BETWEEN WATER AND MEMORY:

New Belgrade and its riverfront

FORWARD IN FORM

GROUNDED IN HISTORY

“Urban artifacts are not only physical constructions; they are also the locus of a city’s memory and therefore of its identity.”

Rossi, Aldo. The Architecture of the City. Cambridge.

Belgrade is a city shaped by a deep historical legacy, where water is not just a geographic element but a defining force in its identity. In the post-war era, developments such as New Belgrade and the Belgrade Waterfront have introduced new urban opportunities for modernization and growth.

Our proposal for the Belgrade Yacht Club and the Athlete Living Facilities seeks to establish dynamic hubs for interaction and innovation within these expanding districts, responding to the city’s rapid transformation while preserving its cultural character and giving the riverfront back to its people.

The project aligns with the Belgrade Masterplan by integrating sustainable and forward-thinking strategies, reducing carbon emissions and energy consumption, and providing high-quality recreational green spaces alongside alternative mobility systems that connect seamlessly to the broader urban fabric.

THE URBAN CONTEXT

Understanding the inmediate spatial environment

- Site Analysis
- Urban Proposal
- City Image Proposal

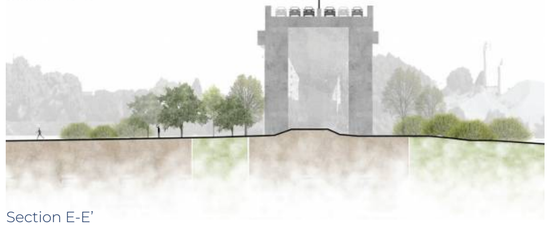
SITE ANALYSIS

Section A-A'

Section B-B'

Section C-C'

Section D-D'



Section E-E'

1. New Belgrade Riviera
2. Delta City Beograd Mall
3. Bus & Train Station
4. Belgrade Arena
5. Great War Island
6. Kalemegdan Fortress
7. Sports & Recreational Center
8. Belgrade Linear Park
9. Ušće Park
10. Sava Centar
11. Belgrade Waterfront Walkway
12. Ada Lake

SITE ANALYSIS

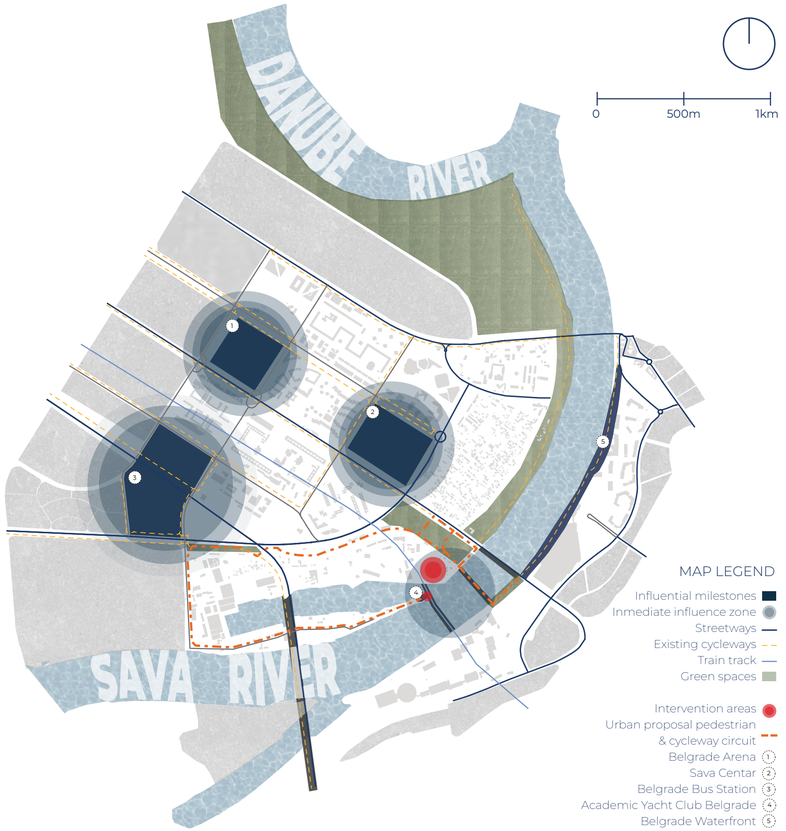
River Network and Flood Hubs

Flood risk along the Sava River is highest near its confluence with the Danube, where fluctuating water levels increase the likelihood of overflow. Therefore, resilient strategies and adaptive infrastructure should be implemented nearby high risk areas.

Connectivity, Mobility and Recreation

Belgrade's mobility relies on major axes and river crossings, but this creates poor pedestrian connectivity along the waterfront. Further, New Belgrade lacks sufficient public facilities, highlighting the need to better integrate infrastructure with urban development.

Centralities and Areas of Influence

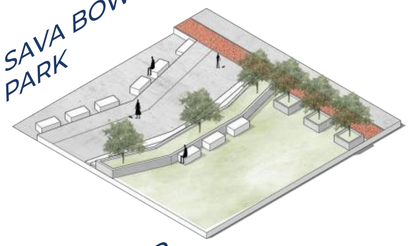


New Belgrade is characterized by large hyperblocks and high-rise, residential-focused developments in contrast to the fine-grained fabric of the historic city. The concentration of key landmarks shape these blocks and the way the people move around them.

URBAN PROPOSAL

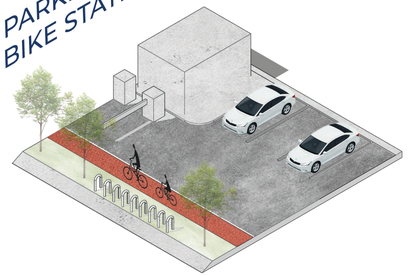
1

SAVA BOW PARK



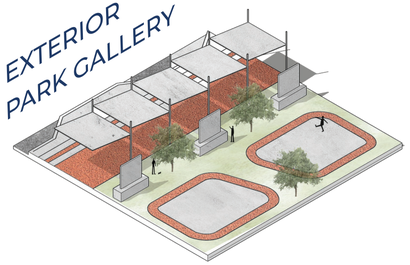
2

PARKING AND BIKE STATION



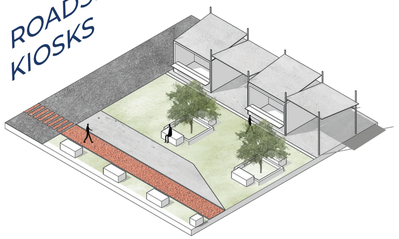
2

EXTERIOR PARK GALLERY



3

ROADSIDE KIOSKS



ROADSIDE KIOSKS

RESIDUE COLLECTION CENTER

WATER TREATMENT PLANT

OUTSIDE PARK GALLERY

PARKING AND BIKE STATION

BRIDGE OF ECHOES

SAVA BOW PARK

ZONE A

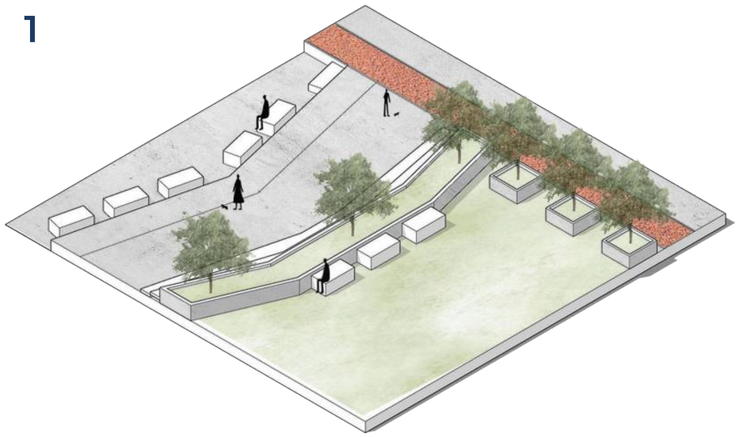
ZONE B

1. Sava Bow Park
2. Košava Park
3. Plane Zero Sports Field
4. Linear Commons Park

Cycleway circuit
Direction of circuit
Under bridge cycleway
Bridge of Echoes

INTEGRATION

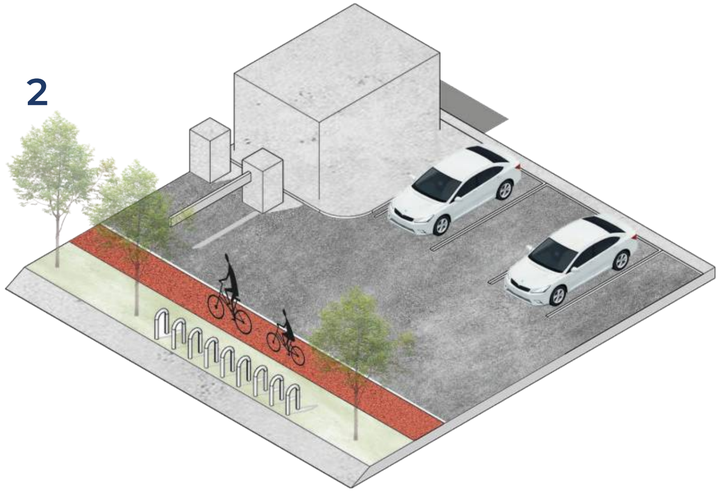
1



Sava Bow Park - Connection

This extension of the Waterfront walkway unifies the public space on both sides of the river by becoming the point of acces to a greenway bridge.

2



Košava Park - Electric Vehicle Charging and Bike Station

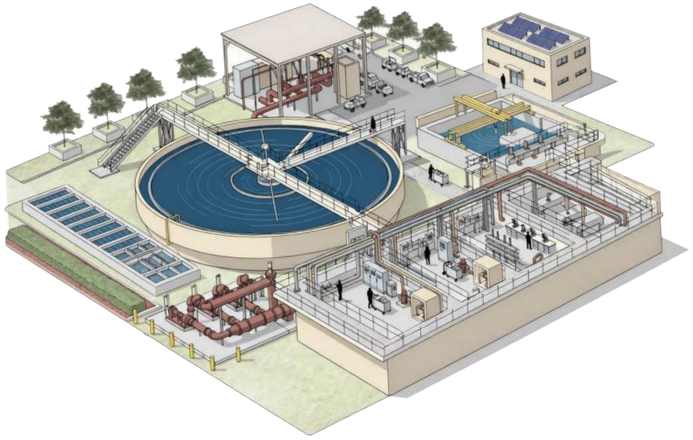
The bridge, highway and sideways all intersect in a space where electric vehicles can charge and park before entering the Zone A buildings.

2

Košava Park - Exterior Gallery

Outdoor spaces right next to Zone A provide public access to temporary art exhibitions that change depending on the city's cultural festivities.

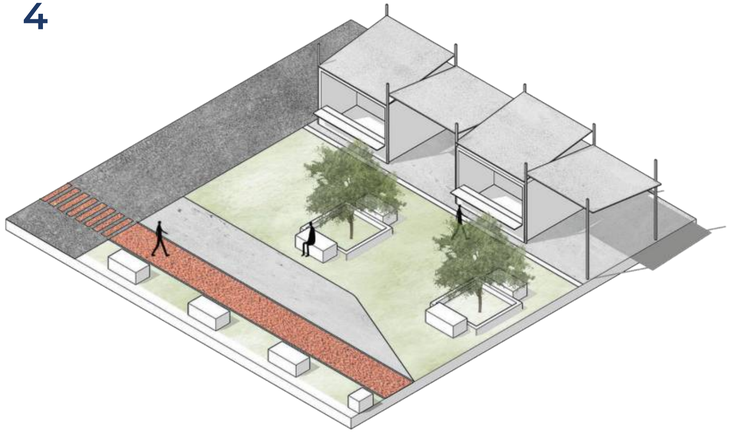
3



Plane Zero Sports Field - Water Treatment Plant

Water treatment plants that aims to decontaminate the river and provide clean water to the facilities and the city.

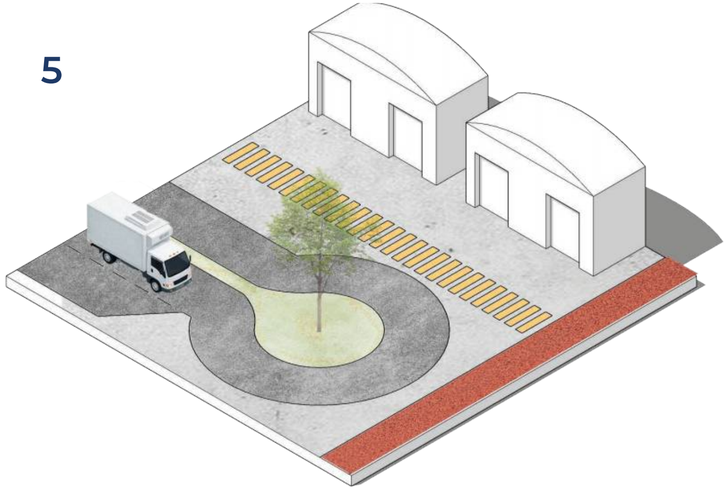
4



Linear Commons Park - Roadside Kiosks

We aim to restore the local economy by providing small businesses of public, high traffic spaces where they can work and engage with the community.

5

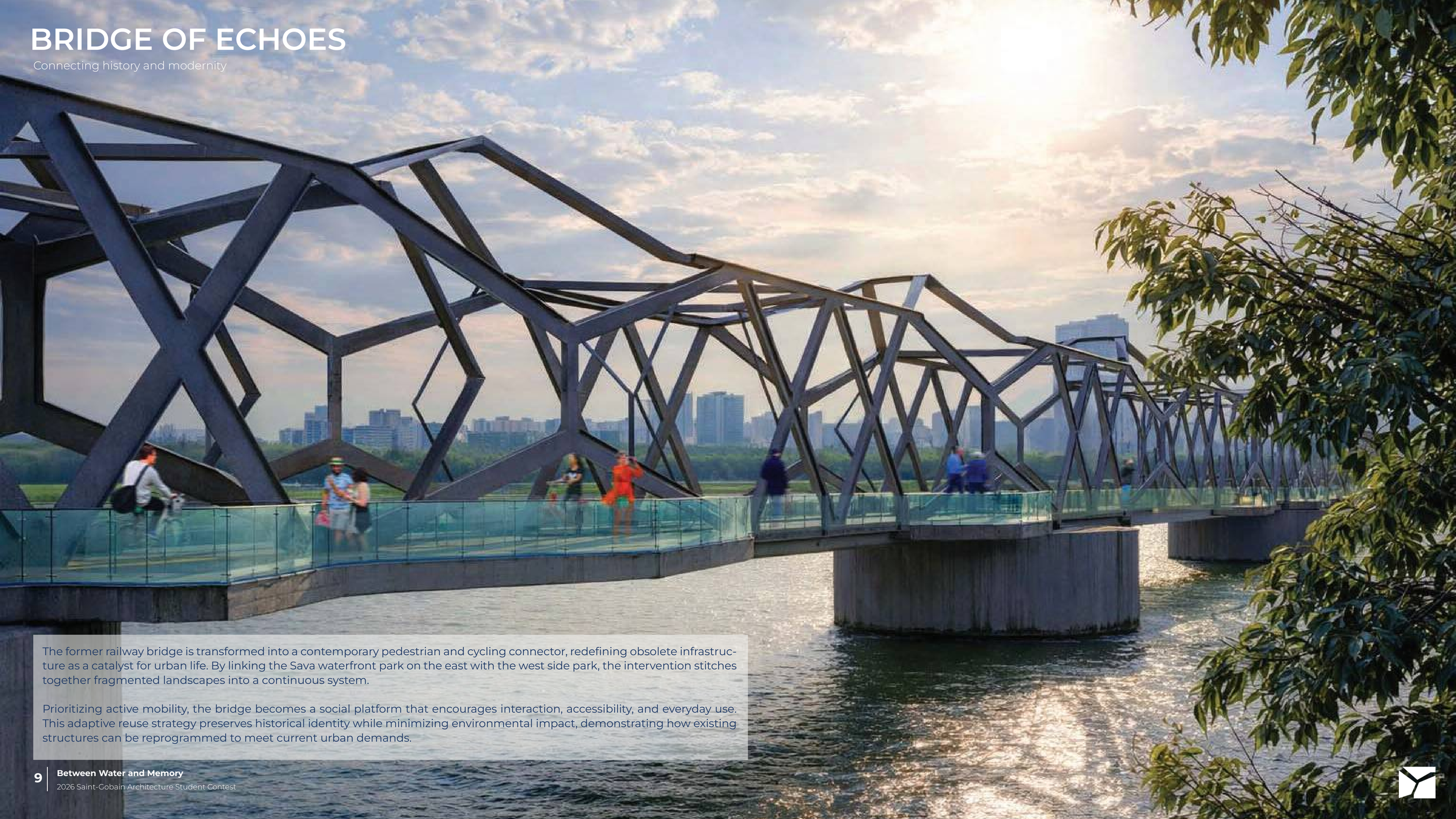


Residue Collection Center - Regenerative

A local hub that reduces environmental impact: organic residues are composted, recyclables are recovered, and remaining waste is managed responsibly.

BRIDGE OF ECHOES

Connecting history and modernity



The former railway bridge is transformed into a contemporary pedestrian and cycling connector, redefining obsolete infrastructure as a catalyst for urban life. By linking the Sava waterfront park on the east with the west side park, the intervention stitches together fragmented landscapes into a continuous system.

Prioritizing active mobility, the bridge becomes a social platform that encourages interaction, accessibility, and everyday use. This adaptive reuse strategy preserves historical identity while minimizing environmental impact, demonstrating how existing structures can be reprogrammed to meet current urban demands.

ZONE A - NEW BUILDING
ATHLETE ACOMMODATION

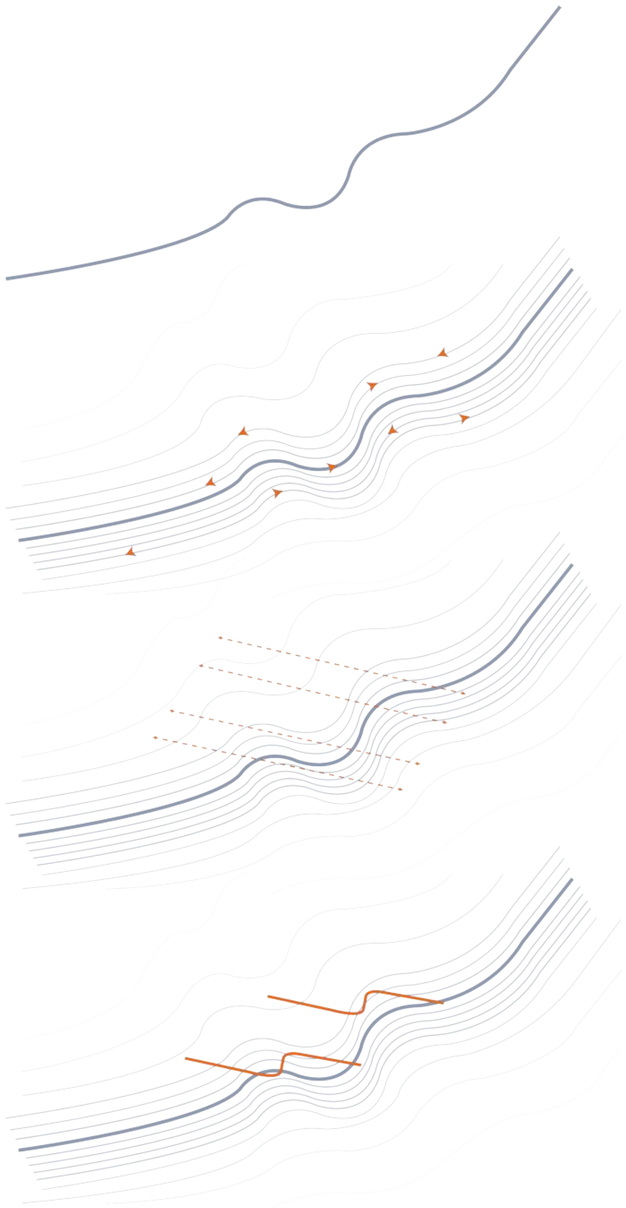
Reclaiming the river, redefining the city through habitation

- Masterplan
- Design Strategies
- Materials Overview
- Construction Process
- Facilities and Spaces
- Sustainable Principles
- Building Carbon Assesment

ZONE A: MASTERPLAN

Reconnecting to the urban fabric

MAIN CONCEPT



1 Riverline Tracing

The river line establishes the primary generative path that organizes the spatial and ecological logic of the project.

2 Extension of Influence

The river's influence expands outward, shaping a gradient of ecological and urban interactions across the site.

3 Anchoring Axes

A system of ordered lines anchors circulation, connections, and spatial hierarchy within the intervention.

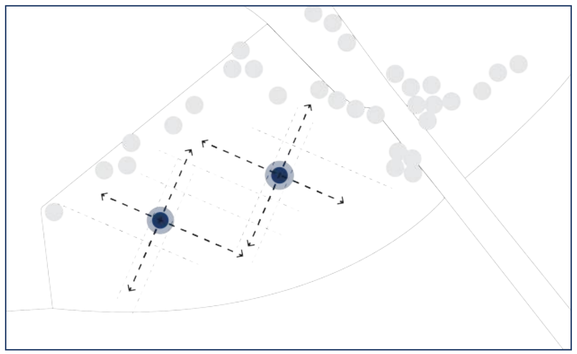
4 Form Positioning

Built forms are strategically positioned in response to these underlying systems, optimizing relationships with context, flows, and landscape.

SITE PLANNING

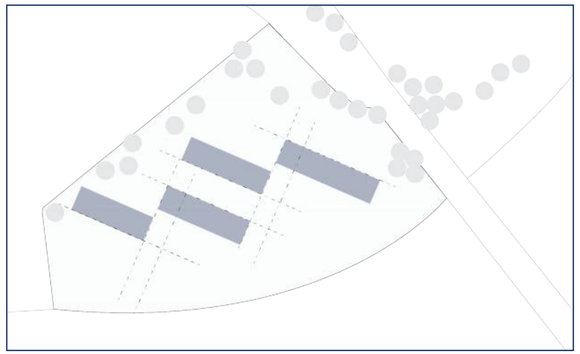
The layout of the Athlete Living Facilities is strategically oriented in response to the **river stream** and **solar exposure**. The buildings are anchored to adjacent outdoor spaces and the Bridge of Echoes, creating a cohesive spatial network and multiple entrances. This approach prioritizes mobility and the integration of public spaces for **interaction, recreation, and exercise**.

Primary Axes & Nodes



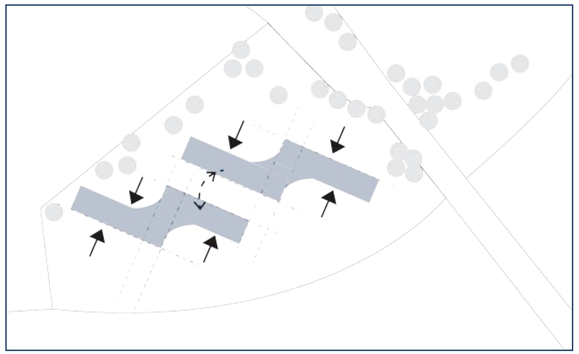
Two main axes intersect to define circulation and create key connection points across the site.

Grid-Based Massing



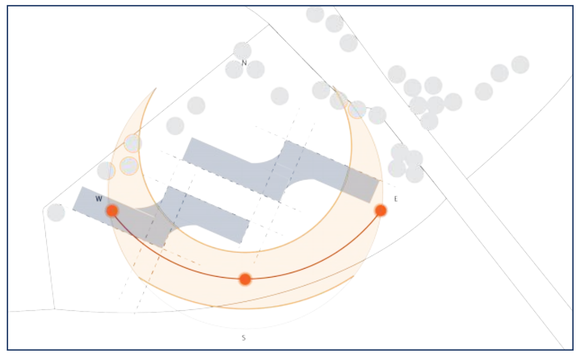
The axes generate a grid that organizes and aligns the building volumes symmetrically between themselves.

Permeability & Circulation



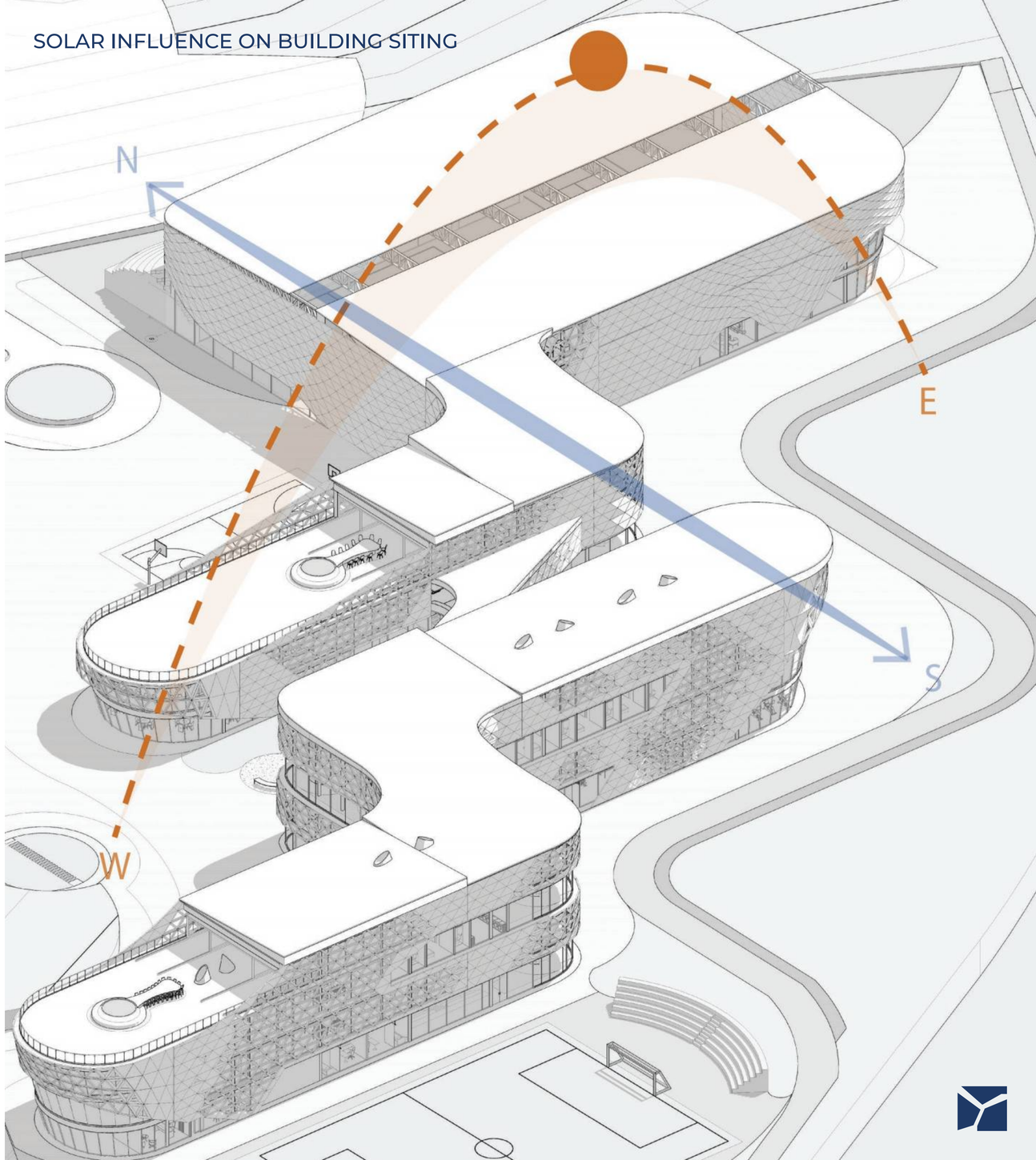
Openings and entrances are introduced to improve flow, permeability, and internal-external connectivity.

Solar Orientation Strategy



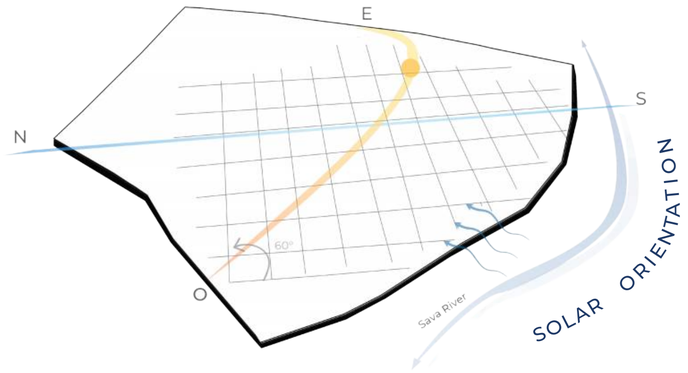
The layout is adjusted to optimize sunlight exposure and environmental performance, enhancing thermal comfort.

SOLAR INFLUENCE ON BUILDING SITING



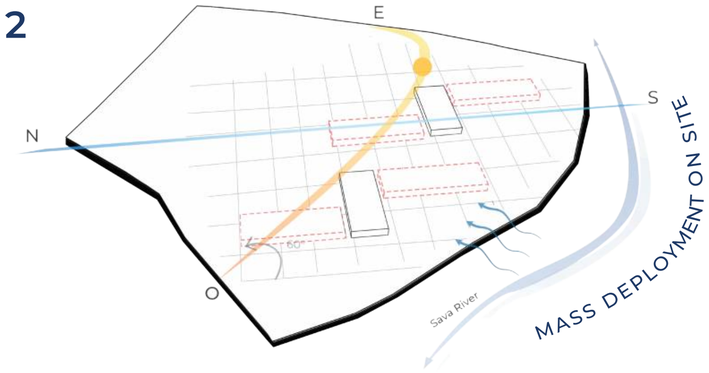
DESIGN OPERATIONS

1



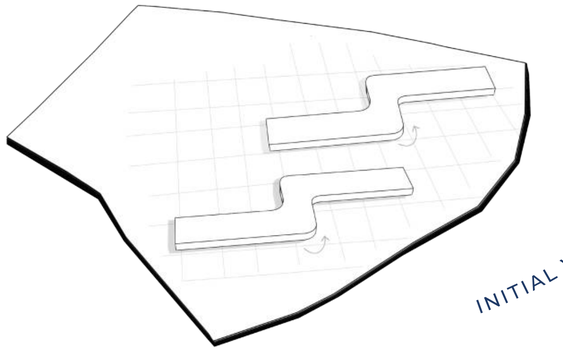
SOLAR ORIENTATION

2



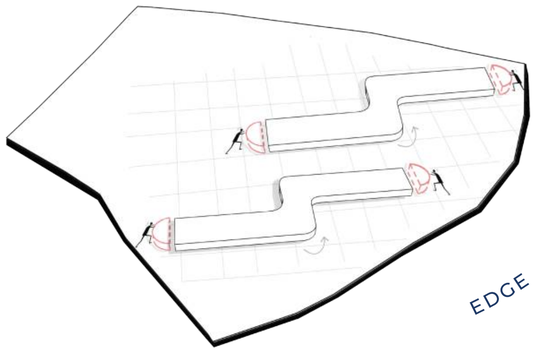
MASS DEPLOYMENT ON SITE

3



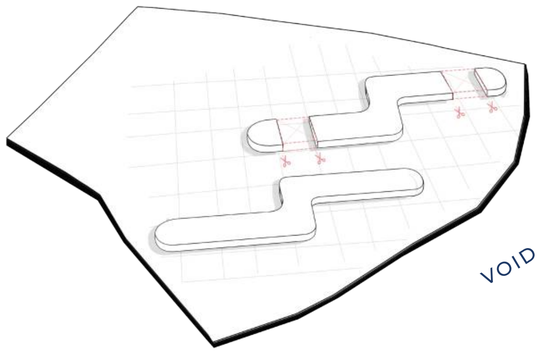
INITIAL VOLUME AND FORM

4



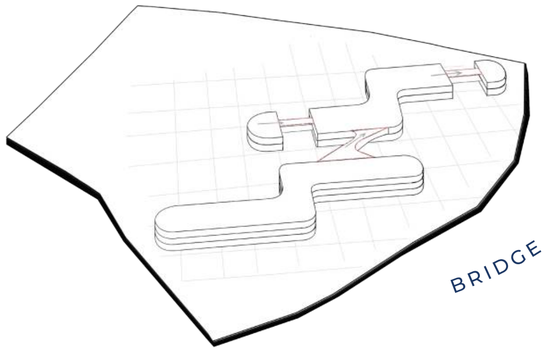
EDGE SOFTENING

5



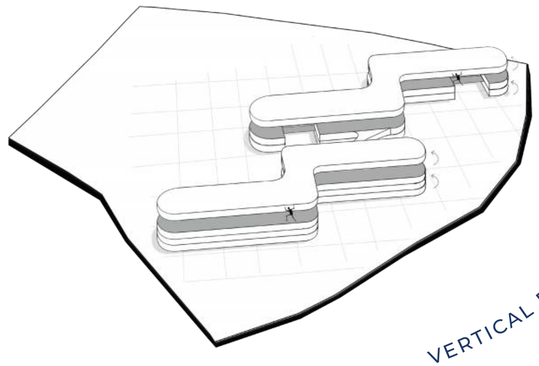
VOID INSERTION

6



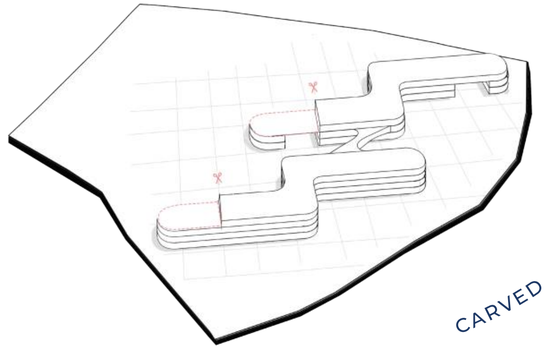
BRIDGE STRUCTURES

7



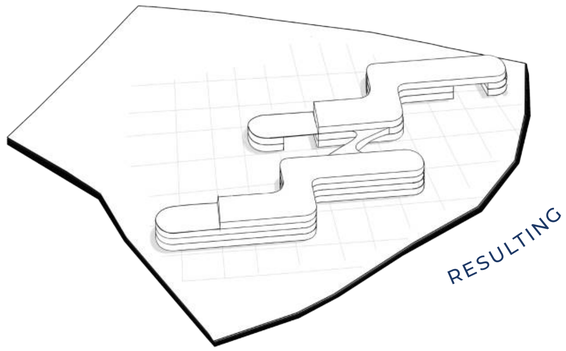
VERTICAL EXPANSION

8



CARVED TERRACES

9



RESULTING VOLUME

ENVIRONMENTAL STRATEGIES

The project is driven by an integrated **water-sensitive system** that links ecology, mobility, and public space. A restored green corridor, rain gardens, and a rainwater plaza work together to manage stormwater, regenerate biodiversity, and activate the urban environment, positioning water as the key element that organizes and revitalizes the entire intervention.

