Submission No 18

PROCUREMENT OF GOVERNMENT INFRASTRUCTURE PROJECTS

Organisation: BuildingSMART Australasia

Name: Mr John Mitchell

Position: Chairman

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The Committee Manager
Committee on Transport and Infrastructure
Parliament House
Macquarie St
Sydney NSW 2000

Via email: transportinfrastructure@parliament.nsw.gov.au

Dear Committee Manager

Thank you for the opportunity to make a submission to the Inquiry into the Procurement of Government Infrastructure Projects

Members of buildingSMART are available to appear at the Inquiry to expand on the points set out in this submission and to answer any questions the Committee may have.

Please find the submission attached.

Sincerely,

JOHN MITCHELL

CHAIRMAN, BUILDINGSMART AUSTRALASIA

Submission to the NSW Parliamentary Inquiry into the procurement of government infrastructure projects

Summary:

buildingSMART submits that the NSW Government should require the adoption of Building Information Modelling (BIM) in all Government procurement projects. This would place NSW at the centre of innovation and global best practice in smart ICT in the design and planning of buildings and infrastructure.

Introduction and overview

This Submission provides a response to the Transport and Infrastructure Committee's call for submissions for its Inquiry into the procurement of government infrastructure projects.

buildingSMART contributes its views in the interests of promoting the policy settings that best support and improve construction and building industry standards, productivity and competitiveness in NSW.

In line with the Committee's terms of reference to investigate "world's best practice with regard to the procurement of government infrastructure projects", buildingSMART also offers insights gleamed from its international reach, with 17 chapters across the globe, and submits that other nations around the world provide a framework, guidance and lessons learned for NSW.

buildingSMART welcomes the opportunity to submit its views to the Committee on these important issues, and to offer its guidance into the adoption of BIM and the potential benefits it believes the Committee should consider.

Background – buildingSMART

buildingSMART is a not-for-profit industry group consisting of organisations committed to seeing BIM adopted nationally. The overriding objective of buildingSMART is that we want to produce much better buildings and infrastructure - a built environment that is valued by the community, that meets real needs, that performs better, that impacts less on the environment, that takes less time and money to build and to use. Within that context, buildingSMART has as a specific commitment to support the use of open standards for sharing information across the supply chain and improving processes in the delivery and management of buildings throughout their life cycle.

Our members are drawn from across the industry, including:

- Building owners and developers (both government and private);
- Architects, engineers and related design, planning and authority professionals;
- Builders, sub-contractors, product and materials suppliers; and
- Related service providers.

Our Board includes industry experts and academics. We do not seek to make a profit, but rather provide our services to buildingSMART pro-bono and in addition to our day-to-day businesses – each of us simply have a personal commitment to seeing the production of better buildings and infrastructure across Australia and New Zealand.

We are part of an international organisation, with 17 chapters across the globe.

Terms of reference: The Committee is to inquire into, and report on, world's best practice with regard to the procurement of government infrastructure projects

buildingSMART has been engaged in investigating and advocating a smart ICT agenda at a state and federal level since 1997. We are committed to working with governments across to the country with the aim of amending procurement policies to require the use of BIM on state and federal government infrastructure projects.

Terms of reference 1): the best process of gateway decision making on the efficacy of public private partnerships compared to other procurement methods;

While there are a range of procurement methods available to a government for consideration, buildingSMART submits that Integrated Procurement Delivery (IPD) contracts should be considered by the Committee as the contract that can be used regardless of which model is adopted. Further detail on IPD Contracts is set out in relation to Terms of reference (2) below.

Terms of reference 2): The best procurement process and documentation;

The construction industry is undergoing a range of technology-driven transformations which are impacting upon the delivery of major and complex building construction projects. buildingSMART believes that one of the key transformations relating to procurement processes and project documentation is the greater adoption of the IPD contract model, and the attendant greater use of BIM. The IPD contract model has been successfully trialled on numerous projects internationally, an experience which offers lessons about the best procurement processes and project documentation methods for the Australian construction industry.

