



**Ganna Youssry**

"Architecture serves as a silent storyteller, preserving memories that shape a place's identity and reflect its deeper soul."



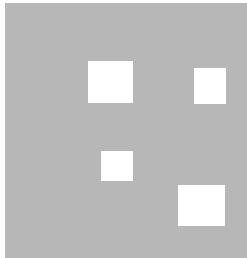
**Jana Nabil**

"As an architect, my identity is sculpted by the balance of structure and emotion in every design."



**Nouran Ahmed**

"Architecture is the art of connection and harmony between ourselves and the world around us."



وْجَدَانُ

Transforming Education from Monochrome to Vibrant Living."

**SAE**  
SCHOOL OF ARCHITECTURE IN EGYPT  
LEARN+EXPERIENCE

Team 50



# BRIEF DESCRIPTION

## Sinai Bedouins' Cultural Heritage

The Sinai population has predominantly been made up of desert-dwelling Bedouins, known for their vibrant traditional attire and rich cultural heritage.



## Infrastructure Gaps in Sinai

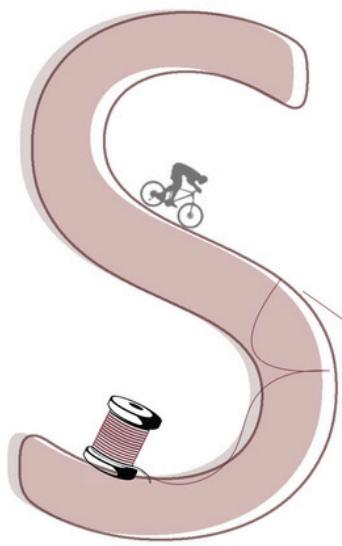
Infrastructure development in the Sinai Peninsula lags behind other regions, impacting residents' quality of life and economic opportunities.



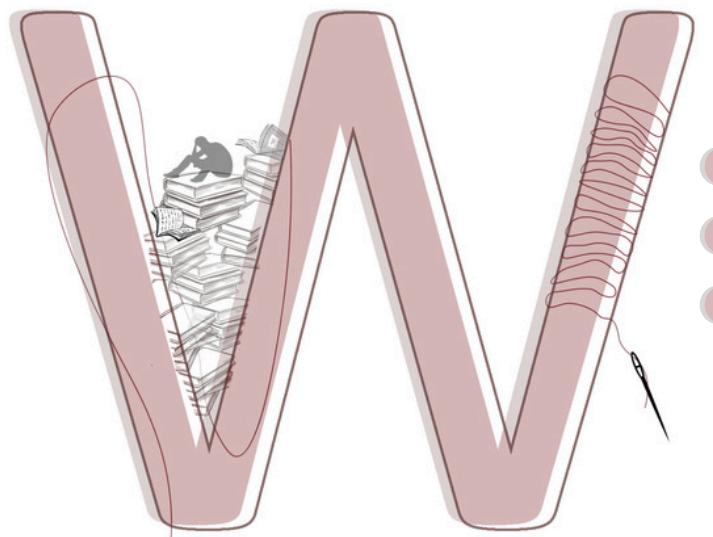
## STEAM School for Bedouin Culture

The challenge is to create a modern STEAM school that aligns with the Bedouin culture of Sinai.

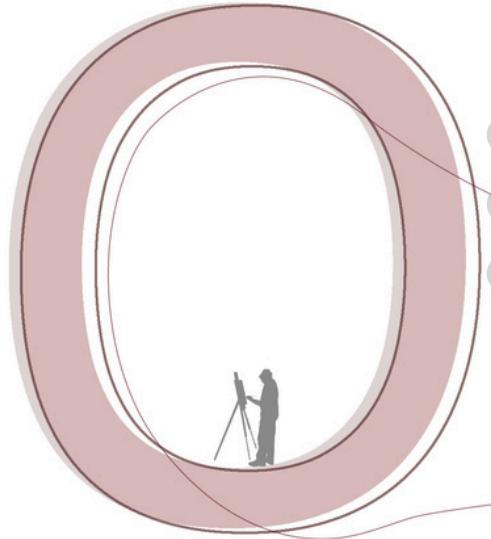
## SWOT ANALYSIS



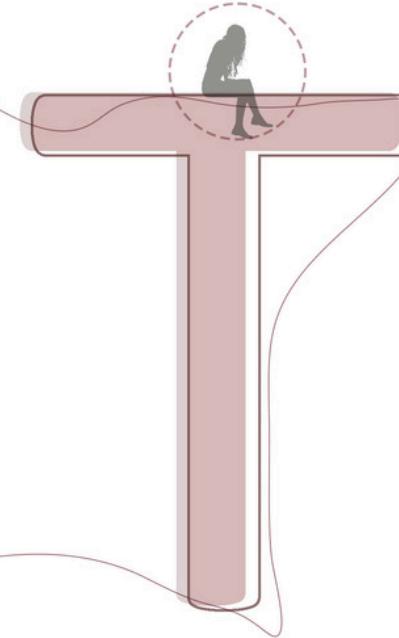
Site is surrounded by Sinai mountains and Red Sea rare vegetation and desert environment.



Lack of accessibility not eligible for life unsafe location.



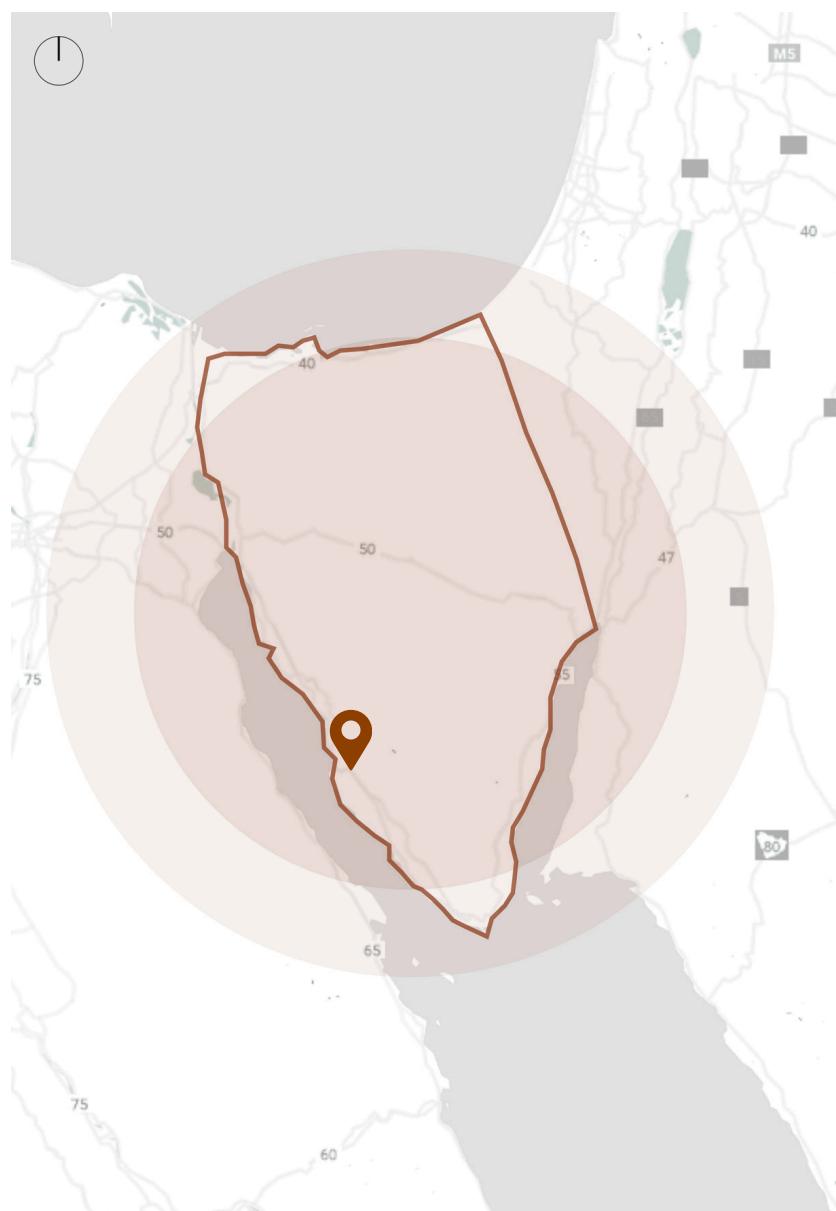
Flat land to shape according to the design potential to connect nature with people.



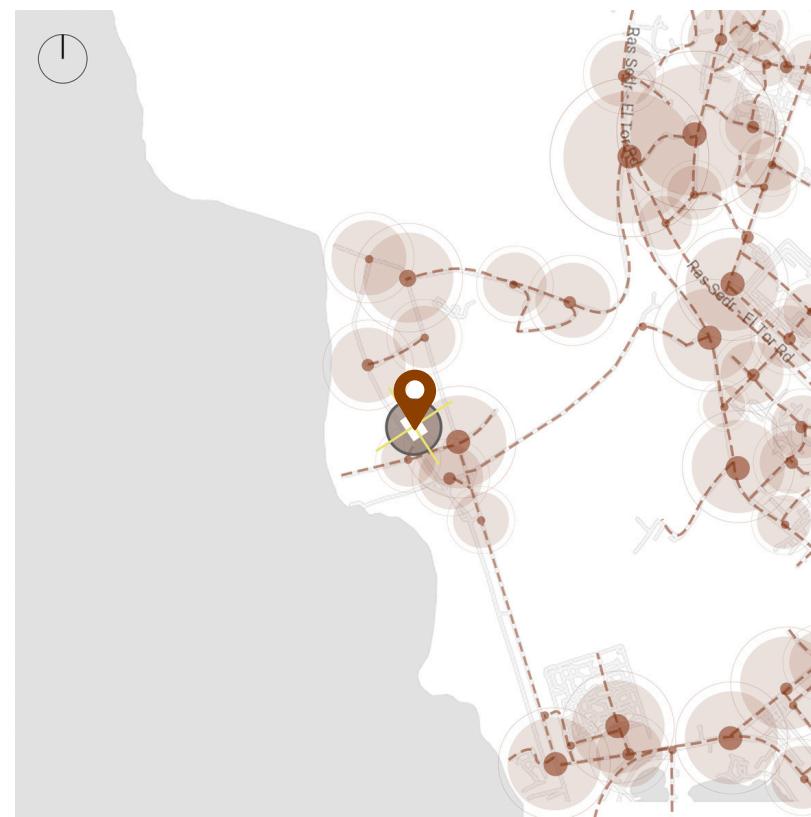
The project program, which is distinct and novel compared to the site identity.

# ANALYTICAL MAPS

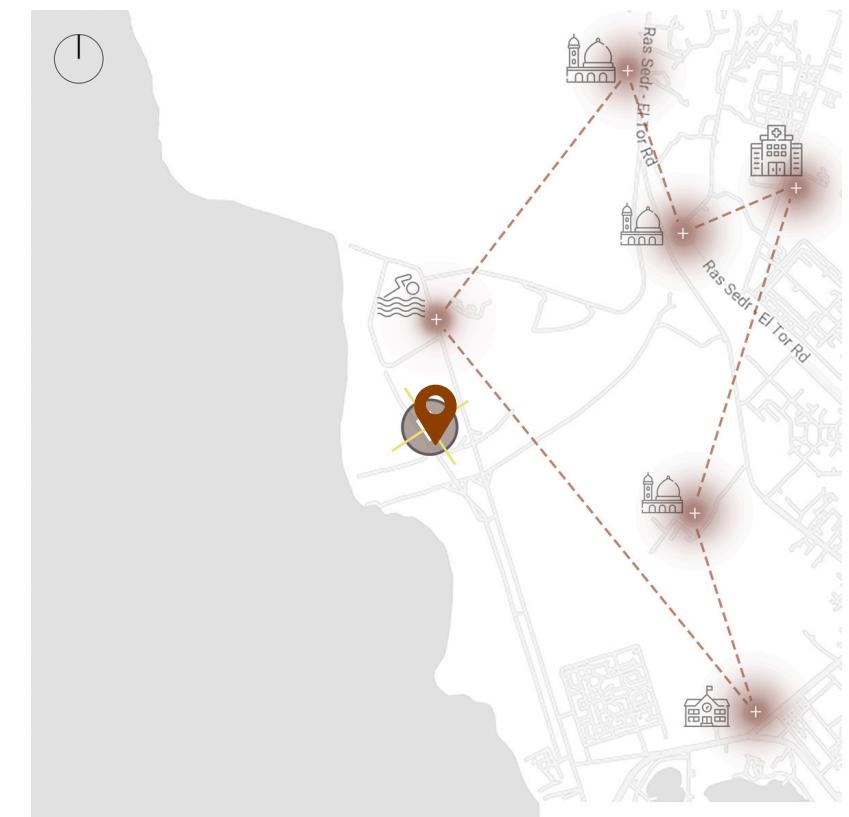
El Tur is the administrative capital of South Sinai, located about 100 kilometers north of Sharm el Sheikh, and serves as a key administrative and economic hub in the region.



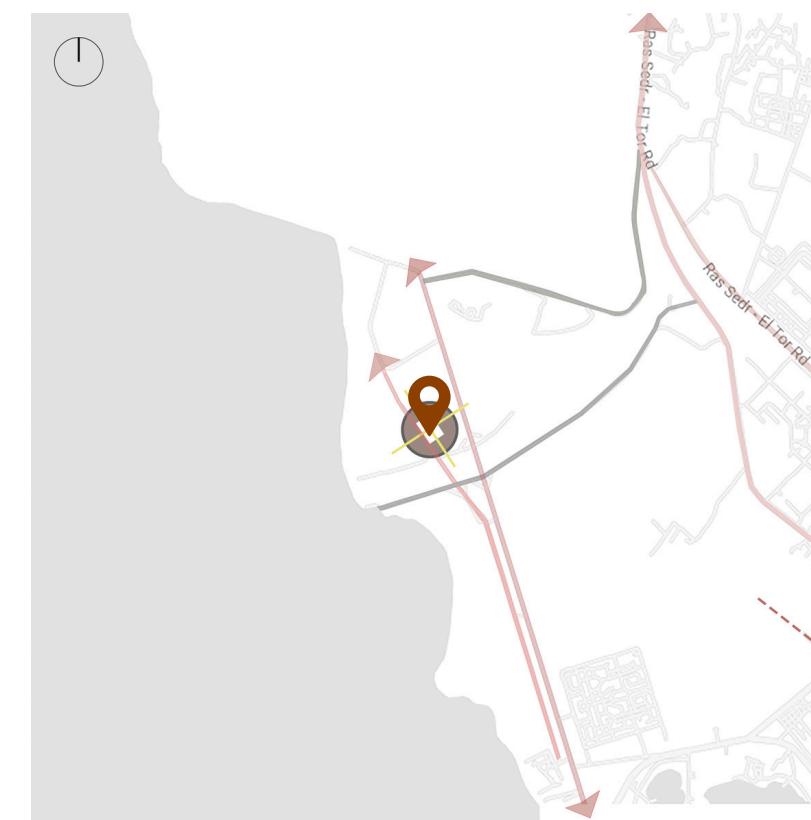
Site Location map



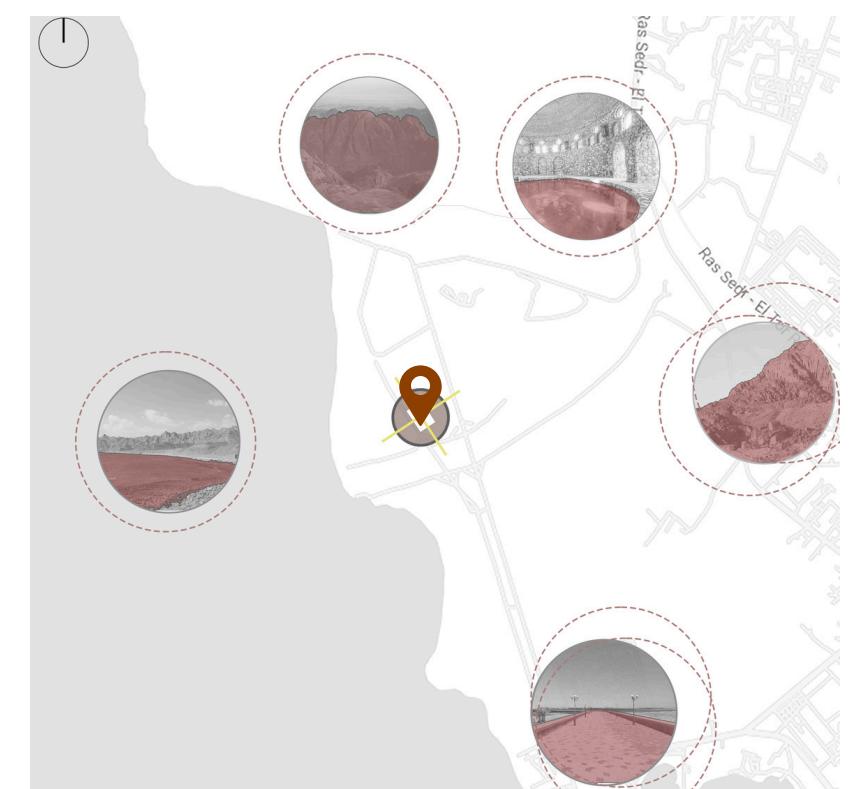
Connections map



Services map



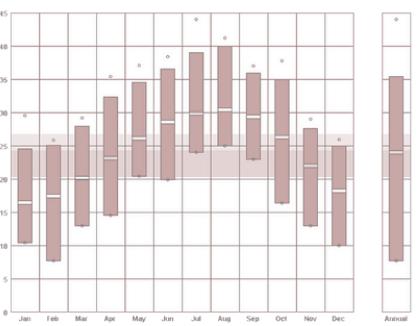
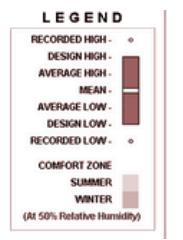
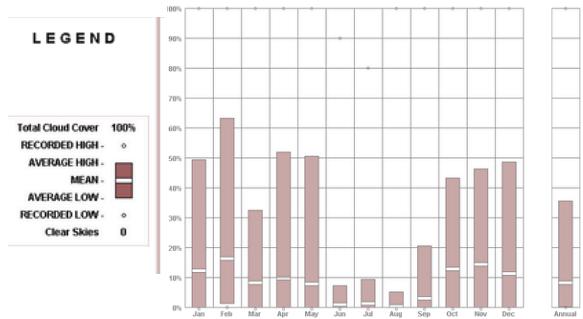
Accessibility map



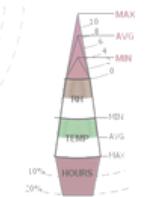
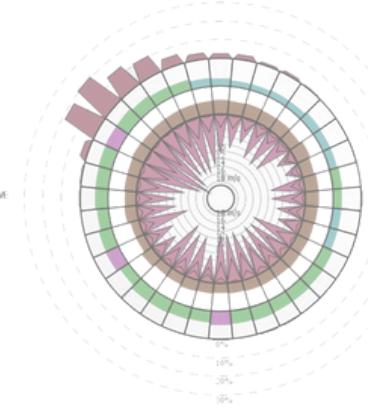
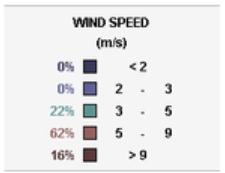
Landmarks map

# WEATHER ANALYSIS DIAGRAMS

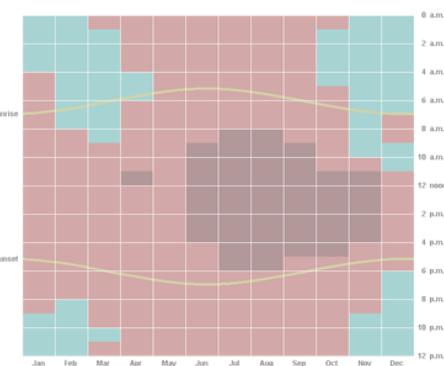
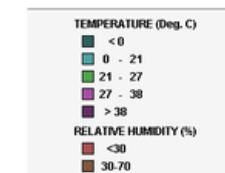
The Sinai Peninsula has an arid climate with mild winters and hot summers in coastal areas, while the desert interior experiences extreme temperature variations. Coastal regions benefit from warm Red Sea waters year-round.



