

# **P O R T F Ó L I O**

ARCHMETRICS

ARCHMETRICS

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## Our Quote:

“

It is not the critic who counts; not the man who points out how the strong man stumbles, or where the doer of deeds could have done them better. The credit belongs to the man who is actually in the arena, whose face is marred by dust and sweat and blood; who strives valiantly; who errs, who comes short again and again, because there is no effort without error and shortcoming; but who does actually strive to do the deeds; who knows great enthusiasms, the great devotions; who spends himself in a worthy cause; who at the best knows in the end the triumph of high achievement, and who at worst, if he fails, at least fails while daring greatly.

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Sunday, August 27, 2024.

From: Eng.Ahmed Tarek [info@archmetrics.org].  
To: To Whom It May Concern - Company.  
Project: Archmetrics Portfolio - Full.  
Subject: AMC Company Introduction.  
REF: 202306000.

ATTENTION: .....  
.....  
.....

Dear Sir,

I am writing to you today to share our company portfolio with you. We believe that our services would be a valuable asset to your business, and we hope that you will take some time to review our portfolio and see how we can help you achieve your goals.

Our company specializes in [company services]. We have a team of experienced professionals with a proven track record of success in [list of accomplishments]. We are confident that we can help your business achieve its goals by providing [list of benefits].

In our portfolio, you will find a selection of our recent work. We have included projects that we believe are most relevant to your business, but please feel free to contact us if you would like to see more work.

We would be happy to discuss our services with you in more detail. Please do not hesitate to contact us if you have any questions.

Thank you for your time and consideration. We look forward to hearing from you soon.

Sincerely,



ABOUT:

We are an Engineering BIM Specialist Firm, dedicated to providing best-in-class Building Information Modeling (BIM) services to stakeholders in the construction industry. Through innovation, efficiency, and precision, we deliver cutting-edge solutions that elevate project outcomes, optimize costs, and maximize sustainability.

Our team of experienced and skilled engineers, architects, and construction experts are well-versed in the latest BIM methodologies and software, such as Revit, Navisworks, and AutoCAD. We leverage these technologies to create building designs that are well-coordinated, functional, and visually appealing. Our unique approach to BIM combines the technical expertise of our team with an unwavering commitment to collaboration, communication, and partnership.

We take immense pride in our ability to consistently exceed expectations, delivering exceptional results on every project we take on. Our experience extends from small-scale renovation projects to large complex initiatives, including commercial, healthcare, educational, and transportation infrastructure. We have a well-established reputation for being a client-focused BIM service provider, delivering projects on time, to accuracy and to clients' specifications.

Through our agile and flexible project management, we ensure that our clients are up-to-date and informed about the project's progress. We also offer training and support to our clients and continually keep them engaged throughout the project phase. This approach ensures that the client is involved and fully informed throughout the project, and its coordination, communication, and collaboration pave the way for successful outcomes.

From initial design to project completion, our team works closely with our clients to provide them with the best possible outcomes to build their assets. With our BIM expertise, the construction stakeholders are enabled to make informed decisions, coordinate stakeholders, and increase efficiency from design to construction and management.

In conclusion, we are an Engineering BIM Specialist Firm devoted to the delivery of high-quality and exceptional BIM services. As we continue to expand in the construction industry, we embrace new challenges, advance our learning, and improve our methodologies. We are committed to providing our clients with the best possible outcomes through communication, collaboration, and innovative solutions.

We welcome the opportunity to discuss your BIM needs and explore how our expertise and services can assist you in achieving remarkable outcomes.

## Mission and Vision



The Company continues to move forward in become the leading multi-discipline engineering company, providing project engineering, project management, engineering studies, construction and maintenance works in Egypt, by consistently delivering projects that meet international standards.

## Company Key Persons



### DR. Ahmed Samir

Partner - Project Manger.  
Manager Director.



### Eng. Omar Afifi Sayed

Partner - Construction Manager  
Manager Director.



### Eng. Abd Elrahman Nahl

Partner - Project Manger.  
Manager Director.



### Eng. Ahmed Tarek

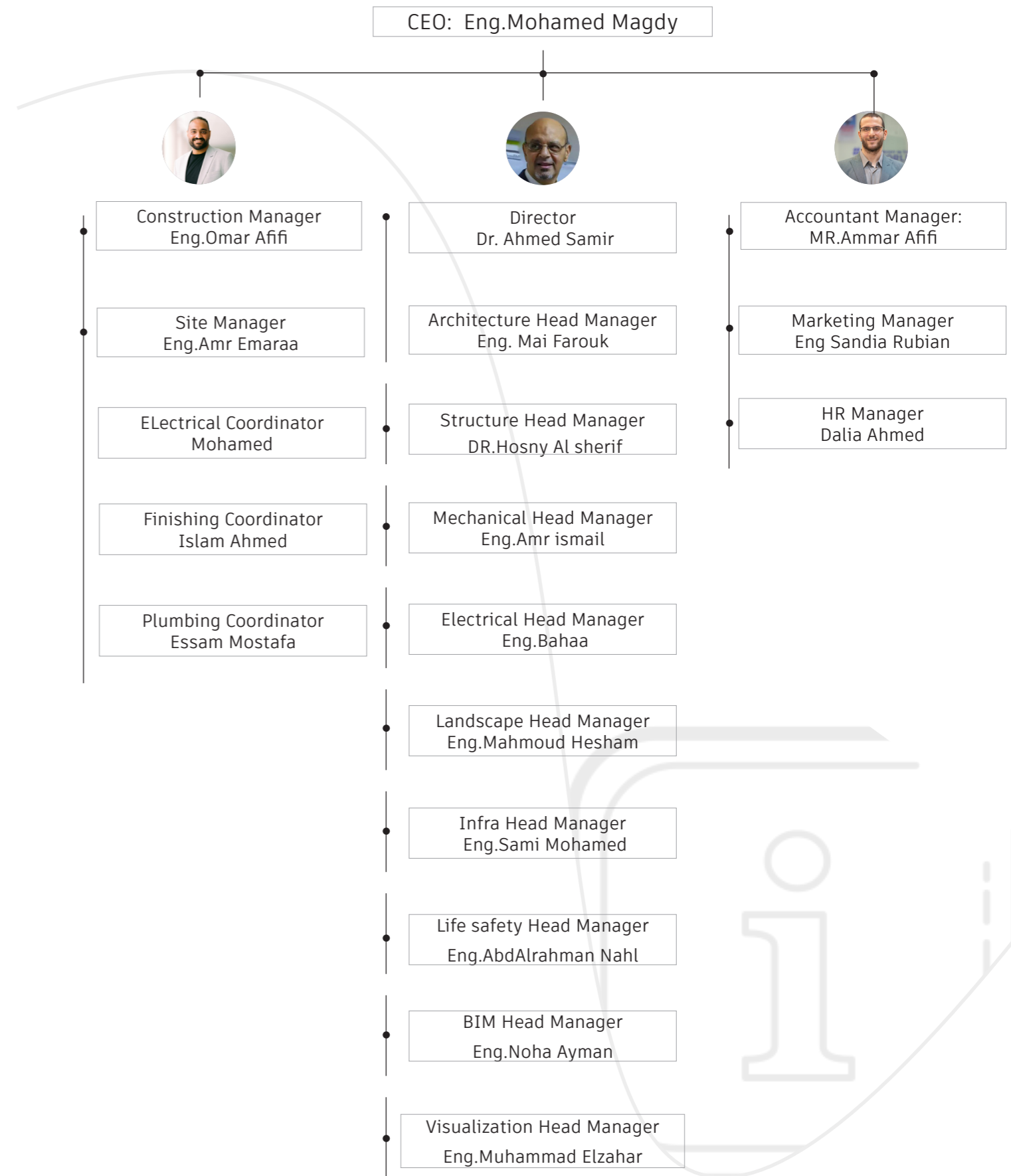
BIM Manager



### Eng. Ahmed Fawzi

Director - Lead Architect.

## Company Heads:

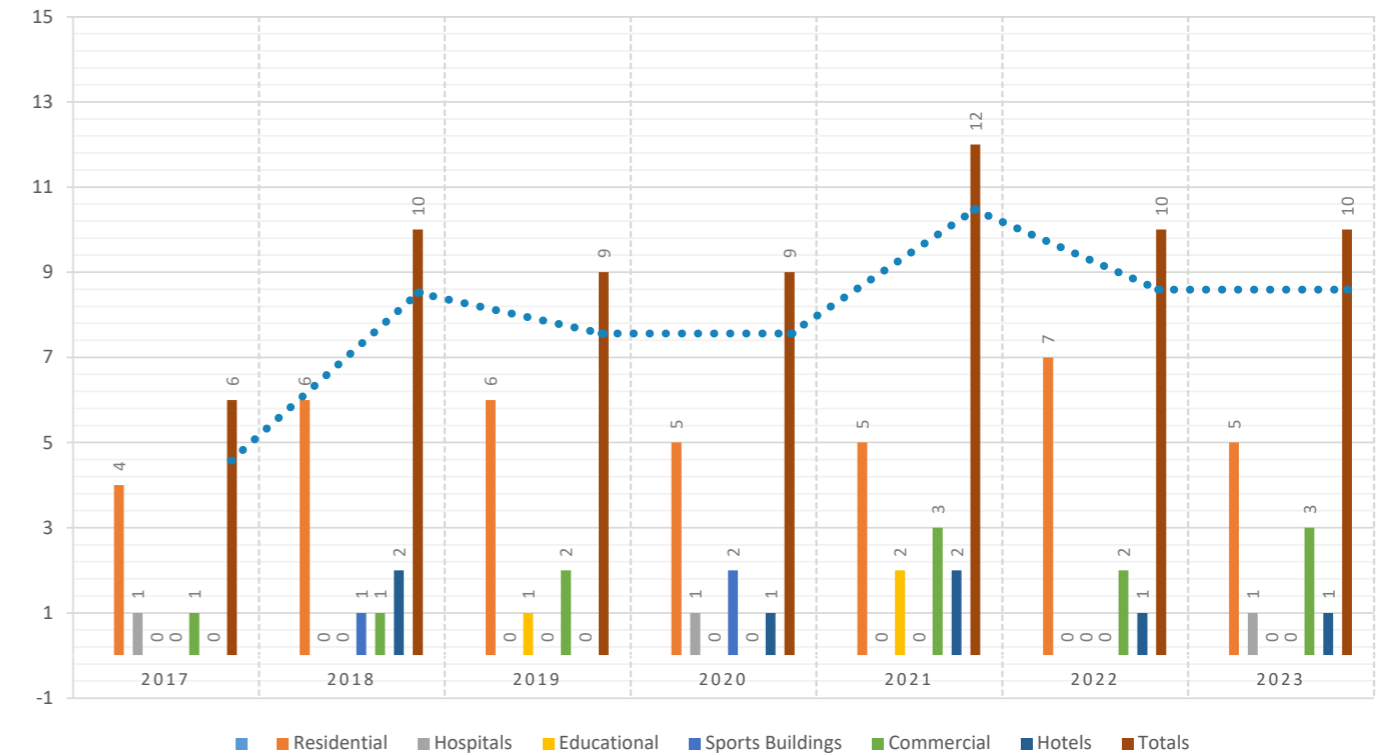




## Our Clients:



## Company Time Line:



## Location & Contact Us:

✉ info@archmetrics.org

📍 Helipolies - Cairo - Egypt.

☎ +2 01008985801 +966539481991

🌐 www.Archmetrics.org

🌐 www.Archmetrics.org





02

## SECTION 03

### ● 03.01 - TOP SELECTED PROJECTS

The specific content of a selected project sample will depend on the specific project and the needs of the organization. However, the elements listed above are a good starting point for any project write-up.

### ● 03.02 - MY PROJECT WORK SAMPLES

emphasizes the importance of the projects that are being highlighted.

### ● 03.01 - PROJECT CASE STUDY

emphasizes the importance of the projects that are being highlighted.

## Selected Projects

Updated Project

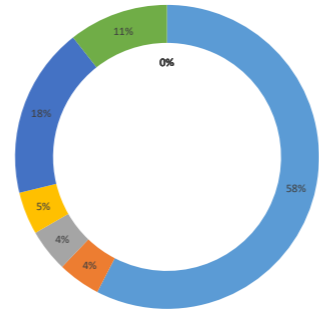
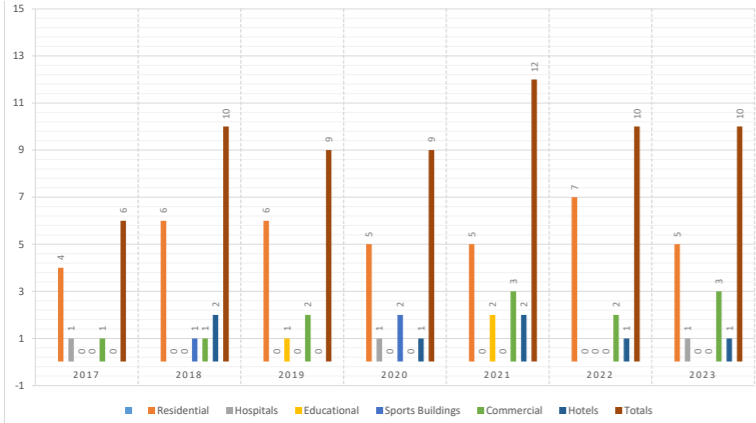


**PROJECT EXPERIENCE RATIO**

From edx

THIS CHART SHOWS THE RATIO OF DIFFERENT TYPES OF PROJECTS THAT YOU HAVE WORKED ON. THIS INFORMATION CAN BE HELPFUL FOR POTENTIAL EMPLOYERS TO UNDERSTAND YOUR EXPERIENCE AND SKILLS.

Type	2017	2018	2019	2020	2021	2022	2023	Totals
Residential	4	6	6	5	5	7	5	38
Hospitals	1	0	0	1	0	0	1	3
Educational	0	0	1	0	2	0	0	3
Sports Buildings	0	1	0	2	0	0	0	3
Commercial	1	1	2	0	3	2	3	12
Hotels	0	2	0	1	2	1	1	7
<b>Totals</b>	<b>6</b>	<b>10</b>	<b>9</b>	<b>9</b>	<b>12</b>	<b>10</b>	<b>10</b>	<b>66</b>



■ Residential ■ Hospitals ■ Educational ■ Sports Buildings ■ Commercial ■ Hotels ■ Totals

**NOTABLE PROJECTS:**

emphasizes the importance of the projects that are being highlighted.



**MASAR PACKAGE A**

2021 -Makkah - SAUDI ARABIA

MASAR Project (previously named King Abdulaziz Road Project KAAR) is being implemented by Umm Al Qura for Development & Construction Company (UAQ / Client) and covers an area of approximately 1.2 million square meters. The Project Site, stretches approximately 3.65km from the Third Ring Road intersection with Umm Al Qura Road to Jabal Omar development just west of the Haram

# Revit - BIM 360 - Navisworks - Slack - RMJM - BIM Manager - IFC Docs - VE Report.



**Dubai Greek Tower**

2016 -Dubai - United Arab Emirates

Dubai Creek Tower is a supported observation tower to be built in Dubai, United Arab Emirates. The preliminary cost of the tower is AED 3.67 billion (US\$1 billion). It was expected to be completed in 2022 at the earliest, but the completion date is unknown since, as of now, the tower is on hold because of the COVID-19 pandemic. The tower was initially known as The Tower at Dubai Creek Harbour.

# Revit - BIM 360 - Navisworks - Slack - RMJM - BIM Manager - IFC Docs



**ALBOUROUGE BUSINESS PARK**

2017 -Cairo - Egypt

Al Burouj is perfectly located between New Cairo, Cairo International Airport, and the New Administrative Capital. The compound is only 15 minutes away from each of these destinations. Al Burouj will have a smart village with eleven administrative buildings, El Sawy Culturewheel, international schools, a health medical center, and a 70 acre orchid park. It will also have a global commercial mall cover-

# Revit - CAD - Navisworks - RMC - BIM Coordinator - IFC Docs - Code Report.





## New Giza University

2017 -Giza - Egypt

Design The NEw Giza the five **educational Medical buildidngs** This building will house the main academic facilities, including classrooms, lecture halls, and laboratories. It should be designed to accommodate a variety of learning styles and to provide students with the resources they need to succeed.

BUA= 35,000 sqm. & No.Buildings= 5 Unit. & Stage= Design & IFC & Construction supervision.

# Revit - Dynamo - Navisworks - RMC - BIM Coordinator - IFC Docs - Code Report.



## AL TALAH GARDENS VILLAS 4.1

2014 -El-Riyad - Saudi Arabia

The district boasts expansive green areas and a wealth of social facilities, while being close to schools, mosques and state-of-the-art commercial areas. Residents will have the choice between Arabian, Spanish or contemporary villas, all executed to world-class standards and available in different sizes.

BUA= over 3.7 million sqm. & No.Buildings=4000 Unit. & Stage= Design & Tender.

# Revit - 3D Max - Navisworks - RMC - BIM Coordinator - IFC Docs - Code Report.



## New Giza University

2021 -Giza - Egypt

construction sites are typically large and complex projects. They often involve multiple trades and subcontractors, so it is important to be able to work well with others and follow instructions. Overall, BIM can be a valuable tool for improving the construction sequence. By using BIM, construction teams can improve planning and coordination, reduce the risk of errors, improve communication, and increase productivity.

BUA= 35,000 sqm. & No.Buildings= 5 Unit. & Stage= Construction supervision.

# Revit - Design Validation - Rfi Reply - RMC - BIM Coordinator - Shop Drawing - Material Review.

v. 2023

P06/10



## MARASI Village A

2018 - North Cost - Egypt

Marassi Village is located in Kilo 125 on the North Coast, about an hour's drive from Alexandria. The project is situated on a beautiful stretch of coastline with stunning views of the Mediterranean Sea. The residential component of Marassi Village includes a variety of apartments, townhouses, and villas. The apartments are available in a variety of sizes, from studios to two-bedroom apartments.

Plot Limit= 2,023,475 sqm. & No.Buildings= prototypes. & Stage= Design.

# Revit - BIM 360 - Navisworks - RMC - BIM Coordinator - IFC Docs - Code Report.

v. 2023

P07/10





## New Giza University

2021 - Giza - Egypt

Managing and coordinating the construction process: This includes ensuring that the project is completed on time, within budget, and to the required quality standards. Reviewing and approving construction drawings and documents: This ensures that the construction is in accordance with the approved plans and specifications.

BUA= 35,000 sqm. & No.Buildings= 5 Unit. & Stage= Construction supervision.

# Revit - Design Validation - Rfi Reply - RMC - BIM Coordinator - Shop Drawing - Material Review.



## New Giza Sports

2018 -Giza - Egypt

New Giza Sports Club: This club is located in the 6th of October City and is home to a number of sports facilities, including a soccer field, a running track, squash courts, and tennis courts. Giza Sports City: This is a large sports complex that is currently under construction. The complex will include a number of sports facilities, including a stadium, a swimming pool, and a gym.

BUA= 20,000 sqm. & No.Buildings= 4 Buildings & Stage= Design.

# Revit - Dynamo - Navisworks - RMC - BIM Coordinator - IFC Docs - Code Report.



## Aziz Compound Villas

2015 -Cairo - Egypt

Luxury villa design in Saudi Arabia is a diverse and ever-evolving field. The country's unique cultural heritage and natural beauty have inspired designers to create some of the most stunning and luxurious villas in the world. Luxury villas in Saudi Arabia typically feature large, open spaces with high ceilings and floor-to-ceiling windows. The interiors are often decorated with traditional Arabic motifs, such as intricate carvings, geo-

BUA= 12,000 sqm. & No.Buildings= 6 villas & Stage= Design.

# Revit - Design - 3D MAX - Designology - BIM Coordinator - IFC Document - Material Selection.



## 500 500 Hospital

2021 -Zayed - Egypt

The 500 500 Cancer Hospital in Sheikh Zayed City, Egypt is the largest cancer hospital in the world. It was inaugurated in 2022 and has a capacity of 1,020 beds. The hospital provides comprehensive cancer care, including diagnosis, treatment, and rehabilitation. It also has a number of research facilities, including an advanced cancer research center.

BUA= 145,000 sqm. & No.Buildings= 3 Buildings & Stage= Design.

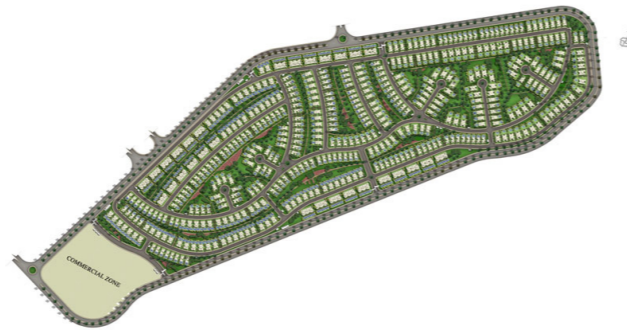
# Revit - Dynamo - Navisworks - RMC - BIM Coordinator - IFC Docs - Code Report.





# T H E C R O W N P A L M H I L L S

**#02** Palm Hills Development (PHD), hereinafter referred to as "The Client" plans to develop "Palm Hills 190 FD" Project, hereinafter referred to as "The Project". The Project is located in October District in close proximity to Palm Hills Projects such as Golf Views, Golf Extension and Woodville projects in October City. The Total area of the Project is (190 fd). The intent of the project is to develop a high-end residential community with facilities including, healthcare, retail facilities, office Park in addition to leisure facilities.....



## MIXED USE BUILDINGS COMMERCIAL BOULEVARD

2020 -Qatar - Lusail

Lusail Commercial Boulevard is located within the boundaries of Qatar's self-contained and comprehensively planned urban development, Lusail City. Situated just to the north of the capital Doha and stretching along a 1.3 kilometer long road featuring **18 spacious buildings**, Lusail Commercial Boulevard has been designed to be the biggest integrated commercial street development in the Arabian Gulf. Spanning the main gateway to the bustling center of Lusail City, Commercial Boulevard district will serve as its key business hub. As the location of one of the official fan zone areas for the 2022 World Cup

No. Buildings= 18 Buildings & Stage= Facade Shop Drawings

# Revit - Navisworks - #ALMANA - #KEO - BIM Coordinator - Shop Drawings - Details.







Case Studies  
Updated Project 2023

**SECTION 03**

● **03.01 - PROJECT CASE STUDY**

A project case study is a detailed examination of a specific project or system. It is a piece of content that sheds light on the challenges faced, solutions adopted, and the overall outcomes of a project.

● **03.02 - MY PROJECT WORK SAMPLES**

emphasizes the importance of the projects that are being highlighted.

● **03.03 - PROJECT CASE STUDY**

emphasizes the importance of the projects that are being highlighted.

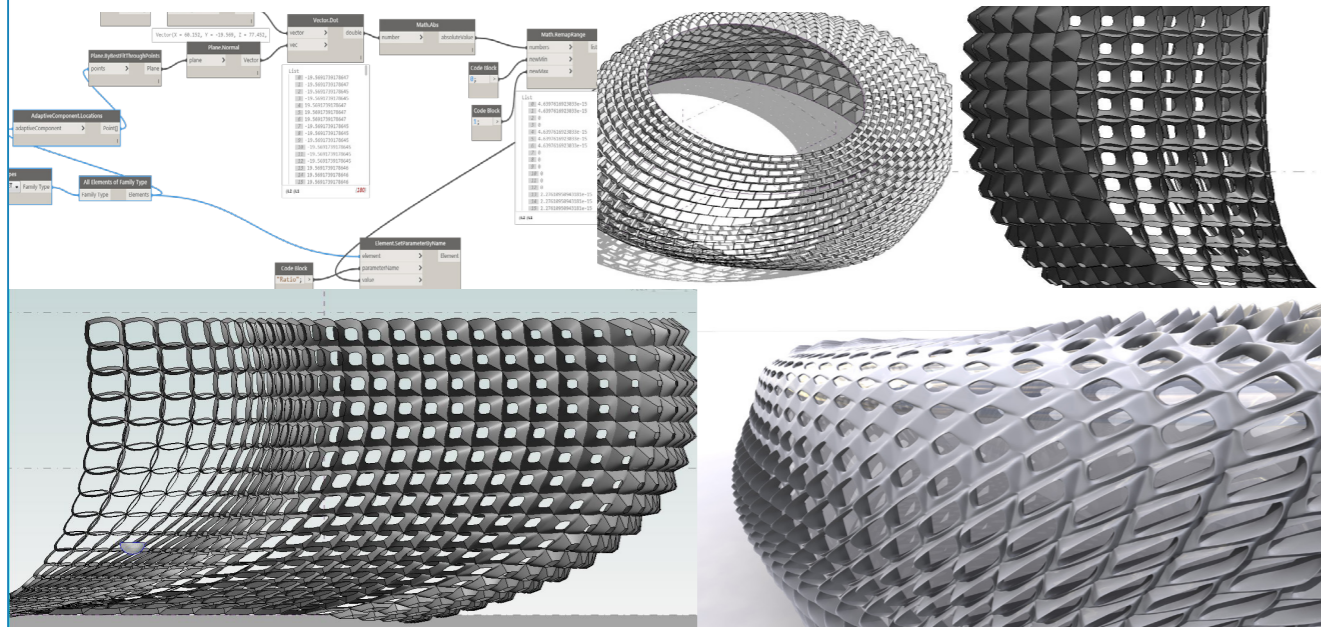


case study - 3 **PARAMETRIC MODELING**

Online self-learning

📍 Brazil

- creating aparametric families by revit and managing them by dynamo nodes.
- family parameters and oriantaion are managed by dynamo.
- Using : Revit & Dynamo.

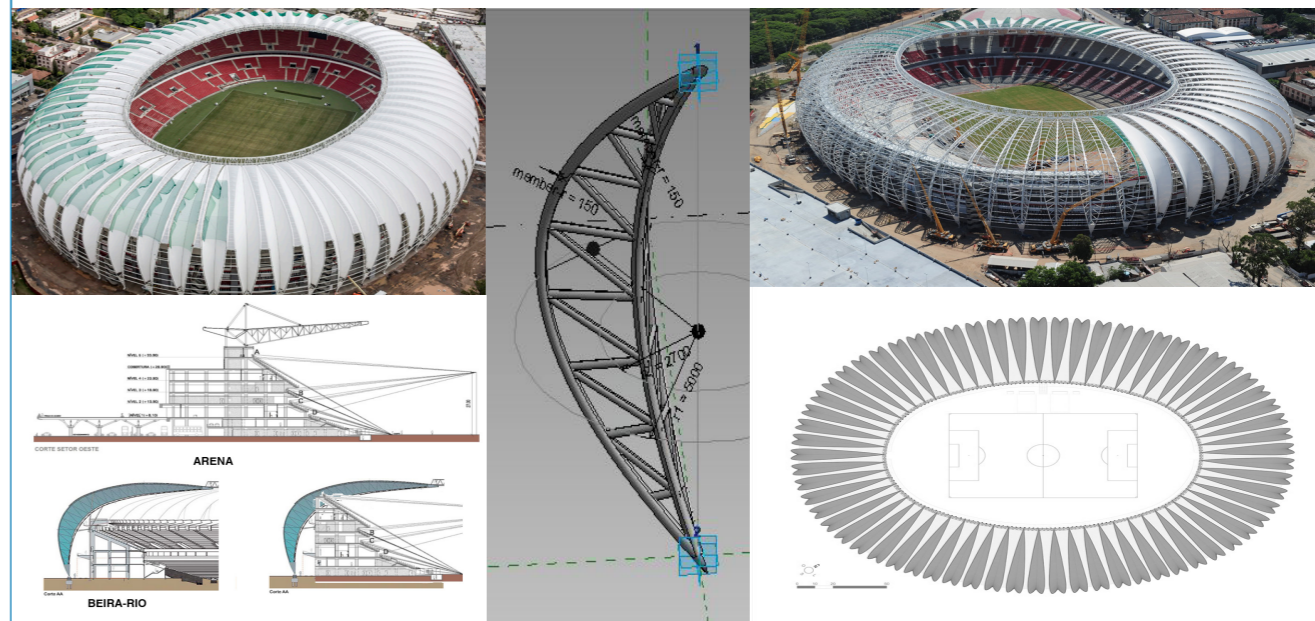


case study - 2 **ESTÁDIO BEIRA-RIO**

Online self-learning

📍 Brazil

- I studied Estádio Beira-Rio strucutre system and Modeling it into revit.
- creating Family revit of strucutre element which i can array it into any shape of model, creating asmart family with parameters.
- Using : Revit.

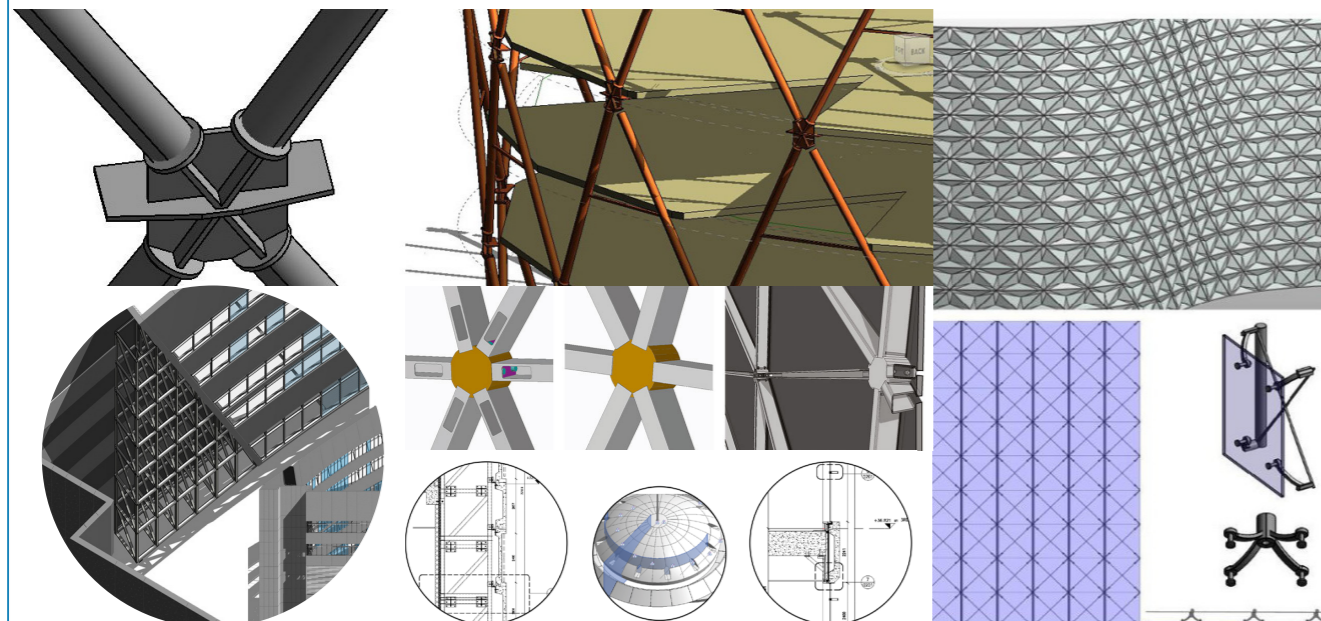


case study - 4 **3D-WORKING DRAWINGS DETAILS**

Online self-learning

📍 Brazil

- Detailing families 3D and 2D for many projects.
- Drafting 2D detail families by revit of wall sections and detailed views.
- Using : Revit.

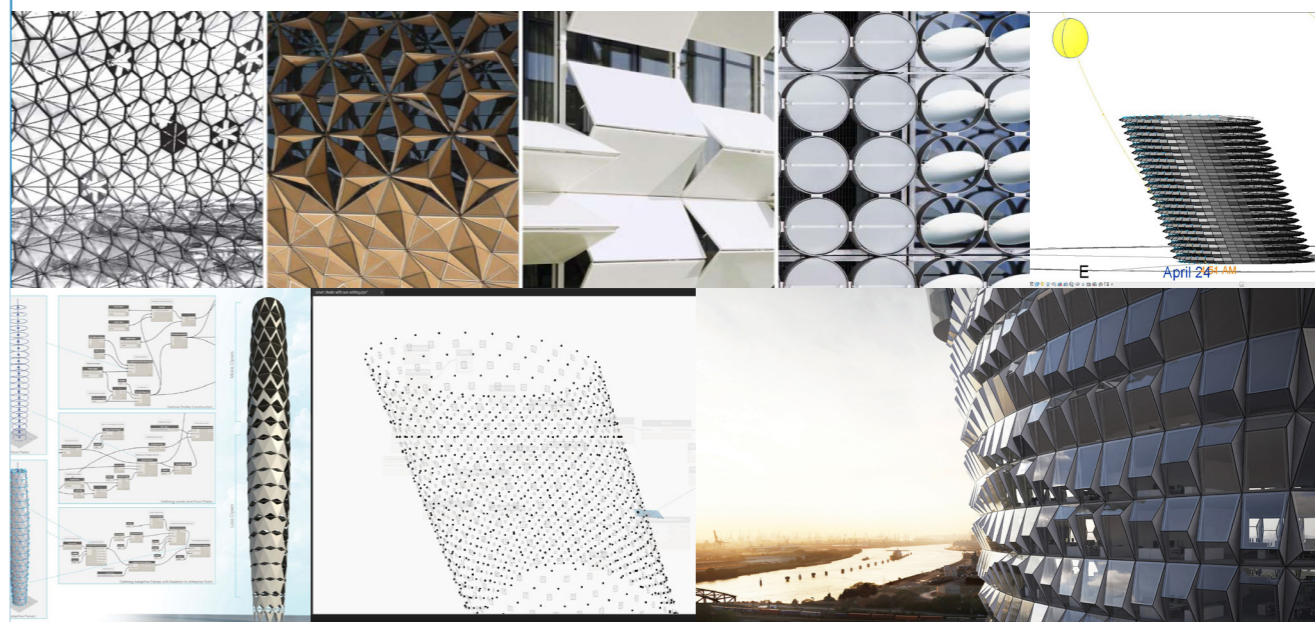


case study - 5 **PARAMETRIC MODELING**

Online self-learning

📍 Brazil

- Folded panel is one of the smart elements of many projects.
- creating Family revit with its parameters which we can mange them with many optional orientation
- Using : Revit & Dynamo.



