**The Mississippi Department of Transportation**
**Research Division**


# Research Consultant Manual

**May 2020**

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# List of Abbreviations and Acronyms

| | |
|---|---|
| AASHTO | American Association of State Highway and Transportation Officials |
| APA | American Psychological Association (style guide) |
| APR | Annual progress report |
| CFR | Code of Federal Regulations |
| FFY | Federal fiscal year |
| FHWA | Federal Highway Administration (USDOT) |
| FMIS | Fiscal Management Information System (FHWA) |
| FY | Fiscal year |
| MDOT | Mississippi Department of Transportation |
| NCHRP | National Cooperative Highway Research Program (TRB) |
| NTL | National Transportation Library (USDOT) |
| NTP | Notice to proceed |
| PI | Principal investigator |
| QPR | Quarterly progress report |
| R&I | Special Committee on Research and Innovation (AASHTO) |
| RAC | Research Advisory Committee (MDOT and AASHTO) |
| RiP | Research in Progress (database) |
| RNS | Research needs statement |
| SME | Subject matter expert |
| SP&R | State Planning and Research (FHWA) |
| TAC | Technical Advisory Committee |
| TRB | Transportation Research Board |
| TRID | Transportation Research Information Database (TRB database) |
| USDOT | U.S. Department of Transportation |
| UTC | University Transportation Center |

# List of Supplements

The following supplementary items are referenced in this manual. These documents are available on the Mississippi Department of Transportation (MDOT) Research Division website, along with other supplements and templates associated with Research Division manuals, using the static URLs provided in the links below. All links automatically point to the most current versions of these files.

Sample Research Plan

Sample Letter Requesting Approval to Use Study Funds to Present Research Results

Technical Brief - Development of a Pavement Management Manual and Data Quality Plan

Technical Brief - Best Practices for Estimating Camber of Bulb T and Florida Girders

Testing Facilities and Technician Experience

Accessibility Requirements

# List of Templates

The following Microsoft Word and Excel files are made available as resources for Consultants to aid in preparation of documents required by the Research Division. These templates, referenced in this manual, are also available on the Research Division website. All links automatically point to the most current versions of these files.

Research Proposal (Microsoft Word)

Study Cost Based on Task and Subtask (Microsoft Excel)

Study Hours Based on Task and Subtask (Microsoft Excel)

Gantt Chart Schedule (Microsoft Excel)

Planned vs Actual Progress (Microsoft Excel)

Planned vs Actual Expenditure (Microsoft Excel)

Study Cost for State Entity (Microsoft Excel)

Study Cost for Non-State Entity (Microsoft Excel)

Quarterly Progress Report (Microsoft Excel)

Annual Progress Report (Microsoft Excel)

Final Report (Microsoft Word)

Technical Report Documentation Page (Microsoft Word)

# Websites Related to Transportation Research

### State and Regional

MDOT Research Division home page: http://mdot.ms.gov/portal/research

Southern Association of State Highway and Transportation Officials: https://meetings.transportation.org/overview-benefits/regional-associations/

Southeast Transportation Consortium: http://www.ltrc.lsu.edu/stc/

### U.S. Department of Transportation

Federal Highway Administration (FHWA): http://www.fhwa.dot.gov/

Transportation Pooled Fund (TPF) Program: http://www.pooledfund.org

Office of the Assistant Secretary for Research and Technology, formerly Research and Innovative Technology Administration (RITA): https://www.transportation.gov/administrations/research-and-technology

National Transportation Library (NTL): http://ntl.bts.gov/

NTL's Repository & Open Science Access Portal: https://rosap.ntl.bts.gov

University Transportation Centers (UTCs): https://www.transportation.gov/utc

### American Association of State Highway and Transportation Officials

American Association of State Highway and Transportation Officials (AASHTO): http://www.aashto.org

Research Program and Project Management for Transportation: https://rppm.transportation.org/Pages/default.aspx

Special Committee on Research and Innovation (R&I) and Research Advisory Committee (RAC): https://research.transportation.org/

### Transportation Research Board

Transportation Research Board (TRB), part of the National Academies of Science, Engineering and Medicine: http://www.trb.org

Cooperative research programs (see below for individual programs): http://www.trb.org/AboutTRB/AboutCooperativeResearchPrograms.aspx

- National Cooperative Highway Research Program (NCHRP)
- Transit Cooperative Research Program (TCRP)
- Airport Cooperative Research Program (ACRP)
- Behavioral Traffic Safety Cooperative Research Program (BTSCRP)
- National Cooperative Freight Research Program (NCFRP)
- Hazardous Materials Cooperative Research Program (HMCRP)
- National Cooperative Rail Research Program (NCRRP)

Individualized TRB information: https://www.mytrb.org/

Transportation Research Information Database (TRID): http://trid.trb.org/

Research in Progress (RiP): http://rip.trb.org/

# Statement of Nondiscrimination

The Mississippi Department of Transportation operates its programs and services without regard to race, color, national origin, sex, age or disability in accordance with Title VI of the Civil Rights Act of 1964, as amended, and related statutes and implementing authorities.

# Mission Statements

**Mississippi Department of Transportation**
MDOT is responsible for providing a safe intermodal transportation network that is planned, designed, constructed and maintained in an effective, cost-efficient and environmentally sensitive manner.

**MDOT Research Division**
MDOT Research Division supports MDOT's mission by administering Mississippi's State Planning and Research (SP&R) Part II funds in an innovative, ethical, accountable and efficient manner, including selecting and monitoring research projects that solve agency problems, move MDOT forward and improve the network for the traveling public.

# Overview of the Manual

The *MDOT Research Consultant Manual* provides comprehensive guidance to external researchers—referred to as Consultants throughout this publication—in completing all aspects of an MDOT research project.

This publication is one of three publications available from MDOT that together detail the contract research process. These are:

- **MDOT Research Manual**, available from the Research Division's web portal. This document explains all steps and key considerations of MDOT's research process.
- **MDOT Internal Research Manual**, available to MDOT staff. This document contains much of the same information as the *MDOT Research Manual* and also provides internal process information and guidance relevant only to MDOT staff.
- **MDOT Research Consultant Manual** (*this publication*), available from the Research Division's web portal. This document provides comprehensive guidance for all external researchers on conducting an MDOT research project.

An overview of each chapter of this publication is provided below.

Chapter 1, Introduction. Explains the purpose of this publication. Provides an overview of the MDOT research MDOT program and the project selection process. Discusses the makeup of the Technical Advisory Committee and the roles of its members. Explains what constitutes reimbursable and nonreimbursable work for a Consultant.

Chapter 2, Research Proposal. Provides comprehensive guidance for what a Consultant should include in a research proposal, how to present the information and how to submit a proposal.

Chapter 3, Quarterly Progress Reports. Provides the schedule for the Consultant to submit quarterly progress reports. Includes requirements and supporting information to be provided with the reports.

Chapter 4, Annual Progress Reports. Provides requirements, guidance and materials for the Consultant to complete the annual progress report.

Chapter 5, Invoicing. Provides guidance on how to submit an invoice, including required support information.

Chapter 6, Interim and Final Reports. Provides considerations for submitting interim and final reports. Addresses accessibility, report workflow timeline and report elements. Discusses style considerations and writing/readability guidelines. Provides final submission requirements.

# 1 Introduction

## 1.1 Purpose of This Publication

The purpose of this document is to provide detailed instruction to external researchers for executing all phases of research for the Mississippi Department of Transportation (MDOT). Such researchers may be from educational institutions or from consulting firms, and they are referred to generically throughout this publication as Consultants. The contracting, proposal development and reporting requirements are the same for these different types of researchers.

## 1.2 MDOT Research Program and Project Selection

MDOT's research program is committed to the conduct of applied research that will provide implementable solutions to problems facing MDOT. The MDOT Research Division administers this program, however, it does not dictate which studies will be funded in any given year.

### 1.2.1 Project Identification and Selection

MDOT research program does not operate on a grant basis. Rather, the MDOT Research Advisory Committee (RAC), made up of individuals from MDOT upper management, identifies which issues or problems will be addressed via funded research studies. The Research Division translates each identified issue or problem into a research needs statement (RNS). Each RNS is then made available to the members of the RAC to evaluate for funding as a research study. A majority of the RAC members and the Federal Highway Administration (FHWA) must approve each proposed research study before it is incorporated into the Research Division annual work program.

