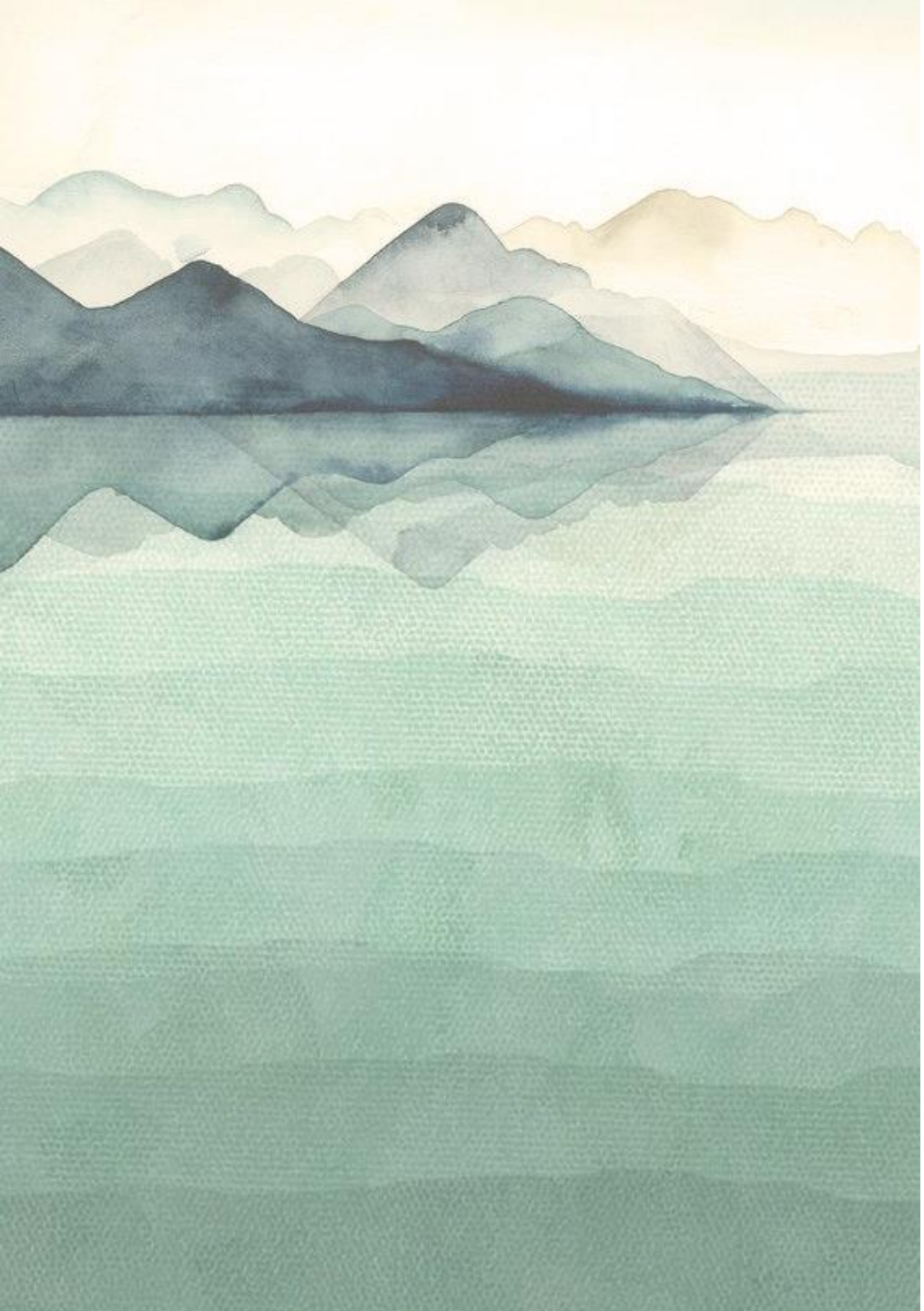


Active Floating Village

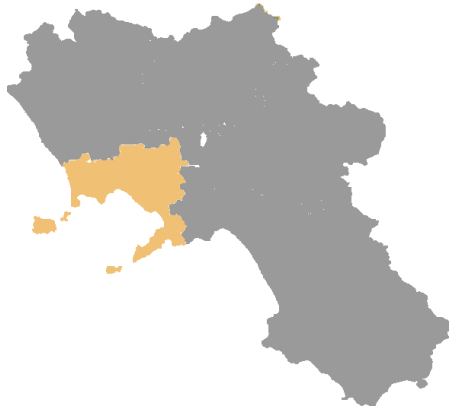
ISCHIA
(LACCO AMENO)

Shahrzad sadat Alavizadeh 10688630
Mona Khakpour azizi 10662704

Site Identification

Lacco Ameno *is a town and comune situated in the northwest of the island of Ischia, in the Metropolitan City of Naples off the west coast of Italy..*

