



5th CitA BIM Gathering Virtual Conference

21 - 23 September 2021

OPW Revit Template

An enabler to increase the implementation of BIM on OPW projects

Michael Day

Civil & Structural Engineer | Office of Public Works

Office of Public Works | Background (1)

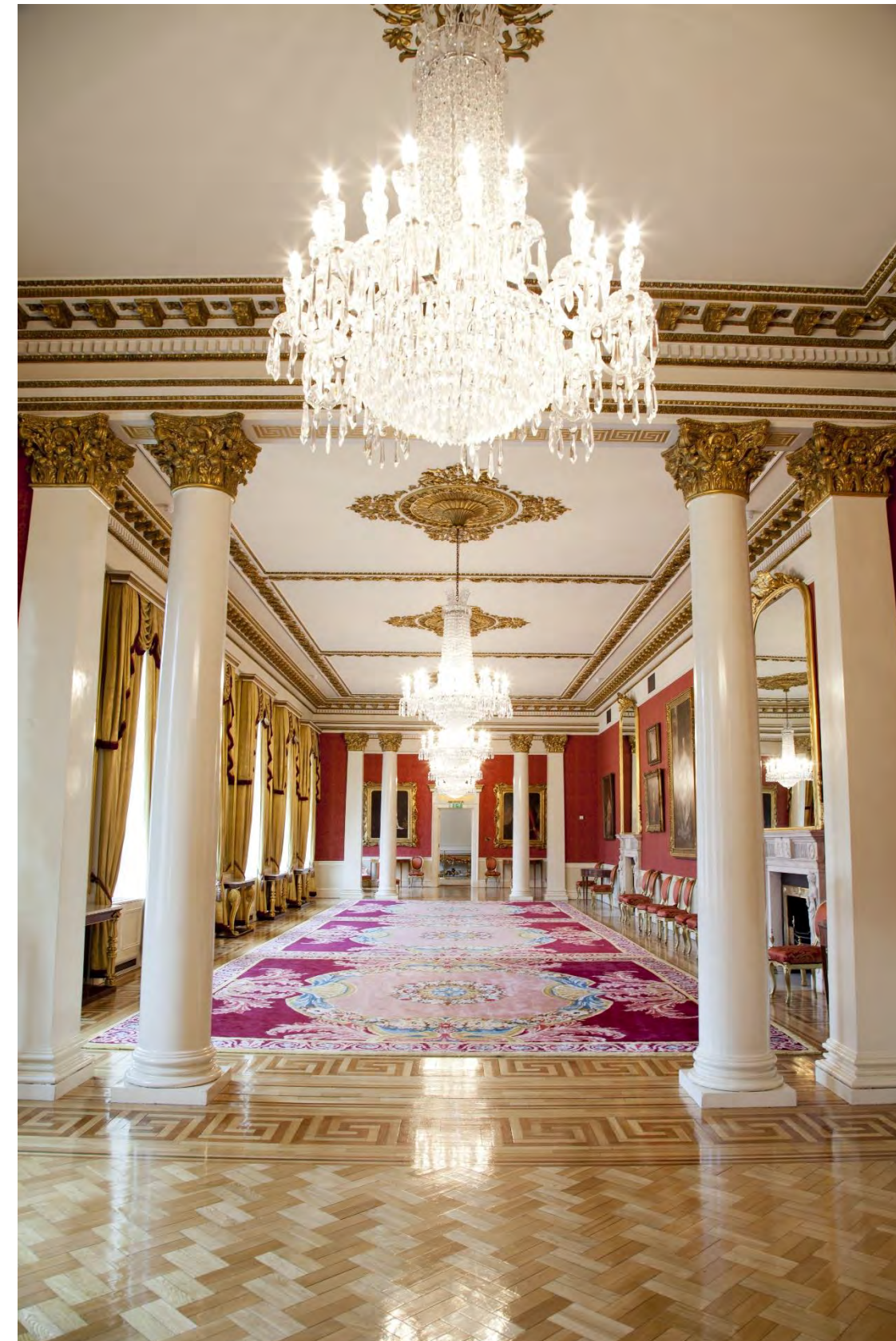


- Established in 1831
- Government office
- Responsible for flood protection, managing property and heritage services

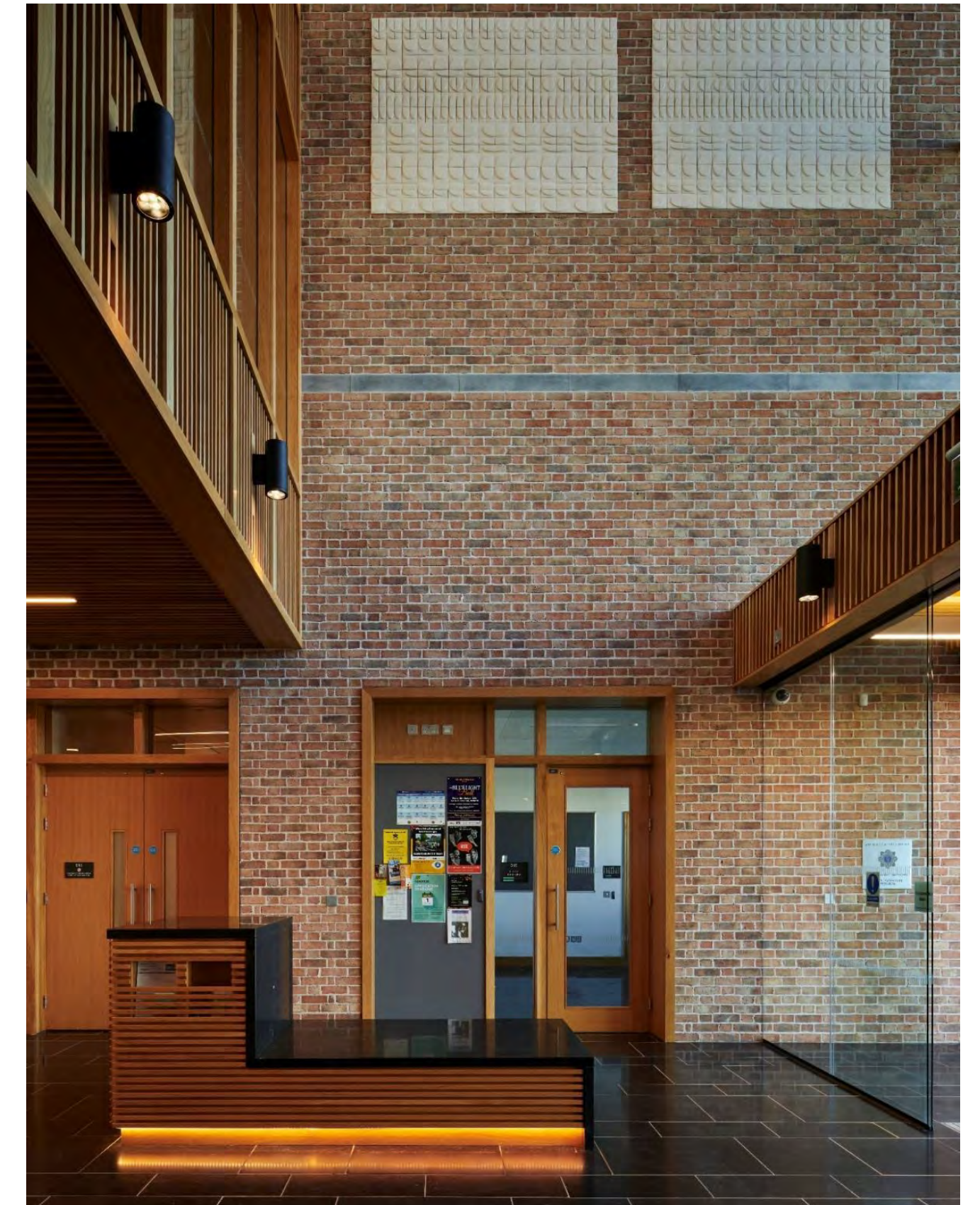
2000+ state buildings



One of 700 Garda properties - Kevin St Garda Divisional Headquarter © OPW



Dublin Castle © OPW



© OPW

Office of Public Works | Background (2)



