



Dale Monks

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Achieving BIM Maturity

COMPANY DETAILS

Company Name: Monks Construction Ltd
 Business Address: Parkfield, Tonna, Neath, SA11 3JN
 Company registration: Monks123
 Project Title: Ysgol Yr Afan
 Project Number: 5010

STAFF

Lead Consultant: Dale Monks
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 Construction Manager: Christine Morris

CLIENT DETAILS:

Client: Neath Port Talbot County Council
 Lead Contact: Gavin Traylor



Llywodraeth Cymru
 Welsh Government



MONKS CONSTRUCTION LTD

NPTCBC

The Quays,
Brunel Way,
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SA11 2GG



Dear Gavin Traylor,

Monks Construction LTD are delighted to be consulting on this fantastic development to enrich the educational journey of young learners in Neath Port Talbot.

We believe that Monks Construction will assist NPTCBC in meeting the aims of the Sustainable Communities for Learning Programme as set out by the Welsh government:

- Improve the quality of school buildings
- Ensure places are available to serve local pupil demand
- Reduce surplus capacity
- Reduce running costs
- Promote sustainability

(Welsh Government, 2023)

Further to this letter please review the enclosed information.

3.0 - BIM Maturity Levels

During this project, BIM maturity will be implemented at the level two stage, aligning with BS EN ISO 19650. The first part of this standard delineates fundamental concepts, principles, and recommendations for managing building information (BSI Group, 2022). Its applicability spans across the procurement, design, construction, commissioning, and asset management activities, encompassing operations, maintenance, and the entire lifecycle of the built asset, from initial planning and engineering to day-to-day operations, end-of-life considerations, and repairs (BSI Group, 2022).

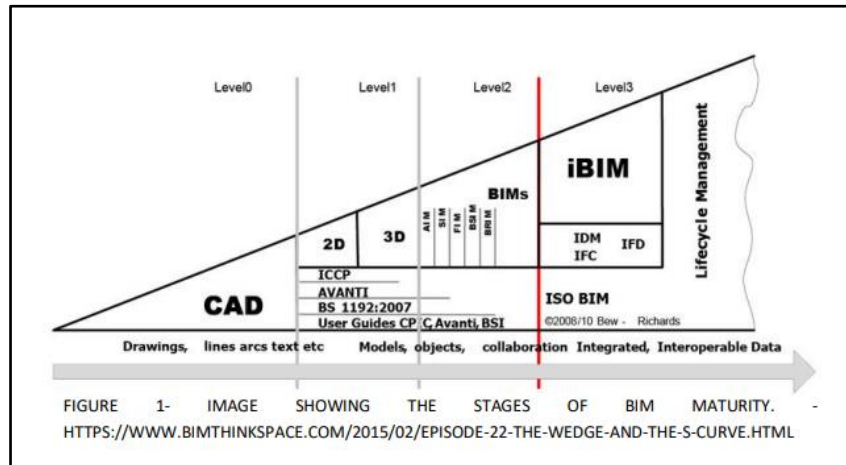


Figure 1 - BIM Information - (Succar, 2023)

- Part 1 removes potential challenges related to teamwork and collaborative sharing are mitigated, leading to a reduction in associated risks and costs within the BIM framework.
- Part two focuses on the delivery stage of the asset.
- Part three addresses the operational phase.
- Part four emphasizes information exchange, establishing criteria for decision points during execution, and ensuring the quality of the resulting project or model (BSi Group, 2022).
- Part five adopts a security-minded approach to information management, emphasizing the need for monitoring and auditing compliance (BSi Group, 2022).

The implementation of BIM level two in this project serves multiple purposes.

Firstly, it demonstrates a comprehension of the BIM procedures and requirements during the tendering process and contract signing.

Secondly, it involves creating a detailed plan for level two, including communication of Employers Information Requirements (EIR's) through the development of a BIM execution plan, a master Information Delivery Plan (MIDP), and TASK Information Delivery Plan (TIDP). These documents ensure seamless organisation and data sharing at every stage of the project.

