Advice Note

Organisation and Asset Information Requirements

Revisions

Revision	Date	Description	Revised By	Issued To
P01	21.01.2019	First publication	RIAI BIM Subcommittee	RIAI

Purpose of Document

This document assists Employers / Clients in understanding the requirements of PAS 1192-3:2014 and related standards in preparing an OIR and EIR which will be beneficial in preparing a robust Employers Information Requirements (EIR) using the RIAI Employers Information Requirements Template and Advice Note which will then inform the BIM Execution Plan for the preferred bidder, ensuring the project is executed efficiently and effectively using BIM.

Scope

This Document document is intended to support all BIM work undertaken collaboratively between the design team members identified in the roles defined in PAS1192-2:2013. It is not the intention of this document to state how each organisation will implement BIM with their respective organisations but organisations are encouraged to ensure that their internal procedures support the roles defined in this document in the interest of project quality control and improving collaborative processes.

RIAI BIM Committee

The BIM committee is working together to realise a unified, usable, co-ordinated approach to Building Information Modelling in a design environment.

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Update Procedure

Proposed changes to this document should be submitted in writing with accompanying examples, discussion or other supportive material to info@riai.ie for the attention of the RIAI BIM Committee. Feedback will be gathered and continuously reviewed; they will be collated to form new revisions at appropriate intervals.

Copyright

This document includes direct references to PAS1192-2:2013, the CIC BIM Protocol (Second Edition), 'The role of the Information Manager is defined in the Outline Scope of Services for the role of Information Management' (first edition 2013) drafted by BL Consult

and Beale and Company on behalf of the CIC and the BIM Task Group and 'Best Practice Guide for professional Indemnity Insurance when using Building Information Models' produced by Griffiths and Armour on behalf of the CIC and the BIM Task Group.

It is important to note that this document will only become truly useful if as many companies adopt it as possible. To that extent, it may be freely distributed and used in any format necessary, provided credit is given to the RIAI BIM Committee.

Disclaimer

All the advice outlined in this document is for information only. The authors and contributing companies take no responsibility for the utilisation of these procedures and guidelines. Their suitability should be considered carefully before embarking upon any integration into your current working practices.

Contents

Brief / Employer Requirements

Historically, the (simplified) client brief for Architects has been:

'We want to build an asset with x amount of accommodation on site x for x amount of money to be delivered by x date in the future with this set of inherent key values.'

Post-construction, once the physically constructed asset has been handed back over to the owner, except for snagging, the Architect work is complete. The owner then goes about figuring out how they are going to manage/sell/let/occupy the asset based on a fragmented Asset Information Model (AIM) which they have been provided containing a set of drawings, a written specification and a contractor-prepared O&M manual (if agreed in the contractors' prelims).

For the Owner, the combination of these pieces of information forms the Building Owner's Manual (now called the AIM) for their newly-constructed asset and it can take on many forms. If the AIM is provided in electronic format, it can be maintained and continuously updated by the facilities/asset management body, or it can be translated into a format suitable for populating an enterprise management database. The information is not provided in a 'ready to go' format and it would need to be tailored to suit the organisation's requirements. No matter what form the AIM takes, traditionally the people responsible for designing and constructing the asset are not part of configuring its' database so there is a higher risk of information loss and inaccuracy of inputs.

BIM stands for Building Information Modelling, and the level 2 BIM client brief is more like this:

'We want to build an asset which has been fully coordinated during the design phase in order to iron out construction risks and costs with x amount of accommodation on site x for x amount of money to be delivered by x date with this set of inherent key values that can plug seamlessly into our current asset management database to be electronically managed without any separate information tailoring procedures once the project is handed over.'

Contemporary software enables the design to be 'fully coordinated during the design phase in order to iron out construction risks and costs', provided that all design team members are using a 'BIM platform' (e.g. Revit, ArchiCAD, Microstation, etc.).

If the brief deals with what has to be delivered, Information Requirements deal with how the brief has to be delivered. Prior to creating a brief, a client will a business case or need for a building which provides fundamental principles that should be checked against when the brief is being prepared and progressed with the design team. Similarly, the client needs to have fundamental principles for how information is prepared, shared and delivered to ensure that the information is complete, correct and delivered in time to make effective decisions. BSI have prepared a number of standards that assist clients defining requirements.

