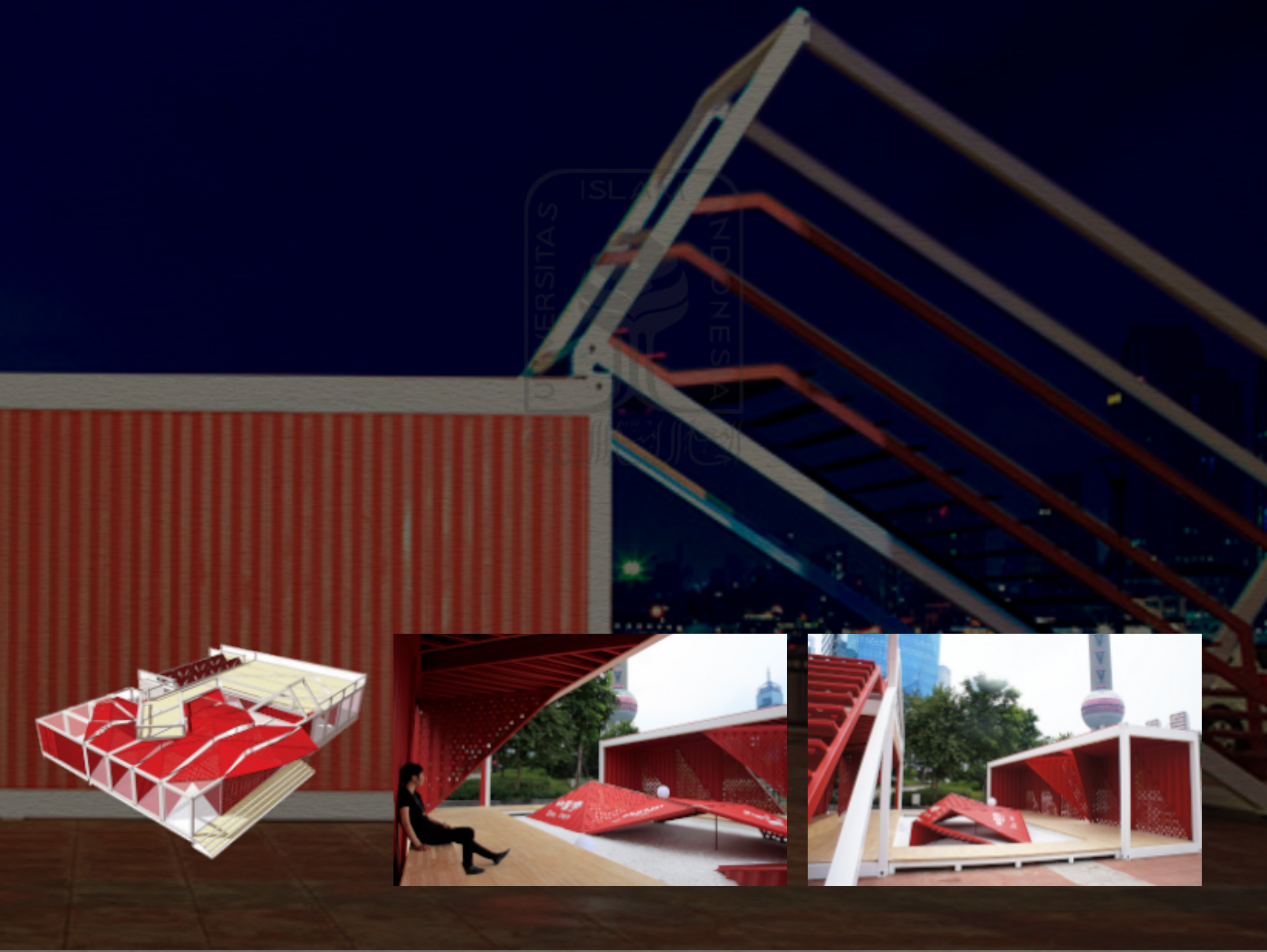
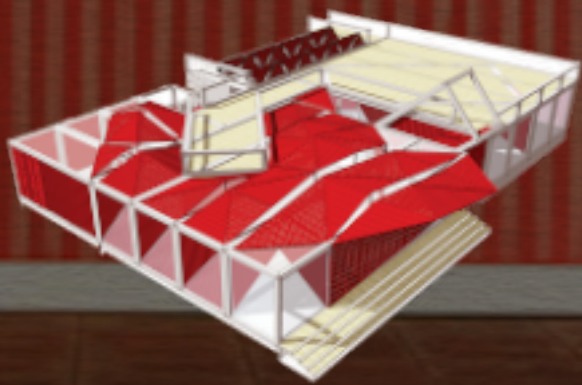
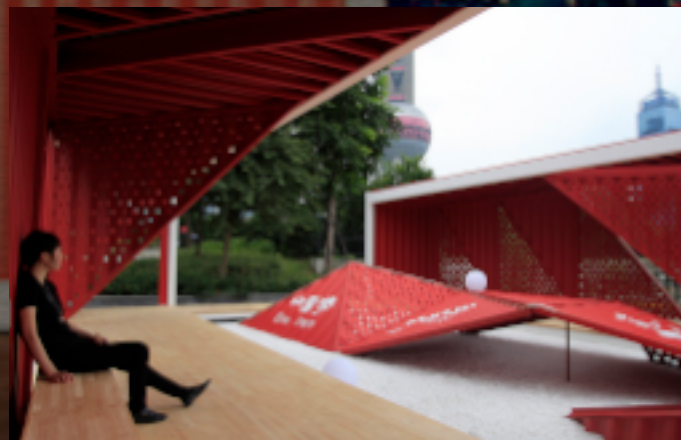


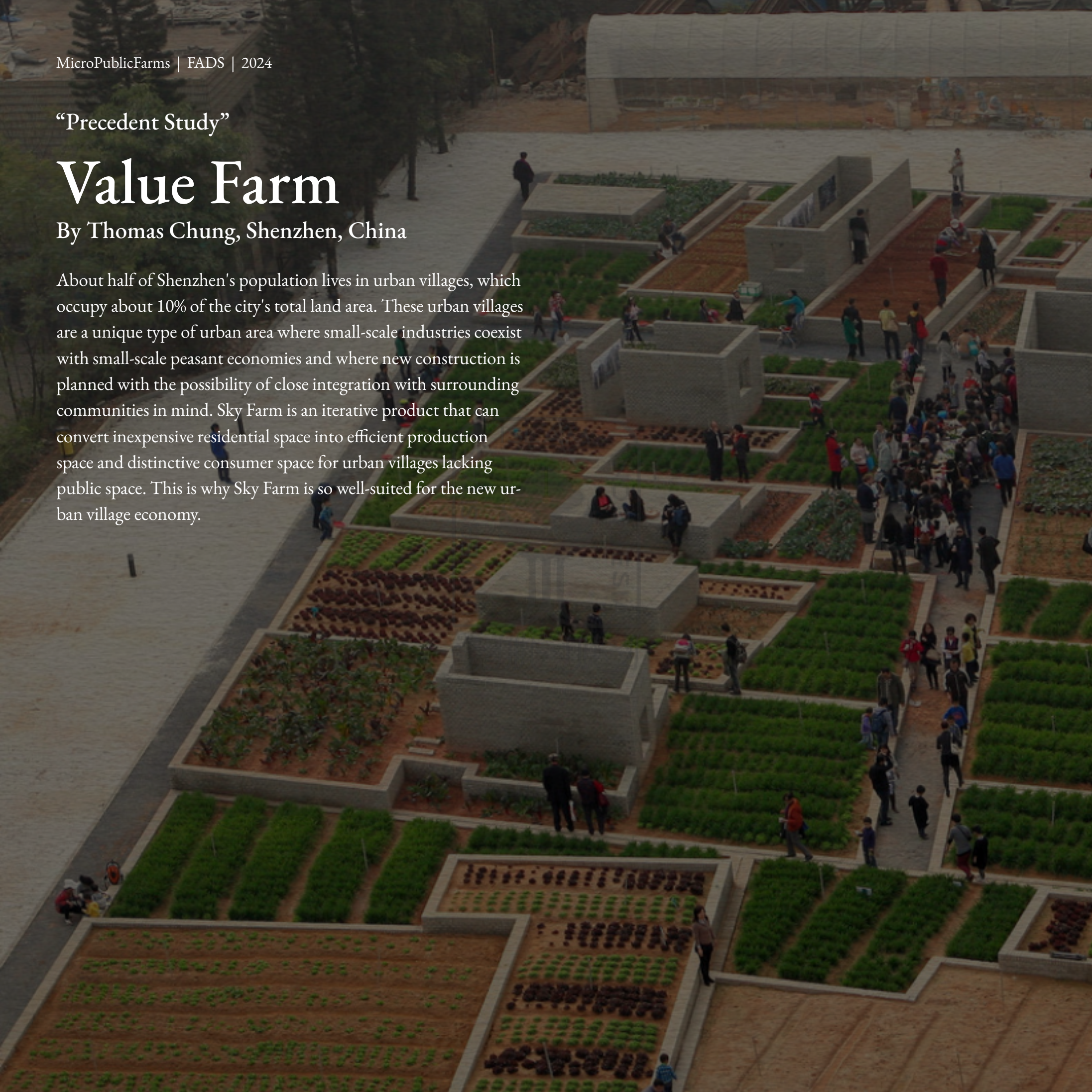


“Precedent Study”

Value Farm

By Thomas Chung, Shenzhen, China

About half of Shenzhen's population lives in urban villages, which occupy about 10% of the city's total land area. These urban villages are a unique type of urban area where small-scale industries coexist with small-scale peasant economies and where new construction is planned with the possibility of close integration with surrounding communities in mind. Sky Farm is an iterative product that can convert inexpensive residential space into efficient production space and distinctive consumer space for urban villages lacking public space. This is why Sky Farm is so well-suited for the new urban village economy.

