



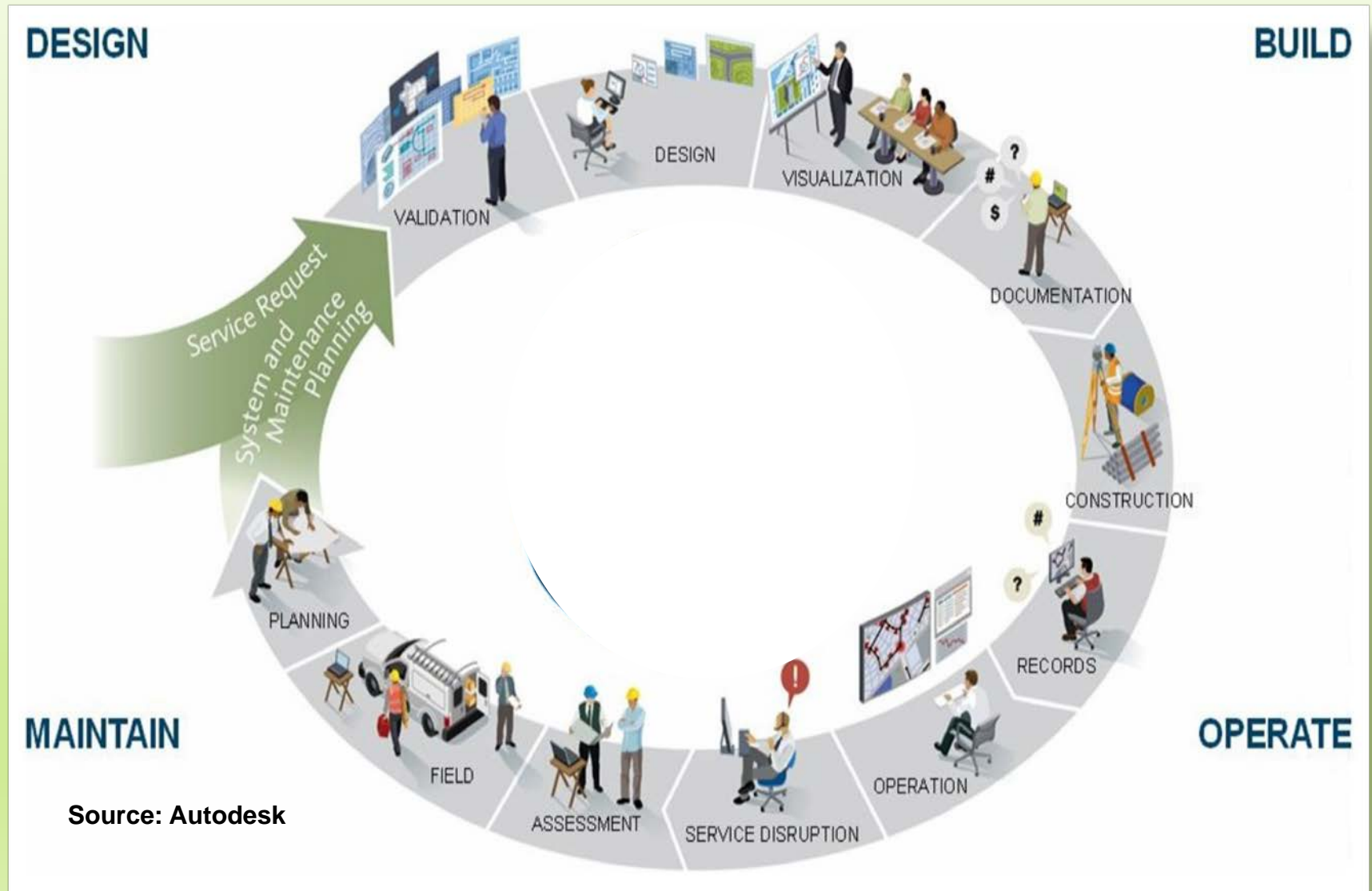
**Digital Assets**  
Salah Al Dilimi  
November 2017

# What is BIM?

“A coordinated set of **processes**, supported by technology, that adds **value** through creating, managing and sharing the **properties** of an asset throughout its **lifecycle**.”

**“Single source of truth throughout the asset life cycle”**

# For the whole lifecycle

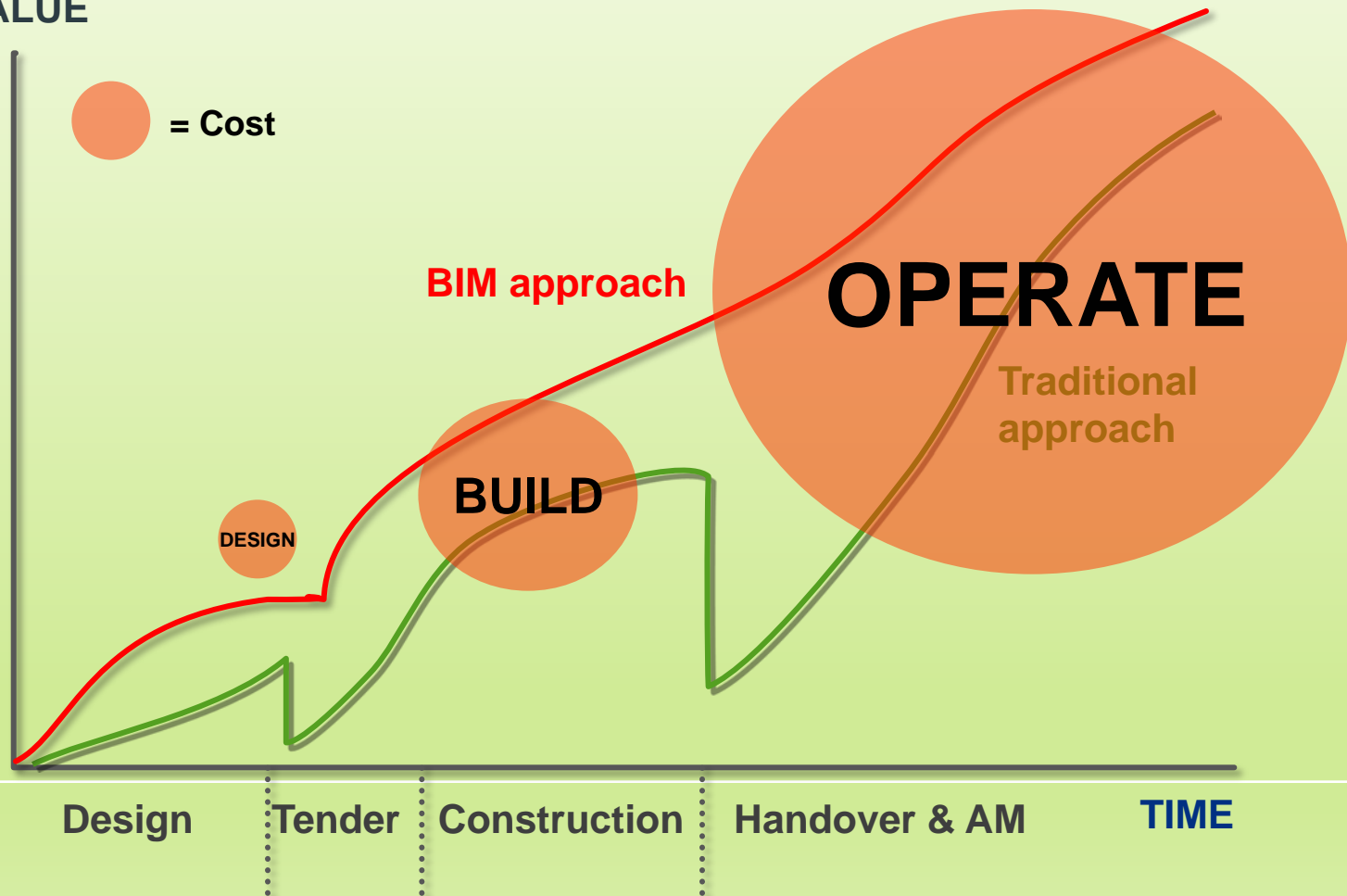


# The three Ps

- ❑ People - Knowledge, experience, handling
- ❑ Process - Establishing a set of requirements and methodologies between collaborating parties
- ❑ Platform - Software, hardware and network infrastructure and interoperability

