HINDMARSH
Leadership at work

BIM and Collaboration Get Results

TEMC

1st Sept 2015

Company History Hindmarsh

National Diversified Builder / Developer

Institutional – teaching, research, public buildings
Health – research, clinical, health centers, hospitals
Residential – private developers, institutions, development

Experienced in various delivery models:
- Lump Sum
- Managing Contractor with designers novated
- Design and Construct

Construction | Development | Retirement | Capital

Hindmarsh Projects

Construction context

Construction in Australia

10% of GDP

$150 Billion Industry - University sector is a large component

Not without its CHALLENGES

- Low productivity
- High cost
- Lack of skills and knowledge
- Adversarial culture

Property Council – Case Study

“Projects as Wealth creators – Drivers of Project Excellence”

- **Many projects fail to satisfy their clients and end-users**
- **Only 1 in 10 projects is considered an excellent project, which is defined by:**
  - Satisfied end-users
  - Happy client (achieving investment goals)
  - Happy contractors and consultants (achieving margins)
  - Project participants enjoyed experience
  - Community appreciation (Good aesthetic/environmental project outcome)
- **Excellent project delivery was achieved by removing wasted effort and creating a positive and equitable project environment**

BIM – Hindmarsh experience

BIM has been a powerful tool for Hindmarsh to assist in creating better projects for all involved parties

Benefits:

- Improved collaboration between project stakeholders
- Optimised design coordination
- Reduced construction costs (through risk mitigation)
- Improved programme performance
- Improved quality (design and construction)
- Reduced waste (design, management, physical)
- Continuous improvement for all involved (on the job learning)
- Enhanced performance of the building
- FM capable models available at the end of the journey

BIM – Hindmarsh Experience

BIM – Hindmarsh South Australia

3D Modeling of complex façade and structural steel	2005
Uni of Adelaide – New Engineering Building – plantroom services	2008
Mawson Lakes School – Architectural, Structure and services	2009
Flinders Ctr Innovation in Cancer – Architectural, Structure, Services	2009
South Australia Health and Medical Research Institute	2010
University of SA – Jeffrey Smart Building	2012
Ergo Apartments	2014

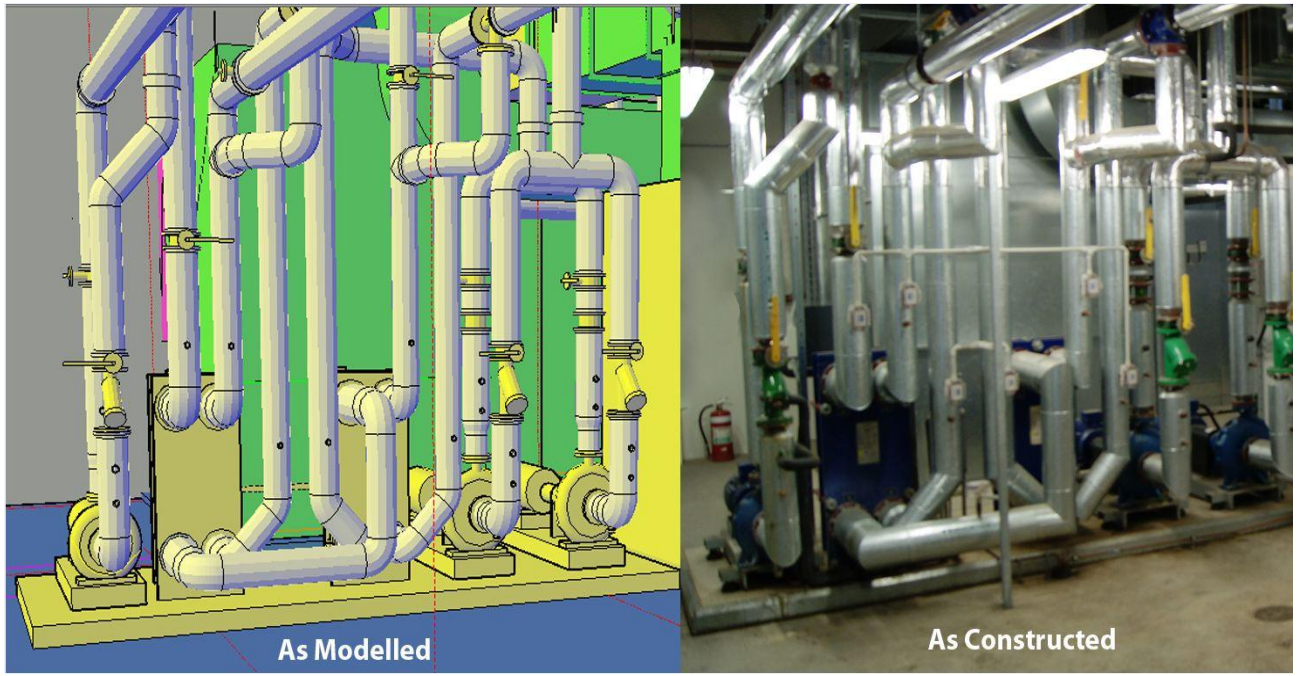
Used in various delivery models:

