



ARCHITECTURE STUDENT CONTEST
20th INTERNATIONAL EDITION, NORD ISÈRE 2025



PIECE BY PIECE

STEP BY STEP | IN THE RHYTHM OF NATURE



TEAM: 4, POLAND

SAINT-GOBAIN STUDENT CONTEST | 2025

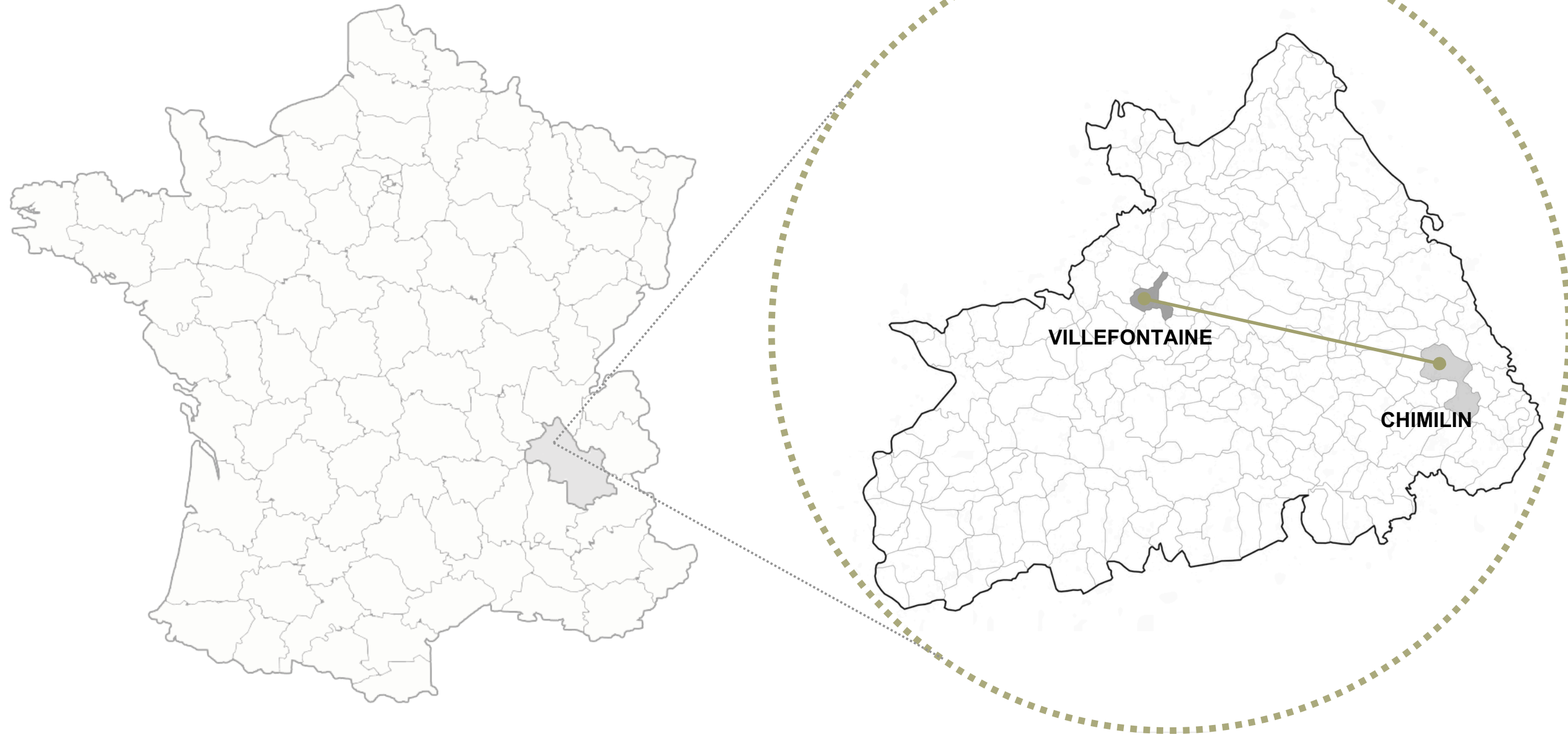
GDANSK UNIVERSITY OF TECHNOLOGY

ALEKSANDRA BOSZKE & NATASZA STĘŻYCKA

LOCATION

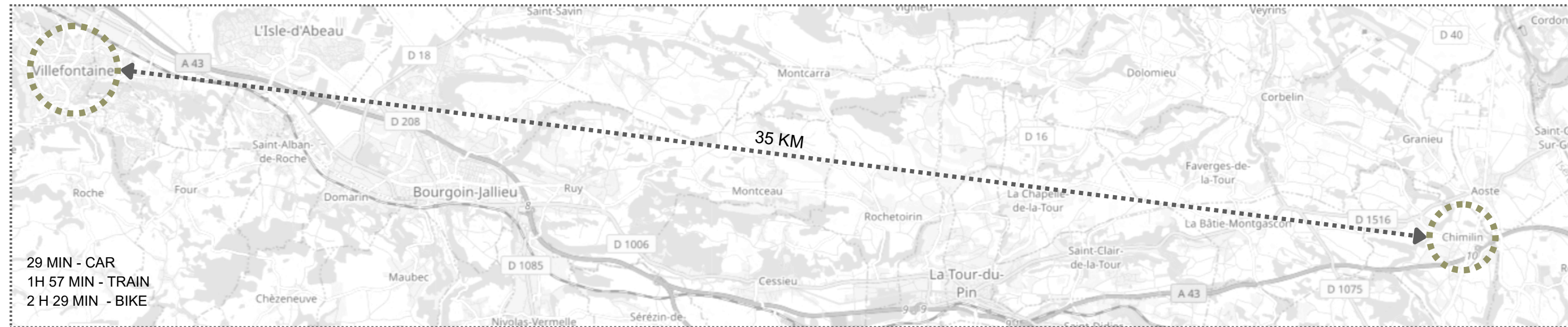
FRANCE: ISÈRE

NORD - ISÈRE

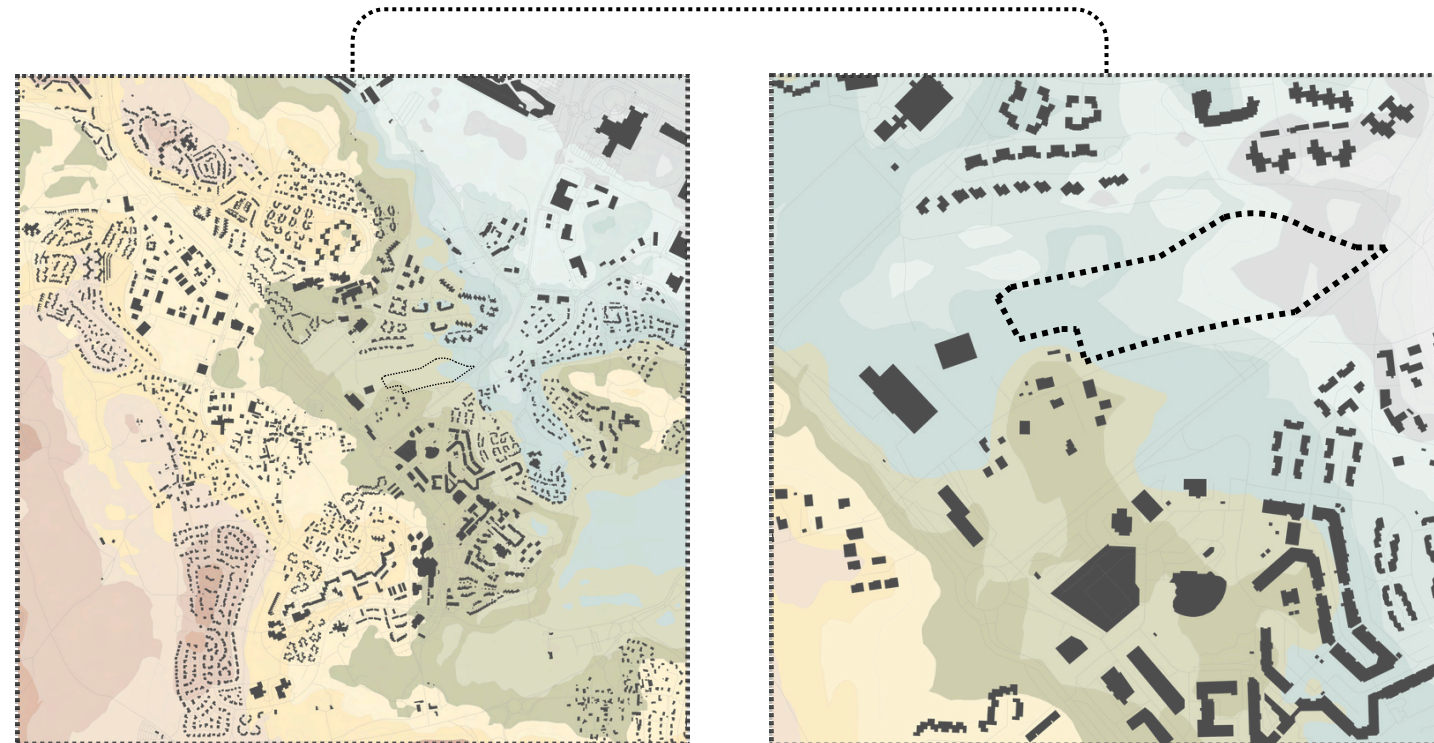


NORD-ISÈRE IS A REGION LOCATED IN THE ISÈRE DEPARTMENT IN EASTERN FRANCE, AT THE INTERSECTION OF ALPINE INFLUENCES AND THE RHÔNE VALLEY. ITS PROXIMITY TO THE METROPOLITAN AREA OF LYON AND THE RAPIDLY DEVELOPING CITY OF GRENOBLE MAKES IT AN IMPORTANT TRANSPORTATION AND ECONOMIC HUB. HISTORICALLY, THE REGION HAS BEEN ASSOCIATED WITH AGRICULTURE, CRAFTSMANSHIP, AND THE TEXTILE INDUSTRY, WHICH HAS INFLUENCED THE CHARACTER OF ITS BUILT ENVIRONMENT. CONTEMPORARY URBAN CHANGES STEM FROM A **GROWING POPULATION** AND THE NEED FOR **SUSTAINABLE DEVELOPMENT**.

TRANSPORT AND TOPOGRAPHY ANALYSIS



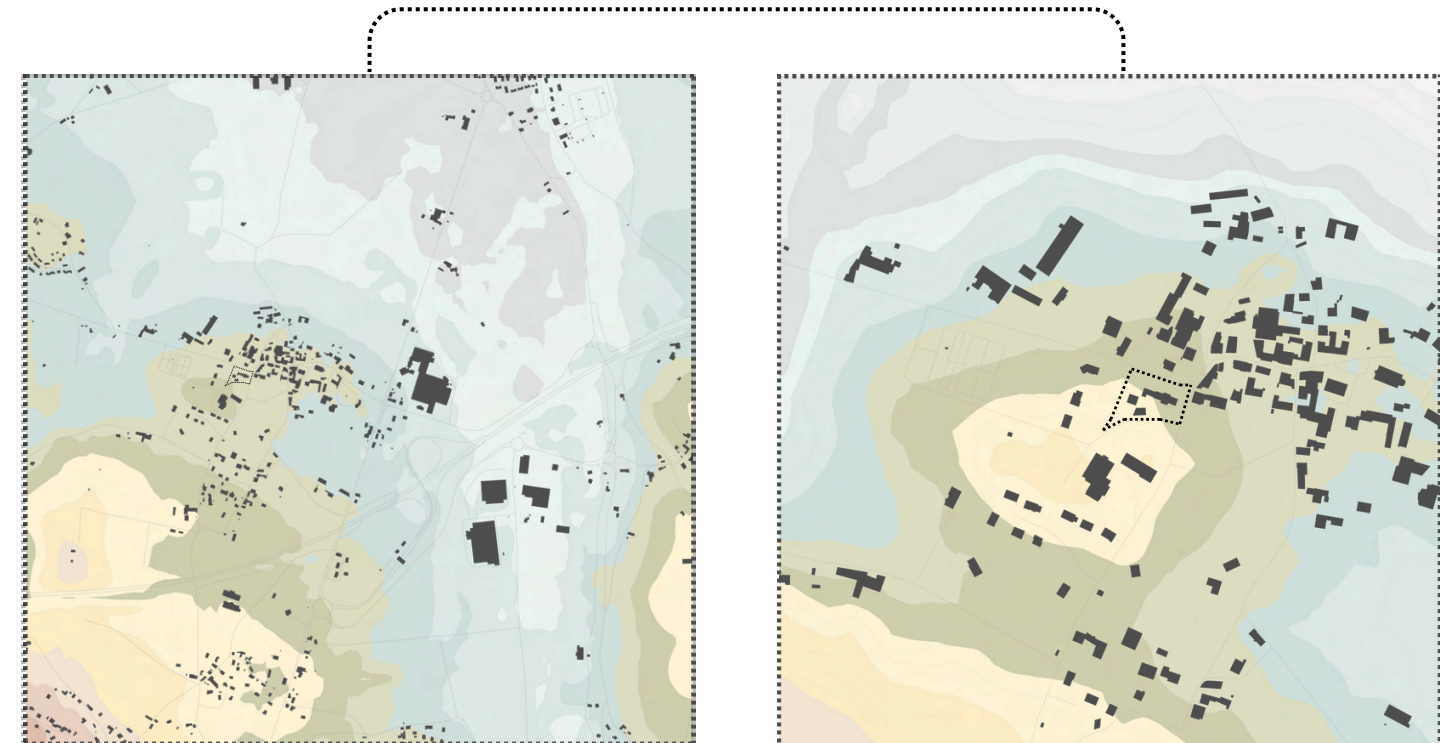
TOPOGRAPHY VILFONTANE



THE TOPOGRAPHY OF THE TERRAIN DIRECTLY INFLUENCES ARCHITECTURAL SOLUTIONS. IT DETERMINES NOT ONLY THE **ORIENTATION** OF BUILDINGS BUT ALSO THE WAY THEY ARE **INTEGRATED INTO THE SURROUNDINGS**, TAKING INTO ACCOUNT OPTIMAL USE OF NATURAL LIGHTING, PROTECTION FROM WIND, AND ENERGY EFFICIENCY.

SAINT-GOBAIN STUDENT CONTEST | 2025

TOPOGRAPHY CHIMILIN



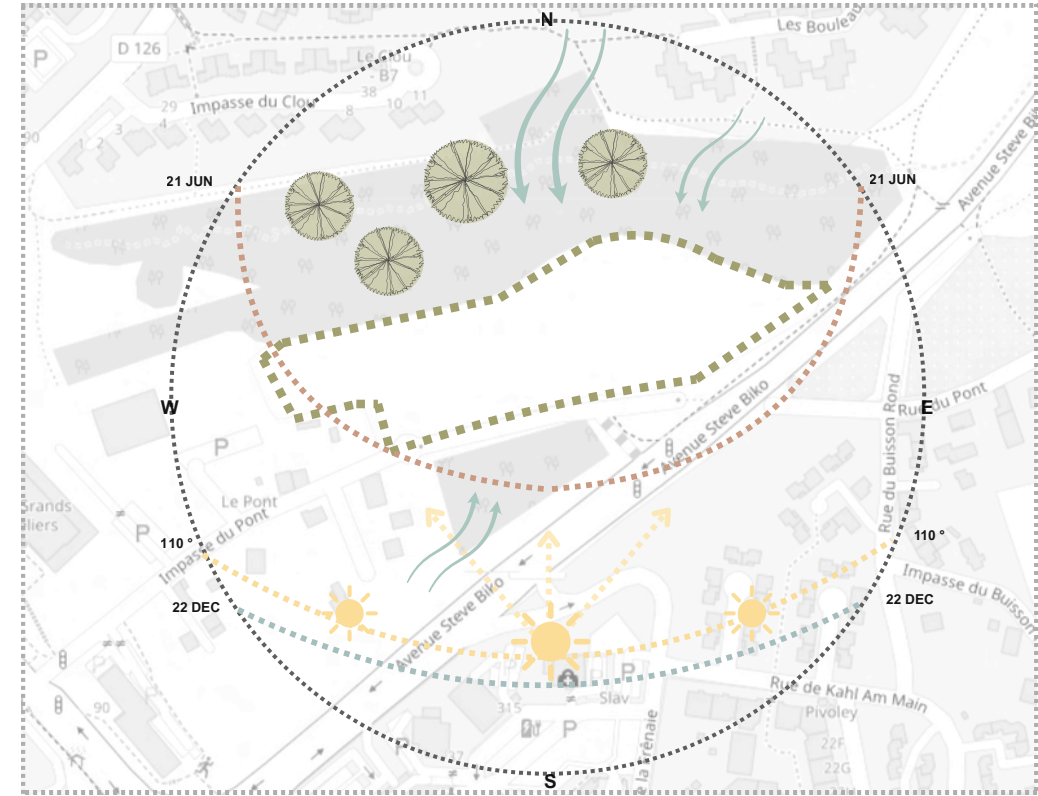
IN NORD-ISÈRE, THE VARIED TOPOGRAPHY, WHICH RISES TOWARD THE SOUTHWEST, INFLUENCES STRATEGIES FOR **WIND PROTECTION** AND **ACCESS TO SUNLIGHT**. ADDITIONALLY, IT DETERMINES SOLUTIONS RELATED TO **WATER MANAGEMENT** AND THE MICROCLIMATE SURROUNDING THE PROJECT.

ALEKSANDRA BOSZKE & NATASZA STĘŻYCKA

MICROCLIMATE OF THE SITE

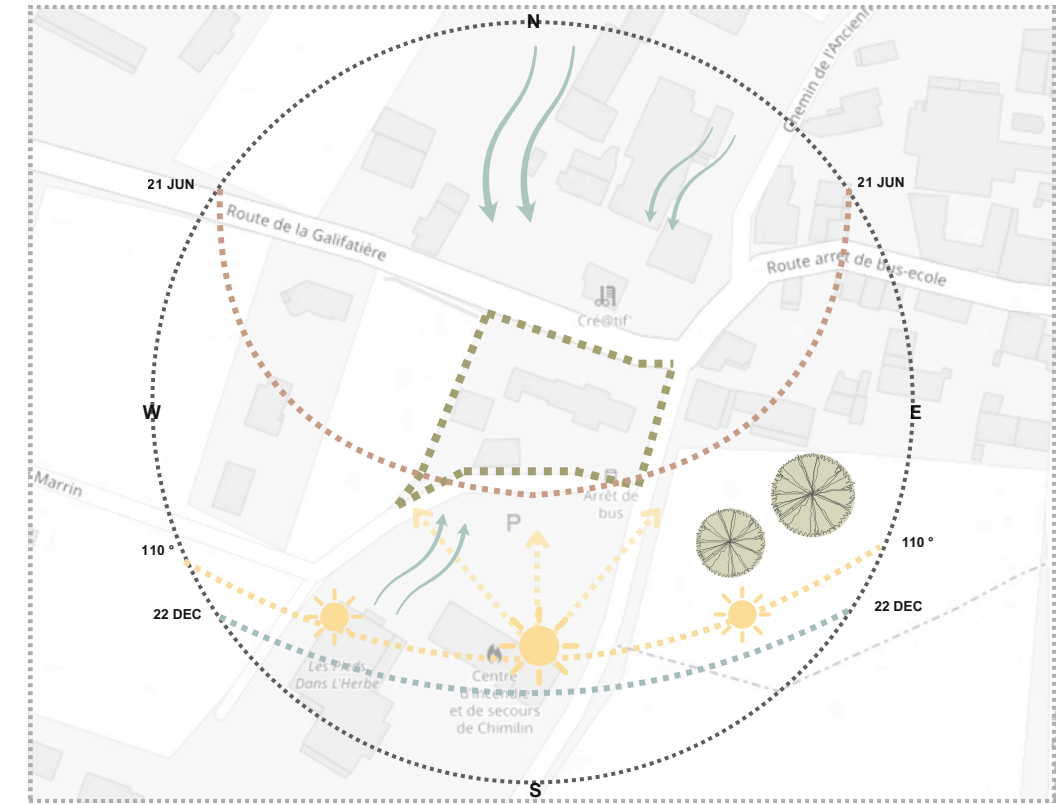
VILLEFONTAINE

ANALYSIS OF SUN AND WIND DIRECTIONS

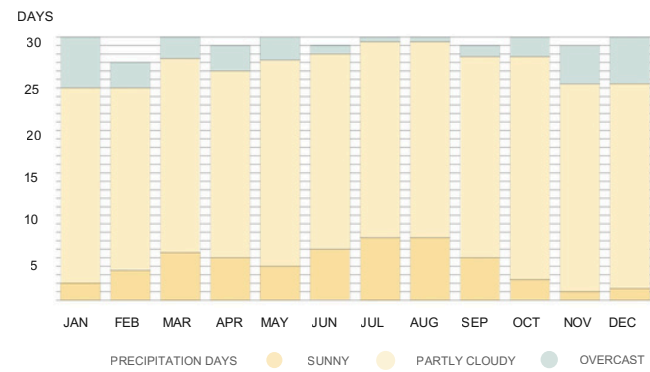


CHIMILIN

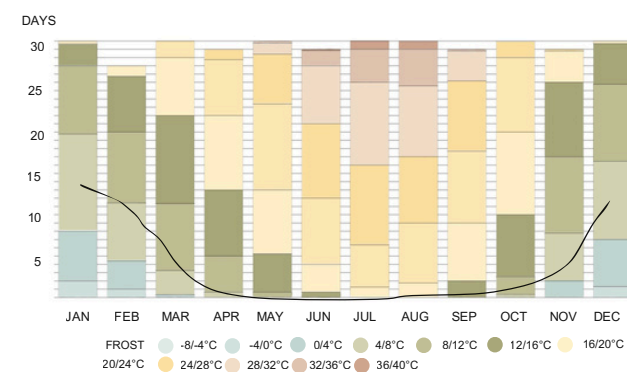
ANALYSIS OF SUN AND WIND DIRECTIONS



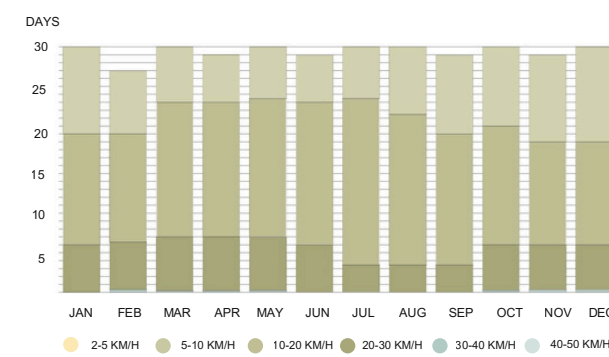
CLOUDY/SUNNY/RAINFALL DAYS



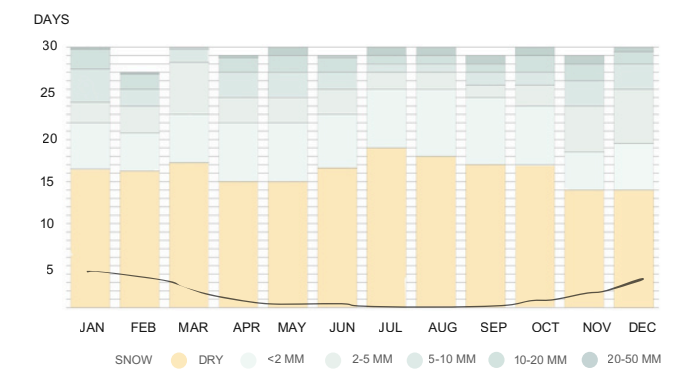
MAXIMUM TEMPERATURES



WIND SPEED



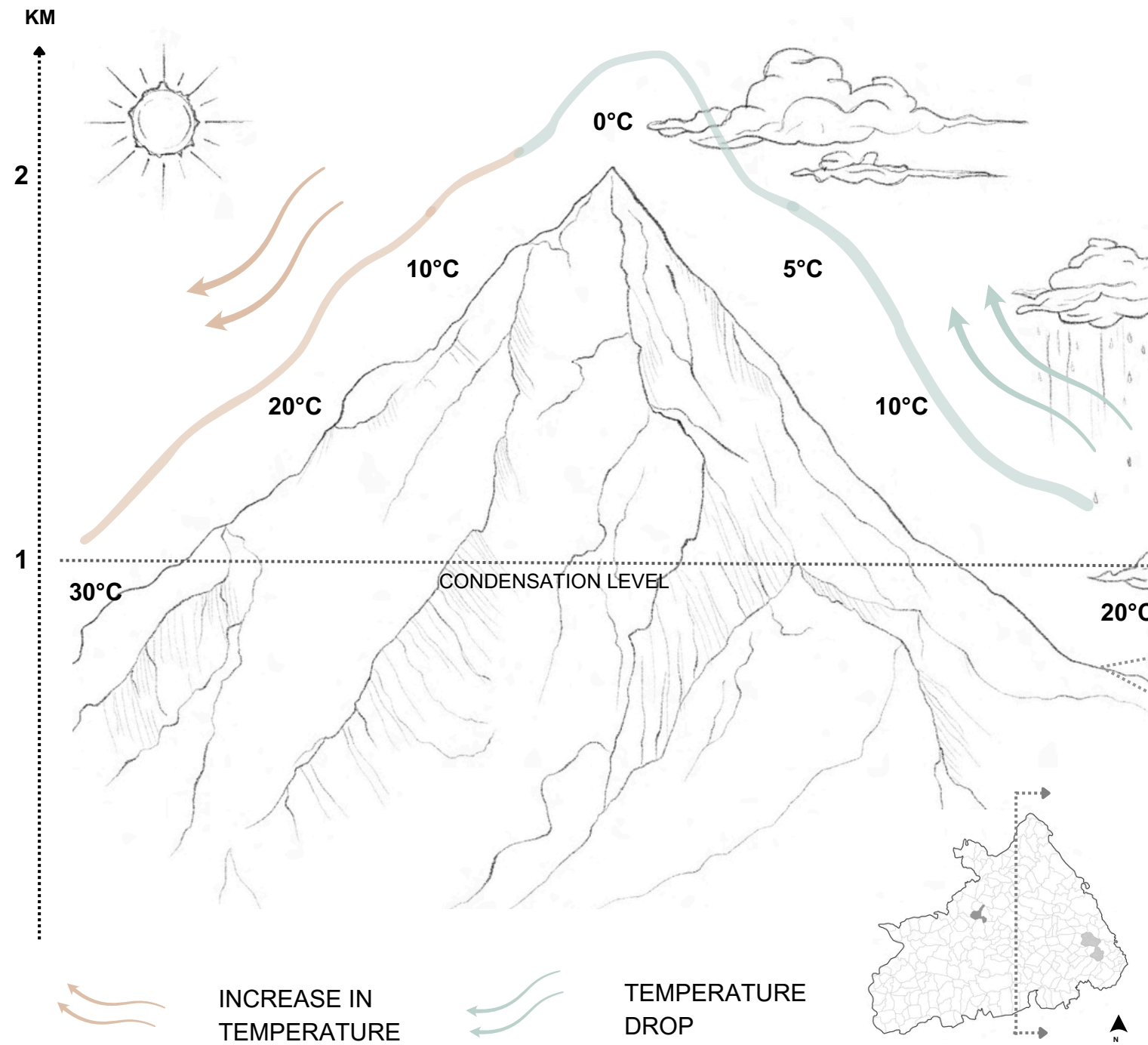
AMOUNT OF PRECIPITATION



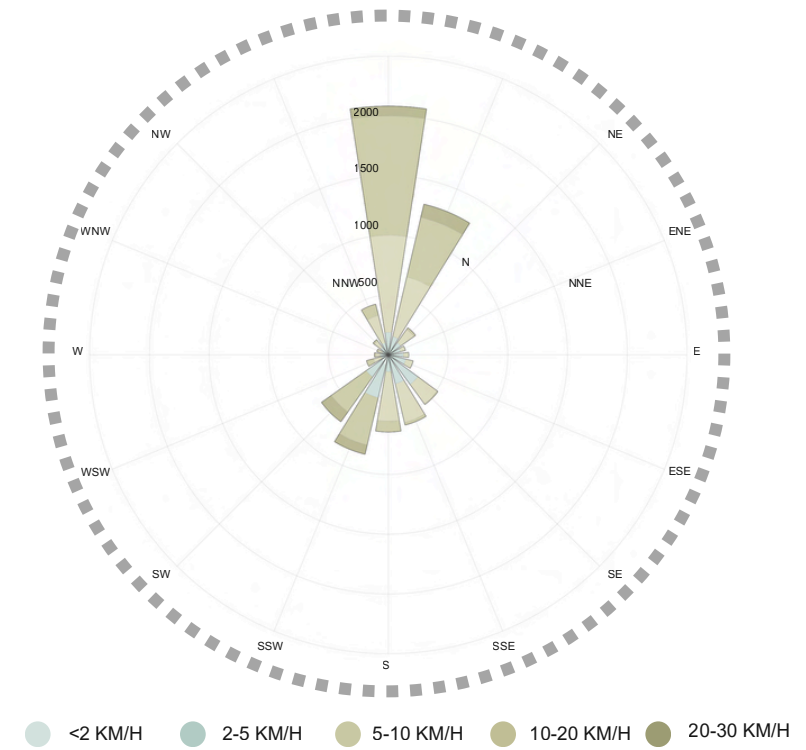
MICROCLIMATE ANALYSIS HIGHLIGHTS THE NECESSITY OF ACCOUNTING FOR WIND DIRECTIONS TO ENSURE **NATURAL VENTILATION** OF BUILDINGS. THE SUN'S TRAJECTORY SUGGESTS AN OPTIMAL ORIENTATION WITH **MAIN GLAZED SURFACES FACING SOUTH**, TO MAXIMIZE SOLAR HEAT GAINS IN WINTER AND IMPLEMENT SUNSHADING SYSTEMS IN SUMMER. THE VARYING NUMBER OF CLOUDY AND SUNNY DAYS, ALONG WITH A BROAD TEMPERATURE RANGE, CALLS FOR ENERGY-EFFICIENT SOLUTIONS SUCH AS THERMAL INSULATION AND **PASSIVE HEATING SYSTEMS**. PRECIPITATION LEVELS INDICATE THE NEED TO DESIGN EFFECTIVE **RAINWATER RETENTION SYSTEMS** AND **GREEN ROOFS**, IN ORDER TO REDUCE THE RISK OF FLOODING AND ENHANCE THE LOCAL MICROCLIMATE.

