

NHSSCOTLAND

BIM DELIVERY GUIDANCE (INTERNAL)

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1. Introduction

In accordance with the Scottish Procurement Policy Note SPPN 01/2017, NHSScotland boards are assessing all projects above £2,000,000 [*Regulated Project*] for BIM via the BIM Grading Tool, located at: <https://bimportal.scottishfuturetrust.org.uk/page/bim-grading-tool>

On such projects the boards are required to comply with the BIM Grading Tool results and adopt the BIM Guidance for public works contracts commencing procurement procedures from 6th April 2017 onwards.

Projects below £2m [*non- Regulated Project*] may consider assessment via the BIM Grading Tool as deemed applicable by the relevant NHSScotland board.

An NHSScotland BIM roadmap, strategy and support framework have been established to help regional boards plan and implement the requirements of the SPPN01/2017 and deliver BIM Level 2 on applicable projects.

This support includes BIM template documentation and tools developed to offer all NHSScotland boards a methodology and consistent approach to BIM Level 2 delivery and management. The documentation is aligned with SCIM (Scottish Capital Investments Manual) guidance, offering a robust and improved information delivery process during the briefing, procurement, commissioning and operational management stages of all new NHSScotland facilities.

Each of the BIM template documents are further outlined in the following sections of this document. Regional template adoption and the collaborative sharing of derived benefits and lessons learnt will support the continual development and roll-out of the national NHSScotland BIM implementation programme.

The population and management of the EIR appendices during the project initiation and delivery phases should be completed by an experience BIM/ Information Manager working directly for/ or appointed by NHSScotland. This strategic role will help ensure all projects where BIM is a requirement is set up and managed in compliance with the appropriate standards and measurements. The BIM/ Information Manager will customise the EIR and appendices, ensure an appropriate BIM protocol is included within the contractual documentation and review the pre/ post-contract BEP's. Working closely with the NHSScotland project stakeholders they will be involved in the information review and approvals process at every key stage.

2. BIM Level 2 Standards and Documentation

To date UK BIM Level 2 adoption and implementation has been underpinned by the development of a core suite of standards and documents produced by the British Standards Institute (BSI). The suite outlines the required processes and information management practices to achieve the relevant BIM maturity level for a project. A list of the documents is noted below. They are currently free to download via the following weblink: <http://bim-level2.org/en/standards/>

The standards for Level 2 consist of:

BS 1192:2007 + A2:2016: Collaborative production of architectural, engineering and construction information. Code of practice

PAS 1192-2:2013: Specification for information management for the capital/delivery phase of construction projects using building information modelling

PAS 1192-3:2014: Specification for information management for the operational phase of assets using building information modelling (BIM)

BS 1192-4:2014: Collaborative production of information. Fulfilling employer's information exchange requirements using COBie. Code of practice

PAS 1192-5:2015: Specification for security-minded building information modelling, digital built environments and smart asset management

BS 8536-1:2015: Briefing for design and construction. Code of practice for facilities management (Buildings infrastructure)

BS 8536-2:2016: Briefing for design and construction, Part 2; code of practice for asset management (Linear & geographical infrastructure)

Note: The below standards are currently in development and will eventually replace BS 1192:2007 + A2:2016 and PAS 1192-2:2013. The two ISO 19650 documents are based on the principles of their predecessors with any terminology changes being preserved via an UK Annex.

BS EN ISO 19650-1: Organization of information about construction works - Information management using building information modelling: Concepts and principles

BS EN ISO 19650-2: Organization of information about construction works - Information management using building information modelling: Delivery phase of the assets

Within Scotland, the Scottish Futures Trust (SFT) have developed an online BIM guidance portal to support clients and the wider public sector in their BIM Level 2 adoption journey. The BIM Grading Tool noted in Section 1 is integrated within the SFT BIM portal.

