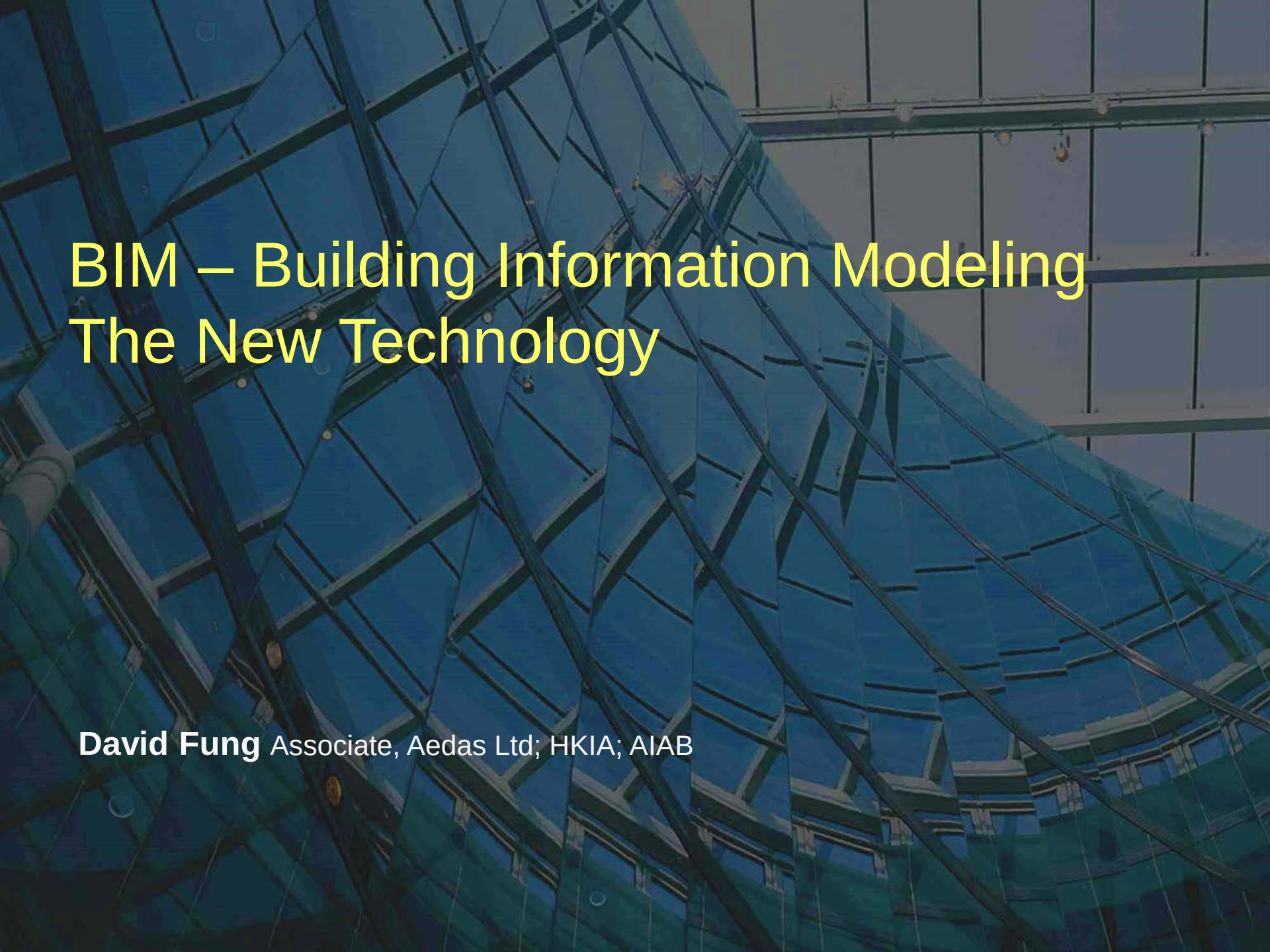




BIM – Building Information Modeling The New Technology

David Fung Associate, Aedas Ltd; HKIA; AIAB

Information

Graphical

Plan
Section
Elevation
Area Diagrams
Schematic Designs
General Building Plan
Structural Plans
E/M Drawings
Schematics
Details
Other Diagrams...

Non-Graphical

Area Schedule
Finishing Schedules
Door/Window/Louvre Sch
Beam/ Column Schedule
Equipment Schedule...

Program

Cost Estimate
Quantity Take Off
Bills of Quantities
Variation Assessments



As a result.....

Inefficiencies, mistakes and delays account for \$200 billion of the \$650 billion spent on construction in America every year.

New wiring, The Economist, January 13th, 2000

In the UK alone, the annual cost of rectifying construction defects caused by poorly detailed drawings and operatives being given incorrect instructions has been put at £1bn (~\$1.66bn).

IT Construction Best Practice service, <http://www.itcbp.org.uk>

The process of construction is itself repeated in its essentials from project to project. Indeed, research suggests that up to 80% of inputs into buildings are repeated.

M4i, <http://www.m4i.org.uk>

Information

Graphical

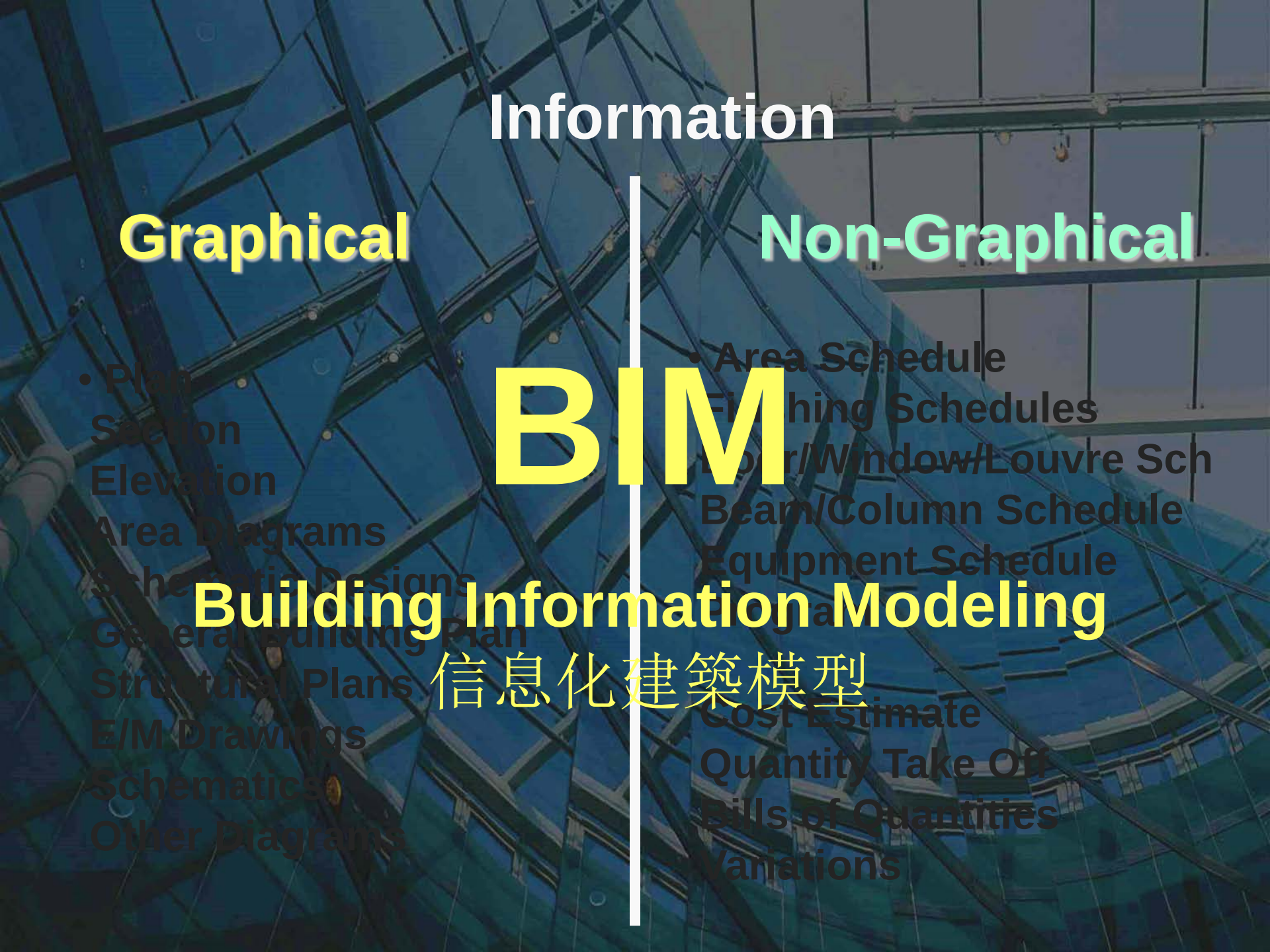
CAD SYSTEMs

e.g. AutoCAD,
Microstation

- Plan
- Section
- Elevation
- Area Diagrams
- Schematic Designs
- General Building Plan
- Structural Plans
- E/M Drawings
- Schematics
- Other Diagrams

Non-Graphical

- Area Schedule
- Word Schedules
- Door/Window/Louvre Sch
- Excel (spreadsheet)
- Beam/Column Schedule
- Access (Data Base)
- MS Project
- BQ Softwares
- Quantity Take Off
- Bills of Quantities
- Variations



Information

Graphical

- Plan
- Section
- Elevation
- Area Diagrams
- Schematic Designs
- General Building Plan
- Structural Plans
- E/M Drawings
- Schematics
- Other Diagrams

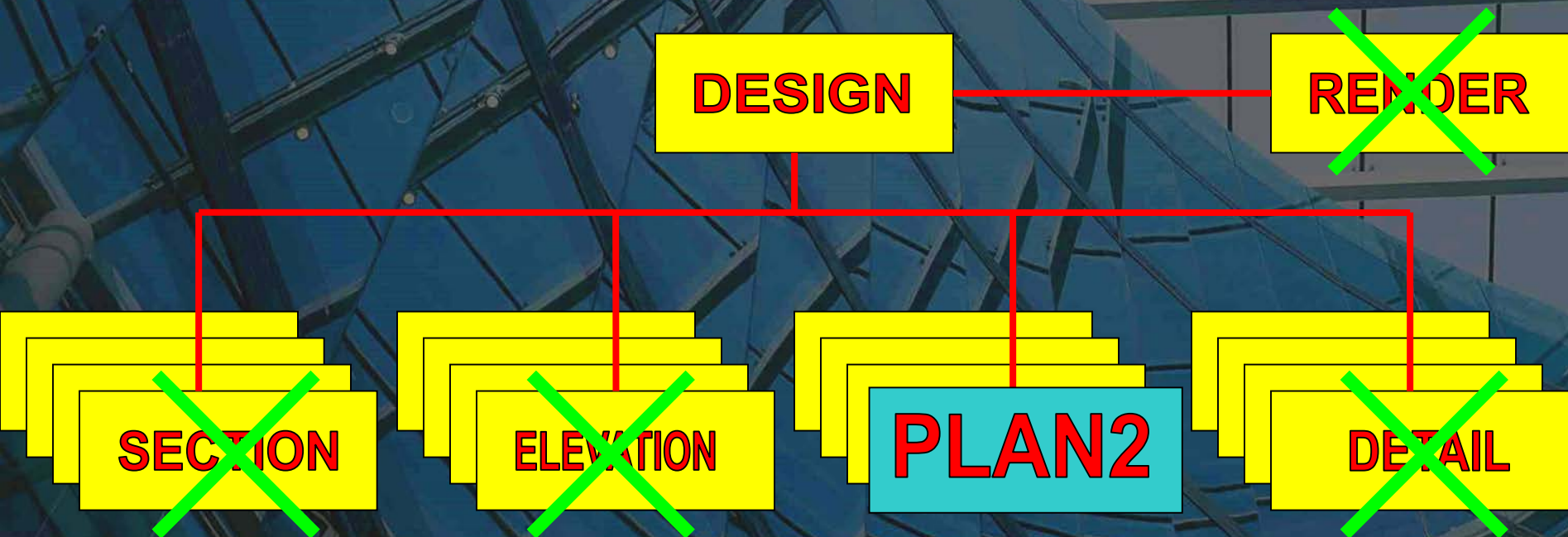
Non-Graphical

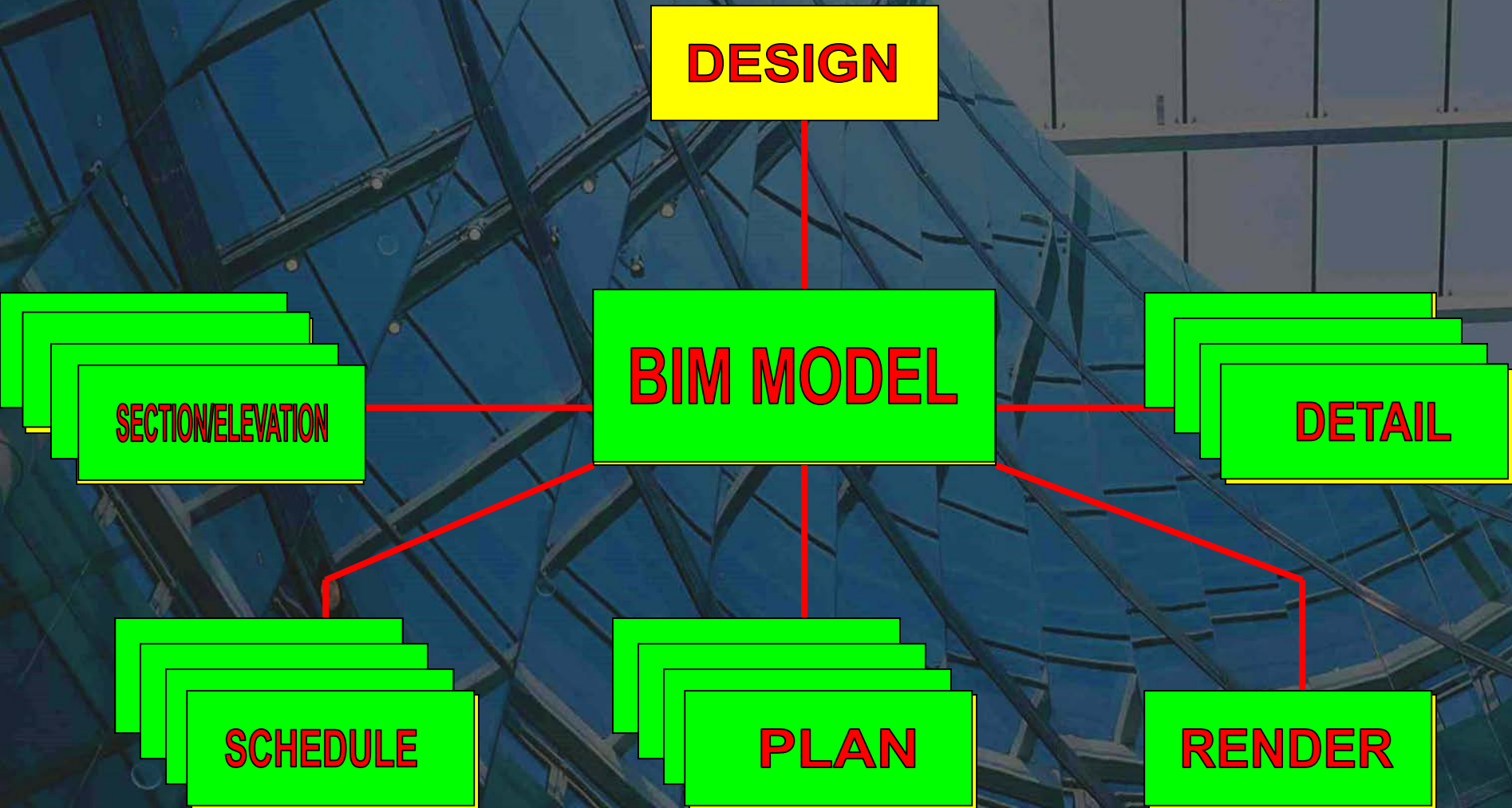
- Area Schedule
- Finishing Schedules
- Door/Window/Louvre Sch
- Beam/Column Schedule
- Equipment Schedule
- Cost Estimate
- Quantity Take Off
- Bills of Quantities
- Variations

BIM

Building Information Modeling

信息化建筑模型





Building Information Modeling (BIM)

信息化建築模型

Definition:

BIM is an **innovative** approach to **architectural design** and **documentation** supporting all phases of design and all the architectural **drawings** and **schedules** required for the design, construction and management of a building project.

Building Information Modeling (BIM)

信息化建筑模型

Misconception:

BIM



3D CAD

Architectural Desktop (Autodesk)

Revit (Autodesk)

ArchiCAD (Graphsoft)

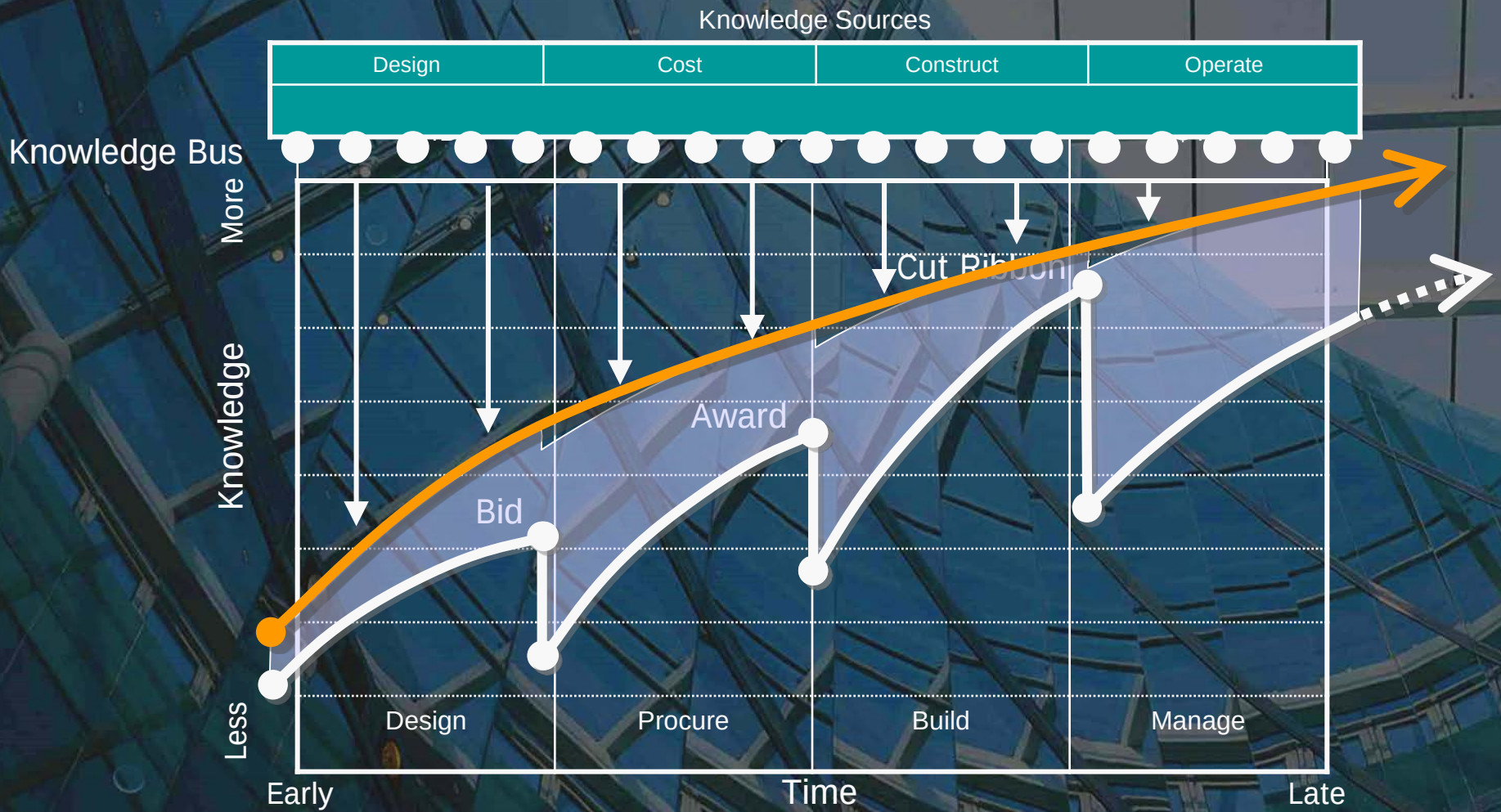
Triforma (Bentley)

Digital Project (Gehry Technology)

AutoCAD (Autodesk)

Microstation (Bentley)

Information “Backflow”



What is BIM (Building Information Model)

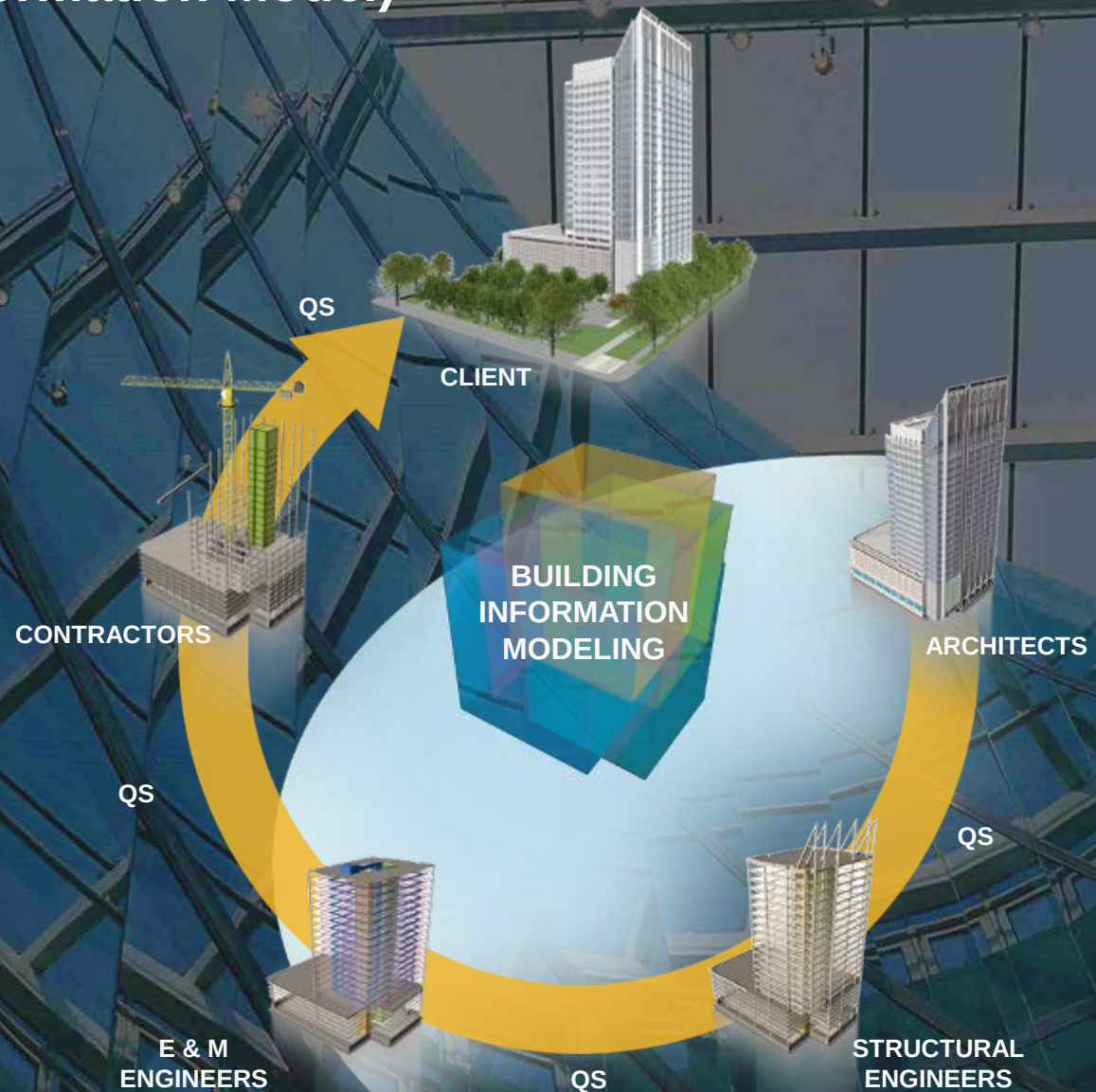
Graphical Data

+

Non-Graphical
Data

+

New workflow

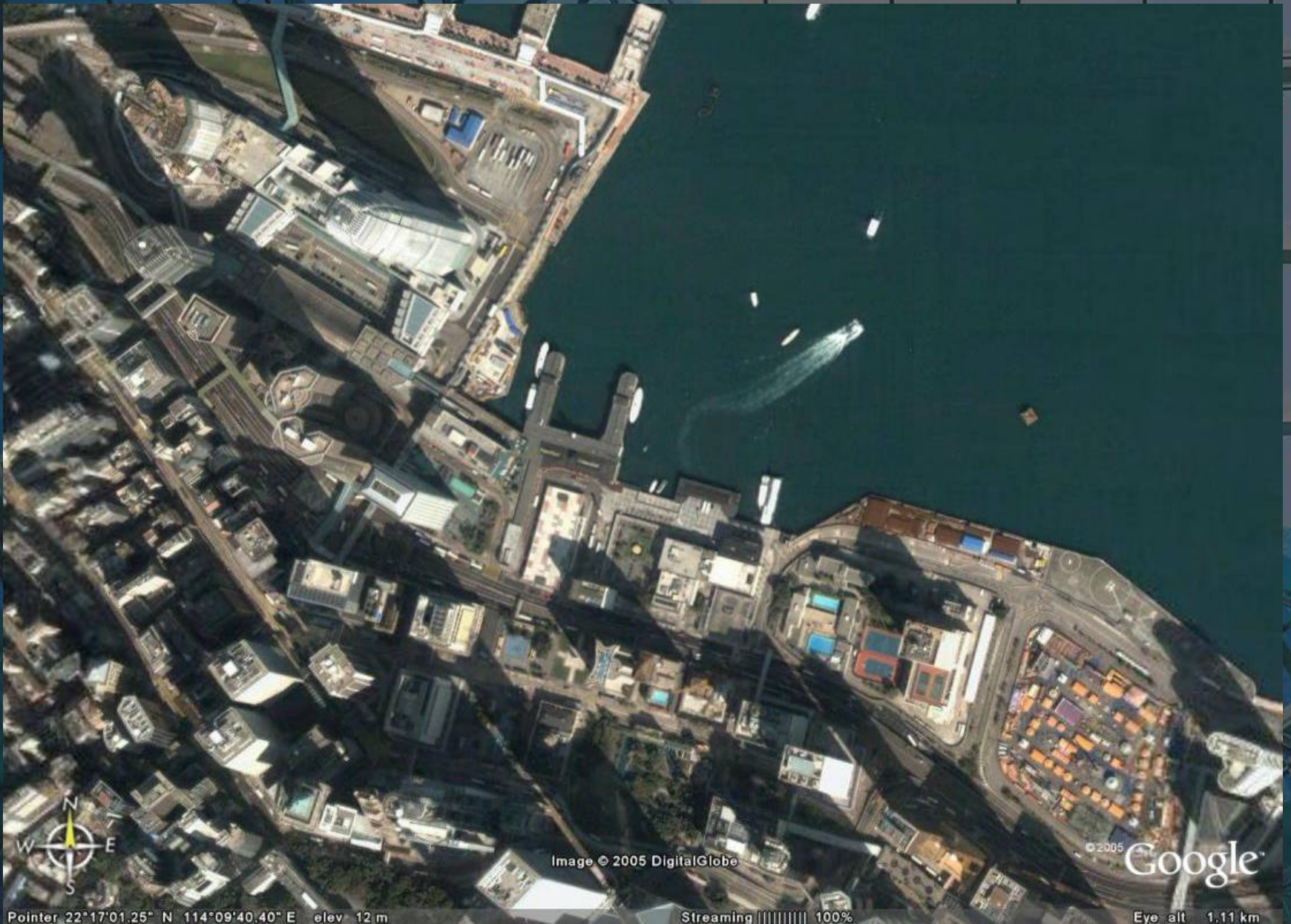


Building Information Modeling (BIM)

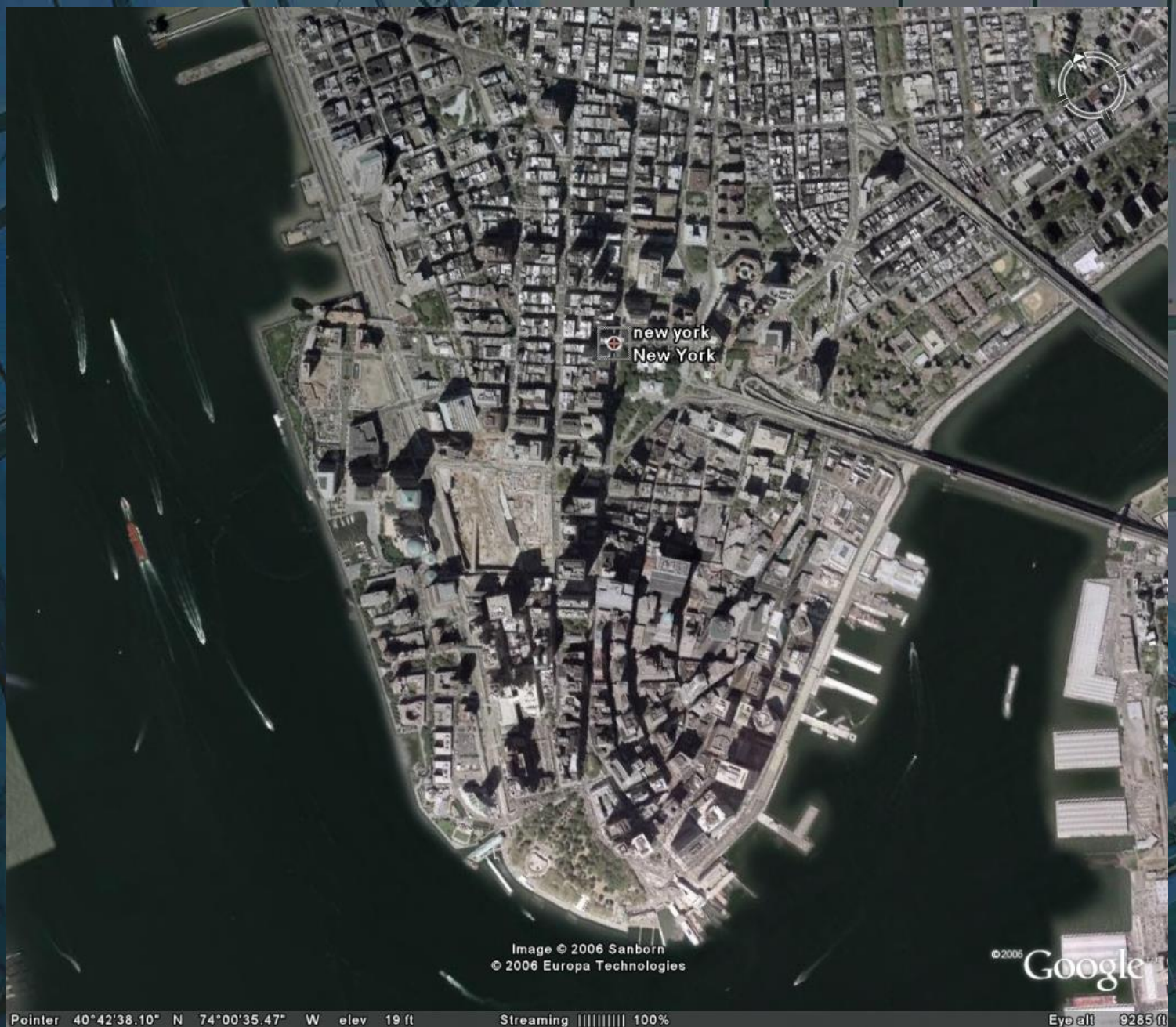
信息化建筑模型

- 1 Visualization**
- 2 Production**
- 3 Co-ordination/ Collaboration**
- 4 Submission**
- 5 Analysis**
- 6 Supply Chain Integration**

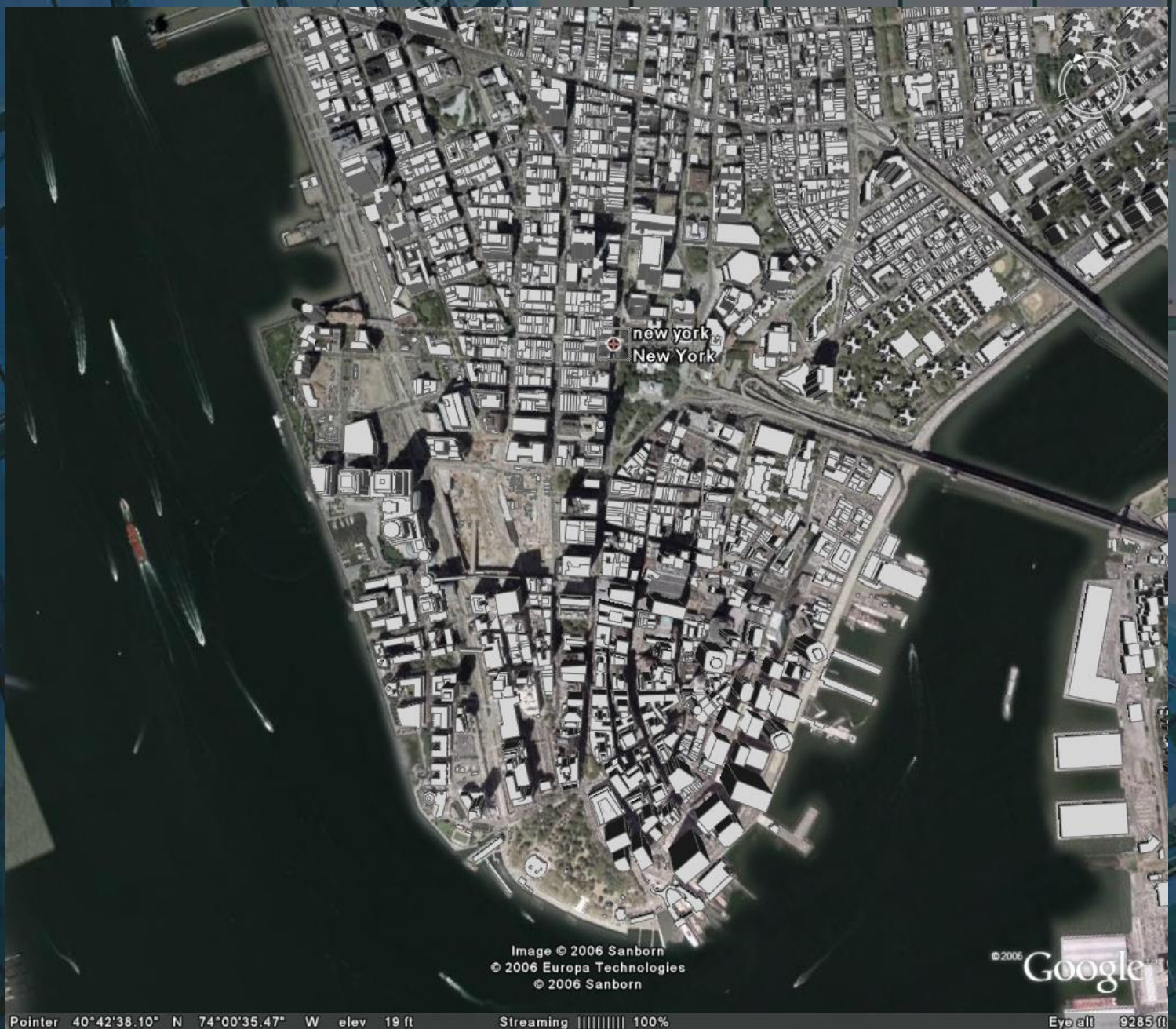
.....



MASTER PLANNING



MASTER PLANNING



MASTER PLANNING



new york
New York

Image © 2006 Sanborn
© 2006 Europa Technologies
© 2006 Sanborn
Image © 2006 TerraMetrics

© 2006 Google™

Pointer 40°42'38.10" N 74°00'35.47" W elev 19 ft

Streaming ||||| 100%

Eye alt 4553 ft

MASTER PLANNING

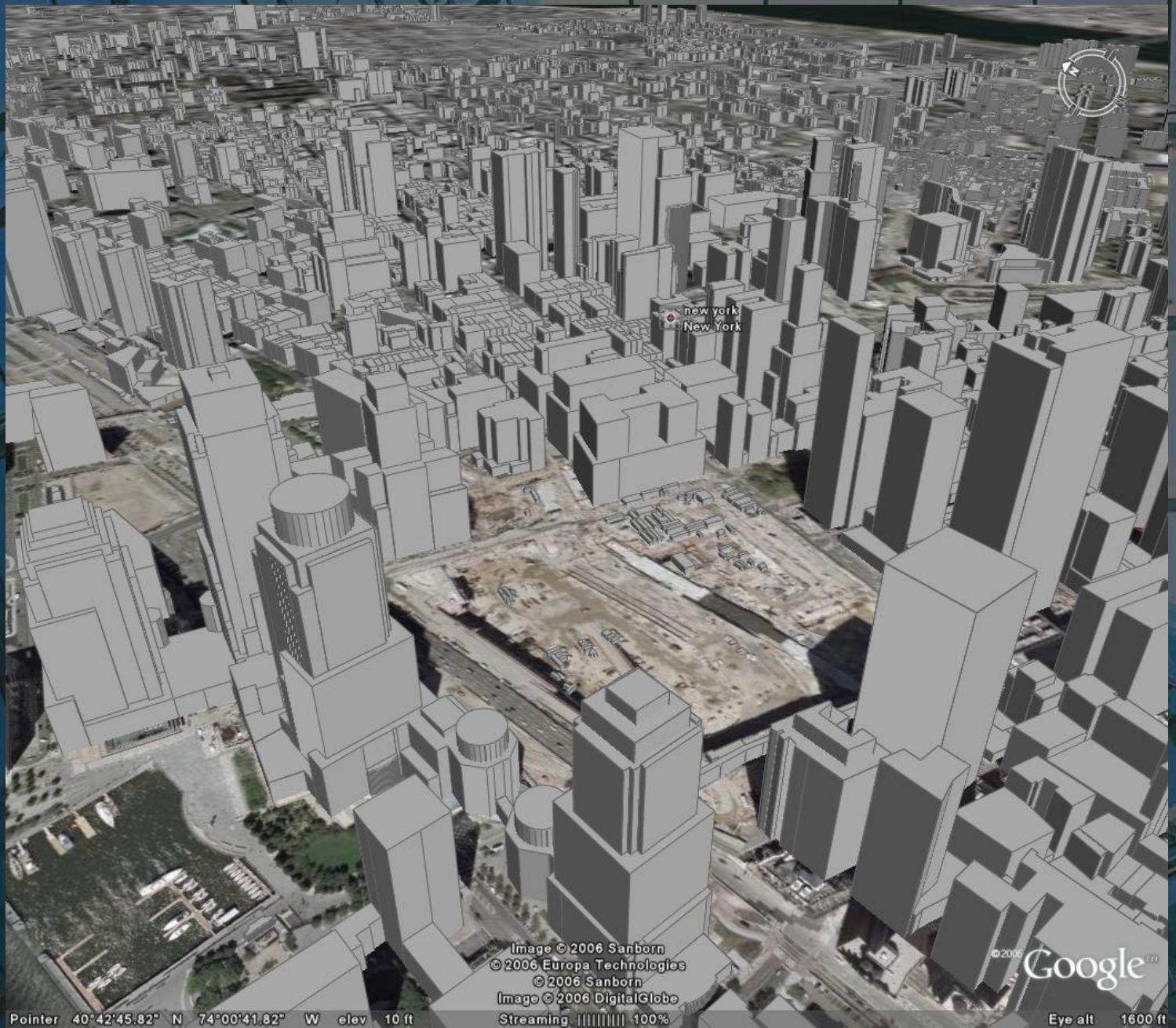


Image © 2006 Sanborn
© 2006 Europa Technologies
© 2006 Sanborn
Image © 2006 DigitalGlobe

© 2006 Google

Pointer 40°42'45.82" N 74°00'41.82" W elev 10 ft

Streaming 100%

Eye alt 1600 ft

MASTER PLANNING

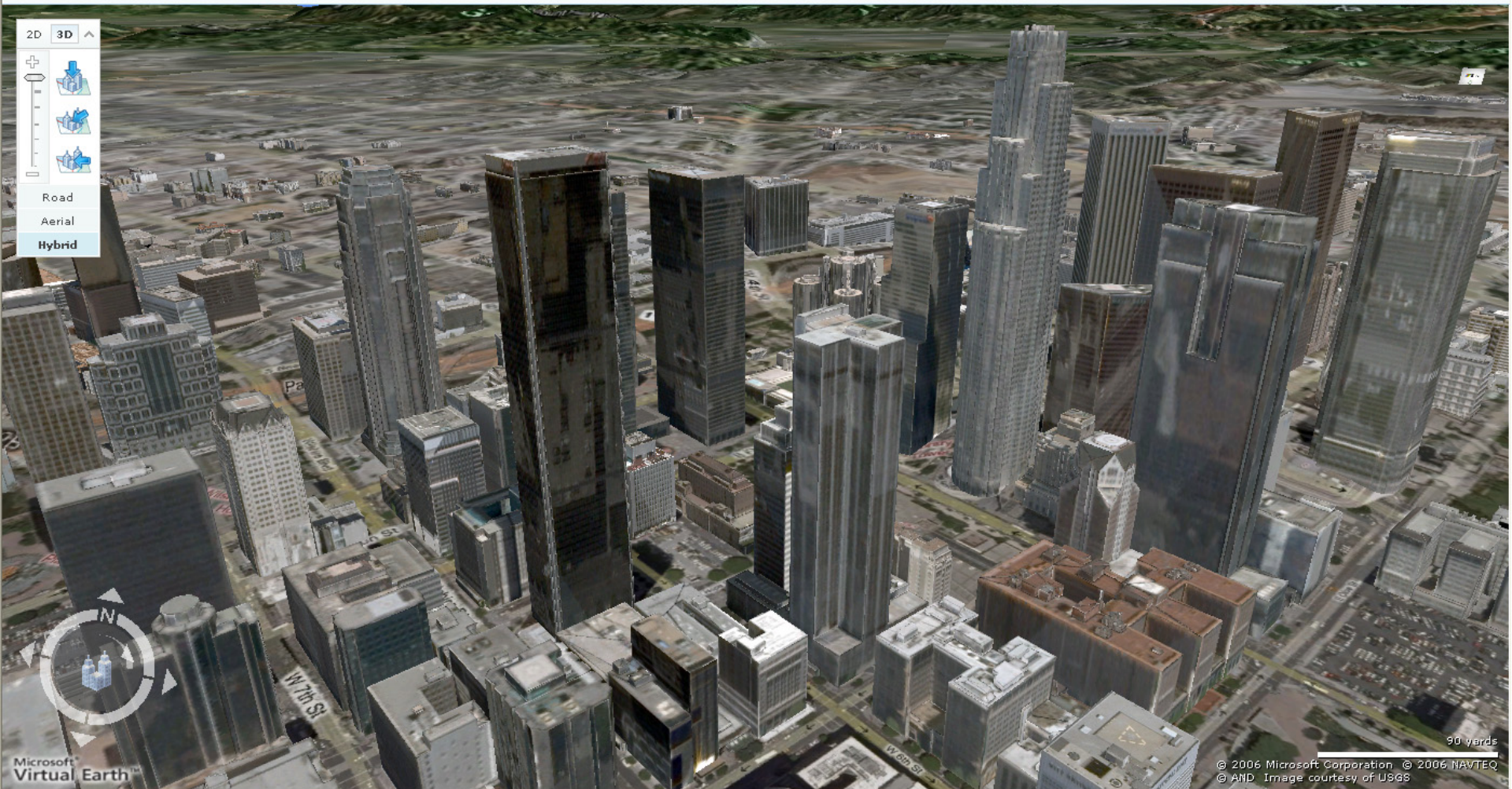


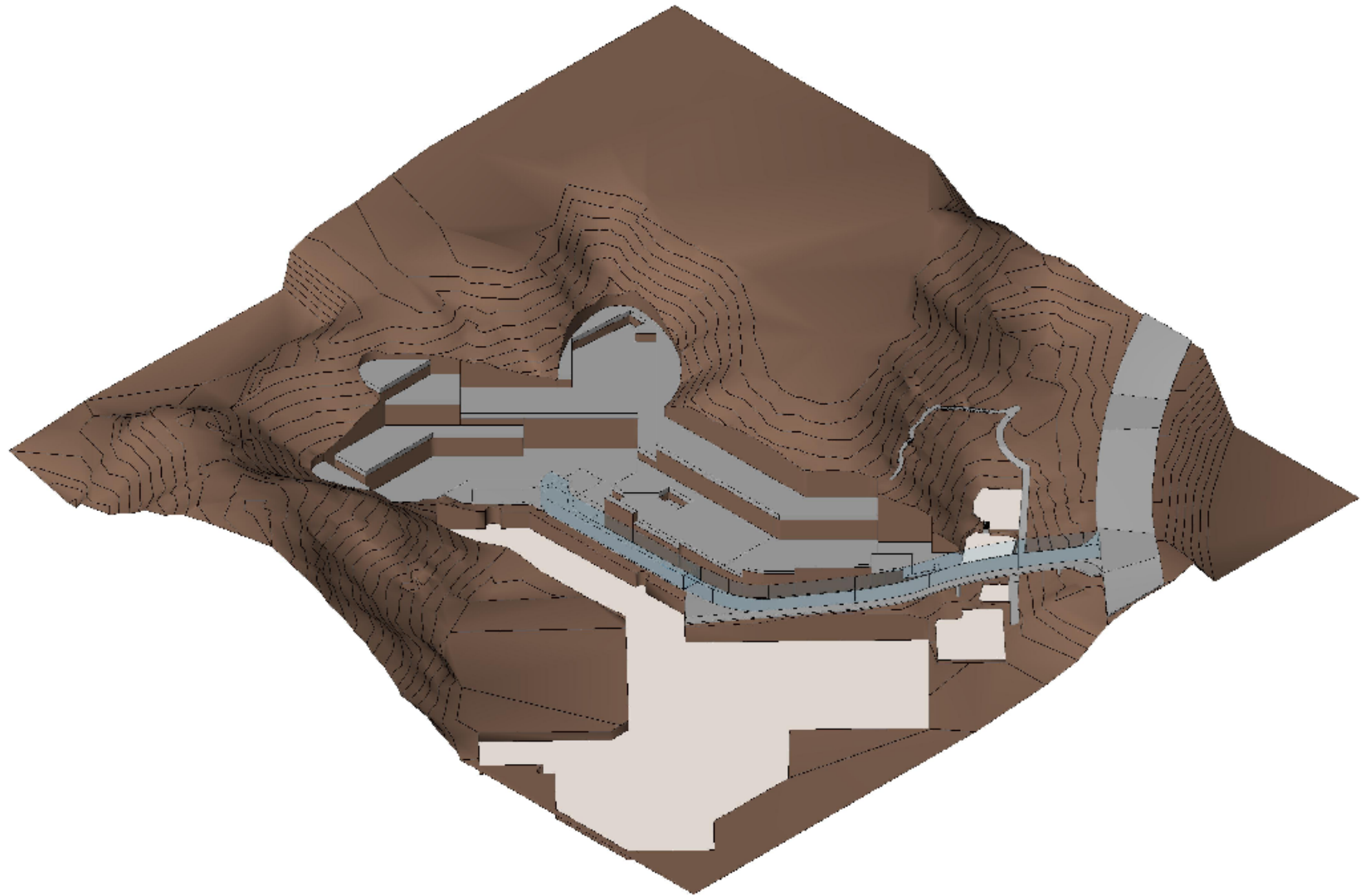
MASTER PLANNING

 **Live Search**

[Businesses](#) [People](#) [Maps](#)

[Sign in](#)
[Help](#) | [Options](#)