Moving forward, the design-to-construction phase integrates information collaboration and coordination through a Common Data Environment (CDE), providing a shared workspace for all users. The fourth point underscores the secure sharing of data using "PAS 1192-5," which addresses technical security considerations in sharing project information. The adoption of a common language ensures uniform usage of file formats and standardized location of project designs and ideas. Additionally, the project incorporates COBie, a Construction Operation Building Information Exchange, serving as a spreadsheet for storing non-graphical data.

Ultimately, the project aims to deliver an Asset Information Model to the client, encompassing all relevant information from its initial delivery to ongoing maintenance and monitoring throughout its lifecycle, extending to decommissioning (AutoDesk, N.D).

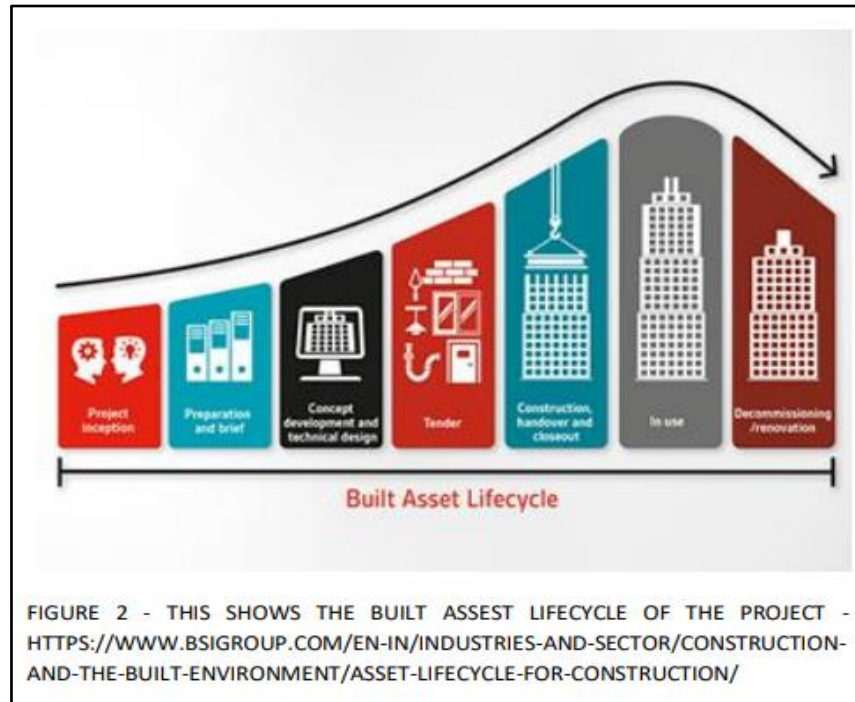


Figure 2 - Built Asset Lifecycle (BSI Group, 2023)

3.0 - Common Data Environment (CDE)

A key method used is Common Data Environments (CDEs). (Hazlegreaves, 2023) points out that CDEs are the main centers for teamwork and sharing information. This plan will assist all partners in working together productively, reduce errors, providing a seamless integration and smooth delivery. The value of well-known rules and agreed-upon methods helps our commitment to sharing information (Lan, 2023). This improves the work environment by ensuring that data shared in a timely and consistent manner throughout the project.

