

# **DPC**

## **Building a Digital Future**

### **Information Management, Interoperability and the Construction Industry**

**Fiona Moore, CDBB UK Implementation  
April 2020**

# Topics

- Why is construction Information Management so important for the construction industry?
- How to deliver it
- Lessons learnt to date (a personal view)
- Q&A

# Centre for Digital Built Britain (CDBB)

Design

Build

Operate

Integrate

## A digital built Britain:

- understanding what information is needed right from the start
- ensuring feedback loops are in place throughout an asset's lifecycle
- information enabling better whole life value and optimising services to improve socio-economic outcomes for citizens
- save money and improve productivity



# **Why is Information Management so important for the construction industry?**

# Construction overview



How construction projects are delivered and then how built assets are managed:

- Clients
- Consultants – design, cost management, project management
- Constructors / Contractors
- Constructors supply chain
- Asset and facilities management
- Senior management and whole life oversight
- Procurement and contracts – their effect on culture and behavior

Construction industry reports

# Poor decision making

Working in  
multiple silos

Purchasing Client



Professional Service Provider



Contractor



Operator, Customer etc





# Why we need to improve construction delivery?

- Transparency (Hackitt Report)
- Waste / carbon
- Lack of real productive collaboration
- Re-work and increased cost
- Poor outcomes
- Poor Health & Safety
- Stakeholder impact
  - Building occupiers
  - Building investors
  - Construction professionals and workers

## Information Management:

1. Procuring defined information
2. Assuring information
3. The ability to share that information

## Building a Safer Future

Independent Review of Building  
Regulations and Fire Safety:  
**Final Report**



May 2018

Dame Judith Hackitt DBE FREng

Cm 9607

# The problem

- Undefined
- Disorganised
- Uncoordinated
- Procured multiple times
- Unmaintained
- Inaccurate
- Unsecure



Current building handover information



# The solution

## Information Management:

- Defined
- Organised
- Coordinated
- Procured once
- Maintained
- Assured and accurate
- Secure

**Now to make it digital...**




What about a library of information?

# Building Information Modelling (BIM) a standardised approach



Thesaurus FreeAgent : Overview LinkedIn Trello HAWCE GliderBIM www.bimregswm.c... Pierre BIM Level 2 SFT BIM



## British Standards and Publicly Available Specifications (PAS) from BSI

The BIM Level 2 suite of documents has been developed to help the construction industry adopt BIM Level 2.

The availability of this suite of documents for free download has been made possible due to government and industry sponsorship. Download your free standards today and be on your way to effectively implementing and achieving BIM Level 2.

[Visit the BSI Shop to view other BIM standards](#)

### Newly released standards

**BS EN ISO 19650-1:** Organization and digitization of information about buildings and civil engineering works, including building information modelling -- Information management using building information modelling: Concepts and principles

**BS EN ISO 19650-2:** Organization and digitization of information about buildings and civil engineering works, including building information modelling -- Information management using building information modelling: Delivery phase of the assets

Buy ISO 19650-1 & ISO 19650-2 & PD 19650 with a special 20% discounted price until April - Click [here](#) to utilise the special offer.

Find out more: [ISO 19650 Transition presentation from BSI, CDBB and UK BIM Alliance](#)

### Standards coming soon

BS EN ISO 19650-3 – Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) – Information management using building information modelling - Part 3: Operational phase of the asset

BS EN ISO 19650-5 – Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) – Information management using building information modelling - Part 5: Security-minded approach to information management.

