

## MASTER-/DIPLOMARBEIT

### Moschee am Taksim Istanbul

Ausgeführt zum Zwecke der Erlangung des akademischen Grades  
eines Diplom-Ingenieurs  
unter der Leitung

Manfred Berthold  
Prof Arch DI Dr

E253  
Architektur und Entwerfen

eingereicht an der Technischen Universität Wien  
Fakultät für Architektur und Raumplanung

von  
Hacer Balin Parlak  
0827085

Ulus Cad. No:29 Sancaktepe / Istanbul Türkei

October 2017



## **TAKSIM BIRD**

a mosque project proposal  
in Taksim Istanbul

Firstly I would like to thank my parents for their love and support throughout my life. And I would like to thank my husband. You are the salt of the earth, and I undoubtedly could not have done this without you. Finally, I would like to sincerely thank my supervisor, Prof. Berthold, for his guidance, support and patience throughout this study.

## **CONTENTS**

Auszug	04
Abstract	06
Introduction	08
Project Area	12
Concept	20
Project	30
Construction	64
Details	74
Renders	80
Model Photos	90
Appendix	98
CV	102

## **AUSZUG**

Vogel Taksim, Istanbul Taksim Moschee Projektvorschlag

Das Ziel dieses Projektes ist ein Platz in Taksim zu entwerfen , wo die Menschen ihre tägliche Gebete machen können und zugleich ein Ort der Treffpunkt geschaffen wird.

Dies ist eine ungewöhnliche Moscheeprojekt. Die klassische architektonische Elemente in Moscheen wie Kuppel und Minarett werden hier nicht verwendet. Daher kann es nicht auf den ersten Blick erkennbar sein, dass es eine Moschee ist. Der Entwurf basiert sich auf der Idee der Taksim-Platz jederart von Farben umzuarmen somit wird die Moschee ein Symbol für die Einheit und Integrität. Flügel-Konzept wurde als Metapher verwendet, sowie nach Bedarf unter die Flügeln von Gott Zuflucht suchen. Die Flügeln treffen sich in einem einzigen Punkt, die die Einheit des Gottes symbolisieren sollen.

Im Projekt wird eine umfassende High-Tech Dach wie zum Beispiel Dachkuppel entworfen und die Flügeln sind wie Minaretten, die wie ein göttlicher Ruf einladen sollen.

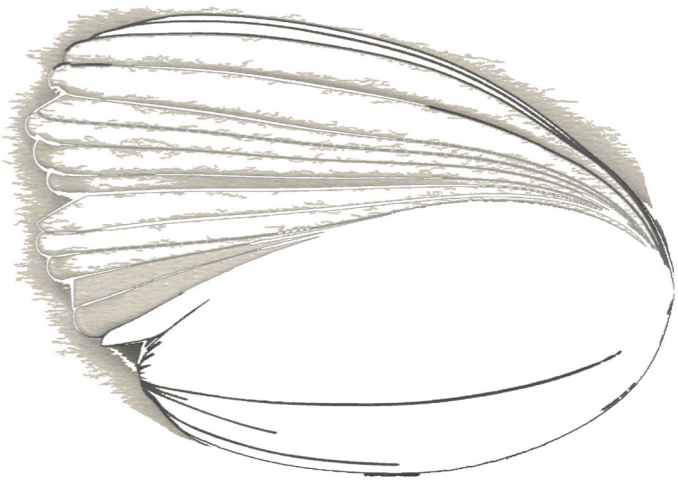
Minaretten sind die besten Erfindungen ihrer Zeit, um die Menschen zum Gebet aufzurufen. Aber leider heute wird Gebetsruf mit Zentralsystem Technologie gemacht, welcher wahrlicher Sinngehalt der Minaretten zu verlieren verursachte.

## **ABSTRACT**

Taksim Bird: A mosque project proposal in Taksim Istanbul

The main purpose of this project is to design a mosque where people do daily worship. And it also will be meeting point for Taksim square.

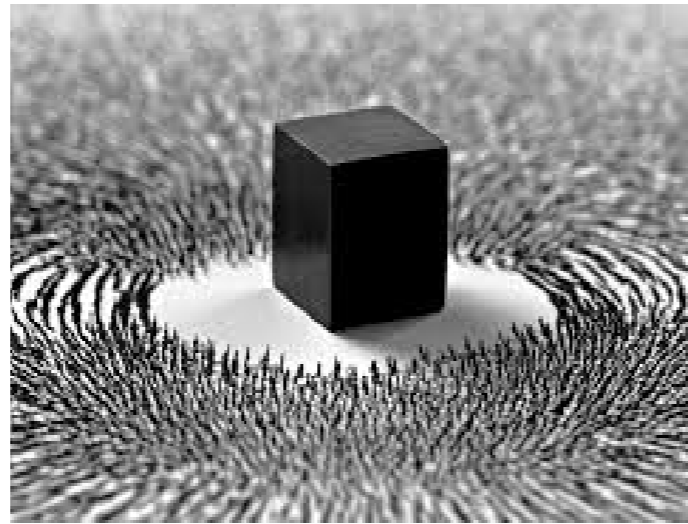
This is an unusual mosque Project. Dome and minaret which are architectural core elements of classic mosque weren't used in this design. Therefore, it may not be perceived if this is a mosque at first glance. It aims to be a symbol of unity that starting from the idea of embracing of all the colors of Taksim square. The wing was used as a conceptual metaphor which means taking a shelter under God's wings when you need. These wings converged in a single point that symbolize oneness of God. It is designed a high-tech roof that encompassing the whole space like a dome. And the wings are like minarets inviting the divine call. Minarets were one of the best important invention of its age because people has needed to hear sounds of the call to prayer. But now, we are using public address system for it. Therefore, it is no longer functional.



**INTRODUCTION**



Praying Silhouette Vector



Pic. 1 Magnetism

Pic. 2

## Prayer

Prayer that is a prominent feature of every religion, is the essence of worship. It is a matter of the most primitive worship. Men or women in all ages and in all lands, since the beginning of religion, have been engaged in the practice of prayer. Therefore prayer belongs to all religions, primitive or advanced. Religion includes belief and practice and principle and institution, but all these draw their vitality from worship. R. R. Marrett says in his article on prayer in the Encyclopedia Britannica that prayer is “a characteristic feature of the higher religions, and we might say that Christianity or Islam, ritually viewed, is in its inmost essence a service of prayer.”

“Salat” is an Arabic word whose basic meaning is “bowing, homage, worship, prayer”. Translating salat as “prayer” is not usually considered precise enough, as “prayer” can indicate several different ways of relating to God; personal prayer or supplication is called dua (literally “call”) in Islamic usage. In its English usage, the reference of the word is almost always confined to the Muslim formal, obligatory worship. It is the 2nd and most important pillar of Islam. It is mandatory on every Muslim. There are no excuses, not even when you are ill, on a journey or even in war. For Muslims obligatory salat is prescribed at five periods of the day. These are measured according to the movement of the sun.

## Kaaba

The Kaaba, meaning cube in Arabic, is a square building elegantly draped in a silk and cotton veil. Located in Mecca, Saudi Arabia, it is the holiest shrine in Islam. In Islam, Muslims pray five times a day and after 624 CE, these prayers were directed towards Mecca and the Kaaba rather than Jerusalem; this direction or qibla in Arabic is marked in all mosques and enables the faithful to know in which direction they should pray. The Qur’an established the direction of prayer.

Upon arriving in Mecca, pilgrims gather in the courtyard of the Masjid al-Haram around the Kaaba. They then circumambulate tawaf in Arabic or walk around the Kaaba, during which they hope to kiss and touch the Black Stone-al-Hajar al-Aswad embedded in the eastern corner of the Kaaba.

Tradition holds that it was originally a simple unroofed rectangular structure. The Quraysh tribe, who ruled Mecca, rebuilt the pre-Islamic Kaaba in c. 608 CE with alternating courses of masonry and wood. A door was raised above ground level to protect the shrine from intruders and flood waters.<sup>1</sup>

<sup>1</sup> <https://tr.khanacademy.org/humanities/art-islam/beginners-guide-islamic/a/the-kaaba>  
Essay by Dr. Elizabeth Macaulay-Lewis

## Common Types of Mosque Architecture

Since the 7th century, mosques have been built around the globe. While there are many different types of mosque architecture, three basic forms can be defined.

- The hypostyle mosque

It makes sense that the first place of worship for Muslims, the house of the Prophet Muhammad, inspired the earliest type of mosque - the hypostyle mosque. This type spread widely throughout Islamic lands.

- The four-iwan mosque

Just as the hypostyle hall defined much of mosque architecture of the early Islamic period; the 11th century shows the emergence of new form: the four-iwan mosque. An iwan is a vaulted space that opens on one side to a courtyard. The iwan developed in pre-Islamic Iran where it was used in monumental and imperial architecture.

- The centrally-planned mosque

While the four-iwan plan was used for mosques across the Islamic world, the Ottoman Empire was one of the few places in the central Islamic lands where the four-iwan mosque plan did not dominate. The Ottoman Empire was founded in 1299. However, it did not become a major force until the 15th century, when Mehmed II conquered Constantinople. Many Ottoman mosques in the late 15th and early 16th centuries referenced Hagia Sophia’s dome; however, it was not until the masterful work of Mimar Sinan.<sup>1</sup>

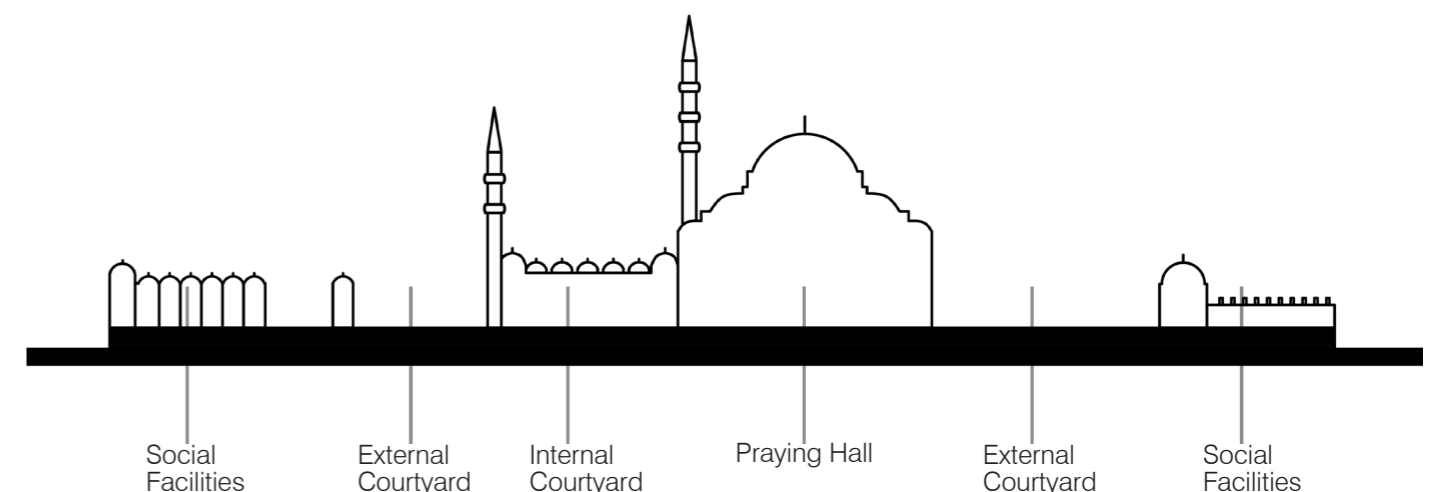
<sup>1</sup> <https://tr.khanacademy.org/humanities/art-islam/beginners-guide-islamic/a/common-types-of-mosque-architecture>  
Essav by Kendra Weisbin

## Great Sinan

Great Sinan, better known simply as Sinan was the chief architect and civil engineer for sultans Suleiman I, Selim II and Murad III. During a period of 50 years, he was responsible for the construction or supervision of every major building in the Ottoman Empire. More than 300 structures are credited to him, exclusive of his more modest projects.

His most famous work is the Suleiman Mosque in Istanbul, although he considered his masterpiece to be the Selimiye Mosque in nearby Edirne. He supervised an extensive governmental department and trained many assistants who also distinguished themselves, including Sedefhar Mehmet Ağa, architect of the Sultan Ahmed Mosque.<sup>1</sup>

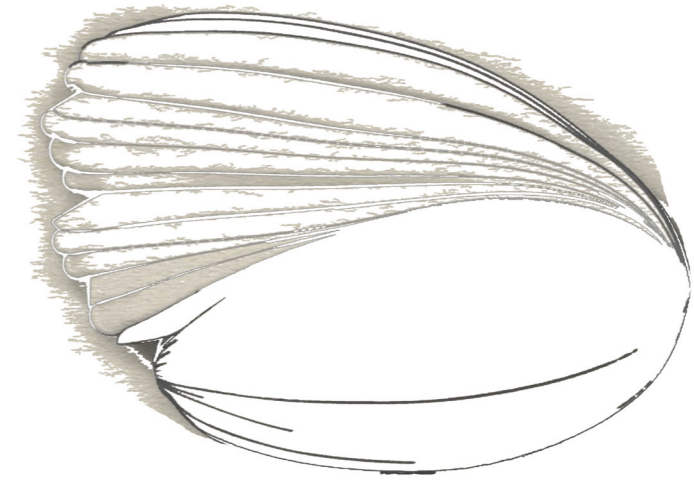
<sup>1</sup> <http://www.newworldencyclopedia.org/entry/Sinan>



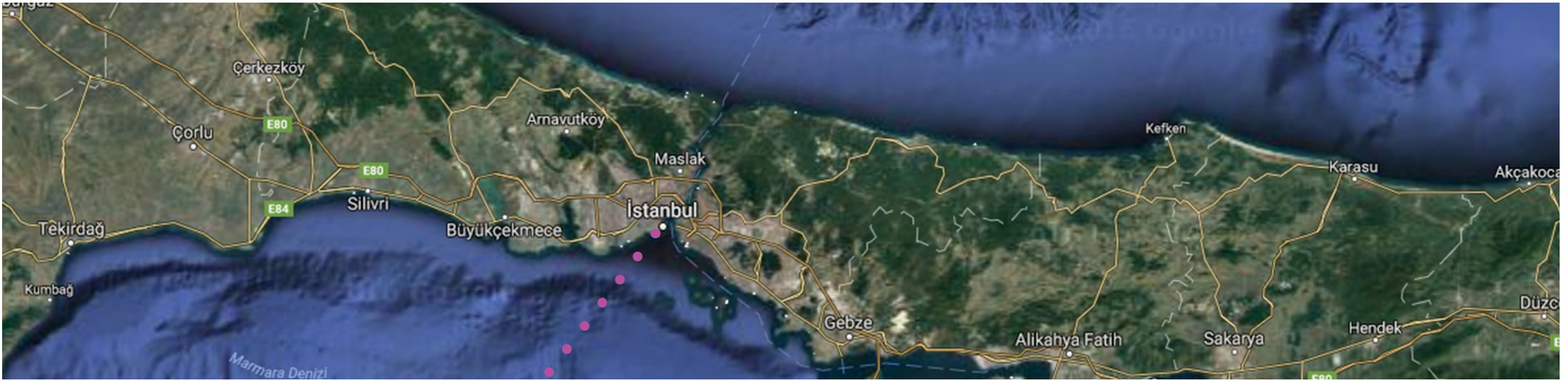
Section Diagram of Classical Ottoman Mosque

Pic. 3





**PROJECT AREA**  
**TAKSIM - ISTANBUL**



TURKEY - ISTANBUL SATELLITE MAP

Pic.4



ISTANBUL - BEYOGLU SATELLITE MAP

Pic. 5



BEYOGLU - TAKSIM SQUARE SATELLITE MAP

Pic.6



Pic.7

## Taksim Square

Taksim Square, situated in the European part of Istanbul, Turkey, is a major tourist and leisure district famed for its restaurants, shops, and hotels. It is considered the heart of modern Istanbul, with the central station of the Istanbul Metro network. Taksim Square is also the location of the Monument of the Republic.

The word Taksim means "division" or "distribution". The Taksim square was originally the point where the main water lines from the north of Istanbul were collected and branched off to other parts of the city (hence the name.) This use for the area was established by Sultan Mahmud I. The square takes its name from the Ottoman era stone reservoir which is located in this area. Additionally, the word "Taksim" can refer to a special improvisational musical form in Turkish classical music that is guided by the Makam system. Another significant building that once stood on the square was the 19th century Taksim Artillery Barracks, but it was demolished in 1940 during the construction works of the Taksim Park. (Taksim Gezi Park)

Taksim is a main public transportation hub and a popular destination for both tourists and the native population of Istanbul. İstiklal Caddesi (Independence Avenue), a long pedestrian shopping street, ends at this square, and a nostalgic tram runs from the square along the avenue, ending near the Tünel (1875) which is the world's second-oldest subway line after London's Underground (1863). Taksim is also a favourite location for public events such as parades, New Year celebrations, or other social gatherings.



Pic.8



Pic.9



Pic.10

## Historical Taksim Cistern (Maksem)

The cistern (maksem) is the first major building in Taksim Square and it was built to meet the water needs of Beyoğlu in the 18th century. According to its inscription, the first part of the Taksim water supply network was completed c.1733. In the years 1797 and 1798, the quantity of water, brought to Maksem (cistern) and distributed to the city, increased through the contributions of Mihrişah Sultan. The Taksim water supply network, providing water also for Taksim, was constructed in four stages between 1731 and 1839. The verse from Qur'an reading, 'We have created everything out of water' is written on the fountain at the square facing side of the two storey octagonal maksem. After the renovation it has been using for social purposes.



Pic.11



Monument of Republic

Pic.12



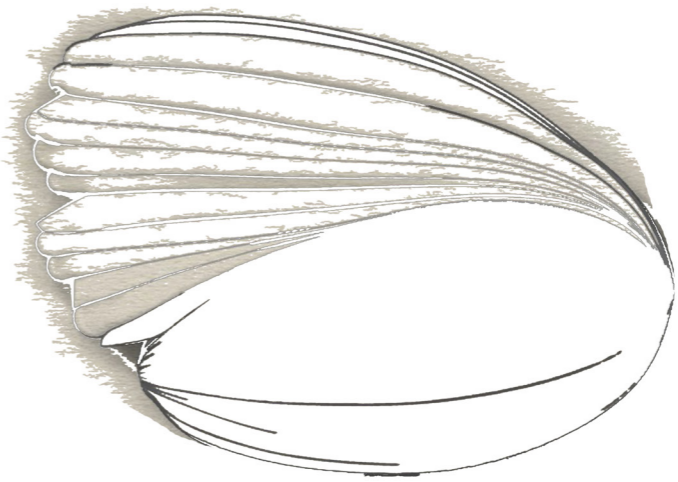
Taksim Gezi Park

Pic.13



MASTER PLAN

Pic.17



**CONCEPT**

### The Symbolism of Wing

The wing is a structure that enable to fly and it is the symbol of lightness, spirituality, the possibility of flying and rising up to heaven. Wings are the expression of the aspiration of the soul towards a higher than human condition, in other words the aspiration to transcend the human condition. Wings are related to the cognitive faculty, imagination, thought, freedom and victory.

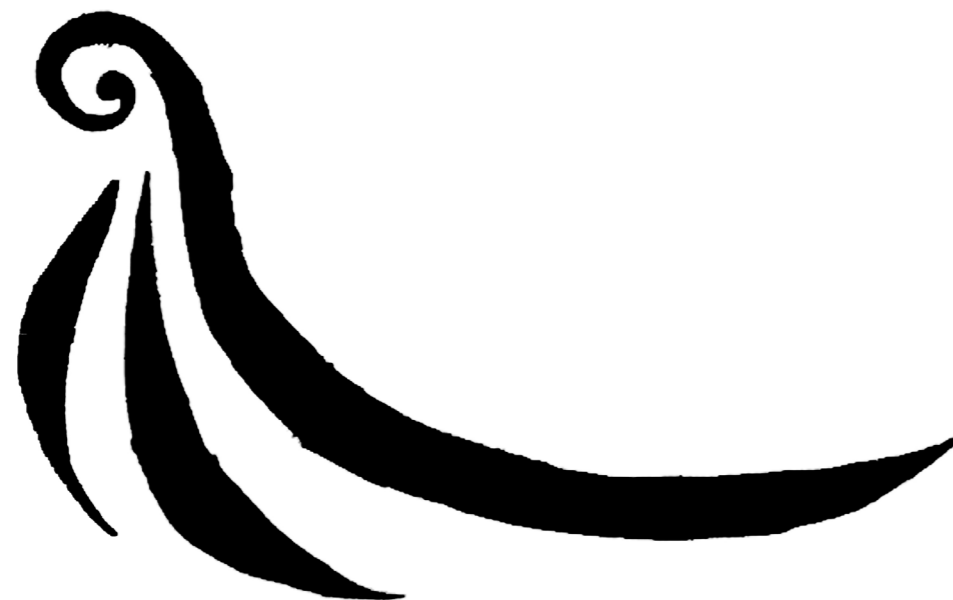
For instance, ancient Greek described love and victory as winged figures. Winged creatures represent heaven like that snakes in some cultures in Anatolia and Mesopotamia represent earth's surface. According to Plato, wings represent Intelligence and Understanding. That is the reason why they are associated with certain fabulous animals, such as Pegasus, representing the sublimation of the specific symbolism of the animal.<sup>1</sup>

<sup>1</sup> <http://library.acropolis.org/the-symbolism-of-wings/>  
Article By M.A. Carrillo de Albornoz & M.A. Fernández



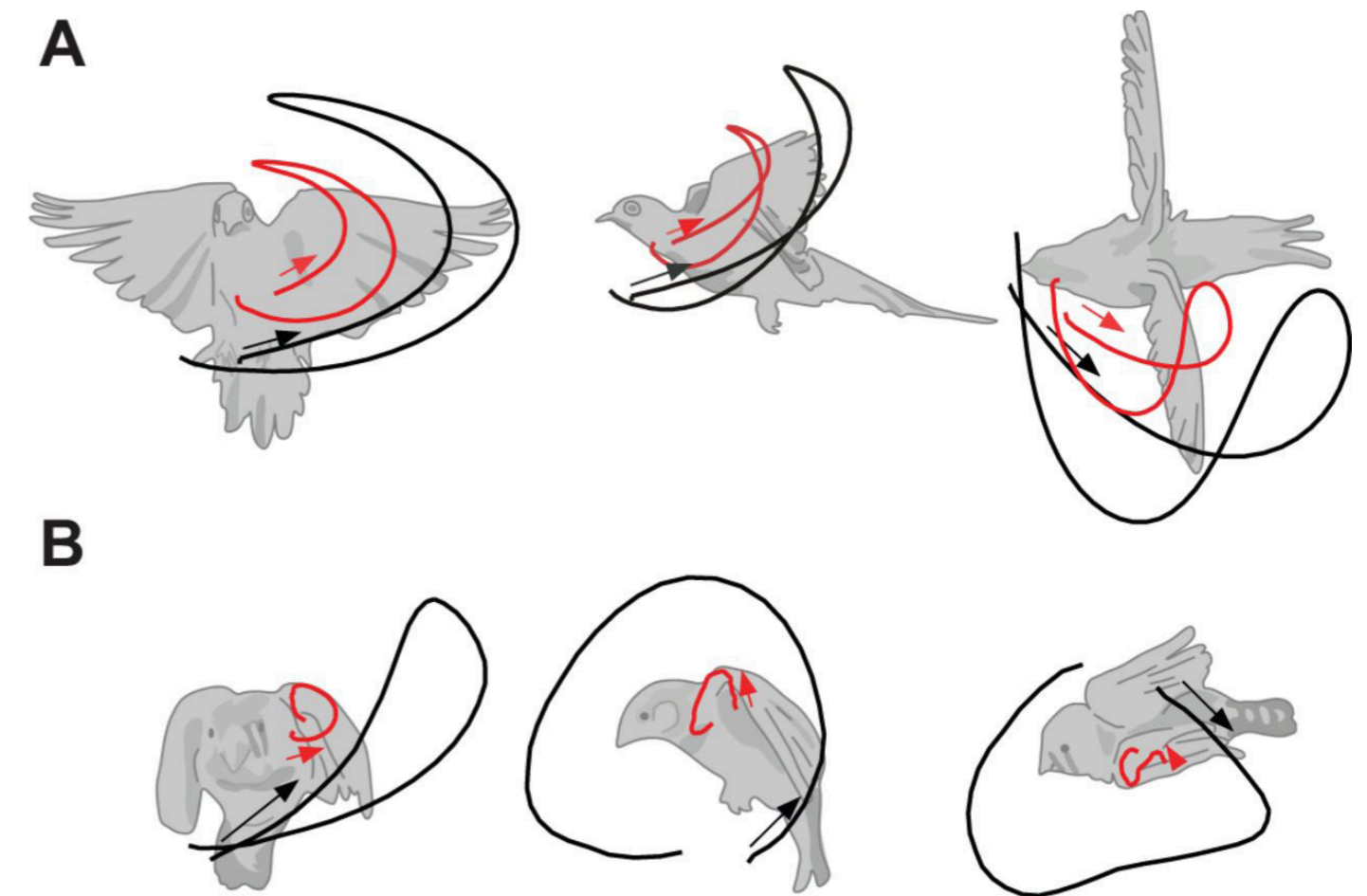
PRAYER MAN

Pic. 18



TATOO - WING

Pic. 19

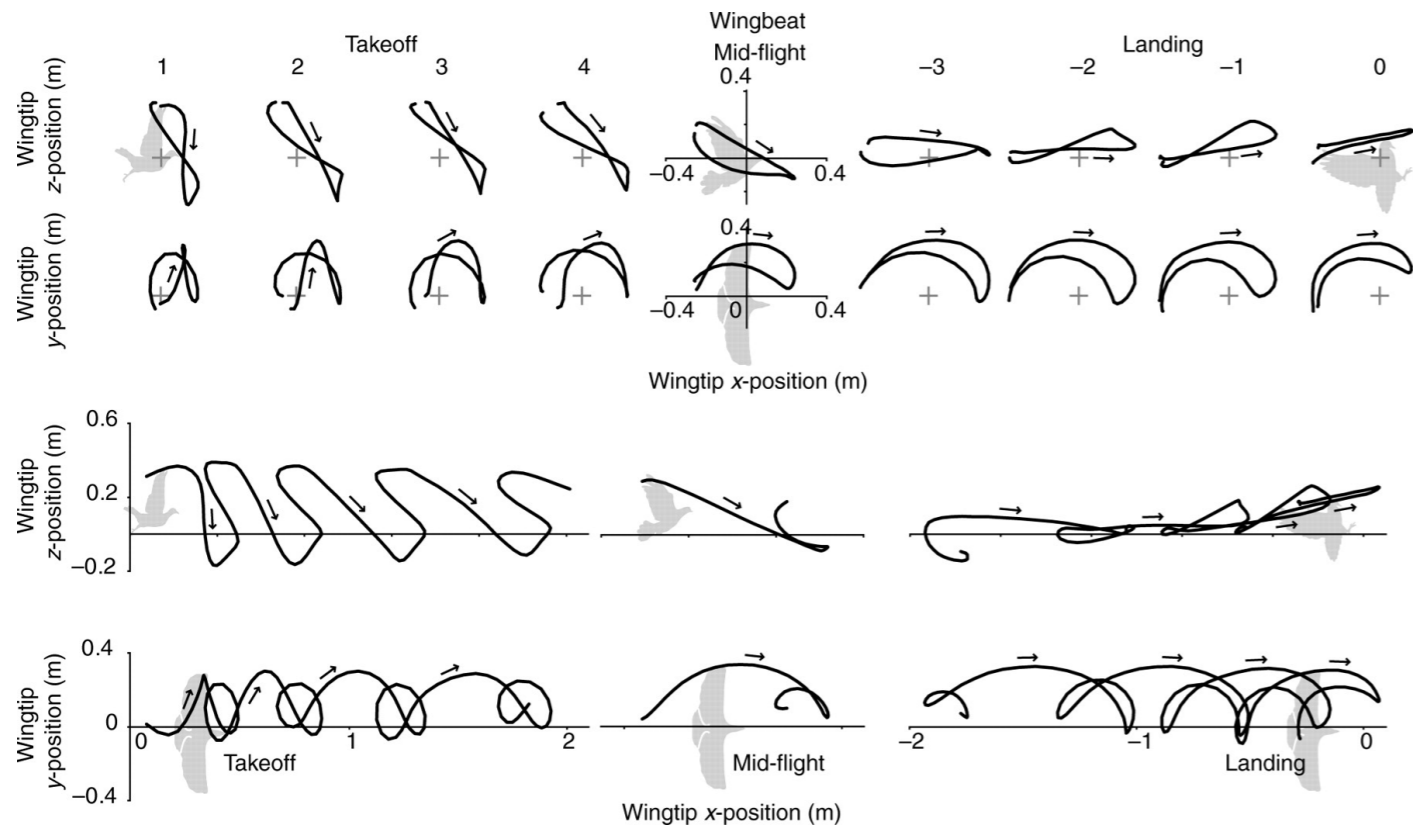


Pic. 20

Traces of representative bird-centered wingtip and wrist movements of the study species.

- (A) Diamond dove,
- (B) Zebra finch.

