CLAW/CEW BIM Toolkit for Clients

Client Training and Supplier Awareness Sessions

Wednesday 24th September

Cardiff

ADEILADU ARBENIGRWYDD YNG NGHYMRU

CONSTRUCTING EXCELLENCE IN WALES

Welcome

Ed Evans

Director of Exemplar and Demonstration Programme

Agenda

CLAW/CEW BIM Toolkit for Clients

Client and Supplier Training and Awareness Days

Morning session for CLAW members

9.00 Registration (Tea/coffee)

9.15 Welcome and Introduction

9.30 Guide to the Toolkit (interactive session)

- o Business Case (15 min)
- o Procurement (30 min)
- o EIR (45 min)

11.00 Tea/Coffee

11.15 Case Study

11.45 Facilitated discussion

12.05 Summing up and next steps

12.15 Lunch and Networking

BIM support programme

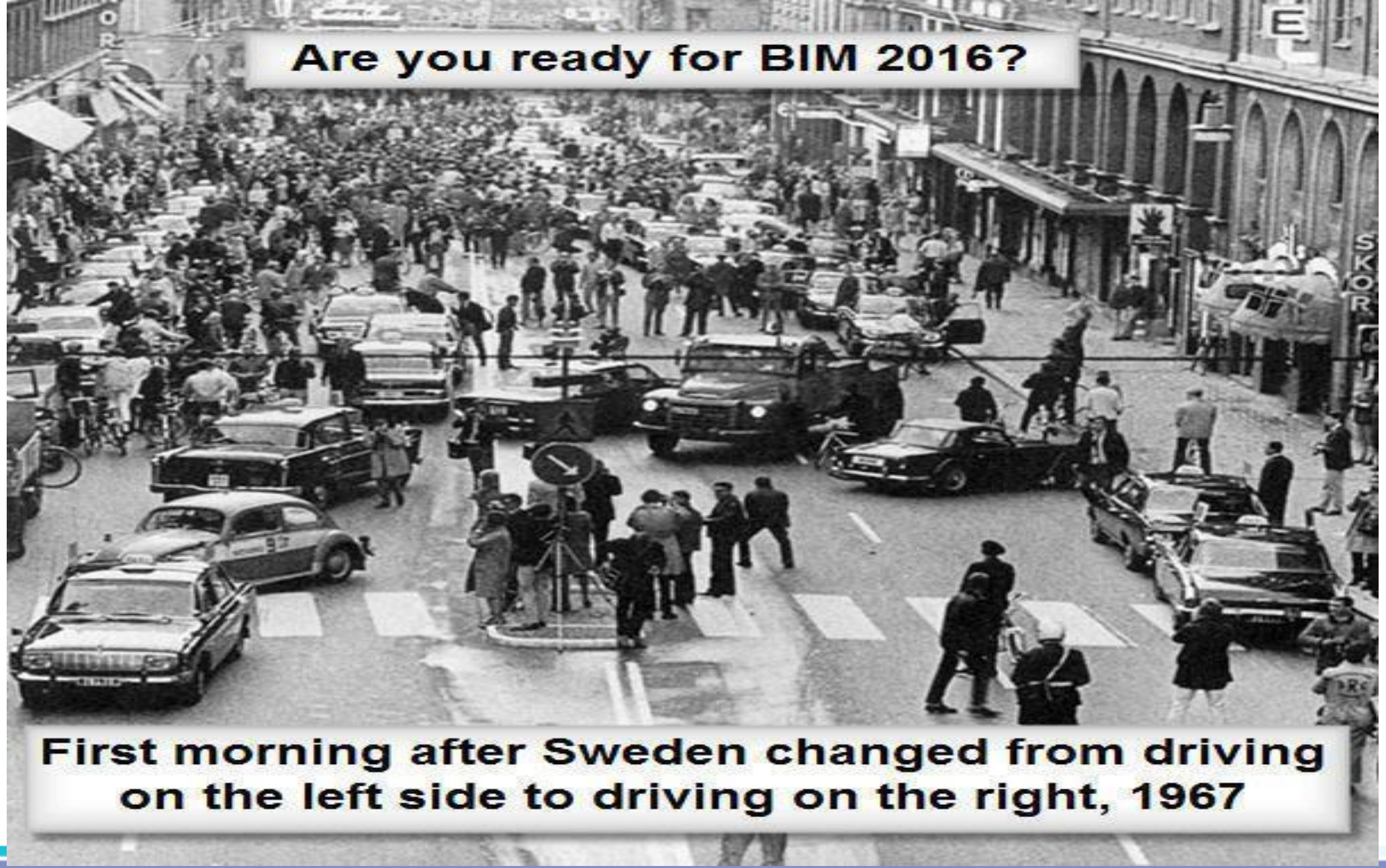
Your Support Team

ADEILADU ARBENIGRWYDD YNG NGHYMRU | CONSTRUCTING EXCELLENCE IN WALES

Professor Andrew Thomas – co author BIM Strategy,
CEx Wales BIM provider, supporting Suppliers and Clients implement,
BIM4SME founder, CEx National BIM Working group

John Lorimer – Co Author of BIM strategy, Local Govt liaison officer
Presented at CEx Wales and BIM events, Chair BIM academy

Graeme Tappenden – Technical Support and Process expert,
Local Govt technical support BIM Task group. Supporting implementation


Are you ready for BIM 2016?
First morning after Sweden changed from driving on the left side to driving on the right, 1967

Need to know and plan 3 things……

Who

Needs to do

What

And

When

Who do we need to tell

What do we need to tell them

When do we tell what
And…. does “stuff” happen ?

- Business case for BIM
- BIM specific Procurement guidance and tools
- Example Employers Information Requirements
- BIM flyer
- EIR Guidance notes
- BIM and GSL guidance note
- Collaborative Maturity Assessment tools
- Glossary of terms and Acronym key
- Reference points for standards and protocols

BIM for CLAW members

see more – achieve more – waste less

BIM is a revolution in the way our built assets are conceived, designed, built, managed & maintained. This is achieved by a development of traditional methods using digital modelling and structured information management through the whole life of an asset, from identifying the need, to disposal.

The benefits of BIM are now well proven with asset owners and the construction industry deriving significant benefit from its use.

The CLAW BIM Toolkit for Clients has been developed to allow the public sector in Wales to articulate and specify its BIM requirements to its supply chains in a consistent and easily understand the format.

BIM will bring a clearer vision of an authority's built asset estate to all stakeholders and achieve greater utilisation, with greater value at lower cost, and with a reduced risk and environmental impact.

For more information and guidance on how to use the toolkit visit our website: www.cewales.org.uk

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http://www.claw.gov.uk/

Headline explanation

Strategic overview

Benefit expectation

Local Government Drivers for BIM

HM Government Construction Strategy mandates BIM for Government Departments.

CEW BIM Task Group recommends adaption of BIM Level 2 by 2016.

Welsh Governments adaption of Wales Construction Procurement Strategy including BIM adaption targets.

Significant pressure on capital & revenue budgets.

Pressure to improve asset utilization and asset cost.

Maximise stakeholder engagement, value & benefit

Minimise delivery risk, reserves and maximise outcomes.

Maximise capital & revenue funding potential.

Support leaner sustainability & carbon reduction commitments.

Maintain an efficient asset procurement, design & management capability.

Maintain efficient framework & supply chain relationships.

Improve built asset cost, time, quality and carbon performance.

CLAW BIM Toolkit for Clients is open to all CLAW Authorities who procure or manage built assets as a client.

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BIM BENEFITS

Estate Visibility – better information management, better decisions & performance reporting.

Stakeholder Engagement – digital modelling results in better, earlier & a more engaged understanding.

Asset Utilisation – better user access, flexibility, managed capacit & agile facility management.

Health & Safety – better management of fire, natural disaster, development & operational health & safety risk.

Environmental Impact – less waste, less energy, better carbon & environmental performance.

Quality – improved outcomes, stakeholder satisfaction, operational flexibility & design life, performance.

Value & Cost – improved value, efficiency and reduced cost.

Whole Life Asset Management – from inception to disposal, full tractability, design, management, planned & reactive maintenance.

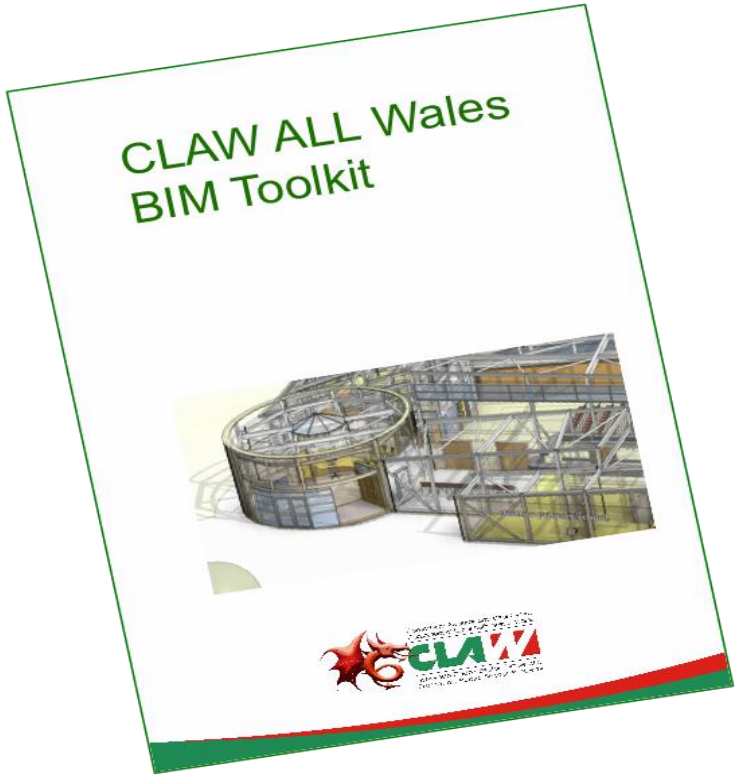
Development Risk – greater certainty of outcome, reduced risk premium, insurances & programme uncertainty.

Project Delivery – shorter development cycles, fewer programme & cost variations.

