

# YOU GET WHAT YOU PAY FOR

## Evaluating Engineering Services

by Mark C. Young

**W**e've all heard this phrase and it can be applied to engineering services.

There is a direct correlation between the fees a consulting engineer charges and the level of expertise and time scheduled for a project. When a consulting engineer submits on a project through a bid selection process, their fee is usually calculated using the lowest cost, lesser experienced engineers on staff and the least possible amount of time needed to complete the project.

The process of developing a price for engineering services is similar in most firms. First a list of tasks that must be completed to accomplish the project is compiled along with a description of services to be performed under each task. This becomes the contract scope of services. The second step is to estimate the time required to complete each task by each class of employee and applying the firm's hourly rate schedule to determine the fee for each task. The sum of each task fee results in a proposed fee for the project.

Some firms take a slightly different approach and use actual employee salaries (or salary cost, which includes salary overhead costs) to develop the estimated cost of each task. If this method is used, overhead and profit are included by application of a multiplier (percentage) to arrive at a proposed fee. In the final step of the price development process the engineer will compare the fee to the project budget, if available, to be sure the fee is within a reasonable limit. You should expect engineering fees to range from about 8 to 15 percent of the project budget, depending on the size of the project. Take for example a project budget of \$3 million, the minimum engineering

fees can be expected to be about \$240,000.

It is important to remember that what costs more now will most likely save money in the long run. While every city must be concerned about the cost of services it receives, they must at the same time be concerned about the long-term cost of the infrastructure needed to serve the community. Without balancing the initial and long-term costs, we cannot be good stewards of the public's money. The right engineering firm, selected through the right process and with the right relationship will function as an extension of the city staff, and will be just as concerned with stewardship of public funds.

Using the bid selection process, the engineer with the lowest fee is selected. The awarded firm will be required to invest the least possible cost in producing the project. As stated before, this usually means the lesser experienced engineers will produce the project while trying to operate within budget and time constraints. What does this mean to the firm's client? Usually it means that the first solution considered is the one used because it will save money during the design phases.

### **QBS Process**

An alternative to the bid selection process is the qualifications based selection (QBS) process. Using the QBS process consultants are selected based on their qualifications to provide the services needed for the project at hand. The engineer selected using this process may not have the lowest fee, but they will endeavor to design a quality project that will save money not only during design and construction, but over the life of the project.

To illustrate the differences of an

engineer selected based on a bid and another selected on qualifications, let's consider a new well and water line project.

An engineer selected using the bid selection process must operate on a limited budget. Most likely they will select the option that at first consideration appears to save money in the construction phases. The well will be designed using the minimum diameter and depth to produce the quantity of water required and the first pump/motor combination found that can do the job will be selected. The smallest appropriate water main will be designed because that choice will minimize construction. While this selection will keep construction and engineering costs within the budget, it may cost more over the life of the project.

How could the cheaper option be more expensive? First, an additional well may have to be drilled in the future if the water table changes due to drawdown or if an increase in demand occurs that was not considered during design. Second, construction and operating costs may be higher than necessary because a more efficient or cheaper pump/motor combination may exist. Third, a larger line is probably a better answer because less energy will be expended moving water to the tank, meaning that the operating costs will be lower.

In the case of the low bid engineering services the engineering costs would be lower, but the total construction and operating costs of the finished project is higher and could result in higher water rates. An engineer selected based on their qualifications can take the time to research more options to determine the lower total cost solution. The engineer will further consider

maintenance and replacement costs and will select materials to minimize these costs. While still working under budget and time constraints, the QBS engineer is not as limited as the one selected through a bid selection process.

### **Selection Criteria**

Selecting an engineering firm using QBS can be a difficult task, and should not be taken lightly. Firms invest thousands of dollars in preparing a response for each project, so firms that will not be seriously considered for the work should not be invited to submit. The more firms that are invited to submit, the harder the selection will be. While many criteria are possible, only a few are truly important. The following should be included in a request for qualifications:

- A description of the project or the services needed. This can be very detailed if the information is known, but is usually general in nature. For example one could say a new sewer line is needed to serve an area of the

city, or one could be specific about the length of the line, the size of the line etc. Descriptions of planning projects are usually less specific. The engineers need to know at this point to decide if the project is within the scope of their usual practice. If you are selecting for an indefinite delivery contract, list the types of services to be expected during the contract period.

- A contact person for the engineers to meet with to obtain more information. A proposal conference also can be used to allow for an exchange of information with multiple firms at the same time. The contact should be the person who will work with the consultant (manage the project) and also should serve on the selection committee.

- A request for names and qualifications of the key members of the proposed project team, including an organization chart showing the roles of the proposed individuals.

- A request for a description of the engineer's approach to the project and a description of the engineers un-

derstanding of the needs or goals of the project. If selecting for an indefinite delivery, ask for general information regarding the approach used for a design project and the approach used for a study.

The most important criterion is the project approach. This will show whether the engineer plans to consider all the factors the city believes are important, and will show how the engineer expects to deal with important aspects of the project. It also can show indirect benefits to the city that one engineer may offer and another may not due to his approach to the project. Such benefits may include GIS data used and delivered to the city or positive public relations due to the engineer's procedures.

It is important to understand the roles of each of the key personnel that will be assigned to the project. In most cases, the project manager will fill an advisory role guiding the technical issues and the production of the project. In some cases however, the project manager's role will be quite minimal.

The firm should present a balanced team, with the skills needed to produce the work described in the project approach. It may not be good to have the success of the project rely solely on one highly talented individual.

If the selection team has met the project managers and some of the other key members of the project teams, it may be possible to make a selection based entirely on the statements of qualifications. If it is possible, the city should make the selection without conducting interviews. If the city has had a working relationship with the firms under consideration, it is likely that the members of the selection committee have enough knowledge of the firms to make the selection without an interview.

If the members of the selection committee (especially the city's project manager) have not met the key members of all the teams being considered, the two or three firms most likely to be selected should be interviewed. Not

more than three firms should be interviewed because to do so would increase the difficulty of making the selection and an interview costs the firms money. During the interview, the selection committee should look for the engineer's knowledge of the project issues, sensitivity to the city's priorities and good staff/engineer interaction. At this point you are not looking for qualifications, experience or firm stability, as the firms you are interviewing have already demonstrated their qualifications. The interview can be used to identify the firm that will best respond to the needs of the project including the working relationship with the assigned staff members.

After the firm is selected, ask them to develop a scope of services and a proposed fee associated with the scope. If the project contains tasks that will require an unknown level of effort, it may be appropriate to compensate the firm on an hourly basis for those tasks. If the proposed fee is

higher than the city expected to spend, ask the engineer to provide information that will allow the city to determine which tasks are the costly tasks. The city can ask that the approach be changed or that the level of effort be reduced to allow the project to meet the budget. Usually if the city explains the problem to the engineer, the engineer can help find a solution acceptable to both parties. If that does not happen, the city can initiate discussions with the second engineer. Asking more than one engineer for a price is the same thing as bidding the engineering services and we have already discussed the pitfalls of that approach.

Engineering services can appear to be expensive, but in many cases the cost is recovered through construction cost savings, increased project life, lower maintenance costs or lower energy costs. Select the engineer that understands your needs and works well with the city staff and you will have a better project.

*Note: In Missouri, communities are required by Missouri law RSMo. Section 8.285-8.291 to select engineering services using qualifications based selection process unless the governing body has passed an ordinance requiring another process. Cities therefore cannot legally bid engineering services in Missouri unless there is a city ordinance specifically requiring bidding for engineering services. □*

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