Belgrade

2.5

Team Member

PAST +1.0

NOW +1.0

FUTURE +0.5

PAST +1.0

SETTLMENT / SOIL / HERITAGE

This region has long been shaped by the coexistence between early advanced settlements, such as Lepenski Vir, and the river.

Construction techniques utilizing soil, spatial organization of interiors, and forms of communal life are understood as cultural and spatial heritage.

These inherited principles establish the foundation of the project.

NOW +1.0

WATERFRONT / FUSION / INFRASTRUCTURE

Today the site exists at the intersection of urban infrastructure and the waterfront landscape. Industrial facilities, mobility networks, and ecological environments coexist in a complex condition. The project interprets this moment as an opportunity to fuse infrastructure with public space and environmental awareness.

FUTURE +0.5

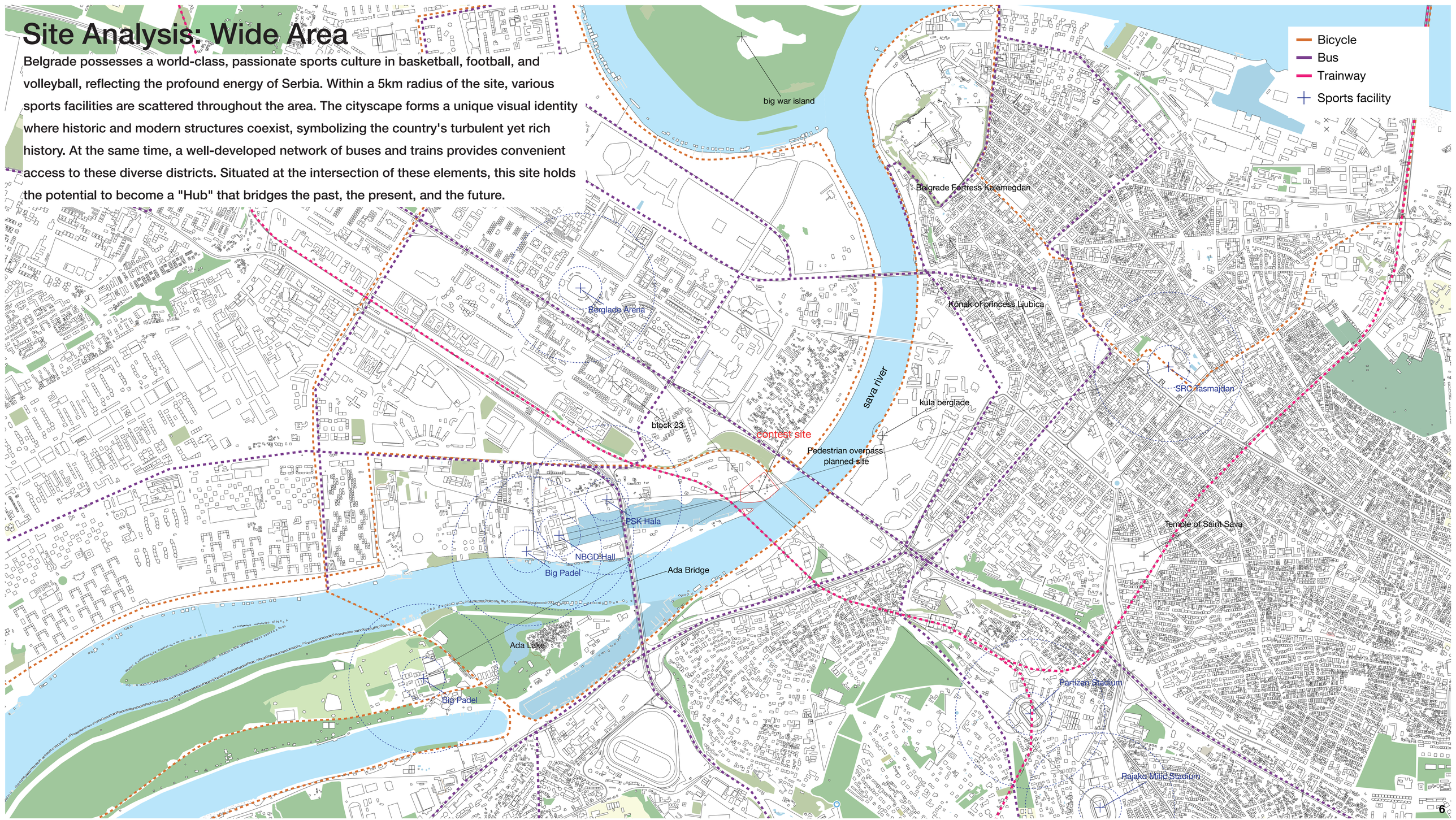
COEXISTENCE / SUSTAINABLE / COMMONS

Looking ahead, this site holds the potential to support the simultaneous coexistence and evolution of human activity, infrastructure, and ecosystems.

By introducing sustainable strategies and shared spaces, the project enables a balanced relationship between these elements and fosters a new form of collective environment.

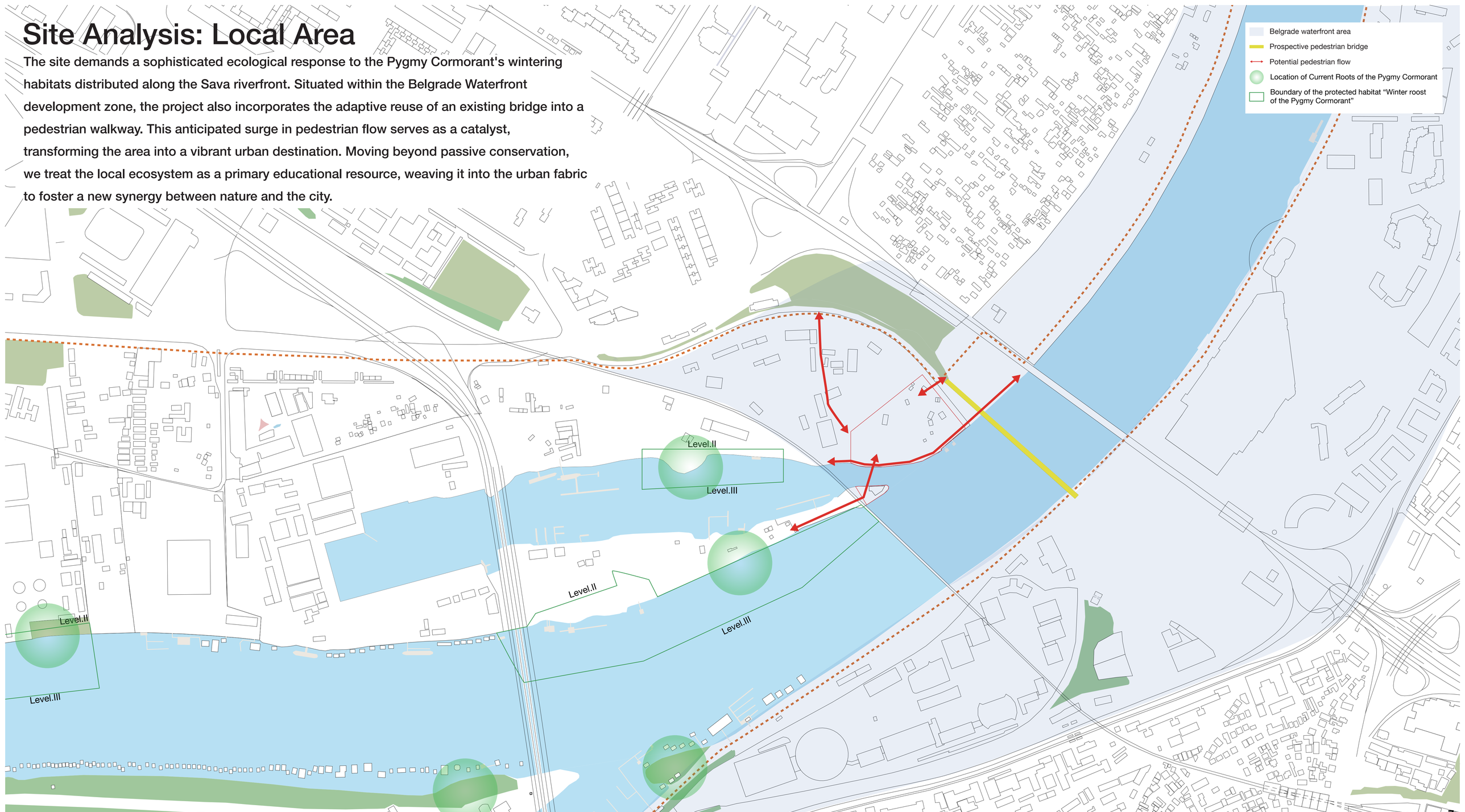
Site Analysis: Wide Area

Belgrade possesses a world-class, passionate sports culture in basketball, football, and volleyball, reflecting the profound energy of Serbia. Within a 5km radius of the site, various sports facilities are scattered throughout the area. The cityscape forms a unique visual identity where historic and modern structures coexist, symbolizing the country's turbulent yet rich history. At the same time, a well-developed network of buses and trains provides convenient access to these diverse districts. Situated at the intersection of these elements, this site holds the potential to become a "Hub" that bridges the past, the present, and the future.



Site Analysis: Local Area

The site demands a sophisticated ecological response to the Pygmy Cormorant's wintering habitats distributed along the Sava riverfront. Situated within the Belgrade Waterfront development zone, the project also incorporates the adaptive reuse of an existing bridge into a pedestrian walkway. This anticipated surge in pedestrian flow serves as a catalyst, transforming the area into a vibrant urban destination. Moving beyond passive conservation, we treat the local ecosystem as a primary educational resource, weaving it into the urban fabric to foster a new synergy between nature and the city.



Site Analysis: Pygmy Cormorant

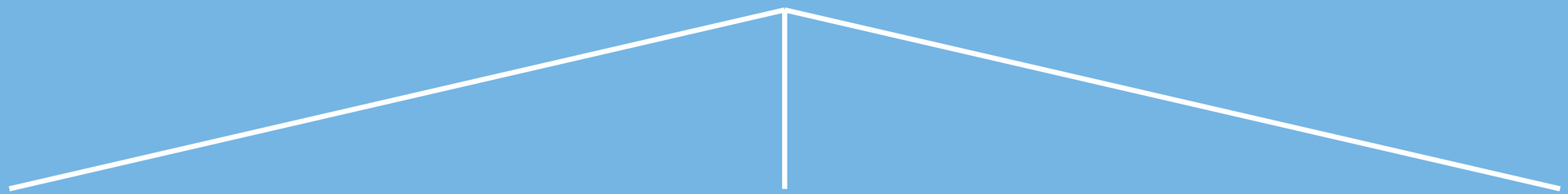
The Sava riverfront in Belgrade is a vital site where approximately 5–10% of the total European population of the Pygmy Cormorant comes to overwinter. This strictly protected species also serves as an indicator of the health of the urban environment. With protected areas designated from Level 1 to Level 3 located near the project site, the existing infrastructure and the ecosystem are already deeply intertwined.

Site Analysis: Lepenski Vir

Existing between 9500 and 5000 BC, Lepenski Vir is recognized as one of Europe's oldest planned settlements. Its residential structures feature distinctive trapezoidal or fan-shaped floor plans, organized in a radial, decentralized arrangement facing the river. Each dwelling was centered around a hearth, which served as the focal point of daily life. The dimensions of these houses were determined by strict proportional rules, resulting in a highly sophisticated geometric character.

Belgrade 2.5

Hub For Human/Nature/Animals



PAST

Lepenski Vir

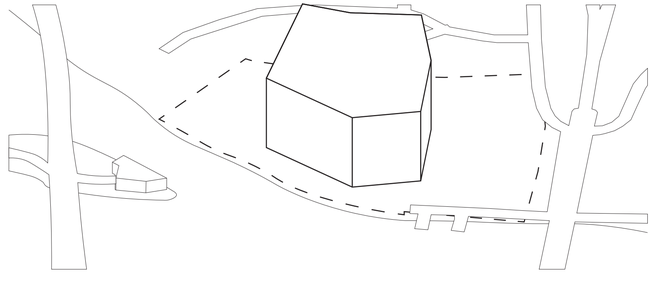
NOW

Infrastructure

FUTURE

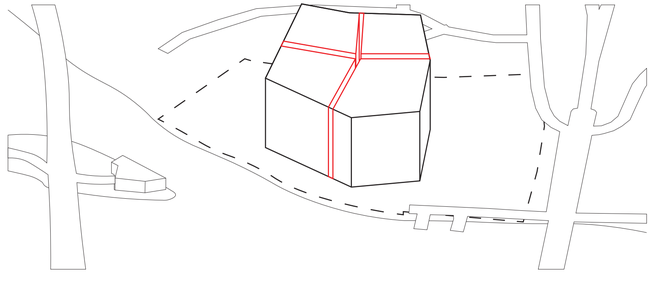
Enviroment

Master Plan Diagram



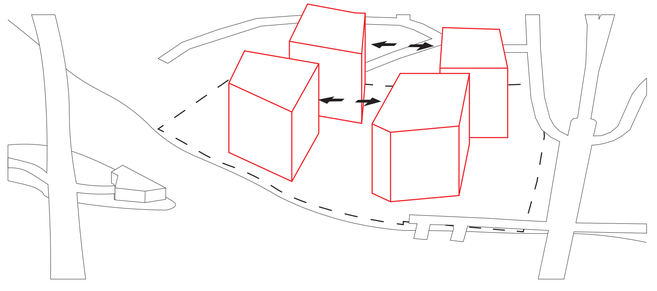
Single Volume

The athlete accommodation is first imagined as a single large volume.