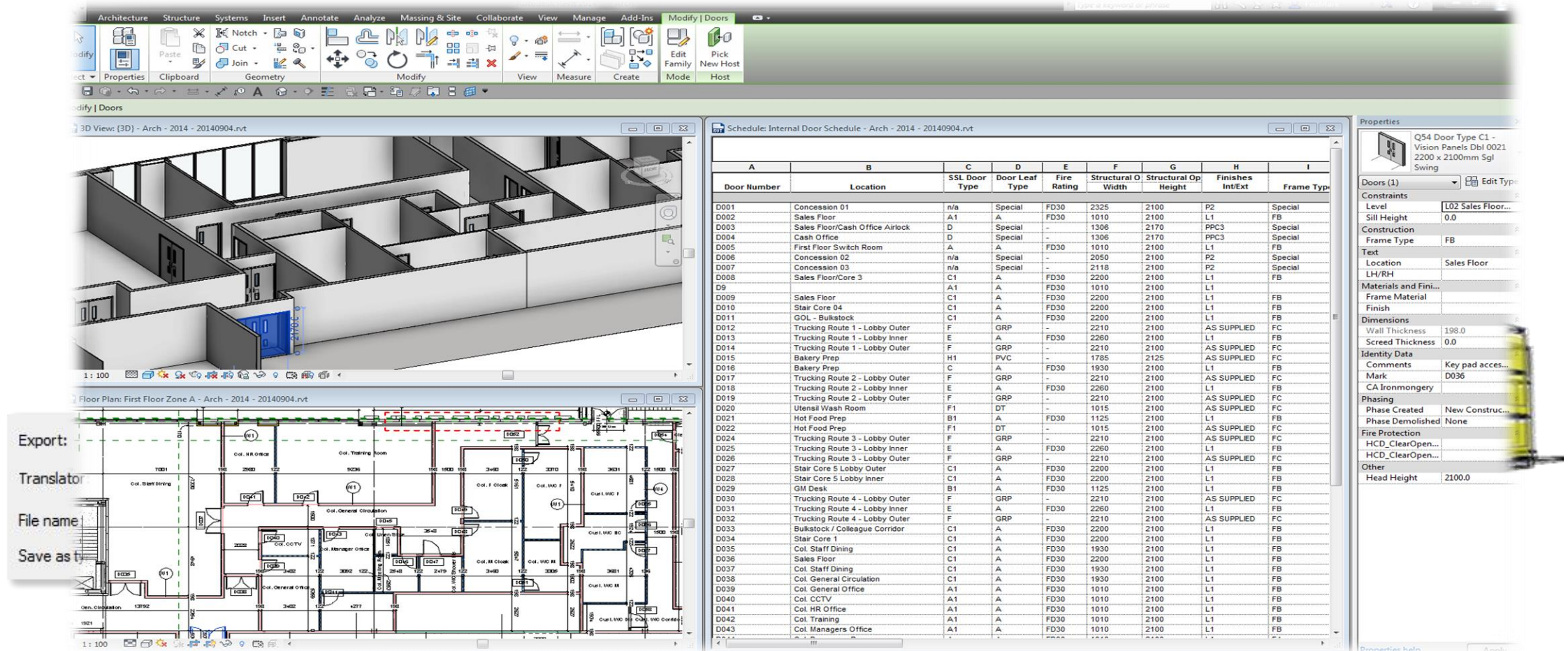
### NEW - PAS 1192-6:2018

**Specification for collaborative sharing and use of structured Health and Safety information using BIM**

PAS 1192-6 specifies requirements for the collaborative sharing of structured H&S information



# BIM - Computer Aided Design (CAD) and 3D?

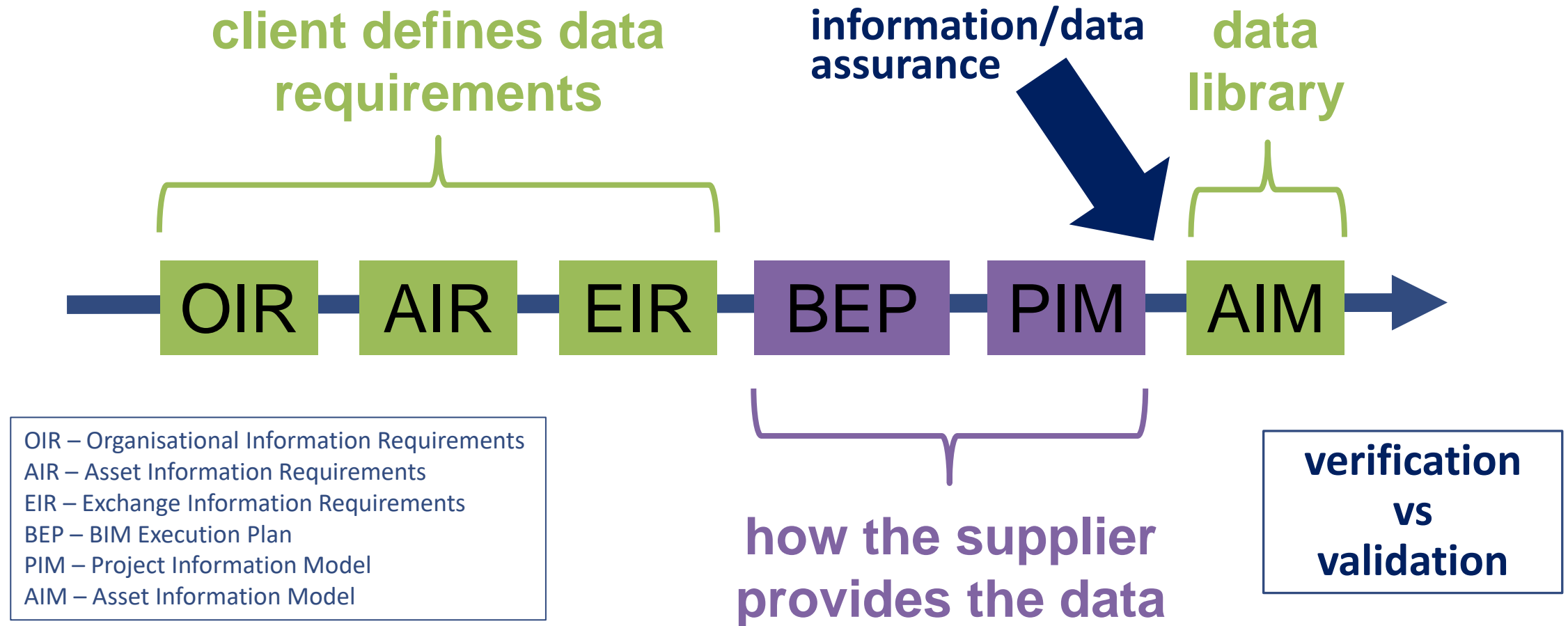


The screenshot displays a BIM software interface with the following components:

