

BIM

‘An advanced tool to reduce costs and support environmental design in the UK’

NOW and NEXT

**THE CONSTRUCTION
PUZZLE-
HOW TO
MAKE EVERYONE WORK
COLLABORATIVELY?**



NOW

Building information Modelling

Is an industry game changer

Is not about 3D graphics

It is about DATA

It is about de-risking construction

It is therefore about efficiency

Faster cheaper better in every way

Clients will want it

You need it



NOW

BIM - WHERE ARE WE



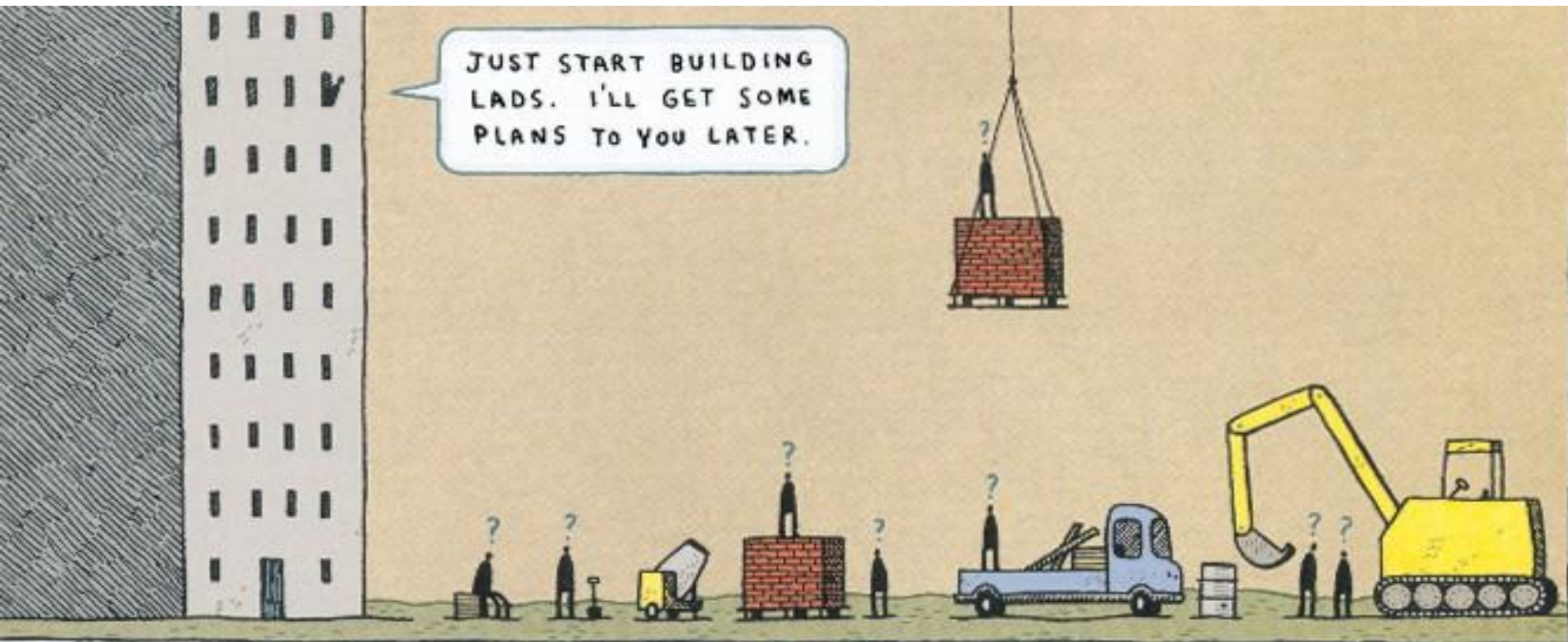
ITS ABOUT CAPTURING
AND USING THE DATA

FROM THE VERY START OF
THE PROJECT TO 'IN USE'
AND BEYOND

THAT DATA IS RELIABLE
VERIFIABLE TRUSTWORTHY

NOW

CONTEXT WHAT WE NEED TO UNDERSTAND - CURRENTLY
DRAWN 2.5 TIMES CONSTRUCTED 1.5 TIMES - POOR VALUE



EXPERIENCE TO DATE NOW

As early as the mid 70's Car and Plane manufacturers started to design test and manufacture using computing.

Today this is all products and goods use digital manufacture production and distribution.

Why not buildings?





NOW

MANY BUILT EXAMPLES OF BIM
METHODOLOGY SURROUND US.
THIS IS THE CHEESEGRATER

IT USED BIM TO-

- CUT THE COST
- CUT THE TIME TO BUILD
- RESEQUENCE THE BUILD
- CONTROL MATERIALS TO SITE
- BRIEF ON SITE TEAMS DAILY
- CONTROL HEALTH AND SAFETY
- AND MORE

NOW



THE STORY SO FAR



BUILDING INFORMATION MODEL (BIM) PROTOCOL CIC/BIM Pro first edition 2013

Standard Protocol for use in projects using Building Information Models

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



bsi.

construction products association

NOW

PAS 91:2013

Construction prequalification questionnaires



BSI Standards Publication

Collaborative production of information

Part 4: Fulfilling employers' information exchange requirements using COBie - Code of practice

bsi.

...making excellence a habit

...in Government

bsi.

NOW

PAS 1192-2:2013
Specification for information management for the capital/delivery phase of construction projects using building information modelling



BS 1192-4:2014
BSI Standards Publication
Collaborative production of information
Part 4: Fulfilling employer information exchange requirements using COBie - Code of practice

Information management for the capital/delivery phase of construction projects using building information modelling



- ESSENTIAL-
- BS 1192-2007
- PAS 1192-2 2013
- PAS 1192-3 2014
- PAS 1192-4 2014
- PAS 1192 -5 2015

- RECOMMENDED-
- BS 7000-4 2013
- BS 8541-1 2012
- BS 8541-2 2011
- BS 8541-4 2012
- BIP 2207 GUIDE

LEVEL 2 DOCUMENTS

Published standards

Digital plan of work

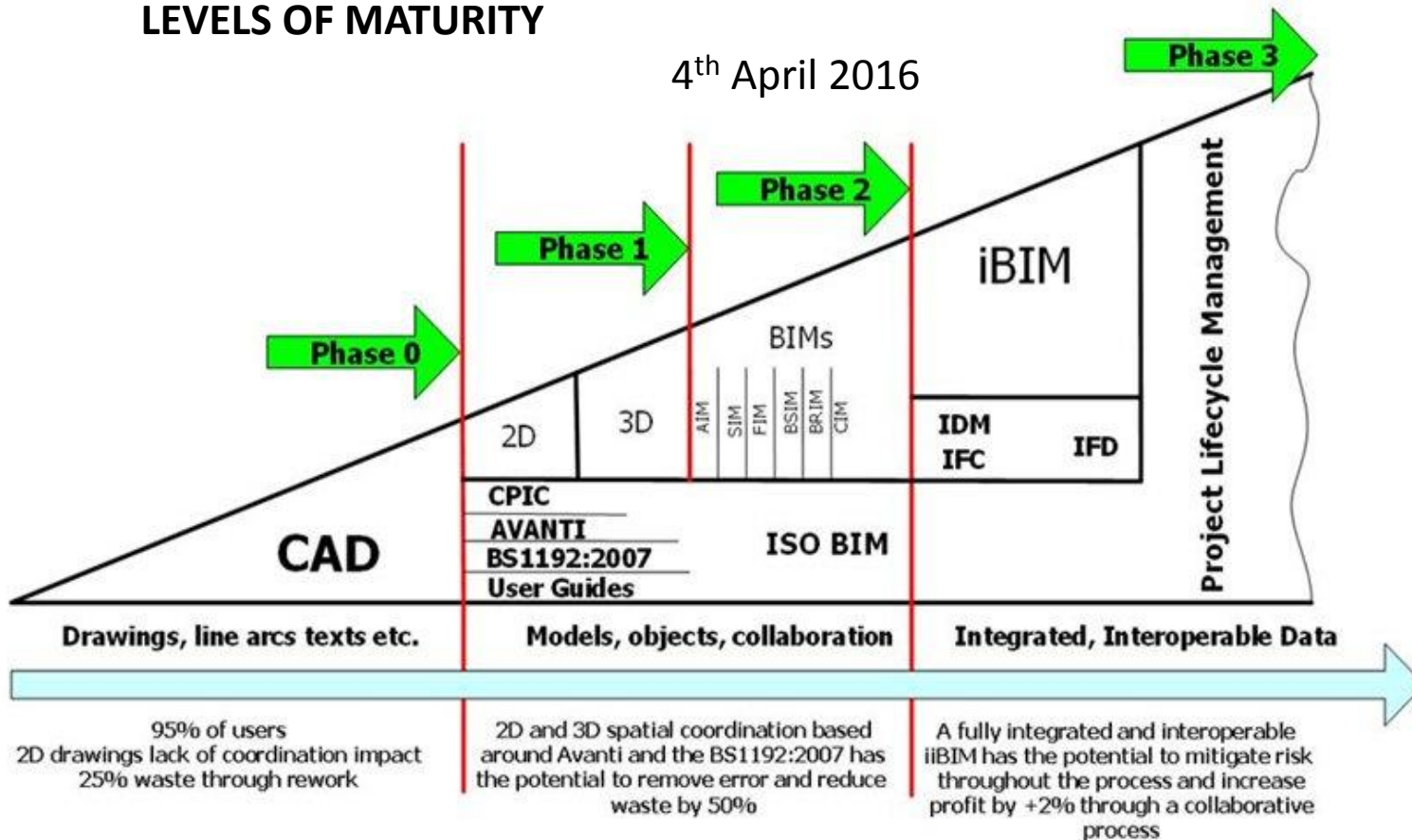
Digital tool kit

‘The wrapper’
Arriving very soon.

