Introduction of BUILDING INFORMATION MODELLING

Infrastructure Solution

28 Feb 2009

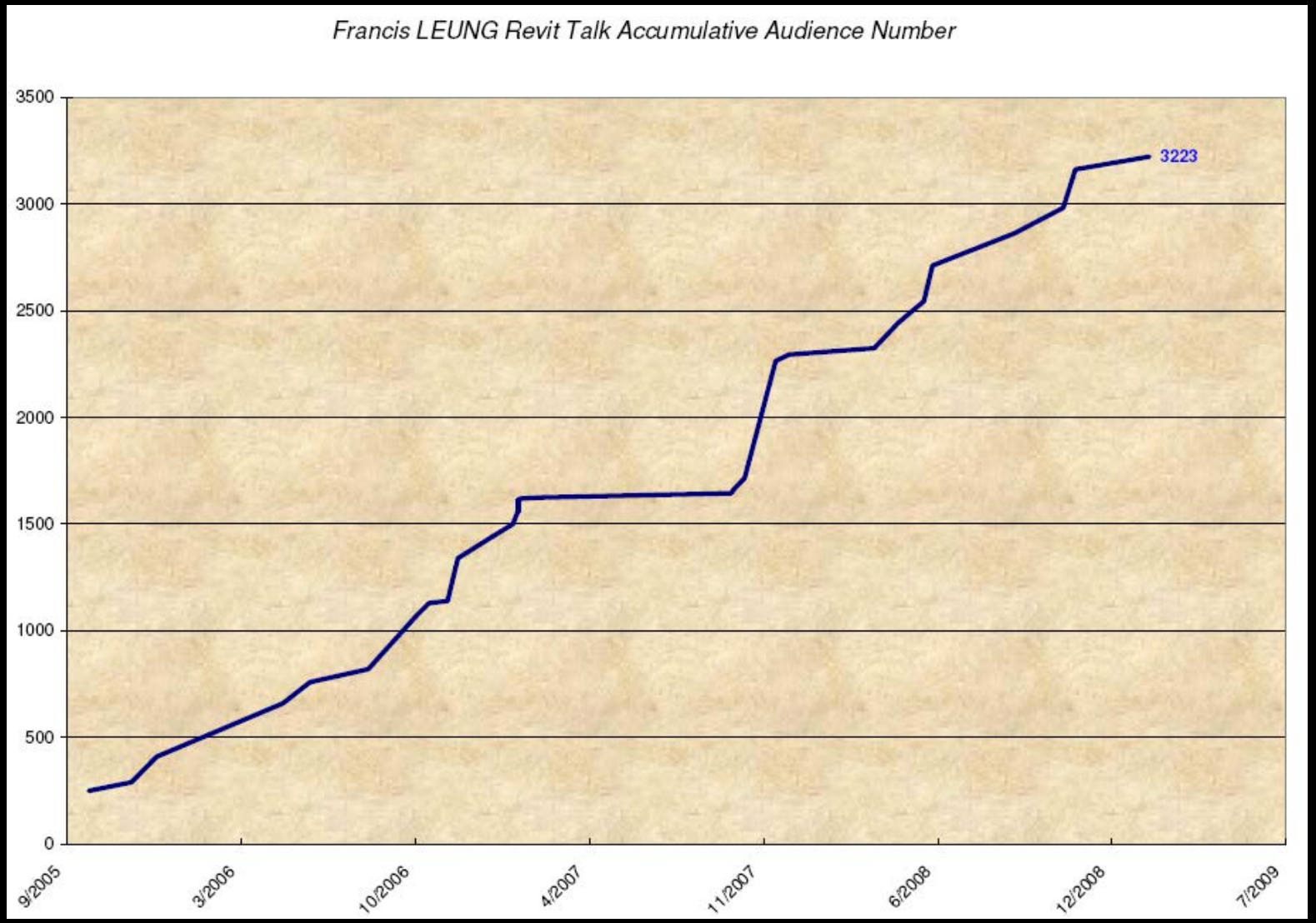
Content

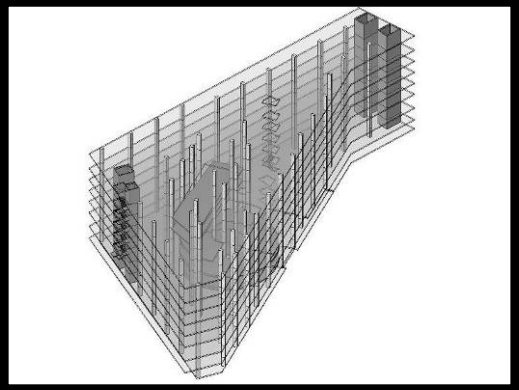
- Introduction of BIM
- Introduction of HKIBIM
- Industry-wide application of BIM in real projects

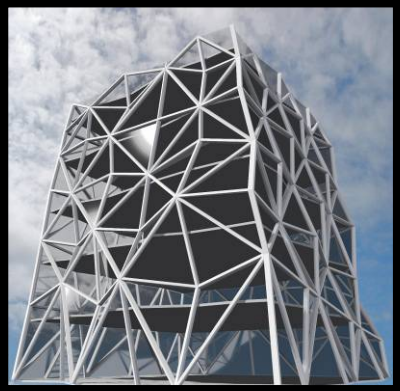
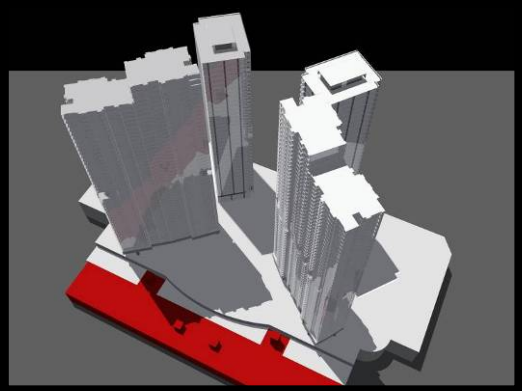
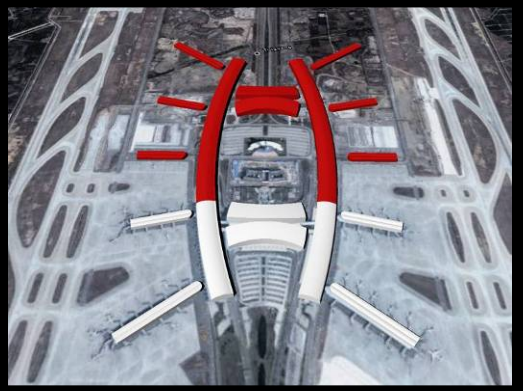
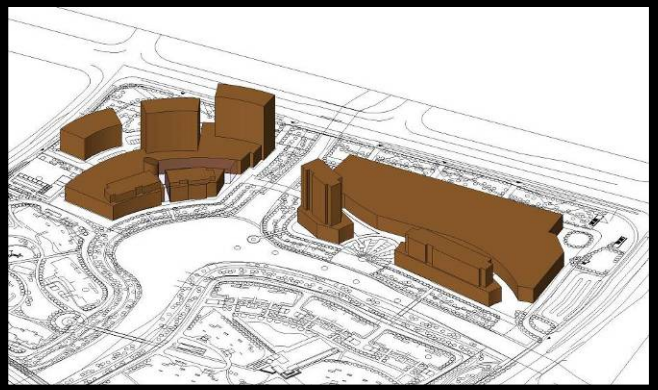
About the Speaker...

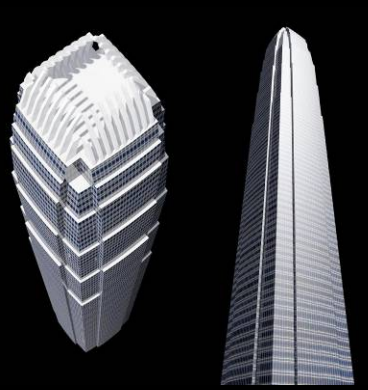
- 20 years of design and CAD experience
- Establish Autodesk Industry Advisory Board (AIAB) in April 2005
- Implementing Revit® in real projects since August 2005
- Head of BIM, WSP HK Limited (since 2007)
- Author, Quick Start Revit Structure 2008
- Chairman, Hong Kong Institute of BIM (HKIBIM) (2009 – 2011)
- BIM Projects extracts
  - Huawei Beijing Environmental and Technology Park, Beijing, PRC
  - Hotel & Office Dev. in Business Bay, Dubai
  - Hotel Dev. in Ulaanbaatar, Mongolia
  - Shangri-la at the Fort, Manila, Philippines
  - Singapore CCRC Vista Xchange, One-North, Singapore
    (Hong Kong Revit BIM Experience Award 2008)
  - CSD for Broadcast Drive, HK

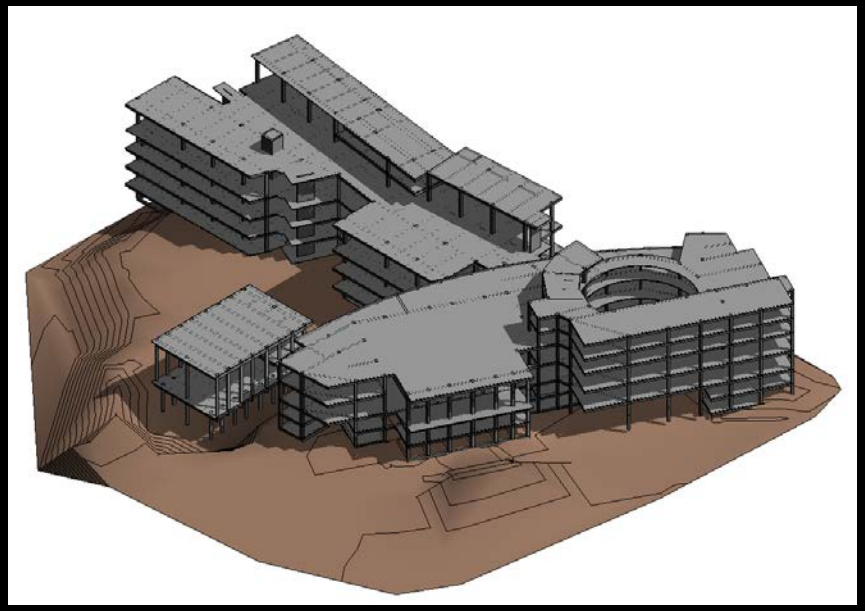
Audience Summary

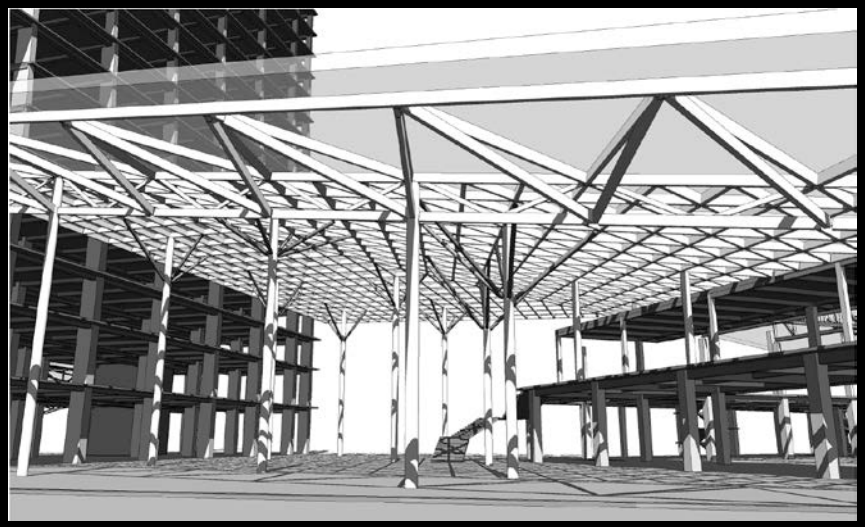


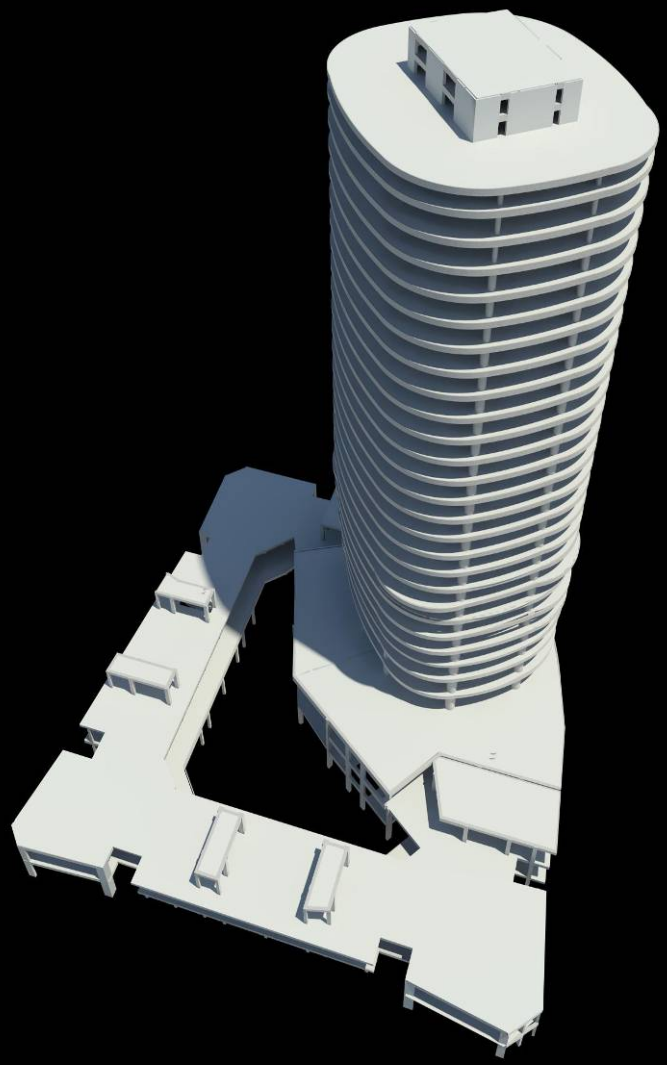





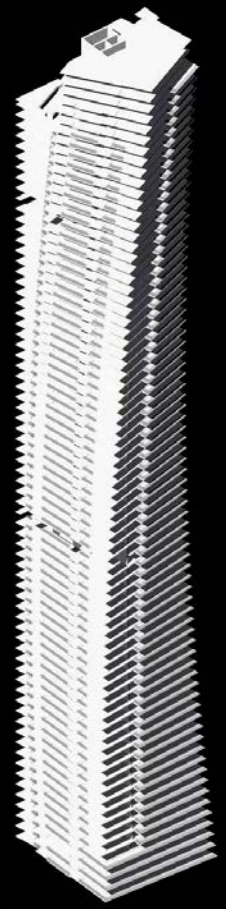


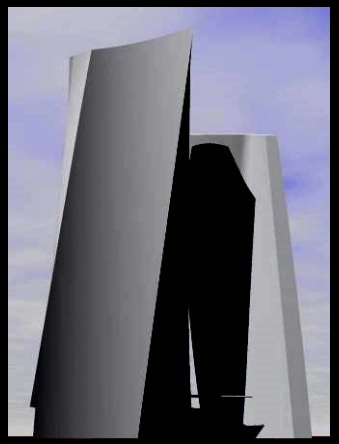


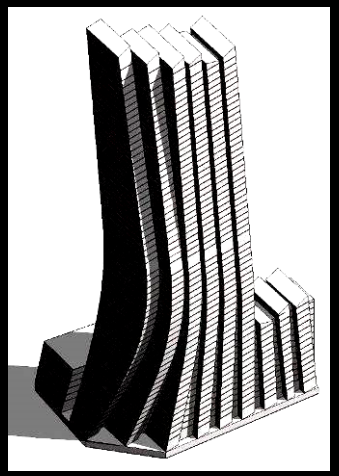


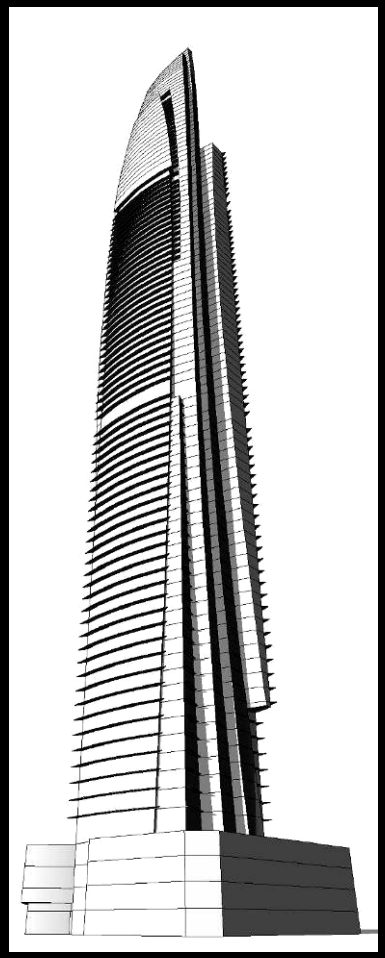
5 Projects with Complex Geometry

- Ocean Heights I, Dubai
  (With courtesy of **Aedas Ltd.***)*
- Dancing Tower, Abu Dhabi
  (With courtesy of **Aedas Ltd.***)*
- Empire Tower, Dubai
  (With courtesy of **Aedas Ltd.***)*
- Ocean Heights II, Dubai
  (With courtesy of **Aedas Ltd.***)*
- Singapore CCRC Vista Xchange, One-North, Singapore
  (W



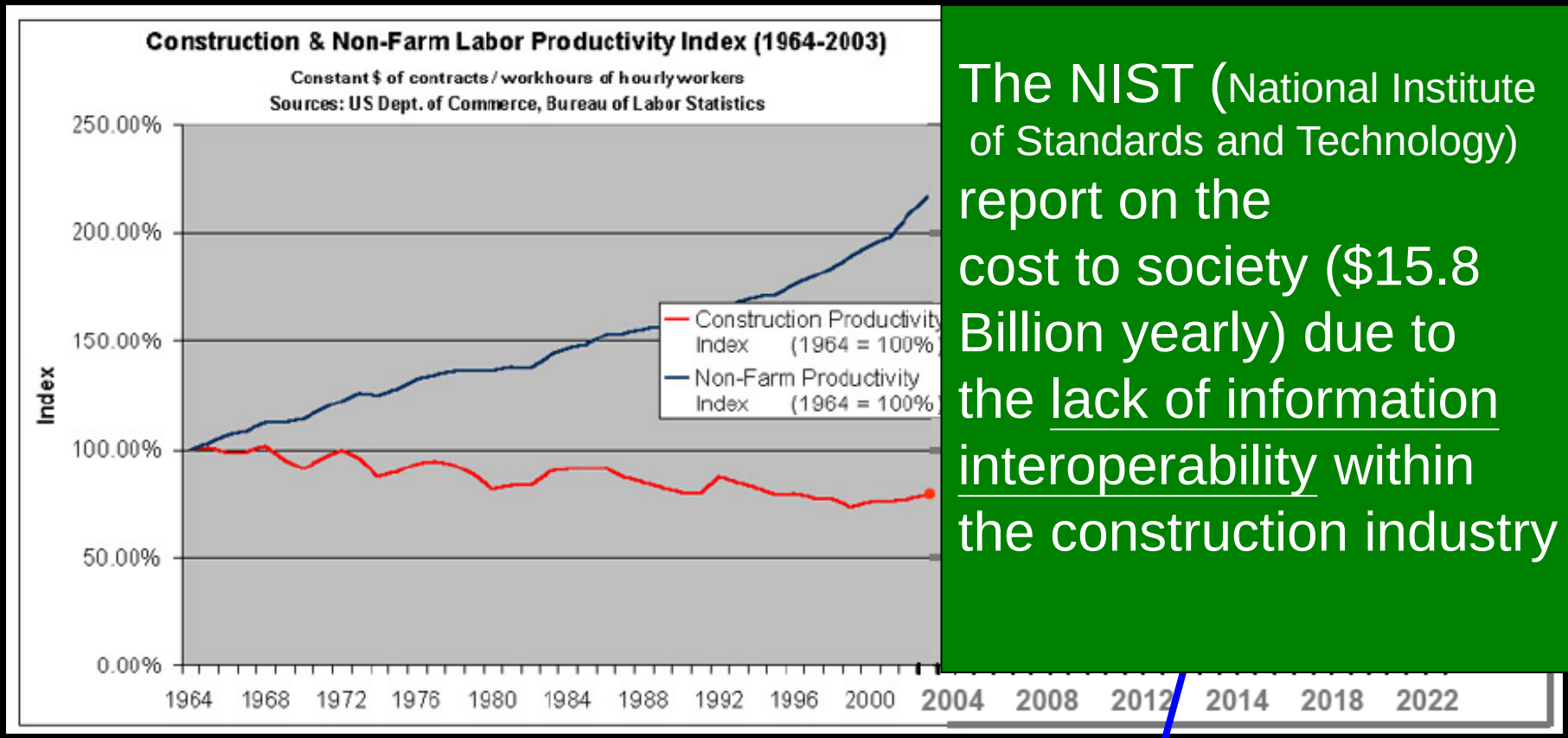






What is BIM?

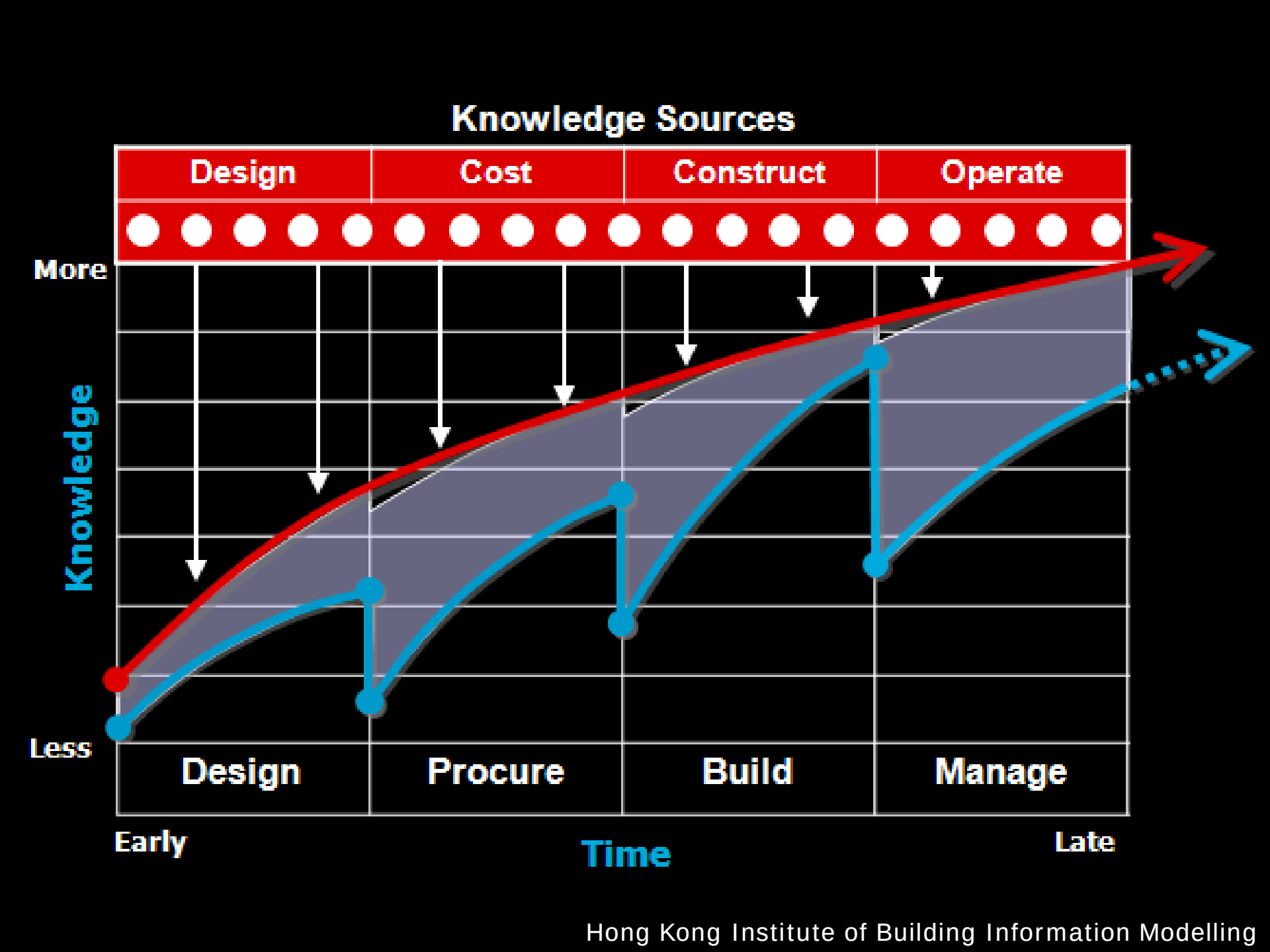
Productivity Index



The NIST (National Institute of Standards and Technology) report on the cost to society ($15.8 Billion yearly) due to the lack of information interoperability within the construction industry

Historical information courtesy of Bureau of Labor Statistics; future projection courtesy of DKS Information Consulting, LLC

The rate of improvement depends on how seriously WE view the crisis and come forward with necessary resources.


Knowledge Sources
Design
Cost
Construct
Operate
More
Knowledge
Less
Design
Procure
Build
Manage
Early
Time
Late

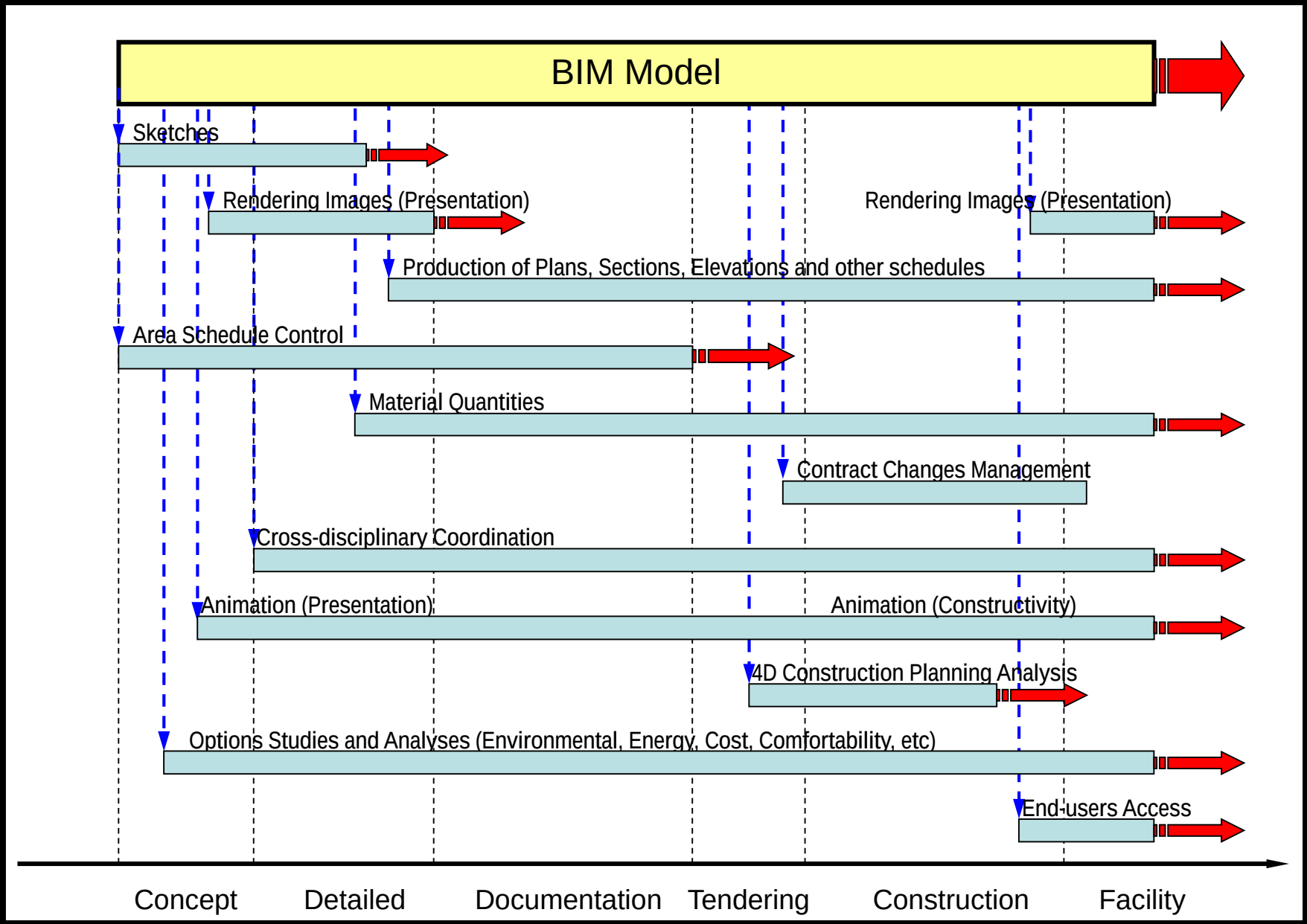
Experience it before it's Real

US National BIM Definition

digital representation of a facility

shared knowledge resource for information

reliable basis for decisions during its life-cycle


BIM Model
Sketches
Rendering Images (Presentation)
Rendering Images (Presentation)
Production of Plans, Sections, Elevations and other schedules
Area Schedule Control
Material Quantities
Contract Changes Management
Cross-disciplinary Coordination
Animation (Presentation)
Animation (Constructivity)
4D Construction Planning Analysis
Options Studies and Analyses (Environmental, Energy, Cost, Comfortability, etc)
End-users Access
Concept
Detailed
Documentation
Tendering
Construction
Facility

US General Service Administration
GSA BIM Guide

U.S. General Services Administration
Public Buildings Service
Office of the Chief Architect

May 15th, 2007

This version of the *GSA Building Information Modeling Guide Series 01 - Overview* is identified as Version 0.6 to indicate its provisional status. With its publication, the GSA BIM Guide, for the first time, becomes available for public review and comment. As its provisional status denotes, however, it will continue to serve as the basis for further development, pilot validation, and professional editing. All readers of this provisional guide are encouraged to submit feedback to the National 3D-4D-BIM Program. Updated versions will continue to be issued to address and incorporate on-going feedback in an open and collaborative process.

Currently, *GSA Building Information Modeling Guide Series 02 - Spatial Program Validation*, version 0.96 is also available for review and comment.

For further information about GSA's National 3D-4D-BIM Program, additional BIM Guide Series, or to submit comments or questions, visit the National 3D-4D-BIM webpage at http://www.gsa.gov/bim.

The National 3D-4D-BIM Program
Office of the Chief Architect
Public Buildings Service
U.S. General Services Administration
1800 F Street NW, Suite 3341
Washington, DC 20405

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Foreword

- The construction industry is ripe for fundamental changes enabled by the same virtual, smart object modeling technology now prevalent in aerospace, automotive, and other industry practice.
- Just as today's major manufacturers use computer technology to model their products virtually before production, **in the future we will first build our buildings virtually on a computer before attempting to build them physically in the field**.
- In titling this guide, OCA has adopted the now predominantly used name, Building Information Modeling, or BIM. **BIM is a data rich digital representation cataloging the physical and functional characteristics of design and construction.** Its purpose is to make the design information explicit, so that the design intent and program can be immediately understood and automatically evaluated.

This Series O1 guide is divided into …

- Section 1: GSA's national 3d-4d-bim
  - This section introduces the GSA's National 3D-4D-BIM Program as well as provides **background information on concepts, definitions, and expectations** underlying 3D, 4D, and BIM technologies, modeling, and models.
- Section 2: 3d-4d-bun projects –the basics
  - This section provides **guidance on best practices** regarding the implementation of 3D, 4D, and BIM technologies in different parts of the project lifecycle, and **reviews the factors that must be considered before implementing BIM on a project**. For specific applications of 3D, 4D, and BIM technologies, please see additional Series Guides.

section 1: GSA's national 3d-4d-bim program

- GSA's initiative has led **other federal agencies to adopt BIM**, elevated the case for open standards, and **encouraged the industry and peer owners to establish an owner's BIM and its requirements**.

- A BIM-based approach **supports 'on demand' generation of documents** (e.g., drawings, lists, tables, and 3D renderings) from a consistent BIM. In a sense, these documents **present views of the current BIM**. A BIM model, therefore, can live longer, **contribute more to process efficiency, and provide superior accuracy than traditional 2D CAD drawings**.

- As a shared knowledge resource, **BIM can reduce the need for re-gathering or re-formatting information**. This can result in an **increase in the speed and accuracy** of transmitted information, **reduction of costs** associated with a lack of interoperability, **automation of checking and analysis**, and unprecedented support of operation and maintenance activities.

Definition of BIM

- **Building Information Modeling** is the development and use of a multi-faceted computer software data model to not only document a building design, but to simulate the construction and operation of a new capital facility or a recapitalized (modernized) facility. The resulting

- **Building Information Model** is a data-rich, object-based, intelligent and parametric digital representation of the facility, from which views appropriate to various users' needs can be extracted and analyzed to generate feedback and improvement of the facility design.

Distinguishing 3D models and BIM

- 3D geometric models contain very little intelligence. **BIM models contain a high level of intelligence.**
- A 3D model includes a three-dimensional geometric representation of the building, whereas a BIM is organized as a **prototype of the building**, in terms of building floors, spaces, walls, doors, windows and a wide array of information associated with each of these elements.
- A BIM can normally be viewed in 3D, but **the model also includes information used by other building analysis applications, such as cost estimating, energy simulation, daylighting, computational fluid dynamics (CFD), and building code checking.**

OCA Status

- OCA's 3D-4D-BIM Program has given guidance and assistance to **over 50 GSA capital projects in the past 3 years**. In particular, **OCA has completed 10 pilot projects**. It has **11 pilot projects underway** in its current capital program, while assessing and supporting 3D, 4D, and BIM applications in over 25 ongoing projects across the nation. This section gives a program overview and elaborates on specific 3D-4D-BIM initiatives the program currently supports.
- **Currently, for all projects receiving design funding in Fiscal Year 2007 and beyond, a spatial program BIM will be the minimum requirement for all major (new and modernization) projects submitted to the Commissioner of the Public Buildings Service for Final Concept approvals.** For additional information, see the BIM Guide Series 02- Spatial Program Validation.

Spatial Validation

- The National 3d-4D-BIM Program has chosen to focus first on using BIM for spatial validation because spatial validation is a universal problem on all projects. **For all projects receiving design funding in Fiscal Year 2007 and beyond, a spatial program BIM will be the minimum requirement for all major (new and modernization) projects** that will be submitted to the Commissioner of the Public Buildings Service for Final Concept approvals.
- OCA has developed a “GSA Concept Design View” of the requirements for spatial data management. The GSA Concept Design View is a model view of the **IFC BIM modeling data standard** that was developed and published by the IAI. The GSA Concept Design View of IFC is currently supported by **Autodesk Revit and Architectural Desktop, Bentley Architecture, Graphisoft ArchiCAD, Onuma Planning System, and Solibri Model Checker**. These applications have gone through four rounds of validation testing using a GSA test case building.

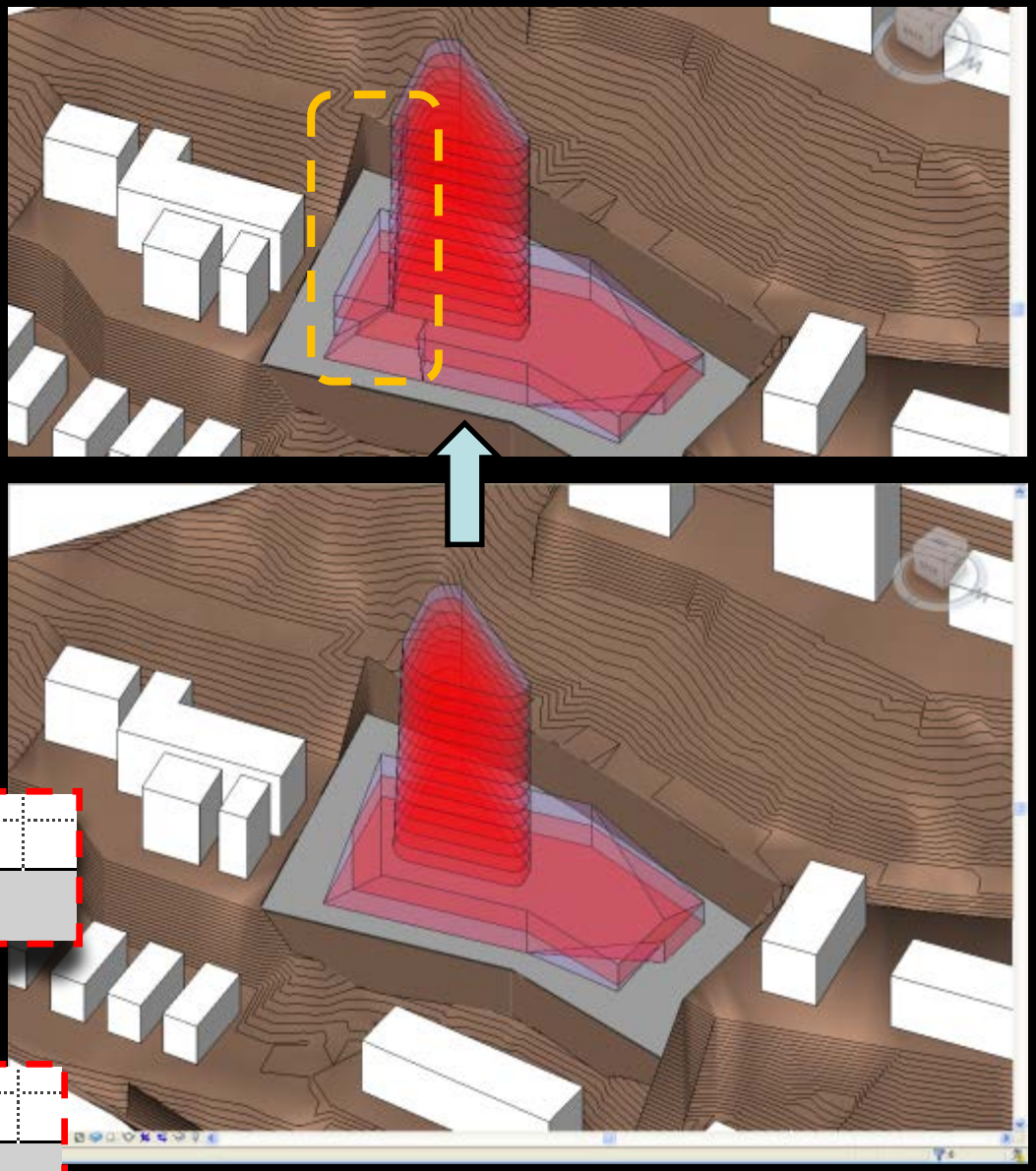
Experience from HK Developers

- Henderson Land Development (Autodesk Revit®)
  - Trial Project: Beijing World Financial Centre
- MTR Corporation (Autodesk Revit®)
  - Existing Stations
  - Trial: New lines
- Housing Department (No preference; start with Autodesk Revit®)
  - In-house trial projects
  - Full strength implementation
- Hong Kong Science & Technology Parks (Autodesk Revit®)
  - Pilot Project: Building 20
- Swire Properties (Digital Project™)
  - One Island East

Implementation of BIM in HK

Developer \ Users	In-house Design Team	In-house Operator (Facility Management)	External Project Consultant	External BIM Consultant
Henderson Land Development	n/a			●
MTR Corporation	●	●		
Housing Department	●			●
Hong Kong Science & Technology Parks	n/a		●	
Swire Properties	n/a	?	●	●

Development Potential and Massing in REVIT reports ***floor area*** real-time



Mass Floor Schedule

Level 楼层	Floor Area 面积	Floor Perimeter 楼板周长	Usage 用途
Level 14	411 m²	85.02 m	Residential 住宅
Level 13	412 m²	85.18 m	Residential 住宅
Level 12	414 m²	85.35 m	Residential 住宅
Level 11	415 m²	85.51 m	Residential 住宅
Level 10	416 m²	85.68 m	Residential 住宅
Level 9	417 m²	85.84 m	Residential 住宅
Level 8	418 m²	86.01 m	Residential 住宅
Level 7	419 m²	86.17 m	Residential 住宅
Level 6	420 m²	85.71 m	Residential 住宅
Level 5	421 m²	85.71 m	Residential 住宅
Level 4	422 m²	85.71 m	Residential 住宅
Level 3	422 m²	85.71 m	Residential 住宅
Level 2	423 m²	85.71 m	Residential 住宅
LEVEL 1	1771 m²	85.71 m	
LEVEL 0	1682 m²	85.71 m	
Grand total: 1	8883 m²		

LEVEL 1	1771 m²
LEVEL 0	1682 m²
Grand total: 1	8883 m²

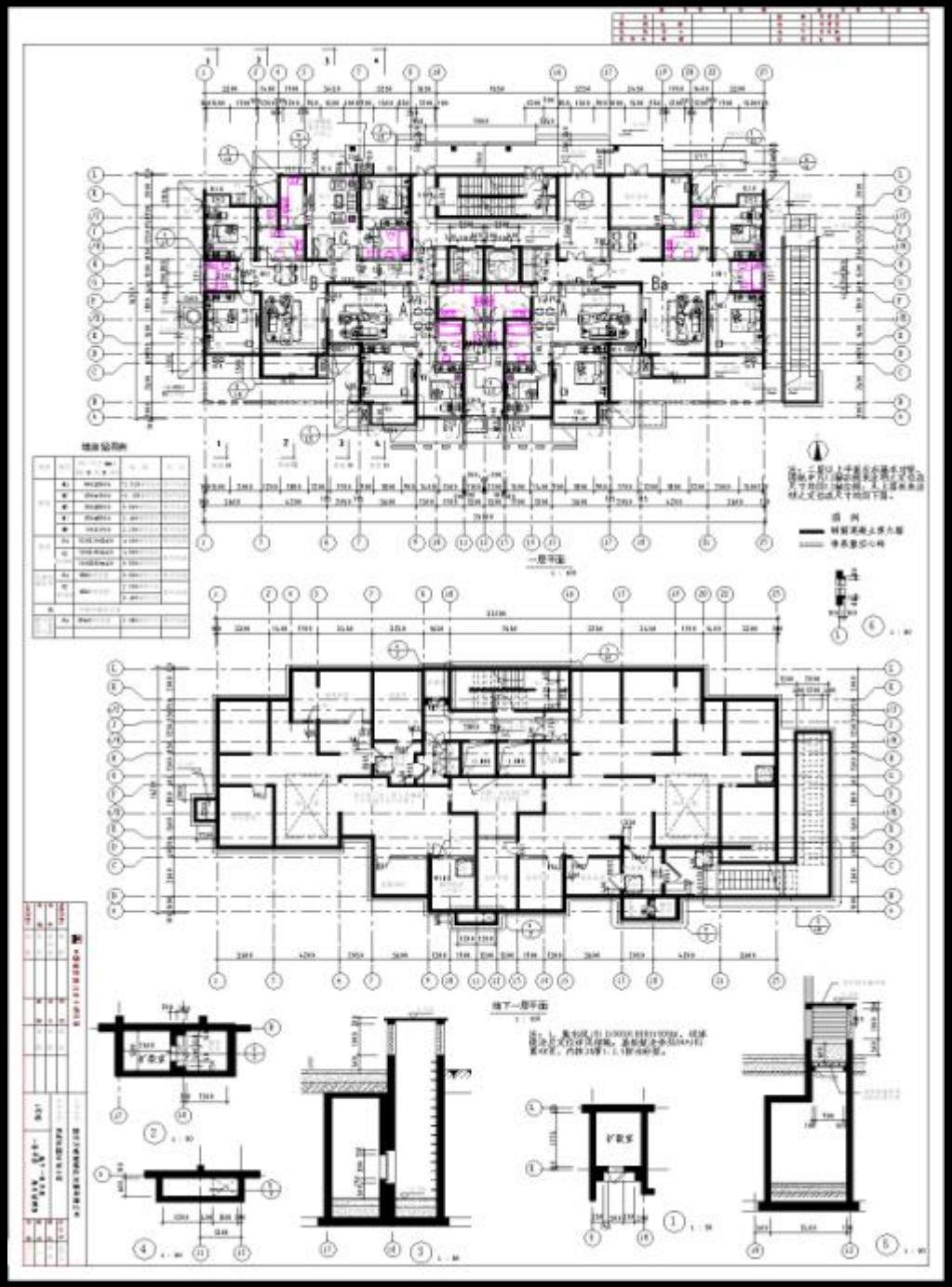
LEVEL 1	1792 m²
LEVEL 0	1682 m²
Grand total: 1	8962 m²

