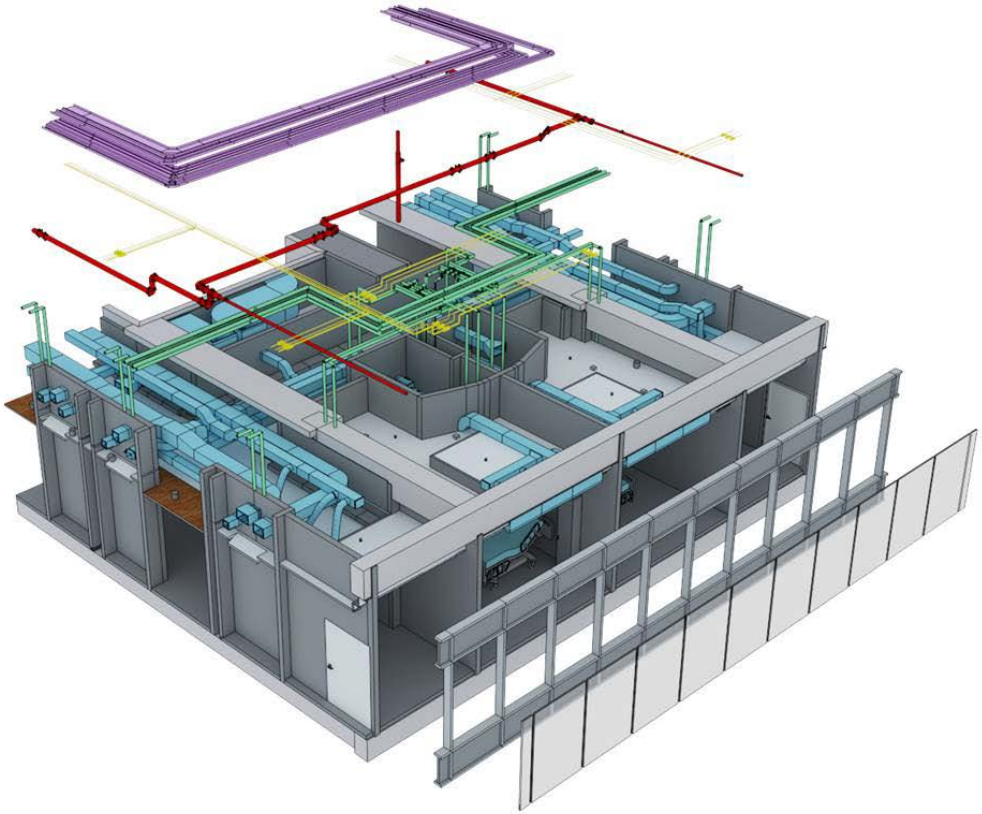
Strategies for Virtual Building Services Coordination



Mark Baldwin

The BIM Hub

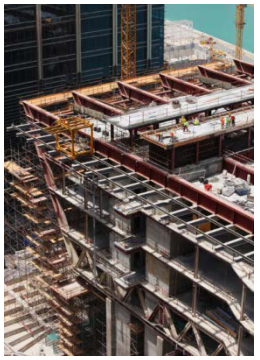
BIM is disruptive!

…but that is the nature of real innovation.

Optimisation Vs Innovation

Project Example 1:
"not-yet-BIM"

3D geometry coordination



Abu Dhabi Financial Centre
United Arab Emirates

Construction Budget:
US$ 1.2 billion

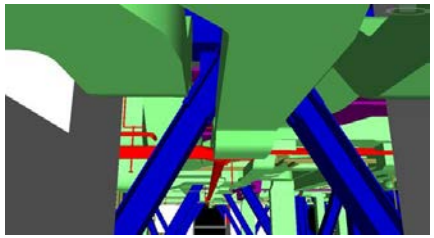
Floor Area:
570,000sqm

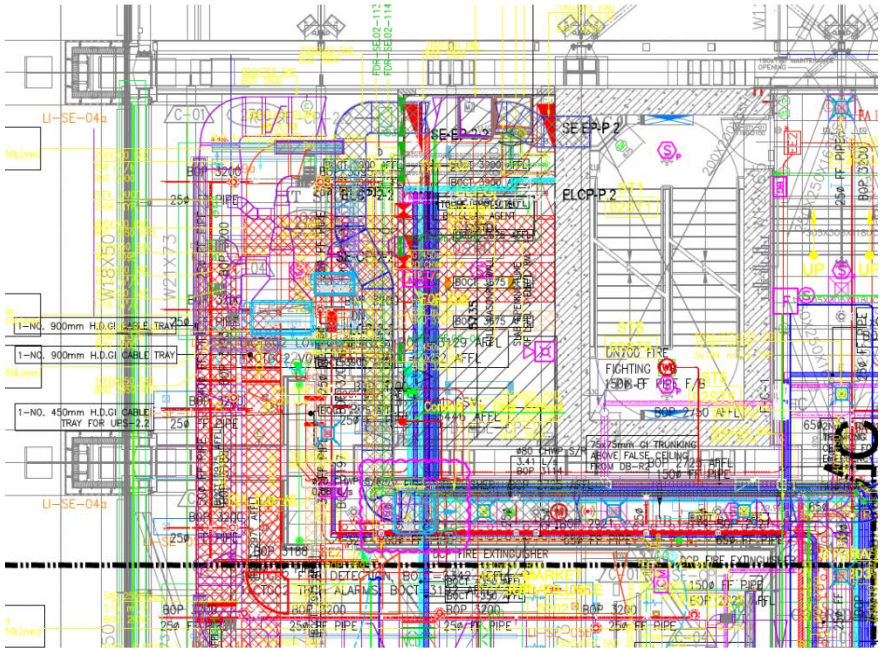
Design Consultants:
Goetsch Partners, Gensler

