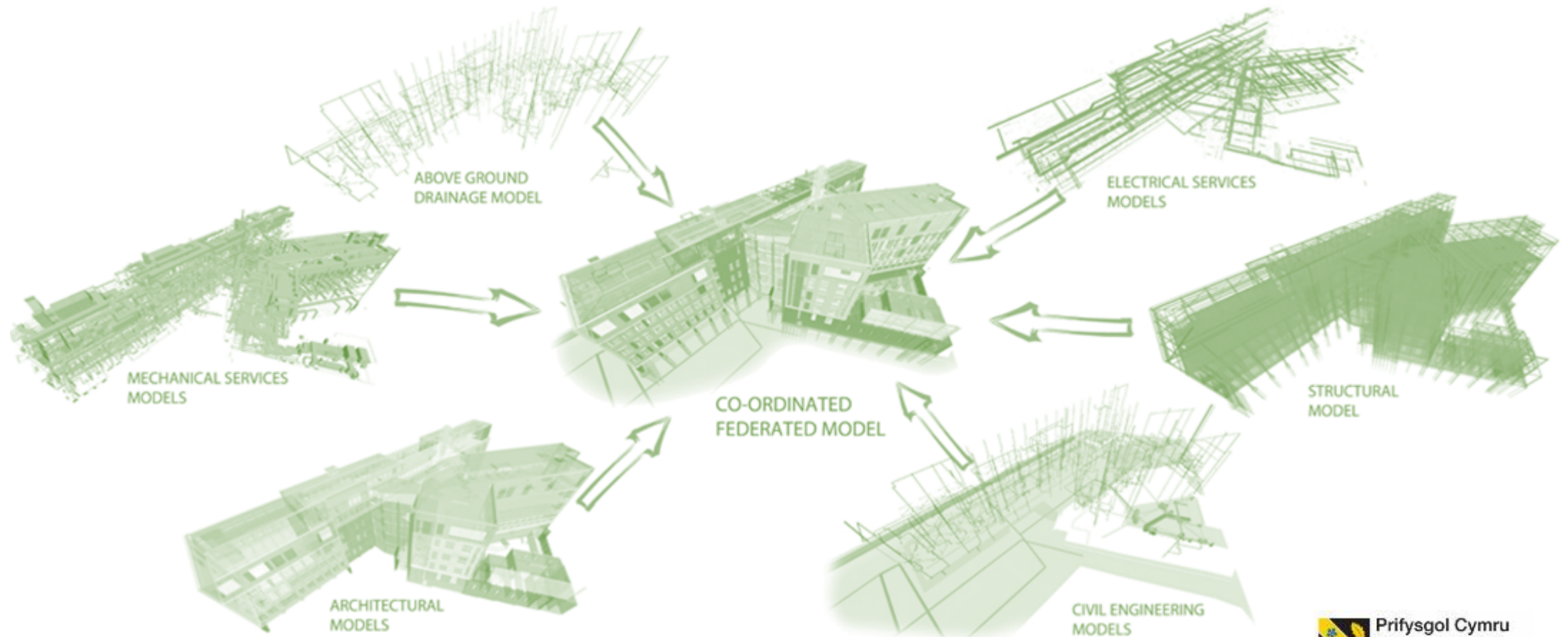


Building Information Modelling



www.onecreativeenvironment.com

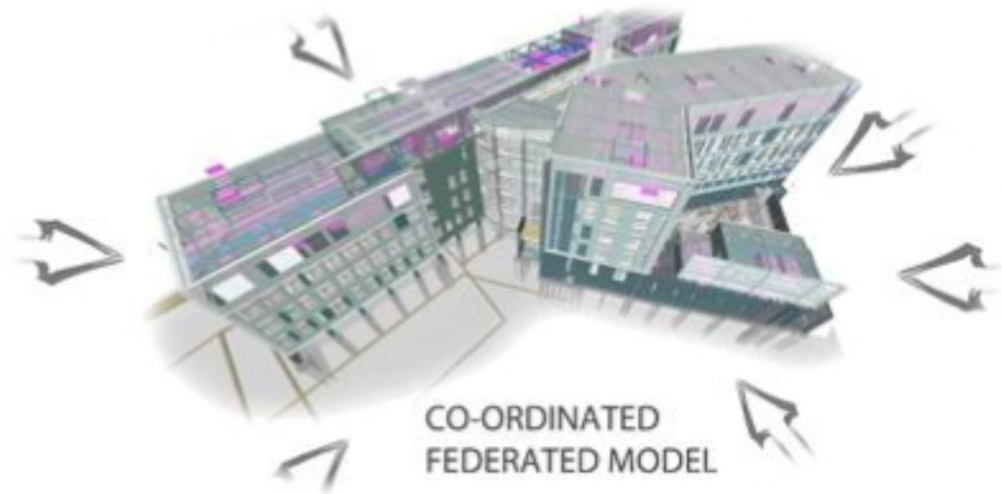
- Collaboration in Revizto.



Collaboration

How can we collaborate?

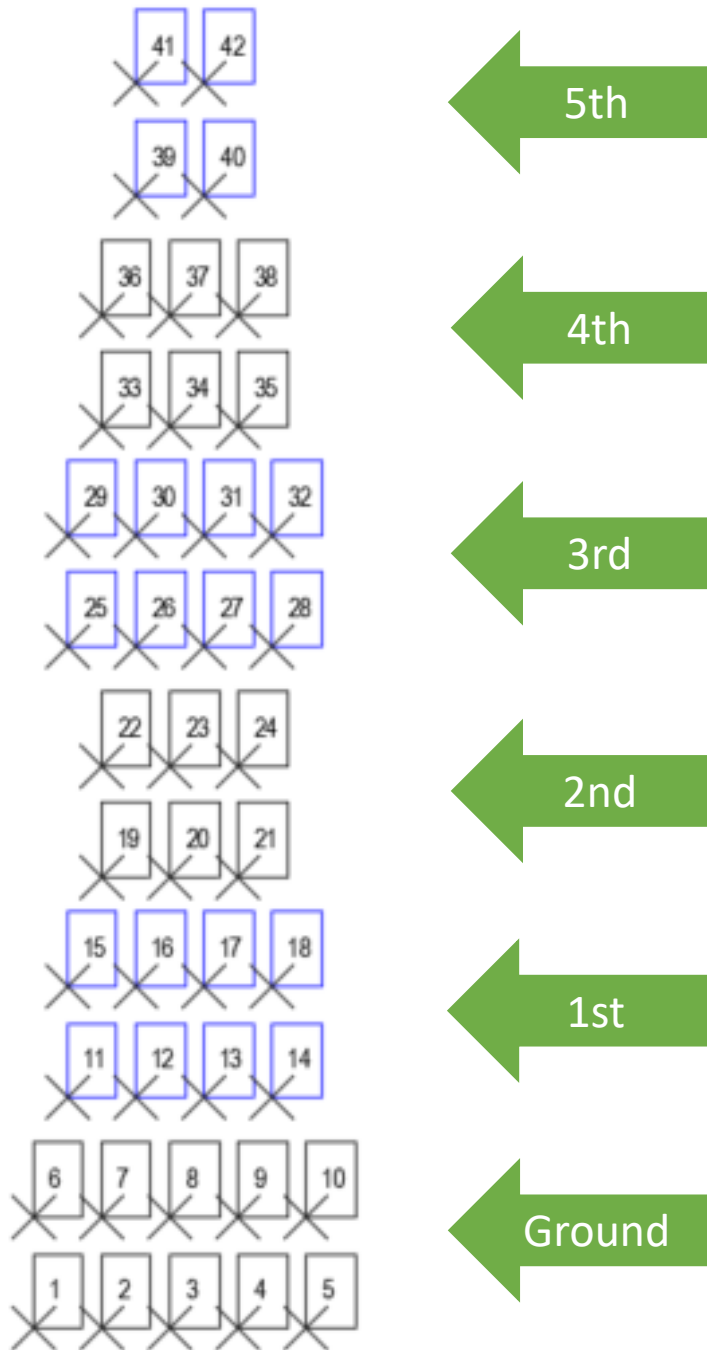
Tools such as Revizto enable a collaborative process using
2D and 3D Modelling with Intelligent Data



<https://revizto.com/en/>

<https://youtu.be/OnG3-0NqLr4>

Collaboration Exercise



Number	Name		Northings	Eastings	Level Height (above Level0)	
1	Gavin	Traylor	0	0	Ground Floor	0
2			0	11000	Ground Floor	0
3			0	22000	Ground Floor	0
4			0	33000	Ground Floor	0
5			0	44000	Ground Floor	0
6			18000	0	Ground Floor	0
7			18000	11000	Ground Floor	0
8			18000	22000	Ground Floor	0
9			18000	33000	Ground Floor	0
10			18000	44000	Ground Floor	0
11			0	5500	First Floor	3000
12			0	16500	First Floor	3000
13			0	27500	First Floor	3000
14			0	38500	First Floor	3000
15			18000	5500	First Floor	3000
16			18000	16500	First Floor	3000
17			18000	27500	First Floor	3000
18			18000	38500	First Floor	3000
19			0	11000	2nd Floor	6000
20			0	22000	2nd Floor	6000
21			0	33000	2nd Floor	6000
22			18000	11000	2nd Floor	6000
23	Ashley	Wood	18000	22000	2nd Floor	6000

Collaboration Exercise

Create a new project from the Architectural Template.

Design a unit with the external dimensions of 8m x 12m.

Your unit must be position to the correct Project Base Point and located on the appropriate Level. NB your project base point should remain at 0 elevation. (Refer to table for Northings and Eastings)

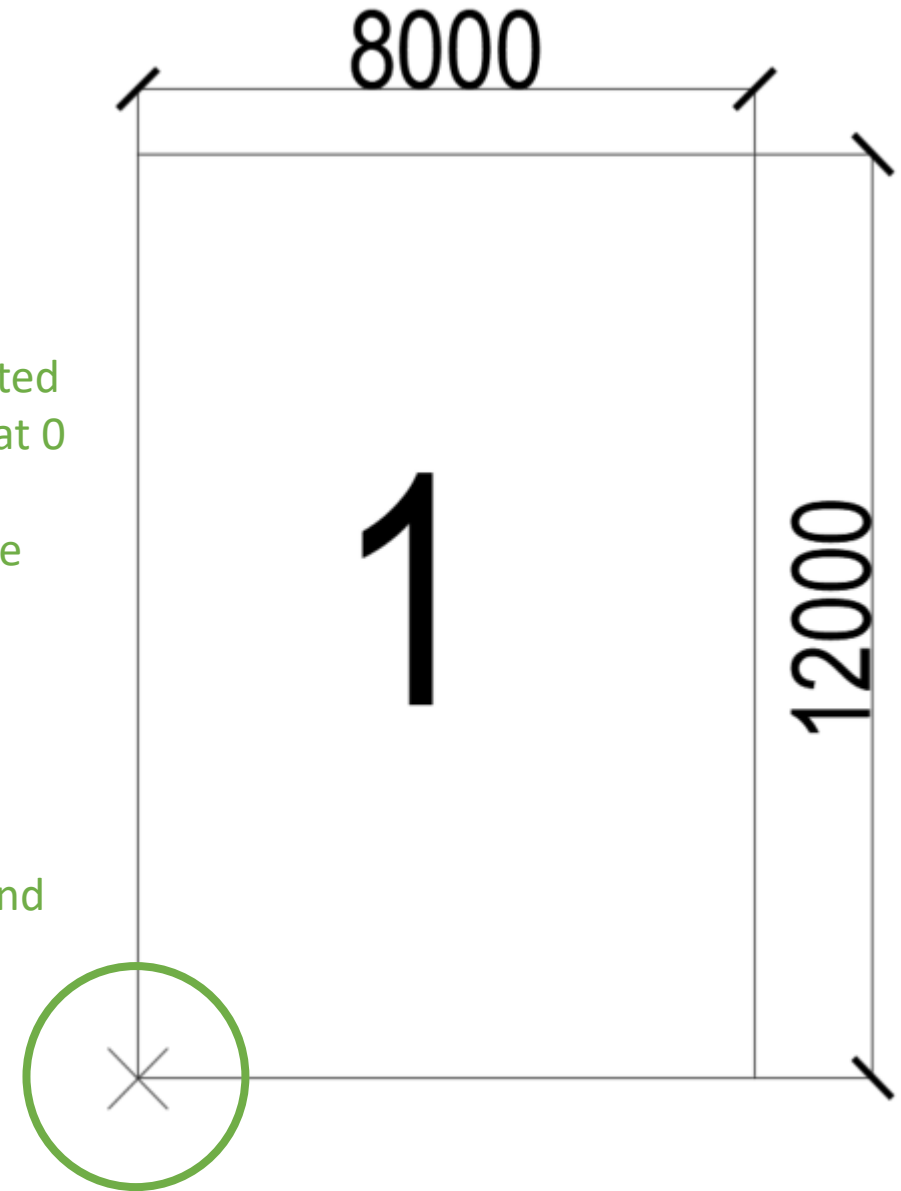
Note there are six storeys in this building so make sure you are on the right level.

