

**CitA**  
BIM GATHERING



# Building Capabilities in Complex Environments

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CitA BIM Gathering 2017, Croke Park, November 23rd & 24th, 2017



## An Exploratory Investigation into the Use of BIM during the Construction Phase of a Public Private Partnership

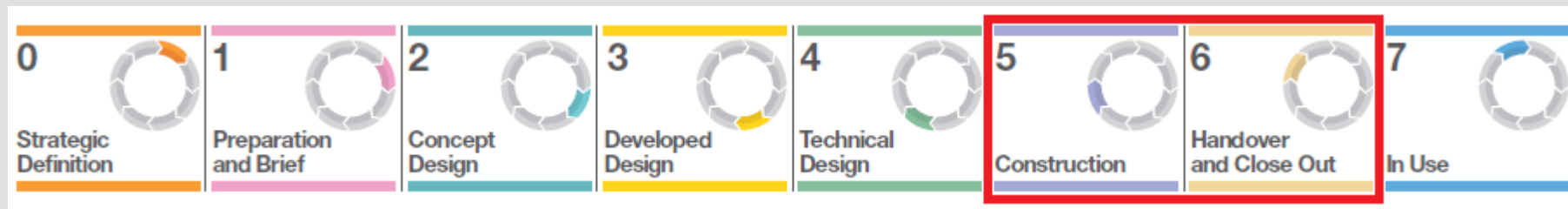


- **Presentation Overview**

- Background to Research
- Case Study: Comeragh College PPP
- The Theory: BIM for Construction Management
- Methodology: BAM's Site Management Team
- Research Findings: BIM for CM; Implementation; FM; PPPs
- Further BIM Developments & Research



- **Background to Research**
- **Brook Cameron:**
  - BSc (Hons) Construction Management & Engineering student at WIT (2012-16)
  - **Industrial Placement** experience with BAM on Comeragh College PPP
  - Final year undergraduate **Dissertation** focussed on experience of using BIM on site
  - Currently **Senior Site Engineer** with BAM Contractors
- **To ascertain the impact of BIM on a PPP project:**
  - During the construction phase of the project
  - In the handover of information from construction to O&M



Source:  
RIBA (2013)



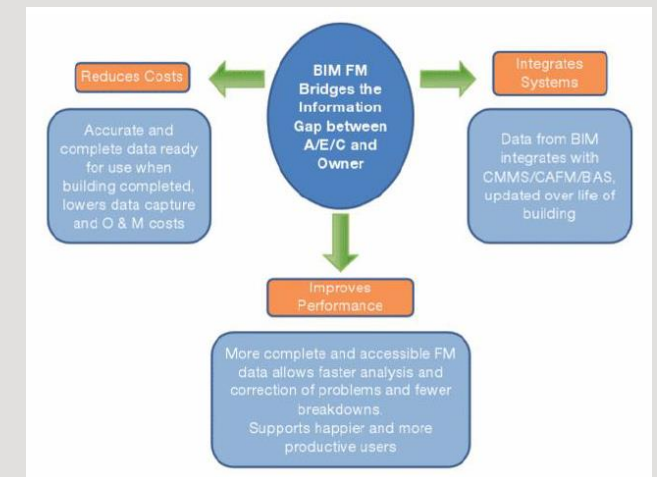
## • Case Study: Comeragh College PPP

- Part of *Schools Bundle 4*
- 6,300m<sup>2</sup> building: teaching, sports & catering facilities
- First public tender to include level 2 BIM mandate
- Contract awarded to BAM PPP in late 2014
- Construction period: January 2015 to March 2016
- Hybrid structure...pre-cast & in-situ concrete and steel
- 25 year Operation & Maintenance under PPP
- Specific focus upon main contractor's perspective on BIM





- **The Theory...**
- **Site BIM for Construction Management is relatively under-developed**
- Problems with communication and information exchange persist on site
- Potential for BIM in a number of areas:
  - Improved, real-time communications & work-flows
  - 4D Scheduling for safety, logistics, planning etc.
  - Visualization and Augmented Reality
  - Coordination and Clash Detection
  - Bridge the information gap between construction and O&M



Source: IFMA (2013)