Campania Region



Napoli Province

Ischia Island

Lacco Ameno

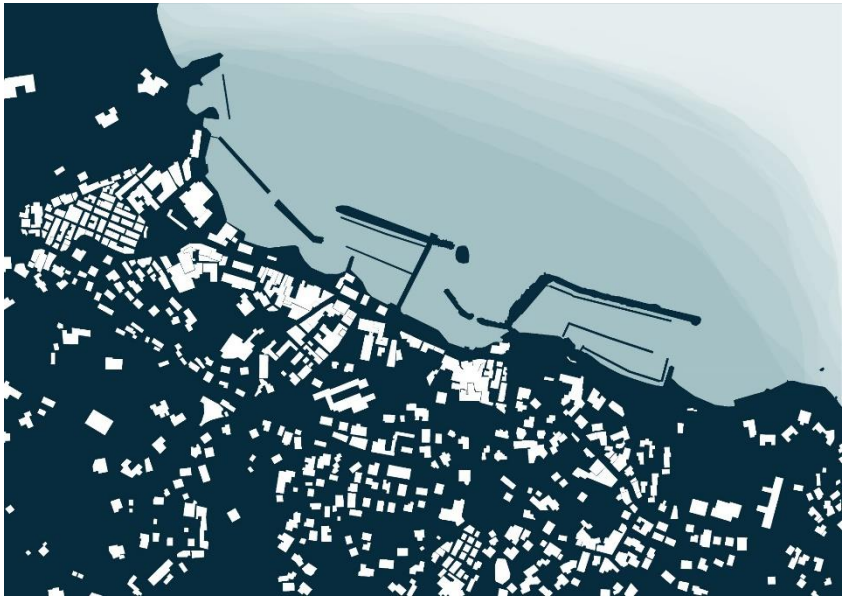
Site Analysis

Use

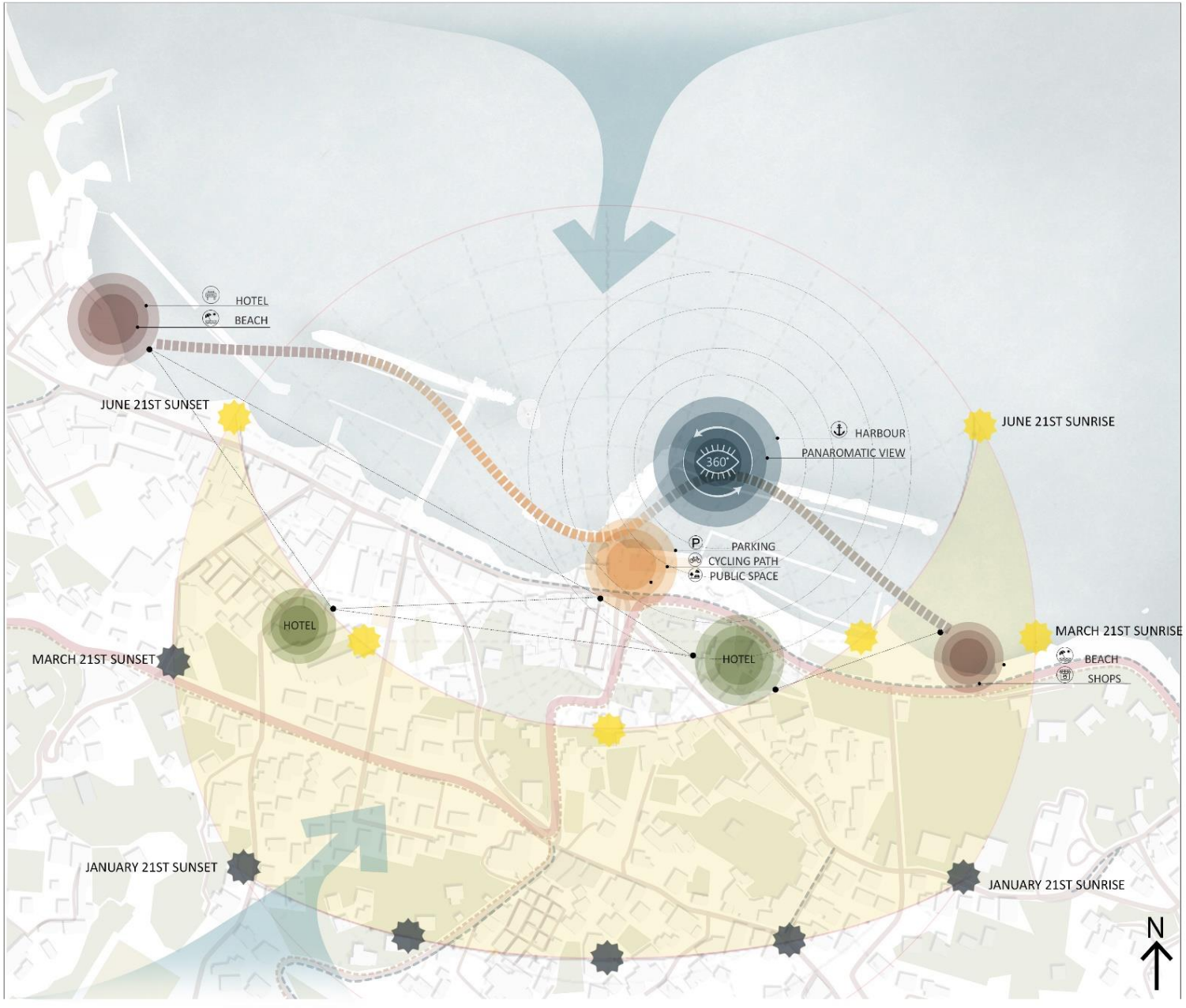
Open spaces

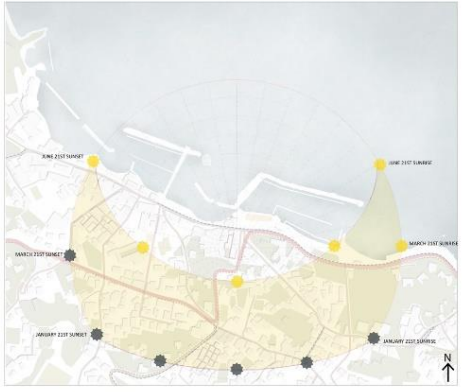
Links

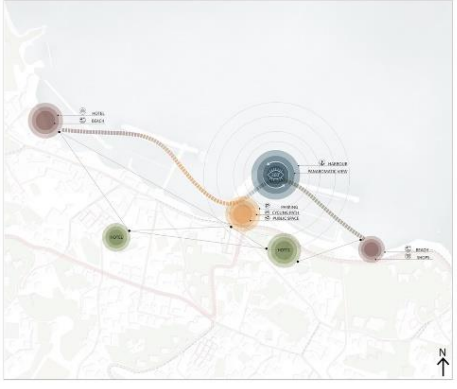
Voids



Site Analysis



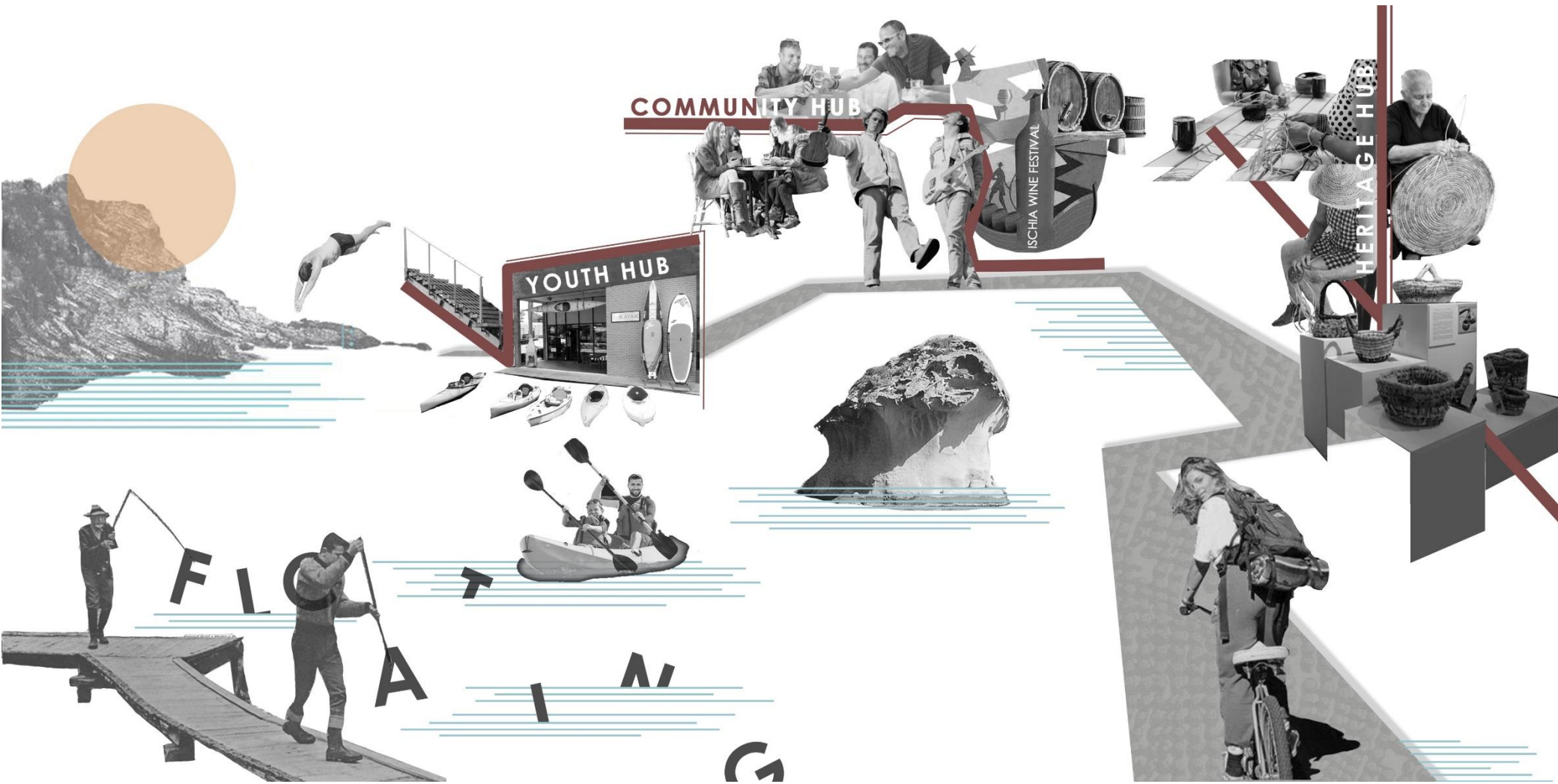




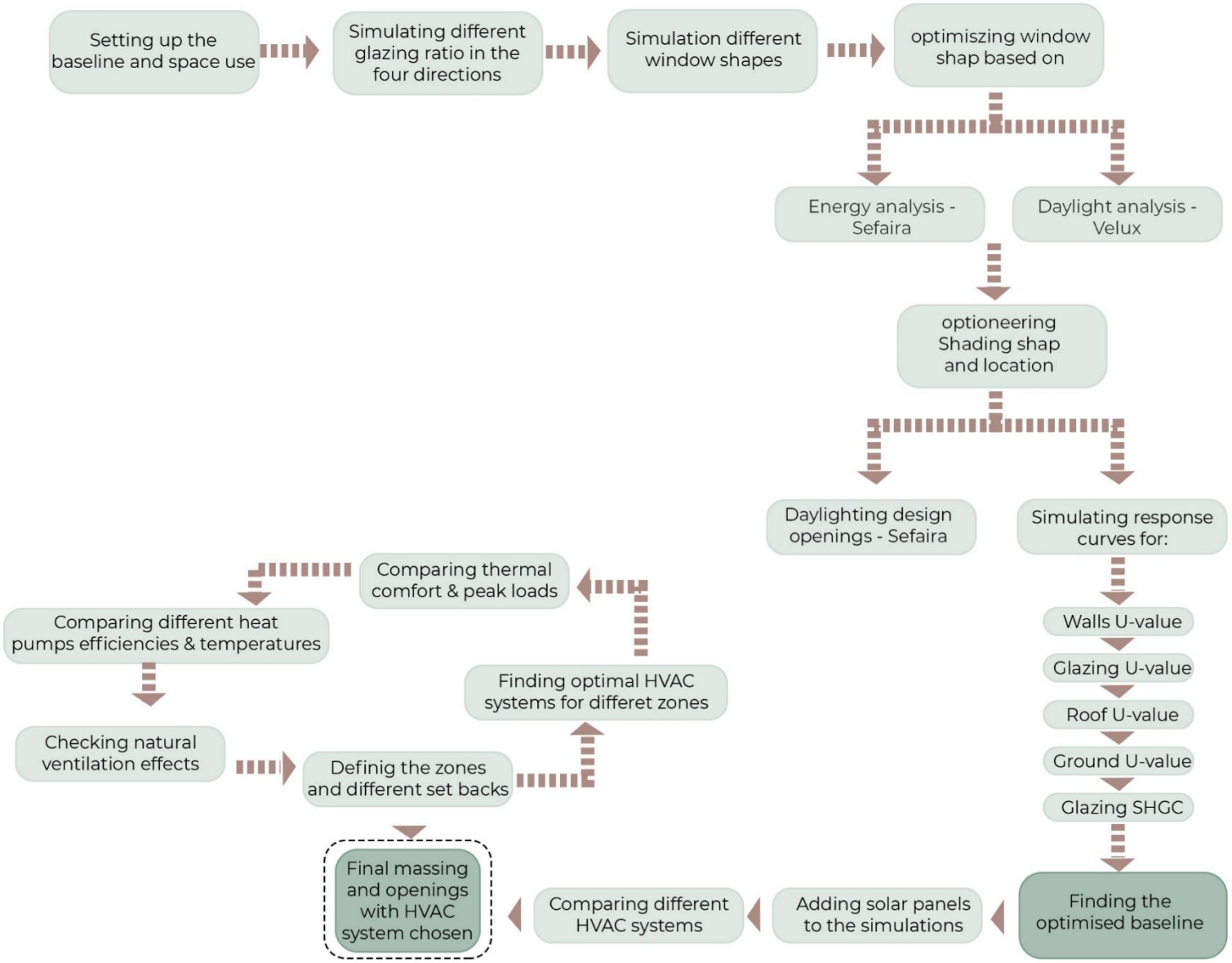
LEGEND

- Wind
- Building
- Cycling path
- Main connection
- Panaromatic view of site
- Main road
- Sunpath in summer
- Sunpath in winter
- Green spaces

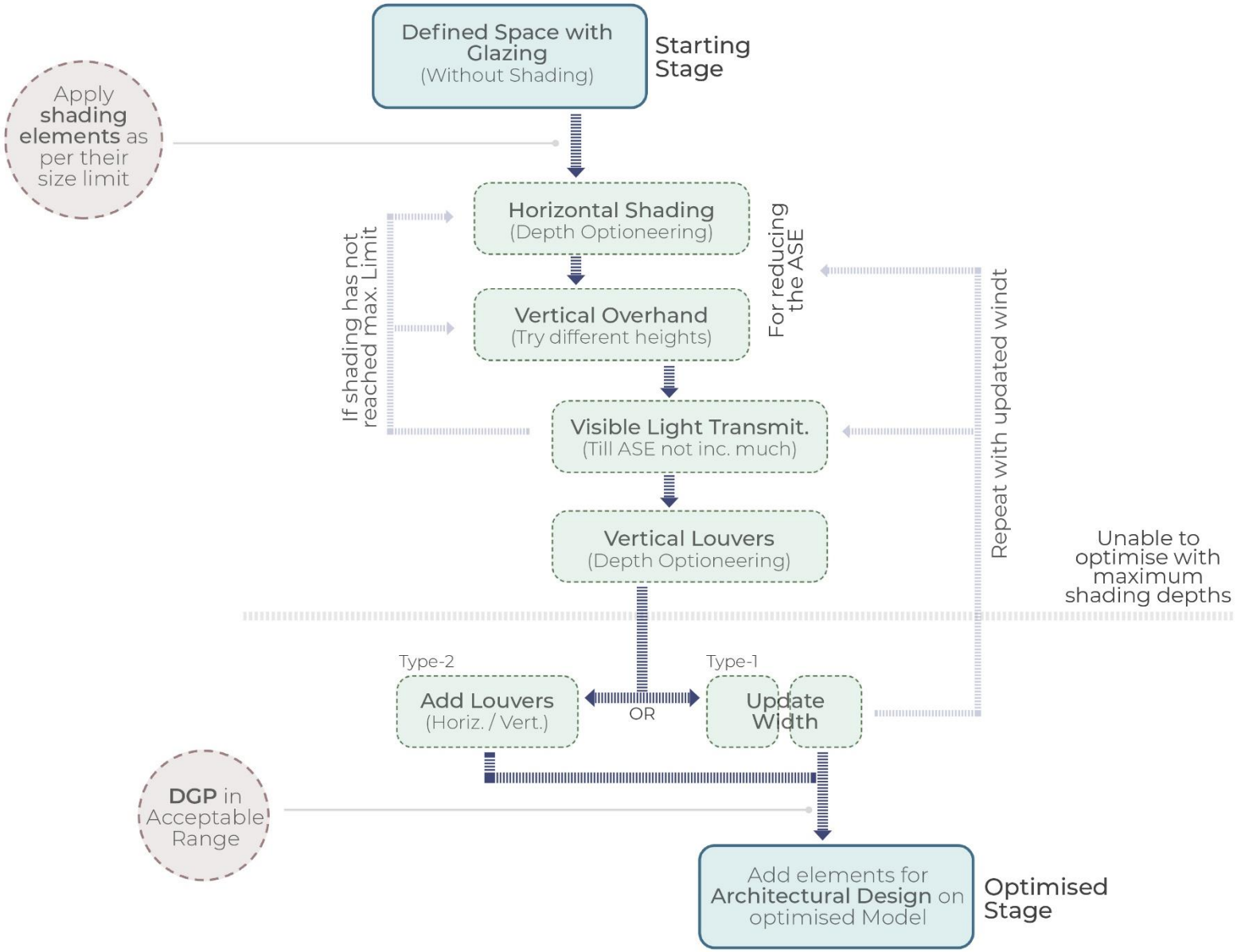
Concept


COMMUNITY HUB
ISCHIA WINE FESTIVAL
HERITAGE HUB
YOUTH HUB
KAYAK
FLOATING

Flow Chart


Setting up the baseline and space use
Simulating different glazing ratio in the four directions
Simulation different window shapes
optimiszing window shap based on
Energy analysis - Sefaira
Daylight analysis - Velux
optioneering Shading shap and location
Daylighting design openings - Sefaira
Simulating response curves for:
Walls U-value
Glazing U-value
Roof U-value
Ground U-value
Glazing SHGC
Finding the optimised baseline
Adding solar panels to the simulations
Comparing different HVAC systems
Final massing and openings with HVAC system chosen
Definig the zones and different set backs
Checking natural ventilation effects
Comparing different heat pumps efficiencies & temperatures
Comparing thermal comfort & peak loads
Finding optimal HVAC systems for differet zones

