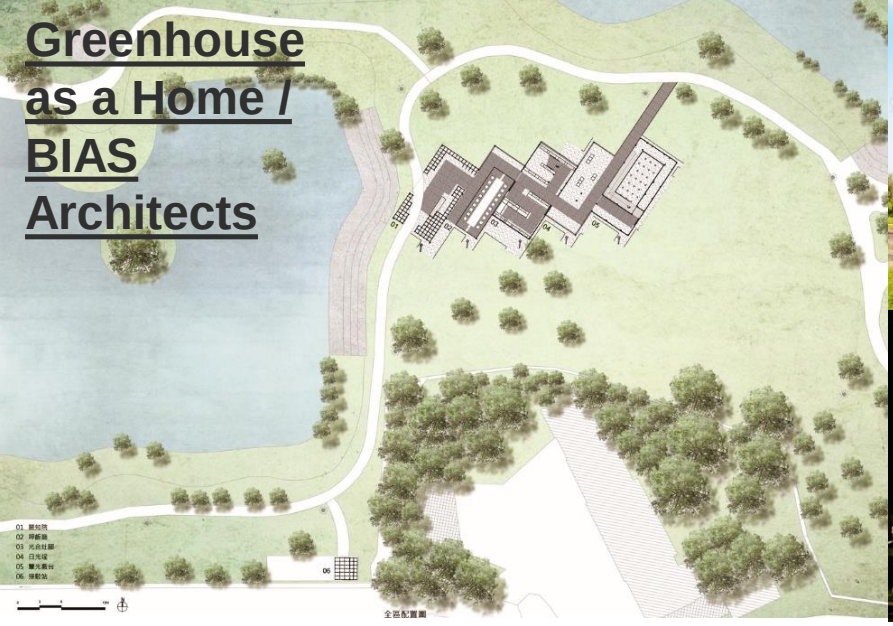
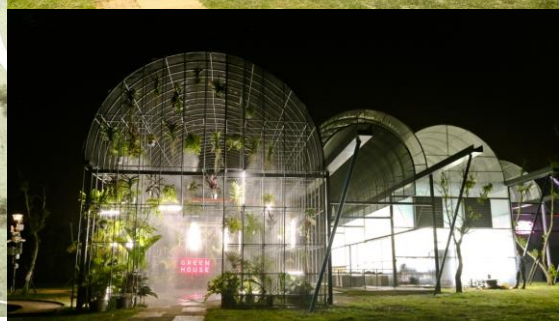
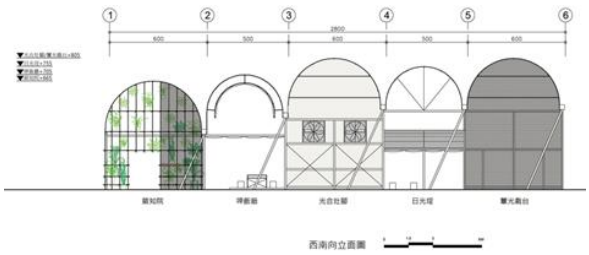
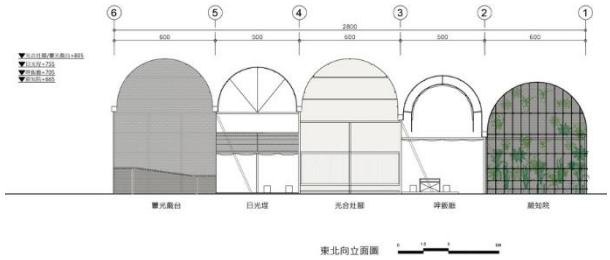
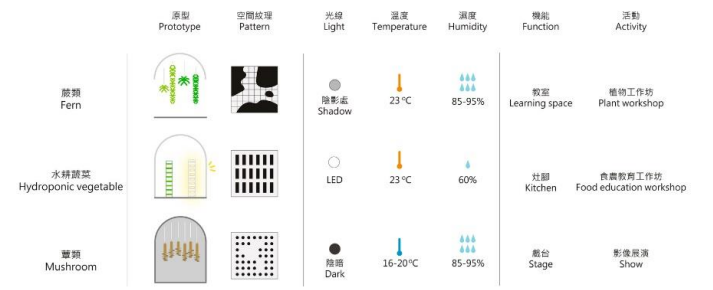
Greenhouse as a Home / BIAS Architects