Green Corridor

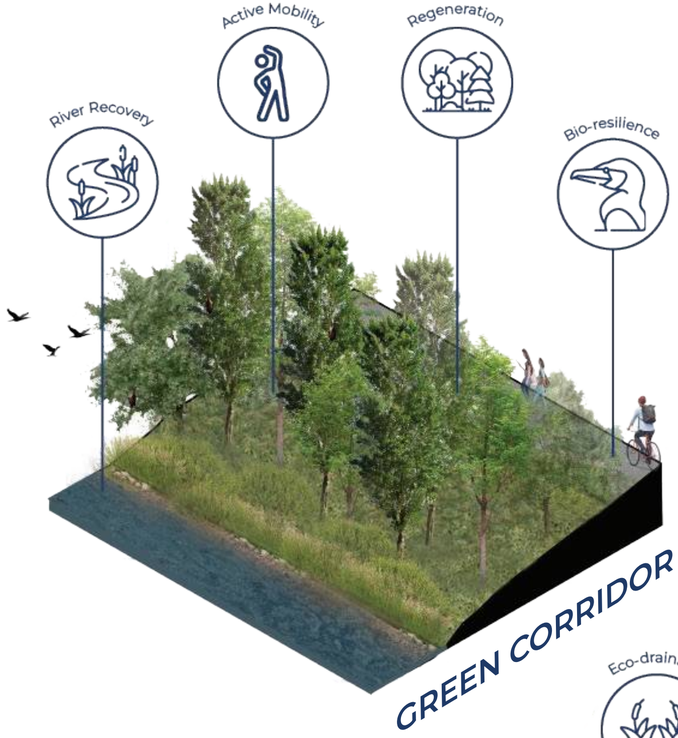
A regenerative axis that restores the river ecosystem, enables pedestrian and bicycle mobility, and strengthens biodiversity through forest recovery and habitat continuity.

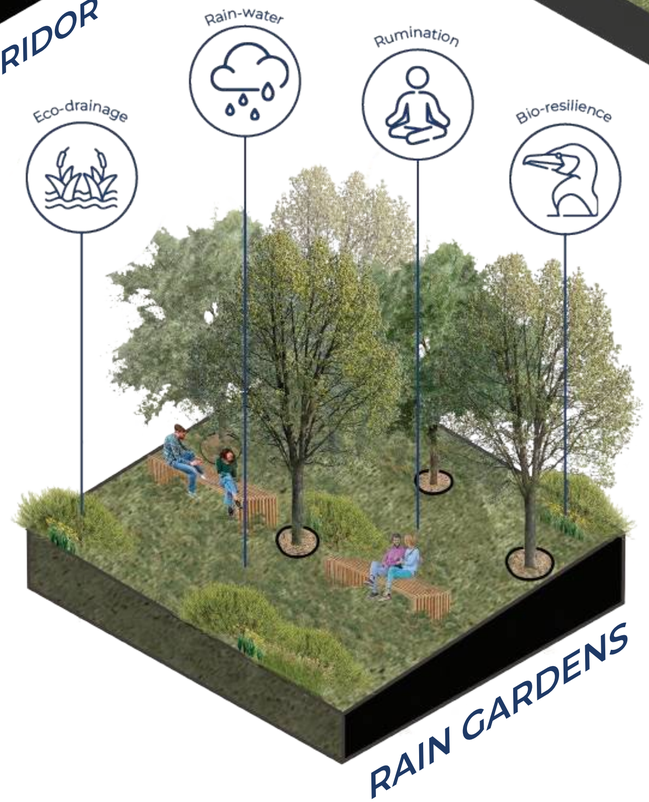
Rain Garden

Decentralized systems that naturally manage stormwater while creating resting spaces and supporting the recovery of native species. By slowing runoff and improving water quality, they contribute to a more resilient urban ecosystem that operates in balance with natural cycles.

Rainwater Plaza

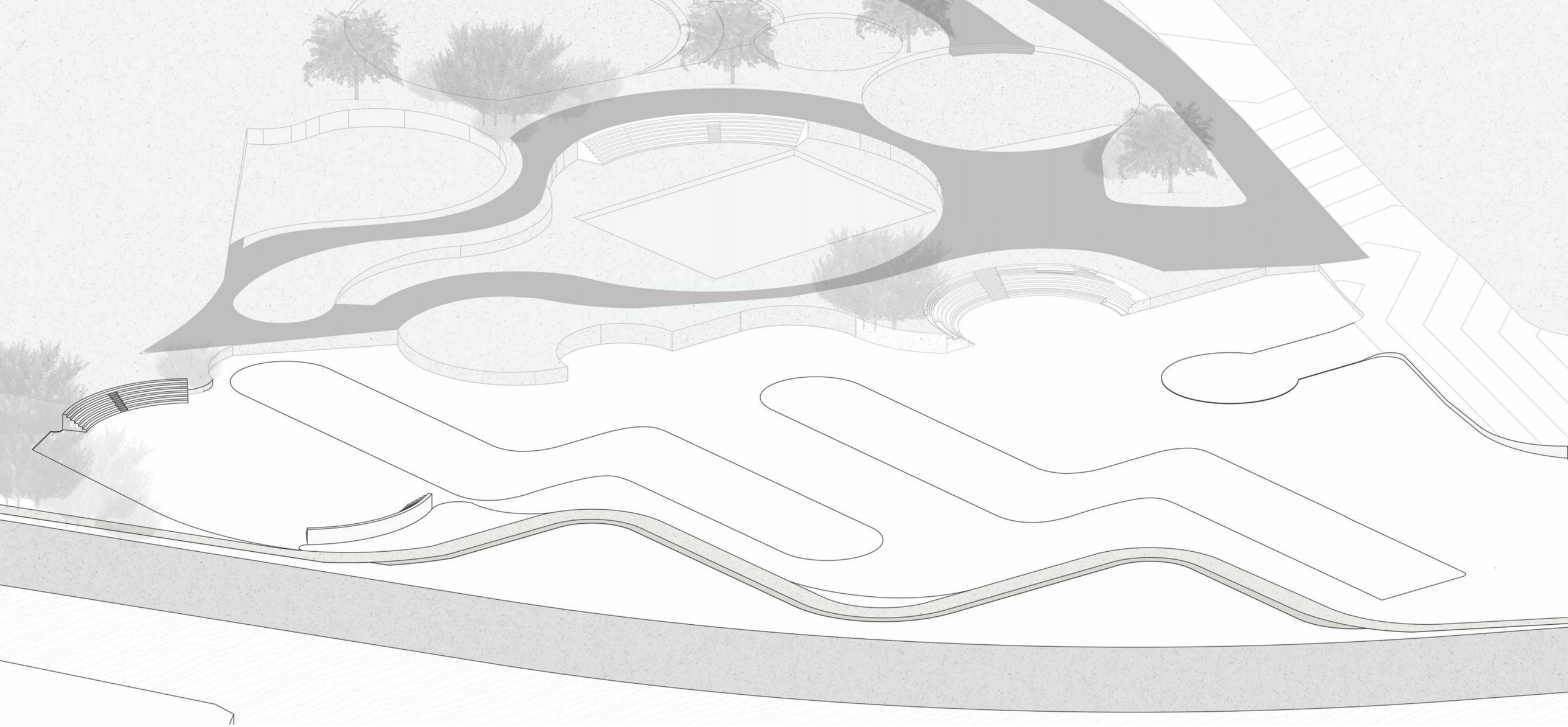
An interactive public space that collects, recirculates, and reactivates rainwater, turning water management into a visible and engaging urban feature, redefining water as ab active design component.



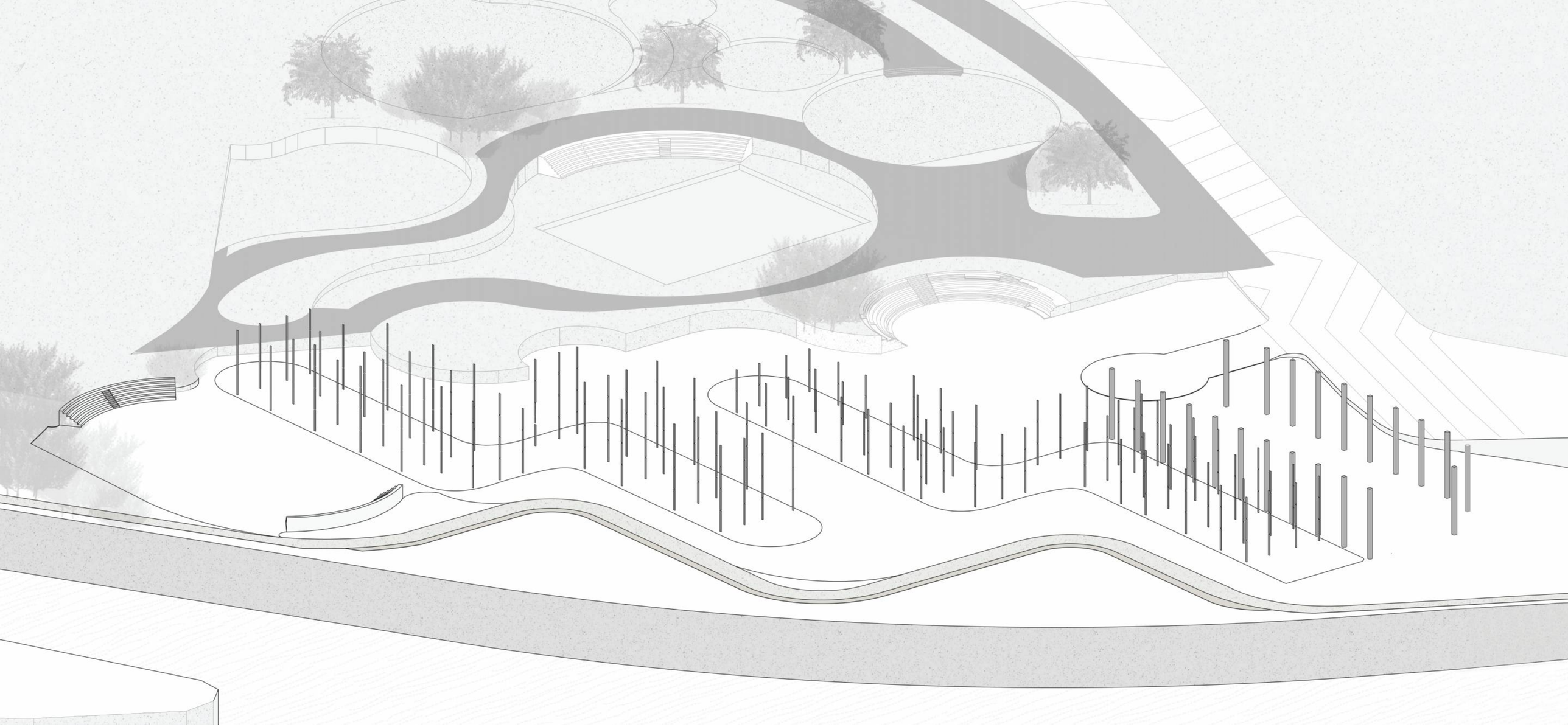


ATHLETE ACCOMMODATION

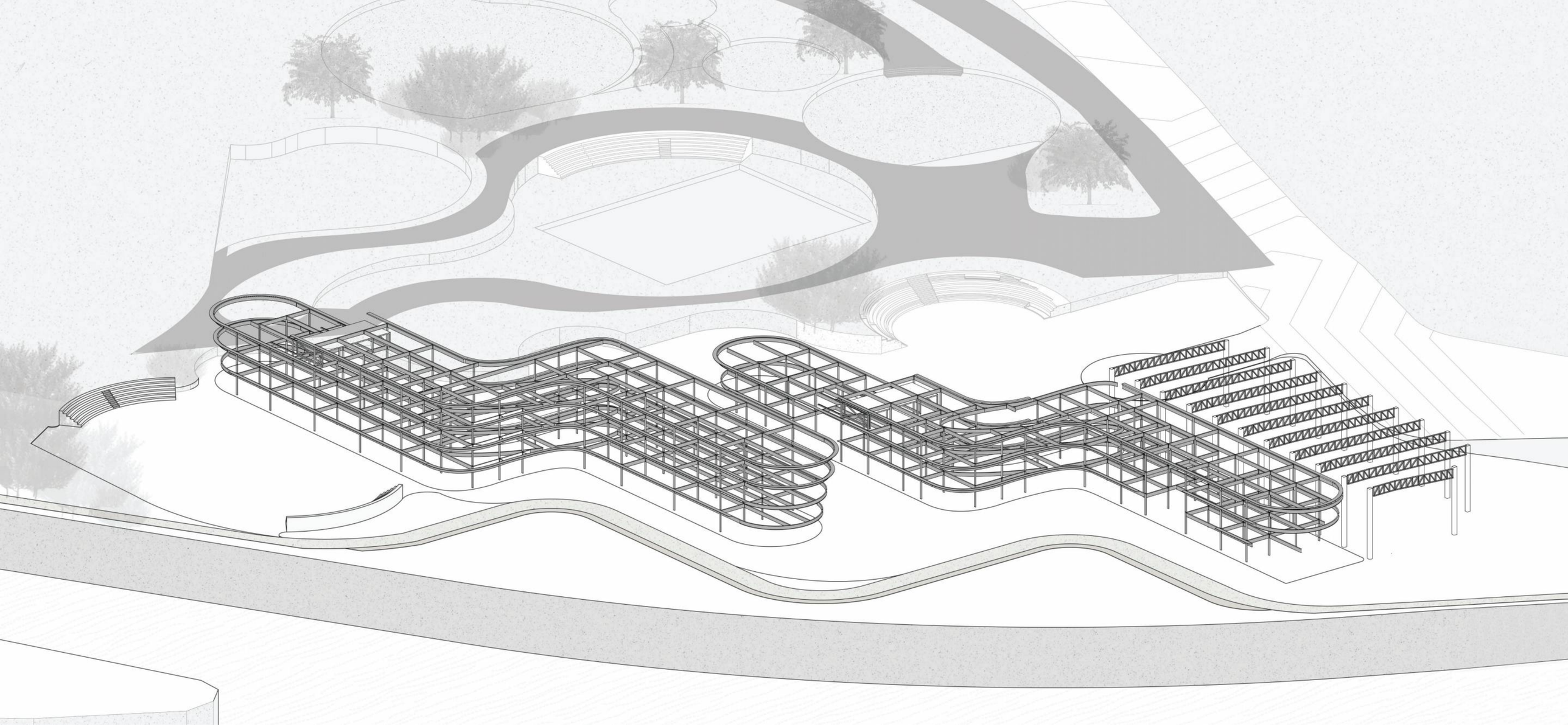
Connecting history and modernity



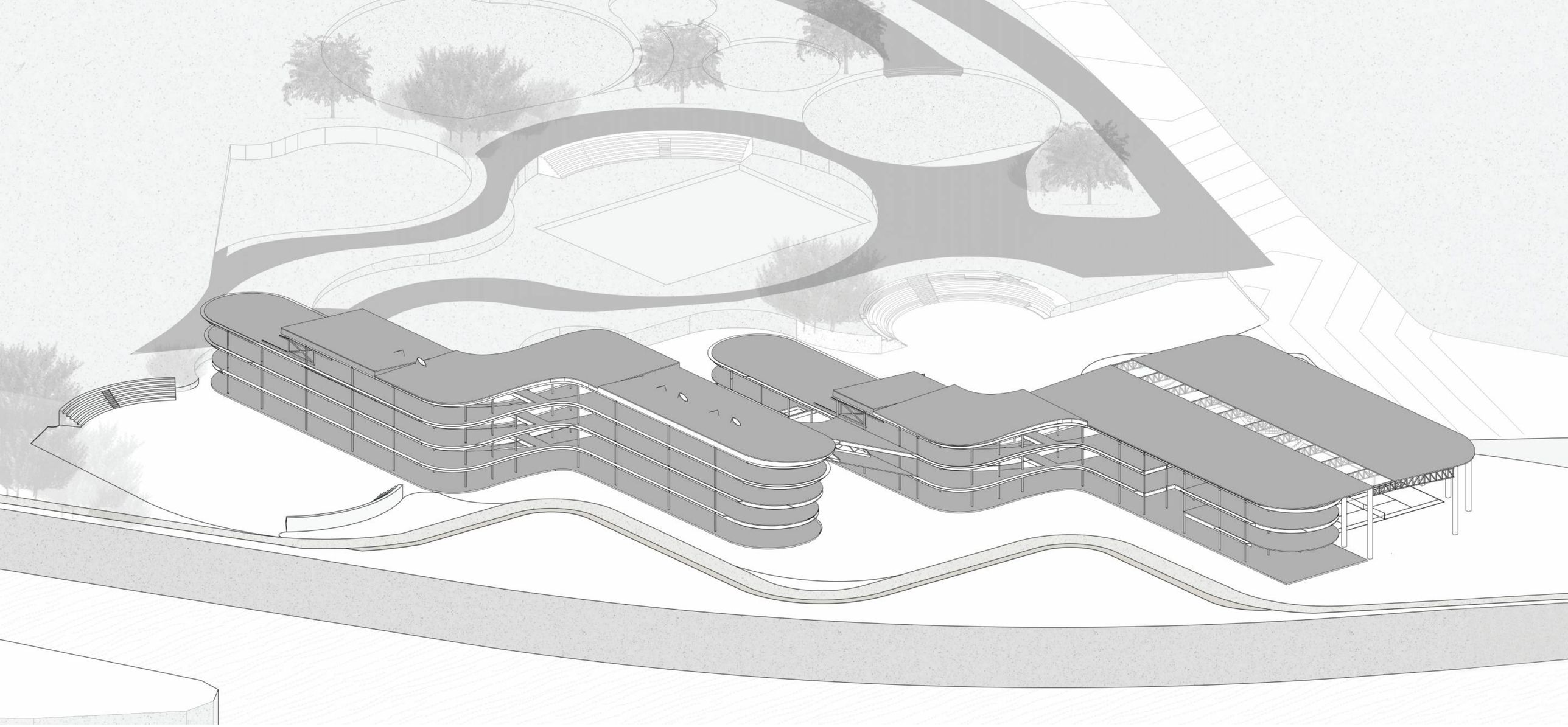
1: TERRAIN



2: COLUMNS

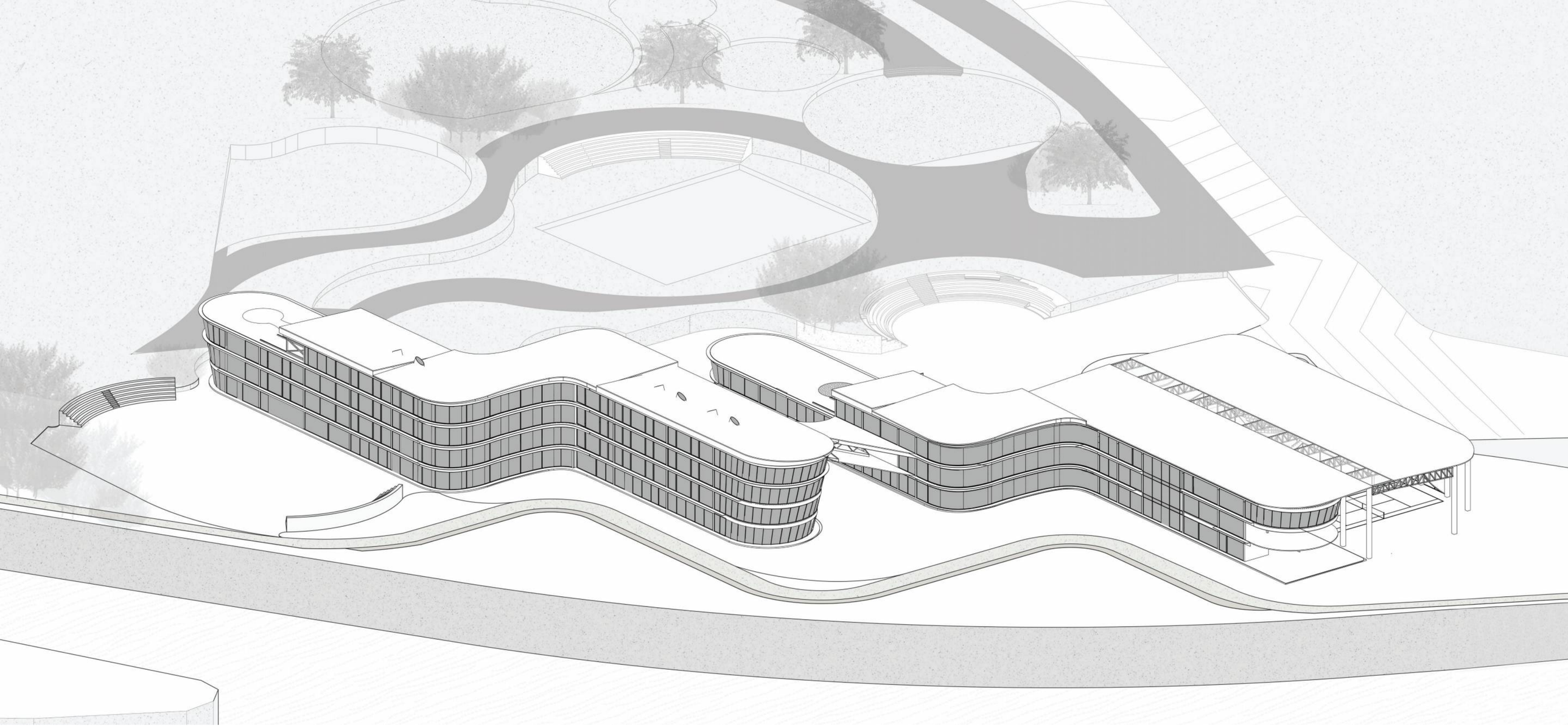


3: BEAMS

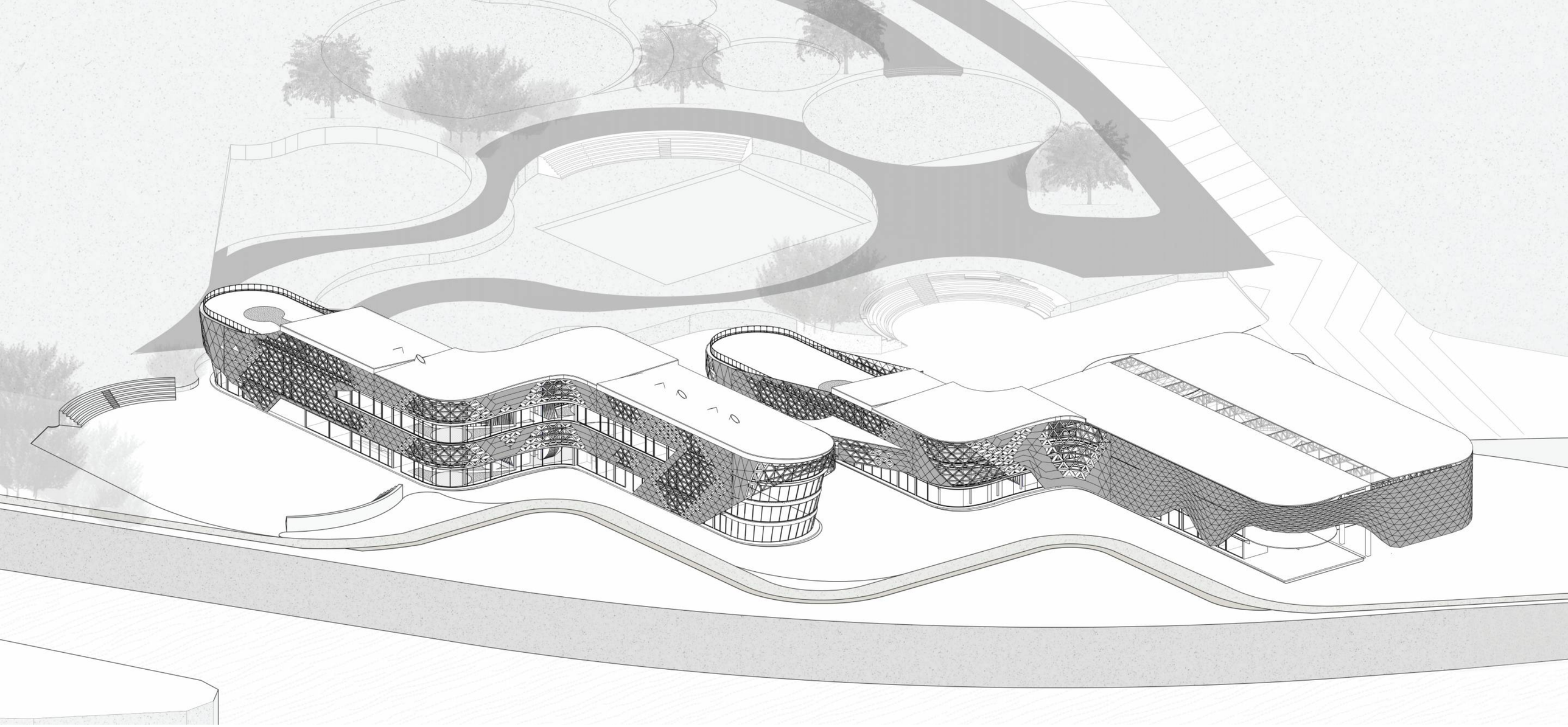


4: SLABS

5: INTERNAL WALLS



6: EXTERNAL OPENINGS



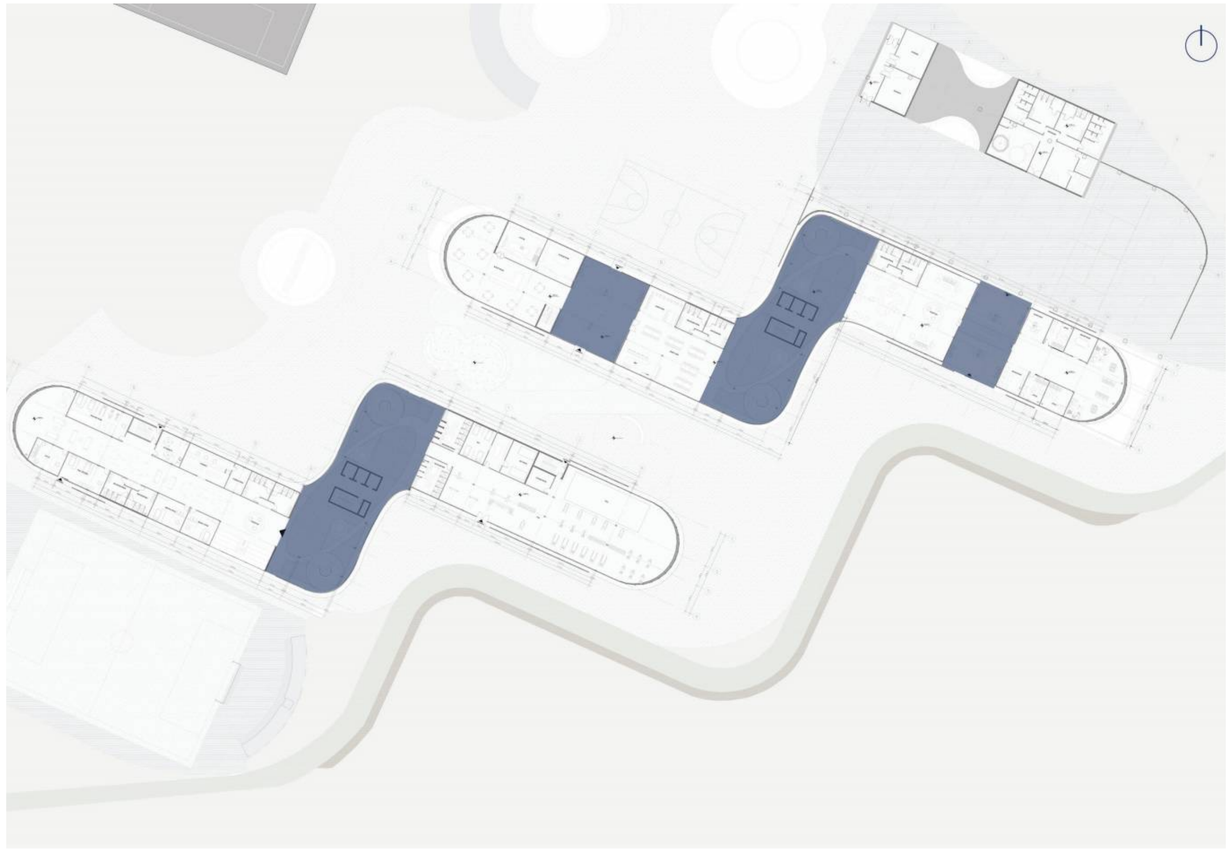
7: MEMBRANE

OUTDOOR SPACES

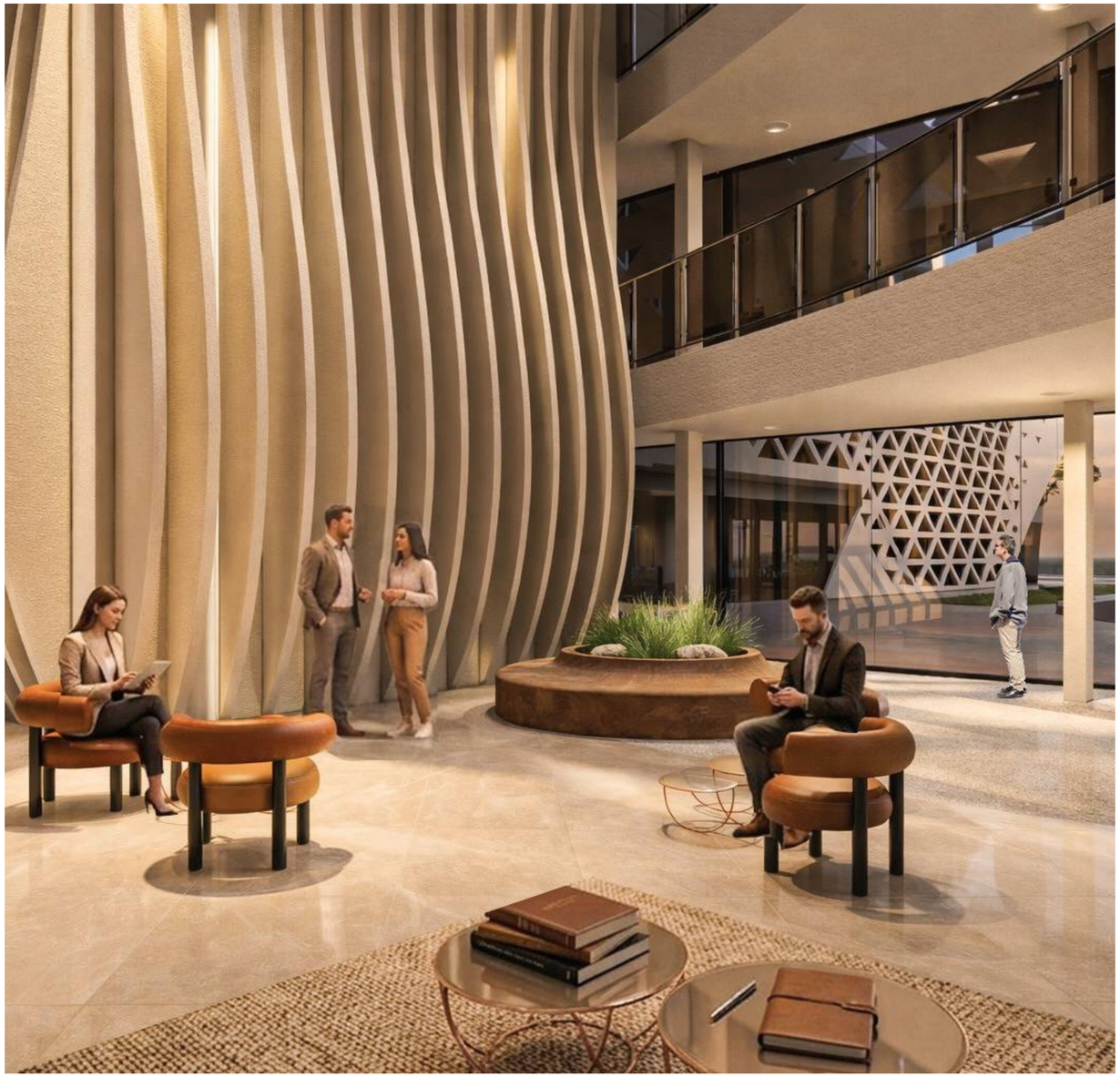
LOBBY AND ACCESS

Nodes of beginning

A monumental, triple-height atrium serves as a light-filled threshold, choreographing user movement through an intuitive, high-volume hub that bridges public access with the building's internal programmatic zones.



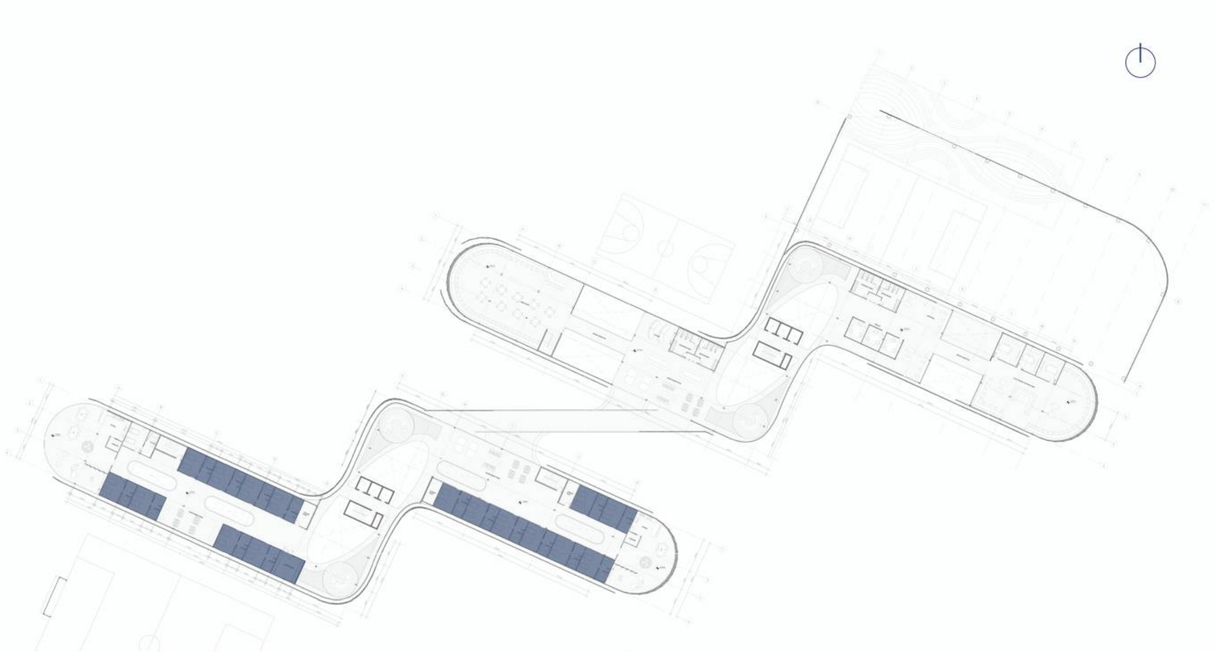
GROUND FLOOR



HABITATION MODULES

Quality living for athletes

The habitation modules provide a refined sanctuary for athletes, utilizing a modular, high-performance envelope and integrated thermal buffers to cultivate a tranquil, climate-controlled environment that prioritizes physiological recovery and intuitive spatial flow.