### 1.2.2 Annual Review

Usually proposed research studies are evaluated by the RAC membership on an annual basis as part of the development of the Research Division work program for an upcoming federal fiscal year (FFY). An FFY runs from October 1 of the previous numbered calendar year to September 30 of the current calendar year. For example, FFY 2020 runs from October 1, 2019, through September 30, 2020. (Note that the FFY is not identical to the Mississippi fiscal year (FY), which runs from July 1 to June 30.)

## 1.3 Technical Advisory Committee

An MDOT Technical Advisory Committee (TAC) is formed for each research study included in an annual work program. Members of a TAC are typically subject matter experts (SMEs) within the proposed research study field of knowledge, as well as a TAC Chair from the Research Division.

▶ **FOR MORE INFORMATION** Typical membership of the TAC is described in more detail in the MDOT Research Manual.

### 1.3.1 Roles and Responsibilities

The TAC's roles are as follows:

- The TAC reviews and refines as necessary the RNS initially created by the Research Division.

- Subject to MDOT upper management approval, the TAC identifies a potential Consultant to perform the research. The Consultant, after being contacted and expressing an interest in performing the research, is provided a copy of the RNS and a link to the latest version of this proposal development and submission document.

- The Research Division member on the TAC schedules an initial meeting between the Consultant and the TAC to review the RNS and ensure that the Consultant fully understands the objectives of the research. The Consultant is encouraged to provide any thoughts and ideas related to the proposed research as these may result in TAC-approved revisions to that RNS.

### 1.3.2 Consultant/Technical Advisory Committee Meeting Minutes

For all TAC meetings, the Consultant will develop a draft of meeting minutes. Emphasis of these minutes will be on the discussion of potential changes to the content of, or funding for, the study tasks and subtasks and the project schedule. A draft of these minutes will be distributed to the TAC members for review and comment within one week of the given meeting. The TAC members will provide any feedback regarding the draft to the Consultant within one week of receipt of same. The Consultant will address TAC member comments and then distribute a final version of the meeting minutes.

Discussion of alternate points of view will be included in the minutes if consensus is not achieved during the meeting regarding issues relative to the conduct of the study. Unresolved issues will be settled via TAC member vote by simple majority. In the case of a tie, the TAC Chair vote prevails as the decision. The final meeting minutes must reflect any decisions on the part of the TAC regarding changes to the conduct of any task or subtask or funding reallocation.

## 1.4 Reimbursable and Nonreimbursable Work

This document provides detailed guidance to Consultants in developing a research proposal that is acceptable to MDOT and performing the project management tasks.

A potential Consultant's activities in developing and submitting a research proposal **are not considered reimbursable work**.

After execution of a contract and notification to proceed by MDOT, project management tasks integrated into the research plan **are considered reimbursable work**. Such tasks include providing minutes for all Consultant/TAC meetings, submission of supporting documentation with invoices, and submission of both quarterly progress reports (QPRs) and annual progress reports (APRs). These tasks are all reimbursable via a project management task that should be included in the research proposal and ultimately in a study contract. Familiarity with these details will allow the Consultant to better plan and budget for these tasks.

The Consultant should become familiar with the entire research proposal development and submission process as well as the project management requirements before agreeing to perform the research study. Contact the Research Division TAC Chair with any questions pertaining to meeting the requirements described in this document.

# 2 Research Proposal

The Consultant develops a research proposal. A Microsoft Word template is available for the Consultant's use.

▶ **FOR MORE INFORMATION** See the Research Proposal template (Microsoft Word).

The Consultant need not use this template but may find it useful and convenient to do so.

The proposal includes the following sections, detailed in this chapter:

1. Research Project Title
2. Problem Statement and Research Objectives
3. Research Plan
4. Funding
5. Duration and Project Schedule
6. Anticipated Research Results
7. Summary
8. MDOT Research Study TAC Members
9. Research Proposal Submitted By
10. Qualifications and Experience of Principal Investigator(s)
11. Testing Facilities and Technician Experience *(only required for applicable projects)*
12. Study Cost Calculation *(submitted separately)*

For proposal sections that require tables, Excel templates are provided.

The Consultant should submit the research proposal via email to the research project TAC Chair and/or Robbie Vance at rvance@mdot.ms.gov as two files:

- Items 1-10 (or items 1-11, if applicable) in a single Microsoft Word file
- Item 12 as a single Microsoft Excel file

## 2.1 General Notes

- If accepted by MDOT, proposal items will be incorporated into the research study contract documents. Generally this includes these items:
    - Research project title
    - Research plan, which becomes the contract scope of work
    - Funding, which is broken down by task and subtask, and described in appropriate accounting terms in the contract
    - Duration, which is incorporated into the contract as a Gantt chart
- The Consultant is responsible for providing a proposal that is relatively free of grammar and spelling errors. A proposal can be denied funding consideration if it includes a significant number of such errors. These errors are considered indicative of future negative issues with written project deliverables.

- A submitted proposal becomes the property of MDOT.
- The Consultant will affirm that he/she has reviewed and understands the content of this document, the *MDOT Research Consultant Manual*, by signing a statement to that effect included in Section 2.3.9, Research Proposal Submitted By.

## 2.2 Guidance and Revision

- Research plan tasks and subtasks should be developed using the RNS and collaborating with the TAC. The Research Division TAC Chair may schedule one or more meetings with the TAC and Consultant as needed to fully develop this section of the proposal.
- The TAC members will review and approve, and possibly recommend changes to:
    - The research plan tasks and subtasks
    - The project schedule
    - Funding allocation per task and subtask

  If any changes are recommended, the Consultant will revise the proposal accordingly and send it back to the TAC members for review and approval of same. All three aspects of the proposal must be finalized before beginning development of a contract for the study.

## 2.3 Research Proposal Components

Components of the research proposal are detailed here.

### 2.3.1 Research Project Title

Make the title as short and concise as possible. As appropriate, the title may be identical to, similar to or materially different from the title of RNS upon which the proposed project is based.

### 2.3.2 Problem Statement and Research Objectives

Address the current or future potential problem in Mississippi where research may be employed to provide recommendations to address the problem. Include the following in this section of the proposal:

- **Background.** What led to the problem at hand? Examples include new legislation, changes in technology, need for new specifications or saving lives. Describe how the problem impacts MDOT transportation facilities or services.
- **Objectives.** What are the anticipated overall end product(s) of the study? Define objectives in terms of the expected product(s) that will result from conducting the research to provide a solution to the problem. Examples of a product include construction or materials specifications, technical standards or practices, improvements to work flow, and a new or revised design procedure or other process.
- **Anticipated benefits.** What are the potential benefits to MDOT transportation facilities or services as a result of implementing the outcomes of this research? Briefly describe these

benefits in this section of the proposal and include a detailed consideration of same in Section 2.3.6, Anticipated Research Results.

- **Relationships to existing body of knowledge.** What manuals, procedures, work performed by other agencies, or ongoing or past efforts have a bearing on this study? If any exist, describe how this study differs in scope or potential application.

The RNS typically provided by MDOT should be used as an initial source document to complete this section of the proposal.

### 2.3.3 Research Plan

Use a research plan to address how the research will be conducted to produce an implementable product meeting the research objectives.

**Incorporate Research Plan in Research Contract**

The research plan constitutes the scope of work for the research contract, memorandum of understanding or other contractual vehicle employed to control the conduct of the study. The intent is that the research plan will simply be copied from the proposal and pasted into the applicable contract document once all parties involved agree to the content of, and responsibility for, same. Given this intent, the research plan is formatted as numbered tasks/subtasks, each expressed in concise contractual terms. Note that the definition of the problem and justification for conducting the research are topics addressed in the problem statement and research objectives section of the proposal and should not be repeated in any of the tasks or subtasks.

A sample research plan provides an example of the type of information and level of detail expected for the expression of tasks and subtasks.

▶ **FOR MORE INFORMATION** See Supplement: Sample Research Plan.