NOW

LEVELS OF MATURITY

4th April 2016

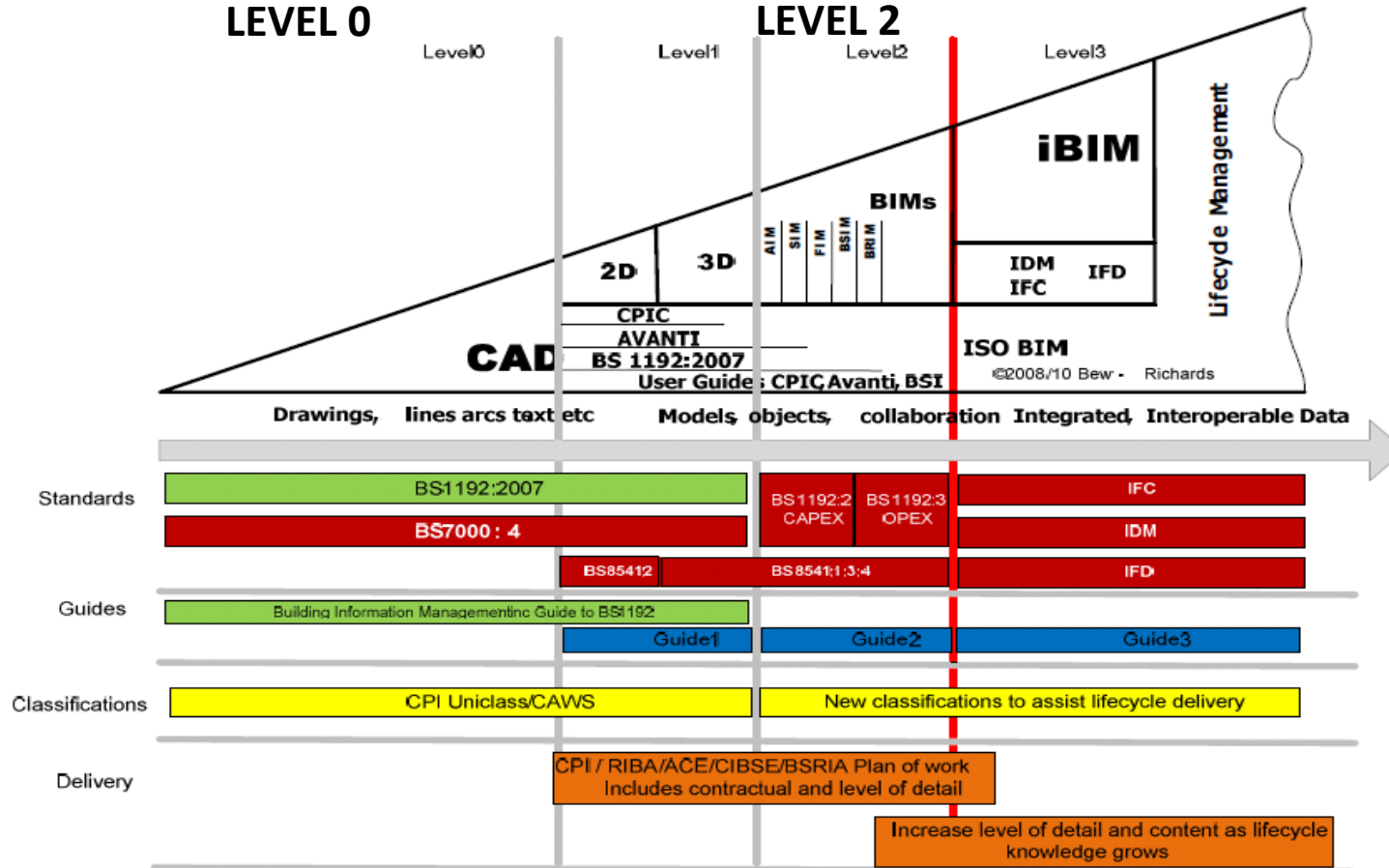


© M. Bew and M. Richards 2008

DRAWING
BOARDS
LEVEL 0

CAD
LEVEL 1

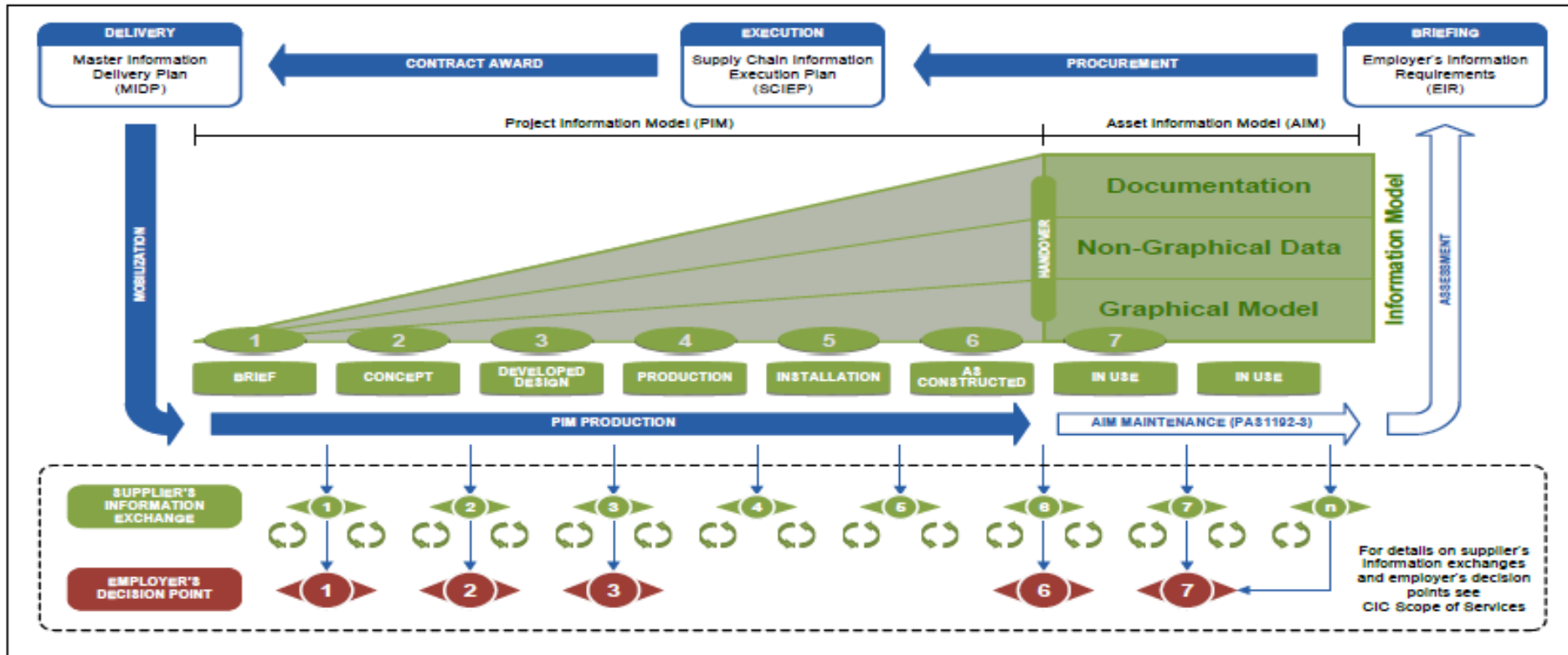
'FILE'
SHARING
BIM
LEVEL 2



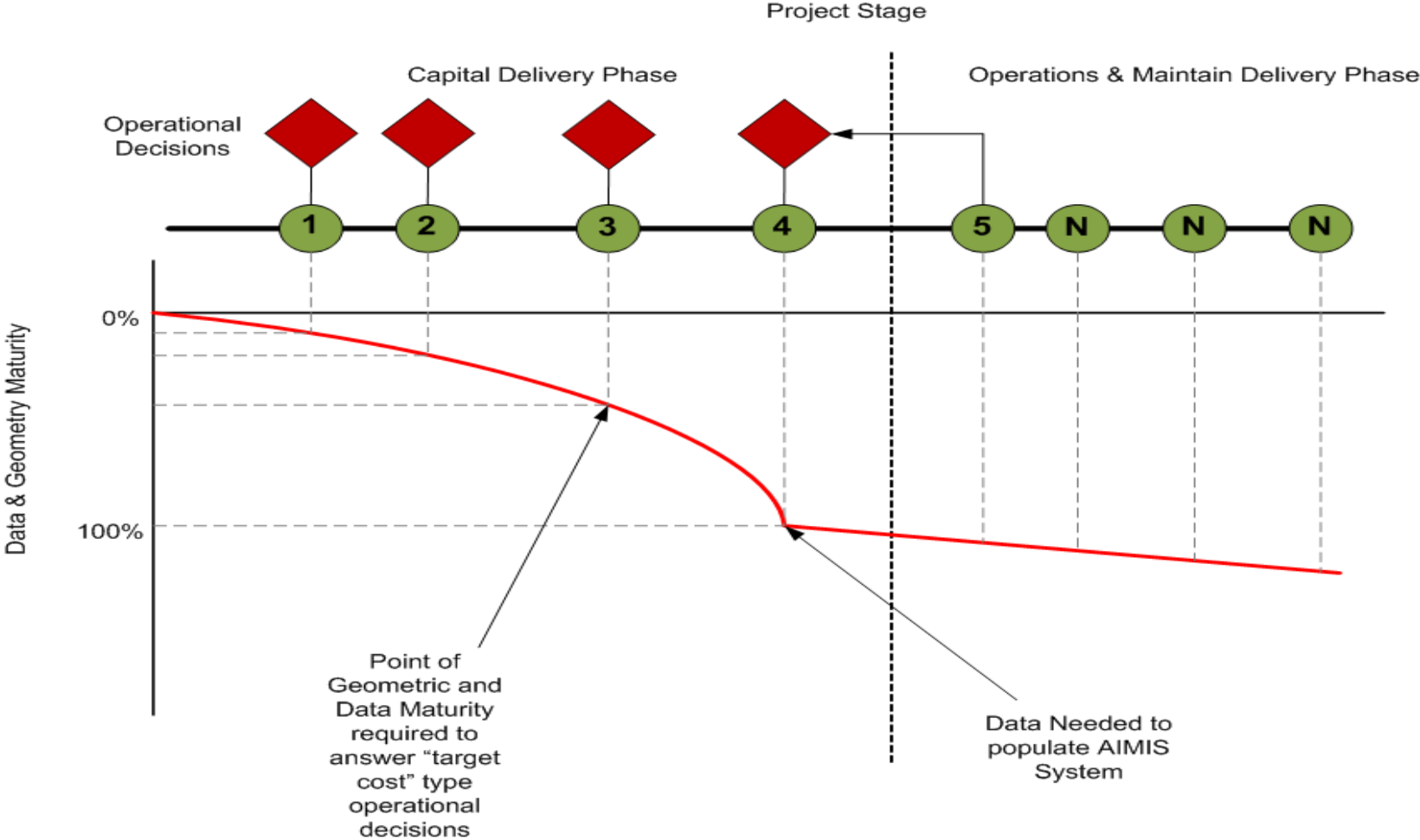
NEXT

From PAS 1192-2

Figure 3 – The information delivery cycle

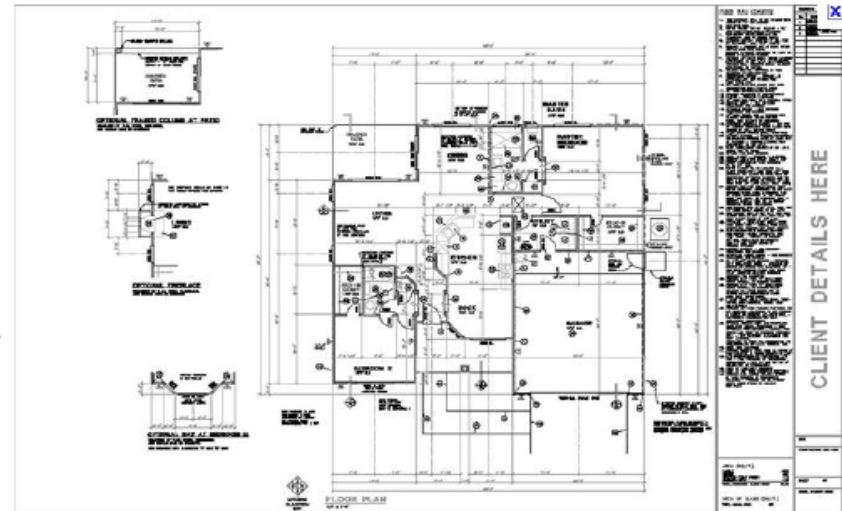
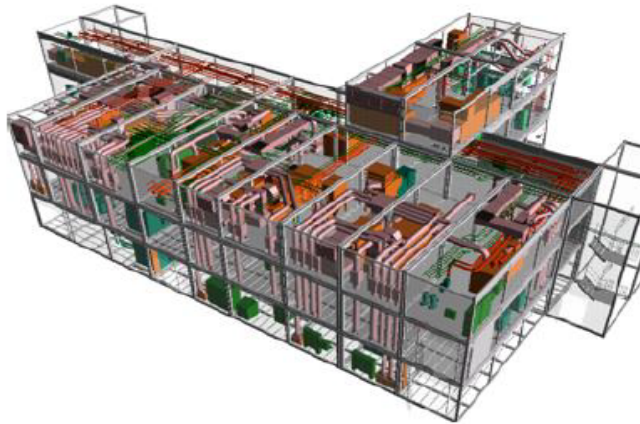


NEXT



What is COBie?

Data Structure



Microsoft Excel - Rayford

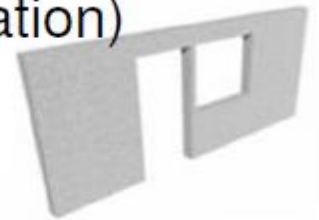
	A	B	C	D	E	F	G	H	I	J	K
	Item	Manufacturer	Trade/Ch	Type/Spec	Quantity	Description	FUNCTION	EXPLODE	Self-Install	Manufacturer	Reference
2	Clear-100A	harsco.com	2000-11-04T11:00:30	Hardware Items	100A	Door Type D1	hClear		000-01-1	0000-03-01	
3	Clear-100F	harsco.com	2000-11-04T11:00:30	Hardware Items	100F	Door Type D1	hClear		000-01-2	0000-03-01	
4	Clear-100G	harsco.com	2000-11-04T11:00:30	Hardware Items	100G	Door Type D1	hClear		000-01-3	0000-03-01	
5	Clear-101A	harsco.com	2000-11-04T11:00:30	Hardware Items	100A	Door Type D1	hClear		000-01-4	0000-03-01	
6	Clear-100B	harsco.com	2000-11-04T11:00:30	Hardware Items	100B	Door Type D1	hClear		000-01-5	0000-03-01	
7	Clear-101A	harsco.com	2000-11-04T11:00:30	Hardware Items	100A	Door Type D1	hClear		000-01-6	0000-03-01	
8	Clear-101A	harsco.com	2000-11-04T11:00:30	Hardware Items	100A	Door Type D1	hClear		000-01-7	0000-03-01	
9	Clear-101A	harsco.com	2000-11-04T11:00:30	Hardware Items	100A	Door Type D1	hClear		000-01-8	0000-03-01	
10	Clear-101A	harsco.com	2000-11-04T11:00:30	Hardware Items	100A	Door Type D1	hClear		000-01-9	0000-03-01	
11	Clear-100C	harsco.com	2000-11-04T11:00:30	Overhead Ceiling Dena Assembly	100C	Overhead Dena	hClear		0000-012-01	0000-03-01	
12	Clear-100C	harsco.com	2000-11-04T11:00:30	Overhead Ceiling Dena Assembly	100C	Overhead Dena	hClear		0000-012-02	0000-03-01	
13	Clear-100C	harsco.com	2000-11-04T11:00:30	Overhead Ceiling Dena Assembly	100C	Overhead Dena	hClear		0000-012-03	0000-03-01	
14	Clear-100B	harsco.com	2000-11-04T11:00:30	Overhead Ceiling Dena Assembly	100B	Overhead Dena	hClear		0000-012-04	0000-03-01	
