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Legal and Business Implications of Building Information Modeling (BIM) and Integrated Project Delivery (IPD)

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Many architects are adopting the use of Building Information Modeling (BIM) technology for the preparation of design documents on their current projects. On a parallel track, owners have an increased interest in exploring alternative methods of project delivery, including construction manager-at-risk, fast tracking, and contractual clauses to incentivize the minimization of costly change orders. These are among the methods, facilitated by the use of BIM, that fall within the larger umbrella of what has come to be known as “Integrated Project Delivery” (IPD).

The purpose of this paper is to summarize some of the contractual issues, from scope to compensation to risk management, that arise with the use of BIM to create project documents and the employment of IPD methods. Although BIM and IPD have the potential to transform the design and construction industries, one should also be aware of the risks. Architects, owners, and contractors should only alter long-settled business and contractual expectations in a careful and deliberate manner. Despite all the rhetoric of revolutionary change within the architectural profession and the construction industry, the most effective type of change is usually incremental. Don’t rush into new types of business and professional relationships until you have carefully considered and discussed them, both within the firm, with your client, and with all other parties. In any new contractual relationship, you need to make sure that the financial and legal risks and rewards are fairly balanced.

Overview and Definition of Terms

Building Information Modeling (BIM). The use of BIM by architects, engineers, contractors, owners, and others is rapidly becoming widespread within the design and construction industries. Major public and private owners, including the federal General Services Administration (GSA) and the US Army Corps of Engineers, are requiring the use of BIM on all of their projects. The nature of BIM, and its ability to create a 3D, 4D (time), and 5D (cost) simulation of a proposed building, is increasingly well understood, so a definition is not necessary here.

However, there is one aspect of BIM that is critical to understand for the purposes of contract drafting and negotiation, and that is the “federated” nature of the BIM models employed for building design and construction. It is tempting, but inaccurate, to refer to a single BIM “model” that will be created by the project team. It is more accurate to think of a federated set of interrelated BIM models, created by different members of the project team, but with the ability to exchange information between their differing software platforms. For example, there might be a “design model,” primarily created by the architect and its consultants, and containing the
information typically found in the plans and specifications that make up the permit and bid sets of construction documents. Similarly, there might be a “construction model,” primarily created by the CM and its subs, and containing the information typically found in shop drawings and other submittals. Contracts for BIM-enabled projects need to take into account the federated nature of the BIM models, and define rules for the creation, revision, and use of different models by different members of the project team.

**Integrated Project Delivery (IPD).** Although BIM can be used with all kinds of project delivery systems, including design / bid / build, many believe that its benefits are greatest when coupled with more collaborative approaches to project delivery. As stated by the AIA National / AIA California Council, in *Integrated Project Delivery: A Guide* (2007):

> “It is understood that integrated project delivery and building information modeling (BIM) are different concepts – the first is a process and the second a tool. Certainly integrated projects are done without BIM and BIM is used in non-integrated processes. However, the full potential benefits of both IPD and BIM are achieved only when they are used together.” [p.20]

Unlike BIM, integrated project delivery (IPD) requires a definition, because it encompasses a range of project delivery methods that have been described by various terms, including “relational contracts,” “lean construction,” “project alliancing,” and so forth. The AIA / AIA California Council in their 2007 *Guide* give the following definition:

> “Integrated Project Delivery (IPD) is a project delivery approach that integrates people, systems, business structures and practices into a process that collaboratively harnesses the talents and insights of all participants to optimize project results, increase value to the owner, reduce waste, and maximize efficiency through all phases of design, fabrication, and construction.

> “IPD principles can be applied to a variety of contractual arrangements and IPD teams can include members well beyond the basic triad of owner, architect, and contractor. In all cases, integrated projects are uniquely distinguished by highly effective collaboration among the owner, the prime designer, and the prime constructor, commencing at early design and continuing through to project handover.”

There are two key elements of IPD: collaborative design process and sharing of financial risks / rewards. Most US projects and contracts to date have relied on a collaborative design process without sharing of financial risks and rewards (we call this approach “IPD lite”). Such projects often reshape and even rename the design phases of the project. Both the architect and the CM will work more intensively prior to the creation of construction documents, and they will share information more freely with each other throughout this process, in order to test the cost and constructability of the design. In this context, see the well-known 2004 white paper issued by the Construction User’s Round Table (CURT),¹ which graphs the need to shift design efforts earlier in the project in order to avoid costly design changes later on, especially during construction.

