TxDOT for any liability that may accrue from the Performing Agency's operation of the vehicle. The Performing Agency shall maintain worker's compensation insurance and any other insurance necessary to meet its obligations under this provision."

Deliverables Table

The Research Supervisor ensures the project adheres to the Deliverables Table. All deliverables anticipated or required from the project should be shown on the Deliverables Table. Minimum deliverables required by TxDOT are listed on the Project Statement or IPR.

Each Deliverables Table should be prepared on RTI's form.

When considering whether a product should be delivered as a stand-alone item or included in a report, consult the guidance in the Project Statement and on the Deliverables Table form. The choice should be based on what the product is, how it will be used, and the intended users in TxDOT. A well thought out plan for deliverables will include each product only once and clearly describe on the Deliverables Table how each product is most appropriately and reasonably delivered.

Deliverables should be produced at a minimum of six month intervals. When a task's duration is less than twelve months, interim deliverables will be negotiated.

Schedule of Research Activities

The Schedule of Research Activities provides an overview of the project, and serves as a project management tool for both TxDOT and researchers. The Schedule shall clearly assign each work tasks to one or more universities on the research team. It shows all tasks proposed, along with an estimated schedule for completion of each task, and the estimated cost of each task. This schedule is the last required document in Exhibit B.

The schedule should be prepared on RTI's Schedule of Research Activities form.. RTI forms are sent to University Liaisons and include an example of a completed Schedule of Research Activities. When a Schedule of Research Activities is prepared, keep the issues below in mind.

- **Making the Schedule a Better Tool** – If each date is not defined for each project meeting, deliverable, or Tech Memo as a task, it may still be noted on the Schedule of Activities that these item will occur. Make notations understandable. The Schedule of Research Activities can then serve as an overview of all project activities.
- **Schedule for Each Tasks** –An assumed start date is shown in the proposal. The work will start only after the project is activated by RTI.
- **Due Date** – The due date should be a clear indicator of when a task will be completed and its' associated deliverable is sent to RTI.
- **Task Titles** – If selected, summarized task titles, as long as each task is still easily and readily identifiable, can be used.
- **Estimated Cost of Task** – On joint projects, TxDOT prefers that to combine all university budgets and show a single amount for each task. If that proves too difficult, show a separate column for each university, adding to its total budget.

Should the project start be significantly delayed past the date anticipated in the proposal, a new schedule will be requested by TxDOT before the Project Agreement is executed, so that everyone involved in the project clearly understands what is expected, and by when.

Use RTI's (Excel) form. The RTI form uses patterns, instead of colours, to distinguish between the original schedule, work completed, and revised schedule for each task. The RTI form also provides a separate line where each time line (original, work completed, revised) may be maintained for each task throughout the life of the Project Agreement.

Section 6
Background and Significance of work

Contents

This section should include several topics.

- The findings of a literature search or other description of existing technology on the subject. A search should be made of the Transportation Research Information Service's (TRIS) or other relevant databases to ensure that previous work is considered in the new project. If a list of references would enhance the proposal, it may be included here.
- Discussion sufficient to demonstrate the researcher's understanding of the underlying principles involved in the problem that TxDOT needs solved, and in the work proposed.

Length and Format

This section is limited to no more than 10 pages, and is prepared free form. Page number this section separately, beginning with "1 of X". Start and end this section on pages separate from all other sections of the proposal.

Background and Significance of Work – What It Is and What It is Not

- **It is** – The place to demonstrate that the subject of the proposed project is understood, and to briefly describe the overall approach to the project.
- **It is** – The place to summarize the results of any literature search performed to prepare the proposal, as each is relevant to the proposed project.
- **It is not** – The place to describe details of the proposed work. Put that information in the Work Plan.
- **It is not** – A place to detail the background and experience of the proposed research team. Put that information in the Research Staff and Facilities section of the proposal.
- **It is not** – The place to list every document reviewed during the preparation of the proposal. Use the (up to) 10 pages for information that is more meaningful during proposal review.

Section 7
Research Staff and Facilities

Contents

This section explains the experience of the proposed research team, and the capacity and capability of the facilities.

Provide information that is relevant to the specific proposed project. Do not send only a resume, or a list of every report the researcher has written. The researcher is best able to relate past experience to the project. Unless an entire career has dealt with the subject of the specific project, don't miss this opportunity to explain how experiences are relevant. Evaluators must make their judgments based on information in the proposal

Format

This section should be prepared on RTI's Research Staff and Facilities form.

Relevance to Project Agreement

This information is used only during the evaluation of proposals. It is not included in the Project Agreement.

Chapter 4
Project Agreements

Table of Contents

Section 1
Approval

Proposal Selection

Proposals received are initially evaluated through an administrative review. During this review, RTI staff determines:

- All researchers on the proposed teams are eligible to participate in the program.
- Each proposal is complete enough to be deemed responsive.
- Each proposal meets any specific constraint or limitation specified in the RFP.

The previously appointed Project Teams are sent the proposals (TxDOT) and team members then evaluate proposals given technical criteria. Each team receives proposals, along with evaluation instructions and criteria. Each proposal is rated against the needs described in the Project Statement and the criteria provided.

Project evaluators independently rate each proposal. The RTI team coordinates and facilitates any required assistance by each respective Project Team. The RTI team simultaneously conducts evaluations. Given all evaluation scores, the RTI project management team then provides recommendations and builds a prioritized list to be reviewed by the Project Review Board.

Project Review Board Approval

In the fall and spring, the Project Review Board will meet to decide which Project Proposals receive funding for Project Award.

Funding Approval

The Project Review Board approves funding for new research projects for the approaching year, given the proposal selections from the project evaluators, and a financial summary prepared by RTI. Given the availability of funds, proposals are awarded or denied given budgetary constraints.

Revisions to the Project Agreement

Although a proposal may be approved by the Project Review Board, the proposal may be require additions, deletions or changes to become a Project Agreement. After funding is approved by the Project Review Board, RTI will prompt the University Liaison to submit a revised Project Agreement.

Revisions requested can be administrative and technical. Each revised agreement will:

- Carry a new date on the Cover Page.
- Clearly mark all revised language.
- Be coordinated through the University Liaison and the RTI Contract Specialist.

After all revisions have been approved by TxDOT, RTI will request a signed copy of the agreement from the lead University Liaison. Before execution by the university (ies), all highlighted revisions will be incorporated, or “accepted” into the agreement.

Section 2
Activation

Initial Activation

Once a Project Agreement has been executed by TxDOT, the liaison for each university will receive an activation letter from RTI. The Activation date is the first day which work can begin. Work completed, or purchases made, before the activation date will not be reimbursed by TxDOT.

Although the term of the agreement may cover several fiscal years, the initial activation only covers the fiscal year specified in the letter, or on attachments to the letter.

On occasion, the initial project activation covers only portions of the project. In those cases, the activation letter will state which work tasks are not yet approved, and researchers will not begin work on those tasks. RTI will issue a subsequent activation letter when that work is approved to start. Work on unapproved tasks will not be reimbursed by TxDOT.

Continued Activation

For projects that extend beyond the initial fiscal year, RTI will issue a separate activation letter for each year. If there are no issues pending resolution on a project, the project will be included on an annual activation letter issued in August, for the fiscal year that starts the following month allowing projects for which work has been approved for the coming year to continue without interruption.

Approval for a specific fiscal year does not guarantee that future years of the project will be funded and approved. No work will continue on a project in a fiscal year for which RTI has not issued an activation letter.

Activation Lists

Activation lists accompany an activation letter and show the termination date and budget amount activated for each project. With each annual activation letter, the total amount shown on the activation list for each program (research or implementation) shows the amount that Article 9 of the CRIA refers to as “Total Program Funding” for that annual program. This amount changes throughout the year as new projects or modifications are activated.

Section 3
Modifications

Determining if a Modification (Mod) is Required

The terms of a Project Agreement can be changed only by executing a Modification. Existing terms in an agreement may be clarified, and some estimates may be updated, without modifying the agreement. Common examples of both scenarios are shown below.

Examples of When a Modification is Required

- Change the total project budget.
- Change an agency's annual budget or indirect cost rate.
- Adding new equipment that can be retained as RTI Inventory and has a cost over $5,000.
- Adding funds to a cost item or category where funds were not previously allocated.
- Change the Project Supervisor.
- Change the termination date.
- Change the Work Plan, including changes in technical objectives, project scope, or tasks.
- Add or remove any item from the Deliverables Table.
- Change the due date for any item on the Deliverables Table.
- Change in the duration of the project schedule.