Business Case

Comprehensive explanation

“languaged “ for
Chief Officers,
Elected Members,
and ICT dept heads



Comprehensive explanation

Written appropriately for
Chief Officers,
Elected Members,
Dept Leads
and ICT Dept Heads

Case Studies
– increasingly CLAW members & projects

CLAWs lead in the BIM All Wales toolkit is transferable to other Public and Private Clients and will enable a clear Welsh Standard for BIM which will reflect additional cost savings and efficiency savings over those being delivered across the UK.

This toolkit supports the delivery of the Welsh Governments Construction Procurement Strategy, efficiency targets and carbon reduction commitments whilst protecting the interests of the indigenous Construction Sector across Wales through a tiered, proportionate and progressive approach.

As with all business change projects, investment will be required to develop the vision, manage the culture change and develop working practices across internal departments and suppliers.
Early projects using the new process will be benchmarked by CLAW and CEW to evaluate the anticipated efficiency gains Local Authorities will achieve real benefits from adopting BIM.

Procurement

Procuring and Tendering….. with BIM

CLAW is not YET ready for this

CLAW chosen approach in Toolkit

Project Scope Position	Description
BIM Ready	Base position for all projects and where a 3D BIM model is not required or not appropriate and for all in-use supply & install or planned or reactive maintenance contracts. This position enables the client to build BIM readiness across his asset estate by collecting integrated structured data and digital information. All information is published electronically as documents and data in COBie or negotiated format.
BIM Adopter	Interim position with project team developing its BIM skills. It is recognised here that all team members may not be fully Level 2 BIM capable and that formal BIM appointments are not practical. L2 BIM KPI should be assessed prior to project start with an expressed improvement plan in place. For UK Government funded projects this position is transitional and only applicable to projects initiated prior to 2016.
Full BIM	This is the full 'business as usual' BIM capability position with full project team collaborating and sharing to Level 2 BIM standards. End to end collaborative managed 3D BIM is the formal contractual position for all project team members.

3 tiers of Project BIM types
Value and complexity

Therefore 3 tiers of Questions
In PQQ and ITT expectations

When inviting PQQ's or tenders clients should seek to "set the scene" for prospective partners by explaining, in simple terms, the approach being taken to BIM. It is suggested that the following text be incorporated into relevant documentation.

This project is to be designed within a federated BIM environment and a model shall be maintained throughout the construction period of the project and handed over to the client as part of practical completion as defined in the Employer's Information Requirement (EIR).

Contractors are required to demonstrate that they can design/manage the project collaboratively within the BIM environment. They will be required to work with the Council to agree a set of BIM Standards for this project and develop templates for use by the design team. The BIM Standards will be aligned with BS1192:2007- Collaborative Working, which defines the process for sharing project information efficiently between all members of the project team.

This is a disciplined auditable process that is both transparent and controllable.

Level 1. For Authorities who wish to start integrating BIM into their procurement process and particularly when looking at engaging with SMEs and local providers it may be helpful to start with two simple questions.

- How will you support our desire to adopt Level 2 Building Information Modelling with collaborative 3d working across the design and project team from an early stage to project close out?
- Please provide evidence to support your response.

Download questions here

Level 2. The preferred approach is to use the questions contained within PAS 91 - they can be used with any PQQ. The scoring matrix will also provide a consistent base from which to evaluate the suppliers throughout Wales. The questions can also be used at ITT stage.

Download questions here

Capability to Deliver PAS91:2013

- Standard requirements for PQQ
- Optional BIM questions (Table 8)
- Drafted with a view to the 2016 mandate
- Tests BIM and collaborative working competencies
- Future certification route (not currently available)
- All suppliers should be prepared
- Initially an open attitude is enough

PAS91:2013 Table 8 Questions

Key Attribute	Range of Scores			
	Poor (0)	Adequate (1)	Good (2)	Excellent (3)
O4 – Q1 Working in a common data environment (CDE)	No understanding of data management issues and no methodology in place	Some understanding of issues with evidence of enterprise-specific standards	Good understanding of issues supported by evidence of project-wide standards	Through understanding with clear evidence of experience and success in the managed application of CDE
Working at Level 2 BIM	No understanding of issues and no BIM systems or methodology in place	Some understanding of issues and evidence of capability. Limited evidence of ability to exchange BIM data	Good understanding of issues, with capability and systems in place for BIM-enabled working. Some evidence of file-based collaboration.	Thorough understanding of issues with systems and methodology in place. Ability to evidence experience and success in data exchange using BIM
Evidence of planned BIM delivery	No understanding of issues and no plans or methodologies in place	Some understanding of issues and awareness of BIM delivery planning	Good understanding of issues. Ability to demonstrate formal enterprise-specific BIM delivery planning	Thorough understanding of issues including evidence of planning of project-wide BIM delivery
Evidence of BIM training	No evidence of awareness of training need	Evidence of application-specific training	Evidence of enterprise-wide training assessment and planning	Evidence of project specific capability assessment and training planning

PAS91:2013 Table 8 Questions

Key Attribute	Range of Scores			
	Poor (0)	Adequate (1)	Good (2)	Excellent (3)
Q4 – Q1 Working in a				
Working in a Common Data Environment		standards		managed application of CDE
Working at Level 2 BIM		to exchange BIM data	evidence of file-based collaboration.	and success in data exchange using BIM
Evidence of planned BIM delivery				
Evidence of BIM training				

Target: Clear evidence of experience and success in the managed application of a Common Data Environment (CDE)

Target: Systems & methodology in place with evidence of experience and success in file & data exchange using BIM

Target: Evidence of project wide BIM delivery

Target: Evidence of project specific capability assessment and training planning

KPI	BIM Team Capability Working Practices	BIM Ready	BIM Adopter	Full BIM
B0	No BIM - Not assessed or no working practices B1-B9			
B1	Electronic File Based Information Publishing (Agreed Formats)	a	a	a
B2	Discipline Based Model Authoring & Visualisation		a	a
B3	Collaborative Working (Full Design Team) (PAS1192-2)		a	a
B4	Collaborative Working (Full Construction Team) (PAS1192-2)		a	a
B5	Construction (Planning, Costing & Environmental) (4D, 5D, 6D)		a	a
B6	User, Operator, Maintainer Engagement (GSL) (7D)		a	a
B7	Employer Engagement (EIR, BIM Protocol, COBie)		a	a
B8	BIM Procurement (PAS91, Framework & Project Contract)			a
B9	Structured Information Exchange & Validation (PAS1192-3)			a

Knowing where our suppliers are up to

how it fits with our own capability

How do we know where we are up to ?

BIM4LG Building Information Modelling (BIM) for Local Government

10 Minute BIM ScoreCard

Authority: bim4info **BIM Index: 11** **Completed on: 19/09/2013 By: Administrator**

Group	Q	A	Question	0	1	2	3	4	5	6	7	8	9
BIM Engagement	1	4	Senior Executives & Sponsors	N/A	Not wanted	Some Awareness	Awareness Building	Awareness Embedded	Team Sponsor	Department Sponsor	Organisation Champion	Regional Champion	National Champion
	2	5	Commissioning Dept & Facilitators	N/A	Not wanted	Some Awareness	Awareness Building	Awareness Embedded	Practitioner	Mentoring practitione	Organisation Champion	Regional Champion	National Champion
	3	6	Procurement Department & Managers	N/A	Not wanted	Some Awareness	Awareness Building	Awareness Embedded	Practitioner	Mentoring practitione	Organisation Champion	Regional Champion	National Champion
	4	5	Project Managers	N/A	Not wanted	Some Awareness	Awareness Building	Awareness Embedded	Practitioner	Mentoring practitione	Organisation Champion	Regional Champion	National Champion
	5	4	Designers & Design Team	N/A	Not wanted	Some Awareness	Awareness Building	Awareness Embedded	Practitioner	Mentoring practitione	Organisation Champion	Regional Champion	National Champion
	6	5	Facility/ Property/ Asset Managers	N/A	Not wanted	Some Awareness	Awareness Building	Awareness Embedded	Practitioner	Mentoring practitione	Organisation Champion	Regional Champion	National Champion
	7	4	Direct Works Organisation	N/A	Not wanted	Some Awareness	Awareness Building	Awareness Embedded	Practitioner	Mentoring practitione	Organisation Champion	Regional Champion	National Champion
	8	5	Capability & Training Group	N/A	Not wanted	Some Awareness	Awareness building	Awareness Embedded	Practitioner	Mentoring practitione	Team Sponsor Champio	Regional Sponsor Cham	National Sponsor Cham
	9	6	Cost Consultants/Quantity Surveyors	N/A	Not wanted	Some Awareness	Awareness building	Awareness Embedded	Practitioner	Mentoring practitione	Team Sponsor Champio	Regional Sponsor Cham	National Sponsor Cham
	10	7	Contractor(s)	N/A	Not wanted	Some Awareness	Awareness building	Awareness Embedded	Practitioner	Mentoring practitione	Team Sponsor Champio	Regional Sponsor Cham	National Sponsor Cham
BIM Process & Methodology Development	11	6	Initiation & BIMTG Workshops (1-5)	N/A	Not wanted	HWG BIM Awareness	Asset Lifecycle Proce	Legal and Commercial	Technical and COBie	Government Soft Landi	Training and Learning	Onward Team Briefings	Cascading Learning
	12	5	RACI Mapping PfD & Strategic Imp Plan	N/A	Not wanted	Pending	WIP	Draft complete for st	Published	Executives Briefed	Executive Sponsoring	Onward Briefings	Actively Cascading
	13	4	BIM Integration & Change Management	N/A	Not wanted	Pending	Awareness building	Awareness Embedded	Practitioner	Mentoring practitione	Team Sponsor Champio	Regional Sponsor Cham	National Sponsor Cham
	14	5	BIM Process Mapping, Gates & PLQ	N/A	Not wanted	Pending	Awareness building	Awareness Embedded	Practitioner	Mentoring practitione	Team Sponsor Champio	Regional Sponsor Cham	National Sponsor Cham
	15	6	Commercial, EIR & BIM Protocol	N/A	Not wanted	Pending	Awareness building	Awareness Embedded	Practitioner	Mentoring practitione	Team Sponsor Champio	Regional Sponsor Cham	National Sponsor Cham
	16	8	PAS 1192, Information Exchanges & COBI	N/A	Not wanted	Pending	Awareness building	Awareness Embedded	Practitioner	Mentoring practitione	Team Sponsor Champio	Regional Sponsor Cham	National Sponsor Cham