15	FM-1	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Heat Pump	hClear		1000-001	0000-03-01	
16	FM-1	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-1	0000-03-01	
17	FM-2	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-2	0000-03-01	
18	FM-2	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-3	0000-03-01	
19	FM-2	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-4	0000-03-01	
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21	FM-2	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-6	0000-03-01	
22	FM-2	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-7	0000-03-01	
23	FM-2	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-8	0000-03-01	
24	FM-2	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-9	0000-03-01	
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30	FM-2	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-15	0000-03-01	
31	FM-2	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-16	0000-03-01	
32	FM-2	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-17	0000-03-01	
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37	FM-2	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-22	0000-03-01	
38	FM-2	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-23	0000-03-01	
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43	FM-2	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-28	0000-03-01	
44	FM-2	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-29	0000-03-01	
45	FM-2	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-30	0000-03-01	
46	FM-2	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-31	0000-03-01	
47	FM-2	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-32	0000-03-01	
48	FM-2	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-33	0000-03-01	
49	FM-2	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-34	0000-03-01	
50	FM-2	harsco.com	2000-11-04T11:00:30	HVAC System Components and Equipment	100A	Roofed Heater	hClear		2000-001-35	0000-03-01	

NEXT

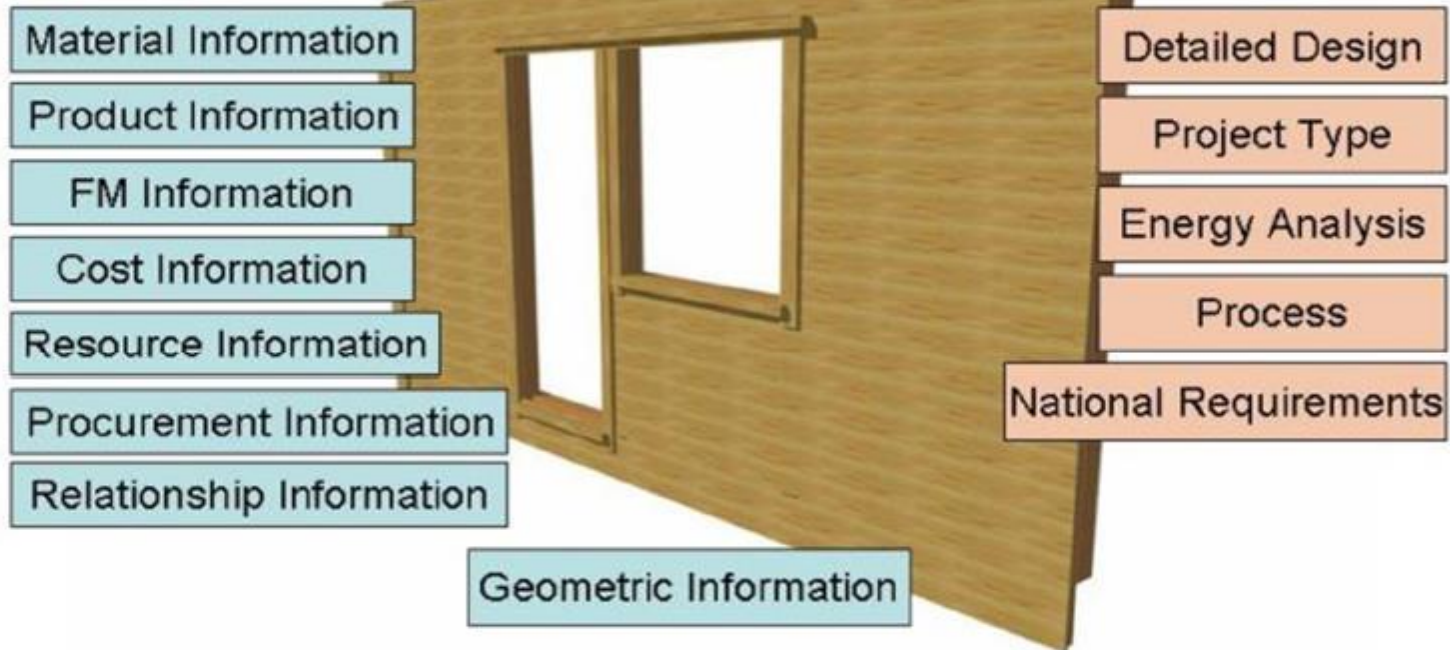
Drawing
symbolic
representation



BM = Building Model
(3D without information)



