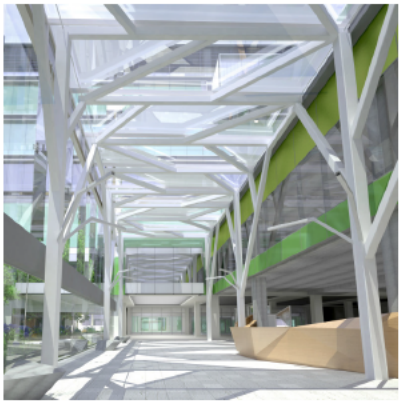
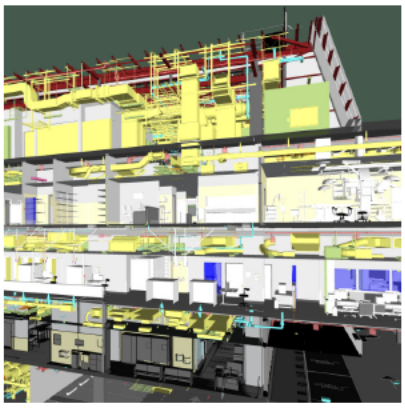
Inquiry into the Australian Government's Role in the Development of Cities

buildingSMART Australasia Submission

JULY 2017

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Executive Summary

The House Standing Committee on Infrastructure, Transport and Cities has commenced a new inquiry into the Australian Government's role in the development of cities, and has asked for public and industry input. In response, buildingSMART Australasia (bSA) has prepared the following submission.

The BIM (Building Information Modelling) and digital engineering sector notes the Commonwealth's intention to deliver national policy that can foster collaborative and flexible urban planning responses. To do that, bSA believes that the Government needs to adopt collaborative BIM based on open standards for information exchange (commonly referred to as Open BIM) as a policy imperative for all agencies that touch on the development of Australia's cities.

Our basis for such a recommendation rests on the significant economic benefits of BIM in helping achieve policy targets as detailed in numerous reports and inquiries such as:

- Productivity Commission – *Inquiry Report into Public Infrastructure* – July 2014 (Recommendation 12.5).
- Infrastructure Australia – *Australian Infrastructure Plan – Priorities and reforms for our nation's future* – February 2016 (Recommendation 10.4).
- Queensland Government – *State Infrastructure Plan – Part B: Program* – March 2016 (Implementation Action 15 and Opportunity 10).
- House of Representatives, Standing Committee on Infrastructure, Transport and Cities – *Report on the inquiry into the role of smart ICT in the design and planning of infrastructure* (March 2016).

The benefits of BIM have been known and thoroughly documented for many years, and can be summarised as follows:

- Better, faster and more rigorous project selection and project funding decisions (resulting from rapid options analysis and scenario planning).
- The secure collection of readily accessible digital data that will enhance future decision making (superior and enduring public records).
- Lower cost public buildings and infrastructure.
- Increased conformity with specifications and performance targets.
- Delivery of public projects as promised (on time, on budget and to the expected standard).
- Transparency and accountability in government project decision making.
- Development of a technology skill base that enables Australia to be more internationally competitive.
- Improved construction industry productivity and labour market improvements including safety.
- Accelerated adoption of digital innovation throughout Australia.
- Greater opportunities for further economic stimulus.
- Improved operation, maintenance and sustainability of public assets.
- Harmonisation of information across departments and agencies, leading to better public records and reporting associated with public assets.

This of course will in turn lead to considerable cost savings to the Commonwealth Government, good outcomes for consumers and tax payers, as well as strengthening the Australian economy.

In conclusion, the digital technologies necessary to help the Commonwealth deliver on its objective of achieving more sustainable cities, already exist and are ready to be deployed.

What regulation and barriers exist that the Commonwealth could influence, and opportunities to cut red tape

Precinct Information Modeling

One of the significant barriers to sustainable urban planning is the sheer complexity of the issues involved and the inability of all parties in the planning and development process to a) see the big picture, b) have input into the process and c) understand the ramifications/outcomes of various urban choices and decisions.

