

LIMERICK PROJECT OPERA FIT OUT - PRELIMINARY BIM EXECUTION PLAN

Abbreviations

BIM	Building Information Modelling
CWMF	Capital Works Management Framework
DTL	Design Team Leader
LOD	Level of Development
OPW	Office of Public Works
QS	Quantity Surveyor

Purpose of this document

The intent of this document is to provide an outline description of how it is envisaged implementation of Building Information Modelling (BIM) will be undertaken on the Limerick Project Opera Fit Out, for the Design, Tender and Construction stages.

This document is to be used as information to assist in procurement of all external consultants for the project, to help them define their requirements for meeting the deliverables as outlined in the scope of services. The information in this document, will be further developed as the project progresses.

Objectives for using BIM

The overall objectives for the implementation of BIM, according to the ISO 19650 series, for this project are:

- Better informed decision making by the DTL throughout the process.
- Improved multidisciplinary construction co-ordination and minimisation of clashes and variations during construction.
- Improved cost and programme certainty and predictability.
- Improved accuracy and consistency of construction information.
- Improved health and safety on-site and during operation.
- Create a virtual/workable model to enable asset management, operational efficiency, and reportingp
- Asset information delivery of the highest quality, which can be used to support the operation and maintenance facilities beyond practical completion.
- To allow for continuous performance evaluation of the facility and energy usage - Modelling the building design and alternative designs, and using a carbon calculation tool at detailed design stages to review the impact of building shape, materials and orientation to identify carbon hotspots.
- Be flexible to adapt to change in building use and development of new technologies

Project Team

OPW will be the Design Team Leaders for the project and will manage the overall project BIM, with the support of an external BIM consultant. All consultants shall develop and prepare, in consultation with the design team and Design Team Leader, detailed co-ordinated working drawings and specifications of their building elements for detailed design Stage 2.2. All consultants shall be required to produce the fully co-ordinated design modelled to the following standards: Level 2 BIM and LOD 350 generally and LOD 400 for any elements that interfaces with the building envelope, including structure, building services, etc.

Level 2 BIM is distinguished by collaborative working, and requires "an information exchange process which is specific to that project and coordinated between various systems and project participants" (Source: Scottish Futures Trust). Under Level 2 BIM, designers are responsible for generating their information to the minimum requirements for Level 2 BIM, which are set-out in I.I.S. EN ISO 19650-2.

Level of Development 350 is defined as the Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of quantity, size, shape, location, orientation, and interfaces with other building systems. Non-graphic information may also be attached to the Model Element.

Level of Development 400 is defined as the Model Element is graphically represented within the Model as a specific system, object or assembly in terms of size, shape, location, quantity, and orientation with detailing, fabrication, assembly, and installation information. Non-graphic information may also be attached to the Model Element.

The consultants will be required to ensure that they have sufficient resources to lead their team in BIM and produce a detailed Revit model, to the level required. They must take full responsibility for ensuring their model and related data are delivered in compliance with all current standards and the project specific requirements.

The following table summarises key project roles for Limerick Project Opera Fit Out; where the design is being led by OPW with a design team of external consultants, appointed by OPW. Additional consultants may be also appointed to work on the project.

Role	Organisation
Architect, Design Team Leader, Design Certifier, Employer's Representative	Office of Public Works
Consultant Civil & Structural Engineer	To be appointed
Consultant Mechanical & Electrical Engineer	To be appointed
Monitoring Civil & Structural Engineer	OPW

Role	Organisation
Mechanical & Electrical Engineer	OPW
Fire Consultant	OPW
BIM Coordinator	To be appointed
Consultant Quantity Surveyor	To be appointed
Project Supervisor Design Process	OPW
Facilities / Asset Manager(s)	To be confirmed

Proposed use of BIM for the project

The following non-exhaustive list describes the status of the use of elements of BIM on this project:

- The Revit model of the As-Built Shell and Core will be made available to the Design Team.
- It is proposed to use Revit 2025 at minimum, upgraded as required during the project with agreement with the design team.
- The Architectural, Civil and Structural, Mechanical & Electrical members of the Design Team will be required to use Revit to generate and coordinate design information during stage 2.2.
- All consultants will be required to complete their own task information delivery plan.
- All consultants will be required to produce a combined set of BIM deliverables including models, data and documents, known as the Project Information Model (PIM), to current required standards and as specified by OPW's BIM information manager.
- All consultants will be required to model as many design options for their element of design, as is required to expedite the fully approved and accepted design.
- Before issuing their options for review/clash detection/co-ordination, they will be required to ensure their model is checked, reviewed and signed off prior to issue to the shared federated model.
- A federated model, managed by the OPW appointed BIM Coordinator, will be used for co-ordination of all elements of the works within these design options. The consultants shall allow for sufficient time and resources to resolve fully any clashes between elements.
- Once an agreed design has been signed off by the design team leader, a federated model, managed by the OPW BIM Coordinator, will be used for the final co-ordination of all elements of the works. The consultants should allow for sufficient time and resources to resolve fully any clashes between elements to ensure a fully co-ordinated detailed design before issuing of first draft of drawings/model to the QS for pricing.
- All of the Design Team, including OPW and external consultants, will be required to use Autodesk AutoCAD 2D to also generate and coordinate design information, in particular for stages 1 to 2.1. It is proposed that all detailing for the building will be produced using 2D. 3D details to be produced where necessary to convey the design intent.
- OPW staff have access to applications in the Autodesk 'AEC Collection', including

- Revit
 - AutoCAD
 - Autodesk Docs
 - Navisworks Manager
- It is intended to use Autodesk Docs as the 'Interim Common Data Environment' for the Project
- It is intended to use Autodesk BIM Collaborate Pro and parts of the 'Build' suite at various phases of the Project (to be confirmed at a later date)
- Consultants shall be required to advise and input into the Project BIM and Information Management Strategy proposed for The Project
- The implementation of BIM in accordance with the ISO 19650 Suite of documents, including any updates to the Standards, National Annexes or Guidance documents which may occur throughout The Project
- The implementation of BIM in accordance with Irish/international best practice
- The use of BIM, Information Management processes and data to facilitate Climate Action / Carbon Reduction targets during all CWMF stages, including implications for the 'Asset Ownership' phase following completion of The Project

Objectives of OPW BIM Project Coordinator

It is proposed that OPW will appoint a BIM Coordinator, to join the Project Team and to assist in the delivery of this Project. Their role is proposed to achieve the following high-level objectives:

- To ensure the Project meets, as fully as possible, the BIM requirements as defined by the Dept. Public Expenditure, NDP Delivery and Reform (DPER), the Office of Government Procurement (OGP) and outlined in the revised Capital Works Management Framework (CWMF) documents¹
- To act as an independent BIM/Information Management Advisor for the Project
- To work closely with the Project Team to develop an Information Management framework for the Project
- To implement BIM processes for The Project in accordance with the ISO 19650 Suite of documents, including in particular the requirements of the Irish National Annex to I.S. EN ISO 19650-2
- To provide guidance to the OPW Project Team and the Design/Project Team more broadly to allow them to fulfil their roles as Appointing Party, Lead Appointed Party and Appointed Party in accordance with the ISO 19650 Suite of documents

¹ <https://constructionprocurement.gov.ie/bim-requirements-in-the-cwmf-from-january-2024/>

- To implement BIM processes on The Project to allow for better measurement of embodied carbon, to drive efficiencies from the point of view of time and cost, and to enable a better quality outcome
- To provide support, guidance and advisory services to the OPW Project Team, the Design Team and the Project Team more broadly
- They will be the BIM Information Manager and their role does not include making any design decisions or rights to issue instructions. They will work under the guidance and in support of the Design Team Leader.
- On appointment to the project, a project specific responsibility matrix in which all required tasks to undertake BIM to EN ISO 19650, will be agreed with all consultants.
- Each Consultant collaborating on the BIM model shall designate a named person to BIM Coordinator for their discipline.

How BIM is proposed to work at Construction stage

The use of BIM shall be for the purposes of design co-ordination and as-built recording only. The construction shall be based on the drawings and specification issued by the design team (Not the BIM models).