Wall types / windows / doors / internal arrangement is up to you. A generic 200mm floor and 200mm flat roof should be used.

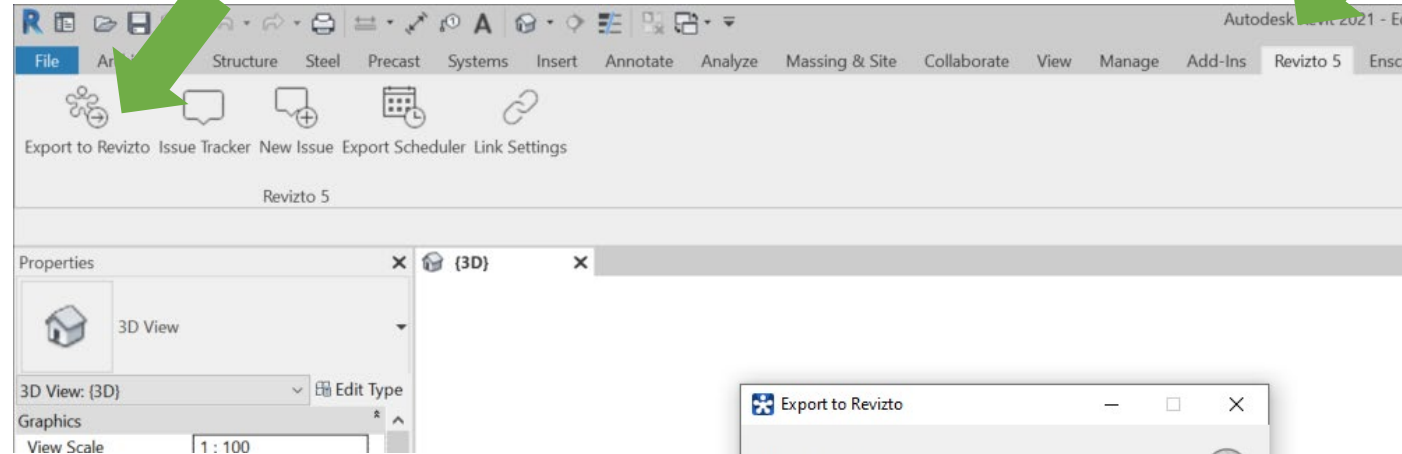
Create a Sheet using the UWTSD Title Block showing the floor plan and section at 1:50 scale.

Create a standard 3D View.

Save your project (add your name to the title)



Collaboration Exercise



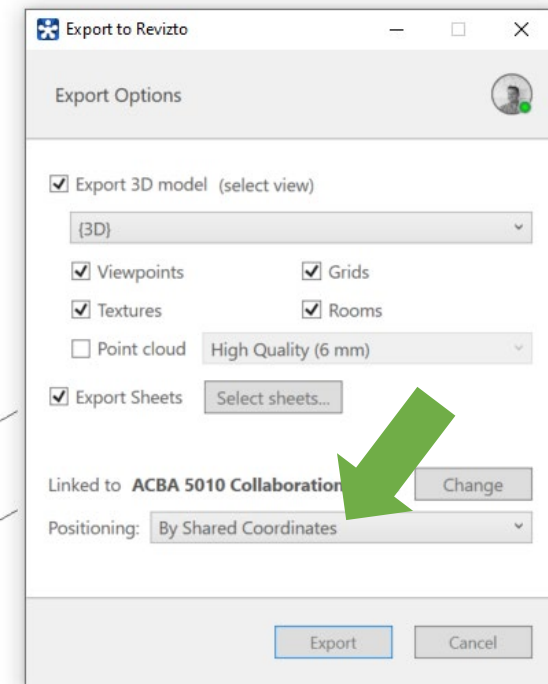
Exporting your Project to Revizto.

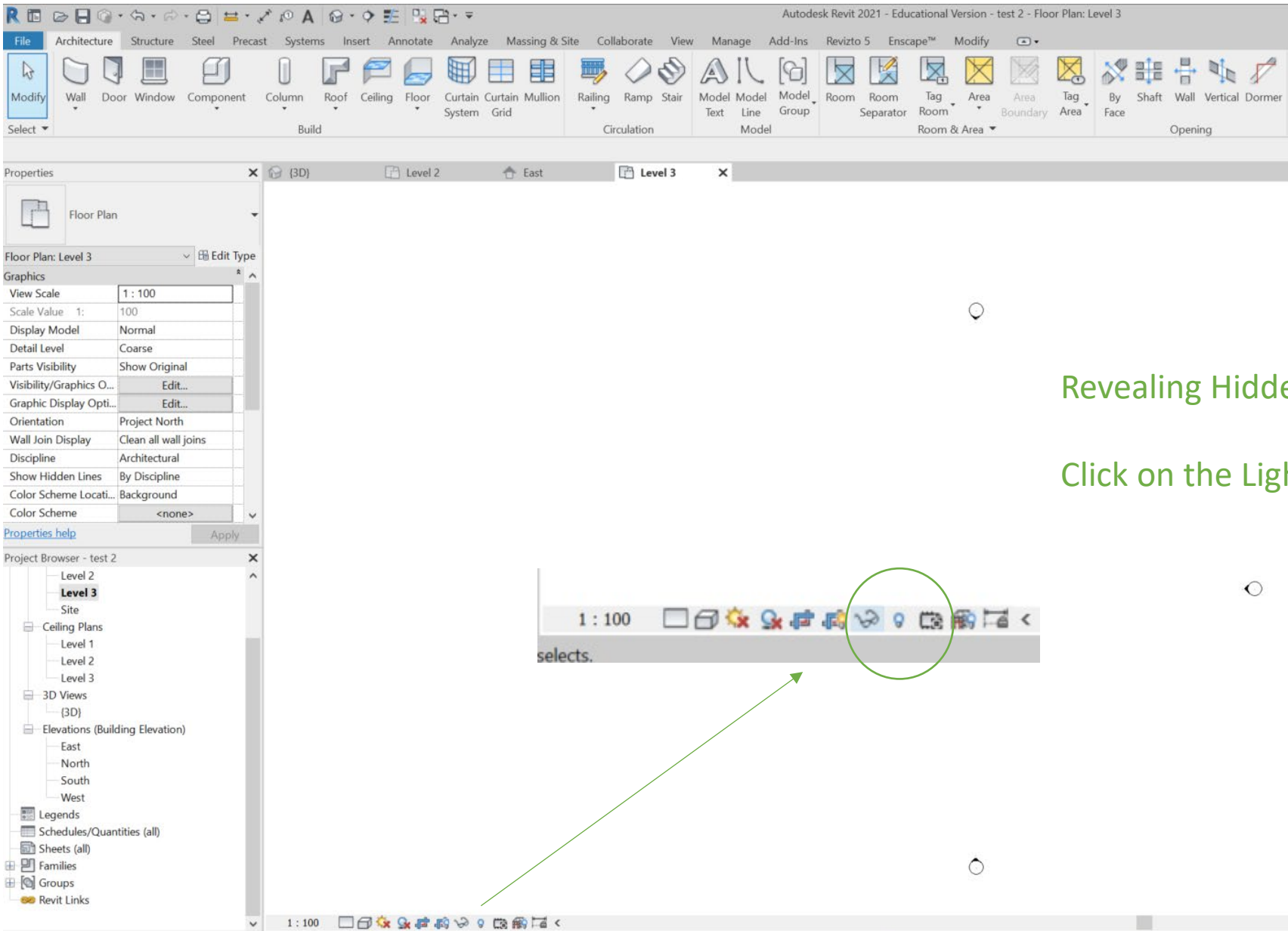
Open your 3D view.

From the Revizto Plug in Menu Select EXPORT TO REVIZTO

Append to an existing Model 'ACBA 5010 Collaboration Class Exercise'

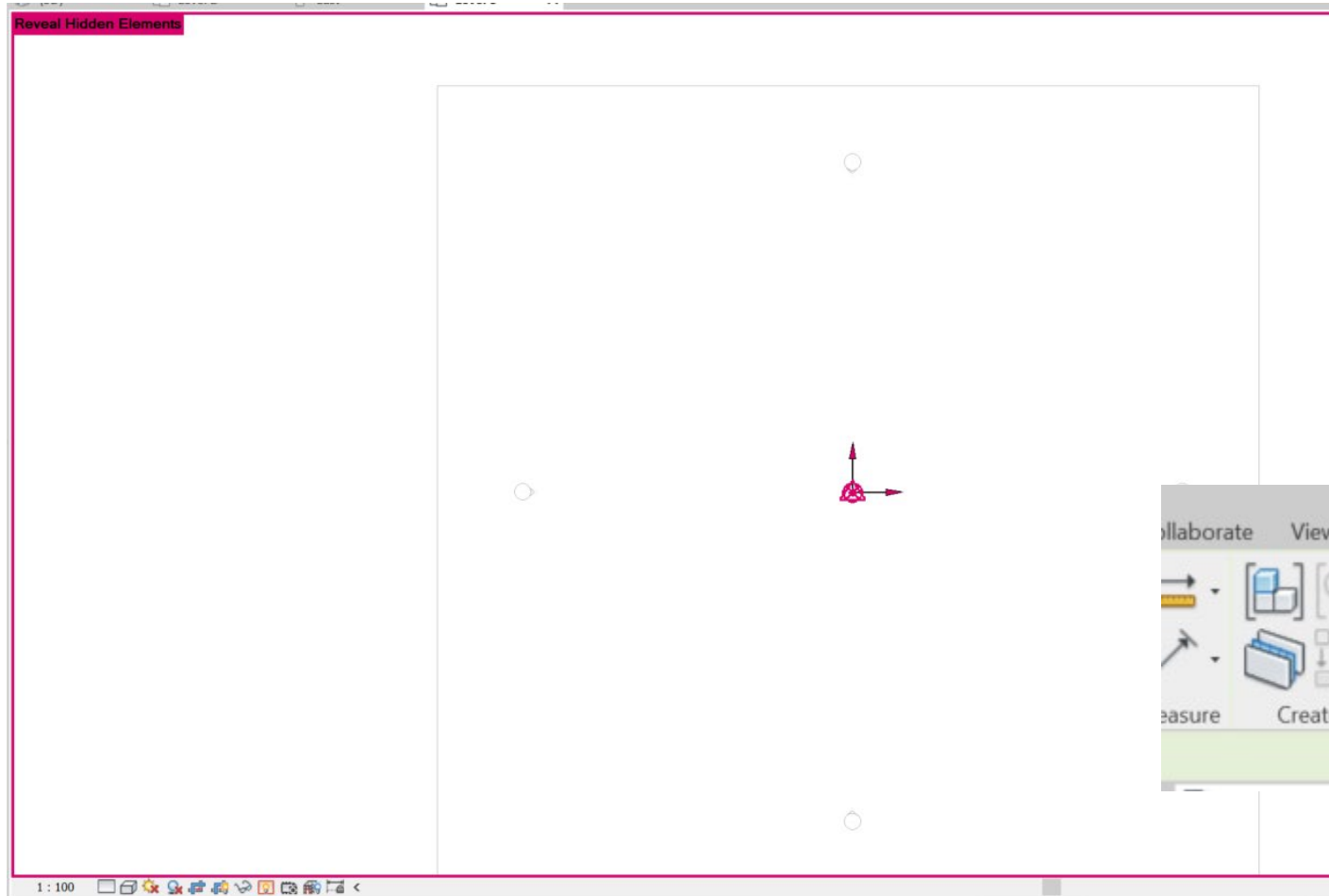
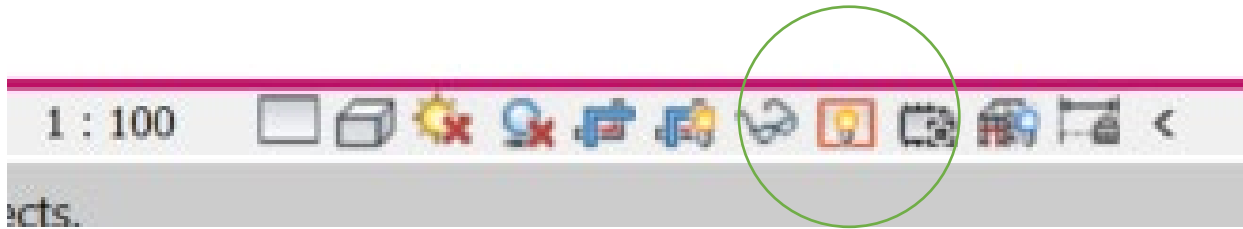
NB: Make sure the Positioning Settings are Set to 'Shared Coordinates'





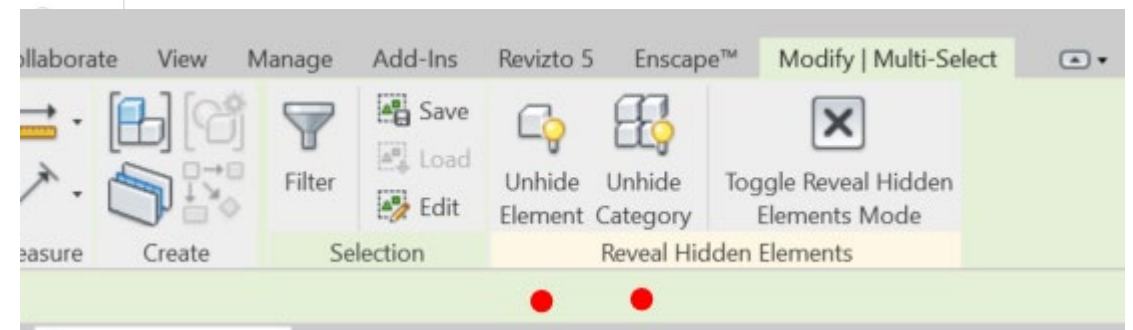
Revealing Hidden Items and Objects in Revit.