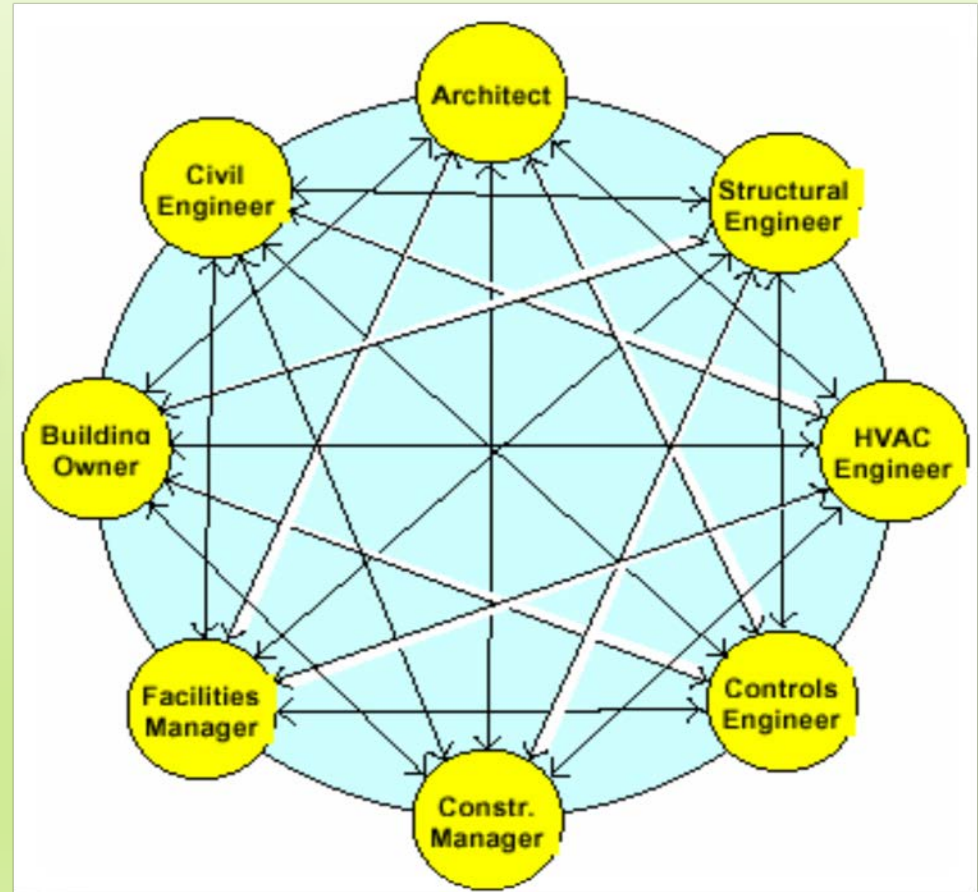
# Information Value

INFORMATION  
VALUE

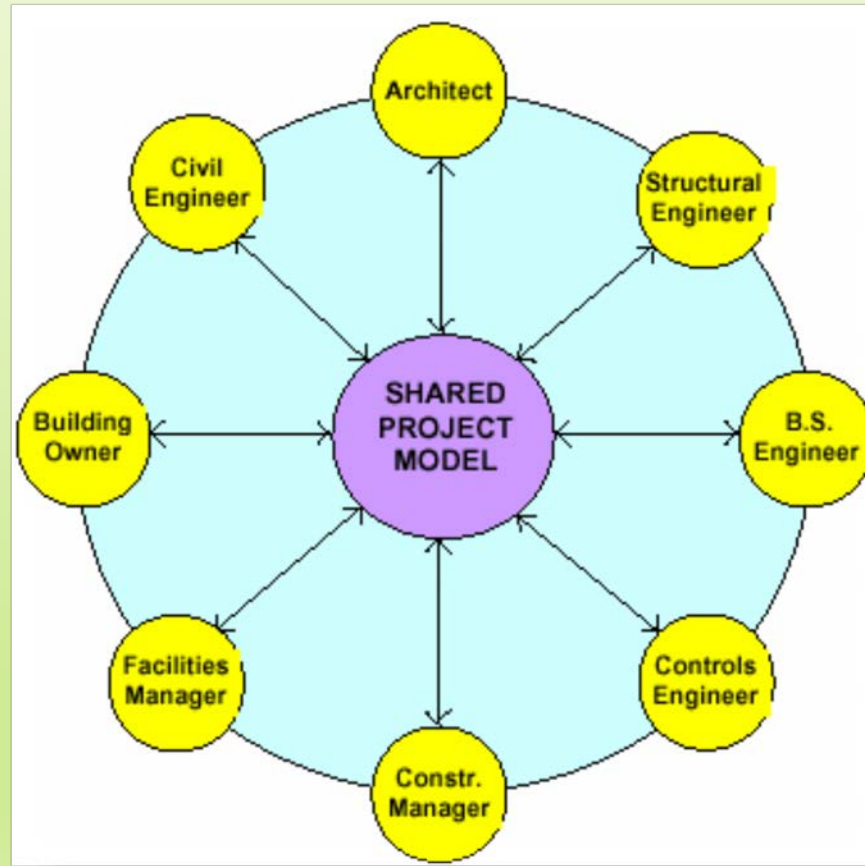


# Traditional Flow of Information

- The **same information is re-entered on average 7 times** in different systems
- significant **communication errors** and loss of project information, **building damages (5% of investment)**
- **25-30% of the construction cost** is caused by splitting up of processes and lousy communication

