

M i n a K h e r a d

Facade Design & Architecture 2024



About Me

Mina Kherad

After finishing my architecture studies with top marks at Azad University in Shiraz, I've become skillful in 2D and 3D drawing and modeling software that architects use and fluent in English and German. I've worked for some top architecture firms where I developed a keen interest in designing building facades. I then got a Master's degree specializing in the Integrated Design of Facade Design from Technische Hochschule Ostwestfalen Lippe. I want to cooperate in creating new ways to make buildings better at energy efficiency and improving people's lives. I am an active and eager worker. I can adapt to different tasks and work as a team or individually. I consider myself responsible, organized, and creative, and I am always attentive to details.



Experience

- Nov 2023 - Feb 2024 • **Real Estate Management**-Work Student at: Riverty
- Mar 2023 - Sep 2023 • **Real Estate Management**-Work Student at: Weidmueller
- May 2021 - Jan 2022 • **Architect** at: Stak office
- May 2020 • **Architect** at: Self-employed architect
- Dec 2018 - Sep 2019 • **Architect** at: Pars Asar Bartar Consulting Engineers
- Sep 2018 - Dec 2018 • **Autocad Designer** at: PolarPey Pars



Skills

- AutoCad
- Revit
- Athena
- Lumion
- Rhino
- BIM Modeling
- Grasshopper
- Enscape
- Sketchup
- Microsoft Offices
- Adobe Creative Suite
- Photoshop
- InDesign
- Illustrator
- SchüCal
- Ubakus
- Flixo



Education

- Sep 2021 - Jan 2024 • **Master of Integrated Design Facade Design** Technische Hochschule Ostwestfalen-Lippe
- Sep 2014 - Sep 2018 • **Architecture Engineering** Islamic Azad University of Shiraz
GPA: 17.13/20
- Sep 2010 - Jun 2014 • **Physics & Math Diploma** Alame Tabatabaei Elites High-school
GPA: 17.25/20



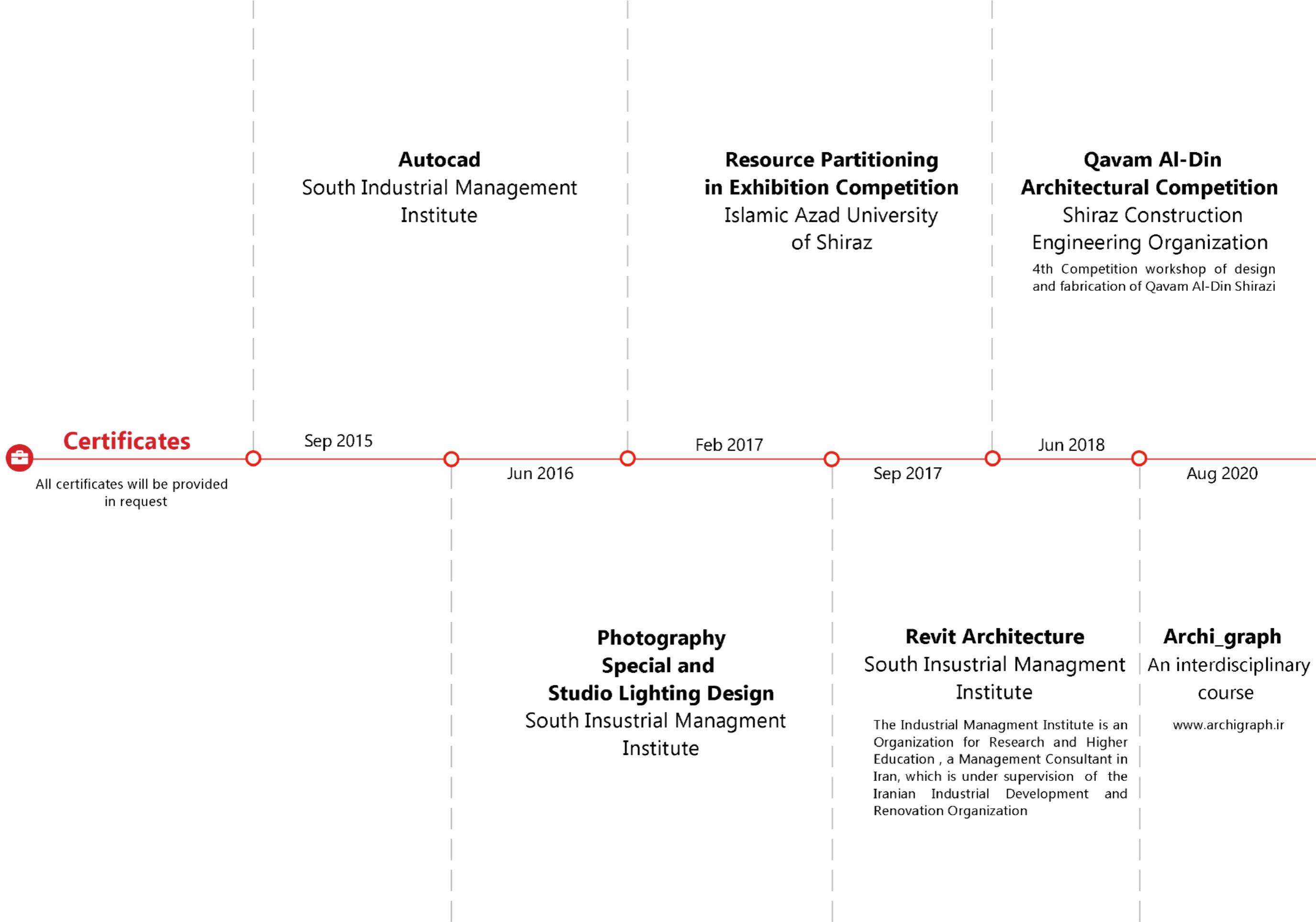
Languages

- English C1
- German B1
- Persian Native



Communication

- ✉ minakherad@yahoo.com
- 📞 +4915753201935
- LinkedIn http://linkedin.com/in/mina-kherad-135b37172
- Instagram minakherad_



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Fall 2017 |
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| 11 | Architectural Competition
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Facade Projects

Facade Design Commercial Building

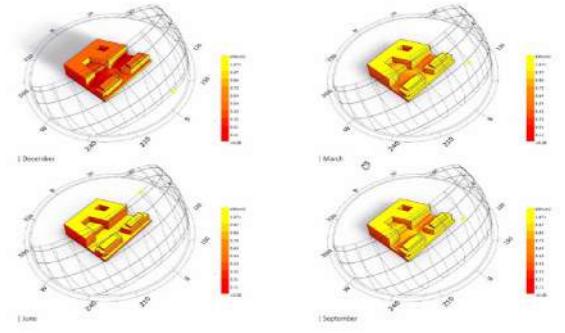
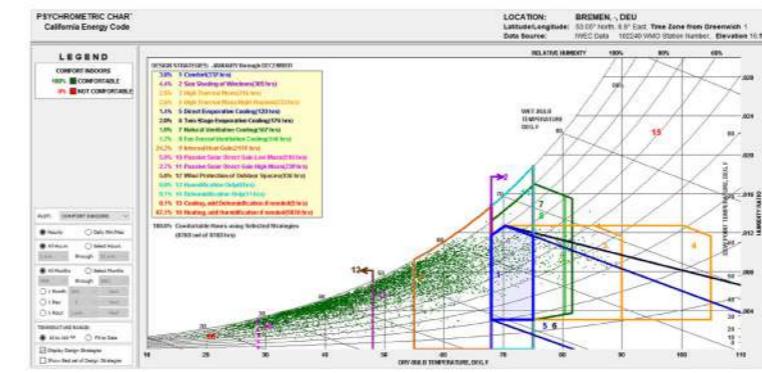
We have been tasked with designing and detailing the building envelope for an office structure. Our goal is to imbue the building with a contemporary and innovative aesthetic while ensuring that our approach aligns with the latest technological advancements and industry standards. This Project was designed in Revit and AutoCAD, and Enscape and Lumion did 3D modeling. Calculations were by Schücal and Flixo.



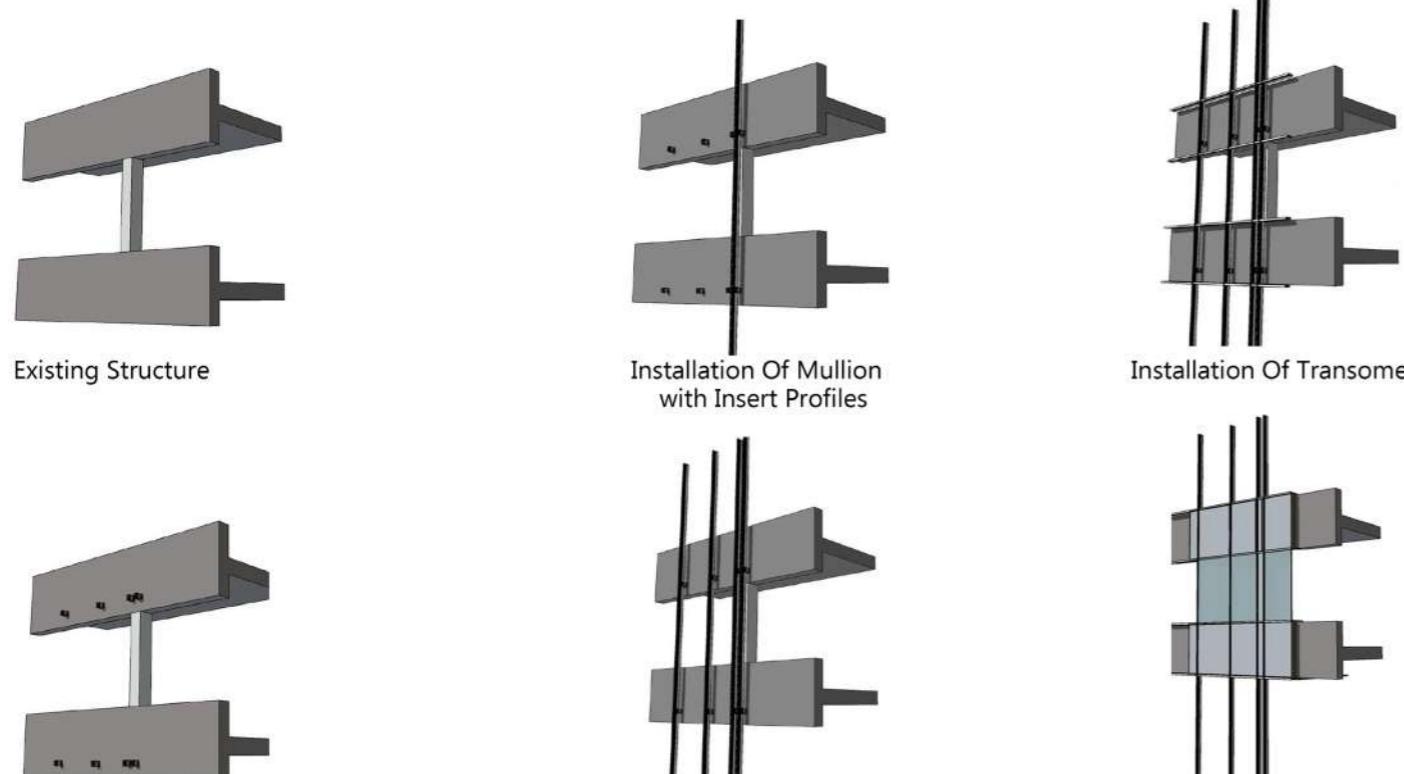
3D model



Floor Plan



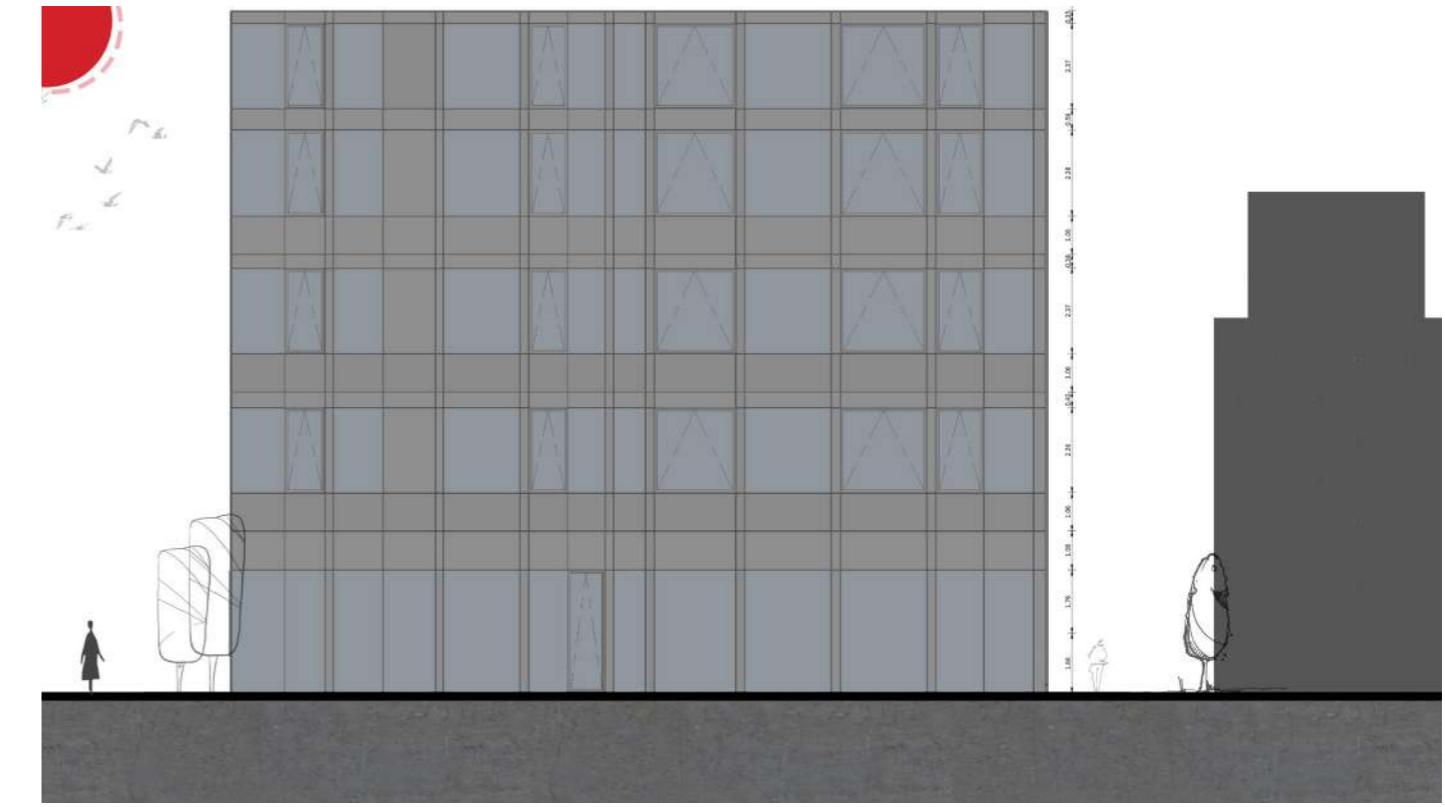
Psychometric Chart and Sun Path Analysis



Section



3D Model



West Elevation



3D Model



North Elevation

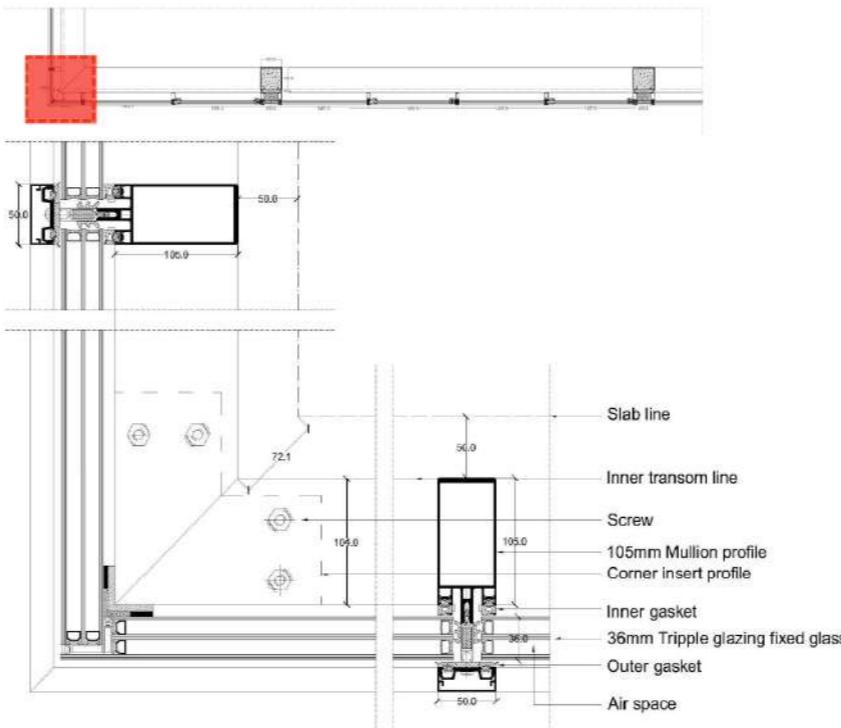
The designed facades presented by **Revit** and **Enscape**.