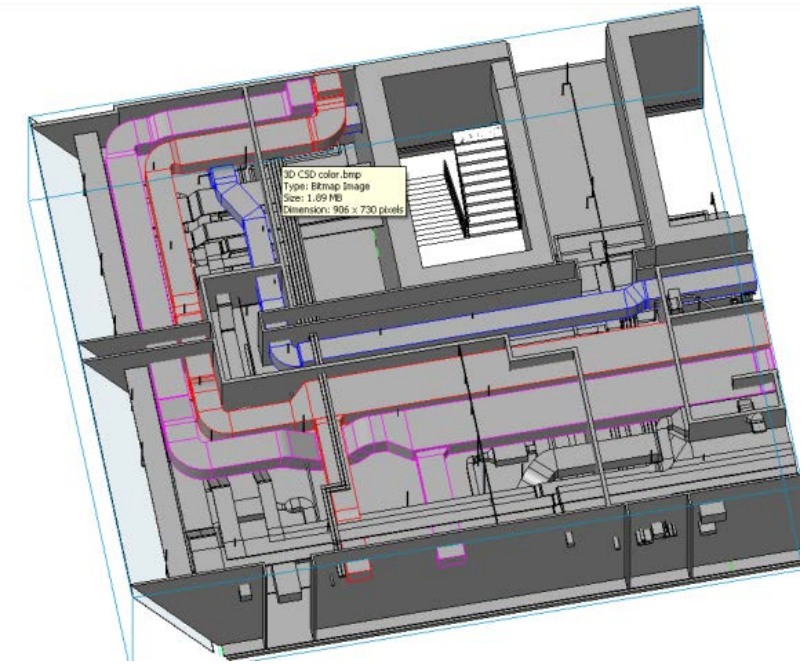
BIM Scope:
Services Coordination
of Stock Exchange building

Status:
Completed 2012


65 mm Ø CHS

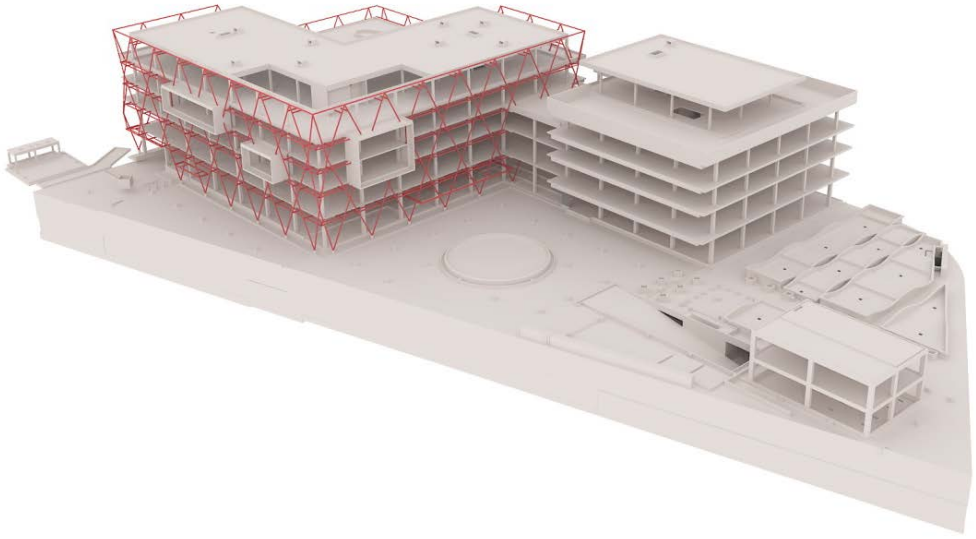



SEE P.P 2
ELCP-P.2
1-NO. 900mm H.D.GI CABLE TRAY
1-NO. 900mm H.D.GI CABLE TRAY
1-NO. 450mm H.D.GI CABLE TRAY FOR UPS-2.2
LI-SE-04a
LI-SE-04a
DN700 FIRE FIGHTING 150M-FF PIPE F/B
75x25mm GI TRUNKING ABOVE FALSE CEILING FROM DB-R2
FIRE EXTINGUISHER
DETECTION
THRU ALARM
BOP 2750 AFFL
BOP 3210
BOP 3166
BOP 3200
BOP 3700
BOP 3120
25ø FF PIPE
150ø FF PIPE