DayLight Flow Chart



Preliminary Analysis

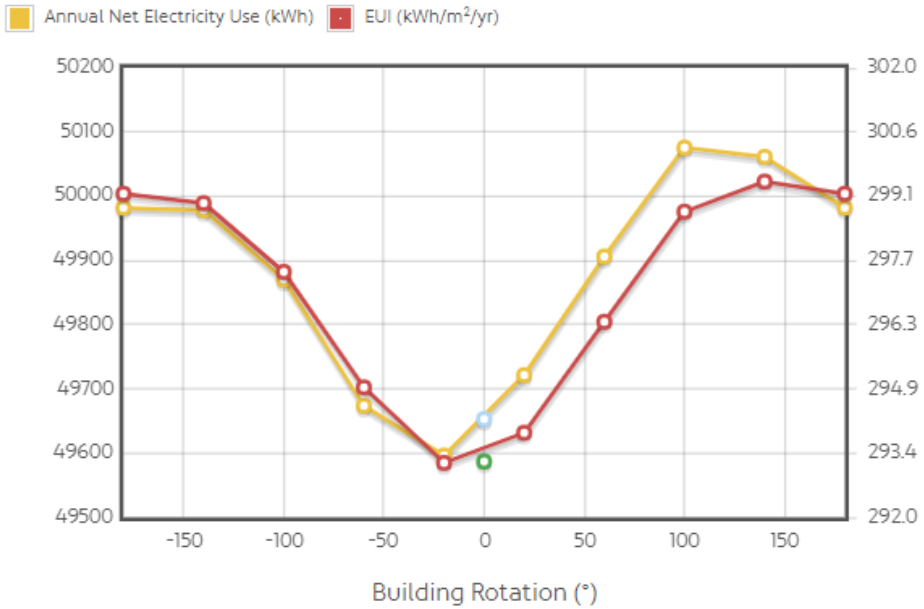
The weather data used is for Lacco Ameno fallow by law:

Walls U-value : 0.34 W/m2k
Floors U-value : 0.38 W/m2k
Roof Glazing:
- Assembly U-Value: 2.4 W/m2k
- SHGC : 0.6

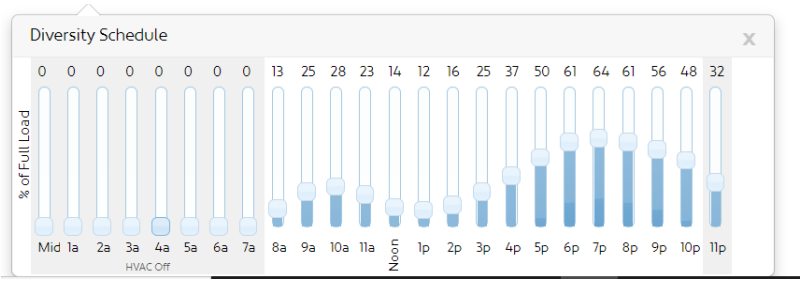
Façade Glazing:
- Assembly U-value : 2.2 W/m2k
- Solar Heat coefficient : 0.4

Roof U-value : 0.33

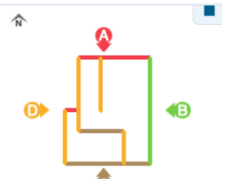
1. Optimising Building orientation

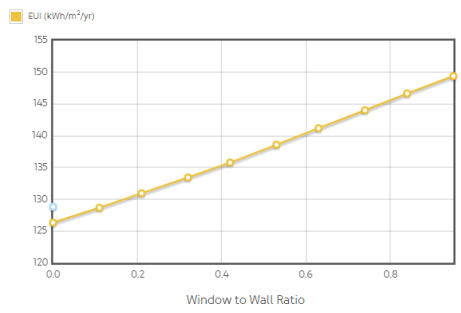


Space Use Definition :
Design Loads |
Occupant Density: 0.5 m2 /person
Equipment Power Density: 7.5 W/m2
Lighting Power Density: 5 W/m2
Ventilation & Outside Air |
Outside Air Rate/Person: 2.5 L/(s.pers.)
Outside Air Rate/Unit Area: 0.30 L/(m2.s)
Design Temperatures |
Setpoint Temperatures:
21 ºC -Heating 27 ºC -Cooling
Setback Temperatures:
12 ºC -Heating 28 ºC –Cooling
HVAC Schedule |
Operating Hours: 8 am to 11 pm
Setback to Setpoint Ramp up Time: 1 hours

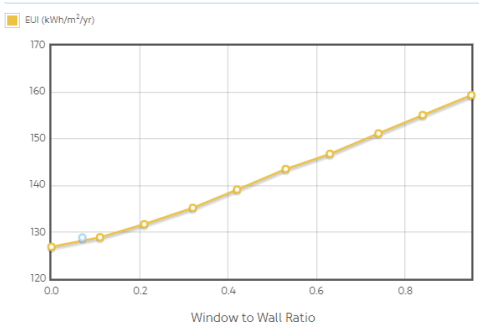


2. Optimal Glazing Ratio Optioneering

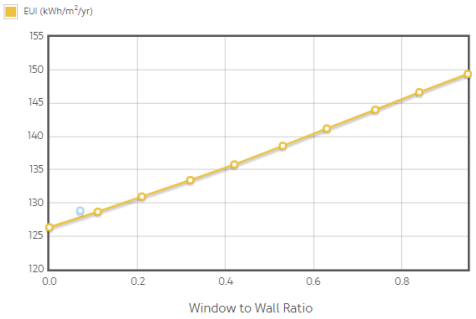




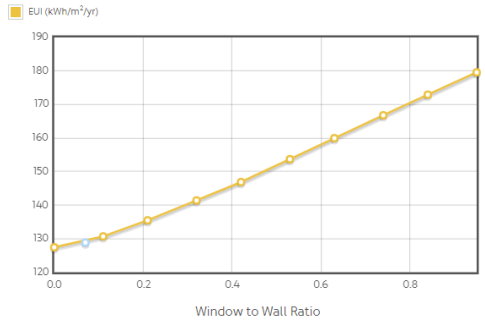
North



South

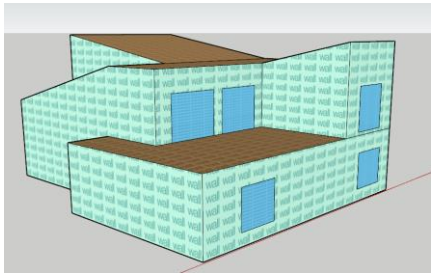


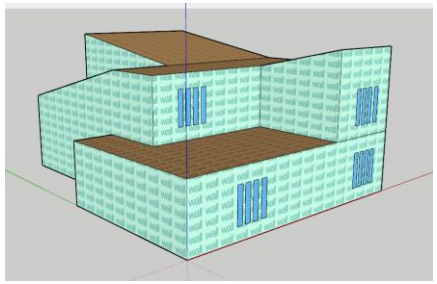
East

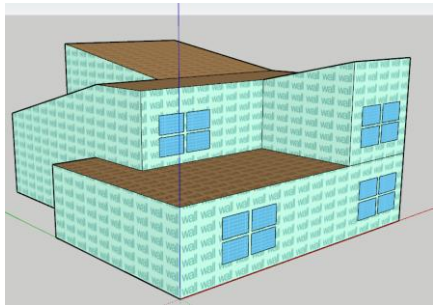


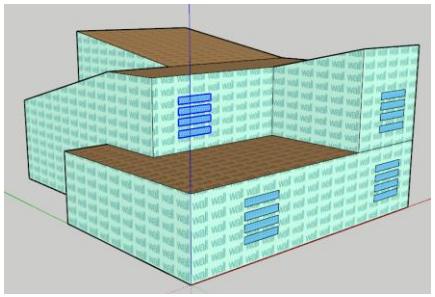
West

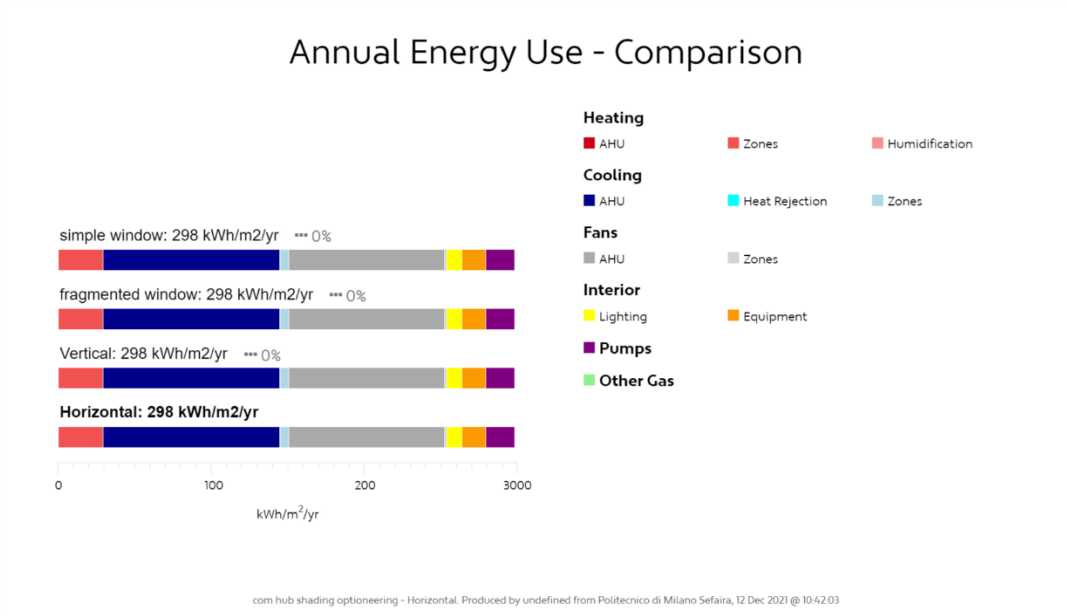
3. Different glazing shape Optioneering





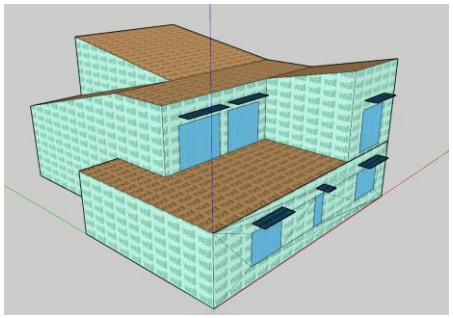


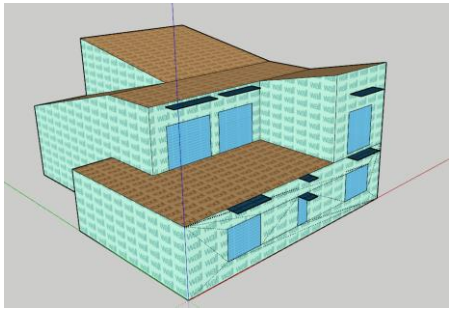


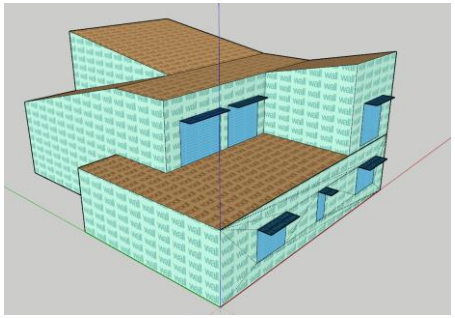


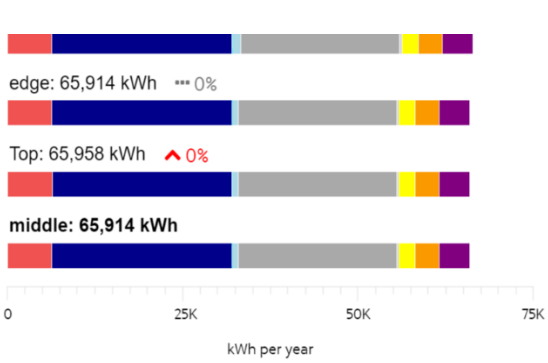
4. Different shading location Optioneering

