

On behalf of the Office of Government Procurement who is co-ordinating this consultation process we thank you for taking the time to participate in this consultation on the development of a BIM Adoption Strategy for the Public Sector.

Please note that all responses received by the Office of Government Procurement will be published within one month of the deadline for receipt stated below.

Fields highlighted in yellow with bold text indicate a mandatory response, all others are at the discretion of the respondent. If mandatory fields are not completed the response may not be considered.

Responses to be emailed to publicworkscontractsreview@per.gov.ie by close of business on **Thursday, 13 April 2017**.

SECTION A – Respondent's details

Name:	Royal Institute of Architects of Ireland (RIAI)
Select the sector title that best describes your area of work:	RIAI represents both Architects & Architectural Technologists working in Ireland.
Indicate whether the views expressed are those of a business, organisation or are in a personal capacity:	<p>Where the views expressed are on behalf of a business or an organisation please provide details on the number of employees or members represented.</p> <p>The RIAI has an overall membership of over 3,300 which comprises Members, Fellows, Architectural Technologists, Retired Members and Fellows, Architectural Graduates, Student Members and Honorary Members.</p>
Do you work in the public or private sector?	RIAI members work in both Public & Private Sector

SECTION B – Response to structured questions

Q1.	Does your organisation already have BIM policies/protocols/procedures?
<p>In 2013, the council of the RIAI adopted the position to promote the use of PAS1192-2 "Specification for Information Management for Capital Delivery Phase" as the standard to be used for BIM projects.</p> <p>The RIAI sought legal opinion on the use of the CIC (UK) BIM Protocol, as an addendum to standard appointments and contracts, where BIM was being used. The RIAI would be happy to make this Opinion available to the OGP if required. The RIAI would advocate that all parties on a BIM project are subject to the same BIM Protocol.</p>	

The RIAI would recommend that the Architect, where acting as the lead consultant, is engaged as the "Project Information Manager" for the design stage, following the CIC (UK) Outline Scope of Services for Information Management.

The RIAI have developed template documents for the Employers Information Requirements (EIR) and BIM Execution Plan (BEP) - 2 key documents referred to in PAS1192-2 - which RIAI would be happy to share with the OGP.

The RIAI BIM sub-committee have prepared a practice note on contractual and tendering procedures in relation to BIM which the RIAI, again, would be happy to share with the OGP.

The RIAI BIM sub-committee have also prepared a practice note on the use and functionality of the Common Data Environment (CDE) following BS1192 which the RIAI would, also, be happy to share with the OGP.

Q2. Has your organisation invested in BIM software?

The RIAI themselves have not, to date, invested in BIM software, but many RIAI member companies (architectural practices) have already invested in BIM Software. Investment into hardware, software and training is still a major concern for the majority of practices but particularly for smaller practices who generally have limited access to cash flow or borrowings for the level of investment required.

Q3. Has your organisation a dedicated BIM manager?

The RIAI has an active practice sub-committee for BIM which has been in existence since 2011. There are 10 people on the committee, representing large, medium and small practices, as well as public sector architects and architectural technologists. The committee has been involved in developing guidance, practice notes and templates to support RIAI members in the implementation of BIM. The RIAI would be happy to share these documents with the OGP to avoid duplication of effort.

Q4. Please outline the obstacles that exist to the successful adoption of BIM in your own organisation

The majority (over 80%) of RIAI member companies are small practices of 3 people or less. The primary concerns of RIAI members would be:

- The investment cost into hardware, software, training in the use BIM, with no apparent or immediate 'Return on Investment' accruing directly to architects. While the overall benefits to the client and project are understood, the direct investment by architects must be considered and supported.
- The individual burden on practices to produce BIM content to a consistent standard, on every project.
- Inconsistency in the demands from clients for BIM on projects, or lack of detail in the demands for BIM, which make it difficult to include when agreeing services and fees and getting other parties to participate
- Late engagement of other parties that need to contribute to the BIM process often requiring architects to do preliminary work of other disciplines at early stages which will then be discarded (abortive work) or progressing design without the input of a key party which may result in re-work at a later stage once that element is introduced.

