



# User's Manual for Research and Innovation

**Joint Transportation Research Program  
of the  
Indiana Department of Transportation  
and  
Purdue University**

*Discovery with Delivery Since 1937*

January 2014

# The Joint Transportation Research Program

## USER'S MANUAL FOR RESEARCH AND INNOVATION

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# Foreword

**From the Indiana Department of Transportation's perspective, research** is a means to proactively address challenges and opportunities through investigation and data-driven decision making and to introduce innovation into INDOT business processes. Research findings frequently provide benefits such as cost savings, better performance, safer infrastructure, and faster delivery of goods and services. Typically, INDOT research is applied research directed to a specific problem or need. While research sponsored through the Joint Transportation Research Program of the Indiana Department of Transportation and Purdue University primarily benefits INDOT customers and stakeholders, it also benefits the transportation industry and the community at large, including Indiana counties, cities, and towns. Technology transfer and the implementation of viable research findings into operations is a priority of the program and is one of the primary measures of success. Research, coupled with implementation, is one of the key drivers of innovation at INDOT.

The **mission** of the JTRP is to conduct, oversee, and partner in cost-effective transportation research that benefits our customers; perform specialized testing on behalf of the department; assist in technology development, identification, and transfer; provide expertise and technical assistance in solving INDOT's transportation problems; proactively address challenges and opportunities; and introduce innovation into INDOT business processes. The research program is a mandated part of the Federal-Aid program, and is a match program (80 percent federal:20 percent state match) utilizing dedicated State Planning and Research (SPR) federal funding.

As a condition for receiving federal research dollars for transportation research, peer exchanges are required of State Departments of Transportation. The most recent peer exchange for the research program was conducted October 23–25, 2013. Some of the outcomes of the peer exchange contained in the Executive Summary were as follows:

- The INDOT Research and Development (R&D) Division runs a sound program that is addressing the right needs, delivering useful products, communicating well, and making a positive impact.
- The program utilizes an effective top-down method for identifying relevant topics and needs for research.
- Research products provide a direct, measurable impact on agency operations.
- Although the INDOT R&D program is very good, opportunities exist for improvement that can foster a great program, such as greater value creation through effective, consistent, and more rapid implementation.

It should be noted that the positive findings of the October 2013 peer exchange are a direct result of the involvement of INDOT executive staff and their staff members, as well as the involvement of countless external transportation professionals in the research program: researchers, those serving on technical committees and focus groups, and many more.

INDOT customers and stakeholders have found that the research program provides not only a venue to solve problems and make data-driven decisions but also, as one of the program's performance measures indicates, a way to reduce costs and stretch transportation dollars. A 2012 cost impact report found that on average, for each dollar invested in the research program, seventy-five dollars in dividends (or benefits) were returned—not a bad rate of return on the investment for Indiana taxpayers!

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# 1. Program Administration

This chapter provides general information pertaining to the conduct of research and implementation sponsored by the Joint Transportation Research Program (JTRP) of the Indiana Department of Transportation (INDOT) and Purdue University. The information consists of general definitions, research policy, and the responsibilities of individuals related to administration of the program.

All procedures outlined in this guide follow the contracts and lease agreements between INDOT and Purdue University (see Appendix A).

## **1.1 Research Funding**

Research projects may be supported or financed by a variety of state and federal research funding programs.

The majority of JTRP research and implementation projects are funded through the State Planning and Research (SPR) Part II research program. JTRP administrative costs may also be funded with SPR funds. In addition, SPR funds are also used to support a number of national and regional research programs every year. Typically, SPR Part II funds require a minimum 20 percent cost share match. If a study is determined by the FHWA to address an issue of national interest, it may be funded completely with 100 percent federal funds.

INDOT must submit a *Work Program and Cost Estimate* to the FHWA before the start of each fiscal year (Code of Federal Regulations, 23 CFR § 420). This document includes proposed and ongoing SPR Part II research projects, a summary of the use of funding for the fiscal year, and the amount of funding required. As required by the federal transportation bill (MAP-21), INDOT must spend at least 25 percent of its annual SPR funds on research, development, and technology transfer activities.

23 CFR § 420 notes that these funds must be spent on research within three years following the end of each highway bill (e.g., MAP-21) or they are lost to the state. Although obligation authority may be flexed during any bill, if the allocated SPR Part II funds are not spent in this time frame, then the state's obligation authority may be reduced by the unspent amount.

## **1.2 JTRP Executive Committee and INDOT R&D Office Responsibilities**

JTRP is administratively housed in the School of Civil Engineering at Purdue University in West Lafayette, Indiana. Management and coordination of the research program is handled through the INDOT Division of Research and Development (R&D) in coordination with the JTRP Office. JTRP operates under the guidance of an Executive Committee. The INDOT Commissioner appoints an INDOT Deputy Commissioner to serve as the Chairperson of the JTRP Executive Committee. The Head of the School of Civil Engineering at Purdue University appoints a Purdue faculty member to serve as the JTRP Director.

Members of the JTRP Executive Committee are appointed as follows:

- The JTRP Chairperson appoints INDOT personnel to serve as voting members.
- The JTRP Director serves as a nonvoting member and may recommend additional Purdue personnel to also serve as nonvoting members.
- The FHWA Indiana Division appoints FHWA personnel to serve as nonvoting members.

Responsibilities of the Executive Committee members:

- Oversee and fulfill the mission and responsibilities of the JTRP.
- Assist INDOT business units and executive staff in identifying research needs.
- Identify and prioritize research need statements for funding and request proposals.
- Determine appropriate funding for research projects.
- Approve research proposals.
- Approve changes to proposals which require Executive Committee approval.
- Recommend implementation of cost-effective research results.
- Approve JTRP expenditures.
- Approve annual *Work Program and Cost Estimate* to be submitted to the FHWA.
- Request contract audit of SPR Part II research program, typically at the end of each fiscal year.

Responsibilities of the Executive Committee Chairperson:

- Chair JTRP Executive Committee meetings.
- Act on behalf of INDOT Commissioner on research matters.
- Assist INDOT business units in identifying major research needs of INDOT.
- Actively promote implementation of cost-effective research findings.
- Recommend INDOT staff members for appointments to the JTRP Executive Committee.
- Coordinate and promote research program roles and capabilities with INDOT executive staff.



Responsibilities of the JTRP Director:

- Serve as the chief executive officer of JTRP.
- Serve as the principal liaison between JTRP and other academic institutions and private and public organizations on matters related to transportation research.
- Oversee the planning and execution of the annual Purdue Road School.
- Recommend Purdue personnel as members of the JTRP Executive Committee.
- Prepare the agenda for Executive Committee meetings, report on JTRP activities at Executive Committee meetings, and supervise the preparation of minutes.
- Submit draft annual *Work Program and Cost Estimate*, semi-annual progress reports, budget estimates, and financial statements.
- Request research ideas and need statements from JTRP researchers and provide guidance with proposal development.
- Supervise personnel employed by JTRP, monitor project expenditures, and maintain equipment inventories.
- Review proposals and final reports of all JTRP research.
- Review time extensions and budget extensions requests.
- Encourage dissemination and implementation of research results.
- Ensure compliance with JTRP policies and procedures.
- Provide engineering and technical training support to INDOT business units and executive staff.

Responsibilities of the INDOT R&D Office:

- Oversee and supervise the INDOT research program.
- Identify transportation research needs, conduct research, and assist in technology transfer activities.
- Develop and oversee the INDOT research program budgets.
- Prepare and submit the annual *Work Program and Cost Estimate* to the FHWA in accordance with federal requirements.
- Serve as principal liaison for INDOT on research activities with JTRP, FHWA, and national associations.
- Promulgate and approve research policies, including policies for consideration by the JTRP Executive Committee.
- Maintain internal records for the research program.
- Process payments for research projects.
- Request audits of research projects and the research program.
- Ensure that the INDOT research program meets all requirements for use of federal transportation funds outlined in 23 CFR § 420.
- Assist the Executive Committee Chairperson with related responsibilities.
- Approve assignment, addition, and/or changes in appointments of Principal Investigators, Business Owners, Project Administrators, and Study Advisory Committee members.
- Recommend project proposals or changes to approved proposals to Executive Committee.

The INDOT R&D Division will assist the JTRP Advisory Board in the conduct of the program.

### **1.3 Public-Private Partnerships**

In many cases research projects are of mutual benefit to INDOT and industry. Industry may partner with INDOT and academia toward funding solutions for common problems. JTRP actively works to promote such public-private partnerships and leverage resources and expertise. Partnering may include providing technical expertise, serving as a SAC member, and funding materials, equipment, and laboratories. Monetary contributors must agree that the tasks, objectives, and deliverables outlined in the JTRP research proposal represent their entire interest in the project, without any requirements for special reports, invoices, or additional work not outlined in the original JTRP project proposal. Furthermore, industry partners shall not construe their participation as endorsement by JTRP, INDOT, or Purdue University of their products, methods, or services.

## **2. Identifying Research Needs**

### **2.1 The Focus Group Process**

The INDOT focus group initiative was an outgrowth of the 1998 research program peer exchange for State Departments of Transportation. The peer exchange participants recommended utilizing focus groups, aligned with INDOT business units and priorities, to identify priority research needs. The focus group process includes meeting with INDOT executive staff, participating in brainstorming sessions with diverse transportation professionals, selecting priority needs by INDOT staff, and approving a recommended program and funding by the Executive Committee. The results of this focus group effort are reflected in the development of the annual *Work Program and Cost Estimate* for FHWA approval.

Before final prioritization, the focus group co-leaders should review existing knowledge from previous research, especially from the Transportation Research International Database (TRID) and the Transportation Research Board's (TRB's) Research Needs Statement (RNS) and Research in Progress (RiP) databases, to avoid duplication of efforts related to a research need.

### **2.2 Research Need Statements**

A Research Need Statement (RNS) will be required for each research need under consideration by the focus group. A standard template for the RNS is provided in Appendix B. A well-written, complete RNS is needed for focus group ranking of research needs.

### **2.3 The Focus Group Ranking of Research Needs**

A standard ranking form will be provided to the focus group co-leaders. Only INDOT focus group members can rank research needs. This should be done independently and confidentially. Although they are nonvoting members, faculty representatives to the focus group are welcome to express their support, or concerns, for research needs before the voting (ranking) takes place.

The focus group co-leaders will summarize the overall ranking of the RNSs based on guidelines and standard summary sheet provided to them. The summary of the ratings from focus group members should follow the format provided.

