

BIM – the UK experience



Richard Waterhouse Chief Executive

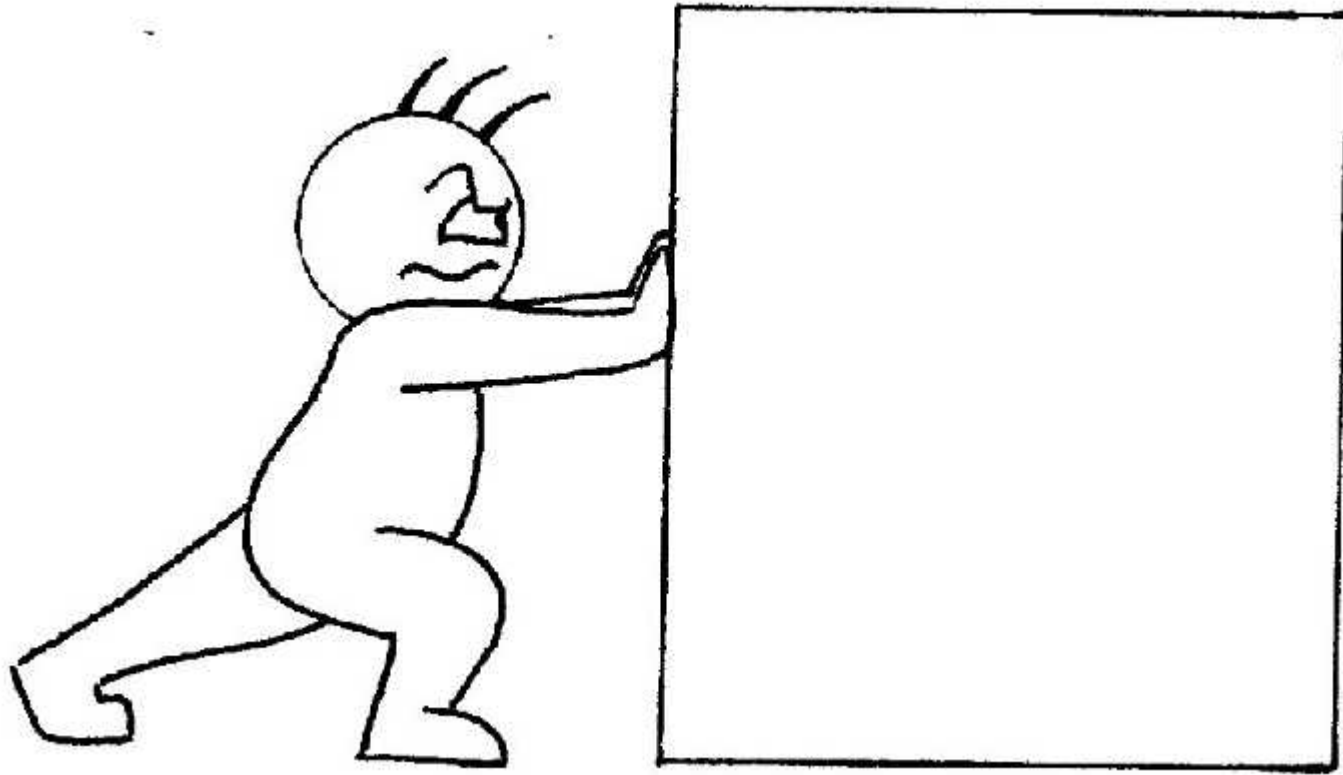


A digital transformation



The problem....

Irresistible force meets immovable object







Problems to be solved:

10% of construction claims caused by incorrect or incomplete data

£2bn of construction re-work each year

Data re-created multiple times with process breaks with over-design at many stages

UK Government Strategy

UK Government Strategy

"This Government's four year strategy for BIM implementation will change the dynamics and behaviours of the construction supply chain, unlocking new, more efficient and collaborative ways of working. This whole sector adoption of BIM will put us at the vanguard of a new digital construction era and position the UK to become the world leaders in BIM."

