

**ARKANSAS DEPARTMENT OF TRANSPORTATION
SYSTEM INFORMATION AND RESEARCH DIVISION
FISCAL YEAR 2021
REQUEST FOR PROPOSAL
RESEARCH PROJECT NO. TRC2101**

TITLE: Update of ARDOT Workforce Forecasting System

ARDOT POLICY

All proposals shall be submitted electronically per the Proposal section of this Request for Proposal. As of Fiscal Year 2020, all research project contracts will be managed under Info Tech's Doc Express Paperless Contracting platform. All information on the utilization of this platform for research projects can be found at http://www.ardot.gov/System_Info_and_Research/research.aspx or from the Research Section.

PROBLEM STATEMENT

ARDOT has relied on 'The Manpower Forecasting System Formulas Program' since the 1970s to predict workforce needs at Resident Engineer's (RE) offices throughout the state. The program takes project characteristics (roadway type, contract amounts, etc.) as input to predict annual inspection staffing levels based on formulas derived from historical construction project data. The software estimates the labor required to inspect projects as they are constructed, determines when and where labor is needed, and generates reports of this information. Unfortunately, the staffing prediction formulas within the program have not been re-estimated to reflect today's workforce productivity and the Department's changing resource usage patterns. Further, from a practical standpoint, the software currently used is outdated and cannot run or be updated easily on modern PCs. Therefore, the purpose of this project is to re-estimate and expand the capabilities of the workforce prediction model and software. For added functionality, the proposed software will allow direct user input for items like seasonal factors and underlying workforce usage trends and ideally enable longer-range predictions (2+ years).

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AREA OF STUDY

The objective of this study is to develop new equations for Construction Division's Workforce Forecasting System and find or write new software with a possibility of the integration of artificial intelligence (AI) in a future interface. Any software found or developed needs to support new equations, using AI and a database for future expansion involving more than one division of ARDOT.

METHOD OF STUDY

Per the Subcommittee Meeting, the old data processor requires a need for development and analysis of the current equations to determine if commercially available software may be used or new unique software developed.

BENEFITS

A detailed cost-benefit analysis shall be included in the proposal. The analysis must include but is not limited to the following:

1. Detailed cost analysis on savings to the Department with full implementation of the projects findings.
2. Any anticipated benefit not foreseen as a cost savings.

TIME AND FUNDING OF STUDY

Work will begin no earlier than July 1, 2020, contingent upon acceptance of the proposal and availability of research funds. The length of the project shall be 18 months. A final report is to be drafted and presented to the Research Subcommittee no later than the last day of the project. Up to 25% of the estimated project costs will be withheld pending final acceptance of the final report. Failure to deliver the required Final Report at the end of the project will result in the cancellation of the project and 25% of the total project cost will be retained by the Department.

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REPORTS

All reports must be in accordance with the 2019 Research Manual (available at http://www.ardot.gov/System_Info_and_Research/research.aspx or from the Research Section). All reports are required to be submitted through the appropriate Doc Express process. An Implementation Report which details the recommended means/techniques for using the project results shall be submitted to the Department six (6) months prior to the research project's Final Report. All Final Reports are required to be reviewed by a technical editor before submission to the Department. An oral report to the Transportation Research Committee may be required. In addition to reports and publications, the Department shall be furnished one (1) copy of any master's thesis or doctoral dissertation which is a result of any investigation or study on this project. The submitting of any report to be published by an outside publication or presentation on this project before its completion; shall be submitted for the Department's approval before submission.

PROJECT DELIVERABLES

The proposed research will provide ARDOT with updated equations and new software for the Construction Division's Workforce Forecasting System. Make sure that an implementation plan with a methodology on determining cost-benefit is included.

AUTHORIZATION TO BEGIN WORK

A letter separate from the contracting documents authorizing the beginning of work will be transmitted through Doc Express initiating the project. Any cost incurred before the authorization letter is received, will not be eligible for reimbursement. The project will begin work no earlier than July 1, 2020.

EQUIPMENT

A complete physical verification of all software and equipment purchased or built for use on this project and the actual location of the equipment will be made each year. An Equipment

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Capitalization Notice is available from the Research Section for the reporting of software or equipment purchased during the project. All software developed on the project will be completed in open source format and ARDOT shall be provided a copy of the source code. If non-expendable or special equipment is purchased with project funds, the equipment is owned by ARDOT and disposition of the equipment will be determined by ARDOT at the project's closeout session.

All rental rates shall be approved by ARDOT before the approval of the proposals. Should a subcontract be part of the proposal, ARDOT will not approve the purchase of any equipment in the subcontract. Any equipment purchased through ARDOT's Transportation-Related Research Grant Program is not eligible for rental rate charges.

All equipment shall be purchased in accordance with the State of Arkansas purchasing laws.

PROPOSALS

Proposals shall be submitted in two separate electronic formats, a word document and a pdf, to Research@ardot.gov no later than the end of business on April 3, 2020. This is a firm deadline. All procedures shall be in accordance with the 2019 Research Manual and Federal Aid Policy Guide (FAPG). In the event of policy contradiction, the FAPG shall govern.

Upon approval of the electronic version of the Proposal by the Research Subcommittee the Project Manager will initiate the process within Doc Express to acquire the appropriate electronic signatures from all parties.