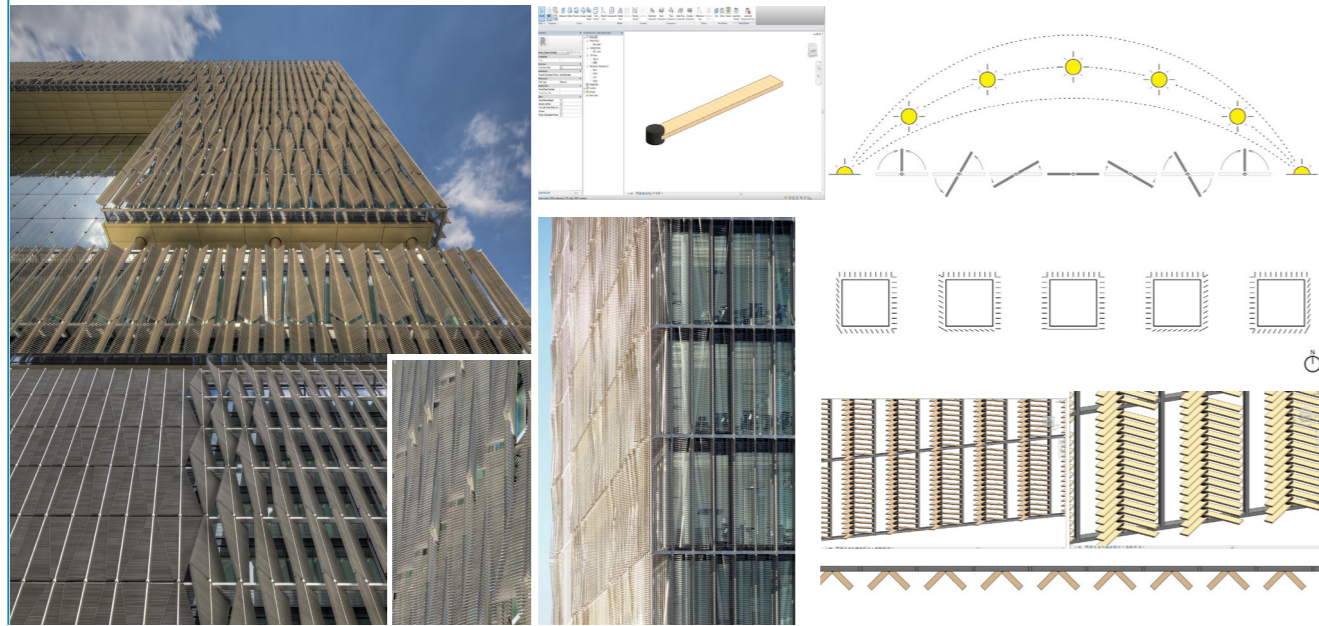


case study - 5 **KINETIC FACADES{RESPONSIVE SKINS}**

Online self-learning

Germany

- Location : ThyssenKrupp Allee 1, 45143 Essen, Germany In 2010.
- Facade intent , Based on precedent work.
- Using : Revit & Dynamo.
- Watch : [www.youtube.com/watch?v=qgurCxwsP80&t=210s](http://www.youtube.com/watch?v=qgurCxwsP80&t=210s)

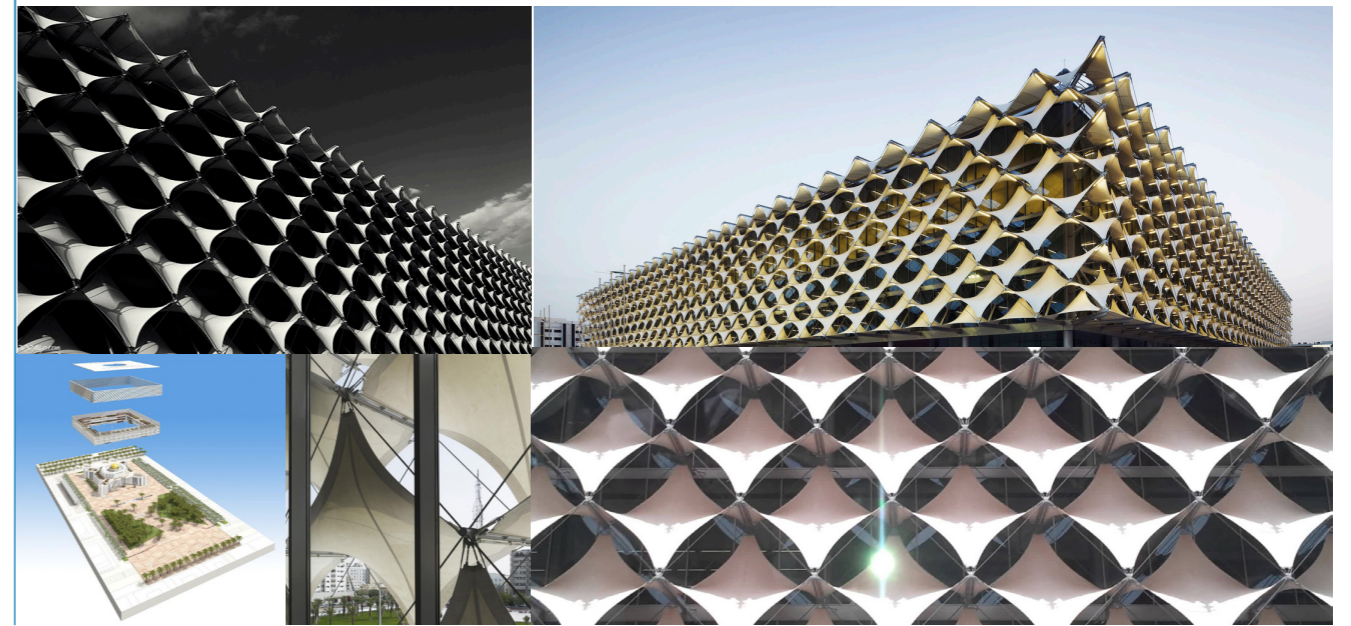


case study - 5 **KINETIC FACADES{RESPONSIVE SKINS}**

Online self-learning

Saudi

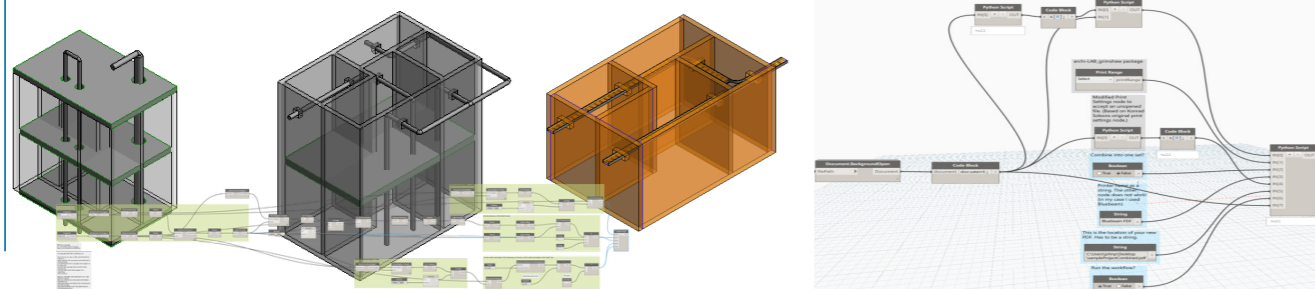
- Location : King Fahd Branch Rd, Al Olaya, Riyadh 12211, Saudi Arabia.
- Facade intent , Developmet facade.
- Using : Revit & Dynamo.
- Watch : <https://www.youtube.com/watch?v=MenAPMC8U-M>



case study - 6 **DYNAMO-WORKFLOWS**

Multi-Project

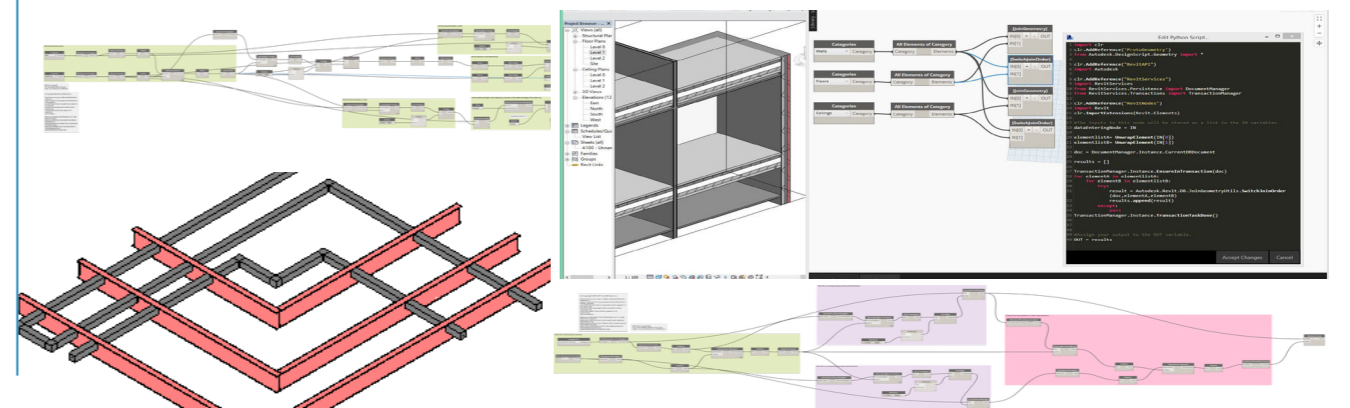
- Workflow: Batch Print PDFs in the Background.  
Interesting workflow posted by the EvolveLAB Team, showing how to batch print PDFs, driving Revit with Dynamo.
- Workflow: How to find the family inside the Room of revit project link.  
show you how to get link elements , find Geometry intersection pairs and set the parameter of elements.
- Workflow: How to creat architect floor and ceiling finish by using room boundary.  
by selecting rooms boundaries i can creat a floor finishes by rooms types and many floor types.
- Workflow: Create Rectangular Wall Opening for Horizontal Pipes in Revit using Dynam.  
to perform the rectangular wall opening for horizontal pipes..



case study - 6 **DYNAMO-WORKFLOWS**

Multi-Project

- Workflow: Auto Join Elements By Dynamo Nodes.  
Interesting workflow posted by the EvolveLAB Team, showing how to batch print PDFs, driving Revit with Dynamo.
- Workflow: Creating sheets automanticly by using Excel file.  
show you how to get link elements , find Geometry intersection pairs and set the parameter of elements.
- Workflow : Create Structural Framing Opening for Horizontal Ducts from a linked file in Revit using Dynamo.  
by selecting rooms boundaries i can creat a floor finishes by rooms types and many floor types.







Capability statement  
Updated Project 2023

03.01 - PROJECT CASE STUDY

A project case study is a detailed examination of a specific project or system. It is a piece of content that sheds light on the challenges faced, solutions adopted, and the overall outcomes of a project.

03.02 - MY PROJECT WORK SAMPLES

emphasizes the importance of the projects that are being highlighted.

03.01 - PROJECT CASE STUDY

emphasizes the importance of the projects that are being highlighted.

Introduction: This section introduces the firm and provides an overview of its services.

Expertise: This section highlights the firm's areas of expertise, such as architectural design, interior design, and project management.

Experience: This section lists the firm's past projects and its experience in different project types and sizes.

Capabilities: This section describes the firm's capabilities in terms of its staff, resources, and technology.

Process: This section describes the firm's project process, from initial consultation to final delivery.

Values: This section outlines the firm's values and commitment to quality, sustainability, and client satisfaction.

# DR.Ahmed Samir Diyae

## ASSOCIATED

# A S

Founding Partner - Partner in charge  
at ARCHMETRICS  
Planning and Projects Control Manager & Project  
Management Trainer

### Professional Experience

Jan 2012 Till Now Training/Consultancy

- Title: Project Management Office Consultant / Instructor

#### • Key Responsibilities:

- o Project Management Professional (PMP) Instructor

- o Risk Management (PMI-RMP) Instructor

- o Planning, Scheduling & Cost Control using Primavera P6 Instructor

- o Agile and Lean construction consultation

- o Implementing Project Management Office (PMO) for the companies by providing the followings:

- o Teaching the preparation course of the (PMP) certificate, and the preparation course of the (PMI-RMP) Risk Management.

Supporting and providing the company's project managers with the project management methodologies for both Predictive and Adaptive project life cycle, Templates, Trainings, Standard and Guidelines for the projects.

Providing the Project Management principals, providing the appropriate processes for the planning, Executing, Monitoring & Controlling of the Project, and providing the required Project Work Performance Report.

Proving the stakeholders with the appropriate Earned Value analysis reports including the variances and performance indexes as well as the forecast estimates.

Developing the projects Risk Management following the standards of PMI-RMP and PMP, identifying associated Risks and their exposures, and suggesting the appropriate risk response plans.

### EDUCATION

B. Sc. In Architecture Engineering, May1986 Zagazig University - Egypt

- High Diploma in the Environmental Sciences, Engineering Department, Environmental Studies and Research Institute, Ain Shams University, May 2000.

- Master Degree in Environmental Sciences, Engineering Department, Ain Shams University, June 2008.

- Project Management Professional - PMP, Project Management Institute, PMP Number: 1395358, 15-March-2011.

- PMI Risk Management Professional – PMI-RMP, Project Management Institute, PMI-RMP Number: 1485410, 07-February-2012.

- PMP Authorized Training Partner Instructor (ATPI) from Project Management Institute PMI

### Technical Skills:

- Excellent on designing, analyzing, operating and controlling construction projects planning systems using Primavera Project Management Planner (Primavera Enterprise P6).

- Ability to Develop, design publish and customize various project management development reports and control applications using Microsoft Power BI and other relevant applications.

- Excellent operation on Most of the Microsoft application.

### Personal Skills:

- Excellent teaching/training skills

- Excellent in learning new technologies

- Highly dedicated

- Excellent team working skills



## About:

AMC Architecture is a full-service architecture firm with over +5 years of experience. We specialize in the design of commercial, residential, and institutional buildings. Our team of experienced architects and designers is committed to creating beautiful, functional, and sustainable buildings that meet the needs of our clients.

We understand that every project is unique, and we tailor our approach to each client's specific needs and goals. We work closely with our clients to understand their vision for the project, and we collaborate with them to create a design that they love.

We are passionate about our work, and we are committed to providing our clients with the highest level of service. We are confident that we can help you create the perfect building for your needs.



# Mohamed Safy

## BIM Manager

# M S

Founding Partner - Partner in charge  
at AMC

Preparing Master Degree of engineering in Architecture and Urban Planning department

Master's Name: Recourses efficient cities

Master's source and scholarship: Köln University, Germany

### Role

Capable of managing small to moderate size projects with responsibility for client satisfaction throughout the project process. With the support of the Project Director, responsible for the negotiation, administration and execution of all project agreements, definition of the scope of work, and accountability for project profitability, development of project work plan through coordination with the project team. Develop and maintain sound business relationships with clients and consultants in all phases of professional activity. Work in conjunction with Technical Manager to facilitate work.

Architectural degree with a minimum of 10 years in the profession, post graduation. Experience on all phases and aspects of small/medium scale projects required. Advanced knowledge of project design and construction documentation and construction materials, building codes, presentation and communication skills. Advanced in CAD, word processing and strong spreadsheet skills. Basic knowledge of 3D computer modeling and graphic design. Previous supervisory experience preferred.

### Relevant Project Experience

Sofiland Admin Building  
(Military Airport) Beer Erida Air Base  
Administration Building for Domitec Group – Al-  
Obour City, Cairo

For The Following Projects:

EMPIRE CINEMAS - ABHA MALL - AL RASHID –  
MIDTOWN CONDO COMPOUND-NEW CAPITAL

ALMEEN NEW CITY UNIVERSITY-EDUCATIONAL BUILDINGS

ALAMEEN NEW CITY TOWERS & ENTERTAINMENT AREA

COMMERCIAL BUILDINGS

KNOWLEDGE CITY – NEW CAPITAL

BAB ELSHAMS RESORT – Nabq – Sharm El Sheikh  
- Red Sea.

SAMALA & ALAM ALROUM RESORT – Marsa  
Matrouh .

SALALAH RESORT – Sultanate of Oman.

MAKAA MOSQUE.

6th OCTOBER FACTORY.

URBAN PLAZA – ALAZHAR

### Areas of Expertise

Business case development  
BIM strategy and implementation  
Systems analysis and reconfiguration  
Project management  
Technical design, procurement and delivery  
Integrated management systems  
Low carbon design and resource efficiency  
Specification writing  
Cost / benefit, risk analysis and stress esting  
Health, safety and environmental management

### Career Interests

Safy derives great satisfaction from  
Understanding client needs and applying creativity  
and innovation to deliver solutions which bring  
value through enhanced productivity, quality and  
reduced risk.

# MOHAMED MAGDY

## MANAGING DIRECTOR

## BIM MANAGER

# M M

**Founding Partner - Partner in charge  
BIM Manager at Archmetrics**

faculty of Engineering Architecture Department, Autodesk Certified Instructor (ACI),  
BIM Instructor at BIM Solutions Authorized Center  
Implementation For BIM Level 03.

### Role

Responsible for leading consultancy and Commercial enterprise at BIM Academy, i has a construction industry background and as a Partner at Architecture, initiated and oversaw BIM technology and innovation within the business from 2014. Magdy has over 7years Practical experience in leading and delivering projects in a number of sectors including Commercial, education, healthcare, leisure, defense, process engineering, conservation and Refurbishment.

### Profile

Responsible for the implementation of Building Information Modeling (BIM) and the Digital Construction procedures at the design, construction and handover stages of a project. A BIM Manager's role and responsibilities may vary depending on whether the individual is working for the client, contractor or designer.

Unique opportunity to have a wide and varied exposure to all elements of the construction process. On a day to day basis a BIM Manager may work with Quantity Surveyors, Designers, Planners and Engineers to assist in the manipulation and extraction of information from data-rich models. There is a common misconception about the simplicity of BIM, some people believe it's just 3D models and which results in "Better Information Management", achieving a more effective and collaborative workplace.

### Relevant Project Experience

- Preparing BIM Protocols and Execution plans For Projects .  
- Meet Clients Requirements to Define BIM Requirements and BIM uses.  
- Working at Multi large scale projects with multi Discipline.  
- Technical Engineering Coordination with Disciplines requirements.

Main projects: Alburouje Business park

New Giza University

Midtown Condo residential.

Iris residential project.

The crown (palmhills)residential villas

**NASHAMI TOWN SQUARE** - It is residential community in Dubai.

**PRIMA HIGHTS** - It is residential building at 6th october city.

**MOI PROJECT** - It is Interior Ministry building of saudia arabia .

### Areas of Expertise

Business case development  
BIM strategy and implementation  
Systems analysis and reconfiguration  
Project management  
Technical design, procurement and delivery  
Integrated management systems  
Low carbon design and resource efficiency  
Specification writing  
Cost / benefit, risk analysis and stress esting  
Health, safety and environmental management

### Career Interests

Magdy derives great satisfaction from  
Understanding client needs and applying creativity  
and innovation to deliver solutions which bring  
value through enhanced productivity, quality and  
reduced risk.

# Hosny El Sharif

## BIM STRUCTURE COORDINATOR

# H E

### **Senior Structure at Archmetrics**

MSc. Structural Engineering Department, Faculty of Engineering, Alexandria University  
Construction Program, SSP, Faculty of Engineering, Alexandria University

#### Role

We provide a full range of structural engineering design services ranging from initial concept and feasibility assessments through to finite element analysis. Our technical staff have experience working across a wide range of industry sectors especially those associated with the nuclear, Defense, marine, commercial and industrial environments. To enable our staff to produce the highest quality of work as efficiently as possible we maintain a high level of capital investment in an extensive range of the latest civil, structural design, detailing and analysis software packages available. Our specialist engineering analysis software and our BIM Modeling software is fully compatible allowing us a fully integrated linkup between our analysis, design and drawing software platforms.

CAIRO BUSINESS PLAZA, NEW ADMINISTRATIVE CAPITAL, EGYPT.  
ROLE: BIM MODELING - SHOP DRAWINGS.  
- AL WASEEL PRIVATE RESORT, RIYADH, KSA  
ROLE: STRUCTURAL DESIGN - BIM MODELING.  
- MIDTOWN CONDO COMPOUND, NEW ADMINISTRATIVE CAPITAL, EGYPT  
ROLE: BIM MODELING - SHOP DRAWINGS - COORDINATION  
- LATIN NEIGHBORHOOD, NEW ALAMEIN, EGYPT  
ROLE: SHOP DRAWINGS  
- ENTERTAINMENT AREA, NEW ALAMEIN, EGYPT  
ROLE: SHOP DRAWINGS.  
- SAUDI GERMAN MEDICAL COMPLEX, ALEXANDRIA, EGYPT  
ROLE: STRUCTURAL DESIGN - BIM MODELING - SHOP DRAWINGS.

#### Areas of Expertise

Business case development  
BIM strategy and implementation  
Systems analysis and reconfiguration  
Project management  
Technical design, procurement and delivery  
Integrated management systems  
Low carbon design and resource efficiency  
Specification writing  
Cost / benefit, risk analysis and stress esting  
Health, safety and environmental management

#### Career Interests

Moataz derives great satisfaction from Understanding client needs and applying creativity and innovation to deliver solutions which bring value through enhanced productivity, quality and reduced risk.

# Ahmed Tarek

## Senior Architect - BIM Manager

# A T

### **Senior Technical Architecture at Archmetrics**

Bachelor of Engineering –Helwan University (Matria branch) Architecture Dept.  
Diploma Regarding Architectural Design in Faculty of Arts – Helwan University.

#### Role

Provides primary technical leadership and Documentation coordination (Senior Architect I) or develops design documentation (Senior Designer I) on large, complex projects or multiple small to moderated projects and directs the work of others, including assigning responsibilities and monitoring their progress and completion. Develop staffing plans / budgets and schedules within the project work plan; and works with the project manager in the development of fee and scope proposals. Directs teams and mentors staff. Architectural Degree with a minimum of 8 years in the profession, post graduation. Experience on all phases and aspects of large and complex scale projects required. Advanced knowledge of project design and construction documentation and construction materials, CAD and word processing tools. Advanced spreadsheet skills required. Intermediate knowledge of 3D computer modeling and graphic design. Minimum 4 years experience in specialized market segment. Previous supervisory experience and professional registration required.

#### Relevant Project Experience

For The Following Projects:  
EMPIRE CINEMAS - ABHA MALL - AL RASHID – MIDTOWN CONDO COMPOUND-NEW CAPITAL  
ALMEEN NEW CITY UNIVERSITY-EDUCATIONAL BUILDINGS  
ALAMEEN NEW CITY TOWERS & ENTERTAINMENT AREA  
COMMERCIAL BUILDINGS  
KNOWLEDGE CITY – NEW CAPITAL  
BAB ELSHAMS RESORT – Nabq – Sharm El Sheikh - Red Sea.  
SAMALA & ALAM ALROUM RESORT – Marsa Matrouh .  
SALALAH RESORT – Sultanate of Oman.  
MAKAA MOSQUE.  
6th OCTOBER FACTORY.  
URBAN PLAZA – ALAZHAR

#### Areas of Expertise

Business case development  
BIM strategy and implementation  
Systems analysis and reconfiguration  
Project management  
Technical design, procurement and delivery  
Integrated management systems  
Low carbon design and resource efficiency  
Specification writing  
Cost / benefit, risk analysis and stress esting

#### Career Interests

Mayar derives great satisfaction from Understanding client needs and applying creativity and innovation to deliver solutions which bring value through enhanced productivity, quality and reduced risk.



# ANWAR MOHAMED

## BIM MECHANICAL COORDINATOR

A  
M

### **Senior BIM Mechanical at ARCHMETRICS**

Bachelor of Mechanical Engineering, Al-Menofia

University.

Autodesk certified Professional for MEP

#### Role

Provides primary technical leadership and documentation coordination on large, complex projects or multiple small to moderated projects and directs the work of others, including assigning responsibilities and monitoring their progress and completion. Develop staffing plans / budgets and schedules within the project work plan; and works with the project manager in the development of fee and scope proposals. Directs teams and mentors staff.

Engineering Degree with a minimum of 7 years in the profession, post graduation. Experience on all phases and aspects of large and complex scale projects required. Advanced knowledge of advanced engineering principles and practices, conventional technology in the specialized field, Industry Codes and Standards, project design, engineering programs and construction documentation and construction materials, CADD and word processing tools. Advanced word processing and spreadsheet skills required. Previous supervisory experience required.

#### Relevant Project Experience

- CFC AURA Highland Apartments Technical Office/MEP BIM Coordinator  
Mech Modeling LOD-350  
Electromechanical Coordination  
Mech. Shop drawing Revit-based.  
- Central Bank Of Egypt Technical Office at Site / MEP BIM Coordinator  
Mech Modeling LOD-350  
Electromechanical Coordination  
Mech. Shop drawing Revit-based.  
- Ministry of Foreign Affairs MEP BIM Coordinator  
Mech Modeling LOD-350  
Electromechanical Coordination  
Mech. Shop drawing Revit-based.  
- Al-Maktom International Airport  
ARFFS Facilities Expansions  
MEP As-Built for Facility Management (6-D)  
LOD-500.  
EXPO 2020 Mobility District Mech. Design Validation  
MEXPO 2020  
Mobility District

#### Areas of Expertise

Business case development  
BIM strategy and implementation  
Systems analysis and reconfiguration  
Project management  
Technical design, procurement and delivery  
Integrated management systems  
Low carbon design and resource efficiency  
Specification writing  
Cost / benefit, risk analysis and stress esting

#### Career Interests

Khalifa derives great satisfaction from understanding client needs and applying creativity and innovation to deliver solutions which bring value through enhanced productivity, quality and reduced risk.

# AMR MOHAMED

## BIM ELECTRICAL COORDINATOR

A  
M

### **Senior BIM Electrical at ARCHMETRICS**

B. S. Electrical Engineering, Helwan university.

Autodesk certified Professional for MEP

Expert at Power Suite for generator sizing

Delta PLC simulation program (logixpro).

#### Role

Provides primary technical leadership and documentation coordination on large, complex projects or multiple small to moderated projects and directs the work of others, including assigning responsibilities and monitoring their progress and completion. Develop staffing plans / budgets and schedules within the project work plan; and works with the project manager in the development of fee and scope proposals. Directs teams and mentors staff.

Engineering Degree with a minimum of 7 years in the profession, post graduation. Experience on all phases and aspects of large and complex scale projects required. Advanced knowledge of advanced engineering principles and practices, conventional technology in the specialized field, Industry Codes and Standards, project design, engineering programs and construction documentation and construction materials, CADD and word processing tools. Advanced word processing and spreadsheet skills required. Previous supervisory experience required.

#### Relevant Project Experience

Infrastructure Projects

Banana Island (12 MVA) – QATAR.

Adera (19 MVA) – Egypt.

New Giza (13MVA) – Egypt.

MASPERO triangle preliminary infra structure works and visibility studies.

Med Town Infra-Structure – Egypt.

Office buildings

UMSALAL municipality building –Qatar.

Raya plaza leasing building–Egypt.

Raya 133 –Egypt.

Ambulance head quarter building–Egypt.

Polaris industrial park office building.

Shopping mall

East Samed Raya Mall– Egypt.

Galleria 40(Raya plaza) – Egypt

Residential Buildings

Adera– Egypt.

Forty west – Egypt.

Future village (ELREHAB) – Egypt.

Hany Lotfy village (ELREHAB) – Egypt.

MOHANADI village – Qatar.

#### Areas of Expertise

Business case development  
BIM strategy and implementation  
Systems analysis and reconfiguration  
Project management  
Technical design, procurement and delivery  
Integrated management systems  
Low carbon design and resource efficiency  
Specification writing  
Cost / benefit, risk analysis and stress esting  
Health, safety and environmental manage-

#### Career Interests

Assem derives great satisfaction from understanding client needs and applying creativity and innovation to deliver solutions which bring value through enhanced productivity, quality and reduced risk.



# MOHAMED ZAHAR

## SOFTWARE DEVELOPER

M  
Z

### **Software Developer at ARCHMETRICS**

B. S. Electrical Engineering, Helwan university,  
Autodesk certified Professional for MEP  
Expert at Power Suite for generator sizing  
Delta PLC simulation program (logixpro).

#### **Role**

Provides primary technical leadership and documentation coordination on large, complex projects or multiple small to moderated projects and directs the work of others, including assigning responsibilities and monitoring their progress and completion. Develop staffing plans / budgets and schedules within the project work plan; and works with the project manager in the development of fee and scope proposals. Directs teams and mentors staff.

Engineering Degree with a minimum of 7 years in the profession, post graduation. Experience on all phases and aspects of large and complex scale projects required. Advanced knowledge of advanced engineering principles and practices, conventional technology in the specialized field, Industry Codes and Standards, project design, engineering programs and construction documentation and construction materials, CADD and word processing tools. Advanced word processing and spreadsheet skills required. Previous supervisory experience required.

#### Relevant Project Experience

##### Infrastructure Projects

Banana Island (12 MVA) – QATAR.  
Adera (19 MVA) – Egypt.  
New Giza (13MVA) – Egypt.  
MASPERO triangle preliminary infra structure works and visibility studies.  
Med Town Infra-Structure – Egypt.

##### Office buildings

UMSALAL municipality building –Qatar.  
Raya plaza leasing building–Egypt.  
Raya 133 –Egypt.  
Ambulance head quarter building–Egypt.  
Polaris industrial park office building.

##### Shopping mall

East Somed Raya Mall– Egypt.  
Galleria 40(Raya plaza) – Egypt

##### Residential Buildings

Adera– Egypt.  
Forty west – Egypt.  
Future village (ELREHAB) – Egypt.  
Hany Lotfy village (ELREHAB) – Egypt.  
MOHANADI village – Qatar.

#### **Areas of Expertise**

Business case development  
BIM strategy and implementation  
Systems analysis and reconfiguration  
Project management  
Technical design, procurement and delivery  
Integrated management systems  
Low carbon design and resource efficiency  
Specification writing  
Cost / benefit, risk analysis and stress esting  
Health, safety and environmental manage-

#### **Career Interests**

Assem derives great satisfaction from understanding client needs and applying creativity and innovation to deliver solutions which bring value through enhanced productivity, quality and reduced risk.

# Abdelrhman Nahl

## Fire Protection Engineer

A  
N

### **Senior Architect - Code Reviewer** Bachelor Degree of Architecture, Fire Protection Engineering, Code Validator Reviewer at HBRC

#### **Role**

familiar with the International Building Code (IBC) and the National Fire Protection Association (NFPA) codes and standards. The IBC is a model building code developed by the International Code Council (ICC) that provides minimum requirements for building safety and health. The NFPA develops and publishes more than 300 codes and standards that are designed to prevent and minimize the impact of fire and other hazards.

To ensure compliance with these codes and standards, it is important to stay up-to-date with any changes or updates that are made. It is also important to have a thorough understanding of the specific requirements for the project at hand, as well as any local code requirements and standards that may be applicable.

In summary, as an engineer code international reviewer, it is essential to have a deep understanding of the IBC and NFPA codes and standards, stay up-to-date with any changes or updates, and be familiar with any local code requirements and standards that may be applicable

Knowledge of the building code. The reviewer must have a thorough understanding of the building code in the jurisdiction where they are working. This includes the specific requirements of the code, as well as the intent of the code.  
Experience in engineering. The reviewer must have experience in engineering, preferably in the field of structural engineering. This experience will give them the knowledge and skills necessary to evaluate the structural safety of a building.

#### Relevant Project Experience

Working at Housing and Building National Research Center (HBRC) as architect since 1/8/2015 (before graduation) till now.  
Working at Urban Training & Studies Institute ( UTI )

Member at executive secretariat of fire protection code committee since 1/8/2015 till now.  
Member at executive secretariat of car parking code committee since 1/8/2015 till now.  
Member at executive secretariat of projects review committee since 1/8/2015 till now.  
reviewe Life Safety & Fire Protection for the following projects according to NFPA :

- 1- New National Cancer Institute (500500) (Phase1).
- 2- Emaar Square (Uptown Cairo).
- 3- Central Business District (CBD) at New Administrative Capital.
- 4- Alamein New City Towers.
- 5- Maadi Twin Towers.

Reviewe Life Safety & Fire Protection for the following projects according to EGYPTIAN CODE :

- 1- Cairo Festival City (CFC).
- 2- Almaza City Center.
- 3- City stars Mall.
- 4- Porto October.
- 5- Mall Of Egypt.
- 6- Sun City Mall.
- 7- Grand Egyptian Museum (GEM).
- 8- Cairo International Airport [Hall 3]

#### **Areas of Expertise**

Familier with the Following:

1. Egyptian Building Code.
2. Egyptian Fire Protection Code.
3. Egyptian Garage Code.
4. NFPA 101 Code.
5. International Building Code [IBC].
6. Saudi Fire Code [SBC] 801- CR

## ARCHMETRICS LIST OF PROJECTS:

We have a proven track record of success in a wide range of engineering consulting projects. Over the past few years, we have completed over 50 projects of all types and sizes.

During this time, we have worked with many clients in the private sector, government agencies and educational institutions. Our work has included engineering studies for new construction and renovation projects, program management for multi-year capital improvement programs, as well as strategic planning and policy analysis.

Our team is committed to providing excellent service that exceeds client expectations. This commitment is reflected in our quality control procedures, which include a rigorous inspection process during construction phases of each project. We have a proven track record of success in a wide range of engineering consulting projects. Over the past few years, we have completed over 50 projects of all types and sizes.

During this time, we have worked with many clients in the private sector, government agencies and educational institutions. Our work has included engineering studies for new construction and renovation projects, program management for multi-year capital improvement programs, as well as strategic planning and policy analysis. Our team is committed to providing excellent service that exceeds client expectations. This commitment is reflected in our quality control procedures, which include a rigorous inspection process during construction phases of each project.

project		client	Building type	Stage	Discipline	Location
Villa Gawad	2017	Private	Villa	Design and Built	Interior Design & Construction	New Cairo
Mall Of Arabia Entrance	2017	Fotuim	Mall	Design	Interior Design	6th Octouber
Villa Orabi Exteriro	2017	Private	Villa	Design and Built	Interior Design & Construction	New Cairo
Al Bourouje Business Park	2017	Capital Group	Office Building	Design	Architecture & MEP	New Capital
The Greek Tower Dubai	2018	Emmar	Residential	Design	Architecture	Dubai
PALM HILLS(The Crown)	2018	Palm Hills	Residential	Design	Architecture & Structure & MEP	6th Octouber
Aspire Academy Building	2018	Aspire Academy	Sports	Design	Architecture	Qatar
LE MERIDIAN	2018	Marriott	Hotel	Design	Architecture	Dubai
Mividia Project	2018		Residential	Design	Structure	
Al Tala Gardens	2018					
New Giza Phase II	2019	New Giza	University	Design	Architecture & MEP	6th Octouber
Yanbou Residential Shop Drawing Project	2019	Saad Development	Residential	Shop Drawing Fabrication	Architecture & Structure & MEP	Saudi Arabia
Opera Project	2019	New capital	Opera	Shop Drawing Fabrication	Architecture	New Capital
Saudia Residential Compound	2019	AlRajhi group	Residential	Design	Architecture & Structure & MEP	Saudi Arabia
American Residential Building	2019		Residential	Design	Architecture	
MARASI Villas	2019	Emmar	Villa	Design	Architecture	
Midtown Condo Project Shop Drawings	2019	Better Home	Residential	Shop Drawing Fabrication	Architecture & Structure & MEP	New Capital
Capitall Business Plaza (Shop Drawing)	2019	Better Home	Office Building	Shop Drawing Fabrication	Architecture & Structure	New Capital
500 500 Hospital	2019					
Albourouje Mall	2020		Mall	Design	Architecture	
Gouna Villa	2020	Private	Villa	Design and Built	Interior Design	
American Residential Building	2020		Residential	Shop Drawing Fabrication	Architecture	
Design Photographer Studio	2020	Private	Studio	Design	Interior Design	
Al Safwa University	2020		University	Design	Architecture	
Manshyia Square Alex Development	2020		Landscape	Design	Landscape	
Mountain View - Icity	2020	Mountain View	Residential	Shop Drawing Fabrication	MEP	
MASAR Pacakge A	2021	Umm al Qura Development	Mixed Use Hospitality	Design - Value Engineering	Architecture & Landscape	Saudi Arabia
Barcellos Resturant	2021	Barcellos Group	Resturant	Design	Architecture	
Madinaty Twin Villa - Lavial	2021		Villa	Design and Built	Interior Design & Construction	Cairo
Midtown Mall	2021	Better Home	Mall	Shop Drawing Fabrication	Architecture & Structure & MEP	New Capital - Cairo
Egyptian International Pharmaceutical Industries Company - EIPICO 1	2022	EIPICO	factory	Shop Drawing Fabrication	Architecture & Structure & MEP	Tenth of Ramadan City
Lusial Shop drawings Landscape	2022	Lusial Group	Office Building	Shop Drawing	Landscape	Qatar
DARI Project	2022		Residential	Design	Architecture	Saudi Arabia
MIDTOWN Sky - Menna Construction	2022	Better Home	Villa	Shop Drawing	Architecture & MEP	New Capital - Cairo
MOI Project	2022	Ministry of interior	Office Building	Shop Drawing Fabrication	Architecture & Landscape	Kingdom of Saudi Arabia
AKAM Building	2022	Akam AlRajhi group	Office Building	Construction	MEP	New Cairo - Cairo
Madinaty South Sector Extension	2023	Tallat Mostafa	Commercial	Design		Cario, Egypt
Oasisi Skywalk BIM Management	2023	Morshide Group	Hotel	Shop Drawing		Cario, Egypt
P08 - Project	2023	Akam AlRajhi group	Office Building	Shop Drawing		Saudi Arabia
Ghabbour Auto Car Show	2023	Ghabour Motors	Car Show	Shop Drawing		Cario, Egypt
NEOM AL WAHA Project	2024	NEOM	Agriculture	Design		Kingdom of Saudi Arabia
NEOM Command Center Project	2024	NEOM	Office Building	Design		Kingdom of Saudi Arabia
The Seven Project Saudi arabia	2024	Saudia arabia entertainment	Entertainment	Design		Kingdom of Saudi Arabia
Red Sea Shura Island Project	2024	Red Sea	Hotel	Design		Kingdom of Saudi Arabia

## ARCHMETRICS LIST OF ENGINEERS:

We work as a team to ensure your satisfaction, so that you can grow with confidence and success. In today's world of unrelenting change, we're confident that we can provide the level of service your business demands. At any given moment, we can handle more than one project at a time—providing our clients with the flexibility they need. And while each project is unique, we have mastered a set of processes that keep everything running smoothly day after day, year after year.

Our staff is comprised of talented individuals who are experts in their fields and have years of experience in providing outstanding customer service. We understand what it takes to ensure that you get the best results possible and are committed to maintaining an environment that fosters excellence in all aspects of our business.

We're sure you'll agree: When it comes to marketing communications services—from websites to brochures, newsletters and direct mailings—we've got what it takes to help you succeed! As a small business owner, you need to focus on your core competencies. You don't have time to worry about the details of any project that is not directly related to your business.

At AMC we work as a team to ensure your satisfaction, so that you can grow with confidence and success. In today's world of unrelenting change, we're confident that we can provide the level of service your business demands. At any given moment, we can handle more than one project at a time—providing our clients with the flexibility they need. And while each project is unique, we have mastered a set of processes that keep everything running smoothly day after day, year after year.

No.	Name	Graduation year	Discipline
1	Dr Ahmed Samir	2007	Project Manager Head
2	Ahmed Magdy	2018	Document controller
3	Mohammed Hosny Hassan	2014	Structure BIM Team leader
4	Yara Alaa	2018	Structure BIM Engineer
5	Abdel-Rahman Said	2018	Structure BIM Engineer
6	Youssef Hassan	2018	Structure BIM Engineer
7	Mohamed Abo el Magd	2016	Structure BIM Engineer
8	Mohamed Magdy	2014	BIM unit Head
9	Mohamed Ali Hussein	2010	Architecture Head
10	Mahmoud Ahmed Hassan	2010	Architecture
11	Said Mohamed Ahmed	2010	Architecture
12	Nora Amira Hassan	2018	BIM Architect
13	Ahmed Mohamed Nour	2018	BIM Architect
14	Karim Ahmed Shahin	2013	Mechanical Team Head
15	Yasmin Ali Ahmed	2014	Mechanical Team Leader
16	Ahmed Khaled	2018	mechanical BIM engineer
17	Abdullah Mohamed	2018	mechanical BIM engineer
18	Khaled Ali Ahmed	2012	Electrical Team Head
19	Salma Ahmed	2011	Electrical team Leader
20	Mohamed Ahmed El-Gindy	2018	Electrical BIM engineer
21	Neema Farid	2017	Electrical BIM engineer



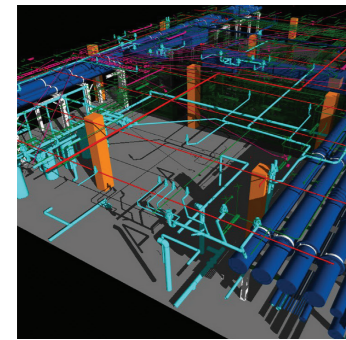
# Training Path

We are Always Working on Developing Our Team Members To be professional at All New BIM Software By Courses and Case Studies.

Now we are working On Three Software pro-gramme (Revit , Dynamo , Navisworks) Also Practicing How to Use Our Templates and How to save Time (Improve Productivity)

Case Studies For Multi-projects Of Leed and Parametric Designs

Clash Detection and Avoiding Rework (Owner Claim that BIM Usage Saves Time and Money)



## 3D VIRTUAL PRESENTATIONS/VISUALIZATION

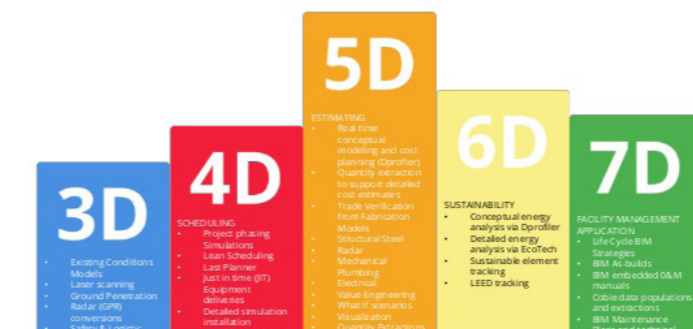
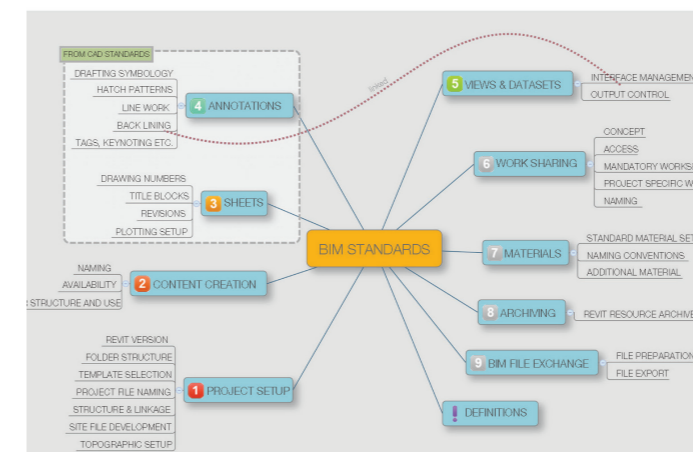
Understanding the client's visualization of the project is equally as important as generating a 3D BIM. Through in-house capabilities and strategic alliances, ALGORITHM can generate photorealistic images and animations for your project. Since an accurate BIM has already been generated, we can export it to the appropriate visualization software package, select the desired view, and compose images.