WIND ANALYSIS

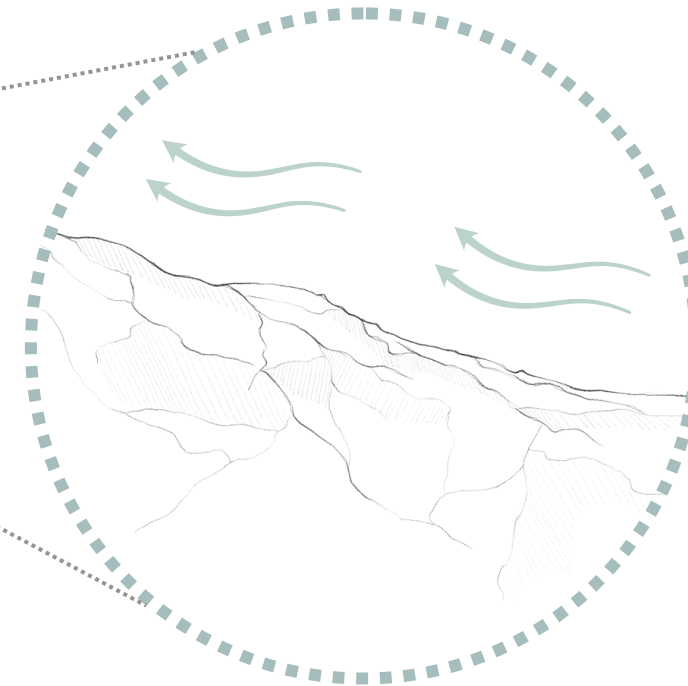
LOCAL WINDS - FÖHN WIND



WIND ROSE



NORD-ISÈRE CROSS-SECTION



OCCURRING IN THE AREA THE FÖHN WIND IS A WARM, DRY AND STRONG MOUNTAIN WIND THAT CAUSES RAPID WARMING AND DRYING OF THE AIR. IT IS CREATED WHEN MOIST AIR RISES ON ONE SIDE OF THE MOUNTAINS, LOSES MOISTURE AND THEN DESCENDS WARMER AND DRIER. THIS CAN LEAD TO RAPID SNOW MELT AND WIND GUSTS OF UP TO 150 KM/H. BUILDING DESIGN SHOULD CONSIDER **A SOLID STRUCTURE, GOOD INSULATION AND MATERIALS THAT PREVENT EXCESSIVE DRYING.**

URBAN AND ENVIRONMENTAL ANALYSIS

VILLEFONTAINE



URBAN FABRIC



NATURE

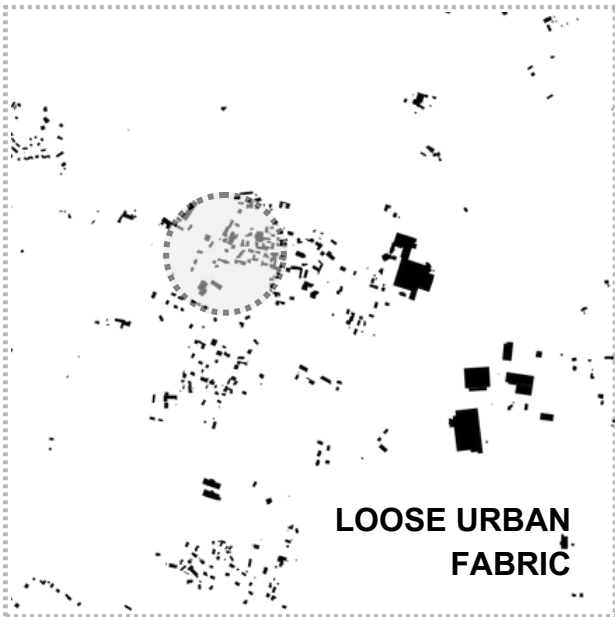


TRANSPORT

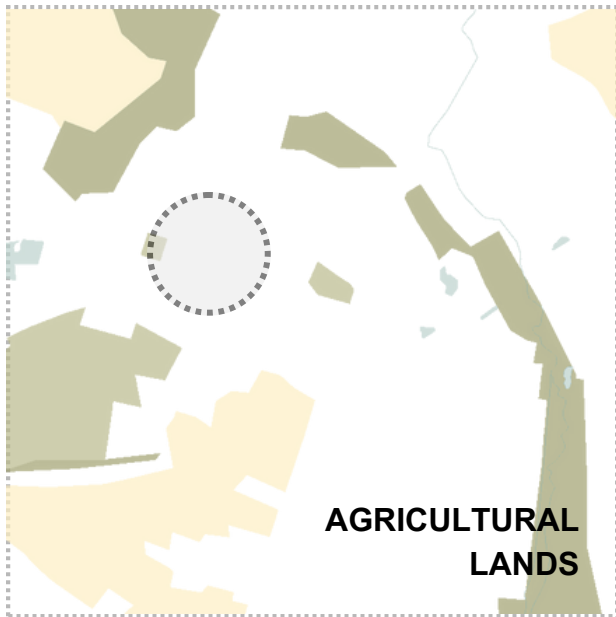


CONSOLIDATION

CHIMILIN



URBAN FABRIC



NATURE



TRANSPORT



CONSOLIDATION

VILLEFONTAINE IS A TOWN WITH A VARIED URBAN STRUCTURE, WITH MODERN HOUSING ESTATES AND A DEVELOPED CULTURAL INFRASTRUCTURE, SURROUNDED BY NUMEROUS GREEN AREAS SUCH AS THE SAINT-BONNET POND NATURE RESERVE. CHIMILIN, WITH ITS RURAL CHARACTER, IS CHARACTERISED BY SCATTERED SINGLE-FAMILY HOUSING, A PREDOMINANCE OF AGRICULTURAL LAND AND LARGE DIFFERENCES IN ELEVATION. VILLEFONTAINE REQUIRES A **BALANCE BETWEEN URBAN DEVELOPMENT AND NATURE CONSERVATION**, WHILE IN CHIMILIN, IT IS CRUCIAL TO **ADAPT DEVELOPMENTS TO THE LANDSCAPE AND AGRICULTURAL CHARACTER OF THE AREA**.

THE PRESENCE OF REGIONAL FAUNA AND FLORA

FAUNA AND FLORA OF PLAINS AND VALLEYS (BELOW 1,000 A.M.S.L.)



COMMON BEECH
(*FAGUS SYLVATICA*)

EUROPEAN ROE DEER
(*CAPREOLUS CAPREOLUS*)

PEDUNCULATE OAK
(*QUERCUS ROBUR*)

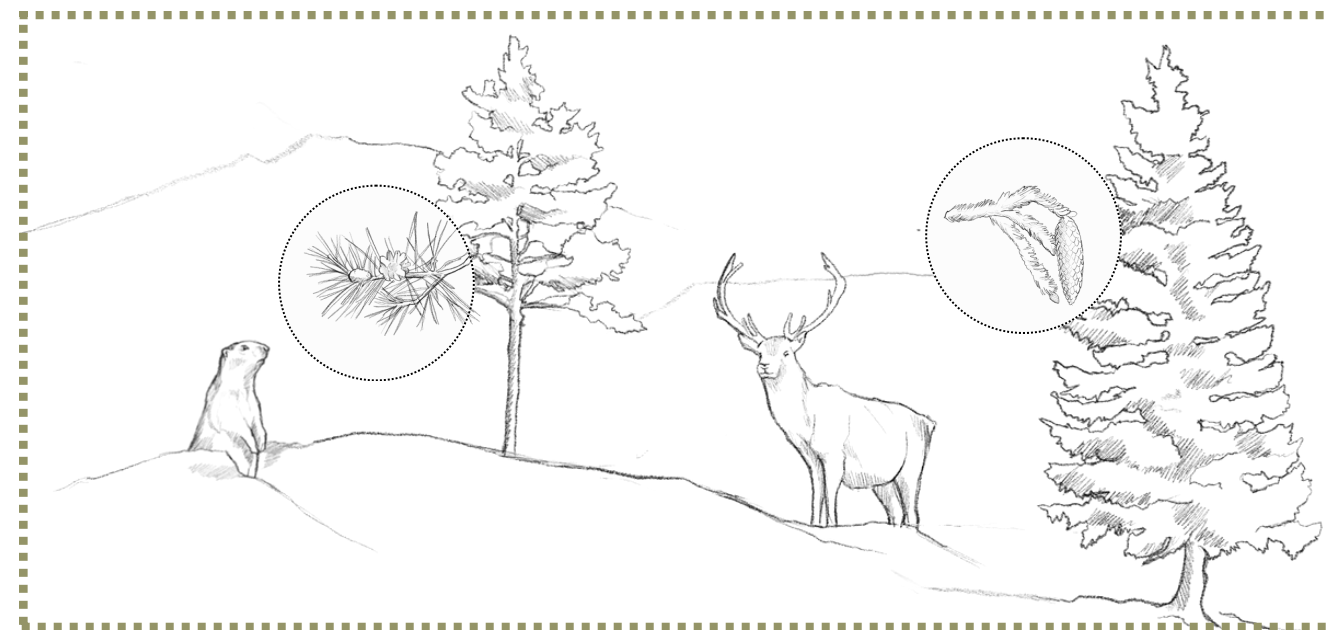
WILD BOAR
(*SUS SCROFA*)

WHITE STORK
(*CICONIA CICONIA*)

GREY HERON
(*ARDEA CINEREA*)

COMMON HORNBEAM
(*CARPINUS BETULUS*)

MID-MOUNTAIN FAUNA AND FLORA (1000-2000 A.M.S.L.)



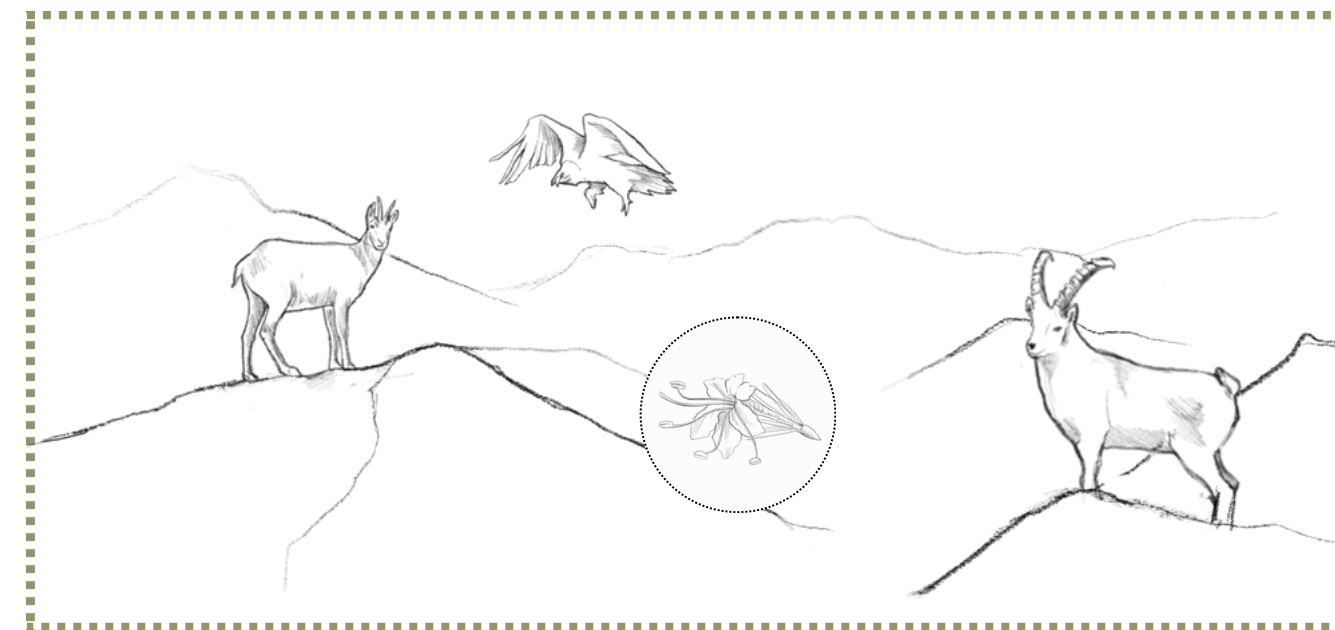
ALPINE MARMOT
(*MARMOTA MARMOTA*)

SCOTS PINE
(*PINUS SYLVESTRIS*)

RED DEER
(*CERVUS ELAPHUS*)

COMMON SPRUCE
(*PICEA ABIES*)

HIGH MOUNTAIN FAUNA AND FLORA (ABOVE 2,000 A.M.S.L.)



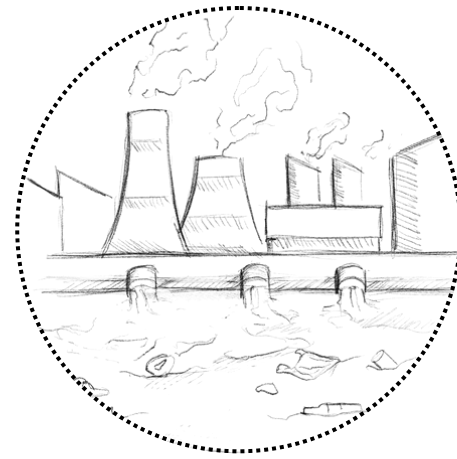
ALPINE CHAMOIS
(*RUPICAPRA RUPICAPRA*)

BEARDED VULTURE
(*GYPAETUS BARBATUS*)

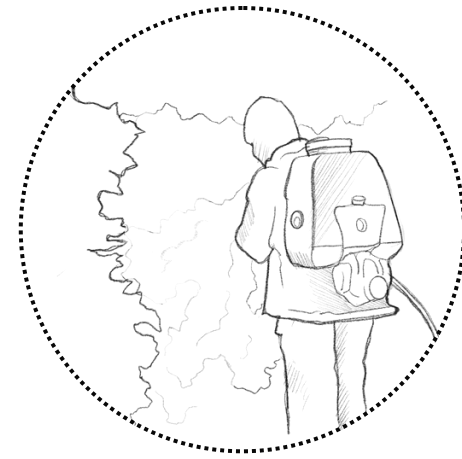
ALPINE STICKLEBACK
(*SILENE ACAULIS*)

ALPINE CAPRICORN
(*CAPRA IBEX*)

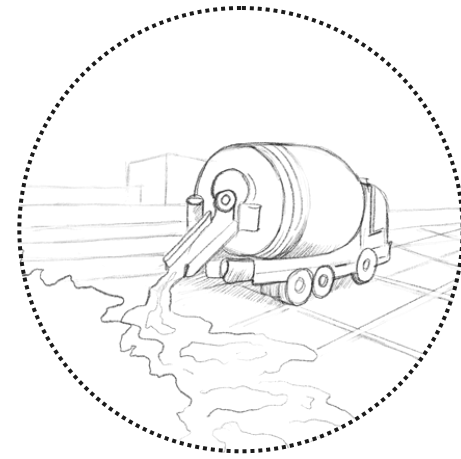
ENDANGERED REGIONAL ANIMALS - WHY?



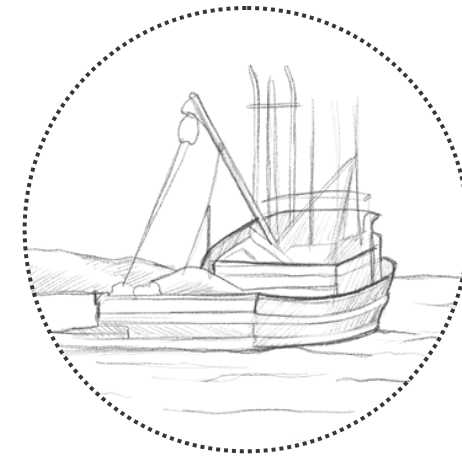
WATER POLLUTION



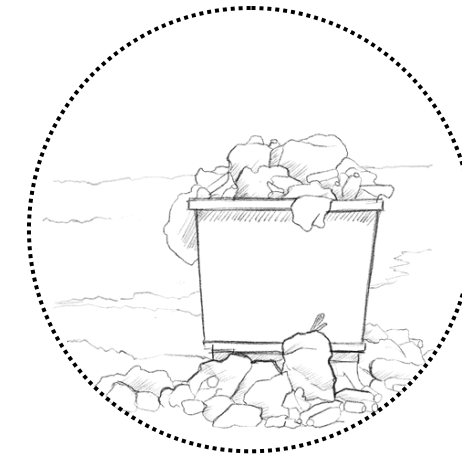
PESTICIDE USE



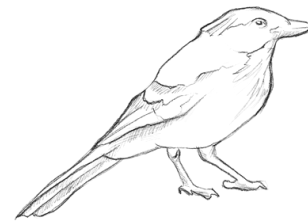
HABITAT LOSS



EXCESSIVE FISHING



TOURISM



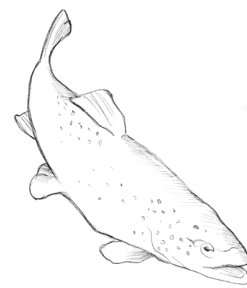
BLACK-HEADED JAY
(GARRULUS GLANDARIUS)



NANTUCKET PRAYING MANTIS
(PHENGARIS NAUSITHOUS)



ALPINE MARMOT
(MARMOTA MARMOTA)



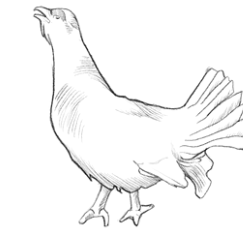
BROOK TROUT
(SALMO TRUTTA)



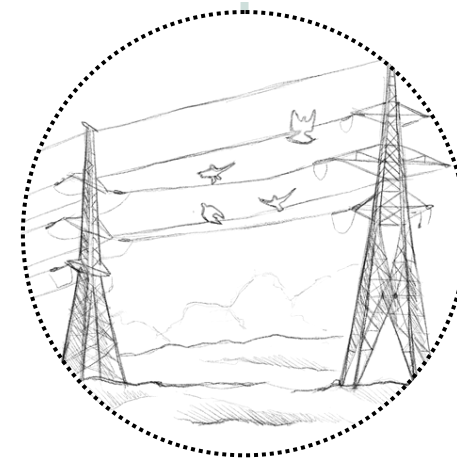
BEARDED VULTURE
(GYPAETUS BARBATUS)



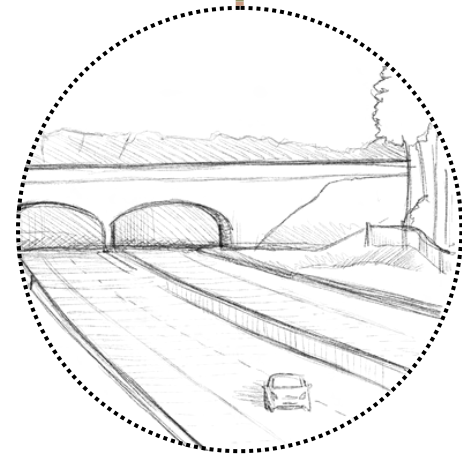
HONEY BEE
(APIS MELLEA)



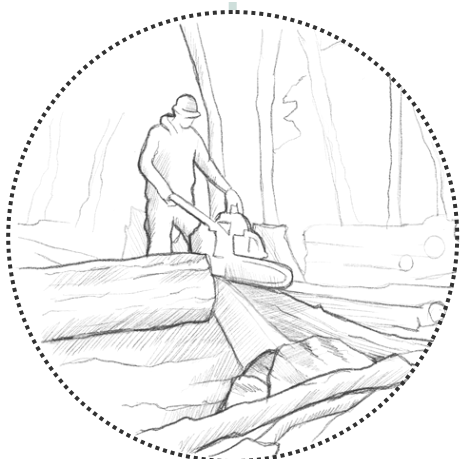
BLACK GROUSE
(TETRAO TETRIX)