The Employer's Requirements (or brief) is a very important document as it defines the success of the outcome. The better prepared they are, the keener the price from the project design or contracting team and the less likely there will be disputes. If the employer's requirements are not properly developed, the client can incur significant additional costs, as

any requirements which are not properly specified, or are changed, will require the issue of instructions for which the client may incur additional unforeseen costs. A project execution plan (PEP) can be used by the Design Lead as a means to execute, monitor, and control projects and serves as the main communication vehicle to ensure that everyone is aware and knowledgeable of project objectives and how they will be accomplished. The BIM Execution Plan (BEP) is a separate document used by the Information Manager to ensure that Employer Information Requirements are being achieved to ensure that information at design and construction stages is transferred successfully to the owner/operators of the building.

Standards

ISO 55000:2014 Asset management Overview, principles and terminology - The first part of an international series of standards that grew out of PAS 55. It covers the concepts, principles and terminology relating to this generic definition of good practice in the optimized management of physical assets.

BS 8536-1:2016 Briefing for design and construction Part 1: Code of practice for facilities management (Buildings infrastructure) - Gives recommendations for the use of data and information needed for briefing for design and construction, ensuring that the future performance and use of a building is considered. The standard applies to all new buildings projects and major refurbishments.

PAS1192-2:2013 Specification for information management for the capital/delivery phase of construction projects using building information modelling - covers how to manage information during the delivery phase of a construction project using Building Information Modelling. PAS1192-2:2013 is prescriptive about the requirements for requirements to be issued as part of tender or a request for a proposal. the requirements for bidders, appointment/contract and post-contract execution to handover of the models and other prescribed information.

PAS 1192-3:2014 Specification for information management for the operational phase of assets using building information modelling - Building information modelling (BIM) is an approach that enables different parties to collect and share information about the same built asset (building or infrastructure) in a common digital format as a way to significantly reduce construction costs. PAS 1192-2 covers information management in the delivery phase of construction projects. This part specifies requirements once the construction phase of a built asset is completed and it's in operation.

BS 1192-4:2014 Collaborative production of information Part 4: Fulfilling employer's information exchange requirements using COBie Code of practice - defines a methodology for the transfer between parties of structured information relating to Facilities, including buildings and infrastructure. It defines expectations for the design and construction project phases prior to handover and acquisition and the subsequent in-use phase. This code of practice assists the demand side, including employers with portfolio managers, asset managers and facility managers, to specify their expectations while helping information

providers, including the lead designers and contractors,to prepare concise, unambiguous and accessible information.

PAS 1192-5:2015 Specification for security-minded building information modelling, digital built environments and smart asset management - specifies requirements for the implementation of cyber-security-minded Building Information Modelling (BIM) throughout the construction process.

BS1192:2007+A2:2016 Collaborative production of architectural, engineering and construction information. Code of practice - provides a ‘best-practice’ method for the development, organization and management of production information for the construction industry, using a disciplined process for collaboration and a specified naming policy. It provides the template for common naming conventions and approaches to collaborative working for use in architecture, engineering and construction. It also facilitates efficient data use in facilities management.

Building Information Modelling (BIM)

The use of building information modelling (BIM) in general and the creation and management of a project-specific building information model in particular should be seen in the wider context of the owner’s information management system. The owner should take steps to ensure that there is sufficient information technology in place to support “Level 2 BIM”, where this is to be adopted.

Requirements

The owner, or the owner’s representative, should consider the following requirements with respect to BIM:

a. the common data environment (CDE) to be used. The requirements for a CDE are identified in BS 1192:2007, PAS 1192-2, PAS 1192-3 and PAS 1192-5.
b. details of information required from the project delivery team to support optimal operational performance of the asset/facility – PAS 1192-3 and PAS 1192-5 provide guidance in this regard.
c. the format and means for information exchange. The requirements may include PDFs, native models, clash rendition models, open source formats such as IFC and COBie data.
d. the structure and format of the asset information model (AIM) that will receive the content from the project information model (PIM). The requirements may be as simple as spreadsheets with prescribe sheets and headings or be prescribed by the requirements of an FM system.
e. details of how content from the project information model (PIM) is to be transferred into the owner’s asset information model (AIM) – PAS 1192-2, PAS 1192-3 and PAS 1192-5 provide guidance in this regard.

f. requirements, policy, processes and procedures for the security of information and data, including the management of access both physically and digitally – PAS 1192-5 provides guidance in this regard; and
g. software to be used to meet operational and security requirements such as the owner's defined enterprise system (see PAS 1192-3 and PAS 1192-5), a computer-aided facilities management (CAFM) system or other means – BS 8587 provides guidance in the latter regard.