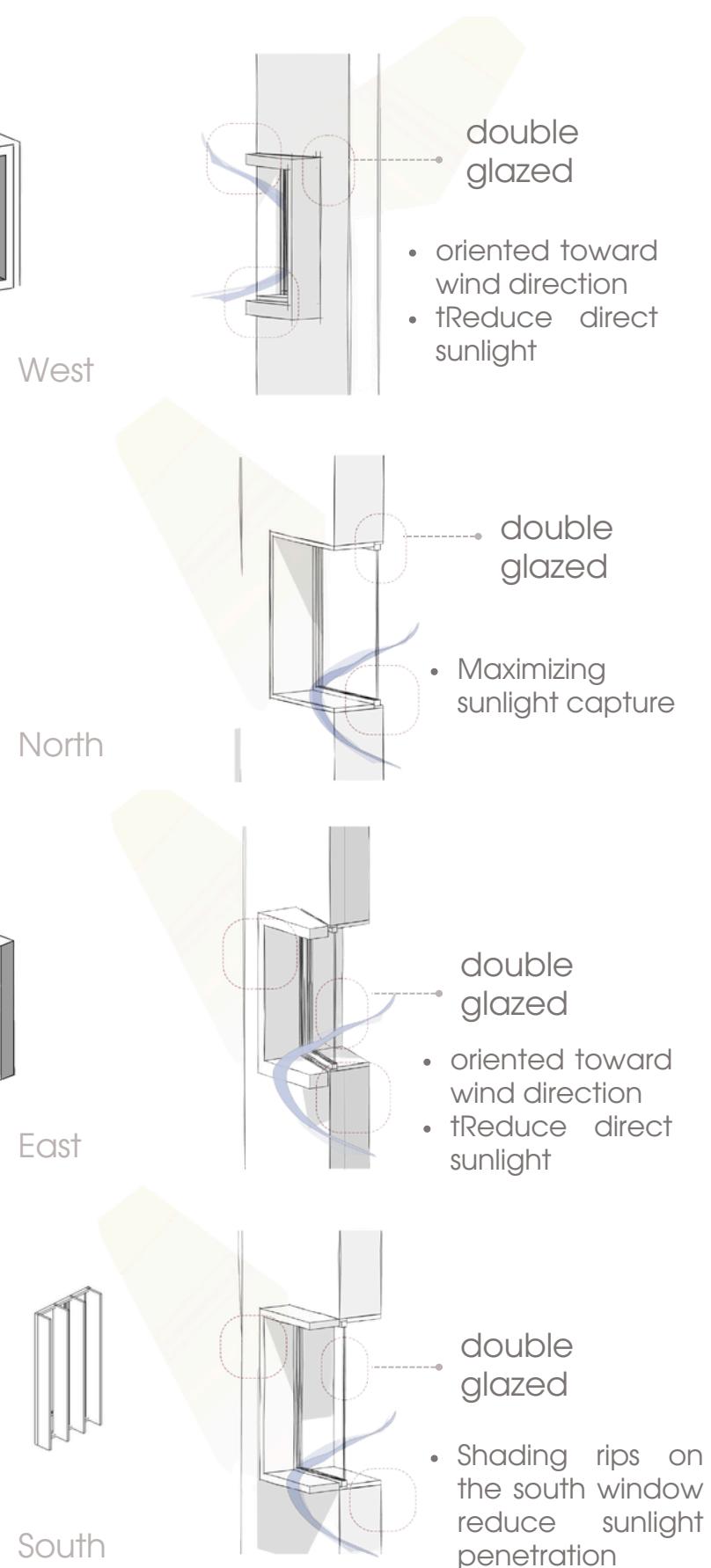
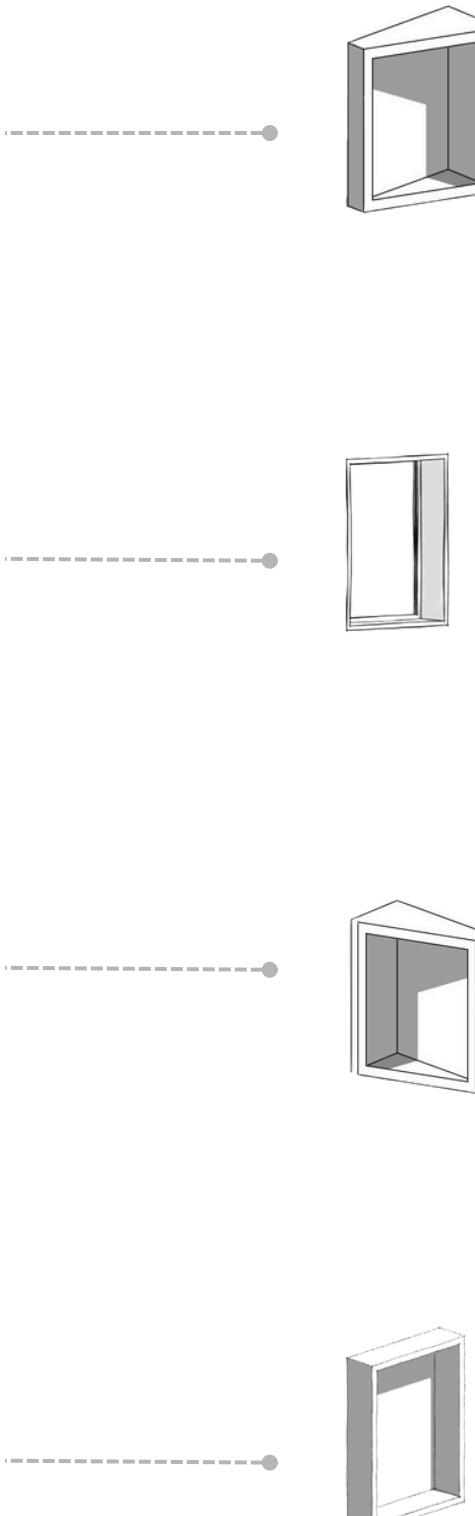
The sky cover graph shows that the maximum coverage reaches 65%, the minimum drops to 5%, and the average is around 35%. This indicates that sun radiation is almost direct most of the time in El Tor.



Wind wheel : From the wind speed data, it was concluded that the highest percentage of wind comes from the northwest direction."



Conclusion: The design should maximize shading and capture the highest amount of wind, using strategies and materials that can withstand the harsh desert temperatures.





# PROBLEMS

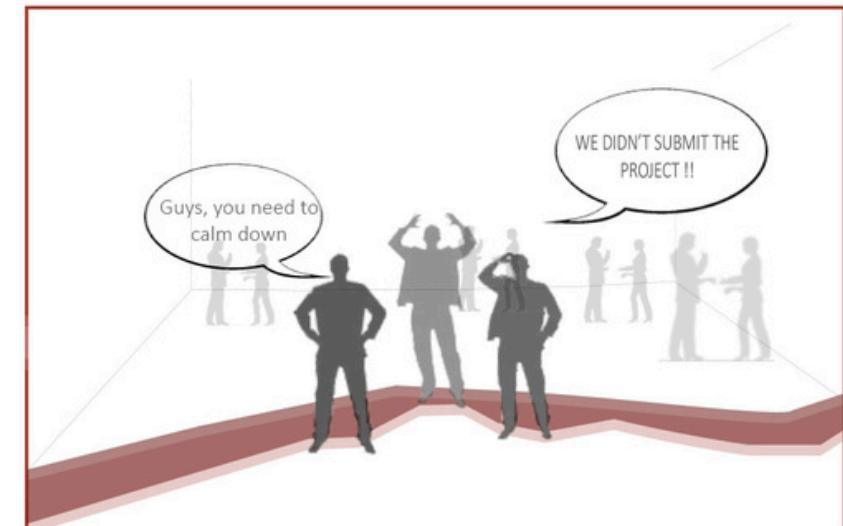
Our concept was inspired by a survey we conducted with STEAM students, which revealed that their main challenge is the inability to freely express themselves.



Landscape Design



Study Addiction



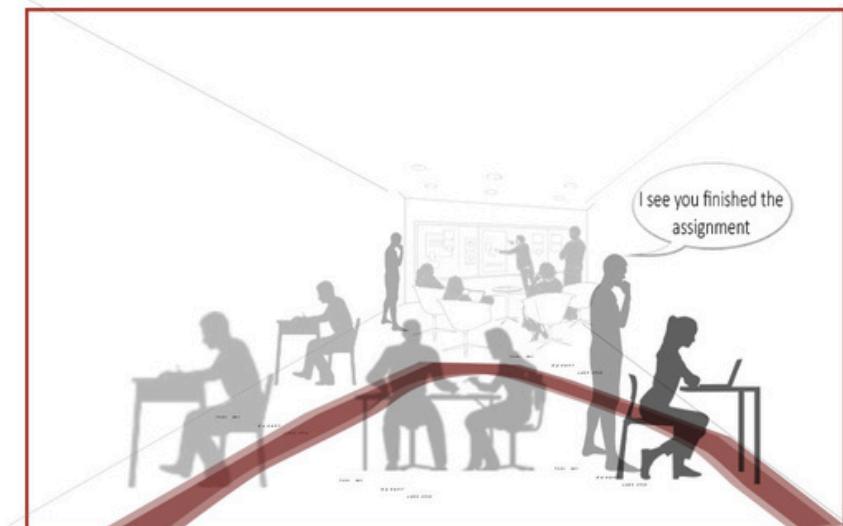
Excessive stress



Lack of service



ceaseless

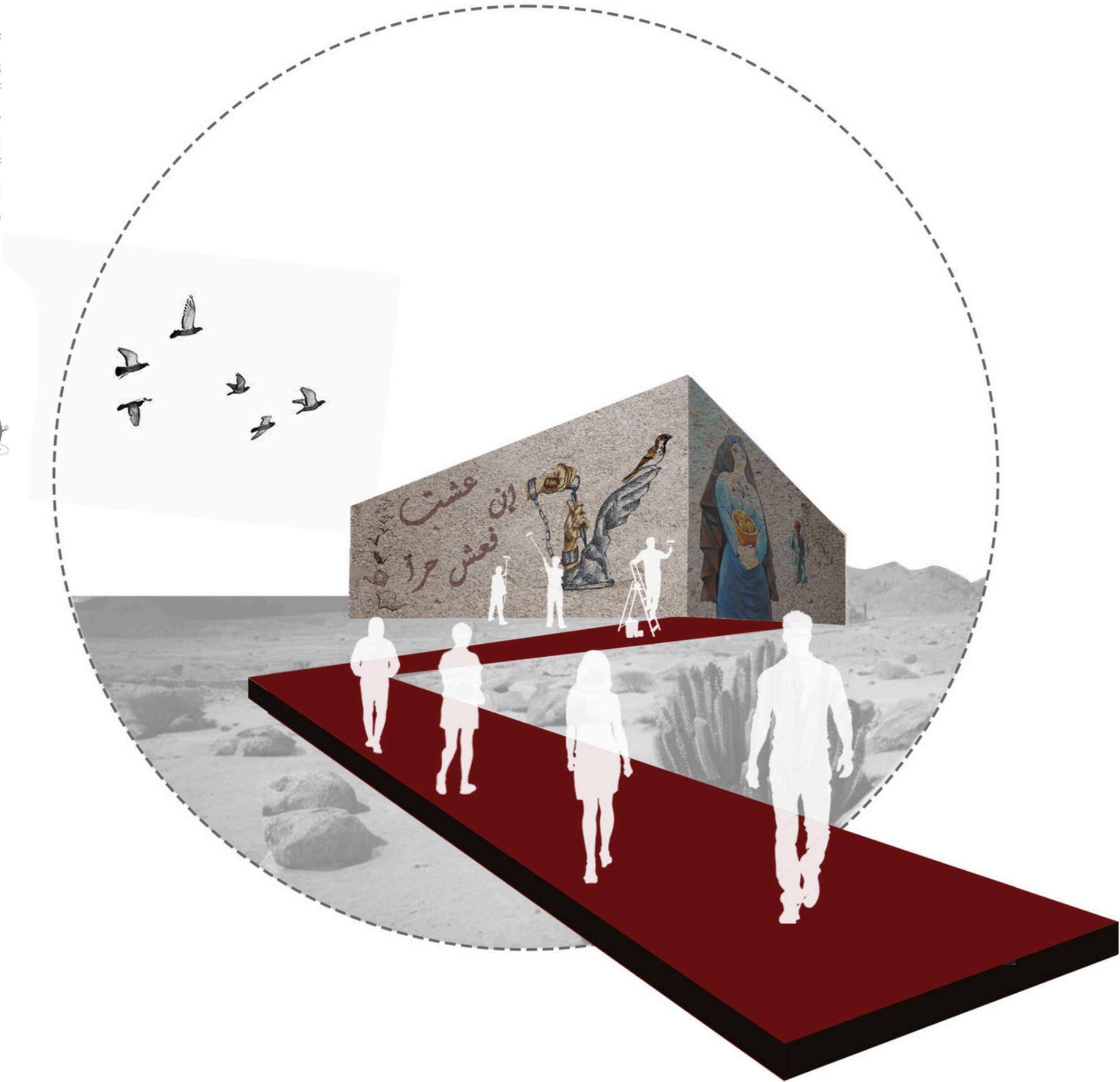
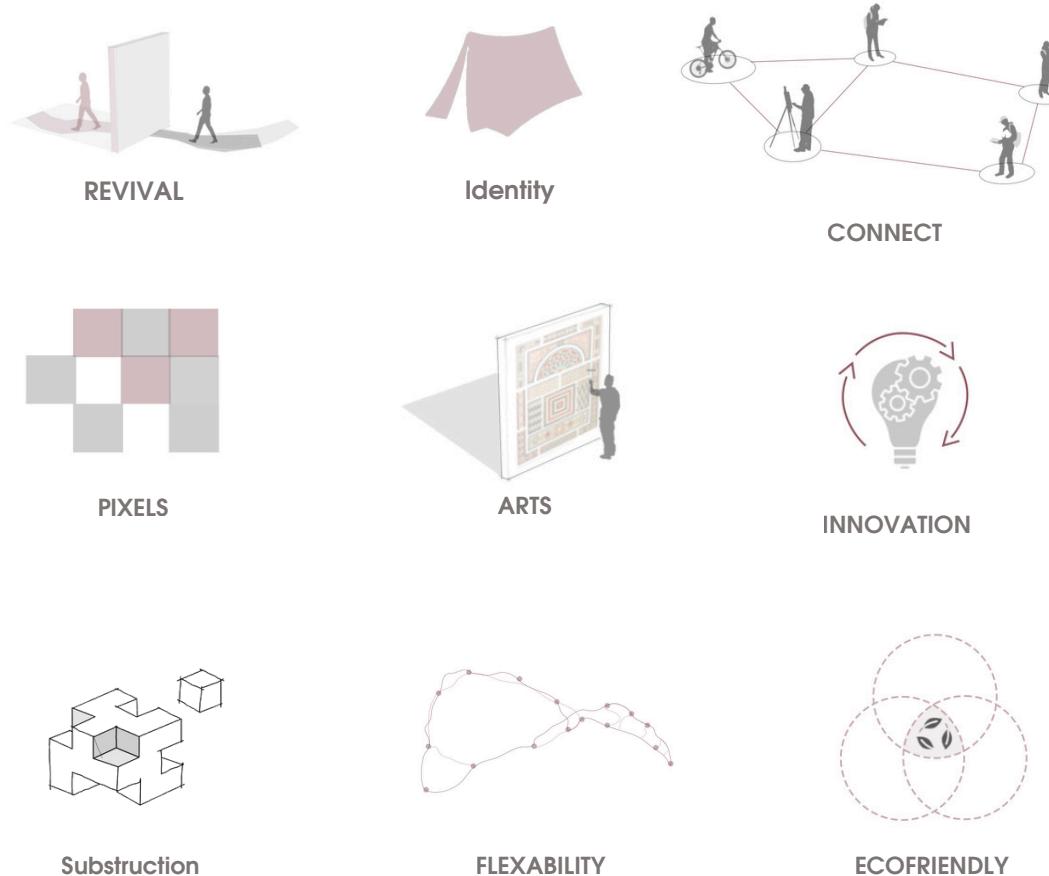