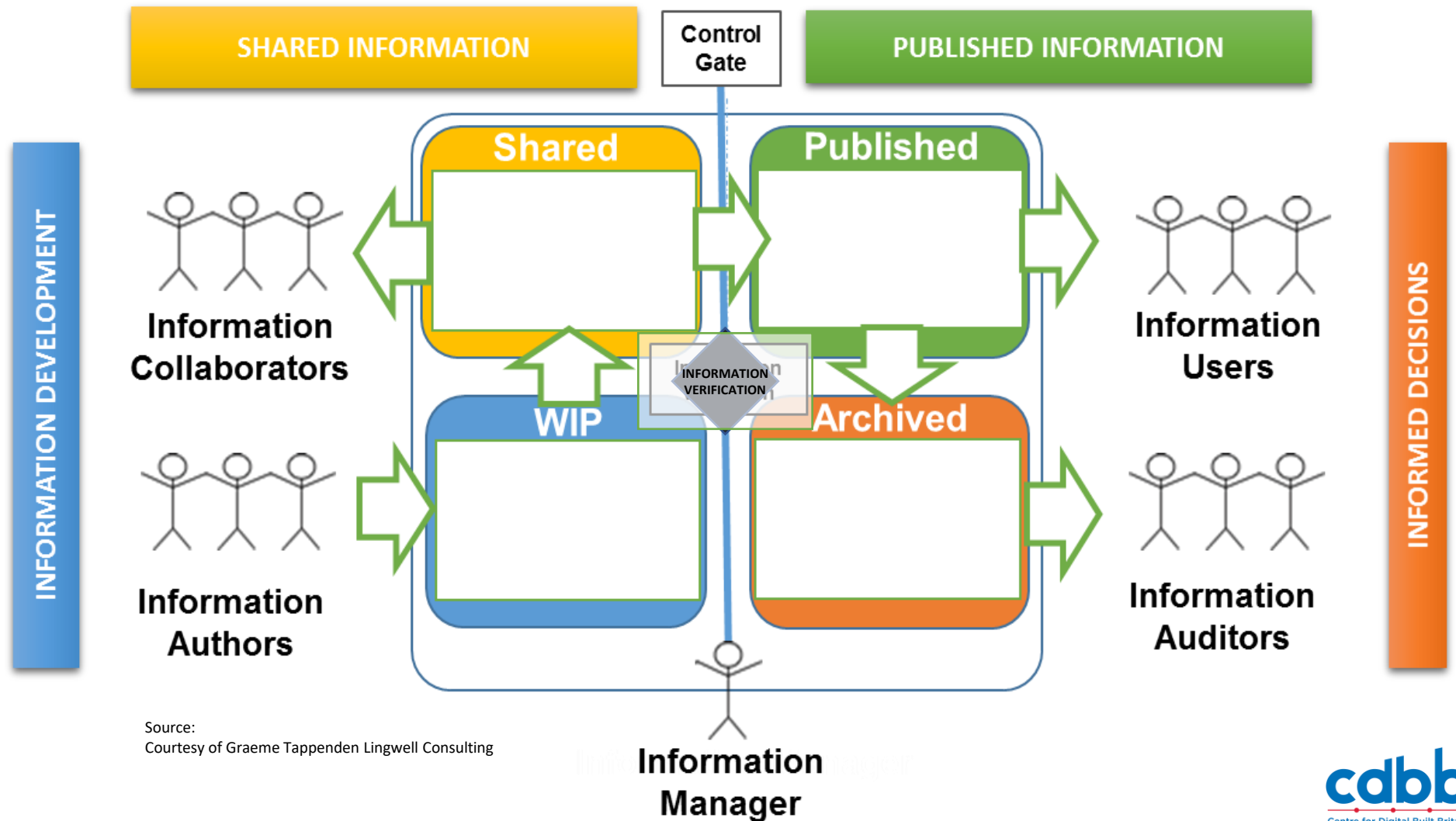
- Top Ribbon:** Architecture, Structure, Systems, Insert, Annotate, Analyze, Massing & Site, Collaborate, View, Manage, Add-Ins, Modify | Doors.
- Left Panel:** Modify | Doors. Below it, a 3D View of a building model and a Floor Plan of the First Floor Zone A.
- Center Panel:** A table titled "Schedule: Internal Door Schedule - Arch - 2014 - 20140904.rvt".
- Right Panel:** Properties panel for a door, showing details like "Q54 Door Type C1 - Vision Panels Dbl 0021 2200 x 2100mm Sgl Swing".
- Bottom Left:** An "Export" dialog box with fields for "Translator", "File name", and "Save as".

