



SNC • LAVALIN

Benefits of BIM for Transportation

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Technical Authority – Transportation BIM

Agenda

- What is BIM
- Collaboration and the Common Data Environment (CDE)
- Realising the benefits
- Case Studies – CR2 and East West rail
- Conclusion
- Q&A

What is BIM?

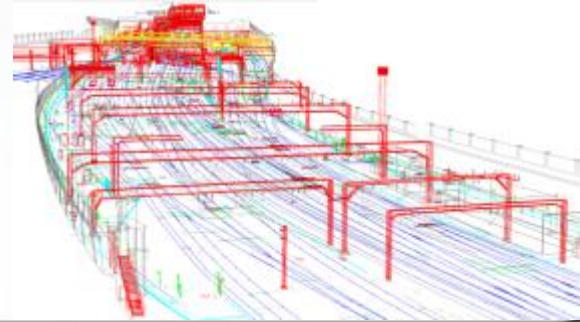
CONGRATULATIONS!

You have met the requirements of the Kitemark schemes in accordance with **BIM Level 2** (PAS 1192-2, PAS 1192-3, BS 1192, BS 1192-4 PAS 1192-5) and have been formally recommended for Kitemark – subject to the approval of our Compliance & Risk assessment.



BIM = Building Information *Modeling*

→ development and use of a **digital model** of the **building project**



BIM = Building Information *Management*

→ methodology and processes used to **manage the construction project** during its whole **life cycle**

UK Standards for BIM

BS1192-2007 PAS1192-2:2013 PAS1192-3:2014 BS1192-4:2014 BS 8541 Series (COBie)



Building Information Modelling is...

- *Collaborative* working
- Multi-Disciplinary Design Team(s) coordination
- Sharing and exchange of information between all parties (owners, designers, contractors, fabricators etc.)
- Single 'federated' integrated model
- Enabler for progressive assurance through collaborative design
- Whole life approach to managing digital assets (realising value)

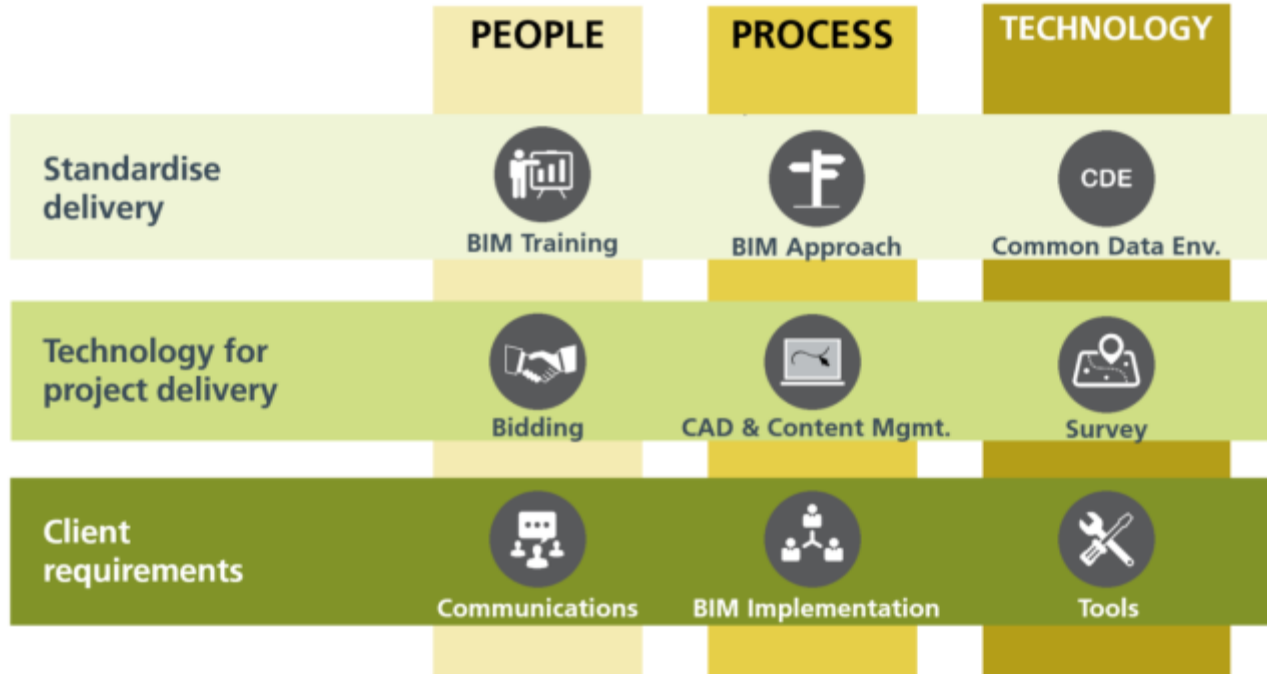
Why?