lack of privacy

# VISION

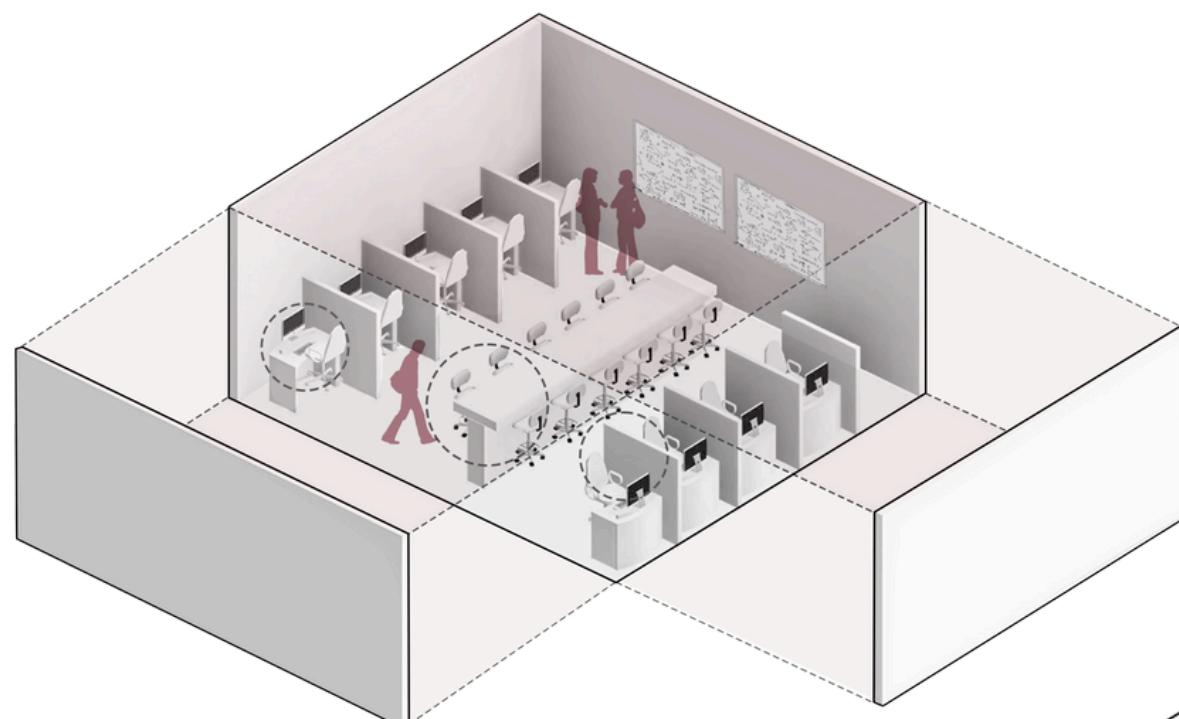
the word wijdan is derived from the core meaning of freedom which is the aim of the project as it emphasises the true meaning of enhancing the emotional aspect of the students reaching out to a more emotionally aware environment that embraces all aspects of life including the artistic, educational, emotional and social aspects of life and the bridge is the link that connects them all together. Its like going out from monochrome colors to vibrant, scintilating one.

## KEYWORDS

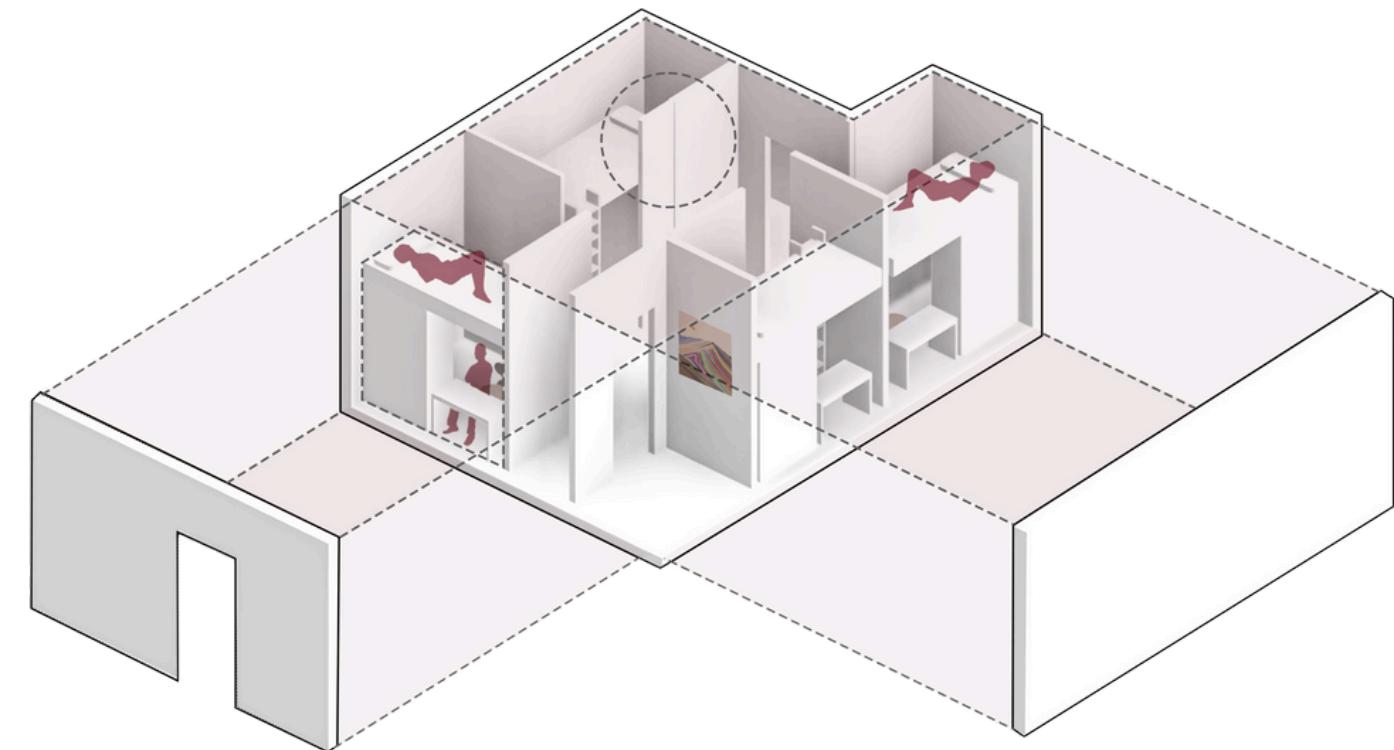


# SOLUTIONS

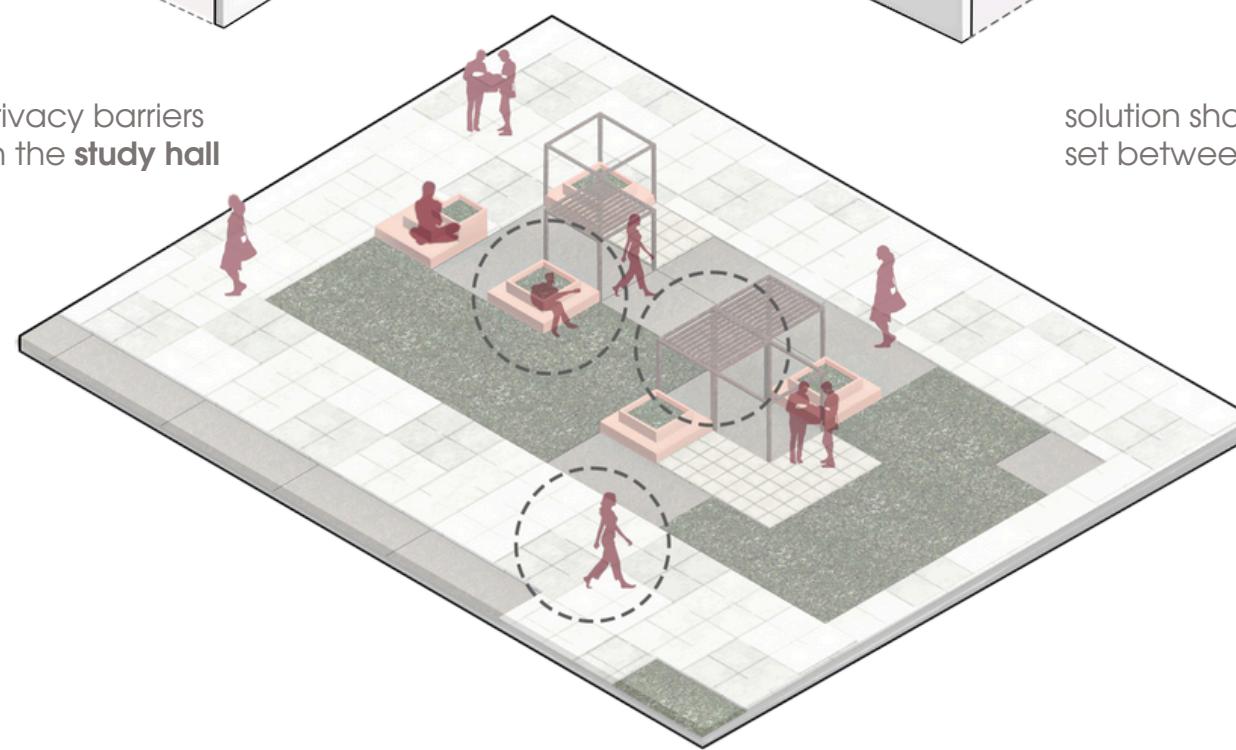
Our concept was inspired by a survey we conducted with STEAM students, which revealed that their main challenge is the inability to freely express themselves.



solution showing the privacy barriers set between students in the **study hall**



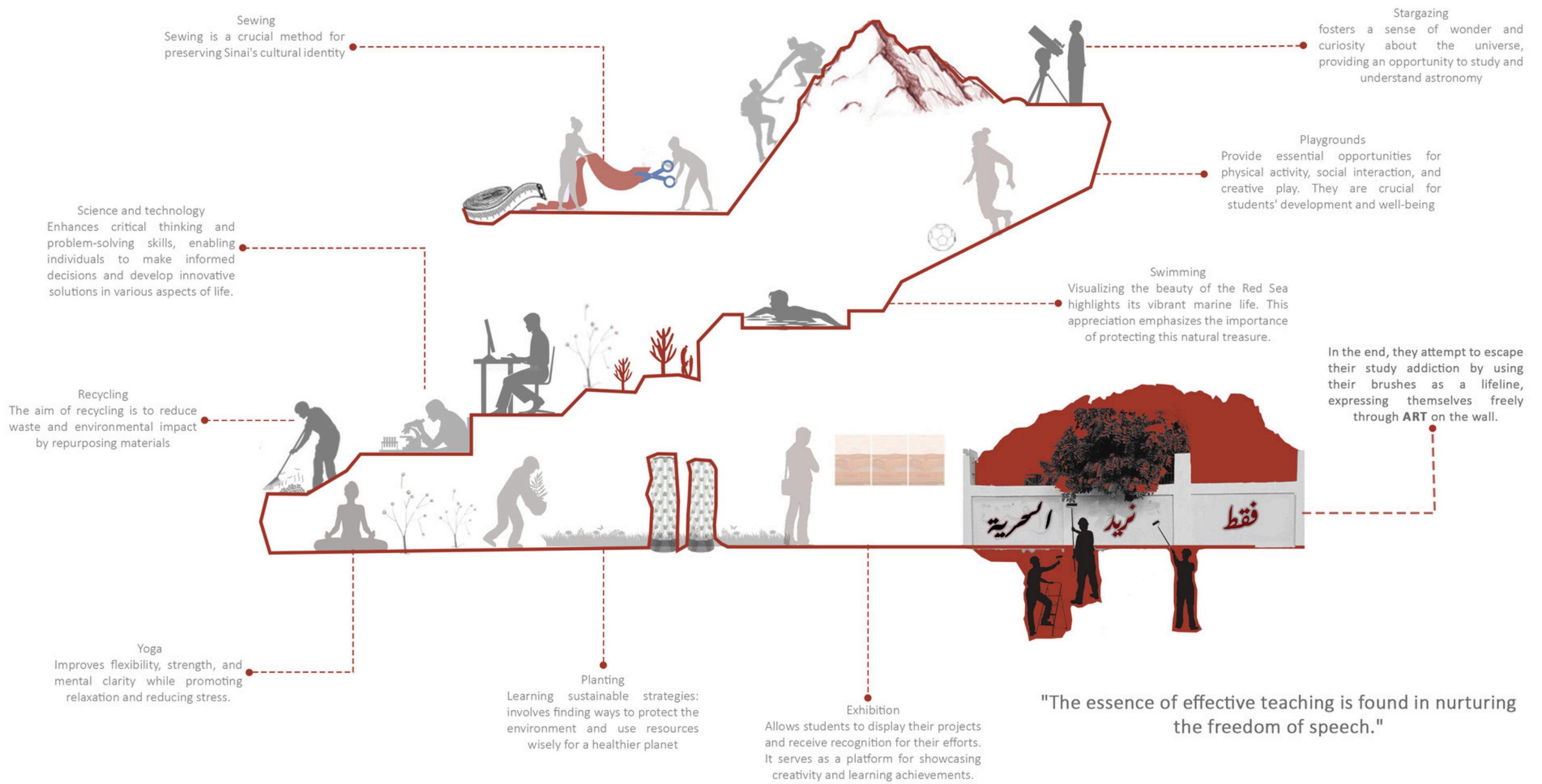
solution showing the privacy barriers set between students in **the dorms**



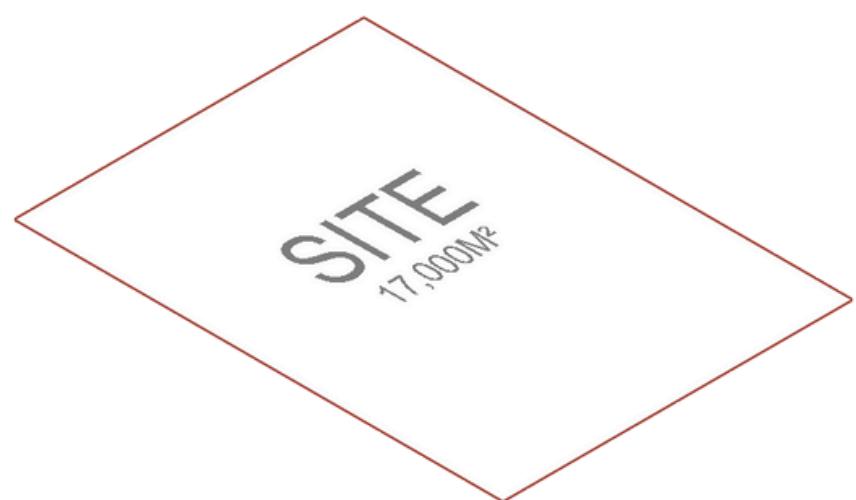
Solution showing the activities in the outdoor areas to relieve stress

# ACTIVITY DIAGRAM

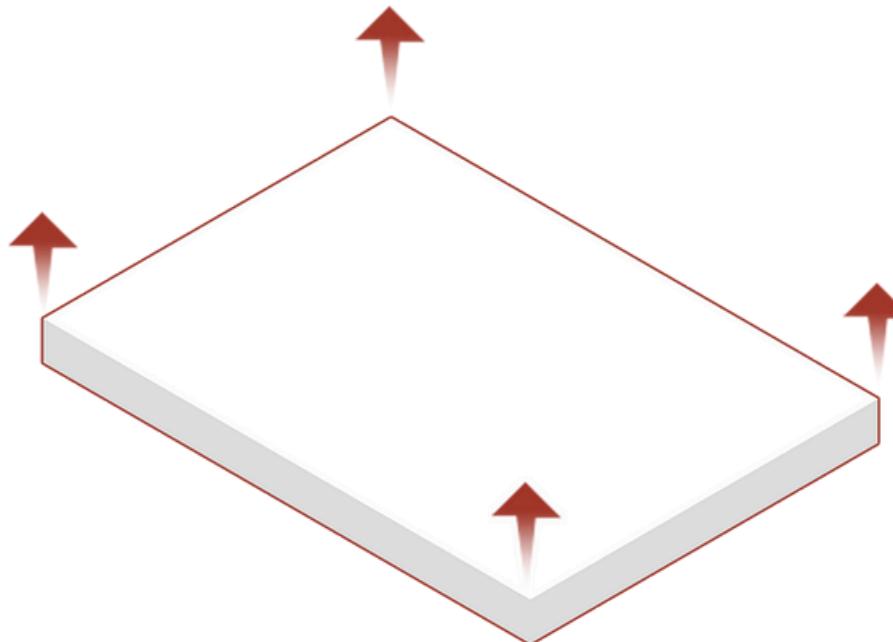
Activity diagram illustrates the workflow of user interactions and system processes