- New construction, refurbishment, conservation, maintenance **projects across Ireland**
- **In-house Designers** – architects, C&S engineers, M&E engineers, quantity surveyors – supported by **External Consultants**
- Client, designer, builder, owner, tenant – present **throughout a building's life cycle**
- **Significant public sector client**

BIM at OPW (1)



- Project work underpinned by **Capital Works Management Framework** (CWMF) – public sector construction procurement
- CWMF – currently under review
 - *“opportunities to further deploy digital technologies, such as BIM, will also be explored”*
- D/PER – Construction Sector Group
- Project Ireland 2040

BIM at OPW (2)

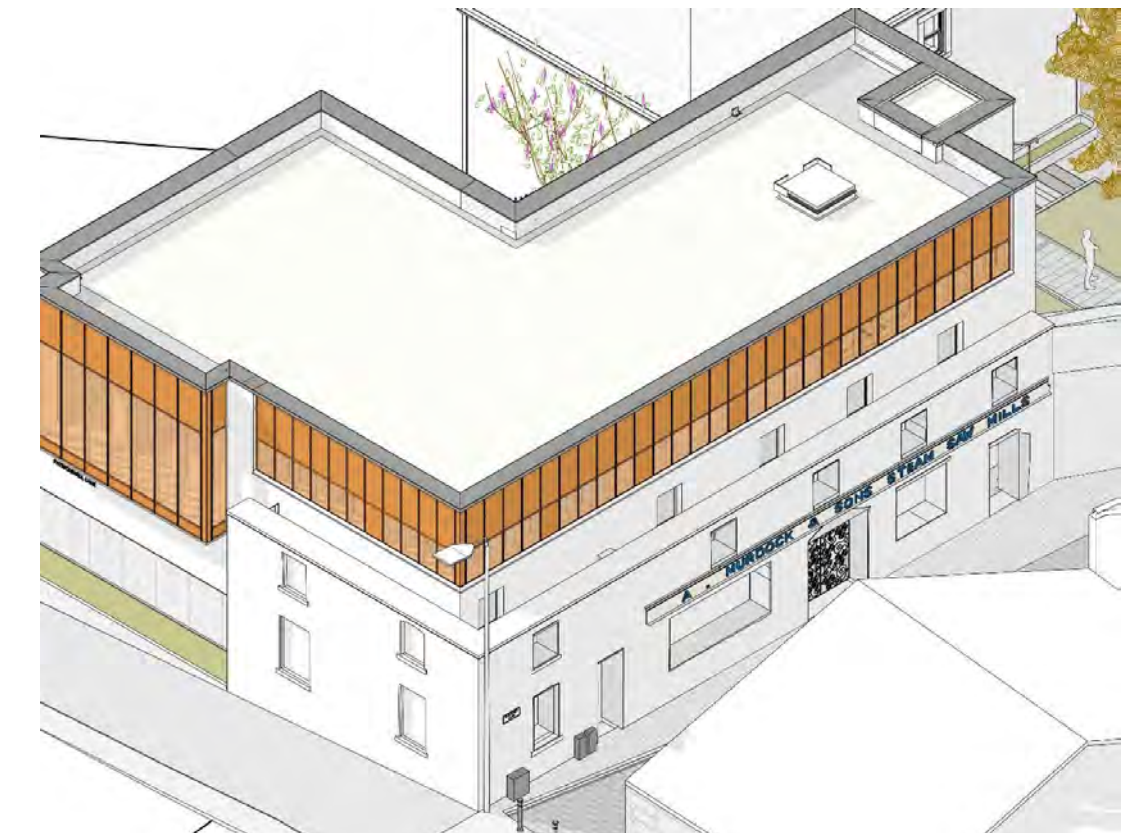
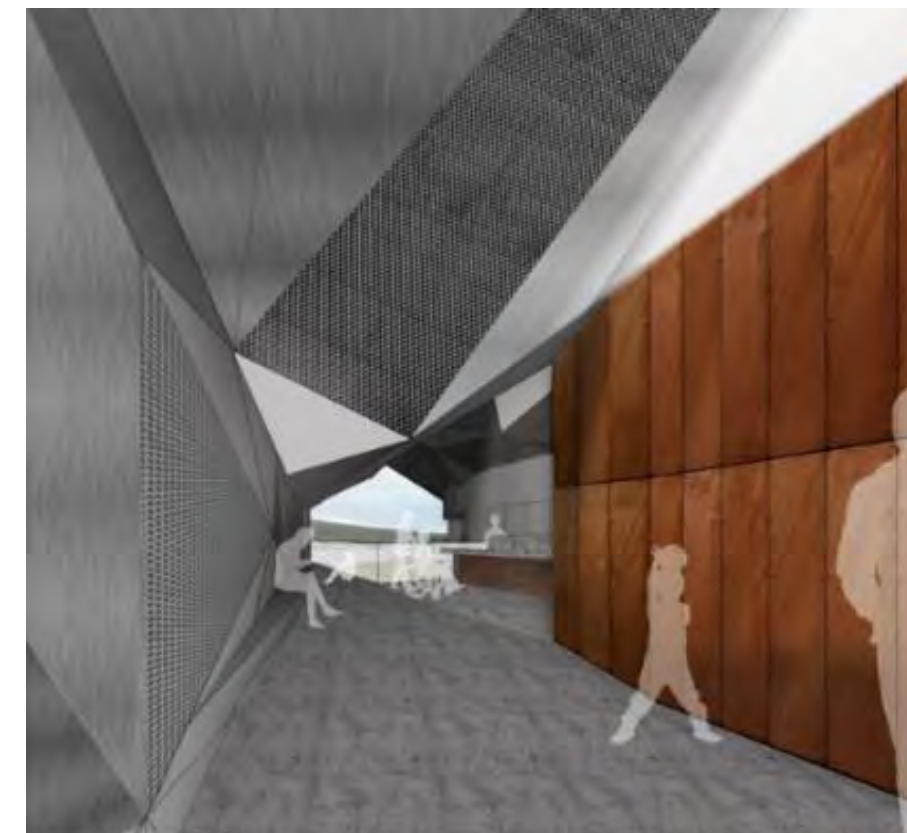


Renewed effort over past two years – beginning of our journey?

