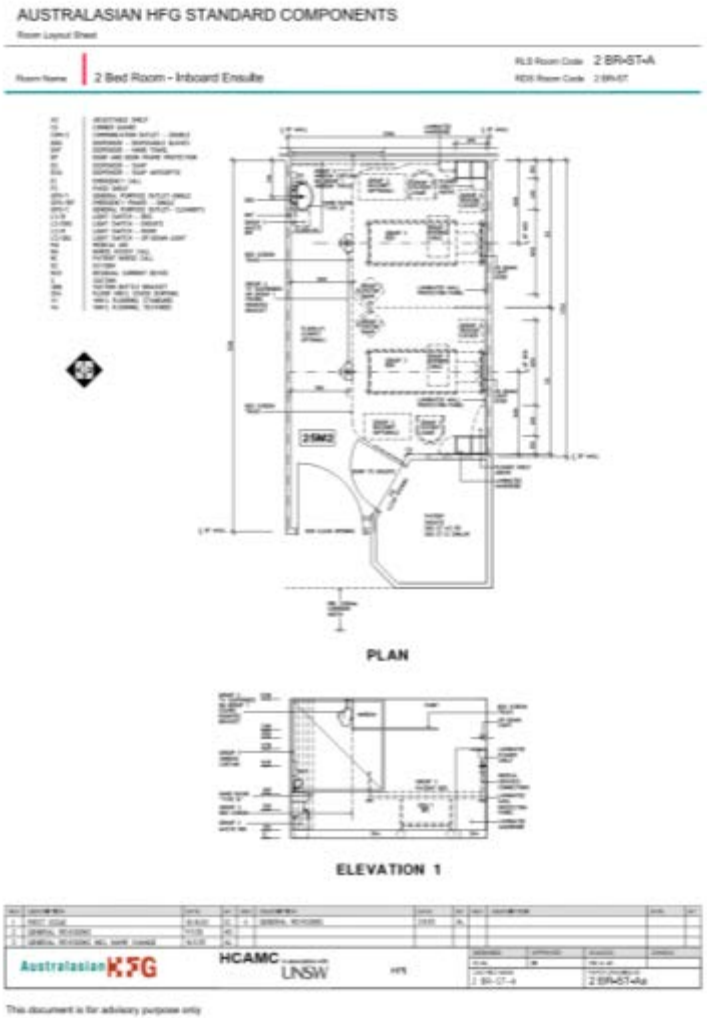
Design Technologies in Health Buildings

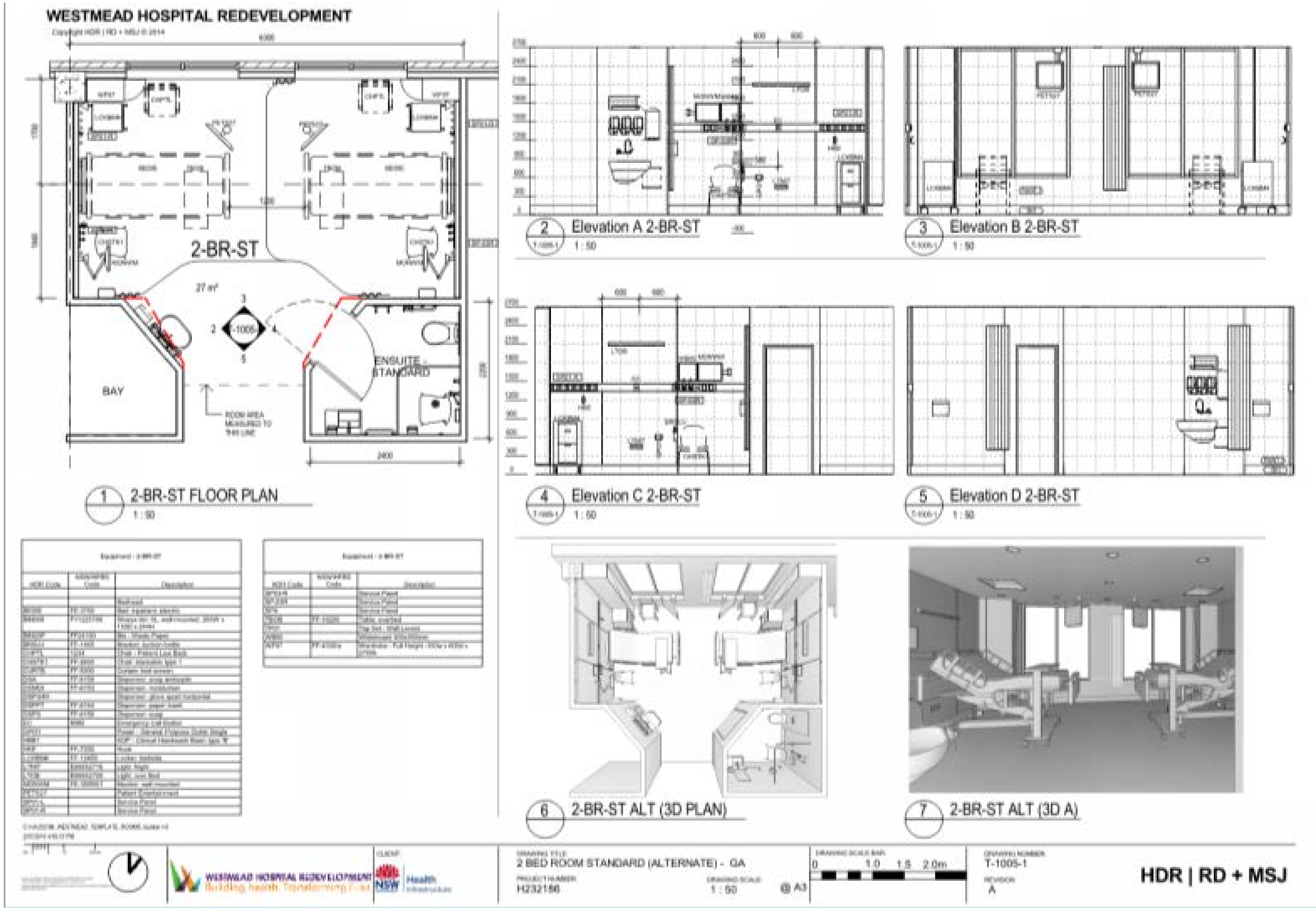
Capturing information and knowledge through technology

01 THE ADVENT OF 3D DESIGN TECHNOLOGIES

2D Plan & Elevation

- Can be hard to interpret for those not in the design industry
- Does not give three-dimensional spatial recognition to the room
- There is no link between the plan and elevation, they are drawn independently of each other and hence may show different information
- There is no ‘intelligence’ in the drawings

