



Employer's Information Requirements

Version 2.0

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Department Documentation Standards

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APPENDICES

Glossary of Abbreviations and Terms

Appendix 1 – Project Particulars

Appendix 2 - Information Delivery Plan (IDP)

Appendix 3 – BIM Maturity KPI System

Appendix 4 – UCL H&S File Format

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1 BIM Procurement and Employer Engagement

1.1 Document Purpose

1.1.1 This document confirms the Employer's Information Requirements (EIR) as a sub-set of the Employer's Requirements or equivalent contract documentation and introduces information requirements, reasons and purpose to the Project Team or Supplier, along with technical and commercial particulars that need to be addressed to support the implementation of Building Information Modelling (BIM) and Government Soft Landings (GSL) for UCL.

1.1.2 The EIR is an important element of a Project BIM Implementation and is used to set out clearly to the Project Team or Supplier what information (models, documents and data) is required generally and at each project stage via a stage based Information Delivery Plan (IDP).

1.1.3 Nothing in this document is intended to relieve the Project Team, including Consultants, the Constructor or its Specialists of responsibility to comply with **UCL** standards including those relating to handover procedure.

1.1.4 The final details for consultant and contractor deliverables are to be included in the agreed project BIM Execution Plan (BEP), and this will inform the production and delivery of a Project Information Model which meets the requirements of **UCL**. The Project Information Model is the end product to be delivered by the supply chain in addition to the physical asset itself.

1.1.5 Any references to the **Employer** or **UCL** within this document, shall be taken to mean the **Client** as defined in PPC2000 and NEC3 Family of Standard Partnership Contracts.

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1.2 Document Structure

UCL has defined their Information Requirements within the Employer’s Information Requirements and IDP. These documents relate to all information deliverables (models, documents and data) including traditional project documents, surveys, reports and appraisals where required by the Employer. The documents will be structured as follows:

1.2.1 Employer's Information Requirements (EIR)

This describes the management standards and collaborative processes needed to produce information required by UCL, and includes:

- 1.2.1.1 Responsibilities
- 1.2.1.2 Requirements and processes
- 1.2.1.3 Methods and protocols
- 1.2.1.4 Relevant business processes
- 1.2.1.5 Supporting software requirements

1.2.2 Information Delivery Plan (IDP)

The IDP will be drafted by the Employer or their nominated representative, to be incorporated by the Project Team or Supplier as part of their BIM Execution Plan (BEP). This information, together with **Appendix 1 - Project Particulars**, will form the basis of the Task Information Delivery Plans and subsequent Master Information Delivery Plan; the development of this information throughout the project lifecycle is known as the Digital Plan of Works. This will include:

- 1.2.2.1 Tasks and Information Deliverables
- 1.2.2.2 Level of Definition for each deliverable, including; Level of Detail (LOD) and Level of Information (LOI)
- 1.2.2.3 The intended role or appointed supplier for the information deliverable

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1.3 Responding to this document

1.3.1 An EIR or EIR/IDP combination should be responded to and implemented through the Project Team or Suppliers BIM Execution Plans (BEPs). References to each section of the EIR should be made clear in the responding BEP.

1.3.2 The BEP (Pre and Post Contract) will need to consider and respond to the following eight cross-UK.Gov headings, and where appropriate to the underlying BIM maturity KPI measures, please see **Appendix 3** for further details:

BIM MATURITY KPI MEASURES
1. BIM Procurement / Employer Engagement
2. BIM Delivery
3. Data, Verification and Validation
4. Collaborative Working
5. Visualisation / Stakeholder Engagement
6. Discipline Based Model Authoring
7. Construction
8. Model Based Estimating and Change Management

1.3.3 The BEP (Pre and Post Contract) will need to include the following content as a minimum:

- Project Information Model delivery strategy [KPI 2.10]
- A response to each section of the EIR, as indicated by BEP guidance notes, shown in the dashed highlighted boxes (as above) [KPI 2.3].
- Specific response to the IDP, confirming ability to deliver information requirements, in the requested format and to the correct LOI [KPI 2.13]
- Project goals for collaboration and information modelling and management [KPI5.1]
- Major project milestones consistent with the construction programme and IDP [KPI 2.2]
- Comments where deliverables are over or under specified, or impractical to deliver with alternative delivery proposals

1.3.4 A compliant BEP in support of a project tender will demonstrate how the requirements of each section of this EIR and IDP will be met. The BEP and its response to the EIR will form part of tender scoring system using the UCL BIM Maturity KPIs, and these measures will be consistently used throughout the life of the project through to Stage 07 handover and in use.

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1.4 BIM Vision and Objectives

1.4.1 UCL is committed to the achievement of BIM level 2 for its estate, leading to improvements across the “Brief, Design, Construct, Operate” Project Life Cycle.

1.4.2 The application of BIM is intended to improve structured data transfer, availability and coordination during design and construction, and also the handover into operations and occupation with integrated CAFM, building control, monitoring and management. The availability of this information will also be applied to lifecycle costing and investment planning.