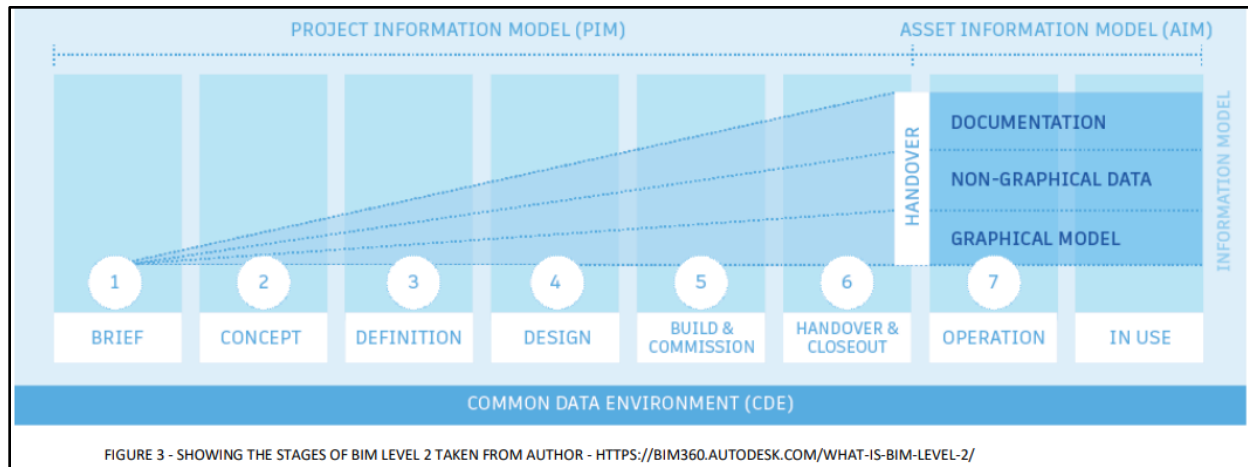


Figure 3 - Common Data Environment (Autodesk BIM 360, 2023)

Figure 3 outlines the various stages of the project, delineating its progression throughout the built asset lifecycle until the final phases of handover and retrofitting. The Common Data Environment (CDE) plays a crucial role in the project's design, sharing, and publication, particularly during the build phase and contract agreement.

The CDE serves as the platform where the project is collaboratively designed, shared among team members and clients, and published.

The archived section of the CDE serves as a repository for comprehensive manuals containing crucial information about the building. This includes details on drainage and sewerage plans, mechanical and electrical route configurations, and service zones. The primary purpose of implementing a CDE is to minimize human errors that may arise during these processes.

4.0 - BIM Execution Plan (BEP)

The BIM Execution Plan (BEP) serves as the contractor's response to the inquiries and requirements outlined in the Exchange Information Requirements (EIR), provided by you, the client. Its primary purpose is to offer a comprehensive understanding of what is anticipated from the project, outlining project details and providing guidance to all project teams. This, in turn, enhances overall communication within the team and promotes a collaborative process. The BEP plays a crucial role in aiding the supplier to bring and deliver the BIM project successfully, relying on the information

provided. It is emphasized that furnishing ample information in both the EIRs and the AIRs is vital to ensuring the project meets the desired standards (Mordue, 2022).

The BEP encompasses the following components and follows the schedule outlined below:

Pre-Contract:

Monks Construction Ltd will generate this during the tendering stage, addressing your EIR.

Specific responses to parts of the EIR, along with the inclusion of:

Project information: Project name, title, location, specific dates, project members, and company.

Project Implementation Plan (PIP): A document produced by bidding companies, outlining the process and plan for the desired project.

Project plans, objectives, and major milestones aligned with the overall project program, including goals in the collaboration process.

Project Information Model (PIM) delivery plan: Outlining the process and providing a 'how-to' to ensure accurate design deliverables.

Post-Contract:

This phase occurs after the client has selected the contractor and awarded the project, detailing the methodology and timescales for the intended project. It includes:

Management: Roles of individuals, companies, or authorities with the necessary information and details for overseeing the project. Client details on how they will approve the information.

Revised PIP information Exchange: Further development of the PIP by the chosen contractor, including additional details on how they plan to deliver the project.

Responsibility Matrix: Agreed-upon responsibilities across the entire team using the Task Information Delivery Plan (TIDP) and the Master Information Delivery Plan (MIDP).

