MoDOT

105 West Capitol Avenue
P.O. Box 270
Jefferson City, Missouri 65102

Missouri Department of Transportation
Ed Hassinger, P.E., Director

1.888.ASK MODOT (275.6636)

August 5, 2025

Dear Consultant:

The Missouri Highways and Transportation Commission is requesting the services of a consulting engineering firm to perform the described professional services for the project included on the attached. This solicitation is for a pilot program to implement the use of the Light Weight Deflectometer (LWD) to accompany the nuclear density gauge in compaction quality control of soils and aggregates. MoDOT will use the I-70 expansion project (currently planning to add it to the Bid Build project from Boonville to Rocheport) to perform additional testing as needed to begin a pilot program to implement the LWD.

If your firm would like to be considered for these consulting services, you may express your interest by responding to the appropriate office, which is indicated on the attachments. Limit your letter of interest to no more than five pages. This letter should include a statement to indicate your firm's understanding of the project. It should also include any other information which might help us in the selection process, including key personnel you would assign to the project and the backgrounds of those individuals, and any sub-consultants you would propose to use, and an indication of your firm's approach to promoting and developing a diverse workforce. MoDOT is committed to reflecting the diversity of the communities we serve and we expect our partners to do the same. We will utilize the consultant information already on file so we will not need a lengthy submittal of other general company information. In addition, please attach one page with detailed information on similar projects that your key personnel have worked on. Indicate the role your key personnel played in the projects and include reference contact information.

DBE firms must be certified by the Missouri Department of Transportation in order to be counted as participation towards an established DBE Goal. We encourage DBE firms to submit letters of interest as prime consultants for any projects they feel can be managed by their firm. We also encourage both DBE firms and non-DBE firms to consider joining MoDOT's Mentor/Protégé program whenever possible as part of a MoDOT project.

MoDOT will evaluate firms based on: Project Understanding & Innovation, Past Performance, Qualifications of Personnel Assigned, General Experience of Firm, Familiarity/Capability, Accessibility of Firm & Staff. Firm's not providing a response on approach to workforce diversity will be considered non-responsive to this solicitation. Firm's that are not current on all of the required prequalification categories found in MoDOT's Approved Consultant Prequalification List at the date of the solicitation expiration will be considered non-responsive.

We request all letters be received by 3:00 pm, August 28, 2025 at the appropriate office.

Sincerely,

DocuSigned by:
Brenda k. Harris
84651FE883F841A...

Brenda Harris
Assistant State Design Engineer

Attachment

MoDOT Central Office

Construction & Materials Division

Brandi Baldwin – State Construction & Materials Engineer

Missouri Department of Transportation
1617 Missouri Blvd
Jefferson City, MO 65109

Division Contact
Lydia Brownell – Geotechnical Director
573-526-4628
Lydia.Brownell@modot.mo.gov

Email responses are encouraged

EXHIBIT B

Statewide, Various Routes by Assignment	
Job No:	Various
Location:	Various
Proposed Improvement:	See Exhibit C
Length:	Various
Approximate Construction Cost:	Various
DBE Goal (if applicable)	0%
Consultant Services Required:	
Other Comments:	Interviews or presentation will not be required for the consultant selection. Consultant may or may not be contacted for clarification of submittal items Tentative Date of Consultant Selection-September 11, 2025

Rating Criteria w/Weighted Values

Project Understanding & Innovation	25 Points Max
Past Performance (not necessarily MoDOT specific)	10 Points Max

This could be examples of past experience with an LWD, experience in construction testing especially density testing, examples of timeliness, etc

Qualifications of Personnel Assigned	15 Points Max
General Experience of Firm	15 Points Max
Familiarity/Capability	20 Points Max
Accessibility of Firm & Staff	15 Points Max
	100 Points Max Total

EXHIBIT C

Scope of Services

Implementing the Light Weight Deflectometer (LWD) for Compaction Quality Control of Soils and Aggregates

MoDOT has completed a research project with Missouri University of Science & Technology to explore ways to use the LWD to reduce/eliminate the departments need to use nuclear density gauges to measure compaction of soils and aggregates. Even though nuclear density gauges have very low levels of radiation, they are a national security risk. They also require significant training time, safety measures and requires MoDOT to coordinate with the Nuclear Regulatory Commission and our Missouri State Emergency Management Association for audits and training. The research was completed in two phases which are summarized below.

LWD Phase 1 Research – TR202002

Phase 1 of the LWD research was to study the implementation of the Zorn LWD for the acceptance of unbound material layers on MoDOT projects and collect different types of material including a lean clay, a select granular backfill, a base aggregate, and a silty clay to perform a series of lab tests. In addition, two different moisture analyzers were evaluated to determine their ability to accurately obtain moisture content in the field. At the completion of Phase 1, it was concluded additional tests were needed to confirm the draft LWD procedure and the Ohaus MB120 moisture analyzer performed the best, but had limitations in the field due to vibrations.

