

A blurred architectural rendering of a modern building with a curved, white facade and a glass facade on the right. The image is out of focus, showing people walking in the foreground. The text 'ASCENDING INTEGRATION CENTRE' is centered over the image.

ASCENDING INTEGRATION CENTRE

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KAREL VOLLERS

HYPERBODY GRADUATION STUDIO

TU DELFT

CONTENTS

CONTEXT

BASE GEOMETRY

HOUSING

FACADE

RESULTING DESIGN

TECHNICAL

CONTEXT

35.000 refugees in 2016 in the Netherlands

Goal of Rotterdam: Housing over 1500 status holding refugees in 2016

TIMELINE REFUGEE

ARRIVAL



6 DAYS RECOVERY/WAITING TIME



APPLY FOR REFUGEE STATUS

STATUS ASYLUM SEEKING



PLACED IN AZC



IMMIGRANT



SELECTED FOR PLACEMENT IN A HOME

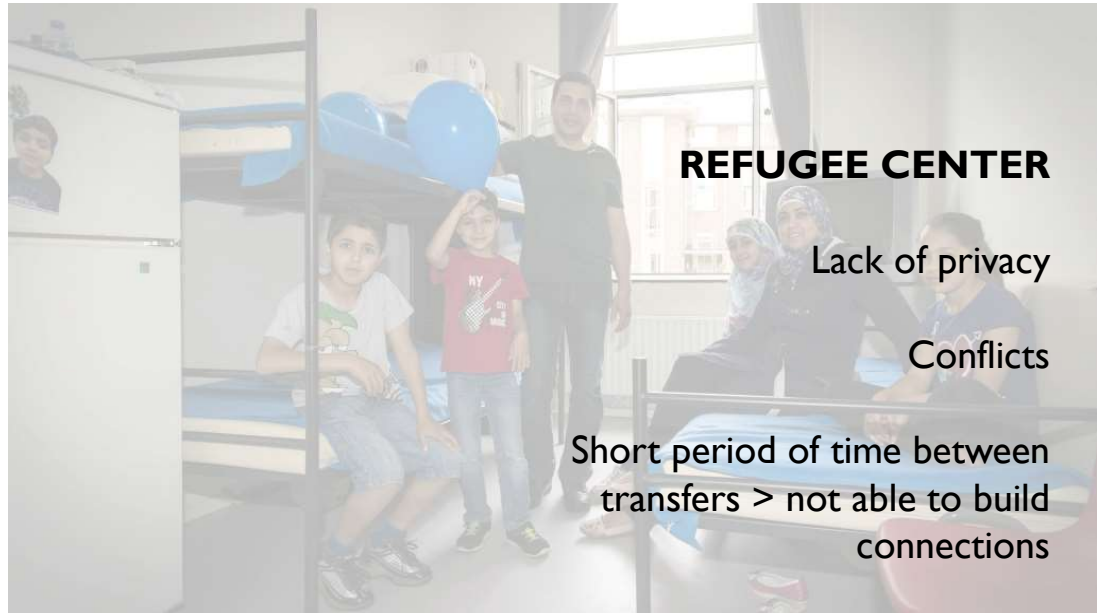
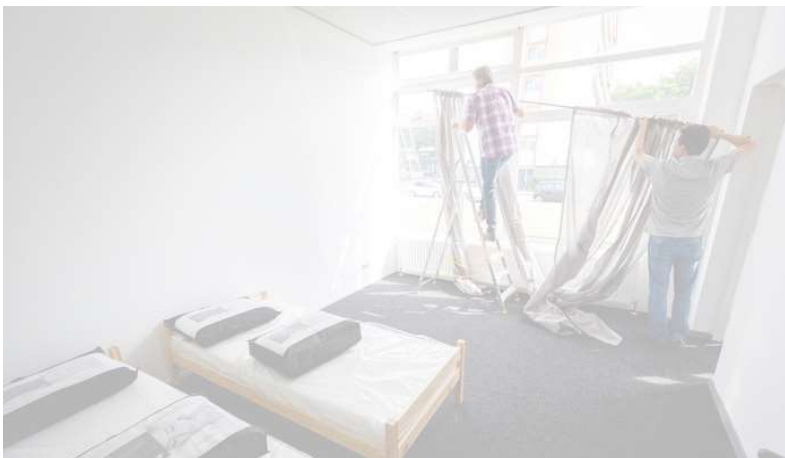
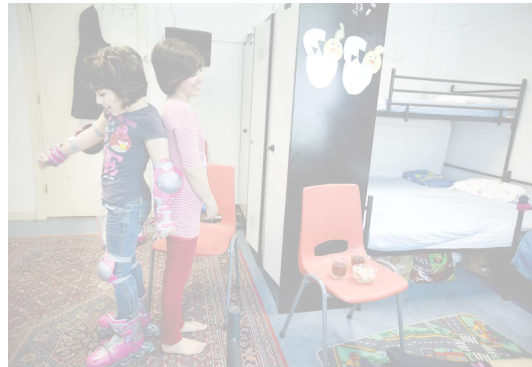
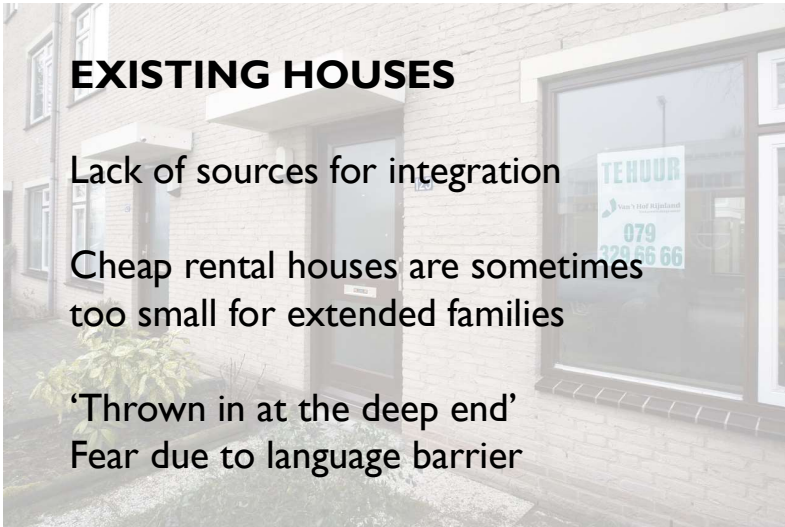


EXISTING HOUSES

Lack of sources for integration

Cheap rental houses are sometimes too small for extended families

'Thrown in at the deep end'
Fear due to language barrier



REFUGEE CENTER

Lack of privacy

Conflicts

Short period of time between transfers > not able to build connections

GOAL

Provide a safe place for immigrants to live and to start their integration process in a state of liminality

Transform an existing building into a place for immigrants, refugees and ex-pats to settle, habituate and develop.

The concept is to make a center that includes spaces for housing, social interaction, integration and career/education development. The building should facilitate the integration process.

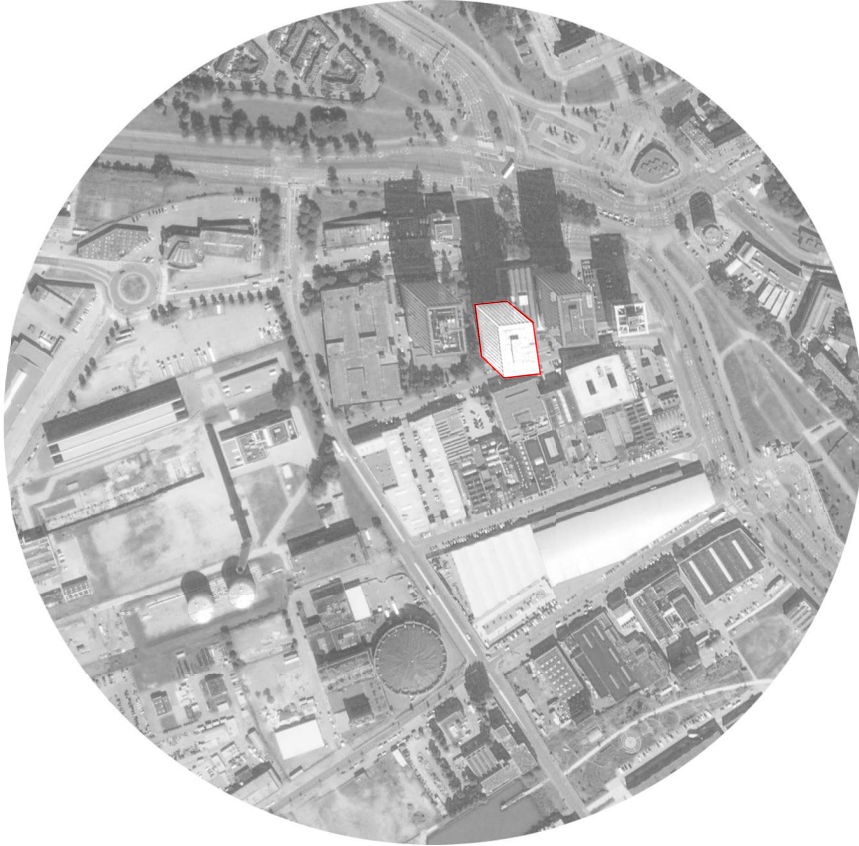
LOCATION



ROTTERDAM



EUROPOINT TOWERS



Large infrastructural node in Rotterdam

Well connected through public transport

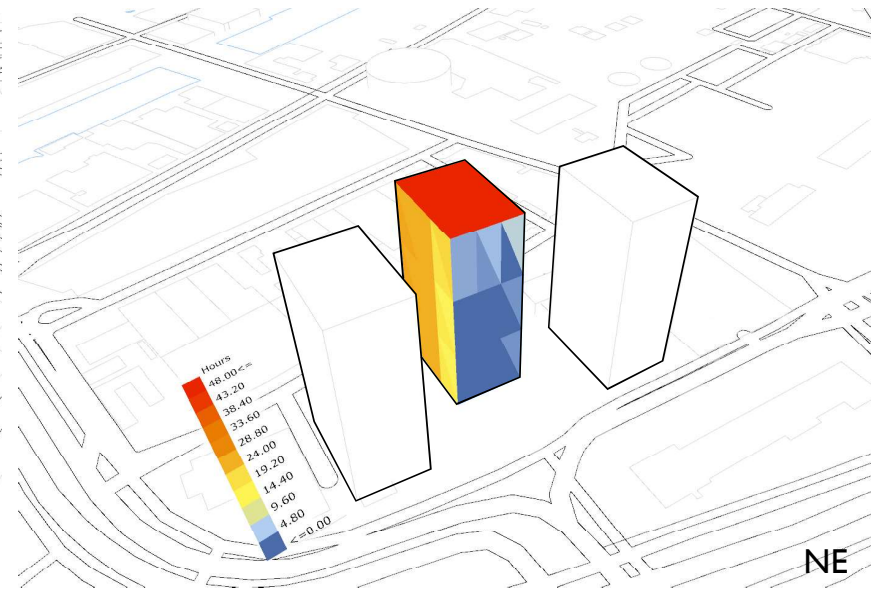
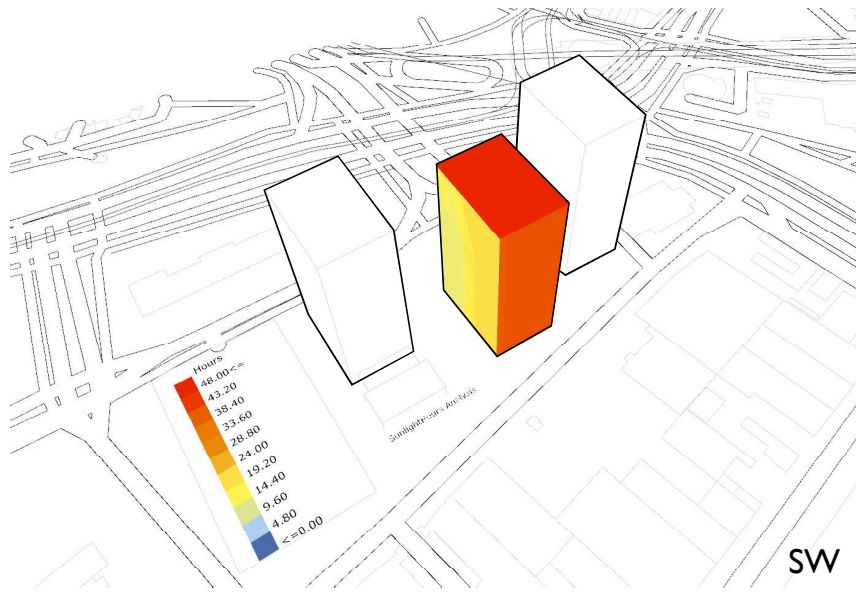
Zone between the city and the developing harbor areas

MARCONIPLEIN

A 3D architectural rendering of a building's floor geometry. The structure is composed of multiple horizontal levels, each with a different footprint, creating a stepped, organic form. The levels are connected by a central vertical core. The rendering is semi-transparent, allowing the internal structure and the layers below to be visible. The overall appearance is that of a complex, multi-story building with a central shaft and various floor plates extending outwards.

FLOOR GEOMETRY

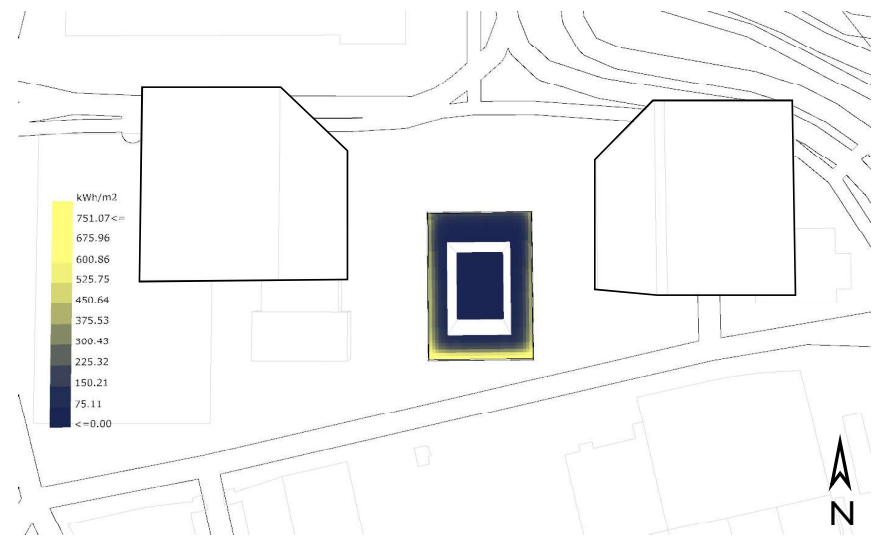
SITUATION



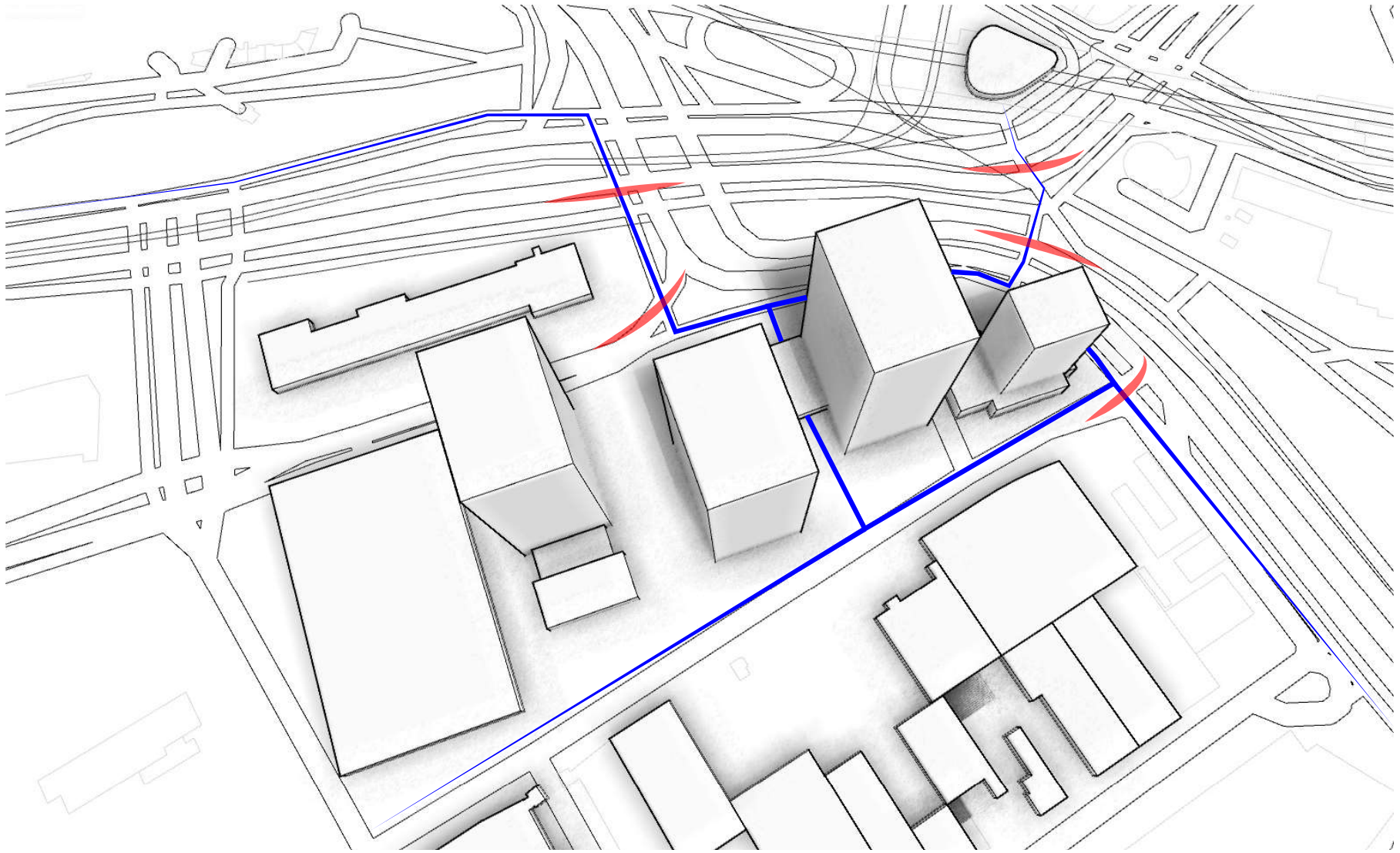
ENVIRONMENTAL ANALYSIS:

NEIGHBOURING TOWERS INCREASE DIFFERENCE IN SUNLIGHT EXPOSURE BETWEEN NORTH AND SOUTH SIDE

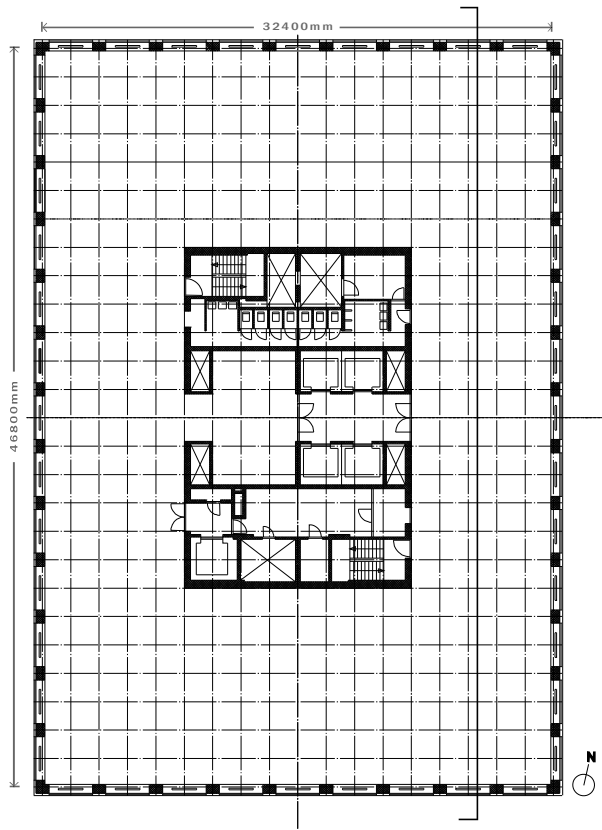
POORLY DISTRIBUTED DAYLIGHT



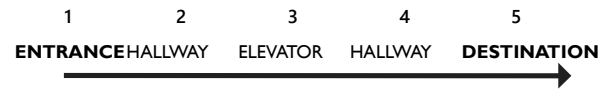
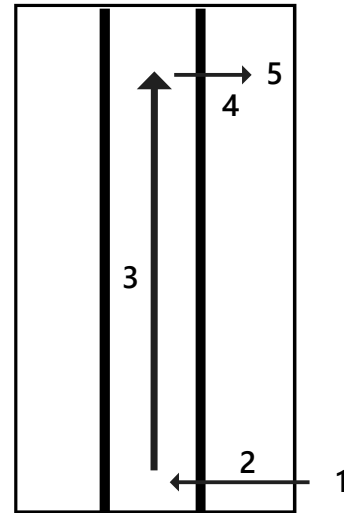
SITUATION



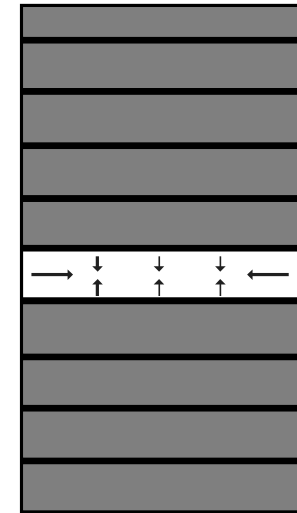
SITUATION



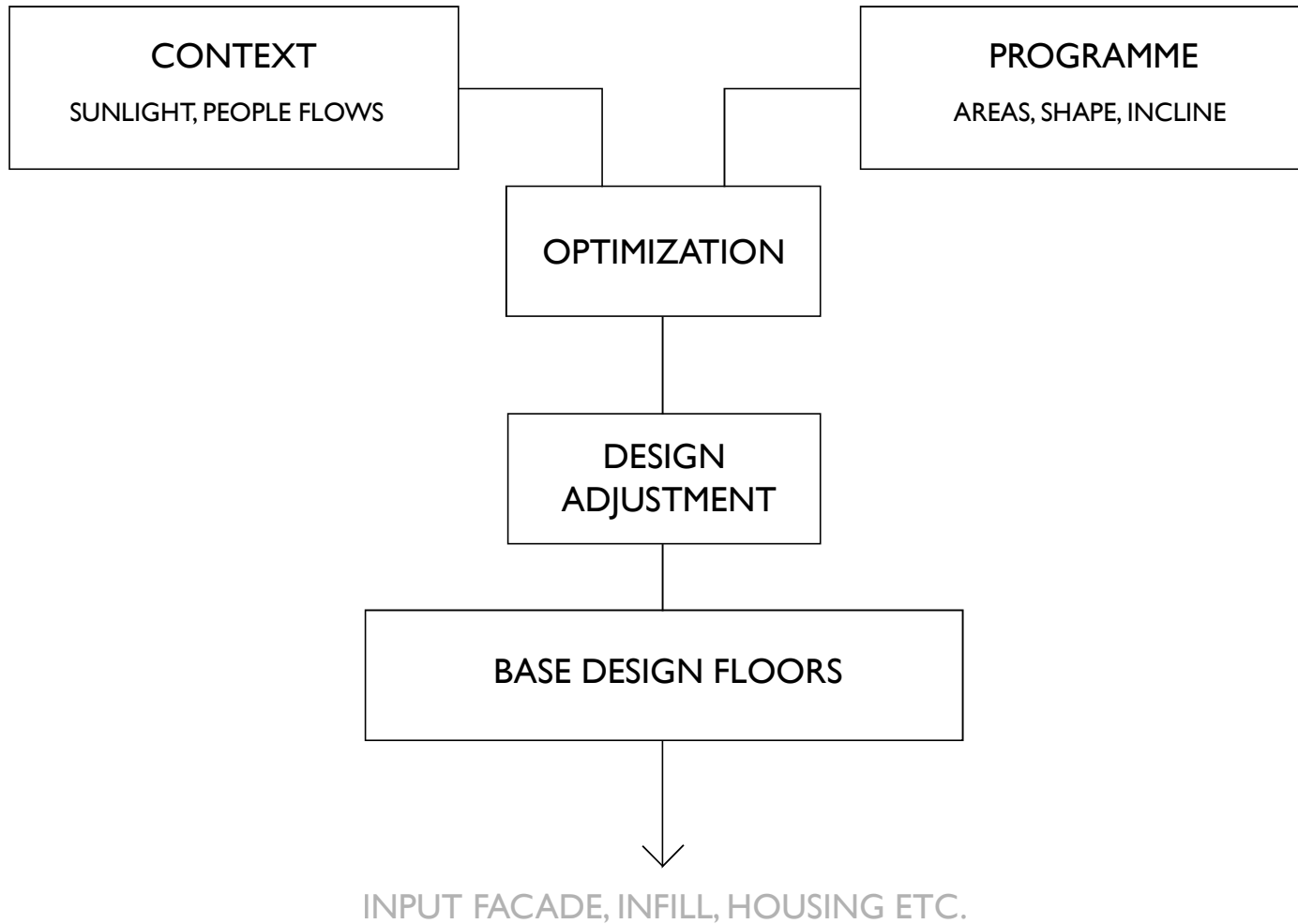
Tunnel vision



Secluded floors



COMPUTATIONAL STRATEGY for FLOOR GEOMETRY



SPATIAL CONCEPT:

