



## REQUEST FOR PROPOSAL (RFP) #17-06

### Evaluating the Accuracy and Use of Drilled Shaft Integrity Testing Methods in Illinois

**POSTED DATE: 9/1/17 CLOSING DATE: 9/30/17**

#### PROJECT INFORMATION

**Funds:** \$440,000 total, including a required 25% (\$110,000) cost share from proposing agency.

**Estimated Contract Term:** 30

**Projected Start Date:** 1/1/18

**Deadline for Submitting Proposals:** 9/30/17

**Submit Proposals via Email to:** [ICTProjectManagement@illinois.edu](mailto:ICTProjectManagement@illinois.edu)

#### BACKGROUND

A recent FHWA/IDOT Joint Process Review identified emerging technologies such as Thermal Integrity Profile (TIP) testing, which is widely considered by industry as a more reliable testing procedure compared with cross-hole sonic logging (CSL), as well as many areas for improvement of drilled shaft construction in Illinois. Based on the review, it is recommended that IDOT utilize integrity testing on drilled shafts. The “integrity testing selection” flow chart will be immediately incorporated into IDOT’s Bridge Manual. Integrity testing will allow IDOT to identify defects in drilled shafts during construction, which will improve the safety of bridges.

Drilled shafts are frequently constructed under conditions such that visual inspection of the shaft sidewalls, bottom, reinforcement location, and concrete placement cannot be performed because the shaft is constructed under water. Integrity testing allows for an assessment of the condition and integrity of the completed drilled shaft to ensure that no flaws were created during the construction process. Evaluating the different methods of conducting integrity testing of drilled shafts will allow IDOT to use the most cost-effective method and have confidence that the chosen method accurately determines the integrity of the drilled shaft. TIP is a relatively new

innovation, used only by a few state DOTs. Embracing this method would make IDOT become a nationwide leader in the use of this innovative technology.

This research will evaluate CSL and TIP to determine which technology is more effective in identifying drilled shafts defects. It will also quantify historical Illinois costs related to integrity testing and remedial actions on Illinois drilled shaft projects and evaluate the cost effectiveness of CSL and TIP.

## **OBJECTIVE**

The objective of this project is to provide guidelines for the most appropriate use of integrity testing considering shaft sizes, number of shafts, soil conditions, expected wet vs. dry method of construction, redundancy of shafts, and importance of the structure. A simple “integrity testing selection” flowchart will be developed to be used by designers for determining when integrity testing should be conducted.

## **RESEARCH TASKS AND REQUIRED DELIVERABLES**

The research will evaluate CSL and TIP to determine which technology is more effective for identifying defects in drilled shafts, quantify historical Illinois costs related to integrity testing and remedial actions on Illinois drilled shaft projects, and using this data, provide guidelines on the most appropriate use of integrity testing considering shaft sizes, number of shafts, soil conditions, expected wet vs dry method of construction, redundancy of shafts, and importance of facility. Potentially, a simple flow chart may be developed to be used by designers to determine when to specify integrity testing. The following tasks are suggested:

Task 1 – Literature Review: The literature review will cover CSL, TIP, and other integrity testing methods.

Task 2 – Data Collection: Statewide, project-specific cost data on historical integrity testing will be collected and costs, findings, and frequency of corrective actions taken as a result of integrity testing will be summarized.

Task 3 – Program Development: An experimental program will be developed to compare the accuracy of CSL and TIP at identifying defects. This program should involve the construction of drilled shaft foundations with intentional “built-in” defects.

Task 4 – Implementation of Experimental Program: The outcome of the experimental program will be implemented as part of the field testing. This should allow IDOT to implement integrity testing for drilled shafts and identify defects in drilled shafts during construction, which will improve the safety of bridges.

Task 5 – Development of Flowchart for Drilled Shafts Integrity Testing: An “integrity testing selection” flow chart will be created to help designers determine when to specify integrity testing for drilled shafts. The “integrity testing selection” flow chart will be immediately incorporated into IDOT’s Bridge Manual.

Task 6 – Final Report: A final report will be submitted per ICT guidelines summarizing the outcome of this research including the expected impact of the outcome on IDOT.