Examples of When a Modification is not Required

- Change a researcher who is not the Project Supervisor.
- Update the status or clarify an entry on the Deliverables Table. A university liaison will submit an updated Deliverables Table to RTI. RTI will evaluate the need for Project Team concurrence.
- Update the Schedule of Research Activities without adding or deleting tasks or changing the duration of the project. The liaison will submit an updated schedule to RTI, and RTI will evaluate the need for Project Team concurrence.
- Update an Itemized Budget to move funding between line items (Fiscal Year total budget does not change). The project manager's approval is required when making changes such as adding or changing equipment, subcontracts, or out-of-state travel

line items in the budget (exceptions are above); including when there was not a previous line item. A revised Itemized Budget is required.

Communicating the Need for a Modification

Notify RTI as soon as there is a known need for a modification of a Project Agreement. Initial discussions commonly happen through email or at a project meeting.

Information universities provide about potential Modifications will include as much information as practical about which terms in the agreement will be impacted, an explanation of justification and impact if not implemented. Enough information must be provided to enable TxDOT to make an effective and realistic initial evaluation of the request.

The explanation of why the agreement needs to be modified will answer the following:

- Why can project work not be completed within the terms of the current agreement?
- How do the proposed changes relate to any previous Modifications on the project?
- Is the information provided consistent with previous status information submitted for the project – in Progress Reports, a Tech Memos, or project meetings?
- How will the recommended changes preserve, or enhance, the value of the project to TxDOT?
- What will happen if the Modification is not approved?

While a researcher may certainly discuss a potential Modification with the Project Team members, it is essential to include the RTI PM. PMs will facilitate the modification of the terms of a Project Agreement and the PM will communicate the possibility of increasing funds to the appropriate team members.

Changing the Project Supervisor

When a Project Supervisor leaves a project, finding a replacement is critical to project continuation. The Project Team must conduct a thorough assessment of project progress to date and documentation of respective work.

As soon as possible, the Project Supervisor or University Liaison will notify the RTI PM that the Project Supervisor is planning to leave the project, along with an estimated date of departure.

The lead university will develop a plan to continue the project. The lead university will submit a nomination for replacement and a continuation project plan to RTI including:

- When and how the university intends to deliver project documentation.

- Name and professional background of the nominated Project Supervisor.
- The nominee's relationship to the project.

The PM and the Project Team will review the status of project work and identify all outstanding concerns, review the status of deliverables due on the project, review the qualifications and past performance of the researcher nominated as the new Project Supervisor, agree to the nominated Project Supervisor or negotiate another solution, decide whether the agreement will be modified to accept a new Project Supervisor or terminated.

Submitting a Modification Form

If initial discussions about modifying an agreement are positive, the University Liaison will submit a formal written Modification. This document, prepared on RTI's Modification form, provides the details about what terms in the agreement need to change, and how.

The University will submit a Modification form in response to a request from RTI. The Contract Specialist on the project will send the request to the lead University Liaison after the Modification has been conceptually approved within TxDOT and funding has been identified. If the changes proposed to the agreement are approved, and funding is secured, a RTI Contract Specialist will promptly request the university to sign the Modification and send the partially executed agreement to RTI, for final execution.

The last date in each fiscal year that RTI typically will request a signed Modification is August 1, with the signed Modification due back to RTI by August 15. These deadlines allow adequate time for final processing before the end of the fiscal year. Meeting deadlines is critical, especially on any agreement set to terminate at the end of August; terminated agreements cannot be modified.

Preparing a Modification Form

The Modification form is the signature page. Language on the signature page must either specify the new contract terms, or incorporated by reference. All documentation associated with the Modification is attached to the signature page. Most items on the form parallel items on the Cover Page of a Project Agreement, and are self-explanatory. The following discusses those items which are unique to Modifications.

- **Numbering Modifications** - Number Modifications in sequence, starting with "1". The sequence continues through the life of the agreement.
- **Document Dates** - Each Modification, and each respective Modification, will be uniquely dated. Each document will carry the date it was developed or last edited. The date distinguishes that document from other versions of that particular Modification, and from any other agreement document for that project. Attachments to the Modification signature page do not need to be separately dated.

- The “revision date” fields on the Itemized Budget and Schedule of Research Activities are used when these documents are updated to provide more current information or clarification, not as part of a Modification. They will be left blank when submitted as part of a Modification.
- **Language on a Modification Form** - The forms that RTI distributes to University Liaisons include a file with example language for common scenarios that arise when agreements need to be modified. Basic language is included for the scenarios listed below, along with reminders of other parts of the agreement that may be affected.
- **Budget Modification**
  - Increase to Annual and Total Budget
  - Move budget from one university to another, no change in Total Budget.
  - Reduce budget in one year, increase in another year, and no change in Total Budget.
- **Project Duration Modification**
- **Research Supervisor Modification**
- **Deliverables Table Modification**
- **Add, Delete, or Revise Tasks**
  - Minor revisions to a task(s) – new Work Plan not attached.
  - Major revisions to a task(s) – new Work Plan not attached.
  - Add a task – new Work Plan not attached.
  - Delete a task – new Work Plan not attached.
  - Revise tasks – new Work Plan is attached.
  - Add tasks – new Work Plan is attached.

Marking Changes in Attachments

When attaching documents to the Modification to show what specific terms of the agreement are being changed, clearly mark all modified language.

Each Modification will highlight only the changes being made in the respective Modification. Changes approved in previous Modifications will be incorporated, or accepted, into the agreement before developing the current Modification. Mark the current changes in simple ways. Common techniques are to underline for additions and strikethrough for deletions.

As with all agreements, use information in the footer, such as the project and modification numbers, and page numbers, to clearly identify the Modification.

Work Plan Rewritten

Occasionally, changes needed to a Work Plan may be so extensive that a complete rewrite is needed. In those situations, language on the Modification signature page will state something like "Entire Work Plan is revised. New Work Plan is as attached."

Changes in the Work Plan are not highlighted in this situation. Rather, the following notice will be included at the beginning of the Work Plan:

> **Significant Modification** – This is a significant modification of the Work Plan. Changes are not highlighted and some previous material may have been removed. This Work Plan must be reviewed in its entirety.

Project Agreement Rewritten

In rare cases, the entire Project Agreement may need to be rewritten. In those rare cases, a new Project Agreement form, rather than a Modification form is used. Review the requirements for Project Agreements in general, and pay particular attention to these items.

- Cover Page — the heading on the cover page will state: "Modification No. ___" before the line reading "Project Agreement." This modification will be numbered in sequence, with all other modifications to the agreement for this project.
- Notice of Rewrite — No highlighting of additions and deletions is necessary. Instead, a notice similar to that shown above for a rewritten Work Plan will be included at the beginning of the Cover Page.

Section 4
Subcontracts

What is a Subcontract?

TxDOT's *Research Manual* defines subcontracts, as they relate to research and implementation Project Agreements.

In general, subcontracts include engineering or professional services provided by someone who is not part of the university. Subcontracts in this context do not include routine service purchases, or services not typically provided by a Texas state-supported university.

The definition of a subcontract is dependent on the type of service to be provided, not on the university's method of procurement.

Purpose of RTI Review

RTI reviews the proposed use of a subcontractor to ensure there is a real need for someone other than a Texas state-supported university to do that work, not to determine the adequacy of the contract provisions. RTI relies on the university to see that subcontracts meet the requirements in the CRIA and the university's own contracting standards.

There are occasions when the private sector or an out-of-state university may be needed to provide a service that is critical to a project, but is not readily available in the Texas university community. Specialized testing services are an example. Before a university plans to subcontract, make a realistic assessment of whether the work can be done by another Texas state-supported university, if not by another department in the researcher's university.

Evidence of RTI Concurrence

RTI's concurrence in a subcontract may be evidenced in either of two ways:

- Execution of a Project Agreement that adequately discloses the subcontract.
- By a written statement from RTI identifying the subcontract and explicitly concurring.

Adequate disclosure of a subcontract in a Project Agreement includes showing an estimated budget for the subcontract on each Itemized Budget affected and clearly describing in the Work Plan what work the subcontractor is expected to perform. Once a specific subcontractor has been selected, the name of the subcontractor should be disclosed to the Project Manager and the Contract Specialist.

If a Project Agreement mentions a subcontract, but does not clearly describe the work the subcontractor is to do, execution of the agreement by RTI does **not** serve as evidence of RTI concurrence. The university will need to request specific concurrence for that subcontract. A written statement of concurrence from RTI will include at least the project number, the name of the subcontractor, and a brief description of the work the subcontractor is expected to perform. RTI's concurrence covers only the work identified. This most typically happens when the need for a subcontract was not known, or not disclosed, in the Project Agreement.