- OPW BIM Committee
- BIM Implementation Strategy
- ICT / Training investment
- Development of Common Standards / Documents
- Revit adoption at project-level

Status quo:

- **Limited number of projects** using formal BIM processes
- No formal Revit templates in use (pre 2020)
- Complex organisation, **varying knowledge**



OPS 2020 Innovation Fund



- Framework for development and innovation in Ireland's public service
- “OPW Revit Template project”
- Increase Revit-use - ease transition from CAD / assist in learning journey and knowledge sharing
- Increased Revit-use to enable increased BIM implementation
- Multi-disciplinary Revit template file – increase collaboration and standardisation
- To be developed internally, with Consultant support
- 1 of 34 projects for funding in 2020 (364 submitted)
- €11k awarded



Baseline Survey



- Circulated to architects and building engineers at OPW
- General use of Revit, Use of Revit Templates, potential for this project
- 76 responses, June 2020
- Key findings:
 - *Variable Revit proficiency across OPW – limited number of “advanced” users*
 - *Two-thirds have received formal Revit training*
 - *Three-quarters have never used Revit to deliver project information at OPW*
 - *42% are “very likely” or “likely” to use Revit on OPW project in next 12 months*
 - *Revit Templates are most frequently “created as I went”*
 - *All surveyed would be “Very Likely” (88%) or “Likely” (12%) to use a Revit Template developed by OPW*

Project Setup



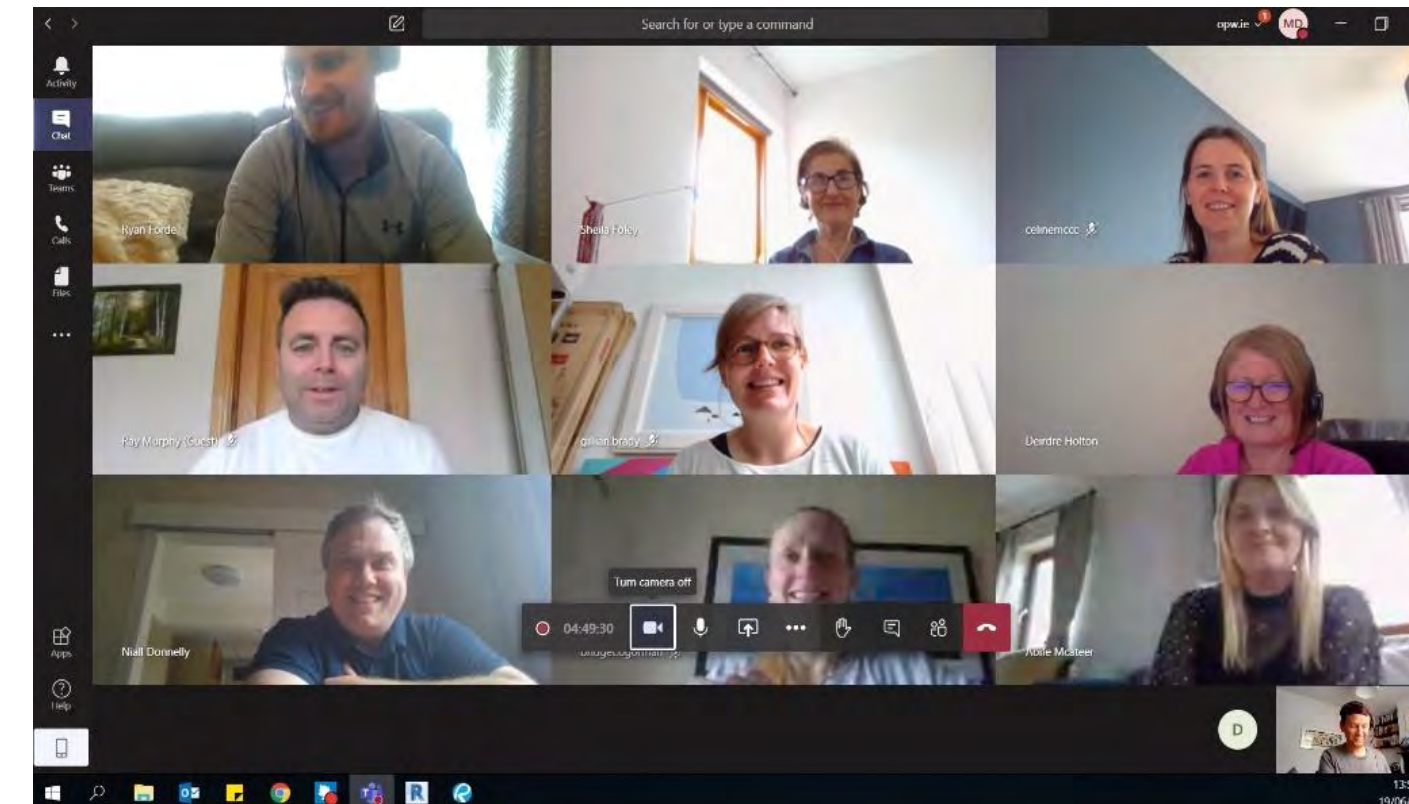
- Multi-disciplinary “**Template Team**” – OPW architects, engineers and draughtspeople – **responsible for template development**
- **Varying Revit proficiency OK**
- Representation from **OPW Dublin and Trim**
- Main **disciplines all represented**
- “Template Ideas” list

OPW Innovation – Revit Template Ideas Dump							
Category	Item	Notes	Discipline	Lead	Support	Target	Status
0 Set Up	Create blank shared Revit model to allow template creation	Advice on any set up required Some guidance on any shared parameters that should be included, particularly for multi-dis templates. Possible categories of Shared Parameters: 1. ISO19650 document numbering parameters – do we think the Irish NA to ISO 19650 is likely to be adopted as currently proposed? Should we use current BS ISO 19650 standards in interim? Section Name / Design Team Members names etc. for drawing border (TBC by OPW Senior Management) 2. Views- Category and Sub-Category to allow for filtering in an OPW Project Browser 3. Fire resistance (minutes) – Loadbearing Capacity (R), Integrity (E), Insulation (I) 4. Room Properties – No. workstations, No. hot desks, Owner, Occupant etc. (FM uses) 5. Doors? 6. Windows?	Common	V Brennan			Done
1 Template Management	OPW Revit shared parameters		Common	L Sobiecki			Started
1 Template Management	Splash sheet when opening up template		Common	N Donnelly			Started
1 Template Management	Naming convention for template elements / families	Adopt recommendation from DBC – which follows NBS approach <Role>_<Source>_<Type>_<SubType> e.g. Z_OPW_GA_SheetScaleBar	Common	To be agreed by all			Done
1 Template Management	Configure Project Browser	Add “Discipline” and “View/Sheet Folder” parameters? Embed sorting of views by drawing series within View Templates (see Revit Model for T.J.H) Sort by scale? Sort by number? Allow for Category and Sub-Category of Views (Shared Parameter) to allow for sorting on a project basis. See possible layout following.	Common	M Day			Started – for agreement with Group
1 Template Management	Default Printer settings for A1/A3/PDF – multiple and single file	Raster or Vector printing – what’s the difference?	Common	M Day			Done
1 Template Management	User Guide ‘help sheet’ for using Template	Include info on level numbering/naming?	Common				Started
1 Template Management	User Guide ‘drawing border’ help sheet	To describe how to use the new OPW drawing border – styles for use, drawing numbers etc.		V Brennan			
1 Template Management	OPW General Standards sheet	Show all of the standard items developed in the template – text styles, filled regions, annotation symbols etc.	Common	M Day			Started
1 Template Management	OPW Structural Standards sheet	Show all of the structural items included in the template	Structural	V Brennan			
1 Template Management	Keynote File template	Include outline set up for file – not specifics Should keynotes be numbering in a particular way? Do this by discipline to include some standard notes?		M Day			Done
1 Template Management	Placeholder for linked models from other disciplines?		Common	-			Not required
1 Template Management	Define Levels and Naming Convention	00 – Ground Floor, 01 – First Floor, B1 – Basement 1, 1M for first mezz etc. (should these be 00-A for Architectural FFL and 00-S for Structural SSL)?	Common	B O’Gorman			Need to review