BIM

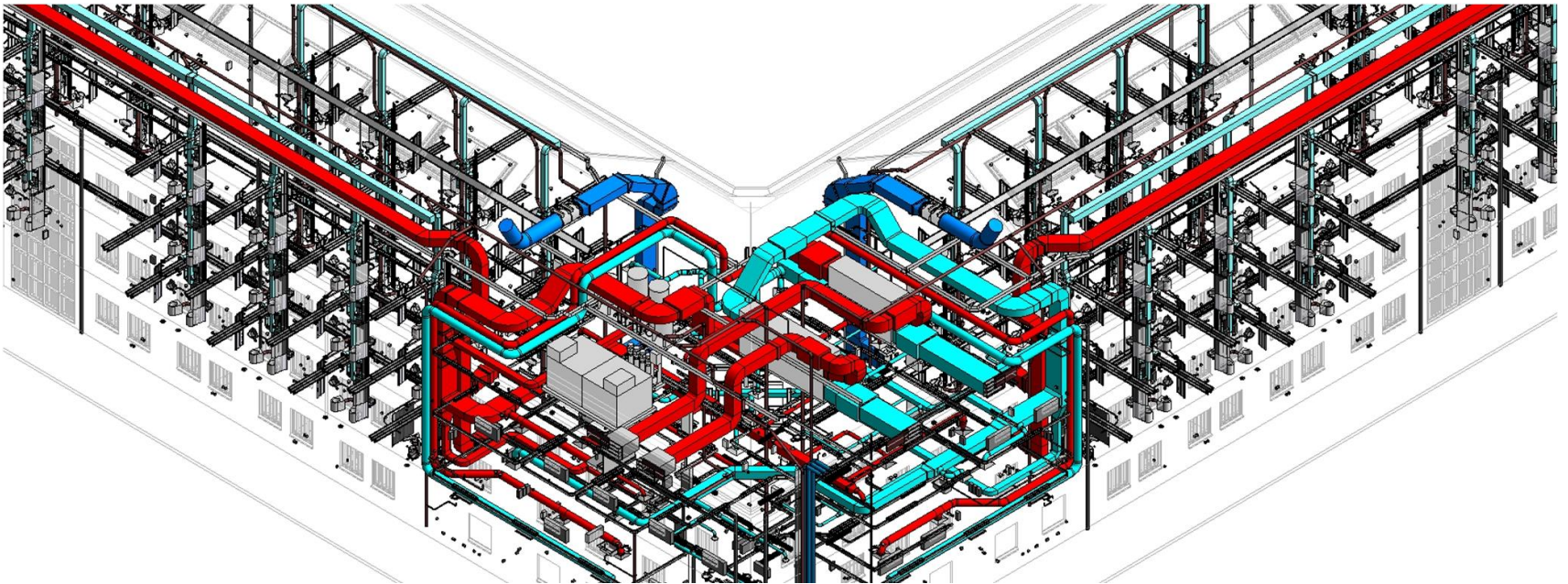


Demonstration Projects Experience

Further 25 underway

Feed back build on experience available

Refining guidance



NEXT



**BIM enabled technology-
Emulation
Virtual Reality
Augmented Reality**

BIM4 *sme*

construction products association 

BIM4FitOut
AN AIS SPECIAL INTEREST GROUP

BIM4M2

BIM4 HOUSING 



40%

already invested in BIM



50%

plan to invest in 2015



10%

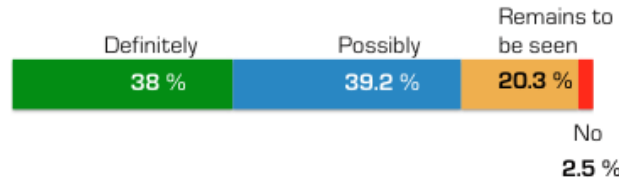
have no plans to invest in BIM



Do you see your investment in BIM as worthwhile?

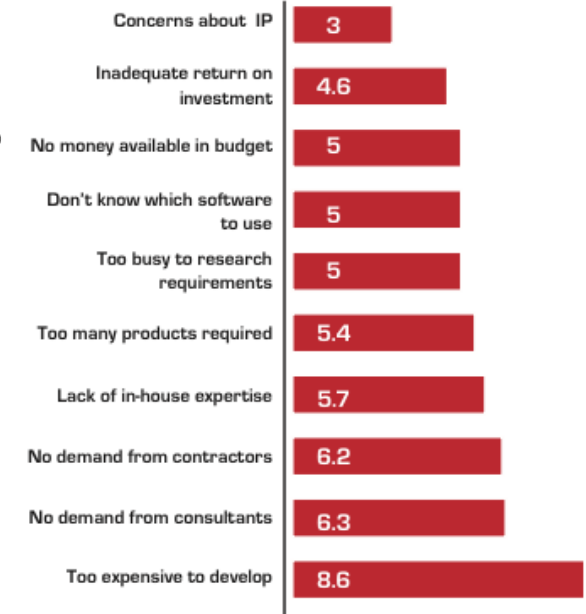


Do you see an investment in BIM as worthwhile?

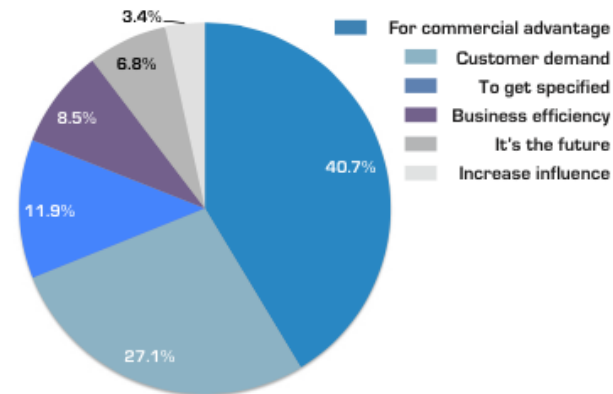


Barriers to investing in BIM

(1-10, 10 being a significant barrier)

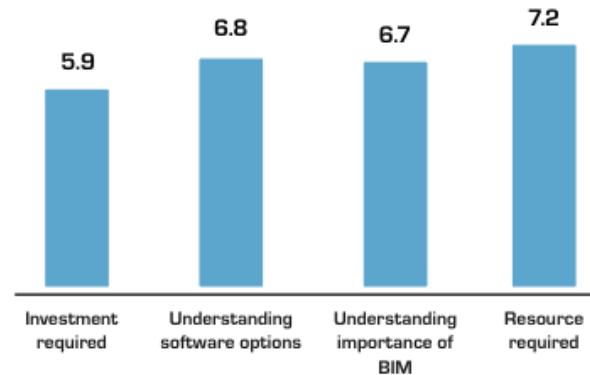


Reasons for investing in BIM



Barriers to investing in BIM

(1-10, 10 being a significant barrier)



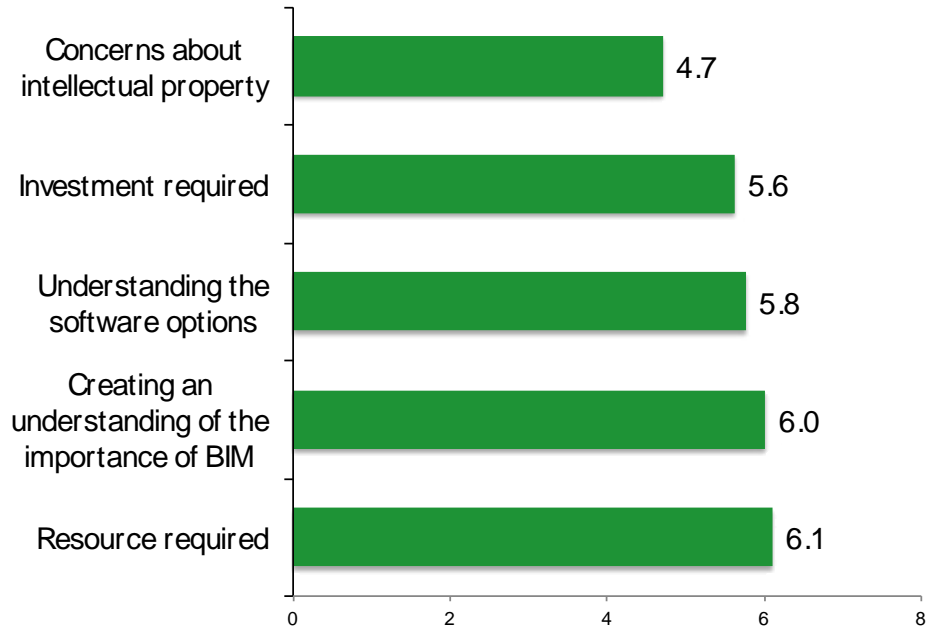
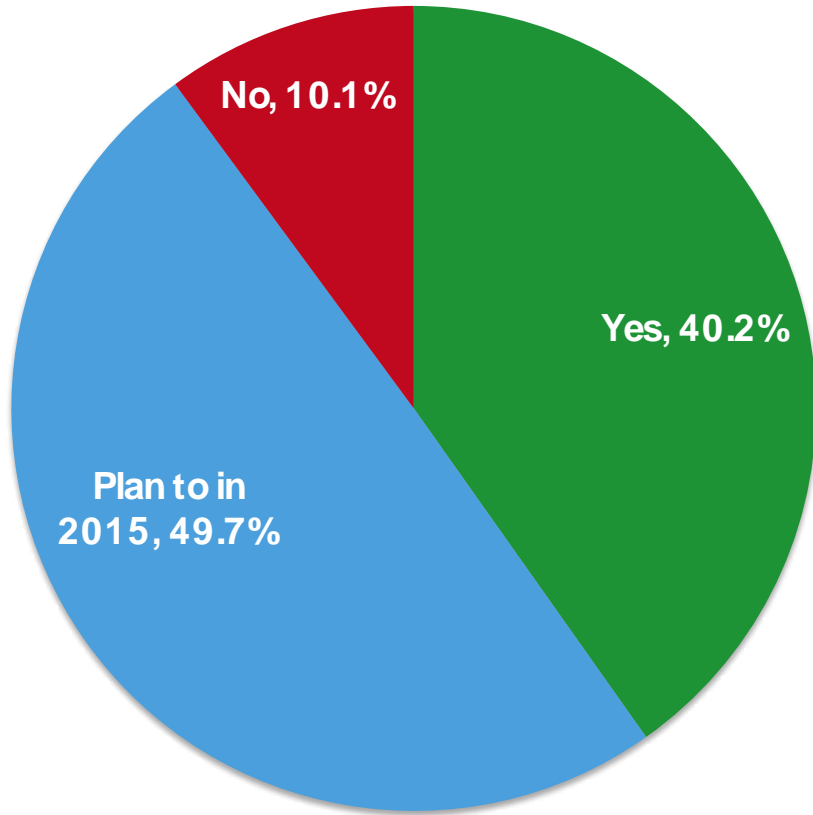
Do you currently offer BIM content for your products?

