



**BUILDING INFORMATION MODELLING:
THE LEGAL FRONTIER –
OVERCOMING LEGAL AND
CONTRACTUAL OBSTACLES**

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Building Information Modelling ('BIM') is not a recent innovation in the construction industry, having been in use in the US for around ten years, but it is only now starting to gain significant traction in the UK. This has been largely driven by the Government's 2011 Construction Strategy which mandated a requirement of 'fully collaborative 3D BIM' for government projects by 2016.¹ The implementation of any new process throws up a host of interesting legal challenges, especially in an industry as multi-faceted as construction. This paper seeks to set out a contractual framework or checklist of contract (or appointment) terms for use in any BIM-enabled project.

A. What is BIM?

In addressing the legal and contractual obstacles to BIM implementation, a suitable starting point would be to define Building Information Modelling or 'BIM'. In point of fact, a more accurate description of BIM would be Building Information 'Management', as the term 'Modelling' often creates mistaken assumptions that BIM refers only to the 3D models that form one part of the BIM process,² whereas BIM in fact refers to an entire process of information generation and sharing, and distinct changes of process in design, construction and facility management.³

The BSI defines BIM as

'... the process of generating and managing information about a building during its entire life cycle. BIM is a suite of technologies and processes that integrate to form the "system" at the heart of which is a component-based 3D representation of each building element; this supersedes traditional design tools currently in use.'⁴

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- 1 Cabinet Office, Government Construction Strategy, May 2011 available at www.gov.uk/government. This formed one of the Strategy's main measures to achieve 10-20% cost savings.
 - 2 An assumption that has had to be dispelled as the issue of BIM becomes more widely debated. One respondent in a LinkedIn discussion suggested a better acronym would be AIM, for Asset Information Management; this is arguably a more accurate description.
 - 3 Chuck Eastman, Paul Teicholz, Rafael Sacks, Kathleen Liston, *BIM Handbook – A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors* (2nd edition, John Wiley & Sons, 2011).
 - 4 See A <http://shop.bsigroup.com/Browse-by-Sector/Building--Construction/Building-Information-Modelling-BIM>.

B. The existing standard form contracts and BIM

The most popular standard form contracts remain the Joint Contracts Tribunal (JCT) and NEC Engineering and Construction Contract (NEC3) suites of contracts.⁵ However, these standard forms have not introduced comprehensive BIM contractual terms to address the new needs of parties' relationships in a BIM project.

For example, in response to the Government Construction Strategy, the JCT published the Public Sector Supplement in September 2011, updated in December 2011.⁶ Despite the prominence given to BIM in the Government Strategy, the Public Sector Supplement does not deal with BIM in any detail, and the clauses relating to BIM are in effect simply a reference to the inclusion of a BIM Protocol as a contract document, such as part of the employer's requirements or as a numbered document.⁷

Like the JCT Public Sector Supplement, the NEC Guidelines⁸ also expect there to be a comprehensive BIM protocol containing all technical issues relating to BIM, but with some very limited amendments to the NEC3 contracts themselves. It has not addressed the consequential impact of these limited amendments.⁹

So one can see how, rather than address the problem head-on, JCT and NEC3 appear to try to side step the issue of BIM's impact on contracts by proposing simply the addition of a BIM protocol, which would set out BIM procedures and duties. However, in the writer's view, the UK standard form BIM protocols are not sufficiently comprehensive.

For example, the AEC (UK) BIM Protocol, rather bluntly states: 'Legal Stuff – Not included in this release'.¹⁰ This would therefore, if used, need extensive BIM contract terms added to the body of the contractual documents.

The CIC BIM Protocol, developed with Government backing, is an attempt to create a protocol that could be used widely across the industry, thereby addressing JCT's and NEC3's requirement for a standard form protocol.¹¹ The CIC Protocol does not, however, provide a complete BIM contract

5 For JCT contracts, see www.jctltd.co.uk and for NEC3 contracts, see www.neccontracts.com. In the NBS National Construction Contracts and Law Survey 2013, 48% of respondents used JCT contracts most often, and 22% used NEC3; the other standard forms had a far lower percentage, www.thenbs.com.

6 Obtainable from www.jctltd.co.uk. There is a Scottish-equivalent Public Sector Supplement.

7 No sample Protocol or further details as to the implementation of BIM are provided. The Supplement envisages that all the detail is intended to be contained in the BIM Protocol.

8 NEC Guidelines, April 2013: 'NEC3: How to use BIM with NEC3 Contracts' available from www.neccontracts.com.

9 See R Green, 'BIM update', which considers the potential consequences, such as additional compensation events, available at www.wragge-law.com (published articles, November 2013).

