Optimising FM Performance Through BIM Technology

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@CunninghamReid

Introduction

Introduction

- **Reid Cunningham** – Strategic Development Director and Project Leader for BAM's FM BIM project 'Project Robin'

- **Phil Palmer** – Virtual Construction Manager

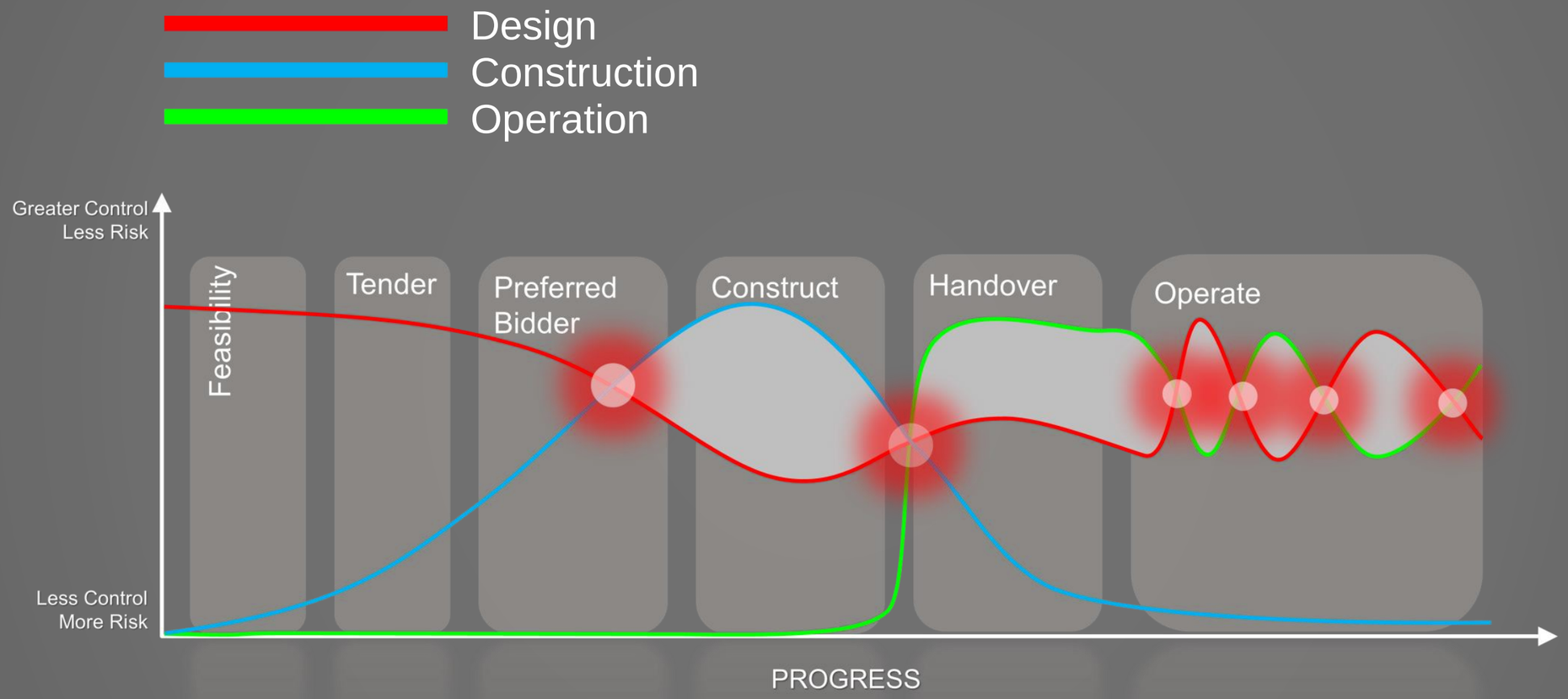
Introduction – BAM Construct UK

- £1bn construction based group in UK
- Mandated BIM for construction projects
- Collaboration between
  - Regional construction companies
  - BAM Design
  - BAM SE
  - BAM FM

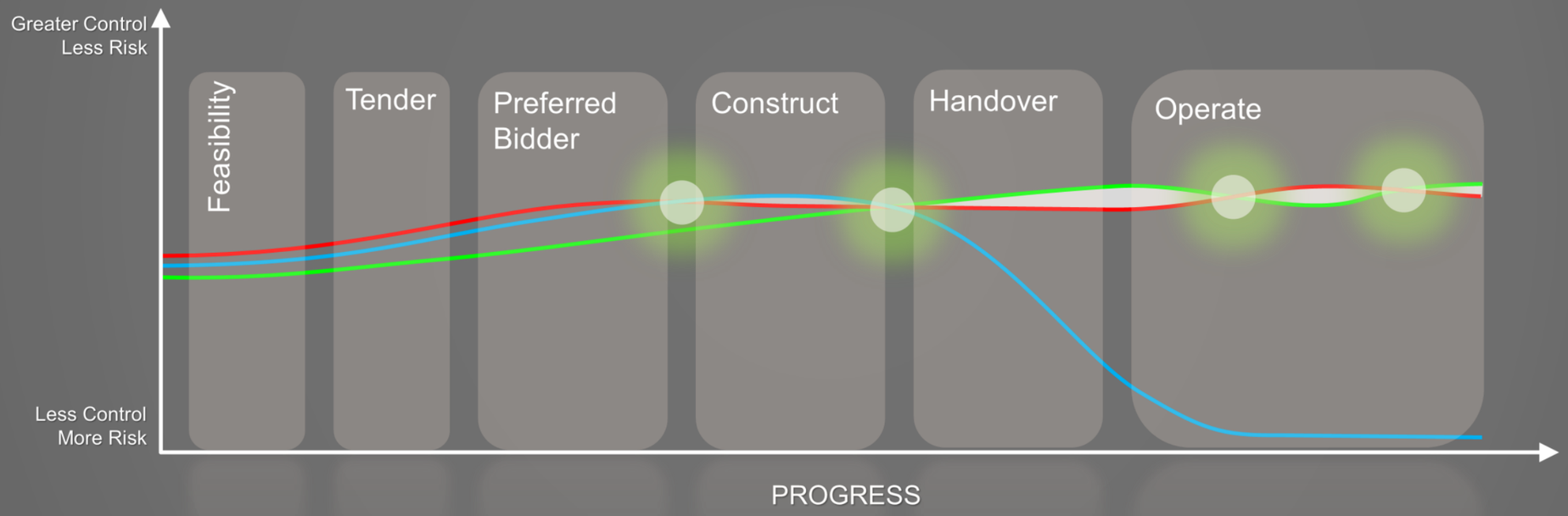
Introduction – BAM FM

- £44m facilities management
- 60% turnover in PFI
  - Public sector heath, education, law & order, public sector accommodation
  - Long term (25 to 30 years)
  - Performance / Availability
  - Fixed price
- 40% turnover in maintenance
  - Commercial sector
  - Static & mobile engineers/technicians

Traditional Data Transfer



Objective of Collaboration Data Transfer using BIM



BAM's 'Project Robin'

AUTODESK.