We understand the importance of designing and building with the environment in mind. Our Portland, Oregon, headquarters is a LEED Gold certified building, and we're committed to helping our customers reach LEED certification on projects as well.

The U.S. Green Building Council released data showing that global green building continues to double every three years. With the increasing demand of eco-conscious construction, the industry is anticipated to reach \$234 billion by 2019. As the leading benchmark in green building, LEED-certified projects are resource-efficient and save money.

LEED points, LEED credits, and LEED prerequisites all contribute to achieving LEED certification. It involves a lot of components, but thanks to building information modeling (BIM), it's not as complicated as it sounds. BIM provides architects, contractors, and engineers an accessible platform to easily collect LEED

# Our Standard and Communication



Using core standards of BIM implementation, defining methodical Specification for collaborative sharing and use of structured Health and Safety information using BIM

PAS 1192-5:2015

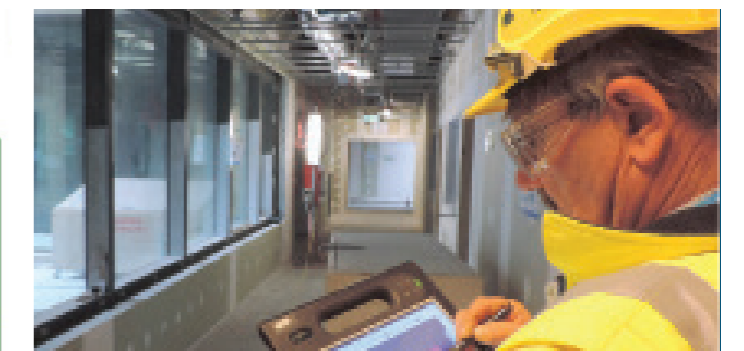
Specification for security-minded building information modeling, digital built environments and smart asset management

BS 1192:2007 + A2:2016

Collaborative production of architectural, engineering and construction information. Code of practice

PAS 1192-2:2013

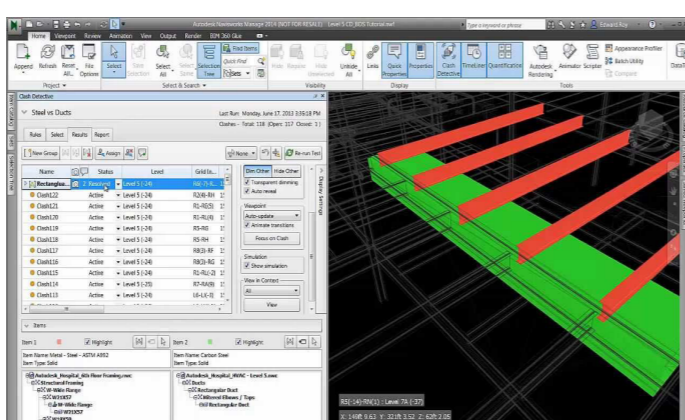
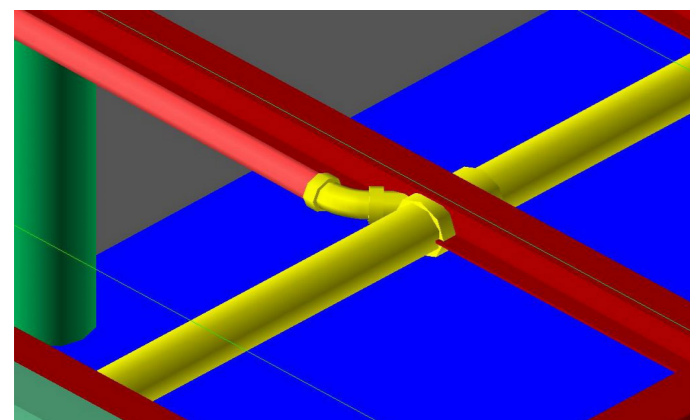
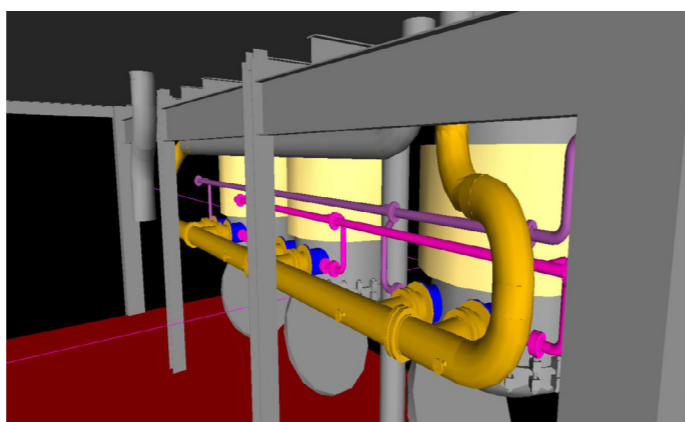
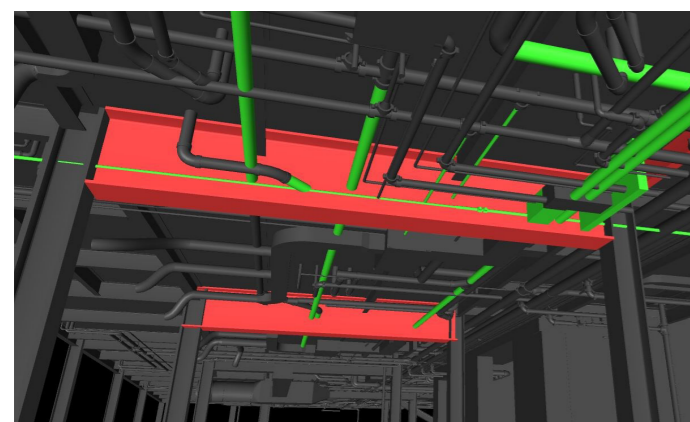
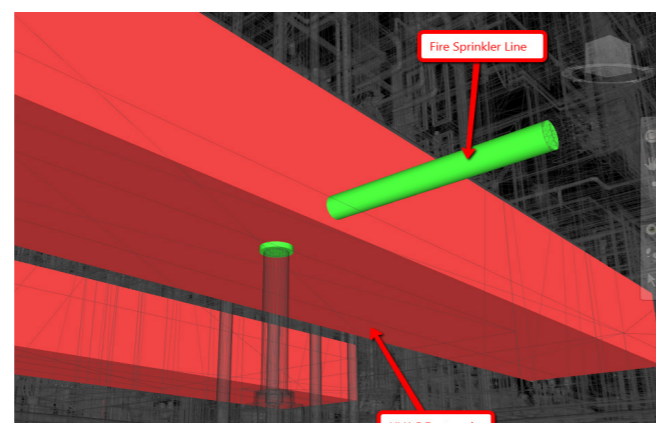
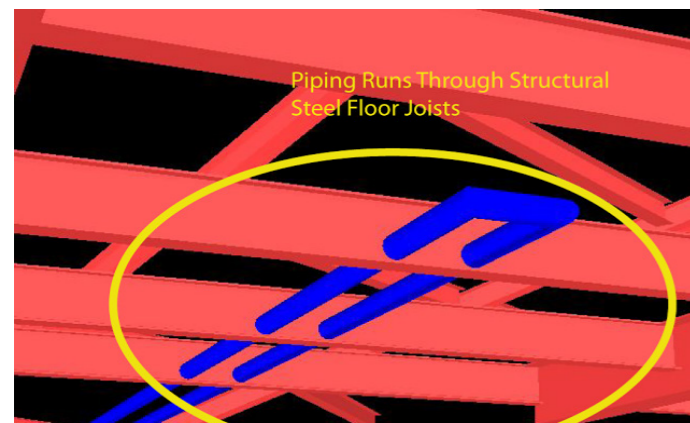
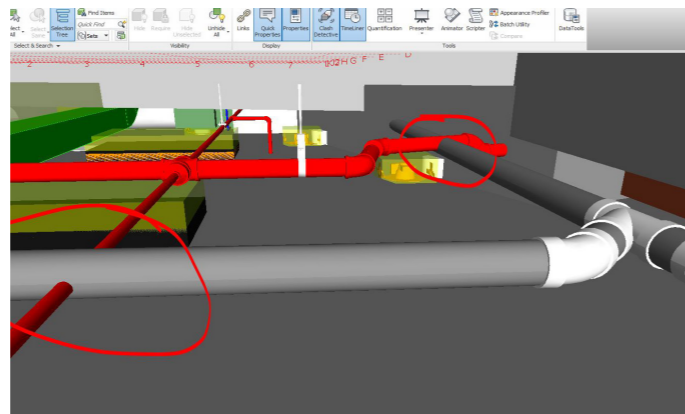
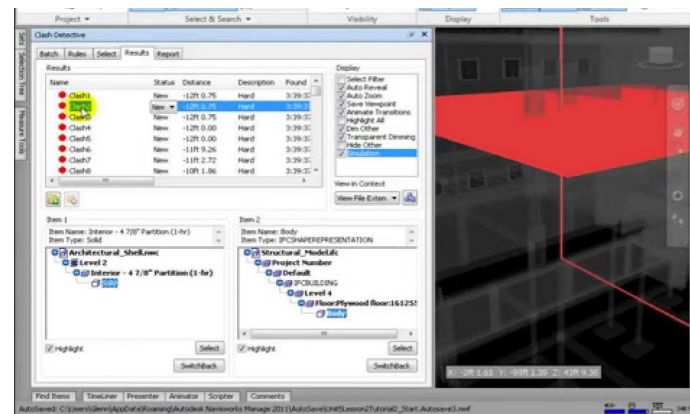
Specification for information management for the capital/delivery phase of construction projects using building information modeling



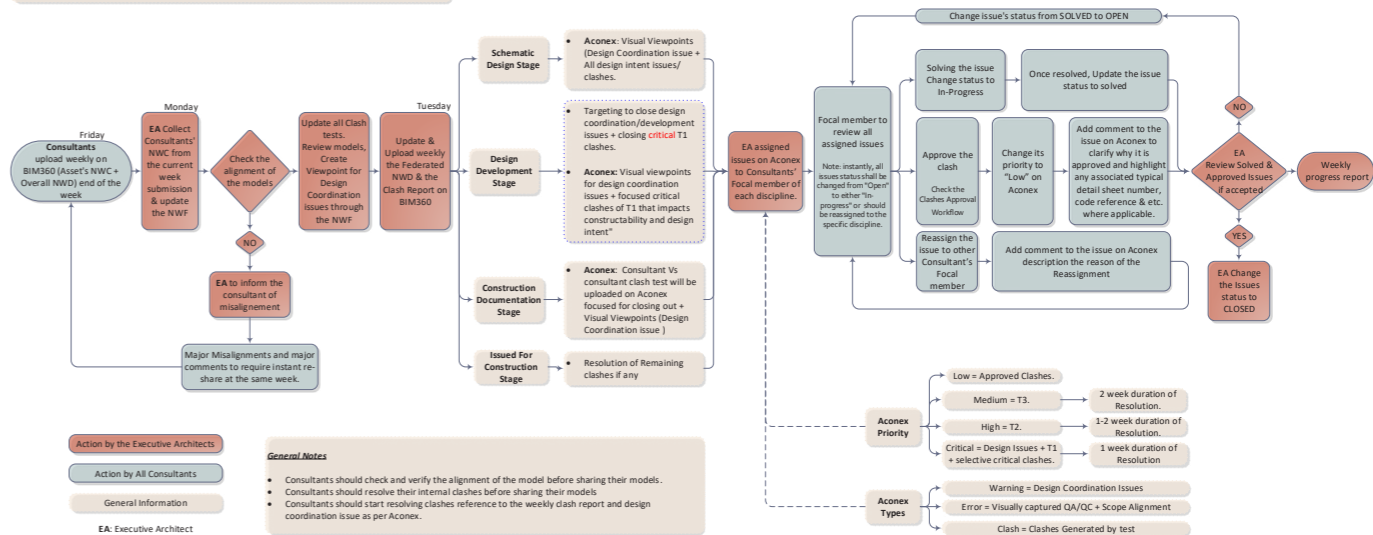


## Clash Detection By Naviswork

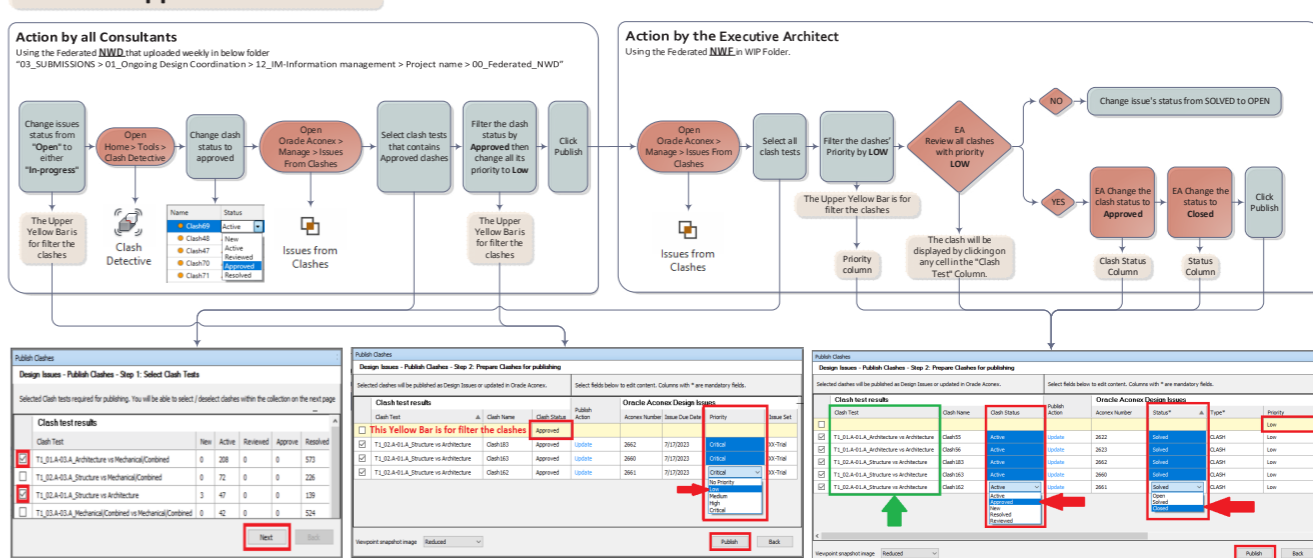
- Better anticipate and help reduce potential clash and interference problems before construction, minimizing expensive delays and rework.
- Perform clash detection tests against specified geometry to help find and resolve conflicts.
- Check as-built laser-scan data against 3D designs
- Open current clash in many original design software applications.
- View clashes in context with geometry in the model and in relation to other clashes.
- Make all nonclashing items transparent to more easily locate clashes in the model



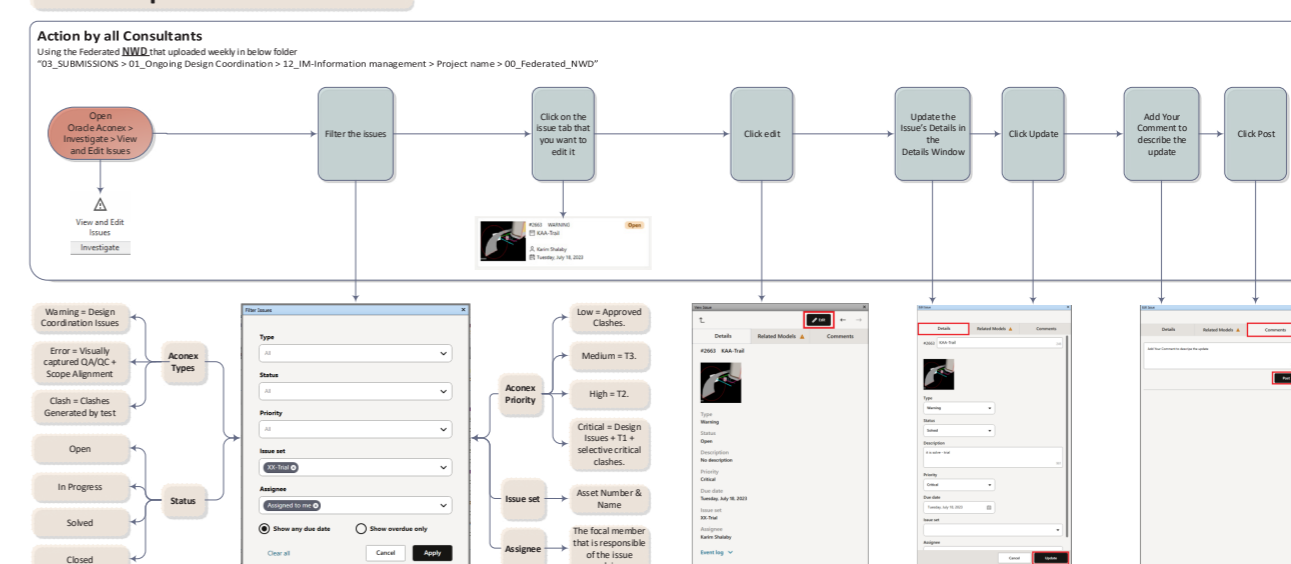
## Project's Coordination Workflow Diagram



## Clashes Approval Workflow

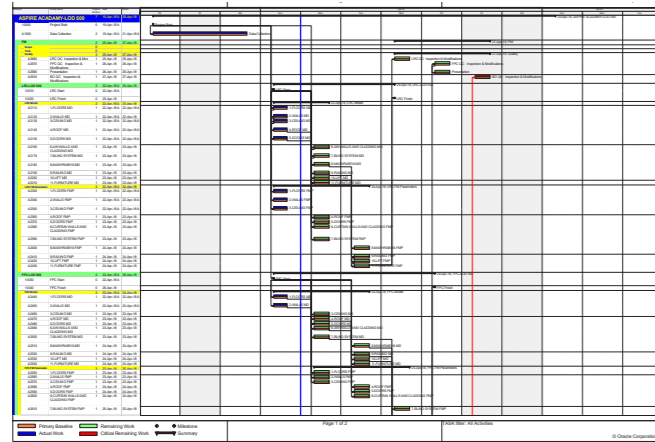


## Edit Viewpoint Issue Workflow





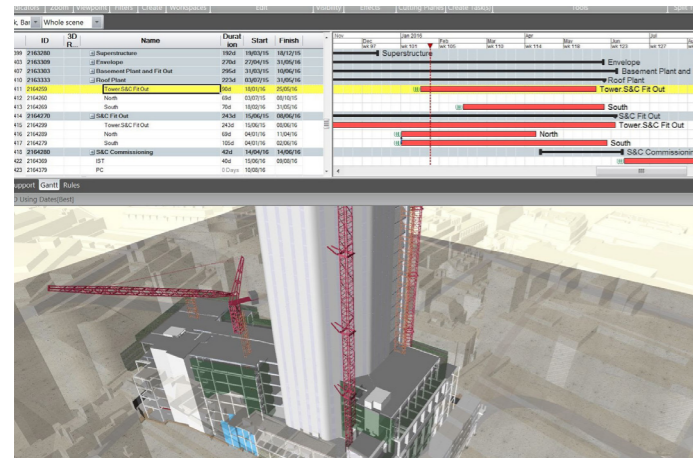
# BIM Project Management



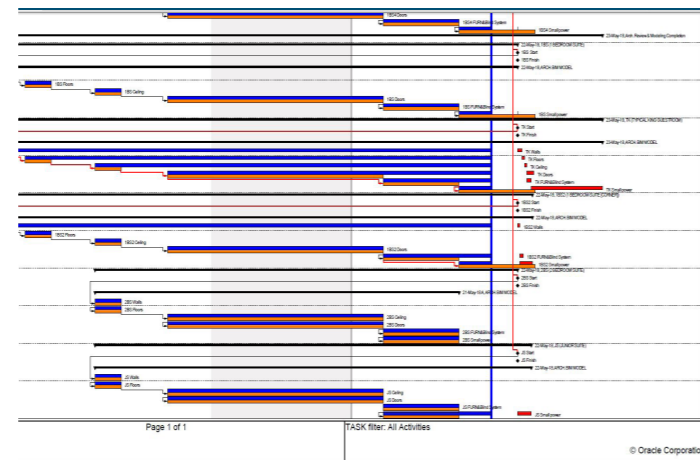
Professional project management can ensure that organisations of all sizes reap the benefits of a well-controlled, project-based approach to business. Some of these benefits are listed below:

Develop a full understanding of the project goals, objectives and benefits before committing significant resources. This ensures that only the projects which are expected to provide benefits exceeding the investment of time and money are initiated.

Ensure that the project proceeds effectively through all the essential phases, from concept through to completion. This makes sure the project is properly reviewed by the stakeholders at key stages including initiation and final acceptance.



Effect	Threat or Opportunity	Primary Objective	Probability	Impact	Risk Matrix	Response Strategy																																										
Project delayed	Threat	Time	Medium	Very High	<table border="1"> <tr><td>VH</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>H</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>M</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>L</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>VL</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td>VL</td><td>L</td><td>M</td><td>H</td><td>VH</td><td></td></tr> </table>	VH							H							M							L							VL								VL	L	M	H	VH		Mitigate
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Activity	Sub-Activity	Start	Finish	Progress	Completion %	
Le Meridien (2 Arch BIM Model Act)		14 May 18	23 May 18	14 May 18	23 May 18	68.8%
Project Management		22 May 18	22 May 18	21 May 18	21 May 18	0%
Management		14 May 18	23 May 18	14 May 18	21 May 18	77.8%
Arch. Modelling from scratch		14 May 18	23 May 18	14 May 18	21 May 18	87.8%
TT (Typical) TRUSS SYSTEMS		14 May 18	23 May 18	14 May 18	21 May 18	87.8%

Project Name	Project Manager	Project Start Date	Project Finish Date
The Architecture Model LOD 400, for the 7 level apartments of the Le Meridien M2 Project. <td>Michael Hardy <td>14 May 2018</td> <td>23 May 2018</td> </td>	Michael Hardy <td>14 May 2018</td> <td>23 May 2018</td>	14 May 2018	23 May 2018

Activity	Start Date	Finish Date	Actual Start	Expected/Actual Finish Date	Schedule % Complete	Performance % Complete
Total	14 May 2018	23 May 2018	14 May 2018	23 May 2018	68.8%	68.8%
Quality	14 May 2018	23 May 2018	14 May 2018	23 May 2018	68.8%	68.8%
Arch. Modelling from scratch	14 May 2018	23 May 2018	14 May 2018	21 May 2018	87.8%	100.0%

# Weekly Clash Status Progress Report

A Weekly Clash Status Progress Report is a document that summarizes the progress of a Clash project in a given week. It typically includes the following sections:

**Summary:** A brief overview of the project's progress, including any major accomplishments or setbacks.

**Tasks:** A list of tasks that were completed or started in the past week, along with their status (e.g., "Completed," "In Progress," "Pending").

**Issues:** Any known issues or blockers that are preventing the project from moving forward.

**Next Steps:** A list of steps that need to be taken in the coming week to keep the project on track.

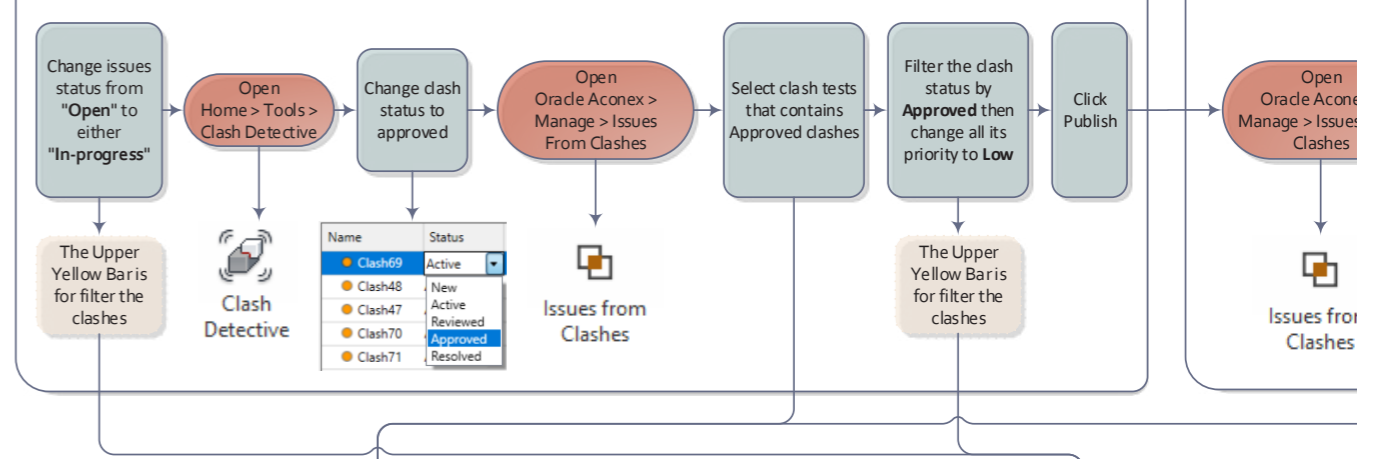
The Weekly Clash Status Progress Report is a valuable tool for keeping track of the project's progress and identifying any potential problems. It can also be used to communicate the project's status to stakeholders, such as managers or clients.

By following these tips, you can write a Weekly Clash Status Progress Report that is clear, concise, and actionable. This will help to keep the project on track and ensure that everyone is on the same page.

## Clashes Approval Workflow

### Action by all Consultants

Using the Federated NWD that uploaded weekly in below folder  
 "03\_SUBMISSIONS > 01\_Ongoing Design Coordination > 12\_IM-Information management > Project name > 00\_Federated\_NWD"



# Clash Status Progress Report

# Weekly Clash Status Progress Report

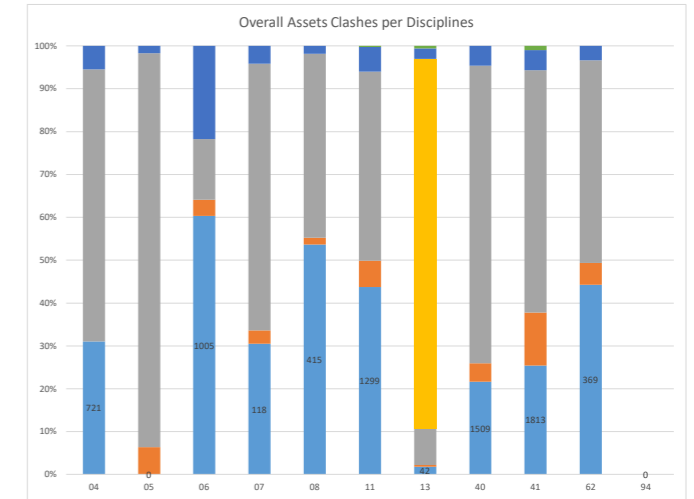
The Navisworks Clash Summary is a tool that allows you to quickly and easily get a summary of all the clashes in your project. It provides a variety of information, including the number of clashes, the types of clashes, and the severity of the clashes. You can also export the clash summary to Excel to track historical data.

The Navisworks Clash Summary is a valuable tool for identifying and resolving clashes in your project. It can help you to:

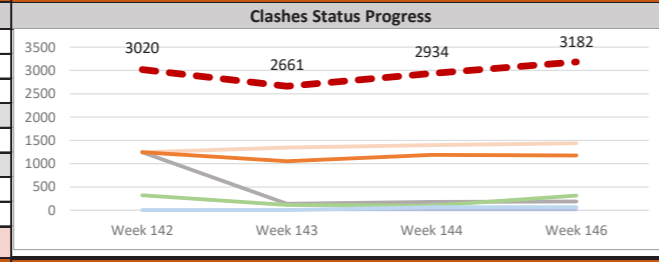
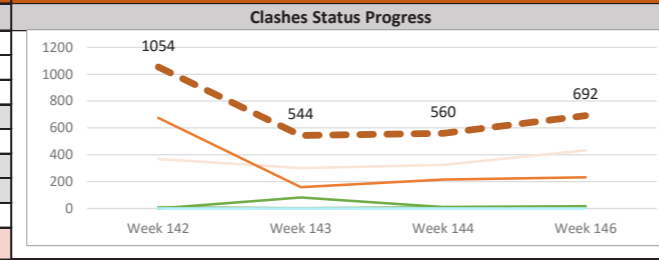
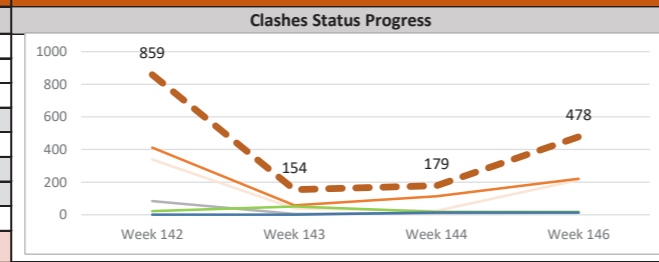
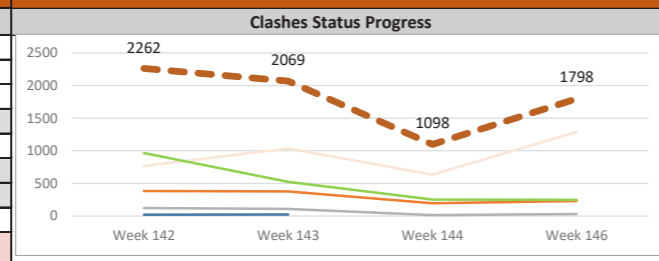
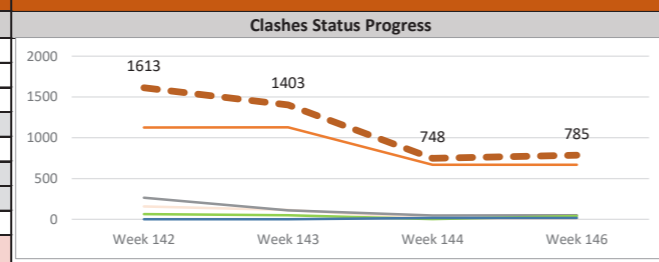
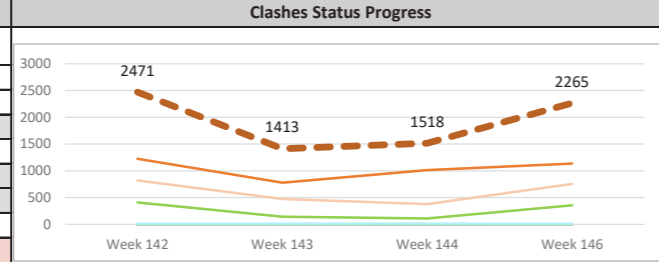
Identify the most critical clashes. The clash summary shows you the number and severity of clashes in your project. This information can help you to prioritize your work and focus on the most critical clashes first.

Weekly Clash Report Includes The Following

1. BIM Model Tracker
2. BIM Alignment Report
3. NWD Model Report
4. Clash Summary Report
5. Clash Progress Report
6. Coordination Recorded Meeting
7. Updated NWF file For the Clash resolution
8. Project Issues (Clash Issues + Design Issues) Viewpoints

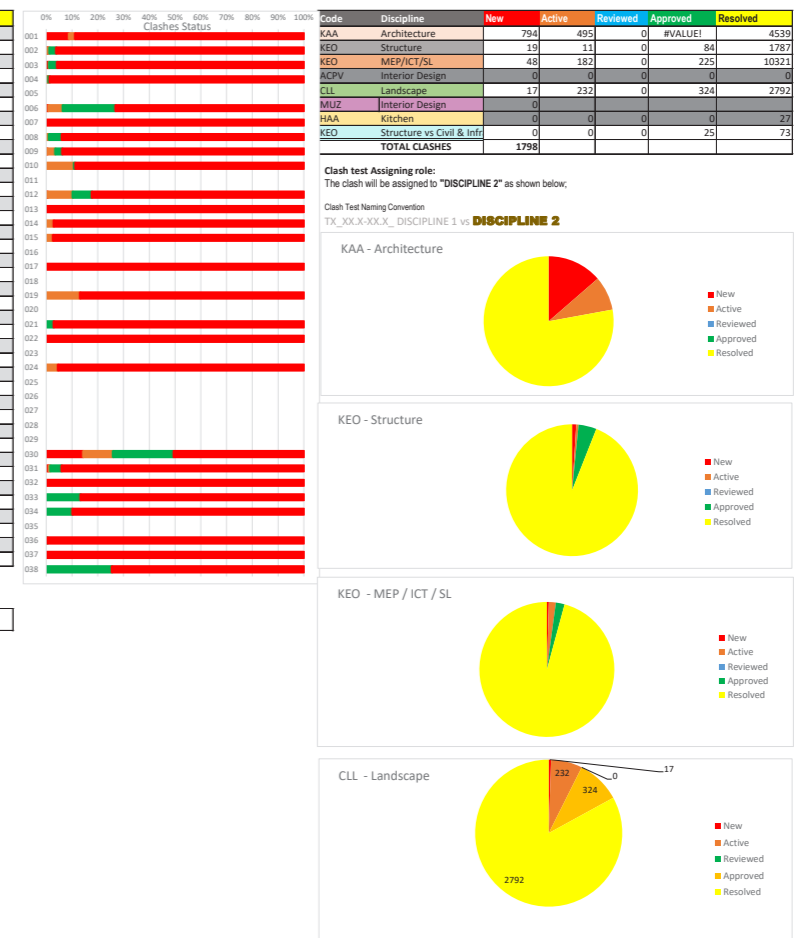


HC1_TAIL ALL ZONES					
HC1_Tail_04-Retail					
		Week 142	Week 143	Week 144	Week 146
KAA	Architecture	821	476	379	757
KEO	Structure	0	0	0	0
KEO	MEP/ICT/SL	1226	779	1013	1136
ACPV	Interior Design				
CLL	Landscape	410	144	111	358
MUZ	Interior Design				
HAA	Kitchen				
KEO	Structure vs Civil & Infra	14	14	15	14
	<b>Total</b>	<b>2471</b>	<b>1413</b>	<b>1518</b>	<b>2265</b>
HC1_Tail_05-Athletics Club					
		Week 142	Week 143	Week 144	Week 146
KAA	Architecture	158	115	11	9
KEO	Structure	265	109	47	49
KEO	MEP/ICT/SL	1125	1128	670	669
ACPV	Interior Design				
CLL	Landscape	64	50	3	41
MUZ	Interior Design				
HAA	Kitchen				
KEO	Structure vs Civil & Infra	1	1	17	17
	<b>Total</b>	<b>1613</b>	<b>1403</b>	<b>748</b>	<b>785</b>
HC1_Tail_06-Beach Club					
		Week 142	Week 143	Week 144	Week 146
KAA	Architecture	768	1037	635	1289
KEO	Structure	123	108	15	30
KEO	MEP/ICT/SL	384	377	196	230
ACPV	Interior Design				
CLL	Landscape	966	523	252	249
MUZ	Interior Design				
HAA	Kitchen				
KEO	Structure vs Civil & Infra	21	24	17	17
	<b>Total</b>	<b>2262</b>	<b>2069</b>	<b>1098</b>	<b>1798</b>
HC1_Tail_07-Activity Center					
		Week 142	Week 143	Week 144	Week 146
KAA	Architecture	339	39	24	213
KEO	Structure	84	5	10	12
KEO	MEP/ICT/SL	412	58	113	221
ACPV	Interior Design				
CLL	Landscape	23	51	18	18
MUZ	Interior Design				
HAA	Kitchen				
KEO	Structure vs Civil & Infra	1	1	14	14
	<b>Total</b>	<b>859</b>	<b>154</b>	<b>179</b>	<b>478</b>
HC1_Tail_08-Dive Center					
		Week 142	Week 143	Week 144	Week 146
KAA	Architecture	369	301	324	433
KEO	Structure	10	2	10	10
KEO	MEP/ICT/SL	675	159	216	232
ACPV	Interior Design				
CLL	Landscape	0	82	10	17
MUZ	Interior Design				
HAA	Kitchen				
KEO	Structure vs Civil & Infra	0	0	0	0
	<b>Total</b>	<b>1054</b>	<b>544</b>	<b>560</b>	<b>692</b>
HC1_Tail_11-Arrival Plaza					
		Week 142	Week 143	Week 144	Week 146
KAA	Architecture	1245	1347	1397	1437
KEO	Structure	1245	139	180	186
KEO	MEP/ICT/SL	1245	1052	1188	1173
ACPV	Interior Design				
CLL	Landscape	322	112	98	313
MUZ	Interior Design				
HAA	Kitchen	8	8	7	7
KEO	Structure vs Civil & Infra	2	3	64	66
	<b>Total</b>	<b>3020</b>	<b>2661</b>	<b>2934</b>	<b>3182</b>
HC1_Tail_13-Mice - External					



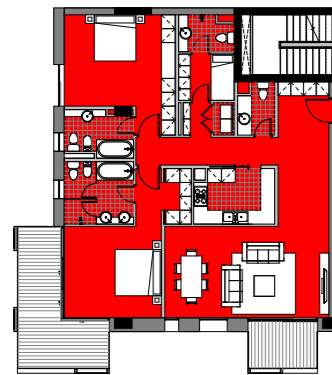
Name	Sino	Clashes	New	Active	Reviewed	Approved	Resolved
B-01-02_Architecture vs Structure	001	3268	269	74	0	745	2760
B-01-03_Architecture vs Mechanical	002	2593	15	17	0	68	2492
B-01-03_Architecture vs Plumbing	003	2048	21	3	0	62	1962
B-01-04_Architecture vs Electrical	004	1897	6	9	0	10	1872
B-01-05_Architecture vs Interior	005	0	0	0	0	0	0
B-01-06_Architecture vs Landscape	006	902	7	51	0	185	659
B-01-07_Architecture vs Kitchen & Laundry	007	11	0	0	0	0	11
B-02-03_Structure vs Mechanical	008	430	0	5	0	24	451
B-02-04_Structure vs Plumbing	009	1044	5	32	0	28	979
B-02-04_Structure vs Electrical	010	585	0	63	0	3	518
B-02-05_Structure vs Interior	011	0	0	0	0	0	0
B-02-06_Structure vs Landscape	012	1826	10	178	0	135	1503
B-02-07_Structure vs Kitchen & Laundry	013	9	0	0	0	0	9
B-03-03_Mechanical vs Plumbing	014	520	0	15	0	0	505
B-03-04_Mechanical vs Electrical	015	1067	0	28	0	0	1039
B-03-05_Mechanical vs Interior	016	0	0	0	0	0	0
B-03-06_Mechanical vs Landscape	017	59	0	0	0	0	59
B-03-07_Mechanical & Kitchen & Laundry	018	0	0	0	0	0	0
B-03-04_Plumbing vs Electrical	019	76	0	10	0	0	66
B-03-05_Plumbing vs Interior	020	0	0	0	0	0	0
B-03-06_Plumbing vs Landscape	021	68	0	0	0	2	66
B-03-07_Plumbing & Kitchen & Laundry	022	2	0	0	0	0	2
B-04-05_Electrical vs Interior	023	0	0	0	0	0	0
B-04-06_Electrical vs Landscape	024	66	0	3	0	0	62
B-04-07_Electrical & Kitchen & Laundry	025	0	0	0	0	0	0
B-05-05_Interior vs Landscape	026	0	0	0	0	0	0
B-05-07_Interior & Kitchen & Laundry	027	0	0	0	0	0	0
B-06-07_Landscape & Kitchen & Laundry	028	0	0	0	0	0	0
Discipline to Discipline		0	0	0	0	0	0
B-01-01_Architecture vs Architecture	030	3642	525	421	0	857	1839
B-02-02_Structure vs Structure	031	1901	19	11	0	84	1787
B-03-03_Mechanical vs Mechanical	032	220	0	0	0	0	219
B-03-03_Plumbing vs Plumbing	033	150	0	0	0	20	130
B-04-04_Electrical vs Electrical	034	99	0	0	0	10	88
B-05-05_Interior vs Interior	035	0	0	0	0	0	0
B-06-06_Landscape vs Landscape	036	445	0	0	0	2	443
B-07-07_Kitchen & Laundry vs Kitchen & Laundry	037	5	0	0	0	0	5
B-02-01_Structure vs Civil & Infrastructure	038	98	0	0	0	25	73

TOTAL NO OF ACTIVE CLASHES 1798

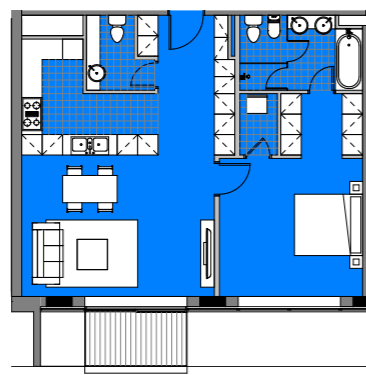


# BIM Data Presentation

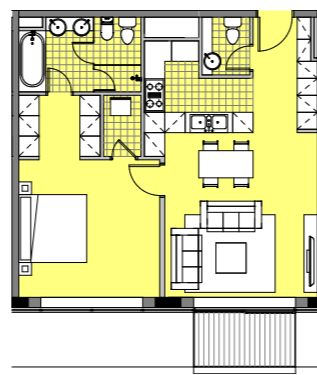
Overall, Revit is a powerful tool that can be used to color rooms in a variety of ways. The benefits of using Revit for coloring rooms include accuracy, consistency, efficiency, customization, and communication.