10 AEC (UK) BIM Protocol, version 2, September 2012, clause 4.3, available at <http://aecuk.files.wordpress.com>.

11 Construction Industry Council, Building Information Model (BIM) Protocol, 1st edition 2013, available at www.bimtaskgroup.org/bim-protocol.

document, and is not without its critics.¹² It appears to have insufficient detail in certain aspects. For example, the Protocol fails to address collaborative information sharing in the anticipated BIM common data environment¹³ yet the sharing of information is a fundamental aspect of BIM implementation.

C. Necessary clauses for a BIM-supportive contract

Whilst there are various BIM documents emerging in the UK, there are still far from any accepted default BIM contract documents or standards. Based on the writer's observations from research, interviews and discussions, the most important clauses for a BIM-enabled project contract are set out below in broadly divided categories.¹⁴ It is intended as a comprehensive set of clauses that should be considered for relevance against the specifics of the individual project when amending standard form contracts or protocols. It should of course be noted that not all contracts are created equal, and the number of amendments varies greatly according to the contract or protocol employed.

While this paper is primarily engaged with the amendment of standard form contracts, these clauses are equally relevant in the creation of bespoke contracts.

1. Clauses relating to process and data

At its simplest, BIM relates to processes (both technical and between parties) and data (eg models and datasets). Clear processes are imperative to establish certainty, efficiency and reliability. This section sets out the types of clauses which should cover the main issues arising in this area, and briefly explains the purpose of these clauses.

1.1. The models

- (a) **How are the models incorporated into the contract (ie contract documents or contract deliverables):** There appears no real need for models to be part of the contract documents. By their nature, the models will be evolving and changing over the course of the design period, and the writer questions how practical it is to make such a moving beast a contract document. One reasonable solution is to instead make the models contract deliverables in similar manner to 2D drawings under present arrangements.¹⁵ This ensures that the content and scope of the models to be delivered is formalised in the contract, without the complicated definition and interpretation of which models (and at which stage of evolution) will form contract documents.
- (b) **The information contained in the models:** The contract should specify what design information needs to be contained in the models, including

12 For example, Marion Rich, D Moore, and Rudi Klein, 'Will construction make the changes for BIM?', *Construction Law*, July 2014.

13 Mentioned by Rudi Klein, *Building Magazine*, May 2014 and Marion Rich, D Moore and Rudi Klein: note 12.

14 These are, inevitably, approximate divisions for ease of reference, and there may be points which straddle more than one category.

15 Therefore also lending familiarity to the process for the parties.

the level of detail required, and its intended use.¹⁶ What information will be provided for each delivery stage may depend on the employer's requirements.¹⁷

- (c) **Limitation and exclusions of liability:** It is presently not uncommon to seek to exclude any reliance on the models and BIM data provided. Logically, for BIM to fully function, whilst some limits are reasonable, these must be balanced against the need to enable parties to properly exchange information as envisaged and required by the BIM process. Conversely, the CIC Protocol provides that parties do not warrant the integrity of any electronic data delivered;¹⁸ in effect providing that parties are not able to rely on the data provided. It would be sensible to consider amending this. Conversely, the more disclaimers exist, the less likely people may be to use BIM. Reasonable limitations of liability and exclusion clauses will provide parties with comfort and clarity of positions, without compromising the efficacy of the BIM process.
- (d) **Implementation of design changes and variations:** Setting out the procedure for design changes and variations to be registered or notified to other parties once implemented into the models, to avoid parties relying on out-dated information. On a day-to-day level, the management of these notifications and storage of the latest model will be overseen by the BIM coordinator/information manager.
- (e) **Hosting, storage and security:** Detailing where the models are to be hosted and stored, and what security measures will be taken against data degradation, corruption and hacking (a particular risk for commercially sensitive projects). It may be sensible to specify the format and location of back-ups of the models and related data as well.

1.2. Timetable

- (a) **The timetable:** The timetable for production and delivery of the models and other BIM data (for example COB ie datasets), to ensure the scheduled programme for the works is met.
- (b) **The programme:** An express obligation to comply with the BIM programme, information plan and related time-sensitive matters will be a vital requirement, to ensure everything keeps on track and to schedule.

2. Clauses relating to interoperability

Interoperability problems arise when errors or loss of integrity occurs to the data as the different systems exchange information. Various commentators have noted that interoperability is a serious issue for BIM.¹⁹ A structure of

16 For example, design or construction.

17 The BIM Task Group's Digital Plan of Work, when ready, may be a good template for this as it is intended to set out project delivery stages and level of detail/definition to be delivered, see www.bimtaskgroup.org.