- Lump Sum
- Managing Contractor with designers separate
- Managing Contractor with designers novated
- Design and Construct

BIM – Hindmarsh Experience

BIM – Uni of Adelaide New Engineering Building

LOD 500 Virtual Prototype



BIM - SAHMRI

SAHMRI

Managing Contractor

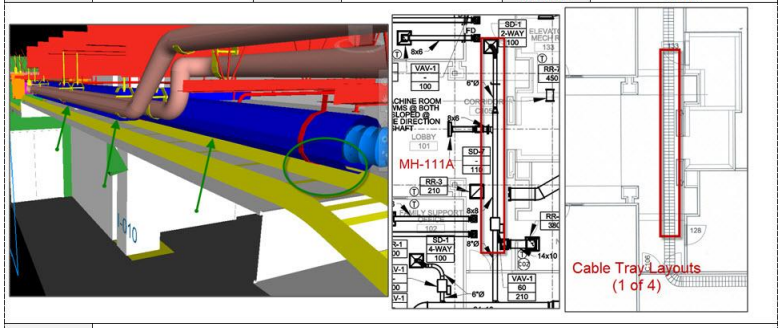
Complex everything
-Cyclotron
- Animal facilities
- Laboratories
- Containment Suites
- Complex structure
- Complex façade
- Staged site possession
- Staged fitout

BIM - SAHMRI

SAHMRI – BIM Process

- Design team committed to BIM 1 yr into the project (Revit & Navisworks)
- HCA used models for 4D initiatives – planning around staging and programming
- HCA engaged VICO for lower levels coordination – focus on services
- VICO process included an ‘embedded’ staff member on HCA team.
- Output was a design audit which allowed for resolution of issues prior to construction.
- Services trades developed the model to LOD400, used for setout, prefabrication and as-built submission

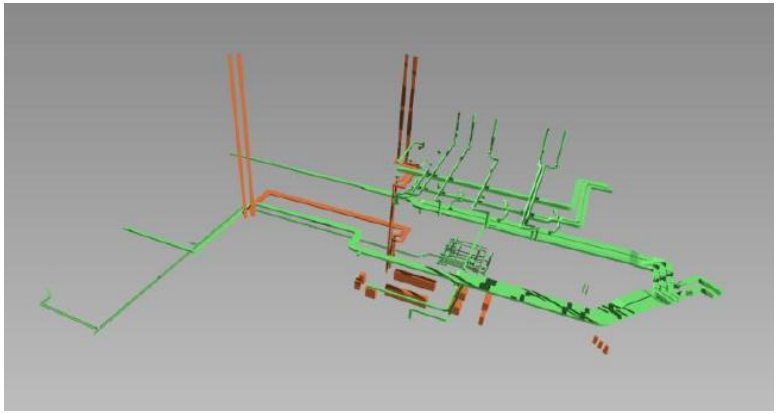
ID	C-006	Trades Involved	ME	Severity	High
Description	Multiple clashes between 18"x4" cable tray and 8"x8" supply duct. The cable tray was routed close above to the ceiling (elv. 10'-0"), but neither the clearance or the clash cannot be avoided. The duct cannot be raised, because the steel joists are too close to the ceiling. There is not enough space for these elements.				
Floor	1st floor	Grid Reference	T-V/4-4.6	Sheet Reference	MH-111A; Cable Tray Layouts (1 of 4); A-611A