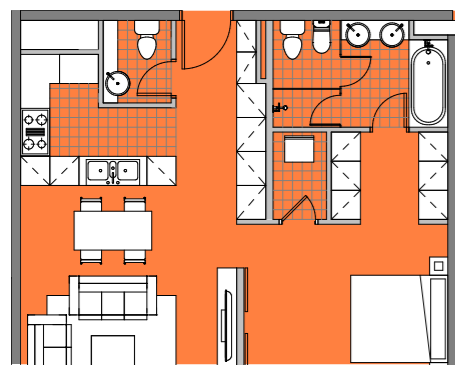
Unit-A



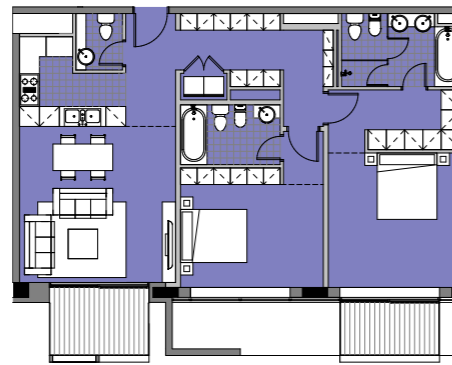
Unit-B



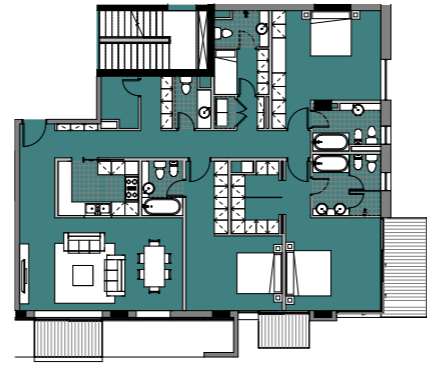
Unit-C



Unit-D



Unit-E



Unit-F

## «experts in a wide range of software»

“We are committed to providing our clients with the best possible software solutions.”

“We are a team of experienced and qualified software professionals who are dedicated to providing our clients with the highest level of service.”

## «Engineering BIM software»

## «Rendering Solution software»

## «Communication software»

## «Analysis software»

## «Project Management software»

## «Structural Analysis software»

## «MEP Analysis software»





**03.01 - PROJECT CASE STUDY**

A project case study is a detailed examination of a specific project or system. It is a piece of content that sheds light on the challenges faced, solutions adopted, and the overall outcomes of a project.

**03.02 - MY PROJECT WORK SAMPLES**

emphasizes the importance of the projects that are being highlighted.

**03.01 - PROJECT CASE STUDY**

emphasizes the importance of the projects that are being highlighted.

**BIM Section**

Updated Project 2023

```

var check = function() {
  //the appear event when appropriate
  //is the element hidden?
  if (!t.is(':visible')) {
    //it became hidden
    t.appeared = false;
    return;
  }

  //is the element inside the visible window?
  var a = w.scrollLeft();
  var b = w.scrollTop();
  var o = t.offset();
  var x = o.left;
  var y = o.top;

  var ax = settings.accX;
  var ay = settings.accY;
  var th = t.height();
  var wh = w.height();
  var tw = t.width();
  var ww = w.width();

  if (y + th + ay >= b &&
      y <= b + wh + ay &&
      x + tw + ax >= a &&
      x <= a + ww + ax) {

    //trigger the custom event
    if (!t.appeared) t.trigger('appear', set

  } else {

    //it scrolled out of view
    t.appeared = false;
  }
};

//create a modified fn with some additional log
var modifiedFn = function() {
  //mark the element as visible
  t.appeared = true;

  //is this supposed to happen only once?
  if (settings.one) {
    //remove the check
    w.unbind('scroll', check);
    var i = $.inArray(check, $.fn.appear.ch
    if (i >= 0) $.fn.appear.checks.splice(i

  }

  //trigger the original fn
  fn.apply(this, arguments);
};

```





Technical Engineering  
section

Updated Project 2023

03.01 - PROJECT CASE STUDY

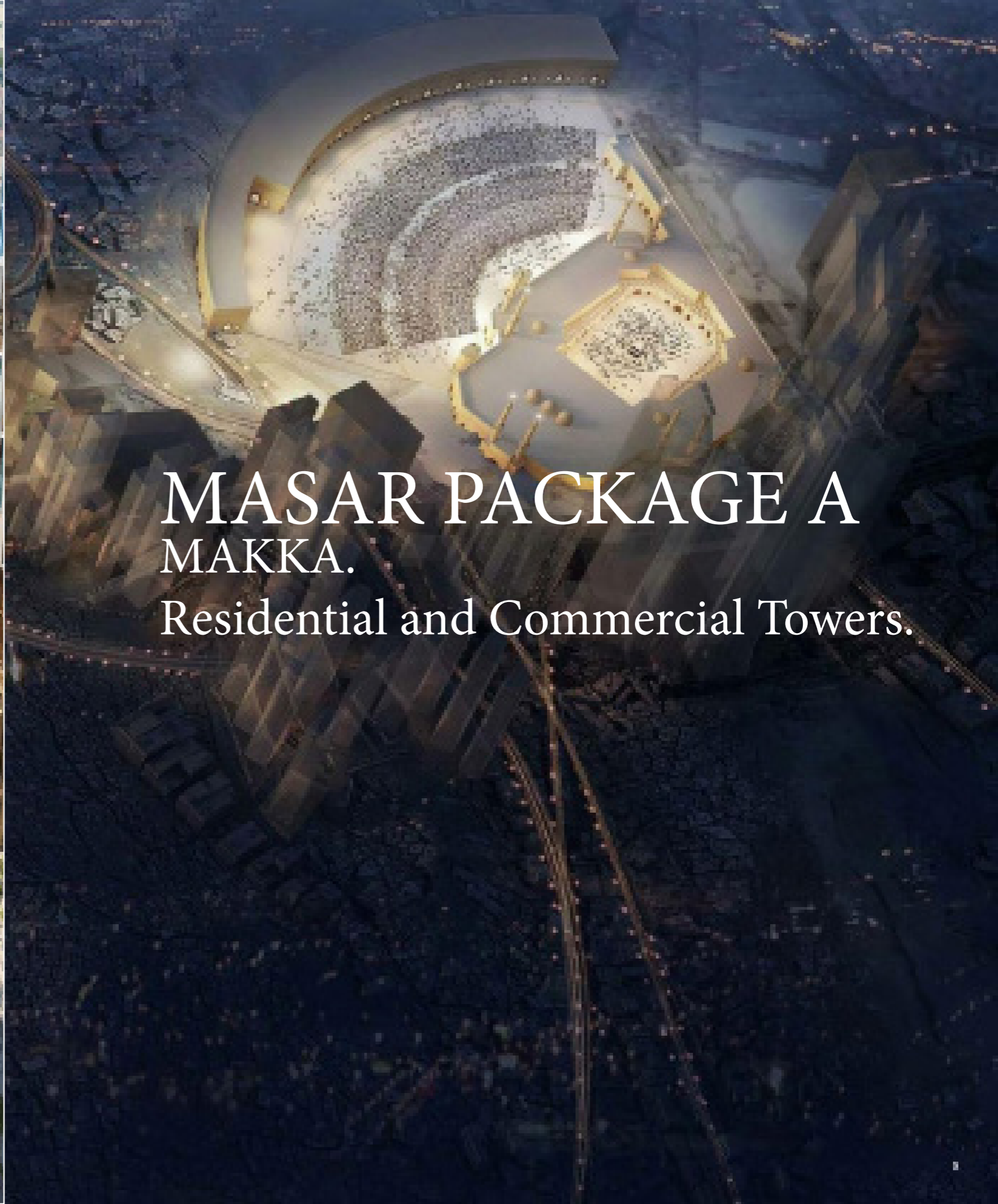
A project case study is a detailed examination of a specific project or system. It is a piece of content that sheds light on the challenges faced, solutions adopted, and the overall outcomes of a project.

03.02 - MY PROJECT WORK SAMPLES

emphasizes the importance of the projects that are being highlighted.

03.01 - PROJECT CASE STUDY

emphasizes the importance of the projects that are being highlighted.



MASAR PACKAGE A  
MAKKA.  
Residential and Commercial Towers.





Convert the 3D shots to a BIM format. The first step is to convert the 3D shots to a BIM format. This can be done using a variety of software programs, such as Autodesk Revit or Bentley Systems AECOSim Building Designer.

Create the building shell. The next step is to create the building shell. This is the basic structure of the building, including the walls, roof, and floors. The building shell can be created by tracing the 3D shots or by using a template.

Add architectural elements. Once the building shell has been created, architectural elements, such as windows, doors, and columns, can be added. Architectural elements can be created from scratch or by using libraries of pre-built elements.

Add engineering elements. Engineering elements, such as HVAC systems, electrical systems, and plumbing systems, can also be added to the BIM model. Engineering elements can be created from scratch or by using libraries of pre-built elements.

Coordinate the different disciplines. Once the architectural and engineering elements have been added to the BIM model, the team needs to coordinate the different disciplines involved in the project. This is to ensure that all of the different components of the building fit together seamlessly.



# “Archmetrics Team-Convert 3D shot to BIM Model.

conversion of 3D shots of Omrania Architecture Design into a 3D BIM model with full coordination between the different disciplines involved in the project is a significant achievement. It demonstrates the team's expertise in BIM technology and their ability to collaborate effectively with different stakeholders. The 3D BIM model will be a valuable tool for the construction and engineering team. It will allow them to visualize the building in detail, identify potential conflicts, and coordinate the different disciplines involved in the project. This will help to ensure that the building is constructed efficiently and accurately.

The 3D BIM model will also be a valuable asset for the building owner. It can be used to manage the building throughout its lifecycle, from construction to operation and maintenance. The model can be used to generate facility management plans, track maintenance schedules, and identify areas for energy efficiency improvements. Overall, Archmetrics Team's conversion of 3D shots of Omrania Architecture Design into a 3D BIM model with full coordination between the different disciplines involved in the project is a valuable contribution to the construction industry. It demonstrates the power of BIM technology to improve the efficiency and quality of the construction process. Here are some of the specific benefits of using a 3D BIM model with full coordination between the different disciplines involved in the project:

- Improved communication and collaboration: The 3D BIM model provides a single platform for all stakeholders to communicate and collaborate on the project. This can help to reduce misunderstandings and errors.

- Reduced errors and omissions: The 3D BIM model can be used to identify and correct potential errors and omissions early in the design process. This can help to save time and money during construction.
- Increased efficiency: The 3D BIM model can be used to streamline the construction process. For example, it can be used to generate construction schedules and to coordinate the delivery of materials.
- Improved quality: The 3D BIM model can be used to ensure that the building is constructed to the highest quality standards. For example, it can be used to check





Archmetrics Created Full Detailed Models For the ID including the RCP Designs and Flooring Design With Coordination of the spaces and Architecture Needs this process for creating and managing digital representations of physical and functional characteristics of places. BIM can be used for interior design projects to improve the coordination between interior designers, architects, and MEP engineers. Overall, BIM is a valuable tool for interior design projects. It can help to improve communication and collaboration, reduce errors and omissions, increase efficiency, improve quality, and reduce costs. beside Furniture selection and placement: BIM can be used to select and place furniture in the interior space. This can help to create a visually appealing and functional space.

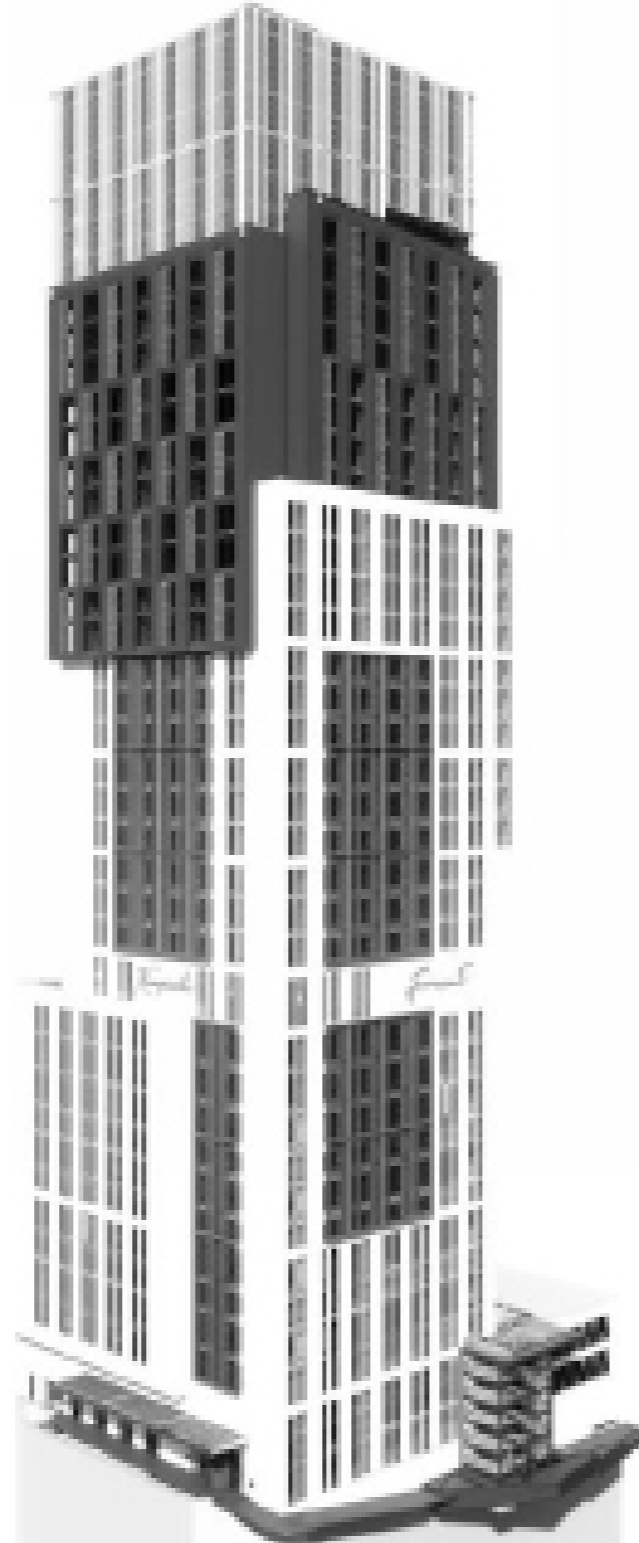




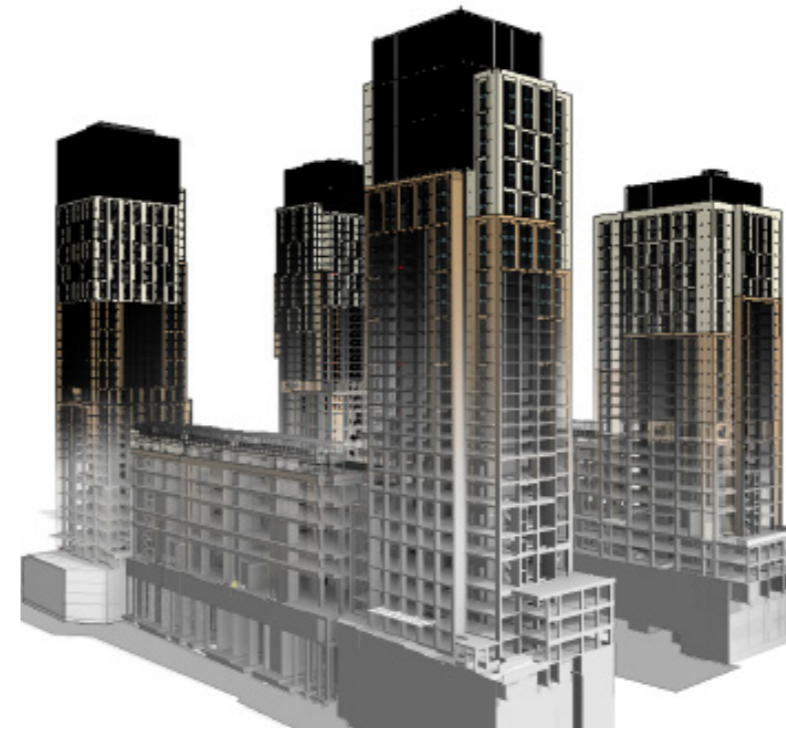
Facade model details, shop drawings, and documentation are all important aspects of the facade design and construction process.

Facade model details are the specific information about the facade design that is needed to fabricate and install the facade. This information typically includes Dimensions and tolerances, Material specifications, Fabrication details, Installation details.

Shop drawings are detailed drawings of the facade that are created by the fabricator. Shop drawings are used to ensure that the facade is fabricated correctly and that it will fit and function properly when installed.



Facade documentation is a set of drawings and specifications that describe the facade design in detail. Façade documentation is used by the architect, contractor, and fabricator to communicate the design intent and to ensure that the facade is constructed correctly. How facade model details are used to create shop drawings and documentation. Facade model details are used to create shop drawings and documentation in a variety of ways. In some cases, the fabricator may use the facade model directly.



full description of our BIM project details and architecture in Saudi Arabia, showing our scope of work as BIM coordination and the creation of a full package of coordinated architectural drawings and schedules.

Saudi Arabia is currently experiencing a period of rapid construction growth, with a number of major projects underway across the country. This growth is being driven by the government's Vision 2030 initiative, which aims to diversify the economy and reduce the country's reliance on oil.

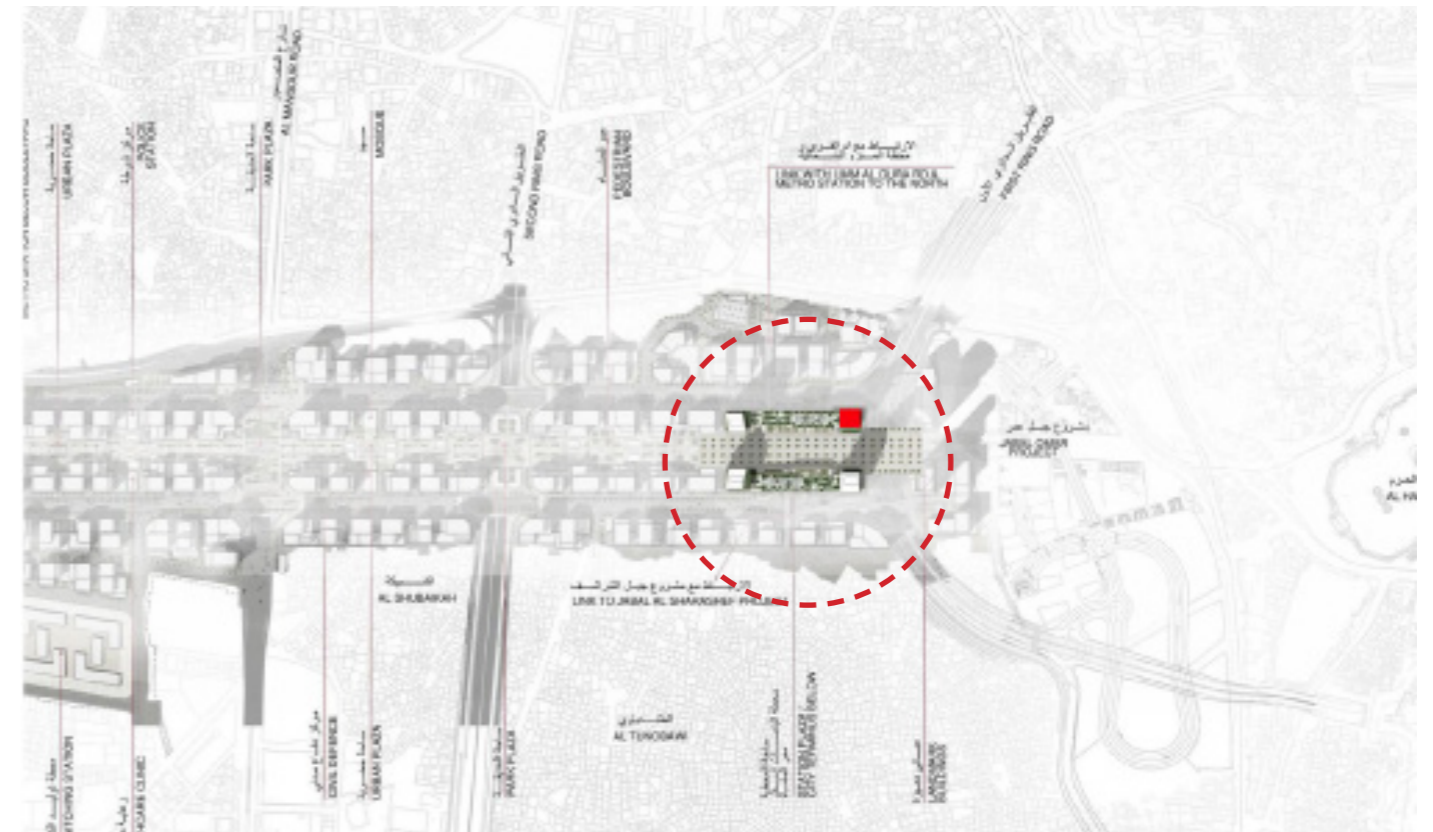
BIM is playing an increasingly important role in the Saudi Arabian construction industry, as it offers a number of benefits, including improved communication and coordination between project stakeholders, reduced errors and omissions, and increased efficiency and productivity.

Our scope of work for this project includes: BIM coordination: We will use BIM software to identify and resolve conflicts between different disciplines, such as architecture, engineering, and construction (AEC).

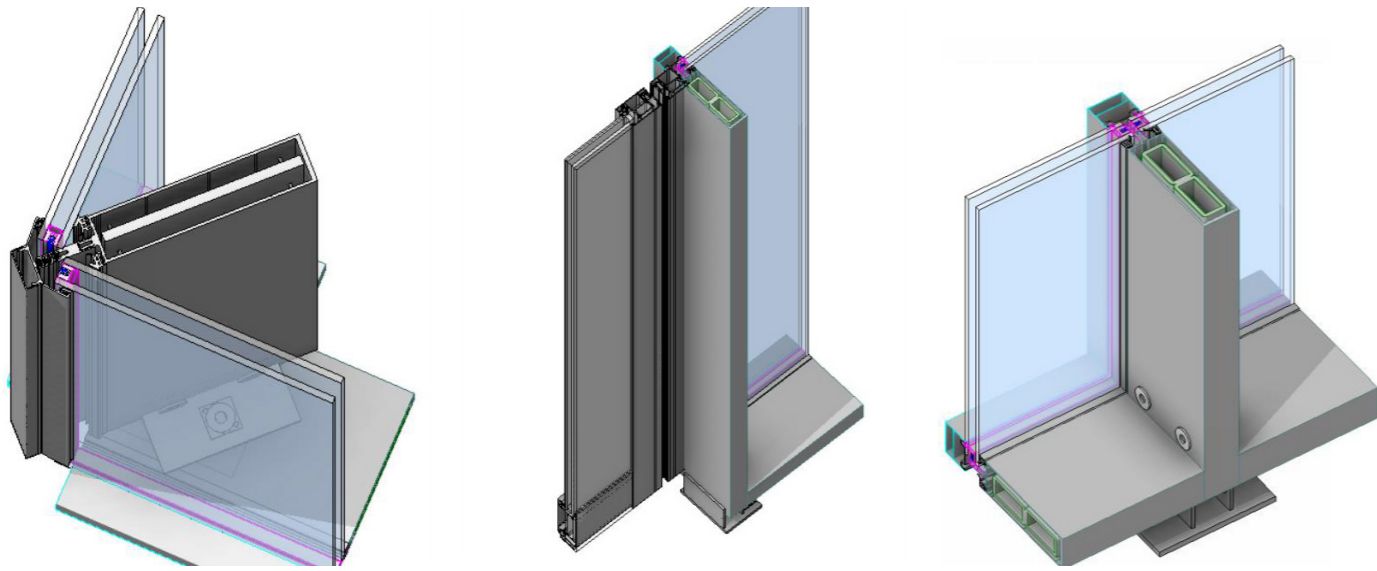
Creation of a full package of coordinated architectural drawings and schedules: Once all of the conflicts have been resolved, we will use the BIM model to generate a full package of coordinated architectural drawings and schedules.

Benefits of BIM Coordination for Architectural Drawings and Schedules

BIM coordination offers a number of benefits for architectural drawings and schedules, including:  
 Improved accuracy and consistency: BIM coordination helps to ensure that the architectural drawings and schedules are accurate and consistent with each other.  
 Reduced errors and omissions: BIM coordination helps to identify and resolve conflicts early on, which reduces the risk of errors and omissions in the drawings and schedules.  
 Increased efficiency and productivity: BIM coordination helps to streamline the process of creating and updating the architectural drawings and schedules.







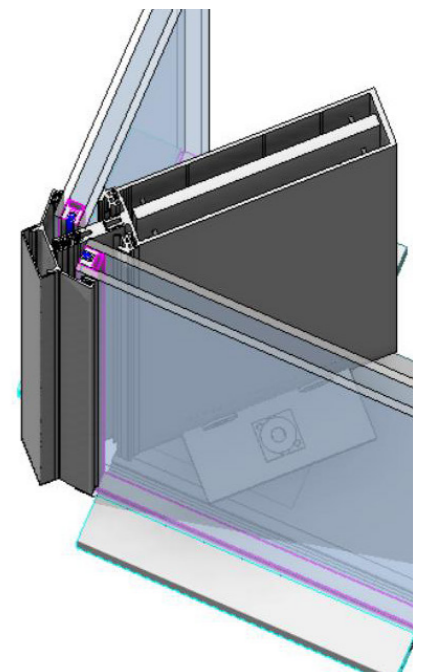
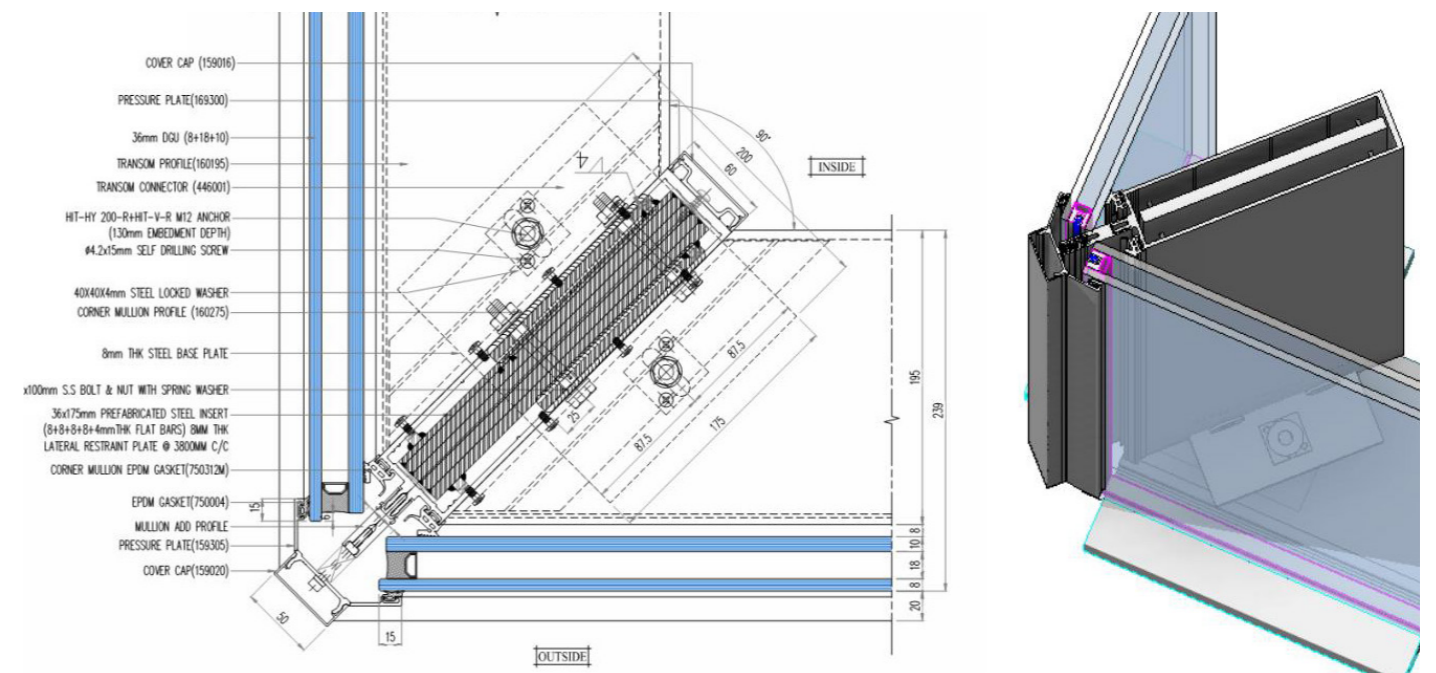
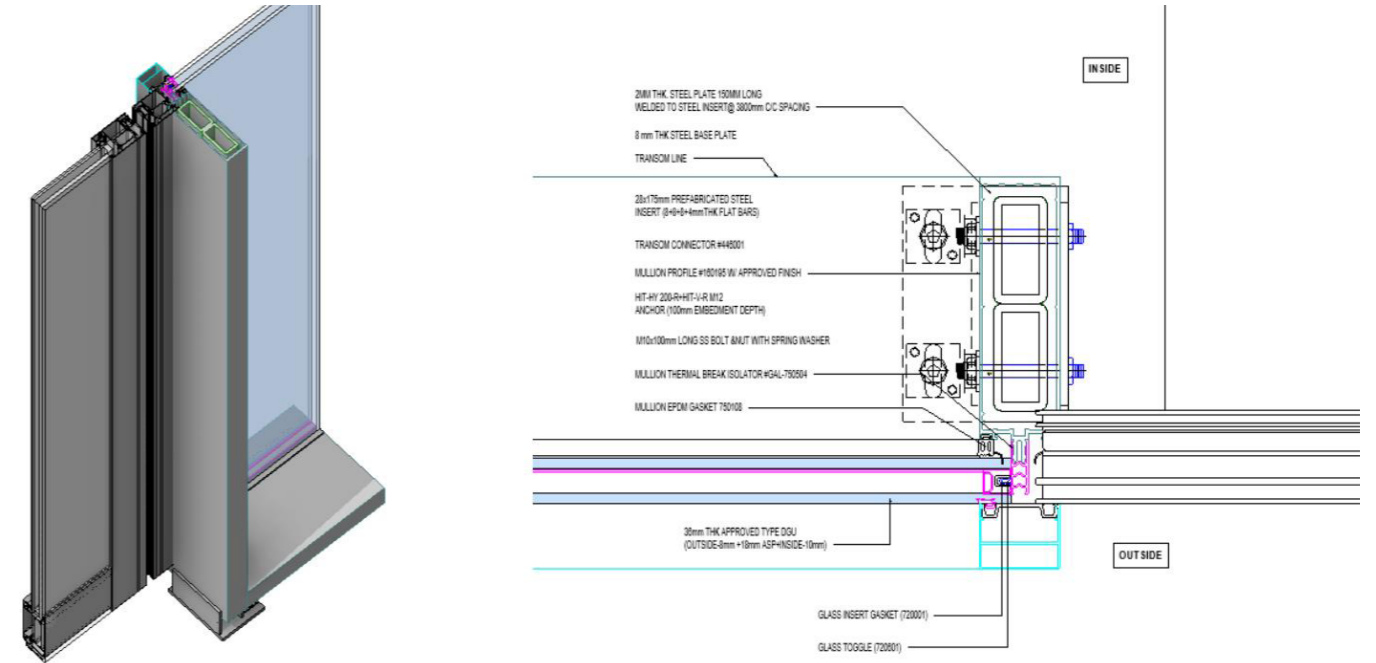
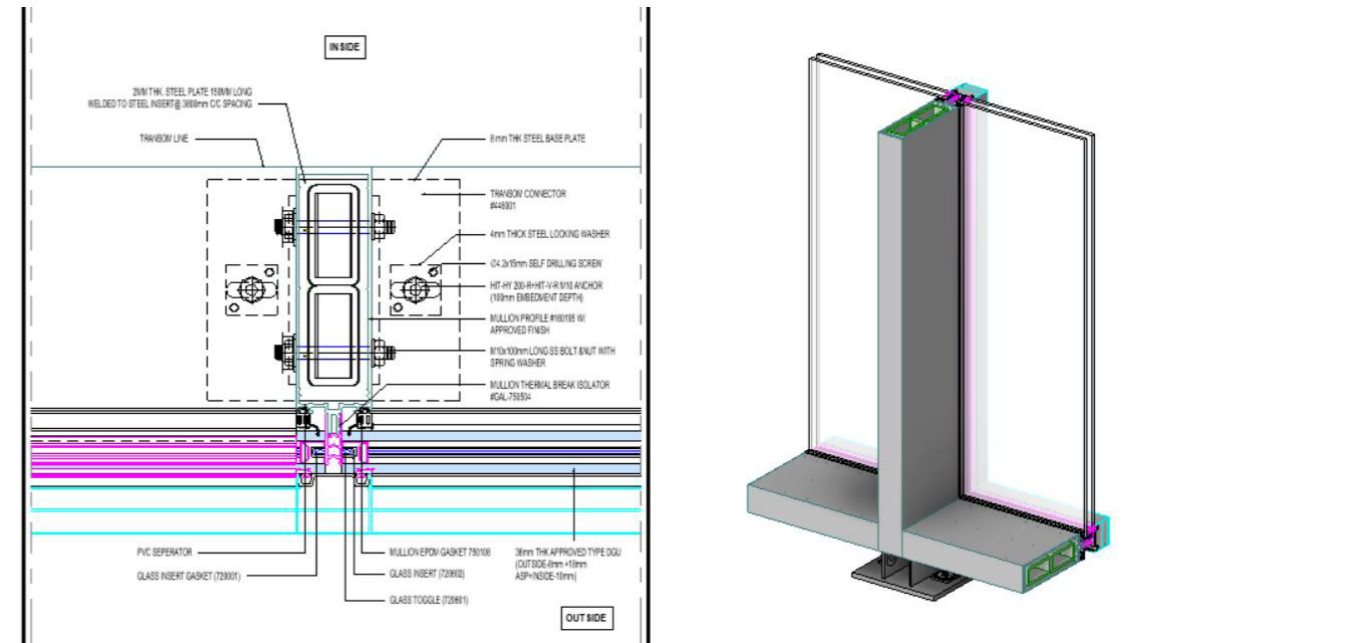
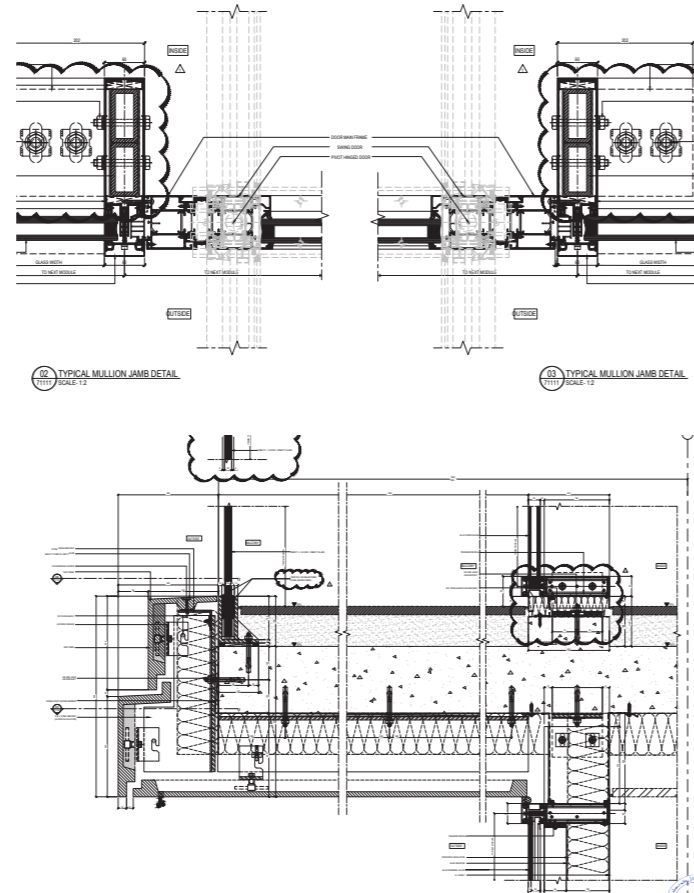
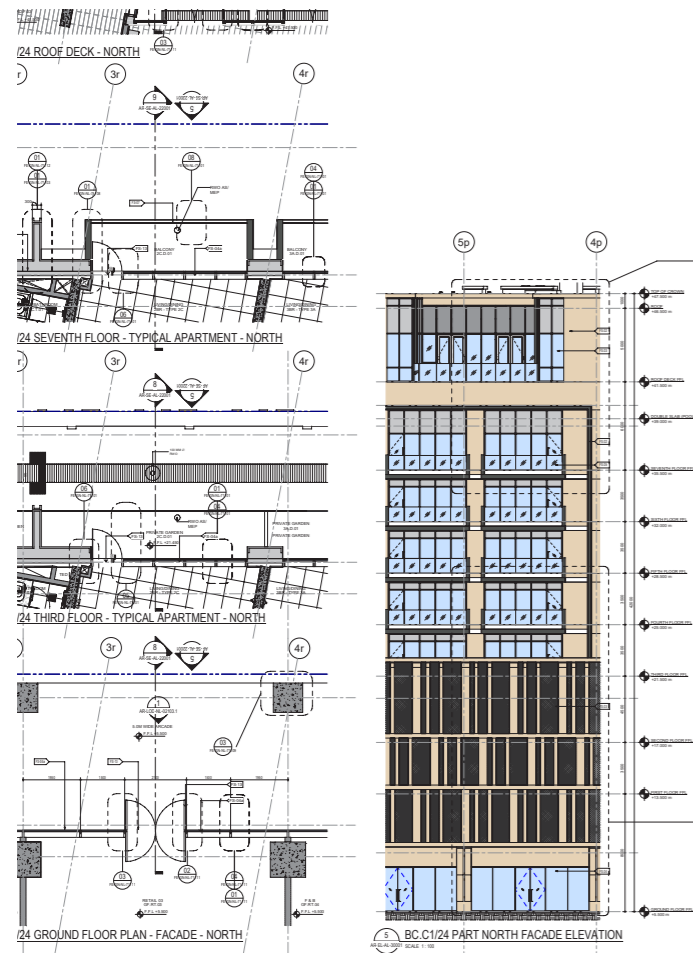
## MIXED USE BUILDINGS COMMERCIAL BOULEVARD