1.4.3 The key objectives that UCL wish to deliver are:

- 1.4.3.1 Deliver validated, verified and structured information and data that can be shared across design teams to support project stage gate decisions, engagement with project stakeholders, and integration of data repositories for O&M manuals, H&S Files and Asset Information.
- 1.4.3.2 Deliver the project into the Employer’s Asset Information Model, and populate operational and line of business systems that will support strategic, operational and asset management decision-making and streamlining following the practical completion of the construction works and installations.
- 1.4.3.3 Authorise Main Contractor’s Technical Design using BIM tools.
- 1.4.3.4 Understand and confirm full programme, sequence and logistics implications using BIM tools, including future PPM requirements.
- 1.4.3.5 Form the basis for post operational performance evaluation and learning.
- 1.4.3.6 Assess and address safety and security issues using BIM tools.
- 1.4.3.7 Check the proposed scope compared to briefing requirements using BIM tools.
- 1.4.3.8 To consolidate all of its individual repositories and all building information into a single repository, to ensure that the correct drawing is used when needed and proper change and access control can be achieved.

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2 Information Requirements

2.1 Information Exchanges and Project Deliverables

2.1.1 This section communicates the timing and content of information exchanges between the Project Team / Supplier and the Employer and how information exchanges are aligned to work stages. Information may flow both ways.

2.1.2 Information exchanges will be in accordance with the RIBA Plan of Work. These will be defined by the Supplier within the BIM Execution Plan, and will align with the following stages:

- Stage 1: Preparation and Brief
- Stage 2: Concept Design
- Stage 3: Developed Design
- Stage 4: Technical Design
- Stage 5: Construction
- Stage 6: Handover &
- Stage 7: In Use

The requirement of any additional Information Exchanges shall be stated within **Appendix 2 – Information Delivery Plan.**

2.1.3 Whilst information can be shared at any time during the course of a stage, formal published information deliverables should be exchanged prior to the end of a stage to advise the decision gateways, as indicated by the project IDP.

2.1.4 Information deliverables required at each information exchange will be as defined by the project IDP and compliant with any standards referenced or defined by the project BIM Execution Plan, which may consist of the following formats:

- 2.1.4.1 3D Geometry Models – Native to authoring tool, unfederated.
- 2.1.4.2 3D Geometry Models – Open standard IFC2x3, unfederated.
- 2.1.4.3 2D Drawings – Generated from the geometry models, and other documents, in PDF and DWG format
- 2.1.4.4 Structured data – COBie UK, extracted from geometry models as a spreadsheet file
- 2.1.4.5 Structured data – Client CAFM system compatible spreadsheet file

2.1.5 Where new project works interface with existing built assets owned and operated by **UCL**, such as refurbishment works to existing buildings, the appointed contractor will incorporate legacy asset information with new works as required. This

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should be discussed further with **UCL**, or an appointed representative, on a project specific basis to determine the delivery and format of information to a level of detail appropriate for the intended use of the data to be collected. The following activities will be required unless expressed to the contrary:

- 2.1.5.1 Surveying existing / legacy built assets, including laser scanning if appropriate and cost effective (ie if 3d modelling is not possible using existing drawings / asset information)
- 2.1.5.2 3D Modelling of building systems, existing / legacy assets, that are to be linked to or affected by new works. This can include all floor, ceiling and wall mounted plant and accessories, and all plant and riser spaces.
- 2.1.5.3 Production of drawings in PDF and DWG format
- 2.1.5.4 Production of structured data, from models or otherwise, in BS1192-4 format, and compliant with **Appendix 2 Information Delivery Plan**.

2.1.6 Asset Information delivered to **UCL** should be in the required format and data structure, to enable the Employer to implement the following with regards to the management and operation of their Assets:

- 2.1.6.1 SFG20 maintenance standards
- 2.1.6.2 BS 8536 code of practice for facilities management
- 2.1.6.3 Production of digital O&M manuals, inclusive of required H&S information.

2.2 Information Delivery Plan (IDP)

2.2.1 An Information Delivery Plan will be produced by **UCL**, or an appointed representative, on a project specific basis, and is interrelated to the EIR. The Design Team or Supplier should review this plan and confirm its ability to provide the information from the appropriate resources, in the appropriate formats at the appropriate stage decision gates.

2.2.2 It is intended that the Information Delivery Plan will form the basis of the Suppliers Master Information Delivery Plan for preparation and submission of information to the Employer at the appropriate stages.

2.2.3 The IDP will include the following:

- 2.2.3.1 A listing of information deliverables to answer Employers ‘Plain Language Questions’ [KPI 1.1]
- 2.2.3.2 Format requirements, constraints or scope for each deliverable [KPI 2.3]
- 2.2.3.3 The Level of Definition, including Level of Detail (LOD) and Level of Information (LOI) for each deliverable.
- 2.2.3.4 The intended role or appointed supplier for the information deliverable [KPI 2.6]

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- 2.2.3.5 Any sensitive information to which specific security requirements will apply [KPI 2.12]

2.3 Level of Definition; Detail and Information

Level of Definition is a term used to define both the Level of Detail (LOD) and Level of Information (LOI) of a given model object. Defining LOD and LOI informs the suppliers of the expected level of development associated to model objects at a given stage of the project delivery.