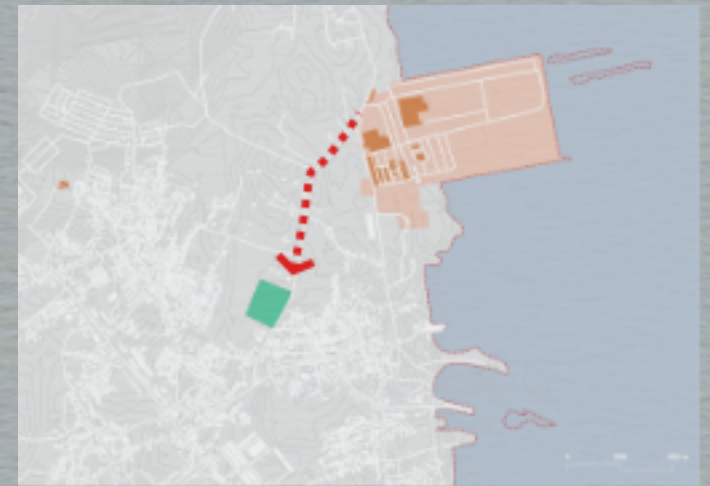




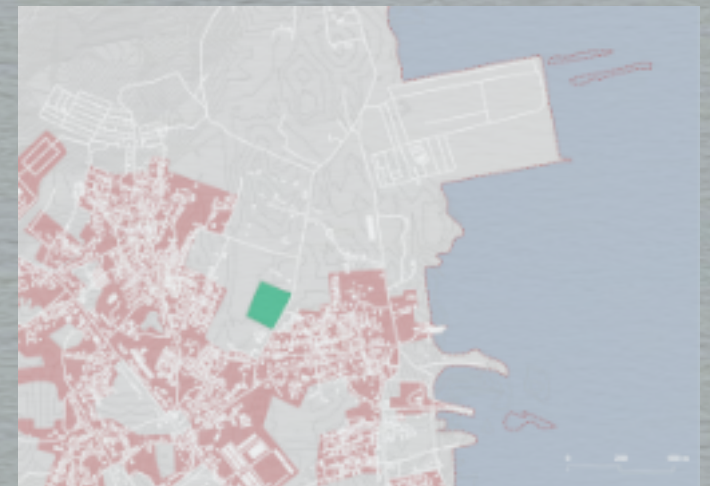


“Messo Analysis”

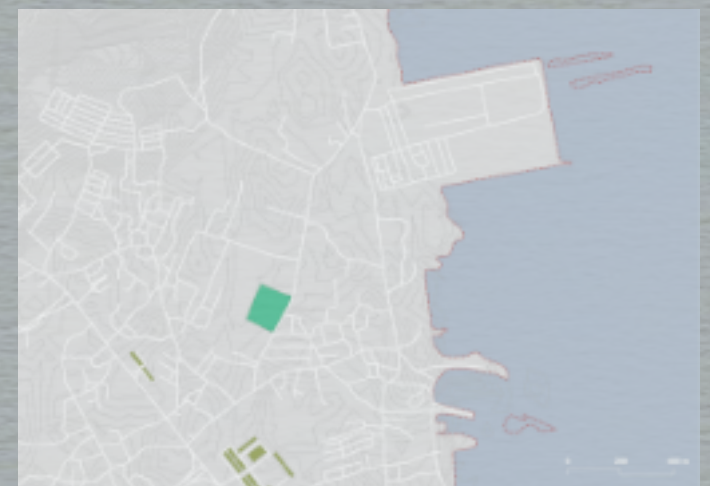




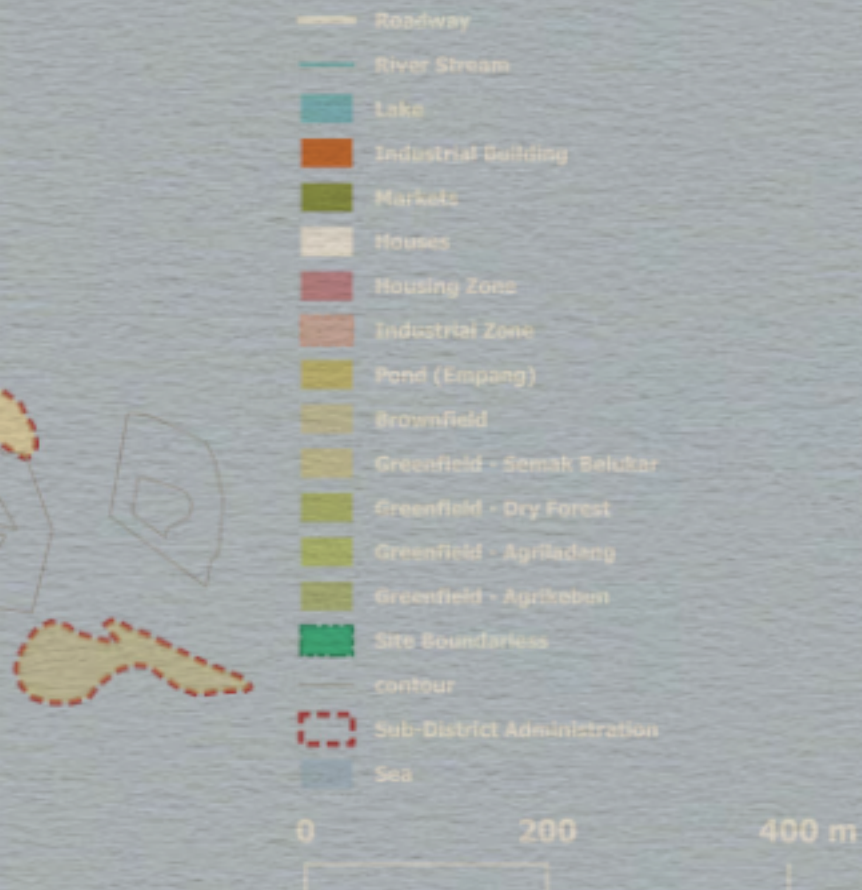
The industrial area is a major consideration in determining the location of the site. Choosing a site that is quite far from the industrial area as a form of preserving agricultural quality.



The location of the site, which is in the middle of a settlement, has advantages in terms of accessibility. People can visit in a relatively short time and the distribution of crops is also easier.



The existence of commercial facilities such as traditional markets and supermarkets around the site location is also a major support. The harvest can be delivered to the nearest market and can be more easily reached by a wider community.





“Site Location”

Description, Dimension & Area



The site selected as the design area is located at Jl. CLT, Batu Besar, Nongsa District, Batam City, Riau Islands with a **total site area of 18,084 sqm or 1.8 ha**. The selected site is a vacant open area adjacent to the residential area and quite far from the industrial area to the north, and quite close to commercial areas. Based on its position, those aspects are a major consideration as an opportunity to create a space for growing crops for daily food.

“Land Use & Planning”

vv



The land is a **brown open field** that occurs due to the expansion of industrial needs and is currently used as a place to place consumable containers. According to the **Local Regulation of Batam City Number 3 Year 2021**, Nongsa Sub-district is one of the areas **designated as Agricultural Area**. Therefore, the design is in accordance with the local land use and also in accordance with the **Regional Medium Term Development Plan 2021-2026**.