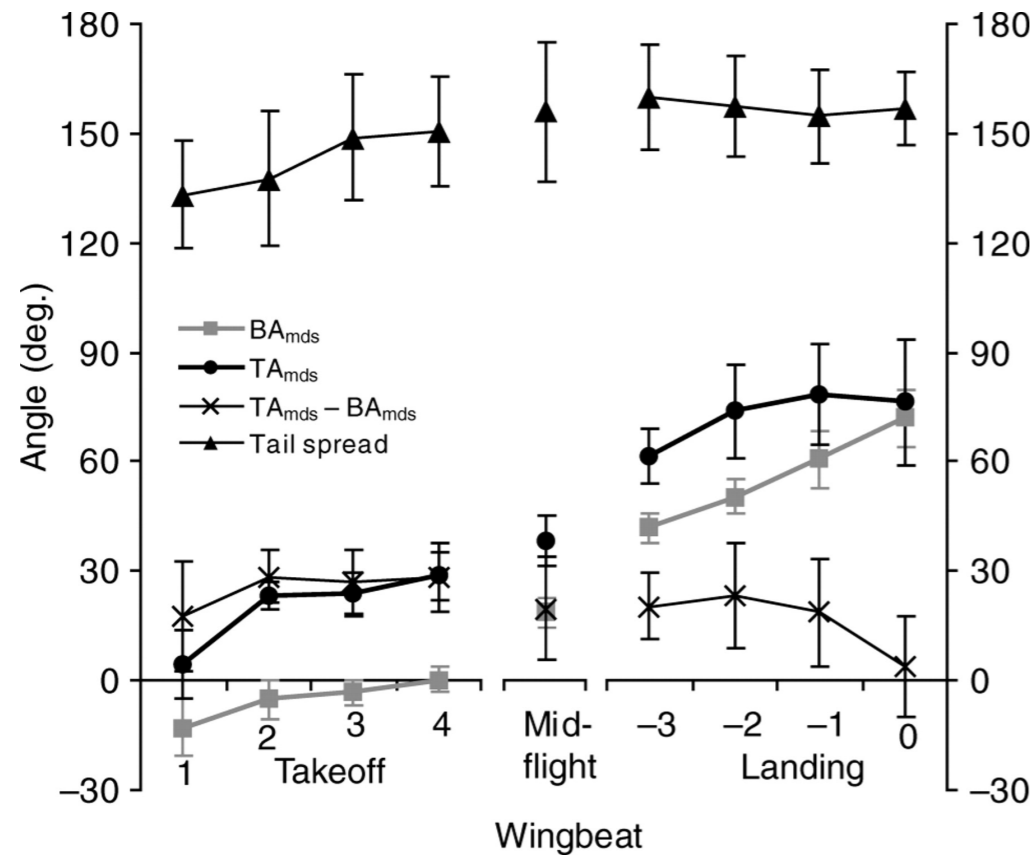
Traces (left to right) are from the transverse, sagittal and dorsal planes (bird silhouettes represent the mid-upstroke position, and are not an exact representation of posture at that point in time). Wrists are represented in red, wingtips in black. Arrows indicate the start of upstroke



Kinematic Traces for Takeoff, Mid-flight and Landing for Bird

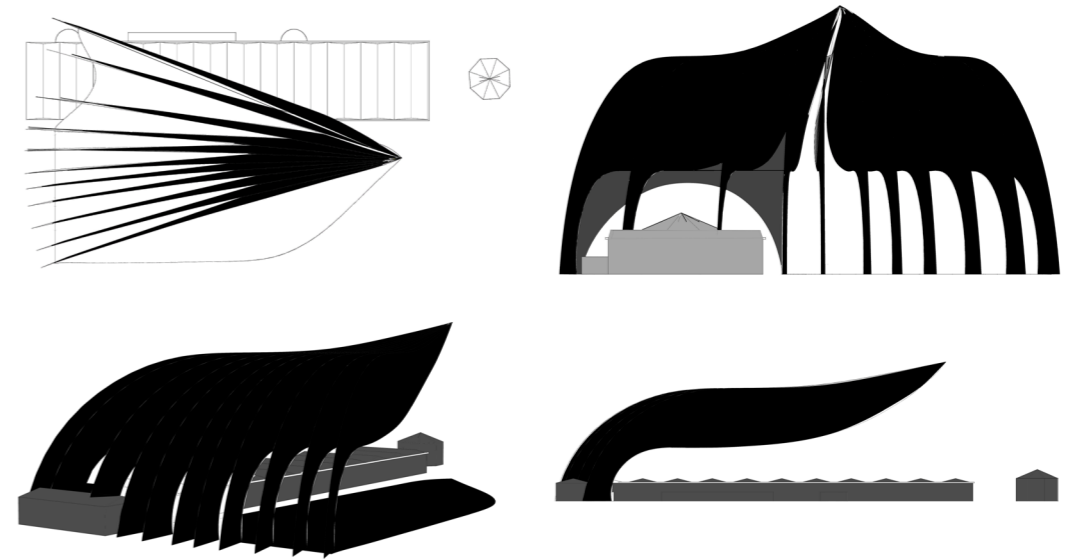
Pic. 21

Arrows indicate the direction of wingtip movement during downstroke. Top panels show wingtip position relative to the shoulder for each wingbeat. Gray crosses indicate the location of the shoulder when the origin is not shown. Lower panels show wingtip position in the global coordinate system, with tick marks indicating distance from the perch. The traces illustrate the changes in stroke planes from negative angles during takeoff and mid-flight to positive angles during landing.

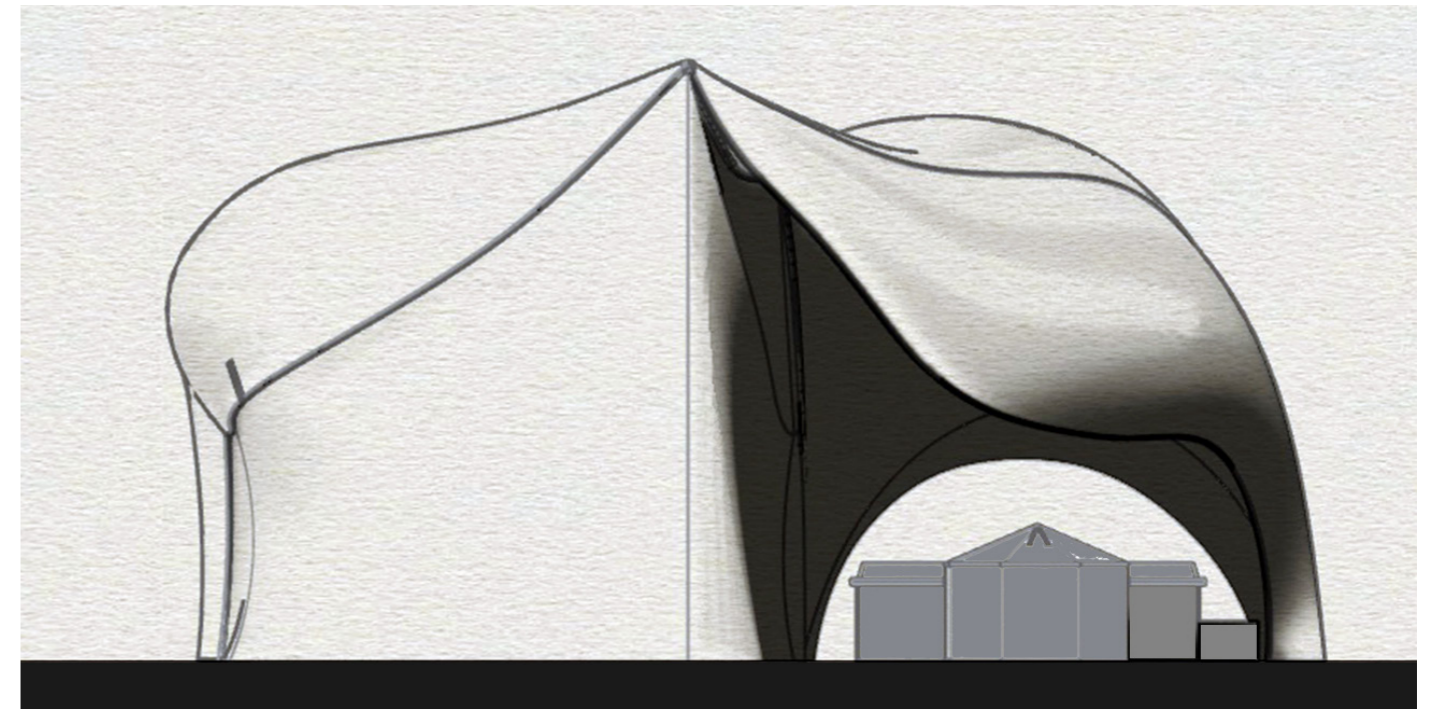


Body and Tail Angles at Mid-Downstroke for Each Wingbeat

Pic. 22



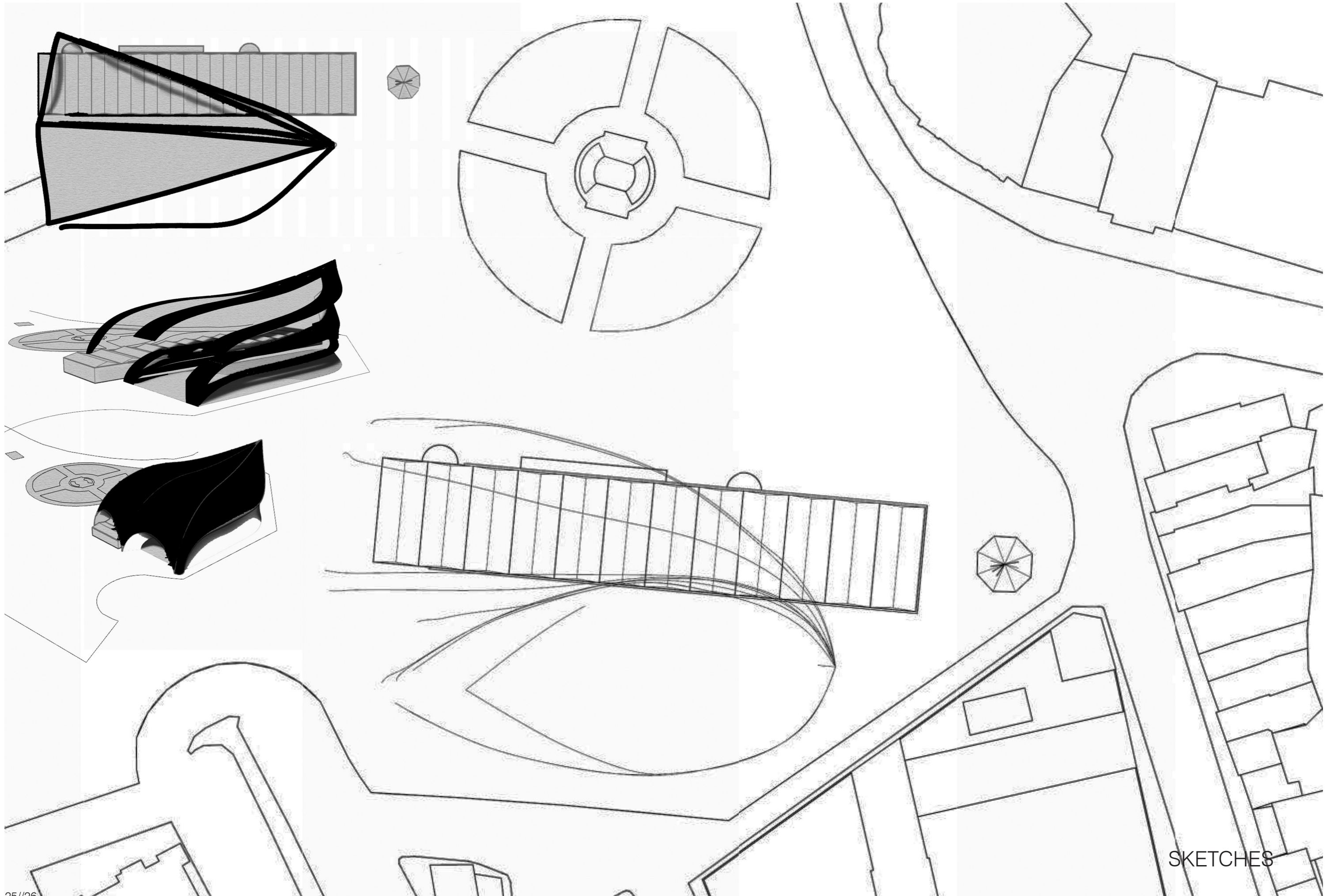
Wing Sketches



Sketch - Being Under Wing

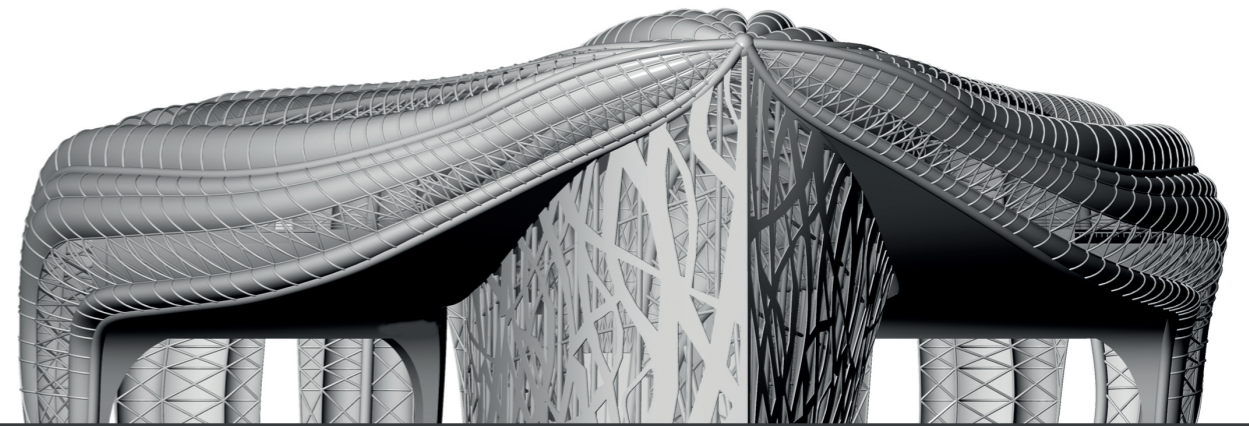
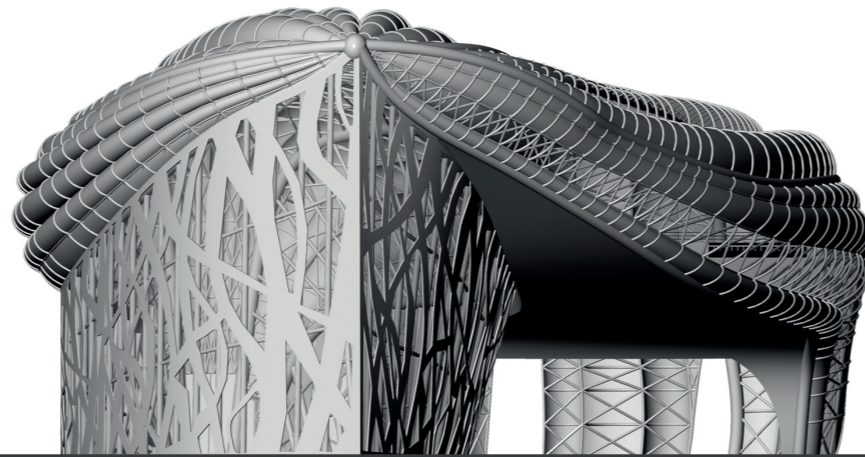
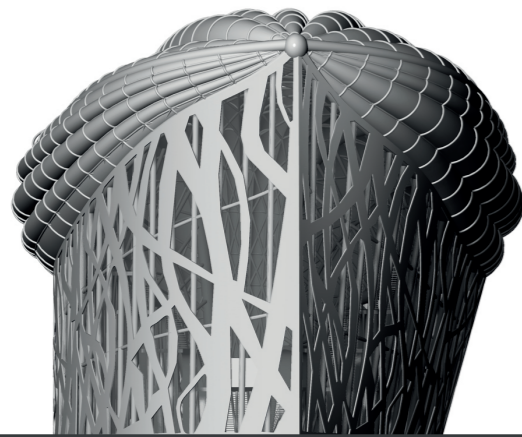
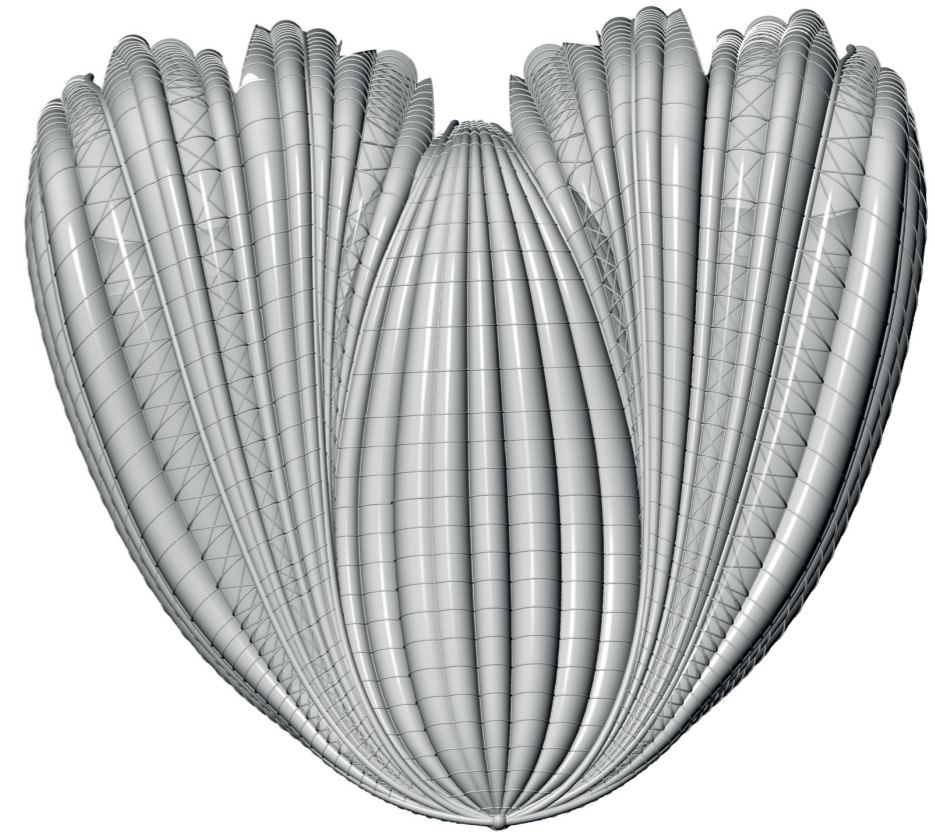
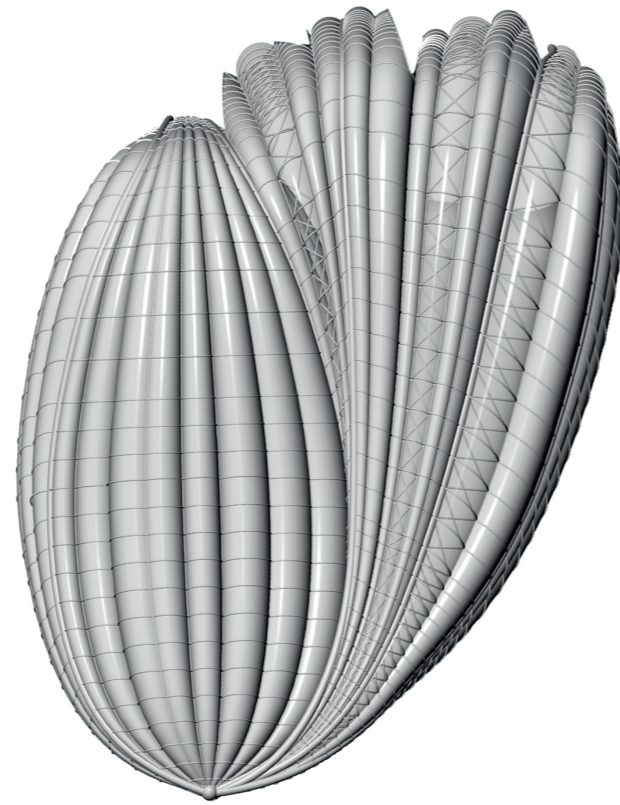
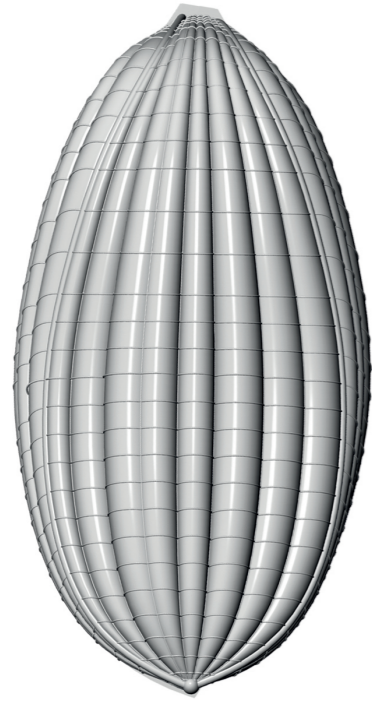
### Biomimicry and Birds

Biomimicry from bios, meaning life, and mimesis, meaning to imitate is a new discipline that studies nature's best ideas and then imitates these designs and processes to solve human problems. One of the earliest examples of Biomimicry was the study of birds which enabled humans to gain the technology of flight. Kinematic traces for takeoff and landing for birds were followed for sketches in this Project too.



SKETCHES





THE BIRD WITHOUT WINGS

THE BIRD WITH ONE WING

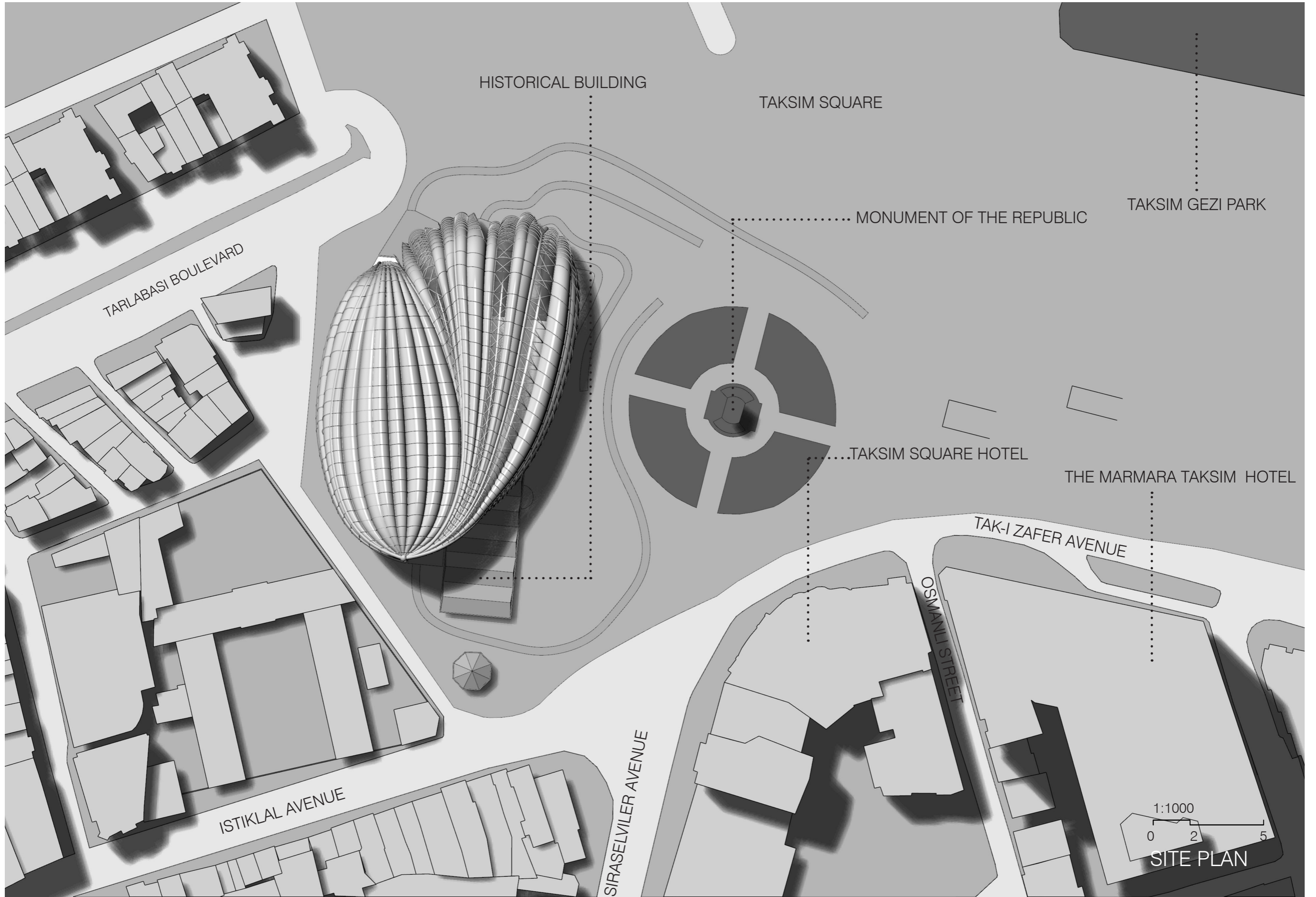
THE BIRD WITH TWO WINGS

The project consists of two main parts as body and wing. The body is the place of main function; in that prayer, and the wing serves some secondary functions. In this project, there is no need for a second wing part because of not only the field of design is limited but also one wing can sustain the places to meet all needs.

However, if this project is tried to be applied as a "type project", the number of the wings can be increased or decreased according to needs. For instance, the project can be designed comprehensively as a one wing or double wings in accordance with the necessity as well as a sole resolvent body.



