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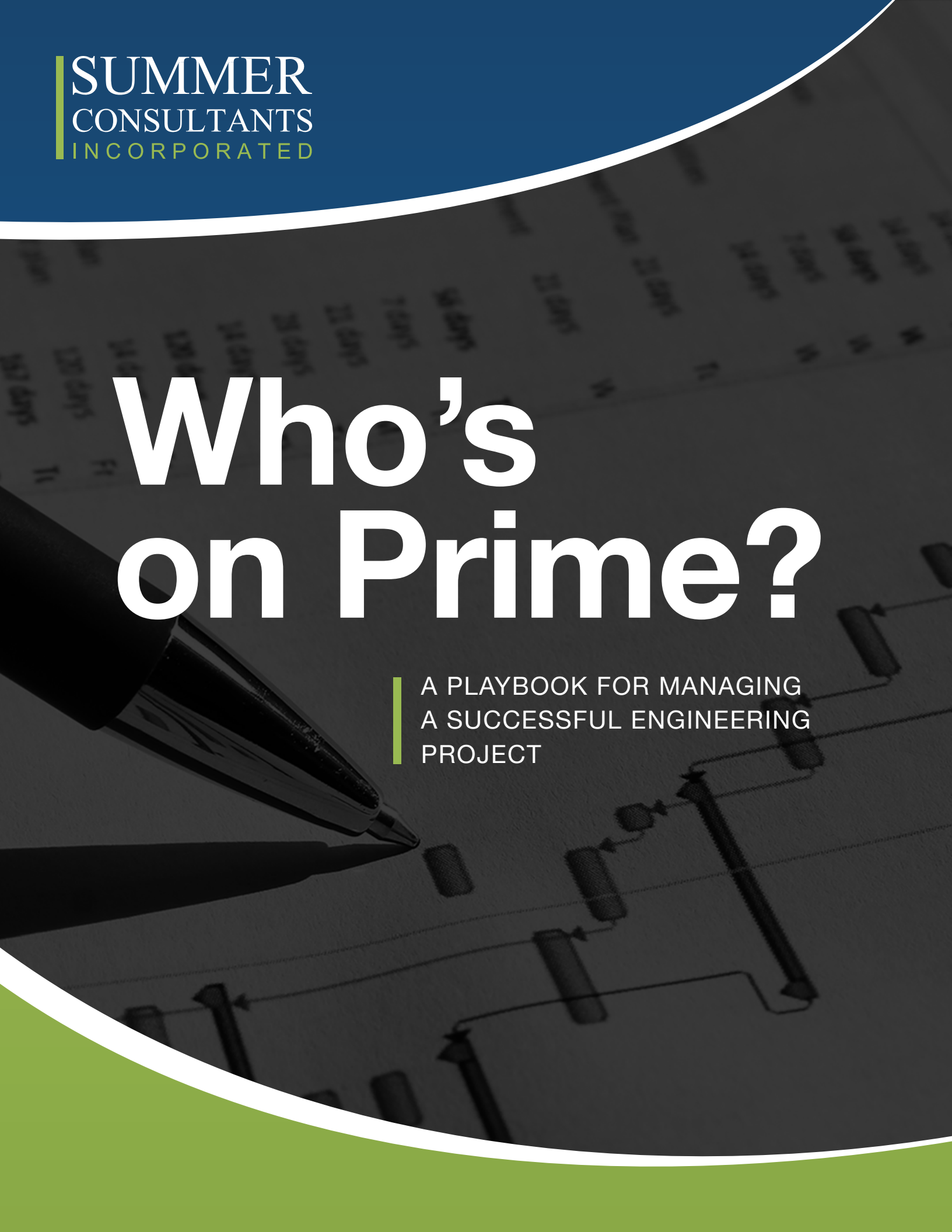
Who's on Prime?

A PLAYBOOK FOR MANAGING A SUCCESSFUL ENGINEERING PROJECT



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INTRODUCTION

Most engineering projects are by their nature challenging, high-stakes endeavors, with multiple stakeholders, conflicting priorities and countless details to manage.

Fortunately, a large portion of the challenges involved will be the responsibility of the prime contractor that you, as the building owner, select. Yet even with the support of a great engineering firm, you will still need to make many decisions and selections — and ultimately, you and your tenants will live with the results for years to come.

That's why it's helpful to have an accurate understanding of what's involved, and how you can prepare your building and its tenants for the engineering project to come. In this guide, we'll discuss some of the qualities to look for in selecting a prime contractor, how certain aspects of complexity can impact the overall project, the project management discipline itself, and several best practices you can adopt to optimize results.

Few decisions regarding your engineering project are more important than selecting the prime contractor.

It sounds easy, but there are several qualities to look for that are most important to overall project success.