10 minute

On Line

self assessment tool

CONSTRUCTING EXCELLENCE IN WALES

	17	8	Government Soft Landings Adoption	N/A	Not wanted	Pending	Awareness building	Awareness Embedded	Practitioner	Mentoring practitione	Team Sponsor Champio	Regional Sponsor Cham	National Sponsor Cham
	18	9	BIM Training & Awareness Programme	N/A	Not wanted	Pending	Awareness building	Awareness Embedded	Practitioner	Mentoring practitione	Team Sponsor Champio	Regional Sponsor Cham	National Sponsor Cham
	19	8	Visualisation Strategy	N/A	Not wanted	Pending	Awareness building	Awareness Embedded	Practitioner	Mentoring practitione	Team Sponsor Champio	Regional Sponsor Cham	National Sponsor Cham
	20	6	BIM Library & Standards	N/A	Not wanted	Pending	Awareness building	Awareness Embedded	Practitioner	Mentoring practitione	Team Sponsor Champio	Regional Sponsor Cham	National Sponsor Cham
	21	4	Collaboration Strategy	N/A	Not wanted	Pending	Awareness building	Awareness Embedded	Practitioner	Mentoring practitione	Team Sponsor Champio	Regional Sponsor Cham	National Sponsor Cham
	22	2	Other Related Initiatives eg Lean	N/A	Not wanted	Pending	Awareness building	Awareness Embedded	Practitioner	Mentoring practitione	Team Sponsor Champio	Regional Sponsor Cham	National Sponsor Cham
	23	1	Modularisation & Prefabrication	N/A	Not wanted	Pending	Awareness building	Awareness Embedded	Practitioner	Mentoring practitione	Team Sponsor Champio	Regional Sponsor Cham	National Sponsor Cham
	24	2	Buildability & Sustainability	N/A	Not wanted	Pending	Awareness building	Awareness Embedded	Practitioner	Mentoring practitione	Team Sponsor Champio	Regional Sponsor Cham	National Sponsor Cham
	25	4	In Use Performance Assessment	N/A	Not wanted	Pending	Awareness building	Awareness Embedded	Practitioner	Mentoring practitione	Team Sponsor Champio	Regional Sponsor Cham	National Sponsor Cham
	26	5	Supplier Engagement Strategy	N/A	Not wanted	Pending	Awareness building	Awareness Embedded	Practitioner	Mentoring practitione	Team Sponsor Champio	Regional Sponsor Cham	National Sponsor Cham
BIM Impact on Business Goals	27	6	Economic	N/A	None	Poor if any	Very Low	Low	Average	Above Average	Target met	Above Target	Exceptional
	28	7	Programme	N/A	None	Poor if any	Very Low	Low	Average	Above Average	Target met	Above Target	Exceptional
	29	7	Functional	N/A	None	Poor if any	Very Low	Low	Average	Above Average	Target met	Above Target	Exceptional
	30	7	Social	N/A	None	Poor if any	Very Low	Low	Average	Above Average	Target met	Above Target	Exceptional
	31	7	Environmental	N/A	None	Poor if any	Very Low	Low	Average	Above Average	Target met	Above Target	Exceptional
BIM Evidence & Value Studies	32	6	Early Adopter Infrastructure Projects	N/A	Not wanted	Pending	Available but not aul	Available being colle	Data sheet published	Case Study pending	Full Case Study WIP	Case Study(s) Publish	Value Benefits Availa
	33	6	Early Adopter Building Projects	N/A	Not wanted	Pending	Available but not aul	Available being colle	Data sheet published	Case Study pending	Full Case Study WIP	Case Study(s) Publish	Value Benefits Availa
	34	5	Early Adopter Facility/Asset Managemen	N/A	Not wanted	Pending	Available but not aul	Available being colle	Data sheet published	Case Study pending	Full Case Study WIP	Case Study(s) Publish	Value Benefits Availa
	35	5	Lessons Learned Case Studies	N/A	Not wanted	Pending	Available but not aul	Available being colle	Data sheet published	Case Study pending	Full Case Study WIP	Case Study(s) Publish	Value Benefits Availa
	36	4	BIM Cost & Carbon Value Savings	N/A	Not wanted	Pending	Available but not aul	Available being colle	Data sheet published	Case Study pending	Full Case Study WIP	Case Study(s) Publish	Value Benefits Availa
	37	4	BIM User & Social Outcomes	N/A	Not wanted	Pending	Available but not aul	Available being colle	Data sheet published	Case Study pending	Full Case Study WIP	Case Study(s) Publish	Value Benefits Availa
Group	**Q**	**A**	**Question**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**

BIM4LG Building Information Modelling (BIM) for Local Government

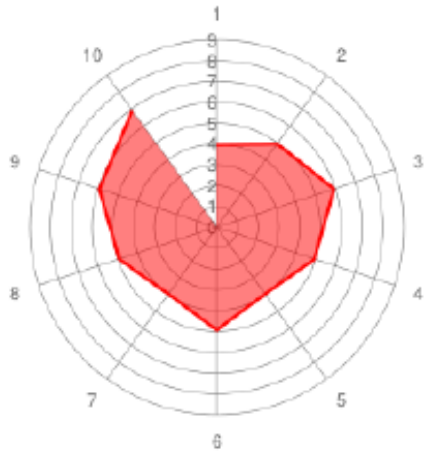
10 Minute BIM ScoreCard

Authority: bim4info **BIM Index: 11**

Completed on: 19/09/2013
By: Administrator

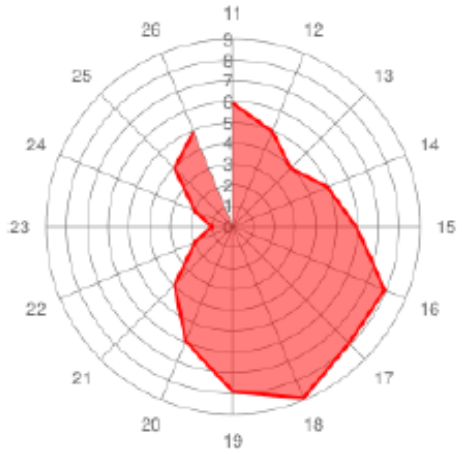
BIM Engagement

q1	4	Senior Executives & Sponsors
q2	5	Commissioning Dept & Facilitators
q3	6	Procurement Department & Managers
q4	5	Project Managers
q5	4	Designers & Design Team
q6	5	Facility/ Property/ Asset Managers
q7	4	Direct Works Organisation
q8	5	Capability & Training Group
q9	6	Cost Consultants/Quantity Surveyors
q10	7	Contractor(s)



BIM Process & Methodology Development

q11	6	Initiation & BIMTG Workshops (1-5)
q12	5	RACI Mapping PID & Strategic Imp Plan
q13	4	BIM Integration & Change Management
q14	5	BIM Process Mapping, Gates & PLQ
q15	6	Commercial, EIR & BIM Protocol
q16	8	PAS 1192, Information Exchanges & COBie
q17	8	Government Soft Landings Adoption
q18	9	BIM Training & Awareness Programme
q19	8	Visualisation Strategy
q20	6	BIM Library & Standards
q21	4	Collaboration Strategy
q22	2	Other Related Initiatives eg Lean
q23	1	Modularisation & Prefabrication
q24	2	Buildability & Sustainability
q25	4	In Use Performance Assessment
q26	5	Supplier Engagement Strategy



BIM Impact on Business Goals

q27	6	Economic
q28	7	Programme
q29	7	Functional
q30	7	Social
q31	7	Environmental

BIM Evidence & Value Studies

q32	6	Early Adopter Infrastructure Projects
q33	6	Early Adopter Building Projects
q34	5	Early Adopter Facility/Asset Management Projects
q35	5	Lessons Learned Case Studies
q36	4	BIM Cost & Carbon Value Savings
q37	4	BIM User & Social Outcomes

Level 3. A further set of 14 questions are attached – 'Questions for potential tier one suppliers'. They allow a more detailed interrogation of a supplier's ability by asking them to demonstrate progress in very specific areas. These questions are best used by Authorities who have developed some experience in procuring and using BIM on projects. They will certainly require knowledgeable people to analyse and mark the responses. They may also be asked of potential or existing suppliers outside a formal procurement activity.

Download questions here

Please demonstrate your progress with the following:

1. Adopting a discipline 3D BIM model authoring approach to your designs & schemes from an early stage to project handover?
2. Adopting a BS1192:2007 CDE collaborative approach across design and project team members from an early stage to project handover?
3. Adopting a federated 3D visualisation and aggregation approach to coordination and clash rendition from an early stage to project handover?
4. Adopting this federated visualised approach as a backdrop to design/client team meetings?
5. Creating and publishing of agreed open standard visualisation models to clients & stakeholders from an early stage to project handover?
6. Creating and publishing of agreed standards 2D drawings, plans and section cut from the 3D BIM models from an early stage to project handover?
7. Creating and publishing other documents and data in agreed electronic formats from an early stage to project handover?
8. Producing a pre and post contract BIM Execution Plans (BEP) & Master Information Delivery Plans (MIDP) confirming tier 1 model production and other documents by agreed plan of work stage?
9. Responding to clients Employer's Information Requirements (EIR) in the production of both pre and post contract BEP and MIDP?
10. Creating and delivering COBie data to Clients EIR including Document Tab issued documents & files (COBie Issue Sheet)
11. Adoption of CIC BIM Protocol and appendix 1 & 2?
12. Adoption of PAS91:2013 Table 8 BIM questions?
13. Involvement of user/operator/maintainer in design development?
14. Adoption of Government Soft Landings (GSL) approach including early definition of post-operative performance (POE) outcome assessment standards?

Question	Description
Note	The question set is optional. Scoring: INFORMATION ONLY
Note	Exemption: The questions in this module need not be completed if your organisation holds a third party certificate of compliance with BS EN PAS 1192:2:2013 from an organisation with a related UKAS accreditation, or equivalent.