Click on the Lightbulb to activate the Reveal View.



Reveal Mode, shows hidden elements in the view, including the Project Base Point and Survey Point.

Unhide Elements (on the Ribbon) to Reveal and Click the Lightbulb to return to the normal view.



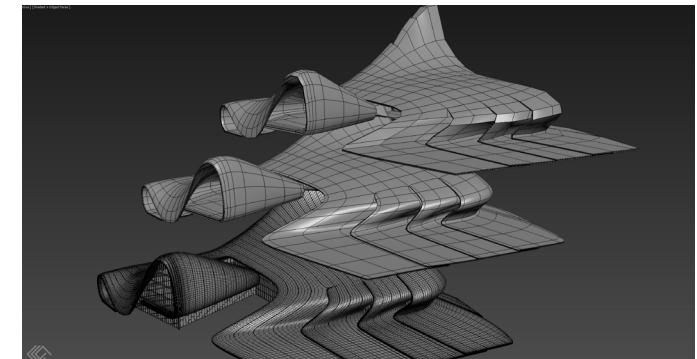
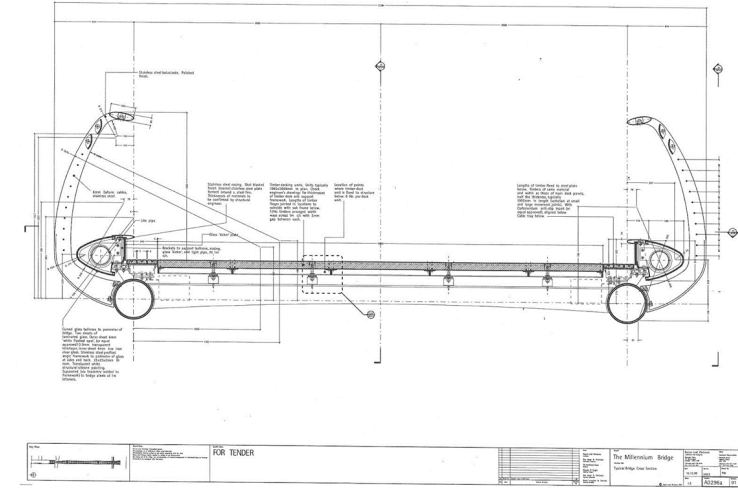
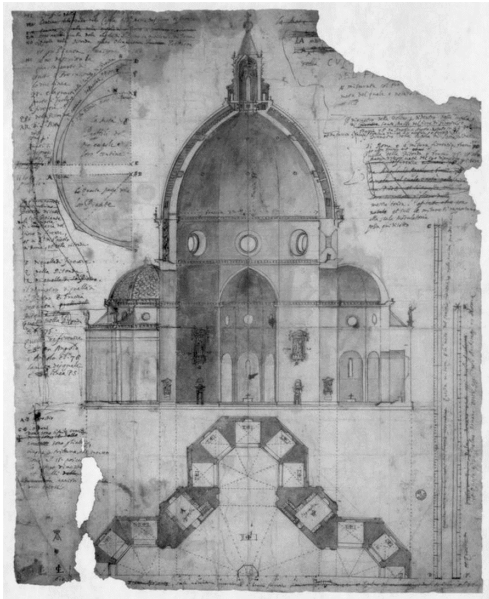
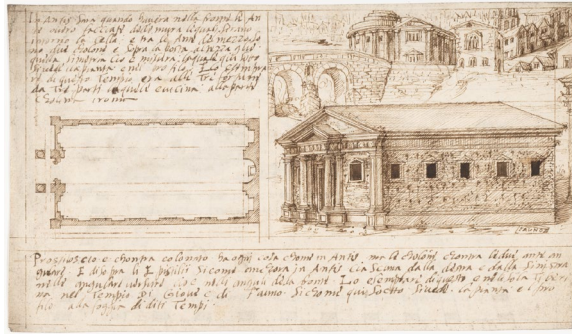
- BIM for Lifecycle & Collaboration in Revizto.



PREVIOUSLY . . .



A picture is worth a thousand words



1 The accelerating pace of change ...



2 ... and exponential growth in computing power ...

Computer technology, shown here climbing dramatically by powers of 10, is now progressing more each hour than it did in its entire first 90 years

COMPUTER RANKINGS

By calculations per second per \$1,000



Colossus

The electronic computer, with 1,500 vacuum tubes, helped the British crack German codes during WW II



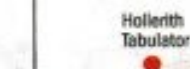
UNIVAC I

The first commercially marketed computer, used to tabulate the U.S. Census, occupied 943 cu. ft.



Analytical engine

Never fully built, Charles Babbage's invention was designed to solve computational and logical problems



Hollerith Tabulator

IBM Tabulator

National Ellis 3000

Zuse 2

Zuse 3

IBM SSEC

EDVAC

Whirlwind

DEC PDP-4

IBM 1130

DEC PDP-10

Intellec-8

Compaq Deskpro 386

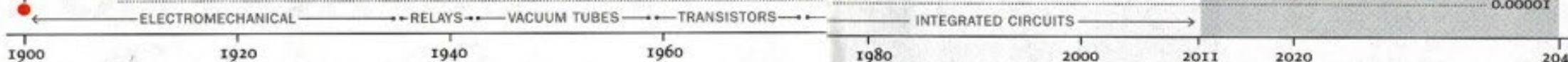
Pentium PC

Pentium II PC

Dell Dimension 8400

Mac Pro

Nvidia Tesla GPU & PC



3 ... will lead to the Singularity



Apple II

At a price of \$1,298, the compact machine was one of the first massively popular personal computers



Power Mac G4

The first personal computer to deliver more than 1 billion floating-point operations per second

2045
Surpasses brainpower equivalent to that of all human brains combined

Surpasses brainpower of human in 2023



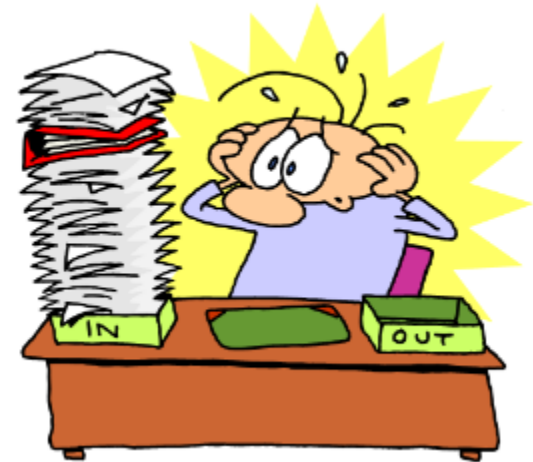
Surpasses brainpower of mouse in 2015



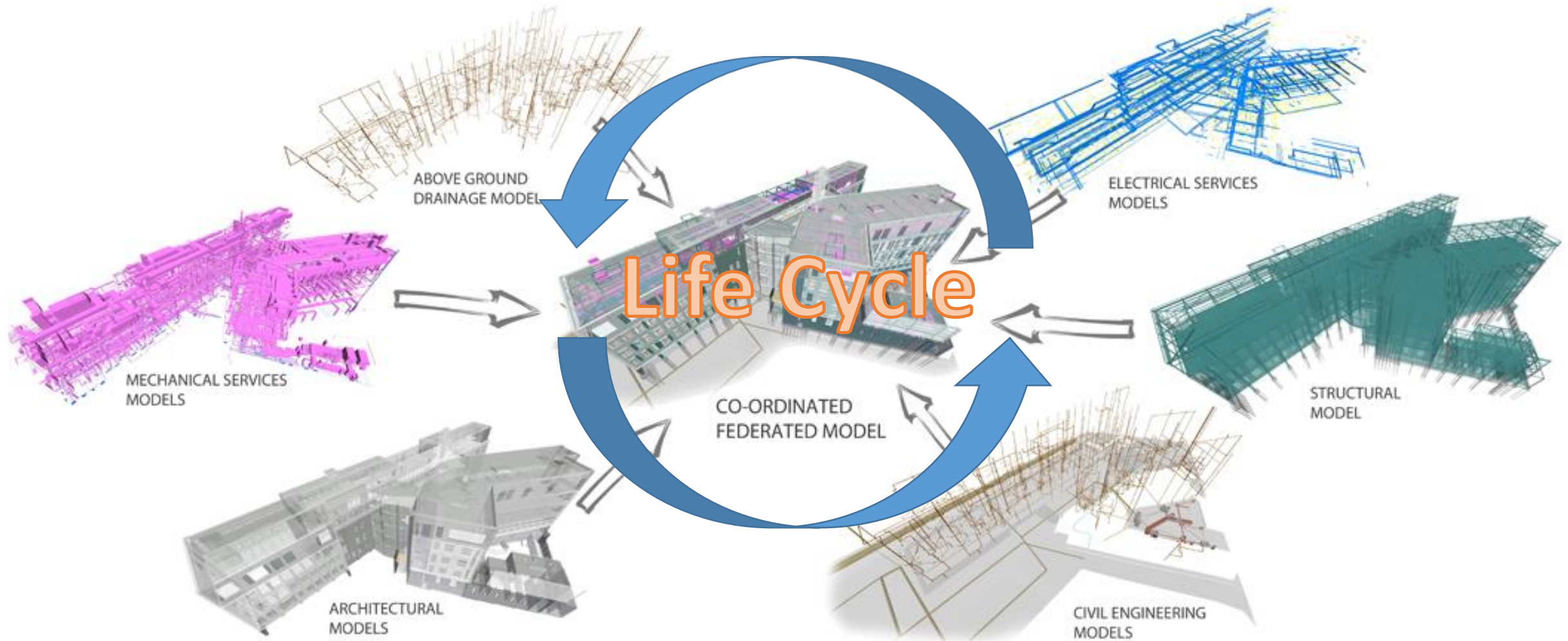
Building Information Modelling

What it really means is a PROCESS of.....