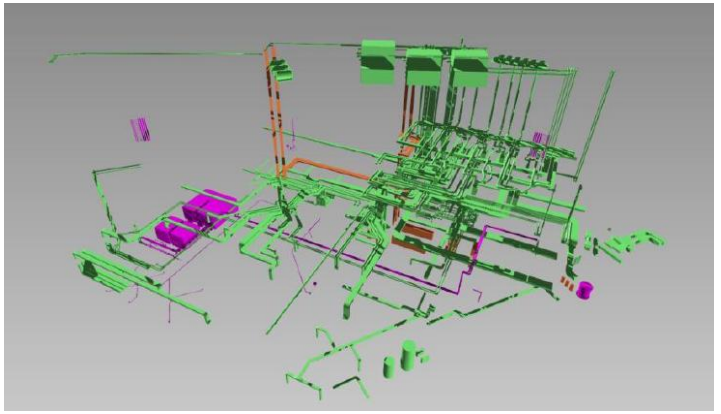


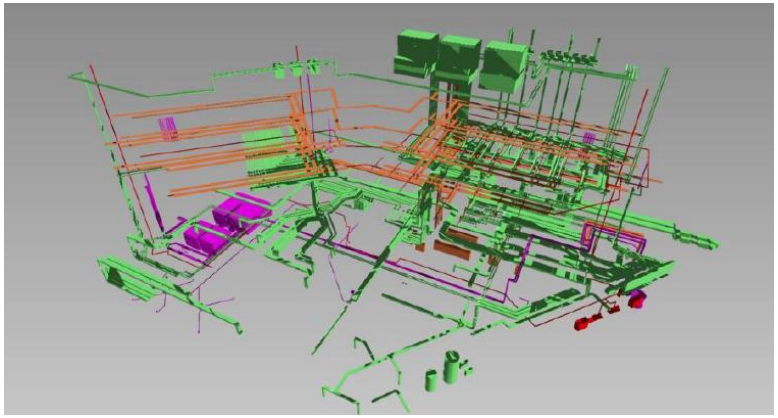
Modeling Assumption	The clash was modeled, the ceiling elevation needs to be lowered.