bam

FSI

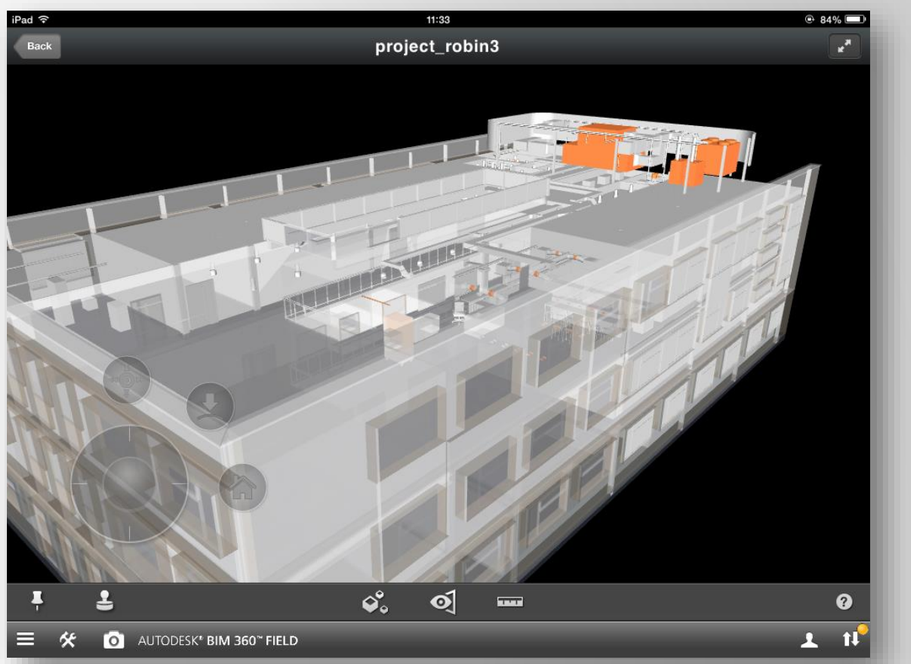
Project Robin

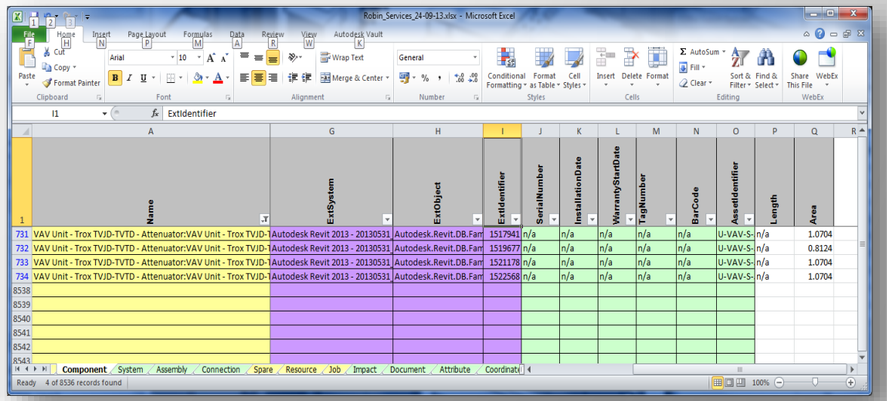
- **Phase 1**
  - Populate CAFM with BIM data
- **Phase 2**
  - Populate CAFM with BIM data for UCL Academy, Camden
  - Operate ‘live’ 3D BIM for UCL Academy, Camden using BIM 360 Field
  - Operational synchronization between BIM and CAFM

Phase 1 – Can we transfer data assets ?

Project Robin – Development POC

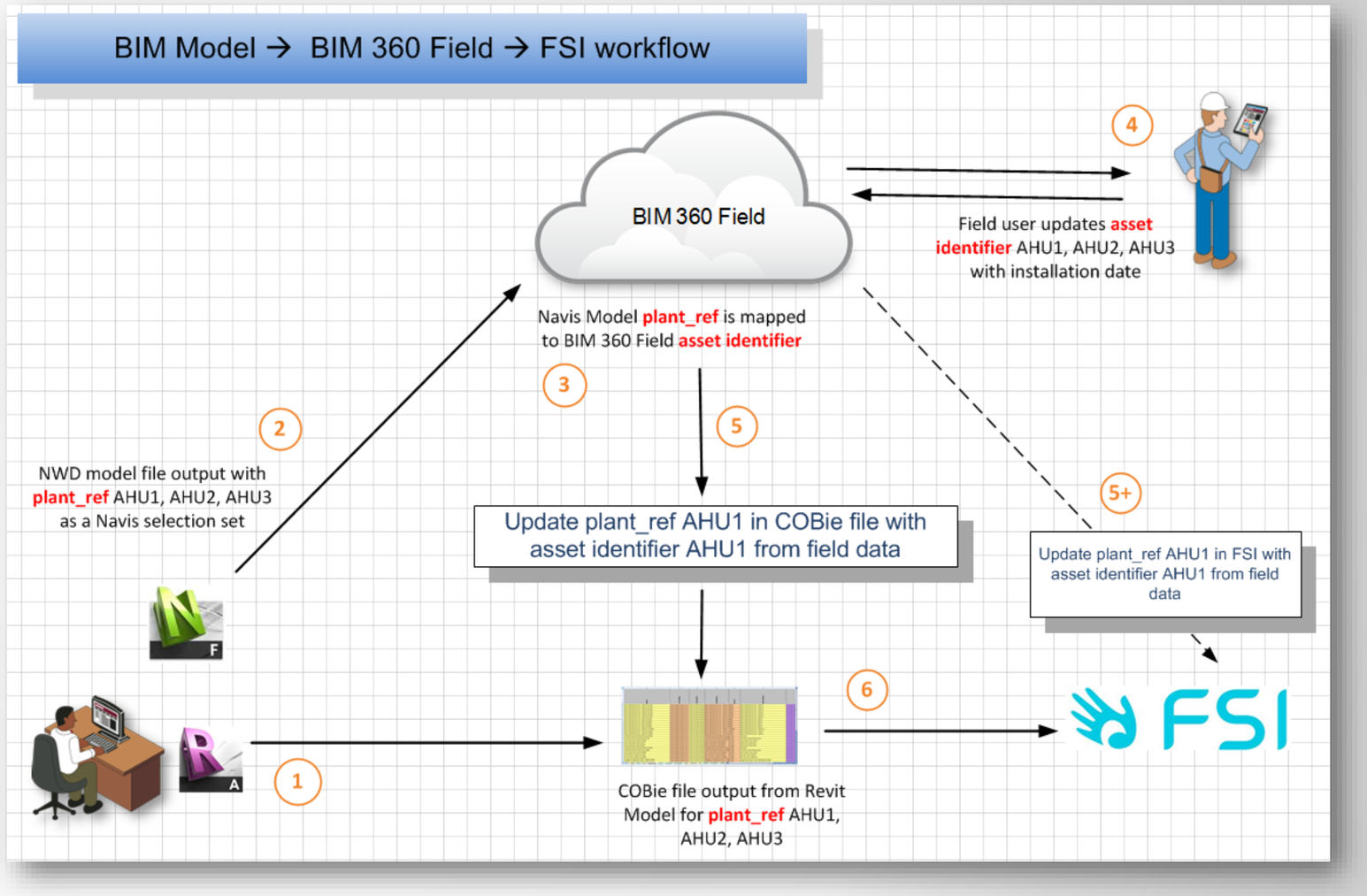
- Phase 1 – Can we do this ?
- Test of data transfer
- Proof of Concept Model (Revit – A “Clean” Model)
- COBIE into BAM FM System
- Mapping the process
- Lessons Learned
- Broadening the scope
- Business Case for Phase 2 - Operational





Project Robin – Development POC

- Map agreed Workflow
- Agree What FM Assets required
- Unique Asset_ref (plant ref)
- Cobie Export ADSK UK Consulting Tool for Revit
- COBIE drops from Discipline Models where required
- Data COBIE Merging Tool
- Phase 1 – Successful Results to move forward with REAL data model



Operational – Phase2 UCL Project

Project Robin – Operational Phase2

The Project	UCL Academy Camden 6 storey Education Sector Building Central London Location.
BAM Construction	Main Contractor
BAMFM	FM Service Contract (20 + years)
Design Team	Non BIM users (in 2d land unfortunately)
BAM Design (modellers)	Re-Model from Existing ‘Record Drawings’ NO Arch Model available NO MEP model FF&E (BAM Design model)
System Live	First Stage Operational - October 2013

Project Robin – Operational Phase 2 Set-Up

- Asset Requirements
- Classification System
- Revit Data Preparation for COBIE and Classifications
- COBIE Data Drops (COBie+)
- BIM Model to Navisworks
  - 360Field Considerations
  - Selection sets for Data Mapping
- BIM360 Data Field Mapping
  - Uniclass2 Filters
  - Additional Documents
- Business Benefits - Measurements

Project Robin – Operational Phase2

Assets / Classifications / Asset_ref – Tying it all Together

Revit/ COBiE model parameters	BIM 360 Field property	Notes
CobieAsset_Indentifier	UNIQUE Asset Ref	Plant_ref in Revit
Revit Type: COBieTypeCategory	Description	
Revit Type: COBieTypeRowName	Type (via CObieTypeRowName)	