3D CSD color.bmp
Type: Bitmap Image
Size: 1.09 MB
Dimension: 906 x 730 pixels

Project Example 2:
"optimisation with digital-prototyping"

automated clash detection & drawing production



Arzanah Medical Complex
Abu Dhabi, UAE

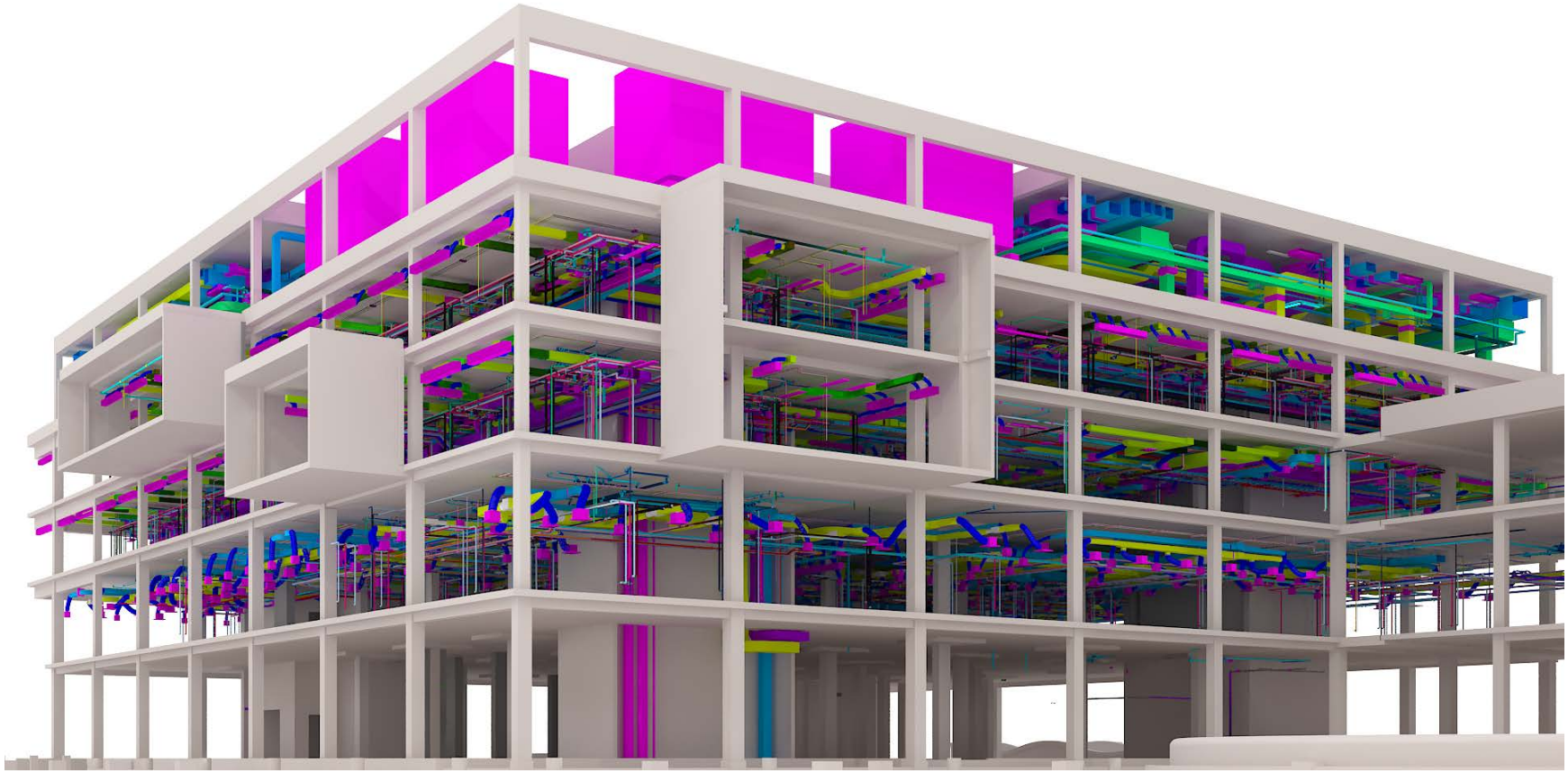
Construction Budget:
US$ 163 million

Floor Area:
56,000sqm

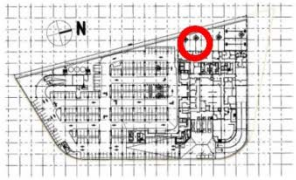
Design Consultants:
WSP, HDP

BIM Scope:
MEP Coordination,
Fabrication drawing production for the MEP contractor.

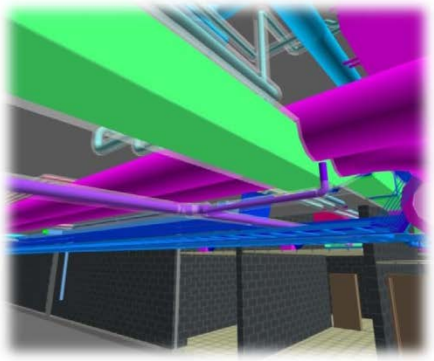
Status:
Completed 2012



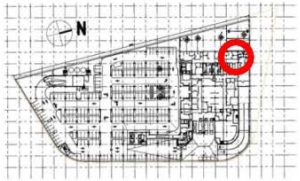
EXAMPLE 02	
Trade/s	HVAC
Description: Fresh Air Make-up duct clashes with Condenser Water Pipes	
Location	