Question	Description	Question Type	Mandatory
9-O4-Q1	Are you claiming exemption?	Yes/No Value	No
9-O4-Q1-1	If yes, please provide a copy of the certificate	Attachment	No
9-O4-Q2	Do you have the capability of working with a project using a "Common Data Environment" as described in PAS 1192:2:2013?	Yes/No Value	No
9-O4-Q2-1	You will be expected to demonstrate that your organisation understands the concept of a "Common Data Environment" as described in PAS 1192:2:2013 and is able to exchange information between supply chain members in an efficient and collaborative manner. If you have delivered a project in this way, you may use this to demonstrate your capability. Your explanation should be clear and concise. If 'yes', please provide details	Attachment	No
9-O4-Q3	Do you have documented policy, systems and procedures to achieve "Level 2 BIM" maturity as defined in the government's BIM Strategy?	Yes/No Value	No
9-O4-Q3-1	You will be expected to provide evidence that you or your organisation has a policy authorised by the Chief Executive or equivalent and regularly reviewed. The policy and procedures should be able to be applied to both large and small projects efficiently. If 'yes', please provide details	Attachment	No
9-O4-Q4	Do you have the capability of developing and delivering or working to (depending up the role(s) that this PQQ covers) a BIM Execution Plan (BEP) as described in PAS 1192:2:2013?	Yes/No Value	No
9-O4-Q4-1	You will be expected to demonstrate that your organisation understands the requirements of PAS 1192:2:2013, in particular with respect to BEP. This will include how to create reliable information and exchange it between supply chain members in an efficient and collaborative manner, and where appropriate, to the client, in the form specified (EG in accordance with the COBie UK 2012 standard and other typical client's information requirements). If you have delivered a project in this way, you may present an example BEP. If 'yes', please provide details	Attachment	No
9-O4-Q5	Do you have arrangements for training employees in BIM related skills and do you assess their capabilities?	Yes/No Value	No
9-O4-Q5-1	You will be expected to demonstrate that your organisation has in place training arrangements to ensure that its staff/workforce have sufficient skills and understanding to implement and deliver projects in accordance with the policy and procedures established to achieve "Level 2 BIM" maturity. Completed Construction Project Information Exchange (CPIx) templates referred to in the Project Implementation Plan (PIP), part of the BEP defined in PAS 1192:2 would be considered If this PQQ is for the first such project that you have considered undertaking, a training plan and evidence of how prior training outcomes in other areas have been assessed, would be considered. If yes, please provide details	Attachment	No

Tier one suppliers only
For now……

High Value framework Lots

Tier ones expected to
(increasingly)
use Q's 1 & / or 2
within their supply chain

constructionline
U.K. REGISTER OF QUALIFIED CONSTRUCTION SERVICES

Interactive project assessment session - Which questions…. and to whom

Project type 1
Value sub £500k
Scope – modest refurbishment and new extensions on school, first works since 2009

Project type 2
Value £450K new extension to 2013 new build school, with legacy model and Asset Information Model

Project type 3
Value £7m new build D&B public and emergency services mixed offices and blue light control station

Project 4
Responsive maintenance works – up to £25k

Project 4
Value £15m New build Highways Link road

Project 5
Term / planned maintenance contract – minor value

Project 7
£20m new build school,

What about in 2015

What about in 2016 ?

BIM

Supplier bidding approaches

Clarity and Evidence please

Maturity Assessment

Knowing (and showing) where you are

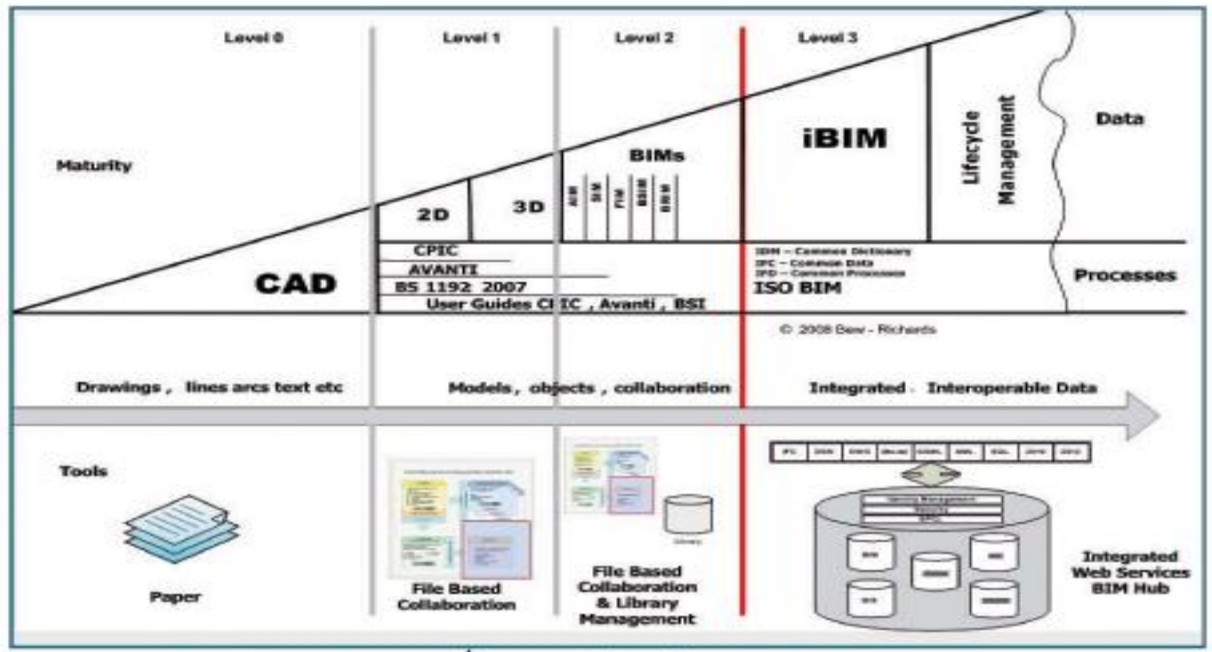
Practice, Policy, Training, and Experience

Policy and targets ?

BIM MATURITY MODEL UNDERPINS OUR COMMITMENT TO ACHIEVE LEVEL 2 BY 2012

	Project A	Project B	Projects C & D	Improvement / Development Plan 2011 / 2012
Award date	Nov 2010	Feb 2011	April 2011	
3D visualisation	✓	✓	✓	
Architectural model	✓	✓	✓	
Structural model	✓	✓	✓	
M&E model	×	✓	✓	
Clash detection	×	✓	✓	
FF&E	✓	✓	✓	
File based collaboration and library management	✓	✓	✓	
Web accessible	×	×	✓	
Thermal modelling	×	✓	✓	
Light and shade	×	✓	✓	
COBie	×	×	×	✓
Acoustics	×	×	×	✓
Smart meter monitoring	×	×	×	✓
Energy consumption	×	×	×	✓*
Embedded carbon	×	×	×	✓*

* not currently in BIM standards and migration



TYPICAL NWCH PROJECT

CASE STUDY [redacted] TECHNOLOGY COLLEGE

[redacted] PROJECT WITH [redacted]

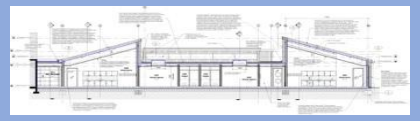
2009 2010 2011 2012 2013 2014 2015 2016 2017

Level 3 / 4

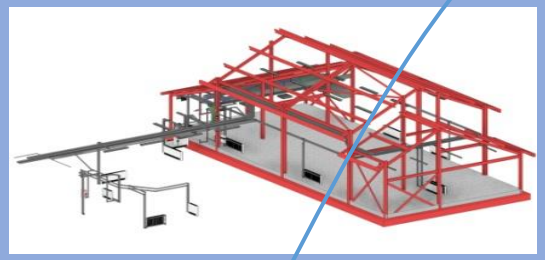
Level 2

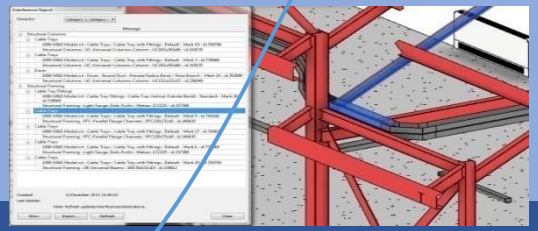
Level 1 ISG BIM Level Capability

Early BIM Projects
• 3D Architectural Models
•Client Presentations
• 3D Steel frames but no opportunities to combine with architectural models
•Software and hardware restrictions to manipulate and combine large models.
•Detailed construction models were split down to be manageable

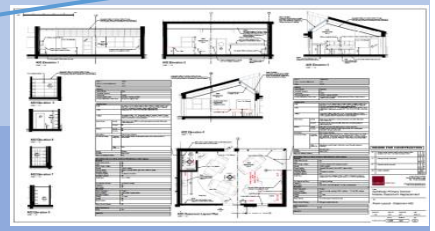


???? invested an internal BIM Steering Group which has centrally developed our BIM Implementation Strategy, including the Company BIM Procedure and BIM Execution Plan, and is championing the deployment of BIM across the business with members from all disciplines:





Current BIM Projects
• 3D Architectural Models
• Client Presentations
• 3D Structural models
• 3D M&E Models
•Software and hardware capability to manipulate and combine large models.
• Clash detection reporting and live editing possible
• 3D walk through at higher quality rendering
• Improving quantity measurements and constant updating of schedules with linked information.
• Agreed standards confirmed throughout the UK standards and trying to extend these through Europe
• Handover procedures agreed for clients to interrogate building components and ongoing maintenance strategies



•**Future for BIM** within ???? will be a continuous development and determined by the Steering Group and Regional BIM Champions.. BIM level 2 projects will continue across a broader section of projects and will ultimately used in all schemes.
•???? Steering Group will continue to develop BIM Operational Procedures and Project Execution Plans
•Current In house BIM Managers challenged to develop the models from 3 and 4D to 5 and 6D by a large retail client and will roll out successful procedures to other sectors across the regions