**PROJECT**



HISTORICAL BUILDING

TAKSIM SQUARE

TAKSIM GEZI PARK

MONUMENT OF THE REPUBLIC

TARLABASI BOULEVARD

TAKSIM SQUARE HOTEL

THE MARMARA TAKSIM HOTEL

TAK-I ZAFER AVENUE

ISTIKLAL AVENUE

SIRASELVILER AVENUE

OSMANLI STREET

1:1000

0 2 5

SITE PLAN

TAKSIM SQUARE

MONUMENT OF  
REPUBLIC

PATHWAYS

EXISTING BUILDING

COURTYARD

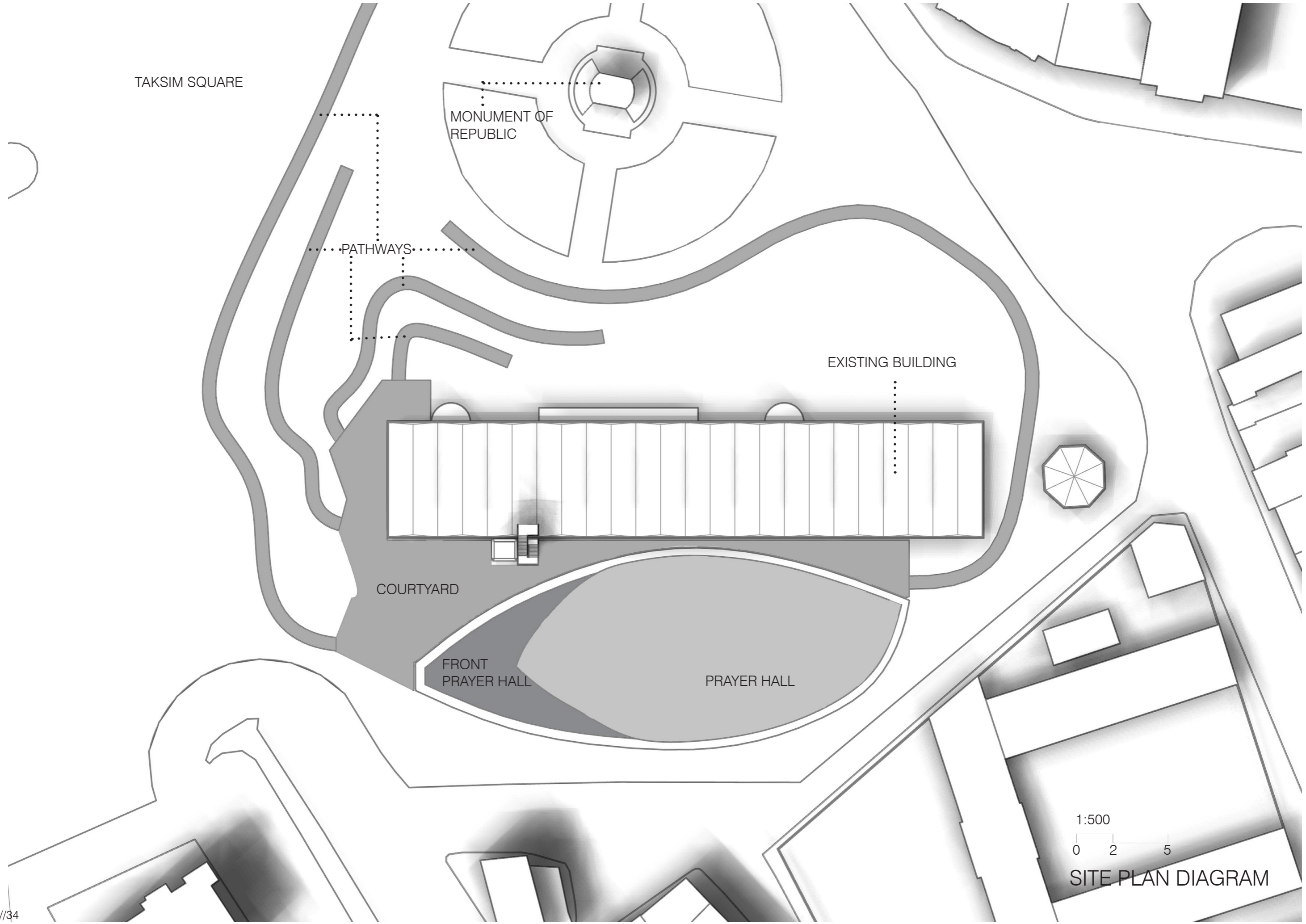
FRONT  
PRAYER HALL

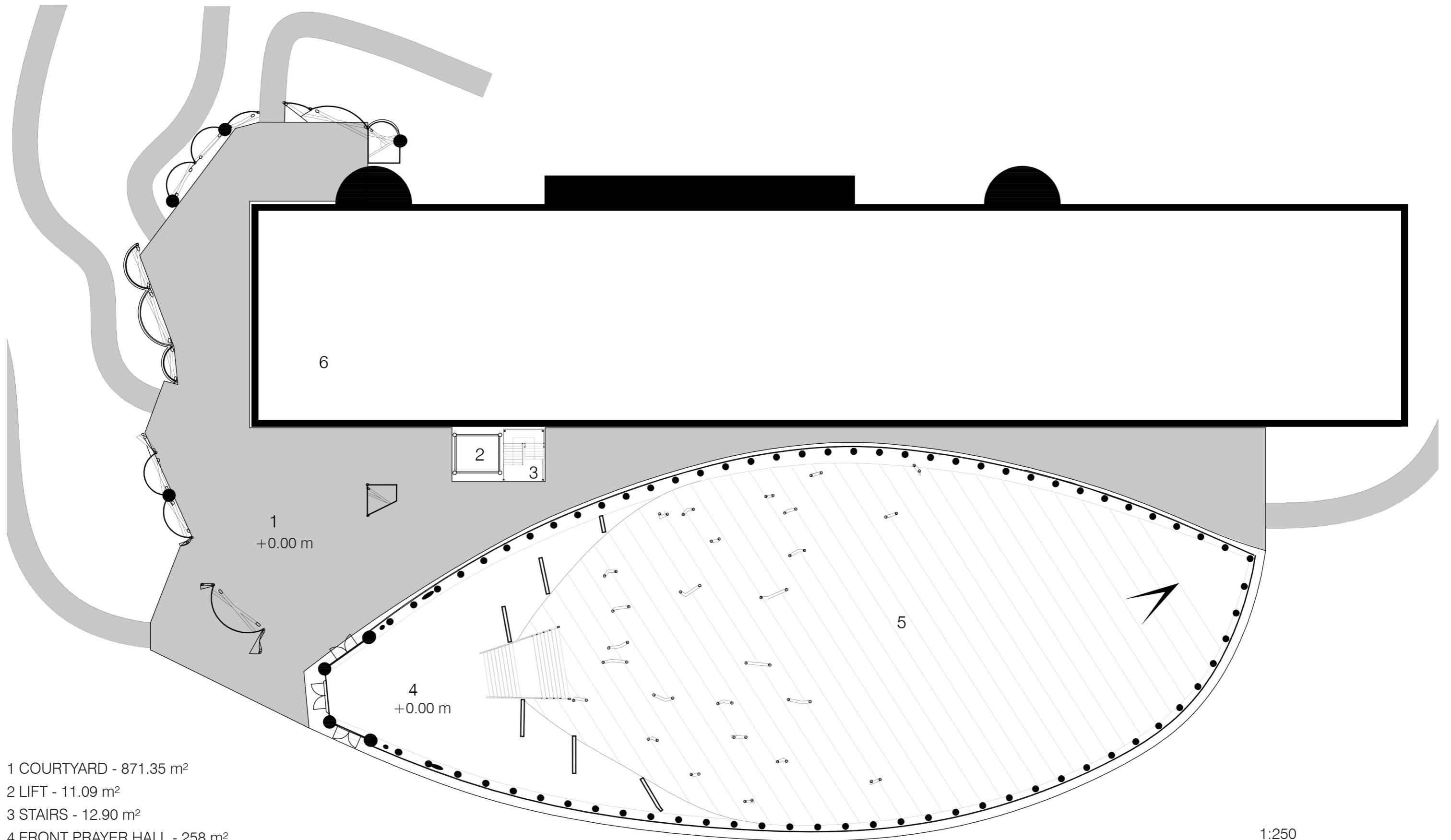
PRAYER HALL

1:500

0 2 5

SITE PLAN DIAGRAM

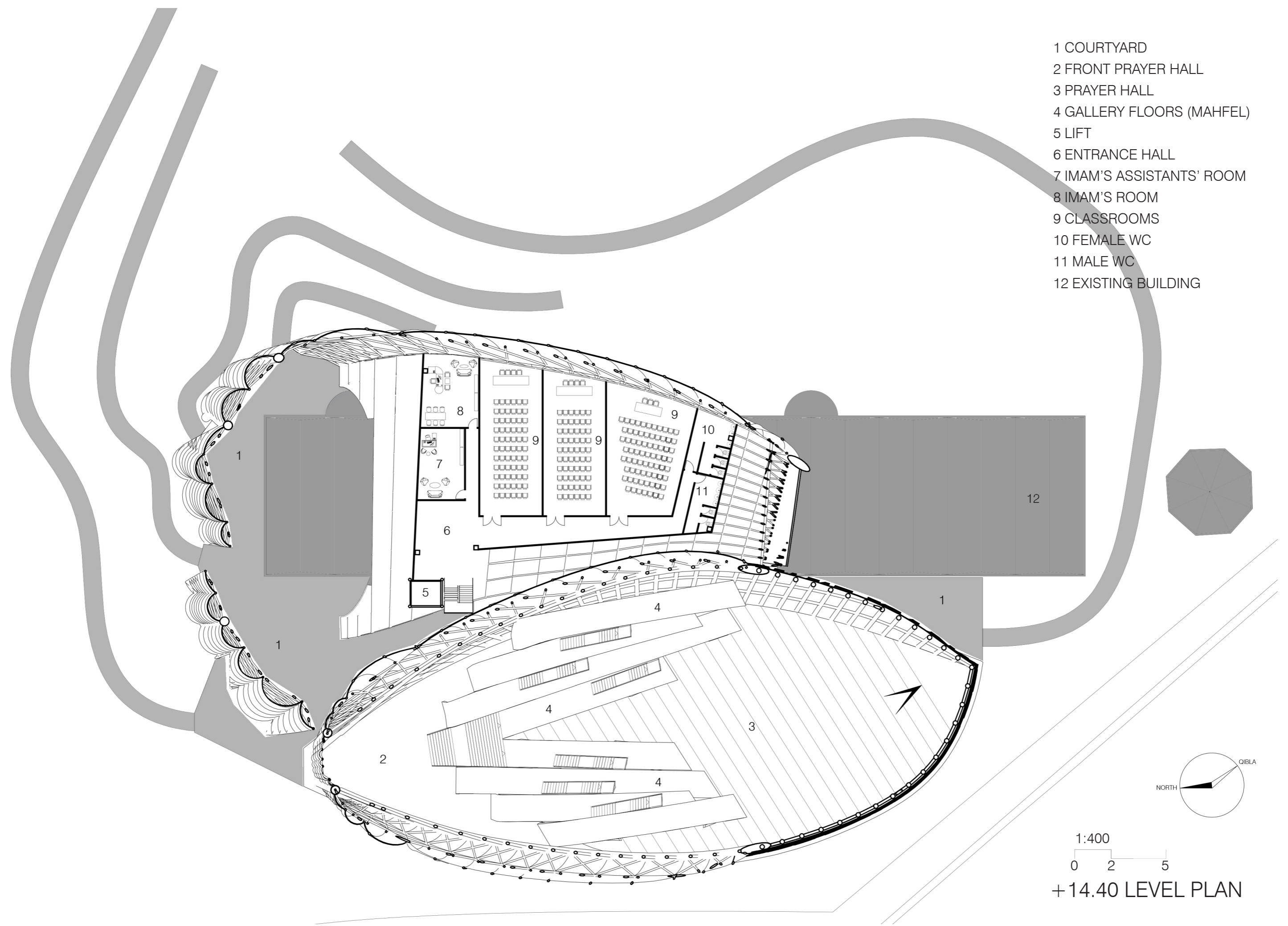




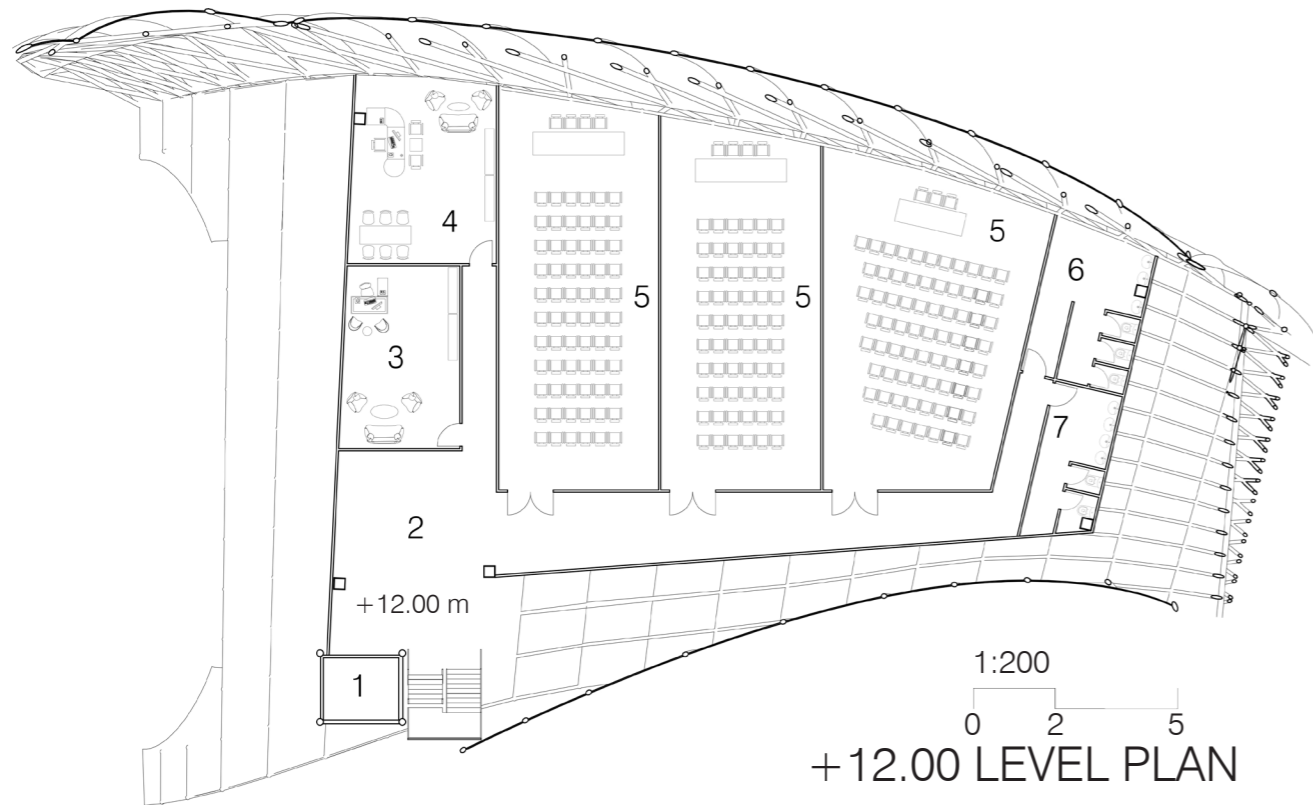
- 1 COURTYARD - 871.35 m<sup>2</sup>
- 2 LIFT - 11.09 m<sup>2</sup>
- 3 STAIRS - 12.90 m<sup>2</sup>
- 4 FRONT PRAYER HALL - 258 m<sup>2</sup>
- 5 PRAYER HALL - 1230 m<sup>2</sup>
- 6 EXISTING BUILDING - 1611 m<sup>2</sup>

1:250  
 0 2 5  
 GROUND PLAN

- 1 COURTYARD
- 2 FRONT PRAYER HALL
- 3 PRAYER HALL
- 4 GALLERY FLOORS (MAHFEL)
- 5 LIFT
- 6 ENTRANCE HALL
- 7 IMAM'S ASSISTANTS' ROOM
- 8 IMAM'S ROOM
- 9 CLASSROOMS
- 10 FEMALE WC
- 11 MALE WC
- 12 EXISTING BUILDING

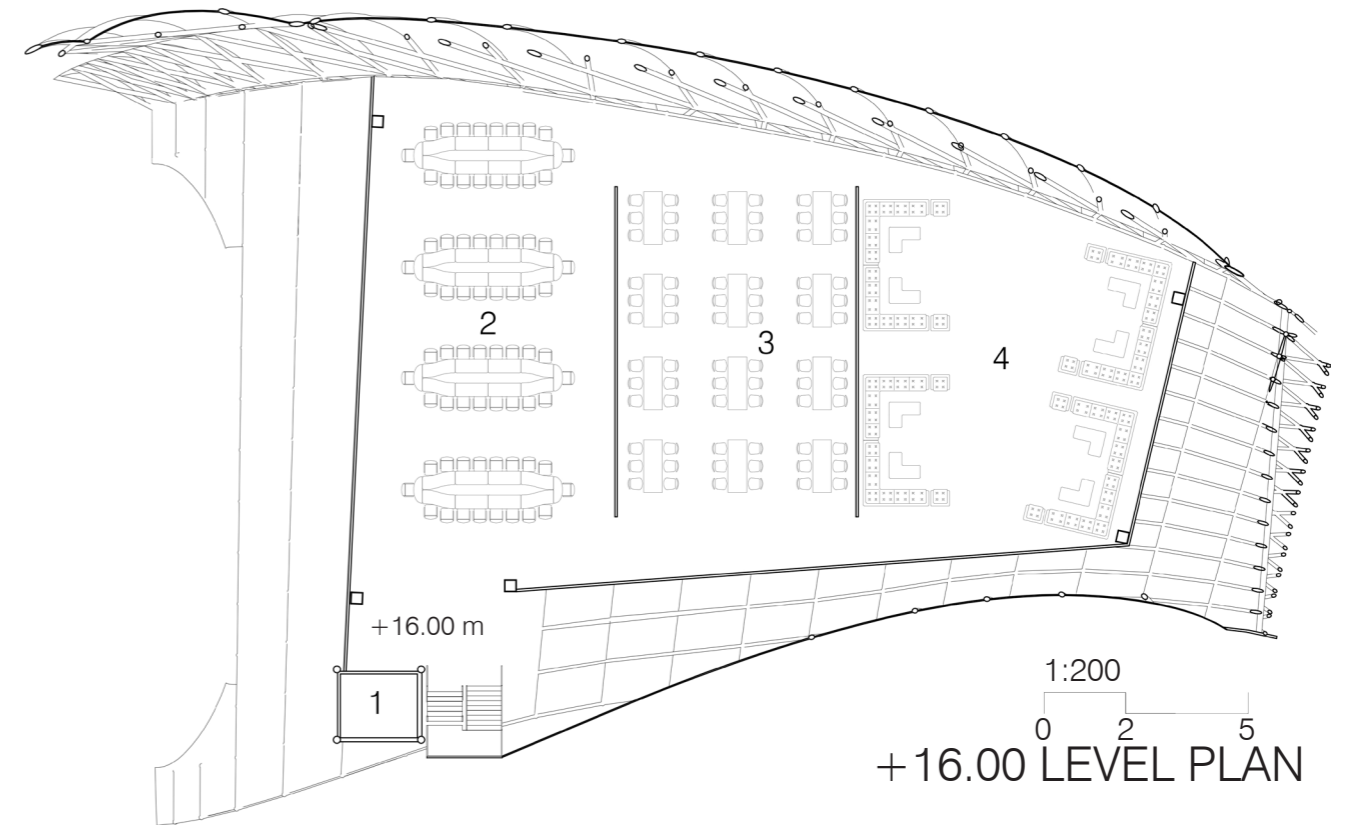


1:400  
 0 2 5  
 +14.40 LEVEL PLAN



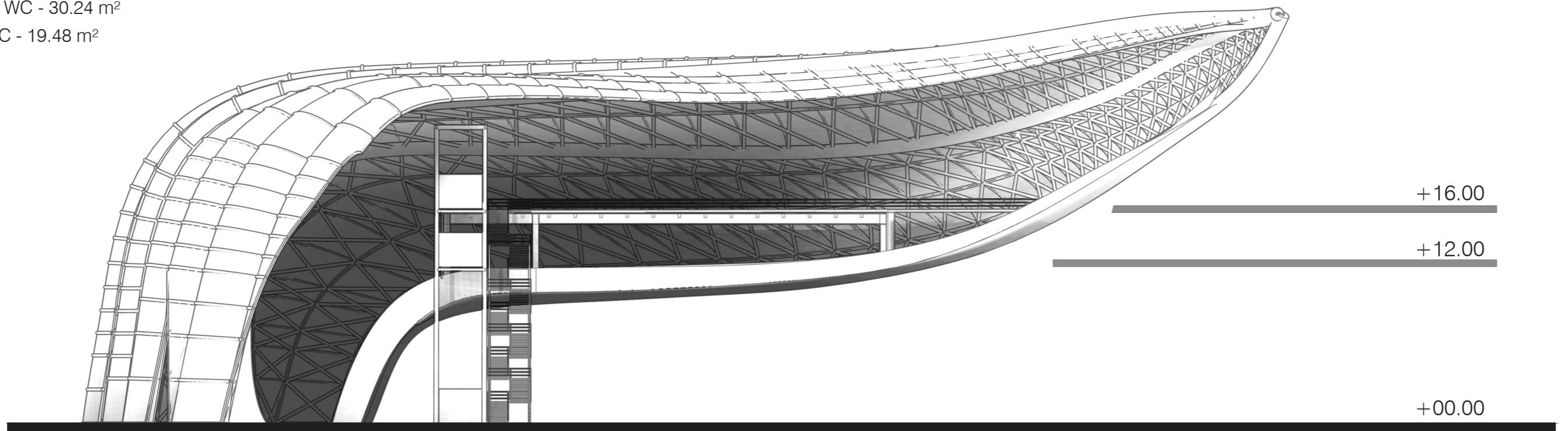
+12.00 LEVEL PLAN

- 1 LIFT - 11.09 m<sup>2</sup>
- 2 ENTRANCE HALL - 40.20 m<sup>2</sup>
- 3 IMAM'S ASSISTANTS' ROOM - 40.86 m<sup>2</sup>
- 4 IMAM'S ROOM - 51.18 m<sup>2</sup>
- 5 CLASSROOMS - 349.33 m<sup>2</sup>  
(119.26 + 109.88 + 120.19)
- 6 FEMALE WC - 30.24 m<sup>2</sup>
- 7 MALE WC - 19.48 m<sup>2</sup>



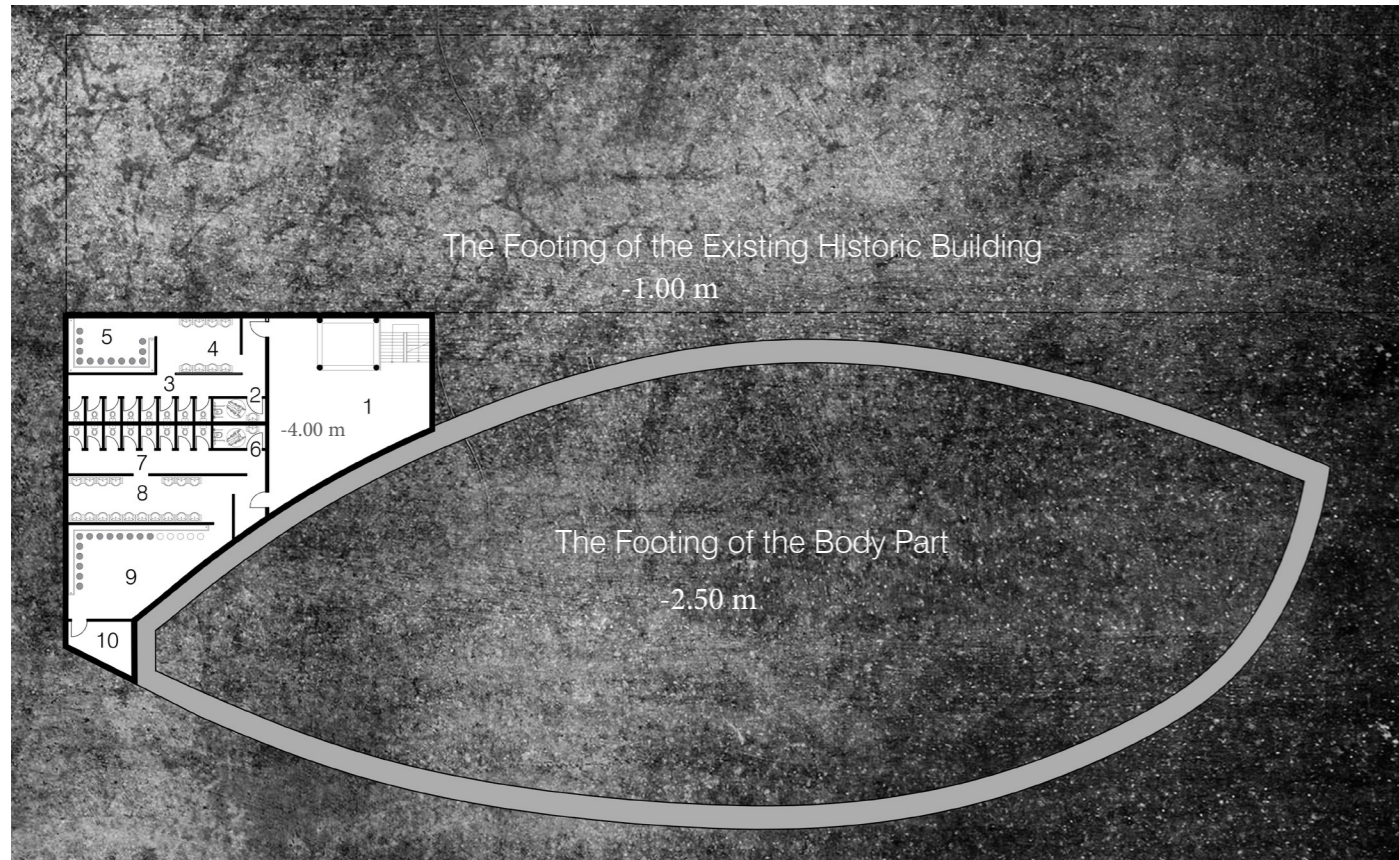
+16.00 LEVEL PLAN

- 1 LIFT - 11.09 m<sup>2</sup>
- 2 WORKING AREA FOR  
NON-PROFIT ORGANISATION - 230.50 m<sup>2</sup>
- 3 GROUP WORK AREA - 193.91 m<sup>2</sup>
- 4 RECREATION AREA - 198.30 m<sup>2</sup>

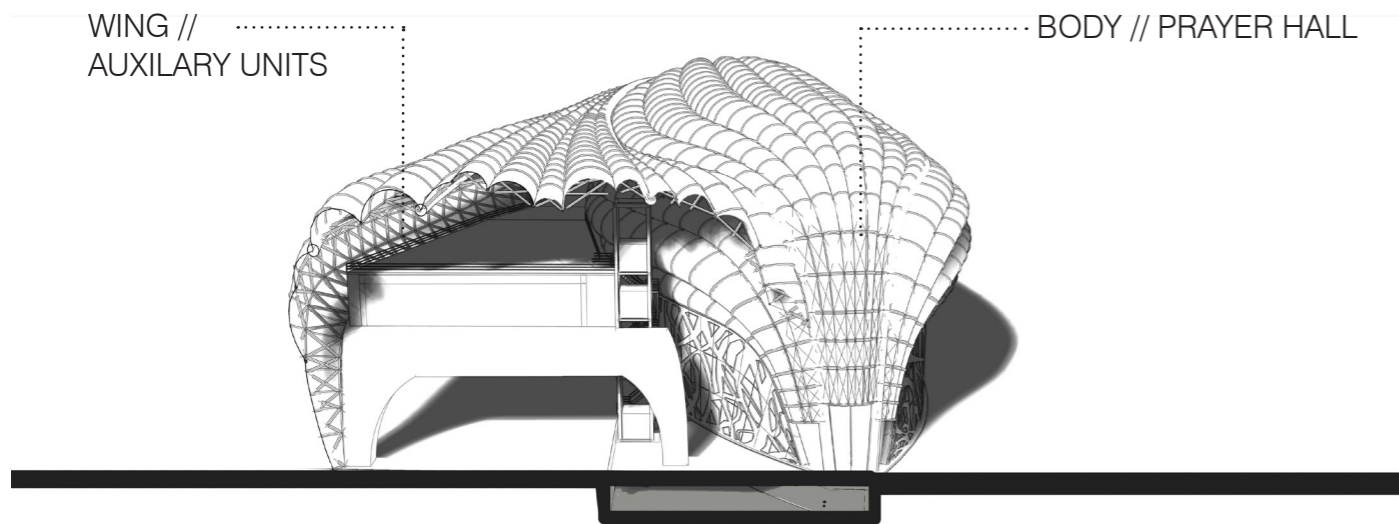


INSIDE VIEW OF THE WING

BASEMENT // CLEANING AREA

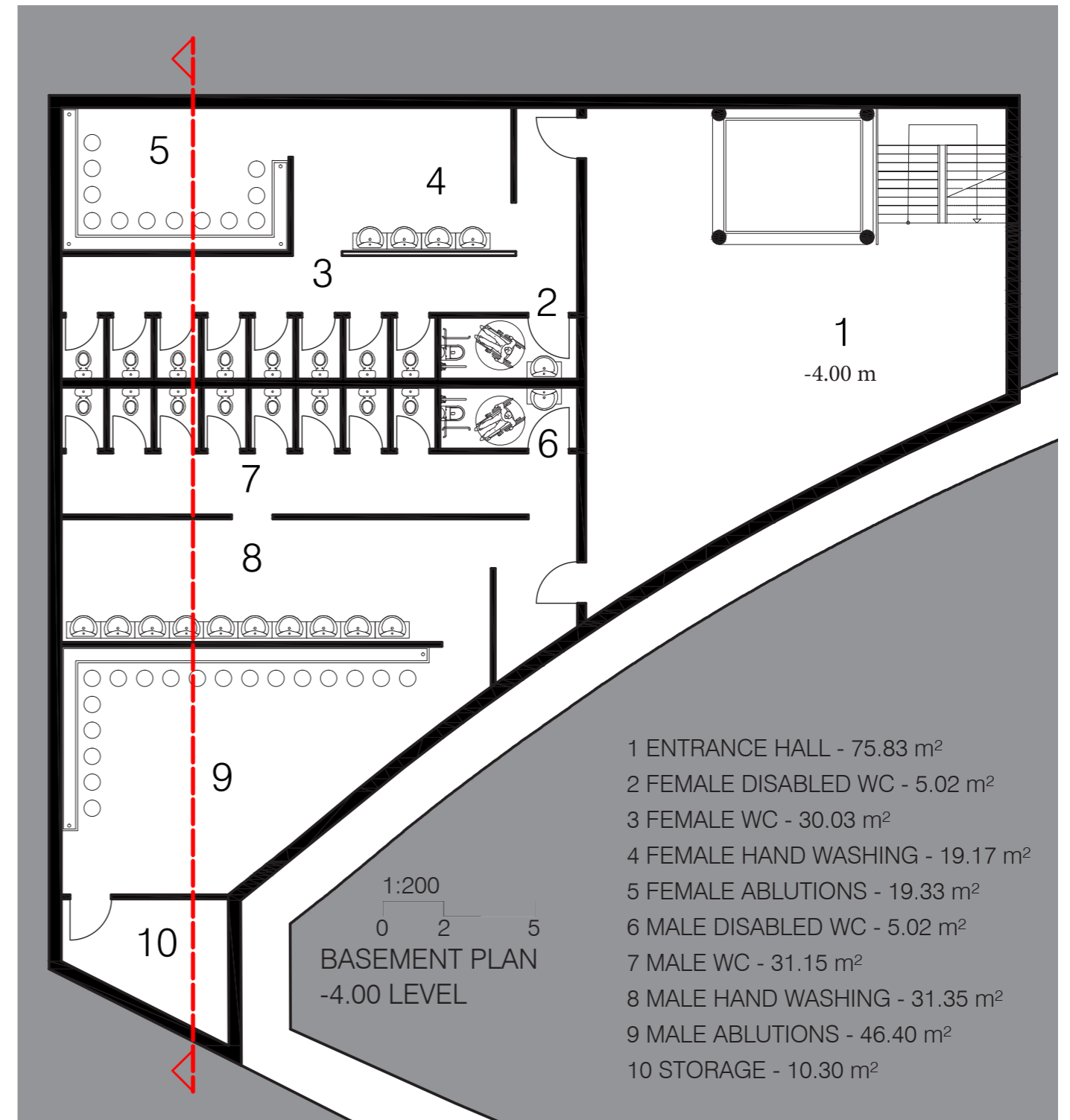


1:500  
0 2 5



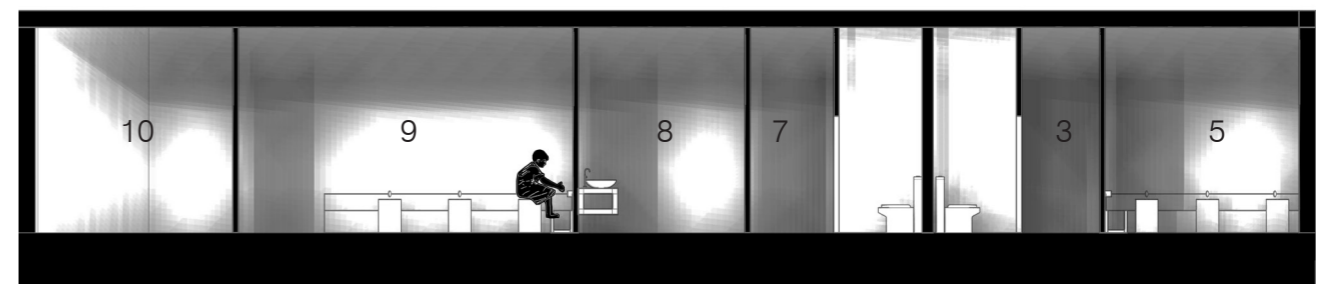
BASEMENT // CLEANING

3D SPACE DIAGRAM



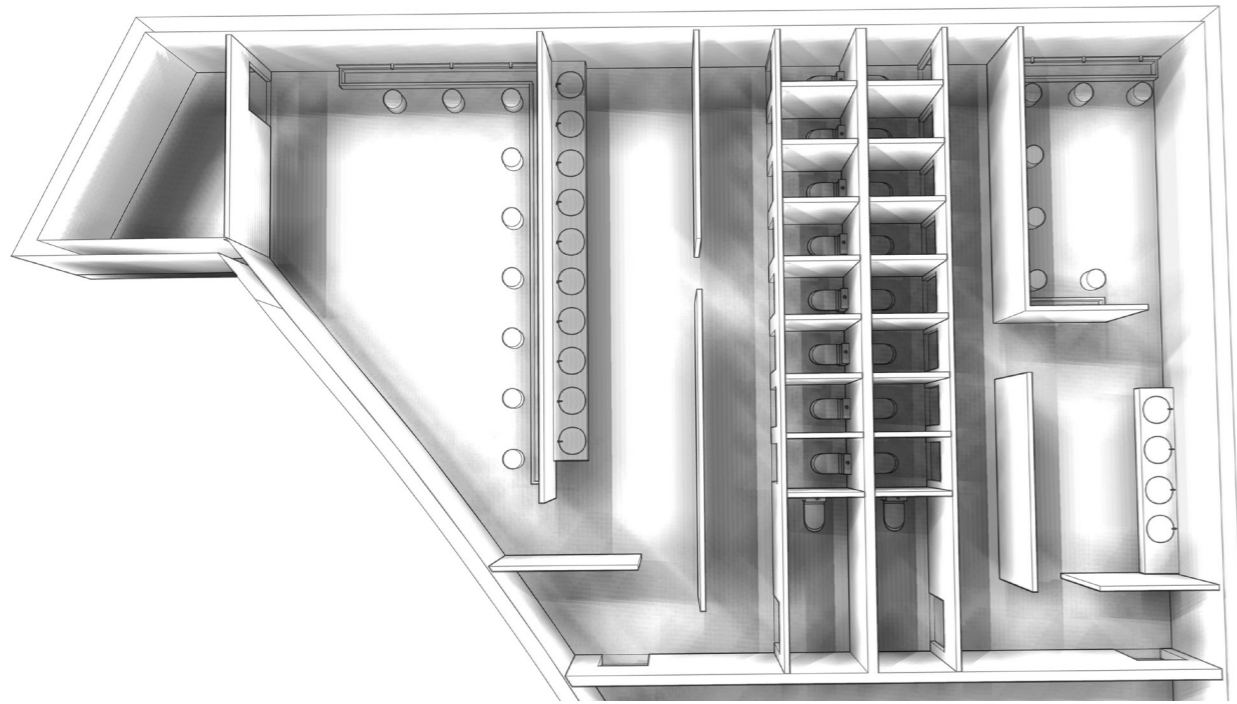
- 1 ENTRANCE HALL - 75.83 m<sup>2</sup>
- 2 FEMALE DISABLED WC - 5.02 m<sup>2</sup>
- 3 FEMALE WC - 30.03 m<sup>2</sup>
- 4 FEMALE HAND WASHING - 19.17 m<sup>2</sup>
- 5 FEMALE ABLUTIONS - 19.33 m<sup>2</sup>
- 6 MALE DISABLED WC - 5.02 m<sup>2</sup>
- 7 MALE WC - 31.15 m<sup>2</sup>
- 8 MALE HAND WASHING - 31.35 m<sup>2</sup>
- 9 MALE ABLUTIONS - 46.40 m<sup>2</sup>
- 10 STORAGE - 10.30 m<sup>2</sup>

