# CIC BIM Competition 2023 – Submission Poster Template

**Location Plan 1:2000**

The proposed Construction Innovation Campus will be located at 95 Yue Kwong Road, Aberdeen, Hong Kong, on a site with a total area of 8,833 square meters.

## About the Project Development

### Design Concept:
Our design solution prioritizes connectivity and sustainability by incorporating three towers of varying heights, a separate connector building, and passively sustainable design elements.

### Building Form:
The proposed design solution incorporates three towers of varying heights connected by a separate building to enhance connectivity and create a cohesive design. The building form relates to the surrounding site context by following the existing building height restrictions and using the existing building as a starting point for the procedure. Additionally, the design's public tower serves as a central hub for visitors to the campus, creating a visual and physical connection with the surrounding community.

### Spatial Arrangement:
The accommodation of key areas in our proposed Construction Innovation Campus design is arranged to enhance connectivity and create a cohesive design. A public tower serves as a central hub, while a separate building connecting the towers serves as a common area for collaboration. The arrangement promotes a collaborative and engaging environment for learning and innovation in the AECO industry.

### Connectivity:
The design includes a designated drop-off area and parking for visitors and staff, as well as clear and accessible pathways throughout the site. Fire safety measures, such as fire-rated walls, sprinkler systems, and emergency lighting, have been incorporated into the design to ensure a safe environment. Furthermore, the design includes multiple evacuation routes with clear signage and wayfinding to guide visitors in case of an emergency.

### BIM Uses in Design, Coordination, Engineering, Analysis and Optimisation:
BIM tools can be used for creating a digital model, coordination, engineering analysis, and optimization. It allows for accurate and detailed construction documents, clash detection, and resolution, performance insights, and exploring design options. BIM promotes efficiency, sustainability, and innovation in the AECO industry.

### BIM Collaboration Approach:
Participants collaborate using Building Information Modelling (BIM) tools and a Common Data Environment (CDE) for information management. The approach promotes communication and consistency among project stakeholders. BIM tools such as Autodesk Revit, Navisworks, BIM 360, and Solibri can be used for real-time collaboration, scheduling, cost estimating, construction sequencing, and clash detection, among others.

### Quality of Design:
BIM improves design quality by creating a detailed digital model for visualization, simulation, and analysis. It enables early clash detection, optimization of the design, and identification of efficient and sustainable solutions. BIM leads to fewer errors, and improved efficiency, safety, and sustainability in the AECO industry.

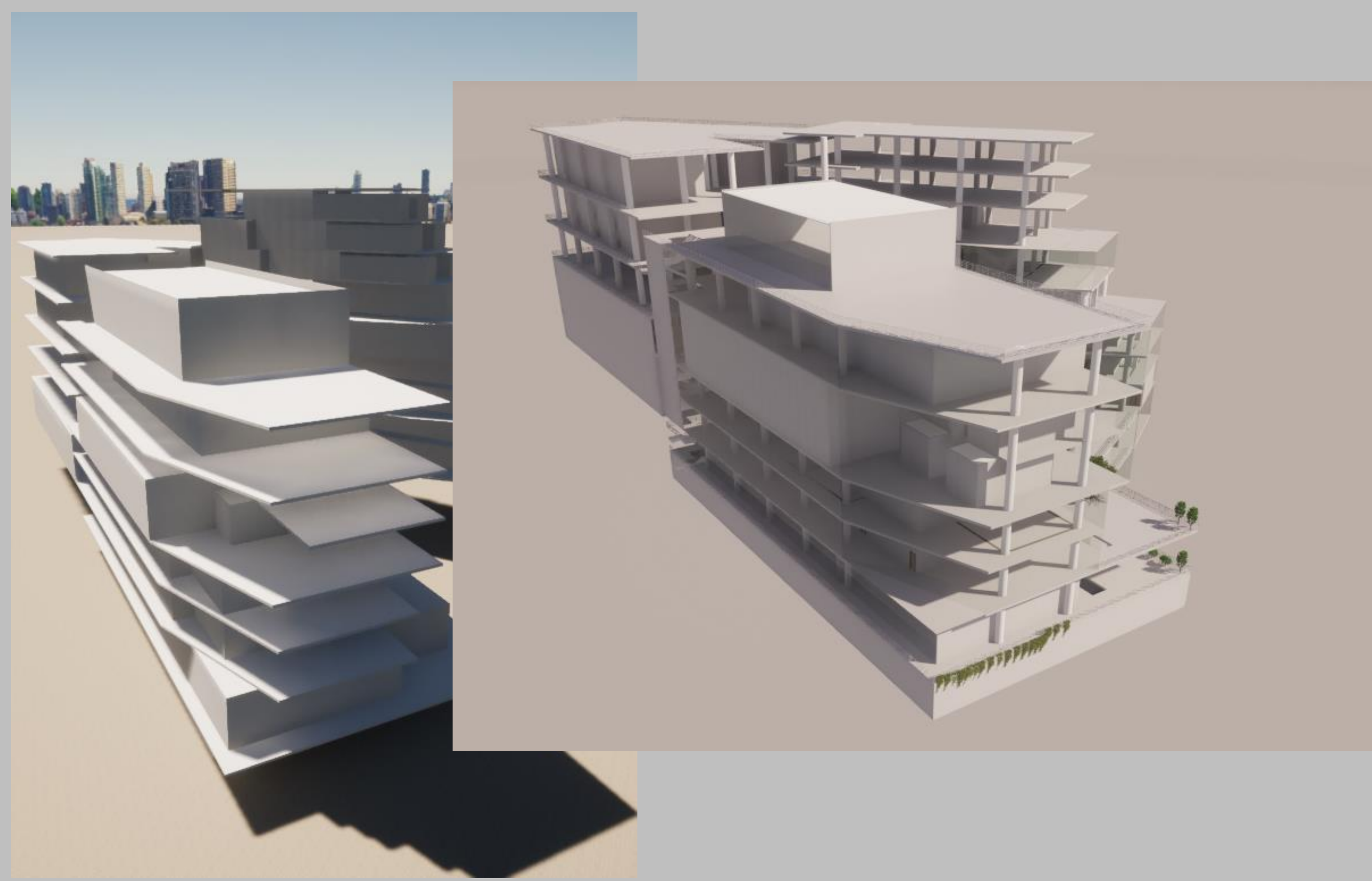
### Sustainability:
The design of the proposed Construction Innovation Campus prioritizes sustainability by adopting a passive building design approach, using sustainable materials, and incorporating sun shading devices and wind catchers. The adoption of modular integrated construction methods, such as MiC, DfMA, and MiMEP, is encouraged, leading to significant improvements in productivity, safety, quality, and sustainability.

### MiC, MiMEP and DfMA:
The use of MiC and MiMEP in their designs by selecting designated areas and developing details in the BIM models showing the installation works of mechanical, electrical, plumbing, and lighting fixtures. Design solutions that are economically viable and efficient to build using MiC, DfMA, and MiMEP are encouraged, leading to significant improvements in productivity, safety, quality, and sustainability.

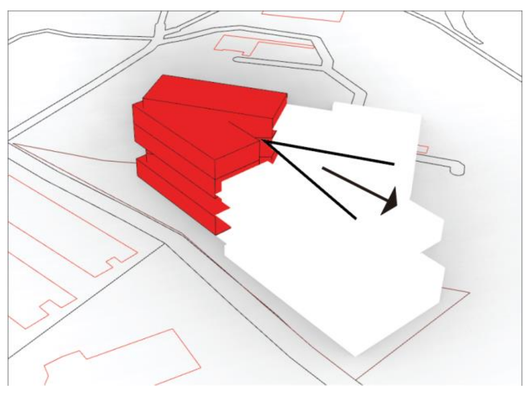
### Constructability:
Some of the innovative approaches mentioned in the project brief include the use of BIM tools and related technologies, the adoption of modular integrated construction methods such as MiC and MiMEP, and the use of sustainable strategies in the design of the CIC to achieve net-zero carbon emissions.

### Summary:
BIM influences the design, engineering, coordination, and project collaboration by providing a digital platform for creating and managing project information. It allows project stakeholders to collaborate more effectively and efficiently, reducing errors and rework during construction. BIM tools can be used for real-time collaboration, scheduling, cost estimating, construction sequencing, and clash detection.

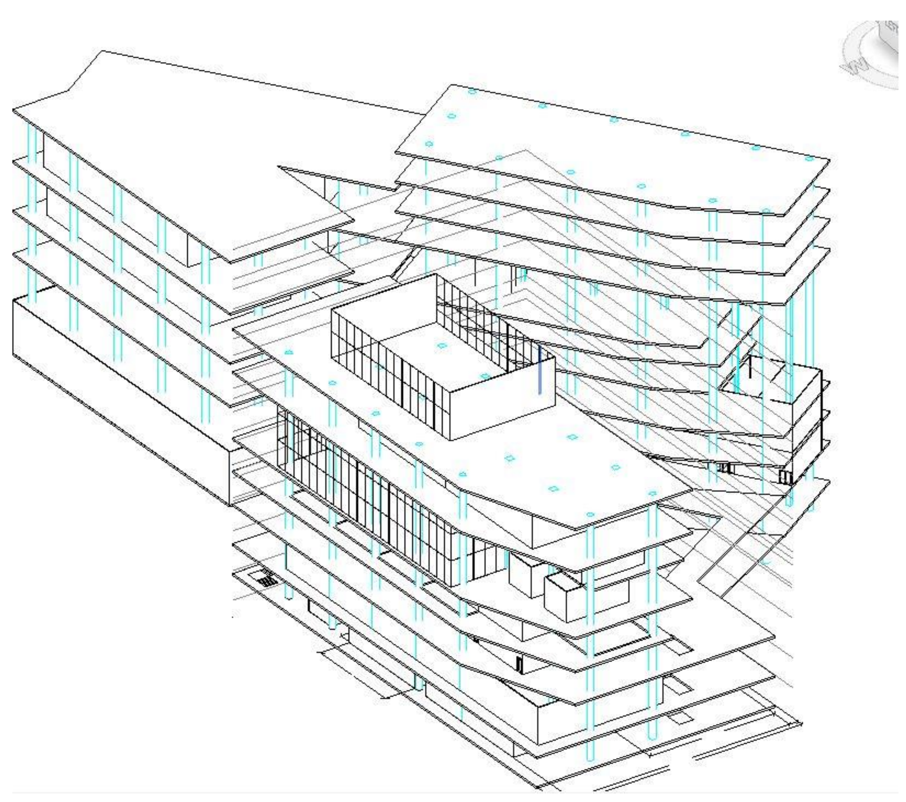
**Conceptual Diagram:** The proposed design solution for the Campus prioritizes connectivity and sustainability while addressing the design opportunities and constraints outlined in the project brief. The design incorporates three towers of varying heights, each with distinct functions, and a separate connector building to enhance connectivity and create a cohesive design