BRIDGE THE GAP BETWEEN THE CITY AND M4H, INVITE LOCALS, FORM A DESTINATION

> **CONNECT BASE OF BUILDING WITH ITS SURROUNDINGS**

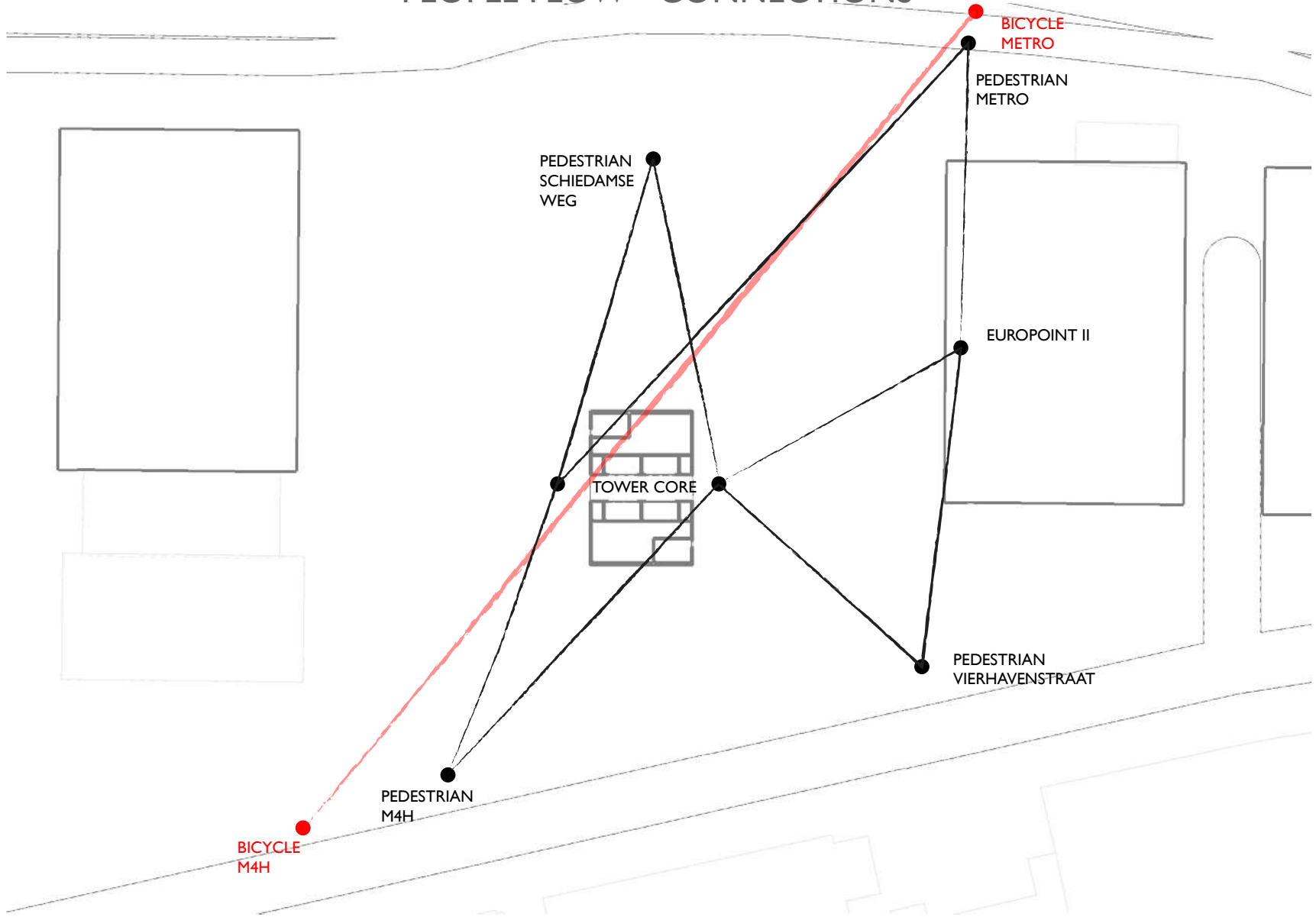
PROMOTE INTERACTION, CREATE MEETING POINTS

> **CREATE VERTICAL CONTINUITY IN THE BUILDING**

BRIDGE THE GAP BETWEEN THE CITY AND M4H, INVITE LOCALS, FORM A DESTINATION
> **CONNECT BASE OF BUILDING WITH ITS SURROUNDINGS**

PROMOTE INTERACTION, CREATE MEETING POINTS
> CREATE VERTICAL CONTINUITY IN THE BUILDING

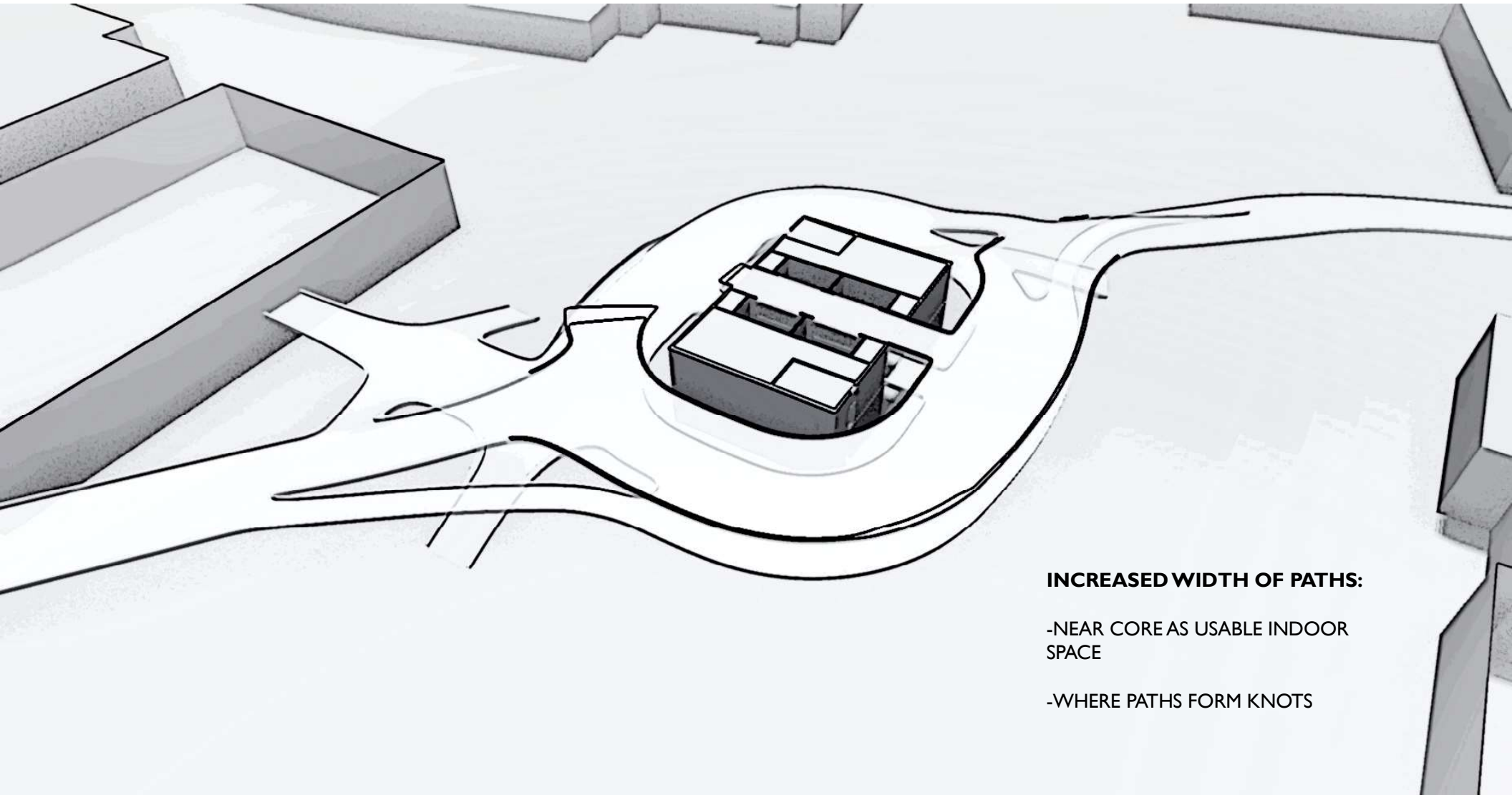
PEOPLE FLOW - CONNECTIONS



PEOPLE FLOW - BUNDELED PATHS



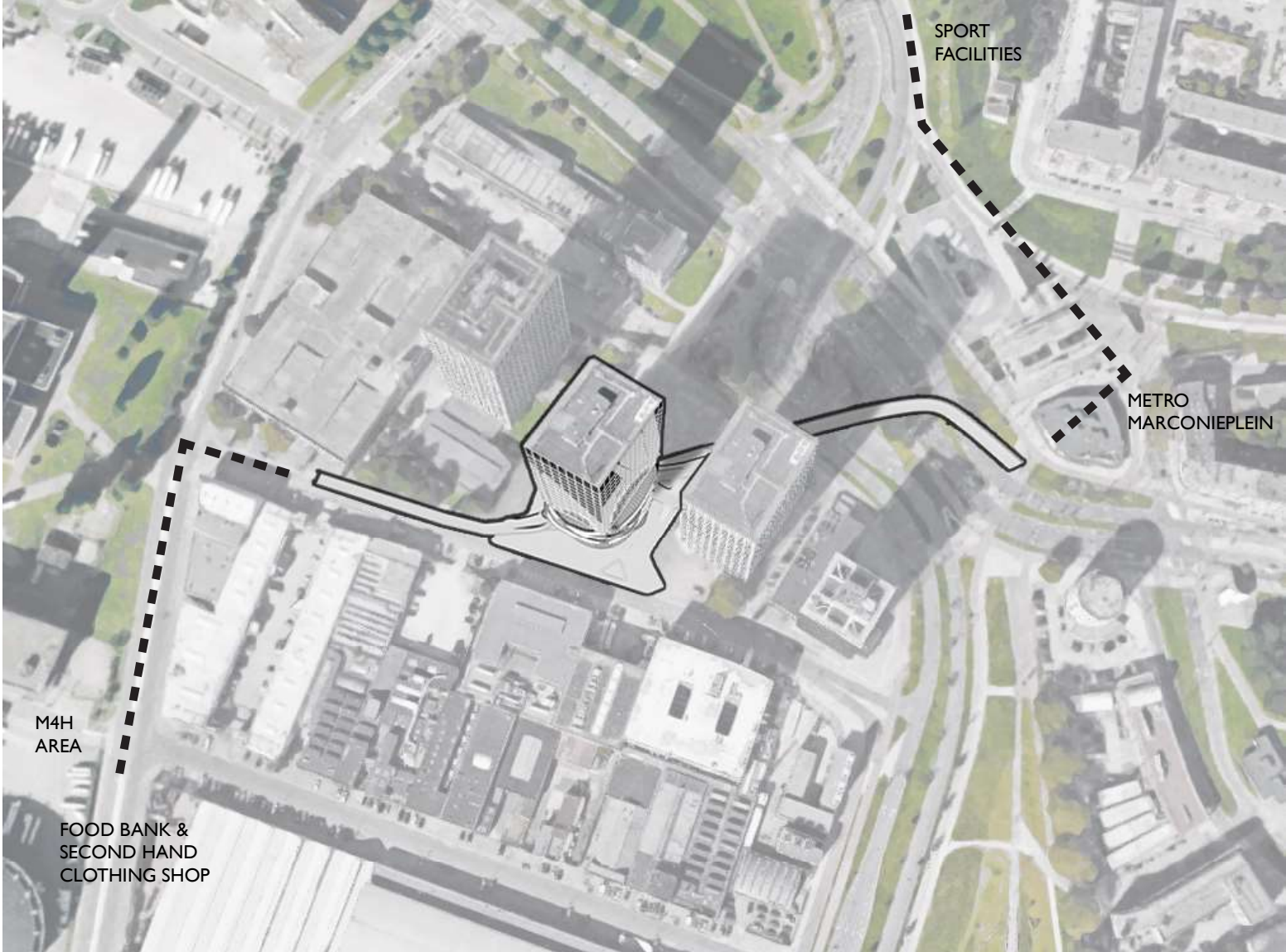
RESULTING GEOMETRY



INCREASED WIDTH OF PATHS:

-NEAR CORE AS USABLE INDOOR SPACE

-WHERE PATHS FORM KNOTS



SPORT
FACILITIES

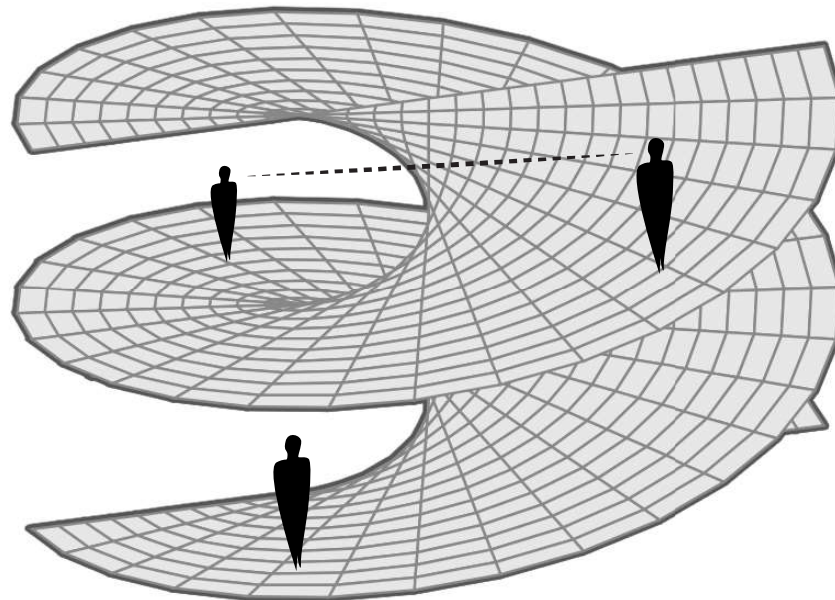
METRO
MARCONIEPLEIN

M4H
AREA

FOOD BANK &
SECOND HAND
CLOTHING SHOP

BRIDGE THE GAP BETWEEN THE CITY AND M4H, INVITE LOCALS, FORM A DESTINATION
> CONNECT BASE OF BUILDING WITH ITS SURROUNDINGS

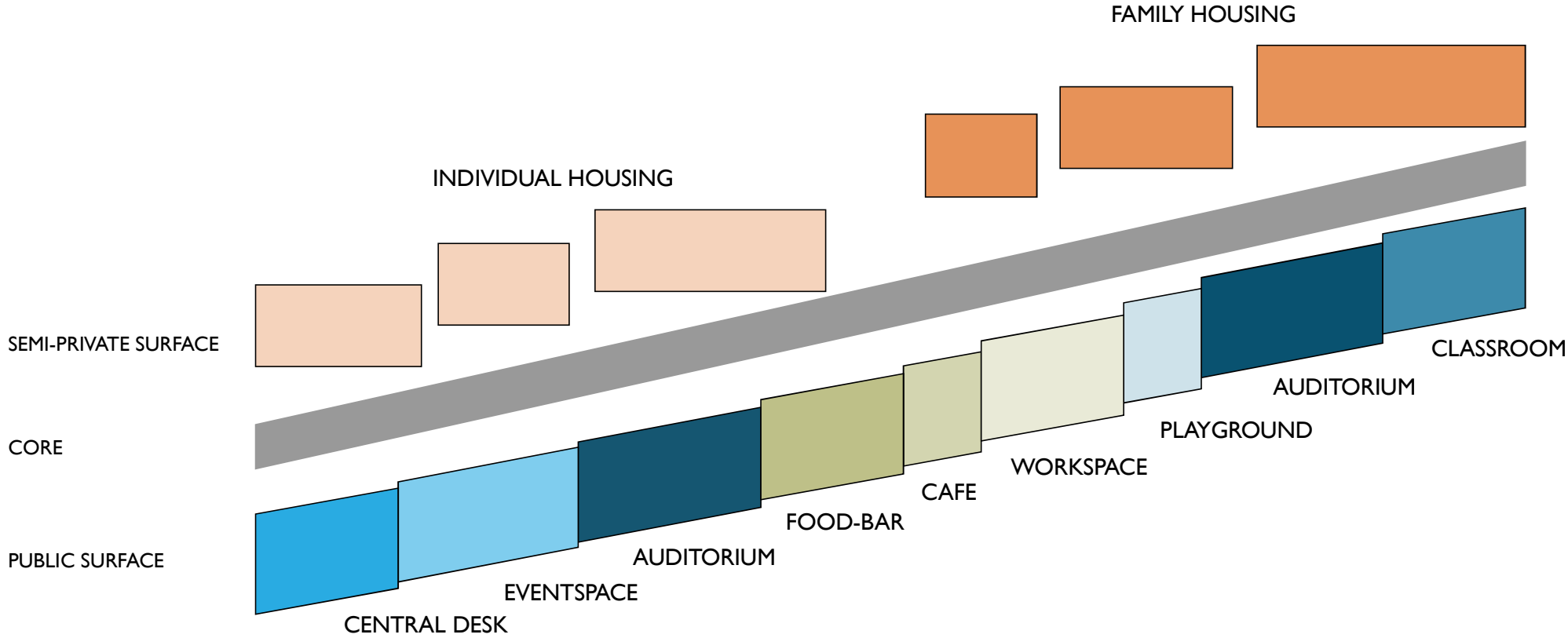
PROMOTE INTERACTION, CREATE MEETING POINTS
> **CREATE VERTICAL CONTINUITY IN THE BUILDING**



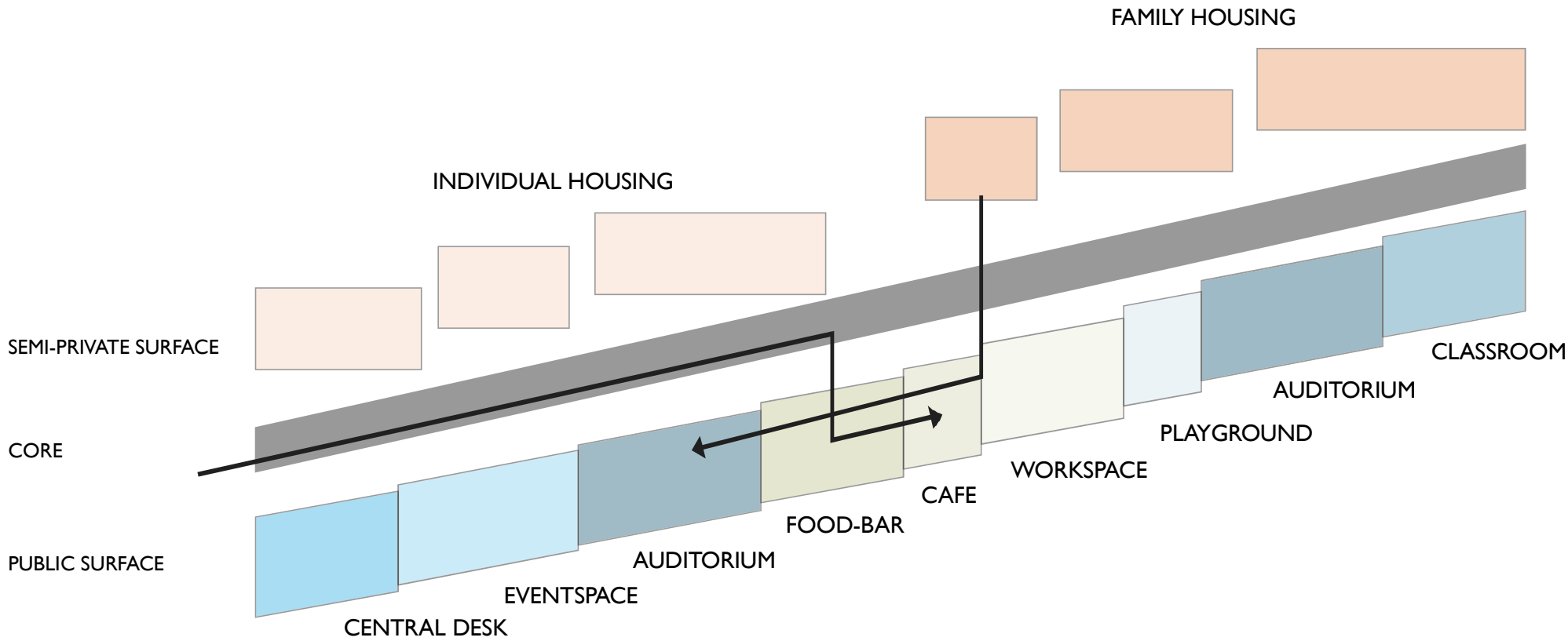
THE HELICOID

- TWO 'WALKABLE' SURFACES
- VISUAL/SPATIAL CONTINUITY ON EACH SURFACE
- SURFACES ARE SEPARATE, BUT NEAR

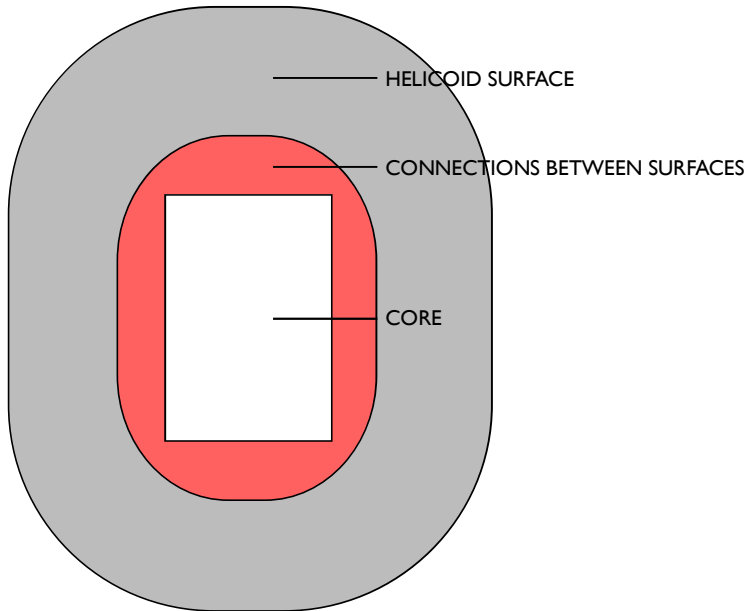
SPATIAL LOGIC



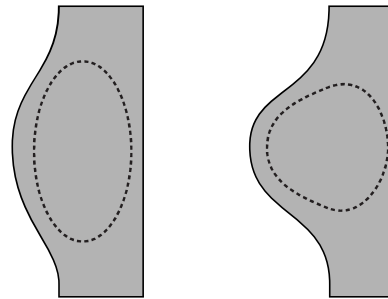
SPATIAL LOGIC



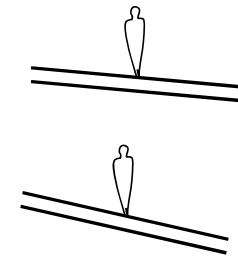
COMPUTATION - PARAMETERS



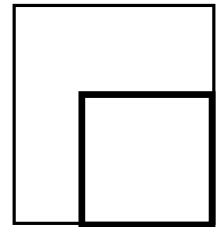
SPACE PROPERTIES OF EACH PUBLIC FUNCTION



SHAPE: OBLONG vs ROUND



INCLINE



AREA

INPUT

DIRECTION HELIX
STARTING POINT HELIX
SHAPE OF SPACE

AREA
INCLINE

SCRIPT

FLOOR AREA HOUSING WITH
SUFFICIENT SUN HOURS
DAYLIGHT EXPOSURE

CHECK AVAILABLE FLOOR HEIGHT

OUTPUT

CONTINUOUS PUBLIC
SPACE

HOUSING 'ISLANDS'

COMPUTATION - PROGRAMME PROPERTIES

FUNCTIONS

	AREA sqm	INCLINE (m/m)
Central desk	150	0.12
Eventspace/workspaces	300	0.10
Auditoriums	200 (x2)	0.20
Workspaces	300	0.10
Playground	100	0.12
Café	150	0.12
Food-Bar	200	0.10
Classroom	200	0.12

HOUSING

SUNHOURSTHRESHOLD:

20 hr/week in WINTER

HEIGHT NEEDED:

INDIVIDUAL HOUSING: **2600mm**

FAMILY HOUSING: **5200mm**

INPUT

DIRECTION HELIX
STARTING POINT HELIX
SHAPE OF SPACE

AREA
INCLINE

SCRIPT

FLOOR AREA HOUSING WITH
SUFFICIENT SUN HOURS
DAYLIGHT EXPOSURE

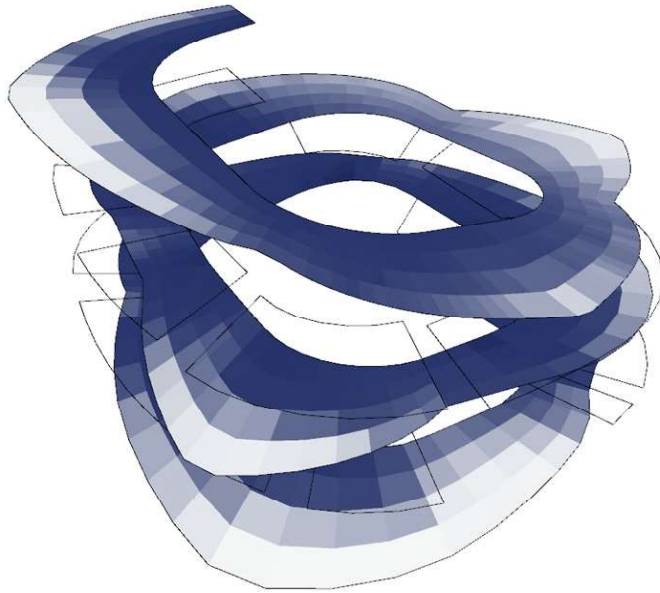
CHECK AVAILABLE FLOOR HEIGHT

OUTPUT

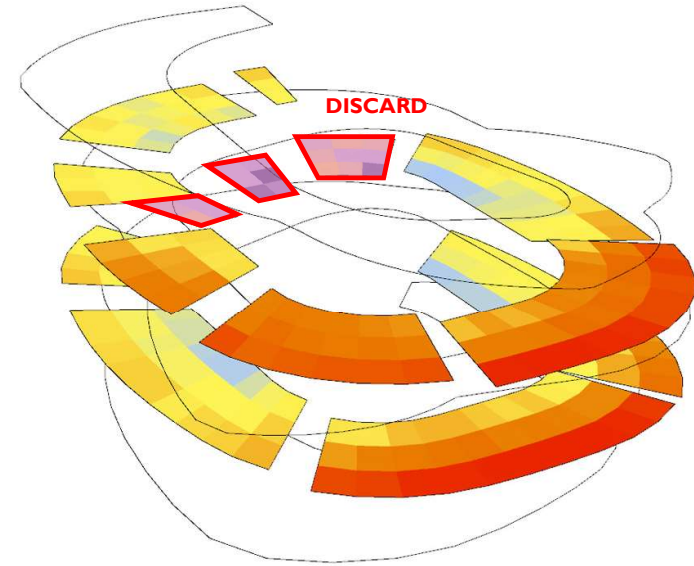
CONTINUOUS PUBLIC
SPACE

HOUSING 'ISLANDS'