The IPD contract model is quite different from traditional contract models. They assist project managers to overcome the dysfunction and waste created by the fragmentation of the construction industry by binding all parties involved in a construction project to joint goals at the earliest possible stage. This early collaboration enables participants to share in the risks and rewards of the project, encouraging collaborative decision-making and joint management of problems.

Among the key benefits of the IPD contract model is that it enables the project to obtain the maximum benefits from the use of BIM. BIM provides a digital representation of physical and functional characteristics of a building which can support the building through its lifecycle. The technology is based on the idea that a building is constructed twice: firstly in virtual space and secondly in physical space. Requiring all project participants to input information into a digital building plan at the earliest phase of the procurement process provides all project participants with clear, up-to-date and accurate information. This increases productivity, while reducing costs and material waste.

This integrated approach to documentation of construction helps to resolve many of the inefficiencies that take place in construction projects. In the first instance it enables project managers to identify and manage issues before the construction phase. The main advantage of the utilisation of the IPD contract model and BIM is that they enable construction projects to be viewed as a whole, with each decision being measured according to its impacts upon the delivery of the whole project.

In 2014 the Australasian Procurement and Construction Council's report, '*A Framework for the Adoption of Project Team Integration and Building Information Modelling*,' noted the productivity and efficiency benefits of this holistic approach. The report argues that:

> "*given the potential savings from BIM, government clients should consider provision of initial designs in a BIM format when the project is of sufficient complexity to provide for lower construction costs and the selection of the lowest 'whole of life' design option*."[1]

Many large construction projects will inevitably reach the sufficient level of complexity during their inception or initial design phase. For this reason it is important that projects are able to adapt to digital modelling technologies such as BIM at the procurement phase.

In Australia, investigations into new forms of contract for projects using BIM have been undertaken by several groups, but largely these developments have not achieved a

[11] 'A Framework for the Adoption of Project Team Integration and Building Information Modelling,' *Australian Construction Industry Forum, Australasian Procurement and Construction Council*, December 2014

substantive outcome at this stage. The Australian legal fraternity believe the process can be readily achieved:

> *"The integration of BIM into contracts in Australia does not have to be a complicated one. There are many mechanisms, including adopting the approach taken in the UK whereby BIM protocols are appended to Australian Standard contracts. As more and more of the private sector continue to drive the implementation of BIM and develop their own internal Digital Engineering Management Plans it has become apparent that the adaption of legal requirements to accommodate BIM can no longer be considered an impediment to the wide implementation of BIM in the design and planning of infrastructure in Australia. Especially in circumstances where so many industry bodies, such as buildingSMART are seeking to develop tools to ensure consistency and uniformity wherever possible. On many projects throughout Australia existing forms of procurement such as PPP, Alliancing contracts and NEC3 contracts are being adapted to accommodate the idiosyncrasies of BIM which are not currently catered for in those standard forms*."[2]

There are international examples, mainly in the USA, on IPD Contracts as follows:

USA:

The US has been proactive in developing IPD contracts and it should be considered in any Australian development. In 2005 a Sutter Health project adopted an IPD contract model and created an individual contract named an integrated form of agreement (IFOA). This was agreed between the architect, general contractor, and owner. "As opposed to a design-construct contract that has a single point of responsibility, the IFOA relies on a Core Group of representatives of the owner, architect, and contractor to administer the project "[3].

Howard Ashcraft, Partner Hanson Bridgett LLP is an expert in this new form of contract and has reported widely on private sector IPD contract experiences[4]. "The IPD contract templates use a "value/cost" model that is designed to permit and incentivise early experimentation and creativity, and then in the construction phase, focus on efficient execution. You can think of it as an economic model of the decision efficiency curve popularly known in the US as the MacLeamy curve. Typically the risk/reward system is modified to reflect the owner/team values for the project. It is particularly appropriate for an institutional owner, such as a University, that is more interested in getting the maximum

2 Lindsay Prehn, Colin Biggers & Paisley, Construction Lawyer, Sydney, tel: +61 (2) 8281 4525
3 Forbes & Ahmed 2010
4 A short article for the International Bar Association outlining the key elements of an IPD approach by Howard Ashcraft

value for its funds than it is in saving cost to be applied to another project. All of our economic models are project specific, and we have about a dozen different approaches we have used. One form assumes an agreement between an owner/designer/builder with specialised subcontracts used to incorporate trades and consultants into the IPD business and contract model. The choice of form depends on the project, the owner and other variables. The key elements of the business model are similar. These are proprietary agreements, but as we have structured 70+ IPD agreements, they have seen considerable use."