When you're searching for a prime contractor, you may find that many engineering firms lack the required skill set or service focus. Indeed, most engineering firms work directly for an architectural firm as a subcontractor on a considerable percentage of their projects. Our firm is different than most engineering firms, in that on nearly 80% of our projects, we lead the project design team, manage the entire project and handle all interaction with the client. That type of experience allows a firm to not only take a broader view of the entire project, but also to manage, monitor and orchestrate the activities of each of the subcontractors.

START WITH AVAILABLE RESOURCES

The first and perhaps most obvious thing to look for is relevant experience. Finding a firm whose past performance includes buildings, systems or programs similar to your own can go a long way toward ensuring that they'll be able to meet your needs. You can begin with an internet search to find companies in your area and beyond that have the kind of experience that you are looking for.

For the federal government, it is actually a requirement of the Federal Acquisition Regulation (FAR) that procuring agencies must evaluate past performance in source selections for negotiated competitive acquisitions. Fortunately, government agencies have a number of resources they can turn to. These include the Contractor Performance Assessment Reporting System (CPARS), a resource that allows contracting officials to objectively evaluate potential contractors' performance and integrity information before making an award decision.

If you cannot access these government resources, you can request a list of client references to contact as well as letters of recommendations and available evaluations about the firm's past performance.

OTHER SOURCES OF INSIGHT

On the other hand, if you've already distributed an RFP to find a prime contractor and are about to start the process of reviewing proposals, there are some very specific qualities that you can look for. For example, firms should have provided resumes of key team members and examples of relevant projects, preferably completed as a prime contractor. By reviewing those projects and their outcomes, you can get a sense of how well the firm will understand your needs, and whether they would be able to hit the ground running on your project.

Typically, when a firm is responding to an RFP, they will try to highlight those projects that are most pertinent to the needs of the client and the specifications of the project at hand. If instead you're seeing descriptions of interesting projects that don't relate to your particular situation, that could be a sign that either the firm doesn't understand your needs, or simply doesn't have relevant experience — and neither possibility should give you lots of confidence.

An important factor to consider in reviewing firms is the depth and breadth of their talent. Many firms are basically built on a model in which there are a few senior engineers leading the organization, a cadre of middle managers, and a large number of junior engineers doing the actual work. This can be an effective way to run an organization, but it's not necessarily the best solution for your project. For example, if your project involves specialized facilities such as laboratories, it pays to understand exactly which individual or individuals in the firm specialize in that particular type of facility. If a firm has only one specialist in an area important to your project, and that person becomes unavailable or leaves the firm during the contract period, your project could be put at serious risk. So it's wise to examine the bench depth of each contractor.

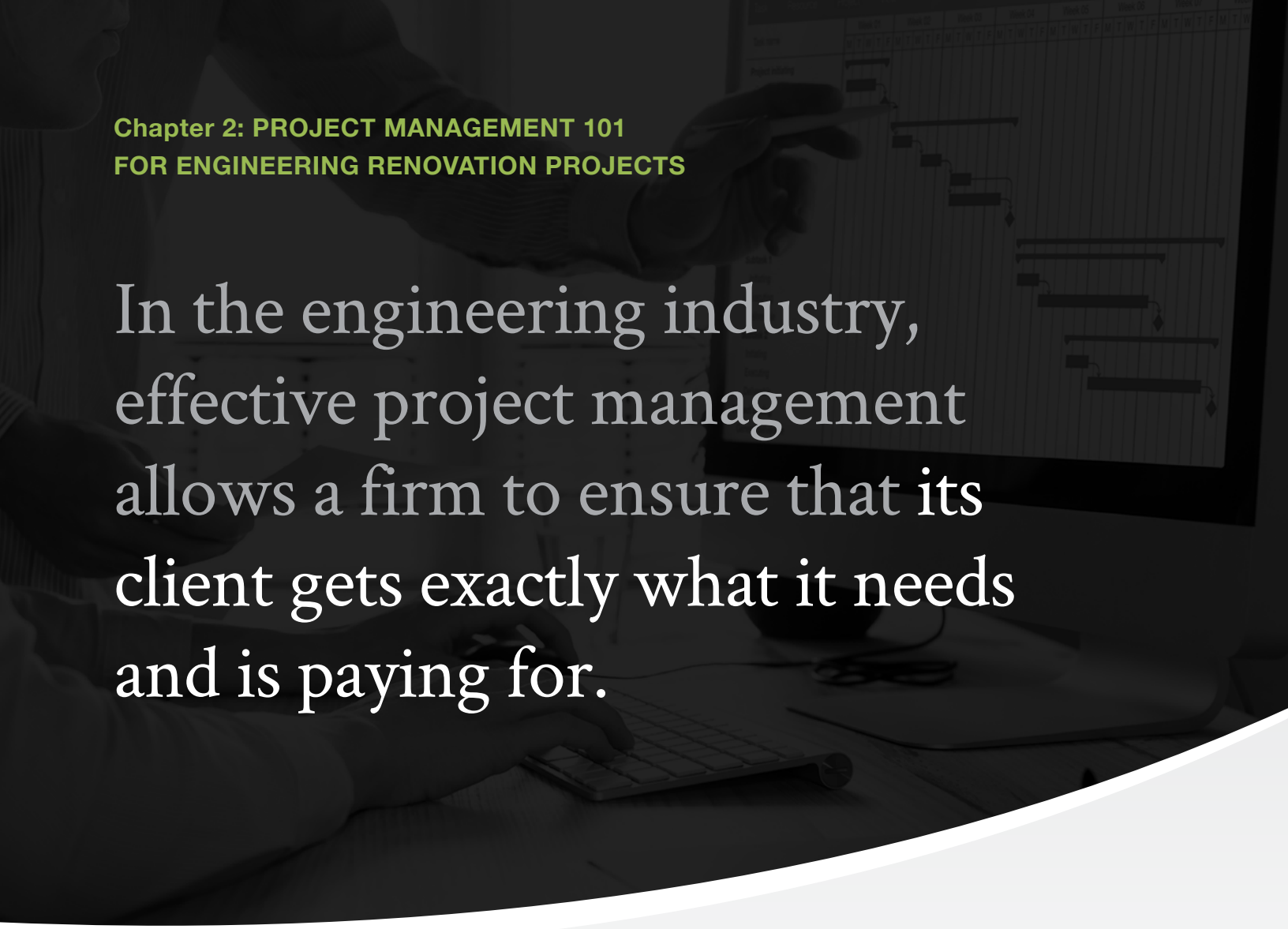
THE IMPORTANCE OF "SOFT SKILLS"