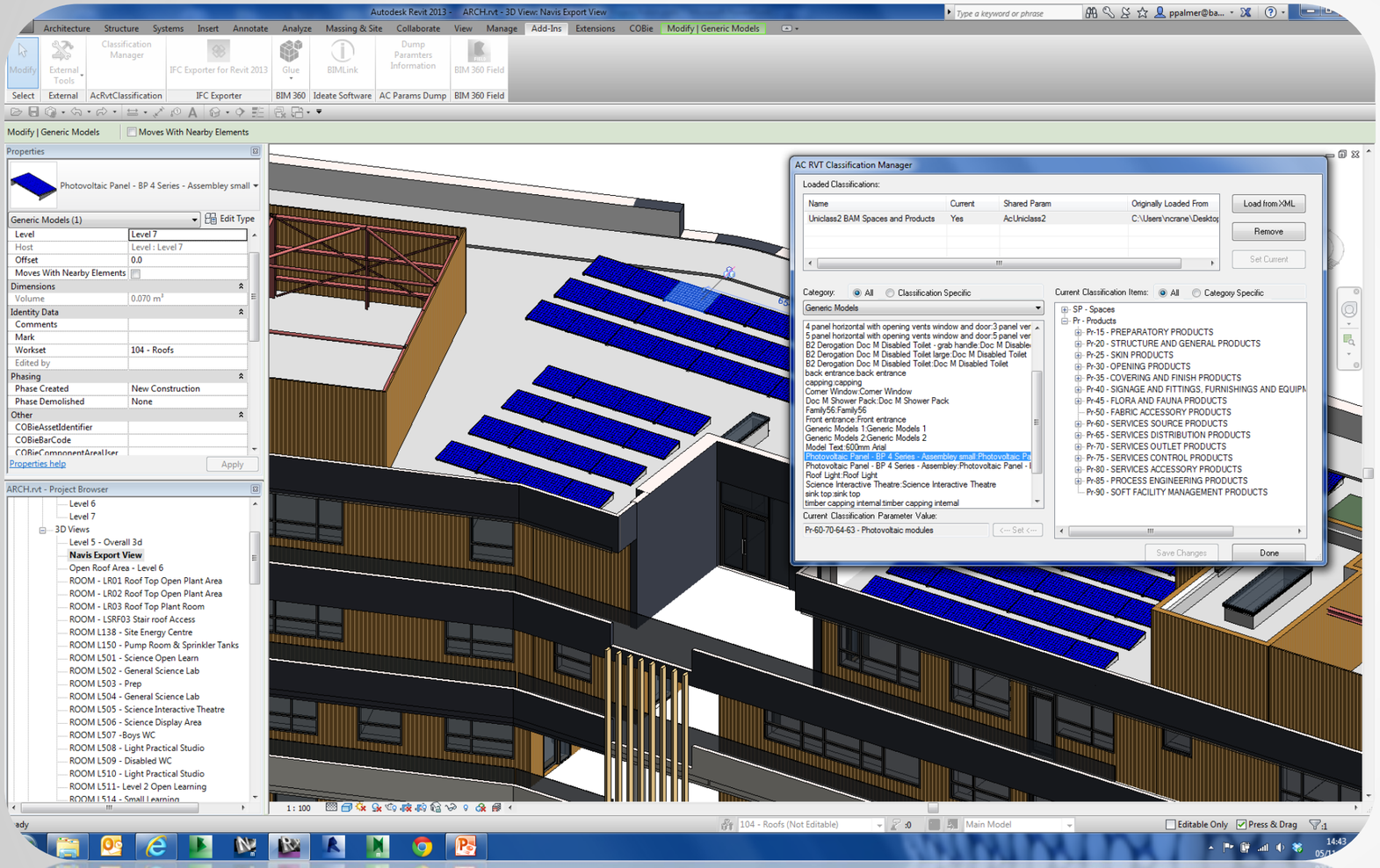
Revit model parameters	BIM360 property	COBiE data fields	Notes
Revit type:Model	Model	Type Tab:ModelNumber	Data Entry
Revit type: Manufacturer	Manufacturer	Type Tab:Manufacturer	Data Entry

Category Type	Uniclass2 Code
Volume Control Damper	PR-25-25-56 - Non-return dampers
Mechanical Air Terminals-Supply Diffuser	PR-03-04-03 - Air diffusers
Pumps	PR-65-36-98 - Water to water heat pumps
AHUS	PR-04-03-08 - Air handling units
Boilers	PR-87-08-15 - Condensing boilers
Condenser - Air Cooled - Horizontal - 180-533	PR-48-13-04 - Air cooled liquid chillers
Motor Control Valve - 15-50 mm:32 mm	PR-94-95-13 - Check valves

- Uniclass2 – Classification agreed for CAFM system
- PPM Schedules built from Assets identified from Uniclass2 (PR Coding system)
- Asset_ref for a UNIQUE key for 360 Field data.
  Aligned with Field Equipment database
  Aligned to FM System for Asset Type.
- FM advised on Asset types that are considered assets within the FM world.
- Agree Additional 360Field Data required
- Full data specification to be completed with PAS1192 for BAM workpackages

Project Robin – Operational Phase2

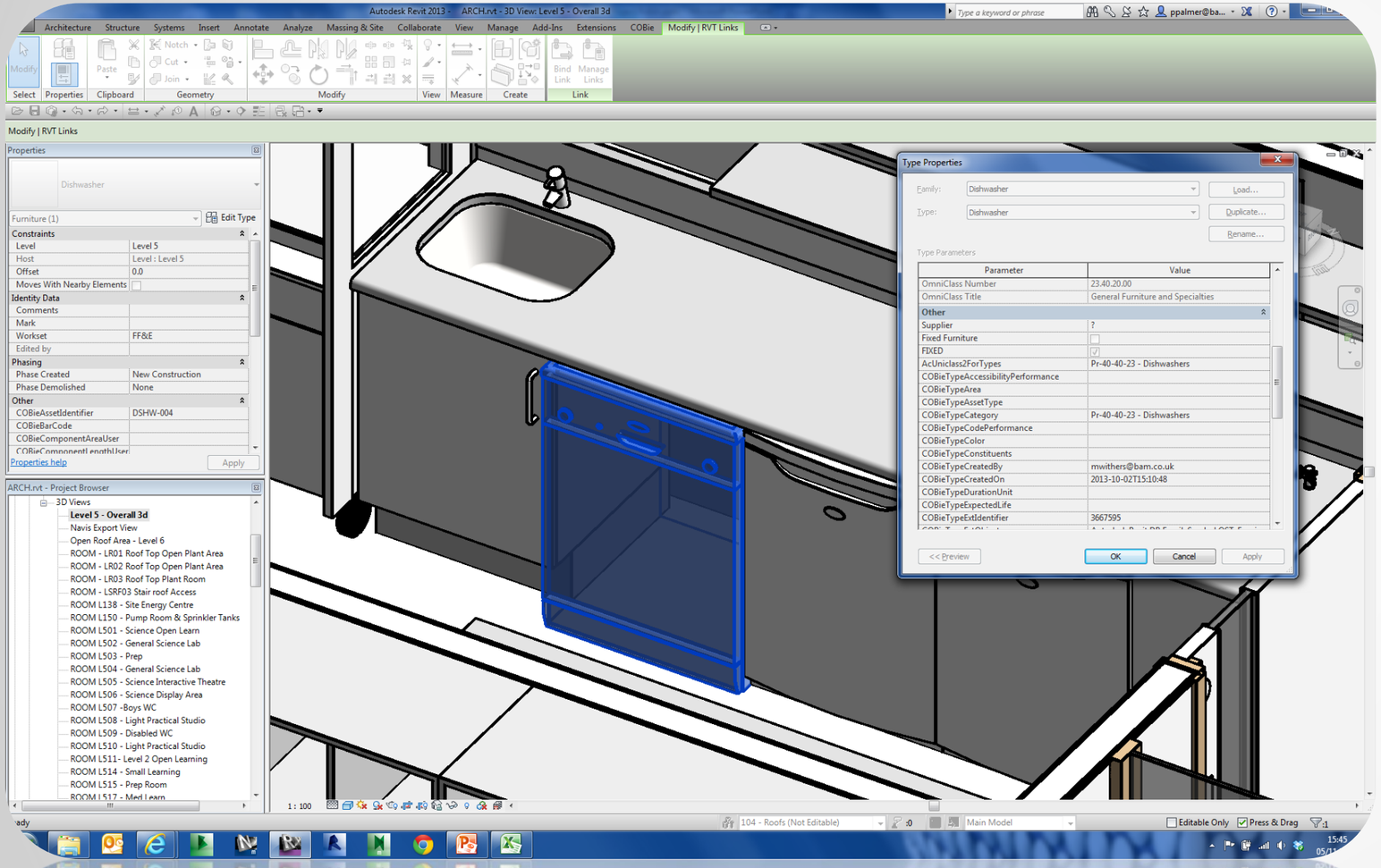
REVIT data Preparation via. Toolkits



- Classification Toolkit by Autodesk UK Consulting Team xml Uniclass2 import to Revit toolkit
- Applying Uniclass2 PR codes to Family Types within Revit Data Model
- FM System PPM regimes automatically created from Uniclass2 Coding system