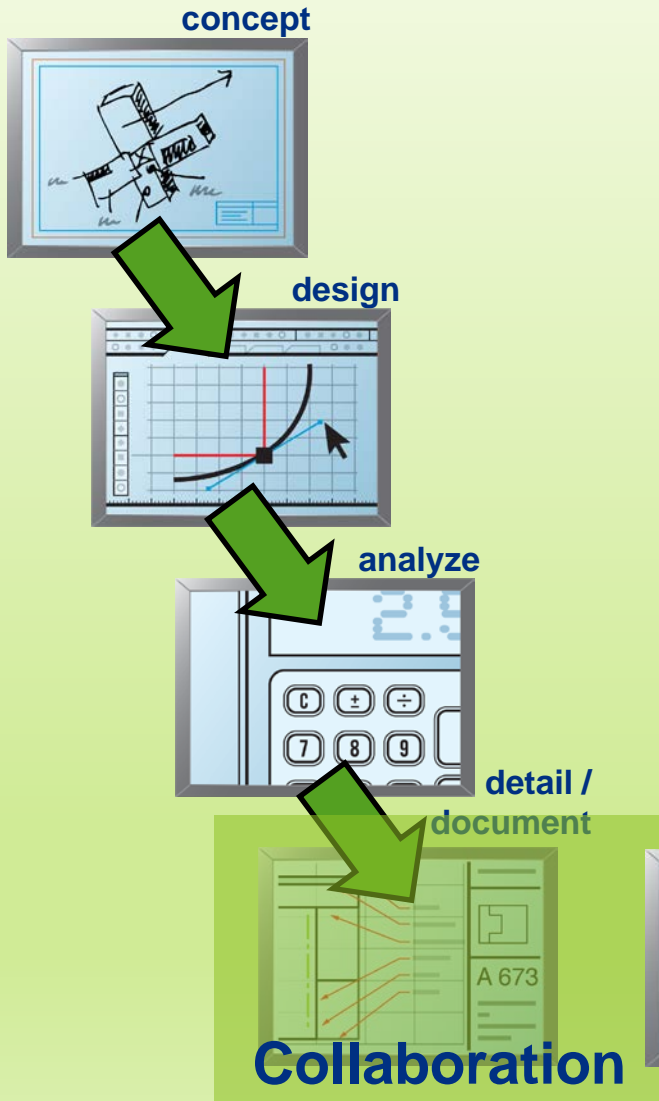


# Building Information Communication Flow

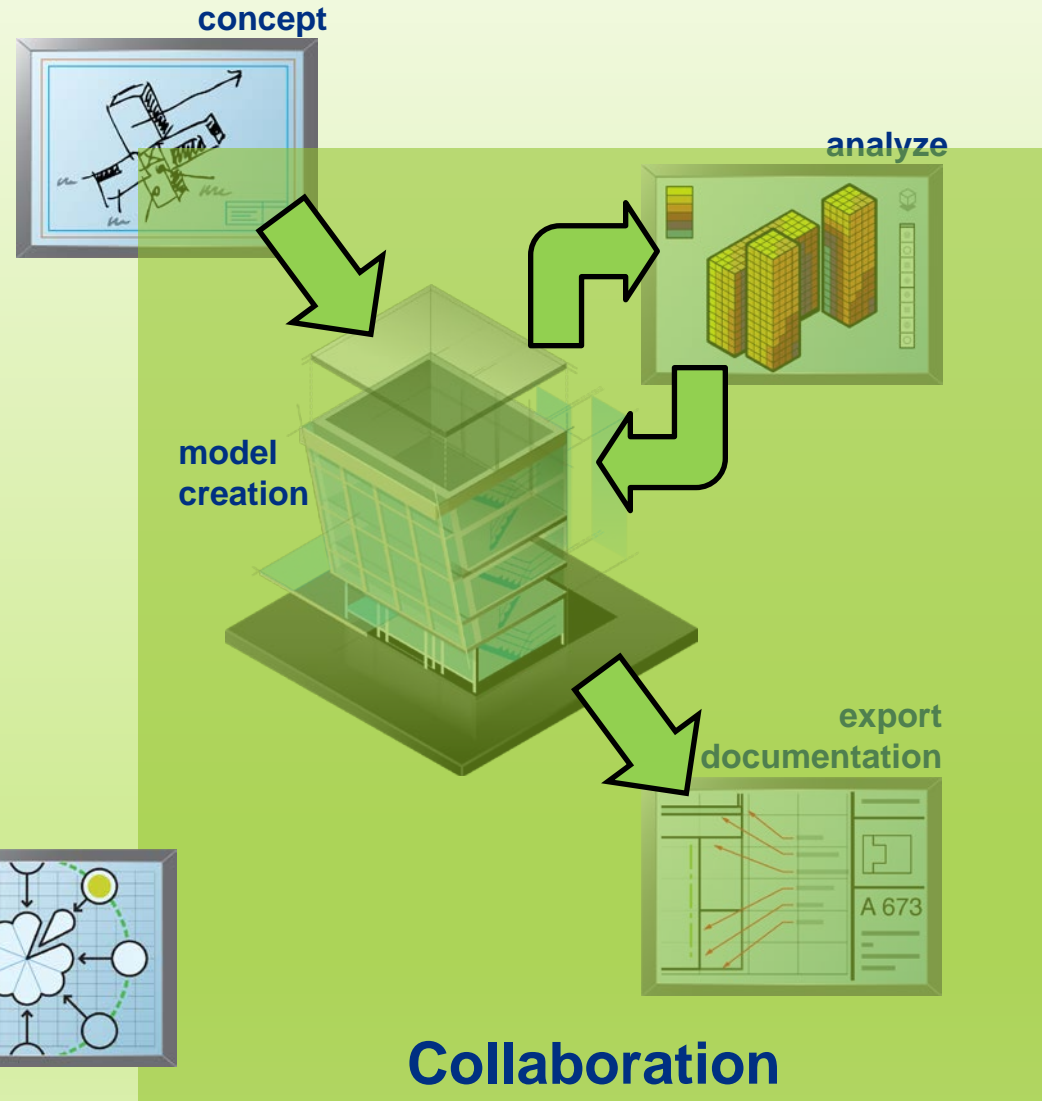


# BIM - Changing the way we collaborate

## Traditional 2D Workflow

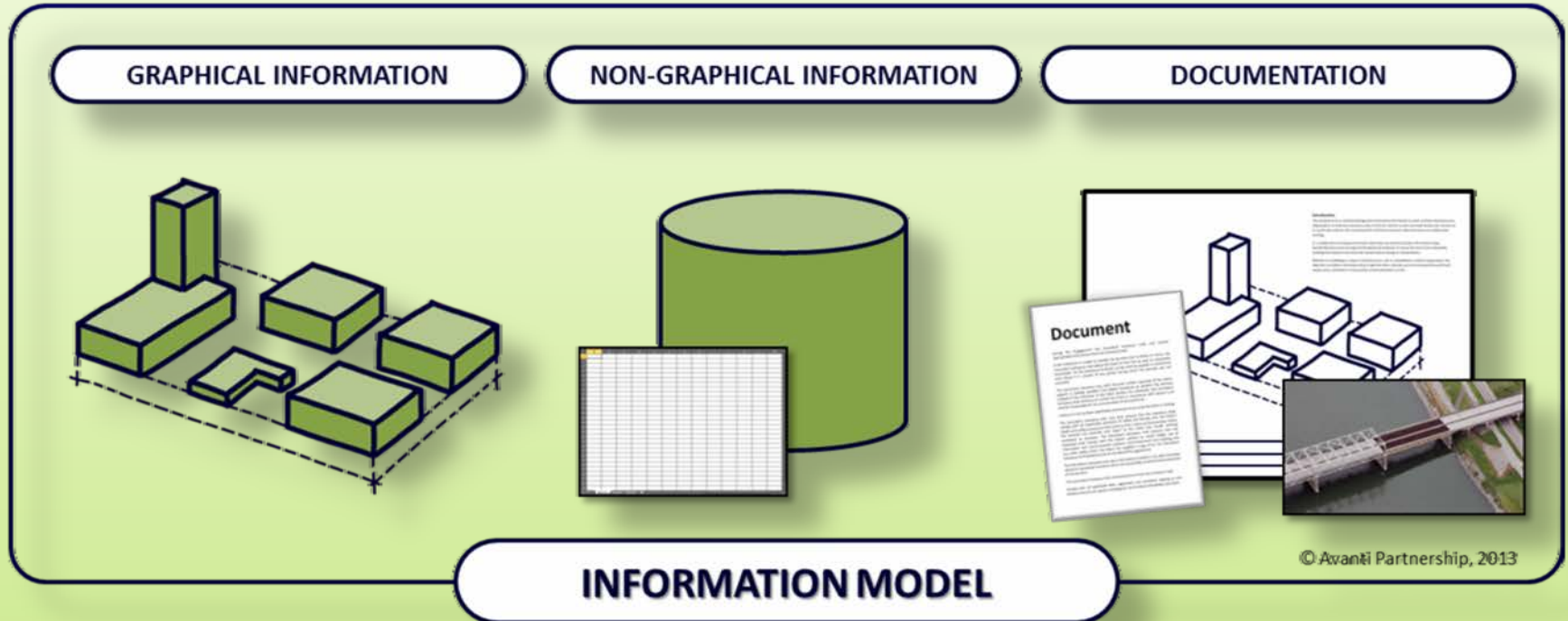


## Building Information Modelling (BIM) Workflow





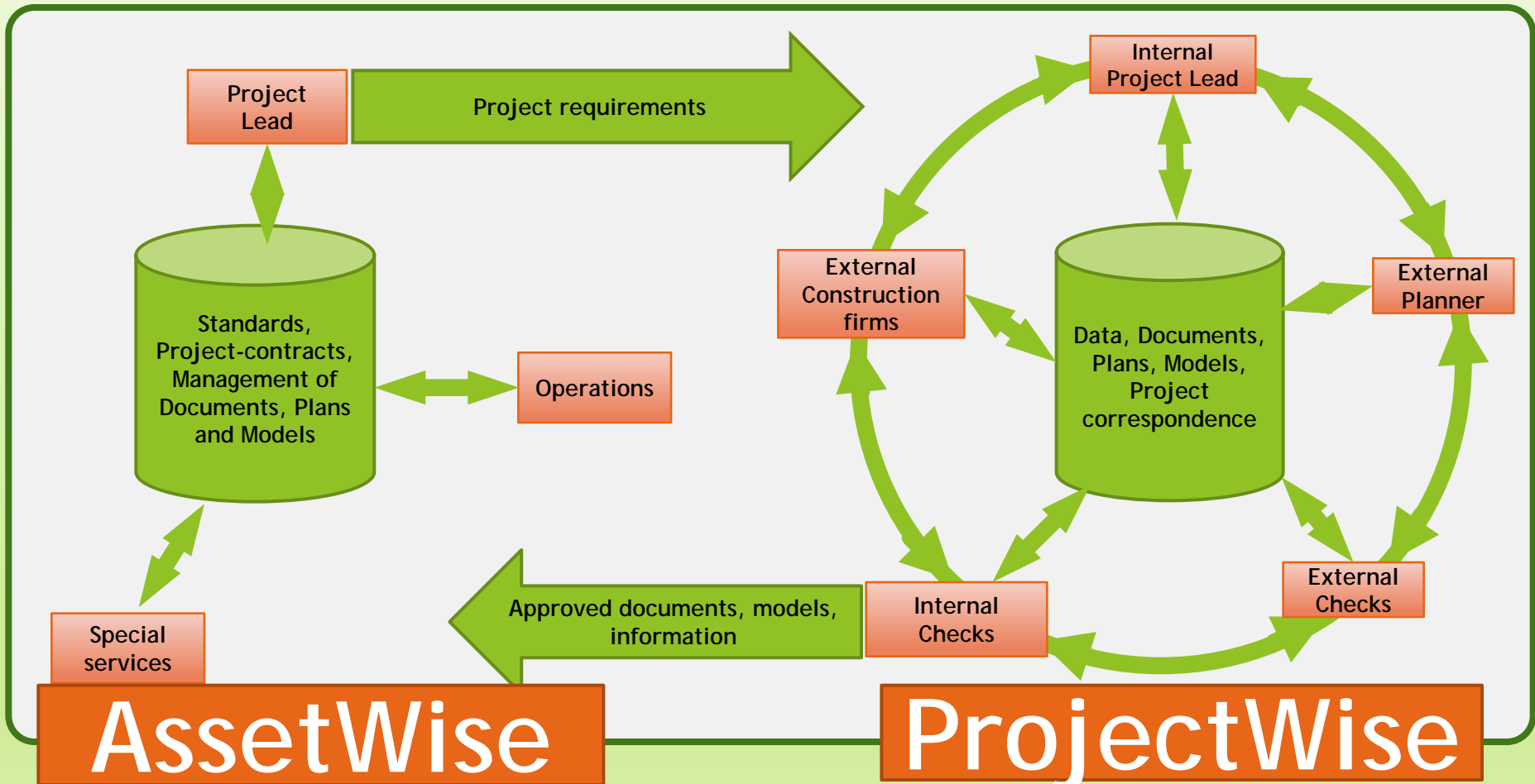
# Type of documents



# Common Data Environment

Operating Platform

Project Platform

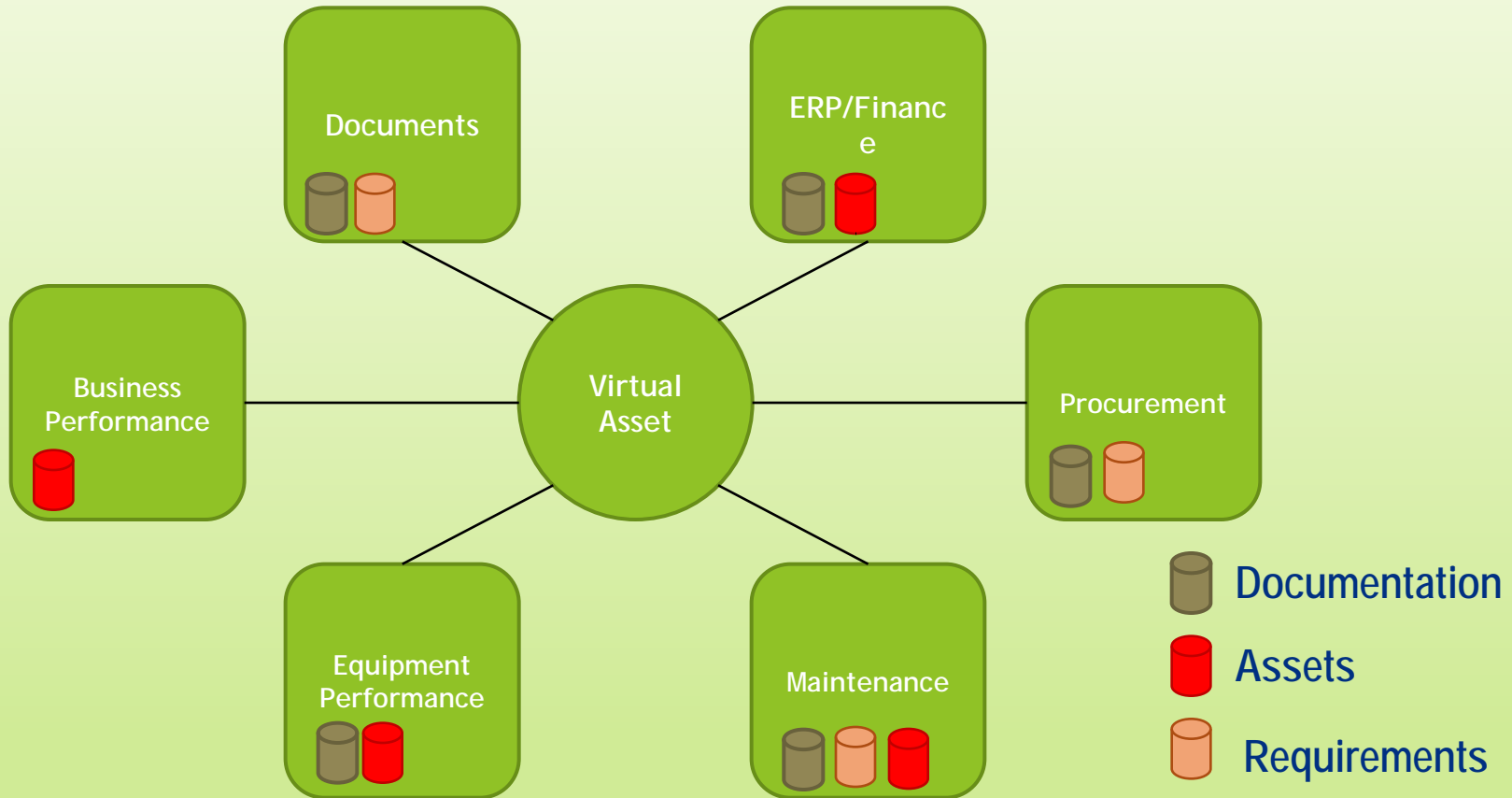


AssetWise

ProjectWise

Common Data Environment

# Centralized Information Management



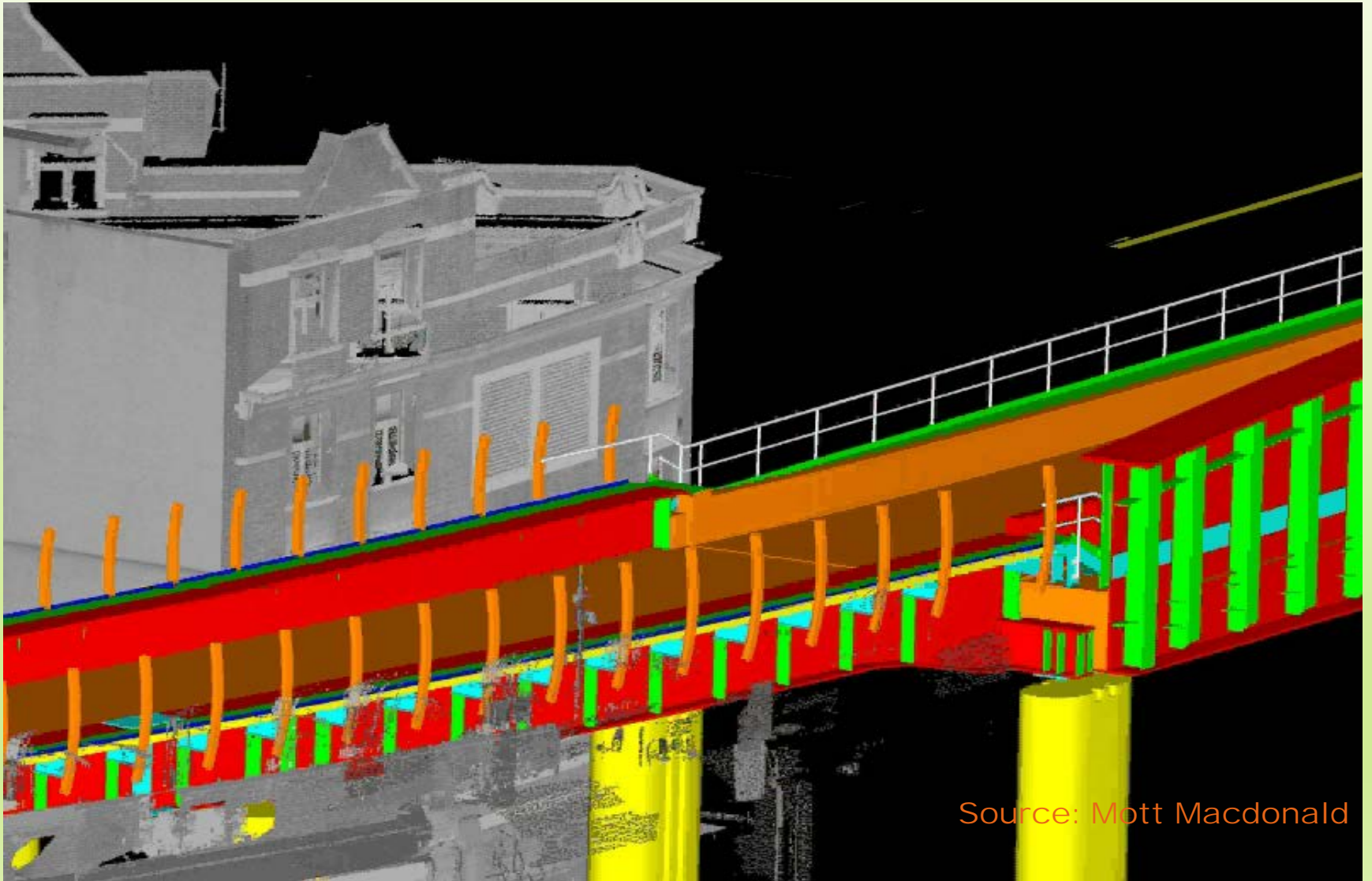
# BIM Enabled Delivery Activities

# Survey - Data Capture



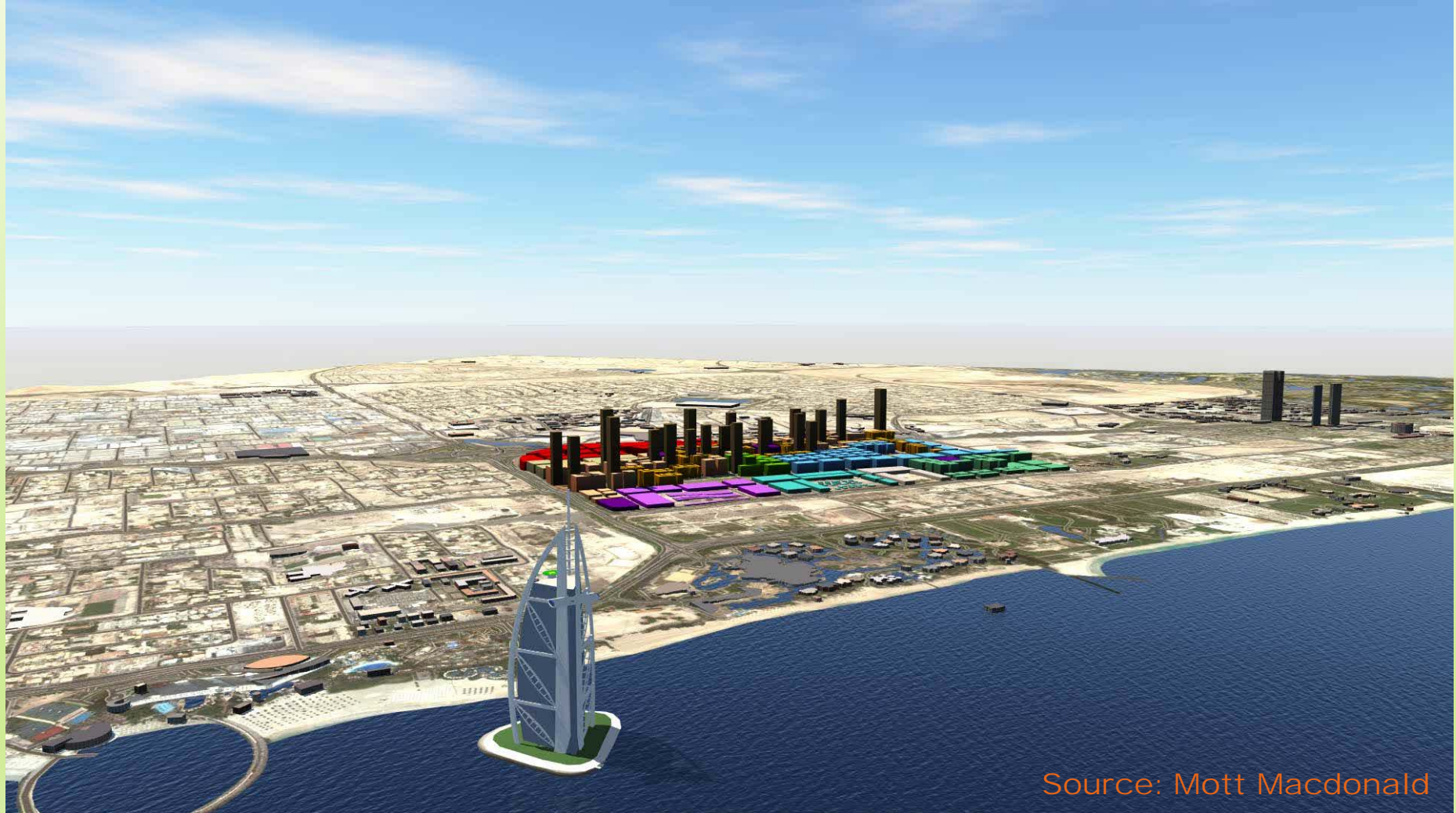
Source: Mott Macdonald

# Survey – Data Capture



Source: Mott Macdonald

# Spatial Planning & Concept Design



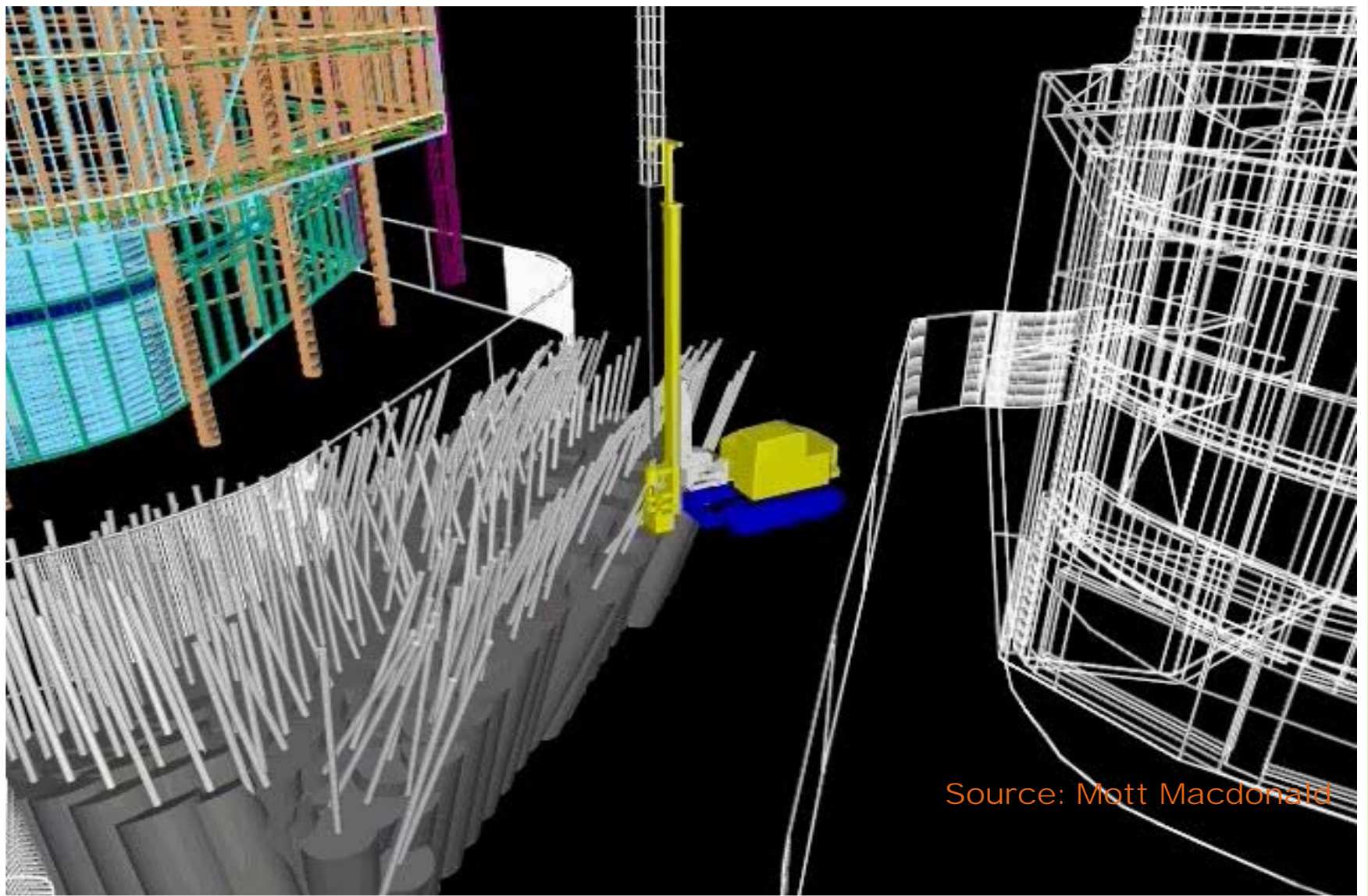
Source: Mott Macdonald

# Stakeholder Engagement



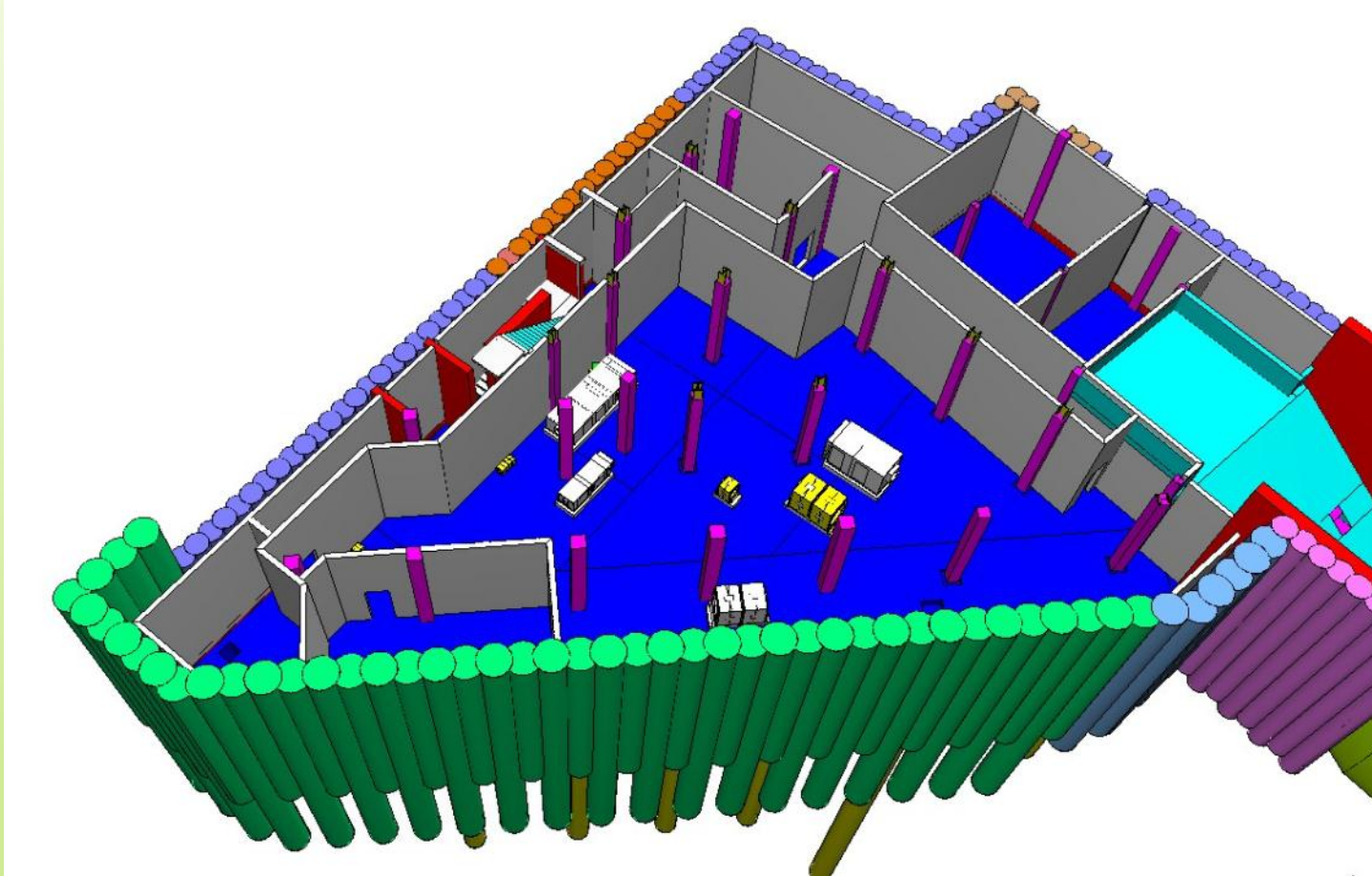