Shading depth: 60cm
Distance between window to Top: 85cm
Distance between window to middle: 40cm









Heating
AHU Zones Humidification

Cooling
AHU Heat Rejection Zones

Fans
AHU Zones

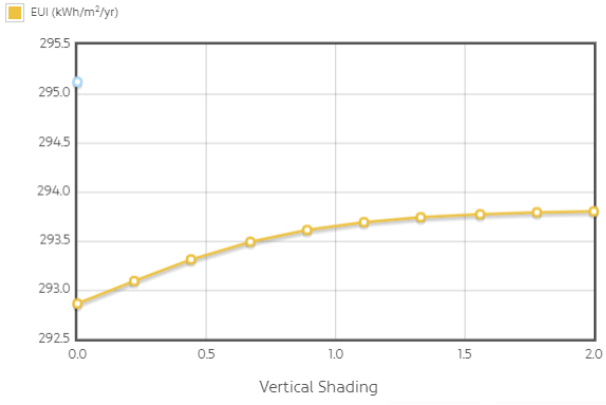
Interior
Lighting Equipment

Pumps

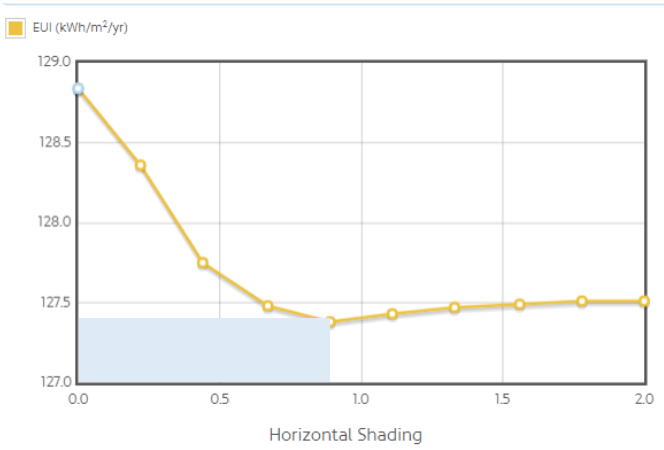
Other Gas

5. Optimizing shading device shape

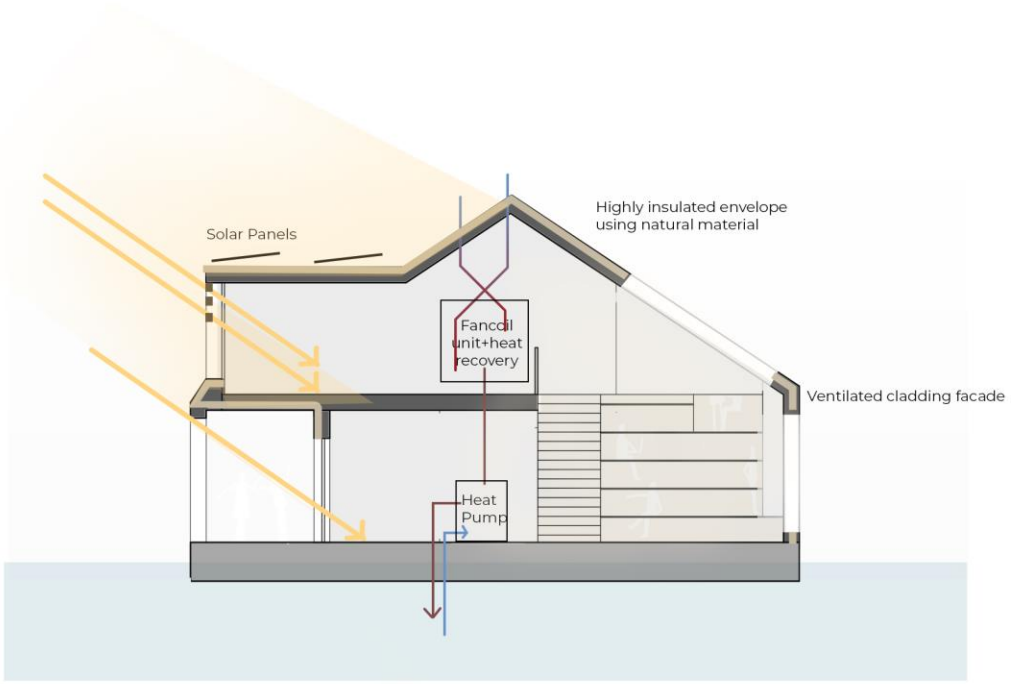
- Vertical Shading in south façade!



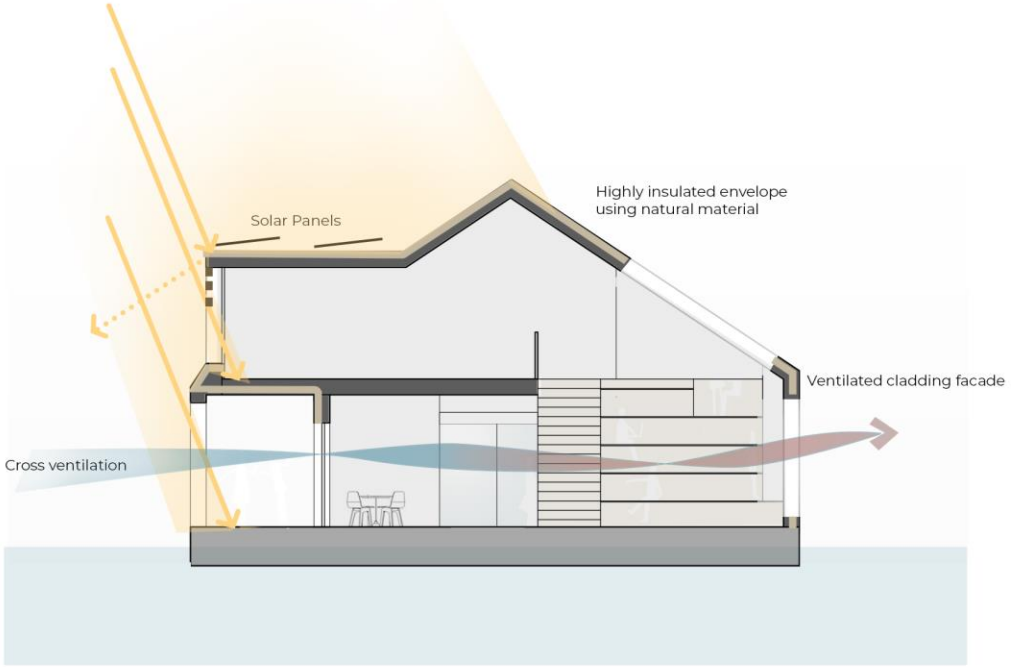
- Horizontal Shading in south façade!