## **2.4 Focus Group Reporting**

The final report from each focus group should contain the following elements:

- A list of the appointed focus group members and meeting participants.
- Brief background information on the chronology of the focus group activities (meeting minutes are not needed).
- A broad synopsis of the issues, problems, needs, state of the art, and so forth, of their focus group subject area as it relates to transportation needs in Indiana.
- A table of proposed RNSs, including priority, title, need submitted by, estimated cost, and intended users.
- The state of the knowledge of each proposed RNS.
- All completed RNSs submitted.
- Completed RNS rating forms from the INDOT focus group members.
- Final scores and the resultant priority listing for RNSs from the focus group.

The focus group co-leaders will be responsible for completion and submission of the final report to the R&D Office by the indicated deadline. The R&D and JTRP Offices will combine the individual focus group reports into a consolidated final report for Executive Committee approval.

## **2.5 Assignment of Project Personnel**

When research needs have been approved by the Executive Committee, the INDOT R&D Division and JTRP Office will meet to identify and recommend project personnel. Available capacity of staff should be considered when selecting project personnel. Principal Investigators (PIs) will be recommended by the JTRP Office and approved by the R&D Office. Project Advisors (PAs) will be selected by the INDOT R&D Division. Once project personnel have been selected, the recommendations will be sent to the Executive Committee for review and approval by the JTRP Chairperson. Business Owners (BOs) will be recommended by the JTRP Executive Committee and approved by the JTRP Chairperson. PIs will be notified by the JTRP Office to begin proposal development and must commit to presenting the proposal to the Executive Committee during the same calendar year, including assigning a presentation date.

## **2.6 Final Approval of the Research Program**

INDOT must submit a *Work Program and Cost Estimate* to FHWA before the start of each State fiscal year. This document must include each proposed and ongoing SPR Part II research project and indicate proposed funding for the next fiscal year. The FHWA Division Office will review and approve the SPR *Work Program* for each fiscal year. After approval of the *Work Program*, it is not necessary for INDOT to submit individual and detailed proposals for review and approval to the FHWA; however, changes to the total

funding level or major additions to the *Work Program* must be submitted to FHWA via an amendment request.

## **3. Research Team Members and Responsibilities**

Each JTRP research project is assigned a Principal Investigator (PI), a Project Advisor (PA), a Business Owner (BO), and a Study Advisory Committee (SAC). At the completion of the research project, the BO, in consultation with the PA, PI, and SAC, completes an Implementation Plan (IP; see Appendix F) and submits it to the R&D Office within 30 days after the completion of the research (research project completion date). Research team members' responsibilities are outlined below.

### **3.1 Principal Investigator (PI)**

The following are the responsibilities of the PI.

- Prepares and submits the research proposal in conjunction with the BO, PA, and SAC.
- Conducts and supervises research in accordance with approved proposal in a cost-effective and timely manner.
- Calls and chairs SAC meetings at least every six months.
- Prepares interim and final reports.
- Prepares semi-annual progress reports.
- Prepares and submits requests for changes to the approved research project in conjunction with and the approval of the BO, PA, and the SAC.
- Conducts a project closeout meeting with the BO, PA, and SAC.
- Provides project updates/summaries to the Executive Committee, as requested.
- Complies with all JTRP policies and procedures outlined in this manual and elsewhere.

### **3.2 Business Owner (BO)**

The INDOT BO is the primary INDOT owner of the research product and is designated by his or her supervisor and the Deputy Commissioner (DC). The BO ensures that deliverables meet INDOT needs and that research results are incorporated into INDOT operations as early as possible. The BO also develops and submits the signed Implementation Plan (IP). The responsibilities of the BO are as follows.

- Has ownership of the research and ensures that the research addresses INDOT needs. Assists PI and PA in development of research proposal.
- Communicates to his or her supervisor and the DC the need for the research, BO support of the research, and how the results will be implemented in INDOT operations.

- Assists the PI in presenting the proposal to the JTRP Executive Committee for approval. Conveys support of the research and intended use of the research deliverables to the Executive Committee.
- Attends and participates in SAC meetings.
- Reviews and approves, as required, semi-annual progress reports, interim reports, final reports, technical summary, project deliverables, and so forth.
- Reviews and gives initial approval to proposed project scope changes, project expansions/extensions, reallocation of proposal budgets, approval to purchase equipment/computers (not specified in proposal), and so forth.
- Works with the PI and PA to keep project on time and on budget, identify intermediate deliverables and concurrent implementation opportunities, and resolve any project issues/conflicts.
- Raises concerns to the R&D Director or JTRP Chairperson if the research is not addressing the department's needs.
- Develops and executes (including obtaining signatures and transmitting) the IP.
- Communicates with the DC throughout the research and implementation process regarding the project status, project deliverables, status of implementation, and any implementation roadblocks (e.g., funding issues, policy needs, legislative issues, and the like).
- Communicates the implementation status, as directed by the DC or the JTRP Chairperson, to the JTRP Office and/or INDOT R&D Office for compilation and reporting.
- Along with the PI, PA, and the JTRP Office, promotes the dissemination of viable research findings, innovation, cost savings, and potential press releases to INDOT users and decision makers throughout the research and implementation process.

### **3.3 Project Advisor (PA)**

The PA is the representative of the INDOT R&D Division who has expertise or working knowledge in the subject area. The PA has the following roles and responsibilities.

- Works with project personnel, particularly the BO, to ensure that project deliverables are achieved within the project budget, scope, and time frame.
- Provides technical guidance to the research.
- Ensures the research proposal follows sound research principles and practices
- Seeks the timely and proactive resolution of any project concerns.
- Works closely with the BO to ensure user needs are met.
- Assists in the transition of the research findings into the implementation phase by assisting the BO in developing and submitting the signed IP to the R&D Office within 30 days after the completion of the research.
- Assists with the marketing and communication of the research effort and research findings.

- Encourages the timely dissemination of implementable research findings to INDOT users and decision makers throughout the research process.

### **3.4 Study Advisory Committee (SAC)**

A SAC typically consists of the following individuals:

- The PI (SAC Chairperson)
- The BO (required)
- The PA (required)
- INDOT technical experts and stakeholders
- Additional external experts and stakeholders such as an FHWA Indiana Division representative, industry representatives as appropriate, and other state agencies

The roles and responsibilities of SAC members include the following.

- Ensure that the research meets the needs of INDOT and other designated users and fulfills the objectives and deliverables of the proposal within the proposal budget and time frame.
- Assist the PI in preparation of the research proposal and provide initial approval.
- Provide technical guidance to the PI during conduct of research.
- Attend SAC meetings.
- Review and provide initial approval of changes to the proposal scope, work plan, and/or budget as proposed by the PI.
- Review and provide comments for draft final reports.
- Provide approval of interim and final reports and project deliverables.
- Assist the BO in developing the IP.
- Attend the project closeout meeting.



## 4. Research Proposal Development and Modifications to the Work Plan

### 4.1 Research Proposal Contents

A research proposal should contain, as a minimum, the following elements.

- **JTRP proposal route sheet completed with the following information:** Study title, PI(s) (name and title), research agency (name and address), project number, project period, funding request, SAC members, SPR number, and current JTRP projects.
- **Introduction:** Background information leading to the research project, including the preliminary literature review.
- **Problem statement:** Concise statement indicating the need for the research.
- **Objectives or purposes:** What the research is to accomplish.
- **Work plan:** How each objective will be achieved. The work plan should tell what, how, and where the study will be conducted. It should include such information as sampling plans, method of construction, tests to be used, number of test sections, statistical analysis approaches, data collection methods, use or development of models, frequency of inspections, and criteria used to judge the results.
- **Expected benefits, deliverables, anticipated implementation, and cost savings:** This section should clearly describe expected benefits resulting from the research project deliverables, anticipated cost savings, and how the research results can be implemented by INDOT. Benefits resulting from the research could be expressed as improved procedures or operations, cost savings, improved quality, or increased efficiency. This section should describe in detail the project deliverables (e.g., software, design guide, specifications).
- **Reporting plan:** Completion dates of interim, draft final, and final reports should be specified. Interim reports may not be required but are recommended when significant findings are found, allowing for early implementation by INDOT. A draft final report must be submitted four months prior (unless otherwise approved by the INDOT Research and Development Division) to the project end date indicated in the proposal. The draft final report is subject to SAC review as described in Chapter 4 and must include as a minimum a BO and PA review, unless otherwise specified by the R&D Office. The final report is then prepared, addressing review comments, by the project completion date.
- **Work time schedules:** A time bar chart is to be included showing the scheduling of the individual tasks of the study. This bar chart further becomes part of the semi-annual progress report indicating completed work by task versus planned

work by task. Time periods should be expressed as months. The completion date should allow no more than four months for review of the draft final report.

- **Cost estimate:** The JTRP budget form should be completed. The estimated cost should be broken down by fiscal year and by item, such as salaries, equipment, subcontracts, in-state travel, out-of-state travel, and supplies. Equipment purchases should be individually identified as much as possible. The amount of effort to be funded for the academic year and the summer months must be identified in this section for each PI and all graduate students employed on the project.
- **BO, PA, SAC members, and DC:** The BO, PA, SAC members, and the DC are to be identified in the proposal. Member affiliations should also be noted.
- **Research team qualifications:** All research team members (i.e., PI[s], graduate research assistants, and technical staff) should be specifically identified in the proposal. The credentials and experience of the PI(s) should be presented, which may be in the form of a résumé or vita attachment at the end of the proposal.

## **4.2 Involvement of SAC in Proposal Development**

SAC members (including the PA and BO) are assigned to JTRP projects to provide technical guidance to the PI in developing the proposal. The PI shall communicate with the SAC members throughout the proposal writing process, and their approval is expected prior to the PI's submission of the proposal to the JTRP Office. A proposal will not advance to the JTRP Executive Committee without the approval of, at minimum, both the BO and the PA. A meeting should be held with the SAC members during the proposal development. The BO is expected to attend the JTRP Executive Committee meeting when the proposal is presented to voice his or her need and support for the proposal. BOs are required to discuss the proposal with their DC prior to the proposal's submission to the Executive Committee for approval.

## **4.3 Proposal Review Policy and Procedures**

The JTRP Executive Committee believes that requiring a methodical review of JTRP proposals is a worthwhile effort as it enhances the quality of proposals and the subsequent quality and impact of research results. Accordingly, all JTRP proposals will be subject to the review policy and procedures of the JTRP Office, as outlined in "Review Policy for JTRP Projects" (see Appendix C).

## **4.4 Proposal Approval Process**

- Research proposals must be submitted to the JTRP Office within the time frame outlined in the "Review Policy for JTRP Projects" (Appendix C).