1:200  
0 2 5  
BASEMENT PLAN  
-4.00 LEVEL

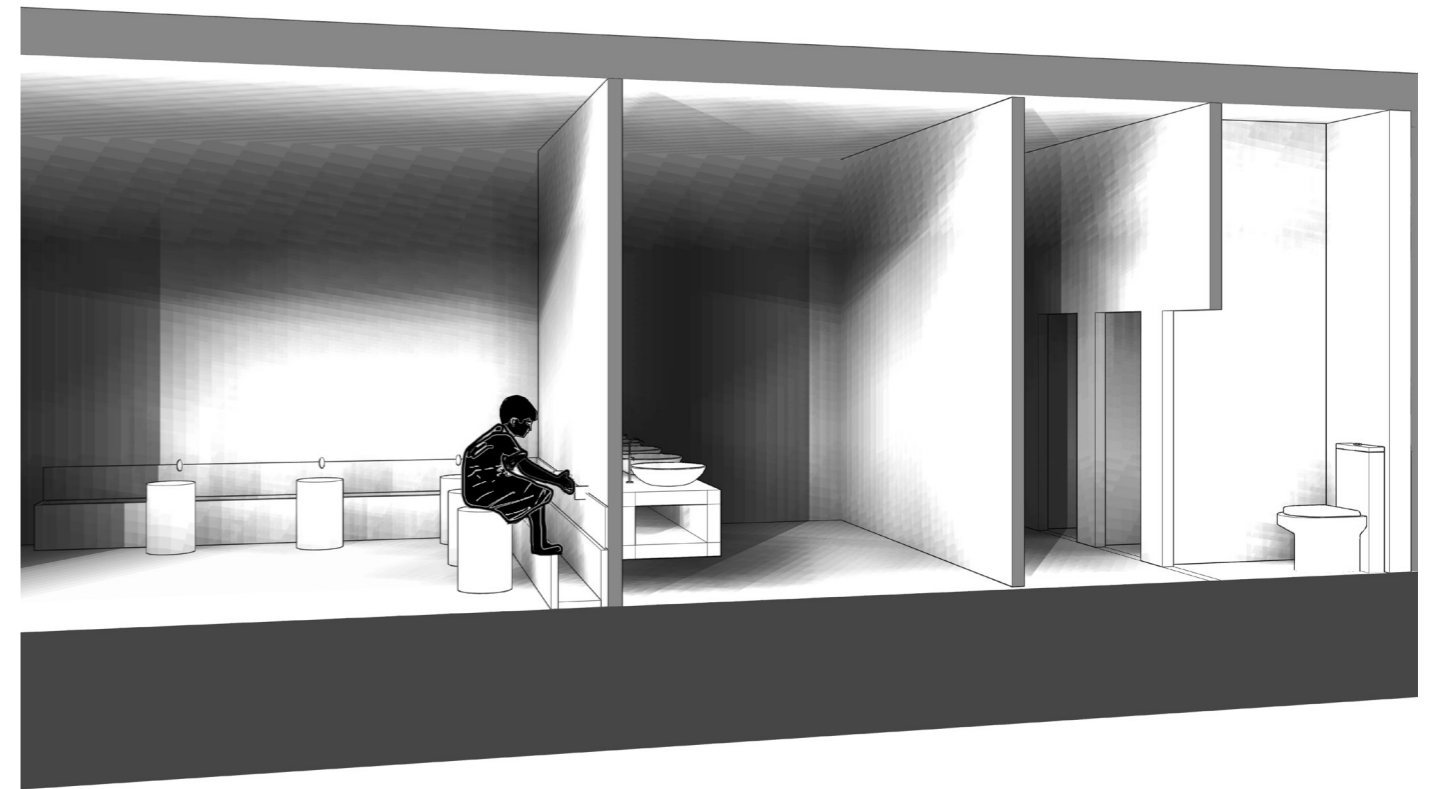


SECTION





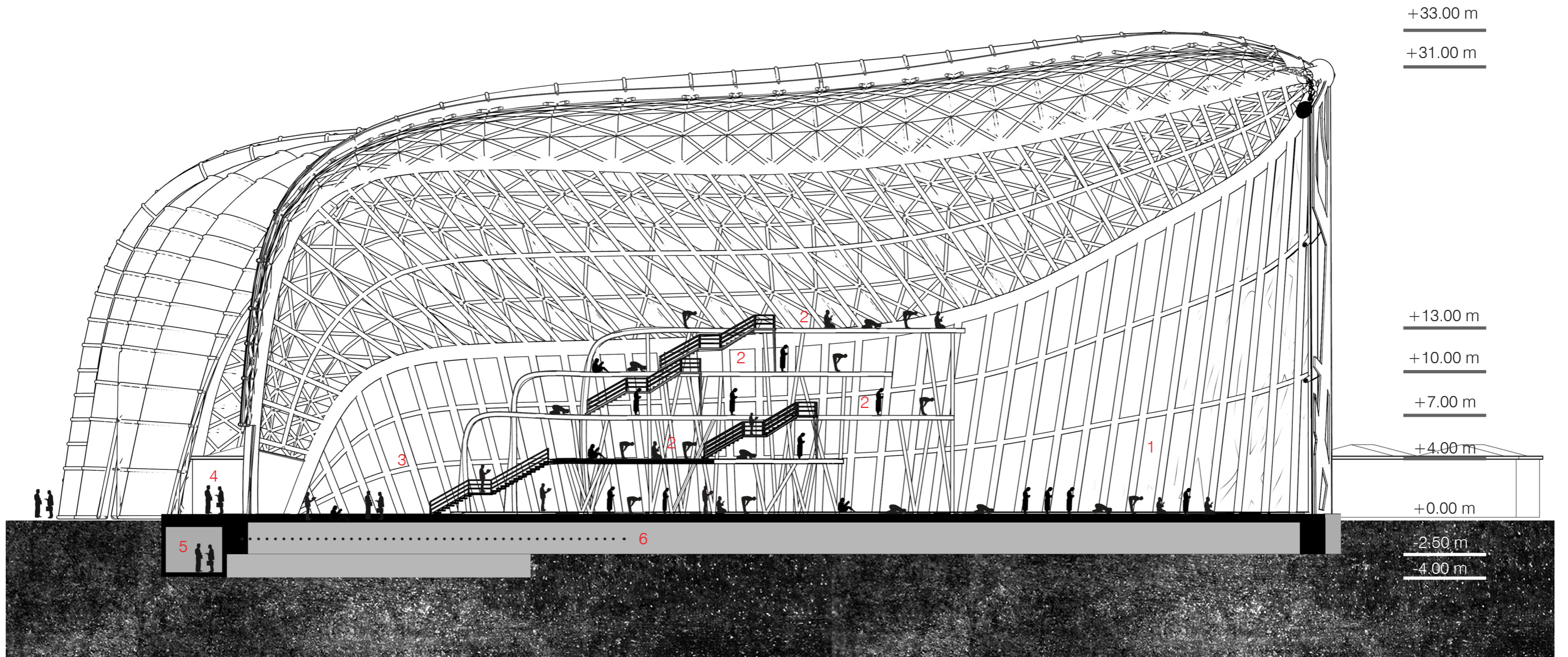
SKETCH PLAN



SECTION PERSPECTIVE FROM ABLUTION AREA

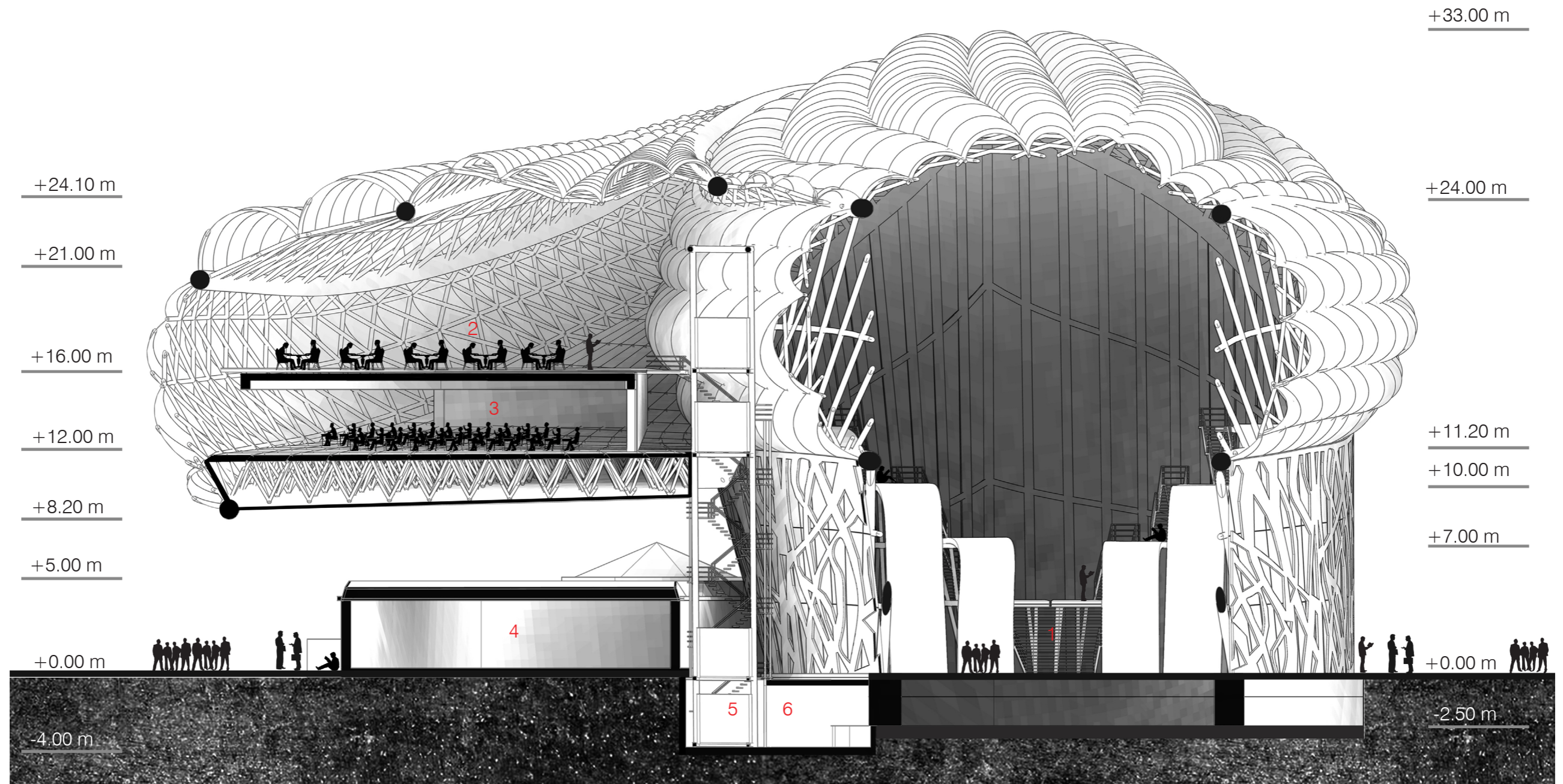


SECTION



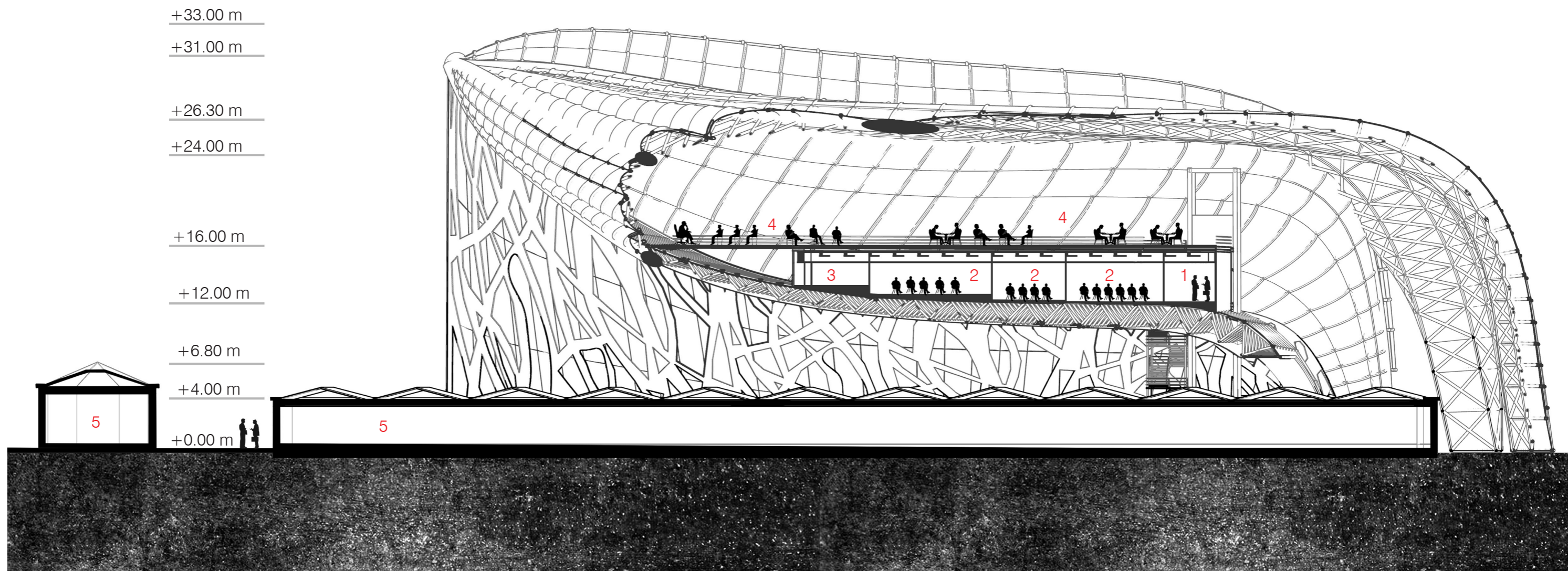
- 1 PRAYER HALL
- 2 GALLERY FLOORS
- 3 FRONT PRAYER HALL
- 4 COURTYARD
- 5 STORAGE // BASEMENT
- 6 CONCRETE FOOTING

1:250  
 0 2 5  
 SECTION A-A



- 1 FRONT PRAYER HALL
- 2 WORKING AREA NON-PROFIT ORGANISATION
- 3 CLASSROOM
- 4 EXISTING HISTORIC BUILDING
- 5 LIFT
- 6 ENTRANCE HALL // BASEMENT

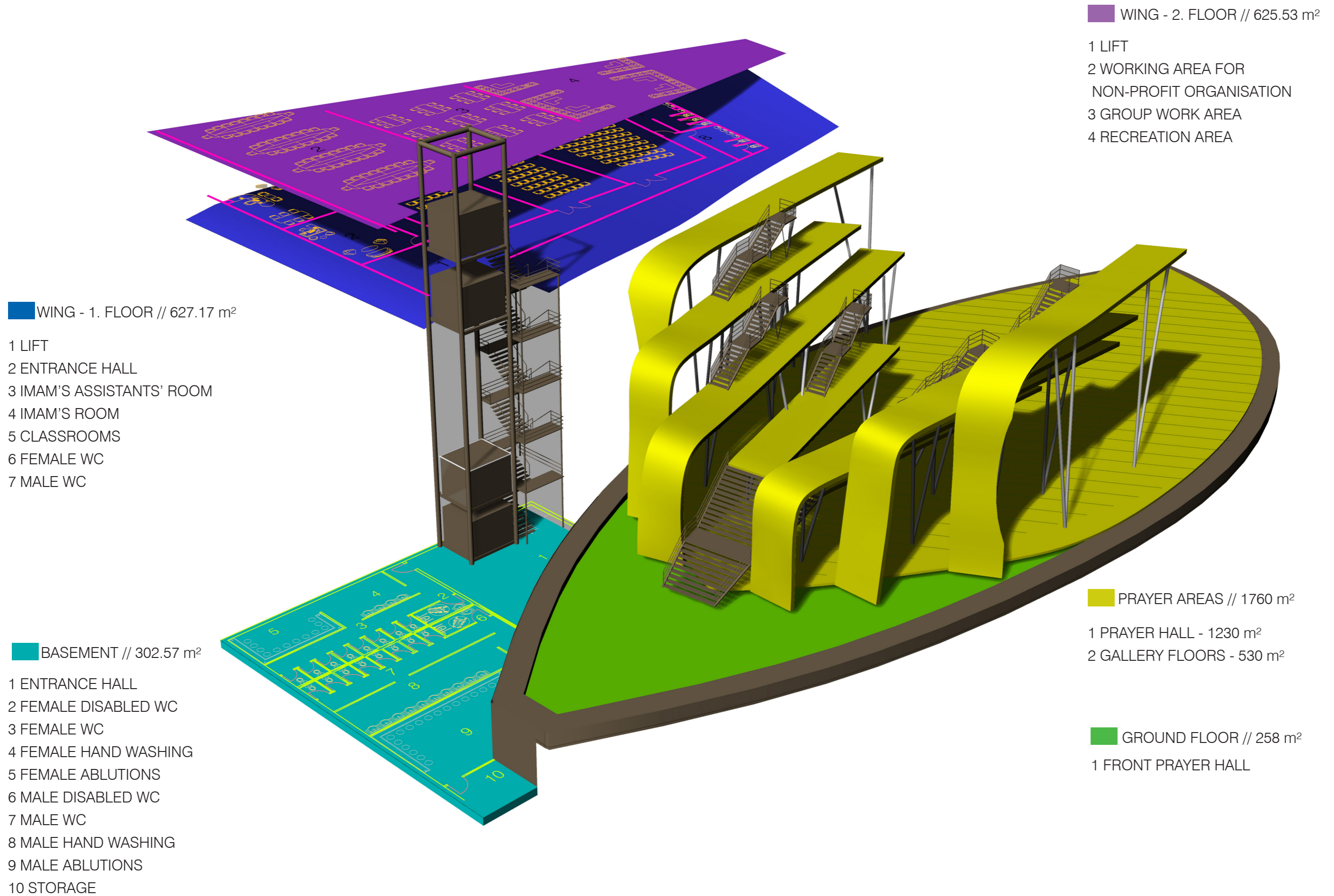
1:250  
 0 2 5  
 SECTION B-B






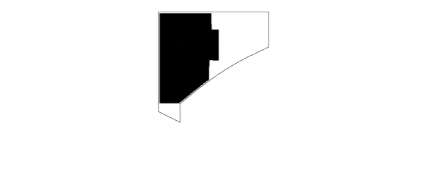
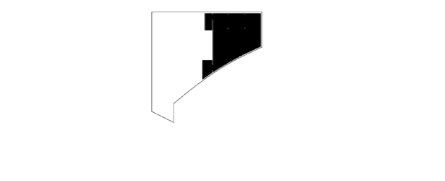
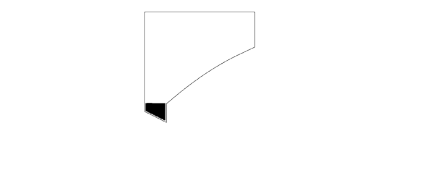
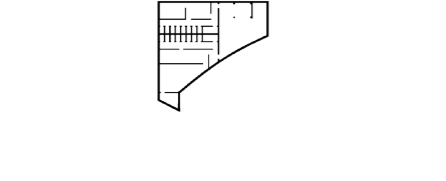
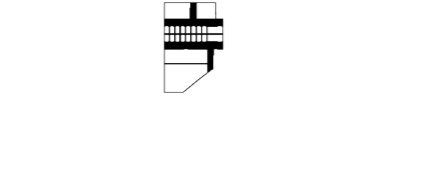

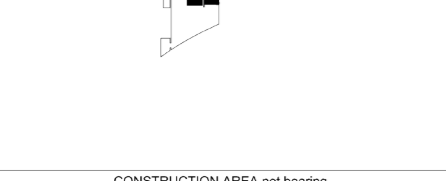
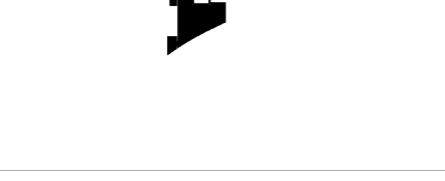
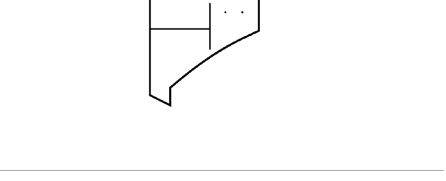
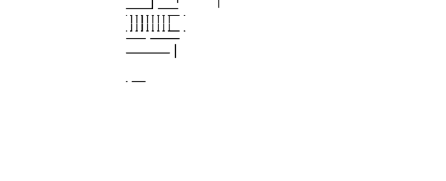
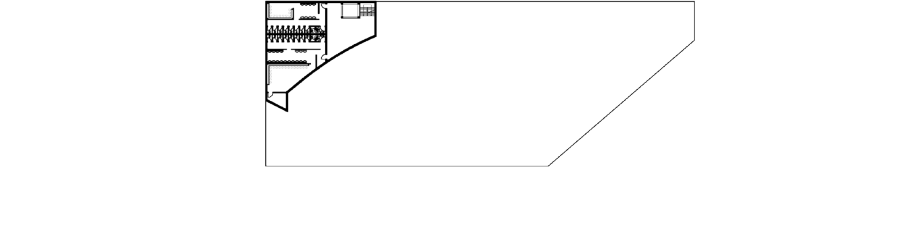
- 1 IMAM'S ROOM
- 2 CLASSROOMS
- 3 FEMALE WC
- 4 FREE AND GROUP WORK AREAS
- 5 EXISTING HISTORIC BUILDING

1:400  
 0 2 5  
 SECTION C-C

# 3D SPACE DIAGRAM

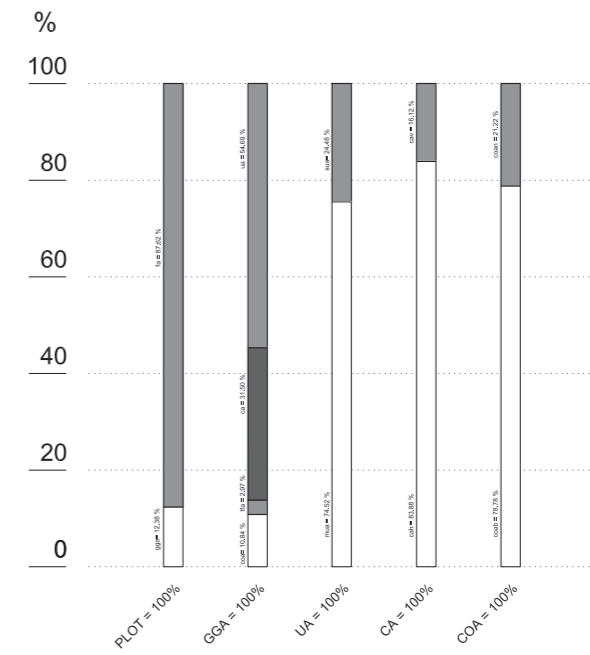


# BASEMENT AREA ANALYSIS OF 'TAKSIM BIRD'

<p>PLOT P: 2807 m<sup>2</sup></p> 	<p>FREE AREA FA: 2459.91 m<sup>2</sup> 87.62% OF PLOT</p> 	<p>GROSS - GROUND AREA GGA: 347.55 m<sup>2</sup> 12.38% OF PLOT</p> 
<p>USABLE AREA UA: 190.09 m<sup>2</sup> 54.69% OF GGA</p> 	<p>CIRCULATION AREA CA: 109.49 m<sup>2</sup> 31.50% OF GGA</p> 	<p>TECHNICAL FUNCTION AREA TFA: 10.33 m<sup>2</sup> 2.97% OF GGA</p> 
<p>CONSTRUCTION AREA COA: 37.67 m<sup>2</sup> 10.84% OF GGA</p> 	<p>SECOND USABLE AREA SUA: 46.54 m<sup>2</sup> 24.48% OF UA</p> 	<p>MAIN USABLE AREA MUA: 143.55 m<sup>2</sup> 75.52% OF UA</p> 
<p>CIRCULATION AREA vertical CAv: 17.65 m<sup>2</sup> 16.12% OF CA</p> 	<p>CIRCULATION AREA horizontal CAh: 91.84 m<sup>2</sup> 83.88% OF CA</p> 	<p>CONSTRUCTION AREA bearing wall COAb: 29.68 m<sup>2</sup> 78.78% DER COA</p> 
<p>CONSTRUCTION AREA not bearing COAn: 7.99 m<sup>2</sup> 21.22% OF COA</p> 		

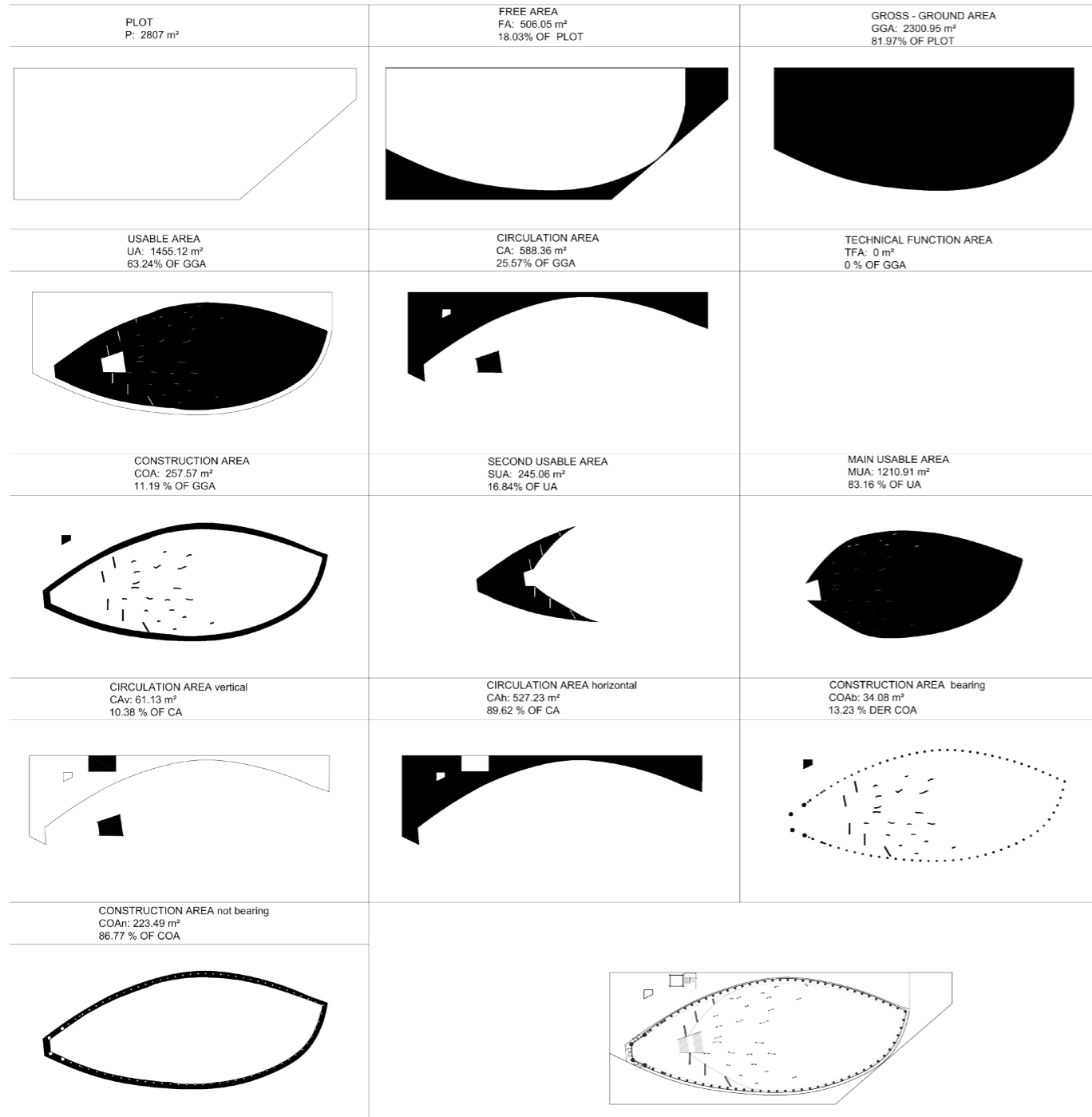
Characteristics	Area in m <sup>2</sup>	Percent	
Plot	2807 m <sup>2</sup>	100.00	
FA	2459.91 m <sup>2</sup>	87.62	% of PLOT
GGA	347.55 m <sup>2</sup>	12.38	% of PLOT
UA	190.09 m <sup>2</sup>	54.69	% of GGA
CA	109.49 m <sup>2</sup>	31.50	% of GGA
TFA	10.33 m <sup>2</sup>	2.97	% of GGA
COA	37.67 m <sup>2</sup>	10.84	% of GGA
SUA	46.54 m <sup>2</sup>	24.48	% of UA
MUA	143.55 m <sup>2</sup>	75.52	% of UA
CAv	17.65 m <sup>2</sup>	16.12	% of CA
CAh	91.84 m <sup>2</sup>	83.88	% of CA
COAb	29.68 m <sup>2</sup>	78.78	% of COA
COAn	7.99 m <sup>2</sup>	21.22	% of COA

## VISUALIZED OF AREA RATIOS



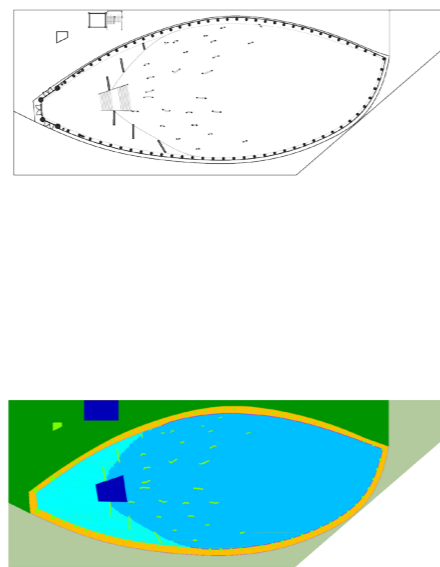
- Plot :Area of Land
- FA :Free Area
- GGA :Gross Ground Area
- UA :Usable Area
- CA :Circulation Area
- TFA :Technical Function Area
- COA :Construction Area
- SUA :Second Usable Area
- MUA :Main Usable Area
- CAv :Circulation Area vertical
- CAh :Circulation Area horizontal
- COAb :Construction Area bearing
- COAn :Construction Area not bearing

# GROUND AREA ANALYSIS OF 'TAKSIM BIRD'

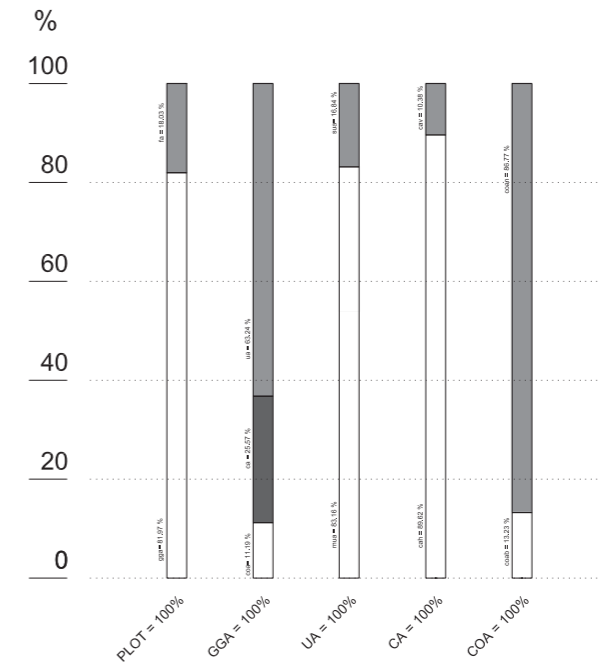


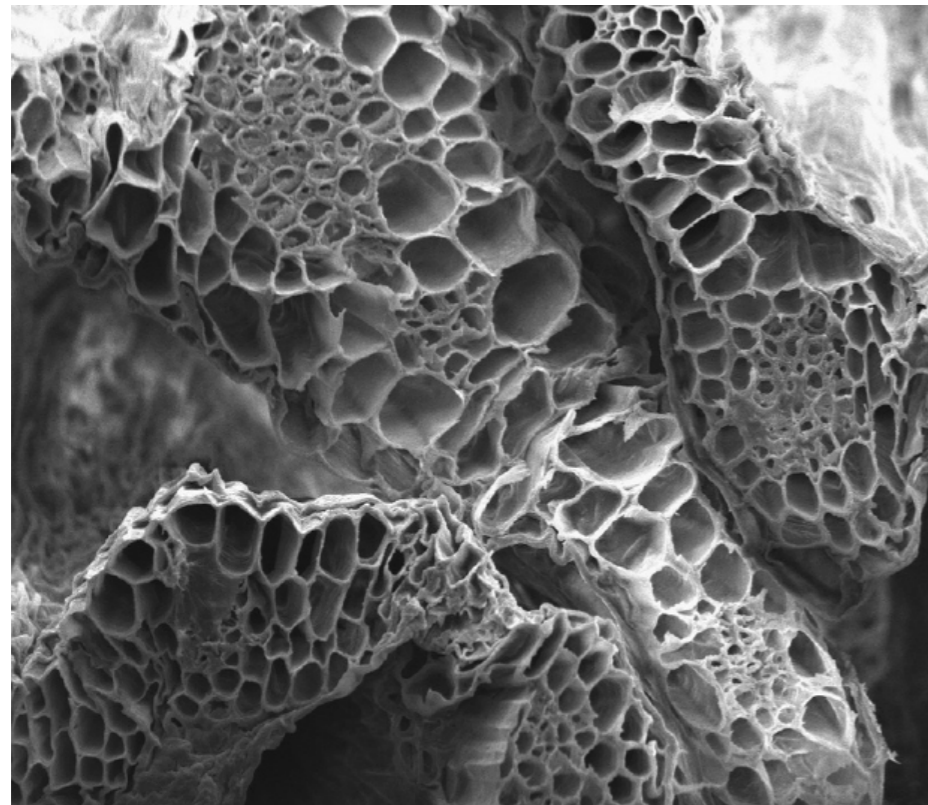
Characteristics	Area in m <sup>2</sup>	Percent	
Plot	2807 m <sup>2</sup>	100.00	
FA	506.05 m <sup>2</sup>	18.03	% of PLOT
GGA	2300.95 m <sup>2</sup>	81.97	% of PLOT
UA	1455.12 m <sup>2</sup>	63.24	% of GGA
CA	588.36 m <sup>2</sup>	25.57	% of GGA
TFA	0 m <sup>2</sup>	0	% of GGA
COA	257.57 m <sup>2</sup>	11.19	% of GGA
SUA	245.06 m <sup>2</sup>	16.84	% of UA
MUA	1210.91 m <sup>2</sup>	83.16	% of UA
CAv	61.13 m <sup>2</sup>	10.38	% of CA
CAh	527.23 m <sup>2</sup>	89.62	% of CA
COAb	34.08 m <sup>2</sup>	13.23	% of COA
COAn	223.49 m <sup>2</sup>	86.77	% of COA

