REQUEST FOR PROPOSAL (RFP) #19-05

_Cone Penetration Testing (CPT) for Illinois Subsurface Characterization and Geotechnical Design_

POSTED DATE: April 1, 2019
CLOSING DATE: April 30, 2019

Submit proposals via email to: ICTProjectManagement@illinois.edu

PROJECT INFORMATION

**Funds:** $500,000 total, including a required 25% ($125,000) cost share from proposing agency.

**Estimated contract term:** 36 months

**Projected start date:** Aug. 16, 2019

BACKGROUND

The Illinois Department of Transportation (IDOT) uses Standard Penetration Tests (SPTs) as primary means of site characterization for geotechnical projects involving roadways, bridges, retaining walls, etc. Even though SPTs are widely used, there are several benefits in Cone Penetration Tests (CPTs) over SPTs, as outlined in the National Cooperative Highway Research Program’s Synthesis 368.

CPTs obtain continuous soil profile data, layer thicknesses, different soil types, pore water pressure measurements, and even seismic shear wave velocities throughout the entire depth of the exploration by pushing a cone penetrometer equipped with electronic sensors through the soil. This continuous record from CPTs provides a better understanding of the soil strata than conventional SPT drilling. Furthermore, all CPTs’ soundings are faster and less expensive than SPTs.
CPTs are increasingly being considered as state-of-practice and cost-effective ways of performing site explorations for many other state DOTs, including neighboring Midwestern states and even AASHTO design codes.

Illinois is one of the few states that has limited experience with CPTs. Currently, minimal guidance is available for IDOT to use CPTs in geotechnical studies. The economic advantage of CPTs and their better reliability could allow IDOT to deliver more miles of highway and more structures with constrained budgets.

OBJECTIVE

The objective of this study is to develop guidelines for using CPTs in subsurface explorations and correlations to Illinois soil properties for incorporation into IDOT's Geotechnical Manual. This will expand the use of CPTs in current IDOT practices to utilize higher quality subsurface data that would reduce the cost of field exploration, design, and construction of roadways and structures.

RESEARCH TASKS AND REQUIRED DELIVERABLES

The proposed research will address the following tasks.

Task 1: Literature review
The research team should review CPT-based site characterization and design procedures, including practices of neighboring state agencies whose soils are presumed similar to those found in Illinois.

Task 2: Perform field testing
The research team should conduct CPTs at 21 sites in Illinois with a small, medium, and high push capacity truck, trailer, and drill-rig-mounted CPT systems. These sites should have soil borings and SPT data that were previously obtained and preferably used in design of a deep foundation to determine if CPTs would have yielded a similar or more cost-effective design.

Task 3: Recommend CPT guidelines for field testing
Based on Task 2, the research team should provide general guidelines for CPT field work.

Task 4: CPT-SPT correlations
Produce and validate CPT-SPT correlations considering soil types, shear strengths of cohesive soils, friction angle of cohesion-less soils and the like.

Task 5: Guidelines and recommendations
The research team should develop guidelines for CPTs' usage for subsurface explorations as well as equipment requirements. Recommendations should be made for CPT-based geotechnical design of roadways and foundations.
Task 6: Final Report
Based on this research, a Final Report detailing the study process, findings, and recommendations should be prepared.

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 an Illinois Center for Transportation (ICT) PI’s role, 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. Technical questions and answers will be posted on ICT’s 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 of 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: Limit total proposal page count to 15 pages, excluding the cover page and/or appendices, and use a font size no smaller than 10. Note: We suggest Arial font with 1.5 line spacing.

1. **Cover page:**
   Use the cover page found [here](#).

2. **Research plan:**
The research plan should clearly and concisely address 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 objective:**
   Provide an introduction to the proposal and a concise overview of the research approach. Then outline the objectives of the research project and explain the questions that will be answered by the research.

   (b) **Research approach/work plan:**
   Include details of the research project and strategy to accomplish the project objectives. Then itemize the tasks to be completed, explaining in sufficient detail what will be done, produced, or completed with each task.

   (c) **Anticipated research results:**
   State the anticipated research results and deliverables.

   (d) **Expected implementable outcome:**
   Describe how the anticipated research results can be used to support IDOT’s implementation of the expected outcome(s).

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. Provide examples of similar research 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 both will be able to fulfill the proposal commitments.