The "big idea" of BIM is that the building is built twice - first in the virtual model, where coordination issues can be resolved (3D); where time-based logistical issues can be tested (4D); where quantities & costs can be confirmed (5D); where structural and energy performance can be simulated and tested (6D). However, the design procurement must be structured in a way that facilitates the time and effort of constructing the "virtual model" to the level of detail to fully test, resolve, analyze as above, before executing work on site i.e. the "value" of the virtual model has to be understood and resourced.

Q5. Please outline the obstacles that exist to the successful adoption of BIM in the construction sector

The RIAI would be of the opinion that the following possible obstacles could exist:

- Lack of a standardized approach to BIM amongst different clients and procuring agencies. The strict adoption of PAS1192-2 will bring about a standardized approach.
- Lack of adoption of BIM standards. There are already International & EU Standards, but these aren't being referenced, used or adopted in practice in Ireland.
- Lack of a clear National Framework for BIM Education that will ensure that the required skills for various parties to participate in a BIM project are being developed at 3rd level as well as post-graduate professional CPD.
- Lack of a real "value-add" incentive to drive BIM adoption. An example would be if BIM was provided as an option for submissions for planning, building control or e-tenders, instead of printed documents, it might incentivize clients and project teams to use BIM earlier.
- Lack of a National BIM Library of content for various building types. Procurement agencies like healthcare, education, justice etc. could provide 'ready-to-use' content which is pre-checked for quality and has requirements embedded in order to help reduce the inefficient duplication and the individual burden on SME's to produce this content. Product manufacturers and suppliers in Ireland can provide content to the National BIM library, making it available to designers and contractors. Organisations like Homebond, or Dept. of Housing etc. could provide standardized BIM details in 'ready-to-use' BIM format.
- Lack of a National BIM Toolkit (similar to NBS Toolkit in UK) to help clients define their project BIM requirements in a digital format which can then be developed by the design team and the construction team. Each project team is left to their own devices.
- Lack of a National Building Specification system that refers, specifically, to Irish Building Regulations and standards and is cross-referenced to National BIM Content. The Specification systems available are for the UK market, not specifically for Ireland.
- Lack of a National BIM Certification programme that provides confidence to clients that the companies tendering have the skill & ability to carry out a project using BIM, following a clearly defined standard like PAS1192-2, but also to reduce the burden on small companies to demonstrate capability on each and every tender i.e. just get certified once.
- Lack of a National BIM Information Resource providing easy to access, clear and concise guidance, tools and templates etc., even short training videos etc., to help SME's to understand and fulfill their duties under a BIM project i.e. reduce the individual burden on all SME's to figure all this out themselves.

SECTION C – Response to Position Paper – respondents may wish to provide the response to this section in a separate document, this should be attached with this response and sent to the email address above.

Standards to be used in the interim period until ISO/CEN standards are available.