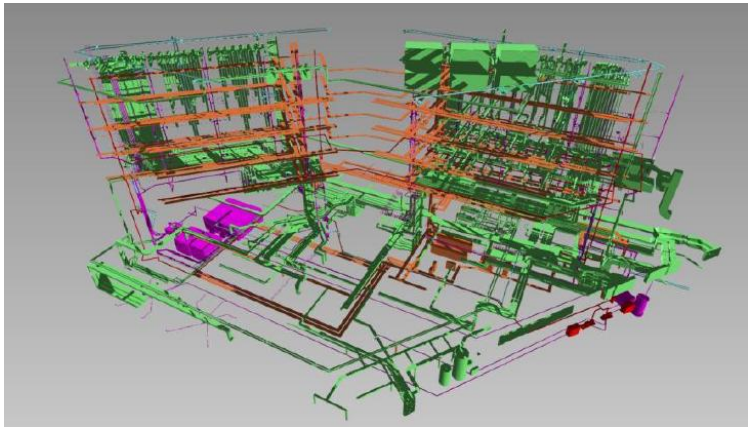
BIM - SAHMRI

Design Development









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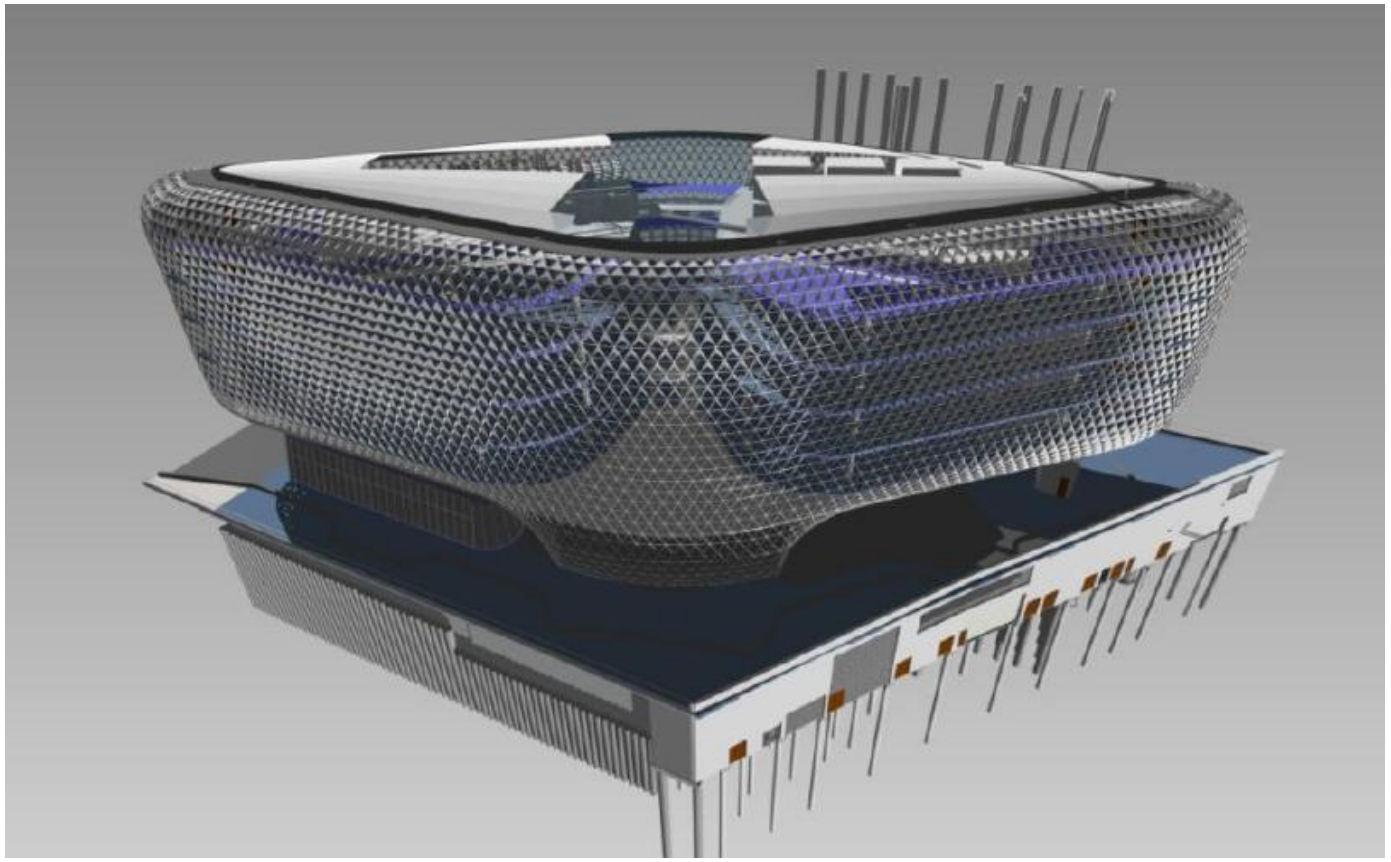

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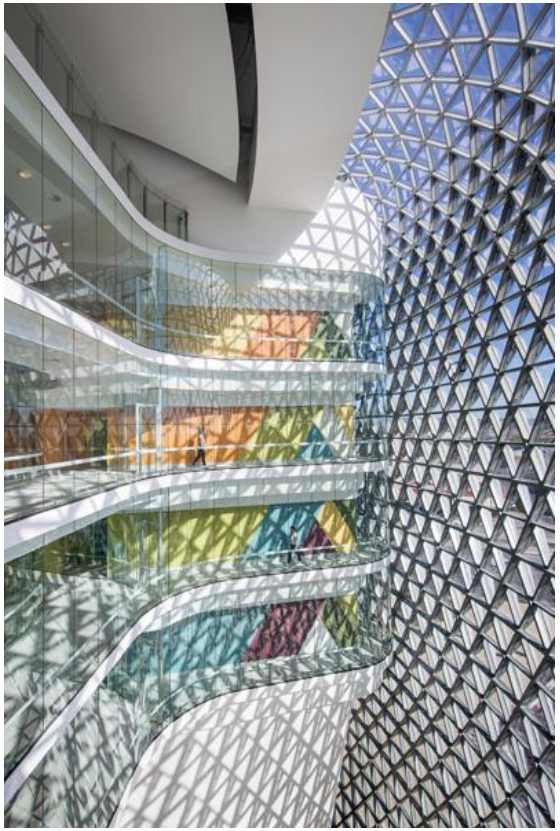

