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BUILDING TOWARD THE PAPERLESS PROJECT: RISKS, REWARDS, AND SAFEGUARDS

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The construction industry, and architectural and engineering ("A/E") firms in particular, have enthusiastically and increasingly embraced the use of technology in generating, revising, plotting, and transmitting their work product and project-related communications. Clients and competition demand it. As a result, the average firm now uses some form of Computer Assisted Design and Drafting ("CADD") on well over ninety percent of its projects. According to some, Building Information Modeling ("BIM") now promises to completely revolutionize, and even dominate, the design and construction process. The technology to aid design professionals continues to evolve with ever-increasing speed. Realistically, the extraordinary rate of change which has characterized the last ten years may even be dwarfed by the changes to come. The challenge is for relationships and human performance capacity to adapt to and keep pace with the rate of technological change.

The evolution of CADD, BIM, and other electronic design tools is claimed to be a tremendous boon and opportunity for most A/E firms. CADD and related tools theoretically allow design professionals to work faster and more efficiently, while providing the client with a better quality and more accurate product. Moreover, the use of electronic mediums also offers design firms an opportunity to expand their scope of services. With only minor modifications, electronically-generated design documents can be modified to meet clients' other needs, such as

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facilities management and planning. BIM may or may not hold similar incentives and opportunities.

As with any such rapid and radical revolution, the growing use of technology in the A/E practice and the introduction of so many new technologies raise previously unrecognized risks and liabilities. Few of these concerns have to do with the creation of the design itself. For example, CADD design is essentially the same traditional design process which simply replaces the pencil with a mouse, while BIM takes existing forms of collaboration and input and compresses them into a single storage facility through the medium of technology. As a result, the new concerns focus primarily on the compatibility of various systems and software, the transmission of electronic information, potential degradation of electronically communicated information, potential misuse of electronically-communicated information, and redefined design roles and responsibilities. None of these risks is so threatening as to justify not utilizing CADD, BIM, and other evolving electronic technology. However, each warrants recognition and a well-reasoned response of practice management and contractual provisions.

The following discussion will begin by addressing an overall approach to electronic design concerns. This paper then addresses some of the concerns related to the emerging and expanding use of project websites, and self-effectual and collaborative design software such as BIM.

ELECTRONIC DESIGN CONSIDERATIONS AND STRATEGIES

1. TECHNOLOGY ADOPTION

The first and perhaps most challenging decisions are how and when to embrace the potential of new technology. New and innovative technologies, tools, and processes represent the next step in defining and managing the standard of care relative to innovation. While these are often new and proprietary to a particular provider such that the requisite combination of reliance and validation should be well thought out, they go further into the standard of care by actually becoming a part of how the design professional provides its service.

Design professionals have clearly been the beneficiaries of technological advances in the tools of their trade. The evolution from the slide rule to the calculator to computer modeling to CADD have all helped design professionals provide their services faster, better, and less expensively. As new tools and processes for design delivery are presented, design professionals face an inherent trade off between opportunity and risk. The opportunity to be, and to be perceived as, "cutting edge" and to provide services better and less expensively is obvious. The risks are less obvious:

- The first has to do with transition costs associated with moving the practice to the new tool and process, in comparison to the actual benefits attained and the staying power of the technology. For example, CADD has obviously established its staying power in the industry over the last quarter century, and has truly become the way practice gets done. By contrast, project websites and extranets which were touted to be the wave of the future for all projects have generally failed to become central and transformative in the industry.

- The second has to do with timing. Move to a new technology too early and a design professional may be plagued by defects and interoperability issues without significant recourse.¹ This clearly implicates the reliability of the provider as well as the capacity of the professional to externally validate the technology and its output. Alternatively, if the design professional moves to the technology too late, the design professional may be deemed to be behind the curve of the “ordinary” professional and thereby below the standard of care.

As a generic rule for purposes of applying the professional standard of care to a new technology or process, the key is to embrace the available processes and technology no later than when they become “ordinary”, but to retain and continue to apply the professional skill and judgment consistent with the training and licensing. The “tipping point” for these purposes is seldom a bright line, but may most easily be tied to some perspective that the technology or process is used more often than not under similar circumstances. At the same time, even when a tool of technology becomes part of common usage, it is imperative that the design professional continue to apply its experience, skill, and knowledge to verify and validate the output data. As a classic example, many structural engineers have been criticized for virtual blind reliance on structural design calculation programs without also applying the scrutiny and validation of their own professional learning and experience. Similar criticisms have arisen through the use of software provided by proprietary product manufacturers. In many ways, technology and processes which streamline the design process through actions occurring on microchips require more, not less, professional understanding, judgment, and insight.