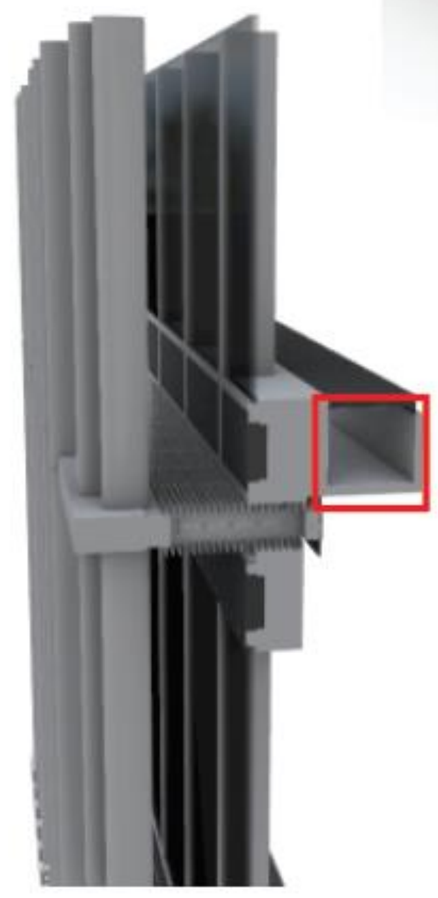
**Overall Bird Eye view:** **The design solution incorporates three towers of varying heights, connected by a separate building to enhance connectivity and create a cohesive design. The design of the towers incorporates sustainable strategies, while also addressing the constraints outlined in the project brief and promoting innovation in the AECO industry.**

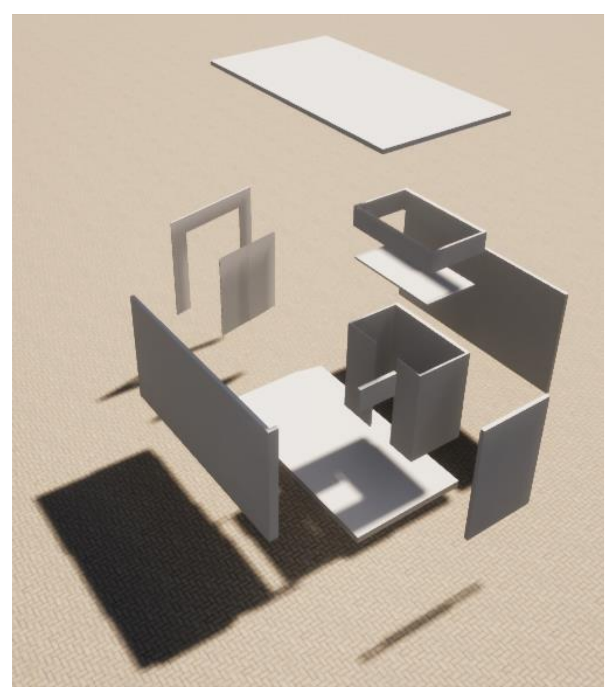


**Building Form and Space:** **The proposed design solution for the Construction Innovation Campus (CIC) incorporates three towers of varying heights with distinct functions. The first tower serves as a central hub for visitors and houses exhibition spaces, a library, a canteen, and a lecture hall. The second and third towers contain classrooms, studios, and workshops, with the third tower also featuring additional amenities such as a gym center and guest house. A separate building serves as a connector between the towers, enhancing connectivity and creating a cohesive design.**



**Quality:** **With BIM, designers can create accurate 3D models that allow for real-time collaboration and coordination among project stakeholders. This can help identify and resolve potential design clashes and conflicts before construction begins, reducing errors and rework during construction. BIM also allows for the creation of detailed construction schedules, cost estimates, and material lists, facilitating better project planning and management. These features can help ensure that the design meets all relevant standards and regulations, improving the overall quality of the design.**





**Sustainability:** **The proposed design solution for the Construction Innovation Campus (CIC) prioritizes sustainability by adopting passive building design strategies. The design incorporates sustainable materials and building elements like sun shading devices and wind catchers to reduce energy consumption. The use of modular integrated construction methods, such as Design for Manufacture & Assembly (DfMA) and Modular Integrated Construction (MiC), allows for the off-site manufacture of high-quality construction components and efficient assembly of the components on-site, reducing waste and improving productivity**

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## Sustainable Design of the Construction Innovation Campus using BIM

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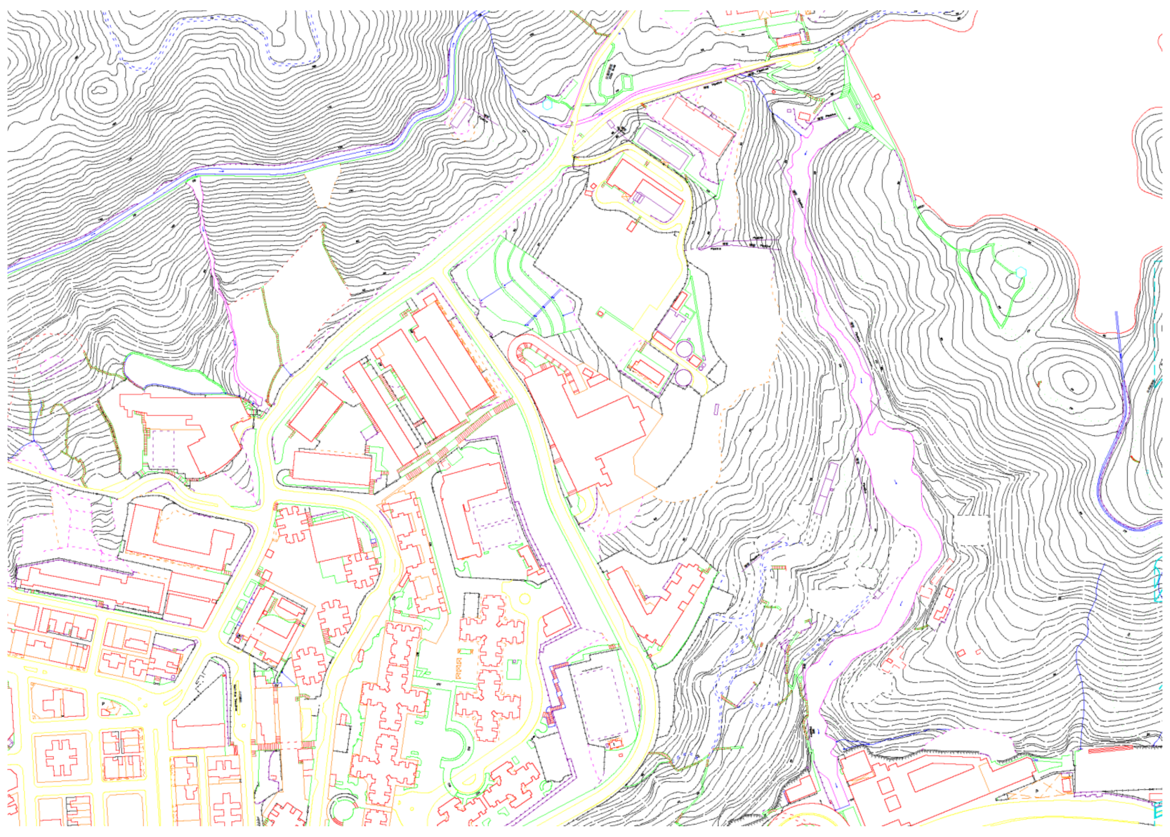
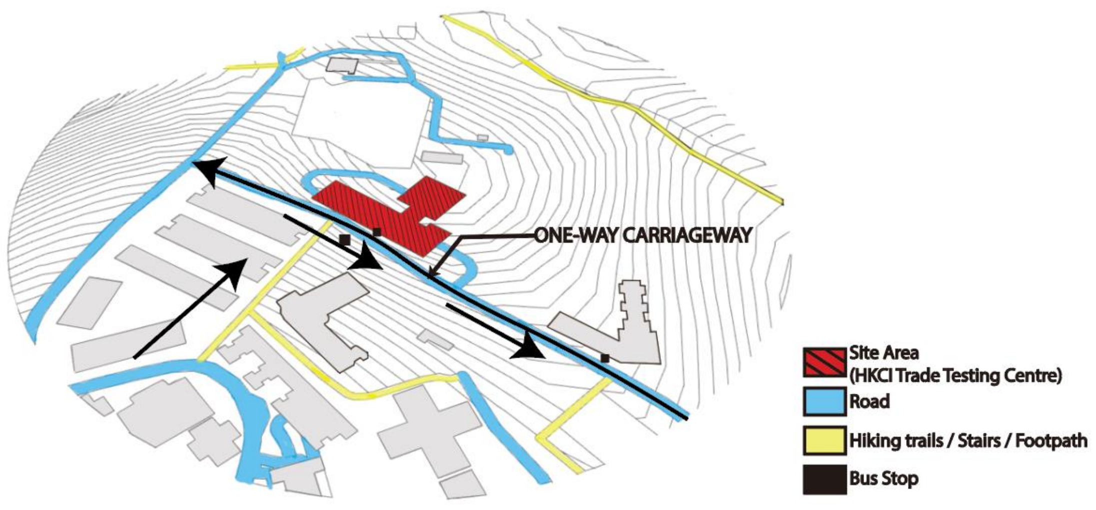
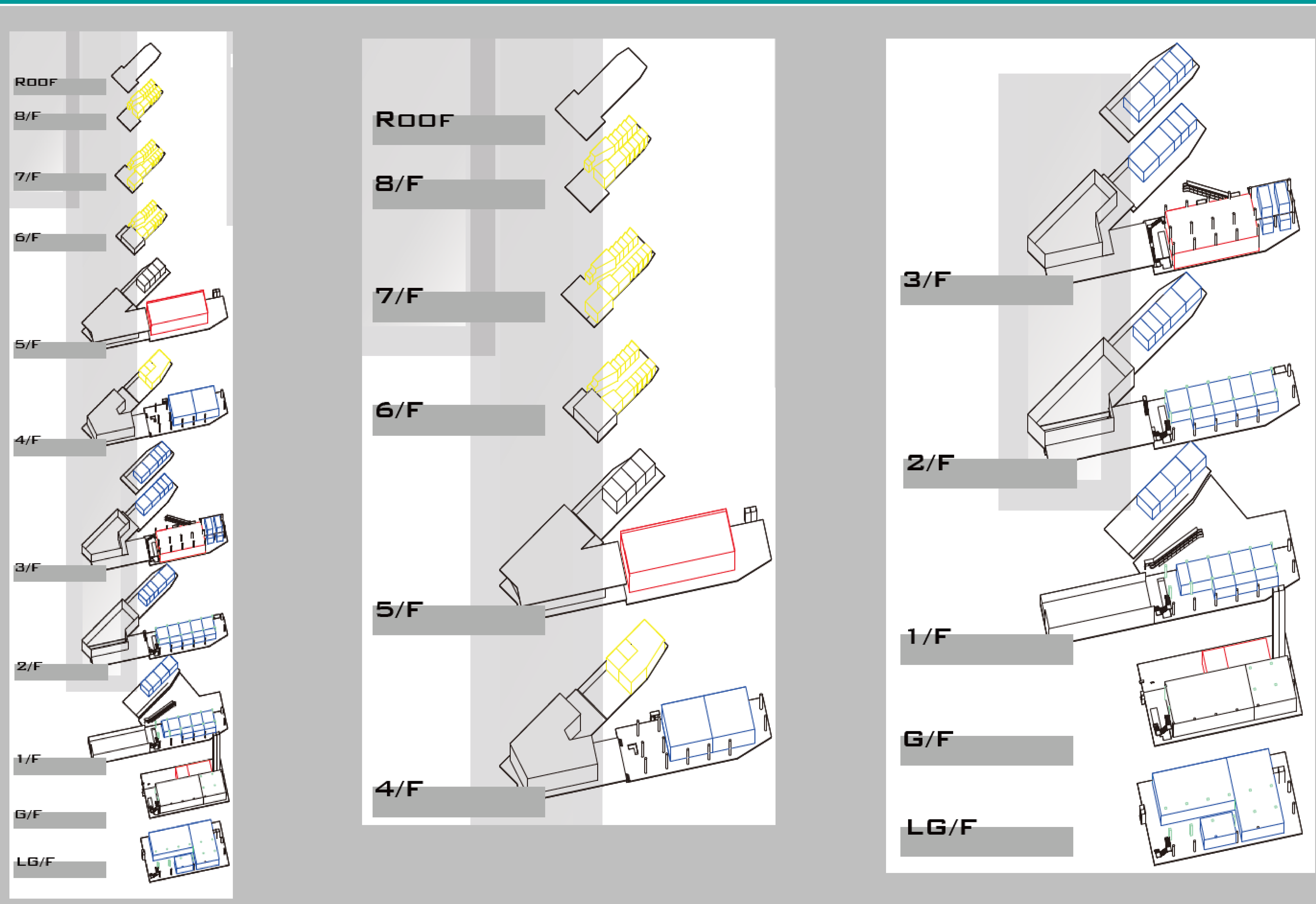
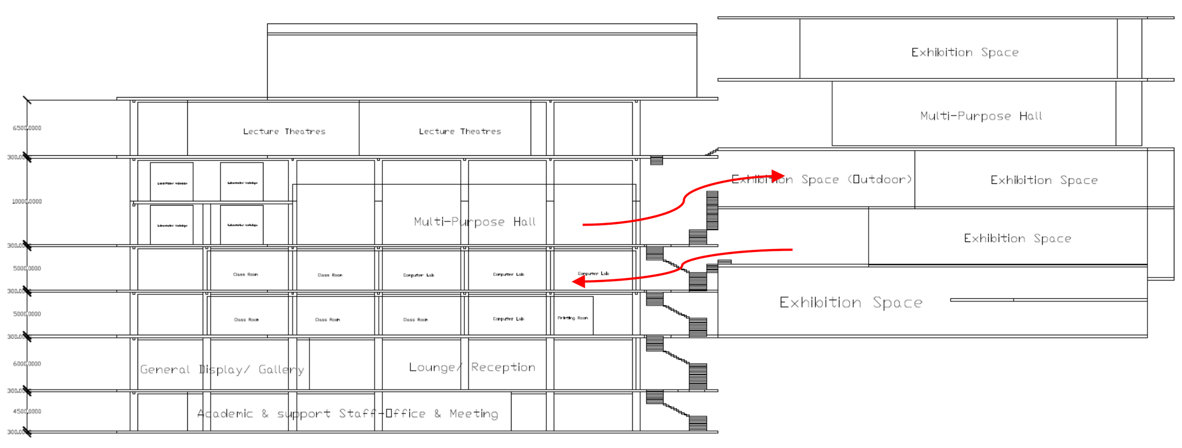
Site Layout Plan 1:1000

