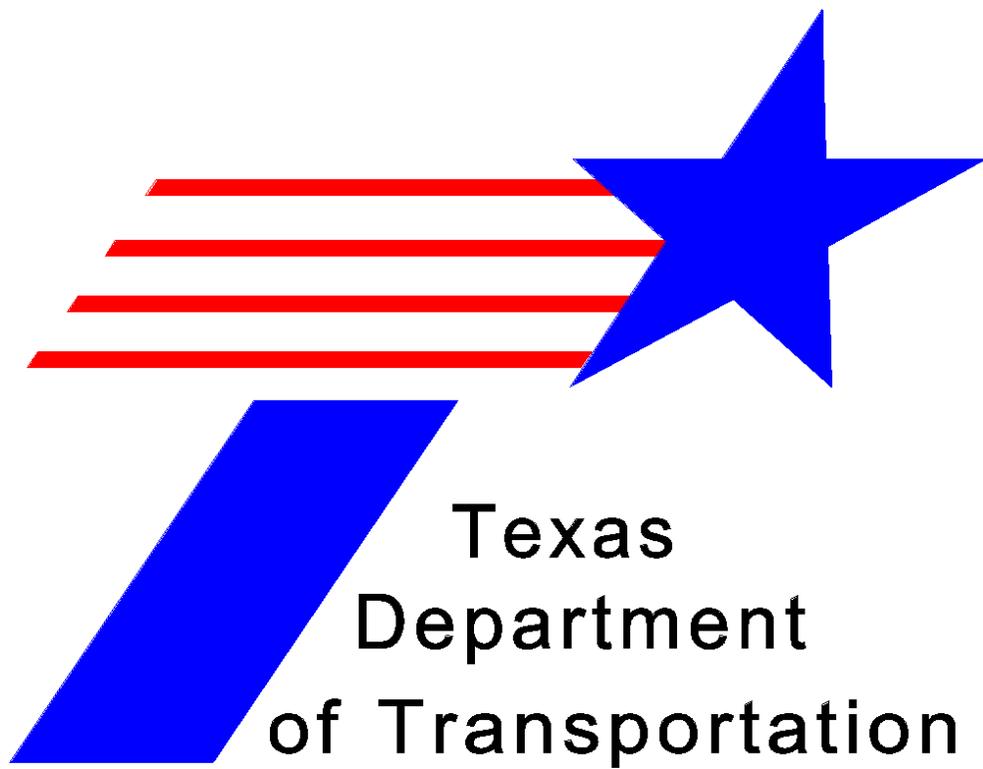


Research Manual



Texas
Department
of Transportation

Revised February 2015

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Manual Notice 2015-1

From: Dana Glover, Director, Research and Technology Implementation Office

Manual: *Research Manual*

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Purpose

To update chapters 1-7 of the *Research Manual*.

Changes

These manual changes remove information that is duplicated in the University Handbook and in the Cooperative Research and Implementation Agreement (CRIA), and add new policies and processes. These changes supersede prior versions of the manual and affect all chapters of the *Research Manual*:

Chapter 1, Introduction.

Chapter 2, Roles and Responsibilities, deleted the previous chapter referencing the CRIA, and renamed the remaining chapters.

Chapter 3, Research Cycle.

Chapter 4, Implementation Program Development.

Chapter 5, Contracting.

Chapter 6, TxDOT, FHWA, and Local Costs.

Chapter 7, Other Research Programs.

Contact

For more information about this manual, please contact the Research and Technology Implementation Office at 512-416-4730.

Archives

Past manual notices are available in a [pdf archive](#).

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Chapter 1 — Introduction

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Section 1 — About This Manual

General

The RTI Manual presents program policies and an overview of the technical research program of the Texas Department of Transportation (TxDOT). Managed by TxDOT Research and Technology Implementation Office (RTI), the program includes financial support for implementation of research results through the RTI Implementation Program.

This manual:

- ◆ describes the various programs and activities, how they are developed, and provides an overview of how they work,
- ◆ describes the individuals and organizations involved in research and their overall responsibilities, and
- ◆ describes the legal and policy issues involved in the program, such as authorizing legislation and Federal and state regulations

This manual supplements the provisions of Cooperative Research and Implementation Agreements (CRIAs) executed between TxDOT and Texas state-supported universities and university systems. By signing the CRIA, each university, or university system, agrees to abide by TxDOT procedures in the conduct of research and implementation projects. This manual provides the framework and policies under which those procedures are developed.

Section 2 — Research Program Overview

Cooperative Research Program

The Cooperative Research Program is research and related efforts conducted by Texas state-supported universities for the Texas Department of Transportation (TxDOT). It focuses on technical transportation issues. Cooperation with applicable universities is reflected through close coordination between TxDOT users of research findings and university researchers, and participation of the universities in the partial funding of some projects.

Importance of the Research Program

The program is important to **TxDOT** because:

- ◆ the development and application of advanced technology, new knowledge and improved methods and procedures are critical to future TxDOT service quality and operational cost-effectiveness,
- ◆ top-quality university researchers are available to help solve important transportation problems, and
- ◆ university students working on TxDOT research projects may be attracted to TxDOT careers upon graduation.

The program is important to **universities** because:

- ◆ a continuing, adequately-funded research program allows them to build and maintain a high-quality faculty and staff of researchers, and
- ◆ it offers graduate students the opportunity to work on and learn from research projects.