Facade Details

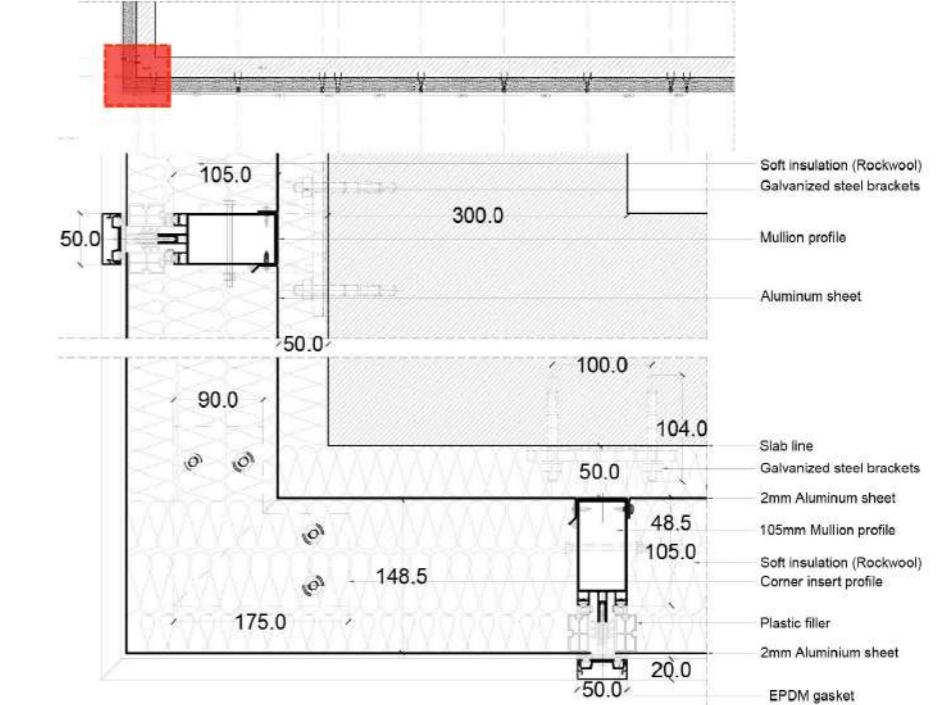
D01-D04



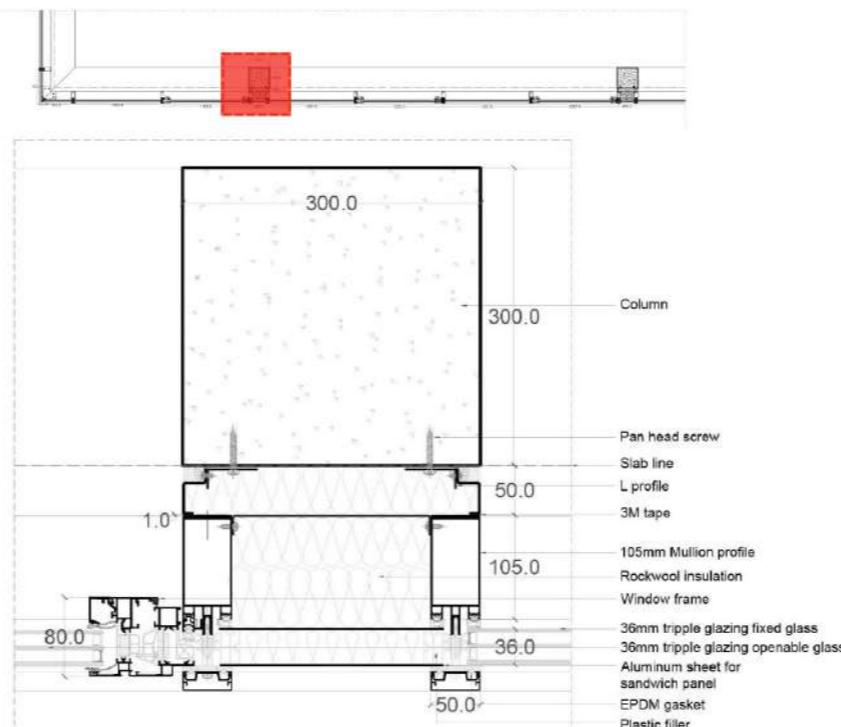
These details are drawn in AutoCAD.



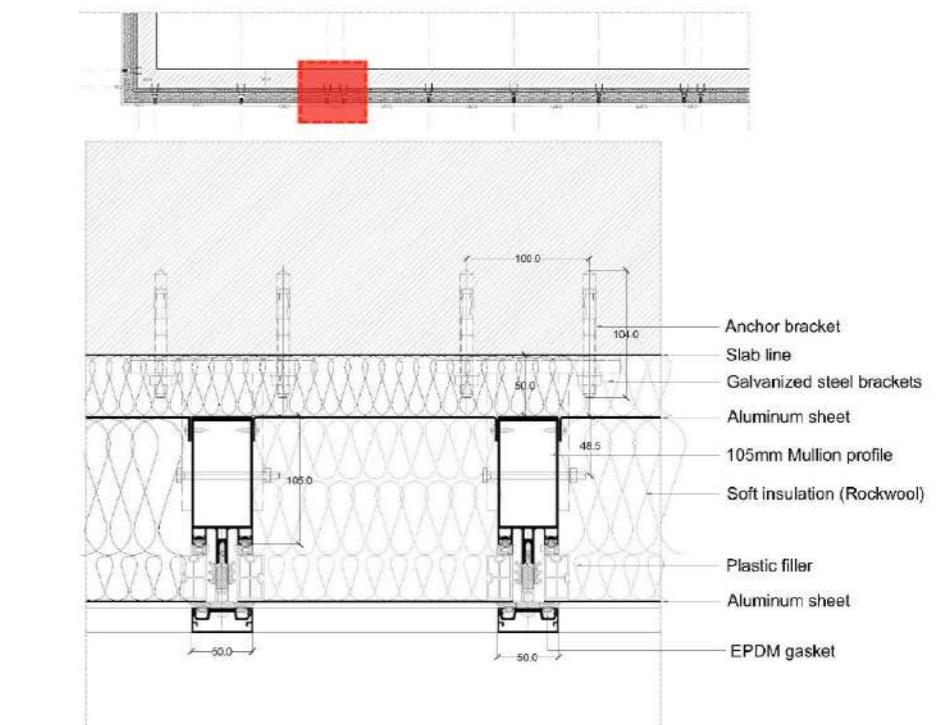
D01, Corner Detail Sill Level



D02, Corner Detail Slab Level



D03, Mullion Attachment to Sill Level

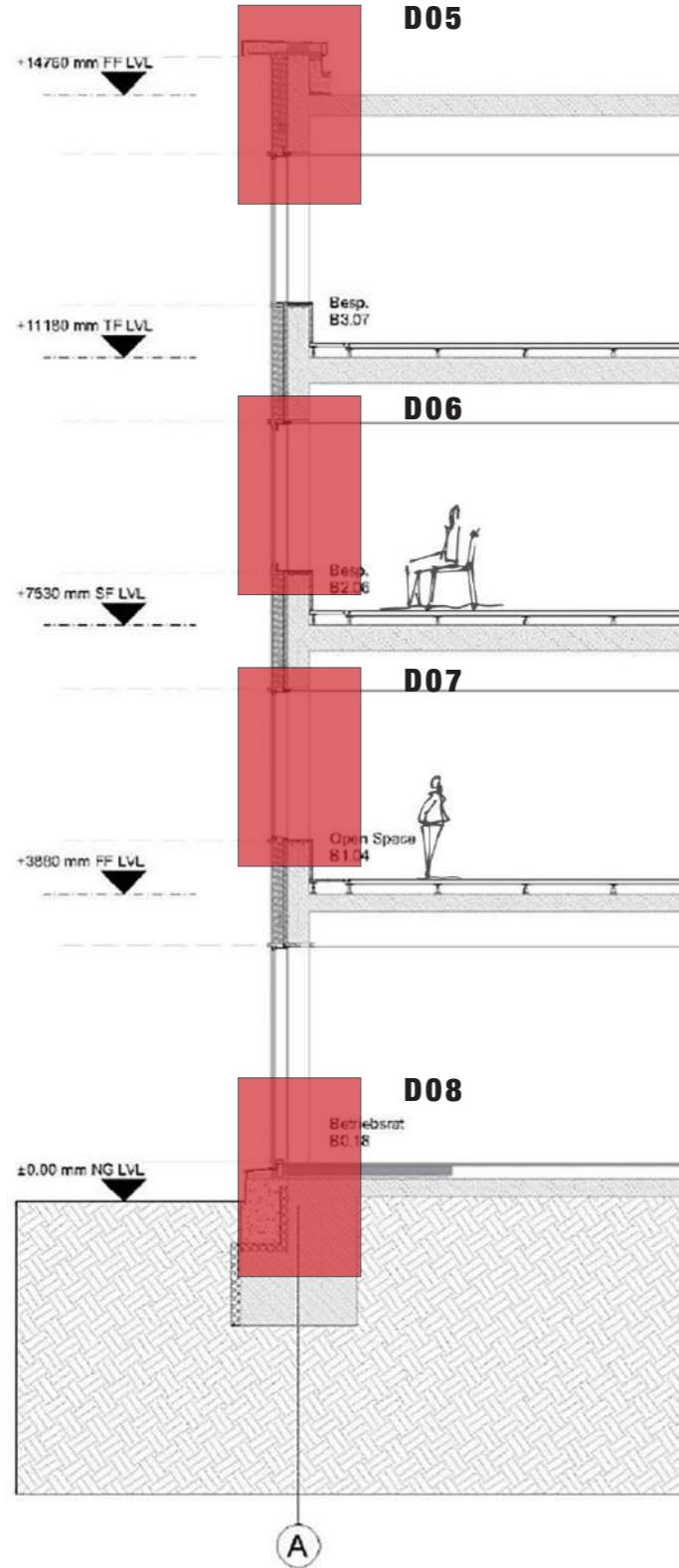


D04, Mullion Attachment to Slab Level

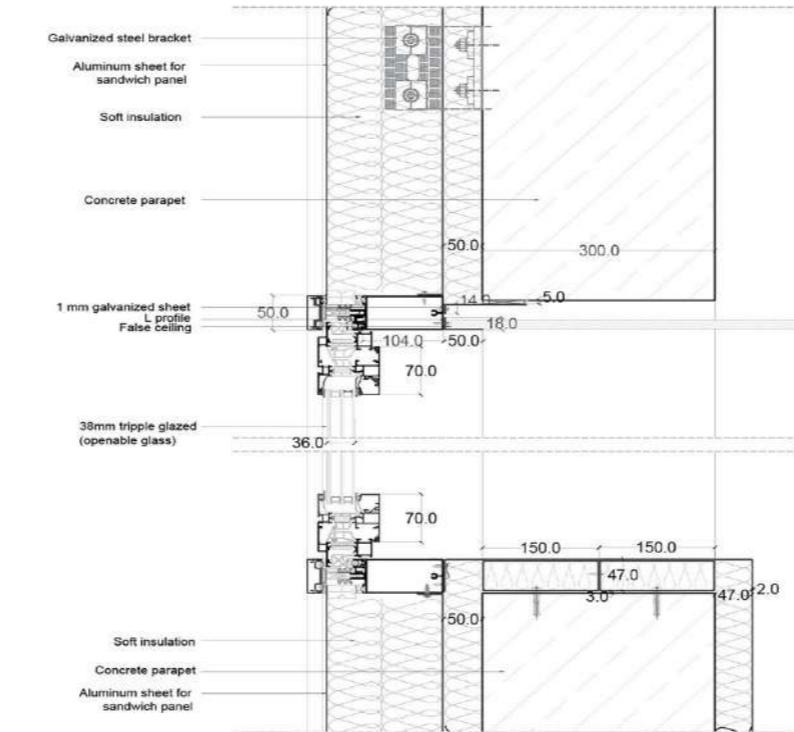
Facade Details

D05-D08

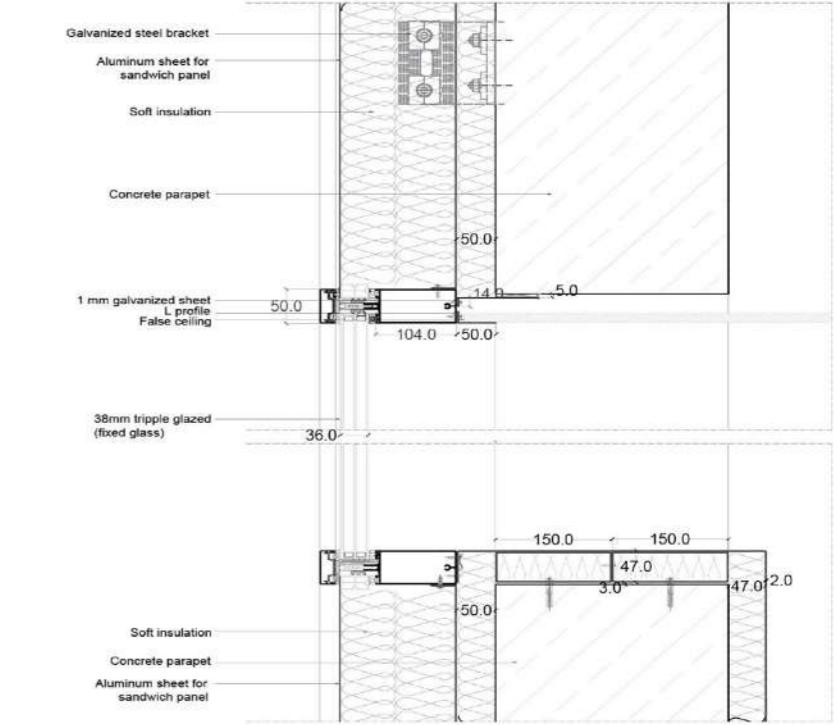
These details are drawn in AutoCAD.



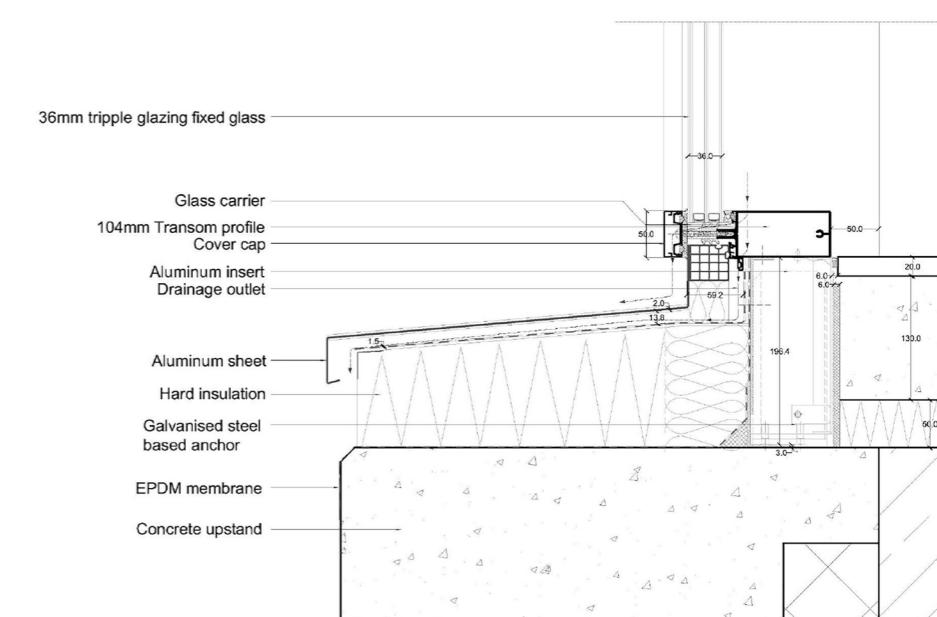
D05, Top Detail



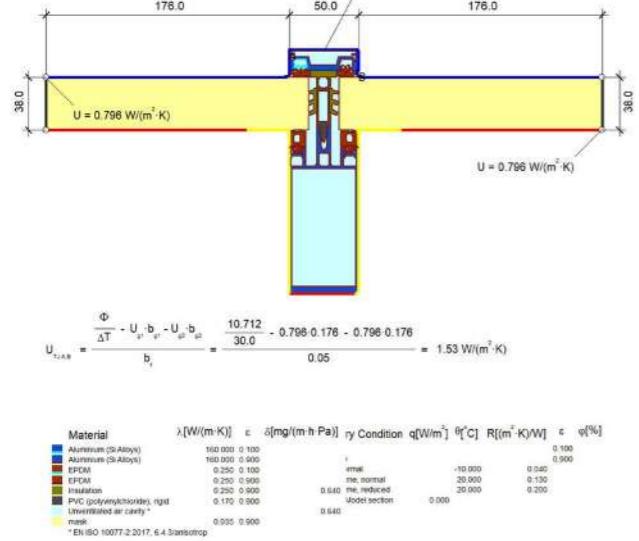
D07, Window Detail



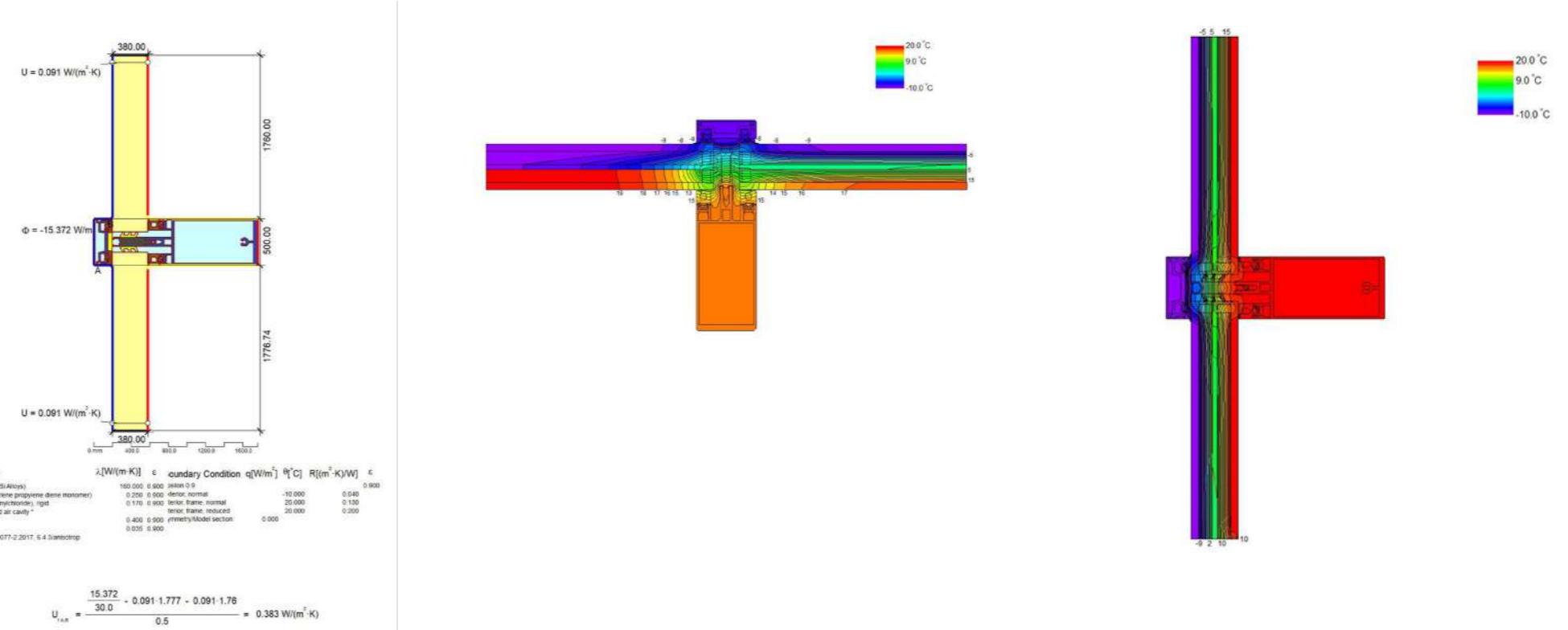
D06, Sill Level Detail



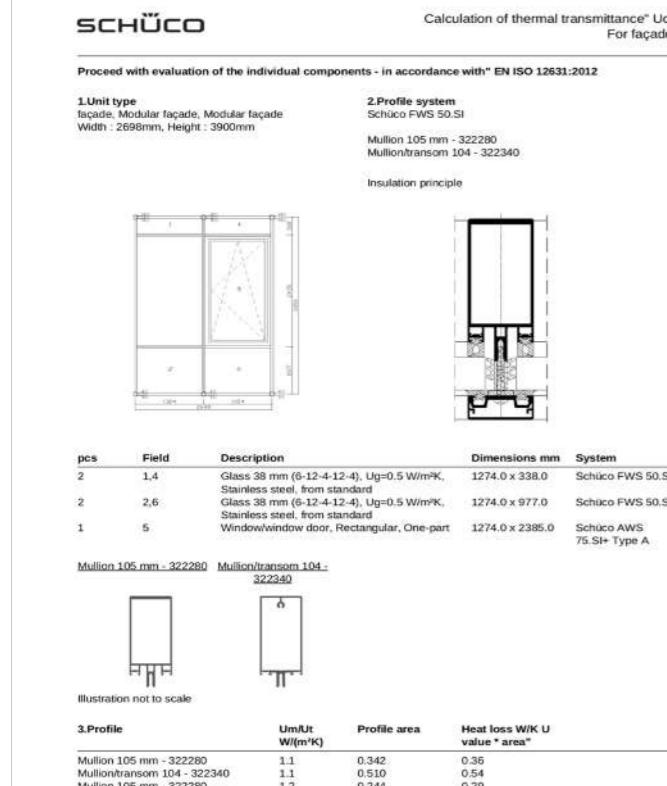
D08, Bottom Detail



U-value Calculations of Mullion and Transom, Flixo



U-value Calculations of Mullion and Transom, Flixo



U-value Curtain Wall, SchüCal

Calculation with Flixo and SchüCal.