Level 3 / 4

BIM Level 2

BIM Level 1

2009 2010 2011 2012 2013 2014 2015 2016 2017

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Contractors BIM Process

Pre appointment BEP and assesment matrix

DES.G.30.BIM.APPENDIX.B.Level.Delivery.Agreement[1].pdf

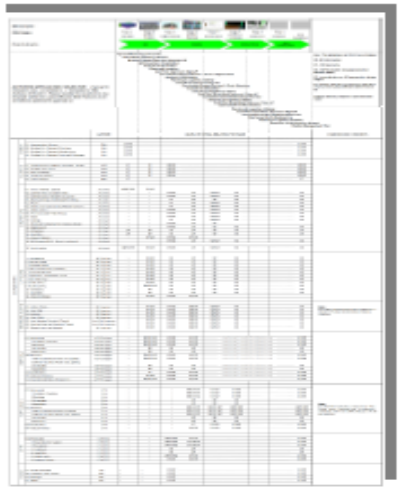
1 / 41 62.6%

Process: Functional Content | Document owner: Design | Document type: Guidance (G)

BIM Protocol – Level of Delivery Agreement — Appendix B

PROJECT NAME:-	
BUSINESS UNIT:-	
SECTOR:-	
DATE:-	

This document is to be used when identifying and referencing the designer's and contractor's detailed scope of service with respect to BIM Modelling duties. The form is to be utilised by Commercial, Design and BIM management teams on each project. The form is to be read in conjunction with the contract documentation and the Laing O'Rourke (LOR) document 'BIM Protocol – Level of Delivery Overview' A7



PARTY	OWNER	SIGN OFF DATE	REVISION
LOR BIM ENGINEER			
LOR COMMERCIAL MANAGER			
LOR DESIGN MANAGER			
ARCHITECT			
STRUCTURAL ENGINEER			
MEP DESIGN			
MEP CONTRACTOR			
FIRE PROTECTION			
CIVIL ENGINEER			
EXPLORE MANUFACTURING			

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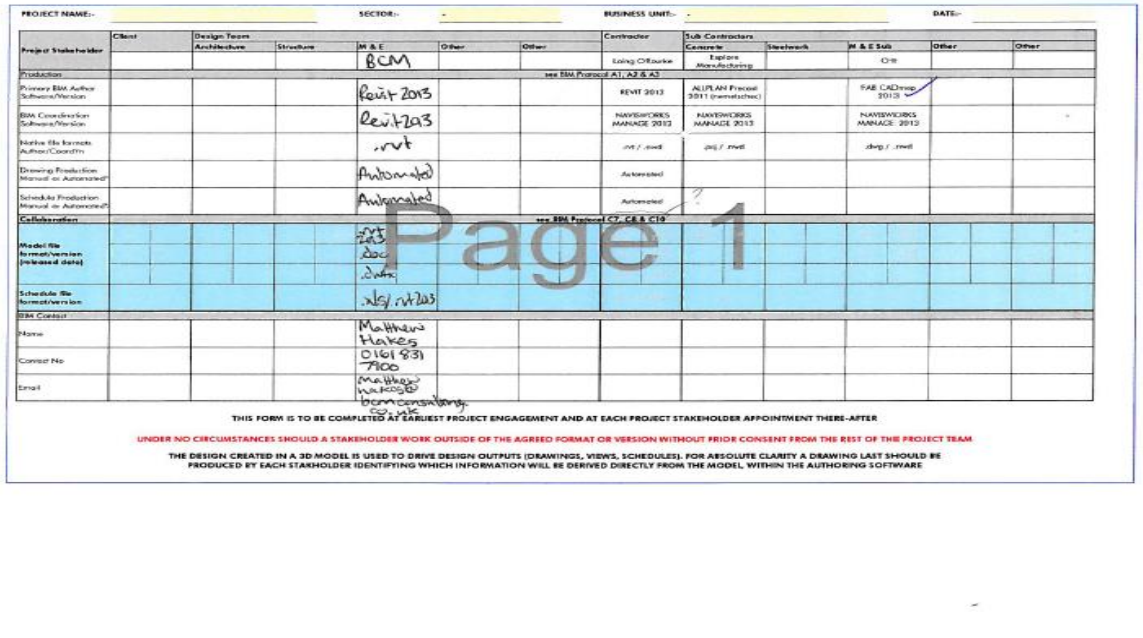


PROJECT NAME:- | SECTOR:- - | BUSINESS UNIT:- - | DATE:-

Project Stakeholder	Client	Design Team: Architecture	Design Team: Structure	Design Team: M & E	Design Team: Other	Design Team: Other	Contractor	Sub Contractors: Concrete	Sub Contractors: Steelwork	Sub Contractors: M & E Sub	Sub Contractors: Other	Sub Contractors: Other
				BCM			Laing O'Rourke	Explore Manufacturing		Ote		
Production	see BIM Protocol A1, A2 & A3											
Primary BIM Author Software/Version				Revit 2013			REVIT 2013	ALLPLAN Precast 2011 (nemetschec)		FAB CADmep 2013		
BIM Coordination Software/Version				Revit 2013			NAVISWORKS MANAGE 2013	NAVISWORKS MANAGE 2013		NAVISWORKS MANAGE 2013		
Native file formats Author/Coord'n				.rvt			.rvt / .nwd	.pcj / .nwd		.dwg / .nwd		
Drawing Production Manual or Automated?				Automated			Automated					
Schedule Production Manual or Automated?				Automated			Automated					
Collaboration	see BIM Protocol C7, C8 & C10											
Model file format/version (released data)				rvt 2013 .doc .dwfx								
Schedule file format/version				.xls/.rvt2013								
BIM Contact												
Name				Matthew Hakes								
Contact No				01618317900								
Email				matthew.hakes@bcmconsulting.co.uk								

THIS FORM IS TO BE COMPLETED AT EARLIEST PROJECT ENGAGEMENT AND AT EACH PROJECT STAKEHOLDER APPOINTMENT THERE-AFTER

UNDER NO CIRCUMSTANCES SHOULD A STAKEHOLDER WORK OUTSIDE OF THE AGREED FORMAT OR VERSION WITHOUT PRIOR CONSENT FROM THE REST OF THE PROJECT TEAM

THE DESIGN CREATED IN A 3D MODEL IS USED TO DRIVE DESIGN OUTPUTS (DRAWINGS, VIEWS, SCHEDULES). FOR ABSOLUTE CLARITY A DRAWING LAST SHOULD BE PRODUCED BY EACH STAKEHOLDER IDENTIFYING WHICH INFORMATION WILL BE DERIVED DIRECTLY FROM THE MODEL, WITHIN THE AUTHORING SOFTWARE

Page 1

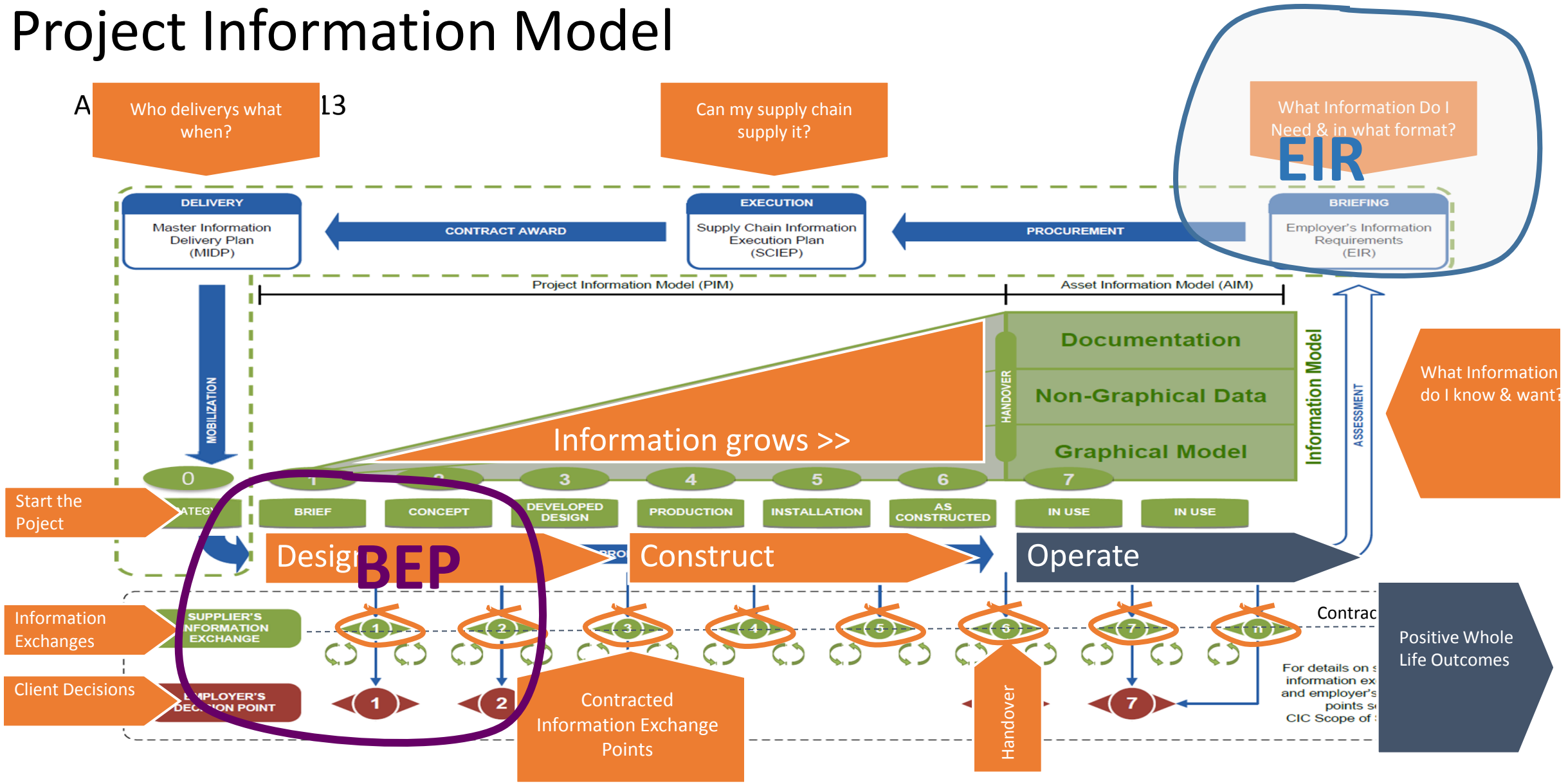
The LOR Way | DES.G.30.BIM.A4.Software.Review (Revision P8 Dec 2012) | Copyright © Laing O'Rourke 2009 All rights reserved. Document uncontrolled when printed | Page Number 1 of 1

BIM Protocol – Stakeholder Software Review

Process: Functional Content | Document owner: Design | Document type: A4 | Guidance (G)

Estate Information Visibility

Project Information Model



EIR and BEP - what is the difference ?