Francis Maude
Minister for the Cabinet Office



BIMTaskGroup.org

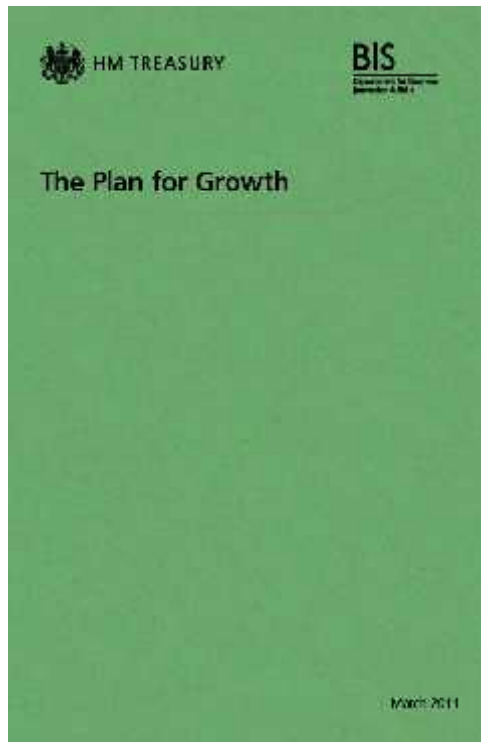
UK Government Strategy



UK Government Strategy



UK Government Strategy



Plan for Growth
March 2011



Low Carbon Action Plan
June 2011



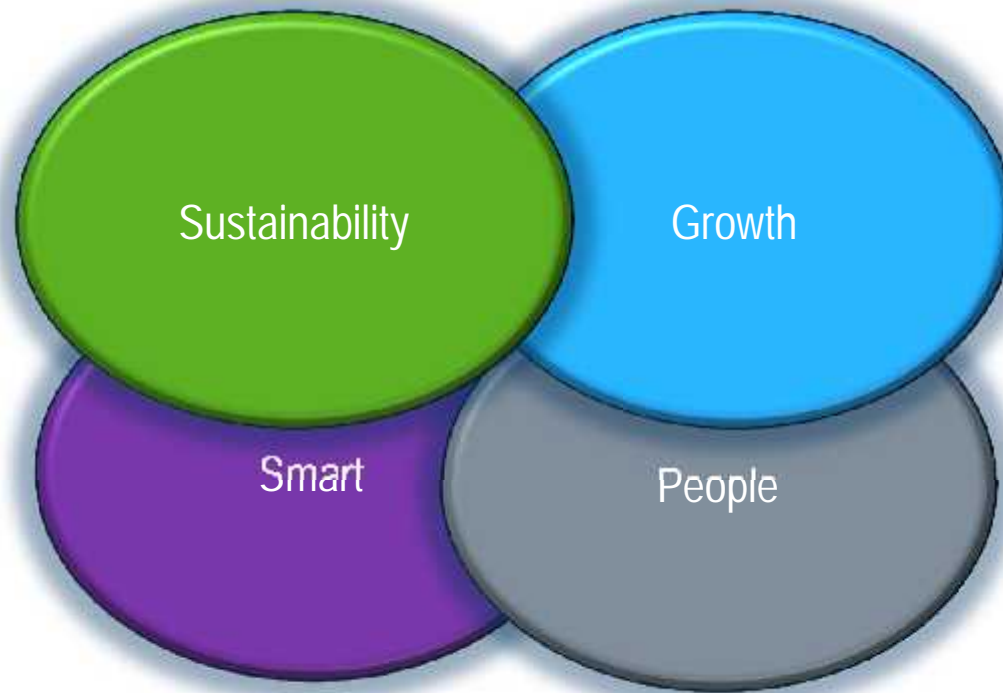
BIM Strategy
June 2011

Simple objectives and requirements:

- 3D collaborative environment by 2016
- COBie output at key stages including handover
- 20% capital cost reduction for construction phase