Mullion/Transom Isotherm, Flixo

Calculations Of Sp

$$\begin{aligned} Sp &= \sum Sx \\ S1 &\text{ Climatic region, type of construction and} \\ &\text{night ventilation} \\ S2 &\text{ Proportion of window area} \\ S3 &\text{ Sun protection glazing} \\ S4 &\text{ Tilt of glazing} \\ S5 &\text{ Orientation of glazing} \\ S6 &\text{ Passive cooling} \end{aligned}$$

Condition is verified

PhotoVoltaics

In west elevation
Number of panels: 38 panels
Panel 1092 mm x 624 mm
Solar cell fit into 1 panel (7x4)=28 cells

Total area : $38 \times 28 \times 0.156 = 25.89 \text{ m}^2$

Voltage per panels = $28 \times 5 \text{ Watt} = 140 \text{ Wp}$

Voltage in 41 panels = $38 \times 140 \text{ Wp} = 5320 \text{ Wp}$

Total NET surface area 25.89 m^2

Total Power of PV Panels 5320 Wp or 5.32 kWp

Acoustic

To achieve required R_w value we will start our calculation with 37dB glass
 $R_w = R_w + K_{size} + K_{fmt}$
 $:dB$ glass 40
Insert Element 1: $R_w = 37 - 2 = 35 \text{ dB}$
Element 2 : $R_w = 37 + (-1) = 36 \text{ dB}$

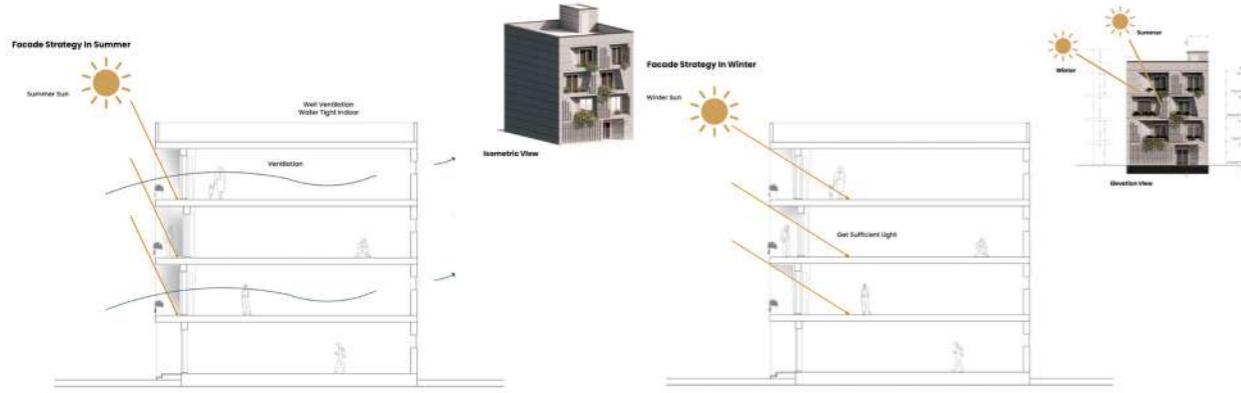
$R'w,erf. = 35 \text{ dB}$ $Rw, R = 35.4 \text{ dB}$
The requirement is fulfilled
Hence the glass of 37 dB will be considered In west Facade

Calculations

Facade Design

Residential Building - Riyadh

Riyadh Capital of Saudi Arabia Riyadh, Saudi Arabia's capital and central financial hub is on a desert plateau in the country's center. Business district landmarks include the 302m-high Kingdom Centre, with a sky bridge connecting two towers, and the 267m-high Al Faisaliah Centre, with a glass-globe summit. In the historical Deira district, Masmak Fort marks the site of the 1902 raid. Area: 1,973 km² Elevation: 599 m Weather: 41°C, Wind N at 13 km/h, 10% Humidity.



Facade Strategy

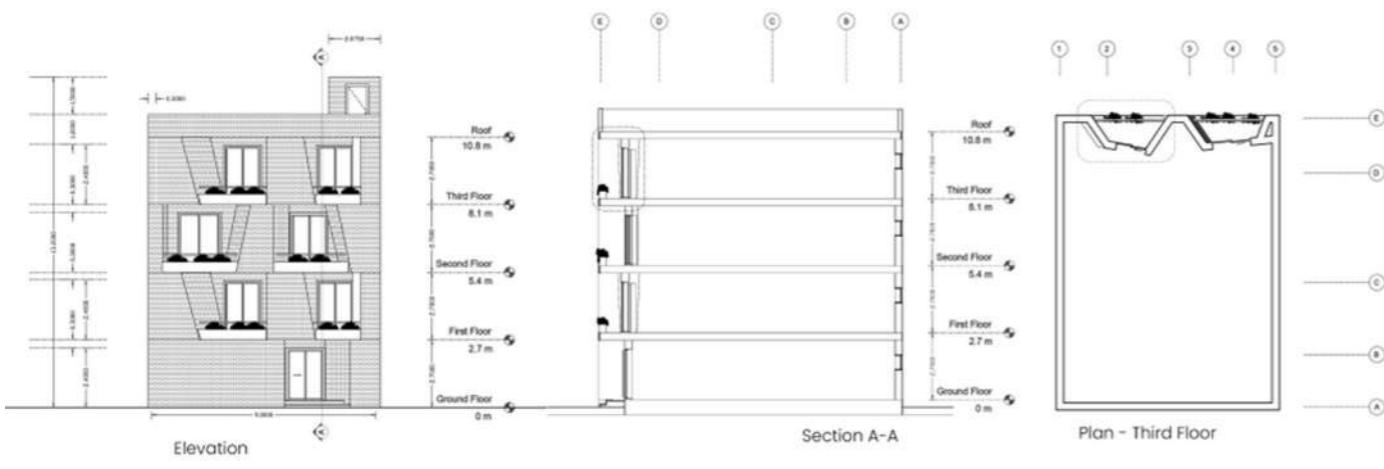


Elevation

In this facade design and system selection, we try to focus mainly on the climate and culture of Riyadh. Design approaches are External corridor (Rwaq) for shading and ventilation. Use thick walls (bearing walls) for structural reasons, providing a thermal barrier. The window glass is aligned with the internal face of the wall. Internal courtyard for ventilation.



3D Model



Facade Drawing



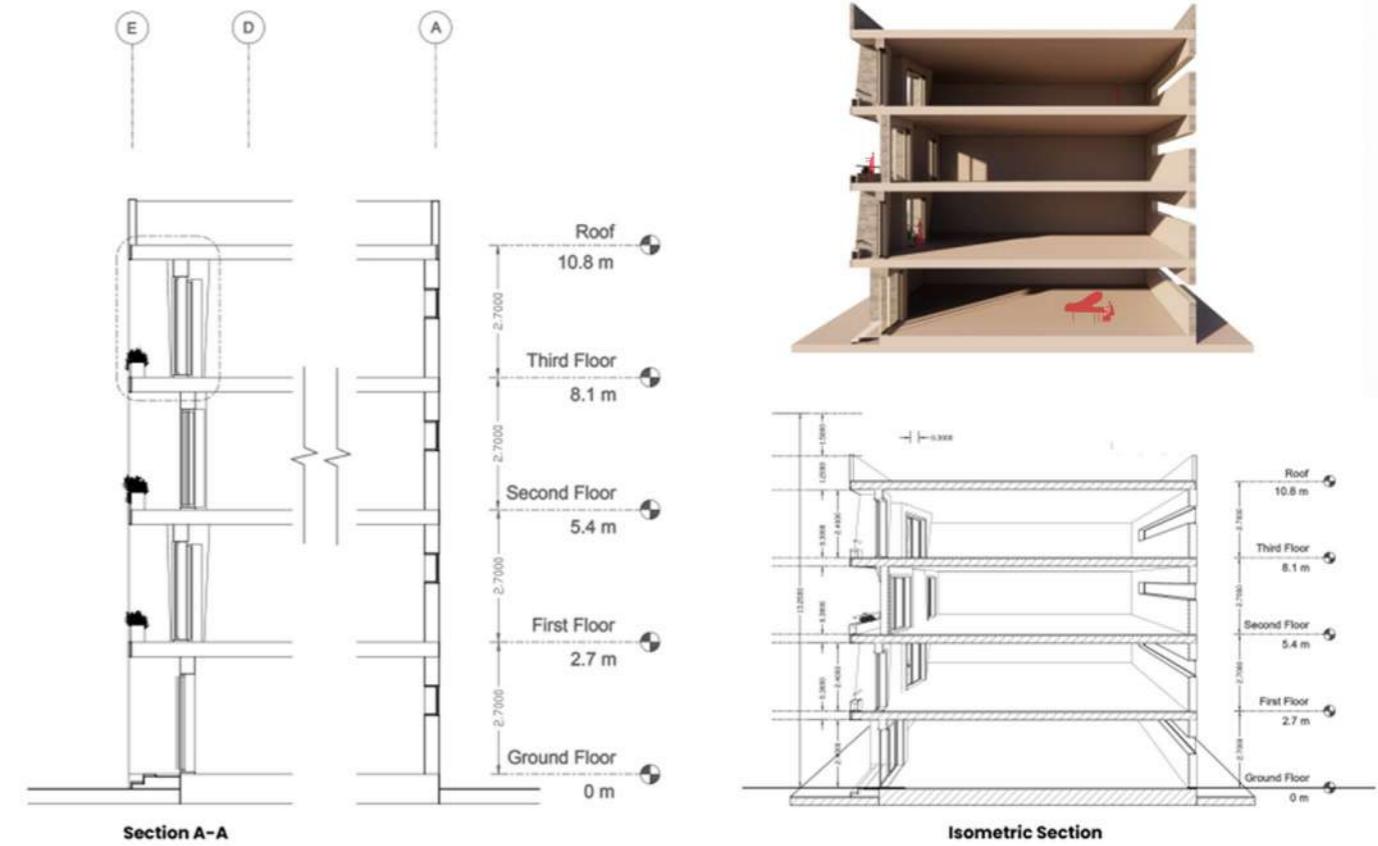
3D Model



3D Model



3D Model

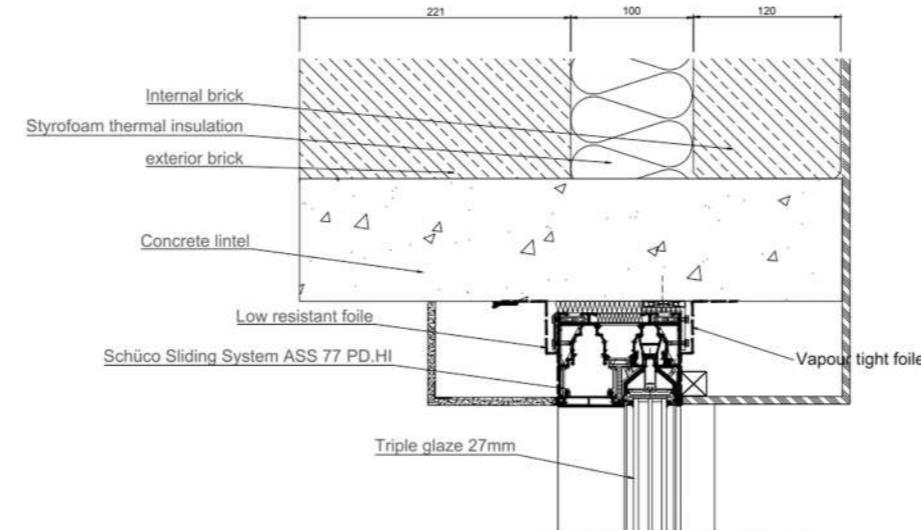
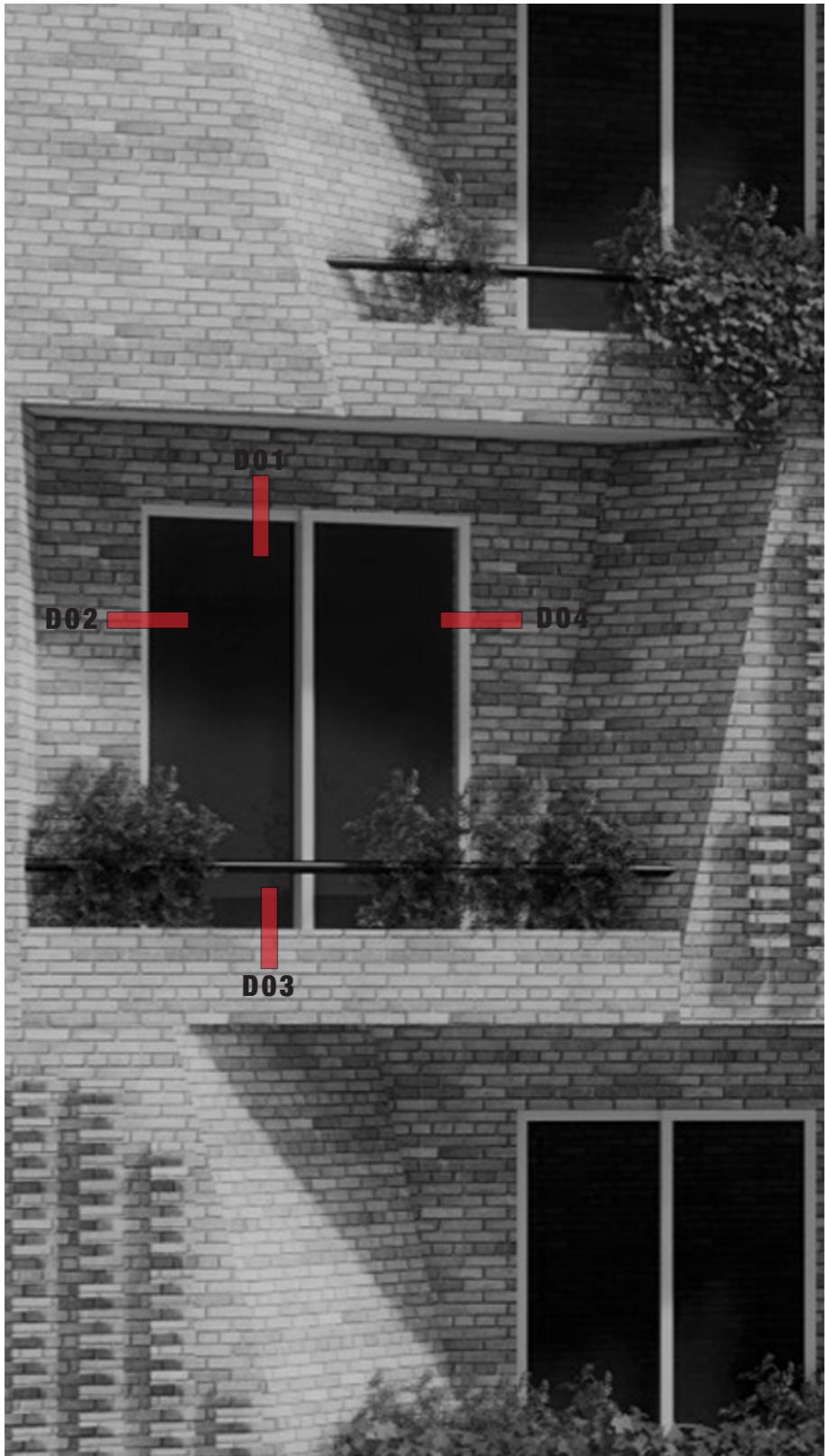


Facade Drawing

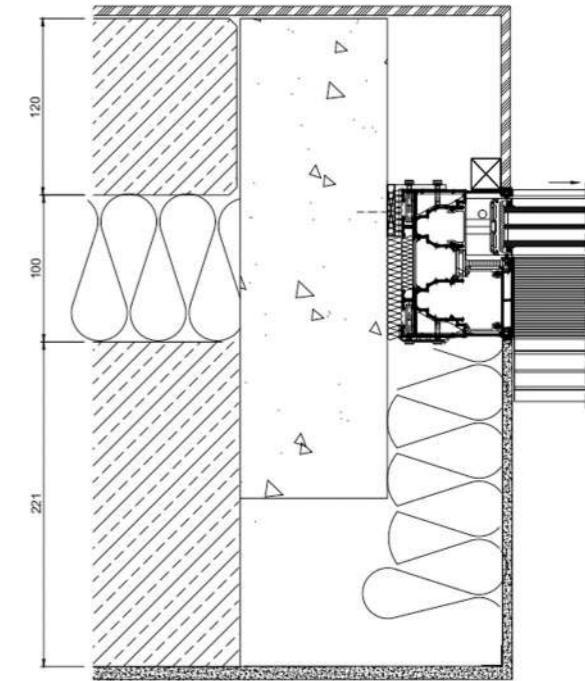
Facade Details

D01-D04

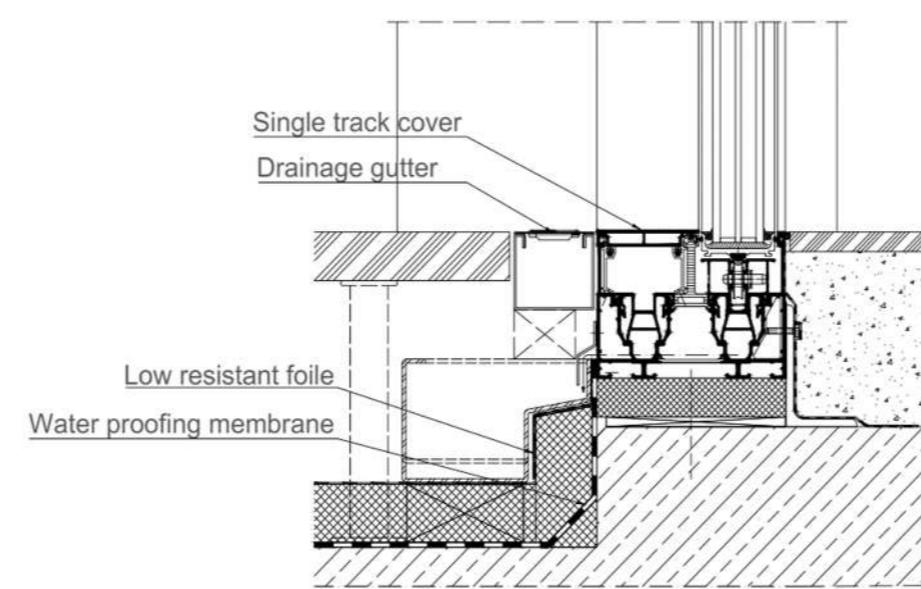
These details are drawn in AutoCAD.