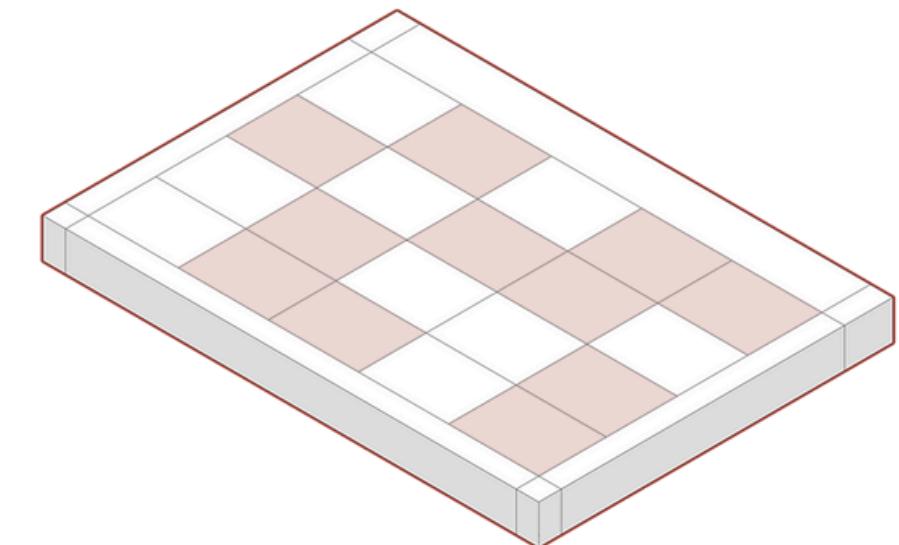
# FORM GENERATION DIAGRAMS



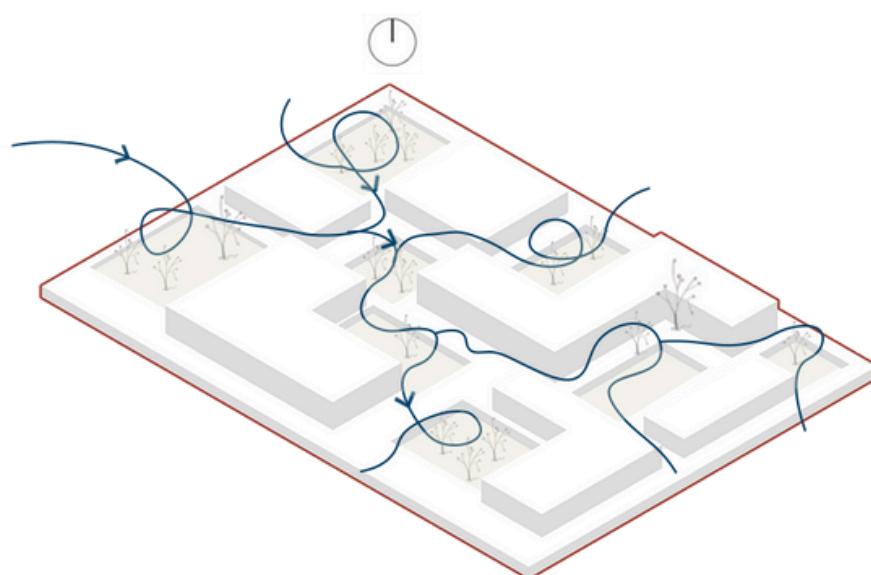
01. Project Site



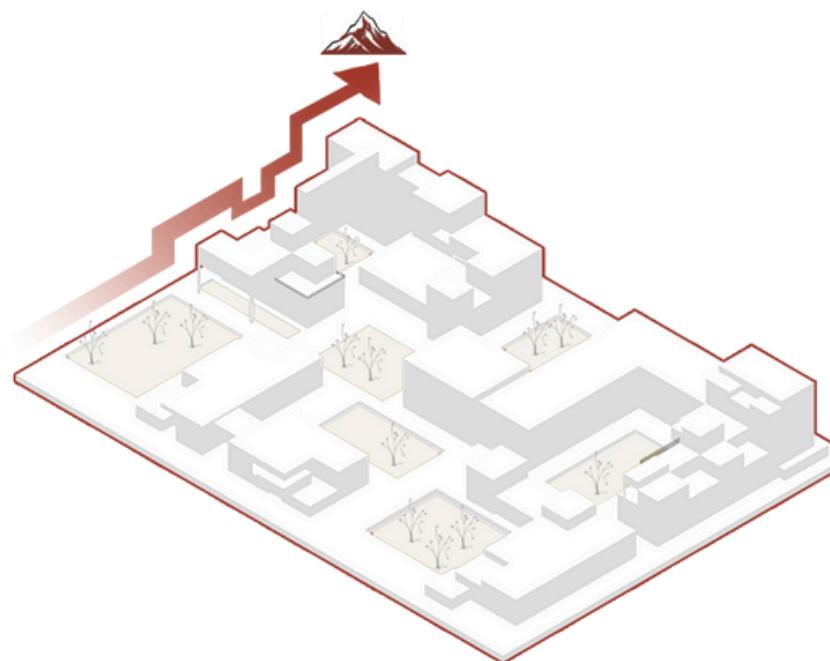
02. Program placed in parametric block



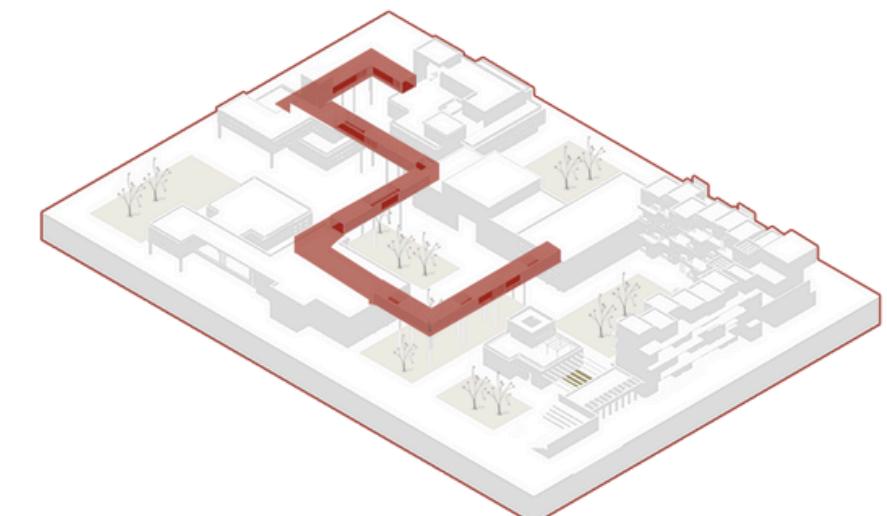
03. Grid Formation



04. The northwestern wind flows through each courtyard, improving the ventilation of the project.



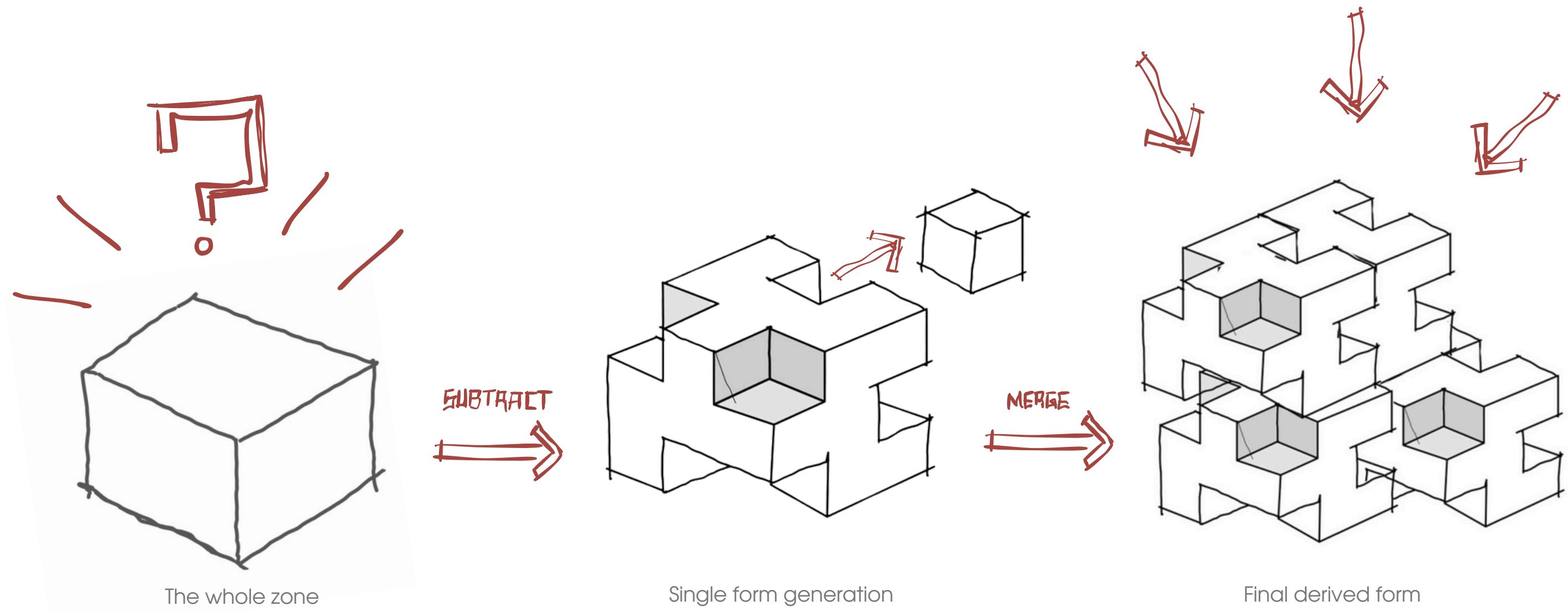
05. The variation in the context skyline affects the project's height, in addition of more detailed zones.



06. Linking each zone with a distinctive path to create an engaging user experience.

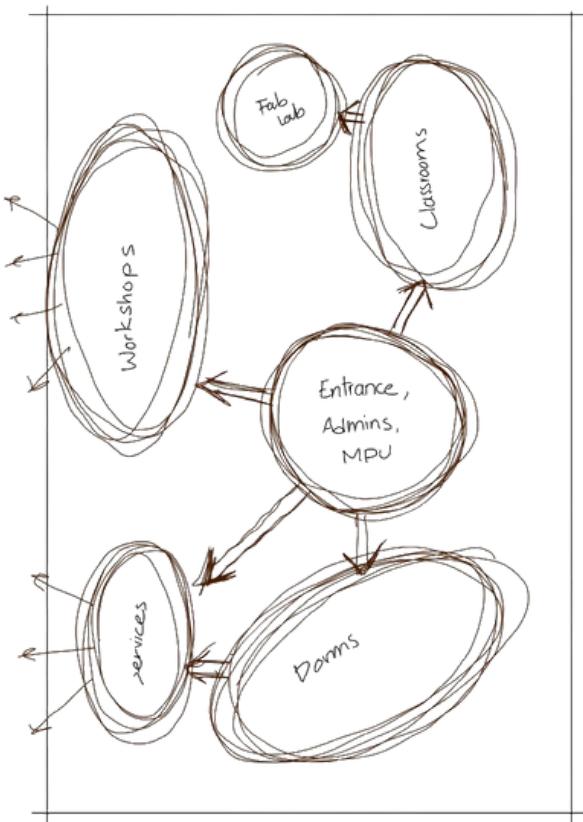
# DESIGN PROCESS

Our design forms were developed to embody the concept of freedom of speech, translating this idea into the architectural expression of the project. Each zone was treated as a separate unit. To process each zone, first subtract a cube from it. Then, apply a repetition process to handle subsequent operations.



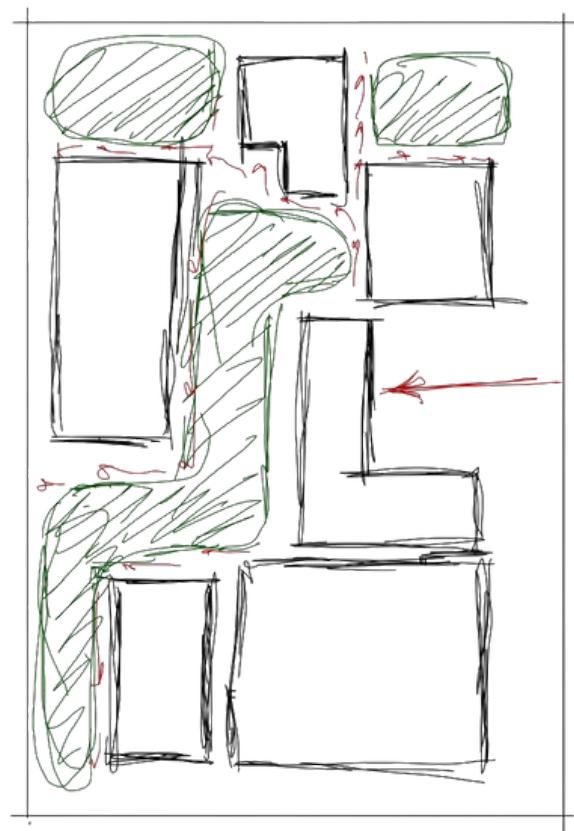
# LAYOUT GENERATION

Strategically creating zones for classrooms, common areas, and outdoor spaces enhances accessibility, promotes collaboration, and connects roofs with pathways, fostering a cohesive learning environment and addressing logistical challenges.



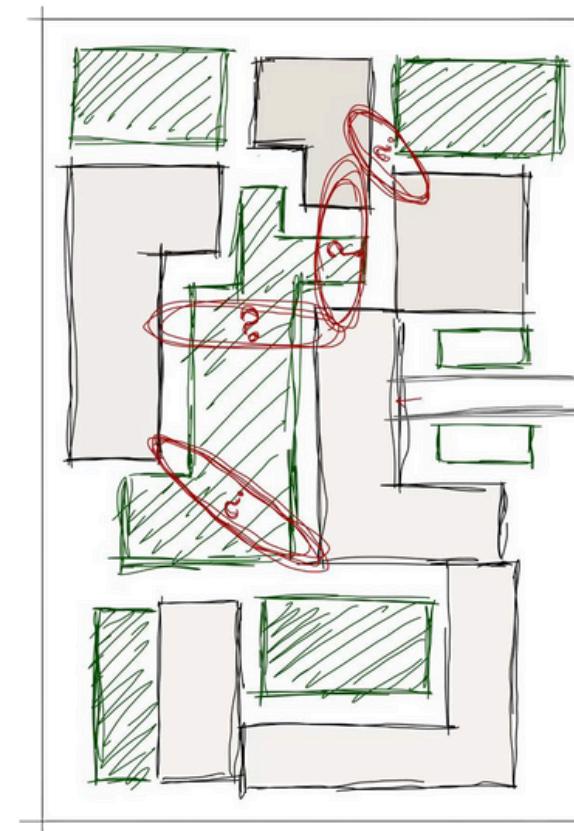
Initiated by orienting the zones to sunlight, wind and view.

1



Zones located and the spaces for solids and voids are established.

2



The courts and the open spaces for activities are positioned.

3



The path expresses the meaning of freedom, involvement and creativity.

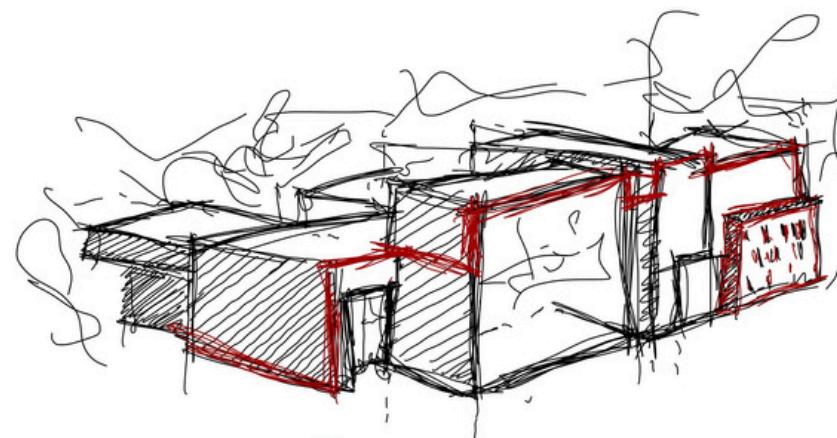
4

## SKYLINE MANUAL ABSTRACT GENERATION

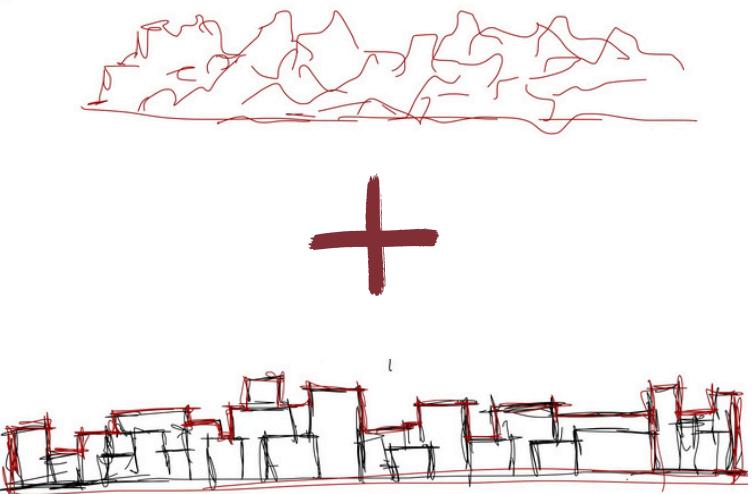
Building skylines that draw inspiration from Bedouin culture and mountains combine cultural significance with scenic beauty. The contours of the landscape are mirrored in each structure, emphasizing flexibility and resilience. The architecture honors the past and the natural world, providing areas that evoke a spirit of nomadism and shared ideals, welcoming both locals and guests.