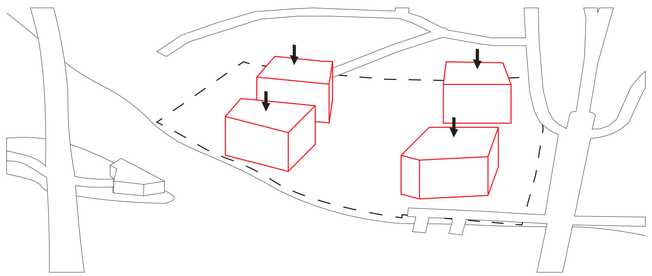
Divide the Volume

The volume is divided to break down the large scale and separate the functions.



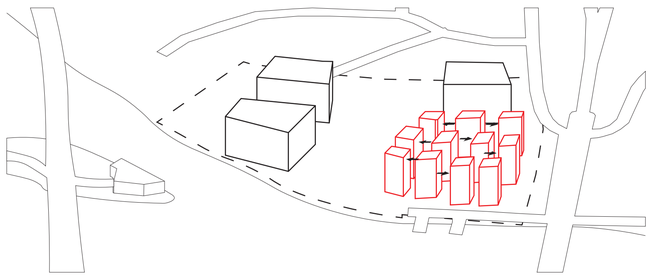
Lower the Mass

The building masses are lowered to bring the scale closer to the human level.



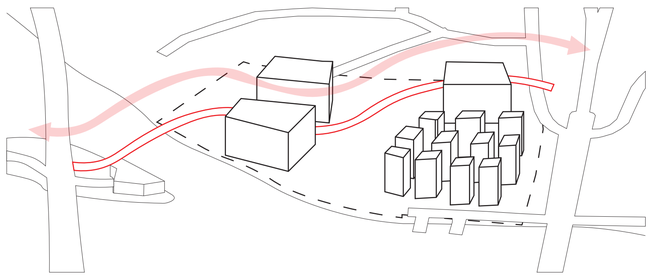
Further Fragmentation

The divided masses are further fragmented into smaller architectural units.



Spread Across the Site

The units spread across the site, forming a settlement-like configuration.



Bridge & Circulation

Bridges connect the buildings and create urban circulation.

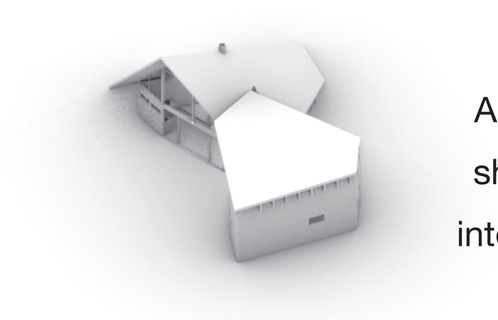
Master Plan

1 Renovation Building
2 Outdoor Public Space
3 Public Riverside Cafeteria
4 Athletes' Dining Hall
5 Sports Hub
6 Residential Complex
7 Neo Lepenski Vir

ZONE A
ATHLETE ACCOMODATION

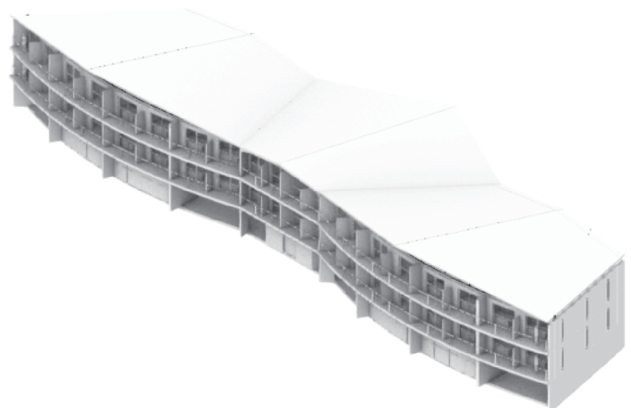
Accomodation Capacity and Ratio

neo lepenski vir		residential complex
60 people	capacity	72 people
10 building	Nnmber of rooms	56 rooms
4 Single Rooms/1 Double Room	Room composition per Unit	40 Single Rooms/ 16 Double Rooms
Capable of accommodating large groups	Target Users	diverse users



Neo lepenski vir

A dwelling organized around a shared space that encourages interaction and communal living.

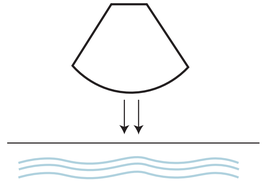


Residential complex

A housing type that efficiently arranges multiple private rooms while accommodating diverse

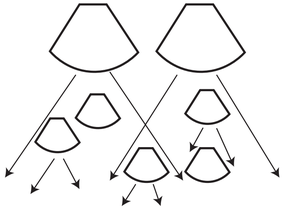
Characterisitics of the original Lepenski Vir

Site Strategies



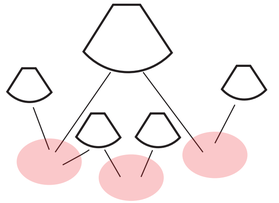
Water front-facing facade

The houses of Lepenski Vir were oriented toward the Danube River, establishing a strong spatial and visual relationship with the waterfront.



Radial circulation Layout

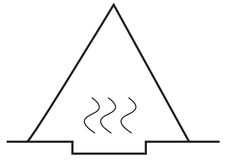
The settlement was organized with circulation paths spreading radially from the river toward the back of the site.



Open Spaces at the end of each circulation path

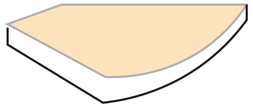
Communal spaces were located at the end of circulation paths, encouraging social interaction among residents.

Building Strategies



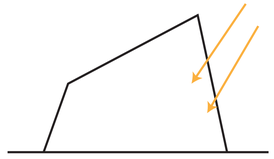
Common space centered around a hearth

Each house was organized around a central hearth, which functioned as the core of daily life and communal activity.



One of the earliest uses of cement in history

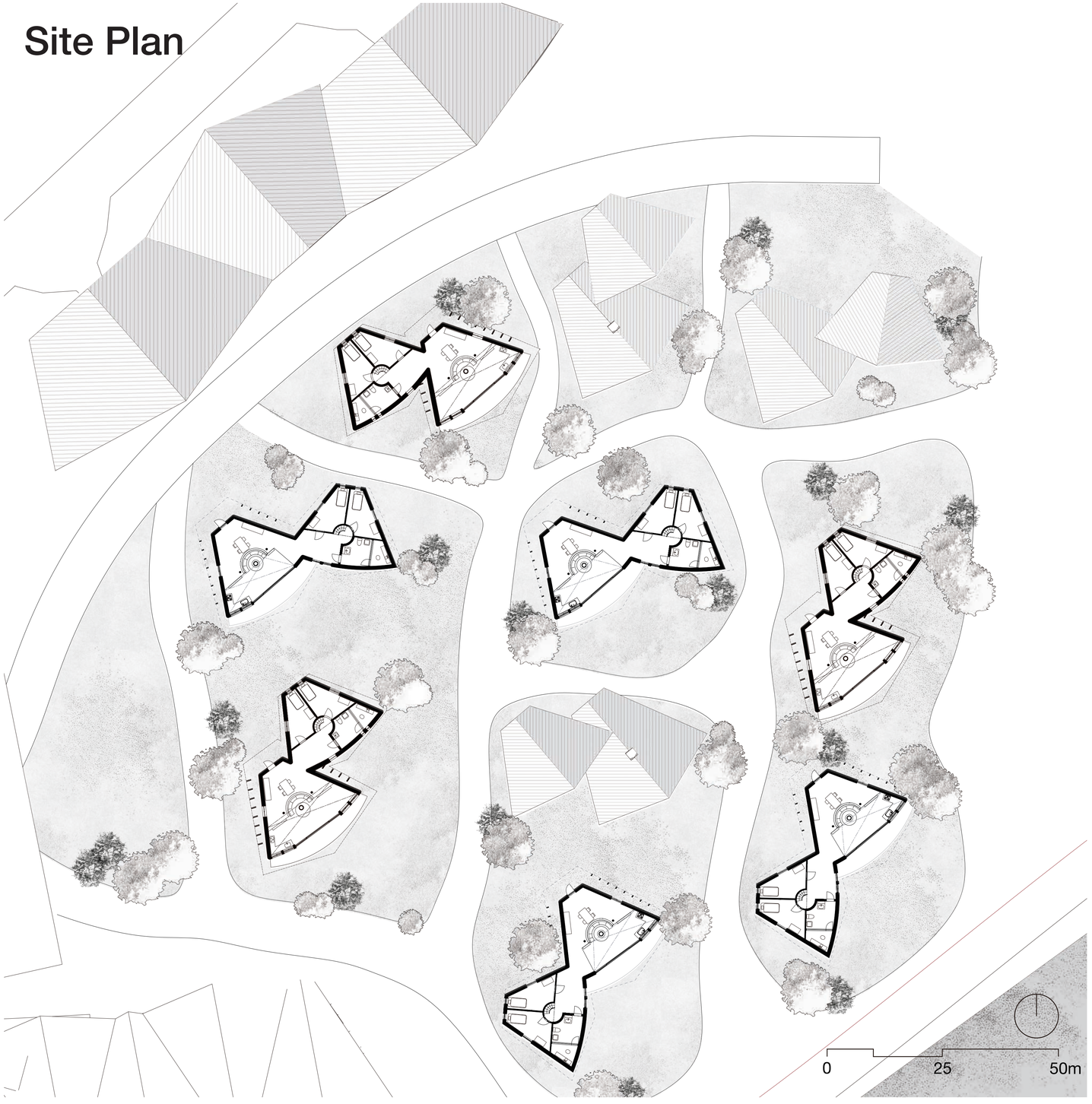
The houses featured floors made of a mixture of limestone and ash, which is considered one of the earliest forms of cement in architectural history.



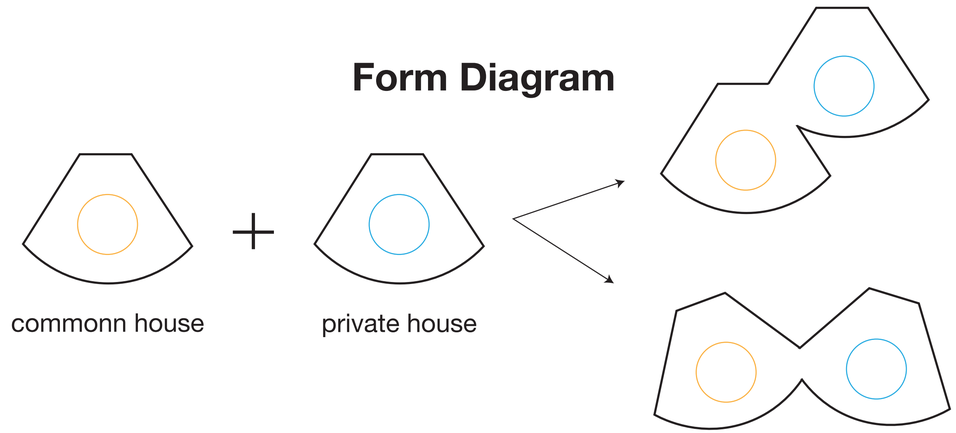
Spaces designed to receive abundant sunlight

The settlement was located on a sunny river terrace, allowing the houses to receive abundant sunlight throughout the

Site Plan

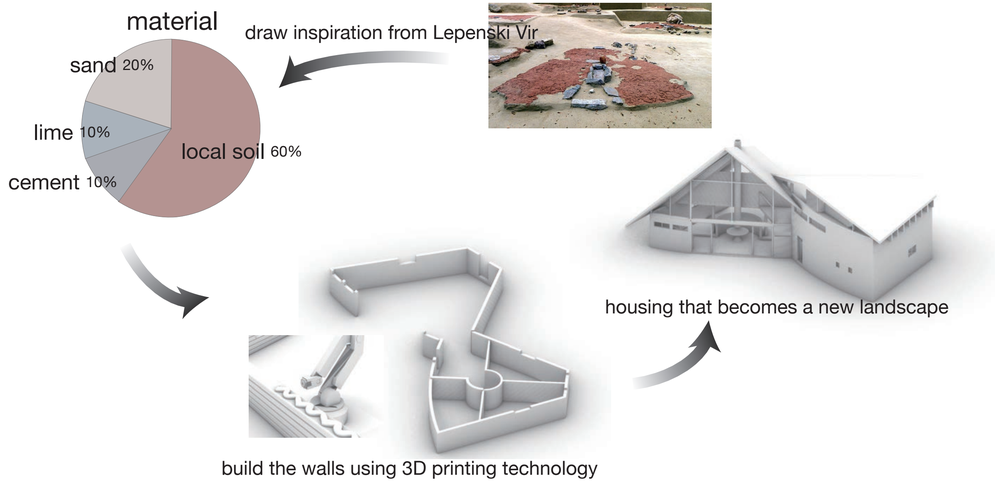


Form Diagram



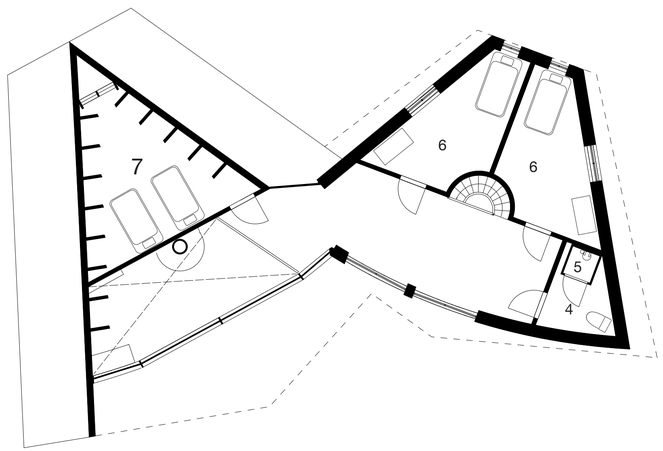
3D-printed residential architecture

The printing material integrates locally sourced soil with cement and lime, forming a hybrid earthen composite.
This mixture reduces cement consumption while maintaining structural stability and printability.
The use of local soil also reconnects the construction process with the region’s historical building traditions.