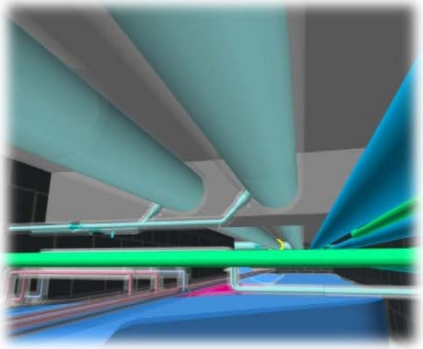
LEVEL: P1
AREA: ZONE 1

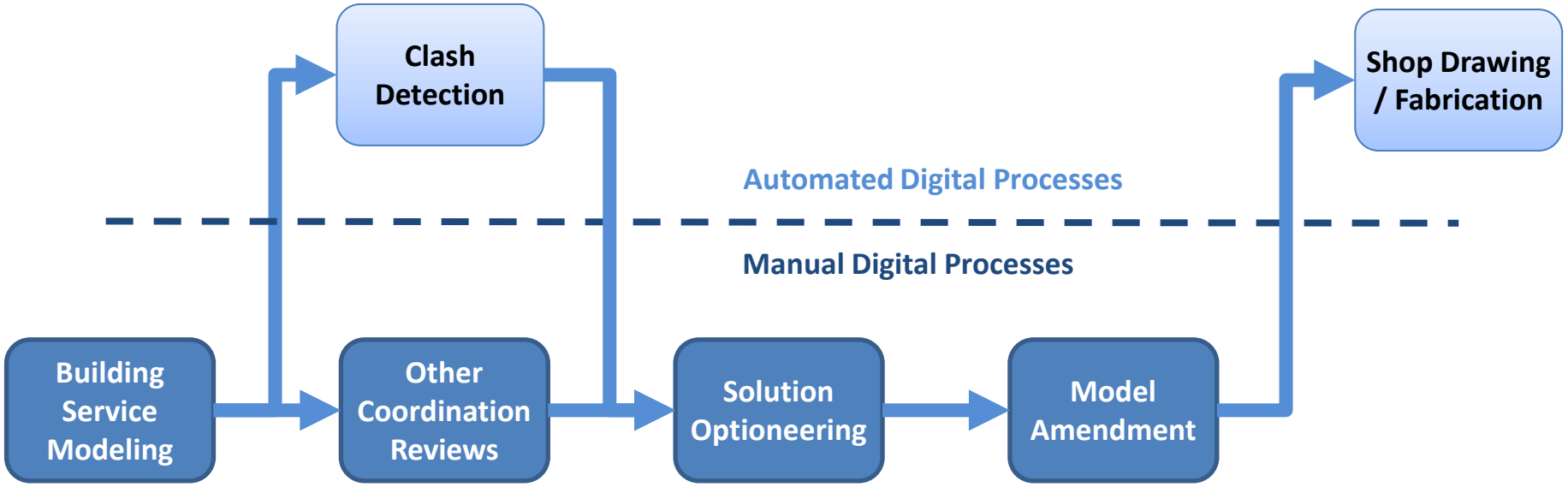


EXAMPLE 02	
Trade/s	HVAC & STRUCTURAL
Description: CHW Pipes clashing with beam	
Location	



LEVEL: P1
AREA: ZONE 1




Clash Detection
Shop Drawing / Fabrication
Automated Digital Processes
Manual Digital Processes
Building Service Modeling
Other Coordination Reviews
Solution Optioneering
Model Amendment

Project Example 3:
"introducing innovation"