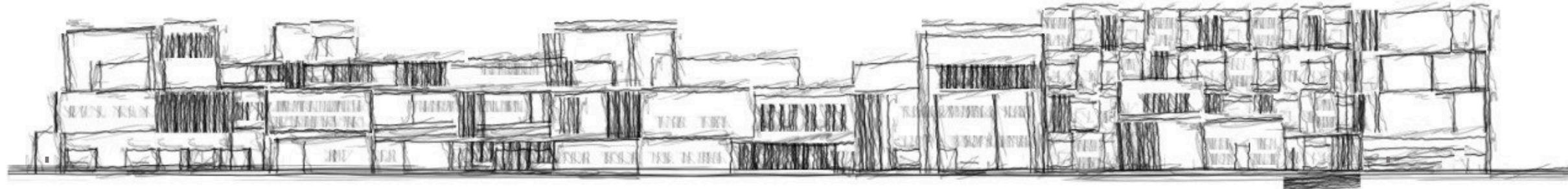
The Bedouin lifestyle inspired the skyline



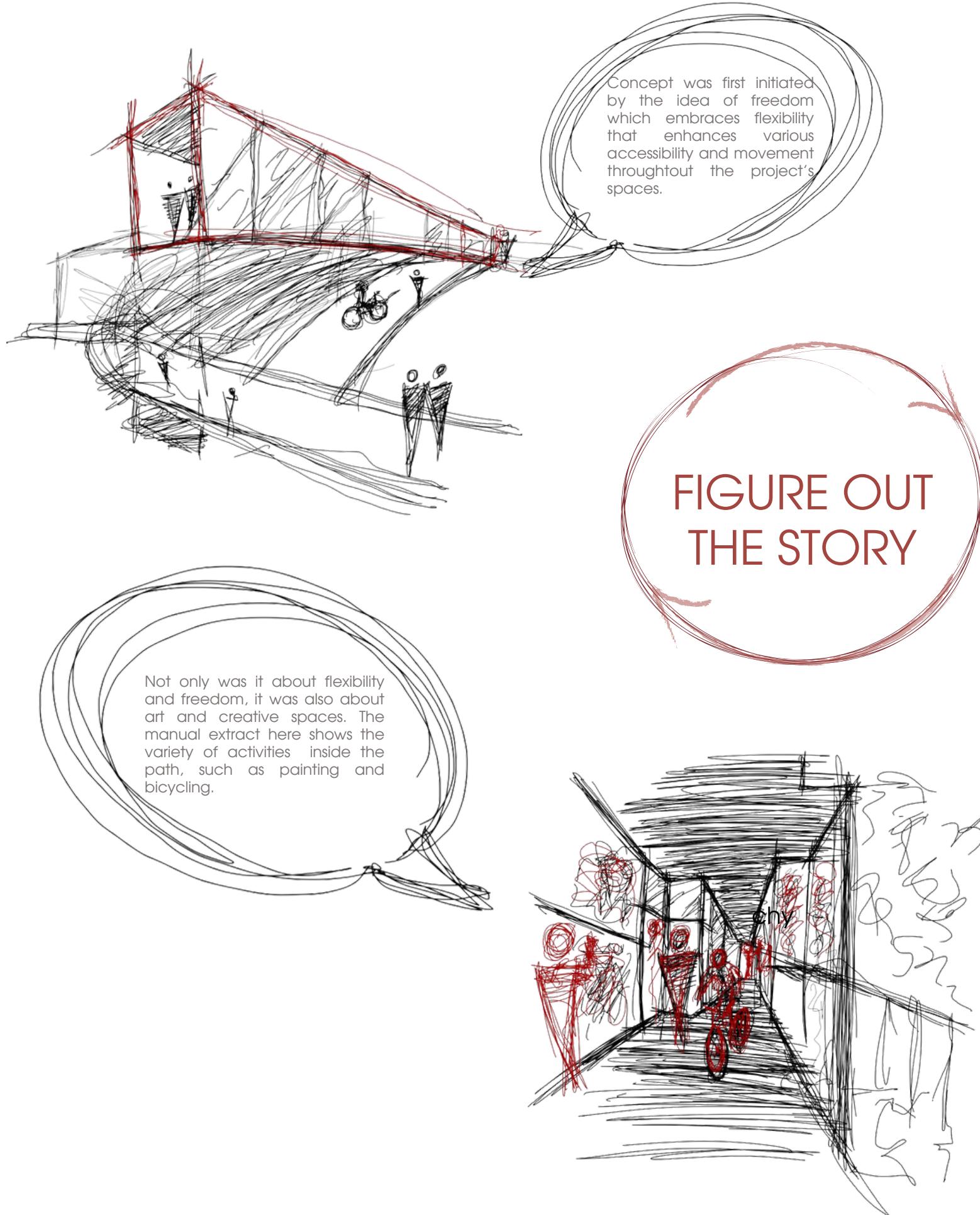
The form was generated from the mountains in the background.



The difference of the heights between the buildings was inspired from the mountains.

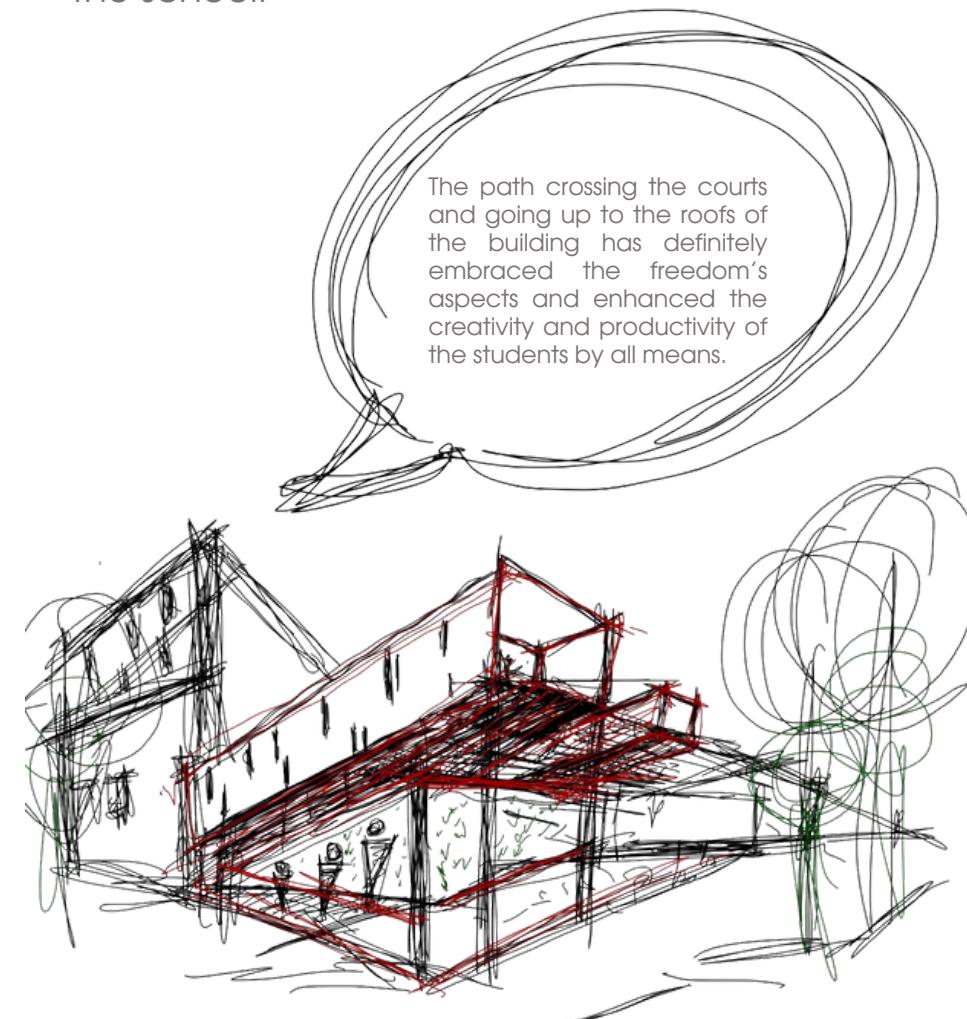


Final elevation sketch



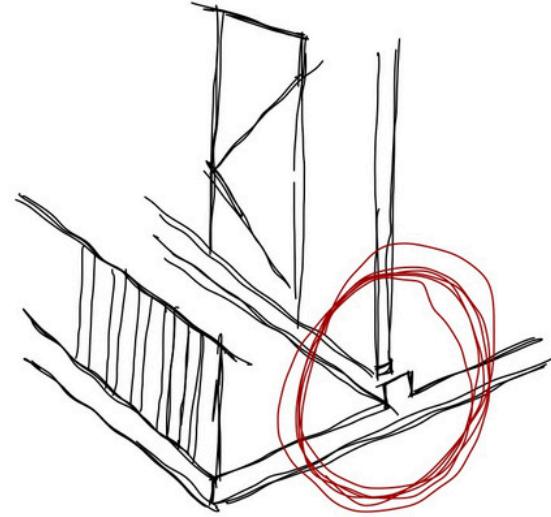
## PATH MANUAL ABSTRACT

The proposed path connects school buildings and courts, improving student experience and accessibility. It offers a unique perspective and facilitates easy movement between classrooms, recreational spaces, and communal areas, fostering community and inclusivity in the school.

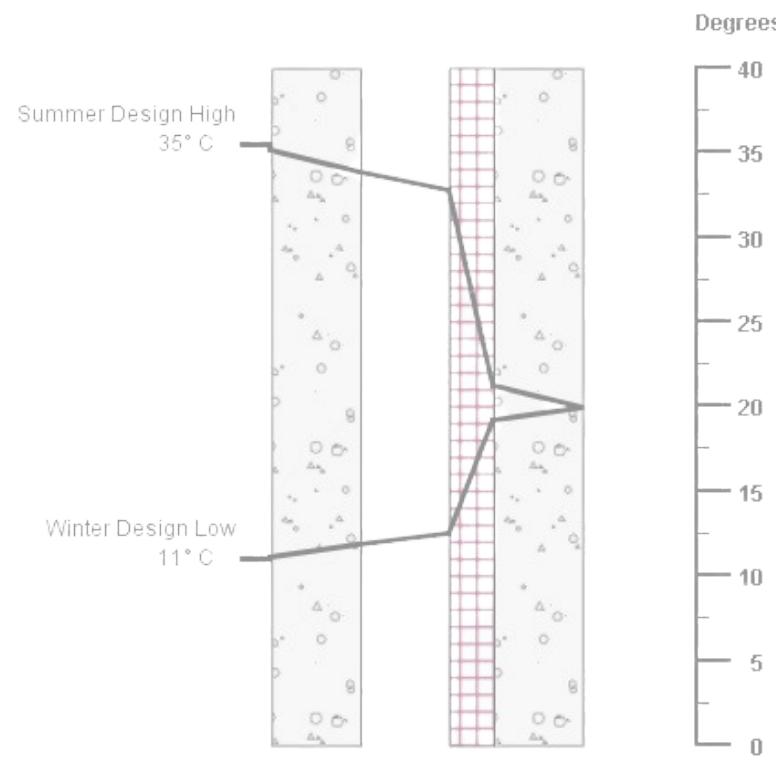


# **THERMAL BRIDGING**

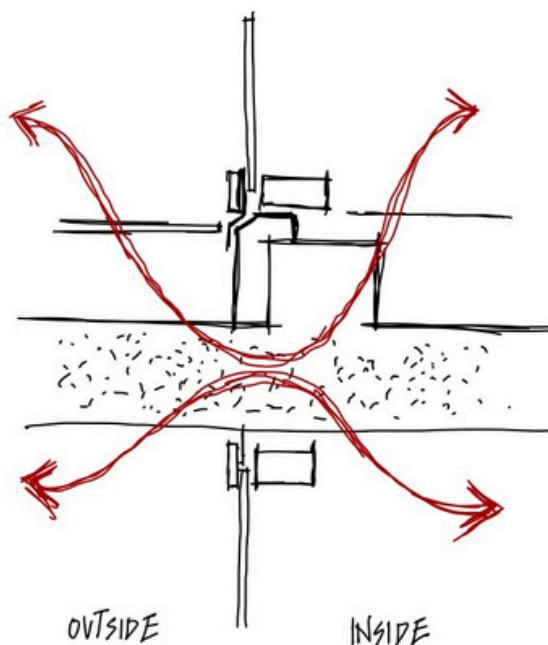
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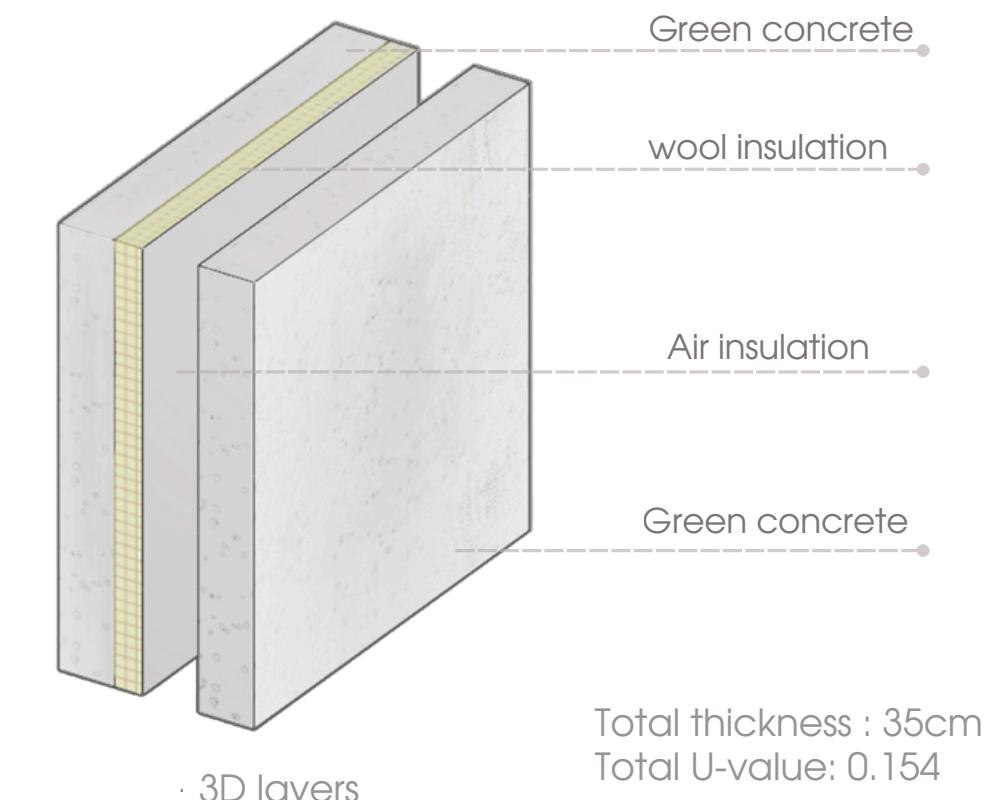
## 3D section



## Wall layers



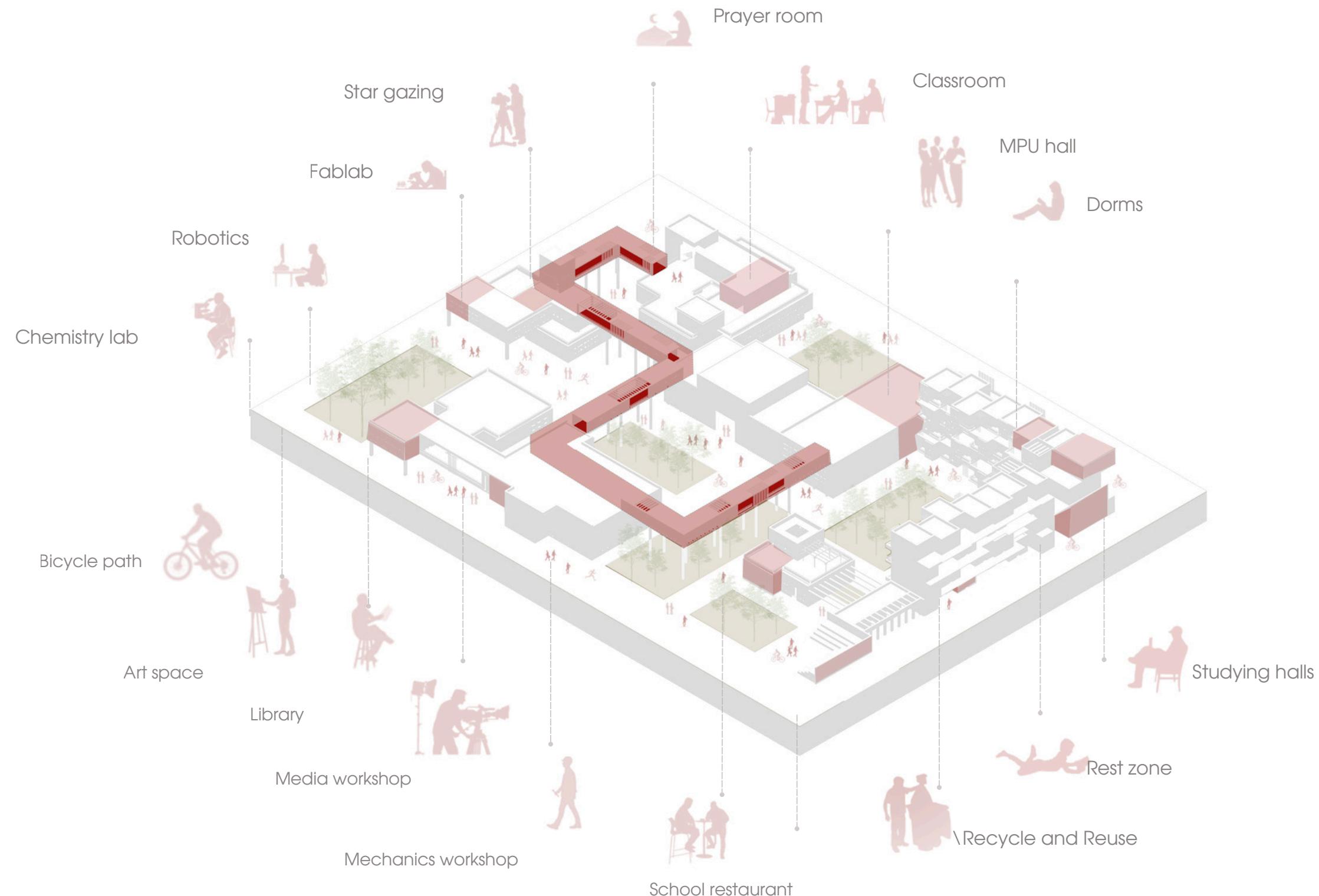
## Detailed sketch



Total thickness : 35cm  
Total U-value: 0.154

# BUBBLE AND AXONOMETRIC DIAGRAMS

The 3D zoning diagram for the STEAM school features an interconnected layout with distinct buildings for labs, classrooms, and collaborative spaces, connected by pathways that enhance movement and interaction, promoting a flexible and integrated learning experience.