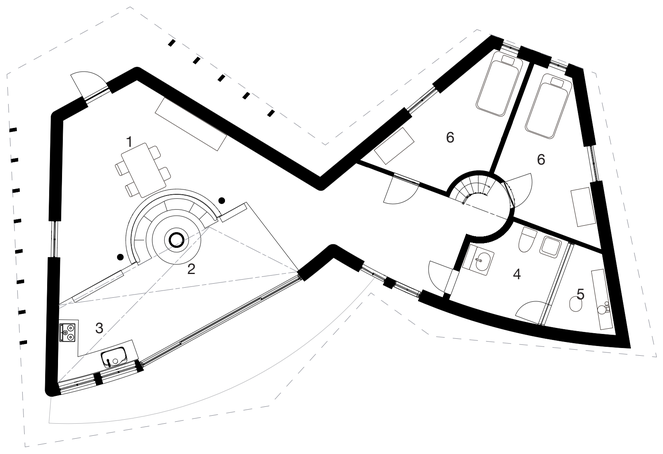


Form1

1FL



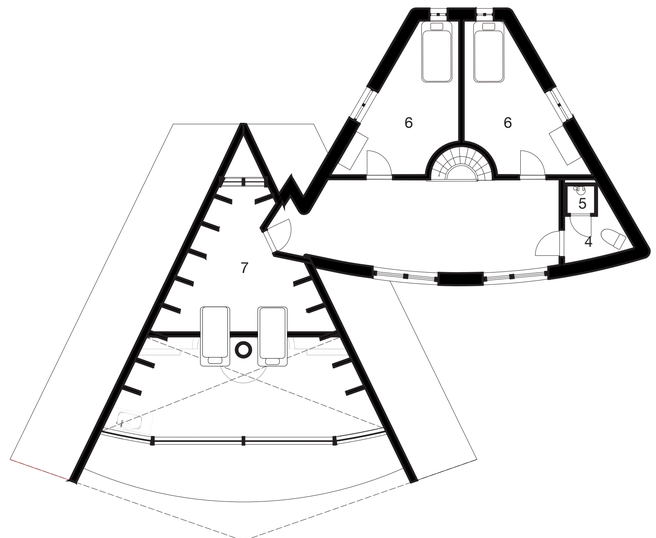
GFL



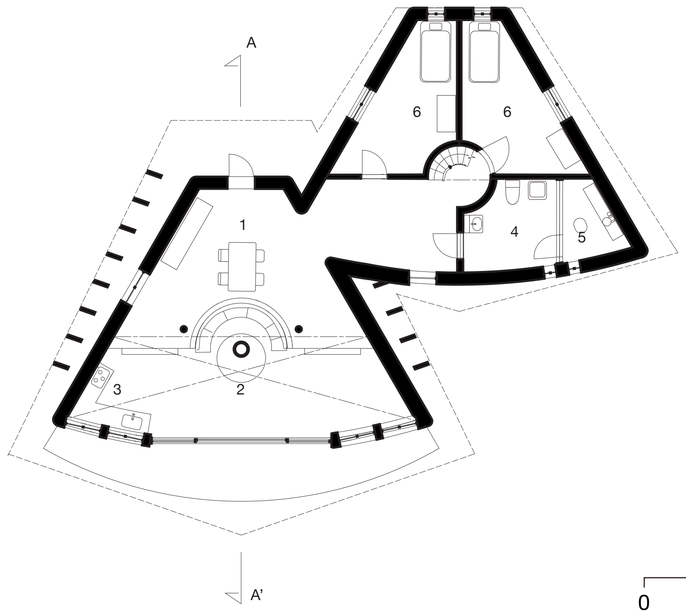
1.Dining Area
2.Common Area
3. Shared Kitchen
4.Toile
5.Bath Room
6.Shingle Room
7.Double Room

Form 2

1FL



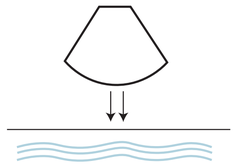
GFL



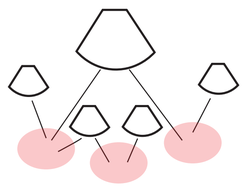
0 5 10m

A-A’ Section

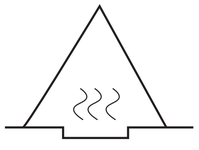
This housing project inherits the characteristics of Lepenski Vir while incorporating contemporary technologies.
Key features include a façade that opens toward the Sava River adjacent to the site and a common space located at the center of the interior. Both elements are derived from the spatial characteristics of Lepenski Vir, directing awareness toward the river and the surrounding exterior environment. Furthermore, the roof extends outward, allowing the common space to continue seamlessly into the exterior. In this outdoor common space, people who regularly engage in sports can gather and spend relaxing time together.



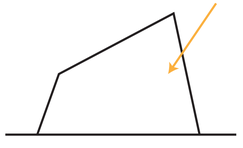
Water front-facing facade



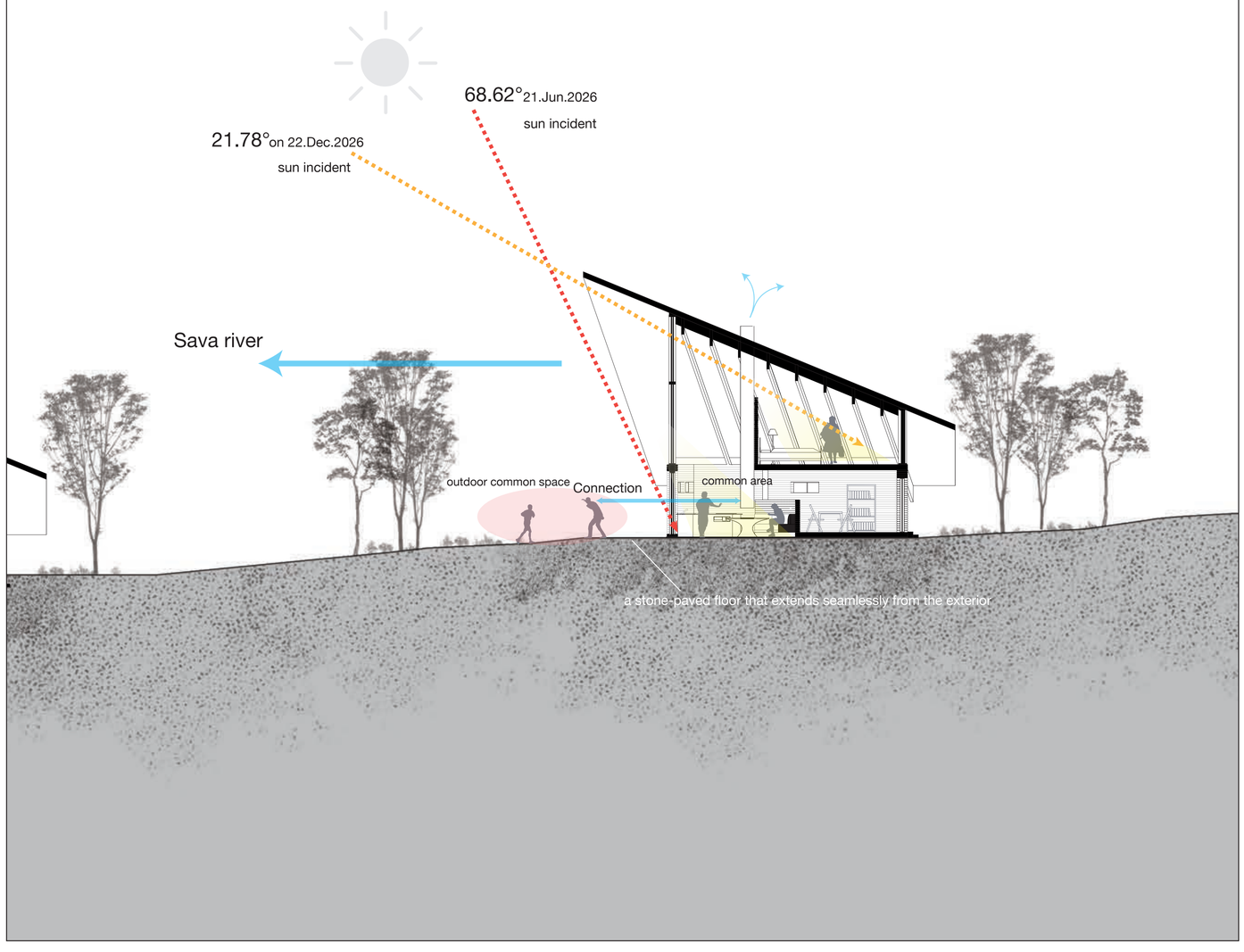
Open Spaces at the end of each circulation path



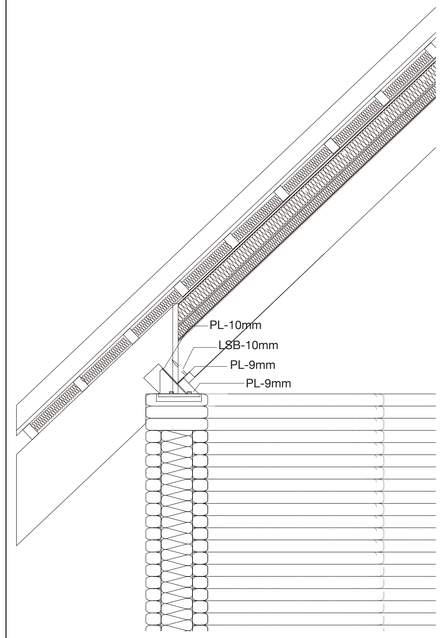
Common space centered around a hearth

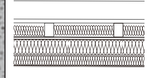


Spaces designed to receive abundant sunlight

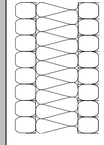


Detail Section





6mm	Water Proofing
30mm	Roof Battens
60mm	Contralate
2mm	Additional Waterproofing Isover Df2
200mm	Isover Unirol Profi Themal Insulation
19mm	Formmark
140mm	Isover Unirol Profi Themal Insulation
2mm	Vapor Barrier Isover Vario KMDuplex UV
19mm	Plywood

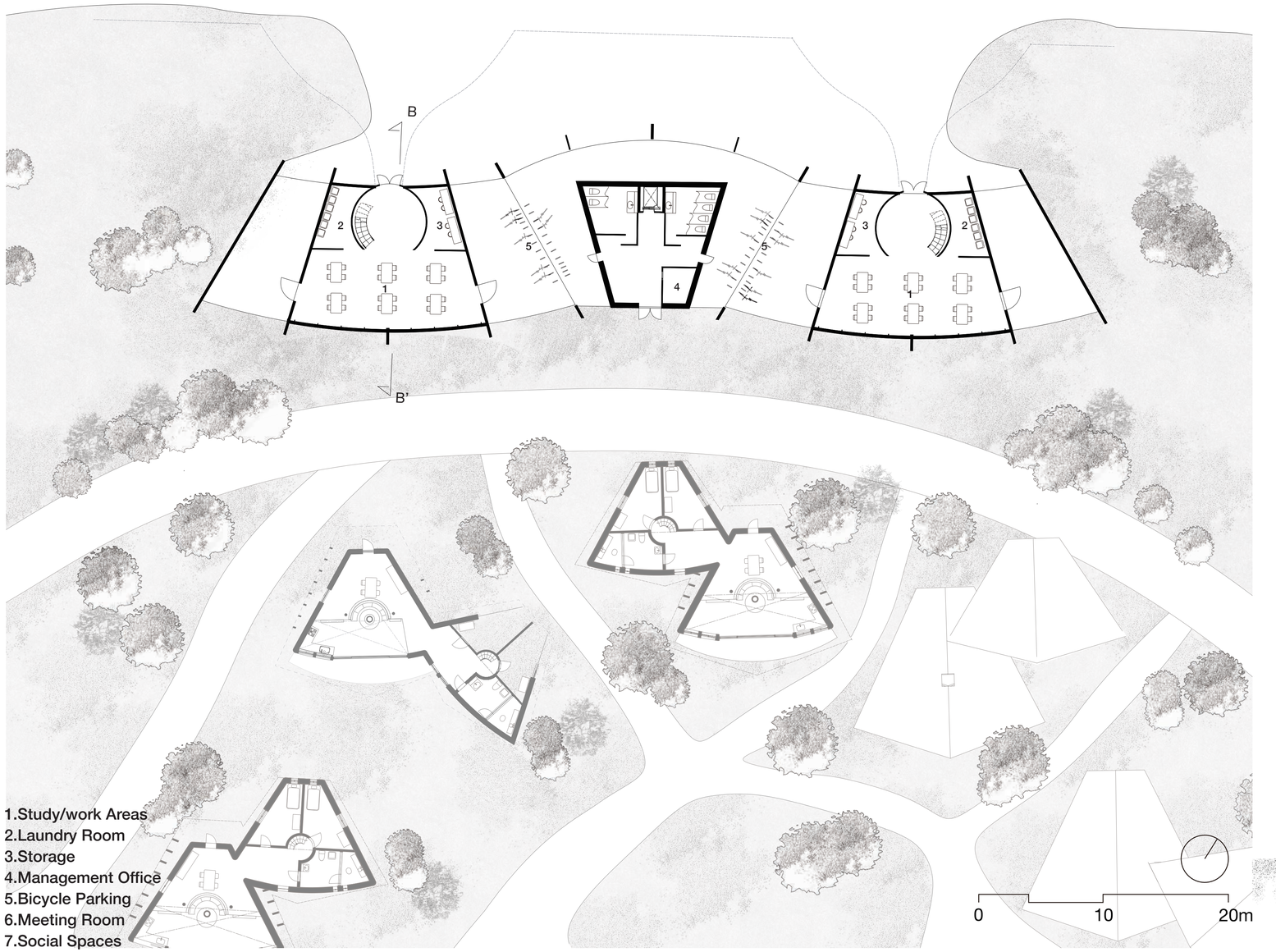


100mm	3D-Printed Earthen Concrete (Weber Beamix Cement + Local Soil + Lime + Sand)
155mm	Isover Insulsafe
100mm	3D-Printed Earthen Concrete (Weber Beamix Cement + Local Soil + Lime + Sand)