- As part of the “Review Policy for JTRP Projects,” the JTRP Office will solicit Executive Committee member project approval (see Appendix D).
- If a presentation is required, the PI, in concert with his or her BO, is responsible for presentation of the proposal to the JTRP Executive Committee. The PI may encourage other SAC members to attend in support of the proposal. The JTRP Office will coordinate all relevant details for the meeting and proposal presentations. Administrative approval of proposals may be approved by the JTRP Chairperson in-between Board meetings for time sensitive proposals.
- All proposals must be submitted to the JTRP Office in electronic format in order to facilitate transmission of board meeting packets to the JTRP Advisory Board members.
- Researchers who have past due projects are not eligible to submit new research proposals. A project is considered past due when the approved final (not draft) report has not been submitted for distribution by the scheduled completion date for the research project.
- Once the JTRP Executive Committee approves the proposal, an electronic copy of the proposal is sent to the INDOT R&D Division by the JTRP Office. The Chairperson of the JTRP Executive Committee, or his or her designate, will then issue a letter of approval for the research project to proceed. The JTRP office will forward the award letter to Sponsored Program Services for setup of the award. Upon award setup, the business office sends award notification to the PI, which includes the expectations for the project’s completion in accordance with the approved proposal.
- If the JTRP Executive Committee does not approve the proposal but requests revisions and resubmittal, then the PI is responsible for revising the proposal for resubmission, with the SAC members’ help, in accordance with the Executive Committee’s recommendations. The subsequent revised proposal must be presented again to the Executive Committee for approval. Electronic approval may be used.

#### **4.5 Changes to the Approved Proposal**

The JTRP and the Executive Committee expect all projects to finish on time and within the projected budget. However, as the work of a project progresses, it is possible that changes to the original study may occur that could alter the study’s objectives, work plan, budget, reporting plan, and so forth. These changes may necessitate a time extension or budget expansion in order for the work to be completed; or in extreme circumstances, when it becomes apparent that the research cannot be satisfactorily performed, it may be necessary to terminate a project without finishing the work plan and associated reporting.

- Requests for changes in study objectives, time extensions, or budget expansions for studies need to be justified.
- The PI must obtain the written approval of the project's SAC in writing prior to formally requesting the extension and/or expansion from the JTRP Office, evidence of which must be provided with the formal change request to the JTRP Office. It is recommended that the PI hold a SAC meeting to discuss this request if a SAC meeting has not been held recently. At a minimum, approval by the PA and BO must be obtained for the extension and/or expansion request to be considered. Approval by e-mail or by virtue of SAC meeting minutes will suffice as written evidence. This step is meant to provide the SAC members an opportunity to provide comments related to how the proposed extension and/or expansion will impact INDOT needs with regard to the project. SAC approval does not constitute final approval of the proposed extension and/or expansion.
- The proposed changes will be forwarded by the JTRP Office to the R&D Office for consideration of final approval.
- The R&D Office may terminate a project at any time as outlined in the current contract between JTRP (Purdue) and INDOT.
- Note that a time extension of more than six months or a budget expansion of more than \$5,000 may also require approval by the JTRP Executive Committee, as well as an appearance at a regularly scheduled meeting of the board. The JTRP Office will advise the PI when this process is required.

## 5. Study Advisory Committee Meetings

SAC meetings are mandatory and should be held during the proposal development phase and at least every six months during the conduct of the research. A final closeout SAC meeting must be scheduled to review the final report and develop an IP. Additional SAC meetings are encouraged when necessary.

A complete list of each project's SAC members and their contact information is provided to the Principal Investigator(s) with the JTRP award letter, and this listing is also available in the project's "SAC" folder at the JTRP website <http://www.purdue.edu/jtrp>. The JTRP Office can assist the PI in scheduling SAC meetings, including deciding on the meeting format, arranging a location and time, ensuring the availability of A/V equipment, and so forth.

- Materials to be discussed during the SAC meeting are to be distributed to the SAC members at least a week before the SAC meeting is held.
- Minutes of the SAC meeting must be submitted to the JTRP Office within two weeks after the SAC meeting for posting in the project's "SAC" folder at the JTRP website <http://www.purdue.edu/jtrp>

## **6. Research Payments, Travel Approval, Equipment Use, and Safety Training**

### **6.1 Research Payments**

The cost principles and eligibility of direct and indirect cost items relative to federally funded research activities are set forth in the Code of Federal Regulations, Title 48, Contract Cost Principles and Procedures, Subpart 31.3 (OMB Circular A-21). Direct costs only will be claimed for reimbursement when in the form of expenses for personnel, travel, and equipment, rental of special space, and materials and services, as further defined in the JTRP contract.

Charges made by JTRP to INDOT are to be actual expenditures for personnel time, travel and subsistence, expendable and nonexpendable equipment, supplies, and miscellaneous services, including computational expenses and other incidental items. Invoices are submitted monthly by Purdue Sponsored Program Services to INDOT on supplementary vouchers.

INDOT maintains the right to withhold an agreed upon percentage of study funds until final deliverables, as outlined in the proposal, are satisfactorily received by INDOT. Furthermore, with written notification to JTRP prior to proposal approval, INDOT reserves the right to assign and make payments for study activities to deliverables identified in the proposal; JTRP retains the right to decline participation in such proposals.

The name(s) of faculty/students/staff to be involved in a project must be identified in the proposal, when known, including the percentages of effort for which they will be paid. Personnel time will be charged (1) for hourly employees, only that time actively spent on the approved project and (2) for salaried faculty and professional staff, only that percentage of effort actively expended on a project, including for both hourly and salaried personnel vacations and sick leave allowances according to the policy of the research agency at the basic rate of pay of their persons employed, plus the research agency's payments for fringe benefits.

For hourly employees, records of time actually spent on each project by each employee will be maintained and available for review. For salaried faculty and professional staff, a certification is made on Personnel Activity Reports (PAR) of the percentage of effort actually expended by each employee during the previous PAR period on each project. These too will be maintained and available for review for the time period outlined in the JTRP contract.

Totals of salaries and wages will be listed on all invoices and will be supported by payroll records showing basic rates of pay; all loadings will be added as separate items

or on a percentage basis applied to the total salaries. There will be no charge for Facilities and Administration (F&A) costs by Purdue University, as Purdue University will contribute office space, heat, utilities, and other services usually associated with F&A costs to the transportation research program of the State of Indiana.

## **6.2 Out-of-State Travel**

- Research-related out-of-state travel may be needed during the course of a study. Whereas it is recognized that travel to conferences, seminars, and meetings is often beneficial to the successful conclusion of research, such travel is encouraged within the following guidelines. Furthermore, the travel budget restrictions many agencies face are recognized and, therefore, only those persons providing direct and lasting benefits to the JTRP research program should be approved for reimbursement for travel with research funds. Consequently, faculty and INDOT representatives should receive preference for approved travel reimbursement.
- It is the responsibility of those involved with administering the JTRP research program to ensure that only appropriate travel is approved. Furthermore, it is the responsibility of each researcher to ensure that the proposed travel directly benefits the research and that the following travel guidelines are followed. Failure to do so may result in delays or disapproval for reimbursement.
- The use of funds for out-of-state travel must be specified in the research proposal. For a research project, the funds for out-of-state travel generally should be less than 3 percent of the total budget. If the proposed travel budget exceeds the suggested maximum percentage, the researcher must justify this to the JTRP Executive Committee in the research proposal.
- Research funds must be spent on travel that is of direct benefit to ongoing or planned research, and only the portion of the trip that is related to the research is eligible for reimbursement with project funds. In general, for multifaceted conferences, seminars, and meetings, such as the TRB Annual Meeting, research funds may be used as reimbursement for up to two days and nights of travel costs for each research project.
- For each research project, the accumulated total out-of-state travel costs cannot be greater than the approved out-of-state travel budget in the proposal. If the accumulated total travel costs exceed the approved out-of-state travel budget, prior approval of the SAC must be obtained before spending study funds for out-of-state travel.
- Only researchers who do not have any past due projects are eligible for out-of-state travel with research funds. A project is considered past due when the approved final (not draft) report has not been submitted for distribution by the scheduled completion date for the research project. If a researcher has one or

more past due projects at the time of the out-of-state travel, no JTRP research funds from any of the researcher's projects may be used for out-of-state travel.

- Researchers should share results of their meeting with their SAC and, although not required, are encouraged to bring to the JTRP Executive Committee information that significantly impacts their study. Each researcher must include all trips taken during the last period and trips planned for the next period in the following progress report.
- Research-related trips to be taken by INDOT representatives utilizing project funds must be approved in advance by the PI and the JTRP Executive Committee Chairperson or his or her designee. Travel funds must be available in the project travel budget.
- Approved project travel funds cannot be used for travel outside of the United States.

### **6.3 Equipment Purchase and Disposition**

- All purchases of nonexpendable equipment, including computers and computer-related devices, purchased through JTRP and initially costing more than \$5,000 must be included on the JTRP equipment inventory list. This inventory list will be maintained by the JTRP Office for studies performed through JTRP, and a copy of will be forwarded to the INDOT R&D Division by April 15 of each year.
- Equipment purchases shall be itemized as much as possible in the study proposal. Approval of the proposal constitutes approval of purchase of the equipment. If the cost of an approved piece of equipment exceeds the itemized cost by \$5,000 or more, SAC approval is recommended. If only the total estimated equipment cost is included in the approved proposal, but the equipment items are not listed, further approval is required from the project's SAC when individual pieces of equipment are purchased costing \$5,000 or more.
- No equipment purchases are allowed after submission of the draft final report for review without the approval of the SAC.
- If a piece of equipment is no longer being used on a JTRP project, or at INDOT's discretion, INDOT can take ownership of the equipment and has first opportunity for ownership. If INDOT (through the JTRP Executive Committee) decides not to take ownership of the equipment and JTRP decides not to retain the equipment, it may be sold to a third party outside INDOT and JTRP at salvage value and removed from the JTRP inventory list. Funds from the salvage will be returned to the JTRP Residual Account. When INDOT takes possession of a piece of equipment, the equipment will be removed from the JTRP inventory list and added to the INDOT inventory list.



## **6.4 Research Team Facilities Use, Orientation, and Safety Training**

- **Use of INDOT Facilities**

All JTRP research team members are required to obtain proper orientation and safety training on all equipment residing at the INDOT R&D Division when applicable. The PA assigned to the project can assist with the scheduling of this training. Proper certification of this training must be submitted upon completion. JTRP research team members are also required to sign a liability waiver.