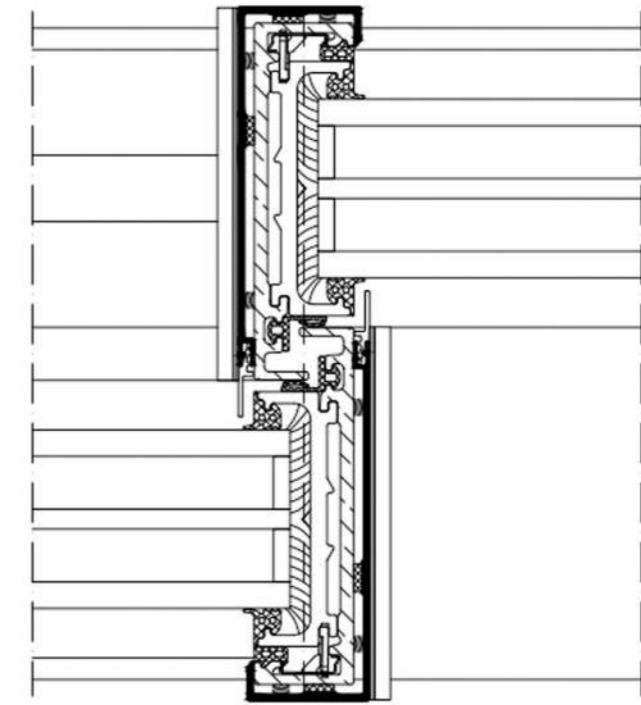
D01



D02



D03

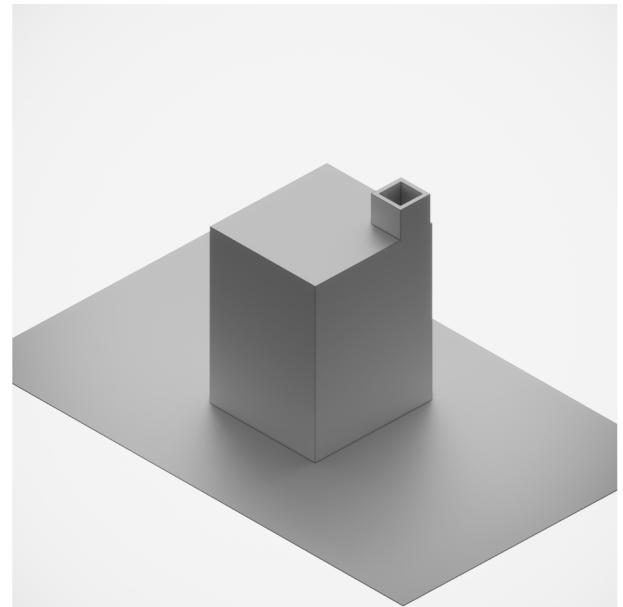


D04

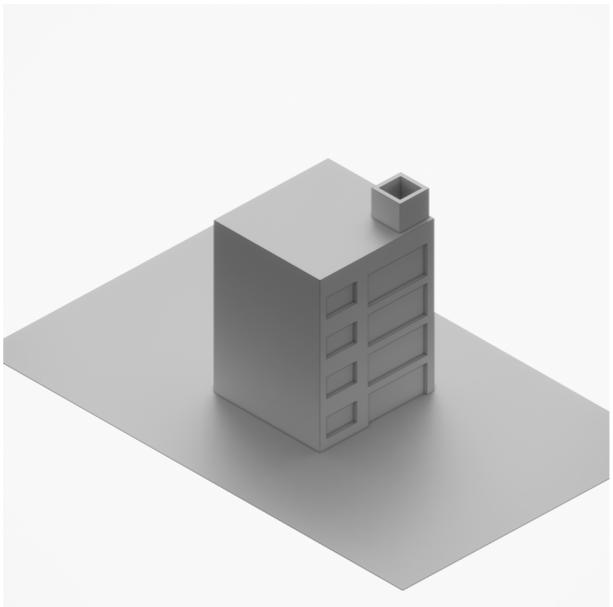
Facade Design

Residential Building - Shiraz

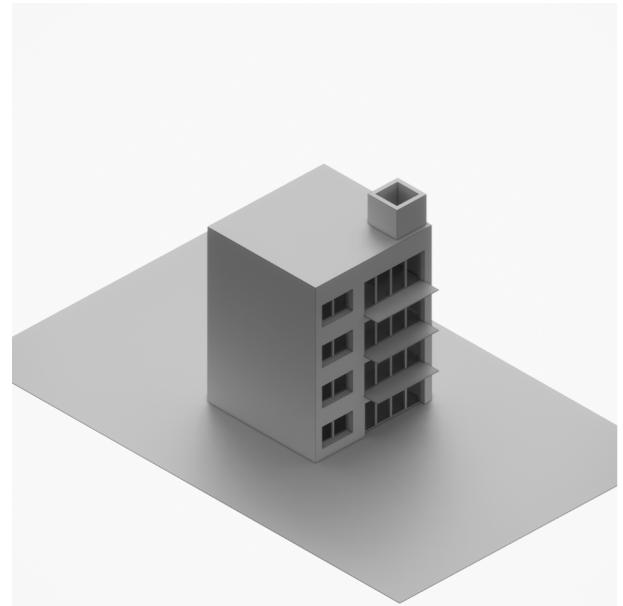
Shiraz is one of the biggest cities in Iran and most significant city at the center of Fars province at the height of 1486 m above the sea level, located in the Zagros mountainous area, v the social and economic structure of Shiraz has been turned into a natural setting for nomads such as Ghashghaei, the farmers and residents to exchange local commodities. In this design, we mainly have to focus on climate, sun radiation, and energy saving because Shiraz has four different seasons, and it's essential to have an accurate system selection .



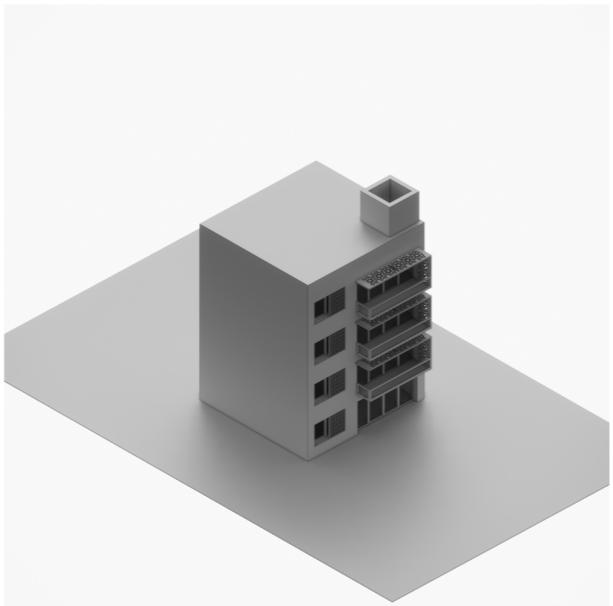
Design Process - 01



Design Process - 02



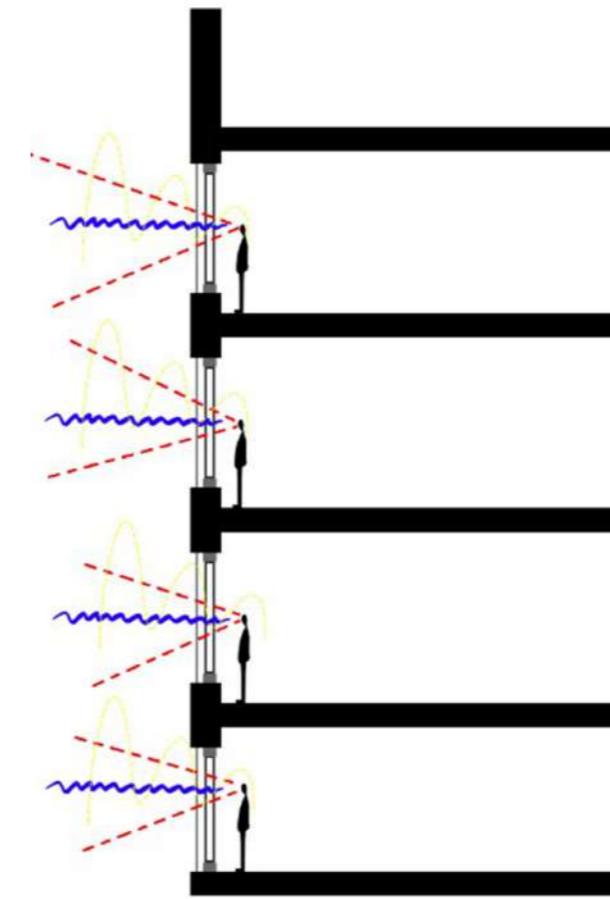
Design Process - 03



Design Process - 04



3D Model



Design Strategy

Issues

- 1-Angles of sun radiation
 - 1.1Angle of sun in Summer
 - 1.2Angle of sun in Winter

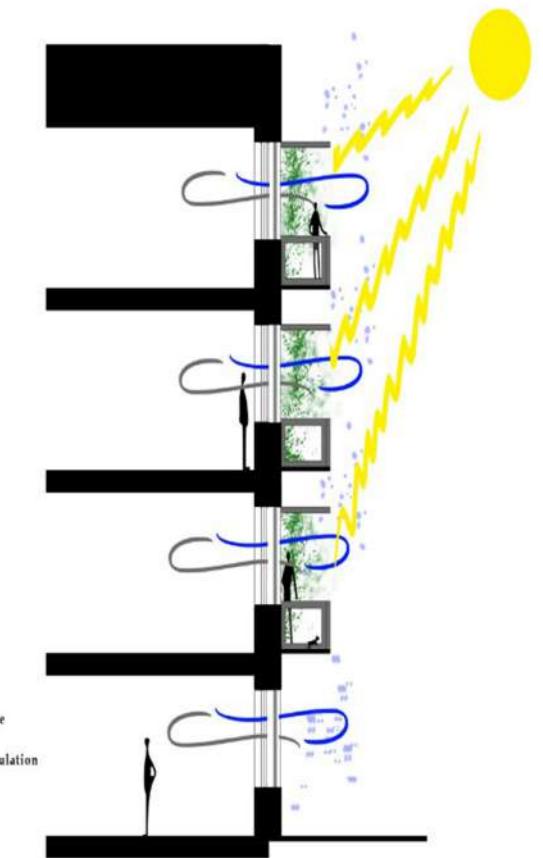
2-Air circulation

3-Light and Shadow

4-Water

Decision

Using second skin can control sun radiation, make beautiful shadows and make aesthetical point to façade.



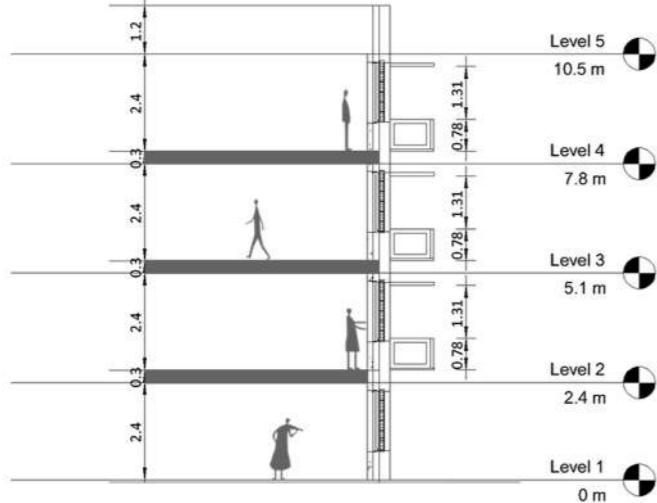
Main Concept

- 1.using brick facade due to climatic reasons and use traditional material
- 2.using second shell inside the building for light and shadow and at last aesthetical point of view
- 3.using semi-open space like balcony and roof garden for circulation and having green space.

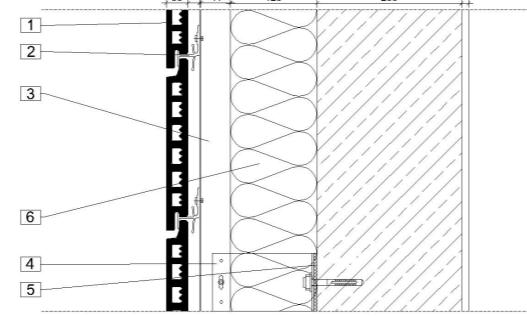
Facade Details

D01-D06

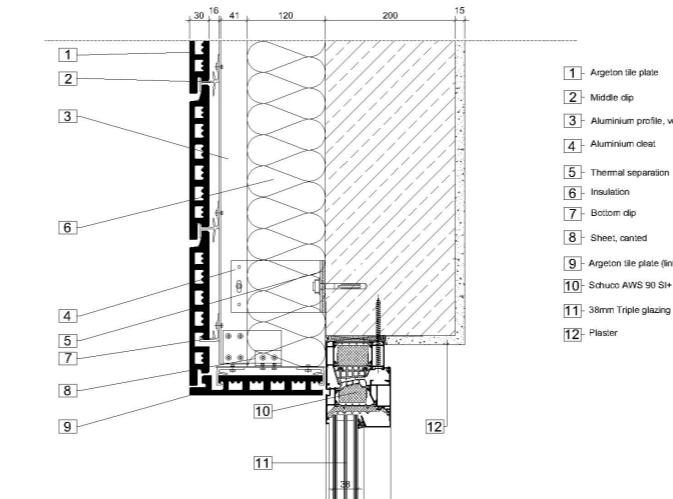
These details are drawn in **AutoCAD** and **Revit**.



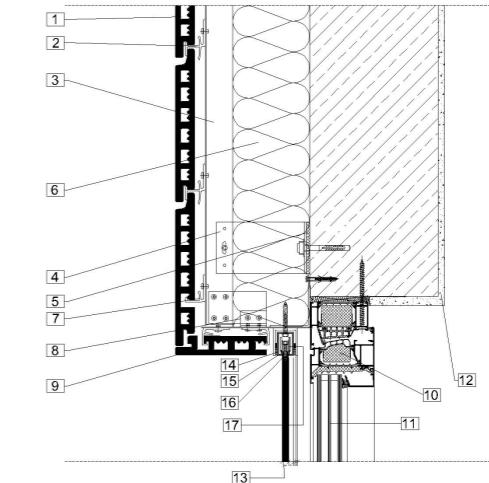
Section



Wall Construction - D01

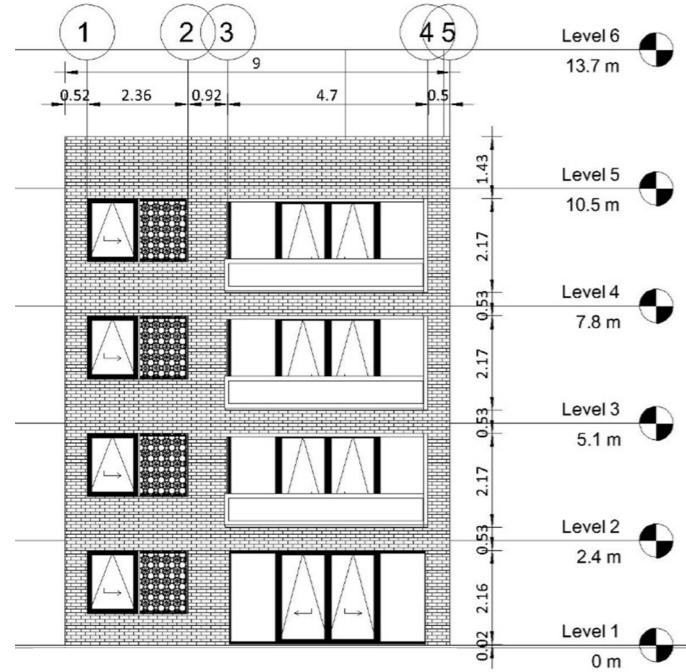


Window attach to wall - Vertical Section - D02

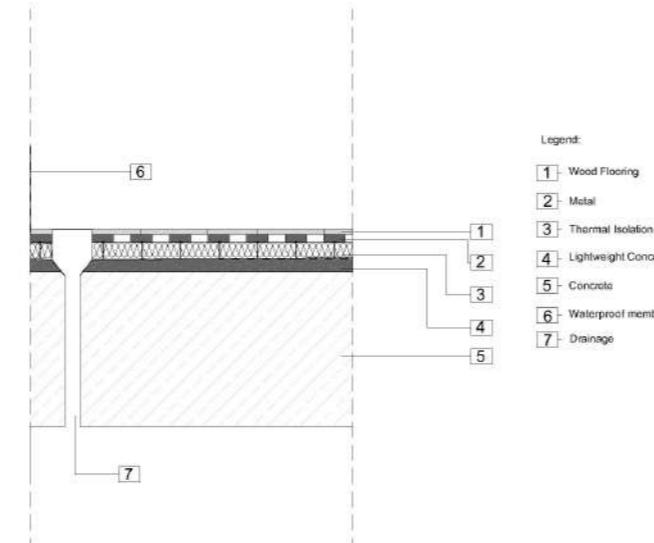


Construction of Mashrabiya - D03

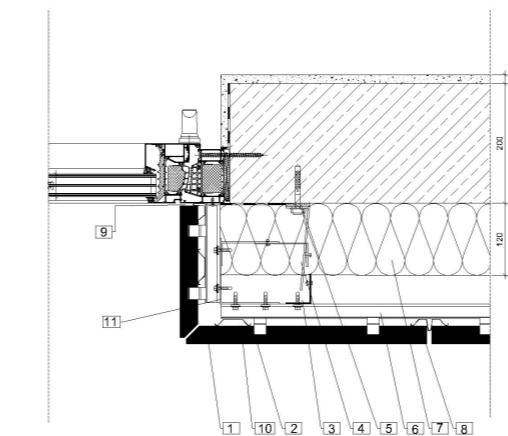
- [1] Argon tile plate
- [2] Middle clip
- [3] Aluminium profile, vertical
- [4] Aluminium cleat
- [5] Thermal separation
- [6] Insulation
- [7] Bottom clip
- [8] Sheet, canted
- [9] Argon tile plate (lintel)
- [10] Schuco AWS 90 Si+
- [11] 38mm Triple glazing
- [12] Plaster
- [13] Mashrabiya
- [14] Silicon seal
- [15] Outer frame
- [16] Guide rail
- [17] Roller carriage