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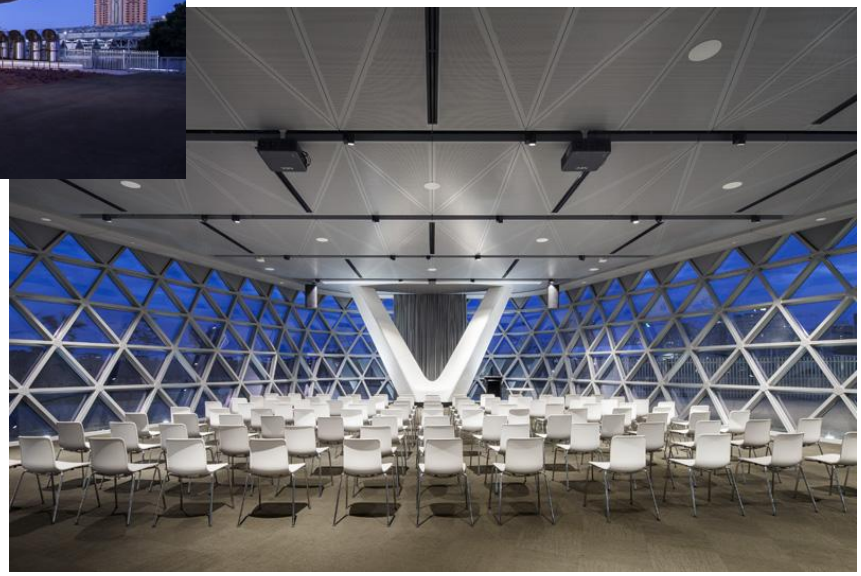

BIM – UniSA Jeffrey Smart Building

Jeffrey Smart Building

Collaboration with:

- Client – UniSA
- Consultants – John Wardle Architects & Phillips Pilkington Architects
- Bestec (Services)
- Wallbridge & Gilbert (Structural)

Design was 2D in CAD through to For Construction

Hindmarsh proposed BIM to UniSA

BIM – UniSA Jeffrey Smart Building

Jeffrey Smart Building

Stage 1 BIM Design Stage

- Built the 3D model and produced Constructability Report – thousands of design discrepancies identified.
- Missing information, clashes and discrepancies between disciplines all resolved in collaborative workshops with design team.
- For Construction documentation update
- Model issued to services trades