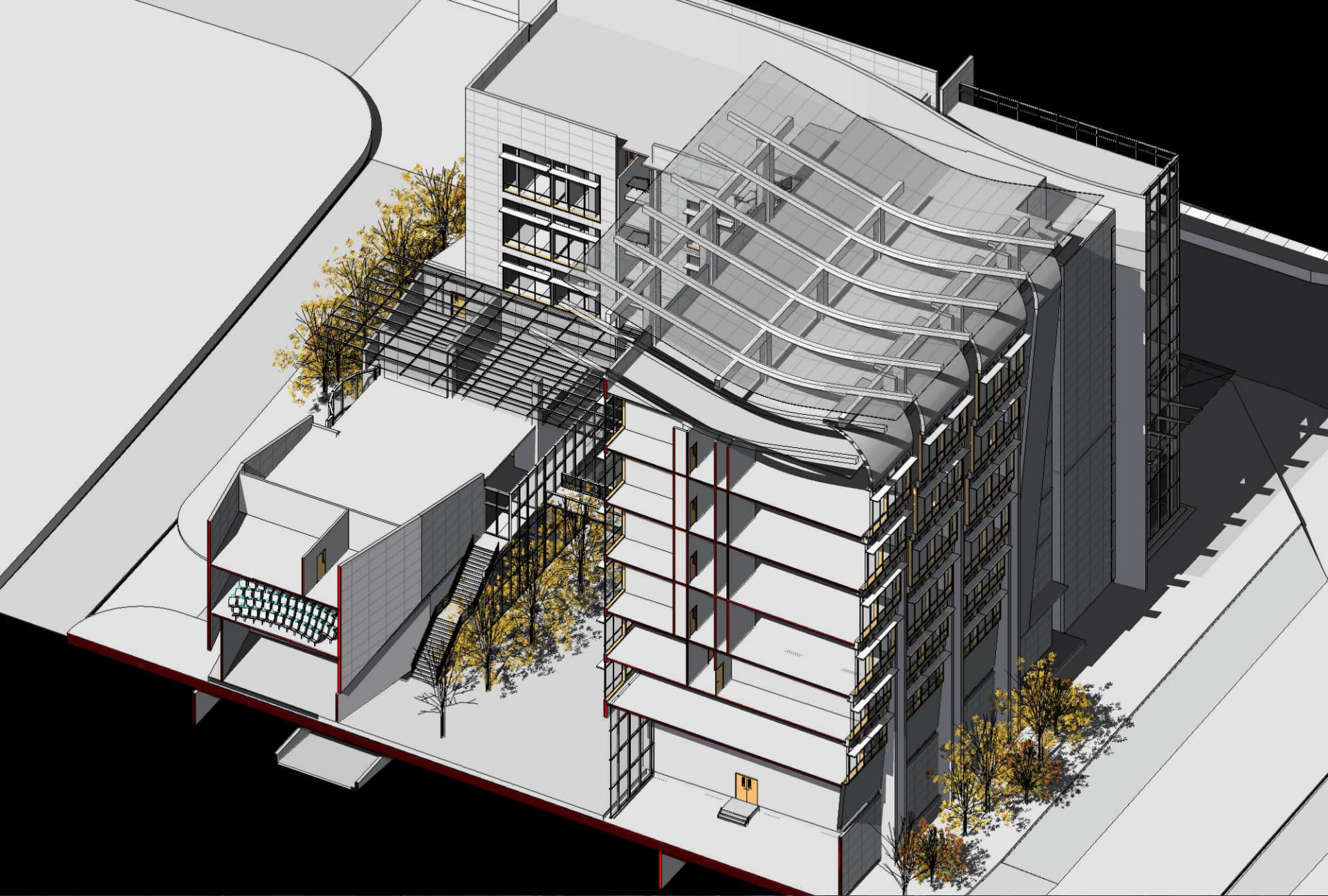
TYPOGRAPHY HANDLING

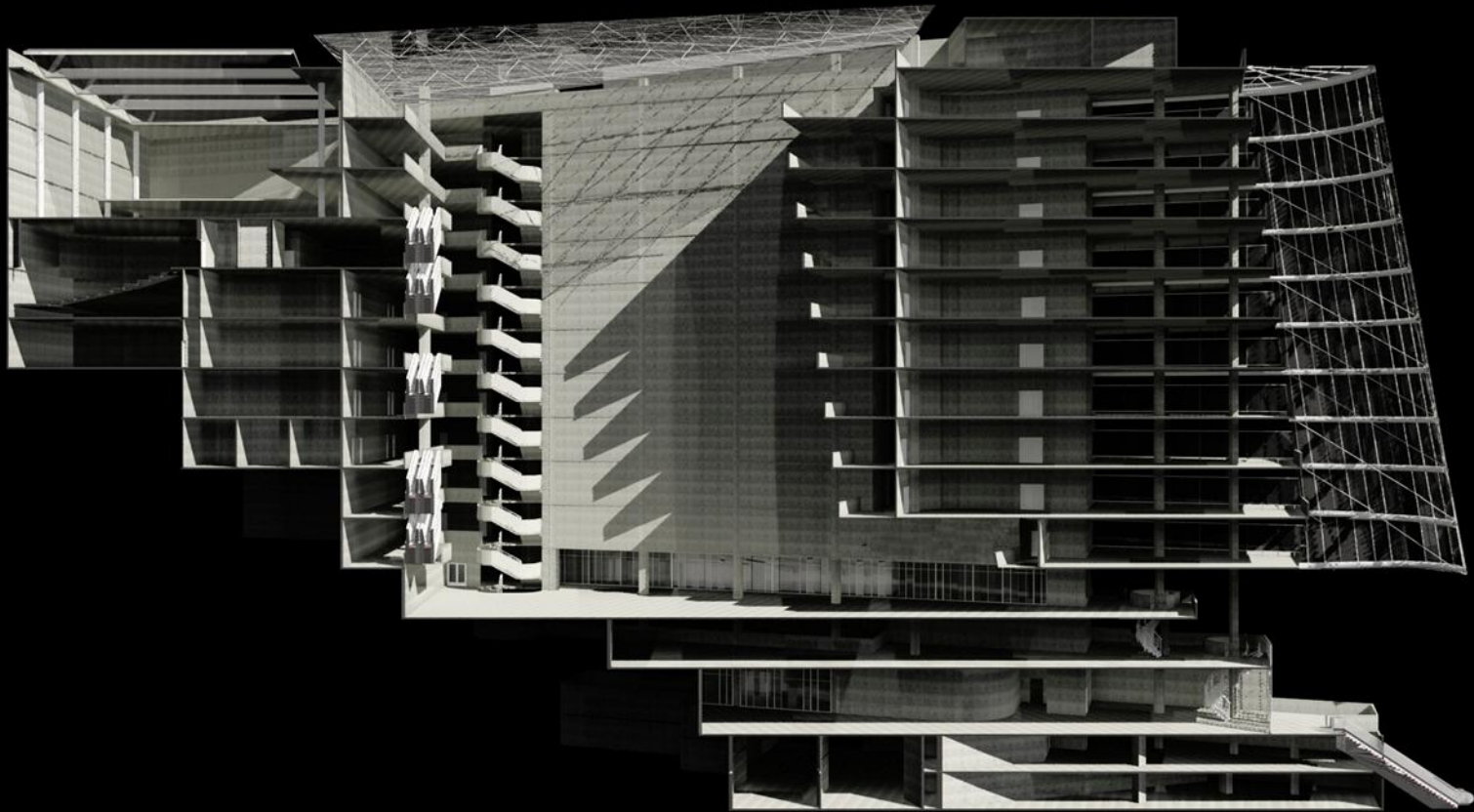
VISUALIZATION & PRODUCTION



VISUALIZATION & PRODUCTION

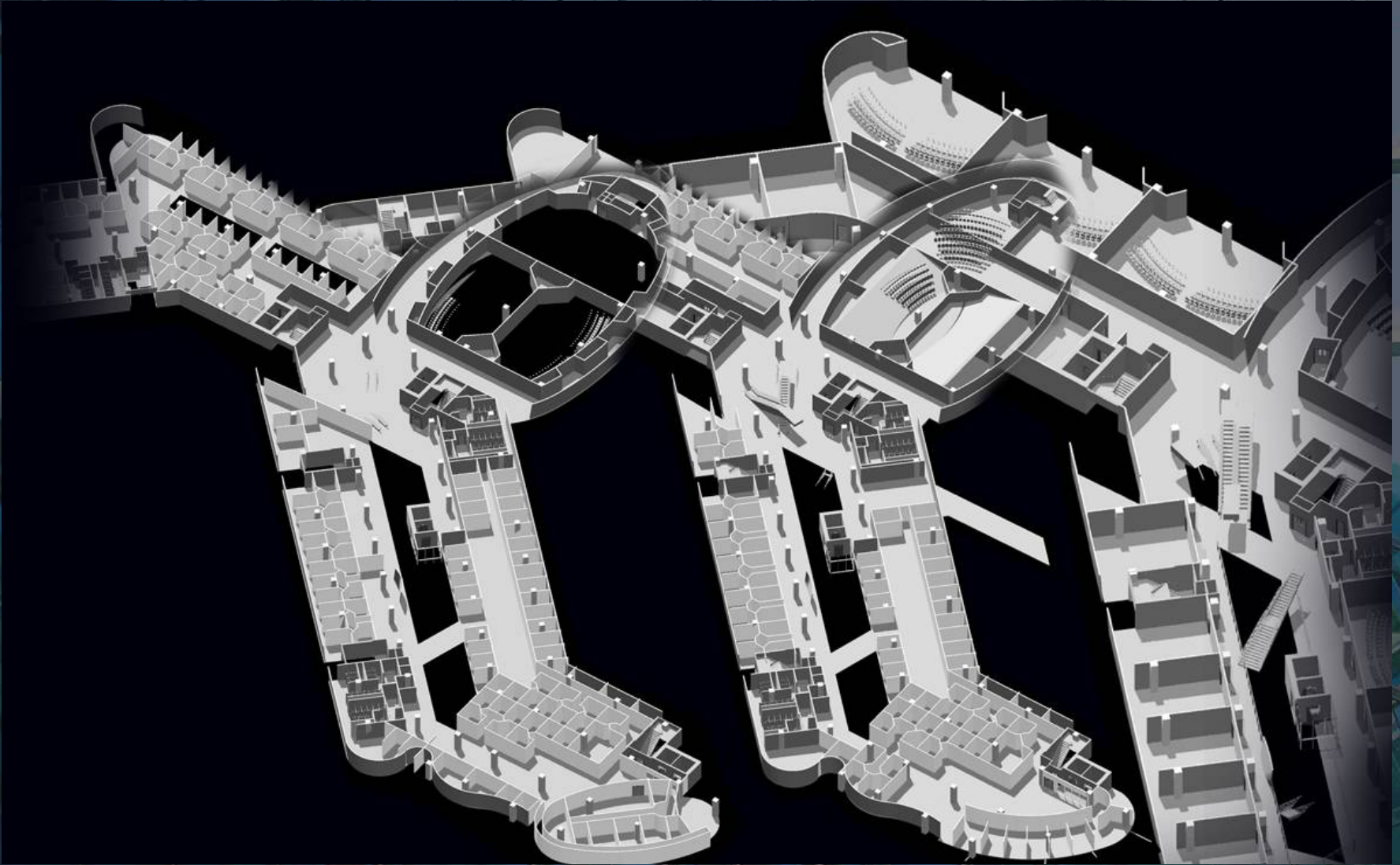


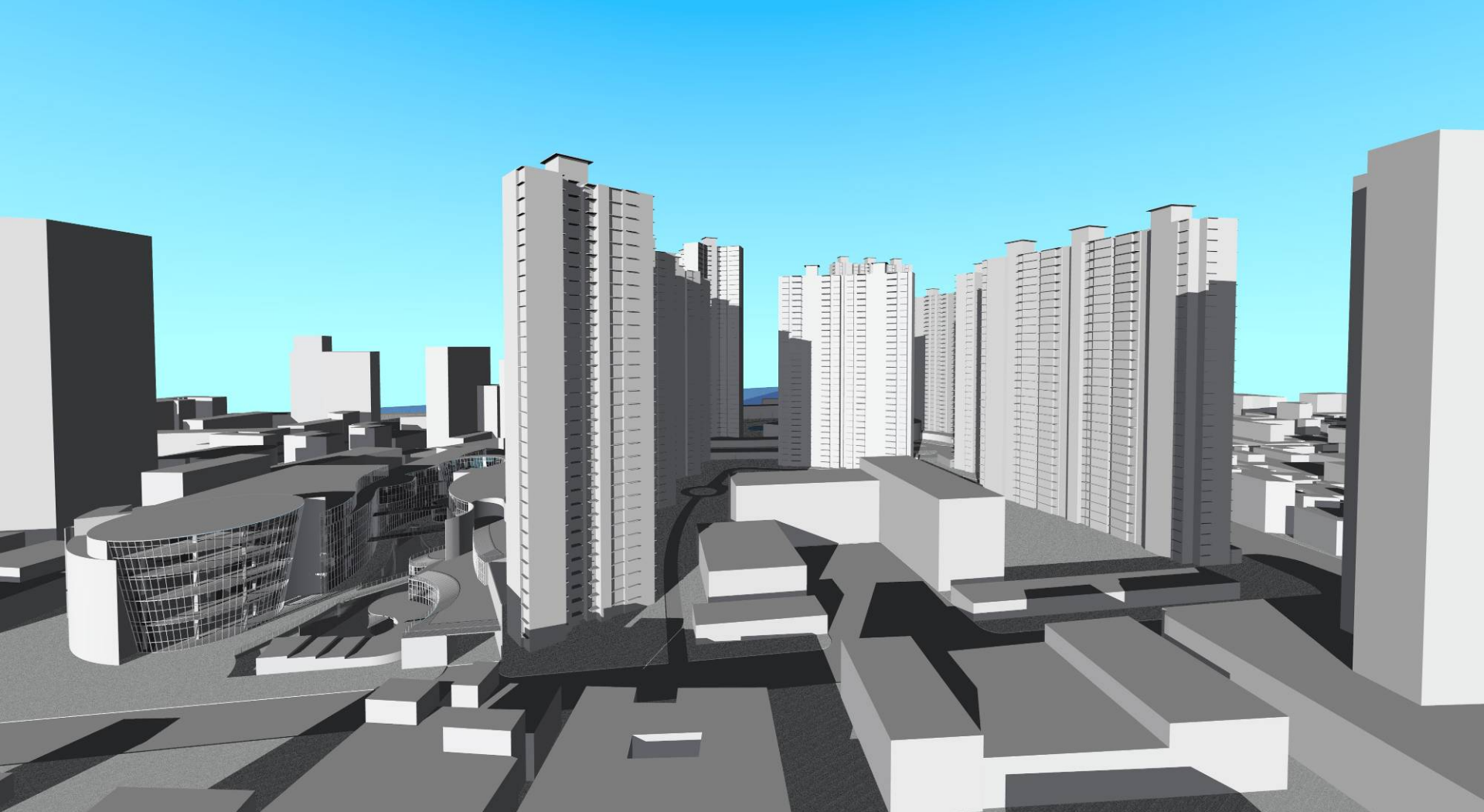




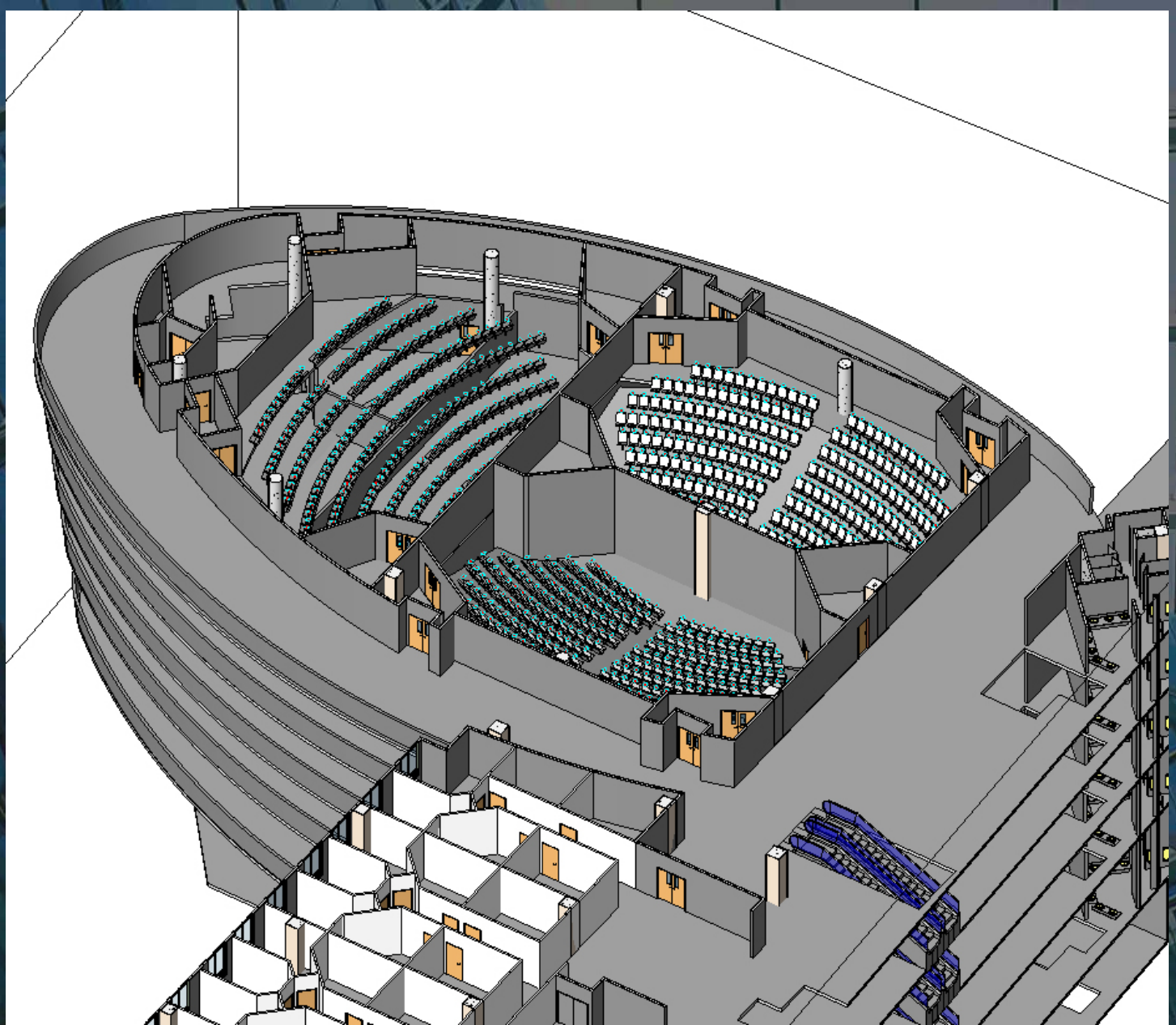
INTERNAL vs EXTERNAL

DIFFERENT DESIGN APPROACH

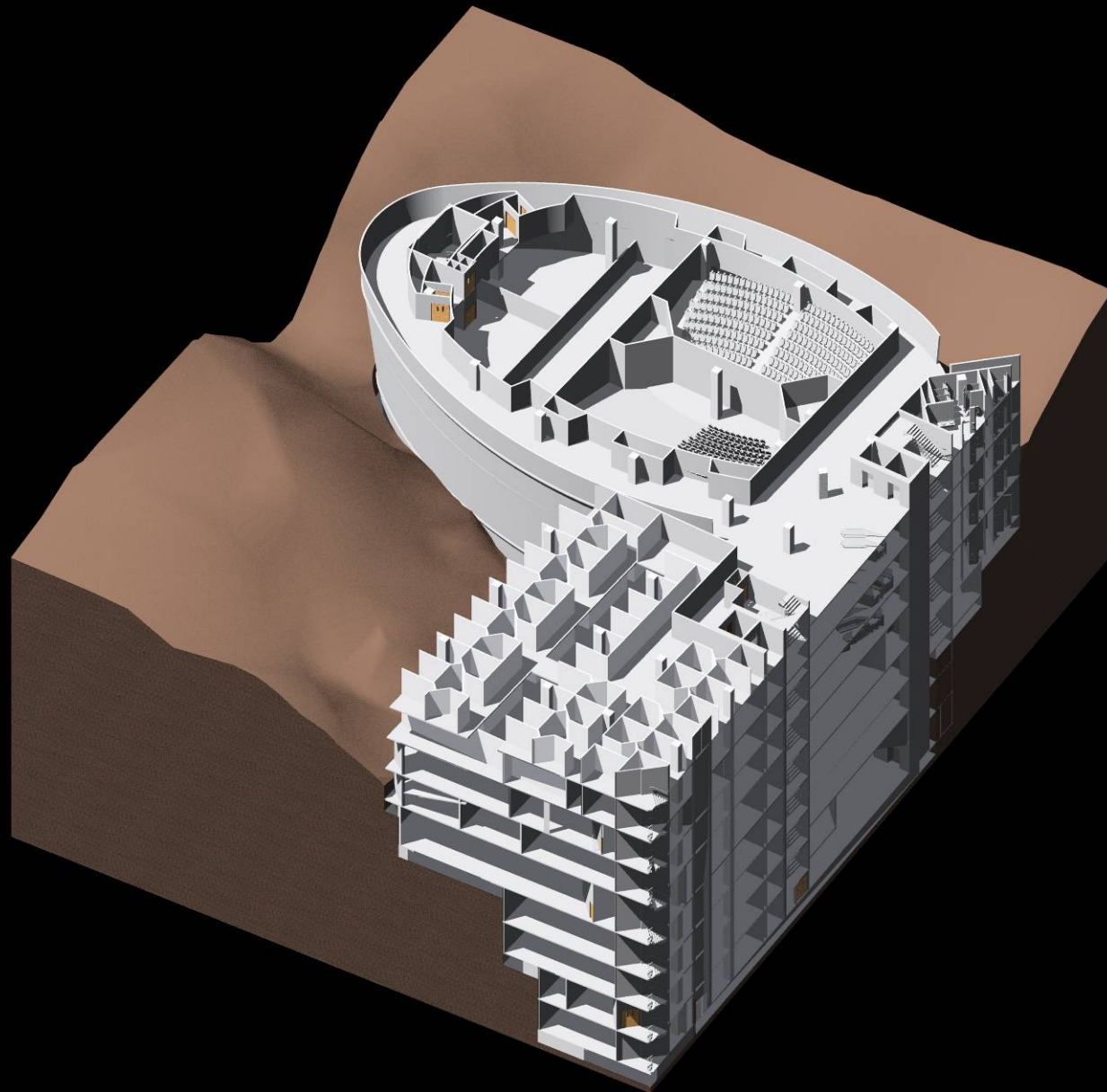




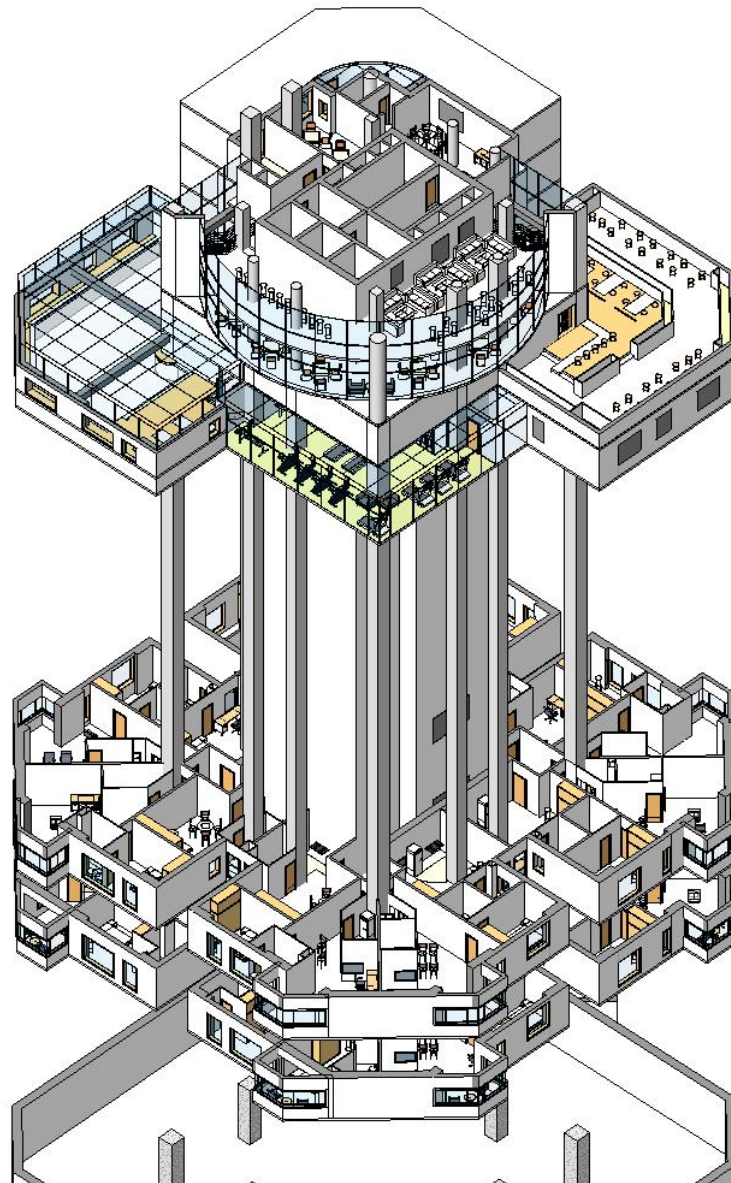
BUILDING IN CONTEXT



CREATIVE DESIGN TOOLS

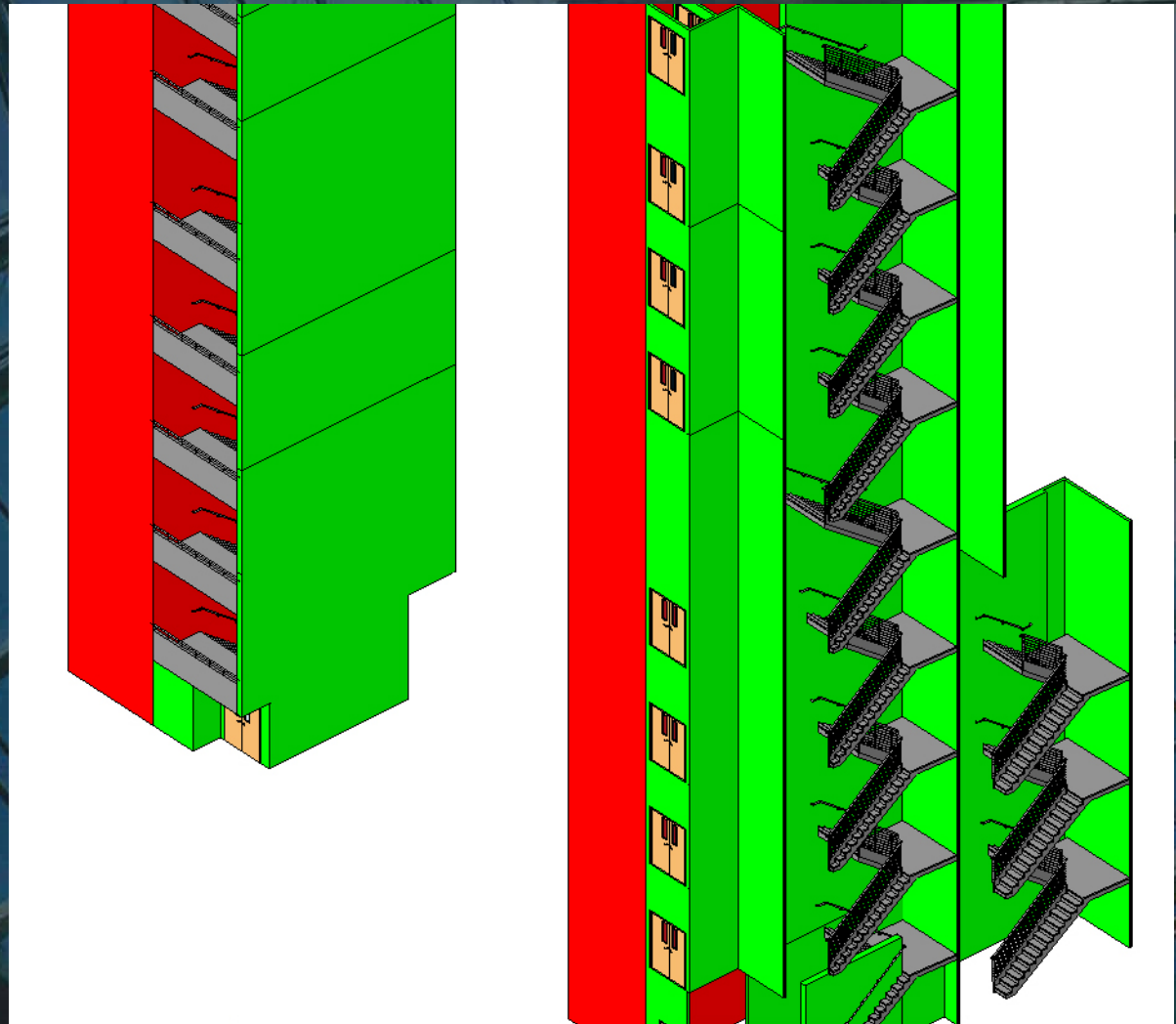


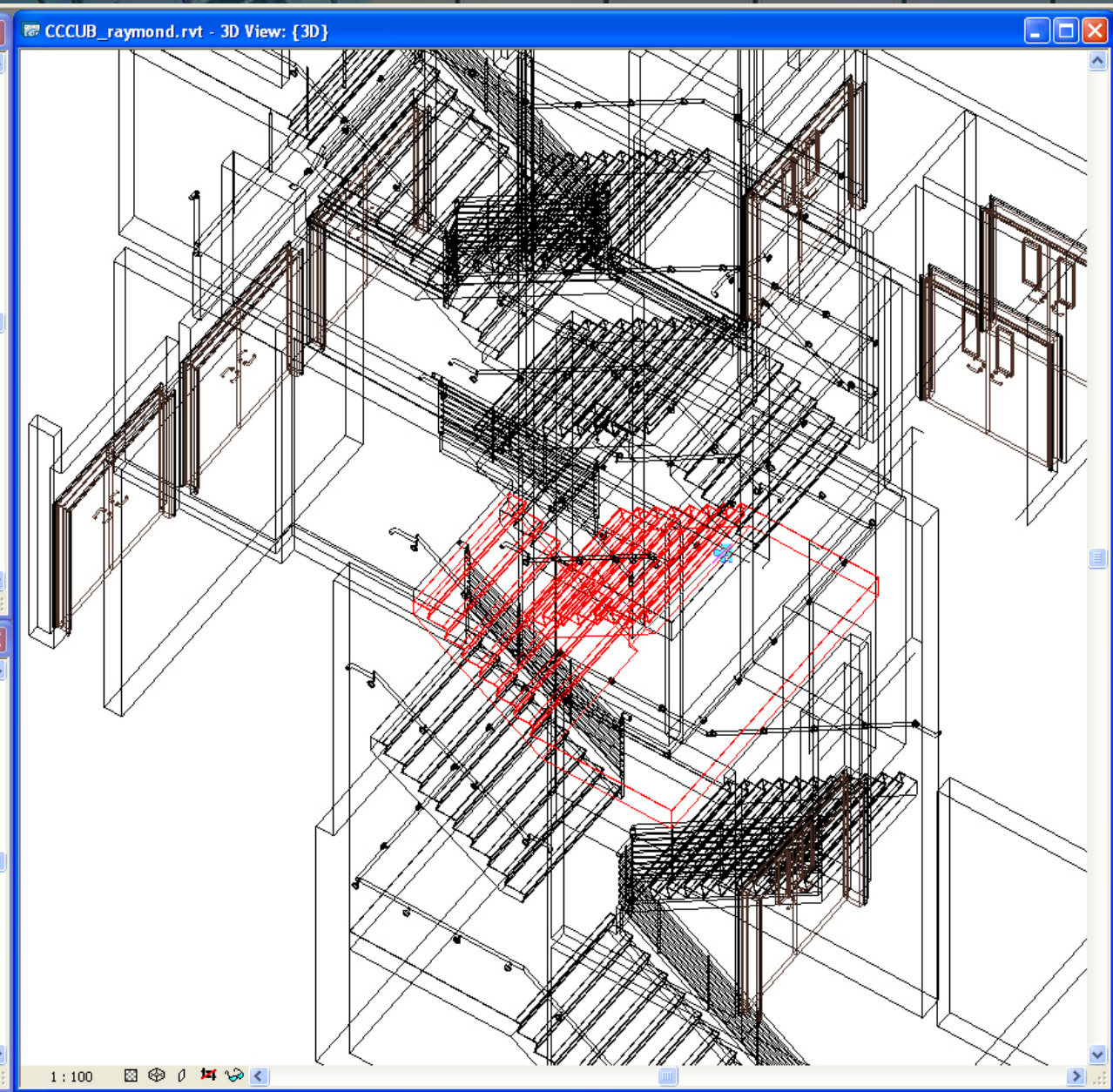
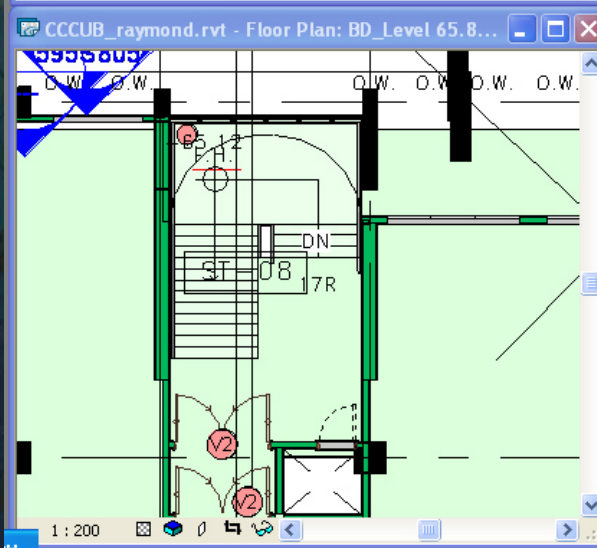
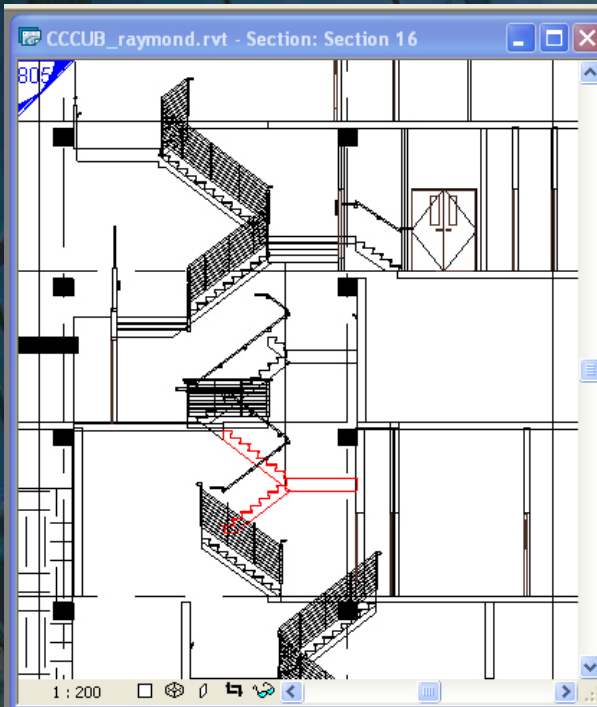
BUILDING IN SITE CONTEXT



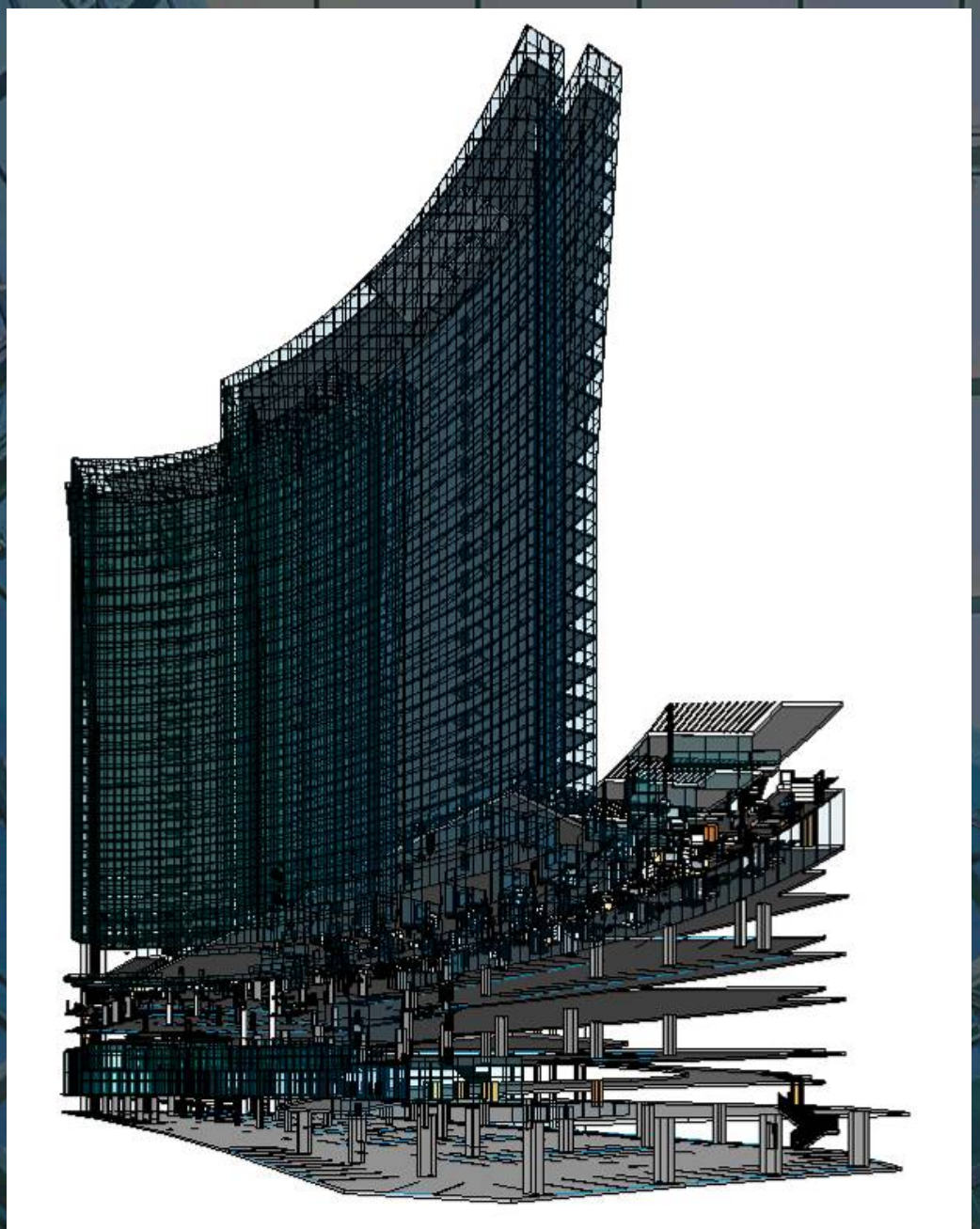
VERTICAL CO-ORDINATION

DIFFERENT DESIGN APPROACH

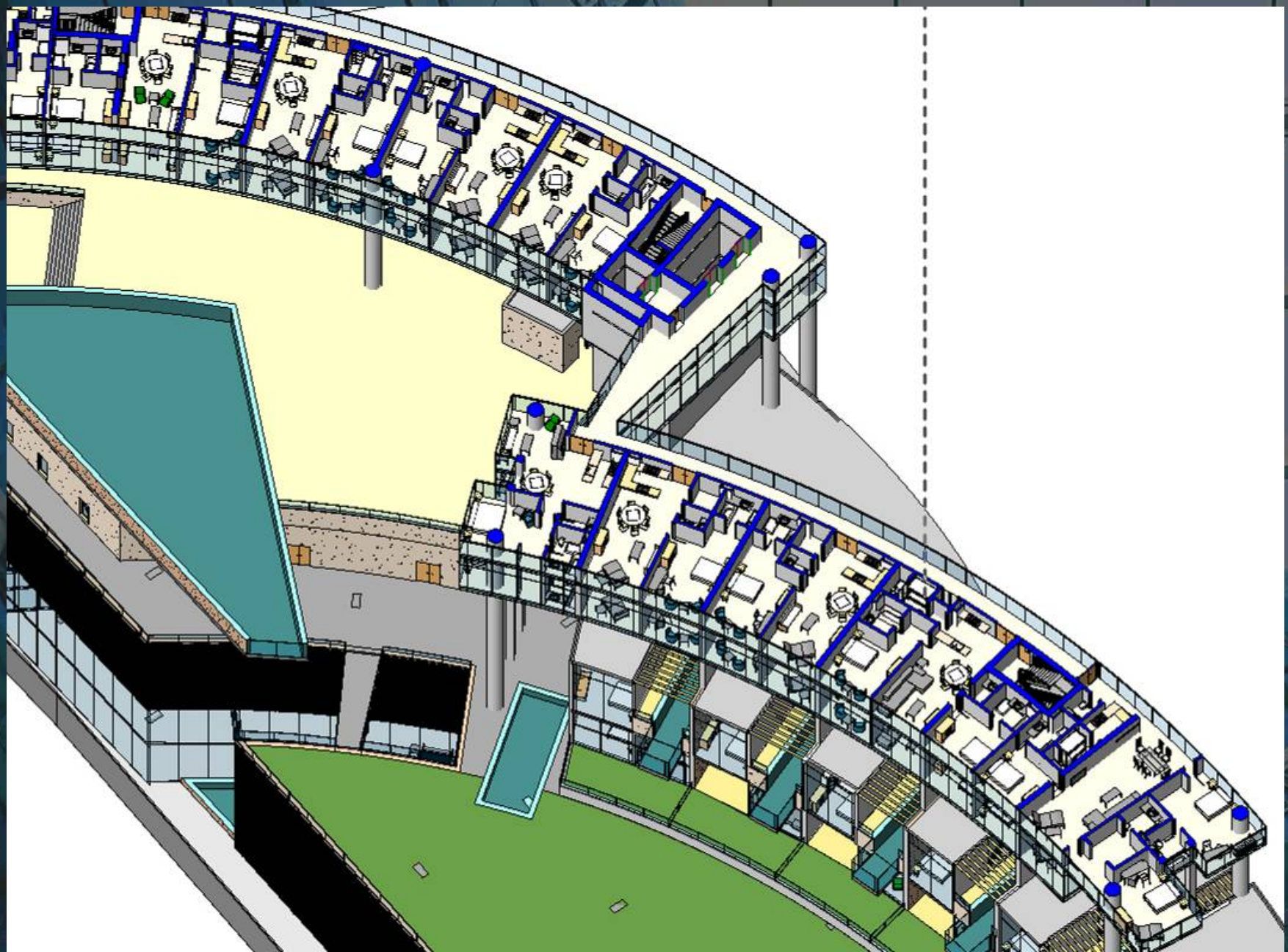




VERTICAL CO-ORDINATION



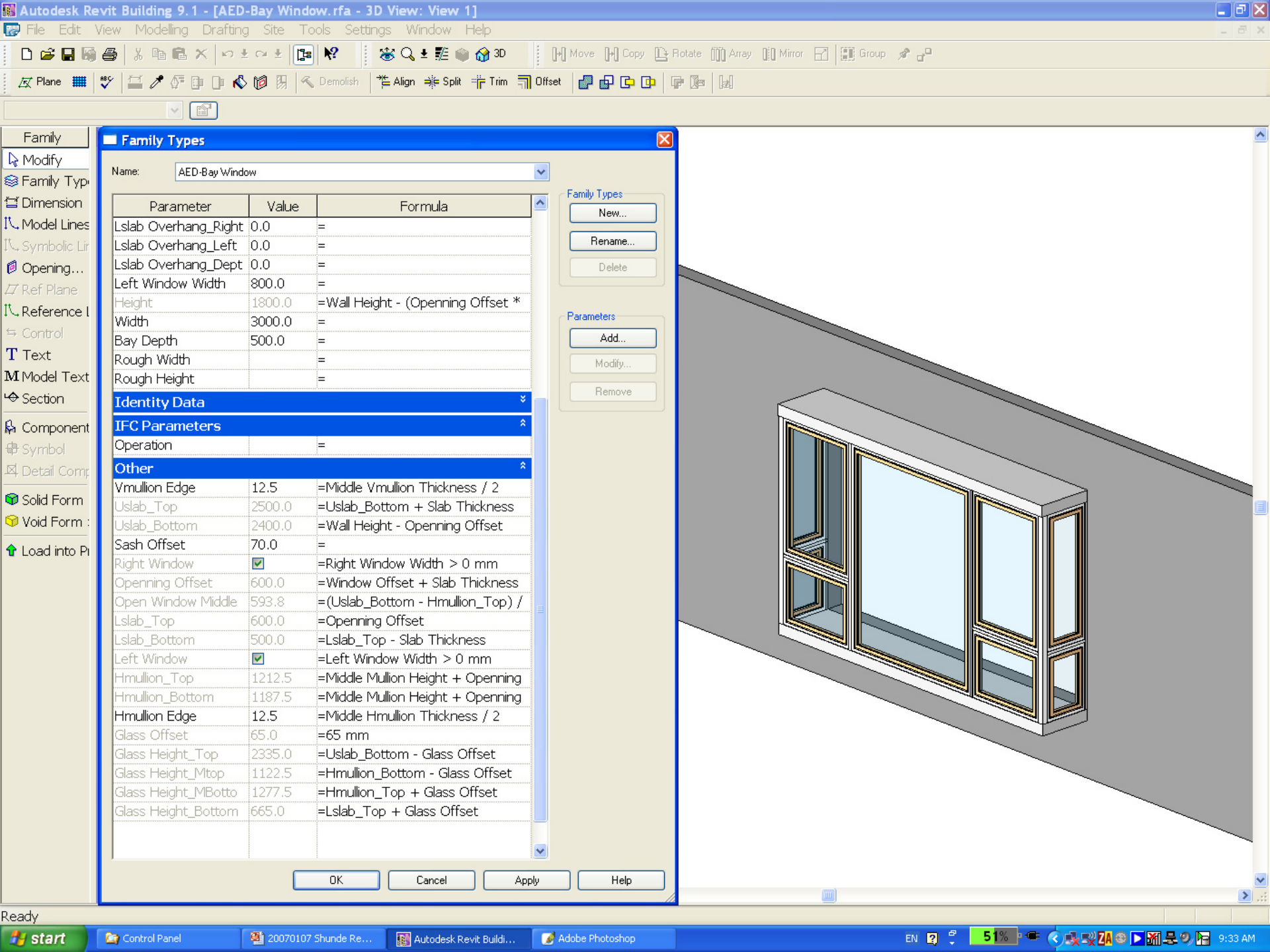
HORIZONTAL REPETITION / MODULARIZATION



MODULAR DESIGN



REPETITIONS vs VARIATIONS

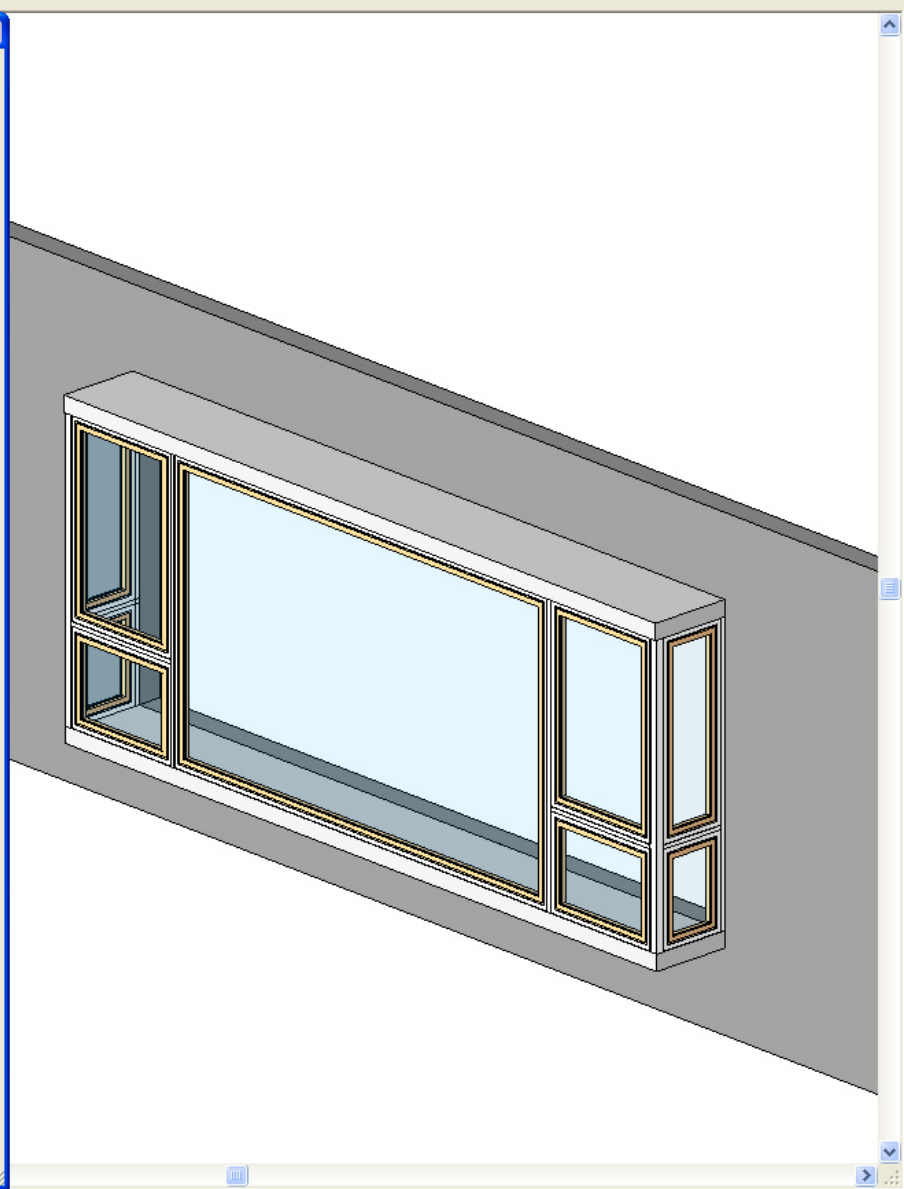


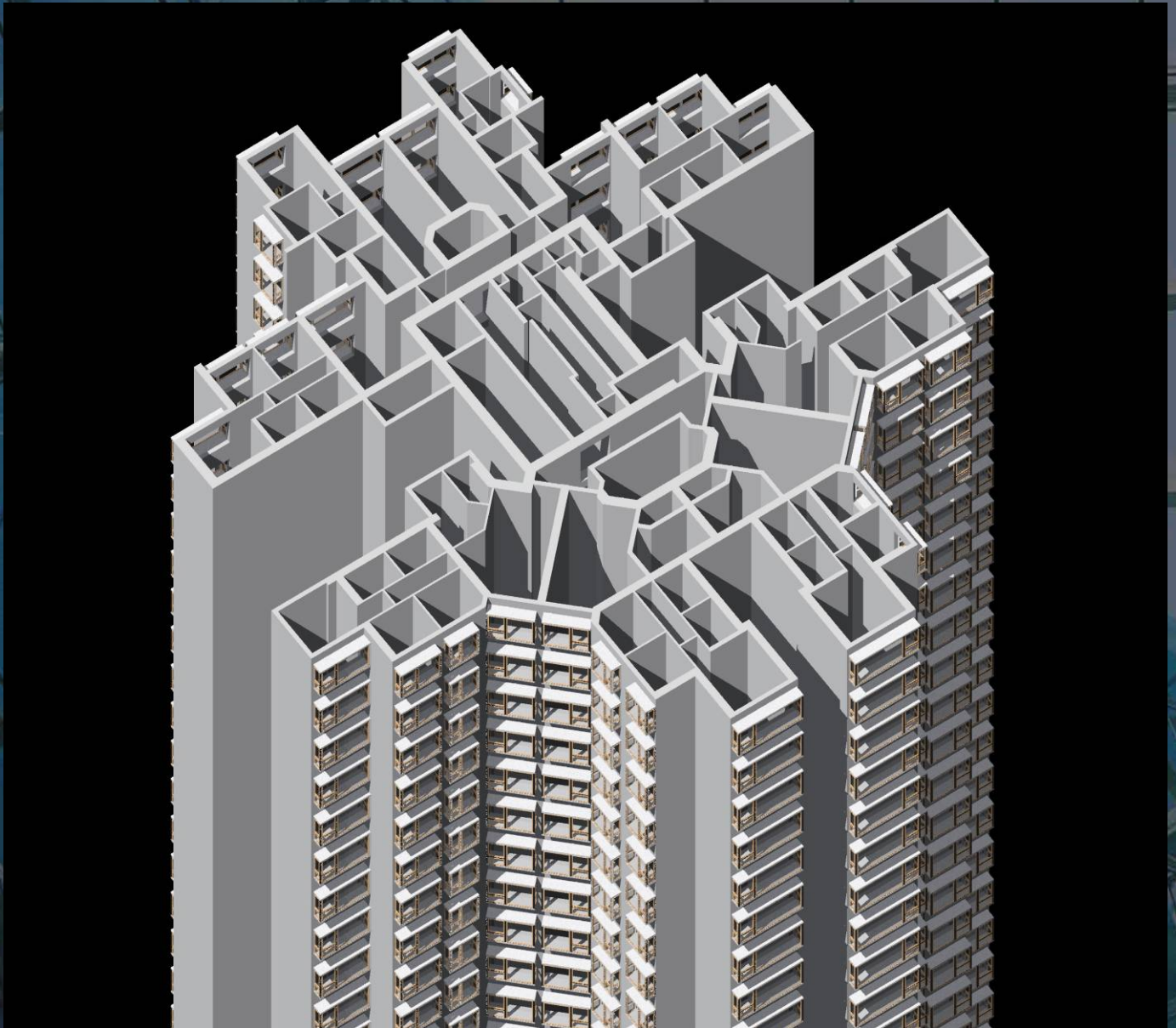
Family Types

Name: AED-Bay Window

Parameter	Value	Formula
Lslab Overhang_Right	0.0	=
Lslab Overhang_Left	0.0	=
Lslab Overhang_Dept	0.0	=
Left Window Width	800.0	=
Height	1800.0	=Wall Height - (Opening Offset *
Width	4500.0	=
Bay Depth	500.0	=
Rough Width		=
Rough Height		=
Identity Data		
IFC Parameters		
Operation		=
Other		
Vmullion Edge	12.5	=Middle Vmullion Thickness / 2
Uslab_Top	2500.0	=Uslab_Bottom + Slab Thickness
Uslab_Bottom	2400.0	=Wall Height - Opening Offset
Sash Offset	70.0	=
Right Window	☒	=Right Window Width > 0 mm
Opening Offset	600.0	=Window Offset + Slab Thickness
Open Window Middle	593.8	=(Uslab_Bottom - Hmullion_Top) /
Lslab_Top	600.0	=Opening Offset
Lslab_Bottom	500.0	=Lslab_Top - Slab Thickness
Left Window	☒	=Left Window Width > 0 mm
Hmullion_Top	1212.5	=Middle Mullion Height + Opening
Hmullion_Bottom	1187.5	=Middle Mullion Height + Opening
Hmullion Edge	12.5	=Middle Hmullion Thickness / 2
Glass Offset	65.0	=65 mm
Glass Height_Top	2335.0	=Uslab_Bottom - Glass Offset
Glass Height_Mtop	1122.5	=Hmullion_Bottom - Glass Offset
Glass Height_MBotto	1277.5	=Hmullion_Top + Glass Offset
Glass Height_Bottom	665.0	=Lslab_Top + Glass Offset