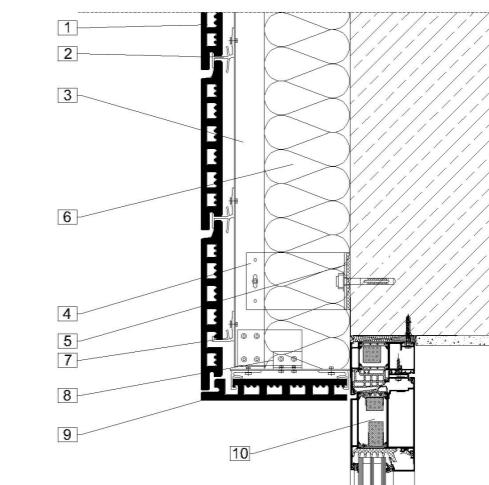
Elevation



Balcony Detail - D04



Window attach to wall - Horizontal Section - D05

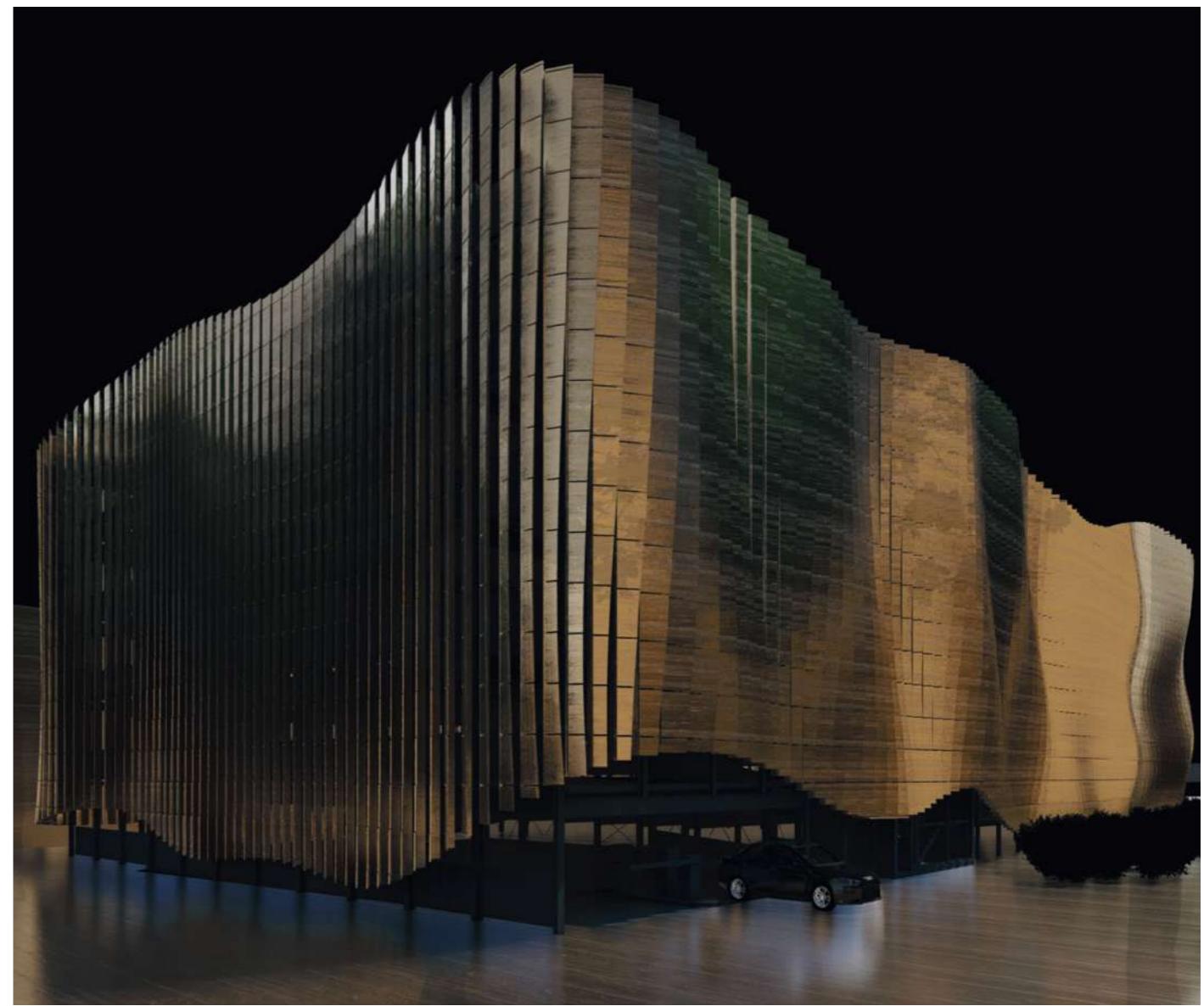


Connnection of the Door - D06

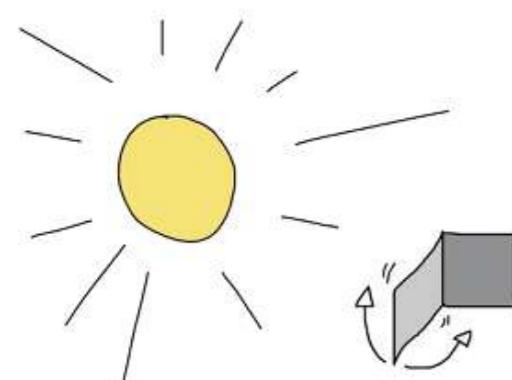
- [1] Argon tile plate
- [2] Middle clip
- [3] Aluminium profile, vertical
- [4] Aluminium cleat
- [5] Thermal separation
- [6] Insulation
- [7] Bottom clip
- [8] Sheet, canted
- [9] Argon tile plate (lintel)
- [10] Schuco ADS 90 Si

FAÇADE Design- PARAMETERS BASED THE WOODWAVE FAÇADE DESIGNER

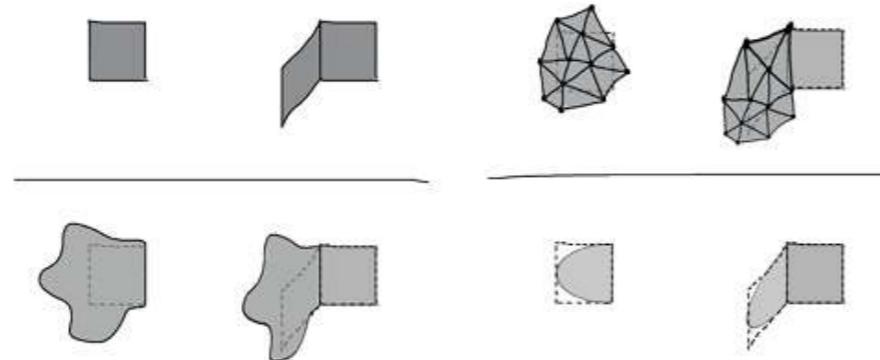
The facade consists of panels to which lamellae are attached, which the designer can customize. The façade designer is based on a previous sun position analysis. This offers the advantage that the user can adapt the façade to local conditions. The angles of the lamellae vary so that in areas with high solar radiation, there is more shading. In areas where the solar radiation is lower, the angle variance allows higher daylight irradiation. On this basis, the designer can use the "Woodwave Facade Designer" to create individual lamellae. A distinction can be made between the two systems. Once the designer can design the shape of lamellae in a specific size frame, it can be applied to the panels in a repeated form. Another option is to design the lamellae in the frame of a particular wave-like shape. In this case, the basis is not the single lamellae shape, which is repeated, but an overall shape, which can be designed with the help of a VR controller and consists of different lamellae, which are joined together to form an overall shape. In both systems, panels that form the supporting structure are wood. Conversely, the lamellae are made of 3D-printed timber, so the angles resulting from the sun position analysis can be easily printed. This has the advantage of using the material as efficiently as possible. For example, if the whole were milled out, a considerable amount of material would be wasted to generate the lamellae's angles. The connecting part between the panels and the lamellae is made of metal. The metal connection is recessed and screwed into the panels. The lamellae are inserted into the metal sheathing on the other side and are also screwed. This provides high stability for the construction. Another advantage of the construction is that the façade has a supporting structure independent of the parking garage. This means that the facade can be adapted to any parking garage design. In addition, existing parking garages could also be retrofitted with the facade. The facade, designed with the "Woodwave Facade Designer," thus offers many advantages in terms of an individual design, which is nevertheless sustainable and adapts to the local conditions.



3D Model



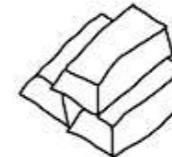
sun position analysis



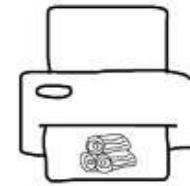
individual lamellar design



panels wood



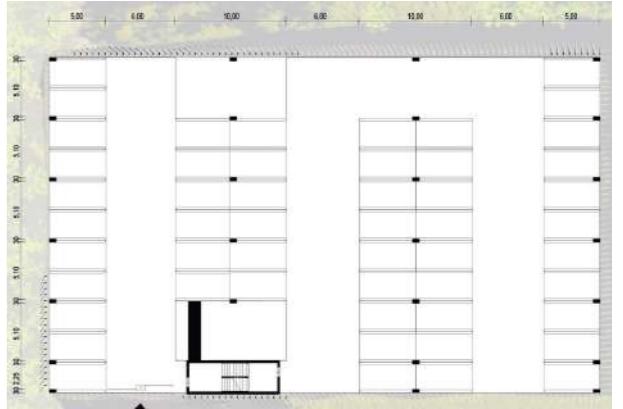
connections metal



lamellae 3D printed wood



3D Model



Floor Plan M 1:100



3D Model



3D Model



3D Model

Another way in which the user can control the shape of the lamella through the VR Headset using Gravity Sketch, where the user begins to design with a basic template, which enables him to move the points and edges of the shape to produce a new lamella shape. The new lamella can then be exported to Grasshopper to be rescaled and then moved on to the rest of the facade design process.

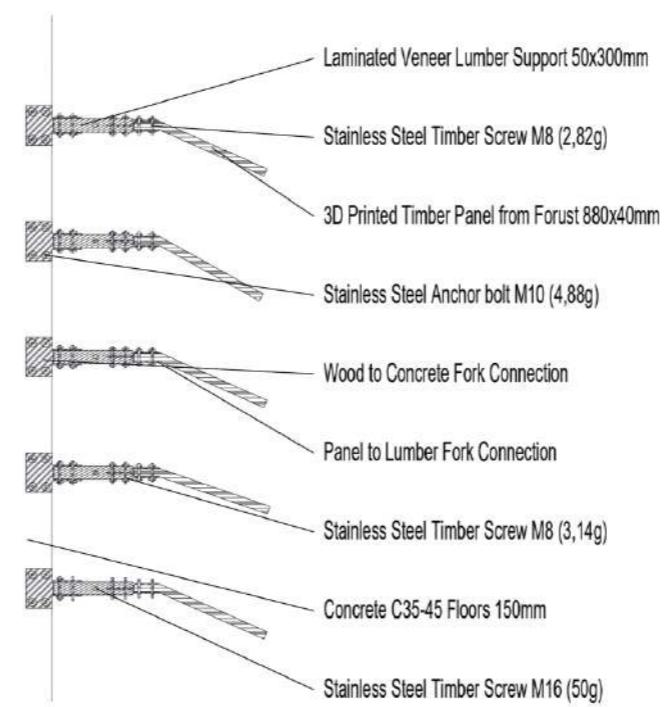


Section AA M 1:200

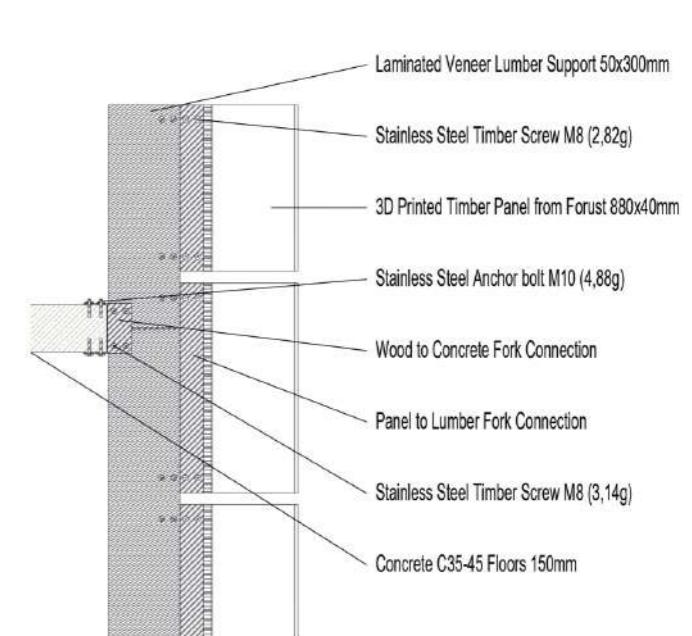


Section BB M 1:200

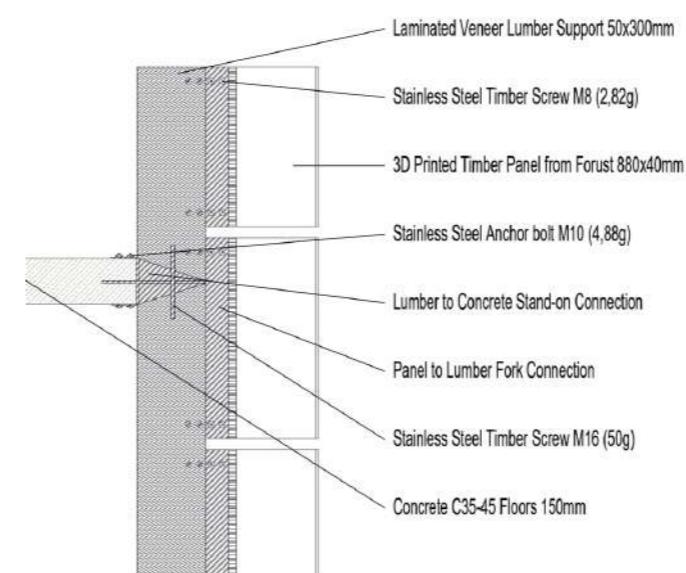
Desktop Metal, a leader in binder jet 3D printing, operates globally with 1000+ employees and facilities in five countries. They revolutionize additive manufacturing by enhancing speed, cost, and reliability, aiming to produce advanced parts for industries like automotive and healthcare at scale.



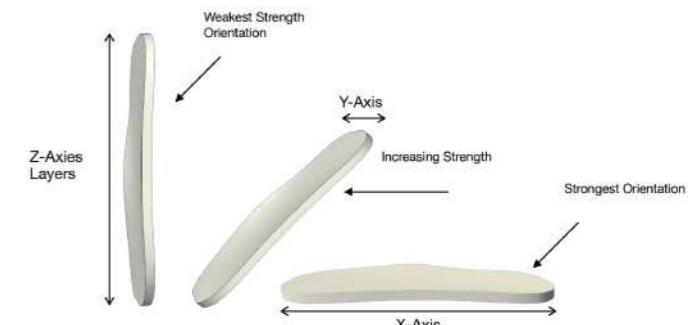
Top Detail View M 1:20



Detail Side View M 1:20



Detail Section M 1:20



Aspect Ratio

Aspect ratios drive allowable feature size. Specifically, the size or width of the feature limits the maximum achievable wall height, slot depth, and hole depth. **PILLAR AND WALL HEIGHT TO WIDTH** The wall or pillar's width limits its height. The aspect ratio for the wall is defined as the ratio of the height to width.

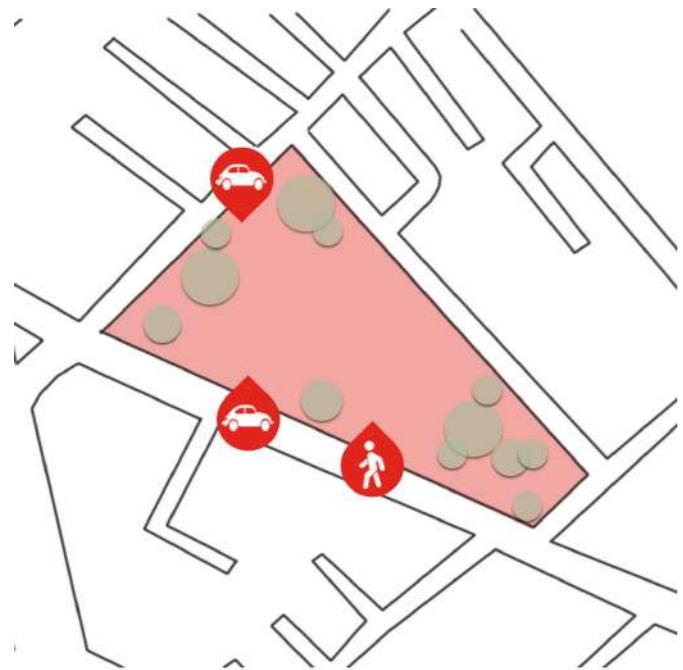


Hospital Design Designing, Planning

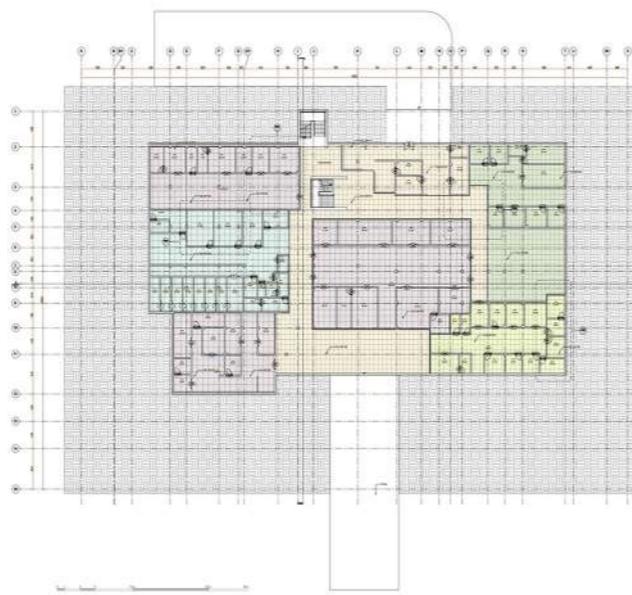
Hospital design is very important, difficult and complicated due to the rapid development of technology. The spaces which is needed in a hospital are examined based on the level of the infrastructure, the number of beds, and also the required departments. Since today, design plays a decisive role in the process of treatment and recovery of patients in medical centers; In this project, I've considered various factors in order to improve the quality of spaces related to patients, staff and visitors; These factors include the use of natural light, careful selection of paints and building materials, the priority of the design concept and flexible spaces, and environmental issues.