In such cases, submit subcontracts to RTI for review at least ten (10) working days before execution of the subcontract.

Chapter 5
Managing the Project

Table of Contents

Section 1
The Project Agreement

Project Agreement

Project work will be provided via a fully executed, activated Project Agreement. Project work will start once RTI has notified the university the agreement has been executed and the project is active for the fiscal year in which the work will be completed.

Verbal discussions that may have taken place in a pre-proposal meeting, or in negotiations after a proposal is selected, do not obligate the university (ies) or TxDOT, unless the results of those discussions were incorporated into the written Project Agreement prior to signature.

Updating the Itemized Budget

See Chapter 4.

Section 2
Project Supervisor Responsibilities

Project Work

The Project Supervisor has primary responsibility to TxDOT for the conduct and completion of all project work, no matter who is scheduled to do each specific work task. The Project Supervisor supervises and oversees the entire research team, including all researchers on joint projects, to ensure project work is consistent with the Work Plan in the Project Agreement.

Deliverables

The Project Supervisor is responsible for seeing that all required deliverables meet TxDOT's standards and are delivered in a timely manner, no matter who is assigned to prepare each deliverable. Assistance can be sought out from other university personnel, including professional editors, to help meet TxDOT's standards for quality and timeliness of deliverables.

Roadside Safety

Each university must follow TxDOT's Handbook of Safe Practices, including wearing hard hats, safety vest and steel toe shoes, or other appropriate safety attire, when working on TxDOT right of way.

Coordinate all traffic control needs and plans with the TxDOT district, when applicable. Ensure submittal of request for TxDOT assistance to RTI.

Request for TxDOT Assistance

When a Project Team requires assistance from TxDOT for work on an RTI project, the team will:

- coordinate with the district(s) to define and schedule the needed work,
- complete an RTI "Request for Research Fund Authorization (RFA)" form, and
- send the completed form to the University Liaison, at least 2 weeks before work is to start.

The University Liaison will coordinate with the appropriate RTI staff, and let the researcher know when the request is approved. If approved, RTI will provide a charge number to the district(s).

Communications with TxDOT

RTI coordinates all program matters through University Liaisons. Expect to receive information from the liaison about program requirements, RFPs, proposal selections, revisions needed to agreements before they are executed, deliverables, and other matters.

The Project Supervisor will communicate directly with the Project Team, generally on technical issues related to a specific ongoing project, and with the Research PM assigned to the project. The Researcher or Liaison may also hear from the RTI Contract Specialist.

Communications with RTI will also be related to the specific project, but may involve a wide range of issues.

Status Reports and Tech Memos

The Project Supervisor is responsible for providing project status reports and findings, for project work, as requested or required by the PM, Project Team or RTI. There are different types of status reports to fill different needs. They all help TxDOT monitor project work, and help manage and demonstrate progress on the project.

- **Informal** - Some status reports are informal monthly emails or phone conversations, which ensure the Project Team is updated.

Project Meetings - Several meetings are typically scheduled by TxDOT on each project. The Project Supervisor may request a project meeting, by letting the Project Team, PM and RTI know a meeting is needed to discuss the project.

- Monthly Progress Reports - Monthly Progress Reports are required for all projects and due on the third business day of the month. Contact the University Liaison for the most updated version of this Form.
- **Technical Memorandums** - Tech Memos describe work completed during a task and document the results of the work.
- **Request for Out-of-State Travel** - Prior to out of state or country travel, a request is required for TxDOT's approval, if the travel will be charged to an RTI project.

Submitting Questionnaires and Surveys for TxDOT Review

A preliminary copy of all questionnaires and surveys expected to be used on a research project must be submitted to RTI before being used in the field. RTI will coordinate a review by the Project Team, and other appropriate TxDOT personnel. The Project Supervisor is responsible for submittal to RTI.

TxDOT reviews surveys ensuring an objective manner and do not offer inappropriate incentives to participants. TxDOT does and will not support paying participants to complete surveys.

Submitting Papers (and Presentations) for TxDOT Review

Prior to publishing or submittal of a paper or presentation to a professional journal or conference documenting work on a TxDOT sponsored project, the Project Supervisor must Receive approval from TxDOT. In this context, publishing includes posting material on a non-secure Internet site.

If the paper or presentation contains subject matter or technical findings substantially similar to those in a deliverable that TxDOT has already approved, another TxDOT review is not needed. Send a courtesy copy to RTI, to help keep everyone aware of what is going on with the project.

If the paper or presentation contains significant technical findings that have not been approved by TxDOT, TxDOT's approval is needed prior to presentation. Submit the material to the professional organization, such as TRB, and RTI at the same time.

When the preparation schedule does not allow adequate time for TxDOT review and approval, send an abstract of the material to RTI, along with a notice of when and where the material will be presented. RTI will coordinate TxDOT's review and approval of the abstract. The paper or presentation must then include a statement that TxDOT has not reviewed the findings. Submit a copy of the complete material to RTI as soon as possible. If there is time before the material is scheduled to be presented, TxDOT will review the material, and the disclaimer may be able to be removed.

Section 3
Technical Memorandums

Overview

Project Agreements include provisions requiring the Project Supervisor to submit a Technical Memorandum (Tech Memo) to RTI at the end of each task. Tech Memos document project work as it progresses and provide current research results to TxDOT. Tech Memos also benefit the project by facilitating the preparation of project reports. Tech Memos are due on the date listed in the Project Agreement Deliverables Table, typically this date is the final day of the month at the end of the respective task.

Contents

Tech Memos will include detailed information about the work completed under each task reported and the results of corresponding work. For example, if the focus of a task in the Work Plan is to conduct certain types of tests on materials, the Tech Memo submitted for that task would typically discuss several issues:

- How the tests were structured.
- Criteria established for evaluation of test results.
- Types of materials tested.
- How many tests were conducted, and on how many samples of each material.
- Test results – presented in a way that is meaningful, effective and relevant to the objectives of that work task.

Data collected during work on a task should generally be delivered to TxDOT with, or in, the Tech Memo. The data will be delivered in the manner most effectively communicated. Raw data to be analyzed or used by TxDOT is best delivered electronically, as raw data. In other cases, or in addition to the raw data, a chart or graph presenting an analytical view of the data may be most appropriate.

Each Tech Memo will present any conclusions, or preliminary findings, that researchers have drawn from completed work. The preliminary findings or conclusions will facilitate TxDOT utilization and ensures relevance throughout the project, as well as highlight differences in project objectives and methodology.

The contents appropriate for each Tech Memo are dependent on the work completed. The Project Supervisor uses judgment to determine what should be included, or discuss thoughts with the Project Team before preparing a Tech Memo.

Minimum Requirements

- **Each Tech Memo must be understandable**. RTI does not require that Tech Memos be professionally edited before they are submitted. Nor does RTI prohibit editing of Tech Memos by any university personnel.
- **Each Tech Memo will be in a format that effectively communicates the information.** RTI does not require Tech Memos any specific format, and the same format may not be appropriate for all Tech Memos. If a task is defined in such a way that the work will most likely represent a distinct chapter in a technical report, the Tech Memo can be submitted in that format.
- **Each Tech Memo will be submitted to TxDOT on or before the due date per the Deliverables Table**. A Tech Memo will be submitted as soon as work on the task is completed. If a task is scheduled to be conducted over a period of many months, the Project Supervisor or the Project Team may decide that a Tech Memo prepared at an interim milestone in that task would benefit the project.

How to Submit

Tech Memos should be sent electronically to the RTIMain Tech Memos are typically submitted to TxDOT by the Project Supervisor. Other university personnel may submit Tech Memos with the approval of the Project Supervisor.

Chapter 6
Deliverables

Table of Contents

Section 1
Submission, Review, and Publication

Deliverables Required on Each Project

The Deliverables Table specifies the deliverables due to TxDOT. The requirement for a deliverable and its due date will only be changed by modifying the Project Agreement.

Value of Research

The Value of Research will be added by the TxDOT Project Manager to the Project Agreement as the first deliverable. It will be due 30 days after the Activation Letter has been sent to the awarded university.

The Value of Research for TxDOT and the State of Texas can be determined from all projects. Value turns the subjective into the objective, which can often turn uncertainty into support. It also builds stakeholder support for projects and to further research if new phases or possibilities arise. It can also uncover additional benefits. Determining value forces practitioners to investigate benefits that might not have seemed obvious at project inception.

In this deliverable, describe the value of the project to TxDOT and/or the State of Texas. Functional areas of value to be focused on during the project are identified by the Project Sponsor during the Project Proposal Period. When identifying values in the selected economic and qualitative functional areas (at least one economic area is required) of the Value of Research, be specific in the values to TxDOT and the State of Texas.