A	B	C	D	E	F	G	H	I
Door Number	Location	SSL Door Type	Door Leaf Type	Fire Rating	Structural O Width	Structural Op Height	Finishes Int/Ext	Frame Type
D001	Concession 01	n/a	Special	FD30	2325	2100	P2	Special
D002	Sales Floor	A1	A	FD30	1010	2100	L1	FB
D003	Sales Floor/Cash Office Airlock	D	Special	-	1306	2170	PPC3	Special
D004	Cash Office	D	Special	-	1306	2170	PPC3	Special
D005	First Floor Switch Room	A	A	FD30	1010	2100	L1	FB
D006	Concession 02	n/a	Special	-	2050	2100	P2	Special
D007	Concession 03	n/a	Special	-	2118	2100	P2	Special
D008	Sales Floor/Core 3	C1	A	FD30	2200	2100	L1	FB
D009	Sales Floor	A1	A	FD30	1010	2100	L1	FB
D010	Stair Core 04	C1	A	FD30	2200	2100	L1	FB
D011	QOL - Bulkstock	C1	A	FD30	2200	2100	L1	FB
D012	Trucking Route 1 - Lobby Outer	F	GRP	-	2210	2100	AS SUPPLIED	FC
D013	Trucking Route 1 - Lobby Inner	E	A	FD30	2260	2100	L1	FB
D014	Trucking Route 1 - Lobby Outer	F	GRP	-	2210	2100	AS SUPPLIED	FC
D015	Bakery Prep	H1	PVC	-	1785	2125	AS SUPPLIED	FC
D016	Bakery Prep	C	A	FD30	1930	2100	L1	FB
D017	Trucking Route 2 - Lobby Outer	F	GRP	-	2210	2100	AS SUPPLIED	FC
D018	Trucking Route 2 - Lobby Inner	E	A	FD30	2260	2100	L1	FB
D019	Trucking Route 2 - Lobby Outer	F	GRP	-	2210	2100	AS SUPPLIED	FC
D020	Ultral Wash Room	F1	DT	-	1015	2100	AS SUPPLIED	FC
D021	Hot Food Prep	B1	A	FD30	1125	2100	L1	FB
D022	Hot Food Prep	F1	DT	-	1015	2100	AS SUPPLIED	FC
D024	Trucking Route 3 - Lobby Outer	F	GRP	-	2210	2100	AS SUPPLIED	FC
D025	Trucking Route 3 - Lobby Inner	E	A	FD30	2260	2100	L1	FB
D026	Trucking Route 3 - Lobby Outer	F	GRP	-	2210	2100	AS SUPPLIED	FC
D027	Stair Core 5 Lobby Outer	C1	A	FD30	2200	2100	L1	FB
D028	Stair Core 5 Lobby Inner	C1	A	FD30	2200	2100	L1	FB
D029	QM Desk	B1	A	FD30	1125	2100	L1	FB
D030	Trucking Route 4 - Lobby Outer	F	GRP	-	2210	2100	AS SUPPLIED	FC
D031	Trucking Route 4 - Lobby Inner	E	A	FD30	2260	2100	L1	FB
D032	Trucking Route 4 - Lobby Outer	F	GRP	-	2210	2100	AS SUPPLIED	FC
D033	Bulkstock / Colleague Corridor	C1	A	FD30	2200	2100	L1	FB
D034	Stair Core 1	C1	A	FD30	2200	2100	L1	FB
D035	Col. Staff Dining	C1	A	FD30	1930	2100	L1	FB
D036	Sales Floor	C1	A	FD30	2200	2100	L1	FB
D037	Col. Staff Dining	C1	A	FD30	1930	2100	L1	FB
D038	Col. General Circulation	C1	A	FD30	1930	2100	L1	FB
D039	Col. General Office	A1	A	FD30	1010	2100	L1	FB
D040	Col. CCTV	A1	A	FD30	1010	2100	L1	FB
D041	Col. HR Office	A1	A	FD30	1010	2100	L1	FB
D042	Col. Training	A1	A	FD30	1010	2100	L1	FB
D043	Col. Managers Office	A1	A	FD30	1010	2100	L1	FB

## 2. Assurance of defined information



### 3. Sharing information - enabling collaborative working





# Interoperability

‘the ability of two or more systems to exchange information and to use the information that has been exchanged.’