- Plot :Area of Land
- FA :Free Area
- GGA :Gross Ground Area
- UA :Usable Area
- CA :Circulation Area
- TFA :Technical Function Area
- COA :Construction Area
- SUA :Second Usable Area
- MUA :Main Usable Area
- CAv :Circulation Area vertical
- CAh :Circulation Area horizontal
- COAb :Construction Area bearing
- COAn :Construction Area not bearing



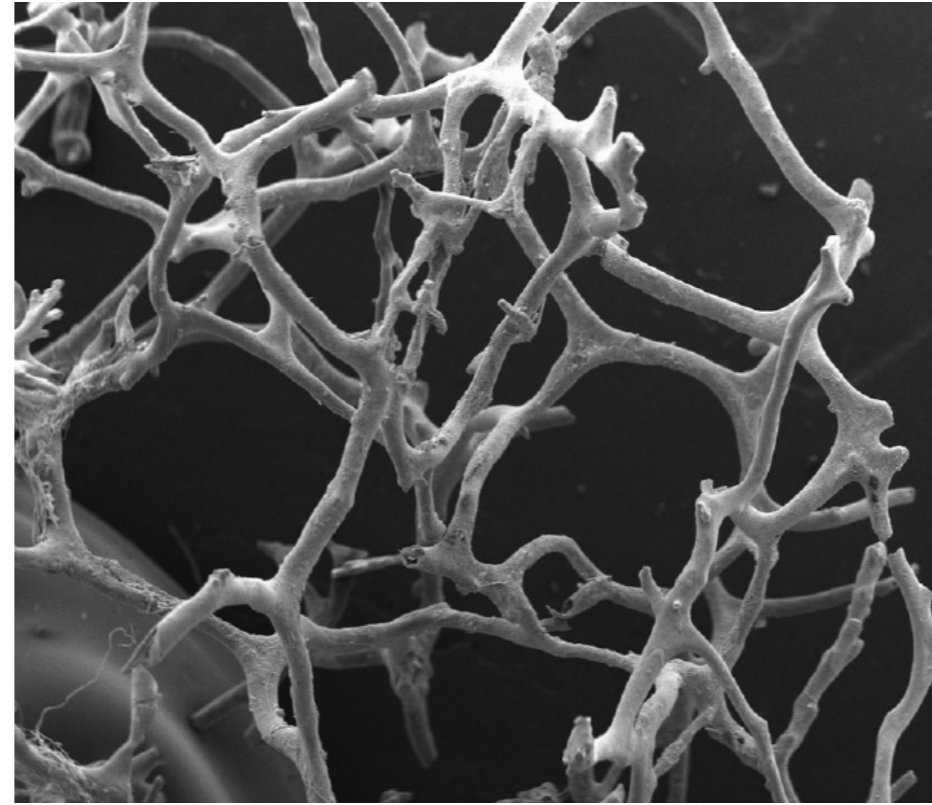
## VISUALIZED OF AREA RATIOS





Cellular Masses

Pic. 23



Sea Sponges

Pic. 24



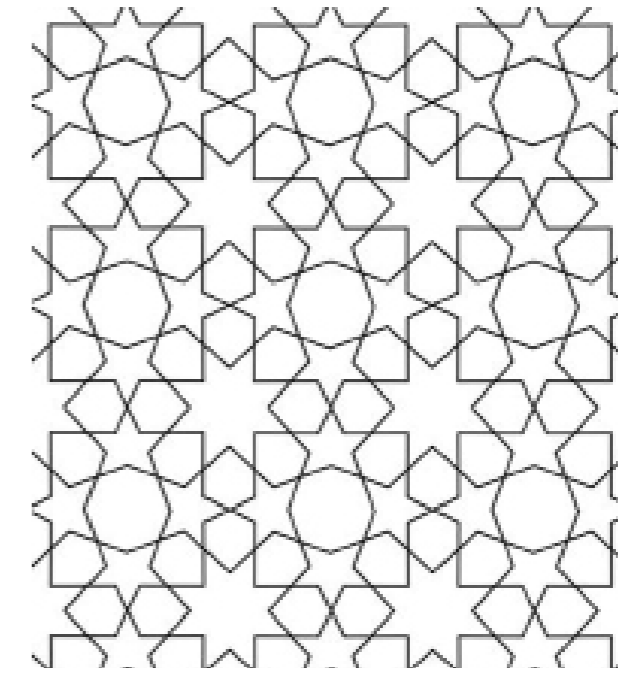
Tree Branches

Pic. 25

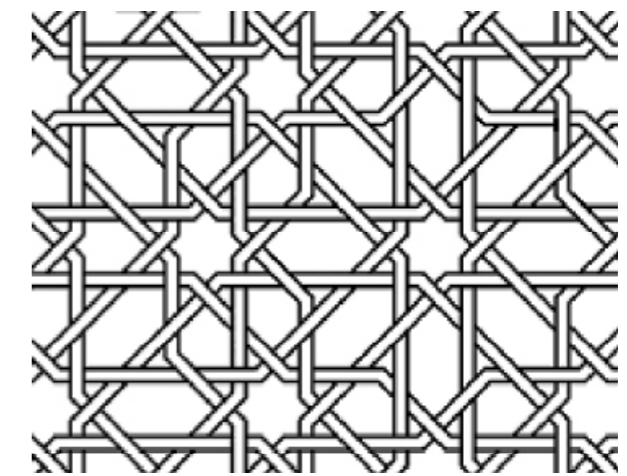


Leaf and Small Scale Geometric Texture

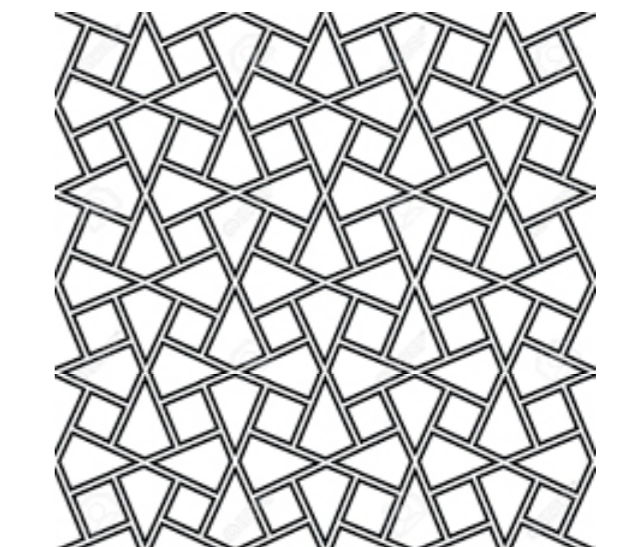
Pic. 26



Pic. 27



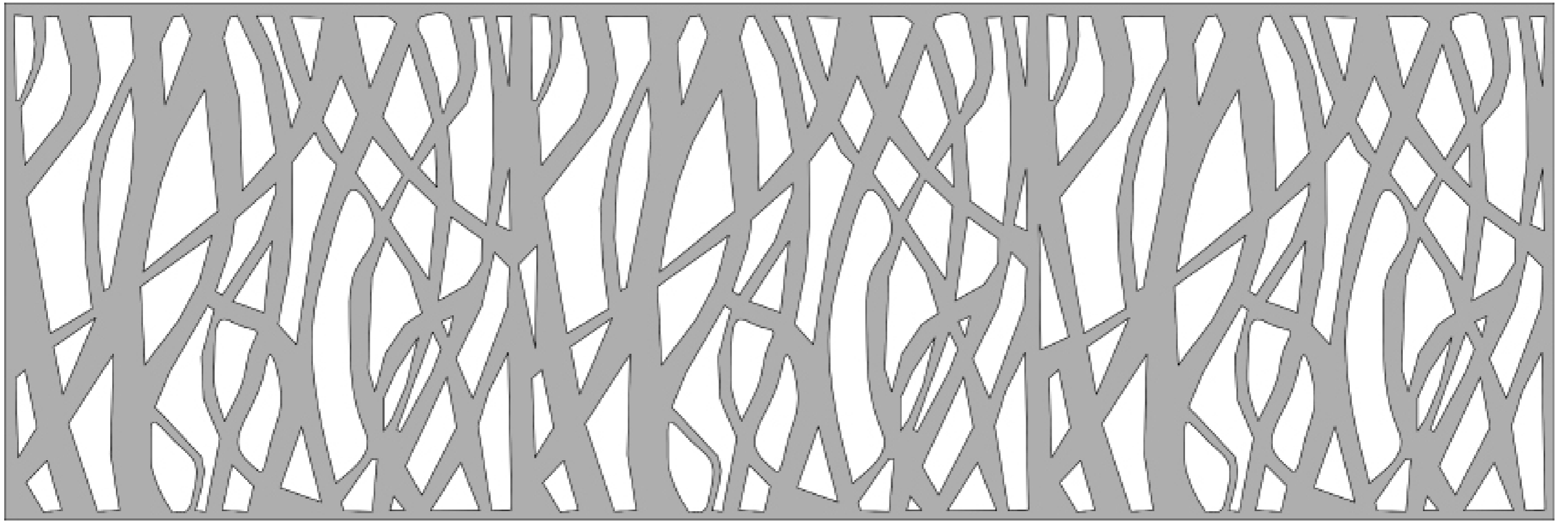
Pic. 28



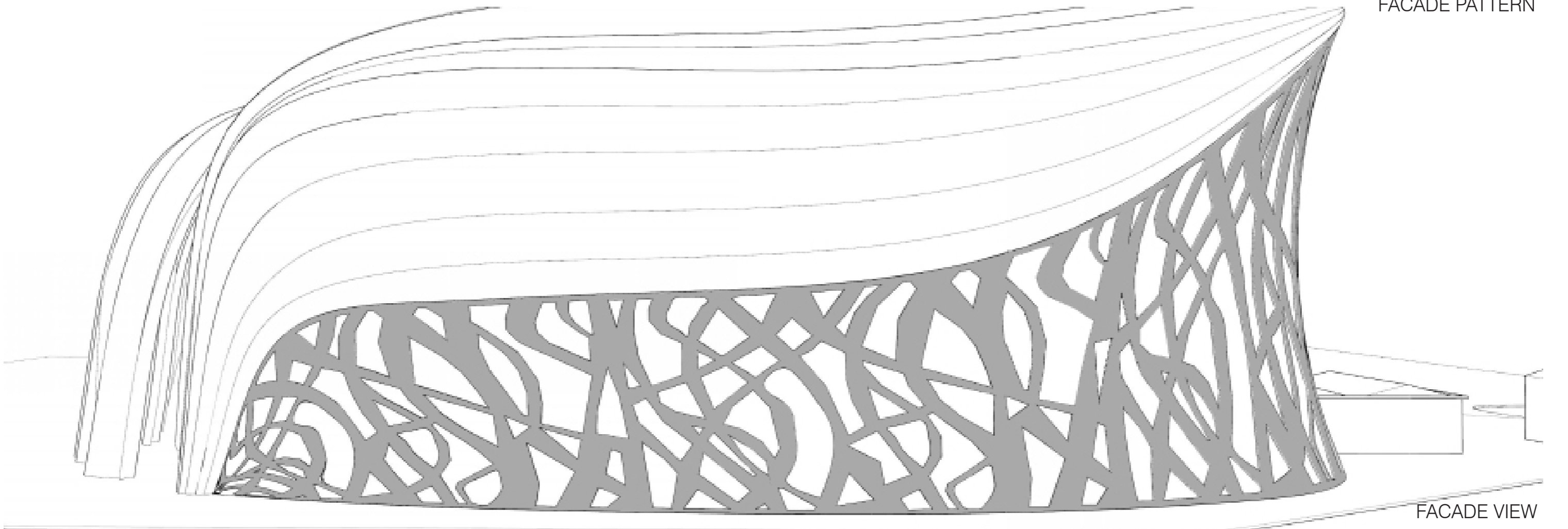
Pic. 29

Traditional Islamic Pattern

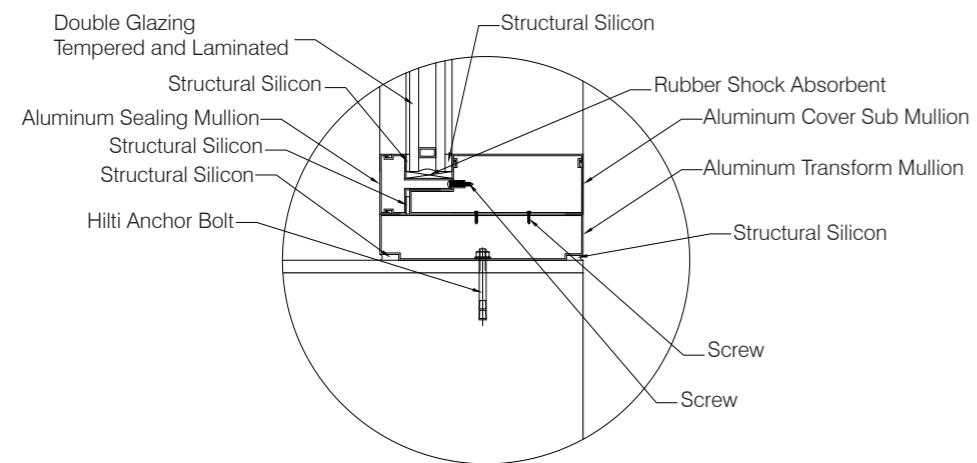
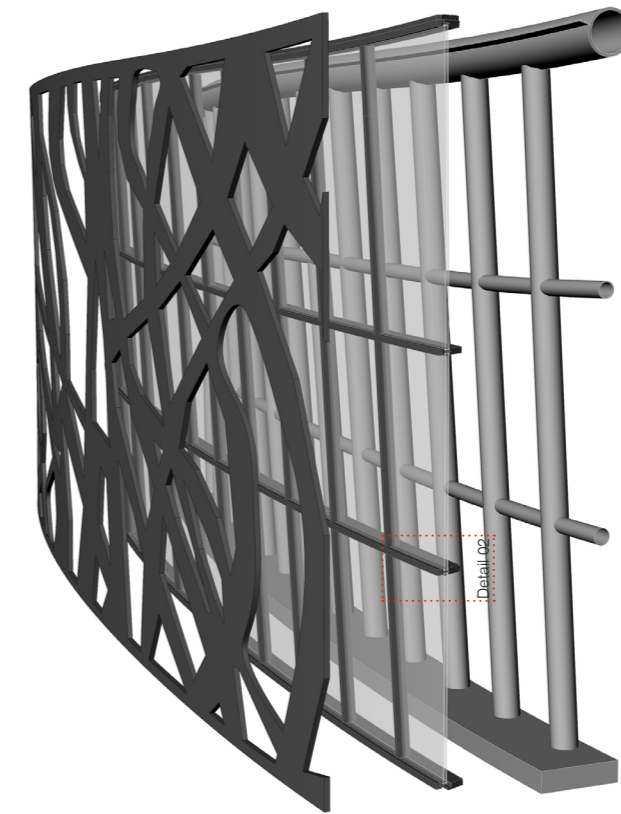
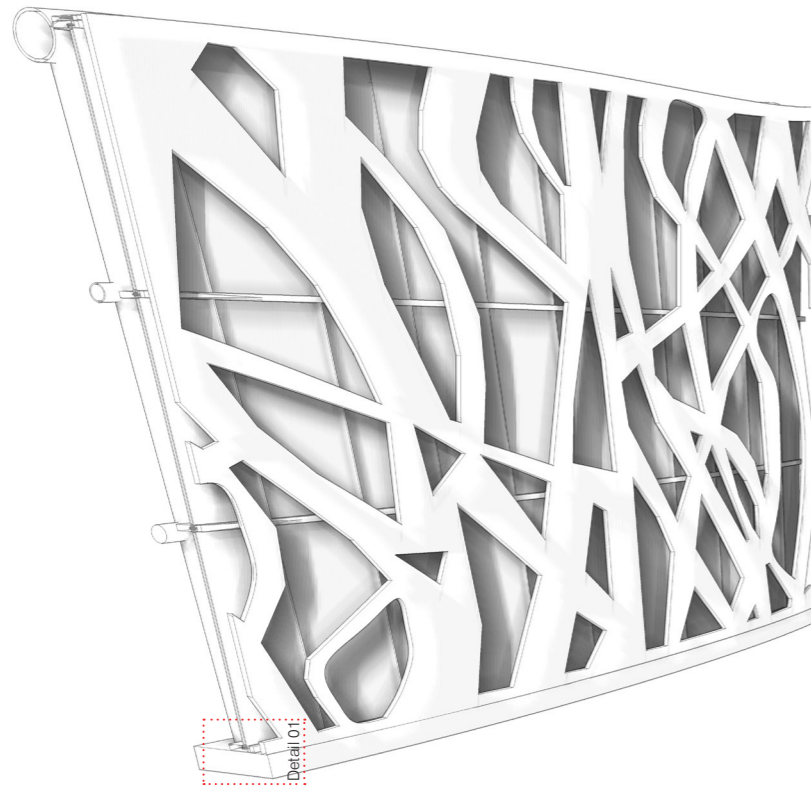




FACADE PATTERN

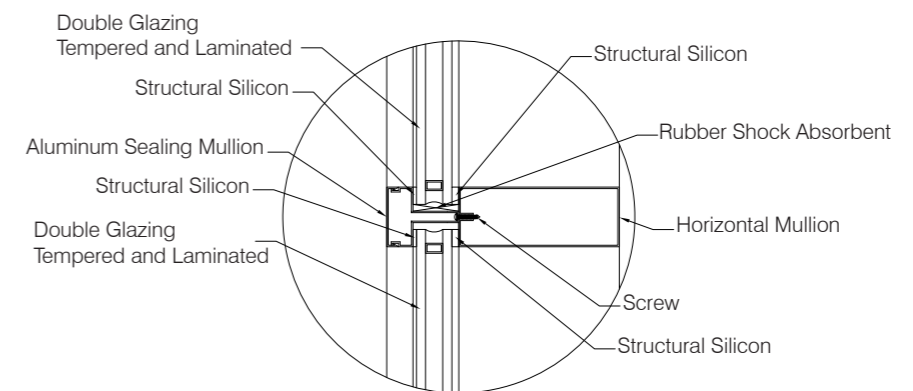


FACADE VIEW



DETAIL 01

3D SHOWING OF FACADE

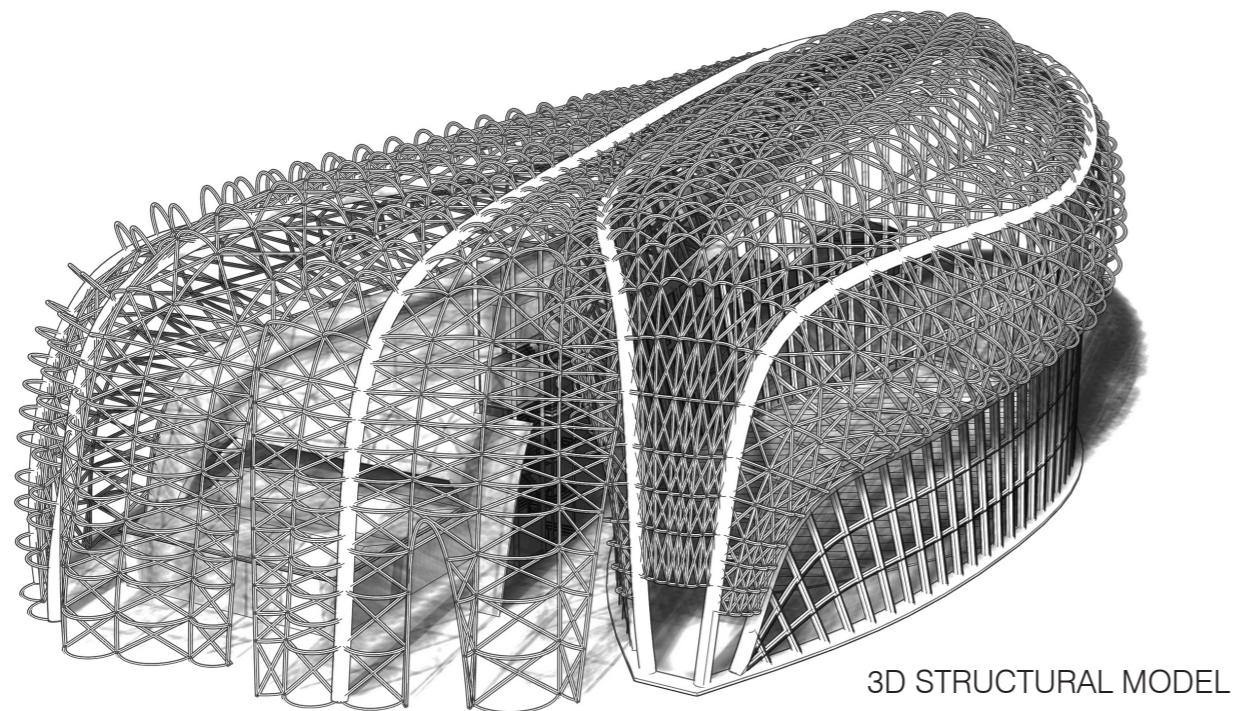
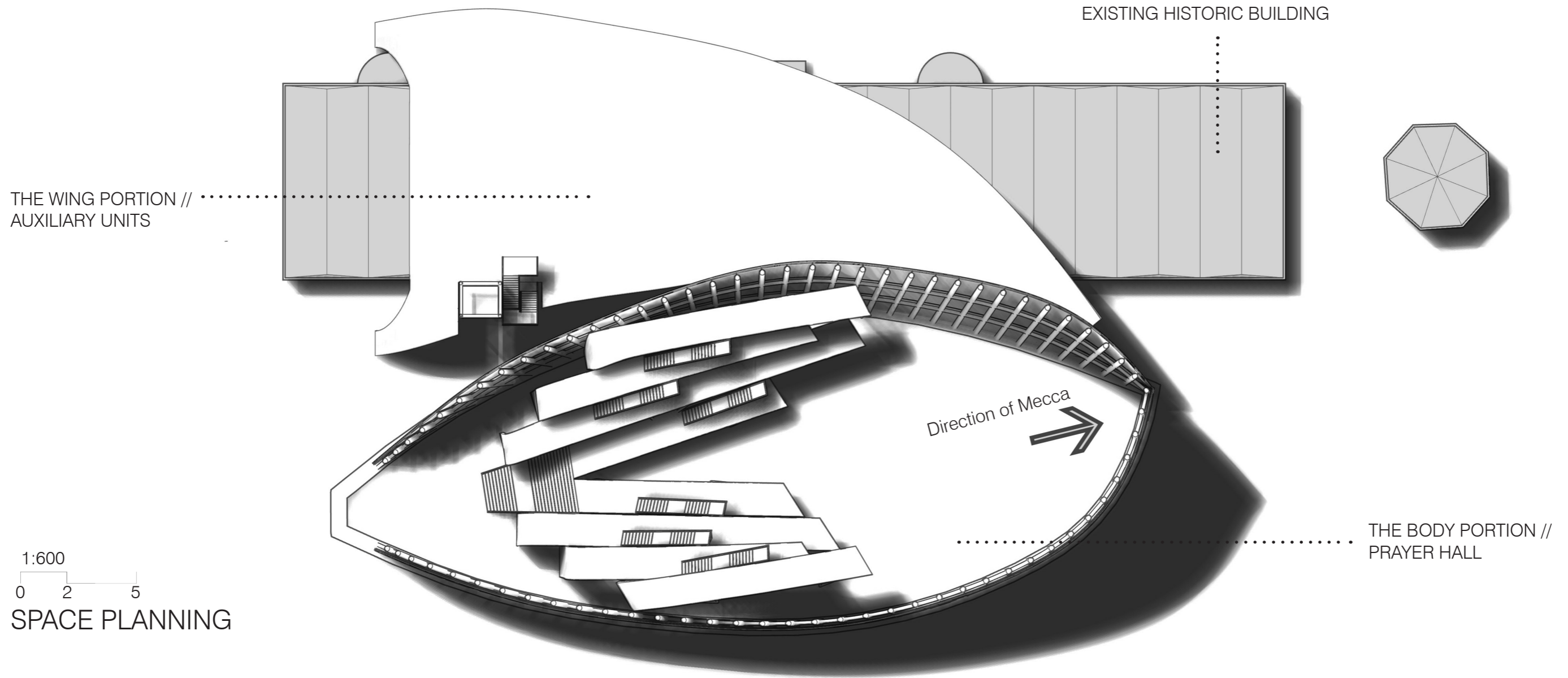


DETAIL 02

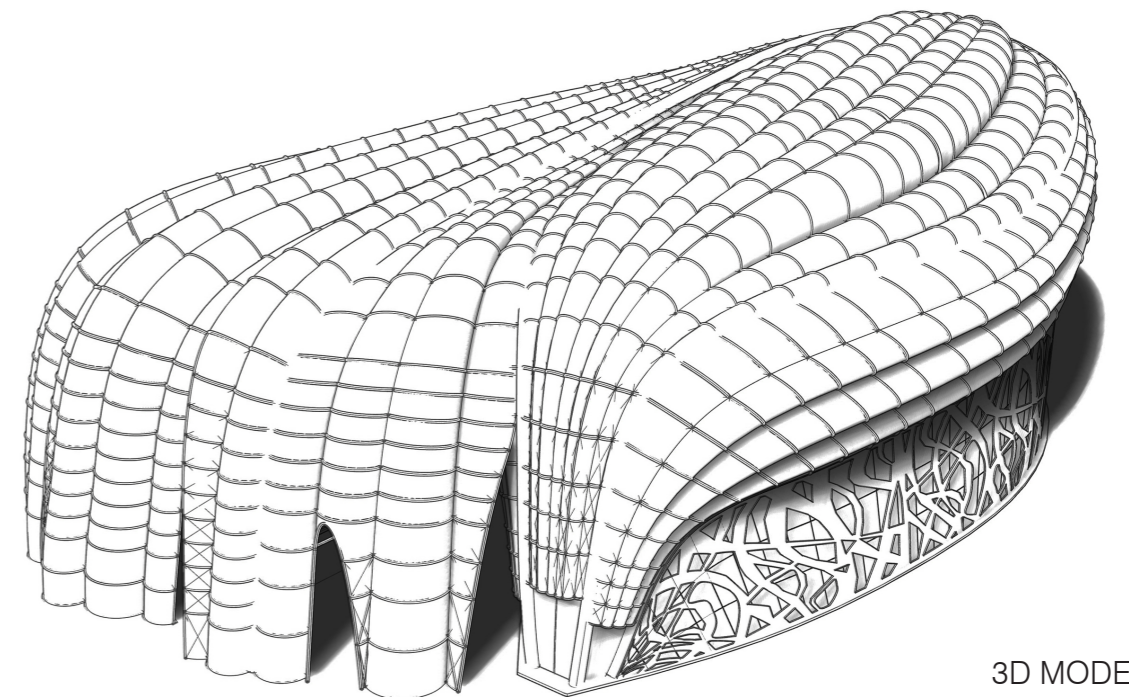
3D SHOWING OF FACADE STRUCTURE



**CONSTRUCTION**



3D STRUCTURAL MODEL



3D MODEL

## MONOCOQUE STRUCTURES

Monocoque, also structural skin, is a structural system where loads are supported through an object's external skin, similar to an egg shell. The word monocoque is a French term for "single shell" or (of boats) "single hull".<sup>1</sup> A true monocoque carries both tensile and compressive forces within the skin and can be recognised by the absence of a load carrying internal frame. Monocoque construction is a construction technique that integrates the outer frame and inner frame into a one piece structure. Carries loads down the foundation bearings points. There are some advantages and disadvantages.

### Advantages

- Extremely rigid structure that can support itself
- Good deal of torsional and lateral stability.
- Lightweight.
- More space inside the structure.
- No load bearing pillars.
- Relatively fewer materials used in construction.

### Disadvantages

- Relies mostly on continuous surface to carry load
- Damage to exterior will compromise integrity of the structure.
- Repairs and modifications are difficult

## SEMI-MONOCOQUE STRUCTURES

The Semi-Monocoque System uses a substructure to which the skin of the structure is stretched. Consisting of stringers on the inside that create tension, which add rigidity to the whole structure.