18 CIC BIM Protocol, note 11, clause 5.1.

19 For example, Olfa Hamdi and Fernanda Leitte, 'The Conflicting Side of Building Information Modeling Implementation in the Construction Industry', *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction*, vol 6, issue 3, August 2014, obtainable from <http://ascelibrary.org>; and S Hamil, 'Building Information

contractual procedures is needed to ensure, insofar as possible, that the project team's data and systems are sufficiently interoperable.²⁰

2.1 Type of software

To reduce the risk of interoperability issues, where practicable, an agreed set of compatible software and/or checking procedures to cater for known interoperability issues between the software intended to be used by the parties could be specified. Specified common standards and formats (eg using IFCs and COBie) for data exchange will reduce interoperability issues further. As a side note, the CIOB Complex Projects Contract makes the contractor entirely responsible for the suitability and integrity of the software selected, where it prepared the specifications.²¹

2.2 Testing and commissioning

Given the different software and processes used across the industry, it seems sensible to provide some express direction in the contract on the acceptable form of testing and commissioning and/or assessment and inspection of models and data at handover to confirm integrity and accuracy.

2.3 Clash detection and checking²²

Insertion of accepted procedure and safeguards for clash detection and checking should be considered to minimise the risk of errors in the data or models which will be copied and relied upon, 'infecting' all the information flowing from it (in turn leading to disputes, bringing an end to the collaborative process).

3. Clauses relating to standardisation and consistency

Many commentators and academics point to the importance of ensuring a standardised approach to implementing BIM, such as when sharing information.²³ Some architects informed the writer that the PAS suite of standards do not in fact, in their view, make it clear what is required to be Level 2 BIM compliant;²⁴ therefore simply specifying compliance with

Modelling and interoperability', NBS website, April 2012,

www.thenbs.com/topics/bim/articles/bimAndInteroperability.asp.

20 Hamdi and Leite, note 19, say contracts are the solution to deal with interoperability issues.

21 The Chartered Institute of Building, Contract for Complex Projects 2013, available from www.ciob.org. This approach appears harsh, but is consistent with employers' preference for one-stop-shop liability and may prove an attractive insertion into JCT contracts where it would work consistently with existing clauses on the contractor's responsibilities, although such a trend is not obviously apparent.

22 See Shona Frame, 'Contracts getting ready for BIM', (2012) 23 6 Construction Law 20, where she notes that the checking processes already in standard form contracts, eg JCT, may need alteration to match BIM processes in the protocol or other documents.

23 For example, Dharshana Navendren, Patrick Manu, Mark Shelbourn, A Mahamadu, 'Challenges to building information modelling implementation in UK: Designers' perspectives', www.arcom.ac.uk/abstracts (Proceedings of 30th Annual ARCOM Conference September 2014).

24 Publicly Available Specification, see www.bsigroup.com.

certain standards is insufficient. Considered below are the clauses required to secure standardisation as a whole.

3.1 Clauses specifying agreed standards

- (a) **RIBA Plan of Work 2013:** Parties should seriously consider incorporating the RIBA Plan of Work 2013 (which is BIM-ready). It provides a clear, free, flexible table to set out the various stages for a BIM-enabled project. The Plan of Work assists the effective implementation of BIM by helping standardisation, through the use of eight common stages which incorporate the main envisaged BIM processes, such as data briefing and soft landings.
- (b) **Use specified standards:** Whilst the available standards are not complete codes, it goes some way to standardisation to expressly require the use of the relevant BIM standards (such as PAS 1192-2:2013²⁵), and ensuring these are complied with.
- (c) **Standardised information exchange processes:** Specifying standardised information exchange processes facilitates consistency and helps avoid misunderstanding or miscommunication (which would in turn lead to disputes). Using standard processes also promotes uniformity, facilitates collaboration and reduces interoperability issues.
- (d) **Standardised BIM library and data dictionary:** To promote standardisation, it may be sensible to specify, where possible, which BIM library/libraries will be used, such as the NBS National BIM Library.²⁶ Whilst providing a foundation for standardisation, in conjunction with the other proposed terms, specifying a BIM library will not lead to complete standardisation by itself, due to a reported insufficiency of BIM objects from manufacturers in the libraries.²⁷ It may also be efficient to require the use of an agreed data dictionary (such as the buildingSMART data dictionary²⁸), to catalogue standardised meanings of the data being exchanged in the models, for parties' common understanding. One commentator points out that such a dictionary could be used to standardise translations of UK specifications into Norwegian.²⁹

3.2 Other clauses standardising processes

- (a) **Definitions and terminology:** There should be consistent definitions and terminology between documents. Published standard protocols are likely to use definitions and terminology that is different from the other contract documents, yet protocols like the CIC Protocol take precedence in the event of inconsistency. Amendments may therefore be needed to

25 PAS 1192-2:2013 Specification for information management for the capital/delivery phase of construction projects using building information modelling; <https://shop.bsigroup.com>.

