

Missouri Department of Transportation  
*Patrick K. McKenna, Director*

1.888.ASK MODOT (275.6636)

November 30, 2020

Dear Research Partner:

The Missouri Highways and Transportation Commission requests proposals from qualified organizations—namely private consultants, universities, and research organizations—to furnish professional services as described in the following request for proposal to be coordinated by the Research Unit of the Construction and Materials Division.

Please submit a proposal for project **TR202112** entitled, "**GFRP Reinforced Bridge Barriers.**" Your submittal must include a work plan, the proposed project team and its background, and any related projects now active or recently completed by your firm. The project team must be led by a licensed professional engineer in the state of Missouri and the final report must be sealed, in accordance with the provisions of Chapter 327 RSMo.

The selection committee will use Qualification Based Selection. A "not to exceed" budget amount is included in the RFP to assist with the required scope, but budgets are not to be included with the proposal submissions, and will not be presented to the selection committee.

Please submit all proposals to [MoDOTResearchRFP@modot.mo.gov](mailto:MoDOTResearchRFP@modot.mo.gov) by **January 12, 2021 10:00 AM (CST)**. More information about project contracting in general can be found at <https://www.modot.org/information-researchers> under RFP documents.

Sincerely,



Jen Harper  
Research Director



*Our mission is to provide a world-class transportation system that is safe, innovative, reliable and dedicated to a prosperous Missouri.*

[www.modot.org](http://www.modot.org)

---

## Background

MoDOT first started using steel free decks in 2007. Both Carbon Fiber Reinforced Polymer (CFRP) and Glass Fiber Reinforced Polymer (GFRP) bars have been used in 4-5 bridge decks on the state bridge system. These decks have been performing well but the cost of the bars had previously kept them from being price competitive with epoxy coated steel bars. Recent price reductions in GRFP has led to a more competitive environment between GFRP and epoxy coated reinforcing bars. MoDOT currently does not have specifications for using GFRP reinforcing within barriers so even if a deck is "steel free" there will still be barrier steel bars embedded within the deck. This project is to develop the specifications and standard drawings for using GRFP reinforcing within Type D Barriers.

---

## Objectives

The objective of this project is to develop specifications and standard drawings for the use of GRFP reinforcing bars within a MoDOT Type D barrier. Modeling shall be done to simulate MASH crash testing of the barrier and deck cantilever so that the final design will be ready for full scale MASH testing done outside of this research project.

---

## Project Requirements

### Task 1: Project Management

The contractor will facilitate a kick-off meeting with MoDOT to review the work plan, scope and schedule; and establish a protocol for regular ongoing communications and coordination with the team. The contractor will also develop minutes for the kick-off meeting and any status meetings that may be held during the project.

The finalized work plan will detail implementation of the following tasks as well as the resources and schedule required to carry them out.

### Task 2: Literature Review

Perform a literature search of past research on barriers and product availability for GFRP reinforcing bars. Specific considerations for GFRP properties must be considered such as the ability to have bends in the bars and differences in development lengths.

### Task 3: Preliminary Design

The number of bends in the bar will be limited and development lengths will need to be considered. A simplified design may be required to make the design cost effective. Preliminary cost analysis will need to take place during this task to verify the preliminary design is feasible from a cost perspective.

### Task 4: Develop Model and Simulate MASH Crash Test

The Contractor shall develop a computational model of the design developed in Task 3 and simulate MASH crash testing. The model should take into consideration the material properties currently used in MoDOT barriers and decks. Fine tuning of the GRFP Barrier and deck

cantilever design should take place within the modeling task such that the Contractor feels confident the barrier will pass full scale crash tests, which are outside the scope of this project. The design should include the transverse bars in the deck near the barrier that are required to resist the MASH forces. The following design criteria will need to be developed for the GFRP reinforced barrier per AASHTO LRFD A13.3.1:  $R_w$ ,  $L_c$ , and  $M_c$ .

### **Task 5: Development of Specifications and Standard Drawings**

The contractor shall develop specifications for the new GFRP barriers to be inserted into the Engineering Policy Guide that is located here: [EPG](#). Standard Drawings must also be developed for insertion here: <https://www.modot.org/barriers-bar-bac>

### **Task 6: Cost Comparison**

Once the final design of the barrier is determined, the contractor should verify with industry the practicality of the design and do a cost comparison with a traditional barrier.