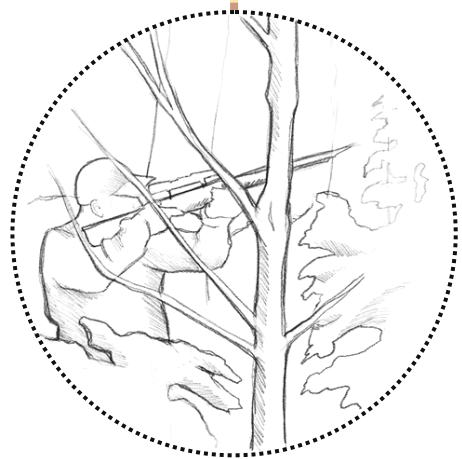
INFRASTRUCTURE BARRIER



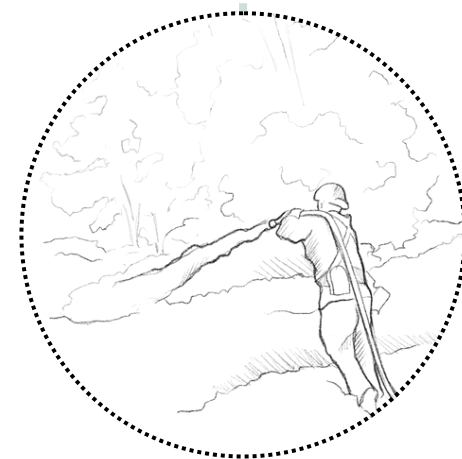
HABITAT FRAGMENTATION



TREE FELLING

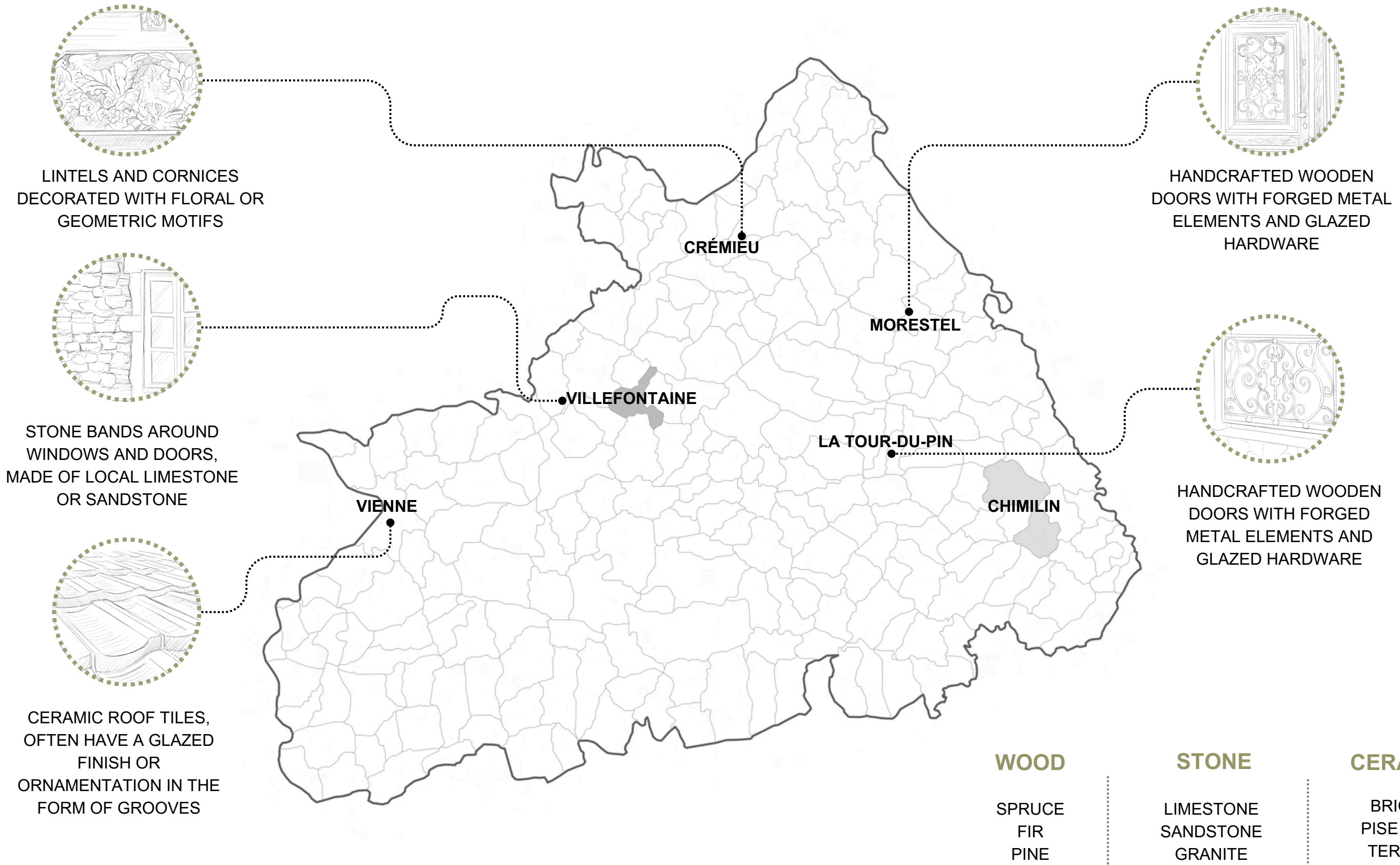


POACHING



RISING TEMPERATURE

LOCALLY SOURCED MATERIALS, PATTERNS AND TEXTURES



COMPARISON OF REGIONAL MATERIALS

TRADITIONAL SOLUTIONS

CONCEPTION - MODERN SOLUTIONS



WOODEN CONTRUCTION



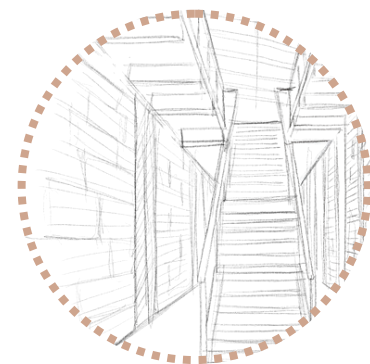
PISE DE TERRE



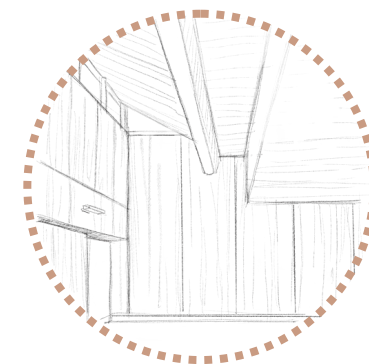
WOODEN FRAMEWORK

MATERIALS

USE OF TRADITIONAL LOCAL MATERIALS IN THE DESIGN - WOOD, STONE AND PISE DE TERRE



PISE DE TERRE



CLT CONTRUCTION



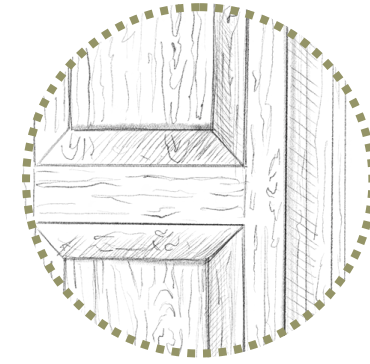
WOODEN CONSTRUCTION

PATTERNS

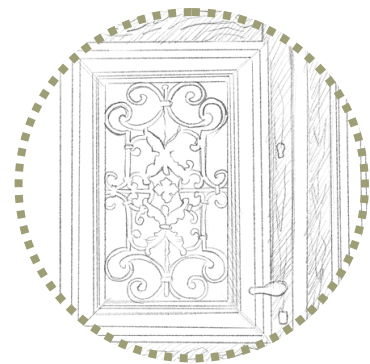
INSPIRATION BUT SIMPLIFICATION OF TRADITIONAL PATTERNS IN THE PROJECT



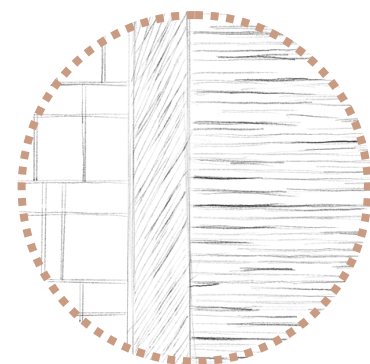
DECORATED LINTELS AND CORNICES



WOODEN FRAMEWORK



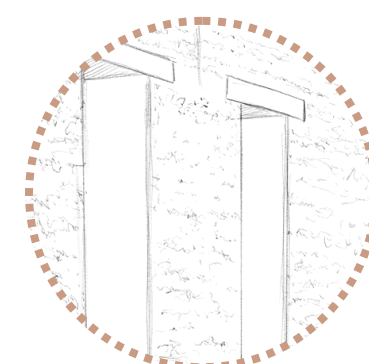
WOODEN DOORS WITH FORGED METAL ELEMENTS



SIMPLE STONE PLATES



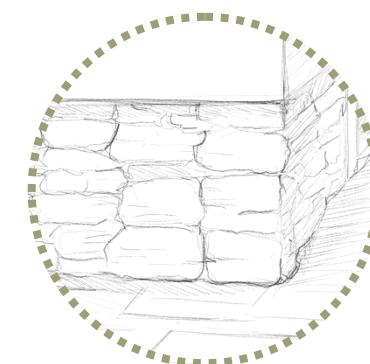
VERTICAL WOODEN PANELS



RAW CERAMIC ELEVATIONS

TEXTURES

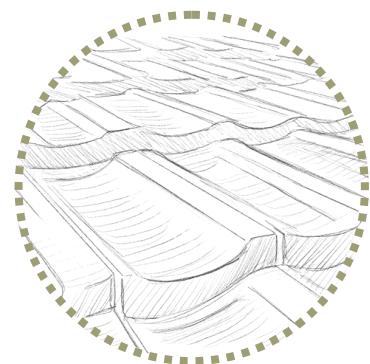
A MODERN, RENEWED VERSION OF THE USE OF STONE, WOOD AND CERAMIC TILES IN DESIGN



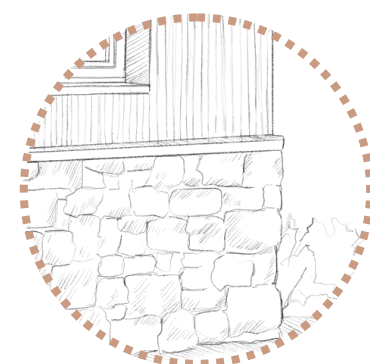
STONE PLINTH



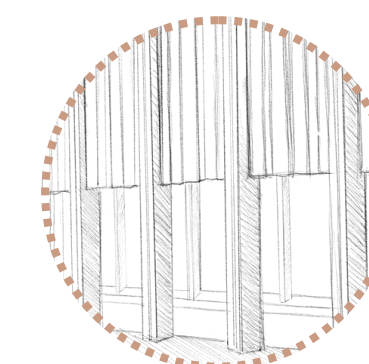
STONE ELEVATIONS



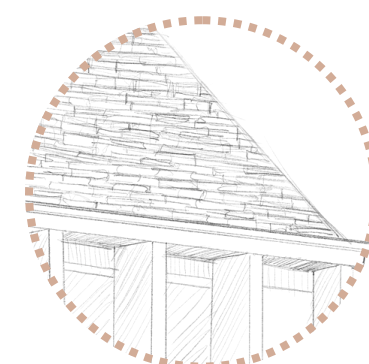
CERAMIC ROOF TILE



STONE PLINTH



WOODEN ELEVATIONS



CERAMIC ROOF TILE

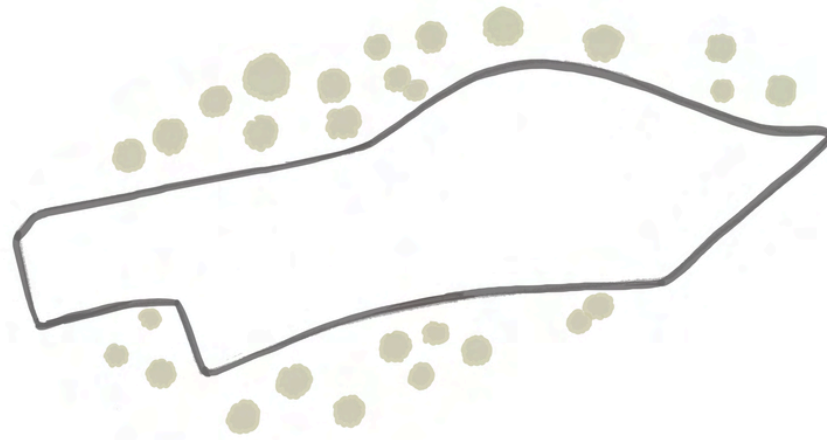
PROJECT CONCEPT

2.1 VILLEFONTAINE

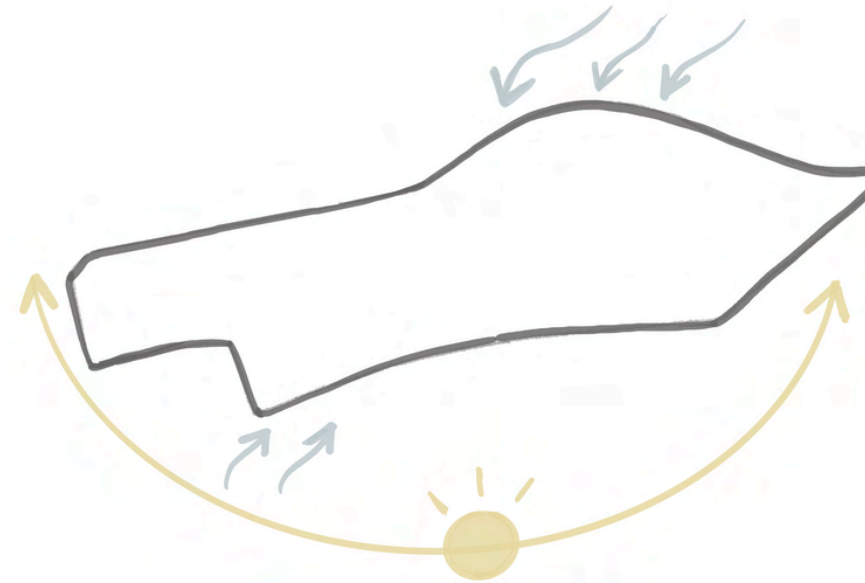
2.2 CHIMILIN



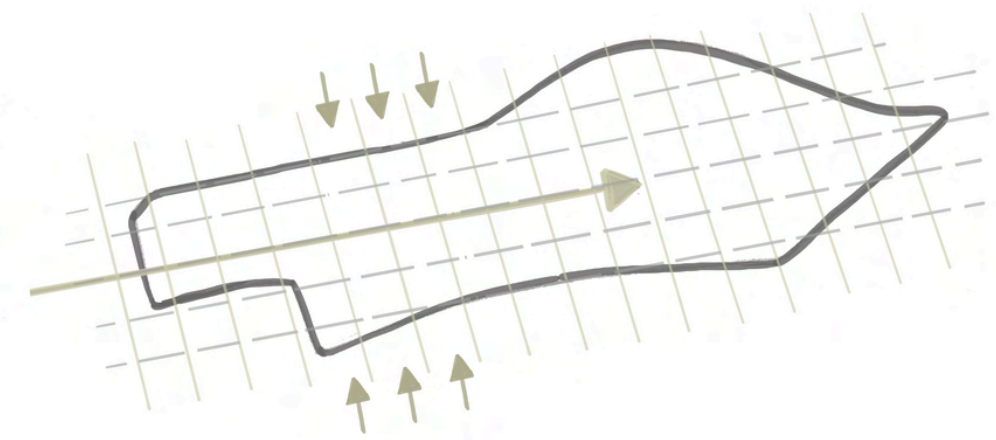




HIGH GREENERY SURROUNDING THE PROJECT SITE



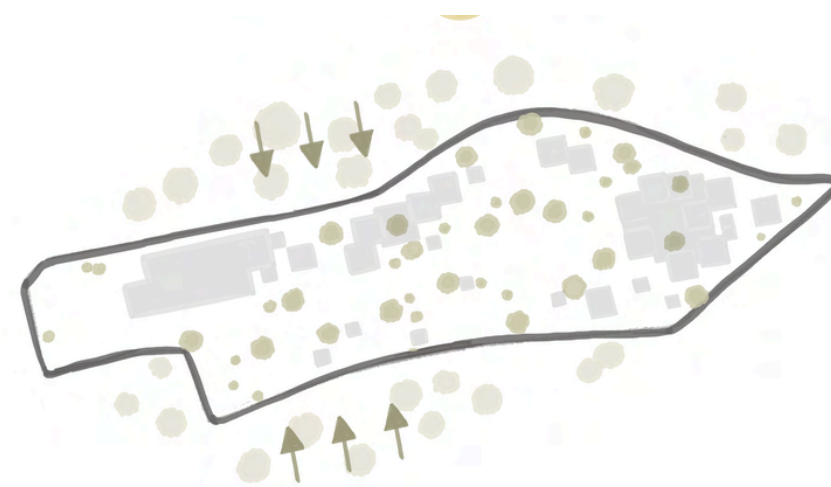
DIRECTION OF SUNLIGHT AND VENTILATION



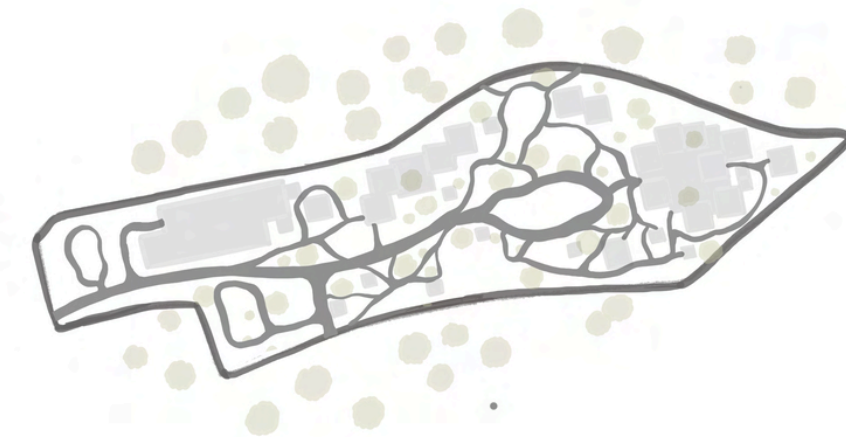
CONSIDERATION OF THE MAIN COMPOSITIONAL AXES



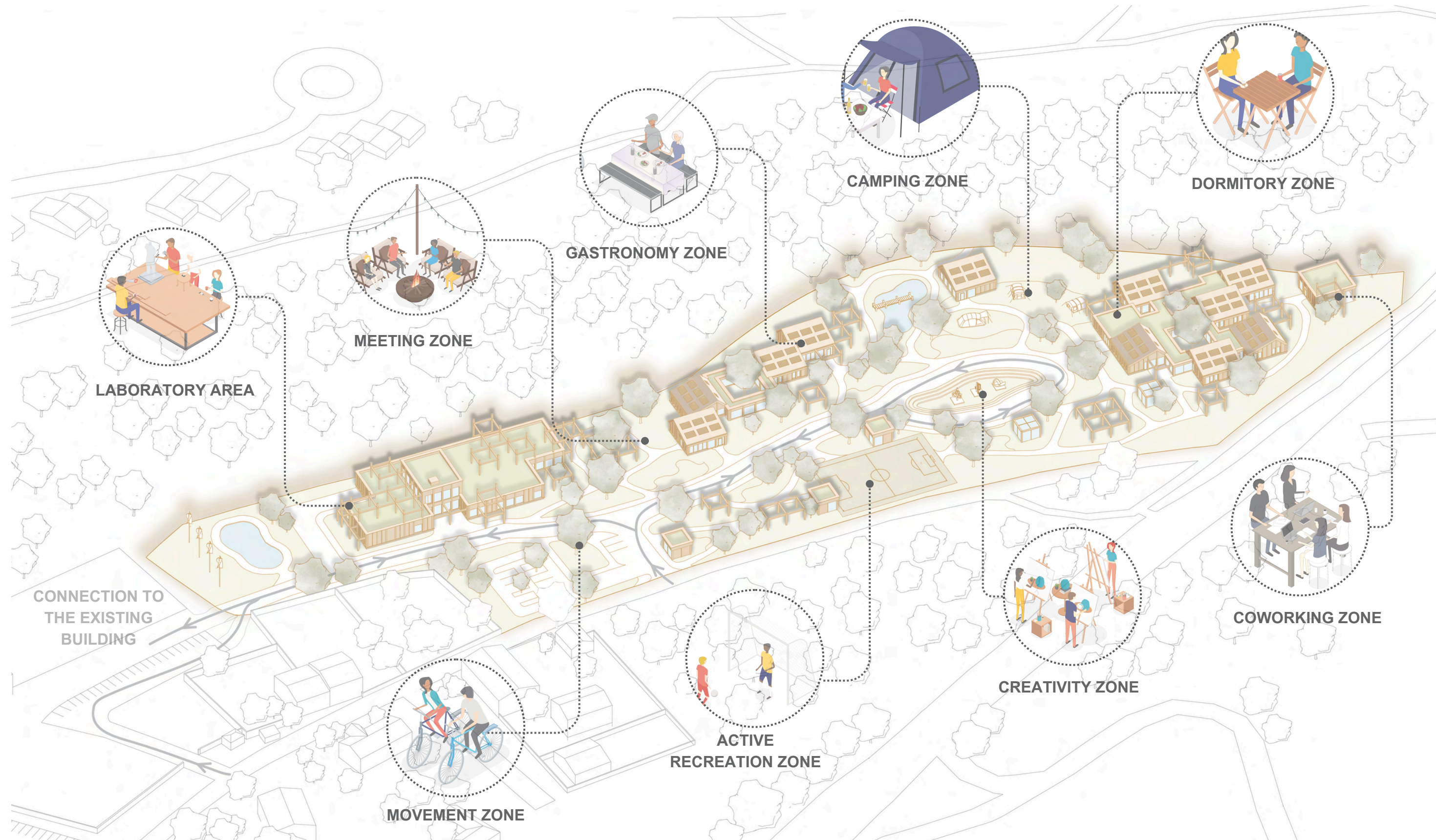
COMPOSITION OF MODULES ON AN ORTHOGONAL GRID



INTRODUCING GREENERY INTO THE SITE



ORGANIC GRID OF PATHS AND WALKWAYS





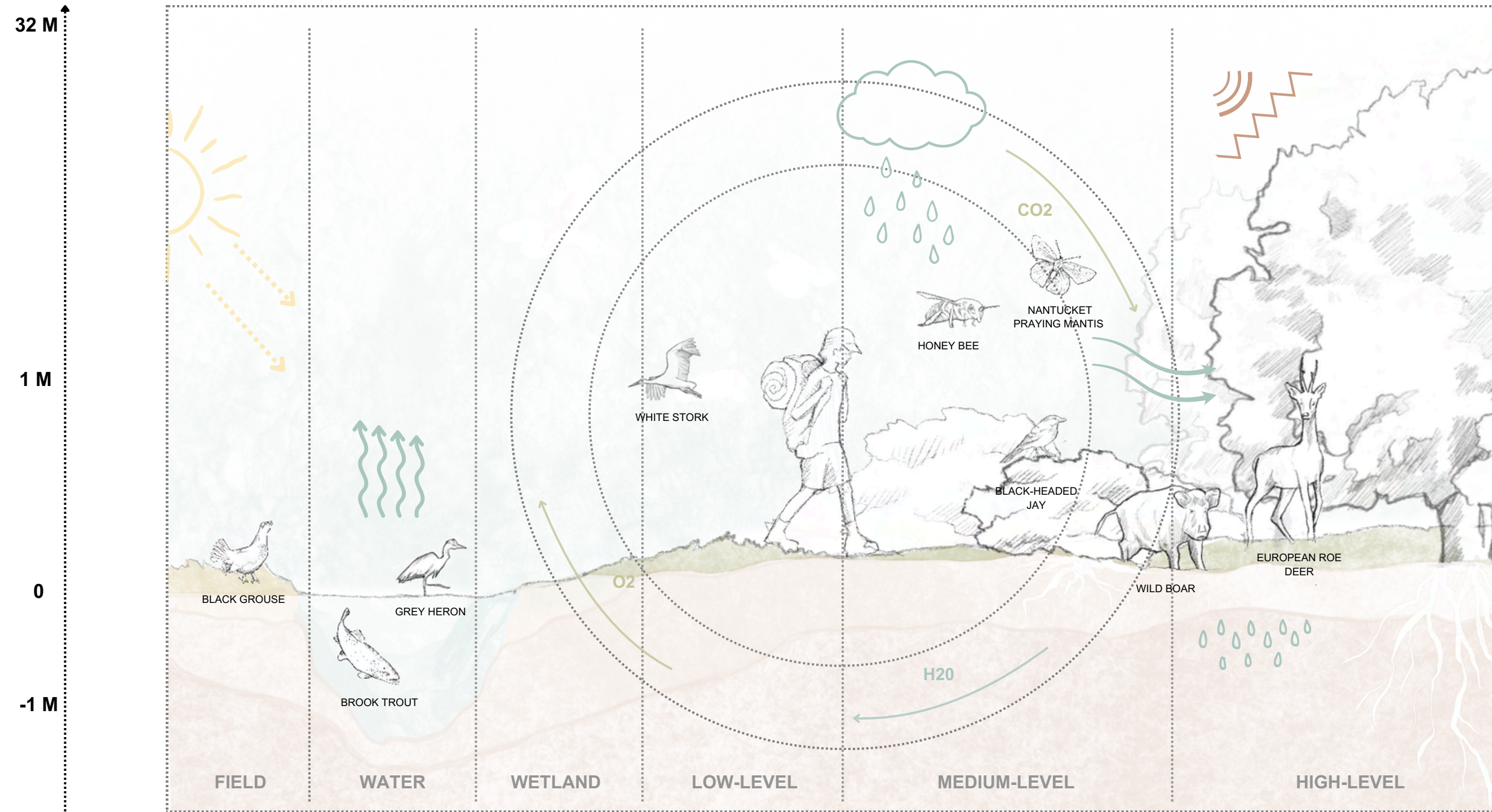
- 1. BOILER
- 2. LABOLATORY
- 3. QUIET ZONE
- 4. CONFERENCE ROOM
- 5. MULTIFUNCTIONAL ROOM

- 6. LIBRARY
- 7. CAFÉ
- 8. DINING ROOM
- 9. CAMPING AREA
- 10. PROTOTYPE VILLAGE

- 11. ACADEMIC VILLAGE
- 12. COWORKING AREA
- 13. CHILL-OUT ZONE
- 14. SPORTS FIELD
- 15. ADMINISTRATION & SECURITY

- 16. BICYCLE STAND
- 17. PARKING
- 18. MAIN ENTRY
- 19. TECHNICAL FACILITIES
- 20. TECHNICAL ENTRANCE

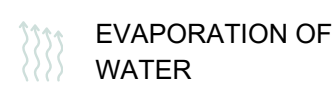




LOW BIODIVERSITY
MEDIUM/HIGH CO2
EMMISSIONS



NATURAL
ACOUSTIC
BUFFOR



EVAPORATION OF
WATER



PRECIPITATION

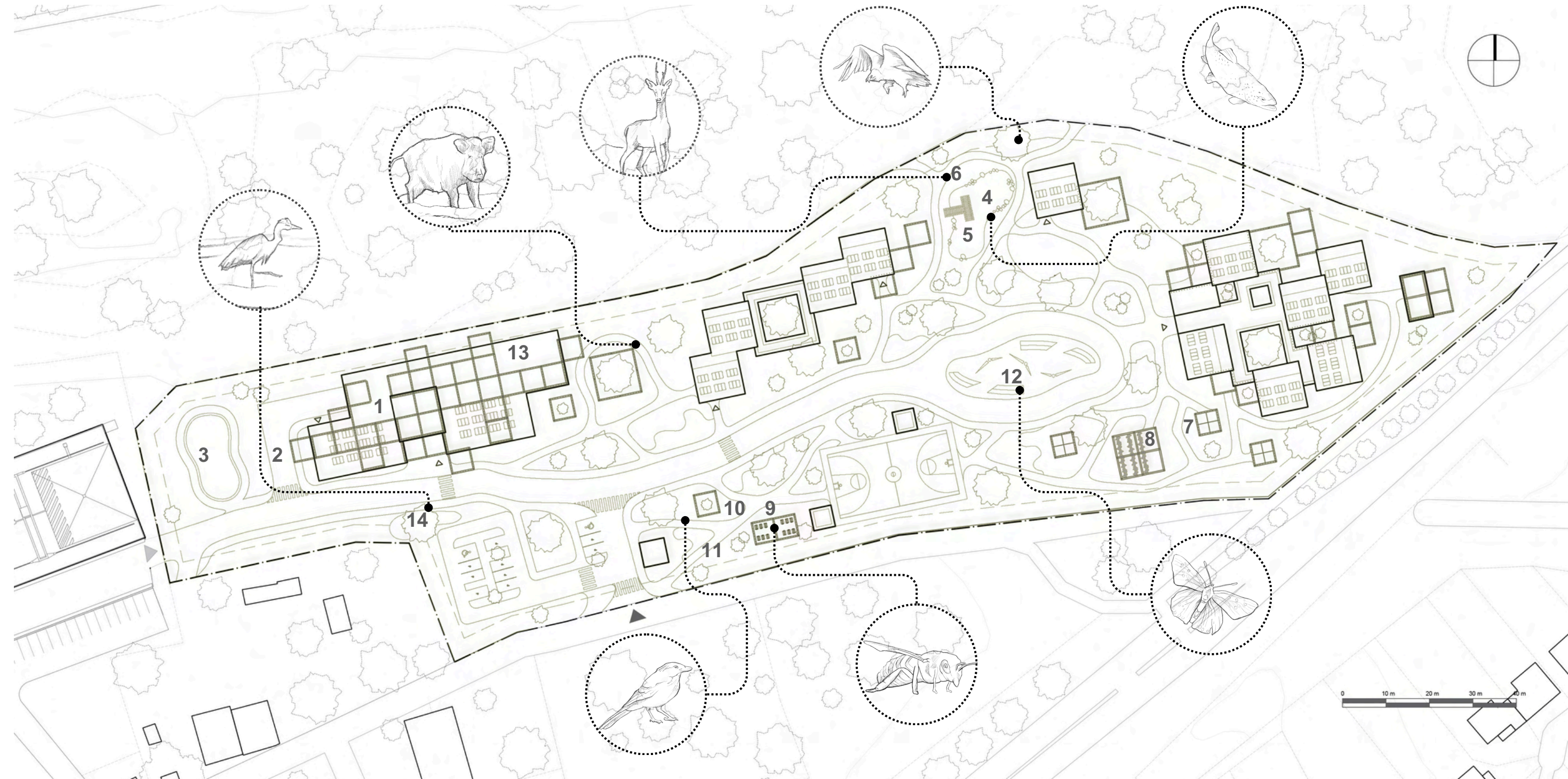


WATER
RETENTION IN
THE SOILE



WIND ISOLATION

HIGH BIODIVERSITY
LOW/NEGATIVE CO2
EMMISSIONS



RENEWABLE ENERGY

- 1. SOLAR PANEL SYSTEM
- 2. RAINWATER RETENTION
- 3. WIND TURBINES

BIODIVERSITY

- 4. POND
- 5. ANIMAL OBSERVATORY
- 6. WILDLIFE FEEDER

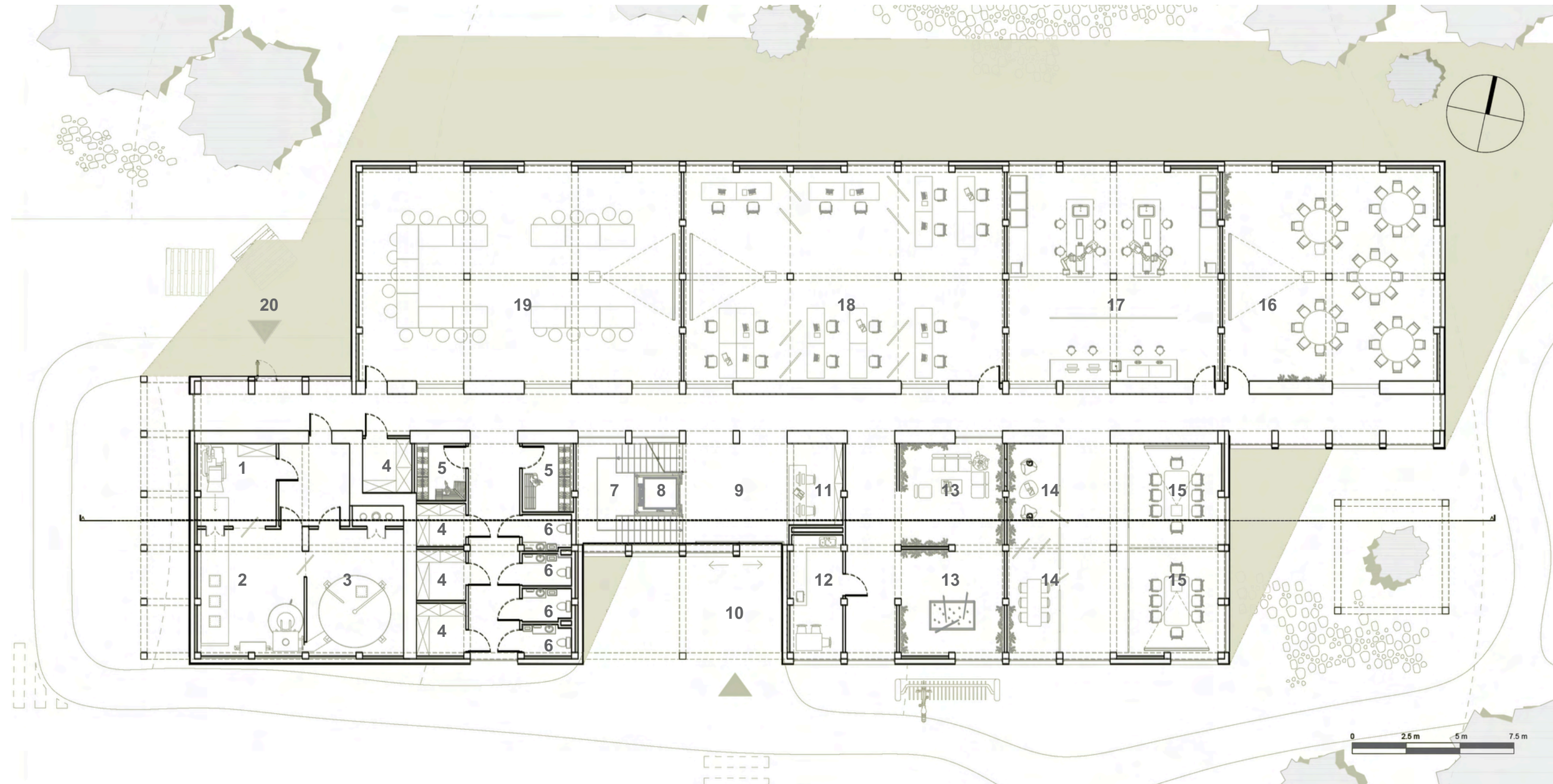
7. VEGETABLE GARDEN

- 8. GREENHOUSE
- 9. HIVES
- 10. BIRD FEEDER

11. RAIN GARDENS

- 12. FLOWER MEADOWS
- 13. GREEN ROOFS
- 14. POND



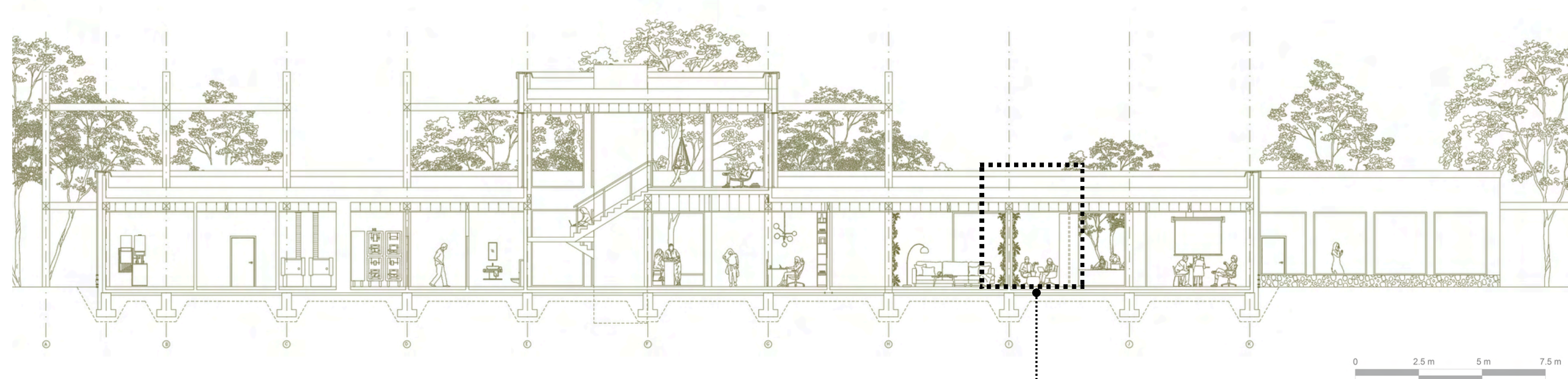


- 1. WOOD SHREDDING ZONE
- 2. BOILER
- 3. SILOS
- 4. MACHINE ROOMS
- 5. CHANGING ROOMS

- 6. SANITARY FACILITIES
- 7. VERTICAL COMMUNICATION
- 8. LIFT SHAFT
- 9. LOBBY
- 10. MAIN ENTRANCE

- 11. RECEPTION DESK
- 12. KITCHEN
- 13. REST AND GAMES ROOMS
- 14. INDIVIDUAL MEETING ROOMS
- 15. GROUP MEETING ROOMS

- 16. MULTIPURPOSE ROOM
- 17. LABORATORY
- 18. OPEN-SPACE OFFICE
- 19. CONFERENCE AND OFFICE SPACE
- 20. TECHNICAL FACILITIES



ISOVER GREEN WALL
"FLORA PANEL"

1. FLORA PANEL 850
2. FLORAPOT
3. VEGETATION
4. GROWING SUBSTRATE
5. INTENSIVE WATER RETENTION LAYER ISOVER
6. LEVEL OVERFLOW
7. SELF-DRILLING SCREW



INNOVATIVE GREEN WALLS IN WORKSPACES HAVE A POSITIVE IMPACT ON USERS' WELL-BEING AND CONTRIBUTE TO **IMPROVING THE MICROCLIMATE** BY REDUCING AIRBORNE PARTICULATES AND ENHANCING AIR QUALITY. ADDITIONALLY, THEY HELP **REGULATE INDOOR TEMPERATURES**, THEREBY REDUCING THE NEED FOR AIR CONDITIONING.