5. **Facilities and equipment:**
Describe the facilities and equipment available to undertake the research proposal. Under the terms of the Inter-Governmental Agreement between ICT and IDOT, laboratories meeting the criteria of [Bureau of Materials policy memorandum 6-08](#) require proof of qualifying laboratory status. More information on this will be provided if and when a proposal is selected for funding.
6. **Timeline requirements:**
A timeline of the research project’s tasks must be included in this section. Describe the amount of time required to complete the research proposal, including final report preparation, ICT’s editing, TRP review of the report, 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 project’s end date. Listed below is an example project timeline.

<table>
<thead>
<tr>
<th>Project Milestones (assuming a January 1 Start Date, and a 2 year project)</th>
<th>2019</th>
<th>2020</th>
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</thead>
<tbody>
<tr>
<td>1 Kickoff Meeting</td>
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<tr>
<td>2 PI conducts Research</td>
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<tr>
<td>3 PI writes DRAFT report</td>
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<tr>
<td>4 PI Submits Final DRAFT report to ICT for editing</td>
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<td>5 ICT Preliminary editing phase</td>
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<td>6 PI/TRP editing phase</td>
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<tr>
<td>7 Final editing phase</td>
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<tr>
<td>8 Report Posted to ICT website (Quarterly Progress Reports Due)</td>
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<tr>
<td>(Semi-annual Evaluations Due)</td>
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<tr>
<td>(TRP / PI Meetings)</td>
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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 facilities and administration (F&A), used for F&A cannot exceed 50% of the modified total direct costs. If a subaward is necessary for extra support outside the proposing agency, note that the sub-award cannot exceed 50% of the total project budget without prior approval.

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/ Federal Highway Administration (FHWA). 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 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 list and explain the travel here. PIs requesting out-of-state travel or in-state conferences using
ICT/IDOT funds must complete a Travel Request Form for PIs and Research Assistants before traveling.

If this project requires the purchase of equipment, list 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 the proposed research, describe the plans for securing 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.
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. It should be consistent with the ICT Request for Research Ideas submission or RFP (whichever is applicable).

*Please note that the federal funding used by IDOT and ICT for this contract research program requires IDOT have access to and share technologies and information developed through this contract research program.*

Any software, databases, or related computer programs developed under this study and identified as a research project deliverable in the initial research project work plan, will become property of IDOT and ICT. IDOT and ICT will provide free use of the software to both IDOT and the federal government, and may share it with other states and governmental entities.

2. **Finalize work plan with TRP:**
Revise the work plan as agreed upon with the TRP. Email the approved work plan and budget to ICT (ictprojectmanagement@illinois.edu), which will assign a project number and enter project data into the ICT website database.

3. **Complete PI section in the online ICT project database:**
Log into the database by visiting the ICT website (apps.ict.illinois.edu/projects). New PIs can request a user name and password from ICT by emailing 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:

   **(a) Personnel:**
   Add project team members, including co-investigators and students.

   **(b) 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 in the 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 email 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 online QPR and send to the TRP chair for review and approval. ICT will send emails reminding PIs to complete the QPR for their research projects.

7. **Provide research progress updates to TRP:**
   Participate in all TRP meetings as scheduled by the PI and TRP chair, generally once per quarter — at least every six months, to provide project updates and answer TRP members’ questions about the project. Kick-off and final meetings should be held in person. All other TRP meetings may be held in person, remotely, or a combination thereof. If you would like help setting up a remote meeting, ICT can help facilitate this. Provide any presentations in advance to the meeting recorder at 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, approximately 35,000 words, excluding appendices. Specific report writing guidelines may be downloaded from the ICT website. Complying with these guidelines will minimize publication delays. You will receive reminders from ICT to draft your project report six months and four months prior to the project end date.

10. **Submit project report to ICT for editing three months prior to project 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:

    **(a) Preliminary edit phase:**
    The PI submits the complete report to ICT Program Management (ICTProjectManagement@illinois.edu) in MSWord format. The 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.

(b) 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.

(c) 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 Dec. 31, your
report should be sent to ICT Project Management for editing no later than
Sept. 30.

11. To participate in the publication or public disclosure of 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, refer to the contract and
contact ICT for further instruction.

12. Comply with the terms of the current ICT intergovernmental agreement,
approved by IDOT July 2017:
This agreement can be found on ICT’s website on the ICT Forms and Guidelines
page.

13. Comply with the current ICT operational guidelines:
Current guidelines can be found on ICT’s website on the ICT Forms and
Guidelines page.