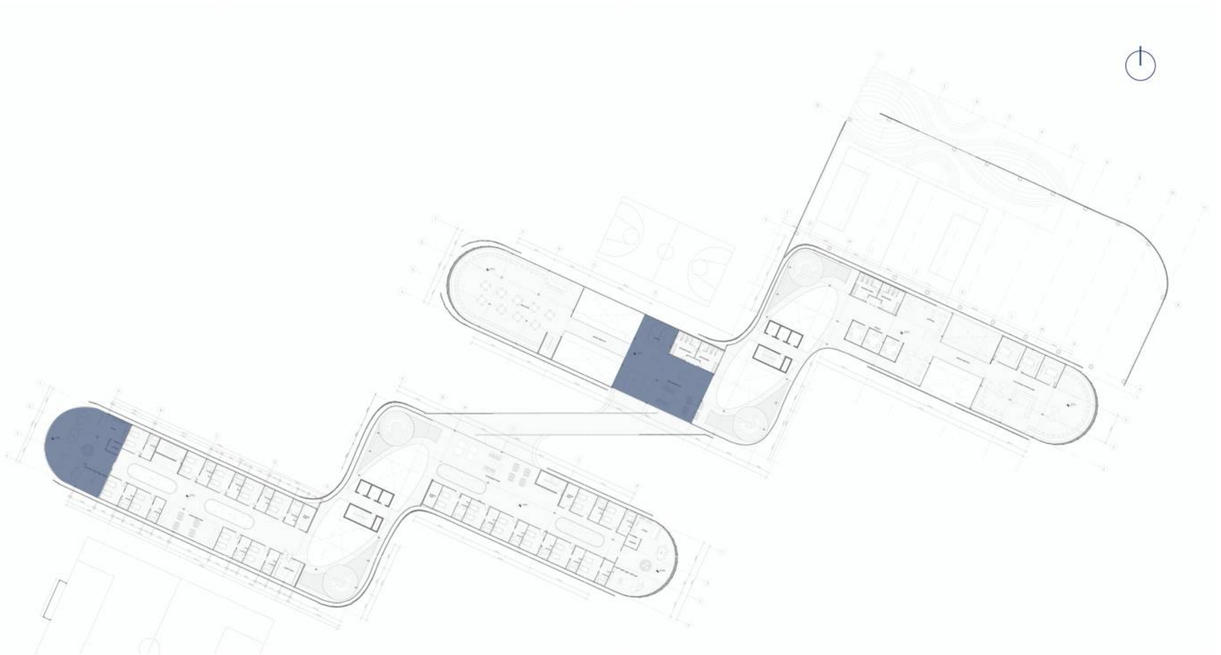


FIRST FLOOR

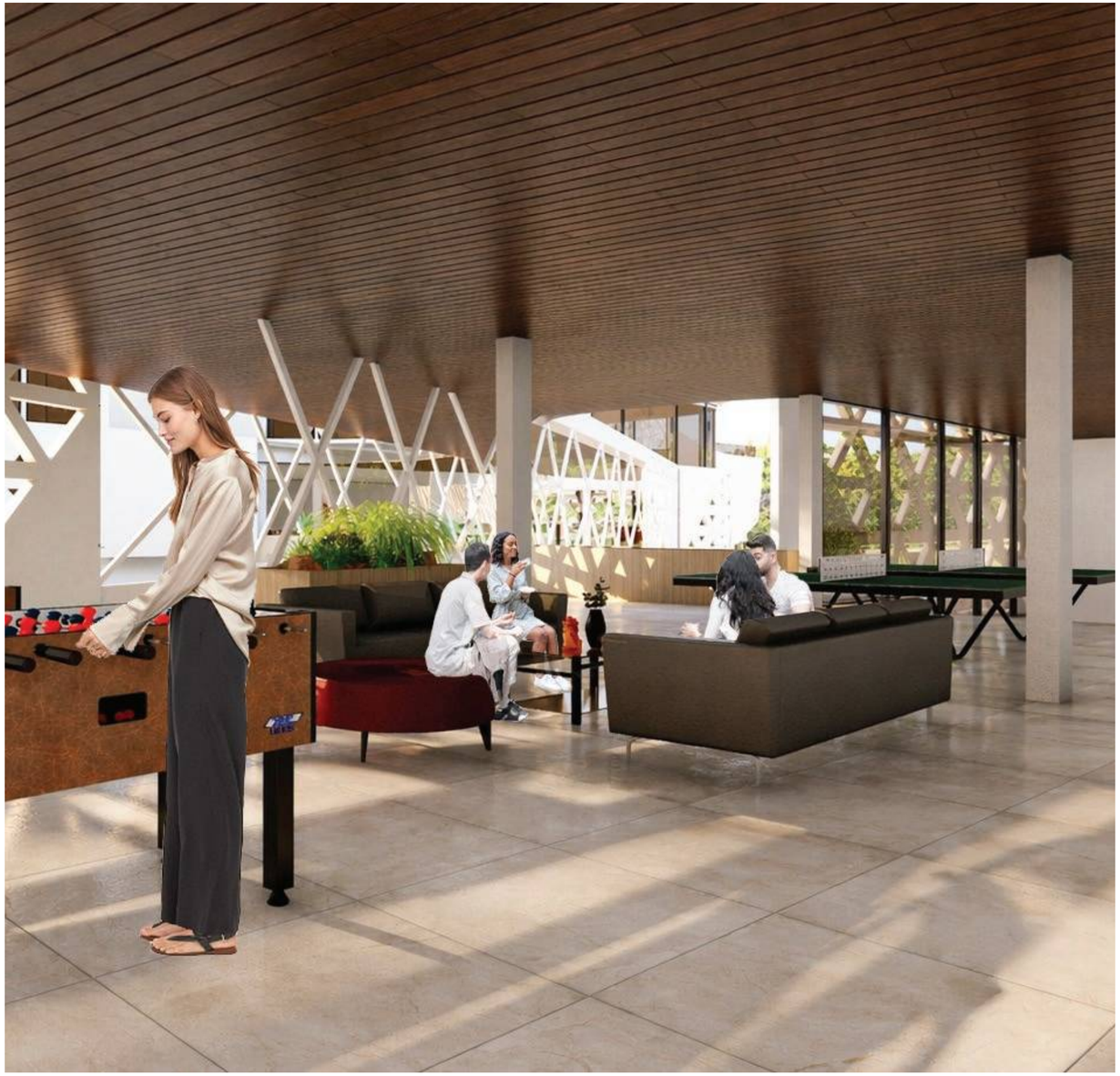
SHARED SPACES

breathing threshold for recreation

Interconnected social volumes, including gaming rooms and dining halls, are strategically positioned within the atrium's microclimate to foster communal interaction while benefiting from the building's passive ventilation and tempered light.



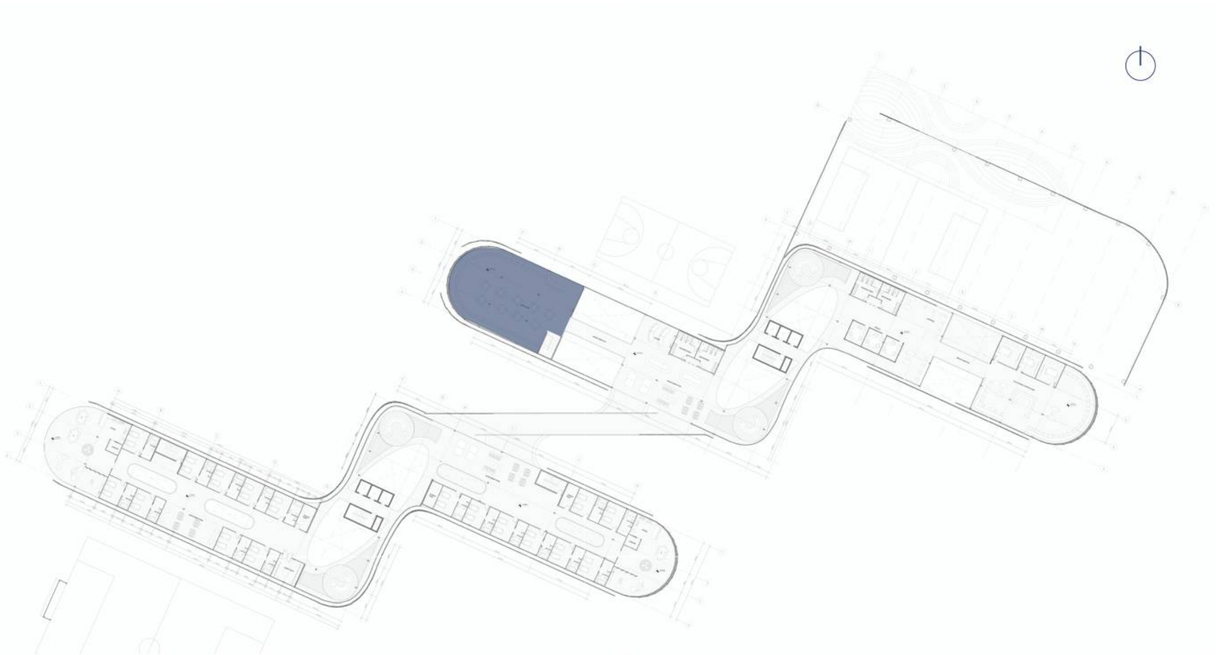
FIRST FLOOR



CAFETERIA & DINING HALL

For enjoyment and community

The dining hall functions as a vibrant communal anchor, integrated into the triple-height atrium to leverage natural stack-effect ventilation and filtered daylight for a thermally comfortable, high-volume social experience.

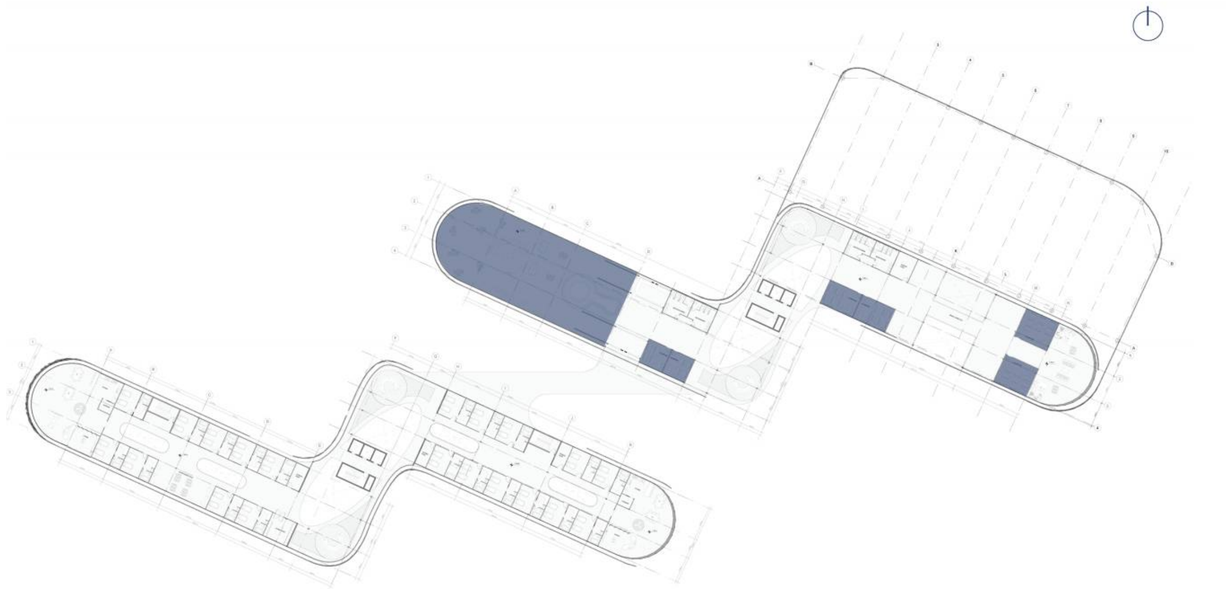


FIRST FLOOR

COWORKING AND STUDY SPACES

In connection with nature

The coworking and outdoor study spaces integrate seamlessly with the bioclimatic envelope, offering a fluid transition between sheltered, tech-integrated work zones and shaded external terraces that harness natural airflows for a refreshed academic environment.

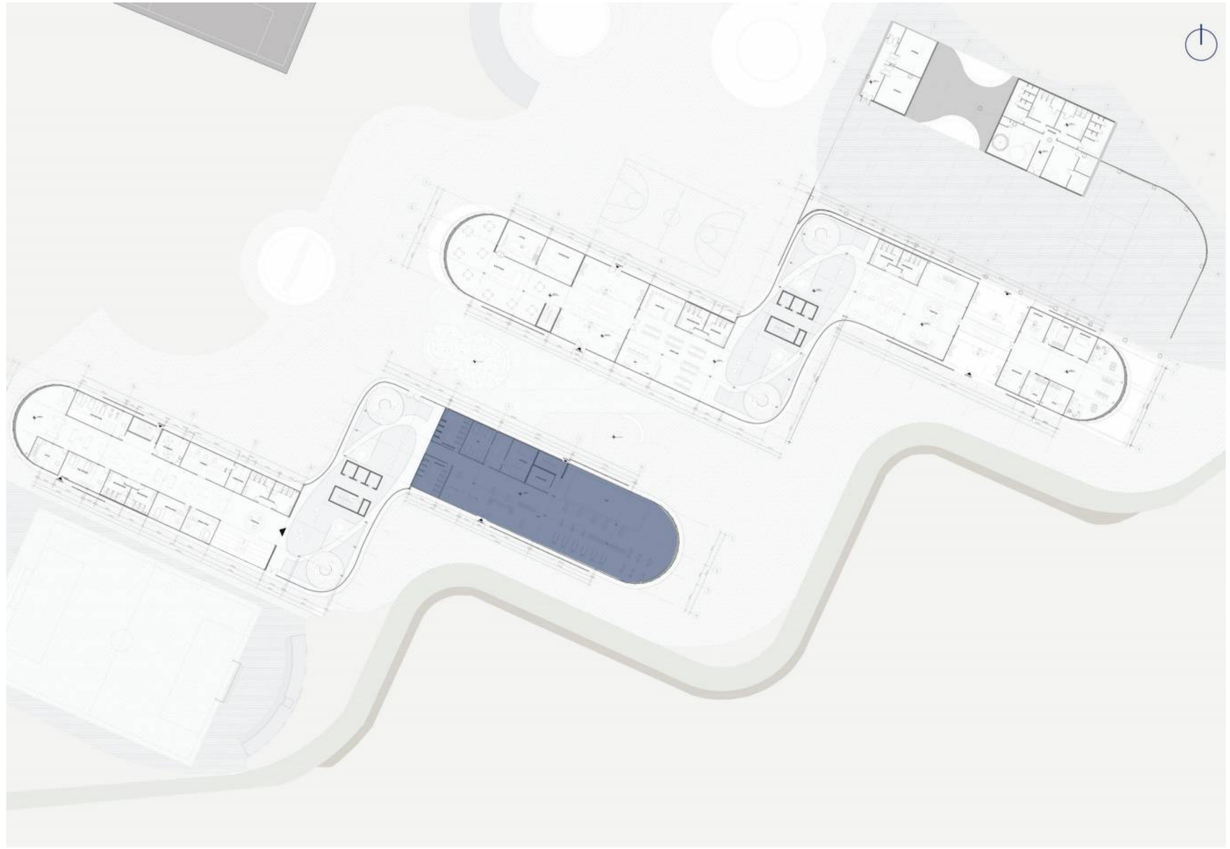


SECOND FLOOR

INDOOR FITNESS FACILITIES

Energized Atmospheric Flow

The indoor fitness and aquatic centers are encased within a high-performance thermal envelope, where the expansive volume leverages the stack effect of the central void to regulate humidity and maintain a temperate, light-washed atmosphere for peak athletic performance.

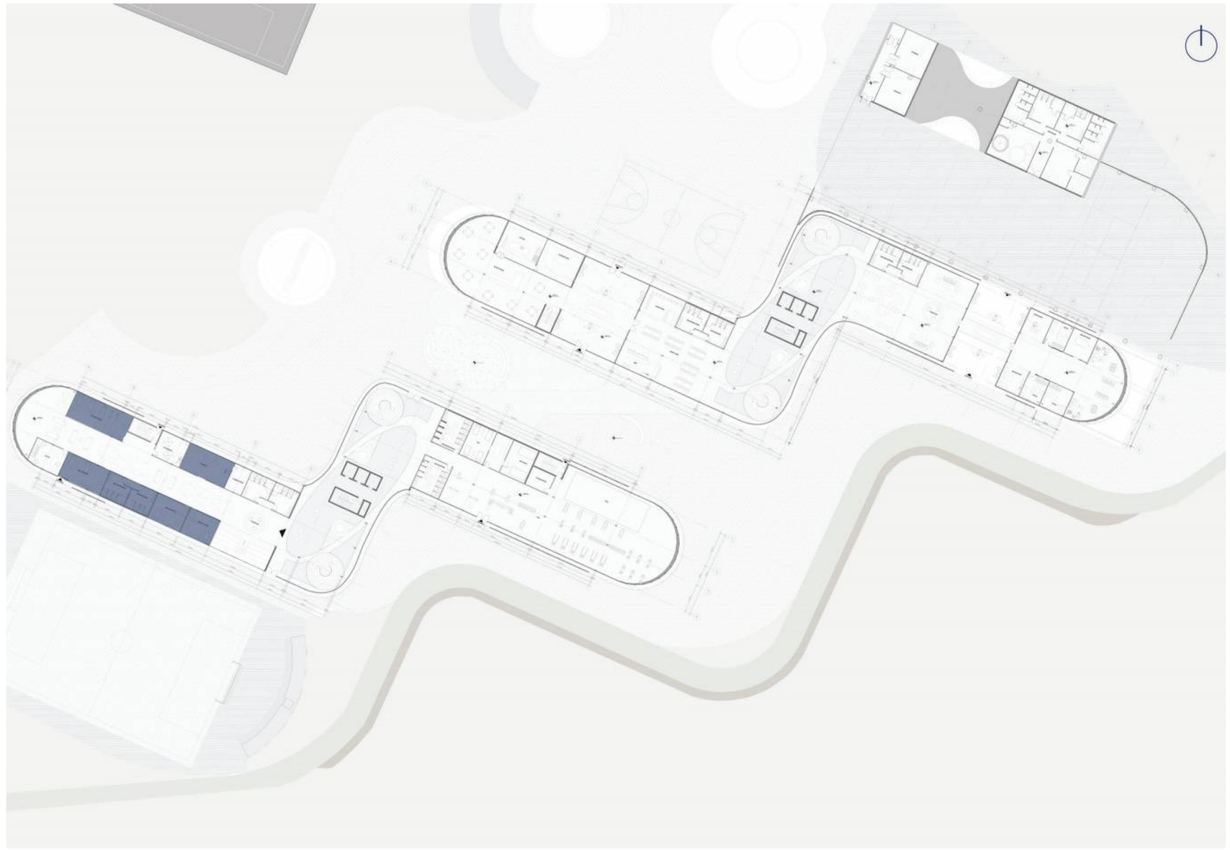


GROUND FLOOR

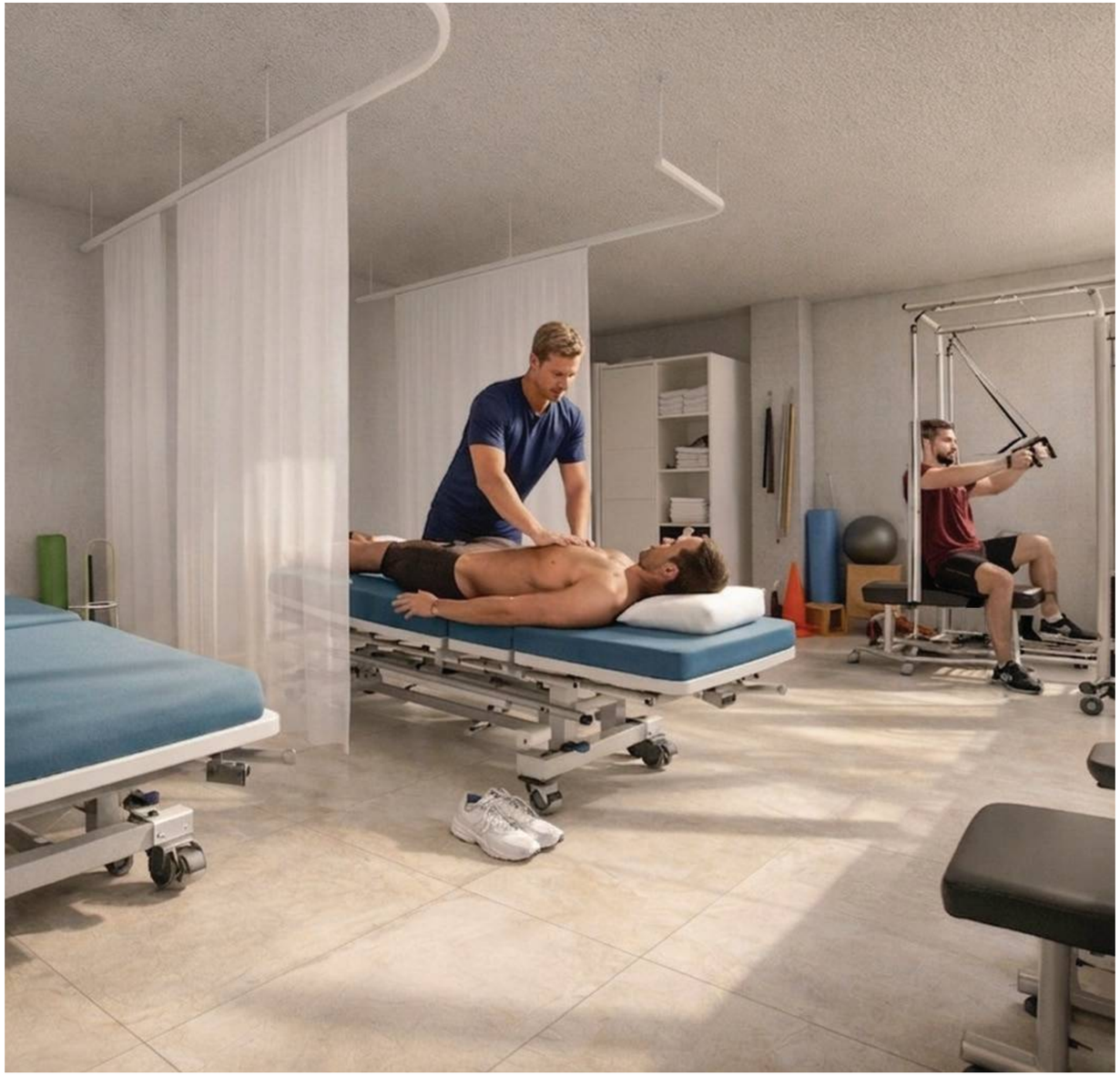
HEALTHCARE AND MEDICAL SUITES

Prioritizing well-being

The healthcare and physiotherapy suites are designed as sterile yet serene clinical environments, leveraging the building's double-facade to provide soft, diffused natural light that enhances patient wellness while maintaining strict thermal stability for specialized medical treatments.



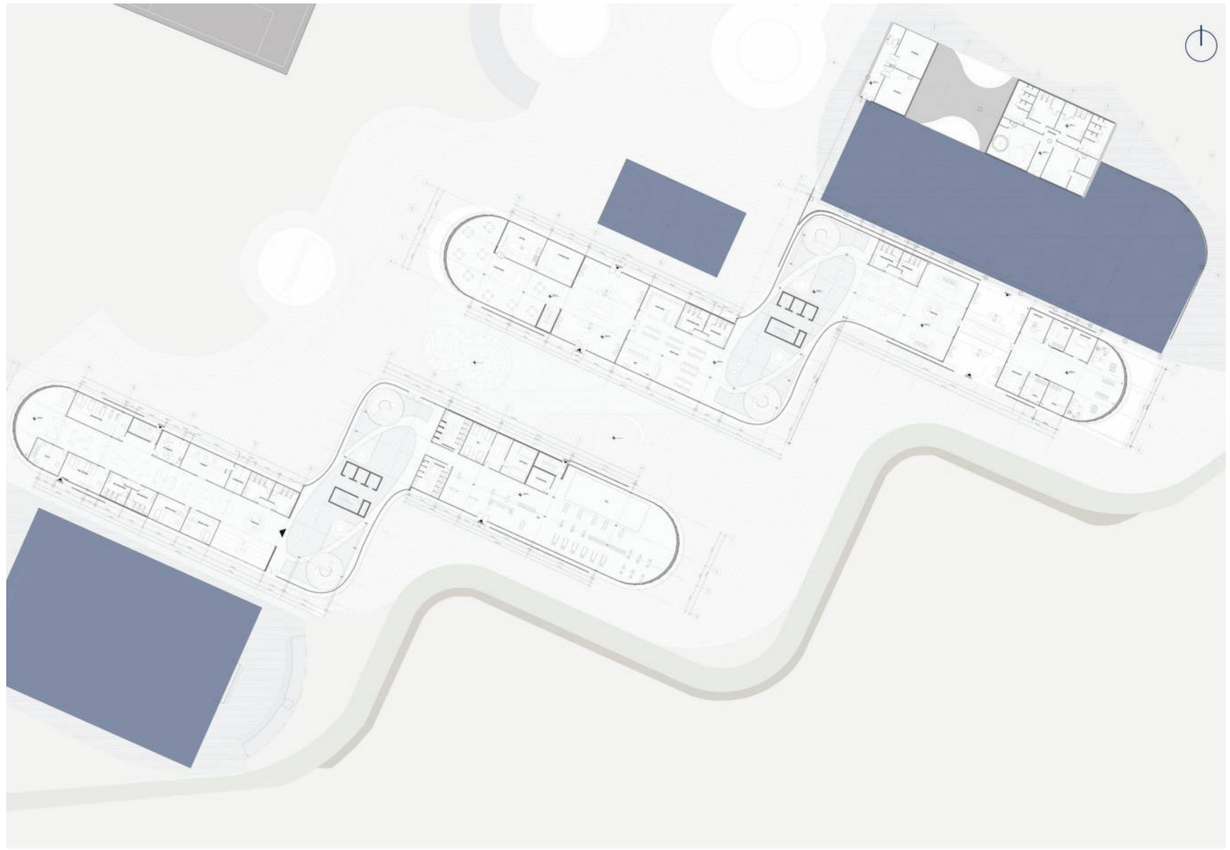
GROUND FLOOR



SPORTS COURTS

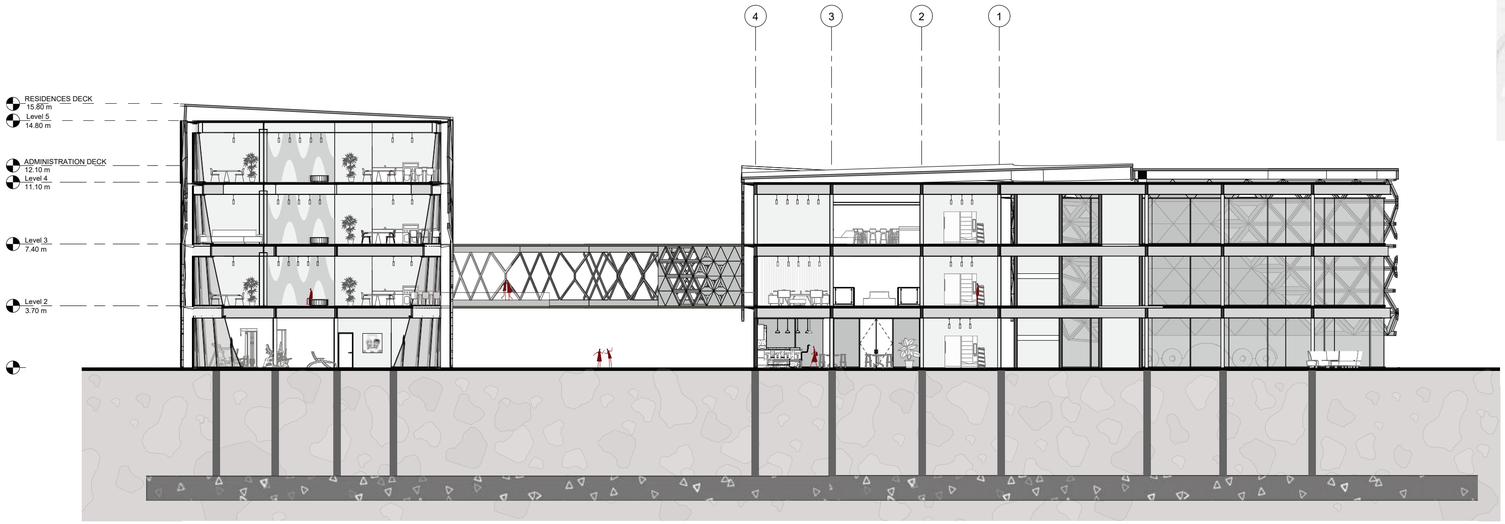
Dynamic Kinetic Pulse

The sports courts are conceived as high-performance volumes where the structural rhythm of the double-skin facade provides a backdrop of glare-free, diffused light, while the vast vertical clearance utilizes the atrium's stack effect to ensure constant air renewal during periods of intense physical activity.

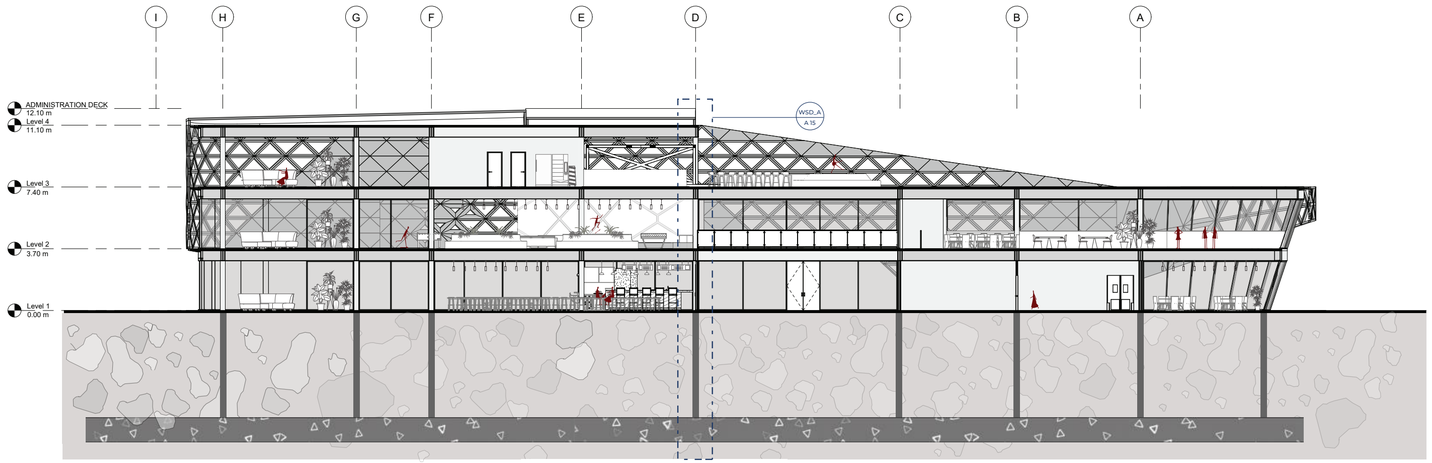


GROUND FLOOR

SECTIONS

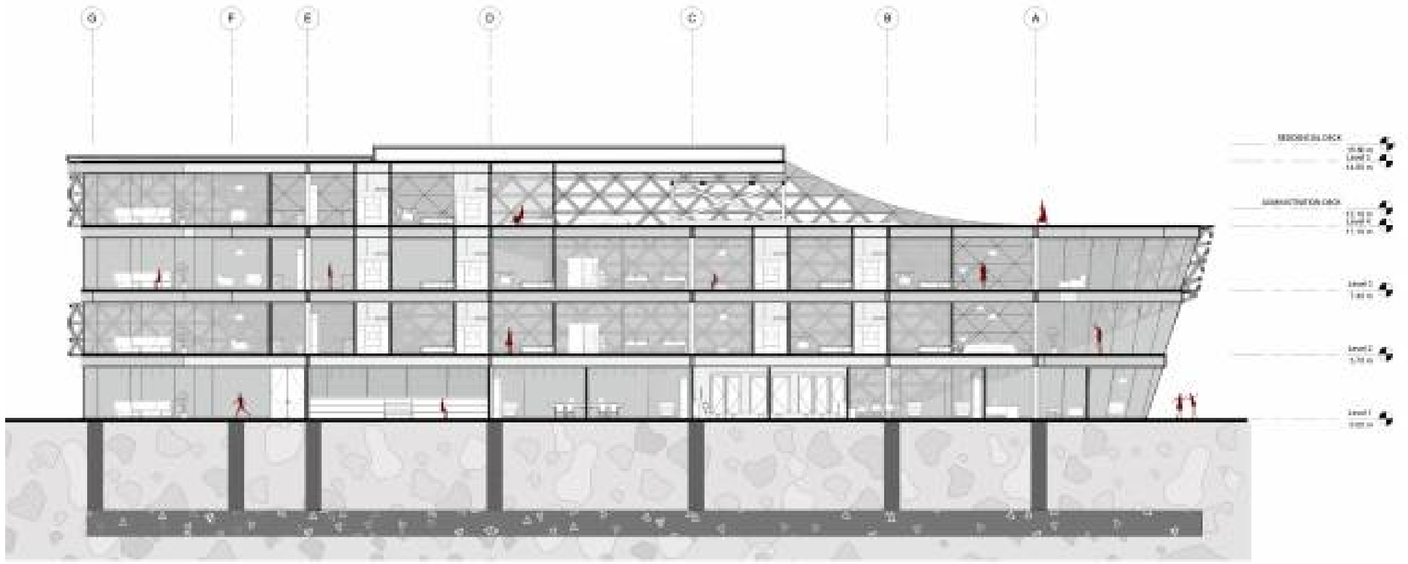


SECTION A-A’

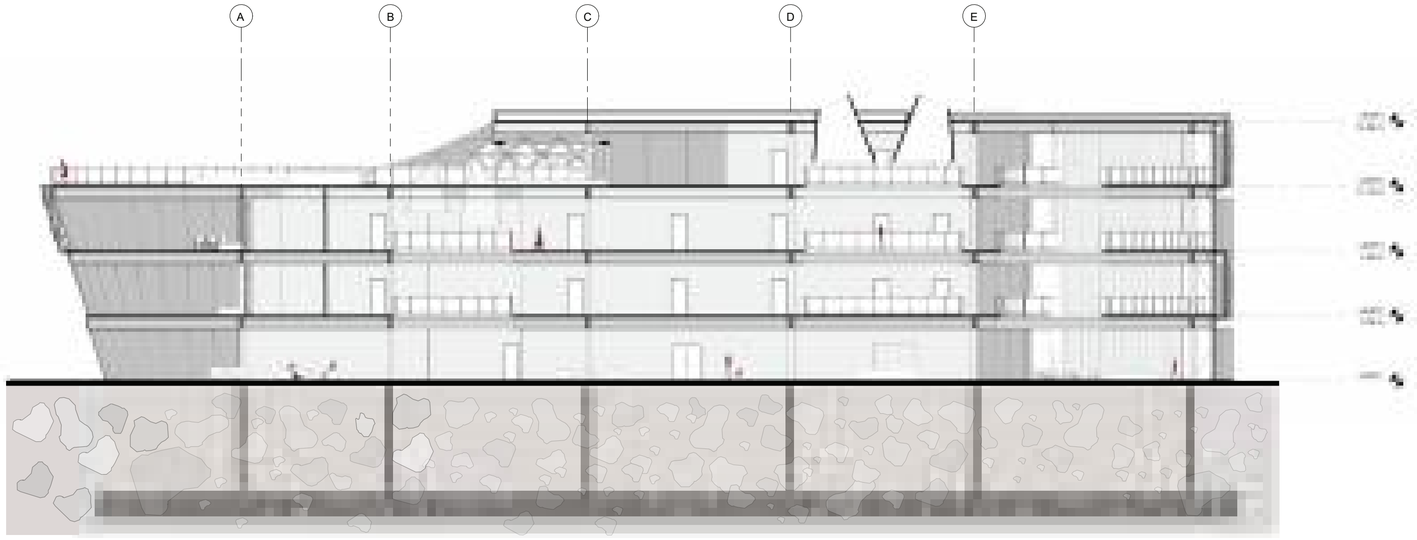


SECTION B-B’