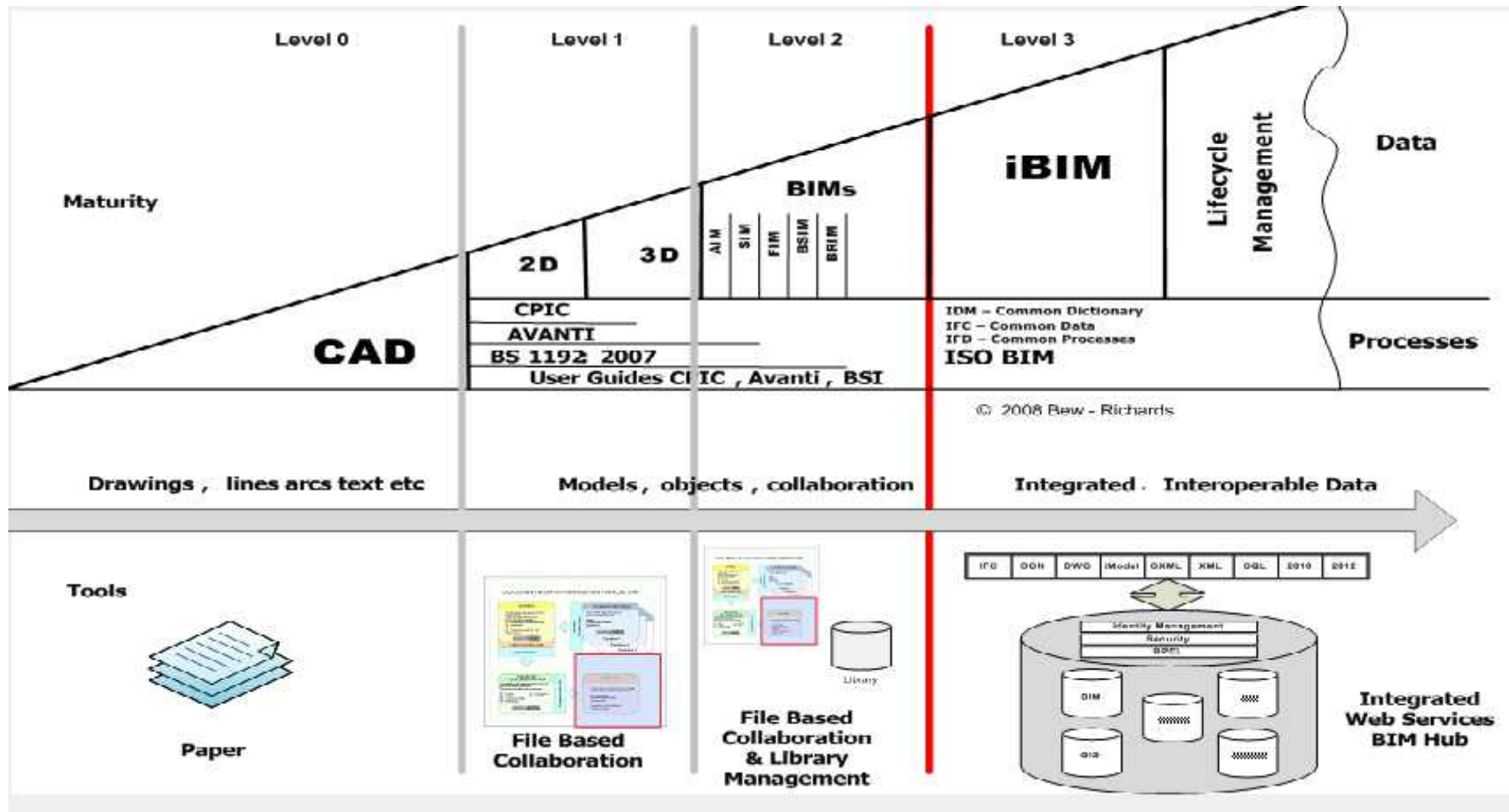
This could only be done with major industry change