- LOD refers to the element's geometry
- LOI refers to the associated information

2.3.1 Appendix 2 provides guidance as to what LOI is required for each model object in terms of COBie data expected at each work stage [KPI 2.2].

2.3.2 Where applicable, the maximum expected LOD and LOI for sensitive assets and systems will be described at each work stage, in accordance with the Built Asset Security Information Requirements (BASIR) [KPI 3.2, 3.3].

2.4 Classification and Categorisation

2.4.1 Uniclass 2015 is a universal classification system for the construction industry, and will be adopted by UCL supply chain partners wherever possible with regards to the classification of geometry model objects and/or projects documentation.

Refer to **Appendix 1** – Project Particulars for requirements.

2.4.2 NRM1 element references may also be assigned to modelled components, to facilitate cost estimating and cost planning for capital building works. It will be indicated within **Appendix 2**, if NRM references are required, and to which packages of work.

2.5 Health & Safety and Construction Design Management

2.5.1 BIM – Building Information Management is "A collaborative way of working underpinned by the digital technologies which unlock more efficient methods of designing, delivering and maintaining physical built assets". Information deliverables in respect of H&S/CDM are detailed in the Information Delivery Plan and will be used to manage the employer's and supplier's H&S/CDM obligations. The supplier shall confirm how their obligations under the Construction (Design and Management) Regulations 2015 will be supported by implementing a BIM approach for the project [KPI 2.11]. **CDM 2015 and the H&S in BIM PAS 1192 Pt 6 requirements are reflected on the HSE Website - BIM and Health & Safety - <https://www.hse.gov.uk/construction/lwit/bim.htm>.**

2.5.2 H&S / CDM information provided by the supplier shall be embedded with the models created and shall be compatible with The UCL Health and Safety File format (**CDM Regulations - Appendix 4**), to enable data to be readily utilised by the Employer. Use of BIMSafe - <https://vimeo.com/398781410> should be considered to ensure adequate management of H&S risks from design through construction, to operation and maintenance.

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3 Management

3.1 Applicable Standards

3.1.1 The purpose of this section is to define the BIM Standards that are incorporated into the Information Requirements.

3.1.2 The core documents and standards that **UCL** will adopt for its projects are:

- 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.*
- PAS 1192-5:2015 - *Specification for security-minded building information modelling, digital built environments and smart asset management.*
- BS 1192:2007+A2:2016 - *Collaborative production of architectural, engineering and construction information.*
- BS 1192-4:2014 - *Collaborative production of information. Fulfilling employer's information exchange requirements using COBie.*
- BS 8536-1:2015 - *Briefing for design and construction. Code of practice for facilities management (Buildings infrastructure).*
- BS 8541-1:2012 - *Library objects for architecture, engineering and construction. Identification and classification.*
- BS 8541-2:2011 - *Library objects for architecture, engineering and construction. Recommended 2D symbols of building elements for use in building information modelling.*
- BS 8541-3:2012 - *Library objects for architecture, engineering and construction. Shape and measurement.*
- BS 8541-4:2012 - *Library objects for architecture, engineering and construction. Attributes for specification and assessment.*
- BS 8541-5:2015 - *Library objects for architecture, engineering and construction. Attributes for specification and assessment.*
- BS 8541-6:2015 - *Library objects for architecture, engineering and construction. Product and facility declarations.*

3.1.3 A Government Soft Landings (GSL) strategy shall be applied, if stated within **Appendix 1**, to ensure a smooth transition from construction to occupation, utilising the soft landings framework and principles of BS 8536-1:2015.

3.2 Information Management Roles and Responsibilities

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3.2.1 The purpose of this section is to bring to the attention of the project team the allocation of roles associated with the management of the model and project information.

3.2.2 The roles themselves are addressed in specific appointments and ERs. The current version of the Project Execution Plan should define the overall responsibility and scope of appointments.

3.2.3 The following roles in connection with BIM may be taken on directly by the employer:

- University Information Manager (UIM)
- University Project Officer (UPO)
- Information Security Manager (ISM)
- Soft Landings Champion (to fulfil requirements of BS 8536-1)

3.2.4 The Supplier shall confirm the parties and named persons who will be responsible for information modelling and management for the project, describing what activities will be performed and what authorities will be held by each individual [KPI 4.4].

3.3 Collaboration Process

3.3.1 The purpose of this section is to define how, where and when project information will be shared.

3.3.2 The Project Team or Supplier is expected to manage the Project Common Data Environment for each stage of the project. The management and system providing this service may change with the appointment of different Project Teams or Suppliers for different stages or phases. There will only be one Project CDE in operation at any one time, to avoid duplicate information.