Model Of Quality Assurance Procedures: Naming conventions, modeling standards, origin points, and change control procedures.

Delivery Process and Procurement: Method for management and the process for delivering the project.

Communication Plan: Timescales for organized team meetings, including agenda topics.

IT Solutions and Technology: Data management, agreed formatting, and software decisions (Mordue, 2022)

5.0 - Using the CAFM System for Whole-Life Monitoring

A robust Computer-Aided Facility Management (CAFM) system is vital for logging each aspect of the project. (Resonai, 2020) states that CAFM systems are very good at controlling and watching facilities in real-time. They offer a unified solution that easily moves between the design and operation stages.

(RIBA, 2023) and The National Institute of Building Sciences (2020) state that this mix is important for big ideas in the National BIM Standard. With emphasizes on the importance of systems working

well together. It displays how simple it is for information to shift between various systems. This method ensures that the CAFM system follows industry guidelines. It uses BIM data effectively by linking with the BIM process through teamwork, resulting in a flexible and changing system. This in turn should allow Ysgol Yr Afan to continue to operate efficiently for many years.

6.0 - Sustainable Communities for Learning Programme

Formerly known as the 21st Century Schools and Education Funding Programme, this document plays a central role in driving this project, enabling the design of a school with top-tier quality, construction, and energy efficiency. Aligned with the Building Research Establishment Environmental Assessment Method (BREEAM), as stated by the Welsh Government (2018), the program mandates that all new schools, including those undergoing remodeling, meet stringent standards, attaining a BREEAM 'Excellence' and an A-rated energy performance certificate.

In adhering to the Sustainable Communities for Learning Programme, the project must address the following key aspects:

Climate Change Readiness

Consideration of overheating, water efficiency, construction, materials, and flood risk.

Community and Out-of-Hours Use:

Integration of school facilities into the wider community during non-school hours, potentially generating income and enhancing the school's profile. Incorporating a facilities booking system. Collaboration with trusts and contacts for community use, including Fields in Trust, PlayWales, Sports Wales, Touch Trust.

Building Performance – Avoiding Rising Energy Costs:

Curbing energy costs, ensuring efficient building performance. Deployment of smart systems to eliminate energy wastage, coupled with an educational room to inform users about building performance and energy consumption reduction. Utilization of CIBSE guidance to evaluate operational energy performance during the design stage.

Climate Change Readiness - Overheating and Water Efficiency:

Innovative mechanical systems for temperature control and monitored water systems to reduce consumption, incorporating leak detection systems.

Construction and Materials & Flood Risk:

Utilization of sustainable materials, research into drainage systems, and the SuDS scheme for rainwater management, with the potential conversion of rainfall into recycled water for the buildings.

Abiding by the Wellbeing of Future Generations Act 2015:

Contribution to families struggling with childcare costs. (Welsh Government, 2023)

Kind Regards,

Dale Monks

Lead Consultant

Monks Construction LTD



7.0 - Information Required Level for RIBA Stages in Building Design

It is important to set the Level of Information Need (LOIN) at every point in RIBA stages. In the first step, we will establish rules for our project based on the UK BIM Framework's guidance (UK BIM Alliance, 2020). This ensures targets and goals at the beginning of the project.

In the Idea Creation stage (Stage 2), we will create plans for how to organize space using rules from a group called AIA in America in 2019. As a result, this makes the design information easier to obtain.

The next steps will use LOIN rules from the Royal Institute of British Architects (RIBA, 2013). To meet the information needs of building and facility management, detailed design information, requirements, and figures will be given.

8.0 - Information Level Need for RIBA Phases

Understanding the level of information needed (LOIN) at every step in the RIBA plan of work is key, assisting in a whole life cycle monitoring. An overview of the LOIN requirements for the major RIBA stages is shown below:

9.0 - Defining the Level of Information Need

The Level of Information Need (LOIN) indicates the quantity and level of information required at various points in a building project (Plannerly, 2022). It's a growing idea that changes as work goes proceeds. This growth helps, lowers risks, and allows for effective decision making.