coordination, construction planning, quantity take-off

Al Mafraq Hospital
Abu Dhabi, UAE

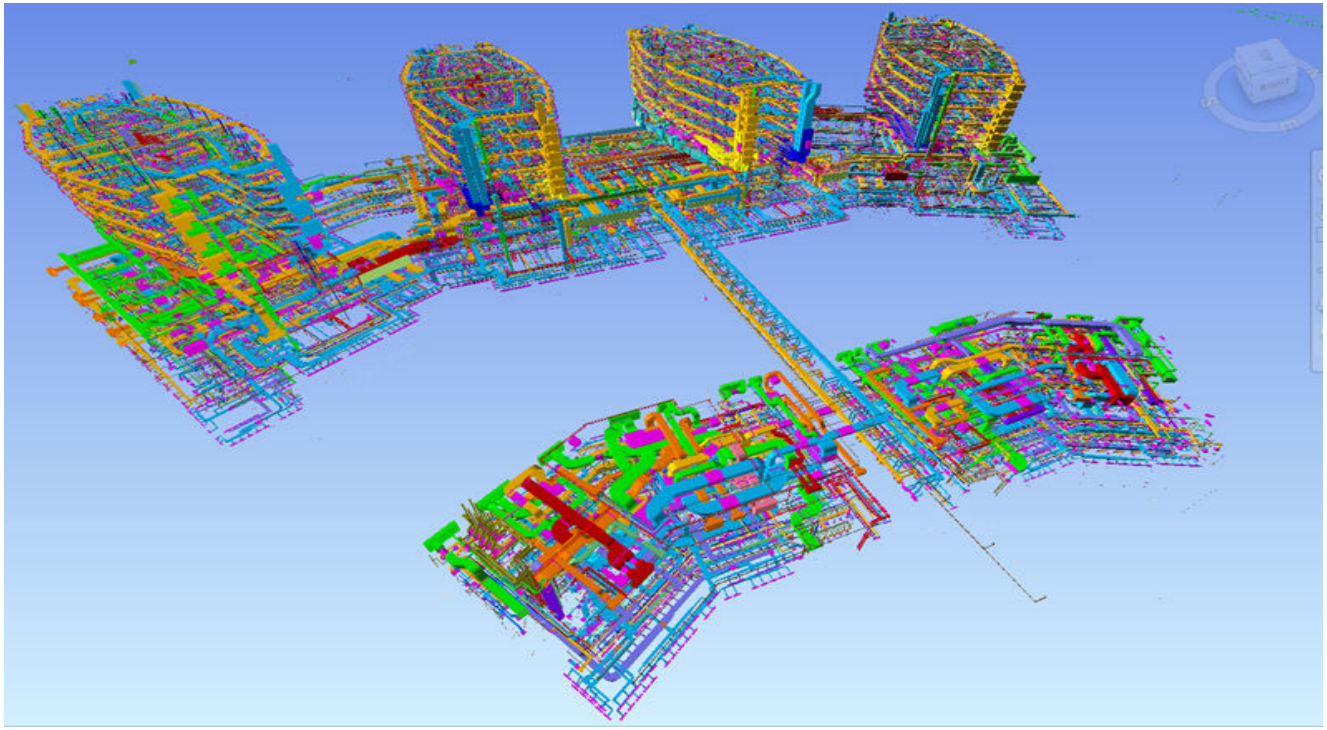
Construction Budget:
US$ 870 million

Floor Area:
250,000 sqm

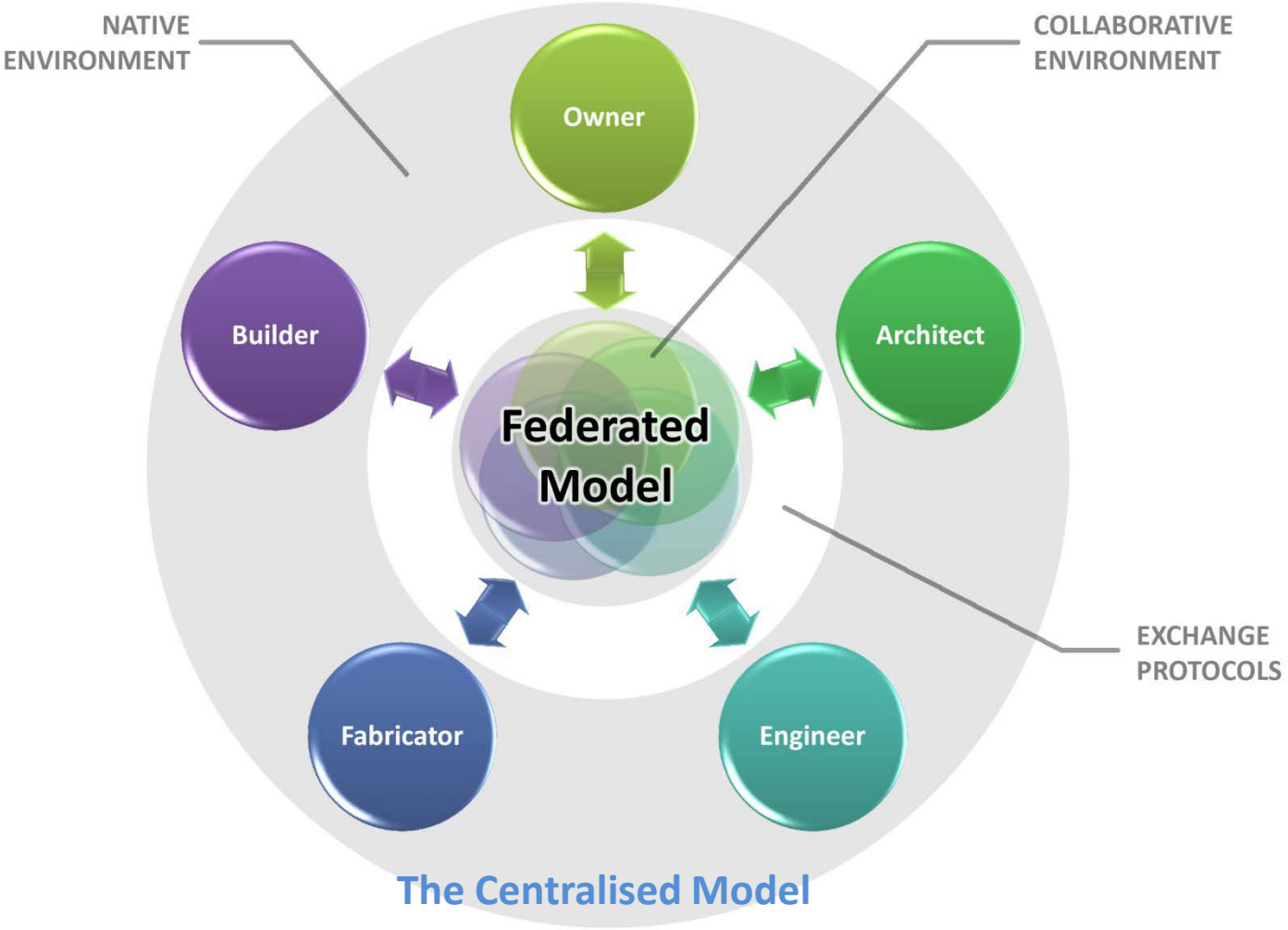
Design Consultants:
Burt Hill / Stantec

BIM Scope:
MEP BIM Coordination, fabrication drawing production quantity take-off, 4D planning for the Main Contractor.