26 NBS National BIM Library: www.nationalbimlibrary.com.

27 Construction Manager, 25th April 2014, website article.

28 See www.buildingsmart.org/standards/ifd.

29 See Ian Chapman, 'What is the buildingSMART Data Dictionary?', February 2013 www.thenbs.com.

ensure the contract has the intended effect. Taking another example, some parts of the US ConsensusDOCS BIM protocol documents appear to be open to interpretation; under the Addendum to this protocol, a party's potential responsibility for the models is wide ranging, including a 'contribution' that arises from that party's 'access' to the models.³⁰ 'Access' is not a defined term, and the definition of 'contribution' is arguably wide enough to give rise to various interpretations. It is obvious from this that it is not advisable to simply adopt standard form documents wholesale without considering the impact of the various terms and any amendments (or insertions) required to standardise the definitions and terminology used.

- (b) **Check for inconsistencies:** In the same vein, the contract needs to be reviewed as a whole to check for inconsistencies and mismatch between the contract documents, avoiding a 'parallel BIM universe'.
- (c) **Priority of contract documents:** Specifying the priority of documents prepares for the real possibility, despite the best endeavours of the contracting parties, that there may be conflicting terms. One answer is to use the CIC Protocol, which takes priority over all other documents. Specifying the priority of contract deliverables and the models may also be sensible as terms may provide for both 2D drawings and 3D models³¹ to be deliverables.³²
- (d) **Back-to-back down supply chain:** Back-to-back BIM terms and standards across the project team³³ are essential to ensure consistency of process and avoid gaps in responsibilities and liabilities. Parties may find this most easily achieved by expressly requiring the incorporation into all contracts down the supply chain, of the same comprehensive protocol³⁴ or other similar stand-alone document. There remains, of course, the inevitable risk that a party simply fails to do this, and disputes can result.

4. Clauses relating to copyright and ownership issues

The Government Construction Client Group concluded in its March 2011 strategy paper that 'little change is required in the fundamental building blocks of copyright law, contracts or insurance to facilitate working at Level 2 of BIM maturity'.³⁵ This view did not change in the Government Construction

30 ConsensusDOCS, 300 Tri-Party Agreement for Integrated Project Delivery, including the 301 BIM Addendum, www.consensusdocs.org. 'Contribution' is defined in the Addendum as meaning 'the expression, design, data or information that [the parties to the project, including sub-consultants/subcontractors] (a) creates or prepares, and (b) incorporates, distributes, transmits, communicates or otherwise shares ... for use in or in connection with a Model for the Project'.

31 There are also likely to be multiple models; parties need to know which ones (or which versions) take priority.

32 Likely for some time until employers and project teams become accustomed to receiving 3D models.

33 Apart from where a particular term is irrelevant to the party's services.

34 Which has been amended and refined to suit the particular project, if from a standard form

35 Government Construction Client Group BIM Working Party Strategy Paper, March 2011: www.bimtaskgroup.org, paragraph 5.2.

Strategy published a short time later.³⁶ In reality, due to the new and extensive use of models, there is nonetheless an important need to clarify the contractual position on copyright and ownership for the different elements that comprise the models, and the models themselves.

4.1. Clause amendment specific for CIC Protocol³⁷

- (a) **Revocable copyright licence:** The copyright licence granted to the employer under the CIC Protocol is revocable on non-payment of fees. As Richard Green³⁸ and Frank Newbery³⁹ point out, this provision would have major implications and disruption for all parties given the shared information and data integration in BIM-enabled projects. It therefore seems unlikely that employers will accept it in practice. If the CIC Protocol is used, this clause should be deleted. Such a term is certainly not an industry standard and would cause significant uncertainty and disproportionate delays to the project, which would effectively be held to ransom in the event of a fee dispute. Alternatively, one could take the ConsensusDOCS route where licence suspension only affects the direct party/parties in default and not any of the other members of the construction team, although (whilst reducing the issues caused by a licence suspension) this may render the suspension worthless in practice, leaving an unsatisfactory situation all round.⁴⁰

4.2 Copyright and ownership

- (a) **Clarity of copyright and ownership of the various elements:** Each party should retain the copyright in its own design contribution within the BIM model and elements derived from the model (where applicable). This is consistent with the traditional position as to design copyright on construction projects, and therefore there has not been any radical shift in that regard.⁴¹ Indeed, the ConsensusDOCS, the American Institute of Architects documentation and the CIC Protocol all take this approach.⁴² The respective copyrights should however be clearly set out in the contract, bearing in mind that the copyright in each element may fall to different parties.⁴³
- (b) **Licences over the designs:** Providing for limited, non-exclusive licences between parties for use of their respective BIM contributions

36 Government Construction Strategy: note 1.

37 CIC Protocol: note 11. Given the Government's support for the CIC Protocol (eg it is on the BIM Task Group website), and lack of a viable alternative at present (see above), it is pertinent to consider the CIC Protocol in particular.