The Contractor shall produce & maintain throughout the contract, a BIM Architectural & Civil and Structural Model Level of Development 350 (LOD 350) generally, with greater detail to LOD 400 for building envelope/façade related elements. The Contractor shall also be responsible for the co-ordination & federation of the Mechanical and Electrical Subcontractor BIM models and any other Subcontractor or Designer BIM models that form part of the final fully federated (all disciplines) and complete as-built BIM model produced by the Contractor.

The Employer shall share the Design Stage Architectural/Civil/Structural/Mechanical/Electrical BIM Model (LOD 350 generally and LOD 400 for any building envelope element or any elements that interfaces with the building envelope, including structure, building services, etc) and Revit Model with the Contractor (for information purposes only) who can use this model as a starting point for their own BIM model - if they so wish, with the following stipulations:

- It is a Design Stage Model only, for information only and not for construction purposes.
- The Contractor shall be responsible for making an appraisal of the Design Stage BIM Model on site and correcting all inaccuracies they find in the Design Stage BIM Model
- The Contractor shall be responsible for all works associated with developing the Design Stage BIM Model (LOD 350 generally and LOD 400 for any building envelope element or any elements that interfaces with the building envelope, including structure, building services, etc) to an accurate As-Built Completion Stage BIM Model (LOD 350 generally and LOD 400 for any building envelope

element or any elements that interfaces with the building envelope, including structure, building services, etc)

- For the construction stage, the Employer shall not be held liable for any inaccuracies in the Design Stage Architectural BIM Model and the Shell and Core BIM Model.
- The Contractors BIM model is to be constructed based on the Design Team's 2D drawings (Volume A Works Requirements). The model is to be updated by the Contractor as the building construction progresses, to reflect the as-built information.

Where a design change is required during construction, the consultants shall be required to issue their revised construction drawings. The consultants shall allow for sufficient resources and time to update and revise their design model as is required in order to complete their services during this stage.

The BIM model will be used for clash detection on a regular basis, to resolve potential design co-ordination issues.

The Contractor shall be required to:

- attend and host BIM co-ordination meetings on a fortnightly basis
- issue clash detection reports on a weekly basis
- federate the respective BIM models and host them on the Common Data Environment
- provide and administer the relevant software for viewing and clash detection: Navisworks Manage (or equivalent and approved by the Employers Representative)

The contractor will then be required to handover the fully co-ordinated and updated as built model to the Employer as part of the Operation and Maintenance Manual and Safety File.

Applicable Standards

To establish a consistent approach to collaboration, the consultants are required to fully understand and adopt the following standards as directed by the BIM Manager;

- BIM Forum 2023 Level of Development (LOD) Specification
- PD 19650-0; 2019 for Transition guidance to I.S. EN ISO 19650
- I.S. EN ISO 19650-1; 2018 for Organization and digitisation of information about building and civil engineering works-Part 1: Concepts and Principles
- I.S. EN ISO 19650-2; 2018 for Organization and digitisation of information about building and civil engineering works-Part 2: Delivery Phase of the Assets
- I.S. EN ISO 19650-2: 2018 National Annex NA for File and Object Naming
- I.S. EN ISO 19650-4: 2022 Part 4 Information Exchange
- I.S. EN ISO 19650-3: 2020 Part 3 :Operational Phase
- I.S. EN ISO 19650-5: 2020 Part 5; Security minded approach to information management
- I.S. EN ISO 19650-6: 2020 Part 6 : Health & Safety
- I.S. 1192-4:2014 Collaborative Production of information. Fulfilling the Employer's information exchange requirements using COBie. Code of practice

- NBS BIM Toolkit: Uniclass (2015) Classification (Complexes, Entities, Activities, Spaces/Locations, Elements, Systems & Products) Level of Definition.
- Building Information Modelling (BIM) Protocol; Second Edition 2018; Standard Protocol for use in projects using Building Information Models (CIC)
- ISO 16739; 2016 - Industry Foundation Classes (IFC) - Data Schema (BS8541: 1-6)
- ISO 12006-2; 2015 - "Building construction - Organization of information about construction works - Part 2: Framework for classification of information"
- CIC BIM Protocol - Building Information Modelling (BIM) Protocol; Second Edition 2018; Standard Protocol for use in projects using Building Information Models (CIC)