Image Courtesy of HOK

项目15：枫韵沁园住宅

设计单位：中国建筑西北设计研究院

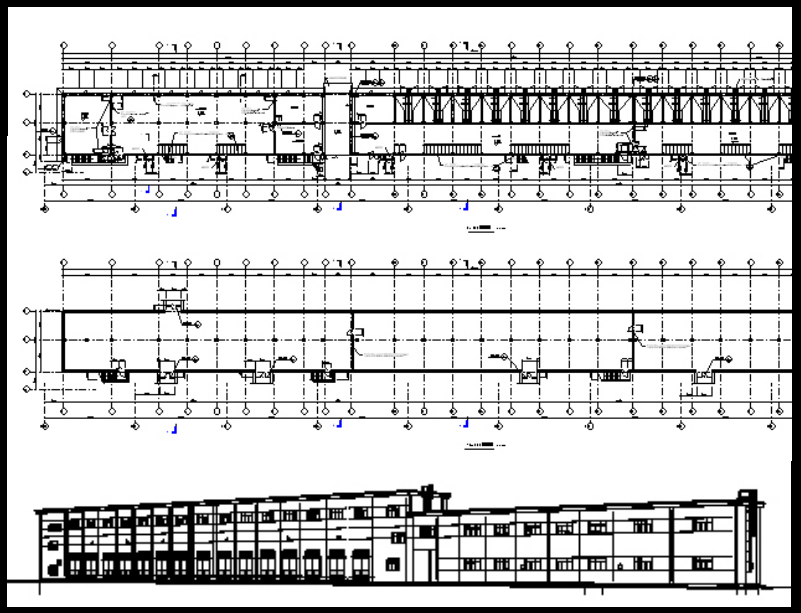
建筑师：崔旸



项目24：首钢酸再生站及退出口电气室

设计单位：中冶南方工程技术有限公司

建筑师：叶清波



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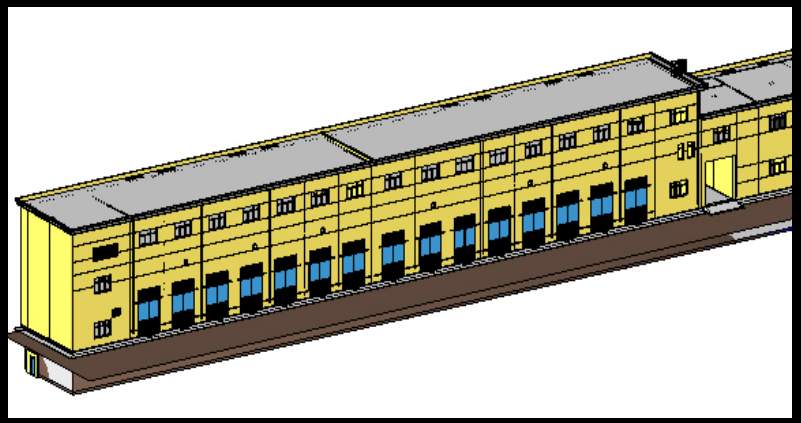
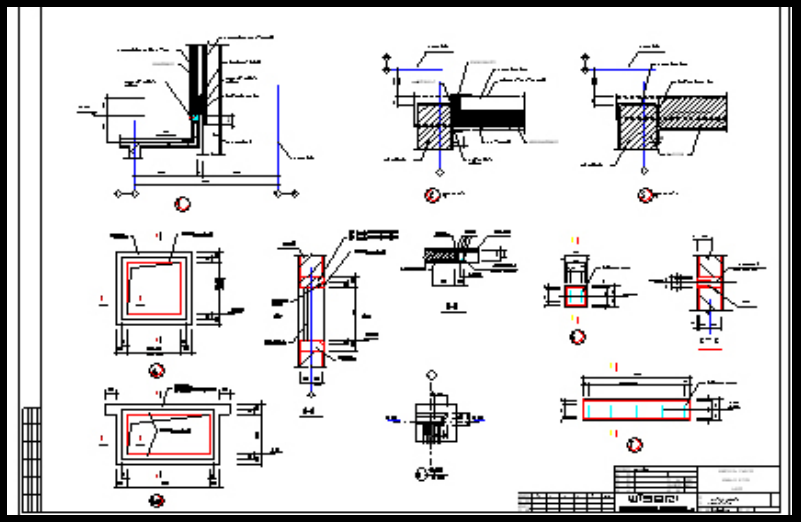
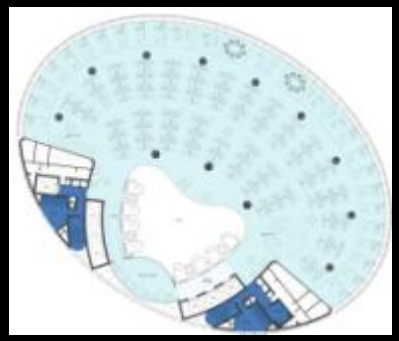
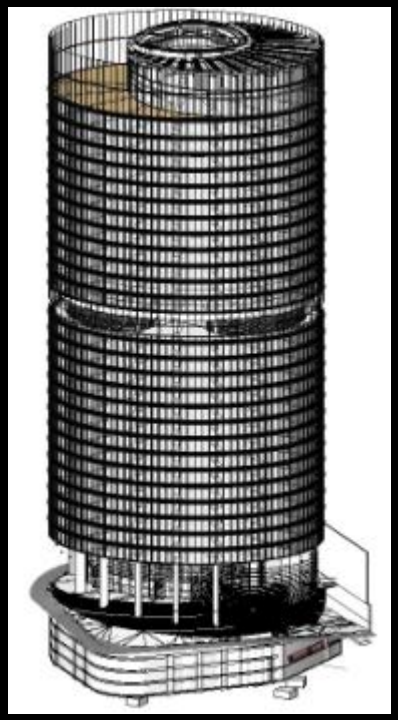




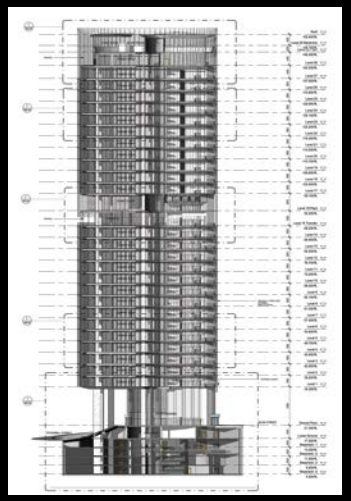
Schedule



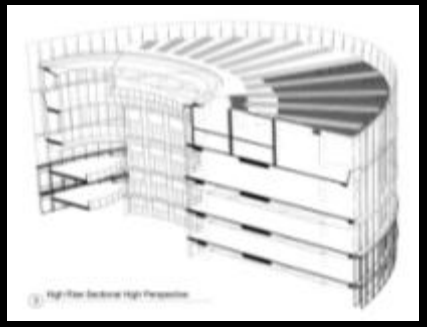
Plan



Central Building Information Model



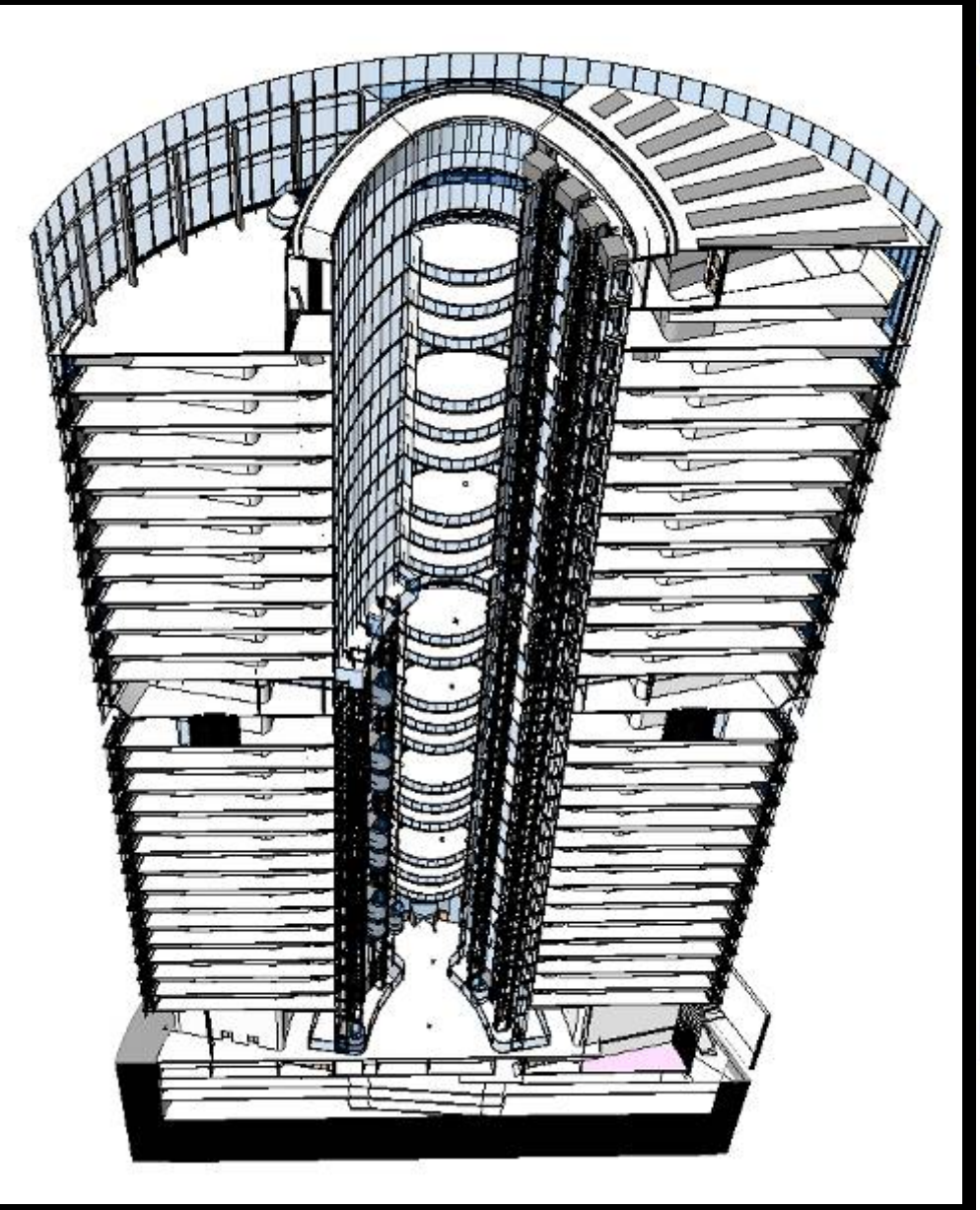
Elevation/Section

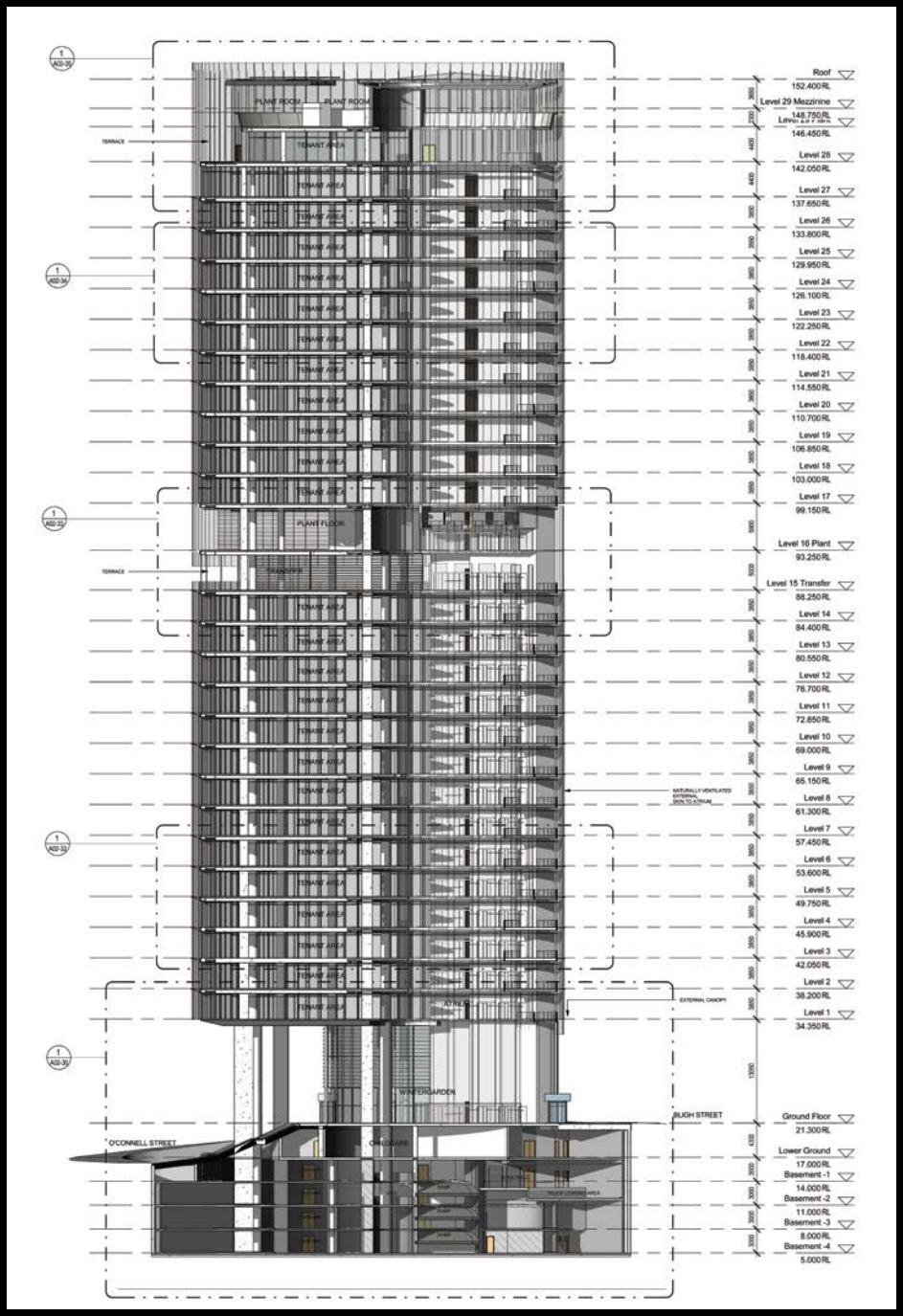


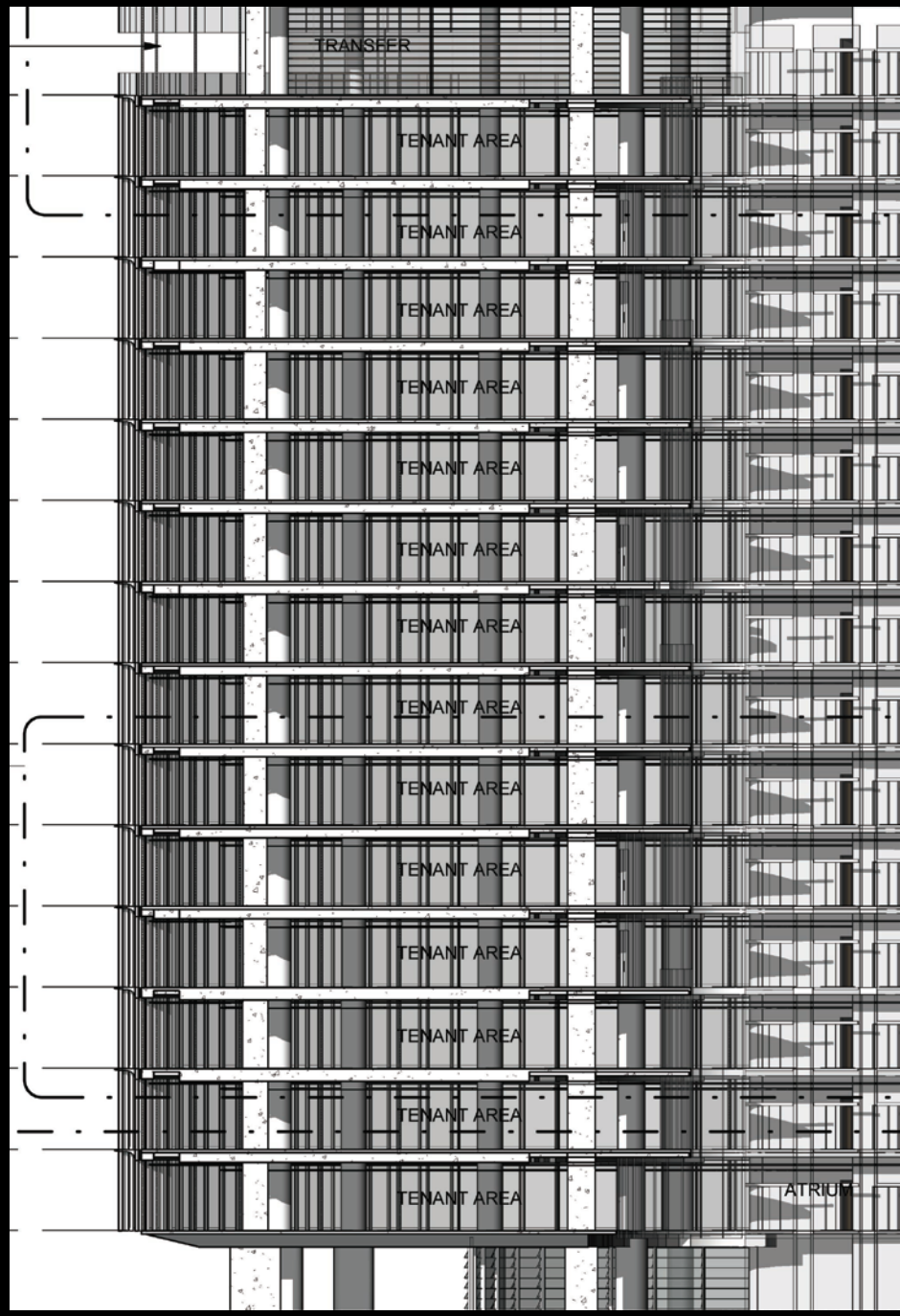
3D study

Detail

A better way to draw *Design led documentation*




PLANT ROOM
PLANT ROOM
TERRACE
TENANT AREA
PLANT FLOOR
TERRACE
NATURALLY VENTILATED EXTERNAL SKIN TO ATRIUM
EXTERNAL CANOPY
ATRIUM
WINTERGARDEN
O'CONNELL STREET
CARLOADING
BLIGH STREET
Roof 152.400RL
Level 29 Mezzinine 148.750RL
Level 28 142.050RL
Level 27 137.650RL
Level 26 133.800RL
Level 25 129.950RL
Level 24 126.100RL
Level 23 122.250RL
Level 22 118.400RL
Level 21 114.550RL
Level 20 110.700RL
Level 19 106.850RL
Level 18 103.000RL
Level 17 99.150RL
Level 16 Plant 93.250RL
Level 15 Transfer 88.250RL
Level 14 84.400RL
Level 13 80.550RL
Level 12 76.700RL
Level 11 72.850RL
Level 10 69.000RL
Level 9 65.150RL
Level 8 61.300RL
Level 7 57.450RL
Level 6 53.600RL
Level 5 49.750RL
Level 4 45.900RL
Level 3 42.050RL
Level 2 38.200RL
Level 1 34.350RL
Ground Floor 21.300RL
Lower Ground 17.000RL
Basement -1 14.000RL
Basement -2 11.000RL
Basement -3 8.000RL
Basement -4 5.000RL


TRANSFER
TENANT AREA
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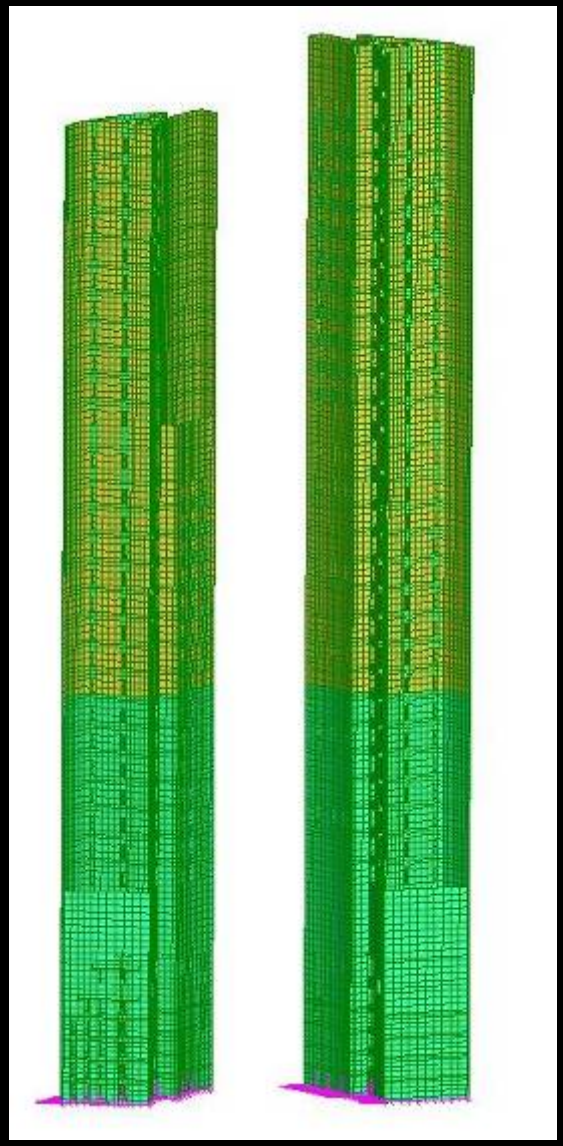
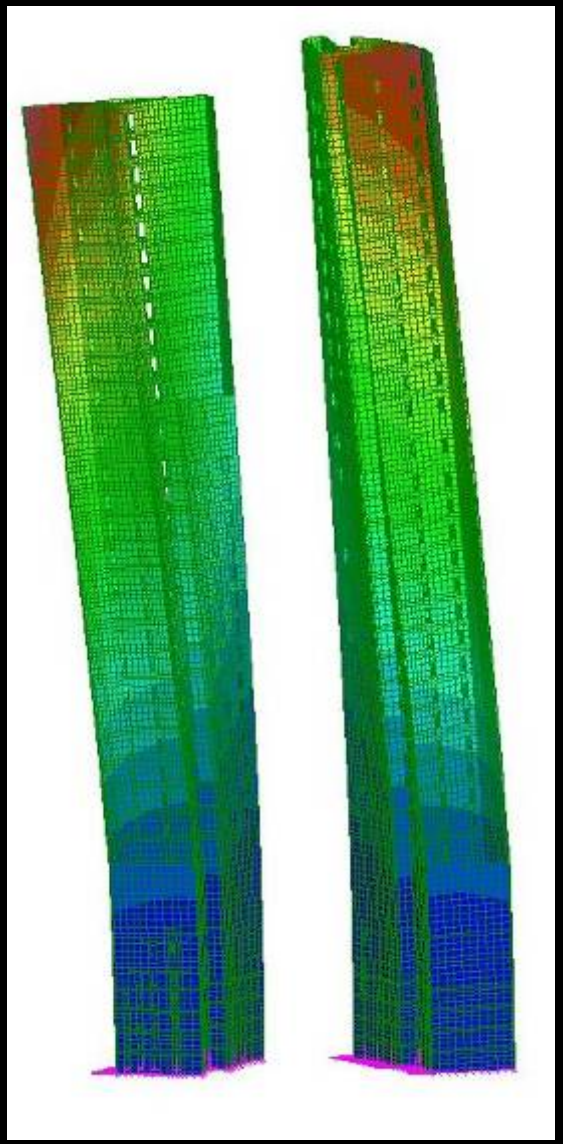
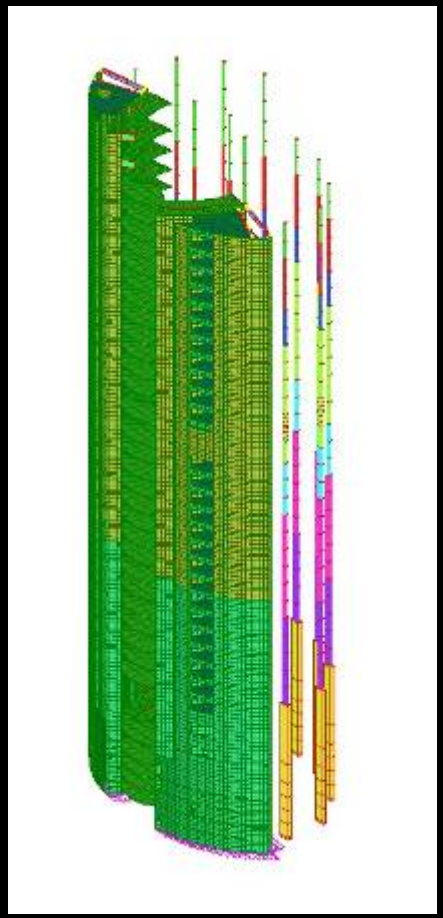
ATRIUM

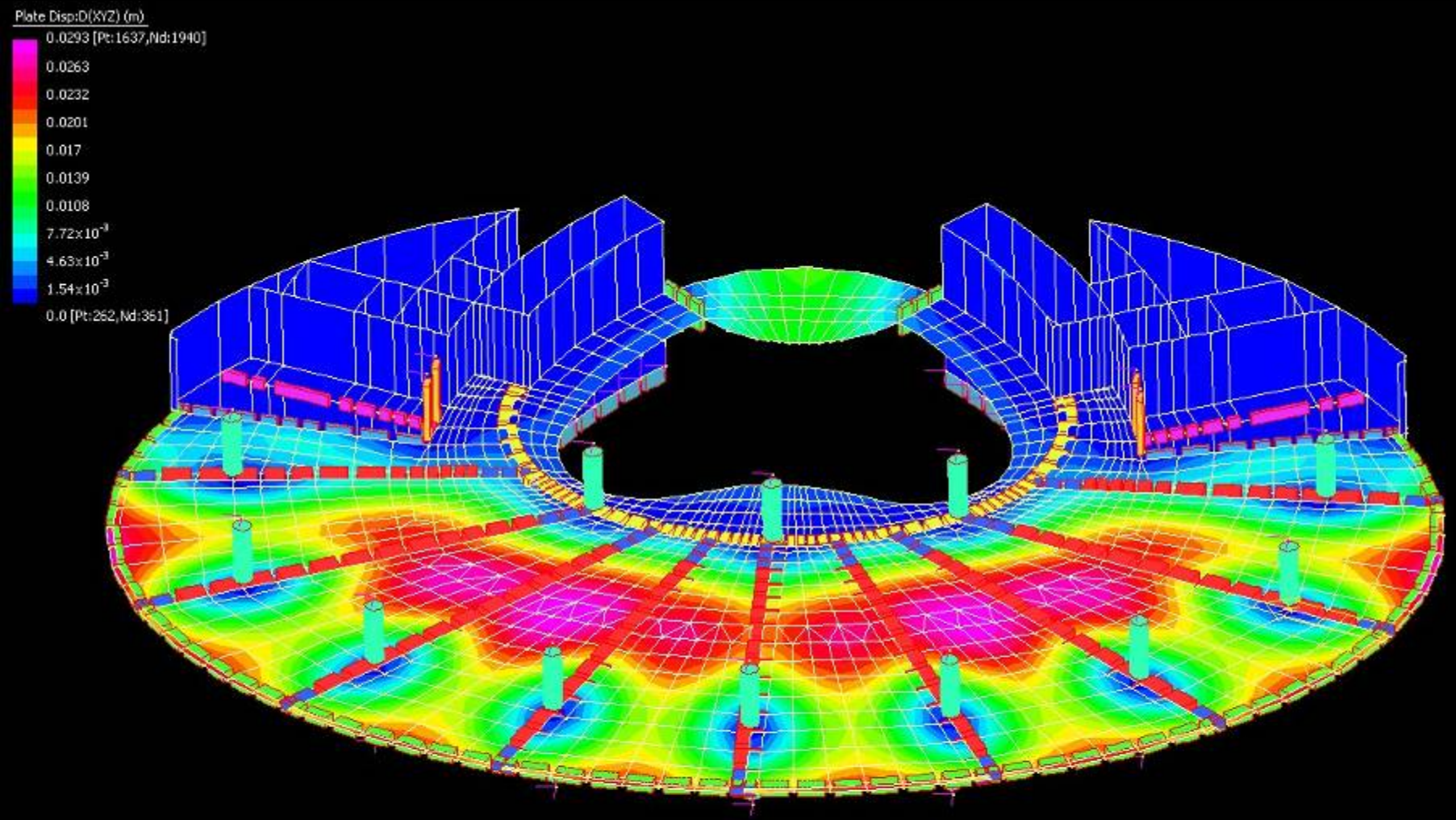
Vertical and Wind loadings







Finite Element Analysis



ADVANCED
BUILDING TECHNOLOGIES

DS-PLAN

Bligh Street Sydney
CFD analysis of double skin facade

ADVANCED BUILDING TECHNOLOGIES | DS-PLAN

Impact of lamellas and deflectors

The aim is to analyse the impact of obstructions and deflectors at the inlet and outlet openings on the ventilation of the facade cavity and to verify the proposed solution.

Boundary conditions:

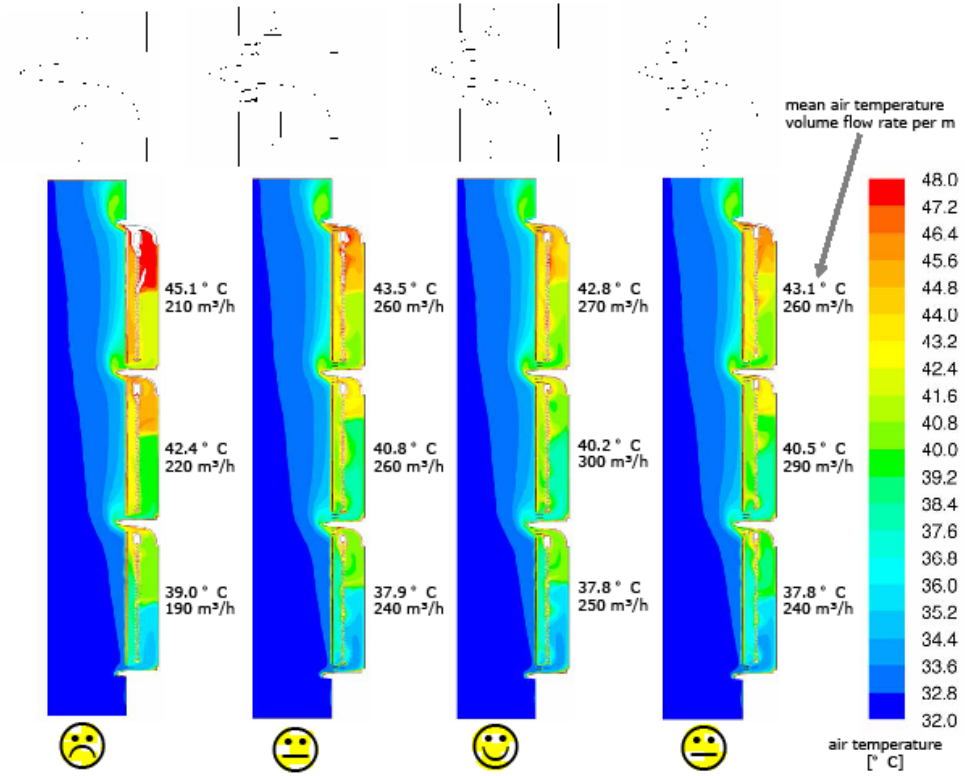
- solar radiation: → 750 W/m² on outside surface (autumn/spring, midday, NE, NW)
- outdor temperature: → 32 ° C
- indoor temperature: → 24 ° C
- wind: → **no wind (worst case)**
- glazing outer skin: → white glas 2x8 mm
- glazing inner skin: → sun protection glazing 68/34, Ug=1.8 W/m²K
- shading: → lamella blinds: RAL 9006 (silver) (solar absorption: 46%, solar reflection: 54 %)

Case 1: opening hight 150 mm, no barriers (no rain protection)

Case 2: opening hight 250 mm, lamellas (rain protection)

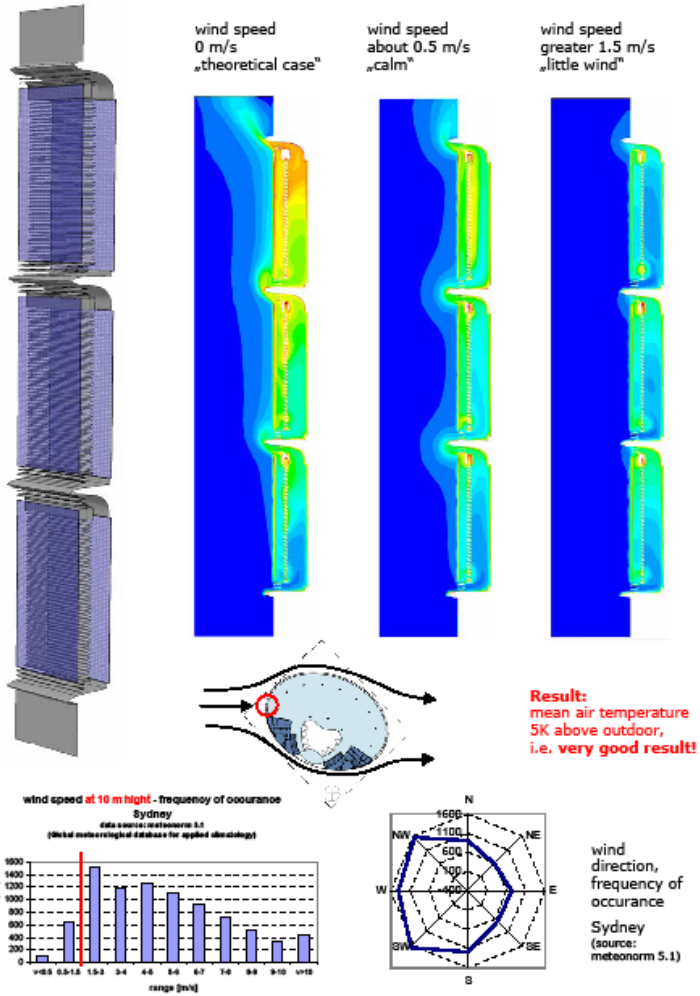
Case 3: opening hight 250 mm, lamellas (rain protection), deflector at lower lamella

Case 4: opening hight 250 mm, lamellas (rain protection), deflector at upper lamella

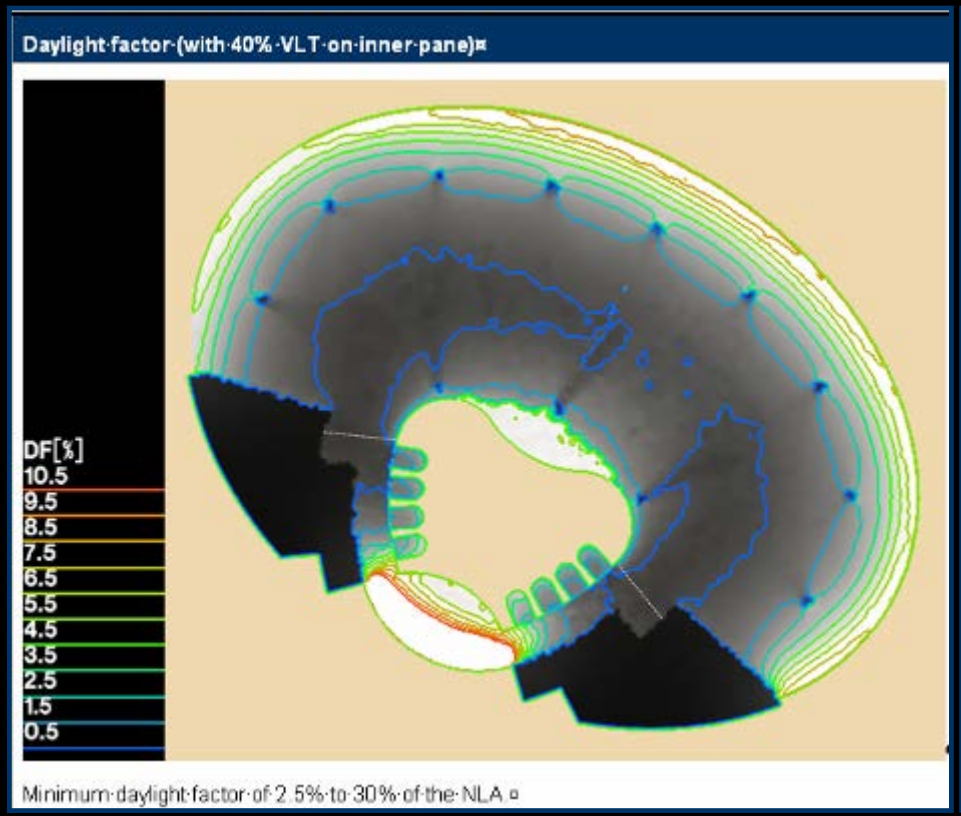


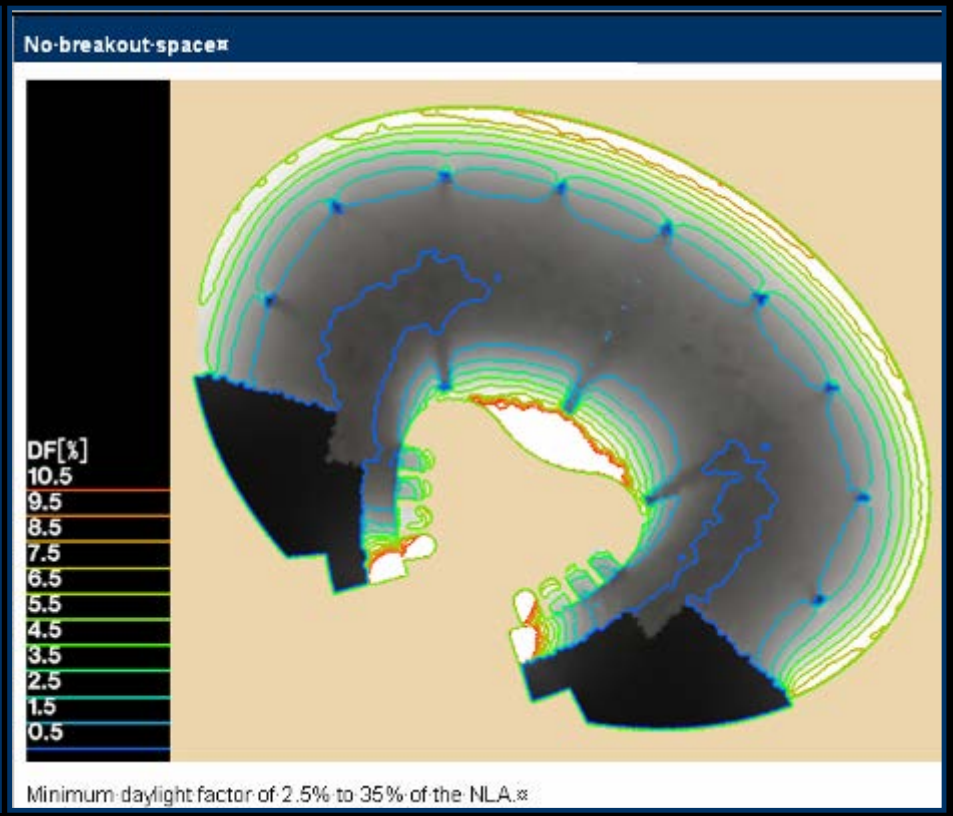
Impact of wind

The aim is to analyse the impact of wind speed on the temperature increase due to recontamination. The results are valid for direct wind exposure, i.e. right angle between wind direction and facade.

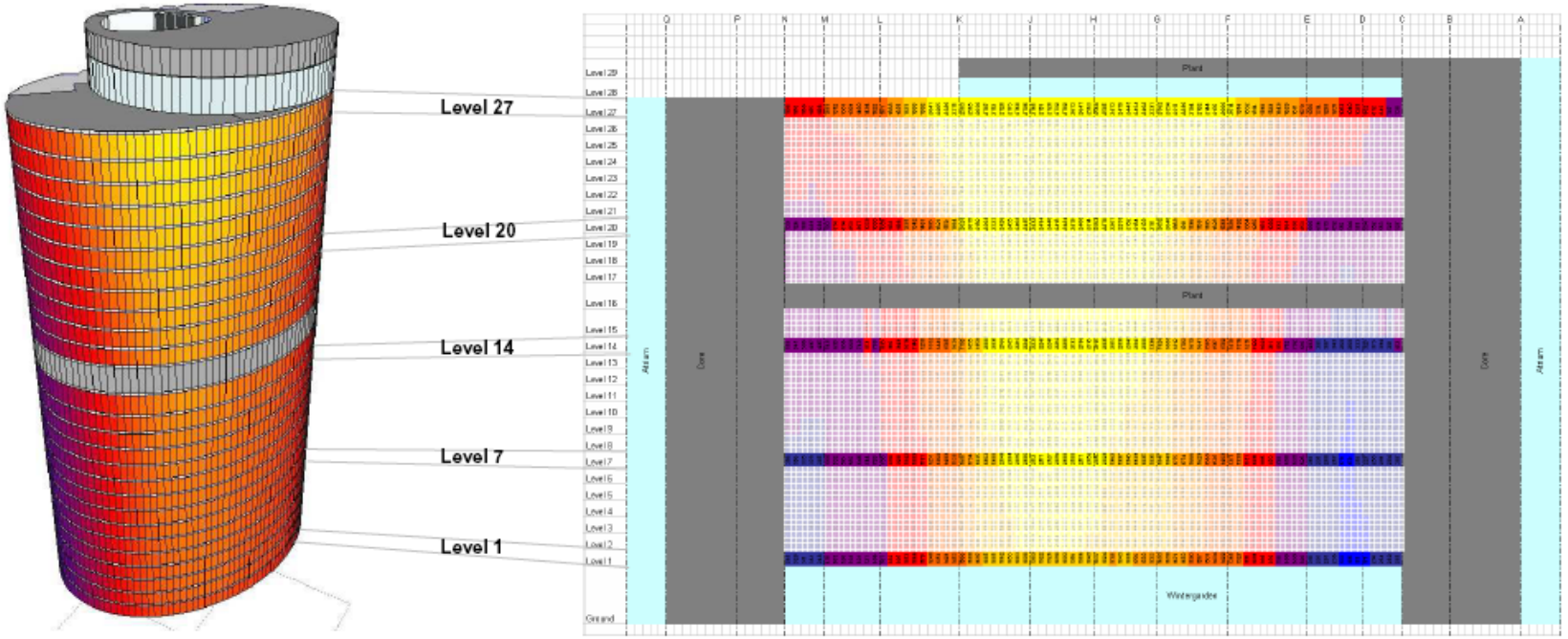


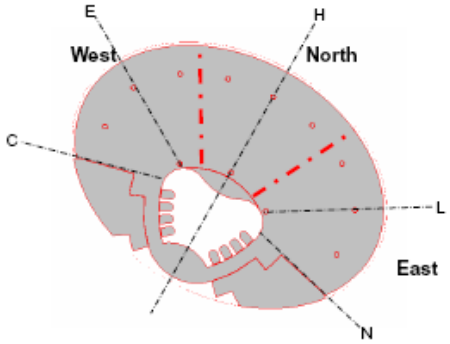
Daylight Analysis





We have calculated the number of hours of direct solar onto each panel of the façade for a typical weather year (total 3650 hours). For ease of visualising the whole façade we have unwrapped the façade and presented the results on a flat projection as demonstrated below. Levels 1, 7, 14, 20 and 27 have been assessed in detail.





The results have been summarised with column graphs for each selected floor for the east, north and west sectors as shown in the key plan to the left.

Introduction of HKIBIM

HKIBIM

- The Hong Kong Institute of Building Information Modelling
- Established in Winter 2008
- Developed from AIAB
- Members include engineers, architects, project managers, …
- Founding Board Members:
  - Chairman: Ir Francis Leung (WSP)
  - Vice Chairman: David Fung (Aedas)
  - Honorary Secretary: Wendy Lee (Autodesk)
  - Honorary Treasurer: Felix Chan (Summit Technology)
  - Alex Ho (HK Housing Authority)
  - Dr Andy Wong (HK PolyU)
  - Elvis Li (Tecton)
  - Hermann Fong (ASD)
  - YY Yip (Henderson Land Development)

Objectives

- To promote and advance the general education, understanding, appreciation and interest of and in building information modelling management for benefit of the member and general public;
- To foster general awareness, understanding and concerted efforts in the community of Hong Kong towards the advancement of the Objects and the issues thereof;
- To establish an identity for the Institute within Hong Kong and overseas;
- To establish and maintain standards of building information management practice in HK;
- To establish links with relevant institutes of tertiary education, Government Bureaus/Departments, Statutory bodies and other organizations;
- To research, facilitate and promote the means of better management of building information for improving communication, co-ordination, management, productivity, delivery time, cost, and quality throughout the whole building life cycle;
- To improve understanding of the range of professional competence of fully qualified members;
- To provide guidance on careers in building information management profession;
- To establish and maintain a Code of Conduct for practitioners of Building Information Modelling in HK;
- To attract membership of the Institute to support the objects; and
- To do such other lawful things as may be conducive to the attainment of the Objects.