1. As the consultation document has mentioned, there are 2 aspects to BIM standards. BIM is both a Process and Deliverable. In terms of the information management process, ISO19650 parts 1 & 2 are currently out for comment, and are being developed by ISOTC59/SC13 and under the Vienna Agreement, CENTC442 (the technical committee for BIM Standards in EU), will not develop separate or competing standards. Since CENTC442 are participating with ISOTC59, it is anticipated that once ISO19650 is adopted in its final version, that CENTC442 will adopt it as a European standard. At that point, member states are precluded from developing or maintaining a separate National Standard. In the interim period, the RIAI would recommend that the UK standards for information management (BS1192 parts 1-6) be used rather than developing a separate interim National standard. The current draft of ISO19650 is broadly based on the UK standards anyway, so there shouldn't be much difference once the final version is adopted.
2. Once ISO19650 is adopted, we will be required to produce National Annexes, which detail specific implementation of the ISO in Ireland. With the UK being such a big export market for Ireland, and given the amount of work already carried out by the UK, the RIAI would recommend that the National Standards Authority of Ireland (NSAI) do not start from 'scratch', in developing the National Annexes to ISO19650, but start from good practices already established in the UK and other early adopting nations (e.g. Scandinavia, Netherlands etc.). The government will need to support NSAI to resource a national technical mirror committee to develop the national annex to ISO19650, once adopted.
3. In terms of the Information Deliverable Standards, CEN (The European Standards Committee) have already adopted 3 international standards last year, as listed below, and therefore the National Standards Authority of Ireland (NSAI) are now precluded from developing or maintaining a separate national standard. However, the national implementation of these standards now has to be considered and worked out. The RIAI would recommend that the government charges, and supports NSAI to resource a national technical mirror committee to develop the national implementations of these standards, rather than leaving it up to individual companies and organisations to figure this out for themselves. This would be far more efficient and consistent approach.
 - I.S. EN ISO 16739:2016 Industry Foundation Classes (IFC) for data sharing in the construction and facility management industries (ISO 16739:2013)
 - I.S. EN ISO 12006-3:2016 Building construction - Organization of information about construction works - Part 3: Framework for object-oriented information (ISO 12006-3:2007)
 - I.S. EN ISO 29481-2:2016 Building information models - Information delivery manual - Part 2: Interaction framework (ISO 29481-2:2012)

The Role of Project Information Manager

We note the comment in the consultation document that *"... Best practice suggests that this important role requires full attention and should not be performed alongside other roles except on*

smaller projects. The role should be separately identified and resourced for the design, construction and operational stages..."

The RIAI would not entirely agree with this comment. We do agree that it is an important role, that requires full attention and that it should be identified and resourced. But we disagree that it should *'not be performed alongside traditional roles.'* The CIC PI insurance guide for Level 2 BIM indicates risks with appointing the Information Management role to an individual outside the project team.

We would, respectfully, suggest that "design" is communicated through "information" and that the coordination of design, equally, requires the proper coordination of information. To attempt to separate the coordination of design and the coordination of information between 2 parties that are not contracted, could create difficulties, in our opinion, where a 3rd party could potentially cause a delay or obstruction in the "design coordinator" carrying out their duties. We would suggest that "best practice" is that the party responsible for coordination of design, at a particular stage, is also responsible for the coordination of "information". The responsible party should of course properly assign and resource the role within their organisation or sub-contract the resource and technical requirements of the role, but the ultimate responsibility of "information management" would remain tied to the responsibility of "design coordination".

The RIAI would also suggest that, as a general principle, the lead consultant would be the most appropriate party to take on the role of Project Information Manager during design stage, which would be an additional duty, and that the Main Contractor would be the appropriate party to take on the role of Project Information Manager during construction stage and the appointed building operator (or facilities manager) would be the appropriate party to take on the role of Information Manager during operations stage.

It is important to note that PAS1192-2 requires each supplier or discipline to also have their own internal information manager (Task Team Information Manager), which is an equally important role, which needs full attention and which needs to be properly identified and resourced. In fact, the role of Project Information Manager cannot be successfully carried out, in our opinion, without the contributions from the individual Task Team Information Managers from each discipline. It is important that in procuring services from individual disciplines and suppliers that the contracting authority ensures this role/function is properly specified and identified so that it is included in the supplier's appointment/contract.

Short-term Implementation of BIM Level 1 as a "Stepping Stone"

The RIAI would suggest that the implementation of BIM Level 1 as a short-term requirement, could be relatively easy to implement and would provide a good "stepping stone" or incentive for industry to begin to use or to follow good "information management" standards and principles on 2D projects. BIM Level 1 envisages each design team member operating in 2D or 3D but imposes standards for information management such as BS 1192: 2007. There would be some compelling benefits to all parties, even at this level, in having information produced, managed and shared in a consistent way on all projects (whether 2D or 3D). The majority of industry are already using digital tools like CAD to produce information. It is a small step to ensure a consistent naming convention, as provided by BS1192, and to share electronic information in an organized way within a Common Data Environment (CDE) as described in BS1192. We believe the implementation plan should include a short-term target to achieve BIM Level 1 on projects, which will provide a necessary stepping stone to achieving BIM Level 2 and beyond. The RIAI have

produced an advice note on the Common Data Environment, and would be happy to share this with the OGP.