**MDOT Support for Study**

The Consultant will advise if the proposed research requires MDOT provision of data, materials sampling and testing, traffic control or some other service to facilitate conduct of the study. This will be accomplished by including separate tasks and subtasks in the research plan clearly defining these services. Consultant tasks will be labeled with a "C," and MDOT tasks will be labeled with an "M" (for example, Task C1—Literature search and Task M1—MDOT lab to do Atterberg limits soil testing).

**Define Who Does What**

Work required by MDOT will not be combined in the same task or subtask as work performed by the Consultant. All tasks and subtasks included in a research plan will clearly state the responsible party for the given task and subtask. Where MDOT services are required, include the responsible MDOT division(s) or district(s). For example, the Consultant may be required to analyze pavement distress data provided by the Research Division. In this example, one task in the research plan states that the Research Division will provide the pavement distress data to the Consultant, and a separate task states that the Consultant will analyze the data.

As a second example, the research study requires coordination of Consultant testing in conjunction with contractor construction operations. In this hypothetical study, the Consultant intends to test

cementitious stabilized material at the time of placement by the contractor and at time intervals subsequent to its placement. The research plan needs to include one task or subtask that addresses the Consultant testing activities and another task or subtask that addresses the requirements of, and responsible party for, coordinating the testing activities of the Consultant with the contractor.

**Identify Risk and Mitigation**

All participants in a research project should seek to identify risks to the completion of the project and describe how they can be mitigated. MDOT addresses risk throughout the research process, with two instances called out specifically in the MDOT Research Manual.

- During development of RNSs (MDOT Research Manual, Section 2.5.1), risks include MDOT champions leaving and shifting priorities.

- During development of the research proposal (MDOT Research Manual, Section 3.2), risks include the principal investigator (PI) leaving and not getting the desired quality of final deliverables.

In the research proposal, the Consultant should likewise identify risks from the Consultant's perspective. Generally, these risks will include those risks listed above. After identifying the risk(s), the Consultant should include a description of how the risk(s) can be mitigated. Use of the following four "T's" is recommended:

1. *Tolerate*. Accept the circumstances. Sometimes nothing can be done due to cost or staff constraints. Even if this route is chosen, the risk should be monitored for changes and mitigation strategies.
2. *Treat*. Take action to reduce the likelihood or risks occurring and/or their impacts, if possible. For example, the risk of the main PI leaving may be mitigated by the identification of a co-PI who would take over the research project.
3. *Transfer*. Plan ahead to reduce the impact of the risk. An example of risk transfer is obtaining insurance. This method is rare in research studies.
4. *Terminate*. Carefully review practices and processes in the research project to see if the risk can be eliminated.

**Identify MDOT Personnel Providing Services**

Each MDOT service required by the Consultant must have an MDOT individual identified to provide that service prior to development of a research contract. The TAC will provide this information to the Consultant and he/she will enter the names and contact information of those individuals in the research proposal under Section 8, MDOT Research Study TAC Members, of the research proposal.

Generally members of the TAC will provide MDOT services; however, there may be some cases where non-TAC MDOT employees are needed to provide requisite services. These individuals will also be identified by the Consultant in this section of the proposal along with the service(s) to be provided by those individuals.

**Incorporate MDOT Involvement in the Project Schedule**

Tasks and subtasks for which MDOT is responsible are not reflected in the funding for the study; however, they are reflected in the project schedule that tracks overall study progress. This enables MDOT personnel to plan for providing the required services to the Consultant at the appropriate time to maintain the progression of the study and allow submission of project deliverables per the project schedule.

**Assign Percentage of Total Consultant Research Effort by Task**

For each task or subtask performed by the Consultant, the percentage of total Consultant research effort to complete the study is assigned. In the pavement distress data example provided in the "Define Who Does What" subsection, the pavement distress data provided by MDOT is not considered part of the Consultant research effort; however, the Consultant will analyze the data. If the analysis requires 15% of the total effort on the part of the Consultant to complete the study, then 15% is assigned as the percentage of total Consultant research effort for this task or subtask.

**Include Consultant Travel**

Proposed Consultant travel for presentation of study findings will be included as separate tasks or subtasks of the research plan. Presentations to MDOT audiences, typically to the TAC or upper management, and audiences outside of MDOT should be included.

Consultant travel for presentations to audiences outside of MDOT must be approved, in writing, by the MDOT State Research Engineer prior to the scheduled travel. The Consultant will submit a letter of request with a format including a location for signature and dating by the State Research Engineer. This can also be done via email.

▶ **FOR MORE INFORMATION** See Supplement: Sample Letter Requesting Approval to Use Study Funds to Present Research Results.

This sample illustrates the required detailed breakdown of anticipated travel expenses.

**Obtain Approval for Presenting and/or Publishing Results of Research Studies to Audiences Outside of MDOT**

The Consultant shall obtain approval from the MDOT State Research Engineer or his/her designee before presenting and/or publishing the results of an MDOT-funded research study in any forum outside of MDOT or document other than an MDOT research report or Technical Brief. For example, prior to submitting a paper for presentation at the Transportation Research Board (TRB) Annual Meeting and/or publication in the TRB's *Transportation Research Record*, the Consultant shall obtain approval from the Research Division TAC Chair.

MDOT reserves the right to review the final version of any presentation or paper prior to its submission and reject either portions of it or in its entirety. Grounds for rejection include, but are not limited to, the dissemination of information that is sensitive to the needs of the department, conflicts of interest, or promotion of a specific manufacturer's product or technology.

**Include Consultant or University Purchase of Equipment**

Purchase of equipment by either a Consultant or university to support the conduct of a given study will be included as separate tasks or subtasks of the research plan. All equipment purchased by a Consultant (that is, a nonuniversity entity) will become the property of MDOT at the conclusion of that study. For purchase of equipment by a university, the following paragraph will be included in each task or subtask related to the purchase of that equipment:

> The UNIVERSITY shall be subject to those provisions outlined by the MDOT Research Division and CFR [(Code of Federal Regulations)] 200.313 when purchasing equipment. Any nonexpendable equipment purchased by the UNIVERSITY under this work assignment with state and federal funds will become the property of the COMMISSION upon completion of the project, unless otherwise agreed upon by FHWA and the COMMISSION.

**Provide Project Management Deliverables**

The Consultant is responsible for submitting the following project management deliverables:

- Minutes for all TAC meetings
- QPRs
- APRs
- Supporting documentation with submission of invoices

All research plans will include a standard task with four subtasks as illustrated in Supplement: Sample Research Plan, Task C6.

**Complete Interim and Final Reports**

The proposal will include a task for Consultant development and submission of the final study report. If the study requires an interim report, such as a document providing the details of field test section construction, a separate task will be included in the research plan for that interim report. Supplement: Sample Research Plan, Task C7, illustrates the inclusion of the final report task in a research plan. Refer to Chapter 6 of this manual for the sequence and time requirements for presentation and submission of these reports. Chapter 6 provides further details for writing and submitting a report that is acceptable to MDOT.

**Technical Brief**

Some research studies have anticipated study deliverables amenable to presentation via a Technical Brief. The TAC and Consultant will evaluate the merits of including a Technical Brief as one of the deliverables from the study. If deemed appropriate, a subtask will be added under the final report task for Consultant submission of a Technical Brief of the research study as a stand-alone document (that is, separate from the final report document). Generally this document will be no more than two pages in length (note that some of the examples below exceed this length). The Technical Brief should include a short summary of each of the following:

- The problem or issue requiring research
- Research method
- Conclusions/recommendations for implementation

A list of the TAC members and non-TAC members providing services in support of the research should be incorporated in this document. Two example MDOT Technical Briefs are provided as supplements to this manual.

▶ **FOR MORE INFORMATION** See Supplement: Technical Brief - Development of a Pavement Management Manual and Data Quality Plan.

▶ **FOR MORE INFORMATION** See Supplement: Technical Brief - Best Practices for Estimating Camber of Bulb T and Florida Girders.