- **Roadside Safety Training**

Very often the conduct of JTRP research requires that researchers collect data along Indiana highways. All faculty, staff, and graduate and undergraduate students participating in JTRP research projects must take part in roadside safety training produced and coordinated by the JTRP Office at Purdue University. Verification of participation in this training must be submitted via the online training certification before or immediately following the project award. The training is available here: <https://engineering.purdue.edu/Intranet/Groups/Schools/CE/Safety/roadside-safety/RST-confirmation>. The appropriate roadside safety equipment shown in the training video is available from the Civil Engineering Transportation area for checkout, and all researchers are expected to make use of this equipment while doing their fieldwork. JTRP and INDOT put a great emphasis on roadside safety. Failure by any researcher to comply with this requirement may result in loss of funding. All questions regarding the roadside safety training and equipment should be directed to the JTRP Office.

# 7. Reporting Research Progress

INDOT and the FHWA require that the progress of research projects be monitored throughout the duration of the project. Additionally, as with all SPR Part II projects (unless otherwise permitted), a report must be prepared that outlines the research that was conducted as well as the research results, conclusions, and implementation recommendations. This chapter covers the requirements for research progress reporting and report development.

## **7.1 Progress Reports**

Progress reports must be prepared for all SPR Part II funded studies. Other types of studies (e.g., totally federally funded projects) may also require progress reports.

Progress reports should contain the following items:

- Project identification: title, SPR number
- Personnel: PIs, research team members, and SAC members
- Project start date
- Project completion date
- Research agency: JTRP, INDOT, other
- Progress:
  - Description of major progress in the proposed research tasks since last progress report
  - Dates of all SAC meetings held and a copy of the last SAC meeting minutes
  - Pictures of research and/or implementation activity during the past six months (pictures should be high resolution and submitted as separate files)
- Problems encountered
- Work planned during next reporting period
- Completed reports, papers, and presentations
- Implementation of results to date
- Out-of-state travel during the last reporting period or planned for the upcoming reporting period
- Project progress schedule: time bar chart expressed in months showing expected progress and actual progress to date for the individual tasks of the study identified in the approved proposal
- Finances: total project budget, total expenditures to date, and expenditures for present reporting period (the JTRP Office will insert this information)

Progress reports are due in electronic version by January 15 and July 15 of each calendar year during the duration of the research project. The JTRP Office will send out progress report due date reminders. Completed reports are to be forwarded by the PI to the JTRP Office. Reports not containing the necessary information will be returned to the PI for completion. A sample progress report is shown in Appendix E.

## **7.2 Interim Reports**

While not required for all research projects, an interim report may be requested by the SAC for a particular research project, typically during proposal development. While there are no established format requirements for interim reports, it is anticipated that final report formatting requirements will be followed. PIs are to submit interim reports to the SAC and the INDOT R&D Division. A formal review is not generally required.

# 8. Reporting Research Results

## **8.1 Final Report Features**

INDOT requires a final report for each SPR-funded research study. For implementation studies funded with SPR funds, the SAC may require only a short summary of work completed and deliverables. JTRP author guidelines for technical reports are located here: [http://docs.lib.purdue.edu/jtrp/style\\_guidelines.pdf](http://docs.lib.purdue.edu/jtrp/style_guidelines.pdf)

## **8.2 Draft Final Report Review**

Four months prior to the completion of the research project, the PI is required to submit a draft copy of the final report to the Purdue e-Pubs system unless otherwise approved by the INDOT Research and Development Division. This four-month period is included to provide sufficient time for review and revision of the draft final report. The JTRP report publishing process with guidelines for submission, review, and publication of the final report can be found here:

[http://www.lib.purdue.edu/sites/default/files/epubs/JTRP\\_report\\_publishing\\_process.pdf](http://www.lib.purdue.edu/sites/default/files/epubs/JTRP_report_publishing_process.pdf)

A closeout SAC meeting will be required just prior to the completion of the project. The JTRP Office can assist with the scheduling of this meeting. The closeout meeting is not meant to supersede the review procedure discussed previously. Topics for the closeout meeting should include the following:

- How the PI addressed the SAC members' review comments
- Comments or concerns regarding the final report
- Adequacy of the technical summary
- Proposed implementation and finalizing the Implementation Plan (IP)

## **8.3 INDOT Research Project Implementation Plan Form**

Emphasis is always placed on accelerating and concurrent implementation of research findings into INDOT operations. PIs and SACs should look for early and concurrent implementation opportunities during proposal development, during conduct of the research, and in developing and implementing IPs. It should be recognized that delaying implementation of research results in a delayed- or lost-opportunity cost. Additionally, if possible, to maximize the return on the research investment (ROI), broad statewide implementation should be the goal. During the conduct of the IP, if a delay or issue is encountered by an implementer—typically the BO—the implementer should bring this to the attention of his or her supervisor or DC. The BO is to submit a signed, approved IP to the R&D Division within 30 days after the completion of the research (project completion date). Approval to close out a project is not dependent on the BO's

submission of the IP. While all SAC members may sign the IP, only the implementers, PA, and BO signatures are required.

#### **8.4 Final Report Dissemination**

The JTRP Office will provide electronic copies of the final reports to the appropriate agencies and repositories as defined in the document titled *JTRP Report Publishing Process* (see section 8.2). JTRP Final Reports will be made available for viewing, downloading, and/or purchase of a print-on-demand copy at the JTRP e-Pubs repository: <http://docs.lib.purdue.edu/jtrp/>

#### **8.5 Publication Provisions and Proprietary Rights**

Publication provisions and proprietary rights shall be in accordance with the current contract language and federal and state law.

At least 50 percent of all royalties will be forwarded to the JTRP Office for utilization in the JTRP research program.

## 9. Implementing Research

The benefit of applied research is realized when research results are utilized in operational practice. Research results will not be fully or cost-effectively incorporated into operations without deliberate forethought and planning. Successful implementation begins during the identification of research needs and is integrated into development of the proposal. Opportunities for accelerated and concurrent implementation should be identified and reflected in the proposal time line and deliverables. There is a missed-opportunity cost when research results are not quickly and fully implemented. **The underlying goal is to implement viable research results into practice as soon as possible and as fully as possible.** Each proposal is to include a section discussing proposed implementation, including potential ownership and use of research results, obstacles, resource requirements, policy issues, and so forth.

**A completed and signed Implementation Plan (IP; see example in Appendix F) is required as part of each project.** The IP is to be developed by the project BO in consultation with the SAC, PA, and PI. A good practice is to complete the IP at the closeout SAC meeting. NOTE: An IP can include multiple individuals and steps to address in order to fully implement the research findings. As indicated in the IP, a time line of implementation activities is to be included. **A research project is not completed until a detailed and signed IP is submitted by the BO.**

The signed IP will be distributed to INDOT leadership and staff responsible for implementation. Primary responsibility and accountability for implementation rests with the designated implementers identified in the IP. The IP should be considered not only as a plan to implement, but a working document that needs to be reviewed frequently and updated as needed, by the implementer(s). If resources such as PI time (e.g., for training, workshops) and purchase of prototype equipment are required for successful implementation, the INDOT R&D and JTRP Offices are willing to provide assistance where possible and should be contacted.

A new resource for researchers is the Purdue University Research Repository (PURR), which is a university Research Core (<http://www.purdue.edu/research/cores>) for Purdue faculty, graduate students, and staff. PURR provides a free service and platform for the creation of funder-compliant data management plans, a collaborative project space for data management, and a wizard for the publication of datasets with digital object identifiers (DOIs). In addition, PURR ensures the long-term preservation of research data.

To learn more about the Purdue University Research Repository, watch the PURR introductory video (<http://www.youtube.com/watch?v=Yw0IJ7FqA8>) or visit the PURR website (<https://purr.purdue.edu>).

## **9.1 Funding Implementation Activities**

Implementation of research results is an approved expenditure within R&D work program outlined in the annual *Work Program and Cost Estimate* (with some limitations). Consequently, Implementation Proposals can be submitted as other research proposals for funding. They are generally submitted near the completion of a research project. Implementation Proposals are developed, approved, and conducted in the same manner as research proposals, except that the deliverables of the project are the actual implementation of research results. As such, a final report may not be required for an Implementation Project; however, semi-annual progress reports are required for these projects.

To encourage implementation of viable research results, an implementation line item is included in the annual *Work Program and Cost Estimate* prepared by the INDOT R&D Division. These funds are set aside specifically for implementation activities and projects. Accessing these funds should be done in coordination with the project PA and/or the INDOT R&D Division.

## **9.2 Progress Report for Implementation of Projects**

Progress reports for Implementation Plans (not Implementation Projects) may also be required at the discretion of the DC or JTRP Chairperson for certain implementation projects, typically “high value” projects. These progress reports are to be prepared and submitted by the implementer(s) of the IP.

The JTRP Office and INDOT R&D Division may be asked by the Executive Committee to compile and report on the status of the progress reports, including developing an annual summary. In such cases, the JTRP Implementation Engineer and the INDOT R&D Division will designate the required format for submission and may include the following:

- A copy of a current IP
- Status of implementation
- Identification of any problems or issues
- Next action steps

## **9.3 Return on the Research Investment (ROI)**

Evaluating the ROI is good business practice when practical and where data exists (e.g., cost factors). The JTRP and INDOT R&D Offices may be asked by the Executive Committee to conduct an ROI. A modified internal rate of return (MIRR) or benefit-cost analysis (BCA) may be required on candidate projects to demonstrate the cost savings impact of research and the R&D program overall.

## **Appendix A**

### **JTRP Contract between INDOT and JTRP (Purdue)**



**CONTRACT**  
**BETWEEN**  
**PURDUE UNIVERSITY**  
**WEST LAFAYETTE, INDIANA**  
**AND**  
**INDIANA DEPARTMENT OF TRANSPORTATION**  
**STATE OF INDIANA**  
**FOR THE**  
**JOINT TRANSPORTATION RESEARCH PROGRAM**

This Contract, made and entered into on this 21<sup>st</sup> day of June, 2013, by and between the Indiana Department of Transportation, hereinafter referred to as "INDOT," and Purdue University hereinafter referred to as "PURDUE," on behalf of its Joint Transportation Research Program, hereinafter referred to as "JTRP."