FITNESS DETERMINATION



PUBLIC SPACE > + DAYLIGHT YEARLY
> - TOTAL FLOOR LENGTH



HOUSING ISLANDS > + SUNLIGHT IN WINTER

INPUT

DIRECTION HELIX
STARTING POINT HELIX
SHAPE OF SPACE

AREA
INCLINE

SCRIPT

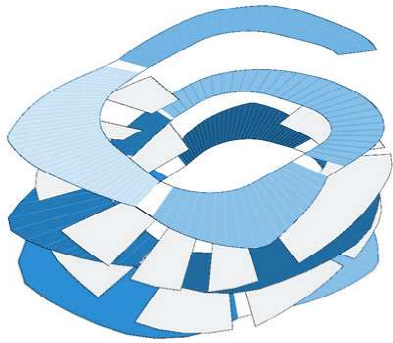
FLOOR AREA HOUSING WITH
SUFFICIENT SUN HOURS
DAYLIGHT EXPOSURE

CHECK AVAILABLE FLOOR HEIGHT

OUTPUT

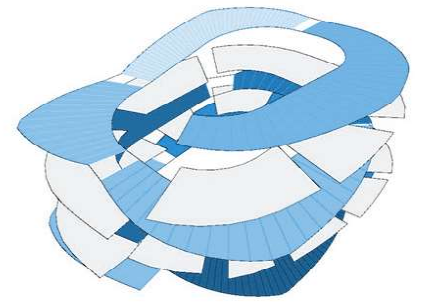
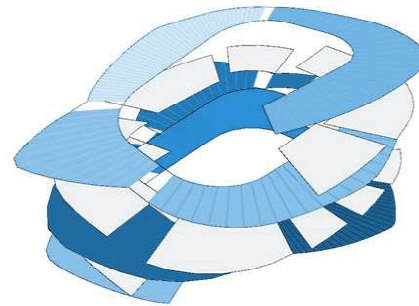
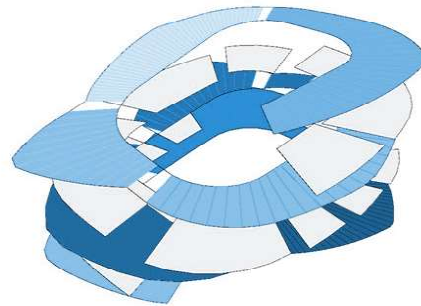
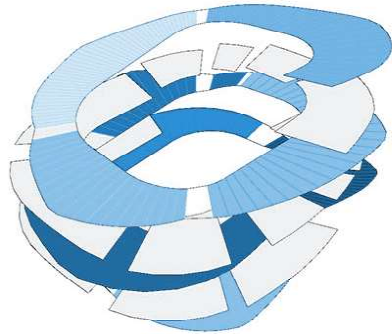
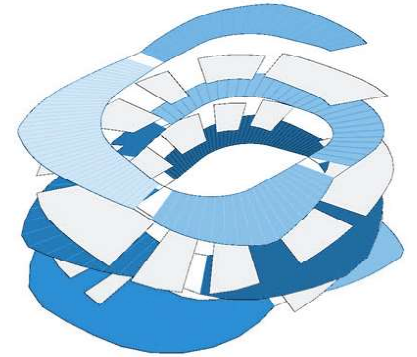
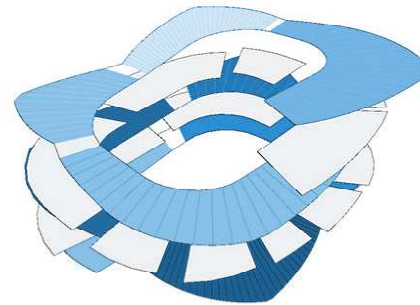
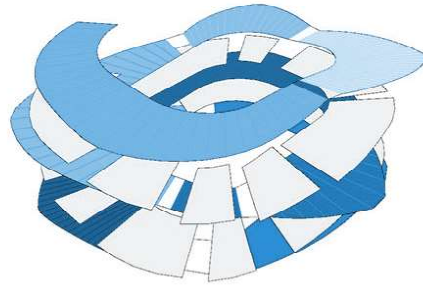
CONTINUOUS PUBLIC
SPACE

HOUSING 'ISLANDS'



FIRST ITERATION

1200 m2 housing
360kwh/m2



'FINAL' ITERATION

1900 m2 housing
420kwh/m2

INPUT

DIRECTION HELIX
STARTING POINT HELIX
SHAPE OF SPACE

AREA
INCLINE

SCRIPT

FLOOR AREA HOUSING WITH
SUFFICIENT SUN HOURS
DAYLIGHT EXPOSURE

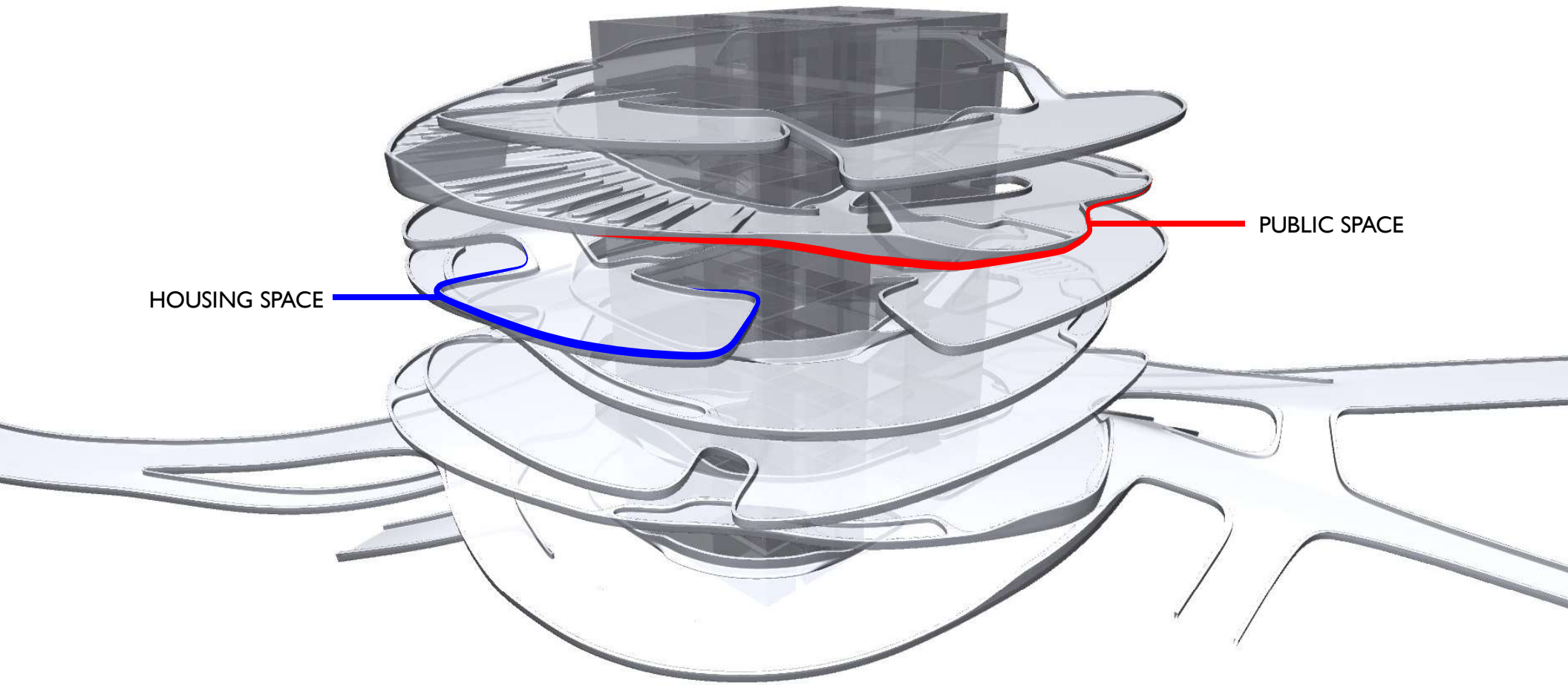
CHECK AVAILABLE FLOOR HEIGHT

OUTPUT

CONTINUOUS PUBLIC
SPACE

HOUSING 'ISLANDS'

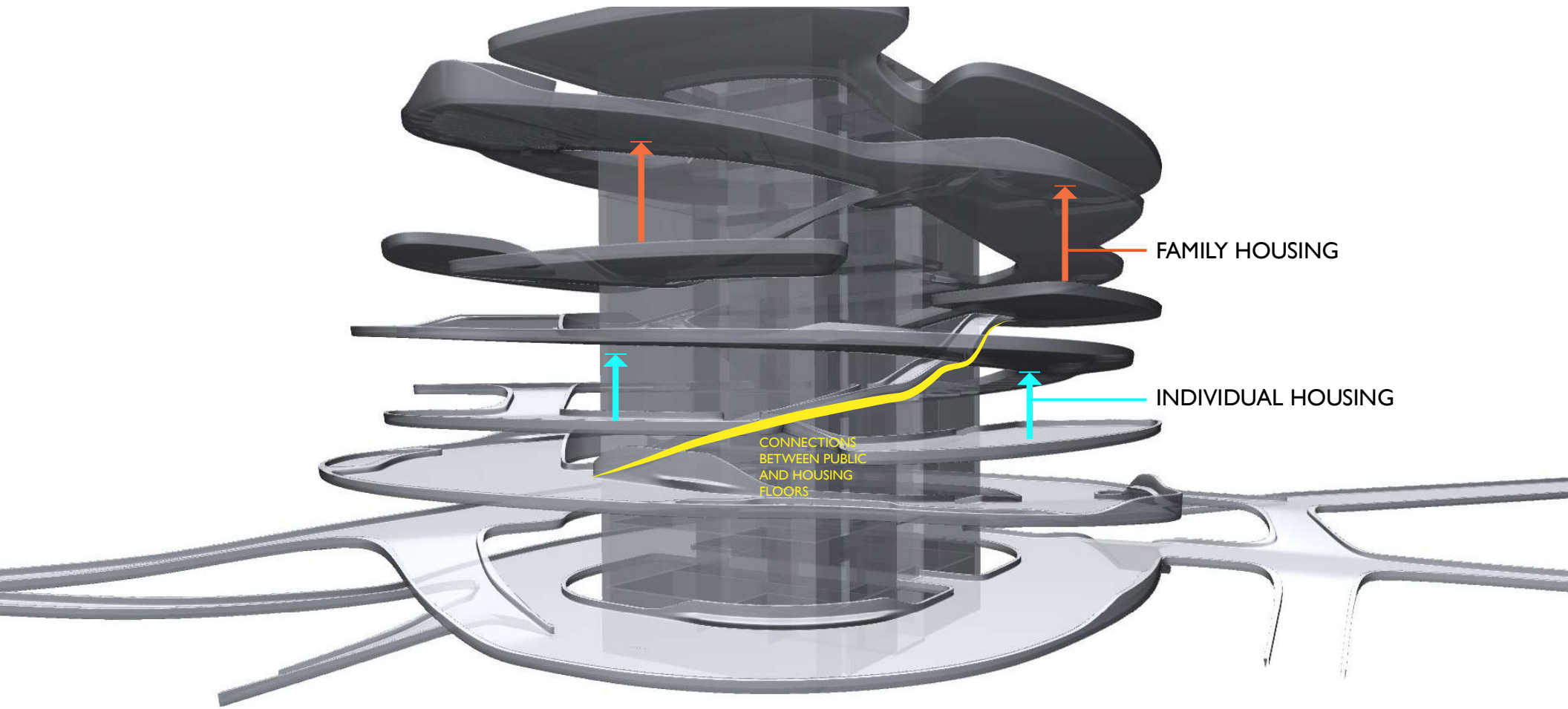
RESULTING FLOORS GEOMETRY



HOUSING SPACE

PUBLIC SPACE

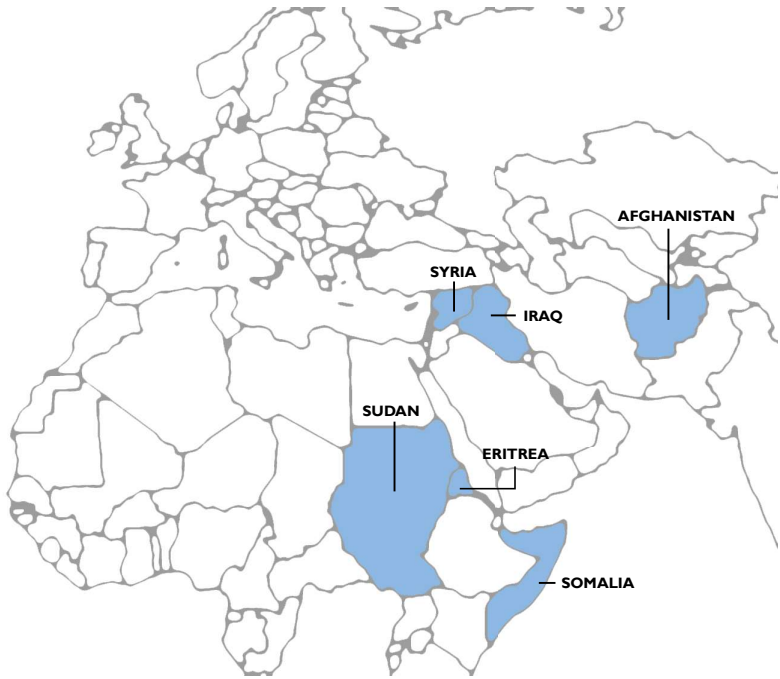
RESULTING FLOORS GEOMETRY



A blurred background image of a stadium filled with spectators, with the word "HOUSING" overlaid in the center.

HOUSING

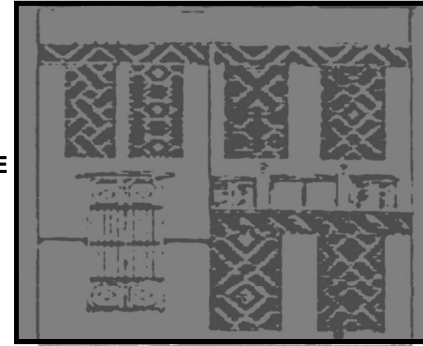
ORIGIN, FAMILY & PRIVACY



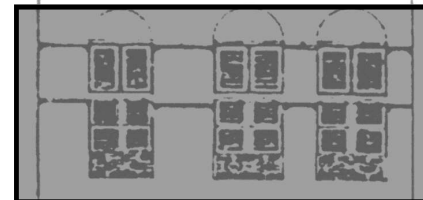
FAMILY

Live in extended families of multiple generations
Family is protected from outside world > introvert character

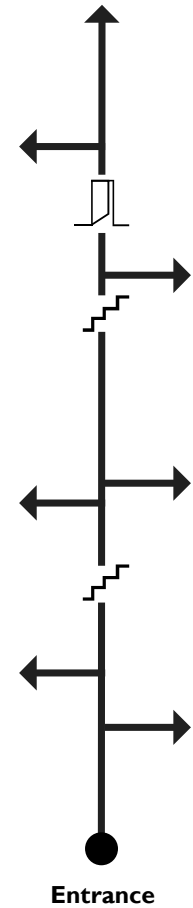
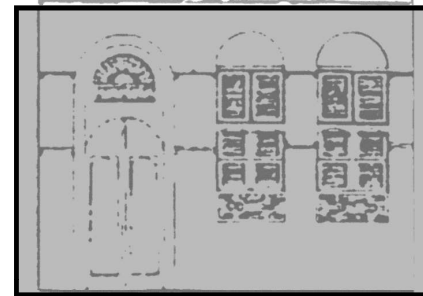
**MOST PRIVATE
(WOMEN)**



**PRIVATE
(FAMILY)**



**SEMI-PRIVATE
(GUESTS)**

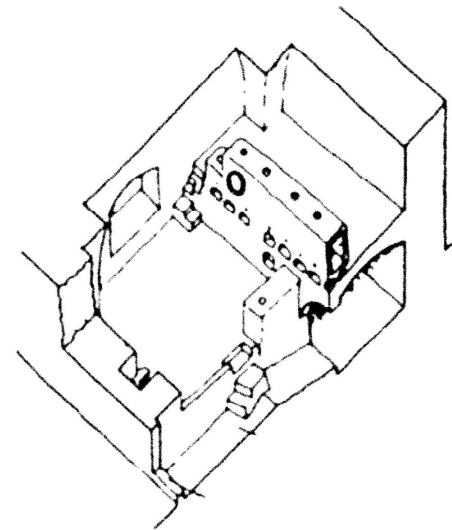
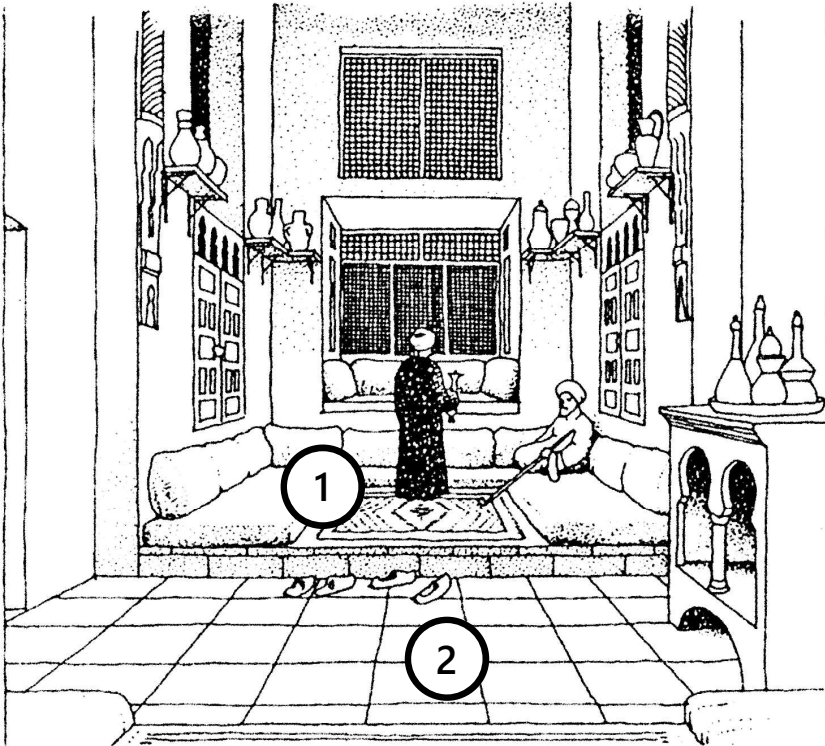


TRADITIONAL HOUSE

Spaces are easy to transform from sitting room to bedroom with mattresses and pillows

Room enclosures are used for storage of those mattresses and pillows, but also for food, tools and clothing

- 1: Mastaba: Raised floor meant for seating, often in U-shape configuration
- 2: Madura: Repressed floor for depositing shoes etc.



HOUSING CONCEPT:

PROMOTE INTEGRATION, EXTRAVERSION, INTERACTION, CREATE MEETING POINTS

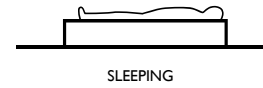
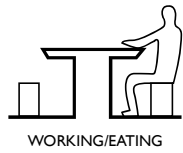
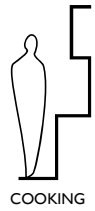
> **CREATE (VERTICAL) CONTINUITY IN THE APARTMENTS**

DESIGN FOR DIFFERENT TIMEFRAMES

> **APARTMENTS ARE ADAPTABLE** (YEARS, MONTHS AND REALTIME)

PRIVACY & ACTIVITY

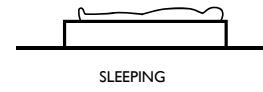
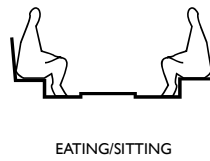
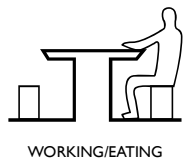
INDIVIDUALS



PUBLIC



PRIVATE

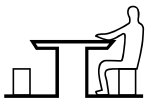


FAMILIES

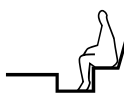
INDIVIDUAL INTERIOR



COOKING



WORKING/EATING



LOUNGE/SITTING



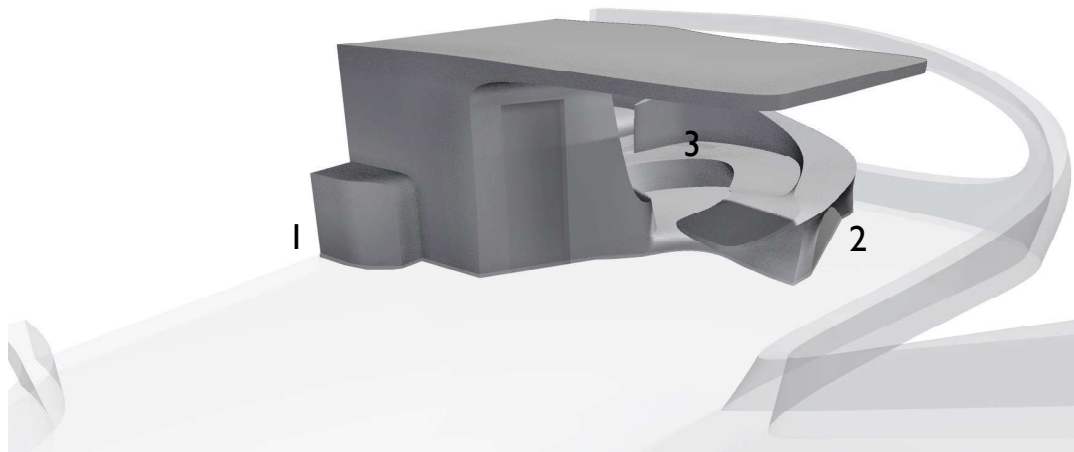
SLEEPING

1

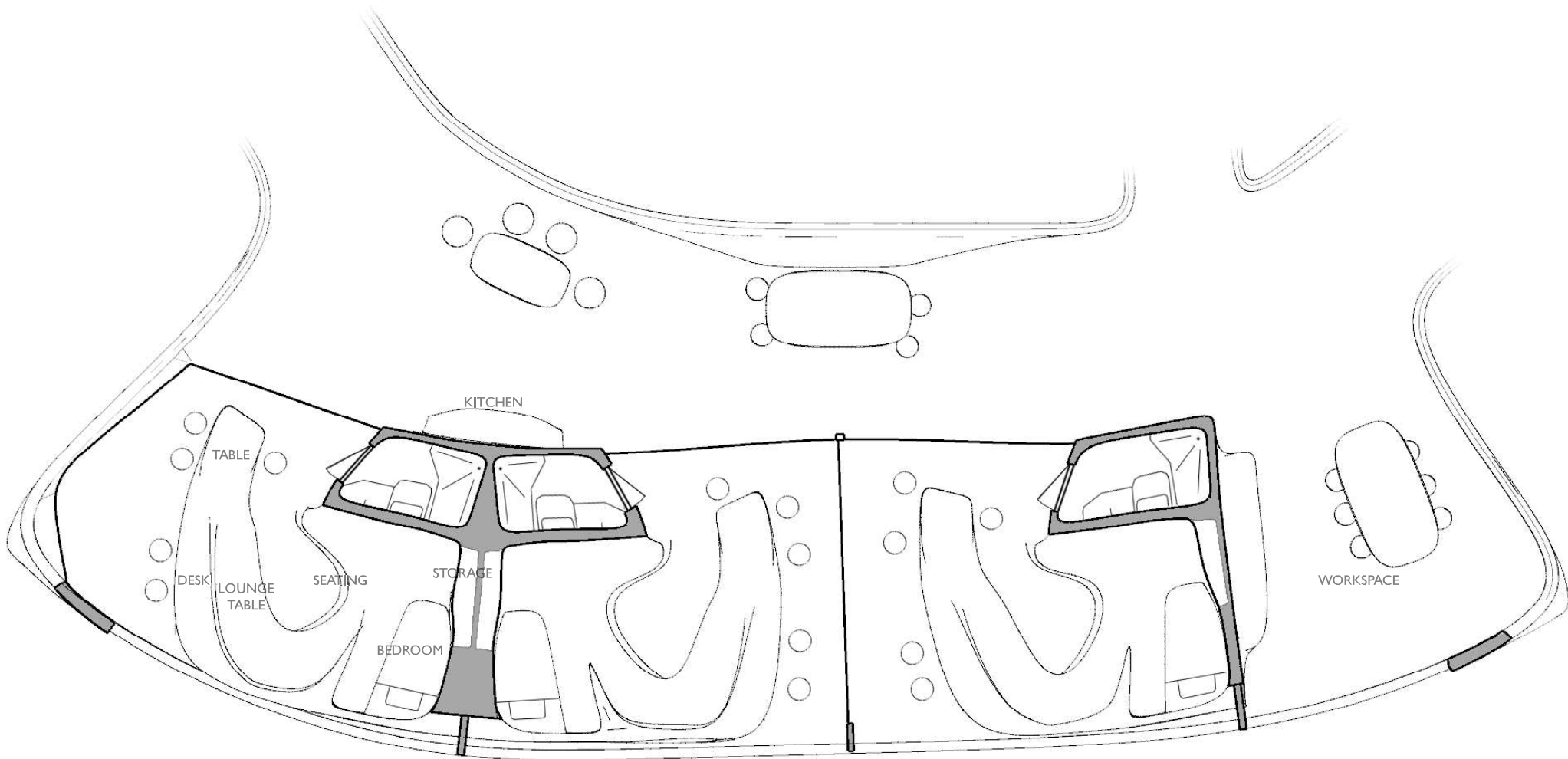
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3