2020 - Qatar - Lusail

Lusail Commercial Boulevard is located within the boundaries of Qatar's self-contained and comprehensively planned urban development, Lusail City. Situated just to the north of the capital Doha and stretching along a 1.3 kilometer long road featuring **18 spacious buildings**, Lusail Commercial Boulevard has been designed to be the biggest integrated commercial street development in the Arabian Gulf. Spanning the main gateway to the bustling center of Lusail City, Commercial Boulevard district will serve as its key business hub. As the location of one of the official fan zone areas for the 2022 World Cup

No. Buildings = 18 Buildings & Stage = Facade Shop Drawings

# Revit - Navisworks - #ALMANA - #KEO - BIM Coordinator - Shop Drawings - Details.

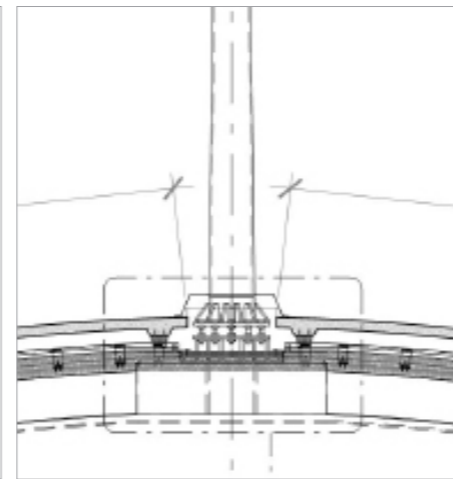
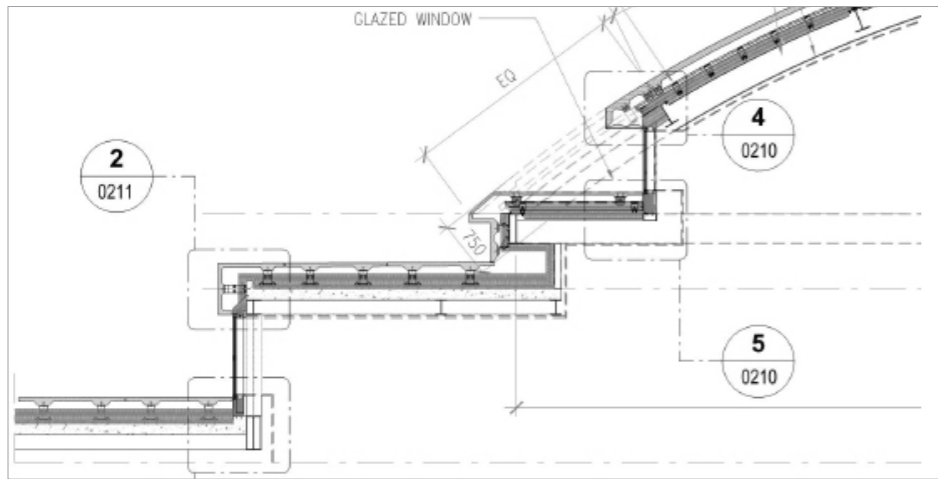
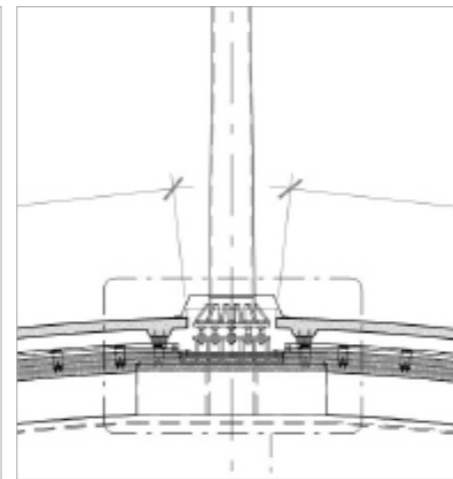
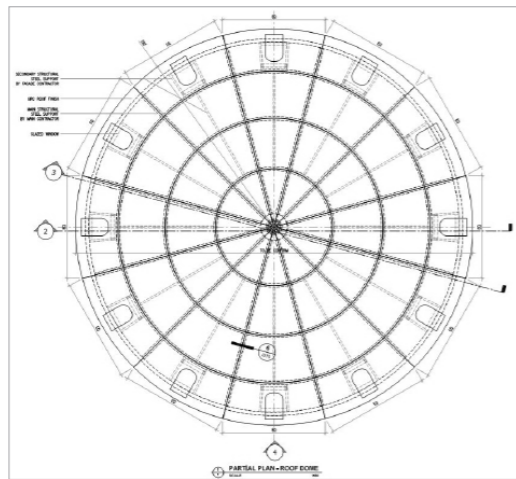
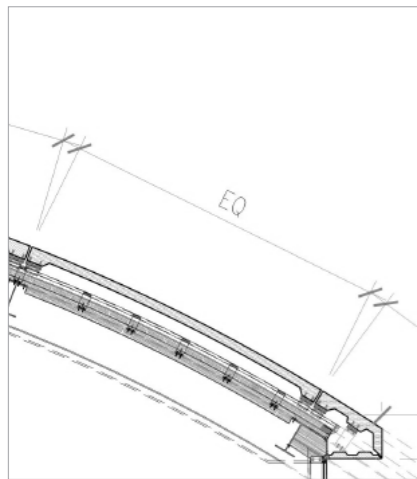
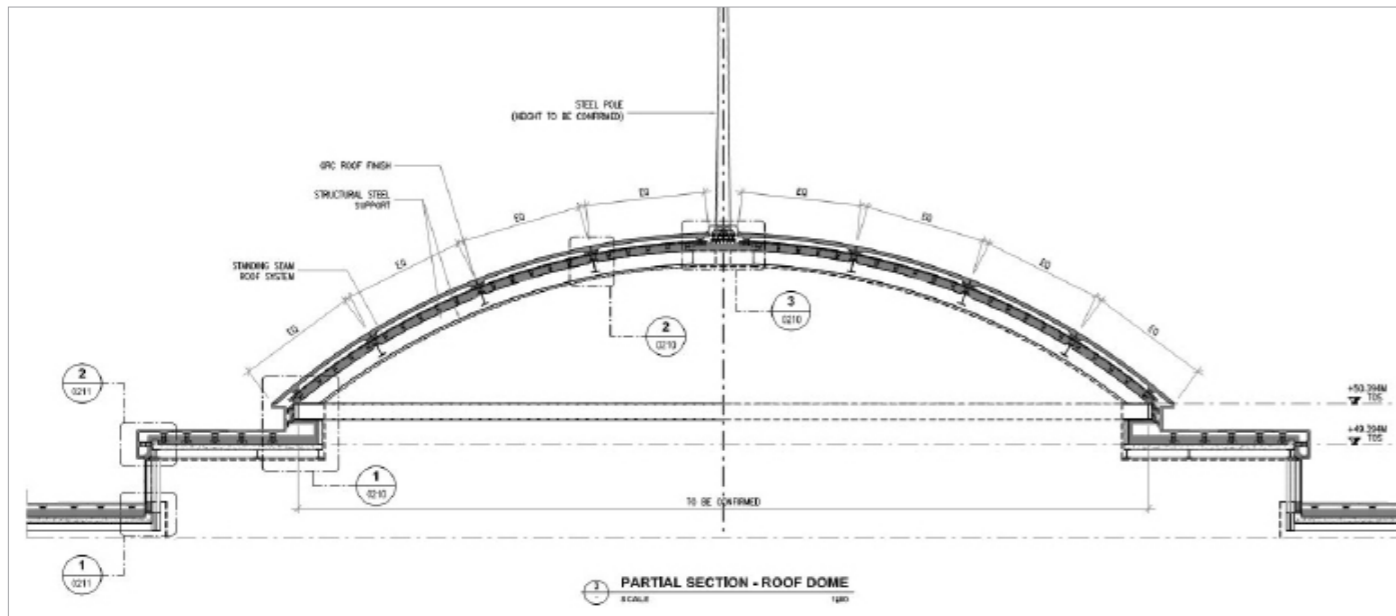






KINGDOM OF SAUDI ARABIA  
MINISTRY OF INTERIOR  
Ministry Buildings





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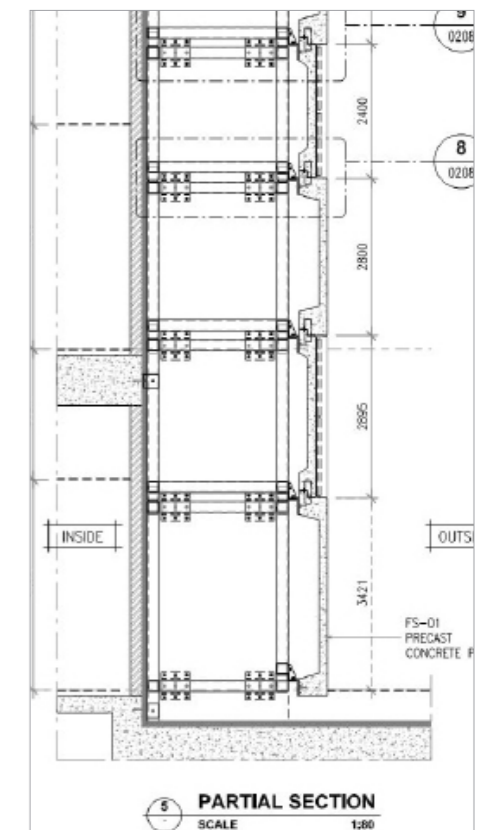
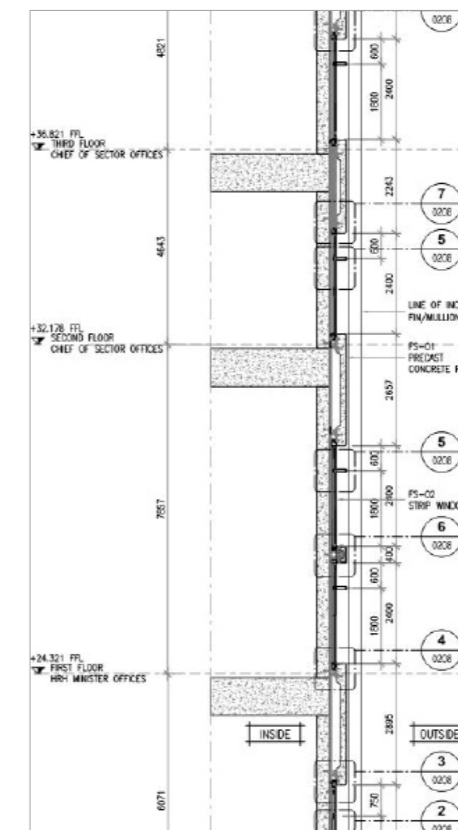
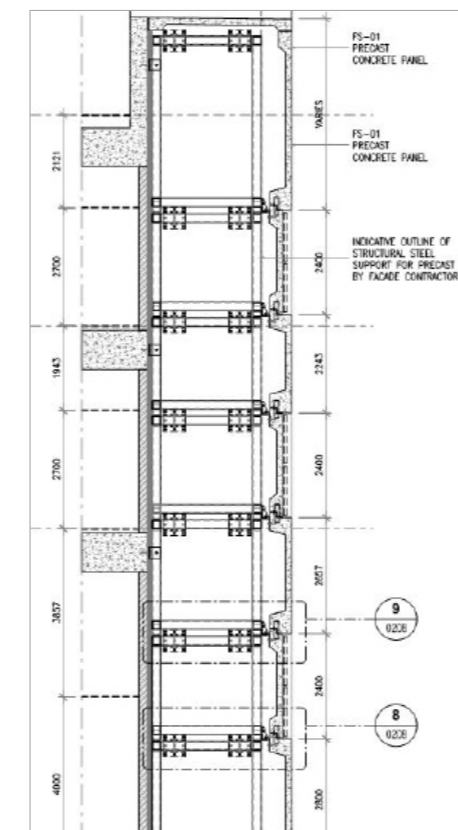
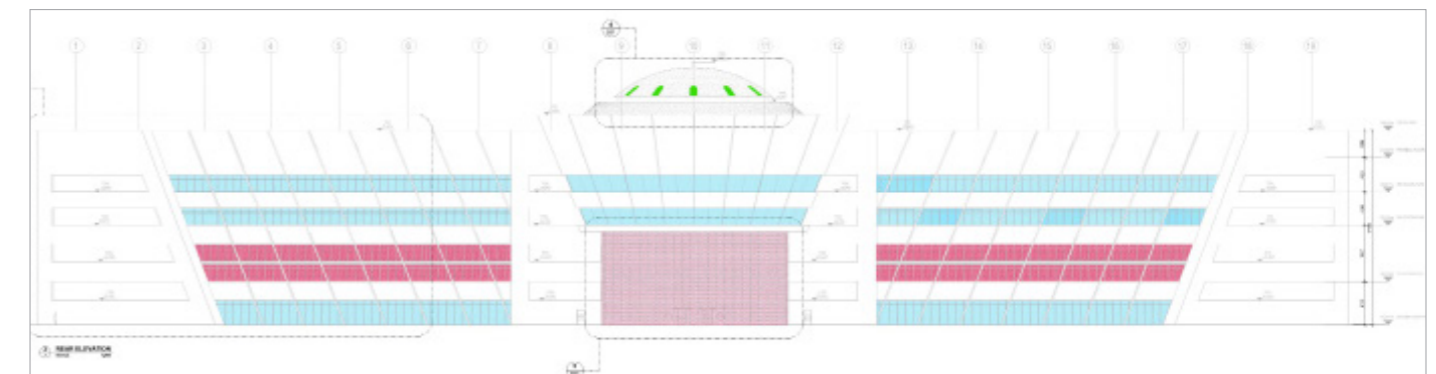
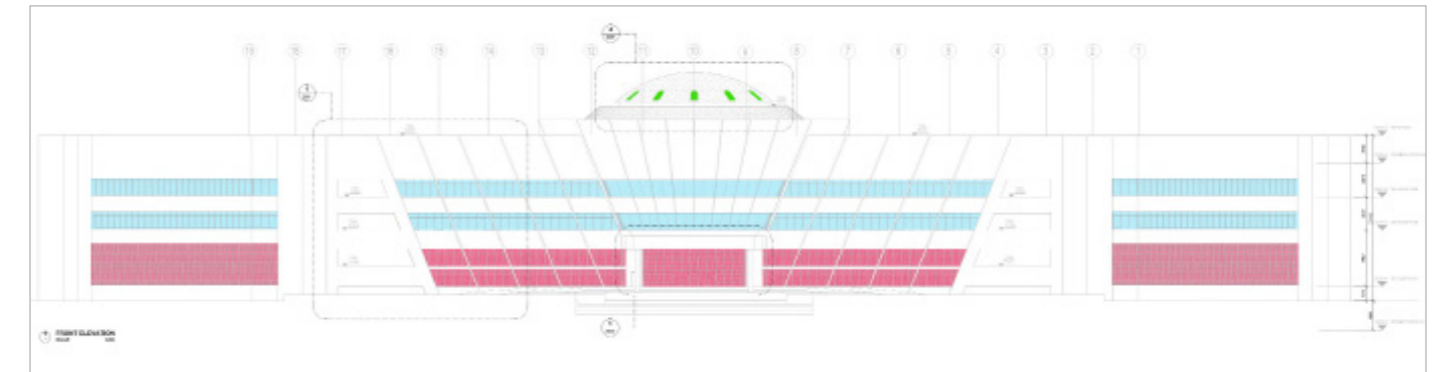
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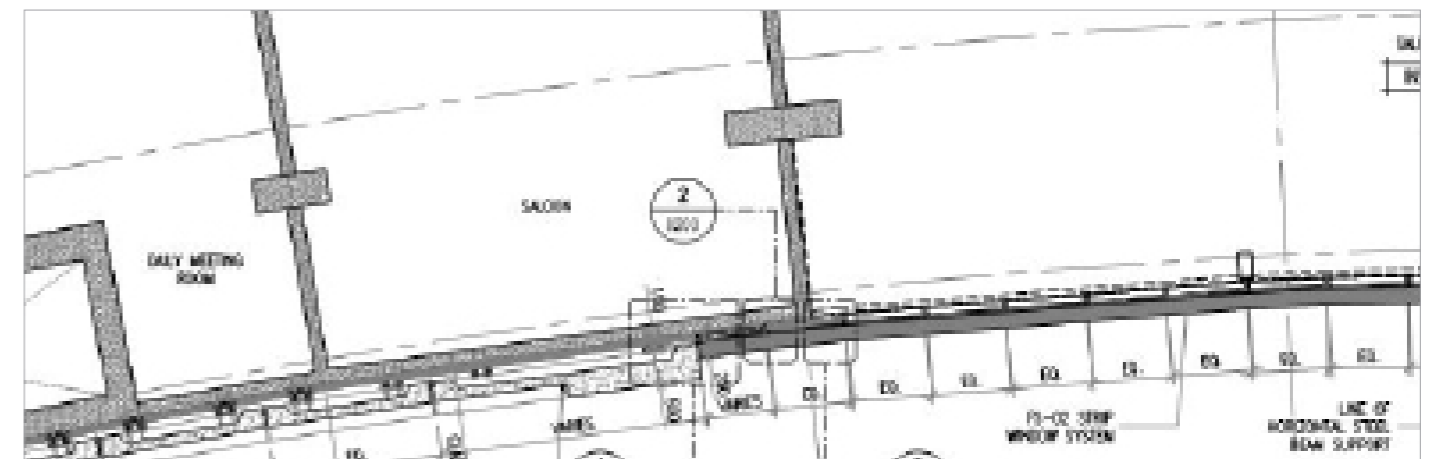
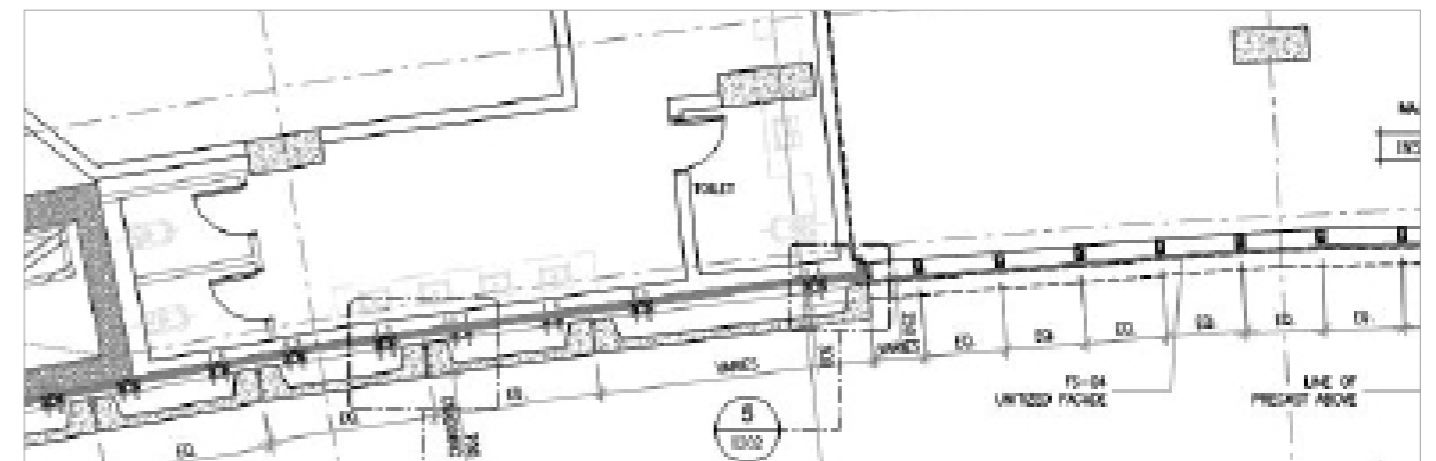
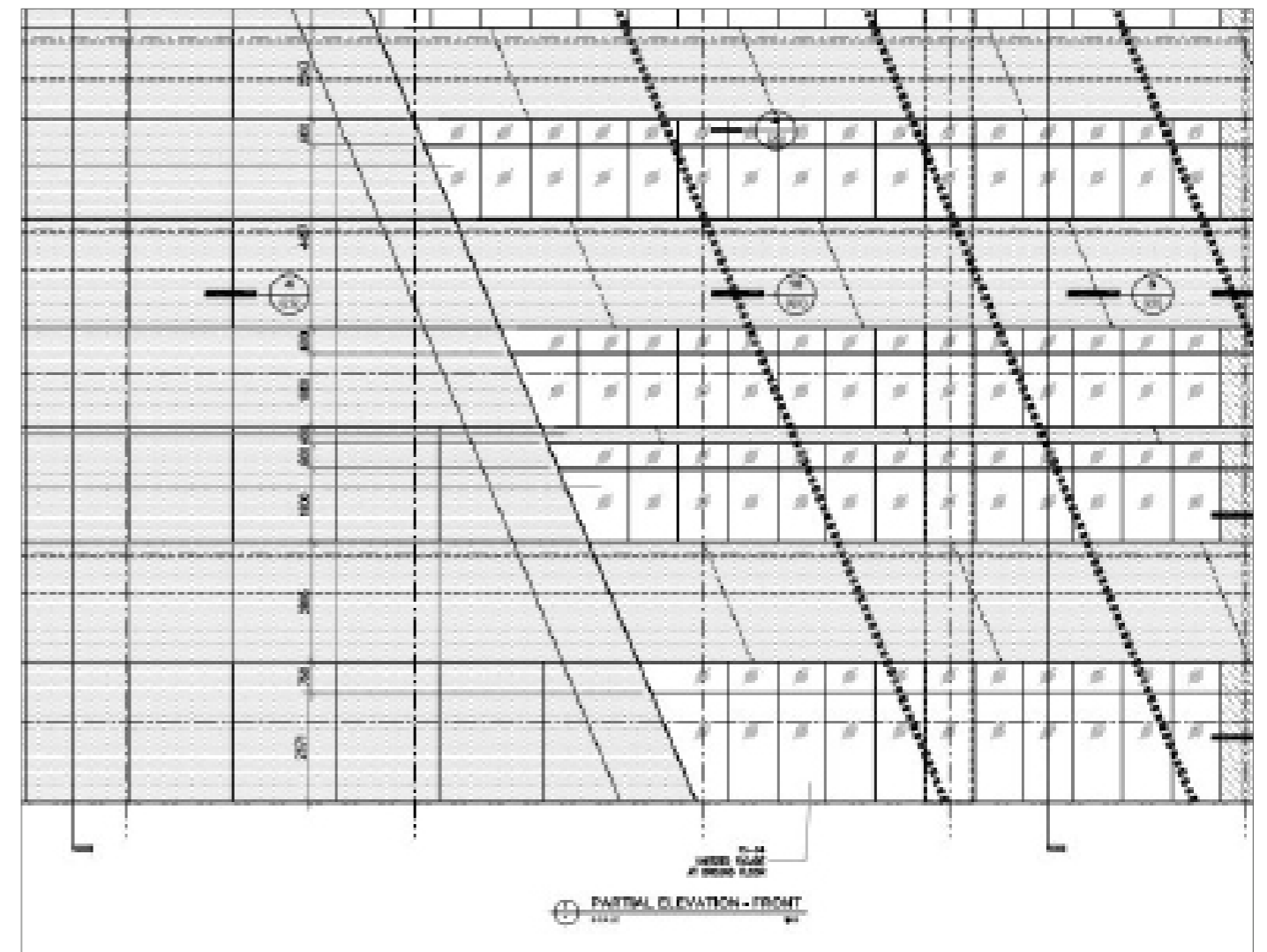
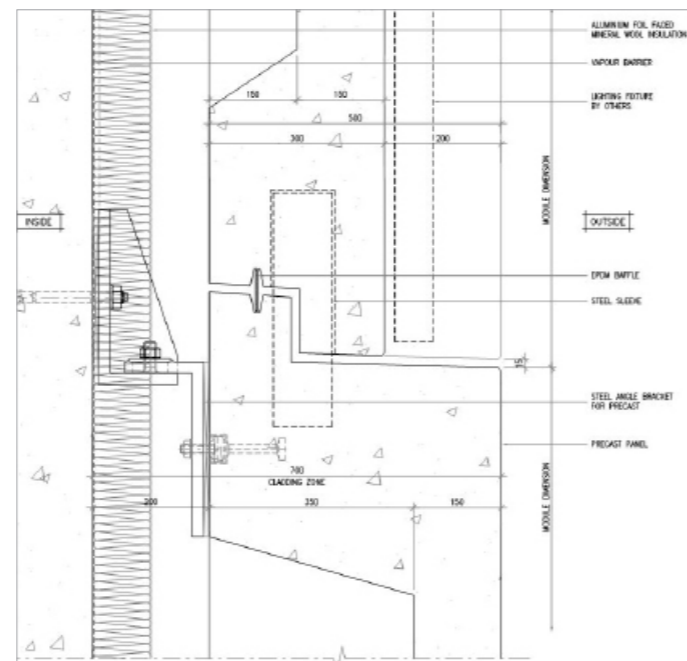
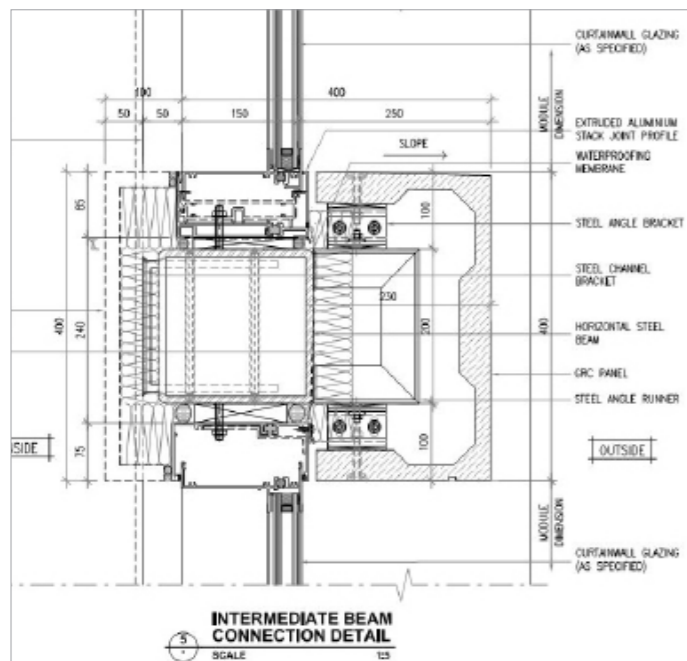
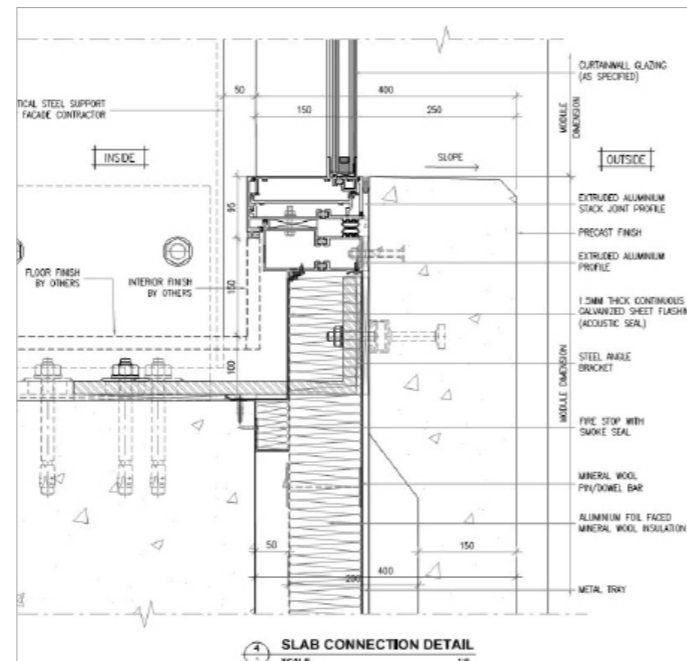
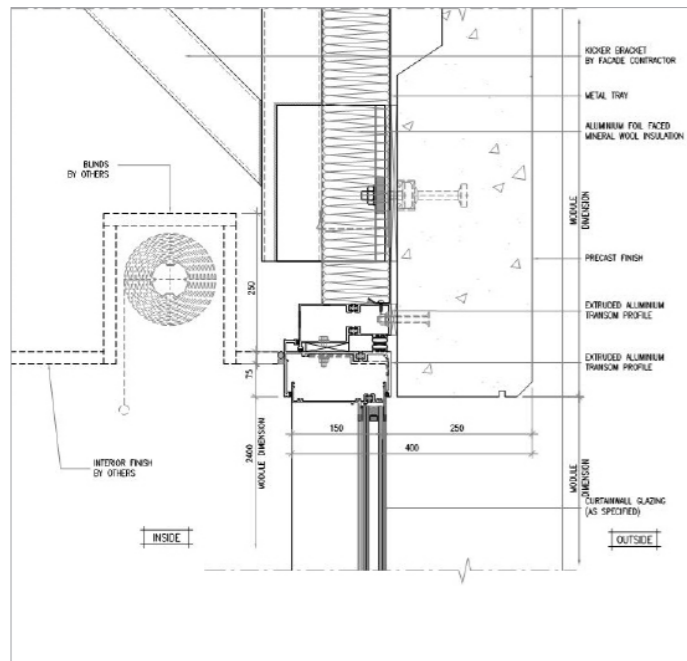
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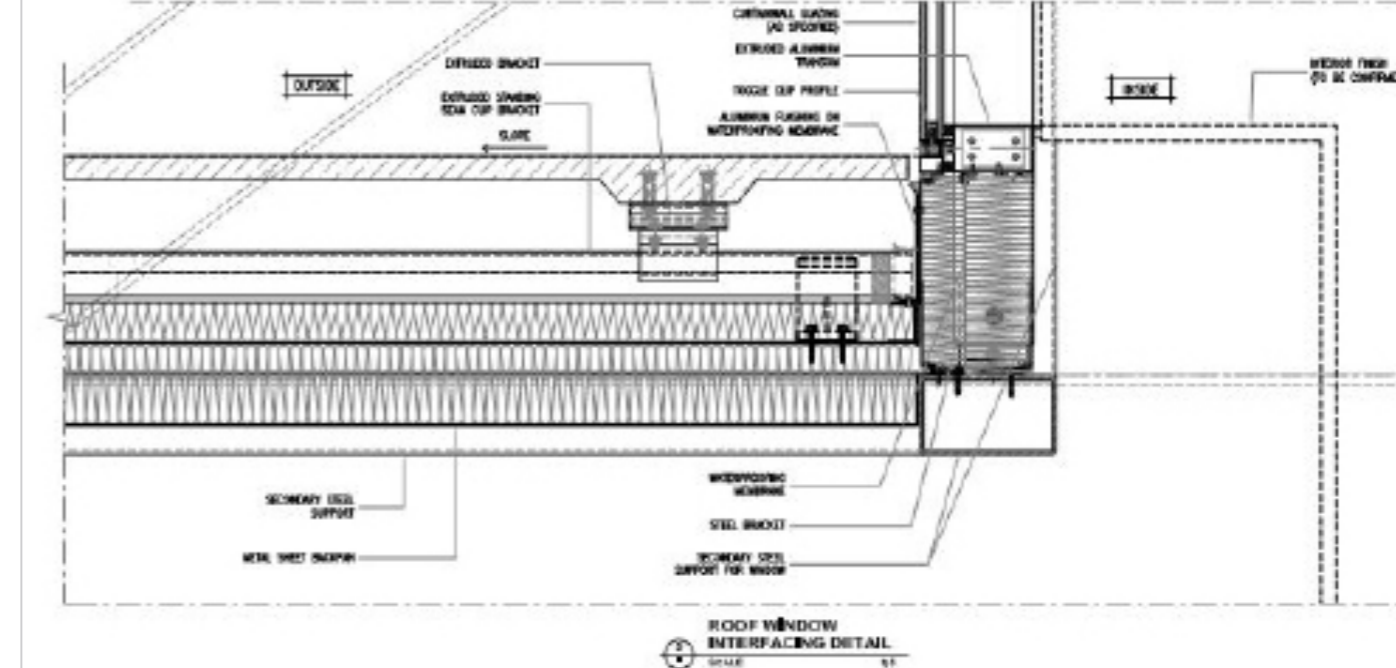
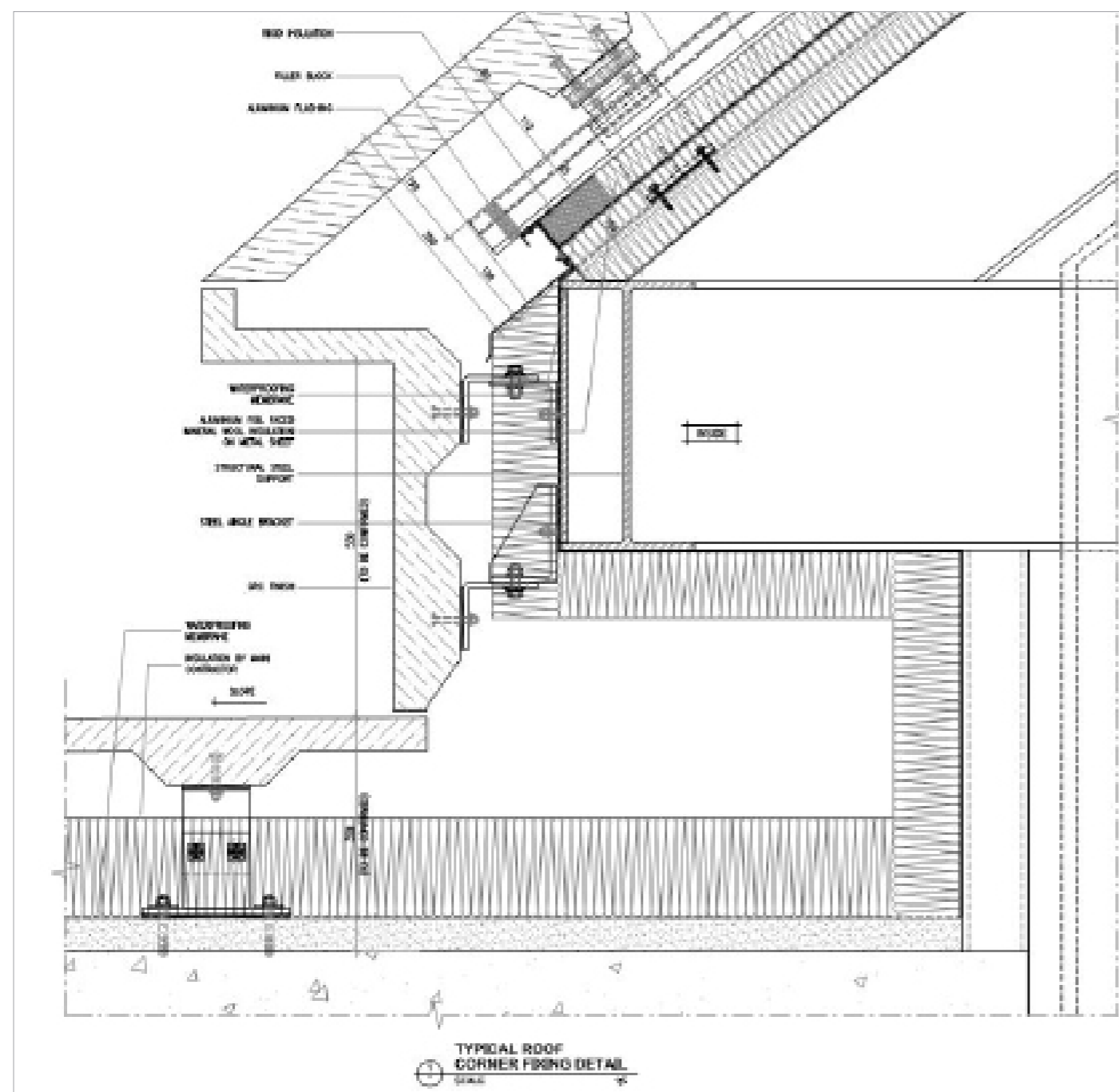
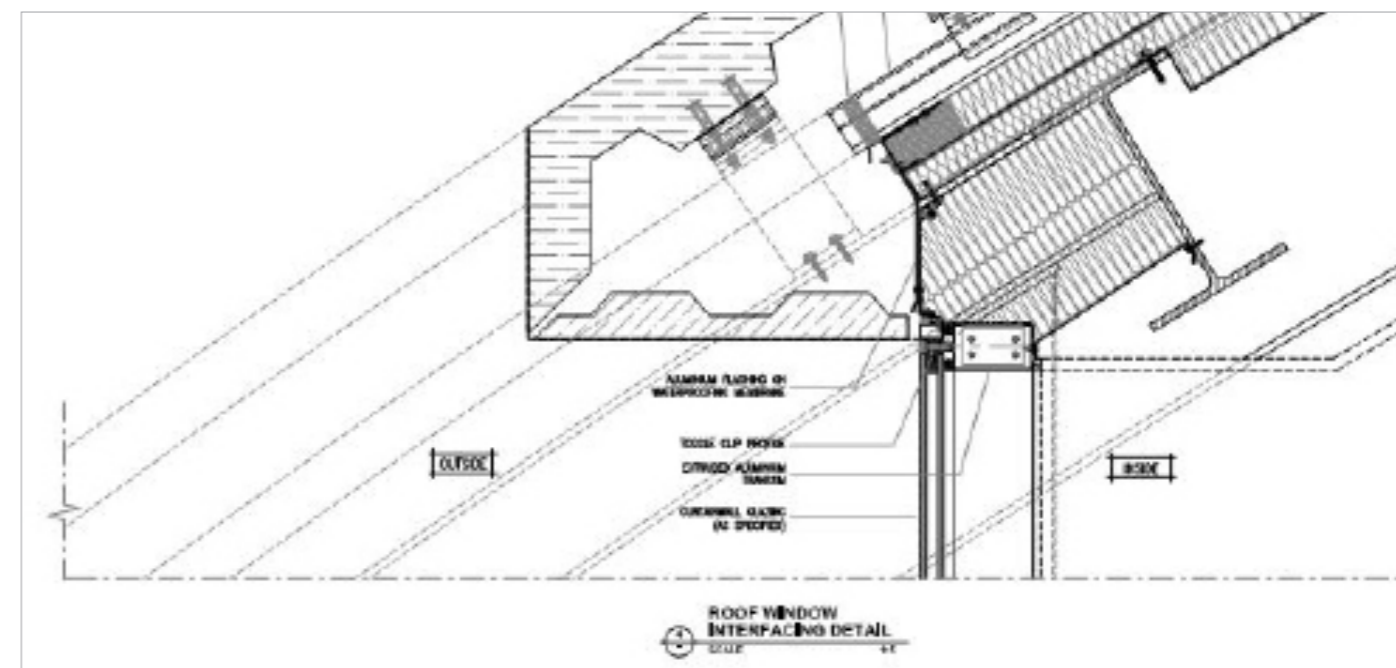
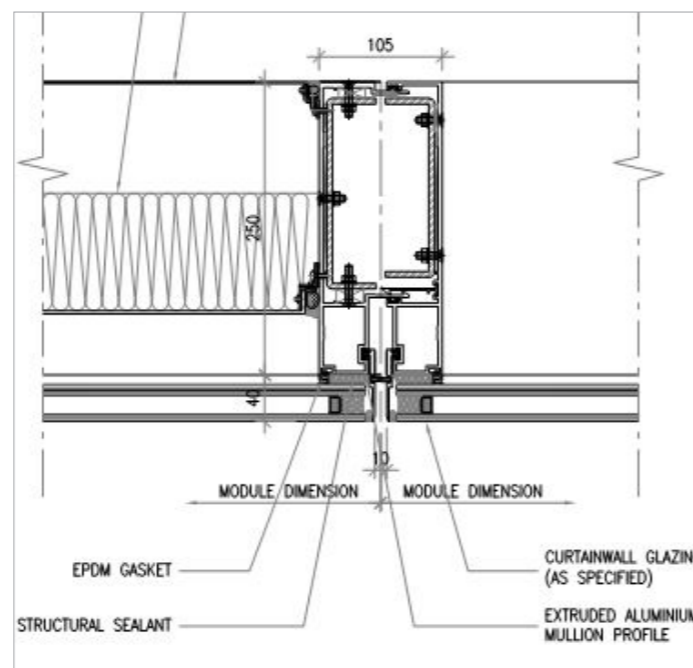