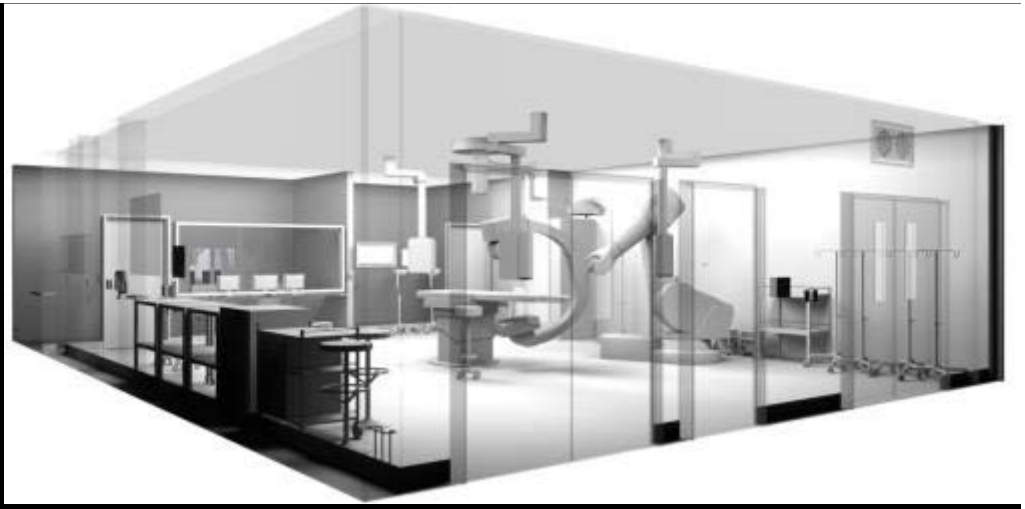


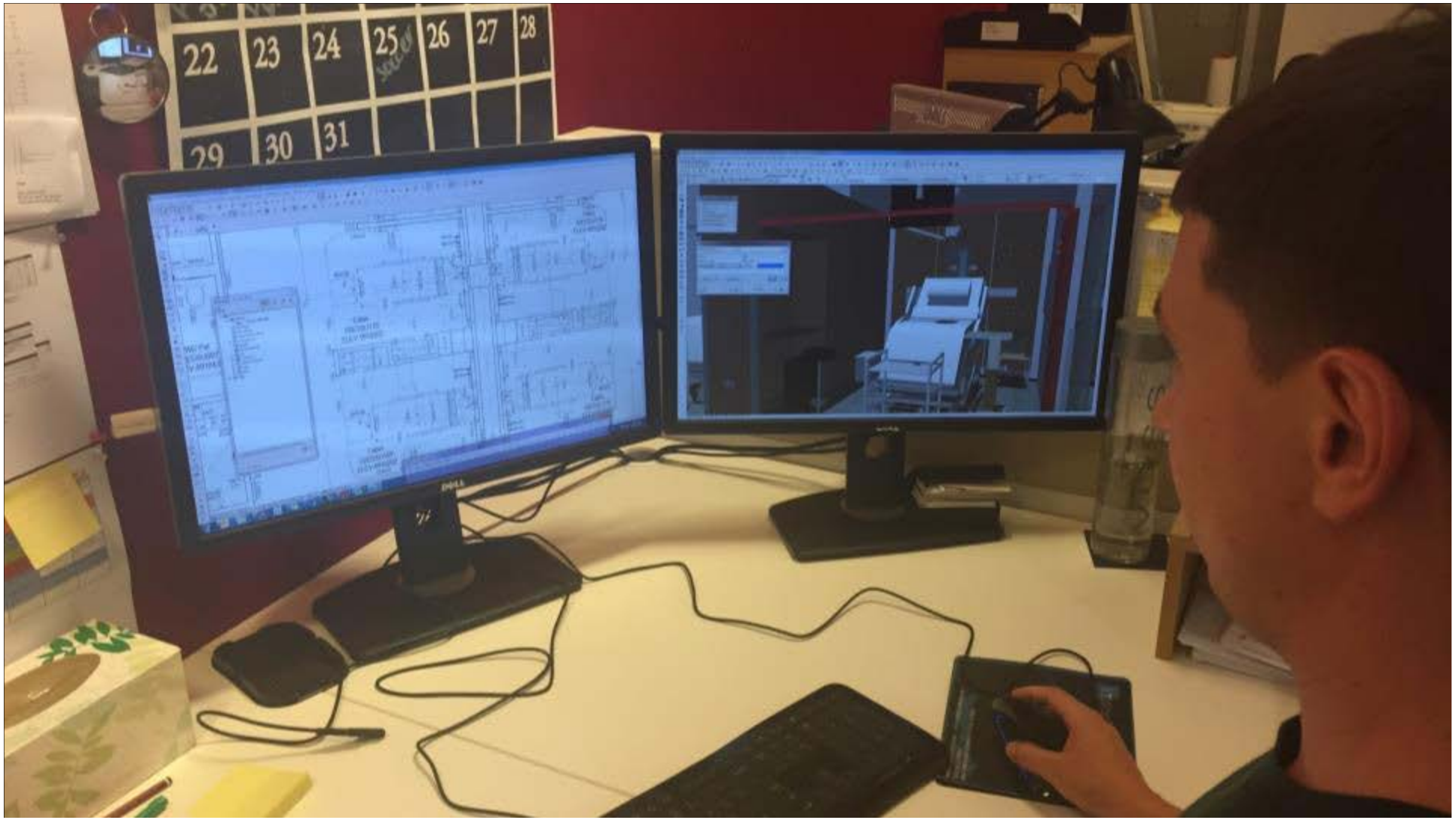


WESTMEAD HOSPITAL REDEVELOPMENT
2-BR-ST
27 m²
ENSUITE - STANDARD
BAY
ROOM AREA MEASURED TO THIS LINE
1 2-BR-ST FLOOR PLAN 1 : 50
2 Elevation A 2-BR-ST 1 : 50
3 Elevation B 2-BR-ST 1 : 50
4 Elevation C 2-BR-ST 1 : 50
5 Elevation D 2-BR-ST 1 : 50
6 2-BR-ST ALT (3D PLAN)
7 2-BR-ST ALT (3D A)
WESTMEAD HOSPITAL REDEVELOPMENT
NSW Health Infrastructure
DRAWING TITLE
2 BED ROOM STANDARD (ALTERNATE) - GA
PROJECT NUMBER
H232186
DRAWING SCALE
1 : 50
@ A3
DRAWING NUMBER
T-1005-1
REVISION
A
HDR | RD + MSJ

Why?

- Better engagement with stakeholders – taking them on the journey
- Faster decision making by clearly conveying the design in a 3D environment
- Confidence in achieving functional requirements & fit for purpose environments for stakeholders
- Efficiencies in decision making in design, documentation, construction and FM
- Capturing and storing knowledge through the process
- Better risk management for all stakeholders




22
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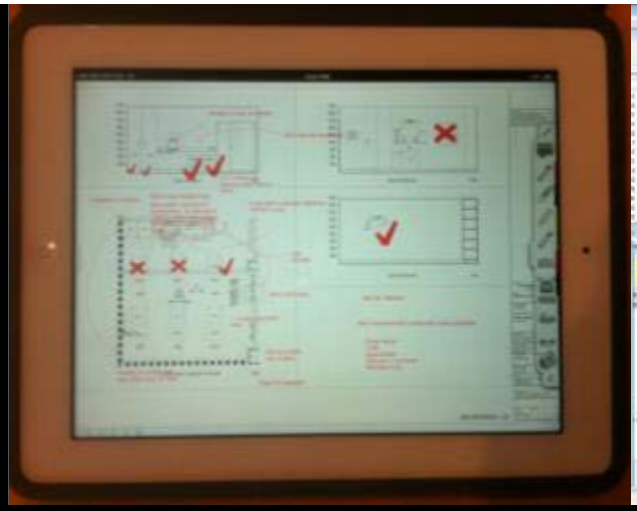
Technology In User Groups

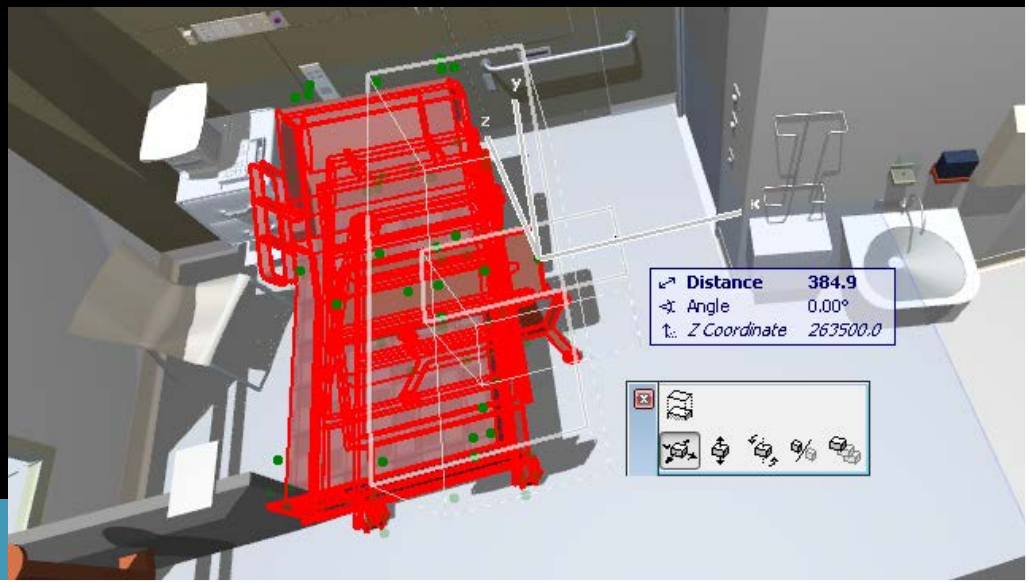
Annotating &/or changing RLS & RDS in meetings