EIR – Employers Information Requirements

- Issued and formed by Client
- Driven by probity, compliance and functionality
- Clear declaration of intent and strategy
- Rules
- Standards
- Expectations
- Definitions
- Processes
- Behaviours and Culture
- End User and asset focussed

What if there are no EIR ‘s ?

CHAOS

Supplier Led solutions or better Integration ?

BEP – BIM Execution Plan

- Developed with / by supply team Design, in house design, traditional or D&B contractor
- Tactical – Project specific
- Protocols
- Definitions
- Details
- Details
- Time Defined
- Project and performance focussed
- Influenced by EIR’s

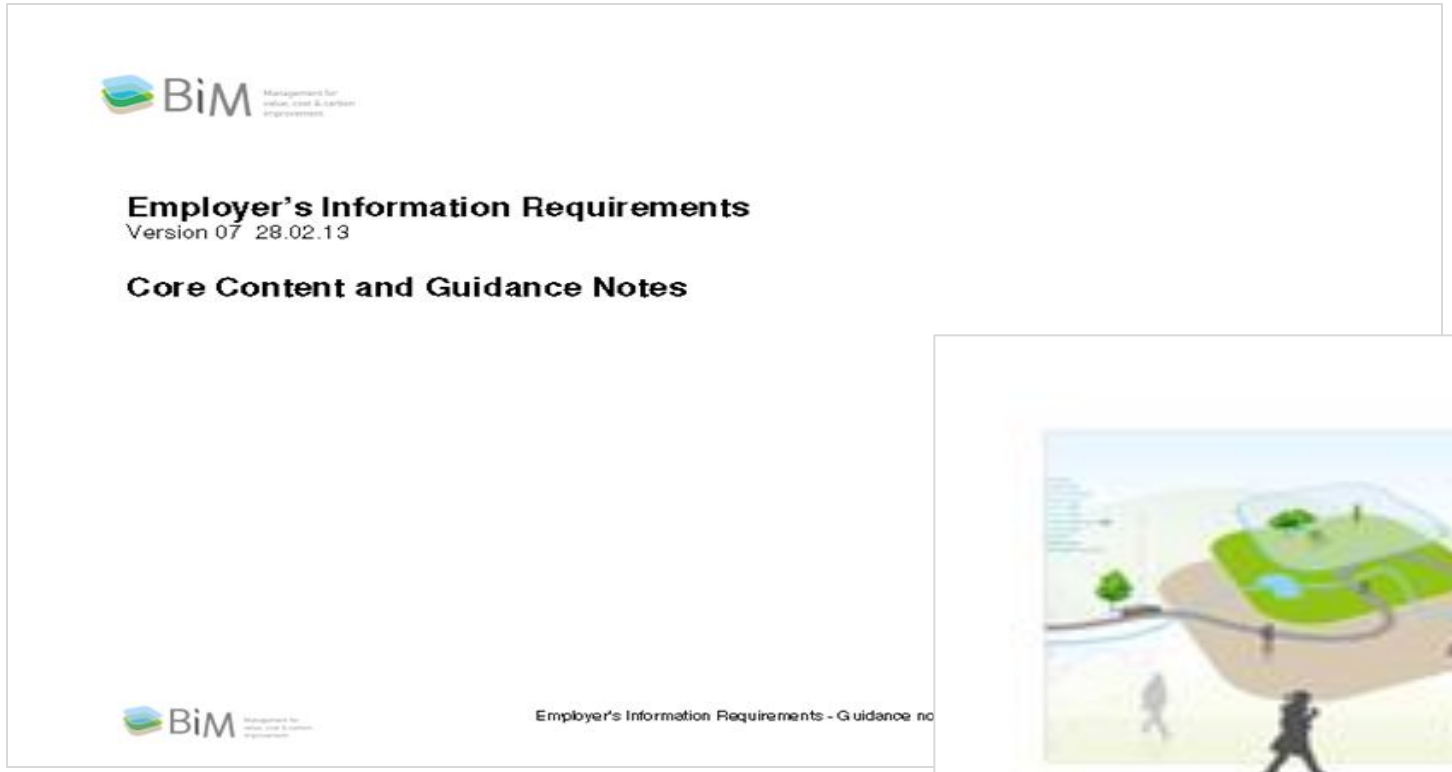
What sort of
terms / Information / Things
that we might define ?

Interactive excerise

EIR Subject Areas

Technical	Management	Commercial
Software Platforms Data Exchange Format Co-ordinates Level of Detail Training *Classification* *Naming*	Standards Roles and Responsibilities Planning the Work and Data Segregation Security Coordination and Clash Detection Process Collaboration Process Health and Safety and Construction Design Management Systems Performance Compliance Plan Delivery Strategy for Asset Information	Data drops and project deliverables Clients Strategic Purpose Defined BIM/Project Deliverables BIM-specific competence assessment

Employers Information Requirements



In What (usable) Formats

If possible the preferred route is to adopt open standards based Information Exchanges before significant investment is made both in time, learning and systems

Visualisations: Discipline IFC (or NWD) models

Data: Federated COBie

Documents: PDF or Office

Drawings: PDF or DWG/DGN

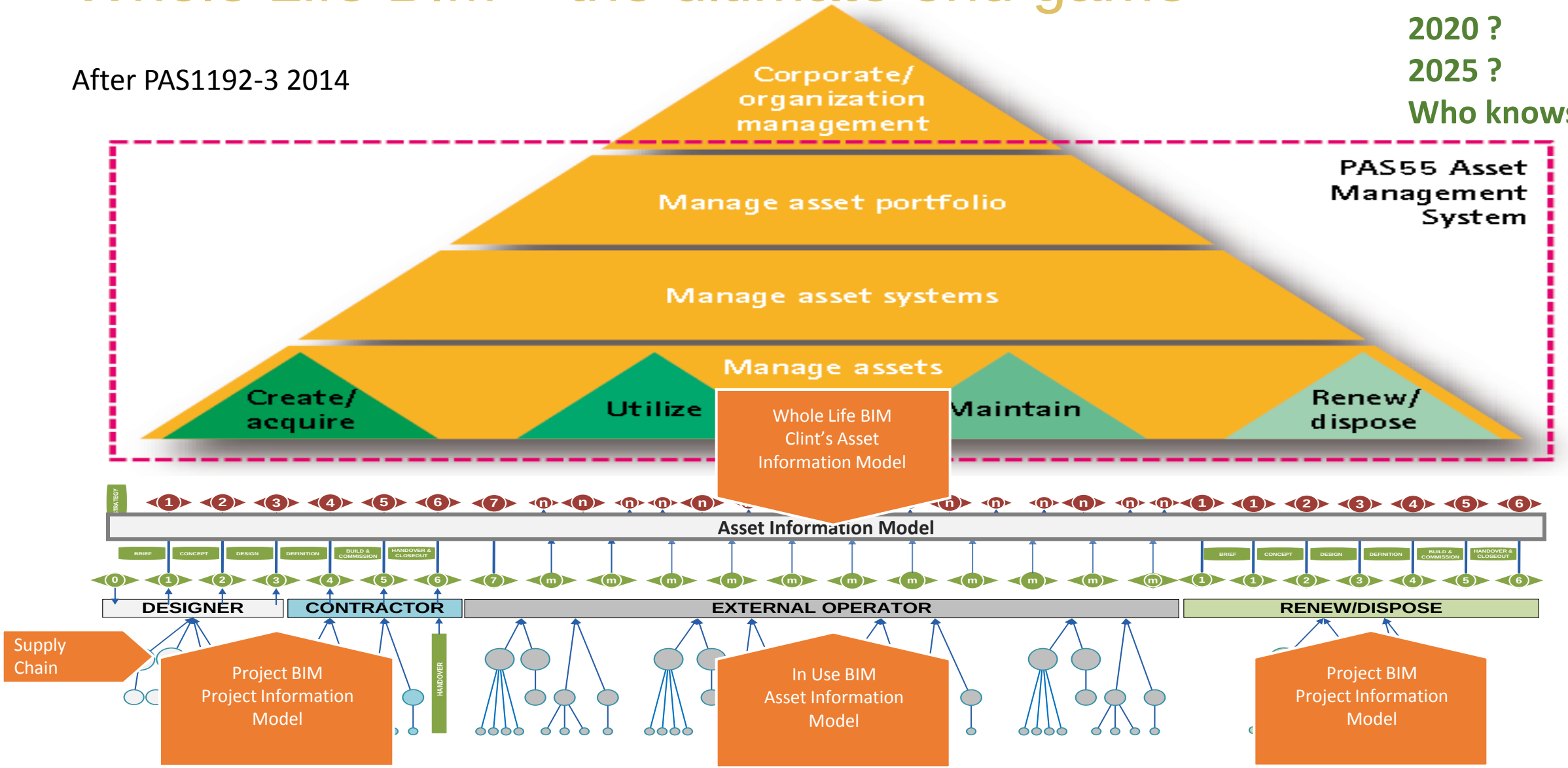
Native Model Files: stored and used purely as reference; updated as part of a PAS55/PAS1192-3 managed review process by suitably skilled professionals.