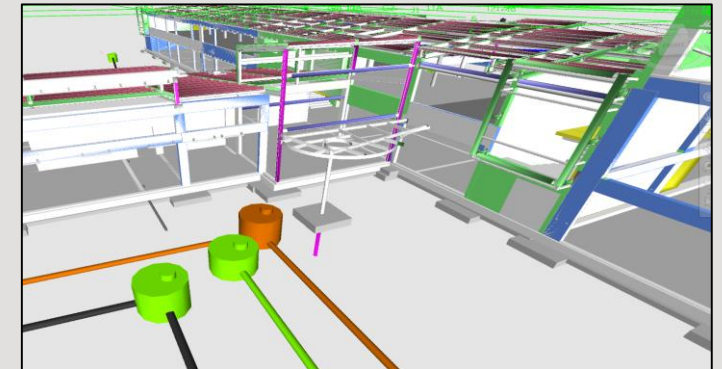
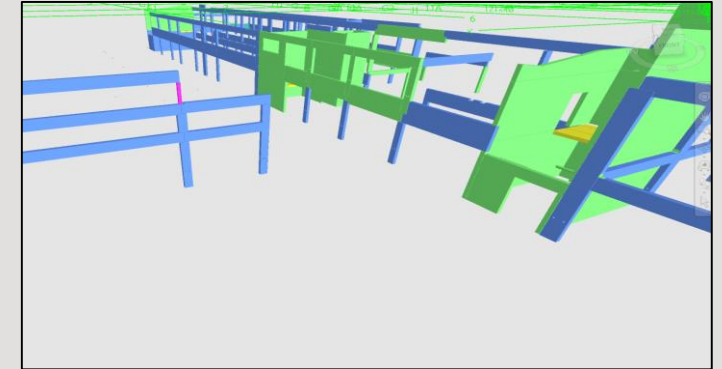


- **Methodology: Case Study of BAM's Site Team**
- Semi-structured interviews with:
  - Project Manager
  - Site Foreman
  - Senior Engineer
  - Site Engineer
  - BIM Coordinator
- Limitations of methodological approach
  - Focus on BAM's site team and construction phase only
  - Interviewer also member of site team = potential bias!
  - Interviewees first time using BIM





- **BIM for Construction Management**
- Cloud-based CDE using Autodesk BIM 360 & iPads
- Recognition of BIM for *information management*
- Instant access to information whilst on site... *“the right information in the right place at the right time”*
- Improved communications internally and externally
- Improved RFIs - issues remain in getting responses!
- Greater accountability in completing checklists
- Clash detection for services and precast







## • Implementation Issues

### • Key Enablers

- Clearly defined BIM strategy
- Having the right mobile technology in place
- Strong leadership and support from PM

### • Still in early stages of BIM implementation

- Lack of knowledge across supply chain
- Fear of change!
- Costs associated with implementation
- Confidence in information

### All projects are fully supported by BIM by 2020

	3D -Visualisation -Coordination -Engineering	Model based -QTO -Estimation -Specifications -Verifications	-Handover As Build to O&M -Deploy As Maintained	Model based -4D planning -Progress monitoring -Validation	Simulations to optimize -Cash flow -Performance -Logistics	Full Integrated BIM Support
2020	100	100	100	100	100	100
2019	100	100	100	100	90	90
2018	100	100	100	90	80	70
2017	100	100	90	80	70	60
2016	100	90	80	70	60	50
2015	100	60	50	40	30	20
2014	50	30	30	20	10	10
2013	20	10	10	5	5	5