The program is important to the **State of Texas** because:

- ◆ it contributes to the high quality of Texas transportation facilities and services,
- ◆ it assists the state in meeting needs created by growth and changing technologies,
- ◆ it ensures that transportation research funds are available to Texas universities to maintain the high quality of education at those institutions, and
- ◆ it ensures that high-quality transportation talent is available in Texas.

Types of Research Involved?

Topical areas — Chapter 150 of the Education Code, provides for research relating to transportation, including:

- ◆ economics,
- ◆ planning,
- ◆ design,
- ◆ construction,
- ◆ maintenance, and
- ◆ operation of transportation facilities.

Transportation facilities are defined as:

- ◆ highways,
- ◆ turnpikes,
- ◆ airports,
- ◆ railroads (including high-speed railroads),
- ◆ bicycle and pedestrian facilities,
- ◆ waterways,
- ◆ pipelines,
- ◆ electric utility facilities,
- ◆ communication lines and facilities,
- ◆ public transportation facilities,
- ◆ port facilities, and
- ◆ facilities appurtenant to other transportation facilities.

Applied and Basic Research — The program has traditionally been drawn from problems that need solutions, and concentrates on achieving results that can be applied rapidly to improve procedures and materials. Basic research, to understand underlying processes and phenomena, is also important and is supported in the research program.

Research Involving Information Technologies

Many research projects include the development of simple automated tools to be delivered to TxDOT, much like an advanced end-user might develop for themselves.

While automated tools and applications are a natural outcome of some research projects, the purpose of the research program is not to fund projects whose sole or predominant objective is the acquisition, development, maintenance, or enhancement of new or existing hardware or software.

Projects with IT are discouraged. No project with IT will be executed unless approved by TxDOT's Executive Director.

Performing Research for TxDOT

Any Texas state-supported senior college or university performs Research — It is TxDOT policy that research projects be open to competition among all Texas state-supported senior colleges, universities, and research agencies, referred to collectively in this manual as universities, that have an interest and expertise in a specific project.

The Research and Technology Implementation Office maintains a list of Texas state-supported universities who have named research liaisons, and sends requests for proposals (RFPs) and other program announcements to those liaisons. Joint projects, in which two or more universities pool expertise on a single project, are encouraged.

Other Texas state and local agencies — Texas state and local agencies may conduct projects for which they have expertise, if the expertise is not otherwise available at a Texas state-supported university.

Federal agencies — Federal agencies may conduct research projects for TxDOT.

Private firms, private universities, and other private entities — Private sources are rarely requested to conduct research projects for TxDOT. The Texas Legislature provided for the development of the cooperative programs between TxDOT and Texas state-supported universities. The intent was to develop a program that would benefit the State of Texas as a whole through the strengthening of both TxDOT and the participating universities. Therefore, it has been TxDOT policy to honor the intent of the legislature and restrict the majority of the program to our university partners.

If expertise is not available at a Texas state-supported university, or at a Texas state agency, TxDOT Administration may approve contracting with the private sector, under provisions for consultant or professional services contracts, or other procurement procedures.

Federal Regulations

The Federal Highway Administration (FHWA) provides program-level oversight of TxDOT's research program, because it is federally funded. FHWA employees also serve on several of TxDOT's research project teams, providing federal oversight and technical expertise.

Federal regulations, 23 CFR Section 420.209, include the requirement that each state periodically conduct a review, termed a “peer exchange”, of its research program, and that the state participate in similar reviews of other states' programs.

Section 3 — Authority and References

Research Program History

The earliest program of cooperation between TxDOT and a university is described in Vernon's Texas Civil Statutes (VTCS), Article 6904 1/2 I, Laboratories, as legislated in 1917 by the 35th Legislature. This law stated that the laboratories of Texas A&M University and The University of Texas would be at the disposal of the Highway Engineer for testing and analyzing road and bridge material.

Commission Minute Order No. 25396 was passed on September 29, 1948, providing for a research program between the Agricultural and Mechanical College of Texas (now Texas A&M University) and the Texas Highway Department (now TxDOT).

On May 24, 1963, Commission Minute Order No. 52742 was passed, authorizing the State Highway Engineer to enter into agreement with such other qualified Texas schools and universities under the terms of Minute Order No. 25396.

On May 13, 1997, the Texas Legislature passed Senate Bill 698, which broadened TxDOT's authority to contract with Texas colleges and universities for transportation-related research.

Authority for the Research Program

State of Texas — Authority for the program is found in the following statutes:

- ◆ *Education Code*, Section 85.29, which provides for research and experimentation in transportation between TxDOT and the Texas A&M University System.
- ◆ *Education Code*, Section 67.24, which provides for research and experimentation in transportation) between TxDOT and The University of Texas.
- ◆ *Education Code*, Chapter 150 which provides for research and experimentation in transportation between TxDOT and Texas public senior colleges and universities.

Federal Highway Administration (FHWA) — The research program is conducted under the provisions of 23 CFR Part 420 - Planning and Research Program Administration.

Section 4 — Research Funding and Budgeting

General

The discussion in this section is limited to work which meets the definition of research, implementation or technology transfer and is contracted or managed through the Research and Technology Implementation Office (RTI).