Base: 199

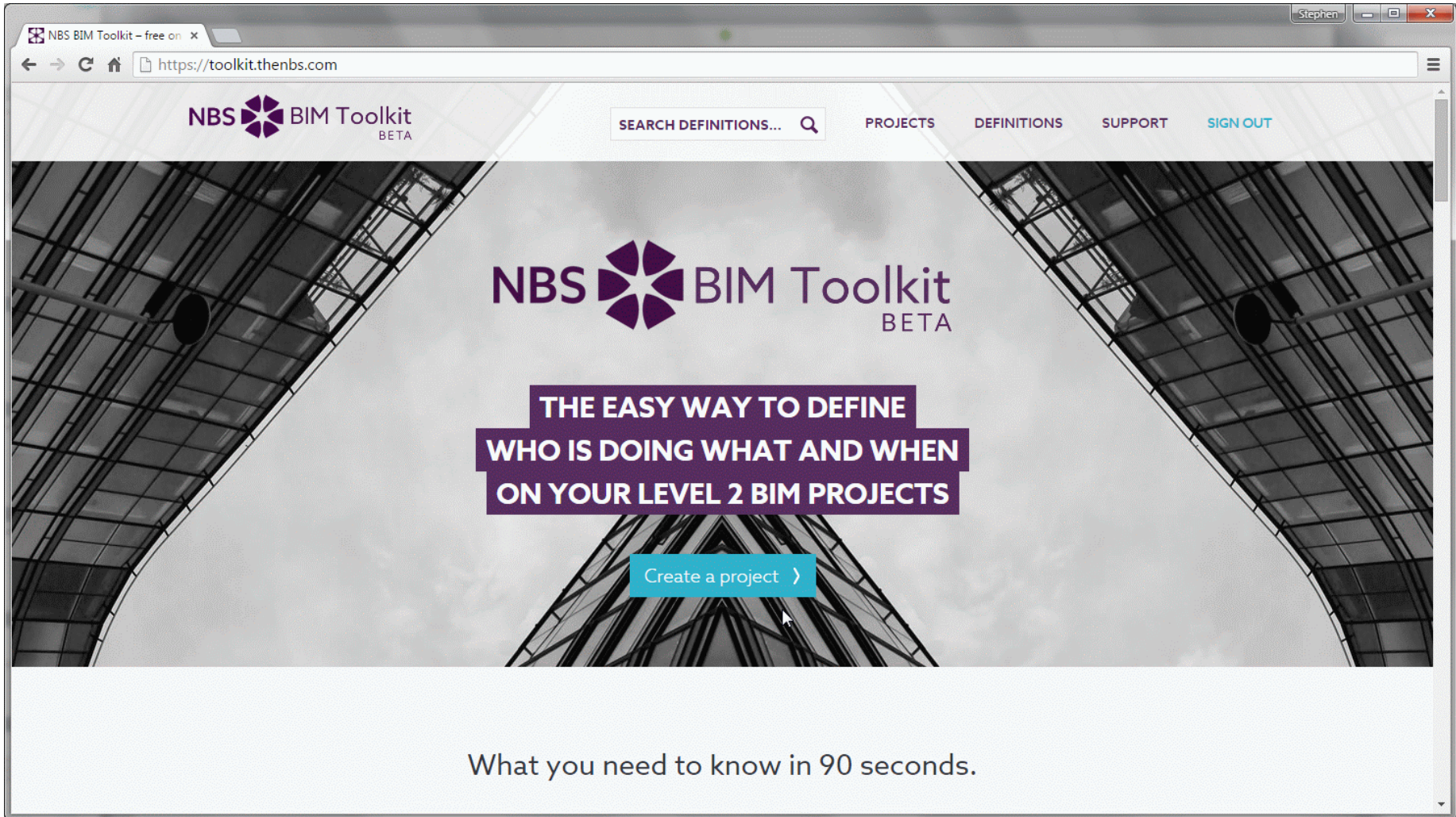
Barriers to implementing BIM

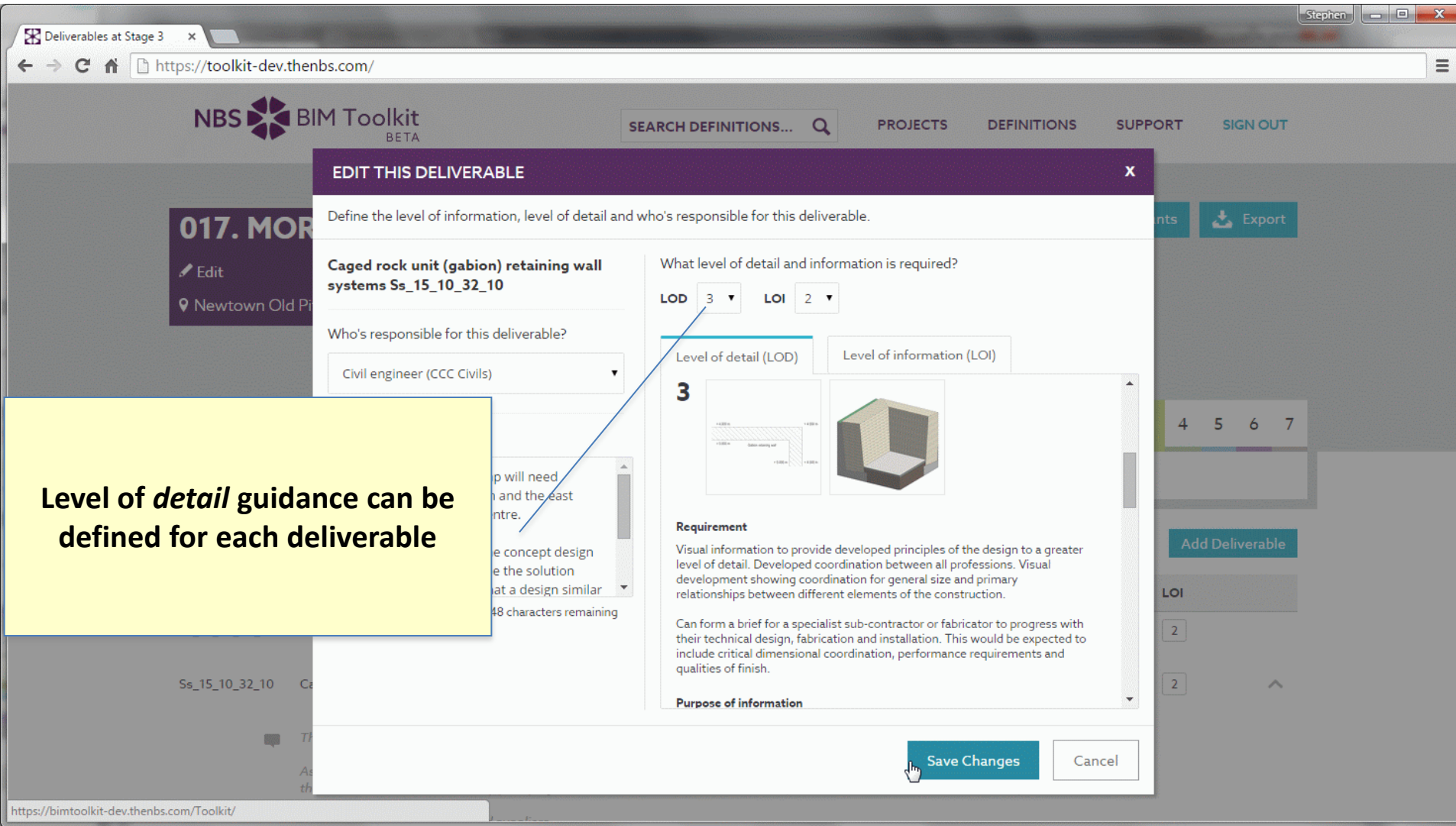
(score 0-10, where 10 is significant)

Base: 69



NEXT





Deliverables at Stage 3

https://toolkit-dev.thenbs.com/

NBS BIM Toolkit BETA

SEARCH DEFINITIONS... PROJECTS DEFINITIONS SUPPORT SIGN OUT

EDIT THIS DELIVERABLE

Define the level of information, level of detail and who's responsible for this deliverable.

Caged rock unit (gabion) retaining wall systems Ss_15_10_32_10

Who's responsible for this deliverable?
Civil engineer (CCC Civils)

What level of detail and information is required?
LOD 3 LOI 2

Level of detail (LOD) Level of information (LOI)

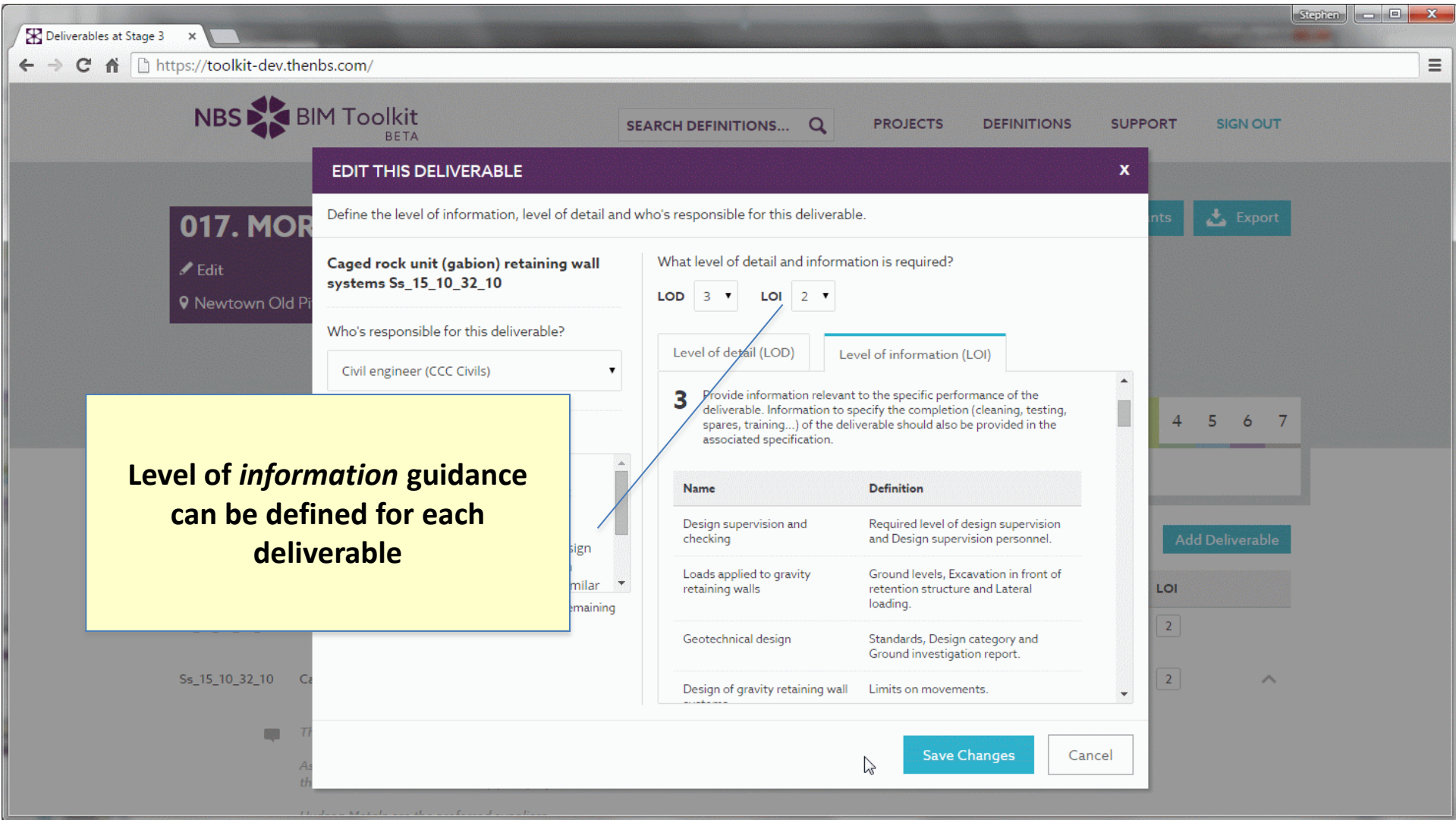
3

Requirement
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.