Project Robin – Operational Phase2

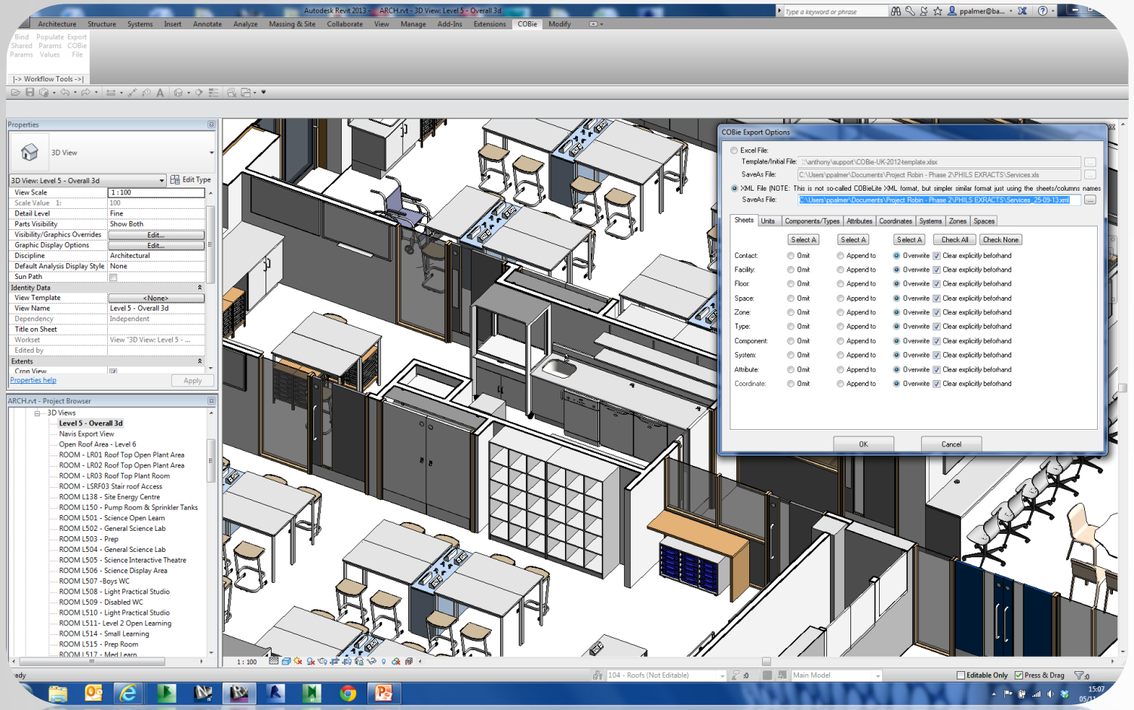
REVIT data Preparation via. Toolkits

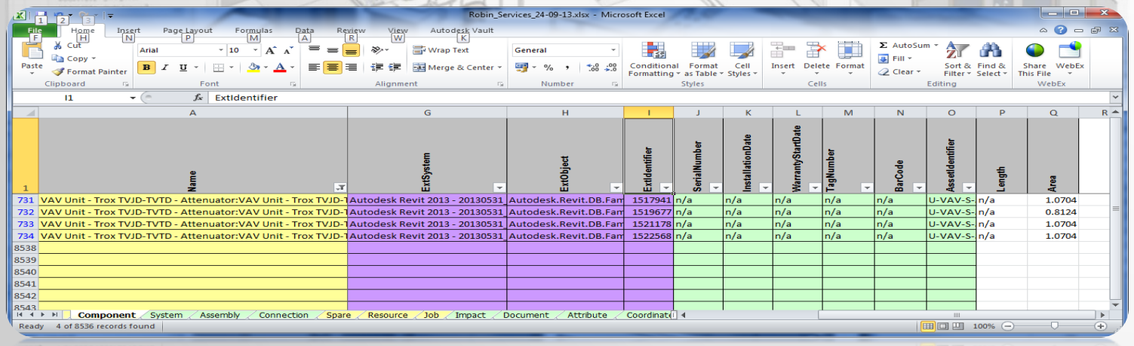


- BAM Unique Asset_Ref system applied to Each Unique Instance of family. (Shared Parameter)
- Asset_Ref linked to Bim360
- Asset_ID database of equipment in 360 Field provides linking mechanism for Field360 and FM System

Project Robin – Operational Phase2

REVIT – COBIE data Drops

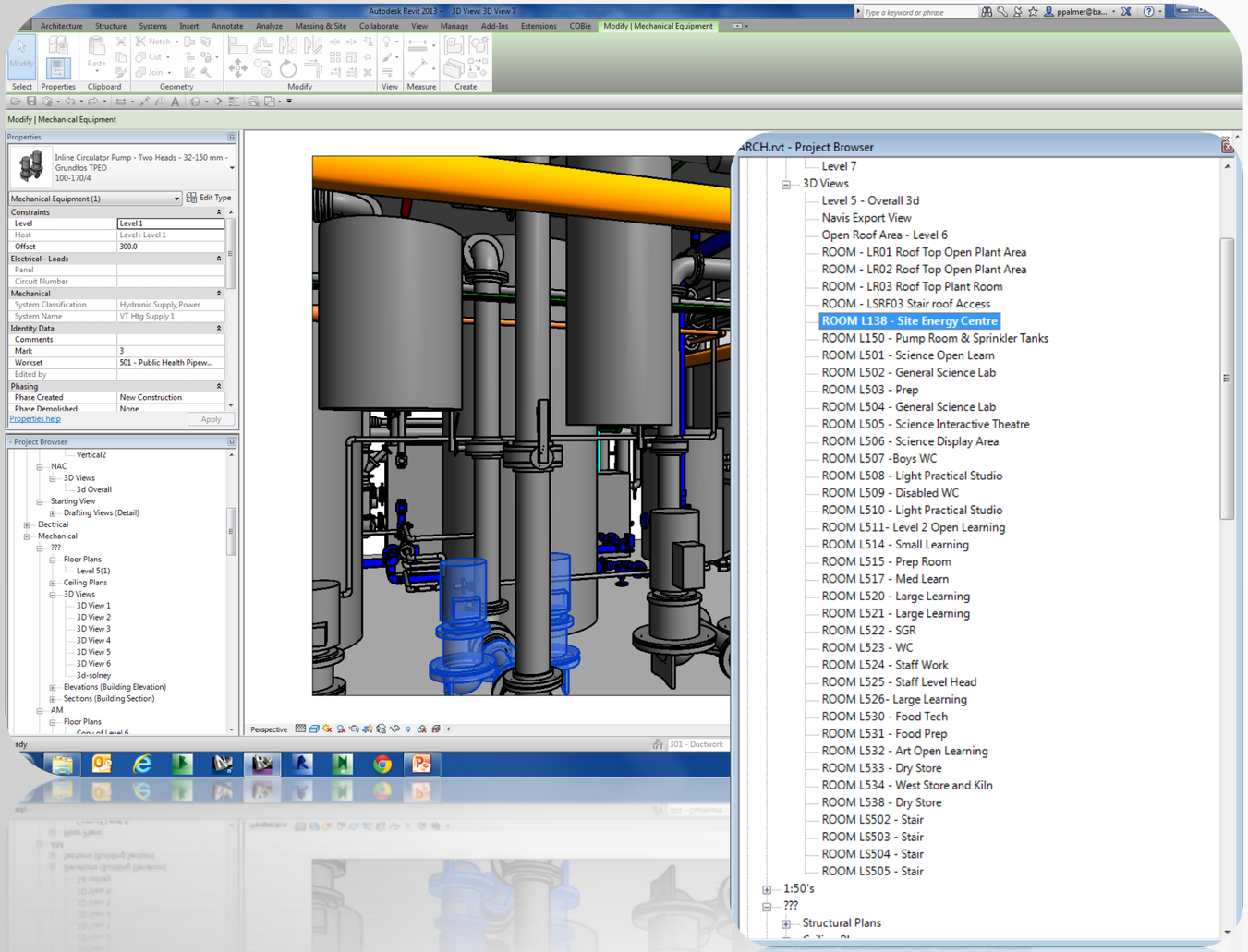




- COBIE Exporter Toolkit by Autodesk UK Consulting within the Revit environment.
- COBIE exported to XML format for data transfer to FSI CAFM system
- COBIE XLS exports also available if required
- Separate XML Outputs provided from EACH design data model
- STRU – ARCH – MEP – Interiors
- Assets then available in FSI FM System