### **Task 7: Develop Report, Research Summary, Specifications, Standard Drawings and Presentation**

The Contractor shall develop a final report detailing the tasks completed during the project, including any and all findings generated during the project's duration. The Contractor shall provide a 1-2 page research summary that states the project objectives, findings and conclusions. The Contractor shall also prepare updated language and the new calculations for entry into relevant sections of MoDOT's Engineering Policy Guide (EPG). A presentation for MoDOT staff, summarizing important or significant details of the project, shall also be provided.

---

## Project Deliverables

For templates and forms for reports and plans, visit <https://www.modot.org/information-researchers>

### Email Communications

E-mail and phone communications between the Principal Investigator(s) and MoDOT contacts as necessary are required to provide on-going updates of progress throughout the project

### Data Management Plan

The plan is a formal document that describes the data that is acquired, created or produced during the project, specifies who owns it and who can access it as well as information on how it will be described, managed, analyzed, stored, shared and preserved during and after the project is over. Please refer to templates on the [website](#).

### Quarterly Reports

Quarterly reports should be submitted throughout the project on the last day of March, June, September and December. The quarterly reports are not intended to replace any additional correspondence between the research team and MoDOT needed to keep the project moving. Please refer to template on the [website](#).

### Interim Presentation

An interim presentation shall be scheduled near the mid-point of the project to update MoDOT on the progress and the direction of the project. The purpose of the interim presentation is to evaluate the progress and determine if any mid-project corrections are necessary.

### Draft Final Report and Research Summary, Specifications and Standard Drawings

These drafts should be final products except for revisions based on MoDOT's review. A final report must include a completed Technical Report Documentation page. Please refer to **Publication Guidelines** and summary template on the [website](#).

### Final Report and Final Research Summary, Specifications and Standard Drawings

After MoDOT's review is complete and documents have been edited to MoDOT's satisfaction, final documents should be submitted as a Word documents (unless otherwise instructed). Please refer to **Publication Guidelines** and summary template on the [website](#).

### Final Presentation

May be required. The contractor will present the results, recommendations, and implementation ideas to MoDOT and other stakeholders. The contractor will coordinate location, date, and meeting fees with MoDOT. For stakeholder and agency participants, any travel and lodging fees are to be covered by individual attendees or their firms. MoDOT and stakeholders will provide feedback to the contractor, especially related to implementation.

## Task-Specific Deliverables

Task	Deliverables
1	Schedule and conduct kickoff meeting. Kickoff meeting minutes. Draft and final work plans.
2	none
3	Preliminary Design
4	Computational Model
5	Specifications and Standard Drawings
6	Cost Comparison
8	Final report & research summary and EPG language and calculations. Presentation. Final project meeting.

## Project Schedule

The following is an estimate of the project timeline or information on key dates within the project, presuming the project starts **February 16, 2021**. Proposals need to include a work plan with a proposed timeline. For a sample of a work plan template, see link below. Changes to our estimated project timeline below will be considered, however, timeline extensions cannot be guaranteed. The project timeline will be discussed and finalized during the kickoff meeting.

For report templates and forms, visit <https://www.modot.org/information-researchers>.

Date	Milestone
2/26/2021	A kickoff meeting with MoDOT will be scheduled to discuss project requirements and deliverables. The dates of key milestones and deliverables will be determined from this meeting.
8/16/2021	Interim presentation must be done by this date.
2/1/2022	Draft final report, draft summary report, draft specifications and draft standard drawings are due. The draft documents shall be submitted to MoDOT approximately two months prior to the final report.
4/1/2022	Final report, final summary report, final specifications and final standard drawings are due. The final documents shall be due approximately one month before the end of the contract. This is to allow all billing to be completed prior to the end of the project.
5/2/2022	Final invoice due, contract ends.

---

## Special Notes

Project budget is not to exceed **\$75,000**. A budget is not to be included in the proposal but will be required for the contract and must be within this limit. For a sample Budget template, report templates and forms, see <https://www.modot.org/information-researchers>.