Value must:

- Be balanced, with qualitative and economic data
- Contain financial and non-financial perspectives
- Reflect strategic and tactical issues Represent different time frames
- Be consistent in collection and analysis
- Satisfy all key stakeholders
- Be grounded in conservative standards
- Come from credible sources
- Reflect efficiency in its development
- Create a call for action
- For TxDOT or the State of Texas.

The Value of Research breaks down into a set of functional areas. These functional areas will have qualitative or economic benefits. Each functional area will have a value of research that would benefit TxDOT, Texas, or both. These functional areas are cross referenced with value type and the benefiting entity below:

Functional Area	QUAL	ECON	Both	TxDOT	State	Both
Level of Knowledge	X			X		
Management and Policy	X			X		
Quality of Life	X			X		
Customer Satisfaction	X			X		
Environmental Sustainability	X				X	
System Reliability		X		X		
Increased Service Life		X		X		
Improved Productivity and Work Efficiency		X		X		
Expedited Project Delivery		X		X		
Reduced Administrative Costs		X		X		
Traffic and Congestion Reduction		X			X	
Reduced User Cost		X			X	
Reduced Construction, Operations, and Maintenance Cost		X			X	
Materials and Pavements		X			X	
Infrastructure Condition		X				X
Freight movement and Economic Vitality		X				X
Intelligent Transportation Systems		X				X
Engineering Design Improvement			X			X
Safety			X			X

Value Types

Qualitative

- *Intangible Benefits* are subjective benefits that cannot be measured in monetary terms.
- *Influencing Decisions*. Although intangible benefits are hard to define, they can influence business and legislative decisions.

- *Intangible Assets* consist of information and knowledge that an organization can use as "intellectual capital" to produce funding and cost savings.
  - Patents, copyrights and licenses
  - Customer lists and relationships
  - Non-compete agreements
  - Favorable financing
  - Software
  - Trained and assembled workforces
  - Contracts
  - Leasehold interests
  - Unpatented proprietary technology
  - Trademarks/Trade names

Economic

- **Net present value** is a calculation that compares the amount invested today to the **present value** of the future savings from the implemented research.

$$NPV = \sum_{t=1}^{T} \frac{C_t}{(1+r)^t} - C_o$$

where: C_t = net cash inflow during the period
C_o= initial investment
r = discount rate, and
t = number of time periods

- **Cost-Benefit Analysis** is a systematic approach to estimating the strengths and weaknesses of alternatives that satisfy transactions, activities or functional requirements for a project. It is used to determine options that provide the best approach for the adoption and practice in terms of benefits in labor, time and cost savings.

    - ***Cost- Benefit Ratio*** attempts to summarize the overall value for money of a project or proposal
    BCR = Present Value of Total Savings (Benefits) / Present Value of Cost of Research

    - ***Total Savings*** *(Benefits)*
    Total Savings = (Estimated Savings over a period of Years) – Cost of Implementation

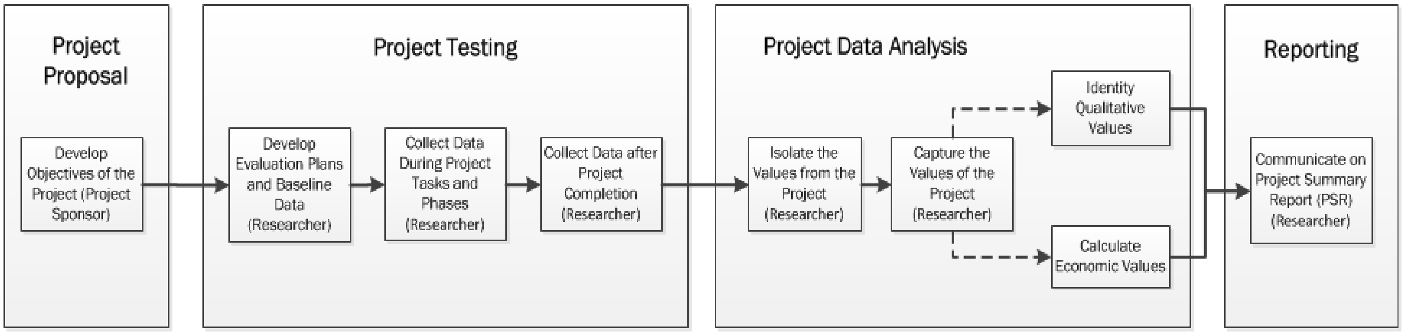
    - ***Payback Period*** is calculated by counting the number of years it will take to recover the *budget* invested in a project.
    Payback period (Years) = Project Cost / Cost Savings per Year

Method of Development

TxDOT has developed a method to determine Value of Research. The process leads a researcher through four phases within a project assisting in identifying inputs and calculating the value of a project's research. Value is broken out into two categories: 1. Qualitative, 2. Economic. Researchers shall expand upon what qualitative values are expected. Researchers shall calculate the various economic value benefits expected within the project. Researchers should define all formula inputs, essentially 'show their work' within the Value of Research Template.

The process steps are as follows:

Determining the Value of Research



Project Proposal

Develop Objectives of the Project. Functional areas of value are evaluated for each project and assigned by the TxDOT Project Sponsor.

Project Testing

1. Develop Evaluation Plans and Baseline Data. Baseline data identifies the recognized TxDOT Research Functional Areas values in the beginning of the project. The first deliverable of the project will be the 'Value of Research.' Expected benefits of each functional area should be evaluated and include any assumptions and estimates. Economic functional areas are Explanations on economic based value should be described

   These areas can include qualitative and economic data.

   A. Identify the Functional Area value(s) for determining the Value of Research. The methods are determined by what the objective(s) of the project are for TxDOT.

   B. Identify the projects Qualitative and Economic Data Sources. Qualitative sources will not be measurable. Economic Data sources will have equivalents associated to dollars, time, and lives.

   C. Identify the entity that the measure is for and include an explanation.

2. Collect Data During Project Tasks and Phases. Measures of the data sources are recorded during testing.

3. Collect Data after Project Completion. As the project's testing ends, conclusions and decisions can be drawn from the measurements of data sources.

Project Data Analysis

1. Isolate the Values from the Project. The measures of the data sources are converted, summarized and categorized into the areas of the Value of Research for TxDOT: Qualitative and Economic.

2. Capture the Values of the Project.
   A. Identify Intangibles. List qualitative value aspects of the research.
      - Intangible Benefits
      - Influencing Decisions
      - Intangible Assets

   B. Calculate Benefits – Find the economic values of research using formulas:
      - Benefit/ Cost Ratio
      - Total Savings
      - Payback Period

Reporting

1. Value of Research is the first Deliverable of the Project, due 30 days after the Activation letter has been sent to the Awarded University.
2. Communicate on Project Summary Report (PSR)
   A. Write up all findings on the values of the research for TxDOT of the project by method.
      I. Qualitative.
      II. Economic.
         - Discuss data sources and measures.
         - Explain estimates.
   B. Include updated Value of Research Template with the PSR.

At the end of the project, the Value of Research will be revaluated in the Project Summary Report (PSR). Researchers will again discuss what qualitative values are expected. Newly identified qualitative values found throughout the project should be included. Researchers will also calculate the various economic benefit values found within the project. Variances between the initial estimated values in the Work plan should be contrasted against the values found at the end of the project in the PSR.

Value of Research Template

The Value of Research Template is a RTI form provided to the University Liaisons. It is a plug-n-play spreadsheet which will calculate multiple formulas based off a few inputs. Complete the following on the Template:

- Project #
- Project Name
- Agency Name(s)
- Project Budget (Total for all project years)
- Project Duration (Yrs); Do not round, equate the number of months into the appropriate decimal using .08333 for each month.
- Expected Value Duration (Yrs)

- Exp. Value (per Yr); Expected value is the amount of savings to TxDOT and/or the State of Texas
- Discount Rate; typically 5%
- Total Savings, NPV, Payback Period, and Cost Benefit Ratio are calculated.
- Variable Justification: This section is a narrative of how the Expected Value and Expected Value Duration were conceived for the Value of Research; include references and source material as needed.
- Functional Area: list the designated functional areas selected by the Project Sponsor; each area can be listed once and can have multiple values associated.
- Value: Based off the Functional Area, expand upon the qualitative value associated with a project; there can be multiple values per each function.