Project Robin – Operational Phase2

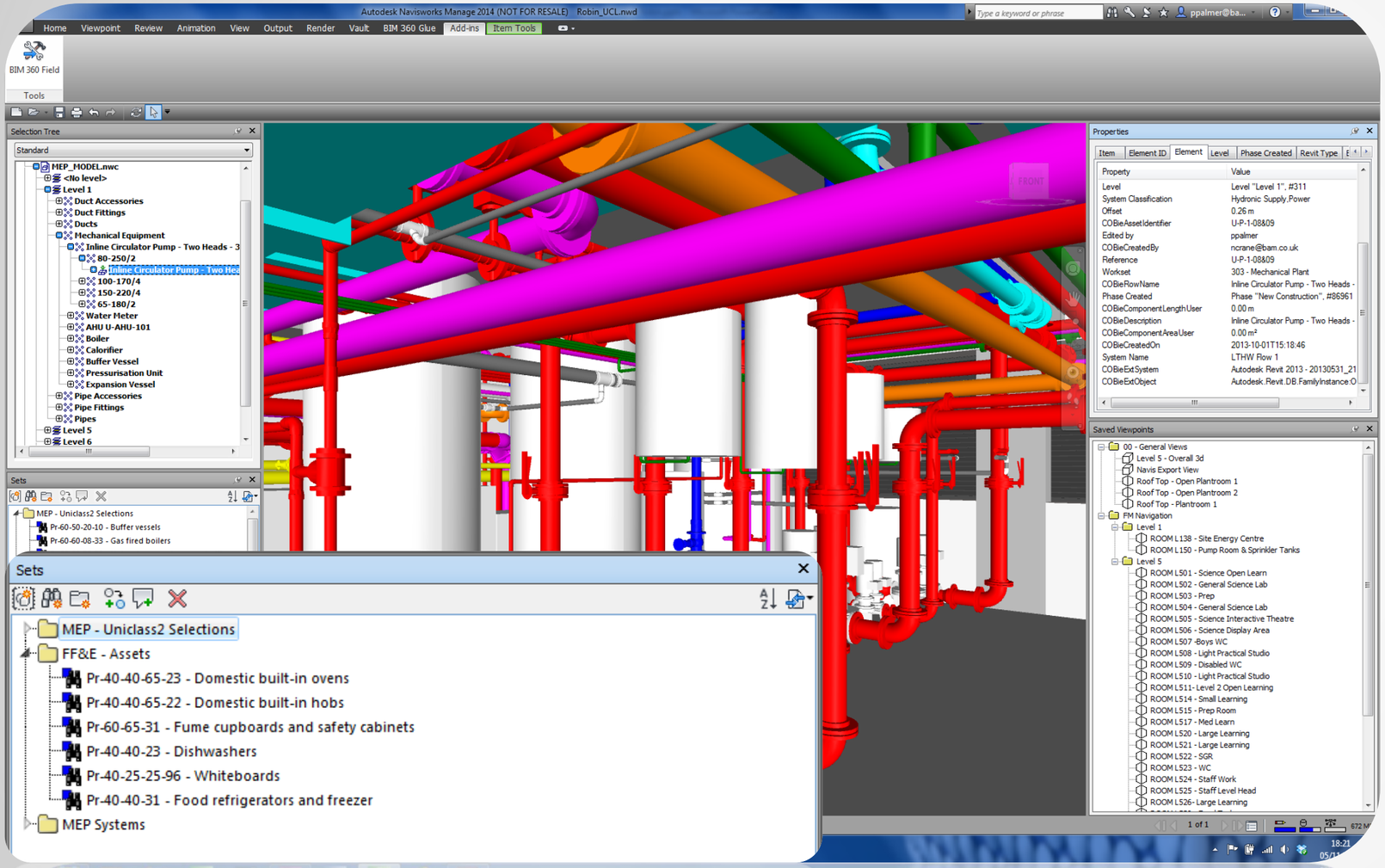
Model Preparation for Navisworks – 360 Field Considerations



- Consider the ‘End User’ in mind
  It’s a new tool to them
- Consideration for BIM360 Field Navigation Required for ease of use by users
- Views associated to Rooms and Major Building Areas created within Revit Environment
- Views then transferred over to Navisworks Combined Model when exported from Revit data model.

Project Robin – Operational Phase2

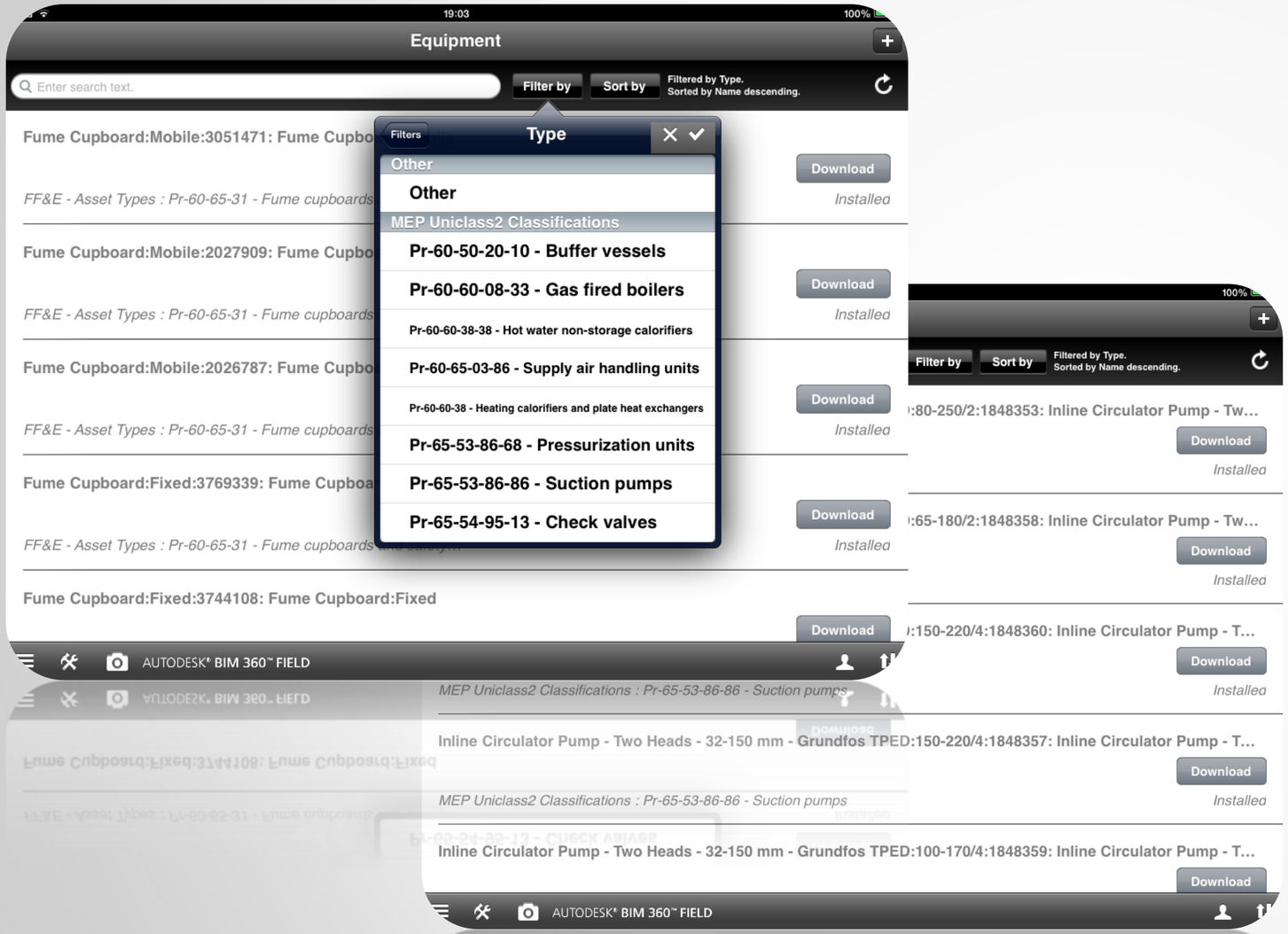
Navisworks Preparation – Selection Sets Mapping