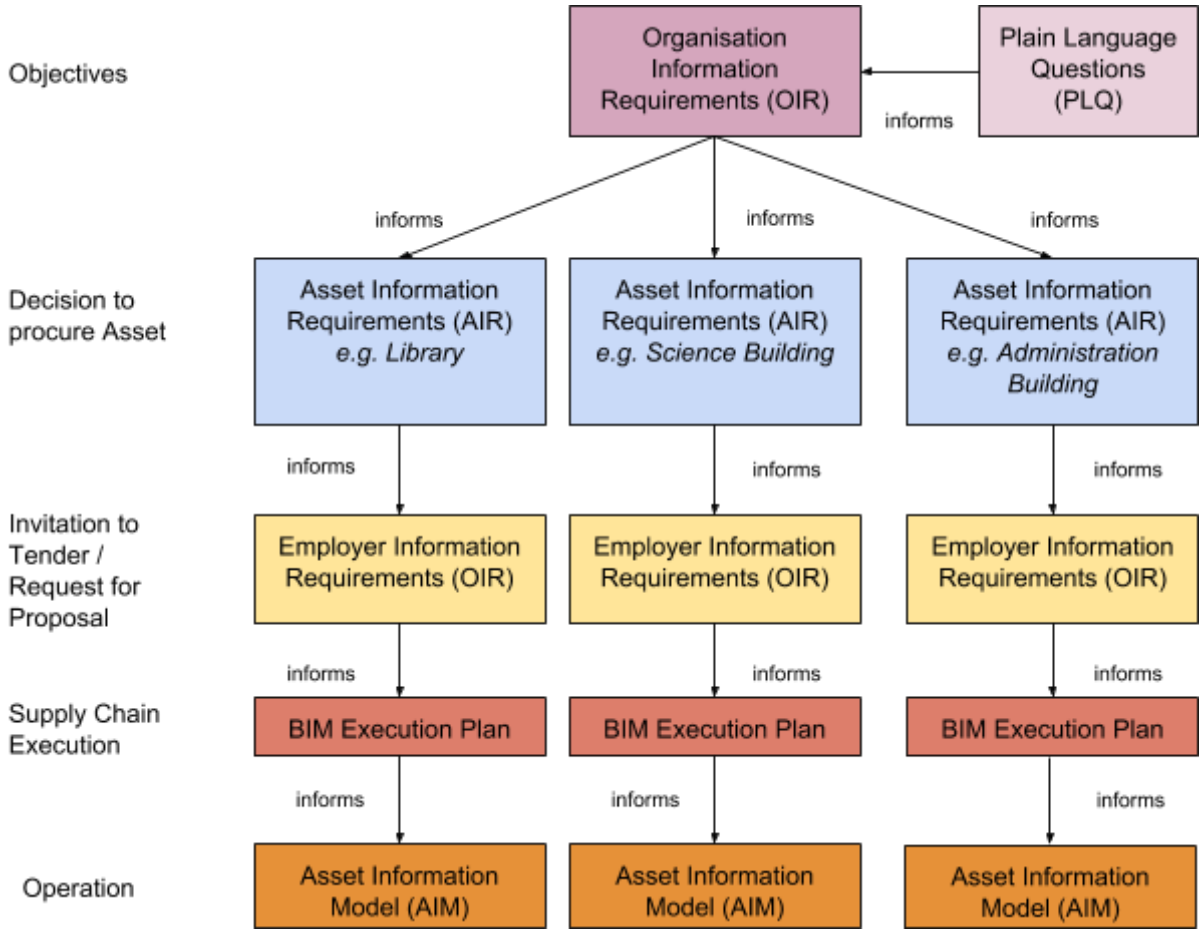
Outline of Level 2 BIM Process

Outline of the BIM process resulting in an Asset Information Model (AIM);