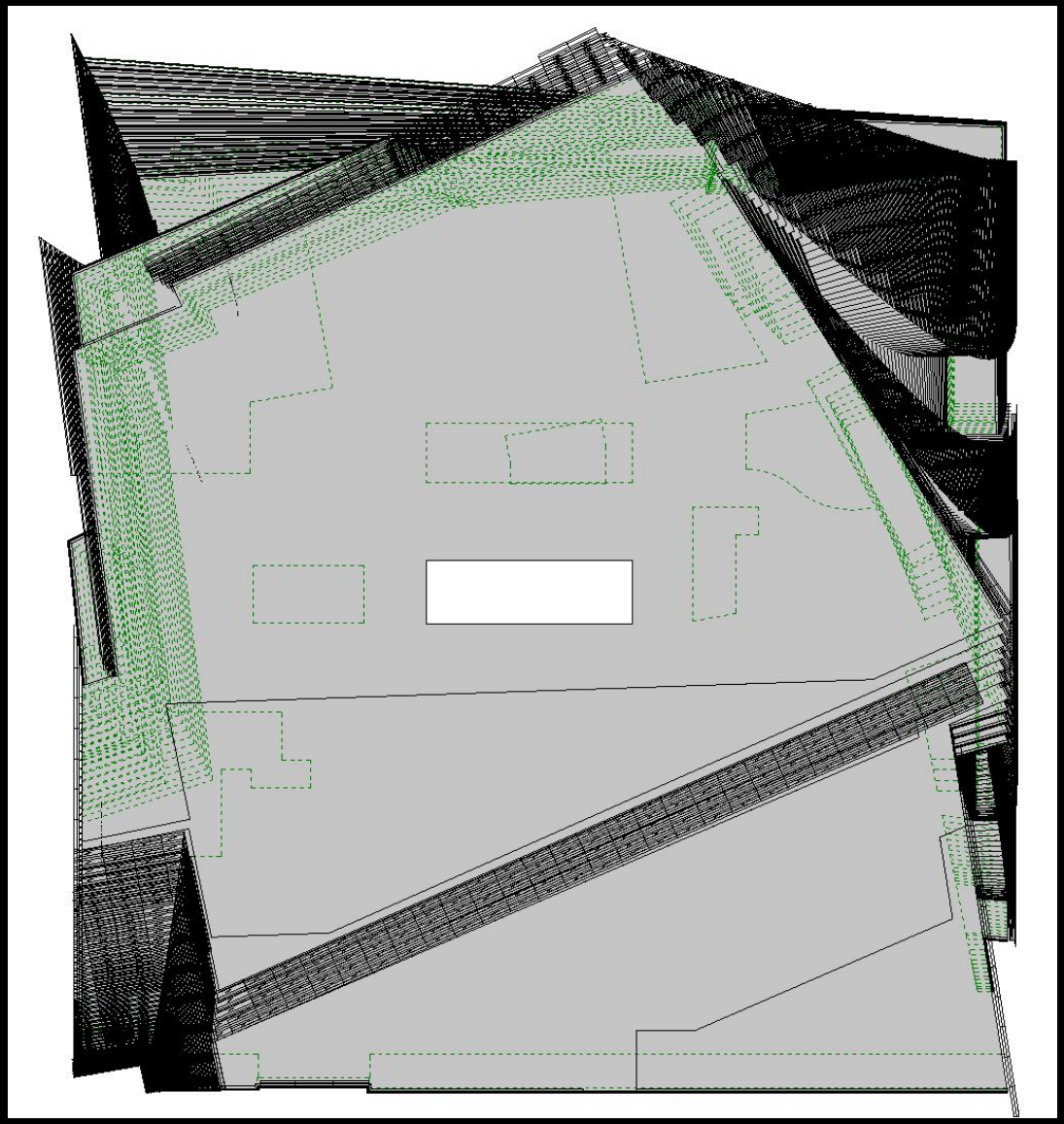
Urgent tasks

- Establish membership acceptance criteria
  - Professional Exam?
  - Software specific?
- Develop BIM Standard & Specifications
- Promotion to the youths
  - Undergraduates?
  - Secondary School Students?
- Promotion to the Industry
  - Developers
  - Architects
  - Consultants
  - Contractors
  - Government

Experience in Real Projects (Architectural)

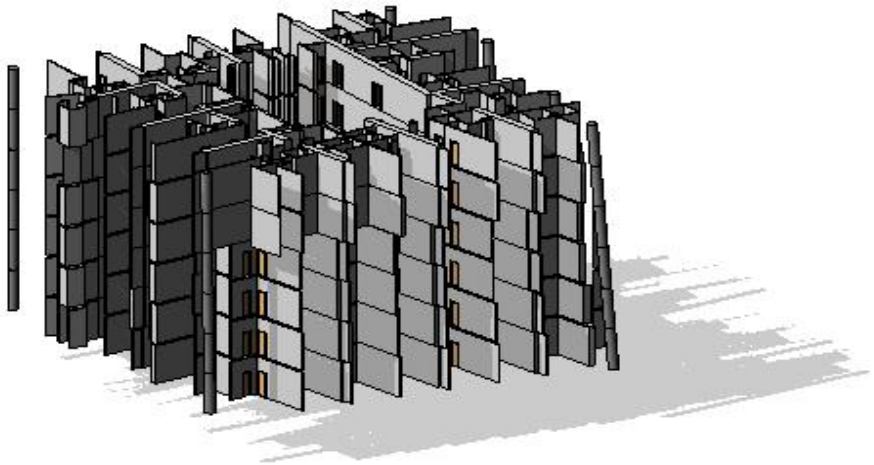
- Ocean Heights I, Dubai

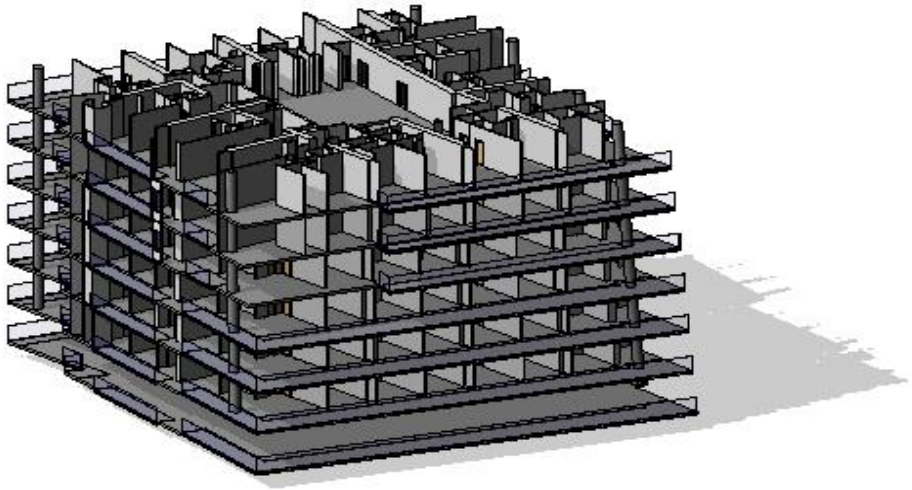
Bird-eye's View

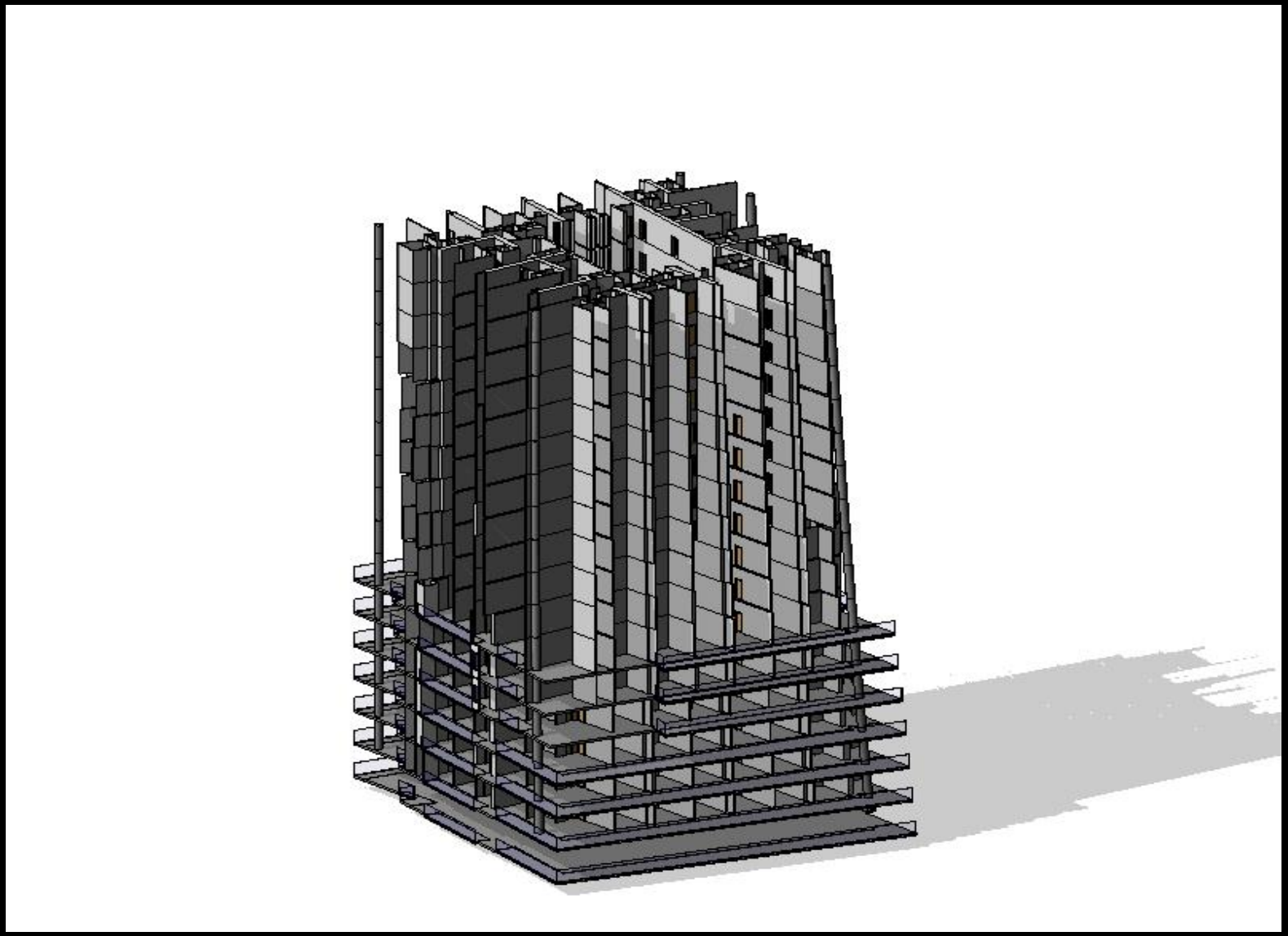


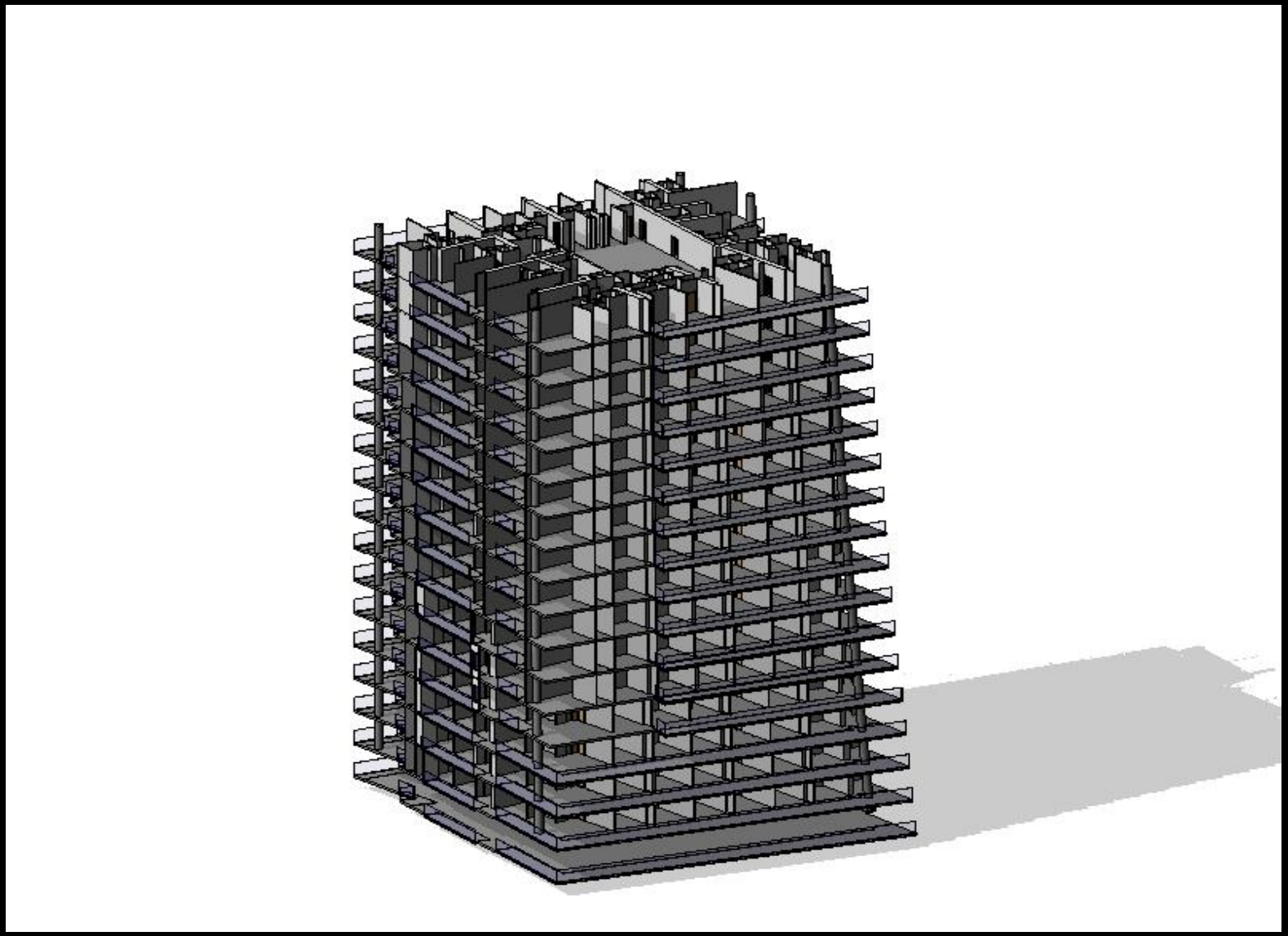
Objective for BIM/Revit®

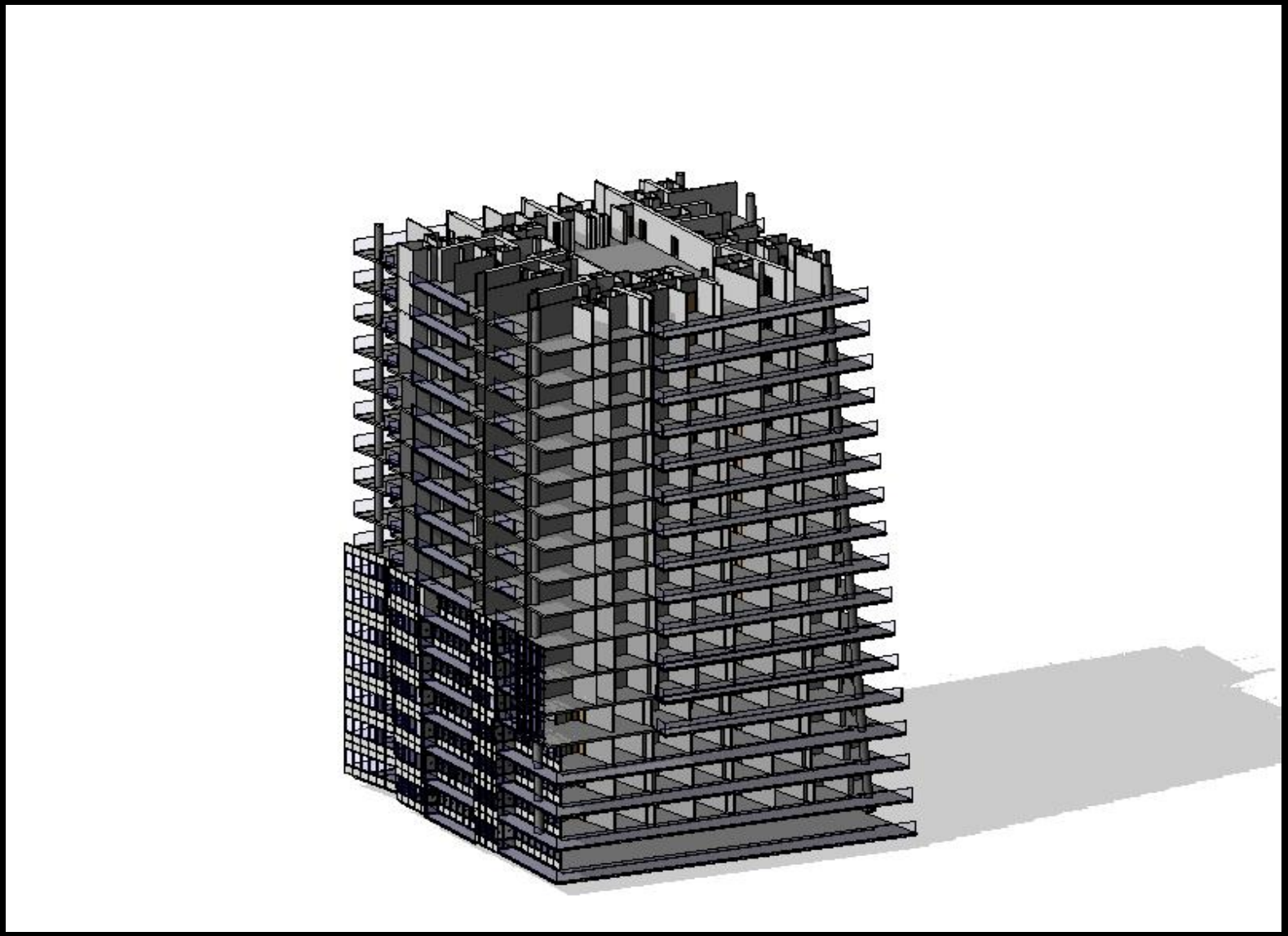
- Rationalize Geometry
- Rebuild Floor Plate Profiles
- Set-out Mullions (based on specific rules)
- Work out Certain Wall Panels geometry and setting out
- Add Certain Wall Panels to Revit Model
  - For visualization
  - For documentation (elevations and schedules)
- Produce AutoCAD drawings for Curtain Wall Penal Elevations