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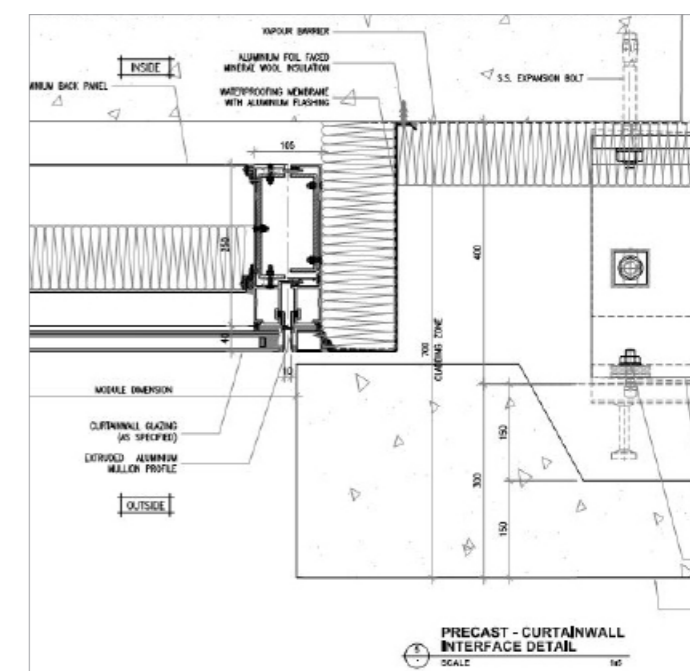
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Life safety section

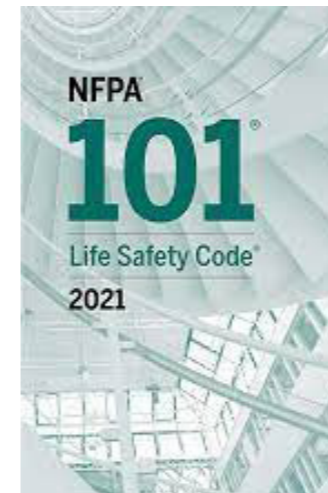
Plans / Reports / Docs Study

International Building Code IBC.



The International Building Code (IBC) is a model code developed by the International Code Council (ICC). It is a set of regulations that establish minimum standards for the construction of buildings and structures. The IBC is intended to protect public health, safety, and welfare by ensuring that buildings are designed and constructed to withstand various hazards, including fire, earthquakes, and windstorms. The IBC is updated every three years to reflect changes in building technology and construction practices. It is adopted by jurisdictions throughout the United States and around the world. If you are involved in the design, construction, or ownership of a building, it is important to be familiar with the IBC. The IBC is a valuable resource for ensuring the safety and quality of buildings.

National Fire Protection Association NFPA



NFPA 101, also known as the Life Safety Code, is a comprehensive set of fire safety and life safety standards for buildings and structures. It is published by the National Fire Protection Association (NFPA), a nonprofit organization dedicated to public safety.

FPA 101 addresses a wide range of fire safety issues, including:

- Means of egress: This includes requirements for stairs, ramps, and corridors that allow occupants to safely evacuate a building in the event of a fire.
- Fire protection: This includes requirements for fire alarms, sprinkler systems, and fire extinguishers.
- Building construction: This includes requirements for fire-resistive materials, structural stability, and smoke control.
- Occupancy classification: This includes requirements for different types of occupancies, such as schools, hospitals, and office buildings.

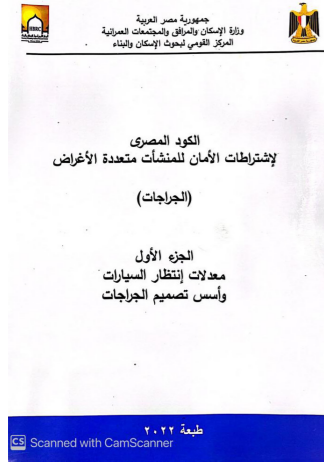
Egyptian Fire code



The Egyptian Fire Code is a set of regulations that establish minimum standards for fire protection in buildings and structures in Egypt. It is intended to protect public health, safety, and welfare by ensuring that buildings are designed and constructed to withstand fire. The Egyptian Fire Code covers a wide range of topics, including: Fire protection systems: This includes requirements for fire alarms, sprinkler systems, and fire extinguishers, Building construction: This includes requirements for fire-resistive materials, structural stability, and smoke control, Fire drills: This includes requirements for regular fire drills to ensure that occupants know how to evacuate a building in the event of a fire. The Egyptian Fire Code is updated every three years to reflect changes in fire technology and construction practices. It is enforced by the Egyptian Ministry of Interior.



## Egyptian Garage code



The EGC covers a wide range of topics, including:

- Building construction:** This includes requirements for fire-resistive materials, structural stability, and ventilation.
  - Fire protection:** This includes requirements for fire alarms, sprinkler systems, and fire extinguishers.
  - Equipment:** This includes requirements for parking spaces, lighting, and signage.
  - Operation and maintenance:** This includes requirements for regular inspections and maintenance of fire protection systems and equipment.
- The EGC is enforced by the Egyptian Ministry of Housing, Utilities, and Urban Communities.

## Saudi Fire Protection Code



SBC 801 is an important tool for protecting public health, safety, and welfare. It helps to ensure that buildings are safe from fire and that people can safely evacuate buildings in the event of a fire.

Here are some of the benefits of using SBC 801:

- Increased safety:** SBC 801 helps to ensure that buildings are safe from fire.
- Reduced risk of damage:** SBC 801 helps to reduce the risk of damage to buildings from fire.
- Increased value:** Buildings that comply with SBC 801 are often worth more than those that do not.
- Reduced liability:** SBC 801 can help to reduce liability for designers, builders, and owners.

If you are involved in the design, construction, or ownership of a building in Saudi Arabia, it is important to be familiar with SBC 801. SBC 801 is a valuable resource for ensuring the safety of buildings and people.

## Our Life safety Study Submittal Includes:

### 1. Architectural Building Code Regulation Plans:

(Travel distance path, dead end study, fire rated walls, Escape stairs, means of egress, occupant load spaces, Required parking slots according to code, High rise and super High rise building requirements, Ramps and stair slopes and Dimensions)

### 2. Electromechanical Building Code Regulations plans and Calculations (MEP):

(Fire fighting system, Fire alarm system, ventilation system, Smoke system includes (Cause and effect matrix, CFD Simulation Model), Riser Diagrams)

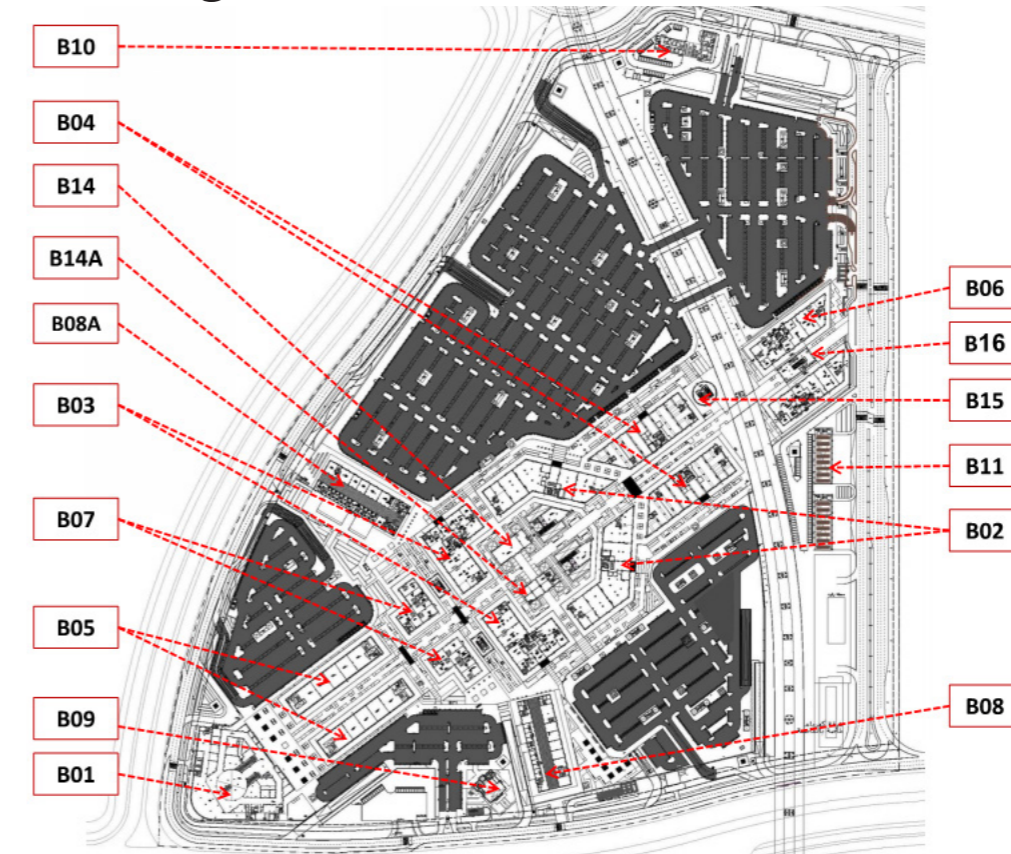
### 3. Life Safety and Fire Strategy report

A life safety report is a document that describes the fire protection systems and procedures for a building. It is typically developed by a fire protection engineer or other qualified professional.

### 4. Traffic Study Report

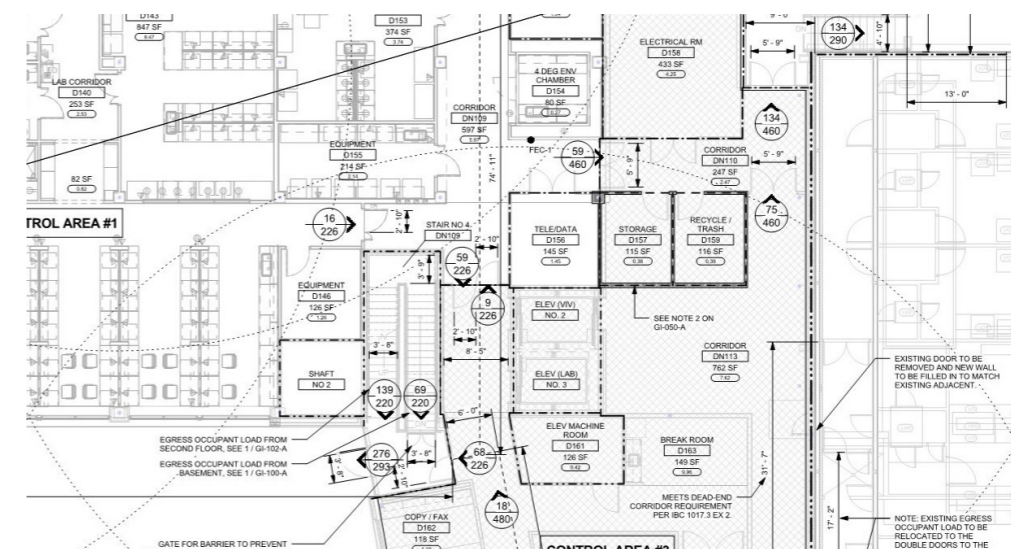
A traffic study report is a document that analyzes the traffic conditions in a particular area. It is typically used to assess the impact of a proposed development on traffic, and to recommend mitigation measures.

## Building Code Numbers and Global Levels



The image shows a building with floors. The building is located in a busy downtown area and is surrounded by other office buildings, hotels, and restaurants. The building is named "The Tower" and is owned by a large real estate company. The building is used by a variety of businesses, including law firms, accounting firms, and marketing firms. The building is also home to a number of restaurants and shops. An image description is a short text that provides information about the contents of an image. It can include information about the building usage, levels, and names.

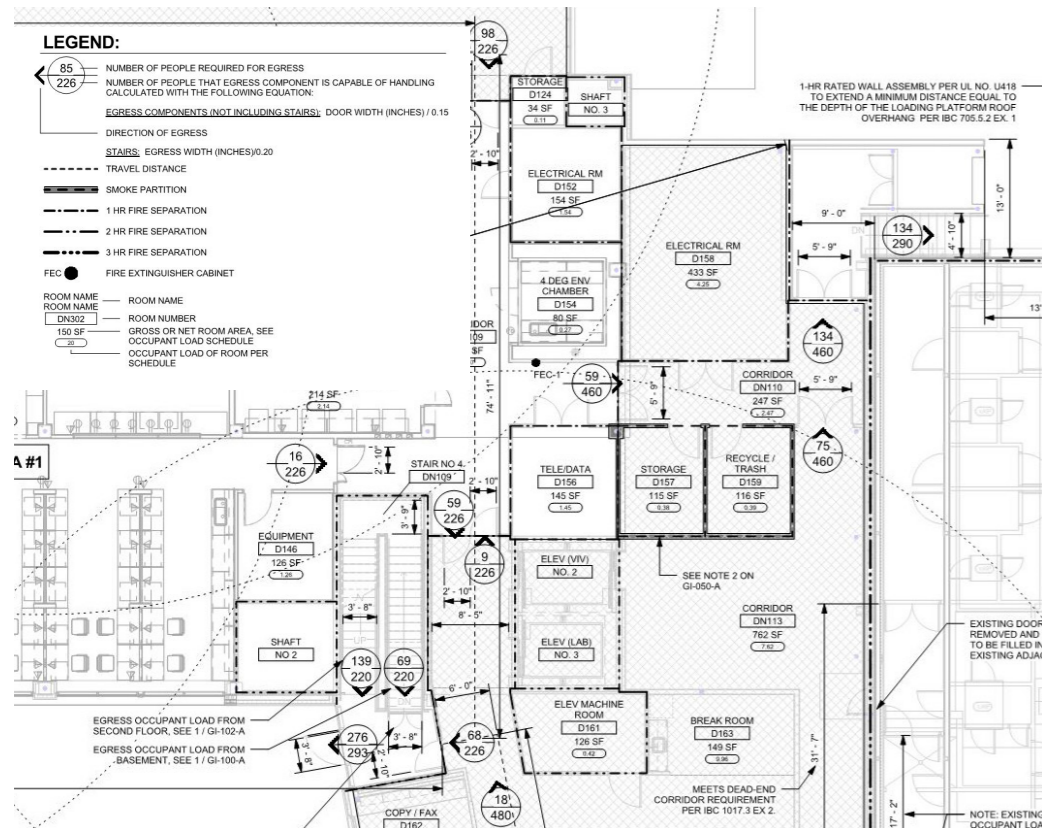
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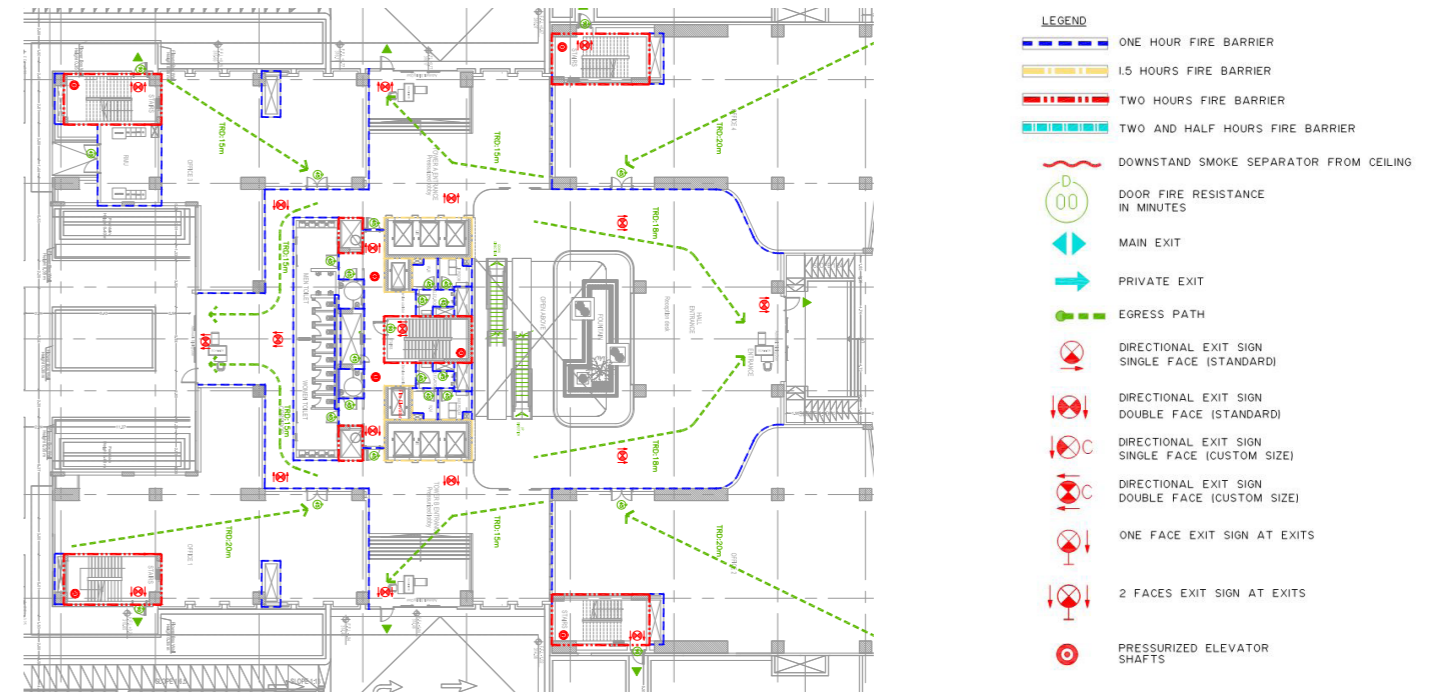


# Building Code Numbers and Global Levels



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# Fire Rated Walls & Travel Distance plan Sample



# FIRE FIGHTING REQUIREMENTS FOR ALL SPACES

معيار المكافحة والتأمين	تصنيف الأشغال	المساحة بالدور	اسم الفراغ
Wet sprinkler system, 60 min. duration (NFPA13)	3و	452.4	مخزن
No system required	3و	103.71	خزان مياه الحريق
Wet sprinkler system, 30 min. duration (NFPA13)	خدمات	240	حمامات
There is no electric room	3و	34.6	غرفة كهرباء
Wet sprinkler system, 60 min. duration (NFPA13)	خدمات	94	ممرات هروب و بهو
		<b>5830</b>	

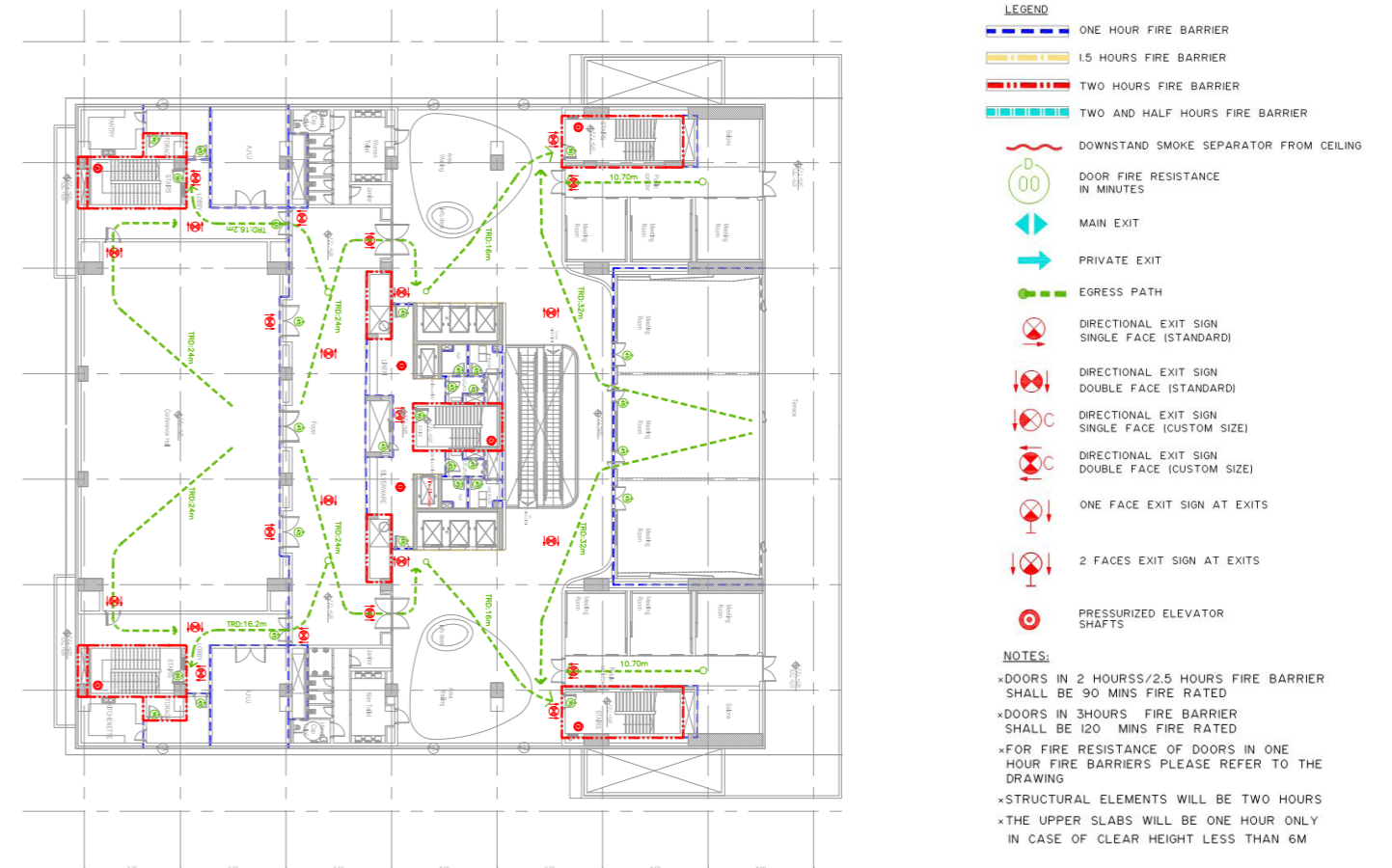
## دور البدروم الثاني منسوب 10.05

معيار المكافحة والتأمين	تصنيف الأشغال	المساحة بالدور	اسم الفراغ
Wet sprinkler system, 60 min. duration (NFPA13)	الأشغال الصناعي والتخزيني قسم 3 (3و)	452.4	مخزن
There is no water tanks	خدمات	103.71	خزان مياه الحريق
Wet sprinkler system, 30 min. duration (NFPA13)	خدمات	108.06	حمامات
Wet sprinkler system, 30 min. duration (NFPA13)	خدمات	112.65	مصلي
There is no electric room	خدمات	34.6	غرفة كهرباء
Wet sprinkler system, 60 min. duration (NFPA13)	خدمات	94	ممرات هروب و بهو
		<b>5830</b>	

## دور البدروم الاول منسوب 5.30

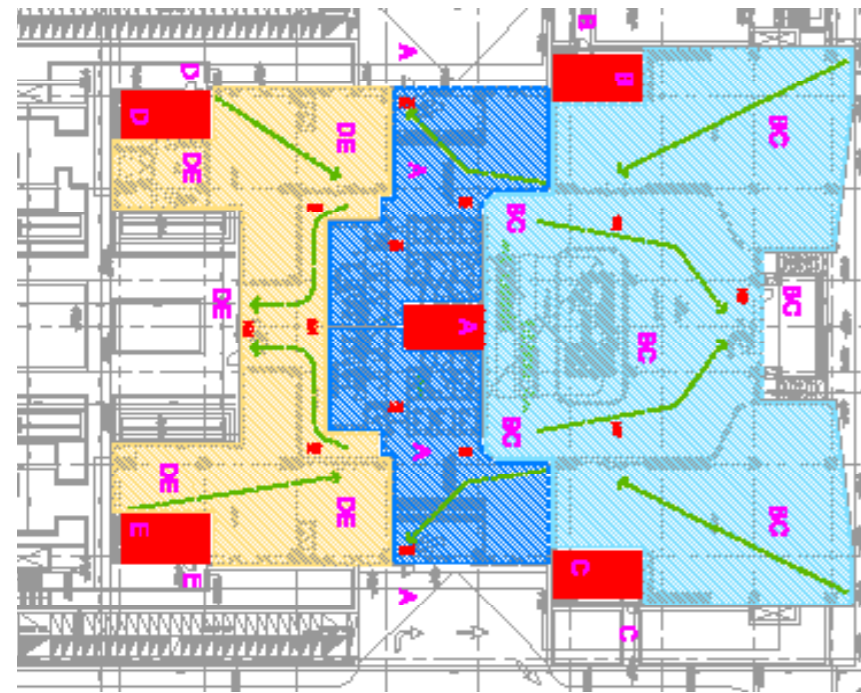
معيار المكافحة والتأمين	تصنيف الأشغال	المساحة بالدور	اسم الفراغ
Wet sprinkler system, 60 min. duration (NFPA13)	الأشغال الصناعي والتخزيني قسم 3 (3و)	134.5	مخزن
Total flooding CO2 gas system(NFPA12)	خدمات	42.3	محول كهرباء
Total flooding CO2 gas system(NFPA12)	خدمات	35.25	LT ROOM
Wet sprinkler system, 60 min. duration (NFPA13)	خدمات	28	غرفة رفع مياه النافورة
Wet sprinkler system, 30 min. duration (NFPA13)	خدمات	31.24	Garbage collection
Wet sprinkler system, 30 min. duration (NFPA13)	إداري مهني (د)	35.02	Security
Total flooding FM200 gas system(NFPA2001)	خدمات	21.2	DAS ROOM
Wet sprinkler system, 30 min. duration (NFPA13)	خدمات	30.3	SMART METERS
There is no electric room	خدمات	34.6	غرفة كهرباء
Total flooding FM200 gas system(NFPA2001)	خدمات	34.8	غرفة تحكم
Total flooding CO2 gas system(NFPA12)	خدمات	45	غرفة مولد
Wet sprinkler system, 30 min. duration (NFPA13)	خدمات	108	حمامات
Wet sprinkler system, 60 min. duration (NFPA13)	خدمات	150	ممرات هروب و بهو
		<b>5830</b>	

# Fire Rated Walls & Travel Distance plan Sample





# Evacuation plan Sample



- LEGEND**
- ONE HOUR FIRE BARRIER
  - 1.5 HOURS FIRE BARRIER
  - TWO HOURS FIRE BARRIER
  - TWO AND HALF HOURS FIRE BARRIER
  - DOWNSTAND SMOKE SEPARATOR FROM CEILING
  - DOOR FIRE RESISTANCE IN MINUTES
  - MAIN EXIT
  - PRIVATE EXIT
  - EGRESS PATH
  - DIRECTIONAL EXIT SIGN SINGLE FACE (STANDARD)
  - DIRECTIONAL EXIT SIGN DOUBLE FACE (STANDARD)
  - DIRECTIONAL EXIT SIGN SINGLE FACE (CUSTOM SIZE)
  - DIRECTIONAL EXIT SIGN DOUBLE FACE (CUSTOM SIZE)
  - ONE FACE EXIT SIGN AT EXITS
  - 2 FACES EXIT SIGN AT EXITS
  - PRESSURIZED ELEVATOR SHAFTS

# Evacuation plan Sample



- LEGEND**
- ONE HOUR FIRE BARRIER
  - 1.5 HOURS FIRE BARRIER
  - TWO HOURS FIRE BARRIER
  - TWO AND HALF HOURS FIRE BARRIER
  - DOWNSTAND SMOKE SEPARATOR FROM CEILING
  - DOOR FIRE RESISTANCE IN MINUTES
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  - DIRECTIONAL EXIT SIGN DOUBLE FACE (CUSTOM SIZE)
  - ONE FACE EXIT SIGN AT EXITS
  - 2 FACES EXIT SIGN AT EXITS
  - PRESSURIZED ELEVATOR SHAFTS

- NOTES:**
- DOORS IN 2 HOURS/2.5 HOURS FIRE BARRIER SHALL BE 90 MINS FIRE RATED
  - DOORS IN 3 HOURS FIRE BARRIER SHALL BE 120 MINS FIRE RATED
  - FOR FIRE RESISTANCE OF DOORS IN ONE HOUR FIRE BARRIERS PLEASE REFER TO THE DRAWING
  - STRUCTURAL ELEMENTS WILL BE TWO HOURS
  - THE UPPER SLABS WILL BE ONE HOUR ONLY IN CASE OF CLEAR HEIGHT LESS THAN 6M

# Cause and Effect Matrix

Level-Basement-B01						
	Fan name	EXF-21	EXF-21	EXF-21	EXF-21	Low grill motorized damper
		1st Fan	2nd Fan	1st Fan	2nd Fan	
CO ventilation	0ppm < CO < 25ppm	0	0	0	0	Open
	25ppm < CO < 50ppm	1/2	0	1/2	0	Open
	50ppm < CO < 200ppm	1	0	1	0	Open
	CO > 200ppm	1	1	1	1	Open
Smoke extract	Delay	Delay	Delay	Delay	Delay	Delay
	Delayed start value	.0 s	.0 s	.0 s	.0 s	Closed
	Equipment status	1	1	1	1	Closed

Level-Basement-B02										
	Fan name	EXF-20	EXF-20	EXF-20	EXF-20	FAF-01	FAF-01	FAF-01	FAF-01	Low grill motorized damper
		1st Fan	2nd Fan	1st Fan	2nd Fan	1st Fan	2nd Fan	1st Fan	2nd Fan	
CO ventilation	0ppm < CO < 25ppm	0	0	0	0	0	0	0	0	Open
	25ppm < CO < 50ppm	1/2	0	1/2	0	1/2	0	1/2	0	Open
	50ppm < CO < 200ppm	1	0	1	0	1	0	1	0	Open
	CO > 200ppm	1	1	1	1	1	1	1	1	Open
Smoke extract	Delay	Delay	Delay	Delay	Delay	Delay	Delay	Delay	Delay	Delay
	Delayed start value	.0 s	.0 s	.0 s	.0 s	120.0 s	120.0 s	120.0 s	120.0 s	Closed
	Equipment status	1	1	1	1	1	1	1	1	Closed

Level-Basement-B03										
	Fan name	EXF-20	EXF-20	EXF-20	EXF-20	FAF-01	FAF-01	FAF-01	FAF-01	Low grill motorized damper
		1st Fan	2nd Fan	1st Fan	2nd Fan	1st Fan	2nd Fan	1st Fan	2nd Fan	
CO ventilation	0ppm < CO < 25ppm	0	0	0	0	0	0	0	0	Open
	25ppm < CO < 50ppm	1/2	0	1/2	0	1/2	0	1/2	0	Open
	50ppm < CO < 200ppm	1	0	1	0	1	0	1	0	Open
	CO > 200ppm	1	1	1	1	1	1	1	1	Open
Smoke extract	Delay	Delay	Delay	Delay	Delay	Delay	Delay	Delay	Delay	Delay
	Delayed start value	.0 s	.0 s	.0 s	.0 s	120.0 s	120.0 s	120.0 s	120.0 s	Closed
	Equipment status	1	1	1	1	1	1	1	1	Closed

Upper Floors											
	Fan name	ST.P.F-01	ST.P.F-02	ST.P.F-02	PF-01	PF-02	PF-03	PF-04	PF-05	SM-F.01..05	HVAC System
										In fire floor only	
Smoke extract	Delay	Delay	Delay	Delay	Delay	Delay	Delay	Delay	Delay	Delay	Delay
	Delayed start value	.0 s	.0 s	.0 s	.0 s	120.0 s	120.0 s	120.0 s	120.0 s		Closed
	Equipment status	1	1	1	1	1	1	1	1	1	Closed

Note: Relief pressure damper shall control the pressure in staircase to not exceed 87 pa

	Off	1st speed-lower speed-	2nd speed-higher speed-	
Main extract and supply fans:	EXF-xx / SF-xx	0	1/2	1



# PRESSURIZATION CONTAM ANALYSIS REPORT

## 1 Introduction

Prepared this analysis report to validate the smoke control system designed for office building project, Egypt. This analysis is based on the project documents and drawings provided to Bravo Design Solution BDS through the client

## 2 Project Scope

The scope of this report is to validate the design of the smoke control system design against the design performance criteria, using the CONTAM software.

### 2.1 Building Description

The building consists of a seven-story aboveground level and three underground basements. The aboveground levels comprise multiple office spaces, the basements are car park, the building is served by multiple smoke proof staircases extended to various levels.

One staircase at the middle core of the building connects the 7 levels, roof, and the underground levels. Two other staircases at the boundary serve from 7<sup>th</sup> floor to basement 3 level, additional two staircase connect the basement levels. For more information, please refer to Architecture plans.

All staircases and elevator hoist ways are smoke proof enclosure using pressurization fans at the roof and use multiple injection at each story using hard ducts.

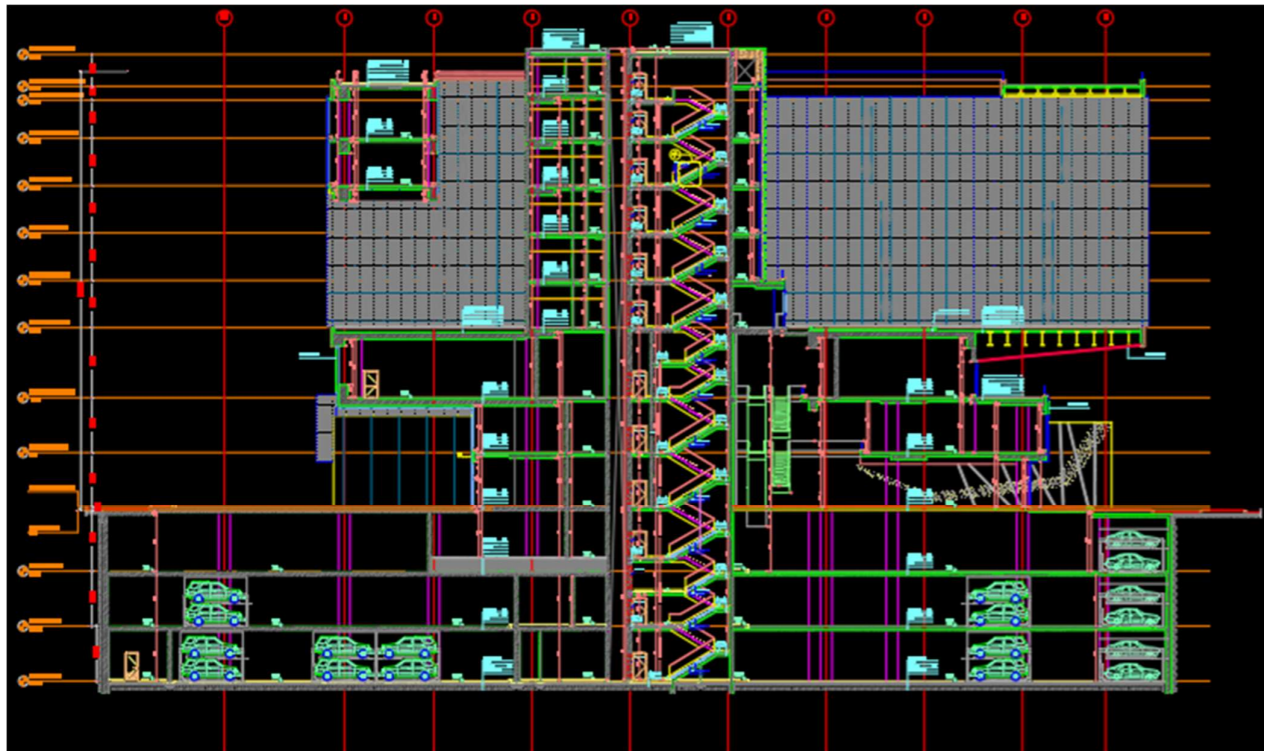


Figure 1: Building section.