- Information Centred Working is proven to:
 - Reduce overall project schedules
 - Deliver improvements in Quality
 - Drive down costs
 - Improve safety
- Proven in numerous similar industries
 - Oil and Gas
 - Buildings
 - Nuclear
 - Roads & Infrastructure

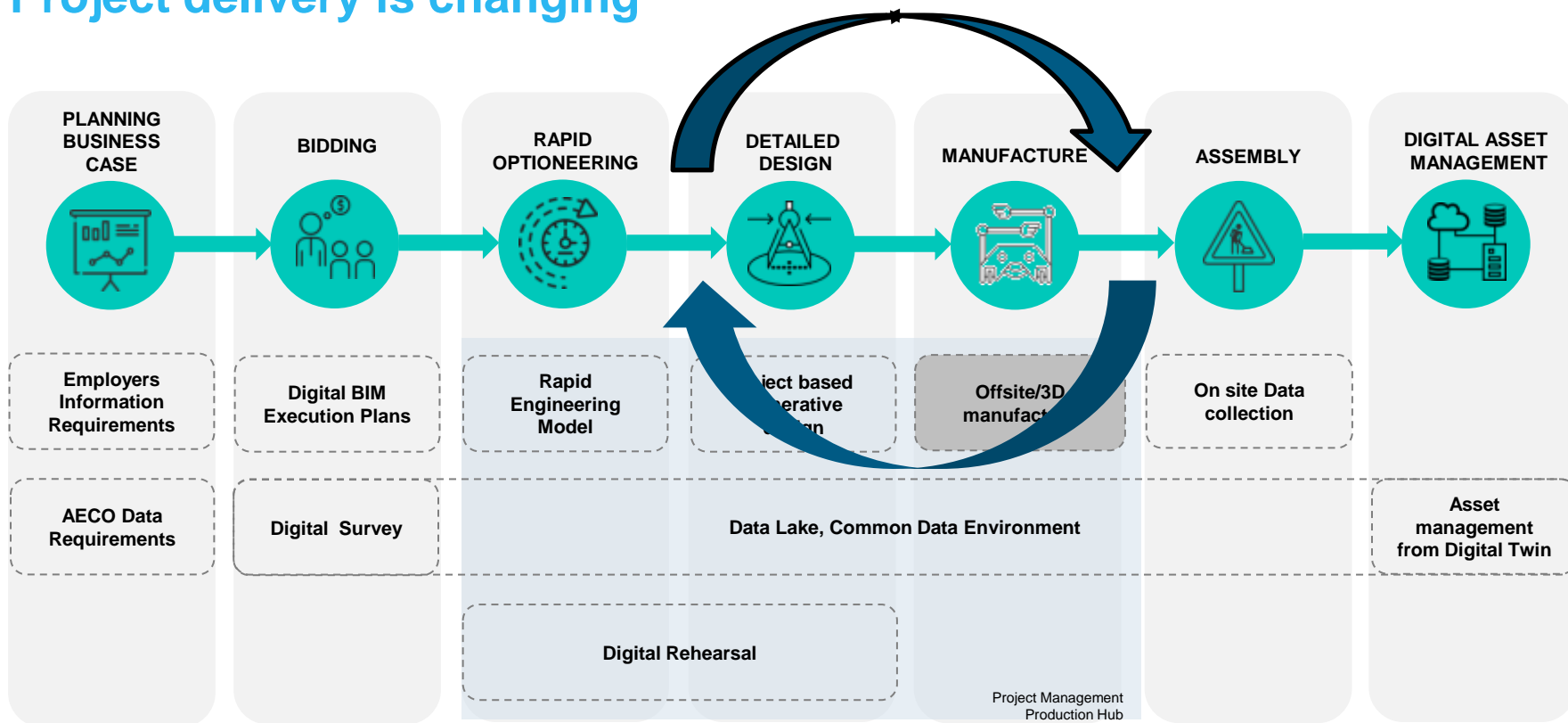


- **The basis for BIM: BS 1192, PAS-1192 etc**

How we will deliver this?

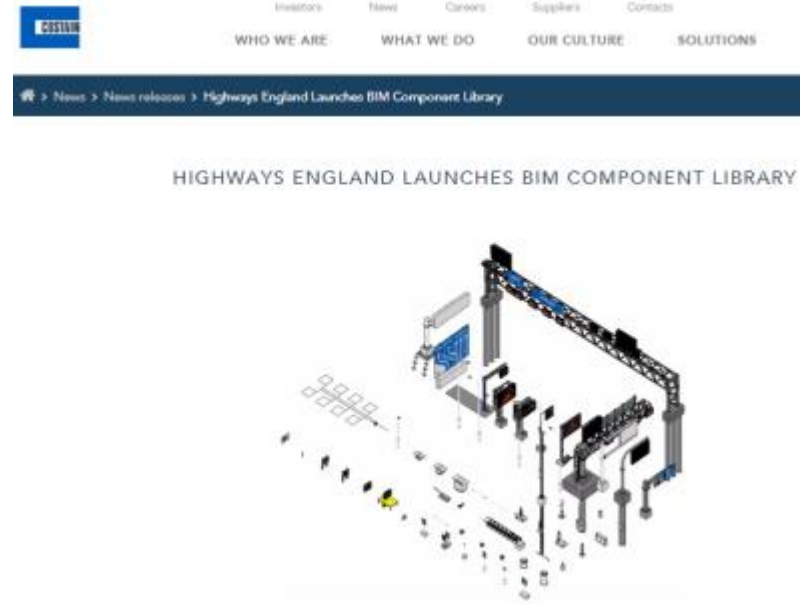


Project delivery is changing



What our clients want

- Drive a step change in efficiency, predictability, benefits & value
- Eliminating project and programme development product waste
- Streamlining common activities
- Standardised design & streamlined approvals
- Value based procurement – not hours based
- Share/re-use designs across community