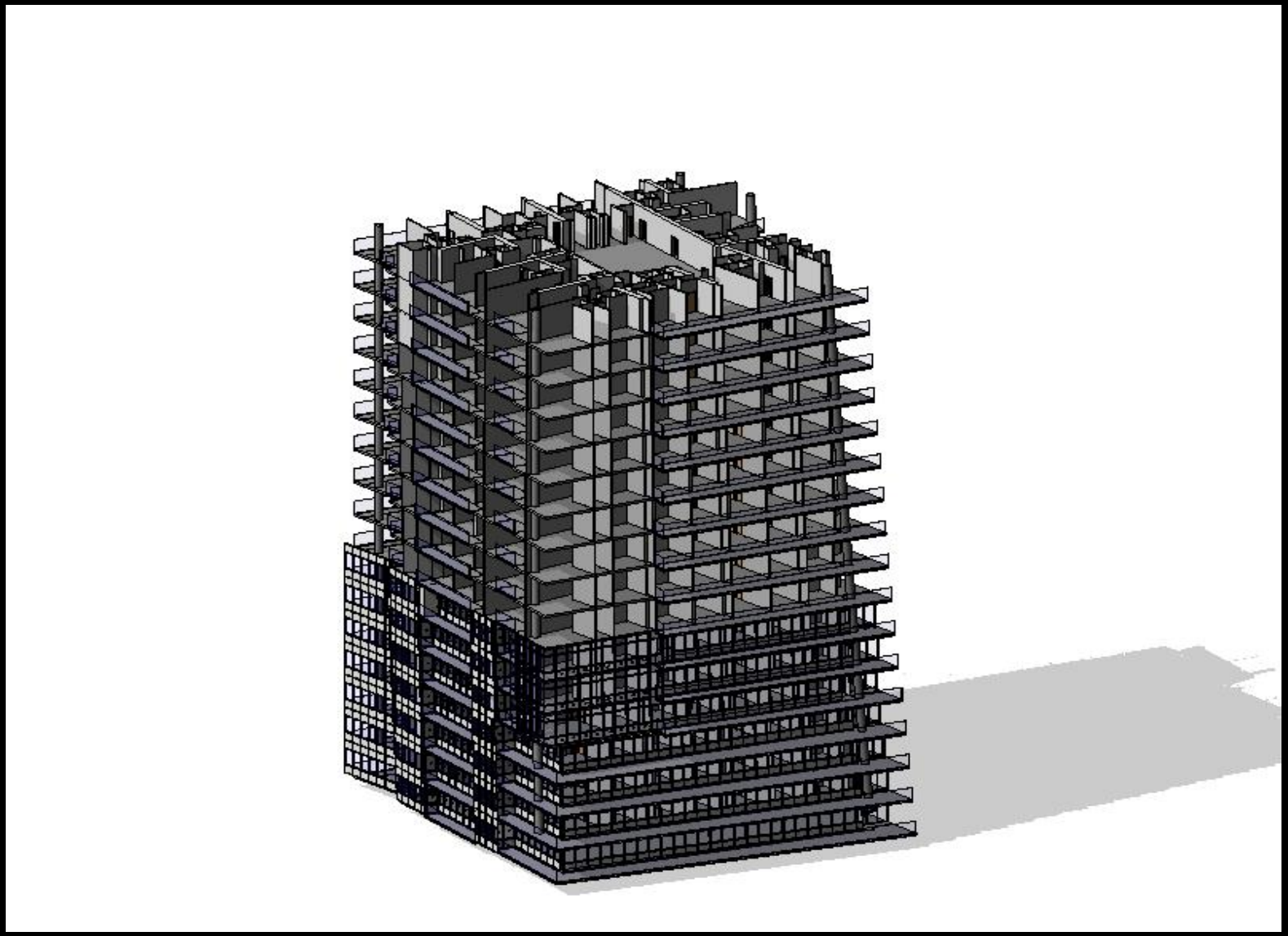


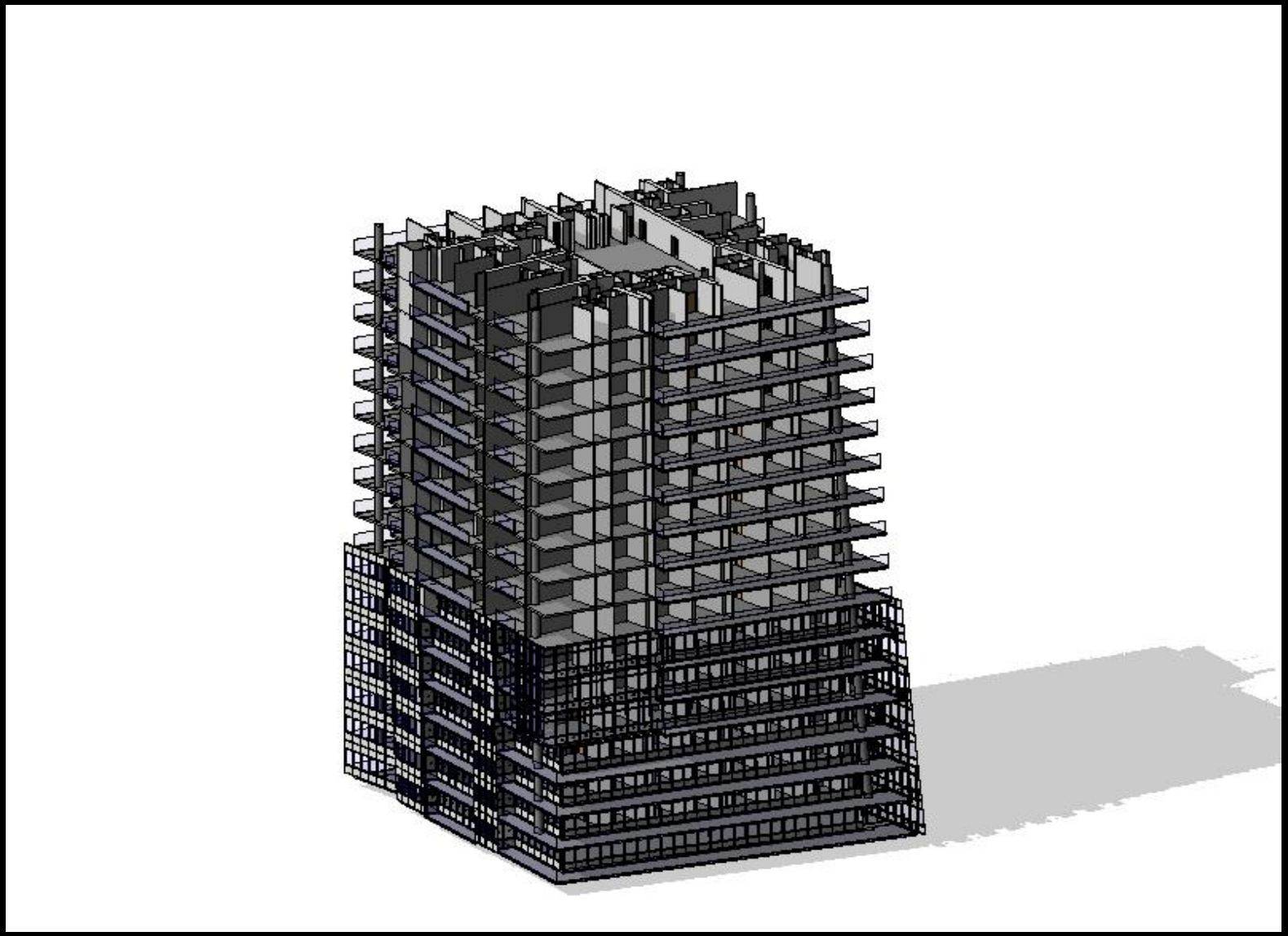


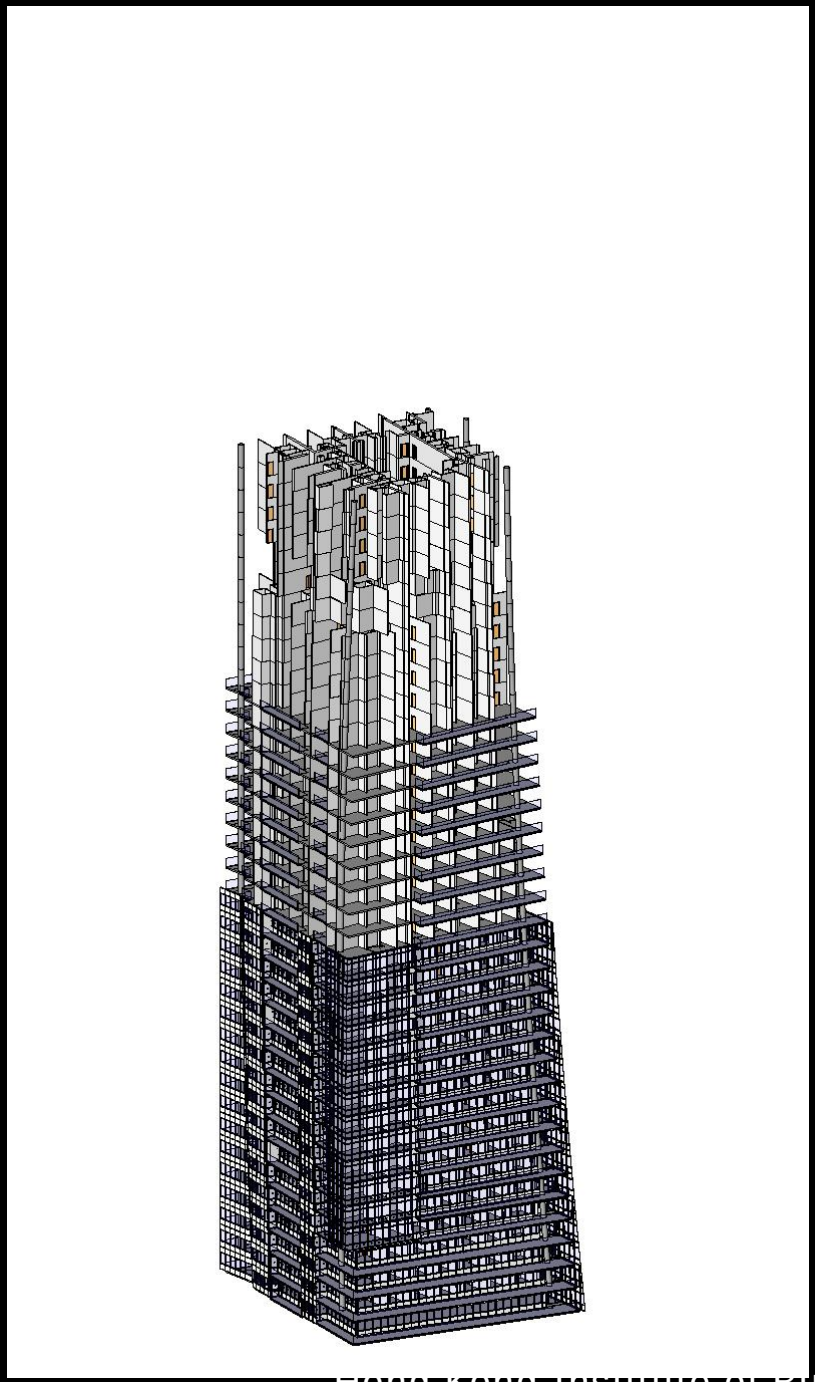


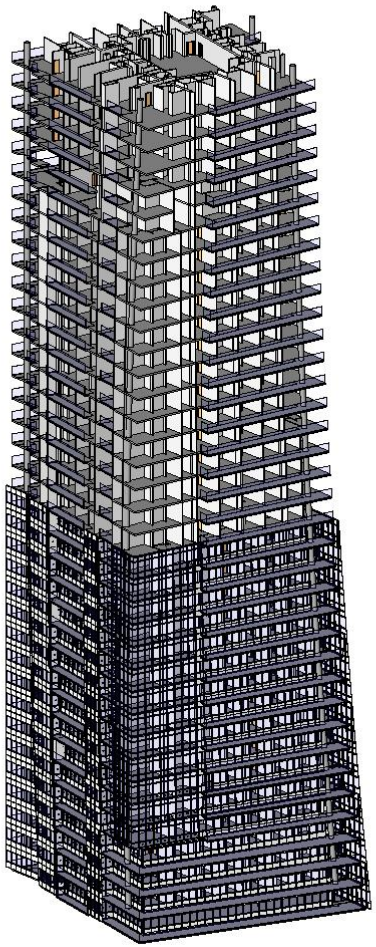


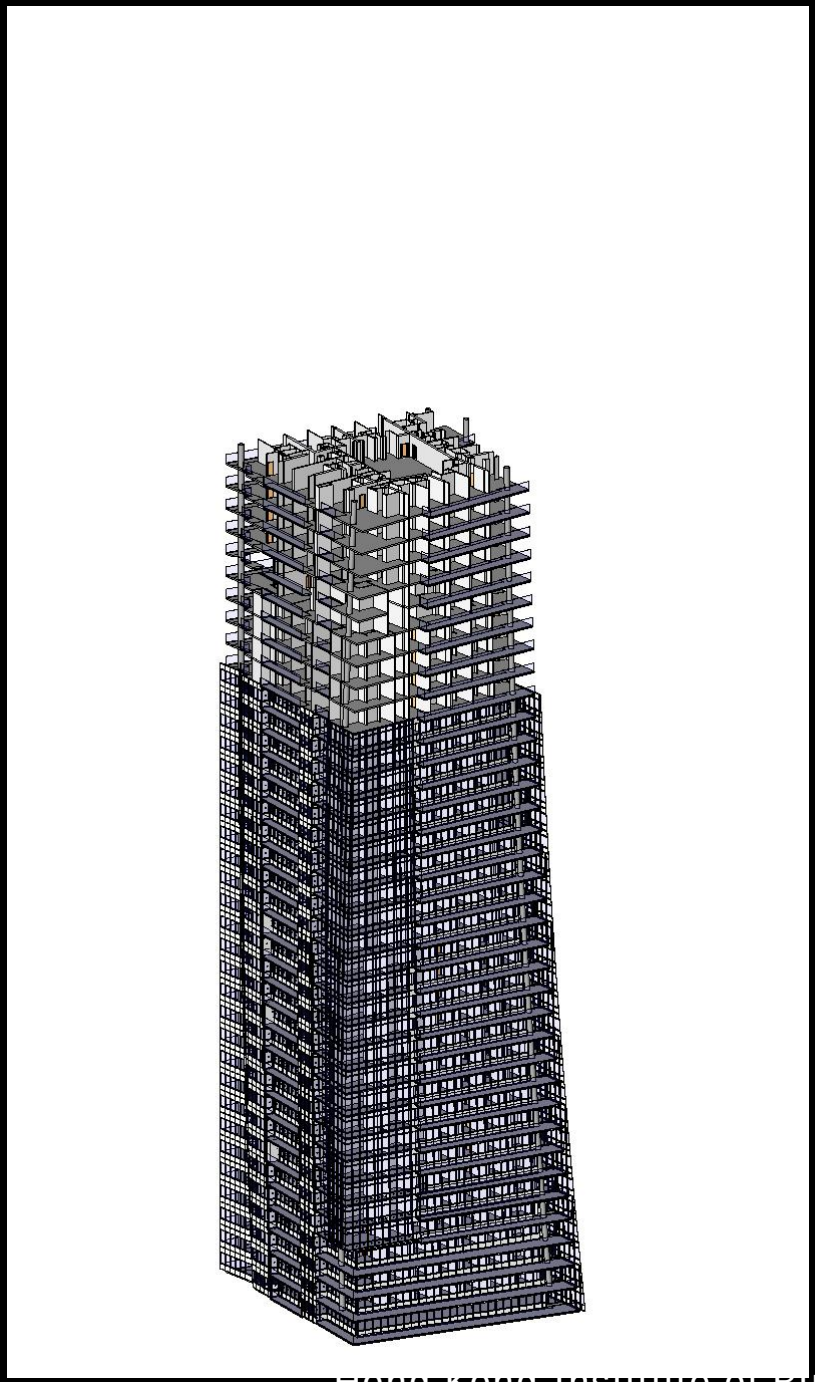


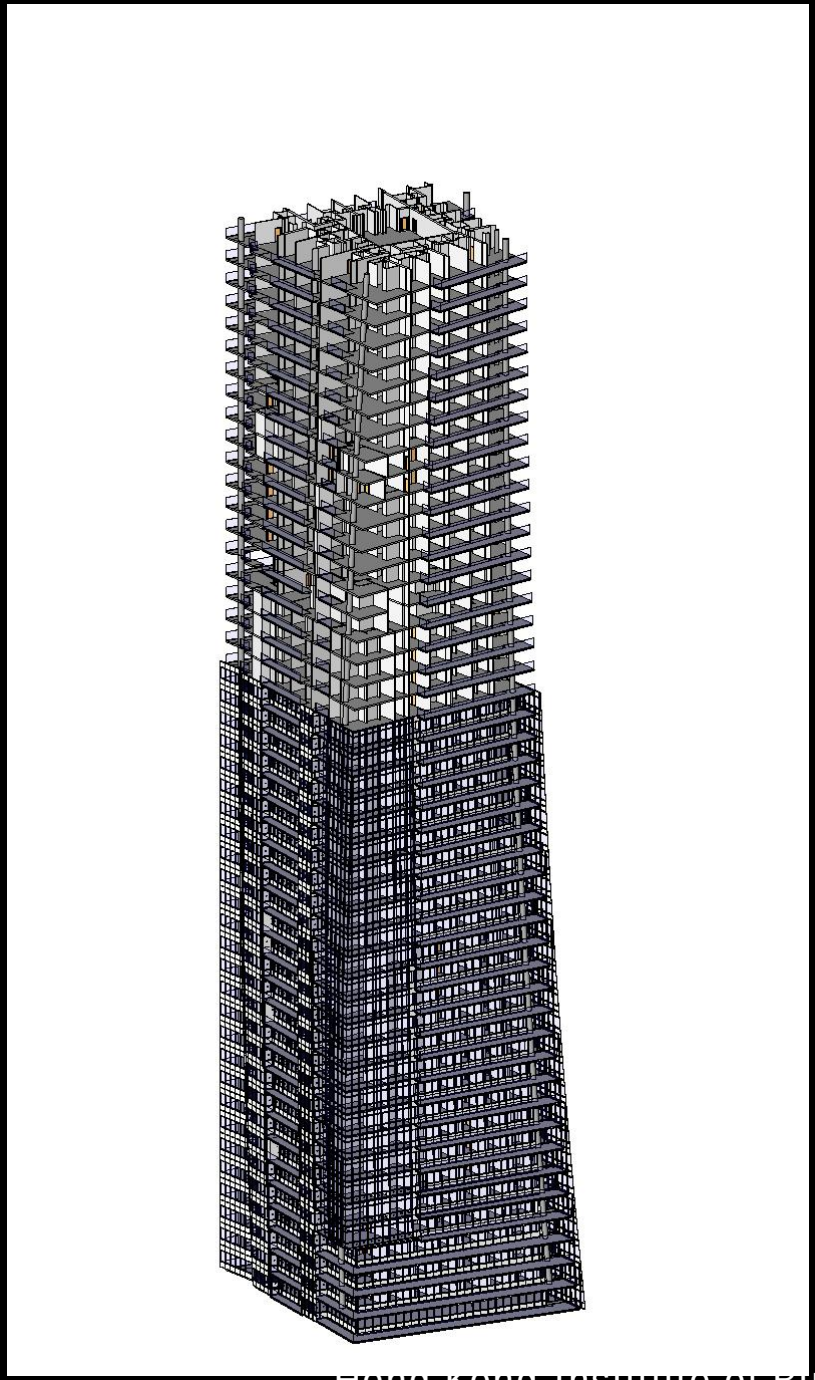


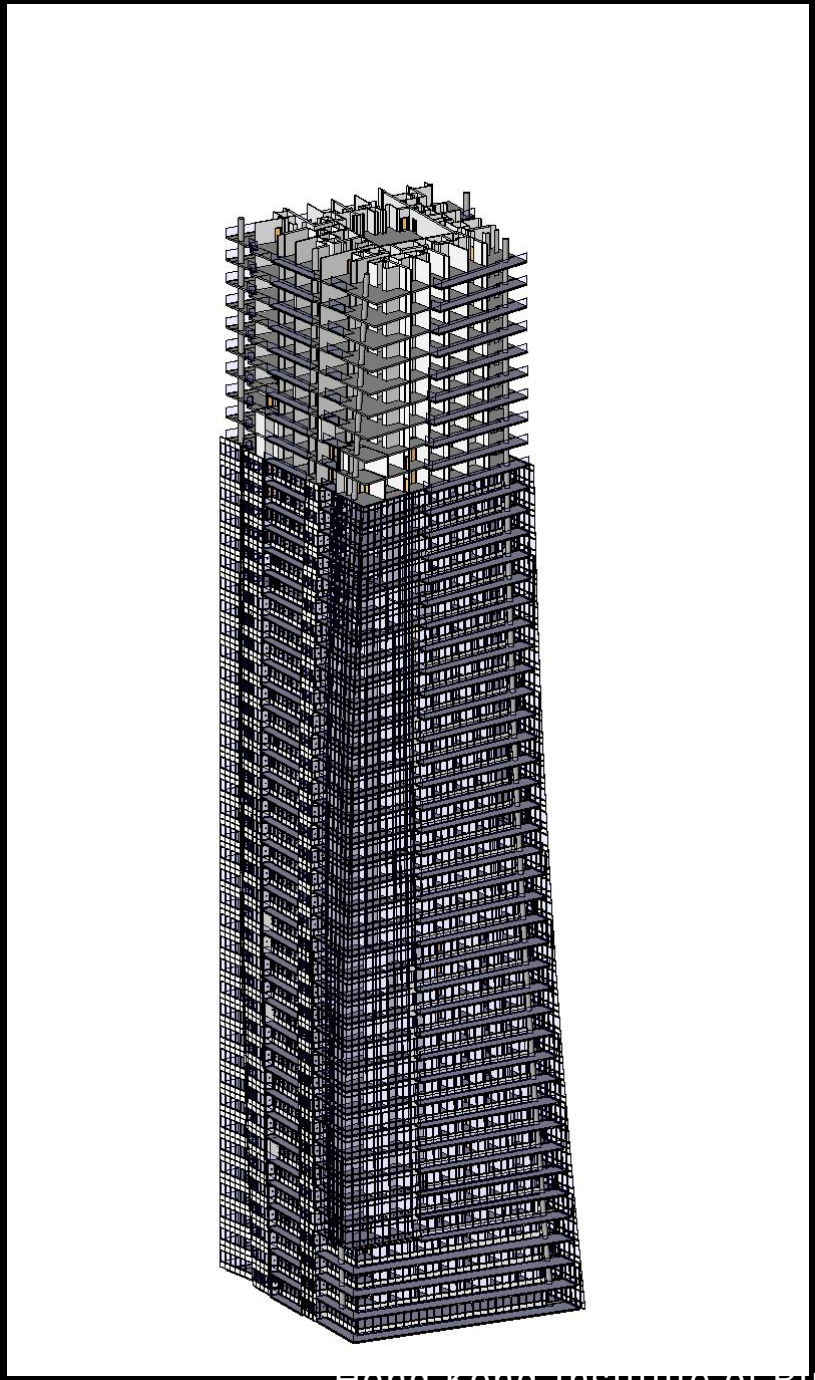


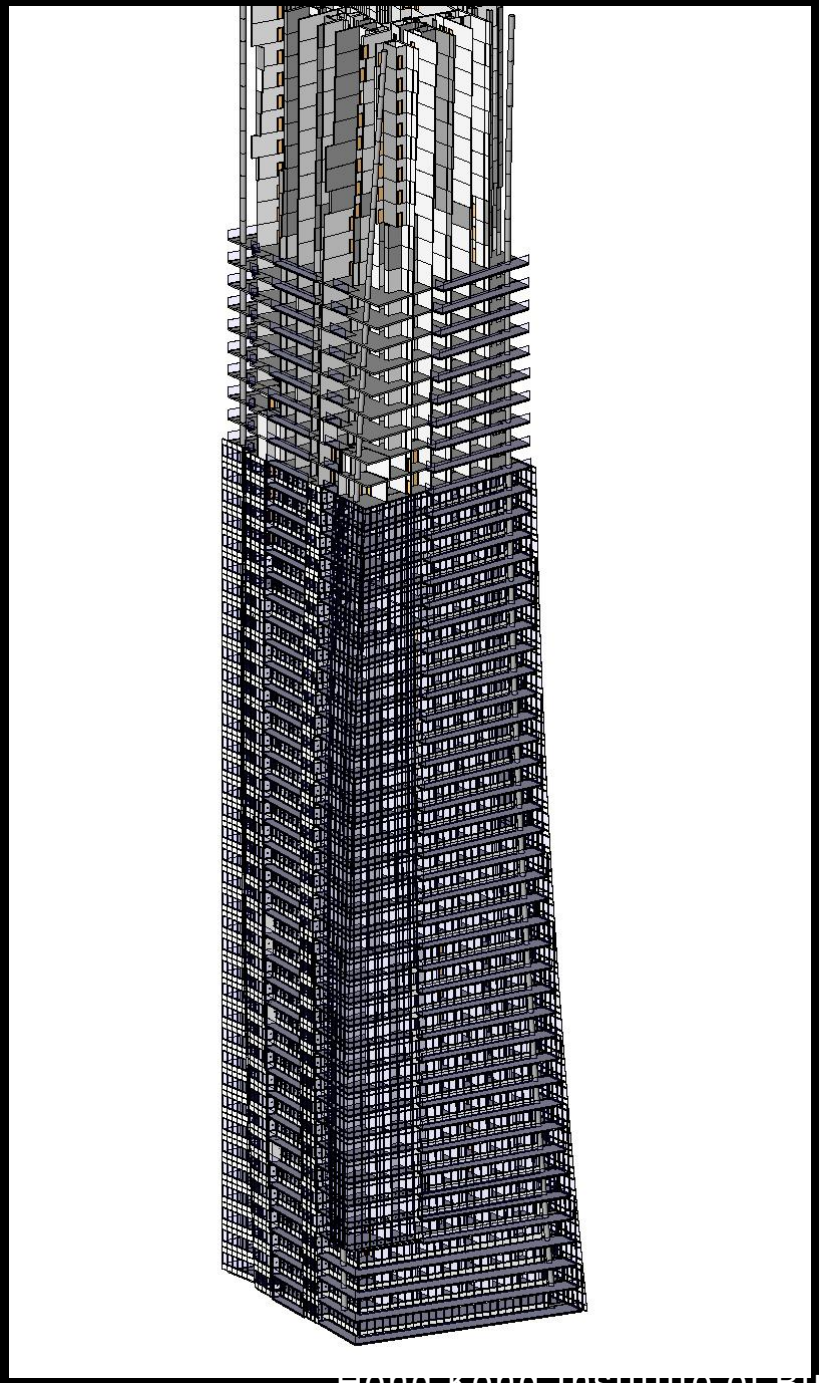


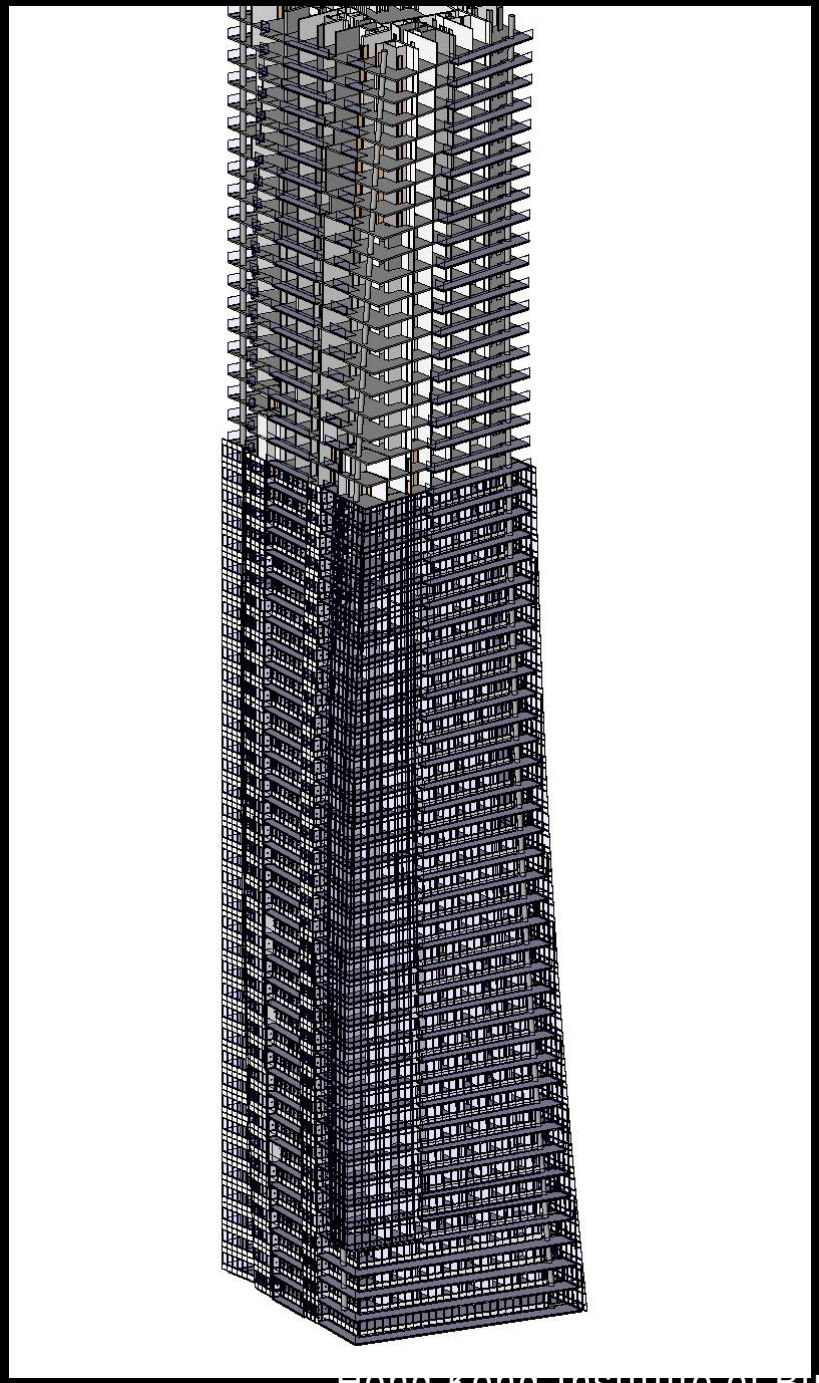


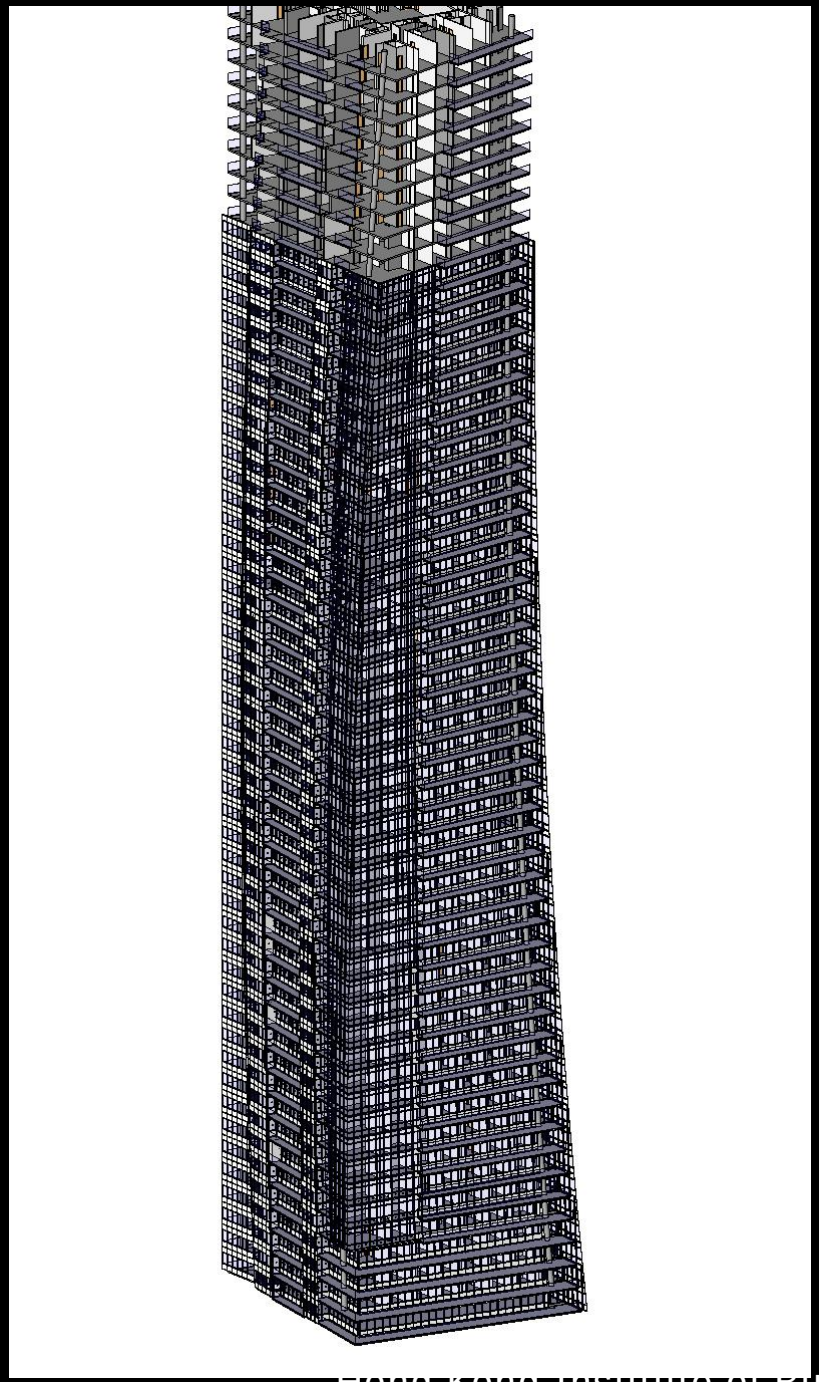


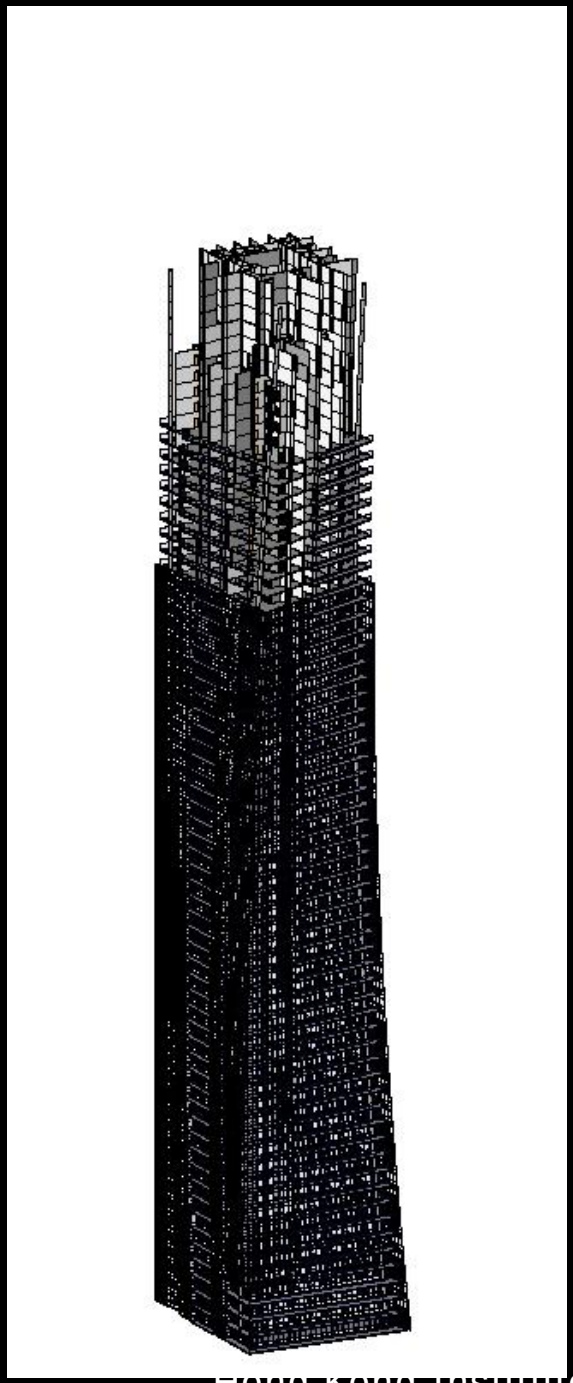


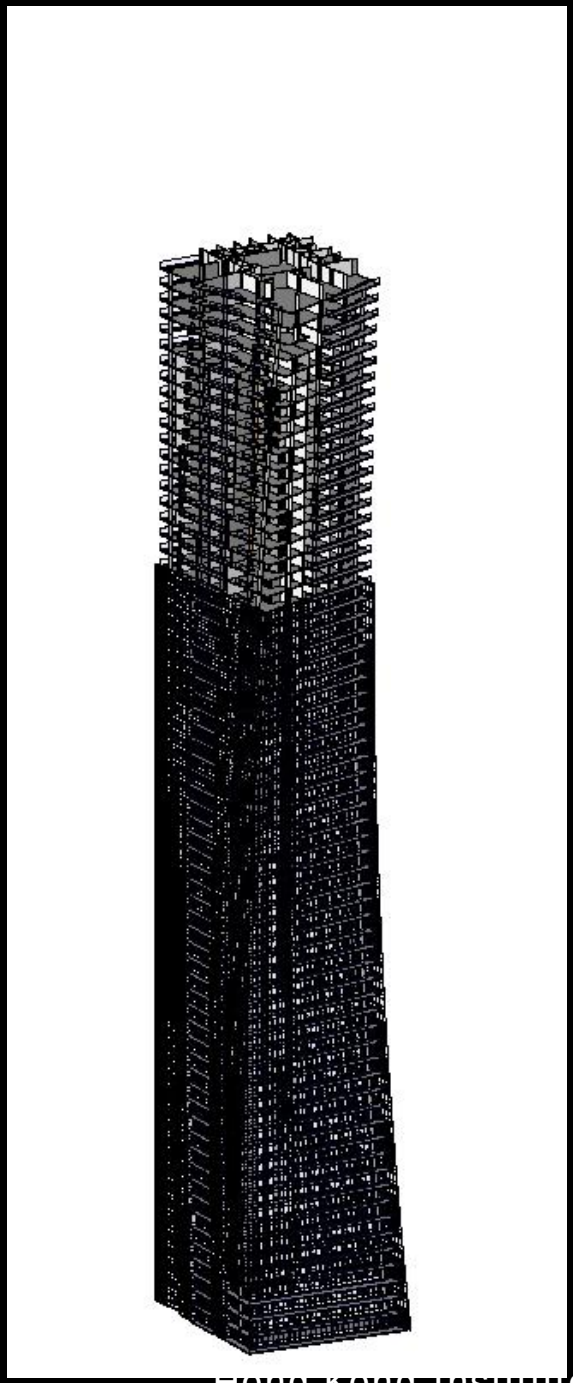


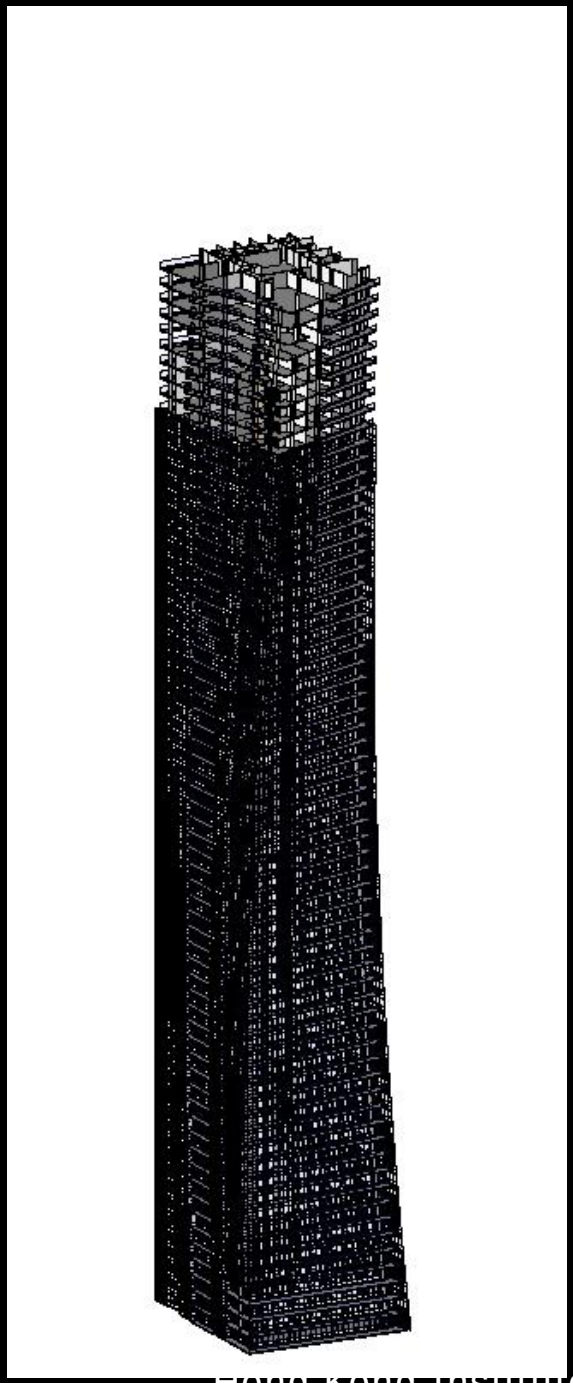


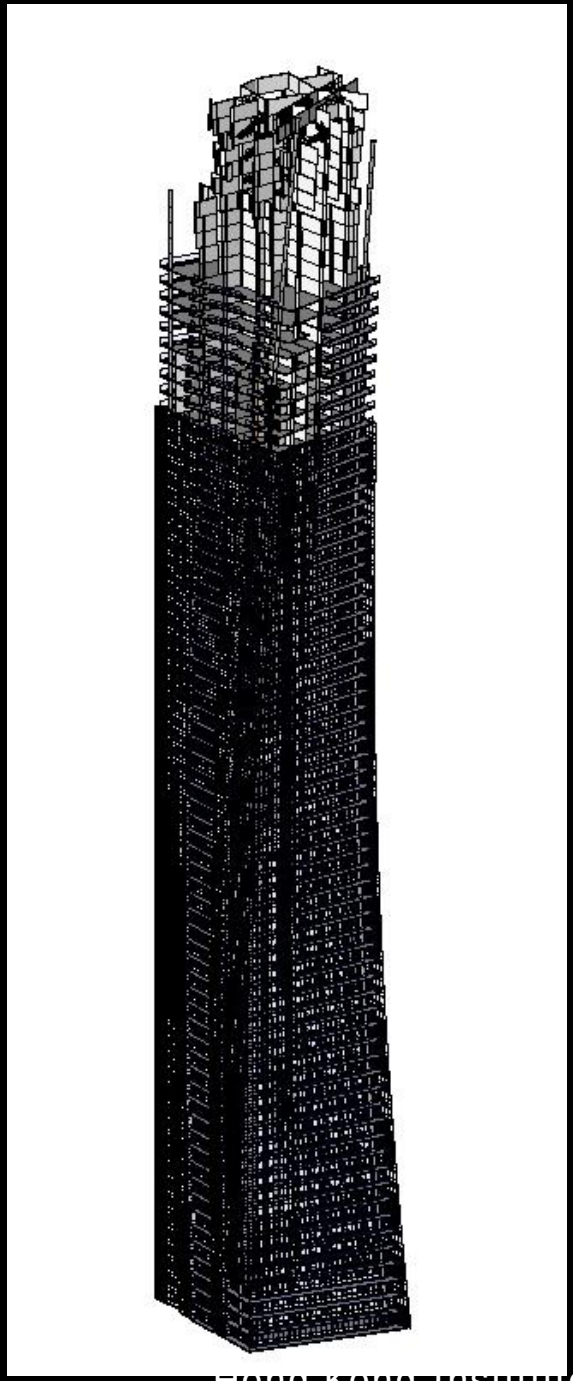


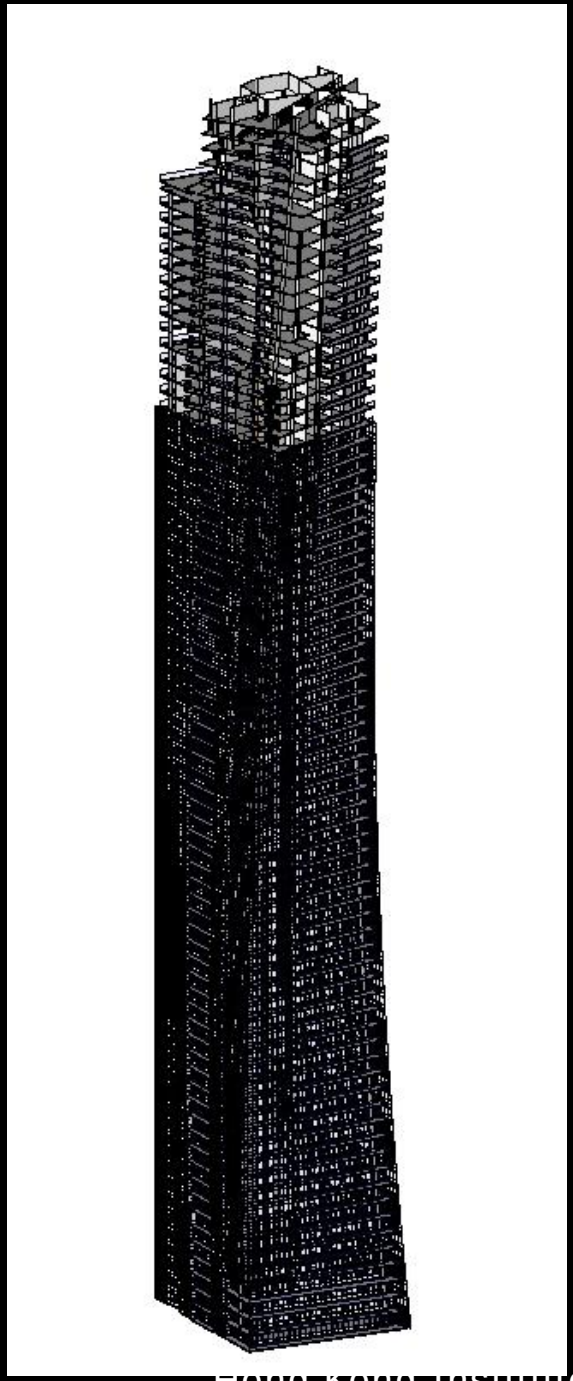


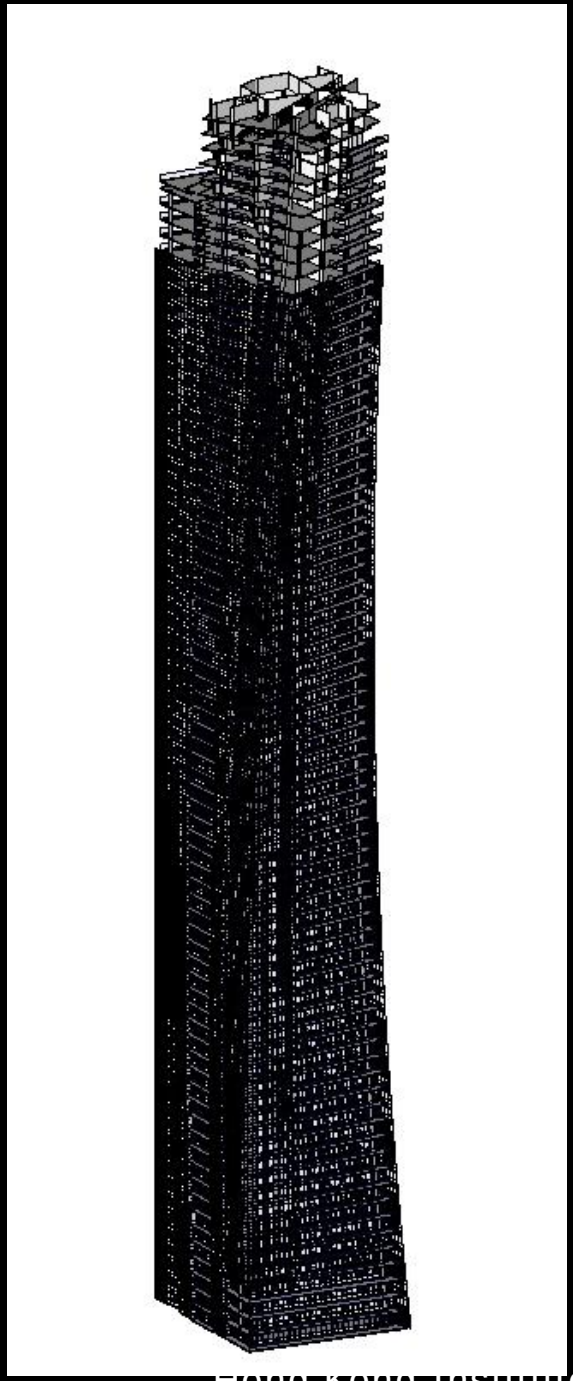


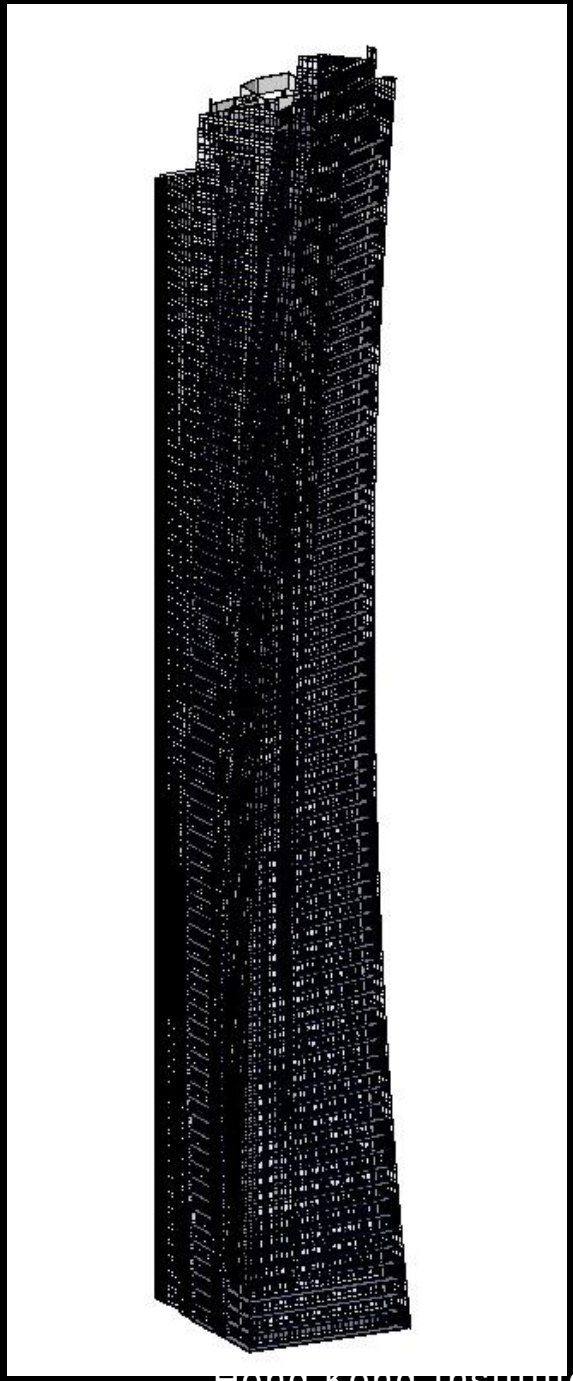


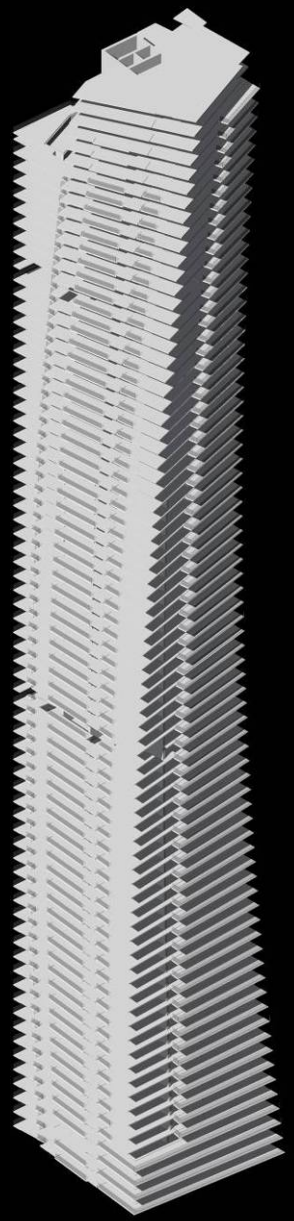


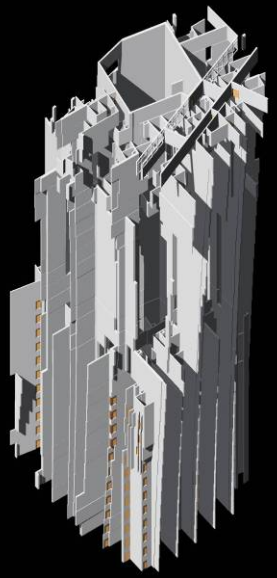


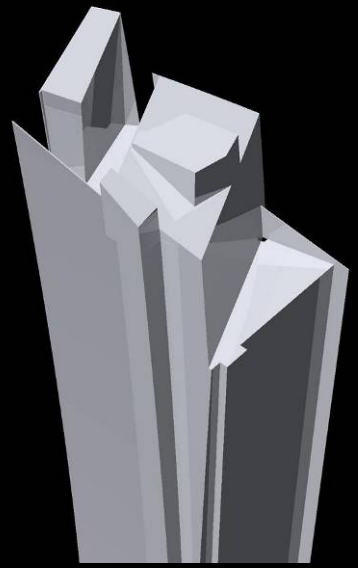


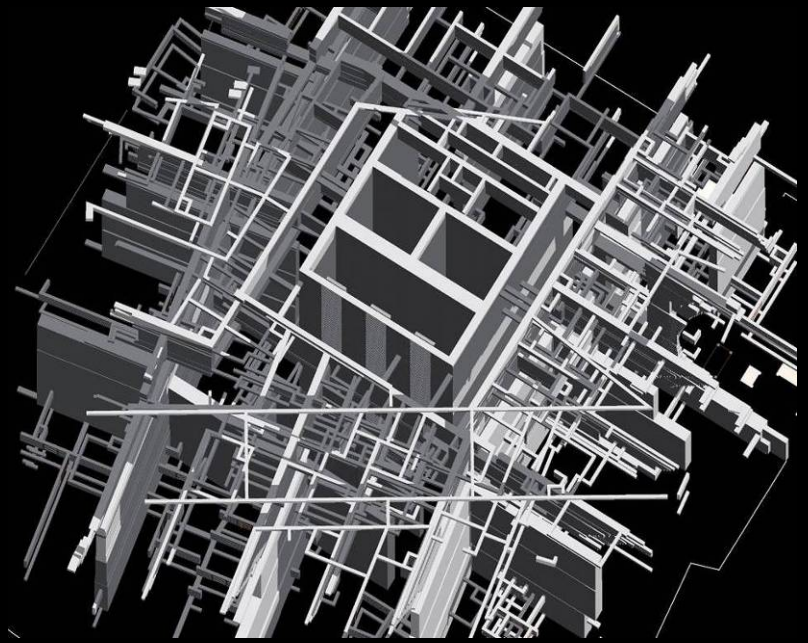


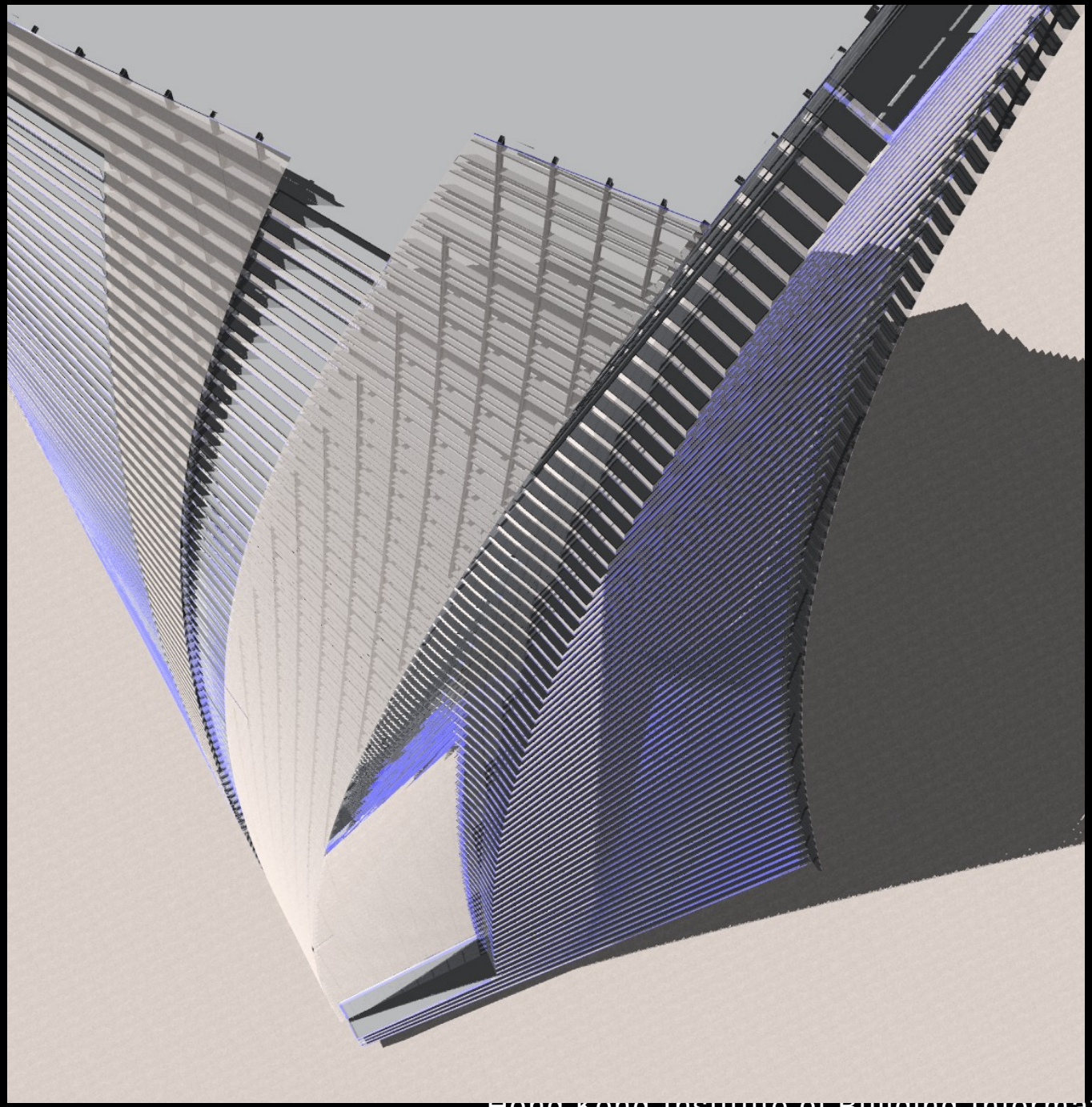




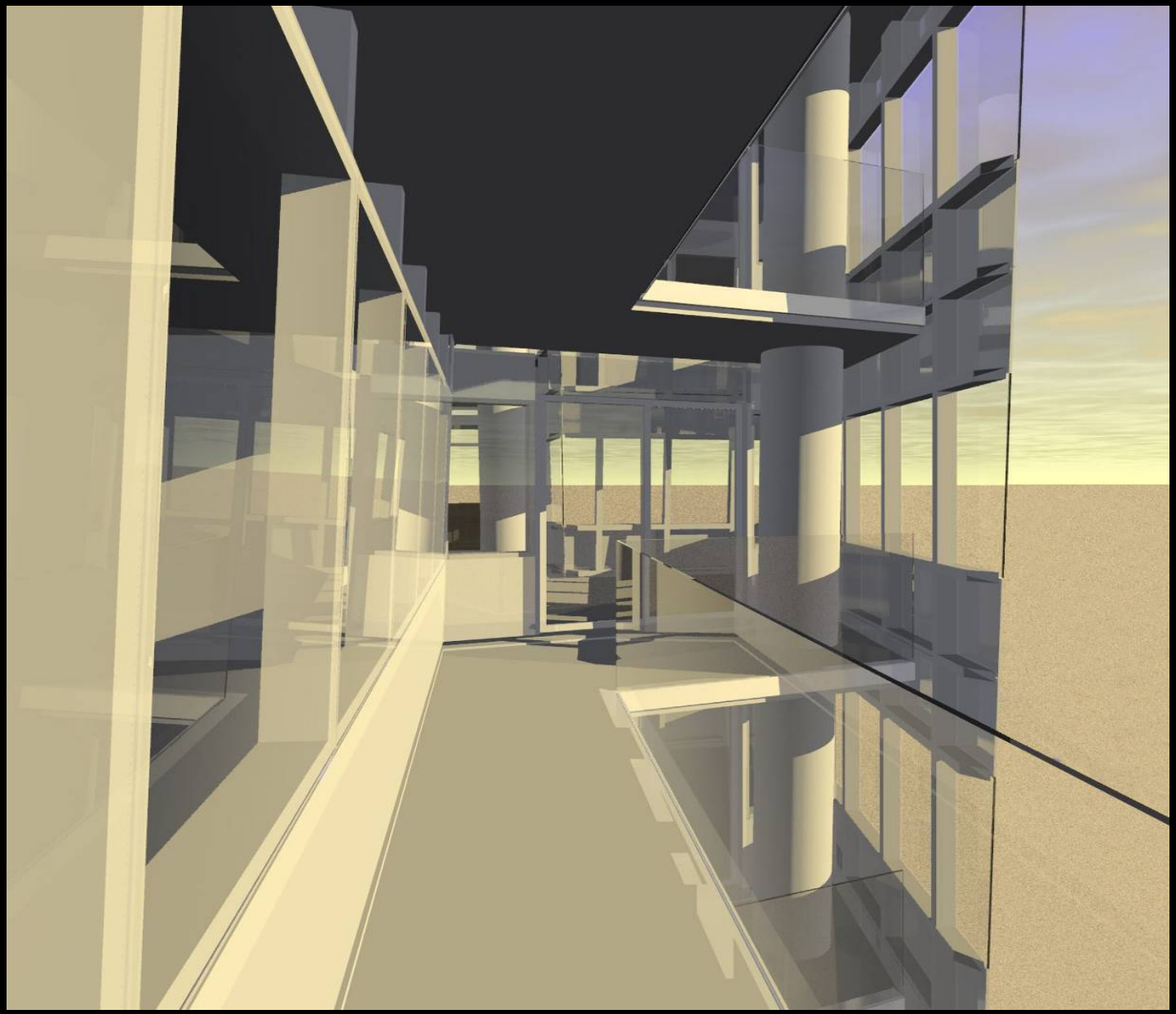








Hong Kong Institute of Building Information Modelling



Autodesk Revit Structure 4 - [Ocean Heights 1 R4 Local 2.rvt - Schedule: Multi-Category Schedule]

File Edit View Modelling Drafting Site Tools Settings Window Help

Move Copy Rotate Array Mirror Group 3D

Plane Demolish Align Split Trim Offset (Not Editable) Level 31 to

Headers: Group Ungroup Rows: New Delete Show

Basics

Modify
Structural Colur
Structural Wall
Beam
Component
Slab
Grid
Ref Plane
Dimension
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Ocean Heights 1 R4 L...

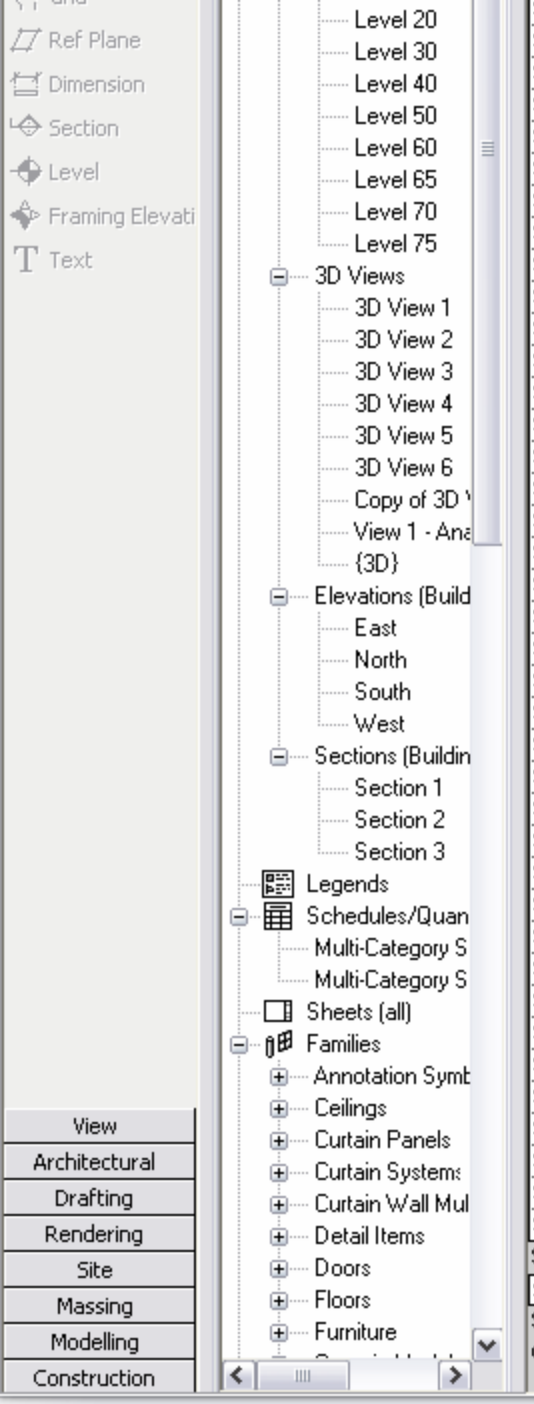
- Views (all)
  - Structural Plans
    - CAD REFEF
    - Level 1
    - Level 1 - An
    - Level 2
    - Level 2 - An
    - Level 4
    - Level 10
    - Level 20
    - Level 30
    - Level 40
    - Level 50
    - Level 60
    - Level 65
    - Level 70
    - Level 75
  - 3D Views
    - 3D View 1
    - 3D View 2
    - 3D View 3
    - 3D View 4
    - 3D View 5
    - 3D View 6
    - Copy of 3D
    - View 1 - Ana
    - {3D}
  - Elevations (Build
    - East
    - North
    - South
    - West
  - Sections (Buildin
    - Section 1
    - Section 2
    - Section 3
- Legends
- Schedules/Quan
  - Multi-Category S
  - Multi-Category S
- Sheets (all)
- Families
  - Annotation Symb
  - Ceilings
  - Curtain Panels
  - Curtain Systems
  - Curtain Wall Mul
  - Detail Items
  - Doors
  - Floors
  - Furniture

View
Architectural
Drafting
Rendering
Site
Massing
Modelling
Construction

Multi-Category Schedule

Family	Mark	Level	Width	Width Left	Width Right	Offset 1	Offset 2
Curtain Wall Panel 2	L08F01N01	Level 8	1255.67			-31.08	-41.89
Curtain Wall Panel 2	L08F01N02	Level 8	1255.67			-41.89	-52.71
Curtain Wall Panel 2	L08F01N03	Level 8	1255.67			-52.71	-63.53
Curtain Wall Panel 2	L08F01N04	Level 8	1255.67			-63.53	-74.34
Curtain Wall Panel 2	L08F01N05	Level 8	1255.67			-74.34	-85.16
Curtain Wall Panel 2	L08F01N06	Level 8	1255.67			-85.16	-95.97
Curtain Wall Panel 2	L08F01N07	Level 8	1255.67			-95.97	-106.79
Curtain Wall Panel 2	L08F01N08	Level 8	1255.67			-106.79	-117.60
Curtain Wall Panel 2	L08F01N09	Level 8	1255.67			-117.60	-117.60
Curtain Wall Panel 2	L08F03N09	Level 8	1224.13			5.31	5.66
Curtain Wall Panel 2	L08F03N10	Level 8	1224.13			5.66	6.01
Curtain Wall Panel 2	L08F03N11	Level 8	1224.13			6.01	6.36
Curtain Wall Panel 2	L09F01N01	Level 9	1255.72			-29.00	-39.77
Curtain Wall Panel 2	L09F01N02	Level 9	1255.72			-39.77	-50.54
Curtain Wall Panel 2	L09F01N03	Level 9	1255.72			-50.54	-61.31
Curtain Wall Panel 2	L09F01N04	Level 9	1255.72			-61.31	-72.07
Curtain Wall Panel 2	L09F01N05	Level 9	1255.72			-72.07	-82.84
Curtain Wall Panel 2	L09F01N06	Level 9	1255.72			-82.84	-93.61
Curtain Wall Panel 2	L09F01N07	Level 9	1255.72			-93.61	-104.38
Curtain Wall Panel 2	L09F01N08	Level 9	1255.72			-104.38	-115.15
Curtain Wall Panel 2	L09F03N09	Level 9	1224.13			0.64	0.74
Curtain Wall Panel 2	L09F03N10	Level 9	1224.13			0.74	0.84
Curtain Wall Panel 2	L09F03N11	Level 9	1224.13			0.84	0.94
Curtain Wall Panel 2	L10F01N01	Level 10	1255.77			-26.77	-37.49
Curtain Wall Panel 2	L10F01N02	Level 10	1255.77			-37.49	-48.21
Curtain Wall Panel 2	L10F01N03	Level 10	1255.77			-48.21	-58.93
Curtain Wall Panel 2	L10F01N04	Level 10	1255.77			-58.93	-69.64
Curtain Wall Panel 2	L10F01N05	Level 10	1255.77			-69.64	-80.36
Curtain Wall Panel 2	L10F01N06	Level 10	1255.77			-80.36	-91.08
Curtain Wall Panel 2	L10F01N07	Level 10	1255.77			-91.08	-101.80
Curtain Wall Panel 2	L10F01N08	Level 10	1255.77			-101.80	-112.52
Curtain Wall Panel 2	L10F03N09	Level 10	1224.13			-4.06	-4.21
Curtain Wall Panel 2	L10F03N10	Level 10	1224.13			-4.21	-4.35
Curtain Wall Panel 2	L10F03N11	Level 10	1224.13			-4.35	-4.50
Curtain Wall Panel 2	L81B1RN01	Level 81	1224.10			0.00	0.00
Curtain Wall Panel 2	L82B1RN01	Level 82	1224.10			0.00	0.00
Curtain Wall Panel 2	L83B1RN01	Level 83	1224.10			0.00	0.00
Curtain Wall Panel 2	L84B1RN01	Level 84	1224.10			0.00	0.00
Curtain Wall Panel 2: 38							
Curtain Wall Panel 3	L04F03N01	Level 4	1224.13			-1.53	-0.38
Curtain Wall Panel 3	L04F03N02	Level 4	1224.13			-0.38	0.76
Curtain Wall Panel 3	L04F03N03	Level 4	1224.13			0.76	1.91
Curtain Wall Panel 3	L04F03N05	Level 4	1224.13			12.20	13.34
Curtain Wall Panel 3	L04F03N06	Level 4	1224.13			12.20	13.34
Curtain Wall Panel 3	L04F04N01	Level 4	1200.00			-137.36	-137.36
Curtain Wall Panel 3	L04F04N02	Level 4	1200.00			-137.36	-137.38
Curtain Wall Panel 3	L04F04N03	Level 4	1200.00			-137.38	-137.40
Curtain Wall Panel 3	L04F04N04	Level 4	1200.00			-137.40	-137.42
Curtain Wall Panel 3	L04F04N05	Level 4	1200.00			-137.42	-137.45
Curtain Wall Panel 3	L04F04N06	Level 4	1200.00			-137.45	-137.47
Curtain Wall Panel 3	L04F04N07	Level 4	1200.00			-137.47	-137.49