# Health and Safety



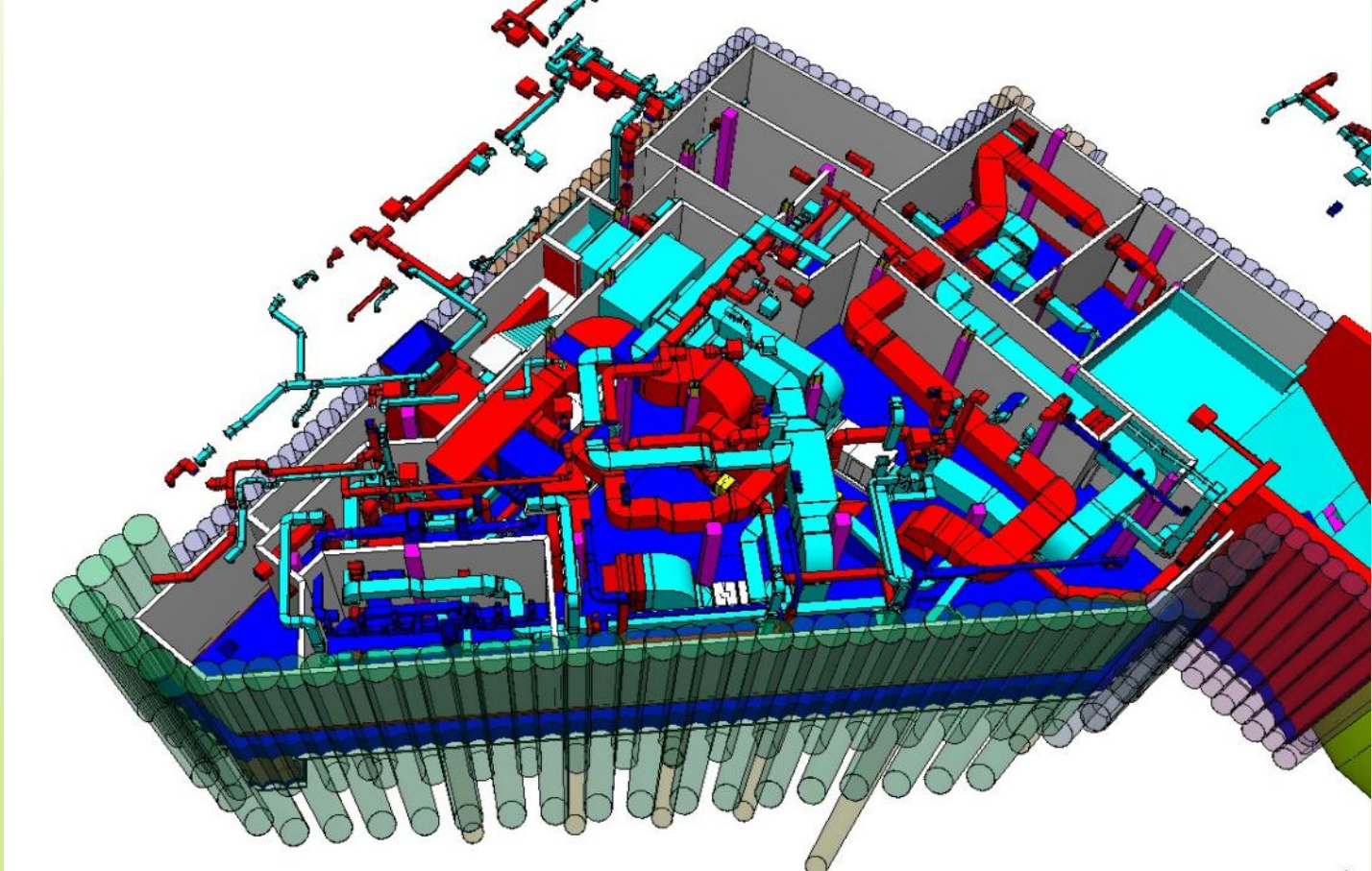
Source: Mott Macdonald

# Design Co-ordination & Review



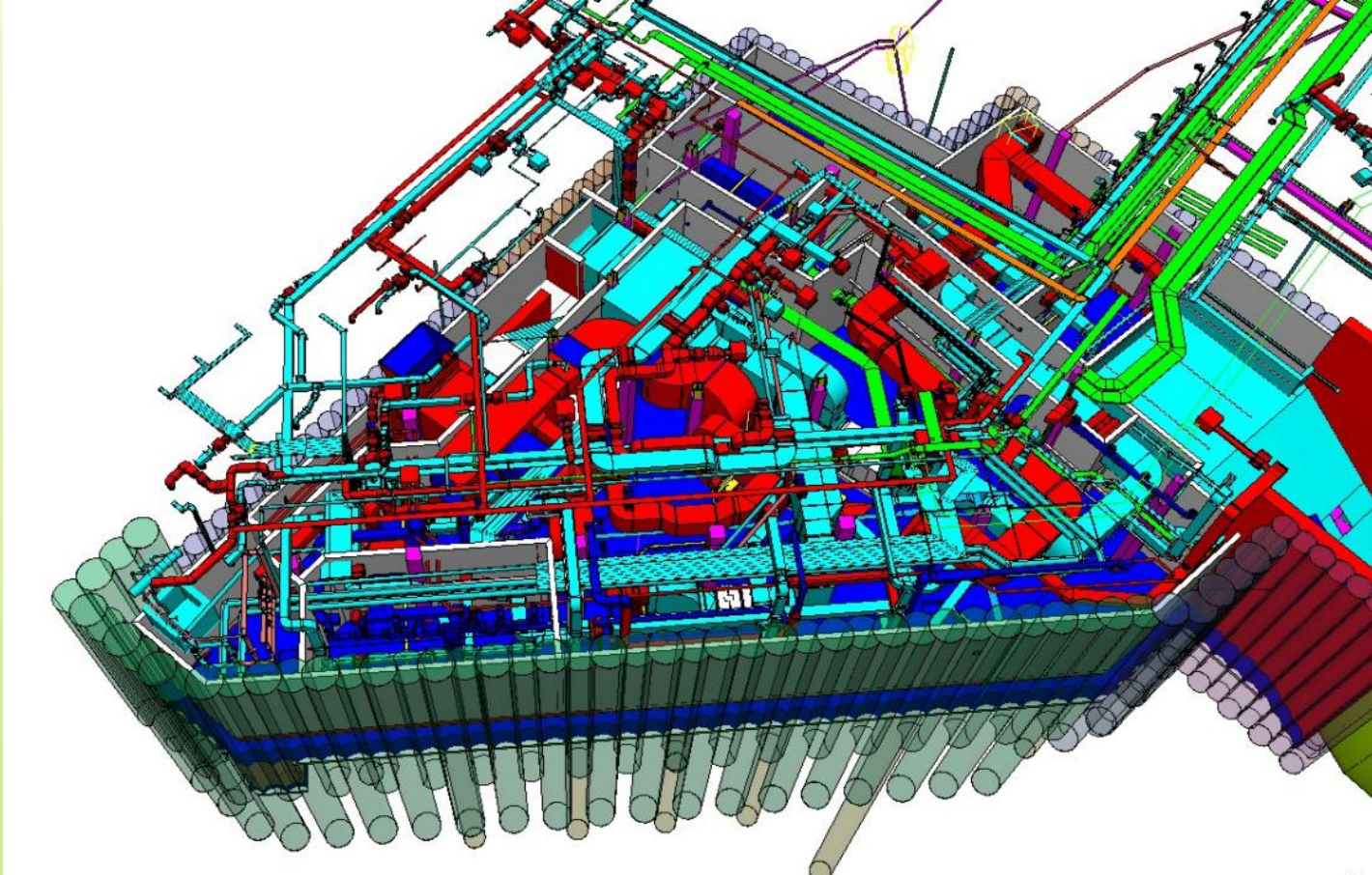
Source: Mott Macdonald

# Design Co-ordination & Review



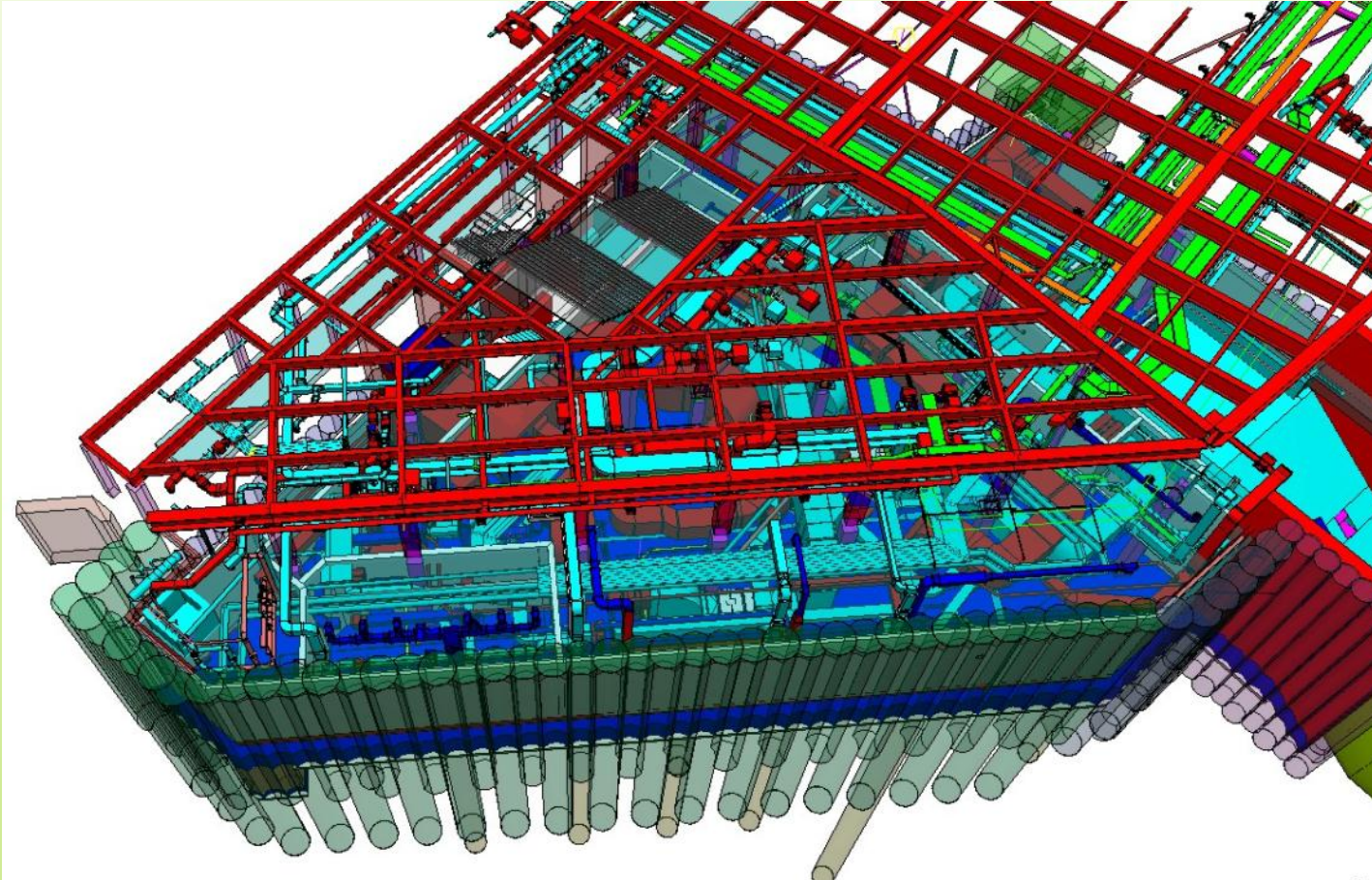
Source: Mott Macdonald

# Design Co-ordination & Review



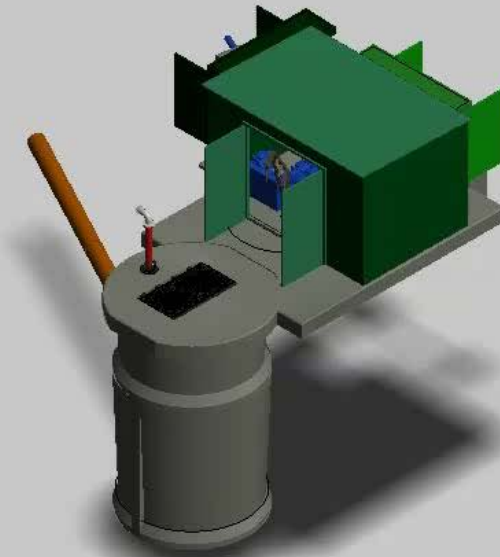
Source: Mott Macdonald

# Design Co-ordination & Review



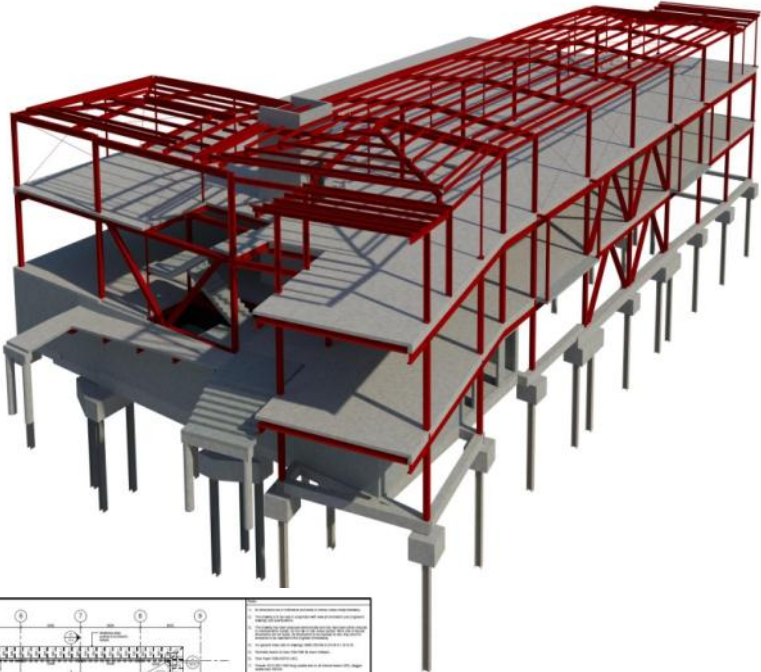
Source: Mott Macdonald

# Clash Detection



Source: Mott Macdonald

# Documentation



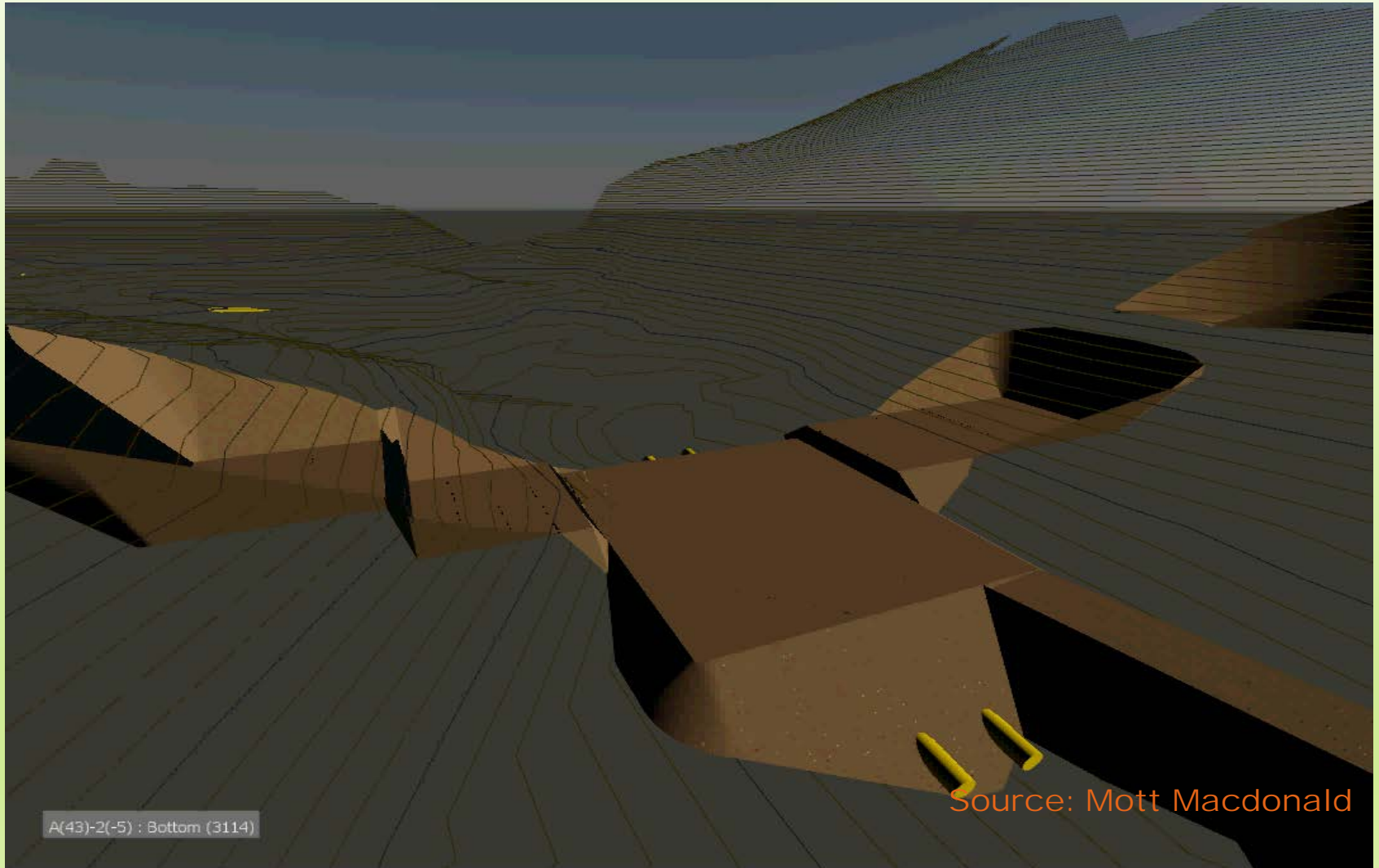
This block contains a collection of architectural drawings. On the left, there are several vertical sections labeled 'Section 1-1', 'Section 2-2', and 'Detail 1-1'. In the center, there are two elevation drawings labeled 'Elevation on Grid 1' and 'Elevation on Grid 2'. On the right, there is a large, detailed floor plan