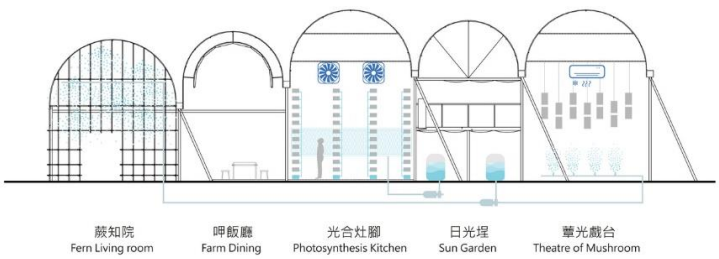












We are **“submerged”** in an element that has properties. Most important, these properties –that we call **climatic- can influence the way we inhabit**. So, since today we can **artificially control the climate, the walls are no more the only important element of architecture.**

Human living space is intertwined with that of the plants and organized according to climatic zones, rather than traditional architectural areas. Greenhouses building materials and structures are arranged to separate climatic areas, while the distribution of water and energy flows is technologically managed.

A study for to integrate planting and programs has been developed, too, and the outcome is that the people can experience an **integrated variation of climate, landscape, and activities**, while they cross “Greenhouse as home.” They can also develop some **sense for the respective interdependences, that is important for to trigger and develop a culture of sustainability.**

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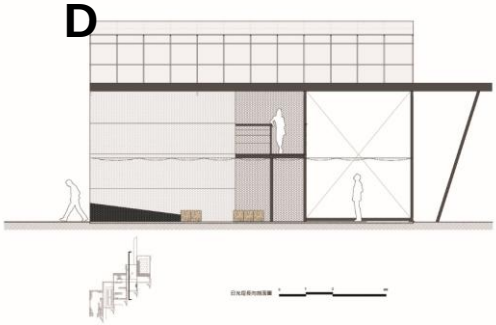
B

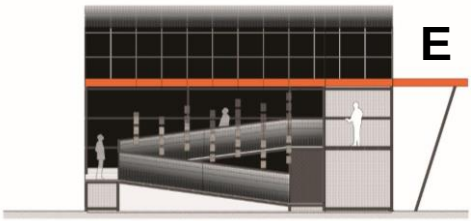
The second zone is still humid but windy and hosts the main activity area. Here, a large table enables the collective dining.

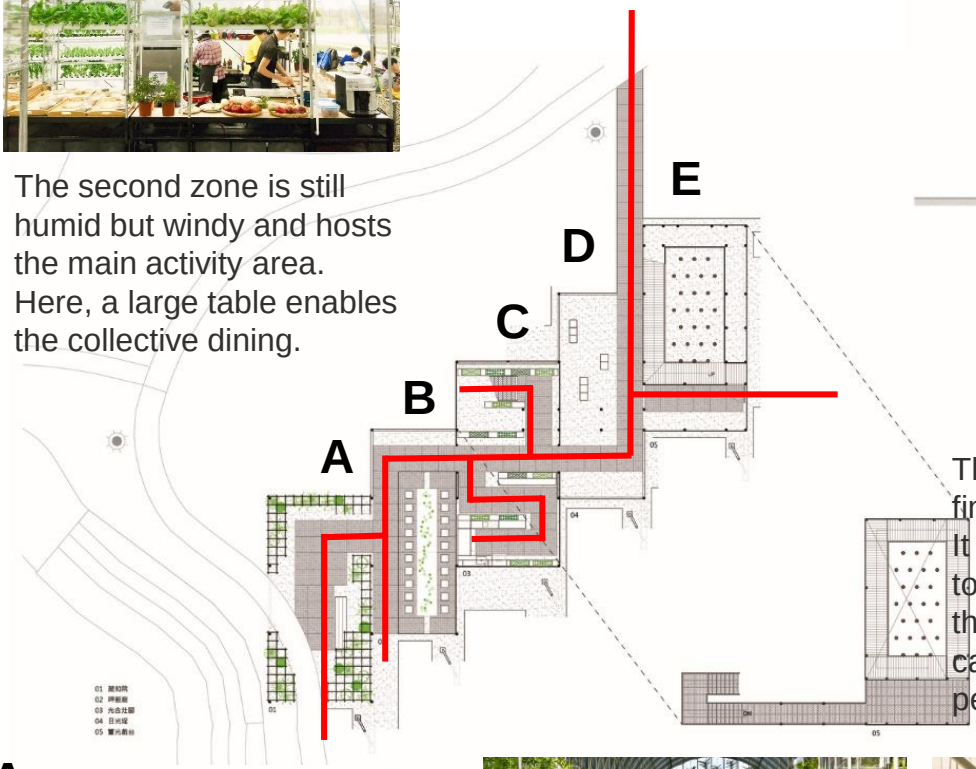
The fourth zone is hotter and drier, and serves to desiccate vegetable as in traditional courtyard houses, but enables the visitors to sunbath, too.