Schematic Design

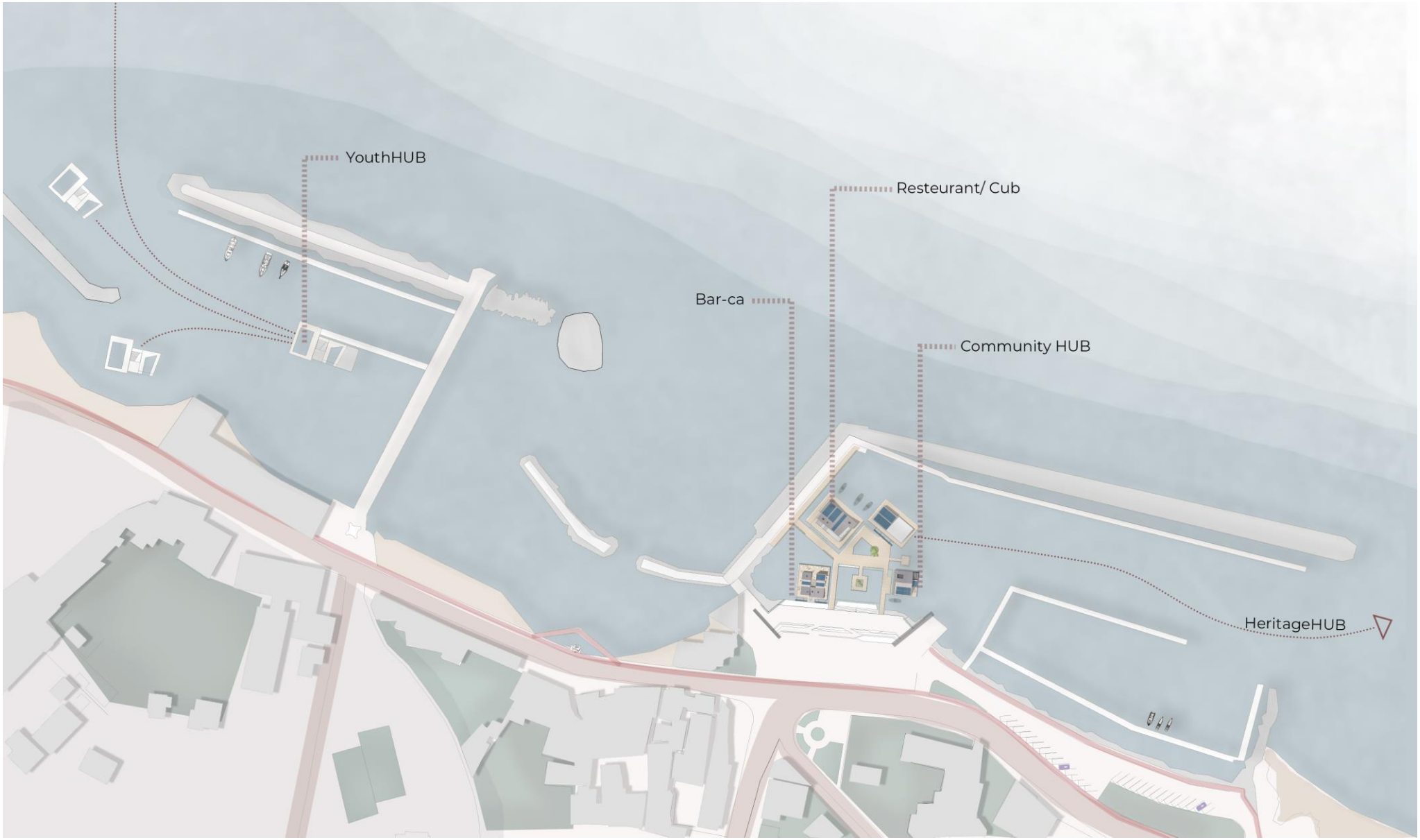


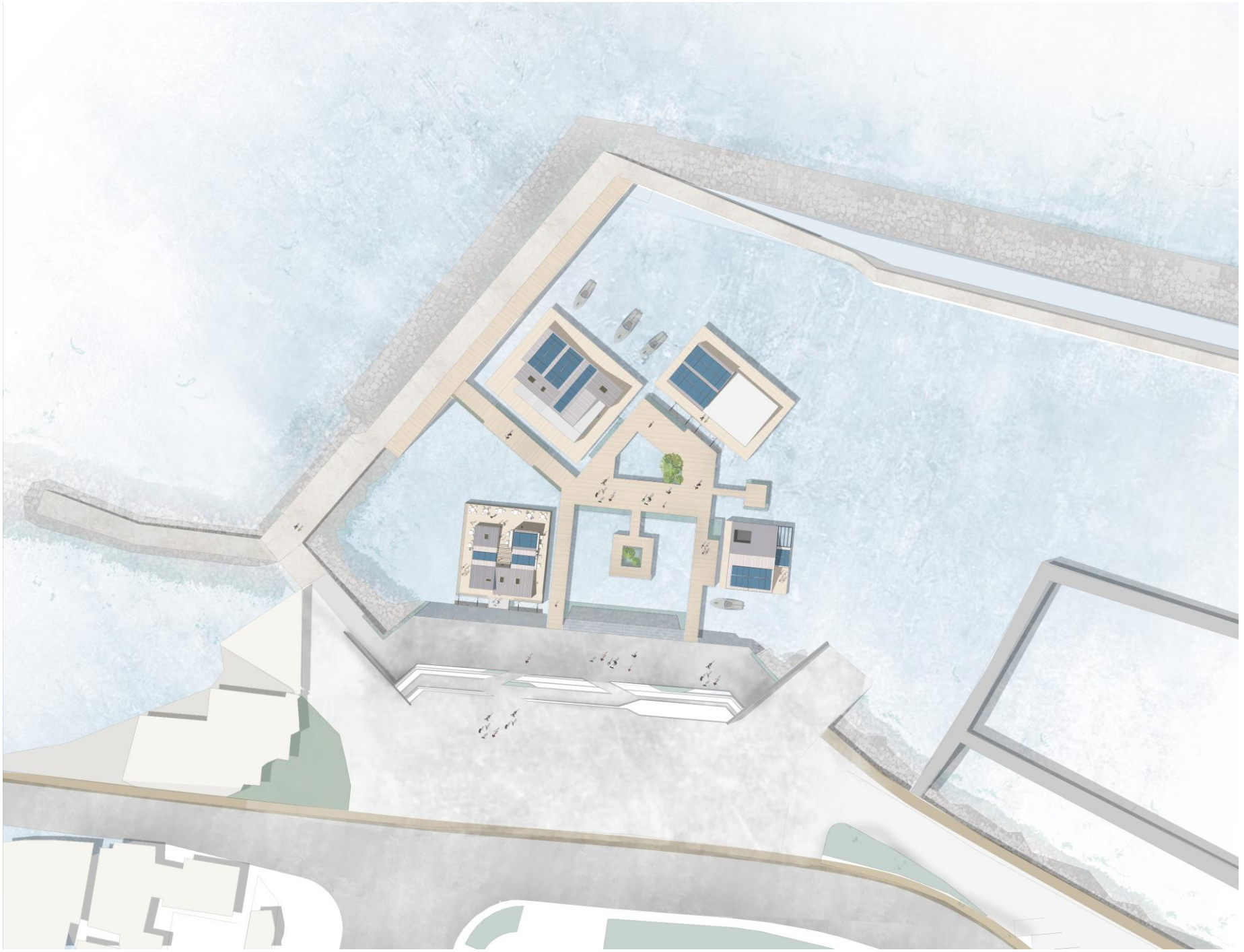
Winter Section

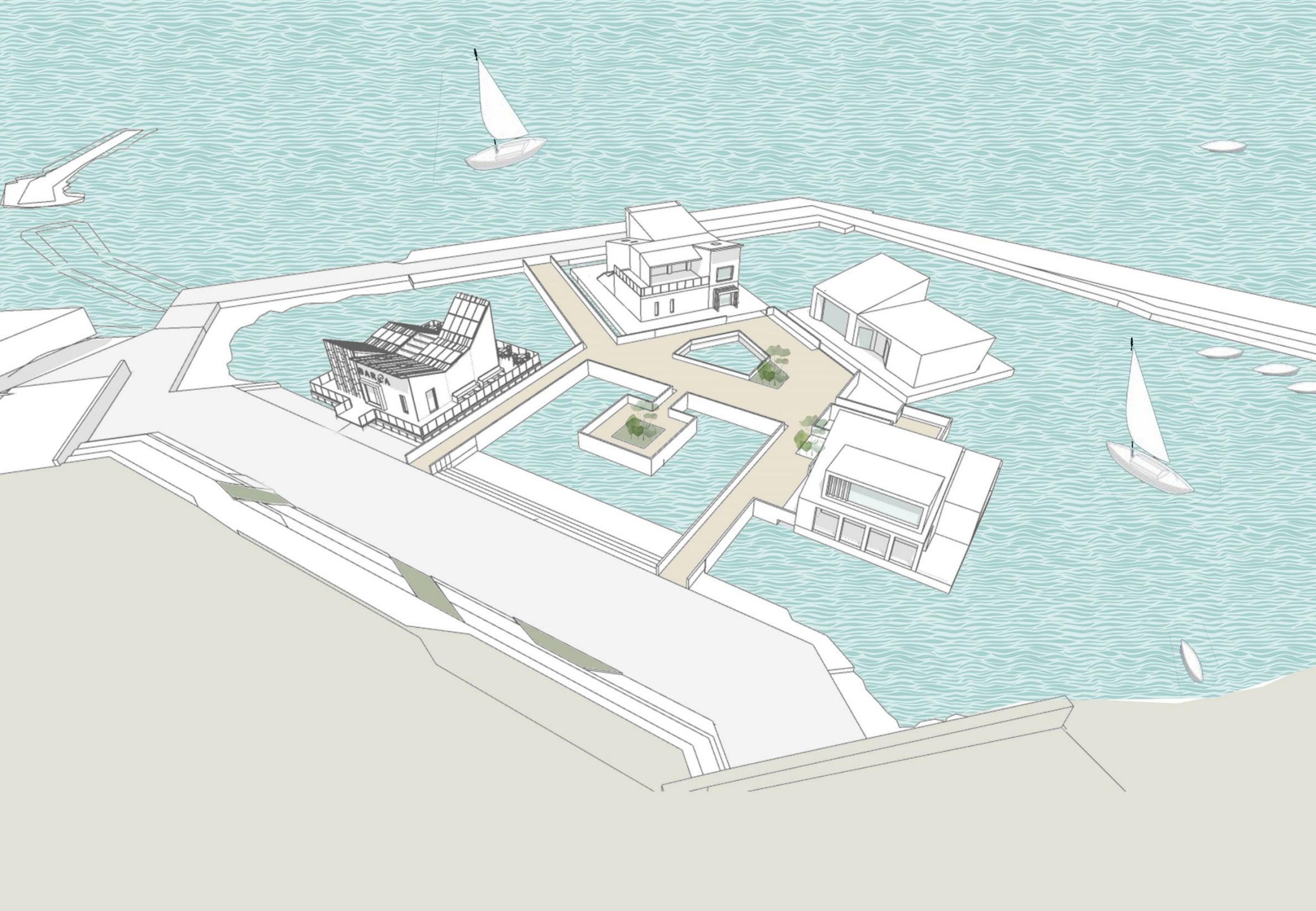


Summer Section

Master Plan



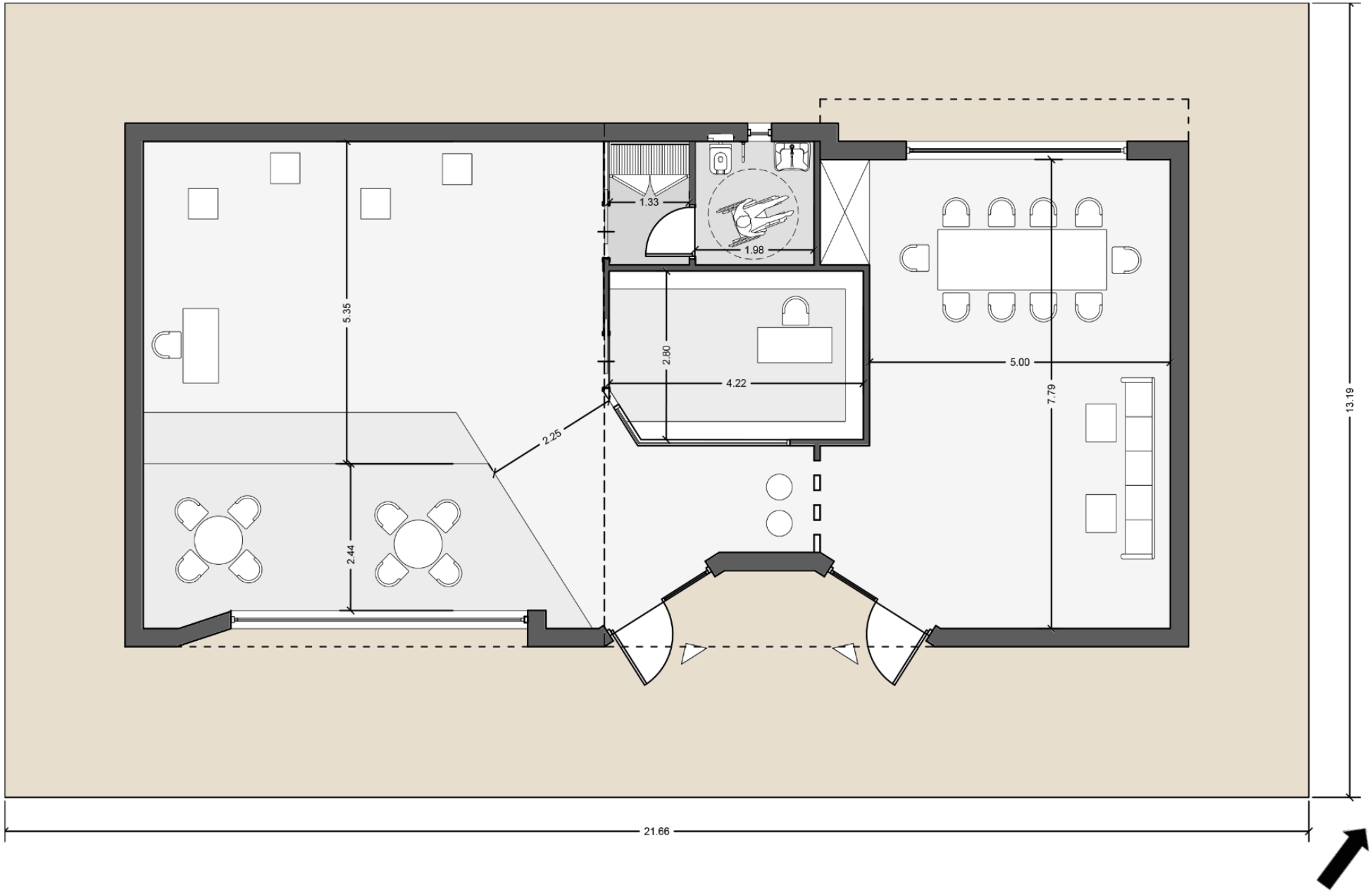




Heritage Hub

Total Area: 145 m2

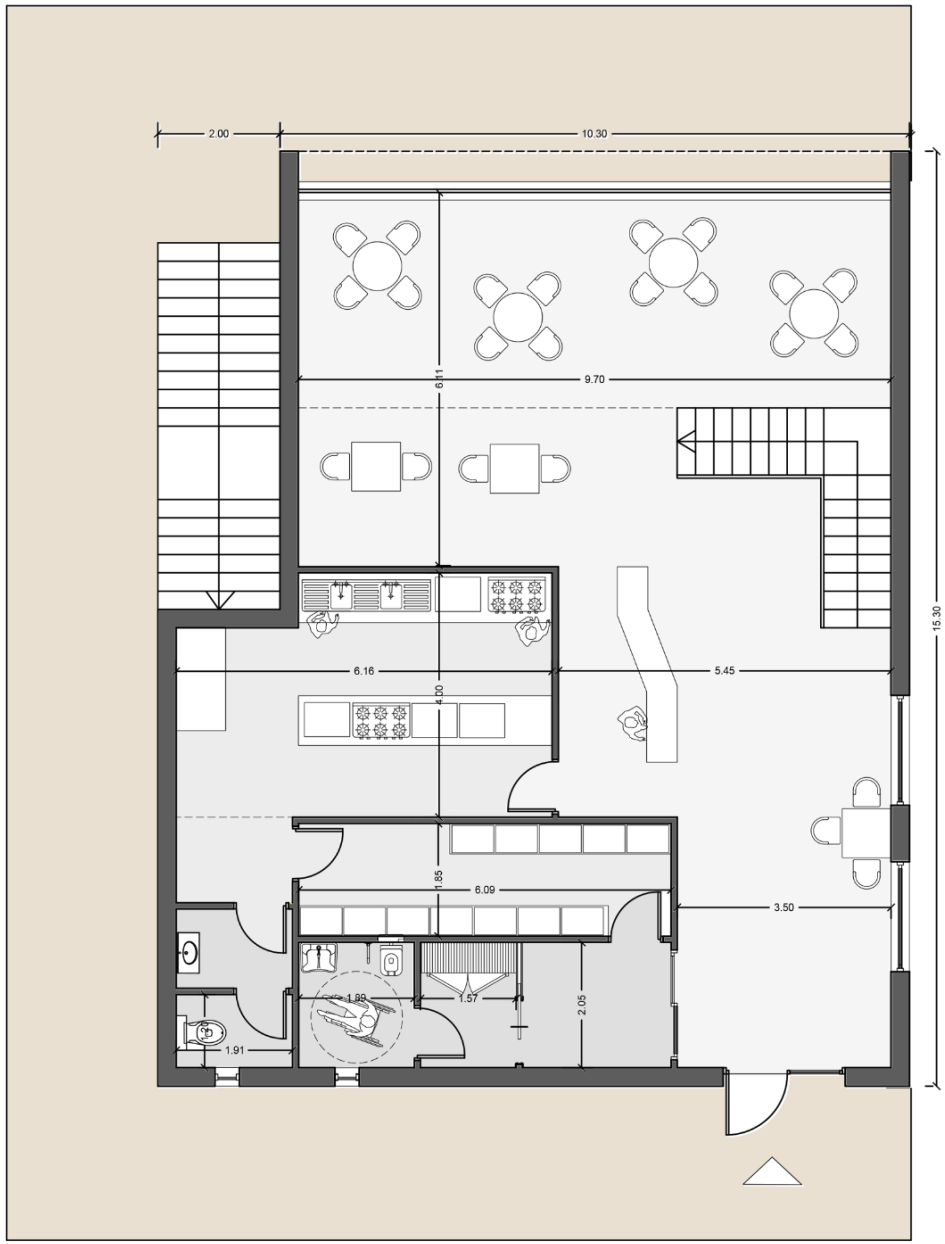
Exhibition : 42.5 m2
Workshop: 21.7 m2
Fests : 42 m2
Shop: 11.5 m2
Bathroom : 6.7 m2