Technical Memorandums

Project Agreements include provisions requiring the Project Supervisor to submit a Technical Memorandum (Tech Memo) to RTI at the end of each task. Tech Memos document project work as it progresses and provide current research results to TxDOT. Tech Memos also benefit the project by facilitating the preparation of project reports. Tech Memos are due on the date listed in the Project Agreement Deliverables Table, typically this date is the final day of the month at the end of the respective task.

Submission of Technical Reports

All reports submitted to satisfy an obligation on the Deliverables Table will be sent directly to RTI. Reports are drafts until approved by TxDOT.

Draft reports may be submitted either electronically or as a hard copy. RTI will evaluate each draft, log the report as received, and then coordinate the review and approval process within TxDOT. The contractual requirement for a deliverable is met once a final complete submission is received by RTI.

Submission of Products

Submit draft product deliverables to RTI, who will then coordinate the review and approval process within TxDOT. When equipment is specified for delivery to a location other than RTI, notify RTI of the delivery, and include the following information:

- Which product the equipment represents.
- When and where the equipment was delivered.
- Who (TxDOT) accepted delivery.

- A picture of the deliverable, including front and side views, when possible.

RTI will contact the employee who accepted delivery, and coordinate the review process. When products are not tangible items to be delivered physically, such as when a university conducts a workshop, notify RTI of the product delivery and include with the notice any related tangible materials available.

Deadline for Submission

Draft deliverables, in compliance with submission requirements, must be received by RTI by the due date on the Deliverables Table. For those products where the Deliverables Table specifies another location for delivery, the formal notice to RTI meets this submission requirement.

TxDOT Review Process

The PM is responsible for final acceptance or approval of each deliverable. During the review process, the PM considers comments from Project Team members and the Project Supervisor.

The PM reviews comments with the Project Team with the university. After the TxDOT review is complete, RTI will provide further instructions.

Final Approval

RTI will provide publication and distribution instructions along with formal approval. The instructions may vary, dependent on the deliverable, the anticipated audience, and the cost of publication.

Publication and Distribution

- **Approved deliverables that TxDOT elects not to publish** — The University may publish at its own expense.

- **Disapproved deliverables** — The deliverable includes opposing information to TxDOT. The University can revise and resubmit the report; the University may not publish the document until an approval is received by RTI.

- **Deliverables containing classified or sensitive information** — The University shall comply with any written request from TxDOT to restrict access and distribution of any deliverable containing information that TxDOT determines to be classified or sensitive. Any disagreement on the part of the university will be submitted to RTI in writing.

Publication and Reproduction Costs

If the university does not have the resources to publish an approved deliverable in accordance with RTI's instructions, contact RTI to discuss potential options. TxDOT may opt to publish the deliverable, using TxDOT or other resources.

Copies Retained by the University

A university may publish up to five hard copies of any approved report or product, at TxDOT's expense. Hard copy needs beyond these limits will be discussed with RTI in advance of publication, and will be evaluated on a case by case basis.

Section 2
Technical Report Standards

General

Technical reports will be developed, published, and reproduced to reflect the best professional standards of the university or research agency. They will be written and edited per current professional standards of style and usage, such as The Chicago Manual of Style or the Federal Highway Administration (FHWA) publication guidelines.

Cover Page

A formal cover page is required on each published report, produced on heavy stock and designed by the university responsible for the report. Information shown on the cover page will include the information listed below:

- Name of the university, prominently displayed;
- Title of the report, prominently displayed;
- TxDOT report number, prominently displayed;
- TxDOT project number;
- URL where the report will be posted on the Internet;
- Additional information may be included at each university's option.

Technical Report Documentation Page

A DOT F 1700.7 form will be included in each technical report. The DOT F 1700.7 will be used as the cover page on a draft report submitted to TxDOT for review. The form is included as the first page of the front matter in reports published in hard copy, and may serve as the cover page for a report published on-line.

Title Page

The Title Page follows the Technical Report Documentation Page, and will include the following information:

- Title of the deliverable;
- Researchers and their research agency(ies);

- Deliverable number, including the entire project number and deliverable item number;
- Project number;
- Project title;
- Sponsoring agency(ies);
- Date;
- Performing agency.

Credits for Sponsor

The following statement will be included either on the report cover or on the title page of each report:

> "Performed in cooperation with the Texas Department of Transportation and the Federal Highway Administration."

If the FHWA credit will be omitted, or other sponsors included in the credits, RTI will notify the University of the changes required.

Disclaimer(s)

Disclaimers, as appropriate, are presented on a separate page, following the title page.

> **Author's Disclaimer —** required in all technical reports, and states:
>
> "The contents of this report reflect the views of the author(s), who is (are) responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official view or policies of the Federal Highway Administration (FHWA) or the Texas Department of Transportation (TxDOT). This report does not constitute a standard, specification, or regulation."
>
> **Engineering Disclaimer —** required on all technical reports that contain engineering recommendations and states:
>
> "This report is not intended for construction, bidding, or permit purposes."

This disclaimer will be accompanied by a statement identifying the engineer in charge of the project, including name, P.E. designation, and license number.

All technical reports produced for TxDOT under this program will comply with the requirements of the State of Texas and TxDOT related to signing, sealing, and dating of engineering documents, as applicable to work produced under the specific project.

Trade Names / Manufacturers’ Notice

Reports will avoid the appearance of endorsing or favoring a specific commercial product, commodity, or service. Trade names or manufacturers’ names are given only if their exclusion results in the loss of meaningful information. When trade names or manufacturers’ names are used in a report, the following “notice” will be included on the disclaimer page:

> “The United States Government and the State of Texas do not endorse products or manufacturers. Trade or manufacturers’ names appear herein solely because they are considered essential to the object of this report.”

TxDOT Disclaimer

If TxDOT disapproves or conditionally approves the report, the University must include any disclaimer deemed appropriate by RTI.

Acknowledgments

Members of the Project Team will be acknowledged in each report, along with their organizations. For TxDOT employees, the acknowledgment may include the “Texas Department of Transportation” rather than individual district, division, or office affiliations. Acknowledgments are presented on a separate page following the disclaimers.

Table of Contents

Each report will contain a table of contents, following the acknowledgments page. This table will include all principal headings and subheads as they appear in the report, along with page numbers. Lists of figures, tables, and abbreviations may follow, as required.

List of Figures

A list of figures (includes figures, illustrations, and photographs) is required for reports containing five or more figures, and may be included at the author’s option in any report. This list will contain:

- The number of each figure;
- The title or caption for each figure;
- The page number of each figure.

List of Tables

A list of tables is required for reports containing five or more tables, and may be included at the author's option in any report. This list will contain:

- The number of each table;
- The title for each table;
- The page number of each table.

List of Abbreviations and Symbols

If the report contains abbreviations or symbols the author will include a list that clearly defines each.

Body of the Report

The body of the report will include all the information needed to adequately support the conclusions and recommendations presented. Contents will be logically organized into chapters. Clearly identify Project Recommendations.

References will be included for specific sources cited in the report. References will contain author(s), title, publication number, publisher, and publication date. References listed in a separate chapter or appendix. Material used to help conduct the project or develop the report, which is not specifically cited in the report, may be listed in a bibliography following the references.

Product deliverables contained within a report will be clearly identified.

Size Conventions

Technical reports will be formatted for 8 ½ by 11 inch pages. Contents will be presented in portrait orientation, with a margin of at least 1 inch on all sides. Large charts or multiple charts presented together, which would not be easily readable otherwise, maybe presented in a landscape orientation, or produced on oversize pages. All reports will be in a single-column format, to facilitate on-line reading. Individual reports may be divided into volumes if deemed necessary by the author.

Line Spacing

For body text and other non-graphical elements, either single or one-and-one-half line spacing is acceptable. Reports with double line spacing will not be accepted.

Pagination

Reports will be printed on both sides of the paper, except when standard bookmaking practice dictates that a left-hand page be left blank so that the start of a section (chapter, appendix, etc.) falls on a right-hand page.

- **Front Matter** — Number pages consecutively with lower case Roman numerals, such as ii, iii, etc. The Technical Report Documentation Page is always page 'i', but does not display the page number. The title page also is left unnumbered.

- **Body of the Report** — Number pages consecutively, starting with Arabic numeral 1 and continuing uninterrupted through any back matter (appendices, list of references, etc.,) in the report. Page numbering each chapter or section separately using a dual system, such as "1-1", is also acceptable.

Figures / Illustrations / Photographs

- **General** — Information in each report will be illustrated clearly and in a cost-effective manner. The most appropriate illustrations will depend on the type of work done and the amount of data gathered. PMs may request figures or illustrations be added to more effectively convey the content of the report.

- **Numbering** — Figures will be numbered consecutively within chapters, using Arabic numerals in a dual system. For example, the second figure in Chapter 3 would be numbered "Figure 3-2". Numbering figures consecutively through the entire report is also acceptable.