Better Information Management



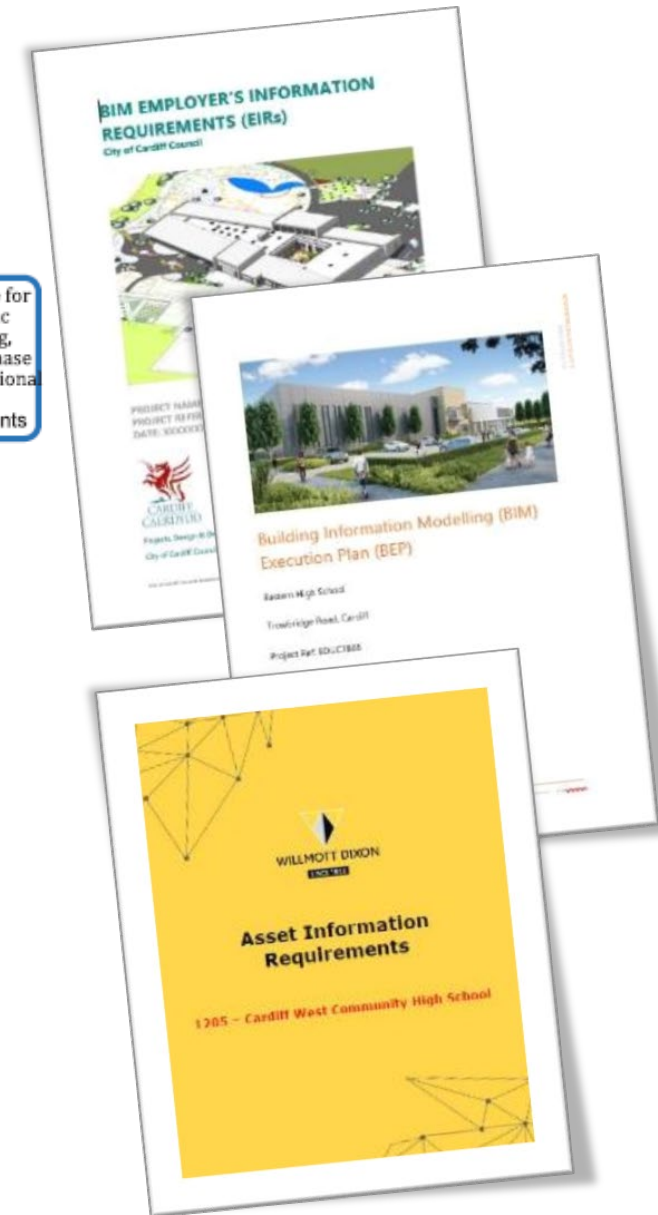
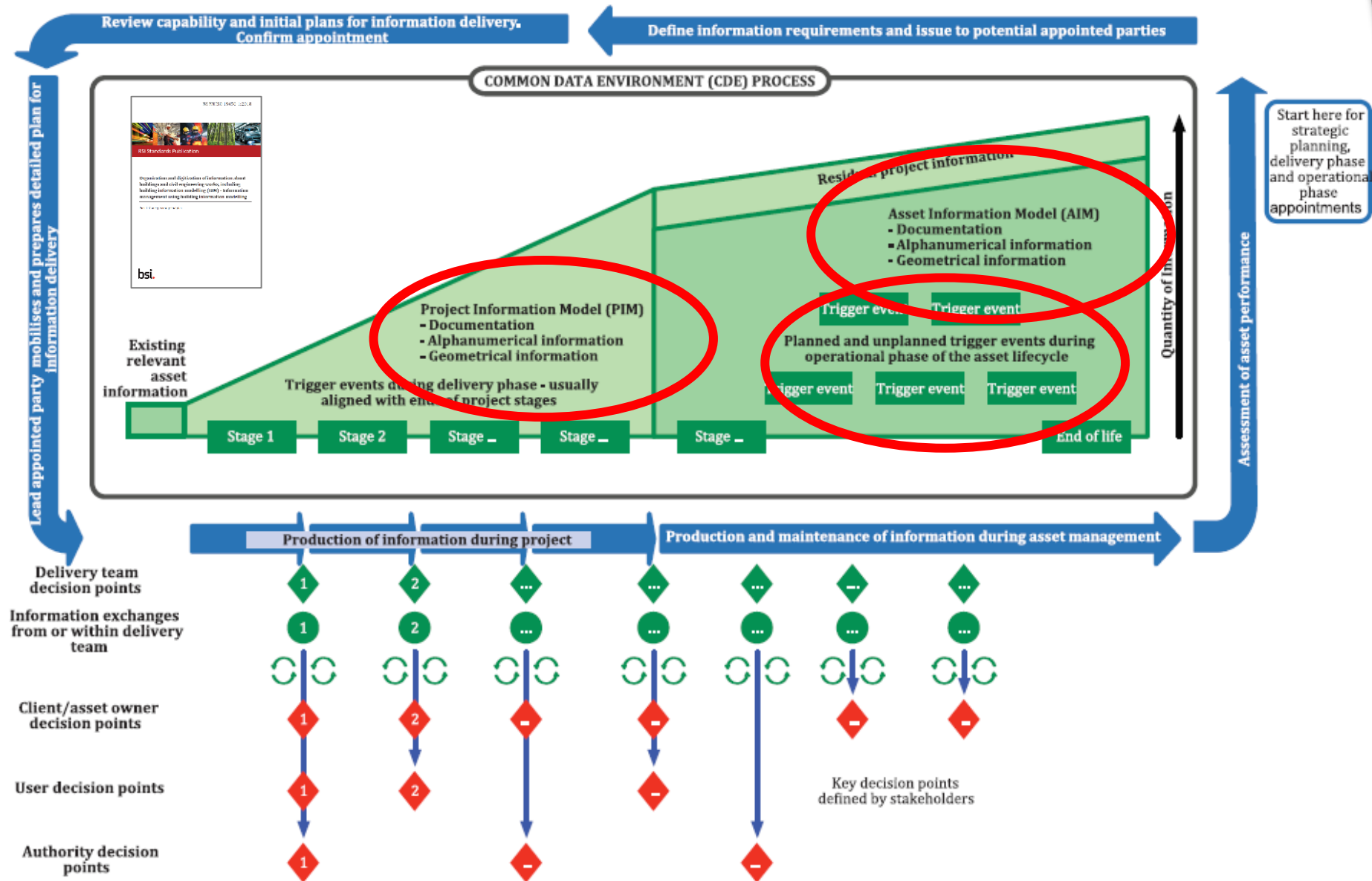
Building Information Modelling



We must consider building life cycles



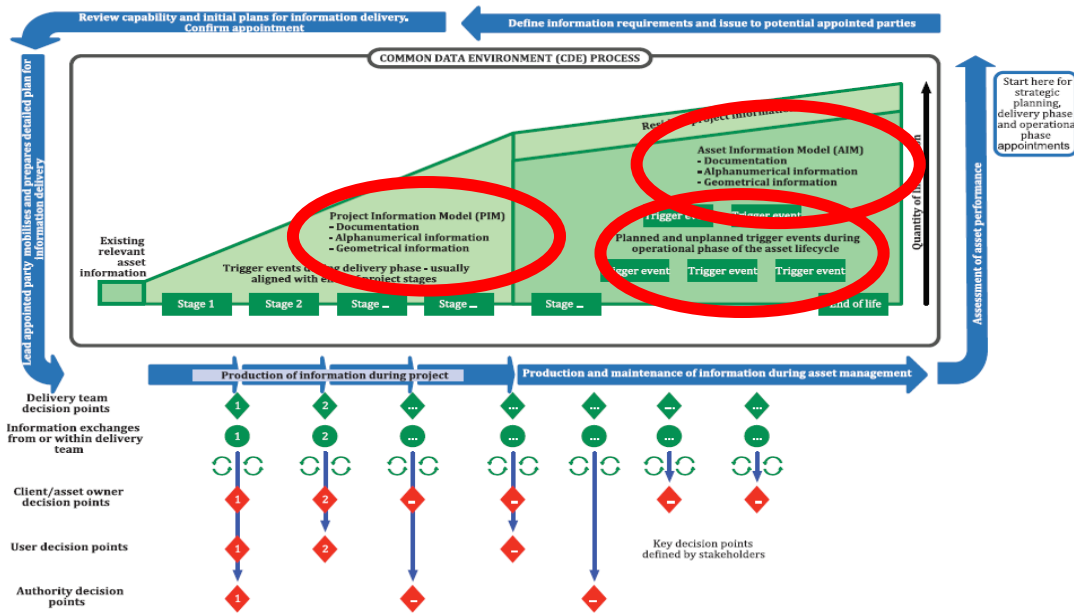
BIM Process Diagram



✓ ✓
Design, Construct, *Operate?*
and Maintain?

One Truth?

New Build BIM Project



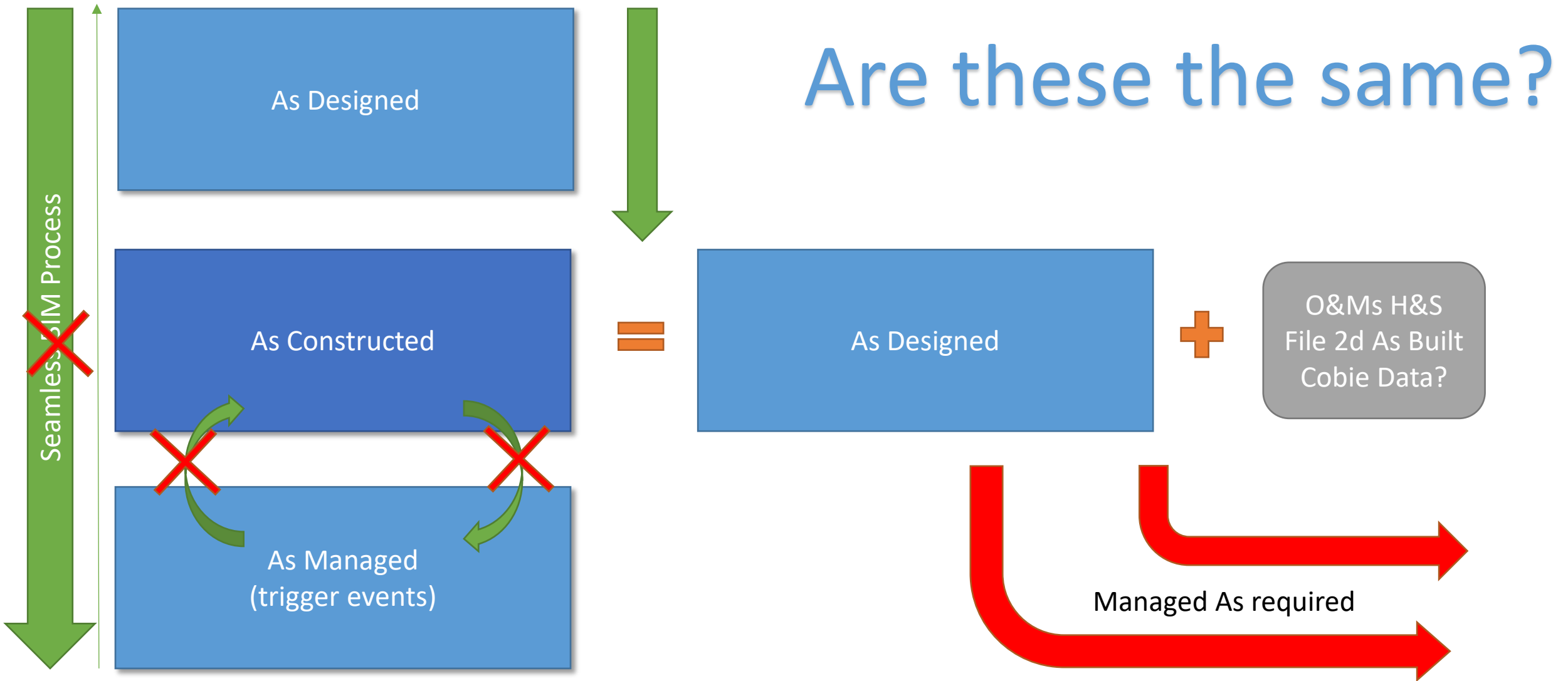
Are these the same?

How do we evaluate?

How is this managed?

What can we learn?

How can we improve?



Design, Construct, Operate and Maintain? **One Truth?**

How do we evaluate?

Post-Occupancy Evaluation (POE)

Many buildings do not perform as planned - in some cases this can impact on running costs, staff and client satisfaction and performance, health, safety and comfort. For repeat construction clients, learning from and correcting past mistakes in design and commissioning of buildings can be extremely cost-effective and greatly improve workplace productivity.

Stewart Brand 'How Buildings Learn' 6 part series.