WITNESSETH:

**THAT WHEREAS**, INDOT is faced with certain basic technical problems in its operations and in connection with its planning of future operations; such problems warranting considerable study and research; and

**WHEREAS**, the JTRP is a cooperative effort created by the Indiana Legislature by its Acts of 1990 and codified at Indiana Code 8-23-9-56, as a means of providing research and development for the best methods of improving and maintaining the state transportation system; and

**WHEREAS**, the JTRP is housed at PURDUE.

**WHEREAS**, PURDUE has the technical staff and facilities capable of doing such research work; and

**WHEREAS**, INDOT expects that the United States Department of Transportation (USDOT) – Federal Highway Administration ("FHWA") and other agencies within the USDOT will participate financially with INDOT in paying the attendant costs of federally funded research studies and activities, such as studies and activities hereinafter referred to as "SPR," and other Federally Funded Studies and Activities, and

**WHEREAS**, INDOT expects to pay the total attendant costs of totally state funded studies and activities, such studies and activities hereinafter referred to as "JTRP Studies and Activities", and

**WHEREAS**, it is required by the FHWA and other agencies within the USDOT, and in the best interest of INDOT, that the basic provisions pertinent to the conduct of work performed by JTRP be enumerated in a Contract hereinafter referred to as "Contract"; and

**WHEREAS**, PURDUE will submit on behalf of the JTRP to INDOT various "Proposals for Research Studies," hereinafter referred to as "Proposals" and each will include a statement of objectives, work plan, deliverables, business case, anticipated benefits and implementation of the study, total cost and timeline and will by reference incorporate the provisions of this Contract; and

**WHEREAS**, the Proposals will be approved by the INDOT Commissioner (or his designee) and the JTRP Executive Board.

**NOW THEREFORE, IT IS AGREED** that PURDUE shall conduct all JTRP research work in accordance with the following:

PURDUE agrees to undertake and perform completely each approved research project, including such investigations, services, activities, consultations, data-gathering, and other related work and studies as it may feel necessary to arrive at satisfactory conclusions pertinent to the specific problems posed, including a final report (and other deliverables identified in the proposal) with recommendations germane to such conclusions. The term "research project" as used herein shall include planning technical investigations and other data gathering and analysis activities as may be defined in approved Proposals.

FOR SPR AND OTHER FEDERALLY FUNDED OR STATE FUNDED STUDIES AND ACTIVITIES THE FOLLOWING PROVISIONS ARE A PART OF THIS CONTRACT:

- I. Term. The term of this contract shall be for five years from the date of the last signature to this contract, subject to either Party's right to terminate the Agreement at any time upon thirty (30) days written notice. If approved research or extension activities are cancelled under this provision, INDOT shall reimburse Purdue for all work completed to that date and for all irrevocable commitments entered into prior to the date of termination notice. Upon termination, all data, results, reports and other materials developed by JTRP will become property of Purdue University, subject to INDOT's right to inspect such documents.
- II. SPR Studies are typically funded using federal and state funds. Other studies and activities may have different funding splits. INDOT, through its annual budgeting process, authorizes an annual appropriation for research assistance and administration at PURDUE. This budgeted amount is made available to PURDUE in advance of disbursement by PURDUE. The exact amount is recommended to the JTRP Executive Board for approval by the JTRP Executive Board and requisitioned by voucher from PURDUE to INDOT as per an annual purchase for JTRP services made by INDOT.

Legislation authorizes this annual aid by INDOT to PURDUE for research and extension. Payment of the aid is obtained by filing a voucher for the amount authorized by INDOT and is not based on the JTRP expenditures by PURDUE. However, to ensure INDOT constantly has knowledge of how the funds are being used and/or accumulated, PURDUE will submit a quarterly estimate of expenses for each succeeding quarter and report the actual expenses of the most recent quarter for which such expenses are available to the JTRP Executive Board.

- III. Maximum Fee: The total sum paid PURDUE under approved study proposals shall not exceed the estimated total cost included in the approved Proposal without written approval as specified in the JTRP Executive Board, approved "User's Manual for Research and Implementation." The basis of payment from INDOT to PURDUE will be actual costs incurred by PURDUE in conducting the research.

- IV. Purchase Orders. If the Commissioner of INDOT (or his designee) and the JTRP Executive Board approves the Proposal, INDOT will issue a Purchase Order per study to Purdue for JTRP expenses.
- V. Cost Principles: The cost principles and eligibility of direct and indirect cost items relative to federally funded research activities are set forth in the Code of Federal Regulations, Title 48, Contract Cost Principles and Procedures, Subpart 31.3 (OMB Circular A-21), Direct Costs only will be claimed for reimbursement when in the form of expenses for personnel, travel, equipment, rental of special space, materials and services, as further defined within the provisions for this Contract.

Charges made by PURDUE to INDOT and payable by INDOT for JTRP, SPR and other federally funded studies and activities are to be actual expenditures for personnel time, travel and subsistence, expendable and non-expendable equipment, supplies, and miscellaneous services, including computational expenses and other incidental items, to be billed monthly or quarterly by PURDUE to INDOT on supplementary vouchers. Such vouchers will be supported by copies of the original documents covering the charges. Such supporting documentation will be maintained at PURDUE.

INDOT maintains the right to withhold an agreed upon percentage of study funds until final deliverables, as outlined in the proposal, are satisfactorily received by INDOT. Furthermore, with written notification to PURDUE prior to Proposal approval, INDOT reserves the right to assign and make payments for study activities to deliverables identified in the Proposal(s); PURDUE retains the right to decline participation in such Proposals.

Personnel time will be charged 1) on hourly employees for only that time actively spent on the project and 2) on salaried professional staff for only that percentage of effort actively expended on a project, including for both hourly and salaried personnel vacations and sick leave allowances according to the policy of PURDUE at the basic rate of pay of their persons employed, plus PURDUE payments for fringe benefits.

For hourly employees, records of time actually spent on each project by each employee will be maintained by PURDUE and available for review by INDOT.

For salaried professional staff, a certification shall be made on payroll forms at the end of each month of the percentage of effort actually expended by each employee during the previous semester on each project. These too will be maintained by PURDUE and available for review by INDOT.

Totals of salaries and wages shall be shown on all billings and will be supported by copies of payrolls showing basic rates of pay, and all

loadings will be added as separate items or on a percentage basis applied to the total salaries. There will be no charge for Facilities & Administration ("F&A") costs. PURDUE will contribute office space, heat, utilities, and other services usually associated with F&A costs to the transportation research program of the State of Indiana, although the JTRP Executive Board, at their discretion, may allocate funds for F & A costs in special circumstances.

VI. Equipment Purchase and Disposition:

All purchases of nonexpendable equipment purchased through PURDUE initially costing more than the amount specified in the JTRP Executive Board approved, "User's Manual for Research and Implementation" must be accounted for with the equipment maintained on an inventory. This inventory will be maintained by the JTRP Director for studies performed through JTRP, and a copy of the inventory in the JTRP Executive Board approved format will be forwarded to INDOT's Research & Development Office by April 15<sup>th</sup> of each year. The equipment will likewise be inventoried in PURDUE's Property Accounting System.

Equipment purchases shall be itemized as much as possible in the study proposal. Approval of the proposal constitutes approval of purchase of the equipment. If the approved proposal includes itemized equipment costs, no further approval of purchasing these equipment items is necessary. If only the total estimated equipment cost is included in the approved proposal, but the equipment items are not listed, further approval is required by the Study Advisory Committee (SAC) and JTRP Executive Board when individual pieces of equipment are purchased costing more than the amount specified in the JTRP Executive Board approved, "User's Manual for Research and Implementation." If the cost of an approved piece of equipment exceeds the itemized cost by the amount specified in the JTRP Executive Board approved, "User's Manual for Research and Implementation" but within the overall project budget, SAC approval is recommended.

At the end of each research project, the JTRP Executive Board is to be notified what equipment was purchased as a result of the project and whether PURDUE desires to retain possession of the equipment for future INDOT research projects. INDOT can take ownership of the equipment and has the first right-of-refusal to acquire said ownership.. If INDOT decides not to take ownership of equipment and PURDUE decides not to retain the equipment, it may be sold to a third party outside INDOT and PURDUE at salvage value and removed from the PURDUE inventory. Funds from the salvage will be returned to JTRP for use in JTRP research and administration and identified in the PURDUE quarterly estimate of expenditure report. When INDOT takes possession of a piece of equipment, the equipment will be removed from the PURDUE inventory and added to the INDOT inventory.

- VII. Records: PURDUE shall maintain accounting records and other evidence pertaining to the costs incurred on each project. These data will be made available for inspection by INDOT, FHWA or any authorized representative of the State and Federal Government at all reasonable times at PURDUE during the study period and for three (3) years after the date of the final payment of funds to PURDUE with respect to the study. Copies of such records shall be furnished if requested.
- VIII. Proprietary Rights: It is agreed that if patentable discoveries or inventions should result from research described herein, such findings shall be promptly reported to INDOT and FHWA. PURDUE will have the right to retain all rights, title and interest in patentable inventions and copyrightable materials including software subject to:
1. A nonexclusive, nontransferable, irrevocable, paid-up license to the United States in accord with the provisions of Title 37, *Patents, Trademarks, and Copyright, Part 401 – Rights To Inventions Made By Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts, and Cooperative Agreements*; and
  2. A nonexclusive, nontransferable, irrevocable, paid-up license to the State of Indiana for governmental purposes.
  3. JTRP Executive Board approved, “User’s Manual for Research and Implementation.”

Purdue may license such patentable inventions, copyrightable materials, and software to Third Parties. When such licenses are royalty bearing, INDOT and Purdue agree to equally share all net royalty income (Net Royalty Income = Gross Royalty Income less direct legal expenses) except for Type 1 software as outlined below. INDOT designates its share of Net Royalty Income to JTRP research and administrative expenses at Purdue.

Furthermore, the parties agree that PURDUE will retain all rights provided for the subgrantee or contractor, and the State of Indiana, acting through its Department of Transportation, will not, as a part of the consideration for awarding this or any future awards, obtain rights in the subgrantee’s or contractor’s subject inventions. 23 CFR § 420.121(j).

It is recognized that two types of software may be developed under this Contract:

- a. Type One: JTRP developed, supported and distributed software. Revenue generated from the sale of Type One Software will be used to offset JTRP expenses related to maintaining, supporting and updating the software.
- b. Type Two: JTRP developed but distributed and supported by a Third Party under license from Purdue. The license provides for full Third Party funding to produce, maintain, and improve the

software. The license also provides for royalty payments to Purdue based on the Third Party sales of the software.

Furthermore, any revenue generated from the sale of reports, publications, data, information, or electronic media described above by JTRP will be used to offset JTRP expenses.