Status:
Expected completion 2014



Strategies
for the digital environment



The Centralised Model

The Federated Model

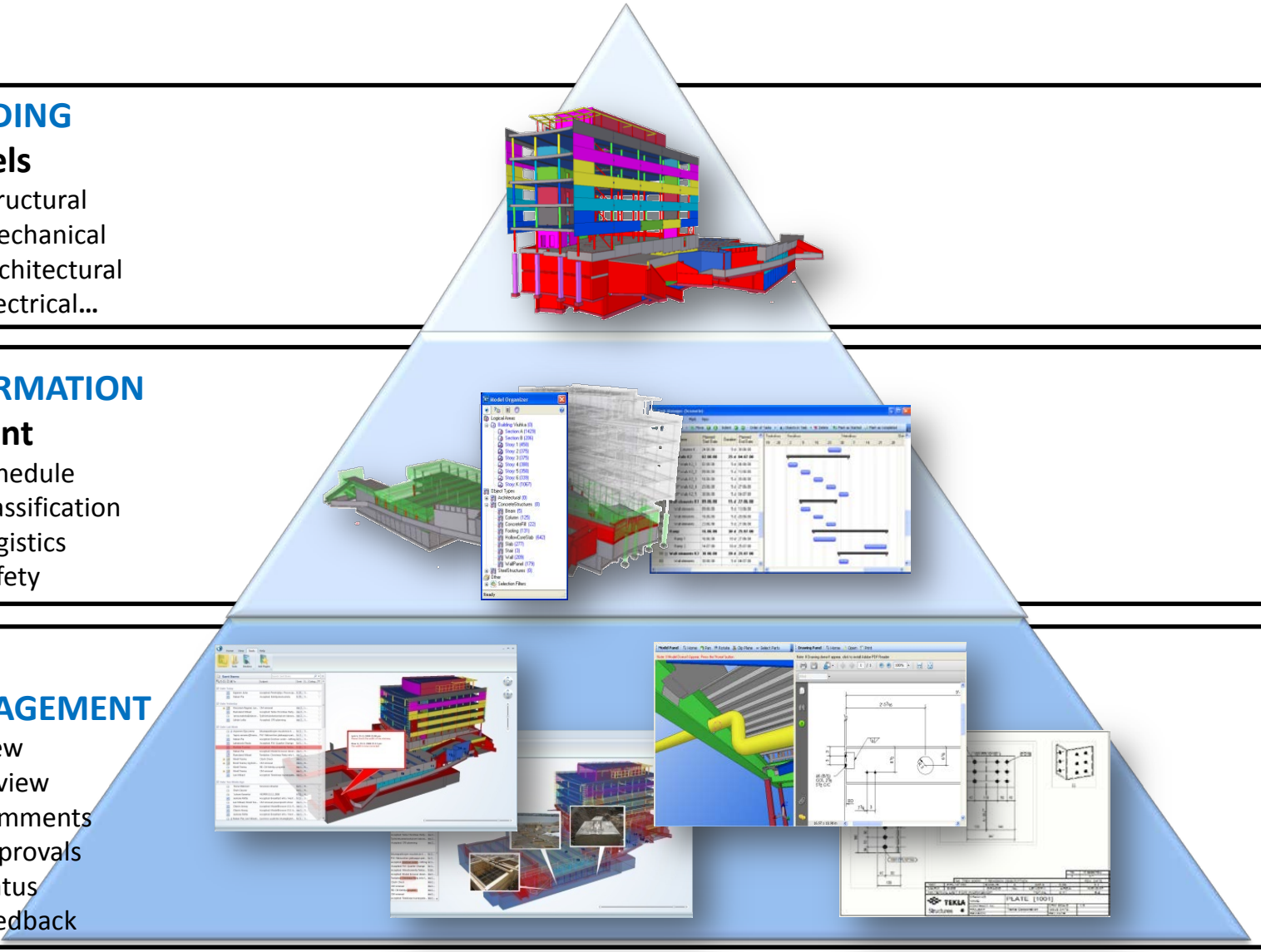
Summary:

recognise and exploit the value and distinction of the native and collaborative environments