3.3.3 Details of the collaboration process sufficient to demonstrate competence and capability must be provided in the Pre-Contract BIM Execution Plan. It is expected that full details of the process will be included within the completed Post BIM Execution Plan.

3.3.4 The BEP should include details of:

3.3.4.1 Frequency and format of milestone information exchanges [KPI 2.2]

3.3.4.2 Proposals to manage restrictions around the sharing of data and information in connection with the Employer's security requirements [KPI 2.12]

3.3.4.3 How the requirements of the Information Delivery Plan will be met and tracked [KPI 3.2]

3.3.4.4 Details of model review workshops and other collaborative working practices e.g. use of model federation and coordination at design and/or site meetings [KPI 5.1]

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3.3.4.5 The proposed frequency and methods for design / UCL client team reviews using federated model / data [KPI 5.1].

3.3.4.6 Details of how all pertinent GSL activities will be recorded throughout the project and shared at the required data exchange points [KPI 5.2]

3.3.5 The Supplier shall confirm their proposed collaboration tool and how they intend it to operate in support of the Common Data Environment in accordance with PAS1192-2:2013 and BS 1192:2007+A2:2016. This should include details confirming how the Archive information will be transferred to the employer upon the Practical Completion of the construction works and installations [KPI 2.10].

3.4 Planning the Work and Data Segregation

3.4.1 The purpose of this section is to set out requirements for discipline based model authoring and data segregation.

3.4.2 Information should be managed in accordance with the processes described in PAS 1192-2:2013 and BS 1192:2007+A2:2016.

3.4.3 Where **UCL** has specific requirements for work management, including security aspects, the requirement and request for proposals should be identified on a project specific basis or as part of the Information Delivery Plan (IDP).

3.4.4 The Information Delivery Plan confirms the information delivery, information formats and information exchange requirements for models, documents and data.

3.4.5 The following strategies are required and should be confirmed in the BEP:

3.4.5.1 Model Management

- Detail of quality assurance processes [KPI 3.1].

3.4.5.2 Volumes, Zones and Areas

- Definitions of zones and the management of adjacency within the discipline models.
- Confirmation of the definition of the project volume structure.
- Confirmation of the volume or space naming convention to be adopted.
- Requirements in connection with the use of separate project volumes for sensitive assets and systems [KPI 2.12].

3.4.5.3 Naming Conventions

- There will be a single project file naming convention in accordance with BS1192:2007+A2:2016.
- There will be an agreed asset naming and numbering methodology, which uses a consistent language for describing an asset’s function and unique asset identification.

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- Zones and Spaces will be agreed and logically and consistently named.

3.4.5.4 Purpose of Issue (Suitability Codes)

- Where a CDE platform does not offer the feature to assign appropriate file suitability metadata. Please use document naming standards as described in BS1192:2007+A2:2016, to communicate the purpose of which the file contents can be used.

3.4.5.5 Publishing processes

- Pre contractor appointment, the contents of stage Information Exchanges will be defined by the lead designer through the generation of Task Information Delivery Plans (TIDP). Post contractor appointment, the contractor shall schedule Information Exchanges via the Master Information Delivery Plan (MIDP).
- Project information will be shared by the Supplier Information Manager to the appropriate CDE to complete the delivery stage.
- The Supplier Information Manager will notify the Employer Information Manager once all required stage deliverables have been uploaded to the CDE.
- The Employer Information Manager will validate the shared project information and asset data, and produce a Red Amber Green (RAG) acceptance report to the Supplier Information Manager.
- Only Green packages will be accepted into the CDE Published file area with the corresponding data outputs and file linkages.
- Amber or Red packages should be remedied by the Supplier.
- Acceptance of failure and resubmission of deliverables in accordance with the Information Delivery Plan is unlikely to cause a variation/compensation event.

3.5 Security

3.5.1 The purpose of this section is to communicate the security measures required to protect personal and commercial information on behalf of **UCL**.

3.5.2 For all built assets, specific security measures related to information exchange will be identified on a project specific basis, in accordance with PAS1192-5, and communicated to the supply chain within Appendix 1 - Project Particulars.

3.5.3 Any file when uploaded to the Supplier CDE or otherwise disclosed, shared, published or exchanged is to be secure in accordance with the standards described in PAS1192-5.

3.5.4 The completed BIM Execution Plan will set out compliance processes and the means by which compliance will be monitored and managed to deliver against these security requirements [KPI 2.12].

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3.6 Coordination and Clash Prevention

3.6.1 The purpose of this section is to ask the supplier to define their co-ordination process, in order to meet employer requirements for quality control.