SECTIONS

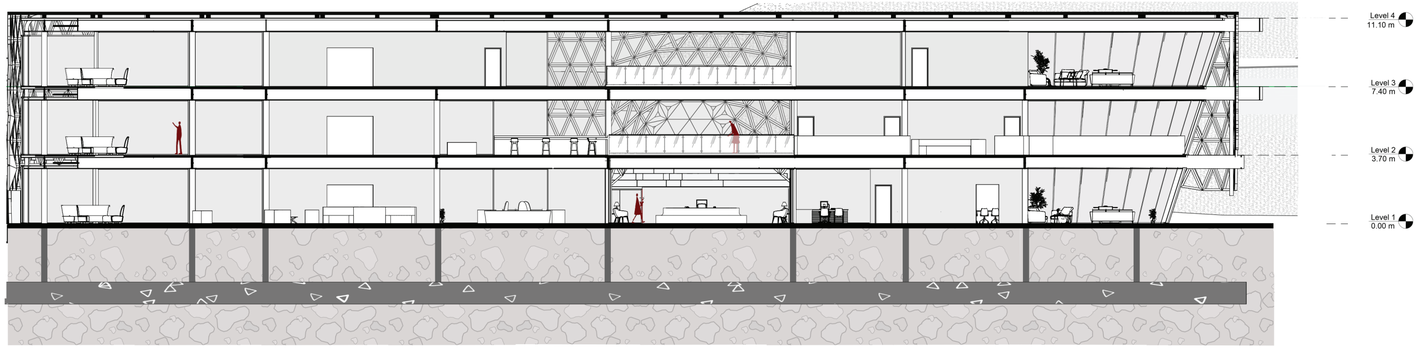


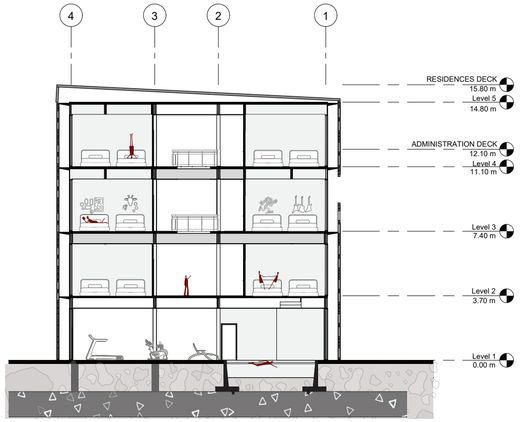
SECTION C-C’



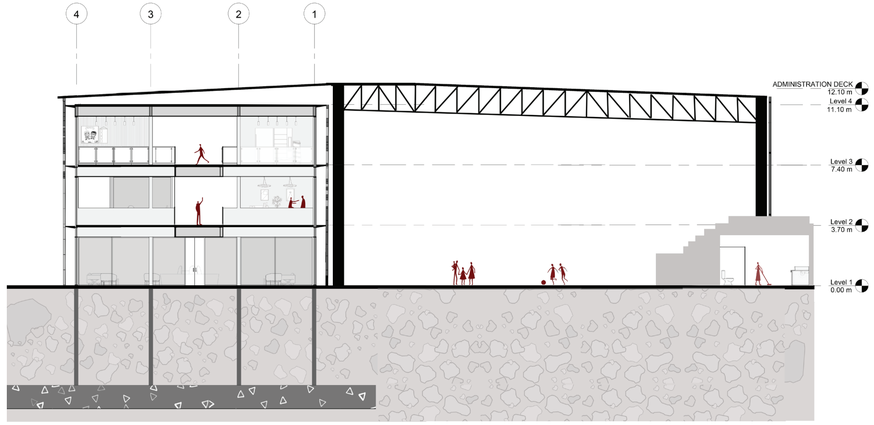
SECTION D-D’

SECTIONS



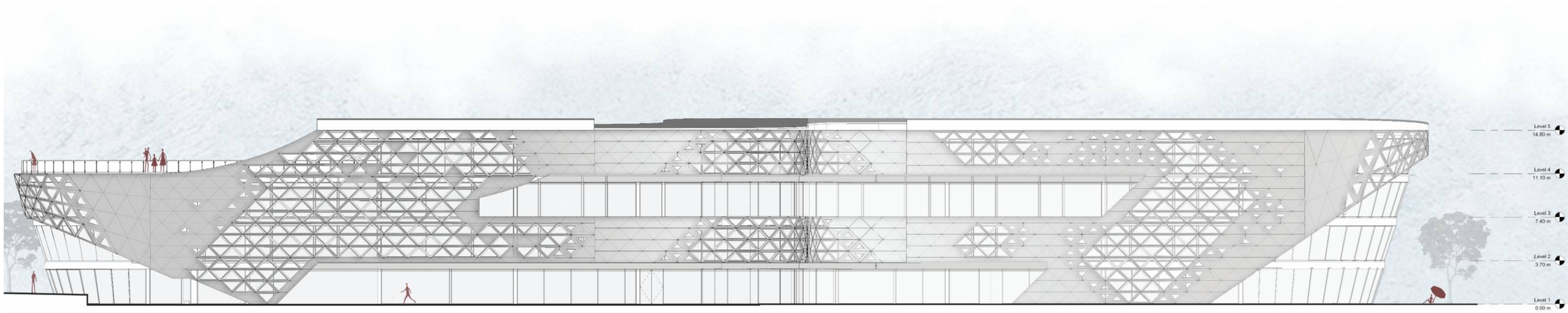


SECTION F-F'

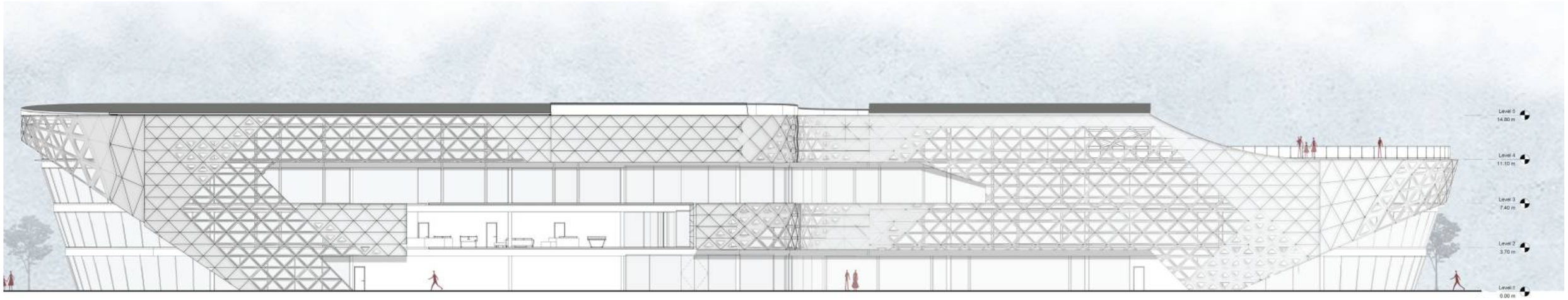


SECTION G-G'

ELEVATIONS

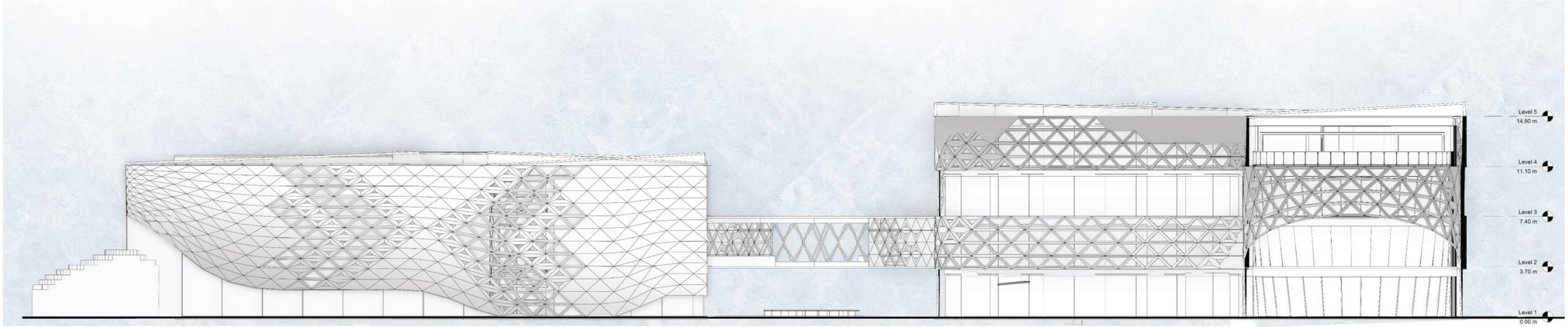


LEFT WING - FRONT ELEVATION

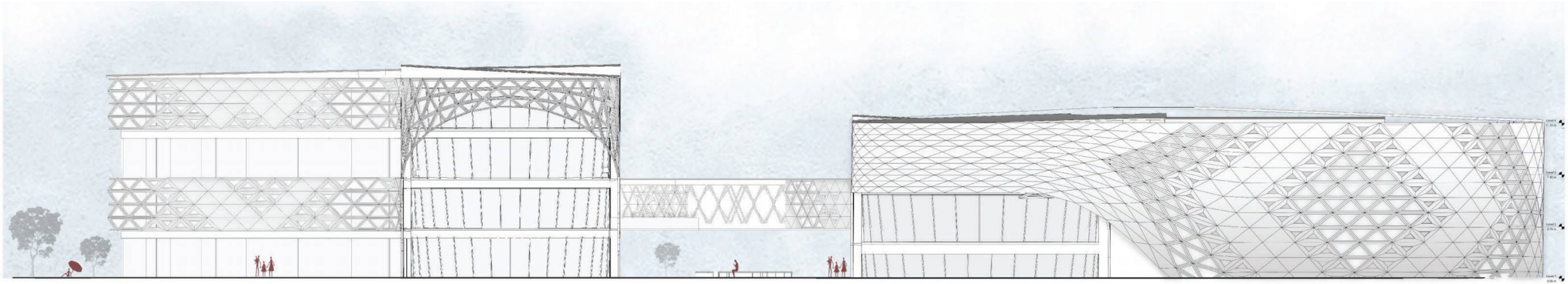


LEFT WING - BACK ELEVATION

ELEVATIONS

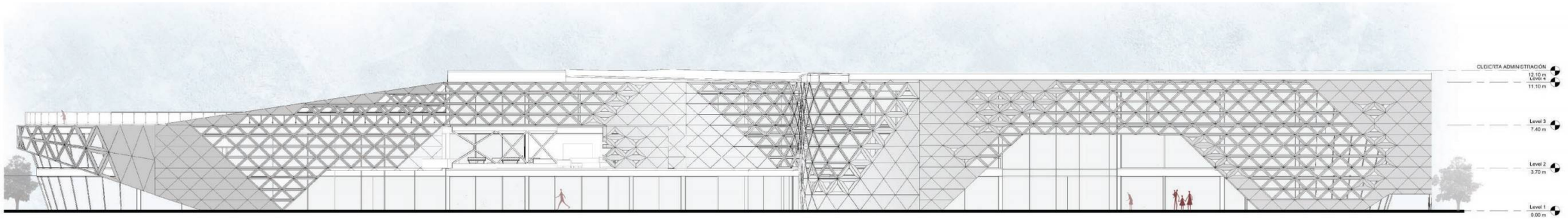


RIGHT ELEVATION

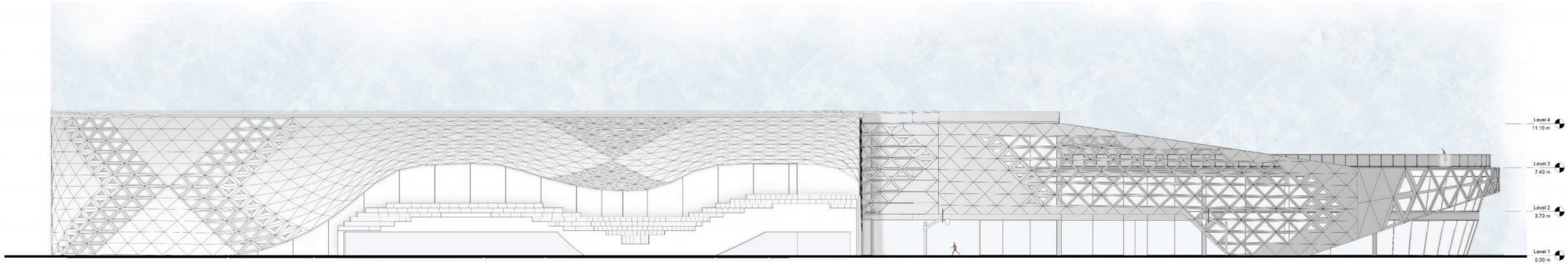


LEFT ELEVATION

ELEVATIONS



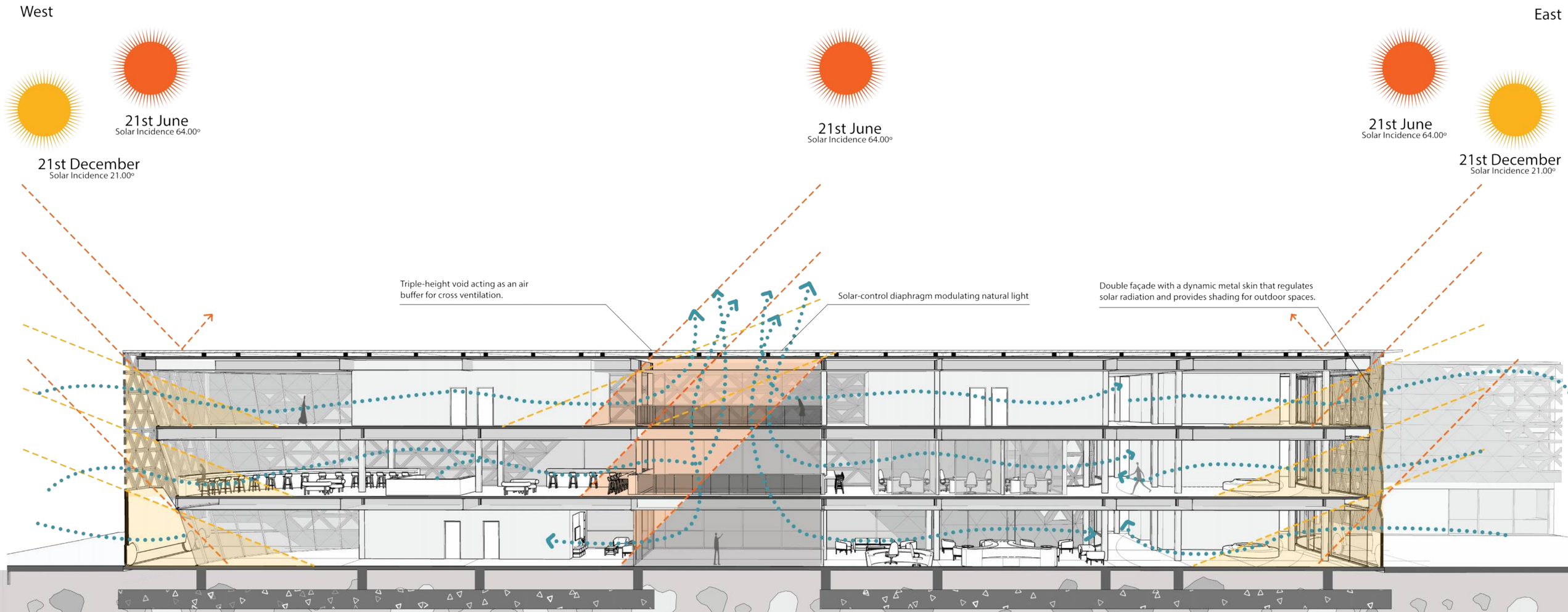
RIGHT WING - FRONT ELEVATION



RIGHT WING - BACK ELEVATION

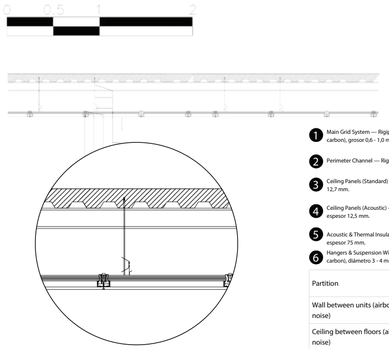
SOLAR GAIN & INDOOR AIR QUALITY

The design utilizes a dynamic double-skin facade and a triple-height central void to create a passive climate control system. By calibrating the building's envelope to the seasonal solar arc (from altitude 21° to altitude 64°), the project blocks excessive heat while the central atrium acts as a thermal chimney, pulling fresh air across the deep floor plans to maximize natural cross-ventilation.



THERMAL COMFORT

The project utilizes a **high-performance** thermal envelope consisting of insulated composite metal decks and multi-layered wall systems. The double-skin facade functions as a thermal buffer to enhance interior inertia and reduce energy loss, while covered bridges maintain thermal continuity between volumes to minimize winter heat escape. This strategy effectively regulates the microclimate, using the building's physical mass and specialized insulation layers to **stabilize temperatures** throughout the open floor

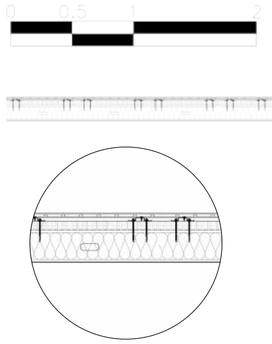


Section View

1. Main Grid System — Rigips CD/UD Main Runner and Cross Tee Grid System (Saint-Gobain Rigips, acero galvanizado reciclable, low-carbon), grosor 0,6 - 1,0 mm.
2. Perimeter Channel — Rigips UD Perimeter Channel (Saint-Gobain Rigips, perfil de borde en acero galvanizado), grosor 0,6 mm.
3. Ceiling Panels (Standard) — Rigips Standard Board 12,7 mm (Saint-Gobain Rigips, placa de yeso estándar no combustible), espesor 12,7 mm.
4. Ceiling Panels (Acoustic) — Rigips Blue Acoustic (DF) 12,5 mm (Saint-Gobain Rigips, placa de yeso de alto rendimiento acústico), espesor 12,5 mm.
5. Acoustic & Thermal Insulation — Isover Akusto Mineral Wool (Saint-Gobain Isover, lana mineral reciclada >70%, λ 0,035 W/m·K), espesor 75 mm.
6. Hangers & Suspension Wires — Rigips Galvanized Suspension Wires and Hangers (Saint-Gobain Rigips, acero reciclable low-carbon), diámetro 3 - 4 mm.

Partition	Factor	Class A2 (mandatory)
Wall between units (airborne noise)	D nT,w (RA,1 i.e. including flanking transmission)	≥ 53 dB
Ceiling between floors (airborne noise)	D nT,w (RA,1 i.e. including flanking transmission)	≥ 53 dB
Ceiling between floors (impact noise)	L' nT,w + C I,50-2500 (i.e. including flanking transmission)	L' nT,w ≤ 58 dB

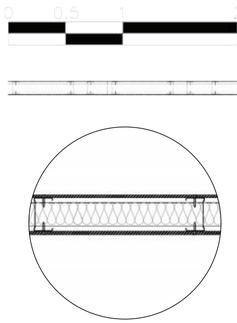
External Wall - Insulation



1. Main Grid System — Rigips CD/UD Main Runner and Cross Tee Grid System (Saint-Gobain Rigips, galvanized recycled steel, low-carbon, quick-lock system), thickness 0.6 - 1.0 mm.
2. Perimeter Perimeter Channel — Rigips UD Perimeter Channel, Rigips Standard Board 12.7 mm / Rigips Blue Acoustic (DF) 12.5 mm (Saint-Gobain Rigips, galvanized steel edge profile), thickness 0.6 mm.
3. Concrete blocks for curbs and low walls — Concrete blocks compatible with Rigips system (for finishes and lower edges), thickness integrated in 12.5 cm total.
4. Ceiling Panels (Moisture Resistant) — Rigips Habito Hydro 12.5 mm (Saint-Gobain Rigips, moisture-resistant impact-resistant gypsum board), thickness 12.5 mm.
5. Acoustic & Thermal Insulation — Isover Akusto Mineral Wool 75 mm (Saint-Gobain Isover, >70% recycled, density 30-50 kg/m³, λ = 0.035 W/m·K), thickness 75 mm.
6. Hangers & Suspension Wires — Rigips Galvanized Suspension Wires and Hangers (Saint-Gobain Rigips, low-carbon recycled steel), wire diameter 3 - 4 mm.

Partition	Factor	Class A2 (mandatory)
Wall between units (airborne noise)	D nT,w (RA,1 i.e. including flanking transmission)	≥ 53 dB
Ceiling between floors (airborne noise)	D nT,w (RA,1 i.e. including flanking transmission)	≥ 53 dB
Ceiling between floors (impact noise)	L' nT,w + C I,50-2500 (i.e. including flanking transmission)	L' nT,w ≤ 58 dB

10cm Interior Wall - Insulation



Plan View

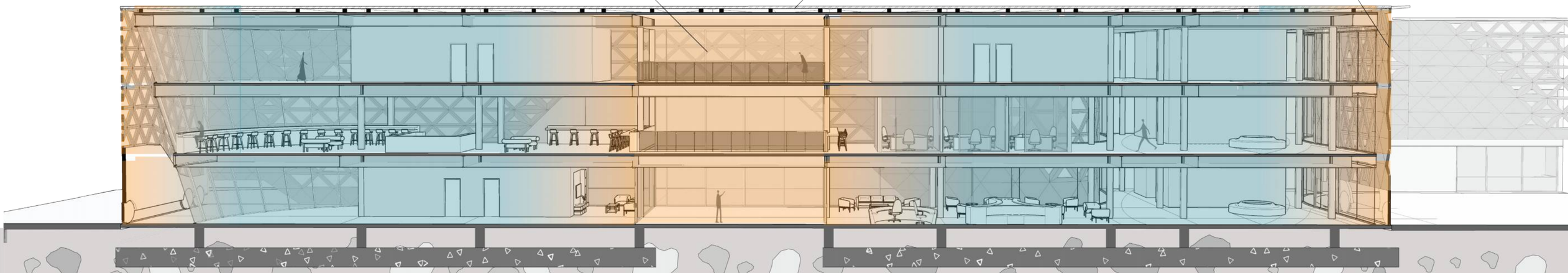
1. Metal profiles for structure (studs and channels) — Rigips CD-/UD/CW/UW profiles (Saint-Gobain Rigips, recycled galvanized steel, low-carbon, 0.6 mm thickness), adapted to 12.5 cm total.
2. Standard gypsum panels (both sides) — Rigips Standard Board or Rigips RB (Saint-Gobain Rigips, standard recyclable gypsum boards, low VOC, 9-12 kg/m²), thickness 12.5 mm per side.
3. Recycled kraft paper honeycomb panels — Honeycomb panels of 100% recycled kraft paper (Rigips compatible, lightweight structure, low carbon, A+ indoor air quality), thickness approx. 10-20 mm.
4. Internal thermal/acoustic insulation — Isover recycled mineral wool (Saint-Gobain Isover, >70% recycled, density 15-50 kg/m³, λ 0.033-0.040 W/m·K), thickness 70-100 mm (filling between profiles).
5. Joint tapes and fillers — Rigips Vario or Rigips Joint Filler (Saint-Gobain Rigips, fiberglass tape + low-VOC ready-mix compound), application thickness 1-2 mm.
6. Screws and fixings — Rigips phosphated or zinc-plated screws (Saint-Gobain Rigips, low-carbon, length 25-45 mm according to thickness).

Partition	Factor	Class A2 (mandatory)
Wall between units (airborne noise)	D nT,w (RA,1 i.e. including flanking transmission)	≥ 53 dB
Ceiling between floors (airborne noise)	D nT,w (RA,1 i.e. including flanking transmission)	≥ 53 dB
Ceiling between floors (impact noise)	L' nT,w + C I,50-2500 (i.e. including flanking transmission)	L' nT,w ≤ 58 dB

Covered bridges connecting volumes, enhancing thermal continuity and reducing heat loss in winter.

In warm conditions, the void dissipates heat through cross ventilation.

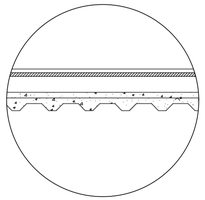
The double façade acts as a thermal envelope, reducing energy loss and enhancing interior thermal inertia.



ACOUSTIC COMFORT

The project is driven by an integrated **water-sensitive system** that links ecology, mobility, and public space. A restored green corridor, rain gardens, and a rainwater plaza work together to manage stormwater, regenerate biodiversity, and activate the urban environment, positioning water as the key element that organizes and revitalizes the entire intervention.

Acoustic Insulated Suspended Ceiling

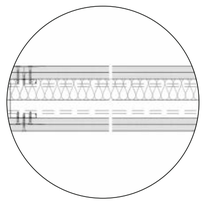


1. Steel Deck (Placa colaborante) — Metalfer® Green Steel Profiled Deck (Metalfer Steel Mill, 100% recycled steel decking, E500 grade), thickness 40 - 60 mm.
2. Base concrete for slab — ECOPact + Chryso Envirolite® ULC (Holcim + Saint-Gobain/Chryso, ultra low-carbon concrete with fly ash, 30-60 MPa), thickness 80 - 120 mm (concrete topping).
3. Upper reinforcement — Metalfer® Green Steel Mesh or Rebar Ø12-Ø25 mm (Metalfer Steel Mill, recycled steel reinforcement), diameter Ø12 - Ø25 mm.
4. Shear connectors — Headed Studs or Shear Connectors (Hilti or compatible), diameter 19 - 25 mm (stud diameter).
5. Lower insulation (optional) — Isover Mineral Wool Insulation (Saint-Gobain Isover, recycled, for thermal and acoustic performance), thickness 50 - 100 mm.
6. pper finishing / Leveling — Weber Floor Level or Weber Screed (Saint-Gobain Weber, low-carbon leveling compound), thickness 5 - 15 mm.

Partition	Factor	Class A2 (mandatory)
Wall between units (airborne noise)	D nT,w (R'A,1 i.e. including flanking transmission)	≥ 53 dB
Ceiling between floors (airborne noise)	D nT,w (R'A,1 i.e. including flanking transmission)	≥ 53 dB
Ceiling between floors (impact noise)	L' nT,w + C_I,50-2500 (i.e. including flanking transmission)	L' nT,w ≤ 58 dB

Section View

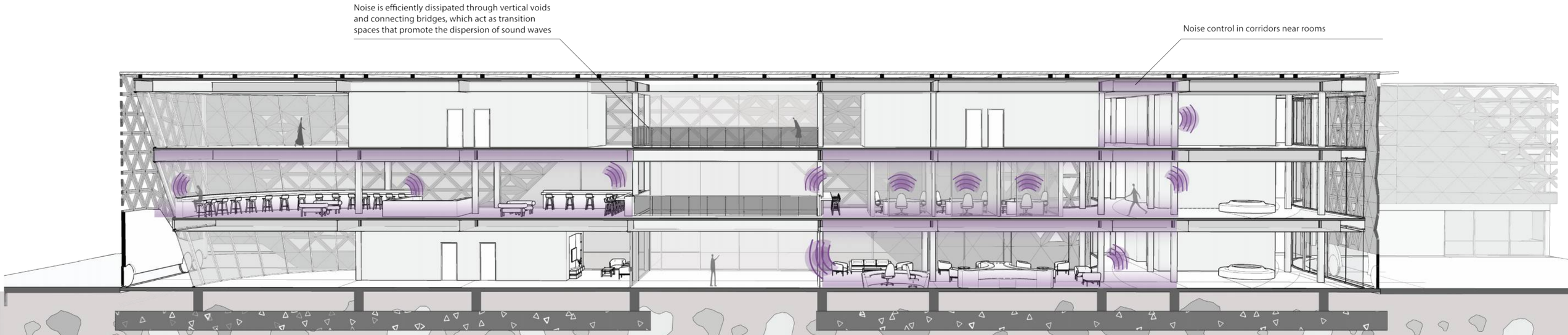
20cm Interior Wall - Insulated



1. Metal profiles for structure (studs and channels) — Rigips CD/UD/CW/UW profiles (Saint-Gobain Rigips, recycled galvanized steel, low-carbon, 0.6 mm thickness), adapted to 12.5 cm total.
2. Standard gypsum panels (both sides) — Rigips Standard Board or Rigips RB (Saint-Gobain Rigips, standard recyclable gypsum boards, low VOC, 9-12 kg/m²), thickness 12.5 mm per side.
3. Recycled kraft paper honeycomb panels — Honeycomb panels of 100% recycled kraft paper (Rigips compatible, lightweight structure, low carbon, A+ indoor air quality), thickness approx. 10-20 mm.
4. Internal thermal/acoustic insulation — Isover recycled mineral wool (Saint-Gobain Isover, >70% recycled, density 15-50 kg/m³, λ 0.035-0.040 W/mK), thickness 70-100 mm (filling between profiles).
5. Joint tapes and fillers — Rigips Vario or Rigips Joint Filler (Saint-Gobain Rigips, fiberglass tape + low-VOC ready-mix compound), application thickness 1-2 mm.
6. Screws and fixings — Rigips phosphated or zinc-plated screws (Saint-Gobain Rigips, low-carbon, length 25-45 mm according to thickness).

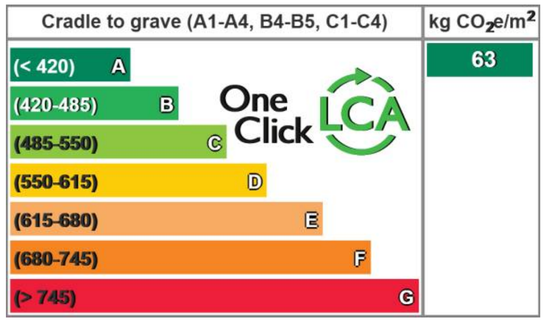
Partition	Factor	Class A2 (mandatory)
Wall between units (airborne noise)	D nT,w (R'A,1 i.e. including flanking transmission)	≥ 53 dB
Ceiling between floors (airborne noise)	D nT,w (R'A,1 i.e. including flanking transmission)	≥ 53 dB
Ceiling between floors (impact noise)	L' nT,w + C_I,50-2500 (i.e. including flanking transmission)	L' nT,w ≤ 58 dB

Plan View



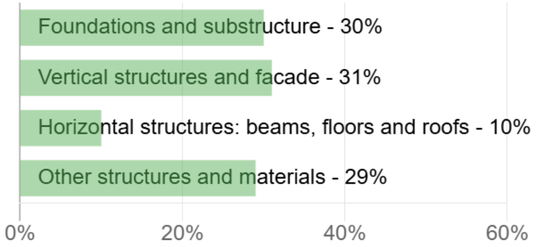
LIFE CYCLE CARBON ASSESSMENT

Environmentally responsible materials



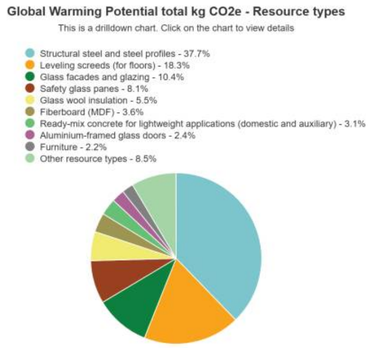
The obtained value (63 kg CO_2e/m^2) is significantly below the maximum threshold for Category A (<420 kg CO_2e/m^2) for residential buildings in Eastern Europe (2025 benchmark). This reflects a highly efficient performance in terms of embodied carbon, substantially outperforming current market standards.

Embodied carbon by structure - A1-A3

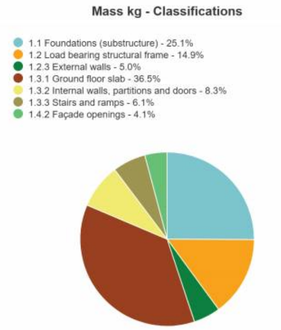


Effective decarbonization has been achieved by reducing impacts in interiors and secondary systems through the use of low-carbon materials. The primary impact is concentrated in the structure and floor systems, while the remainder of the building is designed under principles of material efficiency and emission reduction.

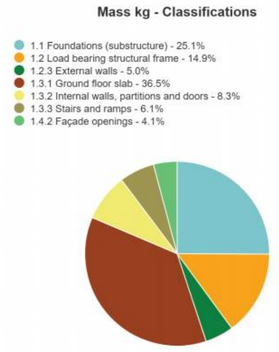
Global warming, t CO2e Resource Types



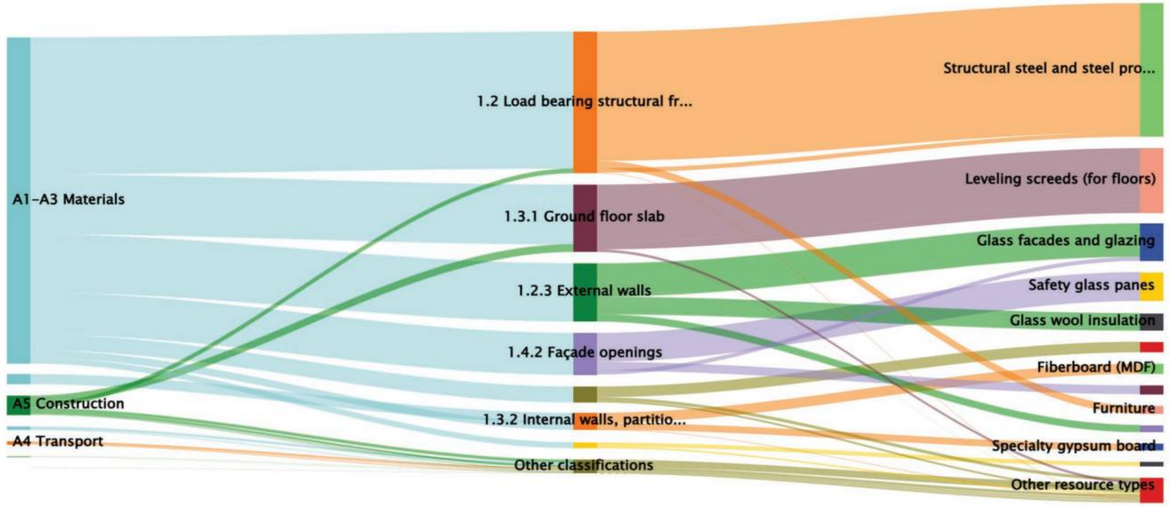
Global warming, t CO2e Classifications



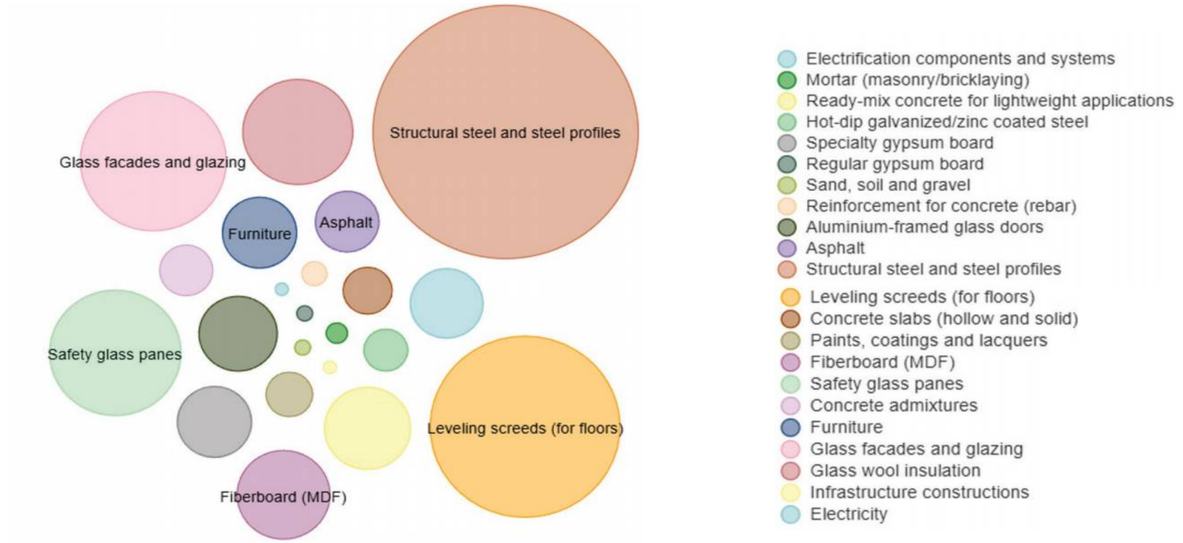
Mass kg Classifications



With a footprint of 63 kg CO_2e/m^2, the project reaches approximately 1,014 t CO_2e in total—equivalent to the annual emissions of 221 cars or the annual carbon absorption capacity of 387 hectares of forest, roughly 542 football pitches.