LOIN mostly changes how information is passed, matching the needs and aims of every step. A good adjustment of LOIN considers the special needs of a project. (Plannerly, 2022).

Step 1: Preparation and Brief

The aim of the RIBA work plan's first step is to build a strong base for the project. This important part, also called "Preparation and Quick Talk," is key. KPIs (Key Performance Indicators) and the whole project needs are important focuses during this time (Parker, 2012). The UK BIM Alliance's 2020 standards highlight how important it is to have clear goals for projects, especially when creating ideas and studying what is possible. This focus matches the Level of Information Need (LOIN) method. It promises that the project team can use data to make decisions at later stages. (RIBA, 2023).

Stage 2: Concept Design

The level of knowledge needed (LOIN) changes as a project progresses to the idea design stage. This emphasizes creating ideas that are important for making building shapes and room setups (Nahan, 2019).

LOIN includes simple asset information that is needed for the next steps, with an emphasis on adding a Computer-Aided Building Management (CAFM) system. The AIA, or American Institute of Architects, is a helpful place to acquire guidance following worldwide recognized practices as declared in 2019 rules (Nahan, 2019).

Stage 2 of LOIN planning involves gathering exact information about how many classrooms are needed, any special facilities, and from the schools specialties (EG visually impaired units etc). This considers future additions and combining technology that could change the end product. The project team will ensure that they are carefully aligned up with NPTCBC long-term goals and growth plans for the school achieved by a LOIN strategy, allowing for bespoke information at the design stage.

Stage 3: Developed Design

In this situation, LOIN provides complete design details, including buildings, machines, electricity, and structure parts. The UK BIM Alliance published the UK BIM Framework in 2020. It puts a strong focus on systems, materials, and parts are required at this stage and assists with full-life costs as well as making very detailed designs (UK BIM Framework, 2023).

Stage 3 of LOIN, includes how different building materials will be used, making interesting classroom designs, and explaining in detail what mechanical and electrical systems will be provided, which further links to pricing estimates. Decisions at this stage can reduce possible upkeep problems later on.

The plan promises that the detailed design is not only detailed and complete, but also prepared for easy completion and lasting life in its work phase by using a careful LOIN strategy.

Stage 4: Technical Design

The need for information (LOIN) is further improved during the design phase. Here, it is required to carefully add details like specifications, quantities, and complete information about assets.

In 2020, the National Institute of Building Sciences said this important step is key to having a good connection with the Computer-Aided Facility Management (CAFM) system, which is mirrored by the US National BIM Standard (Resonai, 2020). LOIN is very important for creating the plan needed to share data between design and building management areas. It helps create a big-picture way of keeping track of everything throughout its whole lifecycle.

Stage 4 also organizes information so that it can easily integrate within the CAFM system. This careful matching ensures that the data made during technical design not only fulfills the key goals of the project, and is prepared for facility and maintenance management.

Stage 5: Construction

During the Building phase, the Level of Information Need (LOIN) shifts its focus to handling requirements related to construction. In this important stage, providing complete job plans and schedules along with key health and safety information is required.

Stage 5 of this Project needs us to give detailed construction plans, for contractors, and health and safety information.

One of the most crucial parts of LOIN now is easily sharing information about assets to the Computer-Aided Facility Management (CAFM) system as this was explained by Resonai in 2020. To fulfill the two key points of acquiring the information needed for building now and setting up good management later, this together makes it possible to analyze in real-time during the construction period (Resonai, 2020).