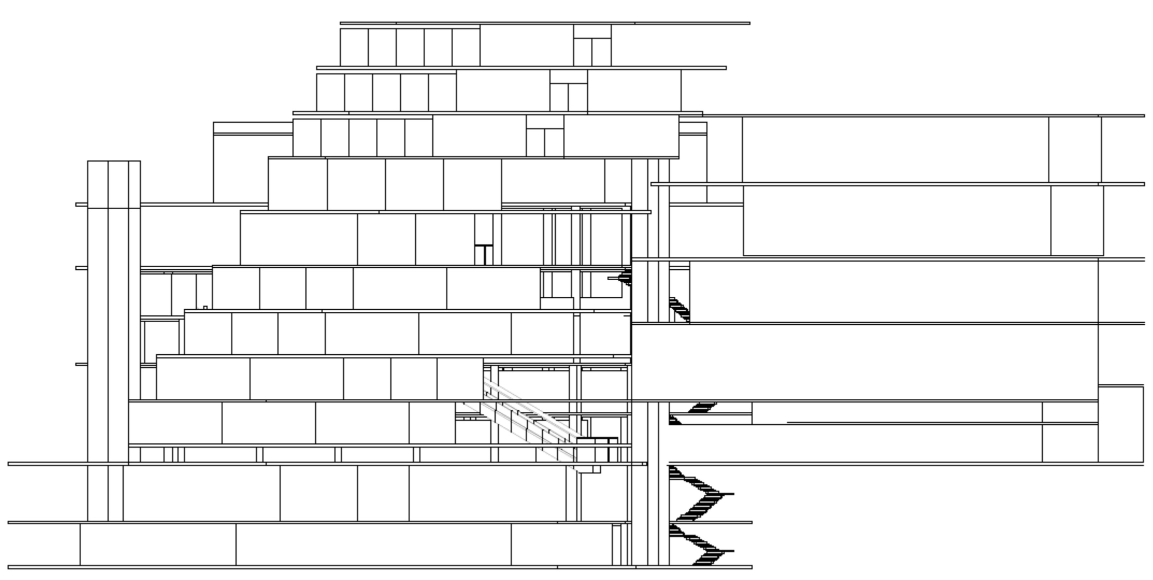


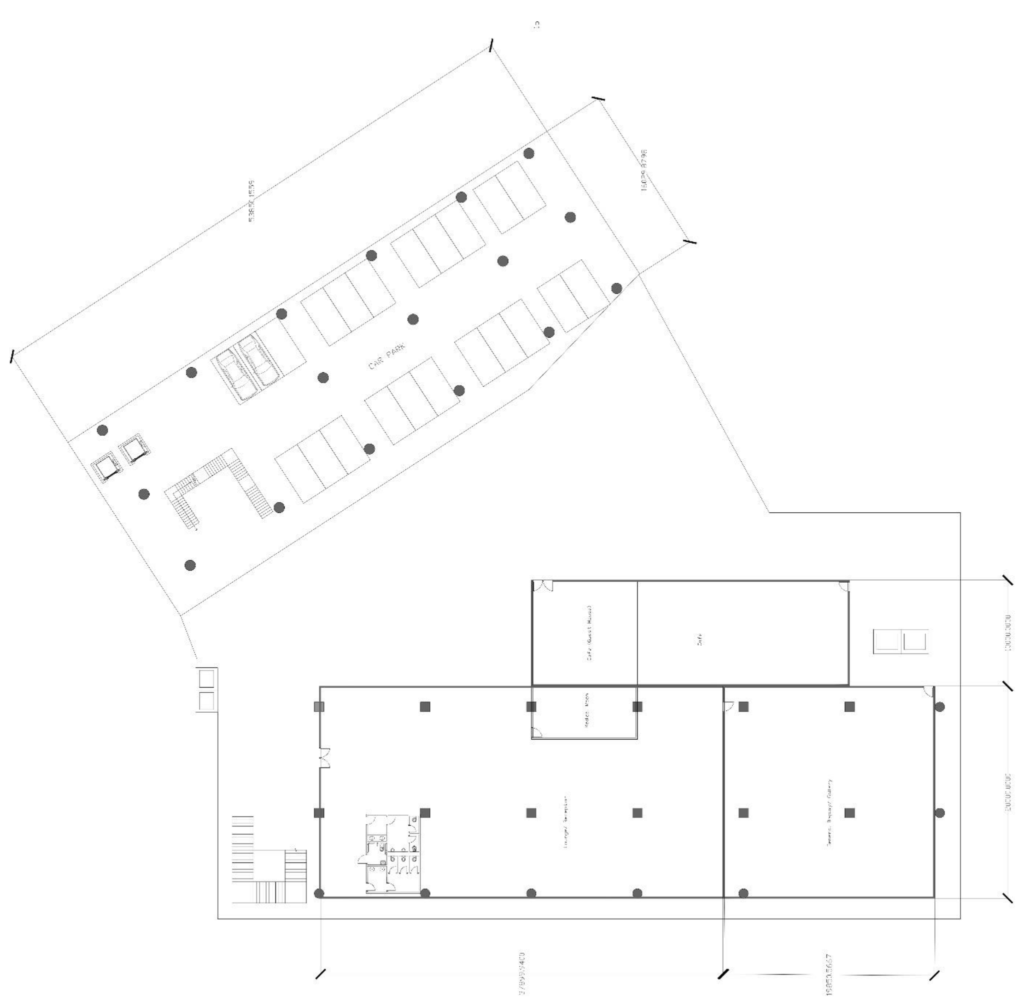


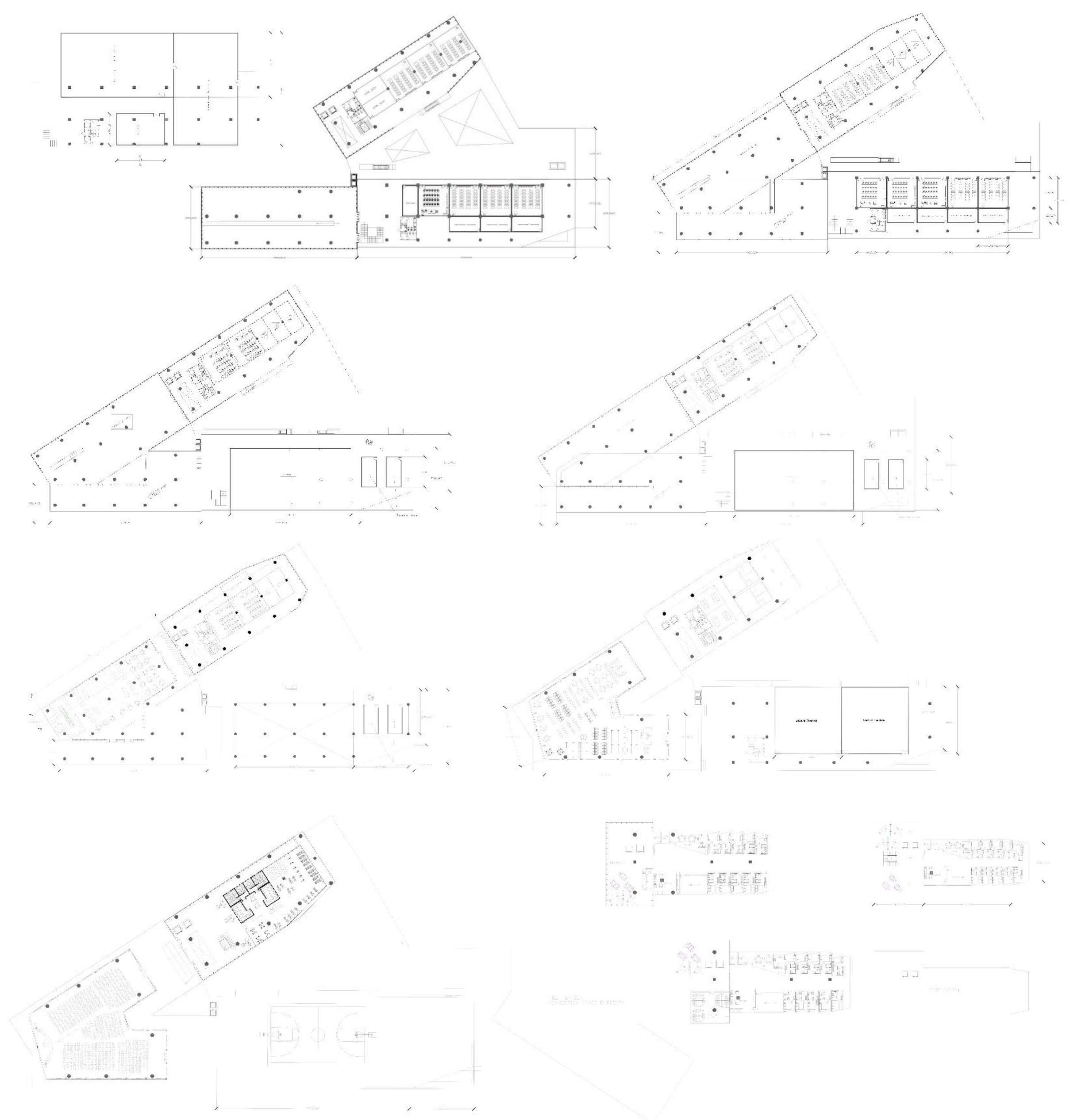

**Perspective View:** In the proposed architectural design solution, we utilized the exhibition space to create different connection points that link the three towers' different spaces. These connection points include a corridor and a staircase, which tightly connect the three towers to form a unified and seamless overall design.







Ground Floor Plan 1:250

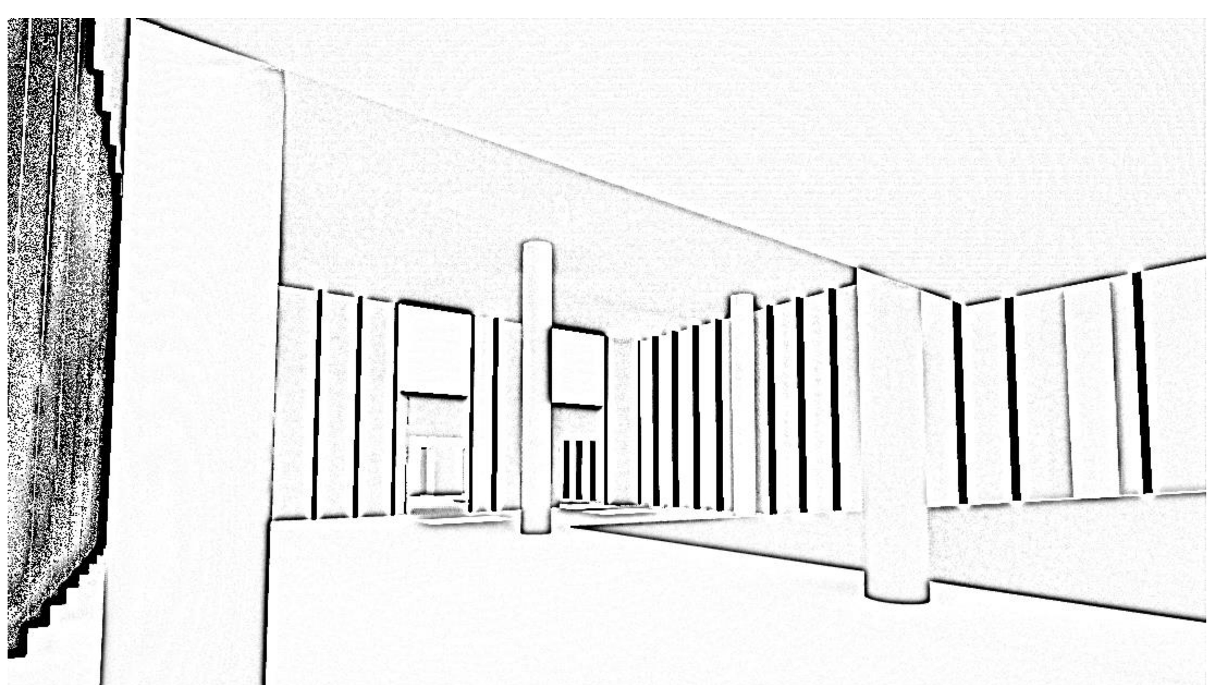


LG, 1-9 FLOOR Plan 1:500

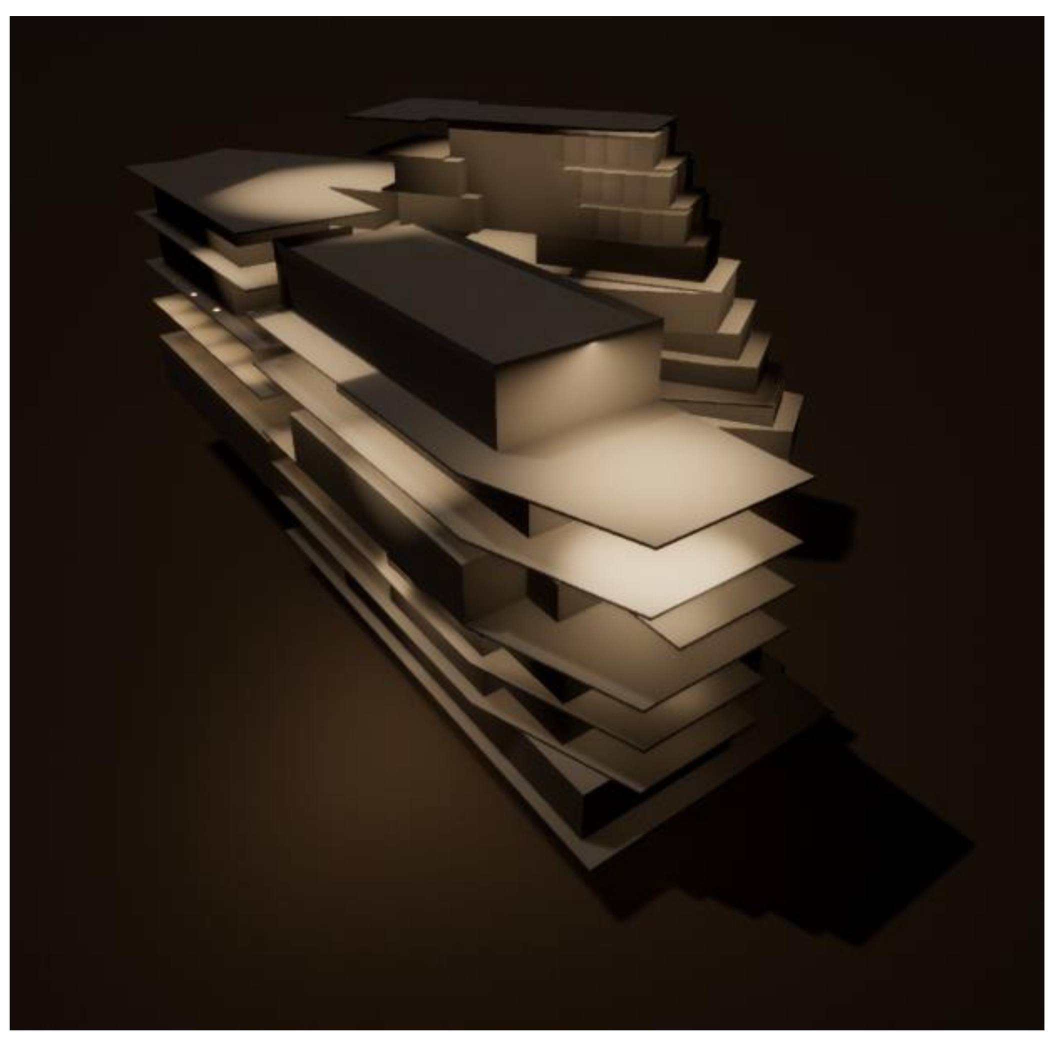
## Computational Design:

The corridor is located on one side of the exhibition space, connecting the public tower and the education tower, providing pedestrian access and bike lanes to facilitate connectivity with the campus. The staircase is located on one side of the education tower, leading to the apartment tower and other facilities, including a gym center and guest rooms. These connection points not only provide convenient transportation but also enhance interaction and connection between different parts.

This design approach effectively connects different spaces by utilizing the exhibition space to create connection points, thus enhancing overall functionality and flow. Additionally, the design of the corridor and staircase considers sustainability, including maximizing ventilation and natural light utilization, thereby improving energy efficiency and reducing energy consumption. Overall, through this design approach, we can maximize the use of space while creating a unified, seamless, and sustainable architectural design.