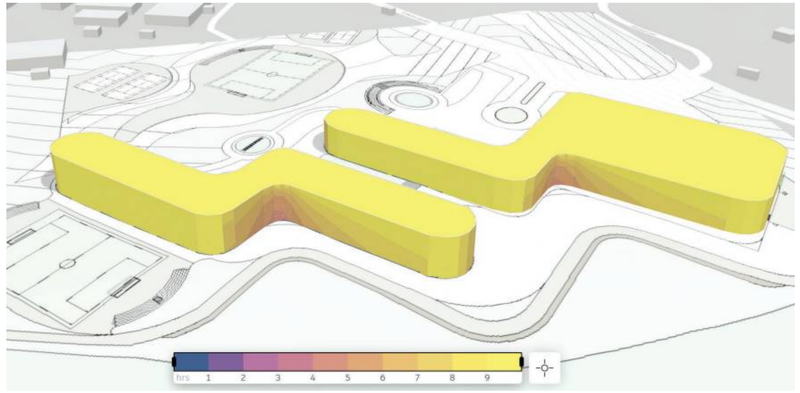
Bubble Chart, total life cycle impact by resource type and subtype



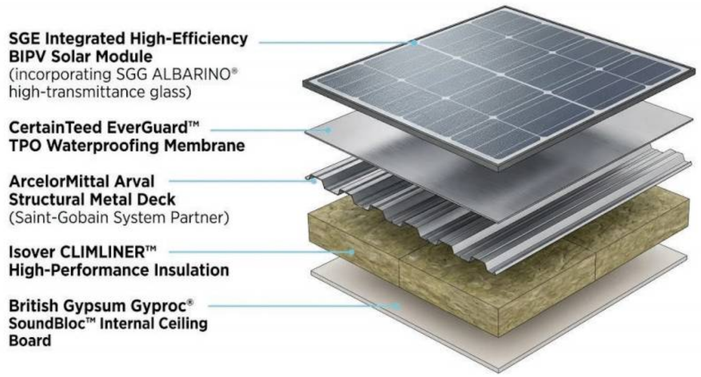
ENERGY USE

Optimization of energy consumption

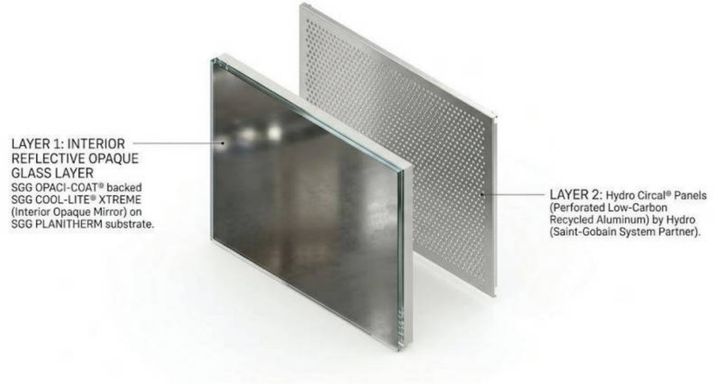
Sun hours analysis



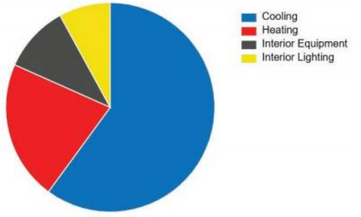
Roof Strategy - Building-Integrated Photovoltaics

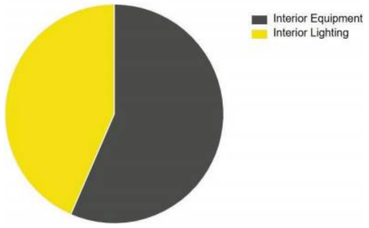


Facade Strategy - Double Membrane



Energy consumption breakdown

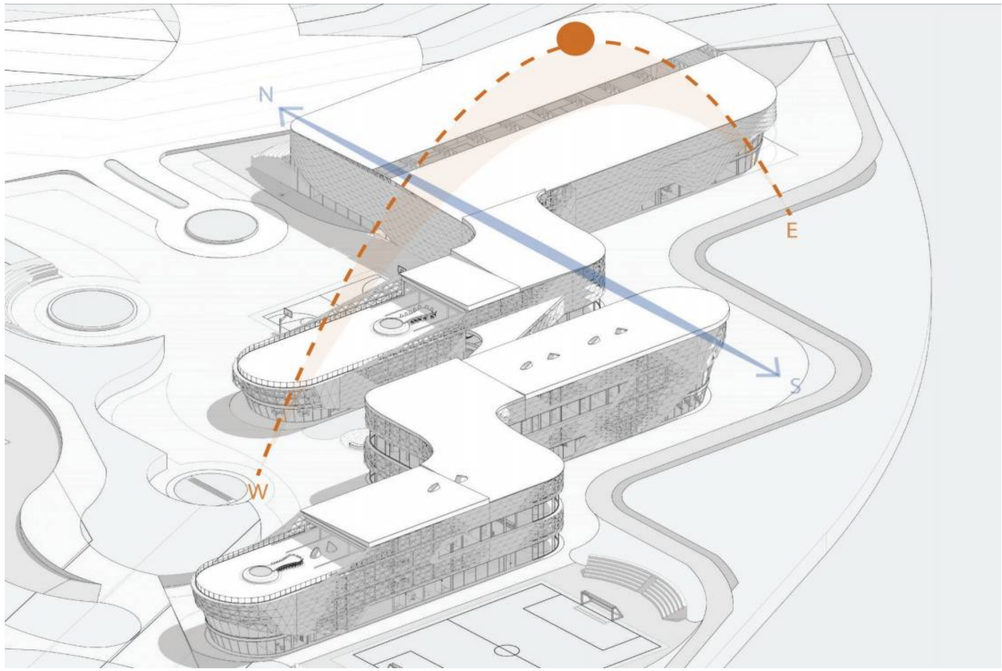




BASE CASE: Existing Design	
End Use	**Consumption (kWh)**
Heating	294,369
Cooling	818,564
Interior Lighting	108,644
Interior Equipment	141,236
Exterior Equipment	0
Fans	0
Pumps	0

TARGET DESIGN: High-Performance Facade	
End Use	**Consumption (kWh)**
Heating	28,500
Cooling	55,200
Interior Lighting	98,800
Interior Equipment	139,700
Exterior Equipment	0
Fans	0
Pumps	0

The first analysis shows thah 98% of facades on the buildings receive at least 3 hours of sunlight daily. We take advantage of this direct sunlight but also implement a double membrane that blocks direct heat gain. Reducing significantly energy consumptions related to cooling.



Roof Strategy

By integrating high efficiency building-integrated photovoltaic panels we aim to produce 80% of the energy that the buildings consume in a year. This way the roofs become part of a sustainable design and project circularity.

Facade Strategy

Since the complex receives direct sunlight all year long, we have implemented a double facade made of reflective opaque glass panels by **Saint-Gobain COOL-LITE XTREME** and an exterior aluminum curtain wall made of manels from **Hydro CIRCAL**. This reduces extreme heat gain or losses and keeps interior comfort during all seasons.

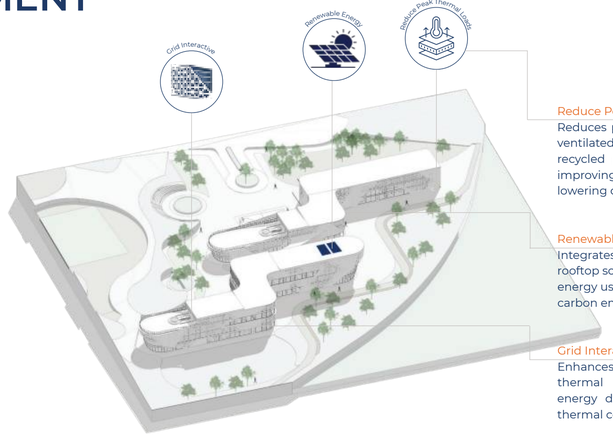
Projected Energy Reduction

The primary aim is a drastic decrease in heating an cooling loads, with a high performance target of **less than 15 kWh/m2** in a multi use complex that operates 365 days a year.

LIFE CYCLE CARBON ASSESSMENT

Environmentally responsible materials

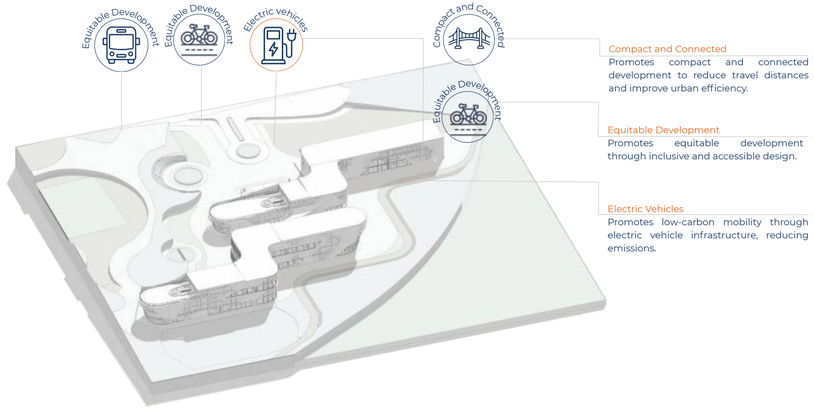
		Total Possible Points	Total Anticipated Points
Integrative Process, Planning and Assessments (IP)		**1**	**1**
IPp1	Climate Resilience Assessment	Required	
IPp2	Human Impact Assessment	Required	
IPp3	Carbon Assessment	Required	
IPc1	Integrative Design Process	1	1
Location and Transportation (LT)		**15**	**7**
LTc1	Sensitive Land Protection	1	1
LTc2	Equitable Development	2	0
LTc3	Compact and Connected Development	6	0
LTc4	Transportation Demand Management	4	4
LTc5	Electric Vehicles	2	2
Sustainable Sites (SS)		**11**	**8**
SSp1	Minimize Site Disturbance	Required	
SSc1	Biodiverse Habitat	2	2
SSc2	Accessible Outdoor Space	1	1
SSc3	Rainwater Management	3	0
SSc4	Enhanced Resilient Site Design	2	2
SSc5	Heat Island Reduction	2	2
SSc6	Light Pollution Reduction	1	1
Water Efficiency (WE)		**9**	**1**
WEp1	Water Metering and Reporting	Required	
WEp2	Minimum Water Efficiency	Required	
WEc1	Water Metering and Leak Detection	1	1
WEc2	Enhanced Water Efficiency	8	0
Energy and Atmosphere (EA)		**33**	**17**
EAp1	Operational Carbon Projection and Decarbonization Plan	Required	
EAp2	Minimum Energy Efficiency	Required	
EAp3	Fundamental Commissioning	Required	
EAp4	Energy Metering and Reporting	Required	
EAp5	Fundamental Refrigerant Management	Required	
EAc1	Electrification	5	5
EAc2	Reduce Peak Thermal Loads	5	5
EAc3	Enhanced Energy Efficiency	10	0
EAc4	Renewable Energy	5	5
EAc5	Enhanced Commissioning	4	0
EAc6	Grid Interactive	2	0
EAc7	Enhanced Refrigerant Management	2	2
Materials and Resources (MR)		**18**	**18**
MRp1	Planning for Zero Waste Operations	Required	
MRp2	Quantify and Assess Embodied Carbon	Required	
MRc1	Building and Materials Reuse	3	3
MRc2	Reduce Embodied Carbon	6	6
MRc3	Low-Emitting Materials	2	2
MRc4	Building Product Selection and Procurement	5	5
MRc5	Construction and Demolition Waste Diversion	2	2
Indoor Environmental Quality (EQ)		**13**	**13**
EQp1	Construction Management	Required	
EQp2	Fundamental Air Quality	Required	
EQp3	No Smoking or Vehicle Idling	Required	
EQc1	Enhanced Air Quality	1	1
EQc2	Occupant Experience	7	7
EQc3	Accessibility and Inclusion	1	1
EQc4	Resilient Spaces	2	2
EQc5	Air Quality Testing and Monitoring	2	2
Project Priorities (PR)		**10**	**1**
PRc1	Project Priorities	9	0
	Project Priority 1: *Insert credit name*		0
	Project Priority 2: *Insert credit name*		0
	Project Priority 3: *Insert credit name*		0
	Project Priority 4: *Insert credit name*		0
	Project Priority 5: *Insert credit name*		0
	Project Priority 6: *Insert credit name*		0
	Project Priority 7: *Insert credit name*		0
	Project Priority 8: *Insert credit name*		0
	Project Priority 9: *Insert credit name*		0
PRc2	LEED AP	1	1
Total		**110**	**66**



Reduce Peak Thermal Loads
Reduces peak thermal loads through a ventilated double facade using 75% recycled perforated aluminum panels, improving thermal regulation and lowering cooling demand.

Renewable Energy
Integrates renewable energy through rooftop solar panels to reduce internal energy use, offset demand, and lower carbon emissions.

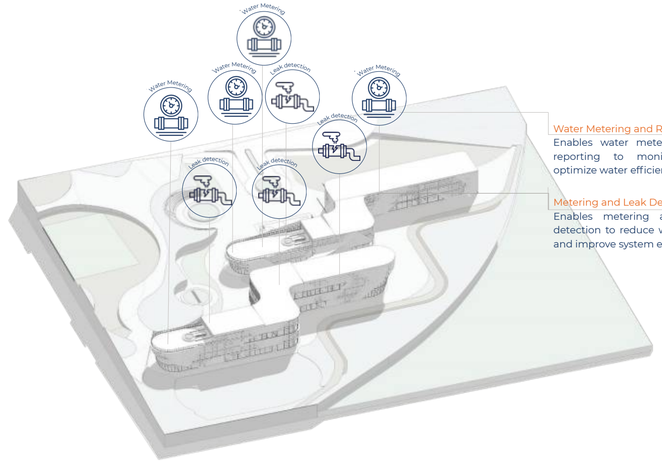
Grid Interactive
Enhances facade insulation to reduce thermal transmittance, decrease energy demand, and improve indoor thermal comfort.



Compact and Connected
Promotes compact and connected development to reduce travel distances and improve urban efficiency.

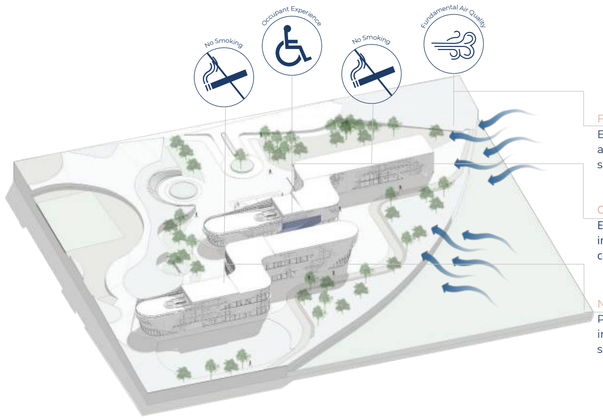
Equitable Development
Promotes equitable development through inclusive and accessible design.

Electric Vehicles
Promotes low-carbon mobility through electric vehicle infrastructure, reducing emissions.



Water Metering and Reporting
Enables water metering and reporting to monitor and optimize water efficiency.

Metering and Leak Detection
Enables metering and leak detection to reduce water loss and improve system efficiency.



Fundamental Air Quality
Ensures fundamental indoor air quality through adequate ventilation and pollutant control to support occupant health and sustainability.

Occupant Experience
Enhances occupant experience through improved indoor environmental quality, comfort, and user-centered design strategies.

No Smoking or Vehicle Idling
Promotes smoke-free buildings to improve indoor air quality and support a healthier, more sustainable environment.

Reduce unnecessary water consumption.
Smart meters detect abnormal continuous flow and allow real-time user monitoring.

Smart data transmission system

Water enters the meter and drives a turbine (impeller) inside the measurement chamber. The rotation is proportional to the flow rate and is transmitted through a gear mechanism, converting it into measurable data.
The control module records total consumption and, in smart systems, enables real-time monitoring and leak detection through continuous flow analysis.

Material Sostenibility
Recycled materiales reduce carbon footprint
- Recycled brass
- Recycled polymers
- Removable components

ZONE B - RENOVATION
ACADEMIC YACHT CLUB BELGRADE

Rethinking the existing, designing for the future

- Masterplan
- Design Strategies
- Low-impact Transformation
- Materials Overview
- Construction Process
- Facilities and Spaces
- Sustainable Principles
- Building Carbon Assesment

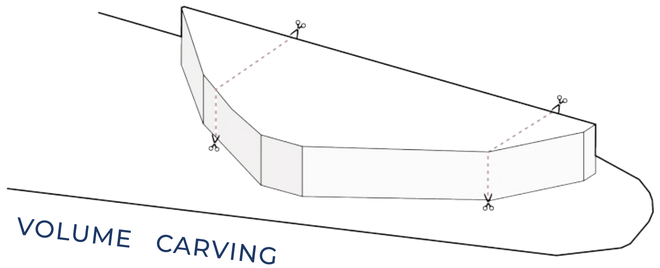
ZONE B: MASTERPLAN

Reconnecting to the urban fabric

1. Entrance
2. Parking Lots
3. Pedestrian Lane
4. Bicycle Lane
5. Green Corridor
6. Green Corridor and Water
7. Bike Parking
8. River Bank
9. Main View Point
10. Floating Dock
11. Yacht Club Building

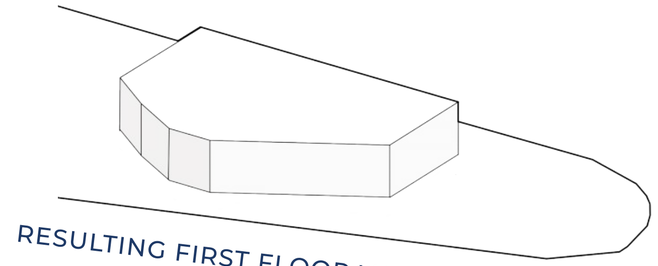
DESIGN STRATEGIES

1



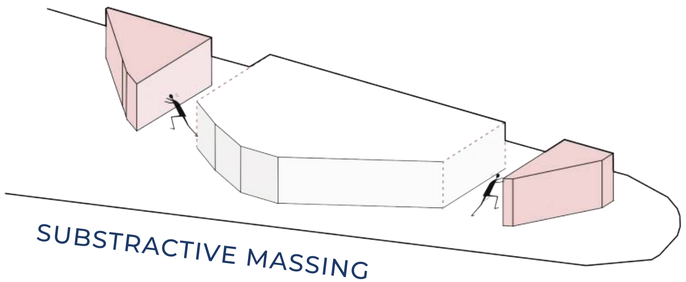
VOLUME CARVING

2



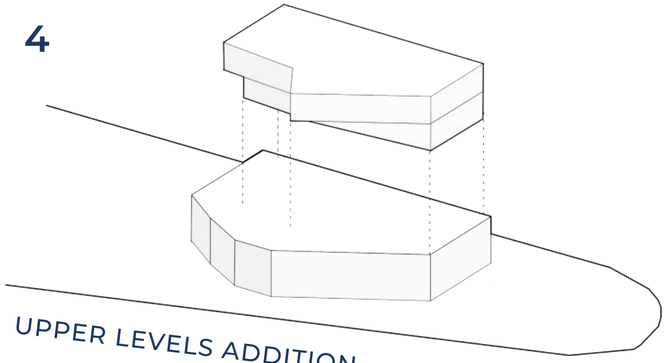
RESULTING FIRST FLOOR VOLUME

3



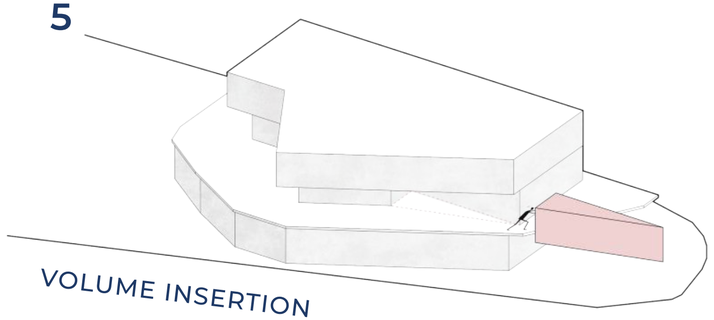
SUBSTRACTIVE MASSING

4



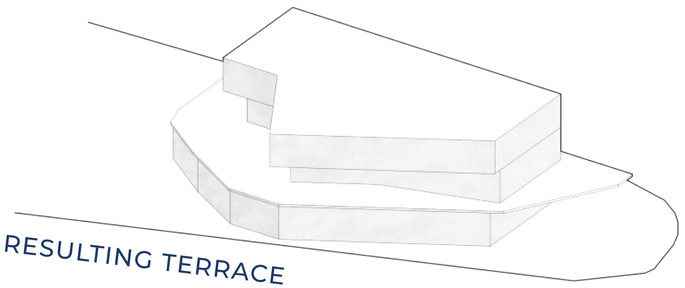
UPPER LEVELS ADDITION

5



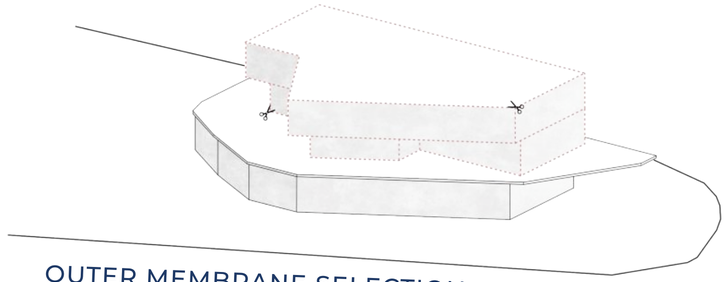
VOLUME INSERTION

6



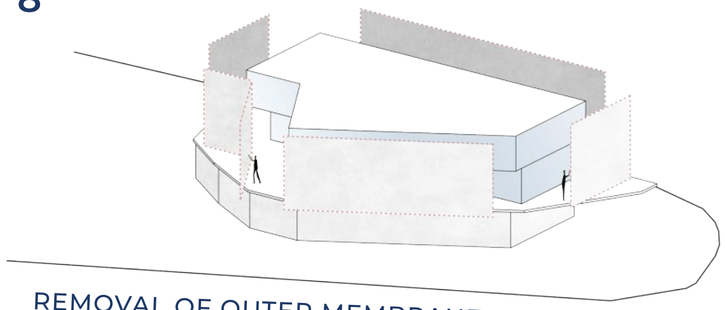
RESULTING TERRACE

7



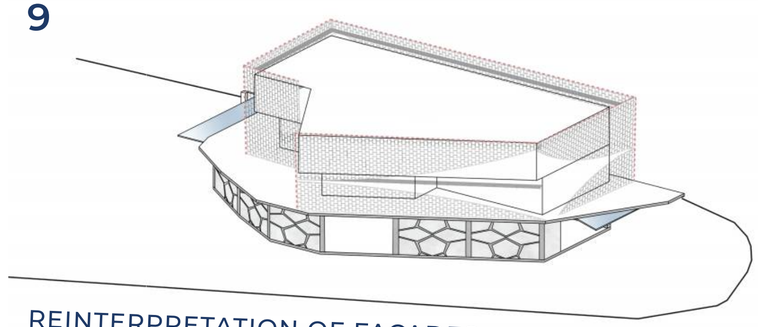
OUTER MEMBRANE SELECTION

8



REMOVAL OF OUTER MEMBRANE

9



REINTERPRETATION OF FACADES

ENVIRONMENTAL STRATEGIES

The project is driven by an integrated **water-sensitive system** that links ecology, mobility, and public space. A restored green corridor, rain gardens, and a rainwater plaza work together to manage stormwater, regenerate biodiversity, and activate the urban environment, positioning water as the key element that organizes and revitalizes the entire intervention.

Disembarkment

A regenerative arrival point that integrates water treatment, supports river recovery, and enhances the resilience of local fauna.

River Lookout

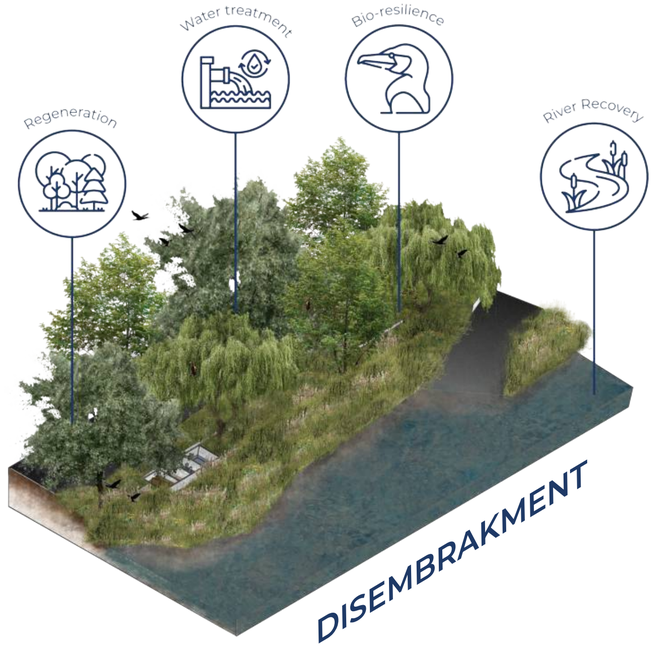
A riverside space that enables observation and connection while integrating active mobility along the water's edge.

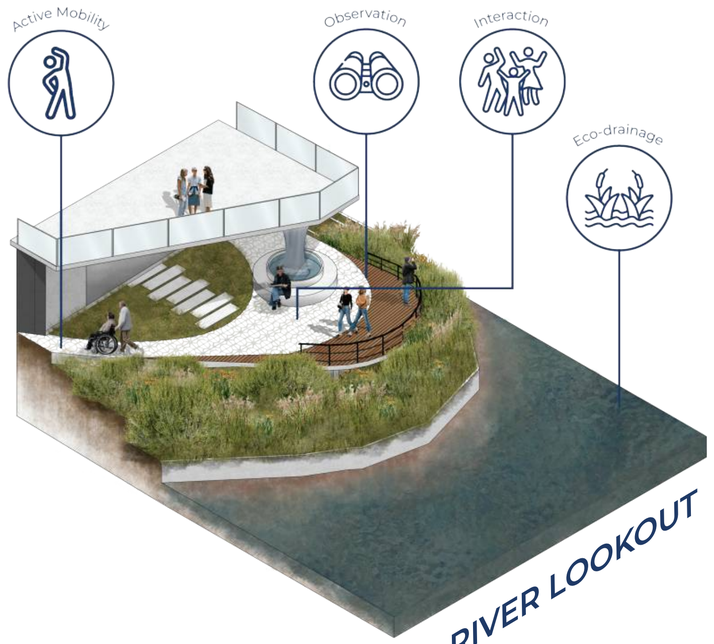
Waterfront Walkway

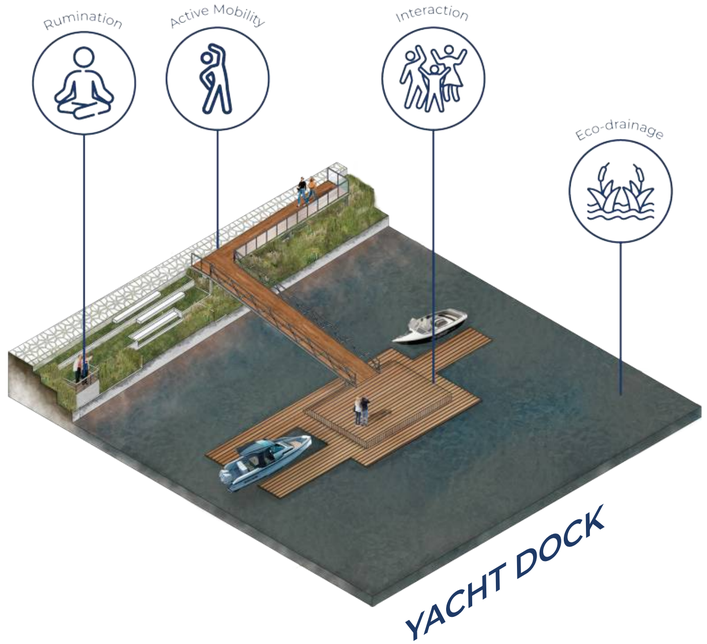
A linear landscape that promotes the regeneration of local species while offering spaces for rest and contemplation.

Yacht Dock

A controlled interface with the river that supports docking activities while incorporating spaces for contemplation and environmental management.

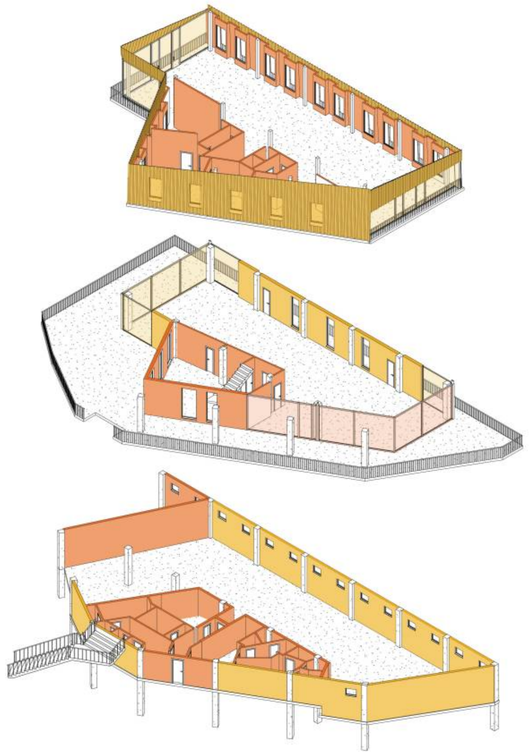






LOW-IMPACT TRANSFORMATION

Existing walls

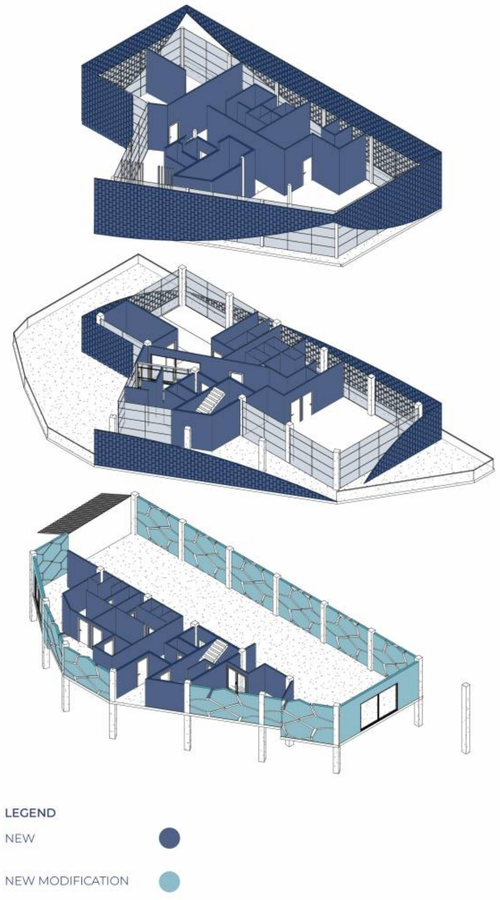


LEGEND

TO BE DEMOLISHED

TO BE MODIFIED

Proposed divisions

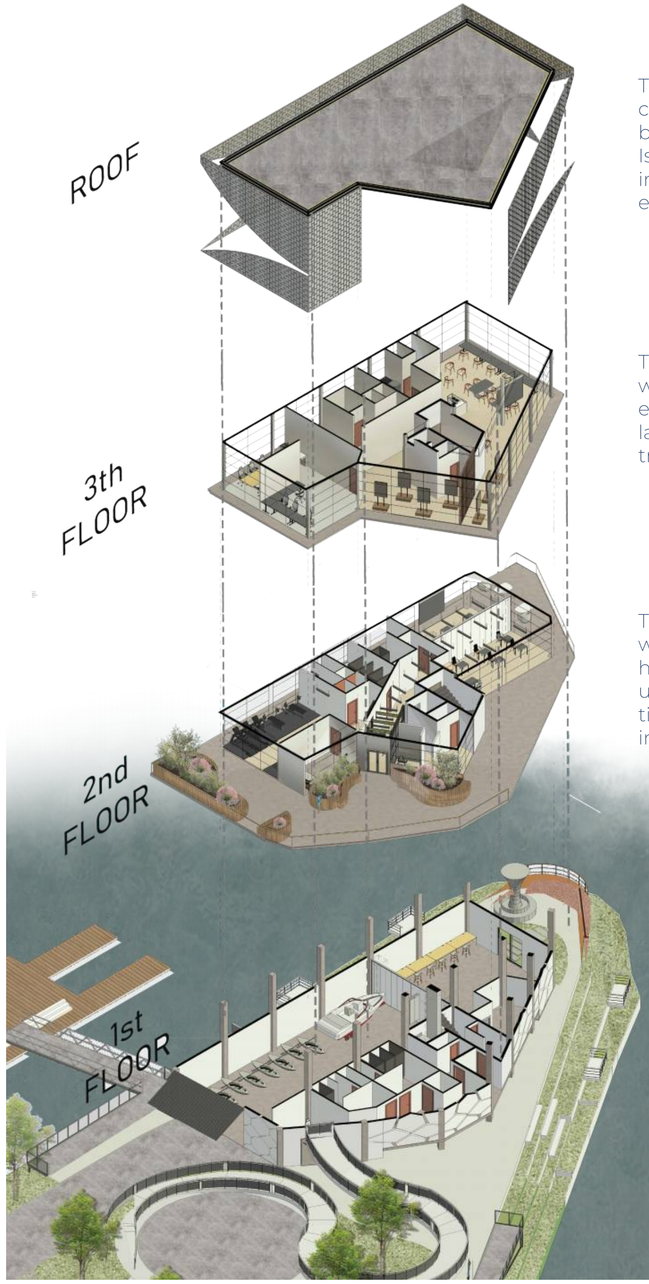


LEGEND

NEW

NEW MODIFICATION

The interior walls have been selectively removed through environmentally responsible processes to optimize spatial distribution, allowing for a more flexible and efficient layout. These are replaced with new partitions made from improved, low-impact materials, enhancing both environmental performance and indoor quality.