- Capturing ideas, decisions & actions
- Recording changes and variations
- Writing comments
- Internet enabled for fast issue and attachment to the meeting minutes
- A complete record of the meeting

Using software for live walk/fly through

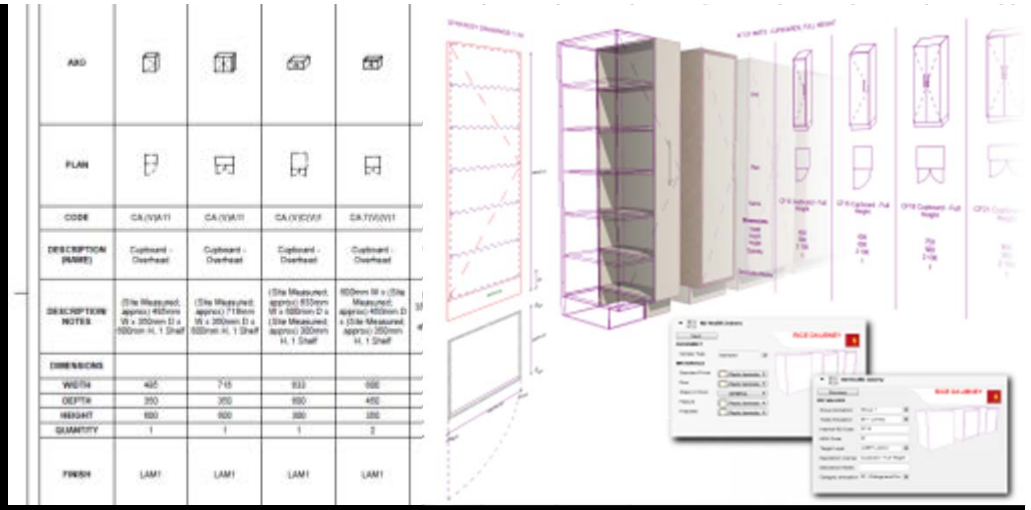
- Live edit and stakeholder input
- Real time update of 3D model including remotely by link to the model server

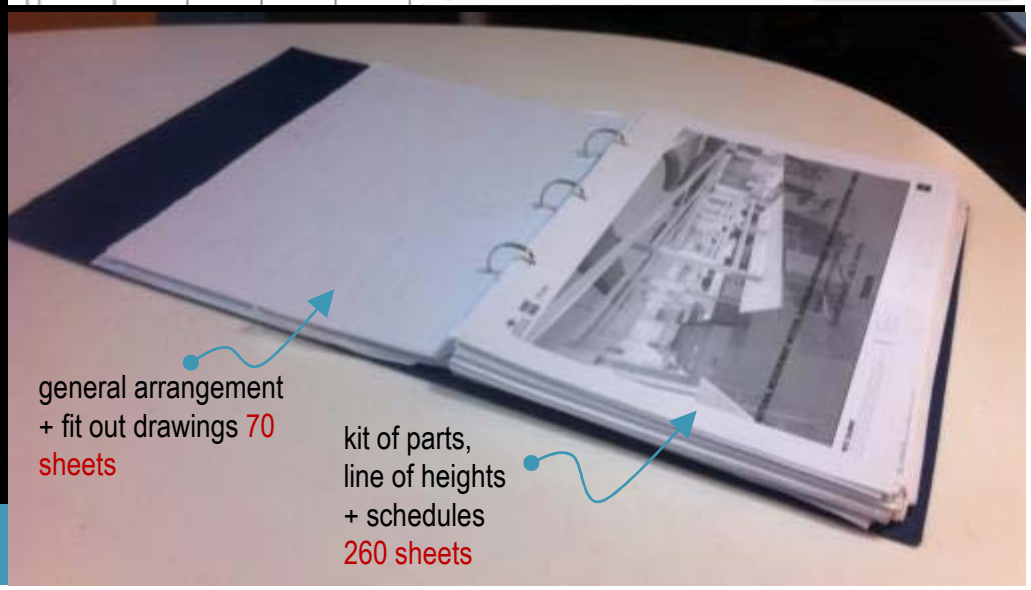




Information & Schedules

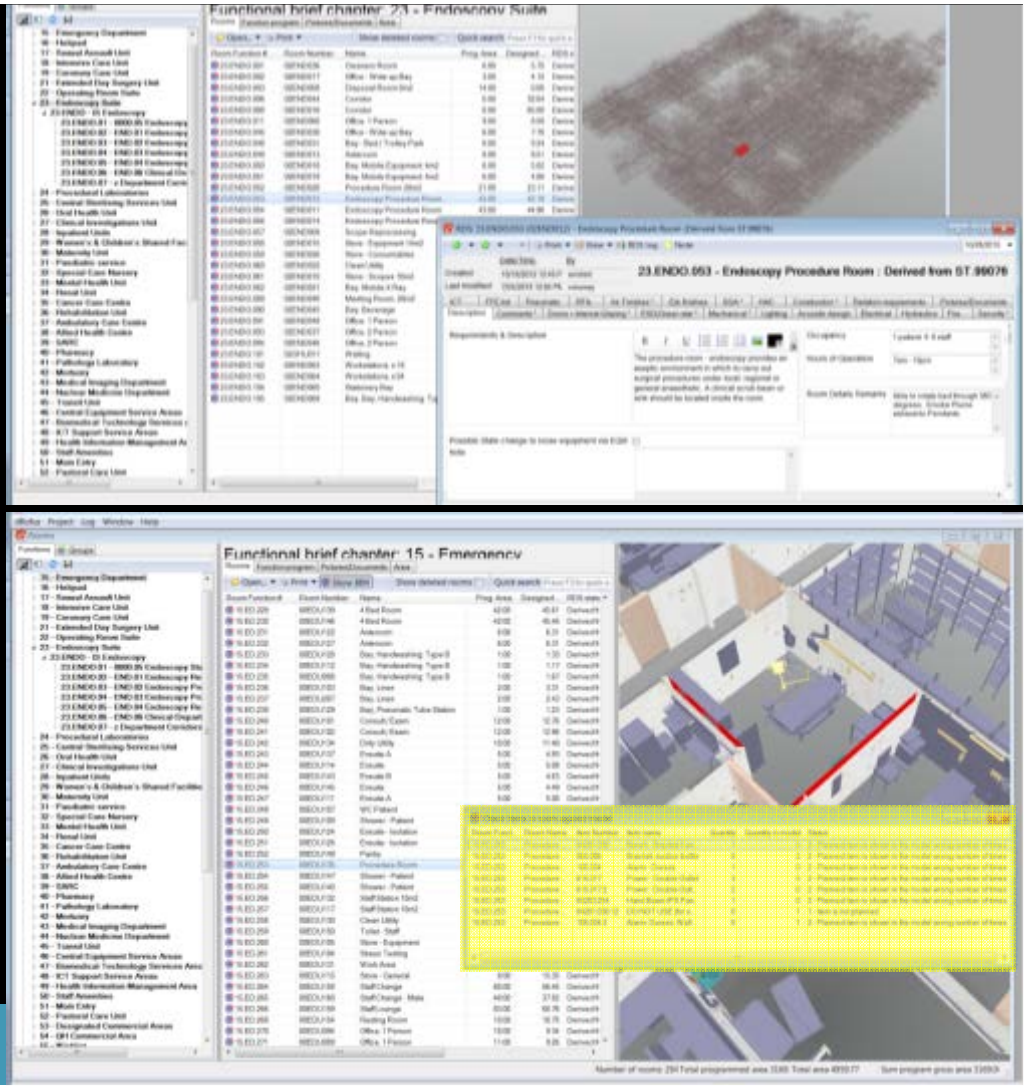
- A BIM, whilst having a 3D output, is really just a big database
- It can be searched, filtered and sorted as any database can
- We are trying to mine our BIM to extract as much information as possible in a scheduled format





dRofus

- Aligns the briefed and designed outcomes
- Change tracking log tracks all changes and brief departures
- Captures knowledge and decisions
- Ability to assign different user level rights
- Internet enabled so accessible remotely
- Integrates with the 3D model
- Intuitive to use and has customisable reporting functions
- Manages risk for all stakeholders