<https://youtu.be/AvEqfg2sIH0>



1 Project Delivery	6 System Behaviour (FM's Experiences)
1.1 Discuss Clients Experience	6.1 Analyse Health And Safety Strategy
1.2 Discuss Project Team Experience	6.2 Analyse Ventilation Strategy
2 Project Outcomes	6.3 Analyse Heating And Cooling Strategy
2.1 Review Strategic Brief	6.4 Analyse Lighting Strategy
2.2 Review Business Case	6.5 Analyse Control Strategy
2.3 Review Sustainability Aspirations	6.6 Analyse Maintenance Strategy
3 Building Use/Occupant Behaviour	7 Environmental Performance
3.1 Analyse Building Layout	7.1 Measure Light Levels
3.2 Examine Building Fabric And Detailing	7.2 Measure Thermal Comfort
3.3 Analyse Occupants Use Of Building And Systems	7.3 Measure Indoor Air Quality
3.4 Analyse Occupation Patterns	7.4 Measure Acoustics
4 Occupant Feedback	7.5 Measure Air Tightness
4.1 Conduct Questionnaires/Surveys	7.6 Measure Heat Loss (Thermal Imaging)
4.2 Conduct Semi Structured Interviews	8 Comparisons
5 Energy Use	8.1 Intended Building Use Against Actual
5.1 Analyse Utility Invoices And Meter Readings	8.2 Design Performance Predictions Against Actual
5.2 Analyse Metering Strategy	8.3 Benchmark Against Published Datasets
5.3 Conduct Equipment Survey	9 Report
5.4 Analyse Embodied Carbon	9.1 Client, FMs, Users
5.5 Analyse Measurement And Verification Strategy	9.2 Project Team
	9.3 Open Dissemination to Industry

<https://www.architecture.com/-/media/GatherContent/Post-Occupancy-Evaluation/Additional-Documents/RIBAPOEBPEPrimerpdf.pdf>

How do we evaluate?

Manual Survey & Observations



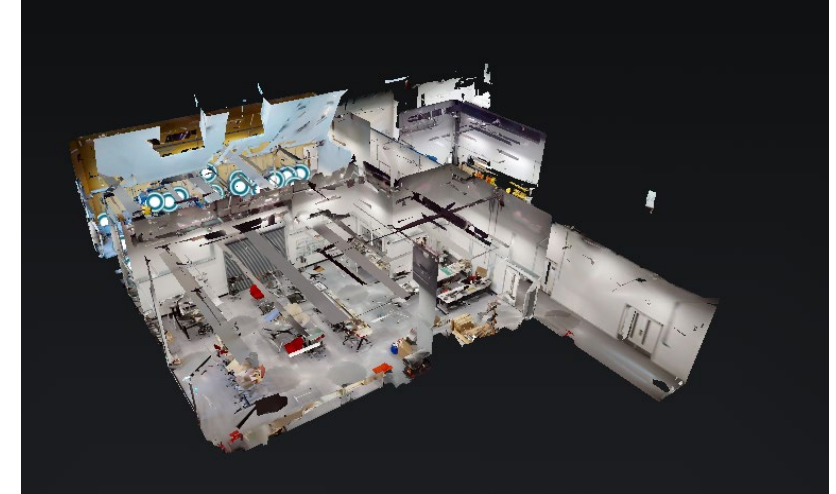
- As built drawings
- Building File / O&M Manuals



How do we evaluate?

Digital Surveys:

- Thermal Imaging
- Drones
- Point Cloud



<https://my.matterport.com/show/?m=6NoRsYdFY4Y>



How do we evaluate?

Laser Scanners

Requires: Tripod, detail pole, prism, reflected target and scanner.

Laser scanners undertake highly accurate detailed surveys, through to production of basic point cloud and rendered photographic imagery.

Typically used for to check as designed against as constructed.

Data can be downloaded and digitally transferred for use in industry software.



How do we evaluate?

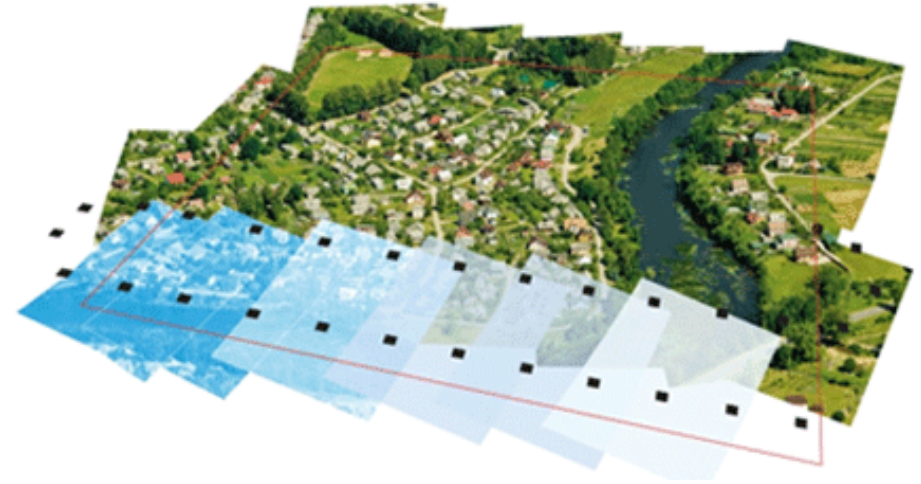
Photogrammetry

Aircraft mounted photographic system, with GPS and inertial navigation system.

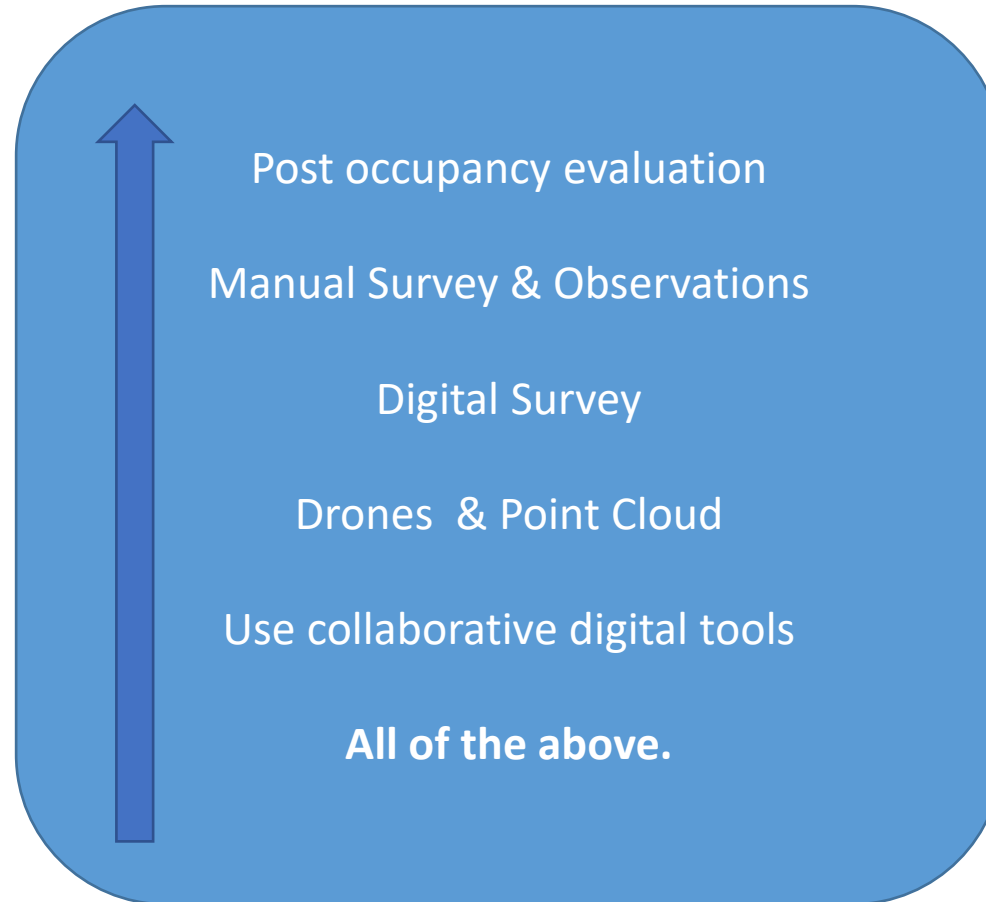
Photogrammetry requires ground control and ground markers produced by a conventional surveying. Fixed patterns of flight are used to produce overlapping photographs.

Stereoscopic images are produced from the photography to produce a 3D image of the site.

With the rise of the use of Drone technology photogrammetry is now becoming a more favourable and affordable option.



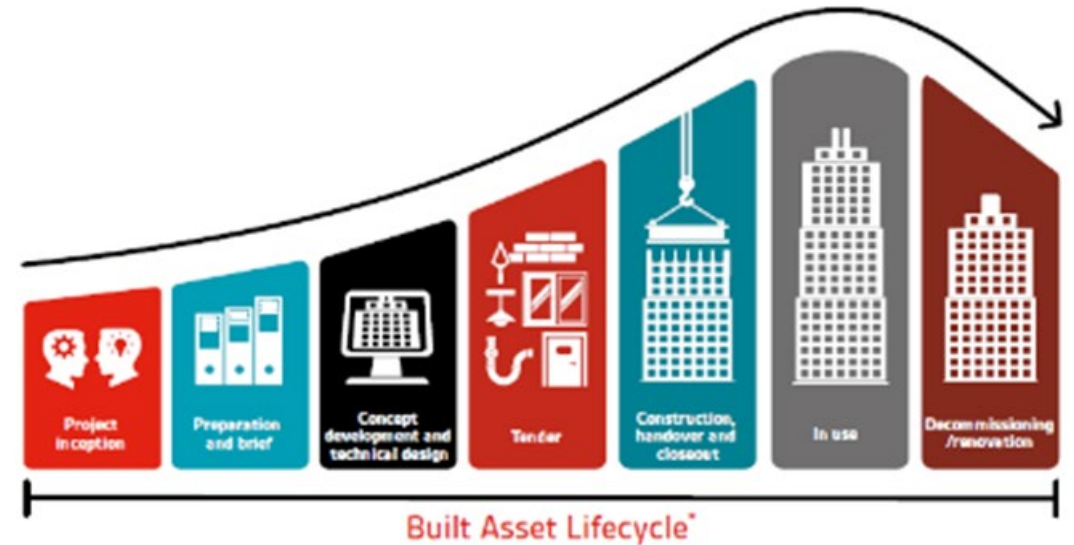
How do we evaluate?



How is this managed?

Life Cycle of the Asset that considers:

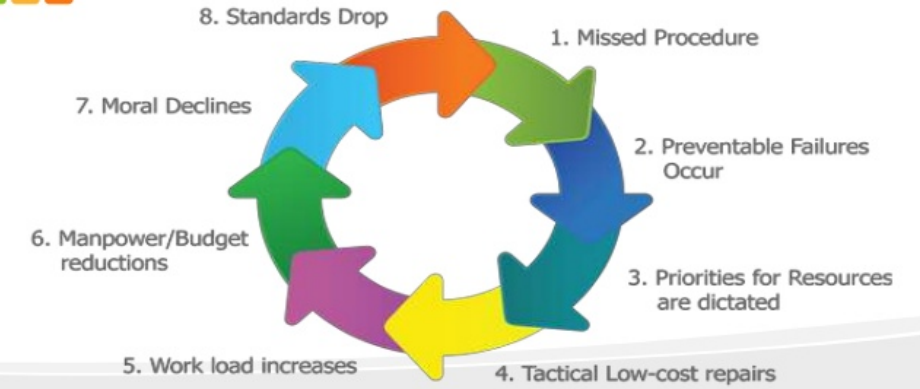
- Management and Controls for Maintenance
- Introduction of Sustainability Measures
- Monitoring Energy Performance
- Health and Safety - Statutory Observations
- Management of Alterations, Adaptations and Refurbishment
- Introduction of New Technologies



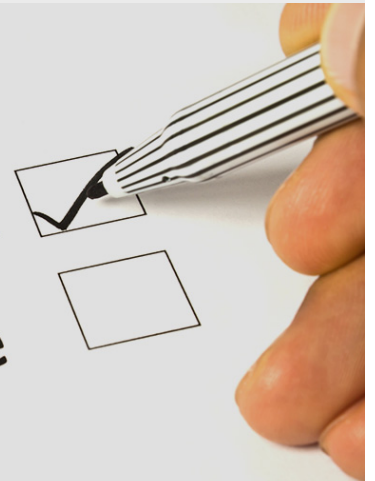
How is this managed?