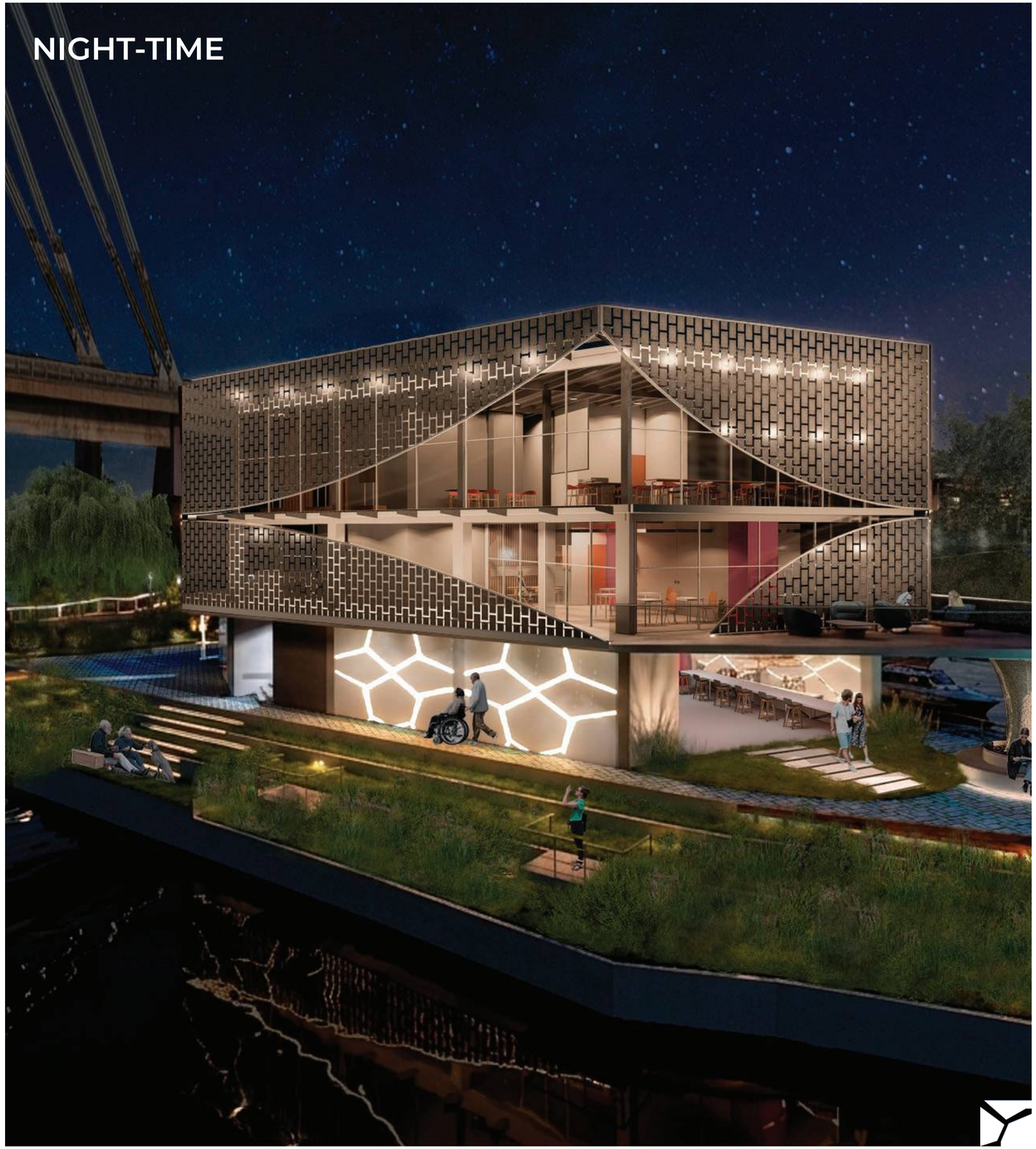
The **roof** is made with ultra-low carbon **ECOPact** concrete from Saint-Gobain and Chryso, which reduces CO_2 by almost 50% using local recycled aggregates. We added Isover insulation, Weber membrane, and BIPV solar panels integrated into **ORAÉ** recycled glass to generate clean energy while controlling heat.

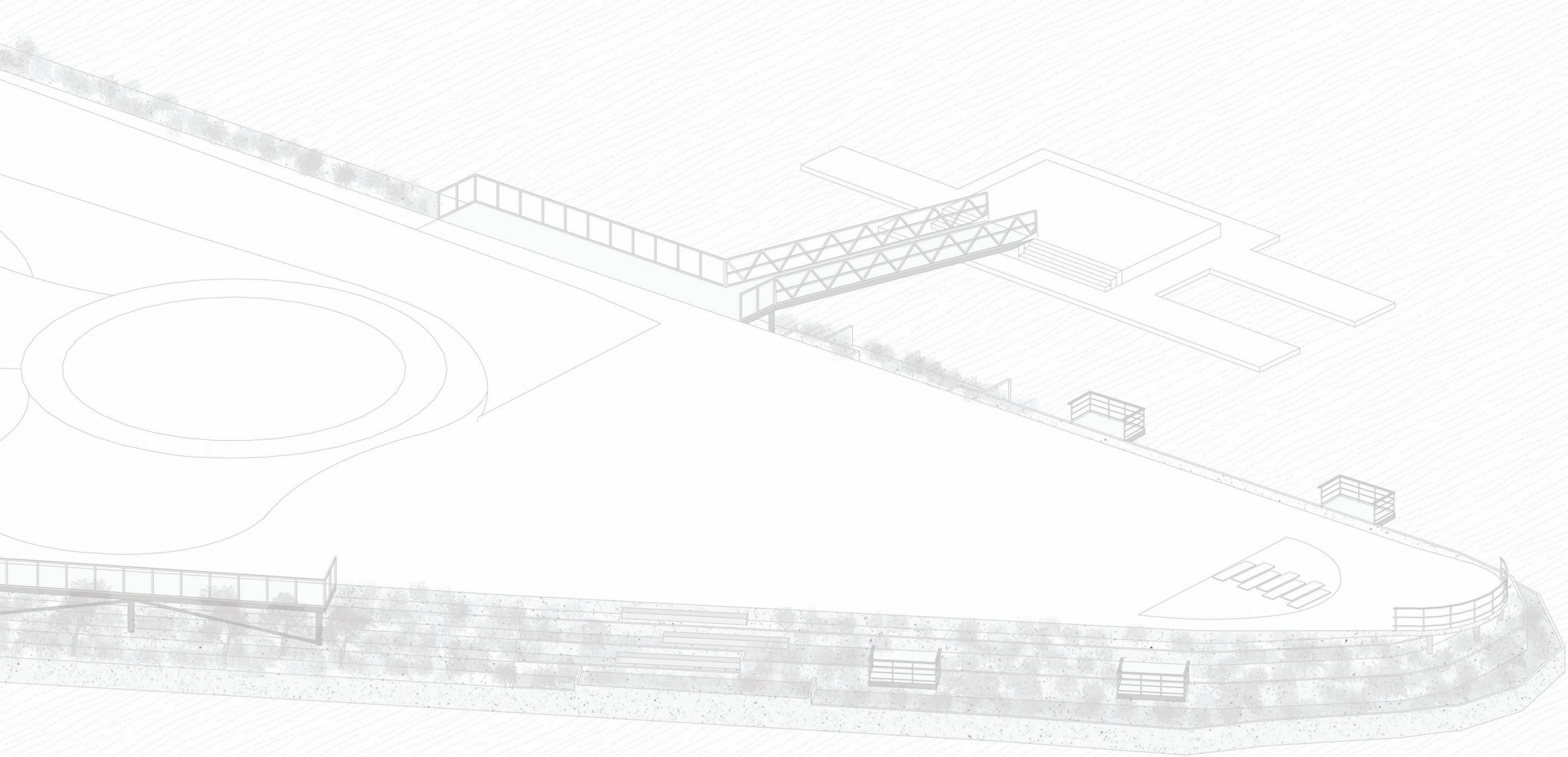
The **second floor** uses a slim, lightweight **Rigips** system with recycled, low-VOC materials for high air quality and efficiency, complemented by high-performance low-E laminated and multi-layer glazing to ensure thermal control, seismic resistance, and clear views of the Sava.

The **first floor** continues the lightweight **Rigips** system with recycled components for structural efficiency and healthy indoor air, complemented by a vegetated balcony using a green roof substrate that enhances CO_2 absorption, thermal regulation, and connection to the surrounding landscape.

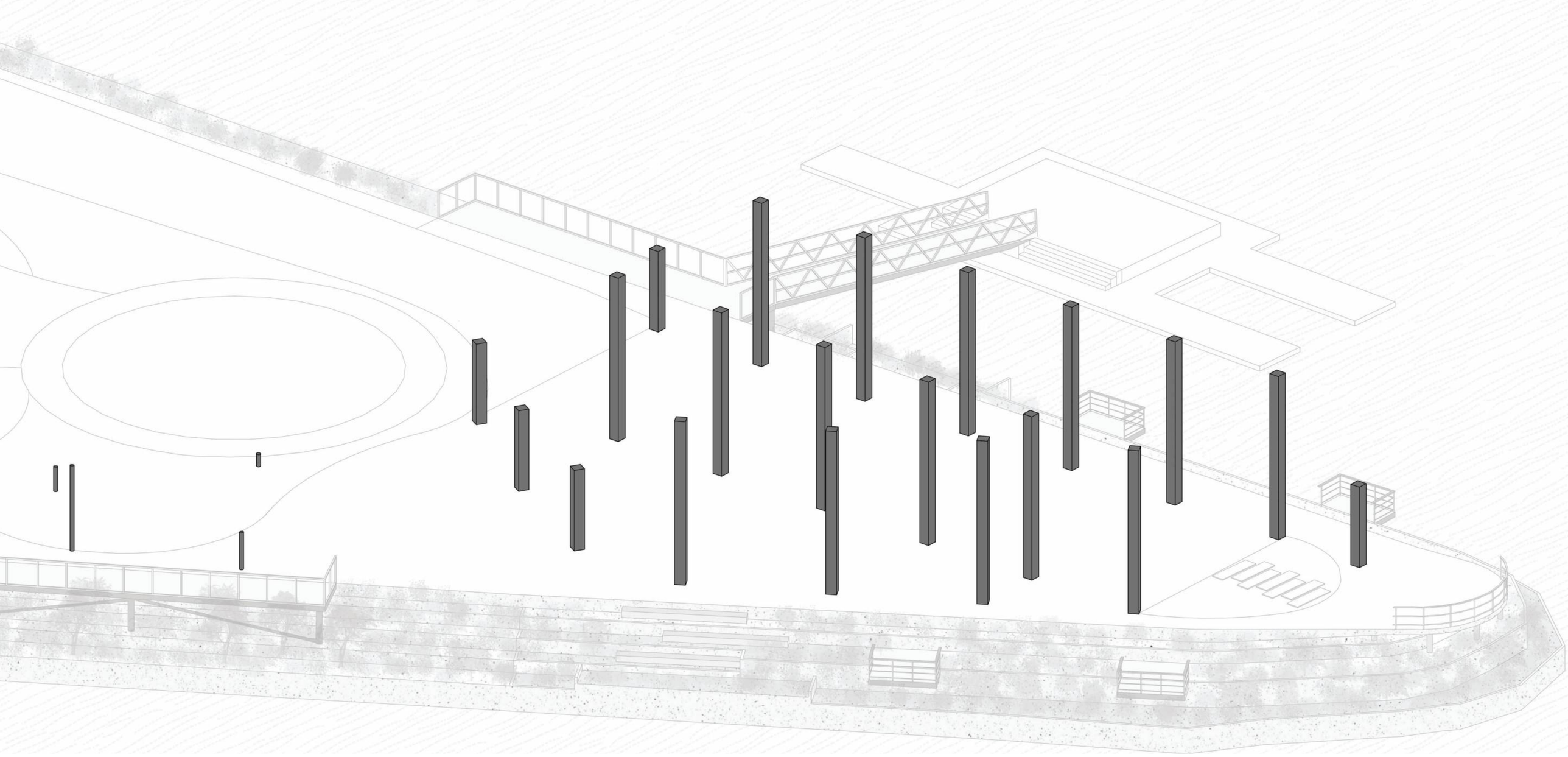
The ground floor combines a concrete wall with an organic diamond pattern and high-performance glazing for thermal efficiency, seismic resistance, and clear views, while upper systems use lightweight Rigips assemblies with recycled materials to ensure structural efficiency and healthy indoor air quality.