- Revit Models Exported to NWC for Navisworks
- Selection Search sets created to select UNICLASS2 categories assigned to Revit Data objects
- Views and all Revit data available within Navisworks properties of objects
- Model ready to Publish to BIM360 Field Project Data
- Selections then mapped in 360Field application for equipment assets

Project Robin – Operational Phase2

BIM360 Field – Uniclass2 Filtering of Assets



- 360Data Organised By Uniclass2
- Type Filters Created for equipment
- O+M and SFG20 Regime Data assigned to Assets

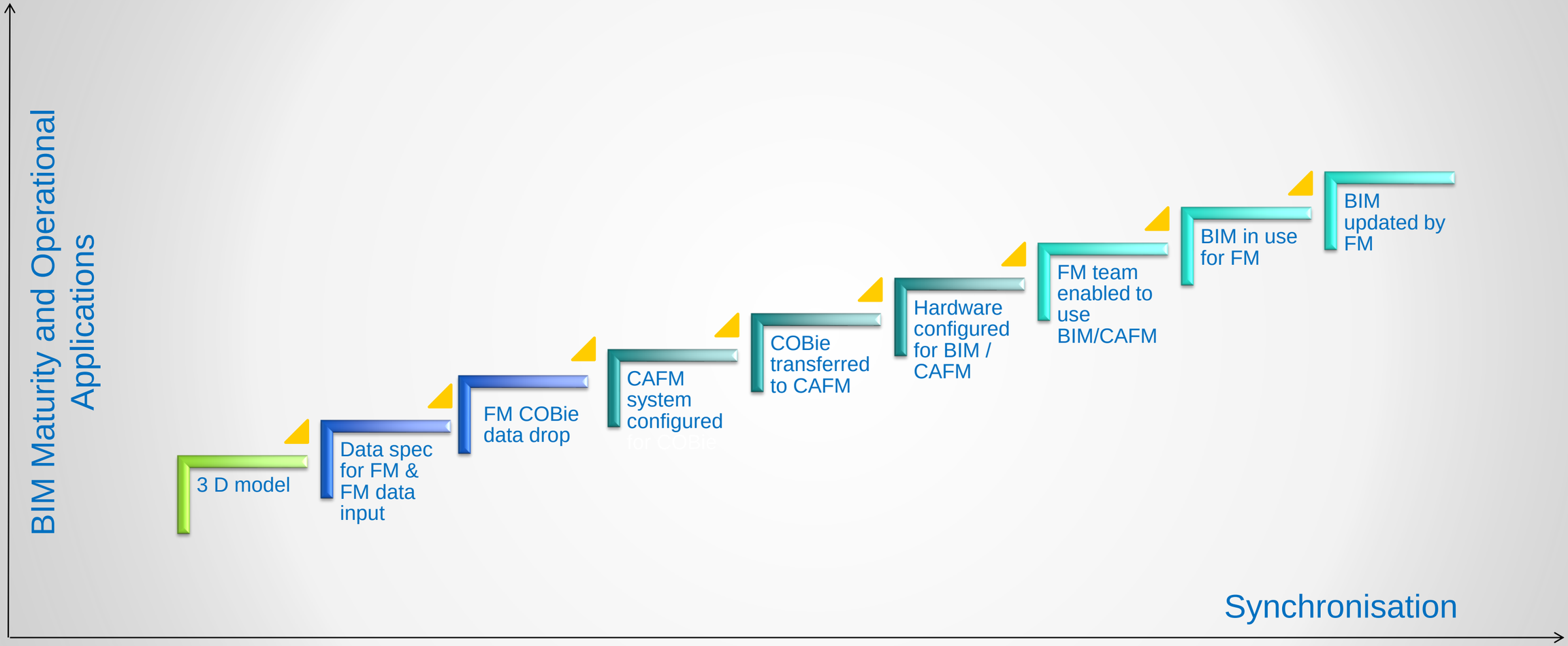
Project Robin – Operational Phase2

BIM360 Field – Navigation by end users

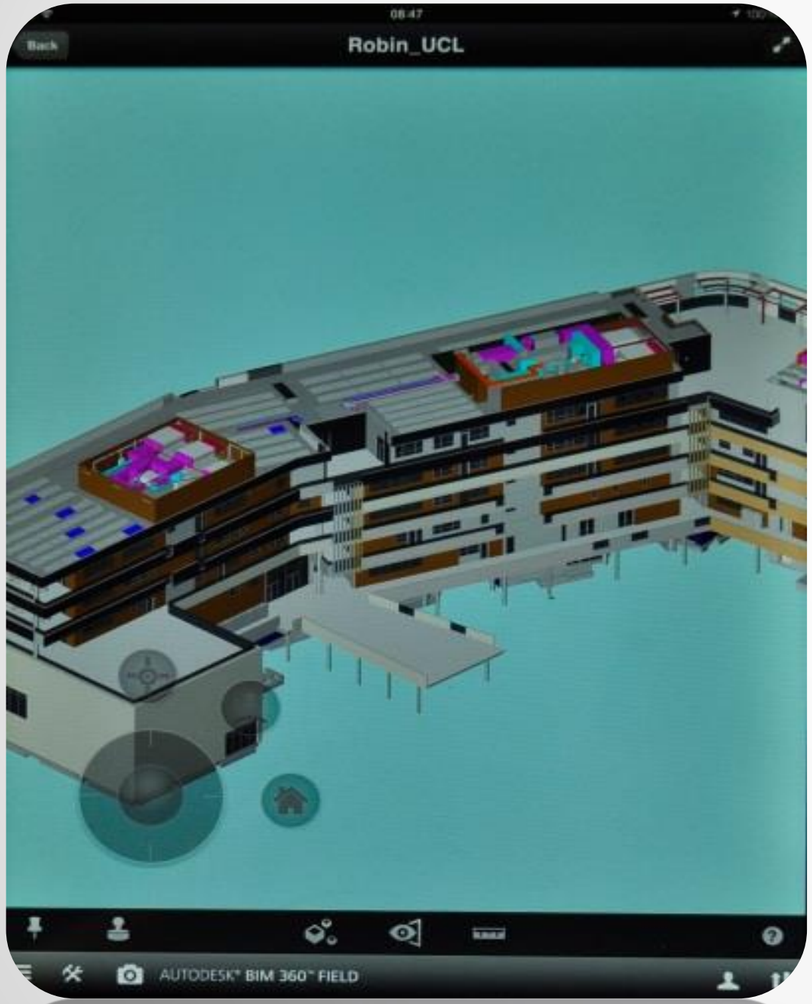
- Equipment listing to model or model to equipment listing
- Navigational Views and hiding of Objects or separated Models Provides full facility to get to the equipment data for FM purposes
- ALL information available as required to FM Engineers

BIM360 Field – Live Demonstration

BIM for FM Journey and Synchronisation



‘Faster First Fix’



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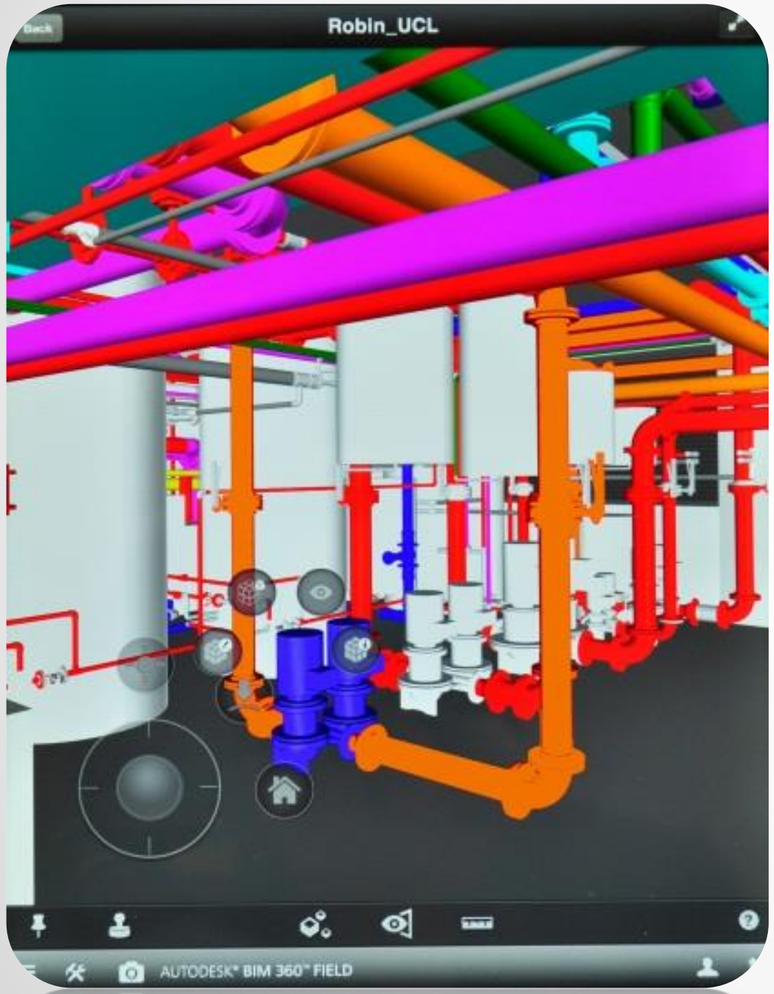