Internal Perspective 1:500

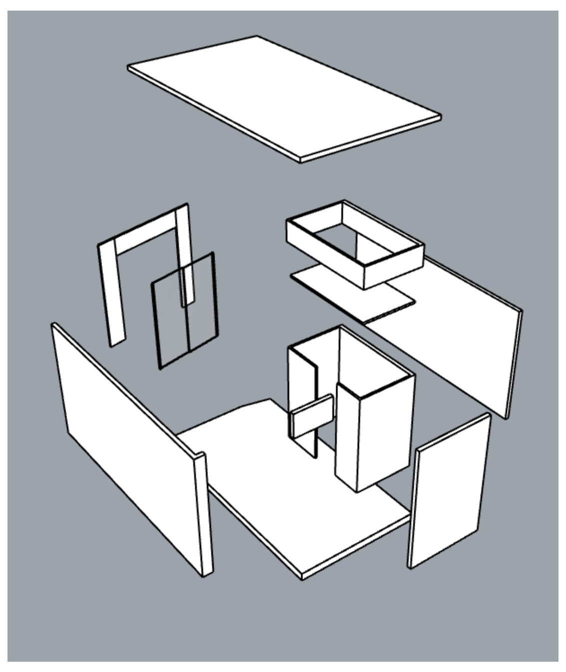


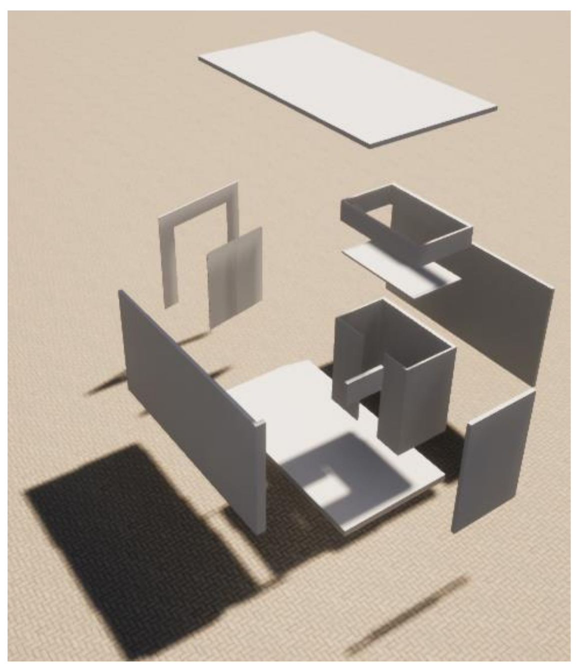
Overall Bird Eye view (Night View)

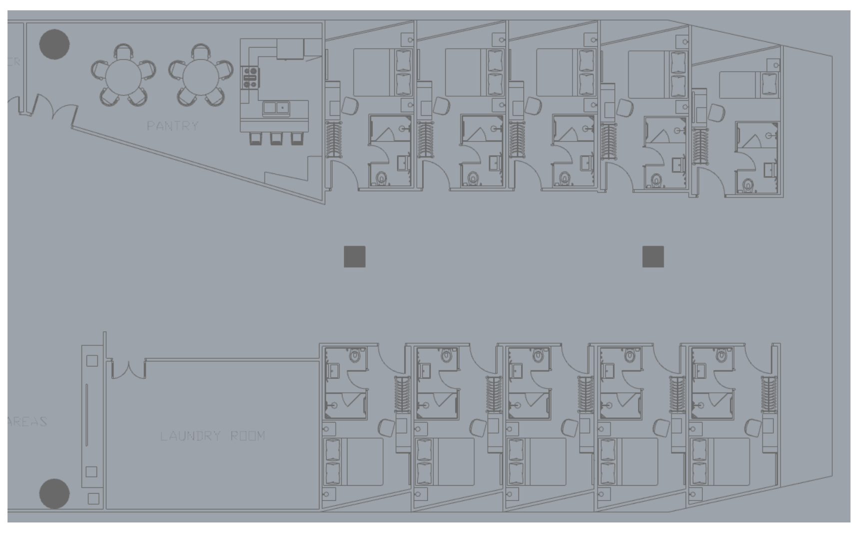
**CIC BIM Competition 2023**

**Sustainable Design of the Construction Innovation Campus using BIM**

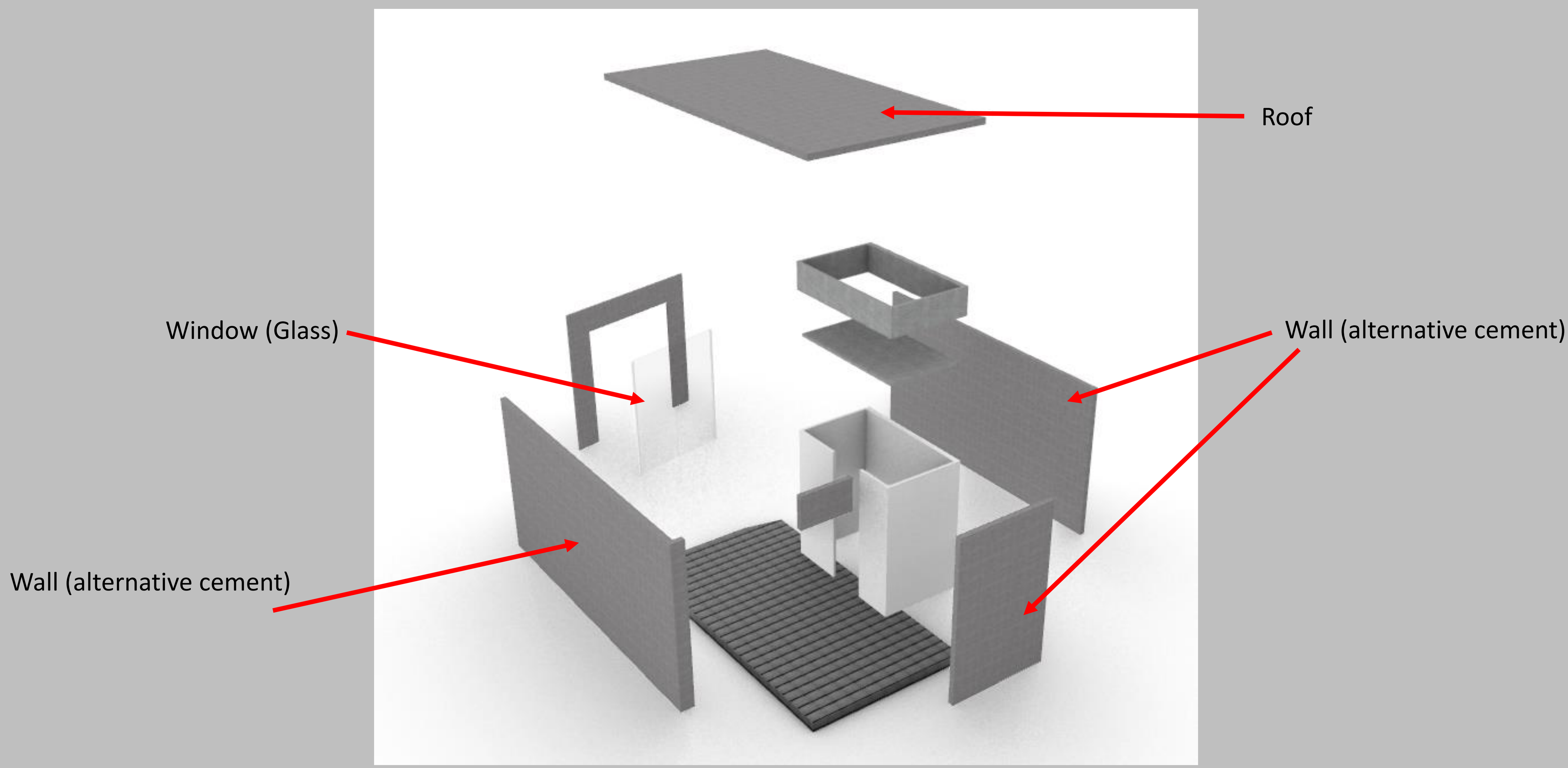
# CIC BIM Competition 2023 – Submission Poster Template



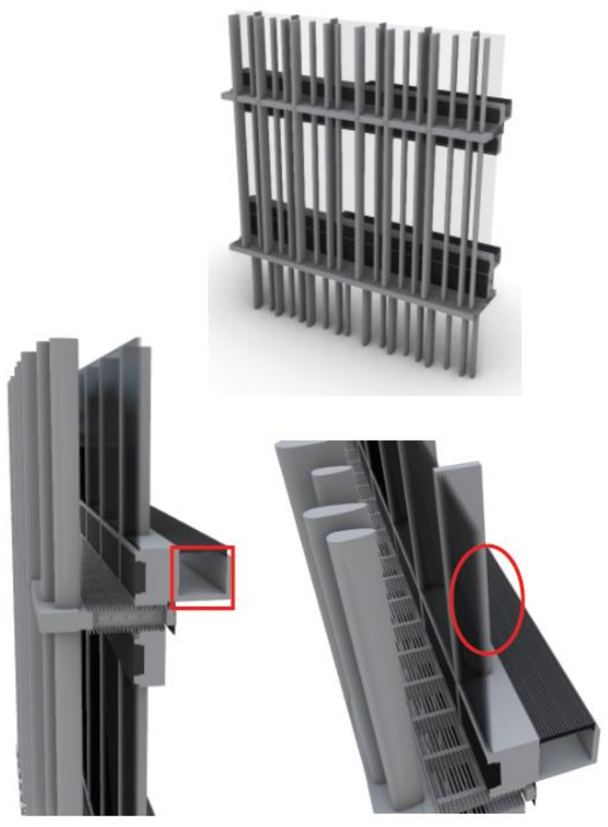




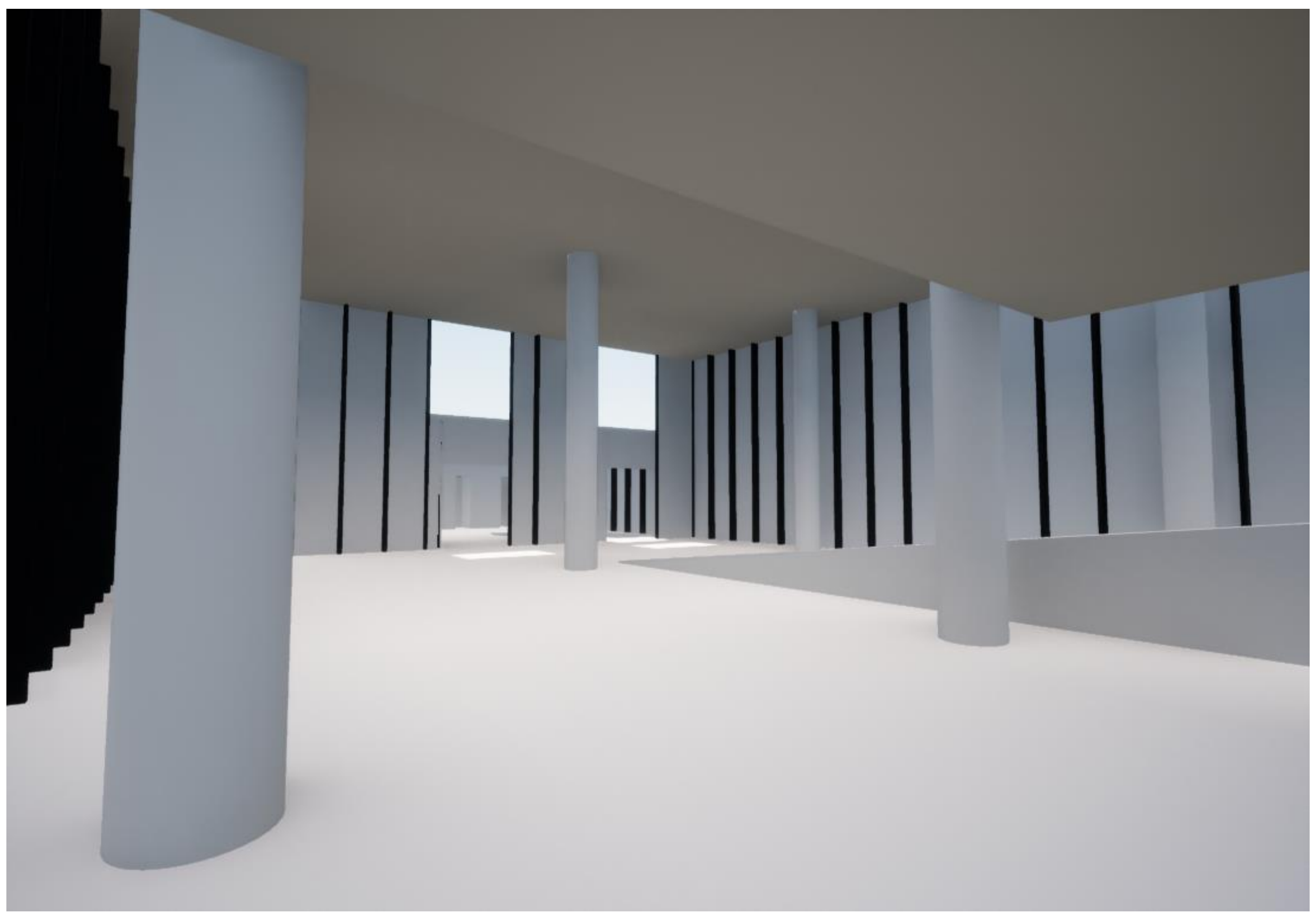
**MiC, MiMEP and DfMA:** In the proposed design solution for CIC, guest rooms are used to showcase MiC, MiMEP, and DfMA approaches. MiC involves prefabricated units assembled on-site, MiMEP integrates MEP systems into room design, and DfMA designs components for ease of manufacture and assembly. The use of these approaches optimizes the design of the guest rooms, reduces construction time and waste, and improves quality and safety. BIM models are utilized to simulate the installation process and identify potential issues. Overall, the utilization of guest rooms demonstrates the effectiveness and efficiency of these approaches in a real-world setting.