# LANDSCAPE STUDY



Section and plan



Pixels landscape layout



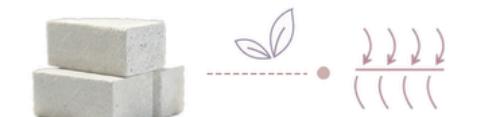
# MATERIALS ANALYSIS



Granite stone from mountains, influenced by rainfall, has an almost zero thermal permeability rate as a building material.



Crushed marine shells mixed with white glass sand in construction mortar reduce its thermal permeability increase its strength



Green concrete, made from sustainable resources and waste products to lower the carbon footprint of construction.

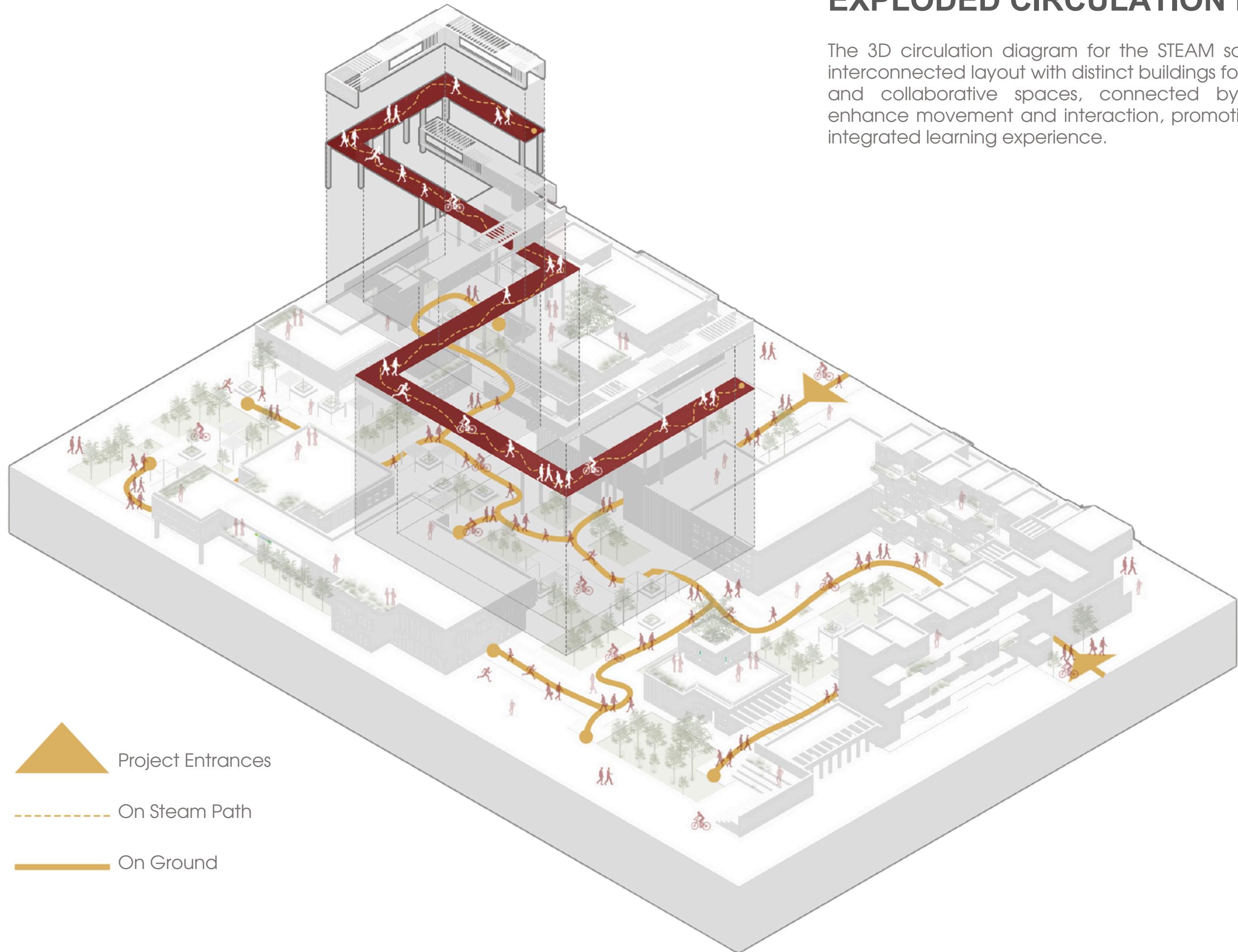


EL-Dabsh is a natural material found in quarries, such as those in the Tullu' Ayun Musa area.

## SITE VISIT



## EXPLODED CIRCULATION DIAGRAM



The 3D circulation diagram for the STEAM school features an interconnected layout with distinct buildings for labs, classrooms, and collaborative spaces, connected by pathways that enhance movement and interaction, promoting a flexible and integrated learning experience.

# EXPLODED MATERIALS DIAGRAM



3D diagram of dorms



## 01.Recycled wood ribs

These ribs create a pattern of openings that allow natural light to filter through while also facilitating airflow. This design helps to improve indoor air quality and reduces the need for artificial lighting.



## 02.Double skin wall

A double-skin wall features two layers of exterior walls with a ventilated gap between them. This design allows for improved thermal insulation and energy efficiency.



## 03.Negative carbon concrete

is a type of concrete designed to absorb more CO<sub>2</sub> during its lifecycle than it emits. It incorporates carbon capture technologies or uses materials that sequester carbon, reducing the overall carbon footprint of construction and contributing to climate mitigation efforts.



## 04.plants

It enhances building aesthetics and environmental quality. These boxes allow for greenery to be integrated into urban spaces, improving air quality, providing natural insulation, and offering a pleasant visual element.



## 05.Recycled glass window

It is made from repurposed glass materials, reducing waste and environmental impact. It maintains the aesthetic and functional qualities of traditional glass while contributing to sustainability by conserving resources.

## ELEVATION AND SECTION SYSTEM

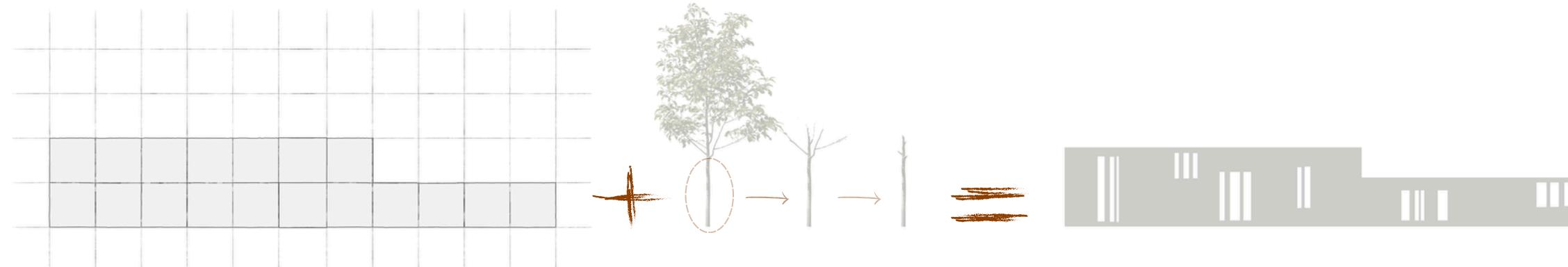
The elevation and the section was presented to explain and show the activities happening in the classrooms and the double skin moderates the ventilation well.



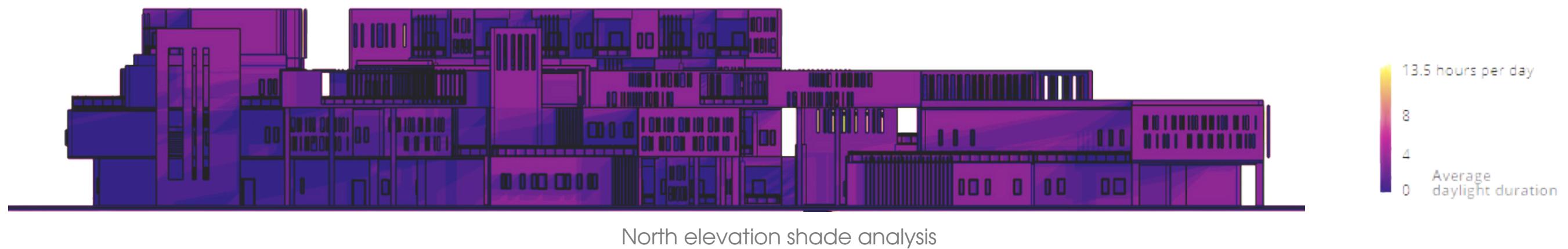
Section Elevation

Elevation of Facade's system of building

## ELEVATION FORMATION



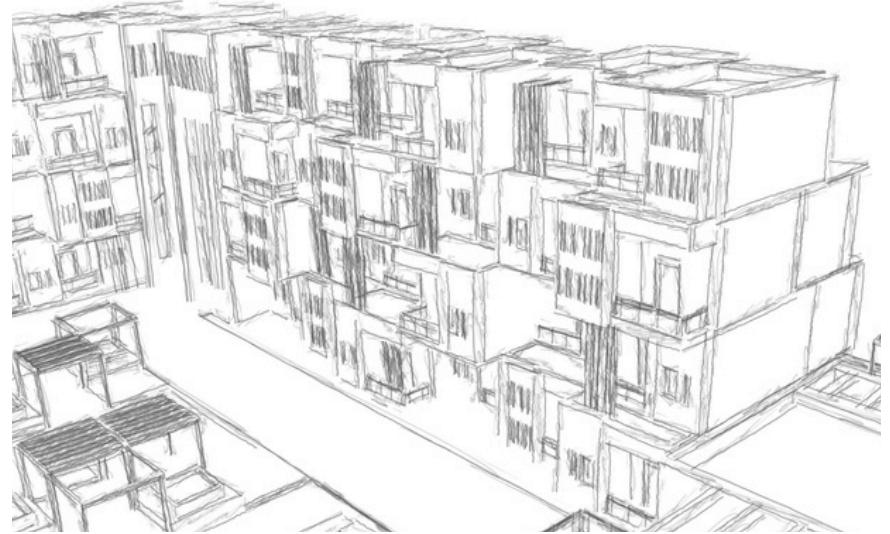
The vertical line design, inspired by olive trees, balances solid elements resembling trunks with voids that echo branch gaps, creating a dynamic rhythm in the architectural elevation.



# SHADE ANALYSIS

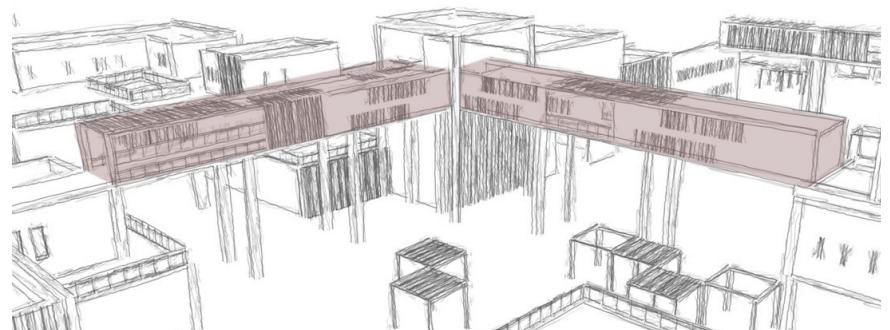
After analyzing the climatic challenges, we prioritized minimizing solar radiation. The following analysis calculates the building's sun exposure throughout the year. Additionally, the shading study provides an average shade analysis every three months, demonstrating the shading the building creates within the landscape.

## Solid and void

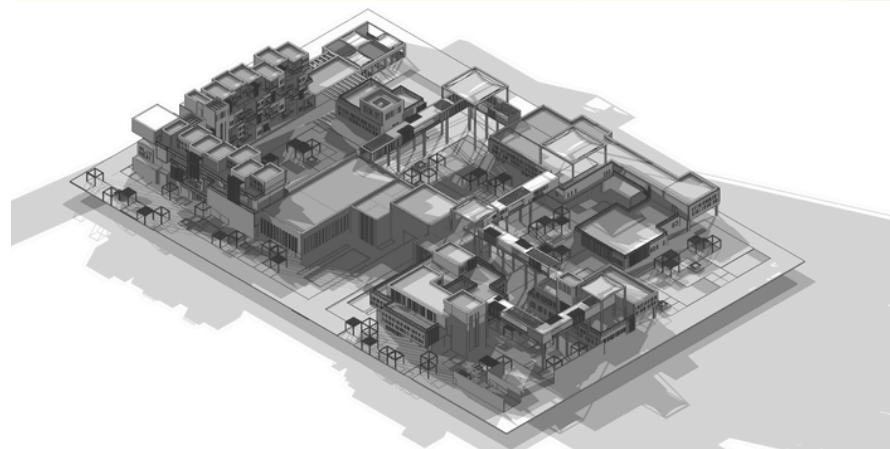
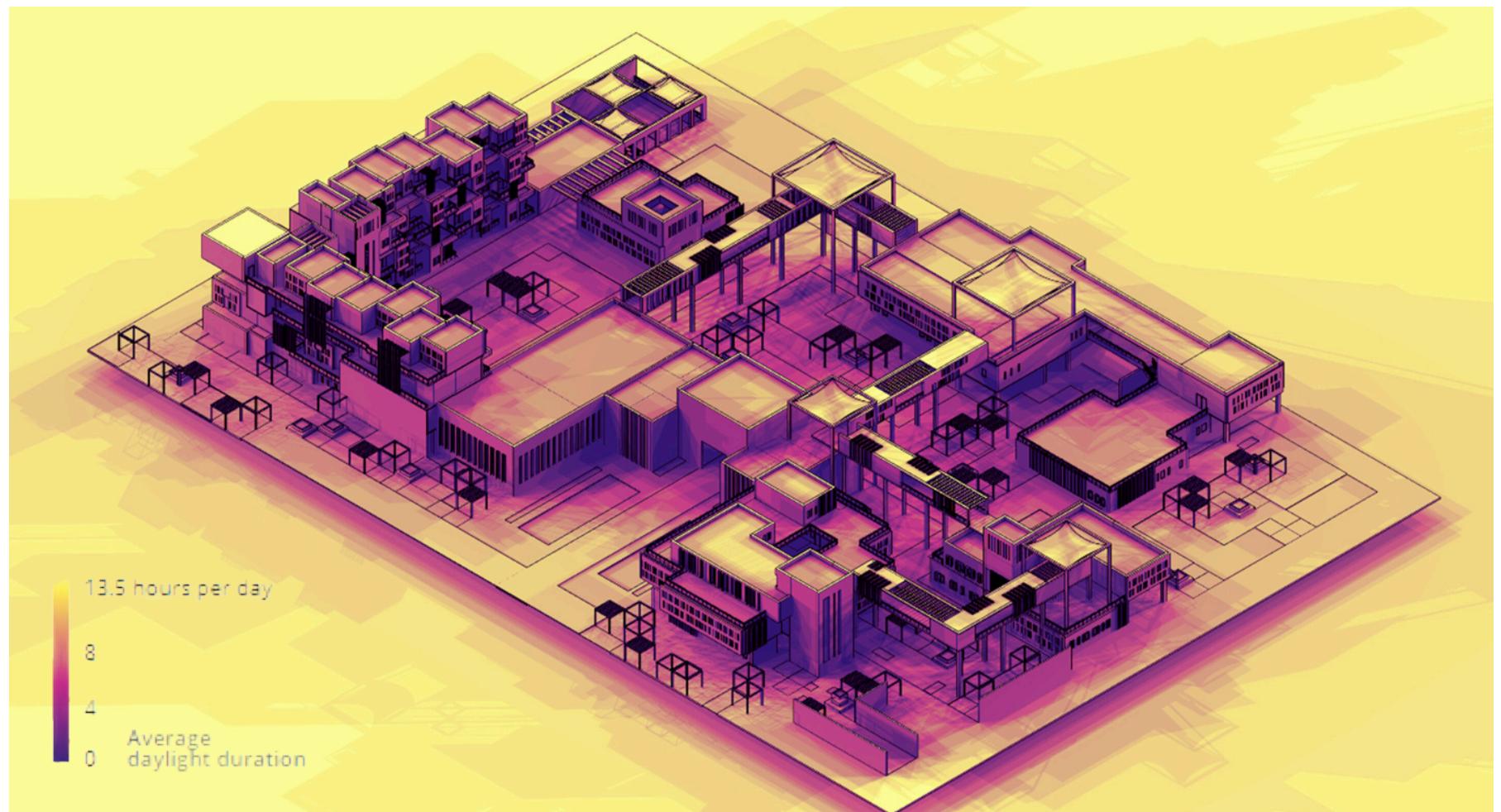


To achieve optimal shading, we implemented various strategies. For example, we designed the structure with a combination of solid and void forms to create more shaded areas. We also connected the building with bridges, which further maximize the shaded spaces.