Another element to consider when reviewing a firm as a prime contractor is what is sometimes known as "soft skills." The view that engineers are often lacking in "people skills" and communication abilities may be a stereotype, but there is probably at least a grain of truth to it as well.

When an engineering firm is in the role of subcontractor, soft skills are arguably less important. However, if an engineering firm is competing to be the prime contractor on a project, these skills are central to the firm's ability to succeed. Such skills allow the firm to understand the client's needs and preferences, manage the coordination and communication among team members, and serve as the client's advocate, among other duties. You're also going to need a project manager who has not only engineering strengths, but also strong leadership qualities, as they'll be responsible for leading and coordinating the work of diverse teams and disciplines.

Unfortunately, there is no easy method for objectively measuring a firm's leadership skills or communication talent based on a proposal alone. Conducting face-to-face interviews with principals and key team members can provide much of the insight you need to make an evaluation in these areas.

So it's worth doing your due diligence — starting with a careful review of each firm's proposal and past performances, examining any other available assessments, and interviewing the team members. Your project will benefit greatly from having the right firm in the lead position — and so will your organization.



In the engineering industry, effective project management allows a firm to ensure that its client gets exactly what it needs and is paying for.

To understand how project management succeeds, let's look at some of its key elements.

SCOPE UNDERSTANDING AND CONFIRMATION

One of the earliest and most central aspects of project management is the process firms use to understand the owner's challenges and expectations in order to provide exactly what they need for the project.

The process typically begins with a *scope of work* document explaining the nature of the issue and the engineering solution the organization is looking for. At our firm, we respond by contacting the organization to schedule a site visit, which we refer

to as our "pre-fee meeting." (Although we include this step in our projects, it's not standard practice in our industry.) In this visit, we are able to see the building's issues firsthand, and ask direct questions to clarify our understanding. Next we review the client's concerns, timing requirements and specific proposed programming changes in layout and engineering, and develop a preliminary cost estimate to help validate the scope with the budget.

In some cases, this process can highlight discrepancies between the owner's hopes or expectations and reality, and ultimately lead to their resolution. In an extreme example, we interacted with a federal agency that had released a scope of work that anticipated a construction cost of approximately $70,000. However, based on our walk-through inspection and on-site discussions with the owner, we determined that the cost would actually be much greater — higher, in fact, by a factor of more than 10. In the process of discussing the issue with the client, the agency realized it needed to either scale back its plan or find a way to secure additional funding. While such a reality check can feel like a setback, it's much better to happen early on in a project, while there is still time to make adjustments.

Once the project fee has been negotiated and the contract awarded, the final step in scope confirmation is to hold a kickoff meeting with the client and the project team. This is where we talk through the project's schedule, budget, deliverables, and any owner or tenant requirements with the entire project team so that everyone is on the same page to start the project.

