The RFP for the Geotechnical Report

Small Effort Yields Big Dividends

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This article makes the case that the use of a Geotechnical Engineer for his/her engineering expertise could be more advantageous to the design team than a request for just low-cost drilling and a cheap Geotechnical Report.

Background

As the Structural Engineer for a building, how many times have you received from an owner a so-called "Geotechnical Report" that in your opinion was worth just slightly more than the paper on which it was written? Chances are, more than once.

Why was there a lack of value? Most likely, the report was written in a vacuum, without any specific communication between the Geotechnical and Structural Engineers. Most likely it was commissioned by an owner with requirements for low cost and fast turn-around time. Why the Owner? AIA documents clearly state that this is an Owner's furnished item.

Let us return to the so-called "Geotechnical Report". What do you do now? For starters, you may pick up the phone and call the Architect to get permission to contact the Geotechnical Engineer with your specific questions. Let's assume you get the O.K. Depending on your relationship with the Geotechnical Engineer, you may get some specific answers or you may hear the phrase: "That will cost you....$". Now you are stuck. You have to call the Architect to get the Owner's approval for the additional payment. (Note: There is nothing wrong with asking to be paid for your services above and beyond the original contractual obligations. Since the Geotechnical Engineer met the initial Owner's criterion of low price, he/she should not be expected "to give away the store".) In most instances, the Owner is not too happy; and, since the job is still in its early stages, neither is the Architect.

Even if you, the SE, were requested to provide some input for the Request for Proposal (RFP), it usually is limited to the boring locations and number/depths of borings, and the Owner will take care of the rest. If that is all that you are asked to provide, the results are not going to be that much different from those previously described.

When AIA G-602 is used as the basis for the RFP, contractual aspects are well covered. Structural requirements are reasonably addressed; however, the Geotechnical Engineer's needs are largely overlooked. This document is only suited when providing the "prescriptive" option for a RFP.

A Different Approach

A different approach would be to issue an RFP that states your desired results and contains sufficient information for the Geotechnical Engineer to provide a proper Geotechnical Report that addresses the needs of the Structural Engineer, eliminating the need for extensive follow-up correspondence.

The Solution: Team Effort

How do you then satisfy both the Geotechnical Engineer's and the Structural Engineer's needs? About 10 years ago, a group of Michigan Structural and Geotechnical Engineers formed a group to discuss this concern. The bottom line of these discussions: a good Geotechnical Report is a team effort between the two disciplines. The group's efforts resulted in a Master RFP for Geotechnical Investigation and Report. It contains two major points:

1) The Structural Engineer is required to: a) furnish specific information about the proposed structure and its location, and b) describe the specific results that are desired.
2) The Geotechnical Engineer is required to address the list of specifics requested in the RFP.

The intent is for the Structural Engineer to edit and "fill in the blanks" contained in the Master RFP; the edited version is then supplied to the Geotechnical Engineer. The Master RFP is available for your review at: **www.seami.org/geotechnical%20RFP.html**.

The Master RFP contains many commentary items aimed at assisting a person new to the format in developing a site- and building-specific RFP.

Issuing the RFP

How and when then does the RFP get issued?

The "How": You may issue it in conjunction with the Architects terms and conditions. Another method is to use it as an attachment to AIA G-602.

The "When": We suggest you hold up issuing the RFP until the results of the Schematic estimate are complete. Note, this does not mean just the structural schematic; it means the other disciplines as well. Why such an extensive requirement? There are often major adjustments to the footprint and the number of stories to meet the Owner's budget. Alternately, if you have a 50 acre site, and various options of locating the structure are possible, issue a preliminary RFP. Request just the basic info for each option and an initial Seismic Site Classification. If one location has better foundation conditions than others, the potential cost savings should be conveyed to the Architect as input for the final site location.

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Major Geotechnical and Structural Needs Summary