0 5 10m

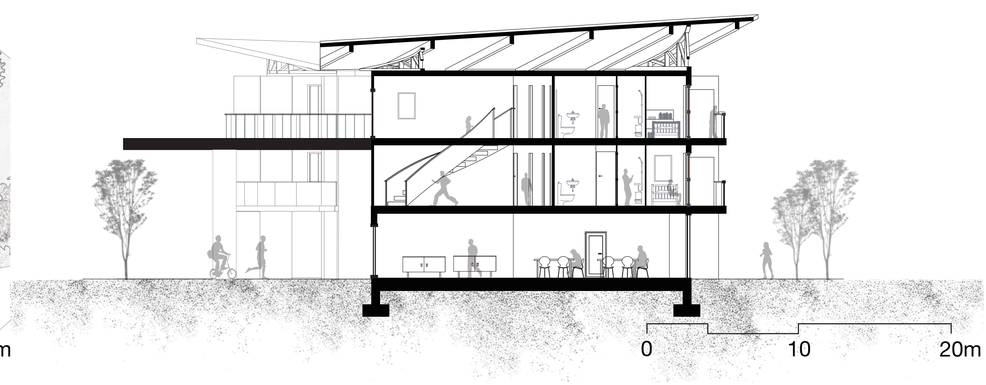
Residential Complex

Site Plan/GF Plan



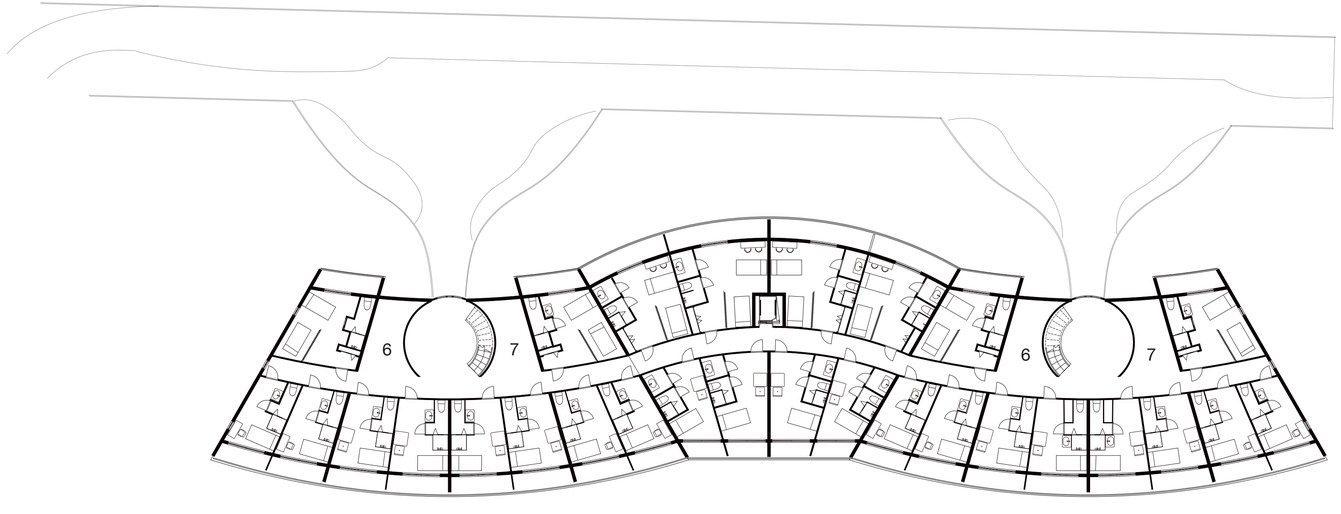
1.Study/work Areas
2.Laundry Room
3.Storage
4.Management Office
5.Bicycle Parking
6.Meeting Room
7.Social Spaces

B-B' Section

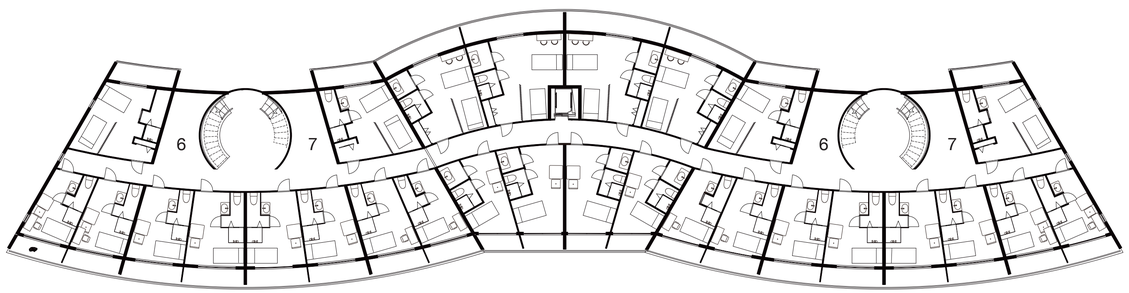


1F Plan/2F Plan

2FL



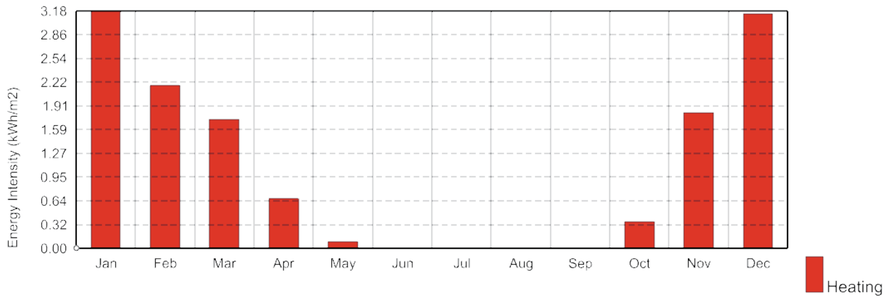
1FL



1.Study/work Areas
2.Laundry Room
3.Storage
4.Management Office
5.Bicycle Parking
6.Meeting Room
7.Social Spaces

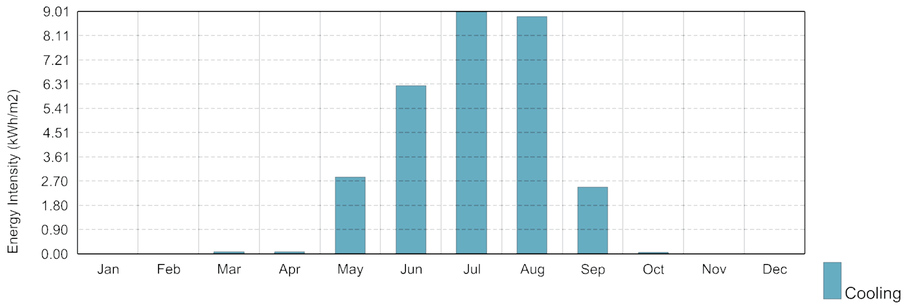
0 10 20m

Heating Needs



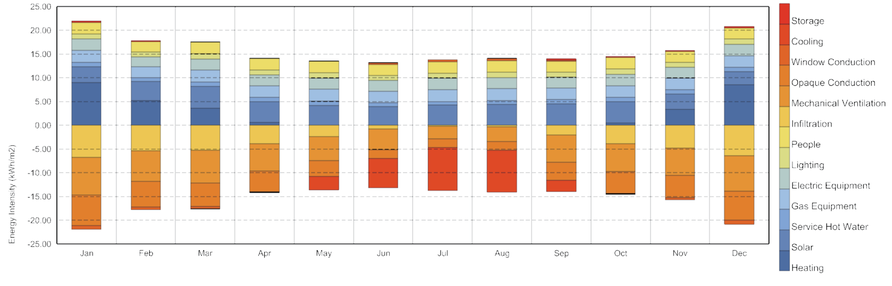
Heating needs [kWh/ ㎡ 13.16< Limit value 15

Cooling Needs

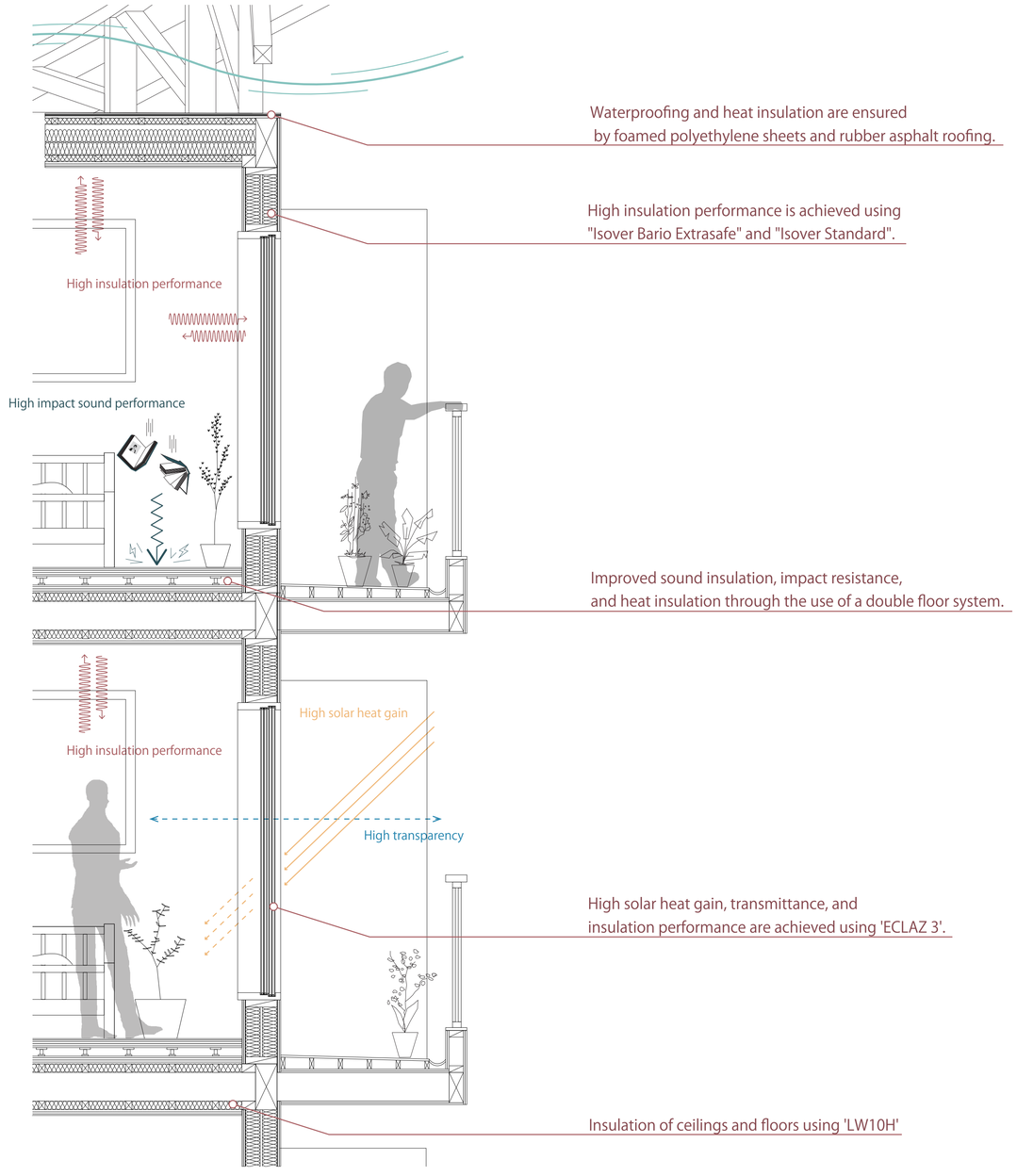


coolingneeds [kWh/ ㎡] 8.61< Limit value 15

Energy balance



Opening up the attic improves ventilation.