Clients Requirements

- Informed Employer's Requirements

Level of Model Definition								
Network Rail GRIP Process has been aligned to be compliant with the PAS1192:2 Publicly Accessible Specification.								
GRIP Process Relation to PAS1192:2 Level of Definition								
GRIP Stage	1	2	3	4	5	6	7	8
	Initiate		Choose Options	Design		Build	Close	
	Output Definition	Concept	Option Selection	Single Option Development	Detailed Design	Construction, Test and Commission	Scheme Handback	Project Closeout
GRIP Aim	Define the output for the project	Define the scope of the investments and identify constraints. Confirm that the outputs can be economically delivered and aligned with network strategy	Develop options for addressing constraints. Assesses and selects the most appropriate option that delivers the stakeholders requirements together with confirmation that the outputs can be economically delivered	Initiation of the development of the chosen single option	Produce a complete, robust engineering design that underpins definitive cost, time, resource and risk estimates	Delivery to specification and testing to confirm operation in accordance with design	Transfer asset responsibility from the project team to the operator and maintainer	Closeout in an order manner. Contractual accounts are settled and any contingencies or warranties are put into place. Assessment of benefits is carried out
PAS1192 LOD	Brief	Concept	Definition	Design		Build and Commission	Handover and Closeout	Operation



Common Project Standards





2

Crossrail 2 ONS
Computer Aided Design Management
Procedure

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Document Approval

Function	Name/Position	Signature / Initials	Date
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Authorised by	Kobena Mustaka, PM	KM	July 2018

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How we need to work – Integrated BIM

Conditions for success

Process

Agreed methods of working to agreed standards

Technology

CDE, collaboration platforms, interoperable software

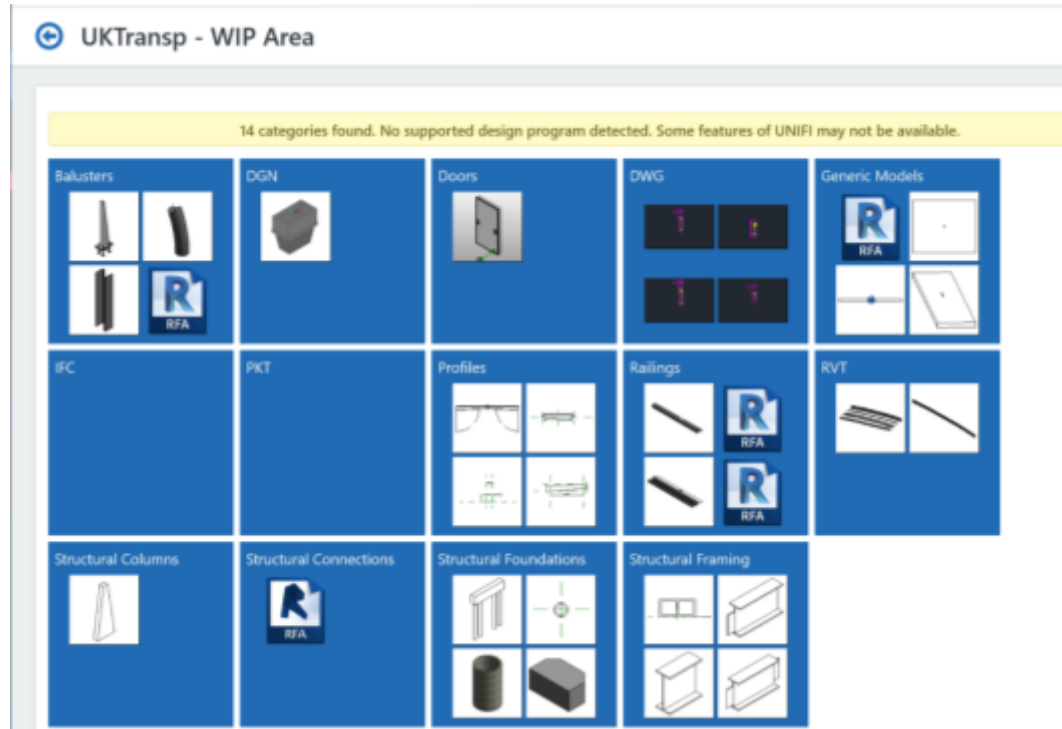
People

We need everyone to be BIM enabled



Design Reuse

Agreed LODs between the manufacturer and contractor



Iterative Model based re design

(2D only as an output)





Collaboration and the Common Data Environment (CDE)

What's a CDE?