Reactive Maintenance Impact



Proactive
Reactive



Planned 'Preventative' Maintenance and Cyclical Testing



Data Base

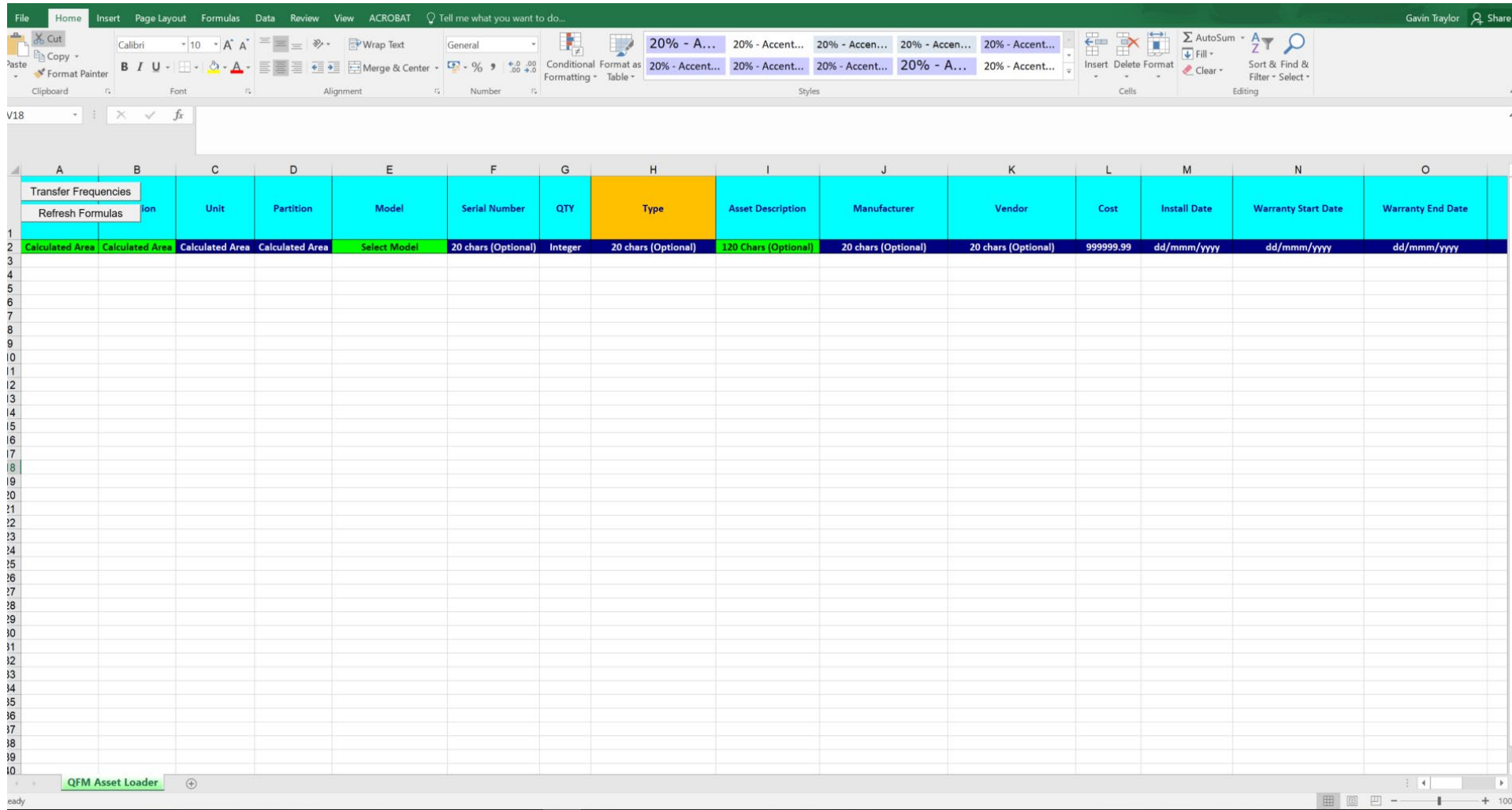
How is this managed?



Old School Data Base

Basic CAFM

How is this managed?



Cloud Based CAFM

How is this managed?



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Solutions

 tf cloud

 tf facility

Latest News

G-Cloud 12

Posted on 28/09/2020

The Technology Forge is delighted to confirm its continued presence on the Crown Commercial Service (CCS) G-Cloud 12 framework.

Business as Usual

Posted on 27/03/2020

Products & Services

For almost 20 years, The Technology Forge has been providing Property and Asset Management Solutions to the public and private sectors. Our current product offering includes two versatile systems to meet the needs of any organisation.

tf cloud

tf cloud is our web based property management system with modules including: Property and Plant, Help Desk, Condition Survey, Suitability, Inspections, Estates, Projects, Risk Assessments, Valuations, Resource Booking, Reporting and much more. tf cloud is completely web based and hosted in the cloud which means there are no setup costs. It can be used with a variety of devices connected to the Internet including PCs, laptops, smartphones and tablets. There are also a number of apps available on Android, Apple and Windows devices.



tommywhite logged in to General Properties Logout

Home Property Resource Booking Estates DLO Finance Contract Cost Plus Grounds Help Calls Condition Education Inspection Project

Assessment Questionnaire Utility Reports Help

Admin

Property Details Plant Fixed Assets Occupancy



View

[All Sites](#)

[All Buildings](#)

Home > Property > Sites > Edit Site > External Area and Building List > Room List

Room List

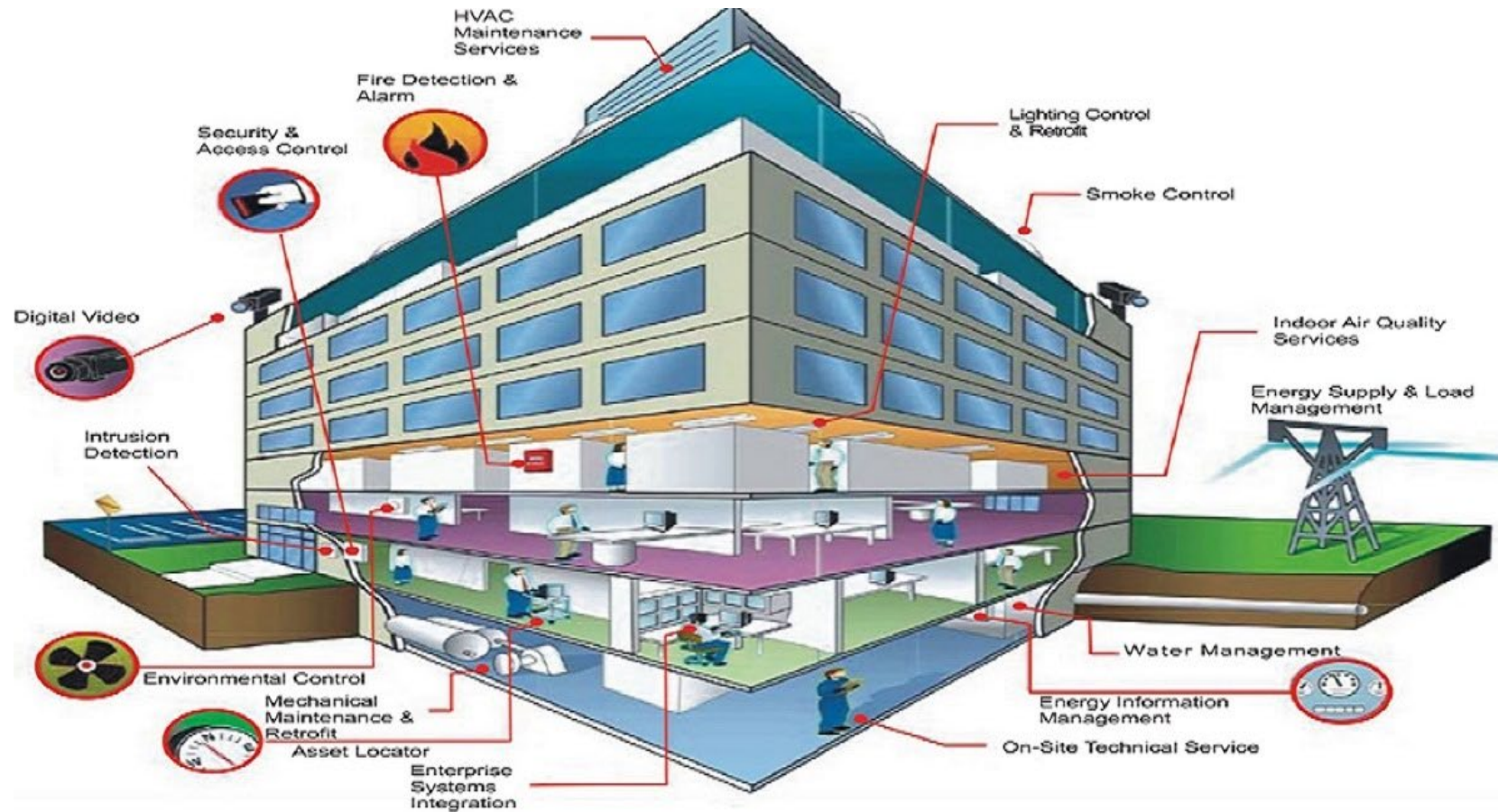
Site

Show	Action	Site Code	Description	LA Code	UPRN
	Edit	Del	10001	Marshall's Mill	12/3791

 Building

Building Management Systems BMS

How is this managed?



How is this managed?



Cobie



1 The accelerating pace of change ...



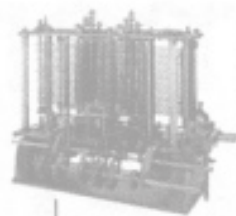
How can we improve?

2 ... and exponential growth in computing power ...

Computer technology, shown here climbing dramatically by powers of 10, is now progressing more each hour than it did in its entire first 90 years

What can we learn?

3 ... will lead to the Singularity



Analytical engine
Never fully built, Charles Babbage's invention was designed to solve computational and logical problems

COMPUTER RANKINGS
By calculations per second per \$1,000



Colossus
The electronic computer, with 1,500 vacuum tubes, helped the British crack German codes during WW II



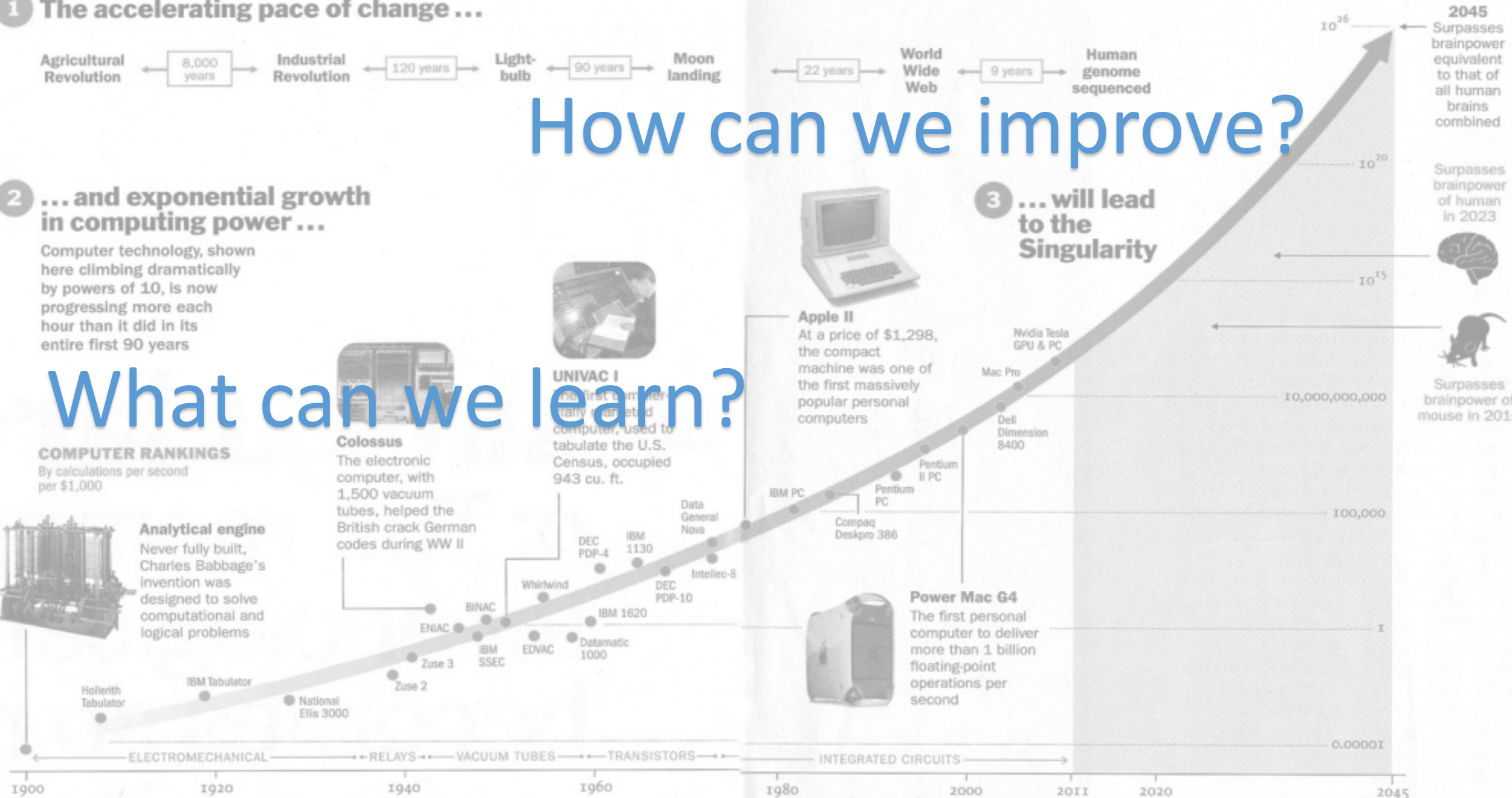
UNIVAC I
The first commercially marketed computer, used to tabulate the U.S. Census, occupied 943 cu. ft.