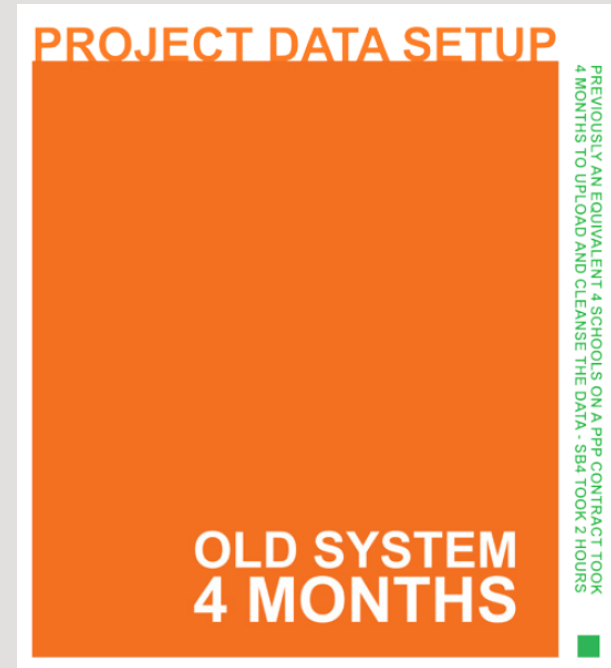


## • Handover to FM

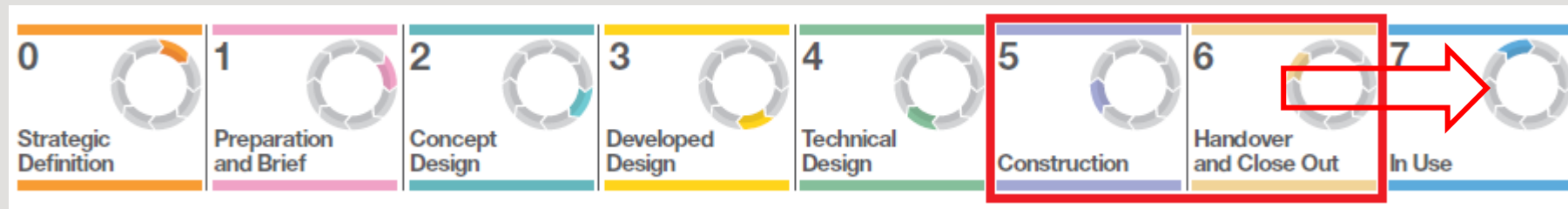
- Overcome problems of traditional O&M manual
- Expedited handover of useful FM information
- Delivery of accurate Asset Information Model
- Significant time and cost savings

## • Implications for PPPs

- Strategic alignment of BIM and PPP process
- Clear platform for future proofing (25+ years)
- Greater certainty = less risk



**Source:**  
BAM (2016)



**Source:**  
RIBA (2013)

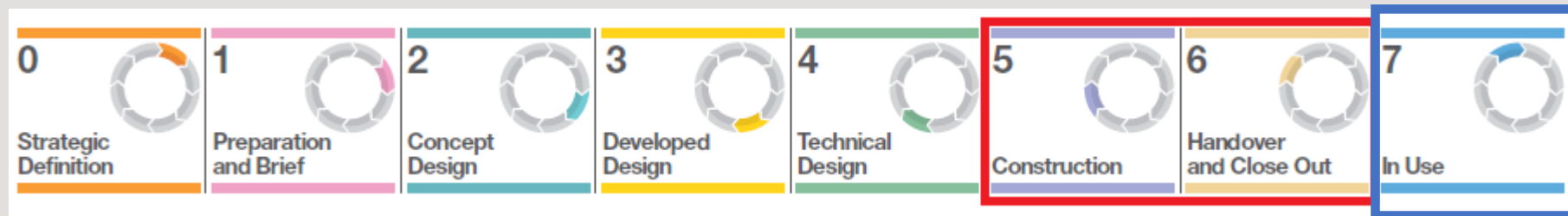


- **Impact of BIM upon construction phase**
  - Mostly positive for the site team
  - Instant access to information while on site
  - Age old problem of responsiveness persists!
- **Implications of BIM for PPPs**
  - BIM as a platform for managing building lifecycle
  - Involvement of BAM FM in early stages of project
  - Improved handover of O&M information to CAFM





- **Further BIM developments...**
  - Improved use of mobile technologies
  - Use of more BIM dimensions/features
  - Further training for site staff
  - Improved BIM across the supply chain
- **Further research...**
  - Comeragh College & BAM FM study
  - More in-depth & objective study as BIM matures
  - Role of other stakeholders in BIM and PPP



Source:  
RIBA (2013)

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# Thank you

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Brook Cameron & Brian Graham