COMFOERABILITY

Exterior wall

Wall between units (airborne noise)

TLtotal=46.0+9+4=59.0dB

59dB≥53dB

Class A1

Floor and Ceiling

Ceiling between floors(impact noise)

45dB≤58dB

Class A1

Roof

Roof between units (airborne noise)

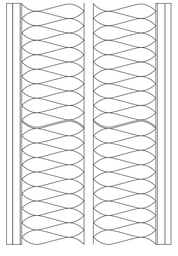
TLtotal=44.5+10+2.5=57.0dB

57dB≥53dB

Class A1

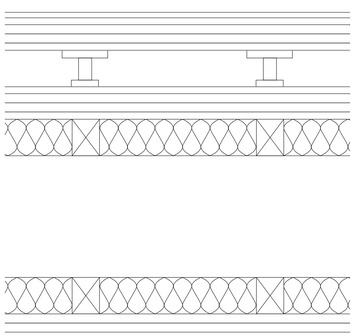
Details

Exterior Wall



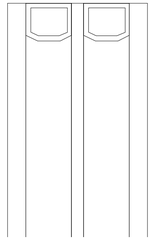
Wood Panel	10 mm	
Plaster Board	12.5 mm	
Isover Bario Extrasafe	0.25 mm	MAG isover
Isover Standard	105 mm	MAG isover
Air	14.5 mm	
Isover Standard	105 mm	MAG isover
Isover Bario Extrasafe	0.25 mm	MAG isover
Plaster Board	12.5 mm	
Wood Panel	10 mm	

Floor



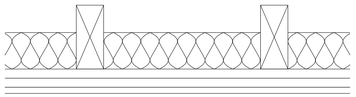
Sawing board	9 mm	
Plywood	12 mm	
Sound Insulation Mat	15 mm	
Reinforced Gypsum Board	15 mm	
Plywood	12 mm	
Plywood	12 mm	
Sound Insulation Mat	15 mm	
Reinforced Gypsum Board	15 mm	
Plywood	12 mm	
LW10H	60 mm	MAG isover

Window



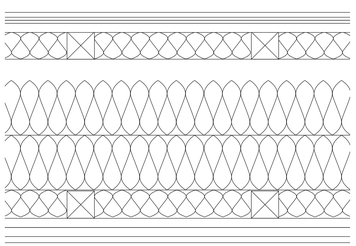
ECLAZ 3	6mm	SAINT-GOBAIN
FL	15mm	
Kr	4mm	
FL	15mm	
ECLAZ 3	6mm	SAINT-GOBAIN

Celing



LW10H	60 mm	MAG isover
Reinforced Gypsum Board	15 mm × 2	
Wood Panel	10 mm	

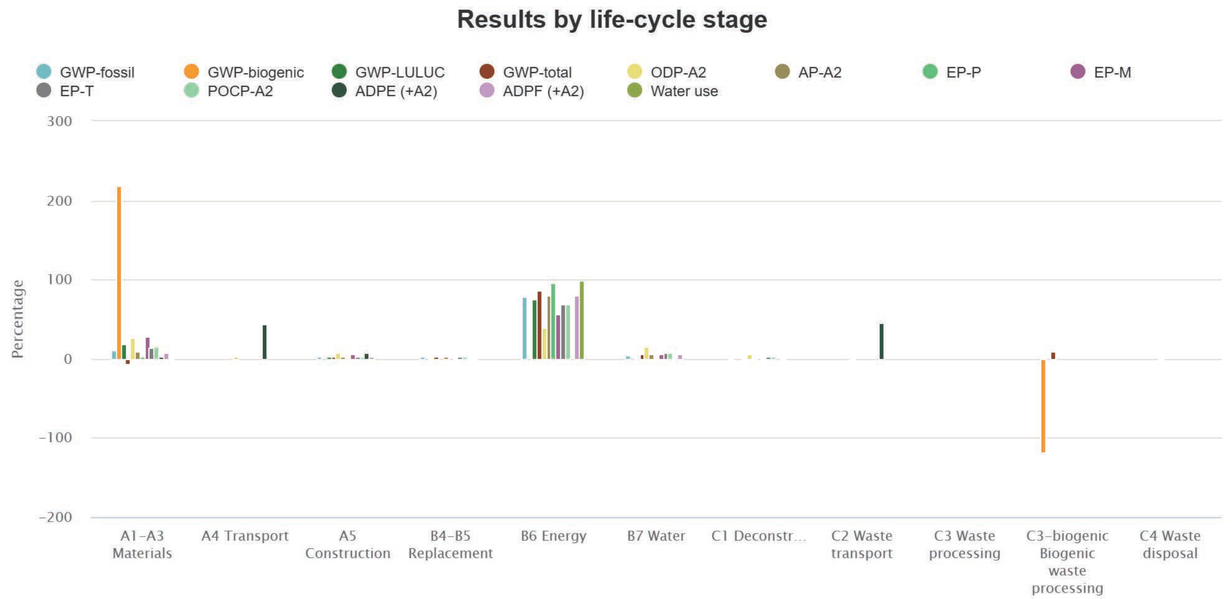
Roof

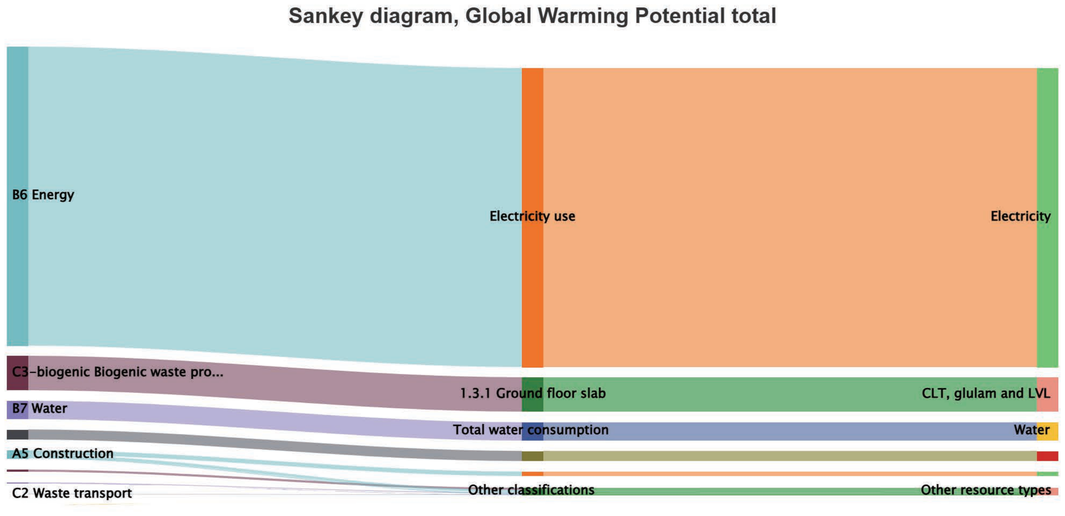


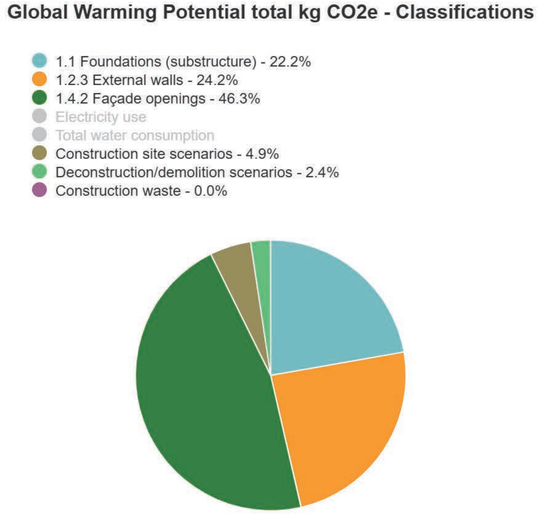
Slate sheet	5mm	
Foamed polyethylene sheet	4mm	
Rubber asphalt roofing material	1mm	
Magbrolite	45mm	MAG isover
Isover Standard	200mm	MAG isover
Magbrolite	45mm	MAG isover
Reinforced Gypsum Board	15 mm × 2	
Wood Panel	10 mm	

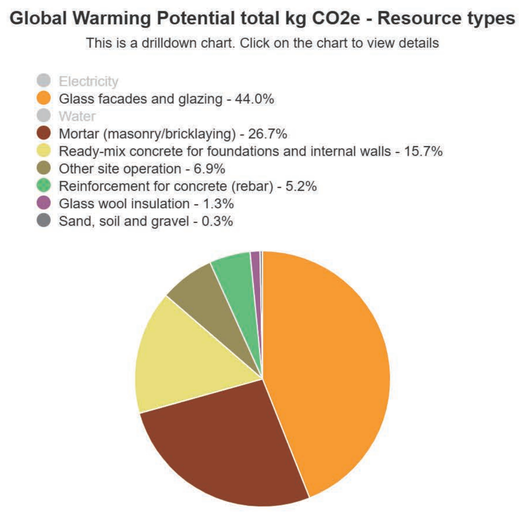
One Click LCA

Cradle to grave (A1-A4, B4-B5, C1-C4)	kg CO_2e/m^2
(< 420) A (420-485) B (485-550) C (550-615) D (615-680) E (680-745) F (> 745) G	269









PASSIVE HOUSE U-VALUE

Exterior Wall U-value

Wall	Material	Thickness(m)	Thermal conductivity(W/m*K)	Thermal resitance(m2*K/W)
Outside				
Outside Surface Resistance				0.0400
External Finish	Wood Panel	0.0100	0.1200	0.0833
	Plaster Board	0.0125	0.2200	0.0568
Sheet	Isover Bario Extrasafe	0.0002		0.0000
Insulation	Isover 32K	0.1200	0.0360	3.3333
Air		0.0145	0.2410	0.0602
Insulation	Isover 32K	0.1200	0.0360	3.3333
Sheet	Isover Bario Extrasafe	0.0000		0.0000
	Plaster Board*2	0.0250	0.2200	0.1136
Insulation	Sound insulation sheet	0.0020	0.1500	0.0133
Inside Finish	Wood Panel	0.0100	0.1200	0.0833
Inside Surface Resistance				0.1300
Inside				
Total		0.3142	1.1430	7.2473
U-value(W/m2*K)				0.1380
Evaluation				Approved

Floor Wall U-value

Floor	Material	Thickness(m)	Thermal conductivity(W/m*K)	Thermal resitance(m2*K/W)
Inside(1st floor)				
Inside Surface Resistance				0.1300
	Wood panel	0.0150	0.1200	0.1250
Insulation	Sound insulation mat	0.0100	0.1500	0.0667
	Plywood	0.0250	0.1600	0.1563
Insulation	LW10H	0.2000	0.0330	6.0606
	Reinforced Gypsum Board	0.0100	0.2200	0.0455
	Wood panel	0.0100	0.1200	0.0833
Inside Surface Resistance				0.1300
Inside(Ground floor)				
Total		0.2700	0.8030	6.7973
U-value(W/m2*K)				0.1471
Evaluation				Approved

Roof U-value

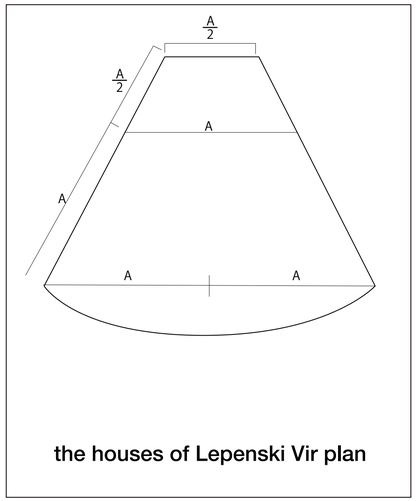
Roof (Ceiling)	Material	Thickness(m)	Thermal conductivity(W/m*K)	Thermal resitance(m2*K/W)
Outside				
Outside Surface Resistance				0.0400
	Slate	0.0050	0.8000	0.0063
PE foam underlayment	Polyethylene Foam Sheet	0.0040	0.0400	0.1000
	Rubberized Asphalt Roofing	0.0010	0.2000	0.0050
	Air	0.0500	0.2410	0.2075
	LW10H	0.2000	0.0330	6.0606
	Reinforced Gypsum Board*2	0.0250	0.2200	0.1136
	Wood Panel	0.0120	0.1200	0.1000
Inside Surface Resistance				0.0900
Inside				
Total		0.2970	1.6540	6.722961304
U-value(W/m3*K)				0.148743977
Evaluation				Approved

Window Wall U-value

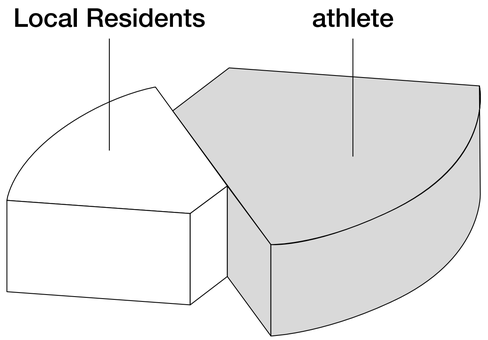
Window	Material	Area (m2)	U-value (W/m2*K)	Heat loss (W/K)
Triple glazing unit	ECLAZ3	2.640	0.600	1.584
Sash	PVC frame	0.660	0.900	0.594
		length(m)	U-value (W/m*K)	
Spacer	Swisspacer	7.300	0.030	0.219
		Area (m2)		
Total		3.300		2.397
U-value total (W/m2*K)				0.726
Evaluation				Approved

ZONE A
SPORTS HUB

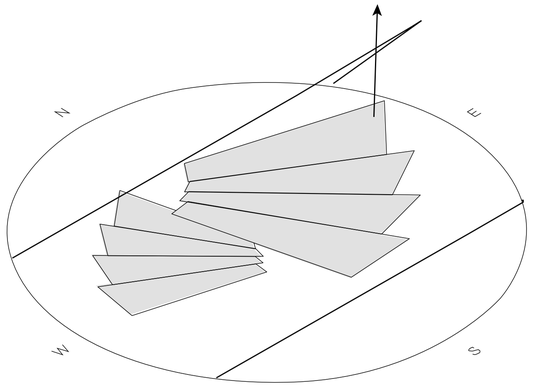
Building Form Diagram



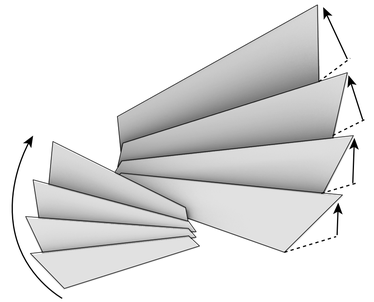
the houses of Lepenski Vir plan



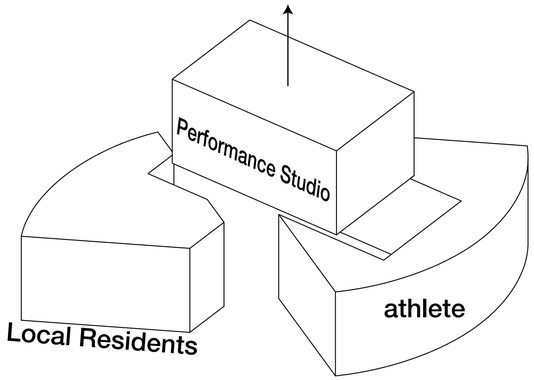
Spaces are allocated according to the program requirements for both athletes and public visitors.