D



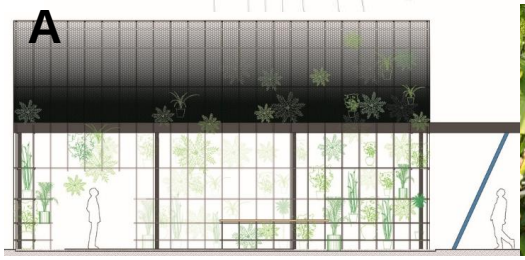
E





The fifth and last zone is finally hot, humid, and dark. It hosts a fungus farm together with a sensorial theatre where the visitors can enjoy light and sound performances.

A



The first zone is shadowy, humid, and fresh. It is inhabited by ferns hanged in a steel grid structure. This assemblage creates ambiguous walls and a forest-like spatial experience that introduces to “Greenhouse as home.”

C

The third zone is climatically stabilized and occupied by a vertical hydroponic farm together with the kitchen. Here, fresh vegetables are picked every day and then cooked in real time for the benefit of the visitors.

The Kathleen Grimm School for Leadership and Sustainability at Sandy Ground / SOM

The Kathleen Grimm School for Leadership and Sustainability at Sandy Ground is the first net zero energy school in New York City and one of the first of its kind worldwide. The 68,000-square-foot, two-story school serves 444 pre-kindergarten through fifth grade students. **The cutting-edge building harvests as much energy from renewable on-site sources as it uses on an annual basis.**

SOM optimized the **orientation and massing of the courtyard-shaped building** to take advantage of sunlight for both ample daylighting and **photovoltaic arrays on the roof and south facade.**

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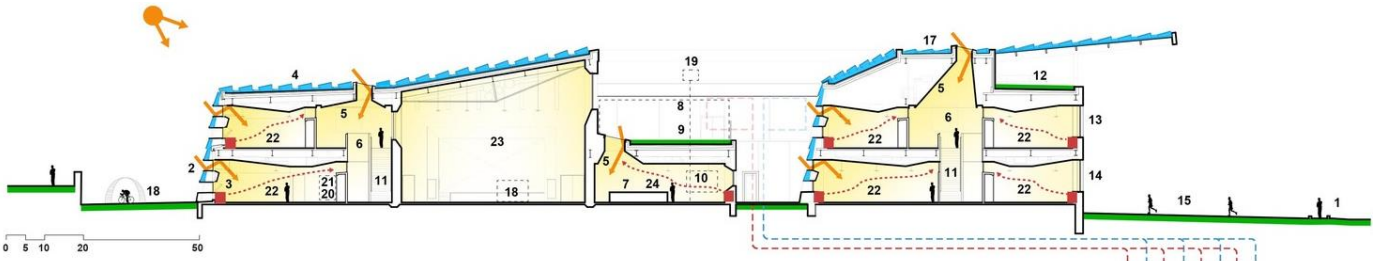
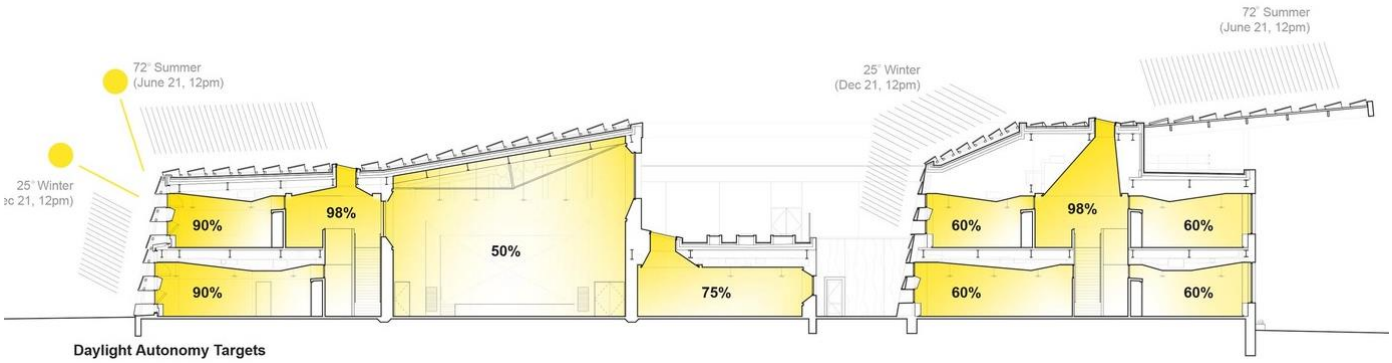
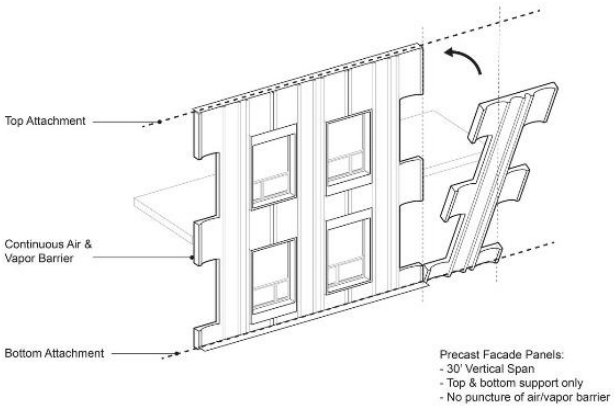