Federal Funding of State Planning and Research (SPR) Program

Source of SPR Funds — Title 23, “Highways”, Chapter 5, “Research, Technology, and Education”, of the US Code provides for SPR funding. Of the total funds apportioned to states, it authorizes 2% of most apportionment categories to be used only for planning and research activities. These funds are administered and accounted for as a single fund, regardless of the category of Federal-aid highway funds from which they were derived.

The 25 Percent Rule — Chapter 5 of the US Code further states that not less than 25% of the SPR funds apportioned to a state for a fiscal year shall be used for research, unless the state meets the requirements for a waiver of this rule.

Sharing of SPR Program Funds — Federal SPR funds are shared between RTI and the Transportation Planning and Programming Division (TPP).

Obligation of SPR Funds — RTI requests obligation of federal SPR funds before each annual program is initiated, based on 80% of the total Legislative appropriation for that program. Obligation of SPR funds for projects which are not part of an annual program are handled individually for each project.

Federal SPR Work Program

Requirements for an SPR Work Program — Title 23, Section 420.111 of the Code of Federal Regulations (CFR) requires that the proposed use of FHWA Planning and Research funds be documented by TxDOT in a work program “acceptable to the FHWA.” Work must be approved by FHWA before SPR funds can be obligated.

Separate Work Programs for Planning and Research — RTI prepares an SPR Part II (research) annual work program, including quarterly updates, separate from the SPR Part I (planning) work program prepared by TPP. The Part II work program includes information on TxDOT’s research and implementation programs. RTI and TPP work together to provide any summary information requested by FHWA.

Budget

Funds for research are budgeted under TxDOT's Research and Technology Implementation budget each fiscal year.

RTI develops a research budget each year composed of funds for:

- ◆ program administration (RTI staff and office expenses),
- ◆ program and project management performed by TxDOT research project teams,
- ◆ TxDOT's cost for TRB membership and participation in NCHRP, and
- ◆ research contracted to Texas state-supported universities.

RTI funds an implementation program each year for:

- ◆ assisting TxDOT in implementing research results and products,
- ◆ technology transfer activities and support, and
- ◆ implementation program administration and management.

Funding available for research and implementation programs is set by TxDOT administration through the department's budgeting process, and is adjusted as necessary depending upon state and federal appropriations.

Additional Federal Funds may be used — Research and implementation budgets reflect approximately 80% federal SPR funds and 20% state matching funds. Estimated federal funds are included in TxDOT's Legislative Appropriations Request (LAR) to assist lawmakers in appropriating adequate state funds to match the federal funds. The final state appropriation includes those estimated federal funds. If federal funds in excess of those identified in the LAR become available during the fiscal year (such as through work orders issued by FHWA), the research budget may be increased by the amount of new federal funds available.

RTI's cash budget is only increased when total research expenditures, including for projects funded with these additional federal funds, exceed RTI's original cash budget. At that point the Finance Division works with RTI to identify the additional funds available and needed, and adjusts RTI's budget.

Other Funds — Research or implementation funding may come from sources other than TxDOT state funds or federal SPR funds apportioned to Texas. Including but not limited to:

- ◆ **Other state agencies** – Occasionally, other state agencies offer to contribute money to TxDOT to fund research of mutual interest, which TxDOT is managing. For example, the agency can recommend that they contribute the state's 20% share to match the 80% Federal SPR share of project costs.

- ◆ **Federal agencies** – FHWA often contributes up to 100% of the budget for specific research or demonstration projects which may have a compelling national importance. FHWA issues work orders for each project and approves funding. If a university will be performing the work, a contract is executed by RTI in accordance with established research contracting procedures.
- ◆ **SPR funds apportioned to other states** – FHWA recognizes a type of project called a Pooled Fund project. For these projects, one or more states and FHWA pool together to conduct research of regional or national significance. FHWA may waive the usual 20% non-federal match on these projects. When Texas leads one of these projects, all the expenditures on the project flow through RTI’s budget because the work on the project is all contracted by RTI. SPR funds from other states are recovered as discussed above under “The Use of Additional Federal Funds.”
- ◆ **Other agencies or entities** (including private institutions) – Projects of mutual benefit may be developed with agencies in addition to those mentioned above. Joint-funded projects with private entities are possible under certain circumstances, and may be performed with strict guidelines to protect the public interest.
- ◆ **No other TxDOT sources** – Current department policy requires all research work to be funded through RTI. (Such a restriction is not placed on implementation work.) Additional TxDOT funds for research can come only from the Finance Division increasing RTI’s budget upon approval by TxDOT’s Administration.

Section 5 — Research Library

Location

The Center for Transportation Research (CTR) Library, at The University of Texas at Austin is the official depository for TxDOT's research library collection. The CTR library contains materials previously housed at TxDOT and many additional transportation related materials, from many different sources.

Services Available to TxDOT Employees

CTR library staff maintains and operates the library as a reference and lending library, with all materials available for loan to TxDOT employees free of charge. The library's lending policies and an on-line catalog can be found at library.ctr.utexas.edu/index.html.

Library staff is available at this email address, ctrlib@austin.utexas.edu, to:

- ◆ help employees learn how to effectively use the on-line catalog,
- ◆ answer queries for employees without Internet access to the catalog,
- ◆ fulfill requests for items found through the on-line catalog,
- ◆ search for relevant material that may be housed at CTR, but not yet listed in the on-line catalog, and
- ◆ search other transportation related reference sources.

