Know Something that Nobody Else Knows:  
The Economics of Construction

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I. INTRODUCTION

The role of in house general counsel in the construction industry has expanded over time from a silo of responsibility for addressing purely legal issues to providing an amalgam of business and legal advice. General counsel today hold broad responsibility for evaluating the risks and impact of company decisions regarding the allocation of company financial resources and long range strategic planning. Their legal role continues to include evaluating and advising the company about contracts and business transactions,, communicating with clients, reviewing project performance issues, helping to resolve claims, and dealing with the myriad of legal issues that may arise within the company, from disputes with third parties to regulatory compliance and labor matters. Today, general counsel is expected to be a resource able to select and manage outside legal counsel and to provide advice regarding insurance and bond protections. This role continues to expand into actively managing business activities, with emphasis on contributing to the overall profitability of the company. No longer are construction contracts evaluated solely for legal risk, general counsel is expected to understand how a project translates into profit for their company and to help to ensure profitability through the contract terms they negotiate.

II. RESOURCE ALLOCATION

The nature of construction projects present unique challenges and opportunities. Rare, if ever, are even the key project team the same from one project to another, let alone their individual team members. Each company has their own varied work experience and familiarity with the other project participants. As a result, virtually every construction project requires forming unique relationships, with each having a varying degree of responsibility for the overall project, yet each contributes to a successful outcome. For instance, an architect may have designed numerous projects for an owner, but never worked with the general contractor hired for the project. Likewise, the general contractor may have a varied range of experience with its subcontractors or material
suppliers that may range from decades of work together to never having worked with each other before. Within each company, each of the individuals working on the project will have a varied range of experience as well both within the industry and within the company.

Even when a majority of the core project team has worked together on a seemingly identical project, no two construction projects are truly ever the same. Even similar structures will have innately different designs as the result of differing site conditions, changes, and code compliance issues. As a result, even on virtually identical projects there will be varying degrees of familiarity amongst project participants with the designs and the resulting means and methods of construction.

Add the varied relationships and range of experience of the individual participants with the uniqueness of each project design and you have a recipe for misunderstandings, disagreements, complications, misinformation, and misallocated risk. As a result, the likelihood of disputes rising to formal dispute resolution increases along with the attendant costs, both monetary and opportunity.

When distilled to its essence, the business of construction, whether from the design or contractor side, boils down to collective decision-making and value judgments on the allocation of capital. Technical ability to perform a task is driven by the results of these value judgments. By and large, any company with sufficient (or unlimited) capital resources could acquire or fully train workers capable of executing the work functions required for any given task on any construction site. The question is at what cost. Simply hiring the best workers, capable of performing work fast and accurately at the highest wages, will not alone translate into profitability. Potentially, retaining only the highest skilled and trained workers may actually translate into non-competitive bids and unaffordable, high overhead. A balance must be found between cost, quality, and speed. As the common saying goes, “fast, good or cheap. Pick two.”

Less experienced workers are typically less costly, but present greater risks of delayed performance, inadequate work quality, and deficient safety performance. By comparison, more
experienced and technically proficient workers will generally be more efficient and spend fewer work hours performing tasks requiring advanced skills, but cost more to retain. Numerous other factors affect work quality, efficiency, and safe practices, but it is the evaluation of these factors and the capital investment that drive the outcome.

This need for value judgment is not unique to hiring laborers, but is required for every aspect of management within a company on each of its projects. Companies that invest heavily in the skill level of their field workers but lack quality management risk inefficiency resulting from improperly allocated labor, material and equipment staging, and work sequencing. Inefficient or poor management can increase overall project budget and schedule risks for a company. Improper allocation of equipment, or improper investment in equipment, may similarly result in inefficient work processes or reduced work quality as employees engage in costly repeated remobilizations due to insufficient quantity or quality of equipment.

Likewise, the allocation of too many workers on a project may result in inefficiencies or quality issues, and thereby result in greater performance cost. The net result may be a short-term savings in labor costs, but longer term risks of inefficiency, acceleration, or rework expenses. Over-allocation of labor has its own costly inefficiencies if the progress of the work or the timing of critical path items performed by others prevent full utilization of the workers, resulting in down time or underutilization/inefficiency issues.

There is no single mathematical model for the allocation of capital resources used in the construction industry. What is universal is that every company’s success rises and falls on its financial value judgments, or sometimes lack thereof, as to how capital is allocated within the company and, in turn, on any given project. Optimally, calibrating the use of capital to the market for the services or materials the company supplies will increase efficiency and profitability. Actual profitability of a project will be greatly influenced, if not ultimately dependent upon, a thorough and appropriate evaluation of project risks.
III. RISK ASSESSMENT

As every project represents a unique and individual set of risks, the evaluation of risk prior to committing to and entering into a contract for a project presents a critical challenge for even the most experienced and skilled parties. A company’s own expertise and experience alone will not ensure a positive outcome for the project, and the risks posed by the unique circumstances and participants of the project will ultimately have a substantial impact on whether the project results in a positive or negative financial outcome for the company.