SCHEDULING

A second major element of effective project management is schedule maintenance. Occasionally, the client's preferred timeline and designer's recommended timeline do not align for a variety of reasons. As project managers, we work with our clients to understand the driving factors behind the preferred timeline, share our knowledge of current industry practices and conditions which may affect the timeline, and develop a mutually agreeable project schedule with the client.

To complete a project, there's a logical order for the different professionals and trades involved in the project, and the processes they oversee, which may have to be adjusted to meet that project timeline. For example, let's say your goal is to reconfigure the

spaces on a given floor of your building within a certain time period. To do so requires hiring an architect to determine which walls need to be moved and where, and what new spaces will be used for what purpose. Then the mechanical engineers determine how much air volume each space needs and what sort of systems are best, and then the electrical engineers can start designing the power systems.

If we are providing project management, we establish internal milestones early in the process for each of the parties involved in order to stay on schedule, and then monitor their progress. If a milestone is missed, we work with that party to get that piece back on track so that the overall project schedule is not affected.

BUDGET MAINTENANCE

Budget oversight is another key element of effective project management. To effectively track performance against the budget, we schedule a series of submissions, specifying the percentage of work that must be completed for each. For example, if we've made our 65% submission (this may also be known as the design development phase) and we're 25% over budget, we need to problem-solve with the owner to reprioritize elements of the design to stay within the budget. In addition, we can build in contingency options for upgrades in our estimates, in case bids come in lower than expected. In any case, we make certain that the finished work product meets the client's needs and budgetary requirements.

COORDINATION OF ACTIVITIES

As mentioned above, we schedule the different project activities in a logical way to keep the project on track with milestones for the various professionals and trades involved in the project, which could involve the architect, as well as our own mechanical, electrical and plumbing engineers. As the project moves forward, we coordinate the efforts of the various team members through regular progress updates and reviews of project documents, keeping an eye out for any issues that could affect the schedule or budget.

MANAGING EXPECTATIONS

An additional component of effective project management is managing owner expectations. For example, in our experience, sometimes owners have an optimistic expectation of construction completion timelines. Of course, as designers, the actual construction is out of our hands; but as project manager, we play a key role in ensuring that the owner understands exactly what needs to happen and when — including when tenants may need to temporarily relocate.

Consider a project that involves demolishing and building a new air handling unit. If the project is super-critical and small enough, it could be done over a long weekend, with multiple crews working in 24/7 shifts. But more likely, it's going to require several weeks of work — and it's important to understand that certain sections of your building aren't going to have airflow during that time, so the spaces may be essentially uninhabitable. With effective project management, any disruptions from such changes can be minimized.

HANDLING EXTENUATING CIRCUMSTANCES

The discipline of project management must also be able to accommodate the unexpected. Performed effectively, project management monitors evolving situations that could cause project delays, and develops contingency plans accordingly. The coronavirus pandemic is an excellent case in point, because it has introduced a number of variables that may require adjustments, including modifications to plans for HVAC ventilation rates, filtration, and system controls for maintaining relative humidity, to name a few possibilities.

SEEING THE BIG PICTURE

Of course, this is a very high-level view of project management, and the reality is always more complicated. But the engineering firm you choose should be able to provide a much more specific and detailed plan for managing your project, no matter how complicated it is — giving you and your tenants the assurance that you will get the results you seek.

Every renovation project is unique, but some are more complex than others — and such complexities can have implications for a project's budget and timeline.

From our perspective as an engineering firm, these challenges are a normal part of what we do — but we also recognize that they may not always be as obvious to a building's owners. Here, we'll talk about a few of the most common areas of complexity we encounter, and how they can impact projects.

1. PHASING

One of the main ways renovation projects differ in complexity is whether the building will be occupied or unoccupied during the renovation. If a building is unoccupied, there's no need to plan for the work to take place on evenings or weekends, and no need to temporarily relocate tenants when their part of the building is being renovated.

As this guide is being written in fall of 2020, most office buildings in the United States are still in full or partial shutdown mode in response to the COVID-19 pandemic. But vaccines are being developed, the pandemic will be controlled, and workers will be returning to their buildings. And that's when planning phased approaches will once again play a big role in renovation projects. Although phasing can add a certain amount of time and expense to a project, some of that increase can be offset by the uninterrupted revenue stream made possible by allowing tenant agencies' offices to remain open throughout the project.

Another consideration in phasing is how the building's core systems will influence the projected phasing plan. In some cases, the phasing may be straightforward. For example, the installation of new HVAC and other systems occurring may be able to take place floor by floor, as employees "swing out" to other parts of the building while their area is being renovated. But in other scenarios the HVAC systems might be stacked, one above the other, on multiple floors. It's possible to phase the project so that renovations can be done to one part of the HVAC system even when other parts of the system remain in operation directly above and below it — but it's definitely more complicated to plan and execute.