Training & Consultant Appointment



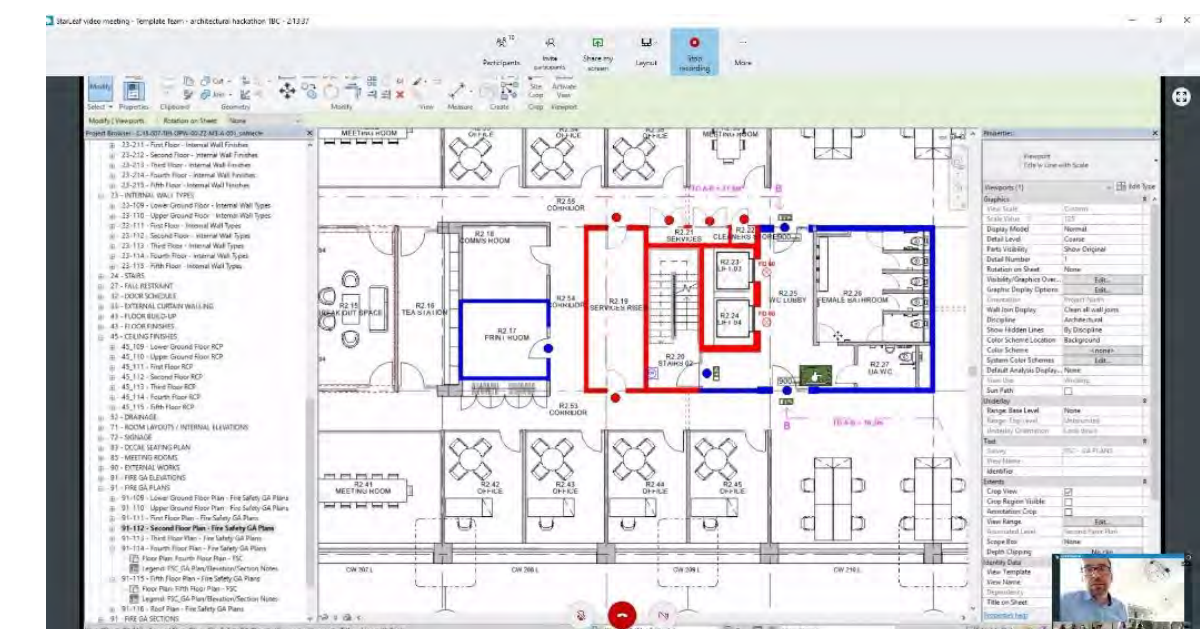
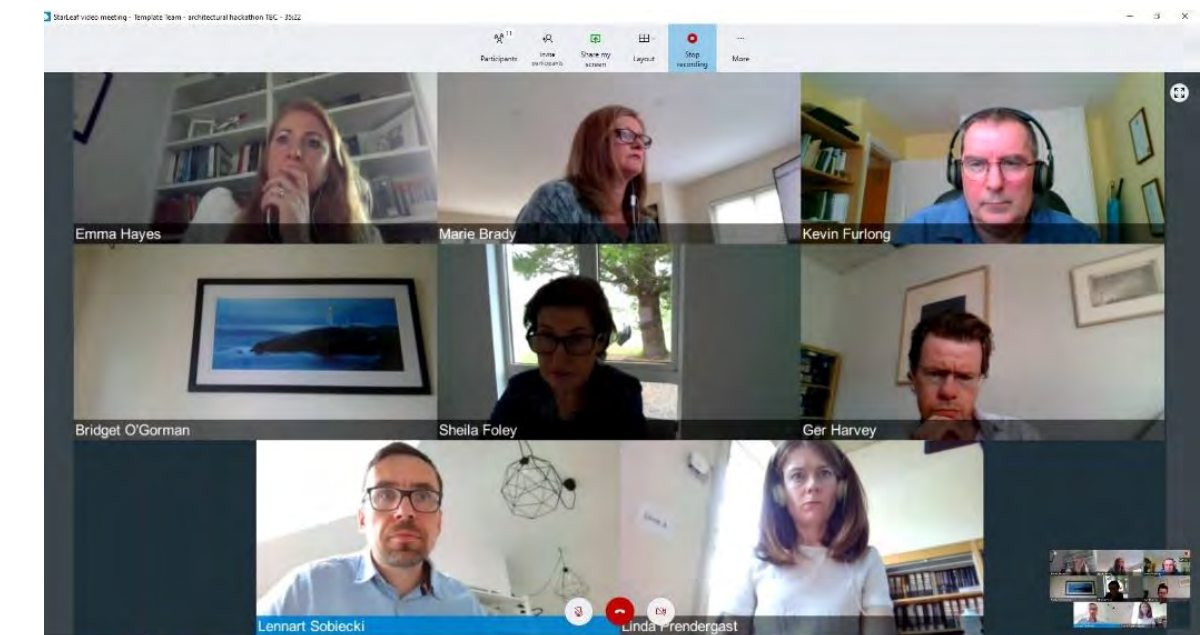
- **Revit Training** completed by Template Team
 - *Revit Advanced – BIM Management*
 - *Revit Advanced – Families*
 - *Revit Refresher/Upgrade (where required)*
- Consultant scope developed by Template Team
- **Digital Built Consultants** appointed to oversee Template development



Hackathon Sessions



- **Six hackathon sessions**
 - *Introductory workshop*
 - *Architectural, C&S, M&E workshops*
 - *Two review sessions*
- **Presentation** by Digital Built Consultants
- **Informal Q&A** with Template Team
- **Screen-sharing**



