

# A Message to Civil and Structural Engineers

Unanticipated conditions. Delays. Change orders. Cost overruns. Failures. These have become the far-too-common hallmarks of modern construction, leading to disputes that waste huge amounts of time and money. Perhaps the most unfortunate aspect of this situation is the forced involvement of design-team members – people like you – who had little or nothing to do with the real problem. That's why *every member of the design team* has a vested interest in confronting project risks to help optimize performance.

Where do the most significant risks stem from? Foundations and earthwork; construction elements that, for decades, have been responsible for more claims than any others. No matter what you do, you cannot eliminate these risks. However, with an astute, empowered geotechnical engineer on the team, you can confront the risks and keep them under control. Just keep one word in mind: **Team**. Because without the team's united involvement, subsurface risks can run rampant, and everyone can be the poorer for it.

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subsurface risks can run rampant.**

ASFE/The Geoprofessional Business Association (GBA) exists to help its Member Firms and their clients confront risk and optimize performance. When you and the

geotechnical engineer are working for the same owner, having the client proceed in a risk-aware manner benefits the project and the entire design team. Toward that end, GBA recommends five basic steps.

**Step 1:** Encourage the owner to select a geotechnical-engineering firm based principally on the technical, professional, and business merit of the staff members who will comprise the geotechnical-engineering team. Of particular importance: their experience with local subsurface conditions and the type of construction involved; their reputation among peers, colleagues, and clients; and your own, personal reaction: Do you feel confident in these people? Will you be able to work with them as professionals you can trust? What you do together will likely last for generations. It should be a source of continuing satisfaction for everyone involved.

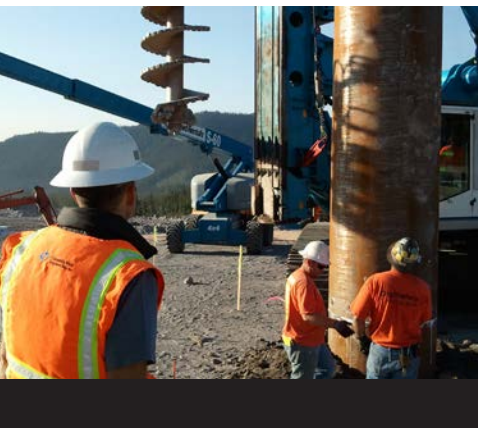
**Encourage the owner to select a  
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**Step 2:** Encourage the owner to work with geotechnical-firm representatives to mutually develop a scope of service that responds to known risks; seek your own involvement in that process. Bear in mind that “dumbing down” the geotechnical scope to reduce the

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fee is the principal reason why foundations and earthwork create excessive risk. **Essential:** The scope should recognize the geotechnical engineer of record as a full member of the overall project team who needs to be actively involved from project start to project finish: No one knows more about local subsurface conditions and their impact on construction.

**Step 3:** Encourage the owner to have the geotechnical consultant review findings and recommendations with other project-team members who, like you, have “a need to know.” As part of that service, the geotechnical engineer should also review how other design-team members have applied geotechnical findings and recommendations, a relatively inexpensive service that is essential to project success.

**Step 4:** Realize that the recommendations included in the final geotechnical-engineering report are *provisional* until the geotechnical engineer can observe actual subsurface conditions during construction. (This is as it should be, given that the geotechnical engineer develops the provisional recommendations based on observation of less than 0.1% of the subsurface materials affecting construction.) If observed conditions differ from those inferred to exist – which is a relatively common occurrence – the geotechnical engineer can quickly modify the provisional recommendations, making them final, with little or no impact on budget or schedule. *For this to happen, the geotechnical-engineering scope of service needs to include on-site observation of the subsurface conditions exposed by excavation.* If it does not, the geotechnical-engineering service will remain incomplete, significantly increasing the owner’s risk as well as your own.

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**Step 5:** Encourage owners to reject the notoriously shortsighted guidance of those who advise them to save money by retaining a different geotechnical firm to perform on-site review. (It’s not uncommon for the different firm to offer on-site review services as a “loss leader” in order to obtain the overall construction-materials engineering and testing (CoMET) assignment.) Those “savings” could come at a really steep price, particularly because replacement-firm personnel cannot possibly know as much about the project and its subsurface conditions as the geotechnical engineer of record. Worse, when questions arise on site, experience shows that the replacement firm’s personnel do not seek clarification or advice from the geotechnical engineer of record, because the geotechnical engineer of record works for “the competition.” That situation can create serious communications breakdowns that can be made even worse by convoluted project-communications protocols. And were this situation to lead to costly problems that otherwise could have been avoided, who would be responsible for the damages? The geotechnical engineer of record? Doubtful: Professionals are not found liable for problems they could have prevented had the client simply followed their advice and retained them to complete their service. The replacement firm, then? Also doubtful: Its personnel are on site to perform quality assurance; to evaluate the degree to which constructors achieve the conditions specified based on the geotechnical engineer’s *provisional* recommendations. The owner? Perhaps. It certainly could explain why owners so often retain counsel to “persuade” others on the project team to “contribute.”

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Some replacement firms say they can eliminate the responsibility/liability concern by becoming the geotechnical engineer of record and assuming the original firm's liability. But doing so does not make them any more aware of conditions known only to the original firm. And if something goes wrong, which is more likely to happen with a replacement firm in charge, the owner will still have to initiate some form of dispute resolution to recover its damages. You may be dragged into that process, especially when it's litigation, as it so often is.

