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## Level 1 before Level 2 – The Irish BIM mandate

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**Abstract – Government Contracts Committee for Construction (GCCC) has prepared a position paper titled ‘A Public Sector BIM Adoption Strategy’, which outlines the context and rationale for the adoption of BIM and puts forward a proposed timeline for adoption, the purpose of this position paper is to invite a response from industry [1].**

**This paper analyses the position paper on the subject of the implementation of the proposed mandate. The author defines what is implied by UK BIM Levels 0, 1, 2 and 3, and collates the responses from industry to the position paper regarding the implementation plan.**

**The position paper is universally welcomed by organisations and there is a want for this initiative to be done right. It is clear from the position paper and responses that there is confusion in the definition of the BIM maturity levels, this confusion is also validated by the literature review. The respondents also want the new mandate to take direction from the upcoming EU BIM standards.**

**The author proposes that the mandate should be for BIM level 1 principals first, to encourage the public sector to introduce information management processes into their organisations, before the planned phased mandate for BIM level 2.**

*Keywords - Building Information Modelling, Irish BIM Mandate, BIM maturity levels*

## I INTRODUCTION

What is the best way forward for BIM implementation in the public sector? Now that the UK Level 2 mandate has come into effect, there is a drive to mandate BIM in Ireland. This mandate is necessary to move government bodies towards BIM, as they are traditionally slow to adopt new ways of working, the correct implementation is crucial to its success.

The question remains what should Ireland do, should Ireland use the UK Level 2 mandate documentation as is, and fix a date for the mandate to take effect, as the UK did, but the UK gave 5 years notice to the industry before the mandate came into practice. Does Ireland have the luxury of this time? The position paper looks at a more staged approach in time, is this the right approach for Ireland so that results can be achieved quickly.

This paper investigates what should the first step that the Irish industry, or more importantly public sector organisations need to take to prepare for the future state of a BIM level 2 mandate.

## II LITERATURE REVIEW

The literature review focuses first on the Government Contracts Committee for Construction’s (GCCC) ‘BIM Adoption Strategy Statement of Intent’ position paper and then reviews the definitions for BIM maturity levels.

### *a) BIM Adoption Strategy position paper*

The GCCC published a position paper on the 15th March 2017, following consultation with public bodies engaged in public works projects, with the purpose of inviting responses from industry. The position paper titled ‘A Public Sector BIM Adoption Strategy’ outlines the context and rationale for the adoption of BIM and puts forward a proposed timeline for adoption.

Statement of Intent: *“Properly implemented, a public sector Building Information Modelling (BIM) adoption strategy will support the implementation of Government policy objectives in the procurement of public works projects, in their construction and in their maintenance upon completion.”*

Government policy objectives are defined as cost certainty at tender award stage, better Value For Money (VFM), and more efficient delivery of public works projects.

The author will focus on the proposed implementation plan of the strategy. The strategy is primarily concerned with managing its adoption rather than case making. It recommends the adoption of BIM on public sector construction projects be mandated by Government to ensure a consistent and coherent approach to procuring BIM on public sector building projects. Through consultation, the views of

the main capital spending bodies have been taken on board in the preparation of the position paper.

The position paper defines BIM maturity levels as;

BIM Level 1: envisages each design team member operating in 2D or 3D but imposes standards for information management such as BS 1192: 2007.

BIM Level 2: each design team member creates and develops its own digital model; together these comprise a federated model of the overall project.

BIM Level 3: full collaboration by the project team members and anticipates the use of a single BIM model held by all project team members to access, use and modify at any time within a centrally held Common Data Environment.

The position paper outlines risks and challenges before defining the strategy. There is a potential risk in its adoption with the production of a model that is of little long-term use at a significant cost and significant disruption in organisations during its early adoption. A risk of failing to manage BIM adoption is also identified, as a piecemeal approach to adoption across the public sector will result in different approaches, which could lead to greater investment required to undo non-standard practices that may be adopted.

The key challenges in order to assist in its adoption, standards must be mandated to ensure that the public sector sets clear and consistent requirements. A draft International Standard ISO 19650 is currently out for comment by CENTC442, this will lead to a new set of BIM standards that will affect the defining requirements. New roles, procedures, and technology will be required in client organisations/Government bodies which will require cultural change.

The position paper states that early contractor involvement is necessary for Level 3, and probes if a

different approach to risk and insurance provisions is needed and if culture change implementation beyond Level 2 is possible.