Purpose of information
Can form a brief for a specialist sub-contractor 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.

Save Changes Cancel

Level of *detail* guidance can be defined for each deliverable



EDIT THIS DELIVERABLE

Define the level of information, level of detail and who's responsible for this deliverable.

Caged rock unit (gabion) retaining wall systems Ss_15_10_32_10

Who's responsible for this deliverable?
Civil engineer (CCC Civils)

What level of detail and information is required?
LOD 3 LOI 2

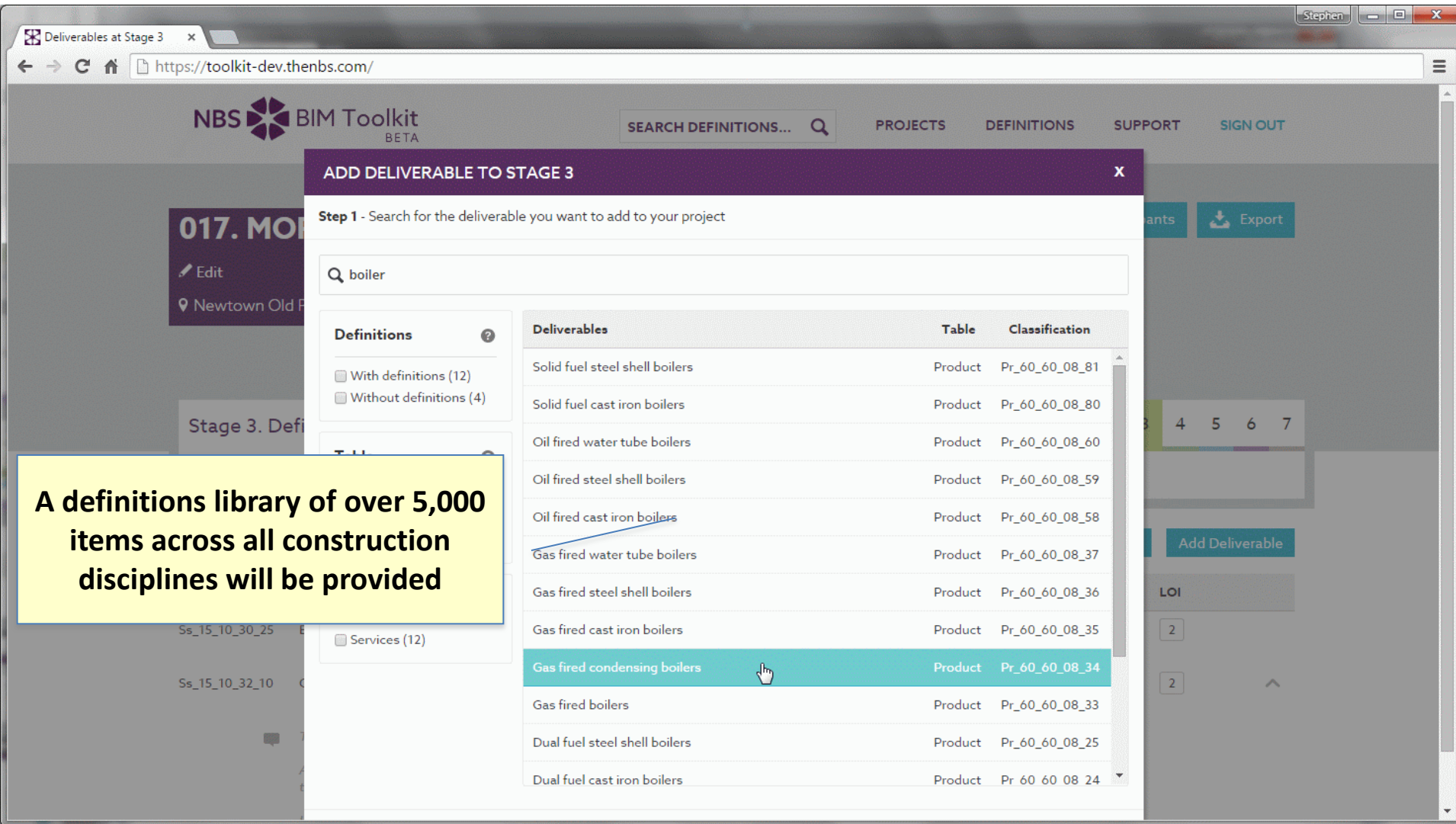
Level of detail (LOD) Level of information (LOI)

3 Provide information relevant to the specific performance of the deliverable. Information to specify the completion (cleaning, testing, spares, training...) of the deliverable should also be provided in the associated specification.

Name	Definition
Design supervision and checking	Required level of design supervision and Design supervision personnel.
Loads applied to gravity retaining walls	Ground levels, Excavation in front of retention structure and Lateral loading.
Geotechnical design	Standards, Design category and Ground investigation report.
Design of gravity retaining wall	Limits on movements.

Save Changes Cancel

Level of information guidance can be defined for each deliverable



The screenshot shows a web browser window with the URL <https://toolkit-dev.thenbs.com/>. The page title is "Deliverables at Stage 3". The main header includes the "NBS BIM Toolkit BETA" logo and navigation links for "SEARCH DEFINITIONS...", "PROJECTS", "DEFINITIONS", "SUPPORT", and "SIGN OUT". A modal window titled "ADD DELIVERABLE TO STAGE 3" is open, displaying "Step 1 - Search for the deliverable you want to add to your project". A search bar contains the text "boiler". Below the search bar, there are two filters: "Definitions" (with sub-options "With definitions (12)" and "Without definitions (4)") and "Services (12)". A table of results is shown with columns for "Deliverables", "Table", and "Classification". The row for "Gas fired condensing boilers" is highlighted in teal, and a mouse cursor is pointing at it.

Deliverables	Table	Classification
Solid fuel steel shell boilers	Product	Pr_60_60_08_81
Solid fuel cast iron boilers	Product	Pr_60_60_08_80
Oil fired water tube boilers	Product	Pr_60_60_08_60
Oil fired steel shell boilers	Product	Pr_60_60_08_59
Oil fired cast iron boilers	Product	Pr_60_60_08_58
Gas fired water tube boilers	Product	Pr_60_60_08_37
Gas fired steel shell boilers	Product	Pr_60_60_08_36
Gas fired cast iron boilers	Product	Pr_60_60_08_35
Gas fired condensing boilers	Product	Pr_60_60_08_34
Gas fired boilers	Product	Pr_60_60_08_33
Dual fuel steel shell boilers	Product	Pr_60_60_08_25
Dual fuel cast iron boilers	Product	Pr_60_60_08_24

A definitions library of over 5,000 items across all construction disciplines will be provided

GAS FIRED CONDENSING BOILERS

Gas fired condensing boilers are described by characteristics such as duty, seasonal efficiency (gross calorific value (minimum)) and thermal performance testing.
 An example use may be within a medium temperature hot water heating system.

Uniclass2015 - Pr_60_60_08_34 Gas fired condensing boilers

Show classification mappings v

Level of detail

Level of information

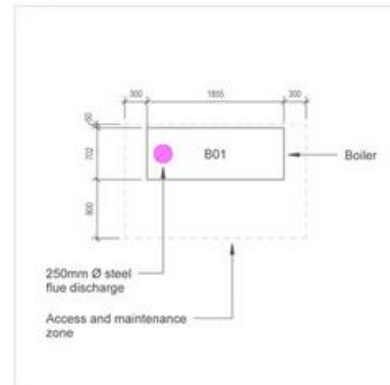
2

Requirement

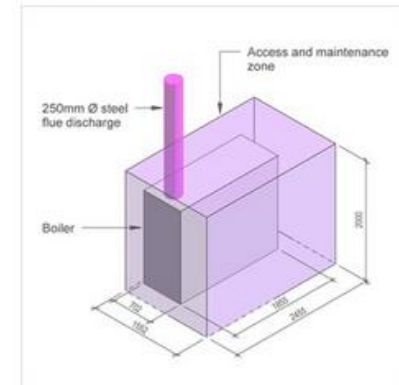
Visual information to provide general principles of the design. Showing arrangement of system with their relationship to internal and external context, and key project criteria to suit a clients brief.

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.