## BIEG Report

Primary recommendations:

- Classification Schema Alignment
- COBie – Practical Application and Development
- Education and Skills
- Industry Foundation Classes (IFC)
- Standards

Secondary recommendations:

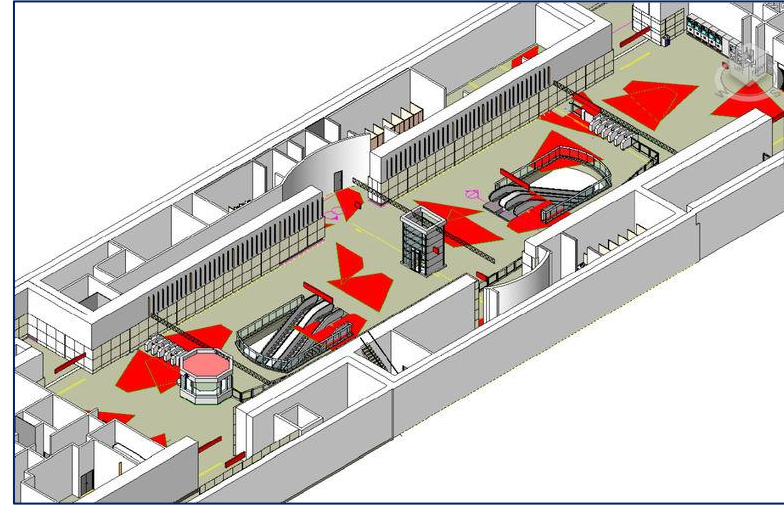
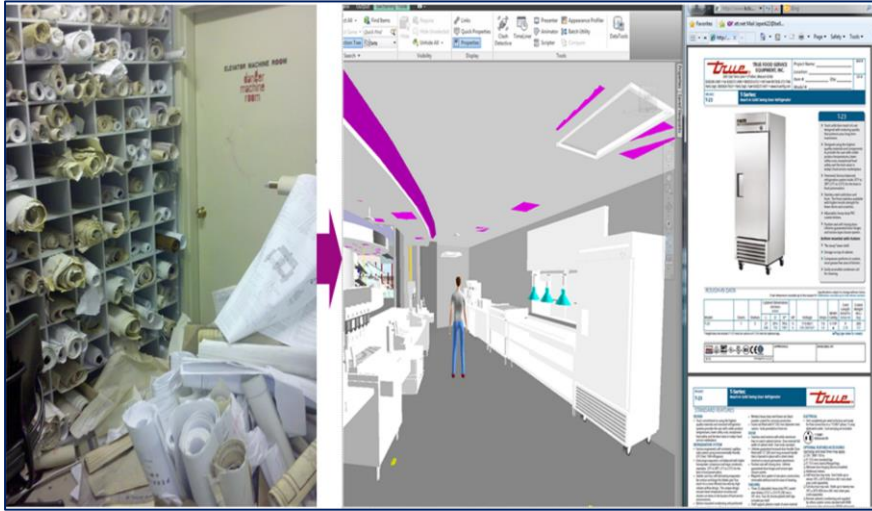
- Asset Information Model (AIM)
- Common Data Environment (CDE)
- Standard Data Approach
- Procurement and Contracts.

Report out for consultation:

<https://www.cdbb.cam.ac.uk/news/bim-interoperability-expert-group-report>

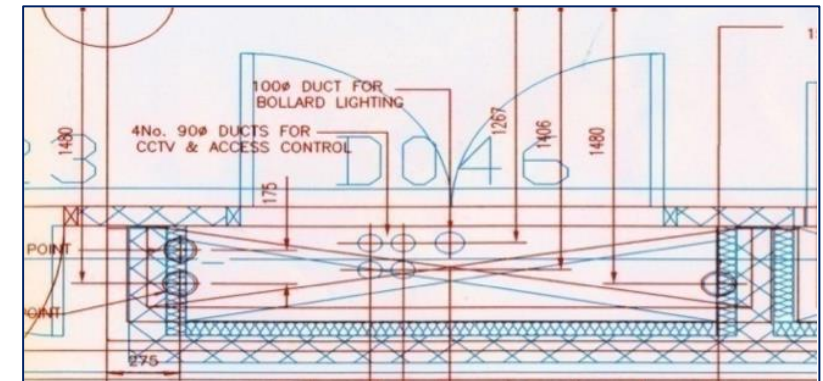
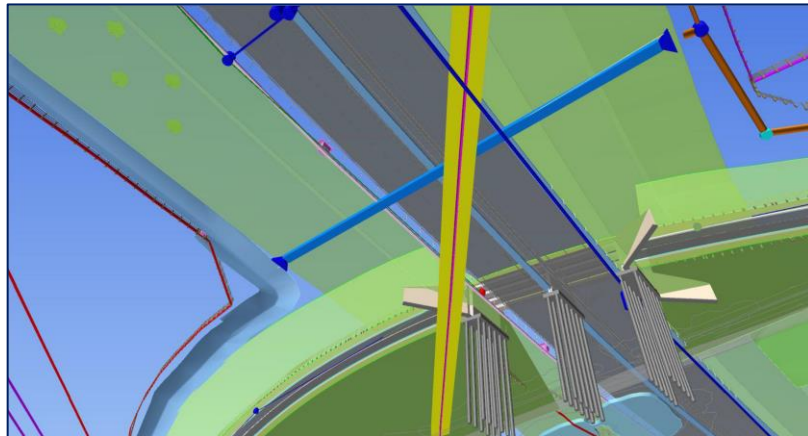


# Security minded digital working



Stage	LOD	LOI
Brief	R	?
Concept	G0	?
Definition	G1	?
Design	G1	?
Build & commission	G2	?
Handover & Close-out	G2	?
Operation / in-use	G2	?