- Contains the project's Integrated Information Set
- Graphical Data – 3D objects
- Non-Graphical data – embedded digital attribution
- Documents – Project Documentation (e.g. Standards, RFI's, etc.)
- GIS (Geospatial Information System)

Traditional
Information
Sharing



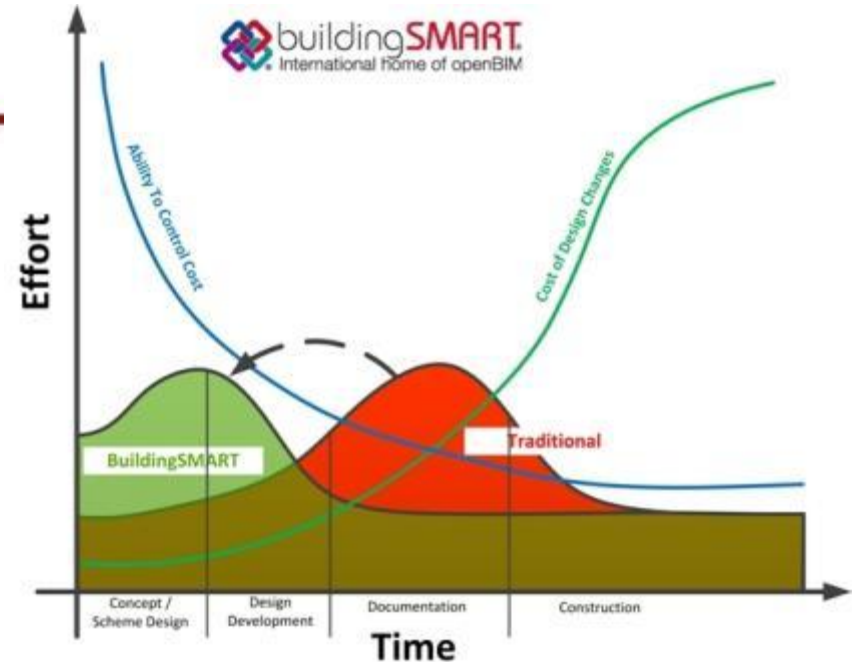
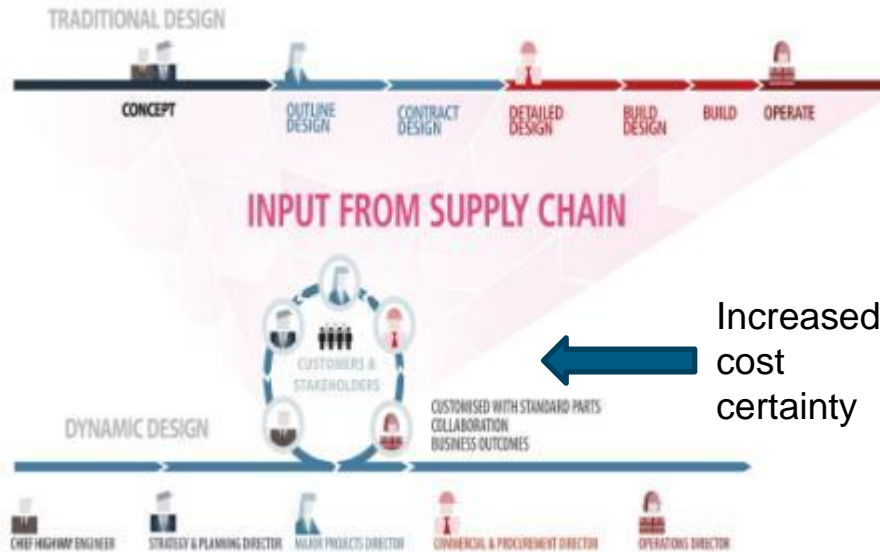
Common
Data Environment
(CDE)