2. ELECTRONIC INFORMATION EXCHANGE

During the course of a project, electronic information and documents may be transferred to and received by a variety of project participants. Broadly stated, these participants may be grouped into three categories: (1) other design team members; (2) clients; (3) and third parties such as contractors. Although the practice and risk management issues relative to each group touch on many similar themes, the actual exchange of electronic information with each group

presents unique concerns and challenges. Accordingly, each group of potential recipients should/must be approached separately. A separate File Transfer Protocol ("FTP") should be thoughtfully adopted and followed for each group.

A. Design Team Members

The starting point has to be the design team. If each and every design team member is not prepared to handle the electronic information and document demands of the project, there will be problems in the delivery of the design product, and issues relative to the client and third parties only become matters of damage control. The growing use of and experience with project extranets, project websites, and even BIM makes this absolutely clear. Accordingly, the FTP for the design team should be established in advance of the project and will ideally be included within the contractual obligations of the design team members.

i. System and Software Compatibility

The first and foundational concern of electronic design is the adequacy, longevity, compatibility, and integrity of the various system components. Systems and software may have their own glitches and may not be able to perfectly or completely read/translate a product generated by another program or system. These potential problems are particularly acute during the current era, as hardware and software are continually evolving while the acquisition of such evolutions is unevenly distributed between firms. The errors created by such software "defects" are often not detected until after the design is complete.

Even though not technically "caused" by the responsible design professional, such errors may lead (and have led) to design liability. This problem is particularly significant because virtually every software licensing agreement has a limitation of liability which narrows the software provider's exposure to replacement of the software. Clients are generally unsympathetic to such limitations. The consequences can be significant. In one case, a glitch in a cost-estimating program cost a firm \$2 million without any recourse against the software provider.

These concerns apply both to a design firm's internal systems and to those of outside recipients expected to receive electronic versions of the design product. **Each must be analyzed separately.** The time and effort necessary to coordinate the system and software compatibility with an outside recipient of electronic design documents is a category of services which should be considered in preparing a plan of action, proposal, and fee estimate for a particular project.

To manage these concerns, a design professional should:

- Select software with the fewest limitations on liability;
- Select proven software with a proven track record and anticipated long-term viability. If not proven, thoroughly scrutinize program and advise client;
- Verify at the outset of the project that all the software programs being used by design team members are compatible with one another, as well as with all those required by the client. If the client intends to share the work product with third parties, the compatibility of those third parties' software and systems should also be verified. Ideally, this will be accomplished by request and receipt of a signed verification of compatibility wherein the other party accepts responsibility for such verification; and
- Conduct tests if there is any doubt as to compatibility of programs.

ii. **Transmission or Translation Errors/Corruption of Information**

Regardless of whether or not the transfer takes place on a disk, external drive, or via e-mail, the potential for transmission errors or subsequently-created electronic glitches is enormous. The liability risk is even greater. Similarly, information transferred from one program to another may not translate the information completely or comprehensively.

In the transmission of electronic documents, a host of possible errors can occur. For the transfer of drive-stored material to proceed without error, all of the following must occur:

- The computer from which the material is downloaded must be fully operational and defect-free;
- The drive onto which the material is copied must be defect-free;
- The drive must not be subject to any physical or magnetic forces during transit that would alter the information on it;
- The information on the drive must be compatible with the recipient's computer software and hardware; and

- The recipient's computer must be fully operational and defect-free.

At any of these stages, critical errors that are difficult to detect could be included in the data. Similarly, electronic transfer of data via e-mail can encounter all of these problems, and more. Once the information is utilized by the recipient, there are even more possibilities for error. The electronically-transferred design data can be altered or damaged by the recipient. Exacerbating each of these risks is the possibility that the recipient is using the software improperly, and small glitches therefore often go undetected.

In most respects, liability risks arising from information transmitted to the design professional are similar to those which existed before the CADD evolution. Whether generated in print or electronically, insufficient or incorrect information provided to the design professional by others may lead to a defective design product. However, with computers, A/Es must now verify that the information provided to them electronically is identical to that which the other party intended to transmit.

New liability exposures arise first and foremost because the electronic transfer of data is often not documented. Even more seriously, the information can be deleted from the recipient's files so that data (as well as any record of its receipt) may be lost. In addition, unlike written copies that clearly reflect changes, computer data can be modified and bear no evidence of the modification. When liability issues arise, one must trace the design data to its source. If A/Es are unable to prove they relied on particular information provided by others, they may bear the loss. Therefore, procedures to document the receipt of information electronically, as well as a means of retaining a copy of the information "as transmitted", are critical.