Additional examples from other states are provided as well. These are more representative of the typical two-page length for Technical Briefs:

- California Department of Transportation: Development of an Economic Framework to Evaluate Resilience in Recovering from Major Port Disruptions
- Michigan Department of Transportation: Implementing 3-D and 4-D Modeling Software to Enhance Bridge Design
- Minnesota Department of Transportation: Evaluating Driver Responses to Intersection Collision Warning Systems

Preferably the Consultant will coordinate with a graphics staff to create the Technical Brief. Use of a graphics staff will aid in the arrangement of a summary of the research study in a visually appealing presentation by incorporating select text, photographs and charts from the study (with figures and symbols explained) and appropriate overall color scheme. The cost for the graphics staff may be added as a research study cost.

**General Requirements for All Project Deliverables**

The Consultant is responsible for providing all project deliverables by the required submission dates. All deliverables must be relatively free of grammar and spelling errors. At the discretion of the MDOT Research Division TAC Chair, deliverables that include a significant number of such errors will be deemed unacceptable and sent back to the Consultant for revision.

Late submission of any project deliverable at any time or submission of these deliverables with a significant number of grammar and spelling errors will also be documented and used with other funding considerations for potential future research studies with the Consultant. To address the second issue, the Consultant may consider securing the services of a technical writer at no cost to MDOT to review the content of all written deliverables prior to submission to MDOT.

**Changes in Work Tasks/Subtasks or Funding**

Subject to TAC approval, changes to the content and ordering of the tasks/subtasks, or reallocation of funds to same, are allowed at any point prior to or after award of the study contract. However, if the study is already included in an approved research work program, the total amount of the study, after reallocation of funds, cannot exceed the total amount provided in the research work program. In this case, should the TAC and Consultant identify work requiring funds in an amount exceeding that already approved, a follow-up or second research study effort should be considered for funding at a later date. Note that any revisions to a given task or subtask start, end or duration or allocated funds will require corresponding update of the project progress schedule and the planned project progress and planned gross expenditures graphs. If the project scope changes significantly, even if a cost increase is not

requested, MDOT may need to initiate a supplemental agreement. In this case, the Research Division will work with the MDOT Consultant Services Unit and will need to get all contract approvals (such as RAC, FHWA and the Mississippi Transportation Commission).

### 2.3.4 Funding

Account for the total cost of the research in two different formats, with each format represented in a separate table. The first format is discussed in this subsection and included in the research proposal. The second format is discussed in Subsection 2.3.12, Study Cost Appropriated by Traditional Accounting Items, and submitted to MDOT in a table separate from the proposal.

**Table 1: Study Cost Based on Task and Subtask**

Include a table in the research proposal that defines the total cost of the research study in terms of the tasks and subtasks listed in the research plan.

▶ **FOR MORE INFORMATION** See the Study Cost Based on Task and Subtask template (Microsoft Excel).

Notes:

- If the study requires the purchase of equipment by the Consultant, then the purchase of that equipment is considered as a separate task or subtask.
- Consultant travel funded by research study funds to present research findings is considered as a separate task or subtask.
- While it is understood that exact travel or equipment costs cannot always be anticipated at the time of submission of the research proposal, an estimate of such costs must be included in the proposal.
- Do not include any traditional accounting item information (such as salaries, overhead and profit) in this table to derive the cost per task. Only include the cost for each task or subtask in this table.
- The total amounts shown in Table 1 showing cost breakdown by task and subtask and the table showing cost breakdown in accordance with Subsection 2.3.12 must be identical to the penny.

**Table 2: Study Hours Based on Task and Subtask**

Similar to Table 1, include a table that defines the total time of the research study in terms of the tasks and subtasks listed in the research plan.

▶ **FOR MORE INFORMATION** See the Study Hours Based on Task and Subtask template (Microsoft Excel).

Notes:

- Tasks or subtasks such as project management, literature search or final report writing are examples that would have associated billable hours.
- Tasks or subtasks that will be billed as unit costs such as purchase of equipment, travel expenses or performance of laboratory tests will not be represented as billable hours in this table.

### 2.3.5 Duration and Project Schedule

**Table 3: Gantt Chart Schedule**

Include a project schedule, via a Gantt chart, with all research proposals. The schedule will graphically illustrate the duration of each study task or subtask as well as the relative concurrence and sequence of same as developed for the research plan.

▶ **FOR MORE INFORMATION** See the Gantt Chart Schedule template (Microsoft Excel).

This schedule will be incorporated as part of the contract document. After a notice to proceed (NTP) is issued, the project schedule will be updated by the Consultant and will serve as supporting documentation with submission of QPRs and invoices.

After the NTP has been issued and the study is under contract, changes are allowed to the content and ordering of tasks or subtasks with TAC approval. Any approved revisions require corresponding update, by the Consultant, of the project schedule and the planned project progress and planned gross expenditures graphs.

**Show NTP as Start Date in Project Schedule With Initial Proposal Submission**

The Consultant should not put October 1 as the start date in the project schedule when initially submitting a proposal because the NTP date is unknown at the time of submission. Instead, the Consultant should develop the project schedule in terms of the months from NTP date. After the NTP is issued, the Consultant will revise the project schedule relative to the date of the NTP.

**Figure 1: Planned vs. Actual Project Progress**

Two additional graphs are also required at the time of submission of the proposal: one displaying planned progress with time and the other showing planned expenditures with time. Each of these graphs will be periodically updated throughout the duration of the study by the Consultant and will serve as supporting documentation with the submission of both QPRs and invoices.

The Consultant will develop a progress graph showing monthly planned and actual progress based on progress in terms of labor hours. Direct expenditures not associated with labor, such as the cost of purchasing equipment or leasing data, are not reflected in this graph.

▶ **FOR MORE INFORMATION** See the Planned vs Actual Progress template (Microsoft Excel).

At the start of the project, there will only be a line indicating planned progress; however, this table will be revised periodically to reflect actual progress (see Chapter 3, Quarterly Progress Reports).

**Figure 2: Planned vs. Actual Project Gross Expenditure**

Similarly, the Consultant will develop a graph showing monthly planned and actual progress based on progress by gross expenditure.

▶ **FOR MORE INFORMATION** See the Planned vs Actual Expenditure template (Microsoft Excel).

Again, at the start of the project, there will only be a line indicating planned expenditures; however, this graph will be revised periodically to reflect actual expenditures (see Chapter 3, Quarterly Progress Reports).

### 2.3.6 Anticipated Research Results

Describe the anticipated research results. The outcome of conducting the research plan should be some product providing a solution to the problem described in Section 2.3.2, Problem Statement and Research Objectives. This section provides the following:

- Detailed description of the anticipated product
- Potential value to enhance MDOT transportation facilities or services as a result of implementing this product
- Implementation Plan

Additional guidance on what should appear in this section follows.

**Potential Value of Recommended Product Service**

What is the potential value of these products and/or services to MDOT? Potential value can include, but is not limited to, one or more of the following:

- Lives saved
- Reduced vehicle crashes
- Protection of the environment
- Reduced traffic congestion
- Department cost savings

Where possible, quantify these values:

- How many lives can be saved?
- How many vehicle crashes can be avoided?
- How much money can be saved by the MDOT?

The Consultant should suggest analytical methods that could be employed to quantify these potential values. If the methods can be utilized during the study contract period, they should be included as tasks or subtasks within the research plan. When feasible, the collection of data should be included in these tasks or subtasks to establish a baseline or reference for comparison should the study results be implemented by MDOT. Data collected subsequent to implementation could then be used in the analytical methods to quantify the benefits of performing the research. Any suggested analytical methods and associated data collection requirements should be included in the Implementation Plan for post-study use by MDOT.

**Additional MDOT Resources to Implement New Product**

A decision to implement the research product requires consideration of additional MDOT financial, physical asset or human resources to incorporate the product into current MDOT practice. Will implementation impact human resource requirements such as:

- Increase the workload for existing employees?
- Require additional employees?
- Require special training for any of these employees?

Will implementation require increased use of existing, or purchase of new, physical assets such as material test or maintenance equipment, or computers?

If a product is going to be developed that will require ongoing maintenance, the Consultant will identify who will take responsibility for this maintenance after study completion. For example:

- If computer software is a study deliverable, which MDOT division(s) or district(s) will be responsible for using and maintaining it?
- If data for inputs to a software program are required from divisions or districts other than the user divisions or districts, are the data providers willing and able to provide such data?
- If new materials testing equipment is recommended for use by the districts or central laboratory, are these entities willing and able to both purchase and use this equipment with their employees?