R - user requirement  
 G0 - Symbolic  
 G1 - Placeholder  
 G2 - Suitable for construction  
 G3 - High resolution



# Lessons Learnt

# Technology solutions – supporting the delivery of a defined process

What are you doing to help achieve BIM compliant with the ISO19650 and make it business as usual?

**Graeme Forbes, ClearBox**

Making sure people understand BIM is about ROI and not about compliance. We are taking a more holistic approach, focusing on users and the outcomes they need to achieve, and helping people understand that they may need to do something differently in order to reduce effort downstream.

**Rob Stephen, Newforma**

We are developing a connected strategy, ensuring that whatever applications our end-users want to use, we are able to work alongside other vendors to translate the relevant information to make it easy to collaborate.

**Stephen Crompton, Group BC**

Providing templates for delivering the simplest elements of BIM so people can stop fearing it. The idea is to be seen as easy to use, not an overhead and that's about making them relevant to the user when implementing them. Identifying a number of best of breeds and integrating them using APIs so they don't have to invest in a lot of new products and systems.

**Helen Thompson, HM Revenue and Customs**

As a client we have to drive the process in order to implement Level 2 BIM throughout the country so that our buildings are delivered in accordance with it and we get the right data in place. We are clear about our data requirements. We are facilitating collaboration within the supply chain, with lots of different design and contractor teams and FM suppliers, encouraging them to learn from each other.

**Ben Nduva, SCISYS**

We are working on the linkages between better information management and better data. We have been involved in bringing information out into the field so people can use it. We are the customer, asset-owner, or other service providers – have better data.

**Duncan Reed, Trimble Solutions**



## Roundtable 6



**John Adams, Glider Technology**

We don't just provide software, we get appointed as the information manager, mainly because people don't love data as much as we do. We spend a lot of time talking with subcontractors, supply chains, manufacturers, to get the data over the line at the end of the project. As the industry digitises, the line between design consultancy and CAD vendors will start to disappear.

**Jozef Dobos, 3DRepo**

We believe in the democratisation of data, access to data. We want to make sure that the information is transparent and all the interested parties have access and visibility. You need to be able not only to look at 3D models but to actually do things with the information behind the models. What we do is open source, to work towards improving the industry.

**Karen Alford, Environment Agency**

We are embedding BIM Level 2 and gradually pushing the boundaries at the pace our supply chain can take and looking at how we can make it easier to do the right thing. We are also getting our own house in order, so how can we be a better client, manage our own data model and maximise the use of our own data with the technology we already have.



**Dave Shepherd, Autodesk**

We provide a range of authoring tools that are capable of delivering Level 2 BIM allowing clients to discharge building regulations and geometry models that give fabrication levels of detail. We support our customers to use the software out-of-the-box or, through mature APIs, to customise it, create links to other places or add third-party extensions.

**Ian Cornwell, Kraken IM**

We are simplifying our feature sets, as there can be far too many. We are also trying to move to High Frequency Data Management rather than sending entire files.

**Nathan Doughty, Asite**

Everything we are doing is geared towards enabling collaborative BIM. We help people understand what BIM does for them, as opposed to can implement BIM one step at a time rather than trying to change design, build and operate a digital asset with the same care as underpinning. And we need to focus on integration.

**Martyn Horne, Vectorworks**

We help customers in architecture and landscape areas to produce requirements for BIM processes. We are fully IFC certified with templates out of the box for those that want to use them. We collaborate to supply generic objects and comply to their standards.

**Stephen Hamill, NBS**

We maintain the Uniclass classification system which enables the classification of all the way down to the smallest of products and we continue to make that available for free.

**Karl Thurston, Graphisoft**

We've got a UK-specific template which deals with a lot of the fundamentals of BIM Level 2 and we have some tools to help people check their data before sharing it.

**Toby Sortain, ISG**

We've been trying to make it easier and more fun to produce high-quality information: architects didn't get into architecture for the data, they still want to do nice drawings. We spend a lot of time educating our clients and, in turn, their clients on process and workflows.

**Ben Wallbank, Viewpoint**

We are predominantly focusing on meeting our clients' requirements, gaining valuable experience to understand and prove the necessary processes, determine and form best practice across the industry. It's as much about the processes and the people involved as it is about the software. We are making our data-capture processes as intuitive and as simple as possible.