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In its fullest version, IPD has given rise to new forms of contractual relations that dramatically change many of the current expectations of owners, architects, and CMs (we call this approach “Full IPD”). The new contract forms include the relational “Tri-Party Agreement for Collaborative Project Delivery” issued by ConsensusDocs in 2007 (Form 300), an earlier version of relational 3-party contract issued by the Lean Construction Institute, and two sets of documents issued in 2008 by the AIA: the “transitional” documents and the “single purpose entity (SPE)” documents. These full IPD contract forms are described in more detail later in this memo. However, such a dramatic shift in business model will require leadership on the part of the owner, full buy-in from all other members of the project team. Moreover, members of the project team for a full IPD project should be selected in large measure for their willingness and ability to work in this kind of collaborative environment.

For these reasons, it is likely to take some time before full IPD is widely used as a project delivery method within the construction industry. For most projects, a more gradual, incremental approach will be called for – evolution, not revolution. This paper maps out the following incremental three-step approach toward incorporating BIM and IPD issues into the contractual frameworks for design and construction projects:

1) **Use of BIM.** This is rapidly becoming profession and industry standard, even on projects that use conventional design / bid / build process. Therefore, these legal questions will soon affect all projects, regardless of whether they employ an IPD process.

2) **Collaborative design process (IPD lite).** As an essential element of IPD, the assumption that the architect and CM will collaborate much more closely throughout the design process can be seen as an evolution of current practice on projects that employ a CM-at-risk. However, the IPD process structures this collaboration much more self-consciously, and it can inject new forms of information sharing and decision-making among all members of the project team.

3) **Sharing of financial risks and rewards (full IPD).** In its most developed form, IPD seeks to provide powerful incentives to all parties to maximize the effectiveness of their collaboration, by altering the traditional contract structures for the sharing of financial rewards and risks, based on exceeding cost, schedule, and quality goals for the project. These types of changes pose the most far-reaching legal implications for the business profitability and insurability of architects and other designers.

Finally, some comments on the contract negotiation process. Any construction contract, because it will shape a relationship that continues for years, throughout the course of the projects, works best when it grows organically out of the relationship of the parties. Because the effective use of BIM and IPD require good communications and clear lines of information sharing and decision-making within the project team, it is all the more important to use the contract negotiation process to discuss and define these issues, and to build mutual trust and respect among team members.
Step 1: Contractual Implications of BIM

Contractual issues to be addressed
The use of BIM on a project --- whether its use is limited to the preparation of construction documents by the architect, or whether the owner, contractor, and other parties also participate in creation of the BIM models -- raises important contractual issues that may not be addressed by standard industry contract forms. Key issues include:

• **Digital data protocols.** The contract should define the specific software and hardware to be used by project team members for the creation of various elements of the BIM models, and it should define clear protocols for determining which member(s) of the project team will have the ability to create, modify, and/or use various elements of the model.

• **Coordination and reliance.** The contract should define the extent to which team members may rely on each other's contributions to the BIM models, so long as the digital data protocols discussed above are observed. For the architect, it will also be critical to define who has responsibility to coordinate and/or ensure the quality of contributions to the BIM models by other parties, including the owner and its consultants and by the contractor and its subcontractors.

• **Project responsibilities and risks.** The contract should ensure that parties do not take on responsibilities that are outside of their scope, fee, and insurable risk, solely by virtue of participating in the creation of the BIM models. Specifically, the contract should state that participation does not make the architect responsible for construction means, methods, and safety programs, and that it does not make the contractor responsible for project design (unless the contract documents contain specific design delegation language, such as design/build for the HVAC system).

• **Copyright / use of documents.** The contract should ensure that participation in creation of the BIM models does not inadvertently change the parties’ expectations with respect to the copyright and use of the documents they have created. Parties also need to realize that contributions to the BIM models by all parties (notably the contractor and its subcontractors) are potentially copyrightable, and so rights to their use should be specifically negotiated in all project contracts.

• **Contractual privity; waivers and indemnities.** The contract must state clearly that participation in creation of the BIM models does not give rise to contractual privity among participants who have not otherwise entered into agreements (for example, between the architect and the contractor and subcontractors). Otherwise, if the use of BIM gave rise to unforeseen categories of liability and uninsured risk, that could severely discourage its adoption. The contract should also address mutual waivers and indemnities among parties, relating to the issues identified above.

Available contract forms
Until 2007, the standard AIA contract documents did not address in any meaningful way the legal issues that arose from all forms of digital data transmissions among project team members, including 2-dimensional CAD documents, Word documents, and emails, as well as
BIM models. The 1997 owner-architect agreements (B141 and B151) referred to a separate agreement to be made between the owner and the architect for transfers of “electronic data.” Yet it was not until 2007 that the AIA finally issued forms of such agreements.² The Digital Data Protocol Exhibit (form E201) is intended to govern data transfers between the owner and the architect and to be attached to their prime contract (now the B101 and B103 agreement forms, 2007 editions). The Digital Data Licensing Agreement (form C106) is intended to be a free-standing agreement between parties who do not have contractual privity, such as the architect and the contractor or one of its subcontractors. Neither of forms refer expressly to the creation of a BIM model, nor do they address many of the key contractual issues identified above. To address specific concerns raised by BIM, in November 2008 the AIA released its Building Information Modeling Protocol Exhibit (form E202), intended to be attached to a wide range of AIA owner-architect and owner-contractor agreements.

