

## Getting the job done but doing it better - Procurement framework development considerations concerning Building Information Modelling (BIM), including built environment information and management

### Introduction

An objective of this submission is to highlight example issues that may arise in relation to BIM for public infrastructure procurement and in respect of the built environment and the government. This submission aims to provide a perspective of what may need to be considered by government or government clients as a result of BIM use, including the information sourced from BIM. This submission, however, does not focus on demonstrating the business case for BIM, nor how the value of BIM should be determined.<sup>1</sup>

This submission primarily concerns and relates to the discussion on BIM as presented in the Productivity Commission, Public Infrastructure Draft Inquiry Report (**PC Report**). Specifically, this includes the discussion following the subheading *The use of new technologies to improve 'whole of life' project costing* (at pages 382-385) and Appendix C of the PC Report, Volume 2, and the Draft Recommendation 11.5 in the PC Report which states:

*For complex infrastructure projects, government clients should provide concept designs using Building Information Modelling (BIM) to help lower bid costs, and require tender designs to be submitted using BIM to reduce overall costs. Governments should give serious consideration to where in their better practice guides they may specify the use of BIM.*

Reference materials are attached as part of this submission or otherwise noted (either as published research or via a link to an internet address).

### Public Infrastructure Procurement and BIM

Simplistically, Building Information Modelling (**BIM**) presents an opportunity to rethink how our built environment is represented. BIM not only supports a shift from a 2D/paper context to a 3D/digital one for project delivery, but also prompts a change in approach to built environment information.

BIM may not necessarily provide new information compared to that which has been traditionally acquired. However, it is suggested that BIM can enable access to built environment information in a more purposeful way. Improving approaches to ensure data is appropriate for multiple uses is key for potential application across the supply chain of a project and for an asset life cycle (notwithstanding existing challenges). However, potential benefits may pervade further.

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<sup>1</sup> If required, see industry example Nisbet, N., & Dinesen, B. (2010). *Construction the Business Case Building Information Modelling*. London: British Standards Institute. (**Attachment A**). Also see discussion on BIM benefits evaluation framework: Love, P. E., Simpson, I., Hill, A., & Standing, C. (2013). *From justification to evaluation: Building Information Modelling for asset owners*. *Automation in Construction*, 35, 208-216.

Based on international and industry supported developments, if BIM is to be used in association with the procurement of public infrastructure by government clients, the procurement framework should include consideration of the following.

1. Establishment of a BIM road map, strategic plan, guide or program

Industry proposed and international examples generally address a government or government client's approach to BIM and/or information sourced from BIM. Critically, there may not be one single solution or answer about how a government client could use BIM or BIM sourced information. Similarly, incorporating such information into existing or legacy framework/systems (to achieve the benefits of interoperability) may include a range of options.<sup>2</sup> It is likely that an initial approach for procurement purposes will involve a process of enquiry.

Further it is arguable that some form of engagement/government intervention will assist to drive perceptions and potentially tailor industry response to government client requirements (particularly given that it is not known whether the market for BIM, whilst emerging as indicated in recent reports, still requires some development or measure of its preparedness for or expertise in BIM in Australia and particularly for applications beyond design).

**Attachment References**

Attachment B - buildingSMART Australasia. (2012). *National Building Information Modelling Initiative. Strategy: A strategy for the focussed adoption of building information modelling and related digital technologies and processes for the Australian built environment sector*, Department of Industry, Innovation, Science, Research and Tertiary Education, Sydney. Download access available from [http://buildingsmart.org.au/nbi-folder/NationalBIMIniativeReport\\_6June2012.pdf](http://buildingsmart.org.au/nbi-folder/NationalBIMIniativeReport_6June2012.pdf)

Attachment C - BIM Industry Working Group. (2011). *A Report for the Government Construction Client Group Building Information Modelling (BIM) Working Party Strategy Paper*. Cabinet Office. Retrieved from <http://www.bimtaskgroup.org/wp-content/uploads/2012/03/BIS-BIM-strategy-Report.pdf> (example of adopted approach)

Attachment D - McGraw Hill Construction. (2014). *SmartMarket Report, The Business Value of BIM in Australia and New Zealand: How Building Information Modeling is Transforming the Design and Construction Industry*. Bedford: McGraw Hill Construction