1. The Employer reviews the Organisation Information Requirements (OIR) taking on board any lessons learned from previous projects.
2. An Asset Information Requirements (AIR) document is prepared based on the OIR. Previous AIRs may be referenced but the principles of the OIR must be maintained and the requirements must match the type of building / facility bring proposed.
3. An Employers Information Requirements (EIR) document is prepared which sets out information requirements for the design team which achieve the AIR.
4. Each design team bid includes a pre-contract BIM Execution Plan and Supply Chain Capability Summary which confirms the methodology and capability to deliver in accordance with the EIR.
5. The Design Lead for the successful bidder confirms the post-contract BIM Execution Plan and a BIM Protocol with completed Responsibility matrix and Information Particulars is included in the appointment(s) with the Employer. The Design Lead confirms the person responsible for Information Management. The BIM Execution Plan sets out the required shared standards, methods and procedures for design team members to use when contributing to the PIM. This includes all files, elements and parameters required to populate the PIM in line with the Employer's Information Requirements (EIR).
6. The Project Delivery Manager sets up the Master Information Delivery Plan (MIDP) cross referencing agreed Employer milestones as Information Exchanges and design team deliverables.
7. The Information Manager sets up the Common Data Environment (CDE) and ensures that systems and processes are in place to achieve the requirements of the EIR and BIM Execution Plan.
8. The Design team prepare agreed models, extracts from models and other information in accordance with the BIM Execution Plan and issue information to the Employer in accordance with the MIDP.
9. At Construction tender stage, the Employer reviews the Employers Information Requirements, adjusts as necessary and incorporates it into the Invitation to tender.
10. Steps 4-8 are repeated with the role of Information Management and Project Delivery Management transferring to the Contractor Lead. The Information Manager for the construction stage is responsible for ensuring that the as-built record model, containing all graphical and attribute data is produced which is effectively a more accurate and streamlined way of compiling the O&M manual in tandem with the

construction process. Subcontractors will have a significant input for providing information which needs to be managed to ensure consistency, completeness and accuracy of information.

11. At handover, the Employer must review the information issued for acceptance. For smaller projects, this may be as simple as reviewing spreadsheets. For large and/or complex projects, this will require input from people managing the facility or input from professionals with a knowledge of FM or FM software. Specialist software may assist in reducing the time it takes to validate the information.
12. Lessons learned are incorporated back into the Organisation Information Requirements (OIR).



Organisation Information Requirements (OIR)

PAS 1192-3:2014 defines requirements for Organisation Information Requirements (OIR) and Asset Information Requirements (AIR). The standard does not however specify the contents of an OIR and AIR as each organisation and the sector they are in have very different requirements but it does provide the ingredients for an OIR with references to standards that are applicable.

The OIR should include data and information required to achieve the organization's **objectives**. Key decision points should be captured in the OIR e.g. Costs should be evaluated based on specified information to evaluate business case prior to instructing the design team to submit for planning permission. The specified information may be the same for all projects e.g. Rooms should be numbered or categorised in a specified manner or maybe fine-tuned in the Employers Information Requirements for a specific project. Lessons learned from individual projects may be used to updated the OIR.

Activities

The organization shall determine, catalogue and maintain its requirements for information to meet the needs of its asset management system and other organizational functions. The following activities may assist in the definition of the OIR from PAS 1192-3:2014 Annex A:

- optimizing the asset management strategy and optimizing/prioritizing its asset management plan(s);
- assessing the financial benefits of planned improvement activities;
- modelling the asset to support operational decision making;
- determining the operational and financial impact of asset unavailability or failure;
- making life cycle cost comparisons of alternative capital investments;
- identifying expiry of warranty periods;
- determining the end of an asset's economic life, e.g. when the asset related expenditure exceeds the associated income;
- determining the cost of specific activities (activity based costing), e.g. the total cost of maintaining a specific asset(s)/asset system;
- obtaining/calculating asset replacement values;
- undertaking financial analysis of planned income and expenditure;
- obtaining/calculating the financial and resource impact of deviating from plans that might result in a change in asset availability or performance (e.g. what is the financial impact of deferring the maintenance of a specific generator by six months?);
- assessing its overall financial performance;
- undertaking the ongoing identification, assessment and control of asset related risks.