38 Richard Green: note 9.

39 Frank Newbery, 'BIM, Copyright and Licensing', available at www.probyn-miers.com, Newsletter summer 2014.

40 ConsensusDOCS, note 30, 301 BIM Addendum, clause 6.7.

41 At Level 3 BIM single models may require more consideration on the practicalities of separating out respective copyrights.

42 ConsensusDOCS, note 30, 301 BIM Addendum; American Institute of Architects E203-2013, Building Information Modeling and Digital Data Exhibit, www.aia.org; and CIC Protocol, note 11.

43 This will need to be accompanied by licences granted for the use of these contributions for the permitted purposes relating to the project, as explained below.

for the purposes of the project, as in the ConsensusDOCS, will facilitate the practical development of the models and eventual construction. This also facilitates collaboration, as the parties do not need to be concerned with impractical claims of copyright infringement, and facilitates an open exchange of information. The employer and/or end-user (for example, purchaser) will also need limited licences to enable use of the information for the ongoing maintenance of the project and related matters.⁴⁴

- (c) **Ownership of the models:** In most cases, the end-user or ultimate client will want ownership of the models. Joint ownership of the models (as opposed to the design) between the project team, employer and end-user (if different) may lead to considerable delays, and potential disagreements, as approval would be needed from each party for use of the models post-completion (for example for maintenance). Taking a practical view, the design team should not have such power over decisions post-completion; any limitations on the use of their design can be set out in the terms of the licence.
- (d) **Ownership of the model outputs (eg cost data; facilities management data; energy efficient data):** Ownership of these outputs should vest in the employer and/or end-user, as model owner, given that these outputs are of greatest importance to them.⁴⁵ Preferably, this would be expressly confirmed in the contract, whether within the licences granted over the design or otherwise, to ensure that the ownership of the model outputs clearly lies where intended.
- (e) **Indemnities for infringement of IP rights:** Arguably, this is not a great shift from present standard form contracts where warranties and indemnities in relation to copyright and intellectual property are relatively common. It would be unsurprising if this becomes the norm given the volume of important data being exchanged.

5. Clauses relating to risk allocation

One significant challenge with BIM is the definition of responsibilities and allocation of contractual risk. BIM's focus on the exchange of, and reliance on, electronic data (sometimes using new software tools), brings with it new risks (both perceived and tangible) in reliance on the integrity of such pivotal data. These risks need to be clearly allocated under the contract to provide parties the necessary certainty and reassurance to work in a fully BIM-enabled manner, which in turn will lead to mitigation of risks. The primary clauses to achieve this are considered below.

5.1 Clauses relating to limitations of risk

- (a) **Limitation clauses:** There should be reasonable limitations on the use and reliance of data and models supplied (eg excluding liability for

⁴⁴ This is again consistent with the traditional position in the industry at present.

⁴⁵ Lesley Currie, 'Building Information Modelling: Its impact on design liability, insurance and intellectual property rights', SCL Paper D169 (May 2014) available from www.scl.org.uk.

changes by third parties and any use for other projects). However, the temptation to simply exclude all reliance on the information and models should be resisted (although currently various examples can be seen in the industry), as this goes against the required collaborative ethos of the BIM process.

5.2 Clauses setting out risk allocation

- (a) **Consistent risk allocation:** It is important to ensure there is a consistent level of duty of skill and care in all the documents forming the contract (for example the main body of the contract and the protocol) to avoid unnecessary disputes or need for judicial interpretation. The terms should be consistent across the construction team to avoid gaps in liability or responsibility, for delivery of the BIM outputs (eg models and datasets) to the same standards, with consistent allocation of risk between the parties.
- (b) **Clarity of risks, roles and responsibilities:** Given each party's different role however, there will be inevitable variations in the levels of risk associated with each party's responsibilities and rights (eg volume of information and models provided). It is vital that the contract clearly spells out the allocation of each of these elements to avoid disputes. In turn, this certainty assists in promoting a collaborative atmosphere.
- (c) **Clarity of scope of roles:** There should be a clear description of which parties are responsible for each BIM element.⁴⁶ For example, it should specify which work is to be designed by the various designers, the contractor and the specialist suppliers, and the related collaboration duties of the parties.
- (d) **Loss of information:** Parties should consider specifying where the risk should fall for loss of information due to software defects, given that this is a real possibility, to avoid disputes on contract interpretation. The allocation of this risk may in practice depend on the parties' bargaining power.