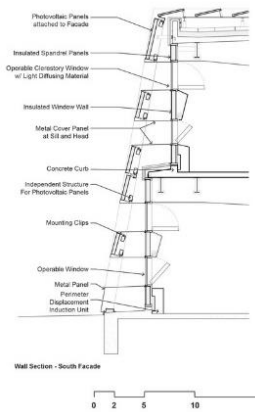
1 Walking Track & Sustainability Tour
2 Clerestory Windows at South Facade
3 Displacement Induction Units
4 Photovoltaic Panels (1,900 KBTU Generated Per Year)
5 Sloped Ceilings Reflect Natural Light
6 Double Height Corridors (98% Daylight Autonomy)
7 Low Energy Kitchen Equipment
8 Greenhouse
9 Vegetable Garden
10 Building Dashboard System
11 Open Stairs
12 Green Roof
13 Large Windows At North Facade
14 High Efficiency Envelope (.01% Infiltration Rate)
15 Running Track
16 Geothermal Wells (81)
17 Solar Thermal (For Domestic Hot Water)
18 Energy Bicycles
19 Wind Turbine
20 Occupancy Sensors
21 Aircuity System
22 Classrooms (90% Daylight Autonomy - South Classrooms)
Classrooms (60% Daylight Autonomy - North Classrooms)
23 Gymatorium (50 % Daylight Autonomy)
24 Cafeteria (50% Daylight Autonomy)

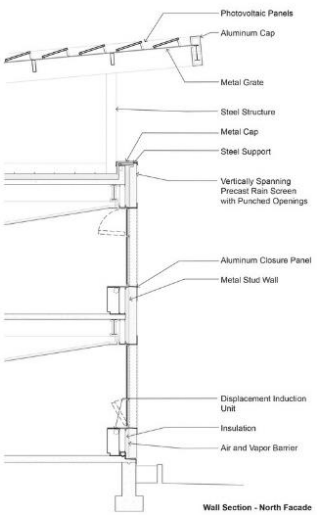


Daylight Autonomy Targets



By using **daylighting strategies** throughout the building, this significantly reduces the school's dependence on electric lighting. The entire building is **oriented on the site to maximize daylight**, and its **two-story height and interior courtyard ensure that natural light can reach the deepest part of each floor.** The **classrooms and corridors feature skylights and clerestory windows, sloped ceilings, and reflective surfaces that optimize natural light in each space**