LWD Phase II Research – TR202103

The Phase II project was to obtain additional field test data to verify the standards for the implementation of the Zorn LWD for the acceptance of unbound material layers. Five additional soils were collected from different project sites in Missouri for this phase and a series of laboratory and field tests were conducted. A total of 582 field LWD tests were performed using three Zorn LWDs. (LWDs #3878, #3879, and #4421). LWDs #3878 and #3879 had a drop height of 28 inches, a plate diameter of 12 inches and a hammer weight of 22 pounds and LWD #4221 had a drop height of 22 inches, plate diameter of 8 inches and a hammer weight of 22 pounds. Acceptance criteria including moisture content and field to target LWD modulus ratios were used to assess the compaction acceptance at the field sites. In addition, a disturbance isolation unit which includes a 1000 W power invertor, four vibration isolation elements, a leveling platform, and a covering hood were designed and tested for the Ohaus MB120. The isolation unit was validated for accurate and effective moisture measurements in the field. When LWD results were compared with the nuclear density gauge density-based evaluation method, the LWD performed reasonably well for fine-grained soils such as clay and silt but poorly for coarse-grained soils. It was also noted results from LWD #3878 and LWD #3879 were more consistent with the nuclear density gauge than those from LWD #4421.

Project Scope

This scope of this project is a pilot program to implement the use of the LWD to accompany the nuclear density gauge in compaction quality control of soils and aggregates. The chosen consultant will use the I-70 expansion project (currently planning to accompany the Bid Build project from Boonville to Rocheport) to perform any additional testing necessary to begin a pilot program to implement the LWD. The consultant will work closely with the I-70 Design Build teams to implement the pilot program and coordinate testing. The I-70 Design Build teams are willing to help with some

of the testing with the LWD's. The consultant must be able to meet contractor schedules as related to the pilot program planned.

MoDOT will purchase 12 Zorn LWD's, 1 Lab LWD, 12 Ohaus MB120's for use during the pilot program. The consultant will need to purchase the material and build 12 isolation units for the Ohaus MB120. The isolation unit design can be found in Phase 2 of the research and MoDOT has a prototype that was built for the research. This equipment will be used for the pilot program and returned to MoDOT at completion. At the final phase of the pilot program, provided it is a success, MoDOT will purchase the remaining equipment needed to replace the current inventory of nuclear gauges. The Consultant shall provide training sessions for MoDOT's seven Districts and MoDOT's Central Office soils laboratory staff once the remaining equipment has been purchased.

The consultant will finalize any necessary data analysis and complete a pilot program on I-70. The consultant will, but not limited to, complete the following:

- Review the already completed research mentioned above.
- Review other DOT LWD implementation procedures and specifications (Maryland, Indiana, and Nebraska)
- Complete any additional testing needed to implement the LWD for fine- and coarse-grained material for use in roadway and structure fills.
- Verify the Ohaus MB120 and isolation unit is still valid for determining moisture content in the field.
- Determine any material or site limitations, such as shallow groundwater, a maximum size of coarse-grained material where the LWD is not suitable for use, or other limitations determined during the study.
- Determine acceptance criteria for compaction of roadway subgrades, structure backfill, slope fills, etc

The consultant will create a testing procedure and any necessary field sheets or calculation spreadsheets. Once a testing procedure is established, the consultant will coordinate with the I-70 project teams to incorporate a pilot project(s) using the LWD on their project. In addition to the pilot program along I-70, two other locations outside of the I-70 corridor will be used as additional confirmation of the pilot program. The consultant will provide any guidance and training needed to complete testing on these additional projects.

Once a final implementation plan is successful, the consultant will revise MoDOT's Engineering Policy Guide (EPG) guidance and standard specifications to implement LWD acceptance. EPG guidance and standard specifications should address at a minimum the following items:

- Testing limitations
- Material limitations
- Equipment List
- Testing frequency
- Location of tests
- Acceptance requirements
- Care and storage guidelines
- Maintenance and Repair Guides
- Calibration Frequency (ASTM E2835)
- Trouble Shooting

- Any other items that should be included to successfully implement the LWD.

Upon successful completion of the pilot program, completion of updating MoDOT's EPG guidance and standard specifications, the consultant will provide instruction and training to our construction inspectors/technicians in our seven Districts and MoDOT's Central Office soils laboratory staff. At this time, MoDOT will complete the purchase of recommended equipment to fully implement the LWD at all MoDOT project office locations. The training and slides used will be provided to MoDOT's technical certification program to aid in creation of a new class at State Technical College.