1. MAIN ENTRY
2. MEN'S BATHROOM
3. LADIES' BATHROOM
4. LAUNDRY ROOM

5. REST ZONE
6. DOUBLE ROOMS
7. ATRIUM
8. DINING ROOM

9. INTEGRATION AREA
10. EIGHT-PERSON ROOMS
11. GAMES ROOM
12. COWORKING AREA

13. SIX-BED ROOMS
14. COMMUNITY GARDEN
15. GREENHOUSE
16. SINGLE ROOMS



#2 VILLEFONTAINE

TECHNICAL SPECIFICATIONS

AIR QUALITY

- Mechanical ventilation with heat recovery (min. rate 30 m³/h/person)
- Natural assisted ventilation - night purge
- Air purification systems with active carbon and HEPA

THERMAL COMFORT

PASSIVE MEASURES

- Building orientation
- Shading elements - pergolas with sun sails and greenery, up to 60/70% shading potential
- Green roof

ACTIVE MEASURES

- Mechanical ventilation with heat recovery
- Heat pump

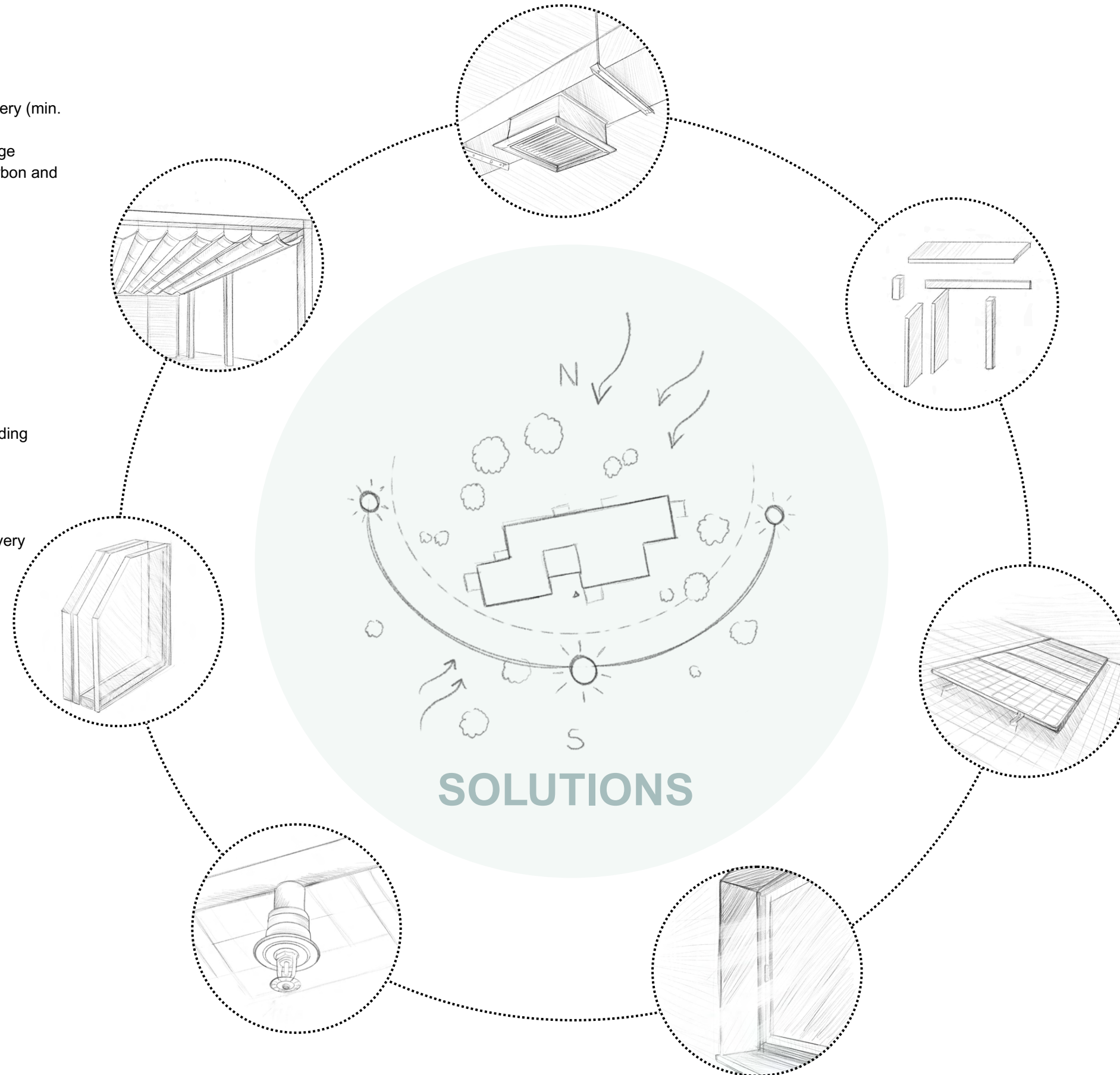
ACOUSTIC COMFORT

Level A1

- Saint-Gobain glazing packages with $R_w \geq 40$ dB with sealed frames
- Wall between units (laboratories/offices) ≥ 53 dB
- Suspended ceiling

FIRE SAFETY

- EI 60 for partitions between floors
- Non-combustible façade and roof
- Protection of escape routes



RESOURCES AND CIRCULARITY

- Deconstruction preferred to demolition
- Re-use of prefabricated elements
- Flexibility in use
- Accurate building life cycle assessment- 276 kg CO₂e/m²

CO2 EMISSIONS AND ENERGY CONSUMPTION

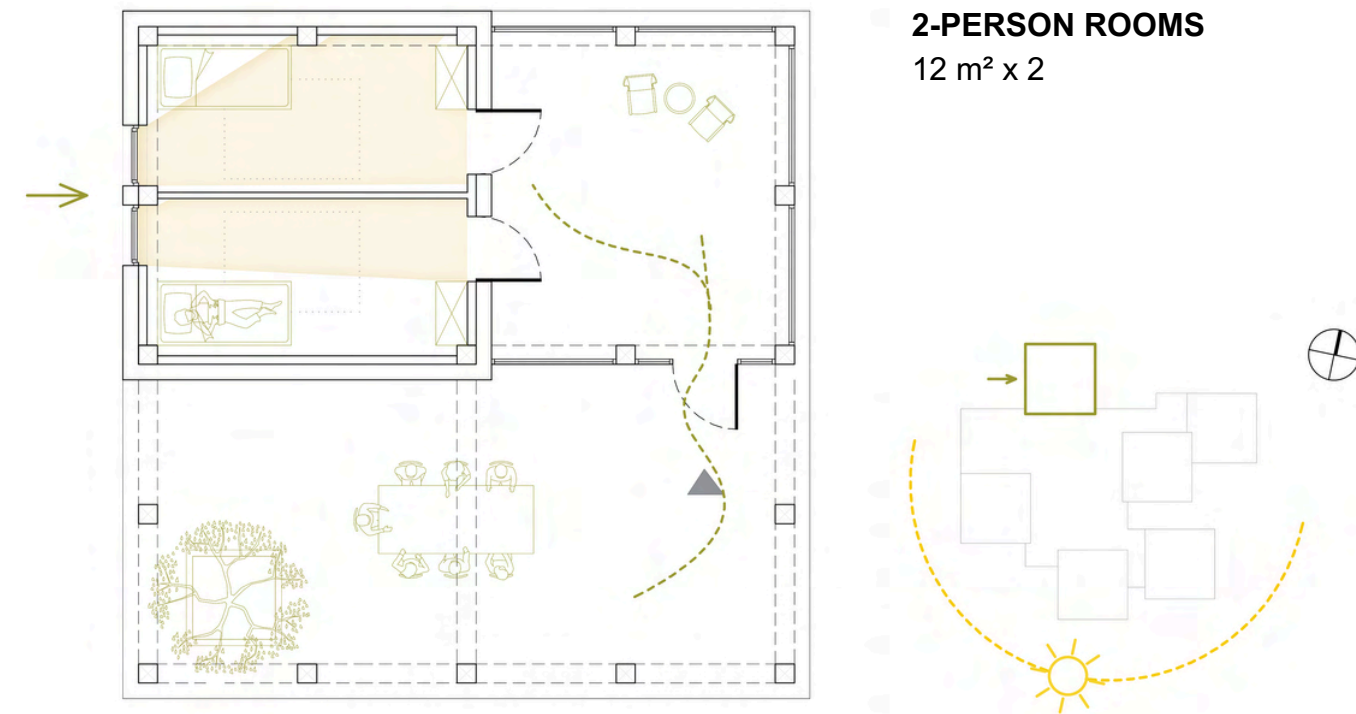
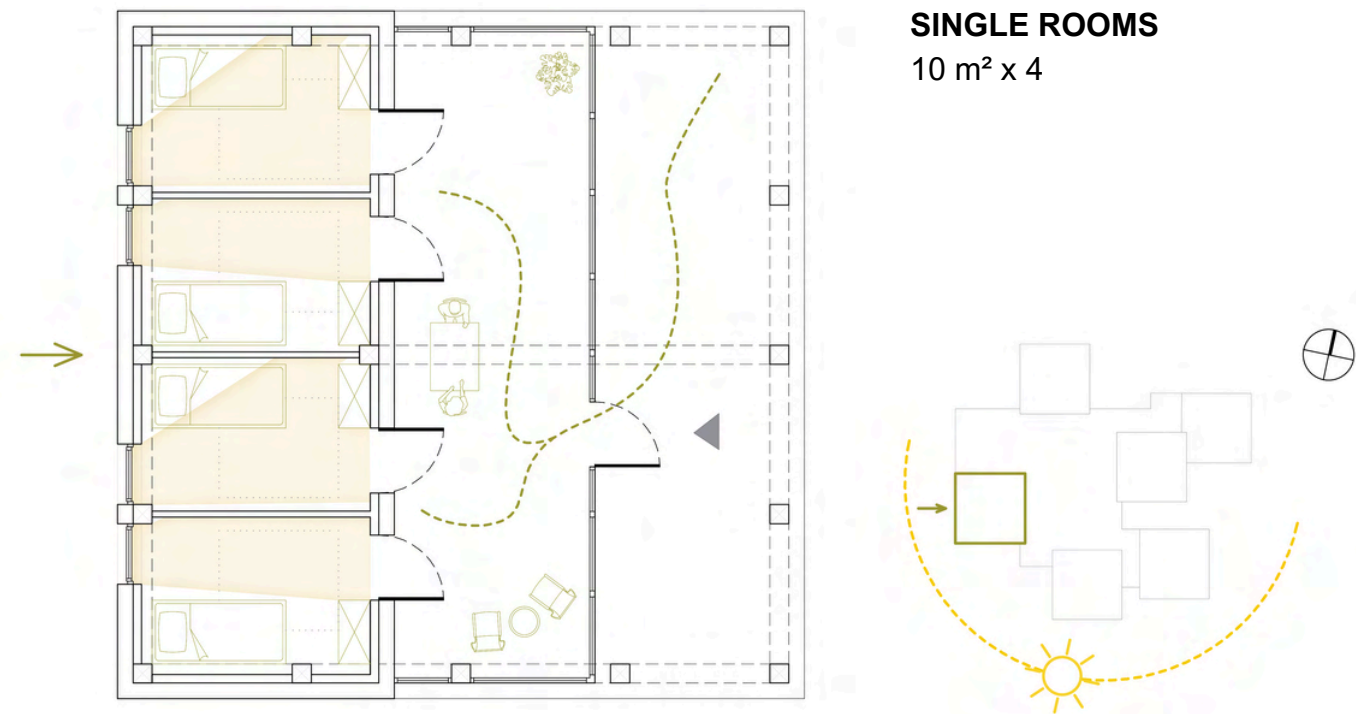
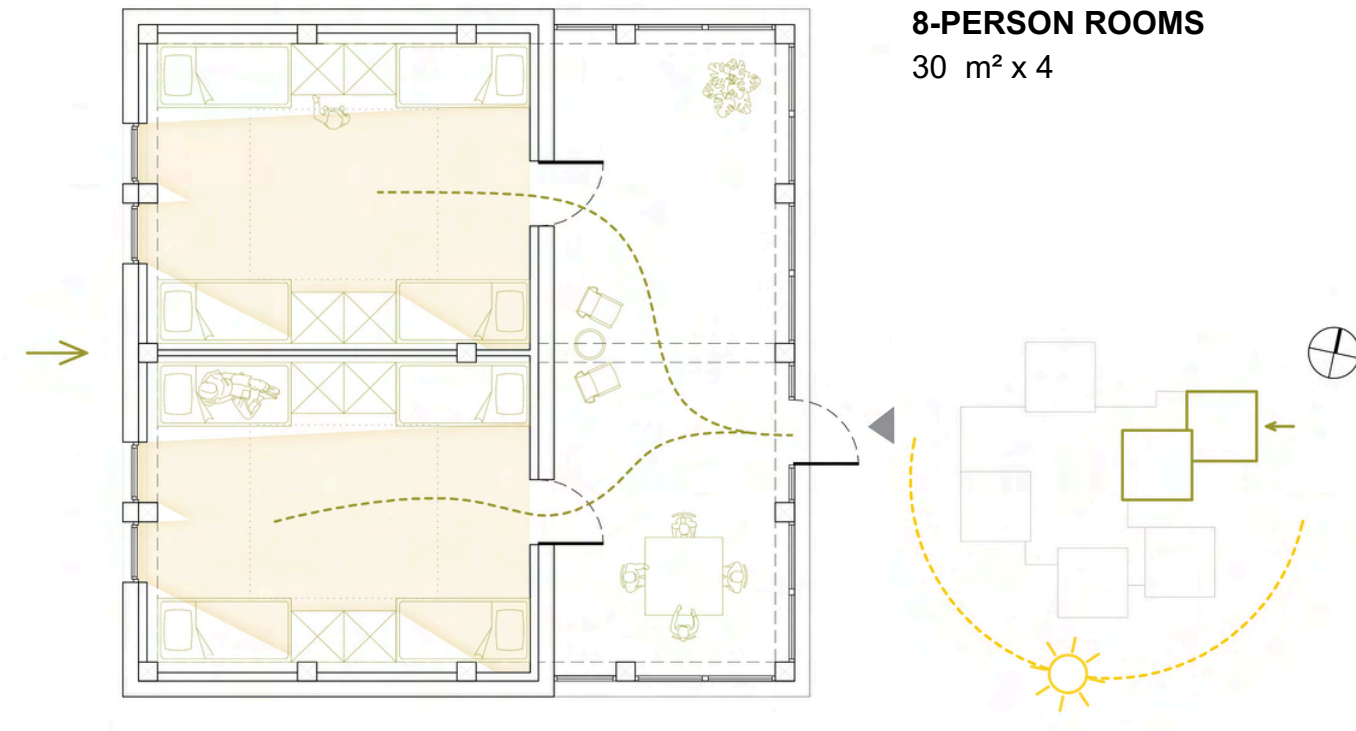
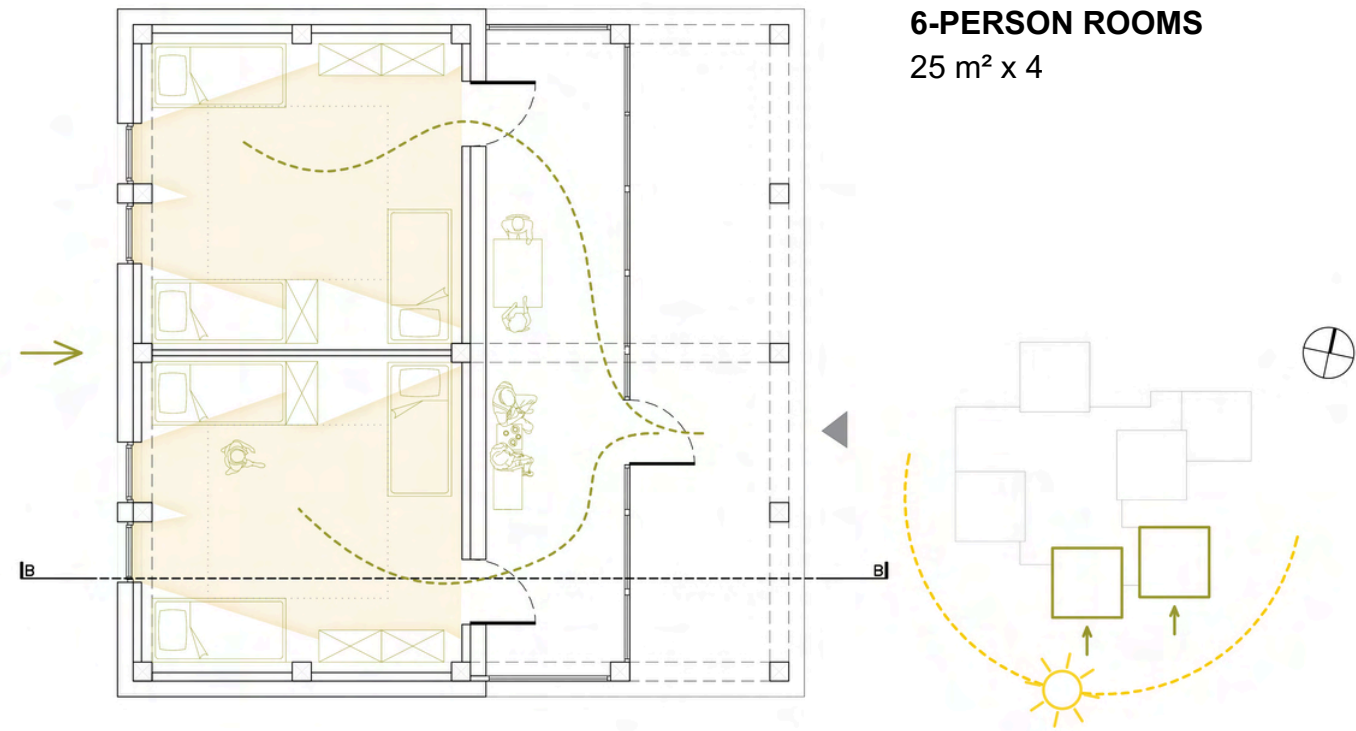
- Energy from RES
- Annual energy requirement for heating - 13.34 kWh/m²- year (Passive House standard)
- Average U-value (roof, external wall, floors on the ground) < 0.15 W/(m²K)
- U-value for windows < 0.8 W/(m²K)

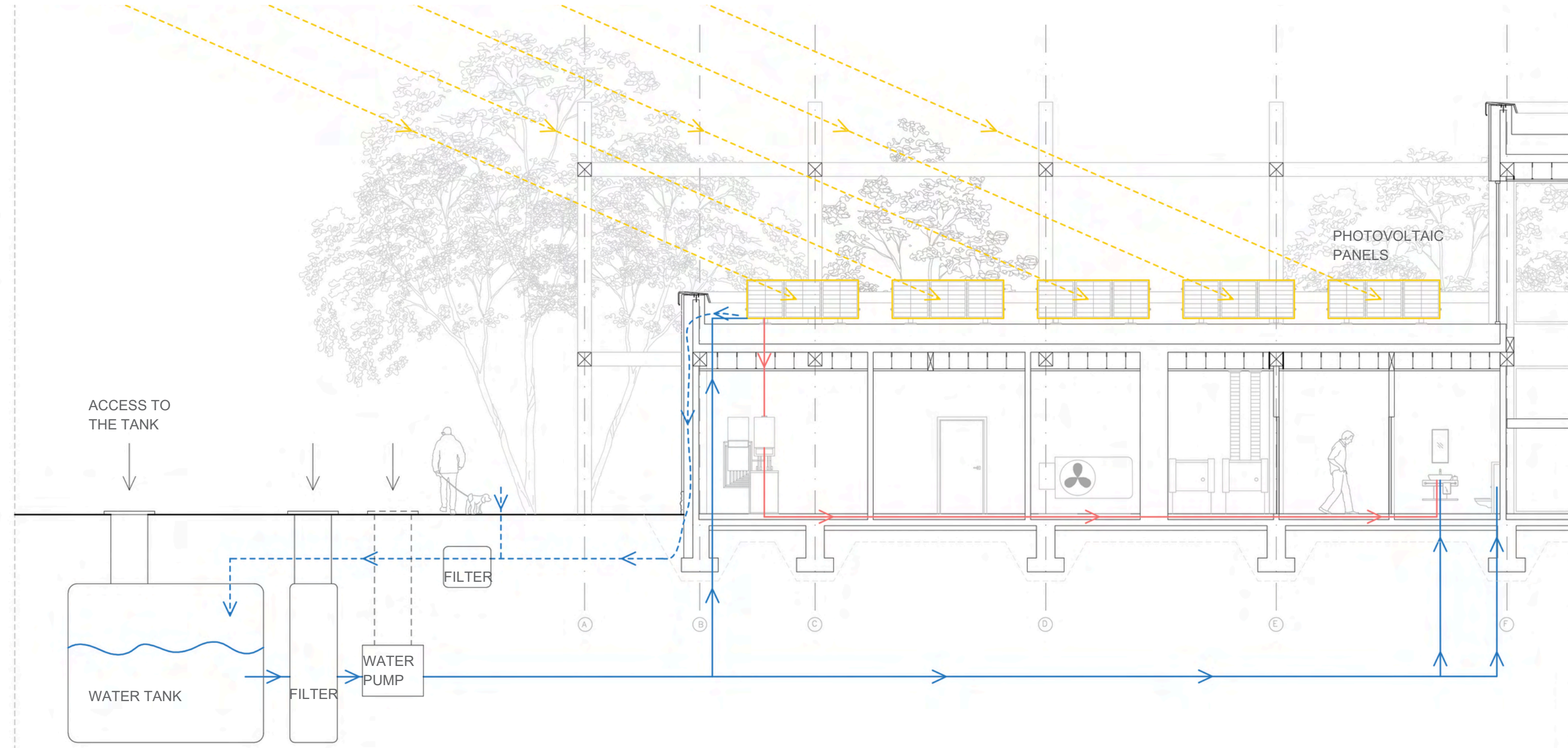
NATURAL LIGHT

- Daylight $\geq 60\%$ (for main rooms)
- Window to floor area ratio $\geq 1:8$
- Consideration of window orientation and size