Changing an industry



Supporting change

The Bew:Richards wedge



Resources – the BIM standards set

PAS 1192-2 (2013) Information during capital phase

PAS 1192-3 (2014) Information during operational phase

BS 1192- 4 (2014) COBie

BIM Protocol

Government Soft Landings

Classification

Digital Plans of Work

Resources – Standards

BS8541-1 to BS8541-4

Library objects for architecture, engineering and construction

BS8541-5 Assemblies

Draft in July

BS8541-6 Product declarations

Draft in August

Managing the whole process

BIM : BAM : BOOM

Savings have always been targeted at design and construction costs



Design
1

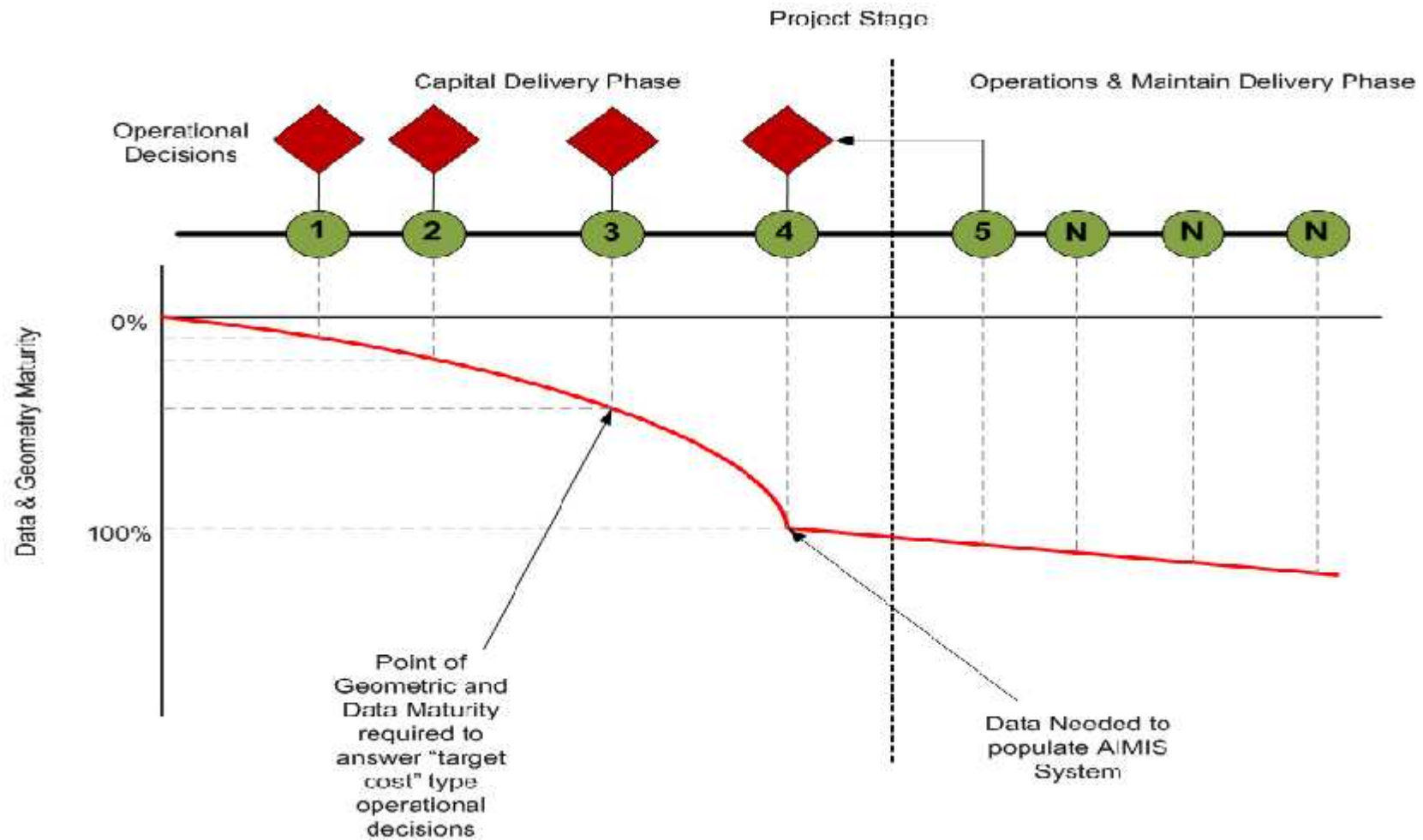


Build
10



Operate
100

COBie UK 2014



COBie UK 2014

COBie UK 2014 example markup [Read Only] [Compatibility Mode] Microsoft Excel

File Home Insert Page Layout Formulas Data Review View

Clipboard Font Alignment Number Styles Cells Layout

Basic Wall:Generic Ext - 150mm

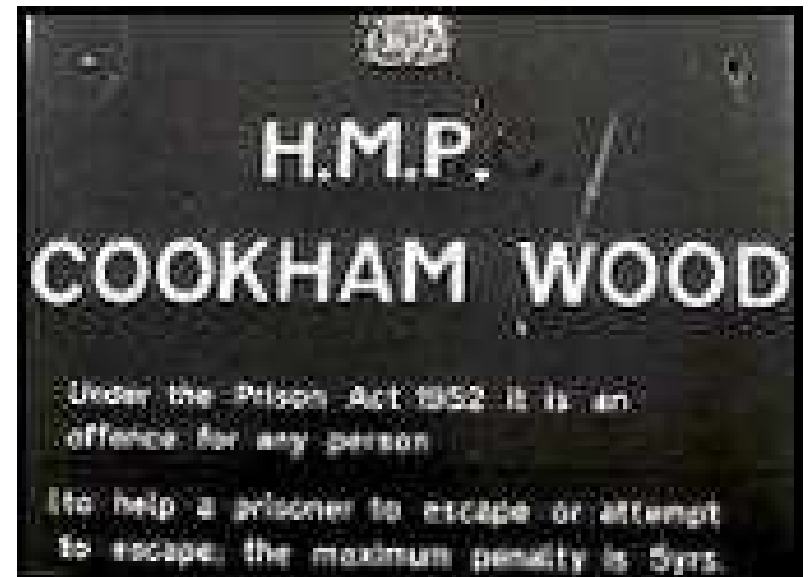
| ID | Name | Created By | Created On | Type Name | Space | Description | Ext System |
|----|--------------------------|-----------------|-----------------|------------|--------|--------------------------|----------------------------------|
| 1 | TFT Monitor | TFT Monitor | TFT Monitor | 211812 | 10-01A | TFT Monitor | Autodesk Revit Architecture 2014 |
| 2 | Mirror | Mirror | Mirror | 211825 | 10-01A | Mirror | Autodesk Revit Architecture 2014 |
| 3 | TFT Monitor | TFT Monitor | TFT Monitor | 211790 | 10-02B | TFT Monitor | Autodesk Revit Architecture 2014 |
| 4 | Mirror | Mirror | Mirror | 211826 | 10-02B | Mirror | Autodesk Revit Architecture 2014 |
| 5 | Generic Int. D Cell Door | 790 x 2110mm | 3,790 x 2110mm | 3,21183 | 10-02B | Generic Int. D Cell Door | Autodesk Revit Architecture 2014 |
| 6 | Generic Int. D Cell Door | 790 x 2110mm | 3,790 x 2110mm | 3,21183 | 10-01A | Generic Int. D Cell Door | Autodesk Revit Architecture 2014 |
| 7 | Plumbing SWP | Plumbing SWP | Plumbing SWP | 211824 | 10-003 | Plumbing SWP | Autodesk Revit Architecture 2014 |
| 8 | WC Pan | 510 x 510mm | 510 x 510mm | 211807 | 10-01A | WC Pan | Autodesk Revit Architecture 2014 |
| 9 | Wallgate | AL3180 Basin | 1700 x 900 | 1700 x 900 | 211808 | Wallgate | Autodesk Revit Architecture 2014 |
| 10 | Cell Bed family | Cell Bed family | Cell Bed family | 211785 | 10-01A | Cell Bed family | Autodesk Revit Architecture 2014 |
| 11 | Cell Desk | Desk | Whitewood | 211787 | 10-01A | Cell Desk | Autodesk Revit Architecture 2014 |
| 12 | Cell Locker | Cell Locker | Cell Locker | 211789 | 10-01A | Cell Locker | Autodesk Revit Architecture 2014 |
| 13 | Safer Seat | Safer Seat | Safer Seat | 211791 | 10-01A | Safer Seat | Autodesk Revit Architecture 2014 |
| 14 | Safer Seat | Safer Seat | Safer Seat | 211803 | 10-02B | Safer Seat | Autodesk Revit Architecture 2014 |
| 15 | Cell Bed family | Cell Bed family | Cell Bed family | 211801 | 10-02B | Cell Bed family | Autodesk Revit Architecture 2014 |
| 16 | Cell Desk | Desk | Whitewood | 211805 | 10-02B | Cell Desk | Autodesk Revit Architecture 2014 |
| 17 | Cell Locker | Cell Locker | Cell Locker | 211809 | 10-02B | Cell Locker | Autodesk Revit Architecture 2014 |
| 18 | Basic Wall | Generic Ext | - 150mm | 211793 | 10-01A | Basic Wall | Autodesk Revit Architecture 2014 |
| 19 | Basic Wall | Generic Ext | - 150mm | 211793 | 10-01A | Basic Wall | Autodesk Revit Architecture 2014 |
| 20 | Basic Wall | Generic Ext | - 150mm | 211791 | 10-01A | Basic Wall | Autodesk Revit Architecture 2014 |
| 21 | Basic Wall | Generic Ext | - 150mm | 211795 | 10-01A | Basic Wall | Autodesk Revit Architecture 2014 |