3.6.2 The following clash prevention processes should be detailed in the BEP:

3.6.2.1 Associated Software

3.6.2.2 Process overview

3.6.2.3 Responsibilities

3.6.2.4 Outputs

3.6.2.5 Proposed workflow and systems for verifying generated and received project data [KPI 3.2]

3.6.2.6 Proposed workflow and systems for validating generated and received project data [KPI 3.3]

3.6.2.7 Tolerance strategy

3.6.2.8 Clash resolution process

3.6.2.9 Verifying technical queries to the supplier (files and data in place) [KPI 3.4], validating suitability of data content with supplier [KPI 3.5]

3.6.2.10 Proposal for quality assurance and liaison with the Client / end users when incorporating PIM data into an Asset Information Model (for FM Operations, and other UCL Asset Management purposes) [KPI 3.1]

3.6.2.11 How this process will align with the employers contractual and process requirements, such as ongoing / periodic technical review.

3.6.3 The Supplier shall also confirm coordination and clash avoidance processes within the BEP, with reference to:

3.6.3.1 Volume strategy

3.6.3.2 Tolerance strategy

3.6.3.3 Technical query workflows

3.6.3.4 Responsibilities for coordination and clash avoidance

3.6.3.5 Software to support coordination and clash avoidance

3.6.3.6 Outputs from coordination and clash avoidance processes

3.7 Compliance Plan

3.7.1 The purpose of this section is to enable the supplier to communicate how the integrity, and hence quality, of the model and other data sources will be maintained.

3.7.2 The supplier should confirm his own internal model file and data standards and compliance procedures including references to standards and compliance software in the BIM Execution Plan. This should refer to:

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3.7.2.1 Quality assurance/control procedure

3.7.2.2 Associated software

3.7.2.3 Period of aftercare; the number of years, that the model should be managed for (if applicable, this should be specified by **UCL** on a project specific basis).

3.7.2.4 Security and information assurance requirements

3.7.3 The Employer or Employer Project Information Manager should be given reasonable access to the Supplier CDE to enable compliance monitoring and audits.

3.7.4 The Supplier shall confirm their quality assurance processes for Data, Models and Documents [KPI 3.1].

3.7.5 If aftercare is required, the contractor must specify the period of aftercare (the number of years that the model should be managed for) following handover.

3.8 Delivery Strategy for Asset Information

3.8.1 This section defines the information exchange requirements for asset information and enables the employer to obtain proposals with regards to asset information delivery into the Employer's FM environment.

Appendix 1 – Project Particulars, states specific requirements for Asset Information delivery, and could be in the following formats:

- COBie
- UCL CAFM Data Collection Template (DCT)
- IFC

3.8.2 The data format for provision to the Asset Information Model (AIM) will be as defined in the IDP, transmitted and contained in the published information exchange formats, as above, together with associated exchange information files.

3.8.3 COBie data deliverable; a spreadsheet file shall be used as the default data exchange format for all asset information, specified by the IDP, whether 3D modelling is involved or otherwise. The IDP defines the COBie tabs to be completed as a minimum for each RIBA work stage.

3.8.4 IFC data deliverable; an IFC geometry model containing UCL listed assets as data rich objects with custom parameters, defined by and to the LOI specified by the IDP.

3.8.5 The UCL CAFM DCT data deliverable; a spreadsheet file generated and/or populated by the 3D model authoring software and custom parameters, defined by the IDP.

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3.8.6 Asset information is to be delivered in accordance with the details described in BS1192-4:2014 and PAS 1192-5:2015.

3.9 Template Provision (MIDP and Project Plan)

3.9.1 The following approach should be used by the Supplier to ensure information coordination and consistency.

3.9.1.1 Master Information Delivery Plan (MIDP). This should be prepared by the Supplier in response to the Information Delivery Plan, and should follow a similar or related format.

3.9.1.2 Project Plan (PP). This will be provided to the Supplier to allow an appreciation of the strategic programme intent for the project and the enable the development of the Suppliers' programme proposal.

3.9.2 In the absence of the Project Plan the IDP will be used by all team members to manage and monitor progress and information delivery for the duration of the project.

3.10 Training

3.10.1 The purpose of this section is to provide bidders with details of training that will be provided in connection with project systems, or training requirements which the bidder will be required to deliver as part of their appointment/contract.

3.10.2 The Supplier shall confirm the training that they will provide for their tools and systems that the Employer and others will be expected to use.

3.10.3 The supplier will be responsible for maintaining and delivering appropriate information handling and access training to all interfacing parties including any Employer staff, for the operation and access to the Supplier CDE.

3.10.4 Training for access and operation to the Employer CDE will be provided by the Employer to interfacing Supplier staff as required.

3.10.5 If proprietary model viewing software is proposed in variance to that shown as held by the Employer in this document then reasonable access and training is to be provided by the Supplier at no cost.

3.10.6 Any general security awareness and induction requirements, as well as any role-based security requirements, will be highlighted to the Supplier on a project specific basis, and set out in the Employer's Built Asset Security Management Plan (BASMP).

3.10.7 Information should be progressively shared and published from the Supplier CDE to the Employer CDE so that in normal circumstances the Employer will not need access to the Supplier CDE other than for compliance purposes.