Stage 6: Handover and Close Out

The Handover and Close stage, which documents the asset information, maintenance regimes, warranties and requirements so that the client can tender for any specialist maintenance plans. Here, the Importance of Information Need (LOIN) ensures the client receives correct and complete details about their assets. This involves a careful check process, mainly using the CAFM (Computer-Aided Facility Management) system with integration (Resonai, 2020). This connection directly impacts the success of any future additional construction or re-purpose. For this project during Stage 6, making sure customers get complete details about assets will be a main goal for LOIN activities.

Stage 7: In Use

In the Use phase, keeping the asset in good shape throughout its life will require referring to the documentation provided in Stage 6, whilst utilizing a risk based decision model, aligned with budgetary availability. Currently, the main aim of LOIN is to continue sharing information between Building Information Modeling (BIM) and the Computer-Aided Facility Management (CAFM) system. During the Project's Use phase, LOIN operations will focus on providing dependable ways for sharing data between the BIM model and the CAFM system (Resonai, 2020). Such as:

- Analyzing energy use
- Drafting plans for regular maintenance
- Update the BIM model to consider any changes made during the working stage.

The project promises to make the asset function better continuously. It also ensures that any changes made during its life are smoothly added into the operating plan.

10.0 - Appendix

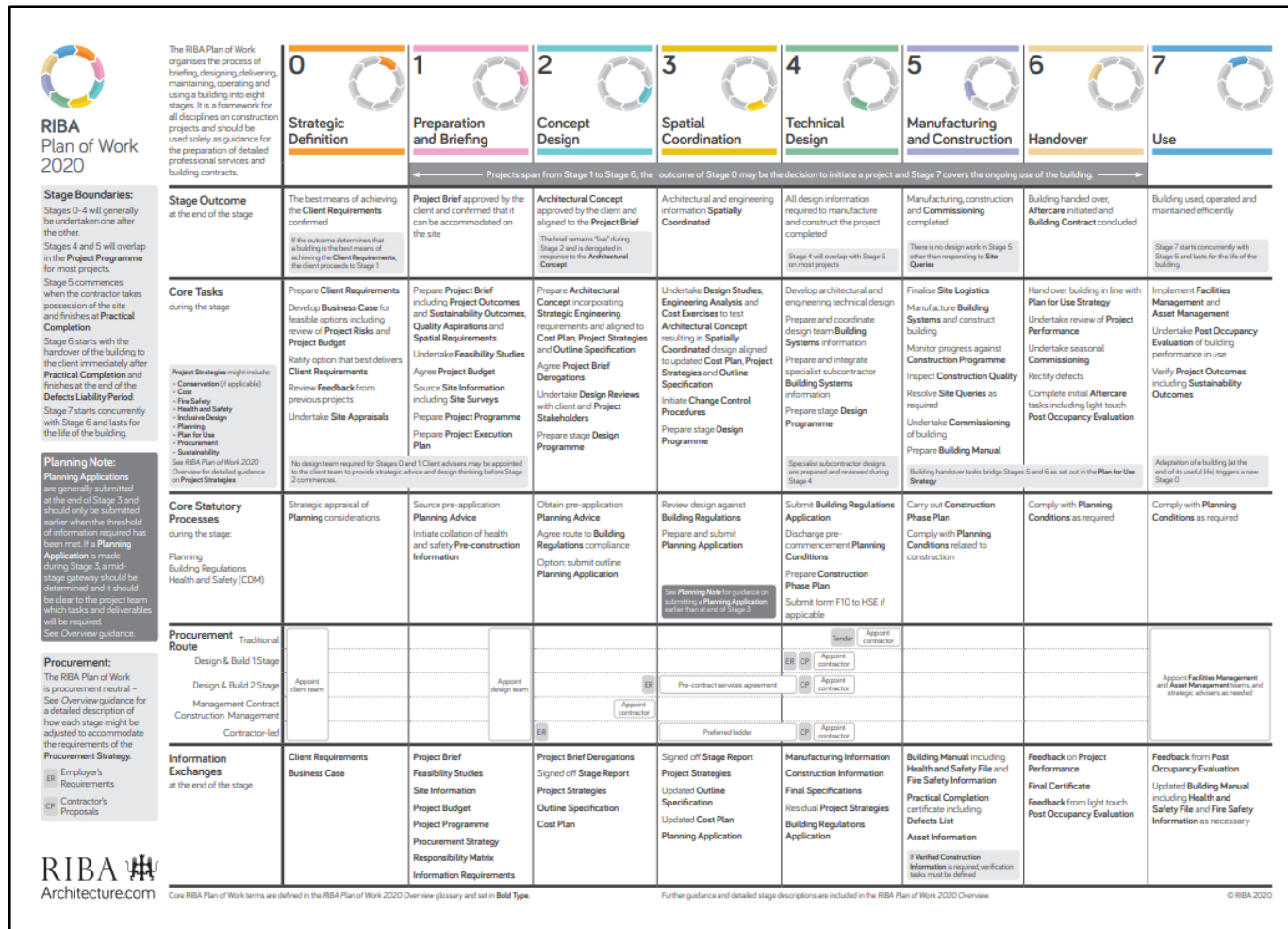


Figure 4 - RIBA Plan Of Works (RIBA, 2023)