Autodesk Revit Architecture 2014



So how are we doing?

Pilot projects



Pilot projects



- Implementation Plan
- EIR
- Tender Documents
- Scoring Process
- Framework Training
- Framework Support



Pilot projects

Currently over £1bn of live projects

Needs to be £20bn in less than two years...

We need to change the industry and that change will also be cultural....

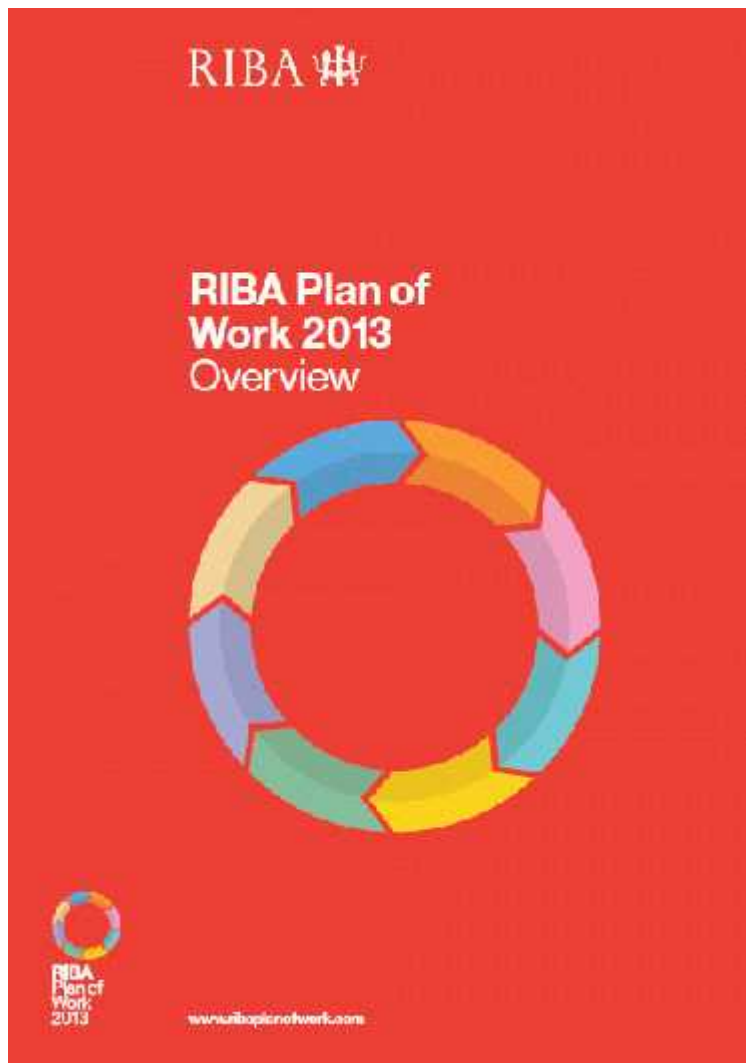
Changing relationships - work streams

Project bank accounts

Project insurance and contracts

Revised plan of works

RIBA Plan of Work



RIBA Plan of Work



RIBA

The RIBA Plan of Work sets out the phases of building, engineering, services, maintenance, operation and repair. It is a framework for a number of key stages. The content of stages may vary or overlap to suit specific project requirements. The RIBA Plan of Work can be used as a guide to help you to define the sequence of detailed professional services contracts and building contracts.