labeled 'Level 2' with a grid system (A through H and 1 through 8). To the right of the floor plan is a title block containing project information, a logo for 'M&R', and a table with the following data:

NO.	REVISION	DATE	BY	CHKD.
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Below the table, there is a logo for 'M&R' and the text 'Plant and Food Research'. At the bottom right, there is a project information block:

Plant and Food Research  
PFR Geomatics Lab  
114-121 Mount Albert Road  
Beverly Hills, Auckland  
General Arrangement  
Level 2  
As indicated 100%  
WMD 2018-01-08

# Construction Sequencing (4D)





# Cost Planning and Estimating (5D)

Mini TOM 3D View

New TOI New TOQ Add Note Restore Quantities Delete Selected Default Mode

04 - Cost Planner

1 Project

- View Dashboard
- Define Settings
- Select Module
- Import from Excel
- Compare & Update
- Define Targets

2 Content

- Edit Tags

3 Model Management

- Manage Models

4 Takeoff

- Takeoff Model
- Manage Takeoff

5 Cost Planning

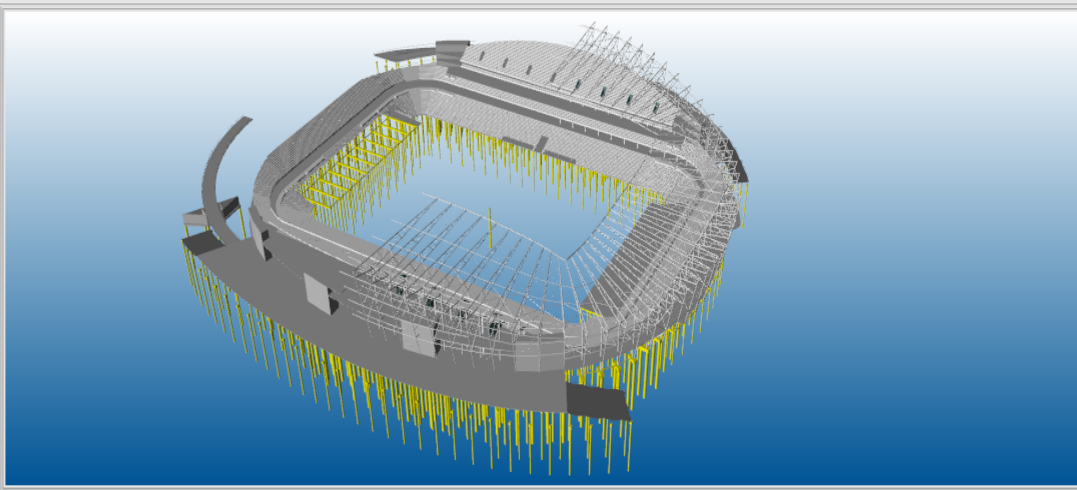
- Plan Cost
- Explore Cost

6 Reports

- Create Reports

Cost Planner Project & References Cost Planner & 3D - Modified New ViewSet(1)

Code	Description	Unit	Value
	Foundation Slab-750mm Foundation Slab		(1)
	Foundation Slab-250mm Foundation Ground Beam		(1)
	Foundation Slab-150mm Foundation Ground Beam		(4)
	M_Pile Cap-2 Pile-P6-3450 x 1200 x 1200mm		(71)
Count		EA	71.000
Edge Perimeter		M	658.475
Hole Count		EA	0.000
Hole Perimeter		M	0.000
Net Bottom Surface Area		M2	290.834
Net Top Surface Area		M2	290.834
Edge Surface Area		M2	790.169
Hole Surface Area		M2	0.000
Net Volume		M3	349.001
Gross Volume		M3	349.001
Joint Horizontal Surface Area		M2	0.000
Joint Vertical Surface Area		M2	0.000
Piece Count		EA	71.000
Edge Length		M	658.475
Joint Length		M	0.000
Hole Fringe Length		M	0.000