BIM – UniSA Jeffrey Smart Building

Constructability report example - CLASH

ID	C-006	Trades Involved	ME	Severity	High
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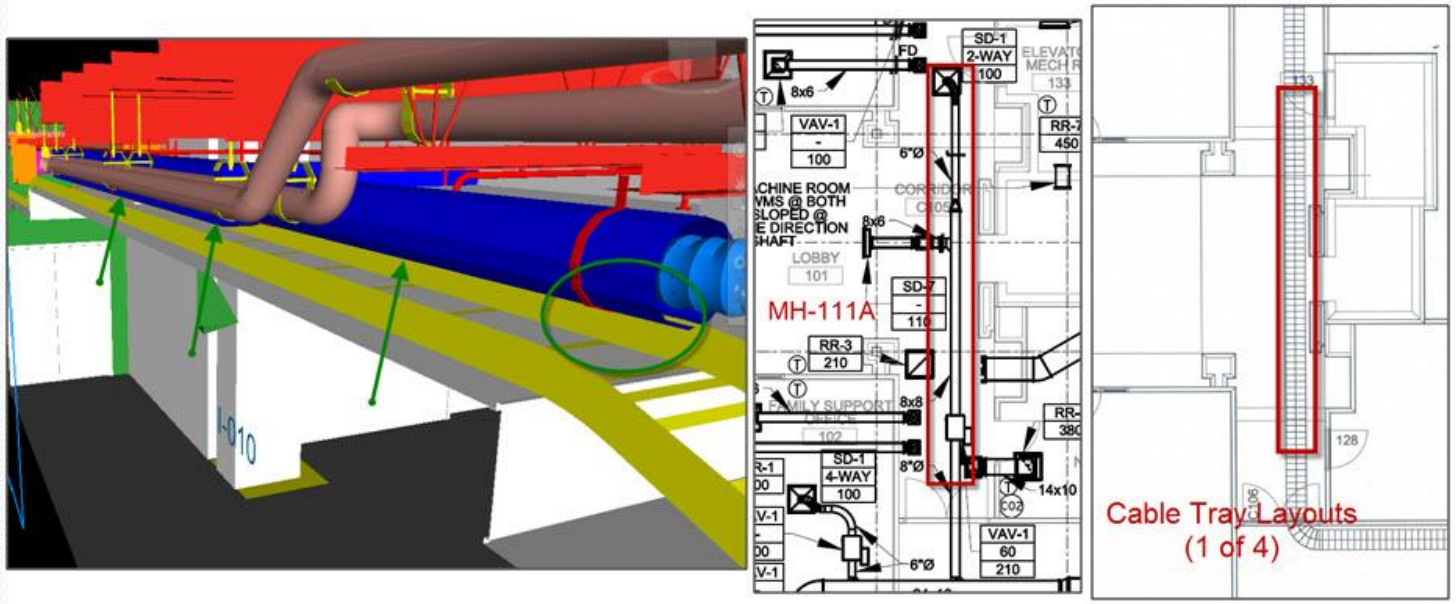

Modeling Assumption	The clash was modeled, the ceiling elevation needs to be lowered.

BIM – UniSA Jeffrey Smart Building

Constructability report example – missing / inconsistent dimensions

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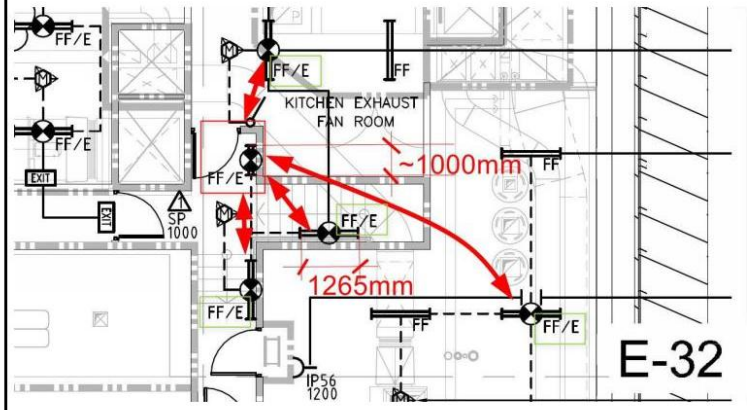
VICO SOFTWARE Integrating Construction

CRI Number	MEP-G-001	Trades	ELEC	Severity	Low
Description	FF/E Lighting Fixture floor plan symbol shorter than the fixture given dimensions in the online specification. According to specification fixture dimensions are 1265mm x 108mm x 100mm.				
Floor	Level 8	Grid Ref.	B-C/7-8	Sheet Ref.	E-32



Modeling Assumption	Modeled light fixture according to online specification.		
Design Team Comments	Correct, symbol used is standard Bestec symbol. Fixutre dimensions stated are correct. [BESTEC]		
Vico Comments	Issue was resolved according to confirmed assumption. No need to update the model.	Issue Status	Resolved

Contractor is responsible for verification of all information before work installation is started.

BIM – UniSA Jeffrey Smart Building

Constructability report example – contradiction between disciplines

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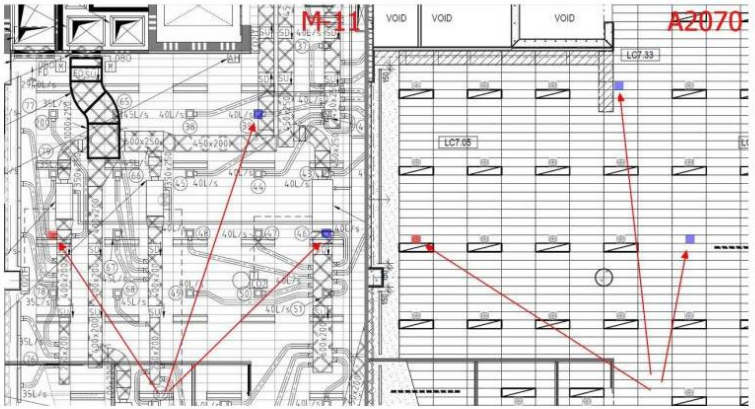
VICO SOFTWARE Integrating Construction