## Connections



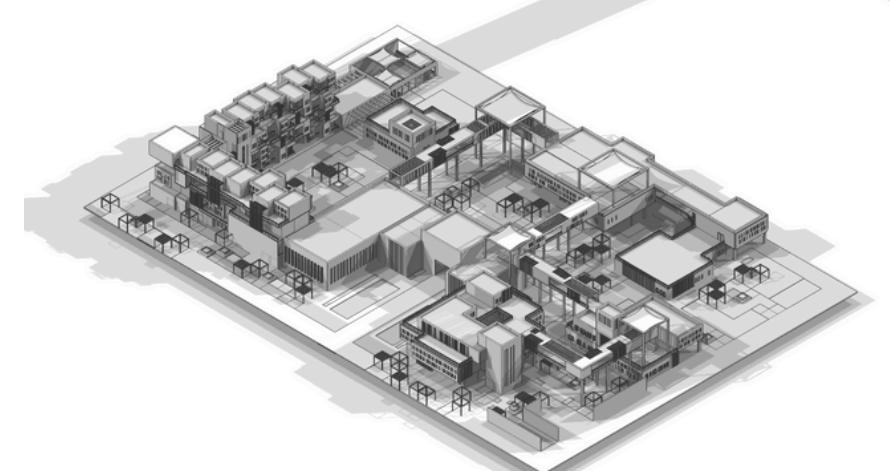
Our design effectively minimizes solar radiation and enhances shading through a combination of solid and void forms and interconnected bridges, promoting comfort and sustainability for the building and its surroundings.



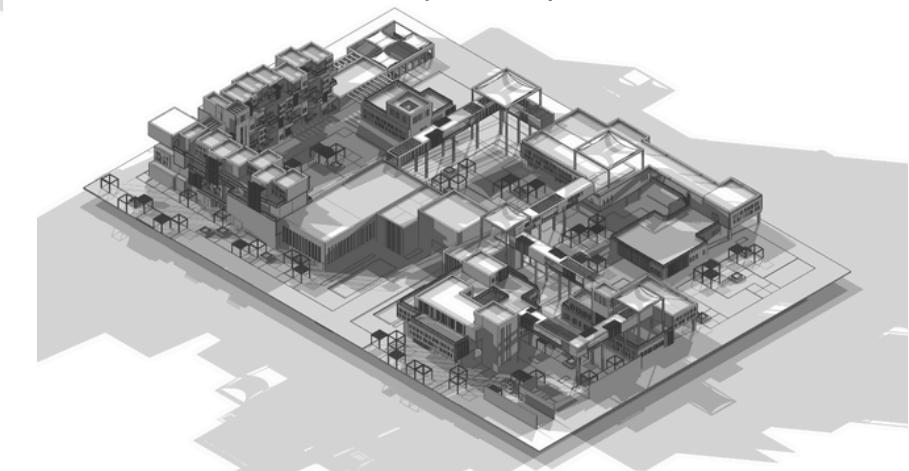
Jan Feb March



April May June

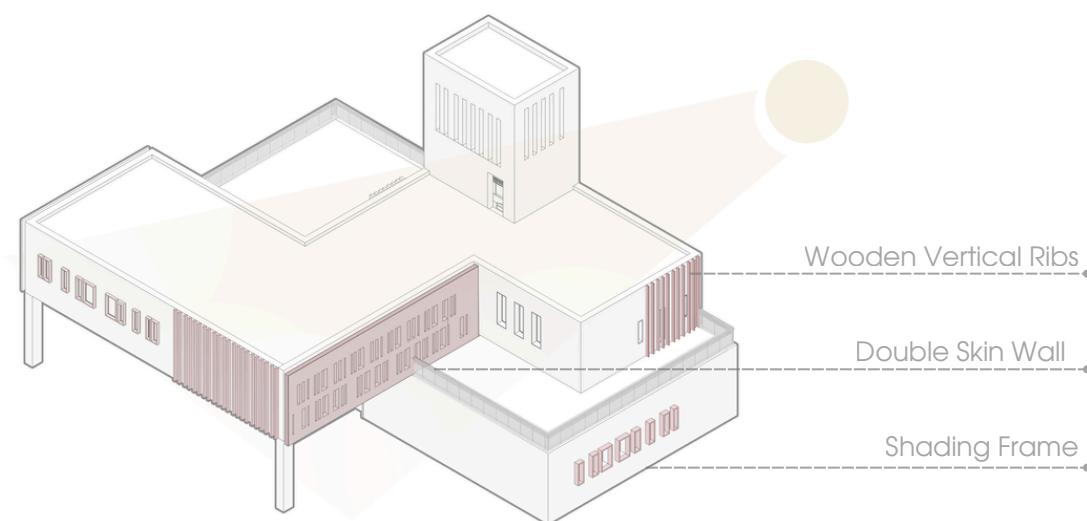


July Aug Sept

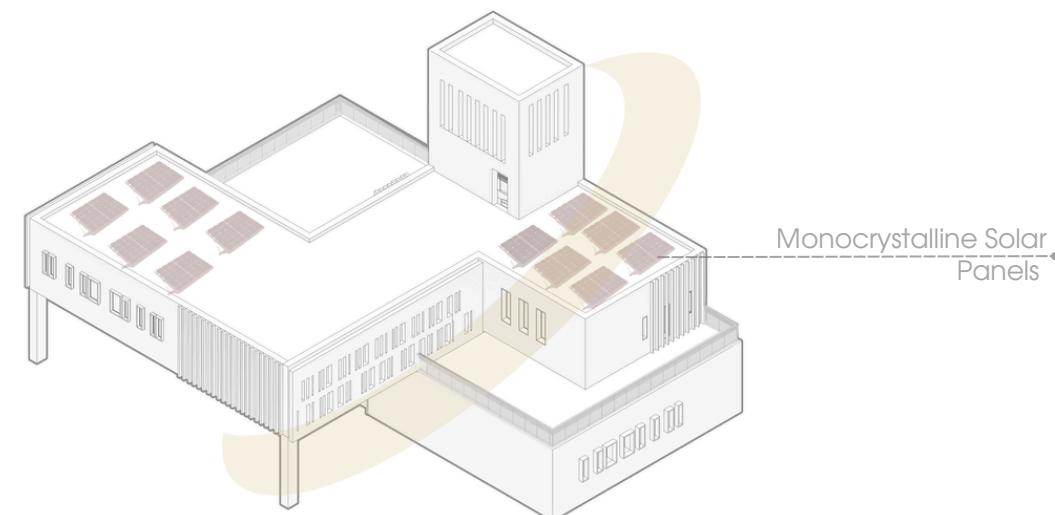


Oct Nov Dec

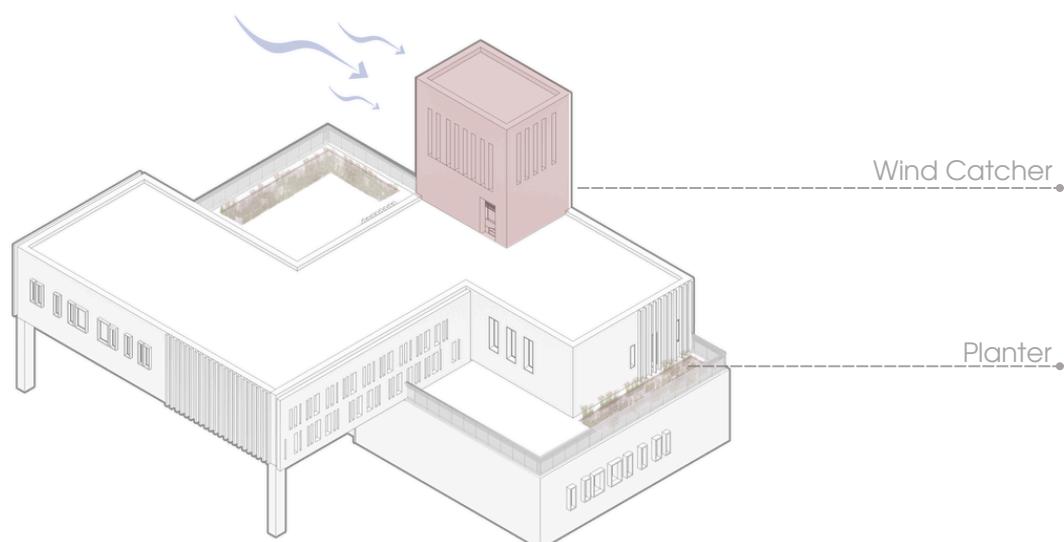
# SUSTAINABILITY STRATEGIES



01. Heat Isolation



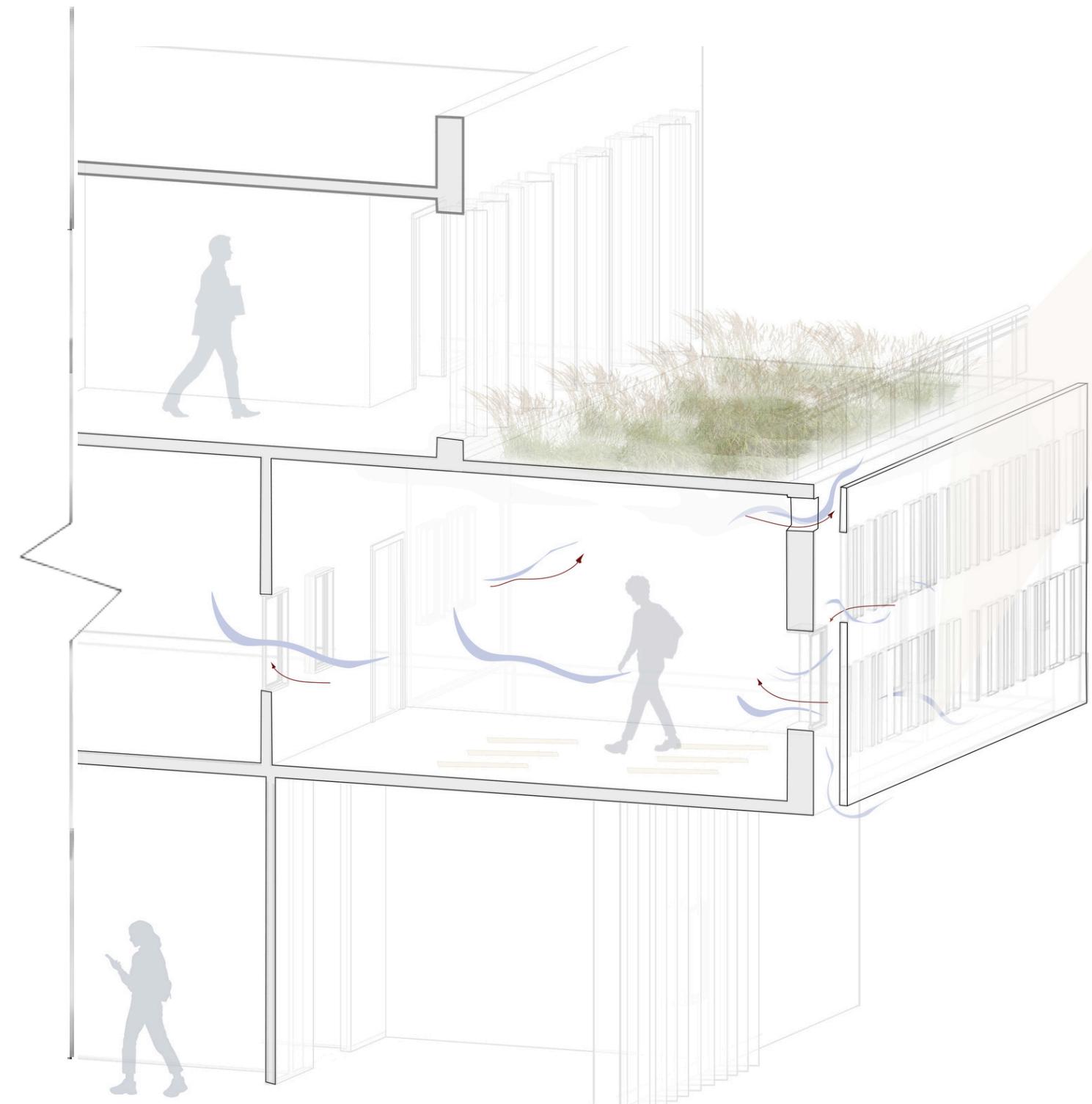
02. Renewable Energy



03. Ventilation techniques

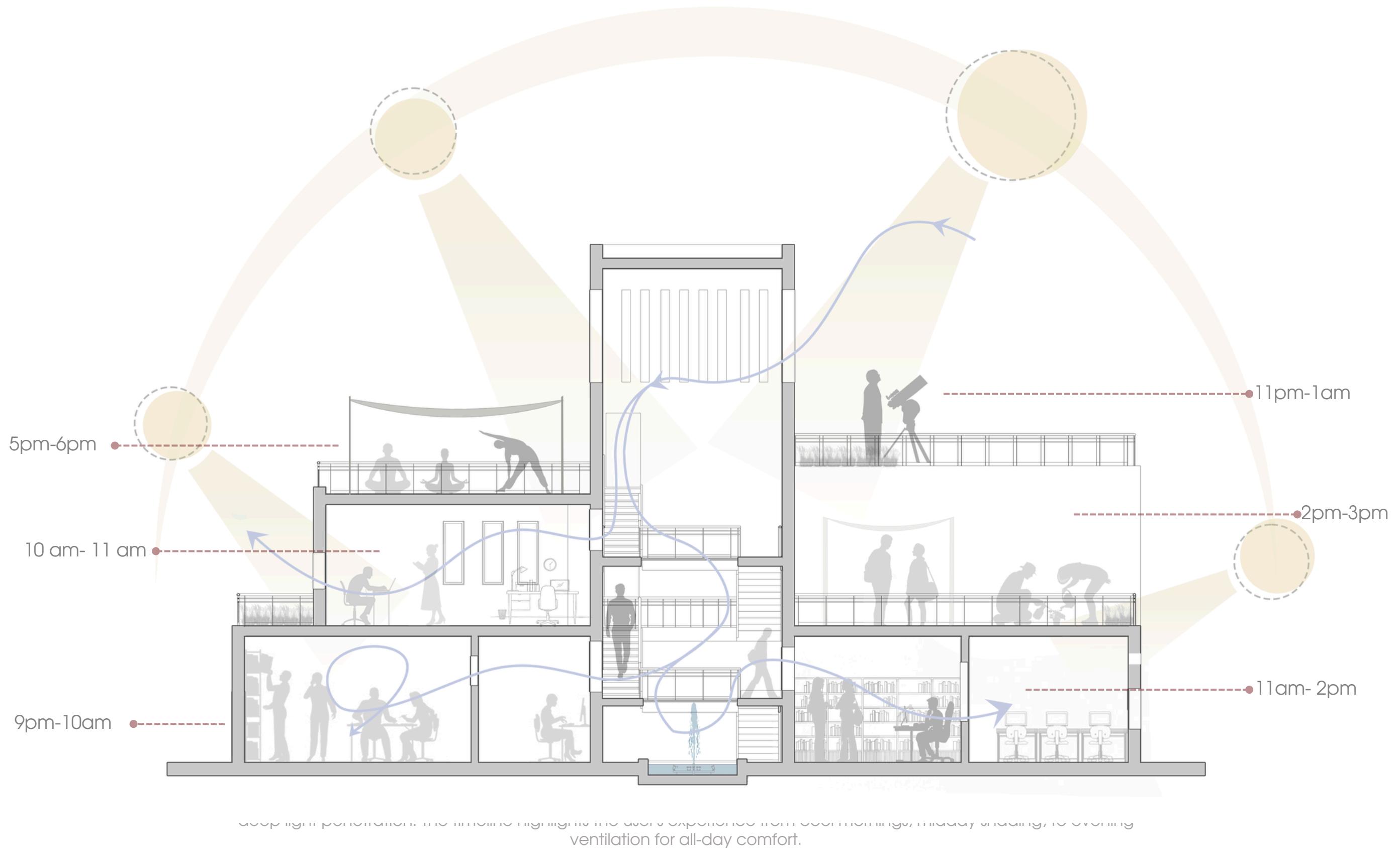
## Double Skin Wall Diagram

A **double-skin** wall enhances thermal insulation, energy efficiency, soundproofing, and ventilation while stabilizing indoor temperatures.