Overarching Template Strategy

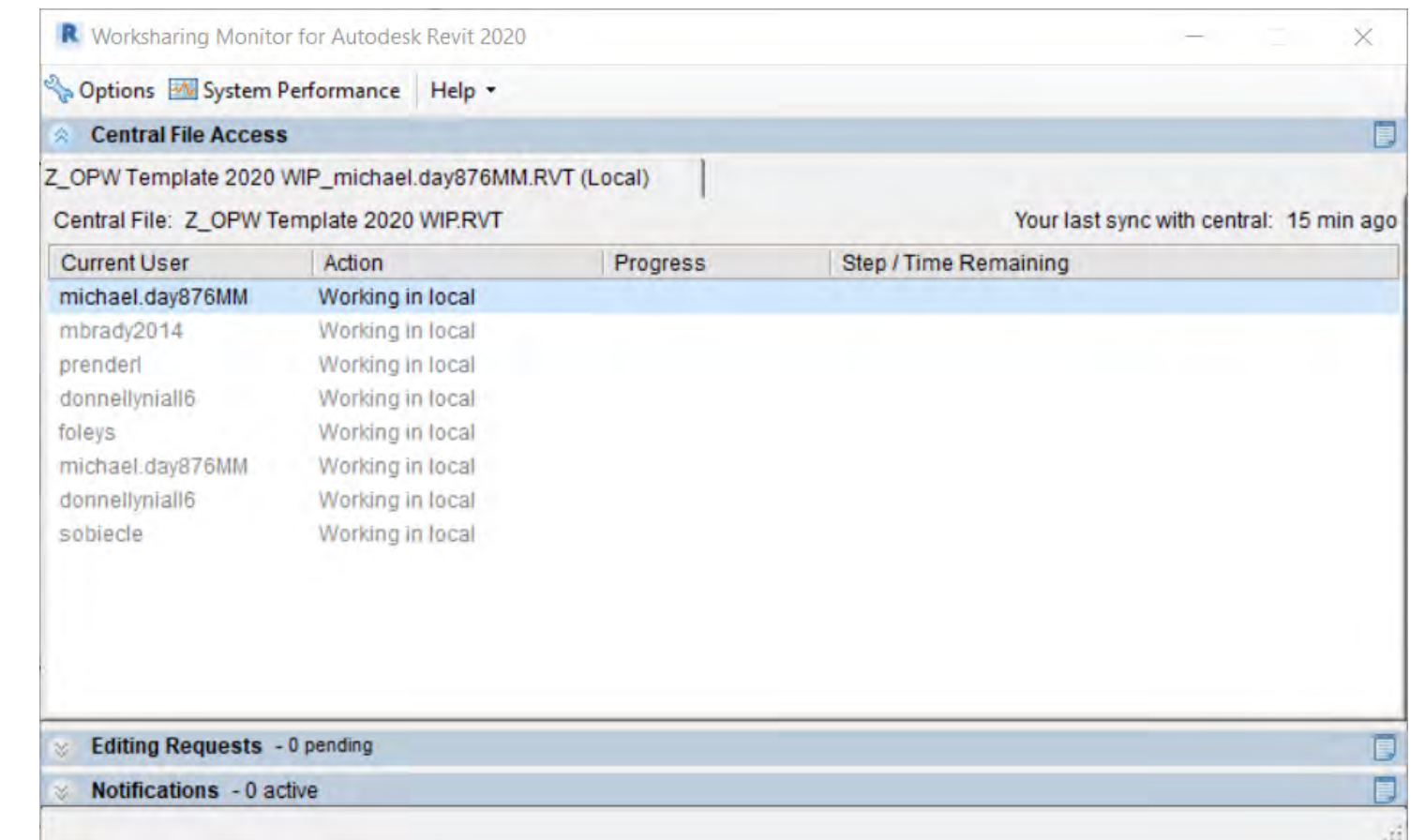


- OPS 2020 proposal – **multi-disciplinary template**
 - *Consistency across disciplines, updates made centrally*
- Multiple approaches presented by DBC – “**main template(s)**” + “**resource template(s)**”
- “Main template” – **frequently used information**, but kept to manageable file size
- “Resource template” – **less frequently used, discipline-specific information**
- OPW approach adopts **1 “main template” + multiple “resource templates”** – enough information in “main template” to allow any discipline to start a model

Template Development



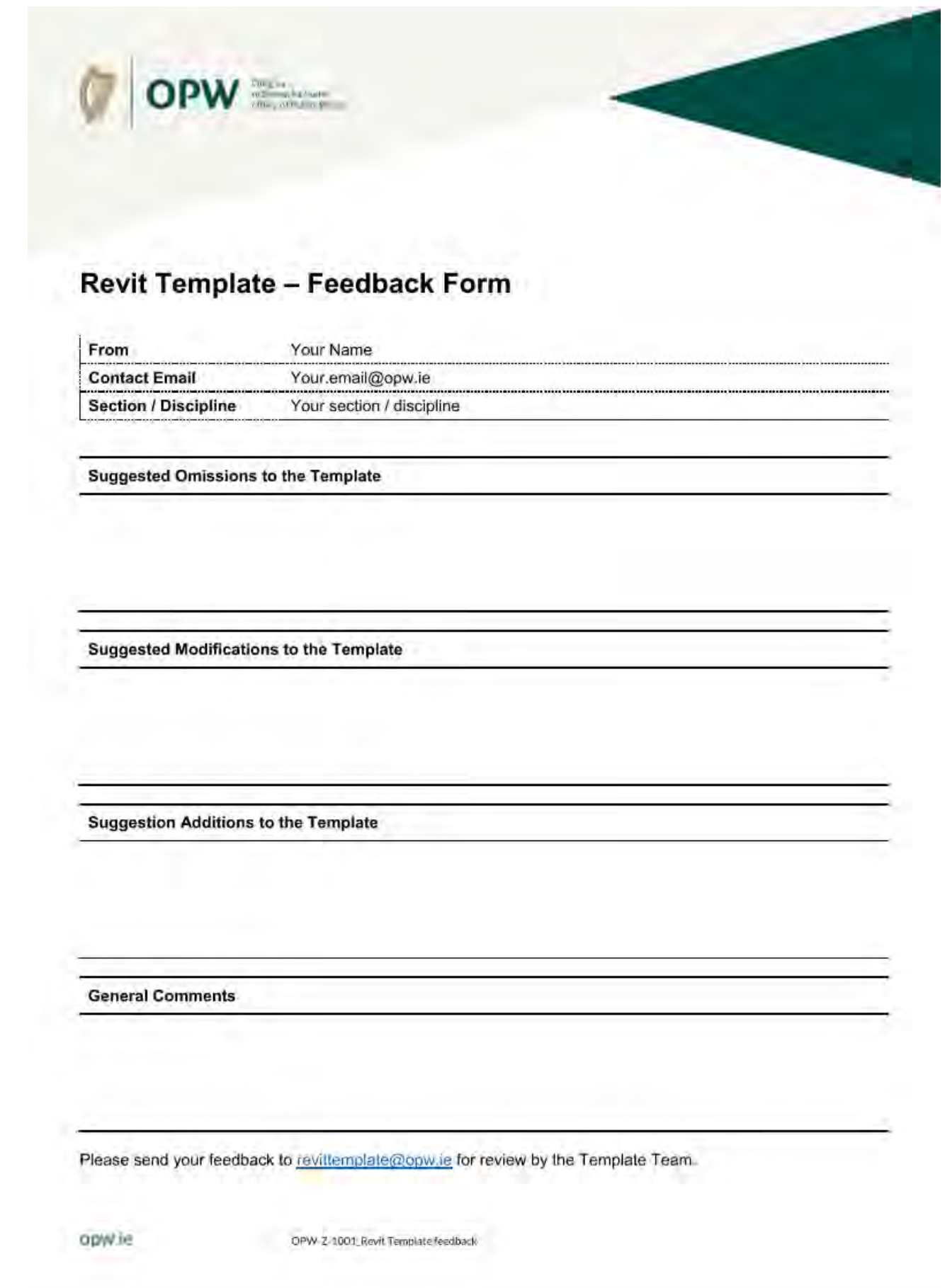
- Template **development by Template Team**, June to August 2020
- **Central .rvt file** used (later converted to .rte)
- Tasks divided up within Template Team
 - *Revit-proficiency of member*
 - *Complexity of task*
 - *Discipline*
 - *Other project commitments*



Template Release



- First version released **August 2020**, following DBC review
- “Read only” version available to all architects and building engineers on **shared drive**
- Main Template, WIP Resource Templates, Support Files, Feedback Form
- First version is “**start of the journey**”

A screenshot of a web-based feedback form titled "Revit Template – Feedback Form". The form includes a header with the OPW logo and a green triangle. It contains several sections for user input: "From" (Your Name), "Contact Email" (Your.email@opw.ie), and "Section / Discipline" (Your section / discipline). Below these are three sections for suggestions: "Suggested Omissions to the Template", "Suggested Modifications to the Template", and "Suggestion Additions to the Template". Each section has a header line followed by multiple blank lines for text entry. At the bottom, there is a "General Comments" section with a header line and blank lines. A footer note states: "Please send your feedback to revittemplate@opw.ie for review by the Template Team." The footer also includes the OPW.ie logo and the text "OPW 2-1001-Revit Template feedback".