Some of the key FTP steps for information received by or transmitted between design team members should be as follows:

- For information received from outside sources (such as clients and separately retained consultants):
 - A contractual provision providing that the design team may rely on such electronically-transmitted information as well as providing for responsibility in the event of errors in the information or the transmission of the information.
 - A review procedure to assure that the information received is in a format and uses software which the A/E is comfortable to apply. If necessary (and often as a general rule), request a hard copy of the electronic information for verification purposes.

- A procedure to review the information as soon as possible after receipt to identify any obvious transmission errors.
 - A representation from the sender as to what the information is intended to represent and its intended use.
 - A transmittal log of all electronic files sent and received.
 - A procedure to document/record the information received, either in hard copy form, electronically, or both. In creating such procedures, carefully consider whether electronically-preserved information will be genuinely and usefully accessible five years, ten years, or more, into the future.
- For information exchanged among the design team members:
- Procedures for the timing and format of electronic files, including the software and means of transmission.
 - Procedures to assure that each design team member is working from the most current version of the applicable documents and identification of what those documents represent.
 - Procedures for tracking and documenting the evolution and transmission of documents and information (*e.g.*, transmittal logs and document version tracking tools).
 - Requirements that within some defined time period following receipt (*e.g.*, 72 hours), the applicable design team member will review the documents received for obvious transmission errors.

iii. **Security**

Where information will be available for electronic access, such as on a project website or a firm home page, security measures must be established. The primary issues are: (1) who will have access; (2) how will access be controlled (*i.e.*, by passwords?); (3) who will have “read only” rights; (4) who will have downloading rights; and (5) who will have rights to add to and/or alter what material. Such procedures must be agreed to, reduced to writing, and distributed in advance of the release or availability of the information.

iv. **Outside Contacts**

Finally, the design team's own FTP should expressly provide who is authorized to receive and convey electronic information to and from the client and third parties, and how such exchanges are to be documented and shared with the other team members.

B. **OWNER CONCERNS**

Many (or even most) owners now expect and demand that the design will be done electronically and that they will receive access to the electronic design documents. In such a situation, the most important issue to resolve at the outset is to identify the owner's expectations and intended uses of those documents. Most often, owners want access to and copies of electronic documents to monitor and/or participate in the design process, to create a project archive, to use the documents on subsequent projects, to provide copies to third parties, to create a set of record "as built" drawings, or to serve as a basis for facility management. Depending on the project, these various uses may or may not be realistic, and may or may not impose additional burdens on or present additional opportunities to the design team.

i. **Identify and Document CADD/Electronic Expectations**

The very first and most important step with any client is to address the issues of CADD and the exchange of electronic information and documents at the outset of the contract. This discussion should take place **before** any work has begun and **before** the contract for services is finalized.

Depending on the relative sophistication of the client, explain the opportunities, limitations, and risks of CADD and the electronic process. Once the client has been adequately educated, focus on what electronic information and documents the client really wants and then work with the client to make those expectations realistic. This discussion presents both an opportunity and a danger to A/E firms. The opportunity is to demonstrate sophistication to the client and to expand the scope of services to meet the client's desires for electronic information. The danger is that the A/E firm may agree to furnish more than the electronic documents can actually provide and/or fail to account for the time and fees associated with those services. The most frequent area of client misconception is the realistic and long-term accessibility and utility of electronic design information.

Once these discussions have clarified the parties' expectations and obligations for electronic documents, the details should be included in the Service Agreement with the client. Specifically, the client's expected uses and the agreed-to electronic deliverables should be expressly set forth in the contract. The contract should also provide that:

- The hard copy is the deliverable and therefore controls;
- The electronic documents are provided at the client's risk as a courtesy; and
- The electronic documents are not warranted beyond the completion of the project or for any purpose not expressly contemplated by the Agreement.