DAYTIME

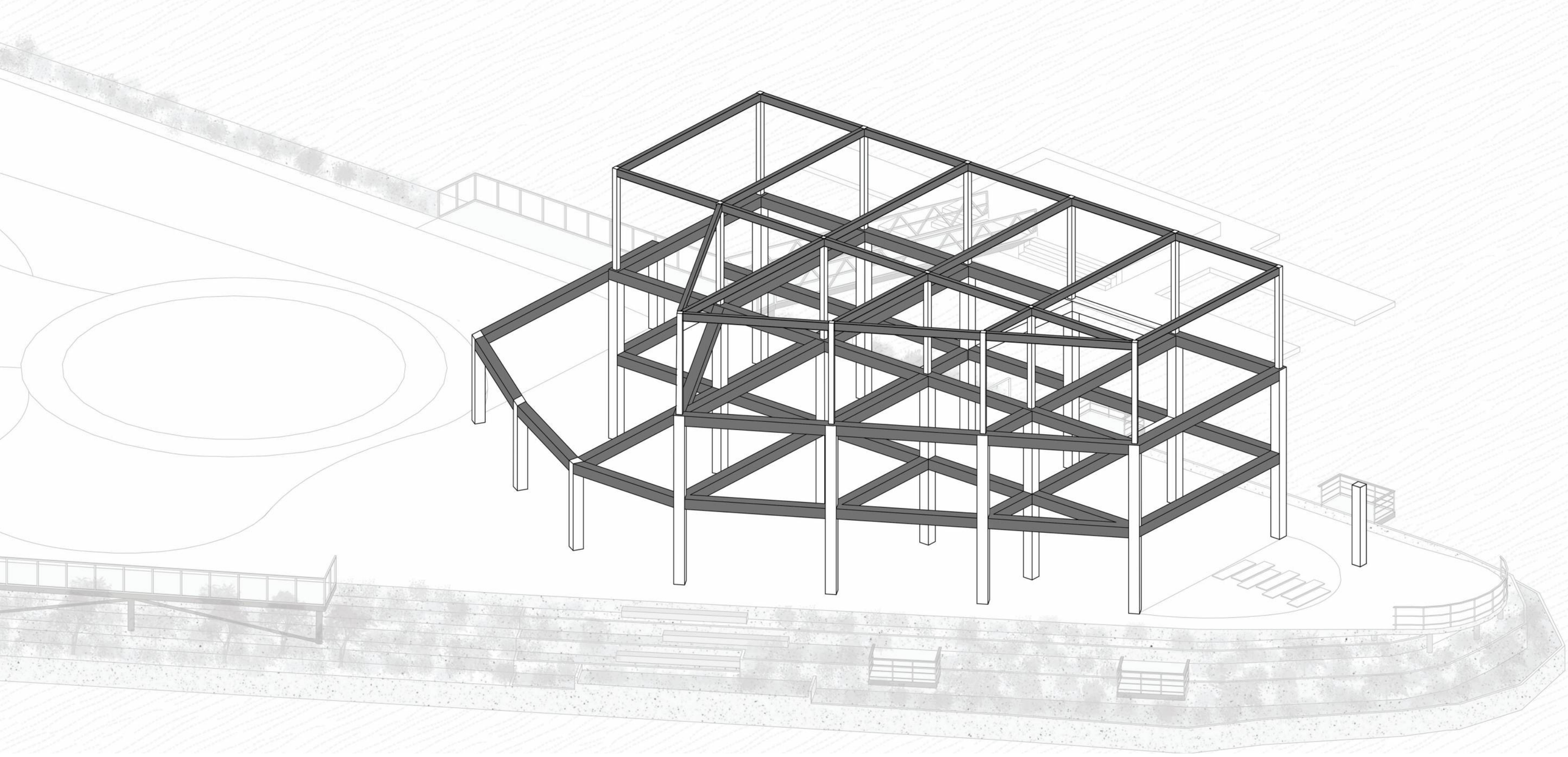

NIGHT-TIME



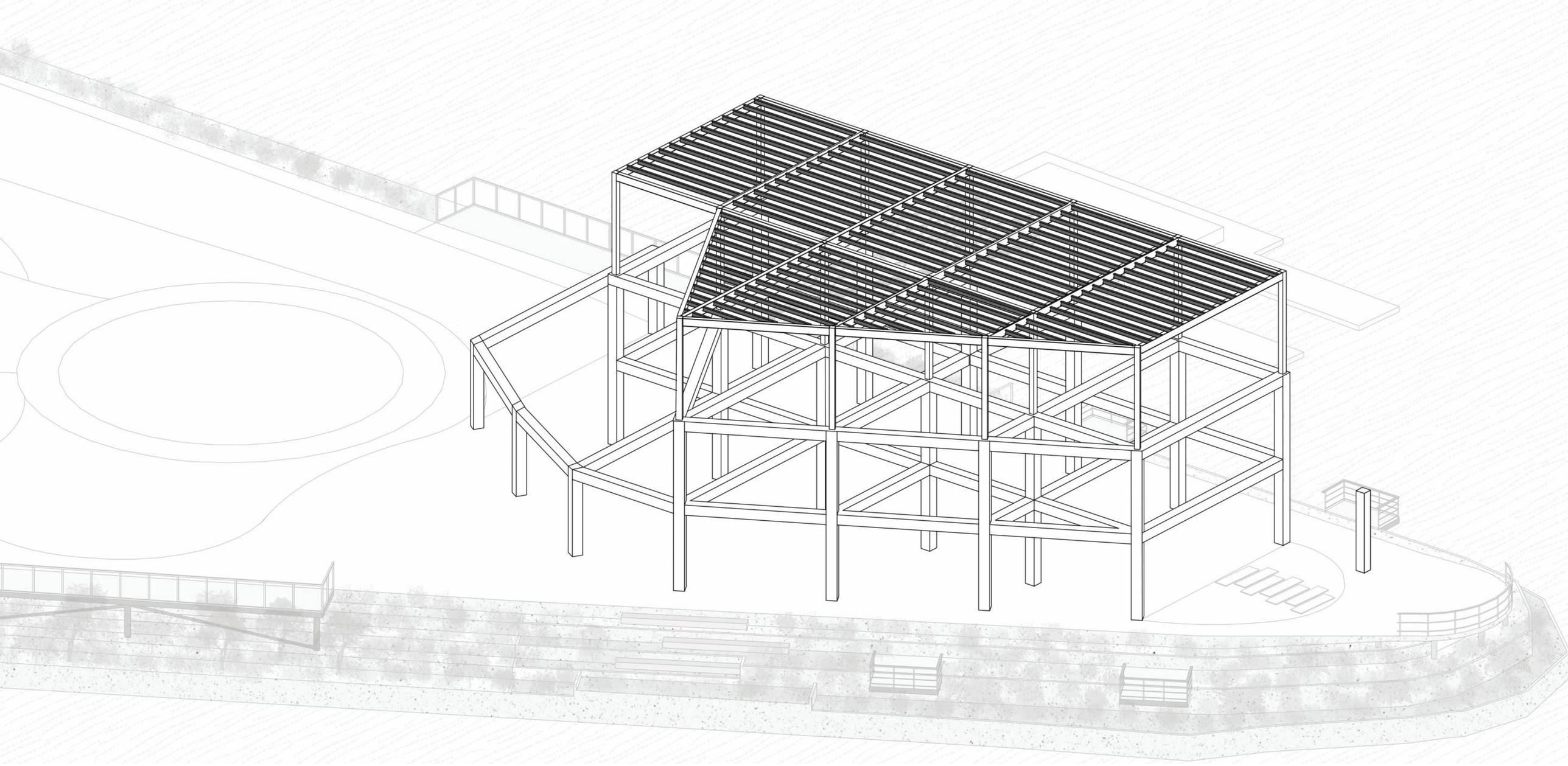
1: TERRAIN



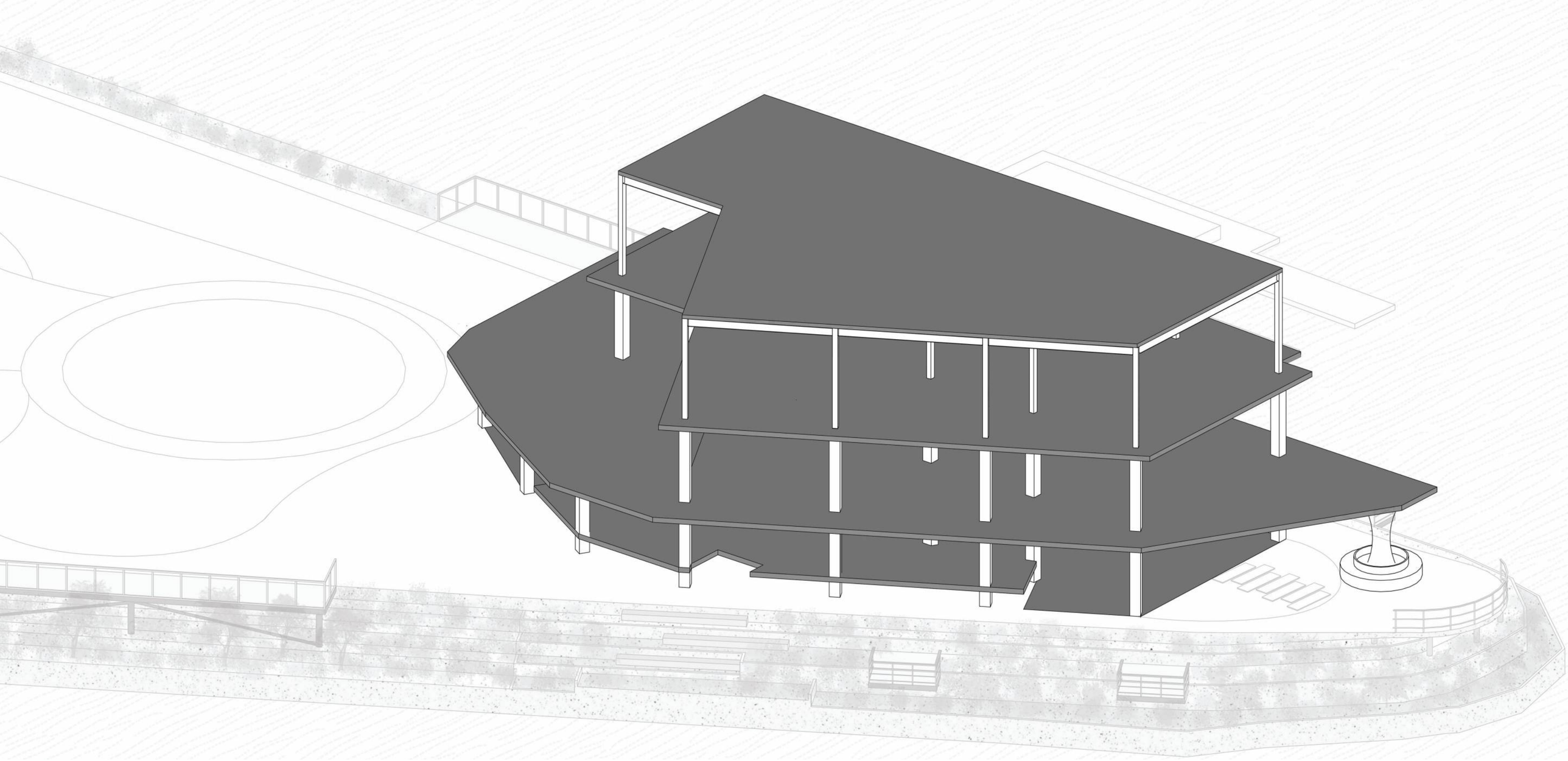
2: COLUMNS



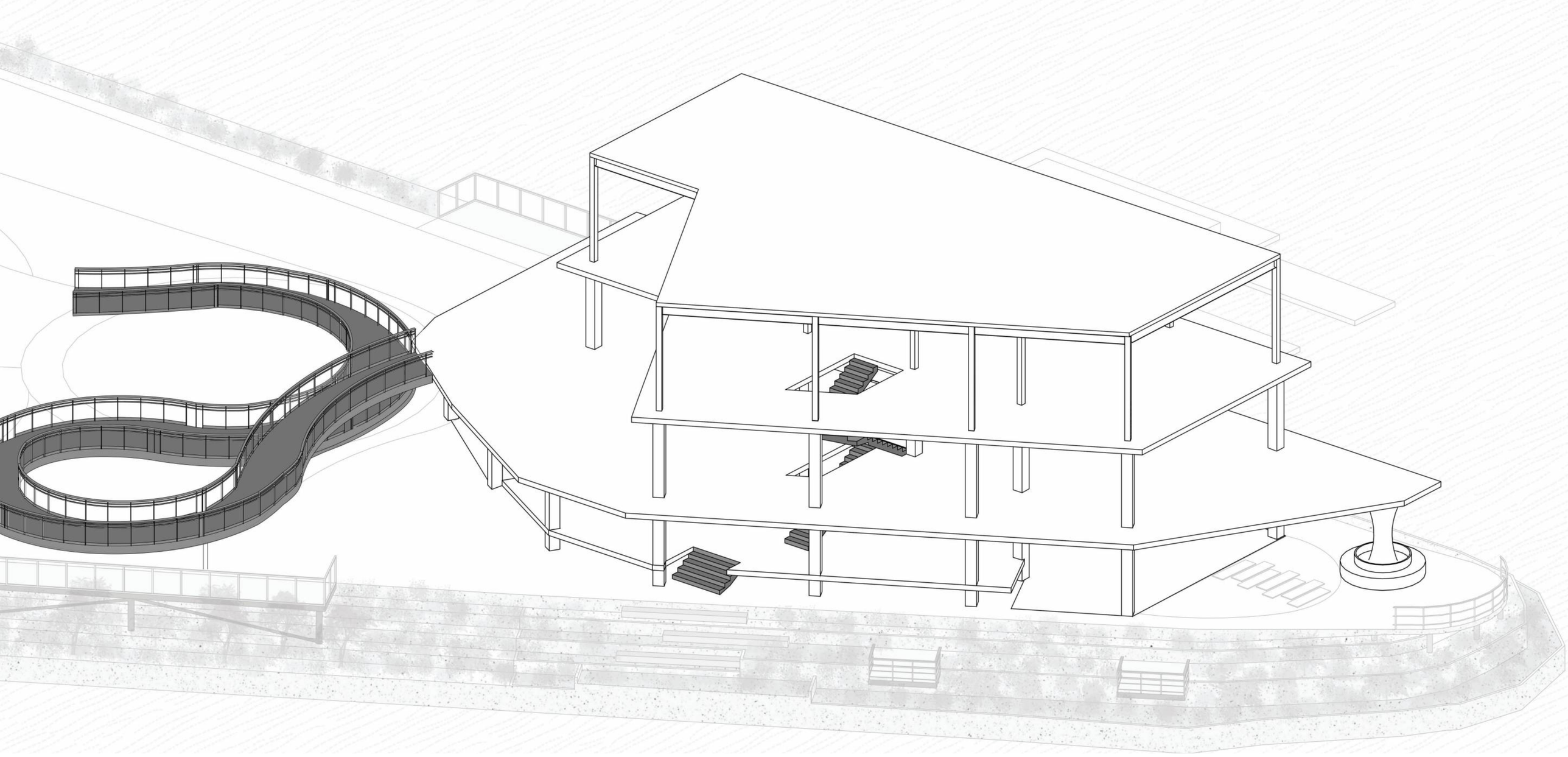
3: BEAMS



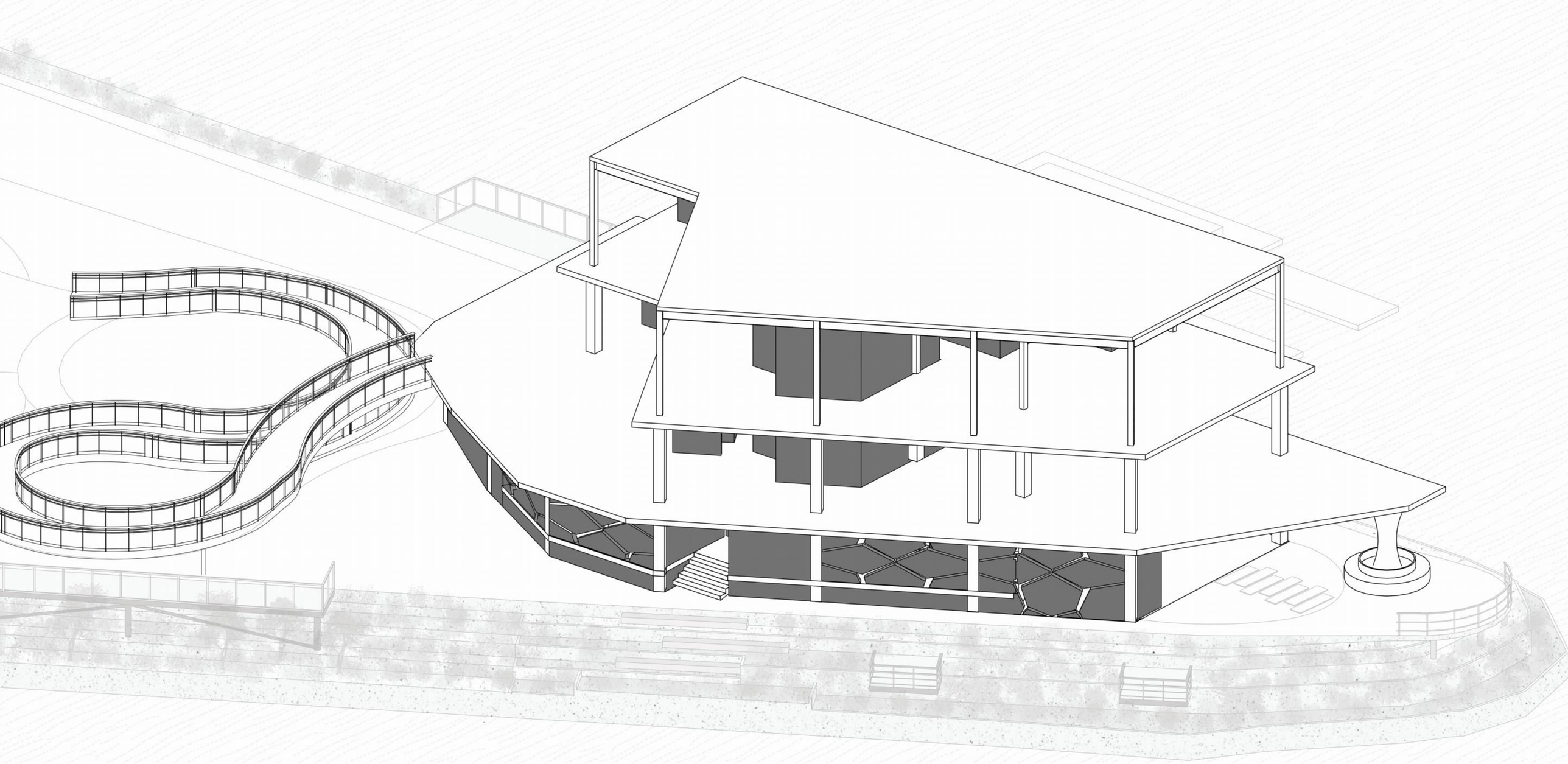
7: MEMBRANE



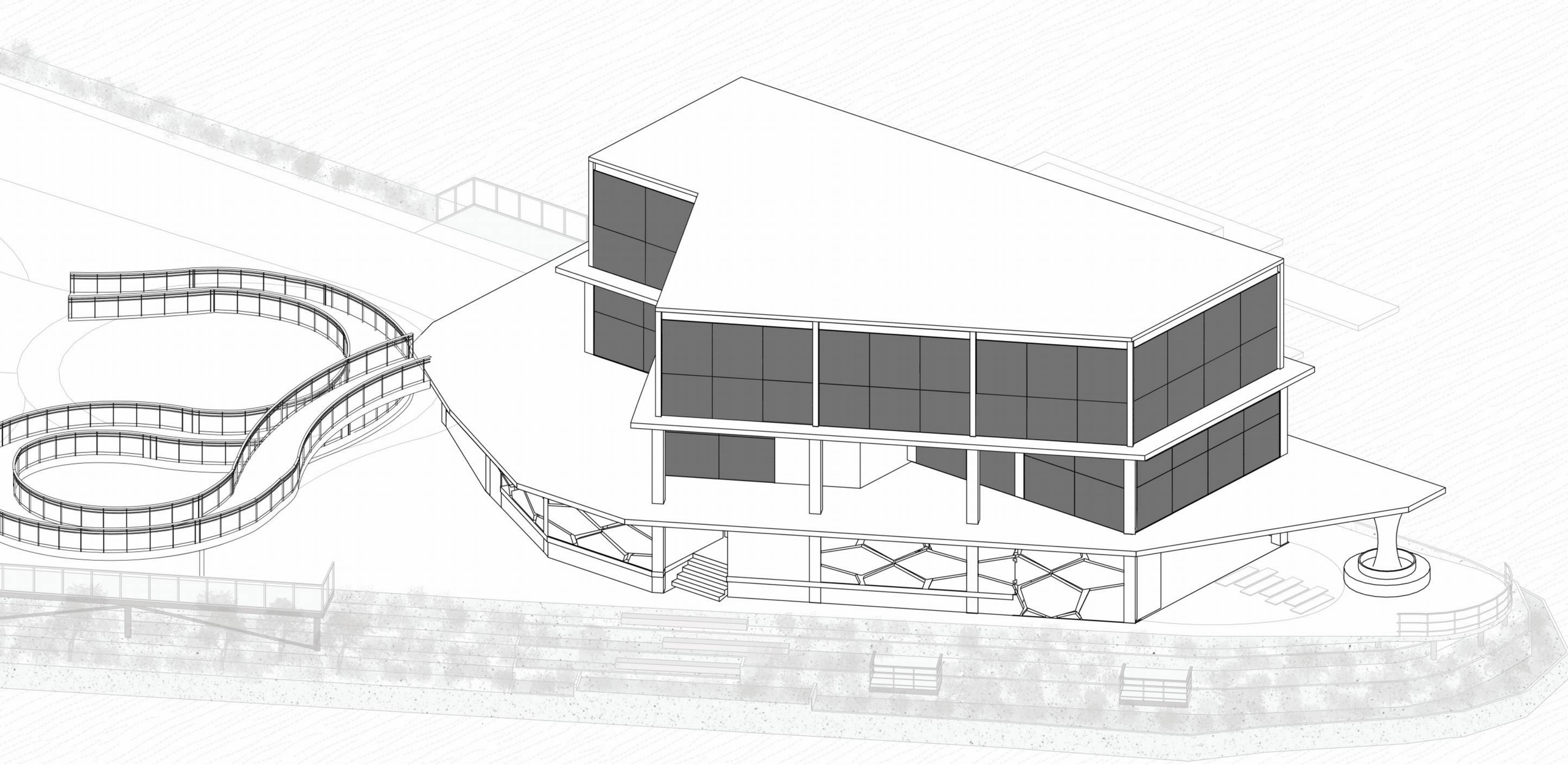
5: SLABS



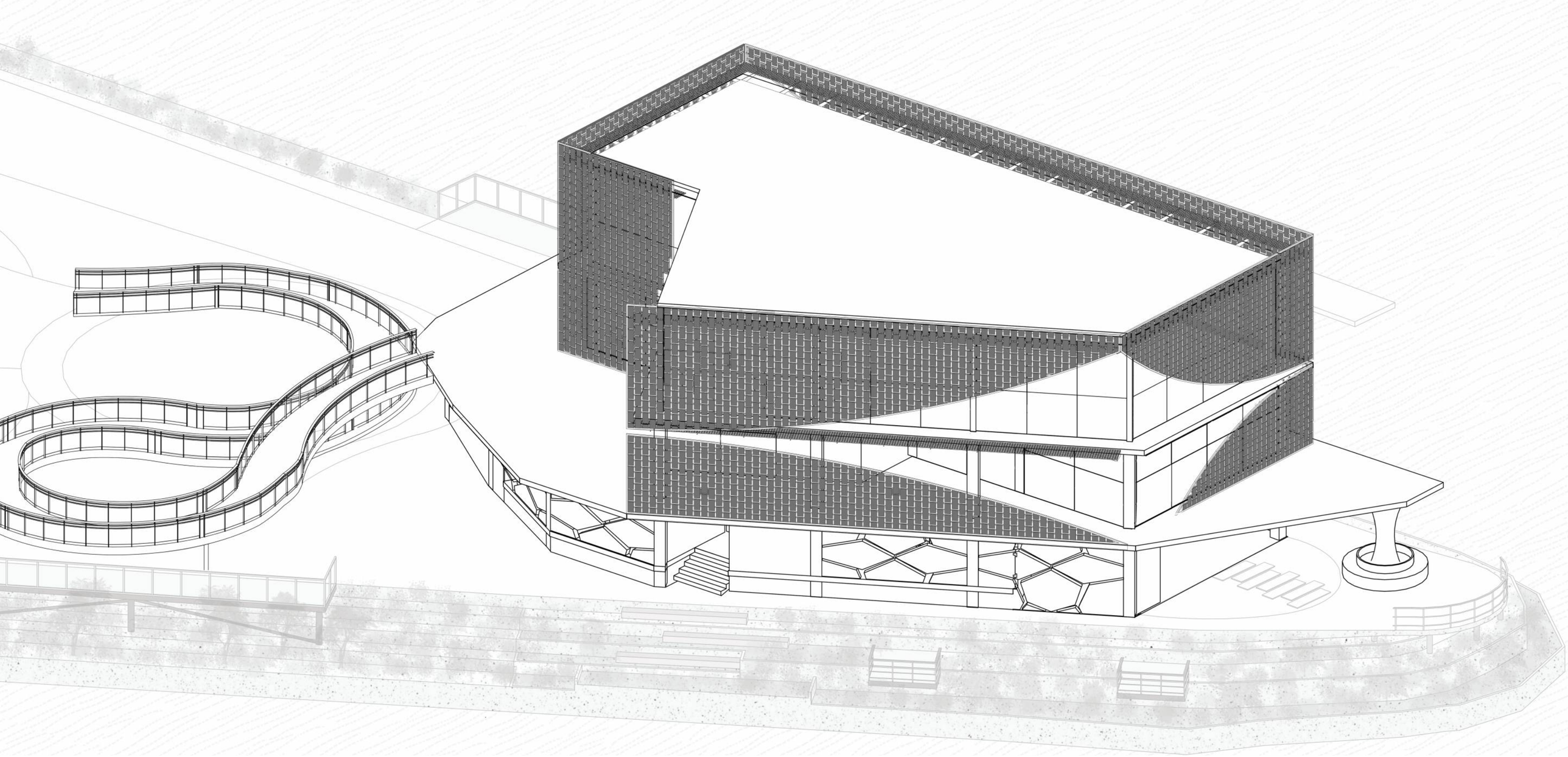
6: CIRCULATION



7: INTERNAL WALLS



8: EXTERNAL OPENINGS

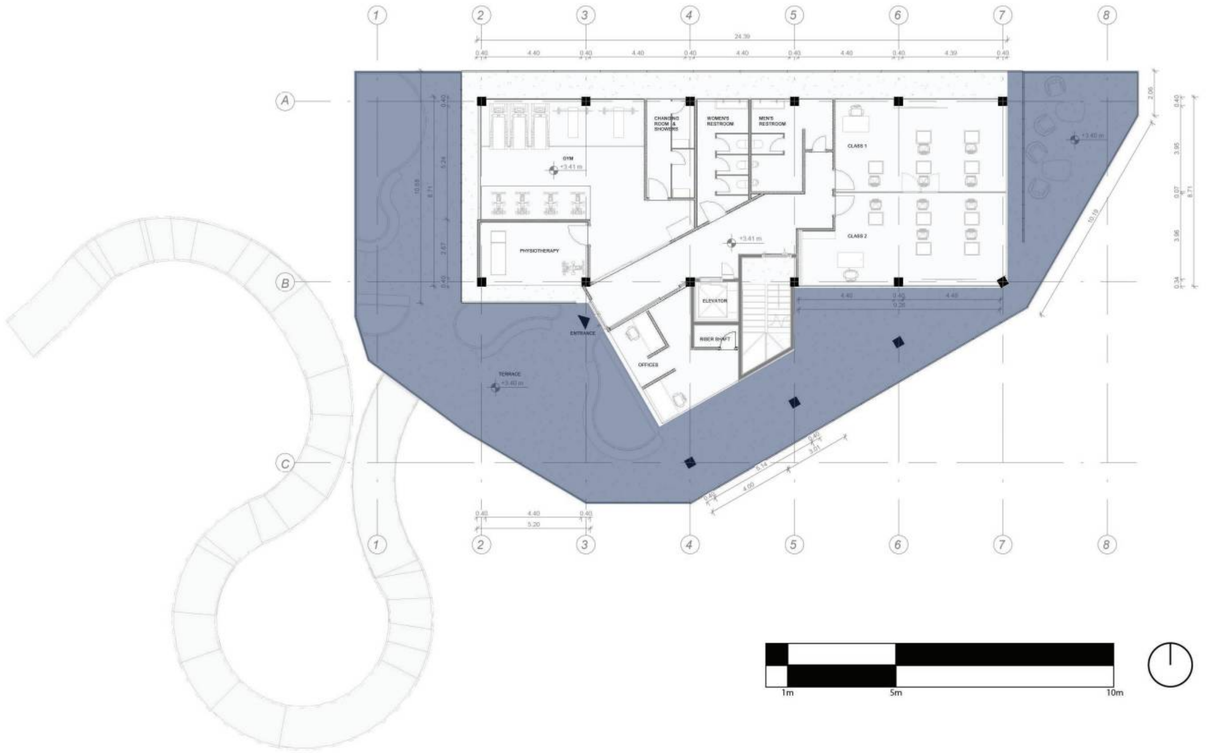


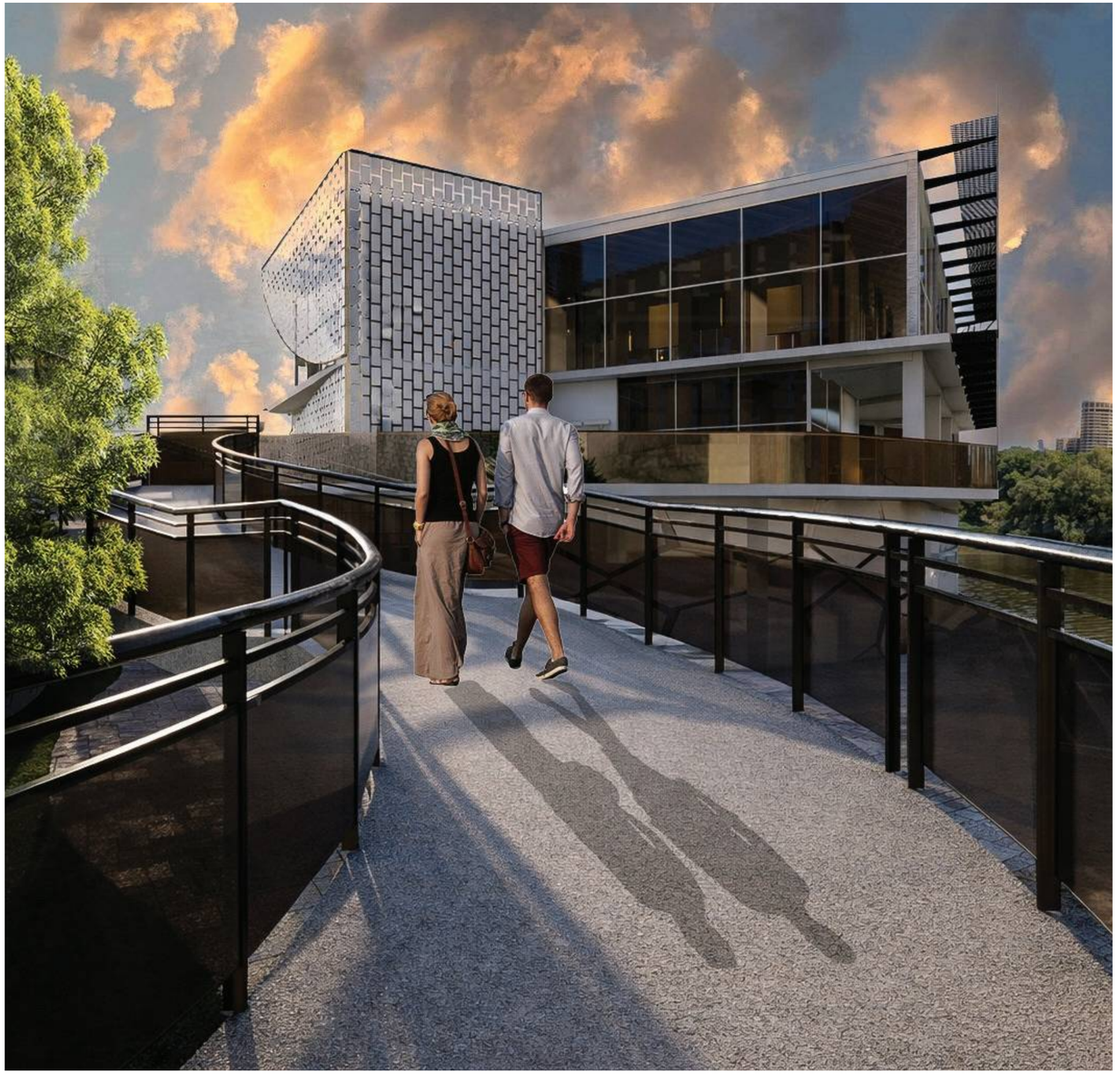
9: MEMBRANE

MAIN ENTRY

The arrival experience is redefined by a panoramic exterior ramp that bypasses the ground level to deliver visitors directly to the first floor. This architectural gesture not only provides an elevated vantage point of the Sava River during the ascent but also creates a clear circulation hierarchy, separating public movement from the technical operations of the hangar below.

FIRST FLOOR

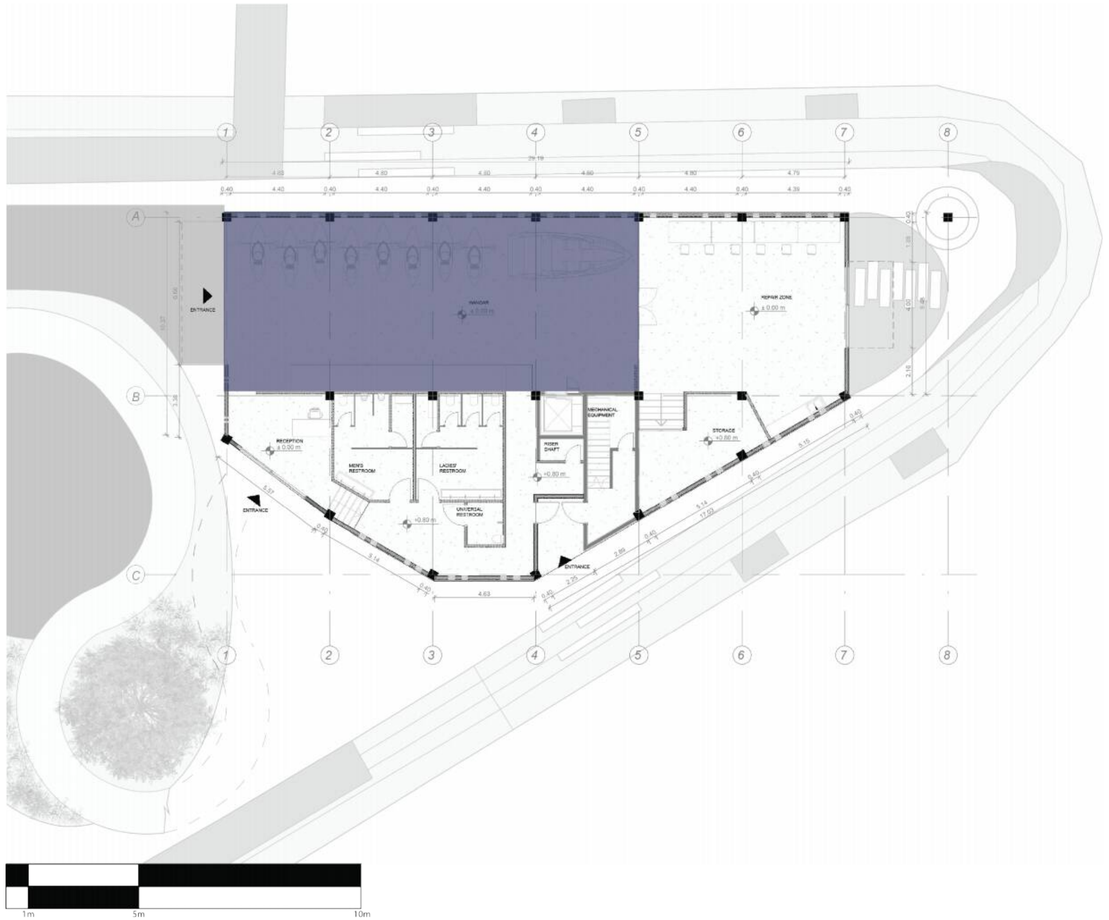




YACHT HANGAR

Located on the ground floor, the hangar has been significantly extended compared to the original layout. This expansion optimizes the logistics of vessel storage and maintenance, providing a more robust technical core that can accommodate a larger fleet while improving the maneuverability of equipment within the dock-adjacent space.

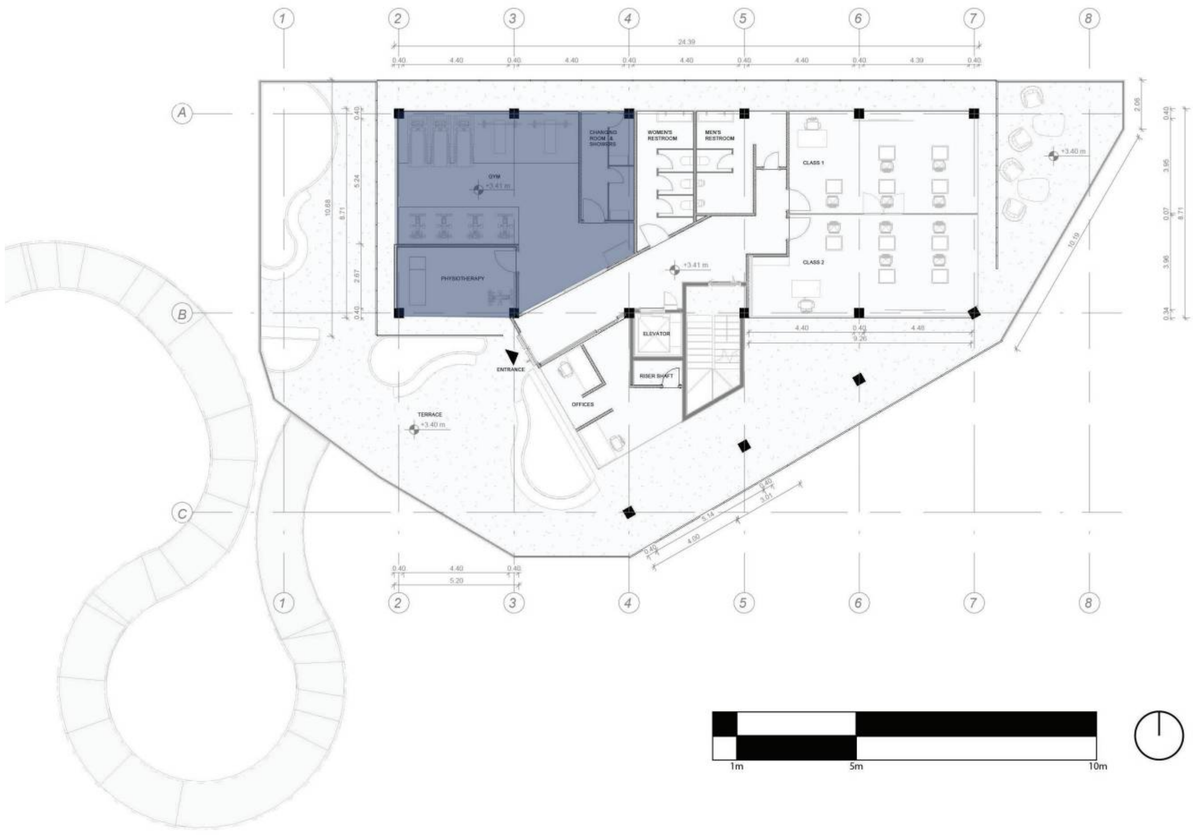
GROUND FLOOR

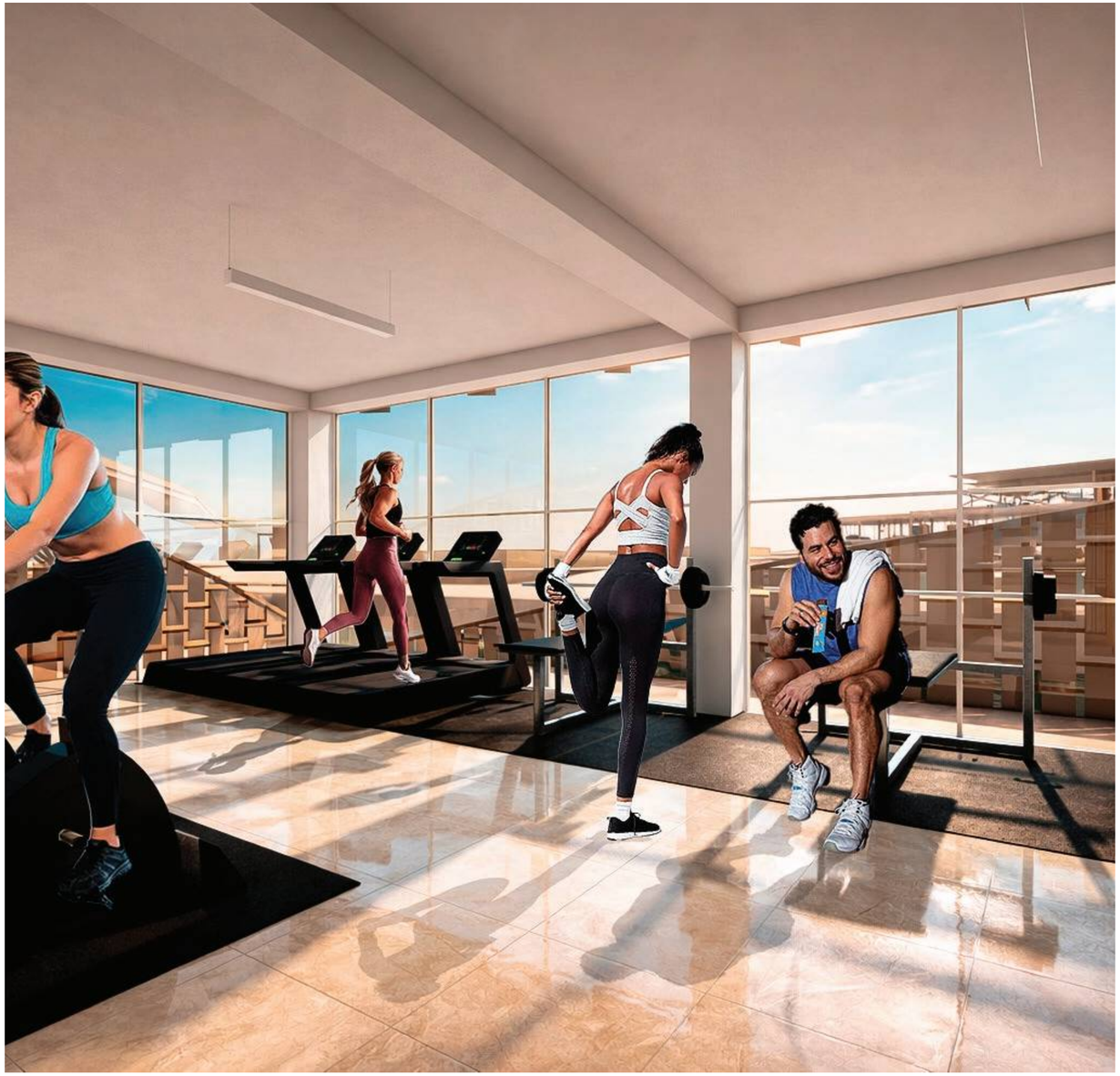


GYM AND FITNESS SPACES

To align with the club's identity as an athletic hub, the first floor features dedicated fitness zones. These spaces are strategically positioned to benefit from the building's natural light and views, providing a high-performance environment tailored to the physical conditioning and recovery needs of the resident athletes.

FIRST FLOOR

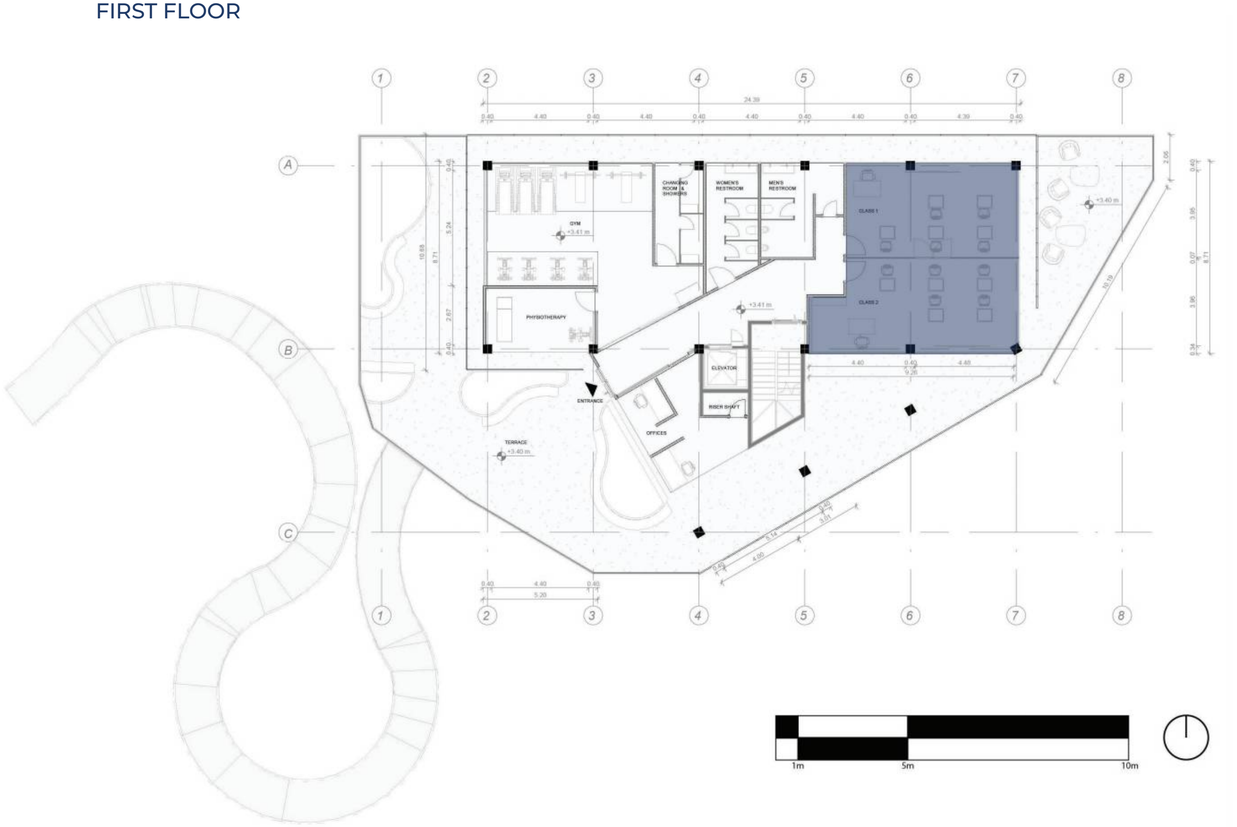




LEARNING SPACES

The educational wing utilizes a flexible layout consisting of two classrooms divided by a movable acoustic wall. This intervention allows for maximum versatility: the rooms can function independently for small seminars or be merged into a single large hall for workshops and club-wide presentations, adapting to the daily flow of the program.

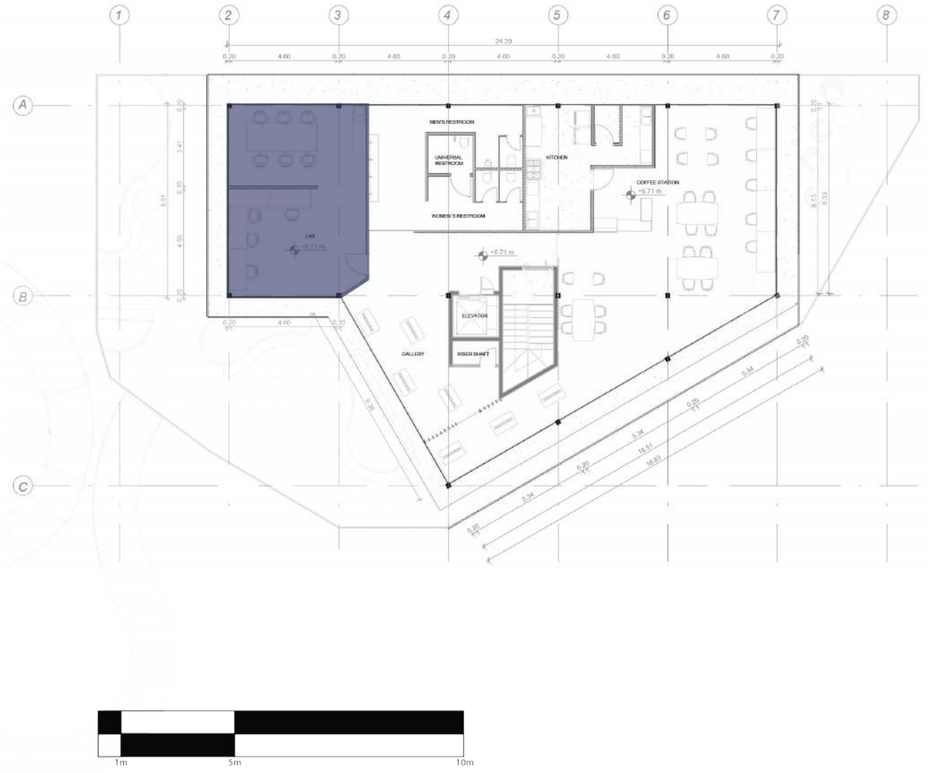
FIRST FLOOR



LAB AND RESEARCH

The second floor hosts a specialized laboratory focused on water study and river ecology. Though small in footprint, this research cell serves as the project's intellectual heart, connecting the club's activities to the environmental preservation of the Belgrade waterfront through direct observation and sample analysis.

SECOND FLOOR



CAFETERIA

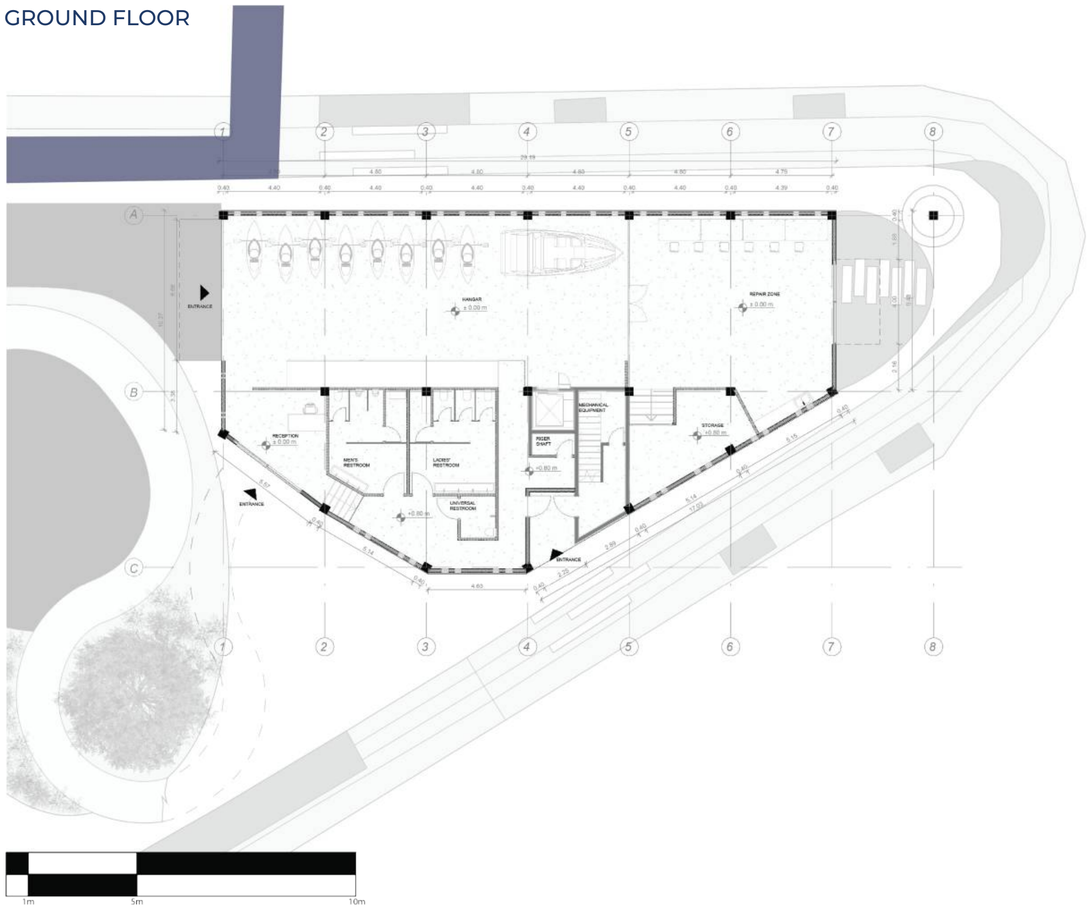
Also situated on the second floor, the cafeteria is designed as a public-facing social anchor. By leveraging its height, the space offers panoramic views of the river and the city skyline, inviting the community into the building and providing a scenic rest point for both members and visitors.

THIRD FLOOR

OUTDOOR SPACES - DOCK

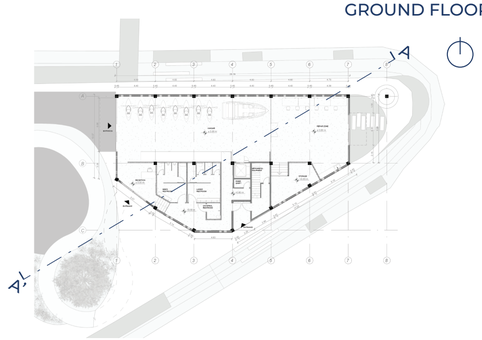
The dock serves as the primary interface between the built intervention and the water. It is designed for seamless yacht mooring and direct access to the ground-floor hangar, ensuring that the transition from the river to the building's technical facilities is efficient and architecturally integrated with the shoreline.