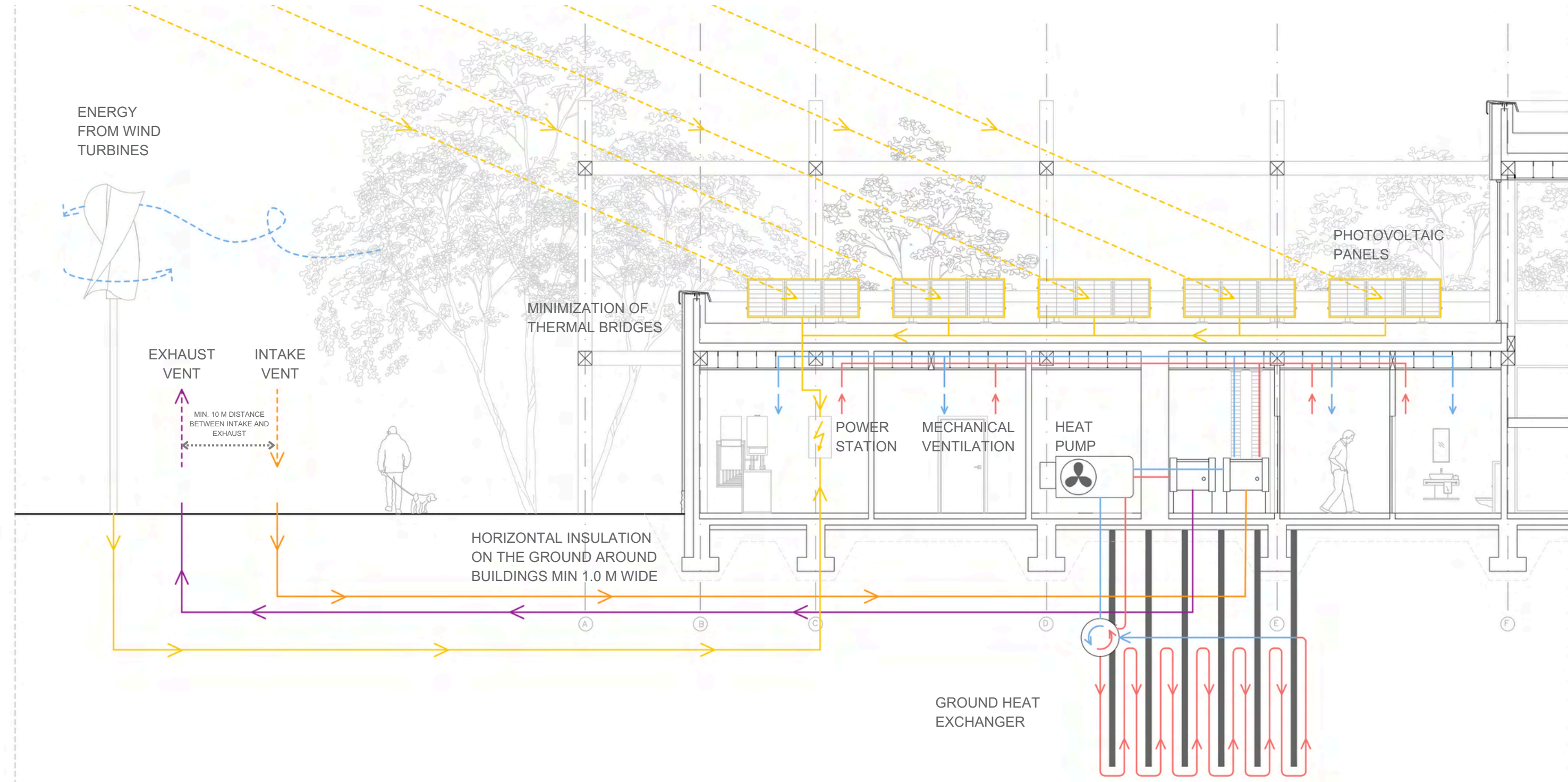
#1 VILLEFONTAINE

NATURAL LIGHT - ROOMS

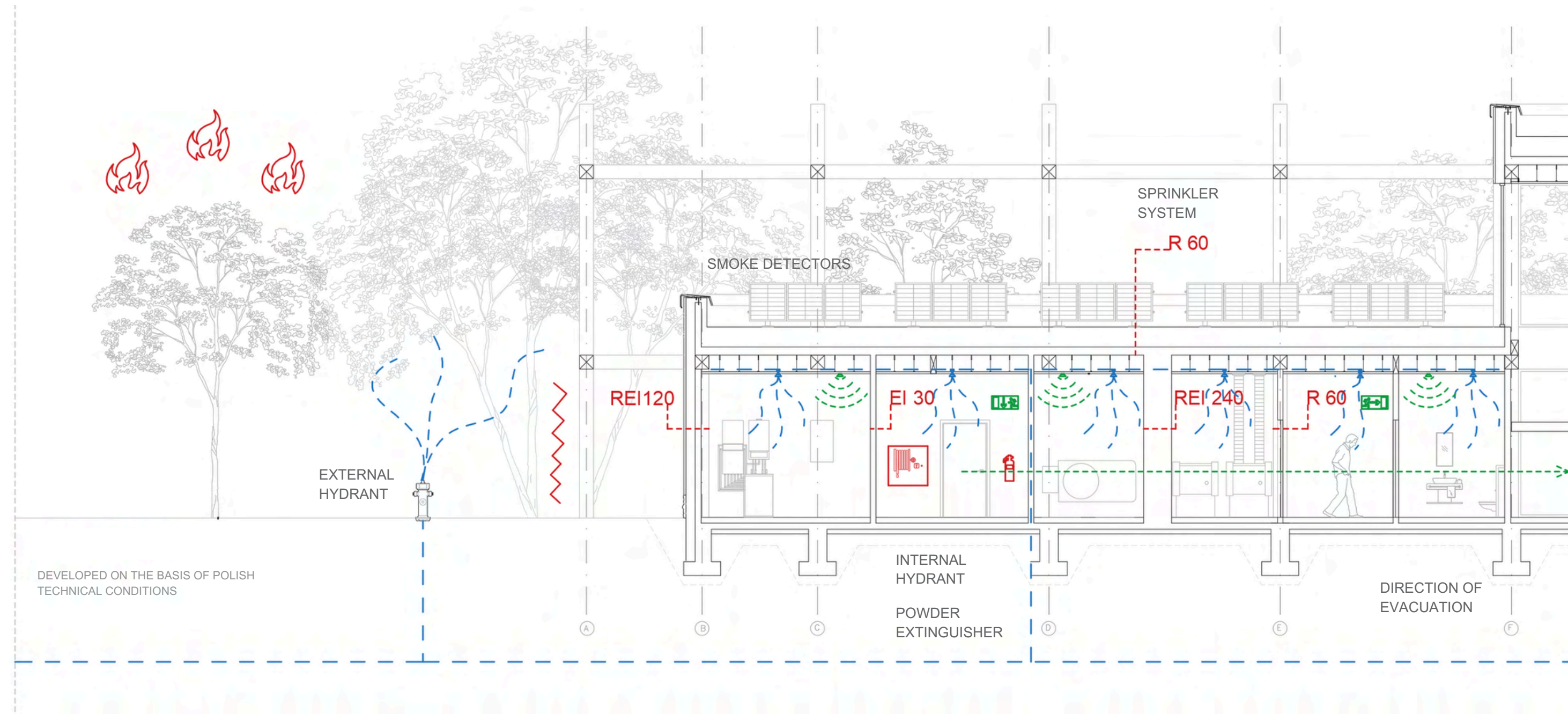




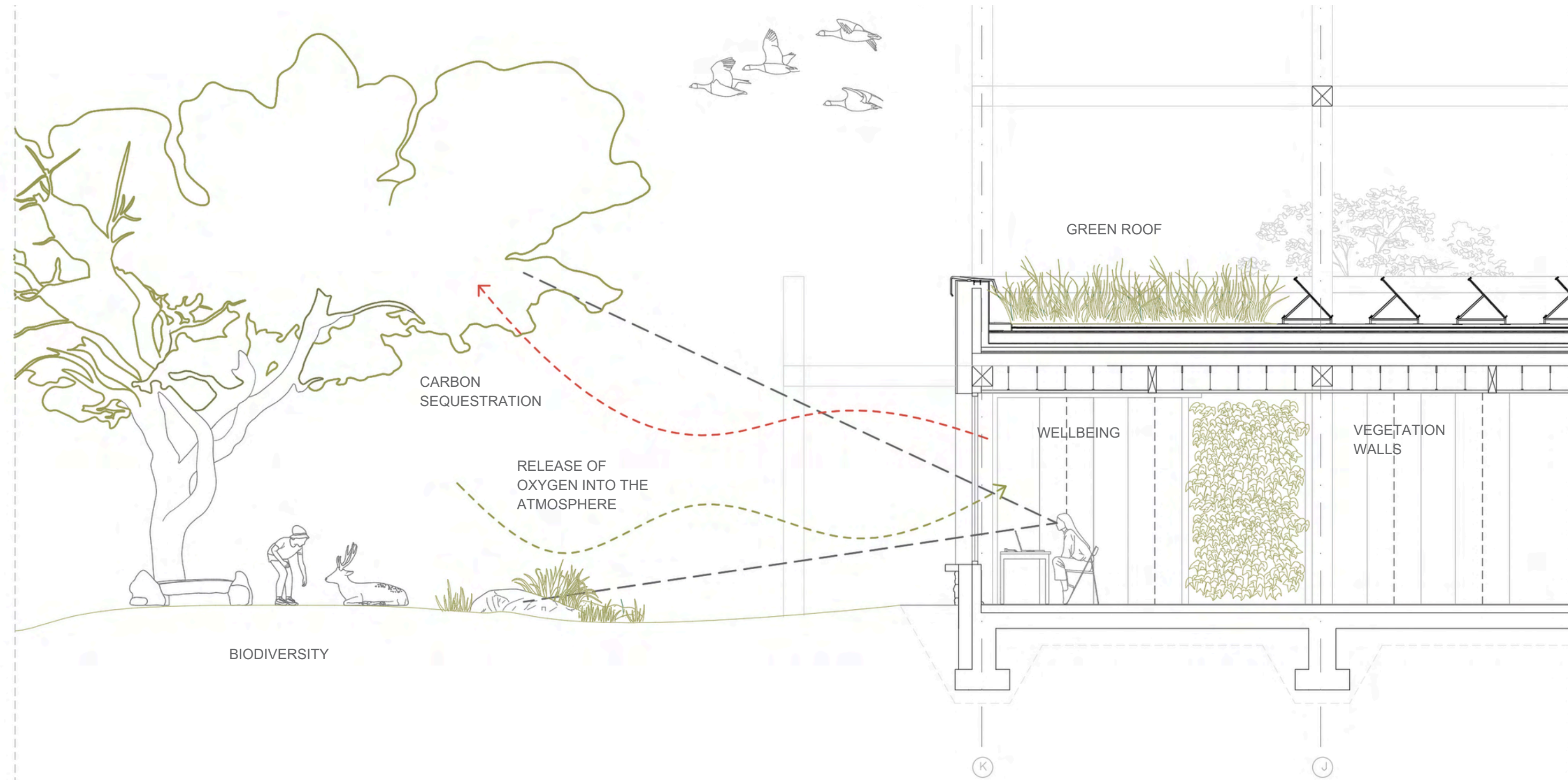
THE RAINWATER RETENTION SYSTEM INVOLVES COLLECTION, FILTRATION, AND STORAGE OF RAINWATER. THE STORED WATER IS THEN HEATED USING PHOTOVOLTAIC PANELS, ENABLING ITS **EFFICIENT REUSE WITHIN THE BUILDING**, INCLUDING FOR SANITARY PURPOSES. THIS SOLUTION SIGNIFICANTLY REDUCES THE BUILDING'S WATER CONSUMPTION, WHILE ALSO SUPPORTING INCREASED ENERGY EFFICIENCY AND CONTRIBUTING TO ECOLOGICAL NEUTRALITY.



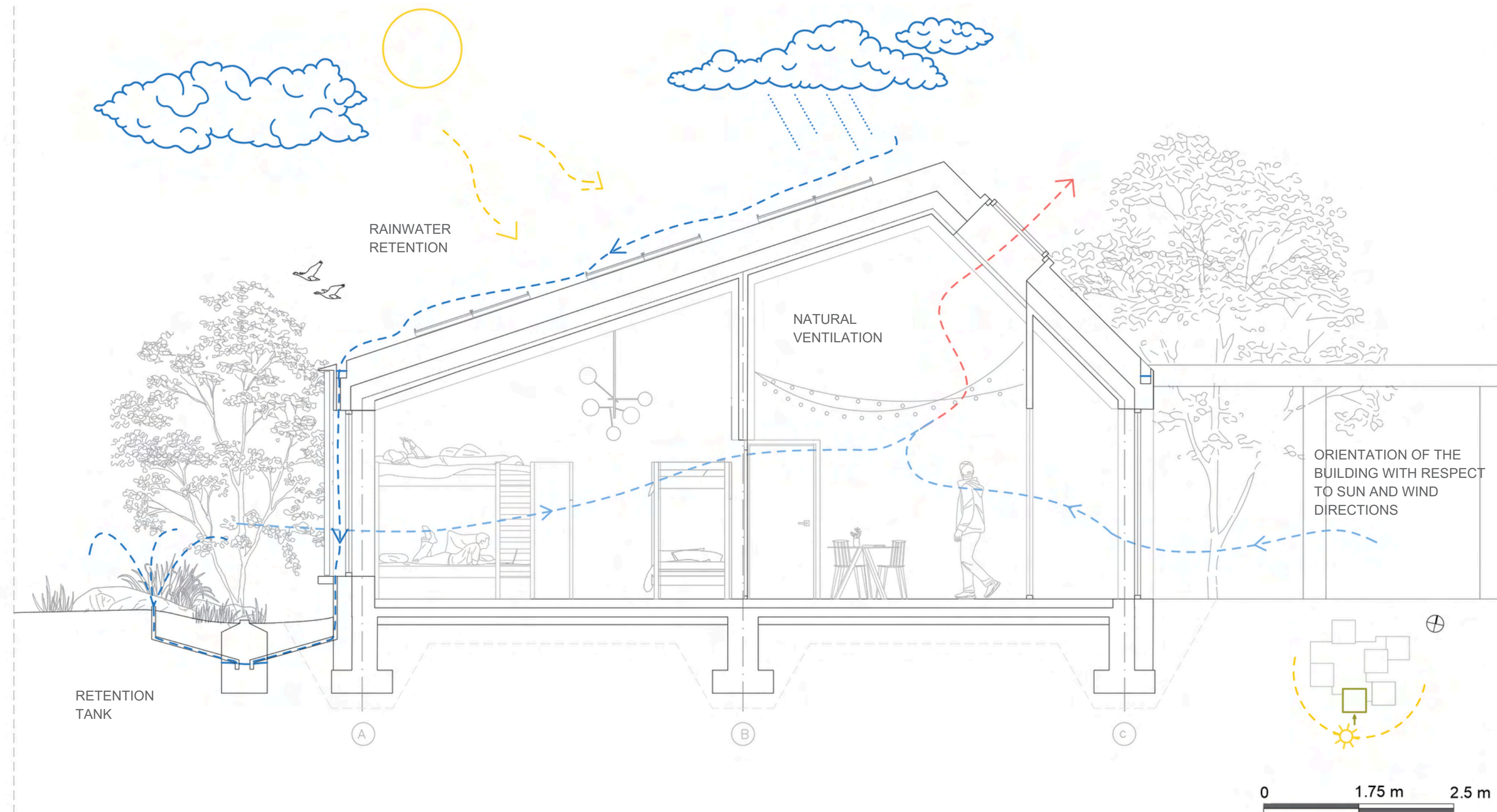
THE DIAGRAM ILLUSTRATES THE OPERATION OF ENERGY SYSTEMS IN A BUILDING UTILIZING **RENEWABLE ENERGY SOURCES**. THE INSTALLATION INCLUDES ENERGY GENERATED FROM WIND TURBINES AND PHOTOVOLTAIC PANELS, WHICH SUPPLY POWER TO AN ENERGY STATION. THE HEATING AND VENTILATION SYSTEM IS BASED ON A HEAT PUMP CONNECTED TO A GROUND HEAT EXCHANGER. ADDITIONALLY, A MECHANICAL VENTILATION SYSTEM WITH HEAT RECOVERY IS IMPLEMENTED, ENSURING **ENERGY EFFICIENCY** AND **USER COMFORT**.



THE BUILDING'S STRUCTURAL ELEMENTS COMPLY WITH **MINIMUM FIRE RESISTANCE CLASSES** (REI 90, REI 120, REI 240). FIRE PROTECTION SYSTEMS HAVE BEEN IMPLEMENTED, INCLUDING A **SPRINKLER SYSTEM**, **SMOKE DETECTORS**, AND **CLEARLY MARKED EVACUATION ROUTES**, ENSURING EFFECTIVE FIRE SAFETY. EI 30-RATED PARTITIONS LIMIT THE SPREAD OF FIRE, WHILE THE ZL III CLASSIFICATION INDICATES THAT THE BUILDING FALLS UNDER THE CATEGORY OF PUBLIC UTILITY FACILITIES. ADDITIONALLY, THE CROSS-LAMINATED TIMBER (CLT) STRUCTURE HAS BEEN TREATED WITH FIRE-RETARDANT IMPREGNATION.



THE DIAGRAM ILLUSTRATES THE APPLICATION OF BIOPHILIC DESIGN PRINCIPLES IN CREATING SPACES THAT **PROMOTE USERS' HEALTH AND WELL-BEING**. VEGETATION ON THE BUILDING'S ROOF AND WALLS SUPPORTS BIODIVERSITY AND IMPROVES AIR QUALITY BY ABSORBING CARBON DIOXIDE, RELEASING OXYGEN, AND REGULATING TEMPERATURE. GREEN SPACES AROUND AND WITHIN THE BUILDING ESTABLISH A HARMONIOUS CONNECTION WITH NATURE, **POSITIVELY IMPACTING OCCUPANTS' WELL-BEING**. THE INTEGRATION OF NATURAL ELEMENTS IN ARCHITECTURE ALSO **ENHANCES THE MICROCLIMATE**, HELPING TO REDUCE THE URBAN HEAT ISLAND EFFECT. THE DESIGN EMPHASIZES THE IMPORTANCE OF THE HUMAN-NATURE RELATIONSHIP.

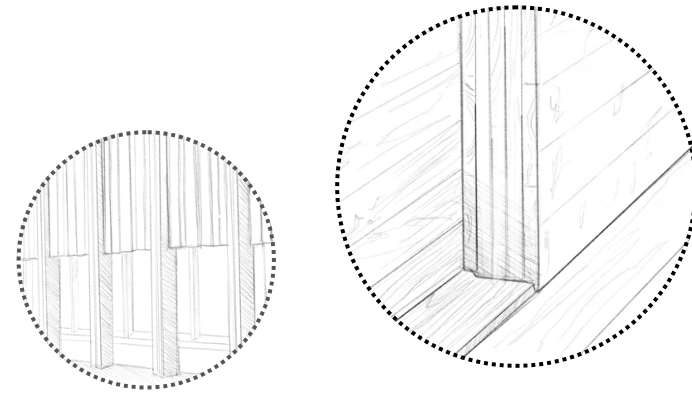


THE BUILDING'S FORM ENABLES **NATURAL VENTILATION** OF THE INTERIOR, ENHANCING **THERMAL COMFORT** AND **REDUCING THE NEED FOR AIR CONDITIONING**. THE ROOF SHAPE AND GLAZING SUPPORT PASSIVE SOLAR ENERGY GAIN DURING COLDER PERIODS. RAINWATER IS COLLECTED IN A RETENTION TANK, ALLOWING FOR ITS REUSE. THE DESIGN ALSO INCORPORATES SURROUNDING GREENERY, WHICH CONTRIBUTES TO THE LOCAL MICROCLIMATE AND ENHANCES THE EFFECTIVENESS OF SUSTAINABLE SOLUTIONS.

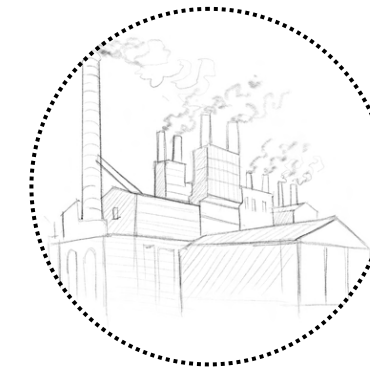
#1 VILLEFONTAINE

CROSS-LAMINATED TIMBER CONSTRUCTION

COMPONENTS THAT ARE SUITABLE FOR REPEATED USE

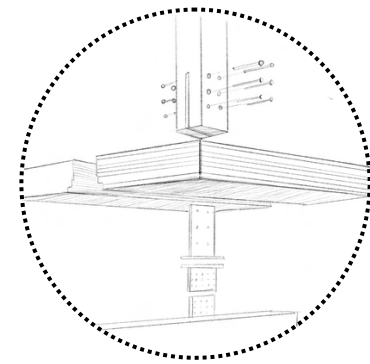


NATURAL AND LOCAL MATERIALS



OPTIMISED CONSTRUCTION PROCESS

EASILY REMOVABLE COMPONENTS



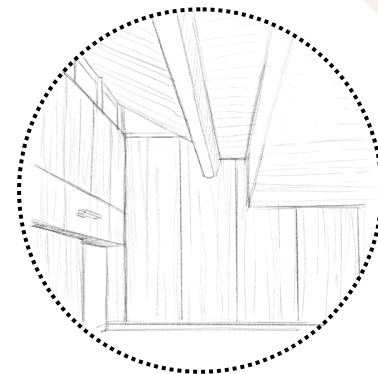
SIMPLE CONNECTIONS WITH LOW COSTS



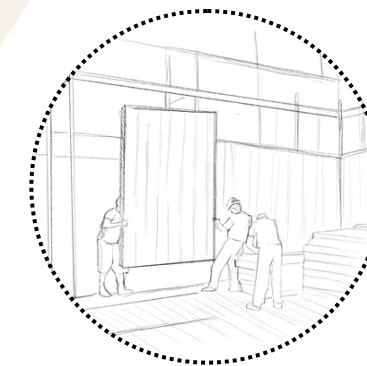
LOW WEIGHT COMPONENTS



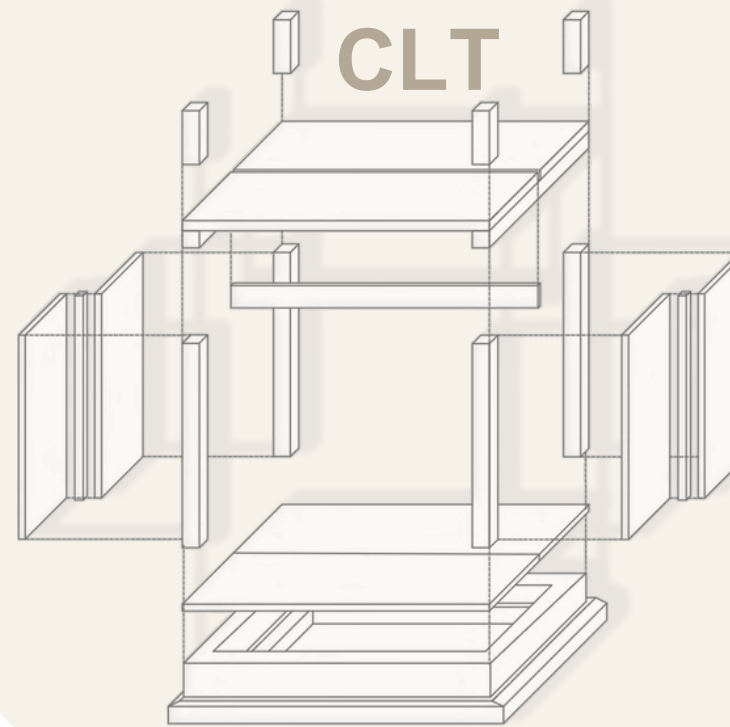
HIGH QUALITY ARCHITECTURE

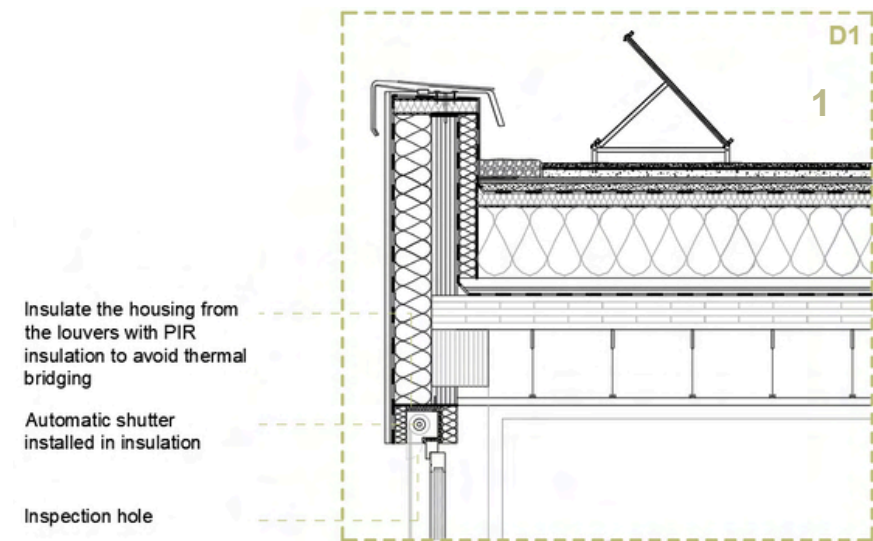


NON-INDUSTRIAL ASSEMBLY



CONSTRUCTION
CLT





Insulate the housing from the louvers with PIR insulation to avoid thermal bridging

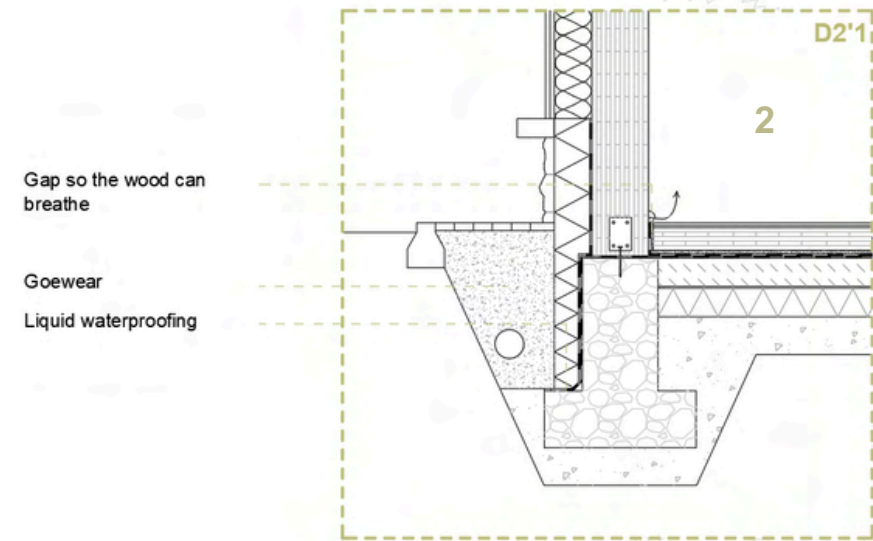
Automatic shutter installed in insulation

Inspection hole

1 EXTENSIVE GREEN ROOF

U-VALUE: 0.062 W/m²K
SOUND REDUCTION: 77 dB
CARBON FOOTPRINT: 13.16 kg CO₂e/m²

100 mm	Vegetation layer
5 mm	Geotextile filter fabric
25 mm	Drainage mat
40 mm	The substrate of an extensive green roof
5+5 mm	WEBER.DRY PUR seal waterproofing membrane
	ISOVER Vario® KM Duplex UV - polyethylene film
20 mm	ISOVER ROBUST Ceiling Board - glass mineral wool
380 mm	ISOVER ROBUST Ceiling Panel - glass mineral wool
30-60mm	Weberfloor 150 dura - cement screed
	ISOVER Vario® KM Duplex UV - polyethylene film
180 mm	Cross laminated timber (CLT) element
360 mm	Air gap
40 mm	Ecophon Master A



Gap so the wood can breathe

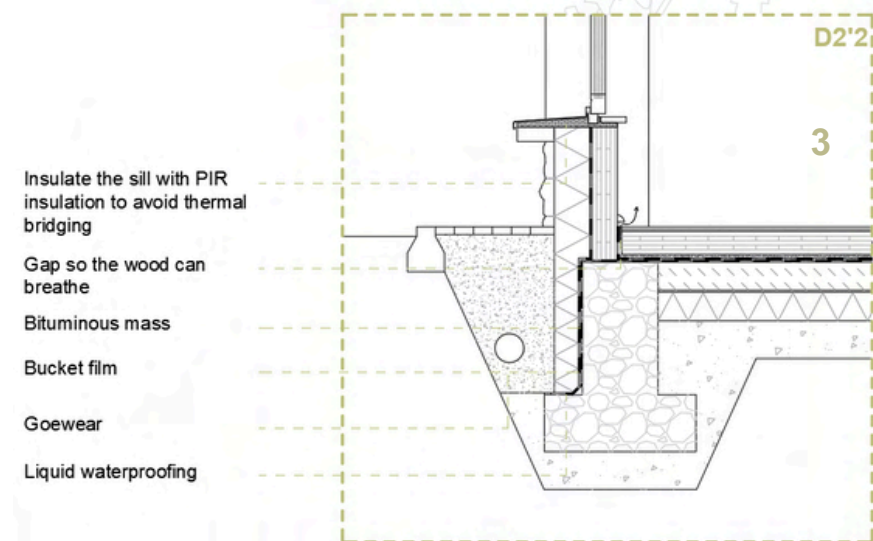
Goewear

Liquid waterproofing

2 CLT EXTERIOR WALL

U-VALUE: 0.063 W/m²K
SOUND REDUCTION: 53 dB
CARBON FOOTPRINT: 13.98 kg CO₂e/m²

22 mm	Wooden facade Moelven Thermowood
220 mm	ISOVER PLUS Board 32 between
245 mm	ISOVER PLUS Stud 1
0,2 mm	ISOVER Vario Xtra - vapour barrier film
300 mm	Cross laminated timber (CLT) element - design element
	Wood preservative