*Please note that the federal funding used by IDOT and ICT for our contract research program requires that IDOT share technology developed through our contract research program. Any software, databases, and related computer programs, identified as a Research Project deliverable in the initial Research Project Work Plan, developed under this study will become the property of ICT, which is required to grant IDOT and the federal government free use of the software, and to share it with other states.*

## **INSTRUCTIONS FOR SUBMITTING A PROPOSAL**

The proposal shall be prepared in accordance with the guidelines presented in Appendix A. The contact name/email and due date should be included on the first page. All potential Principal Investigators (PIs) should read and understand the responsibilities of ICT Principal Investigators, which are presented in Appendix B.

Technical questions regarding the research project or questions regarding the RFP procedures should be submitted to ICT Project Management Team via email at [ICTProjectManagement@illinois.edu](mailto:ICTProjectManagement@illinois.edu). Technical questions and answers will be posted on the ICT website as they are received.

## **SPECIAL CONDITIONS FOR REVIEWING PROPOSALS AND AWARDING ICT FUNDS**

Please note that the following two conditions will be applied during the review of all proposals received and in awarding ICT funds:

- 1) In reviewing and evaluating the proposals received from this solicitation, when multiple proposals are reviewed and have identical scores, preference will be given to Illinois universities (both public and private) over others.
- 2) The award of this project is contingent upon the availability of funds at the time of award.

## **APPENDIX A: GUIDELINES FOR PREPARING PROPOSALS FOR THE ILLINOIS CENTER FOR TRANSPORTATION (ICT)**

Please use the following format for submitting ICT proposals for consideration. Please limit your total proposal to 15 pages in length (not including the Cover/Summary Page or optional Appendices) and use a font size no smaller than 10. We suggest Arial font with 1.5 spacing between lines.

### **1. Cover/Summary Page**

Use the cover page included in Appendix C.

### **2. Research Plan**

The research plan should describe in a specific and straightforward manner the proposed approach for solving the problem described in the problem statement. The research plan should be subdivided into the following sections:

#### **(a) Introduction, including Research Idea Statement**

Provide an introduction to the proposal and a concise overview of the research approach. Outline the objectives of the research project and explain the questions that will be answered by the research.

#### **(b) Research Approach/Work Plan**

Include the details of how the investigator will carry out the project and accomplish the project objectives. Itemize the tasks to be completed, explaining each in sufficient detail so the reviewers understand what will be done for each task and what will be produced or completed with each task.

#### **(c) Anticipated Research Results**

Specifically state the anticipated research results and deliverables.

#### **(d) Expected Implementable Outcome**

Describe how the anticipated research results can be used to support the expected implementable outcome defined in the research need.

### **3. Qualifications and Accomplishments of the Research Team**

Identify who will perform the research and provide a brief explanation of each researcher's qualifications to perform the research. Please provide examples of similar research that the proposed individuals have performed.

#### 4. Other Commitments of the Research Team

Briefly outline the other commitments of the proposed principal and co-principal investigators to demonstrate that both will be able to fulfill the commitments of the proposal.

#### 5. Facilities and Equipment

Describe the facilities and equipment available to undertake the research proposal.

#### 6. Timeline Requirements

A timeline of the research project's tasks must be included in this section. Describe the time that will be required to complete the research proposal, including final report preparation, ICT's editing, review of the report by the Technical Review Panel (TRP), and final review/publishing of the report. Please plan on submitting the draft final report to ICT for initial editing at least three months before the end date for the project. Below is an example of a project timeline.

Project Milestones (assuming a January 1 Start Date, and a 2 year project)	2018												2019											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
1 Kickoff Meeting	█																							
2 PI conducts Research	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
3 PI writes DRAFT report																								
4 PI Submits Final DRAFT report to ICT for editing																								
5 ICT Preliminary editing phase																								
6 PI/TRP editing phase																								
7 Final editing phase																								
8 Report Posted to ICT website																								
(Quarterly Progress Reports Due)			█			█			█			█			█			█			█			█
(Semi-annual Evaluations Due)					█				█			█					█			█			█	
(TRP / PI Meetings)			█			█			█			█			█			█			█			█

#### 7. Itemized Budget

Provide an itemized budget for the entire project, including the cost of personnel, consultants, subcontracts, equipment, materials, travel, overhead/indirect costs and cost share (match).