The government will be asked to decide to mandate the adoption of BIM across the public service on the basis of a high-level strategy. The goal of the strategy is to ensure that public bodies invest the necessary resources and to impose standards for delivery across the public sector. The strategy will include high-level recommendations around standards to be adopted and a timeline for implementation. The strategy will apply to all projects procured under the public capital programme, and Capital Works Management Framework (CWMF) will be augmented to incorporate the necessary documentation. In the timeline for adoption, target dates are set for projects to adopt BIM, early adopters will be those projects where the long-term benefits are deemed to be the greatest, which are complex construction projects with intensive operation and maintenance regime.

The position paper concludes with notes stating that, BIM Level 1 and 2 will be defined in the Strategy. The Contracting authorities should adopt Level 1 before the adoption strategy requires Level 2 to be applied to their projects, as Level 1 imposes many of the information production standards and prioritises the internal organisational changes without having to make the transition to a digital environment and so 'prepares the ground' for the move to the digital requirements of Level 2. The timeline should not be accelerated except for pilot projects to allow service providers and contractors time to adopt the technology and processes [1].

Table 1 – Indicative BIM implementation timeline – Period (months) from Government mandate to the introduction of BIM requirements in contract notices

		Complex Project Complex FM	Complex Project Medium FM	Medium Complex Complex FM	Medium Complex Medium FM	Low Complex
Public Sector	Sub-Sector	Band 5	Band 4	Band 3	Band 2	Band 1
D. Ag & Marine					+36 Level 2	+18 Level 1
D. Defence			+18 Level 2	+24 Level 2	+36 Level 2	+48 Level 2
D. Education	Primary		+18 Level 2	+24 Level 2	+36 Level 2	+48 Level 2
	Secondary		+18 Level 2	+24 Level 2	+36 Level 2	+48 Level 2
	Third Level	+12 Level 2	+18 Level 2	+24 Level 2	+36 Level 2	+48 Level 2
D. Health	HSE	+12 Level 2	+18 Level 2	+24 Level 2	+36 Level 2	+48 Level 2
	Vol. Hospitals	+12 Level 2	+18 Level 2	+24 Level 2	+36 Level 2	+48 Level 2
D. Housing	Housing		+18 Level 2	+24 Level 2	+36 Level 2	+48 Level 2
	Non-housing.	+12 Level 2	+18 Level 2	+24 Level 2	+36 Level 2	+48 Level 2
OPW	Heritage	+24 Level 2	+30 Level 2	+36 Level 2	+48 Level 2	+18 Level 1
	Flood Risk				+36 Level 2	+18 Level 1
	New Build	+12 Level 2	+18 Level 2	+24 Level 2	+36 Level 2	+48 Level 2
TII	Rail	+12 Level 2	+18 Level 2	+24 Level 2	+36 Level 2	+18 Level 1
	Road	+12 Level 2	+18 Level 2	+24 Level 2	+36 Level 2	+18 Level 1

## b) BIM maturity levels

### i) BIM Level 0

The most common definition for BIM level 0 is only utilising unmanaged 2D CAD drafting. Outputs and distribution are via paper or electronic prints, or a mixture of both [2] [3] [4] [5] [6].

This is the traditional way of working enhanced only by technology to speed up the production and exchange of drawings, [5] essentially it is a digital drawing board [6].

All changes, checks, and interfaces across disciplines are manual [5], without common standards and processes [6], this effectively means no collaboration [2].

### ii) BIM Level 1

Level 1 is definition as managed CAD is a mixture of 2D or 3D format using BS 1192:2007, and electronic sharing of data is carried out with a collaboration tool providing a Common Data Environment(CDE), some standardised data structures and formats [2] [3] [4] [5] [7].

Scottish futures trust state that to achieve the BIM Level 1 standard, the following elements should be in place; Roles and responsibilities should be agreed upon. Naming conventions should be adopted. Arrangements should be put in place to create and maintain the project-specific codes and project spatial coordination. A Common Data Environment (CDE) should be adopted, to allow information to be shared between all members of the project team, A suitable information hierarchy should be agreed which supports the concepts of the CDE and the document repository. The establishment and effective management of the CDE is key to this standard [7].

Commercial data will be managed by standalone finance and cost management packages with no integration [3] [4]. This may include 2D information and 3D information such as visualisations or concept development models [5] [6].

Collaboration is limited between disciplines with each controlling and issuing its own information either as 3D models or 2D drawings derived from those models. [5]. But BIMtalk and Designing Buildings disagree with this, stating that models are not shared between project team members [2] [6]. Level 1 can be described as 'Lonely BIM' [2].