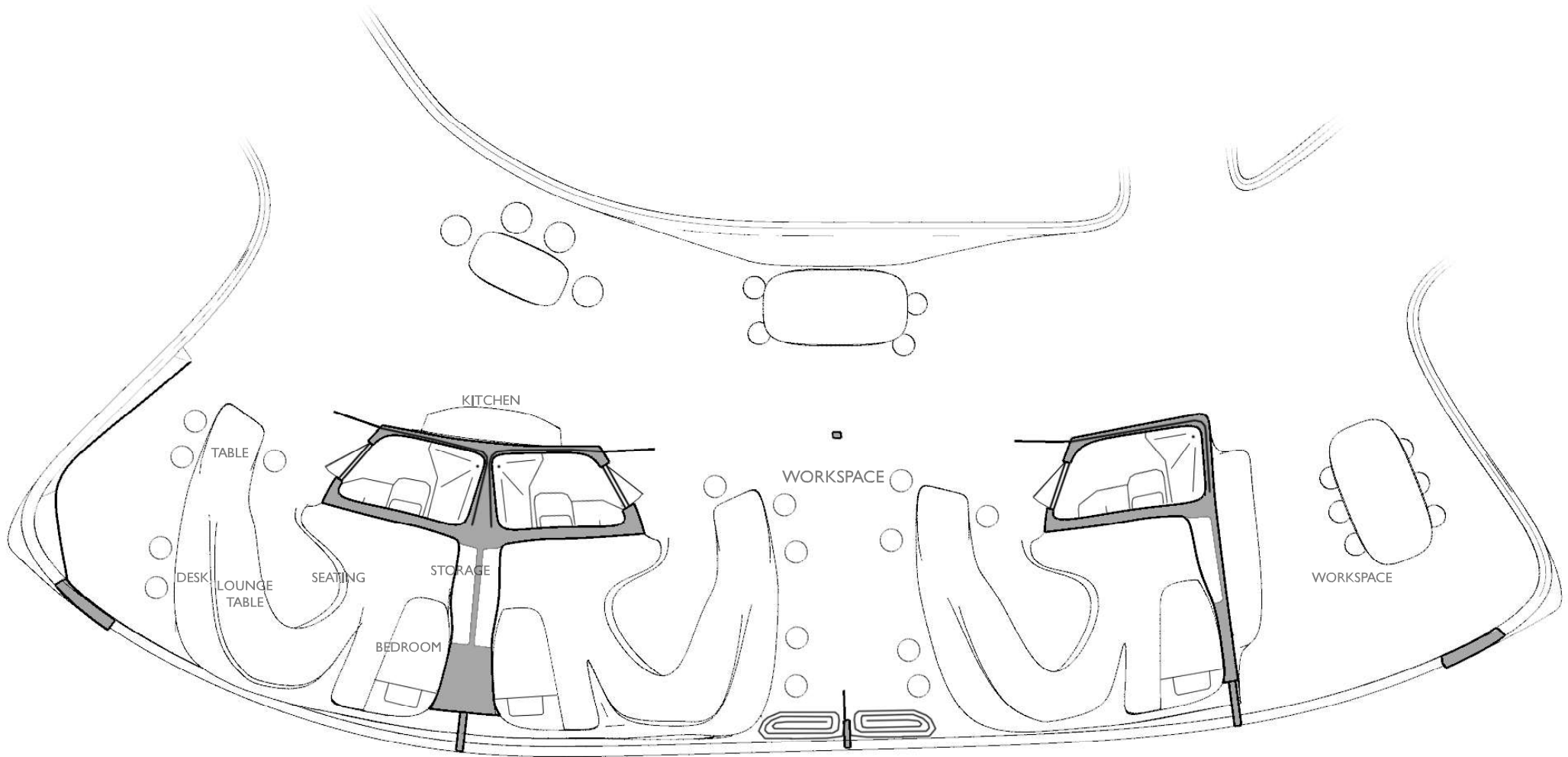
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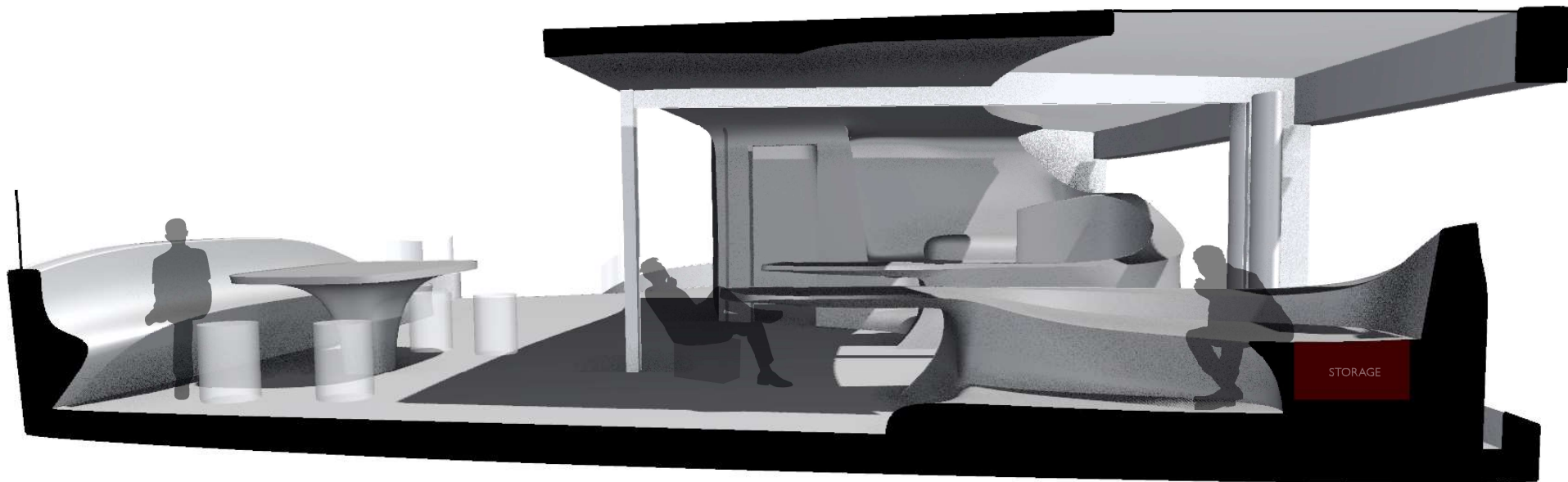
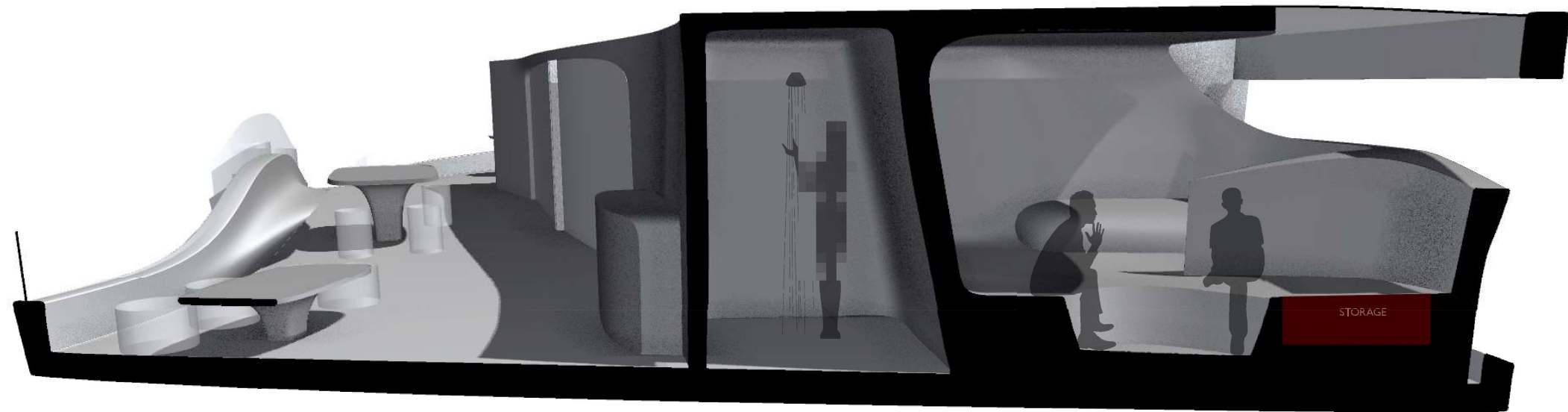


INDIVIDUAL - CLOSED

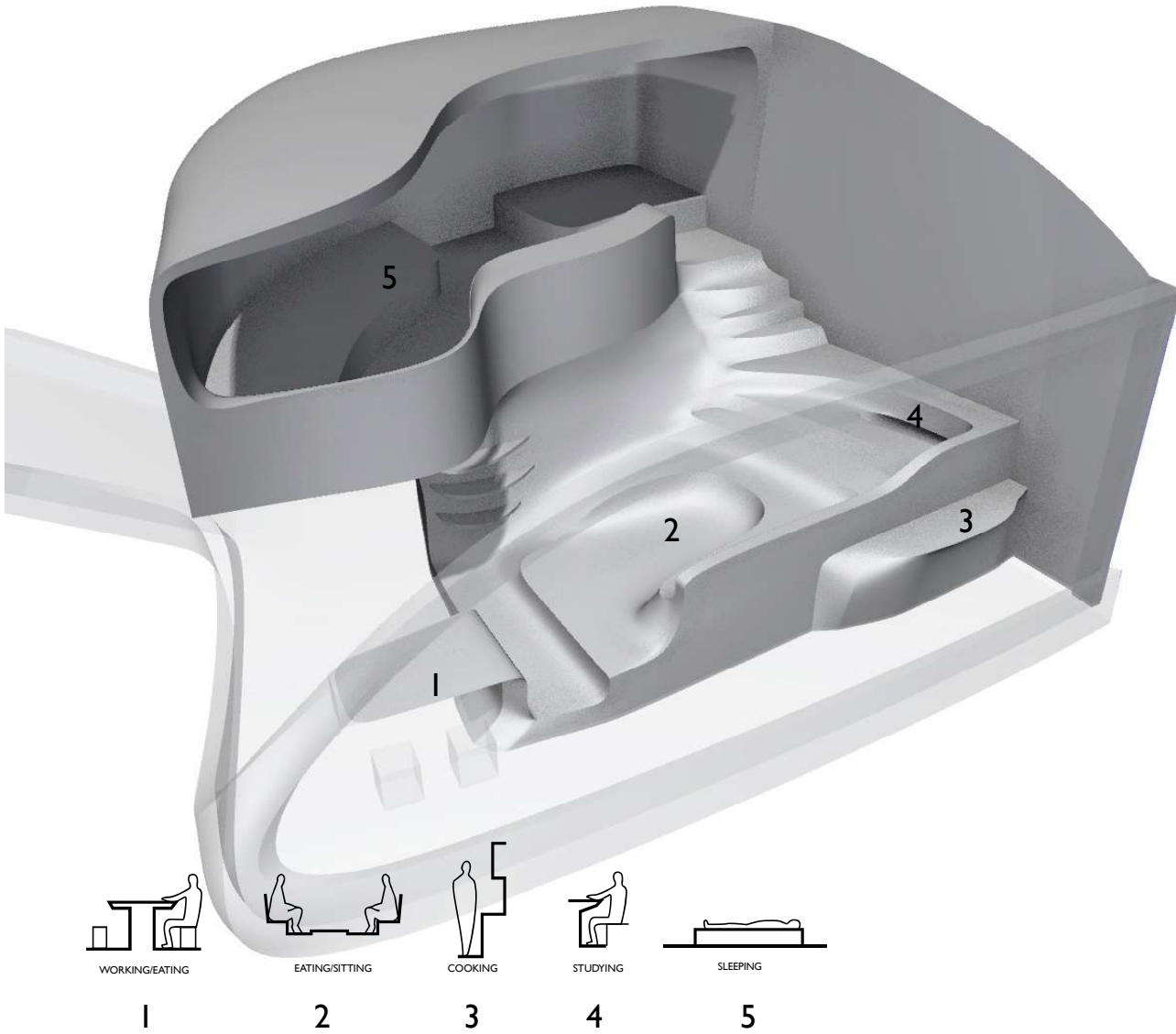


INDIVIDUAL - OPENED

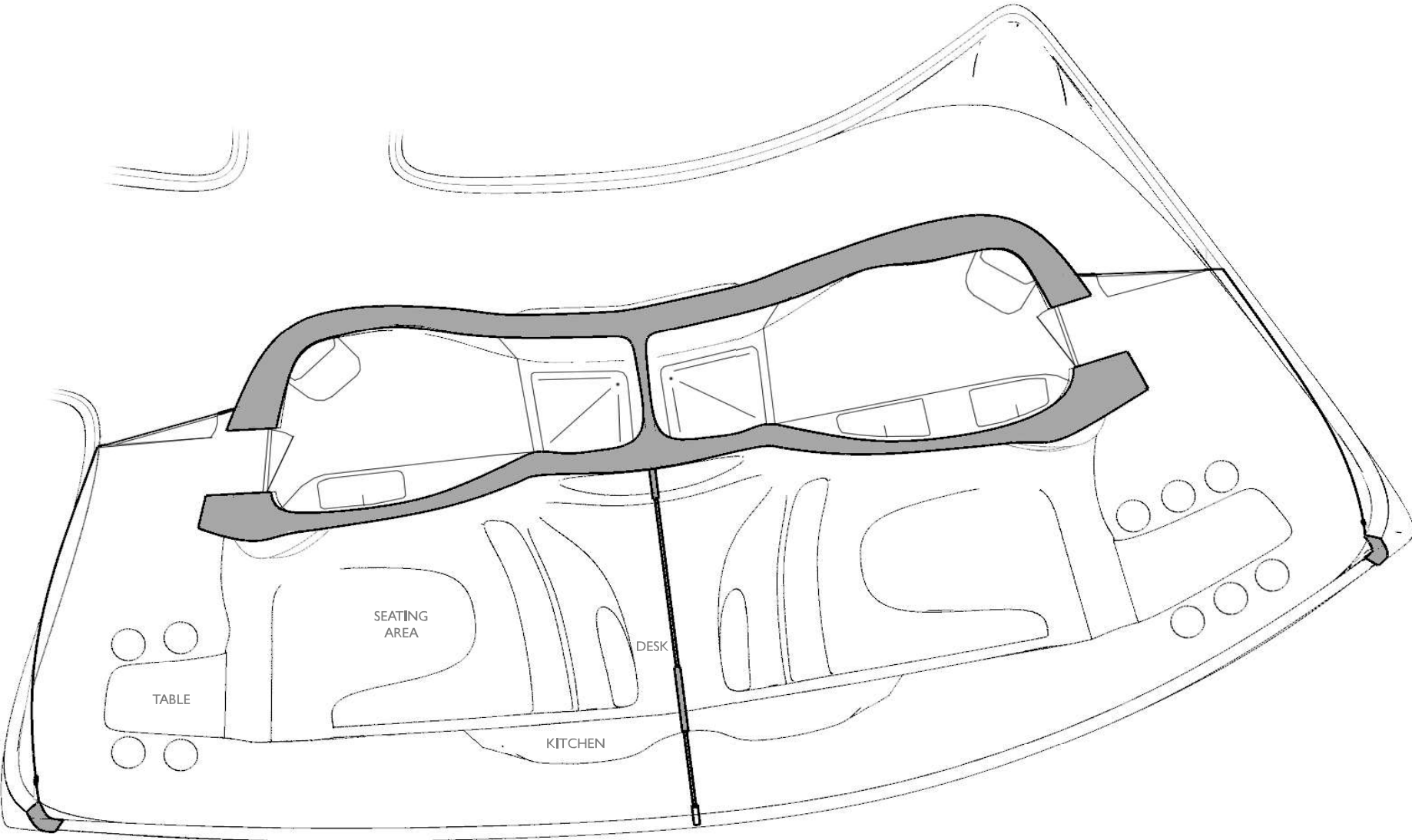




FAMILY INTERIOR



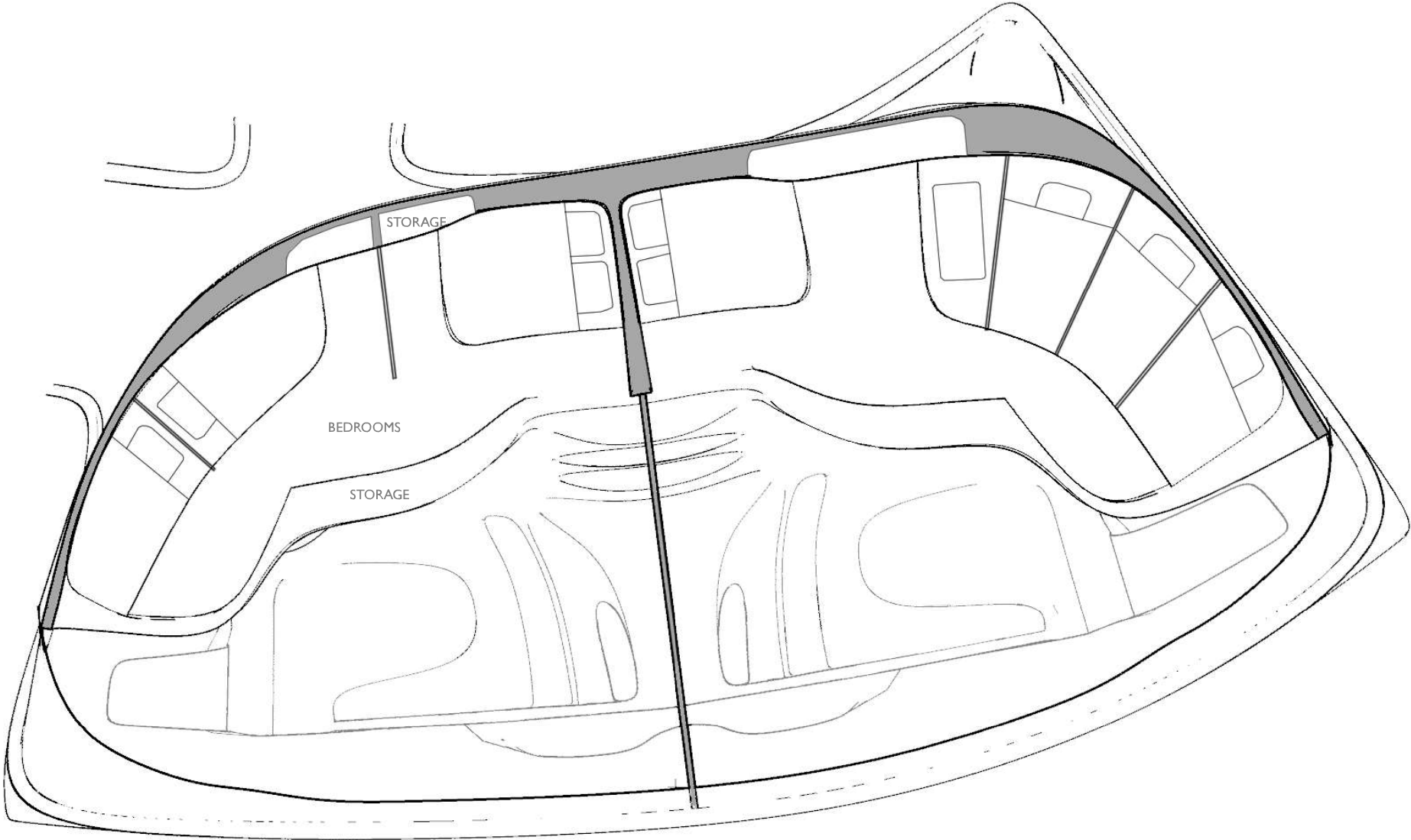
FAMILY - LOWER LEVEL



4 PERSONS APARTMENT

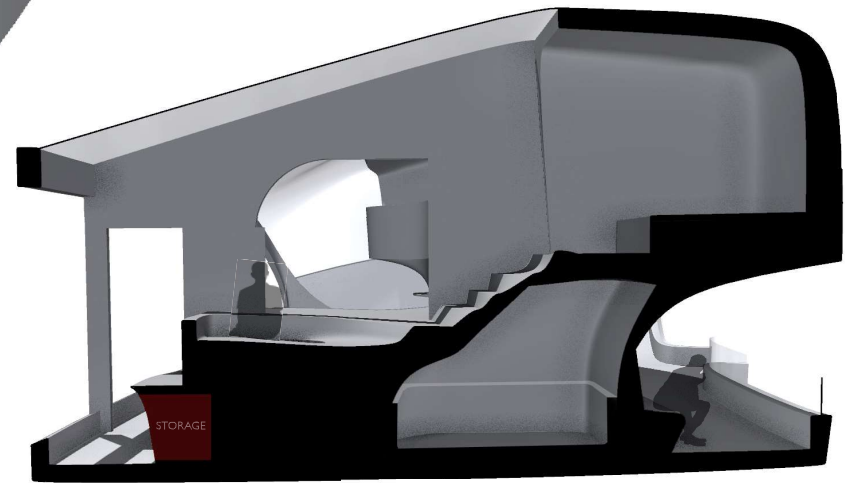
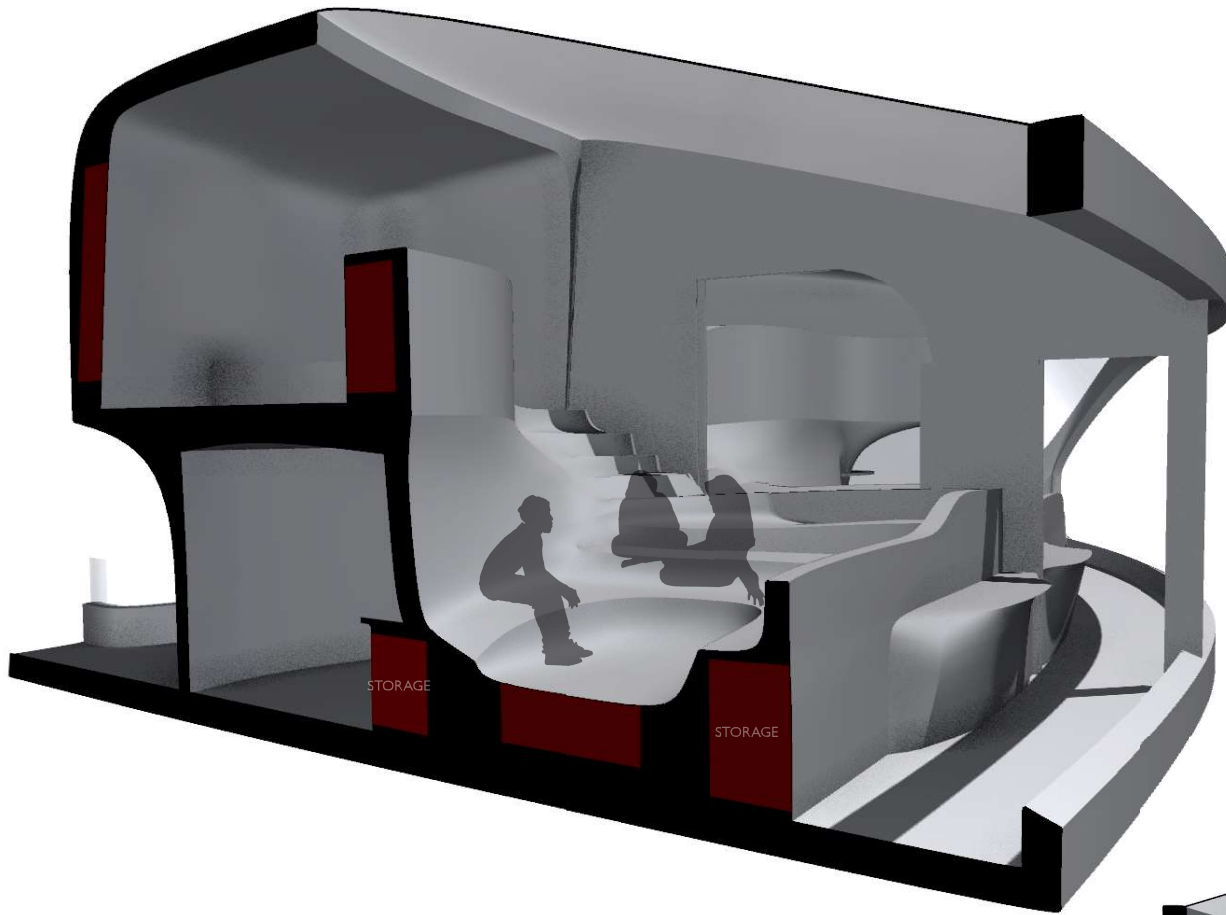
6 PERSONS APARTMENT