Keep it simple: Public Authorities rarely have model authoring skills

Whole Life BIM – the ultimate end game

2016 ?
2017 ?
2020 ?
2025 ?
Who knows……

After PAS1192-3 2014



Case Study

Llandysul School Employers Information Requirements (EIRs) Case Study

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Consortium of Local Authorities in Wales
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THE LLANDYSUL DESIGN PROCESS

Ground Floor

First Floor

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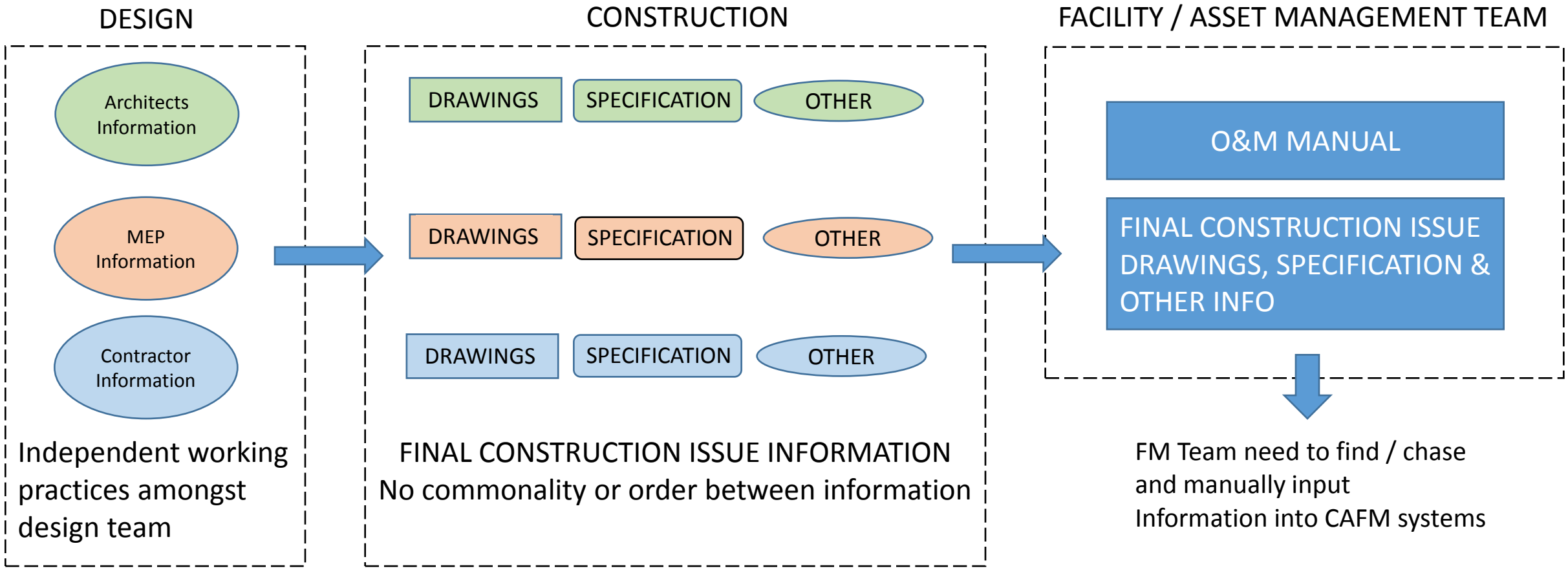
TRADITIONAL DATA TO FM



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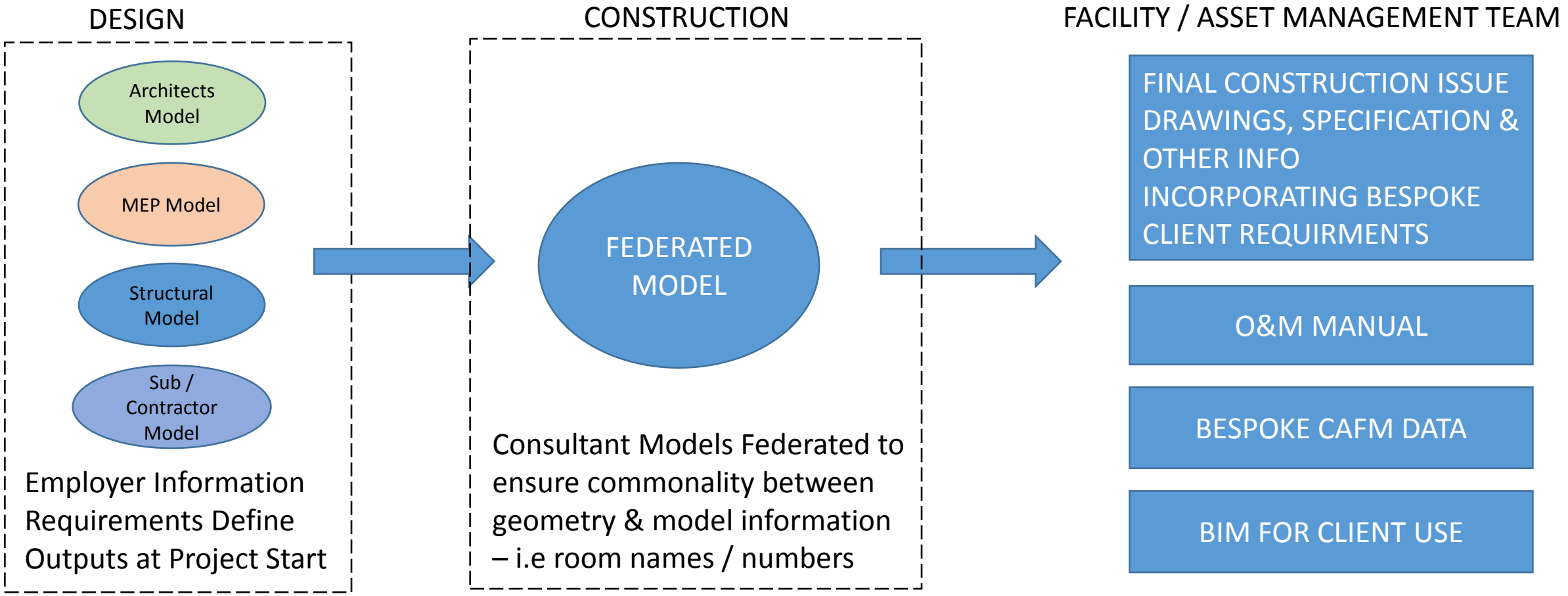
BIM DATA TO FM USING EIR'S



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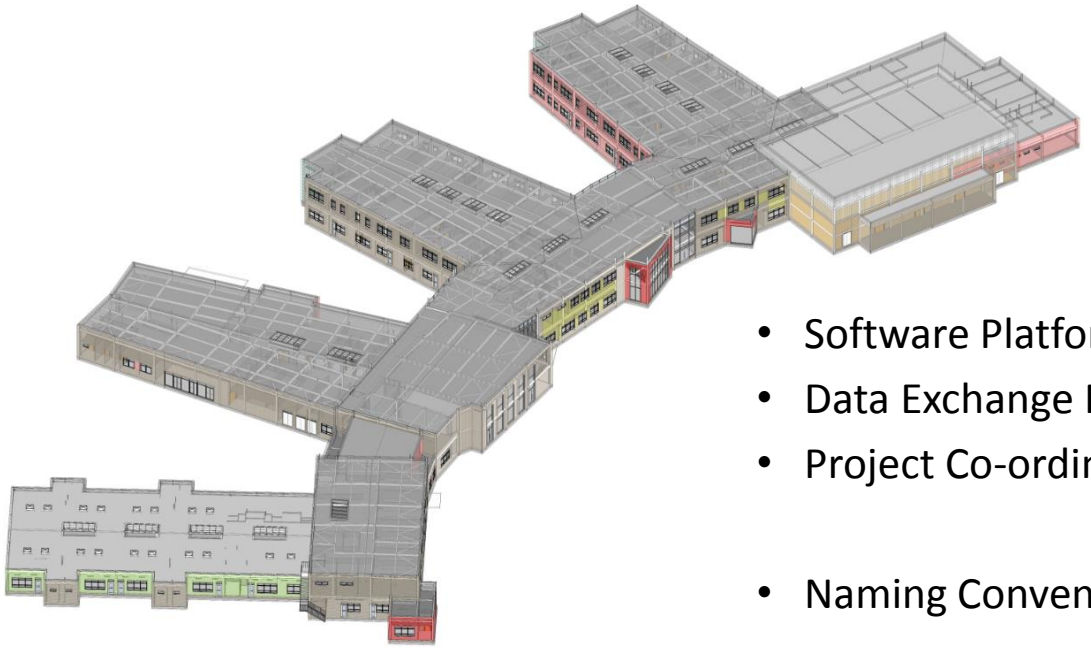
TECHNICAL REQUIREMENTS



- Software Platform – Autodesk Revit
- Data Exchange Format – Revit, IFC, NWC, DWF, PDF & XMLS
- Project Co-ordinates – Location to Ordinance Survey Origin
  - Rotation from True North
- Naming Convention - Building
  - Blocks
  - Department
  - Rooms

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DRAWING NAMING CONVENTION

E05107001-PDA-A-00–00–GA-(20)200-A

Project Specific Reference –	**E05107001 – Ceredigion Individual Building Reference**
Originator Code (Author) –	**PDA – Powell Dobson Architects** **AEC – Aecom** **CAM – Cambria**
Originator Discipline –	A – Architect M – Mechanical E – Electrical P – Plumbing S – Structures C – Contractor / Subcontractor
Volume / Zone / Model –	00 - denotes that the model covers several zones. Zones to be set by Aecom if required.
Level	**00 – Ground Floor** **01 – First Floor** **02 – Second Floor**
Drawing Type	**GA – General Arrangement** **DT – Detail** **BC – Building Control**
Drawing Number	(20)200
Revision	A and so forth