Westmead Redevelopment

Building health. Transforming lives.

NSW MAKING IT HAPPEN

NSW GOVERNMENT Health Western Sydney Local Health District

the children's hospital at Westmead

The Sydney children's Hospitals Network

Westmead Redevelopment

Building health. Transforming lives.

ARTIST'S IMPRESSION

NSW MAKING IT HAPPEN

NSW GOVERNMENT Health Western Sydney Local Health District

the children's hospital at Westmead

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NSW MAKING IT HAPPEN

NSW GOVERNMENT Health
Western Sydney
Local Health District

the children's hospital at Westmead
The Sydney children's Hospitals Network

02 DYNAMIC RENDERS

Panoramic Renders

- 360° panoramas with a key plan using a free downloadable app
- Immersive ‘controlled’ view of spaces
- Static locations
- Ability to ‘look’ around the room


Corridor
Corridor


Entry Area
Entry Area


Staff Area
Staff Area


Patient
Patient Area

03 VIRTUAL REALITY

What is Virtual Reality (VR)?

- VR software is similar to that used in the gaming industry, it provides a ‘virtual’ world
- It uses a digital 3D model, which is taken into VR software and converted to a format that can be viewed through a VR headset
- It compresses the file and converts it to stereoscopic images that are viewed through the headset
- This provides a fully ‘immersive’ 3D environment
- Movement can typically be controlled by a keyboard, mouse, gaming controller or headset controls

Collaboration with Virtual Reality

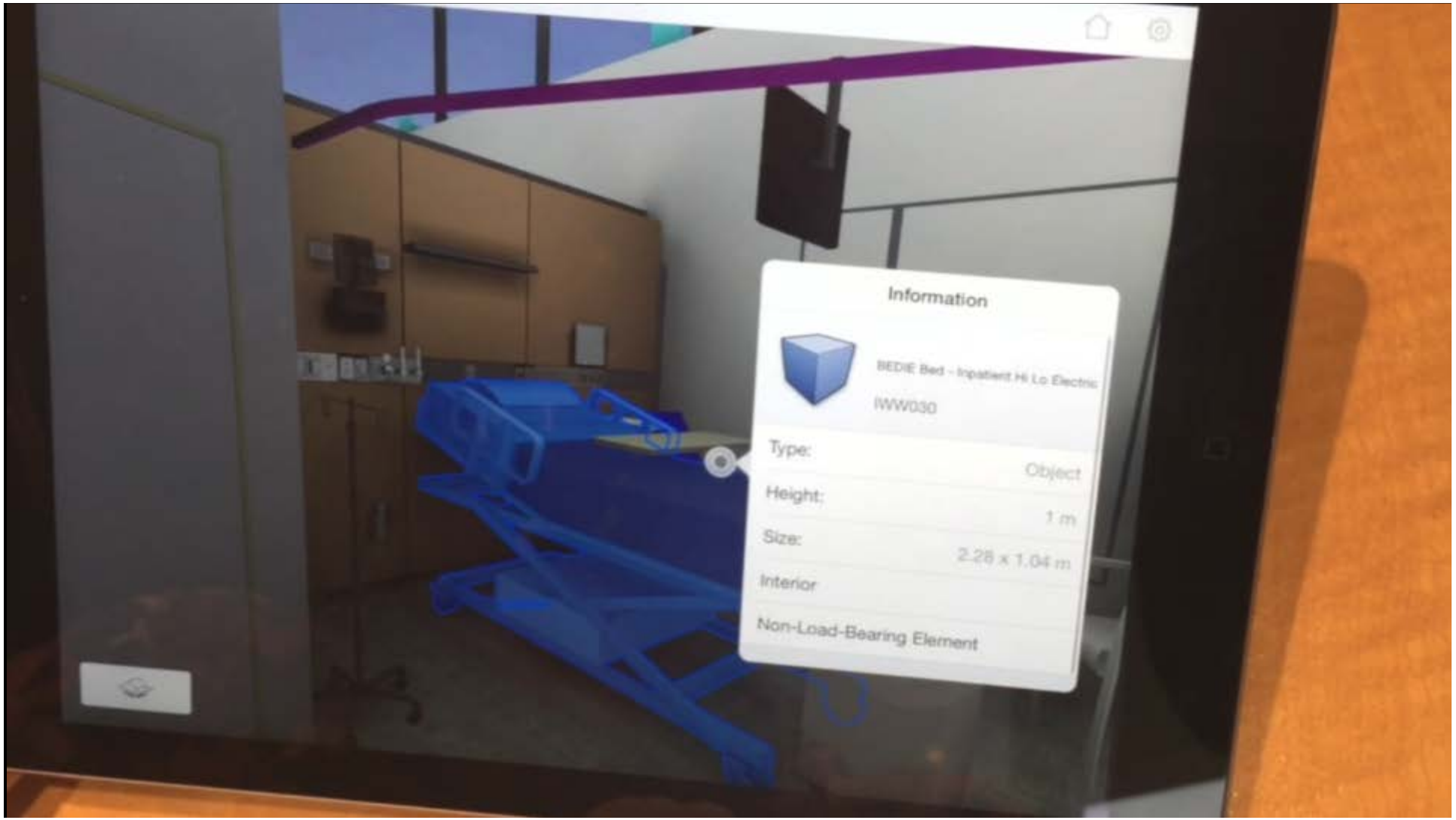
- VR allows users to tour a design virtually, it is experiential
- It helps in understanding the space, layout and design
- It has the potential to benefit the design of hospitals through:
  - maximising the efficient use of space
  - minimising staff travel distances
  - improving sightlines, say from staff stations to beds
  - ensuring the placement of equipment works
  - creating a safer work environment
  - improving wayfinding

Coded Stereoscopic Images for VR Viewers

- A QR scanner reads the image and provides a web link to view the stereoscopic image
- It can be as simple as downloading an app to your smartphone or tablet and viewing through a cardboard viewer