OPW Template



- Agreed **naming convention for template elements**, adopting the ISO 19650 discipline identifier at the start, i.e. 'A_Door Schedule', 'S_Foul Drain [linetype]' 'Z_2.0mm General Text'
- Agreed **naming convention for Families**, adopting the NBS-approach to include the originator of the family has been defined, i.e. 'Z_OPW_TB_...' for a Title Block Family, generated by OPW and common to multiple disciplines
- Defined **Line Patterns**
- Defined **Line Styles**
- Defined **Filled Region** colours, based on the Government Visual Identity Guidelines
- Defined Filled Region colours for materials
- Defined **Text Styles** using Arial, in a range of sizes and colours, based on the Government Visual Identity Guidelines
- **Project Browser layout** has been defined to include both a 'Standard' set up (sorted by Role, and Sub-Category) and an 'Alternative' set up (sorted by Role and National Building Elements identifier)
- **View Types** for each discipline
- **View Templates** to accompany each View Types
- **Annotation Symbols** – North Arrow, Scale Bar, Revision Symbol
- Pre-defined **Architectural Schedules** – Casework, Ceilings, Doors, Furniture, Rooms, Windows
- Pre-defined **Structural Schedules** – Beams, Columns, Floors, Foundations, Walls
- Pre-defined **Common Schedules** – Views, Sheet
- A limited **Material Library** has been added
- A 'Report Cover' matching the latest OPW branding has been added
- A '**Template User Notes**' sheet
- **OPW Drawing Borders** – English and Irish versions

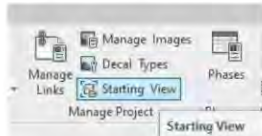
OPW Template – User Notes



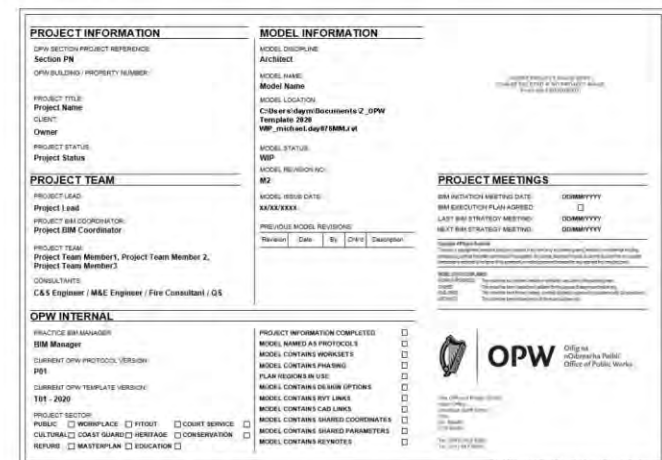
Setting a Starting View

This View is currently set as the 'Starting View' which will appear when you open the Template.

To change this to another View or Sheet within the model, go to the 'Starting View' selector in the Manage tab.

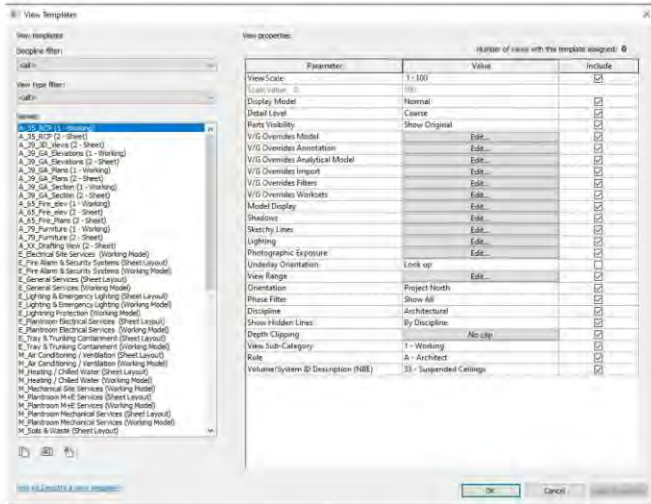


You may find it useful to set drawing 'Z-0001 - Revit Splash Sheet' as your starting view.



View Templates

View Templates have been used throughout this template to control the visual appearance of views, but also how the views are sorted in the Project Browser (i.e. the Role, View Sub-Category and Volume/System ID Description (NBE) parameters).



There are typically View Templates created for both '1 - Working' and '2 - Sheet' views of a given type.

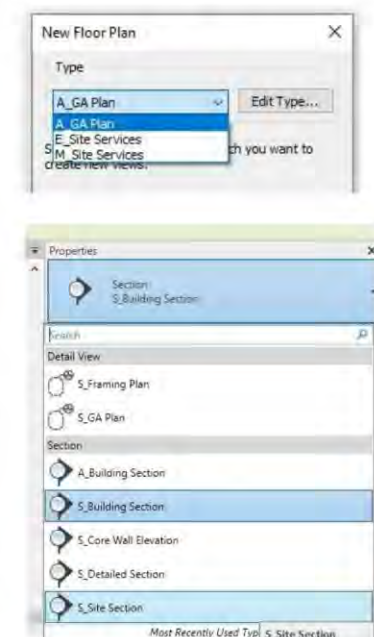
The View Template for any View can be modified through the Properties panel. Where parameters in the Properties panel are 'greyed out', these are controlled by the View Template (the ticks in the 'Include' column within the View Template properties show what is included in each View Template).



Creating Views

A number of different view Types have been created to assist you in creating new views on projects. These are sorted by discipline using the standard identifier 'A-', 'C-' etc. and typically apply a 'working view' template when created.

Use the drop down in the pop up, or within the Properties panel, to select the View Type you want to create.



In general, a '1 - Working' view template is applied to views created. By adjusting the View Template in the Properties panel, these can be 'promoted' to Sheet Views as needed.

View Naming

It is recommended that Views are named in a logical manner to allow them to be easily located within the Browser.

It is suggested that plan view names start with a number to allow them to be logically sorted in the Browser. Note that views can be named differently when they appear on sheets.

00 - Level 0 Plan
0C - Level 0 Ceiling Plan
0M - Level 0 Mezzanine
01 - Level 1 Plan
B1 - First Basement Plan

See also sheet Z-0001 which provides guidance on the values that should be used in the 'Level' field on sheets.

OPW Revit Template Overview

Development of this OPW Revit Template commenced in mid 2020 following the award of funding under the Our Public Service (OPS) Innovation Fund 2020.

The Template was developed in-house by a multi-disciplinary 'Template Team' of architects, M&E engineers/technicians and C&S engineers/technicians under the guidance of an external consultant. Template Team representatives from across the organisation are listed below:
Architecture - Bridget O'Gorman, Celine Clarke, Lennart Sobiecki, Linda Prendergast, Marie Brady, Niall Donnelly, Sheila Foley
M&E Engineering - Andrew Woods, Ray Murphy
C&S Engineering - Michael Day (Project Lead), Valerie Brennan

The current version of the Template is available at the following location:
0:RevitOPW Revit Template

The Template is developed for use across the disciplines, and is supported by a number of separate discipline-specific 'resource templates'. The resource templates include additional information which may be relevant to your discipline and are stored here (if developed):
0:RevitOPW Revit Template\01 Discipline Resource Templates.

The Template and resource templates are supported by a number of additional files (families, keynotes, shared parameters etc.) which are stored here:
0:RevitOPW Revit Library

The Template, resource templates and supporting files have been developed to assist you in developing Revit models and drawings - it is intended to make your life easier, not more difficult! If you have suggestions for how it may be improved, things that you do/don't like about it, or requests for changes please contact a member of the Template Team or email revittemplate@opw.ie

It is envisaged that this Template will evolve over time, so please bear with us as it develops!