The Consultant should consider funding required by MDOT to implement the product and, where possible, a cost/benefit analysis. If such an evaluation can be performed during the contract period, then the Consultant will include it as a task or subtask within the research plan. If not, then the Consultant will provide guidance in the Implementation Plan for post-study evaluation by MDOT.

**Implementation Plan**

The MDOT research study TAC and the Consultant work together to develop an Implementation Plan that considers, as appropriate for the given study, activities to promote application of the product within the department. It is likely that this plan will evolve as the research plan is conducted. This plan should include:

- Identification of the MDOT divisions and/or districts that will utilize the product
- Future activities necessary by the department for successful implementation
- Criteria for judging the progress and consequences of implementation
- When not conducted as part of the study, suggestion and direction for use of analytical methods that can be employed to quantify the potential benefits of the research product
- When not conducted as part of the study, suggestion and direction for quantifying funding required by the department to implement the product and, where possible, cost/benefit analysis
- Consideration of impediments to successful implementation of the product within the department

The research may not result in a product that is conducive to implementation. In some of those cases, the results preclude subsequent research. In other cases, suggestions may be provided for future research that utilizes the knowledge obtained in the current effort that may ultimately result in an implementable product. Either way, a discussion should be included that addresses this issue when an implementable product cannot be obtained as a result of the current research.

### 2.3.7 Summary

Include a one- or two-paragraph summary (250 words maximum) of the proposed research. Include only succinct statements that identify the MDOT problem, the approach to solve the problem, and anticipated research products and/or services that will provide a solution to the problem.

### 2.3.8 MDOT Research Study TAC Members

Include the following information for each of the MDOT research study TAC members and any non-TAC MDOT employees providing services for the study (each TAC includes at least one person from the Research Division who is designated as the TAC Chair in the proposal):

Name:
Title:
MDOT Division:
Work address:
Phone:
Email address:

### 2.3.9 Research Proposal Submitted By

Provide the following information and boilerplate affirmation with dated signature by an authorized representative of the Consultant.

Name:
Title:
Organization:
Address:
City, State, ZIP:
Phone/fax:
Email address:

The Consultant affirms that he/she has reviewed and understands the requirements included in the version of this document corresponding to the federal fiscal year for which proposal funding consideration is requested. Such affirmation is evidenced by the following signature:

_____ _____
Signature Date

### 2.3.10 Qualifications and Experience of Principal Investigator(s)

Describe the PI's technical qualifications and management skills that enable him/her to conduct the tasks outlined in the research plan. This section of the proposal is limited to three pages for each PI. The content of these pages should emphasize PI qualifications and experience that are relevant to the proposed research; do not submit a complete resume. The following is a list of the five subsections including corresponding discussion:

**Professional Preparation**

A list of each PI's undergraduate and graduate education and post-doctoral training will be provided, as indicated below:

| | | |
|---|---|---|
| Undergraduate institutions(s) | Major | Degree and year |
| Graduate institutions(s) | Major | Degree and year |
| Post-doctoral institution(s) | Area | Inclusive dates (years) |

**Work Experience**

In this subsection, the PI will list each job title and/or appointment in reverse chronological order, beginning with his/her current employment. Each listed item should include the beginning and ending date. Corresponding to each item, the PI should also include a brief discussion of any relevant work experience that enhanced his/her technical qualifications and/or project management skills to perform the proposed research. Experience that is not germane to the proposed research should not be included.

**Publications**

A list of up to five publications, preferably most closely related to the proposed project, may be included by the PI in this subsection. Each publication identified must include the names of all authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume, number, page numbers and year of publication. For a PI who has never performed research for MDOT, one of these publications should be sole-authored by that PI and available upon request by MDOT. The website should be provided for any of these documents that are available online.

For unpublished manuscripts, only those submitted or accepted for publication should be listed (along with the most likely date of publication). Patents, copyrights and software systems developed may be substituted for publications. Additional lists of publications, invited lectures and related materials must not be included.

All other factors being equal, publications related to the project are preferred to those that are not, and this should be reflected in the rater's evaluation. However, a researcher may desire to expand his/her scope of research interest and should not be precluded from doing so if MDOT agrees to fund his/her proposal. In these cases, the researcher probably does not have five publications in the proposed field of study, or may not have any, so his/her list may include up to five unrelated publications to allow the rater to generally evaluate the PI's quality of published work and project management experience. In any case the total number of related and unrelated published and unpublished documents, patents, copyrights and/or developed software systems should not exceed five.

When an individual has obtained an advanced degree, but has not published enough to demonstrate experience in the proposed research topic area and/or the necessary project management skills, that individual should list his/her dissertation and/or thesis in this subsection and be prepared to provide a copy of same to MDOT.

This individual should provide a list of the courses taken that are relevant to the proposed research (but not a list of every course taken) and a description of how his/her professional preparation qualifies him/her to conduct the proposed research. Note that individuals who possess a proven track record of

successful research within the proposed research subject area should include their list of professional preparation, but do not have to include this supporting information.

**Related Experience**

A list of up to five activities related to the subject matter in the proposal, in which the PI has been involved, may be listed in this subsection. For example, if the PI is submitting a proposal to evaluate stabilized materials for MDOT and the PI is on TRB Standing Committee AFS80 on Stabilization of Geomaterials and Recycled Materials, the PI should include his/her membership in this list.

Another example would be a proposed research study where soil sampling and testing are required as part of the conduct of the study. Specifically, AASHTO test method T 89, Determining the Liquid Limit of Soils, and AASHTO test method T 90, Determining the Plastic Limit and Plasticity Index of Soils, tests may be required. If the PI has conducted training classes for technicians to sample soils and perform these tests, then this information should be included in this subsection to illustrate how the PI is qualified to either do this testing or manage others to accomplish these tasks, to ensure adherence to the applicable sampling and testing protocols.

**Accomplishments**

Known instances are described of how the results of previously funded research, in the same or closely related problem area to that of the current proposal, were implemented by the funding agency. Examples of implementation include changes to state or national specifications, test methods and/or practices.

For each of these instances, the individual should describe the known benefit(s) to that agency as a result of those implementation activities. Optimally this description will include the benefit(s) expressed in both quantitative and qualitative terms such as number of lives saved, reduced number of crashes or money saved by that agency.

This subsection should include the name of the funding agency and name and contact information for all individuals within that agency that facilitated those implementation efforts. If there are no known cases of implemented research results, then a statement to this effect will be included in this subsection of the proposal.

### 2.3.11 Testing Facilities and Technician Experience

If the proposed research includes construction materials sampling and/or testing tasks, follow the supplemental guidance provided when developing the research proposal.

▶ **FOR MORE INFORMATION** See Supplement: Testing Facilities and Technician Experience.

If the proposed research does not include these types of tasks, include a statement to this effect in this section.

### 2.3.12 Study Cost Appropriated by Traditional Accounting Items

In a file *SEPARATE FROM THE RESEARCH PROPOSAL WORD FILE*, provide an Excel table that divides the total study cost based on traditional accounting line items such as salaries, overhead and profit. The format for this table will be in accordance with the requirements of a contract for the study.

Two templates are provided: Study Cost for State Entity and Study Cost for Non-State Entity. Universities performing research under a master contract should use the first, and all others, including private firms, should use the second.

▶ **FOR MORE INFORMATION** See the Study Cost for State Entity template (Microsoft Excel) and the Study Cost for Non-State Entity template (Microsoft Excel).

# 3 Quarterly Progress Reports

The Research Division is required to submit a QPR to FHWA that includes relevant information for each study included in the work program for the given FFY. To facilitate this submission to FHWA in a timely manner, the Consultant shall write and submit QPRs in accordance with the schedule and format provided herein.

## 3.1 Submission Schedule

An FFY begins October 1 of the previous calendar year. The scheduled dates that each Consultant needs to submit a QPR appear in Table 3.1.