ConsensusDOCS

ConsensusDOCS is made up of 21 member organisations, including; the Associated General Contractors of America (AGC), the Construction Owners Association of America (COAA), the Construction Users Roundtable (CURT), Lean Construction Institute (LCI), and a large number of subcontractor organisations. In 2007 it released its Standard Form of Tri-Party Agreement for Collaborative Project Delivery, entitled ConsensusDOCS 300[5].

American Institute of Architects (AIA)

The AIA have developed several industry guides for IPD, with many useful links to industry and standards organisations.[6] The AIA has published two separate IPD families: AIA 295 one, built on a construction management at risk model, and the Single Purpose Entity (SPE) family AIA C195.

United Kingdom

IPD style contracts are less developed for IPD projects, but examples include the U.K.'s *Be Collaborative Contract*.

Australia and New Zealand

Work has also been undertaken by Standards Australia, in Committee MB10. We would recommend a good reference activity by the Department of Defence, led by Mr Bob Baird[7]. With the assistance of their lawyers, Defence has been examining the changes need for Commonwealth Public Works projects. It is noted that Department of Finance actually administer these contract provisions.

[5] see http://www.consensusdocs.org/
[6] see http://info.aia.org/siteobjects/files/ipd_guide_2007.pdf
[7] Bob Baird, Executive Director CFPC, Department of Defence, Infrastructure Asset Development Branch, +61 (2) 6266 8082, Bob.Baird@defence.gov.au, +61 404 815 67

buildingSMART believes that leading information technologies, such as BIM, are enabling the greater use of collaborative models of contracts for the construction industry, such as IPD contracts. Procurement processes and documentation methods need to adapt to enable the benefits of these new technologies to be gained from the design phase of projects through to construction.

Terms of reference 3): the desirability of the standardisation of procurement processes and documentation;

buildingSMART believes that standardisation of procurement processes and documentation across NSW Government construction projects can save taxpayers money and play a key role in driving productivity gains in the building construction industry in Australia. Standardisation of procurement processes and documentation methods across government construction projects should be done on the basis of the best and most cutting edge procurement processes available. This would enable government procurement processes to be more adaptable to innovative contractual arrangements which utilise front line digital technologies such as BIM, as well as any future innovations. This would be highly desirable, leading to savings for government and productivity for the wider construction industry.

The construction industry in Australia is calling for leadership from governments to provide standards and protocols which enable the construction industry to better utilise digital modelling technologies. The private sector in Australia has well-developed techniques for coming up with ideas and generating their own efficiencies and productivity gains. However, agreement on a common framework across the private sector can be very difficult. Government involvement is a key aspect of business confidence and success. It is important these standards are set by government, and not by vendors.

The need for greater government involvement in the setting of standards was acknowledged by the 2014 Productivity Commission Report on Public Infrastructure, which stated that:

> *"Governments, in consultation with industry and other private sector procurers, should coordinate the establishment of common technical standards to ensure that the greatest benefits from the adoption of BIM are realised."*

National standards must be based upon international best practice in order to maximise the savings and productivity benefits. By providing leadership in the setting of industry standards and stimulating the greater adoption of BIM by the private sector, the NSW Government can safeguard the international competitiveness of its building construction industry.

If we do not pursue BIM in Australia now, foreign investors will, and Australia will lose a valuable opportunity. Equally, BIM has the potential to become a valuable export for Australia. Most of the developing world needs to import design and some construction services for its major projects – this is a significant opportunity. By investing in BIM now, Australians will gain the skills that put them ahead of the curve, preparing Australia for a future in which BIM will be used worldwide.