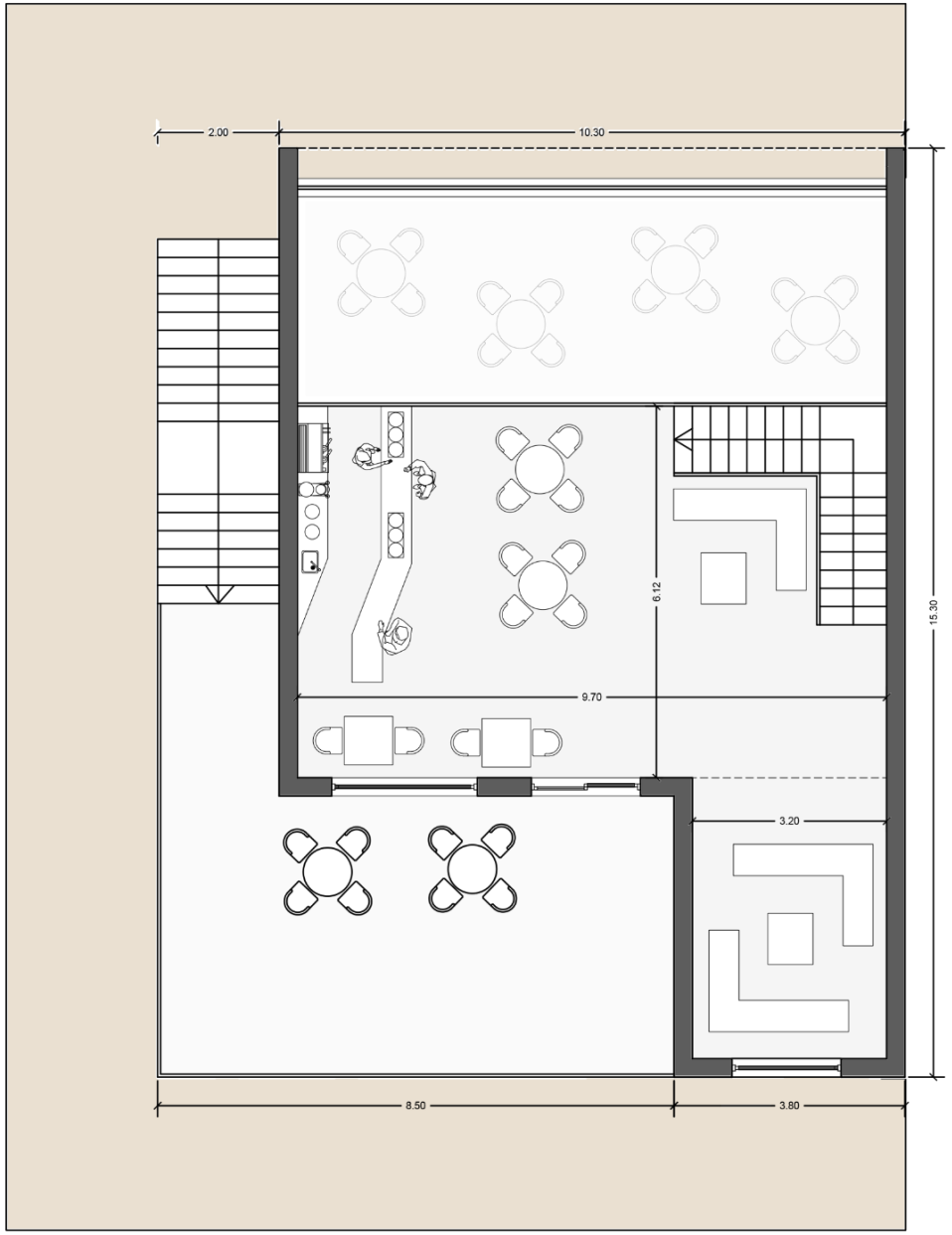

1.33
1.98
5.35
2.80
4.22
5.00
7.79
2.25
2.44
13.19
21.66

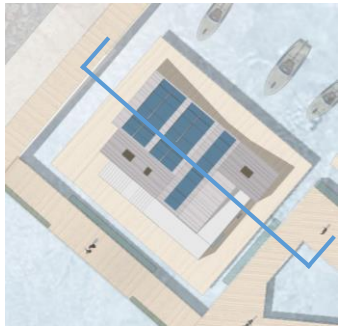
Restaurant-Club

Total Area: 228 m2

Restaurant : 154 m2
Club: 74 m2

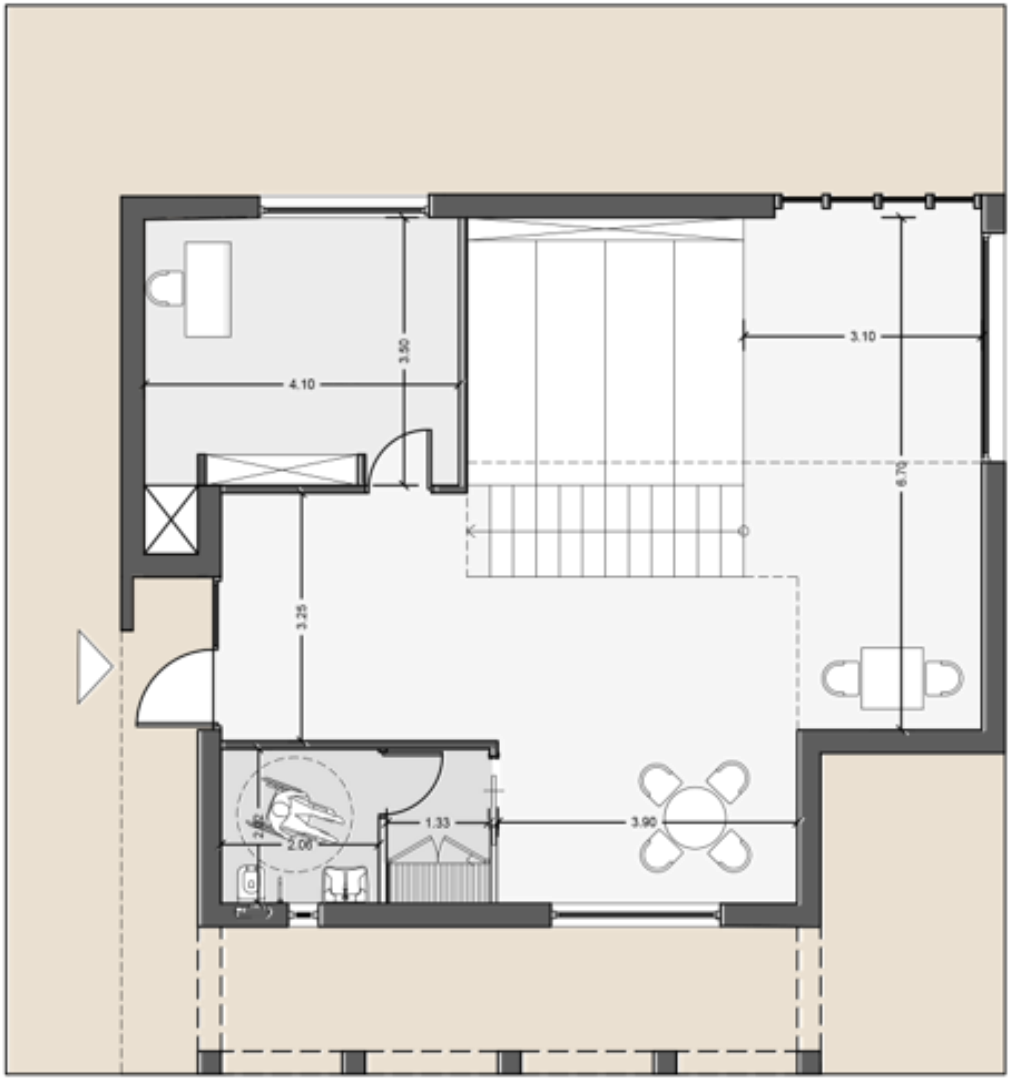

2.00
10.30
6.11
9.70
15.30
6.16
5.45
1.00
1.85
6.09
3.50
1.99
1.57
2.05
1.91

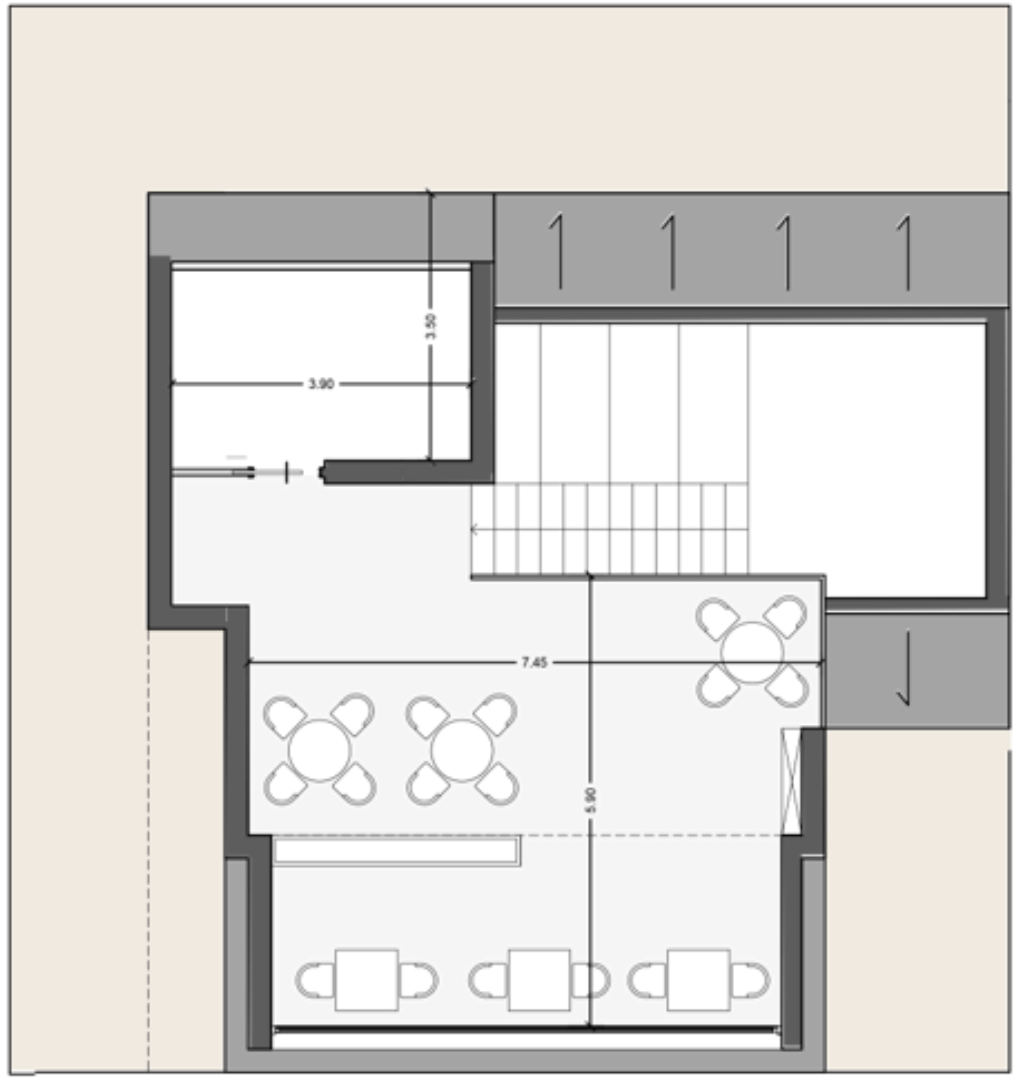

2.00
10.30
6.12
15.30
9.70
3.20
8.50
3.80

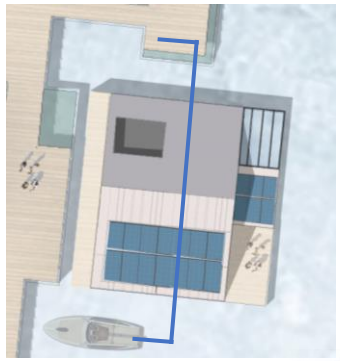