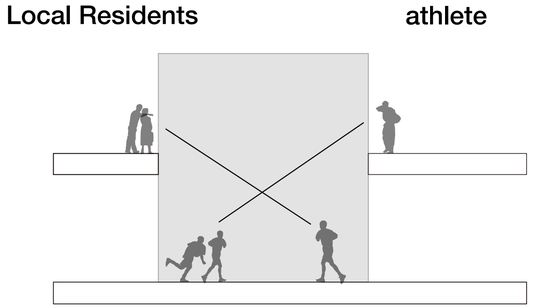
The roof is inclined to capture solar energy.



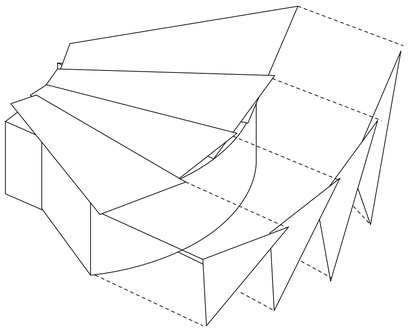
The roof slopes vary according to the position of the sun.



Parts of the two volumes are carved out to form a Performance Studio, which becomes the central program of the building.

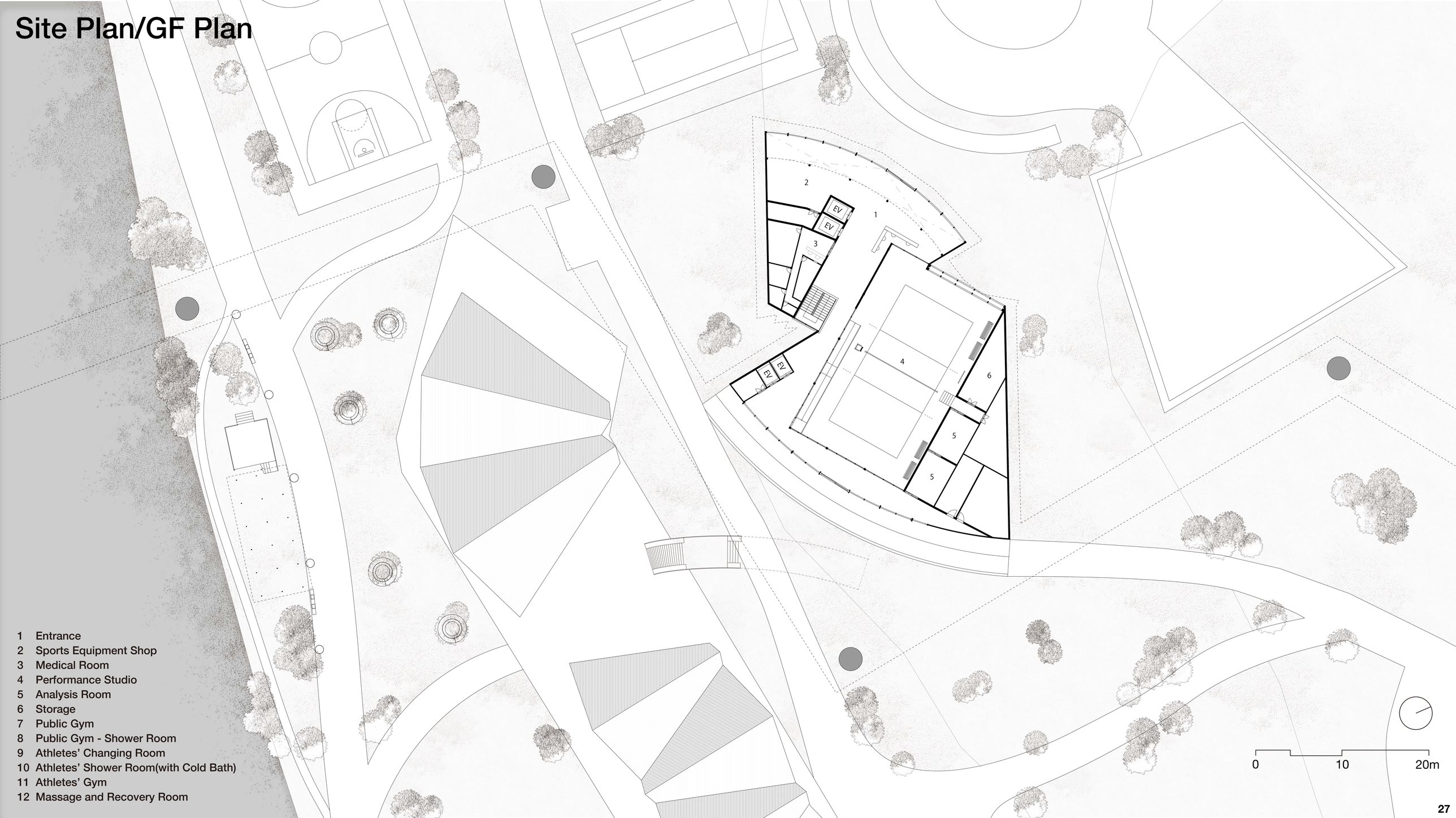


Athletes and public users do not interact directly; instead, the Performance Studio acts as an interface where they can observe and encourage each other.



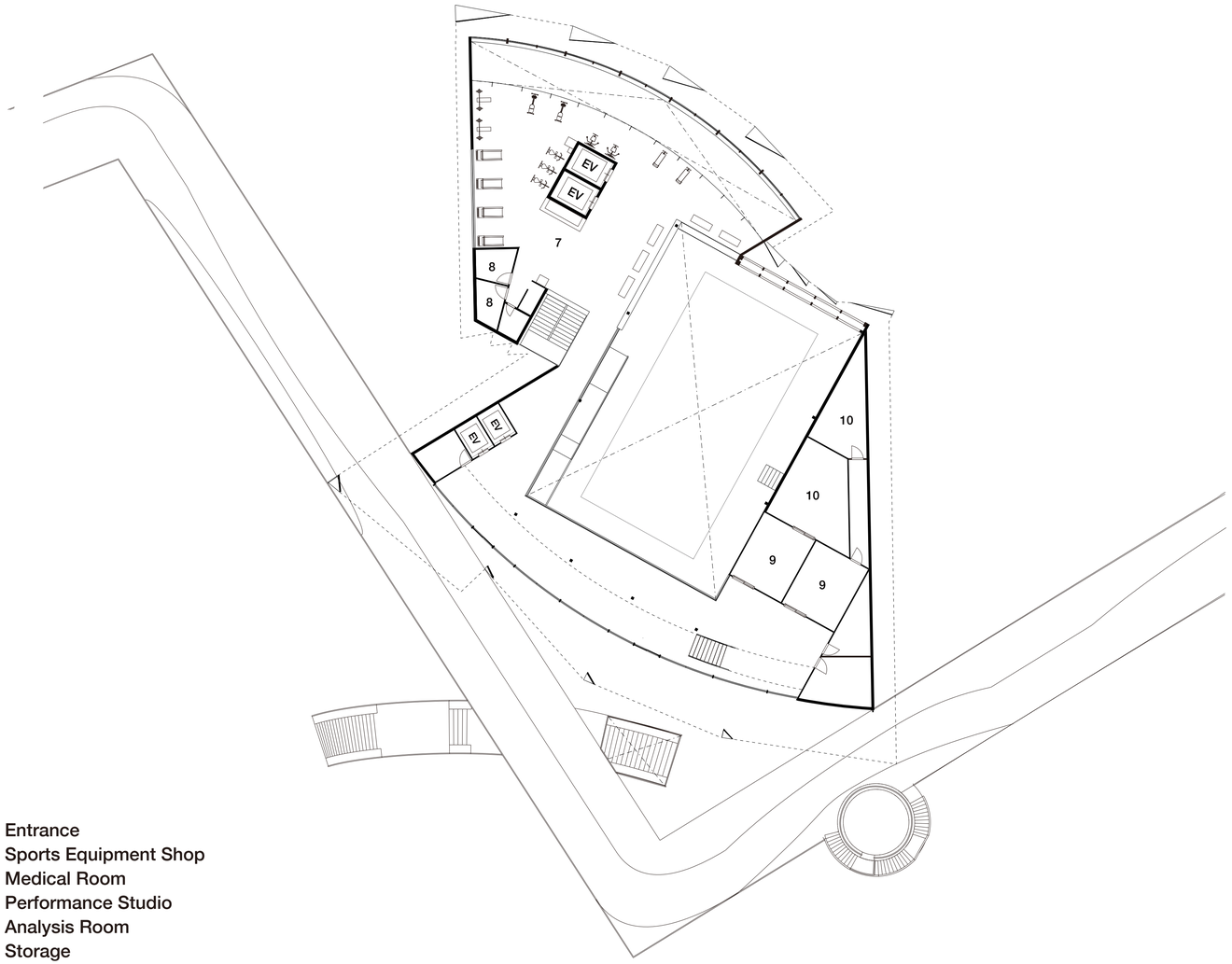
Parts of the roof are extended downward to the surface to soften direct sunlight.

Site Plan/GF Plan

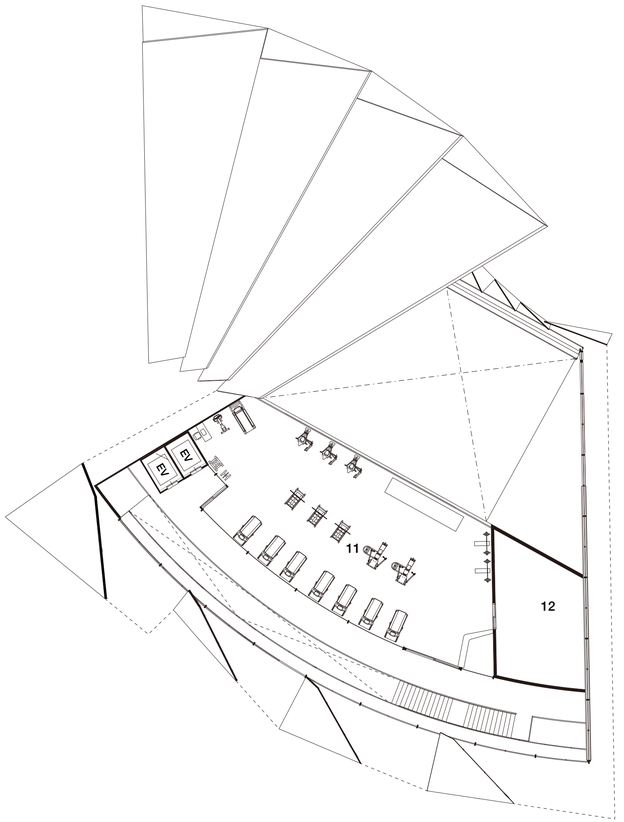


1 Entrance
2 Sports Equipment Shop
3 Medical Room
4 Performance Studio
5 Analysis Room
6 Storage
7 Public Gym
8 Public Gym - Shower Room
9 Athletes' Changing Room
10 Athletes' Shower Room(with Cold Bath)
11 Athletes' Gym
12 Massage and Recovery Room