Apple II
At a price of \$1,298, the compact machine was one of the first massively popular personal computers



Power Mac G4
The first personal computer to deliver more than 1 billion floating-point operations per second



Ensure these the same

Seamless BIM Process

As Designed

As Constructed

Life cycle

As Managed
(trigger events)



Intelligent assets

More efficient management,
maintenance and use of assets

Workflow automation/image
recognition/Trend analysis and
prediction/Natural language processing

Design, Construct, Operate and Maintain **One Truth.**

What about existing building stock?

Challenges of Decarbonisation

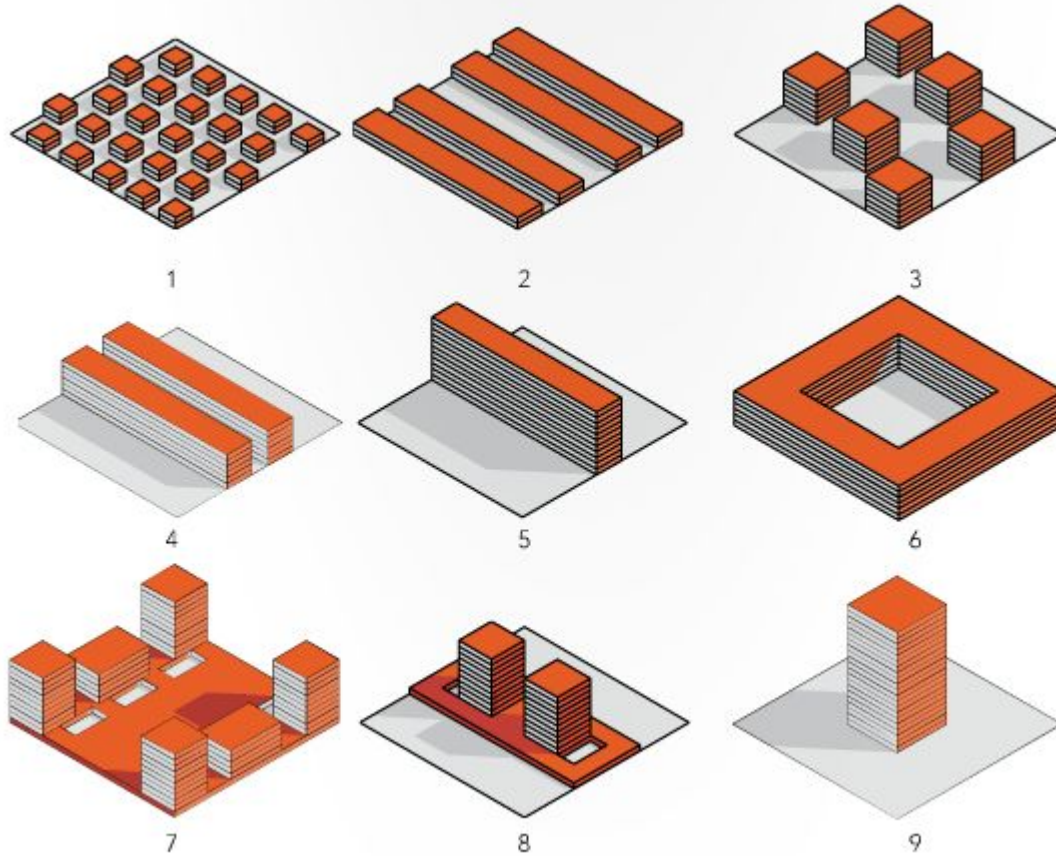
Speaking at the CN [Decarbonising Construction](https://www.constructionnews.co.uk/sustainability/consultant-urges-delivery-of-mass-retrofit-programme-30-09-2020/) conference, Sonal Jain warned viewers that the UK Government's target of a net-zero carbon economy by 2050 is at risk because 80 per cent of the buildings that will be around in that year have already been built.

Jain said: "Because 80 per cent of the building stock for 2050 already exists, we cannot deliver on our net-zero goal without fully upgrading this. There is a limited time to upgrade the existing building stock, and delivering net-zero will require deep retrofits of these buildings."

<https://www.constructionnews.co.uk/sustainability/consultant-urges-delivery-of-mass-retrofit-programme-30-09-2020/>



Challenges of Building Typologies



Functions of Buildings

Why do we Build?

The use of buildings as protective structures or enclosures.

Since fire was first used by primitive people to provide light and heat, the use of energy to aid in environmental moderation has developed internal environments that reduce the effects and extremes in the external climate.

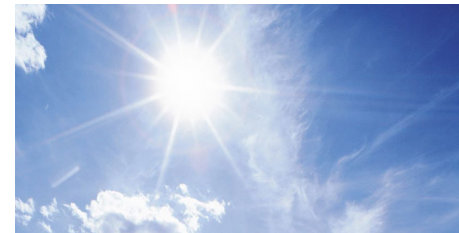
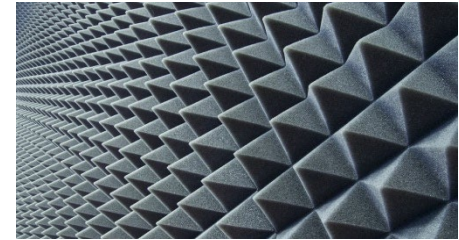


https://i.dailymail.co.uk/i/pix/2015/07/03/14/2A338A5800000578-3148511-image-a-21_1435930837225.jpg

The use of buildings to house people, equipment and processes have resulted in the development of buildings that can control these internal environments with greater accuracy.

As well as protection and enclosure we can now consider:

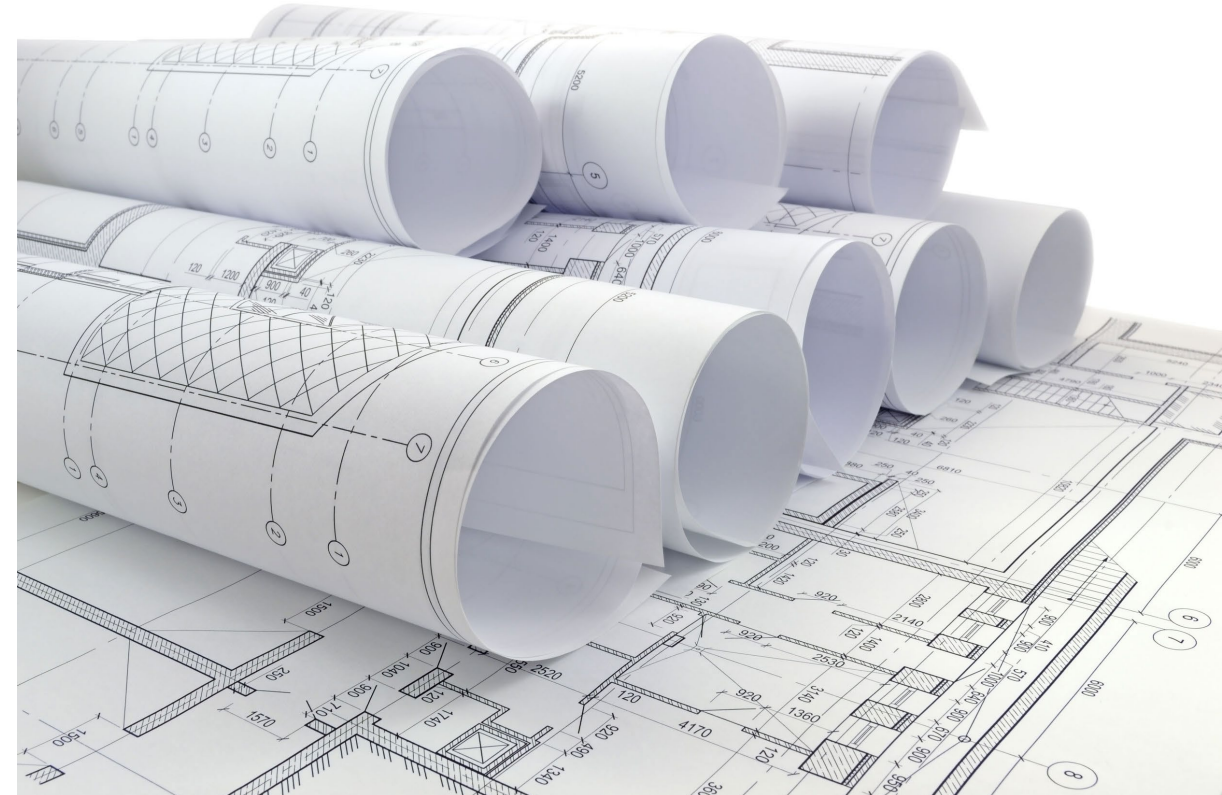
- Thermal Insulation and temperature control
- Acoustic insulation
- Provision of Light (natural and artificial)
- Controls for humidity and ventilation
- Exclusion of contaminants.



Performance Requirements of the Building Fabric

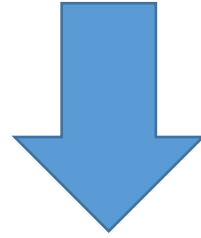
What are the key drivers in providing a building that is suitable for the need?

- Structurally Stable
- Durability
- Thermal insulation
- Protection from weather and exclusion of moisture
- Acoustic performance
- **Flexibility to change to changing needs**
- Aesthetics
- Buildability
- Sustainability

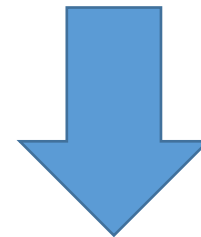


Trigger events?

Flexibility to change to changing needs



How Buildings Learn



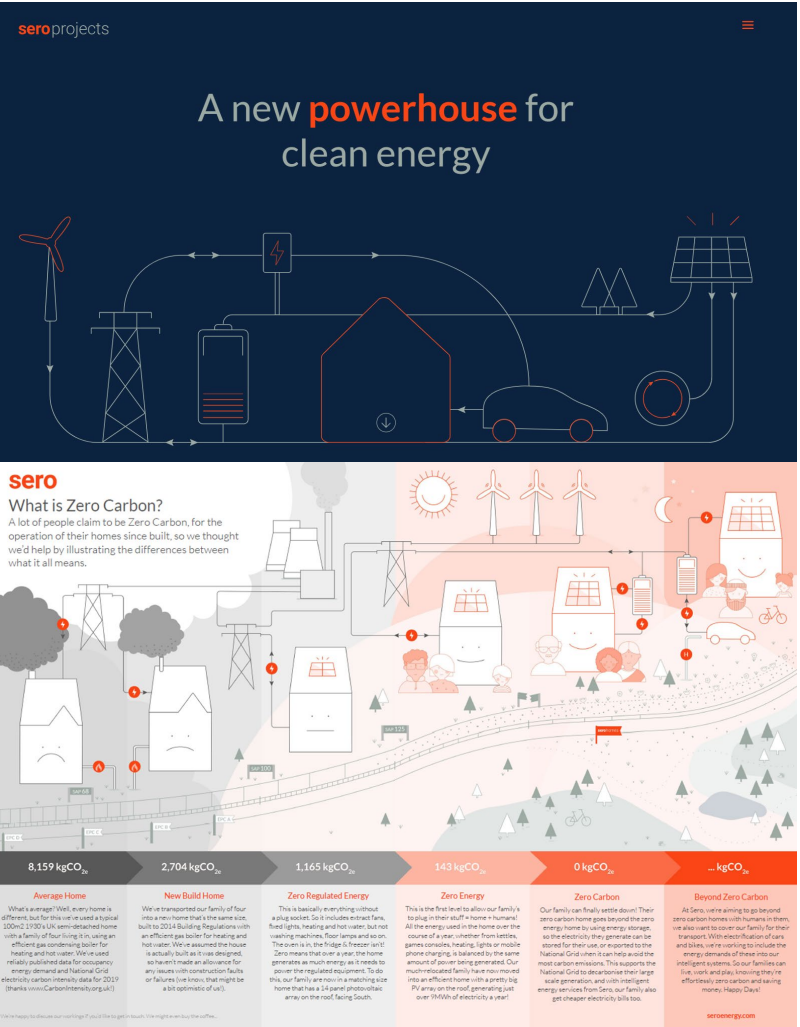
How Digital Technologies can Assist

Challenges and Opportunities

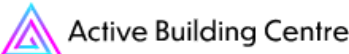


New Technology (Early Adopters – Driving Change)

<https://www.seroenergy.com/>



<https://www.activebuildingcentre.com/>



OUR CHALLENGE

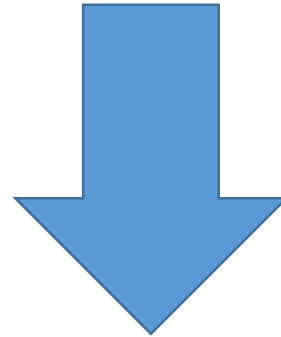
The UK Government is committing to ambitious targets for the UK to reach net zero carbon emissions by 2050.