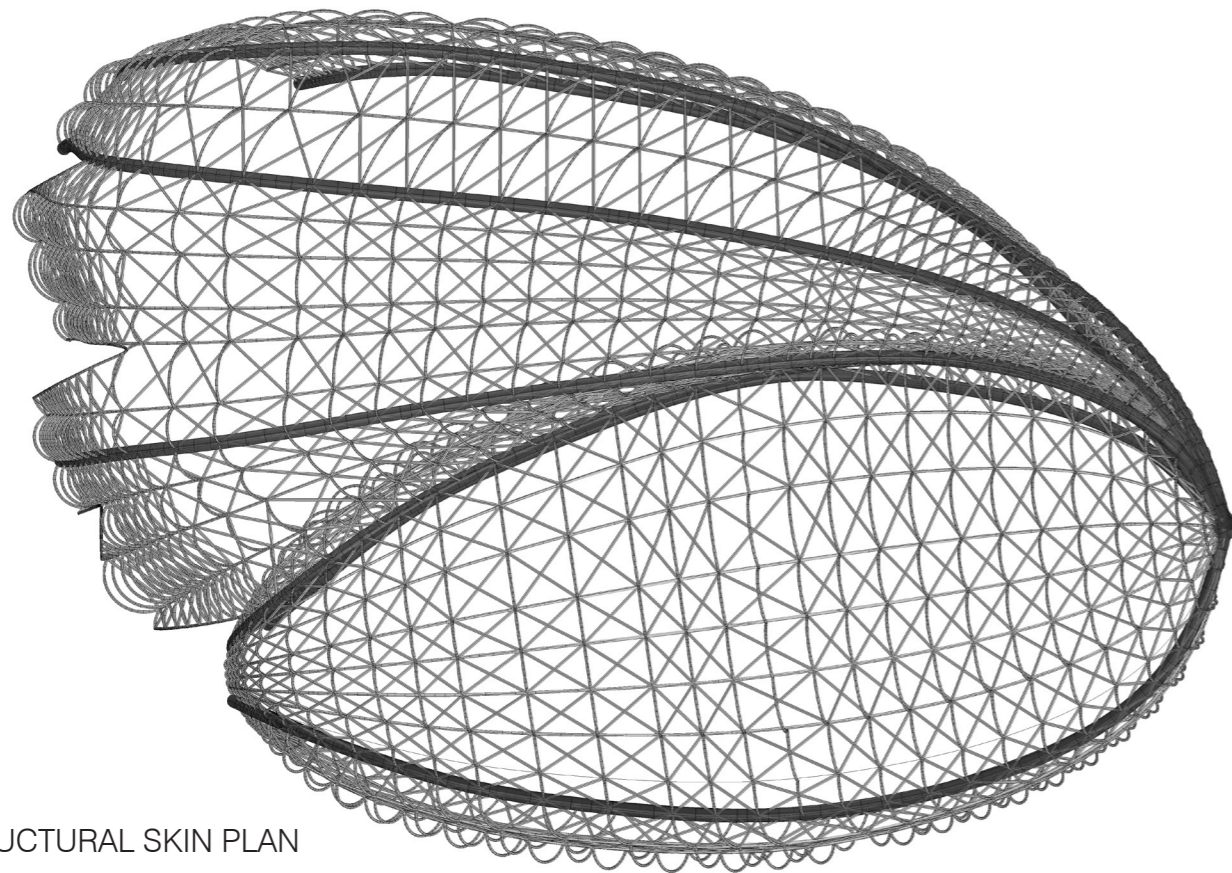
The main difference between monocoque structures and semi-monocoque structures is that semi-monocoque structures are strengthened and supported by Stringers&Bulkheads, compared to the full monocoque structure. Monocoque structures do not have stringers nor bulkheads, and a smooth surface can be added on top which is added in sections, reducing the need for several plates.<sup>2</sup>

Semi-Monocoque cylindrical structures are generally used in flight vehicles to get the benefit of higher strength to weight ratio. A structure composed of stiffeners in two directions (longitudinal and circumferential) may be more efficient than one having in single direction. Generally, the flight vehicle structures will experience structural loads (axial force and bending moment) and thermal loads (temperature) during the course of trajectory. Structural loads and thermal loads acting on the flight vehicle structure are derived from the load and kinetic heating analyses respectively. The structure has to be designed in order that it will withstand both structural and thermal loads and perform its intended functions.<sup>3</sup>

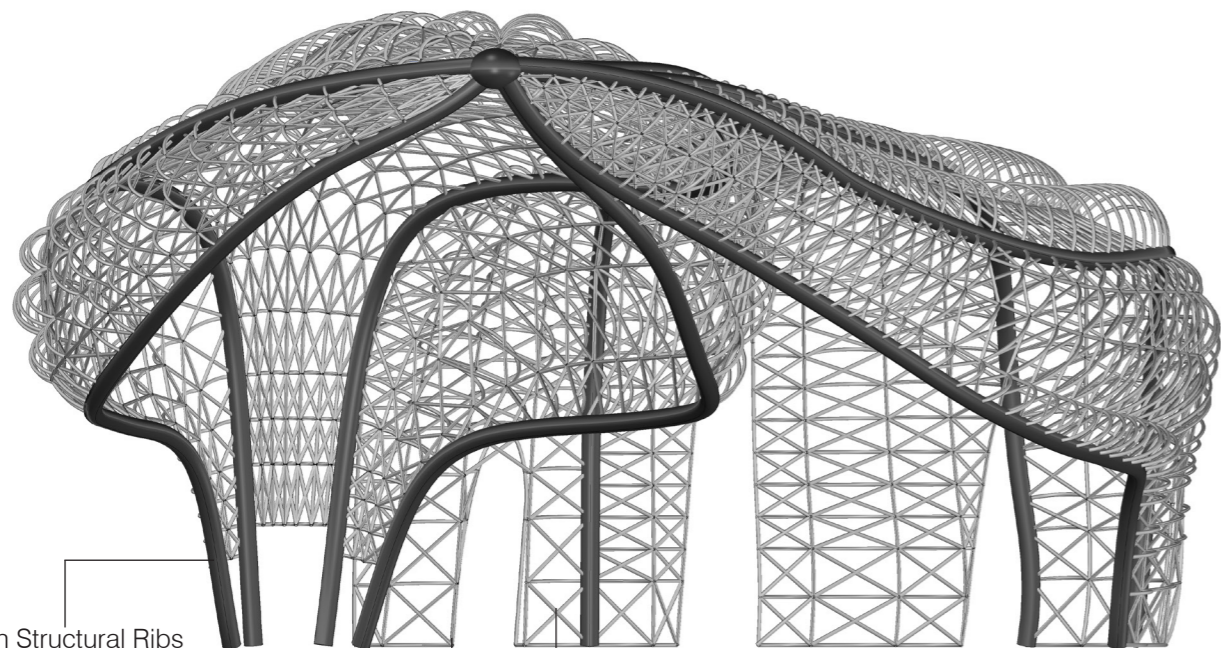
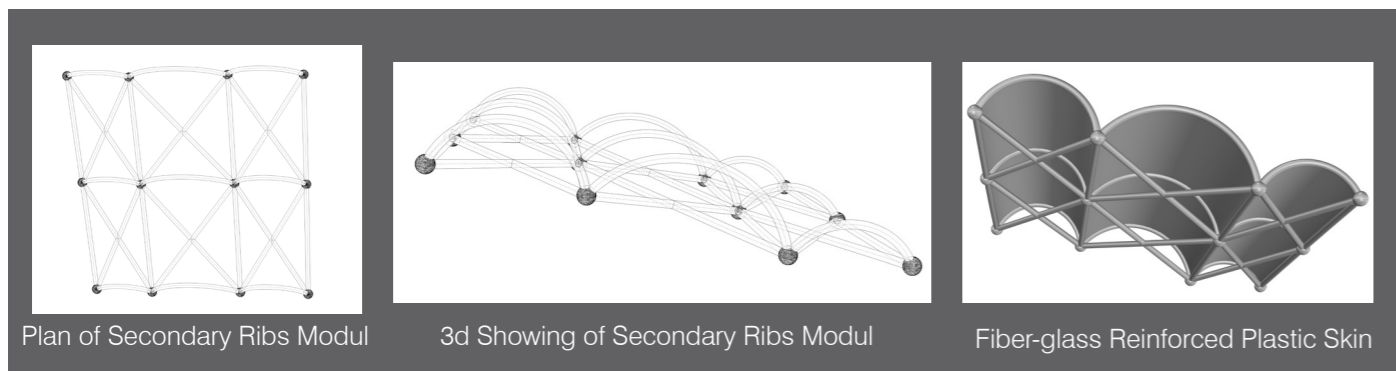
<sup>1</sup> Monocoque Structure from Wikipedia

<sup>2</sup> <https://prezi.com/4qrion1xwmdg/monocoque-construction/> by Aaron Aldridge

<sup>3</sup> [http://www.arpnjournals.com/jeas/research\\_papers/rp\\_2014/jeas\\_0314\\_1032.pdf](http://www.arpnjournals.com/jeas/research_papers/rp_2014/jeas_0314_1032.pdf), by R. Santhanam, P. C. Jain, Y. Krishna and PSR Anjaneyulu