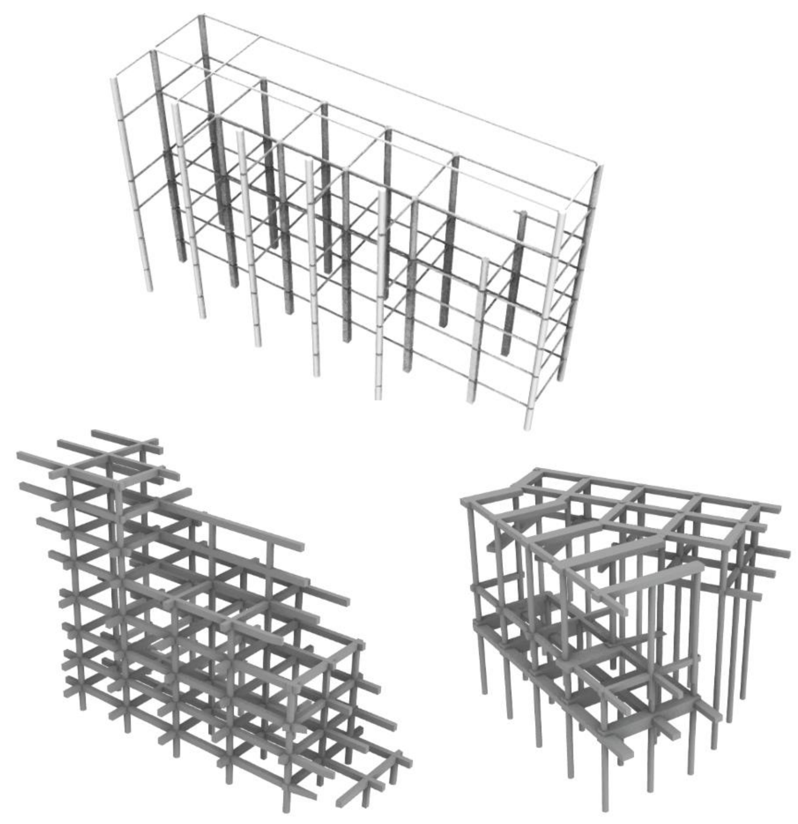



**Perspective View:** For DfMA, we have designed the guest rooms for ease of manufacture and assembly, with the goal of reducing construction time, waste, and cost while improving quality and safety. The guest room components are designed to be easily manufactured and assembled on-site using standardized techniques. For example, we have designed the guest room doors and windows as prefabricated units that can be assembled quickly and efficiently on-site. This approach has allowed us to reduce construction time and waste while improving quality and safety.



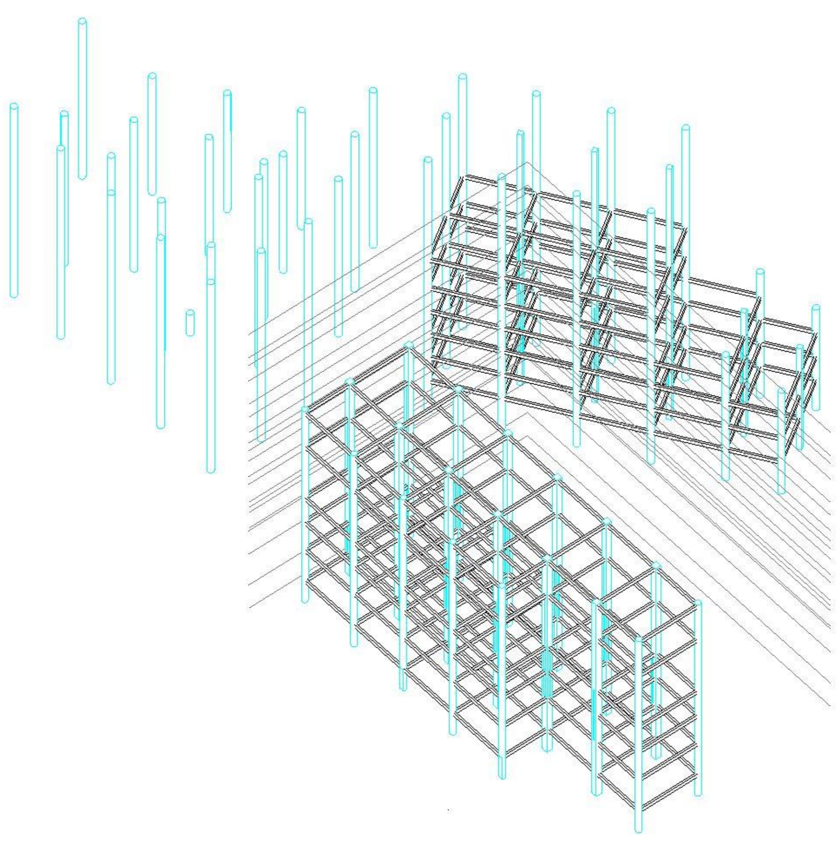
**Evaluation of embodies carbon:** In the CIC design, aluminum is used for the building's façade to enhance sustainability and reduce carbon emissions. The CIC Carbon Assessment Tool (CAT) is used to evaluate embodied carbon and optimize the design by assessing carbon emissions associated with building materials production, transportation, and construction process. The use of aluminum as a building material has several benefits, including its durability, recyclability, and energy efficiency. Additionally, aluminum has a low carbon footprint compared to other building materials, making it an environmentally friendly option.