Evaluative analysis of the risks posed by the various factors affecting a project is, therefore, a critical task for every company. The extent of the analysis performed is dependent on a range of factors such as the contract value, time commitments, type of work or services to be performed, prior experience with similar projects, prior relationships with core project participants, and anticipated fiscal and business outcomes. For example, a supply house supplying a small amount of floor coverings for a project may not have executive level employees perform a formal risk analysis. That task may be delegated to its sales personnel, who might not even realize they are performing a risk assessment when they evaluate extension of credit based upon factors such as the contractor’s history, project information, and the amount of material to be supplied. That analysis, however, informs the terms upon which a sale is made, such as requiring down payment, expedited payment terms, or seeking guarantees or other assurances of payment. Similarly, a trade contractor supplying a relatively small value of work for a project may perform only a limited and informal risk assessment through the process of preparing project take-offs or proposals and within that process, evaluate the anticipated quantities of labor and materials, and then determine the expenses and overall potential profit of a given job. This evaluation will likely take into account the experience with the party hiring the contractor, the preparer and quality of the plans and specifications, the project owner, other known participants whose work may impact the trade contractor, and other business factors.
In contrast to the informal, or even subconscious, risk assessments of smaller or less risk intensive transactions, prudent companies involved in larger or more complex projects, where there are equally increased inherent risks, perform a formal risk assessment. Often such a risk assessment will be performed through a formal committee of senior company management and executives.

A common mechanism for this risk assessment is the development of a “Risk Matrix,” also known as a “Risk Register.” An example of a Risk Matrix utilized by a large commercial construction company is provided in the attached Appendix A. In preparing a risk assessment, a series of potential risks are identified that would be associated with the project. These identified risks may include a number of common risks associated with all projects the company performs, along with project-specific or unique risk categories. Each of these categories of risk are assigned a monetary value representing the most likely or expected high end of cost or expense that would be incurred if the risk were to come to fruition. The categories of risk are then assigned a value representing percentage likelihood of occurrence. Often this percentage is subjective and must be derived from the collective experience of the committee performing the risk assessment, but may also be derived from historical data from prior projects. The percentage likelihood is then applied against the monetary value of the specific risk to identify its cost-risk value. These are totaled across all of the categories to show a total project risk value.

In addition to the objectively identifiable risk values, the risk assessment will often include subjective risk factors. These subjective factors may include prior experience with contracting parties or other critical project participants, and other relationships. Additional evaluation may be made of technology required to perform the project, and prior experience utilizing that technology on similar projects.

A critical factor in the overall risk assessment of a project is the contract compensation structure. There is a significantly different risk evaluation for a lump sum contract price, where a
contractor is assuming all of the risk of costs of the specified work, and a project compensated on a time and materials basis, or a cost plus fee pricing structure. An even more sophisticated evaluation is required when the compensation is a hybrid cost plus fee with guaranteed maximum price (“GMP”), where the contractor assumes all risk of cost about the contractually agreed GMP. With these varied types of contract payment structures, themselves often incorporating multiple types of pricing, including lump sum, cost plus fee, allowances, unit pricing, and GMPs to make up the overall contract price, a unique risk assessment will follow for any given Project.

What is not unique to a project is the positive influence that a thorough risk assessment will have on the overall evaluation of the success of the individual project through identification and management of risks during the project and overall evaluation of the expected returns versus the amount of risk undertaken (risk/reward). A company can never totally eliminate all the risks inherent to construction projects, but can calibrate its activities to ensure the ratio of its risk to reward are consistent with the company’s values.

IV. CONTRACTS

The importance that contracts play in the world of construction will be no surprise to anyone practicing construction law or serving the construction legal market. Applying the analysis derived through the risk assessment, contracts represent the ultimate intersection of one company’s risk tolerance with that of another. Key contract terms may already be factored into a Risk Matrix, or the negotiation of contract terms may be influenced by the ongoing risk assessment and evaluation of the revised terms during the negotiation process.

A. Compensation

Starting at the most basic and often most critical contract term, the method of compensation plays a substantial role in risk transfer. Lump sum or fixed price contracts dominate the market for both design and construction work. The attractiveness of this compensation model is the result of its inherent simplicity in a party’s ability to evaluate the risk posed. As an example, an owner
contracting for architectural services for a fixed fee is limiting risk of costs beyond the fixed fee for the defined scope of services. The owner still bears risk of an architect’s default or additional fees due to other factors such as unknown site conditions, but the remaining cost risk for production of the designs is held by the architect. At the same time, an architect (or contractor) accepting a fixed price contract is internally bearing the risks associated with cost of performing the scope of services (or work). These risks include the company’s own employee and equipment costs, as well as external risks associated with coordination of consultant services, subcontractor costs, review with the owner, coordinating exchange of information amongst project participants, market changes during the term of the contract, and other external costs.

For an owner, it may be a natural reaction to say that these types of risks are better borne by the architect, as it is the party with better knowledge of these issues, and therefore, is in a better position to be able to evaluate and mitigate the risks. While this is not universally true, this line of reasoning is why fixed fee or price contracts are exceedingly popular not only within the U.S. construction market but across the world. This transference of risk through fixed price contracts, however, has a cost. An owner may end up paying more for the services or work than necessary, with the architect or contractor obtaining windfall profits. The price the architect or contractor pays for the opportunity to profit is, conversely, the risk of losses due to cost overruns exceeding the fixed price.

Other compensation methods have their own inherent risk transfer characteristics. Time and material or cost plus fee contracts directly transfer the costs associated with the work contracted to the owner. The costs are being passed through in exchange for the opportunity to pay only the costs of the work, and potentially less than a lump sum contract would cost. In the process, the owner is accepting risks of cost overruns caused by inefficiencies or external factors. The architect or contractor does not have the opportunity to obtain windfall profits, but its risk of cost overruns is mitigated. The architect or contractor’s fee, or markup on the costs, typically
includes allocation of profit and home office overhead expenses. The cost plus fee or time and materials contract does, however, subject the owner to factors outside of its control and potentially disincentives the architect or contractor to perform as efficiently as possible, as they do not have an incentive to limit cost. Despite this drawback, cost plus fee and time and materials contracts are often utilized where full and complete design information is not readily or feasibly obtainable, or where a full scope of work is unavailable either due to time constraints or budget limitations.