3D View

Code	Description	Source Qu.	Consump.	Quantity	Unit	Unit Cost	Total Price	Waste/Fa.	CostType	Status	Type	UniClass
000	Stadium	1.000	1.000	1.000	-	16,215,695.04	16,215,695.04	1.000				
JD.	Groundwork	1.000	1.000	1.000	-	4,074,381.35	4,074,381.35	1.000			Groundwork	
JD.20.	D20: EXCAVATING AND FILLING	1.000	1.000	1.000	-	822,406.25	822,406.25	1.000			Groundwork	JD20 -
JD.20...	Site preparation	1.000	1.000	1.000	-	31,746.00	31,746.00	1.000			Groundwork	JD20 -
JD.20...	Clear site of vegetation, undergrowth, bushes, hedges, generally	20,000.000	1.000	20,000.000	m2	1.59	31,746.00	1.000			Groundwork	JD20 -
JD.20...	JCB 3CX	20,000.000	0.030	600.000	Hrs	22.43	13,458.00	1.000			J233 -	
JD.20...	Muck Away Lorry & Tip Fees	20,000.000	0.038	760.000	m3	19.05	14,478.00	1.000			J233 -	
JD.20...	Groundworks Labourer	20,000.000	0.015	300.000	Hrs	12.70	3,810.00	1.000			J233 -	
JD.20...	Excavation	1.000	1.000	1.000	-	23,327.20	23,327.20	1.000			Groundwork	JD20 -
JD.20...	Site excavation to remove topsoil, average depth 300 mm	20,000.000	1.000	20,000.000	m2	0.56	11,215.00	1.000			Groundwork	JD20 -
JD.20...	JCB 3CX	20,000.000	0.025	500.000	Hrs	22.43	11,215.00	1.000			J233 -	
JD.20...	Excavation to reduce levels, depth not exceeding 1.00 m	9,000.000	1.000	9,000.000	m3	1.35	12,112.20	1.000			Groundwork	JD20 -
JD.20...	JCB 3CX	9,000.000	0.060	540.000	Hrs	22.43	12,112.20	1.000			J233 -	
JD.20...	Trench excavation to receive foundations, pile caps and ground	1.000	1.000	1.000	-	0.00	0.00	1.000			Groundwork	JD20 -
JD.20...	JCB 3CX	4,567.453	1.000	4,567.453	m3	0.00	0.00	1.000			Groundwork	JD20 -
JD.20...	Banksman	4,567.453	0.300	1,370.236	Hrs	22.43	30,734.39	1.000			J233 -	
JD.20...	JCB 3CX	4,567.453	0.300	1,370.236	Hrs	12.70	17,402.00	1.000			J233 -	

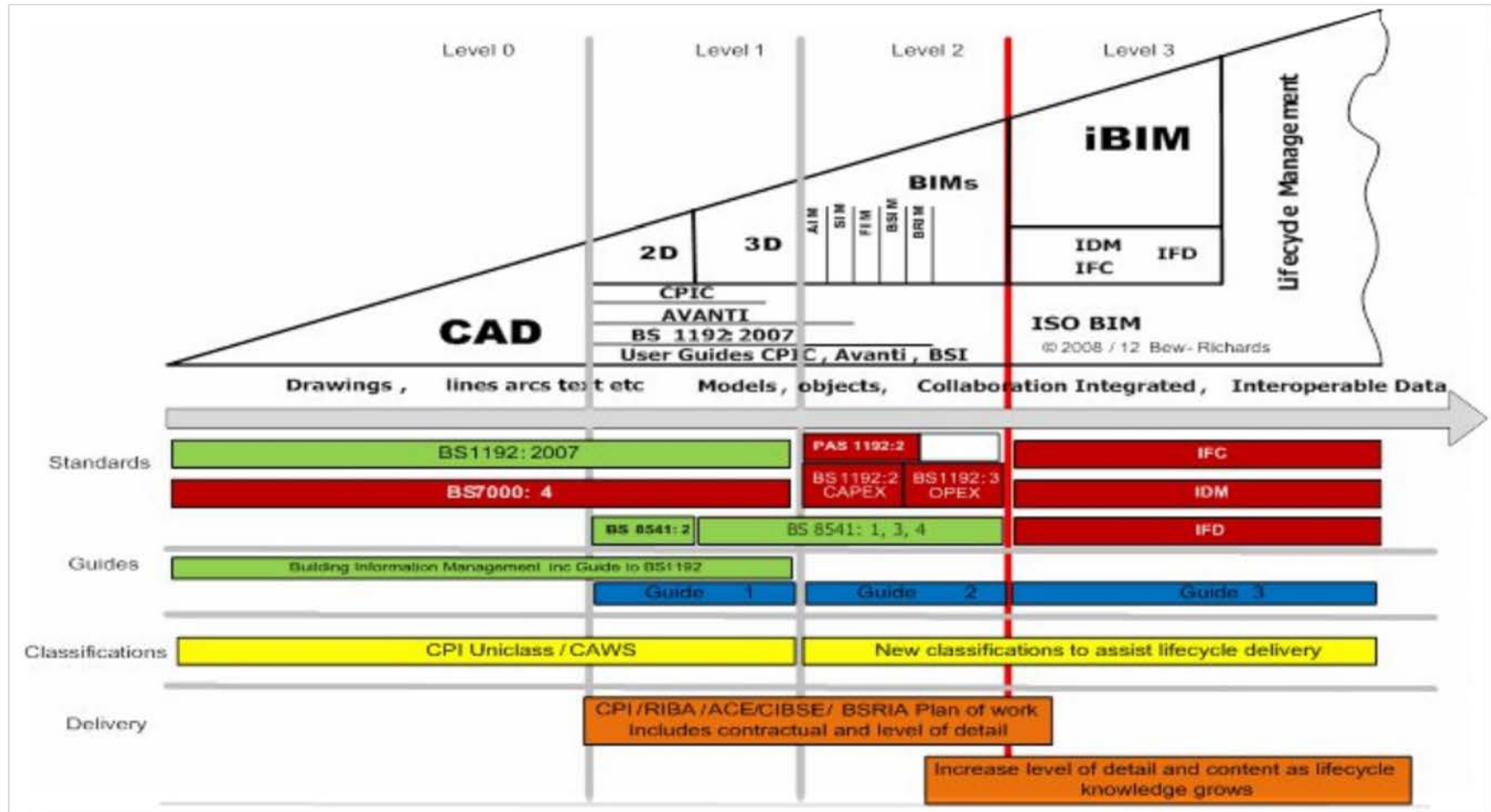
Source: Mott Macdonald

# Asset Management- Mobile technology



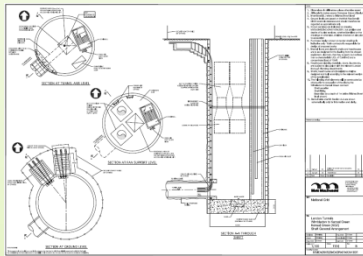
# Governance & Standardisation

# B555 Roadmap and the Maturity Model SA

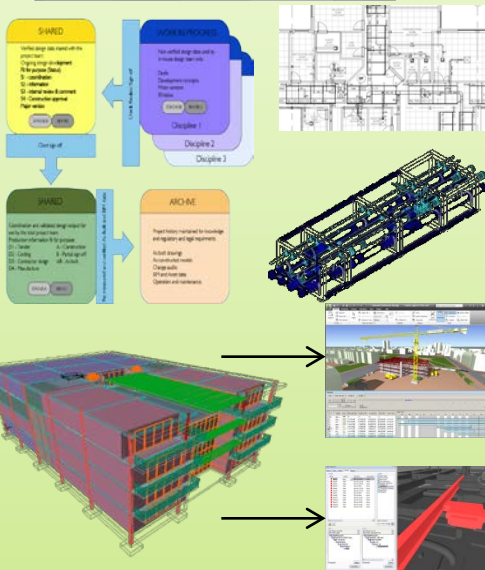


(c/o Bew Richards 2008)

# Level Definitions



- ▶ Level 0 - Unmanaged CAD typically 2D, with paper (or 'electronic ink') exchanged between participants.



- ▶ Level 1 - Managed CAD in 2D or 3D using BS 1192:2007 with a common data environment, but standalone commercial data management

- ▶ Level 2 - Managed 3D environment using separate discipline BIM tools with attached data and integrating commercial data

- ▶ Level 3 - *to be defined*: iBIM or integrated BIM potentially accessing all available data forms, adding value in operation and supported by open standards.



# BS and PAS 1192 series – Water treatment USA



**BS1192:2007** Established the methodology for managing the production, distribution and quality of construction information, including that generated by CAD systems, using a disciplined process for collaboration and a specified naming policy.”



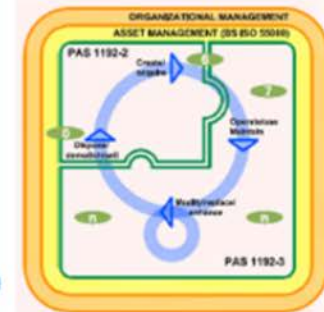
**PAS 1192-2** specifies requirements for achieving building information modelling (BIM) Level 2



**PAS 1192-3** focuses on the operational phase of assets irrespective of whether these were commissioned through direct capital works, acquired through transfer of ownership or already existed in an asset portfolio



**BS 1192-4** defines the collaborative Production of Architectural, Engineering and Construction Information Part 4 – Client information requirements (COBie)

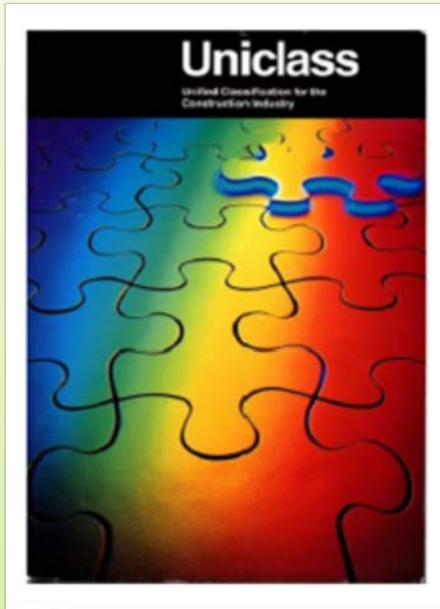


# PAS 1192-5 Success stories – Water treatment USA



**PAS 1192-5 Specification for security-minded building information management, digital built environments and smart asset management**