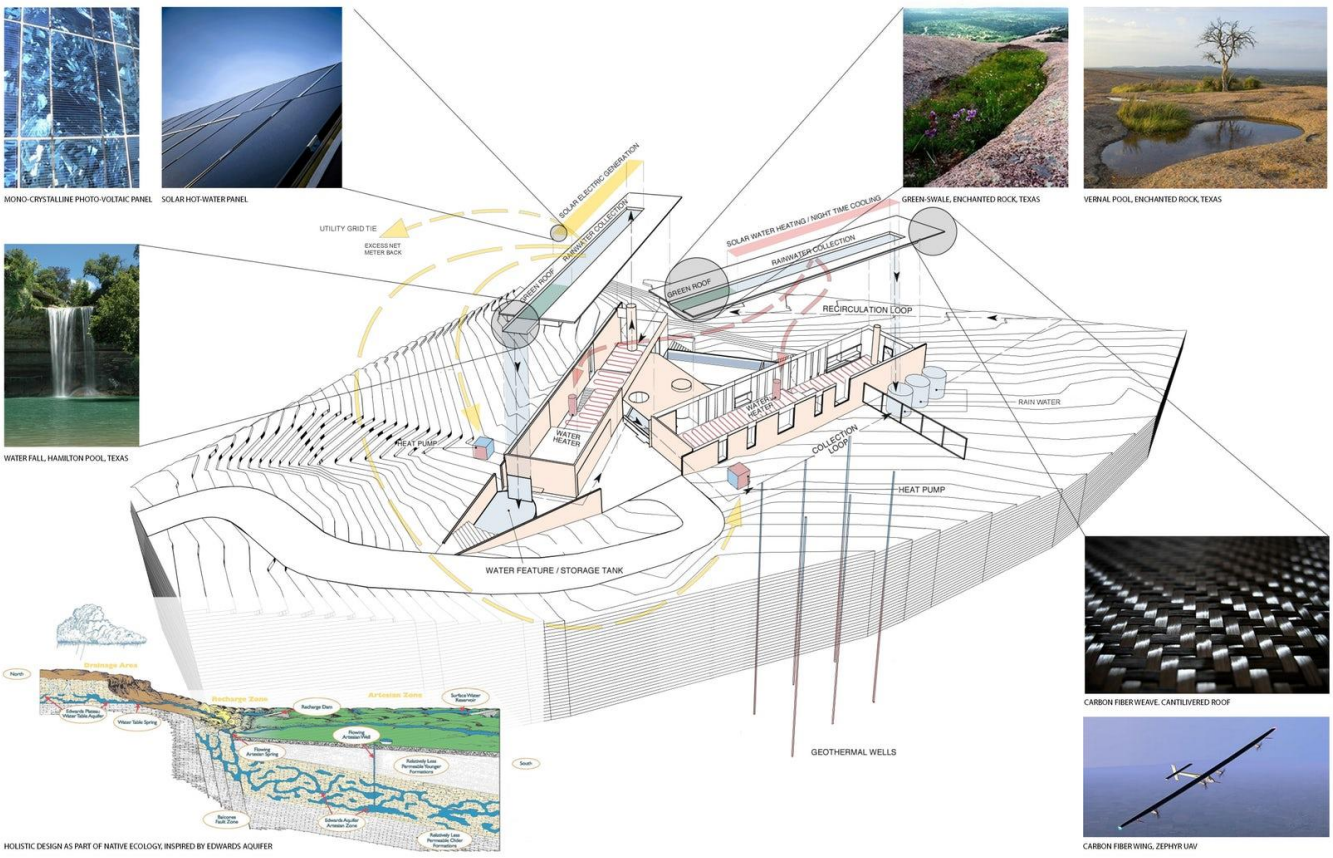




SOM determined the building's basic form — its **height, orientation, and massing** — at the very outset of the project, in order to create the optimal conditions for daylighting. But the **angled roof structure** was developed later in the design process. SOM studied how to increase the efficiency of the **PV panels by placing them at different angles and in various configurations.** The final design allows the **panels to be mounted on sloping planes.** This solution not only reduces the overall area of PVs needed to power the school, but also produces a greater energy output throughout the year.