Guaranteed maximum price contracts employ another method of risk transfer. The owner pays the costs of the work, but only up to a total price that is capped at a fixed, “guaranteed” amount. As a result, the risk of significant cost overrun and inefficient work is transferred back to the contractor or architect, albeit without the ability to obtain a windfall type profit. From the contractor’s perspective, there is no cap on the risk associated with cost overruns on a GMP project without the upside of potential windfall profits. To avoid the innate incentive for the contractor or architect to have the final costs come as close to the GMP as possible (in order to obtain the largest fee or cover as much general conditions or profit built into set labor rates as they can based on the GMP amount) contracts will often include a shared savings clause. Such shared savings clauses pay the architect or contractor a share of the difference between the final actual cost and the GMP. From a contractor’s or designer’s position, the shared savings provision operates as a direct incentive only if the potential share of savings exceeds the potential profit that can be obtained by having total costs meet without exceeding the GMP.

Other compensation structures attempt to achieve a better allocation of risk given the parties’ project goals. Energy savings projects may utilize a compensation structure where the designer or contractor is entitled to a share of the energy or other operations savings obtained as a result of the project. This compensation structure is particularly attractive to project owners with limited funding or financing available to fund capital improvement projects or simply those who choose to transfer the risks associated with the potential cost savings. In this model, the contractor
or designer accepts the potential risks associated with the current state of the facility, and its ability to obtain actual operational savings down the road. Such risk analysis typically drives the contractor’s or designer’s fee model, as well as entails a time-value analysis of its investment.

Other common compensation structures, particularly for architects or engineers, involve fees based upon the total cost of the project. Such fee structures involve a unique alignment of cost risk with overall project costs. Although overall cost may translate into larger or more complex designs that are more time intensive to prepare, overall cost could also have no direct correlation to the design cost, such as in circumstances where a standard living unit is designed and there are significant economies of scale when adding additional units. Likewise, a relatively inexpensive construction could require a number of unique or labor-intensive design elements that greatly expand the project. In addition, the risk allocation in such fee structures is often set at the early stages of the conceptual design based only on projected budget figures. As a result, the architect is taking on a substantial amount of risk associated with the overall cost of design services at a point in the project where a number of design elements have not yet been fully determined. Although the owner is obtaining certainty as to the incremental design costs associated with construction, such that if the project bidding comes in higher than budget, the owner can simply adjust scope to bring the project in budget without having to reconfigure design costs, the owner is accepting a fee structure that could overpay for design services.

**B. Indemnity**

There may be no clause more ubiquitous to construction contract negotiations than the indemnity clause. Often misunderstood by industry laypersons and attorneys alike, indemnity clauses represent an overt risk shift between parties.

In the absence of statutory or common law prohibitions, parties are free to negotiate and contract for indemnification for the myriad categories of risk associated with construction projects. With inequalities in bargaining power amongst owners, architects, contractors, subcontractors and
other project participants, it is not surprising that trade groups have lobbied aggressively to convince state legislatures to statutorily void various indemnification arrangements as against public policy. Forty-four states and the District of Columbia have enacted some form of legislation governing indemnity clauses relating to construction contracts. The scope and impact of these state statutes vary widely depending on the type of project (public, private, residential or commercial) and amongst the scope of indemnity that is restricted or prohibited (sole negligence, partial negligence, and limits on additional insured clauses). Despite the varied scope of these statutes, a consensus generally exists with many states prohibiting indemnification for losses caused by the sole negligence of the indemnitee. A minority of six states permit such broad form indemnification, but even in these six, Alabama, Maine, Nevada, Vermont, Wisconsin, and Wyoming, such clauses are strictly construed.

As a consequence of this legislation and the stratification of the construction industry, indemnification obligations run the gamut from “broad form” indemnification to limited forms. Broad form indemnification clauses represent the broadest form of risk transfer where the indemnitor agrees to indemnify and save harmless the indemnitee from all risks, even those caused by the “sole negligence” of the indemnitee. This is an example of a broad form indemnification clause in a subcontract agreement:

**Indemnity.** The work performed by the Subcontractor shall be at the risk of the Subcontractor exclusively. To the fullest extent permitted by law, Subcontractor shall indemnify, defend (at Subcontractor’s sole expense) and hold harmless Contractor, the Owner (if different from Contractor), affiliated companies or the Contractor, their partners, joint ventures, representatives, members, designees, officers, directors, shareholders, employees, agents, successors, and assigns (“Indemnified Parties”), from and against any and all claims for bodily injury, death or damage to property, demands, damages, actions, causes of actions, suits, losses, judgments, obligations and any liabilities, cost and expenses (whether or not incurred by the Indemnified Parties or third parties), and attorneys’ fees and cost arising out of or related to the Subcontractor’s Work, materials furnished, or services provided
under this Agreement by Subcontractor or its agents, regardless of whether or not caused in part by a party indemnified hereunder.

Given the transfer of risk that includes the indemnitee’s own negligence, broad form indemnification clauses are particularly attractive to upstream contracting parties, such as owners or general contractors. From an owner’s perspective, the general contractor having the knowledge and expertise of running a construction project is in a better position to be responsible for and control activities on the project site, such that the owner wants to shield themselves from the uncertainties and risks of their project. Likewise, general contractors, who are often in a better negotiating position than their subcontractors, commonly include broad form indemnification language in their subcontracts in an effort to transfer risks to the downstream parties. This has a particular advantage from a claim administration perspective for the general contractor. When prosecuting a claim, the general contractor may not need to succeed on a recoverable claim against all parties that contributed to the cause of a loss, but only one subcontractor, which may be forced to initially absorb the entirety of the loss (either with its own finances or through insurance purchased to cover the risk). The subcontractor then takes on the further risk of pursuing third-party or cross-claims against other negligent parties, potentially absorbing the general contractor’s share of liability, as well as the liability of insolvent contributing parties.