- IX. Period of Performance: Each study will be made during the period stated in the approved proposal, unless modified by written approval of INDOT Research and Development and the JTRP Executive Board (or its designee).
- X. Inspection of Work: INDOT, FHWA and other appropriate federal agencies, shall be accorded proper facilities for review and inspection of the work hereunder and shall at all reasonable times have access to the premises, to all books, records, correspondence, instructions, receipts, vouchers and memoranda of every description pertaining to the work hereunder. Arrangements for all reviews and inspections by FHWA or other Federal agencies, will be made by INDOT.
- XI. Travel: It is agreed that all out-of-state travels performed for, or expenses in connection therewith incurred against, a project shall be as specified in the JTRP Executive Board approved, "User's Manual for Research and Implementation," reported to the JTRP Executive Board on a quarterly basis.
- XII. Reports: It is agreed that PURDUE will furnish written progress reports as specified in the JTRP Executive Board approved, "User's Manual for Research and Implementation," on each JTRP project. It is provided that Interim Research Reports, as appropriate and the Final Research Report on each project will be prepared and submitted to the Study Advisory Committee and INDOT for review and comment prior to their publication or distribution. Acceptance of the final report by INDOT as satisfactory is a requirement for fulfillment of this contract as it pertains to a study. Upon approval by INDOT, JTRP will publish and distribute such interim and/or final reports on each project as specified in the JTRP Executive Board approved, "User's Manual for Research and Implementation."

All Interim and Final Reports published shall contain the following statement on the credit sheet: "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 views or policies of the Indiana Department of Transportation or the Federal Highway Administration or the appropriate Federal agency. This report does not constitute a standard, specification or regulation."

- XIII. Publication Provisions:

- A. Papers, interim or final reports, forms or other material which are a part of the work under an approved study will be copyrighted by PURDUE, with the provision that INDOT and FHWA or the appropriate Federal agency and the JTRP authors reserve a royalty-free, nonexclusive and irrevocable license to reproduce, publish, or otherwise use, and to authorize others to use, the work for government or academic purposes on condition that appropriate credit is given to JTRP as the place of first publication. (refer to Article VIII for a more detailed discussion regarding Proprietary rights)
- B. Prior to acceptance of a final report, either party to the Contract or FHWA, or the appropriate Federal agency, may initiate a request for publication of a final or interim reports, or any portions thereof. No other reports may be published, except as provided in Section H below.
- C. Neither party shall publish nor otherwise disclose, nor permit to be disclosed or published, the results of any investigations herein contemplated, or any particulars thereof, during the period of each project without notifying the other and securing its consent in writing, except as provided in Section H below.
- D. The parties to this Contract shall have equal responsibility to review and approve material for publication, except that INDOT reserves the right to initially publish the final report.
- E. In the event of failure of agreement between INDOT and PURDUE relative to the publication of a final report, or any interim reports during the period of a project, INDOT reserves the right to publish independently, in which event the non-concurrence of PURDUE shall be set forth, if requested by PURDUE.
- F. If INDOT does not elect to publish a final report, publication by PURDUE shall then be a matter within the province of PURDUE policy; but, if PURDUE then elects to publish independently, the non-concurrence of INDOT and FHWA, or the appropriate Federal agency shall be set forth, if requested by INDOT or FHWA, or the appropriate Federal agency.
- G. When the scheduled time for presentation of a paper containing previously undisclosed findings does not permit formal review and approval of a complete report, abstracts may be used for notification of intent to present a paper based on the study. Such presentation must protect the interests of the other party by the inclusion of a statement in the paper and in the presentation to the effect that the paper has not been reviewed by the other party or FHWA, or the appropriate Federal agency. Lectures to other groups which describe research plans, but disclose neither data nor results, are permissible.



- H. Publication by either party shall give credit to the other party and to FHWA, or the appropriate Federal agency unless, upon failure of agreement on any report of the study, FHWA, the appropriate Federal agency or either of the contracting parties requests that its credit acknowledgment be omitted.
- I. After acceptance of a final report, PURDUE, INDOT and FHWA, or the appropriate Federal agency is free to use the data and results without restriction. If patentable items are involved, this paragraph is subject to the provisions of Section VIII.
- XIV. Study Advisory Committee: The parties to this Contract, with the consent and approval of the individuals and agencies concerned, will appoint a Study Advisory Committee for each research project as specified in the JTRP Executive Board approved, "User's Manual for Research and Implementation." All agencies cooperating directly with INDOT may be represented on the Study Advisory Committee. The Study Advisory Committee shall provide the principal investigator of the project with technical advice and with suggestions for work programming to promote the efficient and prompt attainment of the research objectives and the implementation thereof as set forth in the approved Proposal for each project. The SAC will provide approvals as outlined in the JTRP Executive Board approved, "User's Manual for Research and Implementation."
- XV. Termination of Previous Agreement: This Contract will become applicable to all future JTRP research projects, thereby terminating and superseding the provisions of the document entitled "A Compilation of Established Policies for Cooperative Special Study Projects" as compiled November 2, 1961 and revised February 1, 1970 and April 4, 1979. Furthermore, this contract terminates and supersedes the Memorandum of Understanding, dated September 22, 1999, as well as three addenda dated June 18, 1980 August 27, 1987, and July 1, 2000 and the contract dated April 30, 2008.
- XVI. Rental of Space, Special Equipment or Facilities: The actual cost to PURDUE of renting additional space, special equipment or facilities, not owned by PURDUE but required for a JTRP project, will be approved by INDOT through a listing in the proposal. The cost thereof shall be included in the total cost of the study.
- XVII. Ownership of Data: The ownership of all data, drawings, charts, etc., which are prepared or produced under this Contract shall be vested in PURDUE with the understanding INDOT has access to such data, drawings, charts, etc., as desired, during each project period and for a period of at least three (3) years following the completion of each study.
- XVI. Subcontracting: It is agreed that PURDUE will not enter into contracts with a third party to execute any part of a project, without prior written approval of INDOT. It is agreed, however, that this provision shall not be

interpreted to prevent PURDUE from obtaining professional assistance at reasonable cost or at no cost from any of its departments or units, or from INDOT.

- XVII. Change in Study: Any alteration, extension, expansion, supplement, or modification of the scope of work and method of study as detailed in an approved proposal must be prior-approved by the Study Advisory Committee, the JTRP Executive Board, and INDOT's Commissioner or his designee, as specified in the JTRP Executive Board approved "User's Manual for Research and Implementation."
- XVIII. To facilitate the fiber optic communication line that allows direct-access to the Purdue University Computing Center, by the INDOT Office of Research & Development, INDOT will provide funding to the JTRP administrative core funds equal to the actual cost for the monthly service fees. The fiber optic line is installed in support of the Joint Transportation Research Program of INDOT and Purdue. It is anticipated that INDOT will provide funding for the access and maintenance fees for as long as the JTRP exists at Purdue.
- XIX. JTRP Director Responsibilities: The JTRP Director is responsible for the overall operation of the JTRP. In this capacity, the Director is responsible for the timely submission of project reports, meeting program requirements and deadlines, and assuring compliance with JTRP Executive Board and Purdue University policies, procedures, and guidelines including the JTRP Executive Board approved, "User's Manual for Research and Implementation,". The Director will monitor all JTRP projects to assure such compliance. The Director will report any faculty and staff failure to comply to the appropriate PURDUE academic or fiscal administrator. PURDUE will take appropriate action to either remedy the immediate problem and/or prevent future occurrences by such faculty or staff member.

The Director will review all PURDUE proposals prepared for submission to the JTRP Board. If acceptable, the Director will submit the proposal, through normal PURDUE procedures, to the JTRP Executive Board for consideration. PURDUE will ensure that procedures are in place to ensure that proposal budgets (including budget changes and expansions) are reasonable and accurately reflect the level of effort required to successfully accomplish project objectives outlined in the proposal and that expenditures against such budgets are properly made and invoiced.

- XX. Termination of Contract: Either party may terminate this Contract by giving the other party thirty (30) days written notice of its election to do so. If research projects are cancelled under this provision, INDOT shall reimburse PURDUE for all work completed to that date and for all commitments entered into prior to the date of termination notice. Upon termination, all data, results, reports, and other materials developed by PURDUE during JTRP projects will become the property of INDOT.

**XXI. Compliance with Laws.**

A. PURDUE shall comply with all applicable federal, state and local laws, rules, regulations and ordinances, and all provisions required thereby to be included herein are hereby incorporated by reference. The enactment of any state or federal statute or the promulgation of rules or regulations thereunder after execution of this Contract shall be reviewed by the State and PURDUE to determine whether the provisions of this Contract require formal modification.

B. PURDUE and its agents shall abide by all ethical requirements that apply to persons who have a business relationship with the State as set forth in IC § 4-2-6 et seq., IC § 4-2-7, et. seq., the regulations promulgated thereunder, and Executive Order 04-08, dated April 27, 2004. If PURDUE is not familiar with these ethical requirements, PURDUE should refer any questions to the Indiana State Ethics Commission, or visit the Indiana State Ethics Commission website at <http://www.in.gov/ethics/>. If PURDUE or its agents violate any applicable ethical standards, the State may, in its sole discretion, terminate this Contract immediately upon notice to PURDUE. In addition, PURDUE may be subject to penalties under IC §§ 4-2-6 and 4-2-7.

C. PURDUE certifies by entering into this Contract that neither it nor its principal(s) is presently in arrears in payment of taxes, permit fees or other statutory, regulatory or judicially required payments to the State. PURDUE agrees that any payments currently due to the State may be withheld from payments due to PURDUE. Additionally, further work or payments may be withheld, delayed, or denied and/or this Contract suspended until PURDUE is current in its payments and has submitted proof of such payment to the State.

D. PURDUE warrants that it has no current, pending or outstanding criminal, civil, or enforcement actions initiated by the State, and agrees that it will immediately notify the State of any such actions. During the term of such actions, PURDUE agrees that the State may delay, withhold, or deny work under any supplement, amendment, change order or other contractual device issued pursuant to this Contract.

E. If a valid dispute exists as to PURDUE's liability or guilt in any action initiated by the State or its agencies, and the State decides to delay, withhold, or deny work to PURDUE, PURDUE may request that it be allowed to continue, or receive work, without delay. PURDUE must submit, in writing, a request for review to the Indiana Department of Administration (IDOA) following the procedures for disputes outlined herein. A determination by IDOA shall be binding on the parties. F. Any payments that the State may delay, withhold, deny, or apply under this section shall not be subject to penalty or interest under IC § 5-17-5.

F. PURDUE warrants that PURDUE and its subcontractors, if any, shall obtain and maintain all required permits, licenses, registrations, and approvals, as well as comply with all health, safety, and environmental statutes, rules, or regulations in the performance of work activities for the State. Failure to do so may be deemed a

material breach of this Contract and grounds for immediate termination and denial of further work with the State.

G. PURDUE affirms that, if it is an entity described in IC Title 23, it is properly registered and owes no outstanding reports to the Indiana Secretary of State.