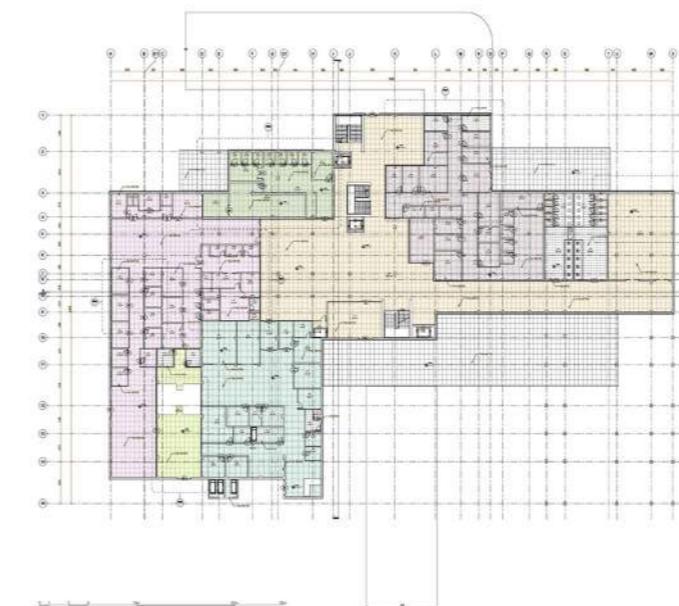
3D model



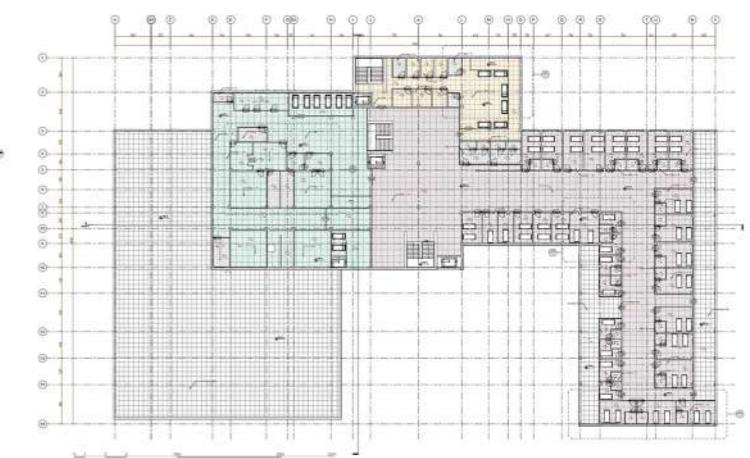
Site Plan



Basement Plan

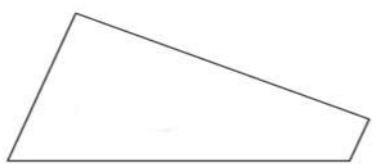


Ground Floor Plan

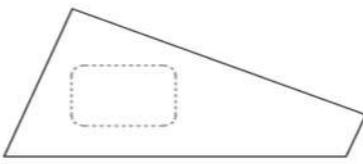


First Floor Plan

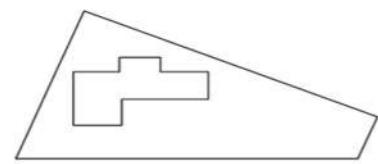
This project was designed and drawn and Rendered in Revit , Lumion.



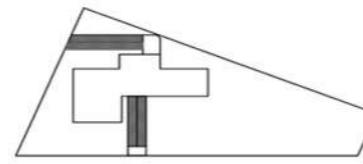
Site Plan



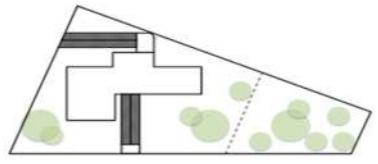
Mass Placement



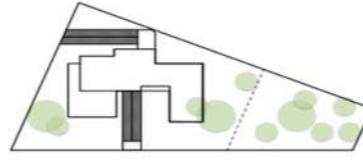
Ground Floor



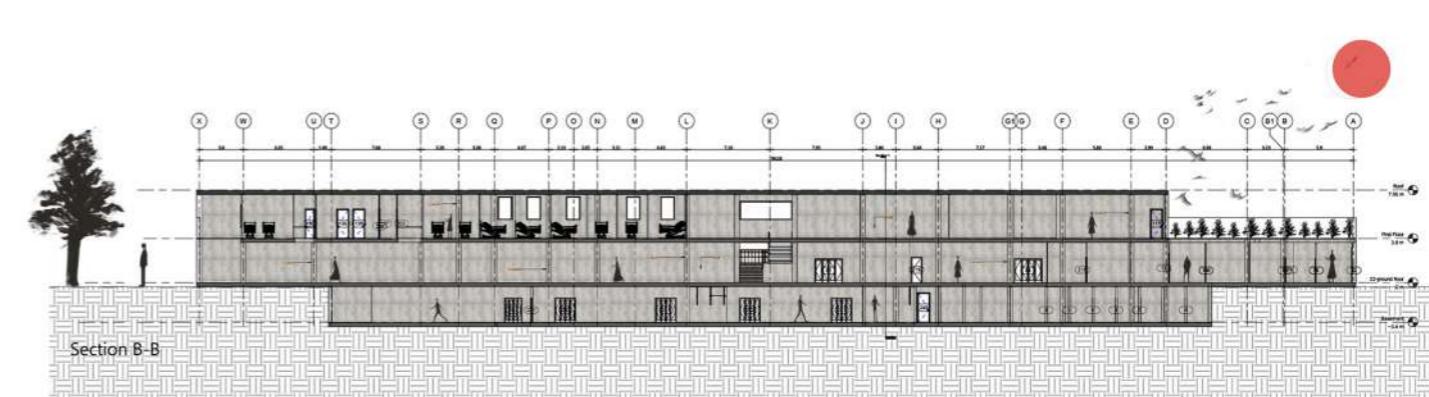
Access



Landscape



First Floor



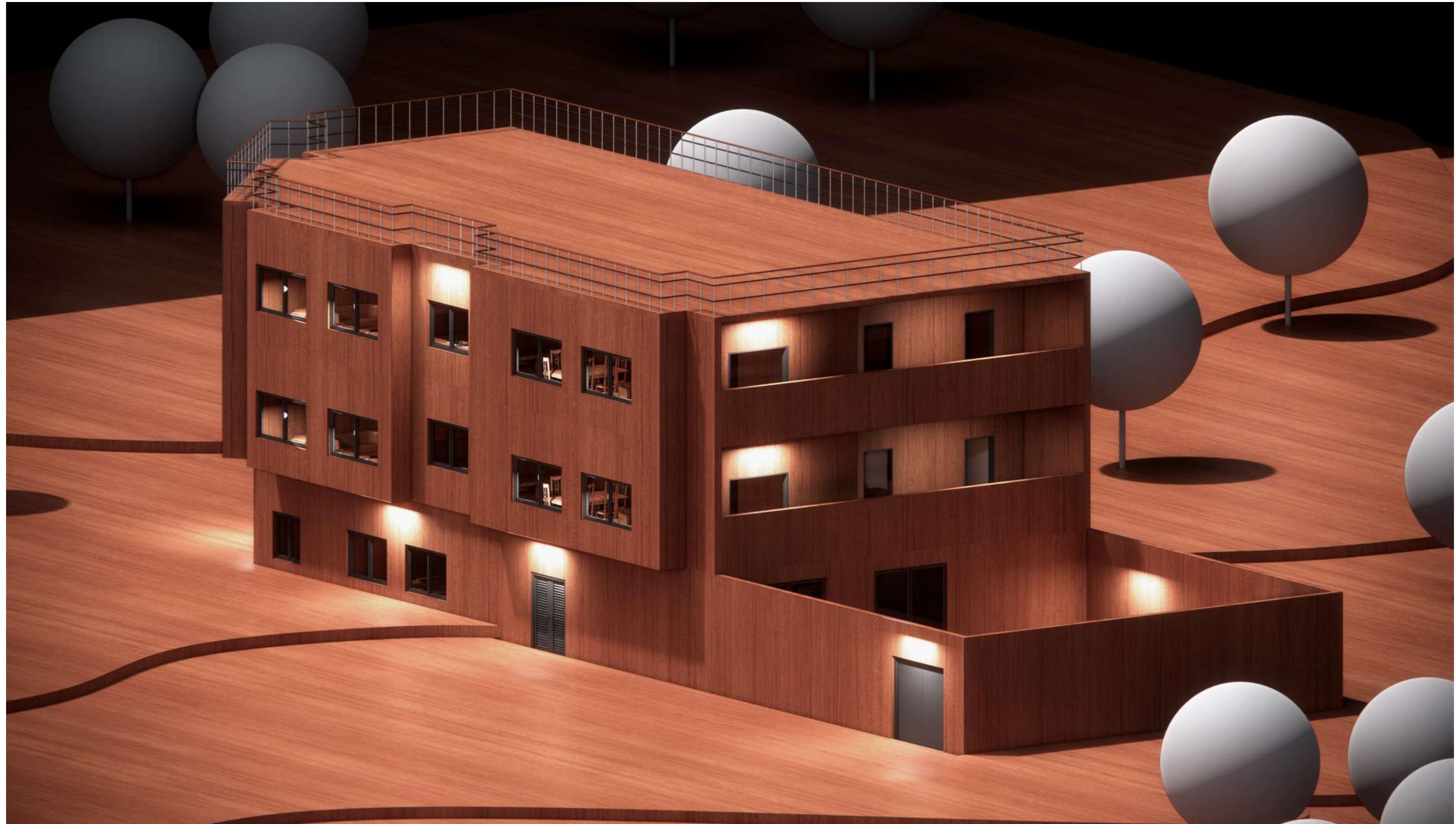
Section Design

Design Process

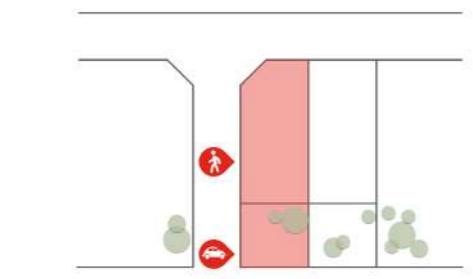
Jomhouri Project

Residential Apartments

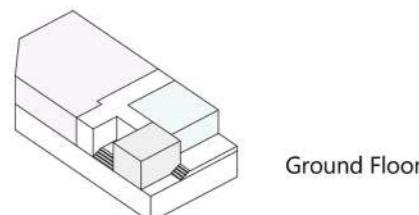
The project site plan is located on Jomhouri Street in Shiraz city. Since this land is located in the urban texture, so its daylight is limited due to its neighbours. In residential projects Lightenings are very important where everyday life is to be done and children usually spend a lot of time at home. In this project, the main priority of the design was based on natural light, and since there are two units on each floor, the light of both units should be considered. So the stairs in the parking are located in right and from the ground floor they move to the left to provide natural light for the units on the right. and aslo the elevator was considered between these two stairs and so that we didn't have to move the elevator upstairs.



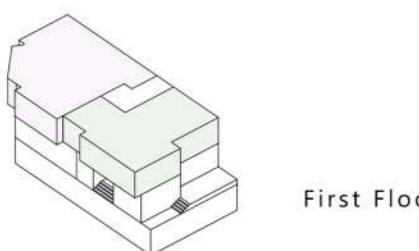
3D model



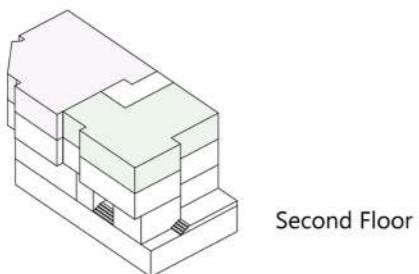
Basement



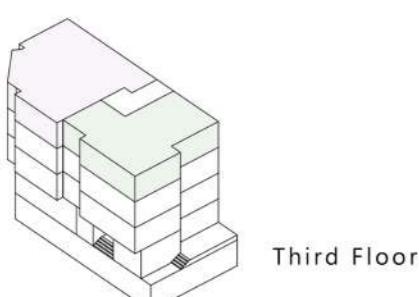
Ground Floor



First Floor



Second Floor



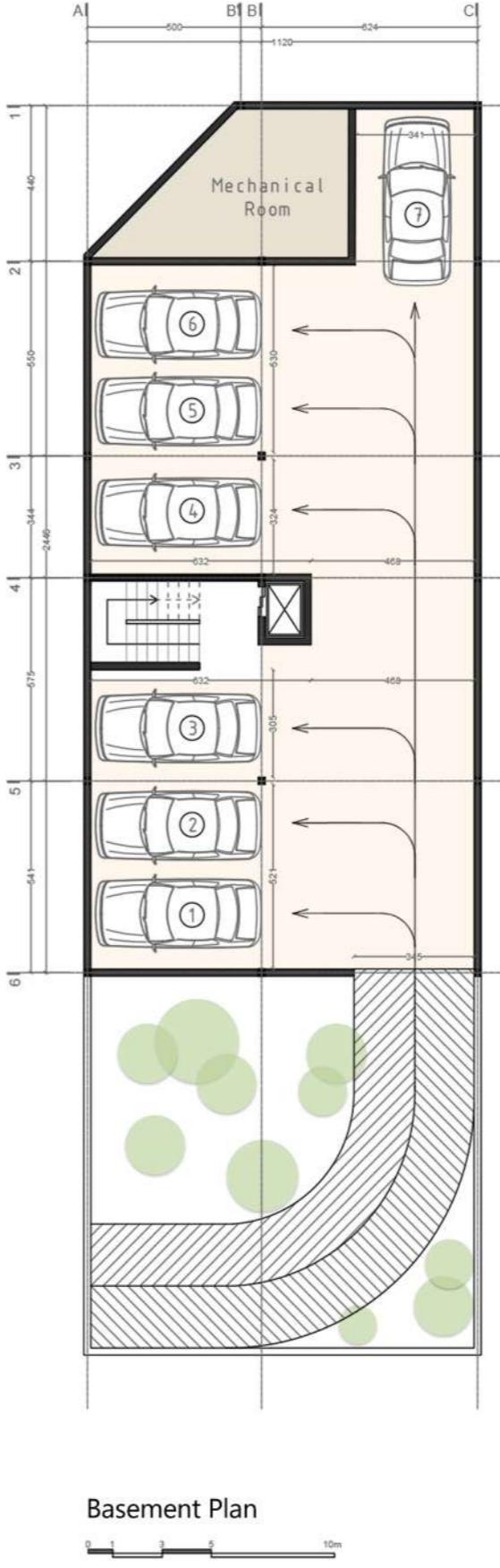
Third Floor

Space Schedule		
Level	Name	Area
Basement	Parking	227.30 m ²
	Stairs and Elevator	17.50 m ²
	Mechanical Room	27.10 m ²
Ground Floor	Lobby	45.35 m ²
	Stairs and Elevator	33.20 m ²
	House Keeper	21.00 m ²
Unit No. 1	Living room	34.30 m ²
	Kitchen	17.70 m ²
	W.C	3.60 m ²
	Bathroom	5.80 m ²
	Bedroom 1	17.60 m ²
	Bedroom 2	14.70 m ²
	Bedroom 3	14.40 m ²
Unit No. 2	Living room	44.70 m ²
	Kitchen	15.50 m ²
	W.C	4.30 m ²
	Bathroom	5.80 m ²
	Bedroom 1	19.30 m ²
	Bedroom 2	10.80 m ²
	Bedroom 3	10.80 m ²
Unit No. 3	Living room	43.05 m ²
	Kitchen	17.15 m ²
	W.C	2.90 m ²
	Bathroom	5.30 m ²
	Bedroom 1	10.90 m ²
	Bedroom 2	9.05 m ²
	Total Area	1323.0 m ²

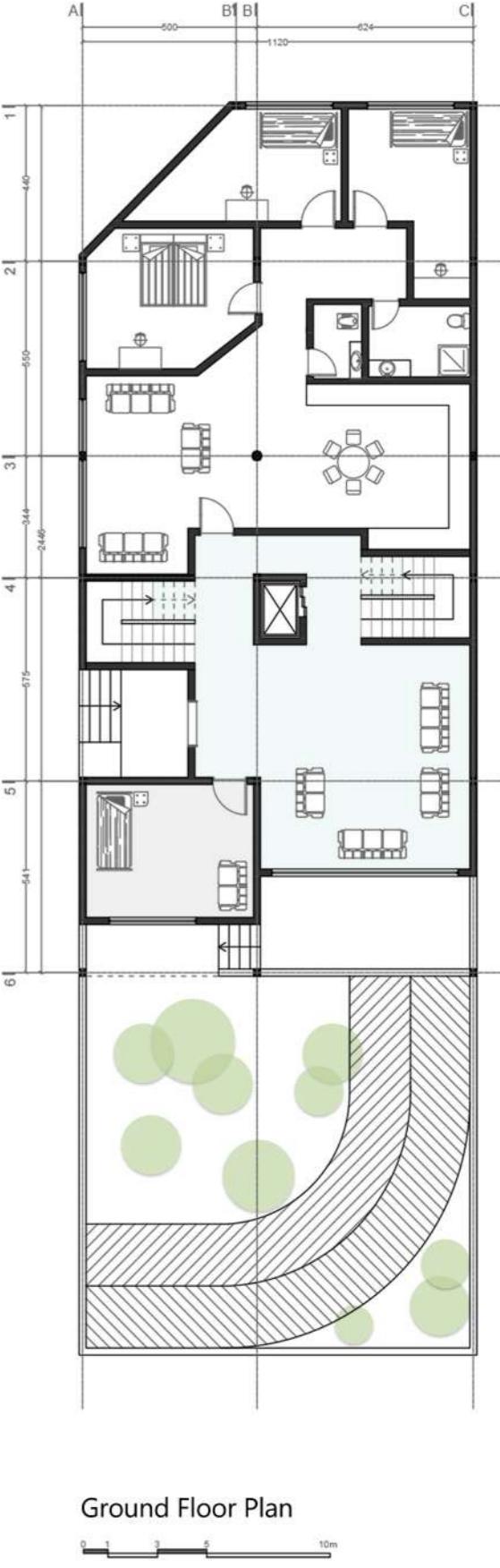
For Each Level		
Level	Name	Area
Basement	Parking	272 m ²
	Joint	98 m ²
Ground Floor	Unit No. 1	139 m ²
	Unit No. 2	141 m ²
First Floor	Unit No. 3	109 m ²
	Unit No. 4	141 m ²
Second Floor	Unit No. 5	109 m ²
	Unit No. 6	141 m ²
Third Floor	Unit No. 7	109 m ²
	Total Area	1323.0 m ²