In essence, an indemnitor under a broad form indemnification clause operates as a *de facto* insurer of the indemnitee against the stated types of loss. Like any insurer charging a premium for insurance, a prudent party accepting a broad form indemnification clause would be wise to ensure adequate compensation is received for the risk undertaken. A party failing to account for the additional risk is essentially providing free insurance.

A contracting party could perform an analysis of the risks posed by a broad form indemnity clause for a given project and with that information identify a premium to be charged for such coverage. Where an insurer might be able to properly account for the monetary value of a risk and spread that risk across multiple parties through its insurance premiums, contractors and designers are not
in the business of evaluating such risks at an actuarial level. Accordingly, these parties are rarely in a position to be able to properly account for the incremental increase in risks and, therefore costs, of accepting such risks, and may be further unable to spread those risks over enough contracts to adequately absorb the collective exposure for loss to the company. Often, a designer or contractor is likely not financially capable on its own of absorbing a substantial loss on a project resulting from a broad form indemnity clause and remaining in business.

From the perspective of many construction companies in house counsel, the unaccounted financial cost of broad form indemnification and the potentially catastrophic losses that can result from these clauses, make broad form indemnity a deal killer. Many design and contractor companies have strict rules within their companies prohibiting personnel from accepting contracts containing broad form indemnification clauses. Although circumstances may warrant limited exceptions to these rules, they are often granted only upon approval by upper management. Simply put, the risk of liability and litigation expenses posed by broad form indemnity clauses, particularly where a company is involved in furnishing them for nominal consideration, are too great and outweigh the potential benefits of taking on a project.

Beyond the bright-line prohibitions instituted within companies against broad form indemnity, there exist a wide and varied approach to indemnity clauses. Commonly accepted contract forms for architects and engineers often avoid mention of any indemnity by the designer to the owner. For contractors, a commonly accepted industry benchmark is contained in section 3.18.1 AIA A201-2017 General Conditions for Construction:

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect’s consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys’ fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or
omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

This indemnification is limited to bodily injury and property damage, but excludes damage to the “Work” itself (i.e., the indemnity is not a guaranty of quality of workmanship or defects in the construction work itself, but only for such work that causes other personal injury or property losses). The indemnity is further limited to the “extent caused by negligent acts or omissions” and, therefore, only those actions within the contractor’s control (or anyone for whom it is responsible).

AIA’s commentary to the A201-2007 version (of substantially similar language) confirms this language is intended to represent comparative fault “for example, if the indemnitee and all other third parties are found to be 20 percent responsible the contractor’s obligation to indemnify would extend to 80 percent of the loss.” Beyond this form indemnity clause lies a vast array of variations on the manner of shifting risk through indemnification.

The impact posed by contractual indemnity to insurance coverage is a substantial concern for counsel reviewing companywide standards for indemnification, and individual indemnification clauses on a project by project basis. Indemnity obligations that run concurrent with the coverage afforded by applicable commercial general liability or professional liability standards present a more palatable and measurable (in premiums) assumption of risk. Accordingly, provisions such as the AIA A201-2017 indemnification in §3.18.1 may follow the general granting of coverage under commercial general liability policies for personal injury or property damage arising out of an accidental occurrence, commonly as a result of negligent acts or omissions. Likewise, the AIA provisions exclude indemnification for damage to the construction work itself – a common commercial general liability exclusion. Such an indemnity clause still presents a
shifting of risk, but a shift that the contractor or designer may have already covered through its insurance.

C. Horizontal vs. Vertical Exhaustion

Evaluation of a jurisdiction’s treatment of exhaustion of general liability insurance limits is a significant factor of project risk evaluation and an important factor in the negotiation of terms for insurance both from an upstream and downstream perspective. A jurisdiction where horizontal exhaustion applies will require that all primary general liability policy limits be exhausted before any policies providing excess or umbrella coverage will pay out on a claim. Conversely vertical exhaustion jurisdictions allow an insured to obtain coverage under excess or umbrella policies when the scheduled underlying primary general liability policy is exhausted. As a result, when the general liability policy is scheduled as the underlying policy, once the general liability limits are exhausted, the insured can look to the excess or umbrella policy before seeking coverage from any other applicable general liability policies of another party.

The flow down nature of construction contracts from the owner through to subcontractors and consultants presents a particular challenge in states requiring horizontal exhaustion. In those jurisdictions, a general contractor, as an insured under its own general liability policy and an additional insured listed on its subcontractor’s general liability policy, would need to exhaust both the subcontractor’s and its own general liability policy limits before obtaining relief under the subcontractor’s excess or umbrella policy. The result is the general contractor is accepting a portion of risk of loss, even when the subcontractor is responsible for causing the loss. Although contract terms may allow the general contractor to recover costs of deductibles resulting from the loss, the general contractor will likely be unable to capture subsequent premium increases resulting from such claims. Consequently, the shifting of risk by an owner to general contractor under indemnification provisions becomes much more significant in horizontal exhaustion jurisdictions, because when the general contractor passes or flows down those provisions to its subcontractors,
the general contractor’s insurance remains at risk up to general liability limits. States applying vertical exhaustion of policy coverage allow for a more direct vertical flow down of risk from owner to general contractor and general contractor to subcontractors, as the pass through of indemnification permits the general contractor, as additional insured, to seek exhaustion of the subcontractor’s general liability and excess or umbrella coverage for a covered claim. Even where vertical indemnity allows for better flow down of risks associated with broad form indemnification, however, a party is still accepting greater risk that it ultimately result in higher insurance premiums.