BUILDING
models
- Structural
- Mechanical
- Architectural
- Electrical…

INFORMATION
content
- Schedule
- Classification
- Logistics
- Safety

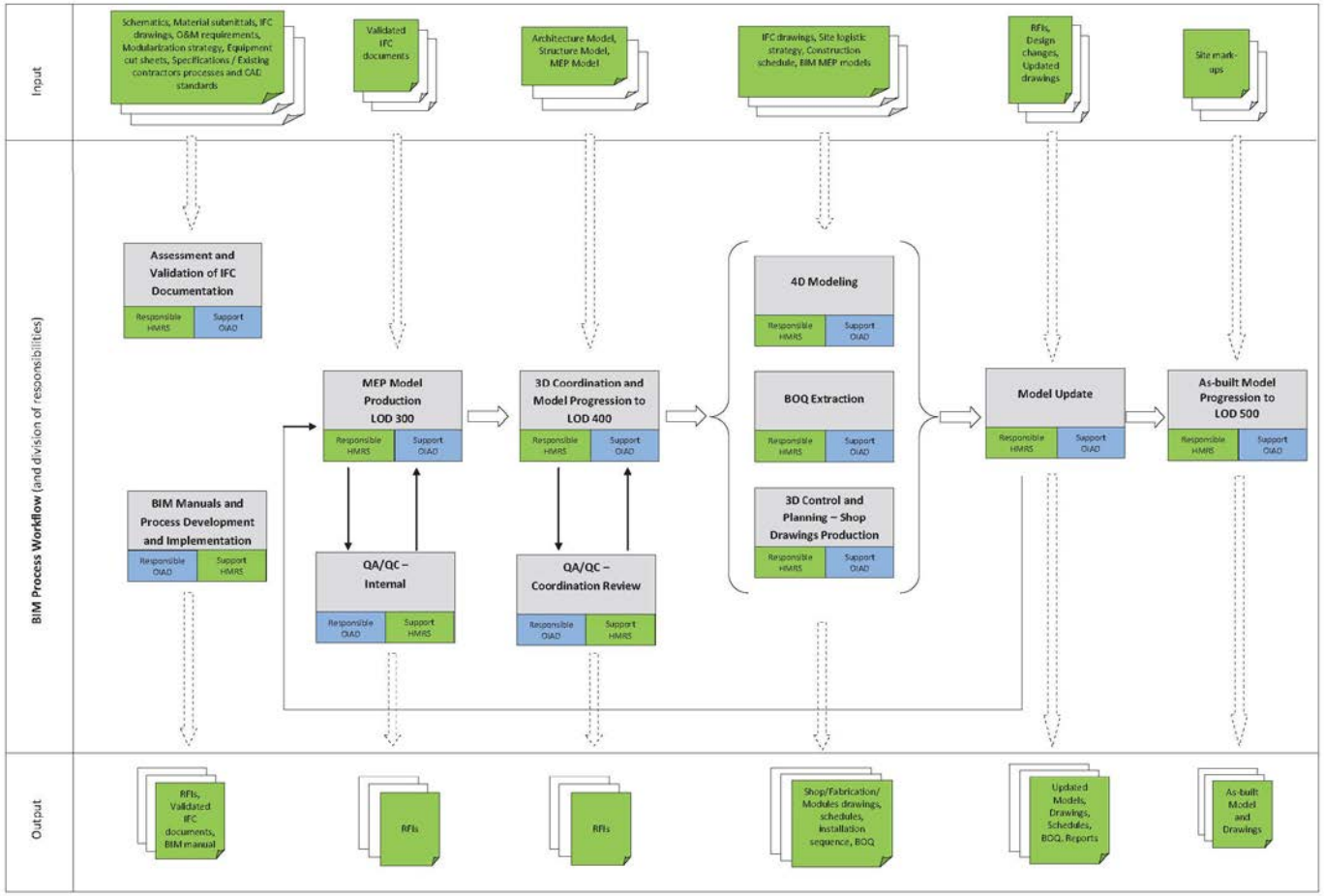
Data
MANAGEMENT
- View
- Review
- Comments
- Approvals
- Status
- Feedback



Summary:

structure your BIM processes around data creation and management, rather than geometry (or drawing) production.