CRI Number	MEP-A-210	Trades	ARCH, MECH	Severity	Low
Description	Contradiction between architectural reflected ceiling plan(A2070) and mechanical floor plan(M-11). The position of the diffusers are not same on the two plan at gridline D-E/1-3.				
Floor	Level 7	Grid Ref.	D-E/1-3	Sheet Ref.	A2070 (CD03); M-11



Modeling Assumption	The diffusers were modeled according to the mechanical floor plan(M-11)(marked with blue)				
Design Team Comments	Waiting for response.				
Vico Comments	Issue is still open. Design team needs to provide updated Architectural and Mechanical floor plans. Issue can be fixed, if these diffusers are on the same place on the floor plans.			Issue Status	Pending

Contractor is responsible for verification of all information before work installation is started.

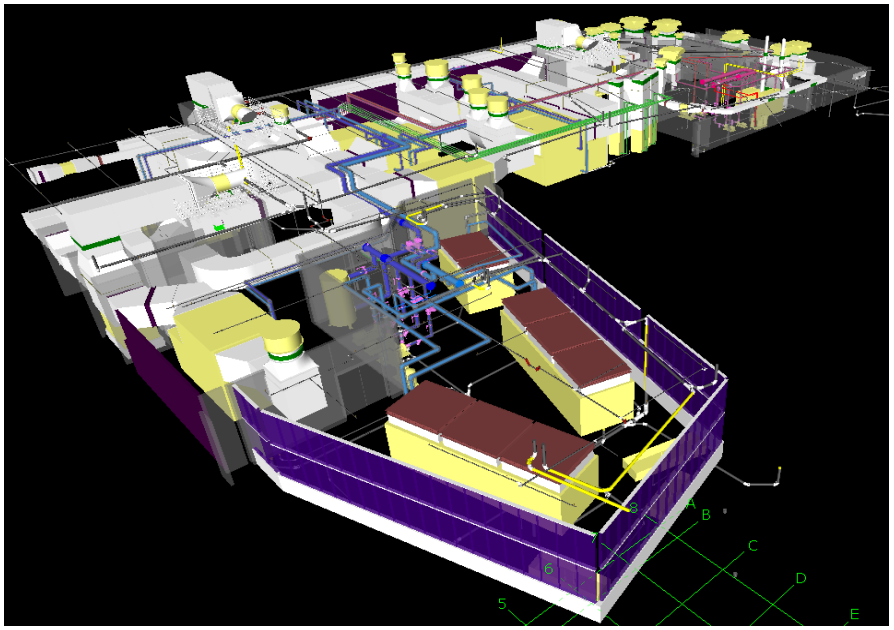
BIM – UniSA Jeffrey Smart Building

Jeffrey Smart Building

Stage 2 BIM – Services Coordination and Clash Detection

- Hindmarsh led the services team developing the shop model

- Weekly workshops held until all clashes resolved, mainly in plantrooms



BIM – UniSA Jeffrey Smart Building

Jeffrey Smart Building - OUTCOMES

- No variations for rework associated with services coordination.
- Reduced RFI / Site Instruction / Variation process and disruption
- Budget savings
- IMPROVED RELATIONSHIPS
- As-Built model available for future FM use
- Very positive student response
- Learning and teaching opportunity
- Value for money – below 0.2% contract value