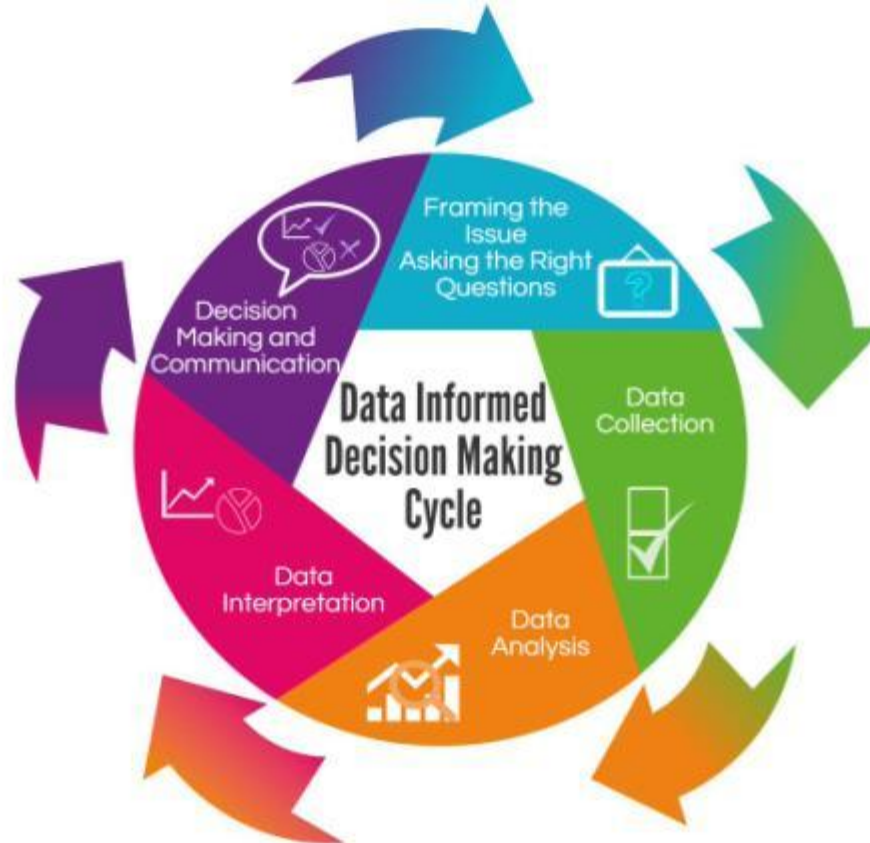
Realising the benefits from BIM



The “Left Shift” agile design with the contractor



Data informed decision making on projects

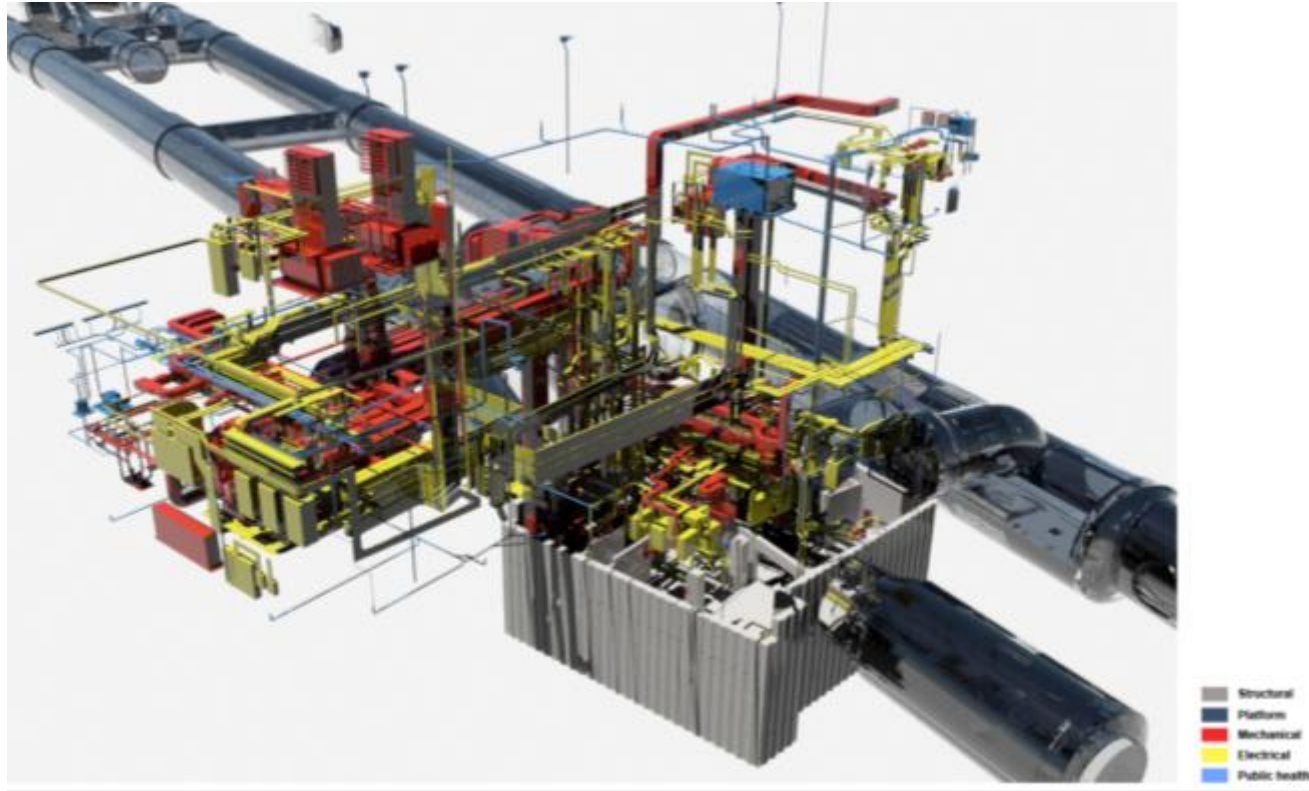


BIM on projects

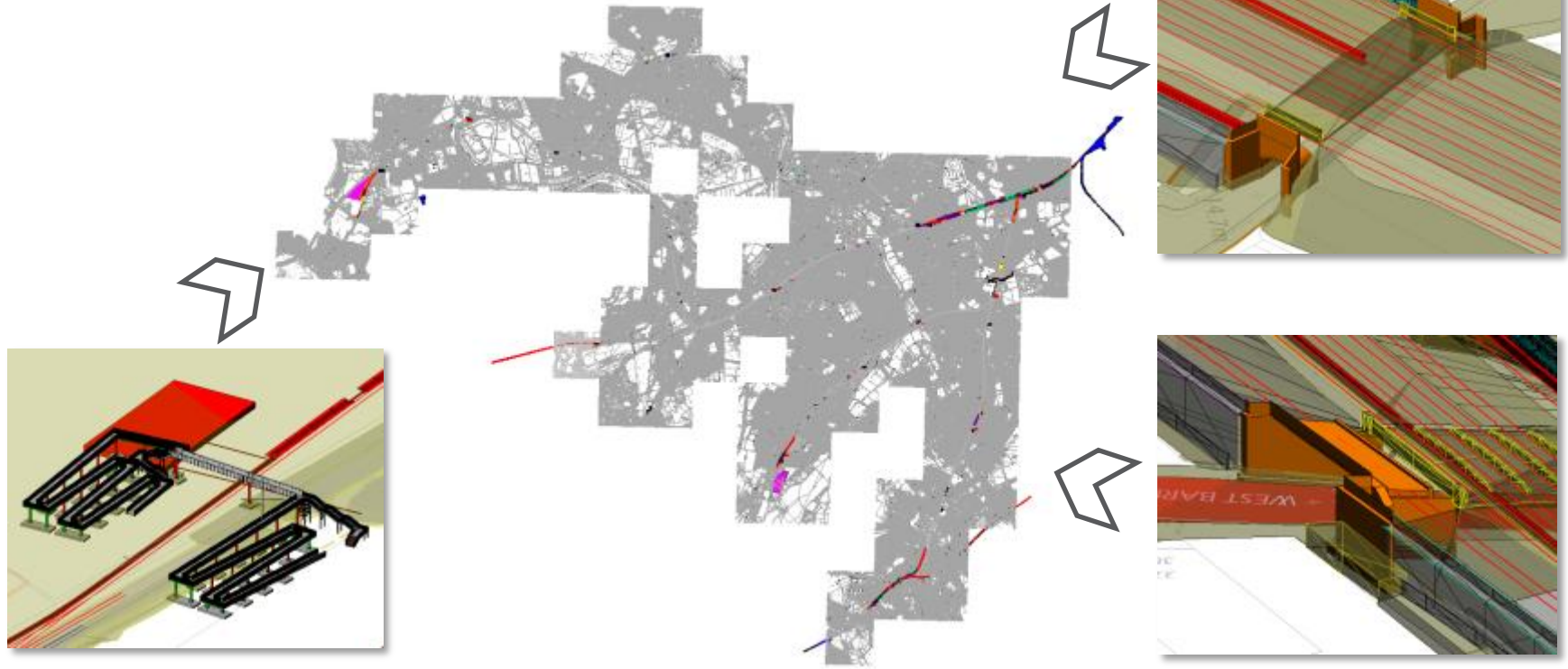
Crossrail 2 (ONS)

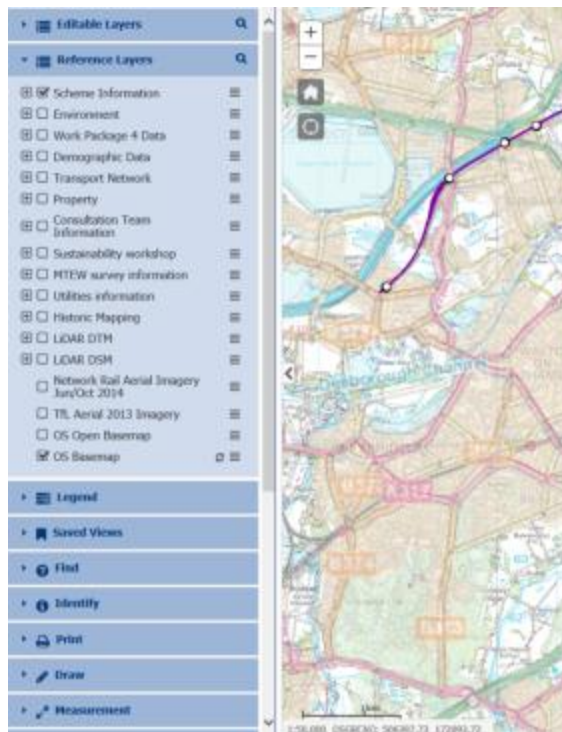


Crossrail Farringdon ETH



Federated 3D coordination model





Welcome to GiGi

This is the project centralised data environment offering access to all geographical information across work packages.

New data is constantly being added so please view the 'what's new' section below.

All information available through these web maps is for **use on the Crossrail 2 project** only in line with the project confidentiality requirements. Users must not share any information available on GiGi outside of the internal project team.

Please click on the relevant map image below to take you to the web maps.

For training, data requests, feedback or any other information please contact Isabella Allen by email at Crossrail2GIS@tfl.gov.uk or phone on 020 3054 7692.