Section 6 — Definitions

Research

Research is a systematic controlled inquiry, often involving analytical or experimental activities, which seeks to gain new knowledge and which may involve development of new or revised products. Research includes:

- ◆ **Basic Research:** which is the study of phenomena to gain knowledge. Specific application may not have been identified.
- ◆ **Applied Research:** which is a project directed at solving a specific current problem and which usually results in the development of products ready for implementation.
- ◆ **State-of-the-Art or Practice Surveys and Studies:** which are studies used to gather existing information relative to an existing problem to assist in implementation or to better plan, direct, or focus research.
- ◆ **Development:** which is the translation of new knowledge into a product, and which may include:
 - **Research Field Testing:** which is to develop or modify a product at a test facility, or in TxDOT's operational environment.

Software program development which solely automates the use of existing technology, formulae, knowledge, and methods is excluded.

Implementation

Implementation is the adoption of a product for use, including Technology Transfer activities that promote adoption, such as:

- ◆ **Information dissemination:** which includes the development and distribution of brochures, manuals, articles, reports, videos, and other materials which provide product descriptions and instructions to enable and promote use.
- ◆ **Training:** which includes training course development and conduct necessary to enable and promote use.
- ◆ **Demonstration:** which is the placing of a product into TxDOT's operational environment to demonstrate its use, which includes:
 - **Deployment:** which is the initial procurement and dissemination of a product to users.
 - **Implementation Field Testing:** which is the demonstration or verification of product performance in TxDOT's operational environment.

Product

A product of the research program may be a new or revised procedure, process, field guide, design, standard detail or drawing, device, material, standard test method, specification, video, computer hardware or software, data collections, training material, or training class.

Field Testing

Field Testing is placing a product into a test facility or TxDOT's operating environment for further development (research), or into TxDOT's operating environment to demonstrate performance (implementation).

FHWA Definitions (23 CFR 420.203)

Research is a systematic, controlled inquiry involving analytical and experimental activities which primarily seeks to increase the understanding of underlying phenomena. Research can be basic or applied.

Basic research is the study of phenomena, and of observable facts, without specific applications towards processes or products in mind; the primary purpose of this kind of research is to increase knowledge.

Applied research is the study of phenomena to gain knowledge or understanding necessary for determining the means by which a recognized need may be met; the primary purpose of this kind of research is to solve a problem.

Development is the systematic use of the knowledge or understanding gained from research, directed toward the production of useful materials, devices, systems, or methods, including design and development of prototypes and processes.

Technology transfer includes those activities which lead to the adoption of a new technique or product by users, and involves dissemination, demonstration, training, and other activities that lead to eventual innovation.

Research, Development, and Technology Transfer (RD&T) activity means a basic or applied research project or study, development, or technology transfer activity.

Section 7 — Acronyms and Definitions

Acronyms and Definitions

CRIA – Cooperative Research and Implementation Agreement

DDO – Refers to TxDOT districts, divisions, and offices.

FPAA – Federal Project Authorization & Agreement, issued by FHWA to obligate funds to TxDOT projects and work programs.

IPR – Implementation Project Recommendation.

NCHRP – National Cooperative Highway Research Program, administered by the Transportation Research Board.

OPR – Office of Primary Responsibility.

PA – Project Advisor, an individual who provides additional expertise on a PMC to assist the Project Director.

PM – An RTI Research Project Manager who manages research and implementation projects for TxDOT from initiation of concept throughout the life of the project.

Portfolio Manager – An RTI Research Project Manager who manages the research and implementation project portfolio for the TxDOT RTI Office.

Project Review Board – TxDOT Administration who provide final review and approval of projects.

Project Team – TxDOT Project Team members or stakeholders included in the Project for Technical expertise.

PS – Project Supervisor, a qualified individual, sometimes referred to as the Principal Investigator, or Research Supervisor assigned by the University to supervise the University's work on a specific project.

RD&T – Research, Development, and Technology Transfer activity.

RTI – TxDOT's Research and Technology Implementation Office, responsible for managing TxDOT's research and implementation programs.

SPR – State Planning and Research Program.

TxDOT – Texas Department of Transportation.

Section 8 — Handbook and Forms

Overview

This section lists the *University Handbook* and forms most often used by personnel who interact with the research and implementation programs. RTI maintains several additional forms that are distributed only as needed, along with specific instructions.

The *University Handbook* provides the detailed discussions and procedures necessary to implement policies presented in this manual.

Handbook and Forms

TxDOT employees may find the *University Handbook* and forms on RTI's Crossroads (Intranet) site.

RTI sends the *University Handbook* and relevant forms to university liaisons as they are updated. Current forms may also be sent to liaisons with each Requests for Proposals (RFP) request for proposal.

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Section 1 — Project Team

TxDOT Administration

TxDOT Administration approve Implementation Project Recommendations (IPRs) in functional areas, including authority for sole-source proposals.

TxDOT Project Team

These members are appointed for each research or implementation project and include:

- ◆ a Research Project Manager, and
- ◆ Project Team Members, assist the Project Manager by providing vital technical expertise and applied transportation experience.

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.

Section 2 — Other TxDOT Personnel

Office of Primary Responsibility (OPR)

The Office of Primary Responsibility is the TxDOT district, division, or office (DDO) which maintains responsibility for the implementation of a project. A representative from the OPR is generally assigned to the Project Team, to provide expertise from the TxDOT organization most knowledgeable of the functional area within the scope of the project.