FAMILY - UPPER LEVEL

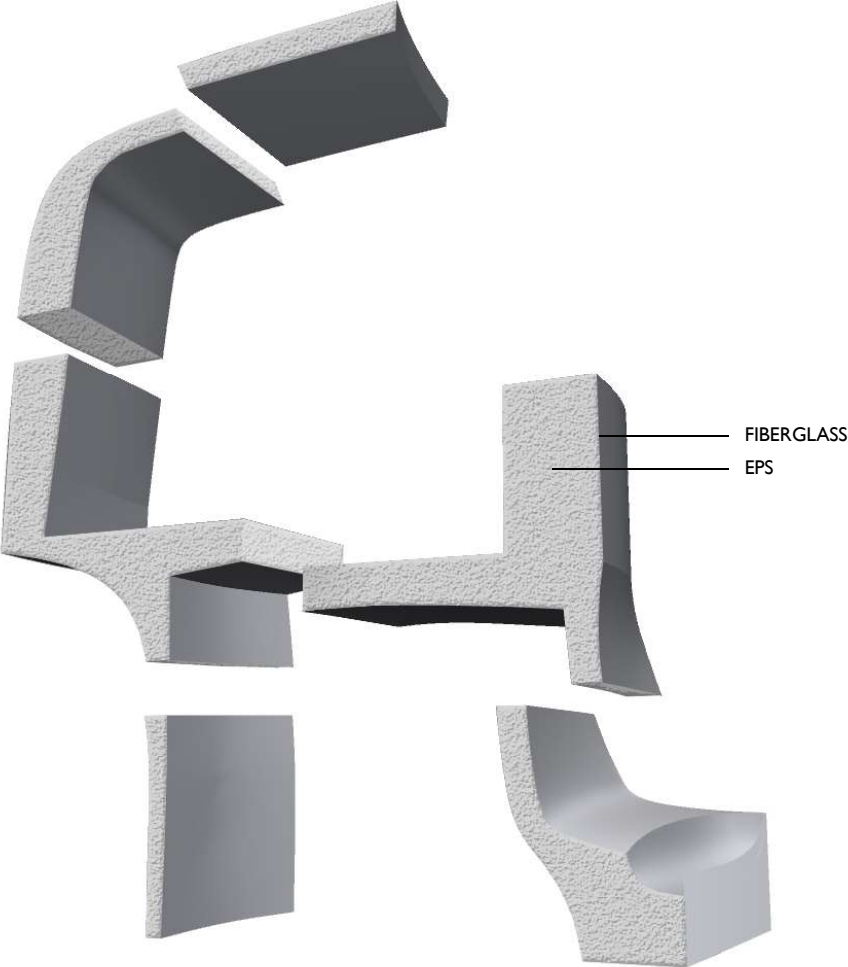
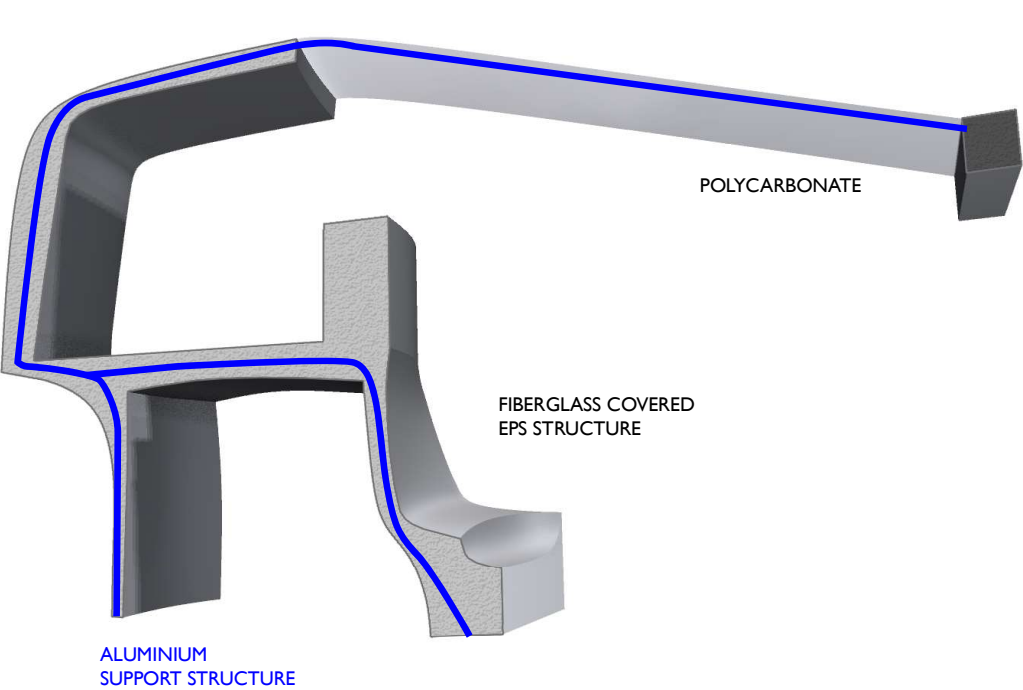


4 PERSONS APARTMENT

6 PERSONS APARTMENT



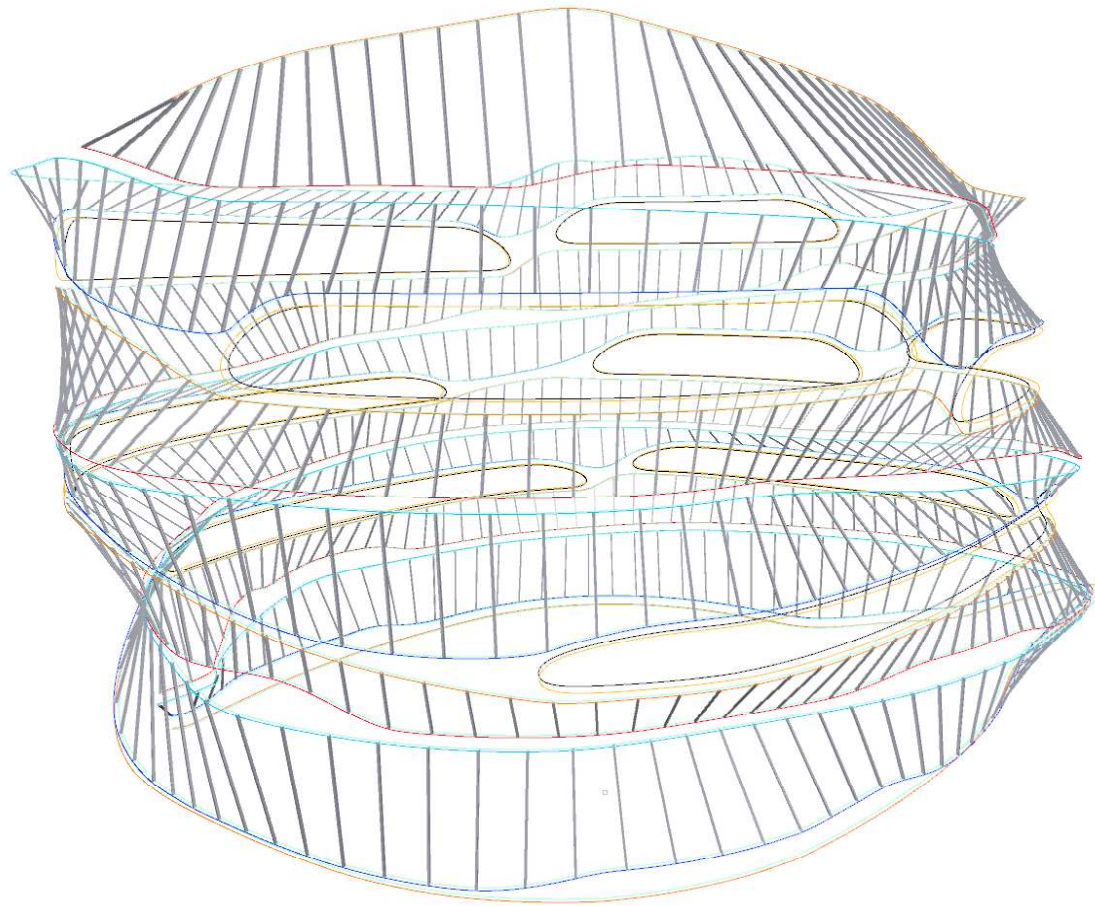
STRUCTURE & COMPONENTS





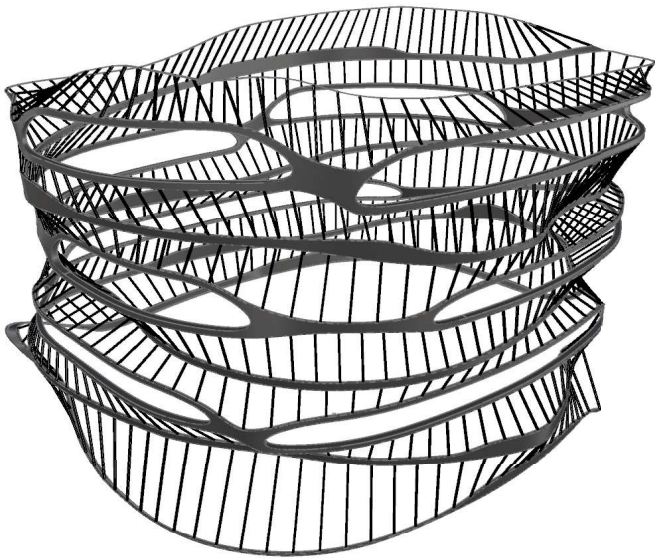
FACADE

GEOMETRY

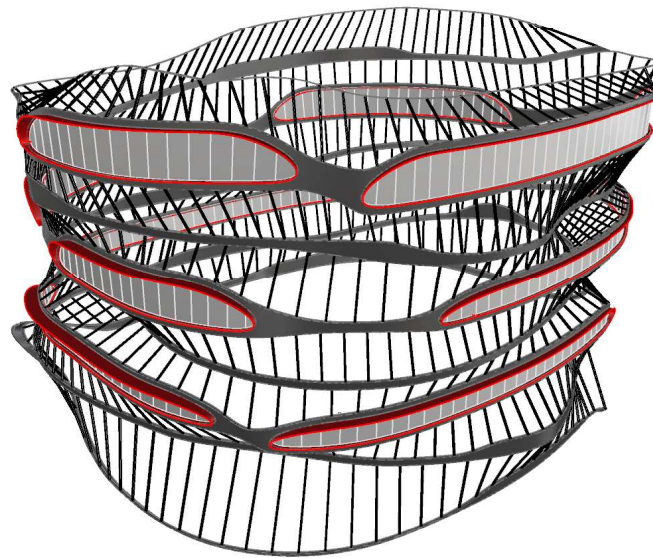


TWISTED SURFACE WITH STRAIGHT SECTIONS

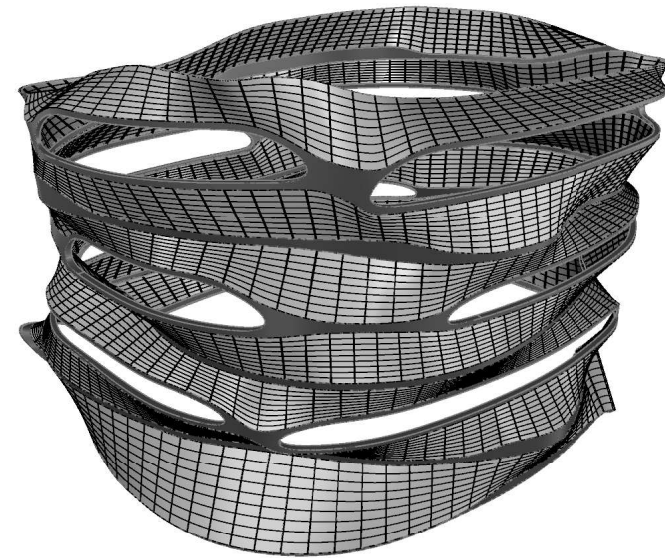
ELEMENTS



BASE STRUCTURE WITH SUPPORTS

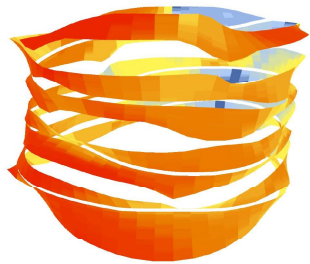


FACADE APARTMENTS

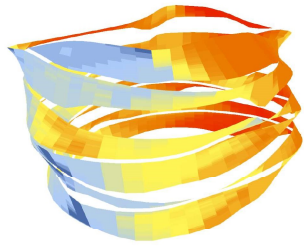


FACADE PUBLIC ZONE

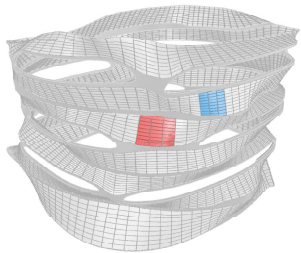
SHADING



SOUTH



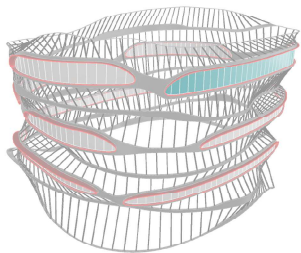
NORTH



THE PUBLIC ZONES HAVE A CONTROLLED SHADING SYSTEM WHICH RESPONDS TO THE AMOUNT OF DAYLIGHT (REGISTERED BY SENSORS)

BLUE: PUBLIC - VIEW MORE IMPORTANT > MORE TRANSPARENCY

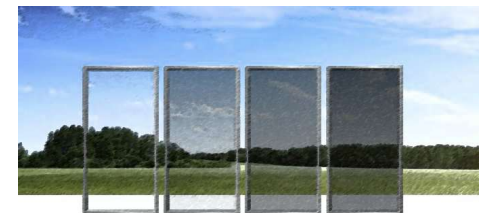
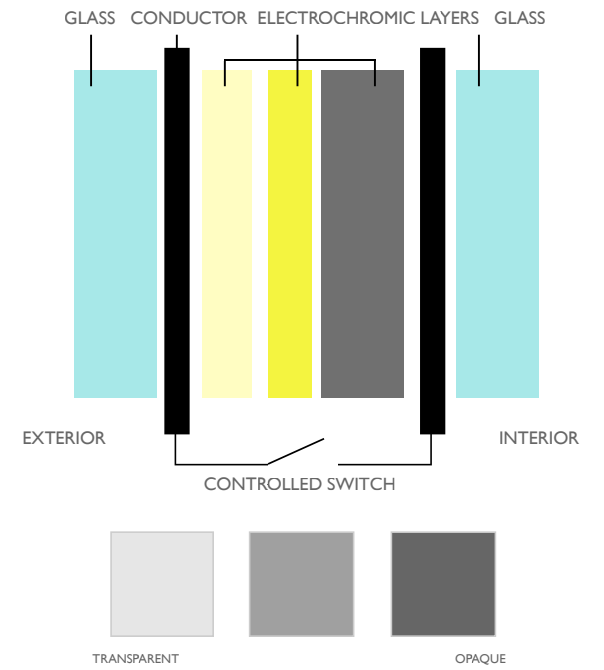
RED: SEMI PUBLIC/HOUSING - HIGH RADIANCE > MORE OPAQUE



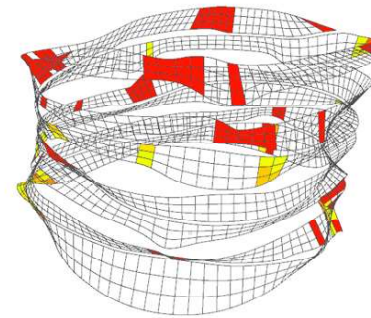
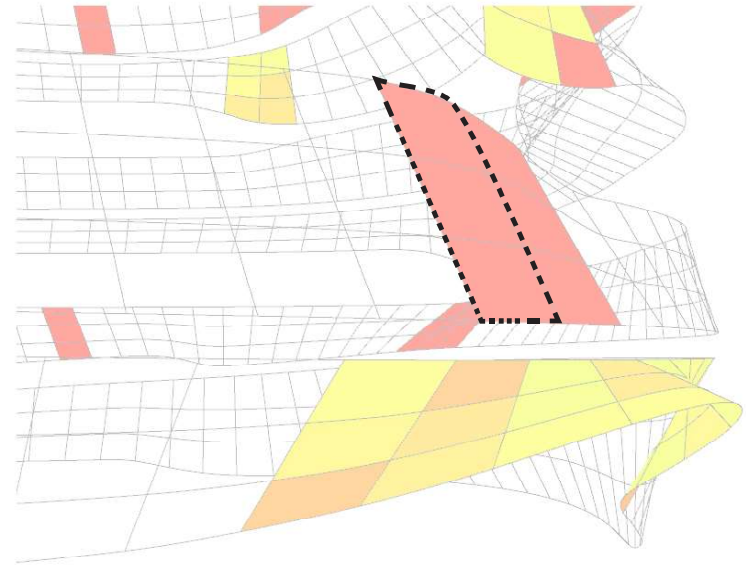
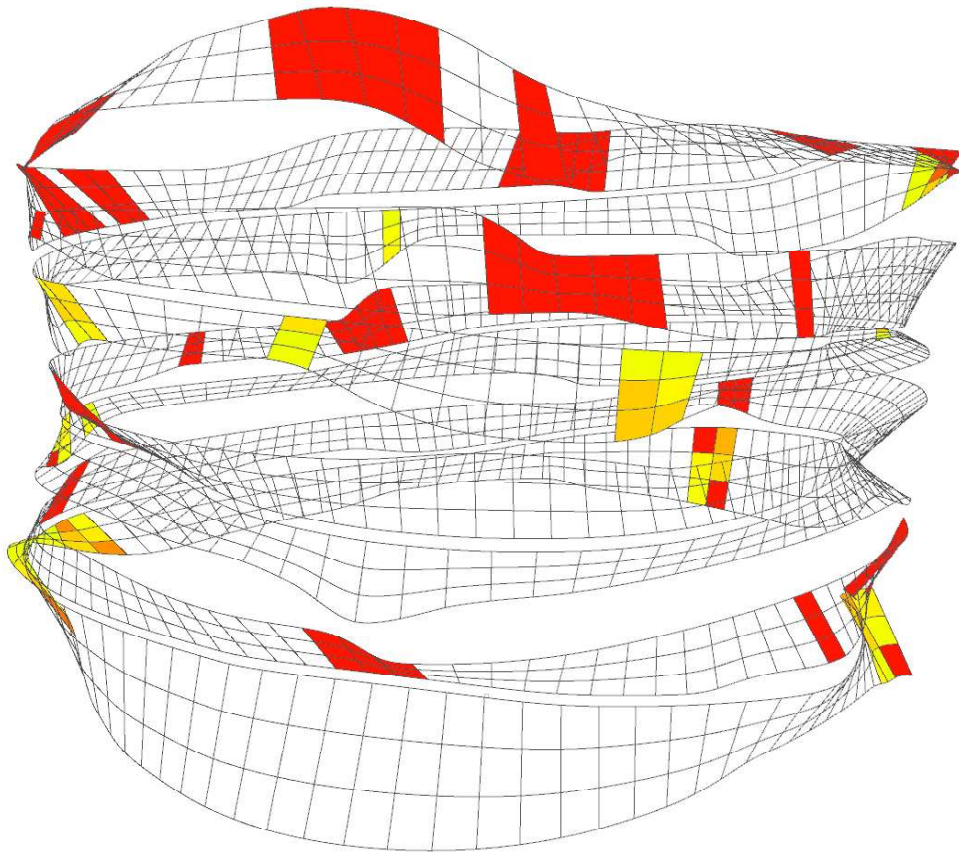
THE APARTMENTS CAN BE CONTROLLED BY RESIDENTS BECAUSE THEY NEED CONTROL OVER PRIVACY