This rich resource can be accessed via the following website: <https://bimportal.scottishfuturestrust.org.uk/>

It is advised that all relevant NHSScotland staff and associated delivery partners involved in the delivery of BIM Level 2 at an internal, organisational and/ or project level familiarise themselves with the BSI BIM suite of documents and the resources available on the SFT's BIM portal. The NHSScotland BIM template documents reviewed in the following sections consistently refer to, and are structured in accordance with the BSI BIM Level 2 document suite.

3. NHSScotland Common Data Environment (CDE)

The establishment of a project Electronic Document Management System – EDMS (cloud-based information sharing platform) is fundamental to the successful delivery of NHSScotland BIM Level 2 projects. It is a key part of the overall NHSScotland BIM strategy and central to all aspects of information sharing and management on a project.

Not to be confused with an EDMS, a Common Data Environment is process of sharing, approving and managing all project information deliverables utilising a project EDMS.

The British Standard Institute (BSI) describes the Common data environment (CDE) as:

"Single source of information for any given project, used to collect, manage and disseminate all relevant approved project documents for multi-disciplinary teams in a managed process [from PAS 1192-2] Single source of information for any given project or asset, used to collect, manage and disseminate all relevant approved files, documents and data for multidisciplinary teams in a managed process [from PAS 1192-3; adapted from PAS 1192-2:2013 to refer to an asset rather than a facility]"

Further details on the requirements for project CDE setup, ownership and management are outlined in the NHSScotland EIR template, section 4.6 Collaboration Process. Any CDE training requirements for NHSScotland staff needs to be identified in the EIR template, section 3.5 Training.

It is imperative CDE ownership agreement and maintenance responsibilities are established at project initiation / contract award stage between the Employer (NHSScotland Board) and PSCP (Main Contractor). This agreement should cover all Employer access requirements and rights during all project delivery and operational stages, including key information exchange points, at project handover, and post-handover during the operational/ FM phase.

NHSScotland BIM Documents:

4. BIM Strategy (Version 1.6)

This document outlines the proposed NHSScotland BIM strategy which was established through a series of collaborative workshops with various boards and stakeholders. It provides a high-level overview of BIM Level 2 processes, tools and guides, as well as setting out a range of key strategic and technical delivery protocols requiring careful consideration during the SCIM Initial Agreement (IA) stage of a project.

5. BIM Strategy Asset Lifecycle Process Map (v 2.0)



The BIM Strategy Asset Lifecycle process map provides an overview of the SCIM process, (*i.e. project inception to post project evaluation of services*) aligned with the RIBA Plan of Works, OGC Gateways, and key information exchange points. The map offers an insight into the correlation and parallel nature of the variant project delivery processes, and helps determine the inter dependencies of information development and flow relevant to each decision-making gateway/ stage.

The prescribed project deliverables (3D models, drawings, reports, schedules etc) for each information exchange point have been carefully collated to ensure all relevant information is available at the right time for appropriate decision making and client approval. The information exchanges are timeously related to project SCIM activities, decision making and approvals process. This can include design assessments, stakeholder engagement, case stage approvals (e.g. strategic, economic, commercial, financial, management), Benefits Realisation, Risk Management, or pre/ handover stage commissioning etc.

The information exchanges should clearly 'answer' a range of 'plain language questions' (PLQ) established for each specific stage, which the NHSScotland board/ Employer will use to

assess whether the project is developing as required, and whether it should proceed to the next stage. The PLQ's form part of the Employer Information Requirements appendices covered in the next section.

6. Employers Information Requirements (EIR)

The Employers Information Requirements (EIR) template and associated appendices will be adopted and form part of the appointment and tender documents on all NHSScotland BIM projects. As the BIM protocol requires details of Building Information Models and Information Management processes, the EIR provides an effective platform to communicate these requirements as part of an appointment process.

The main body of the EIR document is structured into three main sections **Technical**, **Management** and **Commercial**, each outlining the project delivery requirements and forming the basis for development of responding pre- and post- contract BIM Execution Plans. The EIR also outlines the standards and processes to be adopted during the project delivery phases.