# PRESSURIZATION CONTAM ANALYSIS REPORT

The following table is showing the floors and height of each floor, which is used as an input to the CONTAM.

Table 1: Floor Levels and occupancy.

Level	Occupancy	Height (m)	Elevation (m)
Upper Roof	Mechanical Equipment	39.5	0
Roof	Mechanical Equipment	35.55	3.95
7 <sup>th</sup>	Office Spaces	32.25	3.3
6 <sup>th</sup>	Office Spaces	28.15	4.1
5 <sup>th</sup>	Office Spaces	24.05	4.1
4 <sup>th</sup>	Office Spaces	19.95	4.1
3 <sup>rd</sup>	Office Spaces	15.85	4.1
2 <sup>nd</sup>	Office Spaces	9.8	6.05
1 <sup>st</sup>	Office Spaces	5.05	4.75
Ground	Entrance-Lobby	0	5.05
Basement-01	Car Park	-5.3	5.3
Basement-02	Car Park	-10.05	4.75
Basement-03	Car Park	-14.8	4.75

### 2.2 Applicable Codes and Standards

The applicable code for the smoke control system of smoke control system is the Egyptian Code, in addition to the international codes and standards;

Table 2 lists the codes and standards used to prepare this report. Other references and guidelines are utilized, including the SFPE Handbook of Fire Protection Engineering 5<sup>th</sup> Edition and the SFPE Engineering Guide to Performance-Based Design Fire Protection 2<sup>nd</sup> Edition.

Table 2: Code and standard list.

CODE AND STANDARD TITLE	EDITION
Egyptian Code	2007
NFPA 101- Life Safety Code	2021
NFPA 92-"Standard for Smoke Control Systems"	2018
ASHREA Smoke Control Handbook	2006

## 3 Performance Criteria

The minimum pressure difference on the door as per NFPA 92 shall be 12.5 pa to prevent smoke escape to the staircase. On the other hand, the maximum force to open the door shall not exceeds 133 N as per NFPA101, so the pressure difference shall not exceed the 87 pa on the single door to allow for door opening. Those two values will be tested by the CONTAM.

# PRESSURIZATION CONTAM ANALYSIS REPORT

## 4 Developing the Smoke Control System Design

The staircase and elevators are pressurized by fans located at the roof level, the following table shows the pressurization fans schedule.

**Table 3: Pressurization fans schedule of equipment.**

PRESSURIZATION FANS SCHEDULE										
UNIT NO	QTY	AIR FLOW		E.S.P		MOTOR DATA		LOCATION	TYPE	REMARKS
		CFM	IN W.g	K.W	V/PH/Hz					
P.F-01	3	300	2.5	0.2	(220-240)/1/50	ROOF	CENTRIFUGAL (FAN SECTION)	C/W PRE FILTER		
P.F-02	1	300	1	0.1	(220-240)/1/50	1ST-BASSMENT	AXIAL IN-LINE	C/W PRE FILTER		
P.F-03	2	1000	3.5	1	380/3/50	UPPER ROOF	CENTRIFUGAL (FAN SECTION)	C/W PRE FILTER		
P.F-04	2	1250	2.5	1	380/3/50	ROOF	CENTRIFUGAL (FAN SECTION)	C/W PRE FILTER		
P.F-05	2	12000	3.5	10	380/3/50	UPPER ROOF	ROOF TOP FAN	-		

**Table 4: Stair pressurization schedule of equipment.**

STAIR PRESSURIZATION FANS SCHEDULE										
UNIT NO	QTY	AIR FLOW		E.S.P		MOTOR DATA		LOCATION	TYPE	REMARKS
		CFM	IN W.g	K.W	V/PH/Hz					
ST.P.F-01	2	4050	1.5	1.5	(220-240)/1/50	SECOND	AXIAL IN-LINE	C/W PRE FILTER		
ST.P.F-02	2	12000	3.5	9.6	380/3/50	ROOF	CENTRIFUGAL (FAN SECTION)	C/W PRE FILTER		
ST.P.F-03	1	16200	3.5	14	380/3/50	UPPER ROOF	CENTRIFUGAL (FAN SECTION)	C/W PRE FILTER		

**Table 5: Design manual calculations.**

Escape Stairs Pressurization Calculation																
Smoke zone	Fremiter [m]	Height [m]	wall area	Area ratio m <sup>2</sup> /m <sup>2</sup>	stair doors	escape doors	Door leakage area	Door area [m <sup>2</sup> ]	Door total leakage area	Total Leakage Area [m <sup>2</sup> ]	Differential pressure [Pa]	Flow Coeff.	Q1 [m <sup>3</sup> /s]	Q2 [m <sup>3</sup> /s]	Q total [m <sup>3</sup> /s]	
Stair well 8 floors	21.7	35	750.5	0.00017	8	3	0.023	1.89	0.184	0.313115	25	0.65	1.313747	2784	4.2525	9611
Stair Well 12 floors	27.7	47	1380.9	0.00017	12	3	0.023	1.89	0.261	0.632323	25	0.65	1.568149	3484	4.2525	9611
Stair Well 3 floors	25	12	300	0.00017	3	1	0.023	1.89	0.069	0.12	25	0.65	0.503488	1067	1.4175	3004

Civil Defence Elevator Shaft Pressurization Calculation									
ZONE	Fremiter [m]	Height [m]	wall area	Area ratio m <sup>2</sup> /m <sup>2</sup>	Door leakage area	Total Leakage Area [m <sup>2</sup> ]	Differential pressure [Pa]	Flow Coeff.	Flow rate [m <sup>3</sup> /s]
Elevator shaft	8.40	47.00	394.80	0.00016	1.28	1.35	25	0.65	5.67

## 5 Design Input by CONTAM Analysis

The following table show the inputs parameters to the CONTAM:

**Table 6: Design Inputs:**

Parameter	Value	C Coefficient	Reference
Ambient Temperature (°C)	37 summers, 5 winter		-
Indoor Temperature (°C)	22		-

# PRESSURIZATION CONTAM ANALYSIS REPORT

Parameter	Value	C Coefficient	Reference
Wind	Not used to simplify the analysis		-
Exterior Wall Leakage Area (m <sup>2</sup> / m <sup>2</sup> )-Average	1.7x10 <sup>-4</sup>	0.65	Table 3.9 ASHREA smoke Handbook
Floor Leakage Area (m <sup>2</sup> / m <sup>2</sup> )-Average	5.2x10 <sup>-5</sup>	0.65	Table 3.9 ASHREA smoke Handbook
Stairwell wall Leakage Area (m <sup>2</sup> / m <sup>2</sup> )	1.1x10 <sup>-4</sup>	0.65	Table 3.9 ASHREA smoke Handbook
Single Door-Closed Leakage Area (m <sup>2</sup> )	0.0225	0.65	Table 3.5 ASHREA smoke Handbook
Single Door-Open Leakage Area (m <sup>2</sup> )	1.9	0.35	From Architecture Layout
Double Door-Closed Leakage Area (m <sup>2</sup> )	0.065	0.65	Table 3.7 ASHREA smoke Handbook
Double Door-Open Leakage Area (m <sup>2</sup> )-2.13x1.83m size	3.9	0.35	From Architecture Layout
Elevator Door-Closed Leakage Area (m <sup>2</sup> )-Average for 0.9 m door width	0.047	0.65	Table 3.8 ASHREA smoke Handbook
Stair-01 Area (m <sup>2</sup> )	18		
Stair-02 Area (m <sup>2</sup> )	21		
Stair-03 Area (m <sup>2</sup> )	13		

### 5.1 Number of doors open

The following assumptions for doors will be used in the CONTAM analysis. The door at the level of discharge will be considered open to simulate the occupants escape route and civil defense entering the building case. Also, the 6<sup>th</sup> and 4<sup>th</sup> floor will be considered open to simulate the fire floor door open. The main doors for building will be open as well as the staircase discharge to the internal of the building not to external.

Stair Type	1 <sup>st</sup> Door Open	2 <sup>nd</sup> Door Open	3 <sup>rd</sup> Door Open
Staircase 12 floors	At Ground floor	4 <sup>th</sup> floor	6 <sup>th</sup> floor
Staircase 8 floors	At Ground floor	4 <sup>th</sup> floor	6 <sup>th</sup> floor
Staircase 3 floors	At Ground floor	-	-



# PRESSURIZATION CONTAM ANALYSIS REPORT

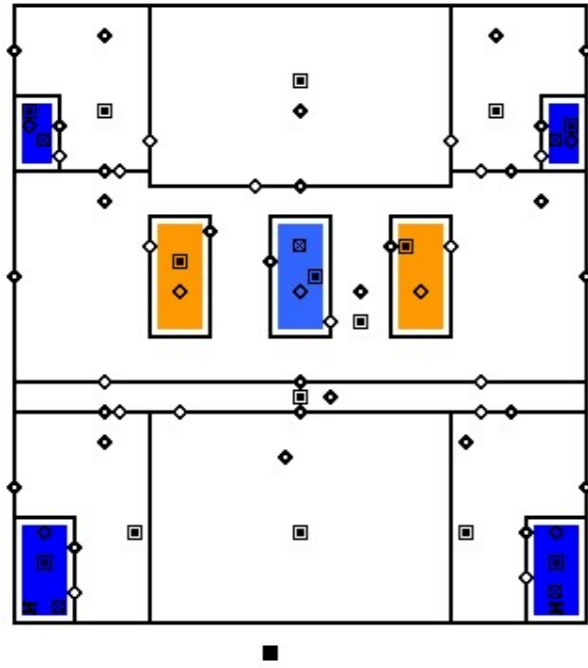


Figure 8: CONTAM Model - Level 2

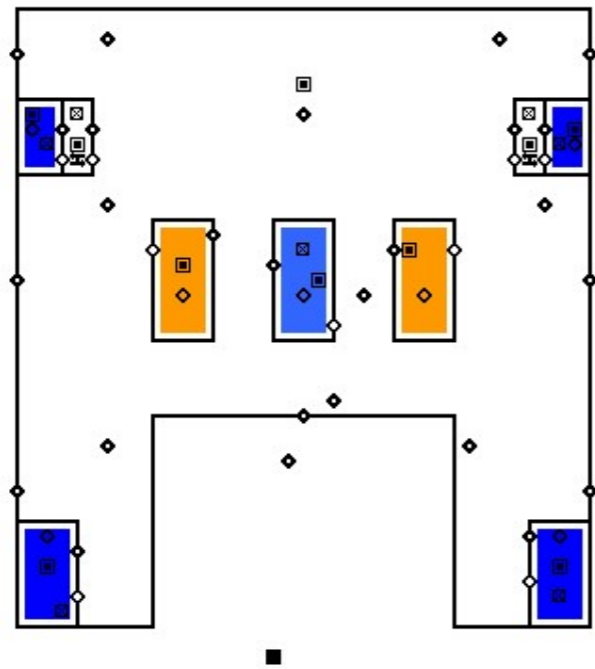


Figure 9: CONTAM Model - Level 1

# PRESSURIZATION CONTAM ANALYSIS REPORT

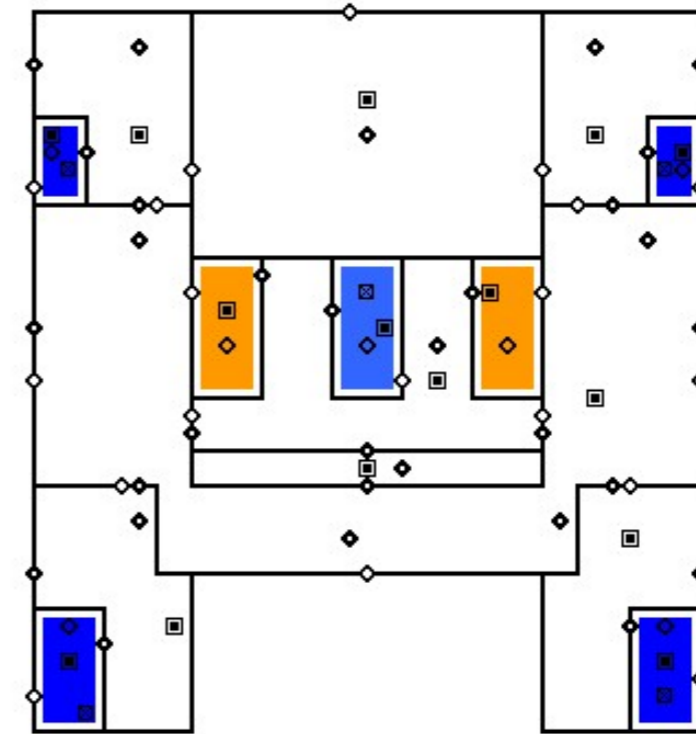


Figure 10: CONTAM Model - Level ground

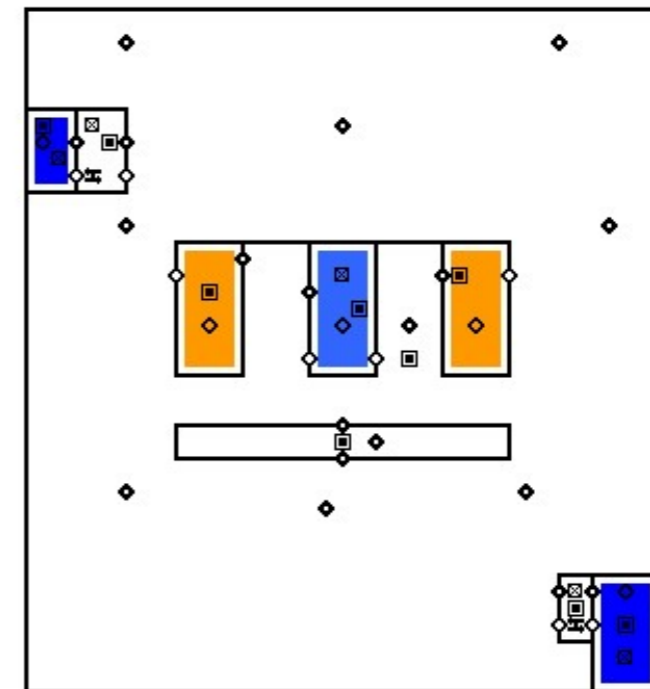


Figure 11: CONTAM Model - Level B01

# CFD SIMULATION REPORT

## 3.3.1 Visibility

Three factors are closely related to visibility: environmental conditions, object's conditions, and human visual ability. The former two factors define visual stimulus, and the latter defines visual sensitivity. Visual response evaluation, namely visibility, depends on both visual stimulus and visual sensitivity. Visual stimulus is represented by four elements, namely size [m] or visual angle [minutes] of a visual target, adaptation (background) luminance  $L_b$  [cd/m<sup>2</sup>], luminance contrast between the visual target luminance and background luminance, and viewing time. If the viewing time is more than 100 ms, the visibility becomes stable regardless of time. We can treat visual response evaluation and visual performance, like visible distance or threshold value, as the visibility. Human visual ability consists of many functions like the field of view, color sensitivity, and so on, but usually the most important is visual acuity (VA).

Visibility is a vital tenability factor since it affects an occupant's ability to find an exit during a fire condition. Available fire protection literature gives a wide range of acceptable visibility criteria. Table 61.4 of the 5th Edition of SFPE Handbook states that acceptable values from 1.2 m to 20 m have been proposed by fire researchers based upon the building application; however, 13- and 4-meter visibility values are proposed for unfamiliar and familiar occupants, respectively, as per Table 61.4 of SFPE HB.

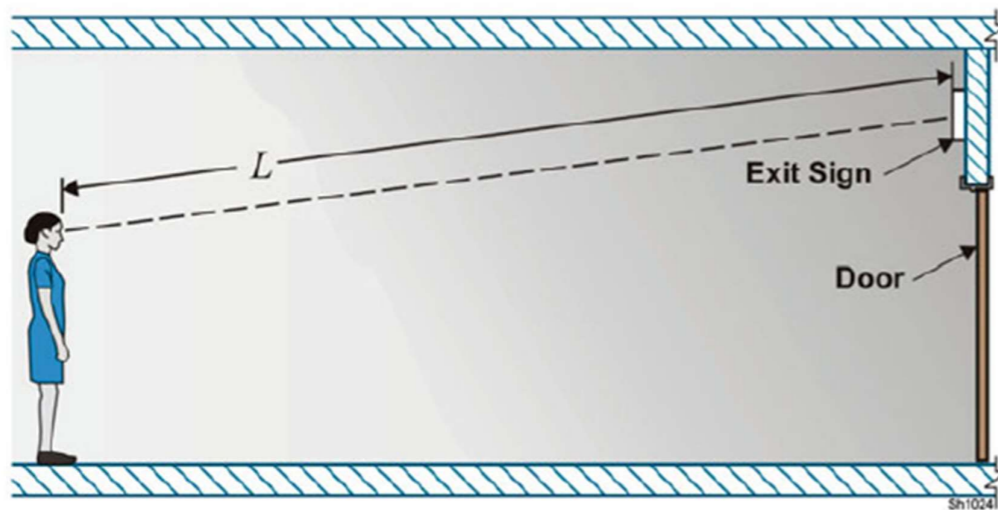


Figure 5: Visibility through nonuniform smoke (from SFPE HB, 5<sup>th</sup> Edition).

## 3.3.2 Temperature

For use in the modeling of life threat due to heat exposure in fires, it is necessary to consider only two criteria: the threshold of the burning of the skin and the exposure at which hyperthermia is sufficient to cause mental deterioration and thereby threaten survival.

# CFD SIMULATION REPORT

The thermal burns in the respiratory tract from inhalation of air containing less than 10 percent by volume of water vapor do not occur in the absence of burns in the skin or the face; thus, tenability limits concerning skin burns typically are lower than burns of the respiratory tract. However, thermal burns in the respiratory tract can occur upon inhalation of air above 60°C that is saturated with water vapor.

Chapter 63 of the SFPE Handbook (5<sup>th</sup> Edition) states that 60 °C was found to be the highest temperature at which 100% water-vapor saturated air can be breathed. As the combustion process and sprinkler suppression can produce water vapor, 60 °C is identified as the tenability limit of the surrounding air temperature in the fire environment.

## 3.3.3 Carbon Monoxide

Carbon monoxide (CO) is one of the measures of the smoke toxicity that occupants are exposed to during evacuation. CO causes occupant incapacitation by combining with hemoglobin in blood to form carboxyhemoglobin (COHb), which reduces the amount of oxygen (O<sub>2</sub>) delivered to the brain and other body tissues.

The COHb concentration likely to cause incapacitation depends on the activity of the victim. The acceptable CO concentration during a fire is primarily based on the duration of exposure and the acceptable level of impact on occupants. Occupant characteristics, such as age and health, have a lesser impact. It was determined that occupants could not be exposed to a level of CO that would disable them; this level of impact is known as AEGL-2.

For the analysis, AEGL-2 was identified as 4% COHb in adults. The prevention of AEGL-2 is used as the CO threshold, which is an extremely conservative value to use for CO and is an exposure level where people with coronary artery disease may experience a reduced time until the onset of chest pain. People can be exposed to 150 ppm of CO for 30 minutes before achieving 4% COHb.

In normal operation, the ASHRAE application recommends a ventilation rate designed to maintain a CO level of 35 ppm for 1 h exposure, with a maximum of 25 ppm for an 8 h exposure.

Table 2 shows the performance criteria used in this analysis. Each criterion is evaluated at 1.8 m above the floor, which is assumed to be at occupant breathing height.

Table 2: Tenability criteria summary.

Tenability Parameter	Performance Criteria In Normal Operation	Performance Criteria In case of fire
Visibility	-	25 m minimum
Air Temperature	-	Less than 60 °C
Carbon Monoxide	Less than 35 ppm	Less than 150 ppm



# CFD SIMULATION REPORT

Fire scenario describes a sequence of possible events and a set of conditions that describe the development of fire and the spread of combustion products throughout a building or part of a building according to SFPE Engineering Guide to Performance-Based Fire Protection (2<sup>nd</sup> Edition).

The design fire scenario comprises three sets of characteristics: building characteristics, occupant characteristics, and fire characteristics. Building characteristics describe the physical features, contents, and ambient environment within the building; the car park level used only as car park for the building above. The car park has an exit stair used as a means of egress. The building details are discussed in the building description section at the beginning of this report.

Occupant characteristics determine the ability of occupants to respond and evacuate during a fire emergency. In our project, a low occupancy density in the car park portion is expected, and the occupants usually are employees working in the office spaces, and they are usually familiar with the building exits. One of the purposes of the smoke control system design in the car park is preventing the smoke from spreading all over the park to allow the occupants to escape during the fire incident.

The last set, fire characteristics, is discussed in the next section.

One of the typical fire scenarios in car park applications is when a parked car goes on fire due to the malfunction of any mechanical or electrical parts in the car engine. In our analysis, the park will be considered as one fire zone, the severe-case fire location is in the worst case location which it is selected based on areas where shear walls, rooms, and walls.

Moreover, the automated car park put challenge on the smoke exhaust system due to the size of fire expected as depicted from fire tests on the stacker vehicle system.

## 5 Design Fire

Fire characteristics are typically quantified as design fire curves, which provide a history of the size of fire as a function of time. Typically, the size of a fire is measured in terms of heat release rate. To determine the heat output of a potential fire in the car park, a design fire must be considered with an emphasis on establishing an energy release rate curve. The characterization of the energy release rate is the critical driving parameter for determining smoke production and smoke characteristics.

Several fire tests were done on passenger cars and stated in the SFPE Handbook (5<sup>th</sup> Edition); the tests were examining several types of cars, and the peak values are between 1.5 and 8.5 MW.

# CFD SIMULATION REPORT

According to BS-7346, Part 7 (2013 Edition, Section 5), "A developing fire in a car or light commercial vehicle typically starts in the engine compartment or the passenger compartment. Typical fire growth in the passenger compartment starts slowly, accelerating once the fire becomes reasonably well ventilated. This often occurs when a window or sunroof breaks. The contents of the passenger compartment usually represent the main fuel load, and the seating, linings, and instrument panel are often made of materials that burn vigorously." The heat release rate for sprinklered car park is assumed 4 MW in the BS 7346-7 as depicted in below table.

**Table 3: Proposed HRR in BS 7346-7.**

**Table 1 Steady-state design fires**

Fire parameters	Indoor car park without sprinkler system	Indoor car park with sprinkler system	2 car stacker with sprinklers
Dimensions	5 m x 5 m	2 m x 5 m	2 m x 5 m
Perimeter	20 m	14 m	14 m
Heat release rate	8 MW	4 MW	6 MW

Moreover, the latest research from NFPA in enclosed car park (2020) summarized the fire tests had been done in the car fire and concluded that no obvious correlation between peak HRR and neither age of vehicle, nor curb weight. If the mass loss percentage is high (20%+) both older and smaller vehicles can yield high peak HRRs and total heat released. (<https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/Building-and-life-safety/RFModernVehicleHazards-in-ParkingCar Parks.pdf>)

Also, the NFPA research in enclosed car park (2020) discussed the electric cars fire tests and demonstrates that no difference in the fire load between the fuel vehicles and electric vehicles, the only difference in materials is the batteries and fuel. Therefore, the same design fire curve can be used for both type of vehicles.

In addition to discussions, there is serious concerns regarding car "stackers"; usually used in private car parks, this (usually hydraulic) equipment allows two cars to be parked on the "footprint" of a single car.

In 2006 Communities and Local Government (CLG) Sustainable Buildings Division commissioned BRE to carry out a three year project titled Fire Spread in Car Parks. One of those tests was carried on two vehicles stacked on steel frame. The effect of this configuration on the development of the fire and on the peak heat release rate was expected to be significant; potentially doubling or trebling the heat release rate.

The test showed that the fire grew rapidly once started and quickly reached the underside of the car above. Flame entered the wheel arch of the upper car igniting the tyre. The fire developed within the passenger compartment of the lower car while growing in the engine of the upper car. Eventually the fire spread to the passenger compartment of the upper car. For more information refer to the full report

# CFD SIMULATION REPORT

In this work, fire is modeled as combustion of gasoline fuel in car fire with a total heat release rate of 8.5 MW with convective & radiation effects. The fire simulation is carried out based on the below fire curve with peak heat release rate of 8.5 MW as per fire test in vehicle stacker. The fire source is represented as a car of length 5 m, width 2 m and height 1 m located in the car park area at the worst case location the car park.

Below experimental fire growth rate graph considered to represent the realistic fire scenario in the CFD simulation.

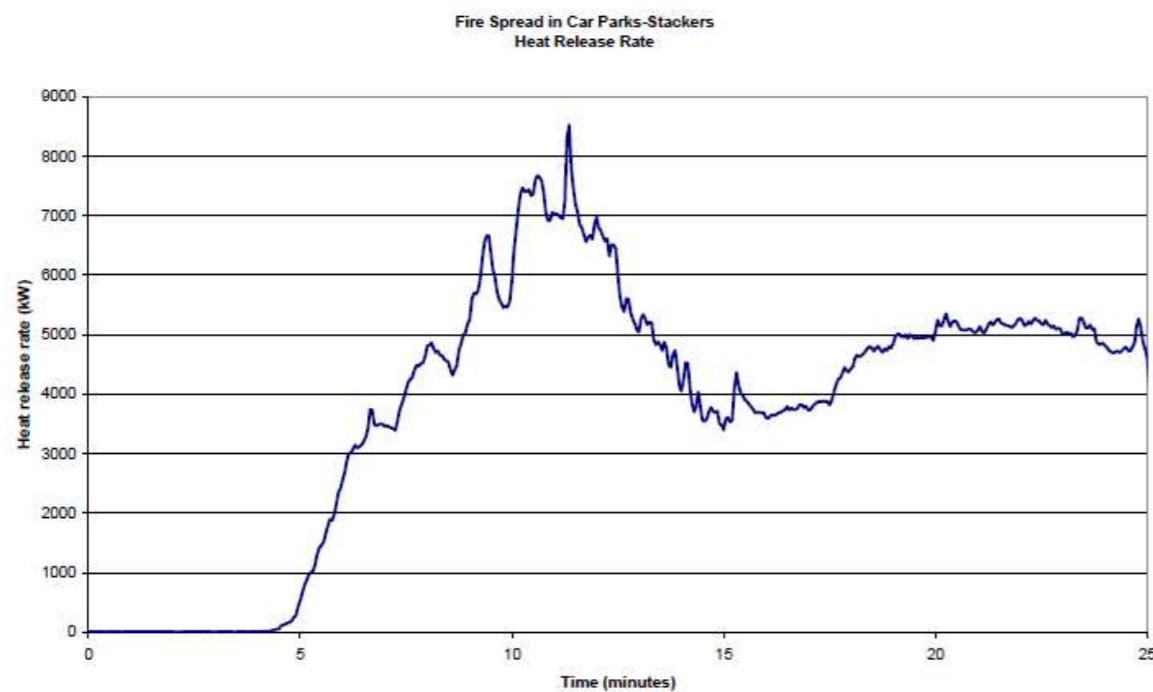


Figure 6: Heat release rate curve.

## 6 Developing the Smoke Control System Design

Regardless the area of the car park, the car park is considered one zone, in normal and fire mode.

### 6.1 Makeup Air and Smoke Exhaust

The overall smoke control system is based on the mechanical ventilation duct system, exhaust fan stations are installed to assist the ventilation in the car park level. The makeup air is provided mechanical in the basement 3&2 and naturally from the ramp opening for the basement 01.

# CFD SIMULATION REPORT

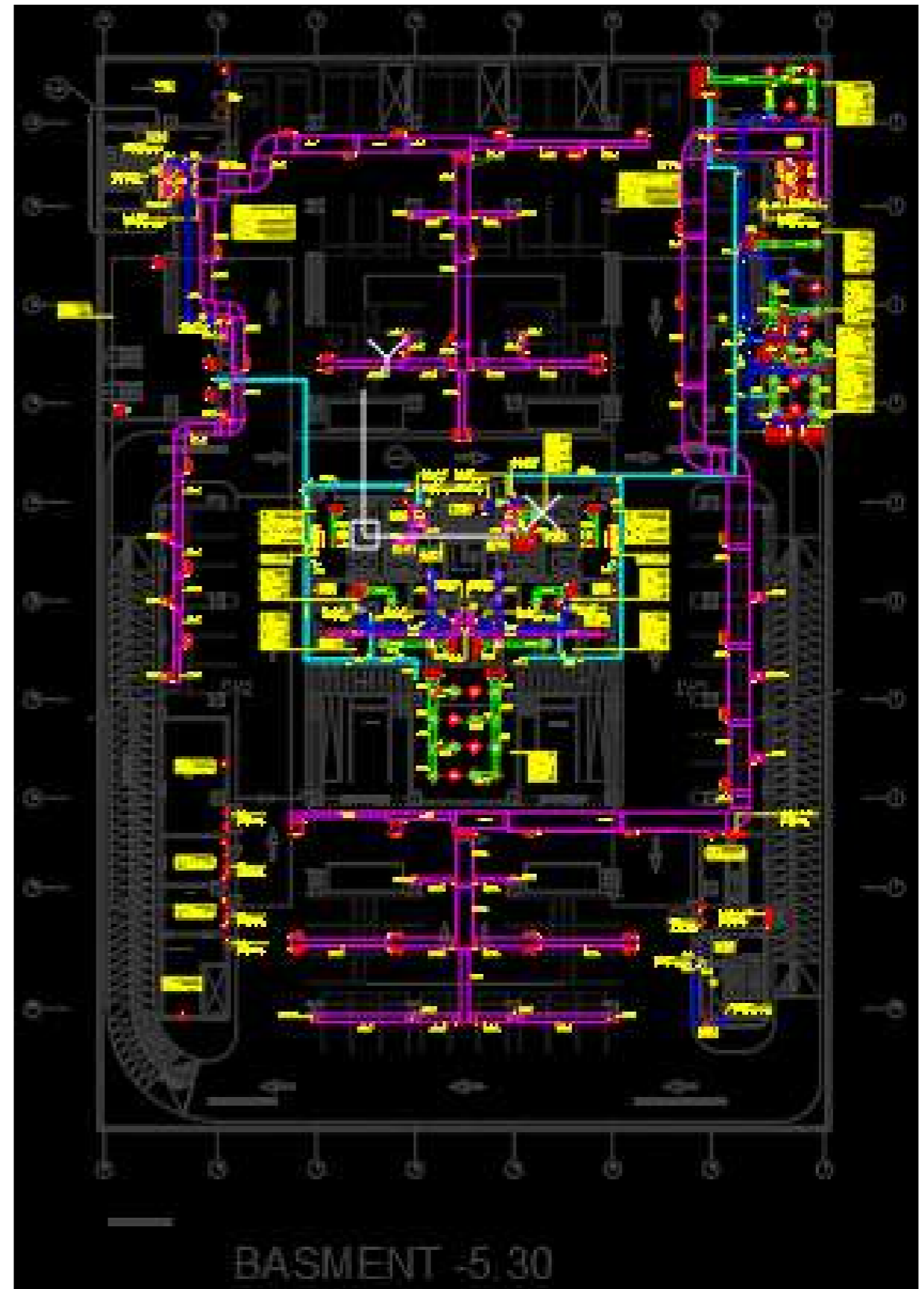


Figure 7: HVAC system layout in basement 01.



# CFD SIMULATION REPORT

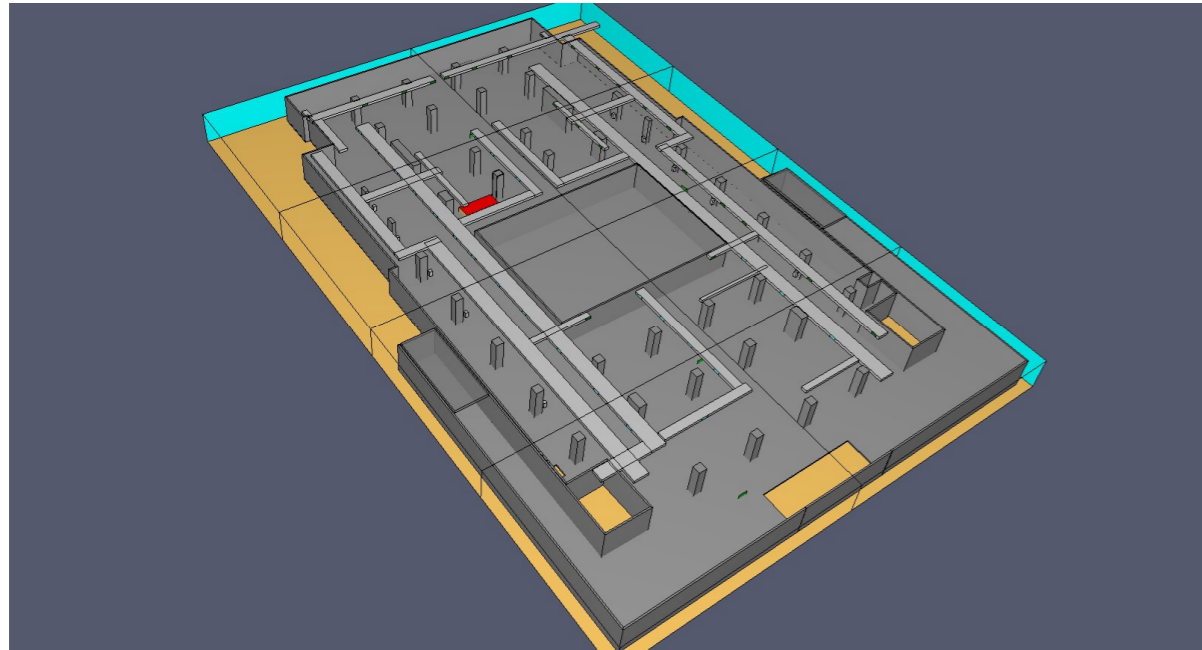


Figure 15: Basement 02 domain-3D.

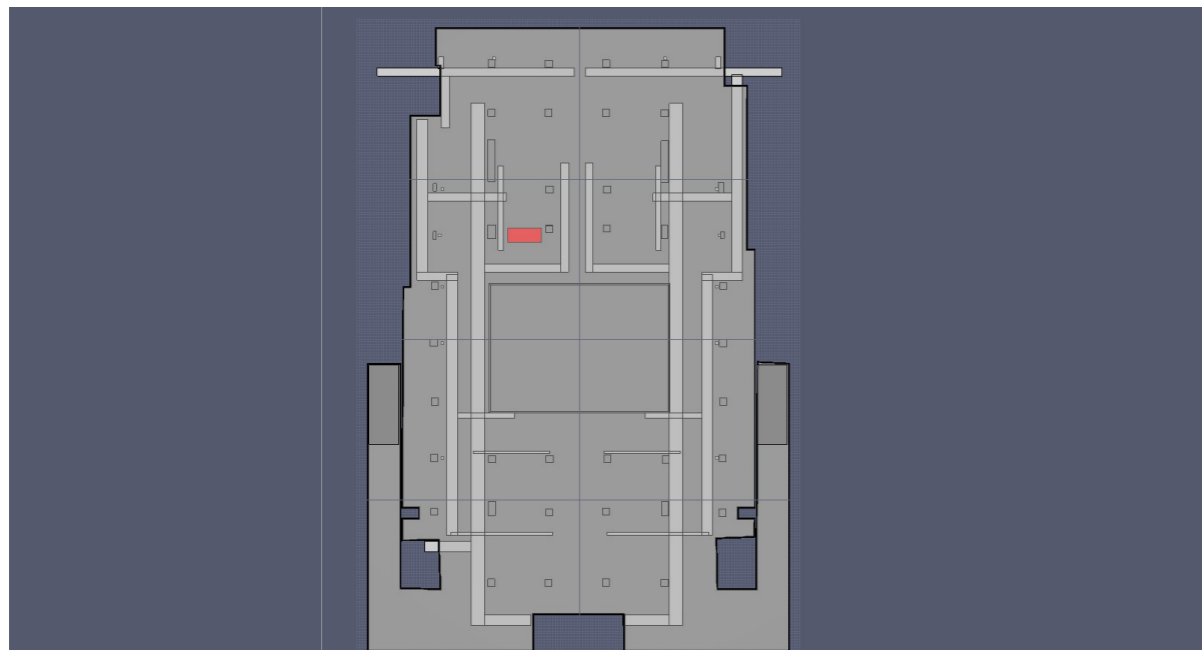


Figure 16: Basement 03 domain-2D.