NOTE: Some of the above activities might not be applicable to all organizations.

The following activities support the high-level activities contained in PAS 1192-3 in relation to OIR:

- asset accounting, activity costing, forecasting;
- planning and budgeting;
- demand management and customer expectation policy;
- capital investment and life cycle costing;
- innovation and change management;
- interfacing with regulatory bodies;
- asset operation or utilization;
- asset modifications, refurbishment, replacement, reuse/redeployment, disposal, recycling;
- spares, materials and purchasing;

- data, information and knowledge management;
- contractor and supplier management;
- human resources, skills development and competencies;
- maintenance, inspection, condition and performance monitoring;
- contingency planning and emergencies;
- energy efficiency and environmental aspects, e.g. renewable resources, recycling, waste management, air purity, hygiene;
- risk assessment and management;
- safety, health and environmental management.

NOTE 1 The OIR is an Employer document and should not be included as part of the Tender documents for the procurement of design or construction of an asset. Include any relevant requirements in the Employers Information Requirements.

NOTE 2 The OIR should be updated periodically and after lessons are learned from handover of the Asset Information Model (AIM).

Plain Language Questions (PLQ)

The Employer should draft Plain Language Questions (PLQ) for each work stage for the purpose of obtaining information to enable decisions to be taken in a timely and effective manner, including the key question of whether or not to proceed to the next stage. The purposes for which information is required should be stated.

Examples:

- Have lessons been learned from previous projects?
- Are there any rights of access constraints on the site?
- Does the design meet volumetric requirements?
- Does the design comply with the Building Regulations?

The PLQs should be part of the Organisation Information Requirements (OIR) which will inform the **Employer Information Requirements (EIR)** as answers to many of the PLQs will need to be confirmed by the project delivery team through specified information delivered to the Employer at the Information Exchanges. For example, the volumetric requirements can be confirmed by a schedule of rooms with areas and heights which is cross referenced with the Employers Schedule of Accommodation.

Refer to Section B1 of the RIAI Employers Information Requirements Template and Advice Note.

Asset Information Requirements (AIR)

Based on the OIR, specific Asset Information Requirements (AIR) shall be specified as part of a contract or as an instruction to in-house teams and may use **data and information** from the Asset Information Model (AIM) relating to the asset management activities being carried

out. The AIR shall also specify **data and information** to be captured and fed into the AIM. Where the activities relate to major works covered by PAS 1192-2, then the AIR will inform the Employers Information Requirements (EIR).

Activities

The Employer should determine the extent to which the following work activities identified in BS 8536-1:2016 might apply to its strategic definition of the asset and the project required to deliver it:

a. identify the business-related **activities and processes** that the new or upgraded asset will be required to support.
b. undertake the security triage process and, where a security-minded approach is required, develop a **security strategy**, security management plan and security information requirements appropriate and proportionate to the owner's business, processes, service provision, assets and personnel. **PAS 1192-5:2015** specifies the processes that assist an organization in identifying and implementing appropriate and proportionate measures to reduce the risk of loss or disclosure of information and data. *Refer to Section A7 of the RIAI Employers Information Requirements Template and Advice Note.*
c. identify the owner's, operator's, end-users' and other key stakeholders' **high-level needs**.
d. determine the required **project outcomes**, including the expected benefits and the required operational performance of the asset from the high-level needs. *Refer to Section B2 of the RIAI Employers Information Requirements Template and Advice Note.*
e. determine the environmental, social, security and economic **performance targets**, as appropriate. *Refer to Section B2 of the RIAI Employers Information Requirements Template and Advice Note.*
f. identify the uncertainties and major **risks** in the project and capture these in a risk register.
g. determine **how the delivery team could assist** in identifying the high-level needs and performance targets, if appointed at this time.
h. review or identify the particular **competencies, skills and experience** that the delivery team should possess. *Refer to Section C6 of the RIAI Employers Information Requirements Template and Advice Note.*
i. review or determine the basis of the **engagement of the delivery team** and its relationship with the operator, operations team or asset manager, as appropriate, end-users and other key stakeholders.
j. identify the particular **competencies, skills and experience** that the operator, operations team or asset manager, as appropriate, could contribute to design and construction.
k. identify **existing policies and standards** that are relevant to the design, construction and operation of the asset (e.g. internal design standards, construction standards and asset management standards). *Refer to Section B5 of the RIAI Employers Information Requirements Template and Advice Note.*