# Measuring Benefits – Environment Agency example



Source:  
Courtesy of Karen Alford EA

Information Delivery Plan

Plan Status: [Edit] Graeme Tappenden Logout

Post Appointment MIDP Delivery Find: [Clear] Project: EATEST01: UAT Test01 New Project CObieIR

Hide/Show: Deliverables Comments Items Blank Rows File Mask Only 3DMF Show MPDT Roles Stages LODs

Ref: EATEST01 Project: UAT Test01  
IDP Manager: undefined Facility: New Project Test xxx

Template: EA14 Plan of Work: Environment Agency Plan of Work 2014

Supplier Information Manager: EA0: Identification EA1: Prioritising EA2: Project Start-up EA3: Business Case Development EA4: Detail Planning EA5: Contract Award and Construction EA6: Contract Complete and Closeout EA7: Operation and End of Life

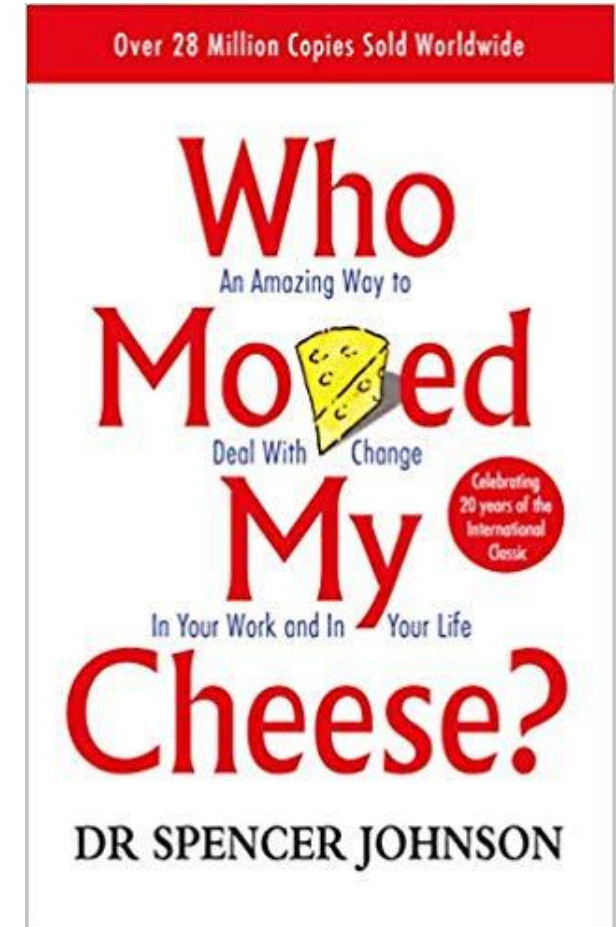
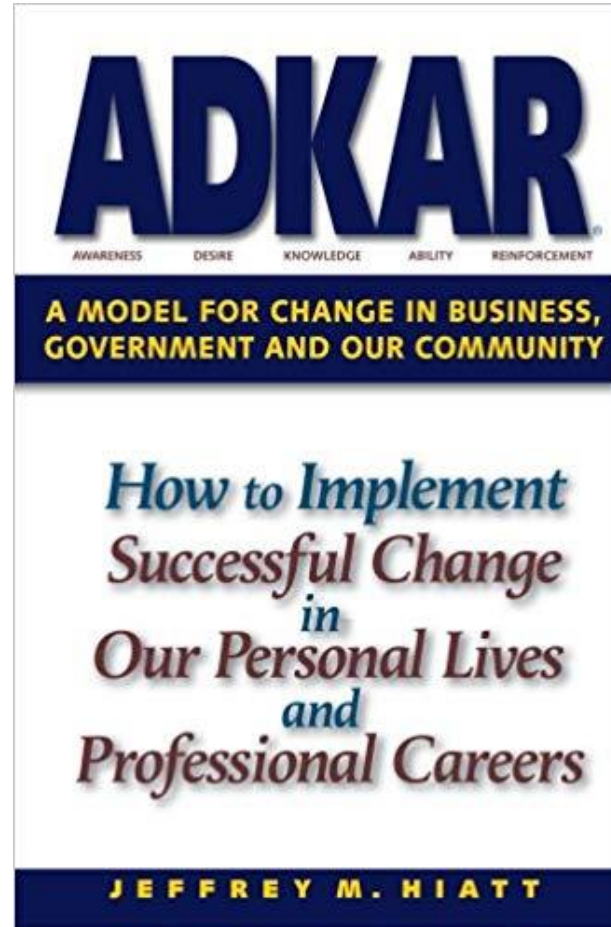
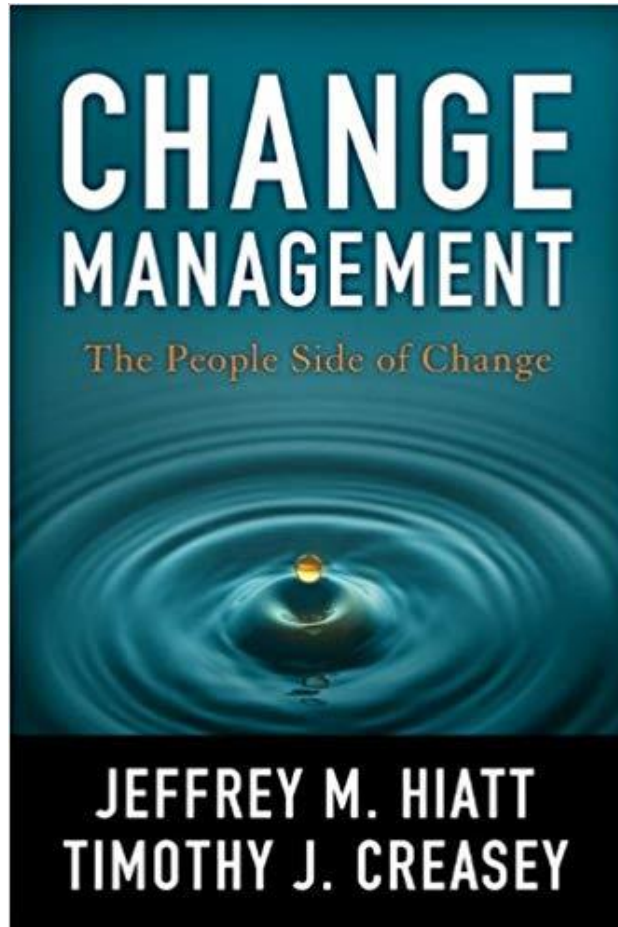
Stage Status: Current Pending Programmed