### iii) BIM Level 2

This is defined as a managed collaborative environment working across disciplines with all parties using a series of domain models, that contribute to a collaborative federated 3D BIM model

with attached data, the models should not lose their identity or integrity [2] [3] [4] [5] [6].

The models, consisting of both 3D geometrical and non-graphical data, are prepared by different parties during the project life-cycle within the context of a common data environment [5].

The collaboration comes in the form of how the information is exchanged between different parties and is the crucial aspect of this level. Capable of exporting to one of the common file formats such as IFC (Industry Foundation Class) or COBie (Construction Operations Building Information Exchange), which enables any organisation to be able to combine that data with their own in order to make a federated BIM model, and to carry out interrogative checks on it [2] [5].

This level of BIM may include 4D Programme data and 5D cost elements [4] [3] [6] [7] and integrated by proprietary information exchanges between various systems or bespoke middleware [3] [5]. Project participants will have the means necessary to provide defined and validated outputs via digital transactions in a structured and reusable form. Clients will have to be able to define and use data, and the industry will need to adopt common ways of working based on standard data file formats. [5]

BIM Level 2 maturity is illustrated in the Bew-Richards "BIM Wedge" noted that Level 2 builds upon Level 1 standards especially BS1192-2007 and its requirement for a Common Data Environment. [7].

Although there is somewhat of a consensus on what BIM level 2 means, it is more difficult to find a agreement on what is required to achieve BIM level 2.

The BSI website 'bim-level2.org' which is supported by the UK government list below as the BIM Level 2 suite of documents, which have been developed to help the construction industry adopt BIM Level 2 [5].

- BS 1192:2007 + A2:2016
- PAS 1192-2:2013
- PAS 1192-3:2014
- BS 1192-4:2014
- PAS 1192-5:2015
- BS 8536-1:2015
- BS 8536-2:2016

The BSI website 'bim-level2.org' also states that Uniclass 2015 and the digital Plan of Work (dPoW) are essential parts of BIM Level 2 and were developed to sit alongside the BIM Level 2 documentation. Uniclass 2015 is a unified classification that contains consistent tables that classify items. The digital plan of work enables an employer to define the deliverables required at each stage of a construction project [5].

BIMtalk [3] state that The UK Government in 2014 refined its definition of level 2 BIM as the following seven components:

- PAS 1192-2:2013
- PAS 1192-3:2014
- BS 1192-4
- BIM Protocol
- GSL (Government Soft Landings)
- Digital Plan of Work
- Classification

BIMtalk has included the 2 tools but also includes the BIM Protocol, as the requirement for this protocol is in PAS 1192-2 and GSL (Government Soft Landings) is now BS 8536-1:2015, this definition does not substantially differ from 'bim-level2.org'.

#### iv) BIM Level 3

The latest UK vision for BIM Level 3 has been published as part of the Digital Built Britain (DBB) Strategy, the Strategy is part of a wider digital strategy which includes The Industrial Strategy – Construction 2025, the Business and Professional Services Strategy, the Smart Cities Strategy and the Information Economy Strategy, with the goal of creating a high-performing, transparent economy that efficiently delivers services to all of its citizens. DBB is to provide a seamless transition from the achievements of Level 2 BIM and the Construction Strategy into an environment where technology and working with technology is second nature in construction, but this strategy has not been fully defined yet [8].

Some sources defined Level 3 as fully open process and data integration enabled by IFC/IFD, managed by a collaborative model server. 'iBIM' (integrated BIM) potentially employing concurrent engineering processes and is intended to deliver better business outcomes [4] [6].

Other sources have a much more narrow view based mainly on the construction stages of projects, defining Level 3 BIM as, full collaboration between all disciplines and contributors to a project will be able to access, modify and transact using a single, shared project model, held in a centralised online repository [2] [5] [6]. This level of BIM will utilise 4D construction sequencing, 5D cost information [3] [6] and supports a 6D project lifecycle information management approach [3] [5] [6].

All parties can access and modify that same model, and the benefit is that it removes the final layer of risk for conflicting information [2] [5]. Current nervousness in the industry around issues such as copyright and liability are intended to be resolved, the former by means of robust appointment documents and software originator/read/write permissions, and the latter by shared-risk procurement routes such as partnering [2].

Finally, some sources define this as 'Open BIM' [2] [4] [6].