2. ACCELERATED TIMELINES

Not too long ago, renovation projects tended to have more elongated timelines. The owner would come up with a general program for what they wanted to do, seek funding, hire an engineering firm to design it, and then get bids for construction. Last but not least, there would be a long construction period.

More recently, owners and engineering firms have tried to compress renovation schedules so that the design process and construction process are more accommodating to tenants and users. Again, this is very doable — but it does raise the stakes for the scoping part of the project, when the engineering team scrutinizes the owner's program, examines how the building is currently constructed, and develops a phasing approach that will meet the owner's needs.

3. MULTIPLE DISCIPLINES

Another aspect of complexity for a project is the extent to which multiple disciplines are involved. One example that comes up with some frequency is when a building has historic qualities or architectural elements. In such cases, the prime engineering firm typically engages a historical architect who can determine the historic nature of certain architectural elements, and help develop a renovation plan that allows those elements to retain their unique historic character. In most cases, the firm also needs to coordinate with the State Historic Preservation Office or other similar entities in order to request and obtain the required permits to move forward with the renovation work.

Another type of project involving multiple disciplines is what we refer to as horizontal construction, which is typical in structures that handle utilities. A common requirement for such projects is to run electrical duct banks or piping between one facility and another, either in the ground or just above ground. In such cases, the engineering firm needs to coordinate the activities of subcontractors such as geotechnical engineers and civil engineers, and also pull certain environmental permits.

A third way a project can involve multiple disciplines is when the team suspects hazardous materials, such as lead-based paint or material containing asbestos fibers. In such cases, the prime firm will often bring in an industrial hygienist, who will obtain samples of suspect material to be tested. If it is determined that there are hazardous materials in the area being renovated, the firm will incorporate their nature and location into its drawing set, so that the construction contractor knows exactly which areas of the building are “hot,” and can perform the work appropriately.

4. LEED CERTIFICATION

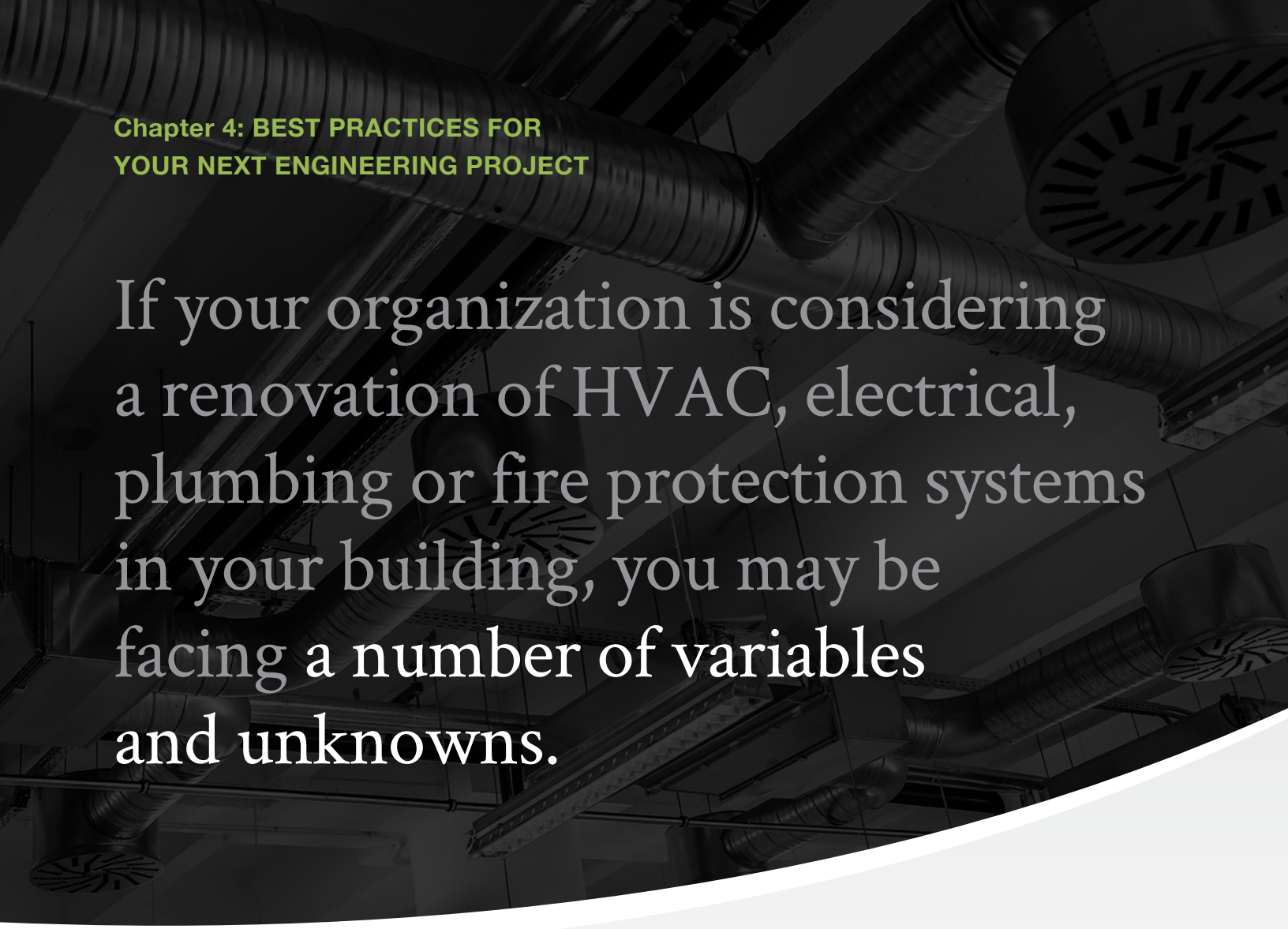
One other major way a project can be complex is when the owner is seeking LEED certification. In general, LEED projects require a significant amount of additional work to prove the requirements have been included, beginning early in the process. There’s also a variety of additional documentation and validations that must be performed, such as creating energy savings models.