Ref	Deliverable	NIF	Ass	Cap	O/F	3DMF	Role	LOD	Role	LOD	Role	LOD	Role	LOD	Role	LOD	Role	LOD	Role	LOD
A0000	Site Conditions / Discovery																			
A0100	Area of Study Define area of study including bounding 3D cube coordinates	Y	N	B	0	dwg	Y													
#	Title	Vol	Loc	Typ	Role	Num	Role	LOD	Role	LOD	Role	LOD	Role	LOD	Role	LOD	Role	LOD	Role	LOD
A0100.1	The Crest level	FEV	00	M3	C	003	HAG	DOC	HAG	DOC	HAG	DOC	HAG	DOC						
A0100.2	Properties at risk	FDW	00	M3	C	1	EA	DOC	EA	DOC	EA	DOC	EA	DOC						
A0200	Site Boundaries	N	N	B1	pdf	Y	EA	LOD0	BAV	DOC			CONS	LOD3	CONS	LOD4	CONT	LOD5	CONT	LOD5
#	Title	Vol	Loc	Typ	Role	Num	Role	LOD	Role	LOD	Role	LOD	Role	LOD	Role	LOD	Role	LOD	Role	LOD
A0200.1	Crest level mapping	FEV	00	M3	C	001	EA	DOC	EA	DOC	EA	DOC								
A0200.2	Site Boundaries	00	00	M2	C	002	EA	LOD0	BAV	LOD0										
A0200.3	Protected No Go Areas	XX	XX	DR	C	003	HAG	LOD1	BAV	LOD1										
A0300	Topographic Survey(s)	Y	N	B1	pdf				EA	LOD7	EA	LOD7	CONS	LOD4	CONS	LOD4	CONT	LOD6	CONT	LOD6
A0400	LIDAR	Y	N	B1	pdf															
A0500	Laser Scans (Point Cloud)	Y	N	B1	pdf															
A0600	Utilities Survey	Y	N	B1	pdf															
A0700	UXO Assessment	Y	N	B1	pdf				EA	LOD7	EA	LOD7	CONS	LOD3	CONS	LOD4				
A0800	Geotechnical Survey(s)	Y	N	B1	pdf				EA	LOD7	EA	LOD7	SI	CONT	LOD4	SI	CONT	LOD4		
A0900	Contaminated Land Survey	Y	N	B1	pdf				EA	LOD7	EA	LOD7	CONS	LOD4	CONS	LOD4				
A1000	Geotechnical Report	N	N	B1	pdf															

Client BIM is about buying two assets,  
the physical asset and the digital asset



# People - cultural change (change management)



Design

Build

Operate

Integrate

**National Digital Twin  
Day 9<sup>th</sup> September 2019**

*“BIM provides the  
foundations of the  
National Digital Twin”*  
Mark Enzer.

Hence it's important  
that we continue to  
build strong foundations  
on which a future digital  
built Britain can rely.

# The journey to come: Beyond – Design, Build & Operate



# Summary

- Why construction Information Management is so important?
- How to deliver it
- Lessons learnt to date (a personal view)

# Q&A?