Cascading Creek House by Bercy Chen Studio LP, USA

The building relates to contemporary architectural trends through its integration of sustainable features, in a combination of time-tested vernacular wisdom and cutting-edge high technology. The **roof structure is configured so as to create a natural basin for the collection of rainwater. These basins harness additional natural flows through the use of photovoltaic and solar hot-water panels**. The water, electricity and heat which are harvested on the roof tie into an extensive climate conditioning system which utilizes water source heat pumps and radiant loops to supply both the heating and cooling for the residence. The climate system is connected to geothermal ground loops as well as pools and water features thereby establishing a system of heat exchange which minimizes reliance on electricity or gas.



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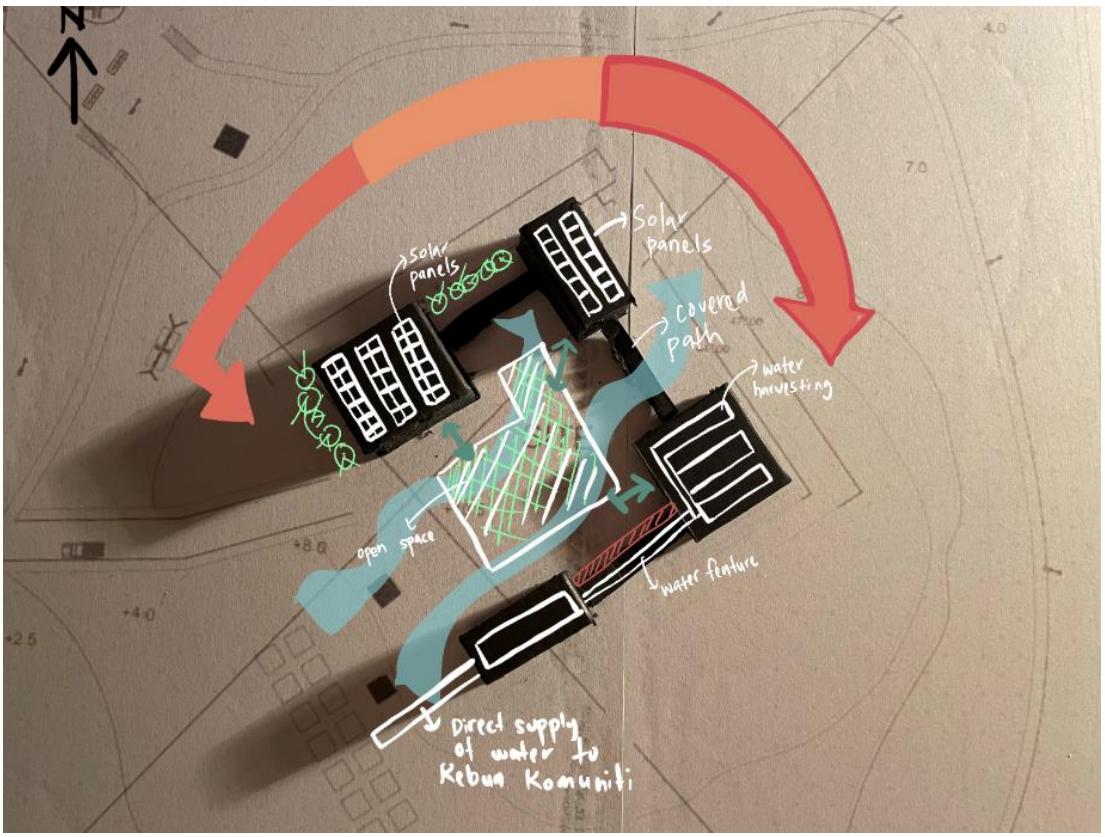
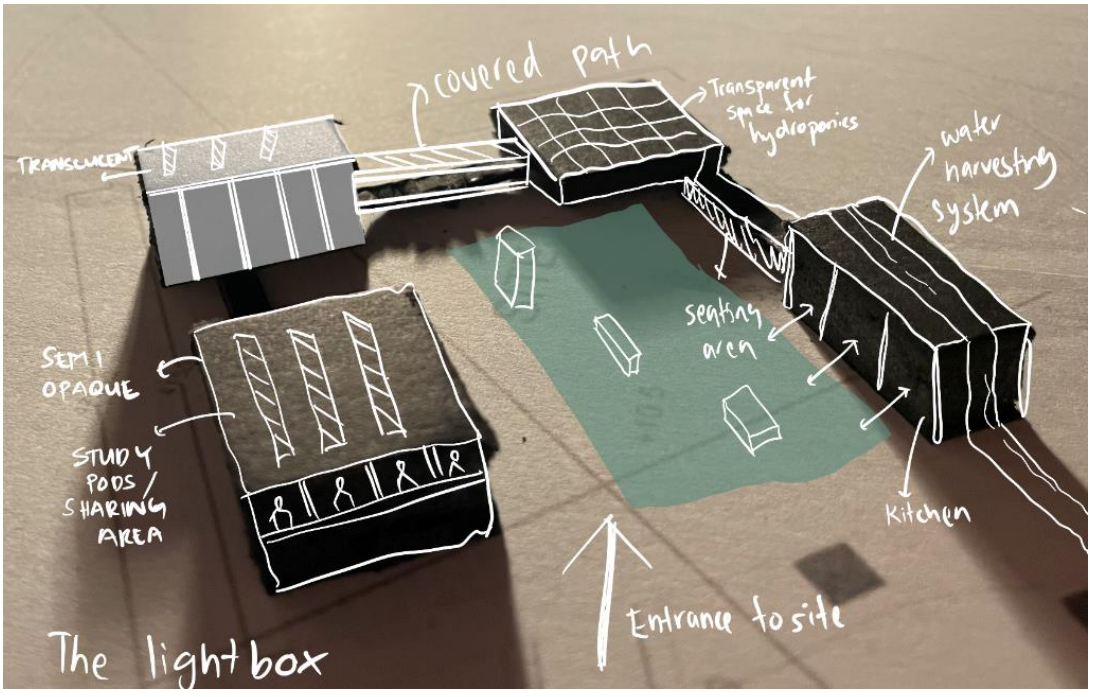
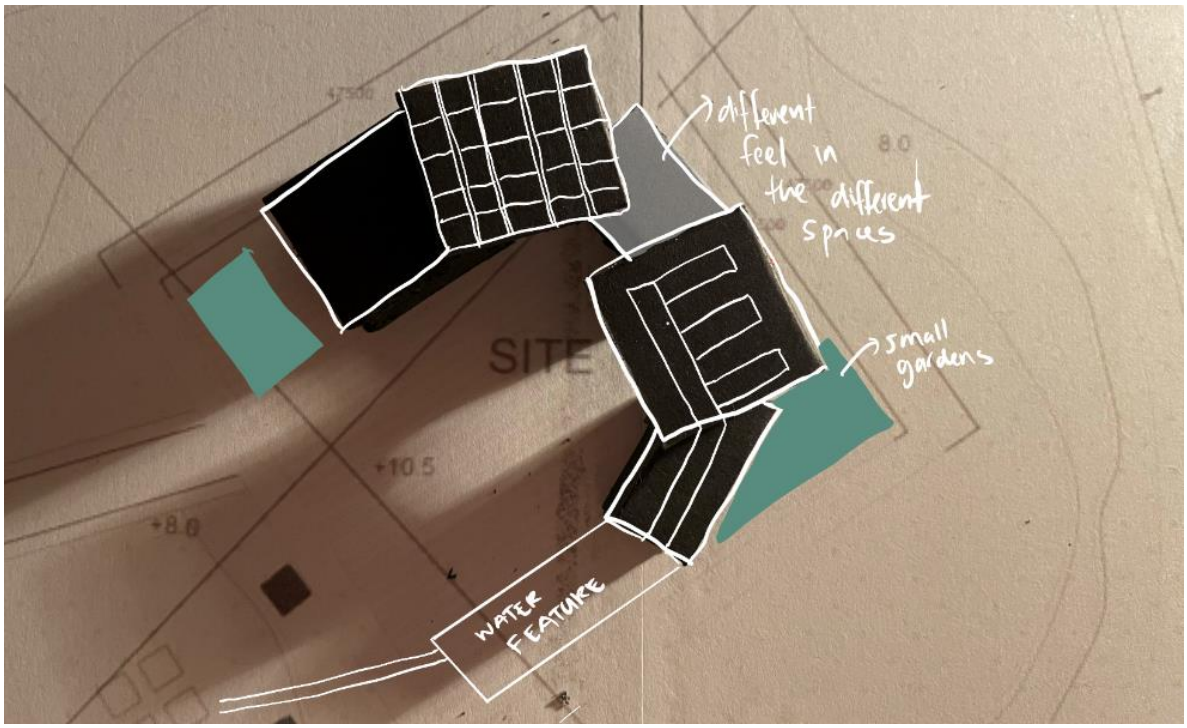
Conceptual Models