Terms of reference 4): the desirability of a standard national process and documentation for the delivery of government infrastructure within a federal structure;

There is a strong desire on the part of the construction industry for government input into the setting of nationally consistent standards for the construction industry. For many companies in the construction industry, state and Commonwealth governments are major clients. The absence of nationally consistent standards means that these companies waste time developing different protocols for dealing with different governments in different jurisdictions. This also creates inefficiencies for construction projects which involve both Commonwealth and state governments. Not only is it important that the NSW Government adopt universal standards for the construction and management of government infrastructure processes, it is also critical that Australian Governments begin to drive greater standardisation across all Australian jurisdictions.

Australia would benefit if specific protocols, universal definitions and standard form contracts were adopted nationwide so that inconsistencies do not develop across jurisdictions. Fortunately, the advanced stage of BIM in countries such as the United Kingdom, Canada and the United States provides a number of options for Australia to adopt and contribute to universal protocols.

The task is not one of inventing new standards for Australia; Australia can "stand on the shoulders" of our international partners which are in a more advanced stage of implementing BIM policy, such as the United Kingdom (UK), whose 'Digital Built Britain' BIM strategy will reach a critical phase in 2016. Australia can learn lessons from the UK's experience and adopt the same approach allowing us to align Australia with international best practice for infrastructure developments.

Without government leadership, different states, government departments and industry players could adopt different standards – potentially the 21st century equivalent of states adopting different rail gauges, leading to missed opportunities and a loss of productivity. It

is critically important not only that there be standardisation of NSW Government procurement, but across jurisdictions.

Terms of reference 5): methods to minimise the cost of contractors tendering for the supply of services with respect to government infrastructure;

There is widespread agreement that intelligent digital technology, such as that represented by BIM, offers enormous benefits when used to develop effective ways of representing the physical world in a digital form. The building, infrastructure and construction industries all understand the value of the BIM process in improving efficiency, quality and cost of project delivery.

The need for vendor-neutral (non-proprietary) methods of exchanging information throughout a project has been recognised through the development of a consistent set of standards in BIM. buildingSMART is the only global organisation to deliver those standards, spanning both buildings and infrastructure. These will allow users to work seamlessly across a broad range of proprietary software tools.

The primary goal is to reduce costs, add value and improve efficiency and legibility in data /information transfer. Standards as in other areas permit national and international coordination and compatibility. Standardised data structure or formats permit automatic processing; to avoid costly and time consuming manual data processing, speed up information sharing, avoiding errors, and reducing costs. An exemplar of this role is AustRoads, which through policies and standards promotes operational consistency by local road agencies across all states and territories. It also provides for service providers in this industry a common way of working and enhanced competition. Other examples are the World Wide Web (IP address formats); email protocols; telecommunications system protocols; and standardised protocols in healthcare.

The APCC's 2-14 report *'A Framework for the Adoption of Project Team Integration and Building Information Modelling'* was produced with a view to identifying optimal delivery outcomes that eliminate waste, maximise end user benefits, enhance industry participants and also increase the productivity of the Australian and New Zealand economies. Specifically in relation to tendering, the report analyses BIM in the context of striving for "the adoption of procurement delivery models and contractual arrangements that remove ambiguity within the project team integration environment and takes advantage of the opportunities afforded by model based collaboration.

The report found that:

"the current approach to tendering can result in wasted effort by 'pushing' designs onto contractors and specialist trade contractors contributing to 10-15% of unnecessary costs. Unnecessary waste is still present in 'design and construction' tenders when typically the core design is locked away with clients and design consultants reluctant to re-open design and incur additional fees".

The Productivity Commission report, published in 2014, is strongly supportive of BIM, devotes an entire recommendation to supporting it and suggests that the Government should lead its development in Australia. Recommendation 12.5 speaks to the benefits to be gained from the adoption of BIM specifically in relation to lowering bid costs and reducing overall costs:

Recommendation 12.5
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.