Insulate the sill with PIR insulation to avoid thermal bridging

Gap so the wood can breathe

Bituminous mass

Bucket film

Goewear

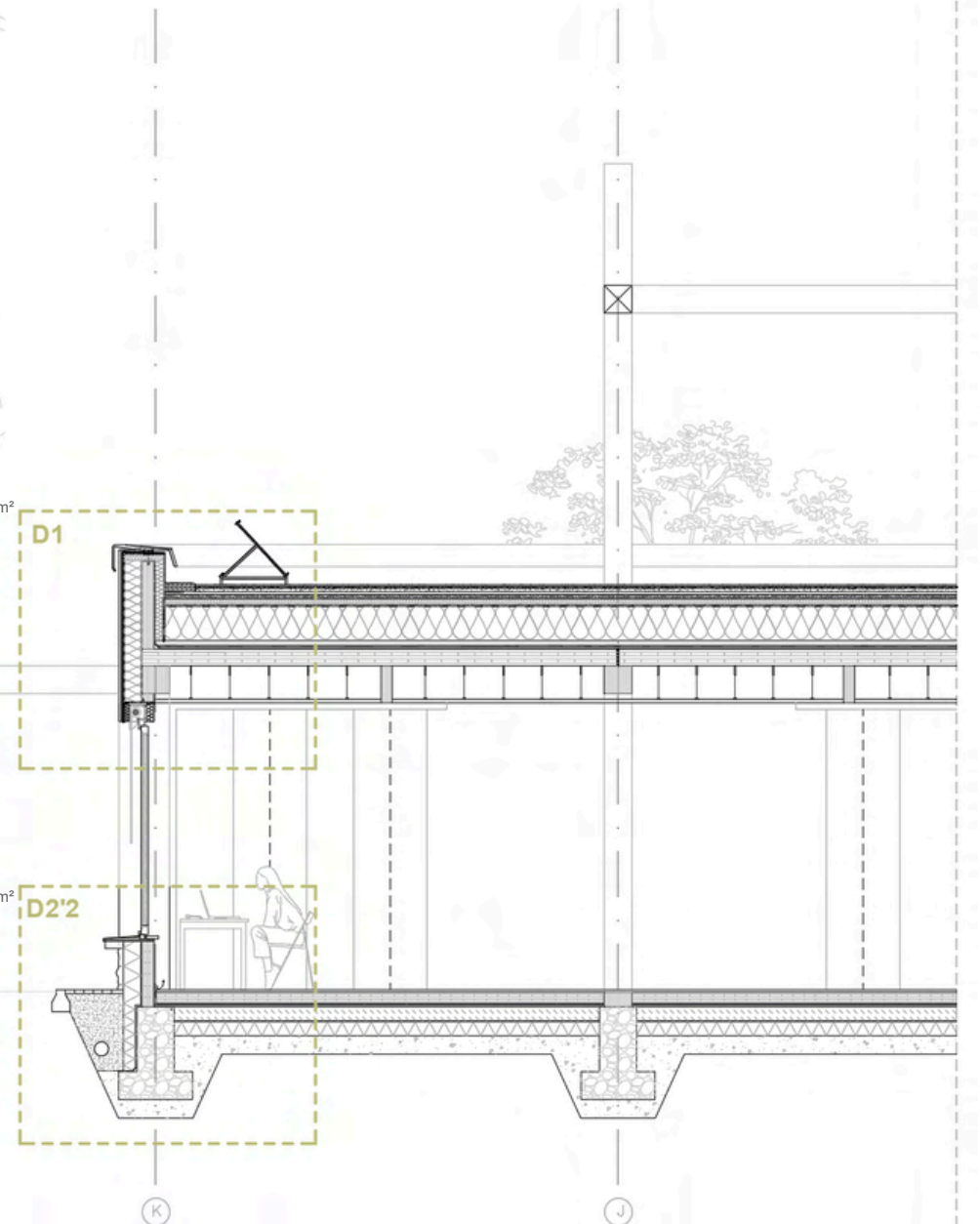
Liquid waterproofing

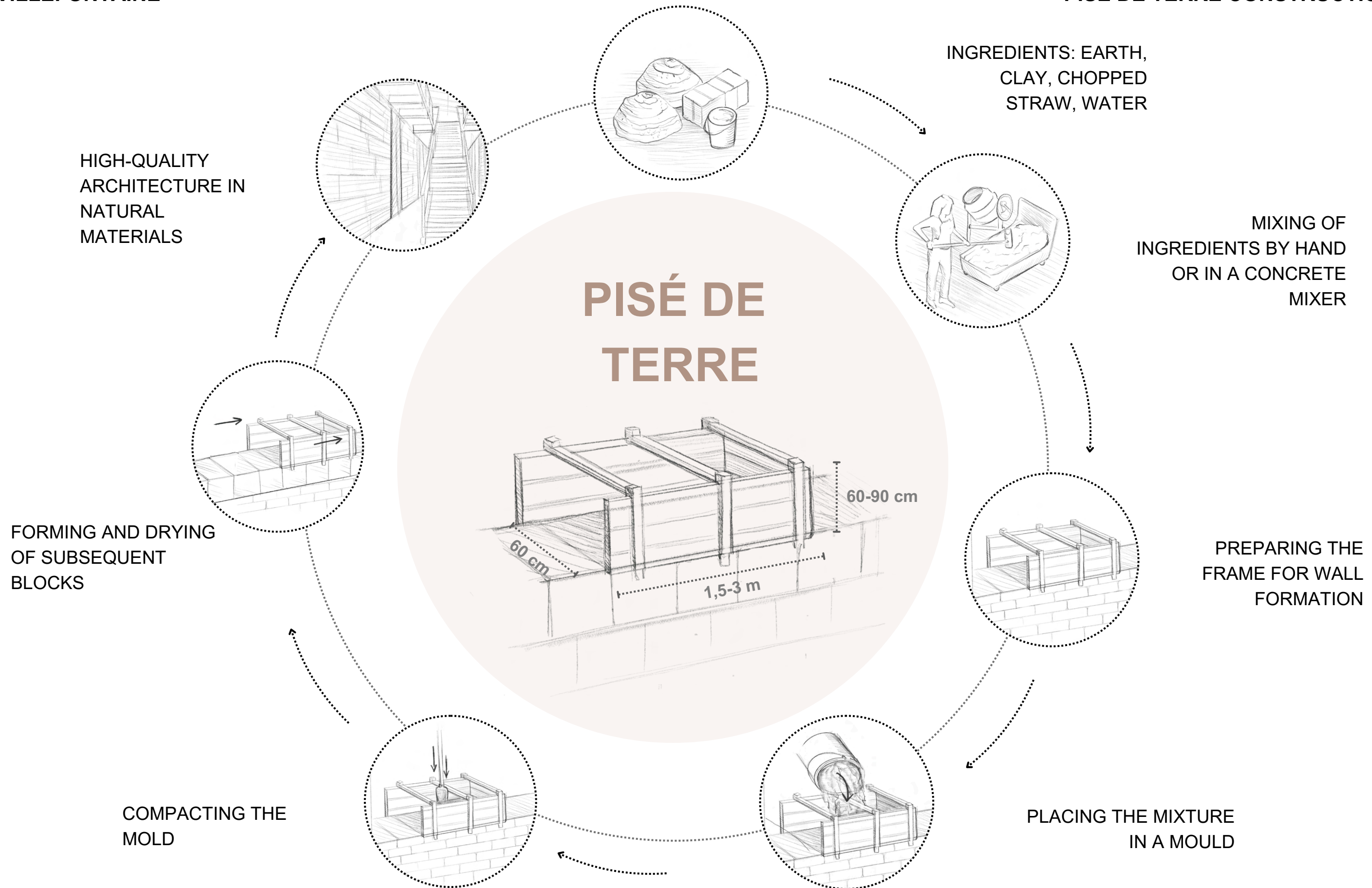
3 FOUNDATION SLAB

U-VALUE: 0.142 W/m²K
SOUND REDUCTION: 145 dB
CARBON FOOTPRINT: 22.38 kg CO₂e/m²

14 mm	Glueless system parquet board
20 mm	Felt mat
120 mm	Cross laminated timber (CLT) element
40 mm	Felt mat
	2x ISOVER Vario® KM Duplex UV - polyethylene film glued overlapping
150 mm	Lean concrete
15 mm	Polyethylene slip film
300 mm	Polystyrene XPS
	Overlap damp proofing membrane
200 mm	Fractional sand
	Native soil

HIGH-QUALITY THERMAL INSULATION AND ELIMINATION OF THERMAL BRIDGES HAVE BEEN ENSURED. MATERIALS FROM SAINT-GOBAIN WITH A LOW THERMAL CONDUCTIVITY COEFFICIENT WERE USED, WITH PARTICULAR ATTENTION PAID TO THE CONTINUITY OF THE INSULATION LAYER IN ALL CRITICAL AREAS, SUCH AS WALL JOINTS, FOUNDATION FOOTINGS, AND THE ROOF.



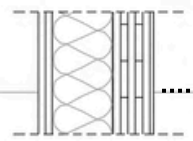


#1 VILLEFONTAINE

PARTITIONS, SAINT-GOBAIN PRODUCTS - LABORATORY

WOODEN FACADES ON ISOVER PLUS LOAD-BEARING INSULATION SYSTEM

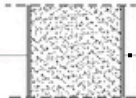
HEAT INSULATIBILITY: $U=0.15 \text{ W/m}^2\text{K}$
 FIRE RESISTANCE: REI 60, REI 90
 NOISE REDUCTION: 46 Rw (dB)
 CARBON EMISSION: 18.7 kg CO2 per m²
 WEIGHT: 84 kg/m²



40 cm	CLT EXTERIOR WALL
22 mm	Wooden facade Moelven Thermowood
220 mm	ISOVER PLUS Board 32 between
245 mm	ISOVER PLUS Stud 1
0,2 mm	ISOVER Vario Xtra - vapour barrier film
120 mm	Cross laminated timber (CLT) element
12,5 mm	Gyproc GNE 13 Normal - gypsum board

BEARING WALL OF RAMMED EARTH 60 CM

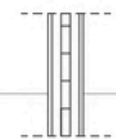
FIRE RESISTANCE: REI 240
 SOUND REDUCTION: 60 Rw (dB)
 CARBON EMISSION: 50 kg CO2 per m²
 WEIGHT: 1134 kg/m²



63 cm	LOAD-BEARING INTERIOR WALL
15 mm	Exterior clay plaster
600 mm	Compacted earth
15 mm	Interior clay plaster

GYPROC GNE NORMAL PARTITION WALL CLT 90 MM

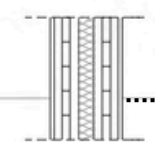
FIRE RESISTANCE: REI 30
 NOISE REDUCTION: 38 Rw (dB)
 CARBON EMISSION: 10 kg CO2 per m²
 WEIGHT: 59 kg/m²



12 cm	CLT PARTITION WALL
12,5 mm	Gyproc GNE 13 Normal - gypsum board
90 mm	Cross laminated timber (CLT) element
12,5 mm	Gyproc GNE 13 Normal - gypsum board

INTERIOR WALL GYPRON GNE AND ISOVER CAVITY WALL BOARD CLT 80 MM

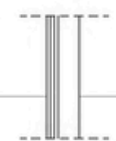
FIRE RESISTANCE: REI 60
 SOUND REDUCTION: 64 Rw (dB)
 CARBON EMISSION: 15 kg CO2 per m²
 WEIGHT: 91 kg/m²



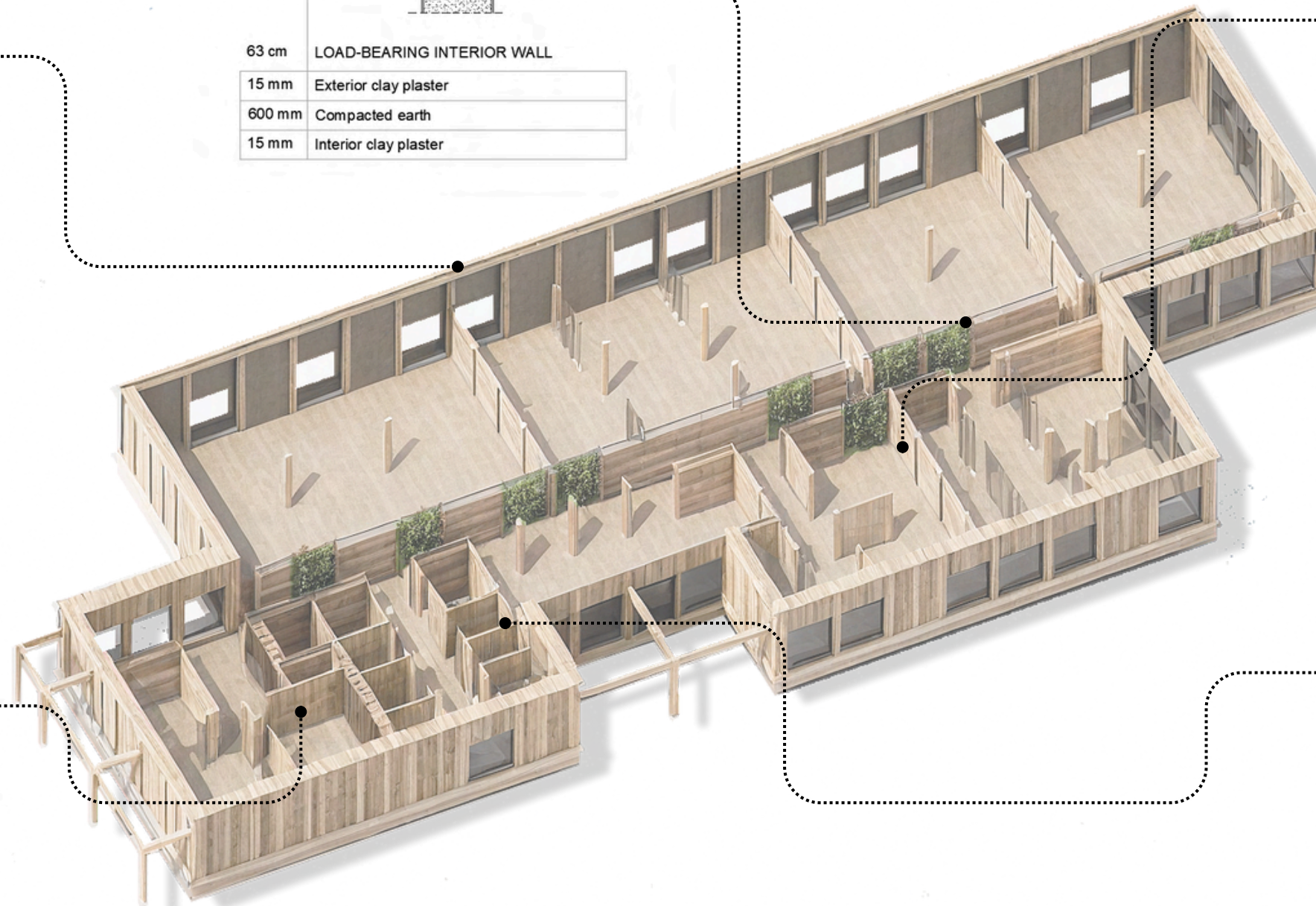
23.5 cm	CLT INTERIOR PARTITION WALL
12.5 mm	Gyproc GNE 13 Normal - gypsum board
80 mm	Cross laminated timber (CLT) element
50 mm	ISOVER Cavity Wall Board 32
80 mm	Cross laminated timber (CLT) element
12,5 mm	Gyproc GNE 13 Normal - gypsum board

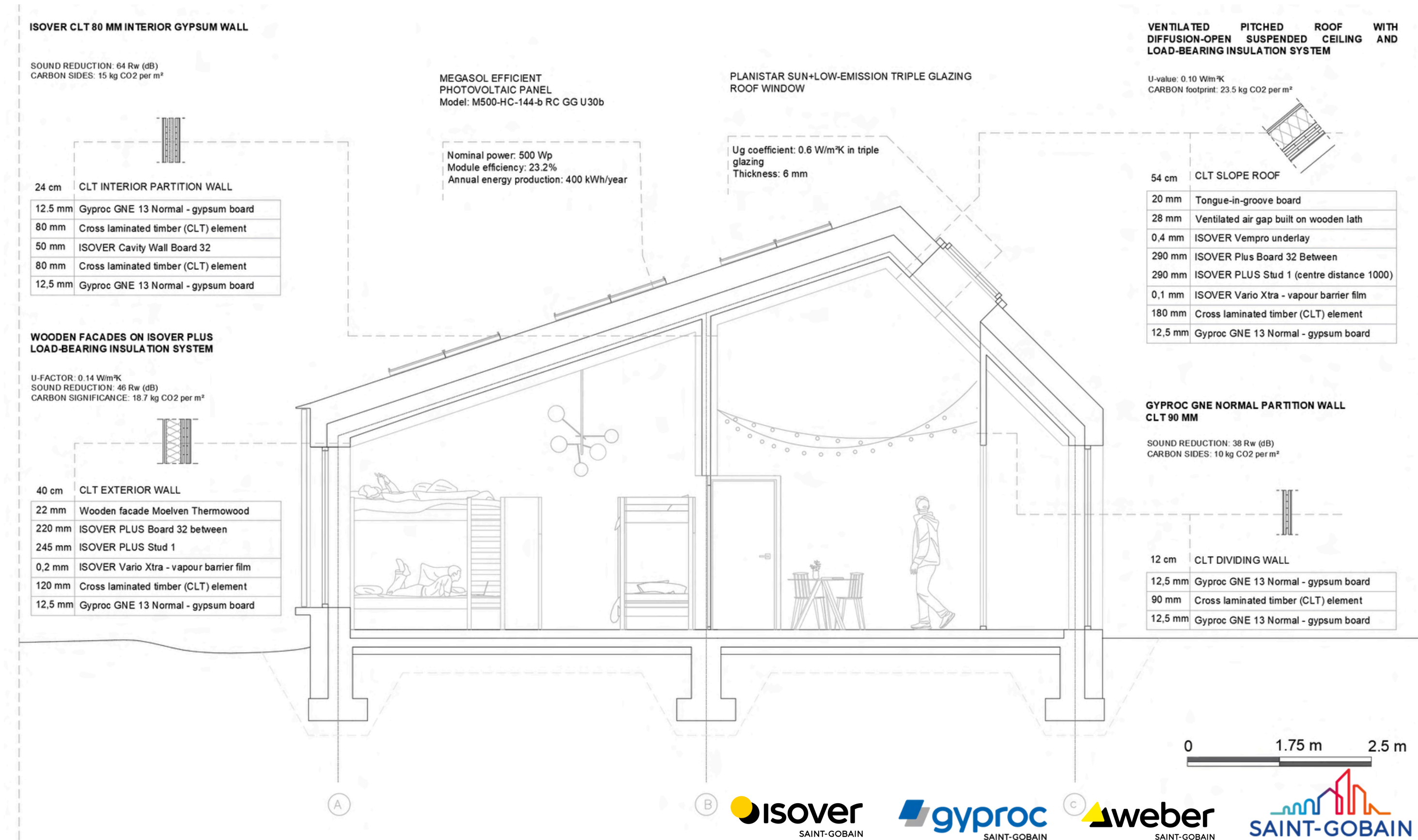
GYPROC GHE, GYPROC GNE AND GYPROC ER WALL

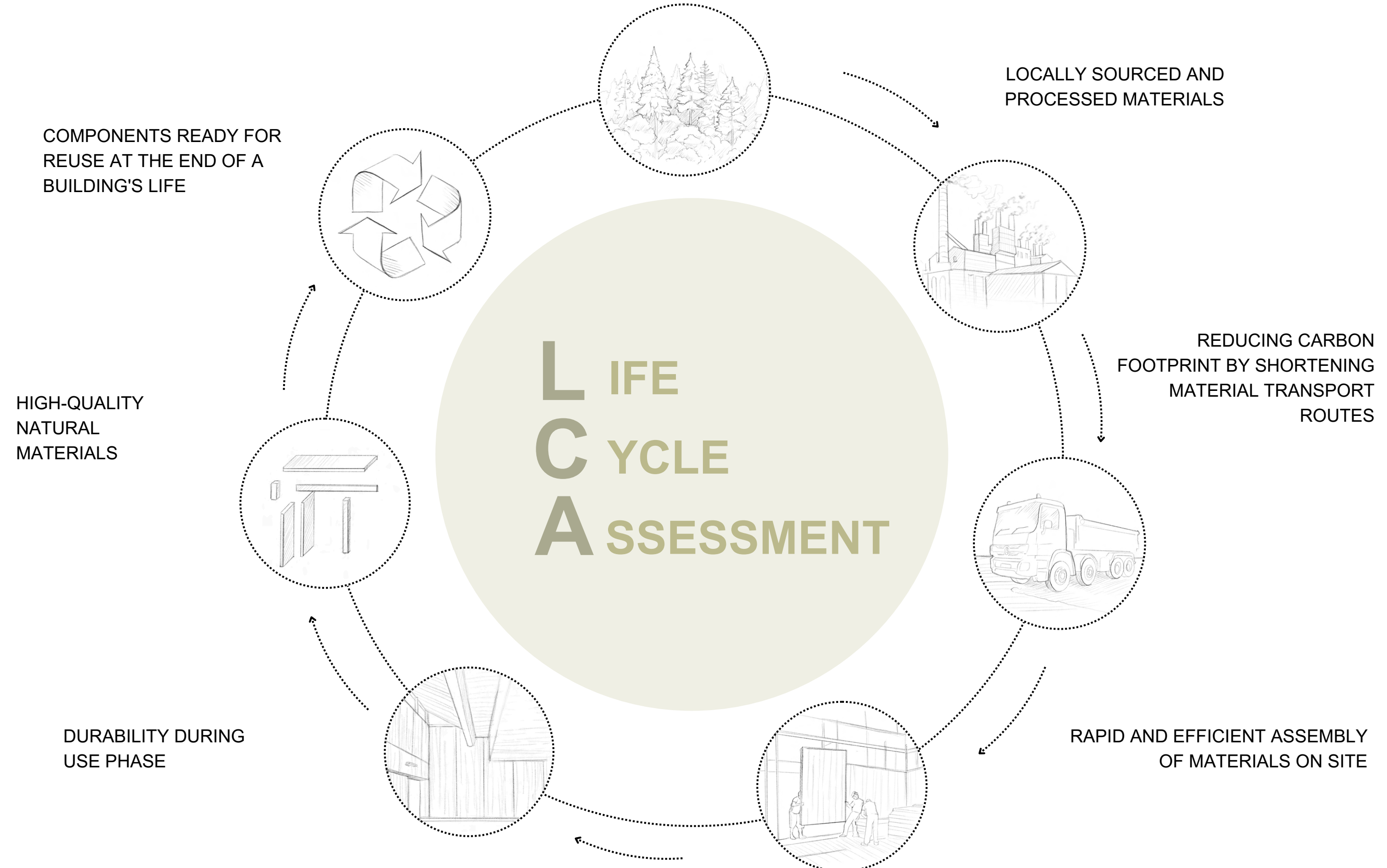
FIRE RESISTANCE: EI 60
 SOUND REDUCTION: 39 Rw (dB)
 CARBON EMISSION: 12 kg CO2 per m²
 WEIGHT: 30 kg/m²



10 cm	WALL OF CHAIN
12,5 mm	Gyproc GNE 13 Habito
12,5 mm	Gyproc GNE 13 Normal
12,5 mm	Gyproc GNE 13 Normal
70 mm	Gyproc ER 450
70 mm	ISOVER Piano Sound Board





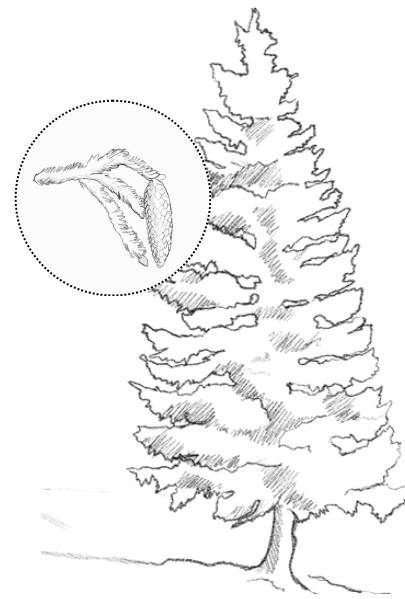


#1 VILLEFONTAINE

LIFE CYCLE OF A MODULAR CLT BUILDING

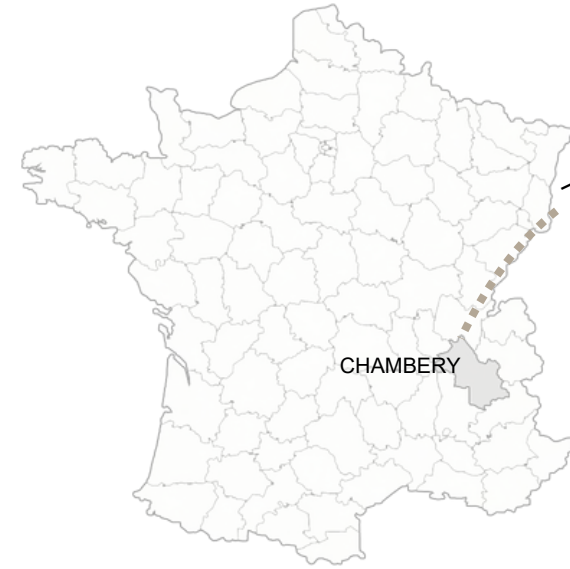
PHASE 'A1-A3' - PRODUCT

MATERIAL:



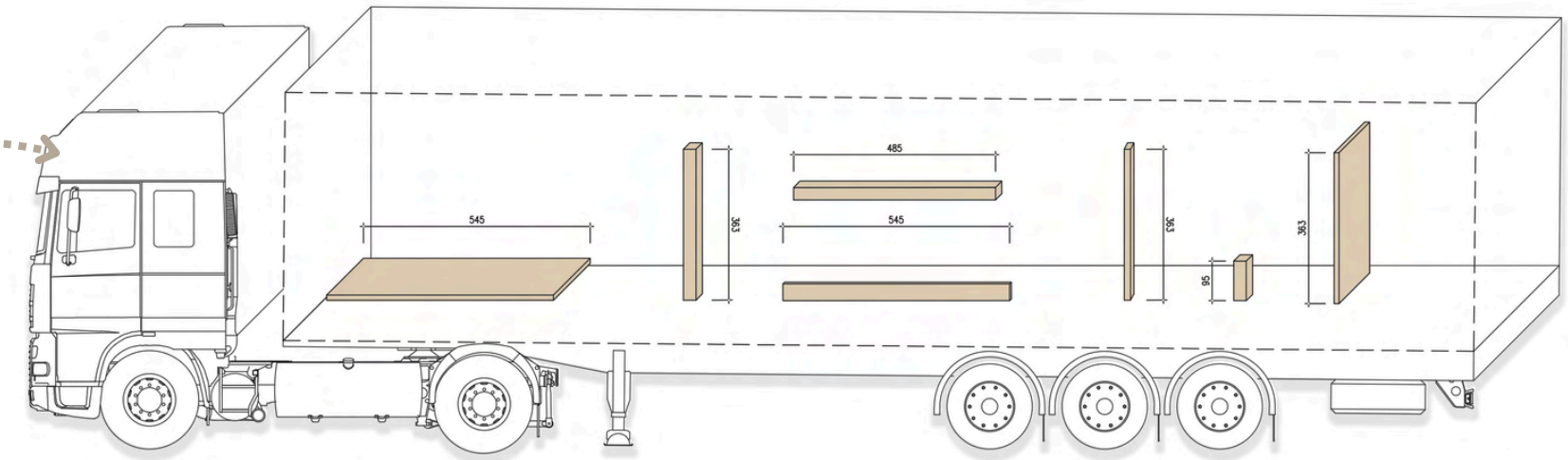
COMMON
SPRUCE

WOOD DENSITY:
480 KG/M³



LOCAL CERTIFIED WOOD FROM
THE 'BOIS DU ALPES'