OK Cancel Apply Help



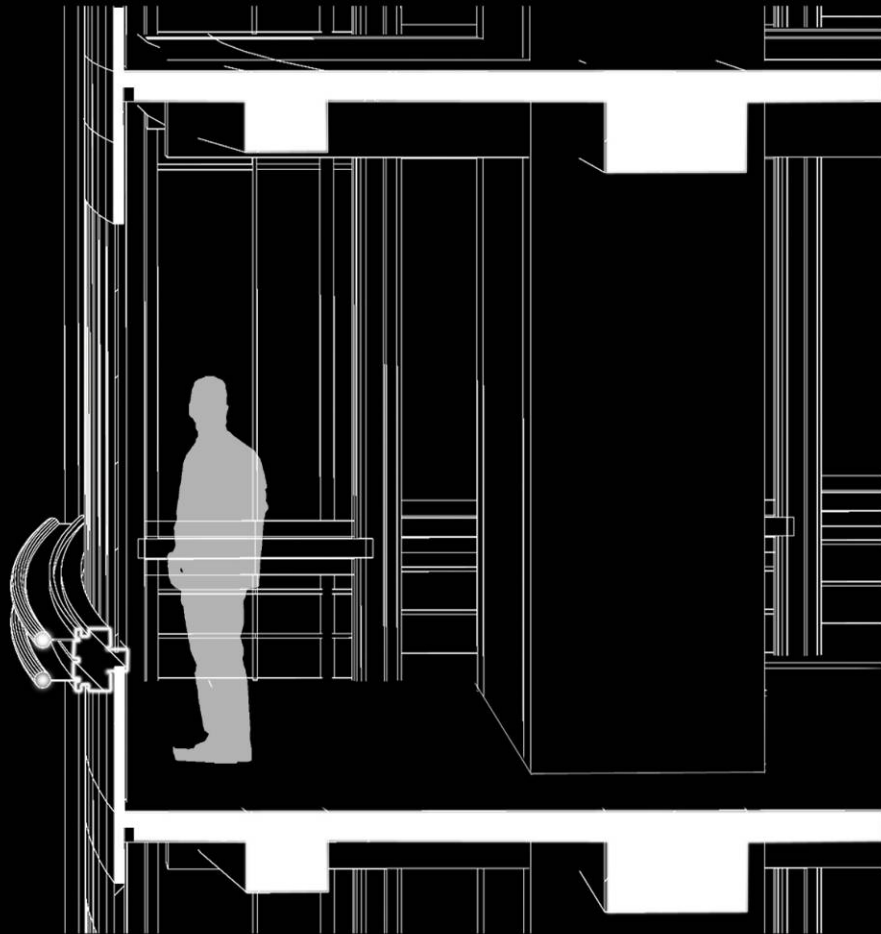


REPETITIONS vs VARIATIONS



廣州辦公室項目

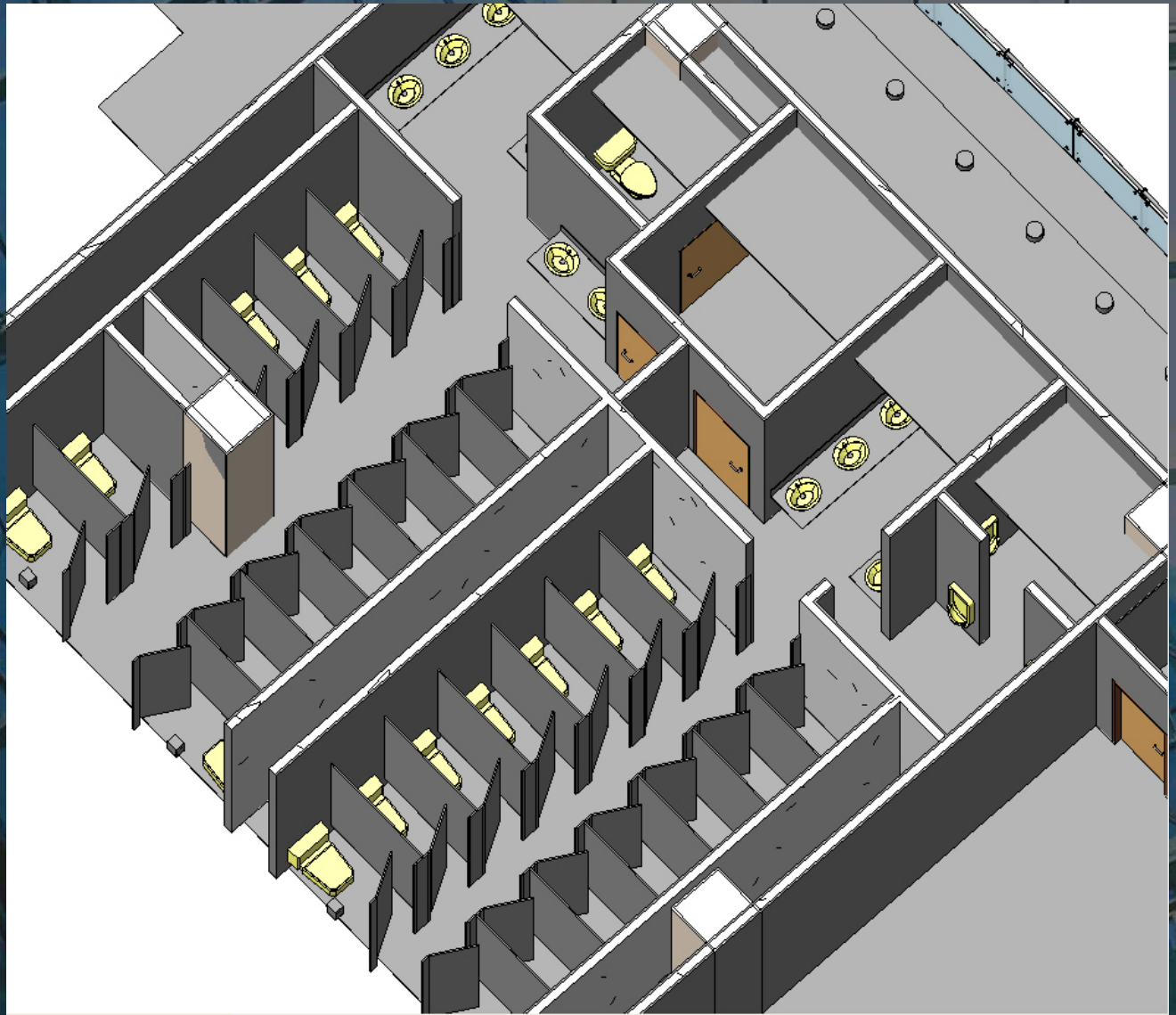
FAÇADE DESIGN and CO-ORDINATION



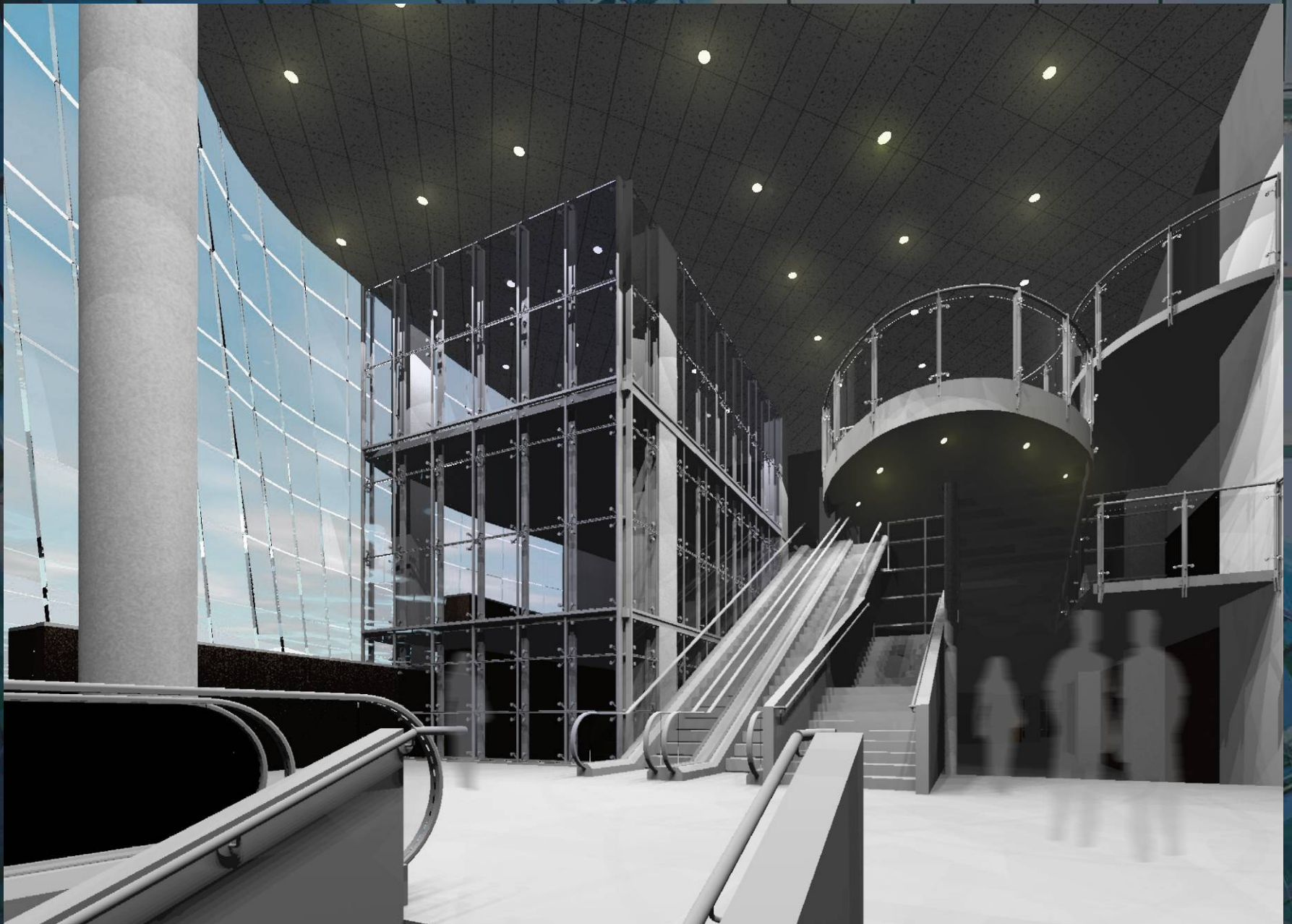
FAÇADE DESIGN and CO-ORDINATION



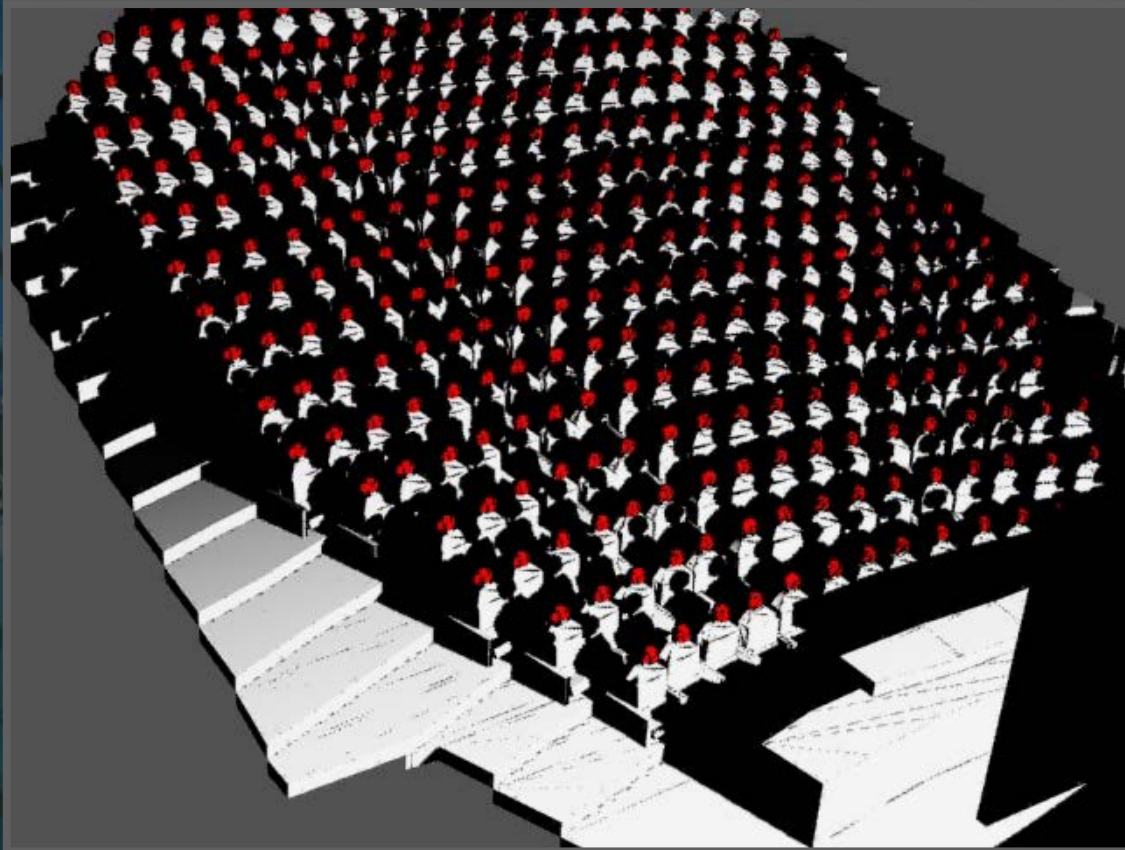
FAÇADE PANEL DESIGN



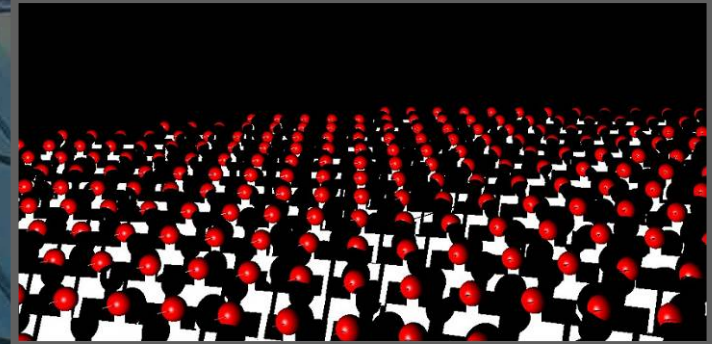
CREATIVE TOOLS



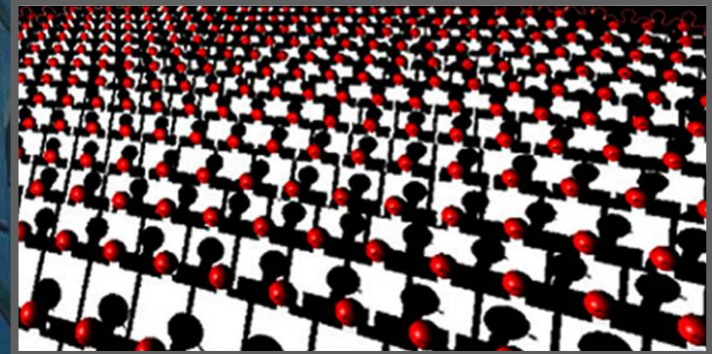
DIFFERENT DESIGN APPROACH – 3D DESIGN



Radiating Light Method

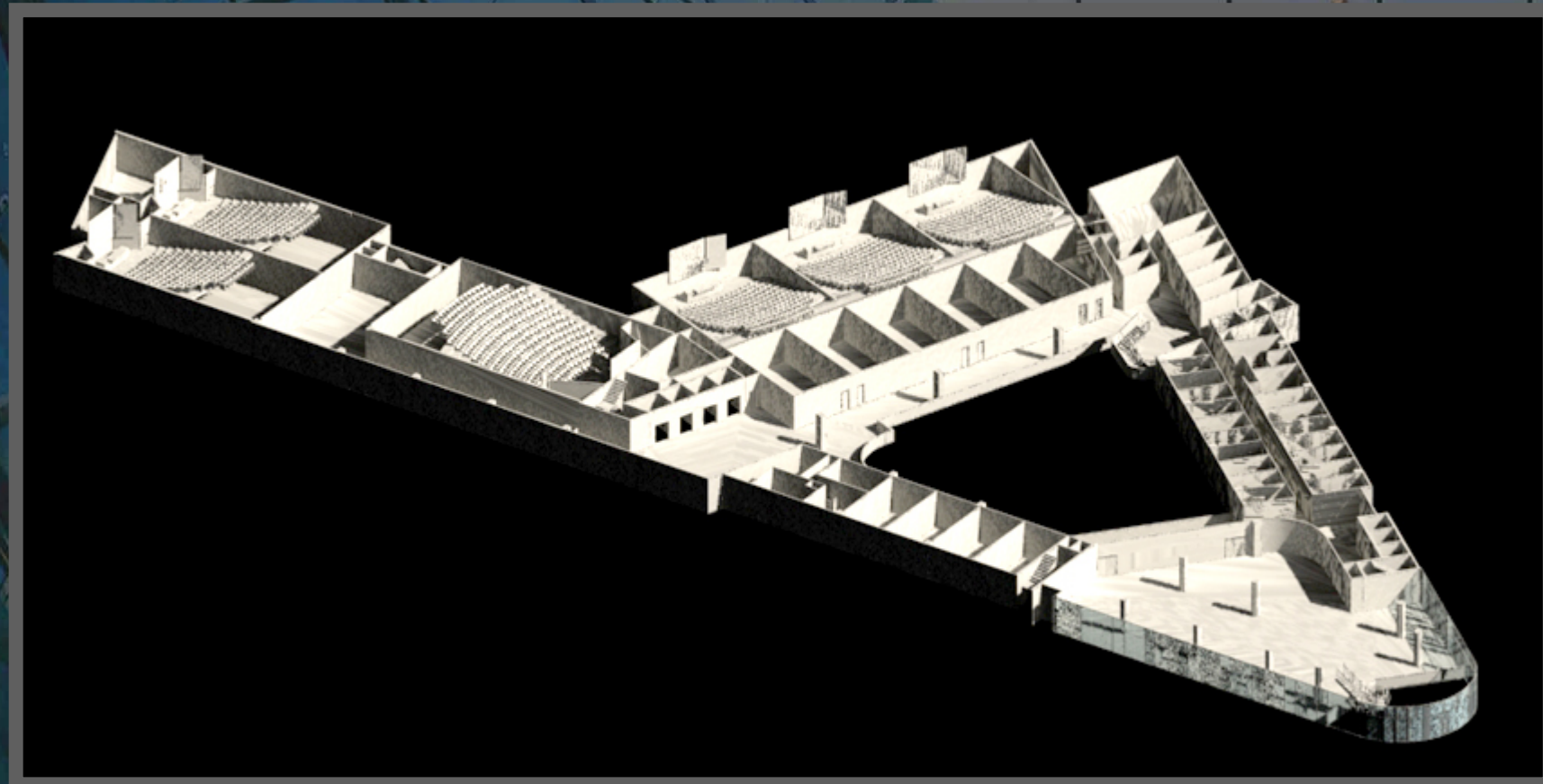


Unsatisfactory sightlines

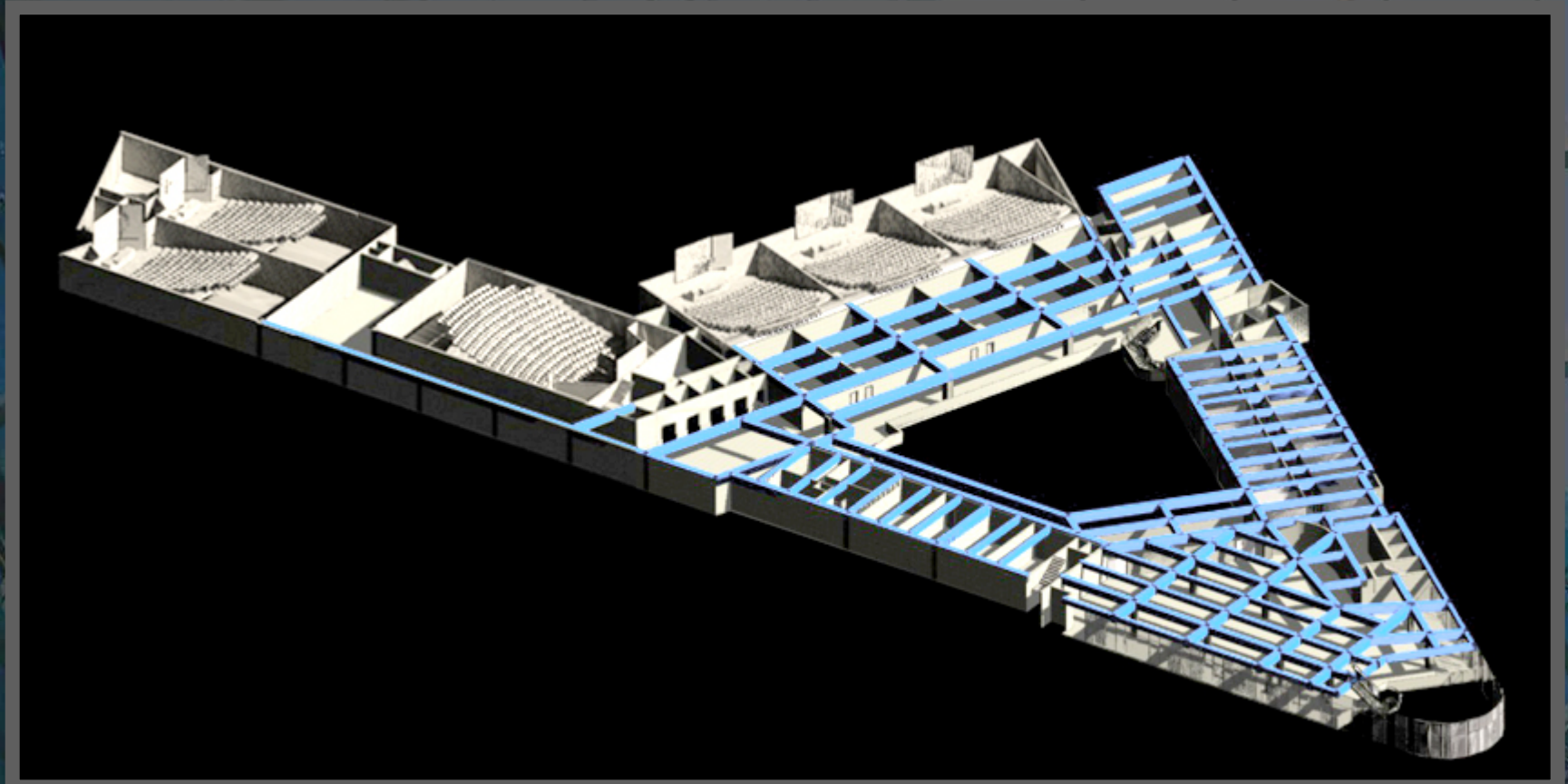


Satisfactory sightlines

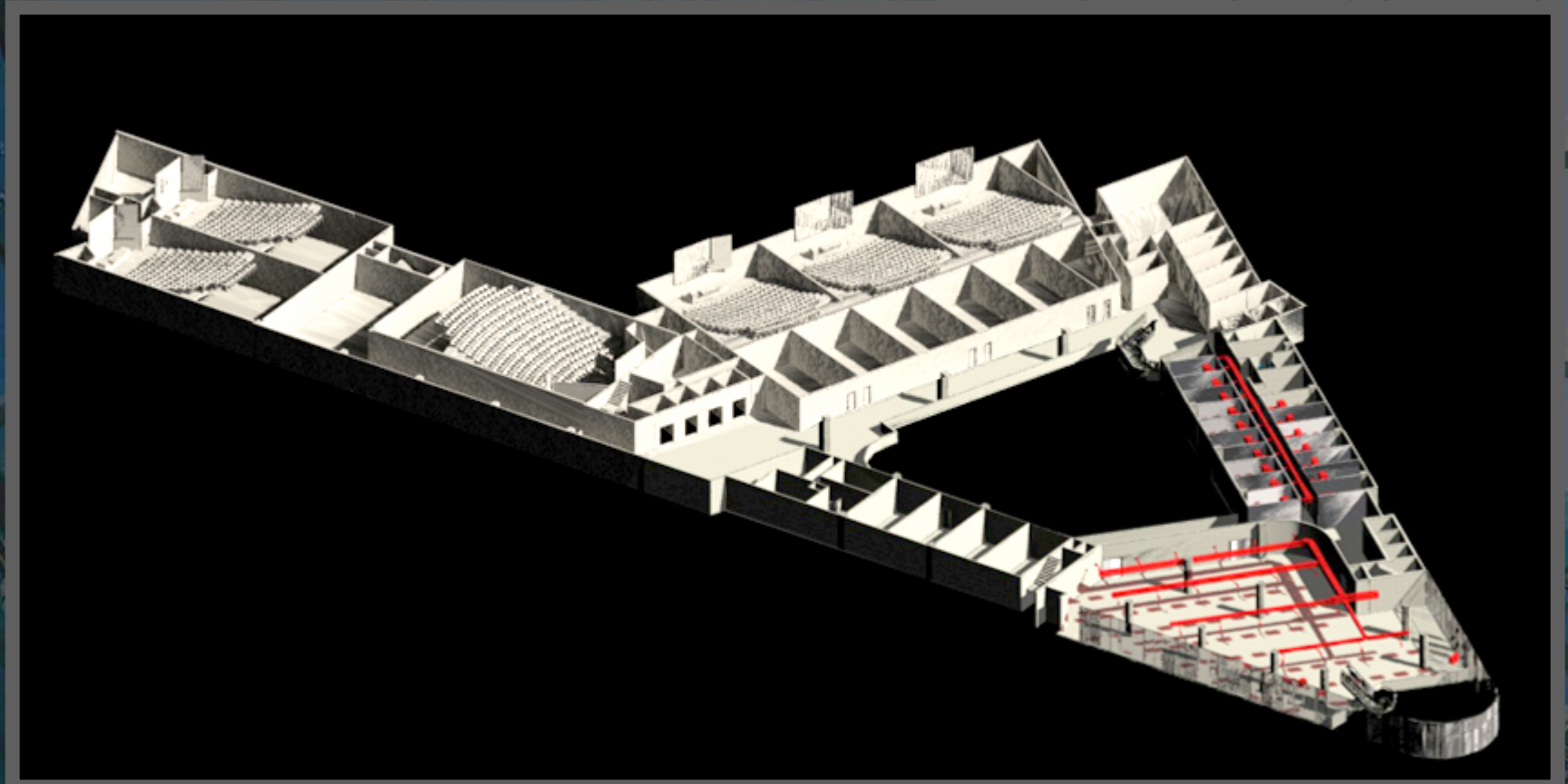
SIGHTLINE STUDIES



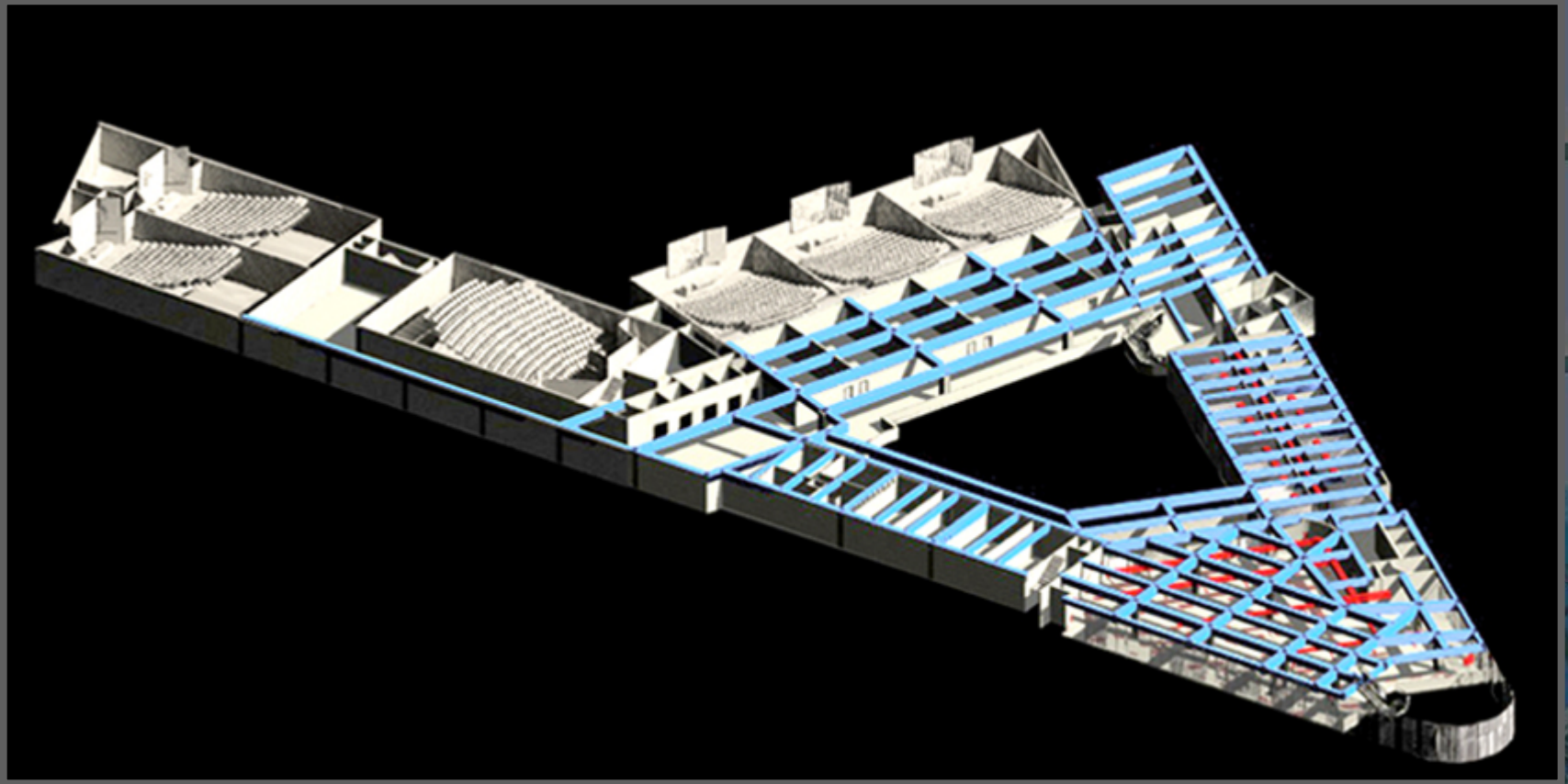
Architecture



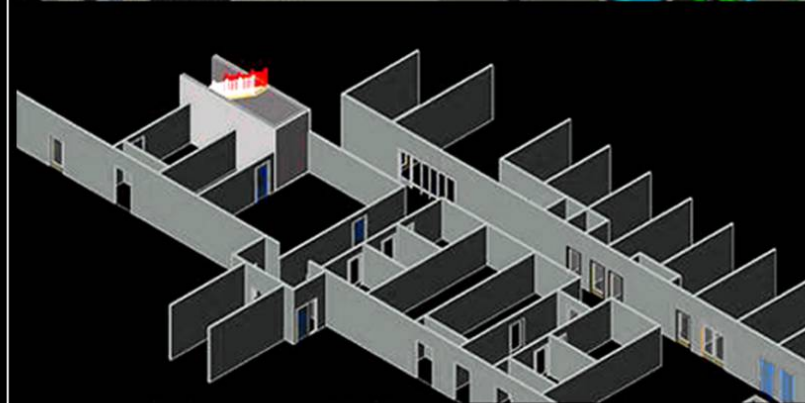
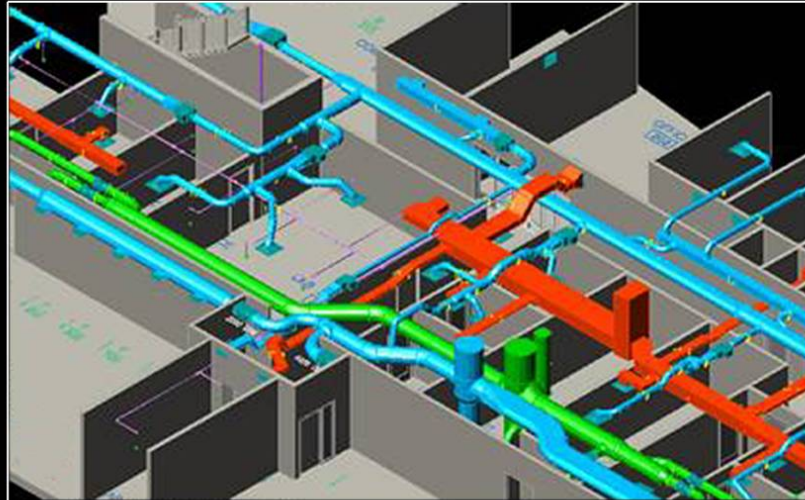
Architecture + Structure



Architecture + E&M

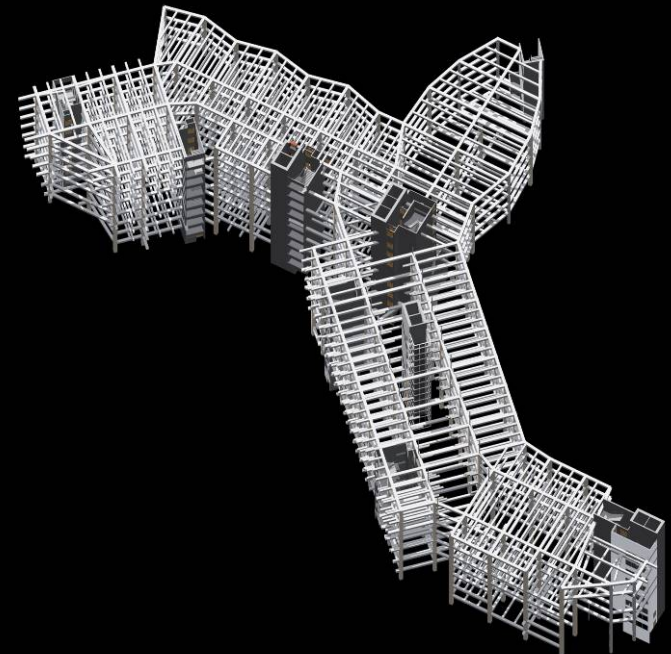
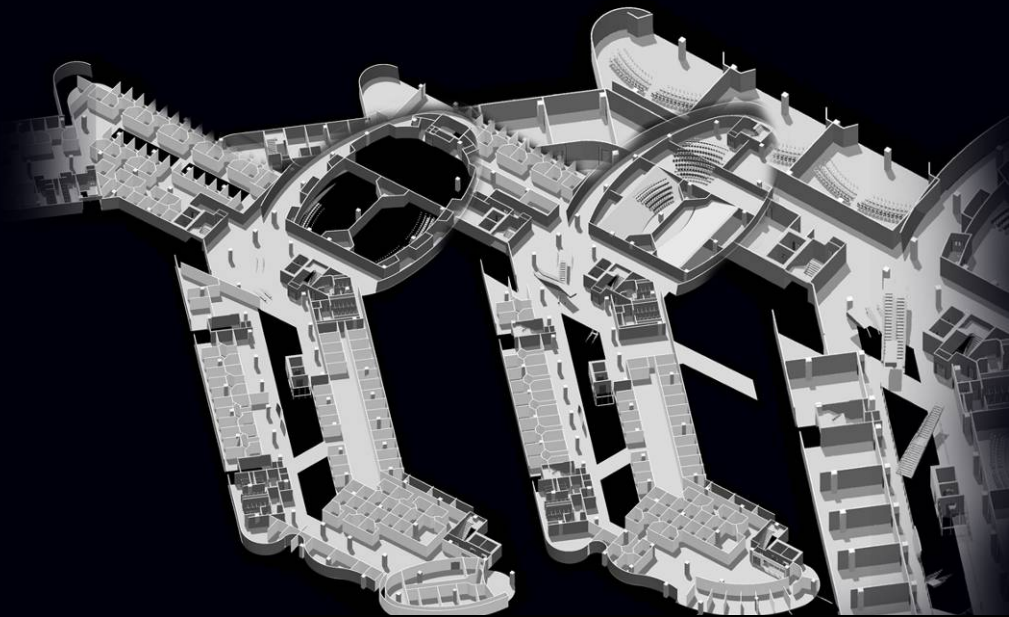


Architecture + Structure + E&M

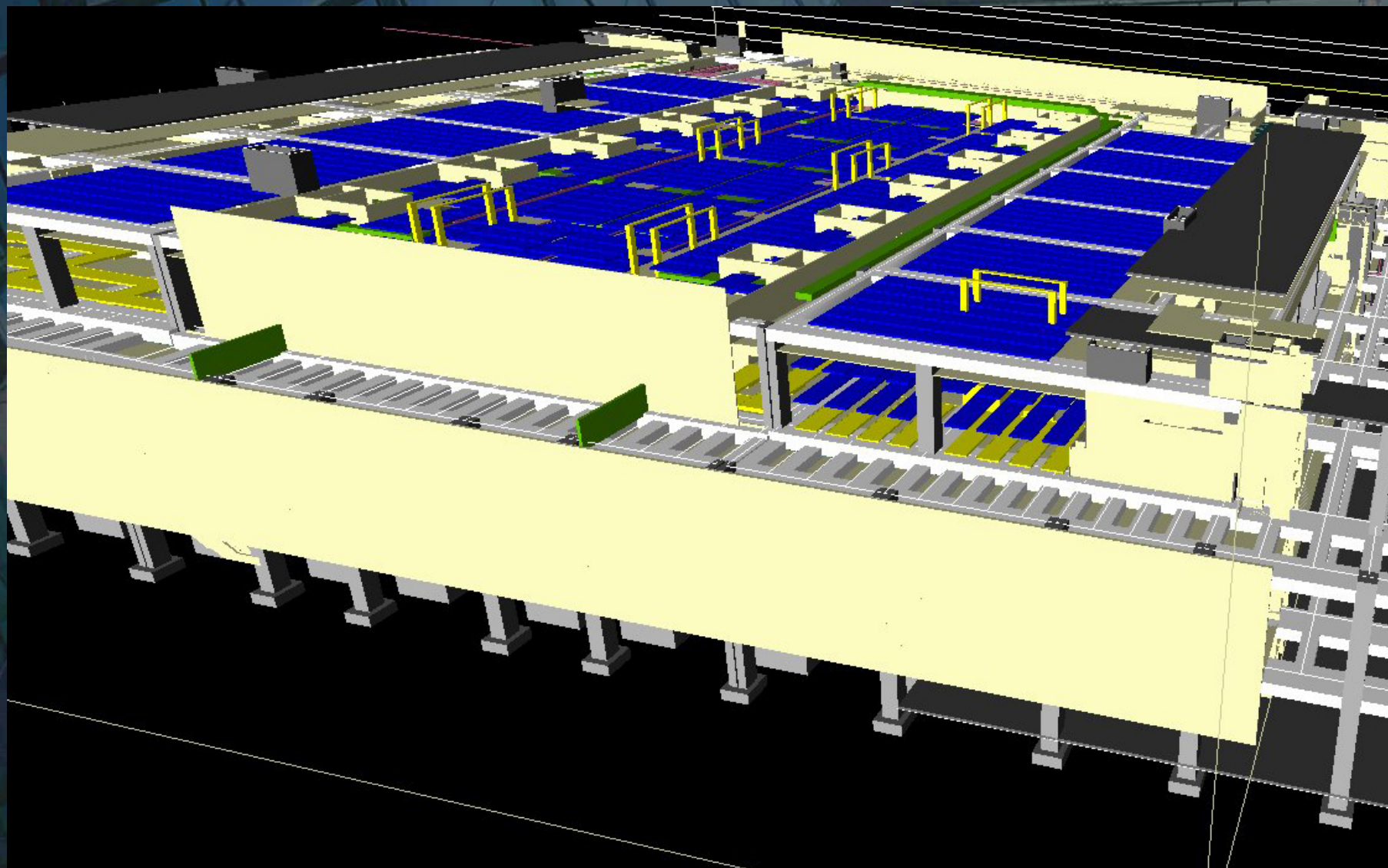


Clash Analysis
Full set of construction
Combined Services Drawings
produced

Close-up collaboration

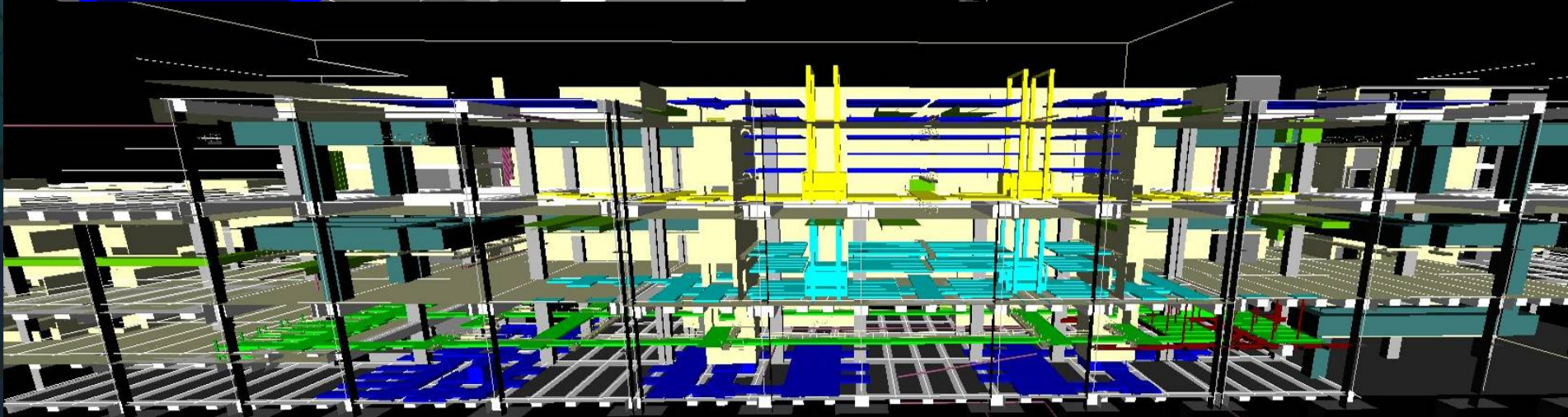
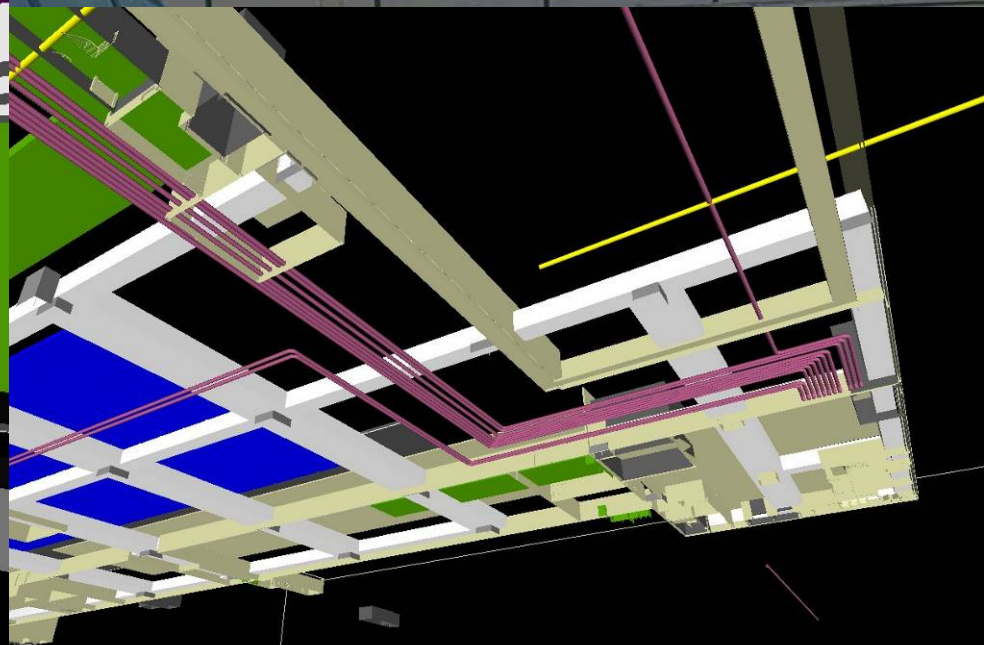
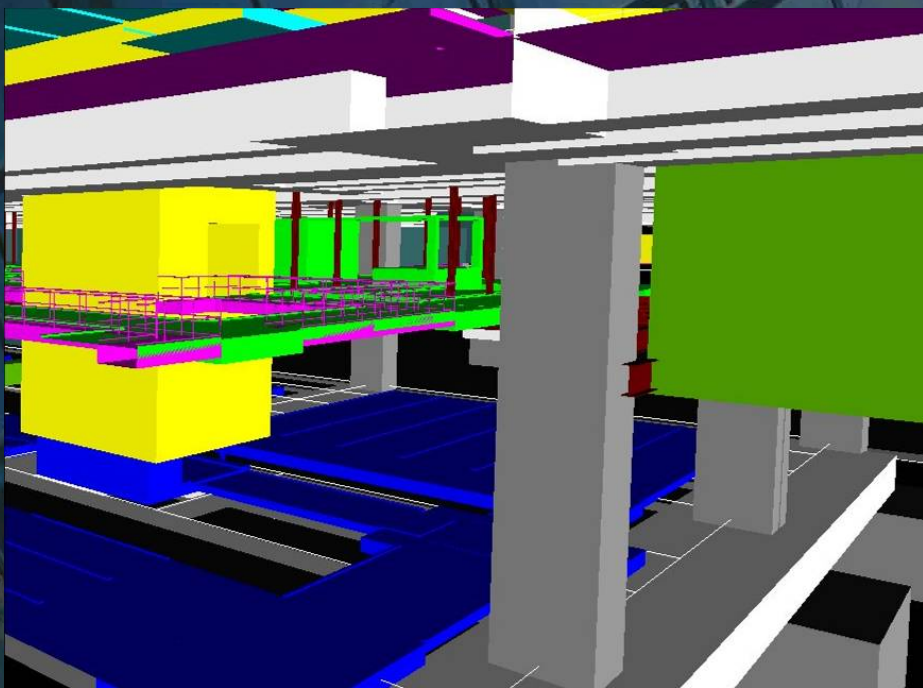


DISCIPLINES COLLABORATION



物流大樓項目

DISCIPLINES COLLABORATION



物流大樓項目

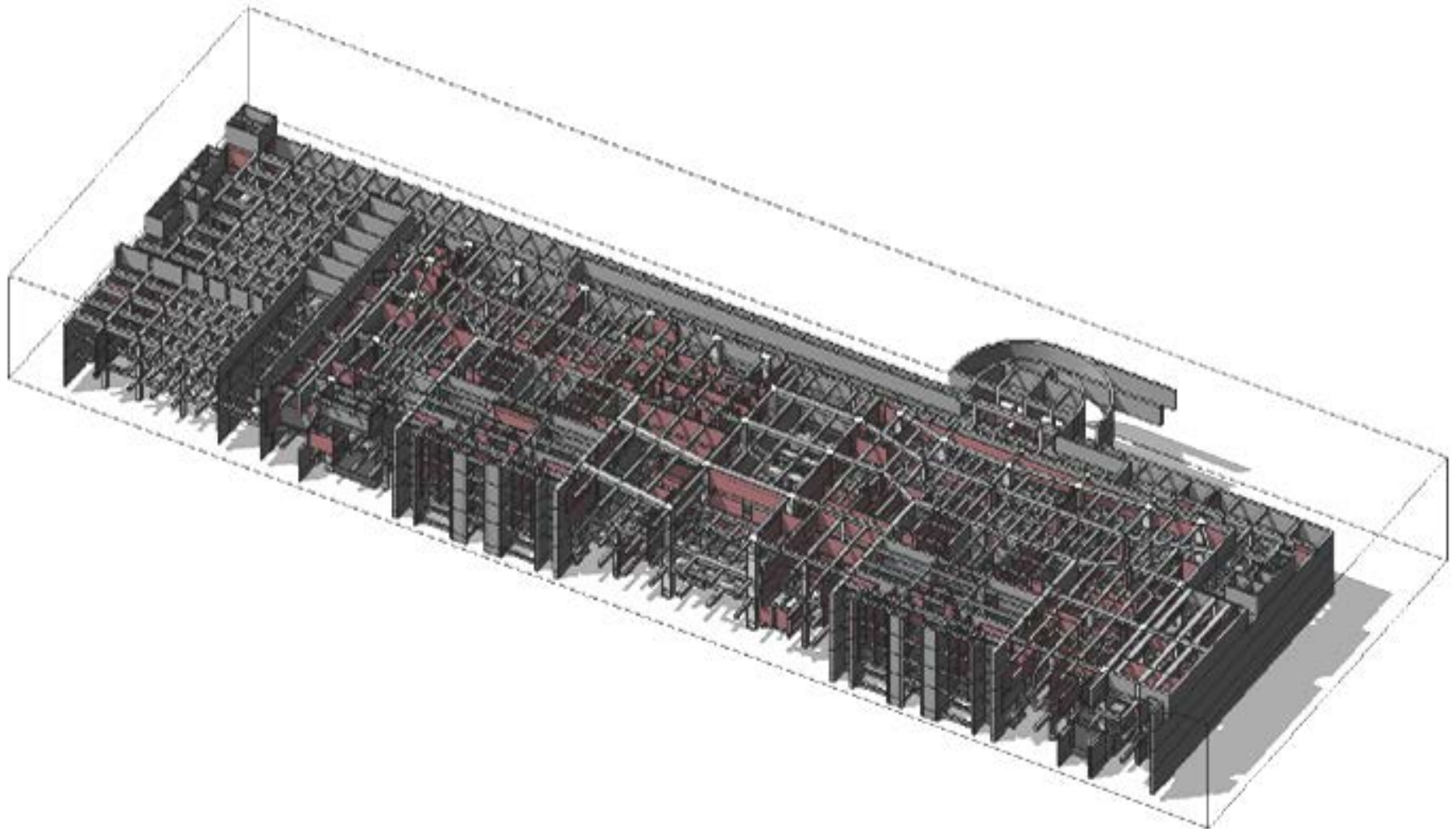
DISCIPLINES COLLABORATION

Wall Schedule							
Family	Family and Type	Length	Width	Count	Area	Volume	
Basic Wall: AED-Concrete - 50mm + Render One sides							
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.548 m2	0.027 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.548 m2	0.027 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.548 m2	0.027 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.548 m2	0.027 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.548 m2	0.027 m3	
0.548 m2: 5		1000		5	2.738 m2	0.137 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.578 m2	0.029 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.578 m2	0.029 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.578 m2	0.029 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.578 m2	0.029 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.578 m2	0.029 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.578 m2	0.029 m3	
0.578 m2: 6		1200		6	3.465 m2	0.173 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.608 m2	0.030 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.608 m2	0.030 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.608 m2	0.030 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.608 m2	0.030 m3	
0.608 m2: 4		800		4	2.430 m2	0.122 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.638 m2	0.032 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.638 m2	0.032 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	200	50	1	0.638 m2	0.032 m3	
0.638 m2: 3		600		3	1.913 m2	0.096 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	250	50	1	0.730 m2	0.037 m3	
Basic Wall	Basic Wall: AED-Concrete - 50mm + Render One sides	250	50	1	0.730 m2	0.037 m3	
0.730 m2: 2		500		2	1.460 m2	0.073 m3	