Support Pages

A number of other supporting views are included as part of this Template. These are filed under 'Z - General' in the Project Browser. Right-click within the Project Browser to Search for any of these help pages.

Drafting Views:

Z_Template User Notes 1/2: this and subsequent sheets
Z_Revit Standards 1 - Common: outlines some of the standards defined within this Template which apply across the Organisation; where possible these are derived from the Government Visual Identity Guidelines
Z_Revit Standards 2A/2E/2M/2S: discipline-specific standards

Sheets:

Z-0001 - Drawing Border Guidance: gives more information about how to use the OPW drawing sheet, the definition of the parameters used etc.
Z-0101 etc.: Sample drawing borders at A0, A1, A2 and A3 sheet sizes are included. Each has an English/Gaelige and an horizontal (e.g. A0h) and vertical (e.g. A0v) option.

Naming Convention

The naming convention used throughout this template broadly follows the following logic:

"X_Description" where X represents the applicable discipline/role followed by "_" and then an appropriate description.

The disciplines/roles used are as follows - adopting the naming convention in BS ISO EN 19650-2:
A - Architect
C - Civil Engineer
E - Electrical Engineer
M - Mechanical Engineer
S - Structural Engineer
Z - General (or Multi-Disciplinary)

The naming convention used for Families extends the principles above as follows:

"X_YYY_ZZ_Description" where X represents the applicable discipline/role, YYY represents who created the family (for OPW families this is OPW) and ZZ is a two-character abbreviation identifying the type of family.

The types of families defined include the following:

GA - Generic Annotation
GM - Generic Model
SY - Symbol
TG - Tag

Browser Organisation

By default, the Template includes multi-disciplinary information and the organisation of the Project Browser reflect this. Included within the Template are Views, Schedules and Sheets which are relevant both to your discipline and other disciplines within the OPW.

The Project Browser reflects the multi-disciplinary nature of the Template, and in principle is organised by Role.

As standard, Views are further sorted by a parameter called "View Sub-Category". The following values are used typically:

1 - Working - these views typically include information which you may not want to appear on a sheet
2 - Sheet - for inclusion on your drawing sheets
3 - Design - showing analytical model elements only

As standard, Sheets are further sorted by a parameter called "Sheet Sub-Category". The values used vary from discipline-to-discipline, but start with the discipline identifier 'A-', 'C-' etc.

An Alternative method of sorting the Project Browser has also been included, where sorting is done using a parameter called "Volume/System ID Description (NBE)" based on the National Building Elements numbering system.

The organisation of the Project Browser can be changed to suit your requirements by right-clicking on "Views", "Schedules" and "Sheets" and selecting this alternative set-up.

Latest Template Updates

The current version of the OPW Revit Template is version P01 (first version, released in late 2020).

Updates in this revision include:

- Template User Notes sheet included (this sheet)
- OPW Drawing Border advice sheet included
- "Revit Standards" sheets have been included, both for Common elements and by discipline
- Text Styles in a range of colours (generally 2.5mm, 3.5mm and 5mm)
- Dimension Styles
- Line weights updated - both annotation and model line weights
- Line Patterns defined
- Line Styles defined
- Filled Regions (colours) added, in accordance with the Government Visual Identity guidelines
- Filled Regions (materials) to match graphics settings for materials
- Filled Regions (drafting patterns) added
- Annotation symbols added
- Material Library definition started
- OPW drawing border included
- Browser Organisation defined - see following
- View and Sheet Schedules defined
- Architectural Schedules defined - Door, Window and Room Schedules
- Structural Schedules defined - Beam (Framing), Column, Floor, Foundation, Wall, "Complete" versions and "Summary" versions for inclusion on sheets have been added.
- Structural Settings have been reviewed

The current version of the Template is also listed in the 'Project Information' in the 'Manage' Tab.

OPW Template – Graphical Standards



OPW Standards

The Standards shown on this sheet have been used throughout this Template to provide some consistency to the visual styles of models and drawings produced by OPW. In general, these are based on the Government Visual Identity Guidelines v2.1.

OPW Line Patterns

Solid	
Centre	
Centre Small	
Dashed	
Dashed Small	
Dashed Long	
Dashed Long Short	
Dashdot	
Dashdot Small	
Hidden	
Hidden Small	
Grid Line	
Demolished	

OPW Tag and Dimension Styles

Arrow Filled 30 degree

Spot Elevation (on Plan)

Z_2.5mm General Dim Arial

Z_2.5mm Site Extents Arial

55°

10

ø 90

OPW Symbols and Families (pre-loaded into Template)

Z_OPW_GA_Rev Issue Triangle

Z_OPW_GA_Rev Issue Box

Z_OPW_GA_North_Point

Z_OPW_GA_Elevation Symbol SSL

Z_OPW_GA_BreakLineStraight

Z_OPW_GA_SheetScaleBar
Types: m and mm

Z_OPW_GA_SheetScaleBarSimple

Z_OPW_GA_Level Step Symbol Small
Types: left and right

Z_OPW_GA_SheetNotesA1

Notes:

1 Sample Notes Sample Notes Sample Notes Sample Notes Sample Notes Sample Notes
Sample Notes Sample Notes Sample Notes Sample Notes Sample Notes Sample Notes
Sample Notes Sample Notes

OPW Text Styles

Z_2.5mm General Arial Black

Z_2.5mm General Arial Blue

Z_2.5mm General Arial Red

Z_3.5mm General Arial Yellow

Z_2.5mm General Arial Black Bold

Z_2.5mm General Arial Black Boxed

Z_3.5mm Heading Arial Black

Z_3.5mm Heading Arial Black Underline

Z_3.5mm Heading Arial Black Bold

Z_5mm XL Arial Black

Z_5mm XL Arial Red

OPW Annotation Line Styles

Z_0 Black Solid

Z_0 Light Grey Solid

Z_1 Black

Z_1 Black Centre

Z_1 Black Centre Small

Z_1 Black Dashed

Z_1 Black Dashed Small

Z_1 Black Dashed Long

Z_1 Black Dashed Long Short

Z_1 Black Dashdot

Z_1 Black Dashdot Small

Z_1 Black Hidden

Z_1 Black Hidden Small

Z_2 Black

Z_3 Black

Z_4 Black

Z_5 Black

Z_6 Black

Z_7 Black

Z_8 Black

Z_9 Black

Z_10 Black

Z_10 Site Boundary

Z_10 Lands within Applicants Ownership

OPW Filled Region Styles - Materials

Z_In situ Concrete

Z_Precast Concrete

Z_Masonry Blockwork

Z_Brick Common

Z_Brick Engineering

Z_Steel

Z_Stainless Steel

Z_Weathering Steel

Z_Timber

Z_Masonry Blockwork (Drafting)

Z_Binding / Grou (Drafting)

Z_Earth (Drafting)

Z_Compacted Fill (Drafting)

Z_Concrete (Drafting)

OPW Filled Region Styles - Brand Colours and RGB Codes

Primary Brand Colours

Z_State Green		0, 77, 68
Z_State Gold		163, 145, 97
Z_Light Grey		237, 236, 229
Z_Dark Grey		86, 81, 82
Z_White		
Z_Black		

Secondary Brand Colours

Z_Light Blue		0, 159, 227
Z_Blue		44, 86, 162
Z_Roadmine Red		229, 0, 81
Z_Orange		240, 126, 76
Z_Red		228, 35, 19
Z_Yellow		255, 229, 36
Z_Light Green		159, 196, 59
Z_Green		0, 157, 61

Note:
Lines have been named using the following convention: Z_<Line Weight> <Colour/Description> <Line Pattern>. Where no Line Pattern is noted, the line is Solid.
Line weights 0 has a pen weight of 16, which is defined as an ultra-thin line.
Line weights 1-10 incrementally increase in size.
Line weights 11-15 are not used.