An alternative family of construction industry contracts is the ConsensusDocs, developed by a consortium of industry groups including the AGC. There are two recently issued ConsensusDocs forms that address digital data transfers: the Electronic Communications Protocol Addendum (form 200.2), issued in 2007, and the BIM Addendum (form 301), issued in June 2008. The 200.2 form covers a wide range of digital communications, from drawings to email to payments. The 301 form specifically focuses on BIM models; it has been expressly drafted to take the federated nature of BIM models into account. Both of the documents are drafted to be attached to all project contracts. Taken together, these documents expressly address the full range of contract issues noted above.

Although specific modifications are likely to be required for a specific project, at the current time (April 2009) it appears that either the AIA’s E202 BIM Protocol Exhibit form or the ConsensusDocs 301 BIM Addendum form could provide an appropriate starting point for an exhibit to be attached to an AIA or other model of underlying owner-architect agreement.

**Step 2: Contractual Implications of Collaborative Project Delivery (“IPD lite”)**

**Contractual issues to be addressed**

Introducing elements of IPD on a project --- whether within the framework of standard CM-at-risk, or whether the owner, architect, CM, and other parties have agreed to a more innovative set of relationships -- raises important contractual issues that may not be addressed by standard industry contract forms. These are in addition to the BIM-related contract issues discussed above under Step 1.

Key issues include:

- **Relationship of design services to compensation.** The IPD process, if properly carried out, is likely to require a higher level of design effort early in the project by both the architect and the CM, and more intensive coordination and collaboration among all parties. Therefore, contracts must ensure that scopes of services for the design phases, particularly for redesign in relation to cost estimates, constructability and phasing reviews, and value engineering proposal, are in line with compensation.

² For a detailed analysis of the new AIA forms, see Chris Noble & Bennet Heart, “The AIA’s New Digital Data Documents,” *Construction Lawyer* (Spring 2008).
• **Phasing of design services.** The IPD process may require a rethinking of the standard definition of design phases (i.e., SD – DD – CD), to more closely match the needs of the project and the expectations of team members.

• **Project responsibilities and risks; contractual privity.** As noted in Step 1, the project contracts, as well as the BIM addendum, should ensure that parties do not take on responsibilities that are outside of their scope, fee, and insurable risk, and that the IPD process does not give rise to contractual privity among participants who have not otherwise entered into agreements (for example, between the architect and the contractor and subcontractors). Specifically, the contract should state that the architect is not responsible for construction means, methods, and safety programs, and that the contractor is not responsible for project design (unless the contract documents contain specific design delegation language, such as design/build for the HVAC system). The contract should also ensure that the architect can exercise responsible control over the design in accordance with professional registration laws.

• **Coordination and review of design services.** As noted in Step 1, the prime owner-architect contract, as well as the BIM addendum, should define who has responsibility to coordinate and review any design-phase services of other parties, including the owner’s consultants and the contractor and its subcontractors.

• **Copyright / use of documents.** As noted in Step 1, the use of BIM in IPD projects makes it particularly critical for all contracts to clearly define the control and use of documents prepared by all members of the project team (including the contractor and its subcontractors). Key issues include the terms of licenses for use in completing the project and future renovations and additions, and rights to use the documents for future projects.

• **Dispute resolution.** All contracts should contain well thought-out dispute resolution procedures to ensure that the project team will be able to continue working smoothly together while the inevitable problems that arise with every project are addressed and resolved fairly and efficiently. All contracts should, at a minimum, provide for mediation of disputes with potential joinder of all parties. For large projects, the appointment of a standing project neutral or dispute review board for the initial review of claims should be considered.

• **Insurance / limitations on liability / waivers/ third-party indemnification.** The contracts should define insurance requirements for all parties, and any mutual waivers of subrogation among parties for claims covered by insurance. The contracts should include any limitations on liability, and any waivers of consequential damagers. The contract should also address indemnities among parties, relating to the issues identified above.
Available contract forms
The standard AIA contract documents (both 2007 and earlier editions) address most of the legal issues identified above that may arise from IPD – but without a specific focus on IPD-related goals. However, there is a new set of AIA contract forms, known as the “Transitional” IPD documents, that seek to foster a more collaborative relationship among owner, architect, and CM, on projects that will go beyond standard CM-at-risk procedures in the degree of collaboration and cooperation during the early design phases. The AIA Transitional IPD contract forms consist of an owner-architect agreement (B195) and an owner-CM agreement (A195) that are primarily limited to the financial and other business terms. The detailed delineation and phasing of the scope of services for both the architect and the CM is contained in a new type of document, the Project Conditions (A295), which is designed to be attached to both the B195 and the A195 contracts. In addition to the higher level of coordination associated with the development of a unified set of Project Conditions, the document also significantly alters assumptions about the phasing of design services for both the architect and CM, following closely on the new six-phase framework for IPD developed by the California Council of the AIA (see discussion above).