Attachment E - Gallaher, M. P., O'Connor, A. C., Dettbarn, J. L., & Gilday, L. T. (2004). *Cost Analysis of Inadequate Interoperability in the US Capital Facilities Industry*. Gaithersburg: National Institute of Standards and Technology. Retrieved July 2013, from <http://fire.nist.gov/bfrlpubs/build04/art022.html>

**Links**

See example approach to BIM by the US government agency, the General Services Administration (GSA): [http://www.gsa.gov/portal/content/105075?utm\\_source=PBS&utm\\_medium=print-radio&utm\\_term=bim&utm\\_campaign=shortcuts](http://www.gsa.gov/portal/content/105075?utm_source=PBS&utm_medium=print-radio&utm_term=bim&utm_campaign=shortcuts)

2. Development of an approach to consider procurement models or contract/project delivery methodologies that compliment BIM objectives

Any adopted approach or procedure may involve determining how BIM is to be used or applied on a project. Identifying government client needs in respect of BIM and the extent of potential impact BIM will have on existing practices and arrangements on a project, may not only apply in respect of design

<sup>2</sup> For example whether to overcome situations where industry models in 3D but contract deliverables are 2D/paper based, or when redrawing/drafting/scanning of public assets is required due to lost/inaccessible or unreliable data.

but could apply potentially across the asset life cycle<sup>3</sup> and for project procurement (including acquiring built environment information as input for procurement decision making processes).

Aligned with industry and international directions (and depending on how BIM is to be used), BIM may also provide a forum (and possibly promote project efficiencies) to facilitate collaborative and/or integrated practices and project delivery. This may include the early involvement of applicable parties (ie contractors, subcontractors, facility/asset managers) which may be required for model establishment and development.

#### Attachment References

Refer to Attachment B (noted above)

Attachment F - Cabinet Office. (2014). *New Models of Construction Procurement, Introduction to the Guidance for Cost Led Procurement, Integrated Project Insurance and Two Stage Open Book*. Cabinet Office. Retrieved from <https://www.gov.uk/government/collections/new-models-of-construction-procurement>

#### Published References

Kuiper, I., & Holzer, D. (2013). Rethinking the contractual context for Building Information Modelling (BIM) in the Australian built environment industry. *Australasian Journal of Construction Economics and Building*, 13(4), 1-17. Retrieved from <http://epress.lib.uts.edu.au/journals/index.php/AJCEB/article/download/3630/3910>

Porwal, A., & Hewage, K. N. (2013). Building Information Modeling (BIM) partnering framework for public construction projects. *Automation in Construction*, 31, 204-214

### 3. Modification of existing contracts and associated documentation to address BIM

Following international developments and proposed industry directions (and depending on how BIM is to be used), it is anticipated there is a need to:

- develop bespoke contractual standard forms or consider exhibit/addendum documentation/contractual forms based on international examples;
- identify and develop standard form/project contractual requirements in respect of BIM, including to address government client's specific BIM needs, the associated potential changes to existing contract based processes, interactions and deliverables, and the possible application of BIM for use in association with waste avoidance and sustainable principles and practices; and
- review and potentially introduce BIM related or based industry standards and specifications, including those for infrastructure and in respect of life cycle applications and data/information and management.

#### Attachment References

Refer to Attachments B, C and F (noted above)

#### Links

As an example of BIM based requirements, see Common BIM Requirements (COBIM) supported by Finnish government agency, Senate Properties <http://www.en.buildingsmart.kotisivukone.com/3>

<sup>3</sup> Despite the benefits of BIM claimed for life cycle applications, it is arguable that such opportunities and challenges are yet to be realised or evolve in the Australian built environment market (for public infrastructure or otherwise), and requires further research and support to determine the extent of the relevant issues.

## BIM and the Built Environment, Role of Government

In assessing the merit of BIM generally, further consideration and research should be given to the potential benefits, opportunities, challenges and implications that may present for the built environment industry, government clients/governments and the community. Specifically this concerns the use of BIM (including the information that can be derived/sourced from BIM) for the entire built environment, rather than just public infrastructure.