If the intended uses include the client's input into the design process, clear procedures should be established for the timing and format of that input. For example, how long does the client have to comment and how will that input be communicated and to whom?

ii. System Compatibility

All of the same system compatibility issues which exist between the design team members apply equally to any client who will receive electronic information. In fact, they may be worse because the client is less familiar with the technology. Accordingly, as with the design team, the client and prime A/E should discuss the software and programs anticipated for the project. This may generally be accomplished in one of two ways. Ideally, the A/E will simply identify the programming it uses and shift the responsibility to the client to make certain its own system is compatible. Alternatively, the A/E may take on the responsibility of coordinating the compatibility of the systems. If this latter approach is taken, the A/E should avoid guaranteeing or warranting the compatibility, and should make certain that the time and expense of this process is adequately built into the fee and schedule.

iii. Transmission Errors/Document Corruption

Transmission errors and subsequent document corruption are concerns applicable to all electronic transmissions, including those to clients. Accordingly, the key FTP steps for information received from or transmitted to the client are similar to those applicable to communications between design team members. These steps should include:

- A contractual provision providing that the design team may rely on electronically-transmitted information from the client or the client's representatives, and providing for responsibility in the event of errors in the information or the transmission of the information.

- A contractual provision that, although electronic documents may be delivered to the client, the hard copies of those documents shall be the controlling documents. **Wherever possible, do not agree to provide an electronic seal to the documents.**
- A contractual provision providing who the client may communicate with electronically, and procedures for such communications. These provisions should correspond to policies established between the design team members.
- A contractual provision providing to whom, if anyone, the client may forward the A/E's electronic work product. Ideally, the client should indemnify the A/E for any claims arising out of such transmission.
- A policy requiring that all design documents conveyed electronically to the client be accompanied by a statement describing the document, its permissible uses, and its relative stage of completion.
- A requirement that the client is to review the information within some defined time period (*e.g.*, 72 hours) to identify any errors in the transmission or information.
- A procedure to document/record the information received, either in hard copy form, electronically, or both.
- A self-executing remedy to address failures to follow these procedures.

iv. **Defining "Deliverables" and Protecting Compensation**

A/Es have traditionally defined discrete moments when information is transferred and a right to payment is established (*i.e.*, delivery of schematic drawings, design development drawings, and working drawings). Client approval sets the parameters for the distinction between "basic" and "additional" services. Post-approval changes entitle the design professional to increased compensation.

With computers, it is possible for clients to be "on line" throughout the design process and to have available all interim design data. As a result, delivery of the design product is made on a continuous basis. The clear lines between "schematic", "design development", and "working" drawings are easily muddied, especially when clients are technically competent and

desire to work along with the A/E. With the rhythm of approval and payment disrupted, and with control over design products lost, the A/E's risk of nonpayment increases. It is therefore imperative that these issues be specifically addressed in the contract. In particular, the contract must incorporate language which not only defines "deliverables" but ties payment to the "deliverables". The precise approach will depend on the nature of the project. Consistent with this approach, clear records should be created to document the progressive deliverables.

The use of in-process design data also creates liability concerns. Assuming the client is willing to pay for the work performed to date, is the client entitled to make use of less-than-final design data in order to speed up a project without agreeing to relieve the A/E from liability for errors and omissions existing in the not-yet-finalized documents? This is an issue that needs to be addressed in the contract. If the client is to be entitled to use such incomplete documents, the A/E's liability should be appropriately limited and the client should be obligated to retain another A/E who will serve as A/E of record.

v. **Ownership and Reuse**

Without question, the greatest financial and liability concern has to do with the unauthorized use of electronic design documents. Anyone with the right software (or even the wrong software) can access and modify an electronic document. Such access to the documents presents a myriad of concerns. When a design work product can essentially be stolen, the first impact on the design professional is the loss of potential fees and revenues. When the reused design is actually used in construction, it may still be traceable or linked to the design professional and thereby become a source of potential liability. What is an A/E to do?

In the United States, design professionals are theoretically protected by Federal copyright law. The creators of "original work of authorship" (such as plans, specifications, or a building design as embodied in a completed structure) are entitled to statutory protection against unlawful copying of their work. A copyright protects the right to:

- Reproduce working copies;
- Prepare derivative works based on the work;
- Distribute copies of the work to the public; and

- Publicly perform or display certain types of works. (In terms of plans, this can mean the construction of the building reflected in the plans.)

A copyright is established automatically when any written or visual work is reduced to a hard-copy form or a recording. Although it is advisable to do so, the indication of a copyright and the copyright owner does not necessarily need to appear on the document. Similarly, no registration is required to establish the copyright. However, owners have the right to register copyrights with the Federal government. If the copyright is registered before an infringement of the work occurs, the author can recover attorneys' fees and statutory damages (which can be as much as \$100,000 per illegal copy).