Promoting Efficiency & Consistency in the sector, and reducing the individual burden on small or medium enterprises.

The RIAI would like to note that a high percentage (over 80%) of architectural companies involved in the construction sector are small practices with less than 3 people. Adopting policies that impose an individual burden on all these practices to re-purpose and re-think the way they do business and, with all associated costs, could potentially be ignored or opposed or create undue difficulties.

Leaving the implementation of the BIM Strategy entirely up to the individual procuring authorities could potentially result in inconsistencies in approach which could make it more difficult for small enterprises to respond to on every project.

The RIAI would suggest that the government has the opportunity, incentive and resources to implement BIM in an efficient and consistent way, across all procuring agencies and project type, and to implement some tools and resources at a National Level which would help improve quality and consistency of data while, at the same time, reduce the individual burden on SME's. The following are some suggestions, which could be explored:

- Clear policy on the use of common Standards
- Providing a "streamlined" and connected digital infrastructure for e-planning, e-building control, e-tendering, etc. that avoids excessive duplication of information which is both a burden on industry and a burden on public sector in having to assess responses etc.
- Providing a National BIM Object Library of both "generic objects" used for design and actual products available in Ireland which are used for construction.
- Providing a library of Accredited Construction Details via Department of Housing or Homebond, in BIM format, which encompass required parameters and principles of current regulations.
- Providing a National BIM Toolkit, similar to UK toolkit, to help clients & project teams define and manage requirements
- Providing a National Building Specification Systems that references Irish building regulations and contracts and are cross-referenced to the Library & Toolkit.
- Providing a National Information Resource with clear guidance, tools and templates and even training videos, to help SME companies and possible procuring agencies.
- Providing a National Learning Outcomes Framework for Education at both 2nd & 3rd Level with tools/resources that can be shared across educational institutes.
- Providing a National BIM certification programme through the NSAI to promote consistency in quality and only requires SME's to get their capability assessed once - not for every project.

Designing for Quality and Performance - not just price.

There are increasing legislative demands for building to "perform" in a particular way such as EU NZeb Targets etc., and it is generally acknowledged that "quality" buildings are more durable and less expensive to maintain and operate over their lifecycle. Quality and performance doesn't necessarily cost more or might cost slightly more in design and construction stage but, when considered in the overall lifecycle of the building, is probably negligible or saves a lot of

time/money. The RIAI would highly recommend that more emphasis is placed on quality and performance of buildings in the procurement process.

BIM (or the creation of the virtual building) allows far more detailed analysis and exploration of the lifecycle costs of the building, to make sure quality and performance targets will be achieved, but the traditional design and construction process, doesn't easily allow the resources/time to perform this kind of analysis, and doesn't allow for the engagement of the right expertise at the right time (i.e. early engagement). The RIAI would highly recommend that the principles of "designing for performance", as detailed in BS 8536 "Briefing for Design and Construction Code of Practice for Facilities Management (Buildings infrastructure)", or more commonly referred to as "soft landings", are incorporated into the procurement process to help ensure that quality and performance outcomes are determined early on and achieved. BS8536 encourages "early engagement" of contractors and building operators in the design process, and post-handover engagement of the design/construction team in post-occupancy evaluations. While there will be some costs involved in implementing the principles of BS8536, these should be negligible or insignificant when considered in overall lifecycle cost of buildings but will help in producing better quality and better performing built infrastructure which will bring "added value" to public expenditure.

References to Level 3 BIM

The RIAI notes that there are some references in the consultation document to Level 3 BIM and would suggest that it may be a bit pre-mature to be referring to Level 3 BIM when it hasn't even been properly defined. It may just create confusion and distraction at this stage. As noted in the consultation document, the implementation of BIM Level 2 maturity requires very little change in the way industry operates, as it should be the immediate focus. Individual suppliers or discipline models provides a clear line of responsibility to the information to be provided by that supplier. The "federation" of models allows for coordination and analysis on the complete building but the responsibility/liability and even copyright or IP, can be traced back to the originators' model. Of course BIM Level 2 is not the long-term "ideal", as there is still duplication of effort between designers maintaining "design intent" models and contractors maintaining "construction" fabrication and as-built models, but BIM Level 2 does represents a vast improvement in how information is produced, managed and shared at the moment - BIM Level 0.