**Table 3.1: QPR Submission Schedule**

| Quarter | QPR Period | Submission Deadline |
|---|---|---|
| 1 | October 1-December 31 | February 15 |
| 2 | January 1-March 31 | May 15 |
| 3 | April 1–June 30 | August 15 |
| 4 | July 1–September 30 | November 15 |

When the Consultant receives written notice that his/her study has been approved for funding, the Consultant must begin accounting for the progress of the study. There is a lapse of time between the written notice of funding approval and the issuance of an NTP. This time must be accounted for by the Consultant via a QPR(s). The information included in the “Progress” and “Plans for Next Quarter” sections of the QPR will account for the development of the research proposal and subsequent contract. For example, one or more TAC meetings with the Consultant may be required during this interim period to develop the research plan, and any such meetings would be documented in the QPR(s).

It is the responsibility of each Consultant to provide the Research Division with a QPR without this division being required to remind the Consultant each quarter that a report is due. To address this issue, the Research Division will keep record of all late submissions of QPRs, and this information will be considered in awards of subsequent research.

QPRs will be submitted to the TAC Chair overseeing the study. Any questions regarding completion of these reports should be directed to the TAC Chair.

## 3.2 Quarterly Progress Report Format

An electronic copy of the QPR format will be provided to the Consultant subsequent to MDOT approval of a research study. It consists of the following four components:

- Progress and plans
- Updated project schedule
- Updated planned vs. actual progress

- Updated planned vs. actual gross expenditure

A template is used for producing the QPR.

▶ **FOR MORE INFORMATION** See the Quarterly Progress Report template (Microsoft Excel).

### 3.2.1 Progress and Plans

The following provides direction on completion of select QPR column entries in the Progress and Plans worksheet.

**Months Included in Progress Reporting Period**

Enter one of the following four entries corresponding to the time frame for which progress is reported:

- October-December
- January-March
- April-June
- July-September

**Progress**

In this section, include a brief summary (250 words or less) of all tasks/subtasks for which work was accomplished during the last quarter. **Include only those tasks/subtasks for which work was actually performed.** Also, provide an estimate of the percent work completed for each of those tasks/subtasks.

As an example, consider a QPR period of October, November and December in FFY 2020. Assume work was performed during this QPR period on two subtasks. The information for both subtasks would be included in one simple paragraph, with the corresponding amount of work expressed as a percent completed for each subtask, as follows:

> Task 2 Subtask a) Materials Analysis: 30% (Interpreted as 30% of the total amount of work required to complete this task/subtask was actually performed during the months of October, November and December). The Consultant would include a brief description of the actual work performed during this period of time. Task 2 Subtask b) Screening Tests: 30% The Consultant would include a brief description of the actual work performed during this period of time.

This entire paragraph would be entered into the cell located immediately below the cell labeled "Progress."

**Plans for Next Quarter**

Under this heading, include a brief summary (250 words or less) of what is planned to be accomplished during the next quarter for each work task or subtask. **List only those tasks/subtasks for which work is actually planned.** Follow the same direction provided for "Progress" by combining all tasks/subtasks into a one-paragraph entry for the cell located immediately below the cell labeled "Plans for Next Quarter."

**Problems Encountered or Anticipated**

Include a discussion of any problems encountered during the previous quarter, or anticipated during the next quarter, that may delay submission of any project deliverables. For example, the research plan may include laboratory testing that requires the Consultant to purchase special testing equipment. Problems may have been encountered with obtaining all of the requisite test equipment to complete the planned percentage of work during the quarter under consideration. Although work was planned, if no work was actually performed, it will not be listed under "Progress." Include a discussion of these problems and how they may affect submission of the final report by the due date. **List only those tasks/subtasks corresponding to problems actually encountered or anticipated.** Follow the same direction provided for "Progress" by combining all tasks/subtasks into a one-paragraph entry for the cell located immediately below the cell labeled "Problems Encountered or Anticipated."

**Total Staff**

The remaining entries in the Progress and Plans worksheet pertain to Equal Employment Opportunity Commission and Title VI information. Enter the total number of staff that worked on this project during the last quarter under the "Total Staff" heading. Show the distribution of the total number of staff based on gender and race under the appropriate adjacent headings. Make sure that the sum of this distribution equals the total.

### 3.2.2 Updated Project Schedule

The Consultant updates the project progress schedule.

**Update Project Schedule After NTP is Issued**

This step is typically only necessary for the first quarterly report. Begin with the MDOT-approved Gantt Chart Schedule template, as introduced in Section 2.3.5, Duration and Project Schedule.

After an NTP is issued for a study, update the project schedule using the date of the NTP as the starting date for the planned sequence of tasks and subtasks. Enter the date of the NTP and corresponding FFY in the project schedule header information. Additional revisions to the project schedule, relative to this NTP date, should be made by replacing the verbiage "Months from Notice to Proceed (NTP) Date" with a subdivision of the research contract period based on the FFY. Each number of month entries from the NTP is replaced with the actual month from the NTP. This change is illustrated in Figures 3.1 and 3.2 below.

| Months from Notice to Proceed (NTP) Date | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |

**Figure 3.1: Gantt Chart Column Labels in Proposal**

| FY 2020 | | | FY 2021 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J | A | S | O | N | D | J | F | M | A | M | J | J | A | S |

**Figure 3.2: Gantt Chart Column Labels in QPR**

**Update Percent Completion by Task**

This step is completed for each quarterly report. For each task, indicate the cumulative completion of the task at the time of the QPR period in the far right column. This includes work completed during the current quarter as well as work completed in previous quarters.

The bottom of the last column in this chart is a cell showing actual overall progress completion. This is calculated automatically in the template.

### 3.2.3 Updated Planned vs. Actual Progress and Gross Expenditures

Indicate actual progress by time and expenditure. Begin with the progress graphs created from the Planned vs Actual Progress and Planned vs Actual Expenditure templates, as introduced in Section 2.3.5, Duration and Project Schedule.

Change the horizontal axis to refer to actual calendar months rather than numbered months from the NTP.

Follow the instructions in both Excel files to populate, by month, percent progress. These will automatically provide data for a second line on the graph indicating progress (see Figure 3.3, which illustrates three months of progress). The expenditure progress graph will look similar.

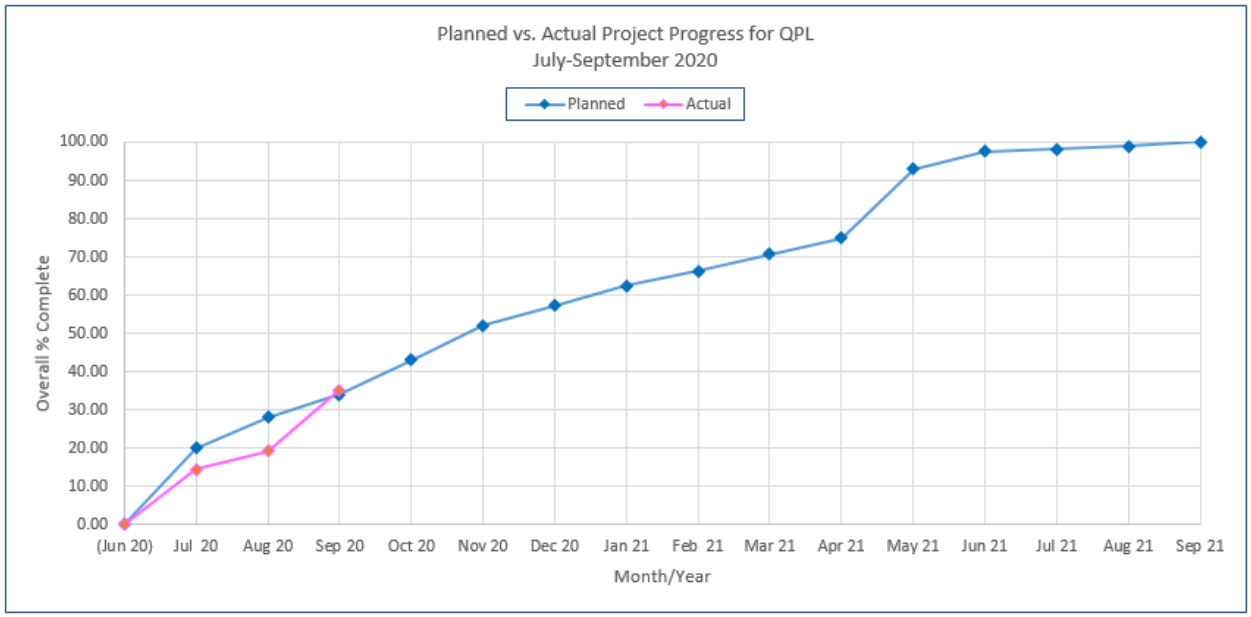


**Figure 3.3: Sample Planned vs. Actual Progress Graph for QPR**

# 4 Annual Progress Reports

Every year the Research Division is required to submit a proposed work program to FHWA for the next FFY. An FFY begins on October 1 of a given year and extends to September 30 of the following year. If a currently funded study is programmed to continue into the next FFY, that study is included in the proposed work program.