“Site Regulation”
Batam Mayor Regulation Number 22 Year 2017



In Batam Mayor Regulation Number 22 Year 2017, it is explained how to control the intensity of space utilization by determining the amount of building allowed on a site which includes:

1. BCR: 45% - 60%
2. GCR: Minimum of 30%
3. BFC is influenced by the physical city
4. Building Setback: 4 meters

“Topography Condition”

Current Condition Based on Field Observation



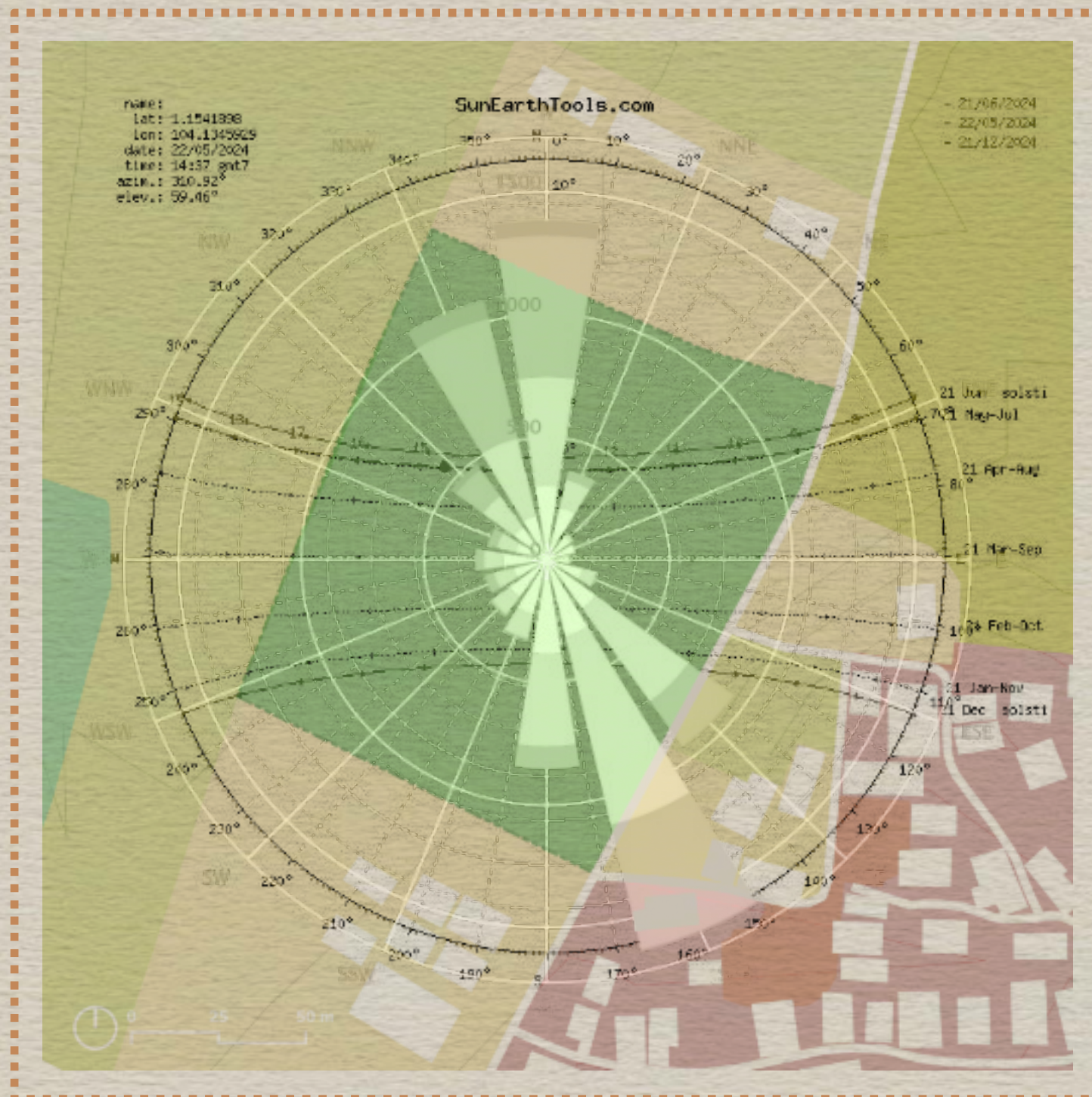
The site is **red soil or bauxite** with a fairly rocky surface that is **surrounded by wild grass, weeds, and some vegetation**. This type of red soil or bauxite has a character that is difficult to grow plants. However, it becomes an interesting challenge by **applying a permaculture system**. The site conditions tend to be **flat** and there are some **low contour areas of less than 1 meter**, so there is no need for planning related to ‘cut and fill’ on the site.

“Site Circulation”

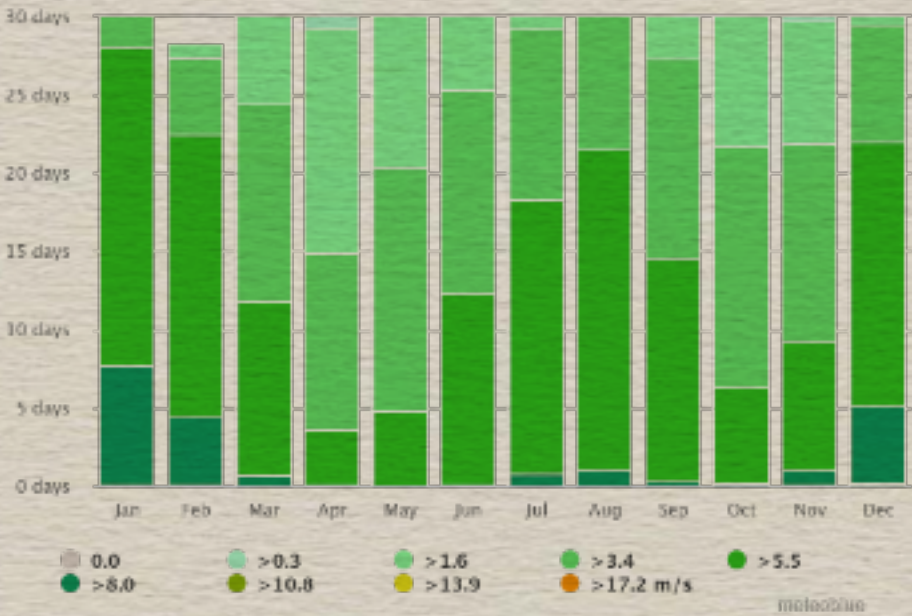
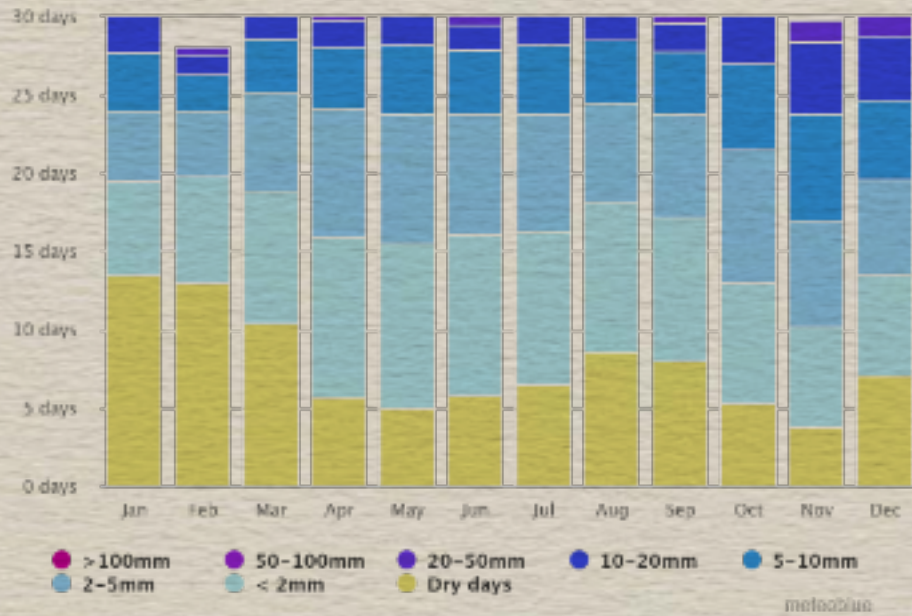
Possibilites from Outside to Inside



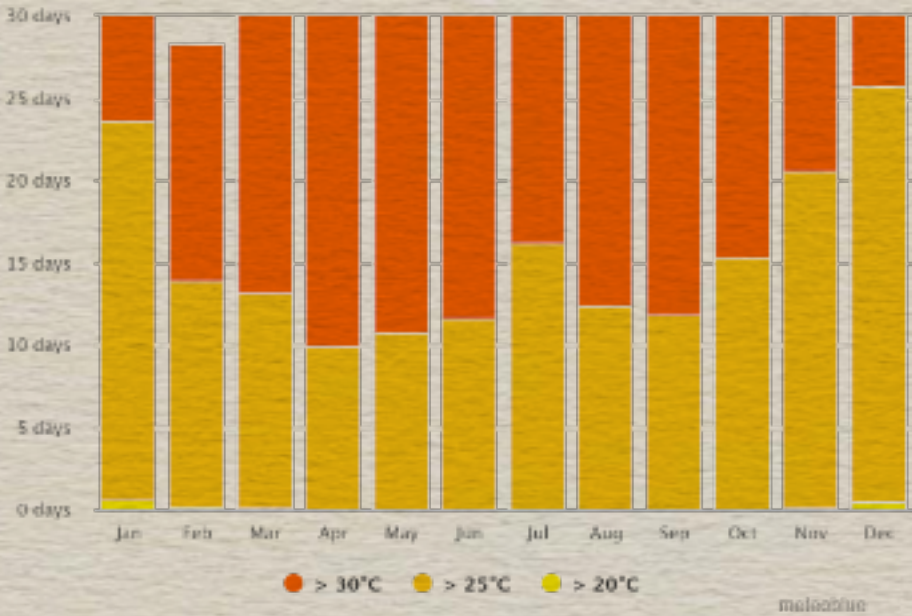
The main road is categorized as a **neighborhood road** with **asphalt pavement material** as the main circulation for wheeled and walking users. This path becomes the **main circulation area to enter the design area**. The **elongated form** of circulation is in line with the **elongated shape** of the site, so the main access to the site has the potential to be able to use **two entrances** on the edge of the road.