### III METHODOLOGY

The approach of the paper is to appraise the position paper's implementation plan for BIM within the public sector. The authors' primary data collection methodology involved Secondary research on the industry responses to the position paper. A Qualitative approach through a social reality paradigm was used to analyse the responses for their reaction to the implementation approach, the responses are collated into three groups; Business, Organisation and Personal. The author has included personal response as they are from reputable sources.

"SECTION C – Response to Position Paper" was the main source of information used.

It was discovered that there are little peer-reviewed papers that defined UK BIM maturity, so the author used government supported websites and reputable websites that have been endorsed by industry bodies to get information regarding BIM levels.

The author reviewed the responses and deemed that Construction IT Alliance (CitA) had misidentified their category, CitA was re-categorised as an Organisation, as it represented the views of its membership through a survey and it describes it's self as an Irish Not-for-Profit Organisation. The Grangegorman Development Agency (GDA) response was not included to remove bias, as this was submitted by the author.

### IV SECONDARY RESEARCH

The response to the GCCC position paper;

#### a) Organisation responses:

##### i) Association of Consulting Engineers of Ireland

The ACEI welcome a consistent approach from the public sector and particularly appreciated the wording "Properly implemented". The association also welcomes the envisaged outcome of a consistent and coherent approach to procuring BIM on public sector building projects.

On BIM maturity levels in the ACEI reading of the text on the position paper, it questions if a centrally held Common Data Environment (CDE) is for Level 3 only. ACEI would suggest the position paper needs to reflect that a CDE is a requirement of Level 0 BIM and required to undertake work to BS 1192.

ACEI would suggest the paper reflects the different possible maturity levels and the achievement of more/less benefit the higher the level. The suggestion that Level 2 is not full BIM may develop a negativity in readers about this maturity and drive them to seek a Level 3 BIM Maturity, which the construction industry (including software and BIM



tool providers) is not ready to deliver. They would suggest that early contractor involvement is maturity level neutral.

ACEI welcome the statement “Contracting authorities should adopt BIM Level 1 requirements before the adoption strategy requires Level 2 to be applied to their projects.” [9]

#### ii) Construction Federation Ireland (CFI)

CFI believe there is a need for clarity as to what BIM Level 2 means in an Irish context, without this definition, there are likely to be contractual problems in any project that states that BIM should be developed to level 2 or level 3 as there is no definition as to what this means.

They conducted a survey of its membership to obtain views from all regions and disciplines to the position paper, some of the feedback included, *“it is critical that process, understanding, responsibilities, and participants are aligned under a clear common framework to permit this. There needs to be a clear definition of what the BIM levels are, particularly on what is meant by BIM Level 2. The GCCC should also set a definitive statement and targets for what should be achieved by introducing BIM to public procurement”*.

The strategy should establish clear objectives, principles and deliver an understanding for participants and there is a need for national standards and protocols. There needs to be a co-ordinated approach between Ireland’s standards development and the EU BIM Task Group [11].

#### iii) Construction IT Alliance (CitA)

The CitA board are delighted to see this strategy and welcome its aspirations. While there is a specific reference to the need for a public mandate for BIM adoption in Ireland, consideration should be given to accelerating this timeline.

CitA also conducted a survey of its membership, the response to the survey shows that members believed that the 48-month timeline for level 2 is not ambitious enough, as Europe could have advanced to Level 3 during this timeline. That a staged approach would be best as it is not practical for every Contracting Authority to have the necessary BIM capability to engage with BIM projects. The mandate applying first to major authorities to develop the capability is preferred and then progressing out to the wider public sector. [12].

#### iv) Dublin Institute of Technology (DIT)

DIT comments included that items shown in Table 1 that require only Level 1, the table must also show when these Bands will mandate level 2 BIM. The

definition of Levels 1 and 2 in the Strategy need to include comprehensive details on or adoption of international / professional body standards on levels of development, detail, and information. They believe adoption of ISO standards around BIM within the strategy is essential for successful implementation [14].

#### v) Royal Institute of Architects of Ireland (RIAI)

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.

The RIAI 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" to achieving BIM Level 2 and beyond. They define 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 RIAI suggest that it's 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.

The RIAI warn that 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. They would recommend clear policies on the use of common Standards or provide a National BIM Toolkit, similar to the UK toolkit, to help clients and project teams define and manage requirements. The RIAI advise that it may be a bit premature to be referring to Level 3 BIM, the implementation of BIM Level 2 should be the immediate focus. BIM Level 2 is not the long-term *"ideal"*, but BIM Level 2 represents a vast improvement in how information is produced, managed and shared at the moment - BIM Level 0.