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4 Technical

4.1 Software Platforms

4.1.1 The purpose of this section is to communicate software platforms and versions where these are known.

UCL encourage an open approach to the digital delivery of their projects, without restrictions on the type of software utilised by the project team.

4.1.2 Platforms and versions used by **UCL** across their projects include the following:

4.1.2.1 Autodesk Revit

4.1.2.2 Autodesk Navisworks

Project specific authoring and reviewing software or collaborative platforms shall be stated within **Appendix 1 – Project Particulars**.

4.1.3 The BEP shall list the software and plugins inc. versions to be utilised by the supply chain, clearly defining processes to work with these platforms and approach to any potential interoperability issues.

4.1.4 The BEP should confirm the process of COBie data generation from the geometry models.

4.1.5 The Supplier shall also confirm how data and information from their authoring software will be prepared and published so that it can be used by the Employer.

4.2 System Performance

4.2.1 The purpose of this section is to communicate to bidders any constraints in the employer's systems or specific IT requirements which may need additional resources or non-standard solutions.

4.2.2 The BEP will confirm adoption of system performance requirements [KPI 2.14].

4.2.3 The following employer-side IT system restrictions and requirements need to be taken into account when developing the BIM Execution Plan:

4.2.3.1 Model size; no physical size restriction but practically 100Mb max

4.2.3.2 Security issues; as required in the security section of this document

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4.3 Data Exchange Format

4.3.1 The purpose of this section is to define the formats used to deliver the Information Exchanges. At a project level, information will be required in a format as defined in the Information Delivery Plan and subject to project specific requirements, which may include any of following outputs:

- 4.3.1.1 Native – 3D discipline (un-federated) model files for all design and analysis models
- 4.3.1.2 COBie – BS1192-4 compliant, complete with reference to the exchanged documents and files
- 4.3.1.3 PDF files – no older than version 7.0 as a default
- 4.3.1.4 Open standard files such as Industry Foundation Class (IFC2x3)
- 4.3.1.5 On projects where PAS 1192-5:2015 is applied, information about sensitive assets and systems will be required in the format specified in the BASIR.

4.4 Coordinates

4.4.1 The purpose of this section is to encourage the adoption a common coordinate system for all BIM data with consistent adoption for all models. Defines requirements for the common coordinate system for all BIM data.

4.4.2 The minimum requirement is spatial coordination stated as follows:

- 4.4.2.1 Intersection of grids XX and YY - xxxxxx.xxxE and xxxxxx.xxxN
- 4.4.2.2 Intersection of grids AA and BB - xxxxxx.xxxE and xxxxxx.xxxN
- 4.4.2.3 Ground floor FFL = xxx.xxx

4.4.3 Other coordination standards defined in the BIM Execution Plan should include:

- 4.4.3.1 Origin rotation
- 4.4.3.2 Offsets
- 4.4.3.3 Datum information
- 4.4.3.4 Units to be used

4.4.4 3D geo-location coordinates to be shown to no less accurate than 10mm (0.01m) in all directions.

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5 Commercial

5.1 BIM Execution Plan

5.1.1 The Supplier shall prepare, deliver and maintain a BIM Execution Plan (BEP) for the project that responds to this Employer Information Requirements.

5.1.2 The Supplier shall review their BEP regularly and additionally when there is any change to their contract.

5.1.3 Pre and Post contract BIM Execution Plans are to be provided in response to the Employer's Information Requirements identifying the Supplier proposals clause by clause. The Pre contract BIM Execution Plan will be scored as part of the tender submission.

5.2 BIM Specific Competence Requirements

5.2.1 This section details the information that a bidder should be required to provide as part of a bid submission, to demonstrate BIM capability, capacity and experience. Further details are described in PAS 1192-2:2013.

5.2.2 Responses will need to describe how organisational BIM maturity, and what capabilities are held specifically where this is in accordance with the standards cited in this EIR. Tenders should include the following detail:

5.2.2.1 Approach to BIM – organisational culture

5.2.2.2 BIM experience – organisational capability and personnel. Level of skill and competency

5.2.2.3 BIM capabilities – examples of previous projects delivered in accordance with the standards sighted in this EIR

5.2.2.4 Security understanding, capability, competence and experience

5.2.2.5 Out-sourced roles – any BIM related roles which are outsourced

5.2.3 Responses will confirm the BIM Toolset, and will describe the processes and procedures that make up the bidder's BIM and information management toolkit specifically where this is in accordance with the standards cited in this EIR.

5.2.3.1 BS1192:2007+A2:2016

5.2.3.2 PAS1192-2:2013

5.2.3.3 BS1192-4:2014

5.2.3.4 Other bespoke processes

5.2.4 Responses will describe details of BIM workload and resourcing, including the resources (and what levels) that are available to the project. Tenders should include the following detail:

5.2.4.1 Resource matrix with level, number, utilisation

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5.2.4.2 Outsourcing details or services etc.