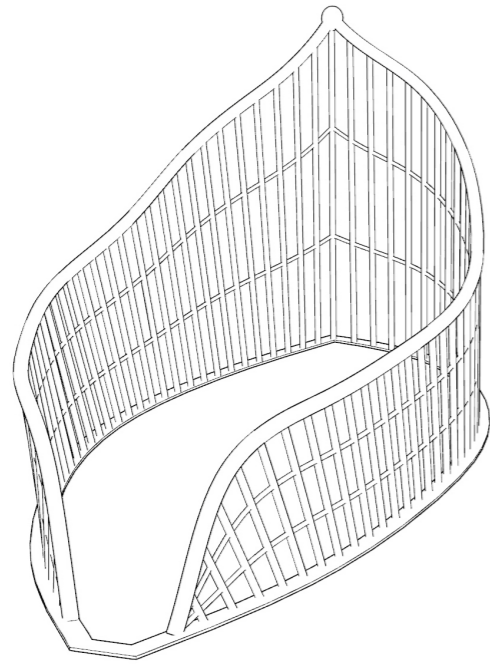
STRUCTURAL SKIN PLAN



Main Structural Ribs  
Secondary Ribs  
Additional Bracing Structures

3D MODELING

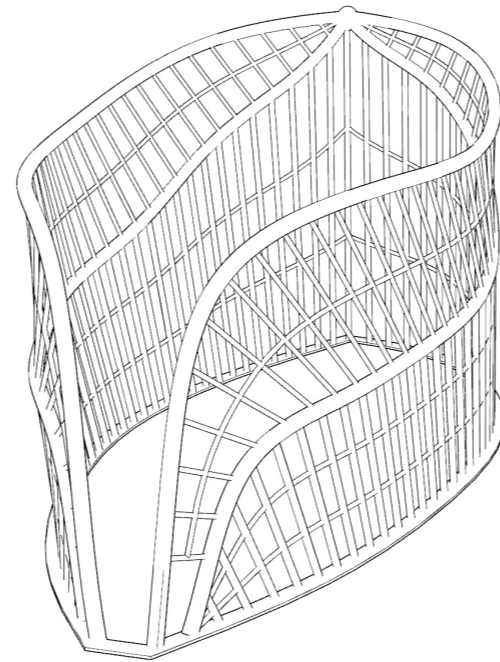
TAKSIM BIRD // THE BODY STRUCTURE



1

---

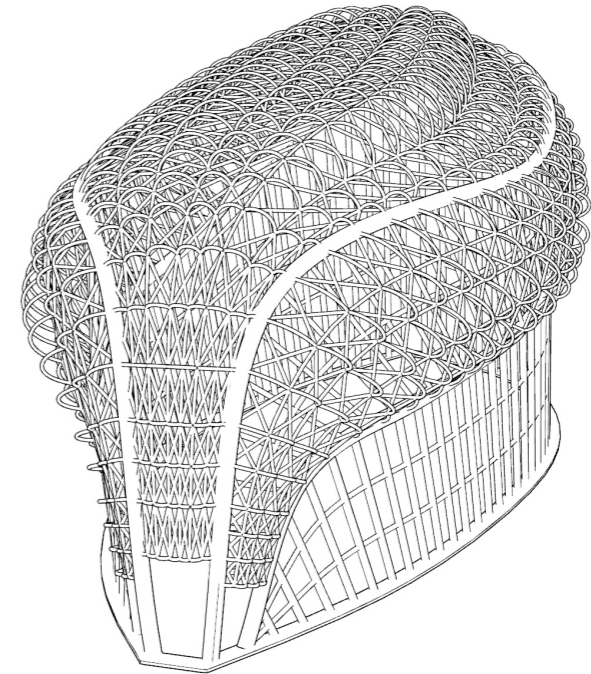
STEEL FRAME FOR FACADE



2

---

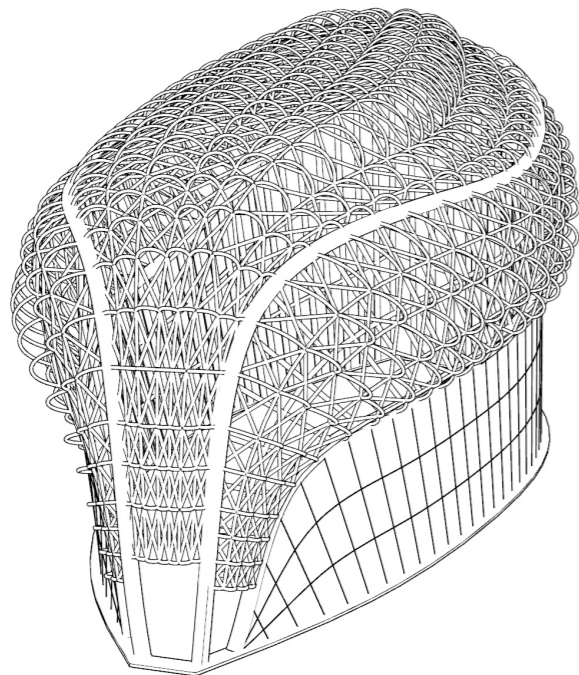
STEEL SUPPORT SYSTEM FOR ROOFING



3

---

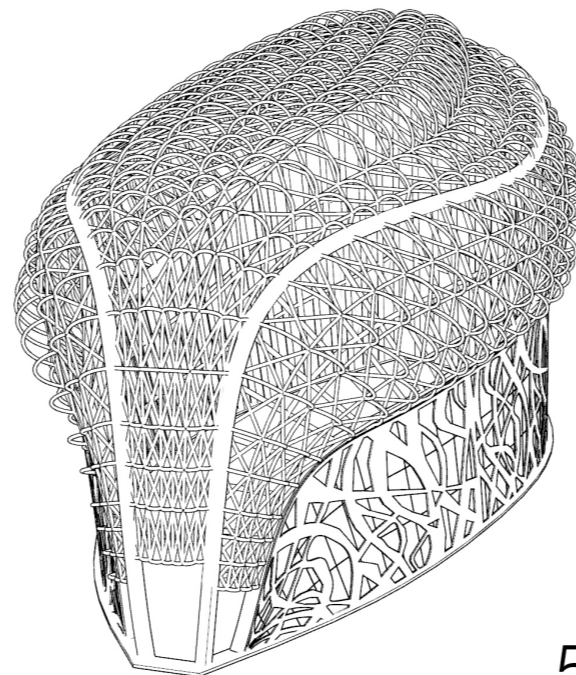
STEEL ROOF CONSTRUCTION



4

---

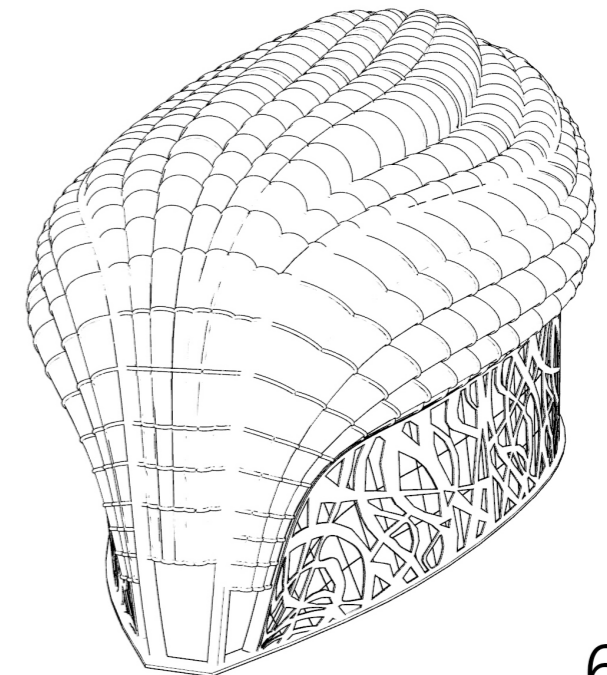
STEEL CURTAIN WALL



5

---

METAL MESH CLADDING FOR FACADE

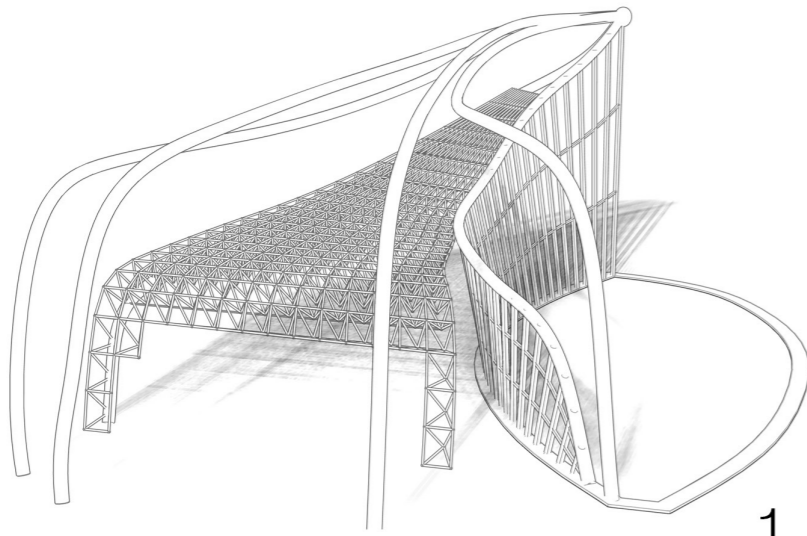


6

---

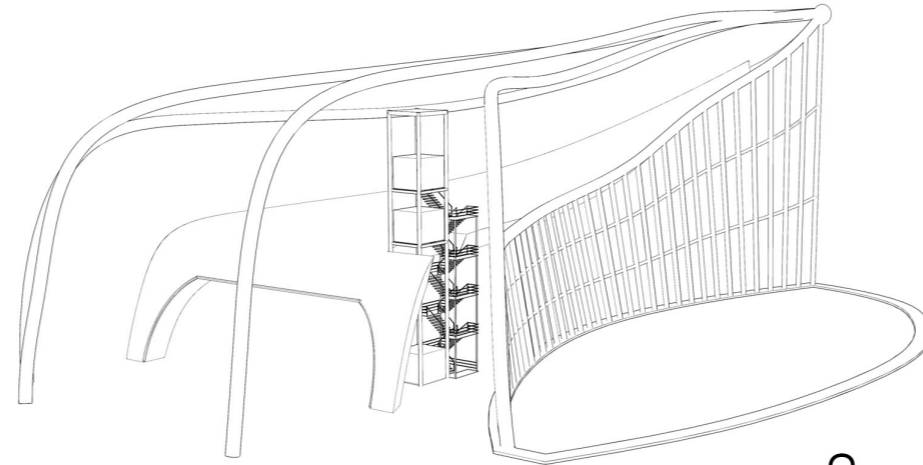
FIBERGLASS REINFORCED PLASTIC (FRP) ROOFING

# TAKSIM BIRD // THE WING STRUCTURE



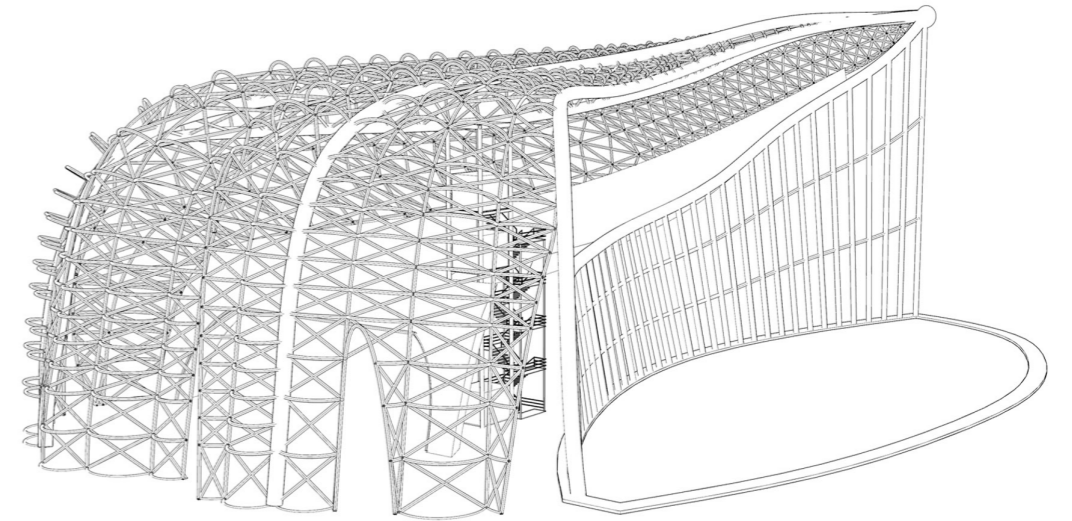
1

SPACE TRUSS SYSTEM FOR WING FLOOR



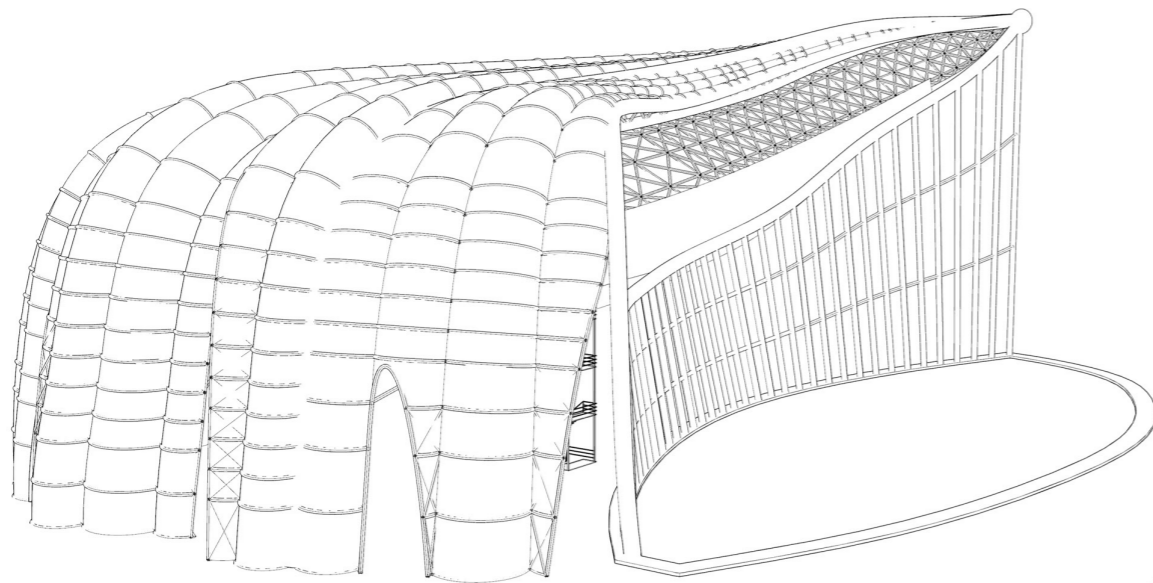
2

COVERING AND ACCESS



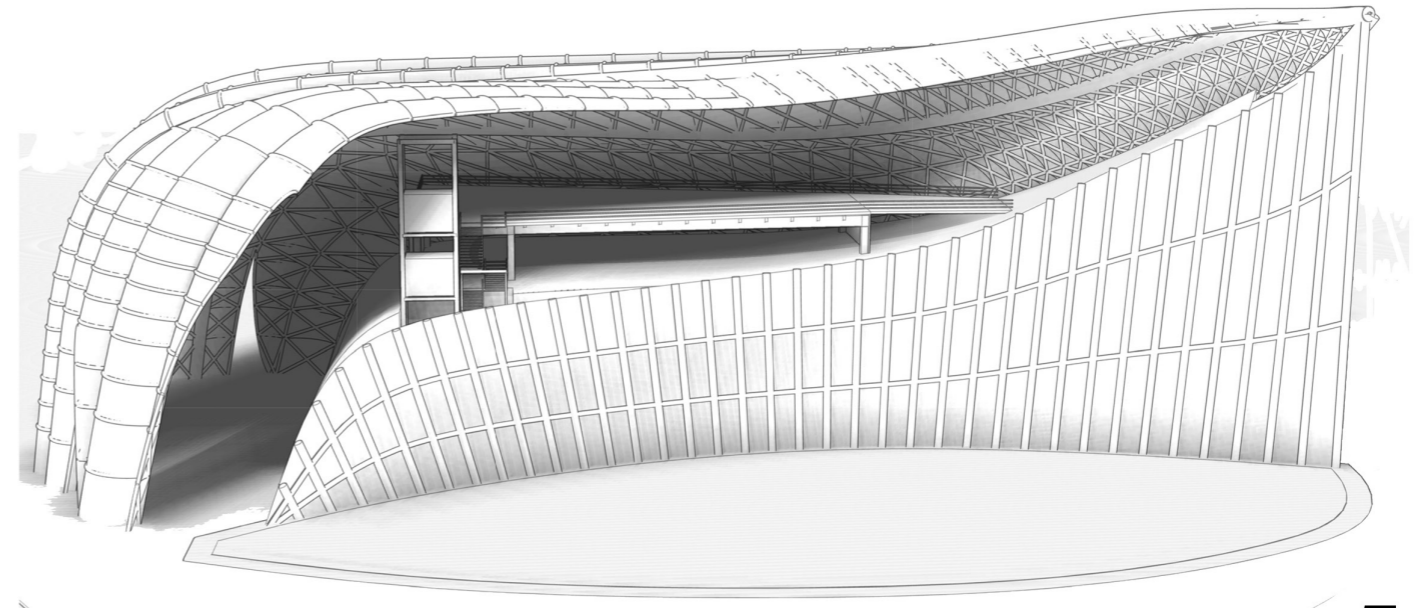
3

STEEL ROOF CONSTRUCTION



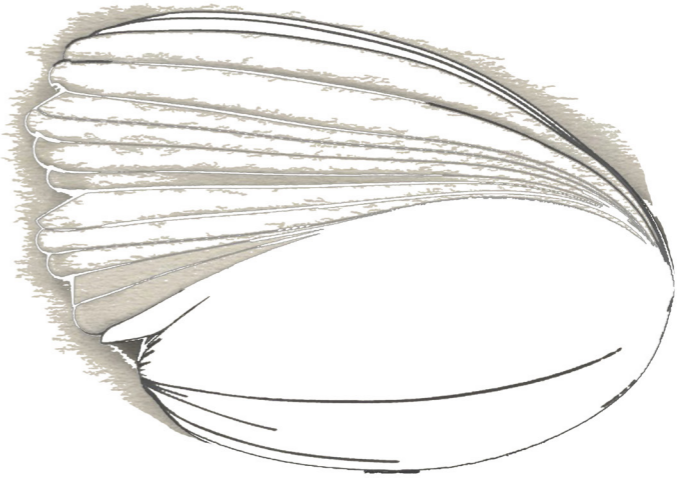
4

FIBERGLASS REINFORCED PLASTIC (FRP) ROOFING



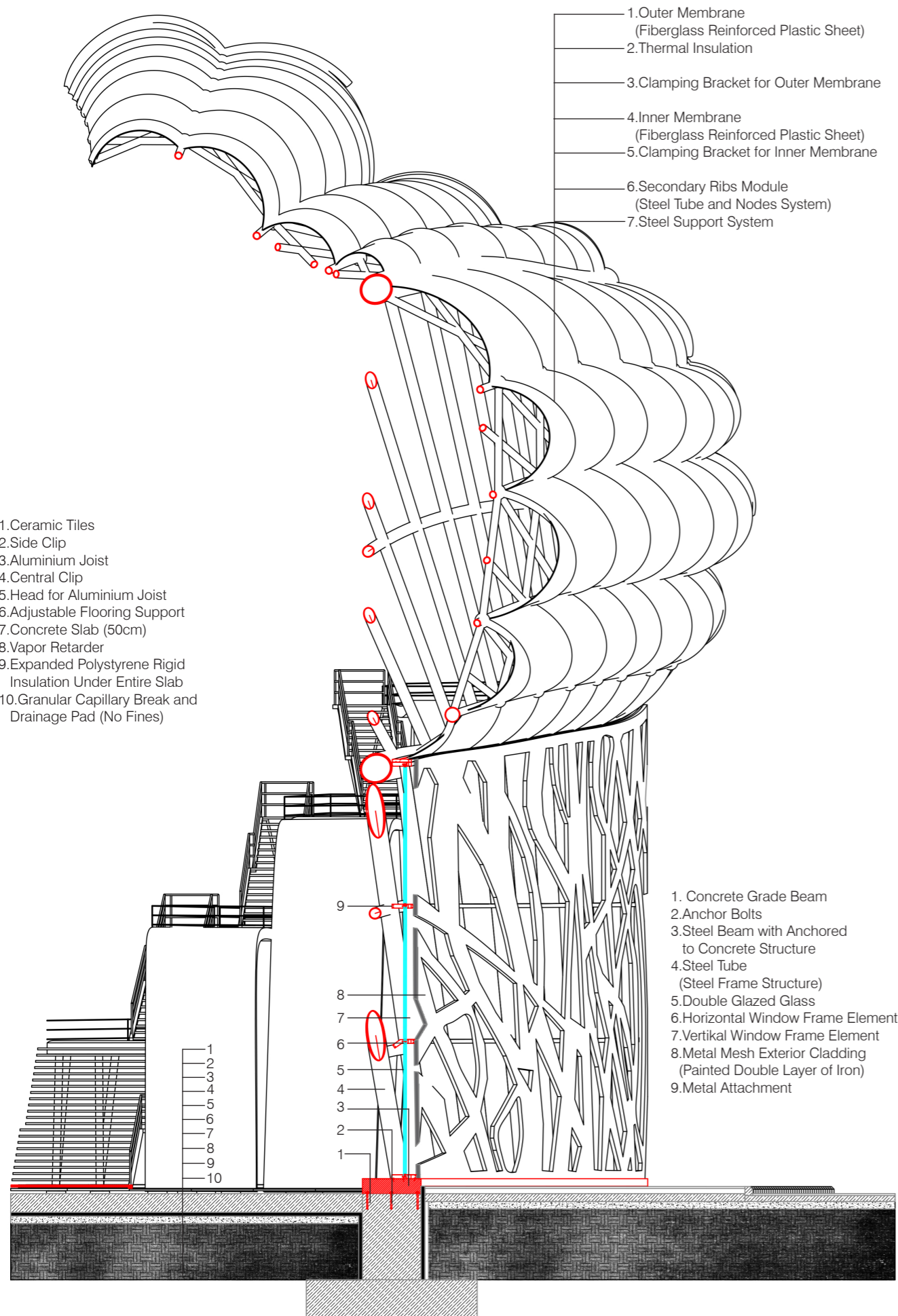
5

INTERIOR ARRANGEMENT OF THE WING

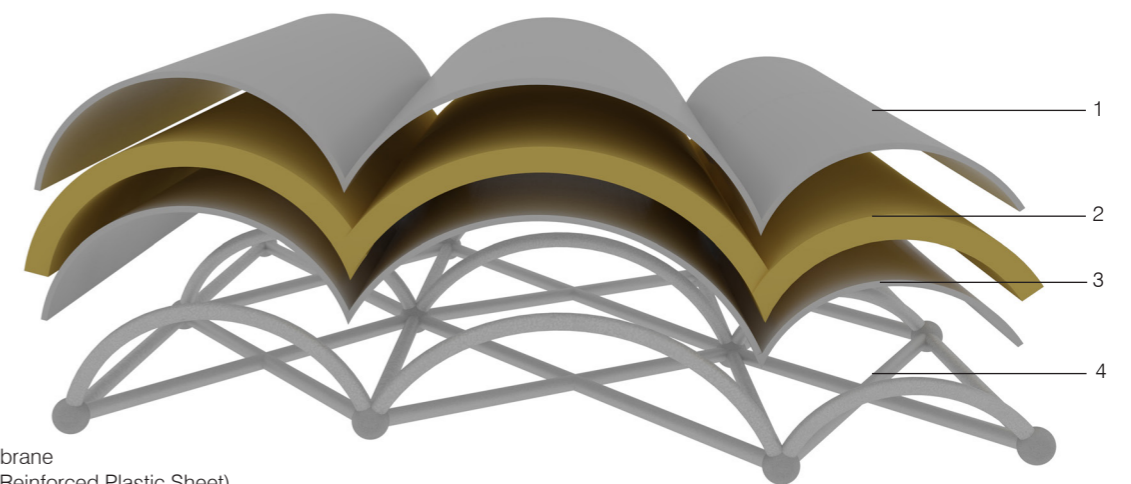


**DETAILS**

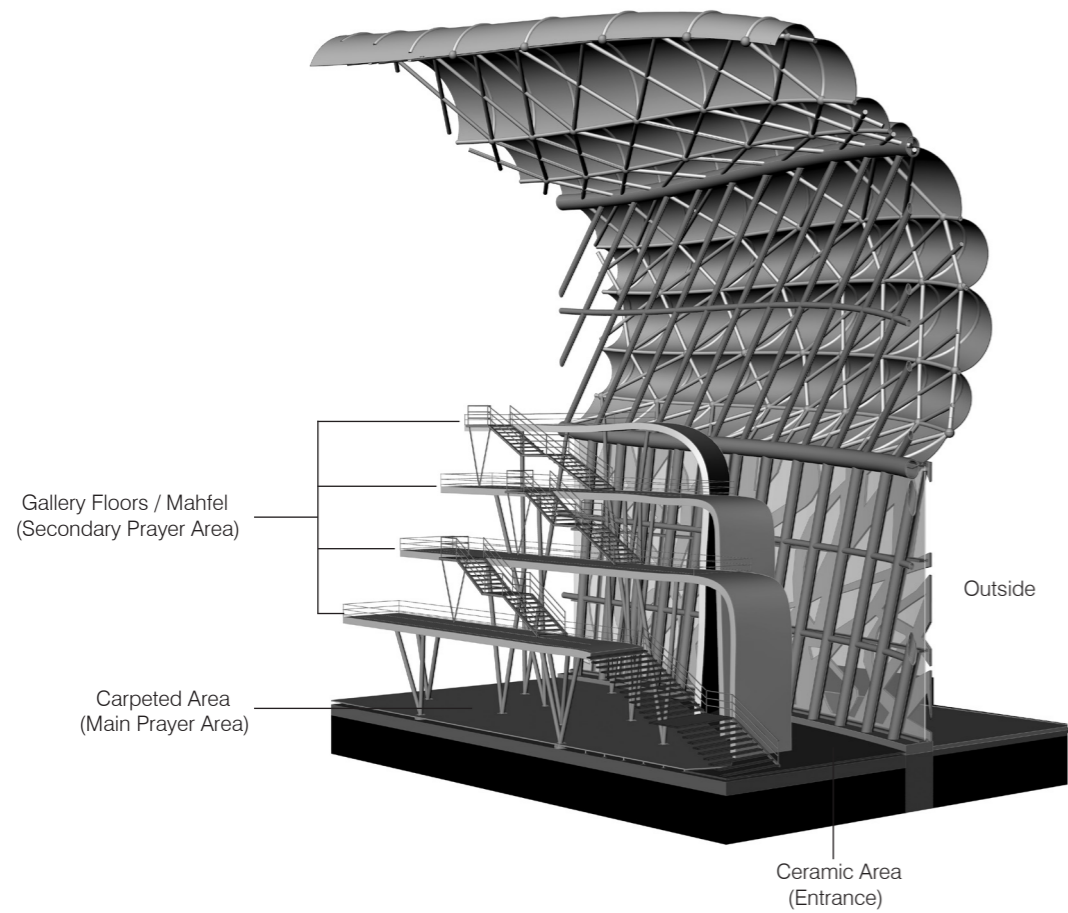




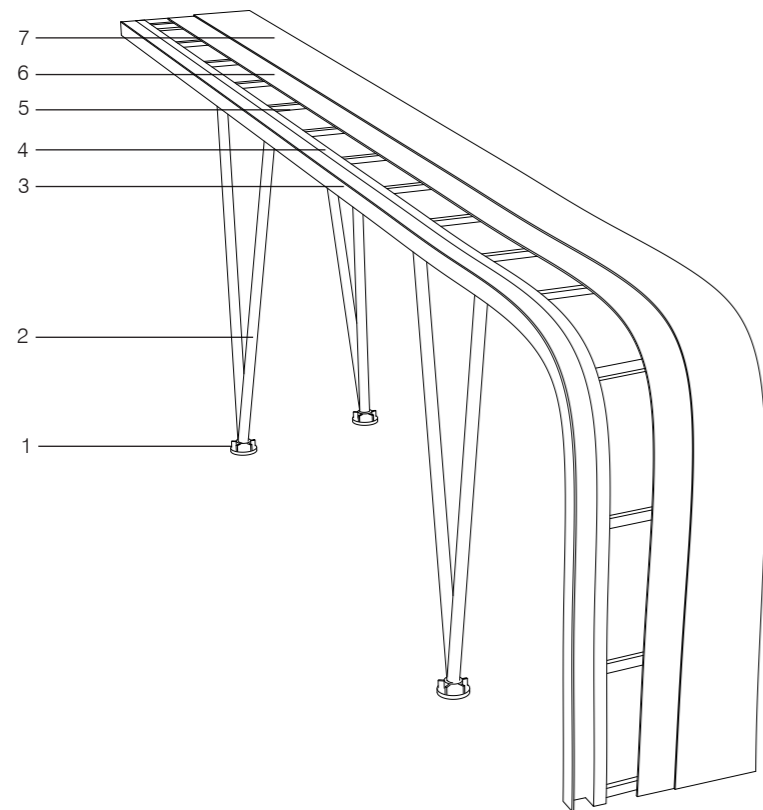
SYSTEM SECTION



3D SHOWING OF STRUCTURAL SKIN

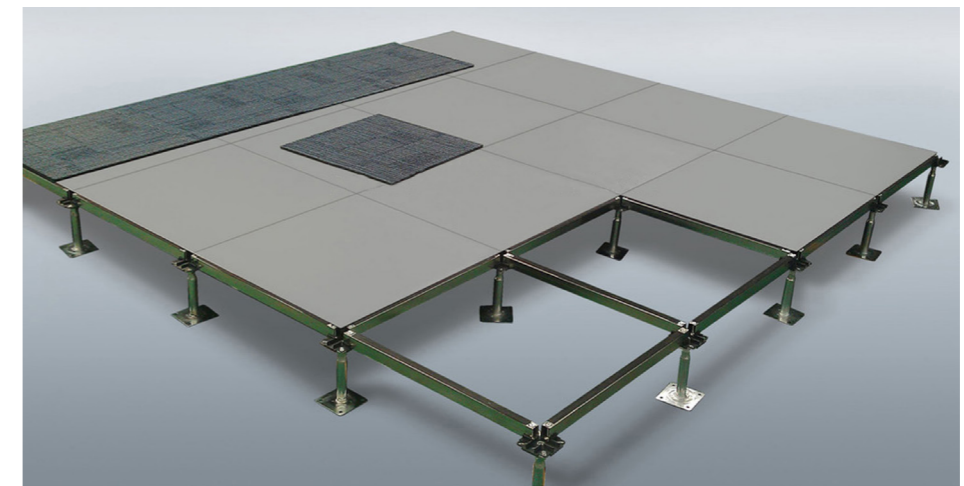
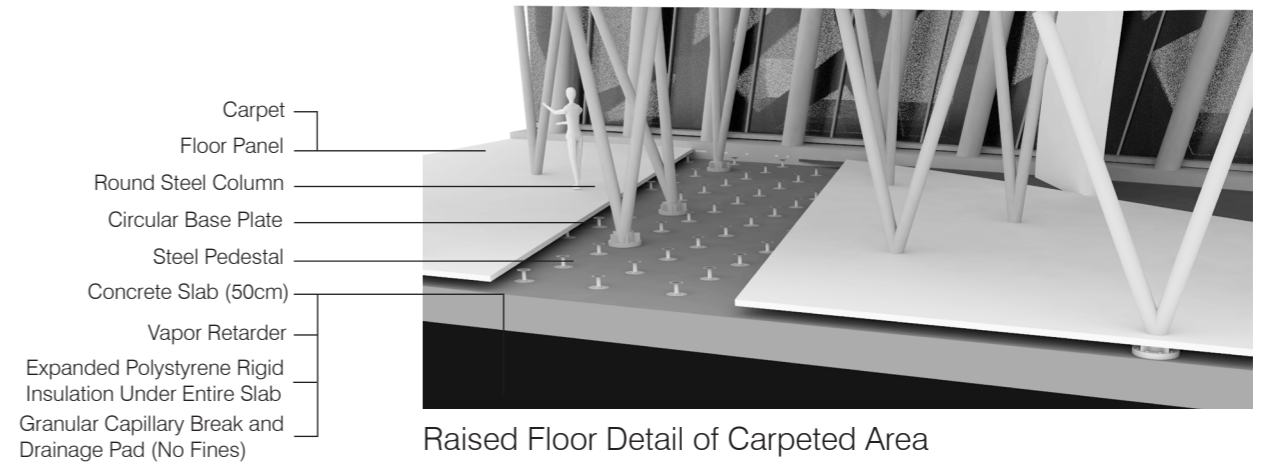


3D SHOWING OF SYSTEM SECTION



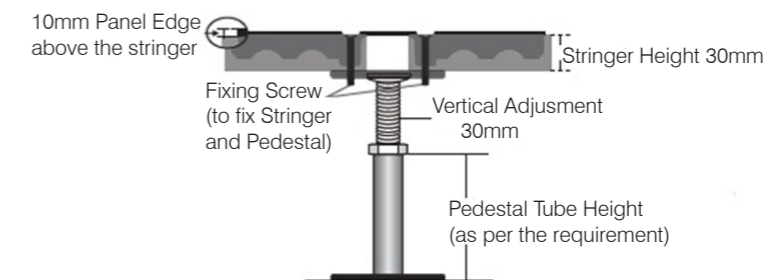
1. Circular Base Plate
2. Round Steel Column
3. Protective Side Coating
4. Steel Main Beam (Steel Frame Structure)
5. Steel Subsidiary Beam (Steel Frame Structure)
6. Perforated Metal Flooring
7. Carpet, Non Rubber Backed
  - Low Tog Underlay if Required
  - Flexible Levelling Compound

3D SHOWING OF GALLERY FLOORS / MAHFEL



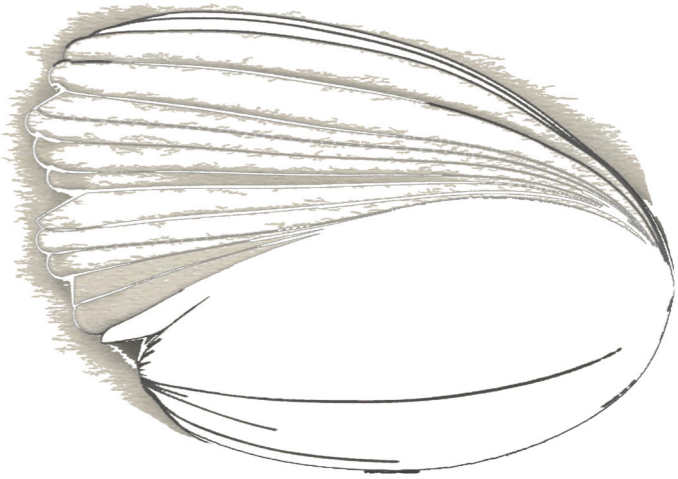
Raised Flooring System

Pic. 30

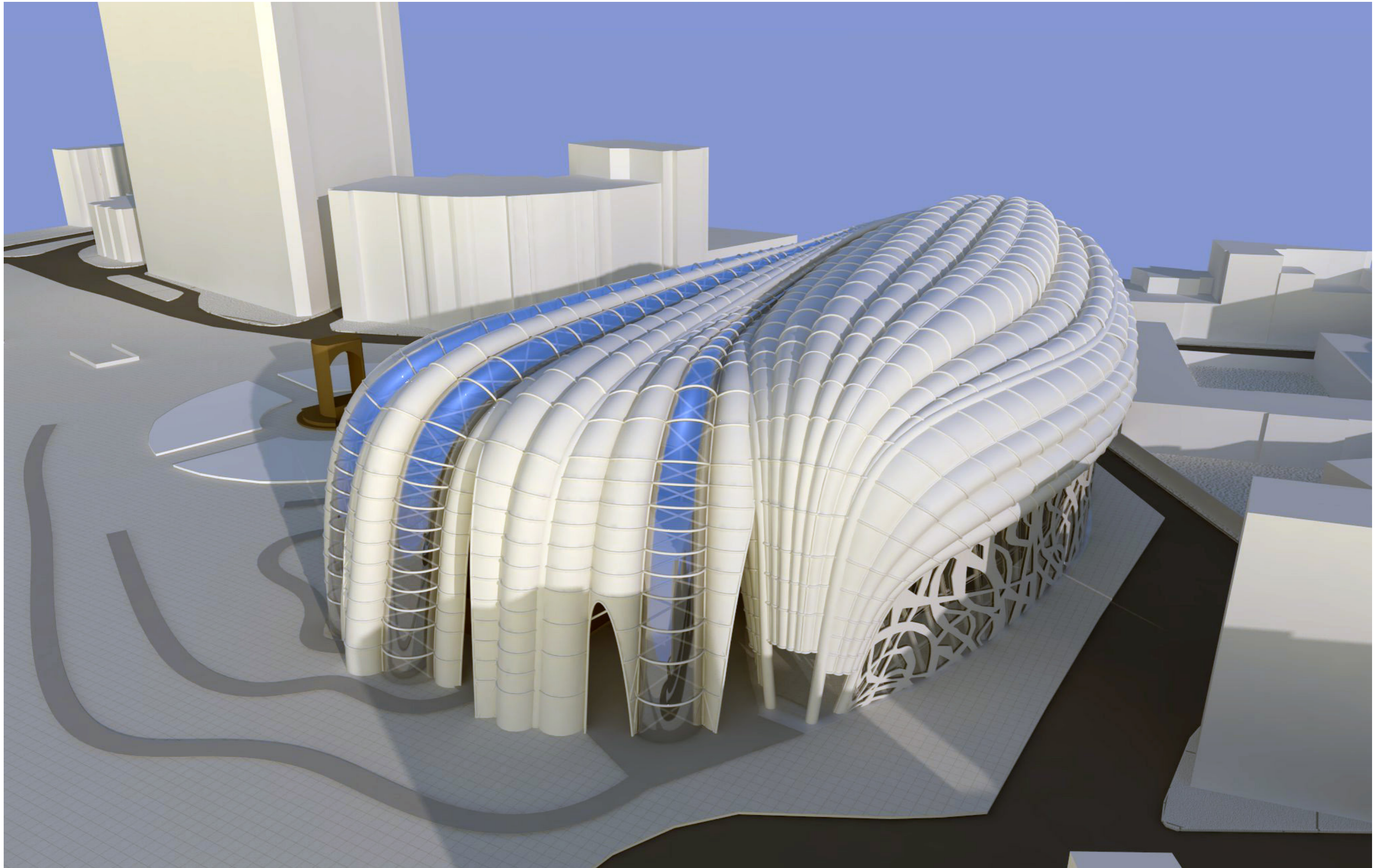


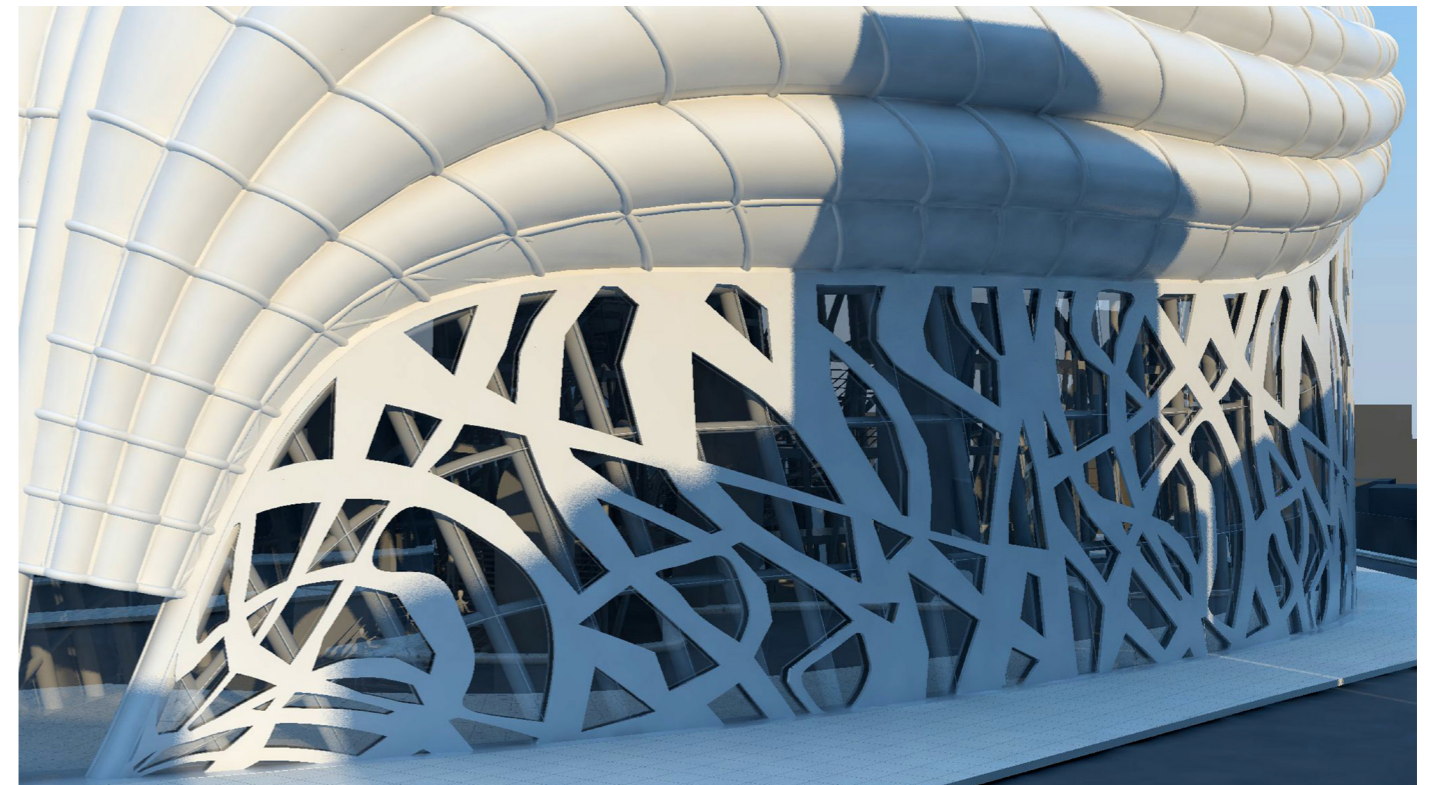
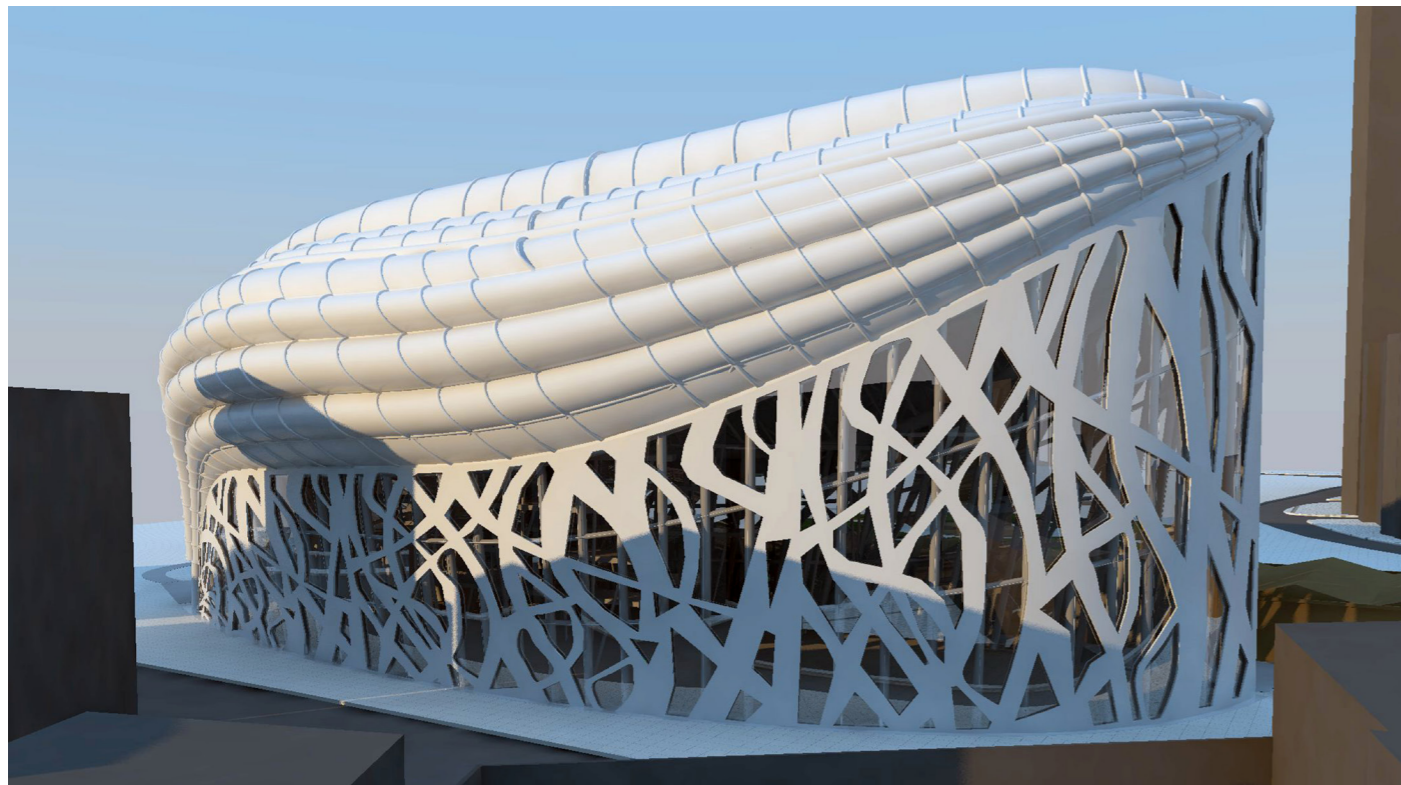
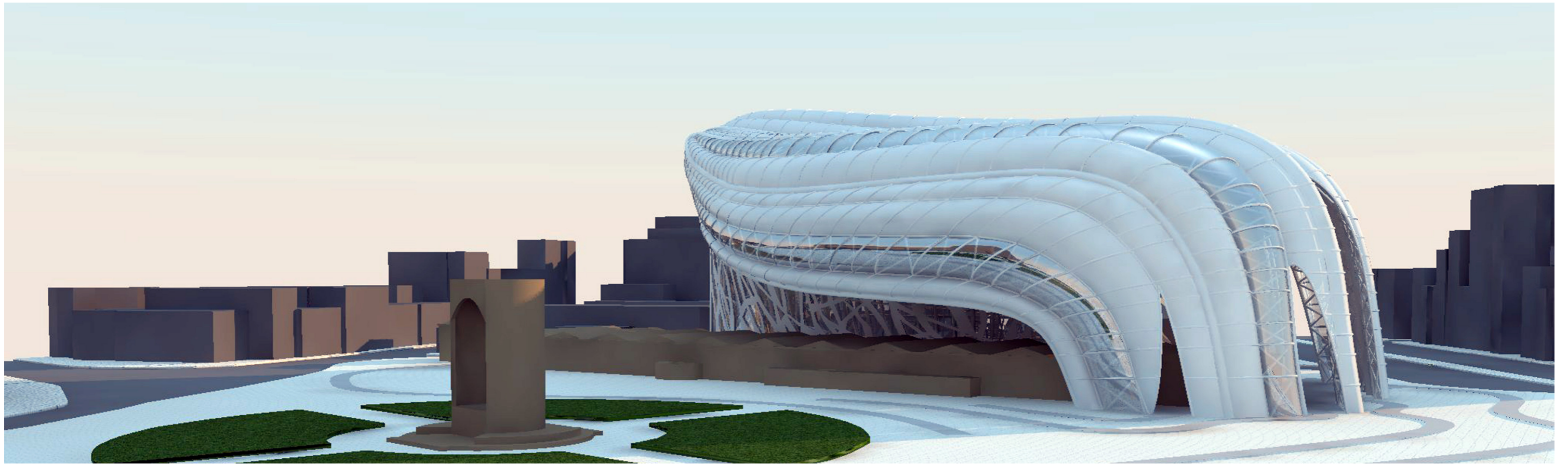
Stringer System Detail

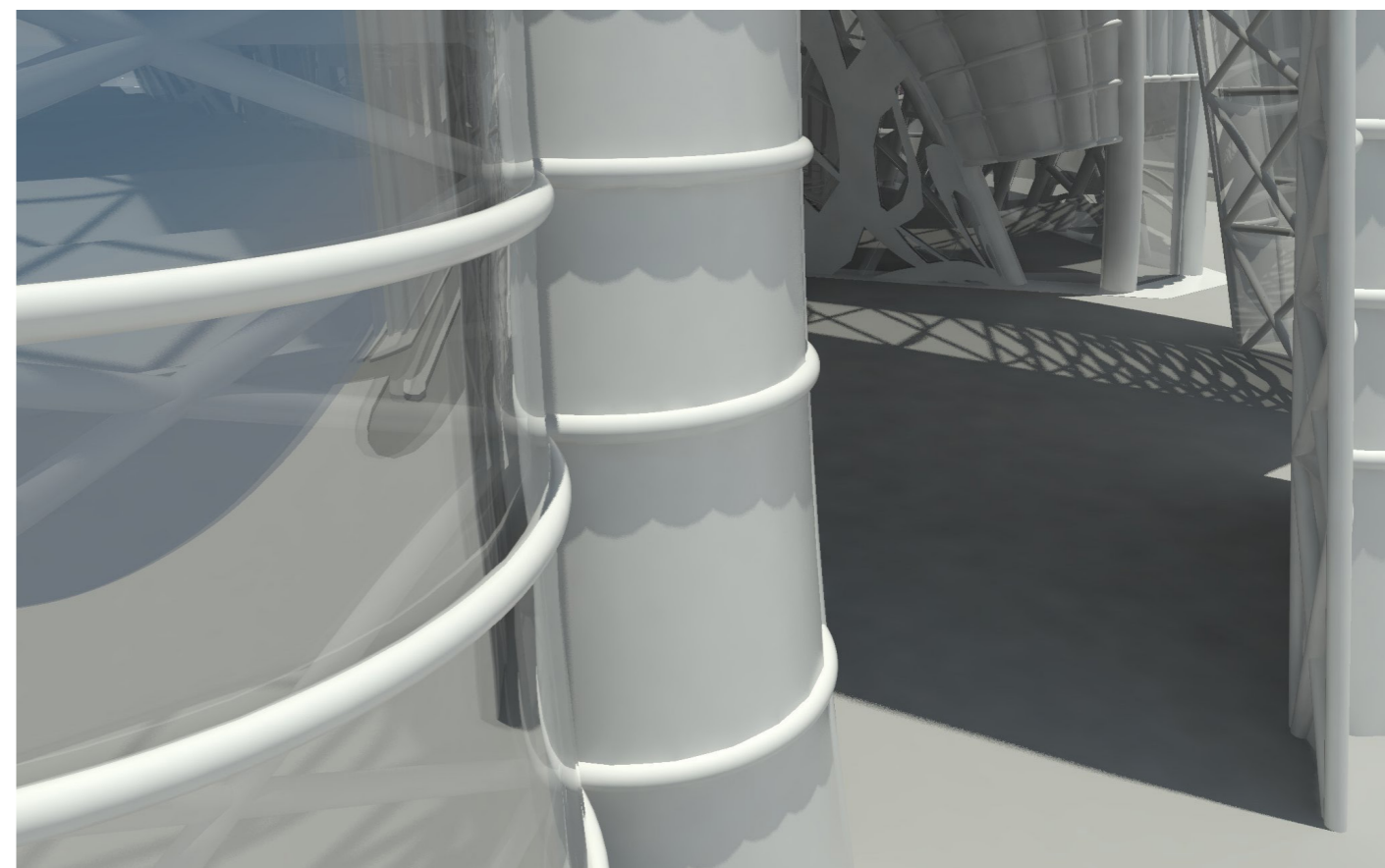
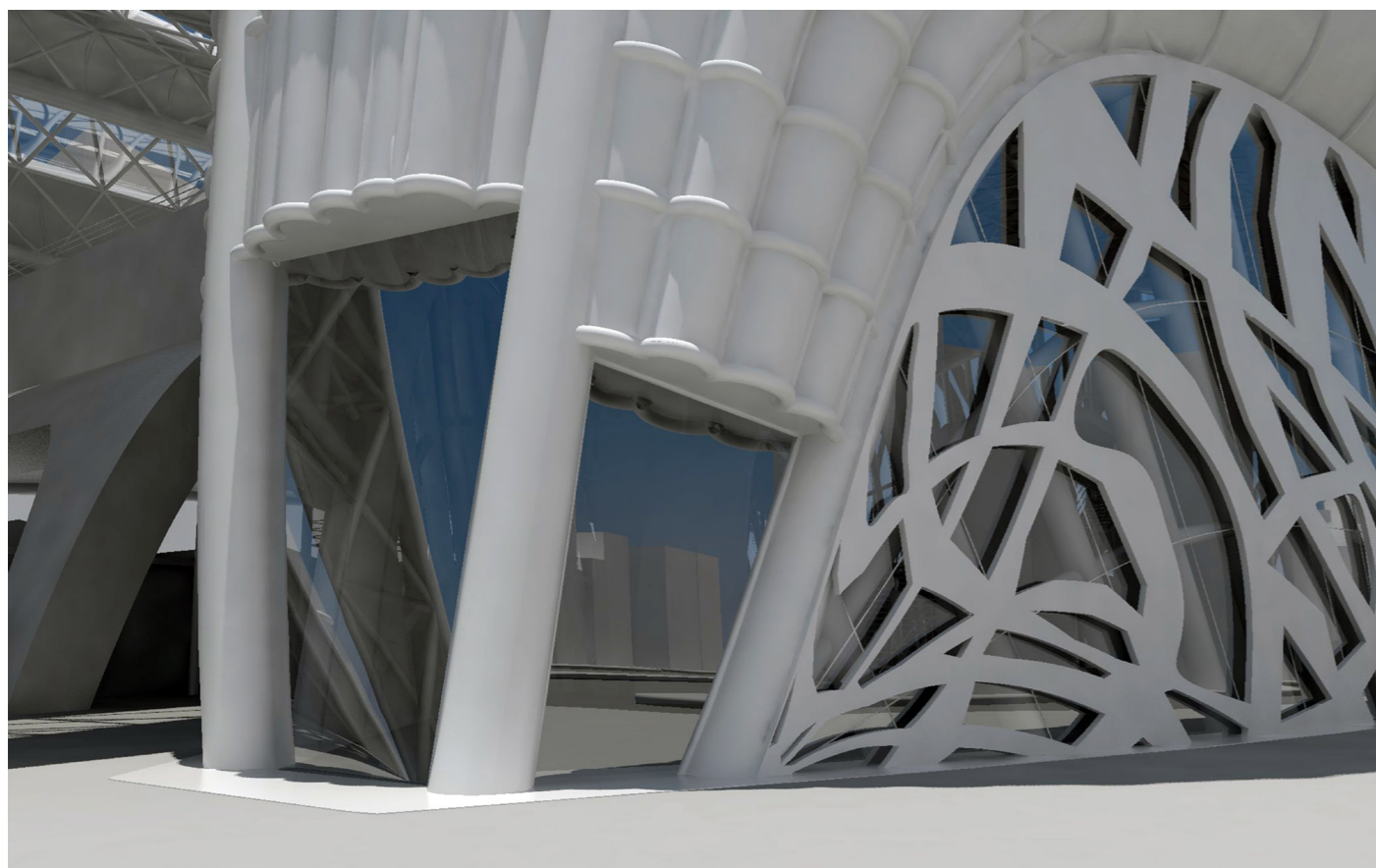
Pic. 31