The document structure has been adapted from an industry standard template but further developed to capture the typical NHSScotland BIM delivery requirements. There are highlighted (red) sections within the template which require further population by the Employer/ Representative before being issued within the tender information pack. Specific input requirements include project information, goals/ objectives, strategic purposes and any delivery requirements (e.g. data exchange formats, training, software utilisation)

The combined EIR appendices establish the overall project information requirements and associated deliverables. They outline the required level of definition (WHAT), described in terms of geometry (levels of detail) and information requirements (levels of information), the means of information exchange (HOW), and the key delivery stages (WHEN) aligned to SCIM and overall project programmes. An NHSScotland Supply Chain BIM assessment pack has been developed to enable regional boards and PSCP's determine the level of BIM experience and quality of resource proposed or being deployed on any BIM Level 2 project.

7. EIR APPENDICES (Asset Information Requirements and Delivery Plan)

7.1 Appendix A – Plain Language Questions (template)

As noted above, a range of Employer Plain Language Questions (PLQ's) have been developed in alignment with SCIM, RIBA Plan of Work 2013 and project information exchange points. These 'questions' or 'checklists' should be reviewed when validating or approving the information delivered by the PSCP/ supply chain at the exchanges points, as outlined in the project EIR.

The PLQ's are categorised under key SCIM themes namely, Executive Summary, Strategic, Economic, Commercial, Financial & Management, Design & BIM, and Commissioning with each question specifically tailored to suit the given project stage and required SCIM deliverables. Columns have been provided to record reviewer initials, commentary, review date, and a YES/ NO suitability.

The questions provided are not static and should be reviewed internally at the Strategic Assessment (SA), Initial Agreement and Outline Business Case stages, to ensure they are fit-for-purpose for the specific project needs.

It is recommended that one master version only is developed per project and electronically stored in a central server location or resource section of the Employers Common Data Environment (CDE).

7.2 Appendix B – NHSScotland Information Exchange Requirements (template)

This section of the appendices outlines the required information deliverables, suitability description and required exchange formats for each project information exchange point. The information issued at each exchange point should enable the Employer/ NHSScotland Board to close out the PLQ's, obtain the necessary SCIM approvals, and enable the project to progress onto the next stage. The listed table objectives are considered static with any additional deliverables added below each relevant theme e.g. design strategies, performance etc.

The red "X's" in columns G to K should be populated to reflect the specific delivery exchange formats for the project.

7.3 Appendix C – Model Production Delivery Table (MDPT) (template)

The MPDT template outlines the elemental breakdown of the project model deliverables in accordance with RICS NRM 1 and corresponding Uniclass 2015 system (Ss) and Product (Pr) classification codes (Columns A-E). The elemental breakdown list should be adjusted to reflect

the initial project design, then sequentially developed during the latter design stages to represent the full Asset Information Model (AIM) deliverable at RIBA Stage 6, handover.

Column F identifies model elements which are maintainable lifecycle assets and require the population of elemental asset data in the form of COBie, or other asset tag values. Project assets and corresponding asset information requirements are scheduled in Appendices D, E and F.

Columns G to AD schedule out the responsible model element author (MEA), level of development (LOD), and level of information requirements (LOI) at elemental level. Refer to section 3.4 in the EIR template for further information.

7.4 Appendix D – NHSScotland Asset List (template)

This appendix lists all project assets that require periodical physical condition, statutory and manufacture/ warranty related maintenance assessments throughout the new facility / asset lifecycle.

The standard, default list has been referenced from the NHSScotland Estates Asset Management: Property Appraisal Manual (PAM) Version 3.0_August 2016. The list should be reviewed during the EIR and SCIM Commissioning Master Plan development stages and refined (added/ removed as applicable) to reflect the project specific maintainable assets. NRM 1 and Uniclass 2015 Product (Pr) Codes should be populated accordingly as the list develops and refines.