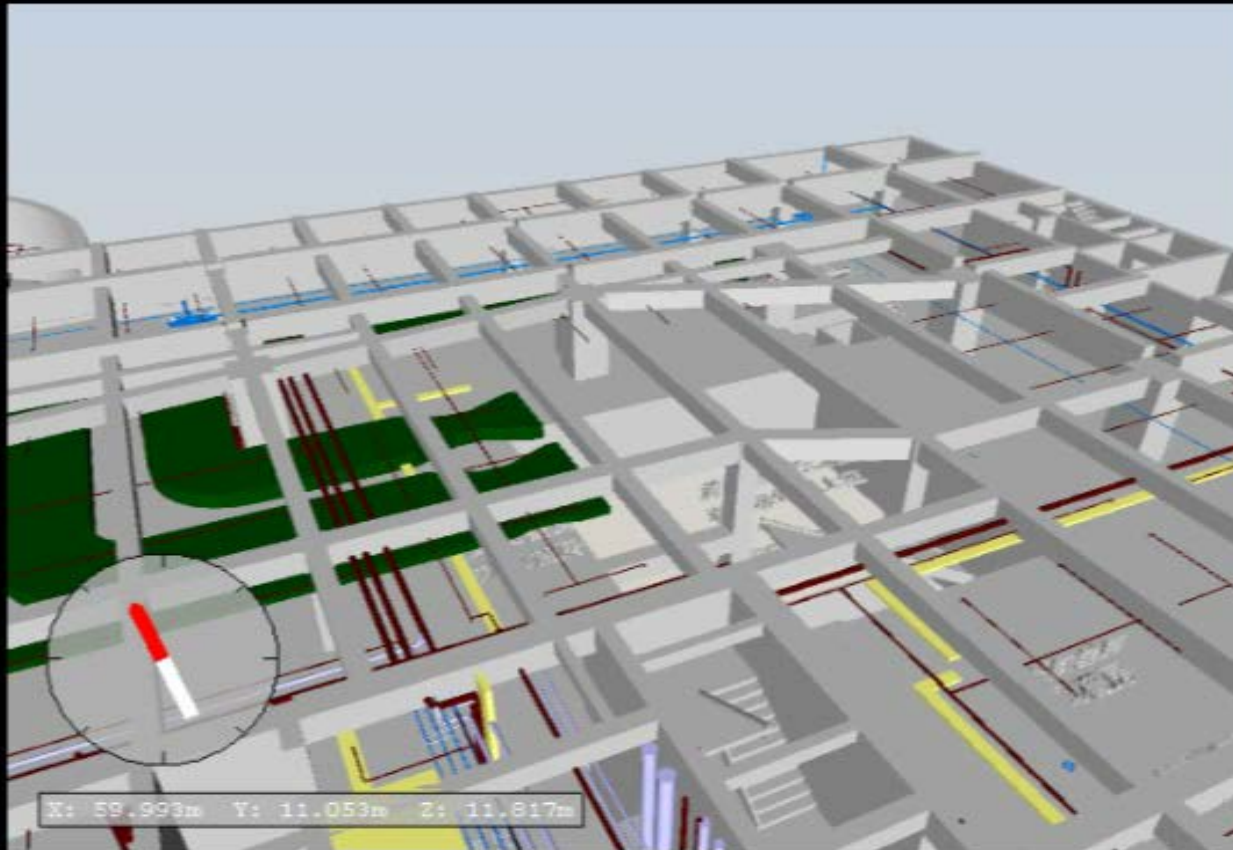
DISCIPLINES COLLABORATION

CO-ORDINATION

Work Flow – Establish BIM Model

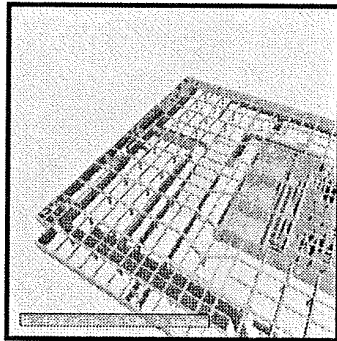


Work Flow - Clashes Identification Processes



Work Flow – Clashes Report

流程 – 碰撞報告



Name	Clash31
Distance	-0.150m
Status	New
Clash Point	-74.537m, 2.437m, -11.450m
Date Created	2006/7/17 03:37:34
Approved By	

Item 1

Path File ->File ->Basement 03.nwc -><No level> ->L2b1
500 x 700 ->L2b1 500 x 700 ->Solid

Item 2

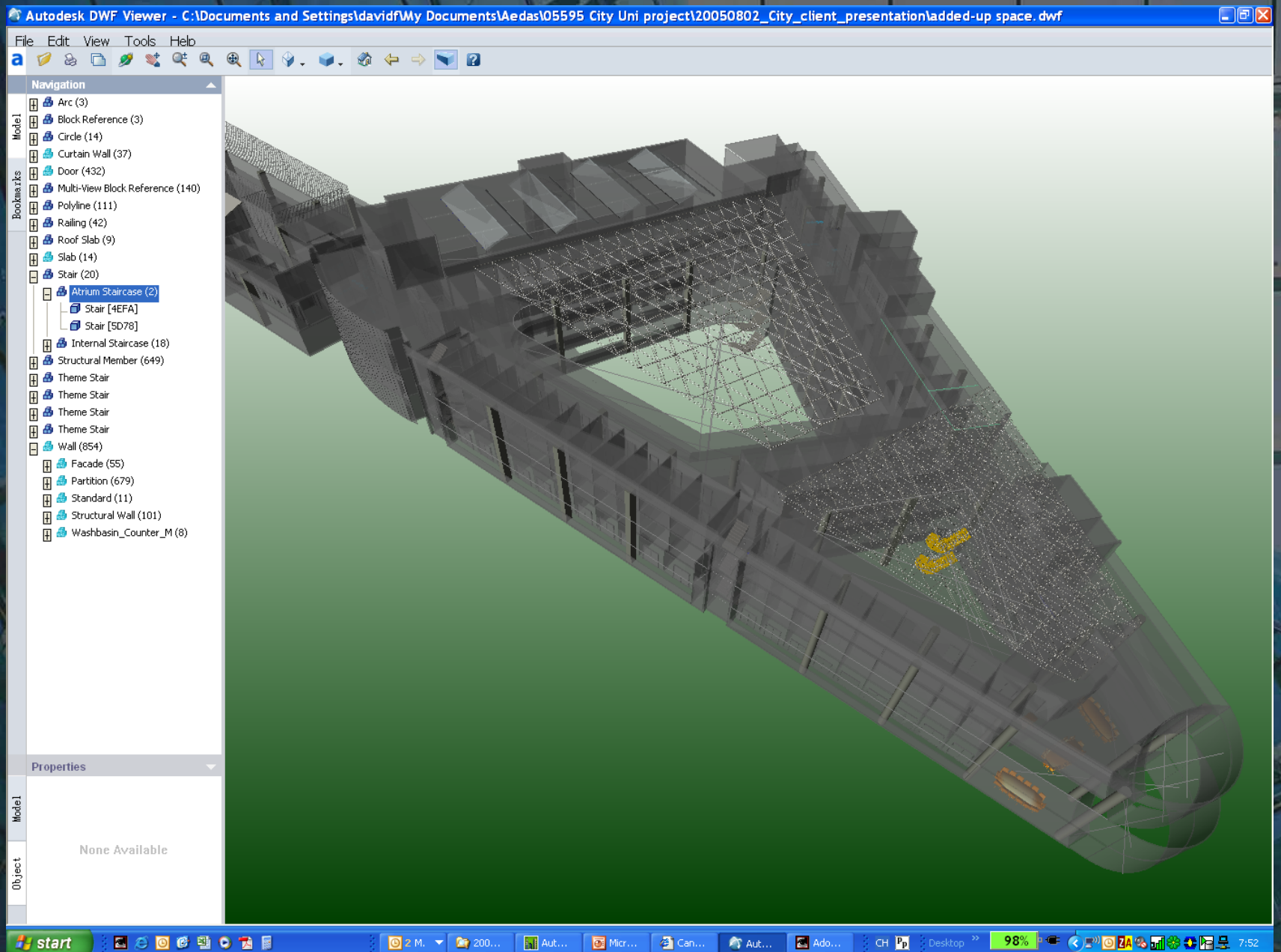
Entity Handle	2AD6
Path	File ->File ->B3HVAC_Duct.nwd ->H-Ductwork-G -
>Duct	

Results – No of Clashes

結果 – 碰撞數目

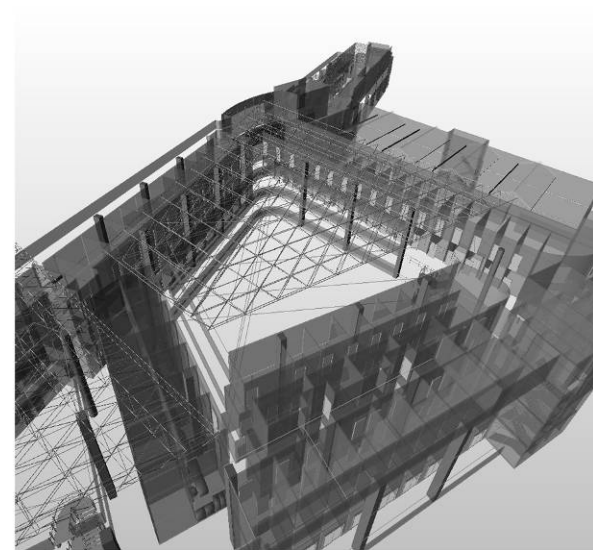
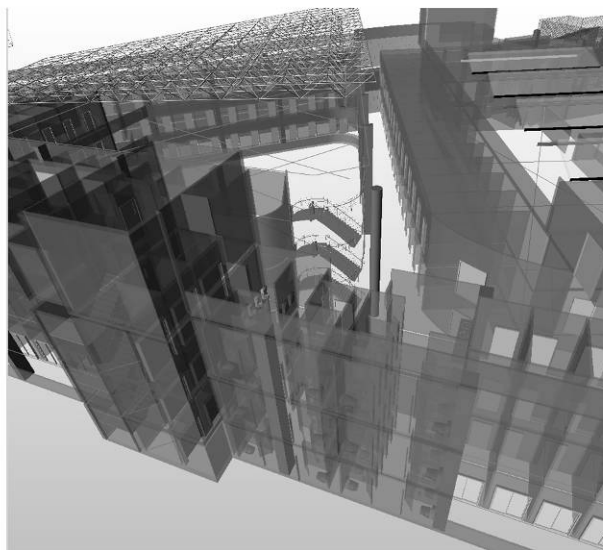
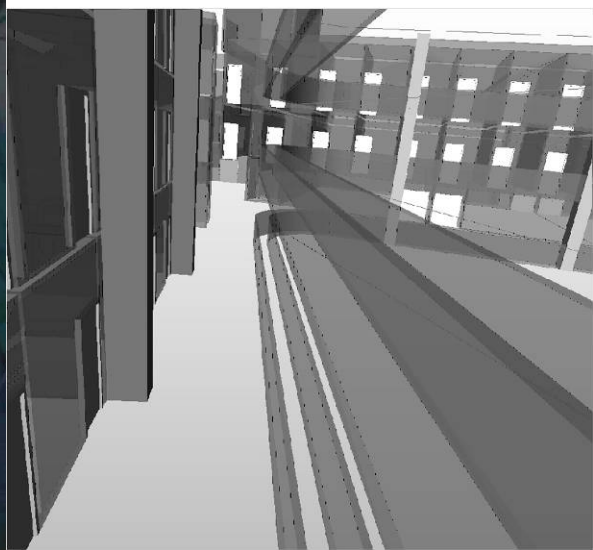
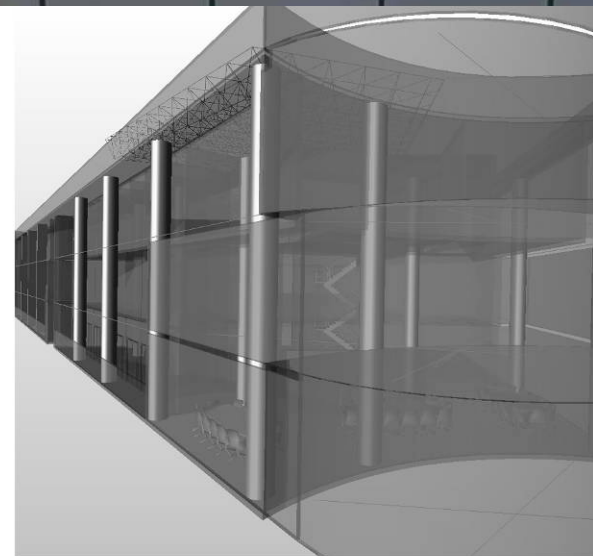
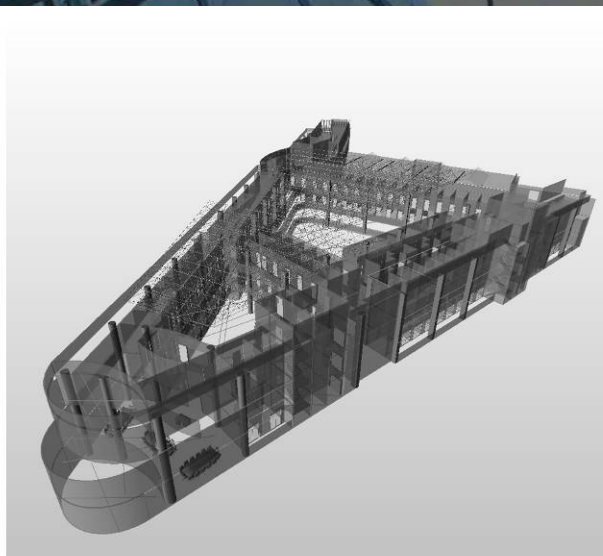
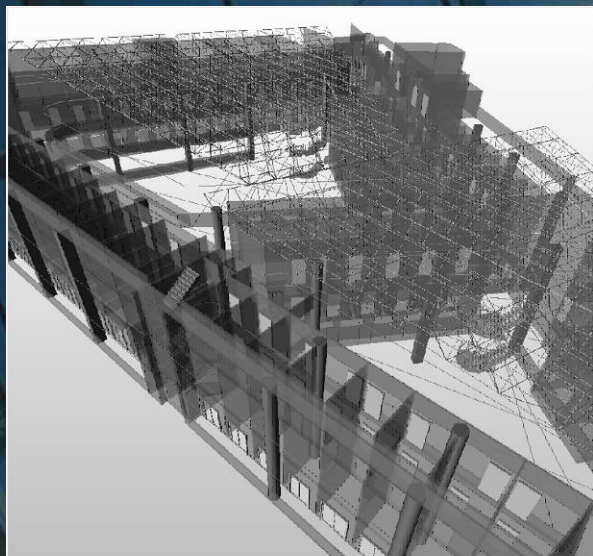
	HVAC Ductwork	Chiller Water Pipe	Fire Services	P&D	Electrical	Total
B1	0	0	0	0	0	0
B1M	0	0	0	0	0	0
B2	0	0	0	0	0	0
B3	0	0	0	0	0	0
Total	0	0	0	0	0	0

X: -65.357m Y: 19.867m Z: -2.579m



香港大學大樓項目

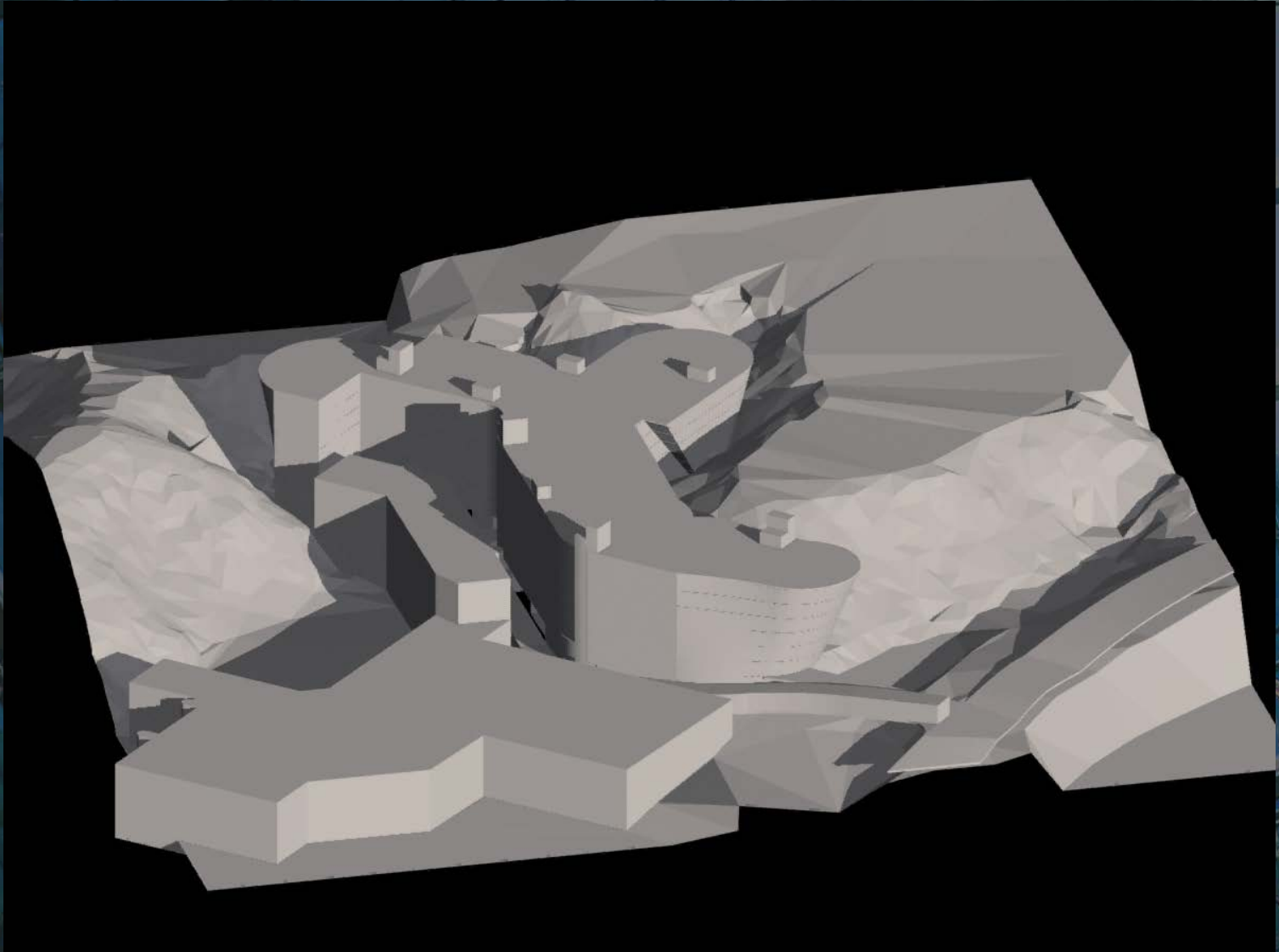
INTERACTIVE COMMUNICATION – DWF



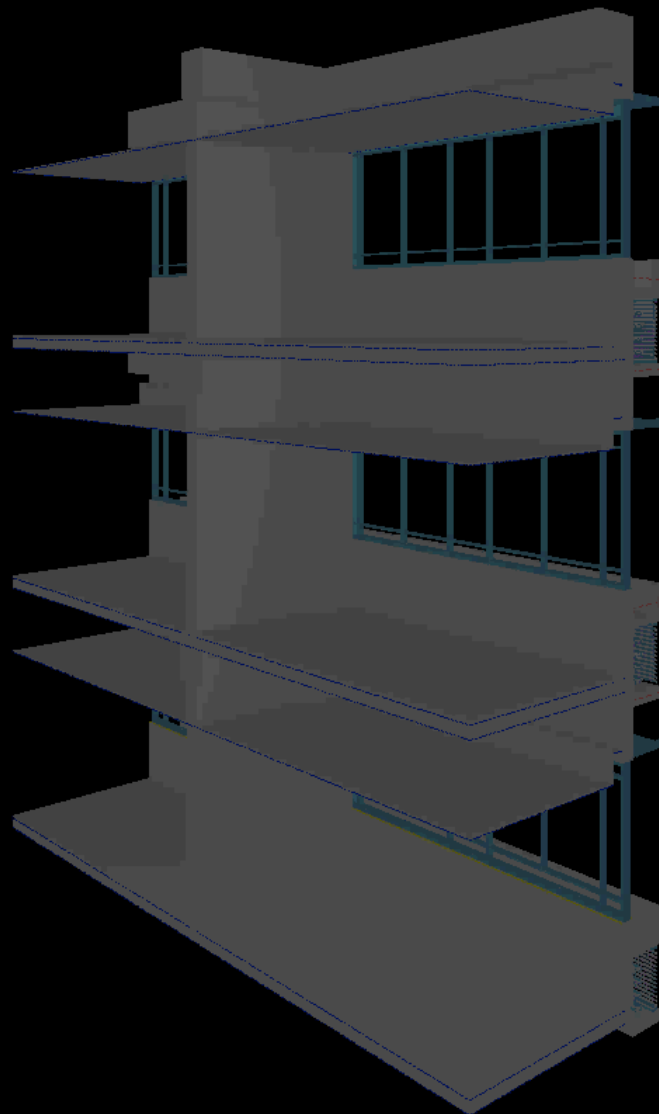
香港大學大樓項目

INTERACTIVE COMMUNICATION – DWF

ANALYSIS



SUN STUDY



FAÇADE SOLAR STUDY 21/12/2005 7:00am – 6:00pm

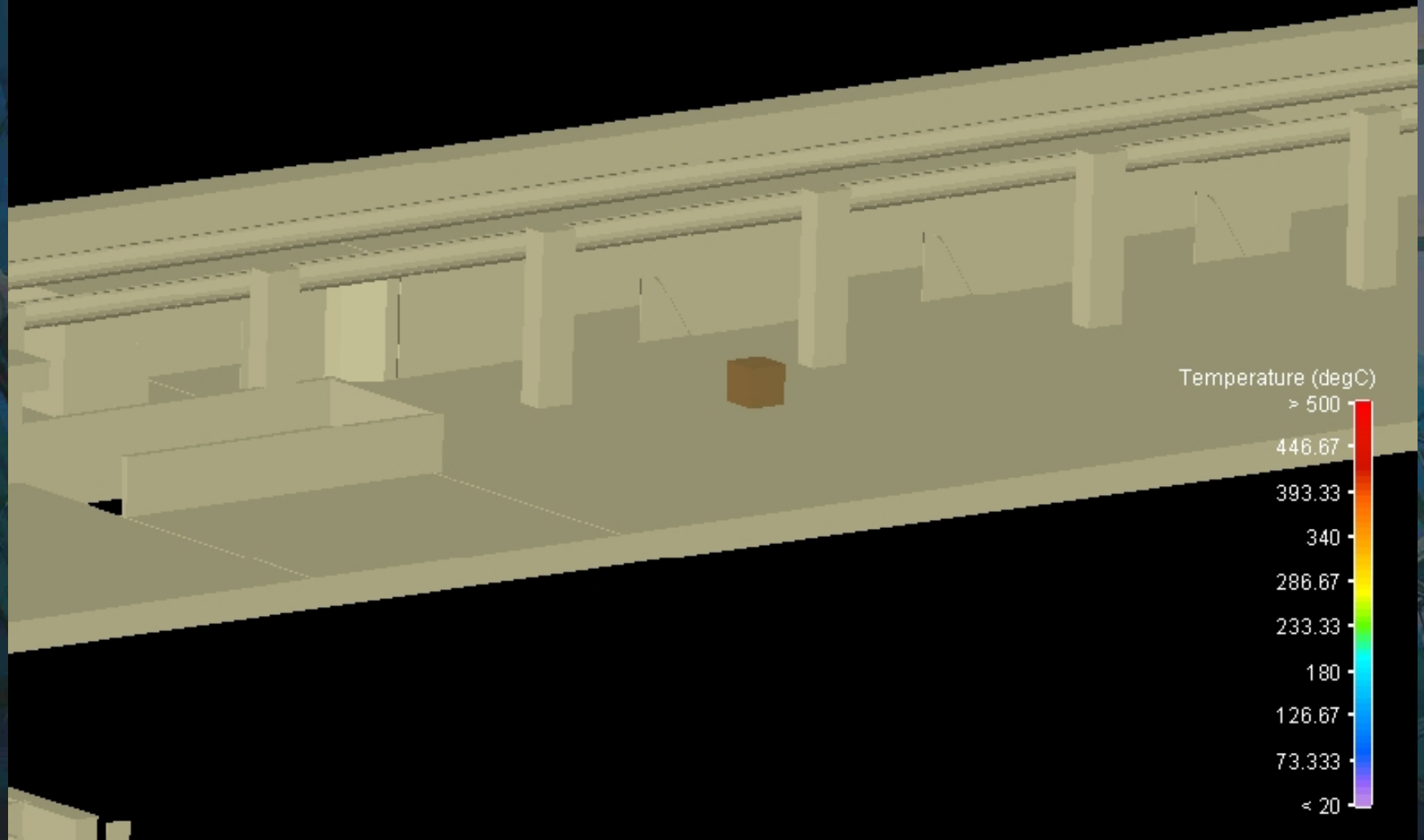
ANALYSIS



VISUALIZATION

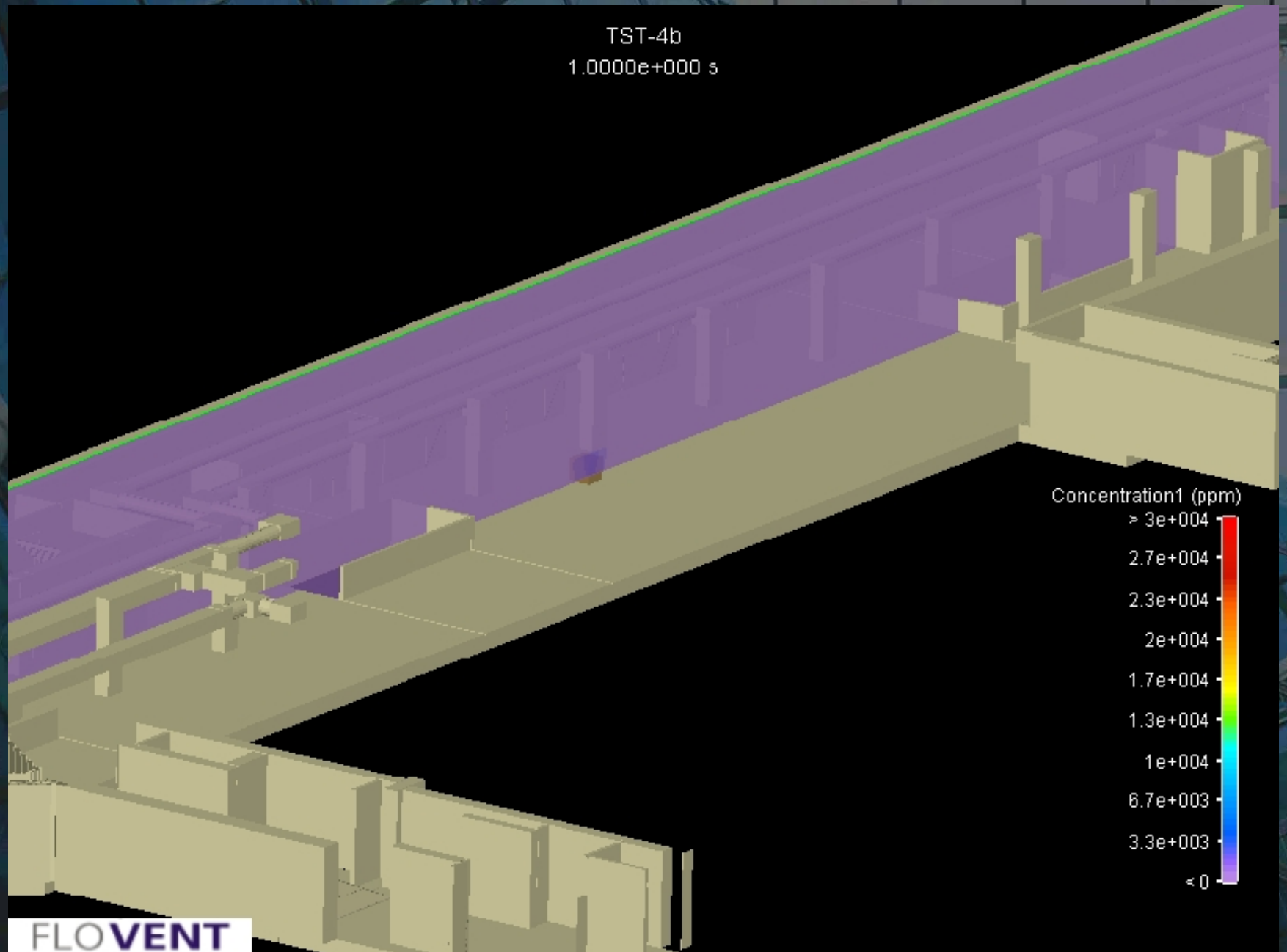
ANALYSIS

TST-4c
1.0000e+000 s

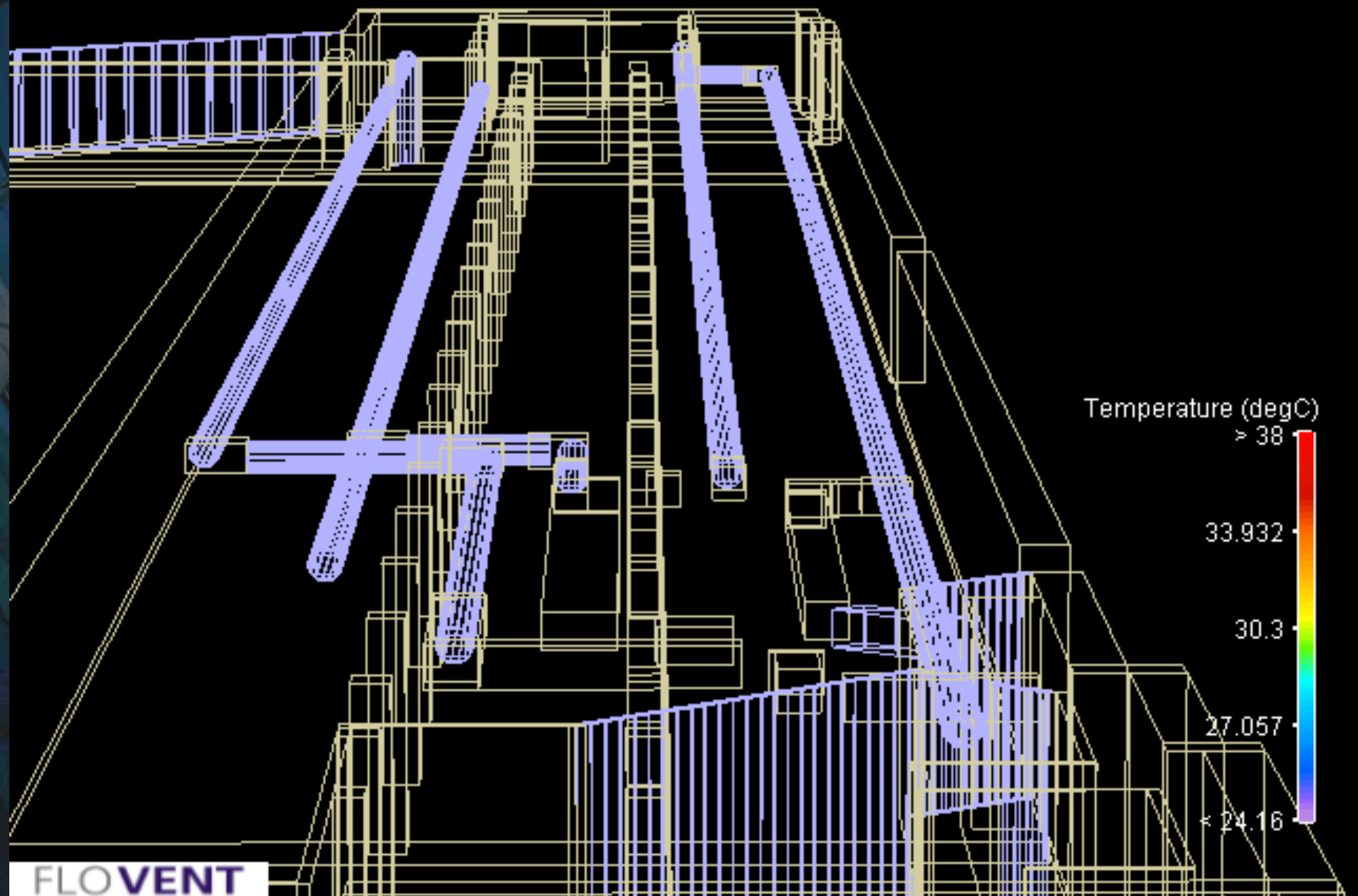


ANALYSIS

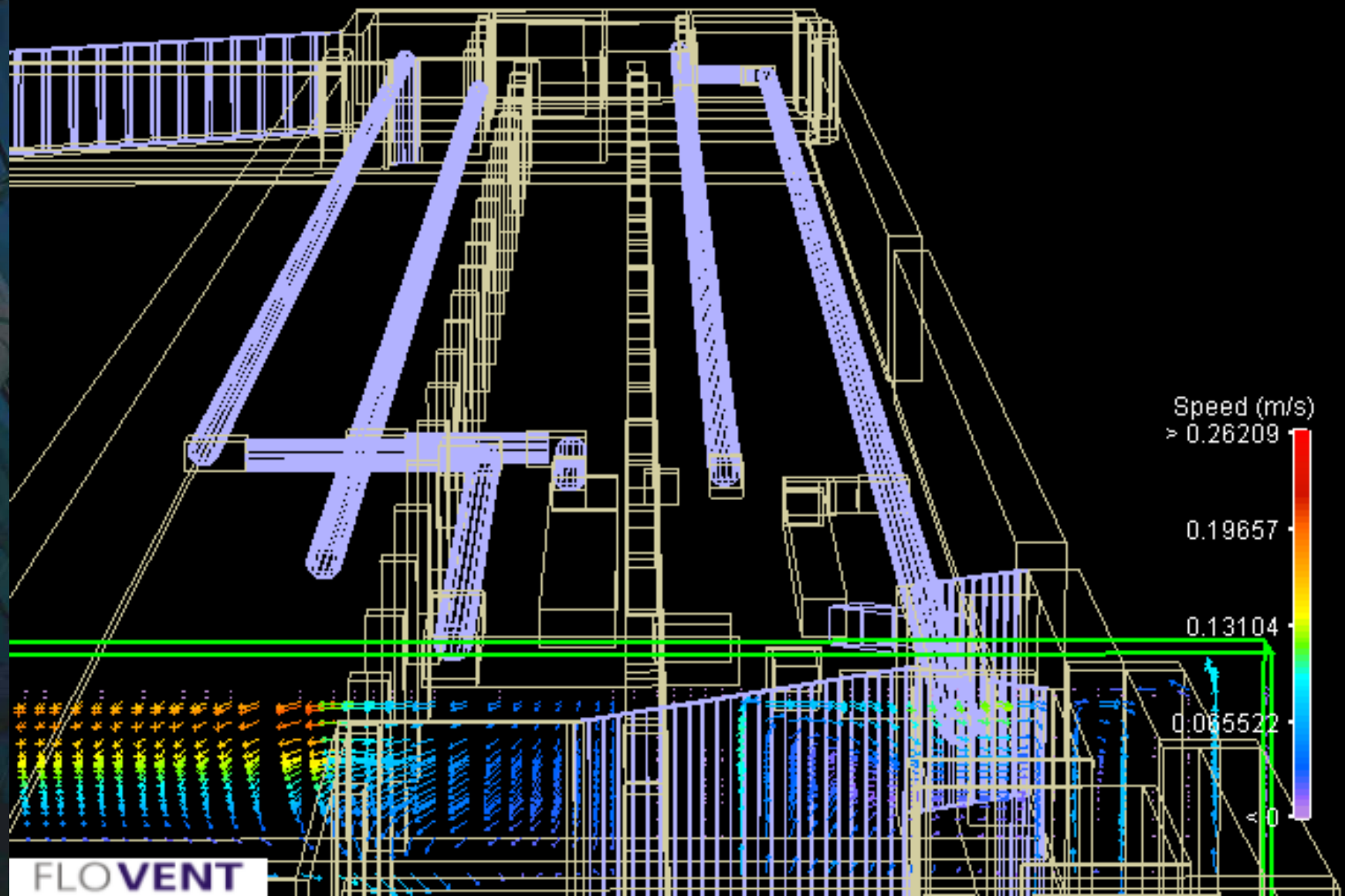
TST-4b
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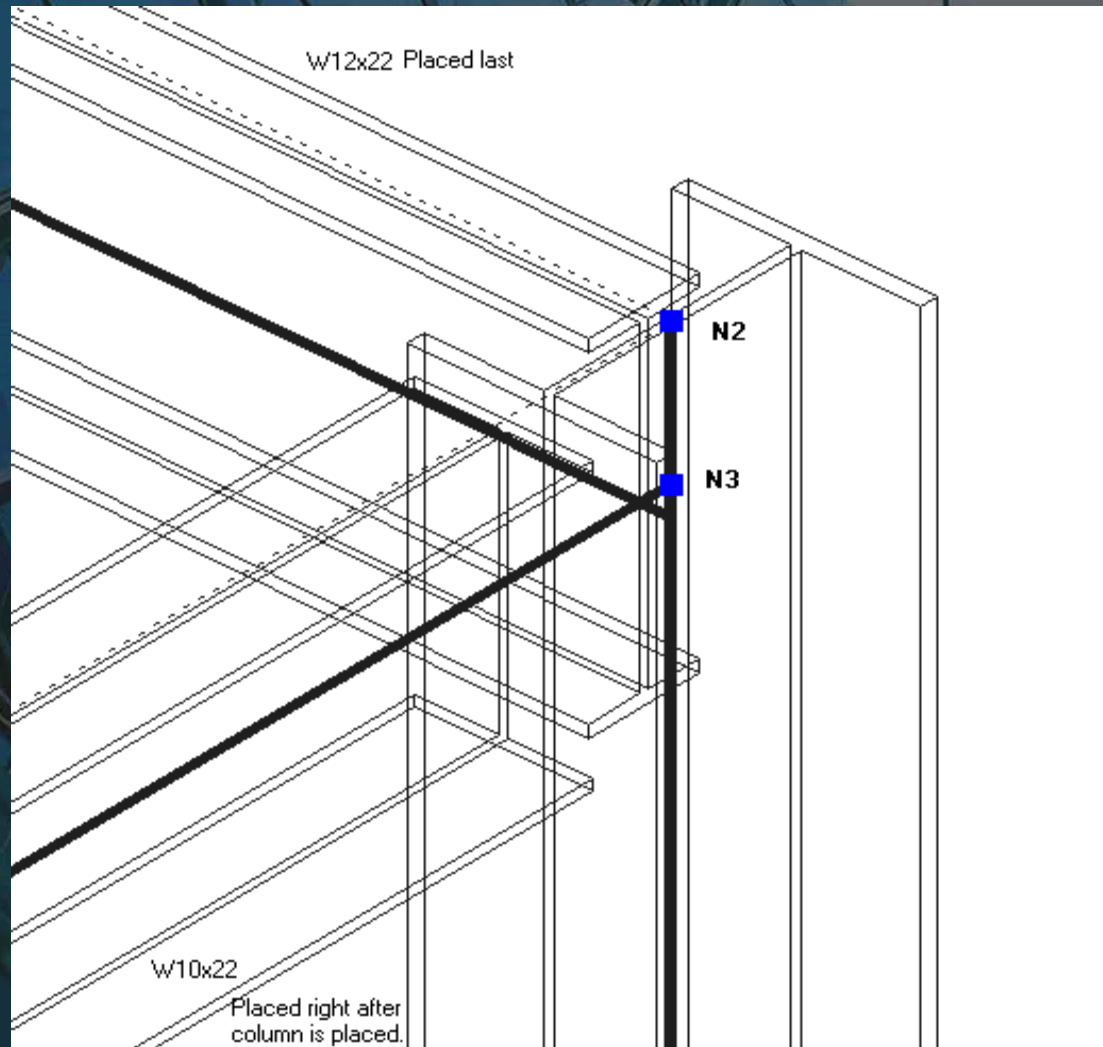
ANALYSIS



ANALYSIS

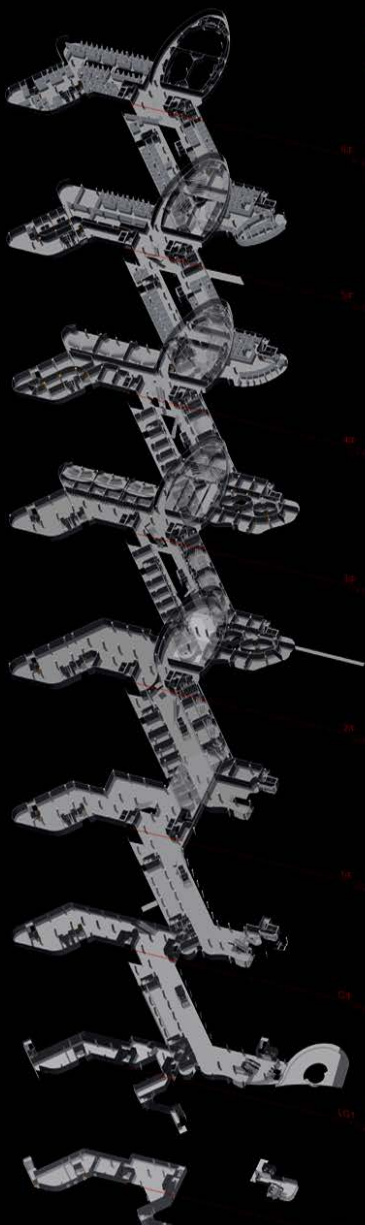


Synchronization between CAD Model and Analytical Models



Is the Building Industry changing?





Seminar **2** 1 Feb (Thurs) 6:30-8:30

The Incentives

perspective from various clients on the application of this new technology, the demand and benefits, the case studies and future planning

Speakers

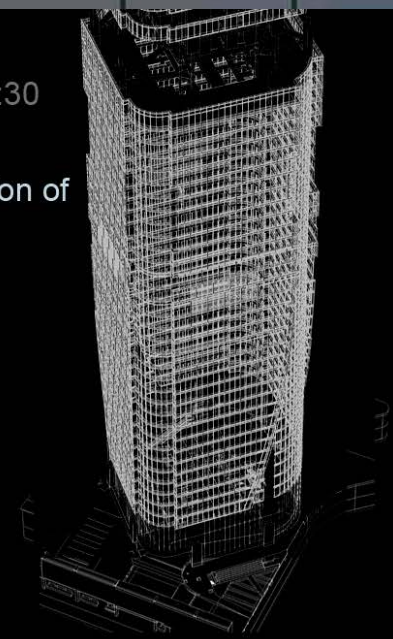
Henderson Land - Y Y Yip

Swire Properties (to be confirmed)

Housing Department - David Mak

BIM Consultant - Elvis Lee

MTRC (to be confirmed)



Seminar **3** 5 Feb (Mon) 6:30-8:30

The Experience

the experience so far of different disciplines on the use of the new technology, the interface issues, the opportunities and practical considerations, impact on the way of practicing architecture, the liabilities, the fee structure, etc.

Speakers:

Architect - David Fung

Engineer - Francis Leung

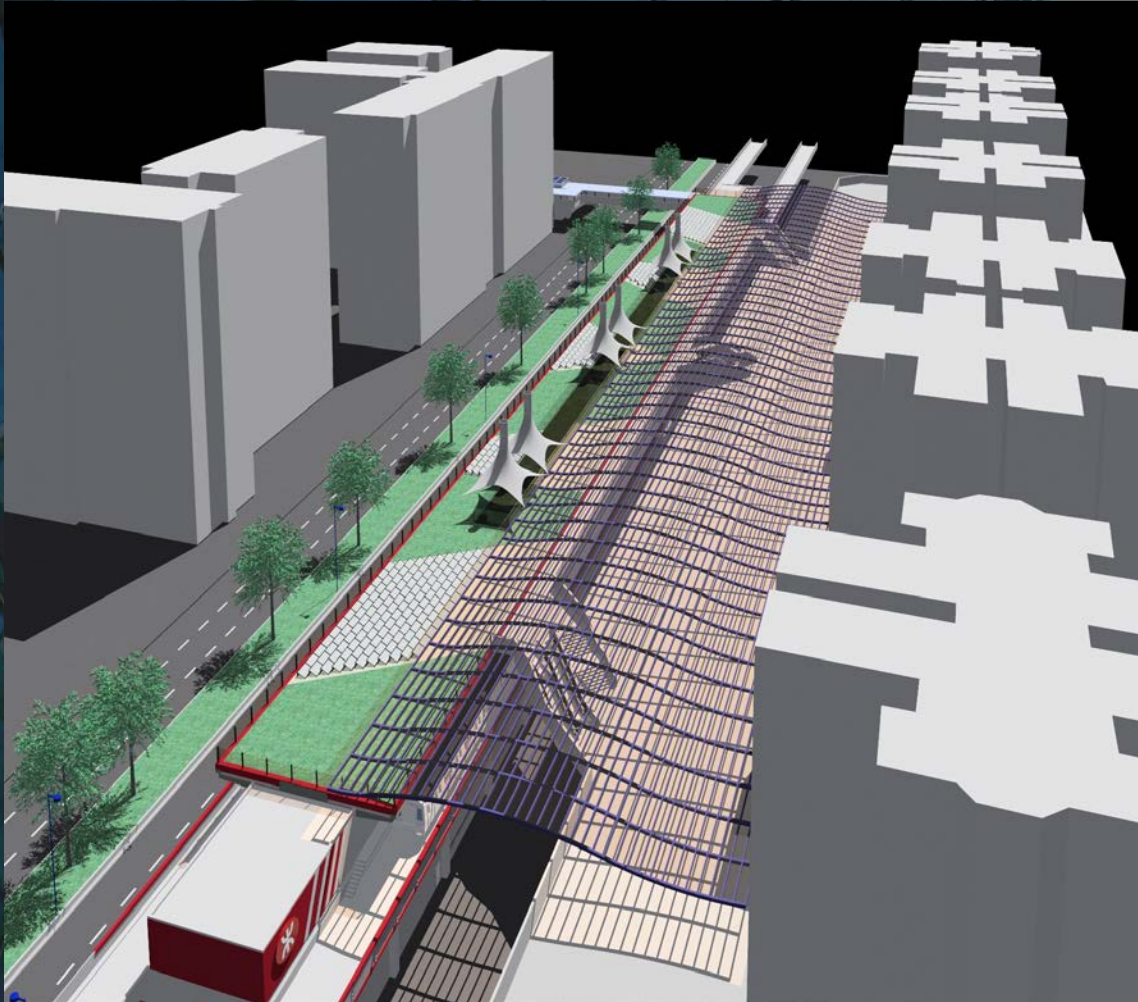
QS - Kenny Tse

BIM Consultant - Elvis Lee

Contractor - Andrew Fan

A year ago...

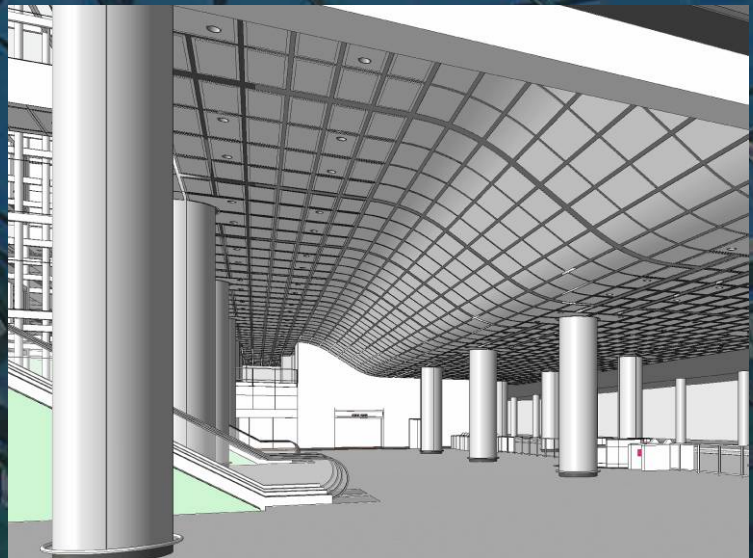
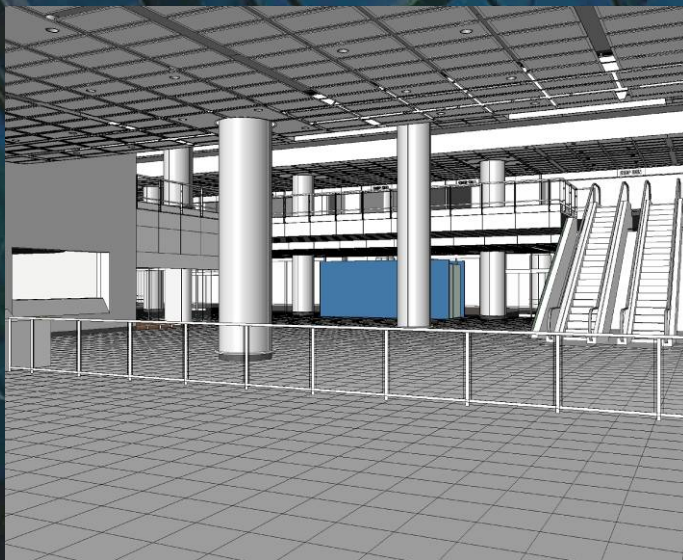
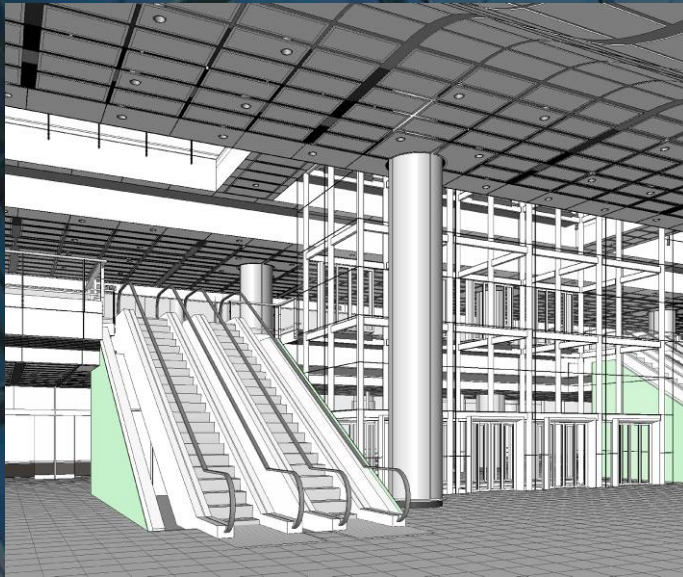
MTRC ...