A tool that bSA would recommend be deployed in high-growth areas and local government areas is PIM (Precinct Information Modeling). PIM is a comprehensive 3D digital database model of a precinct. It contains all the Information needed to support planning, design, development, construction, management, operation, use and retro-fitting of urban precincts. The CRC for Low Carbon Living is working to maximize the benefits of precinct scale, high-growth and local government area developments. PIM provides a definitive repository of information at all stages in precinct design and management based on open standards. It integrates a diverse range of geographic, demographic and planning information data enabling Government to be better able to manage and reduce precinct and LGA scale energy efficiency.

Since the physical world is made up of objects, generally constructed or adapted by us for our convenience, it is natural to construct a PIM as a collection of objects (building, bridge, road, park, etc.) and then associate data or information with those objects. Importantly, that data is drawn from all kinds of existing sources through live database links: usage data, planning data, utility data, social data, product performance data, etc.

In essence PIM can explore all the different views of a precinct and develop a comprehensive digital model that accurately captures all the information needed to support those different views of the precinct. As well as all the activities undertaken to deliver an energy saving built environment, whether we start with a greenfield, brownfield or greyfield, or are simply retrofitting an existing precinct to increase its efficiency and reduce its carbon load.

As usage examples, the beneficiaries of PIM work range from an urban designer/planner wishing to measure projected carbon costs during precinct planning, a utility company endeavouring to optimise their operations to reduce carbon impact, a manufacturer managing the carbon efficiency of their building product or a householder seeking to understand the carbon impact of their lifestyle decisions.

Standards or Benchmarks for New City-Significant Projects

bSA would encourage the Commonwealth to introduce minimum standards or benchmarks for new city/state-significant development and major infrastructure such as large manufacturing, warehousing, waste, energy, tourism, education and hospital developments. However what bSA has in mind is the adoption of digital engineering options that when deployed, will have considerable impact on infrastructure energy and cost savings, even though they are not specifically energy-based standards per se. These options include:

- Adoption of collaborative BIM based on open standards for information exchange (commonly referred to as Open BIM and described here - http://buildingsmart.org/standards/technical-vision/open-standards-101/) throughout the procurement of all public buildings and infrastructure:
    - Process standard – Information Delivery Manual (IDM).
    - Data Standard - Industry Foundation Class (IFC).
    - Change coordination – BIM Collaboration Format (BCF).

- Mapping of Terms – International Framework for Dictionaries (IFD).
- Process Translation – Model View Definition (MVD).

- Develop a closer working relationship with ABAB (Australasian BIM Advisory Board) and adopt the BIM standards and protocols that the ABAB will promote as guidance for the industry. Note that while Commonwealth is an active participant already in ABAB, it could do much more to take the learnings from that forum and proactively drive them through key departments responsible for infrastructure development and the built environment.
- Consider the learnings from international jurisdictions where performance/contractual mechanisms have been used as an effective means of reducing project process duplication, wasted effort and enforcing as-built compliance (resulting in energy savings and reduced cost at the same time). For example, on the current London Underground project, contracts contain penalties if contractors produce construction work that does not meet the initial digital specification and modelling parameters. Likewise there are contractual incentives/rewards for over-achievement of modelling requirements. New contractual models like FAC-1 (Framework Alliance Contracts) are also being used to integrate and harmonise the activity of all contractors on a project. To reduce the incidence of product and building non-compliance, jurisdictions are including in contracts the power for regulators to; enter any project premises with the police or any other authorised person; take measurements, photographs, recordings, samples and test them; require any person to give information/statements or require the production of, or inspection and copy of documents; impose fines and appropriate penalties.
- Adopt automated checking of regulations during design using software applications that link to a BIM model and identify compliance. Does the design comply with the regulations? Where does it fail to comply? What areas need to be resolved? Such a tool has been piloted in the UK and will enable the transformation of the business of checking compliance, including energy efficiency compliance, from a manual hard copy process (often undertaken after the design work has been completed), into an iterative software application that works alongside the design development. The speed of the process will allow the designer to explore other – more sustainable – options and enable swift, regular reassessment, leading to improved designs.