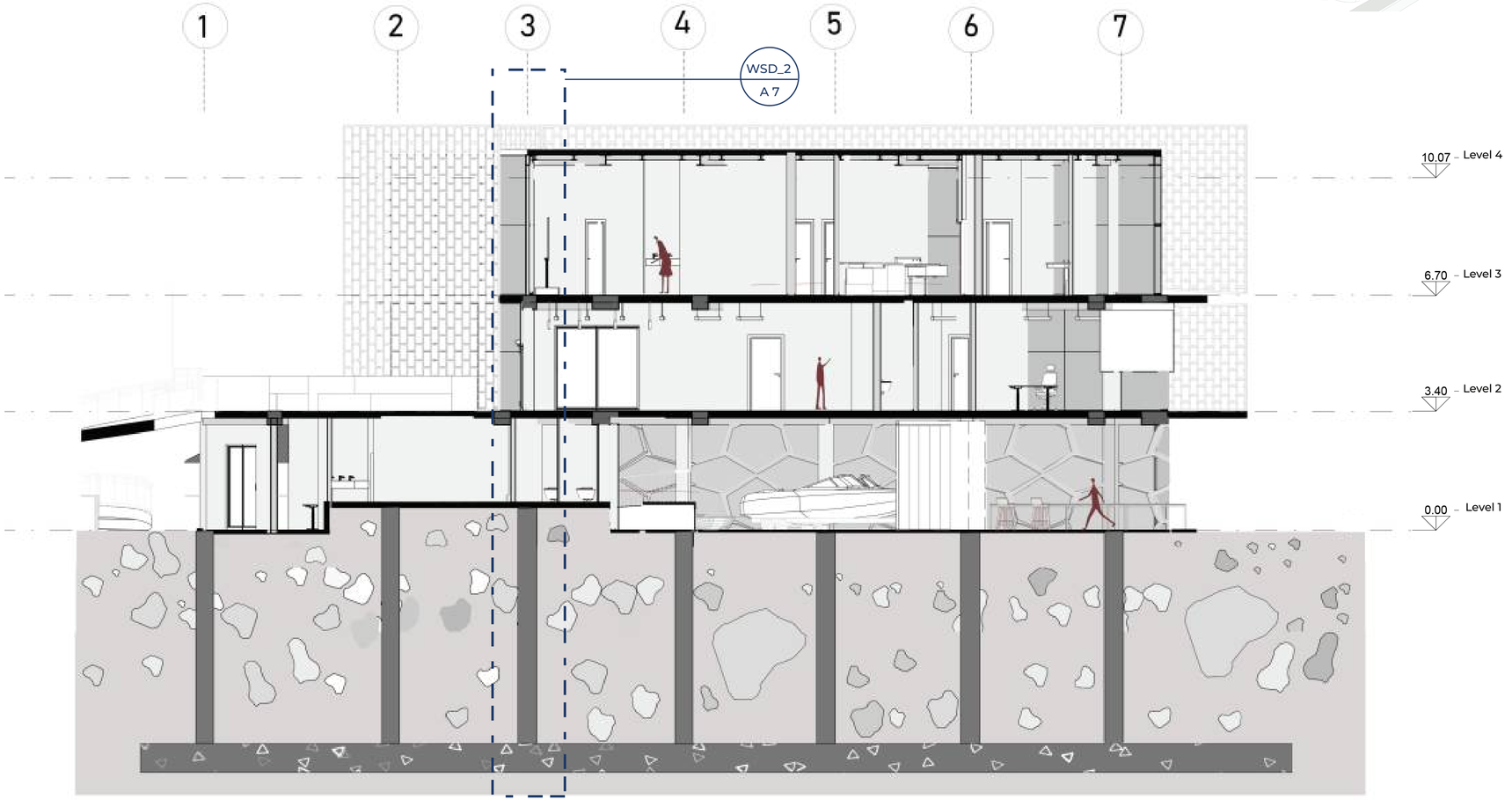
GROUND FLOOR



SECTION A-A’

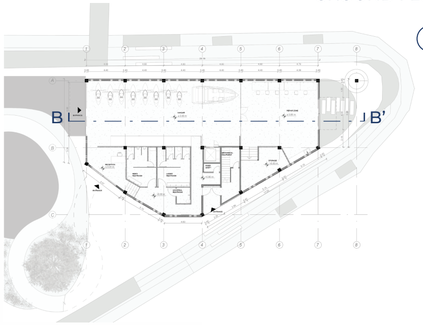
GROUND FLOOR

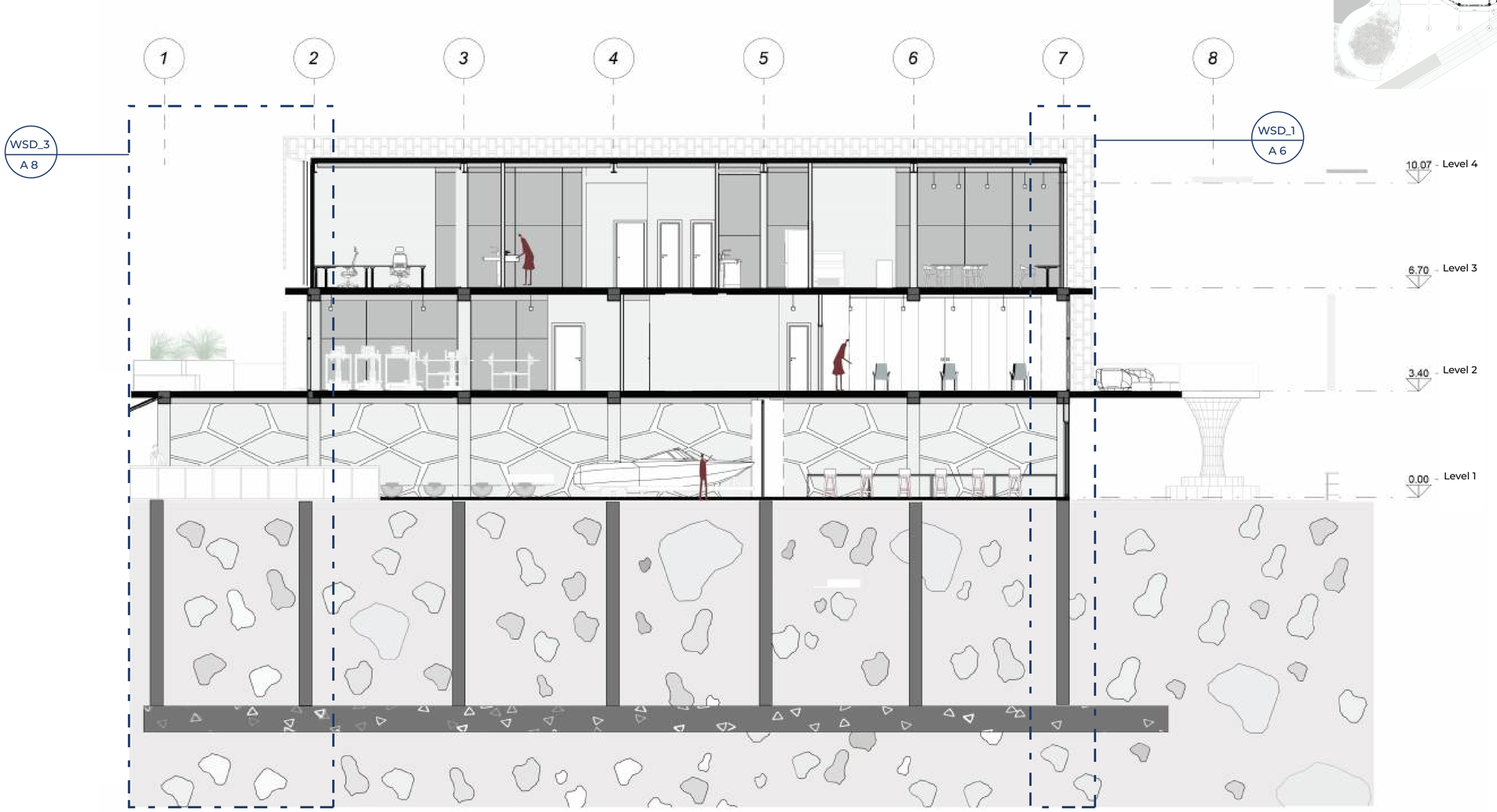




SECTION B-B’

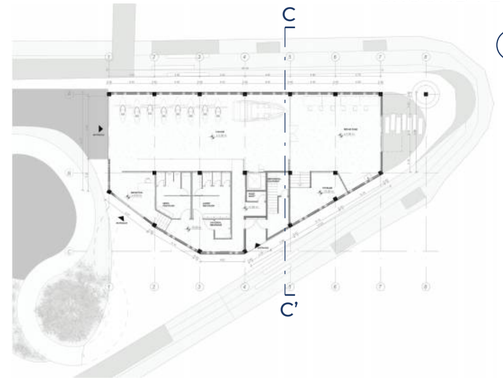
GROUND FLOOR



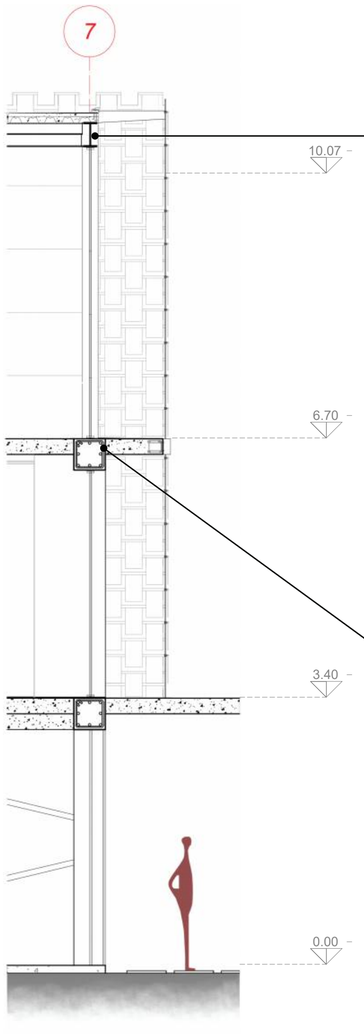


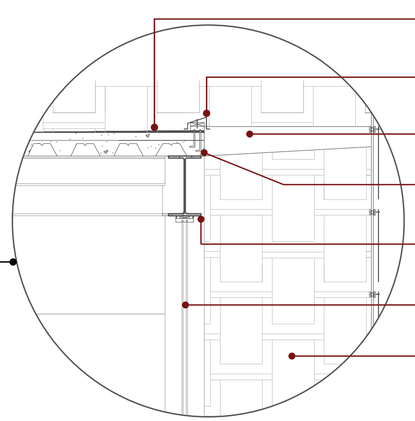
SECTION C-C'

GROUND FLOOR



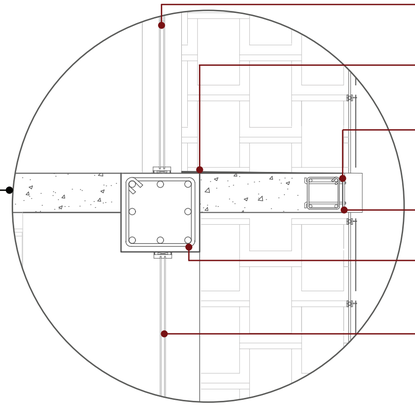
CONSTRUCTION DETAIL - EXTERNAL FACADE





1. WEBER REFLECTIVE CONCRETE PLASTER (2% SLOPE)
   15–20 MM; HIGH ALBEDO; DRAINAGE LAYER
2. HYDRO CIRCAL® 75R RECYCLED ALUMINUM FLASHING PROFILE
   2 MM; IMPERMEABLE TERMINATION; LOW-CARBON ALUMINUM
3. STRUCTURAL STEEL BRACKET (FAÇADE / SLAB FIXING)
   8–12 MM PLATE; RECYCLED STEEL
4. REINFORCED CONCRETE DECK SLAB (FC ≈ 21 MPA)
   200 MM; LOW-CARBON CONCRETE
5. STEEL I-BEAM
   HEA 200–300 MM (TYP.); STRUCTURAL ELEMENT
6. SAINT-GOBAIN ORAÉ LAMINATED WITH COOL-LITE XTREME 70/33 II GLASS
   (LT 70%; G = 0.33; UG ≈ 1.0 W/M²K; LOW-E SOLAR CONTROL
7. HYDRO CIRCAL® / WICONA MICRO-PERFORATED ALUMINUM "SCALES" FAÇADE
   2–3 MM; DYNAMIC SHADING SYSTEM; RECYCLED ALUMINUM

SCL 1:20



1. SAINT-GOBAIN ORAÉ LAMINATED WITH COOL-LITE XTREME 70/33 II
   (LT 70%; G = 0.33; UG ≈ 1.0 W/M²K; LOW-E SOLAR CONTROL)
   6 MM LAMINATED (3+3 MM PVB)
2. WEBER CONCRETE PLASTER (2% SLOPE)
   15–20 MM; CEMENT-BASED
3. J-SHAPED STEEL ANCHOR BOLT
   Ø16–Ø25 MM; L = 300–500 MM; GALVANIZED / STAINLESS STEEL
4. RECYCLED STEEL ANCHOR PLATE (FAÇADE SUPPORT)
   10–15 MM; STRUCTURAL STEEL; LOAD DISTRIBUTION
5. REINFORCED CONCRETE BEAM 40 × 40 cm, STRUCTURAL ELEMENT
6. SAINT-GOBAIN ORAÉ LAMINATED WITH COOL-LITE XTREME 70/33 II
   (LT 70%; G = 0.33; UG ≈ 1.0 W/M²K; LOW-E SOLAR CONTROL)
   6 MM LAMINATED (3+3 MM PVB)

SCL 1:20

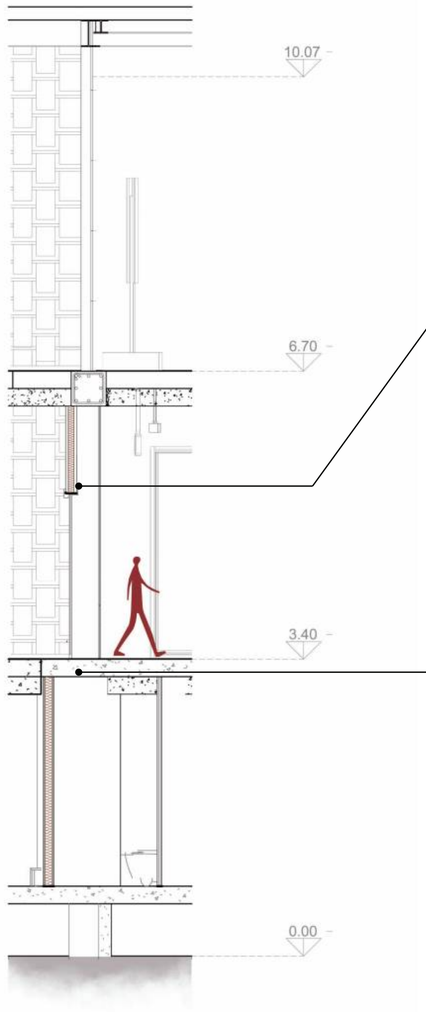
SAINT-GOBAIN

weber
SAINT-GOBAIN

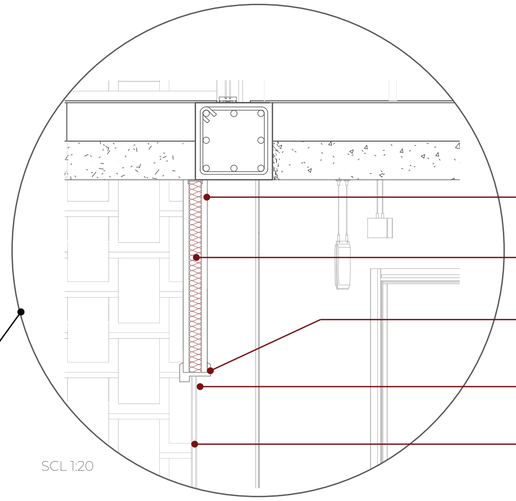
chryso
SAINT-GOBAIN

Hydro
CIRCAL®
Recycled Aluminium

CONSTRUCTION DETAIL - INTERIOR WALLS

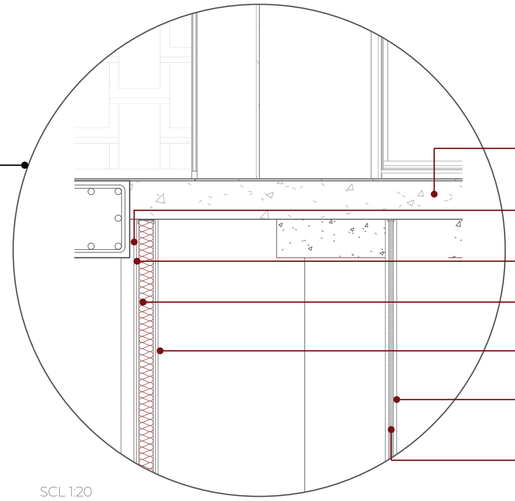


DETAIL 2
SCL 1:50



SCL 1:20

1. RIGIPS STANDARD BOARD (RB) 12.7MM (SAINT-GOBAIN;NON-COMBUSTIBLE; MOISTURE-RESISTANT)
2. ISOVER MINERAL WOOL INSULATION 88.9MM (>70% RECYCLED CONTENT; DENSITY 30–50 KG/M³; Λ = 0.035 W/M·K; MOISTURE- AND FIRE-RESISTANT)
3. WICONA / HYDRO STRUCTURAL METAL PROFILE FOR HINGED GLASS DOOR 1.5–3 MM; ALUMINUM FRAME PROFILE
4. SAINT-GOBAIN CONTRAFLAM LITE 30 CLIMAPLUS 33 MM; FIRE-RESISTANT LAMINATED GLAZING UNIT
5. VENTILATED AIR CAVITY 16 MM; THERMAL + ACOUSTIC INSULATION LAYER



SCL 1:20

1. SOLID CONCRETE SLAB 20CM- f'c= 210 kg/cm2
2. BLUE ACOUSTIC RF (DF) 12,5MM - ACOUSTIC PLASTERBOARD HIGH ACOUSTIC PERFORMANCE GYPSUM BOARD
3. HABITO BOARD DFRI 12,5MM HIGH-STRENGTH, IMPACT-RESISTANT GYPSUM BOARD
4. SAINT-GOBAIN ISOVER AKUSTO MINERAL WOOL INSULATION 75 MM; ACOUSTIC INSULATION LAYER
5. BLUE ACOUSTIC RFI (DFH2) 12,5MM- MOISTURE RESISTANT ACOUSTIC PLASTERBOARD
6. HPL COMPACT PANEL 6 MM; HIGH-PRESSURE LAMINATE; MOISTURE-RESISTANT FINISH
7. RECYCLED KRAFT PAPER HONEYCOMB PANEL 38 MM; LIGHTWEIGHT SUSTAINABLE CORE SYSTEM

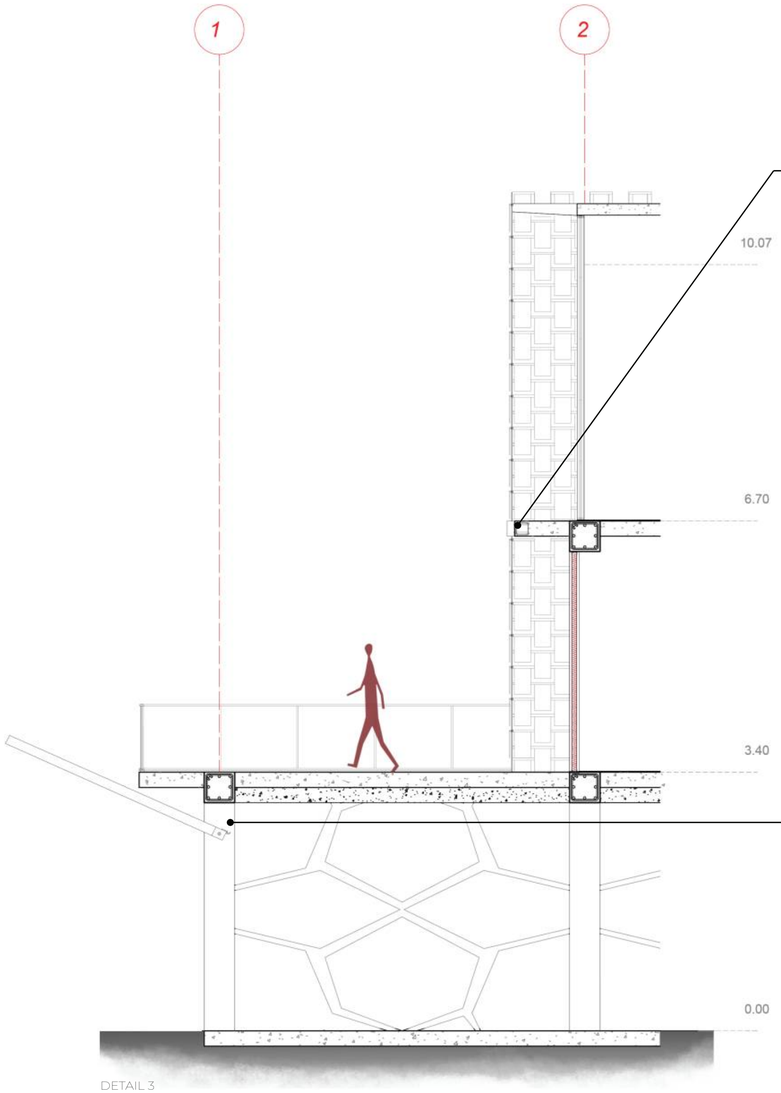
SAINT-GOBAIN

weber
SAINT-GOBAIN

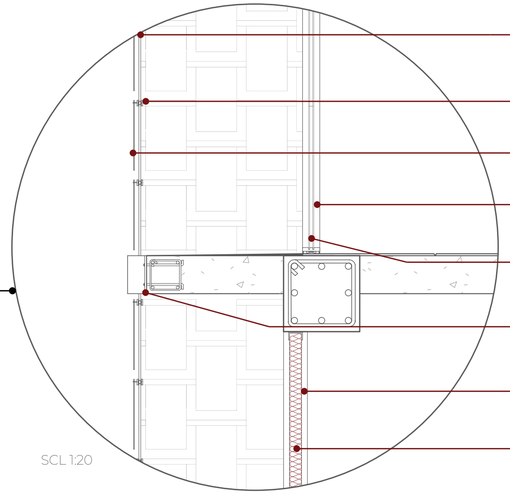
chryso
SAINT-GOBAIN

Hydro
CIRCAL®
Recycled Aluminium

CONSTRUCTION DETAIL - ENTRANCES

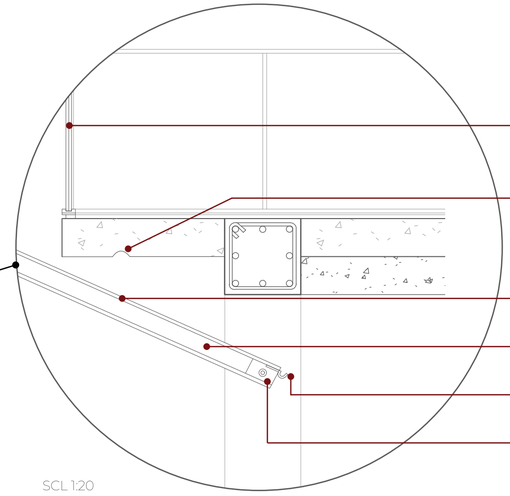


DETAIL 3
SCL 1:50



SCL 1:20

1. WICONA / METALFER® GREEN STEEL VERTICAL PROFILE (FAÇADE STRUCTURE)
   1.5–3 MM; STRUCTURAL FAÇADE SUPPORT PROFILE
2. WICONA / HYDRO HORIZONTAL FIXING PROFILE (FAÇADE SYSTEM)
   1.5–2.5 MM; ALUMINUM SUPPORT PROFILE
3. HYDRO CIRCAL® 75R / WICONA MICRO-PERFORATED ALUMINUM "SCALES"
   2–3 MM; DYNAMIC FAÇADE SHADING SYSTEM; RECYCLED ALUMINUM
4. SAINT-GOBAIN CONTRAFLAM LITE 30 CLIMAPLUS
   33 MM; FIRE-RESISTANT LAMINATED DOUBLE GLAZING UNIT
5. VENTILATED AIR CHAMBER (SAINT-GOBAIN FAÇADE SYSTEM)
   16 MM; THERMAL + ACOUSTIC INSULATION LAYER
6. STEEL ANCHOR PLATE (FAÇADE SUPPORT)
   10–15 MM; STRUCTURAL LOAD DISTRIBUTION
7. SAINT-GOBAIN RIGIPS STANDARD BOARD (RB)
   12.7 MM; NON-COMBUSTIBLE; INTERIOR LINING SYSTEM
8. ISOVER MINERAL WOOL INSULATION 88.9MM
   (>70% RECYCLED CONTENT; DENSITY 30–50 KG/M³; Λ = 0.035 W/M·K; MOISTURE- AND FIRE-RESISTANT)

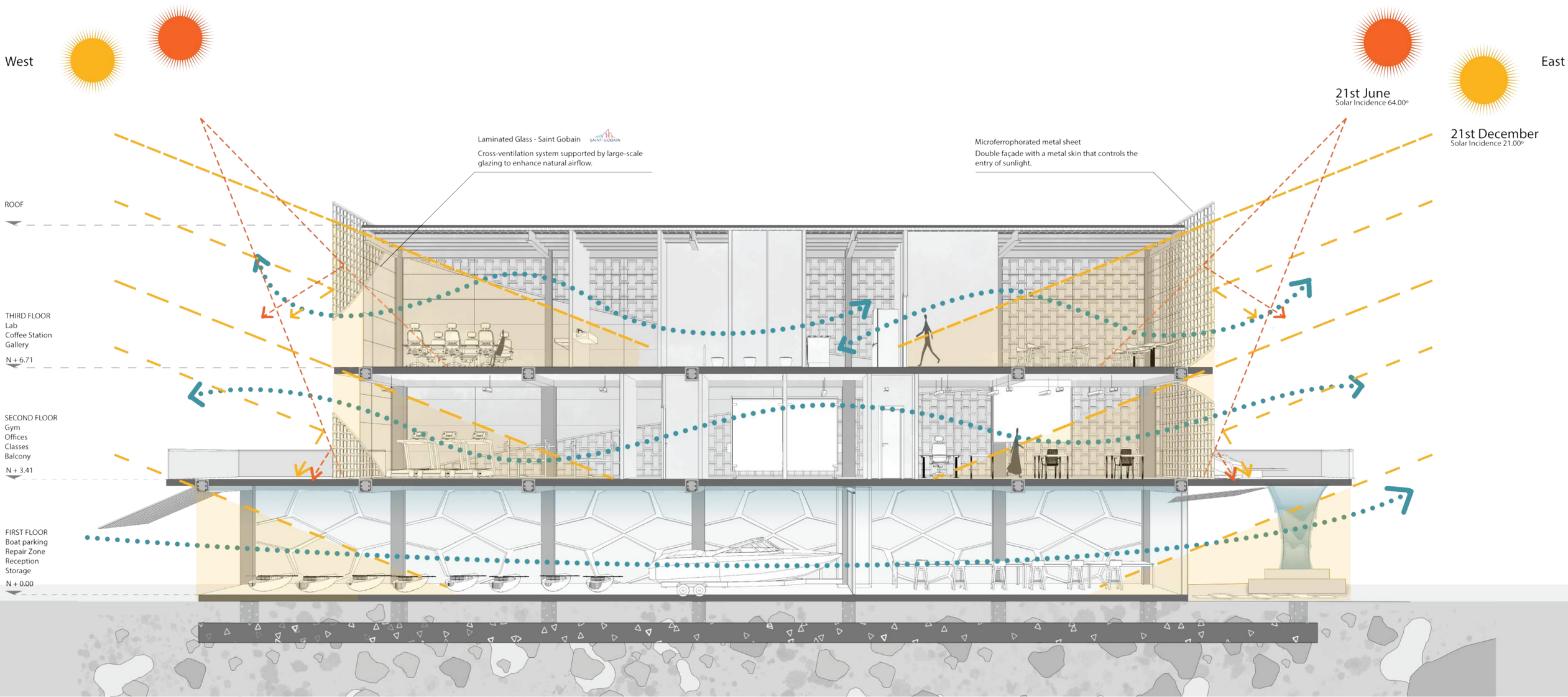


SCL 1:20

1. SAINT-GOBAIN CONTRAFLAM LITE 30 CLIMAPLUS
   33 MM; FIRE-RESISTANT LAMINATED GLAZING UNIT
2. HYDRO CIRCAL® 75R / WICONA ALUMINUM DRIP EDGE PROFILE
   0.7–1.2 MM; FAÇADE WATER DRAINAGE ELEMENT
3. WICONA STRUCTURAL METAL PROFILES
   1.5–3 MM; FAÇADE SUPPORT PROFILES
4. SAINT-GOBAIN CONTRAFLAM LITE 30 CLIMAPLUS + AIR CHAMBER
   33 MM (GLASS) + 16 MM CAVITY; FIRE-RESISTANT DOUBLE GLAZING SYSTEM
5. TRUNKING SYSTEM
   20–50 MM; CABLE MANAGEMENT CONDUIT
6. WICONA MAIN METALLIC FRAME
   3–6 MM; PRIMARY STRUCTURAL FRAME

SOLAR GAIN & INDOOR AIR QUALITY

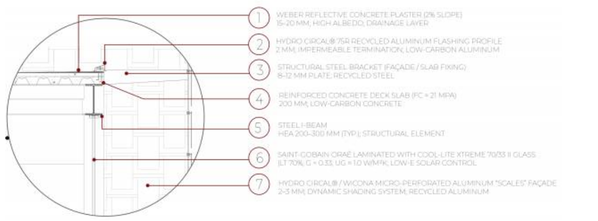
The project manages solar gain through a d**ynamic metal skin** that filters high-altitude summer rays while harvesting low-winter light to naturally heat the interior. This strategy, paired with the atrium's stack effect, ensures thermal comfort by continuously flushing out solar heat and balancing radiant temperatures across the deep floor plates.



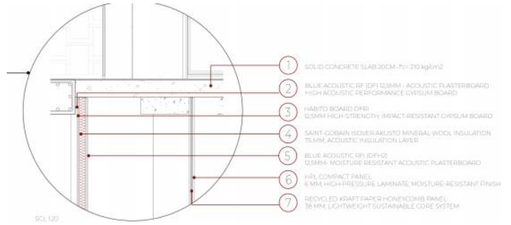
THERMAL COMFORT

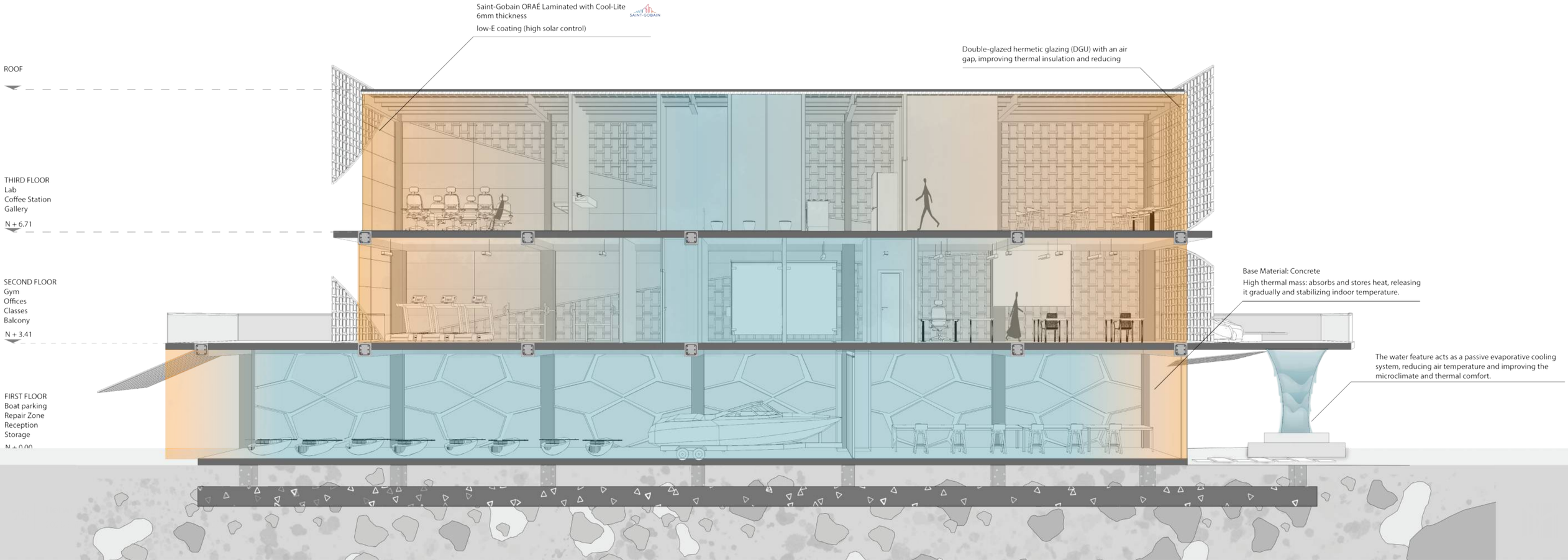
Thermal comfort is achieved through a **bioclimatic equilibrium**, where the building's double-skin facade and natural ventilation plenum stabilize radiant temperatures and air humidity. By leveraging the stack effect to regulate airflow, the architecture maintains a consistent internal microclimate that balances human heat exchange with the environment.

Insulated Suspended Ceiling



Interior Wall - Insulated



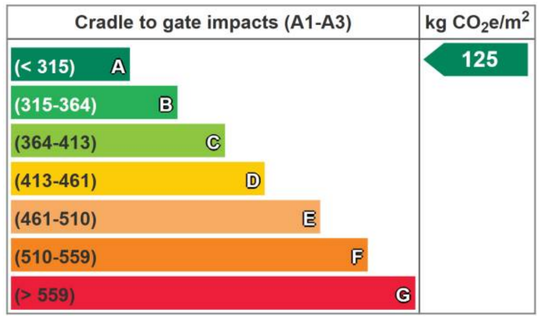


LIFE CYCLE CARBON ASSESSMENT

Environmentally responsible materials

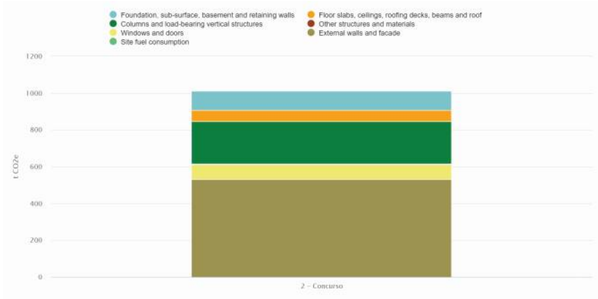
PREVIOUS STRUCTURE

Embodied carbon benchmark

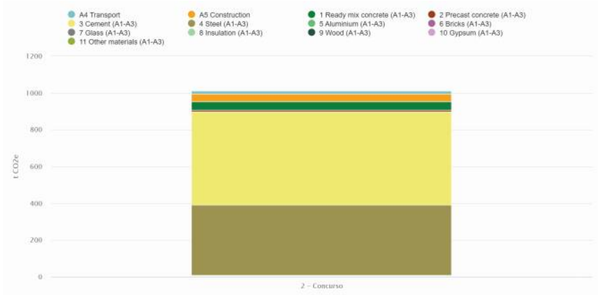


The previous infraestructure has a value of (125 kg CO_2e/m^2). Which is still considered to be in an A category. But the materials aren't environmentally responsible to the context/.

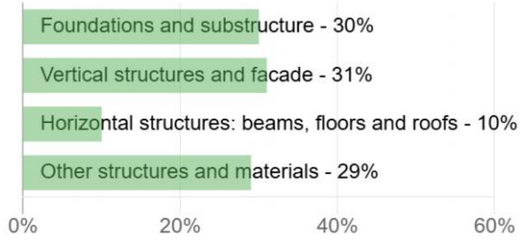
Global warming, t CO2e - Elements



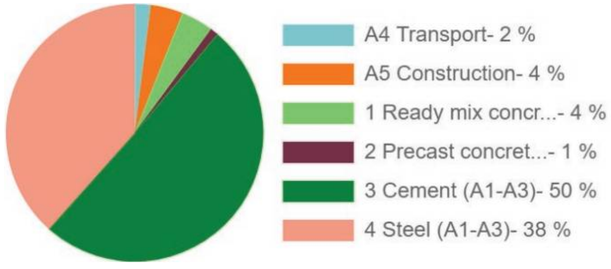
Global warming, t CO2e - Life-cycle stages



Embodied carbon by structure - A1-A3

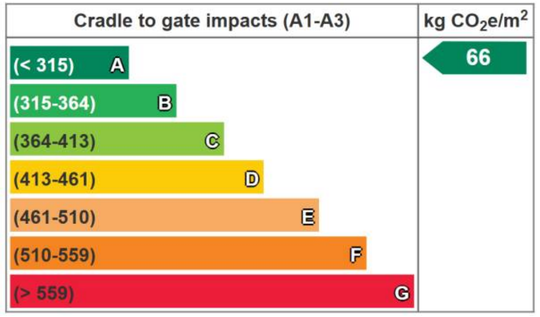


Embodied carbon by life-cycle stage



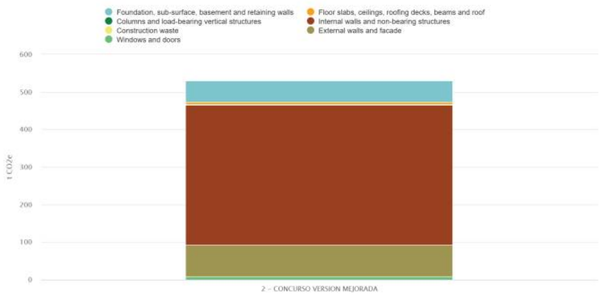
OUR PROPOSAL

Embodied carbon benchmark

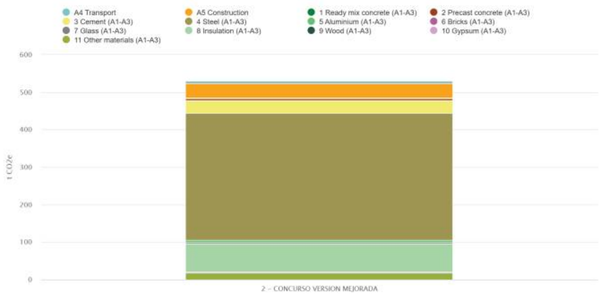


The obtained value (66 kg CO_2e/m^2) is significantly below the maximum threshold for Category A (<420 kg CO_2e/m^2) outperforming current market standards and the previous structure.

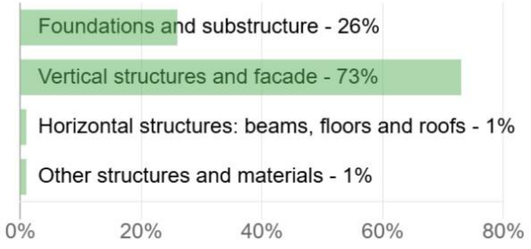
Global warming, t CO2e - Elements



Global warming, t CO2e - Life-cycle stages



Embodied carbon by structure - A1-A3



Embodied carbon by life-cycle stage