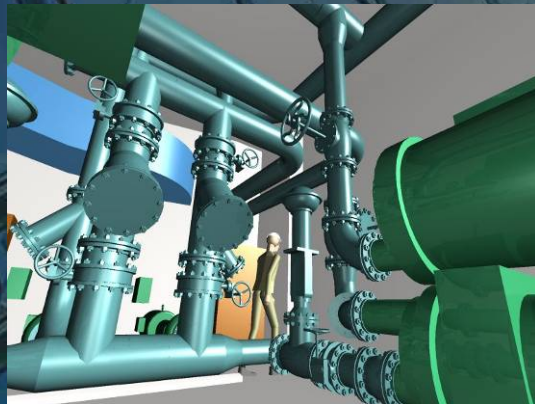
A year ago...



Early Projects...Hong Kong Station

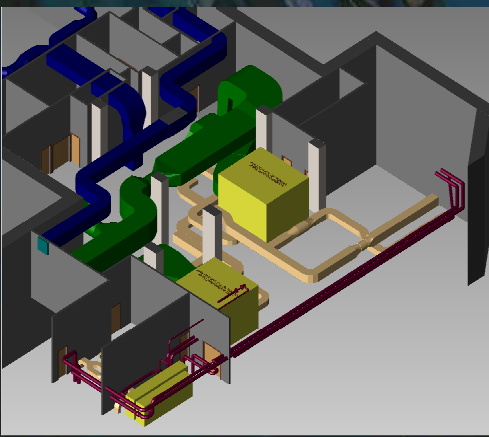
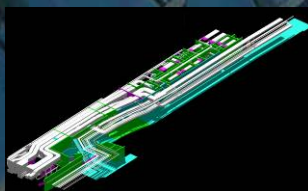
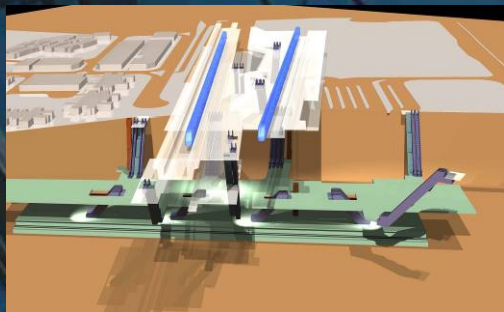


6 Months Ago



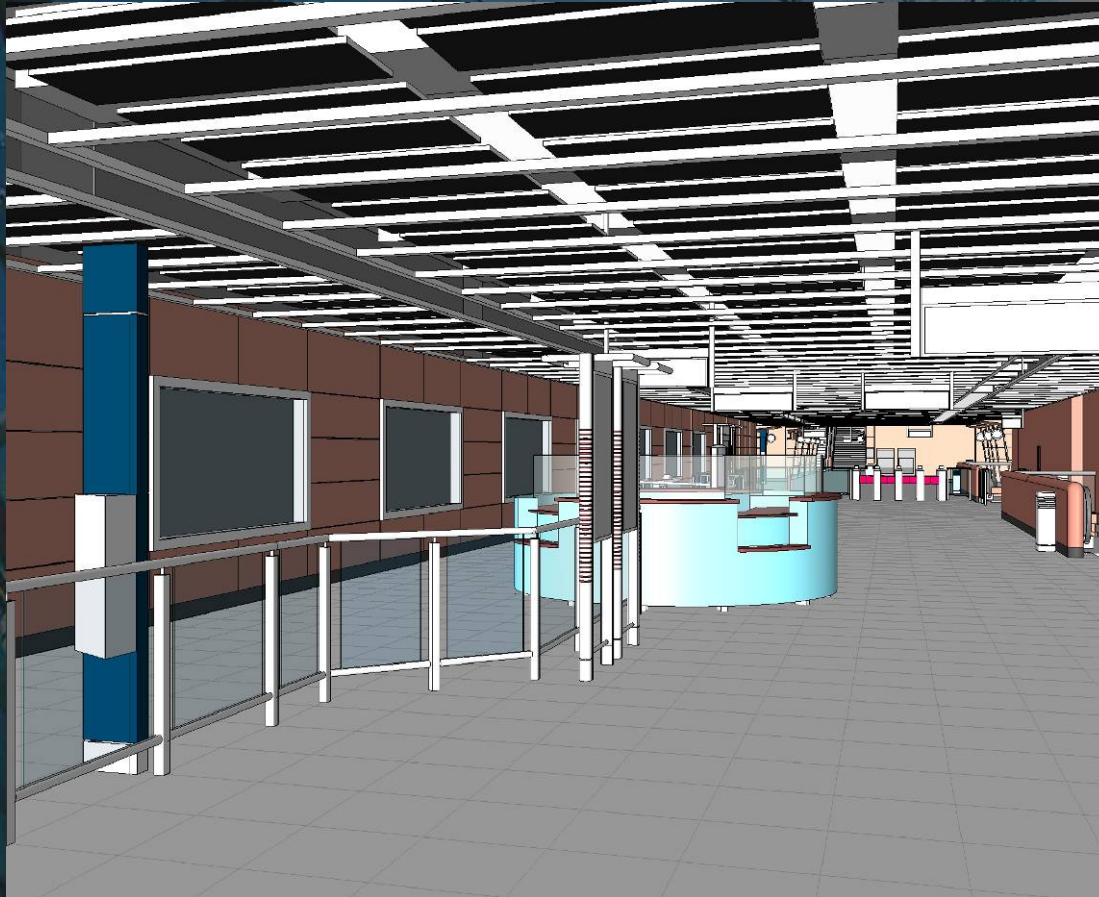
三維空間信息

- 更容易展示物體之間的關係
- 導線碰撞檢查

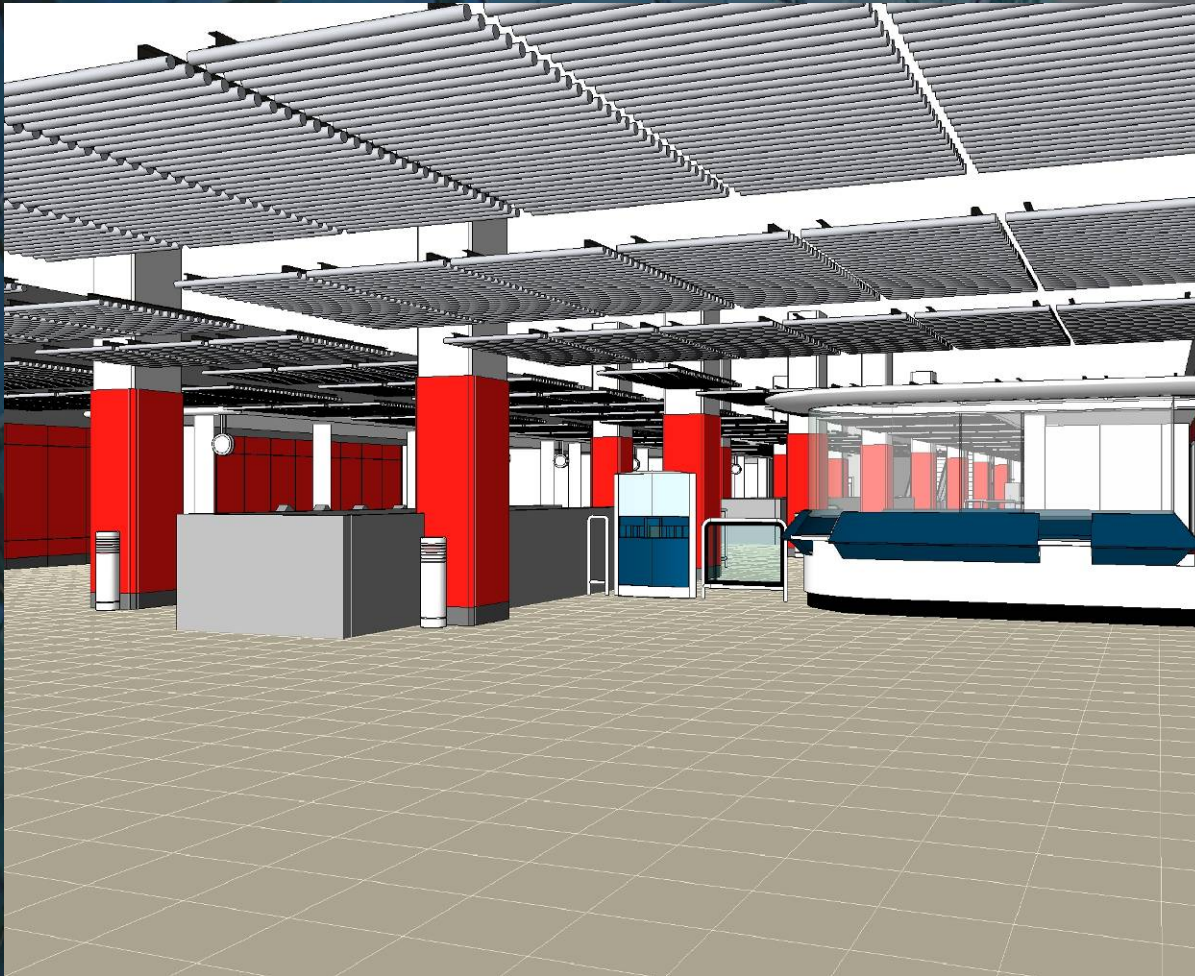


New Project...Tseung Kwan O South Station

Spatial Study
Design Checking



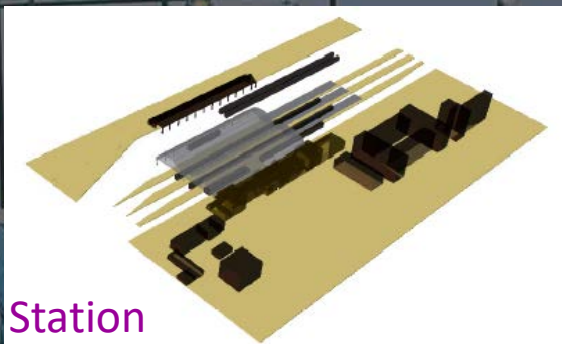
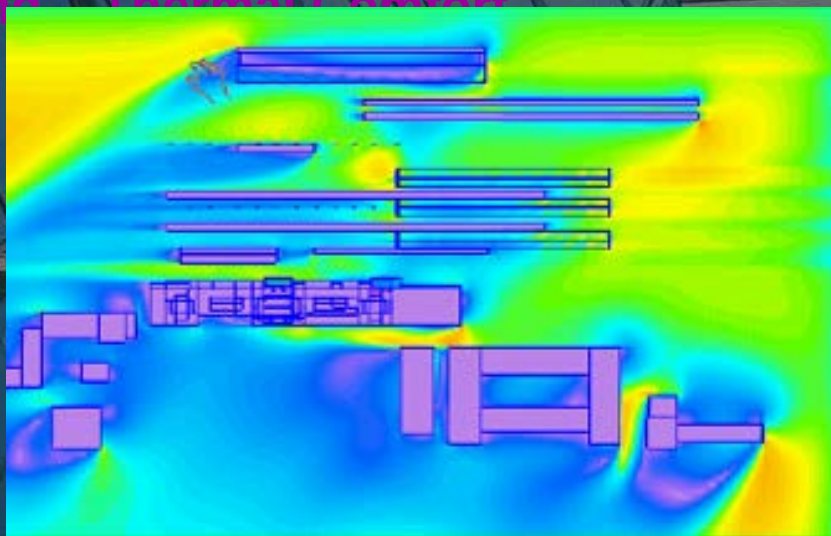
Spatial Analysis... Mong Kok Station Year 2020



Energy Saving Thermal Comfort



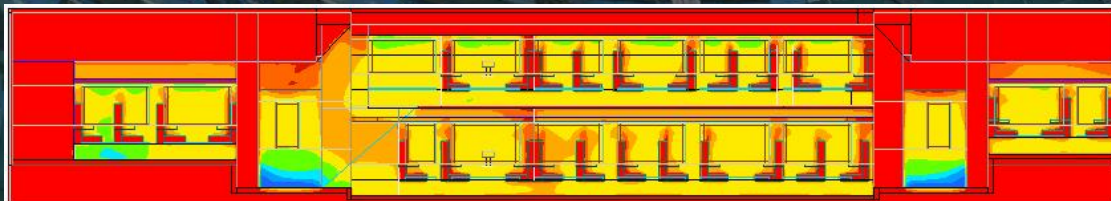
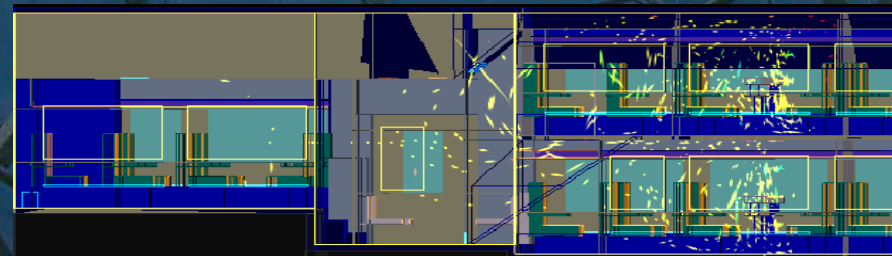
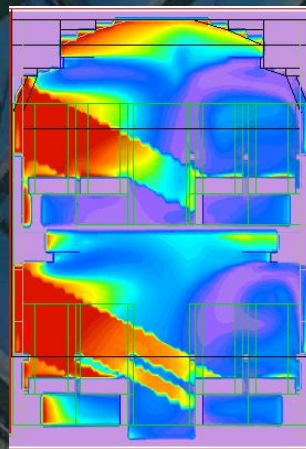
Train Driver



Station

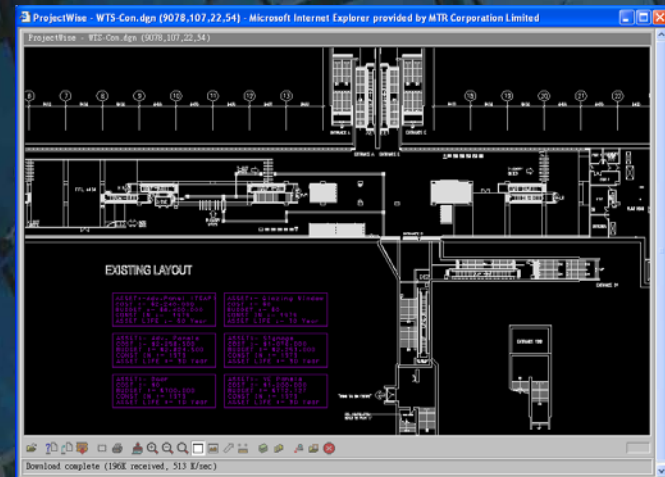
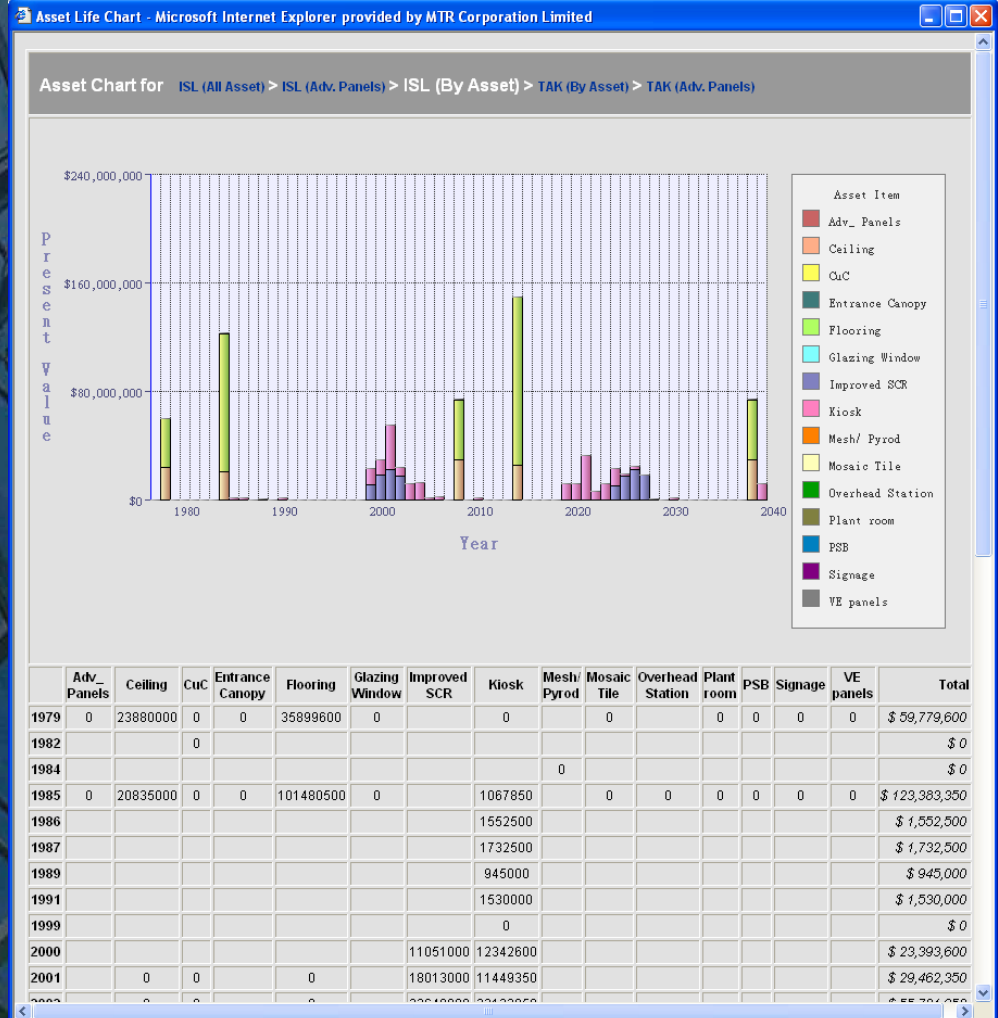


Train



Simulations Software



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MTR Tseung Kwan O Station

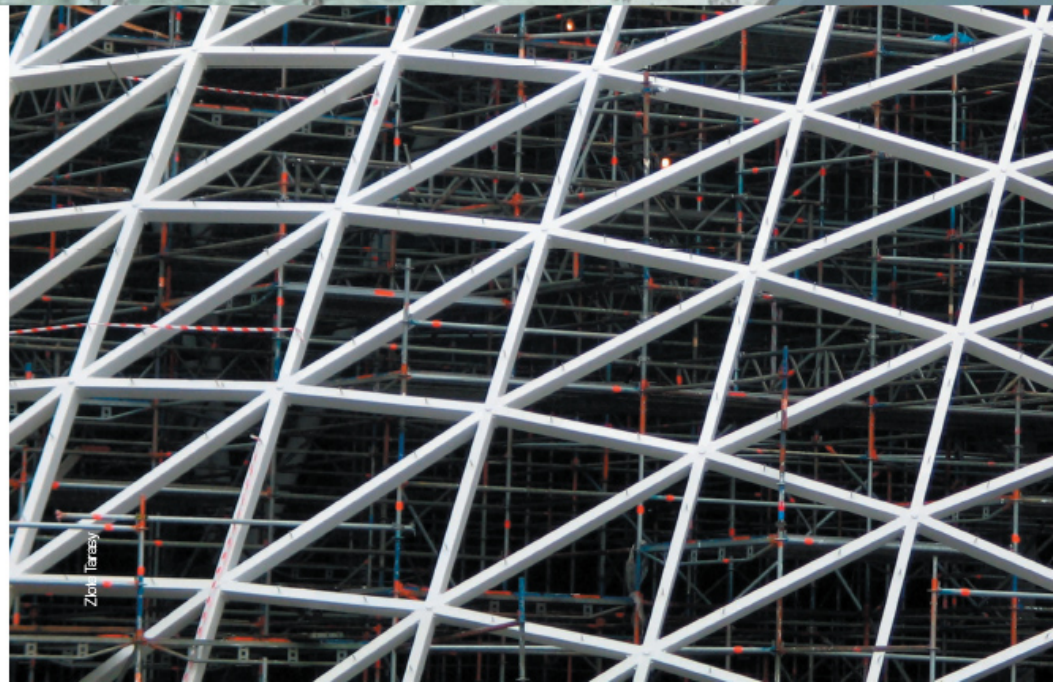
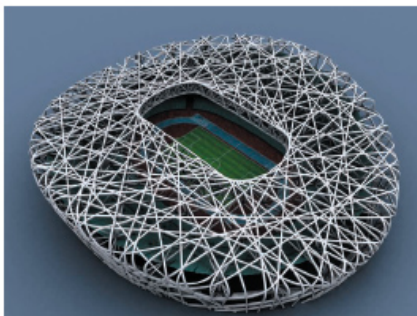
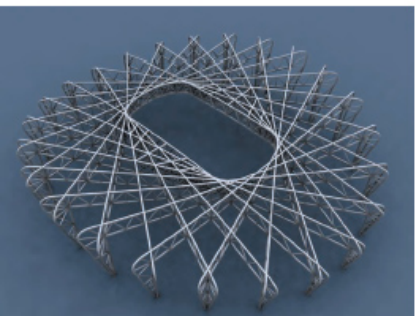
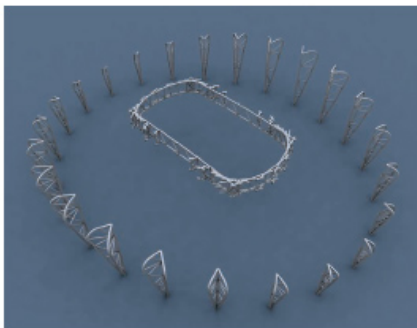
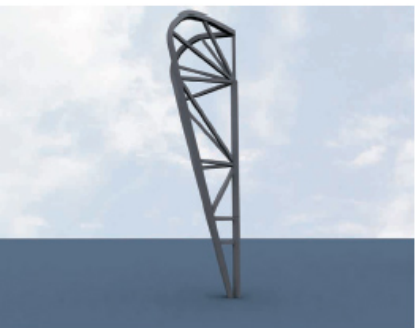
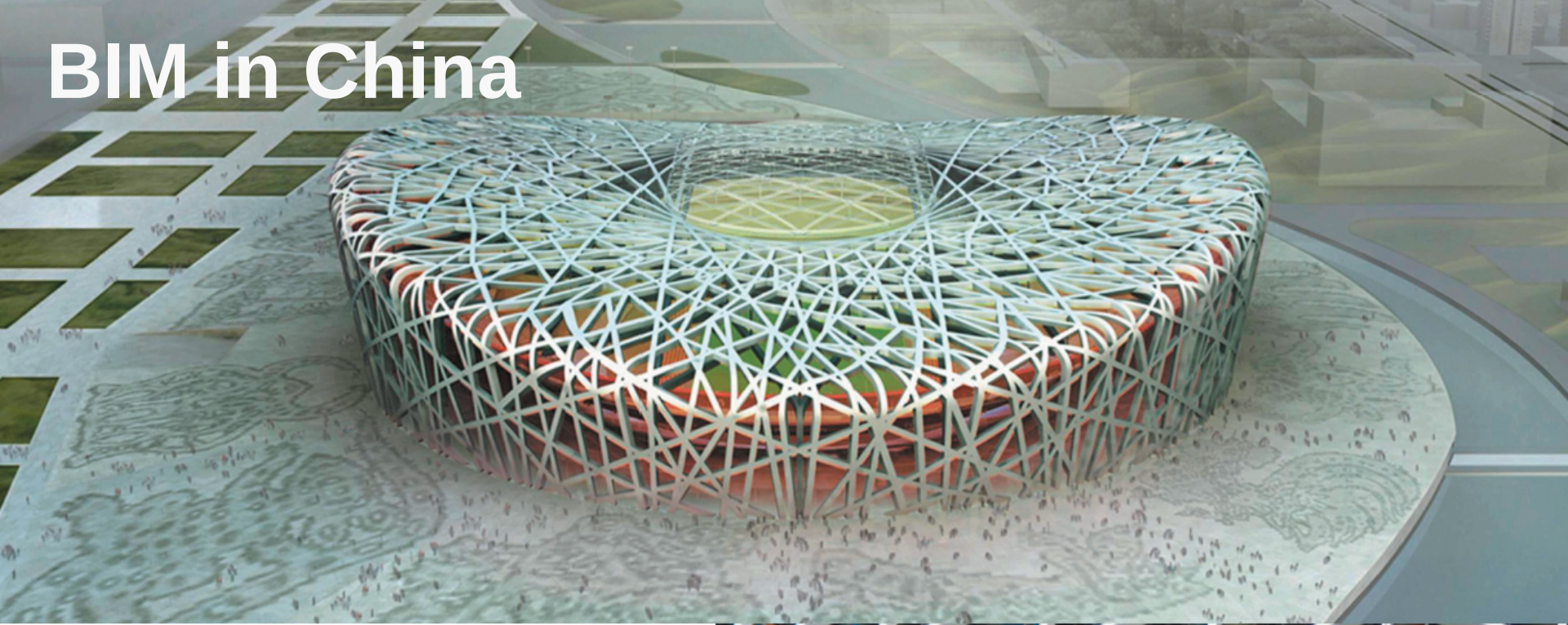


File Help

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- WallExterior_250mm_THK
- WallO_R_Track_Area_200mm
- FloorStruct_200mm_THK
- WallTrack_upstand_300mm_1
- FloorStruct_450mm_THK
- WallTrack_upstand_225mm_1
- WallTrack_upstand_250mm_1
- WallO_R_Track_Area_400mm
- WallInterior_400mm_THK
- WallInterior_200mm_THK
- TKS675_x_900_RC_Column
- TKS1400_x_900_RC_Column
- TKS1500_x_900_RC_Column
- WallExterior_400mm_THK
- TKS1200_x_900_RC_Column
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- TKS900_x_900mm
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- Floor_Finish20mm_THK_TBA
- FloorStep_Riser_20mm_THK
- WallInterior_300mm_THK
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- TKS900_x_600_RC_Column
- TKS900_x_500_RC_Column
- TKS900_x_450_RC_Column
- TKS400_x_600_RC_Column
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- TKS1200_x_1250_RC_Column

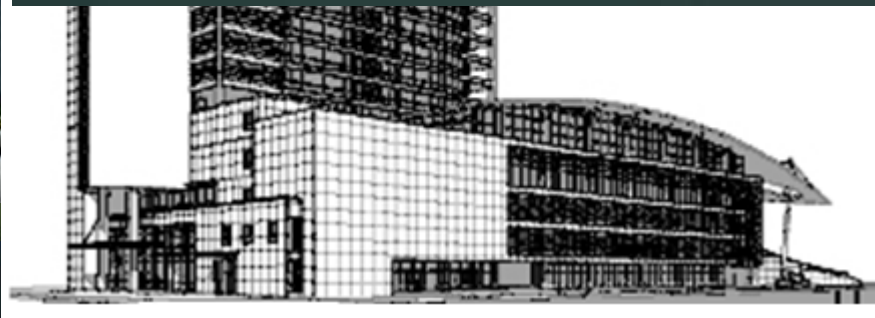
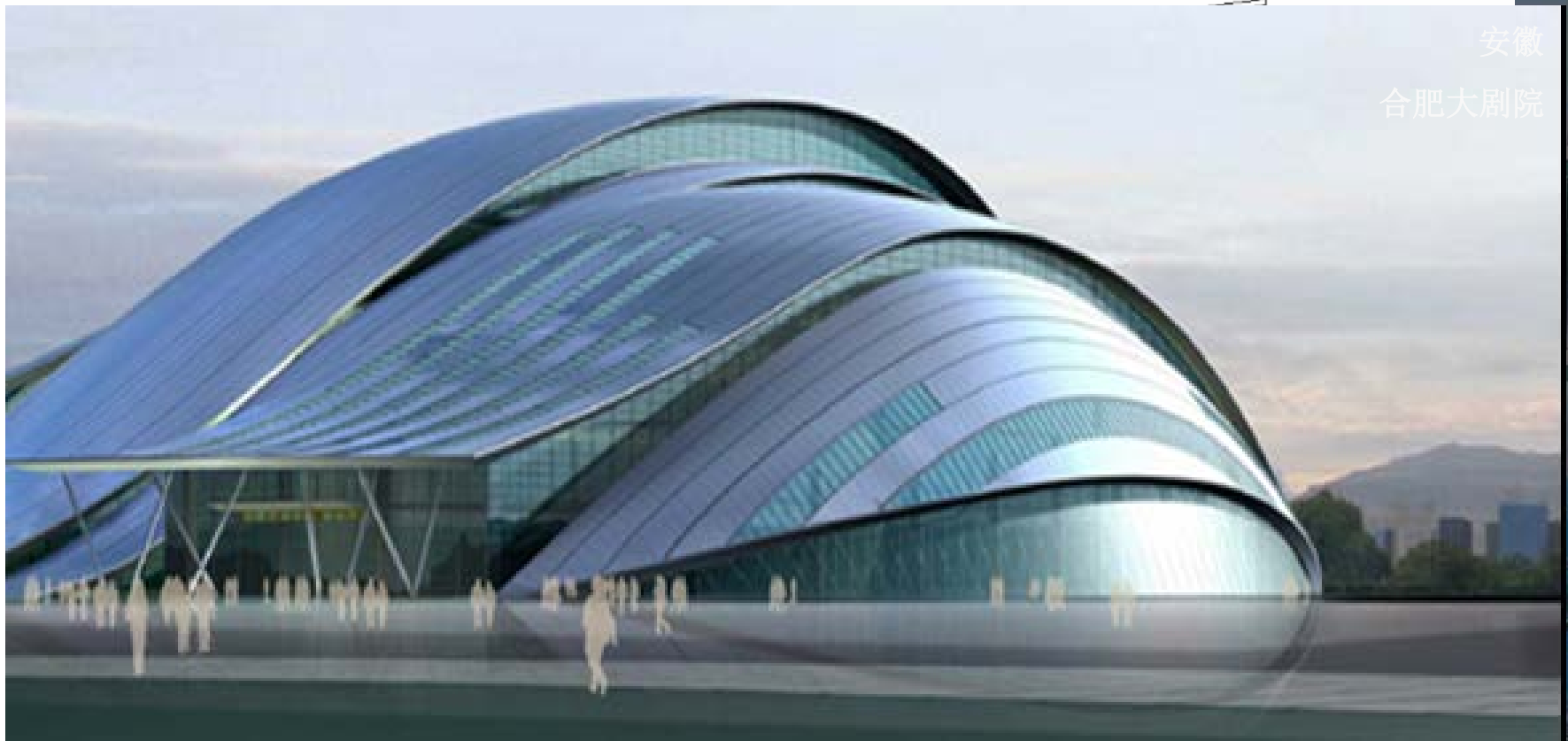