---

## RFP Requirements

- “Contracting Documents” provide further details and links to the required forms. They are available at <https://www.modot.org/information-researchers>.
  - **Organization’s Project Experience:** The proposal must clearly identify the Organization’s experience in offering the services requested in this RFP during the past three (3) years. The description should include a list of the agencies which your organization has served during this time period or currently serves. Please highlight any work you have done with other state agencies or local governments.
  - **Team Member Experience:** Please list all team members (including subcontractors) proposed to work on the project. Attach licenses, certifications and resumes for key personnel.
  - **Organization’s Client References:** Proposals should indicate the name, title, and telephone number of at least three clients within the past three years.
- Proposals must be no more than 8 pages in length with a font size no less than 11 points. This length limit **does not include** the Proposal Submission Form, Organization’s Project Experience, Team Member Experience, Organization’s Client References and optional cover letter (if included, one page maximum).
- Proposals **must be submitted as one combined PDF document**. The submission should only include the required documents organized in the following order: 1) Proposal Submission Form; 2) Cover Letter (Optional; 1 page maximum); 3) Body of Proposal (including work plan); 4) Organization’s Project Experience; 5) Team Member Experience; and 6) Organization’s Client References.
- The Offeror must respond to this RFP by submitting all the information required herein for its proposal to be evaluated and considered for award. Failure to submit all the required information shall be deemed sufficient cause for disqualification of a proposal from consideration.
- Proposals will be evaluated by an agency and stakeholder team with knowledge and backgrounds in relevant areas for this project. Selection of the successful Offeror will be based on the Offeror’s demonstrated knowledge in the required areas, the merit of the proposed methods and approach in achieving the desired goals, the experience and qualifications of the team, the plan for ensuring implementation of results, and the adequacy and availability of team members to complete the work in a timely manner.
  - Correct proposal submission is one of the evaluation criteria. If submission instructions in this section are not followed, the **Offeror risks an automatic 10-point deduction (out of 100 total points)** when points are awarded during the Proposal Evaluation Process.

---

## RFP Schedule

This document constitutes an RFP from qualified organizations to conduct the TR202112, GFRP Bridge Barriers study for the MHTC and Missouri Department of Transportation (MoDOT). MHTC reserves the right to reject any and all proposals for any reason whatsoever.

The following RFP Schedule of Events represents MoDOT's best estimate of the schedule that shall be followed. The time of day for the following events shall be between 7:30 am and 4:00 pm, Central Standard Time unless otherwise noted. MoDOT reserves the right at its sole discretion to expand this schedule, as it deems necessary, without any notification except for the deadline date for submitting a proposal. Time is of the essence for responding to the RFP within the submission deadlines.

The following timeline must be met for a proposal to be accepted.

Date	Action
11/30/2020	MoDOT posts RFP to the website at <a href="https://www.modot.org/research-requests-proposal">https://www.modot.org/research-requests-proposal</a> .
12/9/2020 4:00 PM (CST)	Written comments or questions must be submitted to <a href="mailto:MoDOTResearchRFP@modot.mo.gov">MoDOTResearchRFP@modot.mo.gov</a> .
12/16/2020	MoDOT will post written responses publicly on the website at <a href="https://www.modot.org/research-requests-proposal">https://www.modot.org/research-requests-proposal</a> .
1/12/2021 10:00 AM (CST)	Written proposals must be submitted to <a href="mailto:MoDOTResearchRFP@modot.mo.gov">MoDOTResearchRFP@modot.mo.gov</a> .
1/26/2021	MoDOT will notify submitters about project selection, or if needed about interviews to finalize selection.

---

## Contracting Requirements

The successful team will be required to complete additional documentation and enter into a contract such as a "Standard Research Agreement" or "Task Order." Applicants should be aware of these additional needs so contracting can proceed in a timely manner.

As part of the eAgreements process, MoDOT uses an electronic signature tool, DocuSign, for signing agreements electronically. All parties of the agreement must agree to sign electronically in order to utilize the electronic signature option. If your proposal is selected, you will be informed about how to obtain your credentials for electronic signatures (including how to become a MoDOT vendor if you are not already).

Standard contracts, forms, attachment templates and additional information are available from the website at <https://www.modot.org/information-researchers>.

---

## Proposal Submission

### Submission Deadline

Proposals must be emailed by **10:00 AM (Central Standard Time)** according to email time stamp by the submission date in the RFP Schedule to the Research Director's attention (Jen Harper) at: [MoDOTResearchRFP@modot.mo.gov](mailto:MoDOTResearchRFP@modot.mo.gov). Please reference the project title since more than one RFP may be due at one time. Electronic proposals are required.

### Submission Confirmation

You will receive an email confirmation after your proposal has been received. If you do not receive such a confirmation by **12noon (Central Standard Time)** on the day of the deadline, please contact us at [MoDOTResearchRFP@modot.mo.gov](mailto:MoDOTResearchRFP@modot.mo.gov) as soon as possible. Your submission should not be considered received until you have received your email confirmation.