Geotechnical Engineer's Needs	Why
1. A site plan with topographical information, showing the location of the building and its relationship to other nearby structures, if any a. If the location is not fixed, an approximate envelope for the locations should be considered.	A. The Geotechnical Engineer usually has subsurface maps that show the general composition of the soils, or first-hand knowledge of the geotechnical conditions on this site or nearby sites. B. If the proposed building is located near existing facilities, foundation sizes and types may have to be changed in order to avoid conflicting with or overstressing the existing foundation system. C. If the location is not fixed and an envelope is provided, the Geotechnical Engineer will evaluate the entire envelope.
2. Information regarding the ownership of the property	A. If the property is owned by anyone other than the client issuing the RFP, this information needs to be conveyed to the Geotechnical Engineer in order to coordinate proper site access authorization.
3. A preliminary slab on grade plan, with preliminary column locations and preliminary column loads, as well as the elevation of the slab-on grade a. Also to be shown, if generally known, the approximate locations for the lateral support system, and its vertical and lateral loads i. SE's note: The extensive use of RISA or similar 3-D engineering programs makes this a relatively easy effort.	A. The slab on grade elevation will provide the Geotechnical Engineer with information regarding additional surcharges on the existing grades if the slab-on-grade is higher than the existing contours. B. The column location is important for the "pressure bulb" considerations if there are closely spaced columns that are variations to the general planning grid. C. The location and type of lateral load support system is required if uplift loads are to be considered. A maximum settlement recommendation for a braced frame may be more stringent than that of a moment frame. (As an SE, you would not want too much base rotation in a brace.)
4. Use of proposed structure and that of the adjacent facilities	A. A hospital with extensive brain surgery or eye-surgery activities would be negatively affected if "driven steel piles" is the recommend foundation system for any nearby construction, be it an addition or a stand-alone structure.
5. Type of frame: concrete, steel, masonry bearing	A. The type of frame matters to a Geotechnical Engineer only as further understanding of the total design.
6. Site/civil considerations that are part of the contract	A. Geotechnical Engineers are usually proficient at recommending pavement types. If this is issued as part of the Geotechnical Report, overall cost savings could be achieved. B. As an aside, this would require additional coordination between the Structural and Civil disciplines.
7. Corrosion and grounding considerations that are part of the contract	A. Similar to site/civil considerations
8. Any unusual total or differential settlement constraints, structure loading conditions, or site specific physical constraints that would affect the type of foundation system recommended	A. If there are unusual site specific or building specific constraints, then the Geotechnical Engineer should be made aware so that the drilling and sampling program can be tailored to the constraints and these issues can be addressed in the report.

Structural Engineer's Needs	Why
1. Clear and unambiguous recommendations for the foundation system, whether spread footings, deep foundations, or some other proprietary system	A. Some Geotechnical Reports contain so many "however" statements that the SE has only a vague idea what the recommended foundation system should be.
2. Settlement recommendations	A. Self-explanatory
3. Soil lateral load capacities	A. Generally used at brace and shear wall foundations and in certain instances, depending on the slab-on-grade characteristics, where the building backfill is not equal or not nearly equal on opposite sides; this capacity consists of two (2) distinct values: 1. The lateral resistance of the soil 2. The coefficient of sliding for a specific type of soil B. If a deep foundation system is recommended, the design-software generally requires the soil lateral capabilities for the input. C. As an aside, these values may also come in handy when the Contractor/CM requests permission to backfill against the basement walls prior to placing the slab-on-grade. SEs note: this should be done on the basis of "additional service", and not a "freebie".
4. Lateral loads imposed by the soil onto the building	A. Generally relating to the basement lateral pressure, although loading docks and retaining walls may require this same information
5. Seismic Site Classification a. Evaluate potential for a more detail study to obtain a more accurate classification	A. The SE needs this value to calculate the Seismic Design Category (SDC). B. A higher SDC will not just add cost to the structure, it could result in added cost for the other disciplines.

6. Groundwater conditions	A. If there is a high design-groundwater table, this could impact the design of any below-grade portions of the structure.
7. Slab-on-grade recommendations	A. There may be unsuitable soils that will need to be undercut. B. Other sub-grade preparations may need to be considered.
8. Excavation slope stability	A. Provides information to the contractor determining when and where to use temporary shoring and indicates if open-cut-excavation would potentially undermine existing utilities, driveways or other site fixtures
9. Suitability of excavated materials for site fill	A. Generally, excavated materials are used elsewhere on the site; compaction requirements should be provided for possible use under slabs-on-grade, parking areas or lawns.
10. Anticipated construction problems	A. Draws attention to unusual soil, groundwater, or rock conditions that could impact the design and/or construction of the structure

Review of the Proposal(s) for Geotechnical Work

Issuing the RFP should not be the end of the SE's involvement. The proposal needs to be reviewed to verify that it meets the intent of the RFP. If you requested specific line items, are they there? Is the time-frame for the issue of the report in line with your requirements? Is the number of borings reasonable, and not purposely "low-balled" to have a "cheap" report?

For the case where the RFP was sent to more than a single entity, the SE is generally expected to make a recommendation to the Owner for the selection of the firm to do the work.

The low cost firm may not be the one you feel provides the "best bang for the buck". Convey your reasons for your recommendation to the Architect/Owner as appropriate.

Other Reviews

The author of the RFP may want to include the following as part of the basic scope:

1) Review of the final draft of the Geotechnical Report by the Structural Engineer. Note: this is not to embellish the RFP, just to make sure that the bases are covered.
2) Review of foundation plans and related specifications by the Geotechnical Engineer. This item lets the Geotechnical Engineer confirm that his or her recommendations were properly interpreted.

Summary

A well-scoped RFP will result in a report that minimizes questions and results in unambiguous recommendations. The time spent preparing the RFP is more than made up with fewer questions to the Geotechnical Engineer on the contents of the report. Your comments/suggestions are encouraged.▪