To maintain the integrity of the LEED certification, each project that is seeking LEED status is reviewed by a specialized committee in great detail. To succeed under this

level of oversight, the engineering team, and often other members of the broader team as well, need to put in additional time and effort. The project will be evaluated according to a LEED scorecard, and one has to be mindful that an action being taken in one part of the design may have impacts on others. LEED certification is not an easy process, by design, but engineering firms have the experience needed to navigate the complexities to help their clients achieve the certifications they desire.

IN CONCLUSION

Those are a few of the major areas where a project can be complex. Of course, there can be many other more specific complexities on each particular project — nuances and challenges that are uncovered during the initial discussions and meetings and resolved through careful planning and execution. Here again, that's what an owner pays their prime engineering firm to manage.



If your organization is considering a renovation of HVAC, electrical, plumbing or fire protection systems in your building, you may be facing a number of variables and unknowns.

The following are a few of the most effective things you can do as a building owner to address some of these unknowns — and in the process, help to facilitate a smoothly running and effective project.

1. DESCRIBE THE PROBLEM

By their nature, engineering renovation projects tend to involve one or more building systems that are providing less than optimal service. In order to get the problem fixed, you first need to describe it in some detail to potential prime engineering design contractors.

One important step you can take well before a project begins is to develop a project scope. Although not all clients prefer to do this themselves, it can be an enlightening and useful process. In some cases, tenants prefer to only list the issues and concerns they have, and rely on the designer to identify the scope of work for their particular project. In other cases, especially in the case of large buildings, the building owner may already have a detailed understanding not only of the problem or issue, but also its solution, and will develop a project scope that lists specific corrective actions they want taken.

2. GATHER DOCUMENTATION

One of the most important pieces of information to assemble in any building renovation project is the history of the building itself, and in particular, records of any previous renovations that have occurred. In most cases, it's especially helpful if you can provide the original drawings for those renovations. This information helps the team understand how the building has evolved and how this evolution might affect the design solution.

To document the nature of the problem, one of the most effective approaches we've seen is for owners to collect relevant service tickets or tenant complaints — such as whether the temperature in a certain room or area is too hot or too cold. This documentation can often hold important clues for the engineering firm to review and track down the specific source of the problem.

If you suspect that the problem is being caused by specific pieces of equipment, you can also gather information on the equipment you believe may be causing the issue, including the type of equipment, its manufacturer, and even serial numbers if available.

3. PREPARE YOUR TENANTS

Another best practice is to engage with your tenants early and often to prepare them for the planned renovation. This engagement can start with a general explanation of the work that will be done, followed by detailed plans and schedules. Every organization has its own approach, but many prefer to keep their tenants minimally involved in the detailed planning of the project unless absolutely necessary. In some cases, we've worked with clients who invite specific tenants to sit in on planning meetings and

discussions. For example, on a project where we were renovating systems in a laboratory, our client had one of the researchers who uses that laboratory take part in early discussions to provide direct input about her needs and concerns.