l. identify a **design standardization policy**, where applicable, drawing on any owner-defined standard design elements, especially those driven by operational needs. *Refer to Section B5 of the RIAI Employers Information Requirements Template and Advice Note.*
m. assemble **lessons learned** from previous projects, including validated case studies and other reliable, documented sources.
n. prepare a project management schedule to show the relationship between the phases in the project, the main activities, target dates and other **key milestones**, and the time added as contingency (i.e. schedule contingency).
o. establish an **initial estimate of capital expenditure** to include cost contingency and a statement of its accuracy.
p. determine the approach to **whole-life cost assessment**.
q. establish an initial view of **revenue income** and/or benefits, as appropriate, including sensitivity analyses.
r. determine the requirements and arrangements for the **delivery of project information and asset information**, in particular the phased handover of information and data. *Refer to Section B1 of the RIAI Employers Information Requirements Template and Advice Note.*

The Employer should prepare a responsibility assignment matrix (e.g. a RASCI chart) to cover the work activities and their associated deliverables for this work stage.

Roles and Responsibilities

Clarity of roles, responsibility and authority are an essential aspect of effective information management. Section 7.5 of PAS1192-2:2013 defines roles associated with Information Management and the responsibilities and authorities associated with those roles.

Roles

The roles associated with information management should not be confused with the titles of the managers, which can differ from organization to organization, but the important factors are the ownership, responsibility and authority.

Roles should be embedded into contracts, either through a specific schedule of services or more general obligations. Information management roles are likely to be embedded into more extensive project roles – design team leader, principal contractor, etc.

For projects based on PAS1192-2:2013 and the CIC BIM Protocol (Second Edition), any deviations from the roles defined in PAS1192-2:2013 should be identified in the Employers Information Requirements document provided by the Employer and/or the Pre-contract BIM Execution Plan provided by the Project Team as part of the Project Implementation Plan (PIP) at tender stage.

The roles, responsibilities and authorities shall be defined in the post-contract BIM Execution Plan. The roles and responsibilities of individual team members shall be defined, as shall the

schedule of responsibilities for deliverables of the overall team, bearing in mind that one person may deliver multiple roles.

Key to the allocation of roles, responsibility and authority is the appropriateness and ability of the organization to be able to deliver. In smaller businesses many of these roles may be executed by the same individual.

NOTE Refer the RIAI Information Management Roles Advice Note.

Responsibility

The Employer should establish a **RASC**I (Responsible, Accountable, Support, Consulted, and Informed) chart to assist in identifying roles and responsibility which eliminates or reduces gaps and overlaps between appointed parties.

Details of the information exchange requirements should be summarized by the Employer in a **Responsibility Matrix** which sets out responsibility for model or information production in line with defined Project stages as attached at or referred to in Appendix 1 of the CIC BIM Protocol (Second Edition). The Responsibility Matrix should identify the Specified Information to be produced, shared and published by the Project Team Member and the applicable Level of Definition (the Level of Information and/or Level of Model Detail).

Refer to Section B6 of the RIAI Employers Information Requirements Template and Advice Note.

NOTE 1 The AIR is owned and managed by the Employer or an organisation subcontracted to manage the specific Asset e.g. building / facility and should not be included as part of the Tender documents for the procurement of design or construction of an asset. Relevant requirements should be included in the Employers Information Requirements.

NOTE 2 Refer to Section A8 of the RIAI Employers Information Requirements Template and Advice Note.

NOTE 3 The NBS Toolkit may be used to prepare the Responsibility Matrix.

Employers Information Requirements (EIR)

The EIR (Employer's Information Requirements) is a mandatory document for Level 2 BIM projects which should be included in the Invitation to Tender or Request for a Proposal. The EIR may be a standalone document included as part of the overall Employer Requirements. The contents of the EIR are prescribed in Clause 5.3 of PAS1192-2:2013 and includes a combination of prescriptive and descriptive requirements. Bidders need to review requirements which require a response and must ensure that the supply chain / project team have the capability and capacity to deliver the project in accordance with the requirements.