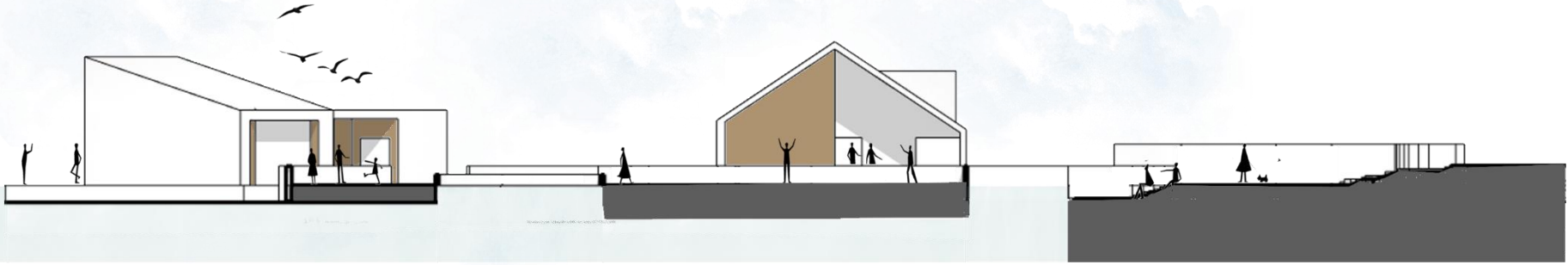
Community Hub

Total Area: 135 m2

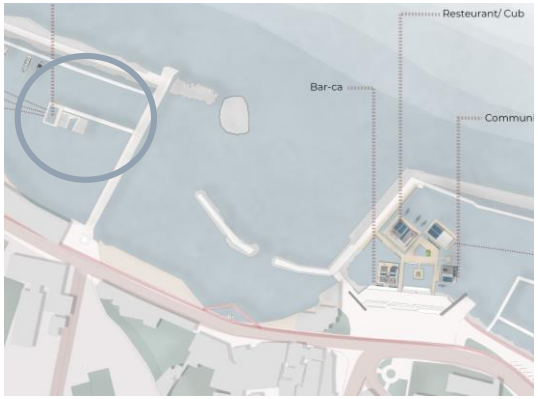

4.10
3.50
3.10
6.70
3.25
1.33
3.90
2.00


3.50
3.90
7.45
5.90



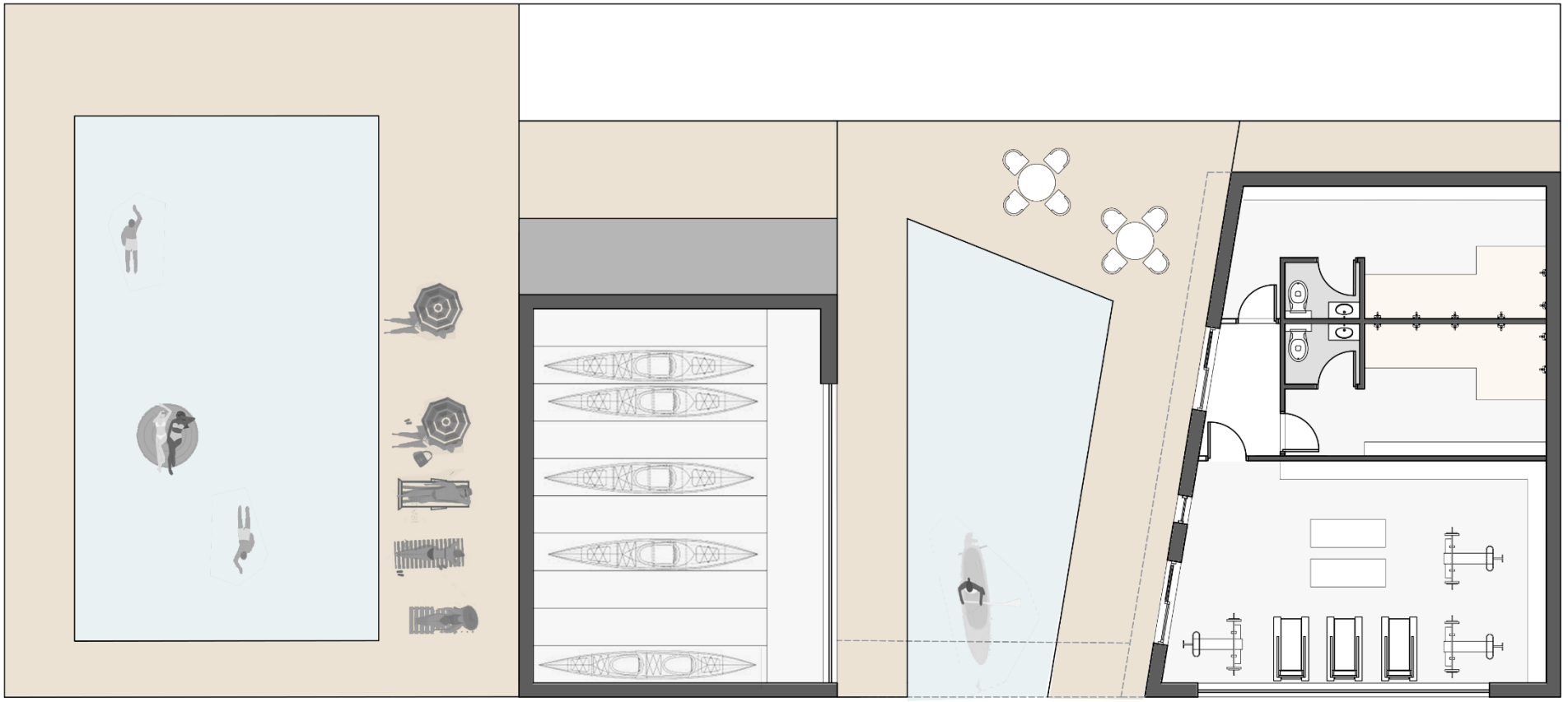


Youth Hub



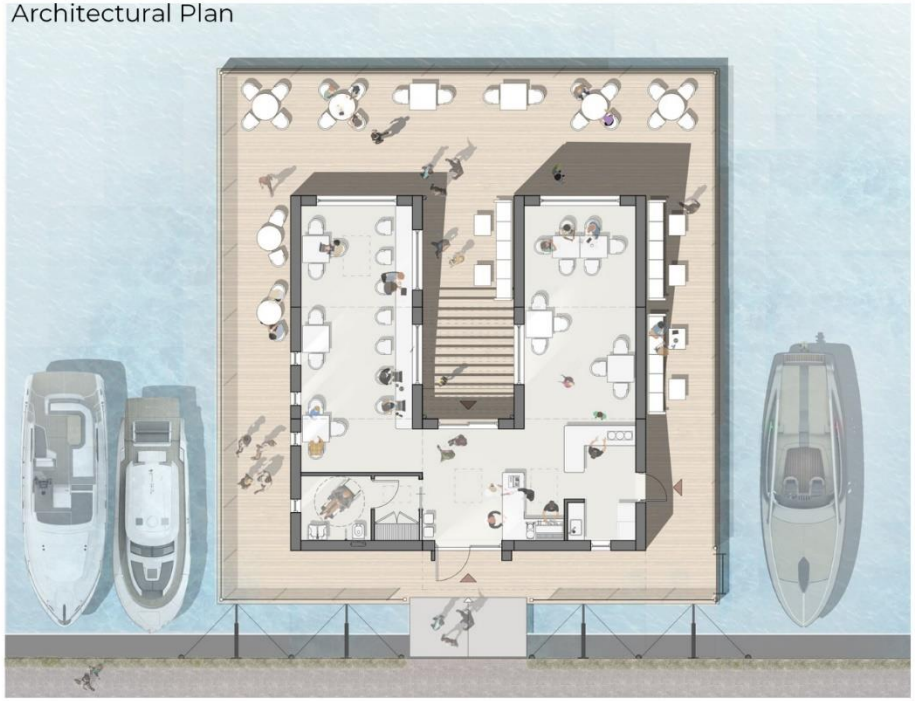
Total Area: 128 m2

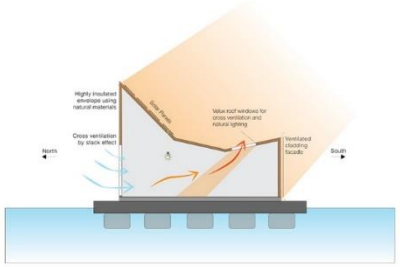
Kayak storage : 49.5 m2 , Capacity : 70-75 boat
Gym and Bathroom : 78.5 m2