1F Plan



2F Plan



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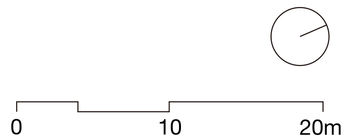
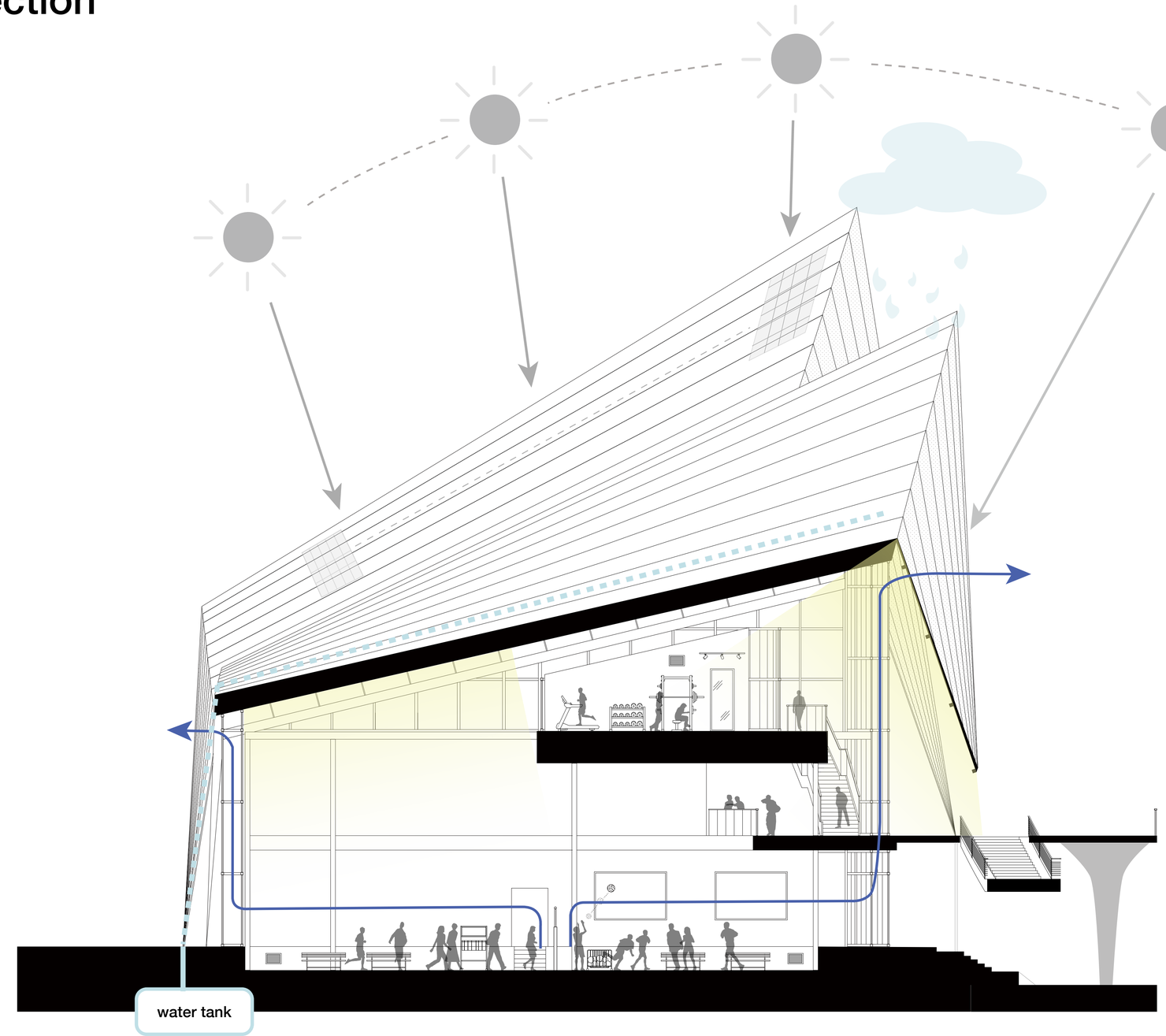
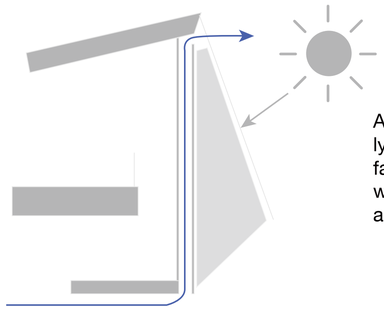
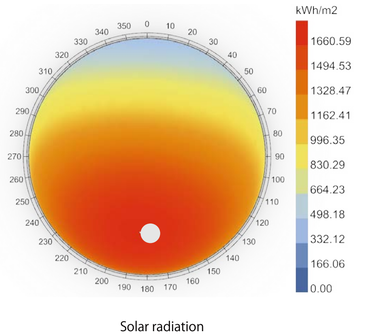


Section





A perforated metal screen is partially applied outside the double-skin façade to reduce solar heat gain while maintaining natural ventilation and visual permeability.



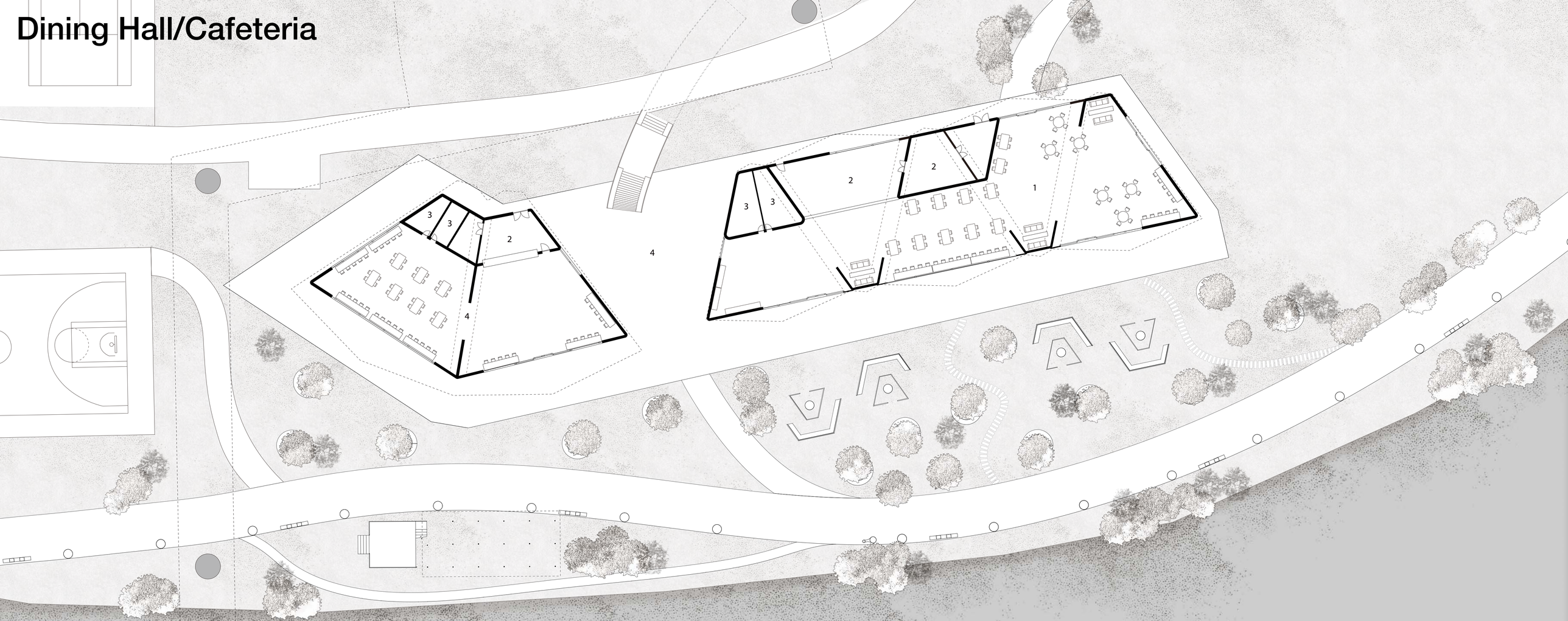
The inclination of the roof varies depending on the amount of solar radiation in order to maximize solar energy gain.

Location of maximum solar radiation
azimuth: 185 deg
altitude: 50 deg
value: 1660.6 kW/m²

The roof valleys are used to collect rainwater, which is stored and reused for toilet flushing and other greywater uses within the facility.

ZONE A
DINING HALL/CAFETERIA

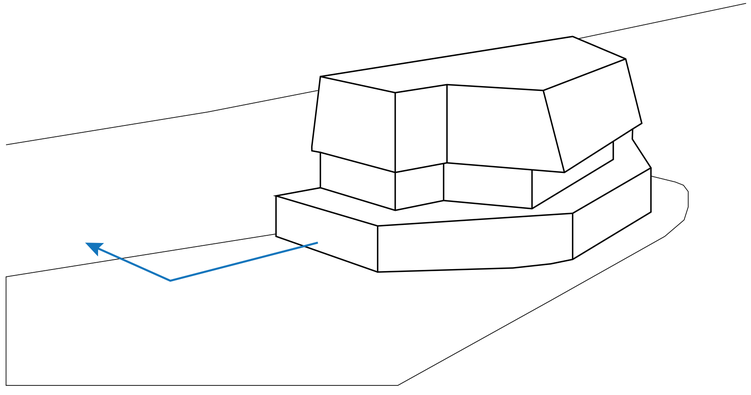
Dining Hall/Cafeteria



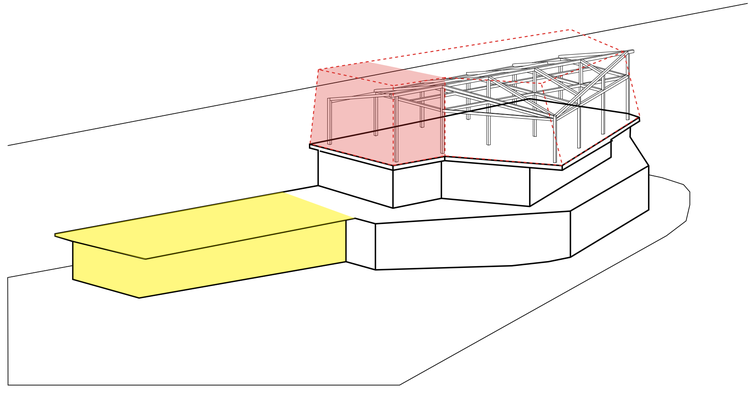
1 Athletes' Dining Hall
2 Kichen/Food Preparation Area
3 Restrooms
4 Public Riverside Cafeteria
5 Common Area

0 10 20m

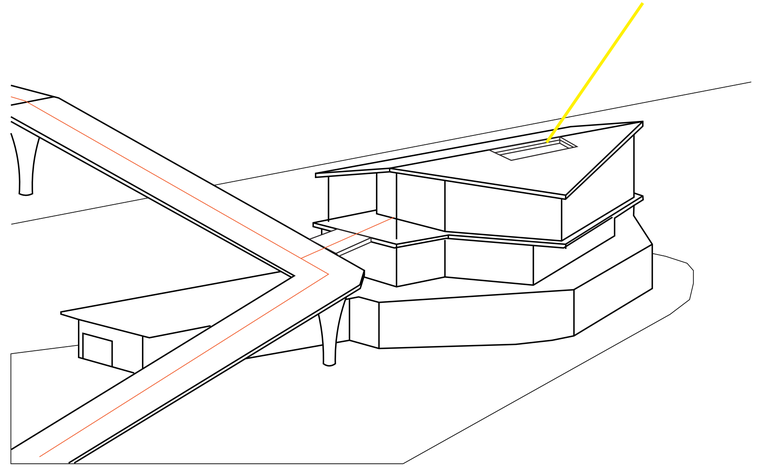
ZONE B
RENOVATION



Original building



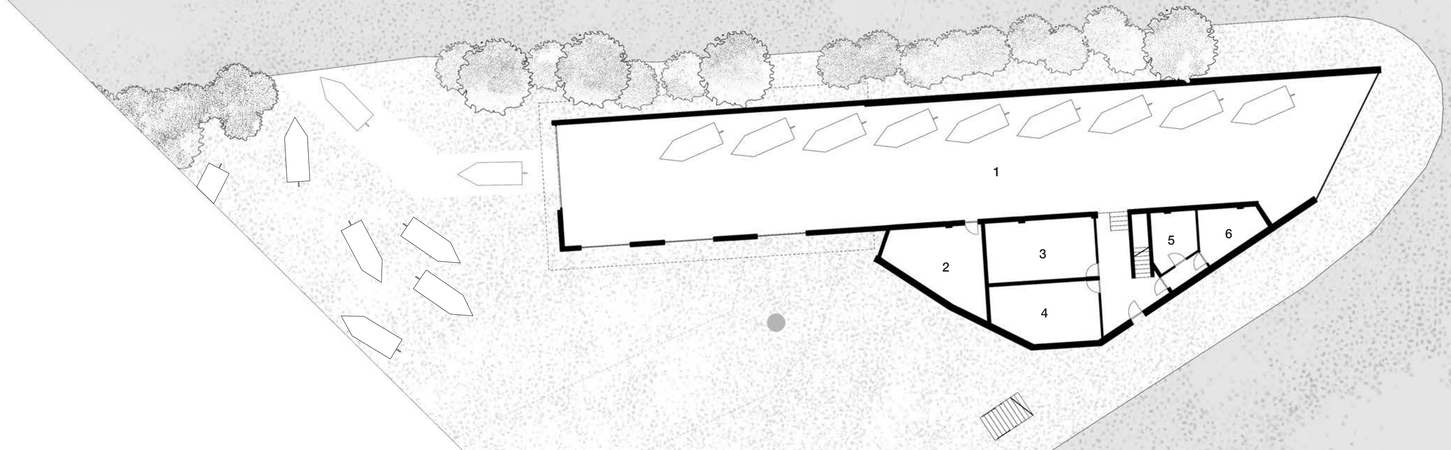
Extension by 3D printing & partial removal of 2F for structural reuse



Installation of skylights and a deck connection to the bridge

The Club is reimagined as a site-specific landscape: 3D-printed extensions expand the Yacht Yard below, while fixed glazing frames boats and equipment as living displays. Above, a Pygmy Cormorant gallery and birdwatching hub opens the second floor to the public, directly connected to the pedestrian bridge and the new athlete accommodation beyond. The Club's own artifacts — its boats, its birds, its river — become the architecture.