- **Titles** — Each figure will include a title or caption, generally beneath the figure. The title will quickly and simply describe the essence of the figure. If a legend is required to make the figure readily understandable, it will be included beneath the figure. Titles and legends will be distinguished from the body of the report by placement (for example, centered just beneath the figure) and a difference in font.

- **Labels** — Labels within figures will appear in a consistent font throughout a report, as that is practical. A font will be chosen for readability and contrast with surrounding text.

- **Color** — Figures will not be printed in color unless authorized by RTI, either by a specific statement, or approval of a draft submitted in color. Approved reports may be delivered electronically, such as on university web sites, in full color without specific permission from RTI, even if the draft was submitted in black and white.

  When figures are developed, colors or patterns will be chosen for critical elements that can be delivered effectively in color electronically, and printed in black and white, as much as practical.

- **Placement** — Each figure will be placed near, but not before, its first reference in the text. If a report contains few text pages and many figures, place all the figures sequentially after the text.

- **Tables Numbering** — Tables will be numbered consecutively within chapters. For example, the first table in Chapter 4 would be numbered "Table 4-1" and the second table in Appendix A would be numbered "Table A-2." Numbering tables consecutively through the entire report is also acceptable.

- **Titles** — Each table will include a title at the top of the table. The title will quickly and simply describe the essence of the data presented in the table. Any legends or notes needed to make the table readily understandable will be included within, or just below the table. Titles will be distinguished from the body of the report by placement (for example, centered just above the table) and a difference in font.

- **Placement** — A table will be placed near, but not before, its first reference in the text. If a report contains few text pages and many tables, place all the tables sequentially after the text.

Equations

- **General** — For each independent equation or for the first in a series of related equations, authors will identify symbols after their first use, or in a separate list, to aid the reader.

- **Numbering** — Within each chapter, sequentially number equations that are part of a series, or which are referred to consecutively in the text, with Arabic numerals in a dual system. Enclose each number in parentheses at the right margin on the last line of the equation elements. For example, "(Eq. 1-2)" in chapter 1, or "(Eq. A-2)" in appendix A. Numbering equations consecutively through the entire report is also acceptable, if a list of equations is then added in the front matter of the report.

- **Placement** — Indent or center each equation in the line immediately following the first text reference made to it.

Use of Copyrighted Material

- **General** — No copyrighted material, except that which falls under the "fair use" clause, may be incorporated into a report without permission from the copyright owner, if the copyright owner requires such. Prior use of the material in a TxDOT or governmental publication does not necessarily constitute permission to use it in a later publication.

  As applicable, copyrighted material used in a report shall be accompanied by a statement substantially as follows: "Reprinted from (title of publication) by (name of author), by permission of (name of copyright owner). Year of first publication _____.”

- **Courtesy** — Acknowledgment or credit will be given by footnote, bibliographic reference, or a statement in the text for use of material contributed or assistance provided, even when a copyright notice is not applicable.
- **Caveat for Unpublished Work** — Some material may be protected under common law or equity even though no copyright notice is displayed on the material.
- **Proprietary Information** — To avoid restrictions on the availability of reports, proprietary information will not be included in reports, unless it is critical to the understanding of a report and prior approval is received from RTI. Reports containing such proprietary information will contain a statement on the Technical Report Documentation Page restricting availability of the report.

University’s Right to Copyright

Article 17, “Copyrights,” of the Cooperative Research and Implementation Agreement (CRIA) contains provisions relating to copyrights on materials developed under a research or implementation project.

Ownership and Release of Data

Release of information contained in a report is restricted prior to approval of the report by TxDOT, to the extent allowed by the Texas Public Information Act.

Section 3
DOT F 1700.7 Instructions

Technical Reports

- **Box 1, Report No.** — enter as FHWA/TX-09/0-1234-1, where:
  - FHWA = Federal Highway Administration,
  - TX = Texas,
  - 09 = year the report is approved,
  - 0-1234 = entire project number, including suffix if used on contract,
  - 1 = usually the Deliverables Table item number, without the preceding "R".
- **Box 2, Government Accession No.** — leave blank.
- **Box 3, Recipient's Catalog No.** — leave blank.
- **Box 4, Title and Subtitle** — entire report title.
- **Box 5, Report Date** — month and year report was written or last revised, whichever is later.
- **Box 6, Performing Organization Code** — leave blank.
- **Box 7, Author(s)** — list all authors, primary author first, including first name, middle initial if available, and last name.
- **Box 8, Performing Organization Report No.** — report number, consisting of entire project number and report number from Deliverables Table, 0-1234-1 for example.
- **Box 9, Performing Organization Name and Address** — name and address of the research agency(s).
- **Box 10, Work Unit No.** — leave blank.
- **Box 11, Contract or Grant No.** — entire TxDOT project number, as on the contract.
- **Box 12, Sponsoring Agency Name and Address** — enter:

  Texas Department of Transportation
  Research and Technology Implementation Office
  P.O. Box 5080
  Austin, TX 78763-5080
- **Box 13, Type of Report and Period Covered** — "Technical Report" and dates showing period of time covered by the report.

- **Box 14, Sponsoring Agency Code** — leave blank.
- **Box 15, Supplementary Notes** — enter "Project performed in cooperation with the Texas Department of Transportation and the Federal Highway Administration." If the title of the project is significantly different from the report title, enter the project title here.
- **Box 16, Abstract** — Include a brief (200 – 250 words) summary of the most significant information contained in the report. When applicable, the abstract should include advice on how the results of the research can be used.
- **Box 17, Key Word** — terms or short phrases that identify the important topics in the report.
- **Box 18, Distribution Statement** — "No restrictions. This document is available to the public through the National Technical Information Service, Alexandria, Virginia 22312, www.ntis.gov."
- **Boxes 19 and 20, Security Classif.** — unless advised otherwise in writing by RTI, enter "unclassified".
- **Box 21, No. of Pages** — total number of pages in the report, excluding any bound covers.
- **Box 22, Price** — leave blank.

Draft Products

Although not required with draft products, at the university's option, this form can be included to help identify the deliverable. If including the form with a draft product, modify the contents of the form, compared to a technical report, as discussed below. This form is not generally published with stand-alone products; as such products will carry enough information to be readily identifiable without this form

- **Box 8** — Indicate "Product", and include the entire product number from the Deliverables Table, 0-1234-P2 for example.
- **Box 13** — Indicate "Product", and do not include a "period covered".
- **Boxes 18, 19, 20** — leave blank.

Section 4
Project Summary Report Standards

General

Project Summary Reports (PSRs) are required for projects. PSRs are utilized to communicate information about research results to a broad audience, although technical information may be included. PSRs serve as a link between research and implementing the results of that research.

The ideal PSR is a clear and concise description of:

- Why the research is important;
- What the research accomplished;
- How the research results may be utilized for implementation.

The material for the body of each PSR is prepared, edited and submitted by the lead university on the project. The PSR is then reviewed, formatted, finalized and published by TxDOT. During this process, TxDOT will make changes to the material submitted, if necessary, to meet TxDOT standards, rather than asking the university to resubmit the material. An electronic copy of each completed PSR is returned to the university to be posted or published as they desire.

Contents

The body of each PSR is limited to 1000 words (if no graphics are included) and discusses the topics listed below. A Technical Report Documentation Page is not required with a PSR.

- **Background** — a brief description of the purpose and scope of the project and why the research was important.
- **What the Researchers Did** — a brief summary of project activities (e.g.: literature review, interviews, laboratory and field testing, surveys, monitoring of test sections, development of a draft specification), and problems encountered.
- **What They Found** —a summary of the research findings and conclusions drawn from those finds, and whether or not the findings were expected.
- **What This Means** — suggestions from the research team for putting project findings to use.
- **The Value of Research** – the same method for finding the value during the Project Proposal is reevaluated using inputs and findings from the conducted research of the project. The updated Value of Research Form is submitted with the PSR.

A graphic is not required in a PSR, but may be used if it will most effectively convey the information. The 1000 word limit must then be reduced to make space for the graphic(s). Graphics will be clear, simple and referenced in the text of the PSR to effectively convey meaning to the reader.

The university will submit the names of all university researchers who will be credited in the PSR, along with the material for the body of the report.

Copyrights

The same standards for use of copyrighted material, and ownership of copyrights, apply to PSRs that apply to technical reports.

Ownership and Release of Data

As stated generally in Article 16, “Ownership of Data,” of each CRIA, release of information contained in a report is restricted prior to approval of the report by TxDOT, to the extent allowed by the Texas Public Information Act.