Column D should be populated with specific project asset codes agreed between the NHSScotland Estates, project NHSScotland Board and FM provider. Columns H to K should be completed to represent the asset data delivery types (COBie, element tagging, O&M manual) and the organisations responsible for delivery. This appendix will inform the development of the MPDT appendix and define the Asset Information Model (AIM) deliverable at RIBA Stage 6, handover.

7.5 Appendix E – NHSScotland Facility/ Estate Asset Management System (EAMS) Requirements

The upper section of this appendix is prescriptive and identifies the data / information requirements delivered by the supply chain for mapping and import into the national NHSScotland EAMS, 3i Studio.

Following consultation with NHSScotland Estates all required data entry fields have been identified for system population through 3i manual / picklist or importing COBie data.

Delivery of these requirements will help standardise the methodology for 3i project setup and enable quicker data population onto the system pre- project handover. These deliverables should form part of the SCIM Commissioning process.

The lower section of Appendix E outlines the wider Operational and Maintenance information requirements also delivered during the SCIM Commissioning process. The list should be

reviewed during the EIR development stage and adjusted / further populated to suit the project specific O&M information delivery requirements. The FM provider should also input into this process.

7.6 **Appendix F – NHSScotland COBie Data Requirements (template)**

This appendix stipulates the full COBie deliverables for the project and should be reviewed and finalised during the EIR development stage. The template version establishes the default requirements for all BIM Level 2 NHSScotland projects with highlighted (red) text values agreed on a project to project basis.

Additional COBie parameters have been added to generate data for import into the NHSScotland EAMS, 3i Studio. These are identified in the comments Column H. The values in Columns E, F and G should correlate with or inform the COBie related cells in other appendices.

A detailed project specific COBie Responsibility & Delivery Matrix should be developed by the PSCP as part of the Post- Contract BEP production. Refer to the NHSScotland EIR template, section 4.10 for further information.

7.7 **Appendix G – NHSScotland Supply Chain BIM Capability Assessment Pack (template)**

With reference to the NHSScotland EIR template section 5.4, a BIM capability assessment pack and process has been developed, enabling relevant NHSScotland boards determine the BIM competency and delivery experience of their consultancy / PSCP framework, pre-contract award. The pack includes:

- Supply Chain BIM Capability Assessment guidance document
- Supply Chain BIM Capability Assessment Form (Questionnaire)
- BIM Capability Scoring Matrix

The assessment pro-forma should also be utilised by the Principal Supply Chain Partners / main contractor to re-confirm the final supply chains BIM capability and delivery experience post-contract award.

The assessment questions are based upon CPIx BIM, IT and Resource assessment forms, and augmented with questions found in PAS 91 prequalification questionnaires and the Scottish Futures Trust BIM Compass tool, located at: <https://bimportal.scottishfuturestrust.org.uk/page/bim-compass>

The process to be followed, to allow the NHSScotland boards to assess the BIM capability of their suppliers, requires three steps and will take four to six weeks in time to complete effectively. The first step being to issue out the BIM Capability Assessment form with standard questions. The second step being the conversion of responses into a set of results using the

associated scoring matrix, and the third step involves combining the responses into a capability summary report for inclusion within the Project Implementation Plan (PIP), Sections 5.1 in the pre- and post-contract BEP template's.

The summary table (5-2) in the pre-contract BEP should adopt High/ Medium/ Low rating values, equated to numerical results generated via the scoring matrix for each BIM Role/ Organisation.

The summary table (5-2) in the post-contract BEP shall outline the numerical weighted scores derived from the full supply chain assessment post contract award. Further details on the proforma for score criteria and weighting can be found in the Supply Chain BIM Capability Assessment guidance document.

The summary results will allow effective comparison between suppliers, and to highlight any areas requiring intervention or further investigation by the Employer.

8. BIM Execution Plan (BEP) (Pre- and Post-Contract)

The NHSScotland pre-contract BEP template and appendices should be adopted and developed by the pre-contract project design delivery team (Lead Advisor/ PSCP) in response to the NHSScotland Employers Information Requirements, Asset Information Requirements and other adopted project contract documentation. e.g. BIM Protocol.