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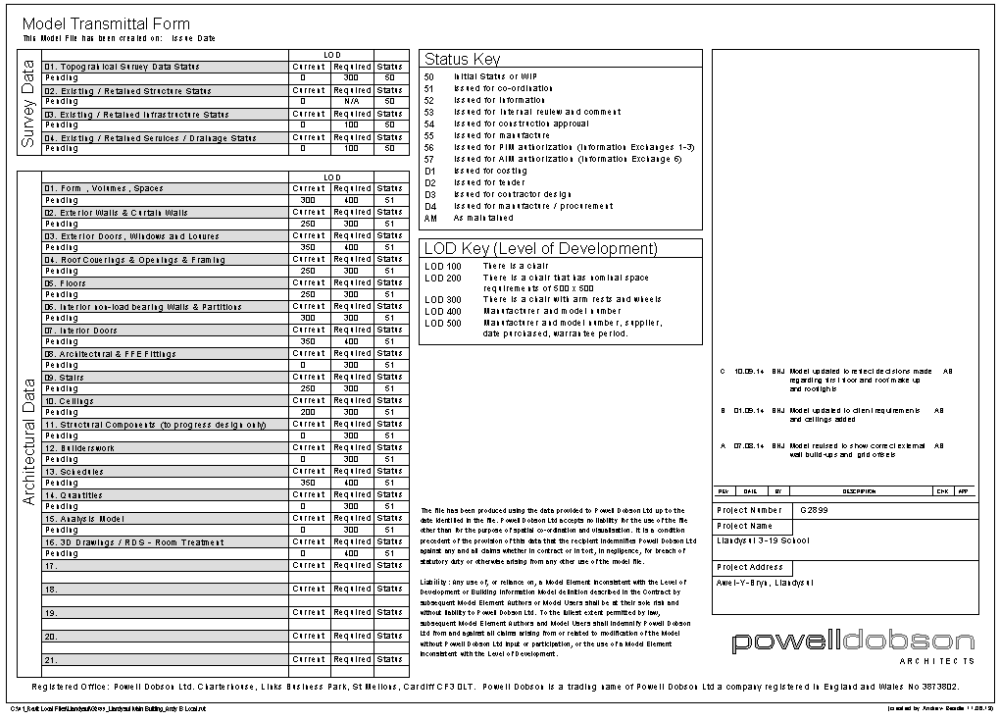
LEVEL OF DETAIL / DEVELOPMENT (LOD)



Model Transmittal Form

This Model File has been created on: Issue Date

Survey Data

	LOD		
01. Topographical Survey Data Status	Current	Required	Status
Pending	0	300	S0
02. Existing / Retained Structure Status	Current	Required	Status
Pending	0	N/A	S0
03. Existing / Retained Infrastructure Status	Current	Required	Status
Pending	0	100	S0
04. Existing / Retained Services / Drainage Status	Current	Required	Status
Pending	0	100	S0

Architectural Data

	LOD		
01. Form , Volumes , Spaces	Current	Required	Status
Pending	300	400	S1
02. Exterior Walls & Curtain Walls	Current	Required	Status
Pending	250	300	S1
03. Exterior Doors, Windows and Louvres	Current	Required	Status
Pending	350	400	S1
04. Roof Coverings & Openings & Framing	Current	Required	Status
Pending	250	300	S1
05. Floors	Current	Required	Status
Pending	250	300	S1
06. Interior non-load bearing Walls & Partitions	Current	Required	Status
Pending	300	300	S1
07. Interior Doors	Current	Required	Status
Pending	350	400	S1
08. Architectural & FFE Fittings	Current	Required	Status
Pending	0	300	S1
09. Stairs	Current	Required	Status
Pending	250	300	S1
10. Ceilings	Current	Required	Status
Pending	200	300	S1
11. Structural Components (to progress design only)	Current	Required	Status
Pending	0	300	S1
12. Builderswork	Current	Required	Status
Pending	0	300	S1
13. Schedules	Current	Required	Status
Pending	350	400	S1
14. Quantities	Current	Required	Status
Pending	0	300	S1
15. Analysis Model	Current	Required	Status
Pending	0	300	S1
16. 3D Drawings / RDS - Room Treatment	Current	Required	Status
Pending	0	400	S1
17.	Current	Required	Status
18.	Current	Required	Status
19.	Current	Required	Status
20.	Current	Required	Status
21.	Current	Required	Status

Status Key

S0	Initial Status or WIP
S1	Issued for co-ordination
S2	Issued for information
S3	Issued for internal review and comment
S4	Issued for construction approval
S5	Issued for manufacture
S6	Issued for PIM authorization (Information Exchanges 1-3)
S7	Issued for AIM authorization (Information Exchange 6)
D1	Issued for costing
D2	Issued for tender
D3	Issued for contractor design
D4	Issued for manufacture / procurement
AM	As maintained

LOD Key (Level of Development)

LOD 100	There is a chair
LOD 200	There is a chair that has nominal space requirements of 500 x 500
LOD 300	There is a chair with arm rests and wheels
LOD 400	Manufacturer and model number
LOD 500	Manufacturer and model number, supplier, date purchased, warrantee period.

C	10.09.14	BWJ	Model updated to reflect decisions made regarding first floor and roof make up and rooflights	AB	
B	01.09.14	BWJ	Model updated to client requirements and ceilings added	AB	
A	07.08.14	BWJ	Model revised to show correct external wall build-ups and grid offsets	AB	

PEN	DATE	BY	DESCRIPTION	CHK	APP

Project Number: G2899

Project Name: Llandysul 3-19 School

Project Address: Aber-Y-Bryn, Llandysul

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- LOD 100 – Placeholder
- LOD 200 – Basic Geometry
- LOD 300 – Detailed Geometry
- LOD 400 – Actual Geometry & Description
- LOD 500 – As above with detailed embedded information – i.e. Manufacturer, Warrantee period, date purchased.

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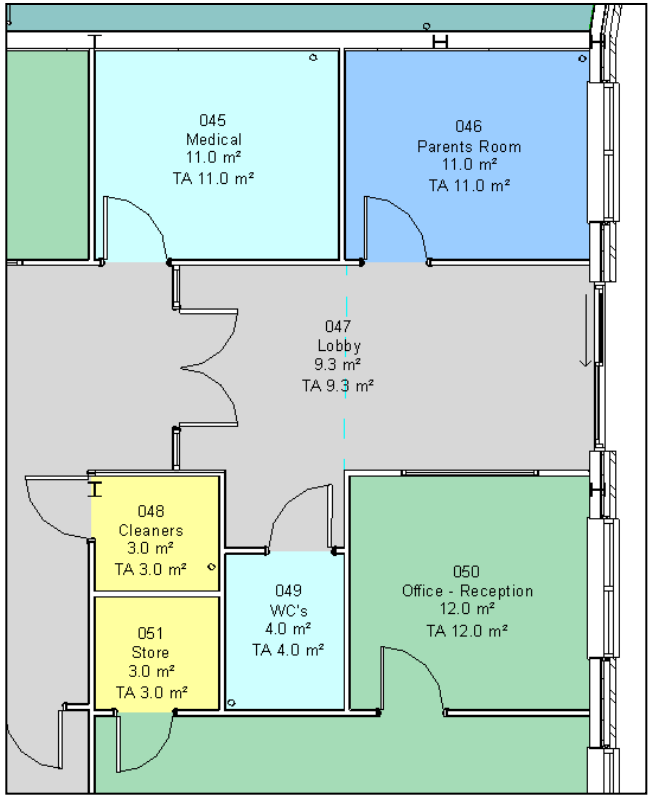
BIM to CIPFA Asset Manager



BIM Room Data
(300 rooms)

/Rooms/row/Internal_Area	/Rooms/row/Length	/Rooms/row/Local_Room	/Rooms/row/Room_Ref	/Rooms/row/Room_Type	/Rooms/row/Room_Use
15.1 m²	Null	Null	0/001	Circulation	Education
5.3 m²	Null	Null	0/002	Toilets	Education
24.0 m²	Null	Null	0/003	Learning Resource Areas	Education
75.0 m²	Null	Null	0/004	Basic Teaching	Education
75.0 m²	Null	Null	0/005	Basic Teaching	Education
5.5 m²	Null	Null	0/006	Storage - teaching	Education
5.5 m²	Null	Null	0/007	Toilets	Education
11.5 m²	Null	Null	0/008	Toilets	Education
3.8 m²	Null	Null	0/009	Toilets	Education
9.6 m²	Null	Null	0/010	Catering Facilities	Education
78.0 m²	Null	Null	0/011	Basic Teaching	Education
22.6 m²	Null	Null	0/012	Toilets	Education
56.8 m²	Null	Null	0/013	Basic Teaching	Education
23.0 m²	Null	Null	0/014	Toilets	Education
57.2 m²	Null	Null	0/015	Basic Teaching	Education
57.2 m²	Null	Null	0/016	Basic Teaching	Education
23.0 m²	Null	Null	0/017	Toilets	Education
57.0 m²	Null	Null	0/018	Basic Teaching	Education
57.0 m²	Null	Null	0/019	Basic Teaching	Education
23.0 m²	Null	Null	0/020	Toilets	Education
57.2 m²	Null	Null	0/021	Basic Teaching	Education
57.2 m²	Null	Null	0/022	Basic Teaching	Education
23.0 m²	Null	Null	0/023	Toilets	Education
56.8 m²	Null	Null	0/024	Basic Teaching	Education
2.2 m²	Null	Null	0/025	Circulation	Education
20.8 m²	Null	Null	0/026	Toilets	Education
2.1 m²	Null	Null	0/027	Toilets	Education
5.0 m²	Null	Null	0/028	Toilets	Education
1.6 m²	Null	Null	0/029	Circulation	Education
20.7 m²	Null	Null	0/030	Toilets	Education
2.3 m²	Null	Null	0/031	Toilets	Education
2.2 m²	Null	Null	0/032	Circulation	Education
7.5 m²	Null	Null	0/033	Storage - teaching	Education
1.1 m²	Null	Null	0/034	Plant	Education
1.4 m²	Null	Null	0/035	Plant	Education

Asset Manager Core Data
(60 fields x 300 rooms = 18,000 cells automatically filled)

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WHERE TO START?

- What FM / AM Systems do I currently have in place?
- What data does this system use?
- How can this benefit from BIM data short term?
- How can this system be developed in the future?
- How do I track changes to a building?
- Think Evolution Not Overnight Change
- CLAW Toolkit

BIM – All Wales BIM Toolkit

Developed for CLAW members…..

PAS 1192 -2 compliant

CIC compliant

OJEU compliant – new EU BIM procurement directive

SME friendly

Future proof and fit for PAS 55 and PAS 1192 - 3

Digitally Built Wales

DILIGENTIA

Digital Built Britain

ADEILADU ARBENIGRWYDD YNG NGHYMRU

CONSTRUCTING EXCELLENCE IN WALES