Ready



Sliding Door	L71B05D12	Level 71	2550.00			0.00	
Sliding Door	L71B05D15	Level 71	2550.00			0.00	
Sliding Door	L72B01D02	Level 72	2400.00			0.00	
Sliding Door	L72B02D02	Level 72	2500.00			0.00	
Sliding Door	L72B04D01	Level 72	1800.00			0.00	
Sliding Door	L72B05D03	Level 72	2550.00			0.00	
Sliding Door	L72B05D05	Level 72	2550.00			0.00	
Sliding Door	L72B05D08	Level 72	2550.00			0.00	
Sliding Door	L72B05D10	Level 72	2550.00			0.00	
Sliding Door	L72B05D12	Level 72	2550.00			0.00	
Sliding Door	L72B05D15	Level 72	2550.00			0.00	
Sliding Door	L73B01D02	Level 73	2400.00			0.00	
Sliding Door	L73B02D02	Level 73	2500.00			0.00	
Sliding Door	L73B04D01	Level 73	1700.00			0.00	
Sliding Door	L73B05D03	Level 73	2550.00			0.00	
Sliding Door	L73B05D05	Level 73	2550.00			0.00	
Sliding Door	L73B05D08	Level 73	2550.00			0.00	
Sliding Door	L73B05D10	Level 73	2550.00			0.00	
Sliding Door	L73B05D12	Level 73	2550.00			0.00	
Sliding Door	L73B05D15	Level 73	2550.00			0.00	
Sliding Door	L74B01D02	Level 74	2400.00			0.00	
Sliding Door	L74B02D02	Level 74	2500.00			0.00	
Sliding Door	L74B04D01	Level 74	1600.00			0.00	
Sliding Door	L74B05D03	Level 74	2550.00			0.00	
Sliding Door	L74B05D05	Level 74	2550.00			0.00	
Sliding Door	L74B05D08	Level 74	2550.00			0.00	
Sliding Door	L74B05D10	Level 74	2550.00			0.00	
Sliding Door	L74B05D12	Level 74	2550.00			0.00	
Sliding Door	L74B05D15	Level 74	2550.00			0.00	
Sliding Door	L75B01D02	Level 75	2400.00			0.00	
Sliding Door	L75B02D02	Level 75	2500.00			0.00	
Sliding Door	L76B01D02	Level 76	2400.00			0.00	
Sliding Door	L76B02D02	Level 76	2500.00			0.00	
Sliding Door	L77B01D02	Level 77	2400.00			0.00	
Sliding Door	L77B02D01	Level 77	2426.17			0.00	
Sliding Door	L78B01D02	Level 78	2400.00			0.00	
Sliding Door	L78B02D01	Level 78	2203.01			0.00	
Sliding Door	L79B01D02	Level 79	2400.00			0.00	
Sliding Door	L79B02D01	Level 79	1974.15			0.00	
Sliding Door: 649							
Sliding Door to Replace CW Pan	L10F01N10	Level 10	1255.77			-123.24	
Sliding Door to Replace CW Panel: 1							
Grand total: 9740							

Ready

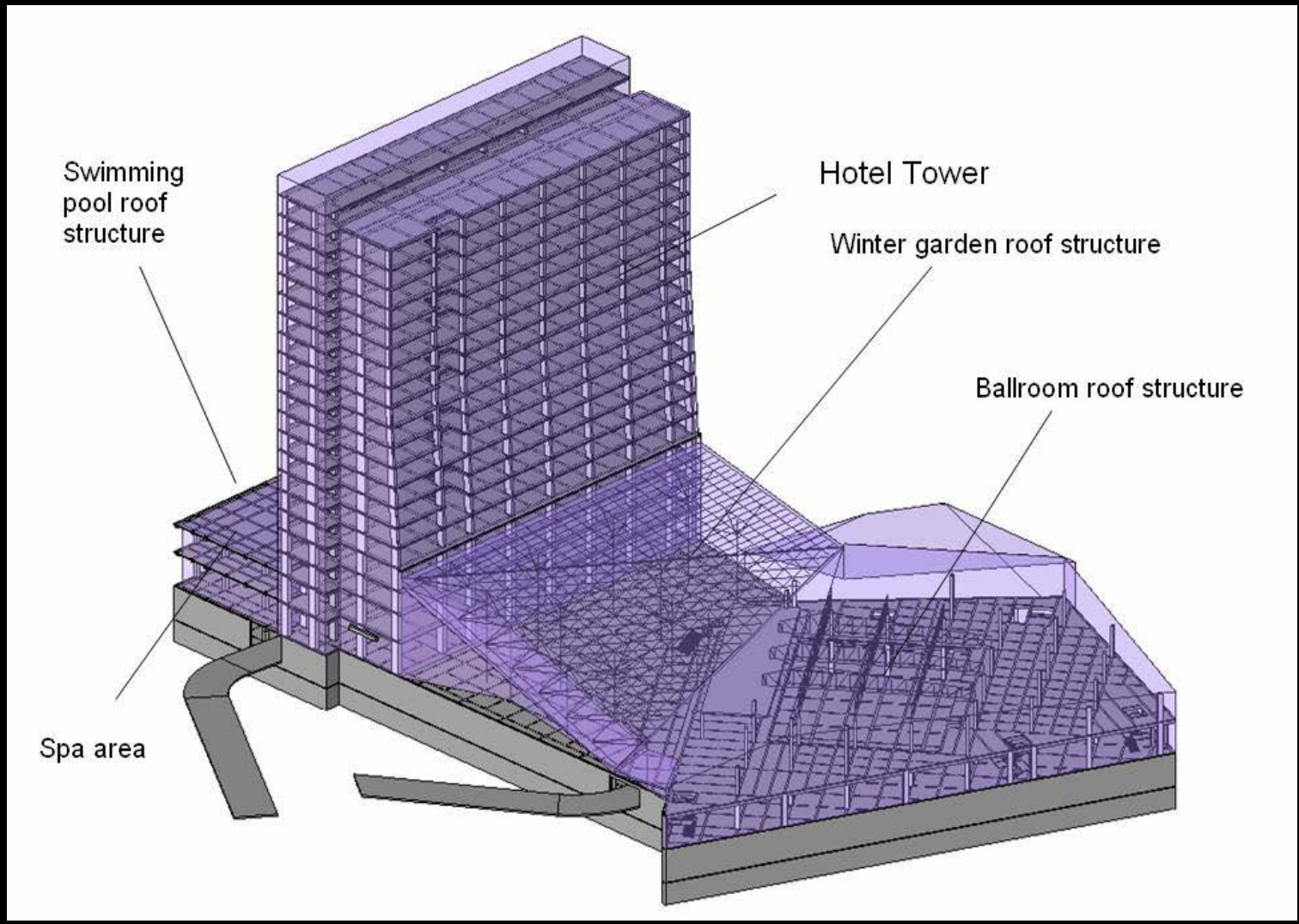
Experience in Real Projects (Structural)

- Sheraton Hotel, Ulaanbaatar, Mongolia

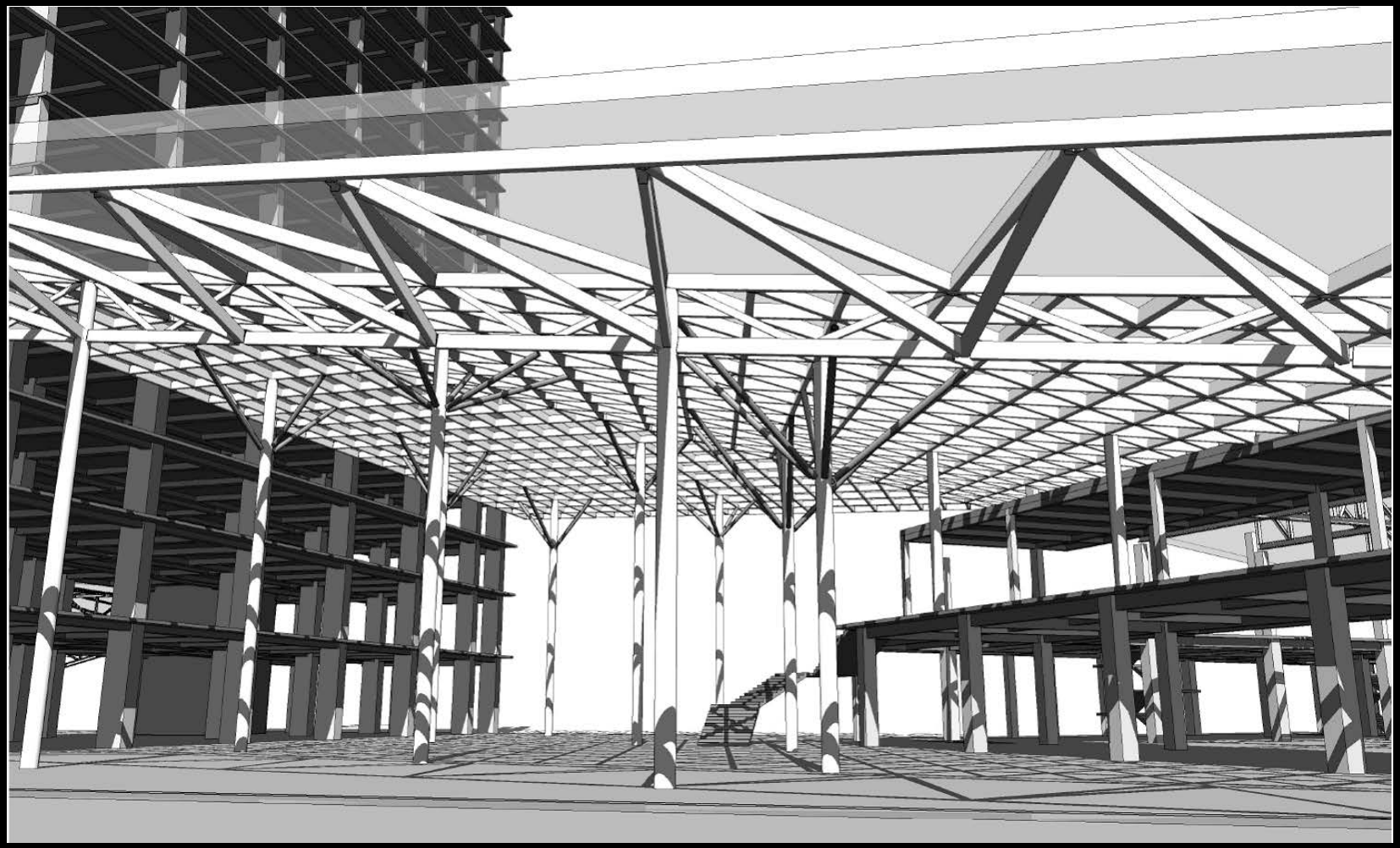
Architectural Expression

Revit Model by: HOK

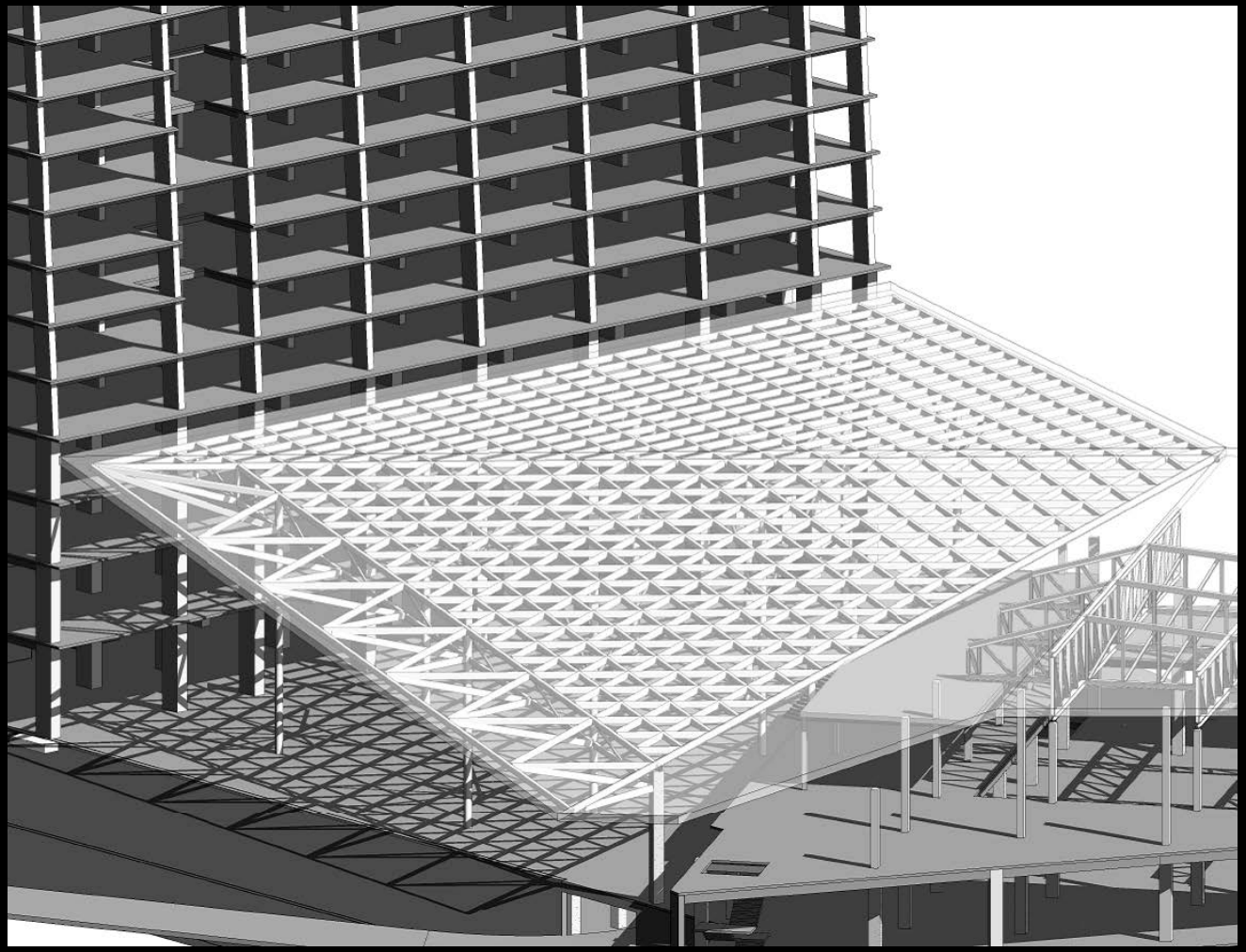
Revit Structure Model (w/ massing)

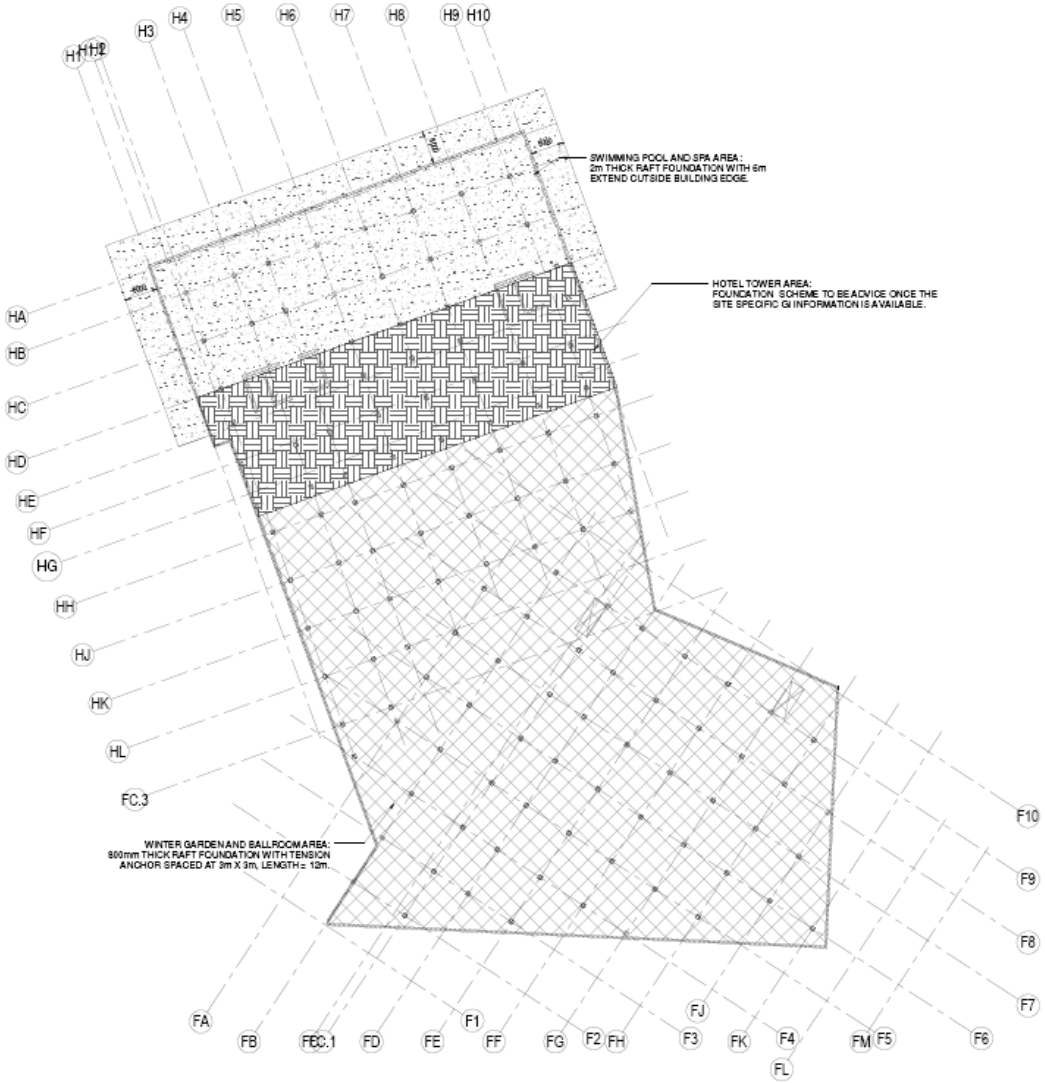


Wintergarden



Revit® Structure Model



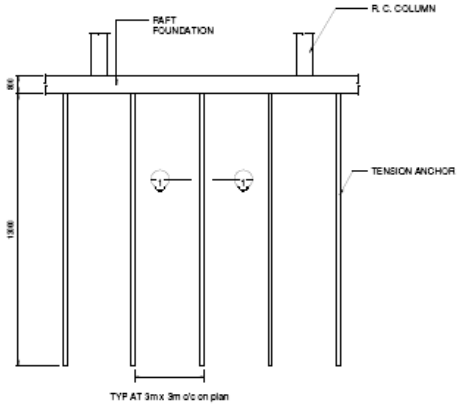


1 LEVEL B2 FOUNDATION PLAN

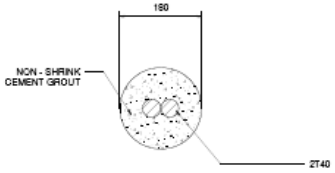
1 : 400

General Notes:

1. Do not scale the dimensions, follow (the mm) written dimensions unless otherwise mentioned.
2. Dimensions shown in these drawing are structural dimensions unless noted otherwise.
3. Any discrepancy to be brought to the notice of consultant prior to commencement of work.
4. All design and construction shall comply with statuory requirement of local authorities with ACI-0318-95.
5. All levels shown in plan are referring to structural floor level.
6. All concrete grade for raft foundation shall be C45.
7. High yield reinforcement shall be with minmum strength of 460 N/mm2.
8. All wall shall be 600mm thick unless noted otherwise.
9. All column to be 700 x 700 unless noted otherwise.



TYPICAL TENSION ANCHOR AT
WINTER GARDEN AND BALLROOM AREA



SECTION 1-1
TYPICAL SECTION FOR TENSION ANCHOR

WSP

Key Plan

Professional Seals

No.	Issue Description	Date
1	IDS SCHEMATIC DESIGN	26/07/05

No.	Revision Description	Date

Drawn by: VL Reviewed by: HM

Project No: J3213

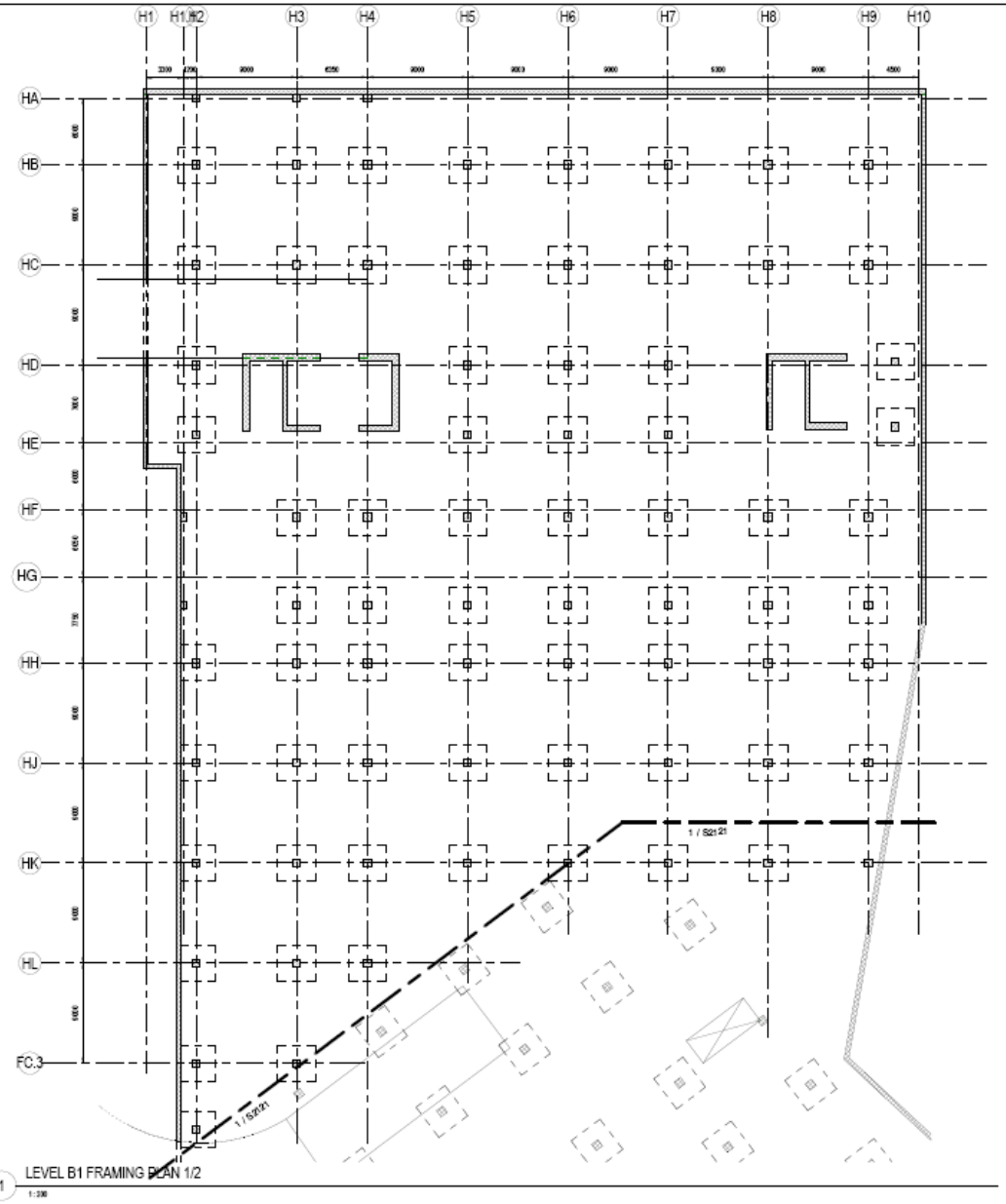
Sheet Title:

LEVEL B2 FOUNDATION PLAN
AND TYPICAL SECTIONS

Original drawing is A1. Scale unless accordingly if reduced

Sheet Number:

S2110



1 LEVEL B1 FRAMING PLAN 1/2

1 : 200

General Notes:

1. Do not scale the dimensions, follow (the mm) written dimensions unless otherwise mentioned.
2. Dimensions shown in these drawing are structural dimensions unless noted otherwise.
3. Any discrepancy to be brought to the notice of consultant prior to commencement of work.
4. All design and construction shall comply with statuory requirement of local authorities with ACI-0318-95.
5. All levels shown in plan are referring to structural floor level.
6. All concrete grade shall be as shown below:

Element	Concrete Grade
Column / Wall	60
Beam / Slab/ Stair Case	45

7. High yield reinforcement shall be with minmum strength of 460 N/mm2.
8. All slabs shall be 275mm thick flat slab unless noted otherwise.
9. All column drop to be 3000 x 3000 x 500mm thick, unless noted otherwise.
10. All wall shall be 600mm thick unless noted otherwise.
11. All column to be 700 x 700 unless noted otherwise.

WSP

Key Plan

Professional Seals

No.	Issue Description	Date
1	80% SCHEMATIC DESIGN	28/08/19

No.	Revision Description	Date

Drawn by: YL Reviewed by: HF

Project No: J3213

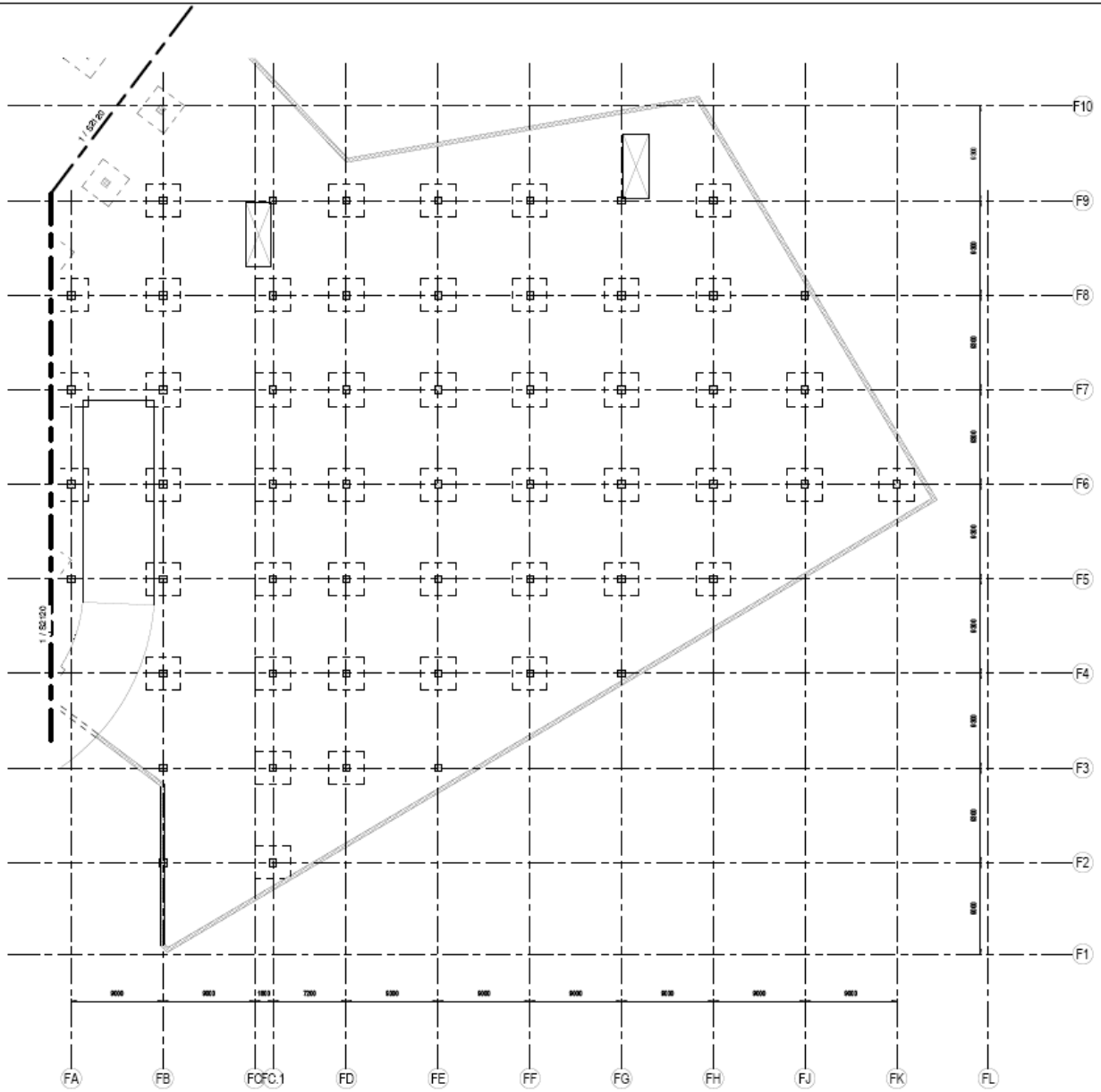
Sheet Titles:

LEVEL B1 FRAMING PLAN (1/2)

Original drawing is A1. Scale unless amendments if noticed

Sheet Number:

S2120



General Notes:

1. Do not scale the dimensions, follow (the mm) written dimensions unless otherwise mentioned.
2. Dimensions shown in these drawing are structural dimensions unless noted otherwise.
3. Any discrepancy to be brought to the notice of consultant prior to commencement of work.
4. All design and construction shall comply with statuory requirement of local authorities with ACI-0318-95.
5. All levels shown in plan are referring to structural floor level.
6. All concrete grade shall be as shown below:

Element	Concrete Grade
Column / Wall	60
Beam / Slab/ Stair Case	45

7. High yield reinforcement shall be with minmum strength of 460 N/mm
8. All slabs shall be 275mm thick flat slab unless noted otherwise.
9. All column drop to be 3000 x 3000 x 500mm thick, unless noted oth
10. All wall shall be 600mm thick unless noted otherwise.
11. All column to be 700 x 700 unless noted otherwise.

1 LEVEL B1 FRAMING PLAN 2/2
1 : 200

WSP

Key Plan

Professional Seals

No.	Issue Description	Date
1	100% SCHEMATIC DESIGN	08/2018

No.	Revision Description	Date

Drawn by: YL Reviewed by: HM

Project No: 2018

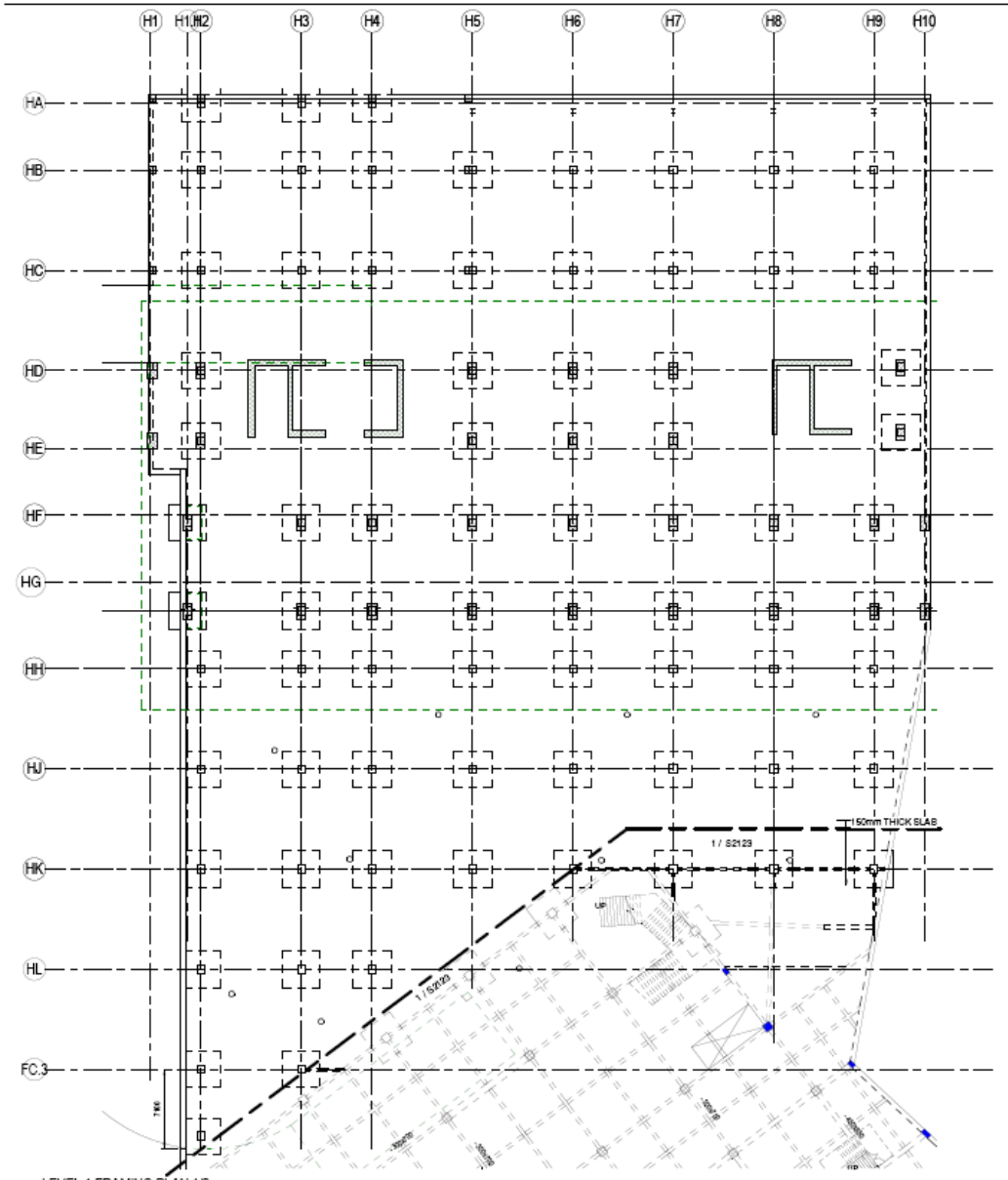
Sheet Titles:

LEVEL B1 FRAMING PLAN
(2/2)

Original drawing is A1. Scale unless accordingly if reduced

Sheet Number:

S2121



1 LEVEL 1 FRAMING PLAN 1/2
1 : 200

General Notes:

1. Do not scale the dimensions, follow (the mm) written dimensions unless otherwise mentioned.
2. Dimensions shown in these drawing are structural dimensions unless noted otherwise.
3. Any discrepency to be brought to the notice of consultant prior to commencement of work.
4. All design and construction shall comply with statuory requirement of local authorities with ACI-0318-95.
5. All levels shown in plan are referring to structural floor level.
6. All concrete grade shall be as shown below:

Element	Concrete Grade
Column / Wall	60
Beam / Slab/ Stair Case	45

7. High yield reinforcement shall be with minmum strength of 460 N/mm2.
8. All slabs shall be 275mm thick flat slab unless noted otherwise.
9. All column drop to be 3000 x 3000 x 500mm thick, unless noted otherwise.
10. All wall shall be 600mm thick unless noted otherwise.
11. All main beam to be 450(B) x 650(D) unless noted otherwise.
12. All secondary beam to be 400(B) x 500 (D) unless noted otherwise.
13. All column to be 700 x 700 unless noted otherwise.

WSP

Key Plan

Professional Seals

No.	Issue Description	Date
1	50% SCHEMATIC DESIGN	30/08/

No.	Revision Description	Date

Drawn by: YL Reviewed by: HM

Project No: 2213

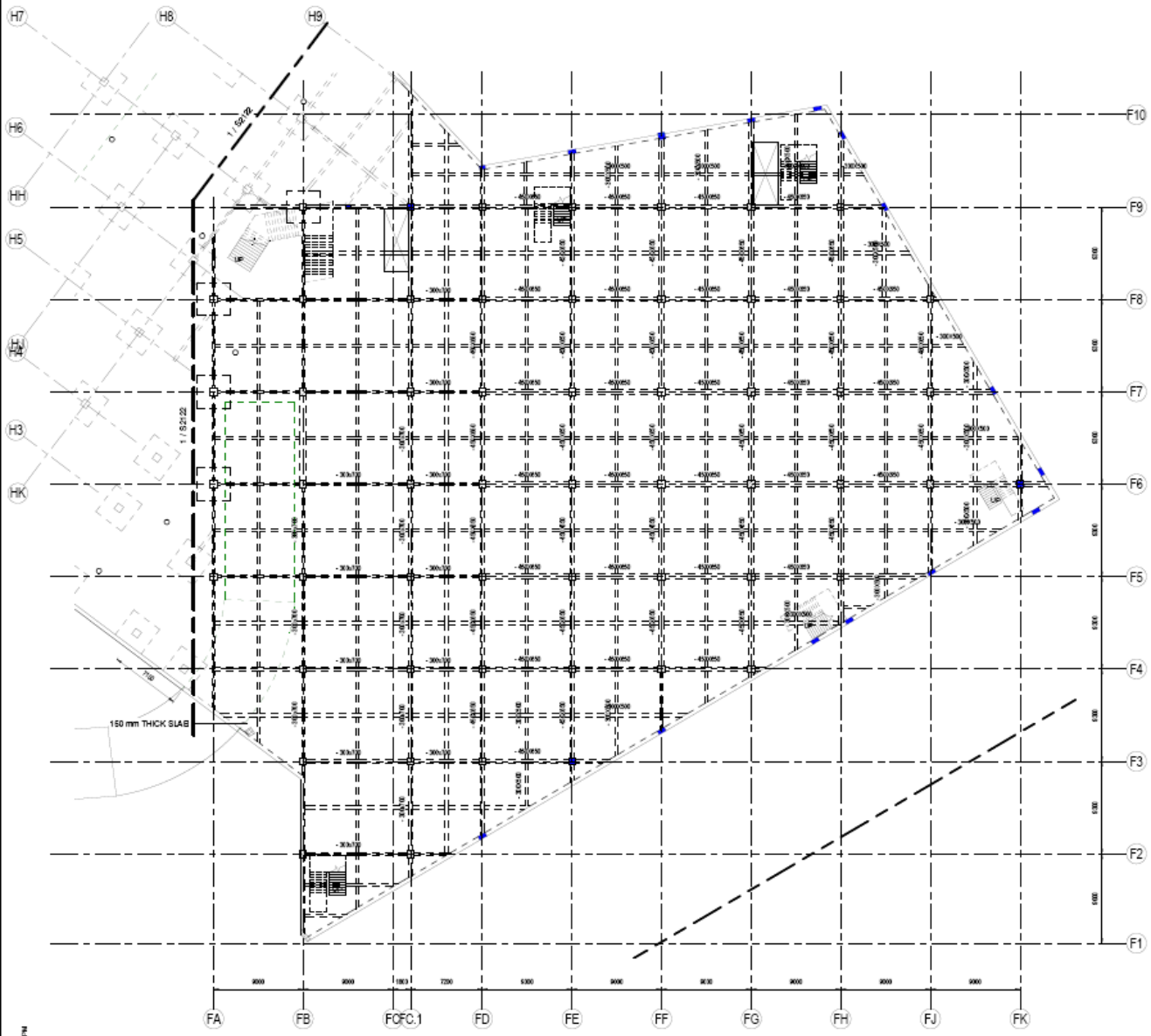
Sheet Titles:

LEVEL 1 FRAMING PLAN (1/2)

Original drawing is at - Scale written accordingly if reduced

Sheet Number:

S2122



1 LEVEL 1 FRAMING PLAN 2/2
1:200

General Notes:

1. Do not scale the dimensions, follow the mm) written dimensions unless otherwise mentioned.
2. Dimensions shown in these drawing are structural dimensions unless noted otherwise.
3. Any discrepancy to be brought to the notice of consultant prior to commencement of work.
4. All design and construction shall comply with statuory requirement of local authorities with ACI-318-95.
5. All levels shown in plan are referring to structural floor level.
6. All concrete grade shall be as shown below:

Element	Concrete Grade
Column / Wall	60
Beam / Slab/ Stair Case	45

7. High yield reinforcement shall be with minmum strength of 460 N/mm2.
8. All slabs shall be 275mm thick flat slab unless noted otherwise.
9. All column drop to be 3000 x 3000 x 500mm thick, unless noted otherwise.
10. All wall shall be 500mm thick unless noted otherwise.
11. All main beam to be 450(B) x 650(D) unless noted otherwise.
12. All secondary beam to be 400(B) x 500 (D) unless noted otherwise.
13. All column to be 700 x 700 unless noted otherwise.

WSP

Key Plan

Professional Seals

No.	Issue Description	Date
1	100% SCHEMATIC DESIGN	30/6/05

No.	Revision Description	Date

Drawn by: VL Reviewed by: HM

Project No: J2213

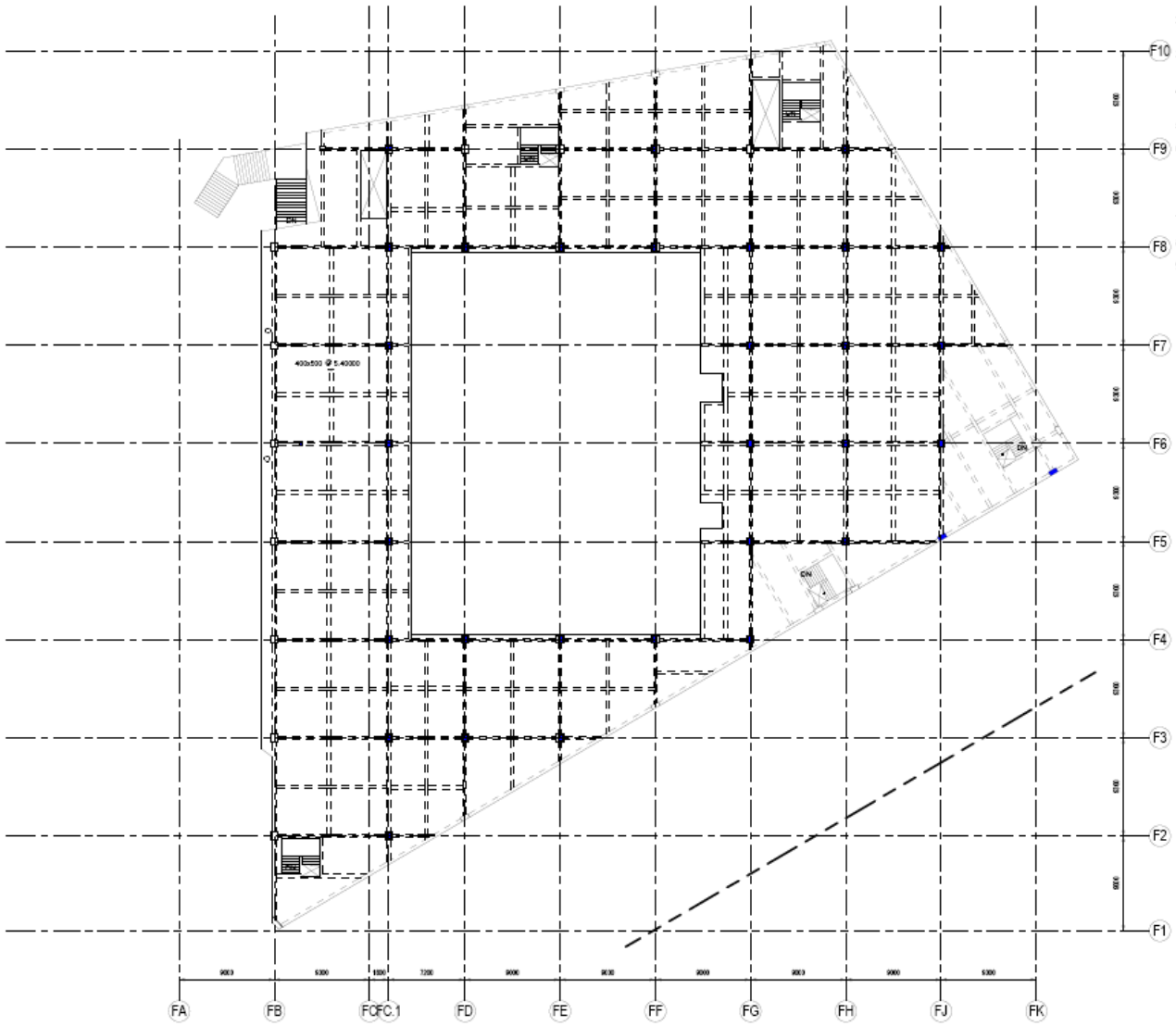
Sheet Titles:

LEVEL 1 FRAMING PLAN (2/2)

Original drawing is A1. Scale unless accordingly if reduced

Sheet Number:

S2123



1 LEVEL 2 FRAMING PLAN (BALLROOM)

1 : 200

General Notes:

1. Do not scale the dimensions, follow (the mm) written dimensions unless otherwise mentioned.
2. Dimensions shown in these drawing are structural dimensions unless noted otherwise.
3. Any discrepancy to be brought to the notice of consultant prior to commencement of work.
4. All design and construction shall comply with statuory requirement of local authorities with ACI-318-95.
5. All levels shown in plan are referring to structural floor level.
6. All concrete grade shall be as shown below:

Element	Concrete Grade
Column / Wall	60
Beam / Slab/ Stair Case	45

7. High yield reinforcement shall be with minmum strength of 460 N/mm2
8. All slabs shall be 150mm thick unless noted otherwise.
9. All wall shall be 600mm thick unless noted otherwise.
10. All main beam to be 450(B) x 650(D) unless noted otherwise.
11. All secondary beam to be 400(B) x 500(D) unless noted otherwise.
12. All column to be 700 x 700 unless noted otherwise.