If the owner already relies on a geotechnical-engineering firm that has provided exemplary service for similar projects, you may be able to "breathe easy." If the owner lacks such a relationship, a firm will have to be found. Chances are you and other design-team members know a few that can provide the quality you need to avoid nasty surprises. If the owner is unwilling to commit to sole-source retention, qualifications-based selection (QBS) is the only alternative that affords a high level of risk containment. It allows owners (and usually key members of the design team) to identify the geotechnical-engineering firm they feel most confident in and then to mutually develop a scope of service uniquely suited for the site involved, the construction proposed, the subsurface risks that may exist, and the owner's own risk tolerances. (Owner's representatives who can tolerate just about any risk there is in hopes of minimizing initial costs can easily be the biggest risks of all.)

The QBS process begins as most others do, by identifying several candidate firms, usually as a result of recommendations solicited from peers, colleagues, and others whose opinions matter. Each candidate should be informed about the project and be invited to submit a statement

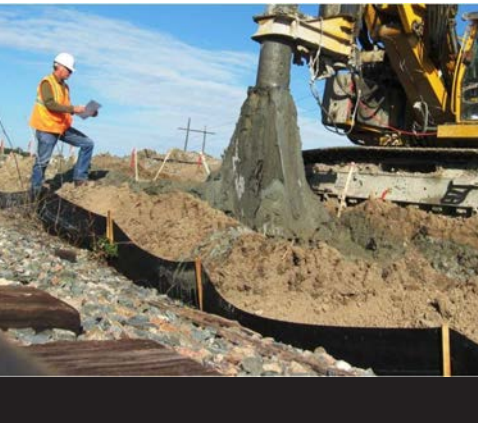
of qualifications. You would be well advised to participate in this process, by reviewing the candidates' submissions and speaking with peers who may have worked with them. In that way you can help the owner's representative identify the two or three firms best suited for the project.

The next step is to interview representatives of each of the "finalists," to discuss the project preliminarily. Some may demonstrate more concern than others about the commission's risks and, all things considered, that may be a good sign. Geotechnical engineers work in a high-risk environment. They want to keep those risks as much under control as they reasonably can, for their sakes and for the benefit of all who comprise the overall project team, including the owner. After the interviews, representatives of the top-ranked firm should be told that the commission is theirs, pending development of the scope of service and acceptance of the fee proposed for fulfilling the scope.

Mutual scope development is perhaps the most important element of a geotechnical-engineering engagement, because it addresses an array of important project risks and how they will be confronted. Having key members of the design team involved in the process is almost always worthwhile, if only because it alerts them to one another's concerns. Note that the most effective scopes have the geotechnical engineer of record serving on the design team from project-start to project-finish.

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Once the geotechnical-engineering team develops the proposed final scope, you and the owner's representative – and possibly others



– should meet with them again to review what they’ve put together. Ask questions. Why do they recommend X but not Y? What are the alternatives? What are the pros and cons?

*Developing a geotechnical scope of service that is satisfactory to all involved parties is essential to keeping risks under control.*

Once the scope of service is accepted, the geotechnical engineer can determine the fee, reimbursable expenses, and schedule required to implement it, as well as an appropriate contingency allowance for dealing with the unexpected. If the total is more than you or the owner anticipated, let the geotechnical engineer know. You can always modify the scope to reduce costs, but encourage the owner’s representative to ask, “Is what I’m going to save worth the additional risk I’ll have to bear?” Almost invariably, the answer is “No,” a contention reinforced by thousands of lawsuits. Remember, too, that the amount invested in the geotechnical engineer’s services is tiny compared to the amount invested in the geotechnical engineer’s recommendations.

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Some owners retain geotechnical engineers using a fee competition of some type, an approach that some of the best geotechnical-engineering firms refuse to get involved with, because it elevates risk to unacceptable levels. A fee competition almost always requires interested firms to bid on the same standard, “level-the-playing-field” scope or to each develop a scope of its own. A standard scope ignores the important factors that make every project unique. And allowing each interested party to create its own scope results in apples-to-oranges comparisons in a process that encourages all participants to propose

the cheapest service possible, because that’s what they believe (usually correctly) they have to do to win the commission. (It’s not uncommon for winning firms to engage in some gamesmanship, seeking change order after change order as they discover “unexpected conditions.”) Either approach elevates risk and helps explain why subsurface issues are so problem-plagued.

Want to tame your risks? Encourage owner’s representatives to obtain their geotechnical services much as they’d obtain any other professional service, by finding providers they respect and trust, then relying on them to explain and recommend alternatives and options. This approach assumes the professional will make honest recommendations, applying specialized technical expertise without consideration of personal gain. And that’s a reasonable assumption, because it’s precisely what wise design professionals like you do to establish long-term relationships with clients they like to work with.

Unquestionably, no one wants to pay more for geotechnical engineering than is necessary to achieve the preferred outcome. It’s even more important to avoid paying more than necessary for the outcome, which is often 100 times more expensive than the geotechnical-engineering services required to achieve it. Which explains why having a trusted geotechnical professional

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on the team can be so beneficial. For example, consider a case where Foundation A costs \$100,000 more than Foundation B. Despite the significant cost difference, some geotechnical engineers might recommend A simply because

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their fee wasn't enough to determine if Foundation B would work as well. Which is just another reason why cheap geotechnical-engineering services can be so expensive.

Recognize that few geotechnical firms offer only one level of service on a "take-it-or-leave-it basis." Almost all offer service levels that vary within certain limits. Common sense dictates that firms will not generally offer their "top-of-the-line" service to those who apparently are more interested in low fee than high quality. Nonetheless, even the most quality-conscious project teams may from time

to time find themselves in situations where low fee is for some reason essential. QBS can be especially valuable in those cases, because it allows the owner and other design-team members to work with qualified geotechnical engineers to mutually determine what will be modified to keep costs as low as possible, in light of the owner's and your own risk preferences.

For more information about this important subject, speak with a GBA member or contact GBA staff. In either case, your inquiries will be welcomed warmly.

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