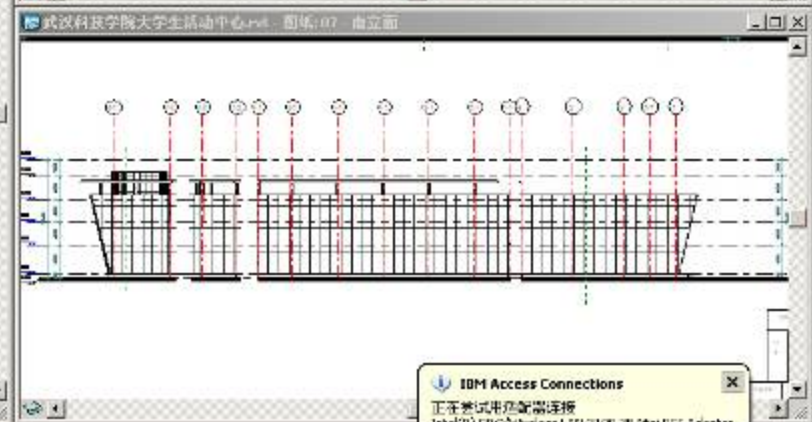
BIM in China

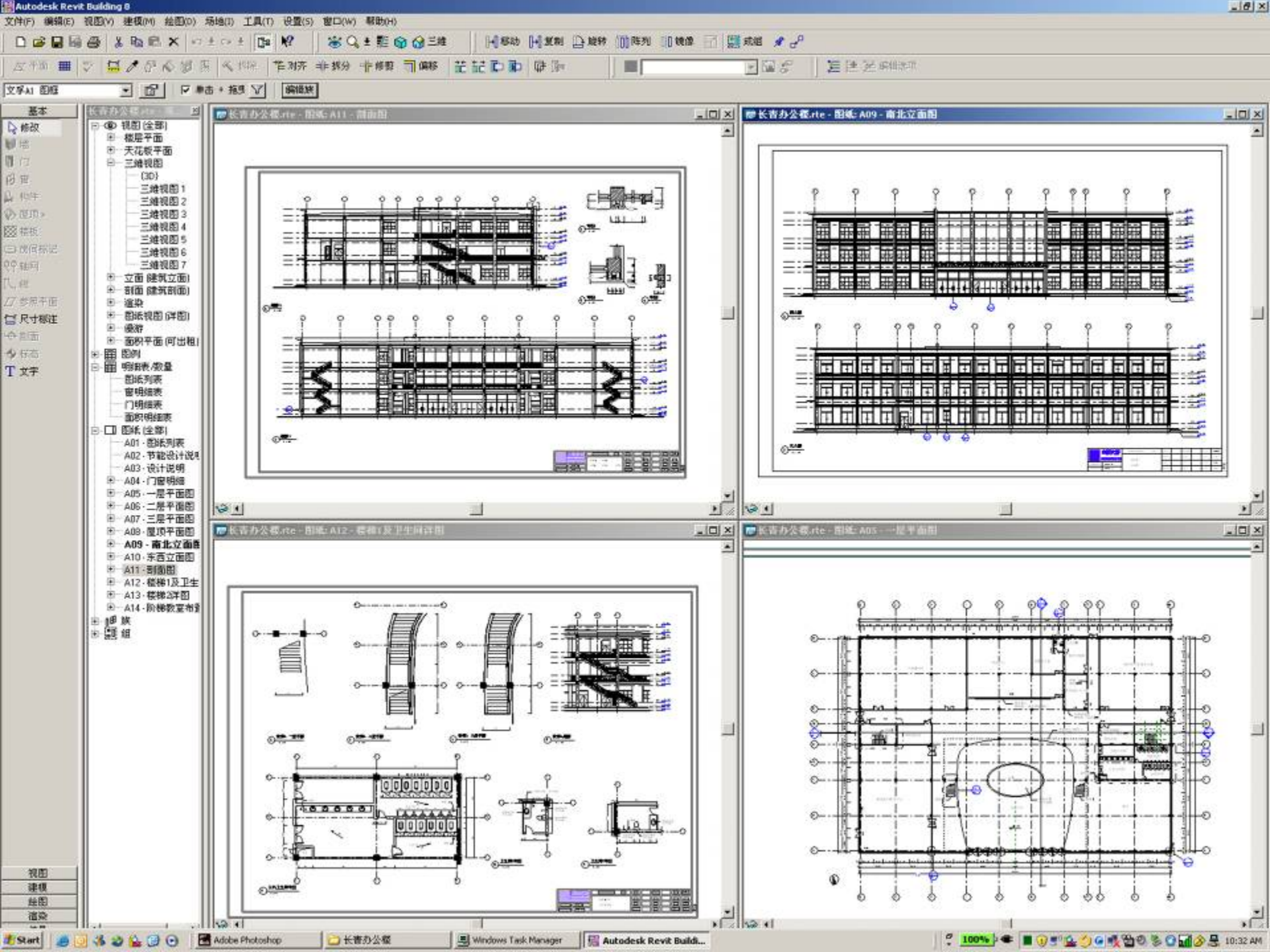


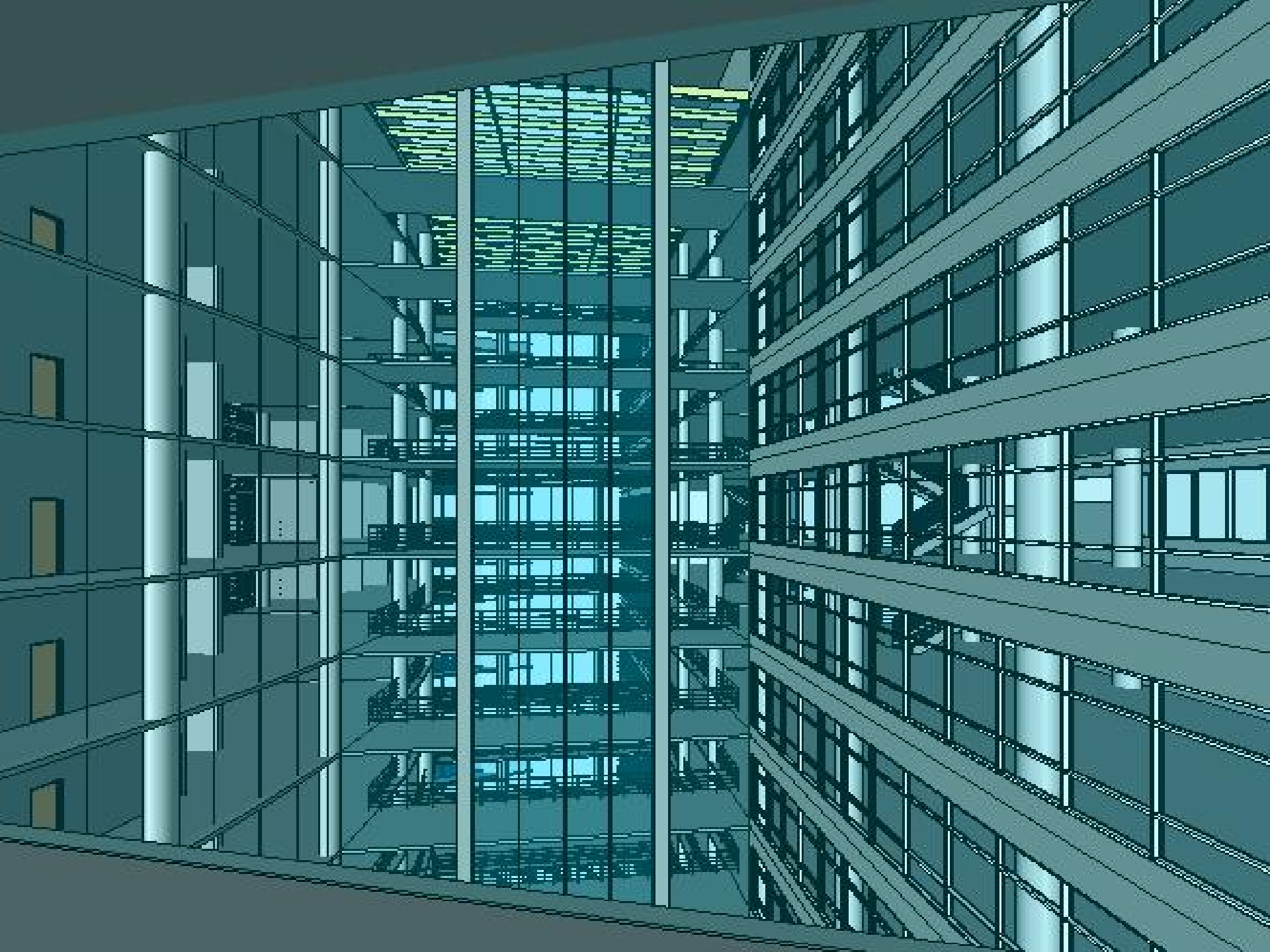
BIM in China

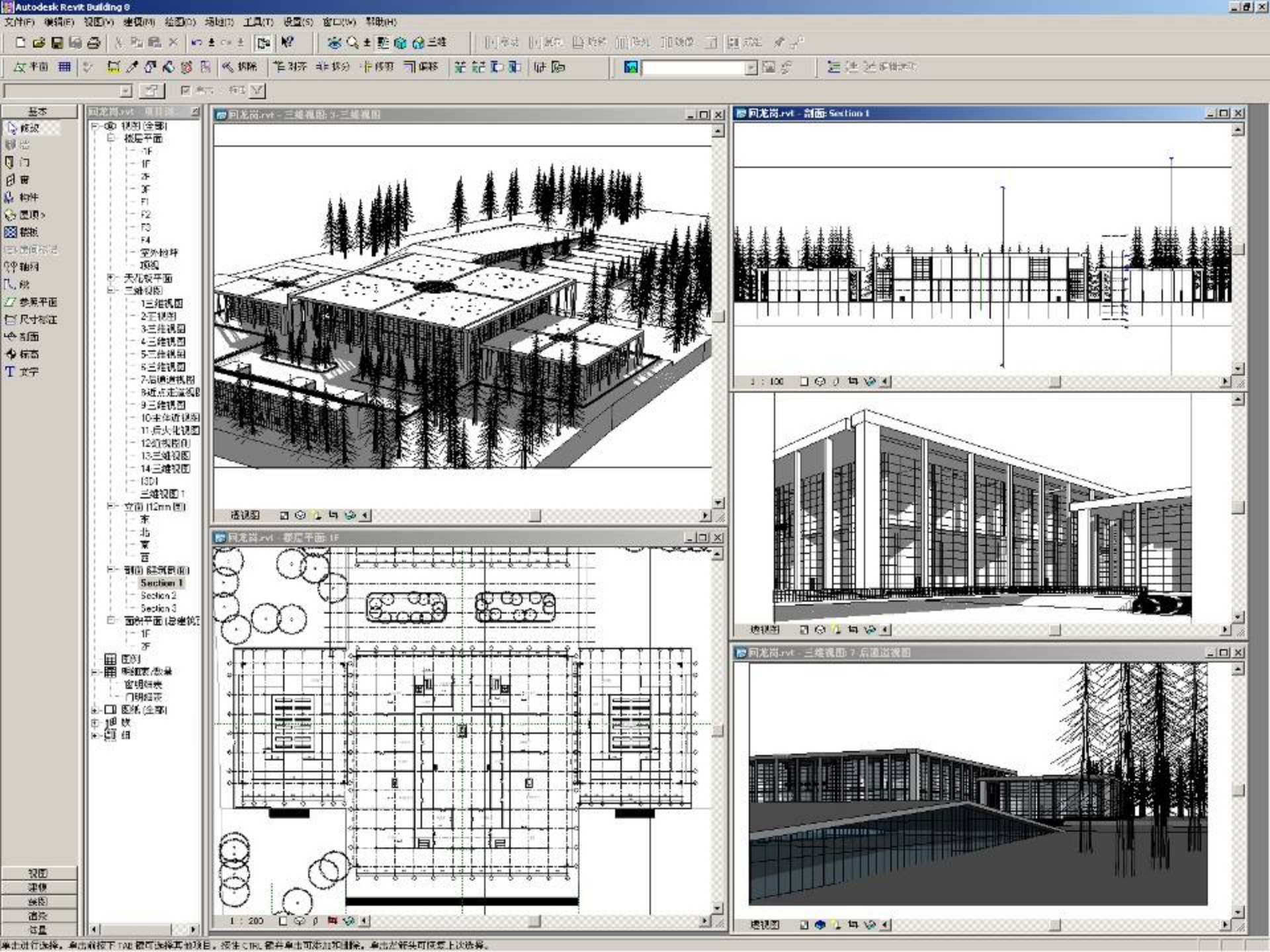
安徽
合肥大剧院

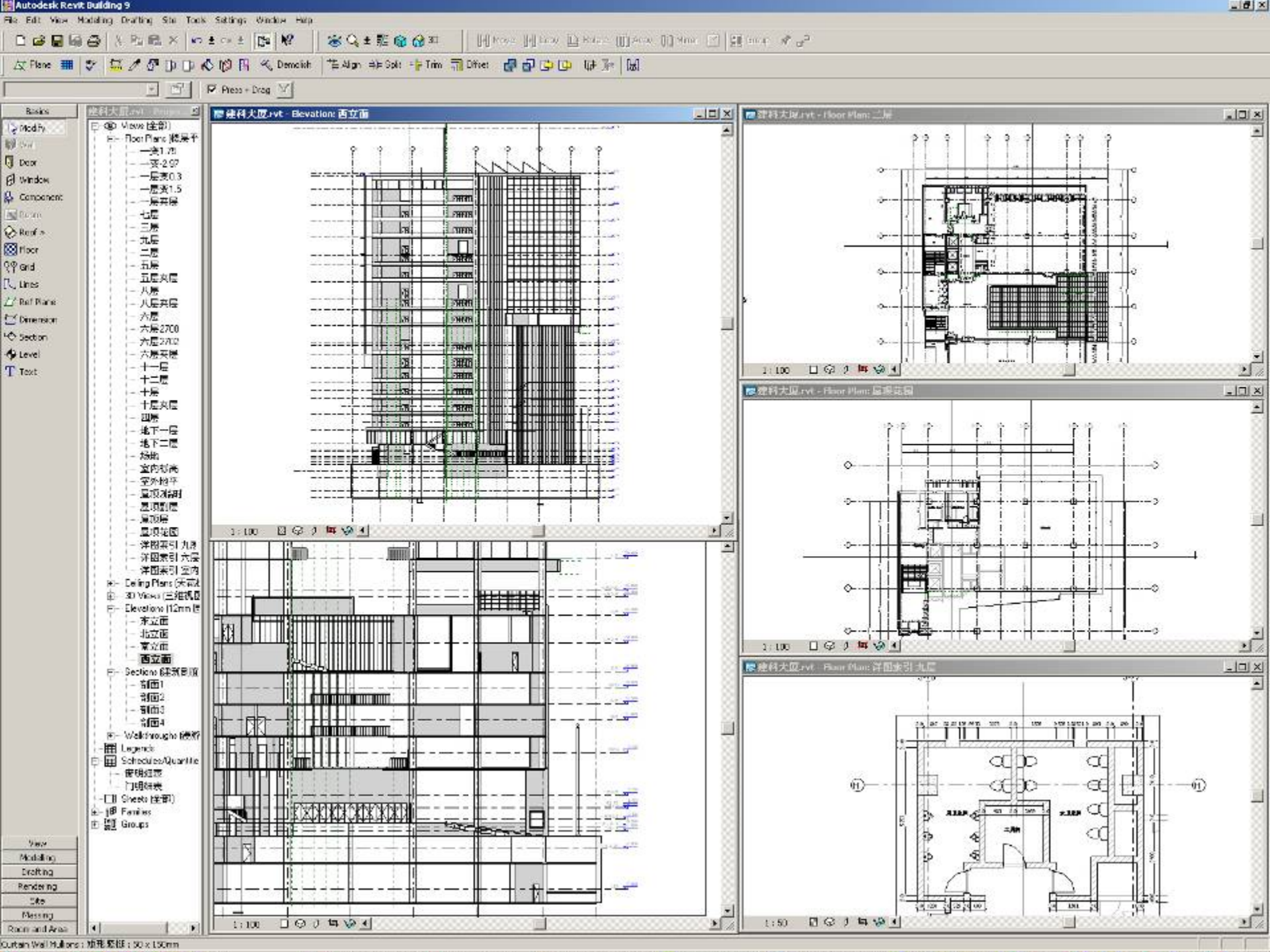


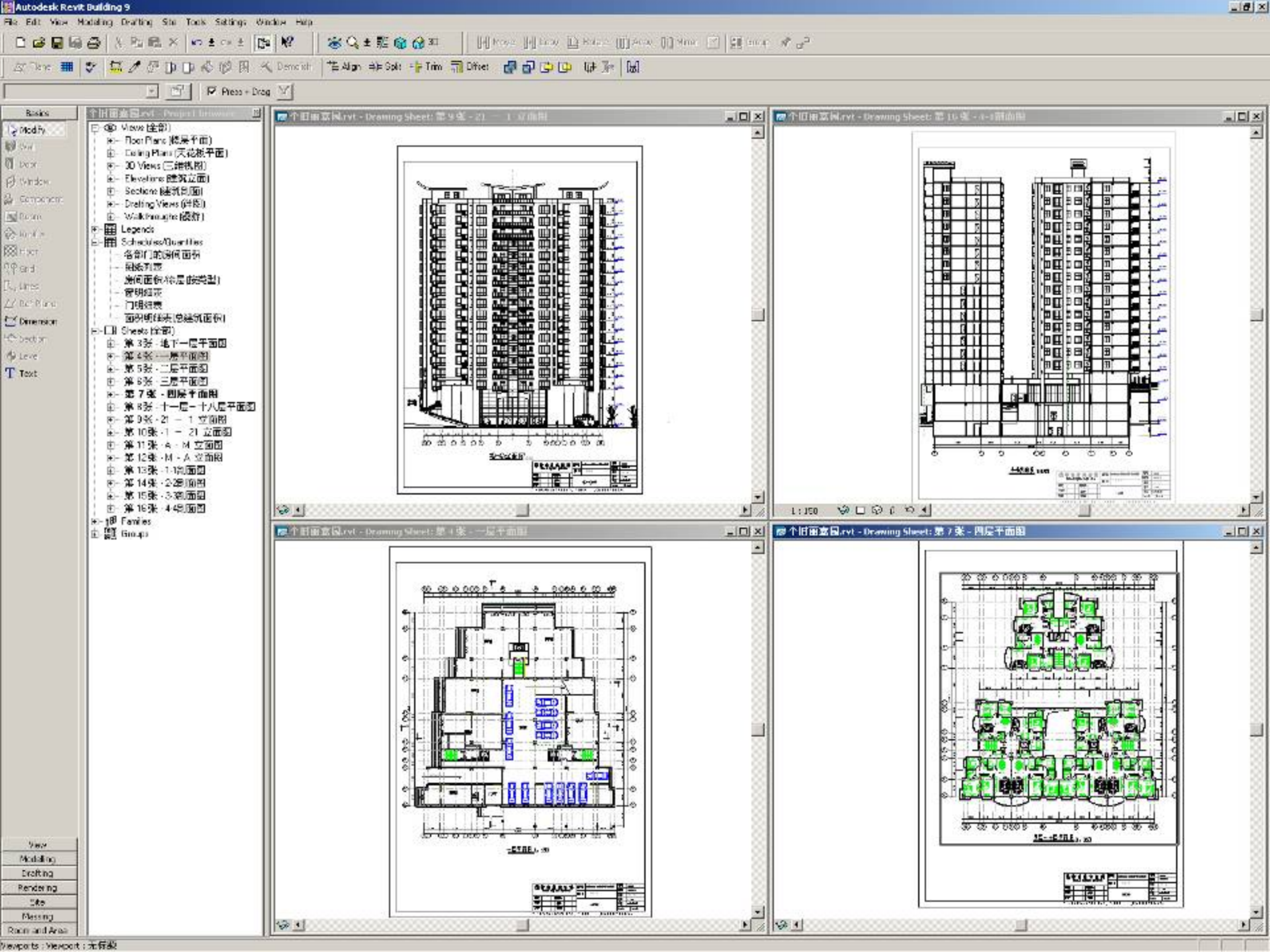


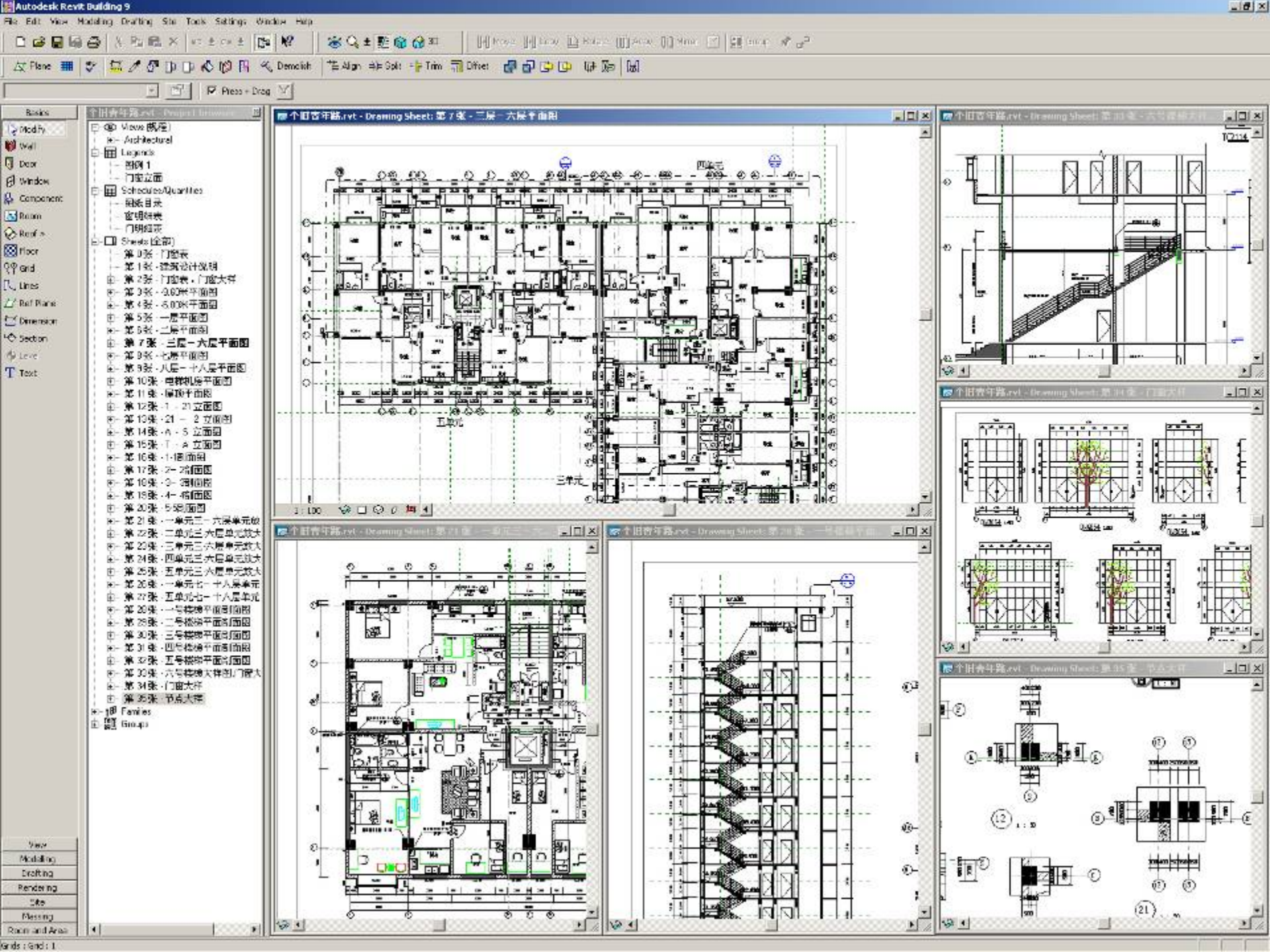


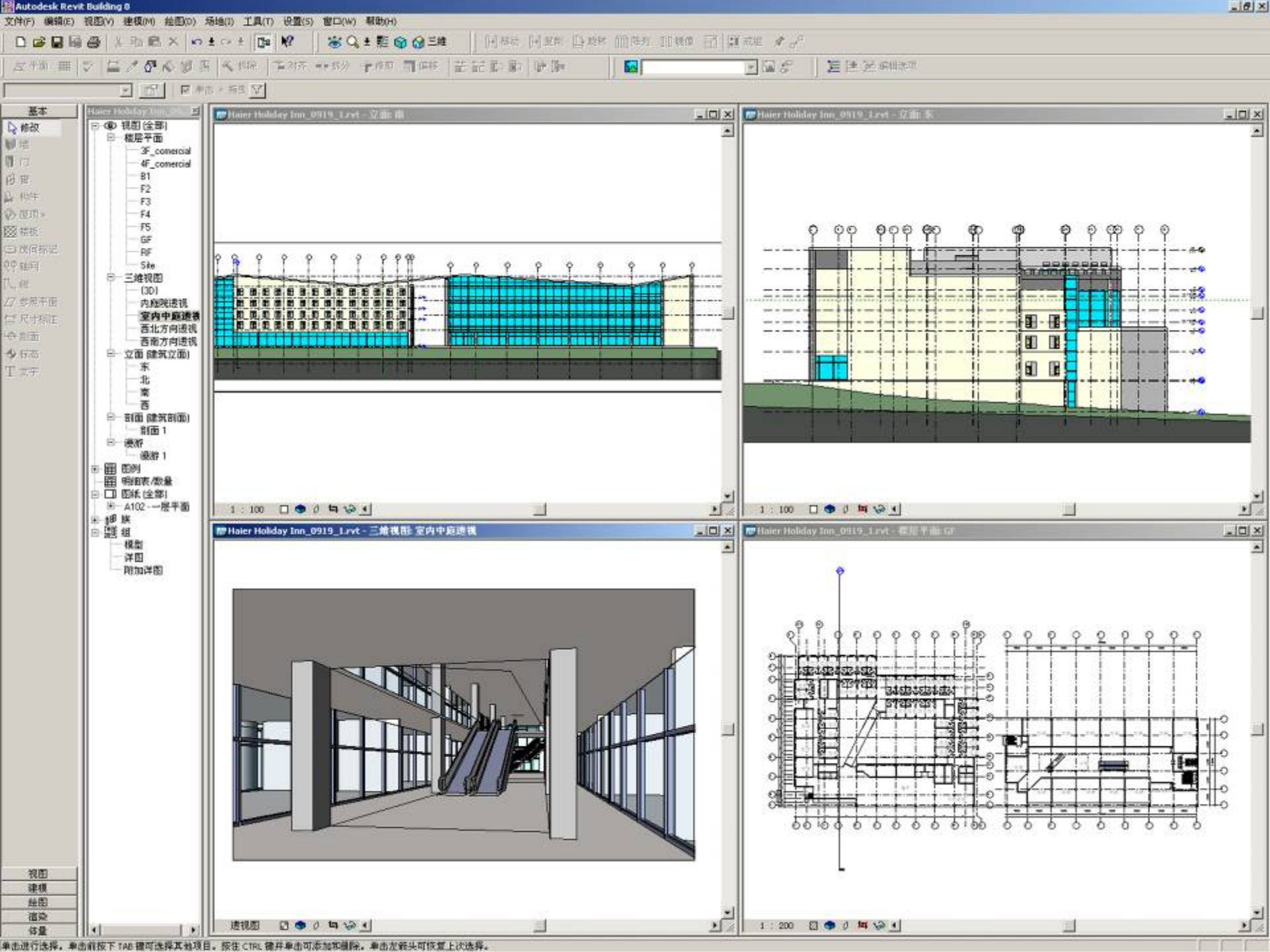




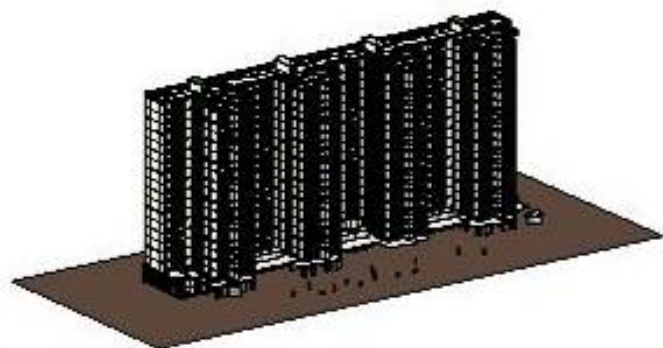
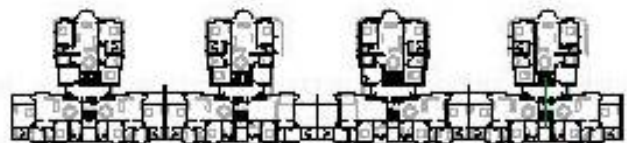








广东省建筑设计研究院 建筑师：郑凯帆



1 : 100



1 : 100

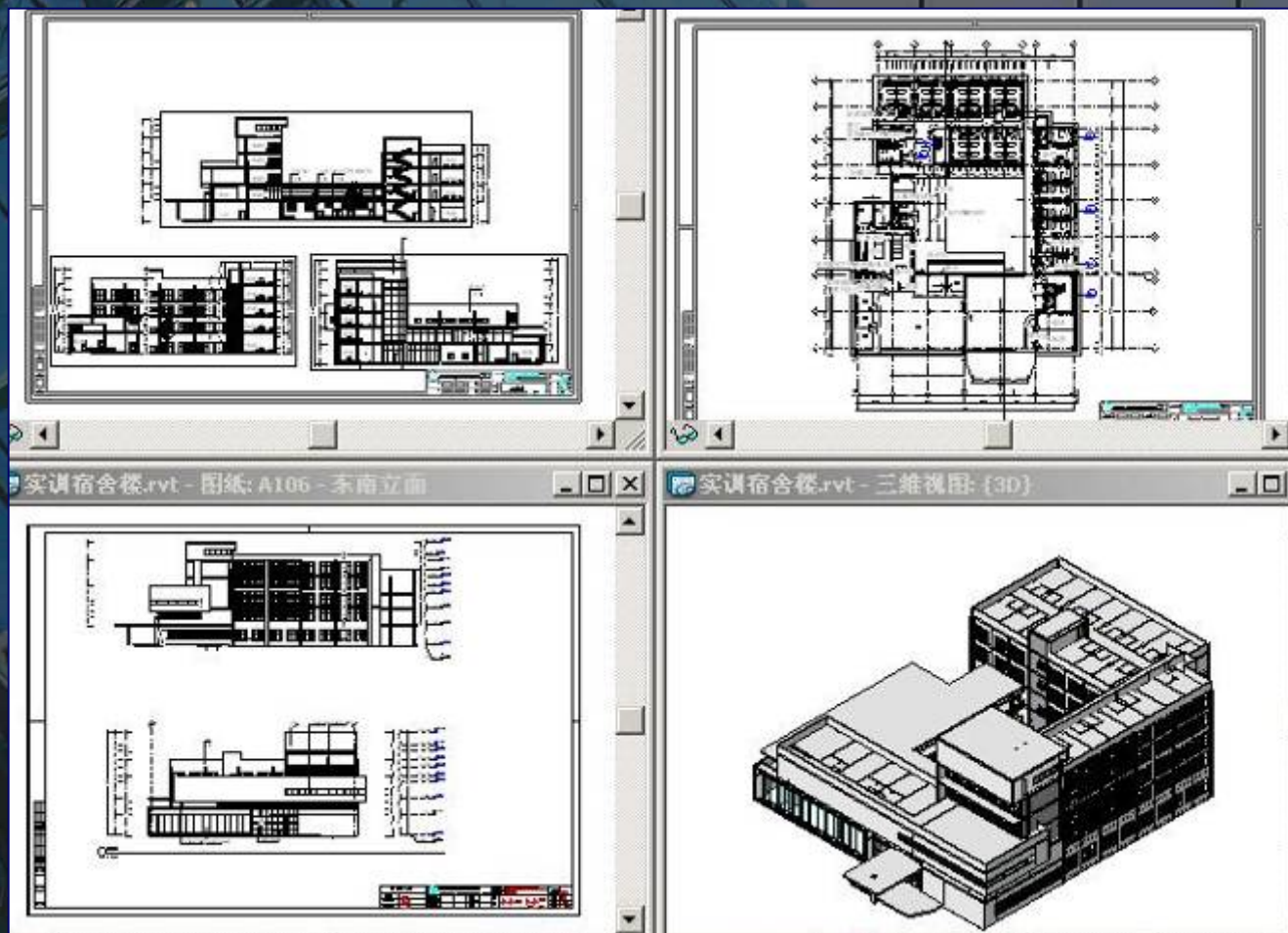


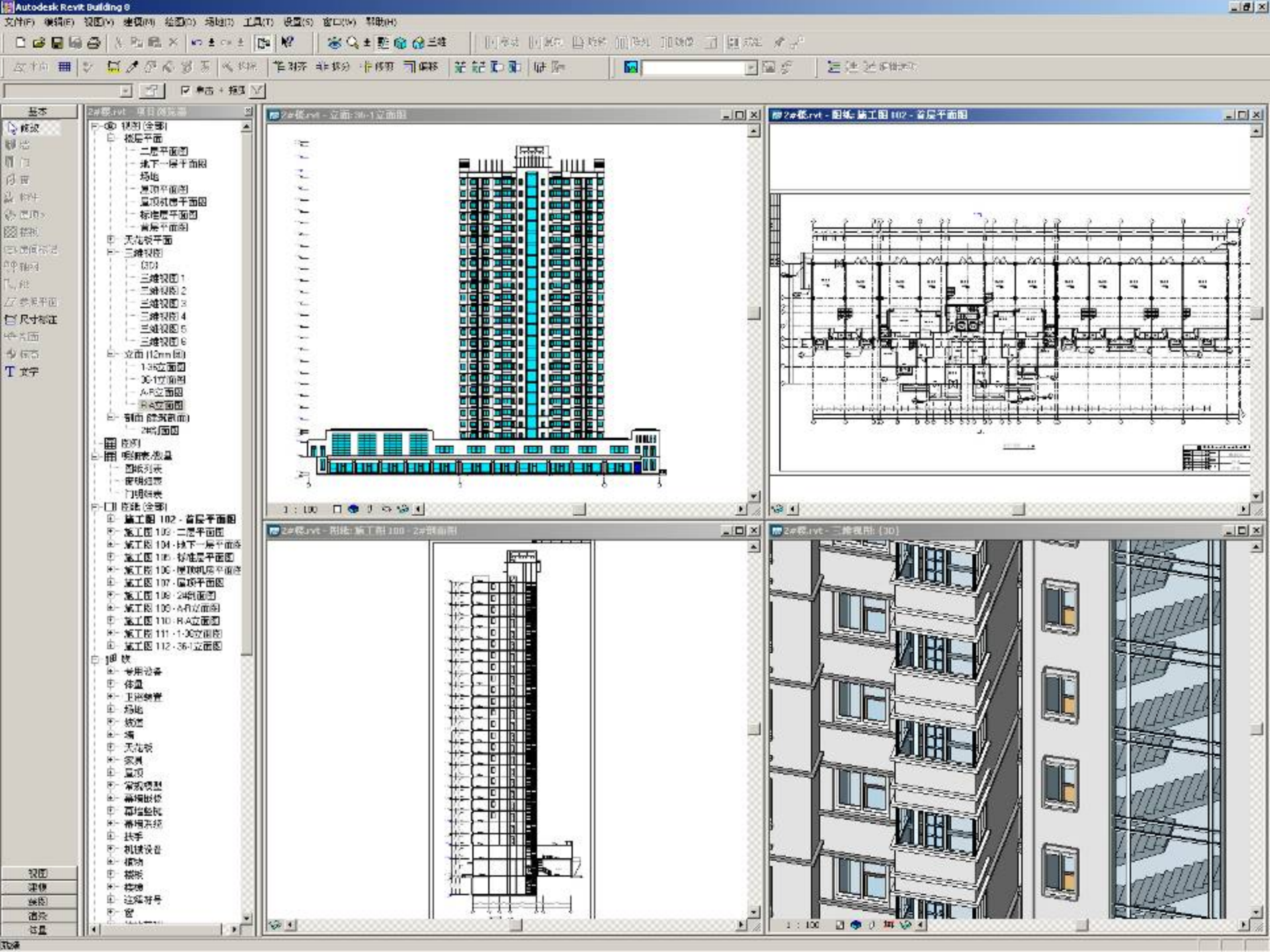
合富广场.rvt - 立面: 北立面

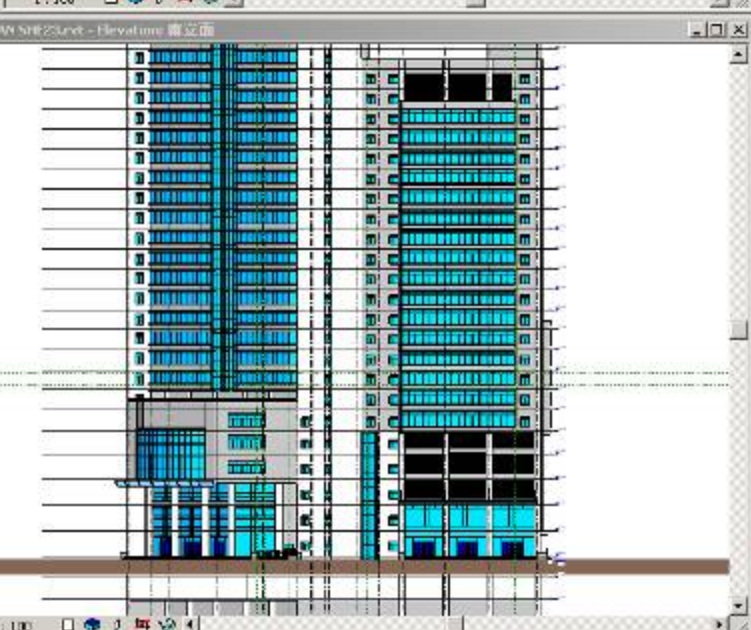
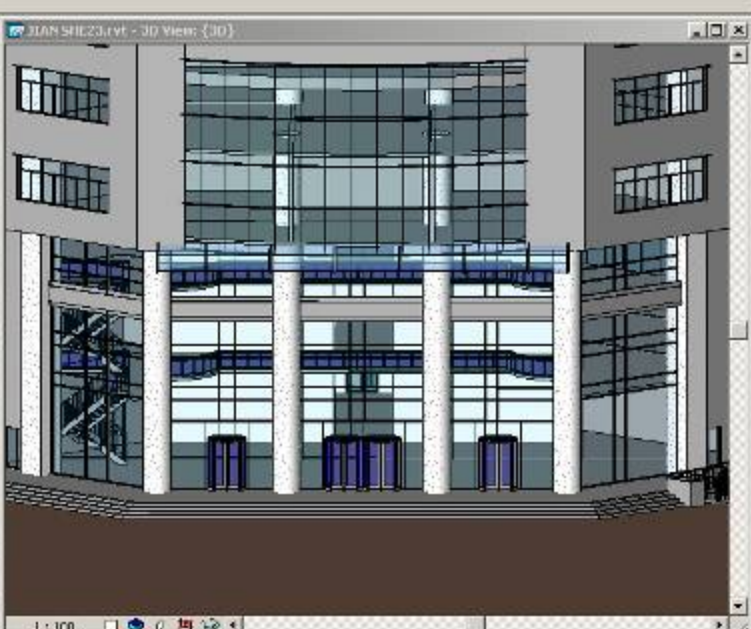
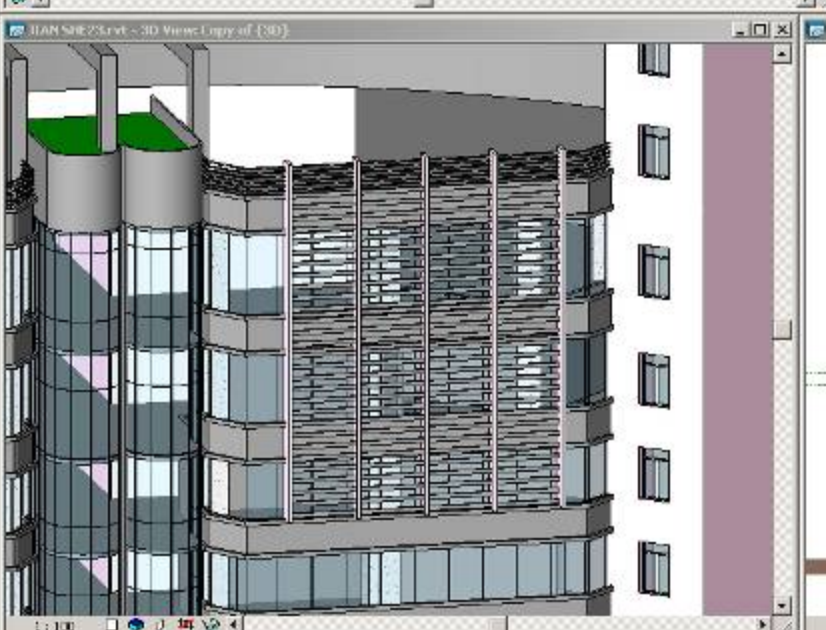
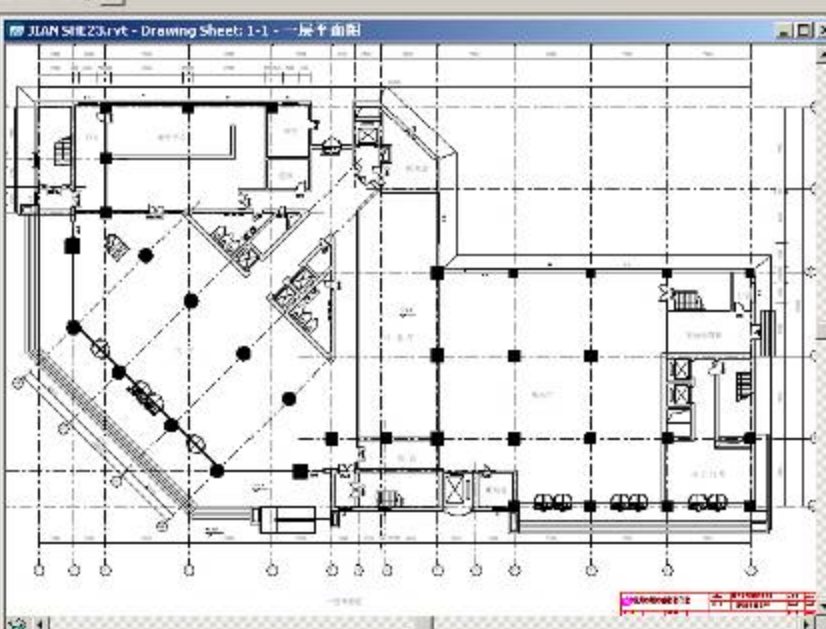
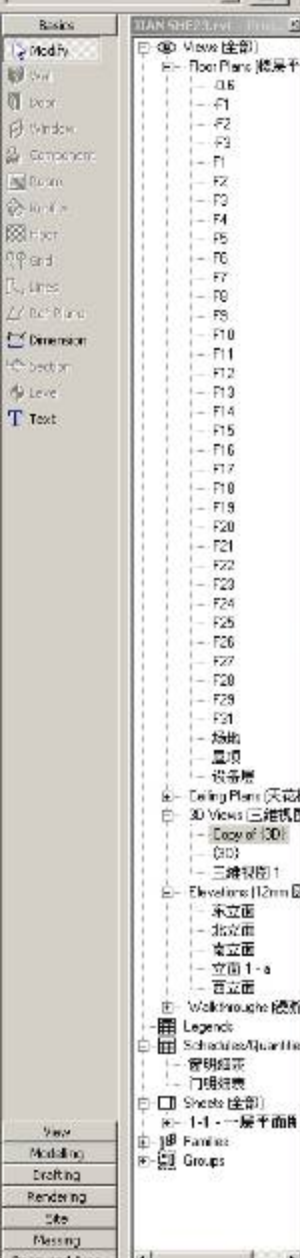
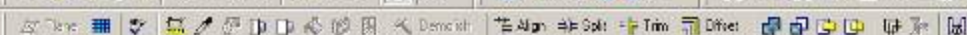


盛邦（上海）咨询有限公司成都分公司 建筑师：许燕

- 中国民航飞行学院模拟机训练中心







"GIS is the inevitable language of the future." -- Jack Dangermond

SOM To Buy 100 Copies of Gehry Technologies' Digital Project

Posted on Wednesday, December 13, 2006 9:03 PM

Skidmore, Owings & Merrill (SOM), one of the world's best known architecture firms, will purchase 100 copies of Digital Project, the parametric BIM software from Gehry Technology. The sales is the largest single deal since Gehry Partners launched the software development venture in 2002.

The purchases will be deployed over a three-year period in SOM offices worldwide. The acquisition is being considered an addition to SOM's technology portfolio, not a displacement of any other software system.

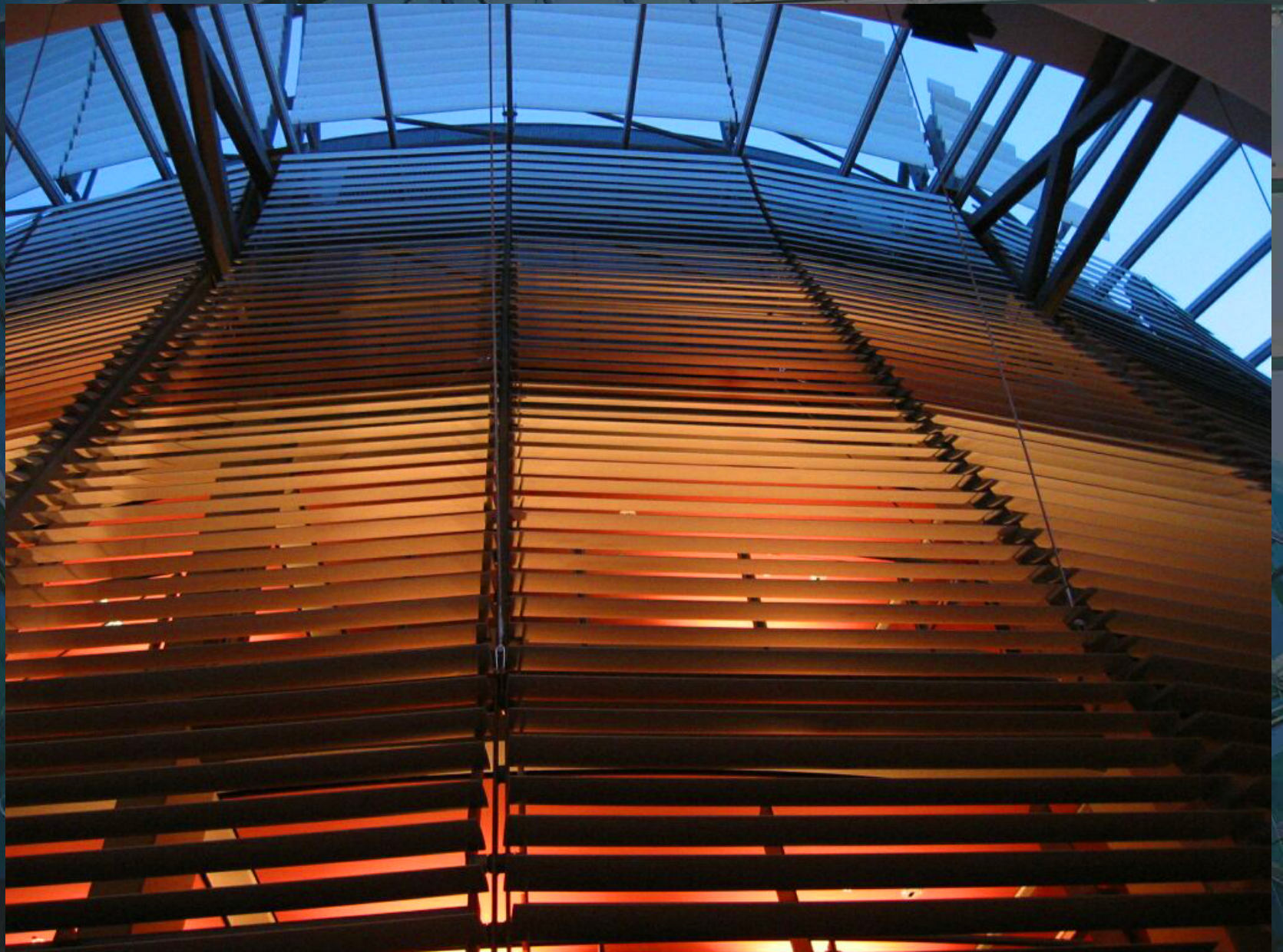
Digital Project has been used by boutique architectural firms on several high-profile projects, and has found some acceptance among large construction firms who find value in developing their own project model. But despite the cachet of coming from the offices of noted architect Frank Gehry, the software has been slow to develop a following.

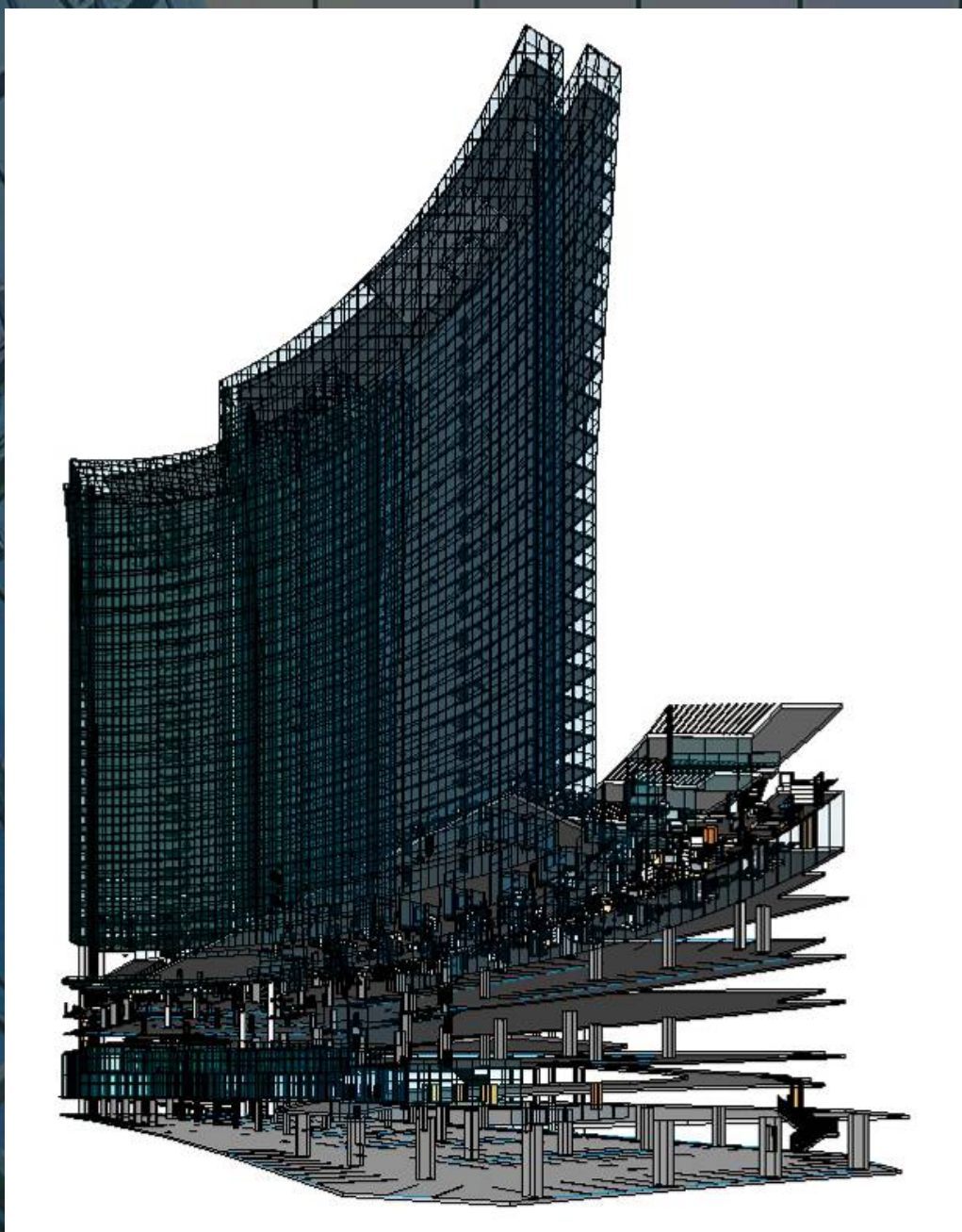
SOM will use Digital Project on a wide variety of design projects throughout its offices in New York, Chicago, San Francisco, and London, says Darren Rizza, SOM's Firmwide Director of Digital Design. "Digital Project will provide us with a powerful design technology, augmenting our overall vision of the digital design process, and maintaining SOM's position as an industry leader and innovator in design and construction. "

Gehry Technologies will provide consulting services and support to SOM during the three-year implementation, to include services for training, implementation, and advanced modeling. "We are delighted to have been selected by SOM to provide advanced software and support services to their design teams, " commented Dr. Dennis Sheldon, CTO of Gehry Technologies, "SOM has long been a leader in the use of CAD and Building Information Modeling (BIM), and this acquisition will enable them to remain at the forefront for many years to come. "

Digital Project is a customized version of CATIA, the 3D parametric CAD software from Dassault Systèmes. It is primarily used by aerospace and automotive firms.

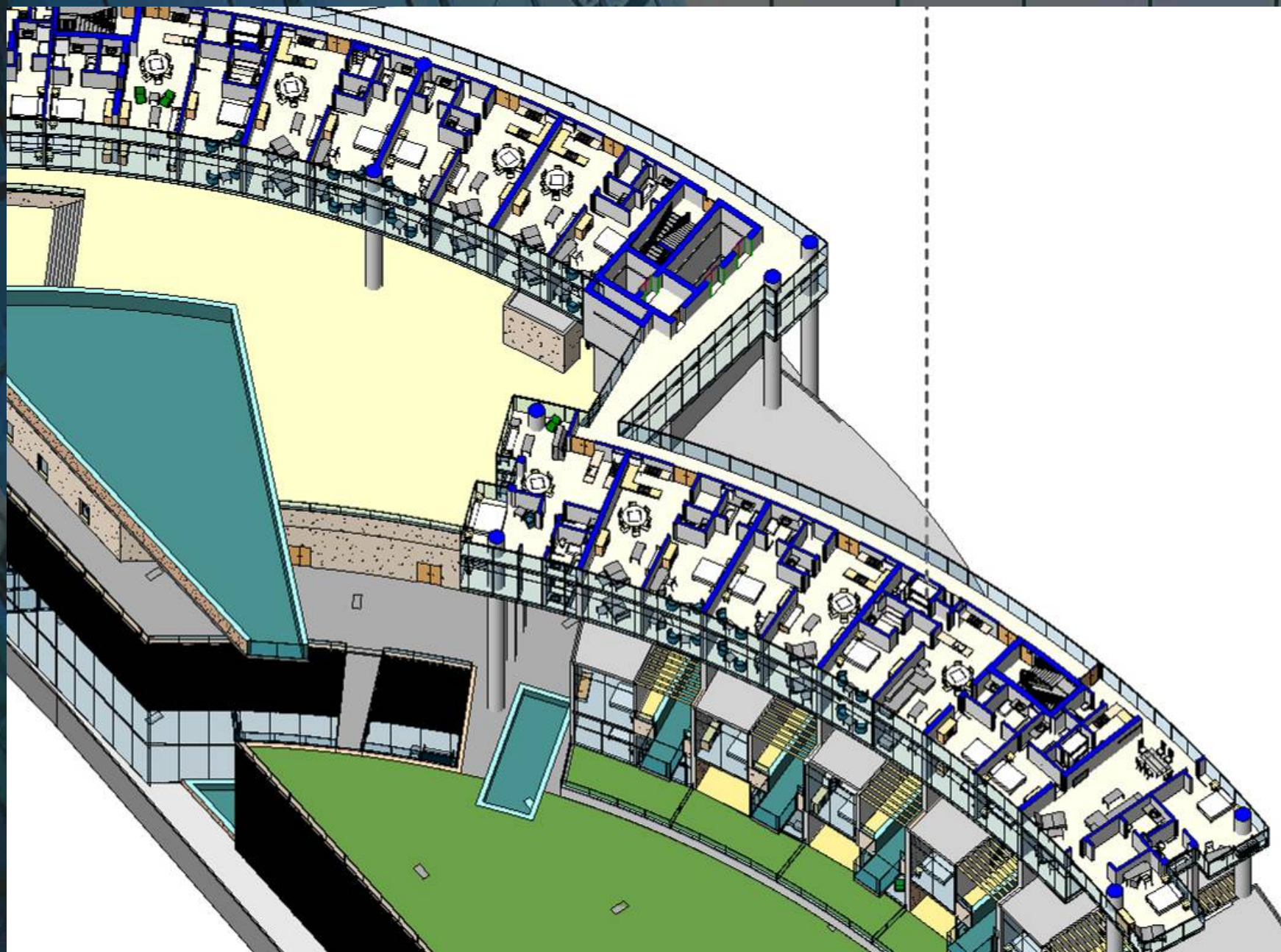
--RSN





中東酒店項目

HORIZONTAL REPETITION / MODULARIZATION

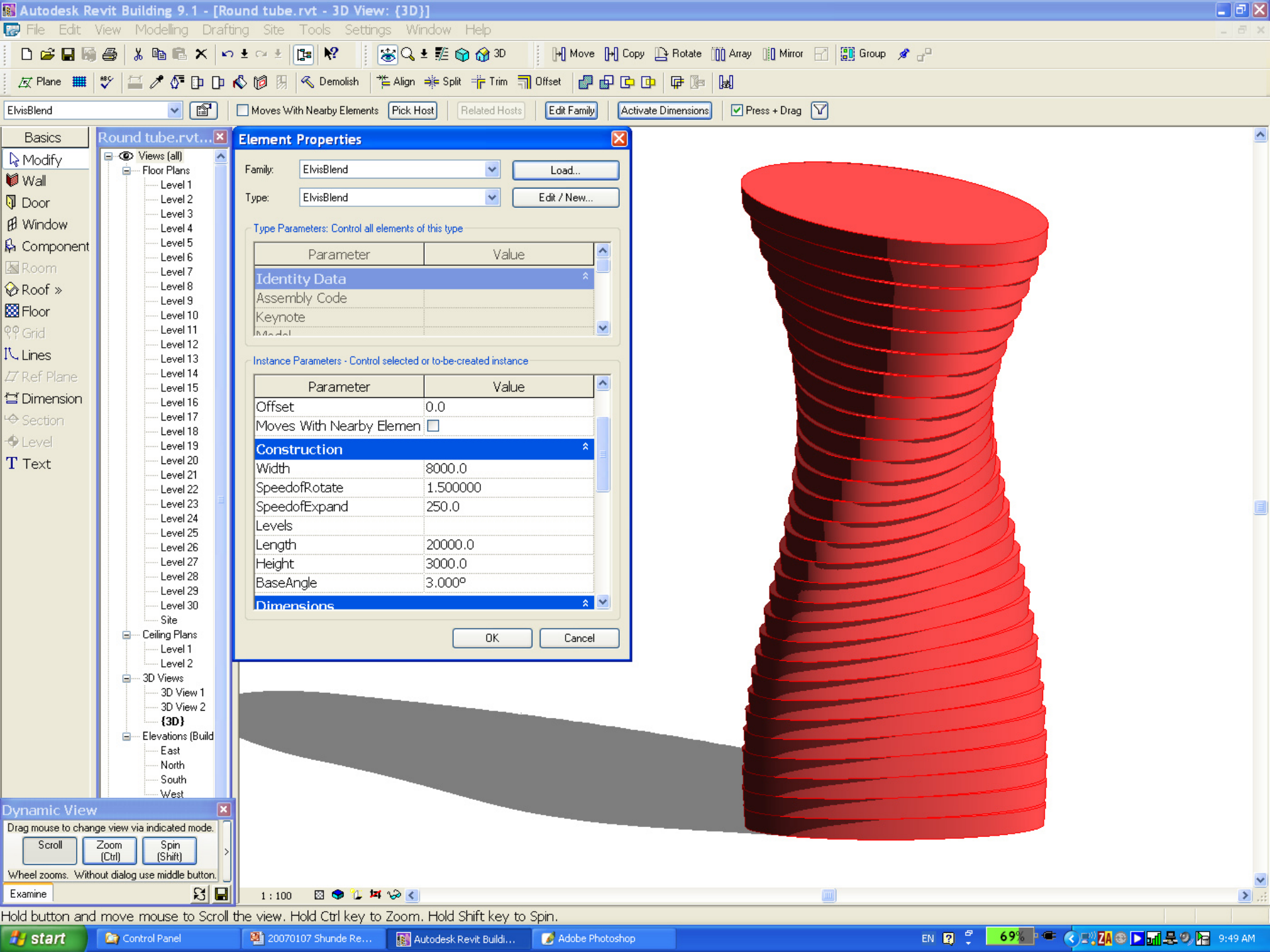
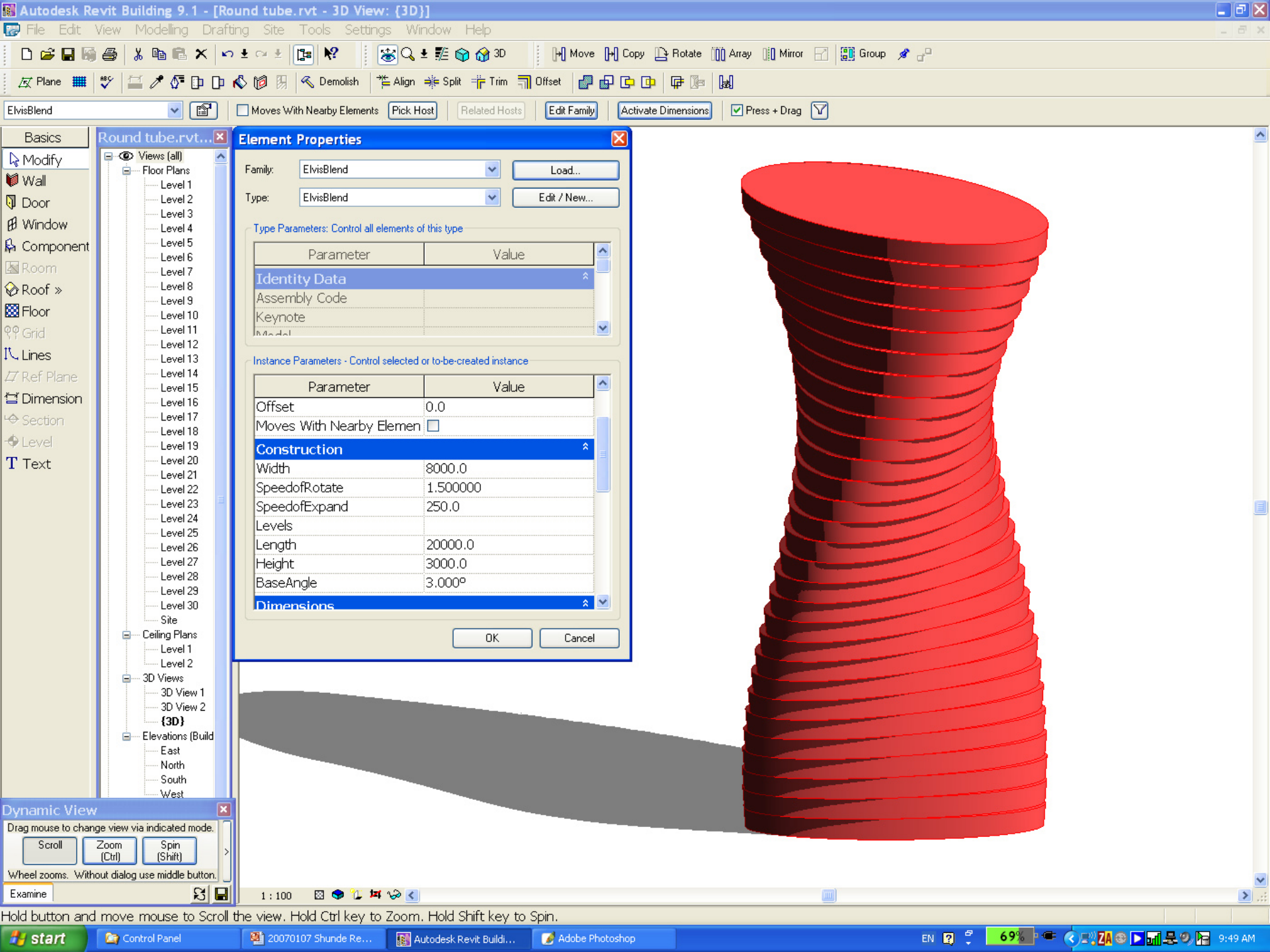


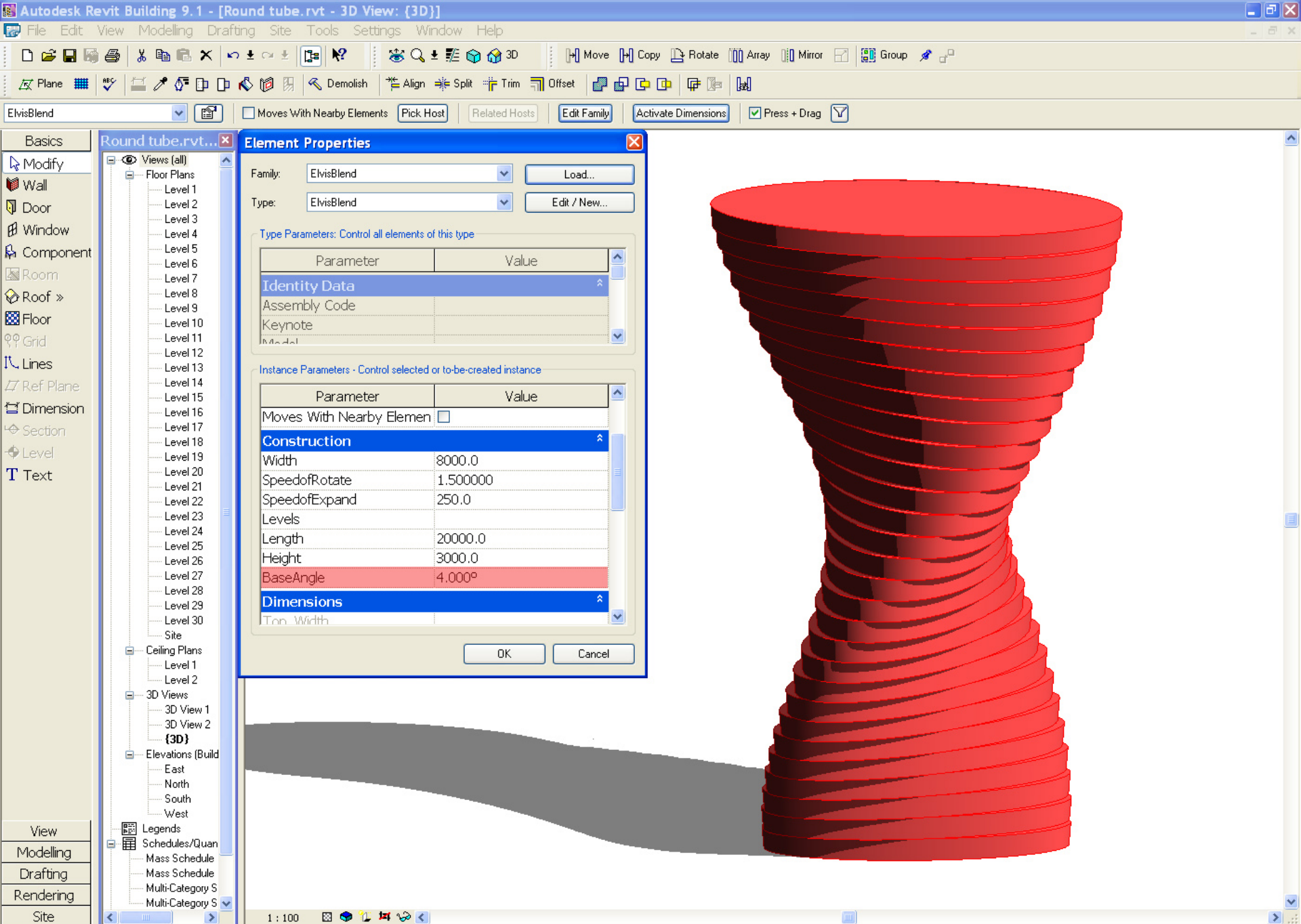
中東酒店項目

MODULAR DESIGN

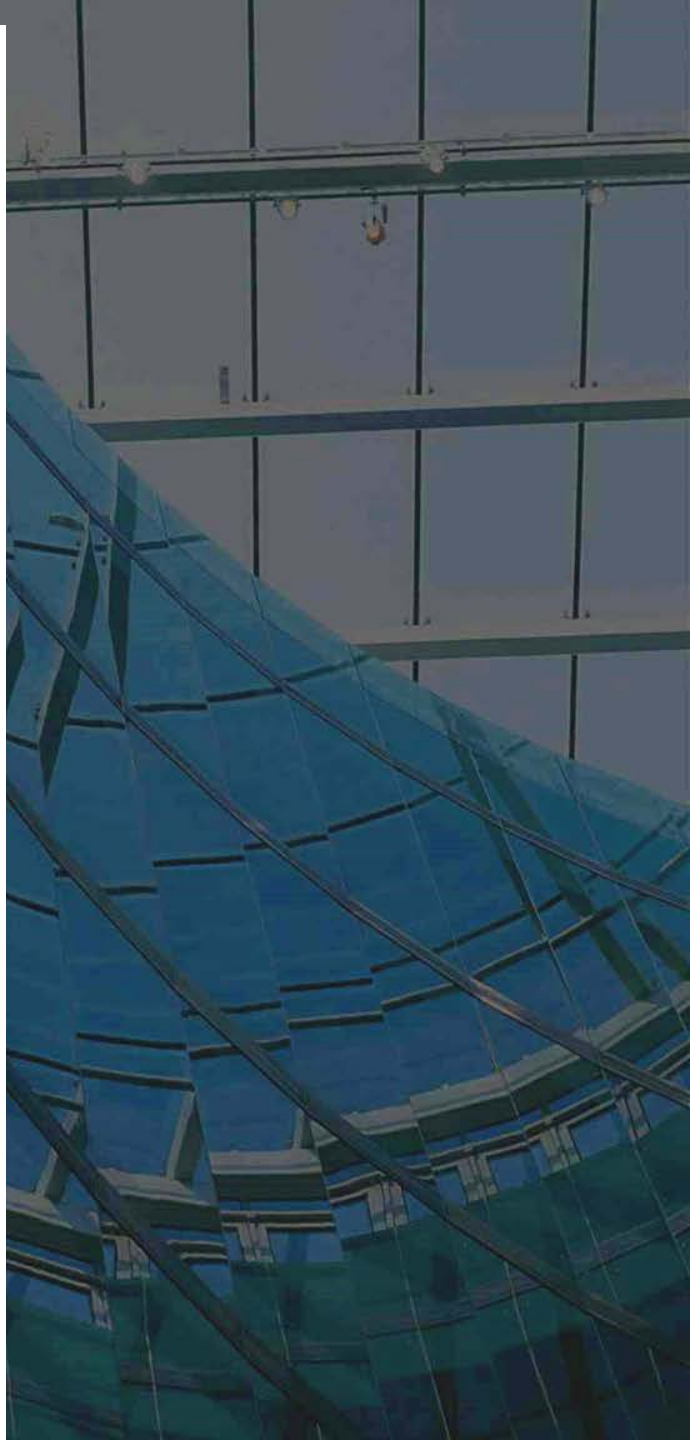
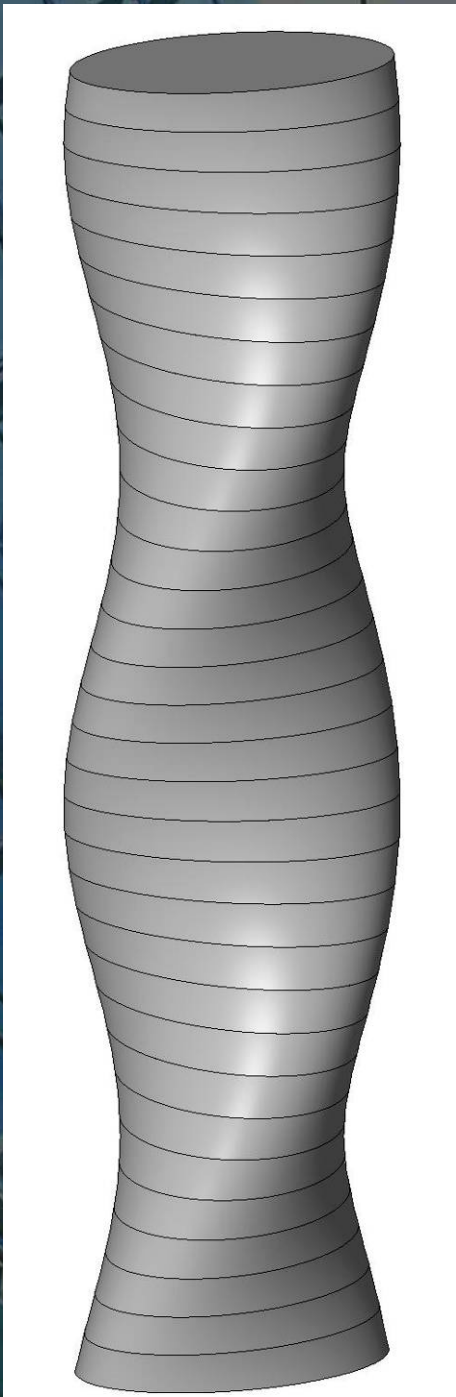
Creativity 創造性







Click to select, TAB for alternates, CTRL adds, SHIFT unselects.





absoluteworld BUILDING 2

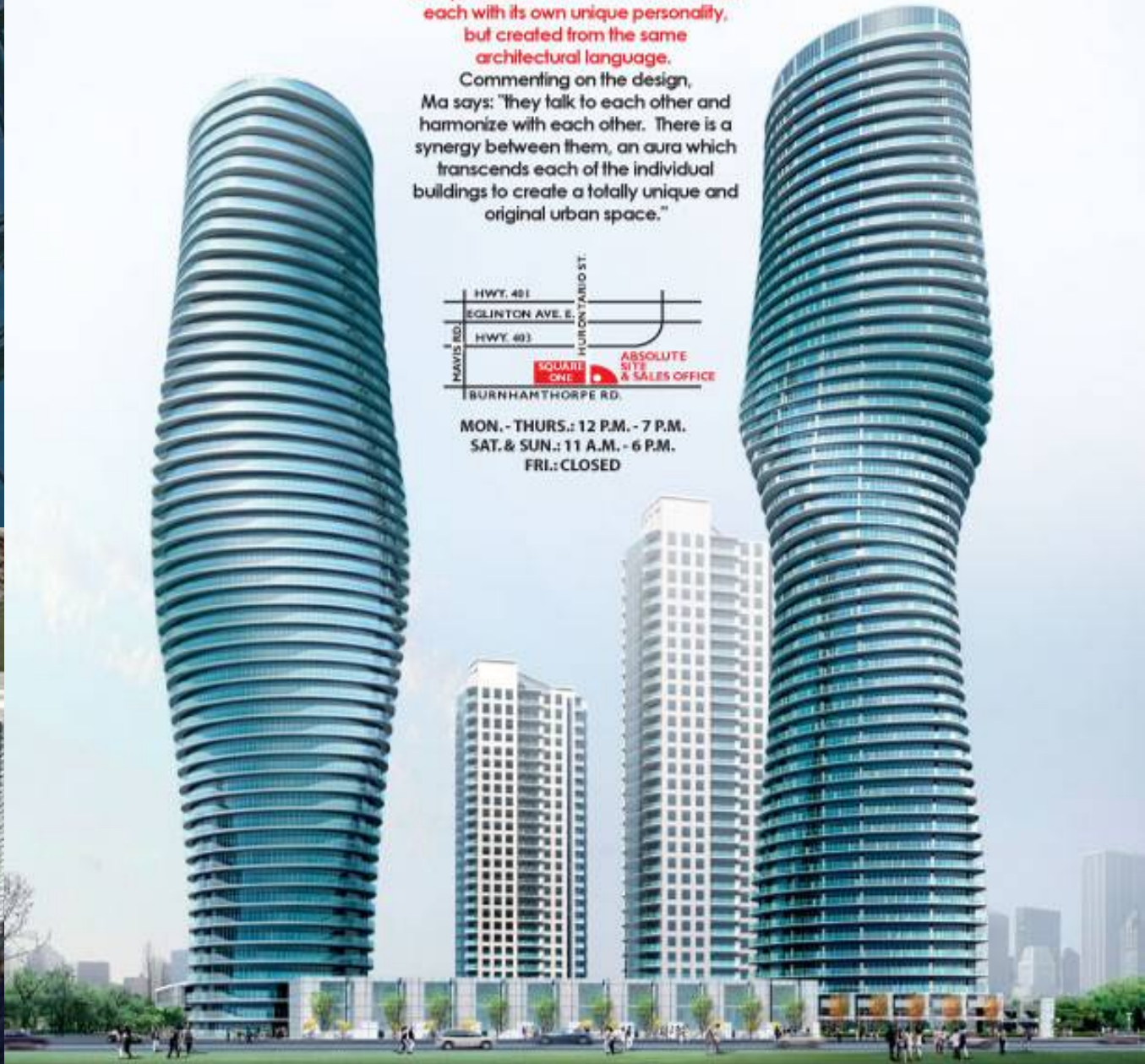
AbsoluteWorld's two buildings, as envisioned by their creator, Yansong Ma. The buildings were designed to complement and enhance each other, each with its own unique personality, but created from the same architectural language.