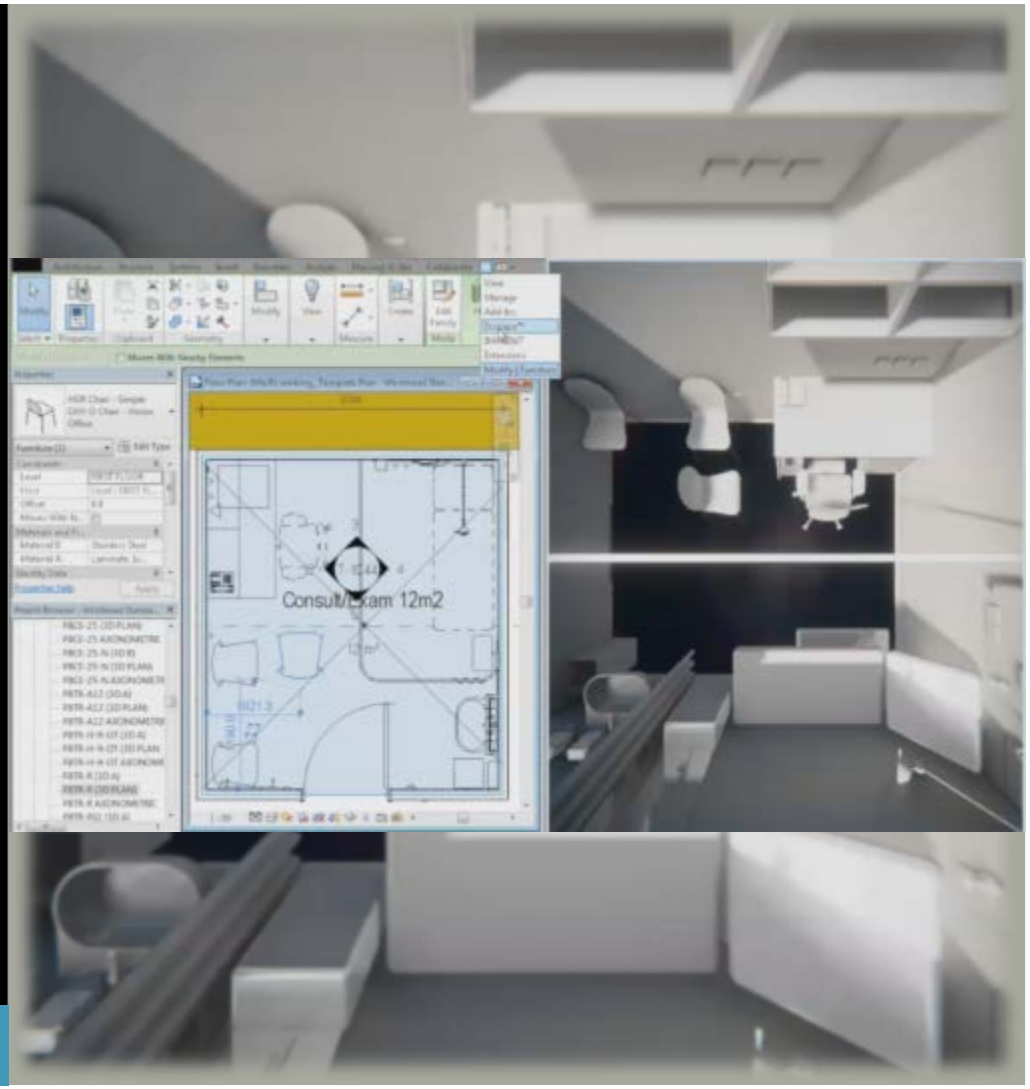

Master 2


Master 2


Information
BEDIE Bed - Inpatient Hi Lo Electric
IWW030
Type:
Object
Height:
1 m
Size:
2.28 x 1.04 m
Interior
Non-Load-Bearing Element

Real-Time Photo-Realistic Rendering

- Plug-in to our BIM authoring software, one click to get a render
- Changes in BIM are immediately reflected in the render
- Fast, high quality renders are able to instantly reflect the changes made
- Immediately enables you to walk through a project and see the effects of factors such as materials, daylighting and atmosphere
- You can even incorporate sounds



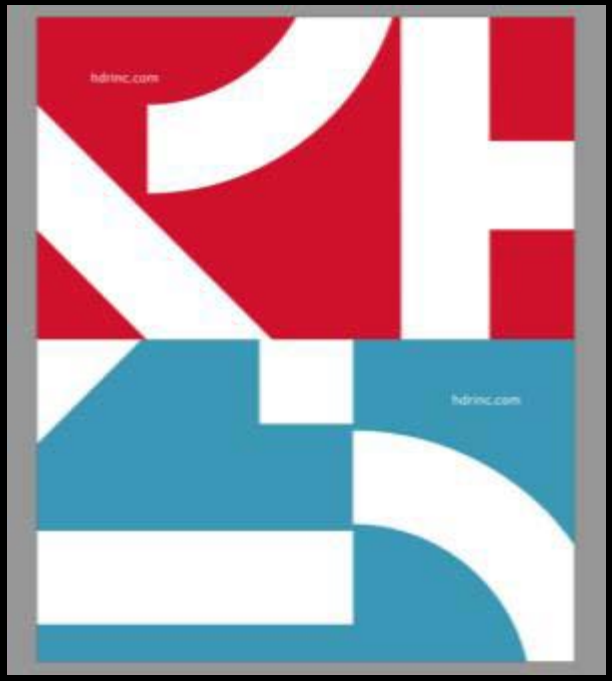
04 AUGMENTED REALITY

What is Augmented Reality (AR)?

- Augmented reality ‘augments’ our physical environment with overlayed content instead of replacing it as virtual reality tends to
- Georeferenced computer-generated images are superimposed into a real life view before the physical element is constructed there
- You can visualise models of construction sites, underground structures, cables and pipes, building elements
- This can be done on a smart phone, tablet or glasses
- With glasses informative graphics can also be displayed in your field of vision as well as audio