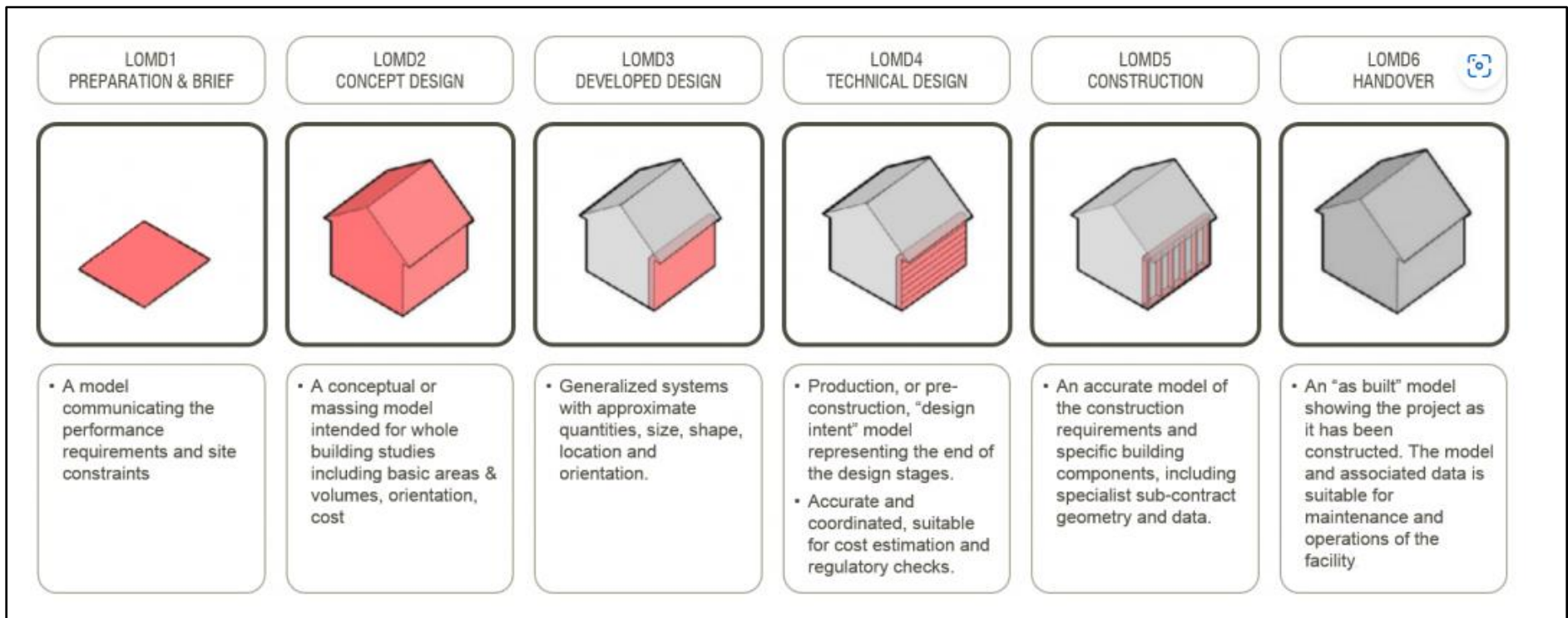


Figure 5 - UK LOD/LOI Visualized (LOD = LOD + LOI, 2023)



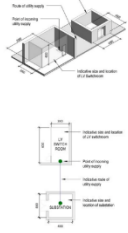
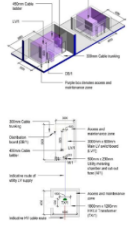
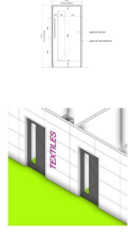
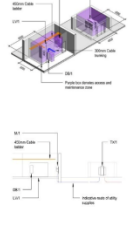
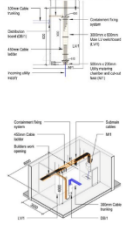
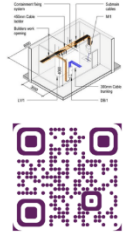
LOD bandings					
	Code	Description/ requirement	Purpose	Fabric example	Services example
2	Concept design What is typical for concept stage?	Visual information to provide general principles of the design. Showing arrangement of system with their relationship to internal and external context, and key project criteria to suit client brief. General descriptions would be expected to communicate principles of materiality, scope, colour and context. Expect strategic coordination with other professions to show general principles of the design.	To provide a visual indication of proposals at a concept stage and support general spatial coordination, identifying key requirements such as access and maintenance zones for primary systems.		
3	Spatial coordination What is typical as the design develops?	Visual information to provide developed principles of the design to a greater level of detail. Developed coordination between all professions. Visual development showing coordination for general size and primary relationships between different elements of the construction. Can form a brief for a specialist subcontractor or fabricator to progress with their technical design, fabrication and installation. This would be expected to include critical dimensional coordination, performance requirements and qualities of finish.	To provide a visual representation of proposals at a Design Development stage and to allow greater spatial coordination, confirming brief for Technical Design stage.		