“Climate Data”
Wind, Temperature, and Precipitation

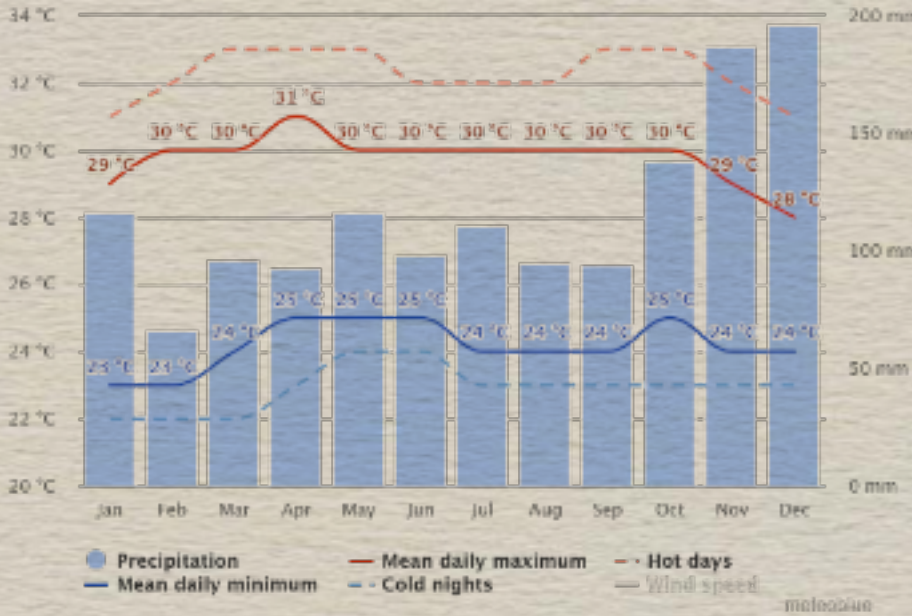


“Wind Speed”



“Maximum Temperatures”

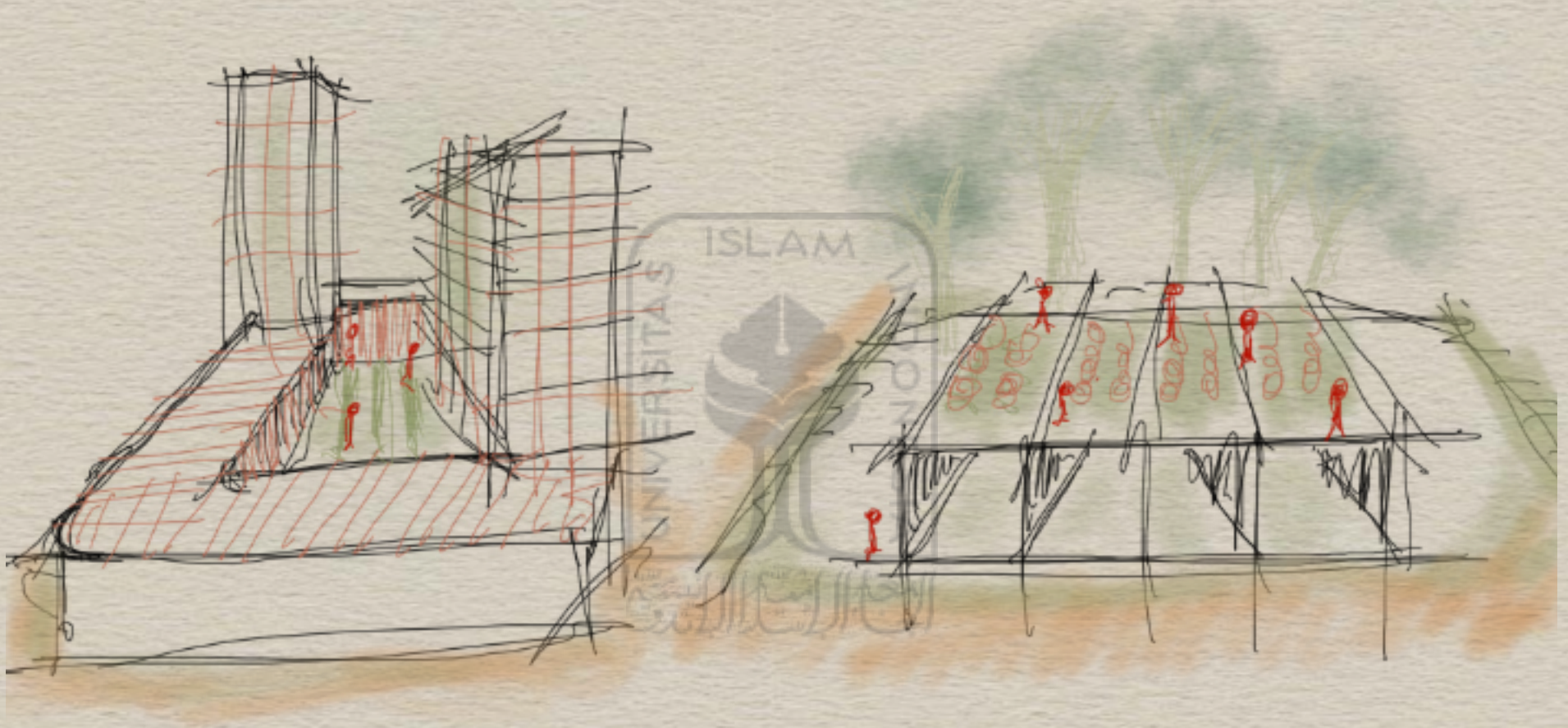
“Precipitation Amounts”



“Average Temperature & Precipitation”

“Exploration of Module Variations”