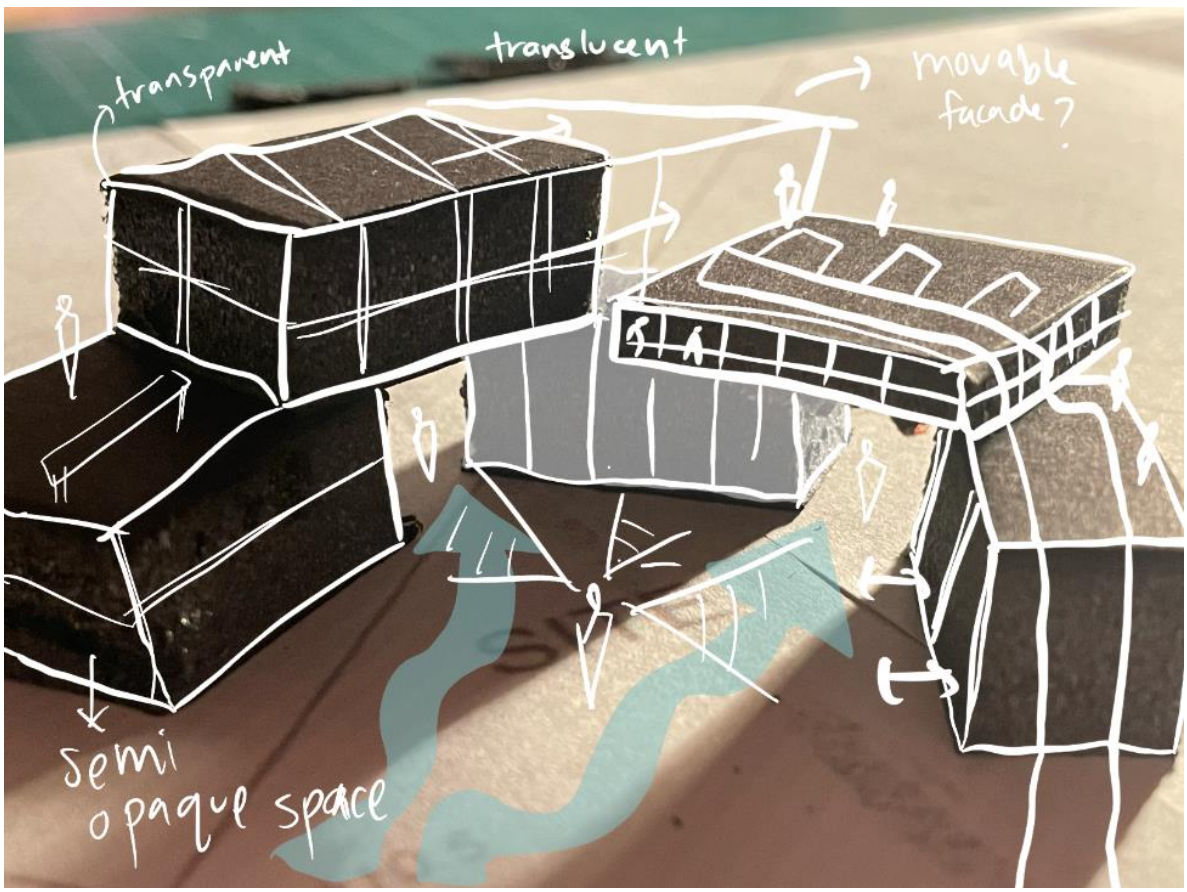




- Sense for respective tendencies that is important to trigger and develop a culture sustainability.
- Different zones with different functions and conditions. This creates different environment throughout exploration of the building.
- Different materials for different senses. Sound of materials, feel and sight triggers emotions. Transparency creates a sense of freedom.

Conceptual Models





- Take advantage of the height of the hill.
- Orient the building for maximum sunlight.
- Two storeys and interior courtyard ensure natural light can reaxch deepest part of the building.
- Skylight, sloped ceiling, and reflective surfaces maximize light.
- Basin on roof create a waterfall that can filter unwanted sound. (water harvesting method)