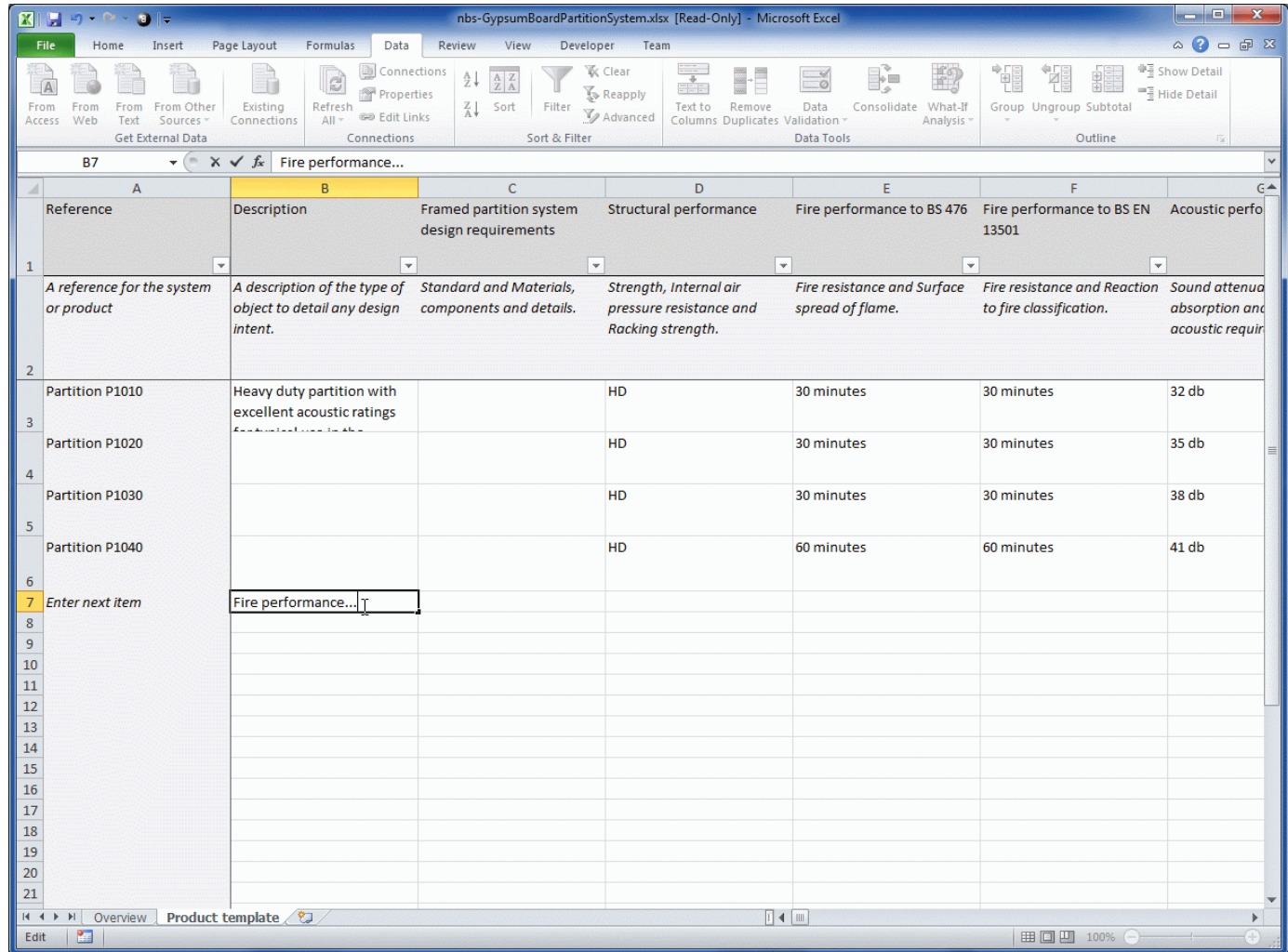
Plan



Model



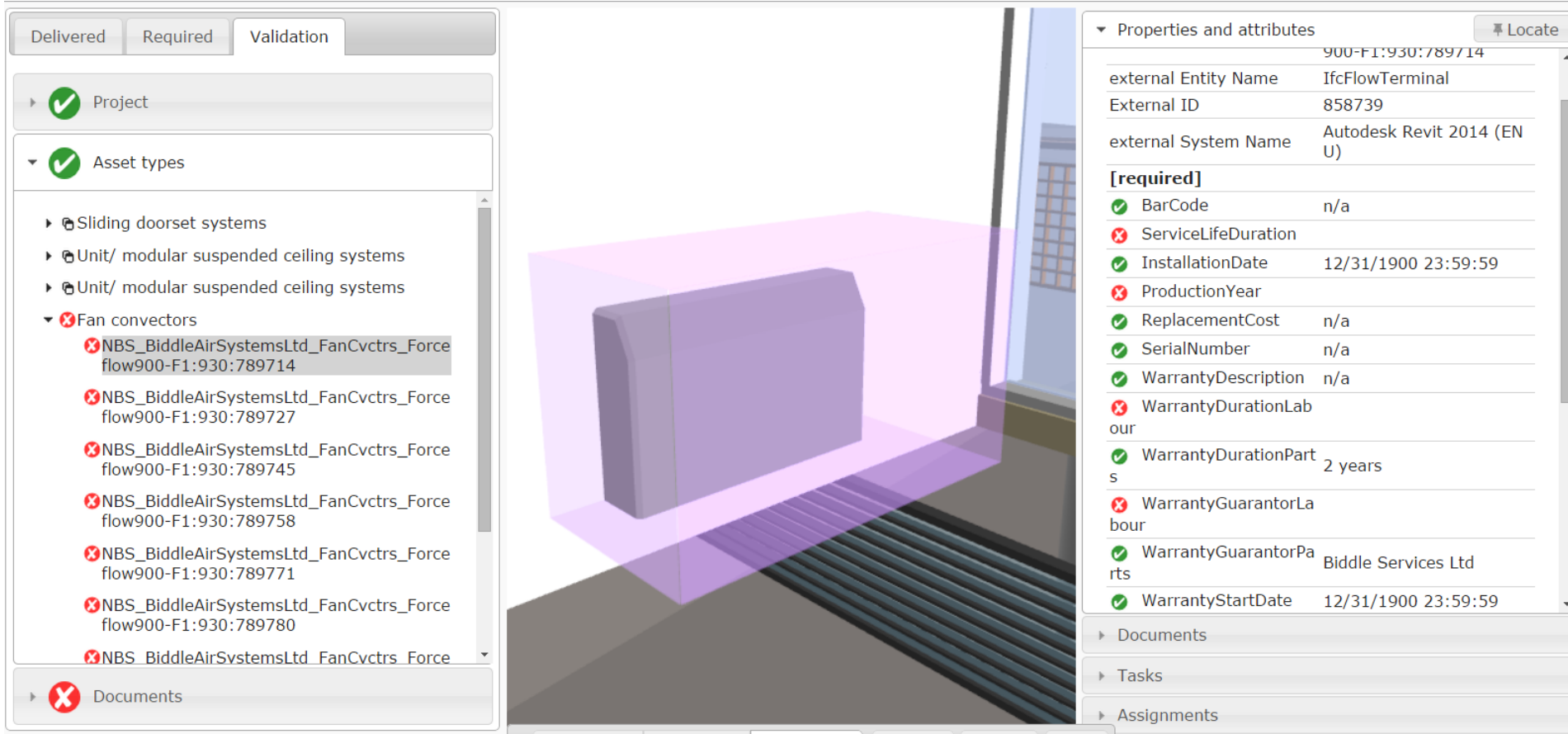
NEXT



The screenshot shows an Excel spreadsheet with the following data:

Reference	Description	Framed partition system design requirements	Structural performance	Fire performance to BS 476	Fire performance to BS EN 13501	Acoustic performance
<i>A reference for the system or product</i>	<i>A description of the type of object to detail any design intent.</i>	<i>Standard and Materials, components and details.</i>	<i>Strength, Internal air pressure resistance and Racking strength.</i>	<i>Fire resistance and Surface spread of flame.</i>	<i>Fire resistance and Reaction to fire classification.</i>	<i>Sound attenuation absorption and acoustic requirements.</i>
Partition P1010	Heavy duty partition with excellent acoustic ratings		HD	30 minutes	30 minutes	32 db
Partition P1020			HD	30 minutes	30 minutes	35 db
Partition P1030			HD	30 minutes	30 minutes	38 db
Partition P1040			HD	60 minutes	60 minutes	41 db
Enter next item	Fire performance...					

NEXT



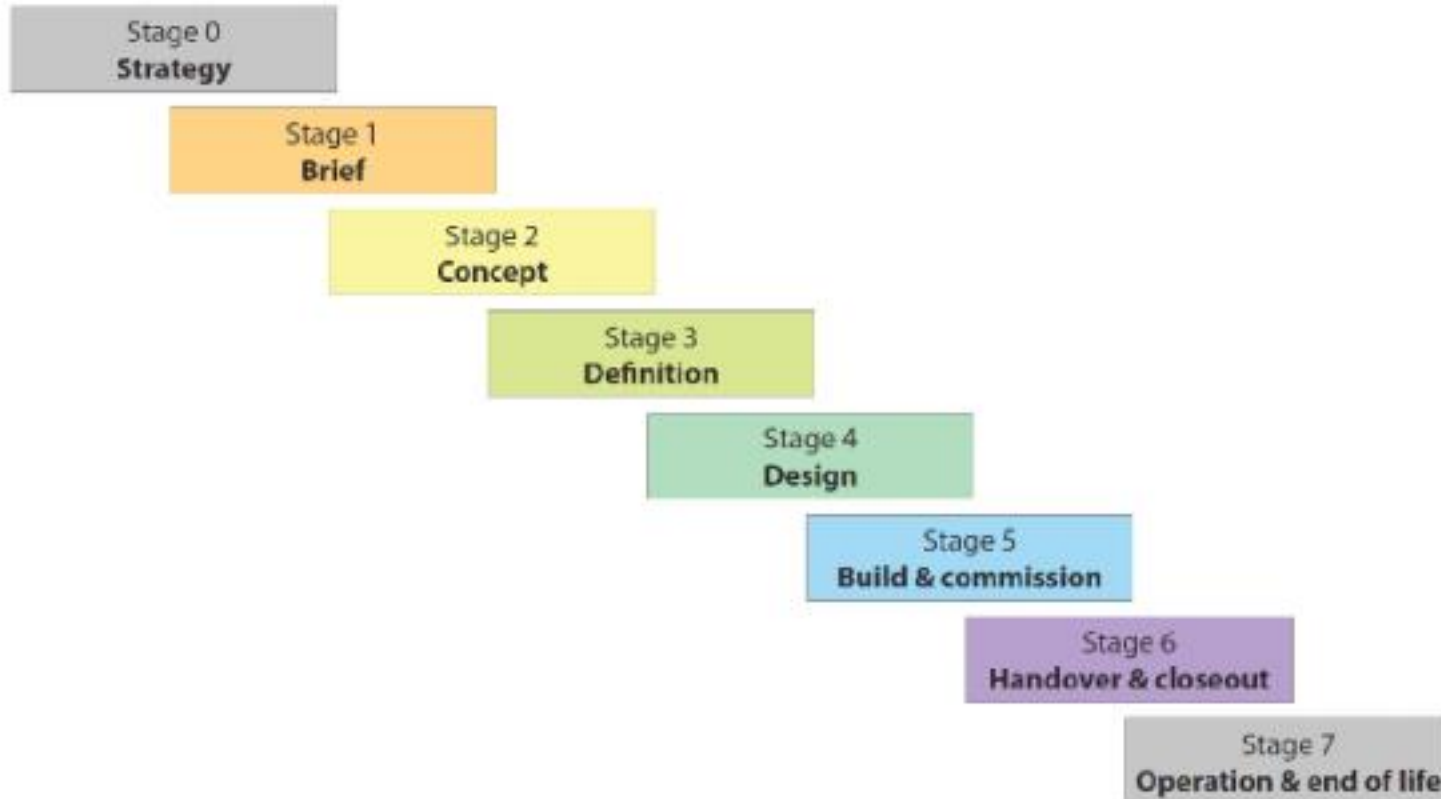
The screenshot displays a software interface with three main sections:

- Left Panel (Navigation):** Contains tabs for 'Delivered', 'Required', and 'Validation'. Under 'Asset types', 'Fan convectors' is expanded, listing several items with red 'X' icons. The top item is highlighted: 'NBS_BiddleAirSystemsLtd_FanCvctrs_Force flow900-F1:930:789714'.
- Center (3D Model):** Shows a 3D rendering of a fan convactor unit, highlighted with a purple selection box.
- Right Panel (Properties and attributes):** Displays a table of properties for the selected item. A 'Locate' button is at the top right.