5.3 Warranties and indemnities

- (a) Parties need to consider at an early stage whether designers should provide a warranty, indemnity or assurance as to the integrity of the electronic data in the design model,⁴⁷ or at the least a standard of care for checking its integrity and avoiding hacking or unintended amendment to the data. In the absence of any such clauses, disputes are foreseeable and who will get left with the blame?

46 Will Cooper and Rachel Chaplin, 'Professional appointments and BIM', (2013) 24 7 Construction Law 26 (available at www.clydeco.com), notes the importance of recording the underlying objective of using BIM in the project to understand how it is to meet the client's needs.

47 There appears to be no such indemnity in the CIC Protocol.

5.4 General issues to bear in mind

- (a) **If standard form protocols are used:** Parties should check that the terms reflect the parties' intentions. The risk allocation in the protocol, if used without amendment, must be checked to be clear. Critics have suggested in commentaries and to the writer that the CIC Protocol lacks the necessary clarity in this regard, and parties may be advised to consider adding the required provisions.
- (b) **US ConsensusDOCS:** If parties are utilising the ConsensusDOCS, it is worth noting that they envisage design responsibility remaining wholly with the consultants; participation of the contractor (or its subcontractors and suppliers) by way of contributions to the models are expressly stated to 'not constitute design services'.⁴⁸ This would be less appropriate in the UK design and build environment, and such terms will require appropriate amendment.
- (c) **Level 3 BIM:** Briefly considering how Level 3 may change risk allocation, Ilsa Kuiper and Dominik Holzer highlight that disclaimers and warranties may be required to avoid impractical scenarios that could eventuate from the anticipated integrated forum.⁴⁹ This is indeed a serious issue which will need to be considered once the intended form of Level 3 BIM becomes clearer.

6 Clauses relating to encouraging collaboration

Despite the passage of time since the Latham and Egan Reports which called for collaboration/partnering, this ethos remains a challenge within the construction industry.⁵⁰ The problem with collaboration or partnering, if you could term it a 'problem' as such, has mainly been a hesitation to adopt a partnering or collaborative approach. Worldwide however, the industry recognises that BIM is closely linked with collaborative working.⁵¹ This section sets out the contractual framework to foster such collaborative processes.

6.1 Accepted and clear contract terms

- (a) **Binding contract terms:** As a starting point, case law and human nature dictate that collaboration needs to be supported by clear (to avoid misunderstanding) and accepted (to ensure they are actually followed) contractual terms. An optional or non-binding 'collaborative' understanding gives rise to a real risk that the collaborative promises

48 ConsensusDOCS, note 30, 301 BIM Addendum, clause 1.6.

49 Ilsa Kuiper and Dominik Holzer, 'Rethinking the Contractual Context for Building Information Modelling (BIM) in the Australian Built Environment Industry', *Australasian Journal of Construction Economics and Building*, 13(4) pages 1-17 (2013).

50 Sir Michael Latham, 'Constructing the Team' (HMSO, July 1994) and Sir John Egan, 'Rethinking Construction' (HMSO, November 1998).

51 The NBS international BIM report 2013, as referred to in the NBS National BIM Report 2014, found that respondents in UK (69%), Canada (63%), Finland (68%) and New Zealand (76%) agreed that BIM was 'all about real-time collaboration', www.thenbs.com/topics/BIM/reports.

will simply fall by the wayside once there is a dispute; the case of *Birse Construction v St David* illustrates that occurring.⁵² An effective contract serves to encourage, and where necessary require, parties to adopt behaviour that supports and furthers collaboration within the project.

- (b) **Clarity of collaborative relationships:** Obafemi Akintan and Roy Morledge noted that, ‘It is not uncommon to see main contractors treat the same subcontractors differently on the different projects they are both engaged on as it is the contract that determines the flow of things.’⁵³ This emphasises the importance of the correct collaborative contractual framework and clarity regarding relationships, to avoid misunderstanding under the usual pressures arising during a construction project. The appropriate collaborative processes may differ depending on the parties and needs of the project.
- (c) **Employer to comply as well:** Ideally, the contract documents should place an obligation on the employer to comply with the BIM process and timetable as well;⁵⁴ this will aid consistency of the process but also facilitate a collaborative mindset, as all parties will feel they are ‘in it together’.
- (d) **Collaborative information sharing:** Processes should be put in place for collaborative information sharing, subject to any necessary but reasonable limitations.⁵⁵
- (e) **Tiered dispute resolution process:** To promote collaboration, there should be a tiered or collaborative dispute resolution process.⁵⁶ One option is for a dispute board or similar arrangement. It is worth noting that any dispute resolution process cannot remove the parties’ right to adjudicate at any time, although promoting a culture of collaboration should assist to minimise the parties’ desire to resort to such a process.