Each project must include a budget that clearly shows the portion of the total cost requested from IDOT/ICT (75%) and the matching funds/cost share (25%) required from the proposing agency. The indirect cost rate (also known as overhead or F&A) used for facilities and administration (F&A) cannot exceed 50% of the modified total direct costs. If a subaward is necessary for extra support from outside the proposing agency, please note that the subaward cannot exceed 50% of the total project budget without prior approval. All projects outsourced outside the University of Illinois System are considered subawards.

A part of the 25% cost share requirement may be fulfilled through the use of unrecovered indirect costs. Any proposal submitted by an organization outside of the University of Illinois system that plans to use unrecovered indirect cost to meet part of

the required 25% cost share must submit a request for approval to IDOT/FHWA (Federal Highway Administration). More information on this letter will be provided if and when a proposal is selected for funding.

Please refer to ICT's budget templates when submitting a proposal to ICT: [UIUC Budget Template](#); [Subawardee Budget Template](#)

## **8. Budget Justification (Narrative)**

Each project must include a budget justification that explains the itemized budget in narrative form. The budget justification provides sufficient detail so there is a clear understanding of how the project costs were calculated and why they are necessary. The narrative discussion of the project cost categories and related line items should be presented in the same order as they appear in the itemized budget.

If this project will require out-of-state travel or to in-state conferences, please specifically list and explain the travel here. PI's requesting to travel out-of-state or to in-state conferences using ICT/IDOT funds must fill out a [Travel Request Form for PI's and Research Assistants](#) *before* traveling.

If this project will require the purchase of equipment, please specifically list these equipment purchases here. Equipment purchases above the \$500 threshold must have an [Equipment Purchase Request Form](#) submitted *and approved* prior to purchasing.

## **9. Cooperative Features (if appropriate)**

If assistance or cooperation is required from other agencies, public or private, to complete this proposed research, describe the plans for securing this assistance.

## **10. Appendices (if appropriate)**

Items such as statements regarding previous work on the problem or related problems, abstracts of related projects, a bibliography or list of references, or materials describing the submitting organization may be included here.

**APPENDIX B:**  
**Principal Investigator (PI) Quick  
Reference Guide for ICT/IDOT  
Sponsored Projects**

*Downloadable forms and guidelines are at:*  
<http://ict.illinois.edu/research/formsguidelines>

1. **Prepare and submit a detailed work plan:** The project's work plan is to include a line-item budget, budget justification, implementation strategy, and deliverables; and should be consistent with the "ICT Request for Research Ideas" submission or RFP (whichever is applicable).
2. **Finalize work plan with Technical Review Panel (TRP):** Revise the work plan as agreed upon with the TRP. E-mail the approved work plan and budget to ICT ([ICTProjectManagement@illinois.edu](mailto:ICTProjectManagement@illinois.edu)), who will assign a project number and enter project data into the ICT website database.
3. **Complete PI section in the on-line ICT project database:** Go to the ICT website at <https://apps.ict.illinois.edu/projects/> to log into the database. New PIs can request a login user name and password from ICT at [ICTProjectManagement@illinois.edu](mailto:ICTProjectManagement@illinois.edu). Click on "View/Edit My ICT Projects" then click on the **Edit** icon on the right side of the screen and complete the following sections: Personnel (add project team members, including co-investigators and students); Project Details (add project tasks, a project description, the progress and significant results this quarter, the anticipated work next quarter, update the project schedule status and provide any project impediments and recommended solutions).
4. **Upload files or photos:** Click on the **Files** icon (upper right corner of screen) and complete the following fields: Document Type (required), Document Title, Authors, and Abstract. Then use the "Browse for File" button to navigate to the directory on your computer and select the file you wish to upload. This process should be repeated for any additional files or photos. You may also use the "e-mail us" link at the bottom of the screen to send ICT the files to upload.
5. **Conduct research as agreed upon with the TRP:** Notify the TRP if any problem develops during the project.
6. **Provide quarterly progress reports (QPRs):** No later than the end of each calendar quarter, update your project's on-line QPR and send to the TRP chair for review and approval. ICT will send e-mails reminding PIs to fill out the QPR for their research projects.
7. **Provide research progress updates to TRP:** Attend all TRP meetings as scheduled by the PI and TRP chair (generally once per quarter, at least every 6 months) to provide project updates and answer TRP members' questions about the project. If you would like help setting up a Go-To- Meeting, ICT can help facilitate this. Provide any presentations in advance to the meeting recorder at [ICTProjectManagement@illinois.edu](mailto:ICTProjectManagement@illinois.edu). Complete implementation worksheet with the TRP's help, and then review/update as necessary at TRP meetings.