When the design product is created, modified, or transmitted with the use of electronic processes, additional issues relating to copyright protection must be addressed. Although the treatment of these materials under copyright laws will not differ from the treatment of a hard copy, the opportunity for the owner to alter, adapt or transfer the materials may be significantly greater. This leads to the obvious question of how to copyright electronically-stored data or design information. In general, regardless of whether or not the design professional has provided the owner with a set of the hard copy or electronic plans or drawings for use on the project, the A/E retains ownership rights unless otherwise agreed in writing.

Nevertheless, every A/E agreement with clients should address the ownership of all copyrights as well as any rights to use or make copies of such documents (a.k.a. licenses). Ideally, such a provision will provide:

- The A/E retains all copyright and other intellectual property rights in the design documents;
- The client and specified additional parties are granted a license to copy and use the design documents solely for the subject project;
- That no alterations or modifications to the design documents shall be made without the architect's express written consent;
- The design documents may not be used for any purpose other than that expressly contemplated by the agreement without the A/E's written consent; and

- Client shall hold harmless and indemnify the A/E from any unauthorized use or modification to the design documents.

If the client insists on becoming the owner of the final design documents, his or her ownership rights should include restrictions on unauthorized uses and modifications, as well as supporting indemnity provisions and liability waivers.

vi. **Risk Allocation**

Finally, some errors or omissions inherent in a design process and in an electronic transfer of design data cannot be completely avoided. The issue becomes who bears such risks. The A/E must necessarily bear the risk of internal operations (*i.e.*, employees' errors in conceptualization, documentation and transmission). However, the risks in the electronic transfer of information, and the improper use of that information by others, should be borne by others who control that risk. Many of these issues can and should be addressed at the outset of the project in the form of contractual commitments.

Many such provisions have been identified above (*e.g.*, indemnity provisions). However, there are other contractual provisions which may and can affect potential liability. In particular, careful consideration should be given to such issues as insurance commitments by the A/E and others, schedule commitments, liquidated damages provisions, and force majeure provisions. (*Note: Any A/E acting as a subconsultant should consider these issues both as to the owner and the prime A/E.*)

C. **THIRD PARTY CONCERNS**

Third parties are strangers to the relationship between the A/E and the client. Such third parties present a particular concern if they receive copies of the A/E's electronic work product. Such parties may include contractors, separately retained consultants, lenders, tenants, and subsequent owners. Such parties do not have a contractual relationship with the A/E and are therefore not contractually limited in their uses of the documents. If it is necessary to provide a third party with access to such electronic documents, careful consideration should be given to protective measures before access is granted. Relevant issues to consider are as follows:

System Compatibility. All responsibility for system and software compatibility should be placed on the third-party recipient. The A/E's sole responsibility should be to identify its own program and method of transmission.

Transmission Errors. Similarly, all risks of transmission errors should be, for such things as shop drawings, placed on the third-party recipient. In the case of contractor's using

the electronic documents, this will help lead them to conduct some form of reasonable analysis of the documents.

Authorized Uses and Modifications. The authorized uses of the documents should be expressly identified. Similar restrictions on the use, reuse, and modification to those imposed on the client should also be imposed on any third-party recipient. Consider precluding any further transmissions.

Compensation. Transmittal and interaction with third parties may also lead to additional costs and expenses. If so, such costs and expenses must be allocated to and paid by **someone**. The A/E should clarify this before transmitting the documents.

Risk Allocation. Such transmittals should also have the protection of contractual risk allocation provisions. In particular, the recipient should agree to indemnify the A/E for any unauthorized use, misuse, or modification.

Ideally, each of the foregoing will be reduced to a written Agreement prior to the transmission of the document. However, if such an Agreement cannot be achieved, the transmittal should be accompanied by an attendant document which sets forth these or similar provisions and provides that any and all uses are subject to these restrictions.

PROJECT WEBSITES AND EXTRANETS

The most surveys indicate that only one of four firms is currently involved in projects utilizing a project website or extranet. Those who are using project websites are generally only using those websites on a minority of their current projects. Nevertheless, "experts" continue to predict that project websites will become the norm for both design and construction administration. As a result, firms must be prepared to address the technology and risk management issues presented by the use of such technologies.

All of the risk management concerns presented by electronic design generally are equally applicable to design and project management through a project website. However, the context of a project website also presents a number of additional considerations and challenges which are discussed below.

1. TO HOST OR NOT TO HOST

The first question is: Who will be responsible for selecting, programming, and administering the project website. Such "web masters" may unwittingly become responsible for many risks far beyond their control and risks which may not be covered by applicable insurance coverage.