Research and Technology Implementation Office (RTI)

RTI manages TxDOT's research and implementation programs, including:

- ◆ coordinating the development of projects,
- ◆ developing and managing research and implementation projects budgets,
- ◆ providing technical and contracting support to all research teams,
- ◆ tracking and supporting the implementation of research results,
- ◆ completing required state and federal reports,
- ◆ maintaining relevant policies and procedures, and
- ◆ reporting program status to the Project Review Board.

The RTI Director:

- ◆ approves modifications to active research and implementation projects.

Section 3 — University Personnel

Research Team

The research team on each project is comprised of:

- ◆ a Project Supervisor, and
- ◆ other researchers, either professional researchers or students (generally graduate students), as needed.

The research team performs the work described in the Project Agreement, and coordinates and communicates with the Project Manager and Project Team, as needed, on all significant project matters.

University Liaison

Each Texas state-supported university wishing to participate in TxDOT's research program must name a central point of contact to handle communication and administration. This contact is the individual designated as the University Liaison.

The University Liaison:

- ◆ coordinates all research and implementation program matters between the university and RTI, including for example:
 - RTI policies and procedures,
 - requests for proposals,
 - proposal submissions,
 - Project Agreements and associated correspondence,
 - requests for specific expenditure or other approvals, as outlined in RTI's *University Handbook*, and
 - deliverables.
- ◆ coordinates research and implementation program matters within their university.

Chapter 3 — Research Cycle

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Section 1 — Research Cycle

The Research Program

While projects may be initiated throughout the year, most research projects are developed through the Research Program Cycle. Multi-year projects are reviewed each year to determine whether they are progressing effectively and productively, and should continue as planned.

Development Cycle

RTI announces specific dates and provides more specific instructions annually, for both TxDOT and university personnel, as activities occur throughout each fiscal year.

Although most research problem statements are submitted based on the cycle described above, DDOs are welcome to submit needs at any time of the year, and in any format. See “Submit Research Needs” on RTI’s Crossroads (intranet) web site for instructions.

Spring	Activities	Fall
April – May	Problem Statement Call	September – November
May	Problem Statements Due	November
May – June	Short list Problem Statements	November – January
June	Request for Proposals	February
June – July	Pre-proposal Meetings	February
August	Proposals Submitted	March
August	Proposals Evaluated	April
August	Proposals Evaluations Due	April
August – September	Project Awards	May
September – November	Project Agreements Signed	May – July
Can Start Immediately	Program Begins	September

Chapter 4 — Implementation Program Development

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Section 1 — Implementation Planning

General

Successful implementation of the results of a research project depends on the research results, management acceptance, management support, and how effectively the research results or technology are packaged and communicated to the end user.

How new technologies will be accepted by management and integrated into practice by the user are considered prior to initiation of a project and are continuously reviewed throughout the research project. The process of integrating research results into practice depends on:

- ◆ a valid strategy or implementation plan,
- ◆ effective communication of research results to the user community (this process is sometimes termed technology transfer), and
- ◆ a dedicated effort by individuals involved in the project.

Initial Planning for Implementation

Initial planning for implementation of research results begins with the development of the research Problem Statement by:

- ◆ identifying the problem to be addressed,
- ◆ identifying the stakeholders impacted by the problem,
- ◆ defining the objectives of the research,
- ◆ identifying the Office of Primary Responsibility (OPR) for implementing the expected results and products of the research project, and
- ◆ defining the products desired as outcomes of the research project, including the format for delivery of the products.

Implementation Plans

As projects near completion and deliverables are reviewed by the Project Team, focused plan for Implementation forms. Implementation plans are developed that outline the steps necessary to incorporate research products into TxDOT operations. Research products are delivered in various formats, including, stand-alone devices, handbooks, analytical tools, guidelines, specifications, or simply recommendations.

Section 2 — Implementation Projects

Funding

An implementation project is typically triggered by the need for specific funding to help integrate a product, new method or process, or innovation into department operations. The Research and Technology Implementation Office (RTI) manages the department's implementation program, which exists primarily to fund these needs. Funding may include:

- ◆ the incremental cost for the first use of a product or innovation in construction or maintenance operations,
- ◆ the purchase of newly developed non-capital equipment for use in the field, or
- ◆ training of field personnel in the use of new equipment or methods.

Implementation related costs not eligible for funding, include:

- ◆ capital equipment purchases, and
- ◆ travel expenses for TxDOT personnel.

Most implementation projects stem from products delivered from TxDOT's research program. Implementation Projects become eligible for implementation funding when projects are complete and ready for integration into department operations.

An implementation project may also be developed to aid in the implementation of a product or innovation from a non-TxDOT program or source. For these projects to be eligible for implementation funding, the TxDOT OPR must evaluate the product or innovation and determine that it is in fact ready to implement.

Implementation Project Recommendation (IPR) Approval

IPRs are reviewed and approved at several levels during their development. This includes the DE/DD/OD of the Office of Primary Responsibility (OPR).

Overview of Implementation Project Contracting

Implementation projects fall under two main contracting processes, depending primarily on whether or not a university will be involved in the project. The contracting process for university implementation projects echoes that of university research projects.