The RIAI would suggest that the government commit resources to the ongoing research and advancement of BIM Level 3, in their strategy, or support participation in European and International groups looking at BIM Level 3.

DIT comments included The RIAI would agree with the principle of a strategic, well-managed, structured approach and assumes that the project bands and timelines do not preclude any procuring

authority from requesting BIM earlier than the suggested timelines [18].

vi) Society of Chartered Surveyors Ireland (SCSI)

SCSI state that In addition to the implementation of a consistent approach across the public services, there needs to be greater coordination between the public and private sectors in the development of the guidelines and procedures. For the items shown in Table 1 as requiring only Level 1, the table must also show when these Bands will mandate level 2 BIM.

The definition of Levels 1 and 2 in the Strategy need to include comprehensive details on or adoption of international / professional body standards on levels of development, detail, and information. The adoption of ISO standards around BIM within the strategy is essential for successful implementation. The mention of IFC at the end of the project is neither specific enough nor appropriate. IFC is a scheme that supports collaboration and interoperability during the project and not so much at handover. SCSI note that there is no reference to (COBie) throughout the document [19].

b) Business responses:

i) Jones Engineering

Jones comment that any policy and standards being developed should reflect the work being undertaken in the EU in relation to BIM (2014 Procurement Directive). The existing UK documents should be utilised as a very valuable template to develop the Irish policy and standards, *'re-inventing the wheel and having differing standards would be a retrograde step'*.

The durations outlined in Table 1 *'seem realistic, however previous experience in implementation of new process in the Irish context has seen dates as a moving feast', 'mobilisation to ensure these dates are met must be a cornerstone of the process'* [17].

ii) DCS Engineering Consultancy

DCS state that the paper is *'a positive read and a lot of good work has gone into the development of this report'*. It is important that an asset management strategy (storage and information system) is developed that BIM information can be linked to [13].

iii) Simon Fraser

Simon Fraser state that the publication is a very welcome development and indicates a clear intention on the part of Government to incorporate BIM

processes into the public procurement of construction projects. The CWMF does not cater for BIM processes and, as acknowledged in the position paper, work will be necessary to include such BIM methodologies and processes as are required [16].

iv) Turner & Townsend

Turner & Townsend comment that BIM Level 3 which is mentioned in the document is a 'long way off'. If the decision is made to use the UK developed documentation i.e. PAS 1192s etc. a review of the Workstage's defined in the Public Works Contracts (PWC) will be needed, as the UK documents are aligned to the RIBA Stages [20].

c) Personal responses:

Bernard Pierce (HSE Estates Department) is fully supportive of the strategy and a coherent approach to procuring BIM on public sector building projects [10]. Dr Shawn O'Keeffe (BIM Development Director and PI of R&D at Headcount Group) believes that 'the wedge idea' from the UK documents and 'Level 2 vs 3, or vs 0, or 1' needs to be omitted and that the mandate should utilise ISO 10303-21. He believes that the emphasis on UK practice should be removed and that the focus should be on a EU BIM ecosystem and other locations that have implemented open BIM practices using ISO 16739 [15].

## V DISCUSSION & ANALYSIS

The position paper finishes with high-level recommendations on standards to be adopted and a timeline for implementation [1]. The author discusses identified topics and concludes with the possible impact of the findings.

a) Timeline

Jones believes the durations outlined in Table 1 seem realistic, but warn of the potential for this timeline slipping, maintaining these dates must be prioritised [17]. For most others the dates are not aggressive enough, CitA believes consideration should be given to accelerating this timeline, with a CitA member suggesting that with 48 months for some categories to take effect, Europe will have advanced to level 3 [12]. The RIAI would encourage procuring authorities requesting BIM earlier than the timelines [18]. Another CitA member agrees with not applying BIM across the industry at once and concurs with the approach of starting with major authorities and developing the capability. DIT comment that categories which currently require only Level 1, should also have a requirement for Level 2 [14]. The GCCC also acknowledge that pilot projects will be

required to allow service providers and contractors time to adopt the technology and processes [1].

#### *b) BIM maturity level*

The respondents differ on their interpretation of what is meant by BIM Levels 1, 2 and 3. Other respondents look for a clear comprehensive detailed definition of what the BIM levels mean in an Irish context [11] [14] [19]. ACEI question the wording “*full*” BIM, the implication that Common Data Environment (CDE) is required for Level 3 only and early contractor involvement is necessary for Level 3 [9], but Turner & Townsend believe that BIM Level 3 is not going to be a concern in the near future [20].