BIM – UniSA Jeffrey Smart Building

Jeffrey Smart Building

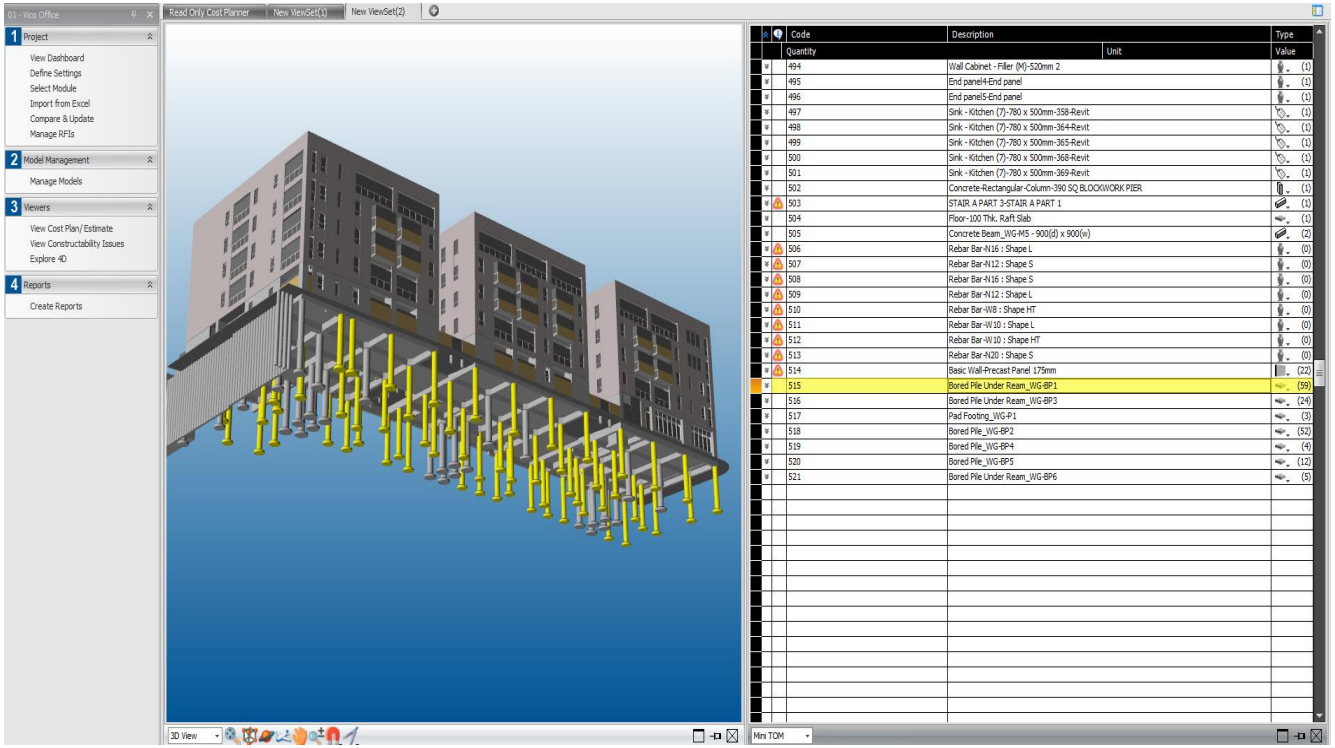
BIM – Ergo Apartments

ERGO Apartments

Hindmarsh Apartment Development - Adelaide

Design & Construct Contract

5D – Quantities for Costs



BIM – Ergo Apartments

ERGO Apartments

BIM – Lessons

BIM – Lessons Learned

- Technology is only part of the story
- Having the right team is key (positive culture)
- Early contractor involvement is important - Integrated delivery model
- Concise BIM Management Plan / Model Progression Specification required – to be agreed with all parties at the outset
- Monitoring of model development important (outputs at the agreed time and to the required quality)
- Win/Win outcome results in increased acceptance

BIM – Challenges

- Creating a trusting and motivating team environment from the outset (Client best placed to select the team)
- Project Delivery system that supports excellent project delivery
- Resistance to change – “That's the way we've always done it.”
- Internal acceptance of BIM in an organisation and strategic approach to implementation are critical
- Change to skill set of staff – Training & introduction of new or advanced roles (BIM Manager, Design Manager, PM, Project Engineer etc.)
- Perceived cost premium
- Perceived risks (Changed process)
- Staff/team capabilities need to be developed – no “off the shelf” solutions – Add BIM process to existing knowledge set
- Lack of BIM capable subcontractors – Mandating, Support & Training

Questions?