ELECTROCHROMIC GLASS



PANEL CURVATURE

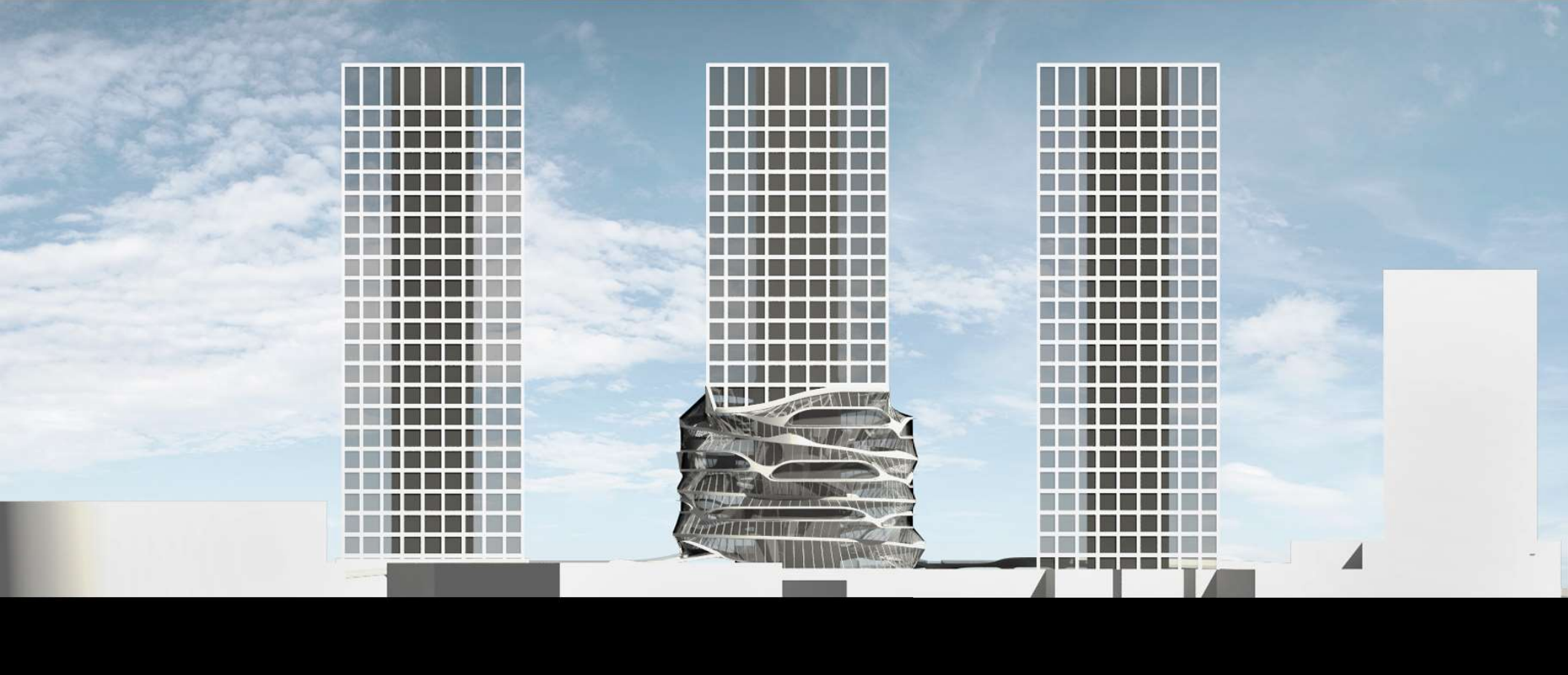


THE COLOURED PANELS HAVE TOO MUCH CURVATURE TO BE PLACED COLD-BENT
THESE PANELS ARE BENT IN THE FACTORY



RESULTING DESIGN

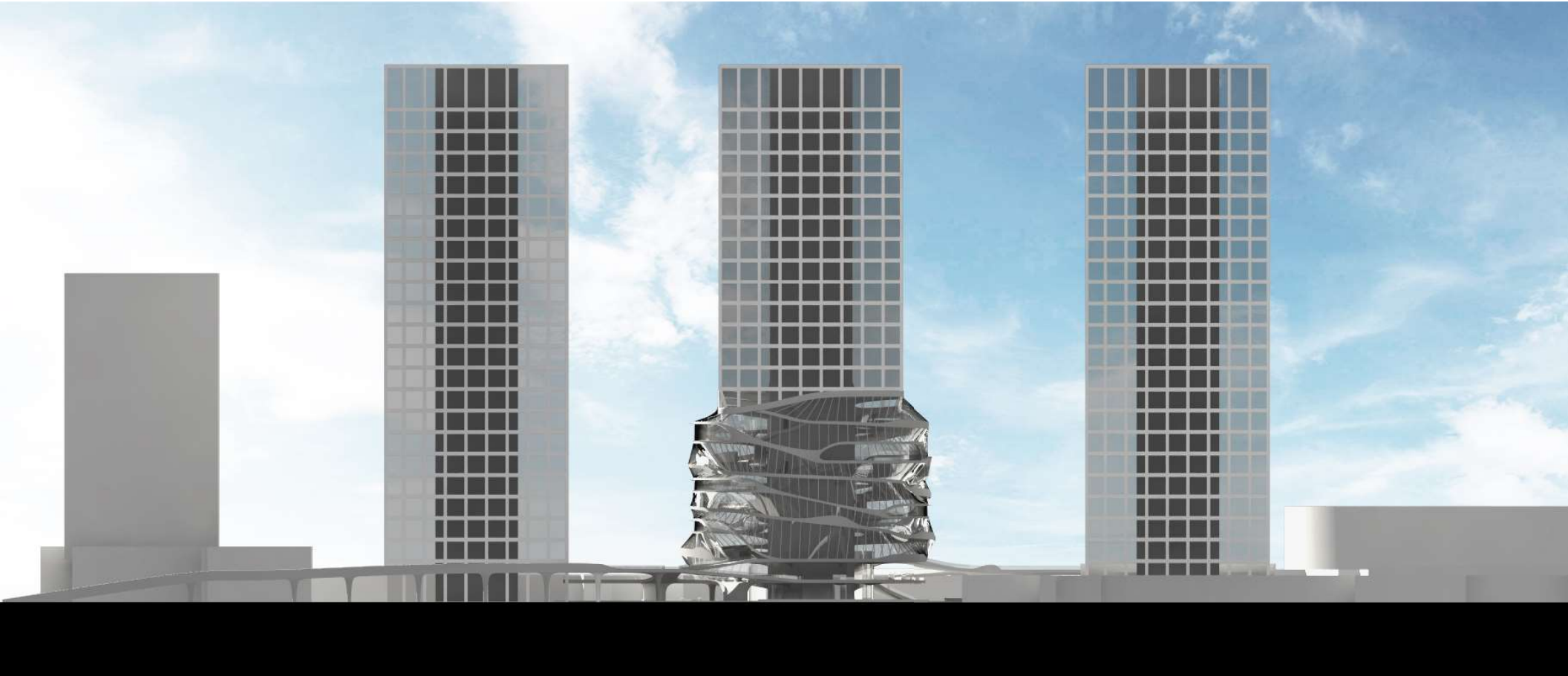
SOUTH ELEVATION

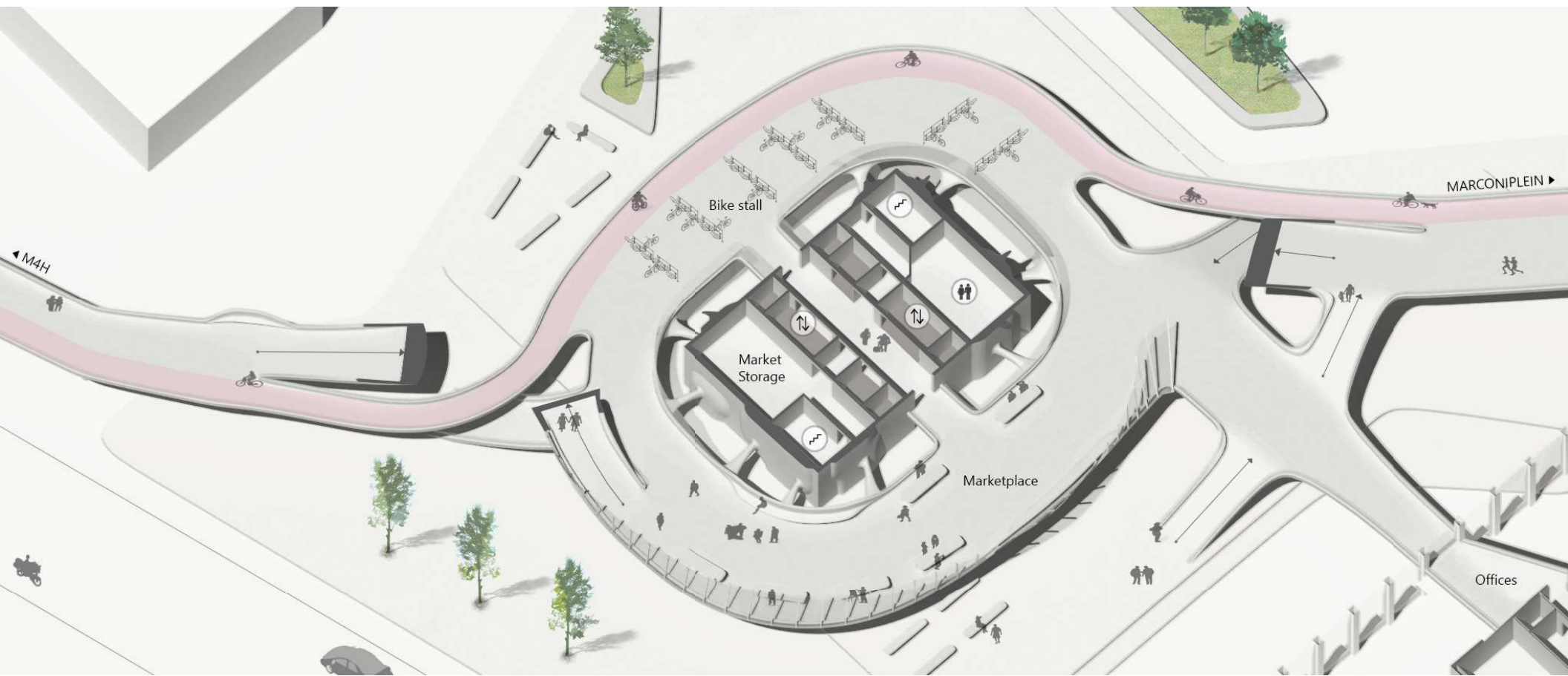


EAST ELEVATION



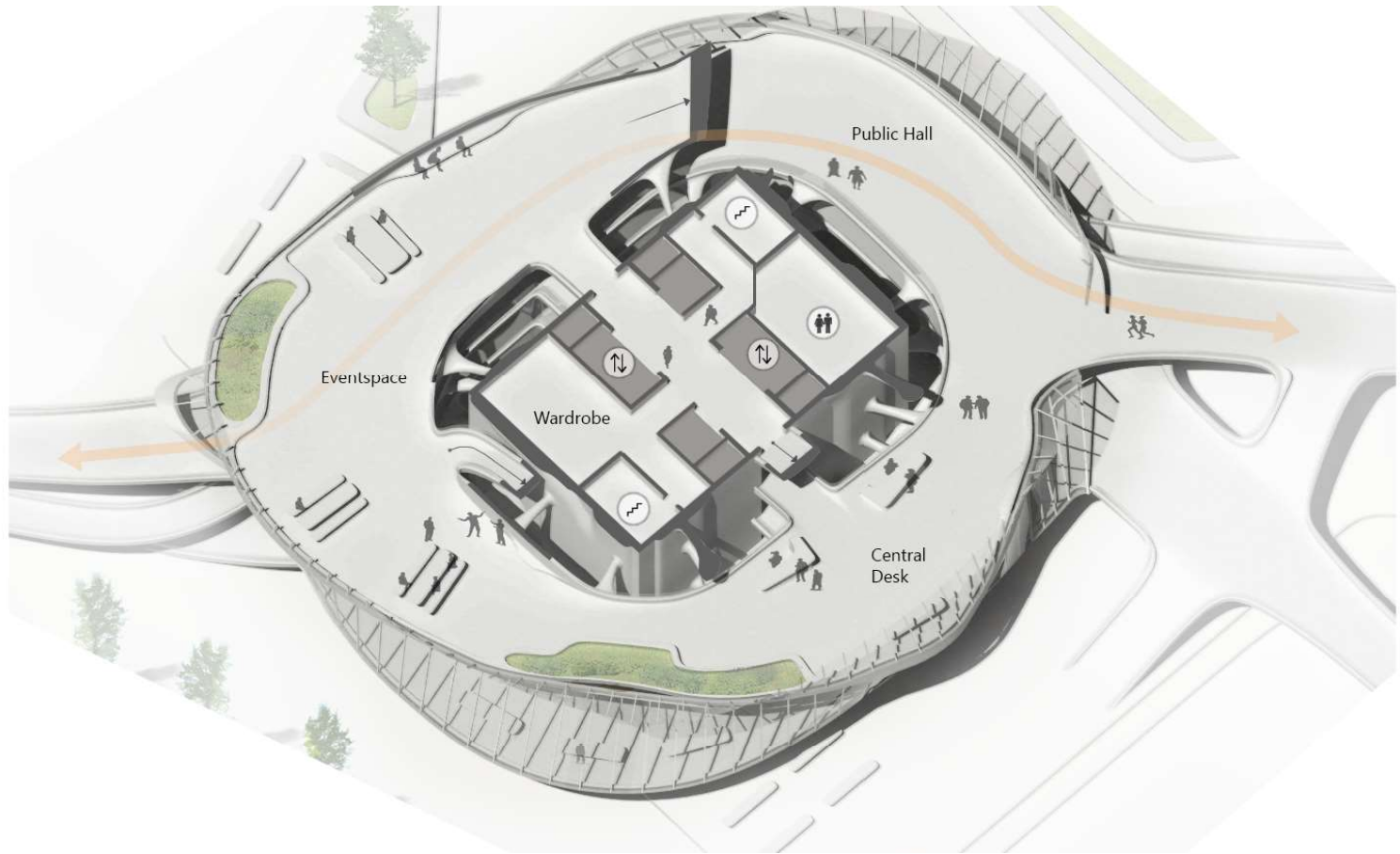
NORTH ELEVATION



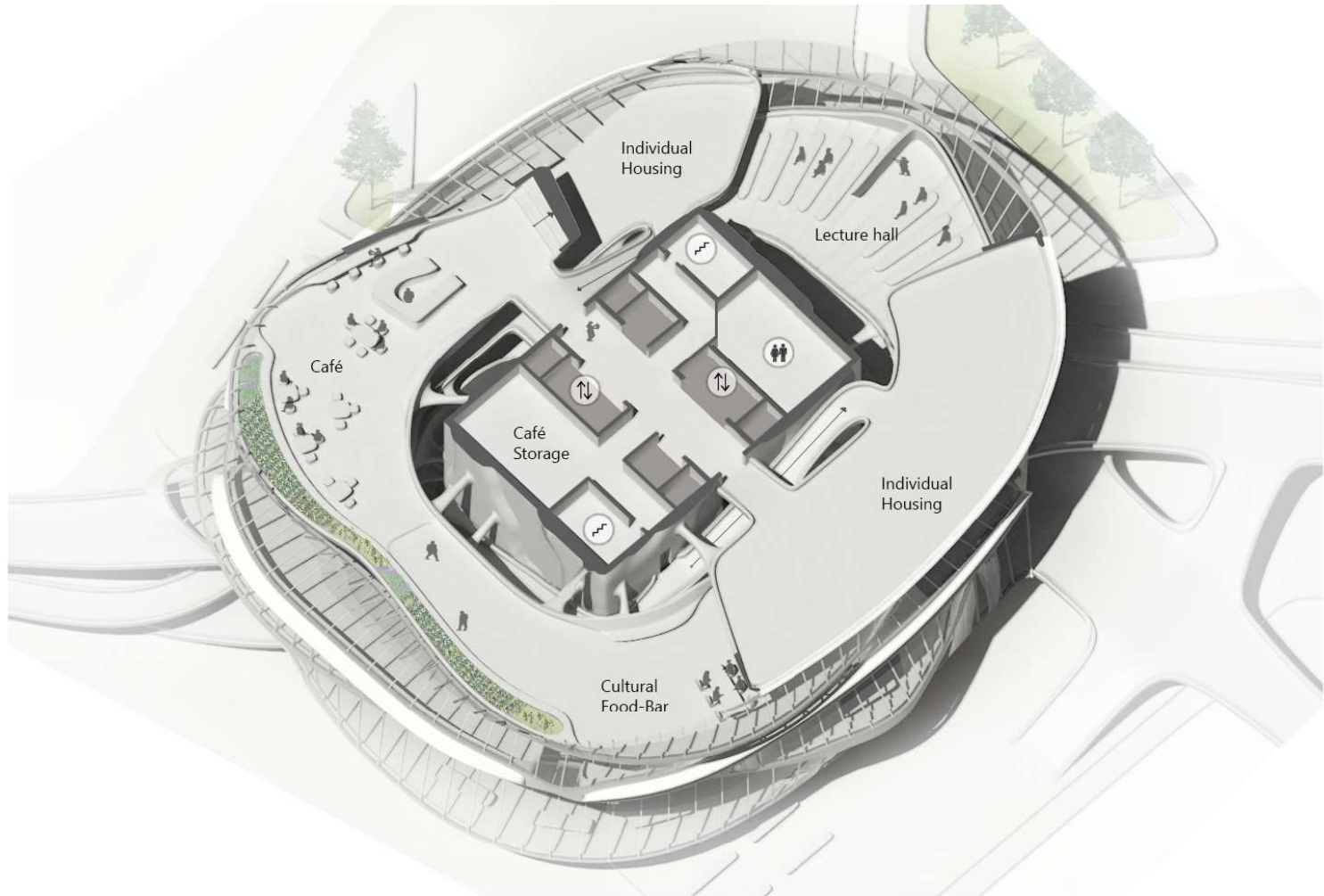


PLAN +3750

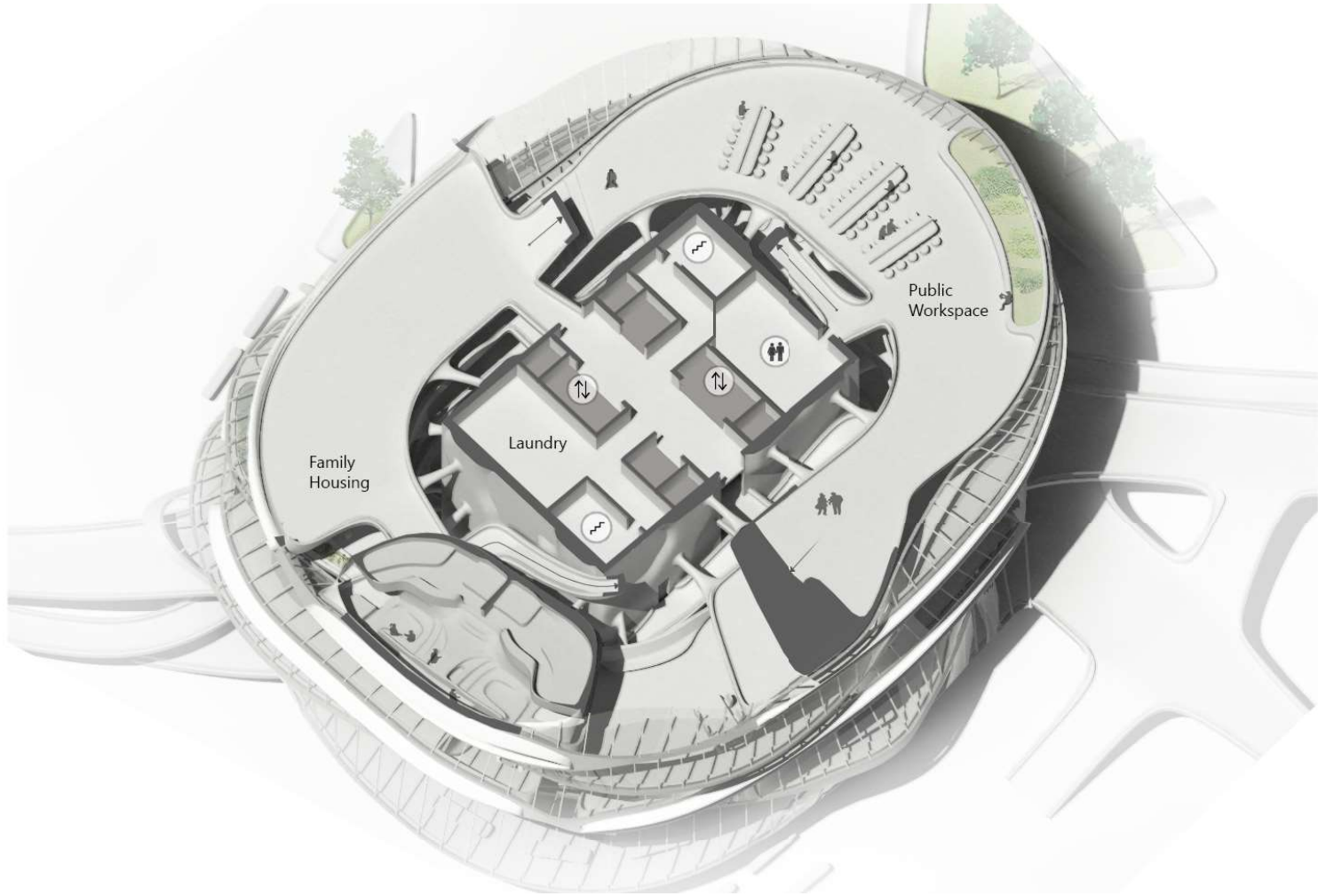




PLAN +7500



PLAN +18000

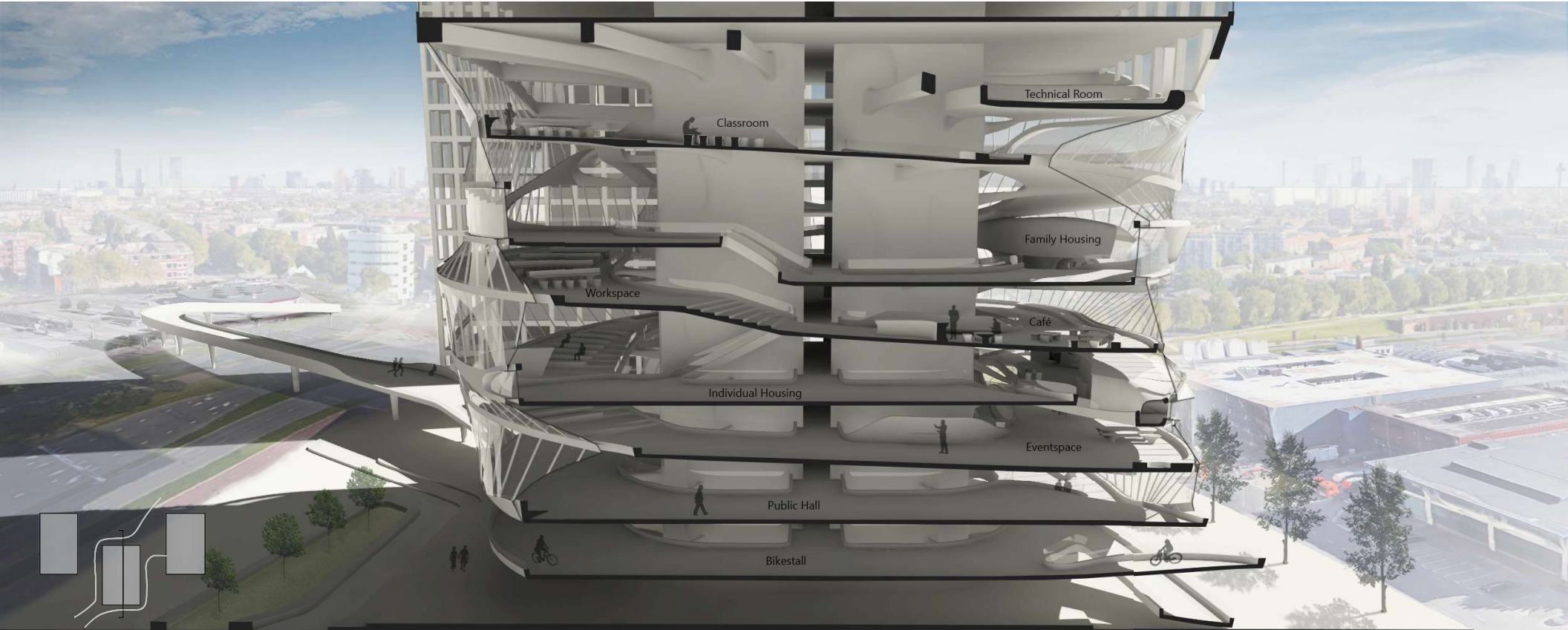


PLAN +31000

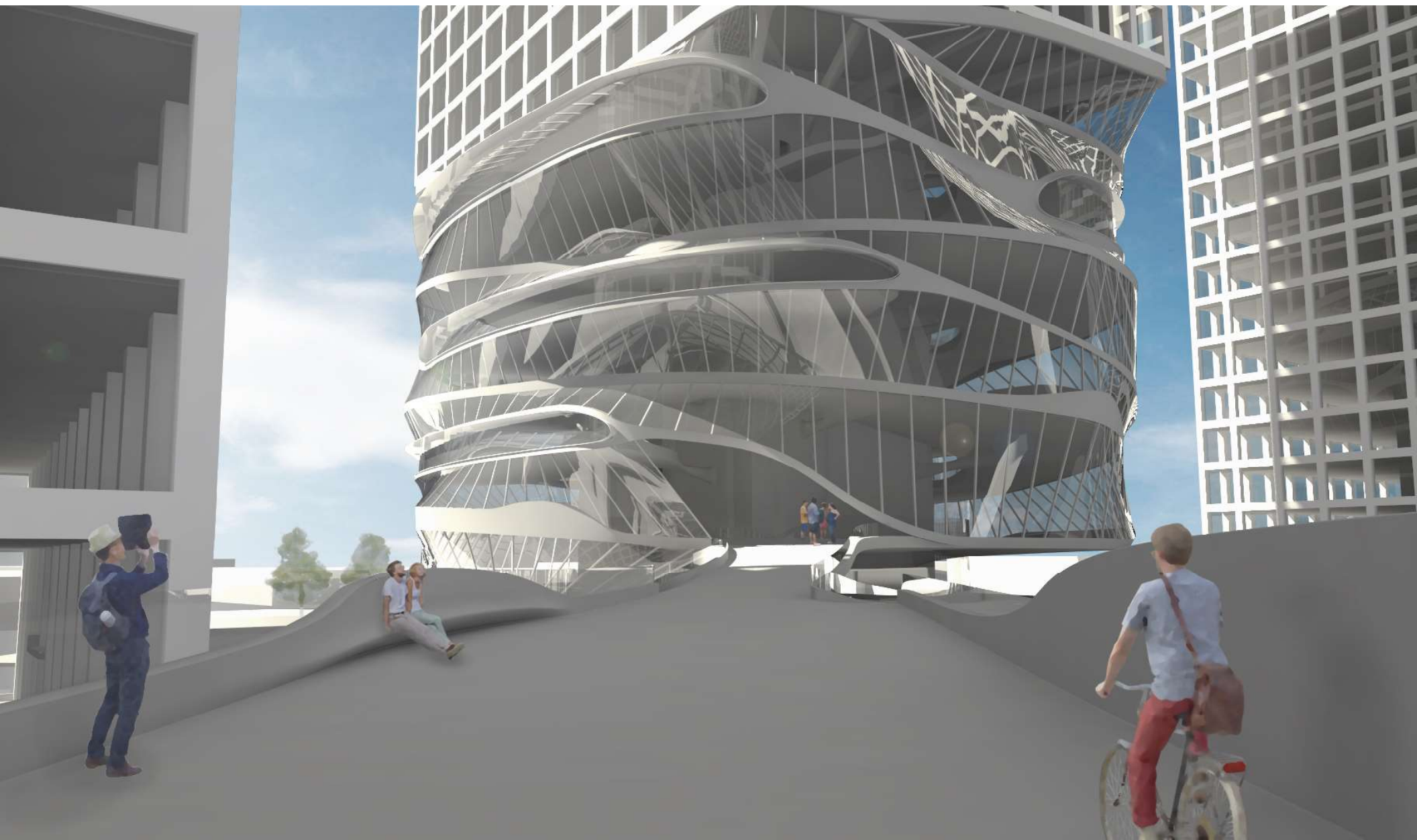
SECTION EAST-WEST

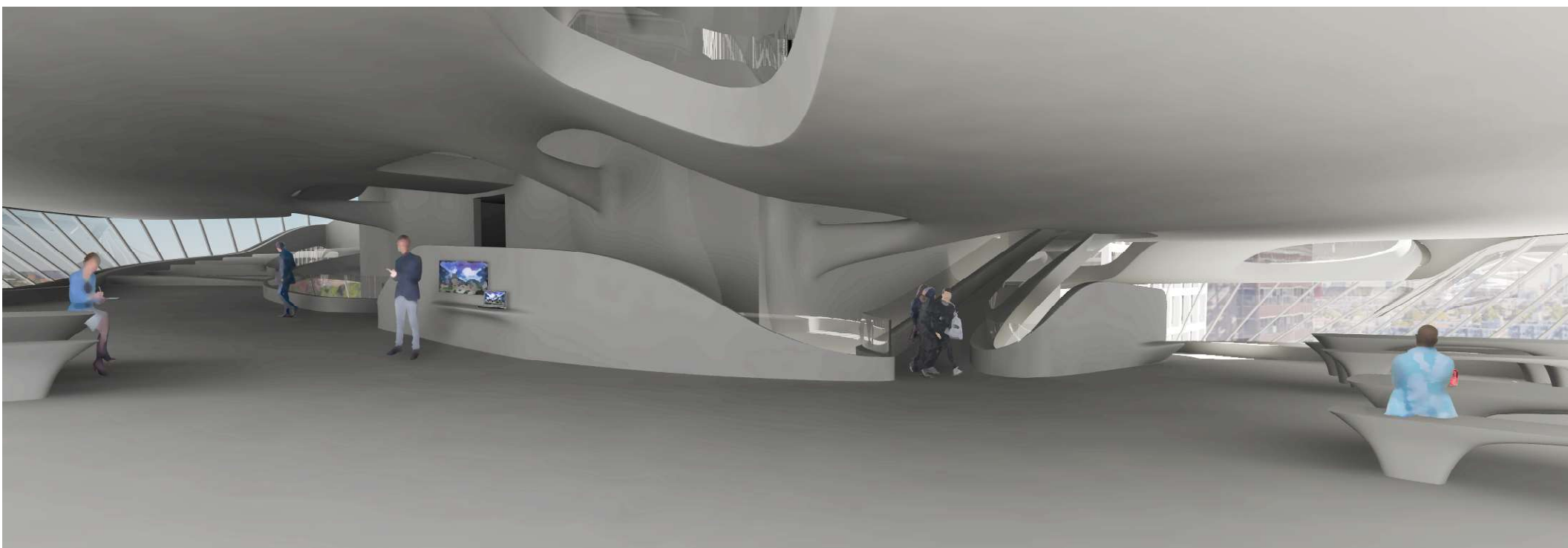


SECTION NORTH-SOUTH





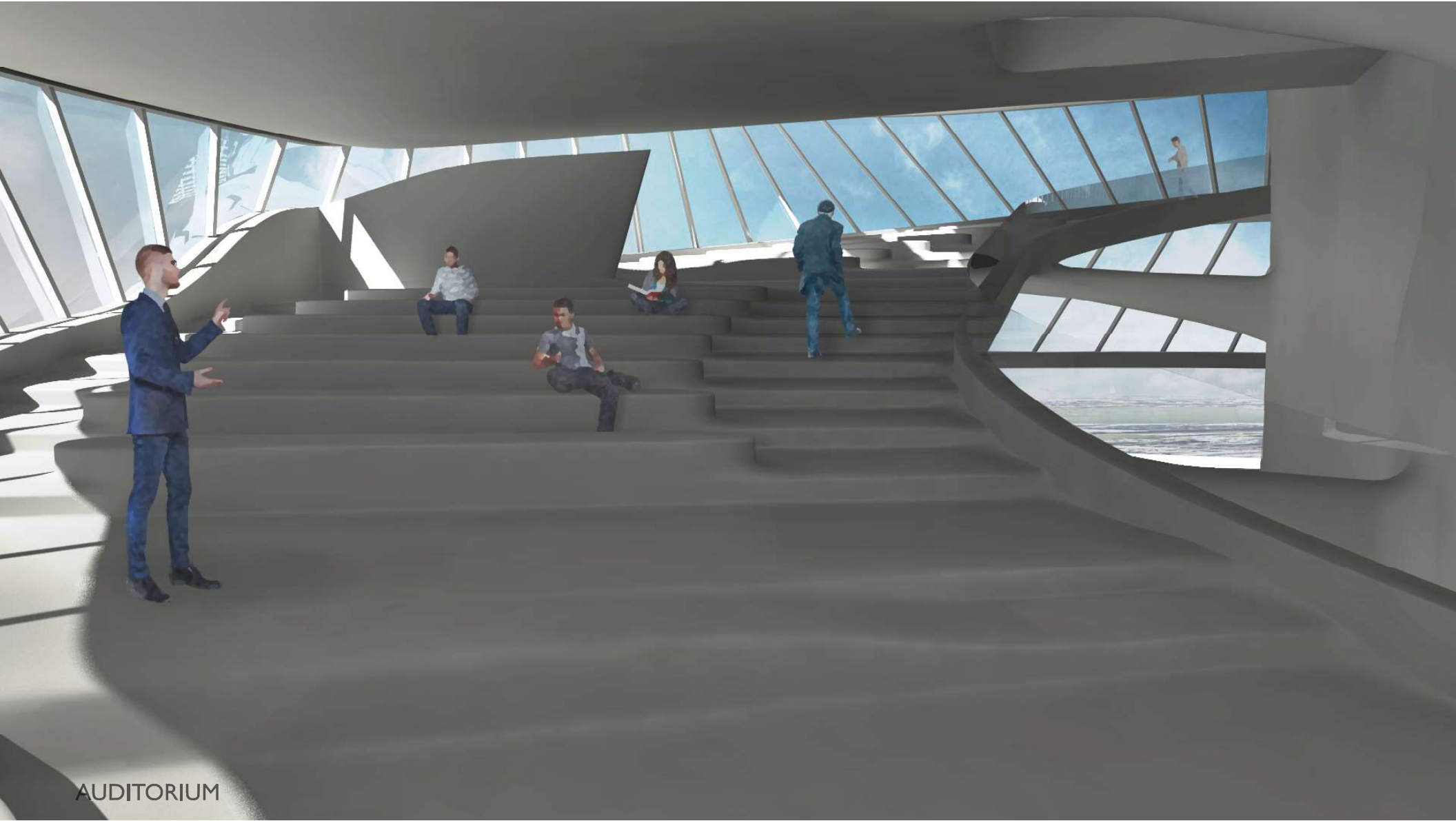




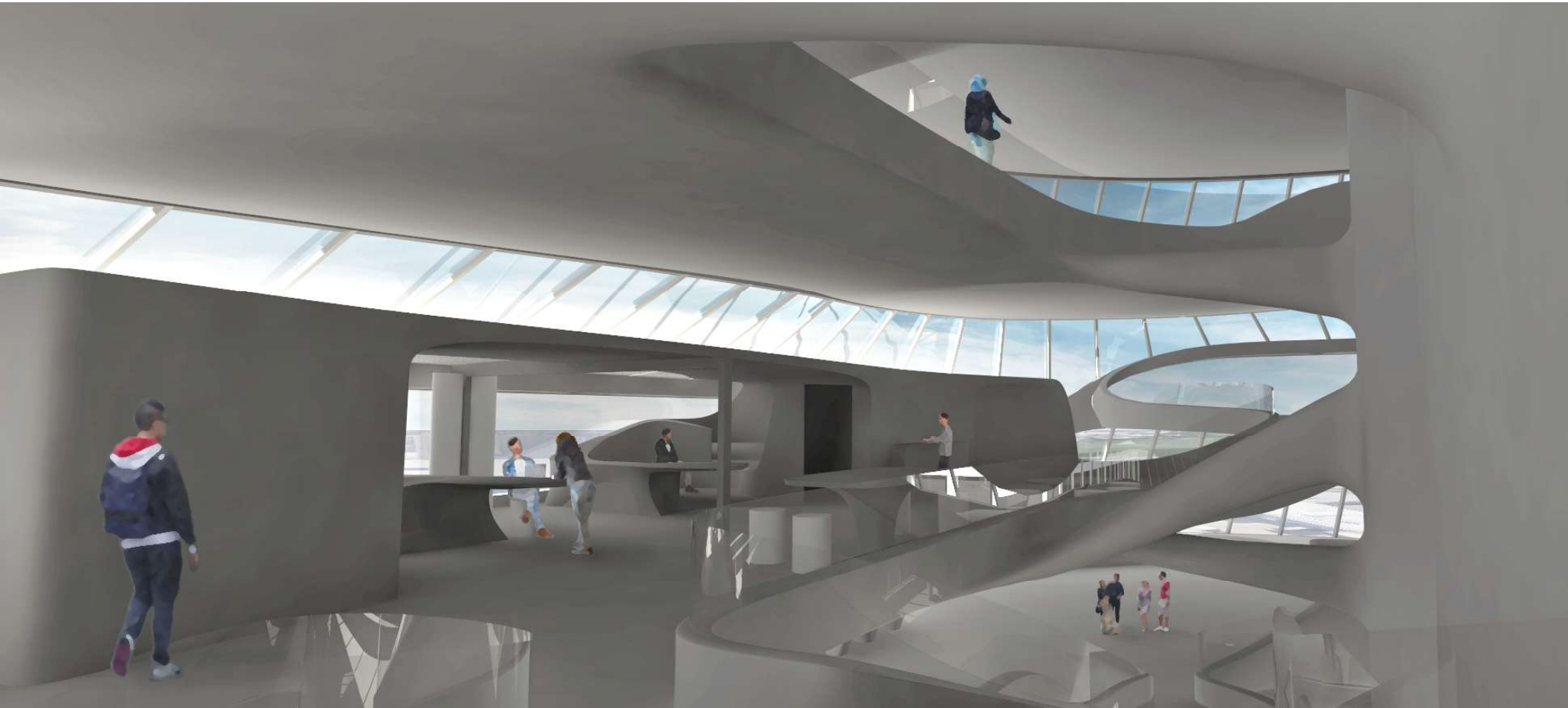
EVENTSPACE



CAFÉ



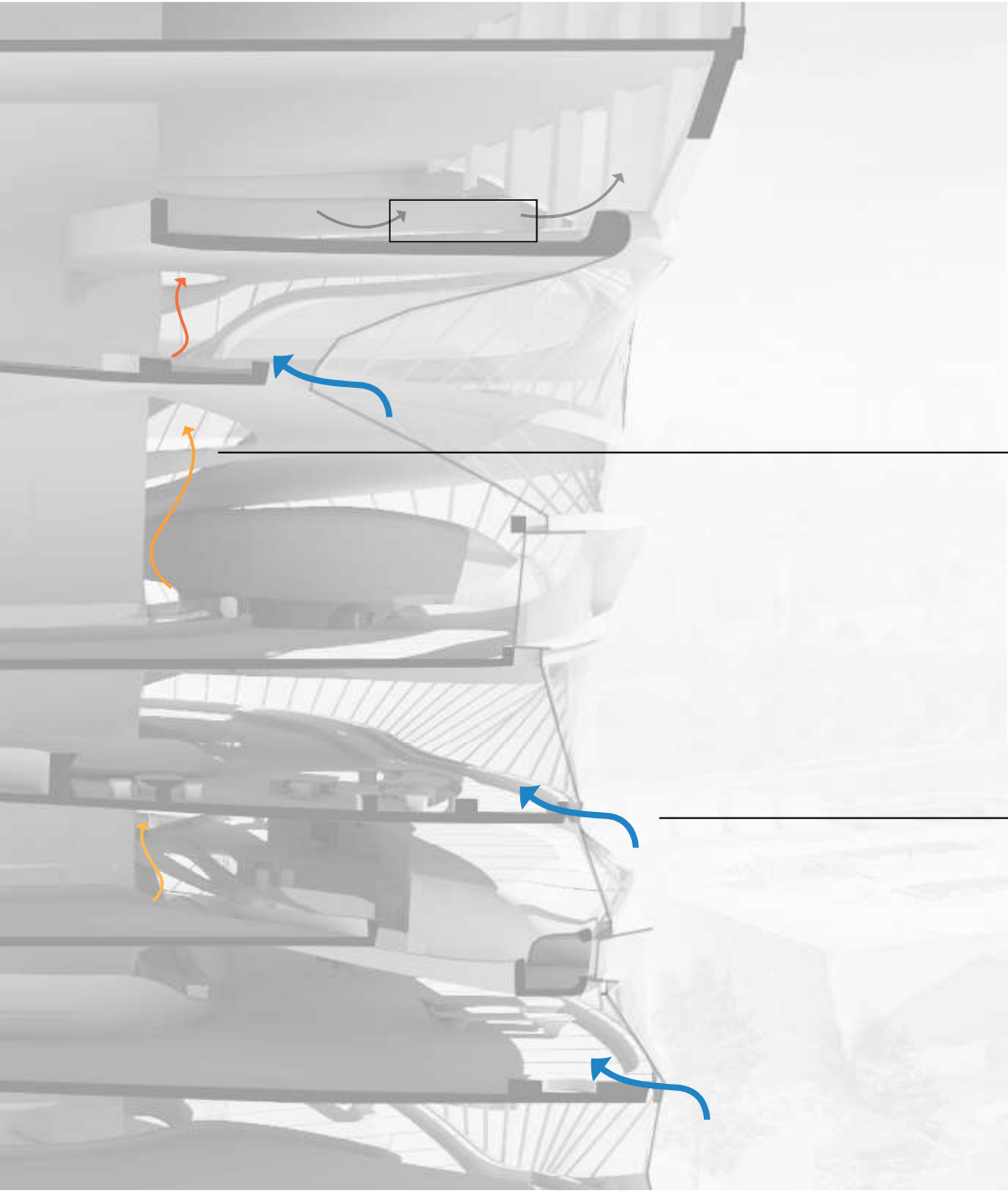
AUDITORIUM



SHARED SPACE AND APARTMENTS