52 The JCT has a non-binding Partnering Charter (PC/N 2011), available at www.jctltd.co.uk, for use with its traditional contracts, but it is questionable how effective it is or indeed how frequently it is used. *Birse Construction Ltd v St David Ltd (No 1)* [2000] BLR 57, 70 Con LR 10 (TCC). (See too comments of Rudi Klein on the first instance judgment in ‘Do we need partnering contracts?’, SCL Paper (September 2002), www.scl.org.uk, page 2).

53 Obafemi Akintan and Roy Morledge, ‘Improving the Collaboration between Main Contractors and Subcontractors within Traditional Construction Procurement’, *Journal of Construction Engineering*, volume 2013, Article ID281236.

54 Although Shona Frame, note 22, believes the employer’s compliance may be implied in any event.

55 There are suggestions that the CIC Protocol fails to provide such processes, and would require additional clauses to cater for this.

56 Heathrow Terminal 5 and the Olympics development in London are noteworthy examples of the success of such steps to avoid formal disputes and promote collaborative working relationships.

6.2 Collaborative or ‘mutual trust’ terms

- (a) There are common building blocks of the current collaborative standard form contracts, which include a term placing a duty on parties to act in ‘mutual trust and cooperation’ or similar terms.⁵⁷
- (b) It has helped to establish certainty that, when interpreting contracts, the courts have shown a willingness to take into account such terms, even when contained in a non-binding partnering charter or similar document.⁵⁸

6.3 Insurance

In March 2011, the Government Construction Client Group commented in their report that little change was fundamentally required to insurance.⁵⁹ Insurance terms in standard form contracts do not presently appear to require amendment for BIM.⁶⁰

6.4 Learning from the Cookham Wood pilot project success

Whilst the Cookham Wood contractual documentation is not publicly available, the published information can be used to inform improvement in contracts to support BIM implementation.⁶¹

7 Clauses relating to standard of care

- 7.1 The general perception is that the standard of care is not expected to change radically, although the new shift to reliance on electronic data does mean that the parties’ standard of care for BIM deliverables⁶² needs to be clarified to avoid differing opinions and consequent disputes if things go wrong.⁶³
- 7.2 Parties will need to consider clear terms dealing with the following issues, the answers to which may vary from project to project:

57 Confirmed by the NBS National Construction Contracts and Law Survey 2013, note 5, in which 61% of respondents undertaking collaborative projects used a contract which included an ethos of trust and mutual co-operation.

58 For example the court in *Birse*: note 52.

59 The future of BIM-supportive insurance, such as integrated project insurance, is outside the scope of this paper.

60 Few respondents to a survey conducted by the writer anticipated encountering disputes regarding insurance in using BIM in projects.

61 For example, collaborative working can be assisted by contractual governance by core group and design teams, to develop, co-ordinate and exchange information in BIM 3D models, and visibility of BIM commitments under service schedules and a project timetable consistent with the transparency expected of BIM. See David Mosey, ‘BIM and Related Revolutions: A review of the Cookham Wood Trial Project’, SCL Paper D171 (July 2014), www.scl.org.uk.

62 For example, the model and other data.

63 Particularly given the absence of case law to confirm the applicable common law standard of care.

- (a) Should delivery of the design models and other BIM deliverables be only subject to ‘reasonable endeavours’ (as per the CIC Protocol) or a more extensive reasonable skill and care of a designer-type of liability?
- (b) Should designers provide some sort of indemnity or assurance as to the integrity of the data in the model, or at least a standard of care for checking the integrity and avoiding hacking or unintended amendment to the data?⁶⁴
- (c) Should the BIM coordinator/information manager provide an equivalent indemnity or assurance?

8 Other legal clauses

This section seeks to capture the other odds-and-ends of issues and areas which are important to implement BIM effectively, but do not comfortably sit in any of the other categories.

8.1 Excluding implied terms regarding goods

There is the possibility that models will be considered goods or products and therefore subject to statutory implied terms such as fitness for purpose under the Sale of Goods Act 1979 or Supply of Goods and Services Act 1982. Given the untested legal waters of BIM, it would be sensible to exclude or limit the application of such statutes insofar as models are concerned, until the law is clarified as to whether they apply to BIM models.