5.2.5 Responses will describe the capability of the principal supply chain to link into the process and how this will be assessed. Tenders should include the following details:

5.2.5.1 Key supply chain partners

5.2.5.2 Expected outputs

5.2.5.3 Assessment process

5.3 Production, Ownership and Use of the Models

5.3.1 The CIC BIM Protocol, first edition 2013, will be implemented by UCL for projects adopting Level 2 BIM; ensuring there is an obligation on parties to provide defined elements of their works / services using models.

5.3.2 All parties involved in the use, production or delivery of models on the project, are required to have a BIM Protocol appended to their contracts.

5.3.3 **UCL** will, as standard, require license to re-use information based on stated permitted purposes as defined within the BIM Protocol.

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Appendices

Glossary of Abbreviations and Terms

Abbreviations

BEP	BIM Execution Plan
BIM	Building Information Modelling
BSRIA	Building Services Research and Information Association
BWM	BIM workgroup meeting
CIC	Construction Industry Council
CDE	Common Data Environment
EIR	Employer Information Requirement
IFC	Industry Foundation Class
LOD	Level of Detail
LOI	Level of Information
MPDT	Model Production Delivery Table
NBS	National Building Specification
WIP	Work In Progress

Glossary of Terms

4D	A 3D representation of an asset with the element of time included to enable simulations.
5D	A 3D representation of an asset with the element of time and cost included to enable simulations, commercial management and earned value tracking to take place.
Building information modelling execution plan (BEP)	Plan prepared by the suppliers, facilitated by the Employer or the Employer’s BIM representative to explain how the information modelling aspects of a project will be carried out
Building information modelling (BIM)	Process of designing, constructing or operating a building or infrastructure asset using electronic object-oriented information

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CIC Scope of Services	Multi-disciplinary scope of services published by the Construction Industry Council (CIC) for use by members of the project team on major projects
COBie (Construction Operation Building information exchange)	Structured facility information for the commissioning, operation and maintenance of a project often in a neutral spread sheet format that will be used to supply data to the employer or operator to populate decision-making tools, facilities management and asset management systems
Common data environment (CDE)	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. This is commonly a cloud based SaaS solution synchronised with party servers to host the information model
CPIx	Beta versions of the CPIx BIM strategy templates are available at (http://www.cpic.org.uk/cpix/) to download for use. These have been developed in consultation with the government BIM Task Group and are in accordance with PAS 1192-2.
Data	Information stored but not yet interpreted or analysed
Design intent model	Initial version of the project information model (PIM) developed by the design suppliers
Document	Information for use in the briefing, design, construction, operation, maintenance or decommissioning of a construction project, including but not limited to correspondence, drawings, schedules, specifications, calculations, spread sheets
Drawing	Static, printed, graphical representation of part or all have a project or asset
Employer	Individual or organization named in an appointment or building contract as the employer

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Employer’s information requirements (EIR)	Pre-tender document setting out the information to be delivered, and the standards and processes to be adopted by the supplier as part of the project delivery process
Federated model	A federated model is an assembly of distinct models or design disciplines, to create a single complete model of the building. Eg Architectural, Structural and Mechanical models may be viewed in a single ‘federated’ model.
Graphical data	Data conveyed using shape and arrangement in space
Level of Definition	Collective term used for and including “level of model detail” and the “level of model information”
Master information delivery plan (MIDP)	Primary plan for when project information is to be prepared, by whom and using what protocols and procedures, incorporating all relevant task information delivery plans
Pre-contract BEP	The pre-contract BEP is to demonstrate the supplier’s proposed approach, capability, capacity and competence to meet the EIR. It is utilised prior to the appointment of any stakeholder.
Post-contract BEP	The post-contract BEP is the document defining standard methods and procedures adopted during the contract in order to meet the objectives and requirements set forth in the EIR. It is utilised following the appointment of project stakeholders and in particular the main contractor.
Project implementation plan (PIP)	Statement relating to the suppliers’ IT and human resources capability to deliver the EIR
Standard method and procedure (SMP)	Set of standard methods and procedures covering the way information is named, expressed and referenced
Volume	Manageable spatial subdivision of a project, defined by the project team as a subdivision of the overall project that allows more than one person to work on the project models simultaneously and consistent with the analysis and design process

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Appendix 1 – Project Particulars

General	
Project title:	[insert]
School or asset name:	[insert if different to project title]
URN or agreed asset abbreviation:	[insert]
Establishment type:	[insert]
Scope of EIR. This EIR document applies to:	<p>[delete as required]</p> <ul style="list-style-type: none"> All works All works excluding [state any blocks. Elements of works and / or external works where it has been agreed that the EIRs should not be applied]