8. **Complete a semi-annual Administrative Performance Evaluation of the TRP:** You will be sent a reminder 30 days prior to the evaluation deadline to download and complete the form.
9. **Write project report:** A final research project report in accordance with ICT guidelines is required to complete your project. Reports should fulfill project objectives set forth in the work plan, show adequate documentation, and be presented clearly and concisely; **the maximum page length is 75 pages (~35,000 words) not counting appendices.** Specific [report writing guidelines](#) may be downloaded from the ICT website. Complying with these guidelines will minimize publication delays. Six months and four months prior to your project end date, you will receive reminders from ICT to draft your project report.
10. **Submit project report to ICT for editing three months prior to project's end date:** Three months before the project's end date, submit the draft report to ICT for editing (**prior to submission to the TRP**). The three-month editorial process is conducted in three phases as follows:
  - **PRELIMINARY EDIT PHASE:** The PI submits the complete report to ICT Program Management ([ICTProjectManagement@illinois.edu](mailto:ICTProjectManagement@illinois.edu)) in MSWord format (template can be downloaded [here](#)). The PI should follow the ICT report formatting guidelines. **Reports that do not follow ICT guidelines will be returned to the PI for resubmission.** A comprehensive technical edit of the report will be performed and then returned to the PI for review and revision. Additional useful documents and forms are on the [Report Guidelines and Documents](#) page.
  - **PI/TRP EDIT PHASE:** The PI reviews the ICT technical edits, accepts/rejects changes, addresses all comments, and forwards the edited report to the project's TRP Chair for review.
  - **FINAL EDIT PHASE:** When the report is approved by the TRP Chair, the PI forwards the final report and the [Final Edit Phase/TRP Final Approval](#) form to ICT Project Management for final editorial review. **Reports submitted without the TRP approval form will not be accepted.**

***NOTE: The three-month report editing and review process must be built into your project timeline. That is, if your project ends on December 31, your report should be sent to ICT Project Management for editing no later than September 30.***

11. **To release project information prior to the final report being published, IDOT approval must be obtained. IDOT requires 21 days to review the approval request.** After 21 days, publication or public disclosure of non-confidential and non-patentable results in professional refereed or peer-reviewed journals or papers to be presented at professional meetings may proceed without interference. The publication or release of non-scholarly work products, any information that is deemed confidential by IDOT, or information which includes patentable results may not be published/released without IDOT's approval. *If the scheduled time for presenting project information previously reviewed by IDOT does not permit formal review of a complete publication or presentation, notify IDOT of the scheduled presentation on the study and provide an abstract, presentation title, or agenda for the presentation. Such presentations shall include a statement that the IDOT/ICT acknowledgement statement and disclaimer statement (available on the ICT website) in all publications and presentations regarding research sponsored partially or fully by ICT which states paper/presentation has not been reviewed by IDOT.*



12. **Comply with the terms of the current ICT Intergovernmental Agreement which IDOT approved in July, 2017:** This agreement can be found on the ICT website on the [ICT Forms and Guidelines](#) page.
13. **Comply with the current ICT Operational Guidelines:** The current guidelines can be found on the ICT website on the [ICT Forms and Guidelines](#) page.

**Appendix C:**  
**Cover Page for ICT/IDOT Sponsored Research Projects**

Please use the following format when submitting proposals to ICT for consideration. Please limit the total proposal to 15 pages in length (not including the Cover/Summary Page or optional Appendices) and use a font size no smaller than 10. Arial font with 1.5 spacing between lines is suggested.

**1. Cover/Summary Page**



PROPOSAL COVER SHEET  
FOR SOLICITATION #17-06

**Evaluating the Accuracy and Use of Drilled Shaft Integrity  
Testing Methods in Illinois**

DUE: September 30, 2017

TO [ICTProjectManagement@illinois.edu](mailto:ICTProjectManagement@illinois.edu)

Submitted by:	Name Organization Address City, State ZipCode
Proposed Investigator(s):	
Corresponding Investigator Name:	
Corresponding Investigator Phone:	
Corresponding Investigator Email:	
Submission Date:	