Regardless of whether or not acting as the website host, every team member should be concerned with the selection of the website provider. While this presents a number of issues, two are more important than the rest:

- Obviously, the first question has to do with the quality and capacity of the software. Does it provide the necessary tools and structure? Does it meet the needs of the project? Is the software sound and reliable? Is the provider secure? Is the provider well managed and available to respond to questions and issues? Does the Licensing Agreement so limit the providers' liability as to render them judgment proof? Such questions are really no different for a website provider than they are for any software provider.
- The second and more potentially devastating concern is the viability and portability of the website provider. As demonstrated by recent literature and promotional materials, the website provider industry is currently experiencing tremendous competition by a number of providers all seeking to get the upper hand on the market edge. Common sense says that eventually one to three providers will emerge victorious. When they do, what will happen to all those using the other sites? Will the information be transferable? Will the site continue to operate to the completion of all pending projects? Can the site be operated independently of the provider?

Aside from the technical considerations, the agreements with such providers should avoid extreme limitations of liability and should provide that the system (or software) necessary for operation of the site will be continuously maintained throughout the duration of the project.

Once the provider is selected, the next natural question is: Who will be responsible for hosting the site. Natural candidates for such responsibilities are the architects, engineers, and construction managers. On first impression, such a role seems attractive. It keeps the host in the loop on all relevant communications and may provide the opportunities to capture additional services and projects. However, such a role should not be entered into lightly. Such a role may present a number of new and potentially significant liabilities:

- Does the host become responsible for the selection and programming of the site? Appropriate disclaimers should be included in the Agreement covering these services to carefully define what is and what is not included in this scope of services.
- Does the host become responsible for the coordination of all communications on the site?
- Does the host become responsible for the content of all communications on the site? If so, the host could potentially become responsible for job site safety which is discussed during the construction administration phase. Similarly, the host could become responsible for any copyright violations, defamation, harassment, or other wrongful acts taking place on the site. Accordingly, the Service Agreement should again expressly define the responsibilities of the host and disclaim responsibility for such issues. Since such disclaimers will not necessarily be binding on injured third parties, there should also be strong Indemnity Agreements to govern these points. The host should also consider posting admonitions against such communications on the site.

The natural corollary to the concerns discussed above for the host is that any site participant should take steps, both contractually and otherwise, to make certain they are not held responsible for any of these issues.

A final question relates to whether the typical professional errors and omission insurance policy covers activities as a website host. Most policies would not traditionally cover claims arising out of software programming, copyright violations, or similar issues.

2. SECURITY

Although part of the overall selection of an appropriate web site provider, one concern worthy of special consideration is security. To be reliable and thereby useful, a website and its contents must be secure. Such security is also critical to each team member's need to maintain custody and control over its work product. Properly considered, such security must take place on two levels.

The first and most obvious level is the outside world. As a general rule, the public should be given access to the site only under the most careful of controls. Where the public is given access to the site, effective barriers should exclude them from the working areas of the site. The preferred approach where public access is desired would be to establish a separate site for the dissemination of public information.

The second level is within the design and construction team. Although the needs and strategies will vary from firm to firm, generally each firm should provide its design input on a “read and copy” basis only so that it cannot be altered by another party. For those receiving such documentation, they should take steps to preserve a record of what information they have received and from who.

3. WHAT IS THE DESIGN AND WHO IS THE DESIGNER?

An inevitable result of the move to project websites and their supporting software is the blurring of the lines between design disciplines, contractors, and vendors. As information from all three sources becomes merged into integrated documents, the lines of responsibility inevitably become blurred. As a result, new and more detailed definitions of design responsibilities and design deliverables to reflect the realities of electronic design are necessary. For the design professional, this should include the following:

- Clear definition of the design deliverable and responsibility, including the controlling form of such deliverables (preferably paper);
- Clear definition of the design input of others, along with a clear description of any coordination or review responsibilities on the part of the design professional (*i.e.*, are incorporated submittals part of the design? what is the design professional’s responsibility for them?). Client Agreements should expressly provide that the design professional may rely on this information unless it becomes aware that it is incorrect or faulty, in which case the design professional’s sole obligation is to refer it back to the source for correction. Client Agreements should also require the client to look to the responsible party in the first instance;
- A clear disclaimer that the design professional is not responsible for anything not expressly encompassed within the descriptions above;
- A clear definition of the design professional’s construction phase responsibilities;
- A schedule and procedure for preserving the project in “snapshots” such that the status of the project is recorded and archived at appropriate intervals; and

- Provisions for the ownership of the website documents and the modification and reuse of such documents.