PHASE 'A4' - TRANSPORT TO THE CONSTRUCTION SITE



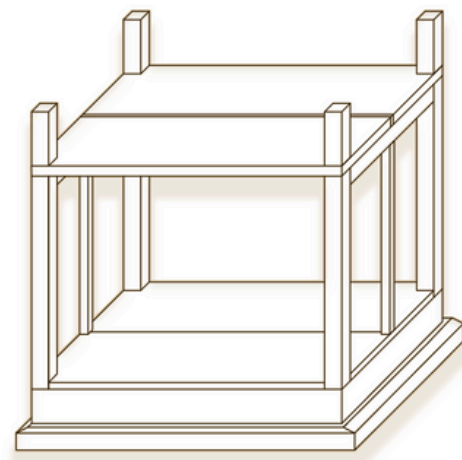
WEIGHT OF 'MODULE 1': APPROX. 5.6 T
EMISSIONS: ~48-52 KG CO₂

DISTANCE: 75 KM

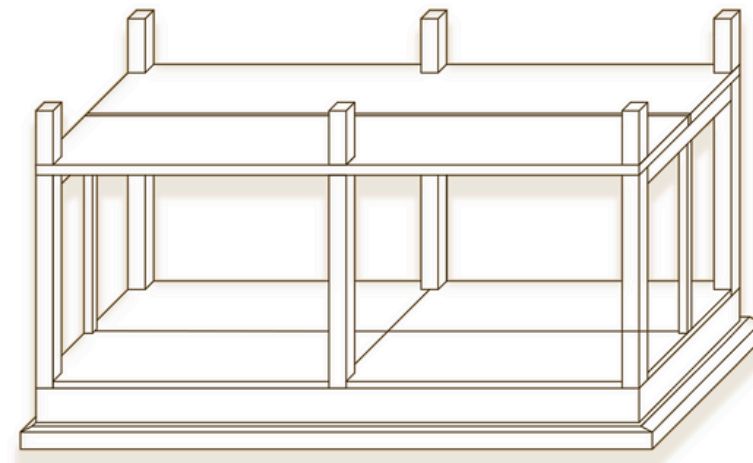
LNG TRUCK WITH TARPAULIN
SEMI-TRAILER

PHASE 'A5' - INSTALLATION/ASSEMBLY

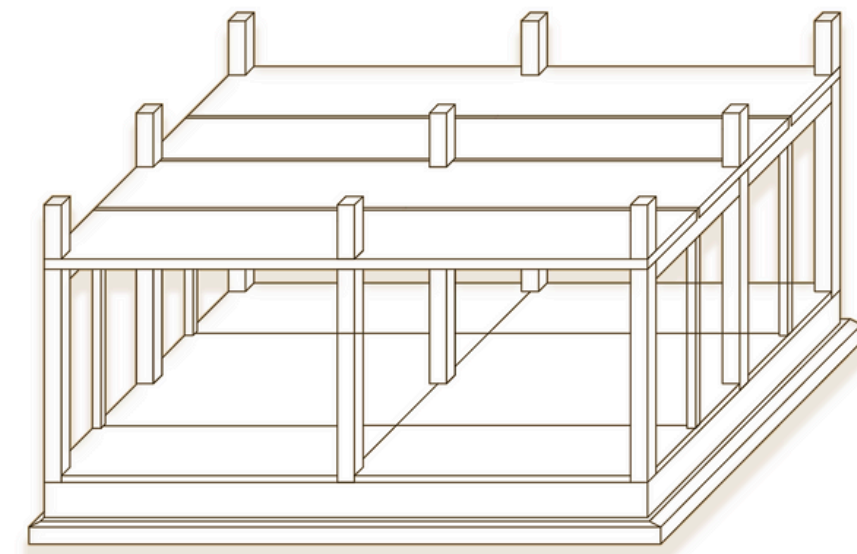
MODULE 1 - 5 x 5 m



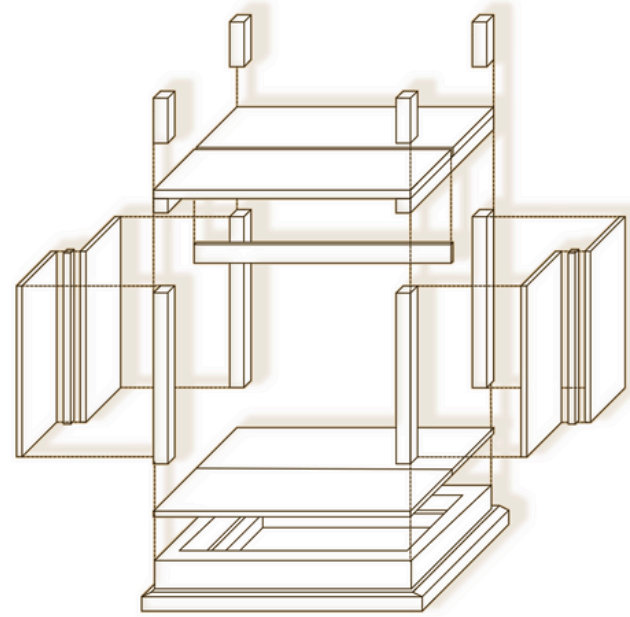
MODULE 2 - 10 x 5 m



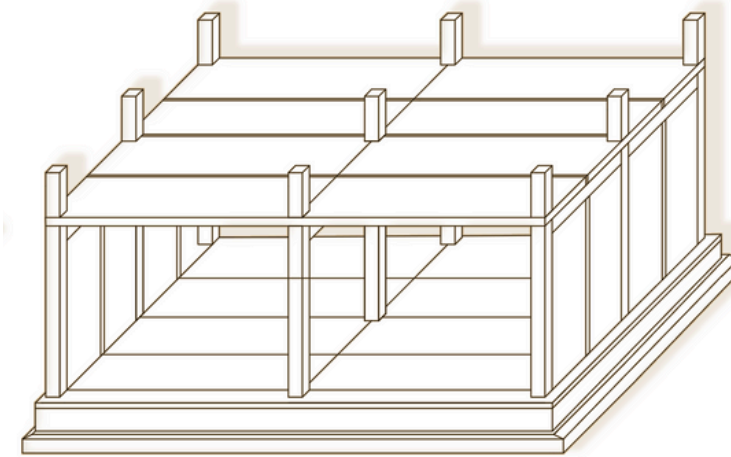
MODULE 3 - 10 x 10 m



#1 VILLEFONTAINE

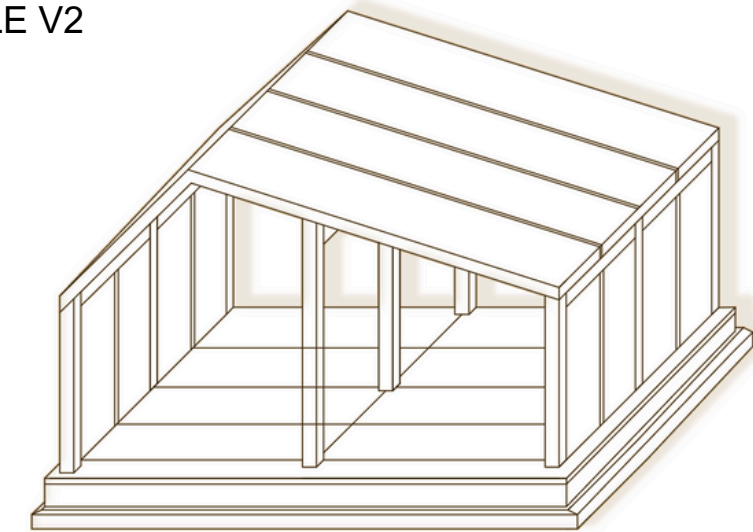


MODULE V1

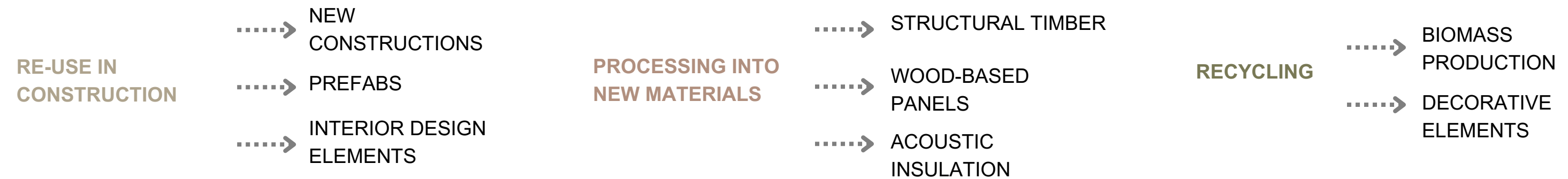


LIFE CYCLE OF A MODULAR CLT BUILDING

MODULE V2




PHASE 'D' - BENEFITS BEYOND THE SYSTEM BOUNDARIES



THE 'CRADLE TO CRADLE' PRINCIPLE

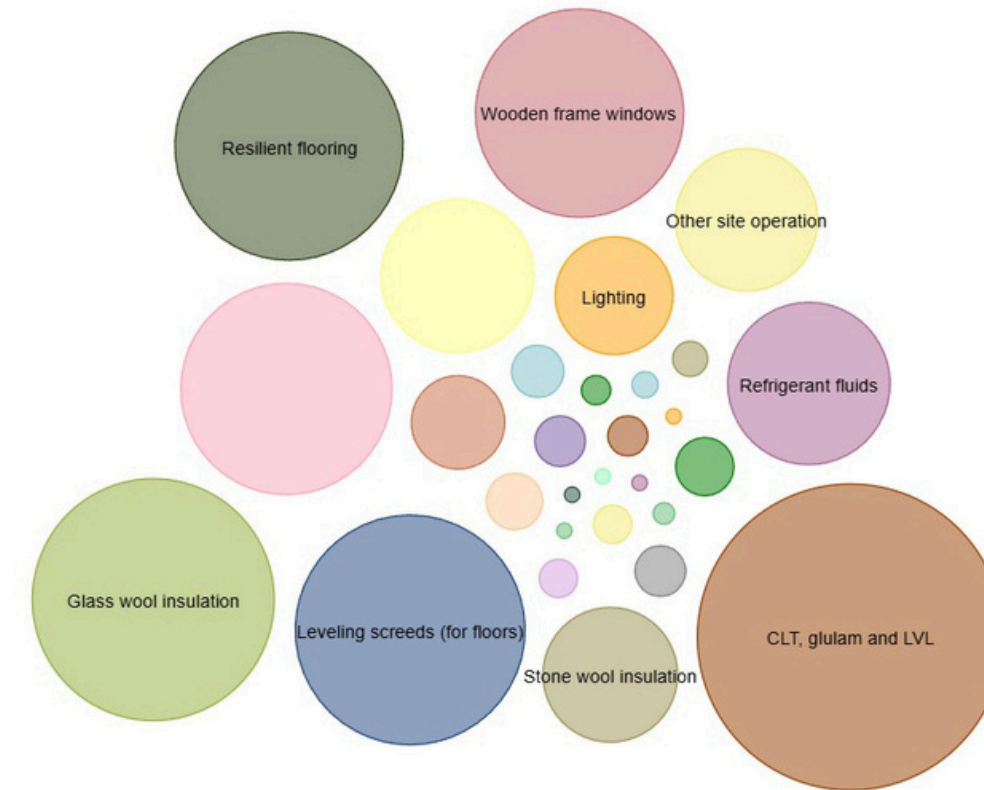


EMBODIED CARBON FOOTPRINT INDICATOR

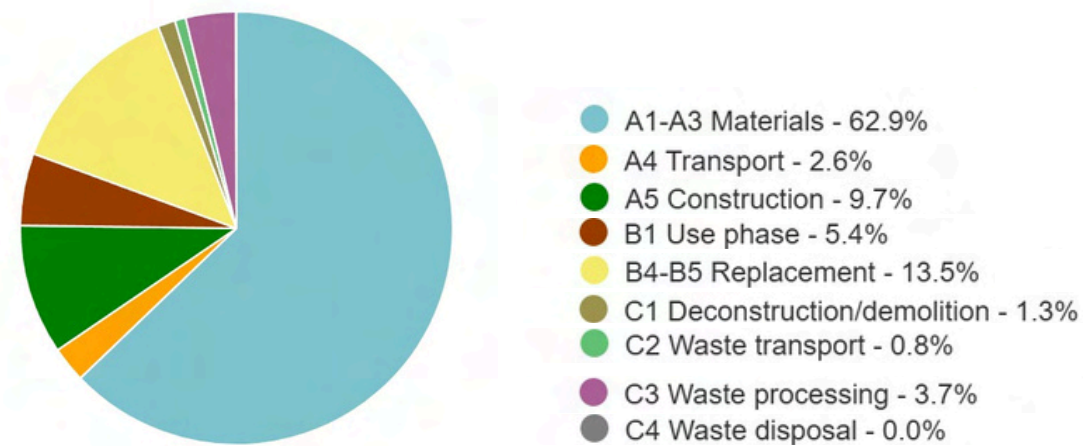
Cradle to grave (A1-A4, B4-B5, C1-C4)	kg CO ₂ e/m ²
(< 350) A	 403
(350-530) B	
(530-710) C	
(710-890) D	
(890-1070) E	
(1070-1250) F	
(> 1250) G	

France all building types - 2023 Q3

TOTAL LIFE-CYCLE IMPACT BY RESOURCE TYPE AND SUBTYPE



GLOBAL WARMING KG CO₂ E: LIFE-CYCLE STAGES



ANALYSIS ASSUMPTIONS

- ANALISED BUILDING: LABORATORY
- MAIN CONSTRUCTION MATERIAL: CLT, RAMMED EARTH
- FOUNDATION: RECYCLED SPLIT STONE
- THREE-LAYER LOW-E GLASS
- INSTALLATIONS INCLUDED
- GLASS WOOL INSULATION

THE BUILDING ACHIEVES A **LOW** EMBODIED CO₂ FACTOR

403 kg CO₂e/m²

THE USE OF THESE MATERIALS CONTRIBUTES TO **REDUCING A BUILDING'S CARBON FOOTPRINT** RIGHT FROM THE CONSTRUCTION PHASE.



#1 VILLEFONTAINE

ANNUAL ENERGY DEMAND FOR HEATING

DATA FOR ENERGY ANALYSIS

GENERAL DATA:

- GROSS CUBATURE 5050.70 m³
- TOTAL AREA 1228.88 m²
- USABLE SURFACE AREA 1044.54 m²
- CONSTRUCTION AREA 184.34 m²
- H STOREY (WITH FLAT ROOF) 4.11 m
- H STOREY (WITH SUSPENDED CEILING) 3.5 m
- H STOREY (WITHOUT SUSPENDED CEILING) 3.10 m
- NUMBER OF PERSONS APPROX. 150

AREA SUMMARY:

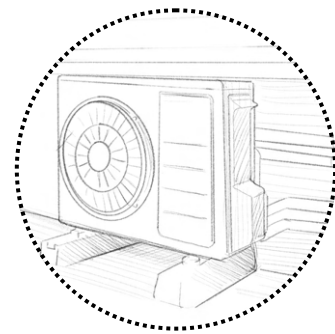
- WALL AREA N 225.52 m²
- WALL AREA S 210.9 m²
- WALL AREA E 100.63 m²
- WALL AREA W 128.24 m²
- WINDOWS AREA N 101.35 m²
- WINDOWS AREA S 106.23 m²
- WINDOWS AREA E 45.52 m²
- WINDOWS AREA W 23.18 m²
- DOOR AREA N 2.42 m²
- DOOR AREA S 6.08 m²
- DOOR AREA E 5.27 m²

FACTORS:

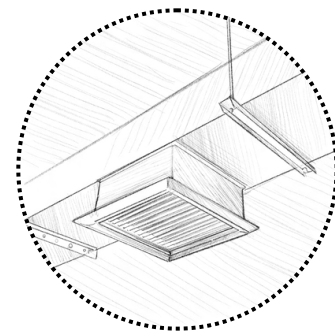
- WINDOWS AND DOORS **U_g - 0.60 W/m²K**
- EXTERIOR WALL **U - 0.15 W/m²K**
- GROUND FLOOR: **U - 0.142 W/m²K**
- ROOF: **U - 0.15 W/m²K**



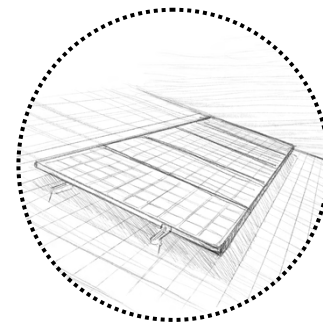
SOLUTIONS



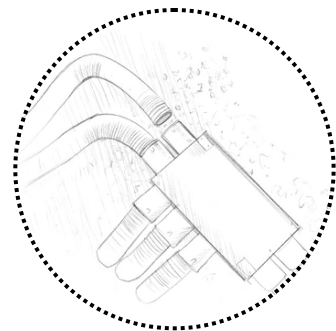
HEAT PUMP



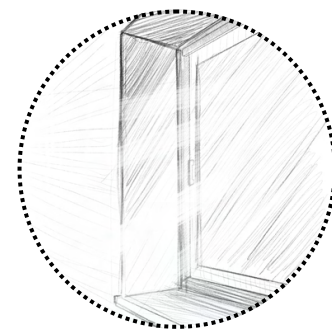
MECHANICAL VENTILATION WITH HEAT RECOVERY



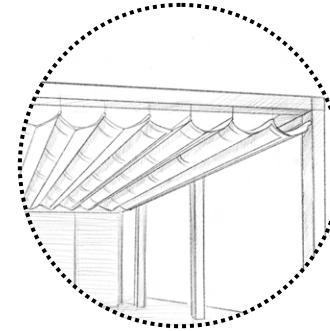
PHOTOVOLTAIC PANELS AND TURBINES



HEAT EXCAHNGER



AIR TIGHTNESS



SUN PROTECTORS

ANNUAL ENERGY DEMAND FOR HEATING

THE LABORATORY BUILDING IS CHARACTERISED BY HIGH ENERGY EFFICIENCY.

13.34 kWh/(m²·year)

WITH PHOTOVOLTAIC PANELS, HIGH QUALITY SAINT-GOBAIN MATERIALS, A HEAT PUMP, HEAT EXCHANGER AND ENERGY FROM WIND TURBINES, IT OPTIMISES THE USE OF RENEWABLE ENERGY AND MINIMISES HEAT LOSS.