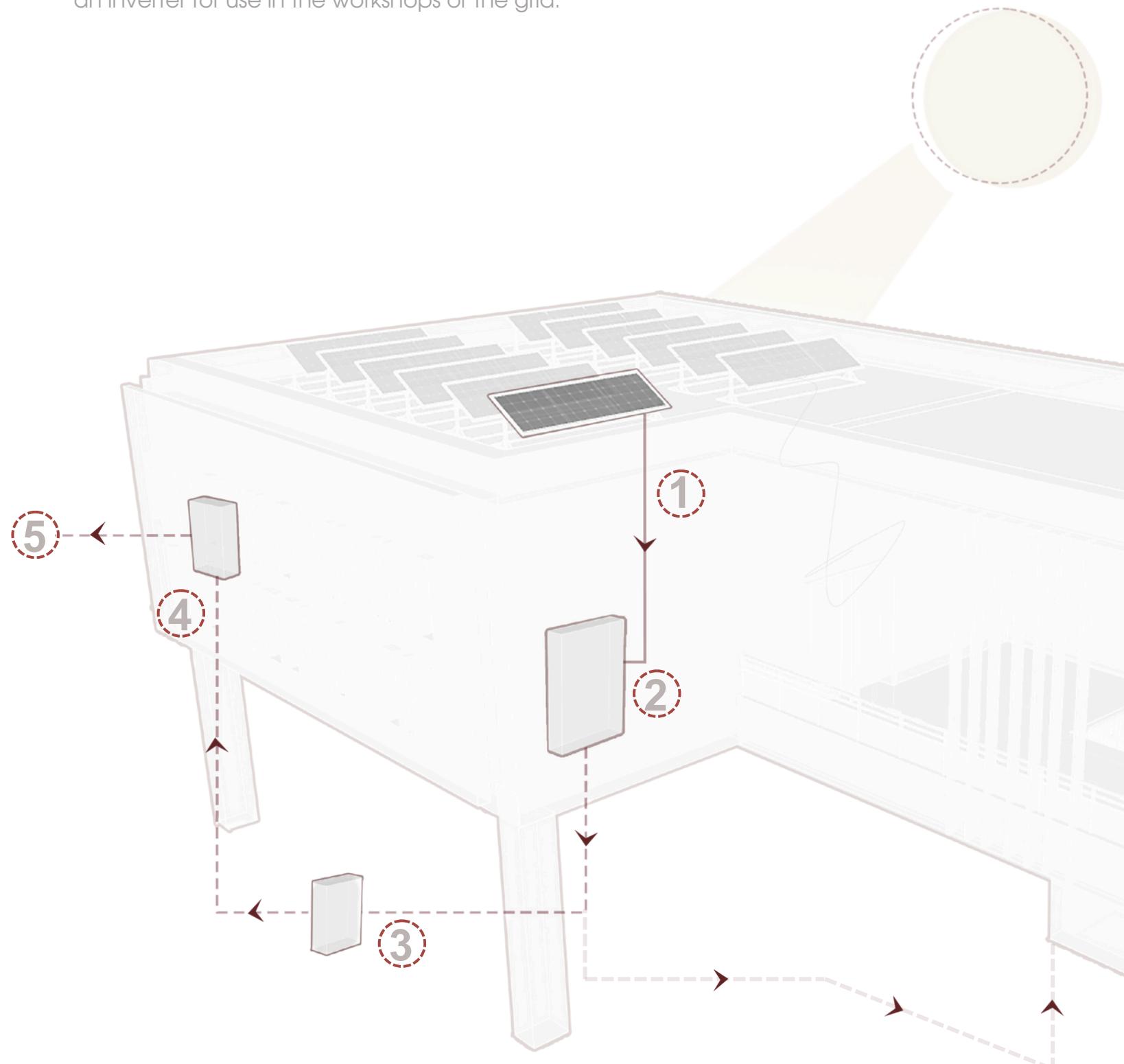
Section showing the ventilation modified by the double skin wall

## PASSIVE DESIGN SYSTEM



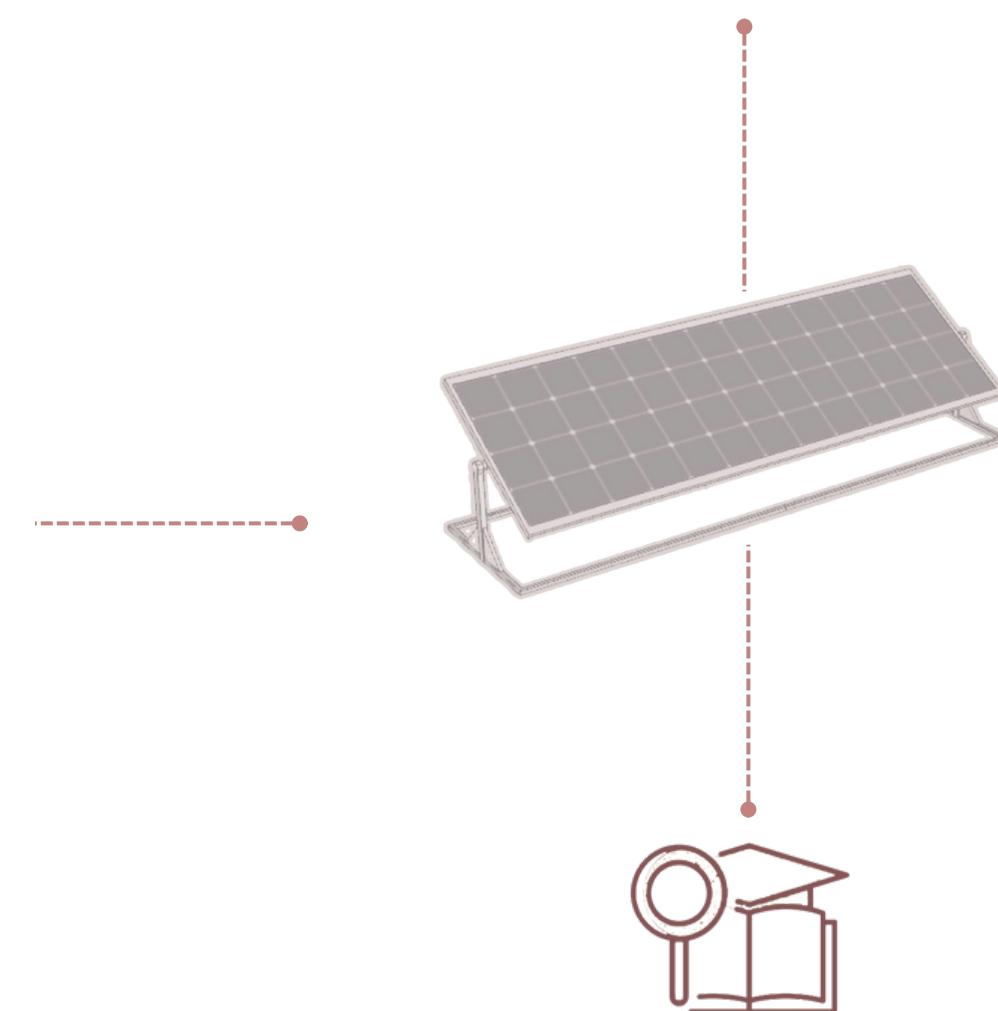
# ENERGY ACADEMIC ASPECT

A visual representation demonstrating the flow of energy in solar power generation, showing how sunlight is captured by solar panels, converted into direct current (DC), and then transformed into alternating current (AC) through an inverter for use in the workshops or the grid.



3D shot showing the solar panels on the fab lab's roof.

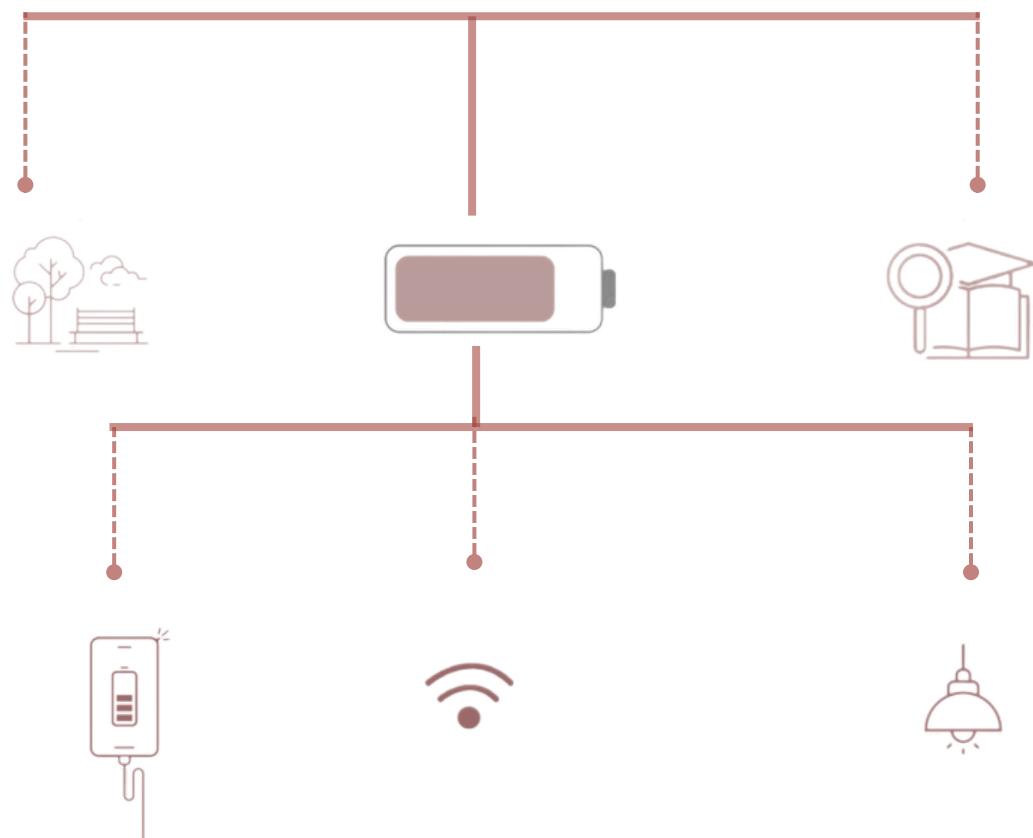
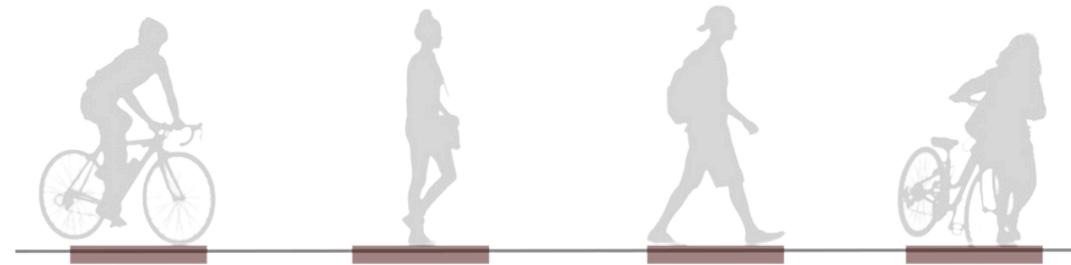
- 1 Electricity is generated and flows into a conductive wire
- 2 The conductive wire carries the DC to the inverter, where it is converted to AC
- 3 The AC travels from the inverter to the electric panel, which delivers electricity throughout the building
- 4 Any unused electricity travels through the electric meter and back to the electric grid
- 5 The grid



# PATHS STUDY

## PAVEGEN

The diagram illustrates how kinetic tiles generate energy from footsteps while providing interactive spaces for students



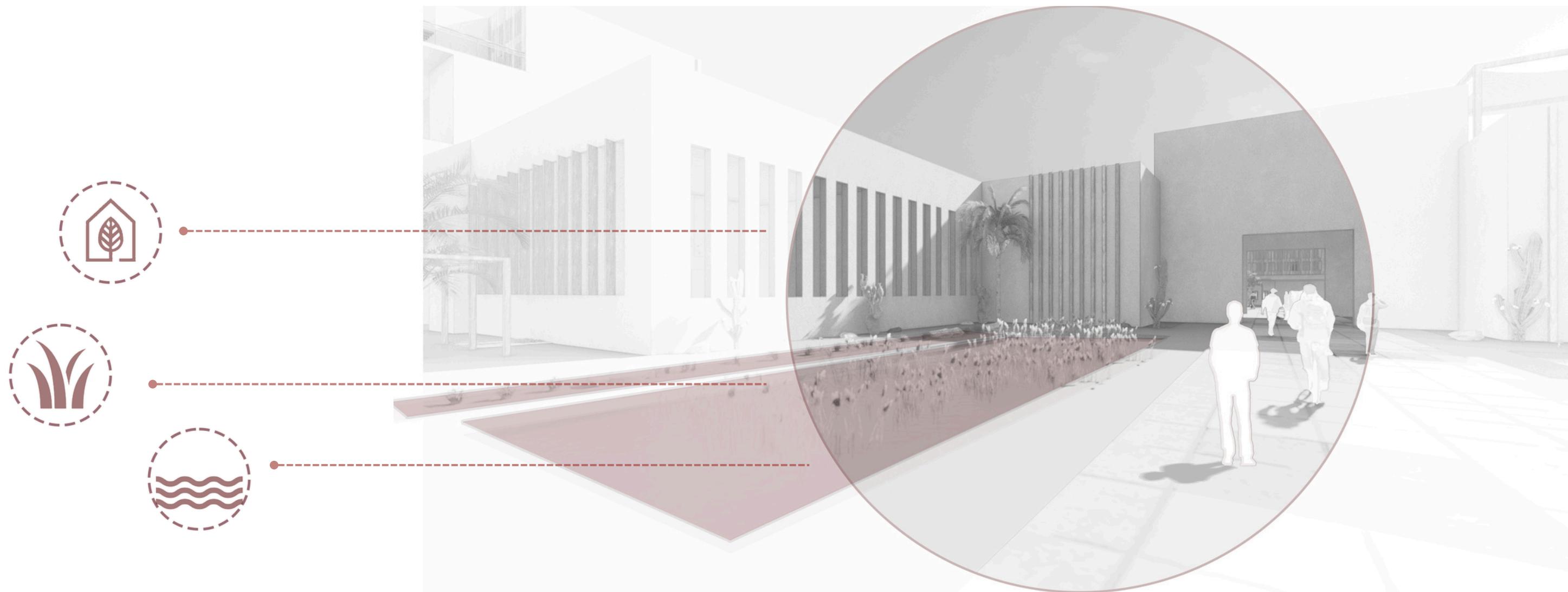
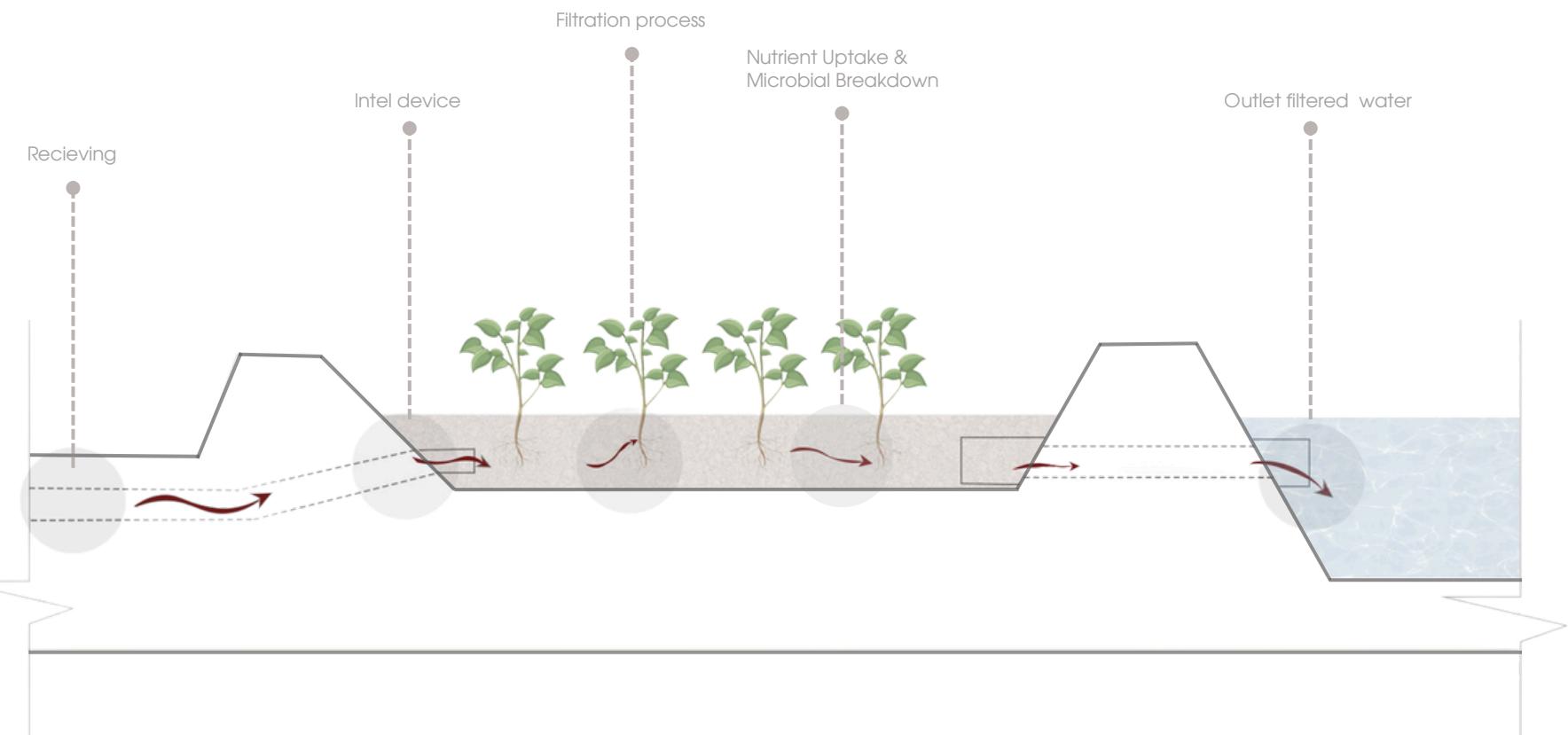
① Charging    ② Wireless communication

③ Lighting

The pathways in our project are multifunctional, serving multiple purposes. They generate energy for the project through kinetic energy tiles, provide activity areas for students, and include seating spaces. This design ensures the paths are both functional and beneficial to the overall environment.

# WATER TREATMENT STRATEGIES

Horizontal Subsurface Wetland (HSFCW) is a natural, eco-friendly system for wastewater treatment. Wastewater flows through a gravel or sand bed below the surface, where plants and microorganisms break down pollutants. It operates below the surface to minimize odors and prevent mosquito breeding, while promoting biodiversity. This low-maintenance, eco-friendly solution is ideal for decentralized or rural areas.



# WELCOME TO WEJDAN



This shot highlights the seamless harmony between the sustainable wetland and the surrounding desert landscape, perfectly blending with the environment. It also captures the integration of the Wajdan STEAM School,

# EYEBIRD SHOT



The shot captures the stunning natural beauty of Sinai, blending pixel art with the desert landscape and a glimpse of the beautiful Red Sea. It emphasizes the site's natural splendor and its harmony with wejdan

# AWAKENING THE DREARY



The shot expresses the dorms and the view of it along with the solids and voids of the form which has deeply embraced the true meaning of flexibility and comfort.

## PATH JOURNEY



The shot has shown the serenity of the view from the heart of the path displaying one of the various activities happening in it which is byscyling that frames the freedom's meaning.

## SOLID AND VOID CONNECTIVITY



Inner shot in the heart of the residential zone showing various activities

## FRAMING THE LANDSCAPE



The shot has shown the serenity of the view from the heart of the path which frames the project.

# SELF REVIVAL



The captured shot shows the different expressions of freedom which shows the self's meeting with nature, art,knowledge and flexibility.



**THANK YOU.**