Ireland could adopt a "wait and see" approach to BIM Level 3 or it could get involved in the research and development around BIM Level 3 and be seen as "leading or contributing" in this area. The RIAI would suggest that the government commit some resources to the ongoing research and advancement of BIM Level 3, in their strategy, or support participation in European & International groups looking at BIM Level 3.

RIAI representation on the Oversight Body

The RIAI believe that architects play a key role in the way information about built infrastructure is developed, managed and exchanged and bring a broad and unique insight into the information management process. We also feel it is important that the understanding and expertise of the architectural profession is included on the Oversight Body. If resourced from within the public sector, the RIAI would request that direct links between the oversight body and the RIAI are maintained.

Collaborative Procurement

BIM, or the construction of the "virtual building" in software, provides opportunities that were not available in traditional procurement. The expertise of those who will construct and will maintain and operate buildings, can be engaged far earlier around the "virtual building". This means that key issues of constructability, logistics, safety, performance, preventative maintenance, operational procedures, full lifecycle costs etc., can all be considered long before the actual project starts on site. Potential problems can be predicted and avoided but this means that traditional procurement, which typically excludes the input of contractors & facilities managers, needs to be changed. There needs to be a mechanism to engage the expertise of suppliers far earlier, based around assessment of the "virtual building", in order to avoid real expensive problems that could occur later. This is not a new idea. Early engagement of the supplier chain was identified as a need by Latham (1994) and Egan (1998) but in most cases there was no "virtual building" to assess. BIM now offers this opportunity for external 3rd parties to quickly and easily review design information when presented in the form of a virtual building (digital data). There are successful examples of the use of "collaborative procurement" like PPC2000 contracts in UK, IPD contracts in US, partnering contracts in Europe, alliancing contracts in Australia, etc. The RIAI believe this opportunity to engage everyone around the "virtual building" that is BIM could potentially solve many problems related to traditional "late engagement" of the supply chain. This needs to be properly considered and explored in procurement.

Project Bands & Timelines.

We refer to Table 1 of the GCCC Position Paper– Indicative BIM implementation timelines. While the RIAI would agree with the principle of a strategic, well-managed, structured approach, we would make the following comments:

- In the "international context" and referring specifically to the UK, our most immediate neighbour, we are 7 years behind. The UK published their BIM strategy in 2010 incorporating their mandate into their 2011 Construction Strategy and set an implementation timeline of 5 years - to April 2016 - in order to allow for the development of standards and protocols. Scotland and Northern Ireland are due to implement their mandates in April this year (2017).
- Also, Band 5 "complex Projects with specialist operations" is not always necessarily the most obvious or immediate project to use BIM on. In fact, small, non-complex projects with lower risk, can often be a better starting point for SME's to use BIM for the first time. The RIAI assumes that the project bands & timelines do not preclude any procuring authority from requesting BIM earlier than the suggested timelines where great benefit may be gained.

Case Studies & Pilot Projects

The RIAI are aware of a number of public sector projects that have already been delivered through BIM or are currently underway. We feel it would be beneficial for these to be properly investigated and documented, for lessons learned, key performance indicators etc. and the case studies to be shared with industry. The RIAI are aware that Enterprise Ireland have awarded a research contract to the Construction IT Alliance (CITA) to investigate the BIM capability in Ireland. As this is "public money", we suggest that Enterprise Ireland and CITA be asked to include some specific public sector projects in their case study research and that this is shared with the broader

industry. The RIAI also feel that the government should commit continued resources to research and development of better ways of planning, designing and constructing in order to ensure "Ireland" is at the forefront of technological development. The RIAI would support the establishment of a multi-disciplinary industry research unit.