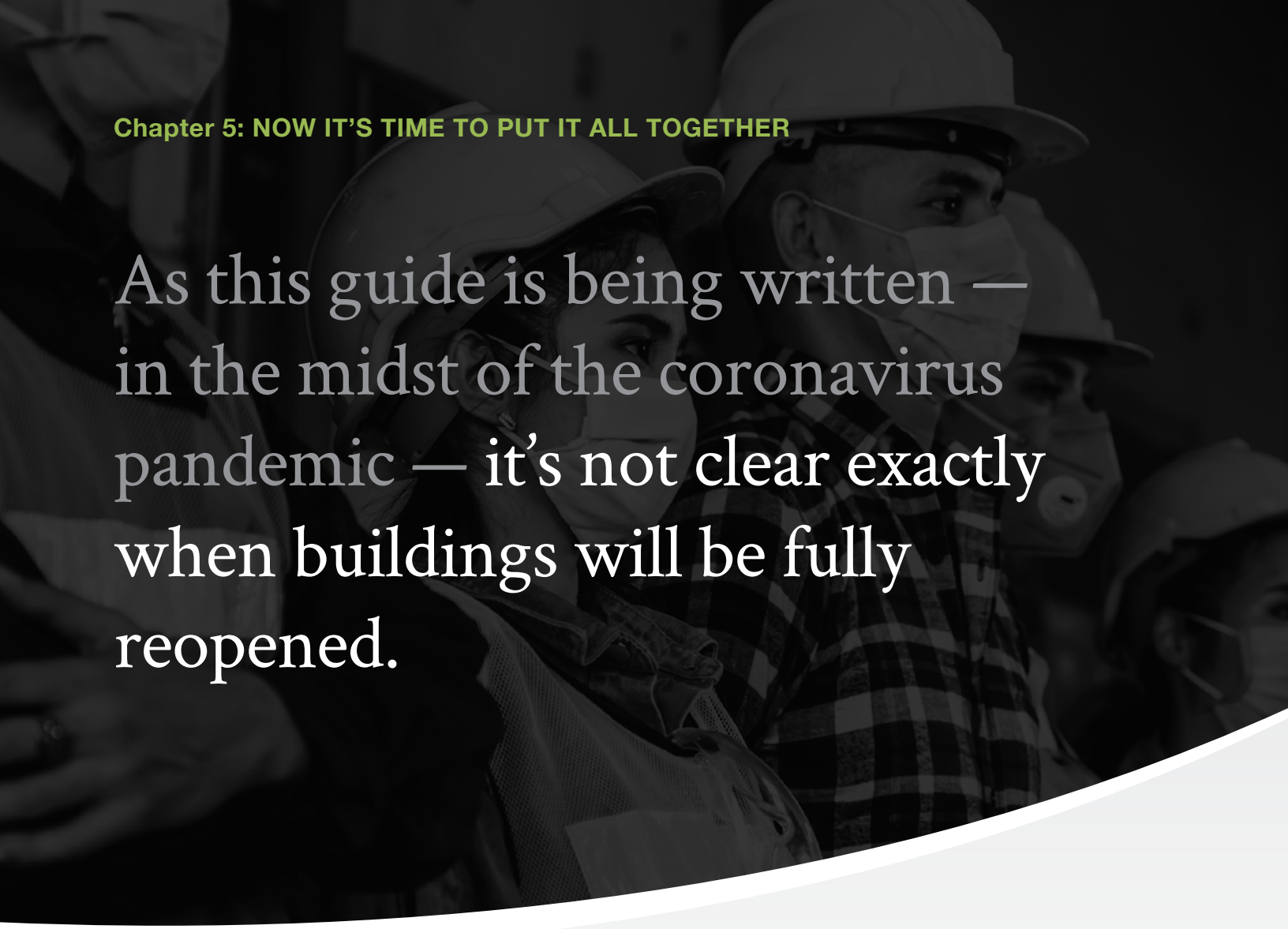
In a project that involves phased construction, it's particularly important to clearly communicate any time periods during which the tenant will need to relocate staff. To minimize the disruptive effect on tenants, it's also critical to notify them in advance of where they will be sited while the work is taking place.

Another good practice is letting tenants know whenever the engineering firm may need to conduct a site visit, and to explain what will (and what won't) happen during the visit. For example, if the renovation is going to result in the installation of a new HVAC system, you want to make sure that your tenants understand that the site visit is just an initial step, and that the actual repair visit will be scheduled later. The bottom line is that tenants should be notified as soon as possible of exactly how, when and where the overall process will affect their people and operations.

GOOD LUCK ON YOUR PROJECT!

These are some of the most effective ways that you can prepare your facility and your tenants for an engineering renovation project. Throughout the process, your prime engineering contractor can be a great resource for answering tenants' specific questions, and providing additional resources if needed.

In your role as building owner, there may be almost countless details and technical issues that will demand your attention over the course of your project, so the more proactive you can be regarding the concerns and questions of your tenants, the more smoothly the process will go. And that, of course, will benefit everyone involved.



As this guide is being written — in the midst of the coronavirus pandemic — it's not clear exactly when buildings will be fully reopened.