University Work

If university involvement is needed to implement a research product, the work is generally sole-sourced to the university that developed the product. In these cases, the Project Supervisor develops the funding estimate for university work.

If the product did not come from a research project, a competitive RFP is generally issued for university support for implementation activities. In these cases, the OPR and RTI Project Manager work together to estimate university activities and funding needed.

University Project Agreements include only the work the university is responsible for.

TxDOT Activities

The OPR's responsibilities under an implementation project are documented in various ways, depending on the scope of the work. Contracts related to the OPR's or other TxDOT responsibilities are not typically executed by RTI. The implementation program generally funds purchases or contracts executed by a district or division. Such issues are explained in the IPR.

RTI determines the best way to establish funding under implementation projects for TxDOT contracts and purchases. When purchases can be charged to RTI's budget, RTI provides a charge number to the district or division making the purchase. When funding must be established in a different budget strategy, RTI initiates a transfer of budget authority to the appropriate strategy funding the contract.

Management of University and TxDOT Performance

The implementation Project Manager directs both university and TxDOT work on an implementation project.

Section 3 — Other Implementation Activities

Technology Transfer

Technology Transfer is the term used for effective communication of research results to the user community, and is an integral part of implementation activities. The Research and Technology Implementation Office (RTI) assists in technology transfer functions in many ways. Including but not limited to:

- ◆ monitoring the quality of deliverables,
- ◆ creating articles about research or implementation projects for publication both inside and outside of TxDOT,
- ◆ maintaining and enhancing the RTI web sites,
- ◆ assisting with the creation of formal presentations of research results,
- ◆ overseeing the maintenance of TxDOT's transportation library, managed by the Center for Transportation Research at The University of Texas at Austin,
- ◆ serving as the clearing house for research related information from federal agencies and other state departments of transportation,
- ◆ maintaining information about TxDOT research activities on TRB's Research in Progress (RIP) web site, and
- ◆ funding technology transfer activities, such as video production, editing, printing of documents and other materials, and distribution of deliverables.

Chapter 5 — Contracting

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Section 1 — Introduction

Authority for Contracting

The Education Code, sections 67.24 and 85.29, Research and Experimentation for the Texas Department of Transportation, allows TxDOT to contract with The University of Texas at Austin and the Texas A&M University System to conduct research relating to transportation.

The Education Code, Chapter 150, Transportation Research, allows TxDOT to contract with any Texas public senior college or university to conduct research relating to transportation.

Types of Contracts and Programs

Cooperative Research and Implementation Agreement (CRIA) — A CRIA contains a set of standard provisions either required by state or federal law, or agreed to during negotiations between TxDOT and universities. Each university wishing to perform a TxDOT research and implementation project must first execute a CRIA with TxDOT.

The standard provisions in each university's CRIA are incorporated by reference into each Project Agreement executed under that CRIA.

Project Agreements (PAs) — Each research or implementation project conducted by a university is represented by a Project Agreement executed between the Research and Technology Implementation Office (RTI) and a Texas state-supported university. Each Project Agreement includes, but is not limited to:

- ◆ an itemized project budget, by fiscal year, for each institution involved,
- ◆ the termination date of the project,
- ◆ a detailed work plan,
- ◆ a deliverables table,
- ◆ a schedule of activities, and
- ◆ whether the project is part of an annual program, or an independent project.

Annual Programs — provides for both an Annual Program of Research and an Annual Program of Implementation between each university and TxDOT.

Each annual program is composed of one or more projects with similar sources of funding. Combining these projects under a single program gives the university some flexibility for sharing funds between projects. This flexibility precludes the need for a university to obtain RTI's approval for minor budget changes on individual projects.

The sum of the contracted budget amounts for all the projects in a university's annual program sets that program's total funding. Although billings may exceed the contracted budget amounts on individual projects, as described in Article 9A of the CRIA, total billings for all projects in a university's annual program may not exceed that program's total funding.

Independent Projects — Article 9B of the CRIA provides for research and implementation projects which are independent of an annual program. These projects are funded from sources different from the funding sources for an annual program, or from multiple funding sources. Consequently, these projects cannot share funding with other projects and must be contracted independently.

Contract Communications Management

RTI develops a Communications Management Plan for each research and implementation project. Each plan lists the stakeholders, the procurement milestones, and the expected formal communications relevant to each project.

Each plan also specifies the point(s) of contact during certain phases of the solicitation and performance periods of each project. Key roles outlined in each plan include:

- ◆ Contract Specialist – point of contact for:
 - receiving all external communications during the solicitation (RFP) period, responsible for recording and retaining all external communications during this period and for providing complete and consistent information to all researchers who expressed an interest in submitting a proposal on the project,
 - ordinary business communications while the project is on-going, and
 - formal contract notices while the project is on-going,
- ◆ Project Manager – after contract award, manages the day-to-day project activities, communicating with researchers as needed

Non-Discrimination

It is TxDOT's policy that no person shall on the grounds of race, color, national origin, sex, age, religion, genetic information, or disability be excluded from participation in or be denied the benefits of or otherwise be subjected to discrimination under any of our programs, including the research program. This policy is reflected in all executed CRIAs, most predominantly in Article 24.

Chapter 6 — TxDOT, FHWA, and Local Costs

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Section 1 — Program Management

Costs Charged to RTI by TxDOT Employees

The Research and Technology Implementation Office (RTI) maintains a charge number for use by TxDOT employees who are involved in management of TxDOT's research and implementation programs. This charge number is available for both time and travel charges related to program management.