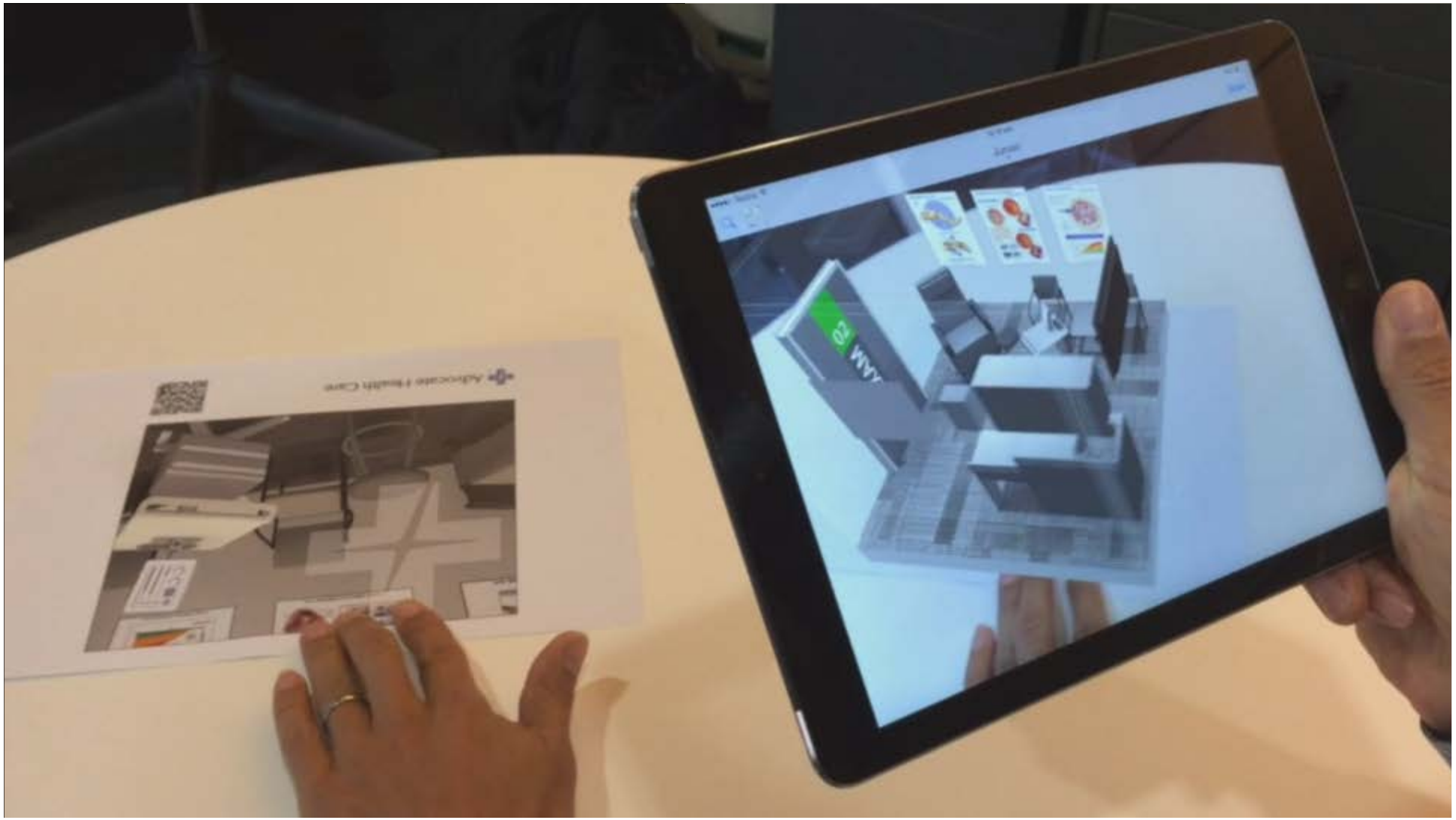
Augmented Reality

Download app and scan QR code

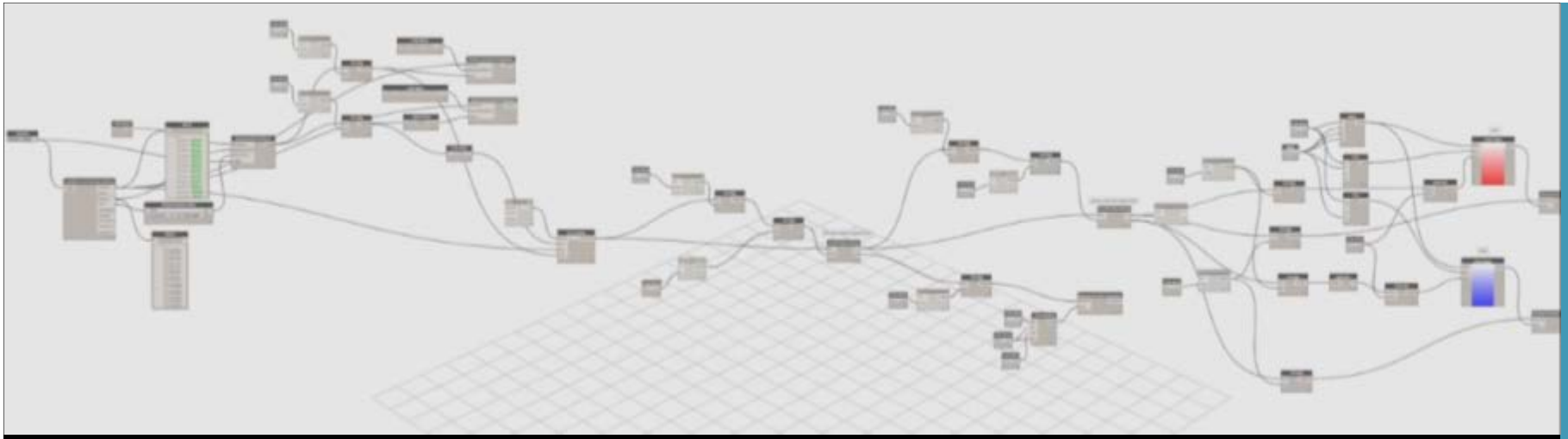


Arrange business cards

View augmented logo



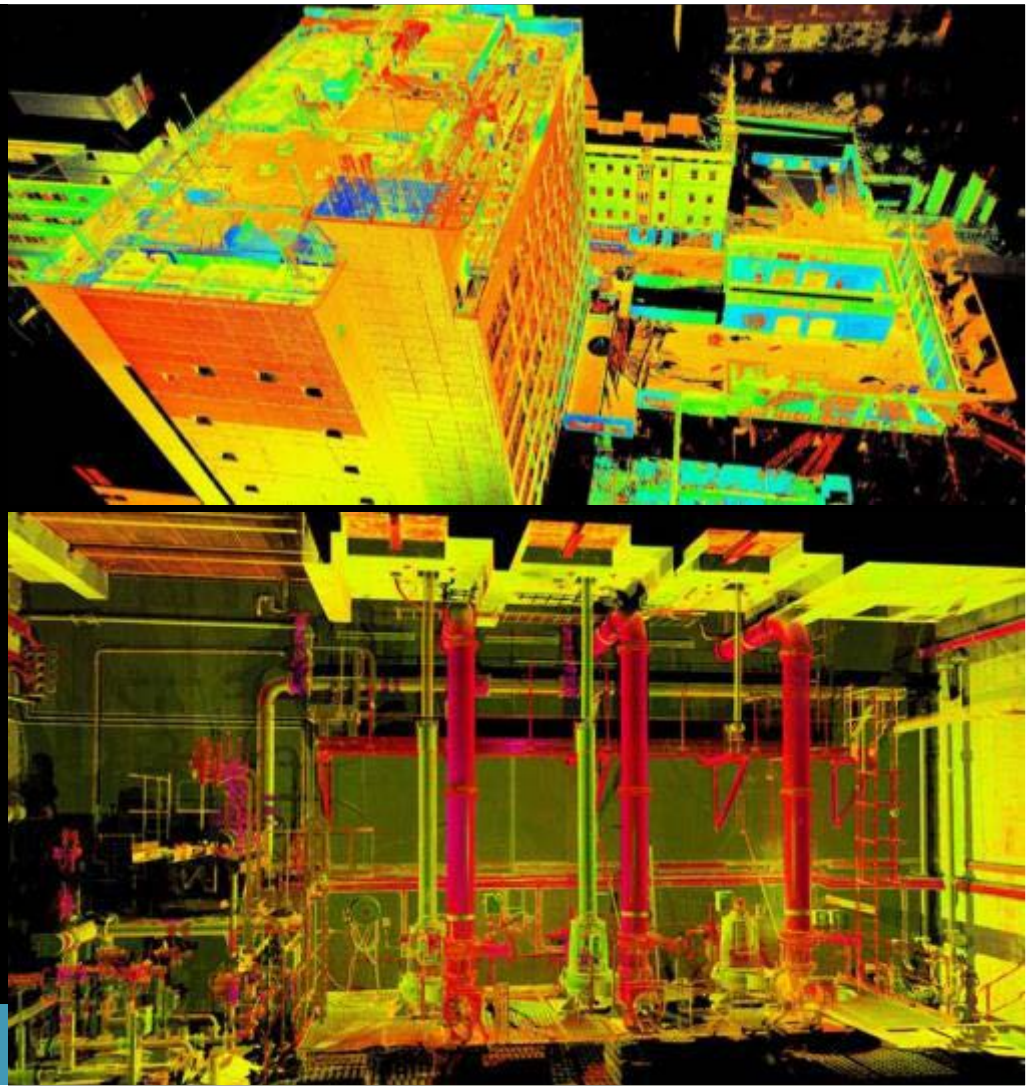

Oxygen Saturation & Pulse Oximetry
Retinal Detachment
02
EXAM



05 WHAT'S HAPPENING IN THE BACKGROUND?

Point Cloud Scanning

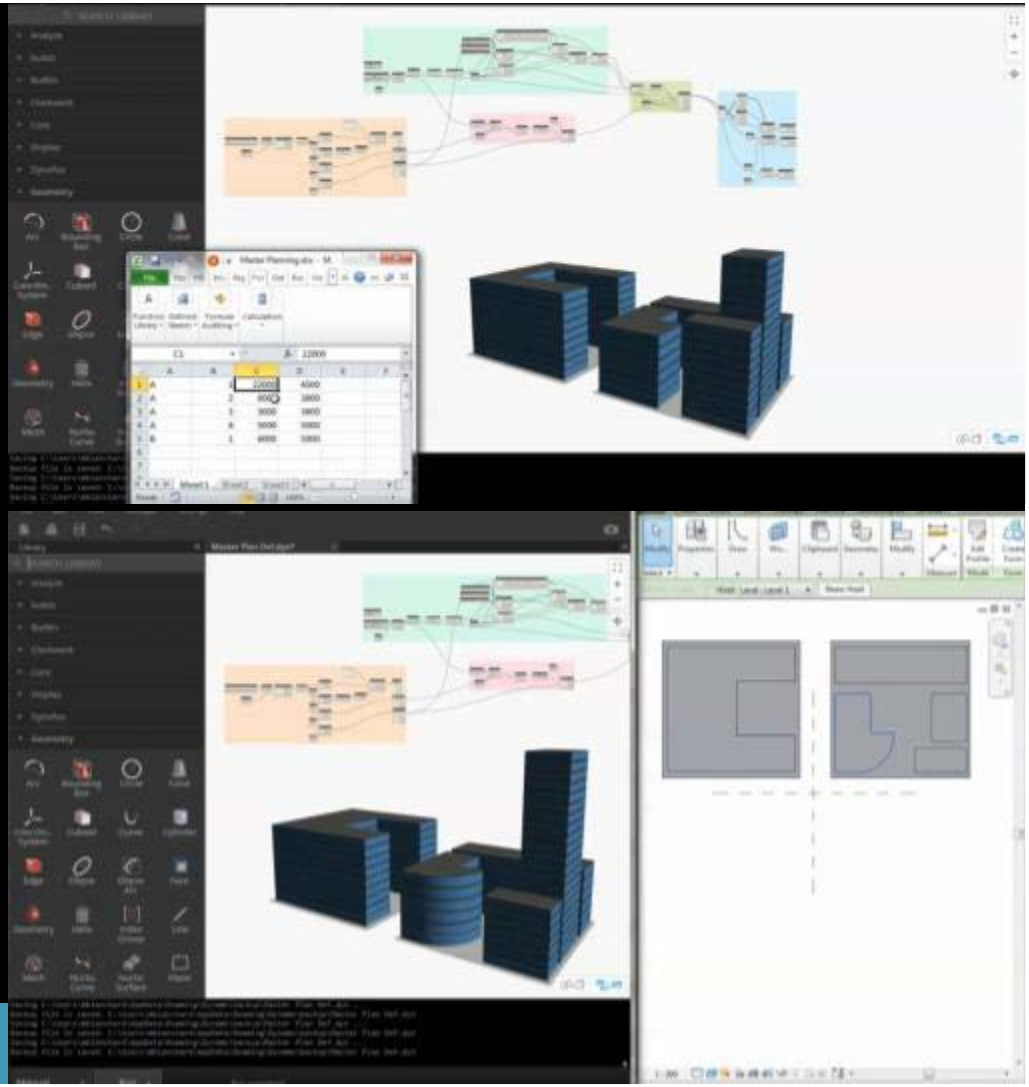
We now have the technology to laser scan buildings and terrains to create a point cloud model that can be incorporated into a digital model that accurately represents the existing site conditions