Submission to RTI

Each Project Summary Report is submitted to RTI via email, with the required contents attached as an MS Word file. The email will be sent to RTI with a subject line containing the project number and “PSR.”

Section 5
Product Standards

General

Products are intended for implementation within TxDOT operations. The Deliverables Table for each project specifies the form or media in which each product will be delivered, and any specific format required. All products will be developed and produced in final form in a manner that reflects the best professional standards of the university or research agency. Standards applicable to specific types of products commonly required by TxDOT are included below.

Equipment and Devices

- **General** — Equipment deliverables, as discussed here, are tangible devices developed or procured under a research or implementation project specifically for delivery to TxDOT.
- **Physical Delivery to TxDOT** — The Deliverables Table specifies where within TxDOT the university will deliver the equipment. Physical delivery will often be to a functional division, or a district, rather than RTI.
- **Schematics** — working plans or schematics may or may not be required, dependent upon patent filing contemplated by the university.
- **Patents** — Article 18, "Patents," of each CRIA contains provisions relating to patentable discoveries or inventions resulting from research or implementation projects.

Guidebooks and Manuals General —

Products such as guidebooks, manuals, and similar items are developed as specified by TxDOT. Often developed as printed documents and published in non-traditional formats, guidebooks and manuals may be printed on heavy stock or waterproof material, or in a size smaller than 8.5 by 11 inches, to facilitate use in the field. Guidebooks and manuals may be published electronically as a PDF document that includes active hyperlinks to resources on the Internet.

- **Standards** — When a product is developed as printed material, all of the technical report standards which can be reasonably applied to the document will be, except the requirement for a Technical Report Documentation Page (form 1700). If a form 1700 is needed with the final delivery of a product, RTI will notify the university.
- **Final Publication within TxDOT** — When a department manual is developed under a research or implementation project managed by RTI, the final outcome of that project

is a draft department manual. Once the PM approves the product on the RTI project, RTI ensures the District, Division or Office, generally the division responsible for the functional area, receives the material in a format that will facilitate final approval and publishing of the manual within TxDOT.

Construction Specifications

- **Format** — Specifications will be delivered in a format consistent with those found in the current version of TxDOT's standard specifications.

- **Final Approval within TxDOT** — Once specifications are approved by the PM, they must be approved by TxDOT's Specification Committee before distribution for use.

- **Other Specifications Format** — The required format for delivery of specifications, other than construction specifications, will typically be stated on the Deliverables Table in the Project Agreement. If not stated in the Project Agreement, the required format will be discussed with the PM before the specification is first submitted to RTI.

Training Materials

- **Development** — Development of training materials shall be coordinated with the agency that will ultimately be responsible for providing and supporting the training. Within TxDOT, this may be a specific technical division or the Human Resources Division. It may also be an outside entity, such as the Texas Engineering Extension Service (TEEX) or the National Highway Institute (NHI

- **Format** — The format in which the training material will be delivered is specified on the Deliverables Table. For a specific training module, multiple formats may be required, such as student notebooks for a workshop, hard copy and electronic instructor material, and a video presentation. Some training modules may be required to be delivered via the internet.

Video Presentations

- **Quality** — Commercial quality equipment will be used for any video footage either maintained raw to document research work or developed into a formal presentation.

- **Scripts** — Scripts for formal presentations will be submitted to RTI for review at least 60 days prior to the start of production.

- **Review of Draft** — A draft of the presentation will be presented to RTI and members of the Project Team for review, prior to final editing.

Technical Report Documentation Page

A Technical Report Documentation Page is not generally required. Each product will carry adequate identifying information, on the product itself, to make this form unnecessary. If the university chooses to submit this form, see "Draft Products" in Section 3 of this chapter.

Copyrights

The same standards for use of copyrighted material, and ownership of copyrights, apply to products that apply to technical reports, when the product is one to which these standards can be logically applied.

Ownership and Release of Data

As stated generally in Article 16, “Ownership of Data,” of each CRIA, release of information contained in a product is restricted prior to approval of the product by TxDOT, to the extent allowed by the Texas Public Information Act.

Chapter 7
University Costs

Table of Contents

Section 1
Allowable Costs

Eligibility Requirements

Eligible costs chargeable by universities, and other research agencies to TxDOT's Research and Implementation Projects are outlined in 2 CFR 200, which became effective on December 26, 2014. The following principles must be met for costs to be eligible for reimbursement by TxDOT:

- Project Agreement must be executed by RTI for any costs to be eligible for reimbursement by TxDOT.
- Costs must be necessary and reasonable on the specific project to which the costs are charged.
- Costs meet all applicable principles for allowable costs in federal regulations.
- Costs are payable under Texas state requirements and rules, including the determination of the correct state budget year.
- Costs must be within the scope of the executed Project Agreement.
- Costs must be incurred during the term of the Project Agreement.
- Costs must be within the approved budget limits for the project.

While there is some judgment involved in determining what costs are necessary and reasonable, there are some costs that should not be charged to a project.

- Business meals not related to travel.
- Costs not actually incurred. For example, charging an amount based on an allowance or estimate, rather than actual cost.
- Salary for someone who did not work on the project for the amount of time charged.
- Costs for preparing proposals.
- Purchases, such as equipment, that are not expected to be used on that project.

Cost Control

TxDOT and universities share the responsibility of ensuring that costs charged to RTI projects meet state and federal requirements. This responsibility is covered by CRIA Article 13, "Billing and Payment" which discusses billing frequency, requirements, and limits.

Equipment

Refer to section 2 of this chapter for requirements related to purchasing and safeguarding equipment purchased under RTI projects.

Supplies

Supplies in this context mean tangible personal property other than that meeting the definition of equipment. Prior approval is not needed from RTI to purchase supplies under a research or implementation project. The university generally retains title to supplies, unless RTI requests title in writing, or title is retained by TxDOT in the Project Agreement. Supplies should be used by the university on the project for which they were acquired. After the project terminates, the supplies should be used on other TxDOT projects

If supplies cost is excess of $5,000 are still on hand when a project terminates, RTI's approval is needed to retain it, without compensating TxDOT. Notify RTI in writing, describing the type of supplies still on hand, and how it is planned to be used. If the supplies will not be used on another TxDOT project, RTI will advise how to compensate TxDOT.

Facilities

Universities and research agencies maintain and operate the facilities necessary to conduct research and implementation projects. Items such as standard office equipment, including general use computers, and furniture are part of these facilities and are not generally chargeable to TxDOT projects. Refer to CRIA Article 10, "Facilities, Equipment and Procurement", for additional information. It discusses such things as equipment procurement, management, and maintenance and repair.

Indirect (Overhead) Charges

Indirect charges by universities to TxDOT research and implementation projects are covered in CRIA Article 12, "Indirect Cost Charges", which discusses indirect cost rate limits and what direct costs indirect rates may be applied to. TxDOT does not allow indirect charges on projects whose primary purpose is to reimburse university personnel for out-of-pocket travel costs to participate on TxDOT research committees.

Salary and Travel

Salary and travel costs are covered in CRIA Article 11, "Salary and Travel Charges". This article discusses general requirements for salary and travel charges, and the advance approval needed from TxDOT for out-of-state travel by university personnel.

Foreign Travel

In addition to the requirements in CRIA Article 11, university personnel are responsible for meeting all requirements of their agencies and the state for pre-approval of foreign travel.

Proposal Preparation

Costs incurred to prepare proposals in response to a Request for Proposal (RFP) issued by RTI must be covered by the university or research agency proposing. These costs may not be charged to a prospective or current TxDOT project. Refer to CRIA Article 1, “Nature of the Agreements” for additional information.

Section 2
Equipment

General Requirements of Equipment

Definition of Equipment - University research facilities may not include all the equipment needed to complete a specific research or implementation project. Specialized items needed for a specific project are typically included in the project budget and procured under that project.

Both state and federal requirements govern equipment issues related to RTI projects. State requirements are implemented through the State Property Accounting (SPA) System maintained by the Texas Comptroller. Relevant federal requirements are contained in several documents.

- Title 23, Section 420.121, "What other requirements apply to the administration of FHWA planning and research funds?", of the Code of Federal Regulations.
- Title 49, Section 18.32, "Equipment", of the Code of Federal Regulations.
- Title 49, Section 19.34, "Equipment", of the Code of Federal Regulations.

In general, federal requirements state that any equipment acquired under an RTI project should be used, managed, and disposed of according to state requirements. Universities are required to follow 49 CFR 19.34 which is consistent with 49 CFR 18.32 and with state property management requirements.