FAMILY APARTMENT INTERIOR



VENTILATION

SUMMER

STACK EFFECT MAKES AIR MOVE UPWARDS THROUGH OPEN SPACE

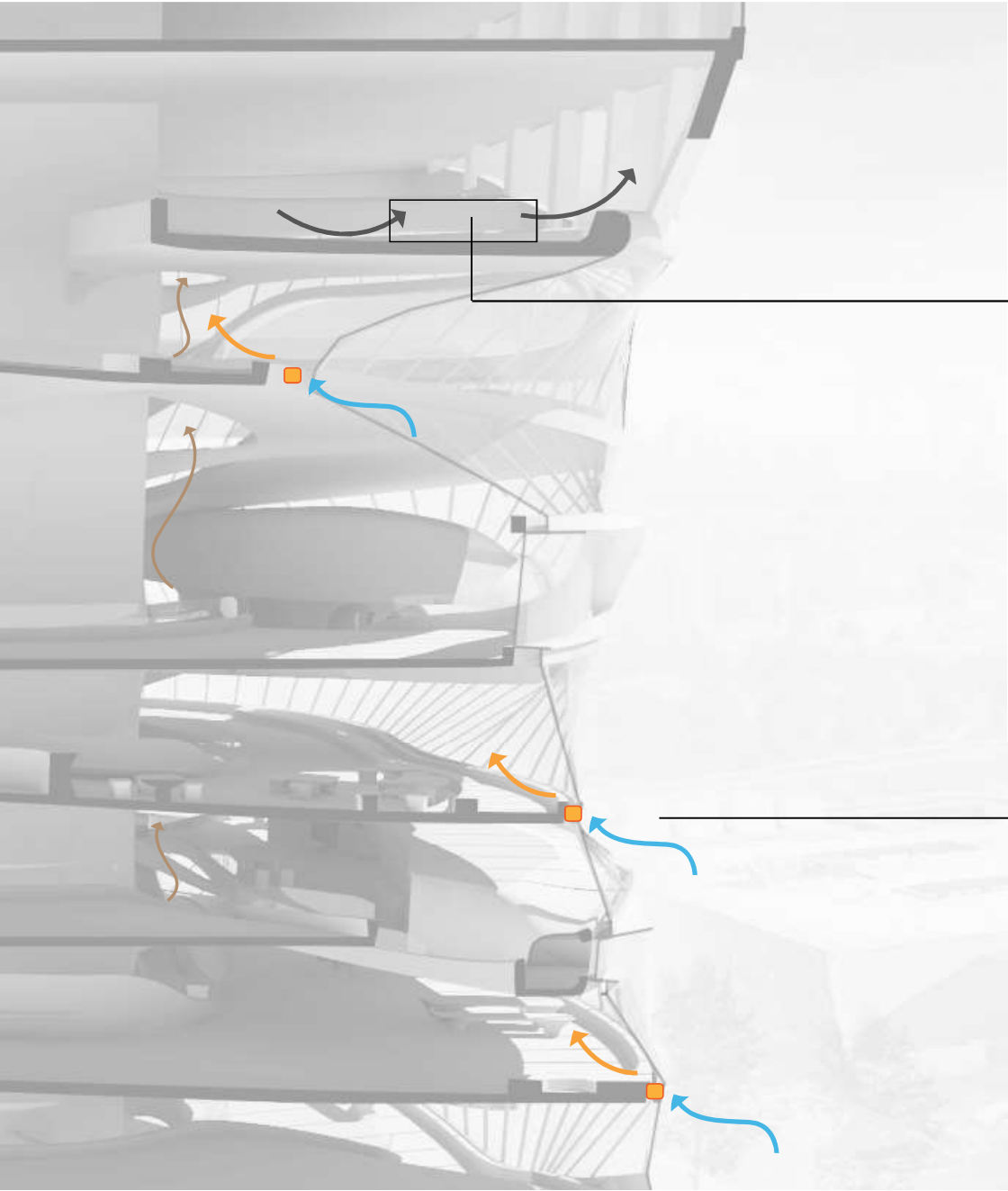
FRESH AIR ENTERS THROUGH THE FACADE

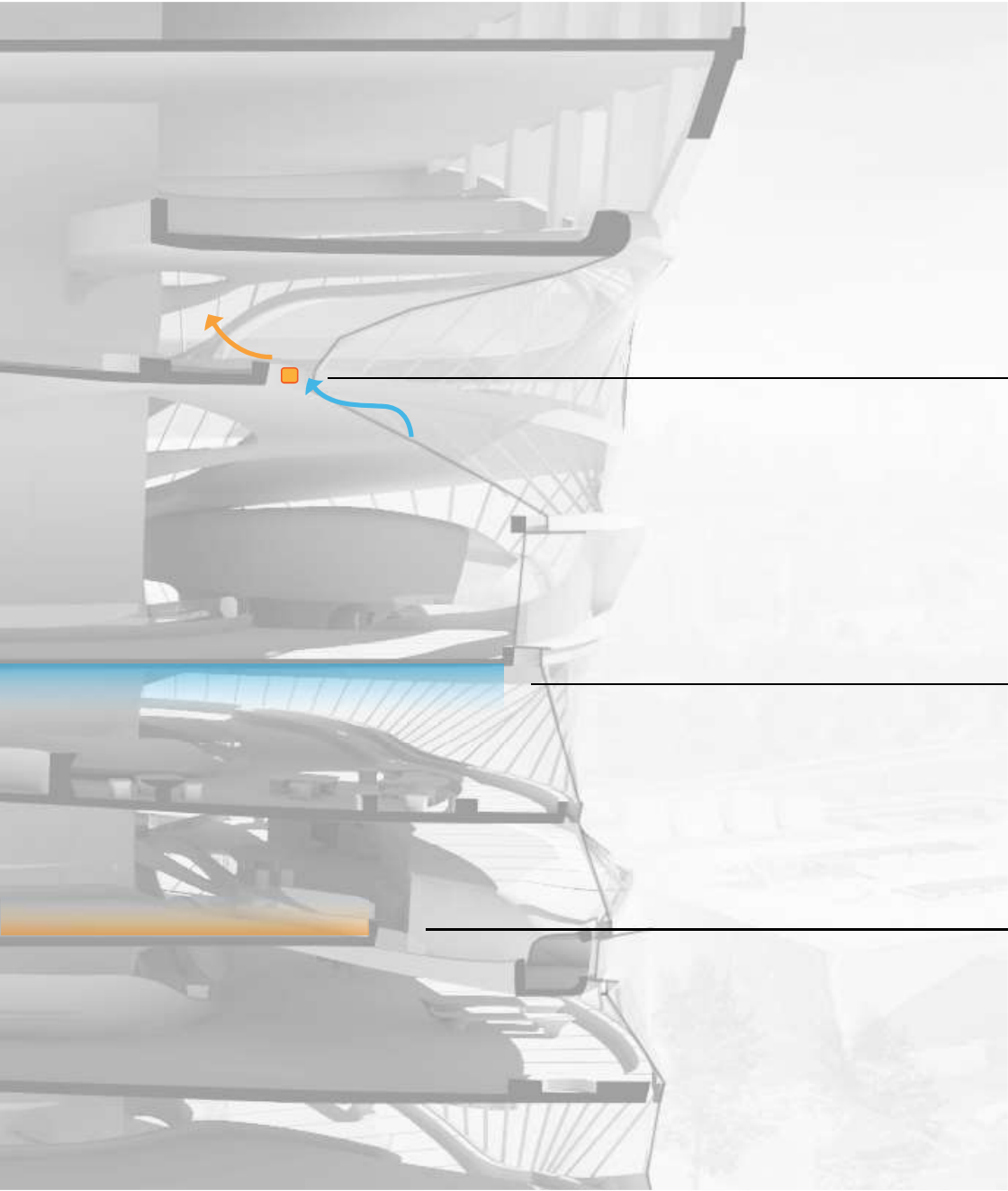
VENTILATION

WINTER

MECHANICAL VENTILATION COMPENSATES FOR WEAK STACK EFFECT

COLD AIR GETS PRE-HEATED BEFORE ENTERING THE SPACES





HEATING/COOLING

PRE-HEATED AIR

RADIANT CEILING COOLING

FLOOR HEATING

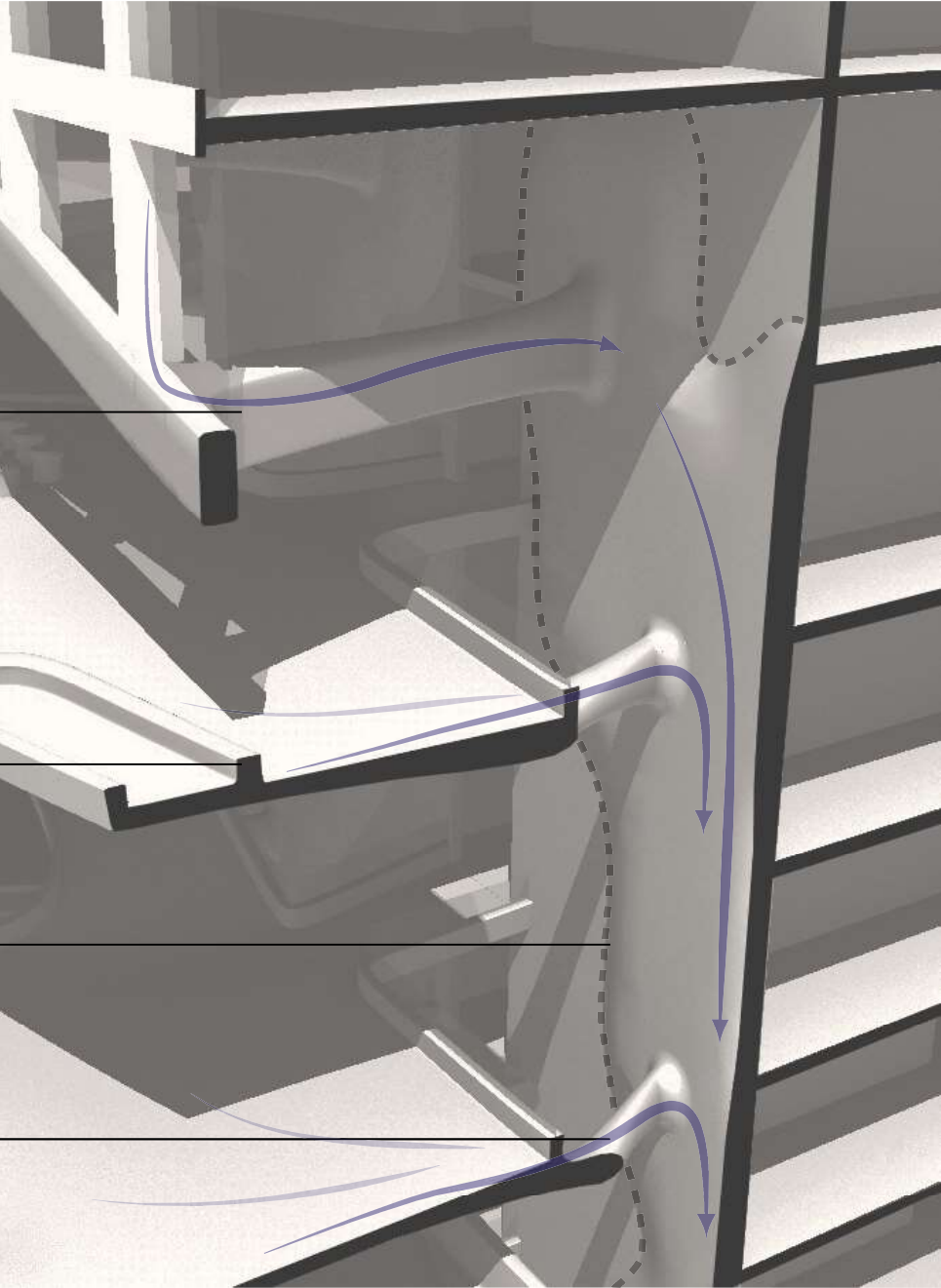
STRUCTURE

CONCRETE BEAMS (H= 1700mm)

CAST CONCRETE FLOOR

CORE REINFORCEMENT

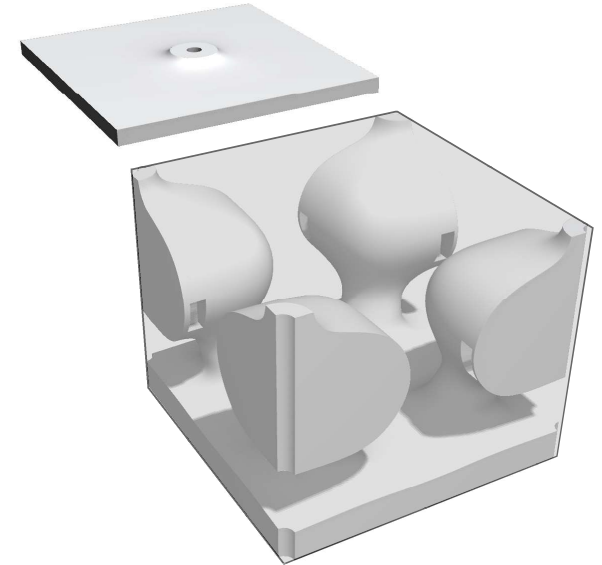
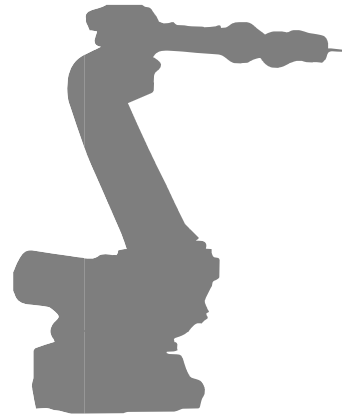
CONCRETE BEAMS (H= 600mm)



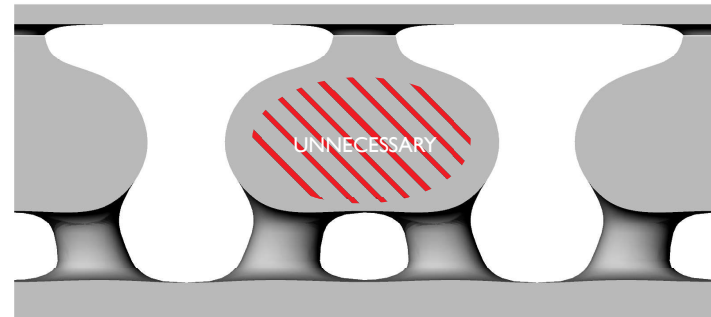
FLOOR PRODUCTION

GOALS

- FREEFORM FLOOR GEOMETRY
- SMOOTH FINISH
- LIGHTWEIGHT TO COMPENSATE FOR CANTILEVER
- INTEGRATE REBAR AND PIPES/TUBES
- EASY TO ASSEMBLE