EIR Clause		Project Requirements
1. BIM Objectives	<p>1.2.2 – Information Delivery Plan</p> <p>The BIMs will be used (in addition to the uses noted) for:</p>	<p><i>[licences use of BIMs and the data and information for the purposes of design, construction, operation and maintenance. If it is likely that BIMs (etc) will be used for other purposes, such as a separate extension (not covered under this contract) or the replication of an asset block then this will need to be noted here. If there is no envisaged additional use insert 'not applicable']</i></p>
1. BIM Objectives	<p>1.2.2 - Information Delivery Plan</p> <p>Additional project BIMs are required as follows:</p>	<p><i>[insert/amend/delete/add as required. Note amend the numerical references in the table above accordingly]</i></p> <ul style="list-style-type: none"> Environmental BIMs enabling measurement of operational carbon Acoustics Daylighting using CBDM to establish Daylight Autonomy and the Useful Daylight Index FF & E
2. Information Requirements	<p>2.1.4 – Information Deliverables</p> <p>Specific COBie requirements are as follows:</p>	<p>As indicated in the Information Delivery Plan (IDP), unless indicated otherwise.</p>

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<p>2. Information Requirements</p>	<p>2.1.2 – Information Exchanges</p> <p>The number of information exchanges for each RIBA Stage:</p>	<p><i>[Insert required number of information exchanges for the work stage. If 1, this assumes an ‘End of Stage deliverable’]</i></p> <p>Stage 1: Stage 2: Stage 3: Stage 4: Stage 5: Stage 6: Stage 7:</p>
<p>2. Information Requirements</p>	<p>2.1.4 – Information Deliverables</p> <p>Additional information exchange file formats are required as follows:</p>	<p><i>[insert as applicable]</i></p>
<p>2. Information Requirements</p>	<p>2.1.4 – Information Deliverables</p> <p>The CAFM system will be:</p>	<p><i>[If CAFM system unknown or not available. Insert N/A]</i></p>
<p>2. Information Requirements</p>	<p>2.4.1 - Classification</p> <p>Uniclass 2015 requirements:</p>	<p><i>[State extent of Uniclass assignment. Add/Delete as appropriate]</i></p> <p>Uniclass 2015 Classification is to be applied to the following project deliverables:</p> <ul style="list-style-type: none"> • 3D geometry model objects • 2D Drawing outputs • Project Documents <p>Work Packages</p>
<p>2. Information Requirements</p>	<p>2.4.2 - Categorisation</p> <p>New Rules of Measurement (NRM) requirements are as follows:</p>	<p>The following works packages will require NRM element references to be assigned to modelled components, to facilitate cost estimating and cost planning for capital building works:</p> <p><i>[As stated in section 2.4.2, the project team should indicate here which packages of work, if any, require NRM references to be included in the model for commercial purposes – list all packages that apply]</i></p> <p>It is expected that the appointed members of the project team will take appropriate measures to ensure reasonable accuracy of modelled information for quantification purposes.</p>
<p>3. Management</p>	<p>3.1 – Applicable Standards</p>	<p><i>[delete / extend as required – consider:</i></p>

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	Additional standards apply as follows:	<ul style="list-style-type: none"> ISO 55000:2014 (Asset Management). This would apply where UCL have an interest in the systems <p><i>If no additional standards apply insert 'not applicable']</i></p>
3. Management	<p>3.4 - Planning the work and data segregation</p> <p>Additional requirements for work management are:</p>	<p><i>[Consideration should be given to any specific requirements of the common data environment and/or requirements for space, zone and volume management - insert as applicable, stating specific requirements. Consideration might include:]</i></p> <ul style="list-style-type: none"> data and information management requirements in connection with the definition and management of volumes, spaces, zones and areas publishing procedures <p><i>[If there are no specific requirements insert 'not applicable]</i></p>
3. Management	<p>3.4.5.5 – Publishing Processes</p> <p>The collaborative working platform will be:</p>	<p><i>[If no provision of CDE by client or 3rd party. Insert N/A]</i></p>
3. Management	<p>3.5 - Security</p> <p>The security triage process (PAS 1192-5) has established a classification of:</p>	<p><i>[select from the following:]</i></p> <p>S1: protect data/information regarding the asset. Take steps to protect data/information about neighbouring built asset(s). Use PAS 1192-5</p> <p>S2: protection data/information regarding the asset. Use PAS 1192-5</p> <p>S3: protect commercially and/or personally sensitive data/information regarding the asset</p> <p>S4: Protection of commercially sensitive and/or personal data/information in the CDE and models is required</p>
3. Management	<p>3.10 - Training</p> <p>Training will be required for:</p>	<p><i>[identify what parties will need training and what the training will be required to cover – note this is only in relation to BIMs, data and information – not wider training for operation/maintenance. Consider:]</i></p> <ul style="list-style-type: none"> Maintenance/updating of the COBie data set The principles of BIM federation

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Navigation around BIMs using freely available software

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Appendix 2 - Information Delivery Plan (IDP)

See separate COBie Data Requirements (PDF Document)

Appendix 3 – BIM Maturity KPI System

See separate BIM Maturity KPI System Tender Questions (PDF Document).

It will be the role the Employer's Information Manager to carry out regular progress reviews to gauge project performance against the established KPIs, and to identify any opportunities for improvement.

Appendix 4 – UCL H&S File Format

See separate UCL HS File Format (PDF Document)

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