In this context, equipment is:

- tangible, nonexpendable personal property.
- with a useful life of more than 1 year, and
- a unit cost of $5,000 or more, including all components.
- that will be used by a university to conduct research work.

The remainder of this section summarizes the requirements covering acquisition and property management for university equipment acquired under RTI projects. Equipment provisions are covered in general in CRIA Article 10,"Facilities, Equipment and Procurement".

Approval for Procurement

Procured equipment must be approved for purchase under current state procures methods and requirements.

Approval for an equipment purchase under an RTI project is obtained and evidenced in either of two ways:

- the item(s) is listed specifically on the approved Itemized Budget for the project, or
- the university receives written approval from RTI prior to the purchase (written requests should include the estimated cost).

Equipment Purchases Must be Necessary and Reasonable

- Equipment purchased under a project, must be for use on that project.
- Purchases made near the end of a project, when there is no reasonable expectation that the equipment will be used on that project, will not be reimbursed by TxDOT, regardless of budget or purchase approval.

The university may also elect to rent the equipment, using the university's internal procedures, if cost savings will accrue to the project.

Procurement Reporting

Universities report equipment purchases to RTI through their billings that include these costs. For details on the information required, see Section 3 below.

Title

TxDOT retains title to all equipment purchased under RTI projects, unless RTI transfers title, in writing, to a university. If TxDOT and a university share the cost of a piece of equipment, they share title. If the university incorporates a component purchased by TxDOT into a piece of equipment, such that the component cannot be recovered from the equipment, TxDOT and the university share title to that equipment.

Possession and Use

Use equipment on the project for which it was acquired until it is no longer needed on that project. TxDOT may then allow the university to retain possession of the equipment for use on other TxDOT projects funded through the Research and Implementation Program. Such equipment should not be used on non-TxDOT projects, unless approved in advance by RTI. TxDOT may ask for the return of TxDOT equipment at any time after project termination, or cancellation.

Property Management

The university must maintain effective property records for all equipment purchased under RTI projects and still in the possession. Effective inventory records typically include:

- A clear description of the equipment.
- Serial number, model number, date of manufacture, or other available manufacturer's identification information.
- State or university property identification number.
- Source of the equipment, including the RTI project number.
- Who holds title.
- Date purchased (or date received if furnished by TxDOT or the Federal government).
- Cost of the equipment.
- Location of the equipment.
- Condition of the equipment and last inventory date.
- Disposal data, including date and price.

Universities are responsible for properly tagging, maintaining, and securing equipment. If TxDOT pays for all or part of a piece of equipment, it must be tagged with a TxDOT-RTI inventory tag. The university is also responsible for conducting annual equipment inventories, and reporting equipment in the possession under the State Property Accounting System. Loss, damage to, or theft of equipment should be investigated by the university, fully documented, and reported to RTI.

RTI is responsible for tracking equipment purchased under research and implementation projects as long as TxDOT holds title to the equipment, or until a university disposes of the equipment, whichever comes first. RTI maintains inventory records for such equipment, performs physical inventories, and monitors each university's inventory process. During physical inventory, RTI will tag equipment in the possession as belonging to TxDOT, if the equipment was not previously tagged.

Disposal

When the university no longer needs TxDOT equipment used within its research, inform RTI in writing that it is no longer needed. State the condition of the equipment and an estimated fair market value. RTI will evaluate the condition and potential uses for the equipment, and instruct the university about disposal actions. Equipment purchased under an RTI project should not be transferred to another agency, or disposed of, without contacting RTI.

Section 3
Billings

Submitting Invoices

RTI considers timely billings submissions to be critical for effective project management. Bills should be sent directly to RTI, generally monthly and no later than 120 days after costs are incurred. CRIA Article 13, “Billing and Payment”, includes provisions covering billing frequency, the application of OMB Circular A-21 and penalties assessed on untimely billings based on a $500 materiality limit.

Electronic Format – All invoices are required to be submitted in PDF format (1 PDF file per invoice). The file can be submitted:

- By email to RTI if the email and attachment together are smaller than 15 megabytes.
- Larger files can be sent to RTI through TxDOT’s drop box service, available at https://ftp.dot.state.tx.us/dropbox.

Before submitting an invoice, perform a quality control check to ensure the invoice is acceptable. RTI recommends checking at least the following points:

- All pages of the PDF are legible. Rotate any landscape pages as needed to be more readable onscreen.
- In order to save data storage space, PDFs are scanned in black and white, not in color.
- Notations (e.g., checkmarks) are used instead of color highlighting to point out specific amounts or other information.
- Excess supporting documentation beyond requirements is removed.

All charges must be for costs incurred during the term of the agreement and within the fiscal year billed. The fiscal year in which a cost is incurred is determined by state purchasing and fiscal management standards. See §5.56 of Title 34, Part 1, Chapter 5 of the Texas Administrative Code for more information.

Send a final invoice, marked “FINAL”, for each fiscal year a project is active.

For equipment which was not received by the end of the fiscal year to be billed, also send a copy of the purchase order awarded during that fiscal year.

If RTI does not receive a notice of remaining charges on a project by December 31, RTI will consider the last invoice received by December 31 as the final invoice for that project year, even if it is not so marked. If invoices are not submitted as required above, TxDOT may not be able to pay them.

Billing Format

Submit each invoice and all supporting documentation with the following requirements, Basic billing requirements are that each invoice be legible, contain all required supporting documentation, and include at least the information listed below on the cover page or on a summary immediately following the cover page.

- TxDOT project number(s) being billed
- University invoice number.
- Fiscal year being billed.
- Billing period (e.g.: July 1, 2014, through July 31, 2014). The billing period must fall within a single fiscal year, and within the active dates of the project.
- Total amount.
- Cumulative fiscal year-to-date amount for the project, including the current invoice.

Each invoice may include other information for the university's benefit, such as university reference numbers, but should not include a TxDOT.

Supporting Documentation

Send supporting documentation listed below, for each project invoiced. If any required document is missing the invoice will be declined.

Break-out pages detailing all expenditures on the invoice by category, including date posted, voucher numbers, break-out of fringe benefits, a list of individual charges, etc.

Documentation of all out-of-town travel (travel away from the researcher's normal work location) sufficient to clearly show:

- who traveled,
- date(s) of the travel,
- destination(s),
- purpose of the travel,
- who the researcher met with,
- when billing for weekend days provide a clear explanation

- specific costs (meals/lodging, mileage, etc.), and
- RTI approval prior to the travel for out-of-state (including foreign) travel.

Documentation of salary charges to clearly show:

- who worked on the project that billing period,
- total cost charged for each person,
- pay period, and
- monthly or hourly rate of each person working on the project. (Show salary rates by directly stating each person's rate in supporting documentation, or by showing the percentage of monthly time or number of hours being billed.)
- For tuition costs, documentation showing the name and amount charged for each person
- For supplies/equipment costs, a copy of the vendor's invoice or receipt, which should clearly identify the items purchased. A vendor invoice is not required for charges under $250, but some documentation is required for all purchases.

Documentation for equipment purchases:

- Send evidence that the equipment has been added to the university's inventory system, such as a screen print from the university or state property accounting system, or other documentation showing:
- Description of equipment, including make, model number, and serial number if available
- university equipment number
- date of purchase
- current location of equipment

Documentation to support charges for services received from outside the university, or from another department within the university. For outside services, a copy of the vendor's invoice or receipt. A vendor invoice is not required for charges under $250, but some documentation is required for all services.

Documentation to explain and justify unusual costs; such as excessive printing, significant equipment repair costs, unusual supply costs, or similar items.

Universities are encouraged not to send supporting documentation beyond what is required. The inclusion of excess documentation increases the time required to process invoices and may generate more questions from RTI to the university.

Review and Payment in TxDOT

Upon receipt, RTI's Accounting Specialist (AS) reviews invoices for general compliance with requirements, and for any unallowable charges. If there are questions, the AS will contact the university's finance staff. After any issues identified in the administrative review are resolved, the AS routes the invoice to the PM for review the invoice.

PMs review invoices for reasonableness and to identify charges that may not relate to approved project work. If there are questions, the PM will contact the Project Supervisor, or may request the AS to ask for additional information.

RTI determines whether payment should be withheld because deliverables are overdue. Whenever possible, universities should not submit invoices for projects with overdue deliverables.

Invoices that pass RTI's review, without needing additional information, are typically paid by the Comptroller's Office 30 days after their receipt at RTI. RTI will request the university's accounting staff to resubmit an invoice requiring adjustment and will advise them if an invoice is declined. For questions about the status of payment of an invoice after that time period, contact RTI to help resolve the issue.

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Research and Technology
Implementation Office

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