www.ribaplanofwork.com

| | 0 | 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 |
| Core Objective | Identify client's business case and Strategic Brief and define conceptual requirements. | Develop Project Objectives, identify Strategic Objectives of Project, Outcomes, Sustainability Aspirations, Program Objectives, other parameters of conceptual and resolve initial Project Brief and undertake Feasibility Studies and review of Site Information. | Review Concept Design and integrate proposals for a range of design building services systems, outline specifications and preliminary Client Information alongside relevant information and Project Strategy in accordance with Design Programme. Agree alternative list of and issue final Project Brief. | Review developed design and integrate proposals for a range of design building services systems, outline specifications, Client Information and Project Strategy in accordance with Design Programme. | Prepare Technical Design to incorporate with Design Responsibility Matrix and Project Strategy to include architectural, structure and building services information, specialist subcontractor design and specifications in accordance with Design Programme. | Obtain construction and works Construction in accordance with Construction Programme in accordance with Design Programme. | Handover of building and commissioning of Building Contract. | Performance of building in accordance with Schedule of Services. |
| Programme of Work | Initial constraints for programming the programme. | Develop Project Milestones and Constraints, list and resolve according to project team. | The programme of work does not fundamentally alter the progression of the design or the construction programme of a project. However, information in this stage will contribute to the construction programme and Building Contract. A complete RIBA Plan of Work 2013 will set out the specific building and programme activities in detail in relation to the chosen programme route. | | | Administer the building contract, including sign-off for the programme and release of project. | Coordinate administration of Building Contract. | |
| Programme of Work | Establish Project Programme. | Develop Project Programme. | The programme route may dictate the Project Programme and may result in certain stages overlapping or being undertaken concurrently. A complete RIBA Plan of Work 2013 will set out the specific stage dates and detailed programme details. | | | | | |
| Programme of Work | Pre-application discussions. | Pre-application discussions. | Planning applications are typically made during the design process. A complete RIBA Plan of Work 2013 will identify when the planning application is to be made. | | | | | |
| Supported Key Support Tasks | Review feedback from previous projects. | Engage Handover Strategy in RIBA Assessments, Design Responsibility Matrix and Information Exchange and prepare Project Information Memorandum (PIM) detailing feedback and communication strategies to be implemented during the project. | Review Sustainability Strategy, Maintenance and Operational Strategy and other Handover Strategy and Risk Assessments. Undertake third party consultation as required and carry out Research and Development activities. Review and update Project Execution Plan. | Review and update Sustainability, Maintenance and Operational Strategy and Risk Assessments. Undertake third party consultation as required and carry out Research and Development activities. Review and update Project Execution Plan, including Change Control Procedures. | Review and update Sustainability, Maintenance and Operational Strategy and Risk Assessments. Prepare and submit Building Regulations submission and any other third party submissions as required, including: Planning and update Project Execution Plan. | Review and update Sustainability Strategy and Information Exchange and other information required for commissioning, testing handover, asset management, information exchange and maintenance and ongoing compliance of project information. | Carry out activities listed in Handover Strategy including Feedback for the client and future projects. Updating of Project Information as required. | Conduct activities listed in Handover Strategy including Post-occupancy Evaluation, review of Project Performance, Project Outcomes and Research and Development aspects. (Updating of Project Information as required in response to ongoing client feedback and the end of the building's life). |
| Sustainability Checkpoints | Sustainability Checkpoint – 0 | Sustainability Checkpoint – 1 | Sustainability Checkpoint – 2 | Sustainability Checkpoint – 3 | Sustainability Checkpoint – 4 | Sustainability Checkpoint – 5 | Sustainability Checkpoint – 6 | Sustainability Checkpoint – 7 |
| Information Exchange | Strategic Brief. | Initial Project Brief. | Concept Design, including outline structural and building services design, approved Project Strategy, preliminary Client Information and final Project Brief. | Developed Design, including environmental and structural, architectural, building services design and updated Client Information. | Completed Technical Design of the project. | As-constructed information. | Updated As-constructed information. | "As-constructed" information updates in response to ongoing client feedback and maintenance or operational developments. |
| UK Government Information Exchange | Not required. | Required. | Required. | Required. | Not required. | Not required. | Required. | Not required. |

* Details can vary to meet specific project or product requirements. RIBA Plan of Work 2013 information is intended to be used as a guide to help you to define the sequence of detailed professional services contracts and building contracts.