GiGi is part of the Crossrail 2 Common Data Environment. Please click on [this link](#) to send us feedback

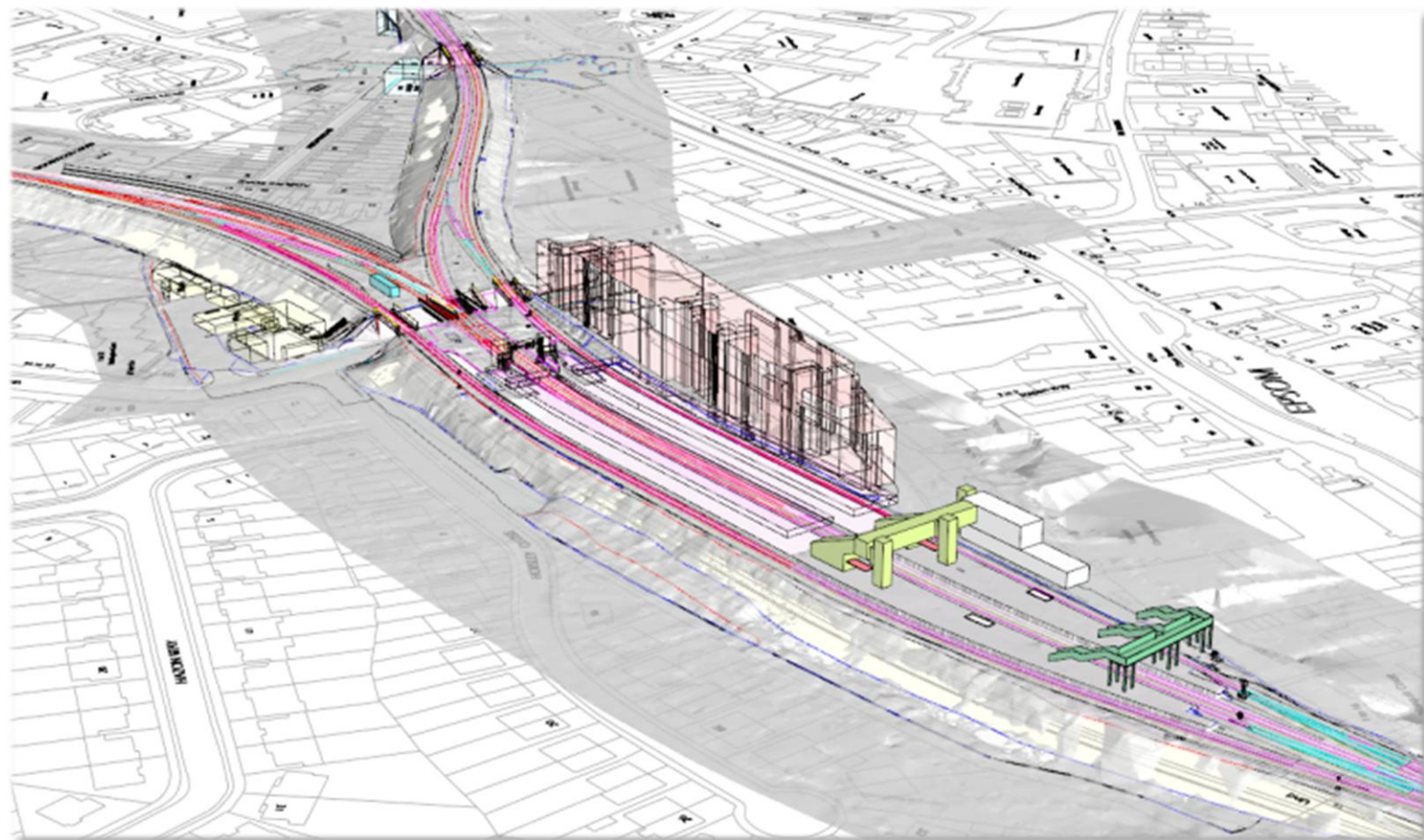
What's New:



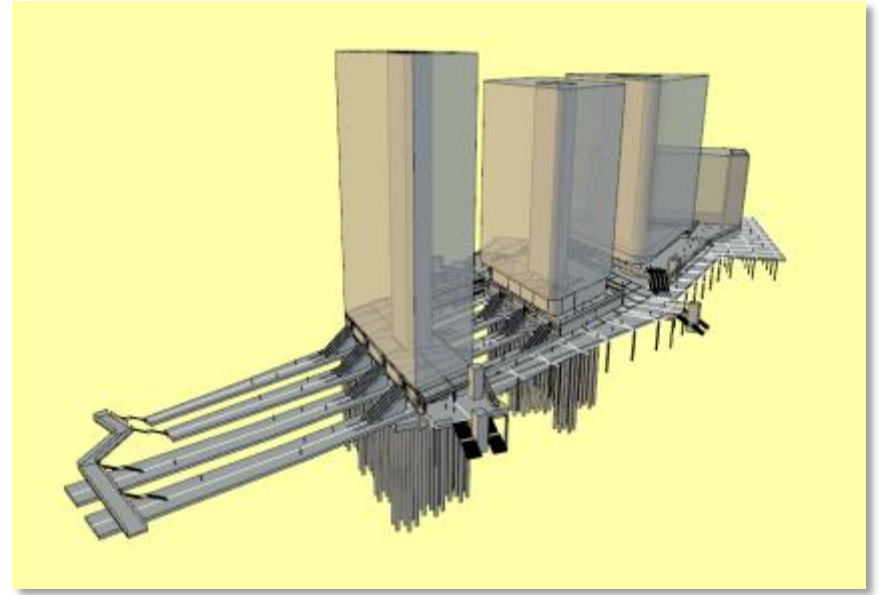
CARS (Croydon Area Remodelling Scheme)