How prescriptive and EIR will be will depend significantly on the capability of the market to deliver. In cases where there are many organisations or project teams who can deliver in BIM, a prescriptive EIR provides certainty which ensures that bids are easy to compare and requirements are straightforward to execute. Where capability of the market is in doubt, for

example in smaller cities, towns and in the countryside, EIRs need to be more descriptive, relying on the bidder to submit their methodology for delivering in BIM. In this case, it is even more important that fundamental principles are captured in an OIR document.

The EIR should define the project data which is required to plug into Asset Information Model (AIM) ‘the current asset management database’. This can be as simple as prescribed fields in a spreadsheet e.g. Room Number, Name and Type to a defined format or there can be a requirement to import data into an FM software system which will have its own rules for how data is structured. If this is not planned from the start, the consequence is that the information will be in multiple disparate files which will require significant effort to collate into a format that is useful for managing and operating a facility.

It is important that the processes, procedures and responsibilities are established to validate the data received at each of the stage gateways with attention paid to accuracy, compliance with standards, integrity, continuity and completeness. These requirements should be set out in the Employer's Information Requirements (EIR) along with validation procedures for the Common Data Environment (CDE).

The EIR is based on the Asset Information Requirements (AIR) which in turn is based on the Organisation Information Requirements (OIR) which includes Plain language Questions (PLQ).

The EIR is included with the Invitation to Tender or a Request for Proposal.

BIM Protocol

The Protocol is just part of a suite of standards, protocols and tools that underpin delivery to BIM Level 2. It takes the form of a supplementary legal agreement that can be incorporated into professional services appointments and construction contracts by way of an amendment. The BIM Protocol identifies building information models that are required to be produced by the project team and puts in place specific obligations, liabilities and associated limitations on the use of those models.

Presently, the only published standard BIM Protocol is the The CIC Building Information Model (BIM) Protocol - Standard Protocol for use in projects using Building Information Models which was published by the Construction Industry Council (CIC) in 2013 and updated with the Second Edition which was published in 2018.

The CIC BIM Protocol features three appendices and these are the only documents which need to be completed with specific project information.

1. Appendix 1 - Responsibility Matrix setting out responsibility for model or information production in line with defined Project stages.
2. Appendix 2 - Information Particulars sets out requirements for the project and the BIM Execution Plan.
3. Appendix 3 - Security Requirements

The Protocol creates additional obligations and rights for the employer and the contracted party / supplier (Tier 1). It is based on the direct contractual relationship between the

employer and the supplier but does not create additional rights or liabilities between different suppliers.

To ensure that the supplier (Tier 1) can undertake its obligations and liabilities, each supplier should incorporate the BIM Protocol into their appointments or contract with subcontractors (Tier 2).

BIM Execution Plan

A BIM Execution Plan prepared by the project team / supply chain to explain how the information modelling aspects of a project will be carried out in compliance with the Employers Information Requirements. A BIM Execution Plan is submitted firstly at pre-contract to address the issues raised in the EIR and then with more detail at post-contract award to explain the project delivery team's methodology for delivering the project using BIM.

The agreed BIM Execution Plan should be identified Appendix 2 of the BIM Protocol. The Information manager should ensure that the BIM Execution Plan is reviewed prior to the commencement of each project stage.

Common Data Environment (CDE)

The Common Data Environment (CDE) is a central repository where construction project information is stored. The contents of the CDE are not limited to assets created in a 'BIM environment' and it will therefore include documentation, graphical model and non-graphical assets.

In establishing a CDE, the requirements of contributing parties should be taken into account. File naming conventions - perhaps, using a standard protocol such as that in BS 1192:2007, will need to be established early. So too will any information security prerequisites where required which can be based on PAS 1192-5 Specification for security-minded building information modelling, digital built environments and smart asset management.

In working with files collaboratively, consideration needs to be given to some kind of workflow / sign-off process so it is clear which information remains work in progress, which has been shared (following appropriate review) and which published (following stakeholder sign-off). A system for archiving information also needs to be included.

The CIC BIM Protocol (Second Edition) proposes that an 'Information Manager' is appointed. The Information Manager is responsible for keeping the myriad of information being generated and shared both synchronised and coherent. In practice a senior team member will typically take on this coordination role.