Space Placement

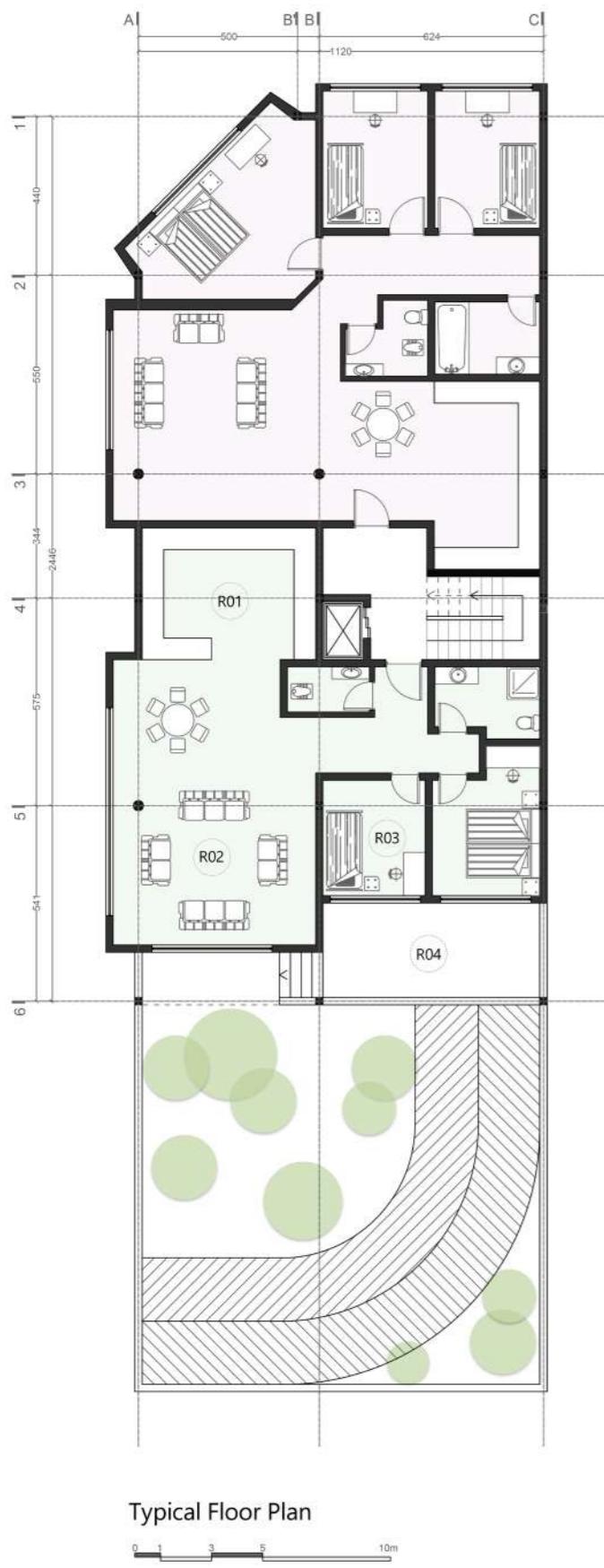
Space Schedule



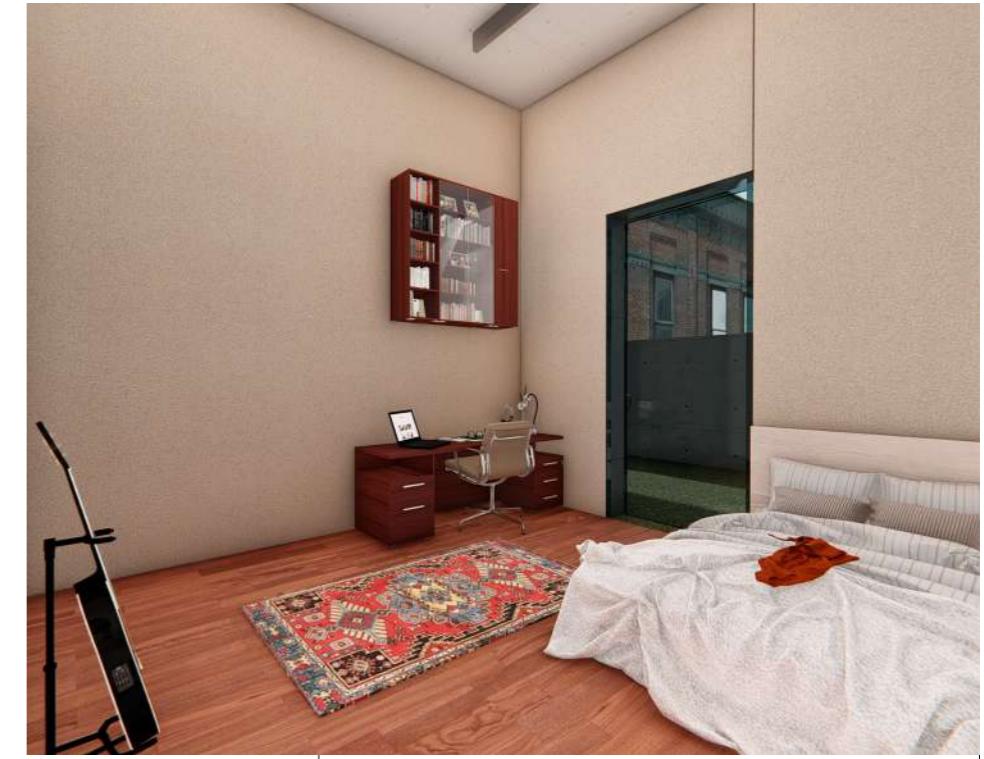
Basement Plan



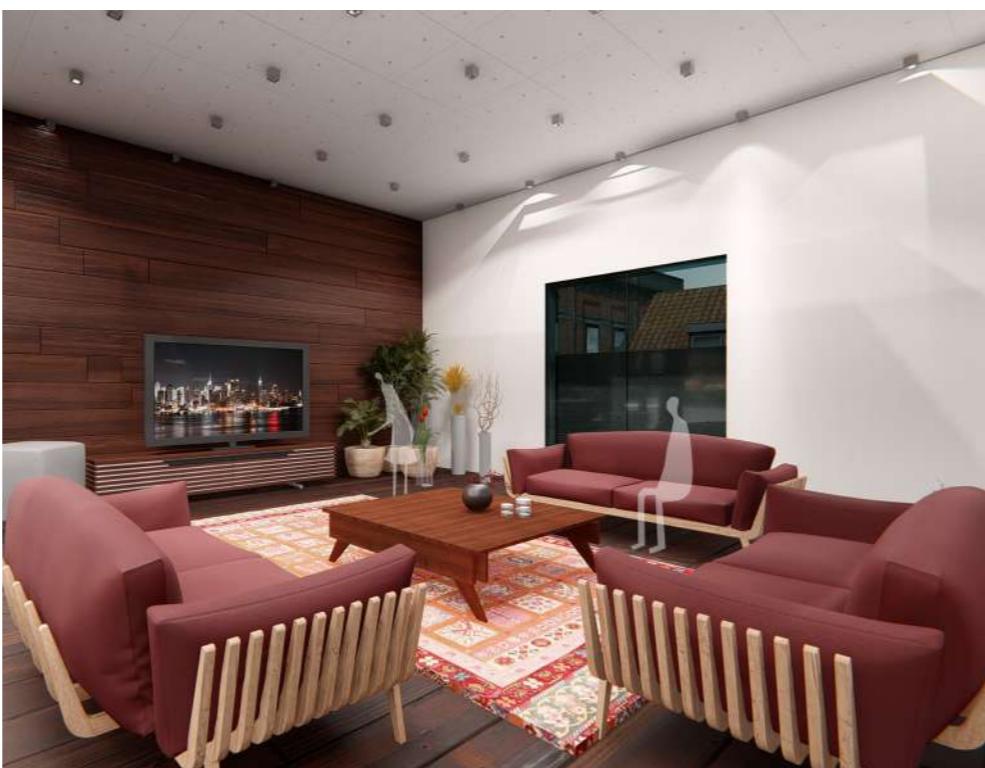
Ground Floor Plan



R01



R03



R02



R04

Typical Floor Plan

This Project is designed in **AutoCAD** and **Revit** and rendered in **Lumion** and **Enscape**.

Residential Neighborhood units

The main purpose of this project was to design urban fabric on a land with an area of 3200 square meters in Shiraz. The first Challenge is to separate the riding path from the sidewalk to reduce the speed of cars, we considered a paved path. The nature of the project includes shared houses, for each unit of which there is an independent scenario of lifestyle, which results in the creation of an independent identity for each house and even each space, so that these spaces have a physical meaning and sense of belonging and function.



This Project is designed in **AutoCAD, Revit, Sketchup, Photoshop**.



Family No. 1
one Level
One Bedrooms
Salon for Party
Dining Table
Backyard

Family No. 2
one Level
Two Bedrooms
Terrace
Parking
Huge Salon

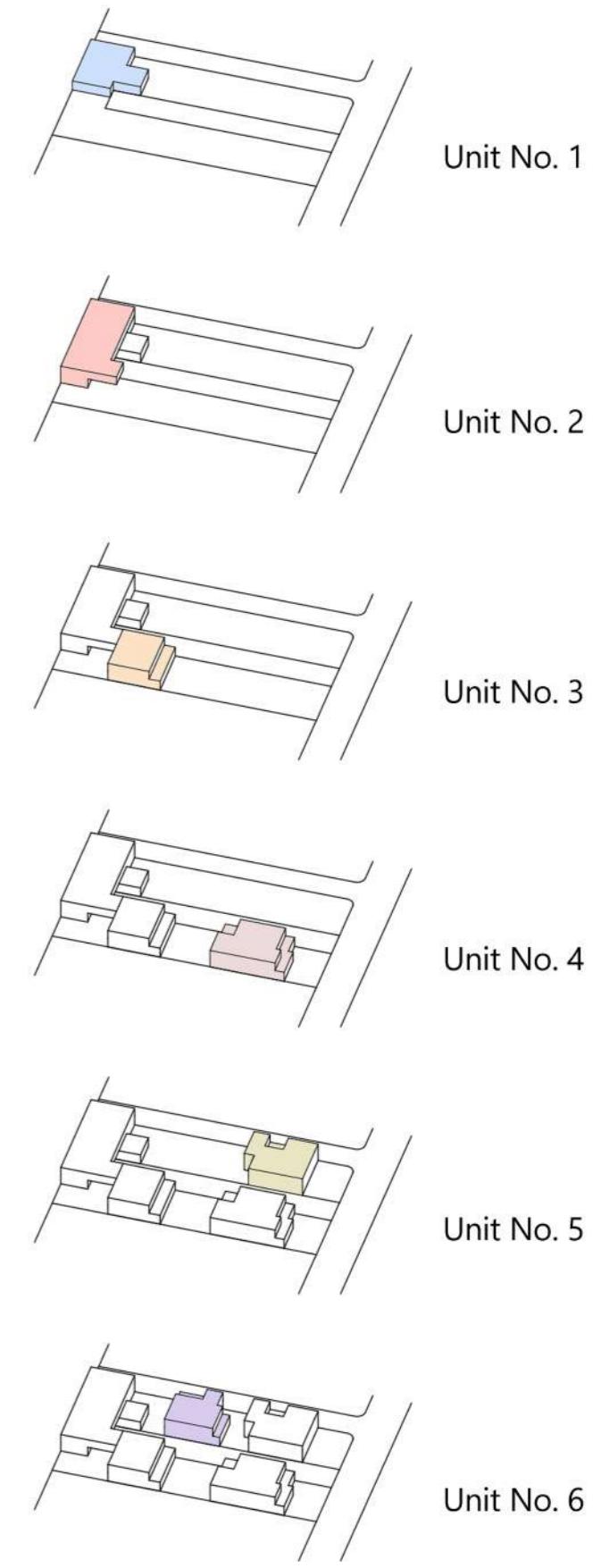
Family No. 3
Two Levels
Three Bedrooms
A work Room
T.V Room
Huge Kitchen

Family No. 4
Two Levels
Four Bedrooms
Indoor Parking
Kitchen Storage
Fire Place

Family No. 5
Two Levels
Four Bedrooms
Large House
Upstairs Living
Buffet for Dining

Family No. 6
Two Levels
Two Bedrooms
Two Work Room
Large Yard
Single Car

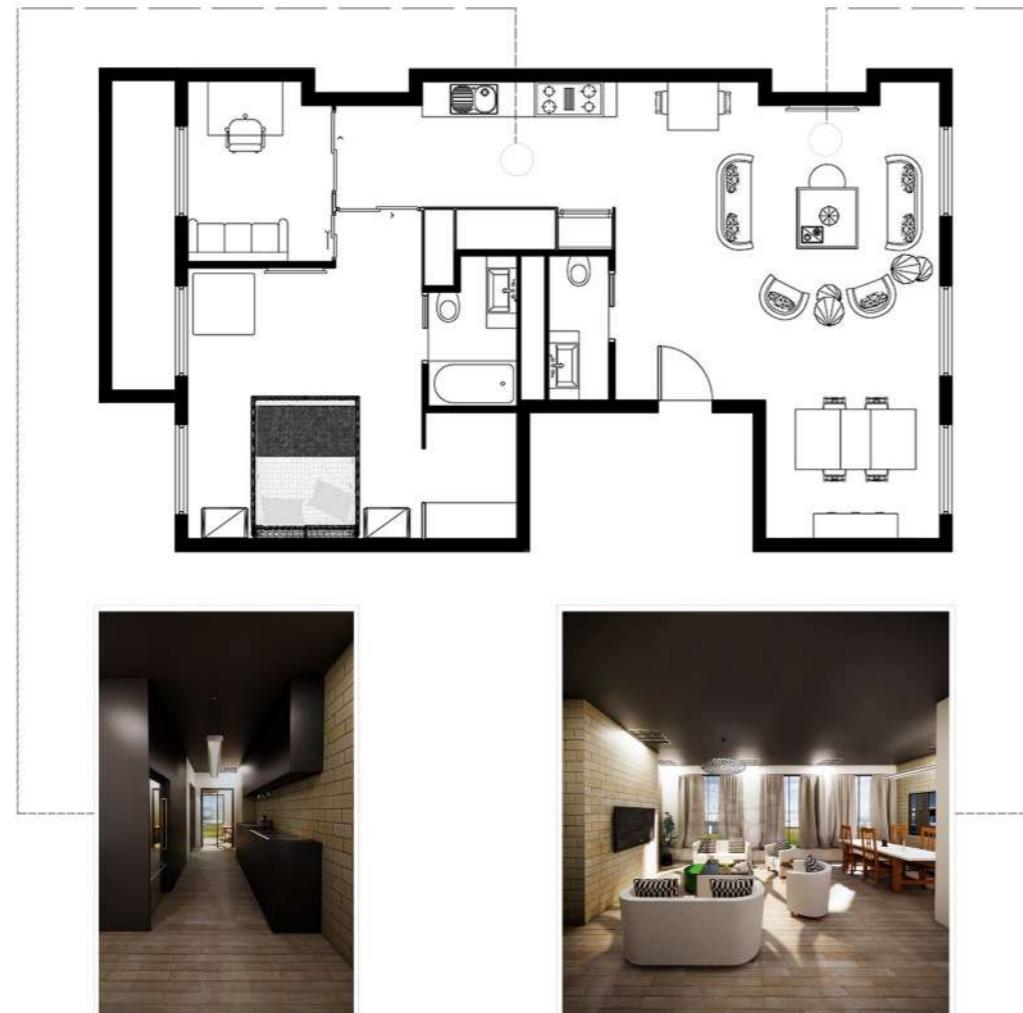
Location of Units



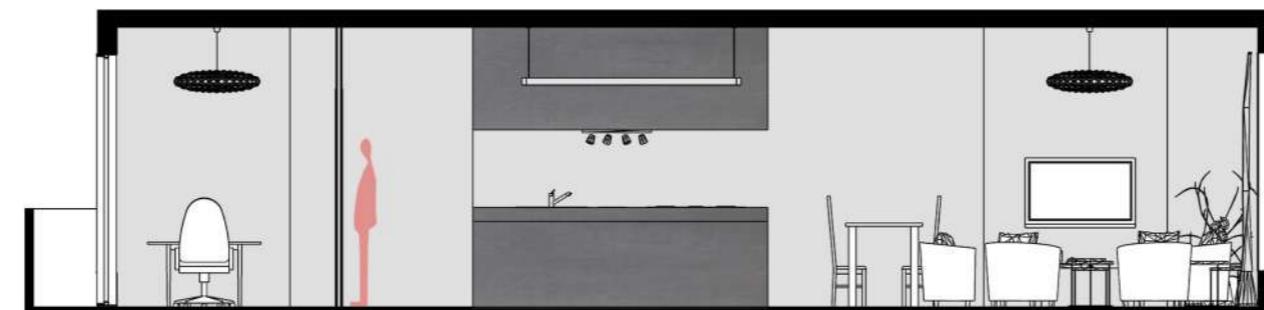
My Dreamy House

Residential Apartment

This is a designing project of an apartment unit located in a 4-story building with 2 units on each floor. The considered project in the western part is adjacent to an apartment unit and has a skylight from the north and south. Consequently, reception areas and rooms are considered in the north and south. This apartment unit has an area of 79 square meters. The employer of this project emphasizes having a workroom, so the workroom is located next to the bedroom and has access from the bedroom and living room area.

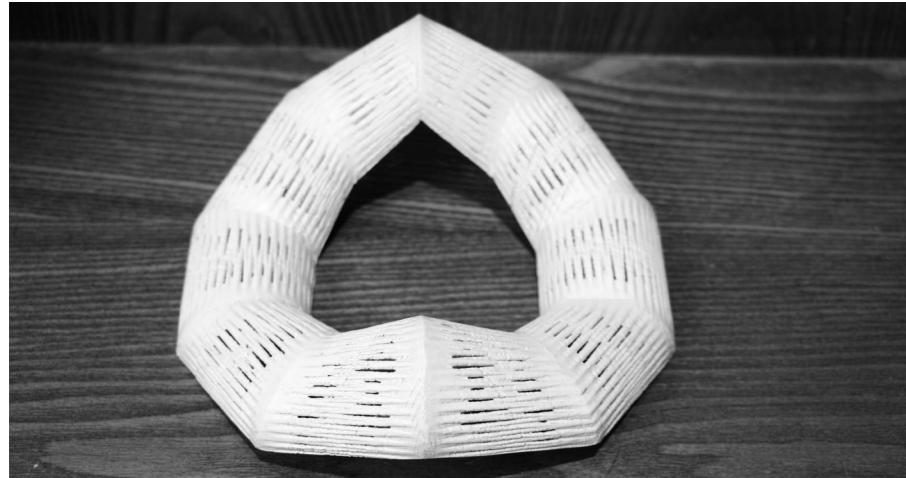


Space Schedule	
Name	Area
Living Room	34 m ²
W.C	2 m ²
Mechanical Space	1 m ²
Bath Room	3 m ²
Room	22 m ²
Working Room	7 m ²
Kitchen	10 m ²
Total Area	79 m²

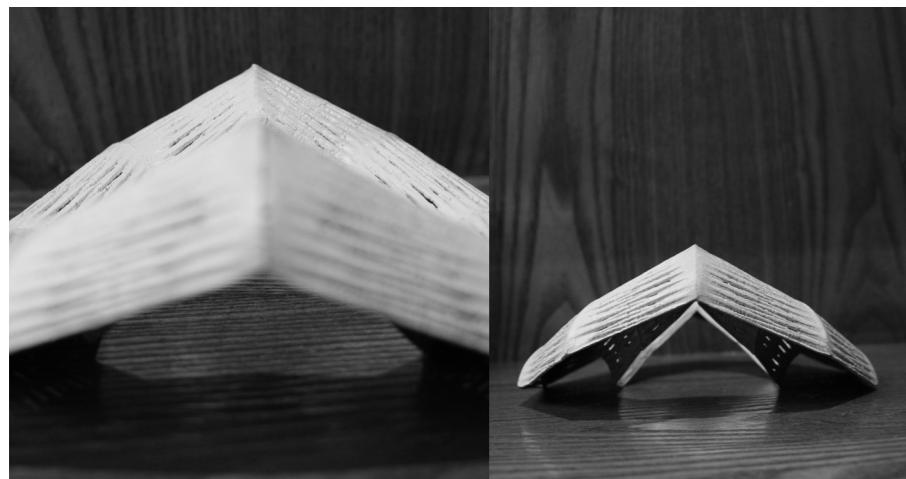


Digital Crafting Pavilion Design

Although industrial production dominates the development and fabrication of products and consumption, digital techniques have helped – even if mostly exemplarily – in reinstating basic principles of craft production in design and architecture “ [...] in which material and form are naturally intertwined into a tradition of making [...]“ (N- Oxman, 2010).
I aim to explore digital architectural ,sketching, ‘3D- and generative modeling, and digital fabrication techniques on a fundamental level.