WSP

Key Plan

Professional Seals

No.	Issue Description	Date
1	90% SCHEMATIC DESIGN	28/08/15

No.	Revision Description	Date

Drawn by: VL Reviewed by: MF

Project No: 25213

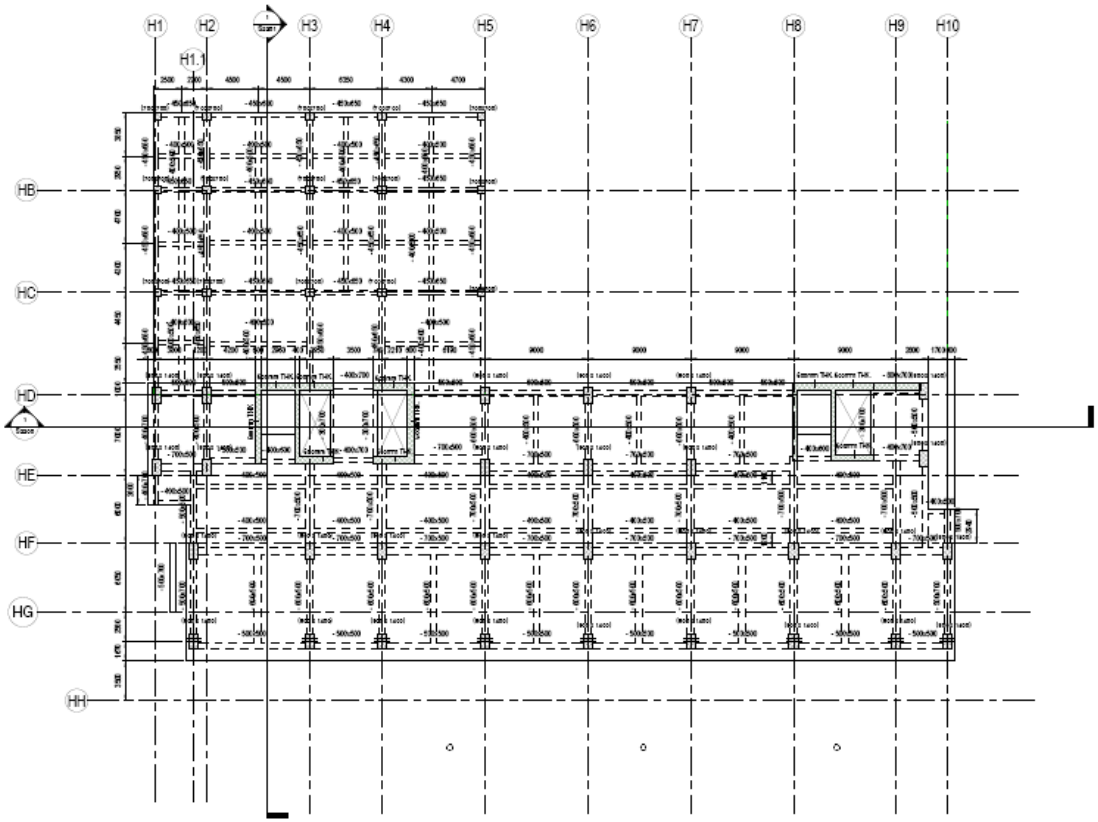
Sheet Titles:

LEVEL 2 FRAMING PLAN (BALLROOM AREA)

Original drawing is A1. Some outline somethings if reduced

Sheet Number:

S2124



1 LEVEL 2 FRAMING PLAN (TOWER)
1:200

NOTES

1. Do not scale the dimensions,follow (the mm) written dimensions unless otherwise mentioned.
2. Dimensions shown in these drawings are structural dimensions unless noted otherwise.
3. Any discrepancy to be brought to the notice of consultant prior to commencement of work.

General Notes:

- All design and construction shall comply with statutory requirement of local authorities and ACI-0318-95.
- All levels shown in plan are referring to structural floor level.
- All concrete grade shall be as shown below:

Element	Concrete Grade
Column / Wall	60
Beam / Slab / Staircase	45

- High yield reinforcement shall be with minimum strength of 460 N/mm².
- All slabs shall be 180mm thick unless noted otherwise.
- All wall shall be 400mm thick unless noted otherwise.

WSP

Key Plan

Professional Seals

No.	Issue Description	Date
1	TCS SUBMISSION	06/09

No.	Revision Description	Date

Drawn by: MW Reviewed by: HF

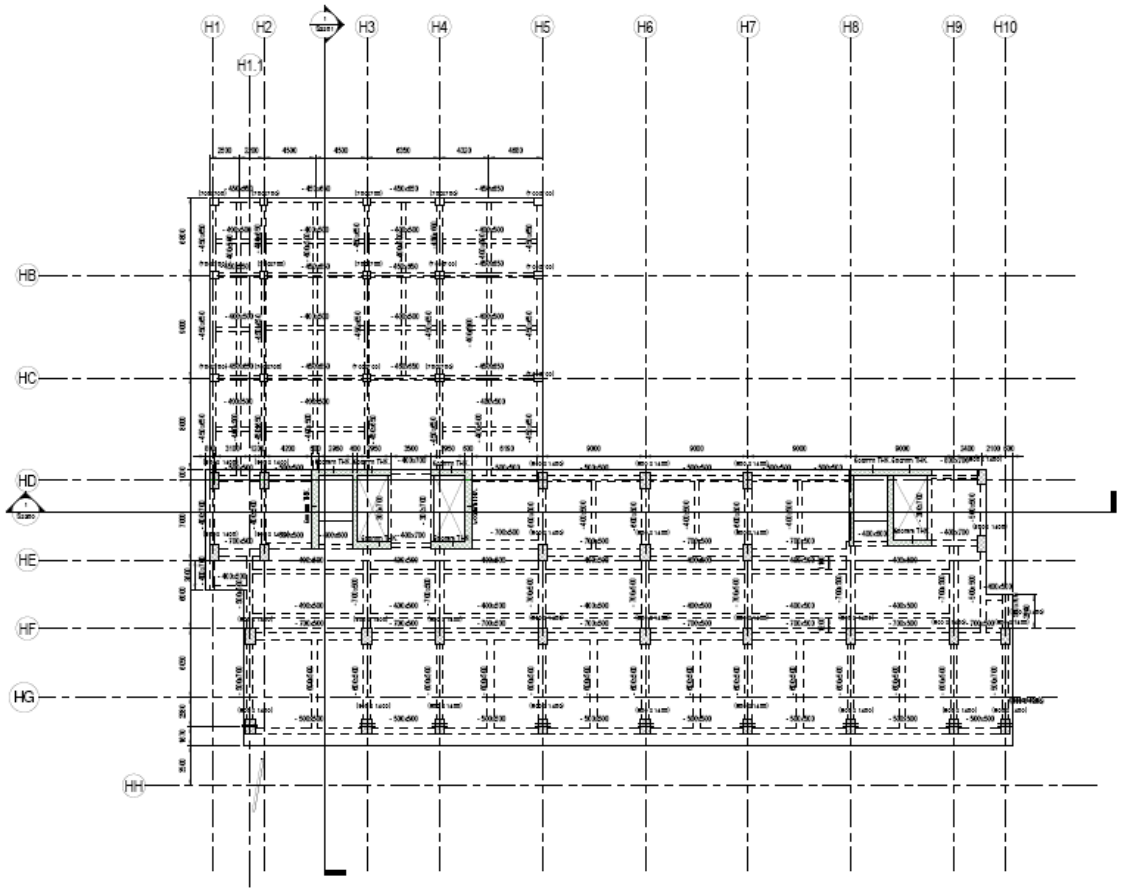
Project No: 2213

Sheet Titles:

LEVEL 2 FRAMING PLAN (HOTEL TOWER PORTION)

Sheet Number:

S2126



1 LEVEL 3 FRAMING PLAN (TOWER)
1 : 200

NOTES

1. Do not scale the dimensions,follow (the mm) written dimensions unless otherwise mentioned.
2. Dimensions shown in these drawings are structural dimensions unless noted otherwise.
3. Any discrepancy to be brought to the notice of consultant prior to commencement of work.

General Notes:

- All design and construction shall comply with statutory requirement of local authorities and ACI-0318-95.
- All levels shown in plan are referring to structural floor level.
- All concrete grade shall be as shown below :

Element	Concrete Grade
Column / Wall	60
Beam / Slab / Staircase	45

- High yield reinforcement shall be with minimum strength of 460 N/mm².
- All slabs shall be 160mm thick unless noted otherwise.
- All wall shall be 400mm thick unless noted otherwise.

WSP

Key Plan

Professional Seals

No.	Issue Description	Date
1	10% SCHEMATIC DESIGN	08/2018

No.	Revision Description	Date

Drawn by: Reviewed by:

Project No: 70213

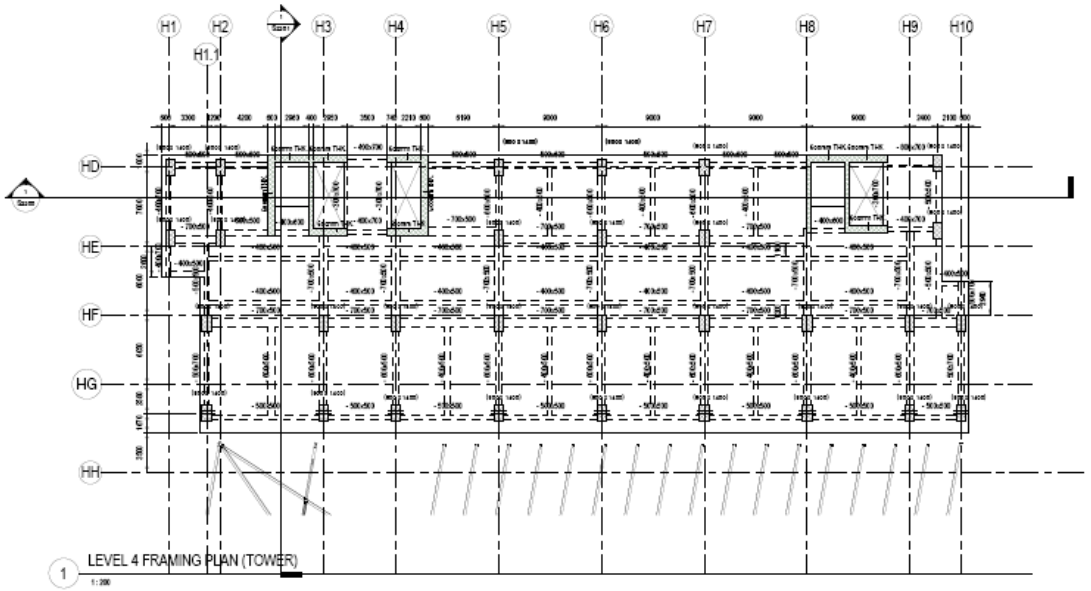
Sheet Titles:

LEVEL 3 FRAMING PLAN (HOTEL TOWER PORTION)

Original drawing is A1. Scale within drawings if reduced

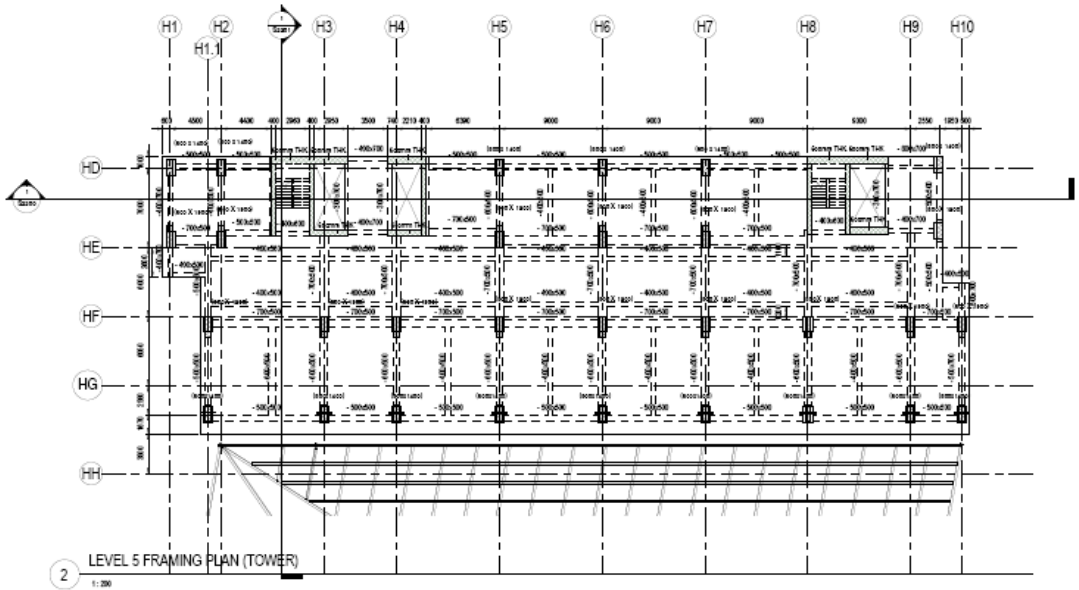
Sheet Number:

S2127



1 LEVEL 4 FRAMING PLAN (TOWER)

1 : 200



2 LEVEL 5 FRAMING PLAN (TOWER)

1 : 200

NOTES

1. Do not scale the dimensions,follow (the mm) written dimensions unless otherwise mentioned.
2. Dimensions shown in these drawings are structural dimensions unless noted otherwise.
3. Any discrepancy to be brought to the notice of consultant prior to commencement of work.

General Notes:

- All design and construction shall comply with statutory requirement of local authorities and ACI-0318-95.
- All levels shown in plan are referring to structural floor level.
- All concrete grade shall be as shown below:

Element	Concrete Grade
Column / Wall	60
Beam / Slab / Staircase	45

- High yield reinforcement shall be with minimum strength of 460 N/mm².
- All slabs shall be 160mm thick unless noted otherwise.
- All wall shall be 400mm thick unless noted otherwise.

WSP

Key Plan

Professional Seals

No.	Issue Description	Date

No.	Revision Description	Date

Drawn by: MM Reviewed by: HM

Project No: 2213

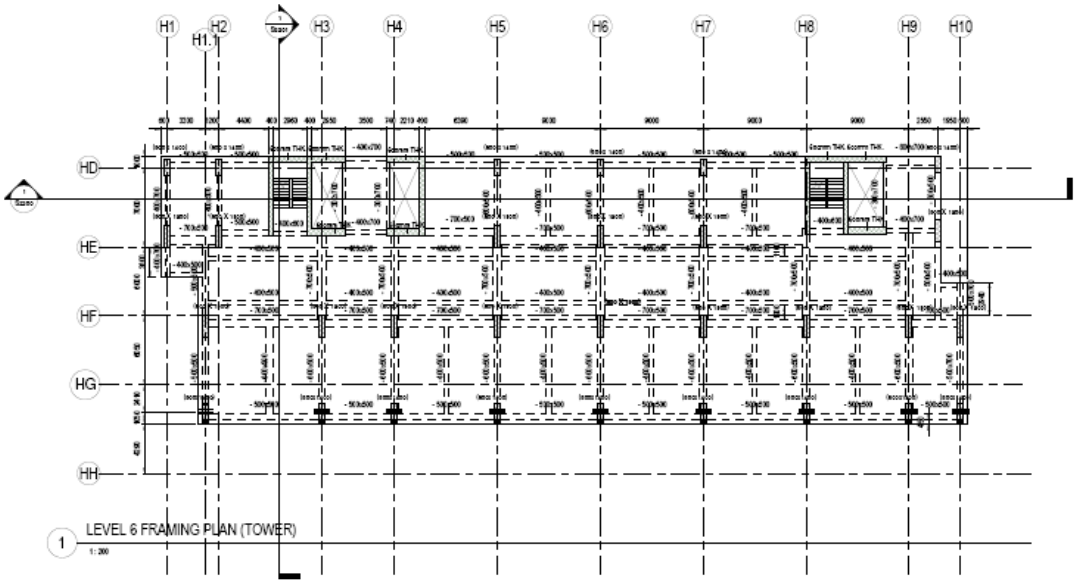
Sheet Titles:

LEVEL 4 & 5 FRAMING PLAN

Original drawing is A1. Scale written accordingly if reduced

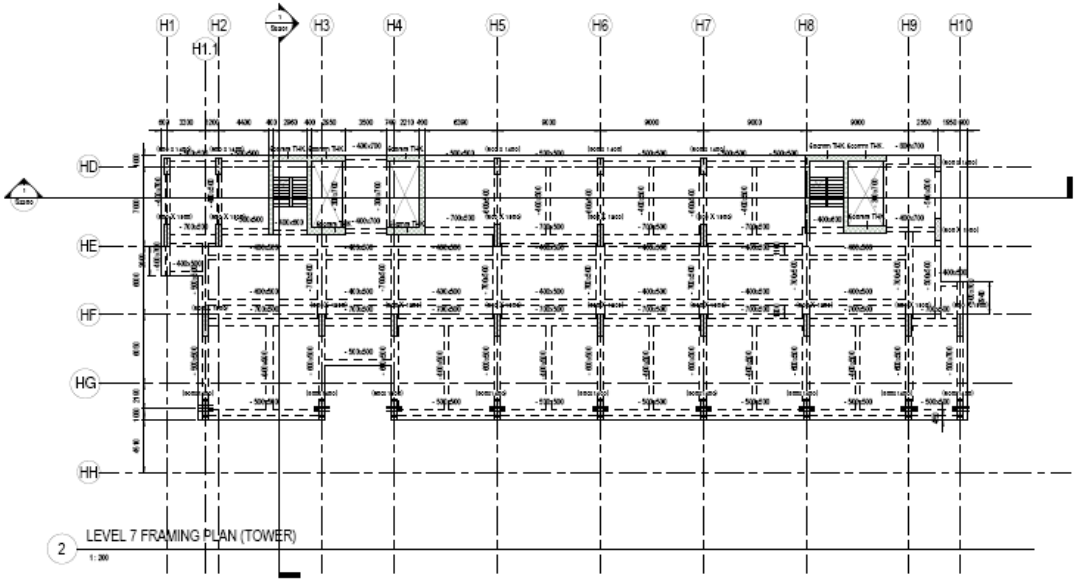
Sheet Number:

S2128



1 LEVEL 6 FRAMING PLAN (TOWER)

1 : 200



2 LEVEL 7 FRAMING PLAN (TOWER)

1 : 200

NOTES

1. Do not scale the dimensions,follow (the mm) written dimensions unless otherwise mentioned.
2. Dimensions shown in these drawings are structural dimensions unless noted otherwise.
3. Any discrepancy to be brought to the notice of consultant prior to commencement of work.

General Notes:

- All design and construction shall comply with statutory requirement of local authorities and ACI-0318-95.
- All levels shown in plan are referring to structural floor level.
- All concrete grade shall be as shown below:

Element	Concrete Grade
Column / Wall	60
Beam / Slab / Staircase	45

- High yield reinforcement shall be with minimum strength of 460 N/mm².
- All slabs shall be 180mm thick unless noted otherwise.
- All wall shall be 400mm thick unless noted otherwise.

WSP

Key Plan

Professional Seals

No.	Issue Description	Date
1	FOR SUBMISSION	DATE

No.	Revision Description	Date

Drawn by: MM Reviewed by: HM

Project No: 2213

Sheet Titles:

LEVEL 6 & 7 FRAMING PLAN

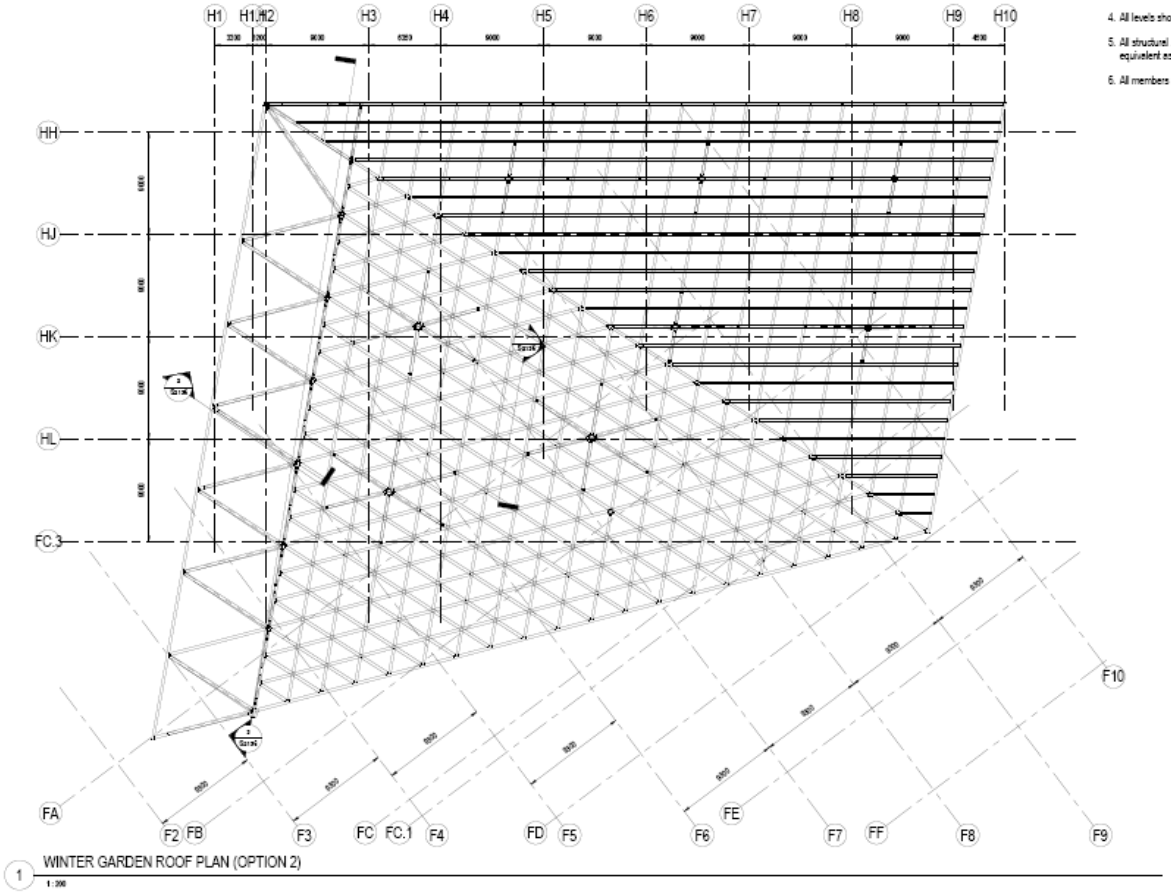
Original drawing is A1. Scale unless accordingly if reduced

Sheet Number:

S2129

General Notes:

1. Do not scale the dimensions, follow (the mm) written dimensions unless otherwise mentioned.
2. Dimensions shown in these drawing are structural dimensions unless noted otherwise.
3. Any discrepancy to be brought to the notice of consultant prior to commencement of work.
4. All levels shown in plan are referring to structural floor level.
5. All structural steel work shall be Grade S355 JR to BS EN 10025 or equivalent as a minimum.
6. All members in the Winter Garden Roof are RHS 450 x 250 x 12.5 mm.



1 WINTER GARDEN ROOF PLAN (OPTION 2)

1 : 200

WSP

Key Plan

Professional Seals

No.	Issue Description	Date
1	100% SCHEMATIC DESIGN	08/2020

No.	Revision Description	Date

Drawn by: YL Reviewed by: HF

Project No: 2019

Sheet Titles:

WINTER GARDEN ROOF PLAN (OPTION 2)

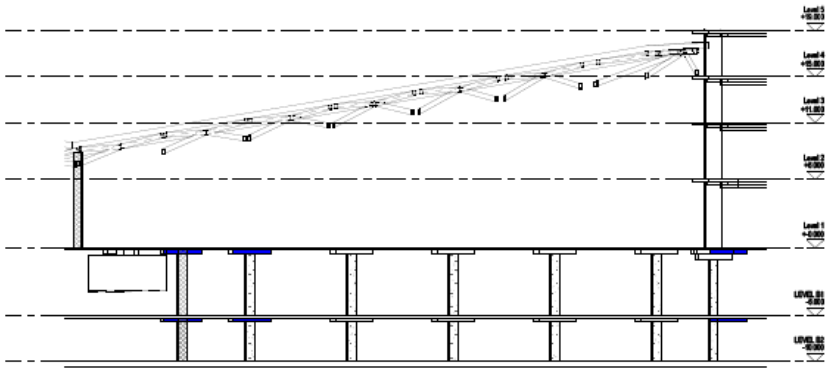
Original drawing is A1. Some entities accordingly if reduced

Sheet Number:

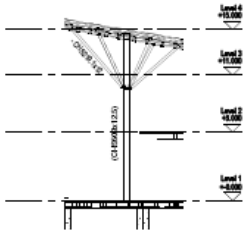
S2135

General Notes:

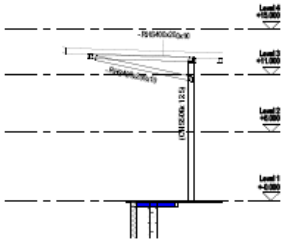
1. Do not scale the dimensions, follow (the mm) written dimensions unless otherwise mentioned.
2. Dimensions shown in these drawing are structural dimensions unless noted otherwise.
3. Any discrepancy to be brought to the notice of consultant prior to commencement of work.
4. All levels shown in plan are referring to structural floor level.
5. All structural steel work shall be Grade S355 JR to BS EN 10025 or equivalent as a minimum.
6. All members in the Winter Garden Roof are RHS 450 x 250 x 12.5 mm.



3 WINTERGARDEN ROOF -SECTION 1 (OPTION 2)
1 : 200



1 TYPICAL TREE SUPPORT (OPTION 2)
1 : 200



2 WINTER GARDEN ROOF - TYPICAL CANTILEVER STRUCTURE AT ENTRANCE (OPTION 2)
1 : 200

WSP

Key Plan

Professional Seals

No.	Issue Description	Date
1	10% SCHEMATIC DESIGN	06/09

No.	Revision Description	Date

Drawn by: YL Reviewed by: HM

Project No: 2211

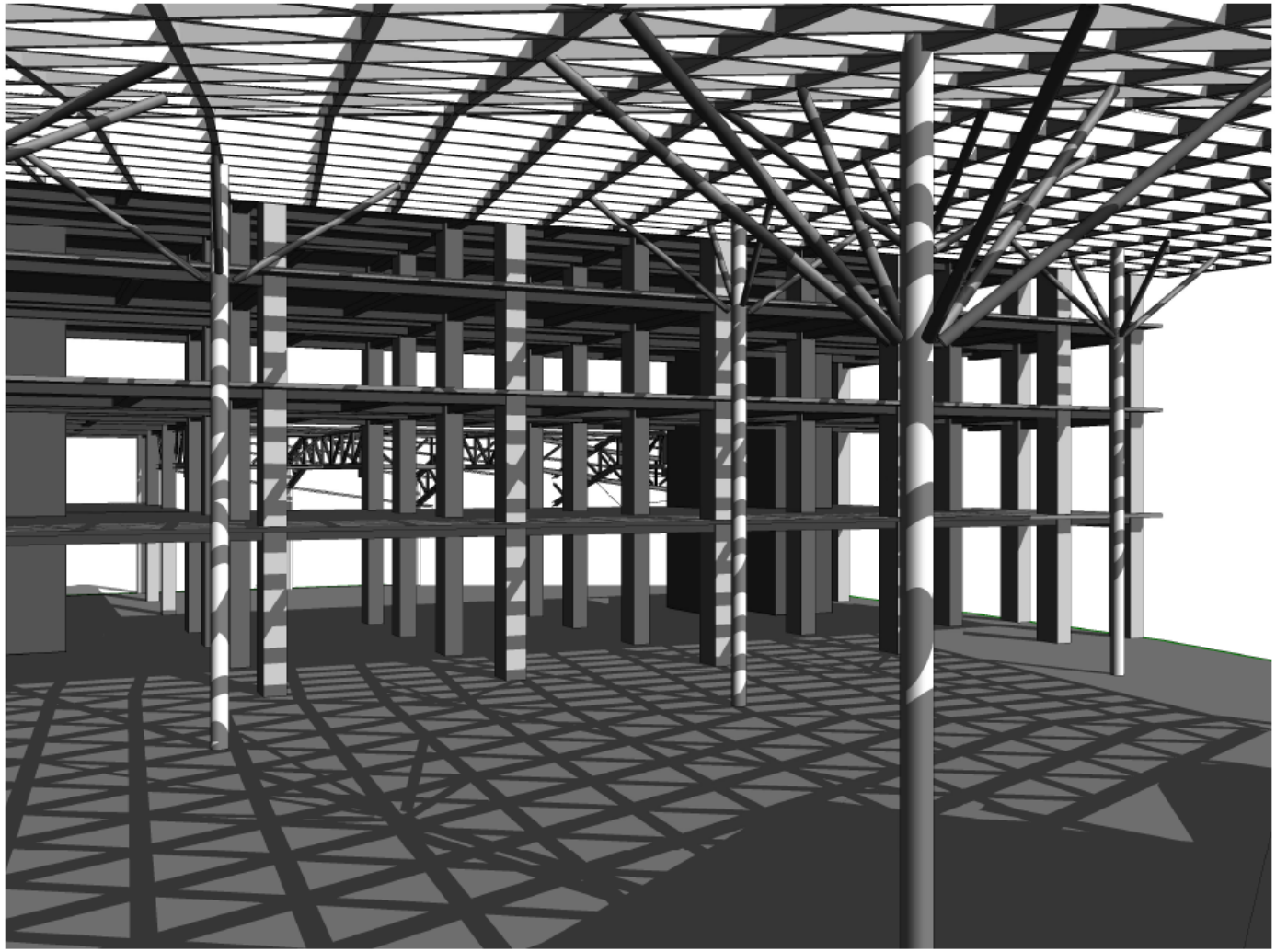
Sheet Titles:

WINTER GARDEN ROOF SECTIONS (OPTION 2)

Original drawing is A1. Scale within accordingly if reduced

Sheet Number:

S2136



1 WINTERGARDEN 3D VIEW
3

WSP

Key Plan

Professional Seals

No.	Issue Description	Date
1	[illegible]	[illegible]

No.	Revision Description	Date

Drawn by: YL Reviewed by: HM

Project No: J2212

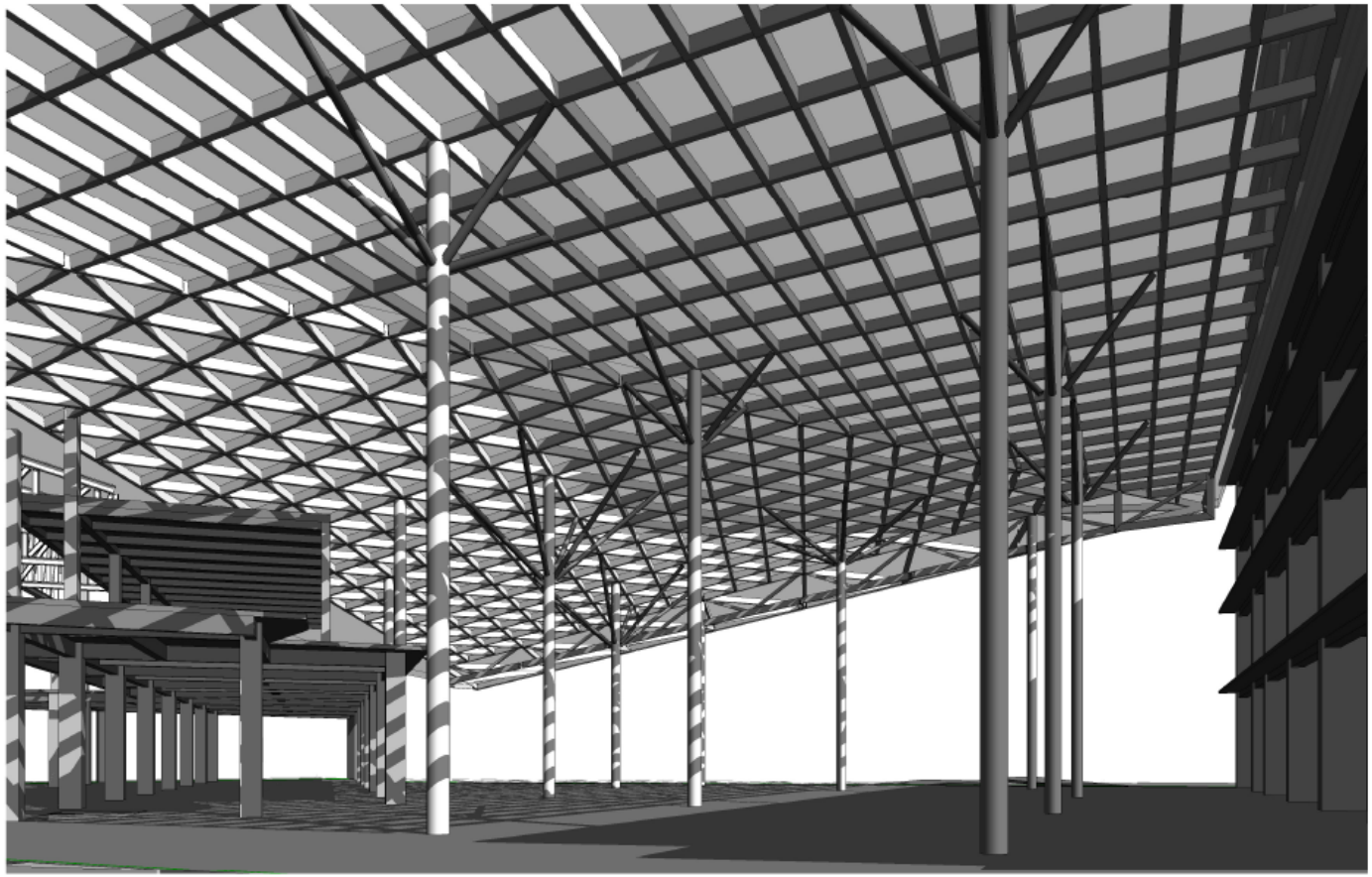
Sheet Titles:

WINTER GARDEN ROOF 3D VIEW (OPTION 2)

Original drawing is A1. Some scales accordingly if reduced

Sheet Number:

S2304



1 WINTERGARDEN 3D VIEW 4

WSP

Key Plan

Professional Seals

No.	Issue Description	Date
1	10% SCHEMATIC DESIGN	26/6/19

No.	Revision Description	Date

Drawn by: YL Reviewed by: HM

Project No: J2212

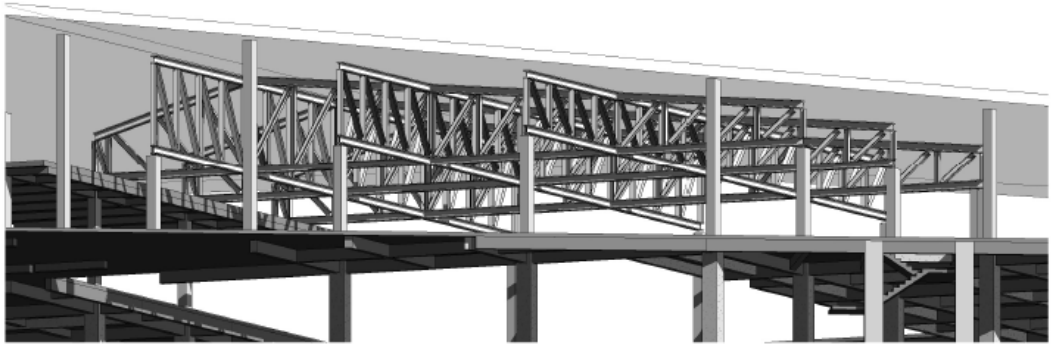
Sheet Titles:

WINTER GARDEN ROOF 3D VIEW (OPTION 2)

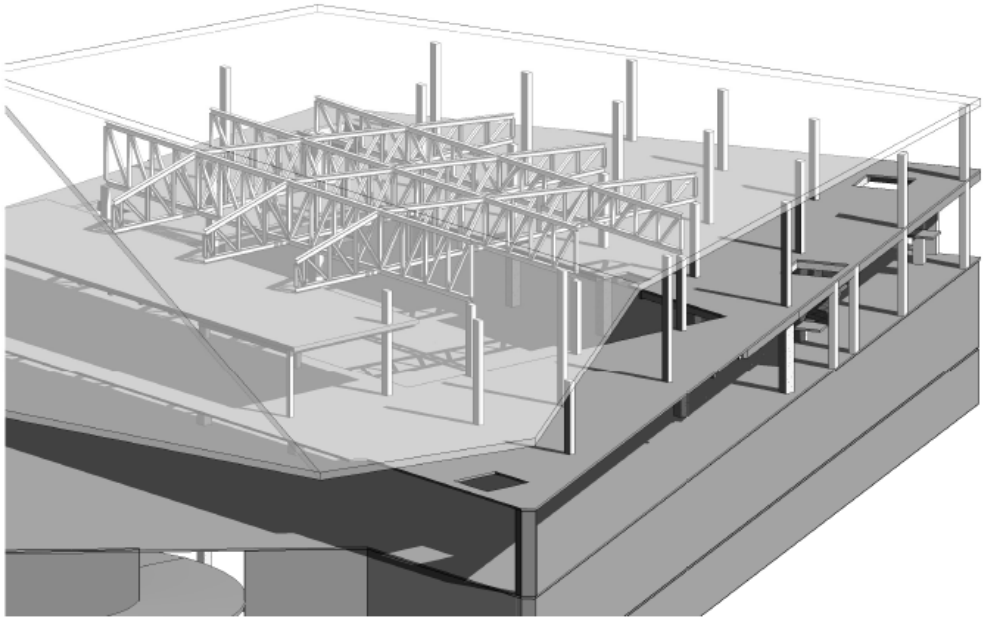
Digital drawing is A1. Size within accordingly if related

Sheet Number:

S2305



1 BALLROOM ROOF TRUSS 3D VIEW 1



2 BALLROOM ROOF TRUSS 3D VIEW 2

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Key Plan

Professional Seals

No.	Issue Description	Date
1	100% SCHEMATIC DESIGN	DMMYY

No.	Revision Description	Date

Drawn by: YL Reviewed by: HM

Project No: Jxxxx

Sheet Titles:

BALLROOM ROOF 3D VIEW

Digital drawing is of Size unless accordingly if related

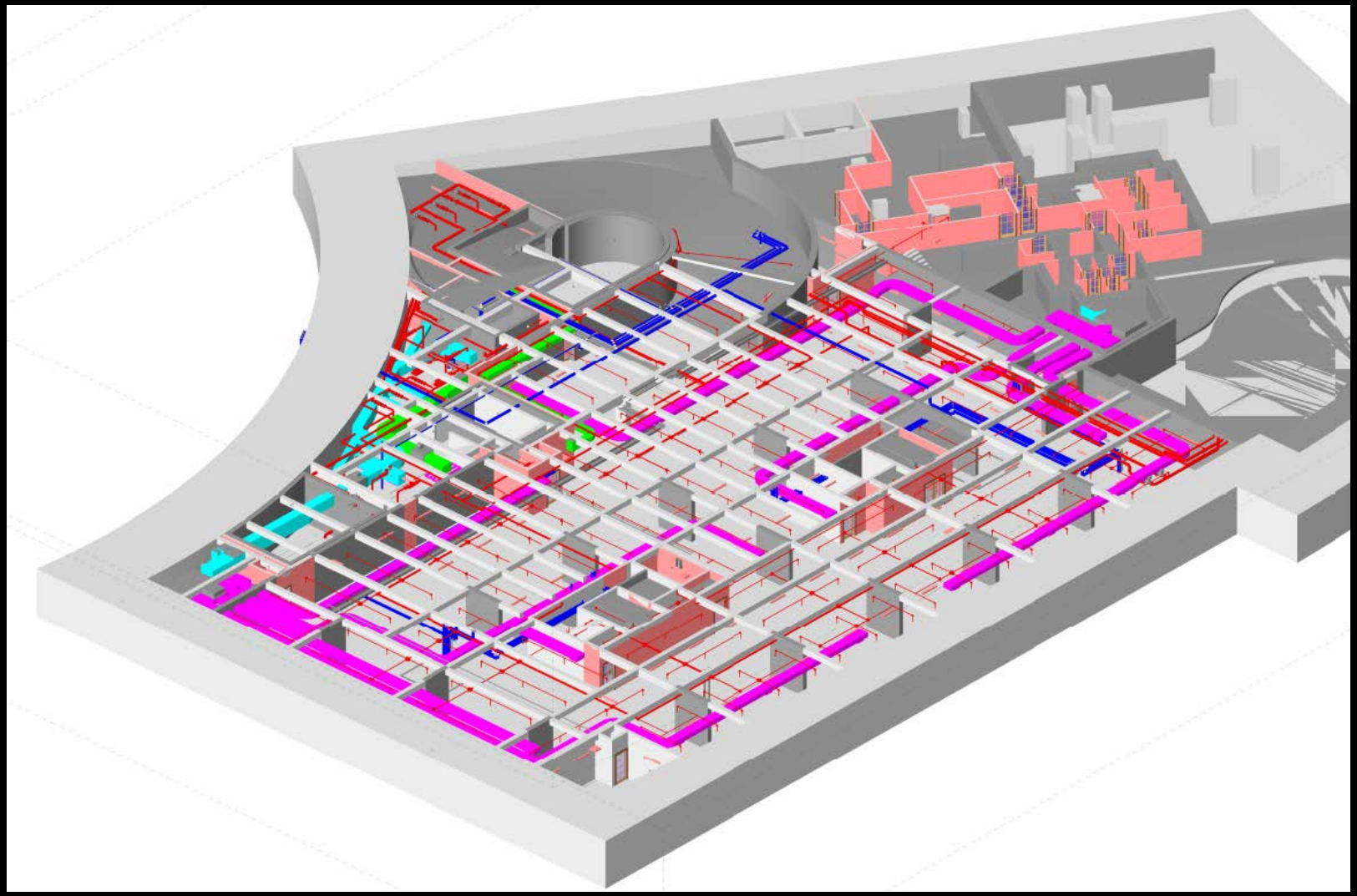
Sheet Number:

S2306

Experience in Real Projects (MEP)