4	Technical design What is required for technical design?	Visual information to provide fixed principles of the design supporting procurement. Developed coordination between all professions. Visual representations showing coordination for general size and relationships between different elements of the construction. Dimensionally accurate graphical representation of system, indicating primary performance characteristics. Graphical information represented may alter, dependent on visual information to be produced, e.g. scope of work drawings, setting out, floor loading, etc. Typical installation details separately produced, linked to model element and adjacent constructions.	To provide a visual representation of proposals at a Technical Design stage supporting full spatial coordination.		
5	Construction What has been constructed?	Visual information to provide full information to support construction/ installation. Developed coordination between all professions. Visual representations showing final coordination for size and relationships between different elements of the construction. Dimensionally accurate graphical representation of system, indicating primary performance characteristics and sufficient information to support installation. Typical installation details separately produced, linked to model element and adjacent constructions.	To provide sufficient information for construction/ installation of the required products. To be updated during the construction process to reflect final decisions.		
6	Record A record of the final constructed built asset for FM/ owners	Visual information (such as record drawings) showing an as-built record of the final systems and products installed in the built asset, and any relevant references to associated information. Visual and geometric data may be acquired through surveys (e.g. laser scanning) of the final built asset.	Visual data that reflects final selections, including any changes made during construction. To provide future reference during the operation stage of a building's life cycle to aid with maintenance, product replacement and disassembly. This will include any verification that demonstrates final results, e.g. final survey results.		

Figure 6 - Level of detail (LOD) and digital plans of work. (The NBS, 2023)

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