The evaluation of jurisdictional exhaustion of general liability policies plays a critical role in the negotiation of both the contract insurance and indemnity provisions. Horizontal exhaustion jurisdictions preclude broad form indemnification and require careful scrutiny of the scope of indemnification required by upstream parties and ability to pass through such obligations to subcontractor’s general liability policies. Further evaluation is then required for subcontractor’s general liability limits. Common practice is to require insurance limits in excess of the $1,000,000 per occurrence that are the norm to allow for a larger limit of coverage by the subcontractor’s insurance, before the general contractor’s policy may be pursued for coverage. Availability of such nonstandard limits vary by jurisdiction and insurer, and present a further factor for each subcontractor on a given project. Critical to any evaluation of insurance terms of downstream parties is the contractual requirement for the subcontractor to include its company as an “additional insured” on a “primary and noncontributory basis” such that at least the subcontractor’s general liability policy will be exhausted prior to the general contractor’s policy. Although such language is common, care must be taken to ensure first that the correct parties are properly named as additional insureds and that the proper primary and noncontributory language is included. In some jurisdictions this may require looking beyond certificates of insurance, which may not be binding on the insurer, and instead to the actual general liability policy and its proper endorsements.
D. Payment

Capital, and particularly the timing of capital disbursement, is a significant driver of work in the construction industry. There may be no greater influence on workflow on a project than the structure and timing of payment. Although common practices have developed, there is a fundamental and eternal struggle between the contractors’ and service providers’ desire to receive payment as soon as possible and the owners’ incentive to delay payment as long as possible. For contractors and service providers, payment earlier allows greater control and flexibility to allocate capital to project needs for labor, equipment, materials, and overhead and to ultimately realize its profits. Earlier payments generally result in lower uncertainty of cash flow, and therefore, risk of outright non-payment. Additionally, earlier payments minimize a company’s reliance on other financing to meet project needs for funding labor, equipment, materials, and overhead.

Much like indemnity can turn a contractor or service provider into a *de facto* insurer, deferred, delayed, or short-paid payments can turn a contractor or service provider into a *de facto* bank. A contractor’s or service provider’s monetary obligations for the project for wages, material costs, equipment, and overhead often need to be met regardless of the status of payment from an owner or upstream party. As a result, a contractor or service provider will need to dip into its own capital or financing through lines of credit or otherwise, to cover interim project costs. The use of such outside capital has a cost, whether through the direct costs of interest on borrowed funds or the time value and opportunity costs of employing the company’s own funds. Without realizing it, a company can quickly go from being a construction contractor or service provider to being a financier, often without practical ability to recoup the lost capital costs or reap the financial reward for putting its capital at risk as would a lender.

Greater certainty of payment allows for greater project cash flow forecasting, and therefore, less uncertainty and risk, through better capital management. As a result, attention to payment terms is critical to ensuring both project success and overall company performance. For prime
contracts between general contractors and owners, common industry terms provide for payment applications every 30 days, typically with net 10 day payment terms. Such payment terms are not without risk, however, as substantial costs of work can be put in place over those 40 days, and during that period, an owner can default or a dispute can arise resulting in payment withholding. Beyond significant defaults, further delays in payment may arise due to owner or architect rejection of all or part of a payment application due to a variety of issues ranging from claims of overstatement of work, paperwork deficiencies, delays in review by owners and architects, lien waiver issues, change order approvals, and other procedural disputes. Care must be taken in the negotiation of contracts to ensure not only the terms of the contract match with payment expectations, but that the actual procedures for payment are discussed to ensure the process is understood and there will be no pretext to rejecting or delaying payment. Additional attention must be paid to these payment procedures during the course of the project to ensure the contracted procedures are actually followed.

Other payment terms may be acceptable given project circumstances and costing methods, such as fixed sum disbursements upon reaching specific project milestones. From a company’s perspective, milestone related payments must be carefully structured to ensure clear, objective triggering events for disbursement and account for potential delays or other circumstances that could slow achievement of a milestone despite substantial completion of the milestone work, and therefore, slow receipt of payment. The structuring of such milestone payments requires a further forecasting of the project costs and schedule into segmented parts. Although the setting of milestone payments can represent greater risk when costs of certain milestones can be spread beyond monthly payment applications, it can provide a means to realize funds earlier through a down payment, or to realize profit and overhead at an earlier rate when cost of work for a given milestone is less than the scheduled payment.
As part of the overall payment structure of a project, retainage holdbacks and disbursement requirements are a significant component of the overall project payment structure. The obvious desire for any party is to keep retainage withholding to a minimum, but generally industry standard retainage falls within a range of 5-10%. Negotiation of retainage amounts below this range is often not feasible or worth the political capital required to negotiate lesser amounts. Project risks, as identified and driven by risk assessment, however, may warrant negotiated reductions or elimination altogether.