Commenting on the design, Ma says: "They talk to each other and harmonize with each other. There is a synergy between them, an aura which transcends each of the individual buildings to create a totally unique and original urban space."



MON. - THURS.: 12 P.M. - 7 P.M.
SAT. & SUN.: 11 A.M. - 6 P.M.
FRI.: CLOSED

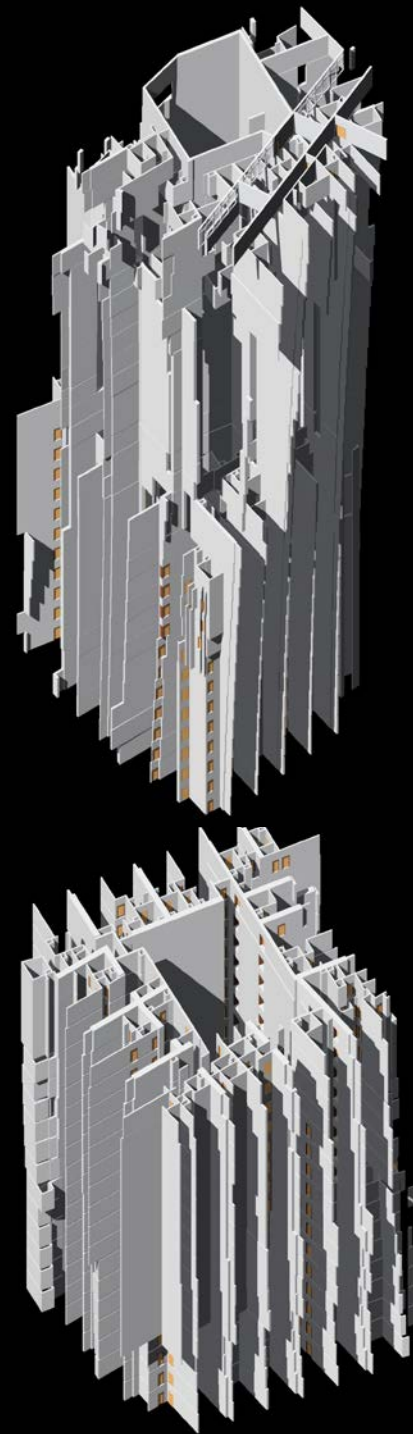
absoluteworld BUILDING 1



Program: Residential Site Area: 3,746 sqm
Floor Area: 659,659 sqm Building Height: 345 m

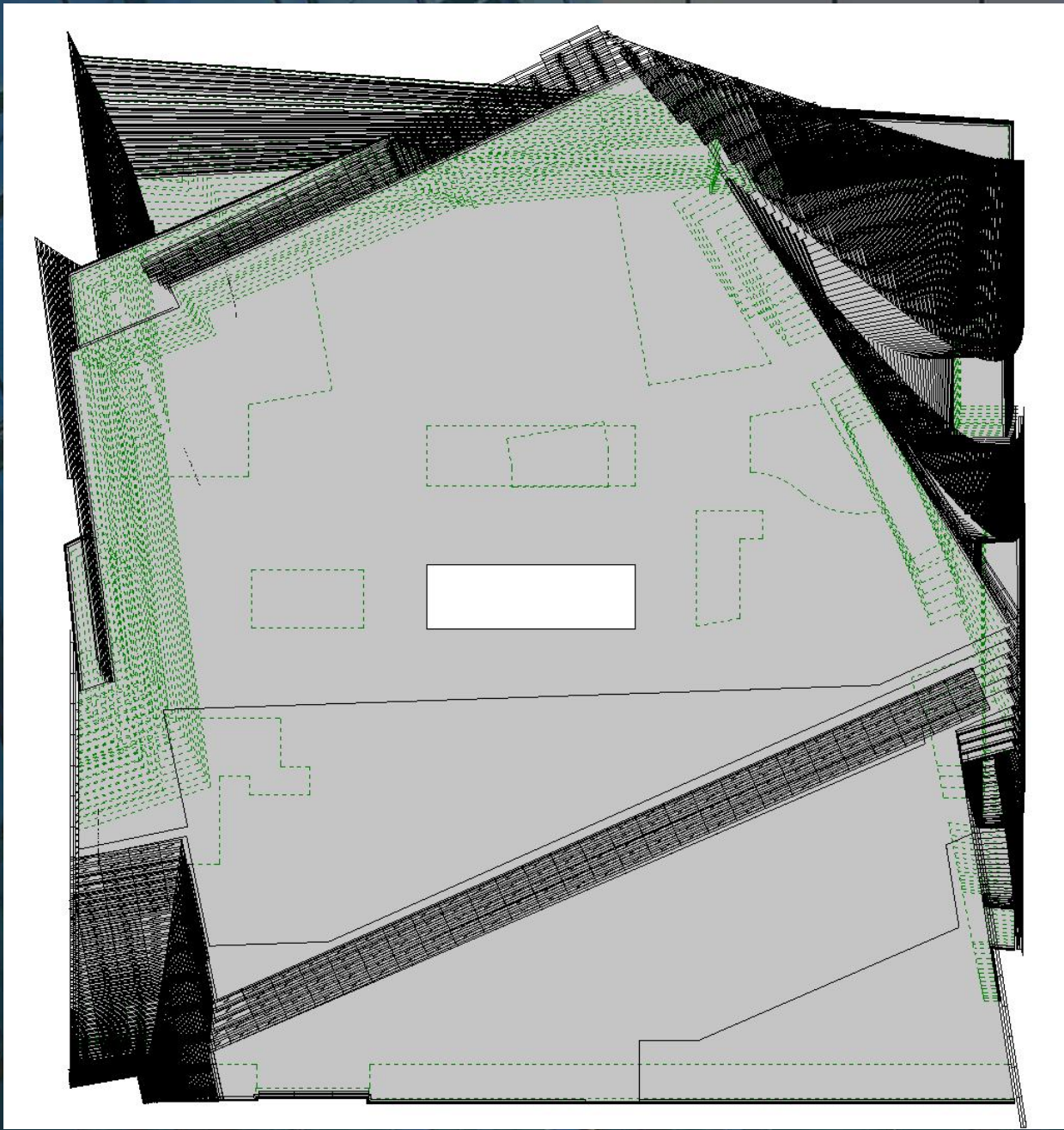


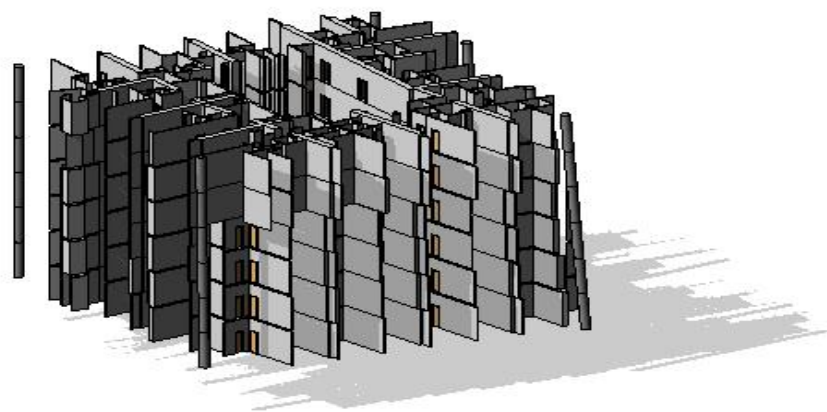
Dubai **Ocean Heights One**

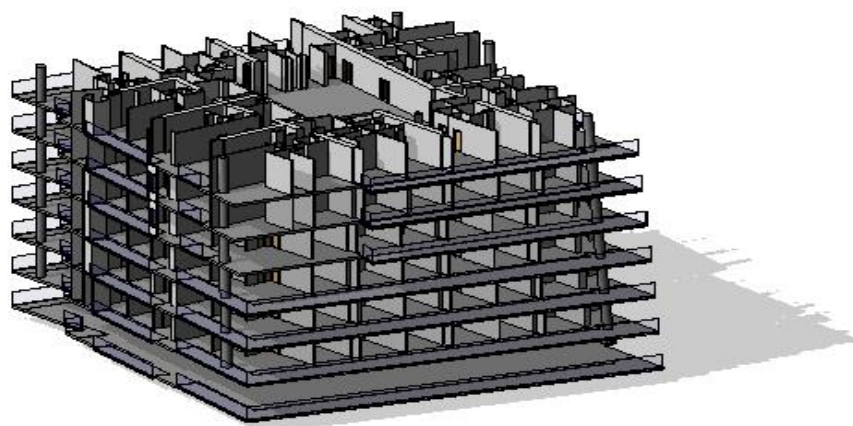


中東住宅項目

COMPLEX GEOMETRY





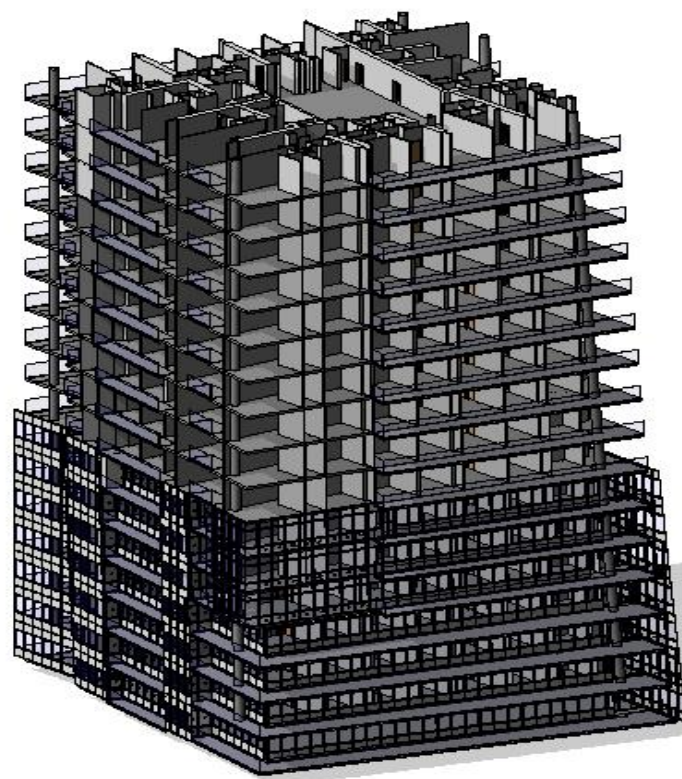










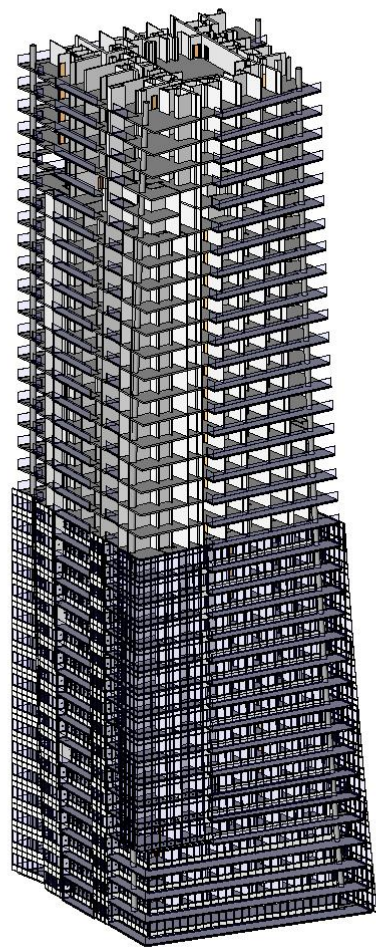


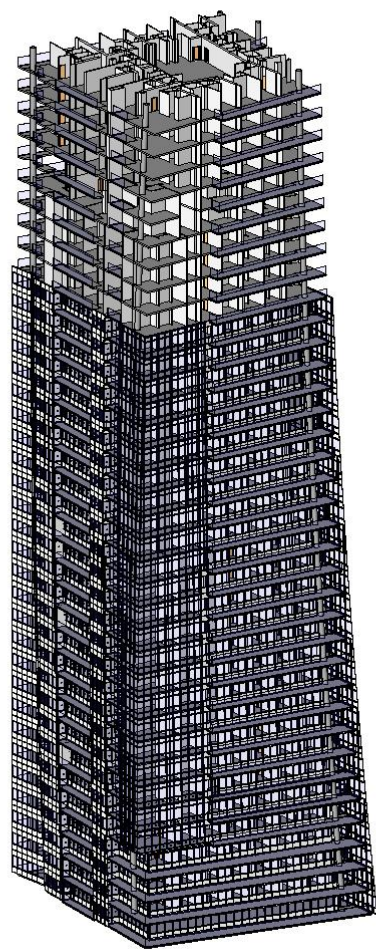


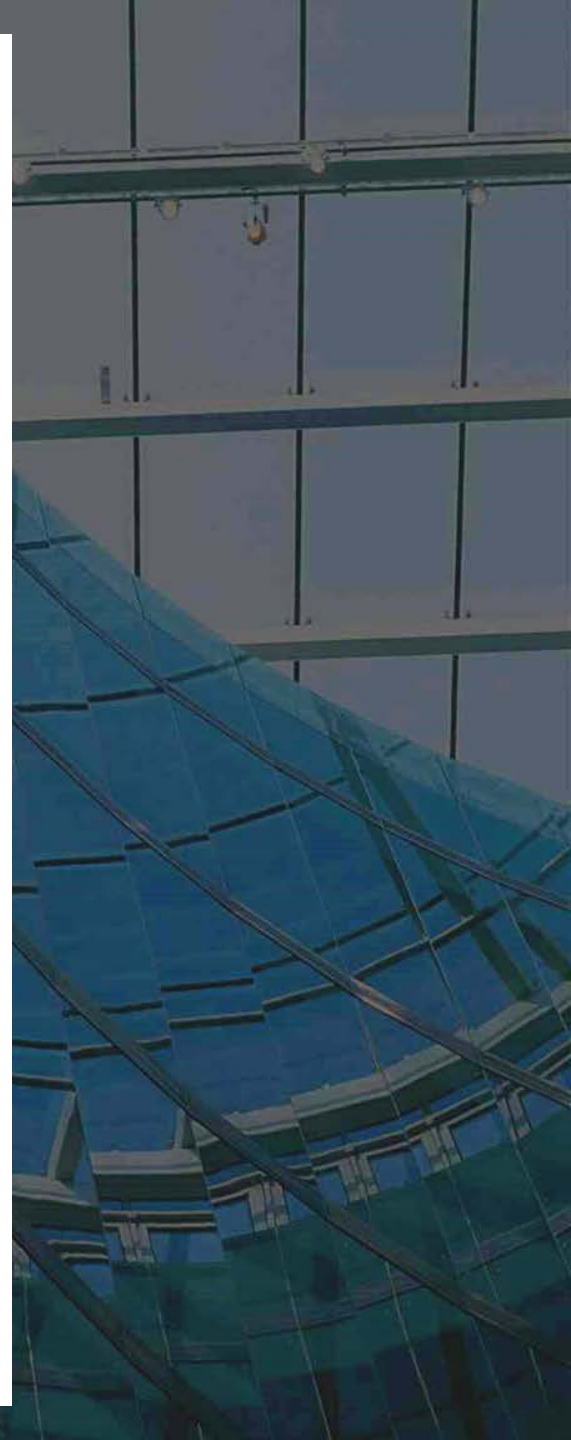
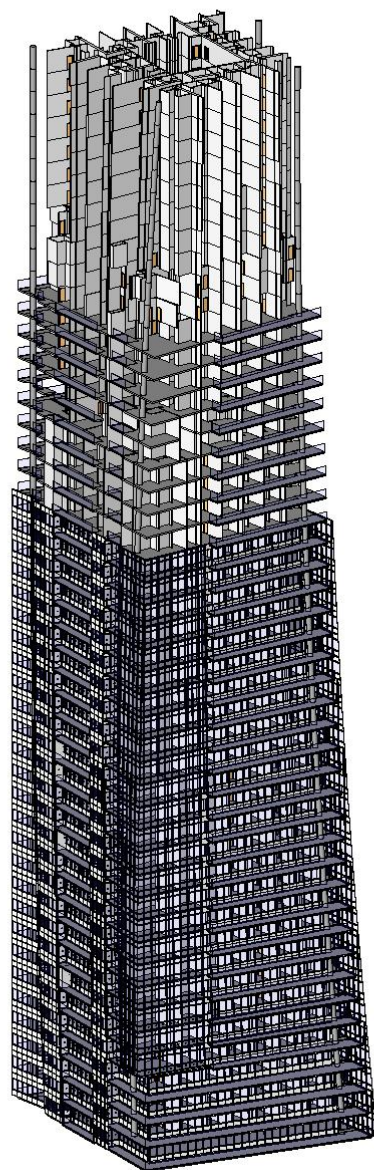


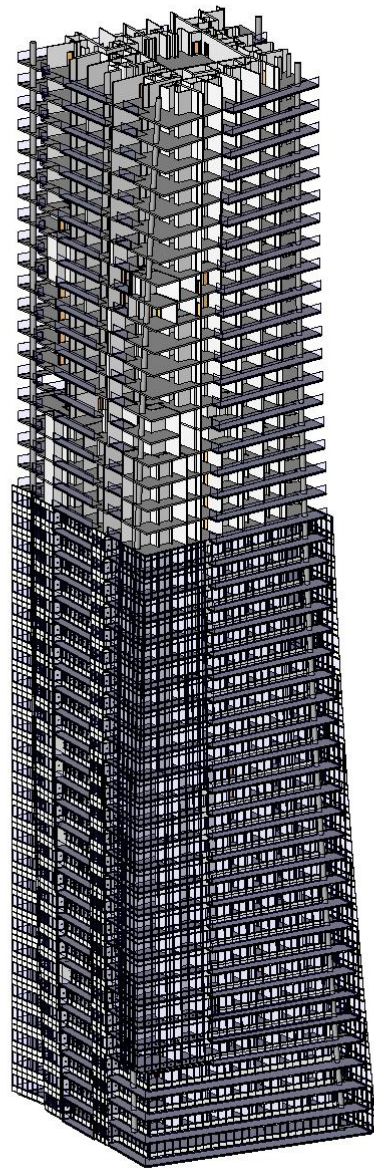


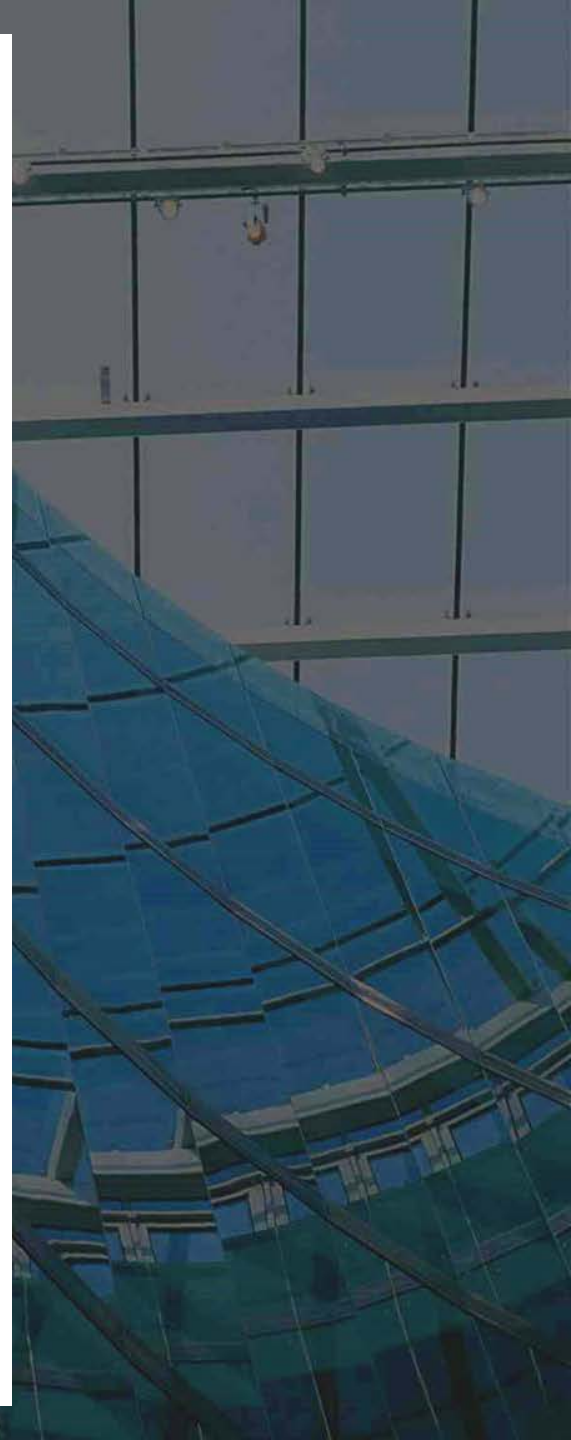
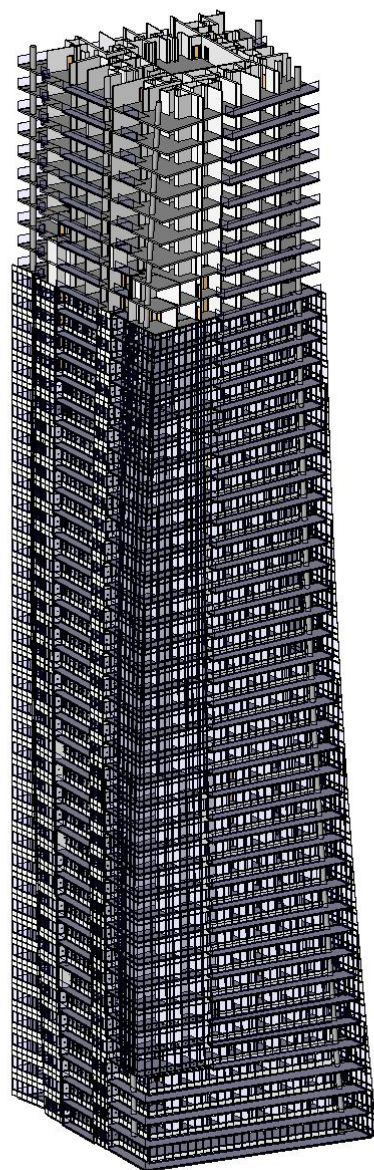


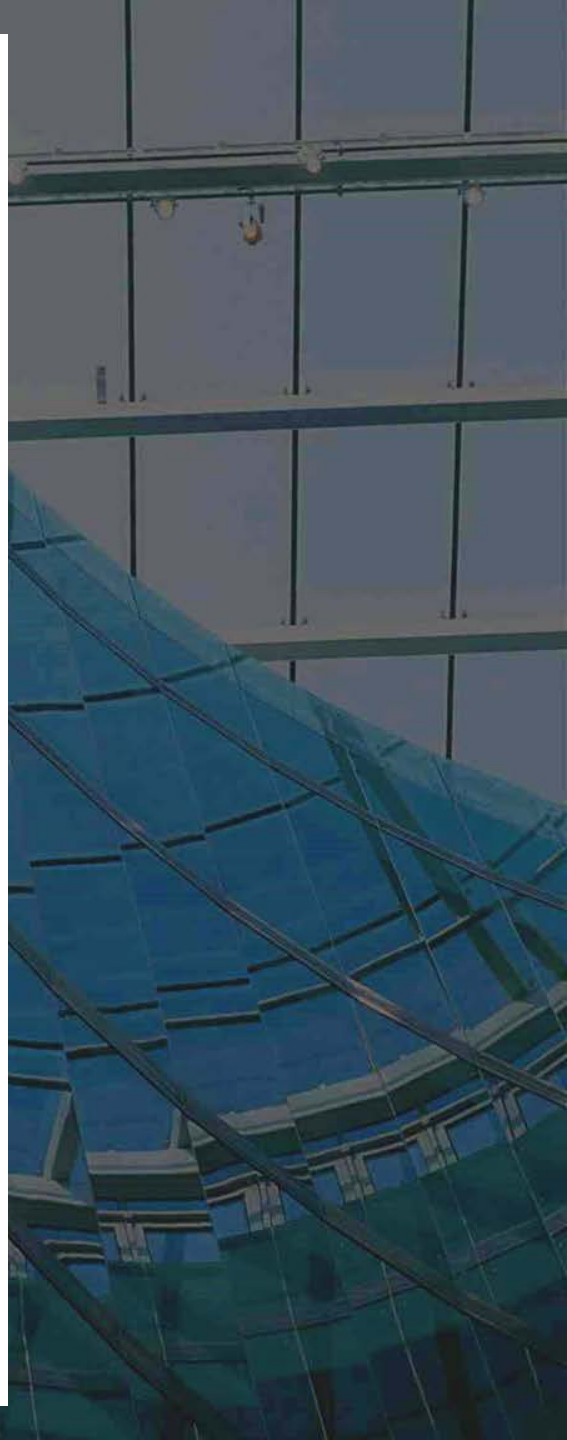
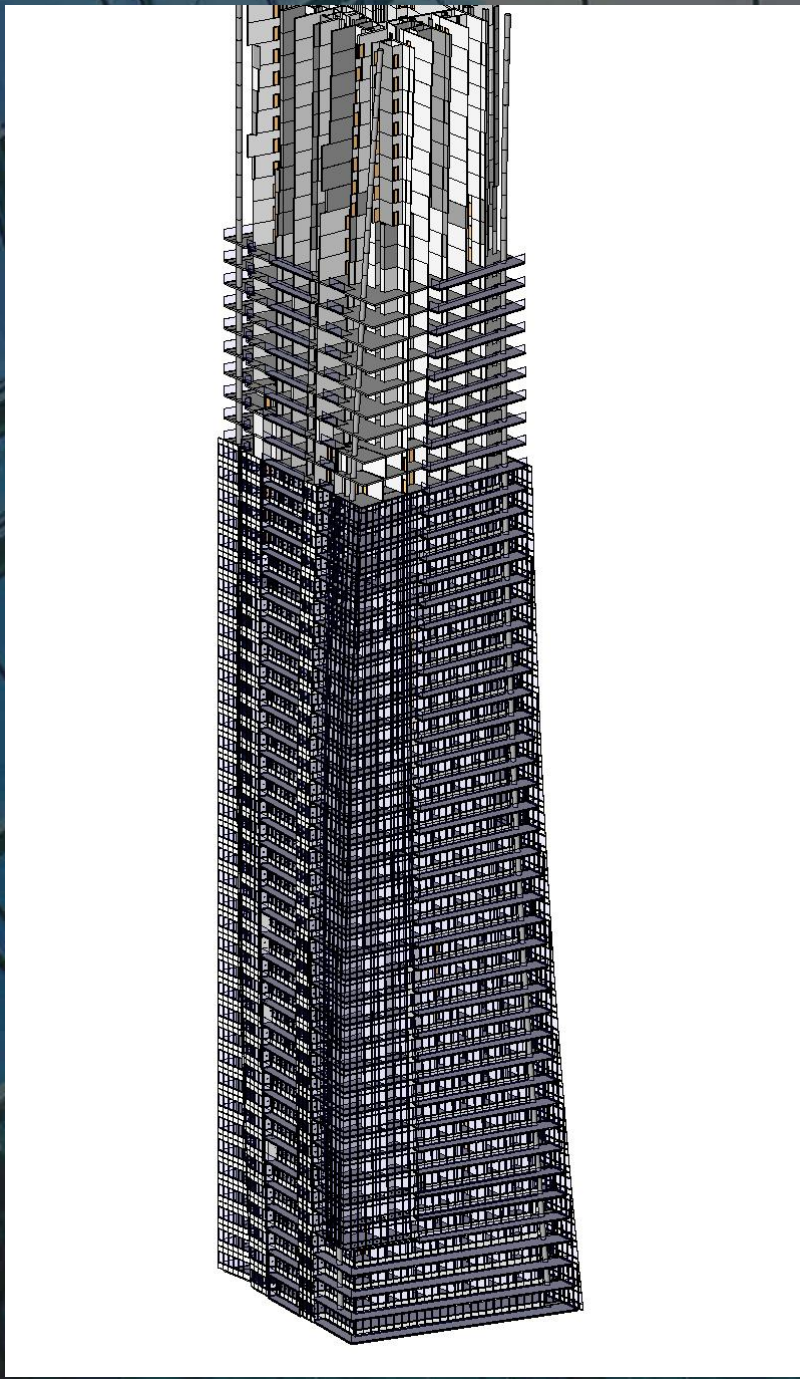


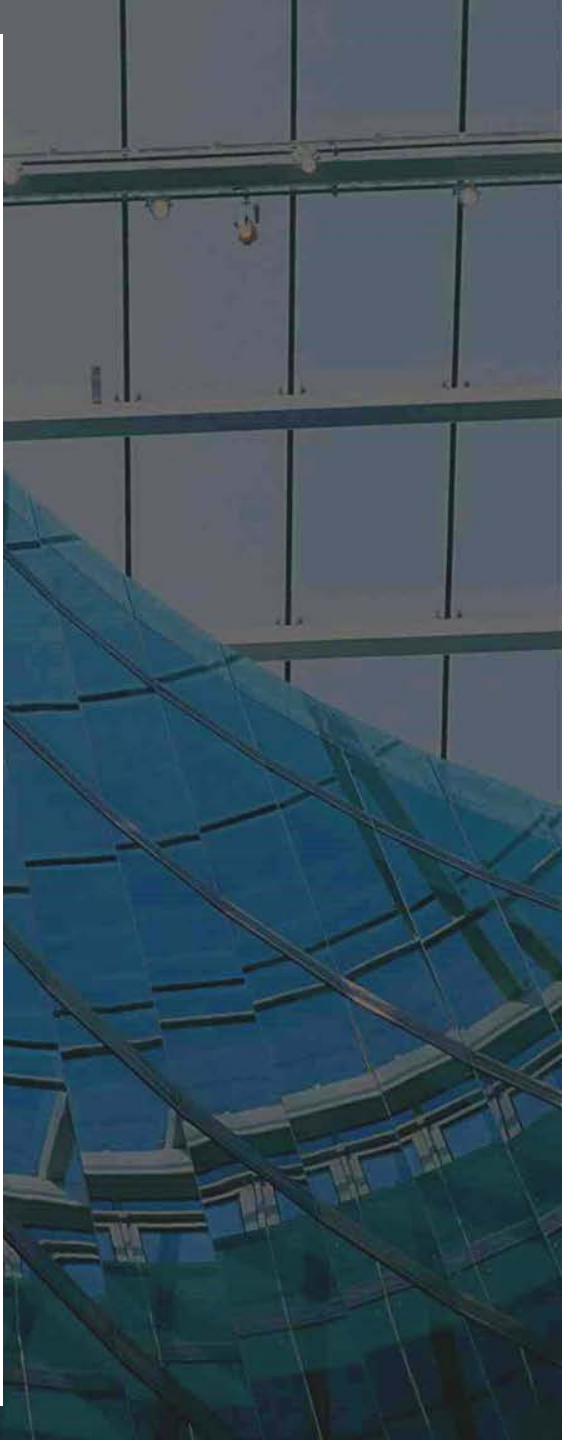
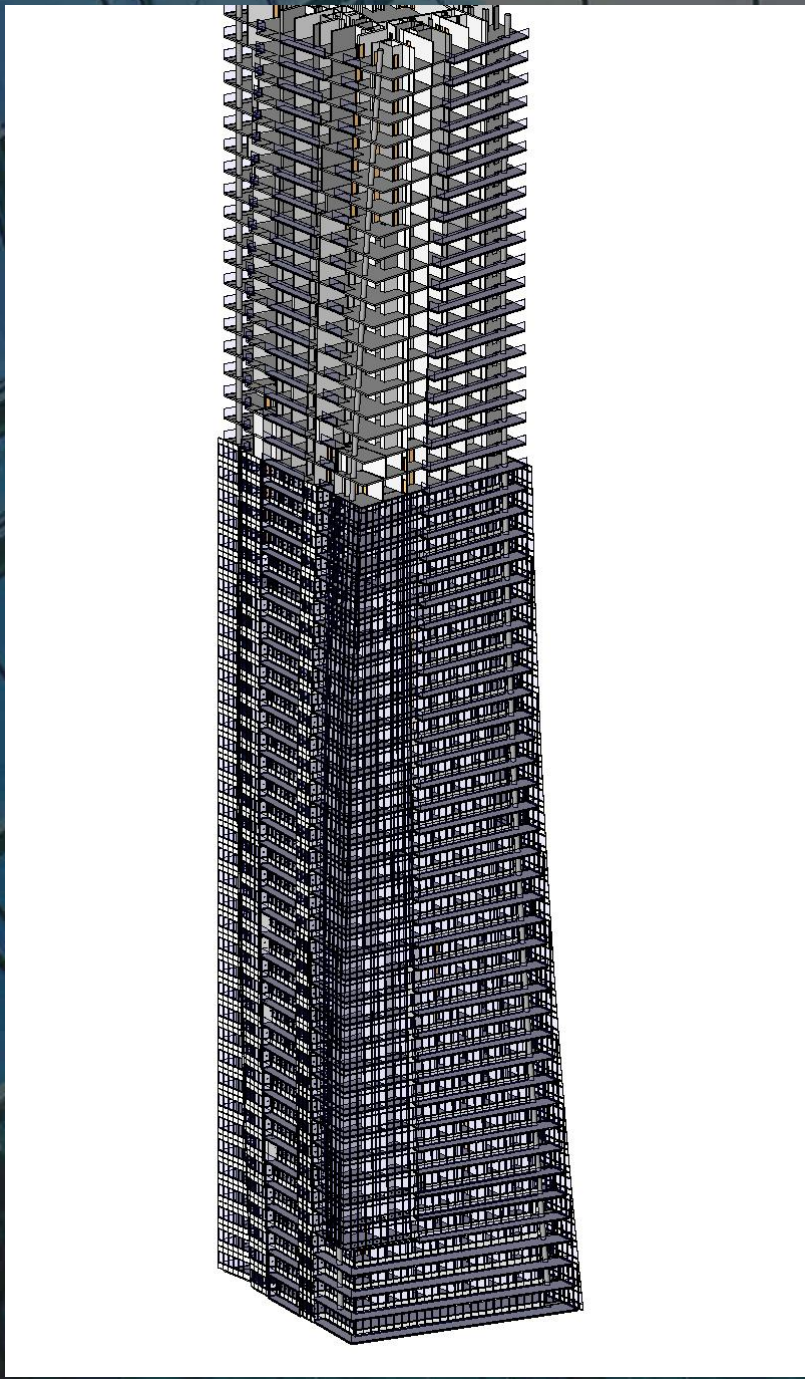


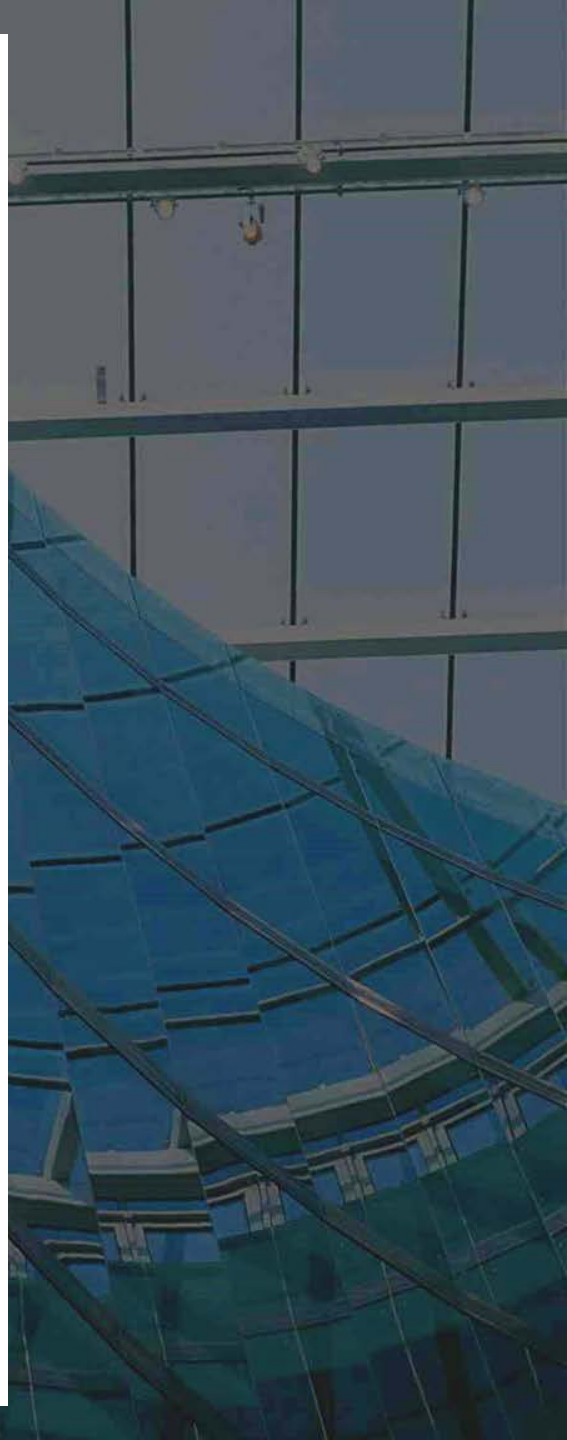
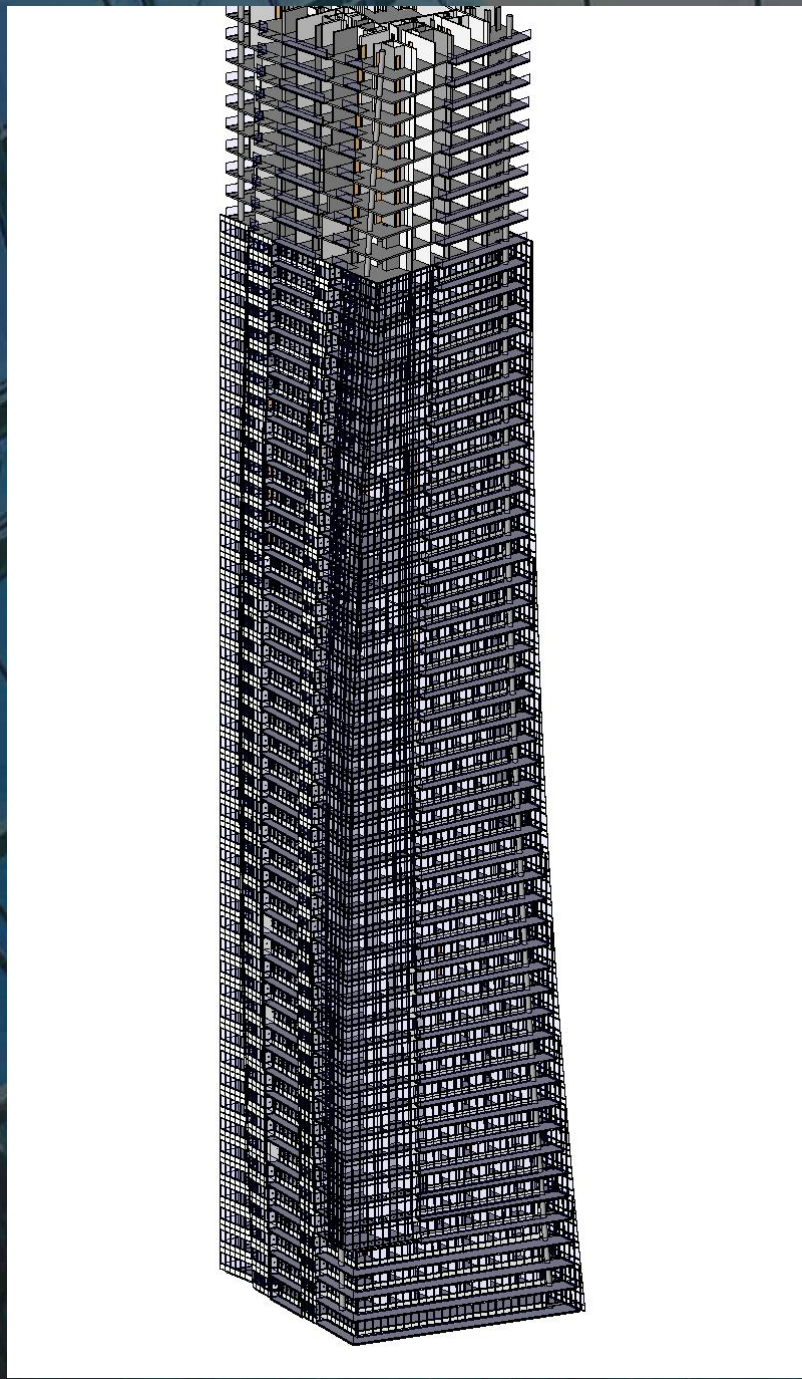