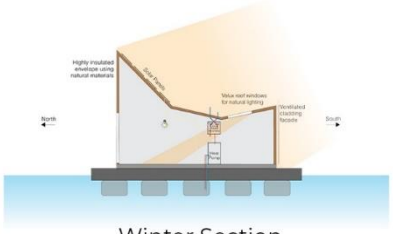

BARCA

Architectural Plan



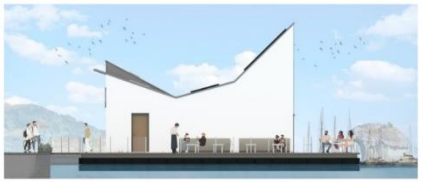


Summer and Mid Season Section



Winter Section

Elevations

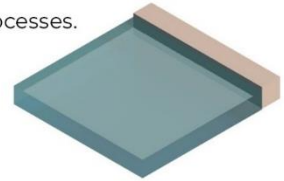


East Elevation

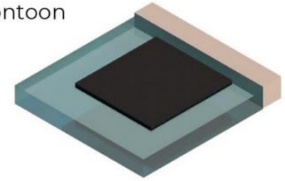
South Elevation

Construction Process

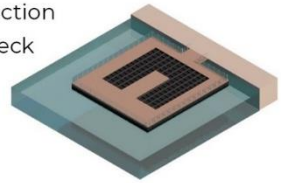
Step wise breakdown of various fabrication processes.



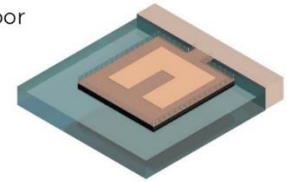
Floating Pontoon



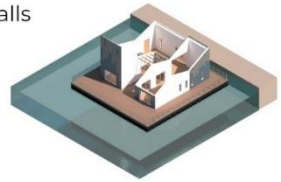
Grid Connection & AddingDeck



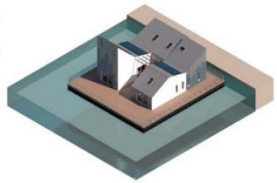
Adding Floor



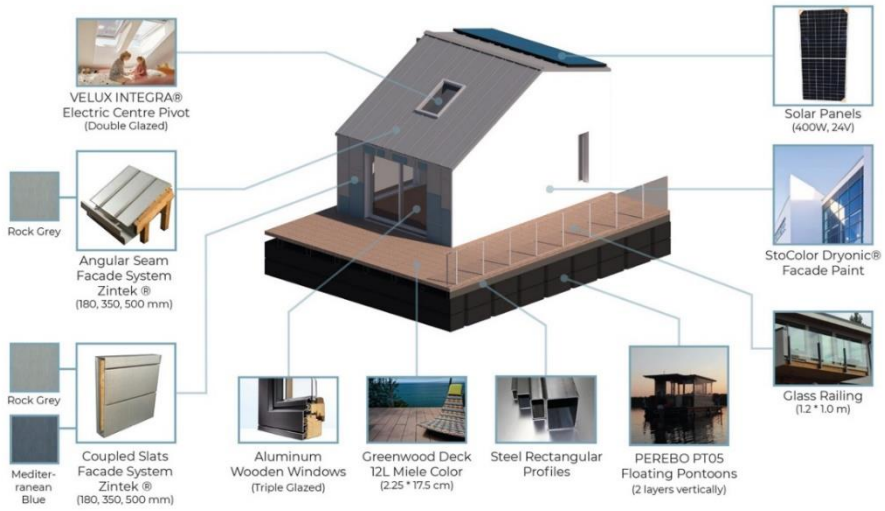
Erecting Walls

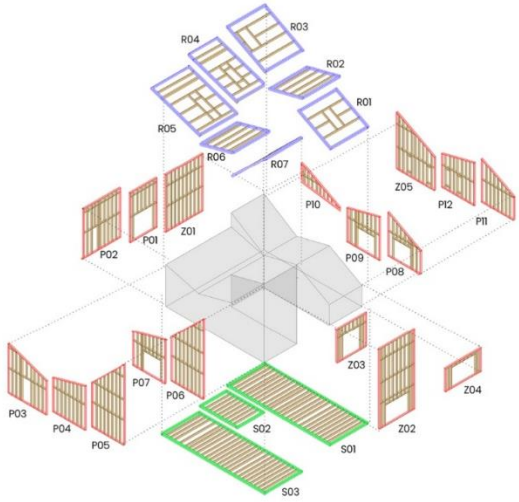


Connecting Roof Panels



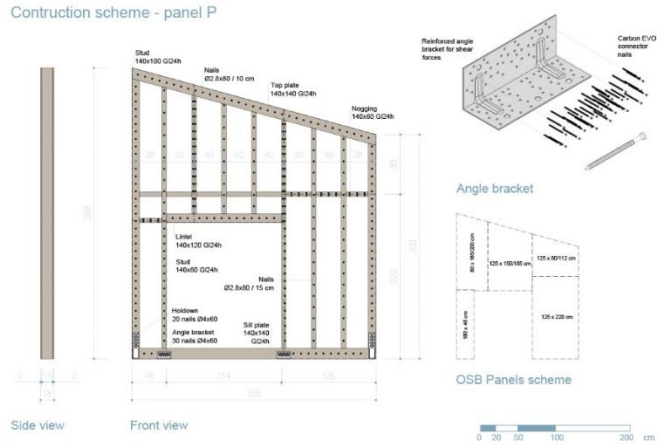
Material Study





Structure | Panelisation

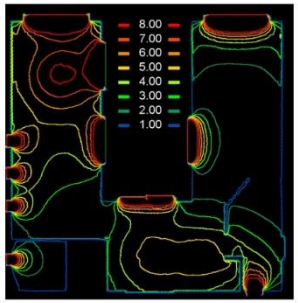
Breakdown of complete building in number of prefabricated timber frame panels as pe the maximum transportable size. Each panel was assigned a unique code and member were distributed as per their dimensions.



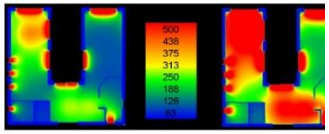
ACTIVE HOUSE

1. Comfort

1.1 Daylight (Visual Comfort)



Daylight Factor



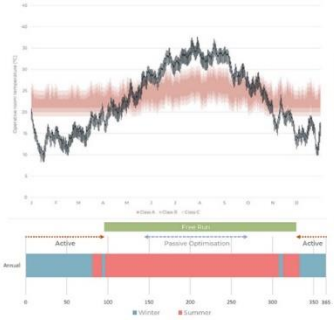
Illuminance Lux

Daylight (Visual Comfort)
Daylight Factor : Simulations performed using VELUX Daylight Visualizer 2

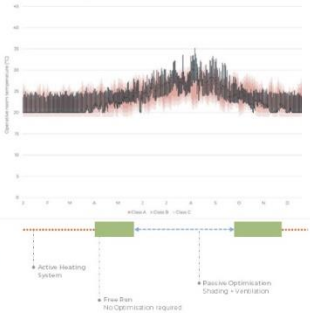
- Total Envelope Area : 335.01 m 2
- Total Area of Glazing : 31.62 m 2
- Opening Percentage : 10.59 %

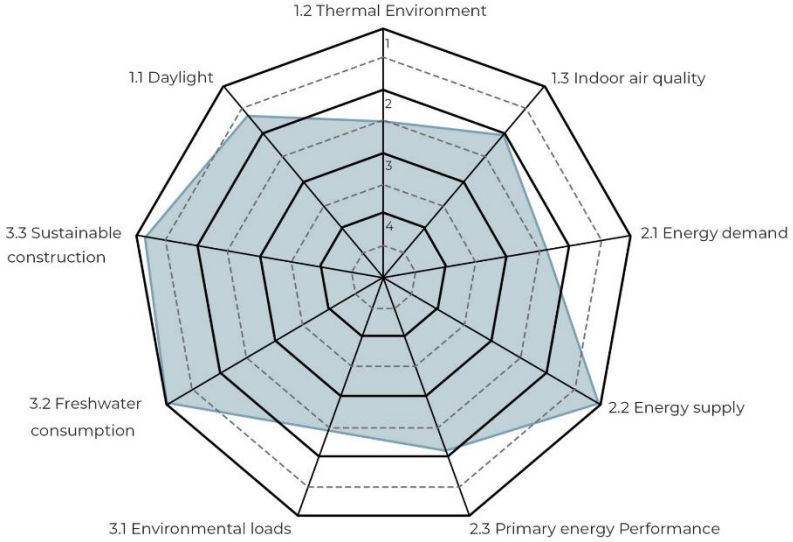
1.2 Thermal Comfort

Base Situation



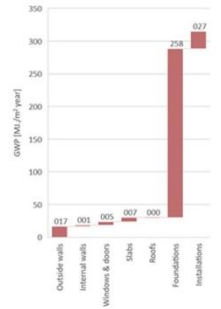
After Optimisation



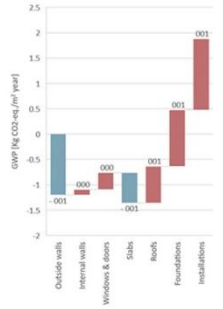


3. Life Cycle Assessment

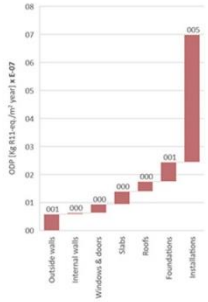
The global warming potential considering only the building itself is negative, thanks to the timber technology. The impact of the pantoons foundation and the installation is the most negative one
Plastic pantoons used in floating system are the main contributors to the use of non renawable primary energy in construction
All the wood products selected are FSC/PEFC certified.
42% in mass of the building is recyclable, with the highest contributor being the foundations
40% of the building is made of wood based materials. If we exclude the foundations this percentage rises to 66%



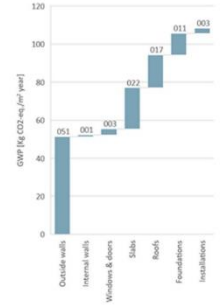
Total use of non renewable primary energy resources



Global Warming Potential

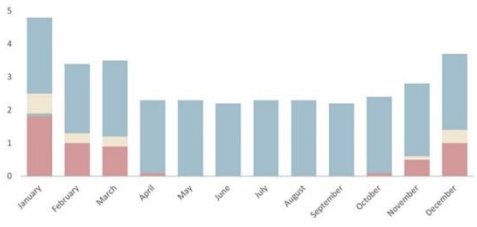


Depletion potential of the stratospheric ozone layer



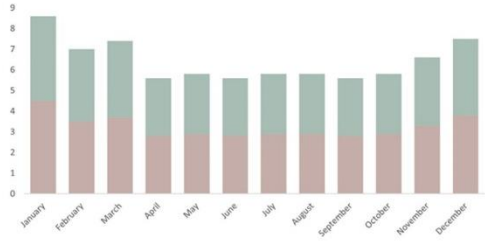
Total use of renewable primary energy resources

2. Energy Study



Monthly Energy Demand

Energy Demand:
Being passively optimized for summers, there is no thermal comfort related energy requirement from May to September. Gradually, the heating system reaches its peak demand for the months in December and January.



Monthly Energy Supply

Energy Supply:
With the integration of a considerable number of PV panels (24m2) oriented towards South, the dependency on external supply is minimised. The panels are sufficient to meet the peak energy energy demand during the heating season as well