Computational Design

Computation Design tools allow us to build graphical ‘nodes’ to perform automated tasks, in this case for:

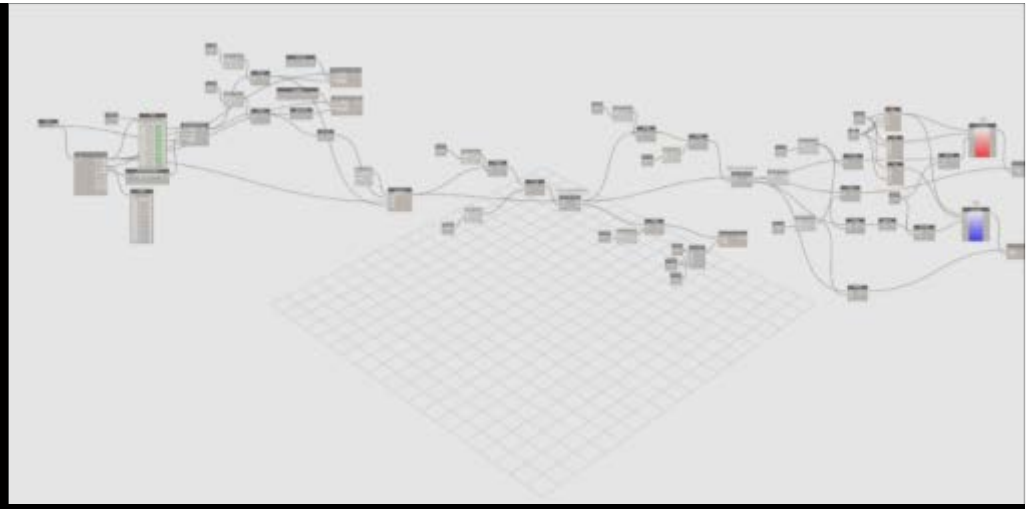
- Feasibility studies
- Blocking and stacking
- Site massing
- Early cost analysis

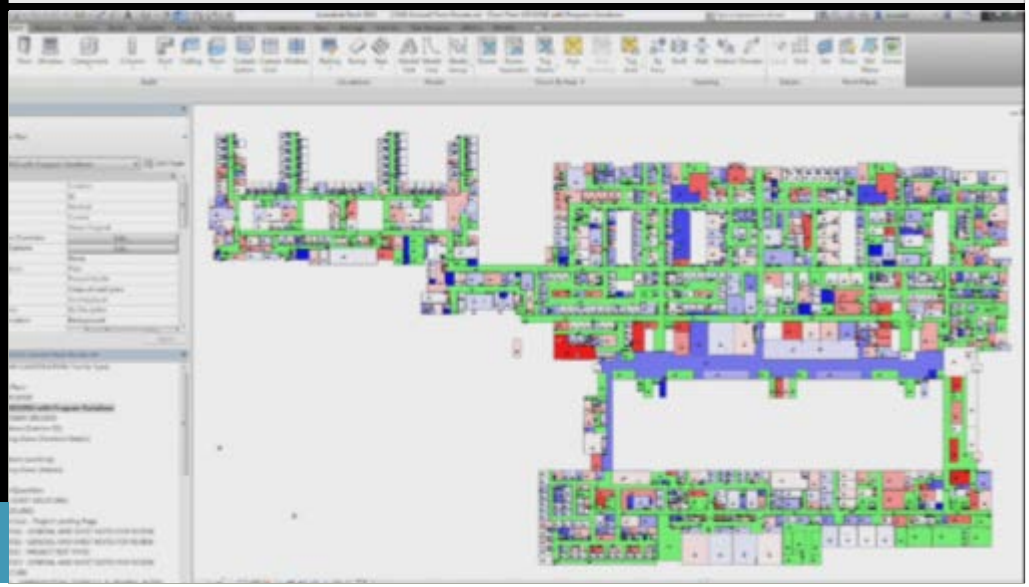


Computational Design

We have developed the means to check area against the briefed area to verify the Schedule of Accommodation using a traffic light system