The contributor retains ownership of the information they store in the CDE. Models produced by individual teams will always remain separate and it is these that are then drawn on to produce the federated model. The CIC BIM Protocol (Second Edition) ensures that contributions from individual team members are licensed to the Employer and in turn the

Employer can license information in the CDE to other members of the project. It is therefore very important that the status of information in the CDE is very clear and unambiguous. BS 1192:2007+A2:2016 provides definitions for status of files on the CDE.

Annex B of PAS1192-3:2014 includes guidance on the use of the CDE during the transfer of Project Information Model (PIM) to the Asset Information Model (AIM).

Refer to Sections A5 of the RIAI Employers Information Requirements Template and Advice Note.

Project Information Model (PIM)

The Project Information Model (PIM) is a general term used to describe the information specified delivered by the supply chain / project team as part of the Information Exchanges. The Project Information Model will be transferred to the Employer at the Information Exchanges defined in the Employers Information Requirements (EIR) document. The Project Information Model is progressively developed across the project lifecycle - it begins as a 'design intent' model and develops to become a virtual construction model. This virtual construction model is transferred to the construction suppliers who will handover the model to employer on completion.

Information Exchanges

PAS1192-3:2014 requires that the exchange of data and information with the Asset Information Model (AIM) shall be file-based and implemented through Information Exchanges between the information provider and the organization responsible for maintaining the AIM. These information delivery points, sometimes referred to as 'data drops' effectively act as 'stage gates' - a point at which data can be analysed and decisions can be considered based on the information available to multiple stakeholders at key points in time. As a BIM Level 2 project progresses the information available will build, typically providing ever-greater richness in detail.

The Information Exchanges are likely to include models (in both native and Industry Foundation Classes(IFC) formats), structured data (such as project schedules or COBie files) and a range of reports or analyses (either in native formats or as .pdfs). The format of each information exchange shall be defined by the organisation that has defined the OIR and should be included in the Responsibility Matrix which is included with the BIM Protocol.

When data is exchanged will vary according to project requirements and the client's own needs. The exchange should happen at the decision points identified in the OIR. The decision points should be included in the EIR and will translate to Information Exchanges which will be included in the Master Information Delivery Plan (MIDP) and Responsibility Matrix. PAS1192-2:2013 proposes 7 Information Exchanges which are:

1. Brief
2. Concept
3. Definition

4. Design
5. Build and Commission
6. Handover and Closeout
7. Operation and In Use

The supply chain are likely to have their own information exchanges on a more frequent basis than the exchanges made with the employer.

The information should be published in the Client Shared area of the Common Data Environment (CDE) for Employer acceptance in accordance with BS1192:2007+A2:2016.

Refer to Sections A1 and B1 of the RIAI Employers Information Requirements Template and Advice Note.

Asset Information Model (AIM)

The Asset Information Model (AIM) consists of data and information that relates to assets to a level required to support an organization's asset management system. The AIM can be as simple as a spreadsheet with prescribed fields or a complex FM system which has a viewer for the 'As built' models and links to technical manuals for maintainable assets. The EIR should prescribe clearly what information is required in the AIM and how the information will be delivered to the client / employer for inclusion in the AIM.

A fundamental principle for any AIM, no matter how simple or complex is the completeness and correctness of the data that it contains as any discrepancy will throw doubt on the quality of all the information.

As information is exchanged in advance of handover, the validation of quality of information in previous exchanges should help minimise the effort in creating structure information at the end of the project. The amount of information generated during the construction phase is significant and as there are many sources for information, there has to be a validation system prior to acceptance of the information. This may be an initial check of what is required, then a check of who is to provide the data, has the data been completely provided and then is it correct. To ensure that data is delivered in a timely manner, the supply chain should be in no doubt about what data is required and who is responsible for delivering the data and when leaving only the correctness to be checked at the end of the project. The combination of a Responsibility Matrix and an understanding of asset information documented in the OIR conveyed through the AIR and EIR can prove invaluable in ensuring that information is delivered on time without disputes.

Refer to Sections A8 of the RIAI Employers Information Requirements Template and Advice Note.

Asset Information Management

Annex A of PAS1192-3:2014 contains guidance on the Asset Information Management process which includes activities, requirements, systems and triggers that change

information in the AIM. This guidance can assist in the creation of the Organisation Information Requirements (OIR) document.