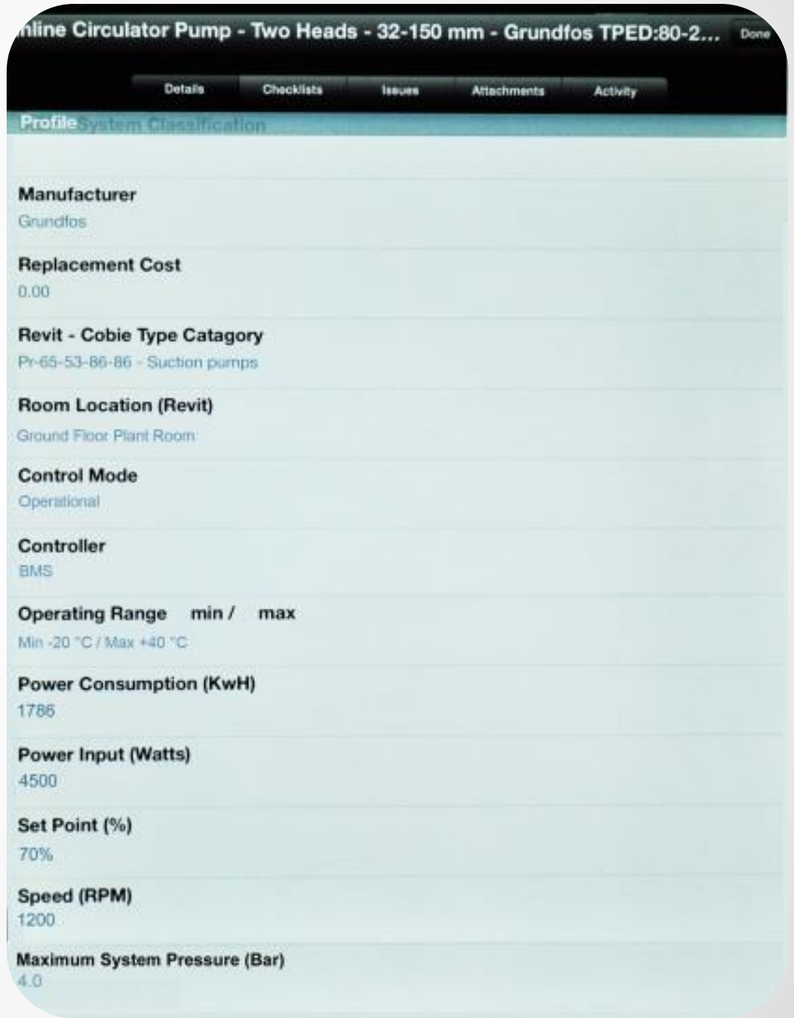

Project Robin – Operational Phase2

BIM360 Field – Business Benefits to BAMFM

Measurement Phase – 3 weeks into Operational Phase

Caretaker Response

An average of 10mins saved by receiving the job card to the device

The Caretaker was able to address an additional issue whilst attending 16% of all jobs

The Caretaker had no previous experience of using an iPad however they are now able to easily navigate both apps via the device

Engineer Response

An average of 25mins saved by receiving the job card to the device

The Engineer found BIM 360 Field to be useful when completing 39% of tasks

The Engineer had some experience of using apple devices and has found the ability to interrogate assets within BIM 360 Field particularly useful

Project Robin (Phase 3)

- Phase 3
  - Add ‘live’ BMS data to the BIM 360 Field screen for assets/systems
  - Increased synchronization of BIM data with other facility or business data to generate a ‘common data environment’

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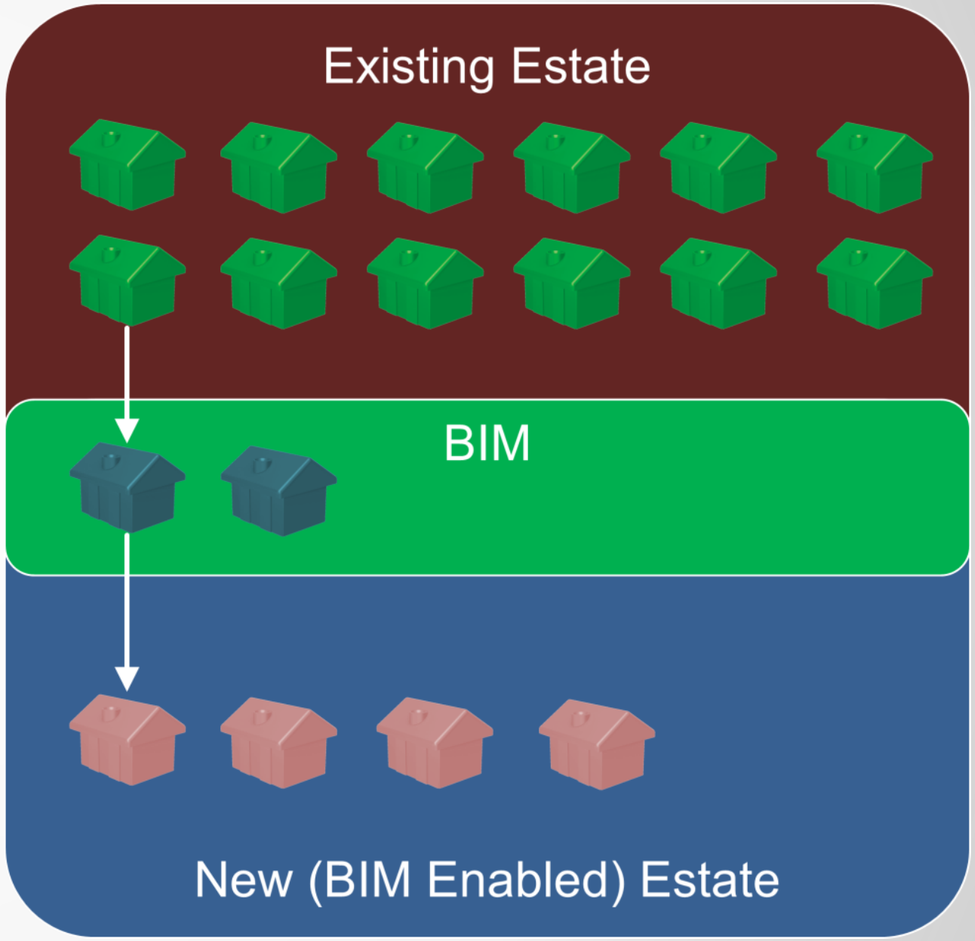
MYTHBUSTERS

Myth 1

- BIM is only for new facilities (‘Back to the future BIM’)