The position paper stated in Note 1, that Level 1 and 2 will be defined in the Strategy [1]. There is no definitive definition of what is required to achieve the UK defined BIM levels. There is a common understanding that the goals of these levels are;

Level 0: Unmanaged information,

Level 1: Managed information within an organisation using industry standards,

Level 2: Managed construction project information across a number of organisations, using process standards for collaborative decision-making.

But this is not the case for level 3, the UK government define this as Digital Built Britain, a combination of the Construction Industry, Smart City and Information Economy Strategies that have yet to be fully defined. The industry bodies are fixed on a definition that requires a single construction model that is modified by all, and that can be used in operation.

#### *c) Level 1 first*

The position paper proposed that the Contracting authorities adopt BIM Level 1 before the adoption strategy requires Level 2, as level 1 will ‘*prepare the ground*’ [1]. RIAI suggest that BIM Level 1 is a good ‘*stepping stone*’ to achieving BIM Level 2 and beyond [18] and ACEI also welcomes the approach of adopting BIM Level 1 first [9]. The RIAI suggest that the implementation of BIM Level 1 will impose standards for information management, ensure a consistent naming convention, and enable sharing of electronic information in an organized way within a CDE as described in BS1192:2007, as they believe that information is currently managed and shared at BIM Level 0 [18]. The GCCC hope that level 1 will prioritise the internal organisational changes required for level 2 [1].

#### *d) EU standards*

The GCCC recognise that the draft International Standard ISO 19650 will lead to a new set of BIM

standards that will affect the defining requirements [1]. This is also echoed by the respondents, who note that the adoption of ISO standards within the strategy is essential for successful implementation [14] [19] and that there needs to be a co-ordinated approach between Ireland’s standards development and the EU BIM Task Group and the 2014 Procurement Directive [11] [17].

The RIAI would recommend that the NSAI develop a National Annex to ISO19650 by building on the UK and other early adopting nations’ good practices [18] but Dr Shawn O’Keeffe believes that the high emphasis on UK practice should be removed as this could hinder Ireland in the EU [15].

The author analyses the impact of the findings and concludes that introducing a BIM level 1 mandate in the short term would give the public sector organisations the directive to start updating their workflow and information management processes. So that when the mandate for level 2 BIM comes into effect, they have their preparation completed and can focus their effort on the new requirement of the production of 3D models.

Use of BIM levels is open to interpretation, the mandate should move away from specifying workflows and instead define information outputs, these outputs should be defined in EU standards. This would focus the supply chain to concentrate on the outputs, and having a consistent output across the public sector would be of value when looking at the information as a whole for smart city functionality.

To allow for a staged implementation, the stages could be specified as file-based deliverables to equate to BIM level 1 for the first step and then container-based deliverables to equate to BIM level 2 for the desired future state.

The approach of following EU or ISO standards allows the public sector to leverage the international knowledge across the industry and use best practise standards without the need to recreate Irish versions, this will also better equip the Irish AEC industry to compete in international markets.

Public sector organisations adopting a minimum of level 1 across all projects will prevent them managing information at BIM Level 2 and BIM level 0 for 48 months till band 5 in table 1 catches up. There is also a risk that if organisations procure information at BIM level 2, that this information will revert to BIM level 0 if there are no information management structures in place, the minimum structure required to manage level 2 information is level 1.

## VI Conclusion

The approach by the GCCC is broadly welcomed by the industry, but with some concerns on the timeline, as it is felt that it could be shortened. There is confusion on what the different BIM levels mean but this is addressed in the position paper which state that



the levels will be defined in the strategy document, there is a consensus that Level 1 is 2D or 3D information managed within an organisation by industry standards, level 2 is 3D information managed over a project using process standards.

It is widely believed that the first step should be to implement level 1, as this will prepare industry and more importantly the public sector for the level 2 mandate, and this mandate needs to look toward the new EU BIM standards to ensure longevity.

The author recommends to address the concerns over the timeline and the confusion over what is meant by BIM level 2, that a simpler mandate of managed information based around the principals of BIM level 1 could be implemented first across all categories concurrently. Imposing BIM level 1 principals for information delivery across the public sector would start to achieve the goal of the strategy in a shorter timeframe, and ensure that public bodies start investing the necessary resources in their digital transformation.

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