Often open for negotiation is timing of reductions in retainage or disbursement of retainage selectively to subcontractors having fully completed their portion of work during the progress of construction. Commonly, reduction of retainage from 10% to 5% or similar halving of the amount of retainage at 50% completion of the work are negotiated. Also, negotiated terms may allow for scheduled disbursement of retainage amounts upon achieving project milestones or completion percentage. These milestones may include simple project milestones, or specific performance objectives, such as meeting operational performance requirements for mechanical equipment installed as part of the work. Negotiation of these earlier reductions in retainage can be significant, particularly on projects spanning years or where substantial capital investment must be made early in a project. With retainage values from 5-10%, this reduction may represent a substantial amount of project or home office overhead costs, or project profit, or just simply cost of the work itself.

Earlier realization of retainage represents value not just through the time value of money, but the employment of this capital for a variety of project and company needs, whether simply for payment of project costs, or other capital needs of the company – of course consistent with any contractor trust fund rules of the given jurisdiction. This earlier realization of retainage amounts represents lessened risk to the company, but also a practical benefit of freeing up capital both for the project and company as a whole.
E. Work Stoppage

Clauses that allow a designer or contractor to stop work in the event of non-payment provide a specific method to create leverage in the event of non-payment. These clauses are critical to ensuring that a company is not forced to continue to incur costs for completing work when it is wrongfully not being paid by an owner. The damage that can be incurred by a company in the event they must continue to cover project costs while the owner is not paying can be substantial, if not business ending. Although in any significant project there may be some dispute as to certain payments, a contract that requires the contractor to continue work despite nonpayment altogether is often a deal breaker. Accordingly, negotiation of terms often results in the contractor’s obligation to continue performance if dispute of payment is below a fixed monetary threshold, and stop work if a dispute exceeds such threshold. Such clauses recognize the owner’s desire to ensure minor disputes do not derail progress, while the contractor will not be in a position to cover all costs of construction through a long drawn out dispute resolution process.

F. Pay If Paid/Pay When Paid Clauses

Evaluation of payment terms is equally significant for the project subcontractors in their risk assessments. Additional attention must be paid to the specific triggering of payment to the subcontractor, commonly known as “pay if paid” or “pay when paid” clauses. For a company, the overall setting of a condition precedent that the general contractor will be obligated to pay the subcontract only “if” payment is first received from the owner is often a deal breaker. Such terms provide no recourse against the general contractor in the event of owner default, and practically limit recovery only through a lien against the property or claim on available bonds – which provide varying degrees of security depending on jurisdiction and bond coverage. Beyond simply transferring the risk of non-payment for owner default, the pay if paid clause subjects a subcontractor to risk of nonpayment due to dispute of payment or offsetting because of project
defects or delays, to which the subcontractor may not have contributed. Such nonpayment may result in withholding of payment to the subcontractor as a cram-down of the risk, and a challenging legal fight for the subcontractor to establish the general contractor’s obligations of payment.

In jurisdictions that prohibit “pay if paid” clauses but allow “pay when paid” clauses, scrutiny is required but the transfer of risk is more manageable. A pay \textit{when} paid clause links the timing of payment to the subcontractor to when payment is made by the owner to the general contractor, but the general contractor is ultimately liable to pay its subcontractor even if the owner defaults. From a subcontractor standpoint the linking of timing of payment through the owner may be necessary as the general contractor may not have capital resources to pay the entire project on a monthly day basis without owner funding being released each month. This practical reality, however, should ideally be balanced with an outside deadline for payment.

In negotiating terms, capping the delay in payment at 60-90 days from the date the general contractor is contractually supposed to receive payment from the owner allows the general contractor opportunity to obtain payment from the owner, but sets an objective deadline of when payment must ultimately be made to the subcontractor. Without such deadline, the subcontractor may be left with an amorphous legal standard in some jurisdictions that the payment will become due within a “reasonable time” after the general contractor was to receive payment from the owner.\textsuperscript{iv} That leaves the subcontractor in a difficult position of escalating payment demands and declaring the general contractor in default, without starting formal dispute resolution proceedings. Ideally, setting firm deadlines from the timing of the subcontractor’s payment application date allows for greater certainty and objective deadlines for measuring the timing of when payment will be due.

In evaluation of the payment terms on a project, whether from an architectural, general contractor, subcontractor or supplier perspective, they should allow for perfection of lien rights via filing lien notices and claims to avoid inadvertent waiving of lien rights. A lien claimant will
want to ensure that the due dates of payments do not interfere with ability to file a lien on a project such that payment does not become legally due after a critical lien filing deadline has passed. Otherwise, the subcontractor may find itself unable to file a lien because payment is not yet due, but then, when payment ultimately becomes due, deadlines for lien filing tied to last performance of work on the project will have expired so that lien rights are lost.

V. DISPUTE RESOLUTION

With the varied relationships and unique risks posed by each project, disputes on construction projects are inevitable. Similar to the value judgments defining the allocation of resources to any given project, companies likewise must decide on their allocation of resources to dispute avoidance and dispute resolution. Whether that involves the allocation of personnel time to informal dispute resolution or budgeting for engagement of outside counsel, all dispute resolution requires an allocation of company capital. With limited resources, every company makes value judgments on when and how much it will allocate to resolution of disputes.

Both informal and formal dispute resolution processes have short and long term consequences. In the short term, personnel involved in the dispute are taken away from their other tasks and forced to expend time and effort on the dispute. This can range from informal investigation of issues, review of documentation, telephone conferences, and meetings, to assistance with preparation of formal dispute resolution claims, demands for document collection and production, personnel interviews and fact gathering, depositions, appearances at hearings, reviewing of pleadings and submissions, and attendance at trials, arbitrations or other alternative dispute resolution hearings. The financial impact to the company caused just by the time commitment of its personnel to the dispute can result in lost opportunities and inadequate staffing or mismanagement of other projects as personnel are pulled away. Such impacts may have a ripple effect throughout a company as personnel are taken away from yet other projects to handle dispute resolution activities.
Although it is easy to recognize the pure financial cost of hiring outside counsel to advance formal dispute resolution, or the opportunity cost of pulling personnel away from their day to day roles in the company, quantification of the cost of disputes on a company’s human resources is a much more difficult task. For example, architects, engineers, and contractors are often driven by a desire to create, whether through construction or design development. Disputes over work quality or management can have significant impacts on emotional well-being and morale of a company that are not readily quantifiable and often overlooked.