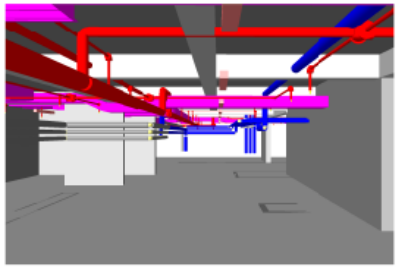
- Broadcast Drive

Combined Services Drawing



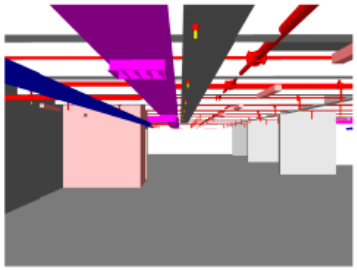
DO NOT SCALE

1 三维视图 1

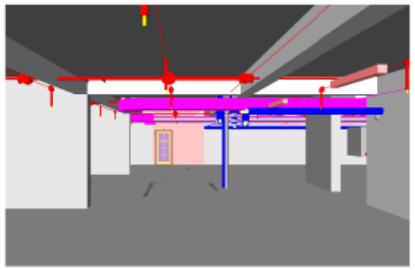


3 三维视图 6

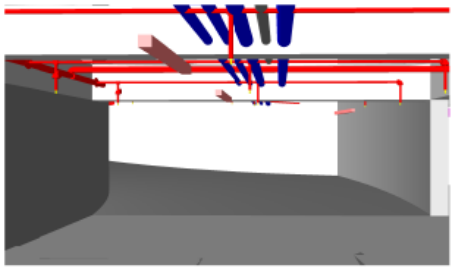
7 三维视图 10



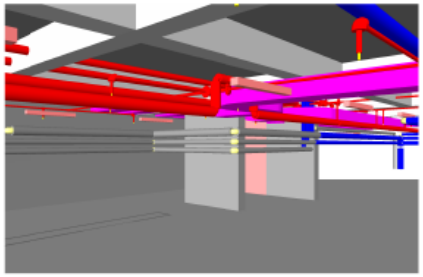
2 三维视图 5



4 三维视图 7



5 三维视图 8



6 三维视图 9

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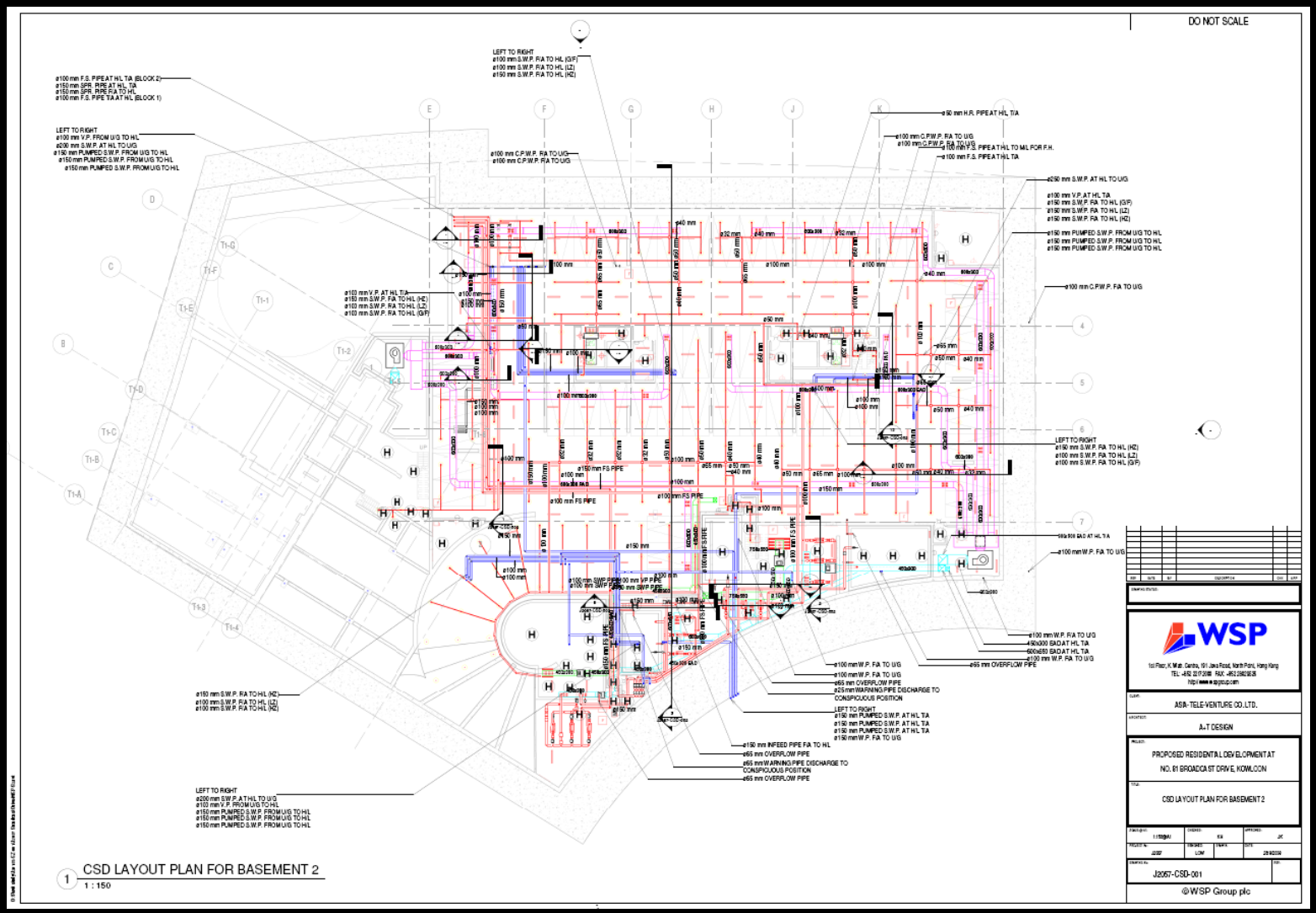
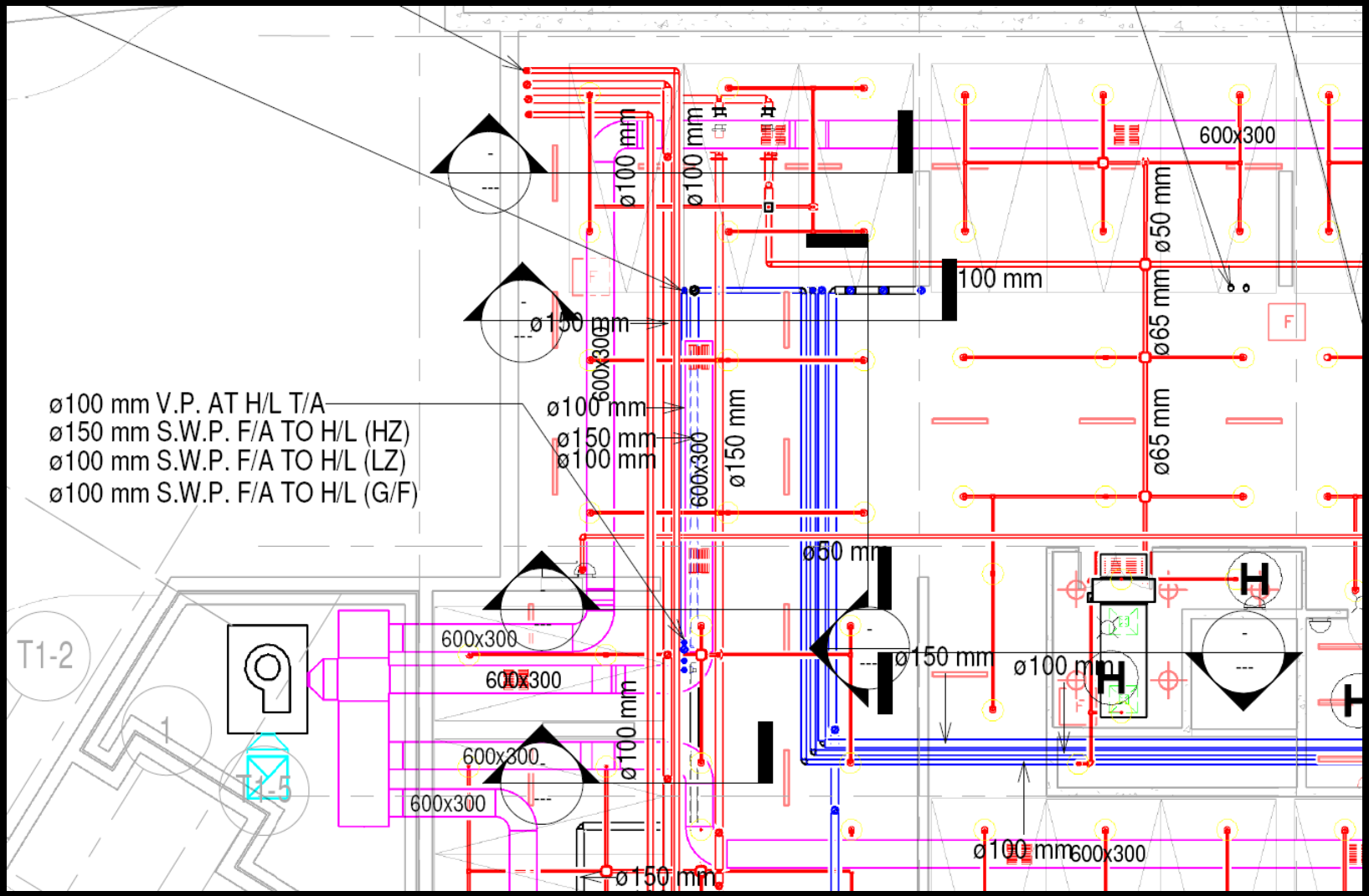
PROPOSED RESIDENTIAL DEVELOPMENT AT
NO. 91 BROADCAST DRIVE, KOWLOON

J2057-CSD-2

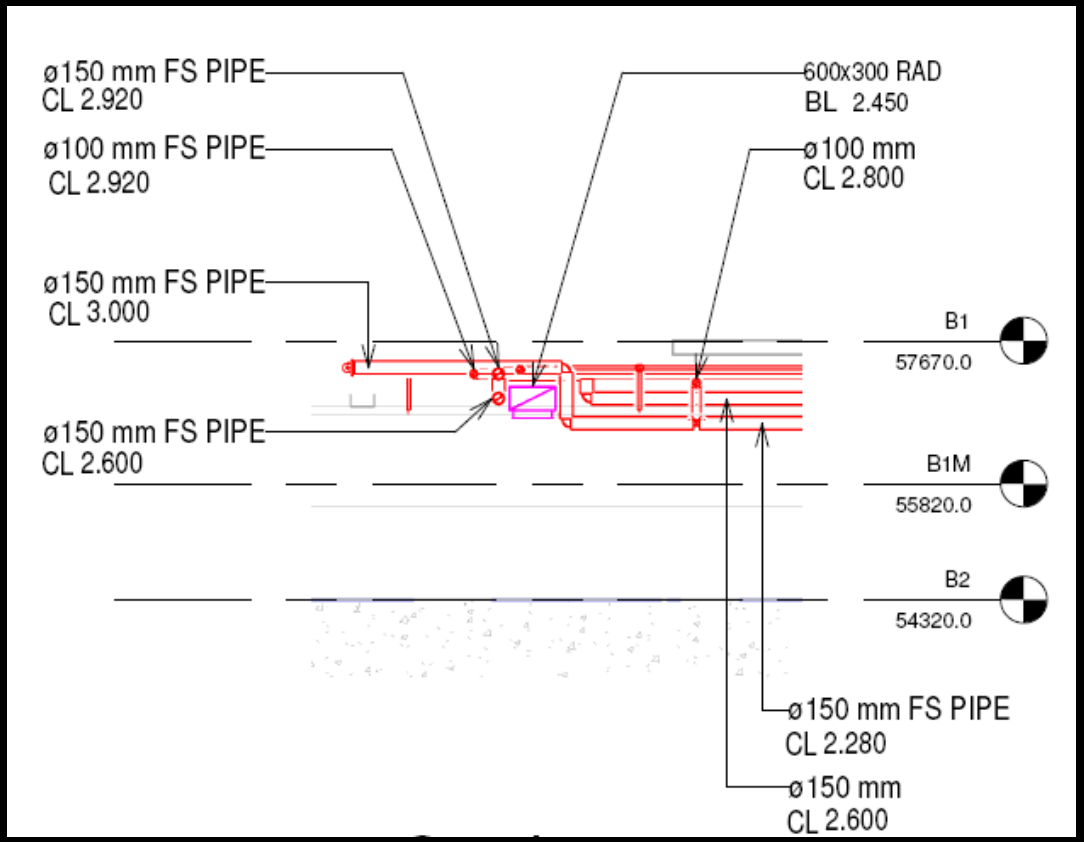
Combined Services Drawing (Basement 2)



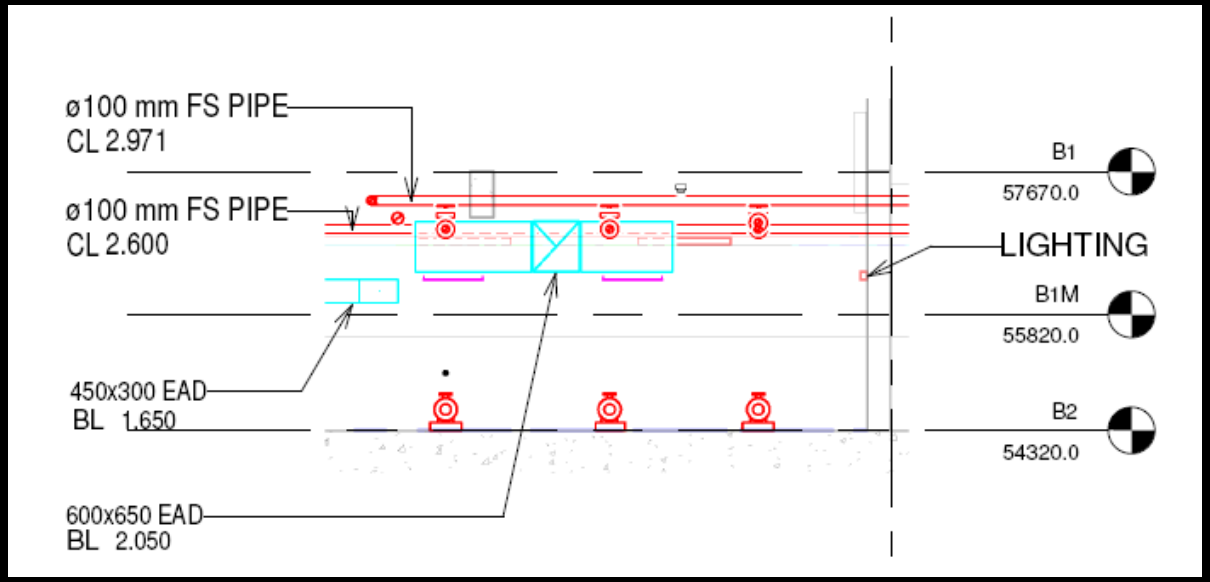
Combined Services Drawing (Basement 2)



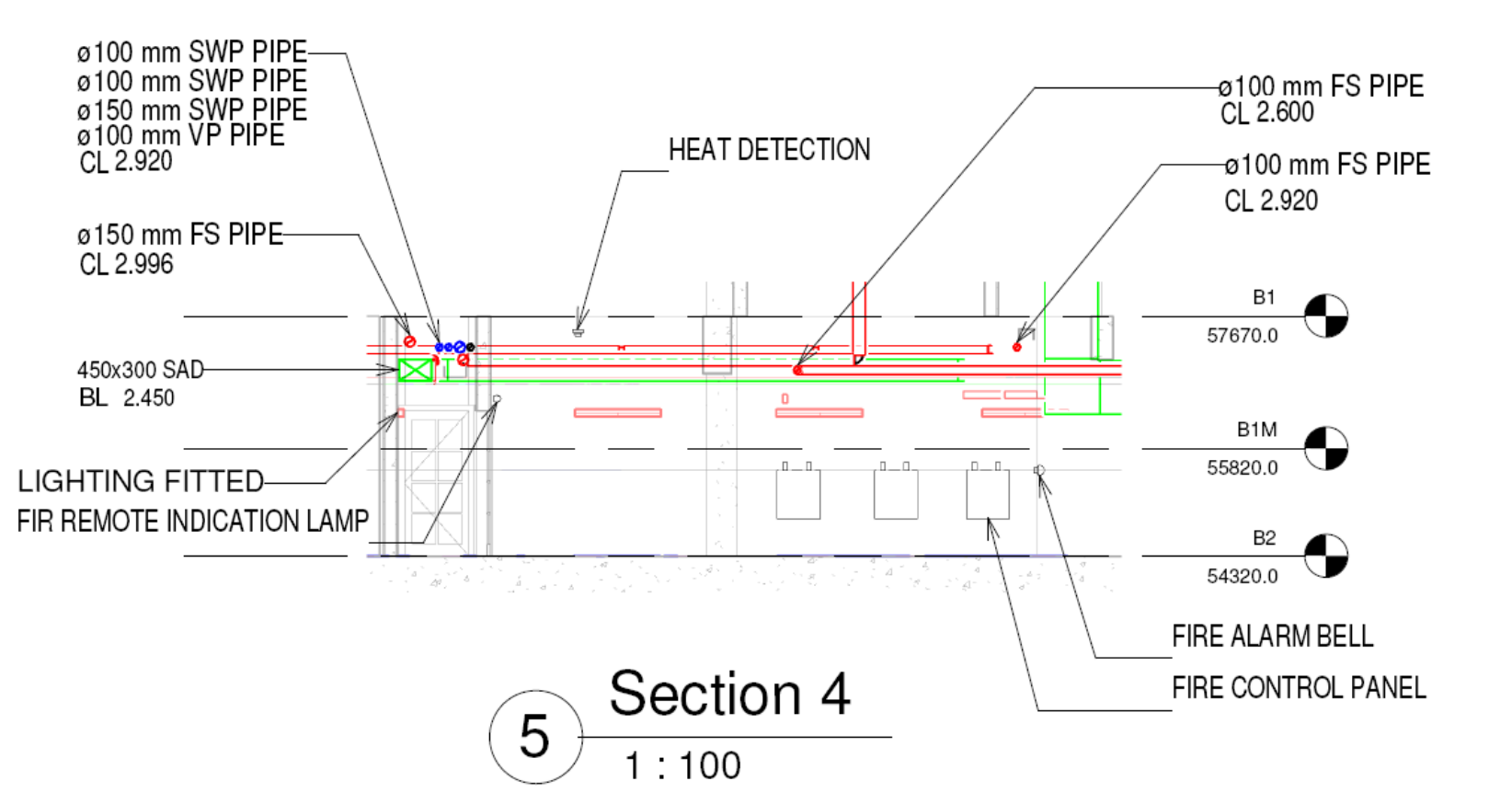
CSD – Section


ø150 mm FS PIPE
CL 2.920
ø100 mm FS PIPE
CL 2.920
ø150 mm FS PIPE
CL 3.000
ø150 mm FS PIPE
CL 2.600
600x300 RAD
BL 2.450
ø100 mm
CL 2.800
B1
57670.0
B1M
55820.0
B2
54320.0
ø150 mm FS PIPE
CL 2.280
ø150 mm
CL 2.600

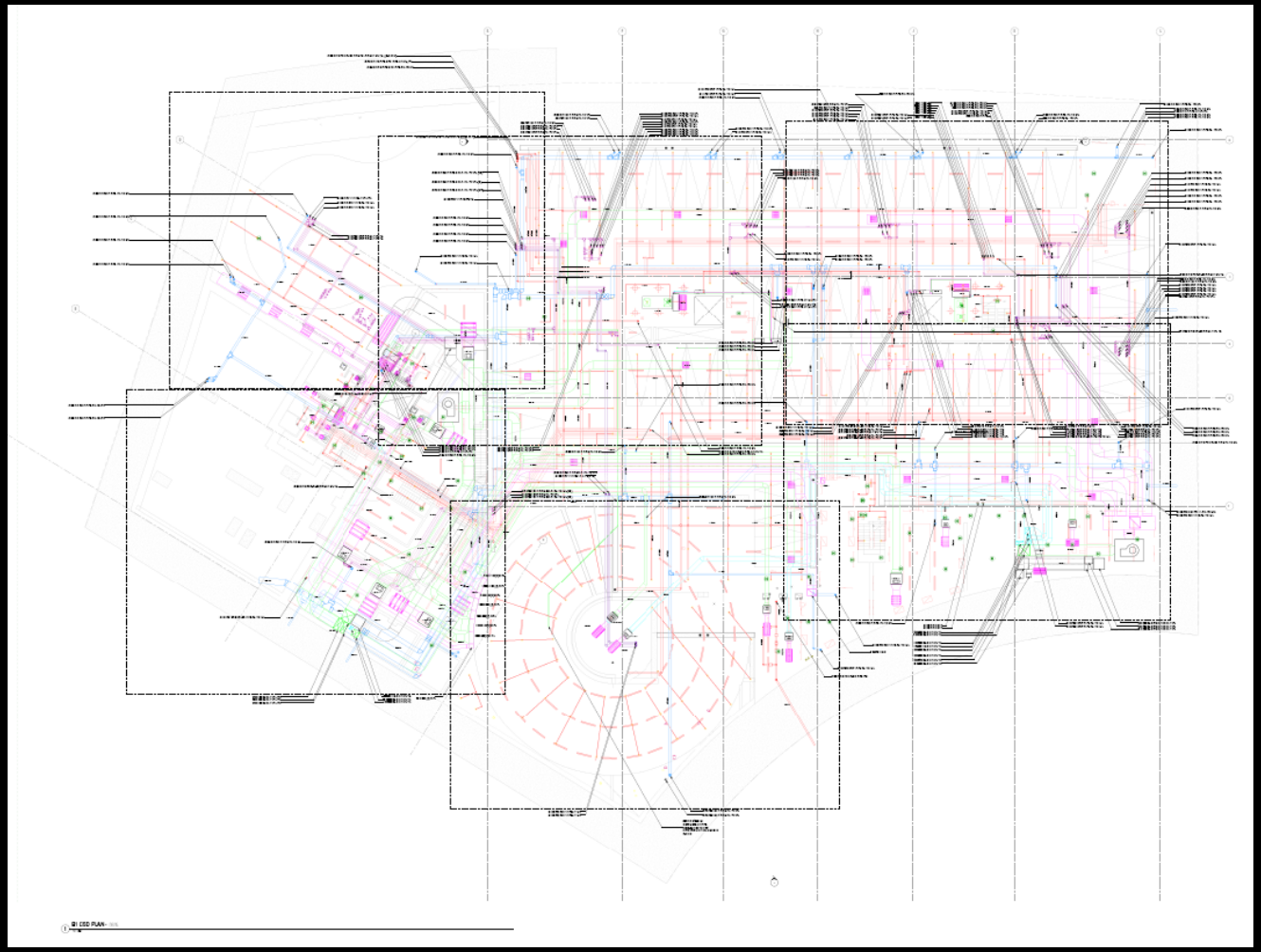
CSD – Section


ø100 mm FS PIPE
CL 2.971
ø100 mm FS PIPE
CL 2.600
450x300 EAD
BL 1.650
600x650 EAD
BL 2.050
B1
57670.0
LIGHTING
B1M
55820.0
B2
54320.0

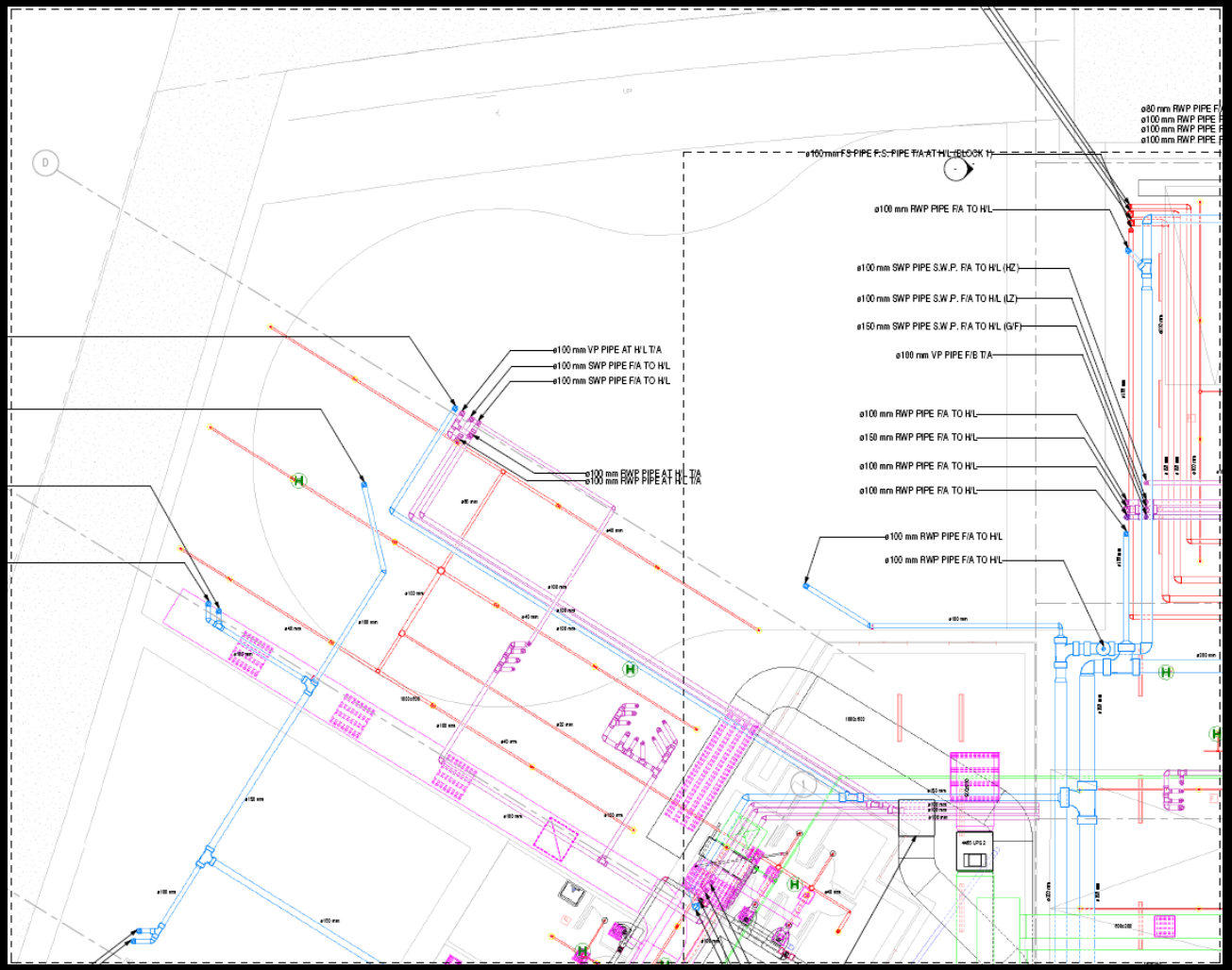
CSD – Section


ø100 mm SWP PIPE
ø100 mm SWP PIPE
ø150 mm SWP PIPE
ø100 mm VP PIPE
CL 2.920
ø150 mm FS PIPE
CL 2.996
450x300 SAD
BL 2.450
LIGHTING FITTED
FIR REMOTE INDICATION LAMP
HEAT DETECTION
ø100 mm FS PIPE
CL 2.600
ø100 mm FS PIPE
CL 2.920
B1
57670.0
B1M
55820.0
B2
54320.0
FIRE ALARM BELL
FIRE CONTROL PANEL
5
Section 4
1 : 100

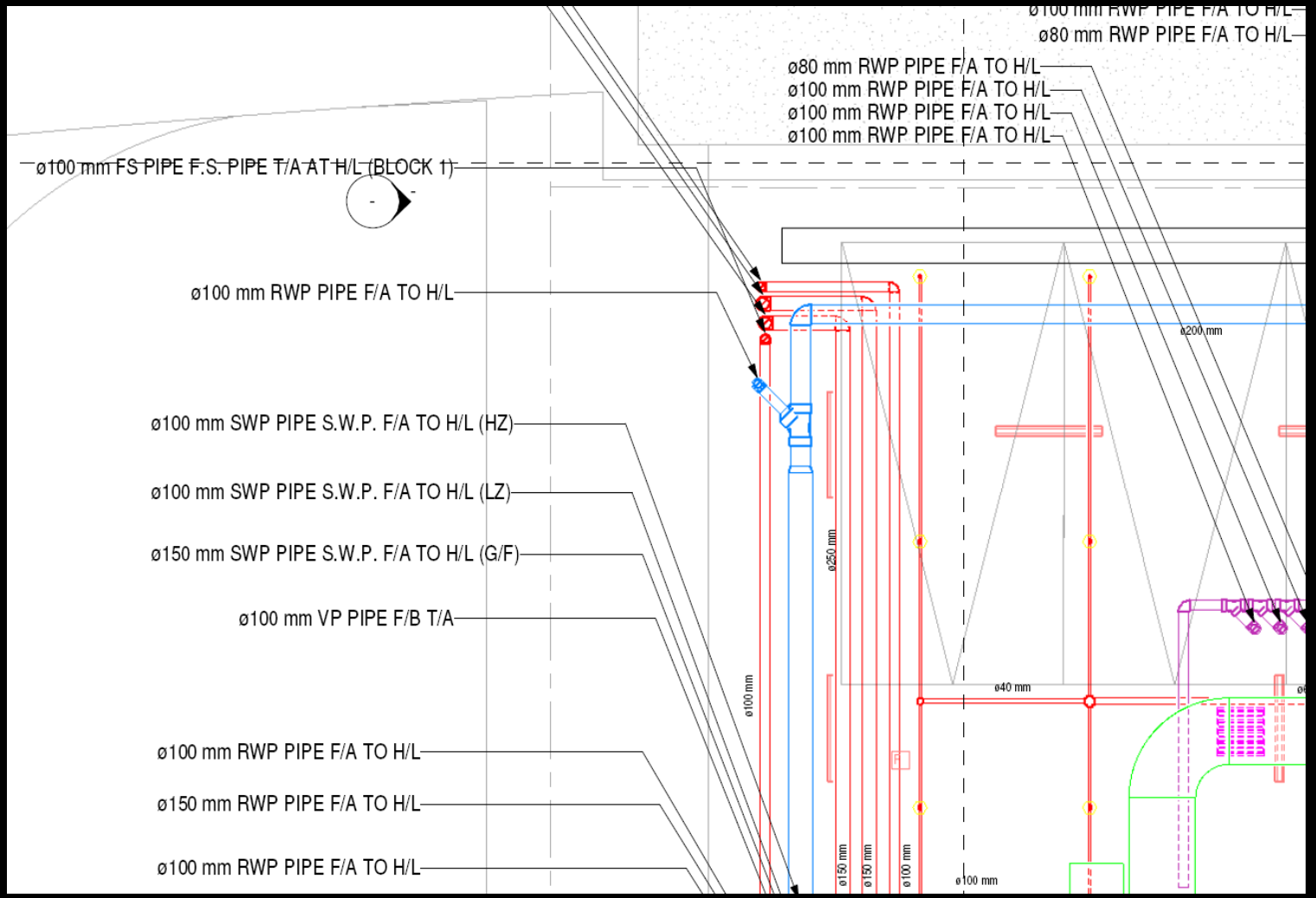
Combined Service Drawing (Basement 1)



Combined Service Drawing (Basement 1)



Combined Service Drawing (Basement 1)



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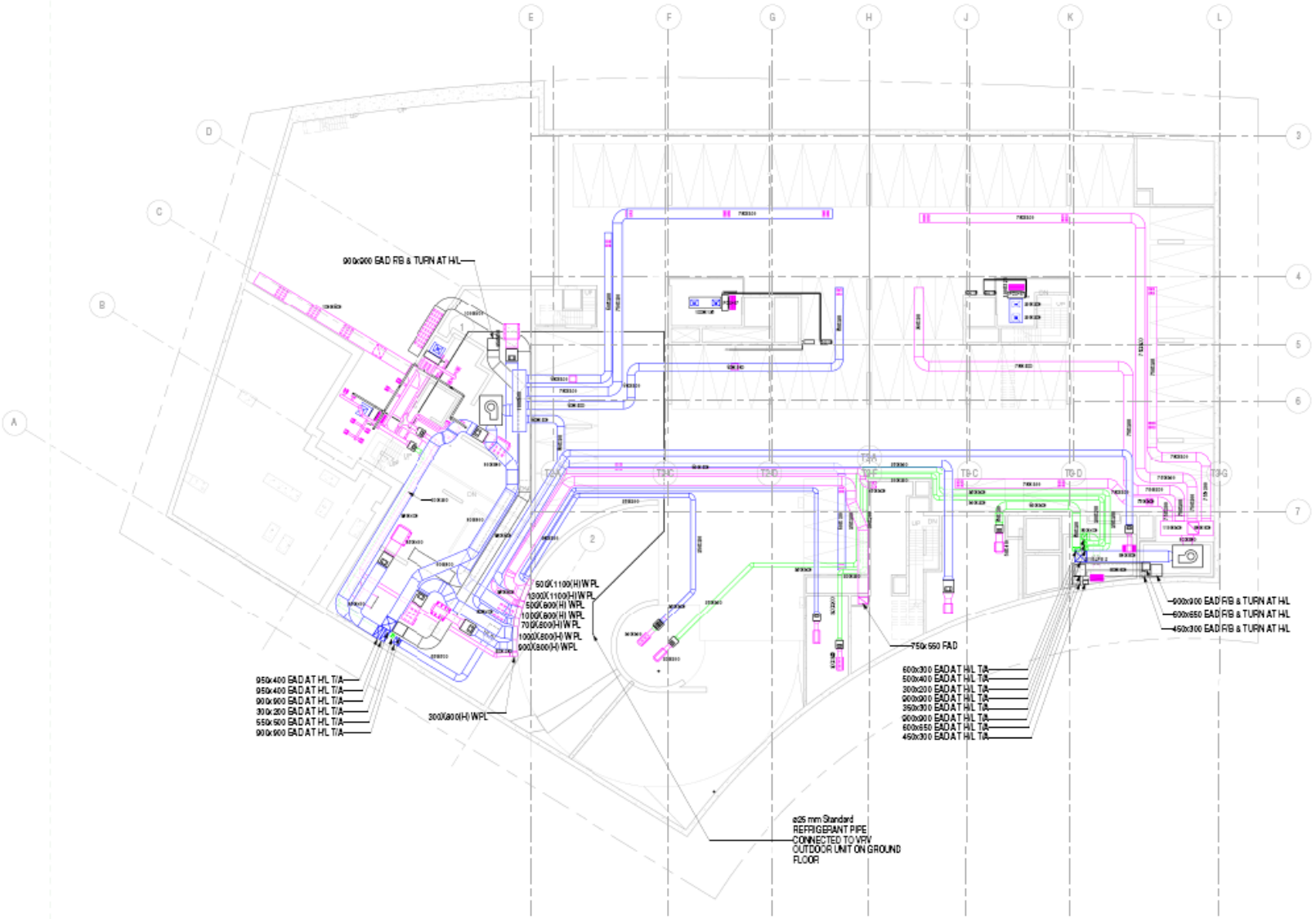

1 MVAC LAYOUT FOR BASEMENT 1
1 : 150

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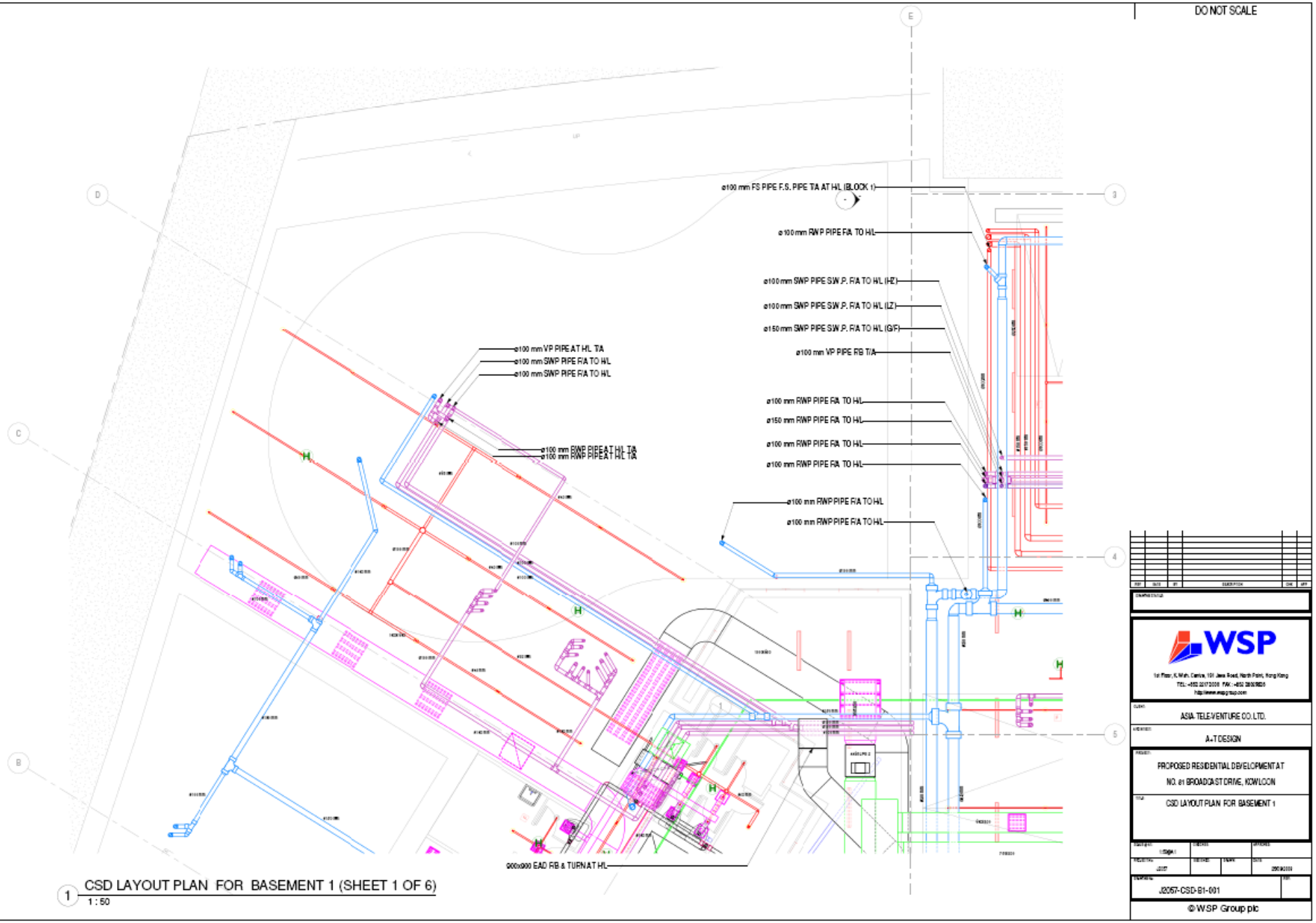
A+T DESIGN

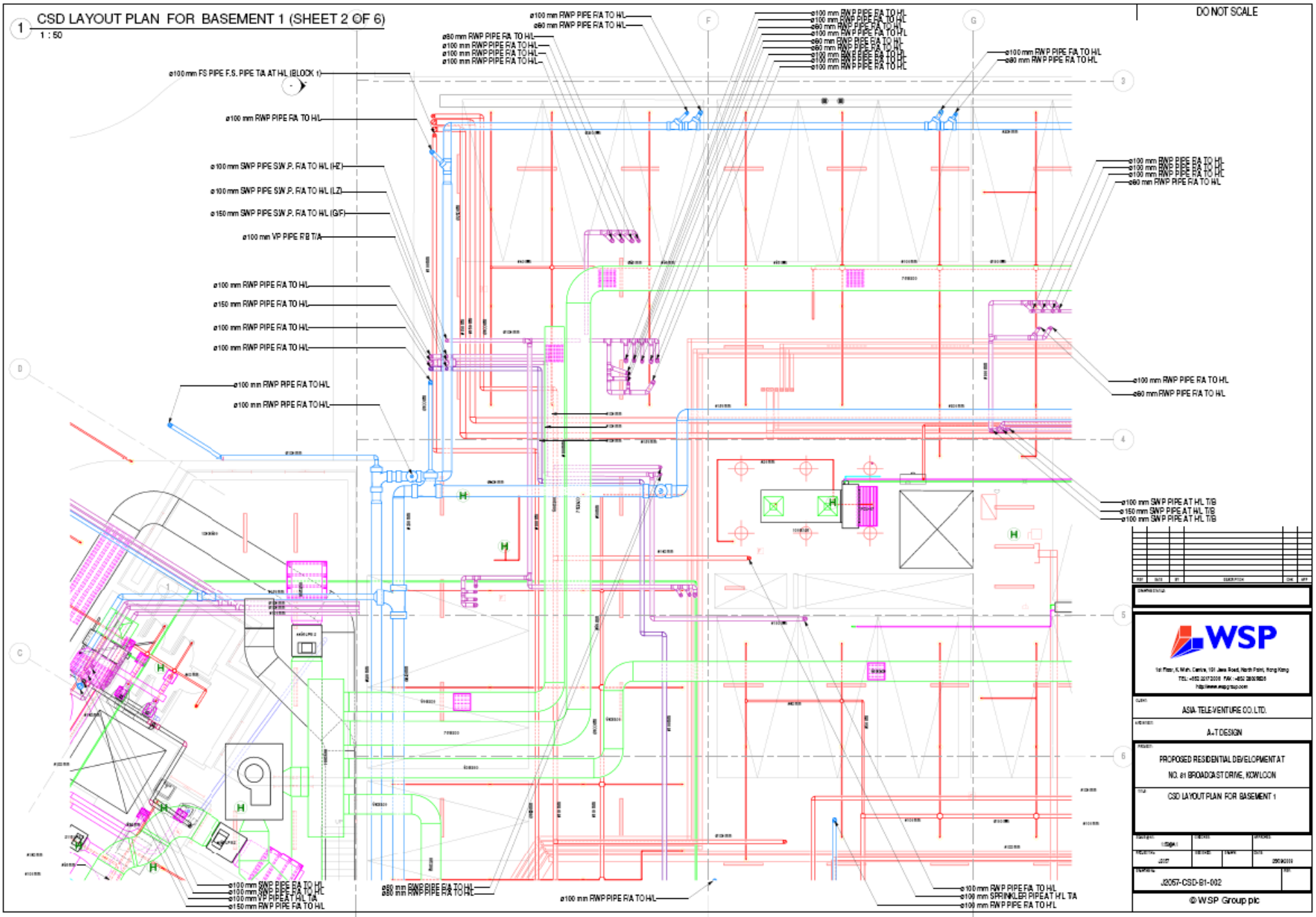
PROPOSED RESIDENTIAL DEVELOPMENT AT
NO. 81 BROADCAST DRIVE, KOWLOON

ACMV LAYOUT FOR BASEMENT 1

J2057-AC-7102



1 CSD LAYOUT PLAN FOR BASEMENT 1 (SHEET 1 OF 6)
1 : 50


1 CSD LAYOUT PLAN FOR BASEMENT 1 (SHEET 2 OF 6)
1 : 50
DO NOT SCALE
ø100 mm FS PIPE F.S. PIPE T/A AT H/L (BLOCK 1)
ø100 mm RWP PIPE F/A TO H/L
ø100 mm SWP PIPE S/W P. F/A TO H/L (HZ)
ø100 mm SWP PIPE S/W P. F/A TO H/L (LZ)
ø150 mm SWP PIPE S/W P. F/A TO H/L (G/F)
ø100 mm VP PIPE R/B T/A
ø150 mm RWP PIPE F/A TO H/L
ø80 mm RWP PIPE F/A TO H/L
ø100 mm SWP PIPE AT H/L T/B
ø150 mm SWP PIPE AT H/L T/B
ø100 mm SPRINKLER PIPE AT H/L T/A
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CSD LAYOUT PLAN FOR BASEMENT 1
J2057-CSD-B1-002
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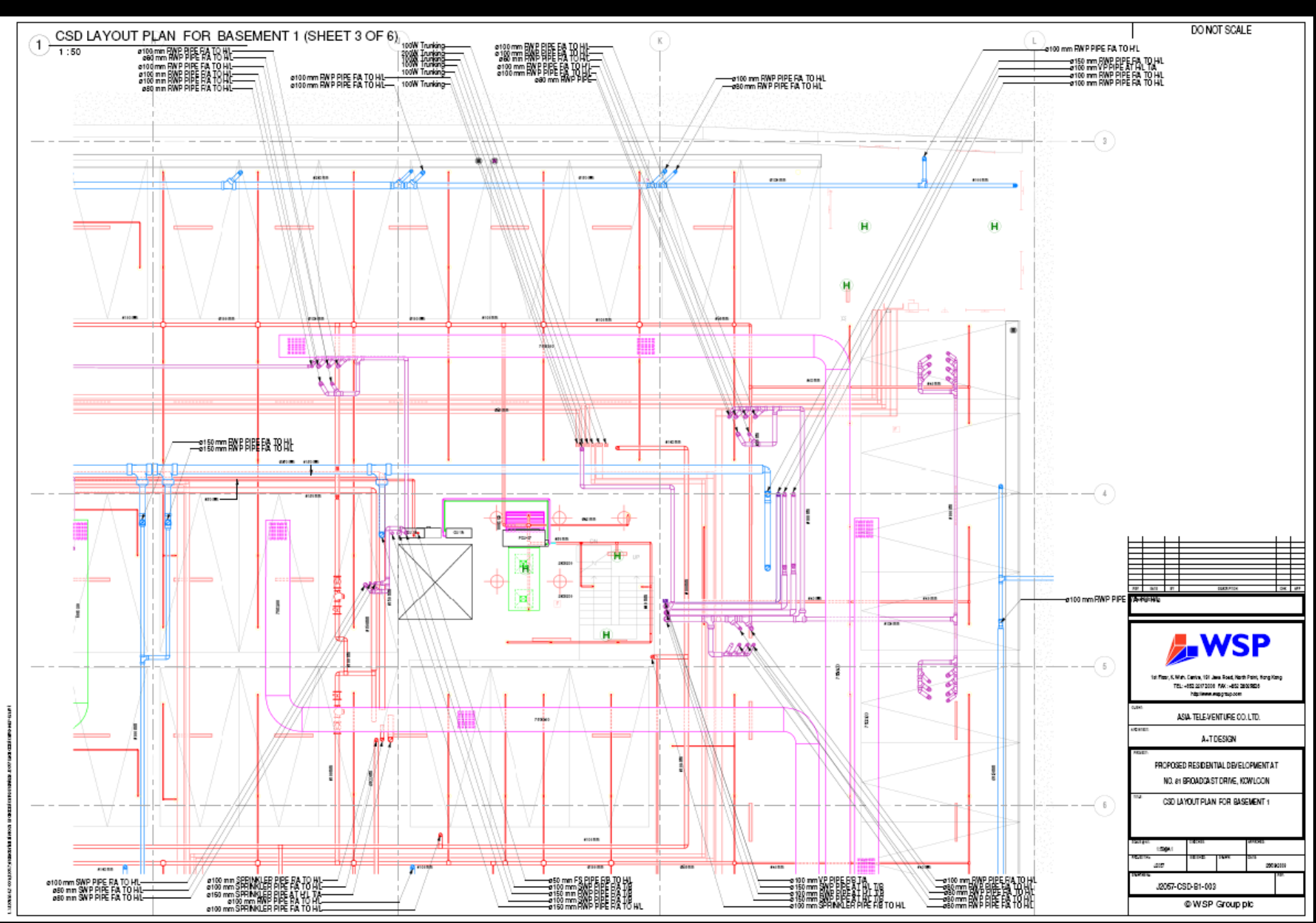
CSD LAYOUT PLAN FOR BASEMENT 1 (SHEET 3 OF 6)
1 : 50
DO NOT SCALE
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NO. 81 BROADCAST DRIVE, KOWLOON
CSD LAYOUT PLAN FOR BASEMENT 1
J2057-CSD-B1-003
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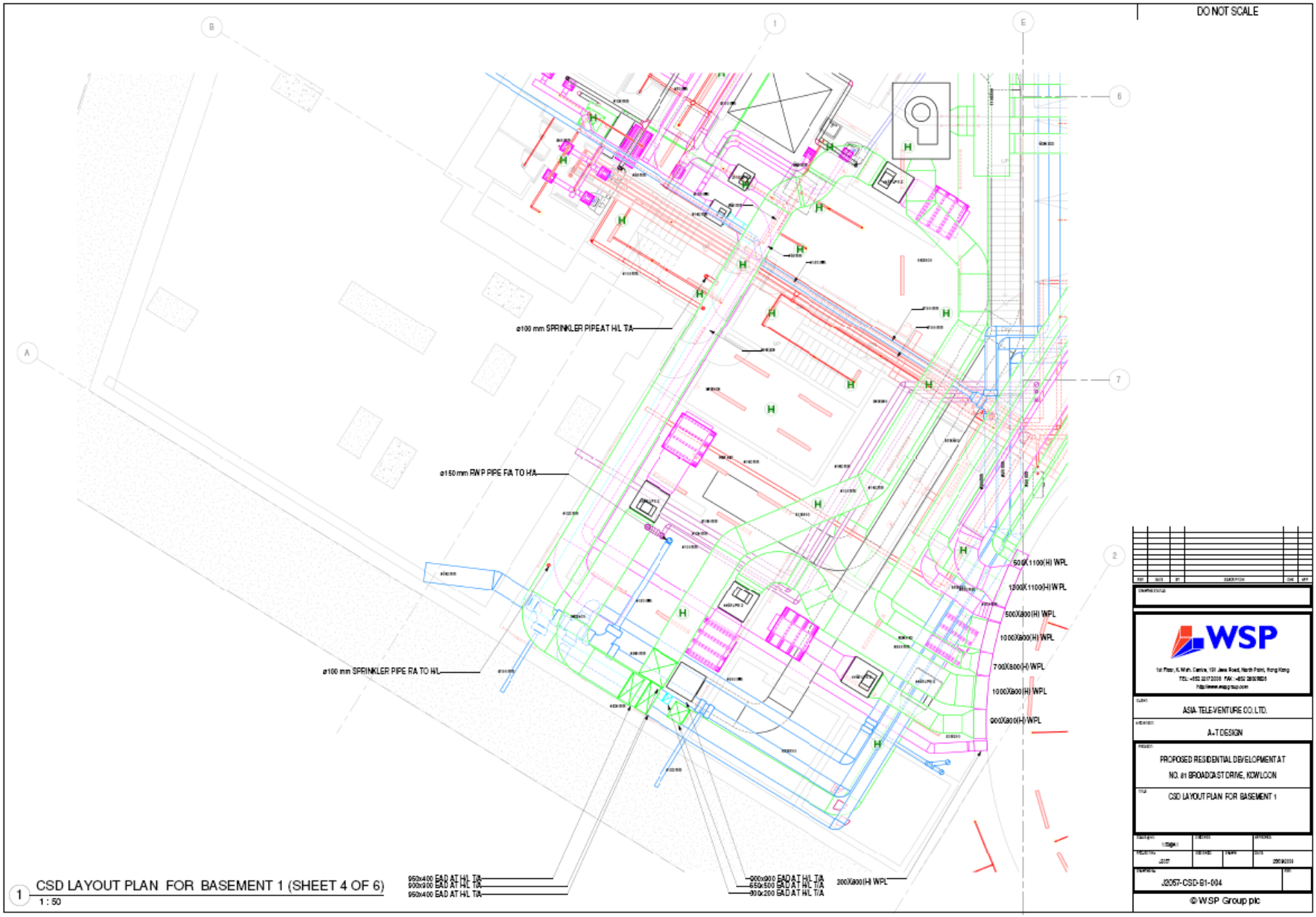