H. As required by IC 5-22-3-7:

(1) PURDUE and any principals of PURDUE certify that (A) PURDUE, except for de minimis and nonsystematic violations, has not violated the terms of (i) IC 24-4.7 [Telephone Solicitation Of Consumers], (ii) IC 24-5-12 [Telephone Solicitations] , or (iii) IC 24-5-14 [Regulation of Automatic Dialing Machines] in the previous three hundred sixty-five (365) days, even if IC 24-4.7 is preempted by federal law; and (B) PURDUE will not violate the terms of IC 24-4.7 for the duration of the Contract, even if IC 24-4.7 is preempted by federal law.

(2) PURDUE and any principals of PURDUE certify that an affiliate or principal of PURDUE and any agent acting on behalf of PURDUE or on behalf of an affiliate or principal of PURDUE (A) except for de minimis and nonsystematic violations, has not violated the terms of IC 24-4.7 in the previous three hundred sixty-five (365) days, even if IC 24-4.7 is preempted by federal law; and (B) will not violate the terms of IC 24-4.7 for the duration of the Contract, even if IC 24-4.7 is preempted by federal law.

## XXII. Drug-Free Workplace

PURDUE hereby covenants and agrees to make a good faith effort to provide and maintain a drug-free workplace, and that it will give written notice to the Indiana Department of Transportation and the Indiana Department of Administration within ten (10) days after receiving actual notice that an employee of PURDUE in the State of Indiana has been convicted of a criminal drug violation occurring in PURDUE's workplace. False certification or violation of the certification may result in sanctions including, but not limited to, suspension of Contract payments, termination of the Contract and/or debarment of contracting opportunities with the State of Indiana for up to three (3) years.

In addition to the provisions of the above paragraphs, if the total Contract amount set forth in this Contract is in excess of \$25,000.00, CONSULTANT hereby further agrees that this Contract is expressly subject to the terms, conditions and representations of the following certification:

This certification is required by Executive Order No. 90-5, April 12, 1990, issued by the Governor of Indiana. Pursuant to its delegated authority, the Indiana Department of Administration is requiring the inclusion of this certification in all contracts with and grants from the State of Indiana in excess of \$25,000.00. No award of a contract shall be made, and no contract, purchase order or agreement, the total amount of which exceeds \$25,000.00, shall be valid, unless and until this certification has been fully executed by PURDUE and made a part of the contract or agreement as part of the contract documents.

PURDUE certifies and agrees that it will provide a drug-free workplace by:

- A. Publishing and providing to all of its employees a statement notifying their employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in PURDUE's workplace and specifying the actions that will be taken against employees for violations of such prohibition; and
- B. Establishing a drug-free awareness program to inform their employees of (1) the dangers of drug abuse in the workplace; (2) PURDUE's policy of maintaining a drug-free workplace; (3) any available drug counseling, rehabilitation, and employee assistance programs; and (4) the penalties that may be imposed upon an employee for drug abuse violations occurring in the workplace.
- C. Notifying all employees in the statement required by subparagraph (a) above that as a condition of continued employment the employee will (1) abide by the terms of the statement; and (2) notify PURDUE of any criminal drug statute conviction for a violation occurring in the workplace no later than five (5) days after such conviction;
- D. Notifying in writing the State within ten (10) days after receiving notice from an employee under subdivision (c)(2) above, or otherwise receiving actual notice of such conviction;
- E. Within thirty (30) days after receiving notice under subdivision (c)(2) above of a conviction, imposing the following sanctions or remedial measures on any employee who is convicted of drug abuse violations occurring in the workplace: (1) take appropriate personnel action against the employee, up to and including termination; or (2) require such employee to satisfactorily participate in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State or local health, law enforcement, or other appropriate agency; and
- F. Making a good faith effort to maintain a drug-free workplace through the implementation of subparagraphs (A) through (E) above.

#### XXIII. Funding Cancellation Clause

When the Director of the Office of Management and Budget makes a written determination that funds are not appropriated or otherwise available to support continuation of the performance of this Contract, this Contract shall be canceled. A determination by either Budget Director that funds are not appropriated or otherwise available to support continuation of performance shall be final and conclusive. I.C.2-17-3

#### XXIV. Non-Discrimination

- A. Pursuant to I.C. 22-9-1-10 and the Civil Rights Act of 1964, PURDUE, shall not discriminate against any employee or applicant for employment, to be employed in the performance of work under this Contract, with respect to hire, tenure, terms, conditions or privileges of employment or any matter directly or indirectly related to employment, because of race, color, religion, sex, disability, national origin, ancestry or status as a veteran. Breach of this covenant may be regarded as a material breach of this Contract. Acceptance of this Contract also signifies compliance with

applicable federal laws, regulations, and executive orders prohibiting discrimination in the provision of services based on race, color, national origin, age, sex, disability or status as a veteran.

- B. PURDUE understands that INDOT is a recipient of federal funds. Pursuant to that understanding, PURDUE, agree that if PURDUE employs fifty (50) or more employees and does at least \$50,000.00 worth of business with the State and is not exempt, PURDUE will comply with the affirmative action reporting requirements of 41 CFR 60-1.7. PURDUE shall comply with Section 202 of executive order 11246, as amended, 41 CFR 60-250, and 41 CFR 60-741, as amended, which are incorporated herein by specific reference. Breach of this covenant may be regarded as a material breach of Contract.

**XXV. Payment**

All payments shall be made in arrears in conformance with State fiscal policies and procedures and, as required by IC 4-13-2-14.8, by electronic funds transfer to the financial institution designated by PURDUE in writing unless a specific waiver has been obtained from the Indiana Auditor of State. No payments will be made in advance of receipt of the goods or services that are the subject of this Contract except as permitted by IC 4-13-2-20.

**XXVI. Notices**

Notices and communications regarding the Contract will be addressed to the party to receive such notice or communication at the address given below, or such address as may hereafter be designated in writing.

If to INDOT:                      Director, Office of Research & Development  
1205 Montgomery Street – P. O. Box 2279  
West Lafayette, IN 47906

If to PURDUE:                      Director, Joint Transportation Research Program  
Purdue University  
Engineering Administration Building, Room 303  
400 Centennial Mall Drive  
West Lafayette, IN 47907-2016

And

Sponsored Program Services  
Purdue University  
155 South Grant Street, Young Hall  
West Lafayette, IN 47907-2114

**XXVII. Governing Laws**

This Contract shall be construed in accordance with and governed by the laws of the State of Indiana and suit, if any, must be brought in the State of Indiana.


**REMAINDER OF PAGE INTENTIONALLY LEFT BLANK**

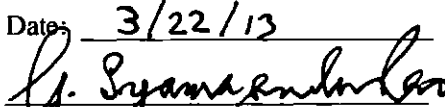
## Non-Collusion

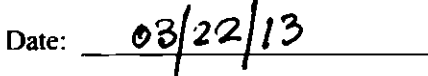
The undersigned attests, subject to the penalties for perjury, that he/she is PURDUE, or that he/she is the properly authorized representative, agent, member or officer of PURDUE, that he/she has not, nor has any other member, employee, representative, agent or officer of PURDUE, directly or indirectly, to the best of his/her knowledge, entered into or offered to enter into any combination, collusion or agreement to receive or pay, and that he/she has not received or paid, any sum of money or other consideration for the execution of this Contract other than that which appears upon the face of this Contract.


In Witness Whereof, PURDUE and INDOT have, through duly authorized representatives, entered into this Contract. The parties having read and understand the forgoing terms of this Contract do by their respective signatures dated below hereby agree to the terms thereof.

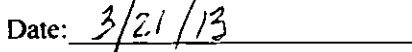
### PURDUE UNIVERSITY

  
Dr. Darcy Bullock  
Director of JTRP

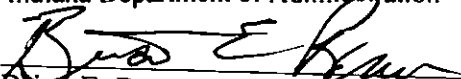
Date: 3/22/13  
  
Dr. Rao S. Govindaraju  
Head of School of Civil Engineering

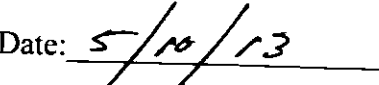
Date: 03/22/13  
  
Dr. Leah H. Jamieson  
Dean of the College of Engineering

Date: 3/27/13  
  
Authorized Signatory  
Sponsored Program Services


Date: 3/21/13  


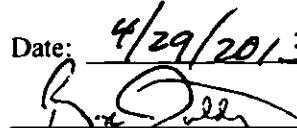
Indiana Department of Administration

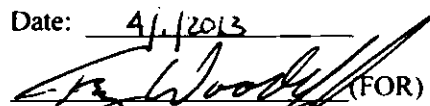
 (For)  
Brian E. Renner, Acting Commissioner  
Department of Administration

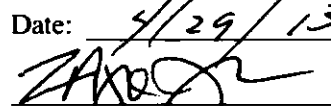
Date: 5/10/13  


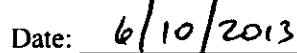
INDIANA DEPARTMENT  
OF TRANSPORTATION  
Recommended for Approval By:

  
Director,  
Contract Administration

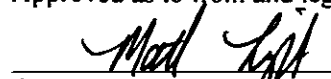
Date: 4/29/2013  
  
Dr. Barry K. Partridge, Director  
Office of Research & Development

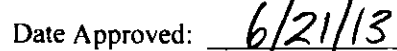
Date: 4/1/2013  
 (FOR)  
Michael B. Cline, Commissioner  
Indiana Dept. of Transportation

Date: 4/29/13  
 For  
Christopher D. Atkins  
Director, Budget Agency

Date: 6/10/2013  


Approved as to form and legality

 (for)  
Gregory F. Zoeller,  
Attorney General of Indiana

Date Approved: 6/21/13  




## **Appendix B**

### **Research Need Statement Template**

INDOT/JTRP FY-2015 Strategic Research Plan

**Research Need Statement (RNS)**

**RNS Title:**

**Focus Group:**

**INDOT Contact:**

**Background & Problem Statement:**

**Proposed Scope of Work:** (Include items such as research approach, deliverables, time frames, project cost, etc.) Complete Estimated Cost Table.

**Implementation Potential:** (Describe items such as project deliverables, how the deliverables will be implemented, person[s] responsible for implementation, time frames for implementation, resources/funding available, resources/funding needed, any policy or specification changes needed to implement, etc.) **Also, identify concurrent implementation opportunities.**

## **Appendix C**

### **Review Policy for JTRP Projects**

## Review Policy for JTRP Projects

Development, approval, initiation, progression, completion, and implementation of a JTRP research project through the JTRP Office is a collaborative effort involving the steps listed below. The primary responsible person/entity for completing these steps with the JTRP Office is indicated in the following table, although it is understood that each project is a collaborative effort that may involve multiple parties at each step.