International Role Models

The United Kingdom (UK) Government recently announced that BIM is now a minimum required by government from 2016.

Their chief construction adviser, Paul Morrell, has identified BIM as one way that government can deliver better value for the UK taxpayer. In his view, using BIM will lead to significant innovation and integration across the supply chain. Furthermore, his guiding statement is that BIM is not about a specific technology or product, but a process to give clients all the data that is of use to manage the facility after hand over. The United Kingdom is expecting to achieve a 20% reduction in procurement costs for government buildings compared with traditional practice through the introduction of its requirement for full 3D collaborative BIM to be used on government building procurements.

Other overseas jurisdictions that already require the use of BIM for government building procurements include the United States, Norway, Finland and Denmark. In our region, China, South Korea and Singapore have taken steps to achieve BIM implementation through a planned approach. For example, the Singaporean Government is well into applying a mandate for BIM, offering incentives to those willing to be the early pathfinders towards a goal of increased industry adoption, and ultimately full BIM submissions.

The Role of buildingSMART Australasia (bSA)

buildingSMART provides the worldwide chapter network, plus the necessary technical and process support, to develop open standards that support information workflows.

buildingSMART Australasia (bSA) is the body tasked with driving the uptake of BIM and digital engineering in Australia and New Zealand. bSA is a chapter of buildingSMART International and as such is able to bring considerable international experience to bear in support of the adoption of digital construction technologies. bSA's mission is to work with key industry and government leaders to develop, maintain and facilitate the use of open BIM standards, collaborative processes and integrated practices. We are committed to ensuring the improved exchange of information between software applications used in the construction and infrastructure industries in Australia and New Zealand.

bSA's objectives are to:

- Improve the policy and regulatory environment for the adoption of common specifications for sharing construction data.
- Facilitate the sourcing of practical information to the industry about common specifications for sharing data.
- Publish common specifications for sharing data to create synergy among the languages of the building and construction industries leading to interoperability of the industry's information systems.
- Help integrate the industry into the global electronic market and improve productivity of the design, construction and operation process in Australasia.

bSA works to fulfil these objectives by gathering and supplying practical and current industry information on behalf of bSA stakeholders and other organisations and companies that follow bSA through various means. This industry-wide approach to responding to technology, policy and regulatory issues, helps to ensure that Governments are informed of potential opportunities in the building industry and are provided with appropriate industry-considered recommendations.

bSA Corporate Members include:

Platinum Supporter	
Australian Department of Defence, Infrastructure Asset Development Branch	
Gold Supporter	
CIMIC Group (EIC Activities)	
Silver Supporters	
Laing O'Rourke Australia	John Holland
BIM Consulting	Investa Office Management
Master Builders Queensland	Lend Lease Building
bSI International Supporters	
Autodesk Australia	Arup
Corporate Supporters	
Masterspec - Construction Information	Norman Disney & Young
BRANZ	Architectus
Hansen Yuncken	Exactal Technologies
Aconex	Architekton
Mitchell Brandtman	Information Quality
12D Solutions	New Zealand Transport Agency
Academic Supporter	
University of South Australia	

Definitions

BIM (Building Information Modelling) is generally regarded as a process whereby a full 3D digital prototype of a planned facility (whether that is a building, piece of infrastructure or an urban precinct) is created during the planning and design stage and then maintained and updated throughout its life cycle to facilitate design collaboration across all disciplines, coordination during the construction and delivery phases, with handover of the as-built model to support on-going asset management and operation of the facility.

Digital Engineering is also known as BIM (Building Information Modelling). The two terms are interchangeable.

Open BIM is a term used to describe the same process when the digital prototype is structured in a non-proprietary, open-standard format and the associated processes are supported by industry-standard tools for managing information exchange between proprietary software tools and open access to standardised object libraries that host manufacturer's product data.