If a given study is continuing into the next FFY (that is, the contract end date is after September 30 of the current calendar year), the Consultant shall submit to MDOT an APR by August 15 of the current FFY in accordance with the format provided herein.

## 4.1 Annual Progress Report Format

A template is provided for the APR.

▶ **FOR MORE INFORMATION** See the Annual Progress Report template (Microsoft Excel).

Complete row 2 of the Microsoft Excel spreadsheet with the requested information. Additional guidance is provided here for completing cells E2, F2 and G2 of the template.

### 4.1.1 Progress for Current Federal Fiscal Year

In this section, include a brief summary (250 words or less) of all tasks and subtasks for which work was accomplished during the current FFY. Note that the instruction for this type of entry is the same as for a QPR: Include only those tasks and subtasks for which work was actually performed. Since APRs must be filed before the end of the FFY, include any work you plan to complete before then.

### 4.1.2 Plans for Next Federal Fiscal Year

In this section, include a brief summary (250 words or less) describing all tasks and subtasks for which work is planned for the following FFY.

### 4.1.3 Problems Encountered or Anticipated

Provide a brief description of any problems encountered during the current FFY or anticipated during the next FFY that may delay submission of any project deliverables. If no problems are expected, enter “None” in this cell.

## 4.2 Submission of Annual Progress Reports

APRs will be submitted to the Research Liaison and the TAC Chair overseeing the study. Any questions regarding completion of these reports should be directed to the TAC Chair.

# 5 Invoicing

Invoices submitted to MDOT will be formatted in accordance with the requirements of the research contract. Supporting documentation must also be submitted with each invoice for interpretation of the invoiced amount in terms of the research tasks and subtasks. Following are requirements for supporting documentation:

- List each task and subtask for which work was completed and billed for in the invoice.
- Include a brief, one- or two-paragraph summary of what was accomplished for each of these tasks and subtasks that warrant reimbursement. **List only those tasks and subtasks for which work was actually performed and billed for in the invoice.**
- Provide an estimate of the percent work completed and a corresponding amount of money for each of these tasks and subtasks.

For convenience, the Consultant may want to submit an invoice at the same time a QPR is submitted, but this is entirely at the discretion of the Consultant.

# 6 Interim and Final Reports

For most MDOT research projects, the final report is the crucial deliverable provided to MDOT to fully and clearly explain the purpose, process, results and significance of the research, and delivery of a satisfactory final report is required for payment of federal and state funds for the research. A very few projects have only test results, software, manuals or educational materials as the deliverable, but these are rare. **Unless this is noted in the proposal and at the project's inception, the Consultant MUST produce a final research report for any federally and/or state-funded research project.** A draft report must be submitted to all TAC members at least three months before the end of the contract to allow for review and revision. This document will serve as a guideline for Consultants to follow in preparing the draft and finalizing the report.

In some cases, one or more interim reports will also be part of the work plan. The guidance provided here for final reports is generally applicable for interim reports, noting that some parts (particularly related to findings, conclusions and next steps) may not be complete.

A template is available for the Consultant's use in producing a final report. Use of this template is not required; it is tool for those who wish to use it.

▶ **FOR MORE INFORMATION** See the Final Report template (Microsoft Word).

Within the template, titles, styles and wording are flexible. The template contains all required elements of a report, plus a table of contents that is updateable at any point during the report writing process.

## 6.1 Accessibility

Regardless of the report template or format used, it is the Consultant's responsibility to ensure the final report complies with accessibility standards set forth in Section 508 of the U.S. Rehabilitation Act. MDOT's template is designed to facilitate accessibility compliance.

▶ **FOR MORE INFORMATION** See Supplement: Accessibility Requirements.

These requirements assure that users with disabilities can access publicly available materials by making use of tools that magnify text, read text aloud or use other techniques.

It is not required that an interim report meet accessibility requirements. However, since content in interim reports is commonly used in final reports, it may make sense to create interim products with accessibility in mind (for example, using minimum contrast ratios for text, adding Alternative Text to images, and ensuring tables do not have merged cells). This will ensure that the Consultant does not need to go back later and remediate or re-create content to ensure that it meets accessibility requirements.

*It is the* Consultant's *responsibility to meet MDOT's accessibility requirements in Microsoft Word and PDF versions of the final submission (see Section 6.6, Final Report Submission and Delivery Requirements). A report that is not compliant or not sufficiently close to compliant will be rejected for the Consultant to remediate at the Consultant's expense.*

## 6.2 Report Workflow

Each interim report (if applicable) and the final report follow a three-month review, comment and revision period of time prior to submission of the final version of the given report. Each three-month time period must be included in the project schedule.

Table 6.1 represents the typical workflow for the delivery and revision of an interim or final report. It assumes that the changes required will be minimal enough to be addressed in a single round of revisions, and that the Consultant will successfully enact these revisions as requested by the TAC.

**Table 6.1: Report Workflow**

| Time Period | Work Activity |
|---|---|
| 3 months prior to due date (interim report) or end of contract (final report) | Consultant prepares draft report and submits to TAC for review<br>Concurrently, Consultant provides a presentation focused on the content of the report to the TAC. This presentation may be face-to-face with the TAC either at the Consultant or MDOT location, or via web conferencing (for which the Consultant is responsible). |
| 4-6 weeks | TAC reviews draft and provides comments to Consultant |
| 4-6 weeks | Consultant revises draft |
| Prior to due date or contract end date | Interim report: Consultant submits revised report in PDF format along with any other interim deliverables.<br>Final report: Consultant submits revised report (in Microsoft Word format, in PDF format and as 8 hard copies) along with any other deliverables. |

## 6.3 Report Elements and Organization

A final report will include most of the typical elements listed in this section. Some are required (such as the Technical Report Documentation page, table of contents and executive summary). Some are optional (such as appendices), depending on what tasks were done in a particular project.

The report can be thought of in three distinct parts—the front, body and end—as outlined here.

**Front**

- Cover/title page
- Technical Report Documentation page
- Disclaimer notice
- MDOT statement of nondiscrimination
- Author acknowledgments
- Table of contents
- List of tables/figures
- List of abbreviations/acronyms

**Body**

- Executive summary
- Introduction/background
- Literature search
- Methodology/research approach
- Research findings and applications
- Conclusions
- Recommendations/Implementation Plan

**End**

- Bibliography/references
- Footnotes
- Appendices
- Back page

Details on how to complete specific sections follow. The items in this section that show as "required" must all be in the report as they appear in this document. The only possible exceptions might be the list of tables, figures and abbreviations, if these do not apply to the report. These items are listed as "optional."

### 6.3.1 Front of the Report

**Cover/Title Page (Required)**

This will be of thicker paper than the main report. This will show the report title, author(s), name of Consultant (university or company), State Study number and date of the report. Consultant, university and/or MDOT logos may be put on this page.

**FHWA Technical Report Documentation Page (Required)**

This is an FHWA/U.S. Department of Transportation (USDOT) requirement and **must** be completed and submitted in the front of the report. It is included in the Final Report template if the Consultant will be making use of that template. It is also provided as a stand-alone template that may be copied and pasted into a different report format. **Please delete the instructional verbiage after filling in the spaces on this page.**

▶ **FOR MORE INFORMATION** See the Technical Report Documentation Page template (Microsoft Word).

Note that FHWA's Technical Report Documentation page uses merged table cells. As a rule, merged cells are not allowed anywhere else in the report per Supplement: Accessibility Requirements, but they are allowed in this one instance per FHWA instructions.