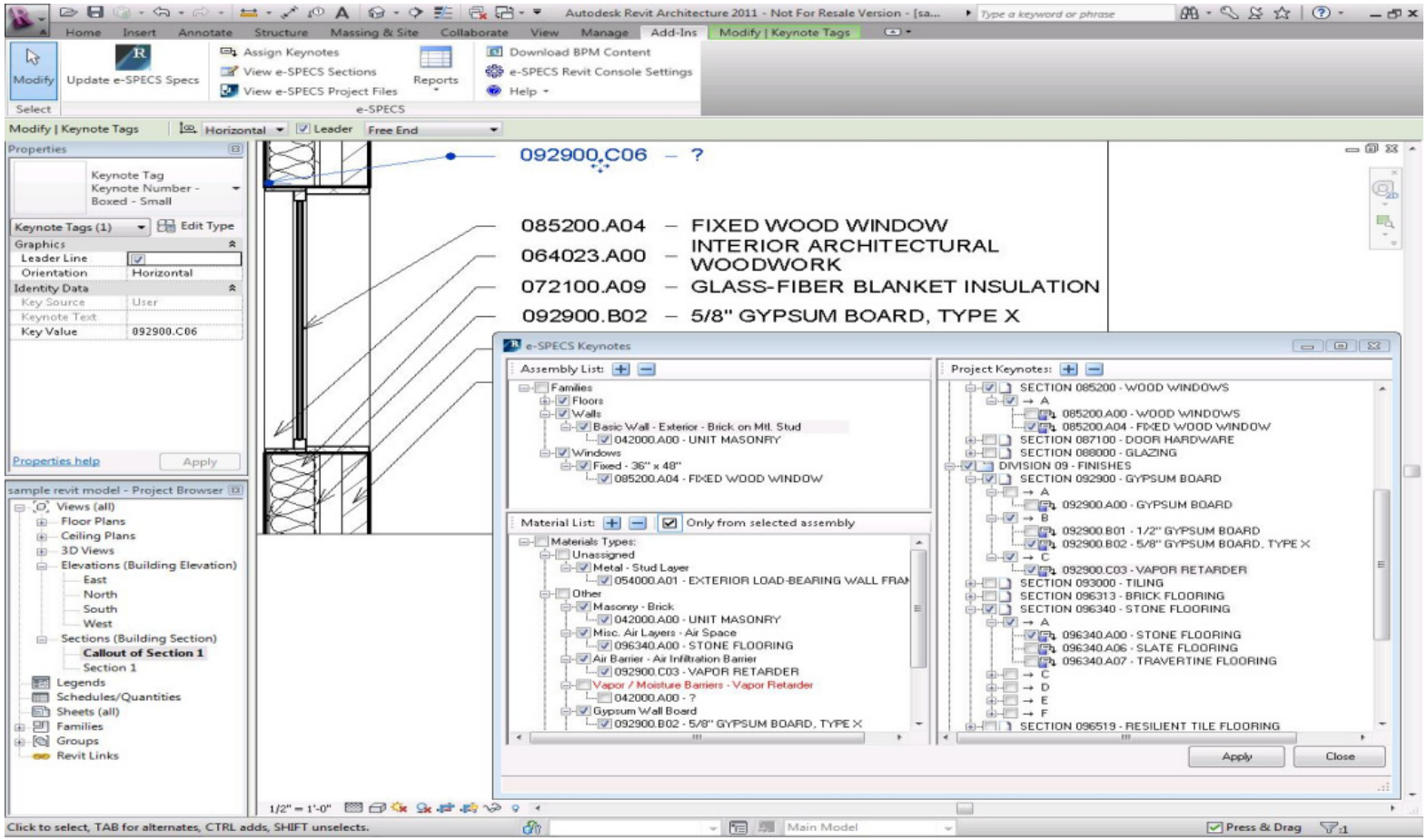
BIM FUNCTION	INCLUDED	EXCLUDED
Inclusion of design content		X
Production of Design Information Model (DIM)		X
Production of LOD 300 model	X	
Production of LOD 400 model (fabrication level)	X	
Production of LOD 500 model (as-built)	X	
Coordination and constructability review & reporting	X	
Model version control and comparison	X	
Model verification (QA/QC auditing)	X	
Quantity take-off	X	
4D (planning / progress reporting) integration	X	
Shop drawing extraction	X	
Modular (prefabricated) design		X
Modelling of support systems (eg. hangers)	X	
BIM to Field (eg integration with Trimble equipment)	X	
Temporary works modelling		X
Integration with O&M Manuals		X
Integration with FM software		X
Engineering Analysis		X
Energy modelling		X
CAD-CAM integration		X


Input
Schematics, Material submittals, IFC drawings, O&M requirements, Modularization strategy, Equipment cut sheets, Specifications / Existing contractors processes and CAD standards
Validated IFC documents
Architecture Model, Structure Model, MEP Model
IFC drawings, Site logistic strategy, Construction schedule, BIM MEP models
RFIs, Design changes, Updated drawings
Site mark-ups
BIM Process Workflow (and division of responsibilities)
Assessment and Validation of IFC Documentation
Responsible HMRS
Support OIAD
MEP Model Production LOD 300
3D Coordination and Model Progression to LOD 400
4D Modeling
BOQ Extraction
3D Control and Planning – Shop Drawings Production
Model Update
As-built Model Progression to LOD 500
BIM Manuals and Process Development and Implementation
Responsible OIAD
Support HMRS
QA/QC – Internal
QA/QC – Coordination Review
Output
RFIs, Validated IFC documents, BIM manual
RFIs
RFIs
Shop/Fabrication/ Modules drawings, schedules, installation sequence, BOQ
Updated Models, Drawings, Schedules, BOQ, Reports
As-built Model and Drawings

Summary:

plan for *outcomes* ahead of *outputs*

ELEMENT	SOURCE			OUTPUT		
DISCIPLINE / MODEL ELEMENTS	INCLUDED IN MODEL			SHOP DWG PRODUCTION		
		YES (discipline)		MODEL EXTRACTION		INDEPENDENT 2D DWG
	NO	Arch	MEP	Arch	MEP	
DRAINAGE						
piping			x		x	
sanitary fixtures			x		x	
PLUMBING (WATER SERVICES)						
piping			x		x	
valves			x		x	
sanitary fixtures		x	x		x	
FIRE FIGHTING						
main piping			x		x	
branches	x					x
sprinklers		x				x
fire hose cabinets			x		x	
MEDICAL GAS						
piping			x		x	
valves			x		x	



eSpecs by Interspec

Summary:

Seek data *clarity* over data *quantity*

Are you really innovating?

Fliz Bike
by Hambrock and Spetter