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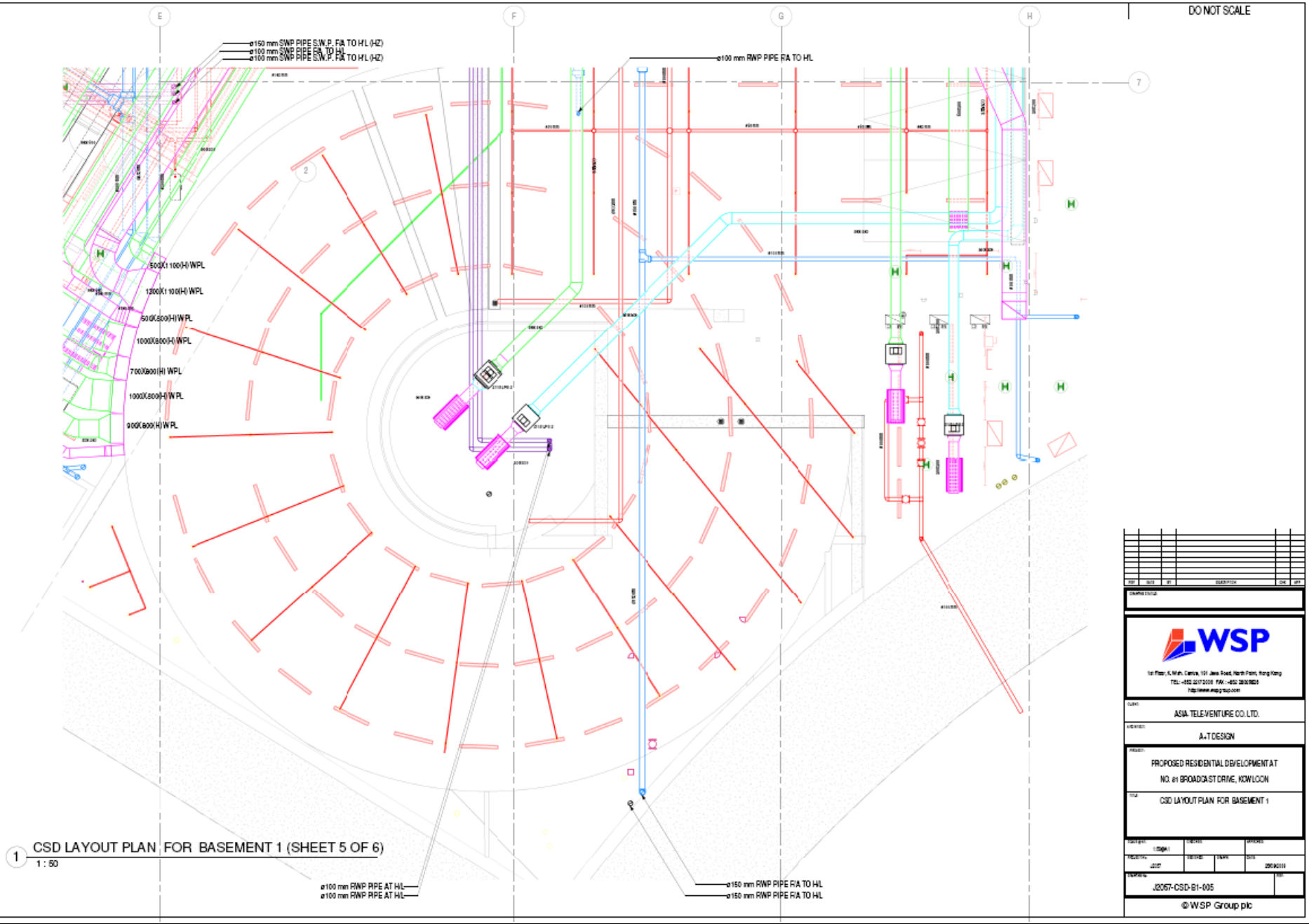
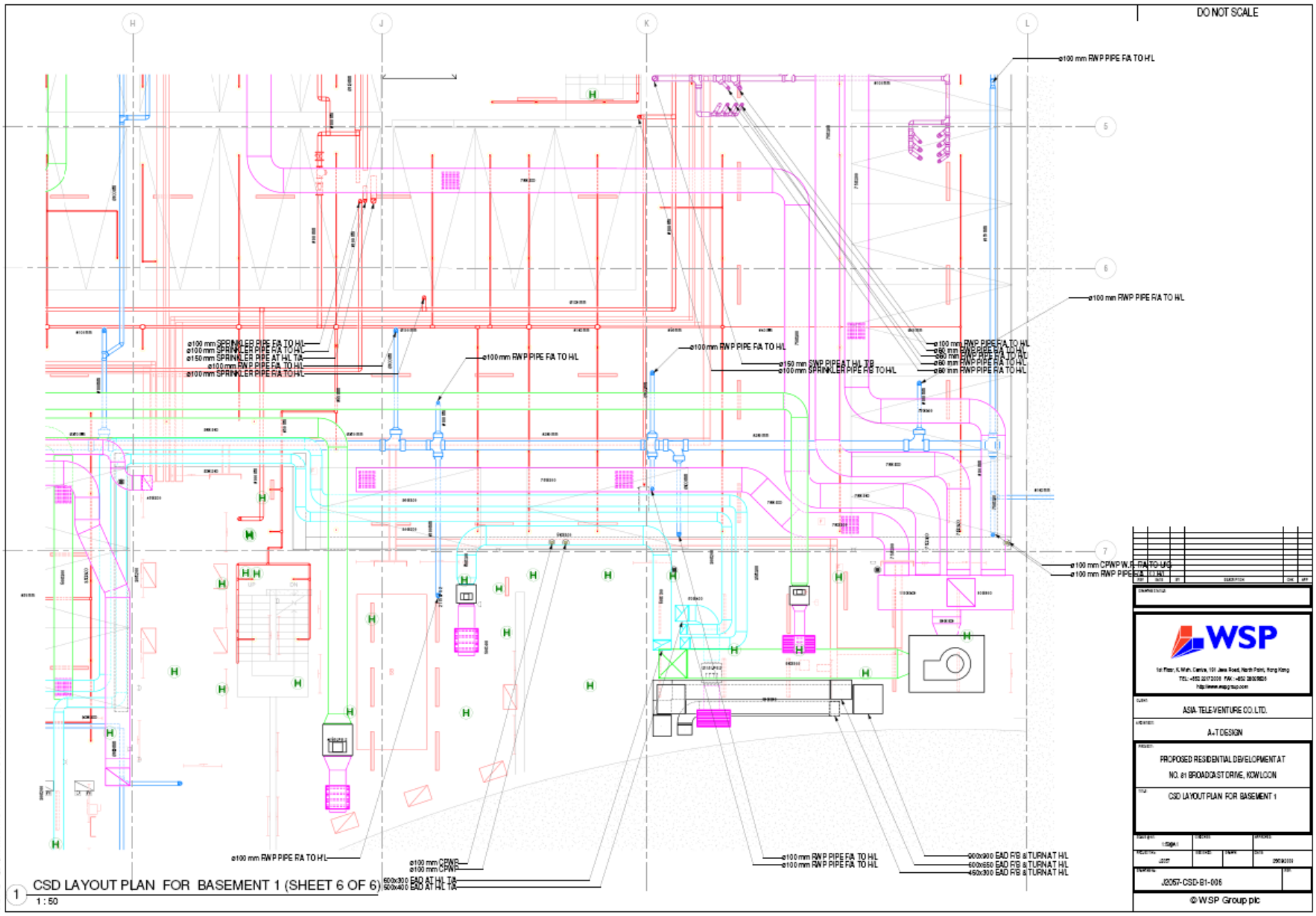


1 CSD LAYOUT PLAN FOR BASEMENT 1 (SHEET 5 OF 6)
1 : 50



1 CSD LAYOUT PLAN FOR BASEMENT 1 (SHEET 6 OF 6)
1 : 50

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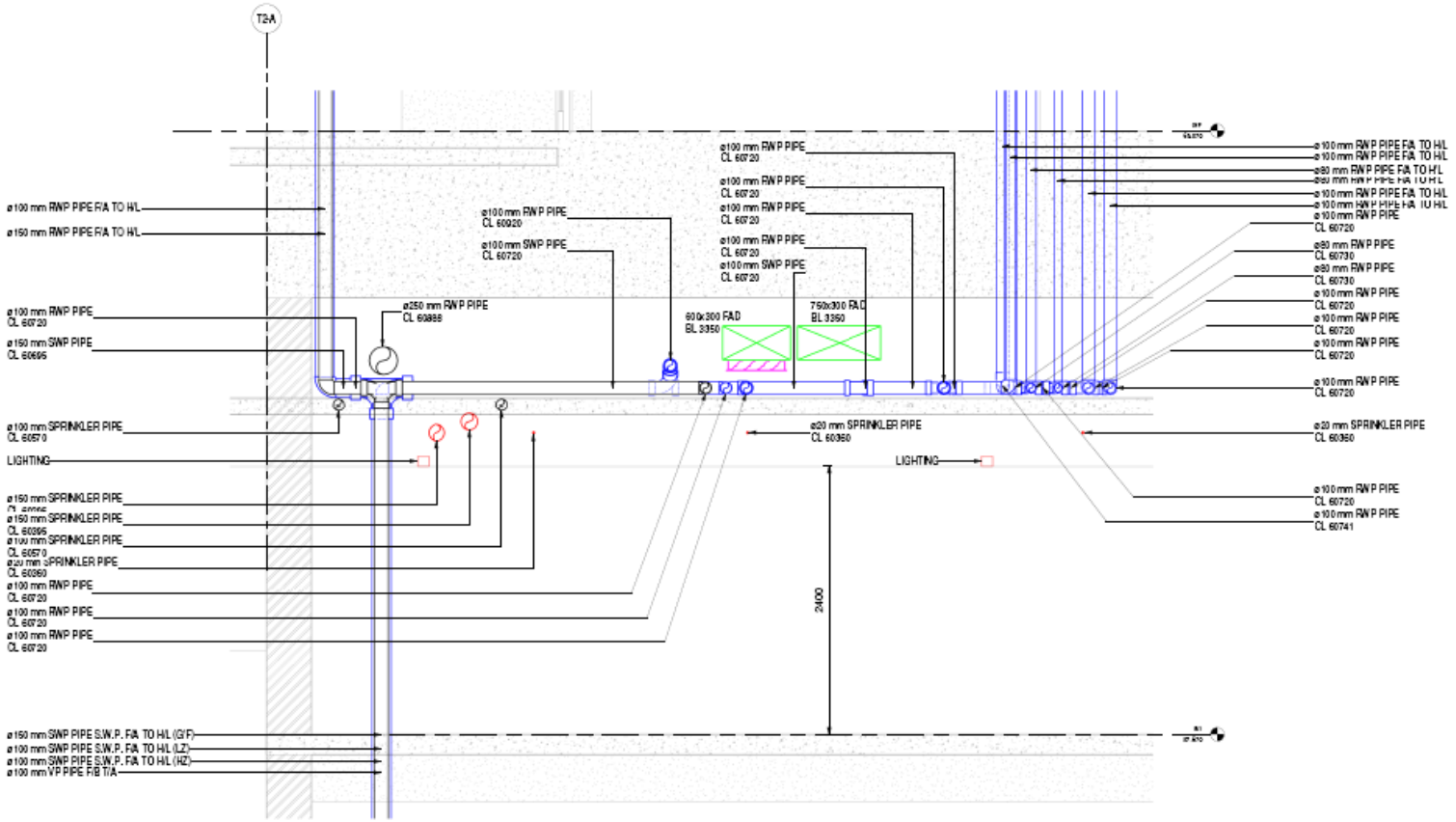

1 Section 2
1 : 20

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TITLE: CSD SECTION FOR BASEMENT 1

(SHEET 1 OF 7)

DRAWING NO.: J2057-CSD-B1-007

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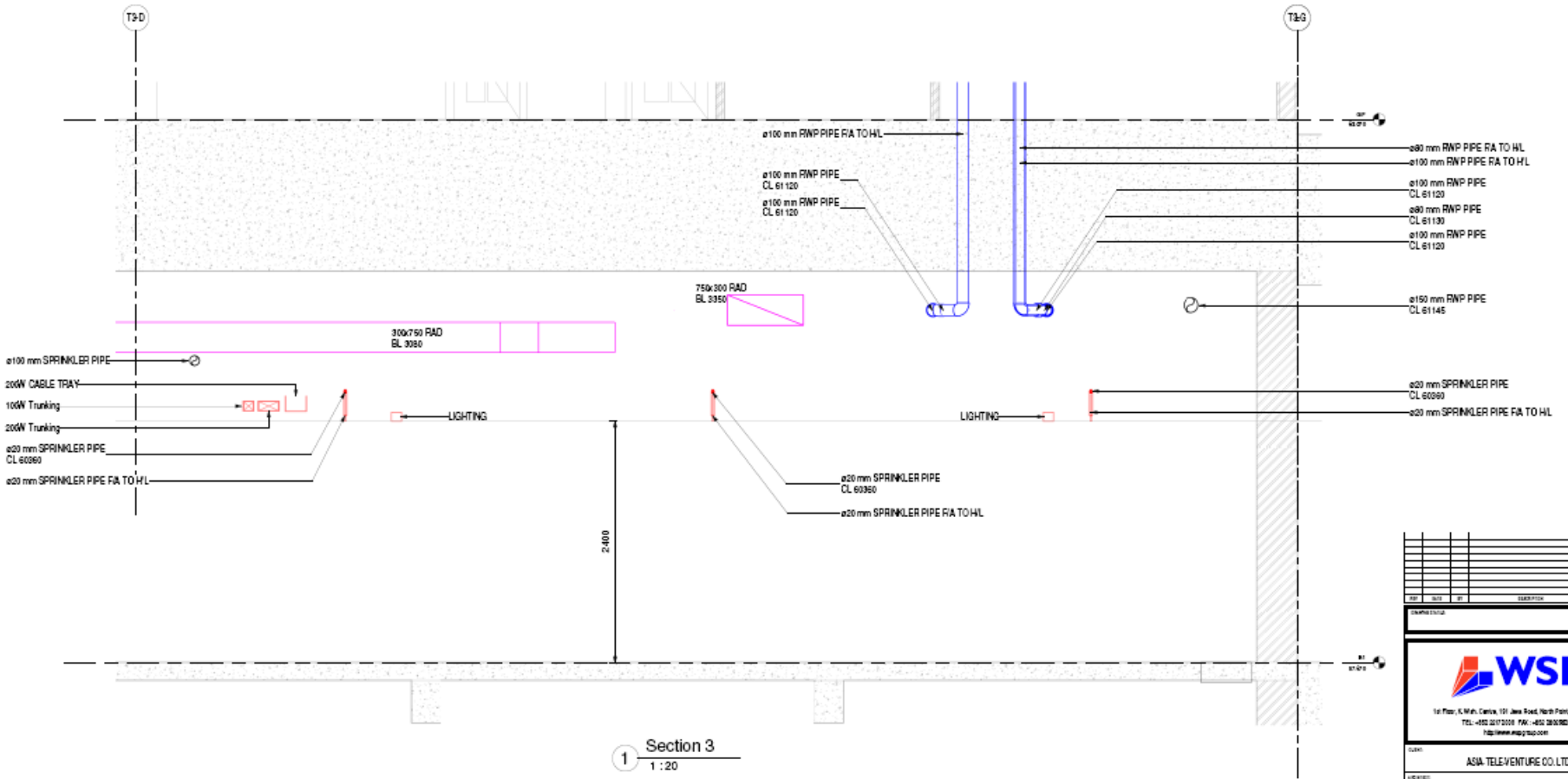

1 Section 3
1 : 20

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ARCHITECT: A+T DESIGN

PROJECT: PROPOSED RESIDENTIAL DEVELOPMENT AT NO. 61 BROADCAST DRIVE, KOWLOON

TITLE: CSD SECTION FOR BASEMENT 1

(SHEET 2 OF 7)

SCALE @ A1: 1:20 | DESIGNED: | DRAWN: | APPROVED:
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DRAWING NO.: J2057-CSD-B1-008 | REV:

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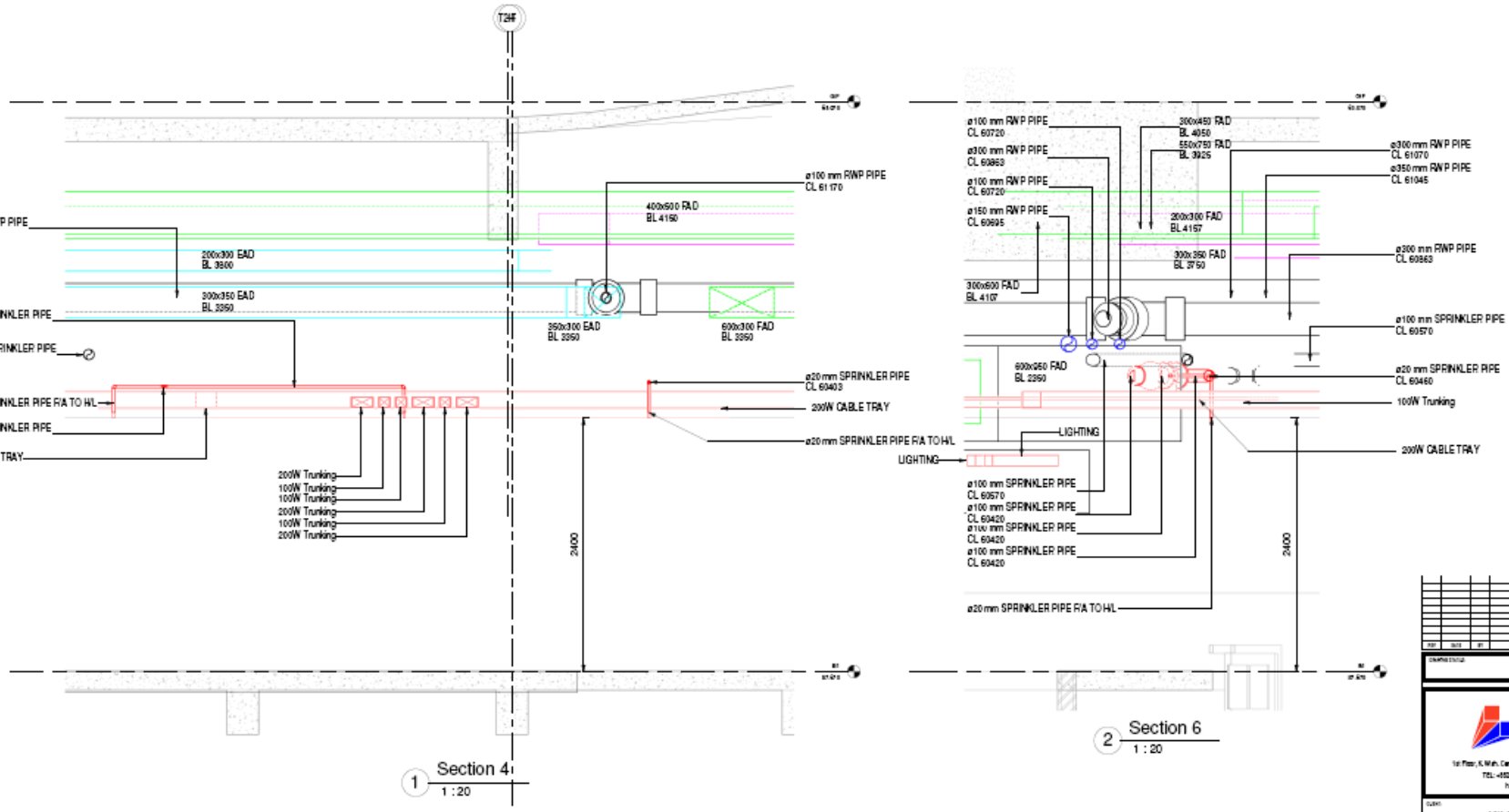

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PROJECT
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NO. 81 BROADCAST DRIVE, KOWLOON

TITLE
CSD SECTION FOR BASEMENT 1

(SHEET 3 OF 7)

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PROJECT	DRAWN	DATE
J2057		25/06/2019

DRAWING No. J2057-CSD-B1-003

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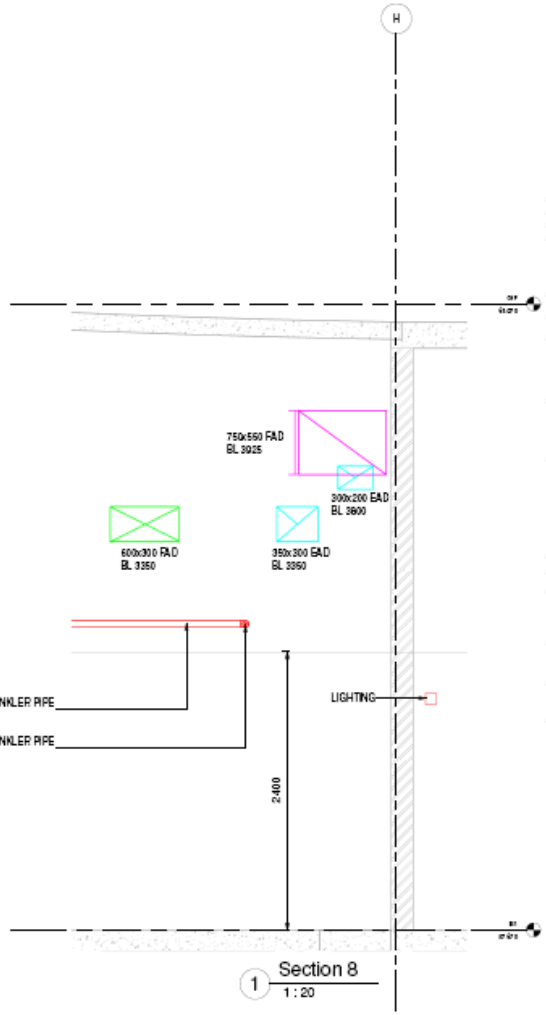

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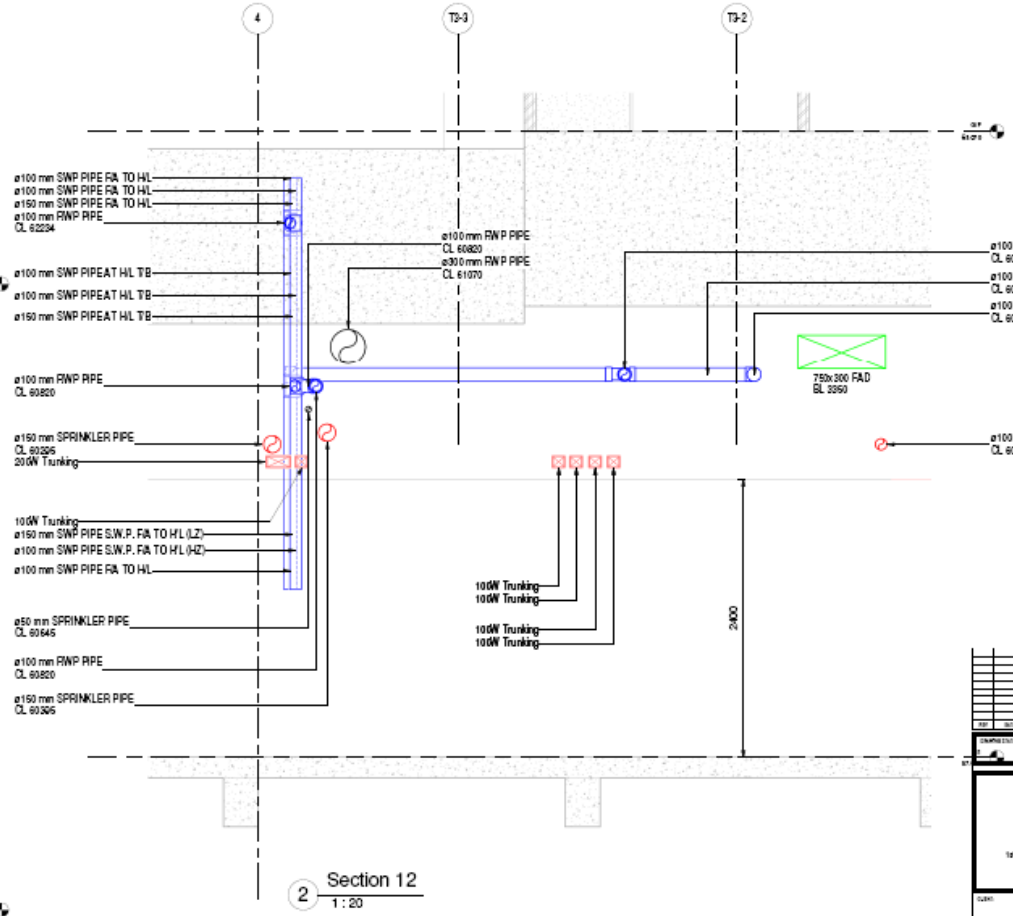

2 Section 12
1 : 20

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PROJECT
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TITLE
CSD SECTION FOR BASEMENT 1

(SHEET 4 OF 7)

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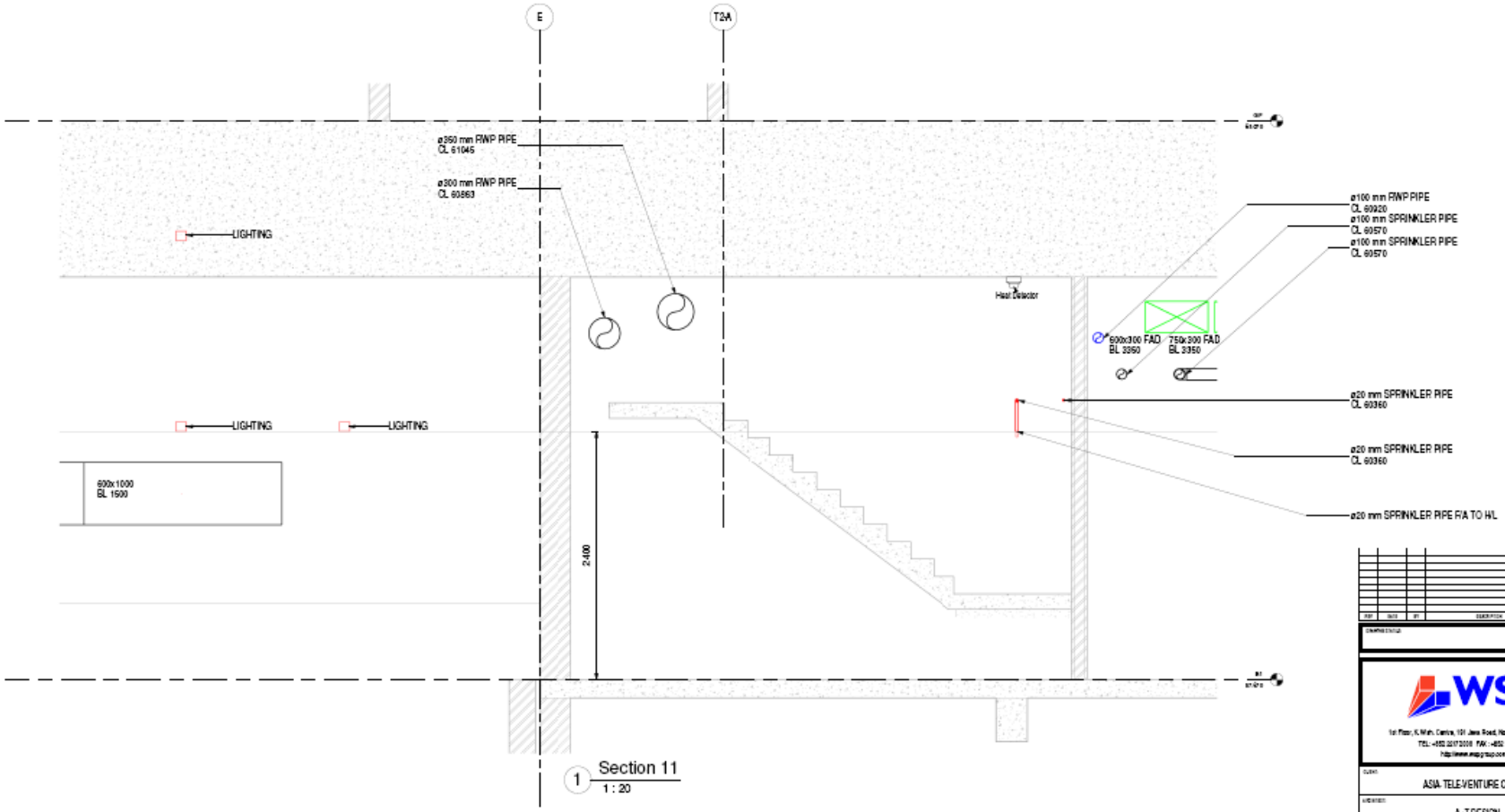
PROJECT NO. J2057	DRAWN	CHECKED	DATE 20/04/2010
DRAWING NO. J2057-CSD-B1-010			REV.

DO NOT SCALE



1 Section 11
1 : 20

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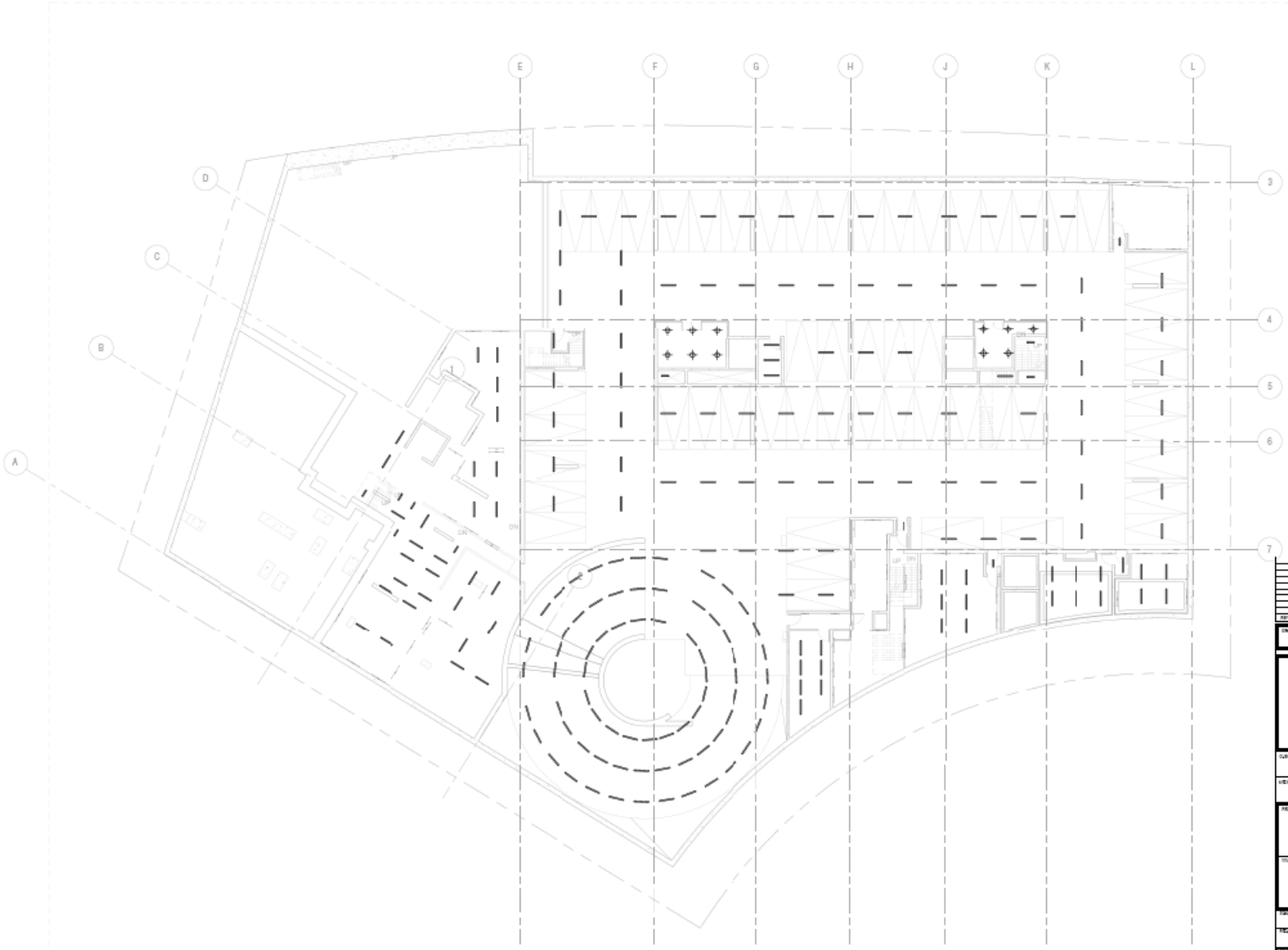
PROPOSED RESIDENTIAL DEVELOPMENT AT
NO. 81 BROADCAST DRIVE, KOWLOON

CSD SECTION FOR BASEMENT 1

(SHEET 5 OF 7)

J2057-CSD-B1-011

DO NOT SCALE



1 LIGHTING LAYOUT FOR BASEMENT 1
1 : 150

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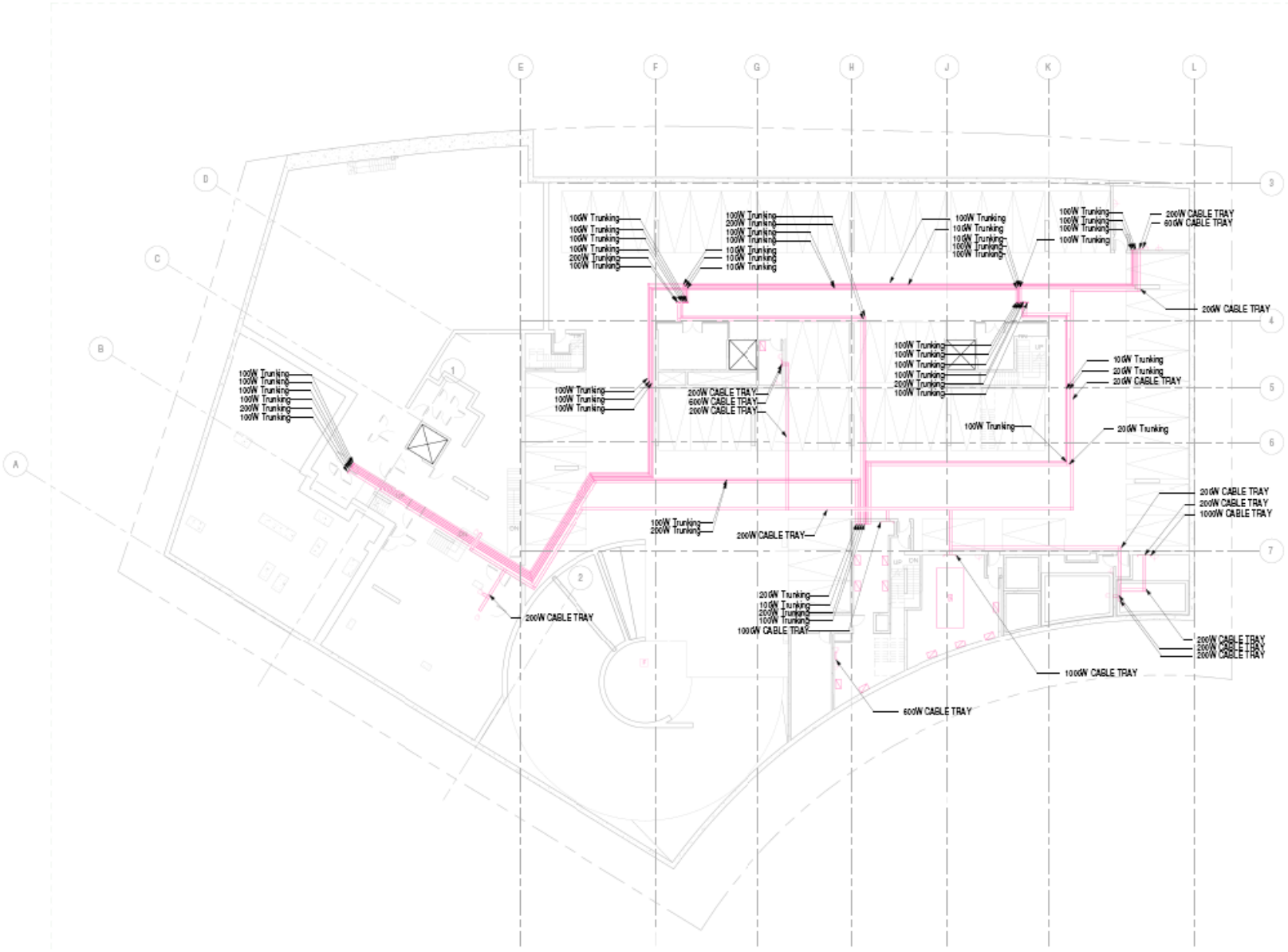
ARCHITECT: A-T DESIGN

PROJECT: PROPOSED RESIDENTIAL DEVELOPMENT AT NO. 81 BROADCAST DRIVE, KOWLOON

TITLE: LIGHTING LAYOUT FOR BASEMENT 1

DRAWING NO.: J2057-EL-5102

DO NOT SCALE



1 ELECTRICAL LAYOUT FOR BASEMENT 1
1 : 150

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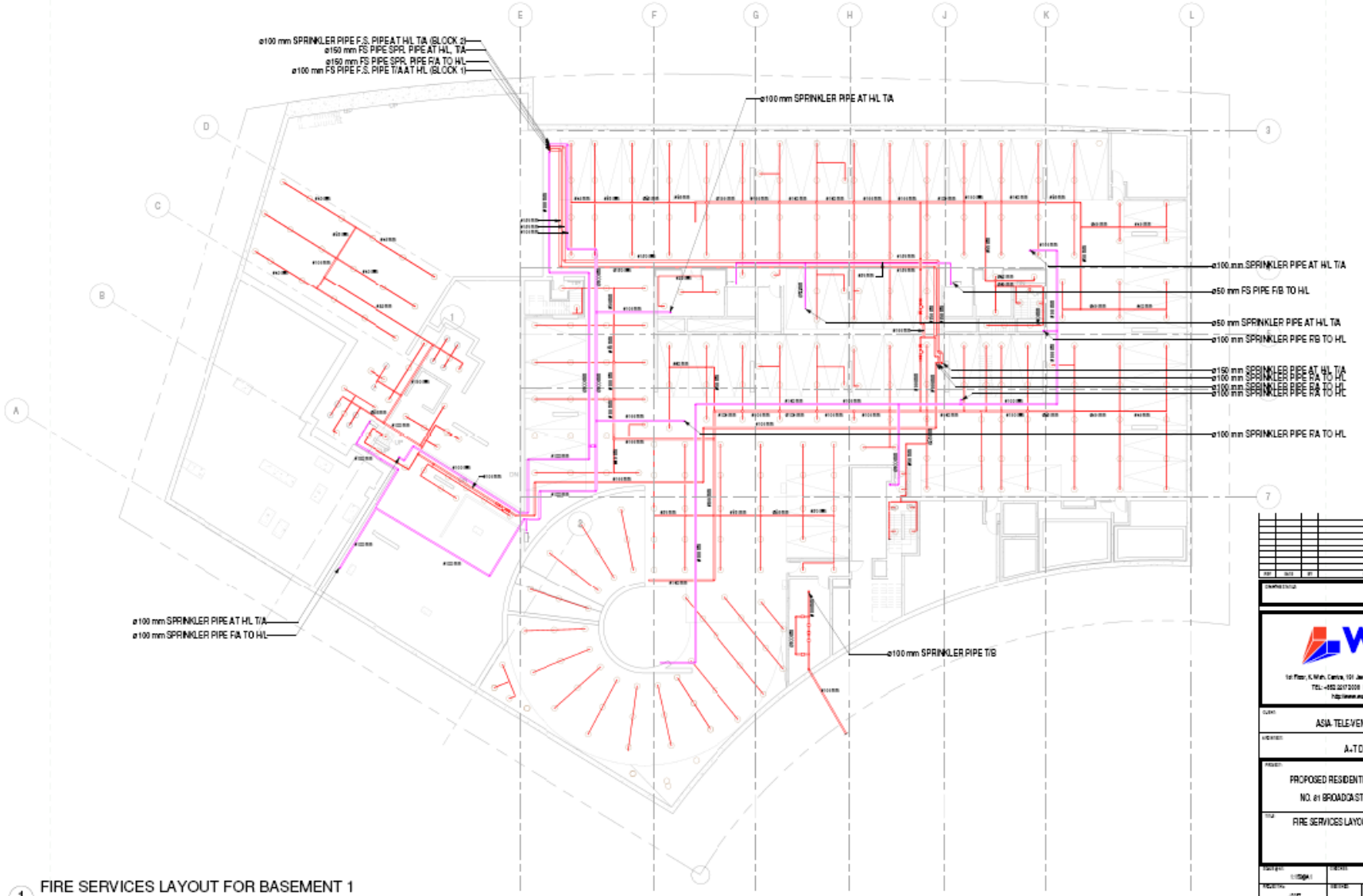
PROPOSED RESIDENTIAL DEVELOPMENT AT
NO. 81 BROADCAST DRIVE, KOWLOON

ELECTRICAL LAYOUT FOR BASEMENT 1

J2057-EL-5202

DO NOT SCALE



1 FIRE SERVICES LAYOUT FOR BASEMENT 1
1 : 150

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PROPOSED RESIDENTIAL DEVELOPMENT AT
NO. 61 BROADCAST DRIVE, KOWLOON

FIRE SERVICES LAYOUT FOR BASEMENT 1

J2057-FS-6602