By using Computational and Parametricism

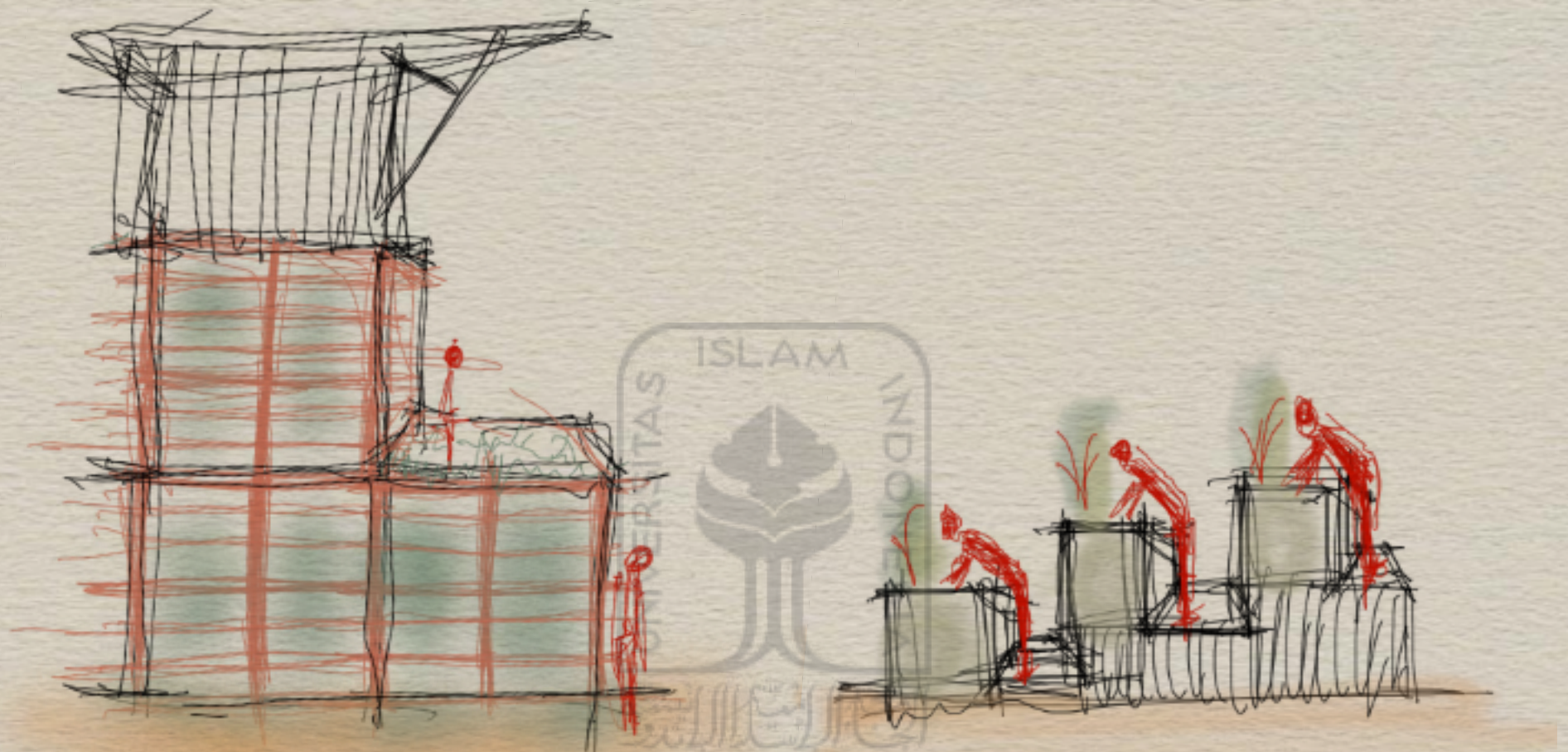


“Semi-Open Farming”

This variation of farming is located between the containers by utilizing the open spaces in between which can create communal spaces and interactions between farmers and residents and between residents. The crops planted are horticultural crops.

“Open-Air Rooftop Farming”

Open-Air Rooftop Farming is one way to utilize the flat roof of the container and can also be used as insulation so that the temperature inside the container remains at a safe limit and is not hot. Open-air rooftop farms are easier to construct and less expensive.



“Vertical Farming & Garden”

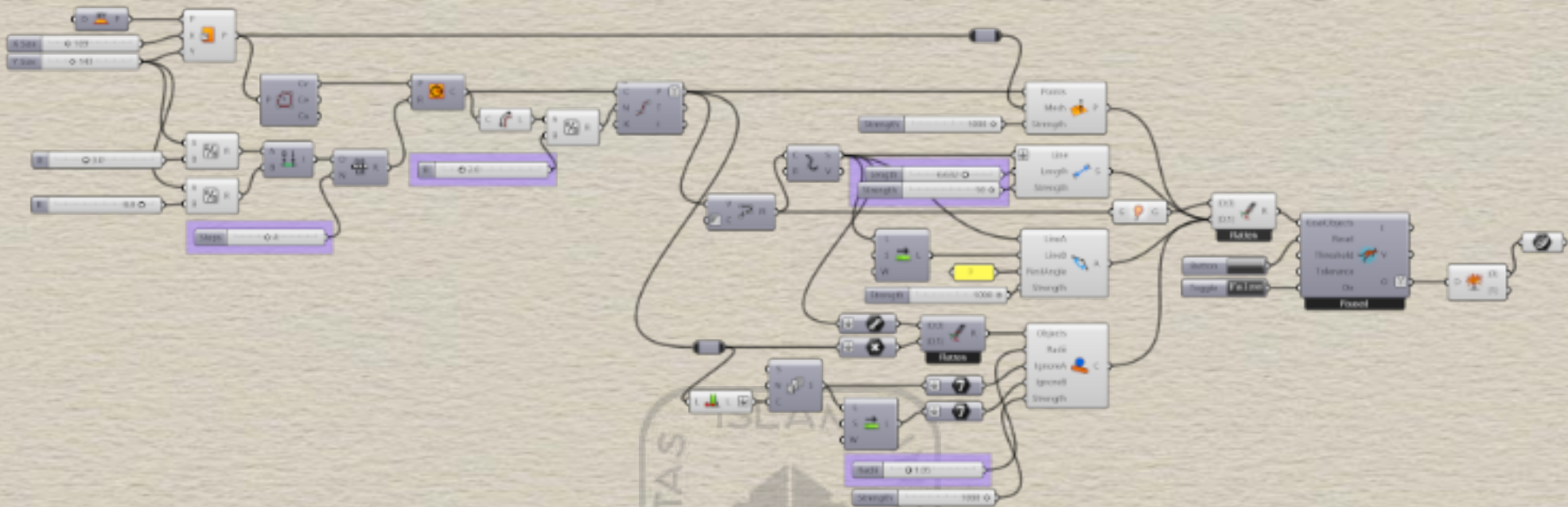
The garden and farming were done by adapting the orientation of the container that rises upwards. The planting medium used is reused wooden pallets. The wooden pallets that are “attached” to the container also become a secondary skin that can maintain the temperature inside the container.

“Soil Block Terraces Farming”

This variant of farming is one of the ways visitors can learn how to grow crops on a small scale which can be applied to each household. The terracing system is applied using wooden pallet boxes so that farming in natural media.

“Exploration of Module Variations”

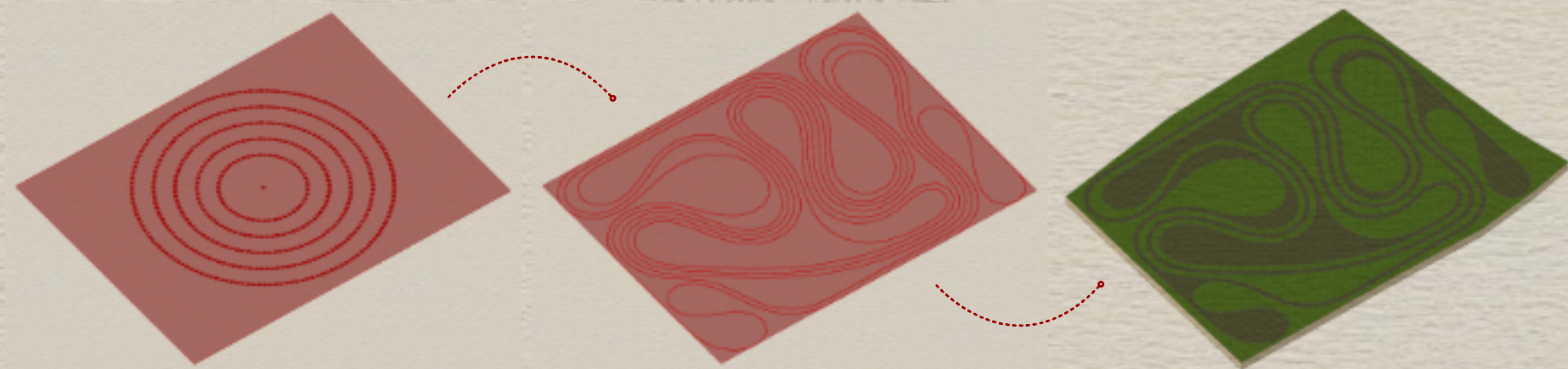
By using Computational and Parametricism



In the process of finding a landscaping pattern for the site, computation is used with input numbers in the X-Y division which are site boundaries and bound to a circular archetype. The target archetype is a circle of 5 ‘steps’ and 1 ‘centre circle’ that is broken down into ‘Point Segments’ in order to move organically, where each step will be filled with farming areas, vegetation, pavements, etc.

“Pattern Transformation”

By using Computational and Parametricism



The Target Archetype

5 steps broken down into Point Segments

Raw Pattern

The target moved fluidly inside site boundaries and resulting the raw pattern

Fill-in Steps

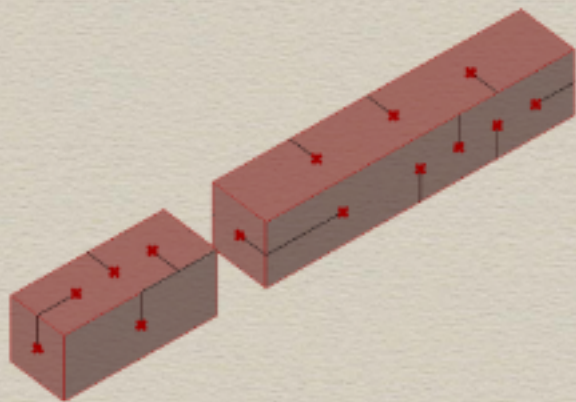
each step will be filled with farming areas, vegetation, and pavements.