# Asset Classification



**“Is a classification system providing a framework of common identification to assets”**

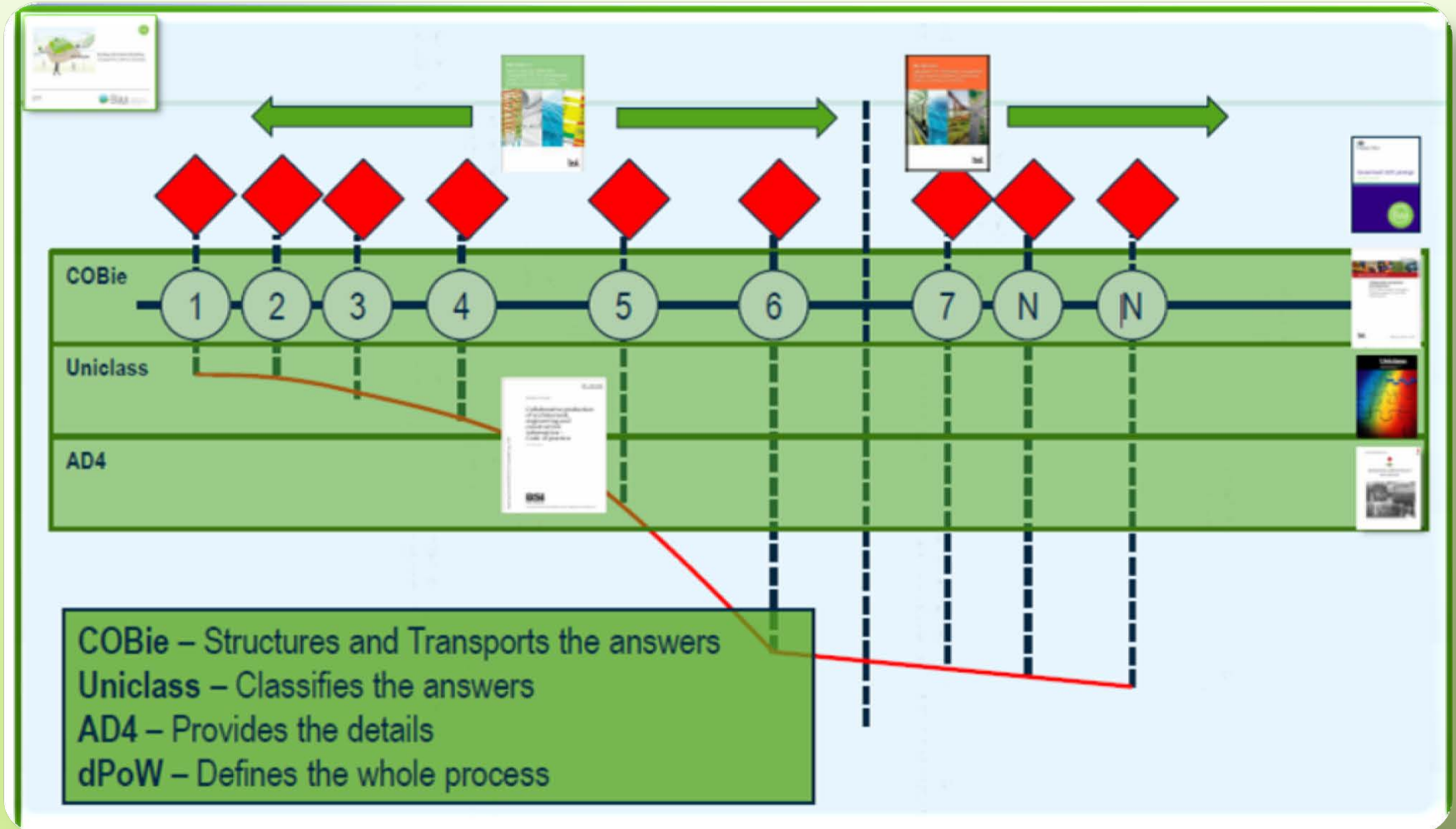
Uniclass 1 -Not fit for infrastructure

Uniclass 2 -A vast improvement but not for Rail or Road

Uniclass 3 - Tackles the infrastructure and leaner assets



# How does it work (dPoW)

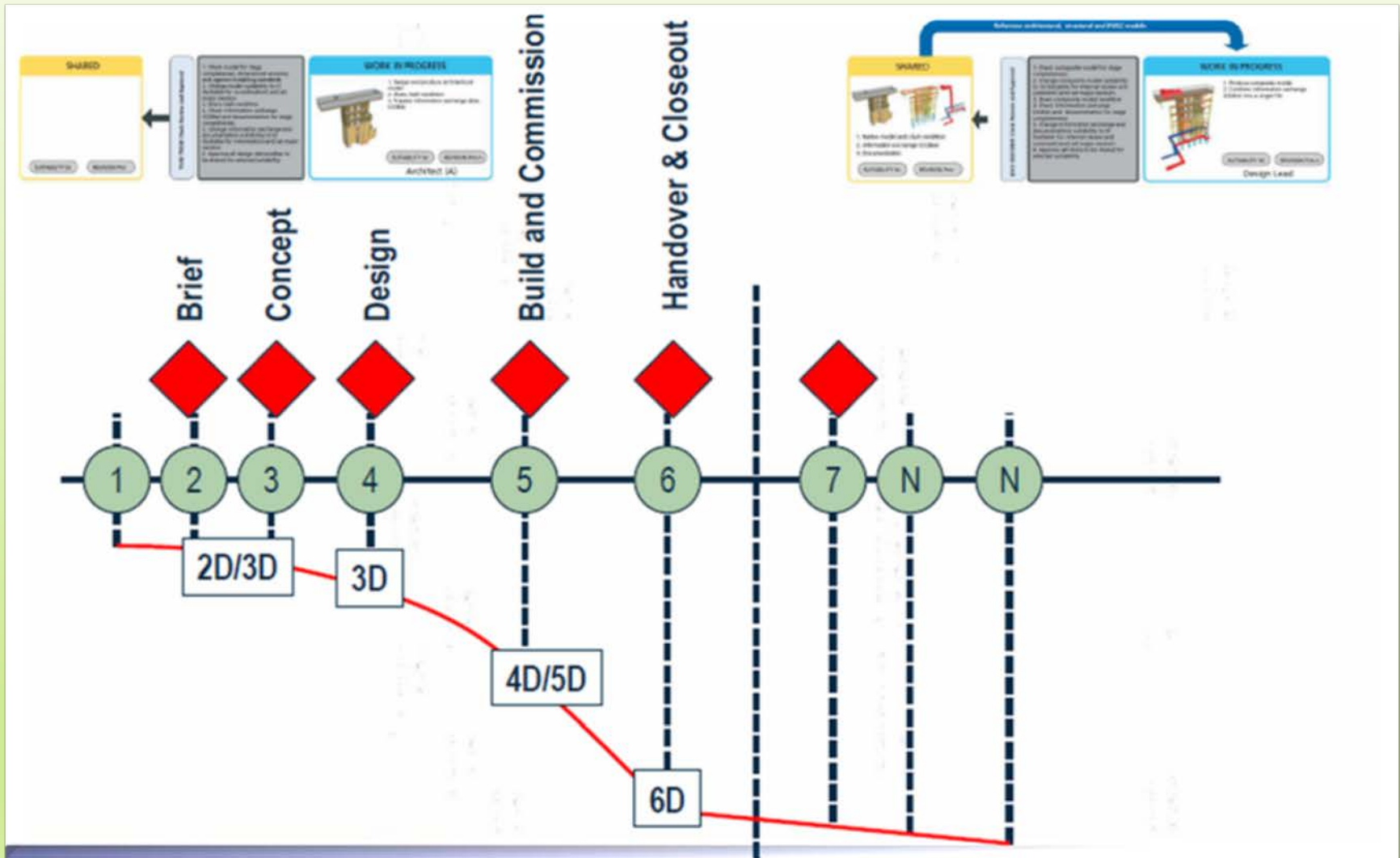


dPoW – Defines the whole process

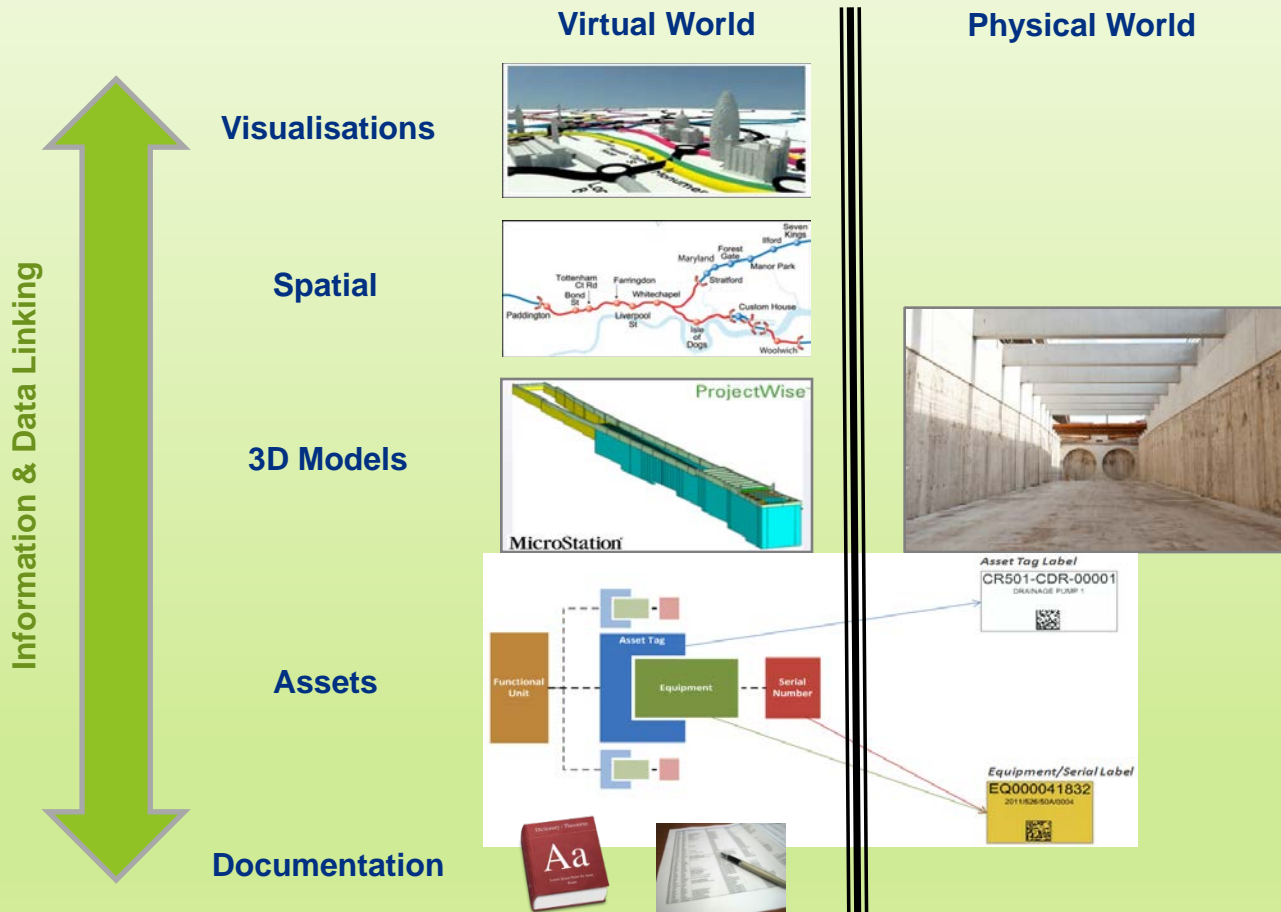
AD4 – Provides the details

Uniclass – Classifies the answers

# Modelling



# Vision... Build Two Rails ...Virtual - Physical



Future perspective

# Implementation Plan

## Where are we now

Delivery and running costs increase year on year

Design quality could be improved

Frequent delays on site due to poor coordination

Loss of production due to facility maintenance slower than liked

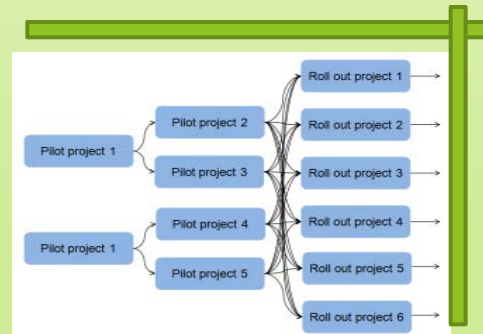
## THE PLAN

Review BIM Strategy

Develop BIM Protocols & Guidance

Pilot Project Implementation

BIM Library & Tools



## Where we want to be and beyond

20% faster delivery of transport infrastructure

Multi £million facility management savings

Zero coordination errors on site

100% increase in information access

Phased approach of controlled risks and lessons learned and shared. Gradual roll-out across business

2 to 3 years

شكراً

धन्यवाद