A further cost consideration is the long-term consequences disputes may have on reputation and recognition within the industry. Loss of reputation of a company simply by being involved in a dispute, even if legally justified, can be significant. Disputes may become public with media reporting, or misreporting, the parties’ claims resulting in a company’s actions being judged by the court of public opinion. For companies that rely on owner selection, rather than competitive bidding, reporting of formal dispute resolution and litigation history can be a significant part of the selection process. Reporting few disputes, or no, litigation history thus becomes a material selling point of a company.

There is no question that informal and formal dispute resolution have significant costs attached to them, and prudent companies evaluate both the quantifiable and non-quantifiable costs of disputes against the potential and most likely outcomes. Outside legal counsel can play a valuable role in evaluating potential outcomes and advising as to a course of action that maximizes the company’s goals, rather than simply seeking a “win at all costs” approach. This may mean the compromise of a likely successful claim, or payment of a claim above likely liability.

VI. CONCLUSION

A construction company is defined by the value judgments it makes with respect to the allocation of capital amongst its labor, management, equipment, materials and operational
overhead. To properly capture the risks and rewards posed by each of those value judgments, thorough risk assessment of the company generally, and each project specifically, is critical. This risk assessment drives the initial approach to a project, its contract negotiations and the ultimate performance. Proper risk assessment ensures consistent approach to project risks across all project and mitigates the risks posed by any individual project.

APPENDIX A

Below is a risk matrix utilized by Lyles Construction Corp. in evaluation of the McLoughlin Point Wastewater Treatment Project located in Esquimalt, British Columbia:

<table>
<thead>
<tr>
<th>Description</th>
<th>Prob. of Occur.</th>
<th>Cost Impact ($000)</th>
<th>Schedule Impact</th>
<th>Basis of Cost or Schedule Impact</th>
<th>Mitigation &amp; Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min</td>
<td>Prob.</td>
<td>Max</td>
<td>Min</td>
<td>Prob.</td>
</tr>
<tr>
<td>Permitting &amp; Approvals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stormwater permit – for existing</td>
<td>10%</td>
<td>$25</td>
<td>$50</td>
<td>$100</td>
<td>4</td>
</tr>
<tr>
<td>PGE Utility Fee Uncertainty</td>
<td>50%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delay in Owner approvals</td>
<td>25%</td>
<td>$25</td>
<td>$50</td>
<td>$100</td>
<td>1</td>
</tr>
<tr>
<td>Surface Mining permit</td>
<td>10%</td>
<td>$25</td>
<td>$50</td>
<td>$100</td>
<td>2</td>
</tr>
<tr>
<td>Delay or more burdensome requirement</td>
<td>25%</td>
<td>$50</td>
<td>$100</td>
<td>$150</td>
<td>2</td>
</tr>
<tr>
<td>Bringing existing buildings to code</td>
<td>25%</td>
<td>$50</td>
<td>$100</td>
<td>$250</td>
<td>2</td>
</tr>
<tr>
<td>Regulators add DBPs to permit</td>
<td>25%</td>
<td>$250</td>
<td>$500</td>
<td>$1,000</td>
<td>2</td>
</tr>
<tr>
<td>Third-party delay</td>
<td>10%</td>
<td>$50</td>
<td>$75</td>
<td>$100</td>
<td>2</td>
</tr>
<tr>
<td>Technical - Design Related</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variations in influent characteristics</td>
<td>10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design cost/schedule overrun</td>
<td>25%</td>
<td>$100</td>
<td>$300</td>
<td>$1,000</td>
<td>2</td>
</tr>
<tr>
<td>Design development/scope growth (creep)</td>
<td>25%</td>
<td>$250</td>
<td>$500</td>
<td>$1,500</td>
<td>2</td>
</tr>
<tr>
<td>Design Error or Omission</td>
<td>25%</td>
<td>$250</td>
<td>$500</td>
<td>$1,500</td>
<td>2</td>
</tr>
<tr>
<td>Residual (greenhouse) solids not dry enough</td>
<td>25%</td>
<td>$500</td>
<td>$750</td>
<td>$1,000</td>
<td>2</td>
</tr>
<tr>
<td>BFP Solids not dry enough</td>
<td>10%</td>
<td>$25</td>
<td>$50</td>
<td>$100</td>
<td></td>
</tr>
<tr>
<td>Capacity of existing outfall</td>
<td>10%</td>
<td>$25</td>
<td>$50</td>
<td>$100</td>
<td></td>
</tr>
<tr>
<td>Accuracy of Flood Elevation</td>
<td>10%</td>
<td>$25</td>
<td>$50</td>
<td>$100</td>
<td></td>
</tr>
</tbody>
</table>
### Site Conditions (Geotechnical, etc)

**Differing conditions**
- 25% $100, $100, $750
- 4
- 6 Additional foundation work. Additional import material. CA ISC clause in contract. Need additional investigations prior to construction. Qualify settlement criteria in proposal to 2" vs 1".