RIBA Plan of Work

| Design Responsibility Matrix | | | | | | |
|--|------------------------|-----------------|----------------------|------------------------|-----------------|-----------------------------------|
| | 2 - Concept Design | | | 3 - Developed Design | | |
| Aspect of design | Design team | | | Design team | | |
| | Design responsibility | Level of design | Information exchange | Design responsibility | Level of design | Information exchange |
| 15 PREPARATORY ELEMENTS | | | | | | |
| 20 WINDOW/FENESTRATION STRUCTURAL ELEMENTS | | | | | | |
| 25 WALL AND BARRIER ELEMENTS | | | | | | |
| 30 ROOF, FLOOR AND PAVING ELEMENTS | | | | | | |
| 35 FIXED ACCESS, TUNNEL, SHAFT, VESSEL AND TOWER ELEMENTS | | | | | | |
| 40 SIGNAGE AND FITTINGS, FURNISHINGS AND EQUIPMENT (FF&E) ELEMENTS | | | | | | |
| 40-10 Signage | | | | | | |
| 40-10-30 External signage | L&J Landscapes | Outline | 1:100 | L&J Landscapes | Performance | 1:100 |
| 40-10-40 Internal signage | City Centre Architects | Outline | 1:100 | City Centre Architects | Full (generic) | 1:100 |
| 40-10-85 Signage power supply and protection | Wire & Free Ltd | Outline | 1:100 | Wire & Free Ltd | Performance | 1:50 |
| 40-15 Fixings, furnishings and equipment (FF&E) | City Centre Architects | Outline | 1:100 | City Centre Architects | Outline | 1:20 1:10 1:5 1:2 1:1 |
| 45 FLORA AND FAUNA ELEMENTS | | | | | | |
| 50 DISPOSAL ELEMENTS | | | | | | |
| 55 PEOPLE SUPPLY ELEMENTS | | | | | | |
| 60 HEATING, COOLING AND REFRIGERATION ELEMENTS | | | | | | |
| 65 VENTILATION AND AIR CONDITIONING ELEMENTS | | | | | | |
| 70 ELECTRICAL ELEMENTS | | | | | | |
| 75 COMMUNICATIONS, SECURITY, SAFETY, | | | | | | |

Global recognition

‘The UK programme based on the BIS BIM Strategy is currently the most ambitious and advanced centrally driven programme in the world.’

Patrick MacLeamy
Chief Executive Officer of HOK

Global recognition

‘The understanding and endorsement of building information modelling in the United Kingdom construction industry is as rapid as it is impressive...BIM is now key to the Construction Strategy and has catapulted UK construction to the forefront in BIM standards and adoption worldwide’

Phillip G. Bernstein FAIA RIBA

Vice President, Autodesk Strategic Industry Relations



BIM Level 3

Government Construction Strategy 2025



Industrial Strategy
July 2013



Digital Built Britain

Government Construction Strategy 2025

Lower costs

33%

reduction in the initial cost of construction and the whole life cost of built assets

Faster delivery

50%

reduction in the overall time, from inception to completion, for newbuild and refurbished assets

Lower emissions

50%

reduction in greenhouse gas emissions in the built environment

Improvement in exports

50%

reduction in the trade gap between total exports and total imports for construction products and materials