Approval

Approval for the use of RTI's charge number is inherent in membership by a TxDOT employee if they serve on any type of review team to assist in reviewing documents or serving as a project advisor.

FHWA Participants

FHWA participants should contact their respective FHWA administrative offices for information on charging time and travel costs associated with TxDOT's research and implementation programs. RTI does not typically cover these costs.

City, County, or other Local Participants

A few members from local governmental or like entities serve on project teams in support of TxDOT's research program. RTI does not typically cover time or travel costs for these members.

Section 2 — Project Participation

Costs Charged to RTI

Research Program — The Research and Technology Implementation Office (RTI) maintains a charge number for use by TxDOT employees who are involved in managing individual research projects. This charge number is available for both time and travel charges related to research project management and is not project specific. Non-TxDOT employees serving on Project Teams are not typically reimbursed for time or travel costs.

RTI also establishes project specific charge numbers. These charge numbers are used by TxDOT employees providing assistance on university projects.

Implementation Program — Time or travel charges related to specific implementation projects are charged to RTI only if the scope of the specific implementation project includes those costs. Implementation project budgets do not typically include travel costs. These costs are typically charged to an employee's regular overhead account.

TxDOT Assistance on University Projects — University researchers sometimes need assistance from TxDOT to be able to perform work in the field. Traffic control is a common example of this type of assistance. After the researcher contacts TxDOT field personnel to coordinate the anticipated field work, the University Liaison submits a request to RTI describing the work, the estimated cost, and whether the work is expected to be performed by state forces or a contractor. After confirming that funds are available, RTI issues a Research Fund Authorization (RFA) and sets up a project specific charge number.

Individuals not serving in one of the approved capacities mentioned above are not eligible to use an RTI charge number.

Chapter 7 — Other Research Programs

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Section 1 — Transportation Research Board (TRB)

Overview

The Transportation Research Board (TRB) is a unit of the National Research Council, a private, nonprofit institution that is the principal operating agency of the National Academy of Sciences and the National Academy of Engineering. The Board's mission is to promote innovation and progress in transportation by stimulating and conducting research, facilitating the dissemination of information, and encouraging the implementation of research results.

TRB fulfills this mission through the work of its standing technical committees and task forces, addressing all modes and aspects of transportation, publication and dissemination of reports and peer-reviewed technical papers, administration of contract research programs, conduct of special studies on transportation policy issues at the request of Congress and government agencies, operation of an on-line database of research information, and the hosting of an annual meeting that typically attracts 8,000 transportation professionals from the United States and abroad.

One of the major contract research programs administered by TRB is the National Cooperative Highway Research Program (NCHRP), which is discussed further in the next section of this chapter.

Other contract research programs administered by TRB include:

- ◆ **Transit Cooperative Research Program (TCRP)** – established in 1992 by the three cooperating organizations: Federal Transit Administration; the National Academies, acting through TRB; and the Transit Development Corporation, Inc., a nonprofit educational and research organization. The TCRP undertakes research and other technical activities in response to the needs of transit service providers. The scope of TCRP includes a variety of transit research fields including planning, service configuration, equipment, facilities, operations, human resources, maintenance, policy, and administrative practices.
- ◆ **Airport Cooperative Research Program (ACRP)** – authorized in 2003 as part of the Vision 100-Century of Aviation Reauthorization Act. In October 2005, the Federal Aviation Administration executed a contract with the National Academies, acting through TRB, to serve as manager of the ACRP. Program oversight and governance are provided by representatives of airport operating agencies. The ACRP carries out applied research on problems that are shared by airport operating agencies, undertaking research and other technical activities in a variety of airport subject areas including design, construction, maintenance, operations, safety, security, policy, planning, human resources, and administration.

To learn more about TRB activities, programs, and publications, visit www.trb.org.

RTI Responsibilities

The Research and Technology Implementation Office (RTI) has several responsibilities related to TxDOT's involvement with TRB. These responsibilities include:

- ◆ coordinating the execution of TxDOT's contract with TRB, which provides funding to help TRB operate, and provides TRB materials to TxDOT,
- ◆ ensuring that TRB publications are maintained in TxDOT's research library, and
- ◆ maintaining information about active TxDOT research projects in the TRB Research in Progress (RIP) database.

Section 2 — NCHRP

Overview

The National Cooperative Highway Research Program (NCHRP) was created in 1962 as a means to conduct research in acute problem areas that affect highway planning, design, construction, operation, and maintenance nationwide. The state departments of transportation are the sole sponsors of the NCHRP. Support is voluntary and funds are drawn from each state's Federal-Aid Highway apportionment of State Planning and Research (SPR) funds, in an amount equal to 5½ % of the total SPR apportionment.

For a complete description of NCHRP program development, and listings of NCHRP projects and publications, visit TRB's web site at www.trb.org and navigate to Cooperative Research Programs. Or visit the NCHRP site directly at www.trb.org/NCHRP.

NCHRP Panel Membership

A panel of individuals representing state departments of transportation, the Federal Highway Administration, universities, and private trade associations is selected to manage each NCHRP project. The panel prepares the scope of work, reviews proposals, selects the organization to do the research, monitors progress on the project, and reviews final reports.