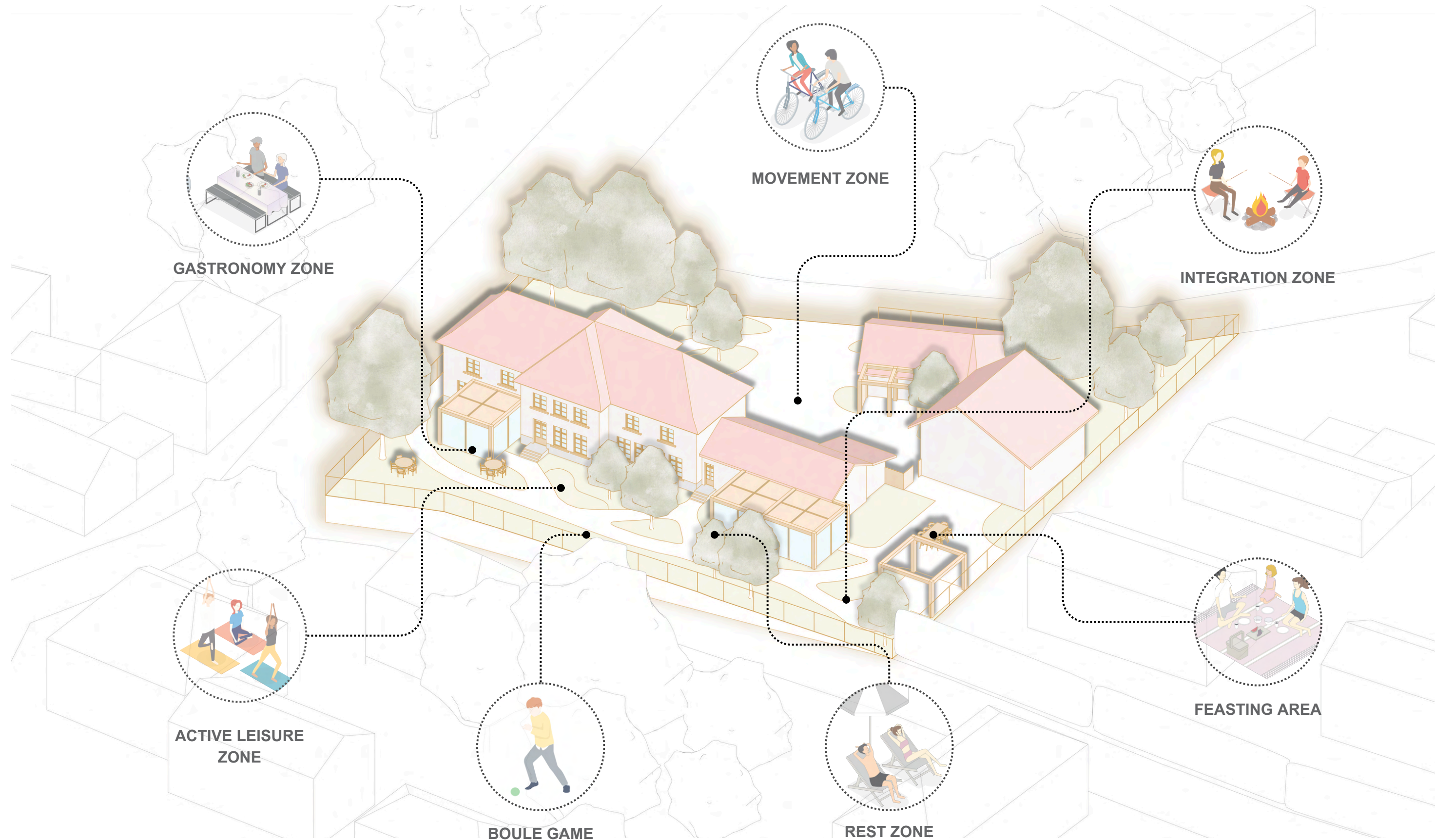
PROJECT CONCEPT

2.1 VILLEFONTAINE

2.2 CHIMILIN







#2 CHIMILIN

MASTER PLAN



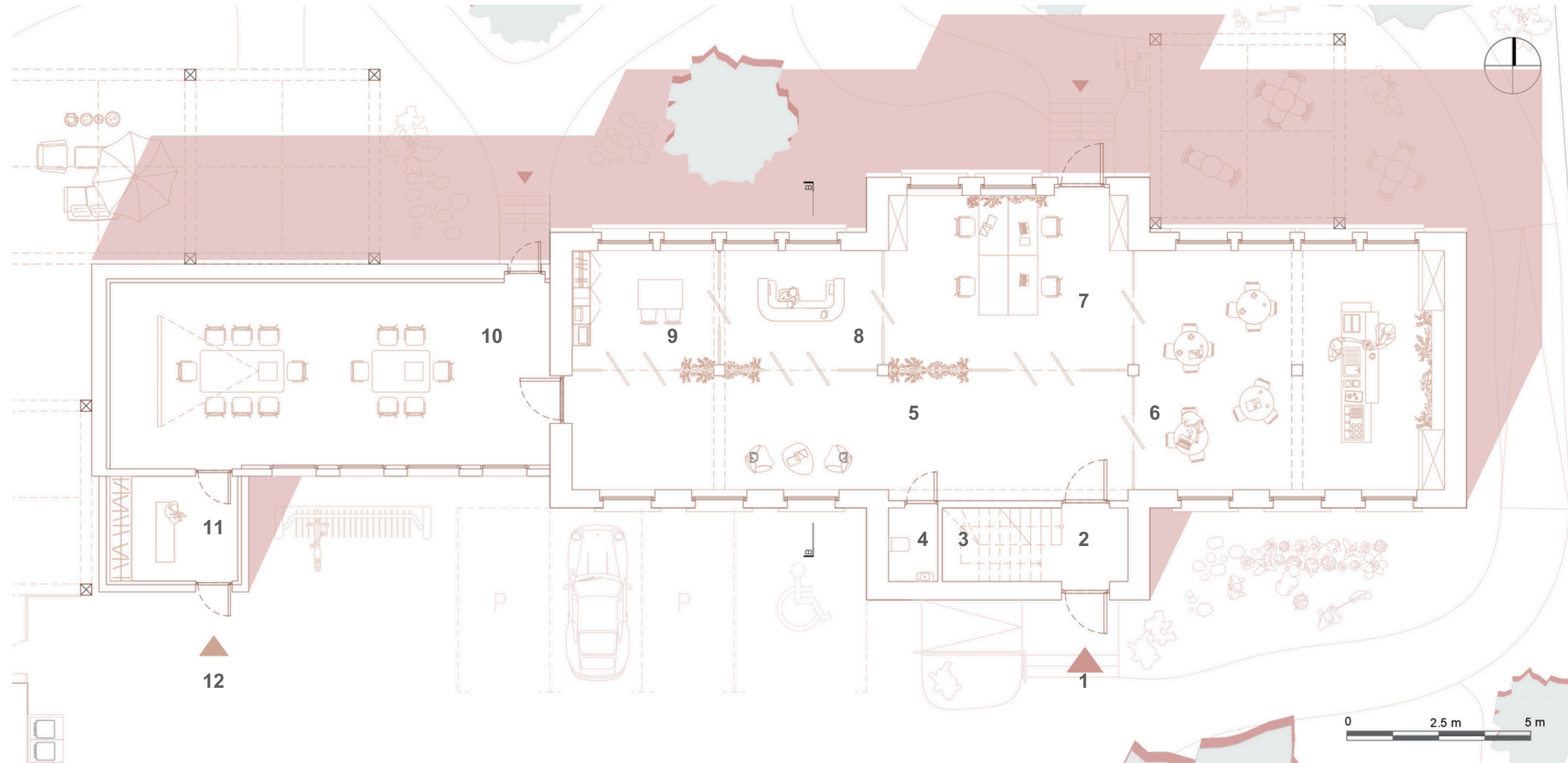
- 1. MAIN ENTRANCE
- 2. FLOWER MEADOWS, GARDEN
- 3. PARKING
- 4. BICYCLE RACKS

- 5. TRASH BIN SHED
- 6. STORAGE
- 7. BEE HIVES, FEEDERS
- 8. TECHNICAL FACILITIES

- 9. OUTDOOR KITCHEN, BARBECUE
- 10. EVENT SPACE
- 11. CAMPFIRE AREA - INTEGRATION
- 12. REST AREA

- 13. CONFERENCE ROOM
- 14. ASSOCIATION CENTRE
- 15. YOGA AREA
- 16. GASTRONOMY TERRACE





- 1. MAIN ENTRANCE
- 2. VESTIBULE
- 3. VERTICAL COMMUNICATION

- 4. SANITARY ROOM
- 5. LOBBY
- 6. CAFETERIA, BUFFET

- 7. COWORKING, LIBRARY
- 8. ADMINISTRATION
- 9. STAFF ROOM

- 10. CONFERENCE ROOM
- 11. CLOAKROOM
- 12. SIDE ENTRANCE

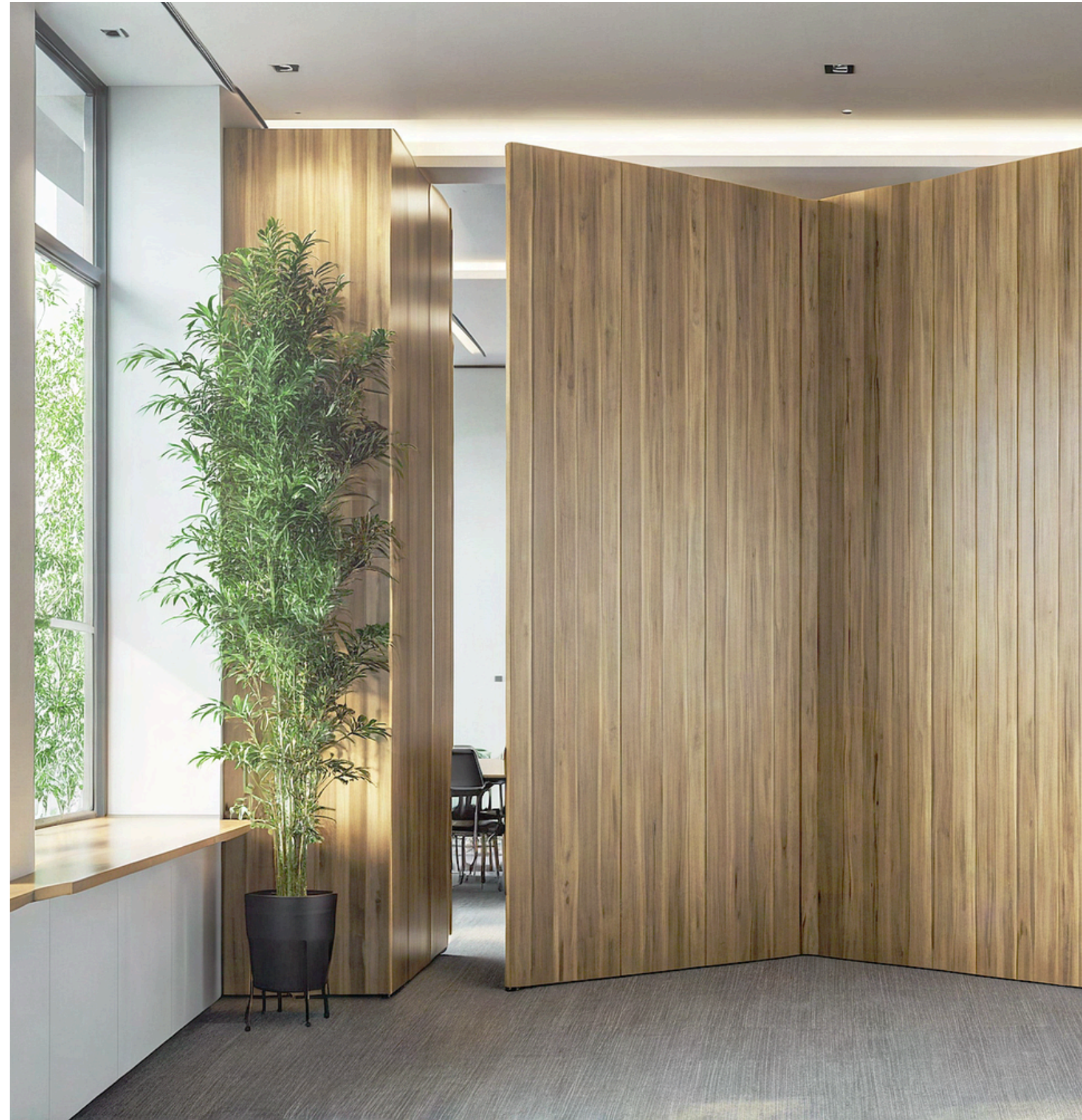


- 1. VESTIBULE
- 2. VERTICAL COMMUNICATION
- 3. SANITARY ROOM

- 4. HALL
- 5. CINEMA ROOM, LECTURE HALL
- 6. PLAYROOM/MUSIC ROOM

- 7. ART ROOM
- 8. UTILITY FACILITIES
- 9. CREATIVE/EXHIBITION SPACE

#2 CHIMILIN



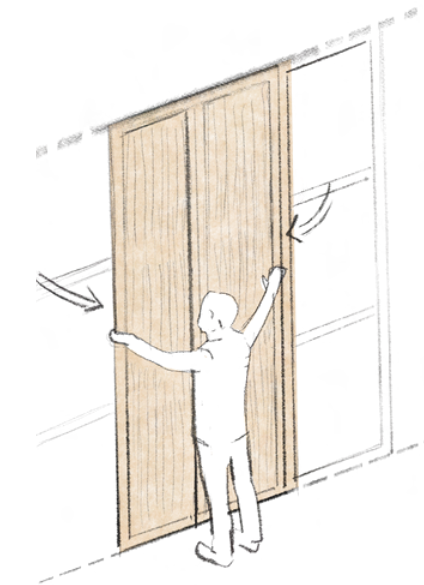
SAINT-GOBAIN STUDENT CONTEST | 2025

TECHNOLOGY - MOVABLE PARTITION WALLS

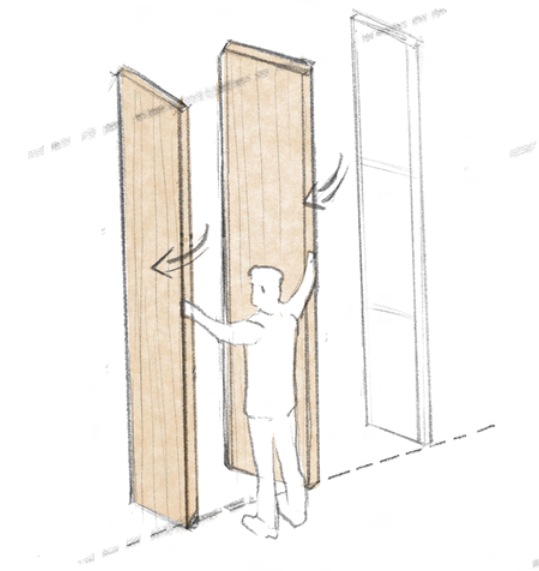
DESIGN WITH A VIEW TO
RE-ADAPTATION OF THE
SPACE

MOVABLE WALL SYSTEM

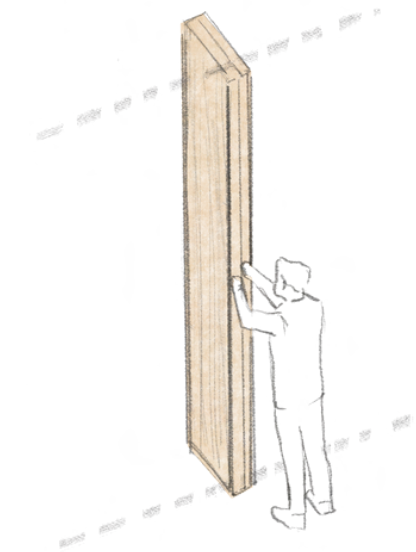
STEP 1
UNFOLDING



STEP 2
SLIDING

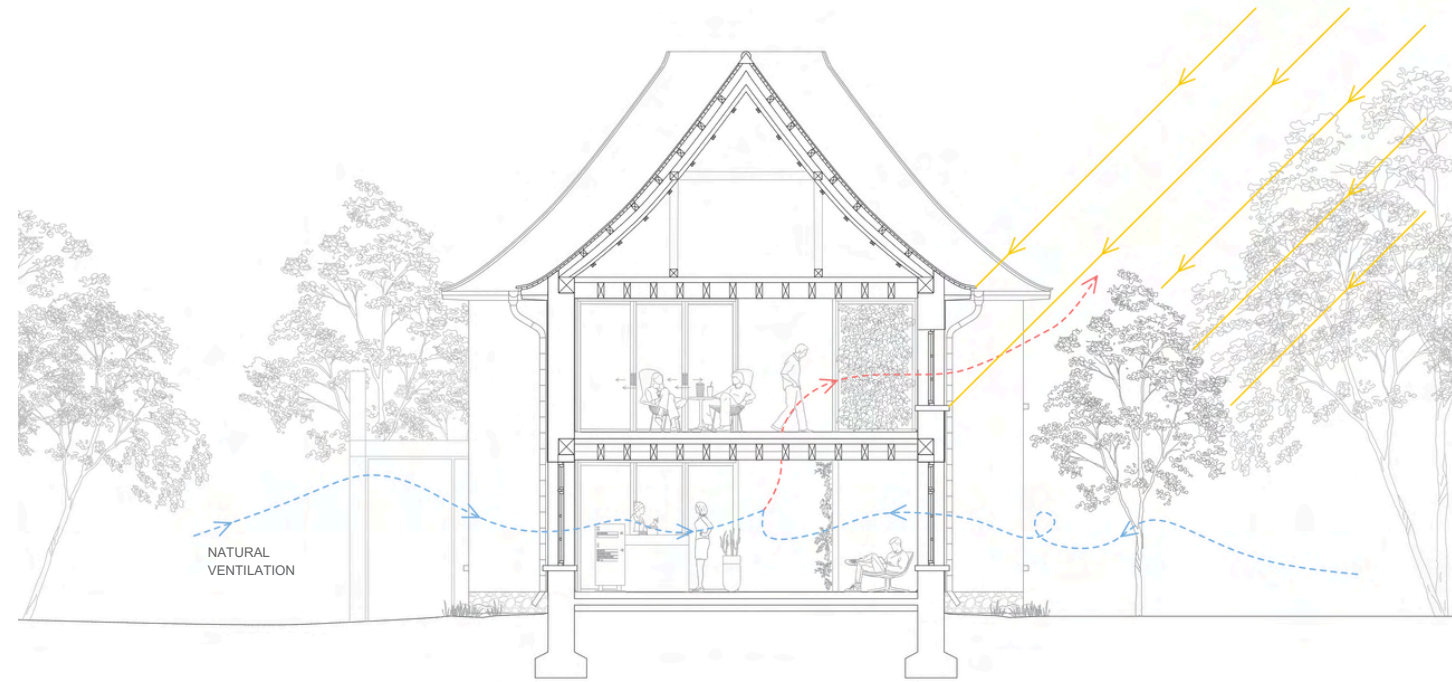


STEP 3
FOLDING

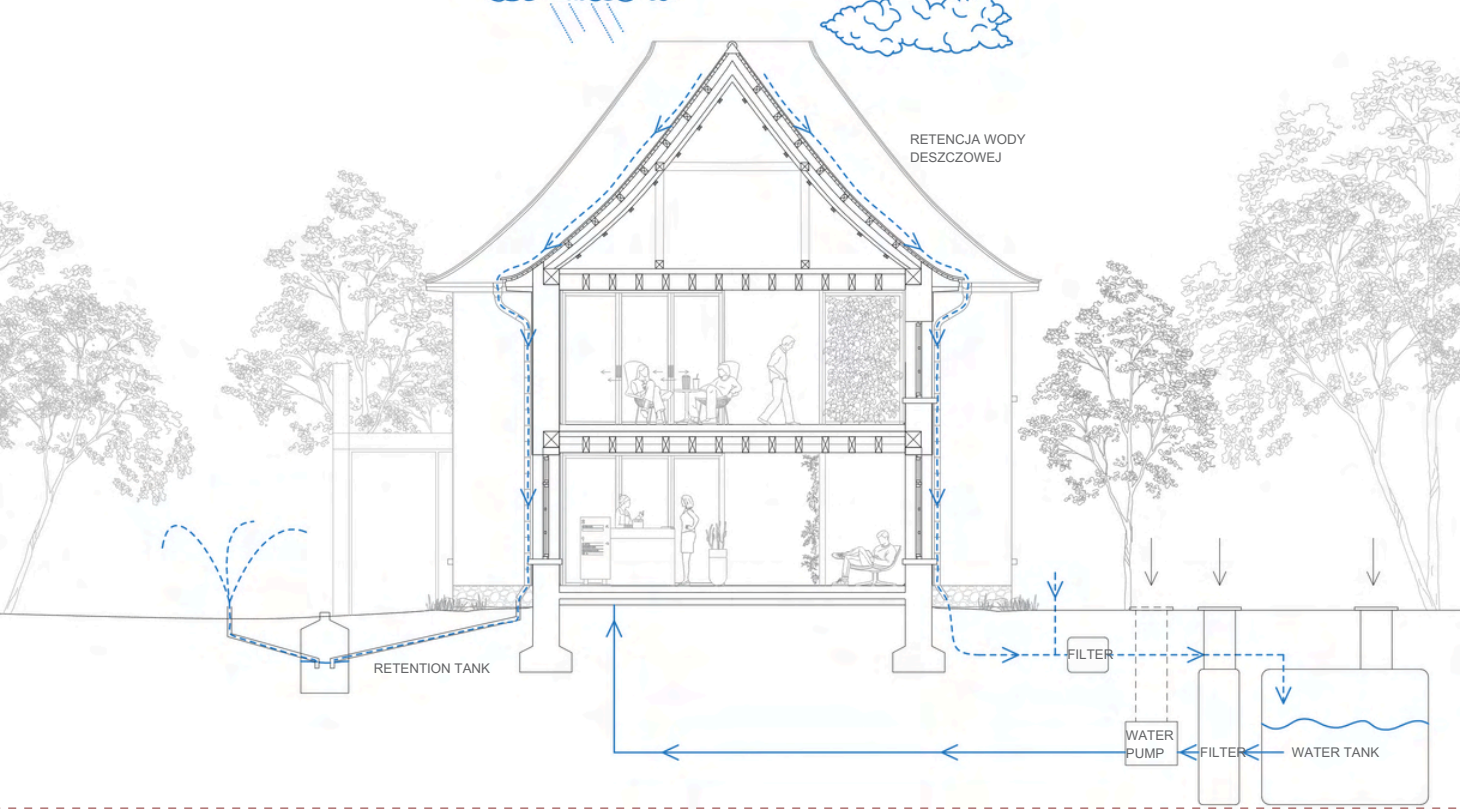


ALEKSANDRA BOSZKE & NATASZA STĘŻYCKA

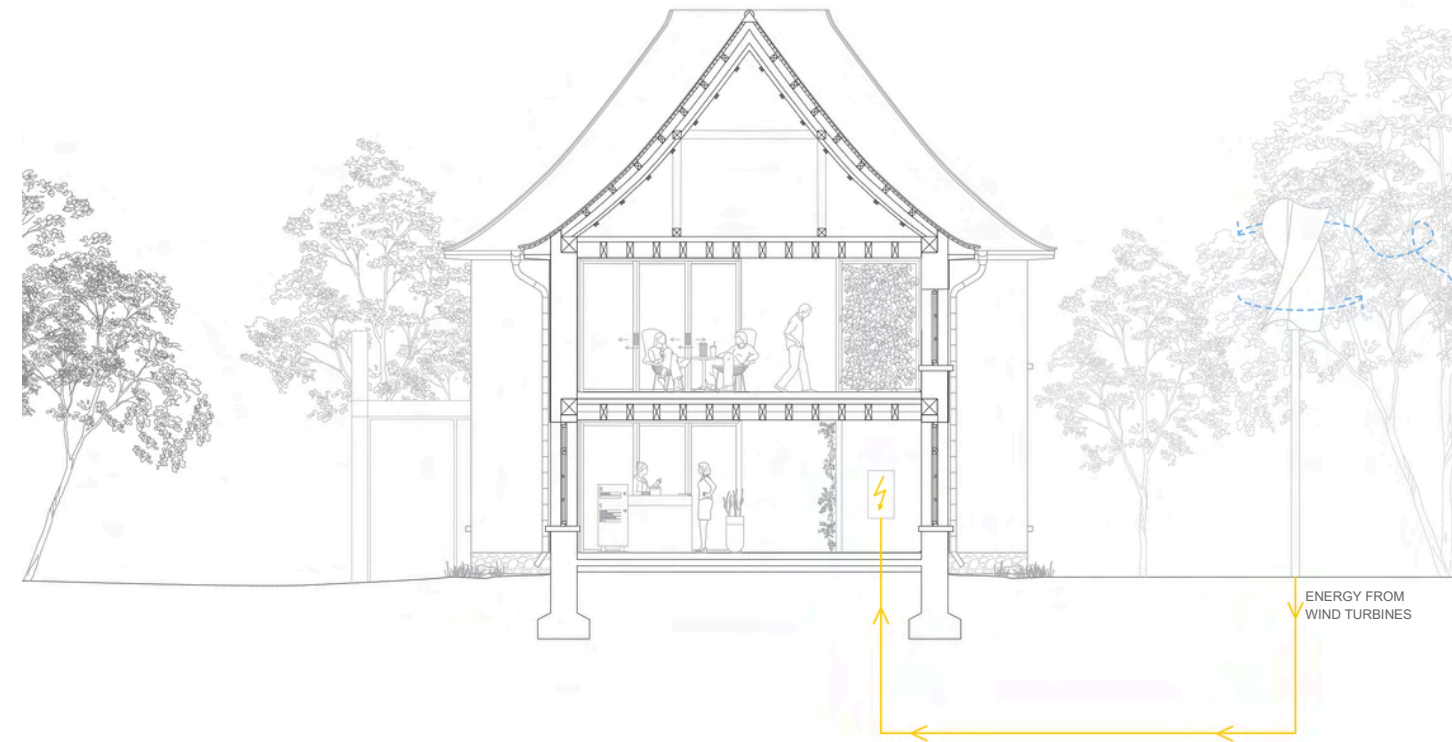
LIGHTING AND VENTILATION



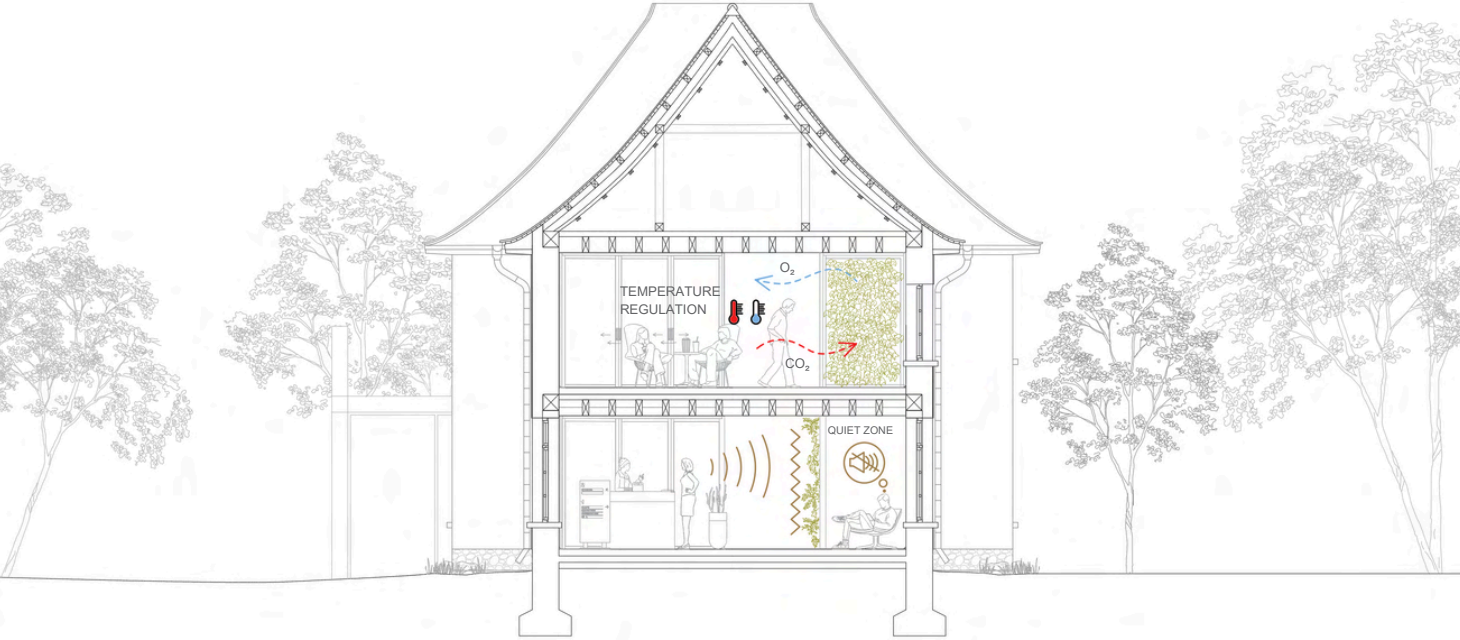
WATER MANAGEMENT

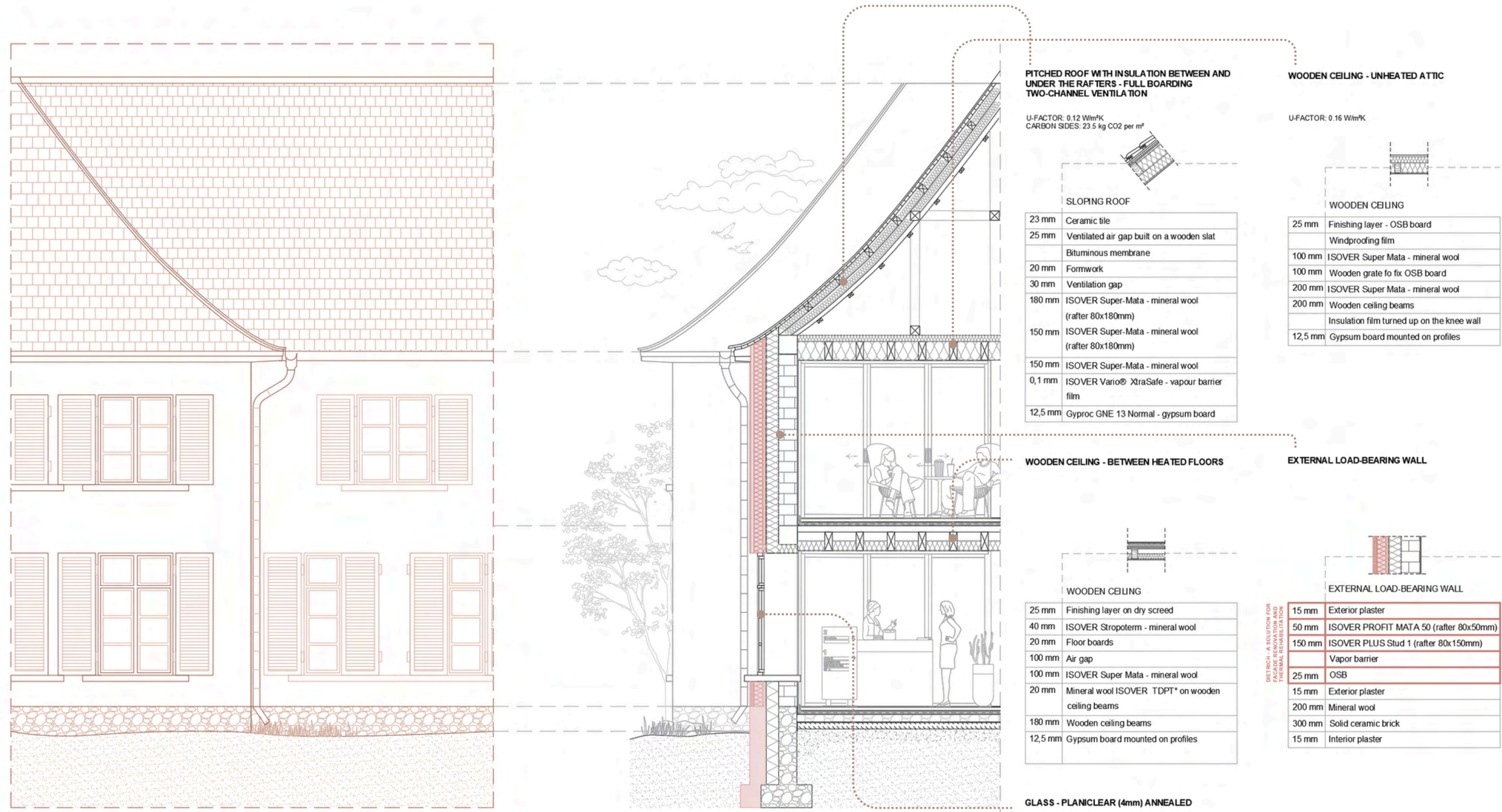


ENERGY MANAGEMENT



WELLBEING

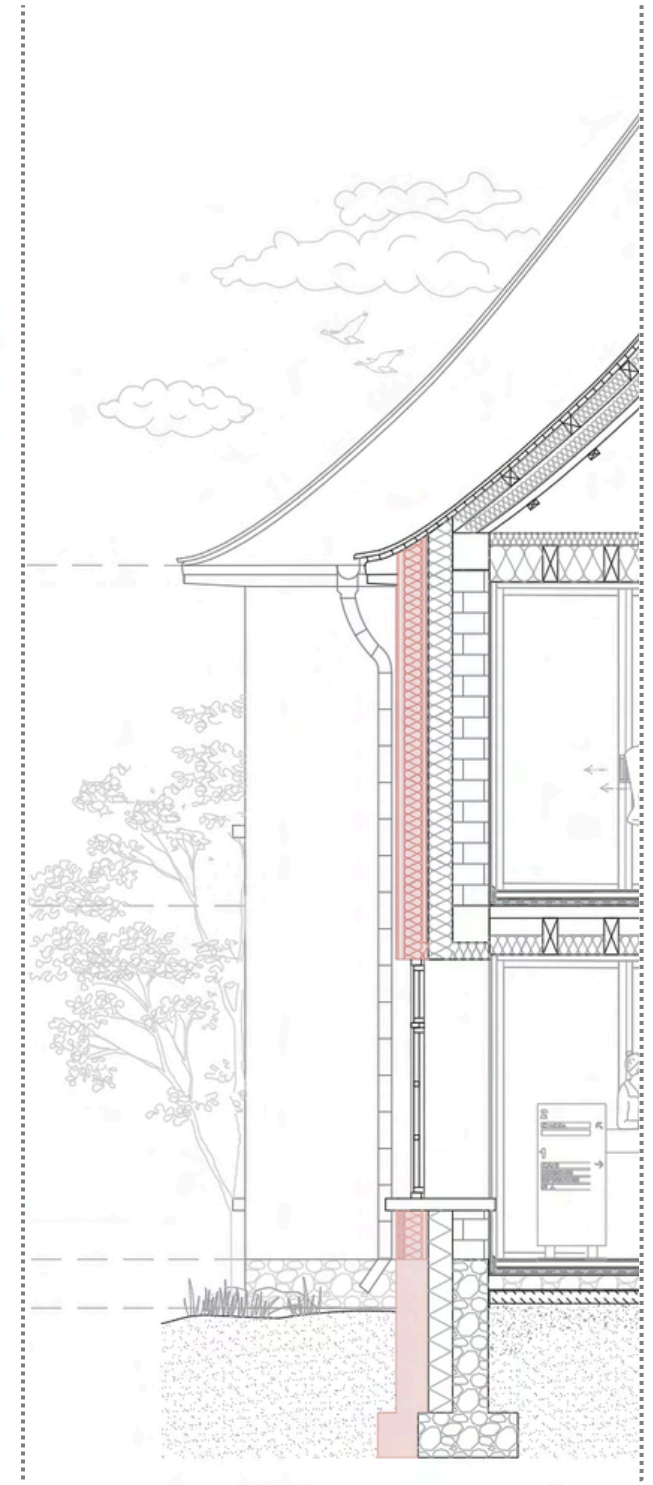






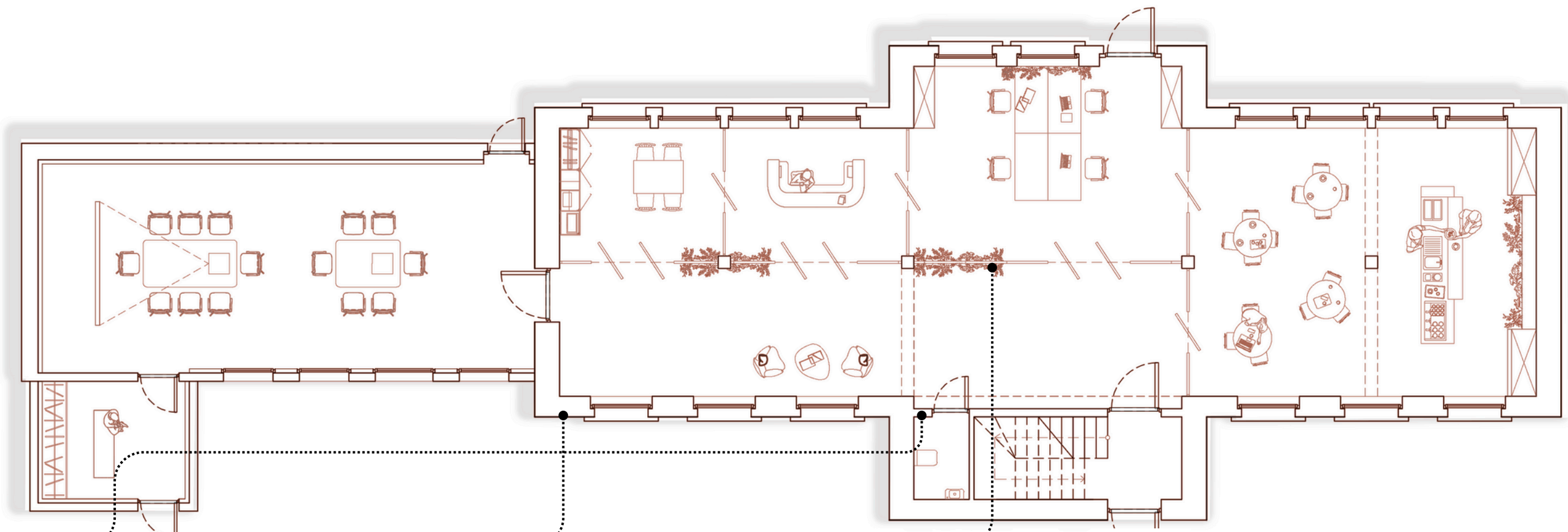
EXTERNAL LOAD-BEARING WALL

EXTERNAL LOAD-BEARING WALL	
15 mm	Exterior plaster
50 mm	ISOVER PROFIT MATA 50 (rafter 80x50mm)
150 mm	ISOVER PLUS Stud 1 (rafter 80x150mm)
	Vapor barrier
25 mm	OSB
15 mm	Exterior plaster
200 mm	Mineral wool
300 mm	Solid ceramic brick
15 mm	Interior plaster



AS PART OF THE REVITALIZATION OF AN OLD SCHOOL BUILDING, A PREFABRICATED SELF-SUPPORTING WALL SYSTEM BY **DIETRICH** WAS USED, INTEGRATED WITH NEW WINDOWS. THIS SOLUTION WAS CHOSEN DUE TO DAMAGE TO THE LOAD-BEARING WALLS, WHICH COULD NOT BE FURTHER BURDENED. THE WALLS ARE BASED ON **INDEPENDENT FOUNDATIONS** AND BUILT USING TIMBER FRAME TECHNOLOGY WITH GLASS WOOL INSULATION, ENSURING HIGH THERMAL PERFORMANCE. THE TECHNOLOGY ENABLED EFFECTIVE INSULATION OF THE BUILDING, IMPROVED AESTHETICS, AND USER COMFORT, WITHOUT INTERFERING WITH THE WEAKENED ORIGINAL STRUCTURE. **THE ORIGINAL APPEARANCE OF THE OLD FAÇADE WAS PRESERVED.**

PLAN - PARTITIONS, SAINT-GOBAIN PRODUCTS



**GYPROC GNE NORMAL PARTITION WALL
CLT 90 MM**

SOUND REDUCTION: 38 Rw (dB)
CARBON SIGNIFICANCE: 10 kg CO2 per m²

12 cm	CLT PARTITION WALL
12,5 mm	Gyproc GNE 13 Normal - gypsum board
90 mm	Cross laminated timber (CLT) element
12,5 mm	Gyproc GNE 13 Normal - gypsum board

BEARING WALL OF RAMMED EARTH 60 CM

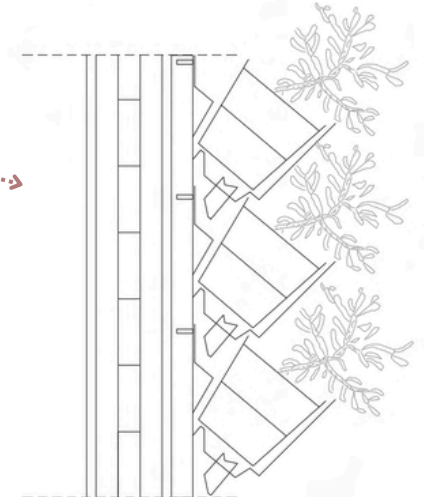
U-FACTOR: 0.63 W/m²K
SOUND REDUCTION: 60 Rw (dB)
CARBON SIGNIFICANCE: 50 kg CO2 per m²
WEIGHT: 1134 kg/m²

63 cm	LOAD-BEARING INTERIOR WALL
15 mm	Exterior clay plaster
600 mm	Compacted earth
15 mm	Interior clay plaster

FLORAPANEL GREEN PARTITION WALL 850

SOUND REDUCTION: 38 Rw (dB)
CARBON SIGNIFICANCE: 10 kg CO2 per m²

12 cm	GREEN PARTITION WALL
12,5 mm	Gyproc GNE 13 Normal - gypsum board
90 mm	Cross laminated timber (CLT) element
12,5 mm	Gyproc GNE 13 Normal - gypsum board
	Self-drilling screw
	Level transfer
	ISOVER intensive water retention layer
	Growing medium
	Vegetation
	FloraPot
	Flora Panel 850





PIECE BY PIECE

STEP BY STEP | IN THE RHYTHM OF NATURE