Figure 1 – Proposed BMUP Scope Map

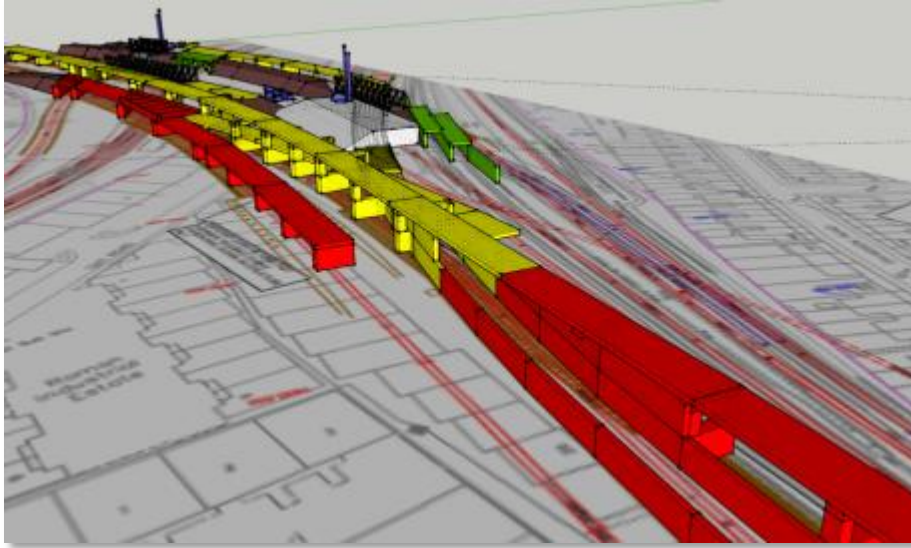




Federated 3D coordination model

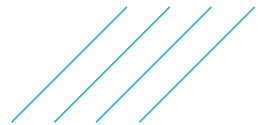


Preliminary Construction Planning (4D)





East West Rail Phase 2 (EWR)



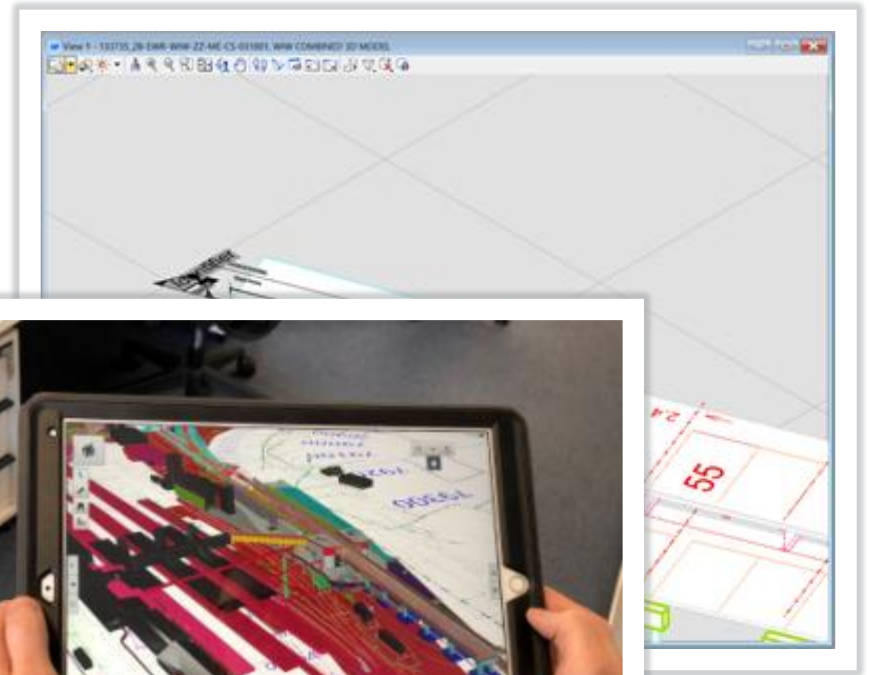
3D Coordination

Benefits

- › Design and Construction Integration
- › Paperless management
- › Training and upskilling

Challenges

- › Training and upskilling
- › Technology Limitations
- › Resources



4D Sequencing

Benefits

- › Visualization
- › Time saving
- › Construction cost savings
- › Health and Safety

Challenges

- › IT capabilities
- › Resources



Benefits

- ## Challenges

- › Modelling methods
- › Compatibility
- › Assumptions



- What you have seen here is really happening on these (and new) projects. This is not theory.
- There is behavioural change required within existing design teams and with traditional working methods.
- Training and upskilling will be required.
- It's not as *scary* as it looks!





Thank you. Any questions?