The post- contract BEP template and appendices should be adopted and developed by the main contractor (PSCP) and project delivery team to reflect agreed resources, processes, managerial protocols and detailed information delivery plan sufficient to deliver the EIR.

Both BEP templates have been adapted from the CPI, CPIx online Building Information Modelling (BIM) Execution Plans and aligned with:

- PAS 1192-2:2013, Clause 6.2 for typical (Pre-contract) BIM Execution Plan production requirements and contents.
- PAS 1192-2:2013, Clause 7.2 for typical (Post-contract) BIM Execution Plan production requirements and contents.

There are highlighted (red) sections within the templates which require further population by the responding party. Specific input requirements include project information, confirmed stakeholders/ BIM roles and responsibilities, confirmed project BIM goals/ objectives, programme delivery dates for the information exchanges, model/ information exchange formats, confirmed supply chain BIM capabilities etc.

The template BEP appendices are directly associated with the EIR appendices and should be completed as noted within the BEP to reflect the agreed project information delivery plan. Information requirements outlined in the final version of the project EIR will enable the initial completion of all pre-contract BEP appendices. A number of these will remain static for the remaining project delivery stages, with others being further developed for the post-contract

BEP or remaining 'live' for sequential population during the design and construction stages. This is further reviewed in the following section.

9. BEP APPENDICES

9.1 Appendix A – Model Responsibility Matrix (template)

With reference to EIR Appendix B '*Information Exchange Requirements*' all model production, exchange formats, project stage delivery and author responsibilities shall be agreed and outlined in the BEP Appendix A - Model Responsibility Matrix. The list should be refined (added/ removed as applicable) to reflect the project specific model delivery.

The appendix columns D, E and F will be updated at pre- and post-contract stages to reflect the final design deliverables, the appointed model authors/ organisations, and inform the development of BEP Appendix B – MPDT, and associated Appendix F - MIDP (*post-contract BEP*).

9.2 Appendix B – Model Production Delivery Table (MDPT)

Appendix B shall be updated at pre- and post-contract stages to reflect the outline and final design deliverables. (added/ removed rows as applicable)

The final version should reflect a fully developed breakdown of model elements, including all maintainable assets. The listed elements should be referenced to Uniclass 2015 codes, which will be embedded with the 3D model elements.

9.3 Appendix C – NHSScotland Asset List

Refer to section 7.4 herein. The PSCP/ main contractor should update Column K 'Delivery Role/ Organisation' once the final supply chain is established. (Post-contract BEP)

9.4 Appendix D – NHSScotland Facility/ Estate Asset Management System (EAMS) Requirements

Refer to section 7.5 herein. This appendix should be static and agreed by the end of the project EIR development stage. It should remain within the BEP appendix set a reference.

9.5 Appendix E – NHSScotland COBie Data Requirements

Refer to section 7.6 herein. This appendix should be checked within pre- and post-contract award BEP's against other appendix columns populated with COBie information to ensure full correlation.

9.6 Appendix F – Master Information Delivery Plan (MIDP)

Refer to section 5.14 of the post-contract BEP template. The MIDP is aligned with the project construction programme, work stages and Employers Information Exchanges and outlines the overall information deliverables for the project, including but not limited to models, drawings or renditions, specifications, equipment schedules, room data sheets etc.

It should be issued by PSCP/ Main contractor as part of the post-contract BEP.

9.7 **Appendix G – Supply Chain BIM Capability Assessment Form and Scoring Matrix Results**

Refer to section 7.7 herein. A full set of all individual/ organisational assessment results shall form this appendix, as part of the post-contract BEP.

9.8 **Appendix H – Security Strategy**

This pre- and post- contract BEP appendix enables responding parties to outline their proposed or final project security strategies / plans in accordance with the EIR. If the provided information is confidential or restricted this section can be easily decoupled from the main BEP document, which can then be widely shared.