Myth 2

- COBie

Facility

Floor

Space

Zone

Type

Component

System

Assembly

Connection

Spare

Resource

Job

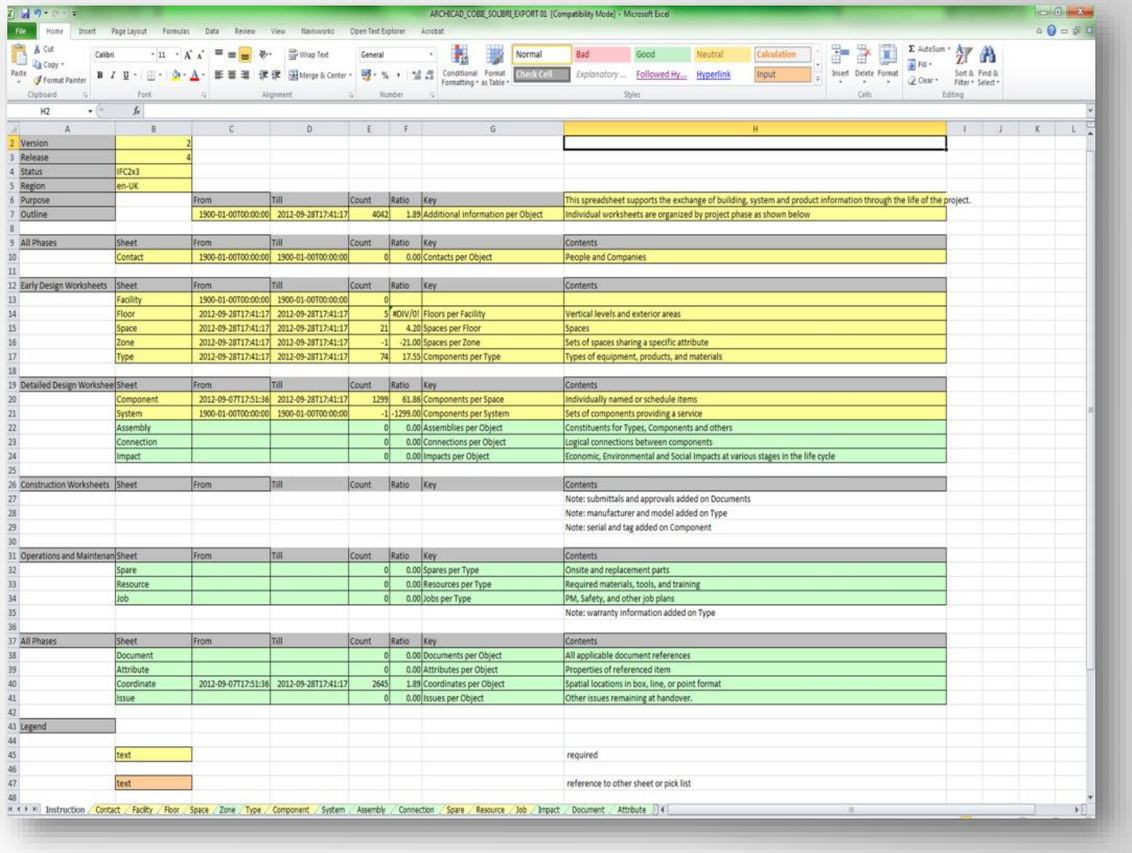
Impact

Document

Attribute

Coordinate

Issue



Myth 3

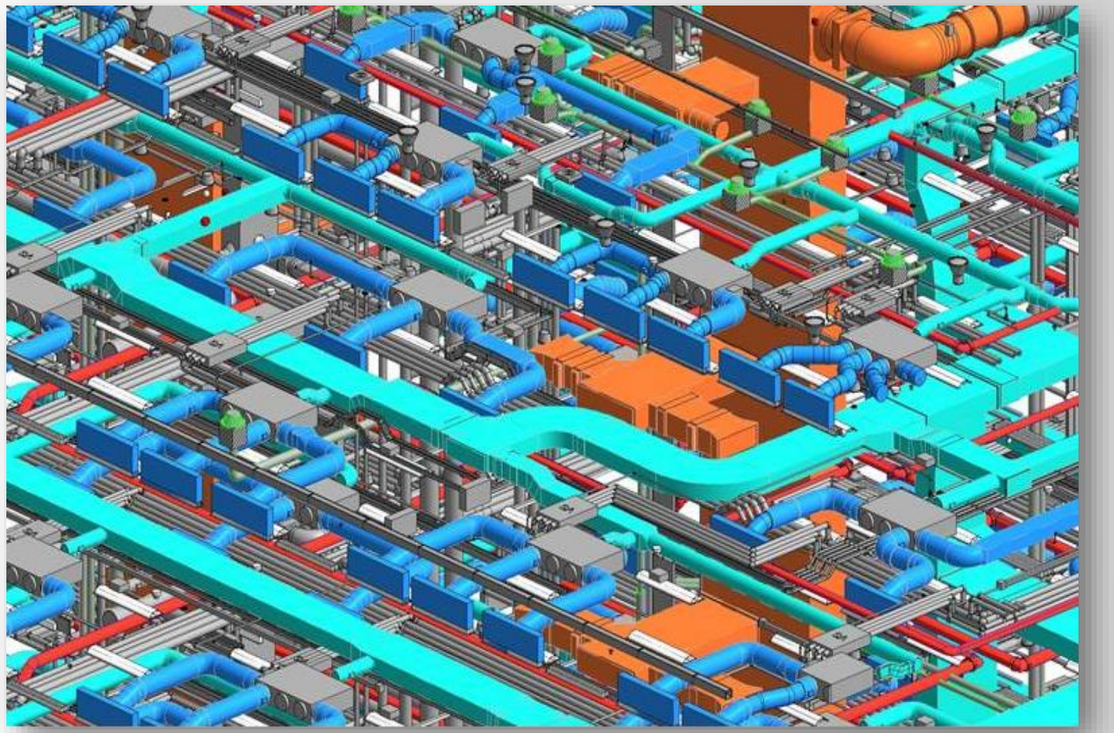
‘Design team’ inputs to BIM are sufficient for COBie and FM purposes…..

and

any benefits of harmonisation of design software used by the design team lasts.’

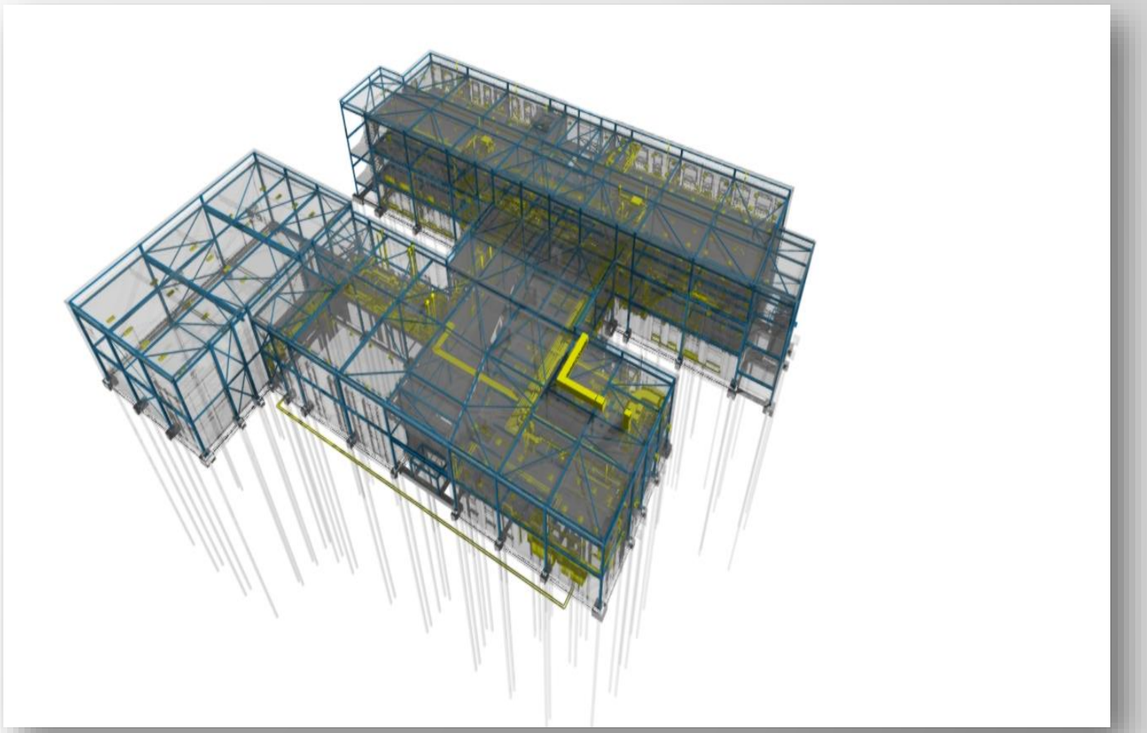
Myth 4

As fitted Drawings (and O&M Manuals are here to stay i.e the BIM model will be replaced on completion of construction by paper O&M manuals.



Myth 5

As fitted Drawings (and O&M Manuals are here to stay i.e the BIM model will be replaced on completion of construction by paper O&M manuals.



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