4. DOCUMENTATION

Project websites generally present even more extreme documentation challenges than do electronic design technologies. For example, all relevant documentation may not be contained within the website itself. Rather, the website may simply serve as a portal to other websites where relevant information is stored. The challenge becomes how to appropriately document the progress of such a web-based project. At a minimum, the relevant contract should provide that all project participants maintain copies of their records for a specified period of time. In addition, the status of the project in general (and the website in particular) should be documented at contractually agreed-to intervals. At a minimum, such “snapshots” should be maintained electronically, with particularly relevant portions reduced to hard copies.

5. BUILDING INFORMATION MODELING

The latest and greatest craze with respect to the design process and innovative technology is unquestionably Building Information Modeling (“BIM”). While the press is filled with reports of the rapid expansion of BIM usage by design professionals, contractors, and others, BIM has certainly not reached the tipping point of “ordinary” for purposes of the standard of care. Even most heavy BIM users in 2008 generally used BIM on only 30-35% of their projects.ⁱⁱ The AIA B101 from 2007 seems to make the non-prevalent application of BIM clear by making both Building Information Modeling and “preparing digital data for transmission” solely and exclusively additional services outside the scope of the Agreement.ⁱⁱⁱ Yet if current trends continue, BIM will become “ordinary” in some circumstances, and thereby dramatically redefine the tolerances of the standard of care in at least those settings.^{iv}

There is disagreement as to whether there have been claims against design professionals based upon the usage of BIM. However, many experts and publications claim that: “It’s only a matter of time.” When they do, some predict that design professionals and their contracts and practices are ill-equipped to deal with them:

... until new risk management techniques have been worked out and new contract language has been developed to allocate more of the risk to the project owner and other parties instead of leaving all the risk with the design firms, BIM poses a serious new risk to design firms and the insurance carriers that insure them.^v

To a great extent, such foreboding and worry comes from a lack of clear boundaries of the design professional's responsibility and standard of care, to the extent BIM-based designs incorporate information from outside sources (*e.g.*, manufacturers, vendors, and contractors) as a part of the multi-dimensional model. Restricted to its simplest application as a tool of the design team alone, BIM should not create such concerns for external responsibility, and the product should be a better design product. Under such circumstances, the key is to determine when to open the model to use, contribution, and manipulation by others, and what happens thereafter. The key is to transfer primary overall responsibility for the model at that point.

Where there is earlier input and contribution to the model by others, it is really little different than traditional issues associated with design-build elements, submittals, and substitution requests. In those situations, good risk management practices both establish the design professional's right to reasonable reliance, and appropriately allocate ultimate responsibility to the proponent. Ideally, BIM-based projects or documentation will make this clear, but even where they do not, extension of these long-held principles may be the basis for containing the BIM-based standard of care for design professionals.

Yet even now and even with limited usage, BIM has and will impact claimants' characterizations of the standard of care and the design professional's failures to exploit "readily" available opportunities. The great challenge and exposure is that BIM offers and boasts a qualitative capacity to improve both design and construction, which is more dramatic and transformative than any technological innovation of the past. Most prior innovations in process and technology simply allowed design professionals to work faster and more easily. BIM proponents claim:

BIM utilizes cutting-edge digital technology to establish a computable representation of all the physical and functional characteristics of a facility and its related project/life-cycle information, and is intended to be a repository of information for the facility owner/operator to use and maintain throughout the life cycle of a facility.^{vi}

By itself, this is a grandiose statement with both immediate and long-term implications. However, the real threat for purposes of the standard of care today are the promised improvements in the quality of the design and the corresponding benefits to the construction process, schedule, and expenses. One design professional insurer has unequivocally stated:

With BIM providing better coordination and detection of conflicts in structures and systems, design firms can avoid many of the construction document problems that lead to delays and change orders during construction. Even on a traditional design-bid-build project, increased communication and collaboration, more

efficient fabrication and delivery time, and improved documentation can reduce the overall liability exposure of the project participants.^{vii}

Such declarations of having used BIM as a solution to some of the most common and expensive design errors and omissions are fertile ground for an owner or contractor impacted by expensive change orders, delays, and cost overruns. To those design professionals who do not even use BIM, they will say that with \$10,000 and some training, all of these woes and damages could have been avoided. For those design professionals who apply BIM resources to some, but not all, projects, the scenario will be even worse. Their work will be held up against other “similarly situated professionals” who have BIM capabilities, and even against their own work on other projects where BIM was used.