Many TxDOT professionals serve on NCHRP panels. RTI coordinates the nomination process for panel members between NCHRP and TxDOT.

Section 3 — Pooled Fund Program

Overview

The Federal Highway Administration (FHWA) sponsors the Transportation Pooled Fund Program as a means for interested states, FHWA, and other organizations to partner to solve common transportation related problems. To qualify as a pooled fund study, more than one state transportation agency, federal agency, local agency such as a municipality or metropolitan planning organization, college or university, or a private company must find the subject important enough to commit funds or other resources to the project.

State and federal transportation agencies may initiate pooled fund studies. Local and regional transportation agencies, private industry, foundations, and colleges and universities may partner with any or all of the sponsoring agencies to conduct pooled fund projects.

RTI Responsibilities

The Research and Technology Implementation Office (RTI) serves as TxDOT's coordinator for the Transportation Pooled Fund Program. In that role, RTI is responsible for:

- ◆ receiving solicitations for pooled fund projects, whether the solicitation is received from FHWA, a lead state on a project, or a DDO,
- ◆ reviewing each solicitation to determine how the proposed project relates to ongoing research activities and TxDOT priorities,
- ◆ coordinating with the appropriate TxDOT division to determine whether they wish to join the project,
- ◆ notifying other states of TxDOT's interest,
- ◆ managing the commitment of TxDOT's SPR funds to pooled fund projects, and
- ◆ managing pooled fund project information for TxDOT on the pooled fund web site at www.pooledfund.org.

Pooled Fund Project Funding

Pooled fund projects are funded from TxDOT's apportionment of SPR funds. As such, they compete for funding with other TxDOT research activities. This competition is either immediate or long-term, depending on whether or not Texas is the lead state on the project. Therefore, all pooled fund solicitations are evaluated to ensure that the benefits TxDOT expects to receive from the project are balanced with the funding committed.

Chapter 8 — Product Evaluation Program

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Section 1 — Introduction

Purpose of the Program

The Product Evaluation Program exists to:

- ◆ centralize and streamline the receipt and processing of vendor requests for TxDOT to evaluate new products,
- ◆ expand field evaluation of products, and
- ◆ communicate findings to vendors and interested department personnel.

The operations of the program are based upon administrative rules published in Title 43, Texas Administrative Code, §15.13. Types of Contracts and Programs.

Definition of a New Product

In the context of this program, a **new product** is a product or process currently available on the market for immediate acquisition for which TxDOT does not have a current specification, or a product which appears to be equal or superior to existing products covered by a specification.

Department Commitment

The department evaluates new products to assist in the utilization of new or improved materials, products, or equipment beneficial to the total transportation effort. Some of the goals of the analysis are to determine whether a product is ready for use and whether it would be beneficial to TxDOT operations. This evaluation may involve confirming vendor data, to avoid the expenditure of public funds on research and development of commercial products.

Section 2 — Product Evaluation Committee

Membership

The Research and Technology Implementation Office (RTI), divisions, and districts provide employees to serve on the Product Evaluation Committee. These employees are selected for their expertise in performing preliminary evaluations of new products. The committee typically includes representatives from:

- ◆ Research and Technology Implementation Office (Chair),
- ◆ Construction Division,
- ◆ Bridge Division,
- ◆ Maintenance Division,
- ◆ Design Division,
- ◆ Traffic Operations Division, and
- ◆ District representatives.

For a list of current members, contact RTI.

Responsibilities

The Product Evaluation Committee (PEC) serves as TxDOT's clearinghouse for coordinating the evaluation of commercially available products for which department specifications do not exist. Products evaluated by the PEC are generally assigned to a division for review. The division and relevant subject matter expert review comments form a strong basis for the final PEC determination.

The PEC does not endorse products. Their review and evaluation is limited to determining if a product may be useful in department operations, and whether it is a product the department may wish to procure.

A representative of the division assigned to evaluate the product is responsible for the monitoring and final decision for the particular product assigned. This responsibility includes developing criteria by which to accept, reject, or defer a product for further testing. Either laboratory or field testing may be recommended. All conclusive evidence of the evaluation determination is submitted to RTI, to be maintained as records of the Product Evaluation Program.

Section 3 — Product Evaluation Process

Submission of Products for Review

Product information is submitted directly to RTI, by a vendor completing a Preliminary Information for Product Evaluation form [1684.doc](#). TxDOT employees outside RTI who are approached by a vendor may refer the vendor directly to RTI.

Initial product reviews are performed based on the product information submitted. These initial reviews do not typically include a test of the product itself, but may conclude that testing of the product is necessary before a final conclusion can be reached.

If testing is considered necessary, the vendor will be notified and asked to provide a sample of the product for testing, at no cost to TxDOT. Only those products provided at no cost to TxDOT will be further tested under the Product Evaluation Program.

Assignment for Review

The Product Evaluation Committee makes an initial assessment of whether the product should be evaluated. If TxDOT specifications currently exist for the product submitted for review, no evaluation is performed under the Product Evaluation Program, and the vendor is notified of the lack of need for further product review. The PEC may also determine that a product should not be evaluated based on other issues, such as the type of product being of no apparent use within department operations.

If the PEC determines that the product should be evaluated, it selects a division or district to perform the evaluation. The selection is based on the functional area of TxDOT operations the product is most likely to benefit.