8.2 The BIM information manager or co-ordinator

This will be a pivotal new role to ensure parties comply with processes and timings, and to coordinate the production and exchange of the BIM deliverables.⁶⁵ The contracts will need to oblige parties to comply with the directions of the manager/co-ordinator if their role is to be of practical use,⁶⁶ although this should not extend to any design/construction powers or responsibilities. The CIC’s BIM Information Manager Appointment does not cover many important issues.⁶⁷ Therefore this standard form should be amended to clarify a number of duties and liabilities.

64 In this new area of law, it is uncertain whether the courts would regard this as a warranty as to the integrity of all data; the contract should clarify the scope of the indemnity.

65 80% of respondents to the writer’s survey regarded responsibility for co-ordination of models to be a dispute they anticipate encountering, or have encountered, in BIM projects.

66 Architects have suggested to the writer that it would be easier for the role to be undertaken by a third party, rather than a design team member, to provide the necessary perceived independence when pushing parties to comply with the processes.

67 For example, clauses on insurance.

8.3 Can laws and regulations be required to be linked to the BIM deliverables

Something to bear in mind is that as software and processes develop, linking the applicable laws and regulations into BIM would facilitate precision checking and compliance with such requirements from an early stage.

8.4 Soft landings

It is expected that terms imposing obligations on the construction team for ‘soft landings’⁶⁸ will become commonplace, and may in practice lead to less claims post-completion, given that issues and problems immediately arising post-completion will be resolved, and the employer will have a better understanding of the property in general.

8.5 Confidentiality

There may be a need for confidentiality clauses, or separate confidentiality or non-disclosure agreements where the design or other information revealed by the construction team members and/or the employer is commercially sensitive.

D. Conclusion

As discussed within this paper, the majority of the industry still uses standard form contracts. Whilst these contracts generally envisage a simple insertion of an all-encompassing BIM protocol, containing all necessary BIM-related terms, this is unfortunately an overly simplistic view of what is required. Regardless of the protocol used,⁶⁹ there will almost certainly be important gaps or discrepancies between the protocol and other contract documents. A protocol is therefore not the end of the story. Furthermore, whilst there are some standards being issued,⁷⁰ given the present lack of consistent form or content for many of the contract documents,⁷¹ there is likely to be a significant amount of disparity and fluidity between the contracts on different projects.⁷²

The comprehensive framework set out by the writer’s proposed checklist of contractual terms⁷³ for use with both standard and bespoke contracts (whether or not a protocol is used) focuses on the primary elements of ensuring clarity of the allocation of risks, rights and responsibilities; implementing standardised processes and procedures to minimise misunderstanding and

68 This describes the situation where there is a graduated handover, with the construction team providing support for a defined period of time post-completion, thereby giving the employer a ‘soft’ landing of the project.

69 Even the Government-endorsed CIC Protocol: note 11.

70 For example, the PAS 1192 standards (note 25) and the NBS BIM Object Standard launched in September 2014, www.thenbs.com.

71 For example, employers’ requirements.

72 Indeed, one industry interviewee expressed his concern that none of the major professional bodies for design professionals, such as RICS, RIBA or ICE, has published supporting BIM scopes of service to ensure consistent interpretation of BIM protocol terms.

73 The related commercial and non-contractual issues are outside the scope of this paper and will be dealt with by the writer in later publications.

errors; and introducing terms to manage expectations, and clarify understanding, as to the reliance, use and status of the BIM models and other electronic data. In addition, the contract terms proposed provide a structure for a more collaborative mode of working, and steps to reduce problems of interoperability.⁷⁴

BIM is generally considered to be the future of collaborative construction projects, becoming increasingly used across the industry to bring cost savings and efficiency. However if the contractual implications are not properly addressed, the potential for dispute is enormous and complex. As often happens with innovation, the legal framework has lagged behind advances in technology, and swift work is needed to bring contracts up to speed.⁷⁵

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74 One respondent to a ‘BIM Experts’ LinkedIn discussion started by the writer suggested that ‘If someone can establish the full performance criteria for both interoperability and collaboration then we may be able to set better measures of benefits – and define better contracts.’

75 See too, two papers presented at the SCL International Conference in London in October 2008: Howard W Ashcraft, ‘Building Information Modeling: A Framework’, SCL Paper D101 (June 2009), and Kimberly A Hurtado and Patrick O’Connor Jr ‘Contract Issues in the Use of Construction Building Information Modeling’, SCL Paper D102 (July 2009), www.scl.org.uk.

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