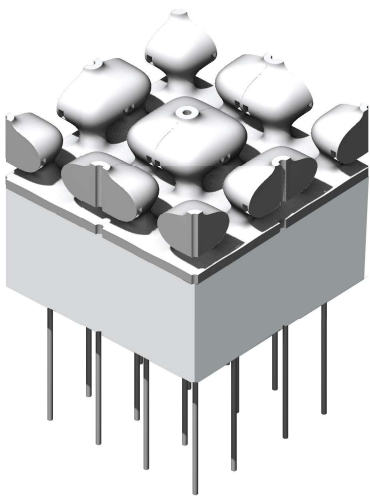


USE THE ROBOTIC CNC ARM TO MAKE UNIQUE AND COMPLEX EPS COMPONENTS AS A CONCRETE MOLD

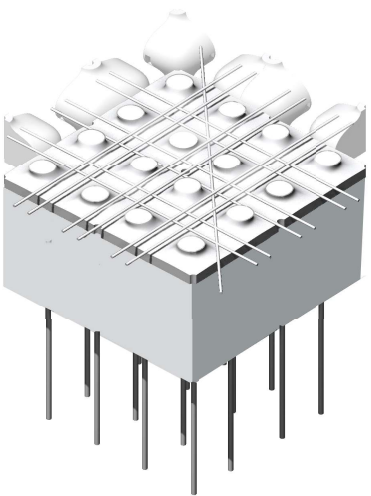


SAVE WEIGHT BY REDUCING CONCRETE VOLUME

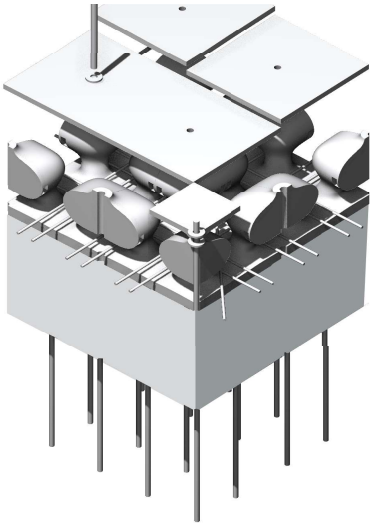
FLOOR ASSEMBLY



PLACE AND CONNECT EPS COMPONENTS ON TEMPORARY SUPPORT STRUCTURE



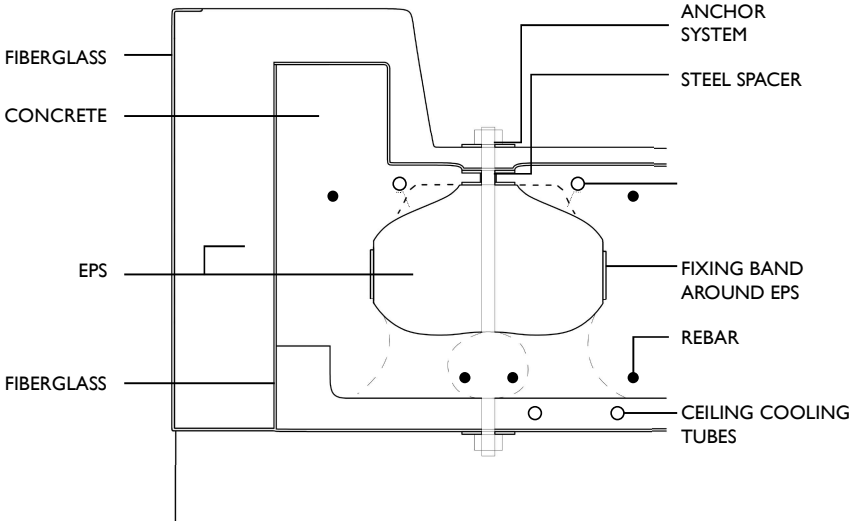
ADD REBAR IN MULTIPLE DIRECTIONS (AND ALSO FLOOR HEATING TUBES)



PLACE TOP COVERS AND TIGHTEN PACKAGE TOGETHER WITH GENERAL FORMWORK TECHNIQUE

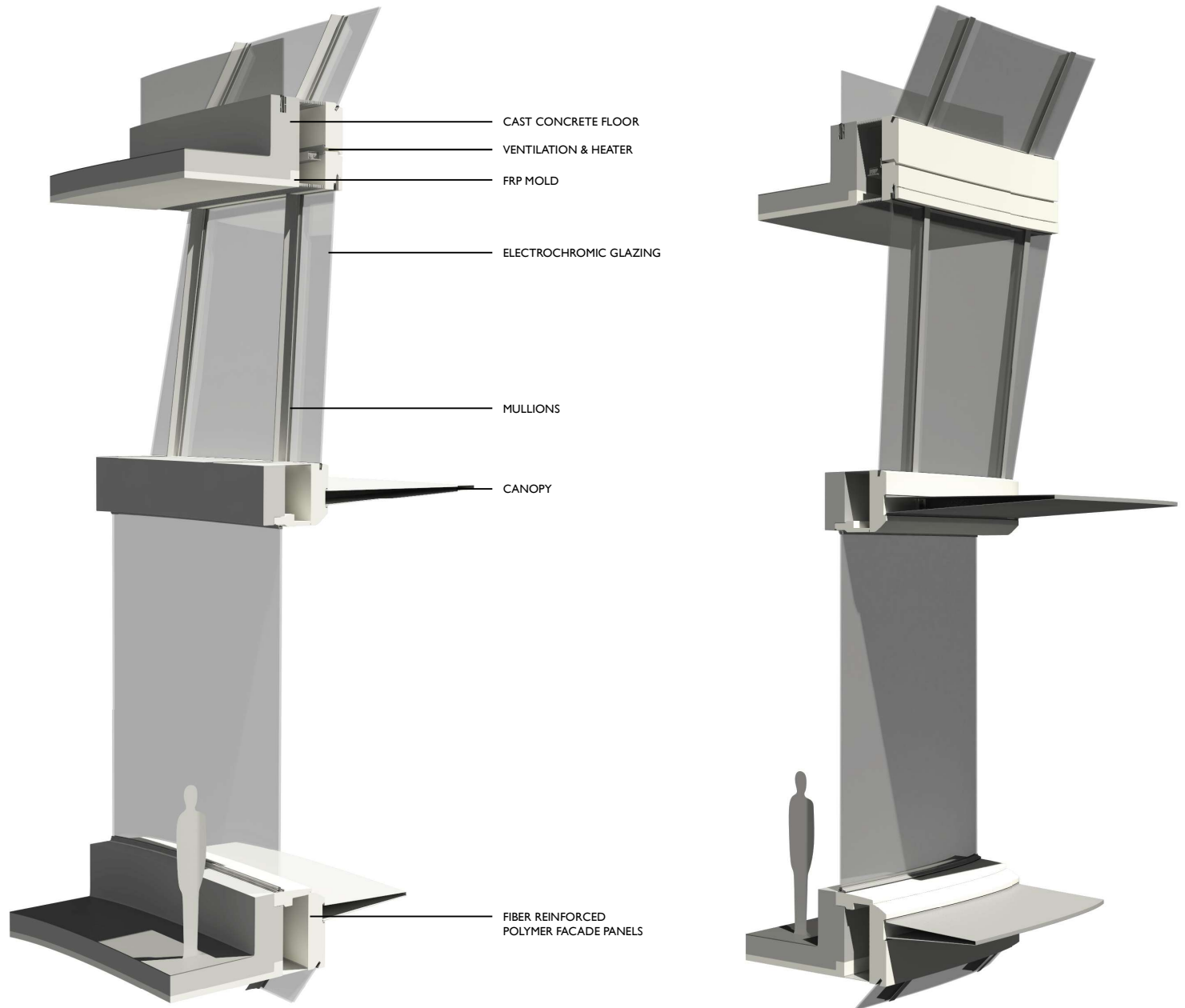
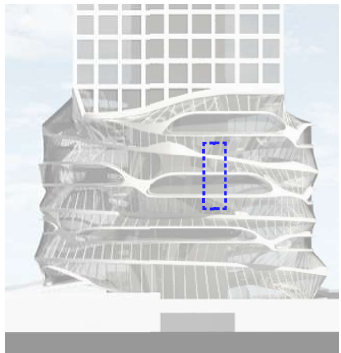


AFTER POURING CONCRETE, EPS COMPONENTS REMAIN IN THE FLOOR AND FORM CEILING FINISH

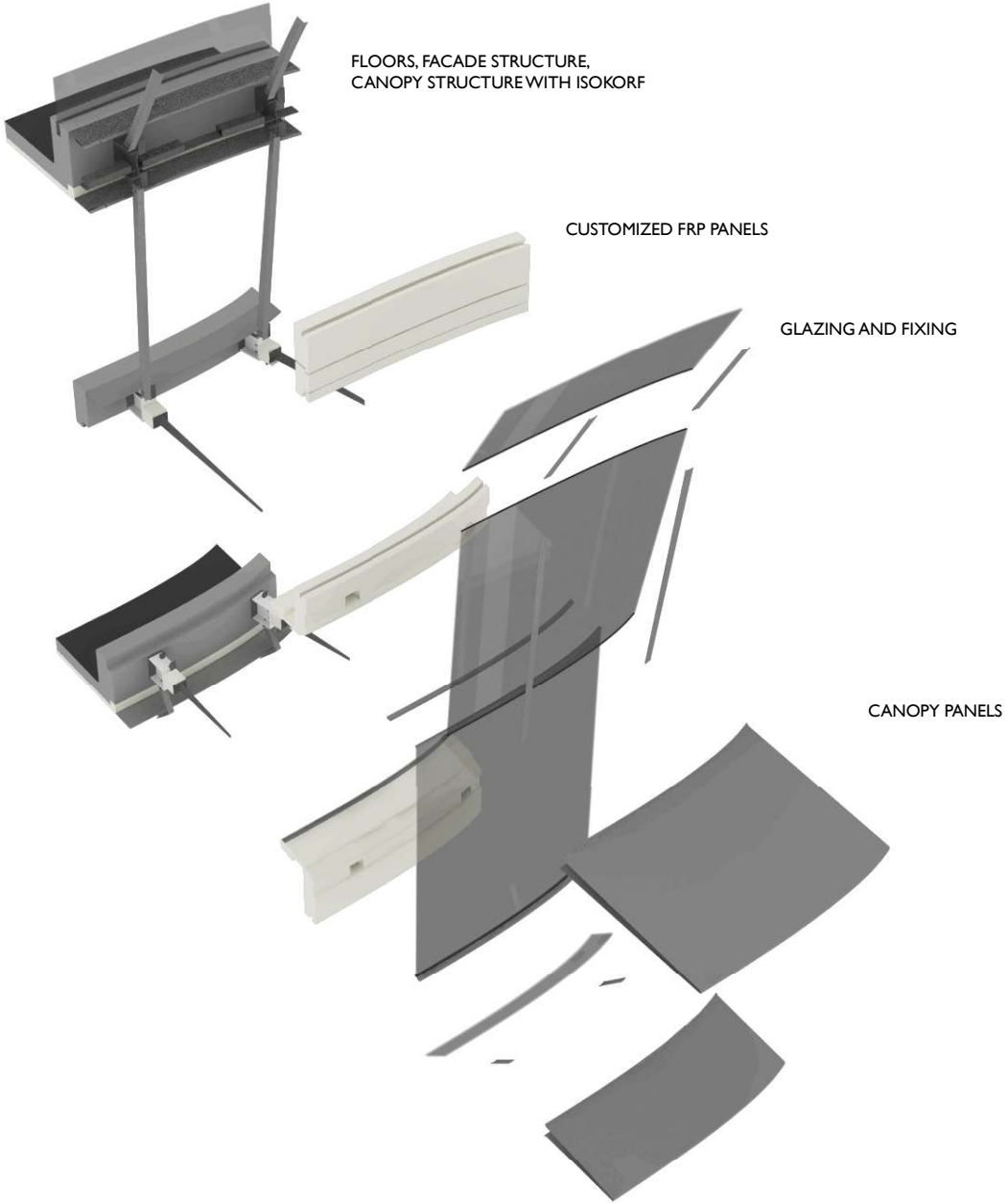


FACADE FRAGMENT

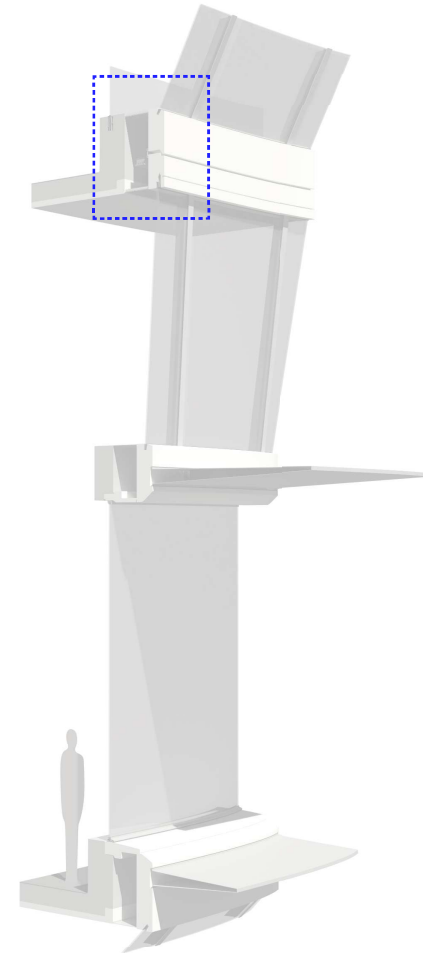
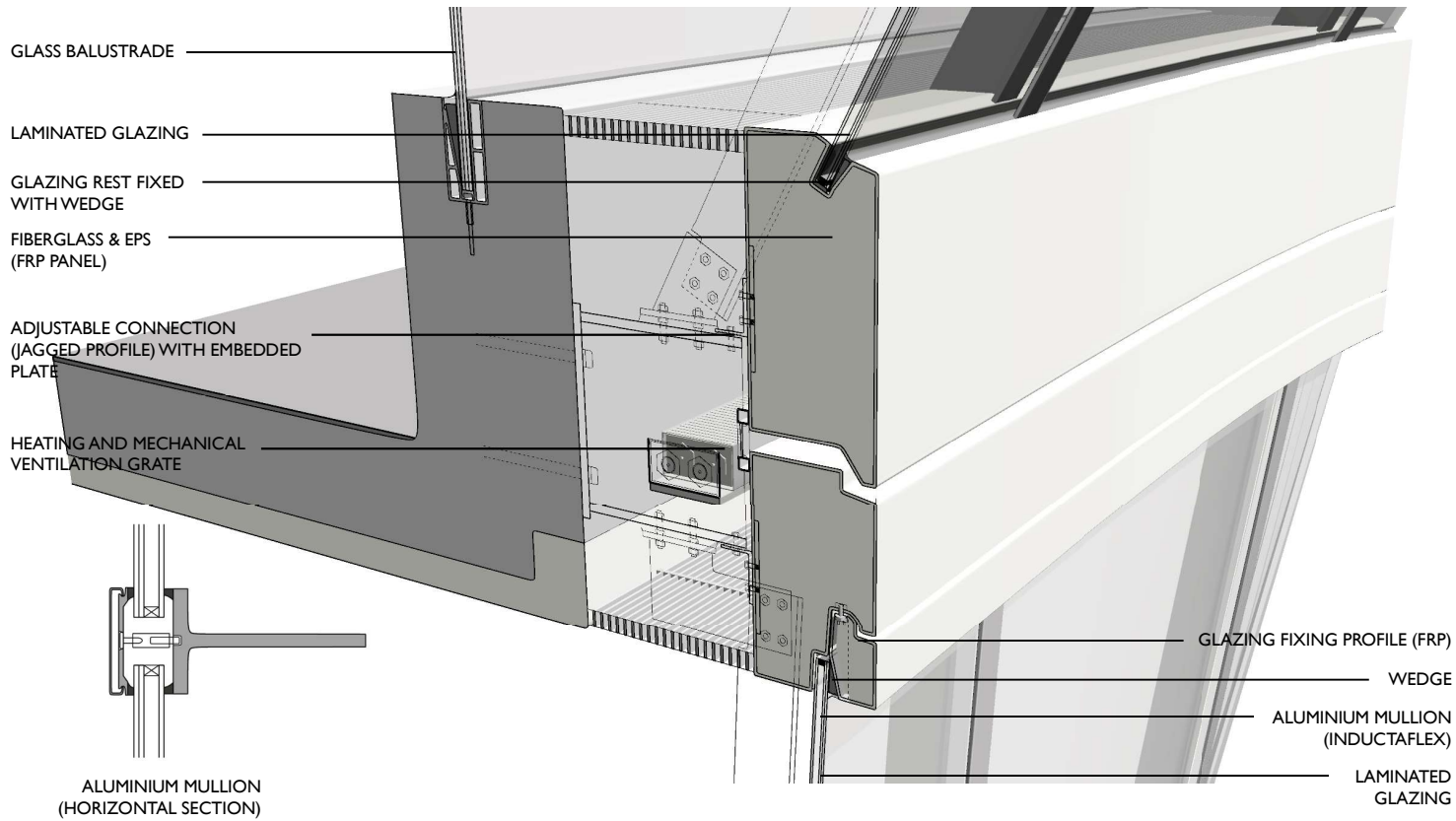
VERTICALLY CUT FRAGMENT OF
APARTMENT FLOOR (BOTTOM)
AND PUBLIC FLOOR (TOP)
WITH FACADE STRUCTURE



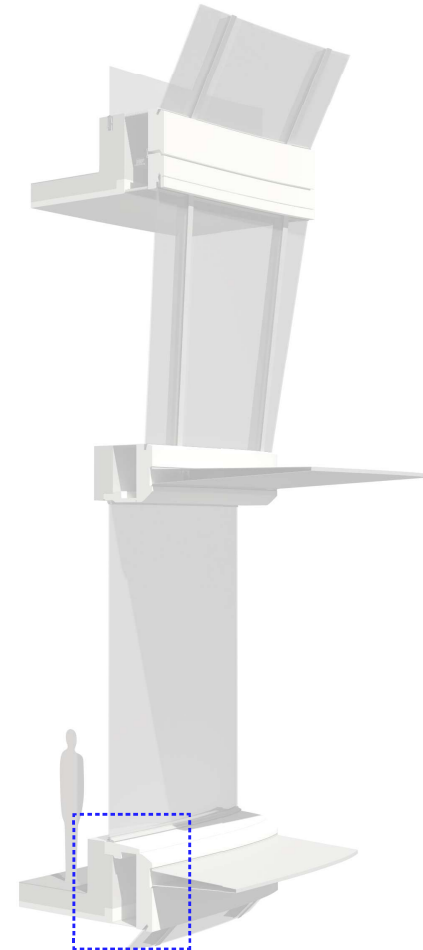
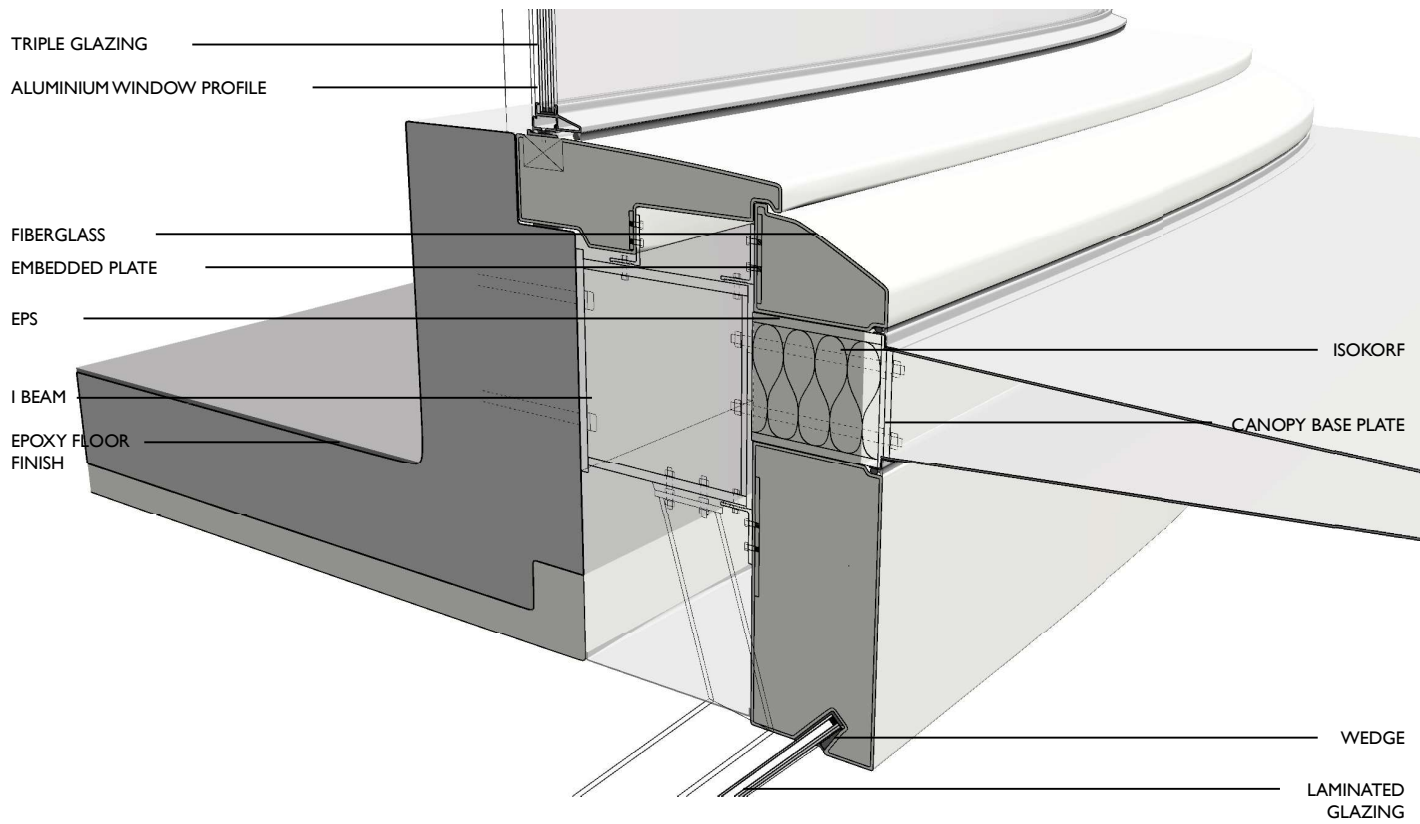
EXPLODED VIEW



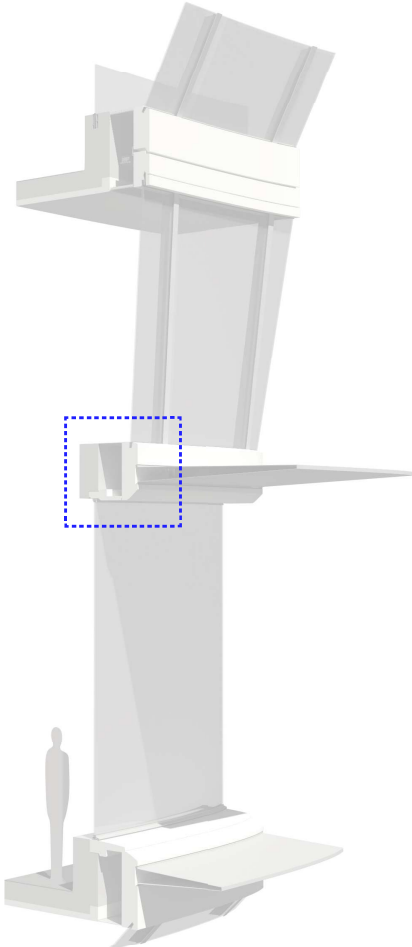
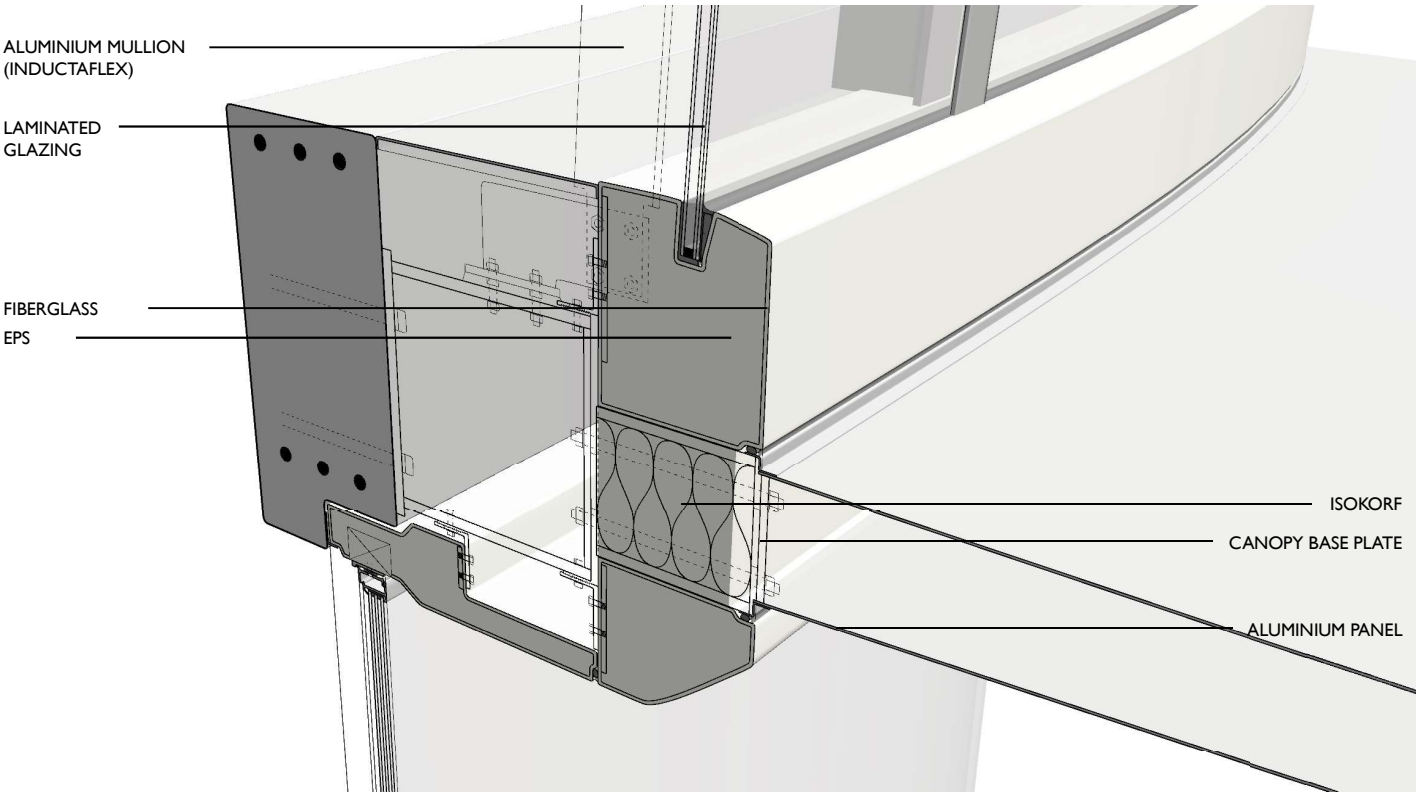
DETAILS



DETAILS



DETAILS



THANKYOU!