As a result of buildings being unoccupied, some of the traditional challenges of renovation projects are greatly diminished (at least for the time being). However, the pandemic will eventually be behind us and buildings will return to normal — and the traditional need to do renovation work within occupied buildings will return.

For most building owners including government, higher educational, and corporate, this means that phased construction will also return, and with it the many logistical complexities described in this document. However, by selecting a good engineering partner, and understanding the process while avoiding the pitfalls, you can greatly increase the likelihood that your project will be a success. We wish you great results in your upcoming engineering project.

Jim Hoffman,

PE, LEED AP O+M, CEM

is president of Summer Consultants and has over 30 years of engineering design experience, both professionally and during his service in the U.S. Army as a combat engineer. He is involved in all facets of the company and works closely with team members on clients' projects. He is also highly involved with complex renovations of HVAC systems, automatic temperature control systems, and chiller plants. His expertise spans federal, institutional, and historic facilities.

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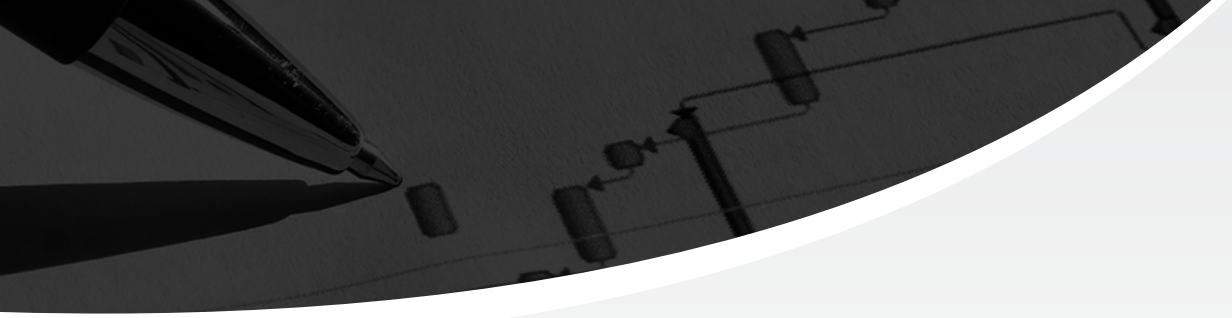
is an associate principal of Summer Consultants and has 20 years of engineering project management, design and commissioning experience with a focus on government and higher educational facilities. She is proficient in the design of mechanical systems, specializing in air distribution, chilled and heating water and automatic temperature control systems. She is also a sustainable design expert.



About Summer Consultants

People have described our work in a lot of different ways: Complex. Challenging. Complicated. Specialized.

But for us, it's just what we do. And while the work may seem complex to some, our elite team of MEP/FP consultants have the qualifications and experience to navigate even the most complicated engineering project with confidence and clarity.

Whether we are working in older federal buildings, or updating occupied historic properties, or modernizing university facilities – we tackle projects that other firms struggle with. That's just one way we've built a reputation as one of the most efficient and reliable MEP/FP consulting firms in the business.

In fact, Independent research revealed that 95% of our Government, Institutional, and Higher-Education clients refer us to others. That's because they know they can count on us as the safe choice when there's little room for error. It's also why our clients tend to hire us again.

When you need an engineering team that only gets stronger under pressure, Summer Consultants takes MEP/FP to a higher level of performance.

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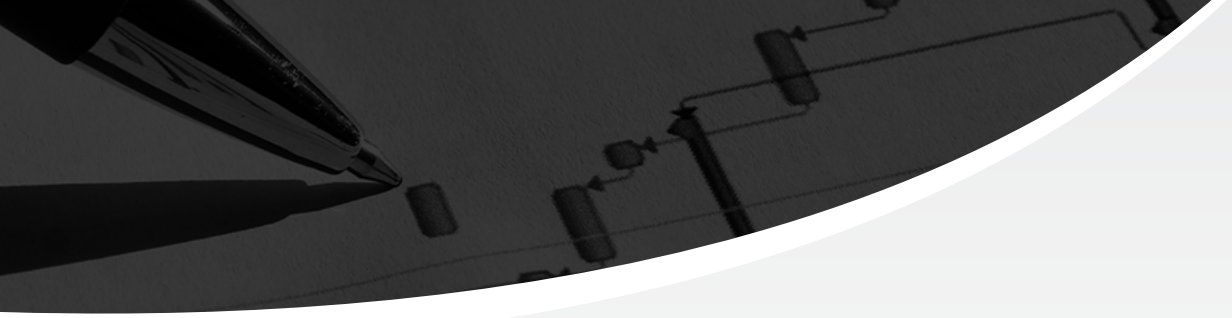

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