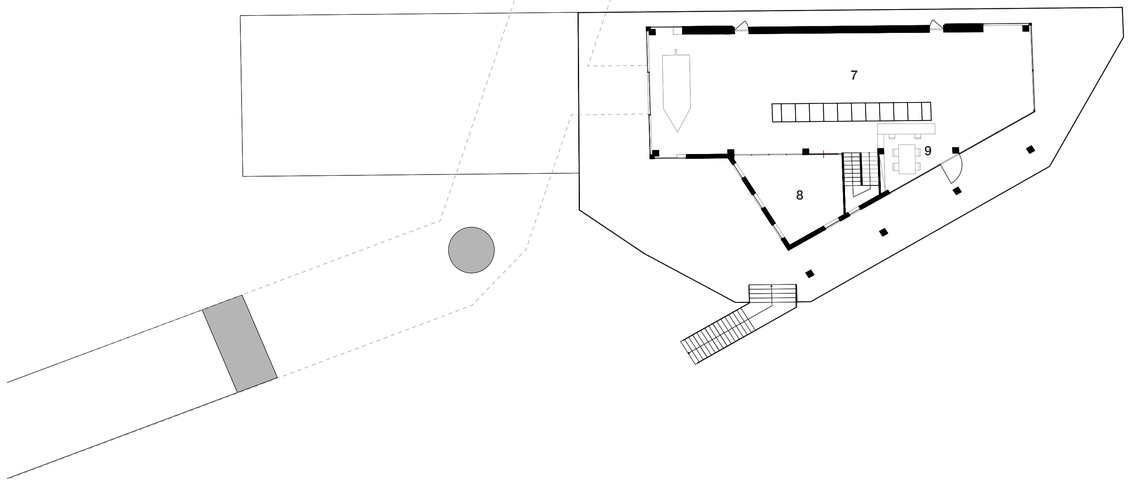
GF Plan



1 Yacht Yard
2 Storage Room
3 Men's WC
4 Women's WC
5 Machine Room
6 Laundry Room
7 Lecture Room
8 Gym
9 Office
10 Gallery
11 Orientation Room
12 Bridge

0 10 20m

1F Plan



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6 Laundry Room
7 Lecture Room
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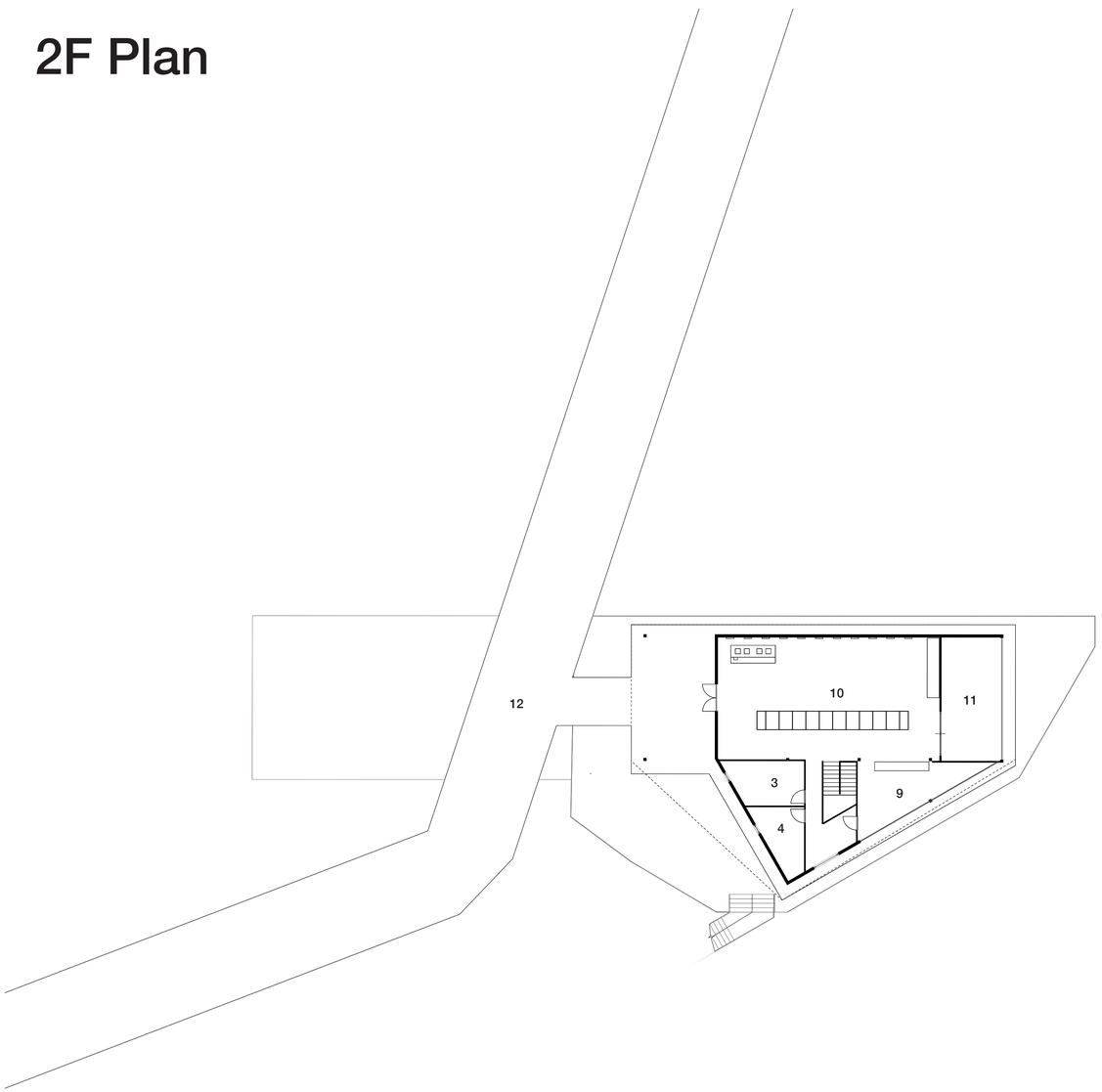
11 Orientation Room
12 Bridge

0 10 20m

2F Plan



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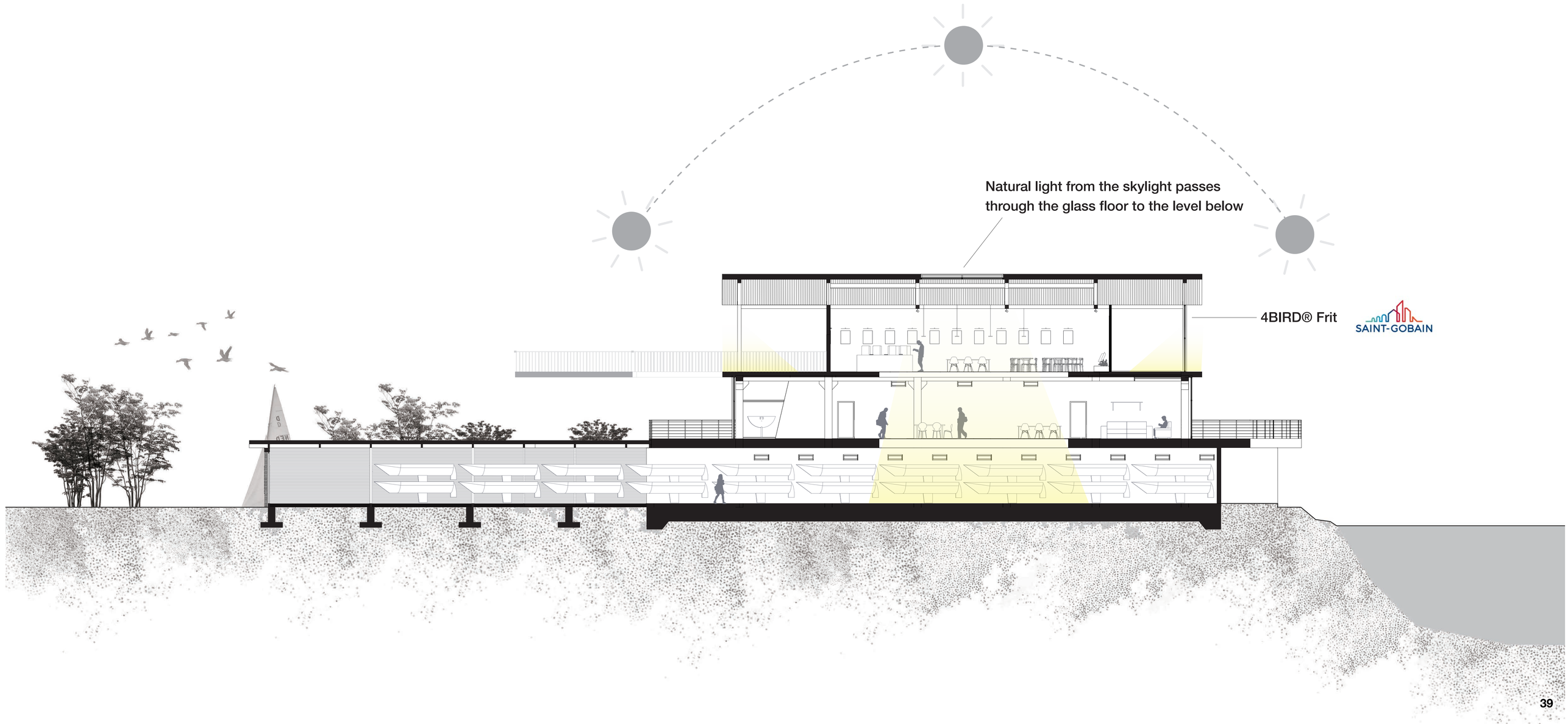
0 10 20m

Section


Natural light from the skylight passes
through the glass floor to the level below
4BIRD® Frit
SAINT-GOBAIN

STRESSED RIBBON BRIDGE

Detailed Section

Strategic Rationale: Beyond a Mobility Link

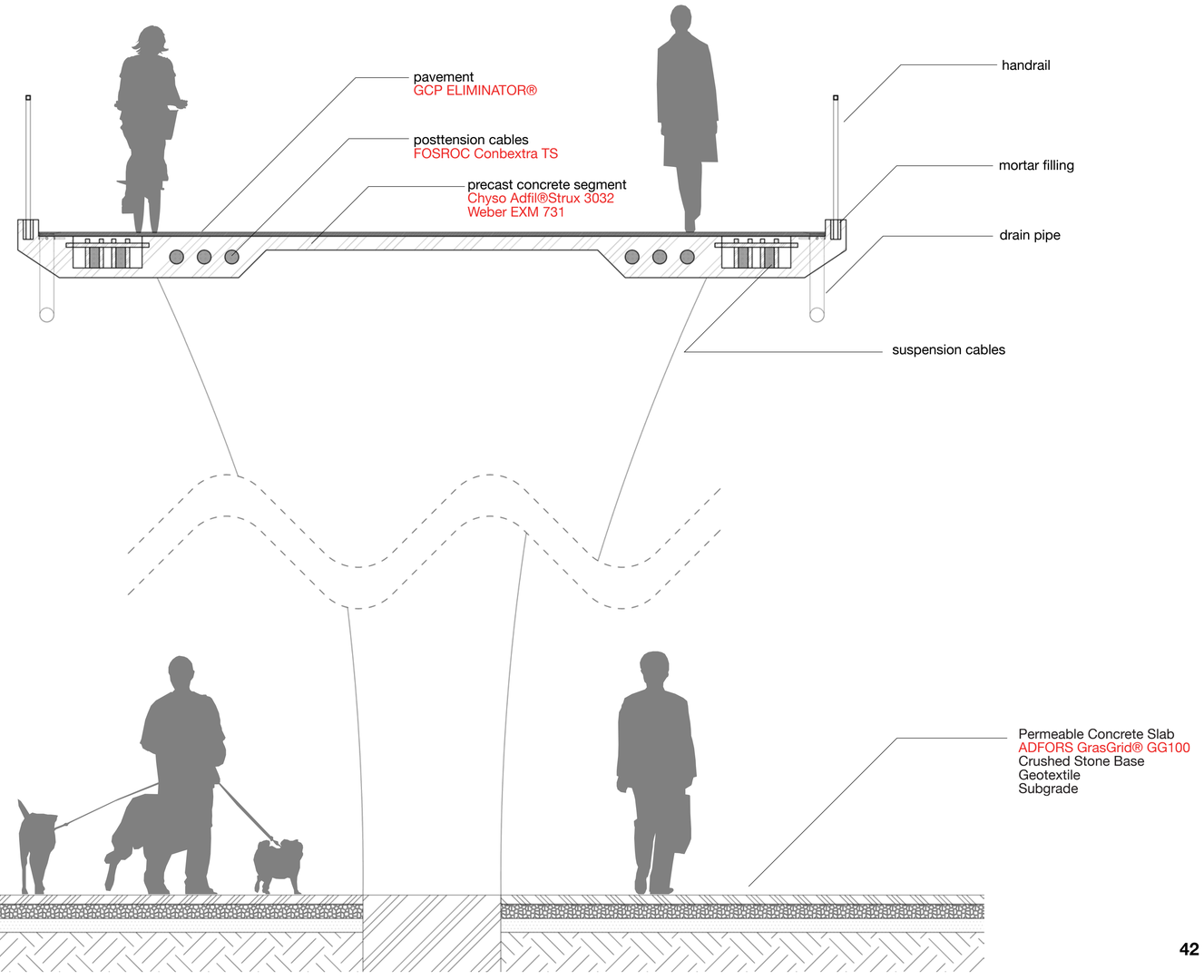
The bridge crossing this site is more than a walking and cycling route; it is a strategic intervention to open the location to an urban scale. By connecting with the historic bridge slated for adaptive reuse as a pedestrian walkway, this project integrates the site into Belgrade's wider urban fabric. While the program includes specialized athlete housing and facilities, the bridge deck functions as a continuous public stratum. It ensures the site remains inclusive, providing a sense of place for both athletes and citizens, regardless of their participation in sports.

Structural Innovation: The Stress Ribbon Method

We have adopted the Stress Ribbon construction method for its structural efficiency and minimal environmental footprint.

Ecological Permeability: The exceptionally thin deck creates a light, "weightless" aesthetic that maintains clear flight paths for the Pygmy Cormorant, minimizing physical and visual obstructions.

Sustainability: Compared to conventional bridge engineering, this method significantly reduces the consumption of concrete and steel, resulting in a lower carbon footprint during construction and aligning with the project’s commitment to sustainable development.



One Click LCA