**Contaminated soil**
- 10% $50, $100, $250
- 2
- 4 Extra work and admin
- 8 Owner risk

**Contamination caused by JV or Subs**
- 10% $50, $100, $250
- 2
- 4
- 8 Deductible cost
- Contractor pollution liability insurance. Flowdown to subcontractors.

**Construction**

**Construction unknowns (other than geotech)**
- 25% $100, $250, $500
- 4
- 12 Up to 1% of construction
- Investigations and surveys of existing conditions, review of as-

**Working at an operating facility**
- 10% $250, $500
- 2
- 4
- 6 Delays, rework.
- Development of construction plan, Communications with operators
- Contingency plan for high impact events

**I&C (SCADA) Integration and performance**
- 25% $100, $250, $500
- Estimate
- Focused coordination and QA/QC. Full FAT by Tesco.

**Weather, Force Majeure Delays or other Construction delays**
- 25% $100, $250, $500
- 2
- 4
- 12 1 month delay
- Schedule contingency (1 or 2 mo). Force majeure clause in contract. Contingency allowance.

**Builders Risk deductible event**
- 10% $100, $250, $500
- Deductible cost

**Subcontractor/Vendor performance**
- 10% $250, $500
- up to 3% of subs & vendors
- Use of known and prequalified subcontractors. Implementation of a construction QA/QC program. On-site superintendence, including weekly meetings. Step-in rights on all subcontracts. Subcontractor bonding

**WBE/MBE Performance**
- 25% $25, $100, $250
- up to 3% of sub costs
- see above

**Worker injury, site safety**
- 10% $50, $100, $200
- 0
- 1
- 2
- One wk per injury or accident + ins. deductible
- EH&S Management w/Safety Manager. Flowdown to subs. Insurance
- H&S training. Prequalification of subcontractors.

**Startup, Commissioning & Acceptance Testing**

**I&C Integration problems**
- 25% $100, $250, $500
- delays and retesting
- Focused coordination and QA/QC. Use of shop mock-up. Full FAT by Tesco.

**CHP System performance**
- 10% $100, $250, $500
- delays and retesting

**Power Consumption Guarantee**
- 25% $100, $250, $500
- delays and retesting
- Prepare good estimate. Use safety factor. Power Appendix #1 page 11(+/‐10% Aeration Sys., +/‐5% Pump & Solids Sys.)

**Total nitrogen standard may not be achievable due to lack of carbon**
- 25% $10, $50, $100
- WW characterization testing and temporary carbon (methanol) source
- Qualify in proposal. Client has influent risk. Confirm characterization during design. Include provisions for carbon addition during acceptance testing.

**Non-Achievement of Ammonia Nitrogen limit**
- 10% $40, $100, $250
- Additional O&M services
- Conventional design – should get <0.5 mg/L vs 1.3 requirement

**Non-Achievement of TSS limits**
- 10% $100, $250, $500
- Possibly a new floc tank
- Conventional Design. Flowdown to vendor. Qualify non-presence of fines. Floc tank contingency.

**Non-Achievement of BOD limits**
- 10% $100, $250, $500
- Delays and retesting
- Conventional Design. Flowdown to vendor. BOD removal is controlled by NH4-Nitrogen removal. Filters remove suspended TSS.

**Drum Thickener not performing**
- 10% $10, $25, $50
- Additional chemical use
- Flowdown to vendor

**Stress testing performance**
- 25% $100, $250, $500
- Re-performance & delays
- Provide write-up in proposal on how the tests will be performed. Stress Test Appendix #7 page 18. Re-test risk.

**Warranty & O&M Performance Period**

**JV warranty costs beyond bid allowance**
- 10% $50, $250, $500
- up to 3% of installed equip.
- Flowdown

**Vendor/subcontractor underperformance**
- 10% $50, $100, $300
- up to 1% of equip & subs
- Flowdown
<table>
<thead>
<tr>
<th>Service</th>
<th>Percentage</th>
<th>Hourly Rate</th>
<th>Daily Rate</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redo Acceptance testing</td>
<td>25%</td>
<td>$50</td>
<td>$100</td>
<td>90 days addl labor + exp</td>
</tr>
<tr>
<td>Additional training and hand-holding</td>
<td>25%</td>
<td>$50</td>
<td>$100</td>
<td>Up to 8 weeks in field</td>
</tr>
</tbody>
</table>

**Cost Estimate & Financial**

- **Accuracy of quantities/completeness of est.**
  - 25% of bid
  - $100
  - $500
  - $1,000
  - 1% of bid
  - 60 design drawings have been developed by AECOM-Lyles.

- **Escalation - beyond mid point of Construction**
  - 25% of bid
  - $100
  - $500
  - $1,000
  - Labor escalation will be in WML GC’s.

- **Scope Gap between Bid Packages**
  - 10% of bid
  - $250
  - $500
  - $1,000
  - Procurement & design diligence. Constructability reviews. Scope Reviews. Discipline Coordination

**Other**

### Notes:

- AECOM recommends 4-6% for contingency which equates to $2-3 Million for a $50 Million Project
- **Cost of Delay Calculation (per week)**
  - GCs: $75K
  - LDs: $80K
  - LD’s-$9000/CD–Provisional Performance Acceptance; $6000/CD–Site Acceptance; Combined $12,000/CD; Fines are separate, LD’s and fines each limited to 5% of Contract. Add. #6 Article 5 pg. 5

- **No Consequential damages Add. #6 Article 10.11.7**
- **Limitation of Liability 50% of Contract Article 12 pg. 10**
- **Provisional Performance Acceptance by 8/1/2017, Add. #6 Article 5 pg. 4**
- **Site Acceptance by 8/1/2018, Add. #6 Article 5 pg. 4**

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