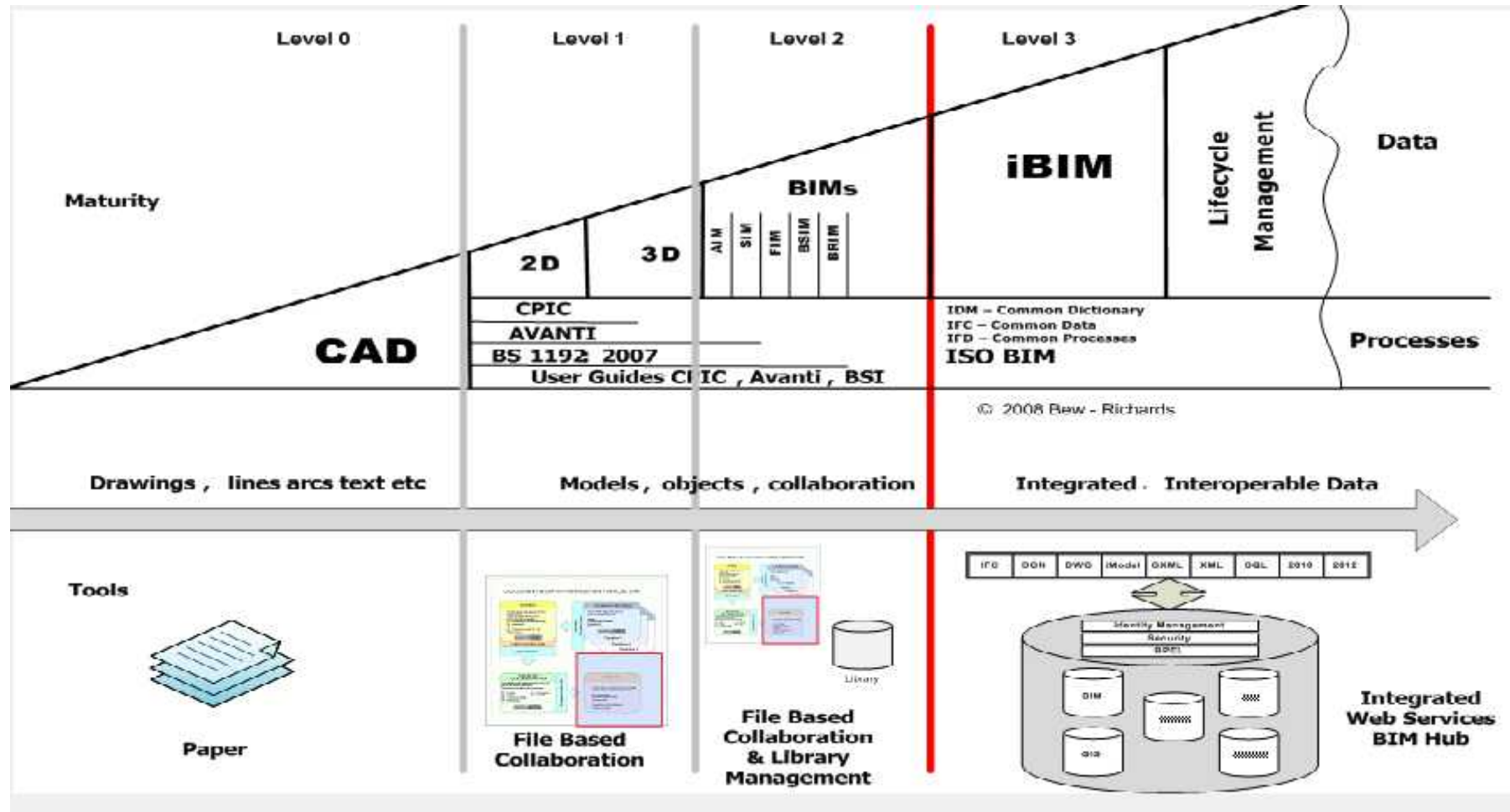
The problem



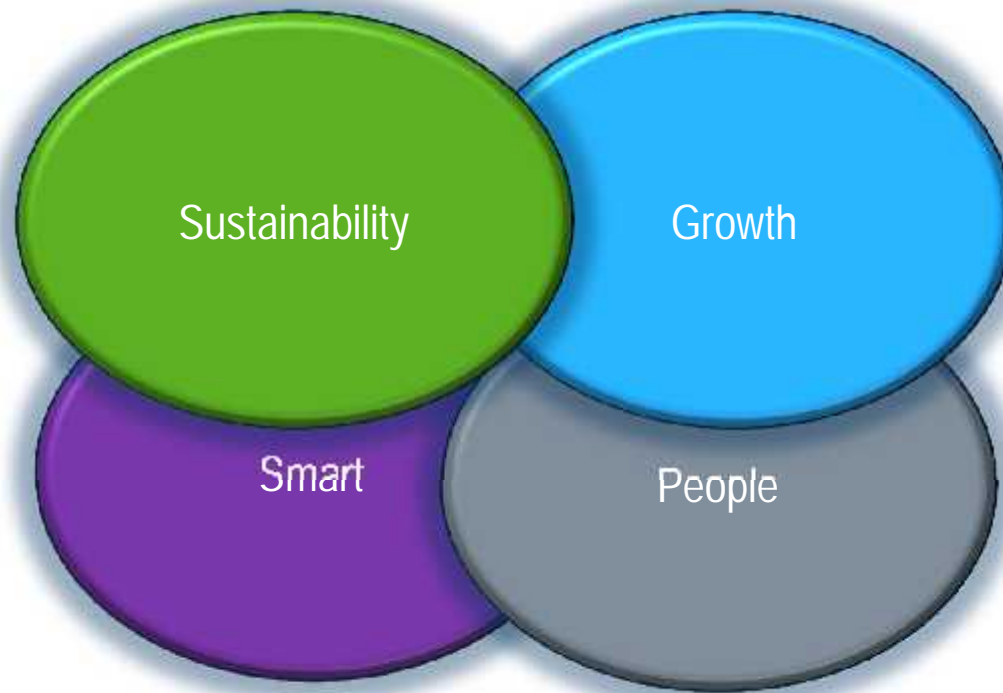
The solution



Changing an industry – level 3



Changing an industry – level 3



Summary

Summary



Digital Built Britain



 HM Government

Summary



Summary

By April 2016, all Government projects will use BIM

There are ambitious targets for 2025 on time, cost, carbon and exports - **revolution** not evolution

Structural change will occur

Global standardisation is happening

Adapt and adopt or be part of history

Thank you

www.theNBS.com