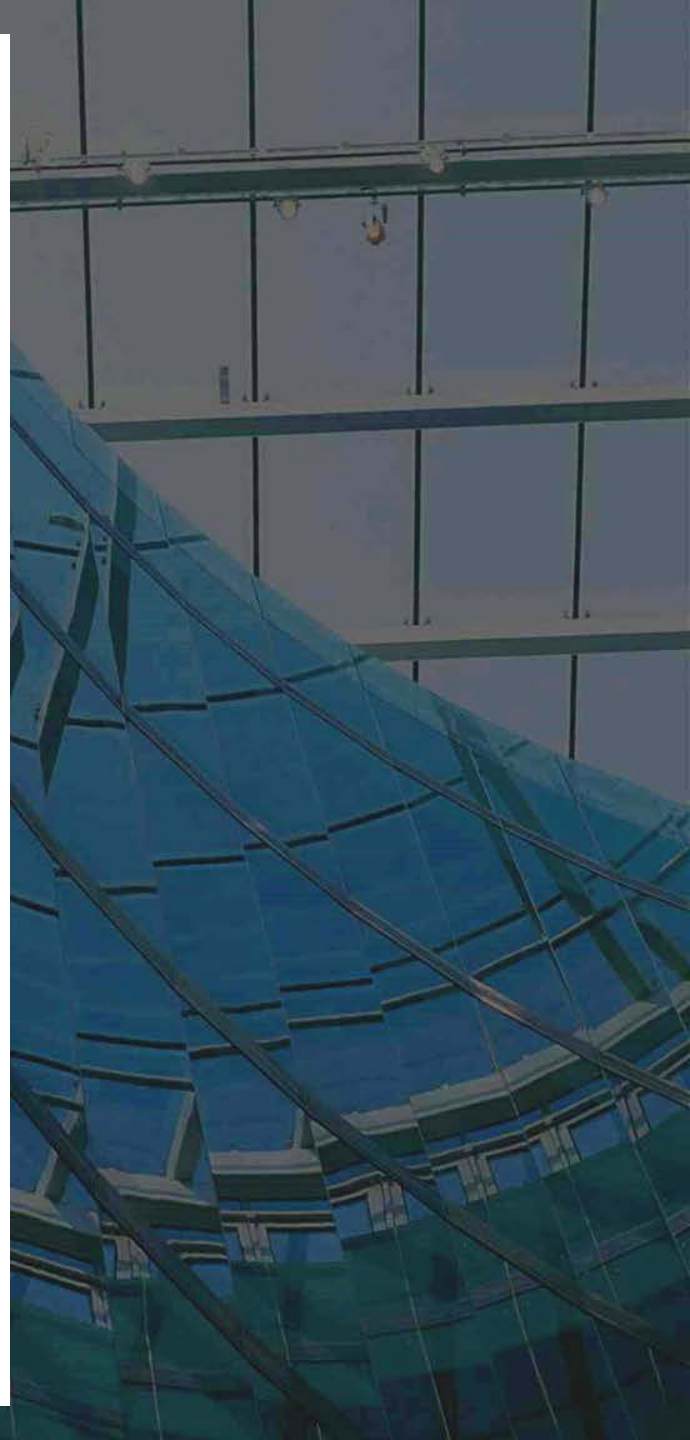


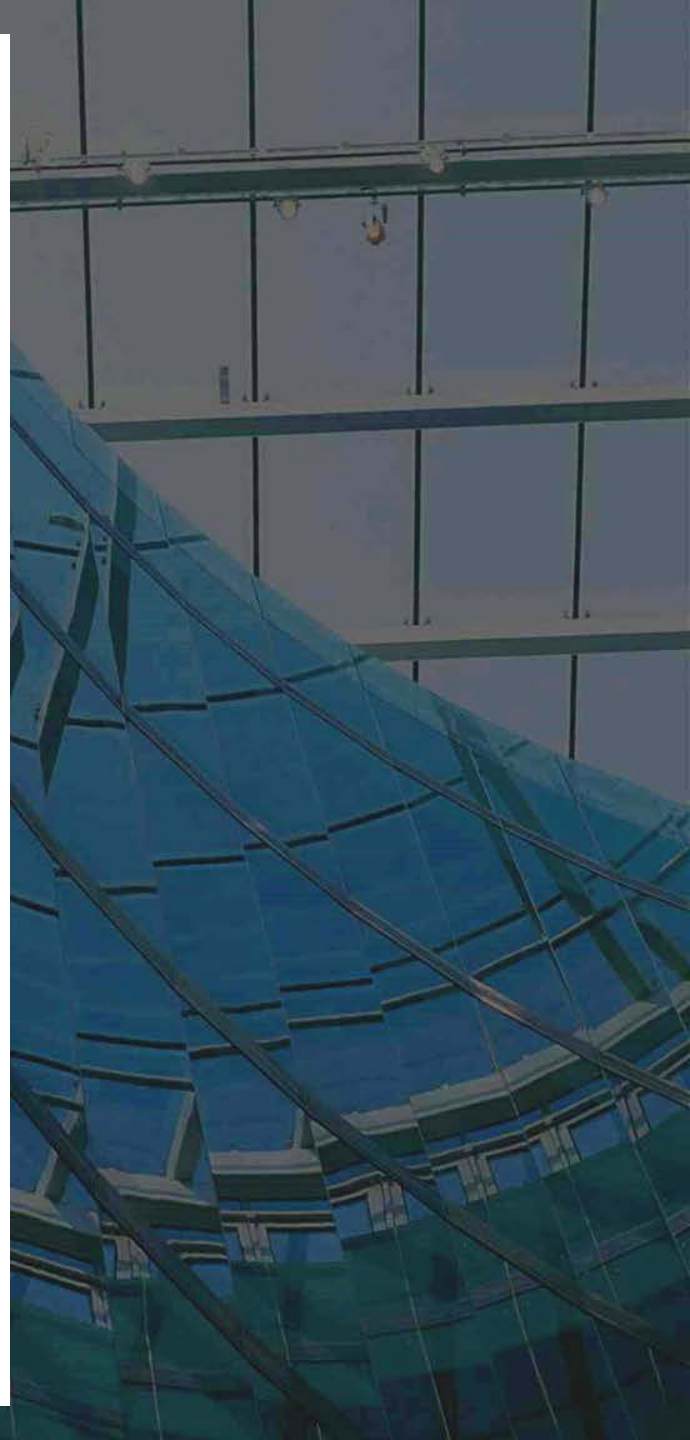


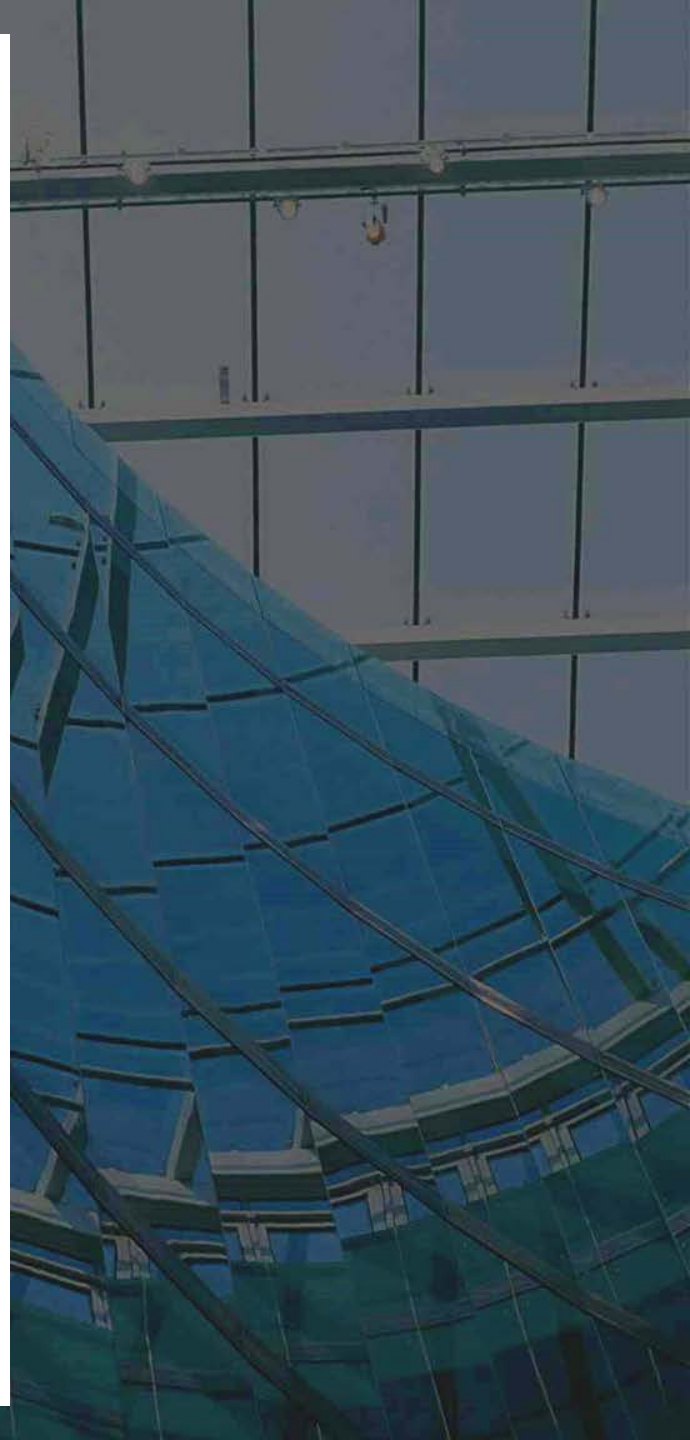


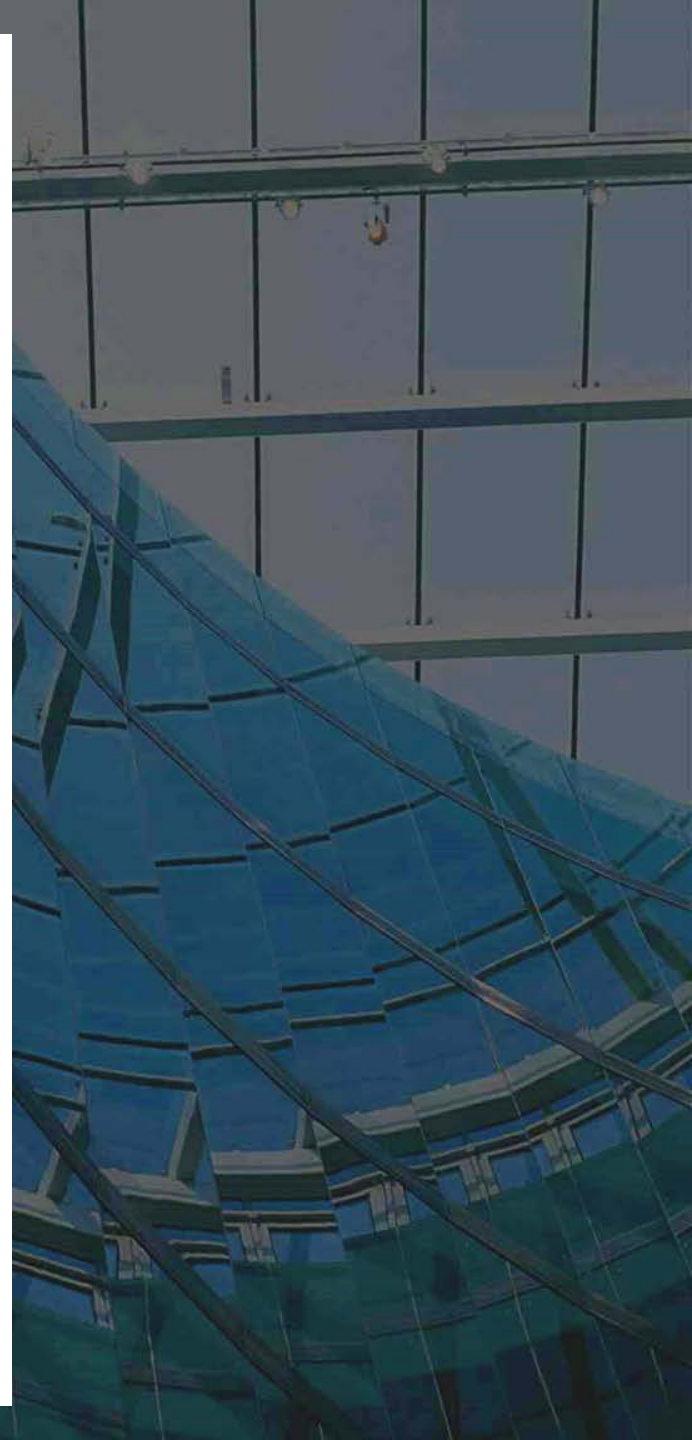


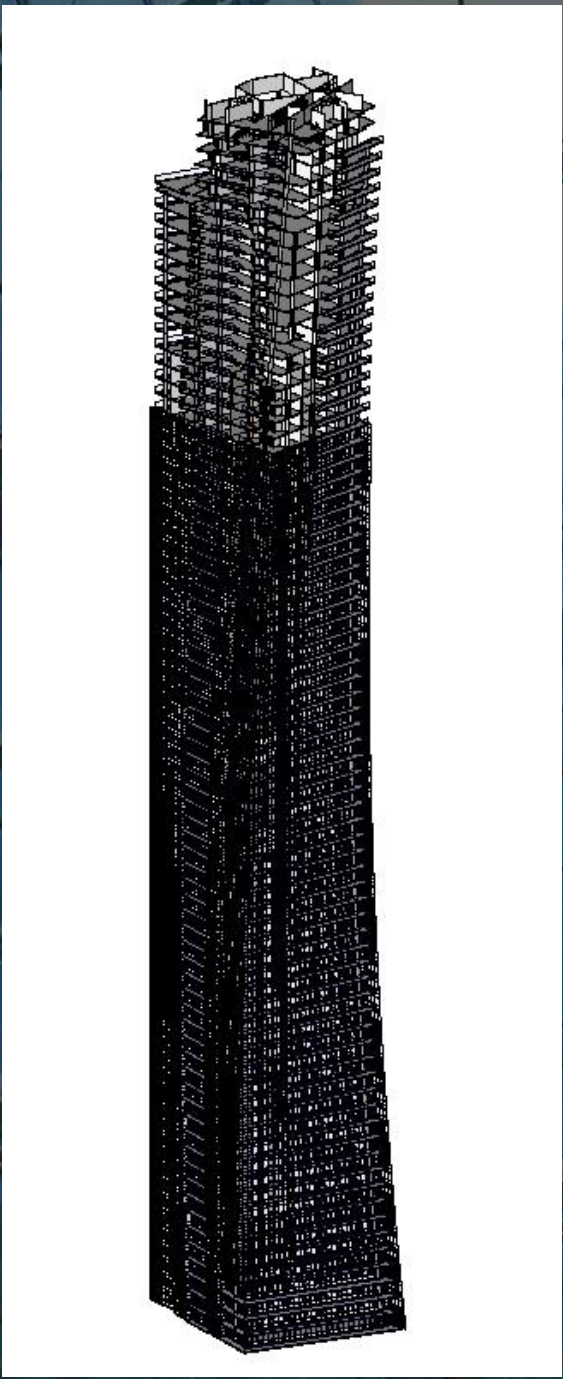




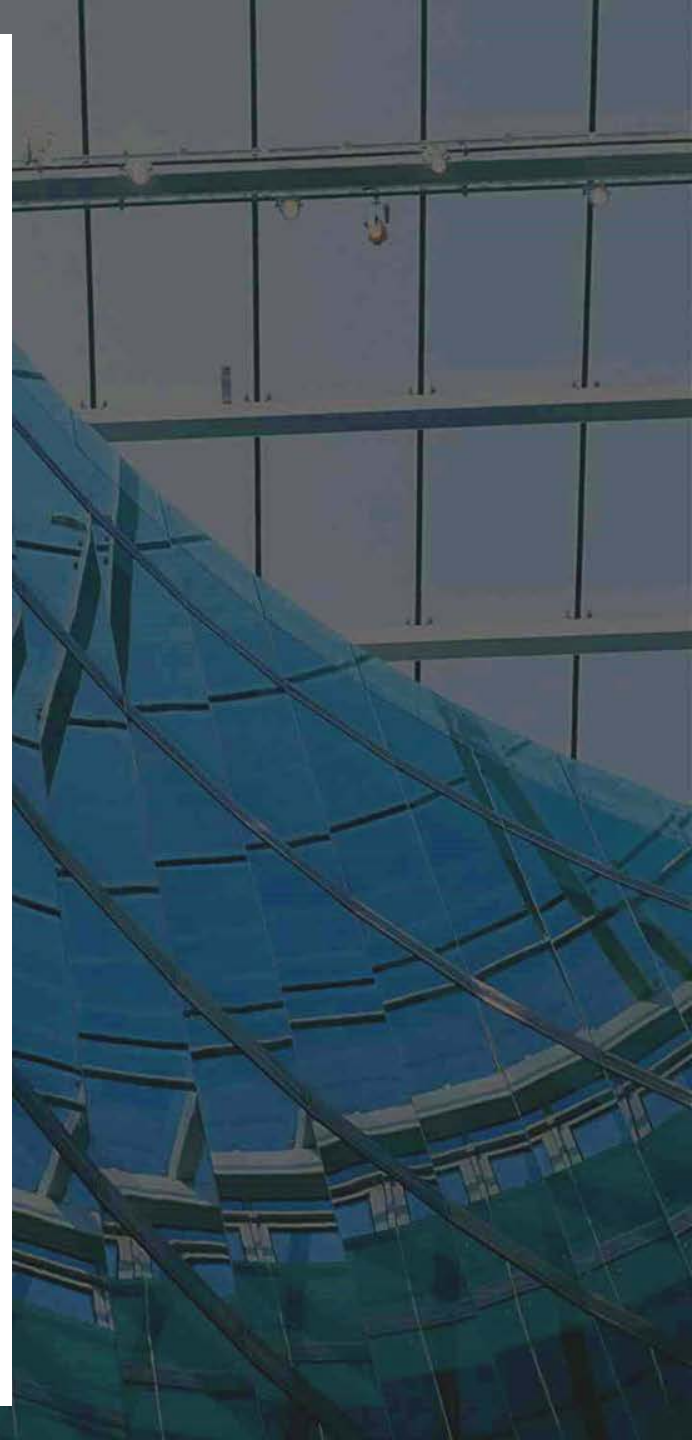


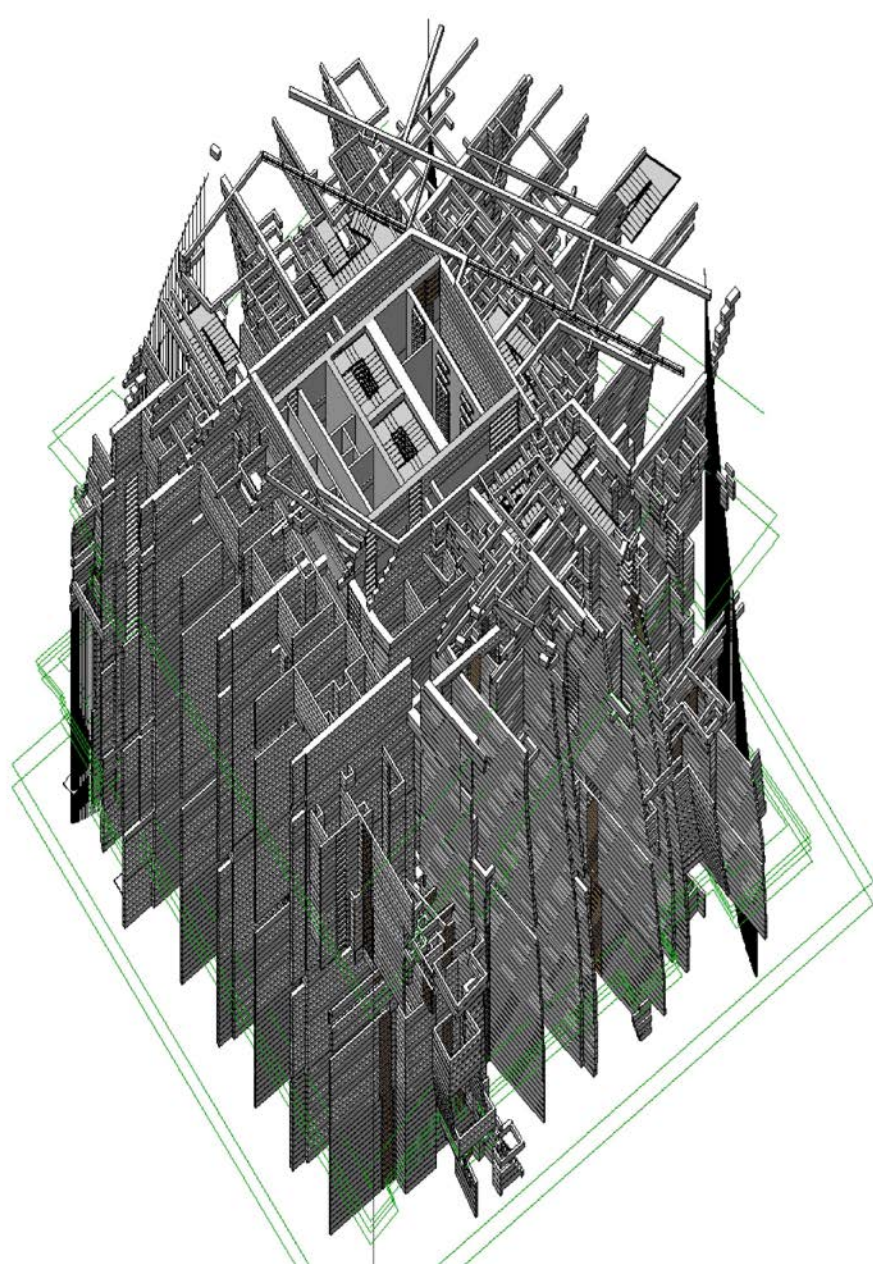
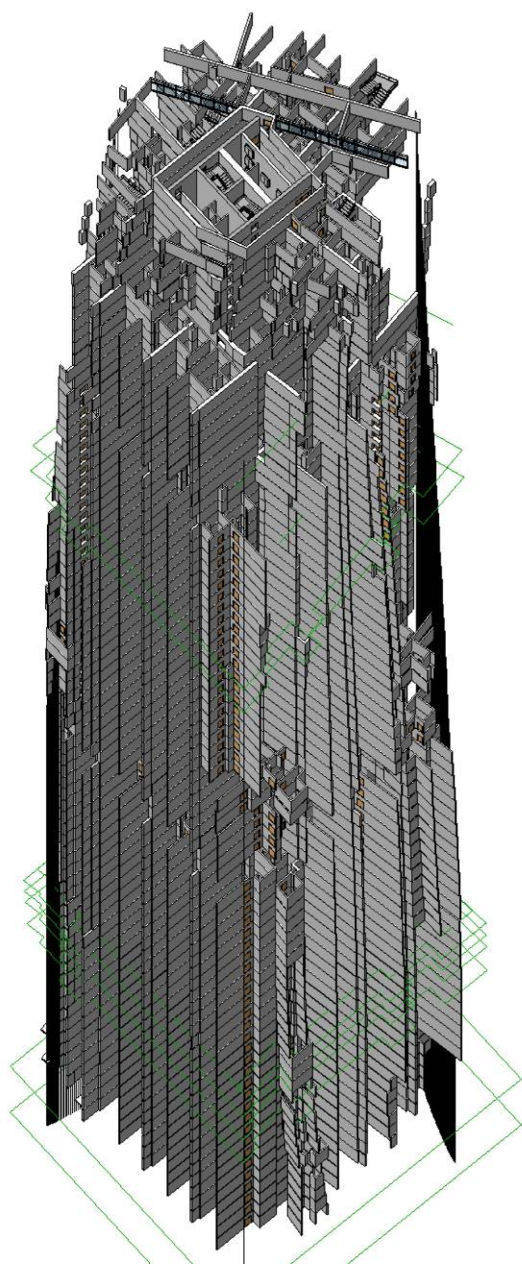






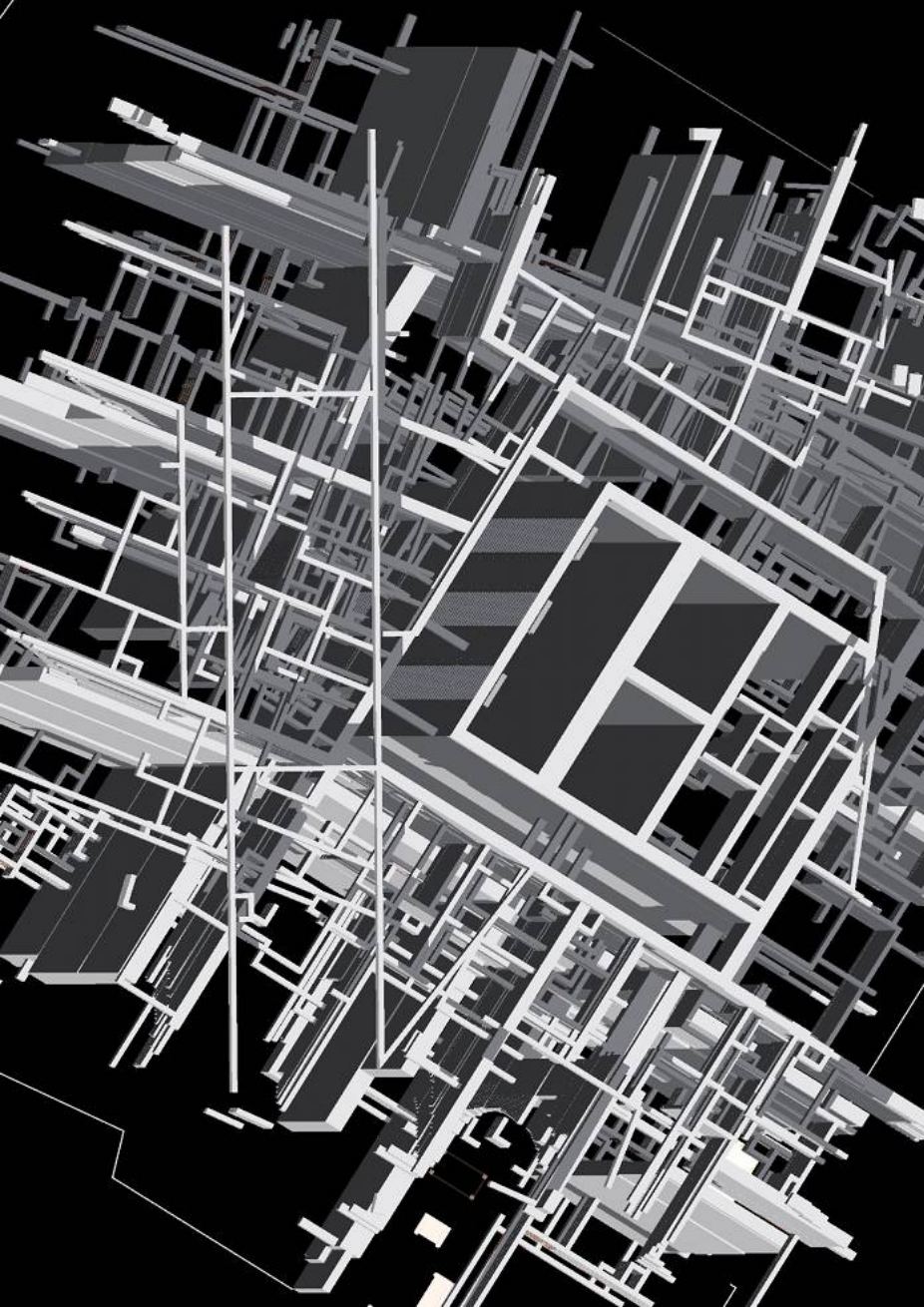




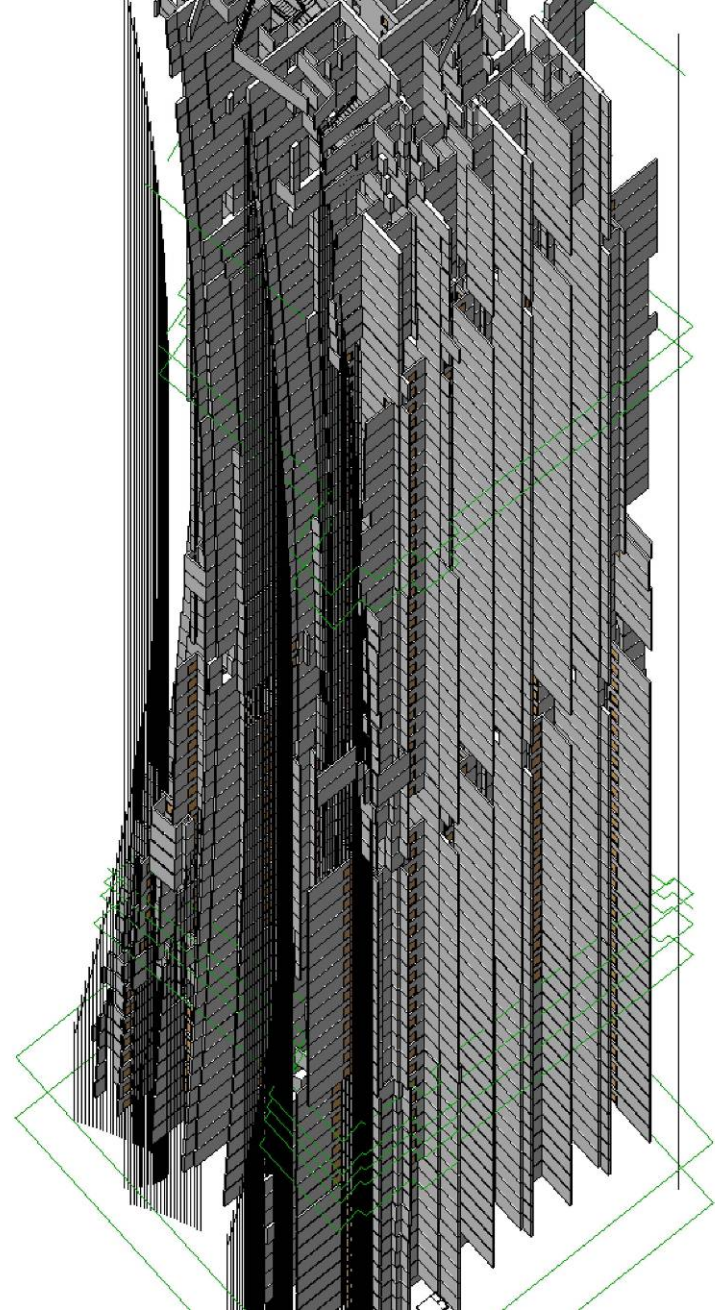


中東住宅項目

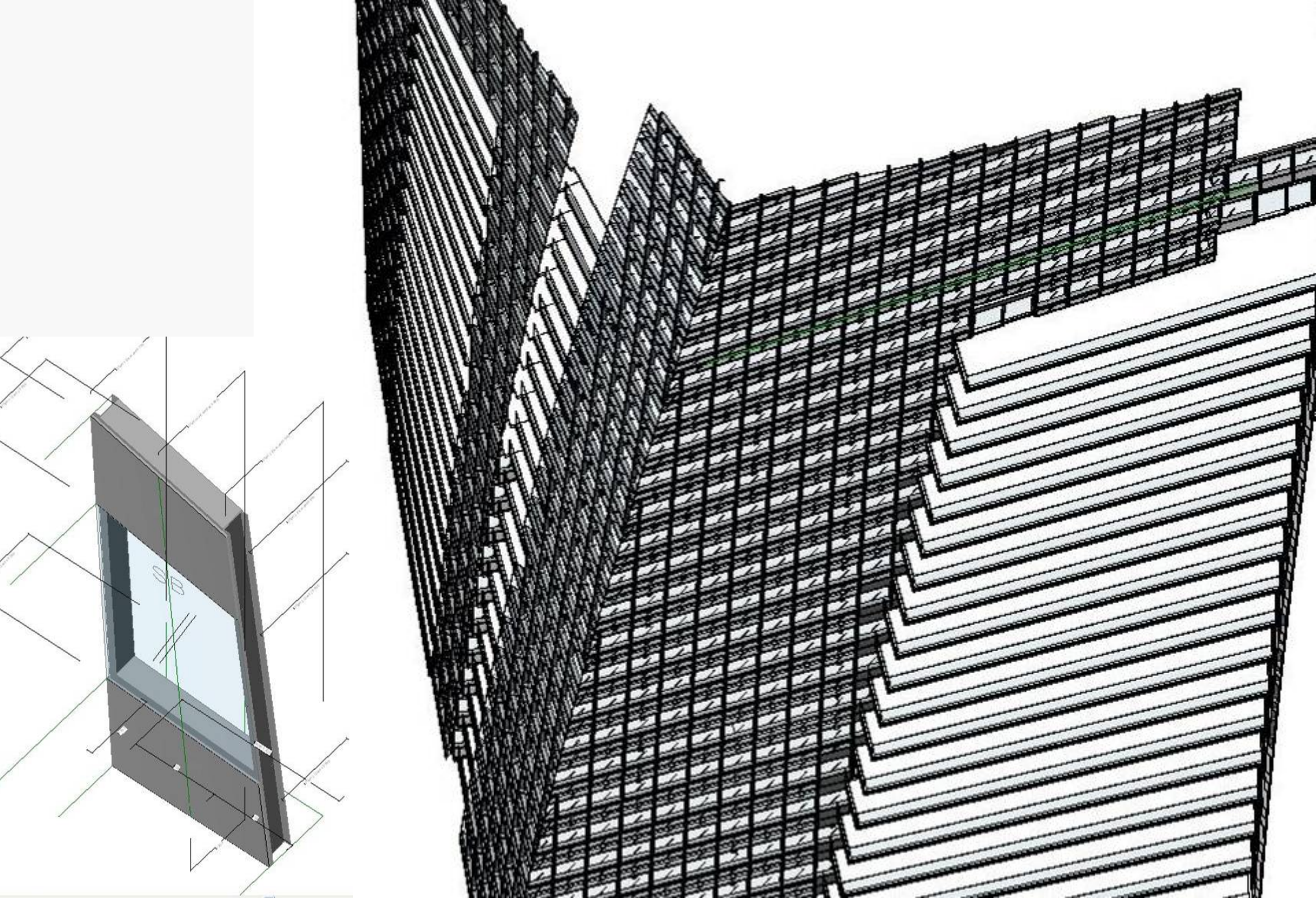
VERTICAL CO-ORDINATION



中東住宅項目



INTERNAL vs EXTERNAL



中東住宅項目

COMPLICATED CURTAIN WALL

Abu Dhabi Empire Tower

Empire Tower was challenged through a client request of not "pushing the limits" too far. The concern is that the residential project was located in the middle of a master plan filled with potential icons. The design standardizes the units to accommodate the client request but manipulates the section to develop a very dynamic solution, which holds its own amidst the visual clutter of its neighbors. This was deemed crucial to the financial viability of this project, which is dependent on pre-sales within a highly competitive market.

The design maximizes the tower's presence on the street, with vertical layers spreading out to the property lines. The building then bends back away from the street across from a large commercial tower, allowing for an enlarged view corridor between the central park of the community and the sea, one block away. The splayed vertical layers converge and rise up before bending forward together, as the 230-meter tower extends into the sky – maximizing its views between the park and the sea •



Initial Massing



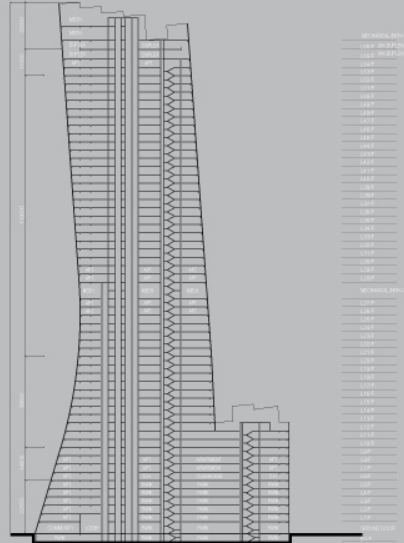
Mass Divisions



Strip Shifting



Strip Bending



Program: Residential, Site Area 7,007 sqm
Floor Area 90,206 sqm, Building Height 235 m

Abu Dhabi Empire Tower

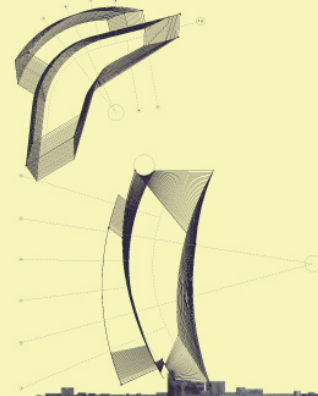
Abu Dhabi Dancing Towers

Located in the heart of Abu Dhabi, Dancing Towers was designed to appropriately fit its surrounding neighbors in scale.

The challenge was how to achieve this when the project was only 70,000 square meters and adjacent properties were relatively small, averaging 900 square-meter floor plates. Two slender towers as opposed to one singular tower was the first step, but the site itself was constrained, forcing a close proximity between the two buildings.

This site constraint is intensified in achieving a viable connective retail podium between the commercial and residential towers, drop-offs to the lobbies and access to supporting functions. The buildings were placed deliberately to maximize the uses down below.

However, the two towers quickly lean, rotate, bend and warp to respond to each other, the adjacent sites and ultimately the view to the ocean at their horizon. These two figures fluidly respond to each other, dynamically engaged and flowing – and ultimately tied together in a passionate dance.



Program Mixed Use Site Area 4,180 sqm
Floor Area 44,235 sqm Building Height 160 m

Abu Dhabi **Dancing Towers**

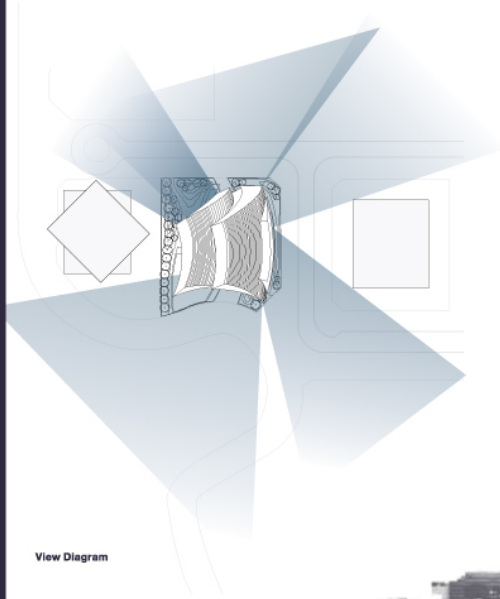
Dubai Ocean Heights Two

Ocean Heights Two is also located in Dubai Marina, UAE, along with its sister project, Ocean Heights One. At 460 meters in height and 105 floors, it will be the tallest tower in its vicinity. However, unlike its predecessor, the requirements for more modulated units up to the 60th floor, forced a different approach while intending to maintain the spirit of its sister.

The first 60th floors of the tower are intended to be service apartments, which in order to be marketable, needed to have the majority of units standardized. The curved shape of the tower improves views past its densely located neighbors. The playfulness of this tower was concentrated into the two most visible faces, allowing units to bend up the tower in two blades. These blades were still modulated up to the 60th floor before the tight restrictions of unit area fluctuations become more relaxed. At this point, the modules drop off and the blades continue, tapering and bending into the sky.



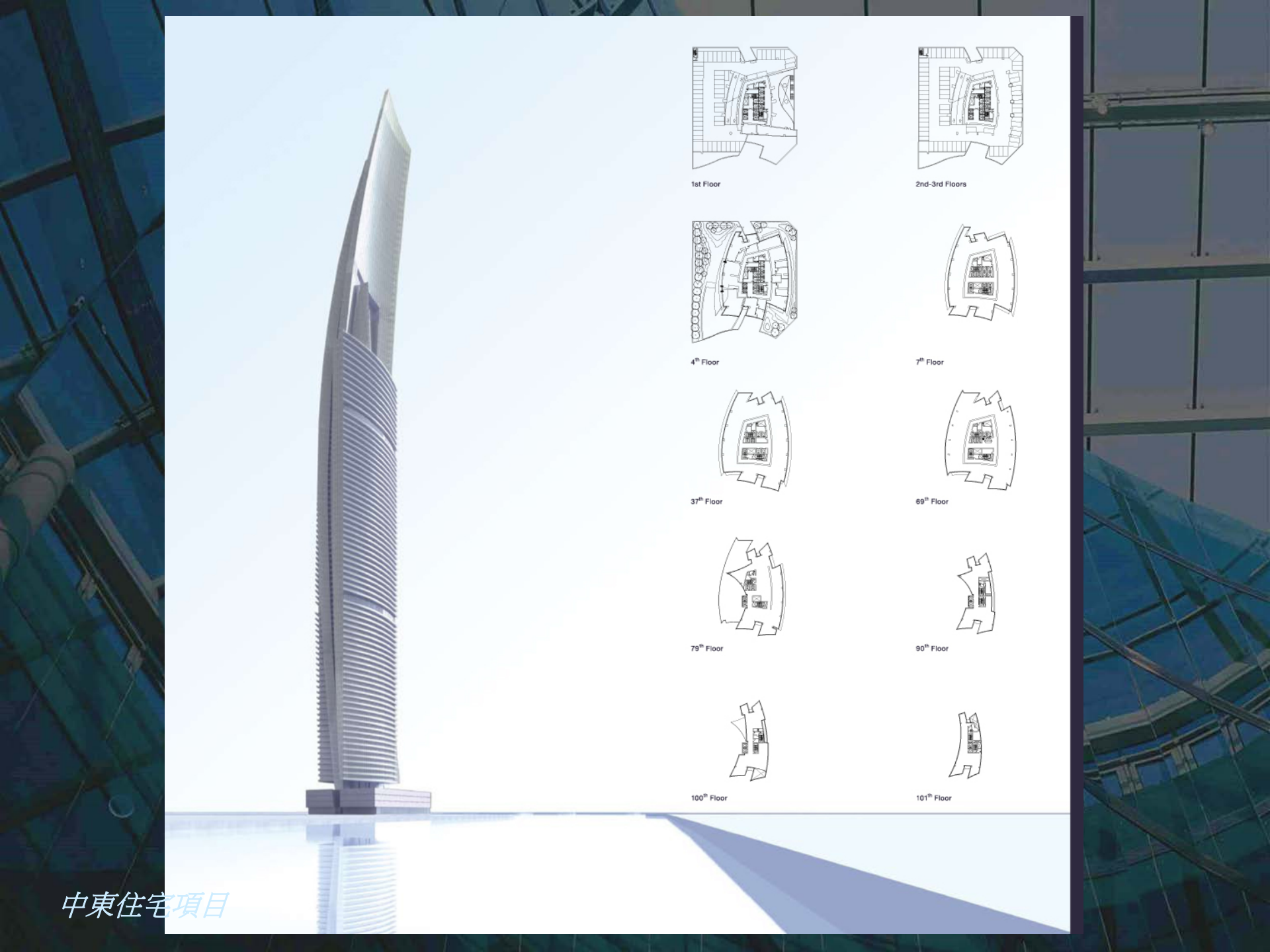
Program Residential Site Area 3,443sqm
Floor Area 197,975 sqm Building Height 460 m



View Diagram



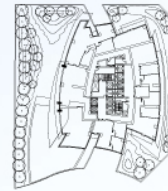
Dubai Ocean Heights Two



1st Floor



2nd-3rd Floors



4th Floor



7th Floor



37th Floor



69th Floor



79th Floor



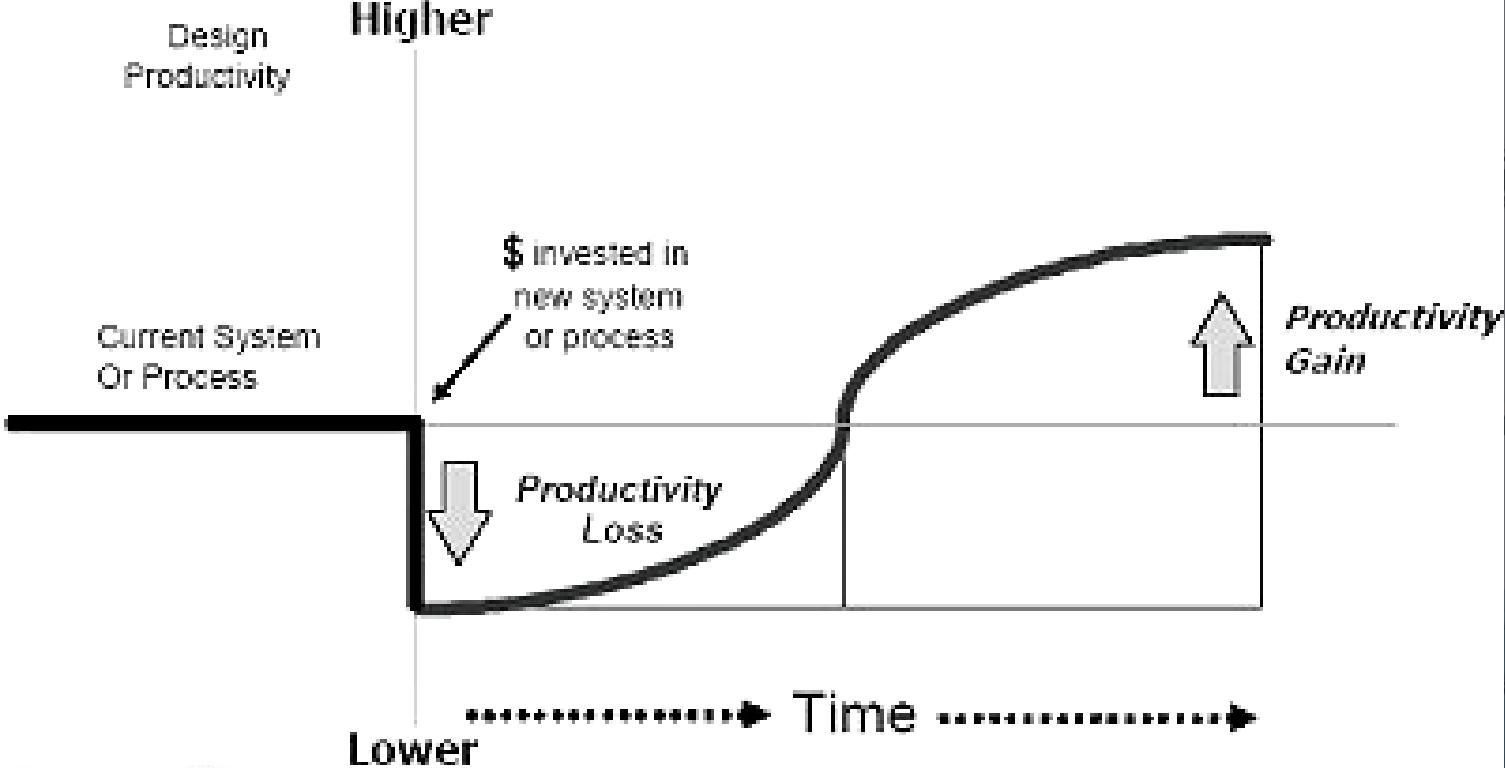
90th Floor



100th Floor



101th Floor



$$\frac{(B - (\frac{B}{1+E})) \times (12 - C)}{A + (B \times C \times D)} = \text{First Year ROI}$$

A = cost of hardware and software (dollars)	
B = monthly labor cost (dollars)	
C = training time (months)	
D = productivity lost during training (percentage)	
E = productivity gain after training (percentage)	

A = cost of hardware and software	\$6,000
B = monthly labor cost	\$4,200
C = training time	3 months
D = productivity lost during training	50%
E = productivity gain after training	25%

Source 26/1/07:
<http://aec.cadalyst.com/aec/article/articleDetail.jsp?id=124222>

>60%



Design and Construction

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• CAD Standards

▶ 3D-4D Building Information Modeling

3D-4D-BIM Overview

Spatial Program Validation

4D Phasing

3D Laser Scanning

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• Commissioning

• Construction Excellence

• Design Excellence and the Arts

• Facility Access for the Disabled

• Sustainable Design

• Urban Development

• Design and Construction Delivery Process

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3D-4D Building Information Modeling

Since 2003, the General Services Administration (GSA) through its Public Buildings Service (PBS) Office of Chief Architect (OCA) has established the National 3D-4D-BIM Program. OCA has completed 10 pilot projects. It has 11 pilot projects underway in its current capital program, while assessing and supporting 3D, 4D, Building Information Modeling (BIM) applications in over 25 ongoing projects across the nation. The power of visualization, coordination, simulation, and optimization from three-dimensional (3D), four-dimensional (4D), and BIM computer technologies allow GSA to more effectively meet customer, design, construction, and program requirements. GSA is committed to a strategic and incremental adoption of 3D, 4D, BIM technologies.

There is a progression from 2D to 3D, 4D and BIM. While 3D models make valuable contributions to communications, not all 3D models qualify as BIM models since a 3D geometric representation is only part of the BIM concept.

Critical to successful integration of computer models into project coordination, simulation, and optimization is the inclusion of information—the "I" in BIM—to generate feedback. As a shared knowledge resource, BIM can serve as a reliable basis for decision making and reduce the need for re-gathering or re-formatting information. GSA is currently exploring the use of BIM technology throughout a project's lifecycle in the following areas: spatial program validation, 4D phasing, laser scanning, energy and sustainability, and courts design validation.

For all major projects (prospectus-level) receiving design funding in Fiscal Year 2007 and beyond, GSA will require spatial program BIMs be the minimum requirements for submission to OCA for Final Concept approvals by the PBS Commissioner and the Chief Architect. At the same time, all GSA projects are encouraged to deploy mature 3D, 4D, and BIM technologies—spatial program validation and beyond—at strategic project phases in support of specific project challenges.

BIM Program Flyer

The following are highlights of the GSA National 3D-4D-BIM Program:

- Established policy to phase in 3D, 4D, and BIM adoption for all major projects
- Leading 3D-4D-BIM pilot application on current capital projects
- Providing expert support and assessment for ongoing capital projects to incorporate 3D, 4D, and BIM technologies
- Assessing industry readiness and technology maturity
- Developed GSA-specific incentives for 3D-4D-BIM
- Developed solicitation and contractual language for 3D-4D-BIM services
- Partnered with BIM vendors, professional associations, open standard organizations, and academic/research institutions

CONTACTS

Charles Matta

(202) 219-2355

charles.matta@gsa.gov• [View Contact Details](#)**Calvin Kam**

(202) 208-0447

calvin.kam@gsa.gov• [View Contact Details](#)

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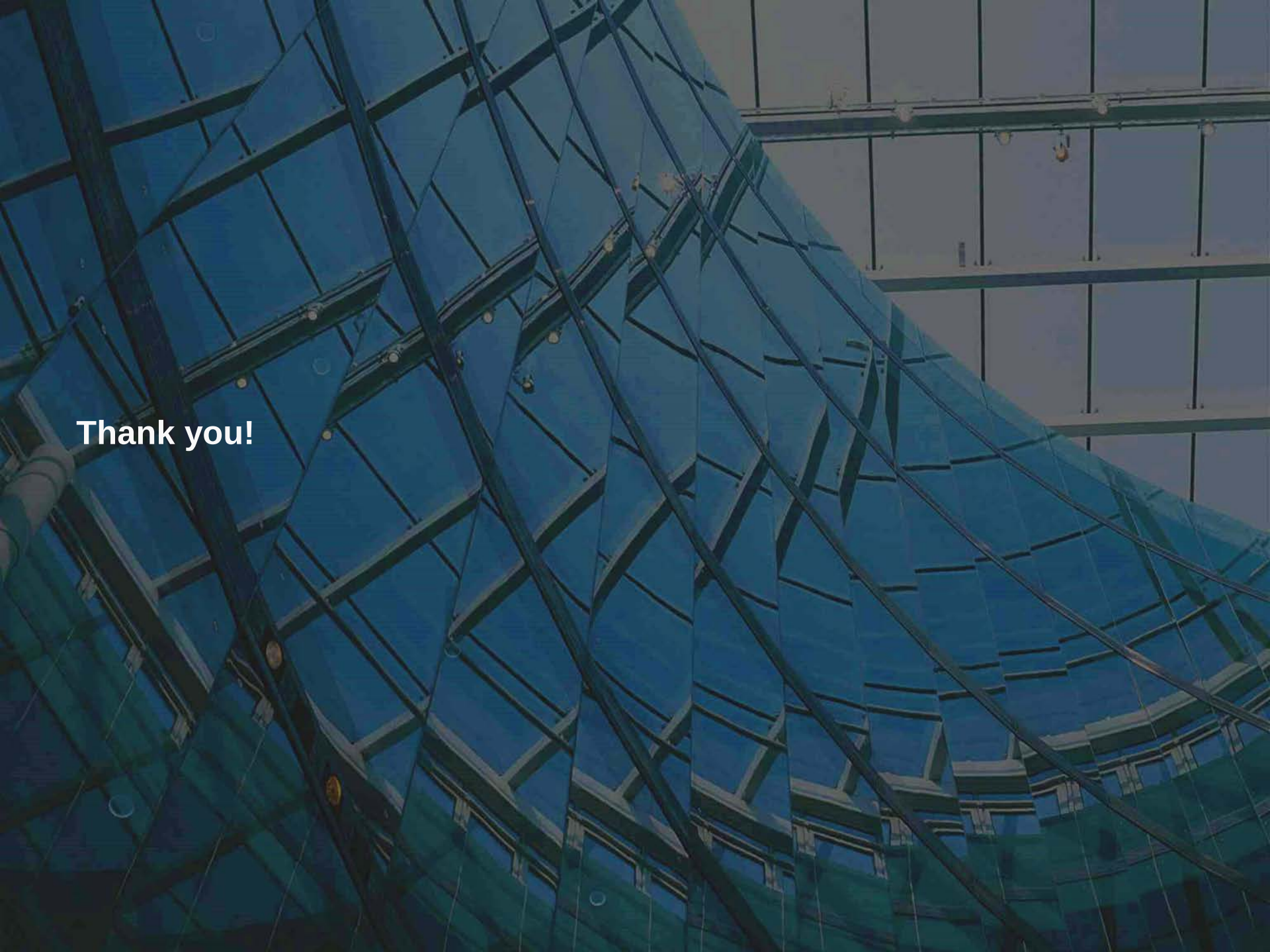
QuickLinks

[A-Z Links to GSA Topics](#)

For all major projects (prospectus-level) receiving design funding in Fiscal Year 2007 and beyond, GSA will require spatial program **BIMs** be the **minimum requirements** for submission to OCA for Final Concept approvals by the PBS Commissioner and the Chief Architect.

Challenges from the Technology to the Industry

- Participation of all participants
- Redefinition of roles of all Building Industry Participants
- Project Delivery Time
- Fee Structure
- Standard Contract Provision – position of BIM model
- Contractual Relationship
- Other supports – Government, Professional Bodies, Education
- BIM Authorities – Standards and Certification
-



Thank you!