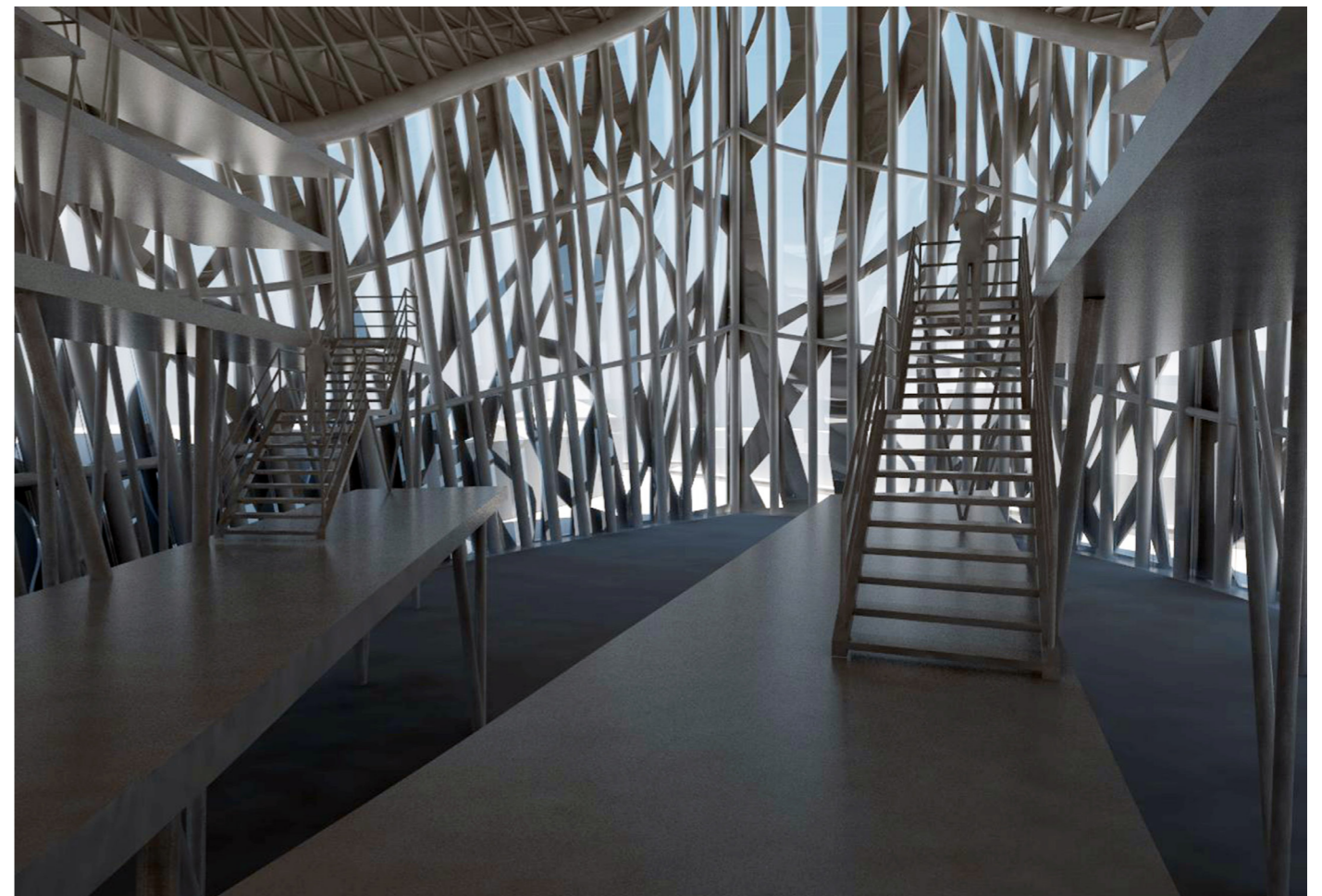
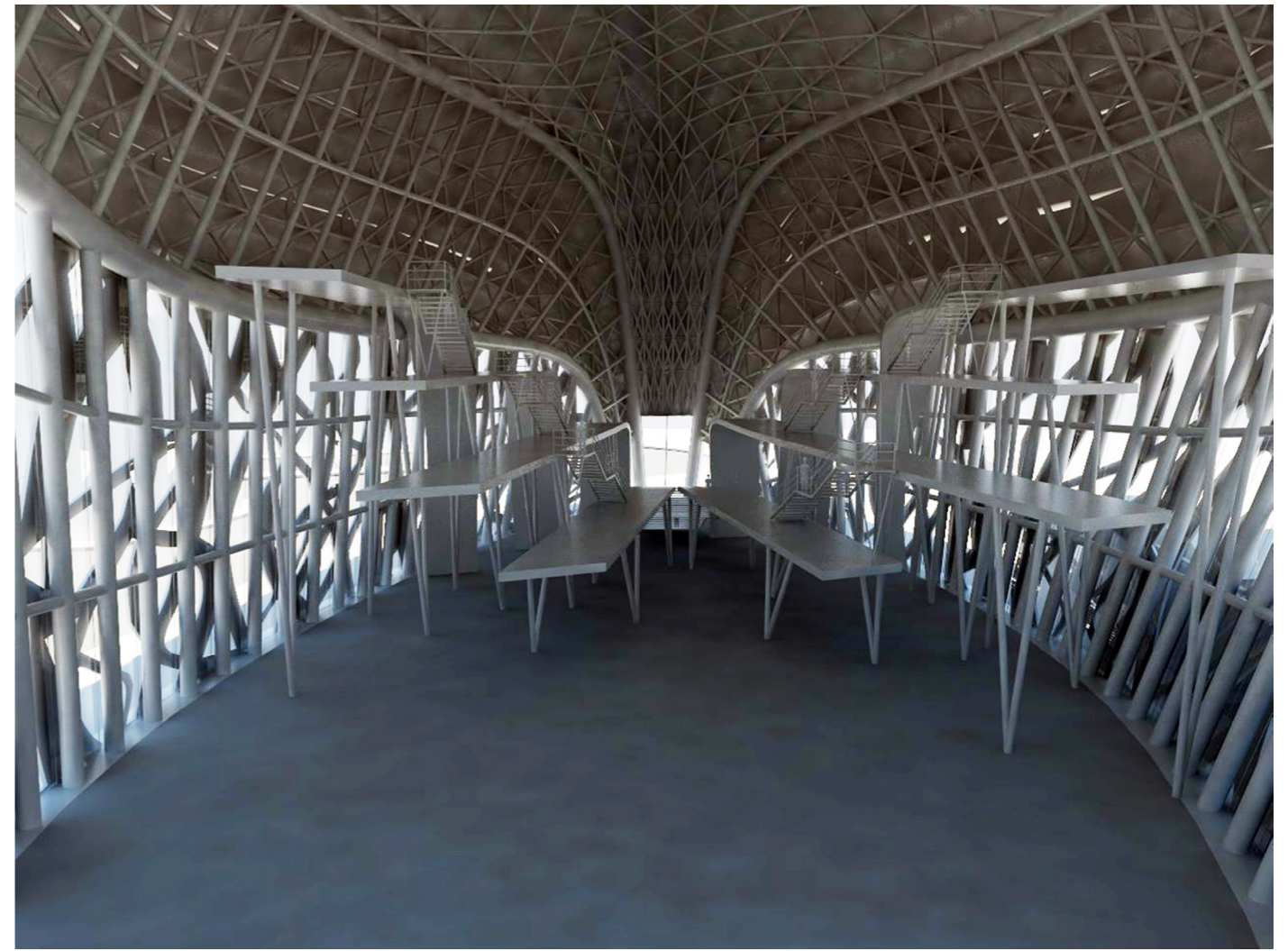
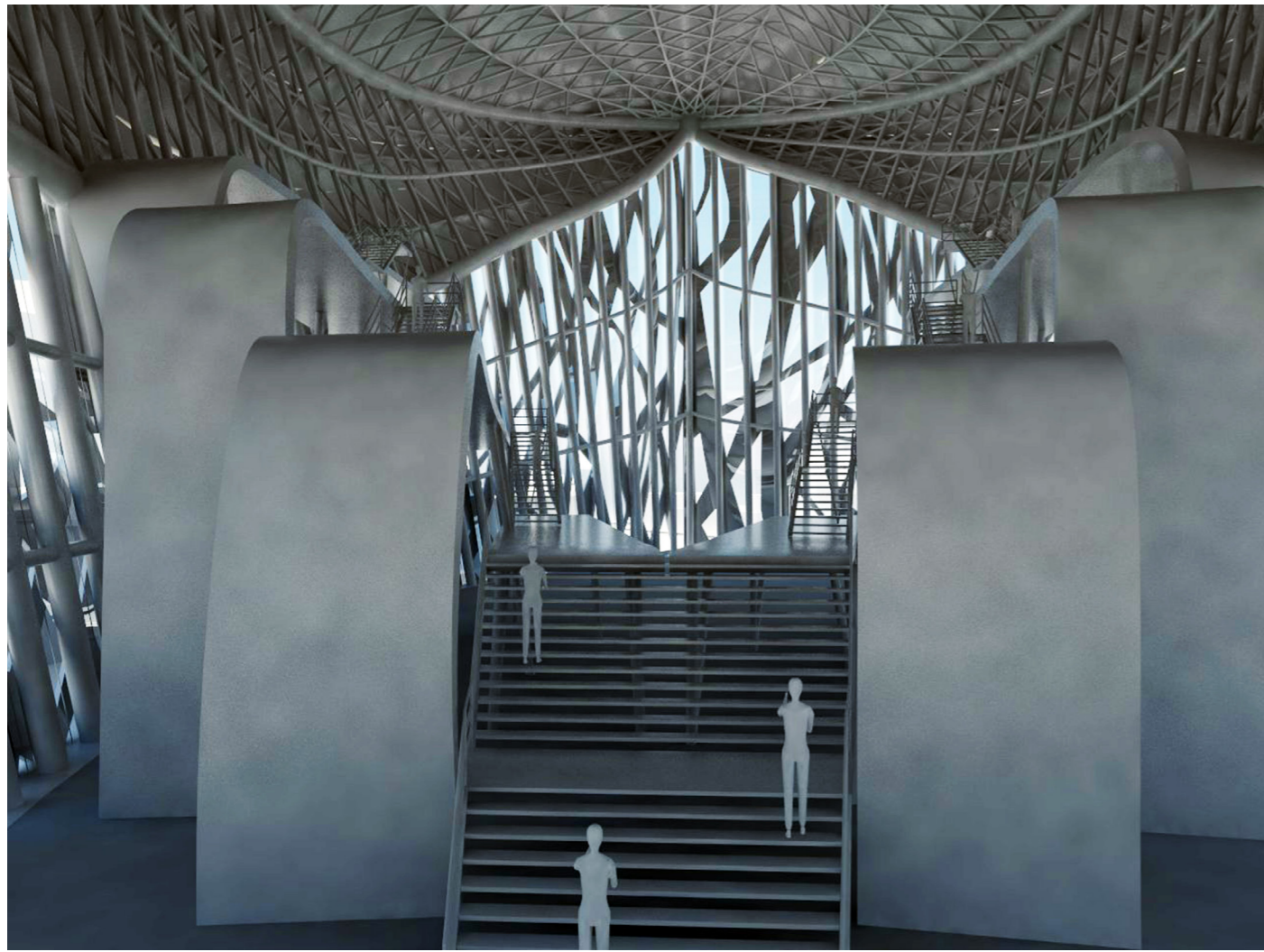


**RENDERS**





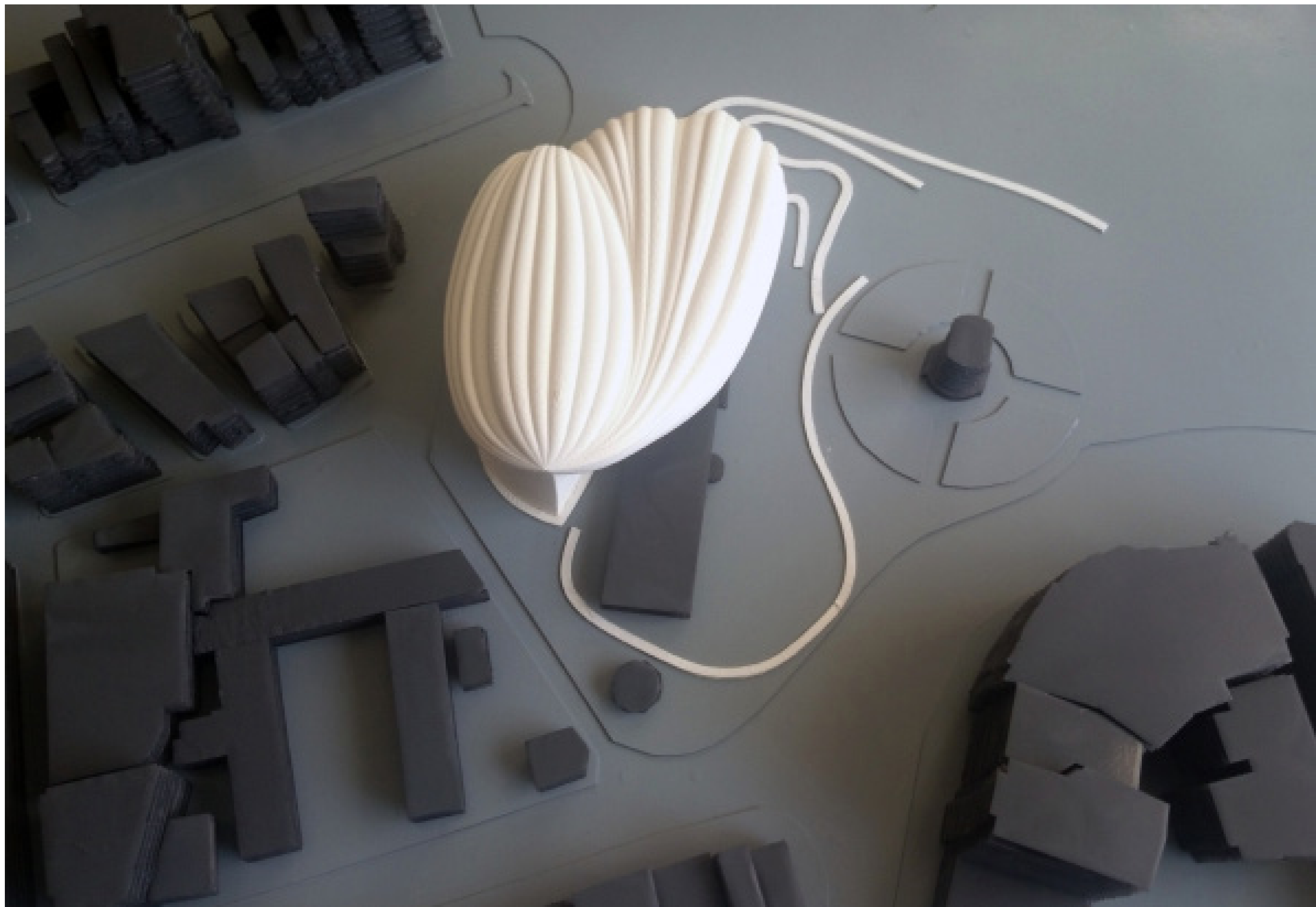


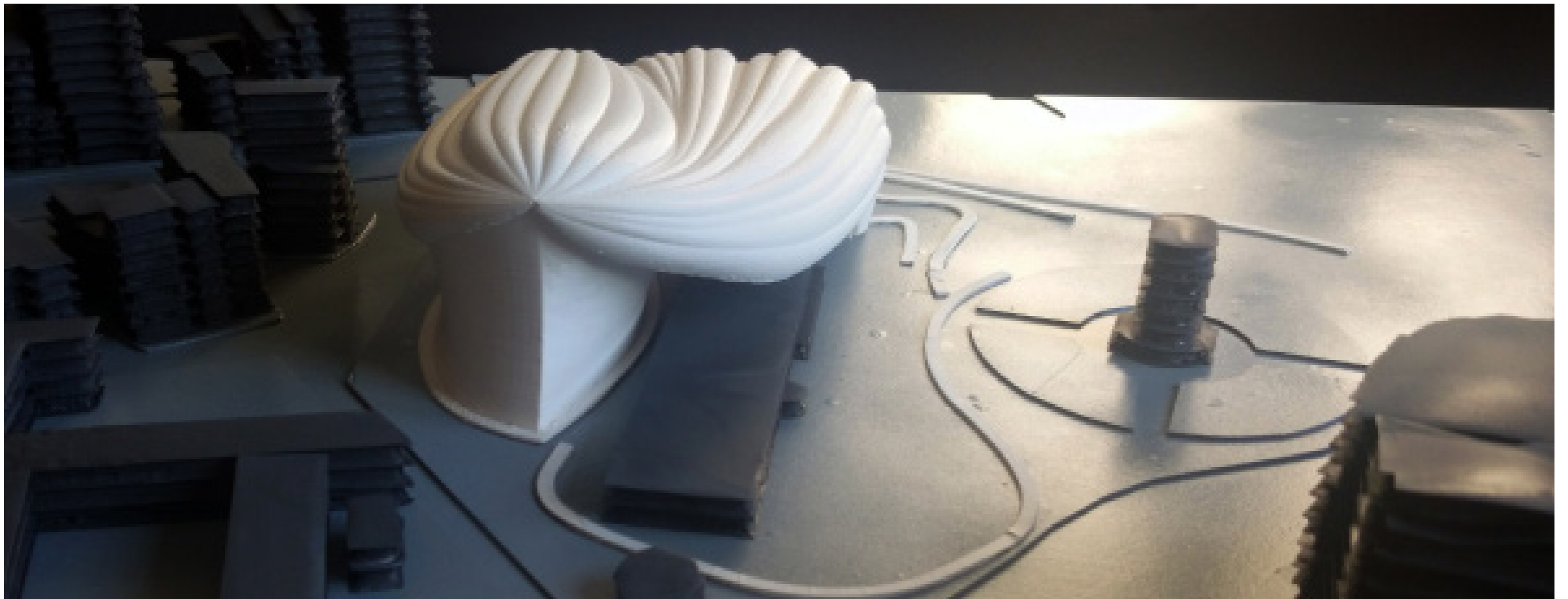
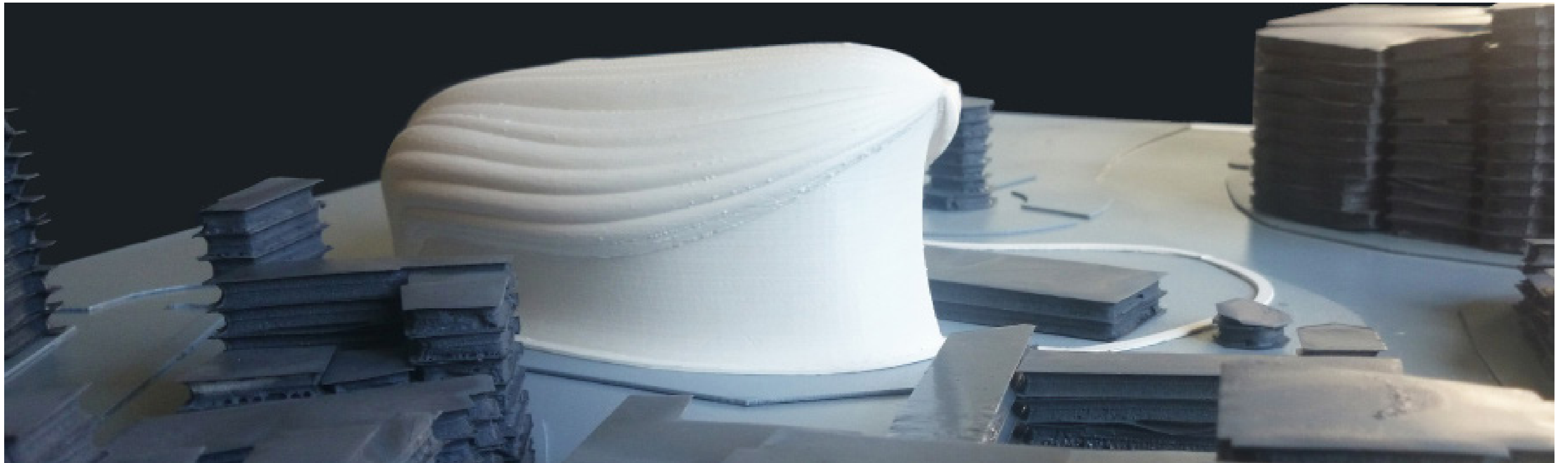


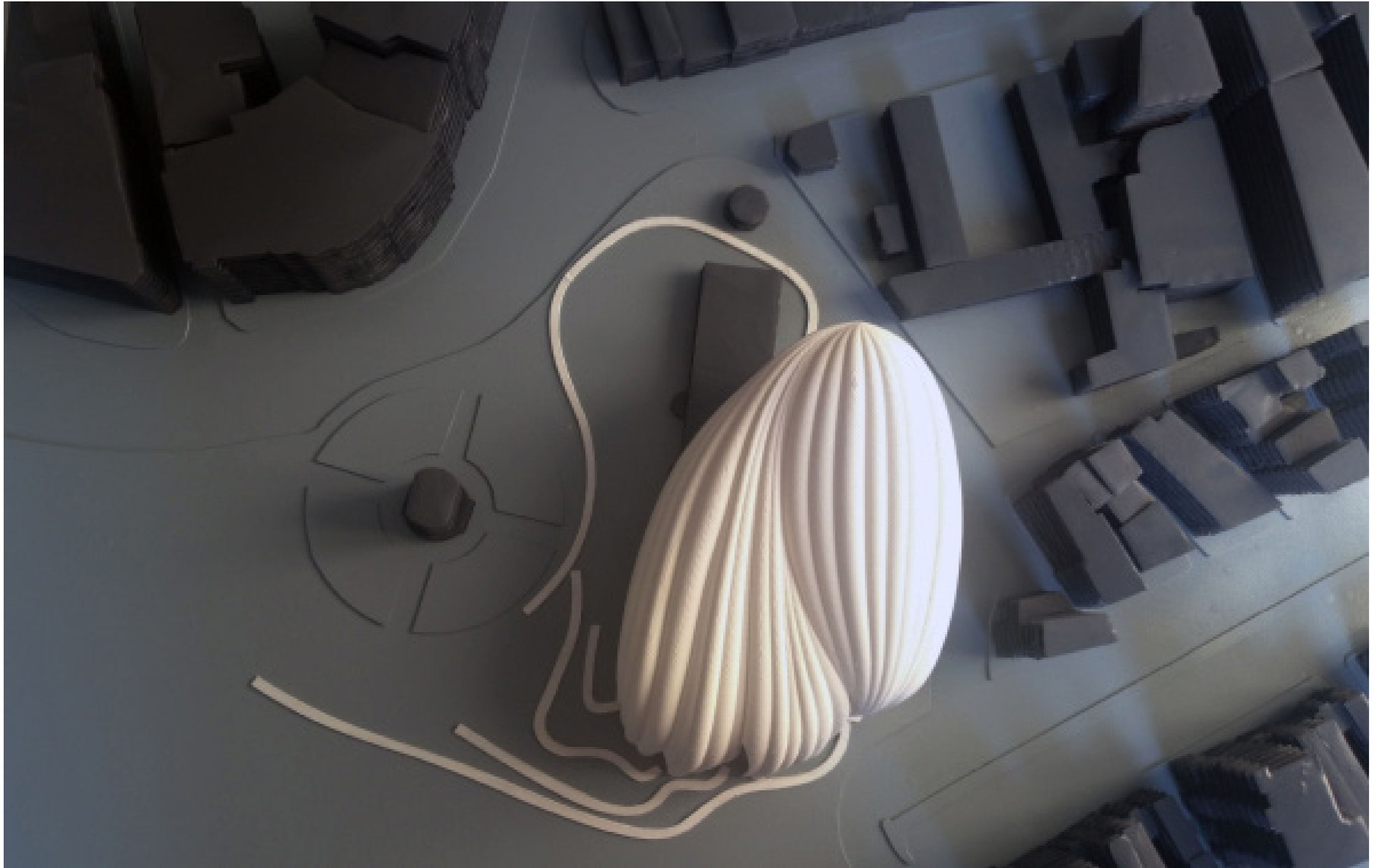


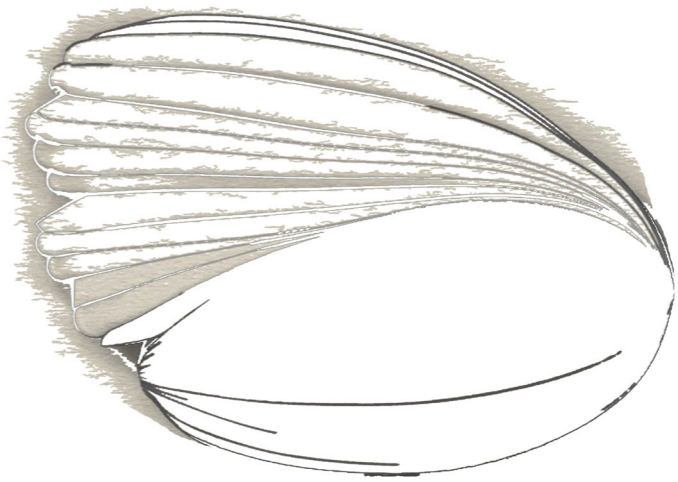
**MODEL PHOTOS**











**APPENDIX**

LIST OF SOURCES

<https://tr.khanacademy.org/humanities/art-islam/beginners-guide-islamic/a/the-kaaba>  
 Essay by Dr. Elizabeth Macaulay-Lewis

<https://tr.khanacademy.org/humanities/art-islam/beginners-guide-islamic/a/common-types-of-mosque-architecture>  
 Essay by Kendra Weisbin

<http://www.newworldencyclopedia.org/entry/Sinan>

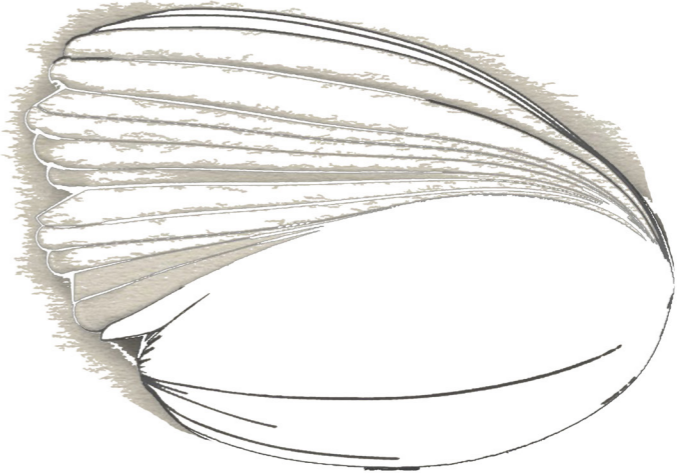
<http://jeb.biologists.org/content/218/16/2518>  
<http://jeb.biologists.org/content/213/10/1651>

<http://library.acropolis.org/the-symbolism-of-wings/>  
 Article By M.A. Carrillo de Albornoz & M.A. Fernández

Monocoque Structure from Wikipedia  
<https://prezi.com/4qrion1xwmdg/monocoque-construction/> by Aaron Aldridge  
[http://www.arpnjournals.com/jeas/research\\_papers/rp\\_2014/jeas\\_0314\\_1032.pdf](http://www.arpnjournals.com/jeas/research_papers/rp_2014/jeas_0314_1032.pdf), by R. Santhanam,

LIST OF ILLUSTRATION

Pic.01 .....Prayer Man  
 Pic.02 .....Magnetism “Kaaba” By Ahmed Mater,  
<http://artasiapacific.com/BlogSaudiArtistAhmedMater>  
 Pic.03 ..... Section Diagram of Classical Ottoman Mosque  
 Pic.04 .....Google Maps  
 Pic.05 .....Google Maps  
 Pic.06 .....Google Maps  
 Pic.07 .....Balın Parlak, Istanbul 2016  
 Pic.08 .....Balın Parlak, Istanbul 2016  
 Pic.09 .....Balın Parlak, Istanbul 2016  
 Pic.10 .....Balın Parlak, Istanbul 2016  
 Pic.11 .....Caner Cangül <http://vivahiba.com/article/show/bir-meydanin-hikayesi-taksim/>  
 Pic.12 .....Balın Parlak, Istanbul 2016  
 Pic.13 .....Balın Parlak, Istanbul 2016  
 Pic.14 .....Google Maps, Taksim Square 2010  
 Pic.15 .....Balın Parlak, Istanbul 2016  
 Pic.16 .....Google Maps  
 Pic.17 .....Master Plan, Istanbul Metropolitan Municipality  
 Pic.18 .....Prayer Man  
 Pic.19 .....Simple Angel Wing, [www.clipartbest.com/clipart-nTBGGapbc](http://www.clipartbest.com/clipart-nTBGGapbc)  
 Pic.20 .....<http://jeb.biologists.org/content/218/16/2518>  
 Pic.21 .....<http://d3e3jwjaj5zk9x.cloudfront.net/content/jexbio/213/10/1651/F5.large.jpg>  
<http://jeb.biologists.org/content/213/10/1651>  
 Pic.22 .....<http://jeb.biologists.org/content/213/10/1651>  
 Pic.23 .....Cellular Masses © Genetic Architectures Research Group  
[http://geneticarchitectures.weebly.com/research\\_group.html](http://geneticarchitectures.weebly.com/research_group.html)  
 Pic.24 .....Sea Sponges © Genetic Architectures Research Group  
[http://geneticarchitectures.weebly.com/research\\_group.html](http://geneticarchitectures.weebly.com/research_group.html)  
 Pic.25 .....Small Tree Branches By Emo\_Boy [http://www.abstractinfluence.com/forums/gallery/image\\_page.php?album\\_id=14&image\\_id=8275](http://www.abstractinfluence.com/forums/gallery/image_page.php?album_id=14&image_id=8275)  
 Pic.26 .....<http://www.creativeapplications.net/processing/nervous-system-profile-cinder-processing/>  
 Pic.27 .....Traditional Islamic Pattern  
 Pic.28 .....Traditional Islamic Pattern  
 Pic.29 .....Traditional Islamic Pattern  
 Pic.30 ..... <http://www.atflor.com/products/Raised-Floor-1>  
 Pic.31 ..... [http://www.avayo.net/product\\_details/104](http://www.avayo.net/product_details/104)



**CV**



## **HACER BALIN PARLAK**

Abdurrahmangazi Mh. Ulus Cad.  
No:29 C-4 Sancaktepe  
Istanbul - Turkey  
hacerbalin@gmail.com  
0090 531 835 37 60

### **EDUCATION**

---

2008-2017	Master of Science, Faculty for Architecture and Planning Vienna University of Technology, Austria
2001-2006	Bachelor of Science, Faculty of Architecture Erciyes University, Kayseri, Turkey
1995-2000	Baskil High School, Elazig, Turkey
1990-1994	Atatürk Primary School, Elazig, Turkey

### **EXPERIENCE**

---

2012-Present	Sancaktepe Municipality, Istanbul, Turkey
2007-2008	Istanbul Metropolitan Municipality, Turkey
2006-2007	Uskudar Municipality, Istanbul, Turkey

### **SKILLS**

---

Technical Skills and Competences	Windows Office Programs Autocad Adobe (Photoshop, Indesign) Rhino Grasshopper
Foreign Languages	English German
Artistic Skills	Abstract Painting
Others	Driving License for Group B