**Disclaimer Notice (Required)**

The following text may be copied and pasted into the report:

> **DISCLAIMER**
>
> **Your organization name here** _____ and the Mississippi Department of Transportation do not endorse service providers, products, or manufacturers. Trade names or manufacturers' names appear herein solely because they are considered essential to the purpose of this report.
>
> The contents of this report do not necessarily reflect the views and policies of the sponsor agency.

**MDOT Statement of Nondiscrimination (Required)**

The following text may be copied and pasted into the report:

> **MDOT NOTICE OF NONDISCRIMINATION**
>
> The Mississippi Department of Transportation (MDOT) operates its programs and services without regard to race, color, national origin, sex, age, or disability in accordance with Title VI of the Civil Rights Act of 1964, as amended and related statutes and implementing authorities.

**Author Acknowledgments (Optional)**

This is not required, but the Consultant might wish to acknowledge those who assisted with the project, such as TAC SMEs, mentors and students not listed on the front page as authors.

**Table of Contents (Required)**

Most word processing software can aid in building an automated table of contents. The Consultant will need to denote the styles of each heading (for example, Heading 1, Heading 2 and Chapter Title) throughout the report. The Consultant should use the software help feature or a reference book for more information.

**List of Tables/Figures (Optional, if applicable)**

Most word processing software can aid in building an automated list of tables/figures. The Consultant will need to denote the styles of each caption as Caption style. The Consultant should consult the software help or a reference book for more information. If preferred, a List of Tables and a List of Figures can be created manually without using the styles feature.

**List of Abbreviations/Acronyms (Optional, if applicable)**

Any acronyms, abbreviations or symbols that are commonly used in the report should be defined.

### 6.3.2 Body of the Report

This section is a bit more flexible than the front of the report. The titles of these sections can be worded differently (for example, the Consultant can write *Research Results and Interpretation* instead of *Research Findings and Applications*). The concepts and relevant information must appear somewhere in

the report in an organized fashion, even if styled or titled differently. The following serves as an example of how a report might be organized. The required elements are noted.

**Executive Summary (Required)**

This section consists of one-to-three paragraphs that clearly and concisely summarize the research problem, objective, methods, research findings, conclusions and recommendations (similar to an abstract).

**Introduction/Background (Required, but can be titled differently)**

This section discusses the research problem, study objectives and any other background information.

**Literature Search (Required in most studies)**

This section discusses any previous publications relevant to the subject.

**Methodology/Research Approach (Required, but can be titled differently)**

This section includes any testing, analysis, surveys or any other means used by the Consultant to address the research objective. It also includes any changes in methods that may have occurred during the course of the research.

**Research Findings and Applications (Required, but can be titled differently)**

This section presents a discussion and interpretation of results and how they relate to the original research problem.

**Conclusions (Required)**

This section summarizes the results and explains how they solved the problem (or if not, why not), wholly or in part. It also discusses the benefits (such as lives or money saved, a new specification or the cost/benefit ratio) in depth.

**Recommendations/Implementation Plan (Required, but can be titled differently)**

This section includes any recommendations and plans for MDOT to implement the findings. It also references any separate implementation deliverables, such as training modules, draft specifications or presentations.

### 6.3.3 End of the Report

**Bibliography/References (Required)**

This section lists all citations. Authors are responsible for obtaining permission for use of any copyrighted materials. The Consultant should refer to a style manual or use the American Psychological Association (APA) guidelines for citations.

**Footnotes (If applicable)**

Footnotes can alternatively be incorporated into the body of the report at the end of the relevant chapters.

**Appendices (If applicable)**

Appendices may include in-depth test results or any information the Consultant feels belongs in the report but not in the main body.

**Back Page (Required)**

This will generally be blank and will be of the same thickness as the title page.

## 6.4 Style Considerations

Below are guidelines for preparing the final report:

- Use a font size of at least 12-point that is easy to read and compliant with Section 508 of the U.S. Rehabilitation Act (see Section 6.1, Accessibility). Compliant fonts include Trebuchet, Calibri, Arial, Verdana, Tahoma, Helvetica, Futura and San Serif.
- Do not right-justify the text or use all capital letters within text. All caps may be used in headings or titles, but not in body text.
- Please label figures and tables with a centered, numbered, bolded caption (either directly underneath or above the table/figure).
- Number the pages either at the top or bottom.
- Put the *entire* final report in one file each (one Microsoft Word file and one PDF file). **Do not** send chapters, appendices, spreadsheets, pictures or other report portions in separate files.
- ***Please proofread the draft report carefully for typographical, spelling and grammar errors, and correct these before draft and final submissions.*** The report will ultimately be published with your name listed as the author. It will be placed on MDOT's website and distributed to the Mississippi Library Commission, the National Transportation Library (NTL), TRB and other research entities nationally and worldwide, so please keep this in mind when submitting the draft and final versions of the report. If more than one person wrote chapters in the report, please check the flow of the overall document before submission.

APA guidelines are an accepted standard for scientific and technical writing. MDOT does not strictly require this style; however, it is a great source for answering writing and stylistic questions. Please see http://www.apastyle.org/ for more information.

## 6.5 Writing and Readability Guidelines

The three concepts for technical writing are subject, audience and purpose. Many reports will be technical in nature, and use of specialized terms is necessary. However, the Consultant may wish to add some brief explanation of some concepts, depending on the audience. The conclusions and implementation portion in particular need to be clearly understood as they will likely be read by people beyond the technical area of the report. Also, the executive summary and abstract need to be concise and understandable for audiences such as chief executive officers and other upper management. The Consultant should communicate often with the TAC members and the Research Division during the draft report review phase.

## 6.6 Final Report Submission and Delivery Requirements

After TAC approval of the draft report and any modifications, the Consultant will submit the following final report items to his/her Research Division TAC Chair:

- Eight (8) spiral-, comb- or perfect-bound hard copies of the final report (no stapled or notebook-bound copies will be accepted).
    - Please copy/print on both sides of the paper in the eight copies to reduce use of paper.
- Microsoft Word electronic file of the final report, with the **entire** final report's components (such as the title page, abstract, chapters, appendices and Technical Report Documentation page) combined into **one** file.
- PDF version of the final report, also with all components combined into one file.
- Digital version of the **Technical Brief** in a mutually agreed upon format (only if the creation of a Technical Brief was included in the contract as a subtask). Section 2.3.3, Research Plan, provides the expectations and requirements for a Technical Brief.

The Microsoft Word and PDF electronic documents should be emailed to all TAC members. The hard copies should be mailed/shipped/delivered to the Research Division TAC Chair at the address below:

(Name of Research Division TAC Chair)
Mississippi Department of Transportation
Research Division 86-01
PO Box 1850
Jackson, MS 39215-1850

If the electronic files are too large to email, the Consultant may submit a CD, DVD or flash drive instead. FTP sites (MDOT's or another FTP site), large file transfer software, or cloud-based storage and transfer (OneDrive or Drop Box, among others) may also be used. (This does not constitute an endorsement of the above-mentioned file-transfer software packages.) When using this method of delivery, the Consultant will need to communicate closely with the TAC Chair to let him/her know that the files are accessible this way, and to ensure MDOT staff can receive or download the files or can access the FTP site or cloud storage location.

Hand delivery of hard copies (and/or CD, DVD or flash drive, if applicable) is also acceptable. Our office is located on the 7th floor of the MDOT Administration Building at 401 North West Street, Jackson, Mississippi 39201. Please put the Research Division TAC Chair's name and "Research Division 86-01" on the box if delivering the copies to the security desk in the building lobby to aid the guard in getting these to the correct person. MDOT assumes no responsibility for undelivered reports. The best way to ensure that the Research Division has received the reports is to communicate: Let the Research Division know the report is being delivered, and follow up to ensure it was received. ***It is the responsibility of the Consultant to communicate with the Research Division about the method of file delivery/transfer.***

After Research Division receives the final report, it will be posted on MDOT's research website at http://mdot.ms.gov/portal/research. It may be a few weeks before the report shows up on MDOT's website. It will also be sent to TRB for posting in the Transportation Research Information Database (TRID), NTL and the Mississippi Library Commission.