**PI = Principal Investigator; BO = INDOT Business Owner; SAC = Study Advisory Committee; JTRP = JTRP Office; R&D = INDOT Research and Development Division; EC = JTRP Executive Committee; IP = Implementation Plan; HVR = High Value Research**

	Time Line	Primary Responsibility				
		PI	BO	JTRP	R&D	EC
Executive Committee approves <i>Work Program and Cost Estimate</i> for the coming fiscal year						
Notify identified PI and solicit proposal presentation date	May			●		
Confirm proposal presentation date with JTRP office	June	●				
Schedule proposal review	July	●				
Develop proposal following JTRP and User's Manual guidelines	Ongoing	●				
Contact PI to confirm proposal status	8 weeks prior to EC meeting			●		
Call SAC meeting for proposal review	5–8 weeks prior to EC meeting	●				
Route proposal to SAC for final approval; BO and PA approvals are mandatory	4 weeks prior to EC meeting	●				
Submit final SAC-approved proposal to JTRP office	23 days prior to EC meeting	●				
Submit final SAC-approved proposal to R&D Office	3 weeks prior to EC meeting			●		
Distribute proposals with electronic ballot to EC for review and approval	2 weeks prior to EC meeting			●		
EC returns electronic proposal ballot	2 weeks prior to EC meeting					●
Notify PI status of EC proposal review: (1) approved, (2) questions for clarification, (3) presentation requested	10 days prior to EC meeting			●		
If presentation is requested, submit PowerPoint slides to JTRP	2 days prior to EC meeting	●				
Proposal approval	EC meeting					●

	Time Line	Primary Responsibility				
		PI	BO	JTRP	R&D	EC
<b>Executive committee approval/start date of project</b>						
Prepare Progress Report and submit to JTRP Office	Jan. 15; July 15	●				
Call SAC meeting	At least every 6 months	●				
Draft Final Report submitted to e-Pubs	4 months prior to expiration	●				
Technical review by BO, PA, and SAC	2–4 months prior to expiration		●			
Reviews distributed to PI	2 months prior to expiration			●		
Call closeout SAC meeting	1 month prior to expiration	●				
PI submits final report to e-Pubs	1 month prior to expiration	●		●		
JTRP Office submits final report to R&D office for approval to close out	1 week prior to expiration			●		
R&D Office approves/disapproves project closeout	1 week prior to expiration				●	
<b>Project expiration</b>						
Prepare IP and submit signed document to R&D office	1 month after project closeout		●			
R&D Office approves/disapproves IP and transmits approved IP to stakeholders	1 month after project closeout				●	
Execute IP	Ongoing		●			
JTRP and R&D Offices track and report status of IP for HVR	Ongoing	●				
Production editor prepares report for typesetting and sends for processing	1 month after approval to publish			●		
Proof sent to PI for review	2 months after approval to publish			●		
PI approves report		●				
<b>Report is published on e-Pubs and available print-on-demand</b>						

## **Appendix D**

### **JTRP Executive Committee Member Project Approval**

## JTRP Executive Committee Member Project Approval

<b>Project:</b>	
<b>Project Personnel:</b>	
<input type="checkbox"/> Project approved (no presentation required) <input type="checkbox"/> Presentation and discussion requested at JTRP Executive Committee meeting <input type="checkbox"/> Address the following concerns/questions and reroute as appropriate <u>Comments</u> <div></div>	

<b>Project:</b>	
<b>Project Personnel:</b>	
<input type="checkbox"/> Project approved (no presentation required) <input type="checkbox"/> Presentation and discussion requested at JTRP Executive Committee meeting <input type="checkbox"/> Address the following concerns/questions and reroute as appropriate <u>Comments</u> <div></div>	

<b>Project:</b>	
<b>Project Personnel:</b>	
<input type="checkbox"/> Project approved (no presentation required) <input type="checkbox"/> Presentation and discussion requested at JTRP Executive Committee meeting <input type="checkbox"/> Address the following concerns/questions and reroute as appropriate <u>Comments</u> <div></div>	

Executive Committee Member:

Date:

## **Appendix E**

### **Sample Progress Report**



**PURDUE UNIVERSITY  
SCHOOL OF CIVIL ENGINEERING  
JOINT TRANSPORTATION RESEARCH PROGRAM**

1. **Project Identification:** Indiana **SPR-3623**  
205320/42020000/8000043233  
  
**Project Title:** Early Detection of Joint Distress in Portland Cement Concrete Pavements  
  
**Principal Investigator(s):** Jason Weiss and Dwayne Harris
2. **Date Started:** 08/01/2011
3. **Completion Date:** 11/30/2013
4. **Research Agency:** Joint Transportation Research Program, Purdue University
5. **Progress:** An extensive round of GPR data has been collected. Data has been collected using 400MHz, 900MHz, 1.6 GHz, and 2.4 GHz antennas. Data was collected with each of these antennas were used in three different orientations and with five different bistatic spacings. This process was completed for 4 different fluid levels within each joint condition. Electrical resistivity measurement continue on high DOS slabs in order to further investigate the detection of standing fluid with this process as well. Laboratory studies are investigating the mechanisms of damage in the presence of freezing salt solutions.
6. **Problems:** None
7. **Work Next Six Months:**  
In the coming months the extensive amount of collected data will be analyzed and summarized to draw initial conclusions from lab studies. A short paper will be written to update the findings of this study. A process for field measurements will be adapted from the results of this data. Field trial areas will be selected for investigation of the use of this method to determine the potential for joint deterioration.
8. **Reports:** None
9. **Research Implementation:** None to date
10. **Personnel:** Jason Weiss (PI), Dwayne Harris (PI), Paul Imbrock, Wesley Jones
11. **Travel:** None

## Semi-Annual Report: January – June 2013

### 12. Project Progress Schedule:

	FY 2011												FY 2012												FY 2013			
Task/Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Task 1: Literature Review																												
Task 2: Evaluate Testing Devices																												
Task 3: Test Specimens with Simulated Damage																												
Task 4: Refinement of Technique																												
Task 5: Field Evaluation																												
Task 6: Prepare Report																												
SAC Meeting																												
INDOT Review																												

### 13. Financial Report:

ITEMS	PROJECT BUDGET	SEMI-ANNUAL EXPENSES	TOTAL EXPENSES
Salaries	132,859.00	52,372.04	80,729.19
Supplies & Services	14,141.00	6,639.06	16,867.44
Capital Equipment			5,075.00
Travel	3,000.00	1,433.14	1,617.88
TOTAL	\$ 150,000.00	\$ 60,444.24	\$ 104,289.51

## **Appendix F**

### **Example Implementation Plan**



## INDOT RESEARCH PROJECT IMPLEMENTATION PLAN

*The Project Advisor is responsible for completing the first section of this form. The INDOT Business Owner is responsible for coordinating proper completion of the remainder of the form and obtaining the necessary signatures. Please note, while ownership of the Implementation Plan rests with the INDOT Business Owner (BO), the PI, PA and SAC are tasked with assisting the BO in completing the IP.*

**Research Project Number:** SPR-3019

**Research Project Title:** *Field Trial of Rapid Setting Repair Materials*

**Principal Investigator (PI):** Jan Olek

**Project Advisor (PA):** Tommy Nantung

**INDOT Business Owner:** Anthony Zander

**Responsible Deputy Commissioner:** Sam Sarvis

**IMPLEMENTATION IMPACT ON PRIORITY AREAS** (select the primary priority area implementation of this project will impact - select only one):

☒ Cost Savings

☐ Safety

☐ Mobility/Reduced Congestion

☐ Quality

☐ Time Savings

☐ Others (specify):

**Note:** If more than one implementer, please complete the information on each implementer's tasks:

**Name of Primary Implementer:** Tony Zander

**Tasks for Implementation.** For **each** task, provide the target date for completion:

- The main purpose of this research is to review some specialty concrete patching materials for maintenance of pavement and bridge decks. The format of the results is: Performance of each proprietary patching product.
- The tasks to implement are: (1) Report to the INDOT New Product Evaluation Committee about the performance of each patching materials, and (2) Proposed a list of approved patching materials to the INDOT New Product Evaluation Committee to be included in the INDOT Approved List of Materials
- As of June 26, 2013, all the approved list of materials have been submitted to the INDOT New Product Evaluation Committee.
- Concrete Engineer will review the report. The best patch materials that are known to perform in the field will be validated for compliance with 901.07 of the Standard Specifications to finalize addition to

*the Department's Approved Material List. This is expected to be completed by September of 2013.*

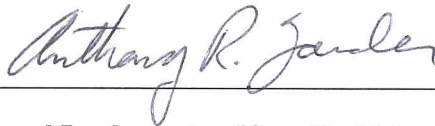
- *The Concrete Engineer will review the suggested changes to the Standard Specifications to determine which currently approved products would be affected. If the suggested changes are considered valid, and do not remove products that are known to perform, then the Standard Specifications will be revised and the Approved Material List adjusted. If the Standard Specifications can be revised without further research, then it is expected to occur after January 2014.*

*Help or resources needed for implementation (e.g. help from PI, funding, equipment, etc.). Please be specific:*

*A seminar should be prepared for presentation to INDOT personnel and contractors to educate them on the quality control issues that have to be addressed to insure long term performance of patching operations. Assistance and resources will have to be provided to the Maintenance Field Support Manager for him to accomplish this task. This effort should be done in combination with the initiative from the Pavement Peer Group. Once the special provision for patching is finalized, seminar/training should be provided to the Districts by March 2014.*

*Signature/Date of Primary Implementer:*

*Anthony Zander*



**Name of Additional Implementer (if applicable):**

*Signature/Date:* \_\_\_\_\_

*Tasks for Implementation. For each task, provide the target date for completion:*

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*Help or resources needed for implementation (e.g. help from PI, funding, equipment, etc.). Please be specific:*

**Name of Additional Implementer (if applicable):**

*Signature/Date:* \_\_\_\_\_

*Tasks for Implementation. For each task, provide the target date for completion:*

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*Help or resources needed for implementation (e.g. help from PI, funding, equipment, etc.). Please be specific:*

**Signature of Project Advisor:** \_\_\_\_\_ *Date:* \_\_\_\_\_

**Signature of INDOT Business Owner:** \_\_\_\_\_ *Date:* \_\_\_\_\_

**Signature of SAC Members (optional):**

\_\_\_\_\_ *Date:* \_\_\_\_\_

\_\_\_\_\_ *Date:* \_\_\_\_\_

\_\_\_\_\_ *Date:* \_\_\_\_\_

\_\_\_\_\_ *Date:* \_\_\_\_\_