OPW Text Styles

ZZ_2.5mm General Arial Black

ZZ_2.5mm General Arial Blue

ZZ_2.5mm General Arial Red

ZZ_2.5mm General Arial Yellow

ZZ_2.5mm General Arial Black Bold

ZZ_2.5mm General Arial Black Boxed

OPW Filled Region Styles - Brand Colours and RGB Codes

OPW Primary Colour Palette

ZZ_State Green		0, 77, 68
ZZ_State Gold		163, 145, 97
ZZ_Light Grey		237, 236, 229
ZZ_Dark Grey		86, 81, 82
ZZ_White		
ZZ_Black		

Adoption & Update




Template used to develop **single-discipline models** on a range of projects:

- Bunmahon Coast Guard Station
- Tallaght Garda Station development
- Ring Garda Station refurbishment
- Kilcain Government Offices project

Updated Template – June 2021

- Changes to OPW corporate colour palette
- Reflects National Annex to **IS EN ISO 19650-2**
 - *Drawing border changes*
 - *Modified discipline IDs ('S' becomes 'SE')*

Revision	Date	By	Chkd	Description
OPW Section Name Technical Lead - Joe Bloggs Project Lead - Kate Bloggs Team Member - Liam Bloggs Team Member - Megan Bloggs Team Member - Noel Bloggs				
 OPW Oifig na nOibreacha Poiblí Office of Public Works				
Office of Public Works 1 Jonathan Swift Street, Tinn, Co. Meath, B15 W7D0 T: 045 942 2000 W: www.opw.ie				
Project Title: Project Name: Project Address 1: Project Address 2:				
Drawing Title: Sheet Title 1: Sheet Title 2: Sheet Title 3:				
Project Scale: ZZ - Common		OPW Section Project Reference: 1234		
Scale: 1:1				
Drawn: A. Bloggs	Checked: B. Bloggs	Approved: C. Bloggs	Date: 01/06/21	
Drawn Description: Information		Drawn Code: P1S	Revision: 1	
Drawing Number: 123456-01-X-B1234-XXX-DR-OPW-ZZ-0001				

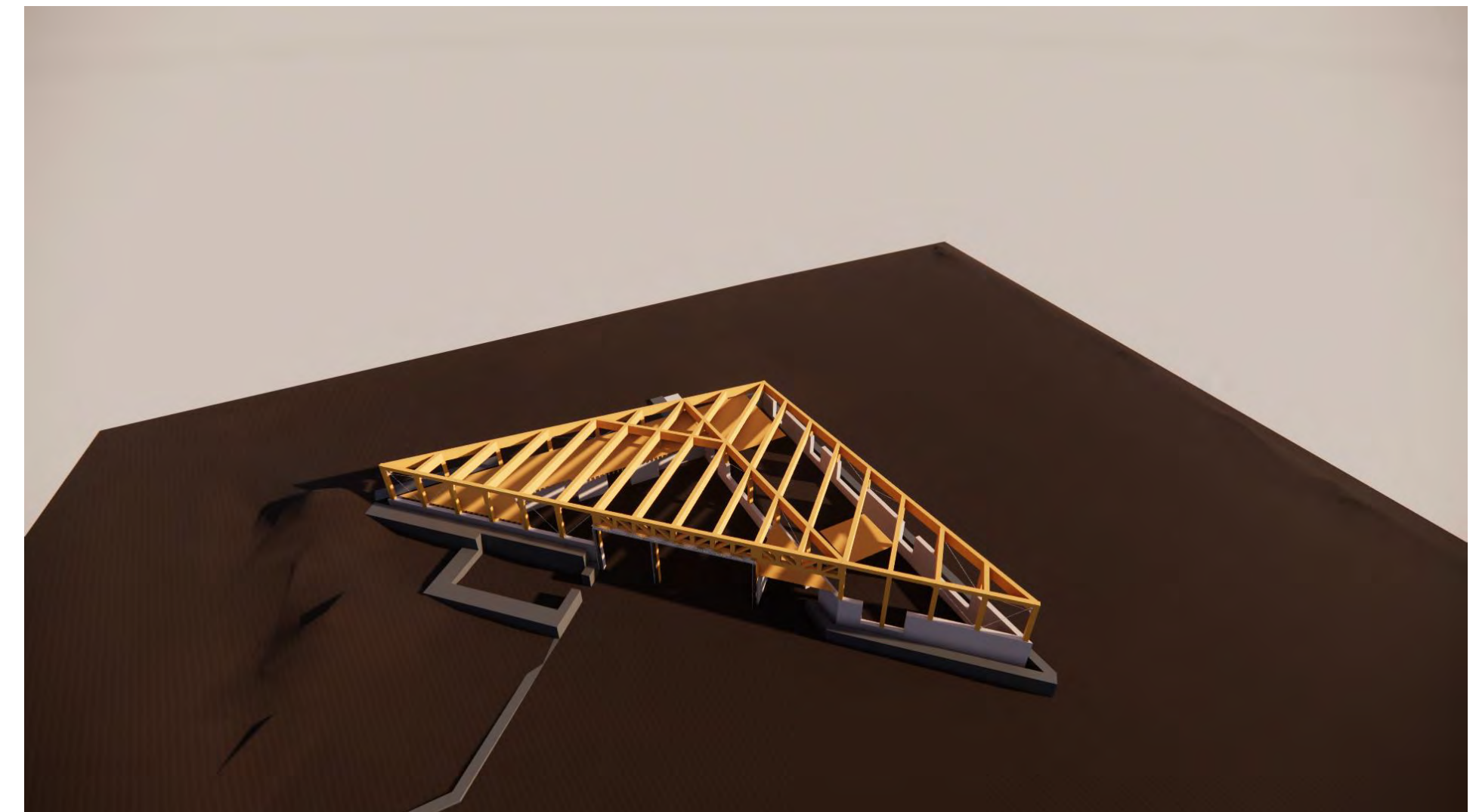
© Office of Public Works



Next Steps



- Continued development required – more to do
 - *By Template Team + OPW BIM Manager (in time)*
- Feedback from colleagues sought
- Follow-on survey in late 2021 / early 2022 to assess use
- Use by others – to be considered?
 - *External Designers on OPW projects*
 - *OPW + External Quantity Surveyors*
 - *Contractors*
 - *OPW Facilities / Property Managers*



Conclusions (1)



- Use of Revit / BIM at OPW is **increasing**
- **Revit skills and implementation vary** across organisation
- Revit Template has been created and is being used – **further work required** to quantify use, to confirm whether it has encouraged people away from CAD
- **Updated CWMF awaited** – consideration of BIM likely
- Awareness of BIM at OPW growing...



Conclusions (2)



*“...the **introduction of appropriate BIM deliverables into OPW procurement processes** – both for design services, in the appointment of contractors and in the acquisition/leasing of State Property – has the potential to reduce direct building costs, mitigate construction risk and reduce potential contractual conflicts, providing improved outcomes on public works projects...”*

OPW Statement of Strategy 2021-2024



5th CitA BIM Gathering Virtual Conference

21 - 23 September 2021

Thank You