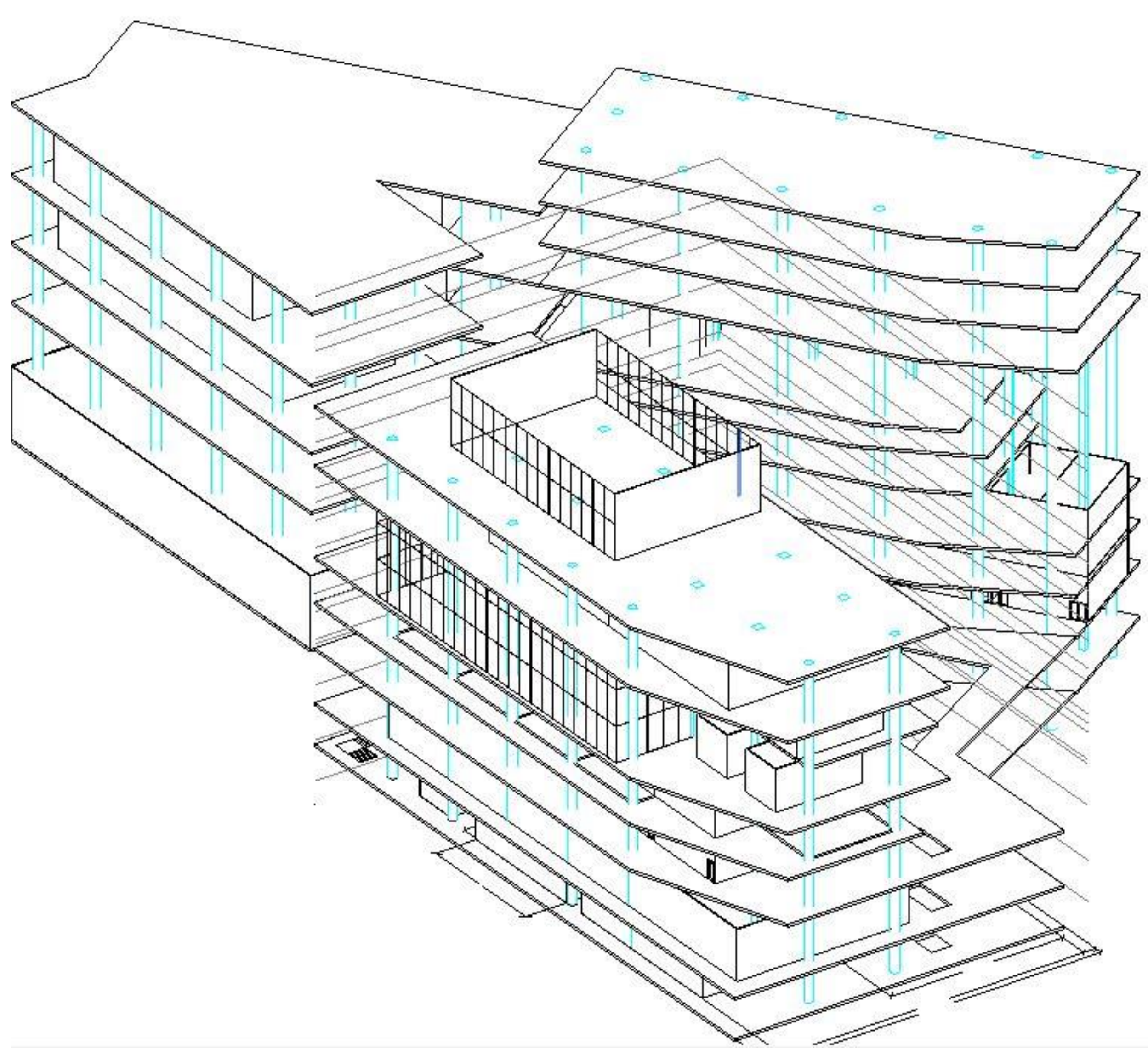


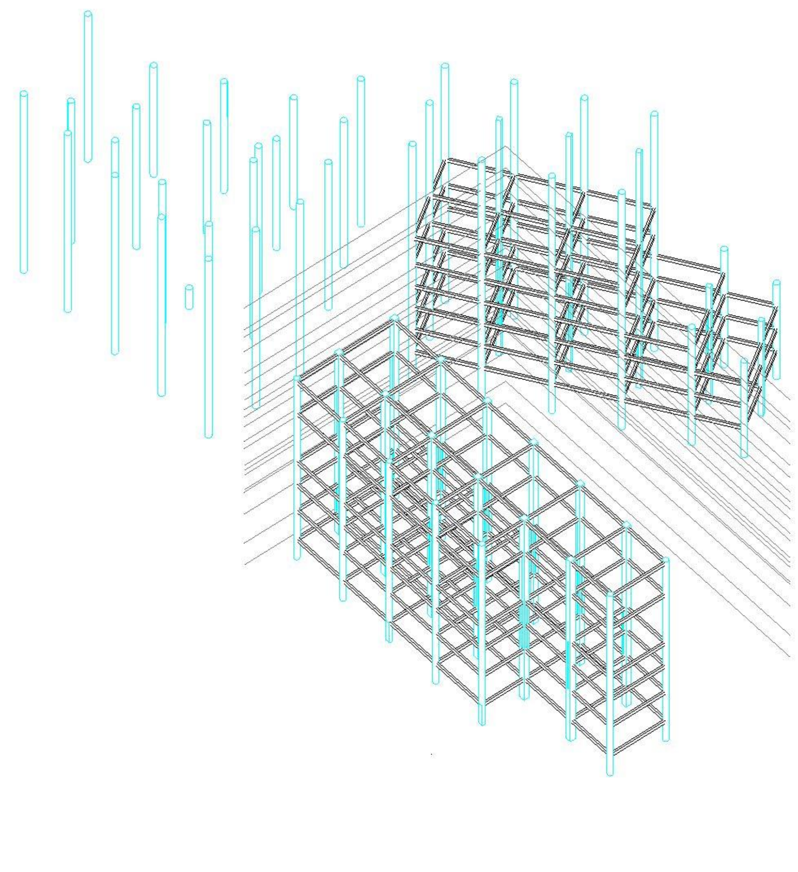
In our design solution for the CIC, we use alternative cement materials for walls and columns to enhance sustainability. To develop the engineering element, we utilize BIM for structural engineering. BIM creates a 3D model of the building's structure, specifying the materials used and visualizing structural performance. We simulate the construction process to identify and resolve potential issues, generate detailed construction documentation, and provide precise instructions for the construction team. This approach optimizes the design of the walls and columns, reduces waste and errors, and enhances sustainability through the use of alternative cement materials.

**Internal Perspective 1:500**



**Computational Design :** BIM is a powerful tool for computational design, engineering, analysis, and optimization of structural systems in construction projects. It enables the creation of accurate and complex structural models, which can be used to identify potential issues and optimize systems for efficiency and cost-effectiveness. BIM facilitates the creation of sustainable and innovative designs that improve the productivity, quality, safety, and sustainability of construction projects.





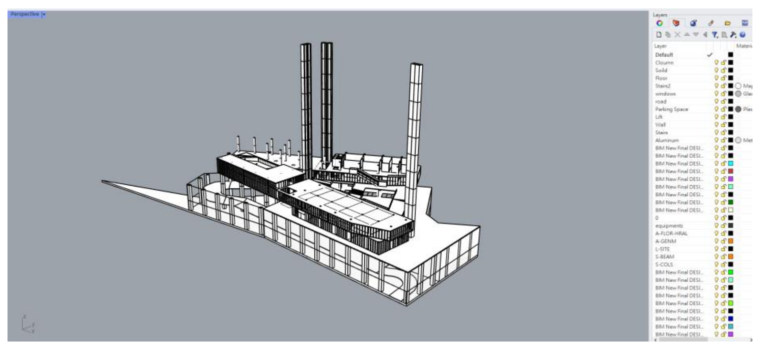
In the CIC design solution, BIM is used for building services engineering. BIM creates a 3D model of the building's mechanical, electrical, plumbing, and fire protection systems, allowing for visualization and analysis of performance. The operation of the systems is simulated to identify and resolve issues, reducing waste and errors and improving efficiency. Detailed construction documentation and drawings are generated from the BIM model, providing precise instructions for the construction team. This approach optimizes the design of the building services systems, reduces waste and errors, and enhances sustainability through efficient operation.

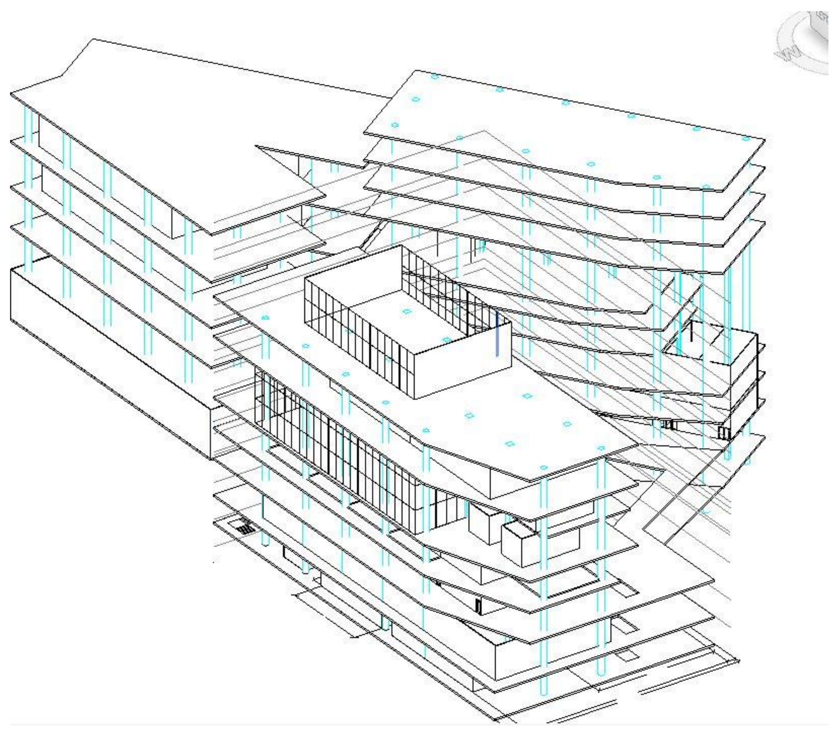
**Sectional Perspective 1:500**

## CIC BIM Competition 2023

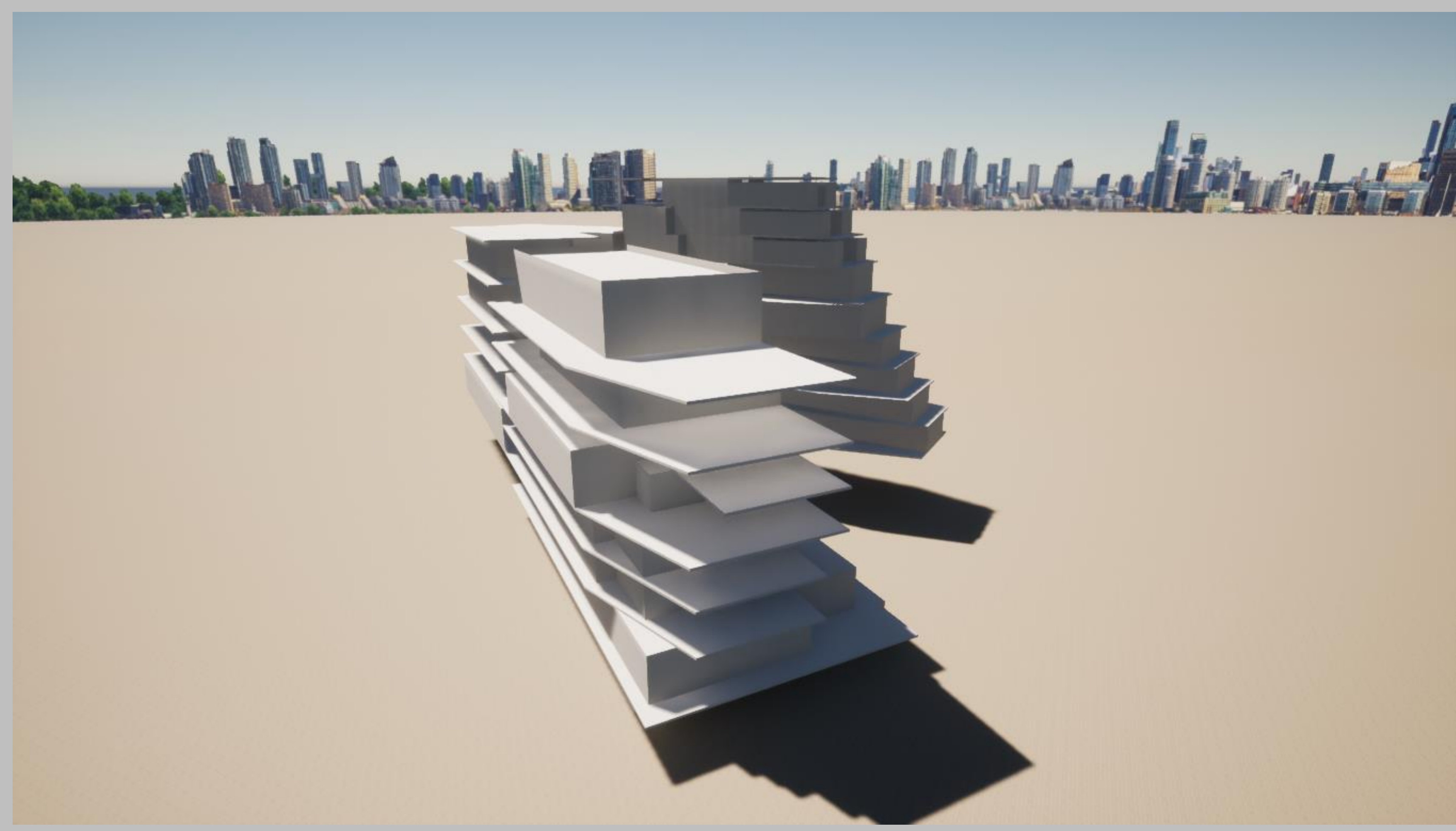
### Sustainable Design of the Construction Innovation Campus using BIM