3D Print Model



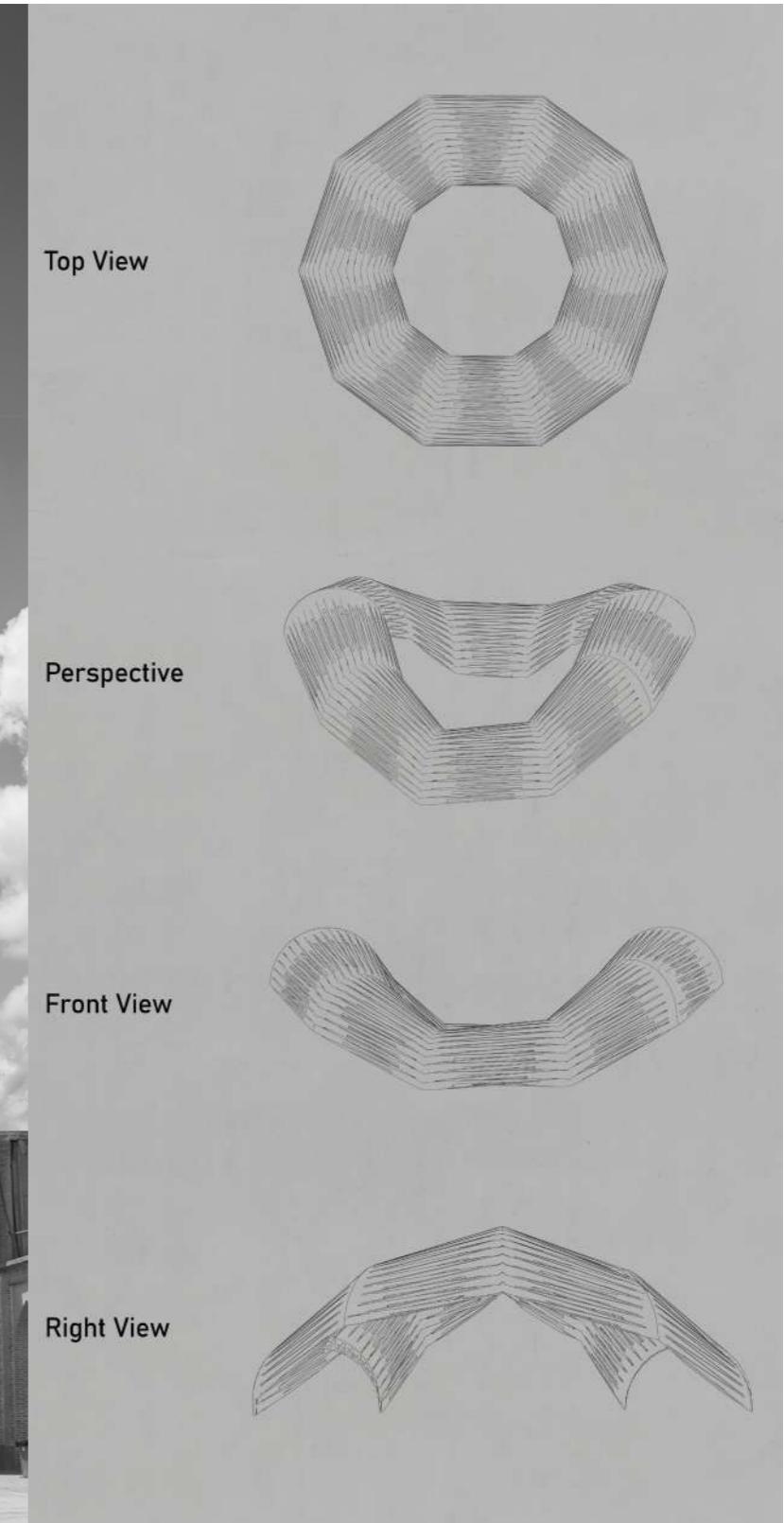
3D Print Model



3D Print Model - Attachment



Designed Model in rhino and Grasshopper - Collage Presentation



RE collect-Format-Use

Contextual Computational

The built environment generates nearly 50% of annual global CO₂ emissions. We must eliminate all CO₂ emissions from the built environment by 2040 to meet 1.5°C Climate targets. This requires a general rethinking of the design and implementation of architectural buildings and the built environment. Currently, most of the textile waste is incinerated or landfilled since no technologically feasible industrial recycling solution can address such a high amount of waste material, 230m garments unsold each year in Germany. In 2018, textile waste was 2,170,000 tons in the EU and 338,342 tons in Germany (Eurostat). The project was a group work project, and the initial idea was to get from Bedouins, a semi-nomadic group of desert dwellers. They are known for their hospitality. The Bedouins survived harsh weather conditions and lived in complex environments. Most Bedouins are animal herders who migrate into the desert during the rainy winter season and move back toward the cultivated land in the dry summer months.

This project was designed in 3D-scanning software, Rhino, Grasshopper, Opennest, and Photoshop.

Material Selection

- 01- Flexibility
- 02- Elasticity
- 03- Light
- 04- Easy to adjust

Steps

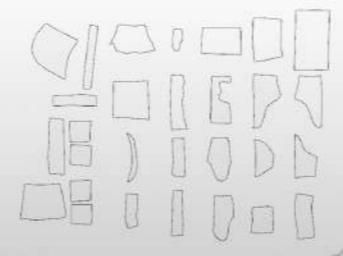
Reuse Material

- 01- Collect the waste material (from local tailor) that consist of several garments with irregular shapes, patterns, and mixed colors.
- 02- Capturing the pieces as a database with monochrome colour background to be read easier by program

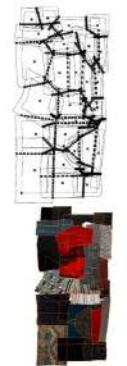
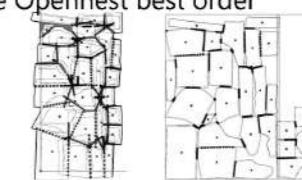
Digitalisation Process

- 03- Scanning pieces using vectorize plug-in

- 4- Put the command to offset the outline from each fabric and give an open



- 5- The process to find the Opennest best order



- 6- The final result arrangement from Opennest



- 7- Arrange the fabric picture into the outline from the arrangement



Form Finding

Defining the layout

Mock Up

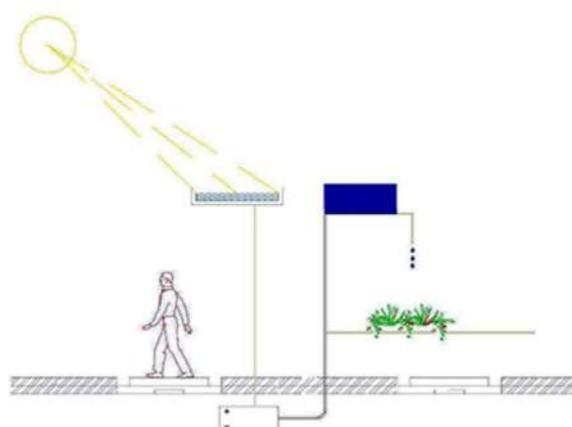


3D model

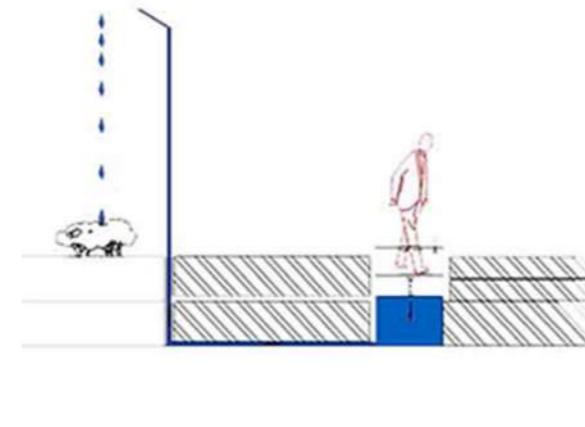
Architectural Competition

Qavam Al-Din

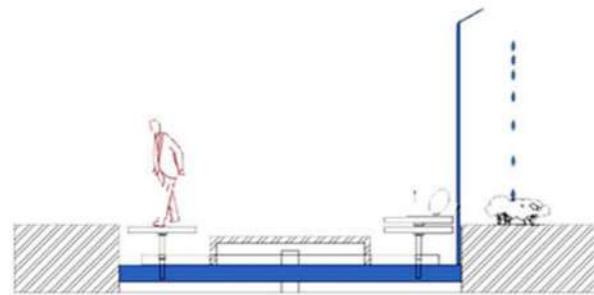
Our group intended to design and construct an architectural work with the aim of explaining and teaching the goals of urban sustainable development and with the topic on urban farming in the form of an educational-design program. This work has been in a form of urban arrangement that in interaction with citizens, familiarized them with the benefits and advantages of urban gardens and their impact on sustainable development achievement. This work displayed a small pattern of urban gardens in its architectural form, and at the same time, it presented information about this type of gardens and methods of creating it with the presence of passersby in the created space. Regarding the nature, modern ecological methods and software, the environmentally friendly and sustainable materials have been used.



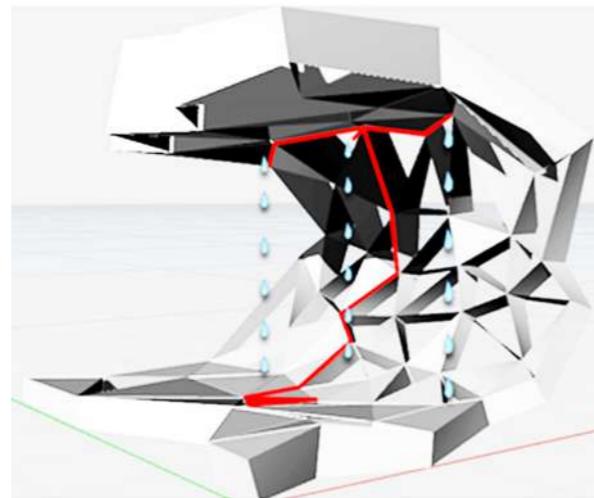
Design Process



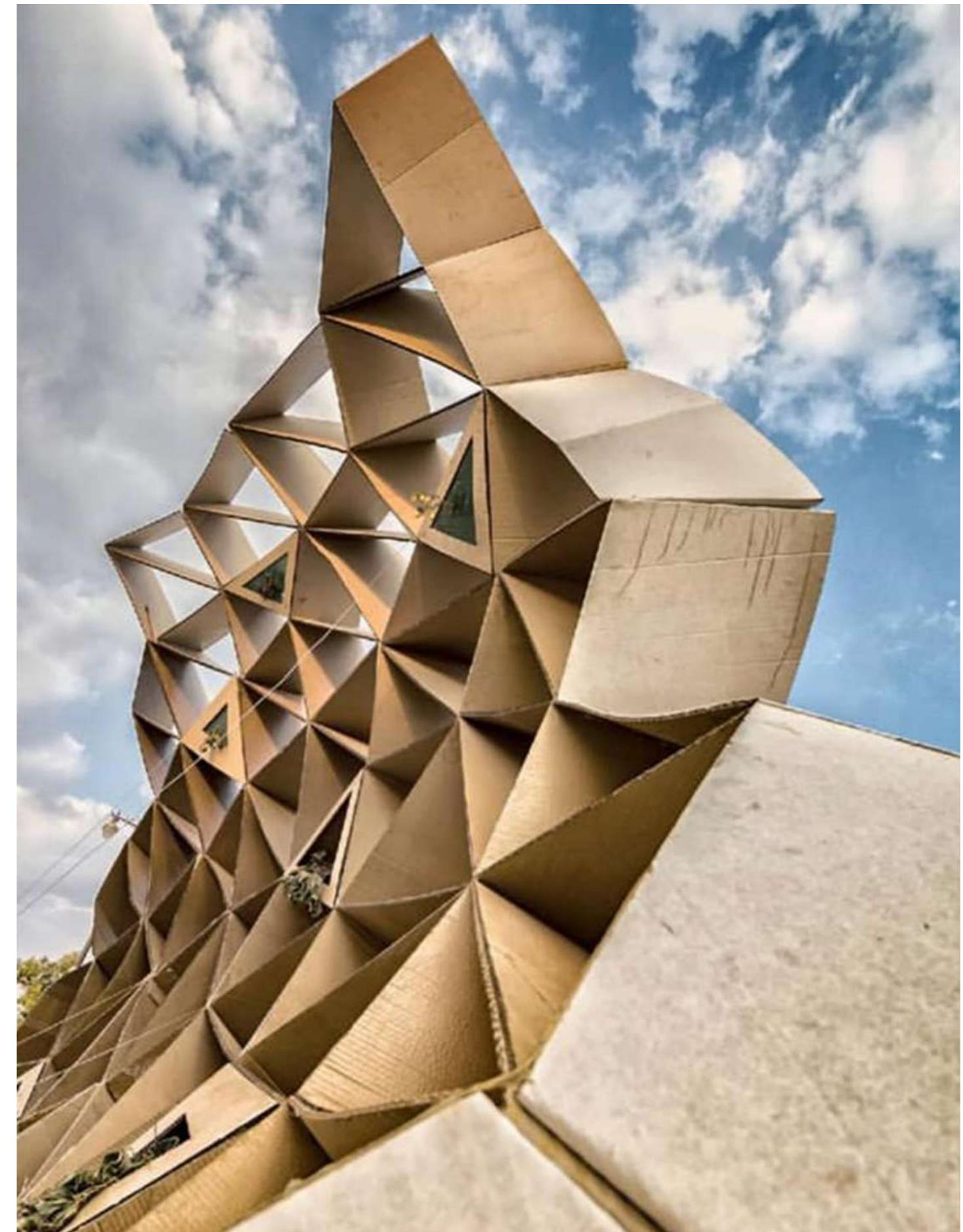
Design Process



Design Process

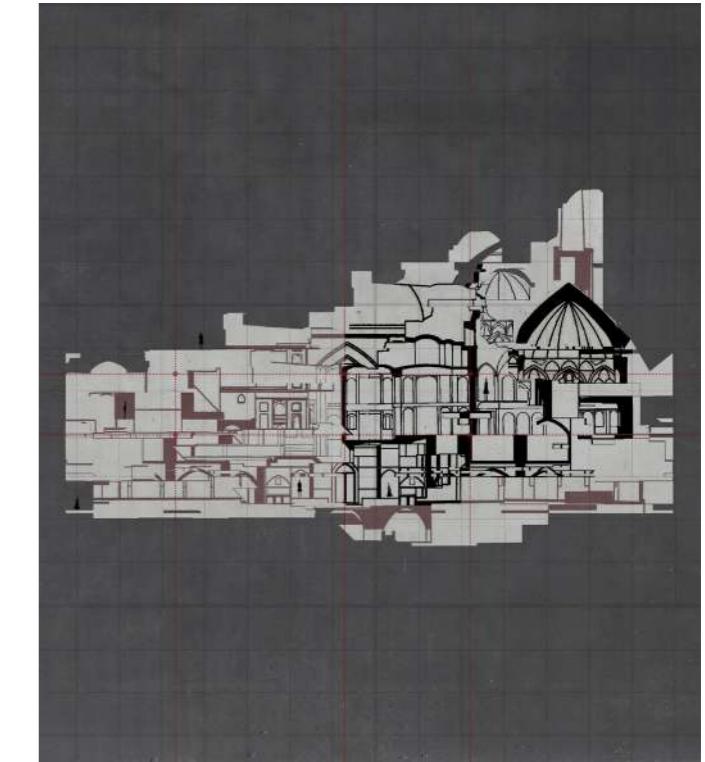
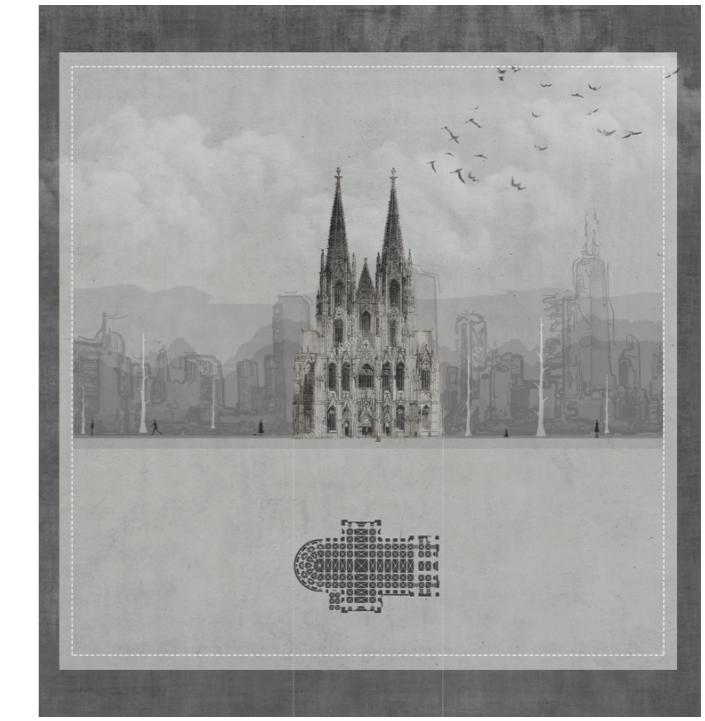
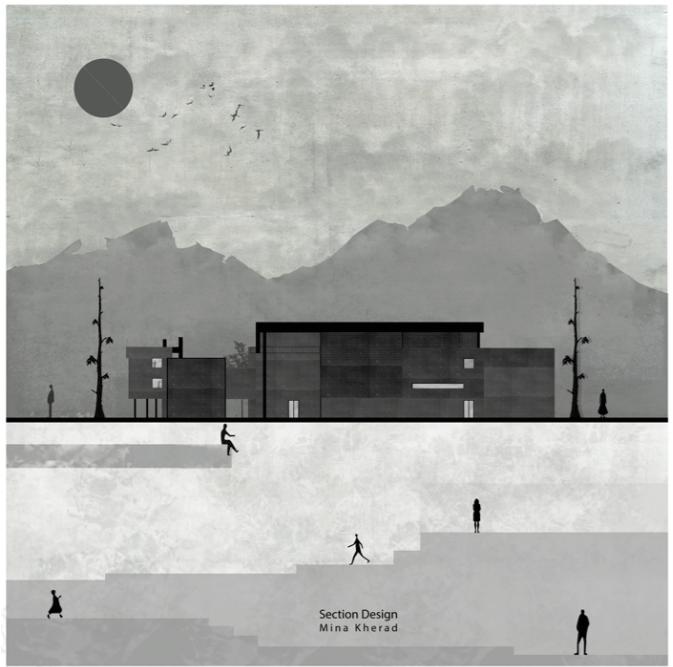


Form Finding



Recyclable Model

CG Art



Computer-generated (CG) presentations offer a distinctive and engaging method to showcase architectural projects. This approach transforms traditional blueprints and models into immersive, lifelike visualizations, enabling clients and stakeholders to envision the final structure with clarity and depth. CG presentations bring designs to life, highlighting each project's unique features and creative vision with dynamic impact.

Thanks For your Attention

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