“Final Landscape Pattern”

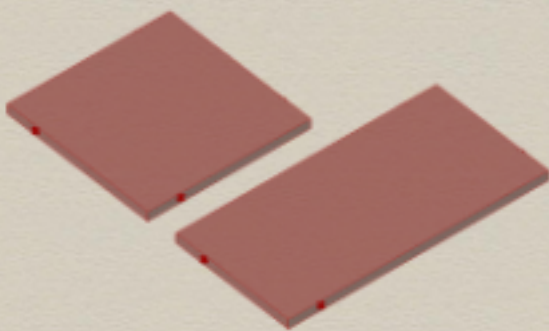
By Archicad



“Exploration of Mass Variations”
By using Computational and Parametricism

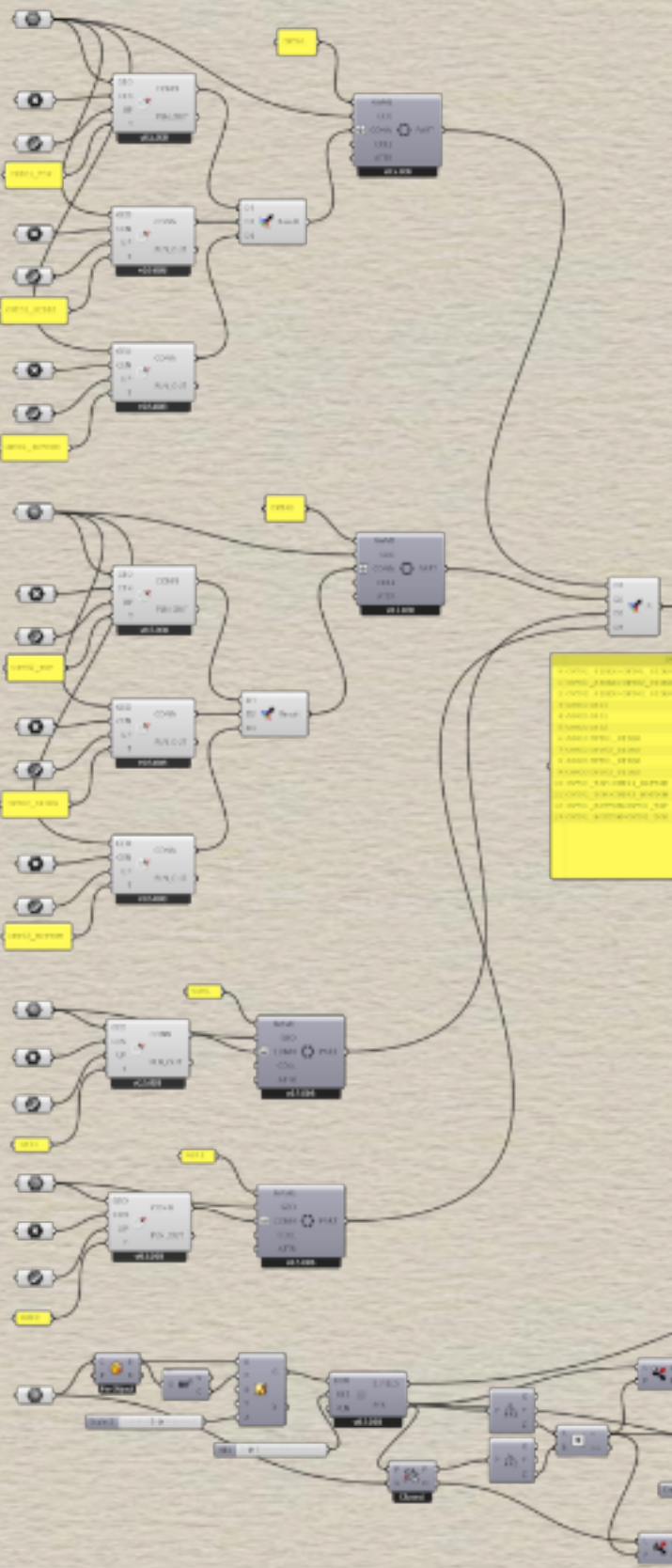


Container Module
20-Foot & 40-Foot



OpenSpace Module

INDONESIA

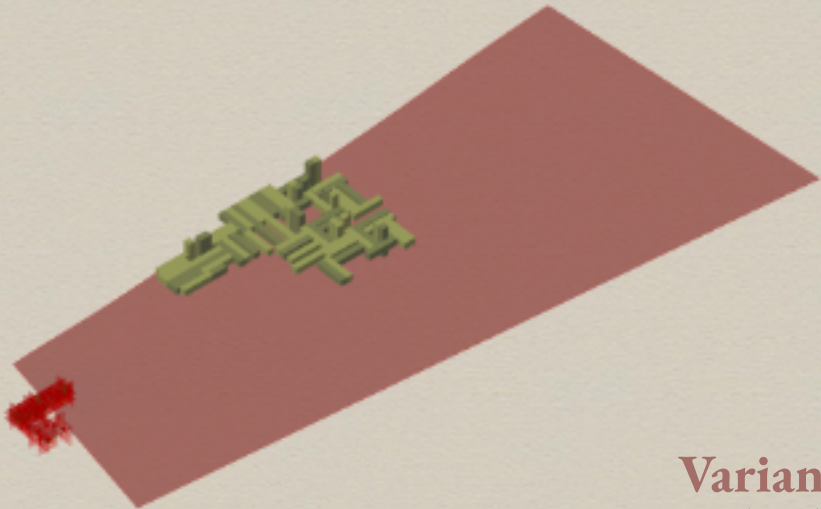


01 In the process of exploring the mass of the building, the basic module used is the shape of the container and open space. In accordance with international container standards, there are two types of sizes: 20-Foot Container and 40-Foot Container. For open space, there is no specific standard, but in the process it is divided into two areas: 25 sqm & 32 sqm.

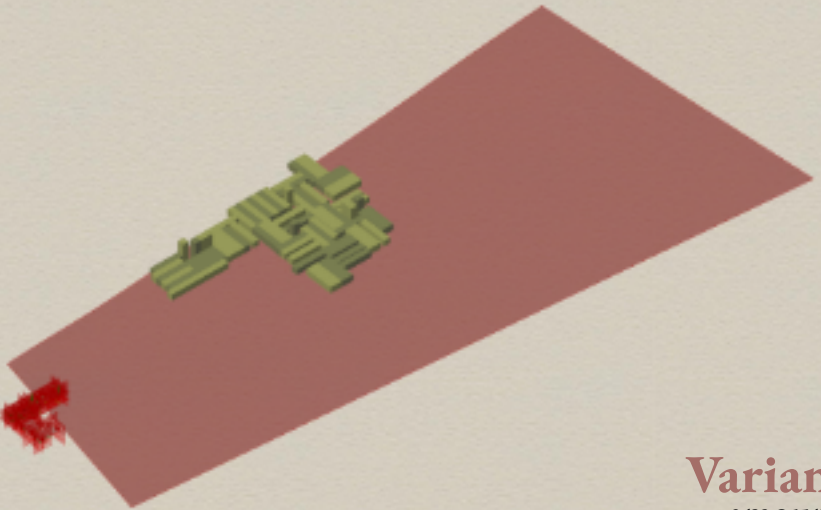
02 Some of these modules are used as the main building masses with variational parametrics plugin in Grasshopper and Rhinoceros software to appear on the site which will be analyzed.