In this context, the role of government is fundamental. Whether as the land holder/owner, major client or for governance and administration purposes, it is suggested (from a UK perspective where BIM is mandated by the government) that maintaining and exploiting government leadership is key to deriving economic advantage from the use of BIM.

Approaches by some governments include an overarching BIM mandate to support the drive for efficiencies in the construction industry (such as the UK) or in recognition of the benefits of technology (such as in Singapore), for example.<sup>4</sup> However, in the US (ie a federal constitution) BIM has been introduced through the use and support by government agencies and organisations for their particular purposes. Other examples include the BIM related provisions for public procurement as adopted by the European Union (EU).<sup>5</sup> However, it is suggested there are also a number of Australian government clients currently considering BIM for their own particular purposes (and who are at various stages of enquiry).

Regardless, however, government clients and industry will require guidance, support and training about BIM, including in respect of life cycle applications, and if BIM (in any form) is to be required for infrastructure projects or to be applied more broadly for the built environment. Whether international initiatives or other possible applications of BIM or BIM sourced information<sup>6</sup> may form aspirational goals, inevitably further work and research by built environment industry will be necessary.

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<sup>4</sup> Whether these example governments have had the capacity to mandate BIM for construction projects as a consequence of their respective centralised government structures or functions may warrant debate.

<sup>5</sup> For example, Article 22 Rules applicable to communication (paragraph 4) of the EU Directive 2014/24/EU of the European Parliament and of the Council states:

*For public works contracts and design contests, Member States may require the use of specific electronic tools, such as of building information electronic modelling tools or similar. In such cases the contracting authorities shall offer alternative means of access, as provided for in paragraph 5, until such time as those tools become generally available within the meaning of the second sentence of the first subparagraph of paragraph 1.*

<sup>6</sup> Potential examples could include:

- for project applications: automating planning review/approval/certification processes (as proposed for application in Singapore, *BIM e-submissions*); safety related considerations (for on-site/project or workplace applications);
- the provision of information of the built environment for emergency/disaster/security and Defence related contexts, including for planning, digital simulation and active response; and public sector/municipal/city planning purposes and information mapping (including the application of BIM for the existing built environment and in association with other technologies such as GIS, laser scanning);
- educational initiatives/endeavours that use BIM/BIM based information or related tools for research or as an educational forum/basis for community education, industry training and learning about the built environment and/or science/engineering concepts based on the built environment.

#### Attachment References

Attachment G - Saxon, R. G. (2013). *Growth through BIM*. London: Construction Industry Council. Retrieved June 2013, from <http://www.cic.org.uk/publications/>

Attachment H – Cabinet Office. (2011). *Government Construction Strategy*. Retrieved from <http://www.bimtaskgroup.org/wp-content/uploads/2012/03/Government-Construction-Strategy.pdf>

Attachment I - Built Environment Industry Innovation Council (BEIIC). (2012). *Final Report to Government*. Retrieved from <http://www.innovation.gov.au/industry/buildingandconstruction/BEIIC/Pages/BuiltEnvironmentDigitalModelling.aspx>

#### Published References

European Parliament. (2014). Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC. *Official Journal of the European Union*

#### Links

An example support forum from the UK is the specialist group, BIM 4 Infrastructure (UK). (2013). Retrieved from UK BIM Task Group: <http://www.bimtaskgroup.org/bim-4-infrastructure-uk/> (general overview)

## Comments on Draft Recommendation 11.5

If considering this approach in the current commercial environment of construction, this approach may be subject to:

- addressing intellectual property (IP) and model/information reuse/reliance considerations and requirements;
- the resource/technological capacity and capability of government clients (or their representatives) to access or interrogate model submissions for the purposes of tender evaluation; and
- considering government procurement policies that may be impacted if the use of specific proprietary systems (of BIM authoring tools) or requirements prevent or inhibit the market for tender submissions/commercial competition.

Further consideration may be necessary (in respect of the proposed approach in the recommendation) to determine what information (including the format, structure of the information) would be required for the purposes of tender submissions and tender evaluation in a BIM context.

#### Attachment References

Refer to Attachment C (noted above)

#### Published References

European Parliament. (2014). Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC. *Official Journal of the European Union* (as an example of procurement requirements, see Article 22 Rules applicable to communication)