To facilitate the consistent use of BIM by public sector procurers, Australian, State and Territory Governments should:

- *facilitate the development of a common set of standards and protocols in close consultation with industry, including private sector bodies that undertake similar types of procurement; and*
- *include in their procurement guidelines detailed advice to agencies on the efficient use of BIM.*

Terms of reference 6): methods to achieve optimal contestability in tendering for the supply of services with respect to government infrastructure;

Against the noted aims and benefits of contestability[8] – subjecting services to competitive pressures and encouraging more efficient and innovative service delivery – buildingSMART notes the benefits offered by BIM in terms of the ability to offer the Commonwealth a more efficient use of public funds.

The NSW Government should actively encourage innovation that provides the best value-for-money, including in procurement models and methods. All Australian governments, including the NSW government, are faced with challenging fiscal environments. BIM is a

[8] Burgess 2015, *Contestability in Public Services: An Alternative to Outsourcing*

money-saving concept that will improve the budget, drive productivity and make Australian businesses more efficient and competitive. Requiring BIM on government projects would deliver substantial productivity dividends for the budget of participating jurisdictions.

The adoption of BIM by industry permits clients and contractors to rehearse the construction of buildings on a computer before it is built. The benefits that this can lead to are far reaching, and extend not only to each and every player involved in the design, construction and maintenance of a building, but also to those who commission the work and use the building. As a significant player in the construction of new facilities for public use, the benefits to Government from using BIM in buildings that it commissions will be dramatic. By mandating BIM, the construction industry will be able to offer the Commonwealth certainty of project spend and drive significant savings for asset acquisition.

In a report released in 2015, the Queensland Department of Transport and Main Roads outlined how they expected professional engineers to evaluate risks and benefits of innovation that lead to 'value for money' solutions.[9] buildingSMART submits that the NSW Government should adopt the same principle, including seeing innovation as an opportunity to improve Australia's future.

BIM is a process that can integrate the data during the design, construction and maintenance of a project to be shared amongst all partners. While some designers, constructors and their consultants still rely on two-dimensional drawn plans to advance their project, those at the forefront of BIM have moved through 3D modelling, 4D (adding time or staging to 3D), 5D (adding cost data to 3D) and 6D (where the 3D data is populated with future asset information).

This is achieved through a mutual exchange of data, resulting in a complete digital description of a project. The BIM digital description is then available for the entire life cycle of a project, providing the client or owner with a perfect, updated "as-built" digital record of their asset. A simple example – instead of a pdf document of a Development Approval, a building model allows 3D assessment, analysis for ESD performance, and compliance with planning codes.

In 2011, the United Kingdom Government – currently the global government role model - announced that it would require fully collaborative 3D BIM as a minimum on all Government construction projects by 2016. The United Kingdom reports it is achieving a 20% reduction in procurement costs for government buildings compared with traditional practice through the introduction of its requirement for full 3D collaborative BIM.

[9] *Engineering Innovation In the Department of Transport and Main Roads,* September 2014, p 5.

Terms of reference 7): any other related matter.

buildingSMART submits that the adoption of BIM into NSW Government procurement models would involve no up-front cost implications for the Government. buildingSMART is simply requesting the Government's support by way of changes to its procurement practices, a move which in our opinion would be cost neutral.

In relation to costs to business, buildingSMART believes this to be modest and short term. Many of the industry's larger designers, engineers and contractors already have BIM software and for those who do not, there would be a one-off cost that would be recoverable on the savings in money and time on all future projects.

At present, large and well-resourced organisations, such as Tier 1 designers and builders, have been in a position to invest in and receive the benefits of BIM. However, in the construction industry 90 per cent of firms are small and medium sized, lacking the resources to independently invest in BIM. These firms are waiting for Government endorsement of BIM before they make these significant investments. It's time for a national Infrastructure policy statement to provide the industry with certainty and confidence to invest in and receive the benefits of BIM.

Conclusion

buildingSMART believes innovation through BIM is an opportunity to improve Australia's future. buildingSMART submits that the NSW Government should follow the United Kingdom's example and require the adoption of BIM in their government procurement projects. This would place NSW at the centre of innovation and global best practice in the design and planning of buildings and infrastructure.

buildingSMART thanks the Committee for the opportunity to provide its views. buildingSMART would be pleased to provide further information or a verbal submission at the Committee's request.

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