Funded through the Transforming Construction Challenge, the Active Building Centre seeks to transform the way the UK designs, constructs and operates buildings.

Active Buildings have the potential to substantially reduce both the operational costs of buildings and their demand on the UK energy infrastructure.



There is a limited time to upgrade the existing building stock, and delivering net-zero will require deep retrofits of these buildings.



Can BIM help us evaluate our Building Stock?

Use of Digital Technology and Interoperable collaborative platforms

Creating a Data Rich Building Stock

FOCUS ON NEW BUILD

Other methods are useful for digitizing an estate

Data Availability

New Build

- Accurate geometry
- Asset data available



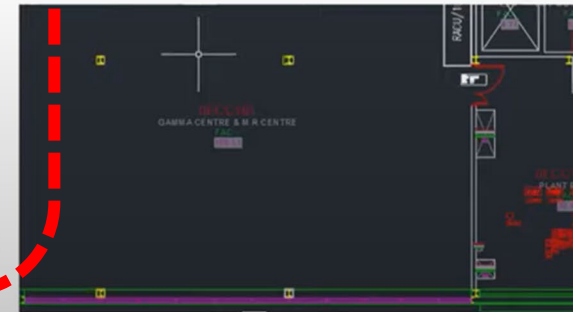
Laser Scan and Model

- Accurate geometry
- Very limited data available



Conversion of Existing 2D information

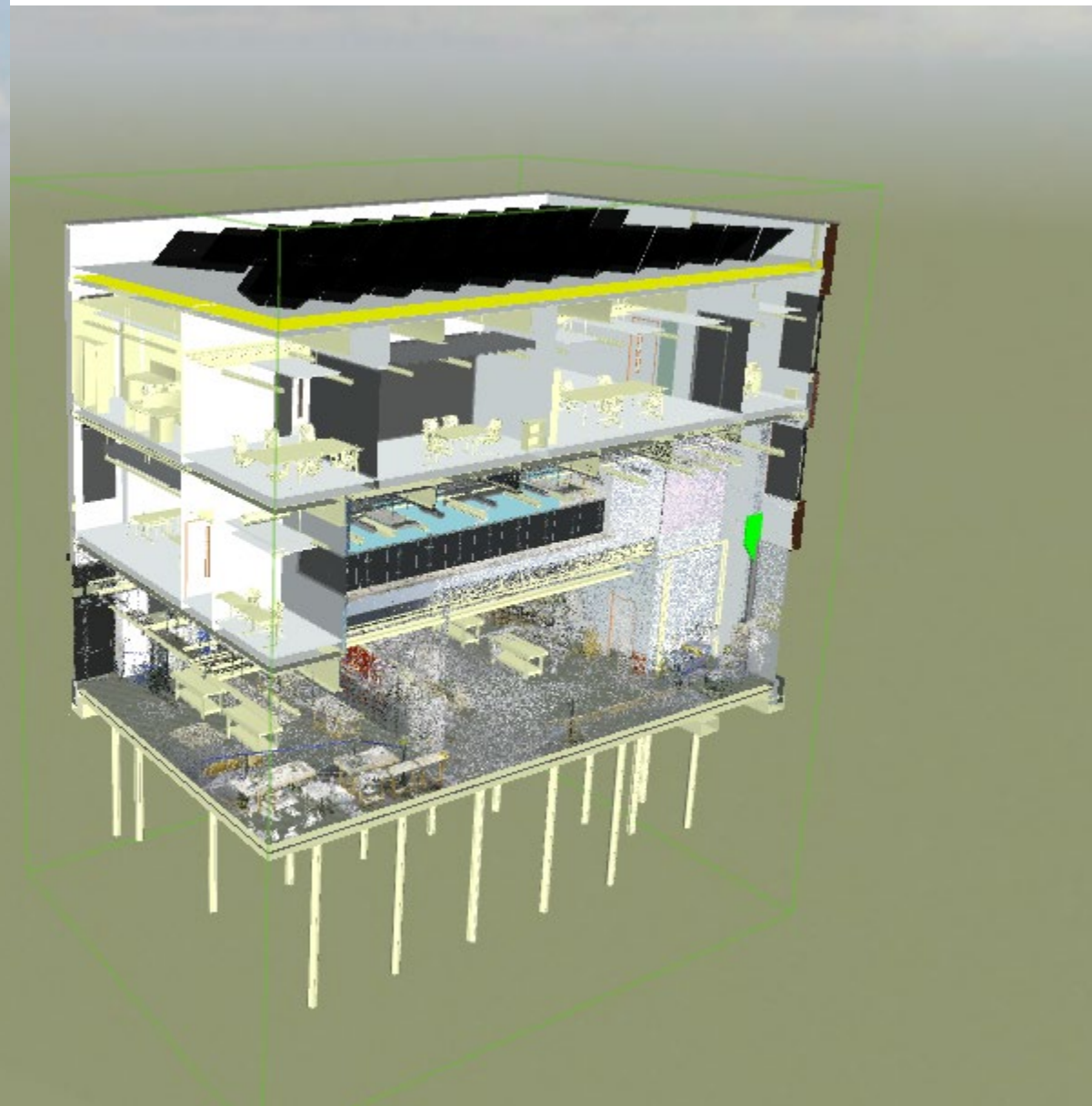
- Inaccurate geometry
- Data limited to drawing notes





<https://youtu.be/dSLZVfrKgRs>

“Many in the Facility Management industry have struggled to make use of information from BIM. Is it surprising? Not really, as a sector, we’re all as diverse and different as the buildings we manage’ Mike Ford BIM Manager UWE



Ensure these the same

Seamless BIM Process

As Designed

As Constructed

Life cycle

As Managed
(trigger events)



Intelligent assets

More efficient management,
maintenance and use of assets

Workflow automation/image
recognition/Trend analysis and
prediction/Natural language processing

Design, Construct, Operate and Maintain **One Truth.**

How can we create data rich intelligent models?

Tools such as Revit enable intelligent 3D Modelling that can be linked into a BIM Process.

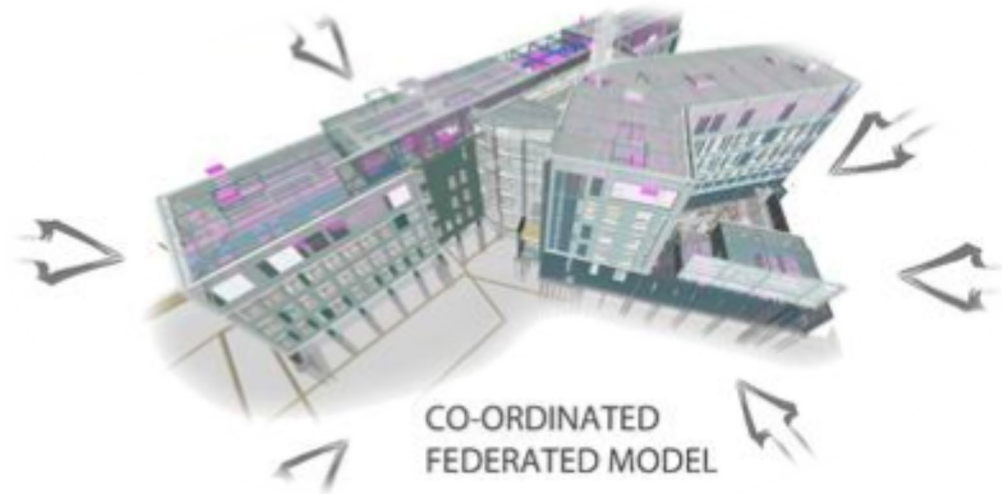


Remember a Revit Model alone is not BIM

Collaboration

How can we collaborate?

Tools such as Revizto enable a collaborative process using
2D and 3D Modelling with Intelligent Data

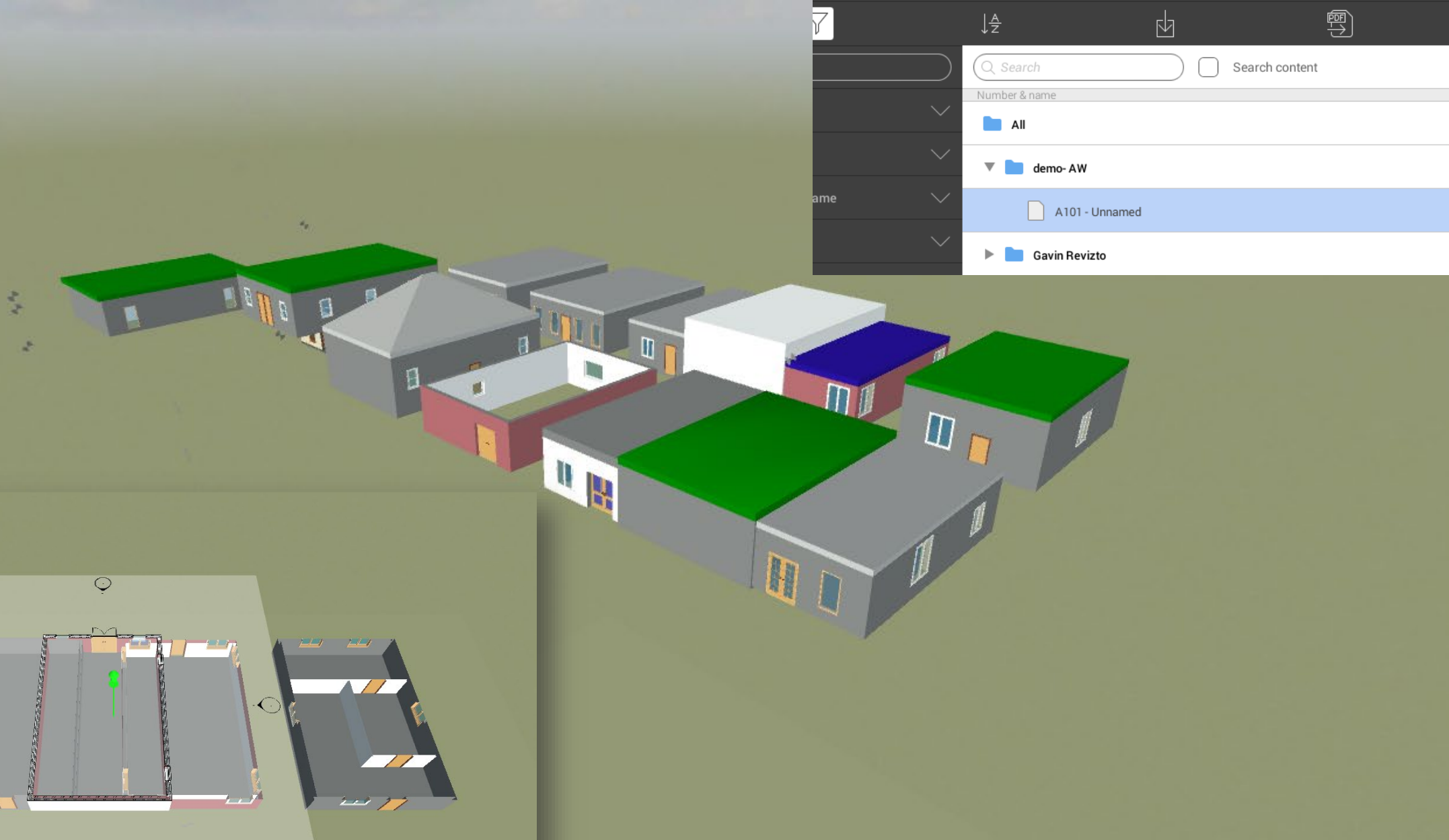


<https://revizto.com/en/>

<https://youtu.be/OnG3-0NqLr4>



revizto™



How can we collaborate?