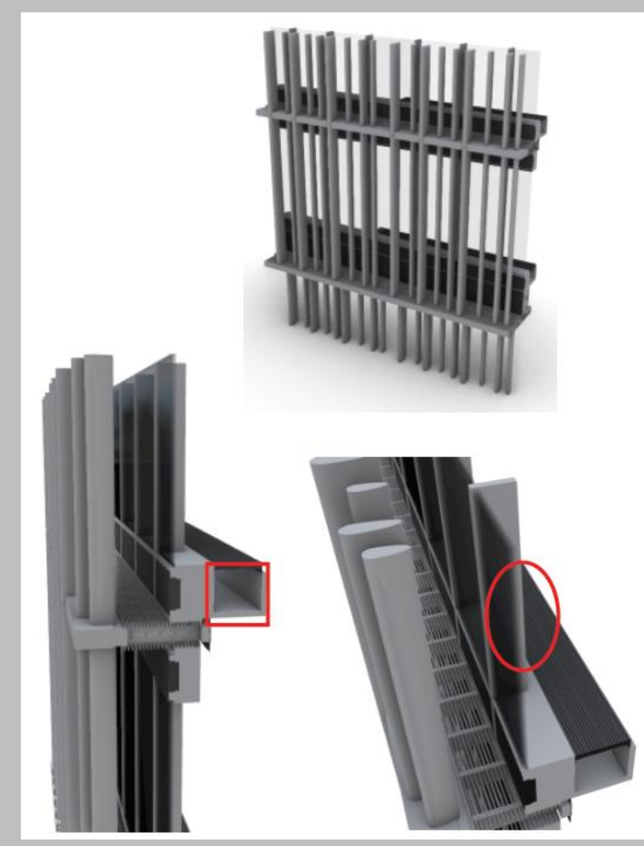
# CIC BIM Competition 2023 – Submission Poster Template



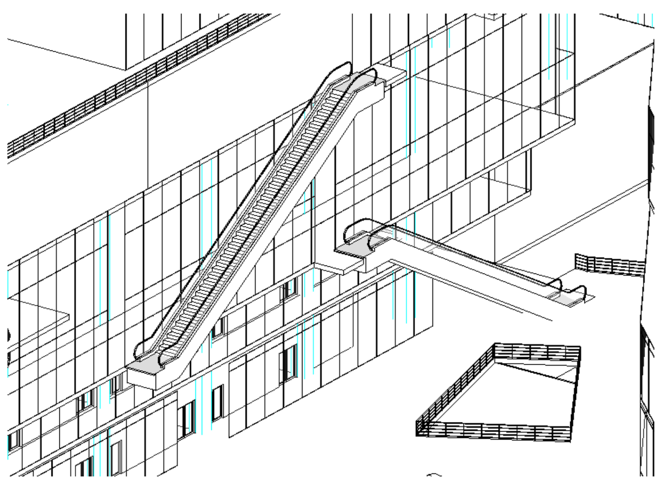


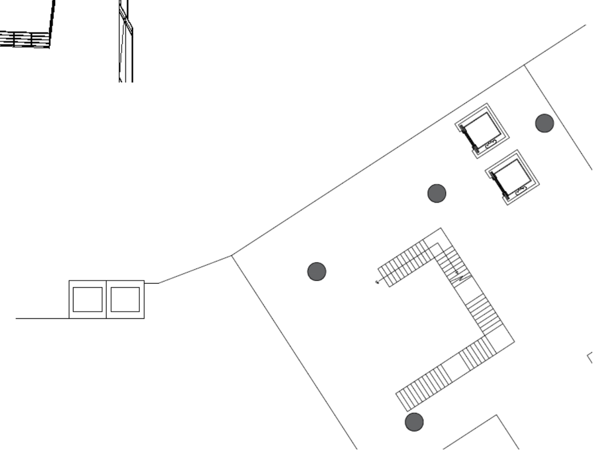
**Design Coordination:** In the CIC design solution, BIM software platforms Rhino and Revit are used for interdisciplinary design coordination. The BIM model serves as a shared data environment, allowing teams to work collaboratively in real-time. The interdisciplinary coordination process involves regular meetings to review and discuss the BIM model, identifying and resolving potential clashes and conflicts between architectural, structural, and building services elements. The BIM model also allows for the analysis of sustainability factors, enhancing the sustainability of the CIC project. The use of BIM software platforms and interdisciplinary design coordination methodology reduces errors and rework, improving design efficiency and overall quality.



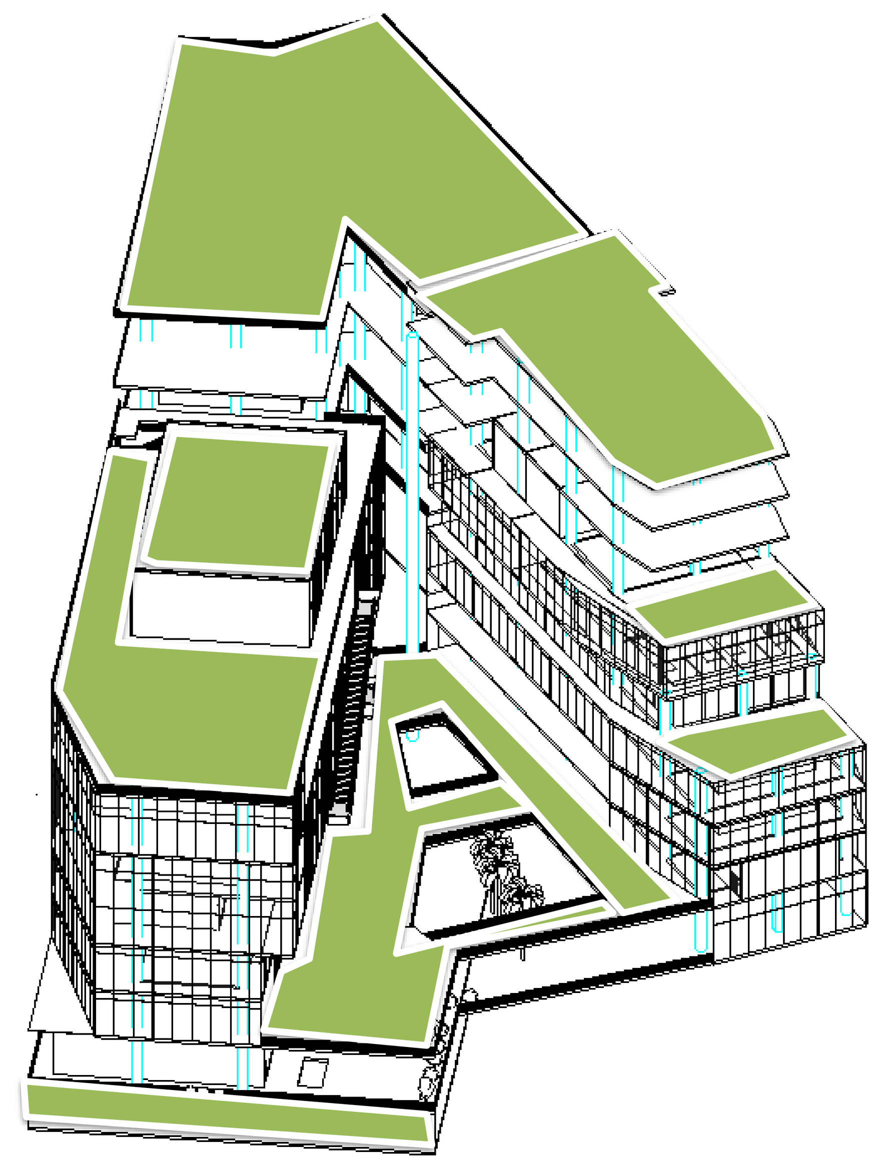


**Perspective View:** The engineering elements of building services in the proposed design for the Construction Innovation Campus (CIC) have been carefully designed to optimize sustainability, energy efficiency, and functionality. The design incorporates a ground-level air supply system and a large area of glass curtain wall, which have been designed with consideration for airflow, building layout, heat load, and solar radiation. The ground-level air supply system and glass curtain wall use high-efficiency technology and renewable energy sources to enhance energy efficiency and sustainability, while an automatic control system adjusts the curtain wall's light transmittance and insulation performance.





**Escalators or Lifts: In our design, the provision of escalators at Tower A and lifts at the loading area helps to segregate pedestrian and vehicular traffic. The use of escalators allows for a smooth and efficient movement of people between floors, while the lifts provide access to the loading area for goods and deliveries. This approach also helps to reduce the risk of accidents and congestion, as pedestrians and vehicles are kept separate.**



| | | |
|---|---|---|
| Green Sapce | | |
| Green Sapce | 5/Floor | 1232.6 |
| | | 1232.6 |
| Green Space | | |
| Green Space | Guest house 9/F | 1592.24 |
| Green Space | Guest house 9/F | 786.41 |
| Green Space | Guest house 7/F | 459.57 |
| | | 2838.21 |

**Greenery Areas:** BIM is increasingly used in architecture design to improve the process and reduce errors. Our aims also be used to visualize and optimize the required 30% greenery coverage, as recommended in Practice Note APP-152 on Sustainable Building Design Guidelines. This creates more sustainable and livable buildings that enhance the well-being of urban communities.

Room Schedule

| Name | Level | Area |
|---|---|---|
| Academic & support Staff-Office & Meeting | | |
| Academic & support Staff-Office & Meeti | Lower Ground Floor | 680.35 |
| Academic & support Staff-Office & Meeti | Lower Ground Floor | 679.78 |
| | | 1360.13 |
| Basketball court | | |
| Basketball court | 5/Floor | 459.57 |
| | | 459.57 |
| Borad Room | | |
| Borad Room | Lower Ground Floor | 141.21 |
| | | 141.21 |
| Cafe | | |
| Cafe | Ground Floor | 288.09 |
| | | 288.09 |

| | | |
|---|---|---|
| Circulation | | |
| Circulation | 4/Floor | 889.41 |
| Circulation | 1/Floor | 874.7 |
| Circulation | 2/Floor | 872.51 |
| Circulation | 3/floor | 789.72 |
| Circulation | 2/Floor | 756.5 |
| Circulation | 4/Floor | 731.01 |
| Circulation | 5/Floor | 690.34 |
| Circulation | 3/floor | 611.75 |
| Circulation | 3M/Floor | 601.28 |
| Circulation | 1/Floor | 559.09 |
| Circulation | 4/Floor | 413.56 |
| Circulation | Guest house 7/F | 194.13 |
| Circulation | Guest house 8/F | 194.06 |
| Circulation | Guest house 6/F | 193.89 |
| | | 8371.96 |

| | | |
|---|---|---|
| ClassRoom | | |
| ClassRoom | 2/Floor | 99.61 |
| ClassRoom | 1/Floor | 99.58 |
| ClassRoom | 2/Floor | 99.58 |
| ClassRoom | 1/Floor | 99.57 |
| ClassRoom | 1/Floor | 99.3 |
| ClassRoom | 1/Floor | 93.73 |
| ClassRoom | 1/Floor | 93.73 |
| ClassRoom | 1/Floor | 93.73 |
| ClassRoom | 2/Floor | 93.73 |
| ClassRoom | 2/Floor | 93.73 |
| | | 966.29 |
| Computer Lab | | |
| Computer Lab | 3/floor | 99.6 |
| Computer Lab | 3/floor | 99.58 |

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## Sustainable Design of the Construction Innovation Campus using BIM