Grasshopper Scripts

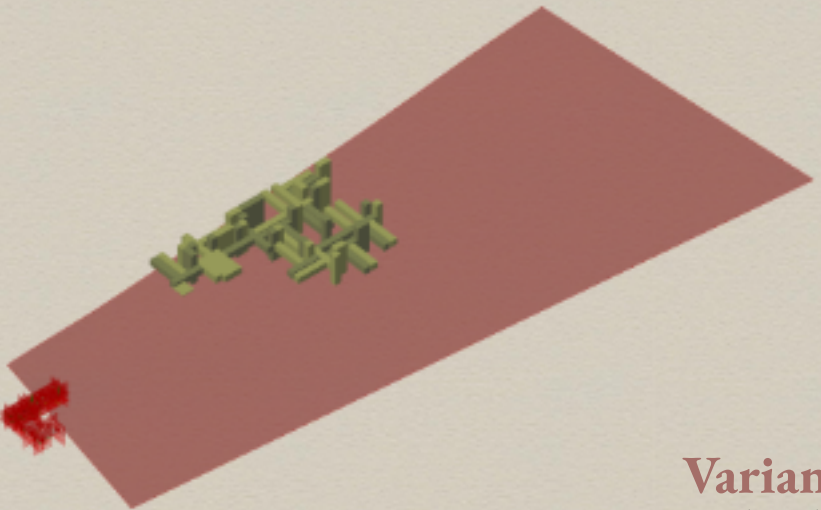
By using WASP as plugin



Variant A
amount: 75



Variant B
amount: 75



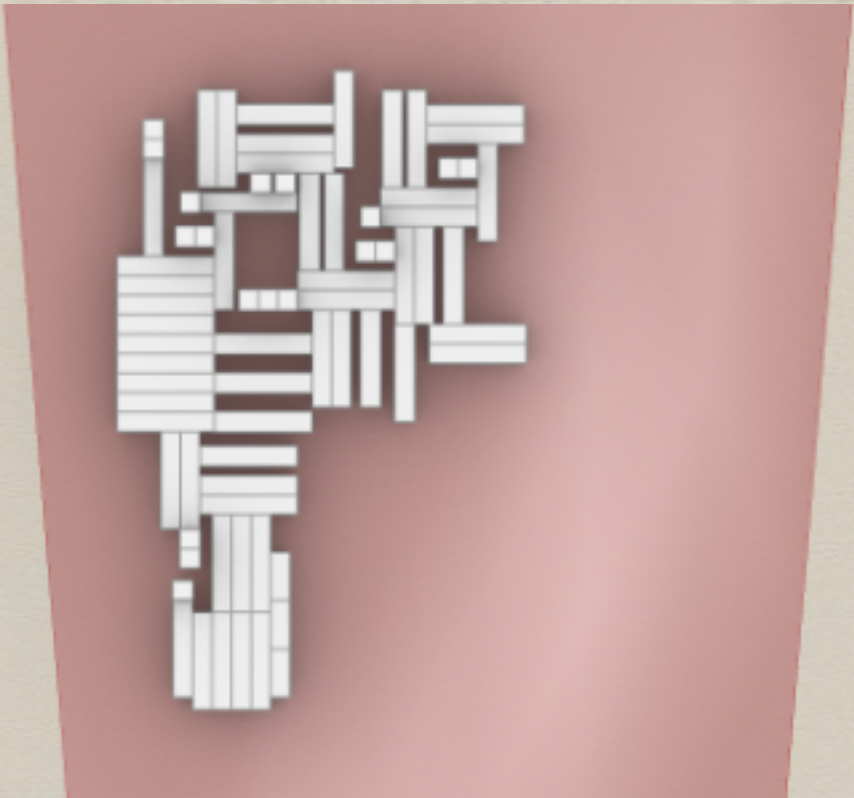
Variant C
amount: 75

in components in the process of developing
processed using the WASP + Ruler Grammar
are. Thus, several variations of building masses
analyzed in terms of open-closed spaces.

03 After the building massing process using the script from the WASP plugin in Grasshopper is successful, several variations of the container arrangement will appear. These variations can change according to the Ruler Grammar that has been created and the number of containers that we think is best, according to our needs, and according to client requests.

“Analysis of Variants”

Based on Needs of Area & Arrangements



Variant A

In 'Variant A', the building mass configuration generated from the grasshopper script is more container modules oriented horizontally than those oriented upwards, which has advantages in the arrangement of spatial functions. However, the disadvantage of 'Variant A' is that the open space for communal and gardening between the containers is narrow, so that the achievement of farming needs is not maximized.



Variant B

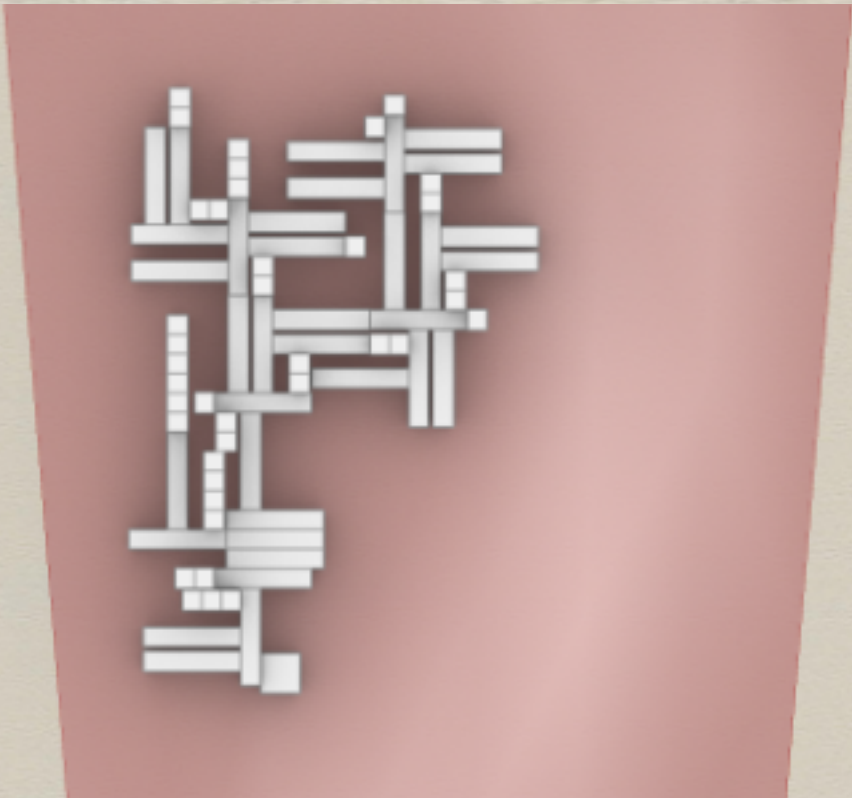
While in 'Variant B', the configuration of the building mass is more container modules oriented upwards than those oriented horizontally, which has advantages in the arrangement of spatial functions. However, the disadvantage of 'Variant B' is that the open space for communal and gardening between the containers is narrow, so that the achievement of farming needs is not maximized.

selected



Variant B

ation of the building mass in the
ontal than towering, but looks denser
t the open space for gardening also
space as a communal area cannot be
'Variant B' is that the horizontal
utilized as "rooftop farming".