# CFD SIMULATION REPORT

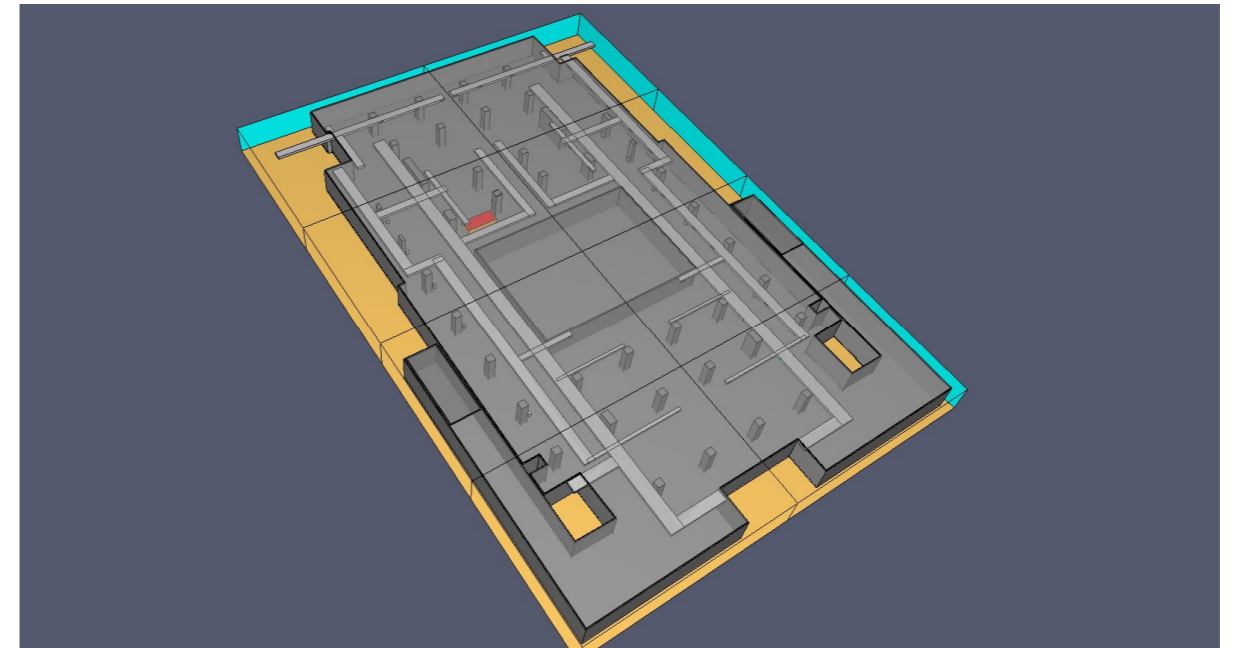


Figure 17: Basement 03 domain-3D.

## 8.3 Uncertainty

The SFPE Engineering Guide to Performance-Based Fire Protection defines uncertainty as "the amount by which an observed or calculated value might differ from the true value." In engineering, there are two types of uncertainty: epistemic and aleatory. Epistemic uncertainty is uncertainty due to a lack of (complete) knowledge. For example, it may not be possible to calculate precisely what the temperature would be in a post flashover fire due to approximations used in models and input values. Aleatory uncertainty is uncertainty due to random variation. For example, sprinklers that are manufactured may have a slight variation in activation temperature and response time index (RTI).

Fire is selected in the farthest spot from the exhaust outlet and in obstructed location as a conservative assumption.

## 9 FDS Results

In this section of the report, the results of the smoke control system design are discussed to validate the design against the project performance criteria. The simulation results for tenability criteria are presented using slice files in the model output. The slice files are used in evaluating gas temperature, visibility, and carbon monoxide concentration.

Each output image produced by Smokeview or PyroSim ResultView contains a scale located on the right side of the image. These scales depict visibility in meters, the temperature in Celsius, carbon monoxide toxicity in ppm, and velocity in meters per second. See a sample of results in Figure 18.

# CFD SIMULATION REPORT

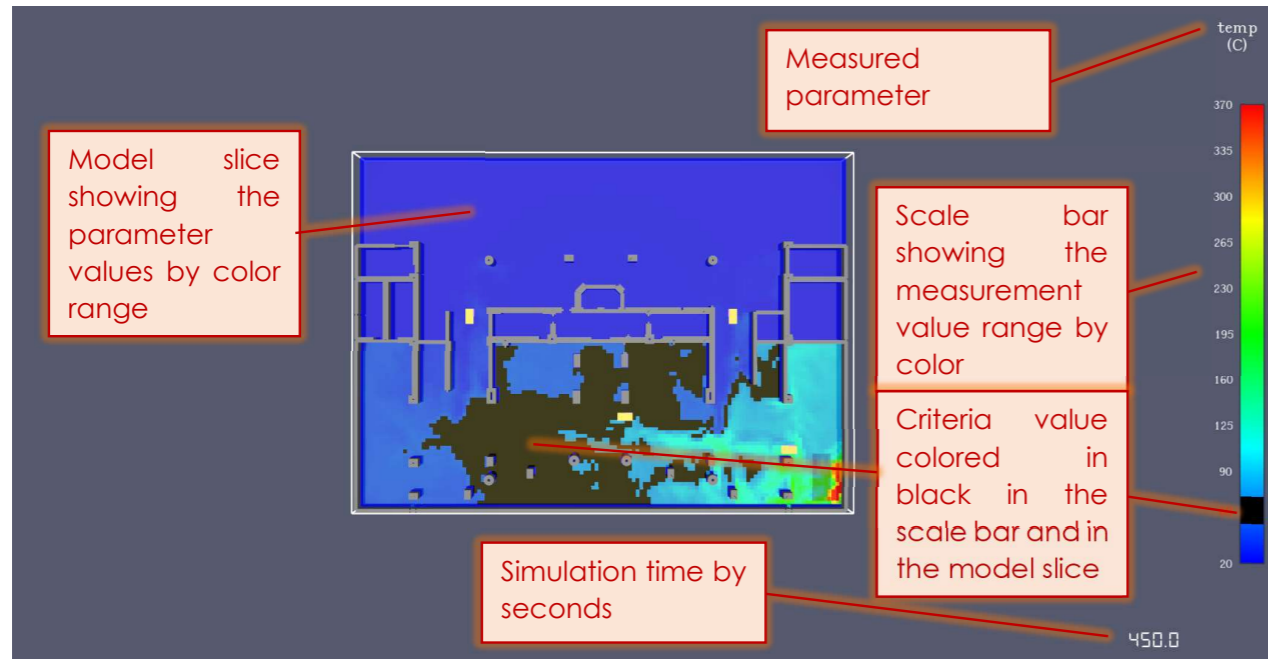
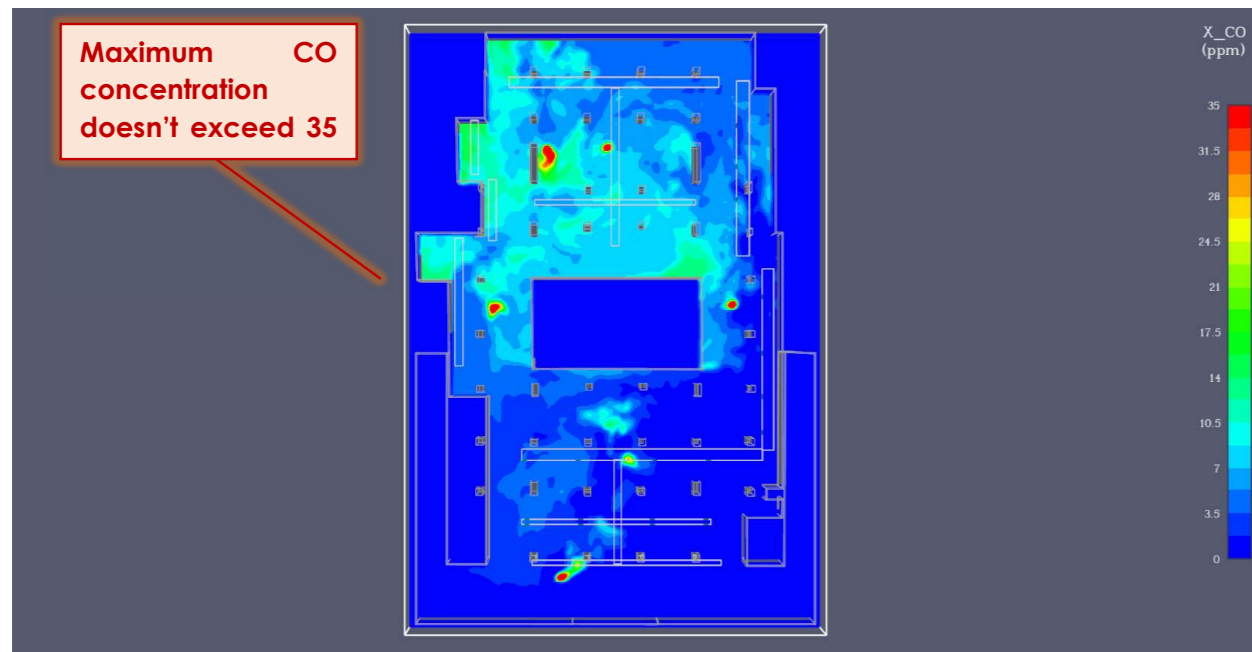


Figure 18: Generic sample of result output slice.

## 9.1 Evaluate the CO Concentration in Normal Mode

Simulation results show the CO concentration at 2m of the car level over 1200 seconds, the criteria limit is to not exceed the 35-ppm concentration limit over 1200 seconds. The ventilation system succeeds in keep the CO concentration lower than the 35-ppm criteria limit.

### 9.1.1 Basement 01:



# CFD SIMULATION REPORT

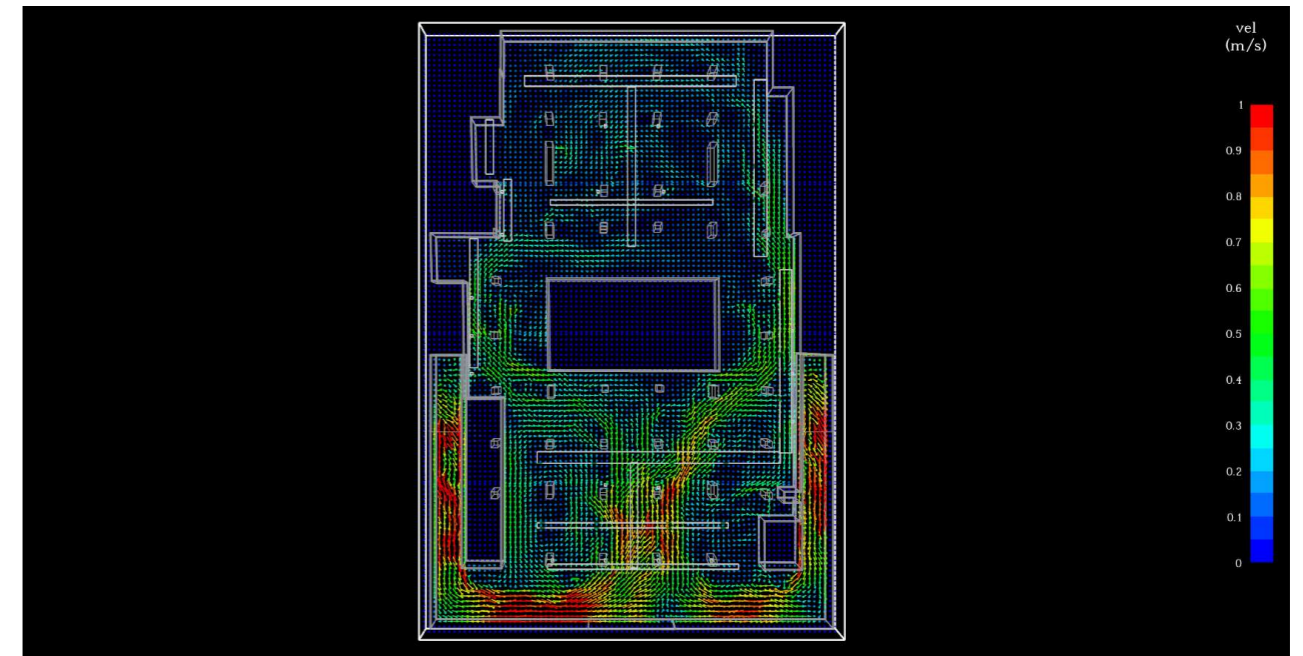


Figure 20: Velocity at 1.6m from FFL-Normal operation mode.

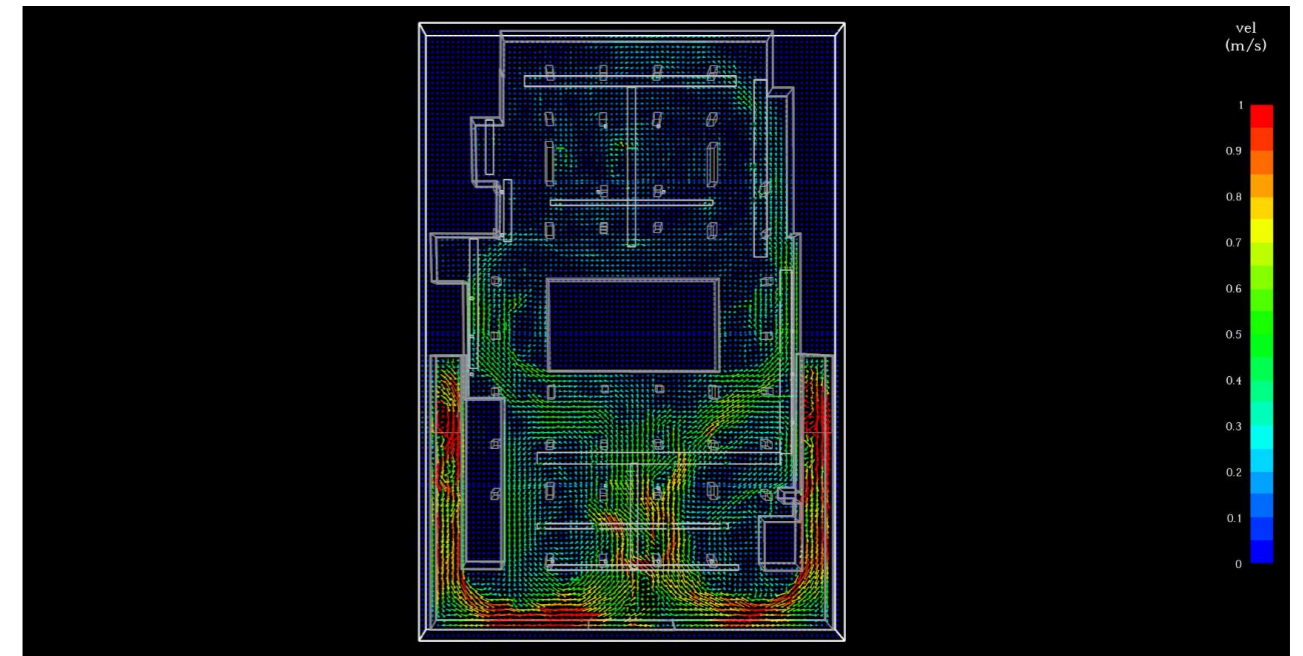


Figure 21: Velocity at 3.2 m from FFL-Normal operation mode.



# CFD SIMULATION REPORT

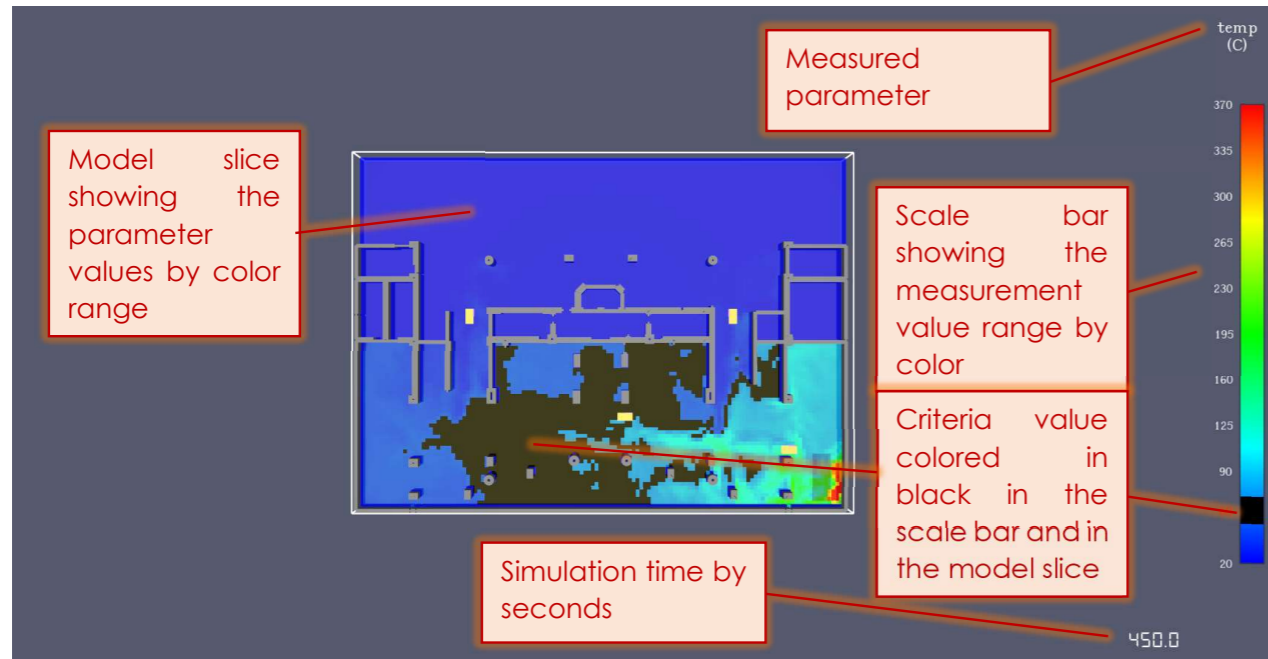
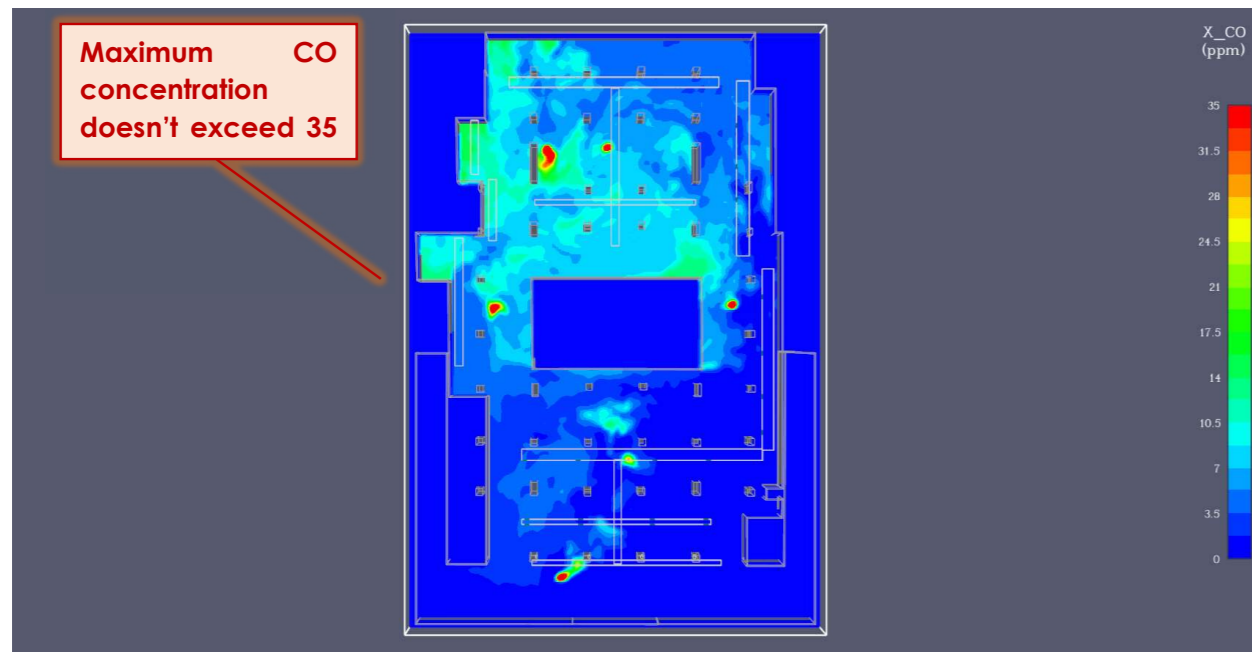


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### 9.1.1 Basement 01:



# CFD SIMULATION REPORT

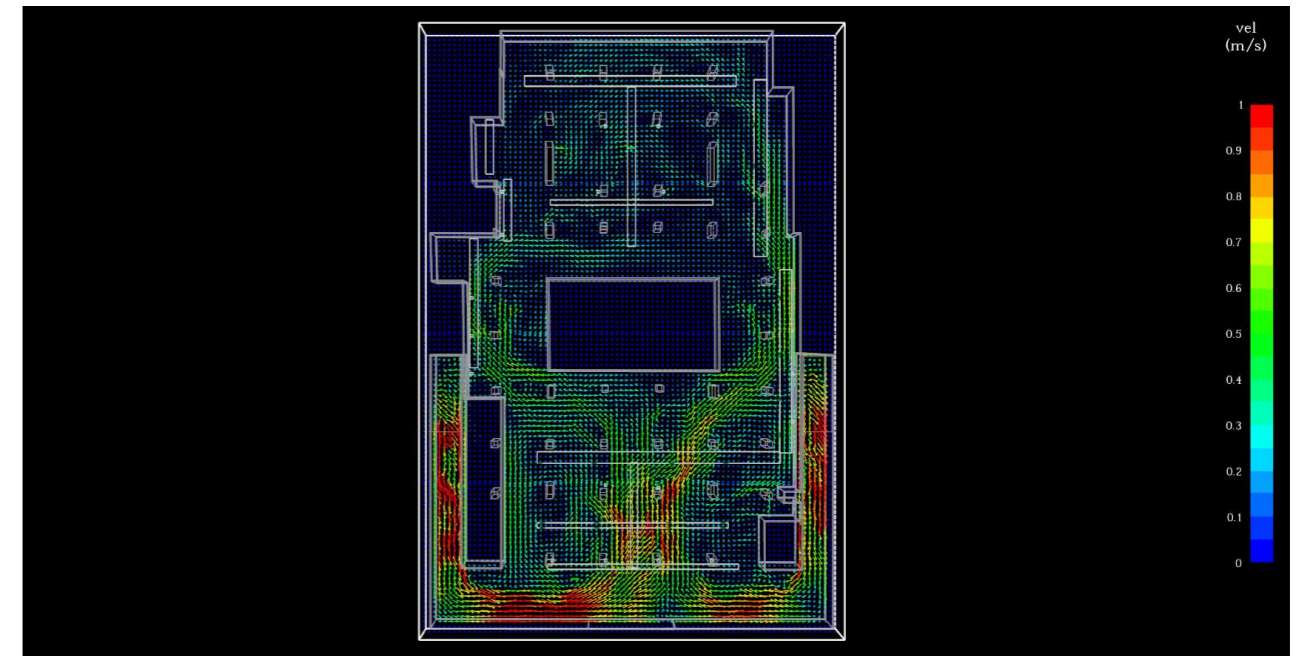


Figure 20: Velocity at 1.6m from FFL-Normal operation mode.

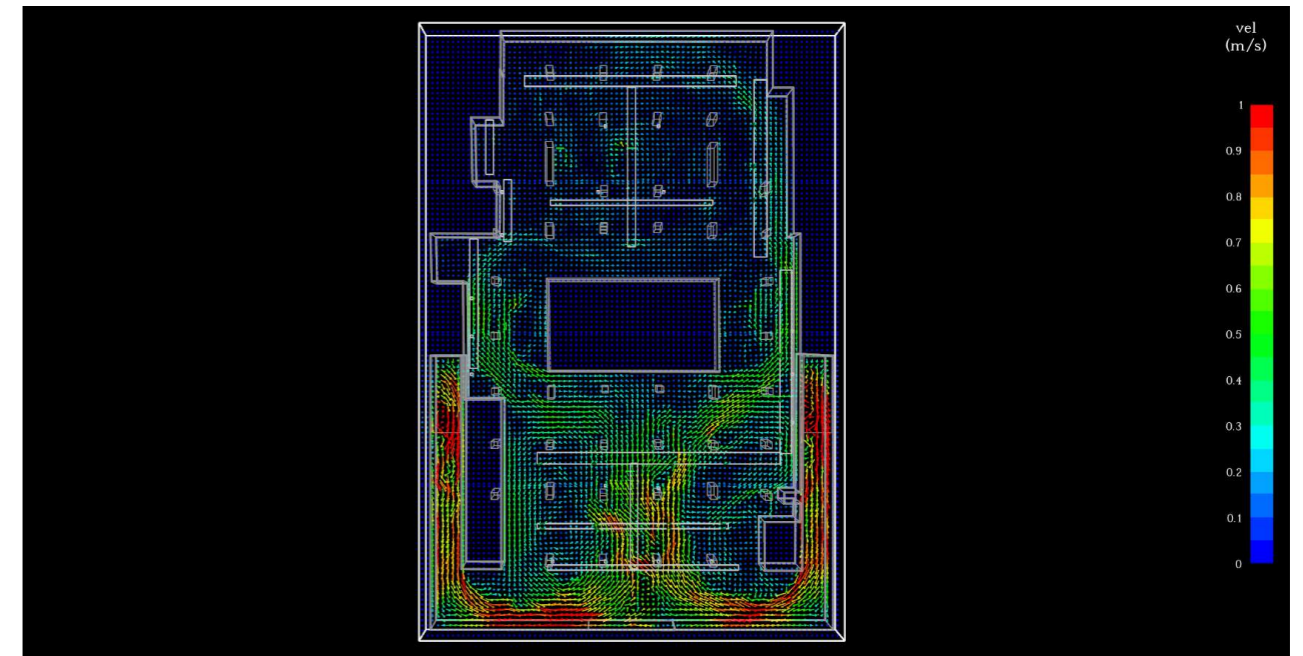


Figure 21: Velocity at 3.2 m from FFL-Normal operation mode.

# CFD SIMULATION REPORT

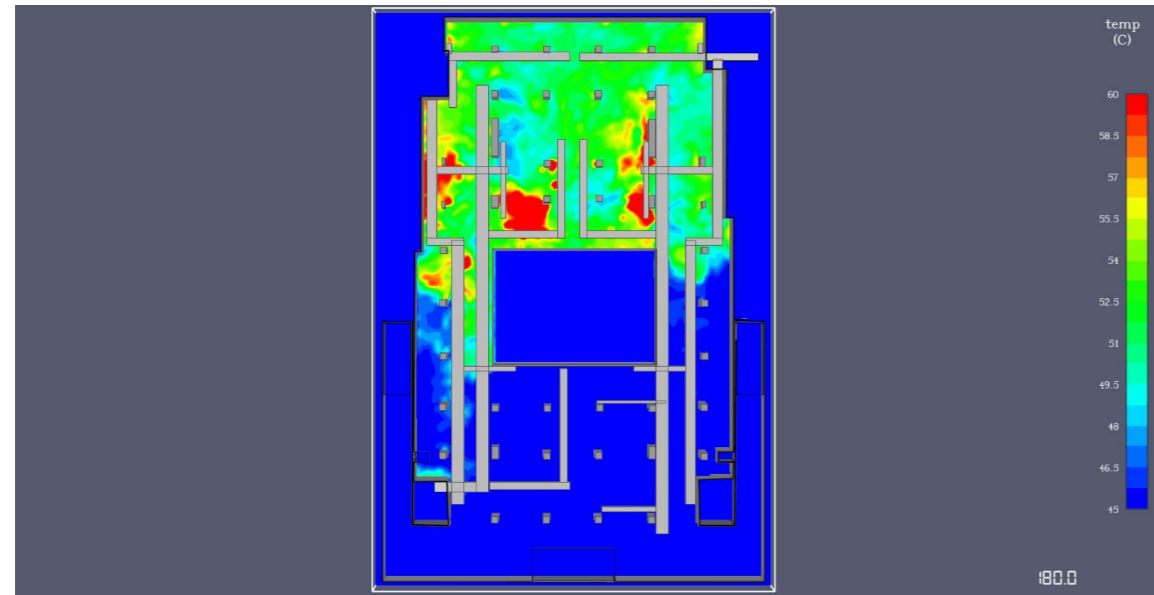


Figure 82: Contours of temperature in (°c) at 180 seconds time in the car park.

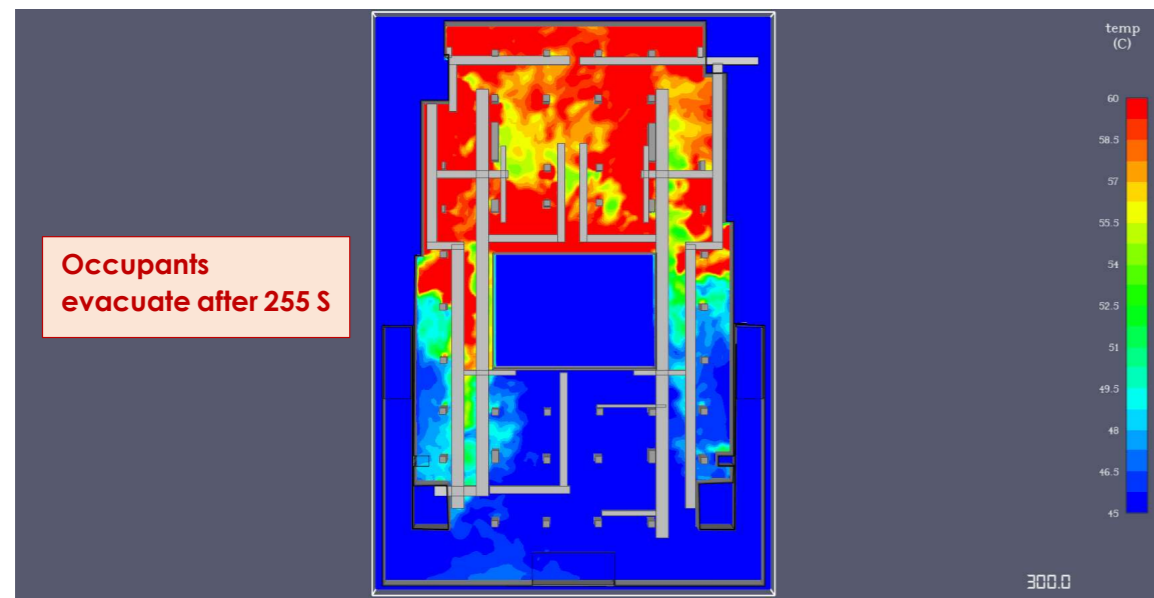


Figure 83: Contours of temperature in (°c) at 300 seconds time in the car park.

# CFD SIMULATION REPORT

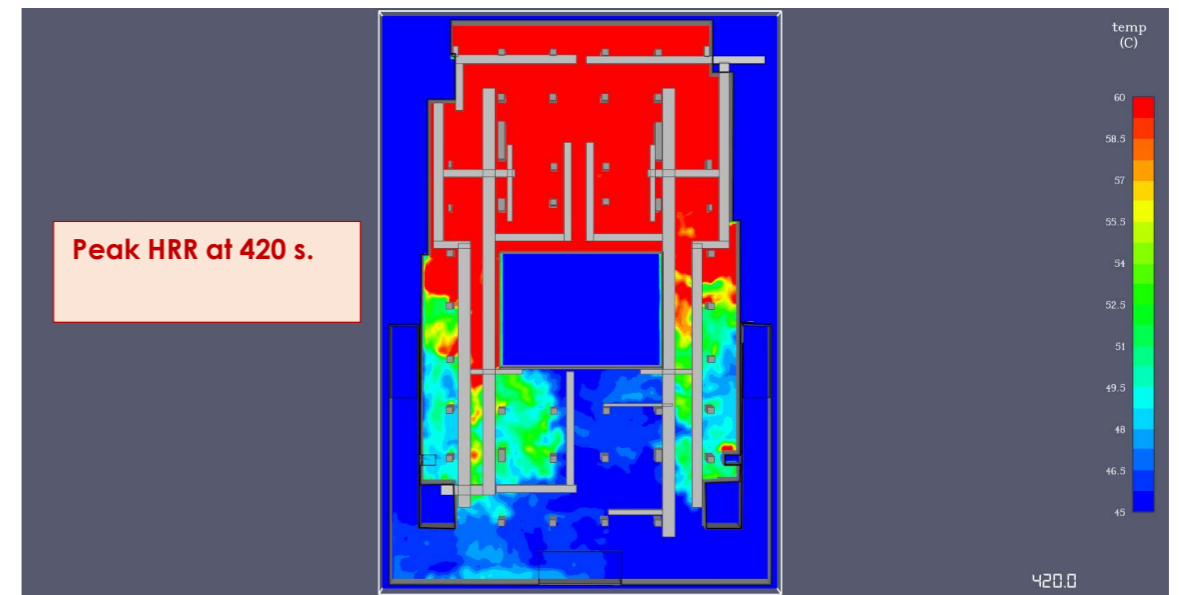


Figure 84: Contours of temperature in (°c) at 420 seconds time in the car park.

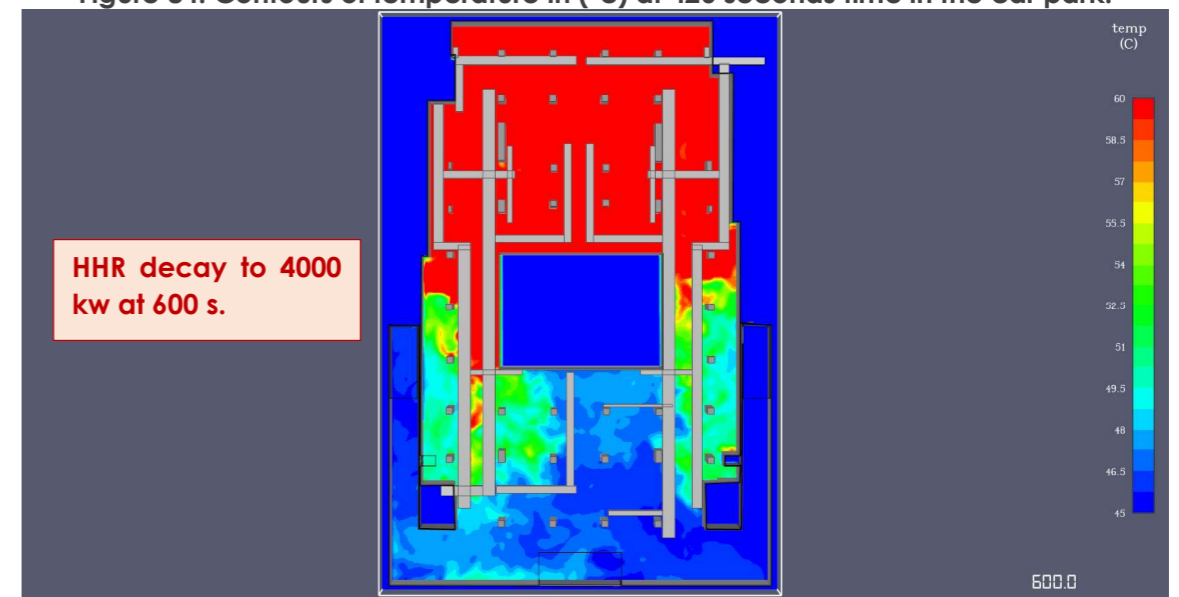


Figure 85: Contours of temperature in (°c) at 600 seconds time in the car park.



# CFD SIMULATION REPORT

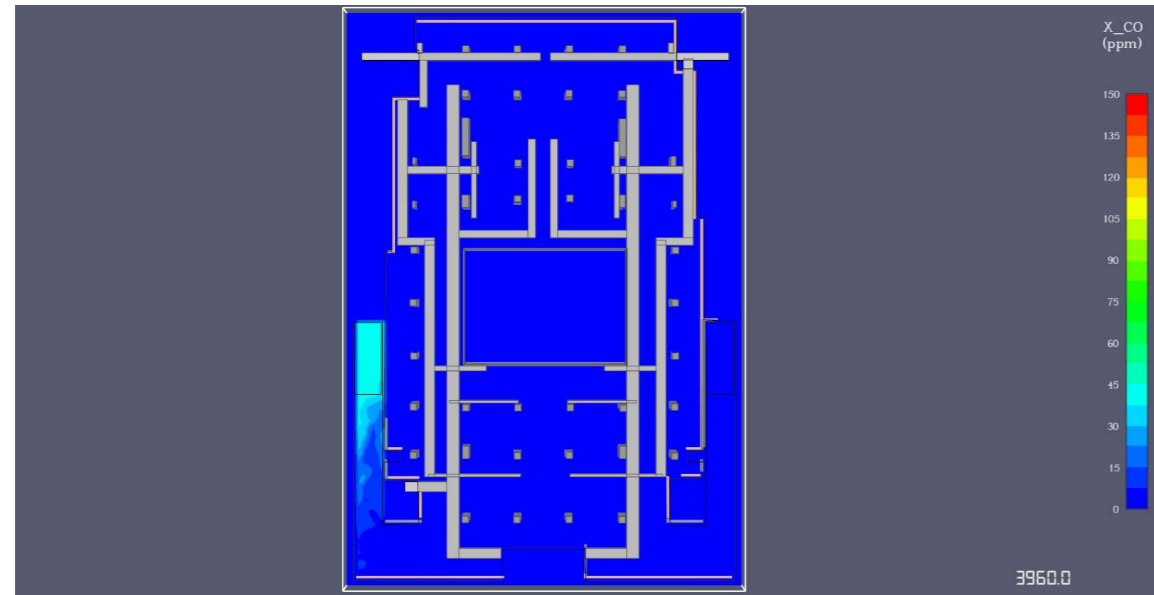


Figure 150: Contours of CO concentration levels in (ppm) at 3960 seconds of time in the car park.

# CFD SIMULATION REPORT

## 10 Conclusion

The following conclusions can be drawn from the CFD simulations of ventilation system for The Car park project as:

1. Ventilation System in the car park area has been designed to reduce the CO level within the acceptable limits. This has been done with the help of CFD tools.
2. All assumptions have been taken according to client requirements & Industrial Standards.
3. After conducting CFD analysis, maximum CO Concentration obtained is less than 35 ppm which is acceptable for 1 hour. Moreover, proper air flow was obtained in complete car park area.
4. The Fire Simulation is carried out to examine the proposed duct smoke control system for a peak heat release rate of 8.5 MW of fire size for fire in the car park.
5. As per the above CFD results for temperatures at the height of 2m
  - The temperature was more than 60 °C at above the fire area at the peak rate of the fire. However, at the other area of the car park the temperature is less than 60 °C.
6. As per the above CFD results for visibility at the height of 2m.
  - The visibility was always more than 10 meters in all over the car park area, except near the fire location at peak heat release rate of fire.
7. As per the above CFD results for CO concentration at the height of 2m.
  - The CO concentration was always less than 150 ppm in all over the car park area, except near the fire location at peak heat release rate of fire.
8. As per the above CFD results, the available evacuation time ASET is more than the required safe evacuation time RSET. So, the occupants can evacuate before exposed to untenable condition.
9. From the above CFD conclusions, temperature tenability criteria of "less than 60 °C", the visibility tenability criteria of "more than 10 meters", and CO concentration tenability criteria "less than 150 ppm" are maintaining all time except at the time of the peak HRR of the fire, keeping a clear path to occupants to escape from the car park in case of fire, and give clear path to fire fighter to enter the car park and reach the fire seat.

# P O R T F Ó L I O

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