The ConsensusDocs 300 Tri-Party Agreement is a contract signed by the owner, architect, and contractor. It incorporates a collaborative approach to design and construction, along with the full range of financial risk/reward sharing devices associated with full IPD. Issues of risk/reward in the 300 form are discussed in Step 3 below. From a perspective of collaboration, the ConsensusDocs 300 goes even further than the AIA transitional documents in applying a uniform set of project conditions to all members of the project team for issues ranging from phasing and scope to insurance, copyright, and dispute resolution. The ConsensusDocs 300 also includes detailed provisions for a collaborative budget-setting and value-engineering process throughout the design phases.

Step 3: Contractual Risk/Reward Sharing Implications of Relational Project Delivery Contracts (“Full IPD”)

Contractual issues to be addressed
If the fuller IPD sharing of rewards and risks is agreed upon, then in addition to the following issues, all of the collaboration and scope issues in Step 2 above should also be addressed. Key issues include:

• **Incentive compensation.** How will the contract define incentive compensation to the architect and contractor for meeting or exceeding defined project goals? How will the goals be defined and by whom? When will the incentive compensation be paid? Will it be subject to give-back if other penalty clauses are invoked?

• **Cost savings and cost over-runs.** Will the contract share cost savings, if total cost less than Target Cost? Who gets what %? Conversely, will the contract share the pain if total costs exceed Target Cost? Will the architect and CM put their profits at risk?

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3 Yale University has employed a unified set of Project Conditions for design and construction contracts in its current capital projects program, averaging $400 million per year. The Yale forms, however, make only limited reference to IPD-type project delivery methods.
• **Intra-party claims within project team.** If there is an express 3-party contract, it should include a partial or complete waiver of intra-party claims among the project team members (owner, architect, CM). If the waiver is partial, the contract should define a limitation of liability – perhaps linked to available insurance.

• **Claims against project team by 3rd parties.** The contracts need to define how the parties will share the risk of third-party claims against team members --- potentially funded by a project policy, or by contract clauses that parties indemnify each other for third-party claims to the extent of their own negligence or breach.

**Available contract forms**

In addition to the collaborative contract elements discussed in Step 2 above, the ConsensusDocs 300 Tri-Party contract incorporates the full range of financial risk/reward sharing devices associated with full IPD, including:

• A provision that the base compensation for both architect and CM will be their direct labor costs and expenses. A separate fee (overhead and profit) will be payable only upon meeting defined incentive targets.

• The contract will define performance benchmarks for the project, in areas including cost, quality, safety, schedule, planning system reliability, innovative design, construction processes and teamwork. The architect and/or CM will receive incentive compensation if benchmarks are met or exceeded.

• If the actual project cost is less than the agreed-upon budget target, the parties shall share in savings in % to be determined. Conversely, to the extent that the actual project cost exceeds the agreed-upon budget target, the contract provides two options; either (1) the owner will bear the risk of cost overruns; or (2) all parties will share the risks, in % to be determined. In the latter case, the architect and CM’s risks may be limited to their fees (overhead and profit).

• The parties mutually waive all claims against each other for collaboratively reached and mutually agreed upon project decisions, for unforeseen events beyond the control of any party, and for consequential damages. In addition, the parties may agree to mutually waive all claims against each other for other good-faith actions, including negligence and breach of contract, unless the action rises to the level of willful default.

In short, under this new model the architect and contractor would share with the owner in the financial risks of delivering the project on time and on budget. In return, all parties would mutually agree not to bring claims against each other (effectively meaning that the owner would bear most of the risk for the architect’s and contractor’s own negligence, so long as they were acting in good faith).

In May 2008 the AIA issued, along with its “Transitional” IPD documents, an initial set of “special purpose entity (SPE)” documents that are ultimately intended to provide an alternative contractual framework for the full range of financial risk/reward sharing devices associated with full IPD. Unlike the ConsensusDocs 300, which is a 3-party contract, the AIA elected a much
more elaborate structure, in which the owner, architect, and CM form a new limited liability company (LLC), of which all three are members (see AIA form C195, 3-party LLC agreement). The LLC in effect becomes a kind of project-specific design/build firm. The LLC would in turn enter into a contract with the form (AIA form C196), with the architect to carry out the design elements of the project, into another contract with the CM to manage the construction, and into a series of contracts with the trade subcontractors to carry out the actual construction work. These subsidiary contracts (AIA form C197) were released in October 2008 by the AIA. However, it is questionable how many owners will be willing to employ this as-yet untested structure.