As a result, many experts, claimants, and industry pundits have and will declare that BIM has already changed the standard of care. Yet it cannot really be true because BIM is not “ordinary”. Economies of scale, technology investments, compatibility with project participants, and reasonable returns on effort maintain BIM as the exception rather than the rule. In fact, for some project types and locations, it may *always* be the exception. Nevertheless, the potential criticism based on the missed or ignored opportunity for a better design product will always remain significantly appealing to juries, judges, and arbitrators. It has become common in such claims for claimant experts to actually model the project using BIM and to visually demonstrate the multitude of issues which could have been avoided in advance.

To address and defend such allegations and claims, design professionals along with their attorneys and insurance carriers may begin by a focus on the “ordinary” professional who remains primarily non-BIM. For that standard, BIM is not “ordinary” as in the common application and, therefore, is not a part of the standard of care for the ordinary and reputable practitioner. However, they may well find even more fertile defensive sanctuary by focusing on the ultimate restriction common to most standard of care provisions – “same or similar circumstances”. Simply stated, the use or non-use of BIM may alone be one such defining circumstance. If it is a non-BIM project, it cannot and should not be compared to a BIM project. Similarly, the project type itself may also be a circumstance which would preclude an elevation of the design standards through a BIM expectation. BIM is most commonly used on large institutional or industrial projects with heavy and intricate MEP requirements. By contrast, it is relatively rare with respect to small residential or simple infrastructure or commercial projects. In the latter categories, BIM may not be even appropriate as a “same or similar circumstance” consideration. Similarly, the project participants and their capacity to take advantage of the BIM system may also limit the comparison.

Of course, the foregoing characterizations are all after the fact and are far from a certain distinction from claims that use of readily-available BIM models could have saved significant time and project upset. As a result, the issue should be discussed with the client and documented as a part of the project expectations in the Agreement. The AIA B101 has accomplished an implied form of this disclosure and confirmation by expressly making BIM and digital information "Additional Services" and therefore not a reasonable expectation. Even better would be a provision which expressly identified the hard-copy instruments of service as the project deliverable, and which eliminated any client expectation in the electronic design models for the project. Such a clause might provide:

Hard copies of the construction documents carrying Consultant's professional stamp shall represent the instruments of service and deliverable under this project. All other copies (printed or electronic) are for convenience only and shall not be relied on for any purpose. The use of any electronic drafting programs or other software in the preparation of the instruments of service is at Consultant's sole option for its own benefit and is not intended to create any rights or expectations on the part of Client.

The combination of utilizing such a provision, with the AIA model expressly making BIM an additional service, should eliminate any reasonable expectation or claim that the client was entitled to the benefits of a BIM study.

Where BIM is used on a project, it is equally important to document the key assumptions, expectations, and procedures. The key would be to document the mutual expectations and future uses. Above all, it is important to reasonably temper client and contractor expectations by making clear that:

- BIM by itself is only a technology and does not equate to Integrated Project Delivery, which embodies another level of procedure.
- BIM is neither perfect nor a warranty of perfection. The client must understand there will still be conflicts, ambiguities, unforeseen conditions, and changes such that they must expect and establish reasonable contingencies for both cost and schedule.
- Participants in the BIM model must be identified along with their roles, contributions, and rights of access, modification, and use. This process becomes dramatically more complicated as the circle of participants expands beyond the design professionals.

- Responsibilities must be established. Most often, this will focus on a single entity responsible for the model or a collaboration with each contributor responsible for its content, along with a process and schedule for input and validation.

ⁱ As an example of technology-related risks of reliance, the Washington Supreme Court upheld the liability limitations in a software license agreement even though an alleged defect in the software caused a contractor to underbid a project by \$1.95 million. *M.A. Mortenson Co., Inc. v. Timberline Software Corp.*, 140 Wn.2d 568, 998 P.2d 305 (2000).

ⁱⁱ *Builders say BIM can be competitive tool during recession.* Daily Journal of Commerce, January 26, 2009, citing in part to a McGraw Hill Construction report.

ⁱⁱⁱ AIA B101 2007, Articles 4.1.6 and 4.3.1.5.

^{iv} "BIM! You've Been Sued!", STRUCTURE, February 2009.

^v J. Kent Holland, Publisher, *Construction Risk.com Report*, Vo. 9, No. 8, December 2007.

^{vi} Nat'l. Inst. Of Building Sciences.

^{vii} *BIM May Reduce Design Exposures but May Create Technology Risks*, Victor O. Schinnerer & Company's Risk Management Guideline No. 2 for 2008.