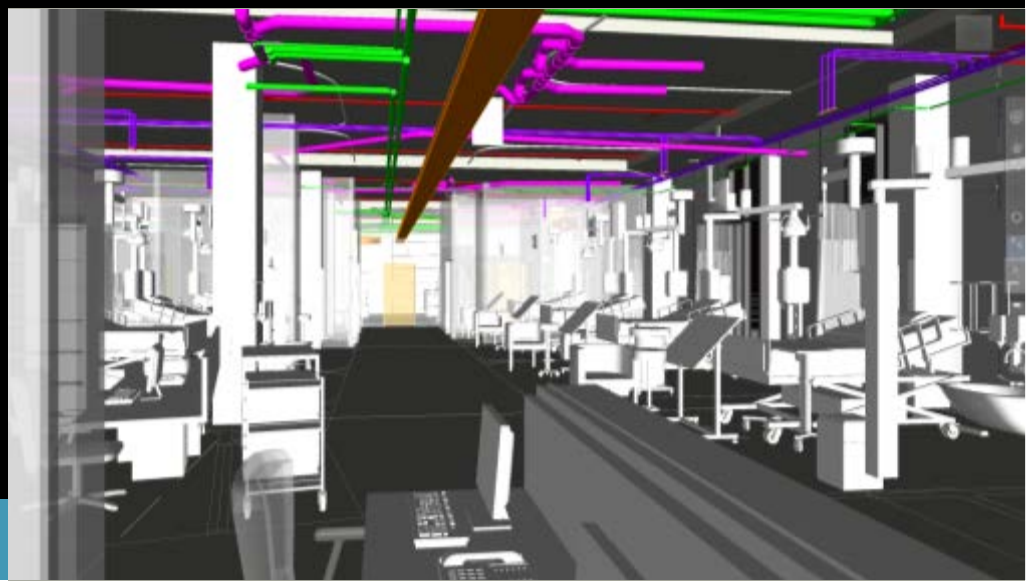
- Does not comply
- Within 5% of compliance
- Complies
- Travel

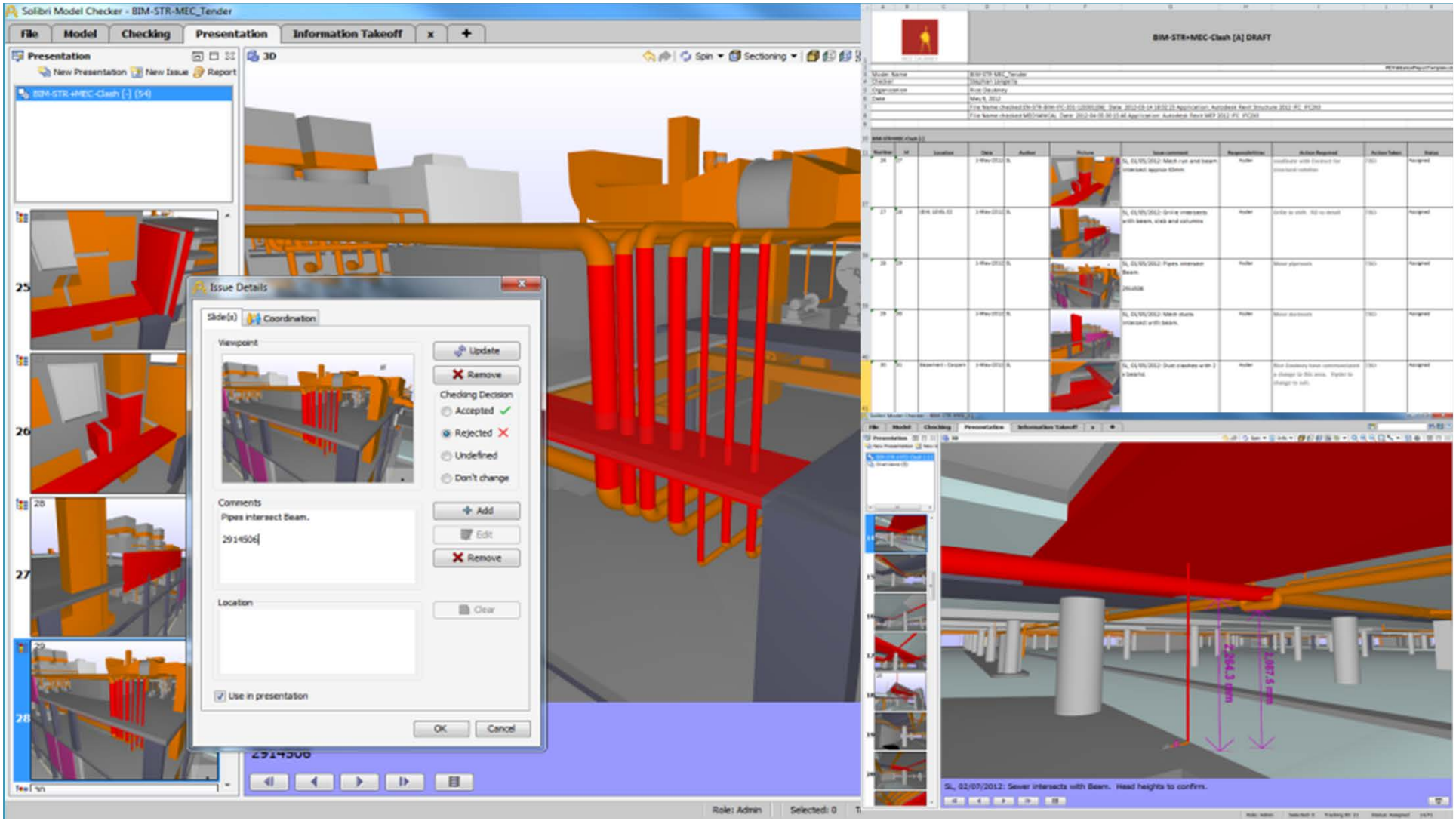




Project Review Software

- Using models from multiple consultants we can create a combined model of the whole building
- This can be used for:
  - Model verification
  - Clash detection
  - Code compliance
  - Brief checking
  - Tracking model updates
  - 4D programming
  - 5D cost estimates
  - 6D asset & facilities management in the future




Solibri Model Checker - BIM-STR-MEC_Tender
File
Model
Checking
Presentation
Information Takeoff
Presentation
New Presentation
New Issue
Report
BIM-STR+MEC-Clash [-] (54)
3D
Spin
Sectioning
Issue Details
Slide(s)
Coordination
Viewpoint
Update
Remove
Checking Decision
Accepted
Rejected
Undefined
Don't change
Comments
Pipes intersect Beam.
2914506
Add
Edit
Remove
Location
Clear
Use in presentation
OK
Cancel
2914506
Role: Admin
Selected: 0
BIM-STR+MEC-Clash [A] DRAFT
SL, 02/07/2012: Sewer intersects with Beam. Head heights to confirm.


Home
Viewpoint
Review
Animation
View
Output
Sectioning Tools
Render
Bluebeam
Print
Print Preview
Print Settings
Send by Email
NWD
3D DWF/ DWFx
FBX
Google Earth KML
Image
Animation
Clash Tests
Timeliner CSV
Current Search
Search Sets
Viewpoints
Viewpoints Report
PDS Tags
Print
Send
Publish
Export Scene
Visuals
Export Data
Liverpool Hospital Clinical Services Building
Saved Viewpoints
External
South East Axo
Over View
EXT Perp NE
EXT Perp SE
Basement
B1 Cut Away
B1 Interior 01
B1 Loading Dock
B1 Interior 02
Ground
GR0 Cut Away
Grd Interior 01
Grd Interior Conc.
Level 01
L01 Cut Away
L01 Interior
Level 02
L02 Cut Away
L02 Interior 01
Level 03
L03 Cut Away
L03 Interior 01
Level 04
L04 Cut Away
L04 Interior 01
Level 05
L05 Cut Away
L05 Interior 01
Level 06
L06 Cut Away
ZA_Level_06
Level 07
L07 Cut Away
Sabonal Cut Aways
Grid AR-AQ
Grid AQ-AP
Grid AP-AO
Grid AO-AN
Grid AN-AM
Grid AM-AL
Presentation Cut
Duct-Water
Duct-Drainage

06 THE FUTURE?

The Future?

- What may have once been a futuristic dream is now commonplace
- The rate of change in technology is ever increasing and the cost of technology is continuing to come down
- Robots, like Automated Guided Vehicles (AGVs), driverless cars, robot vacuum cleaners, etc will continue to have a big impact on our lives and jobs
- The benefits of technology in modularisation and prefabrication are starting to be realised in DfM (Design for Manufacture)
- Artificial Intelligence, computers that can think are now being developed
- Automation is inevitable, economics always wins!!

THANK YOU

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