Properties and attributes	
external Entity Name	IfcFlowTerminal
External ID	858739
external System Name	Autodesk Revit 2014 (ENU)
[required]	
✓ BarCode	n/a
✗ ServiceLifeDuration	
✓ InstallationDate	12/31/1900 23:59:59
✗ ProductionYear	
✓ ReplacementCost	n/a
✓ SerialNumber	n/a
✓ WarrantyDescription	n/a
✗ WarrantyDurationLabor	
✓ WarrantyDurationParts	2 years
✗ WarrantyGuarantorLabor	
✓ WarrantyGuarantorParts	Biddle Services Ltd
✓ WarrantyStartDate	12/31/1900 23:59:59

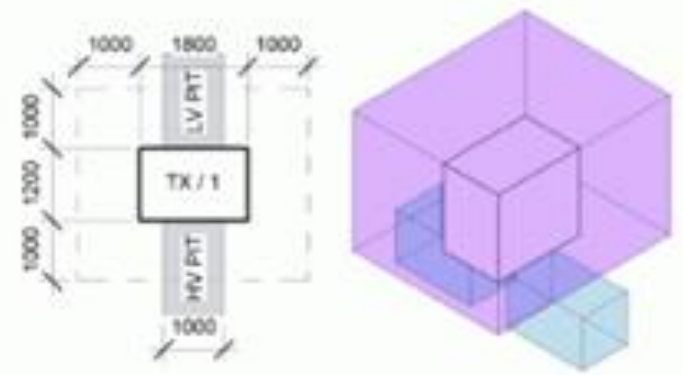
NEXT

UK Government Digital Plan of Work



NEXT

	1	2	3	4	5	6	7
Strategic Definition	Preparation and Brief	Concept Design	Developed Design	Technical Design	Construction	Handover and Close Out	In Use
LOD	1	2	3	4	5	6	2-2
LOI	1	2	3	4	5	6	



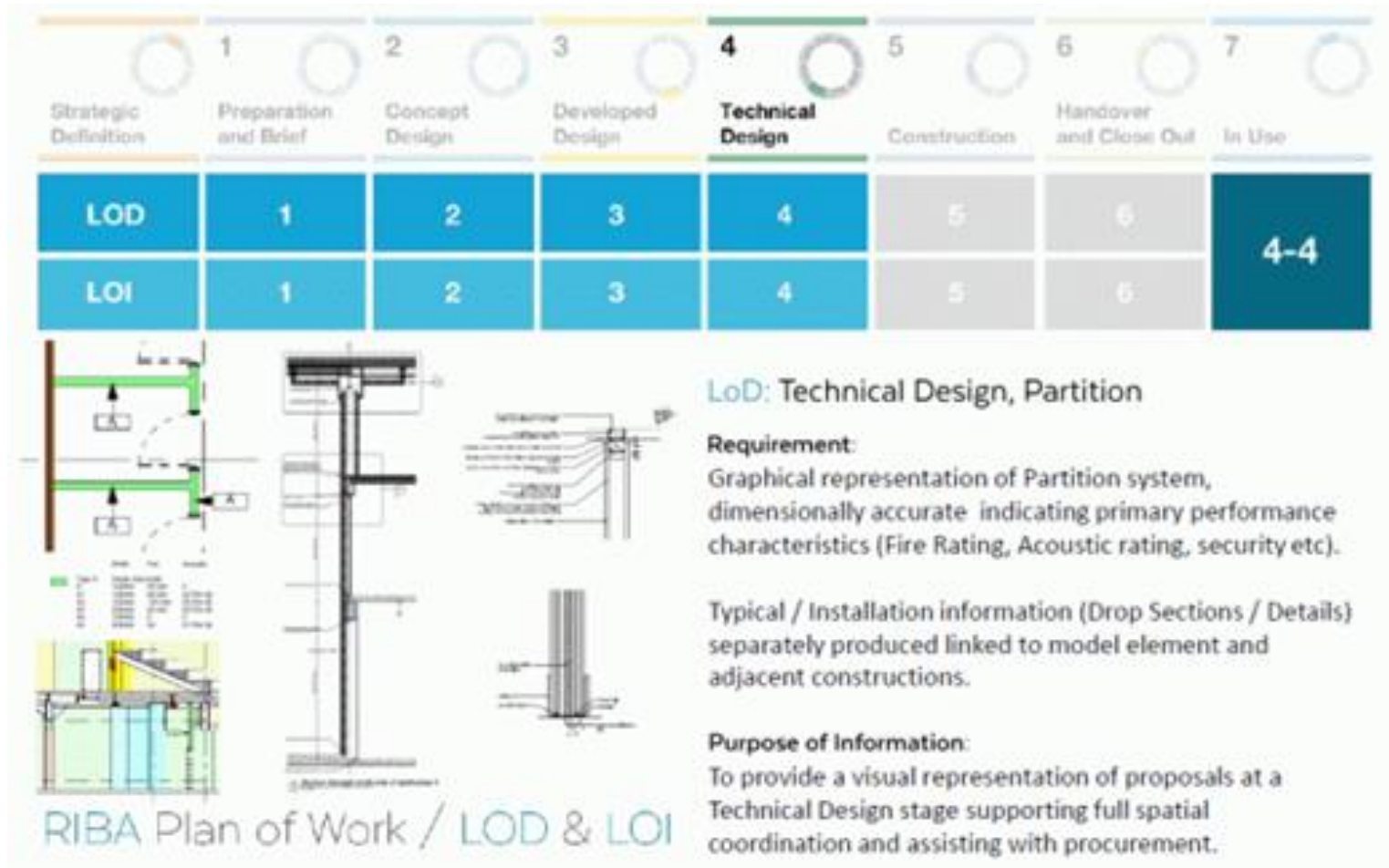
LoD: Concept Design, Transformer

Requirement:
Graphical representation of the equipment with approximate size, shape and location with provision for access and maintenance identified

Purpose of Information:
To provide a visual indication of proposals at a Concept stage identifying key requirements such as size, location, access / maintenance clearance, major services connections etc all supporting coordination

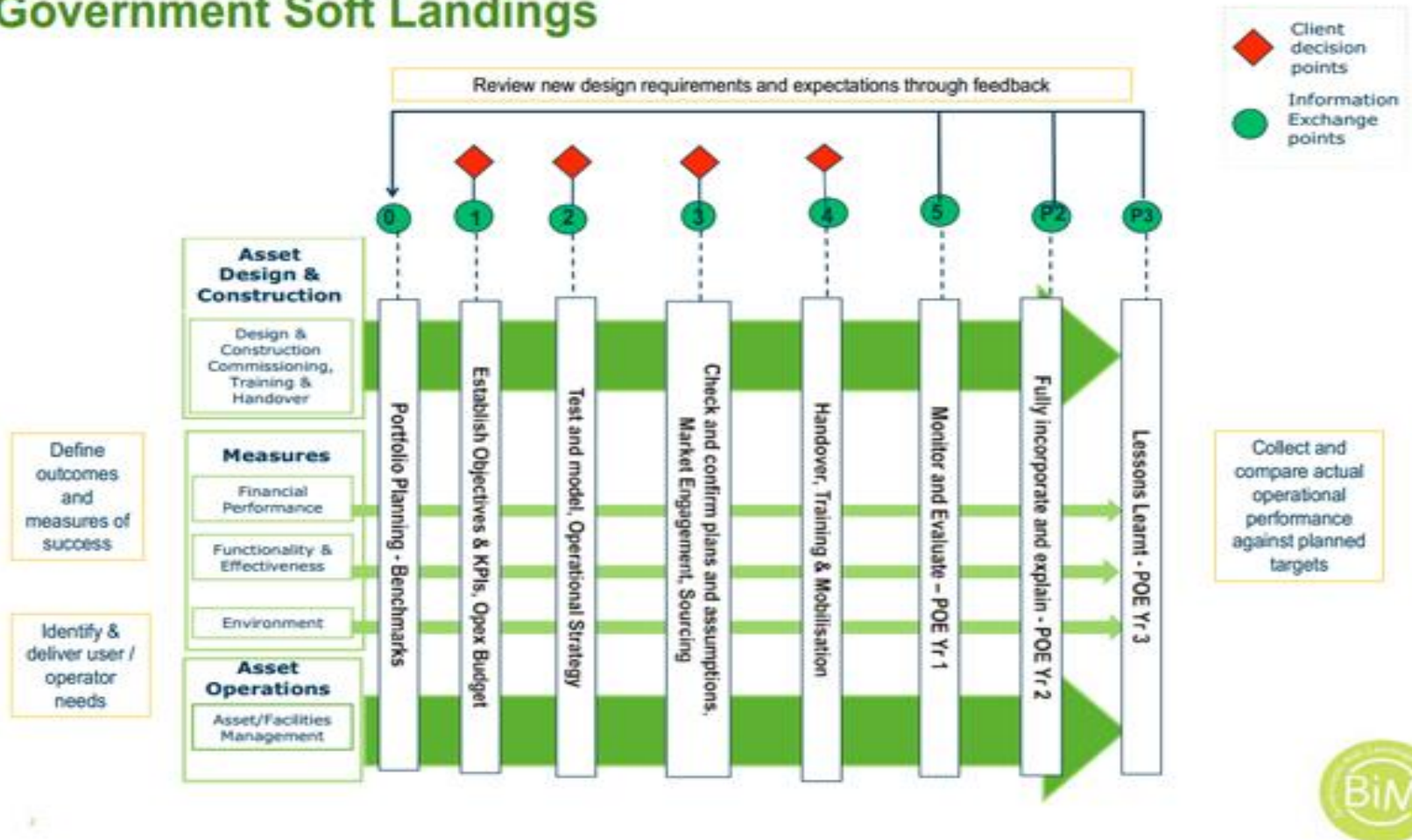
RIBA Plan of Work / LOD & LOI

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Government Soft Landings



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Level 2 working-

Use Pas 1192, series

Use DPOW

Use Tool kit and Uniclass 2015

Develop market and common practice

See returns from investment

Joined-up accurate data from 2016?

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Level 3 is at least 9 years away for common use.
Lots of time to perfect level 2.

ISO 19650 in development (PAS 1192).

ISO Task groups in 30 countries

CEN Standards being progressed

International working (IFC's)

'Buildsmart' around the world

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Closing remarks-

Its all about the data

Accurate designs, Accurate performance

Fully proven performance, pre-build

Data for clients, business model

Data for future proofing, asset





Building Information
Modelling (BIM)
Task Group

Thank you



Digital Built Britain



<http://www.bimtaskgroup.org/>