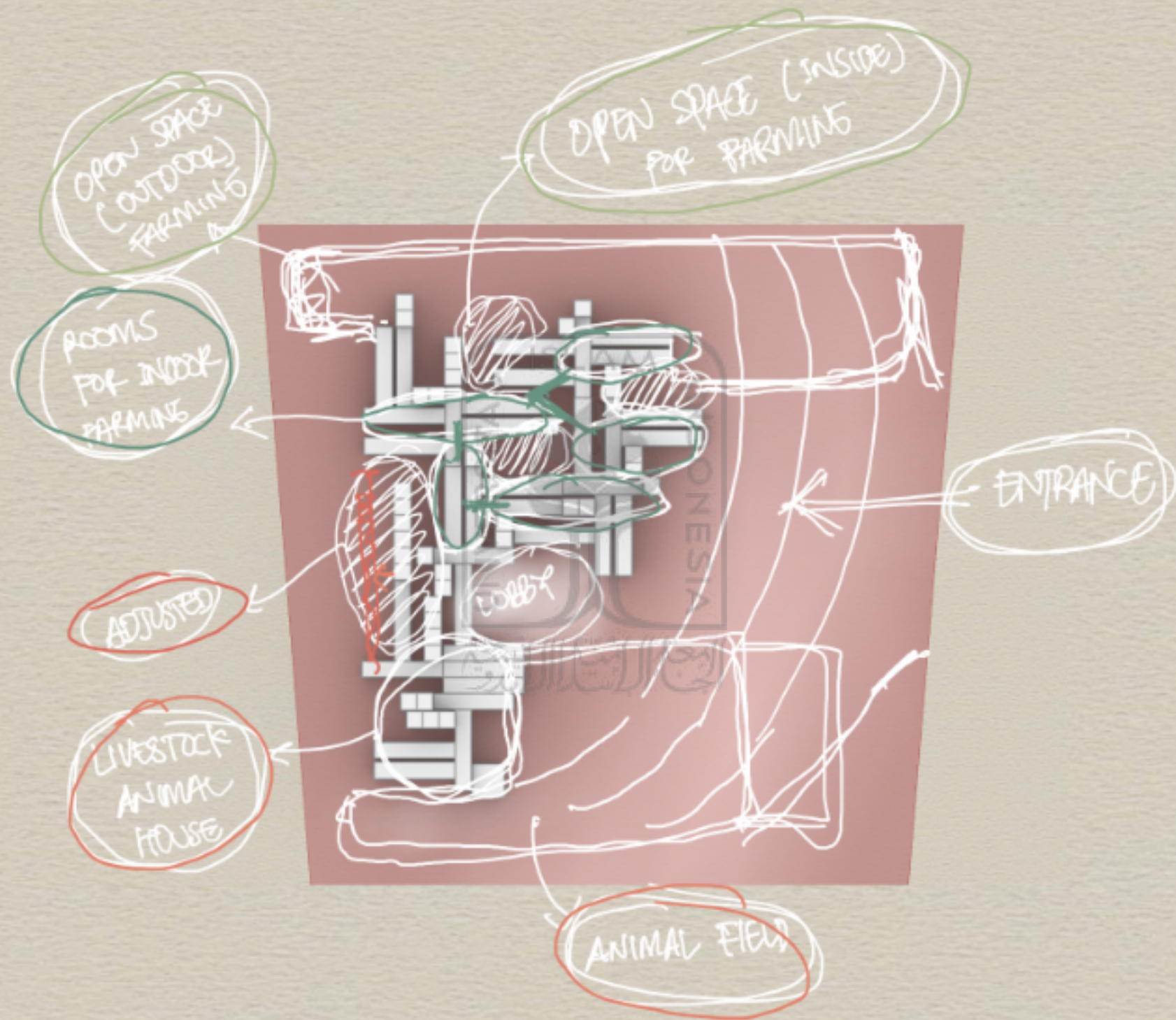


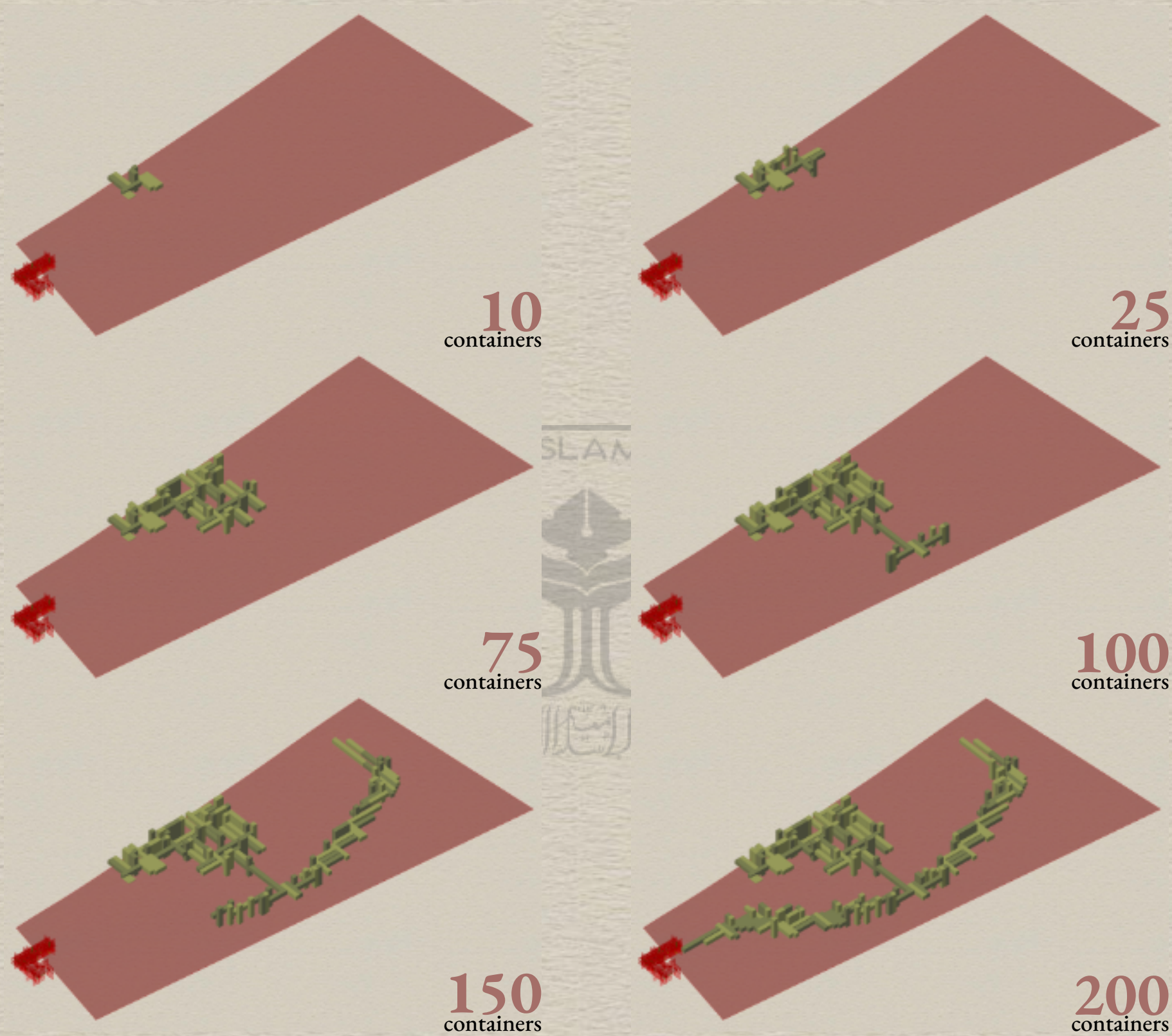
Variant C

Finally, in 'Variant C', a more equitable building mass configuration was found in terms of the orientation of the container modules. Some are horizontal and some are elevated. Then, a lot of open space in the middle of the building's container modules is created, which can be utilized as farming space. The towering container modules can be utilized as vertical gardens. Circulation as access for users is also better created by following the horizontal container pattern.

“Site Zoning”

By using Computational and Parametricism





“Growth of Modules”

This is an illustration of how container modules can grow based on the number of containers required. The simulation also uses WASP plugin from Grasshopper software and this can illustrate the potential for module growth in the future.







“Schematic Elevation”

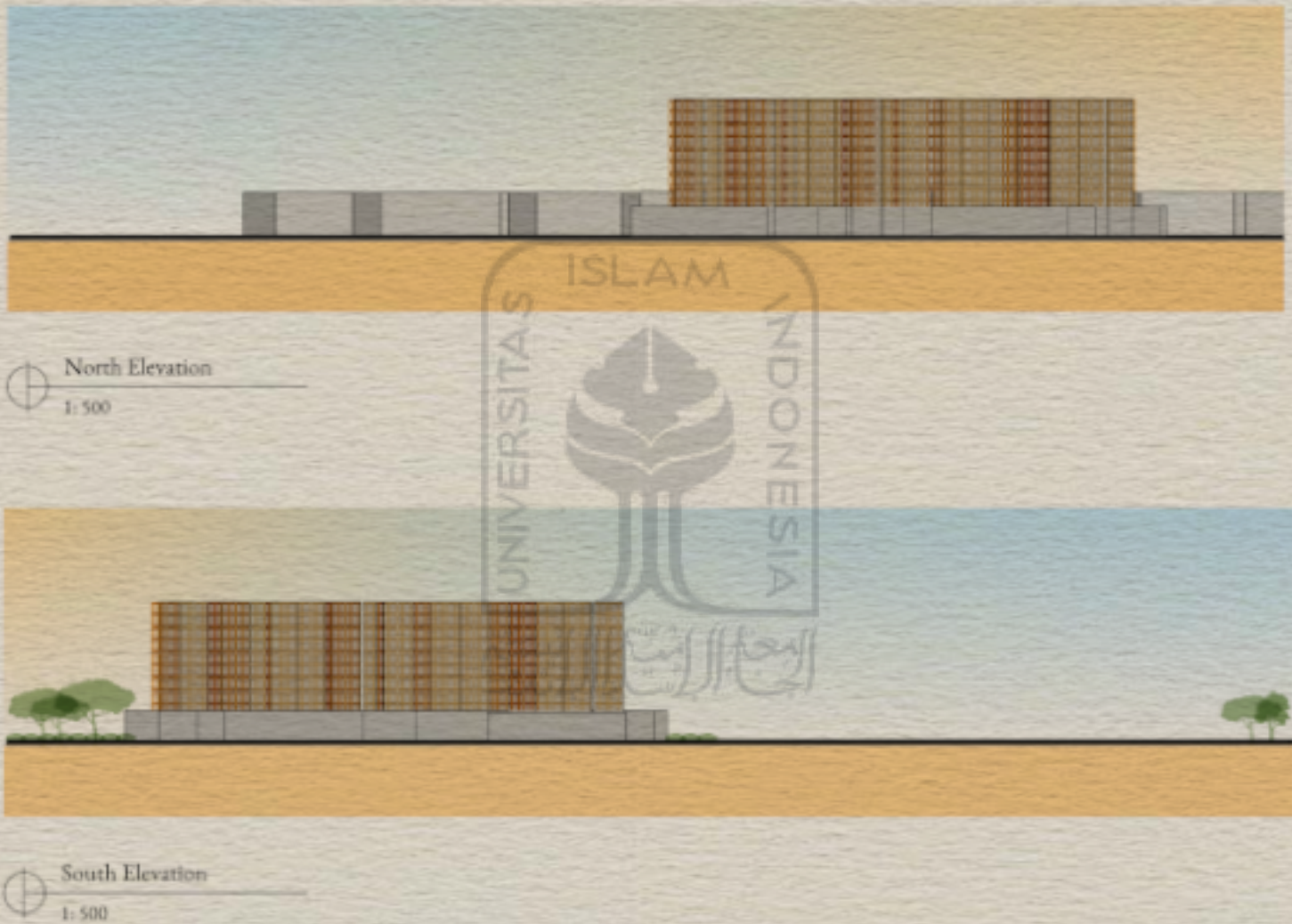


East Elevation
1: 600

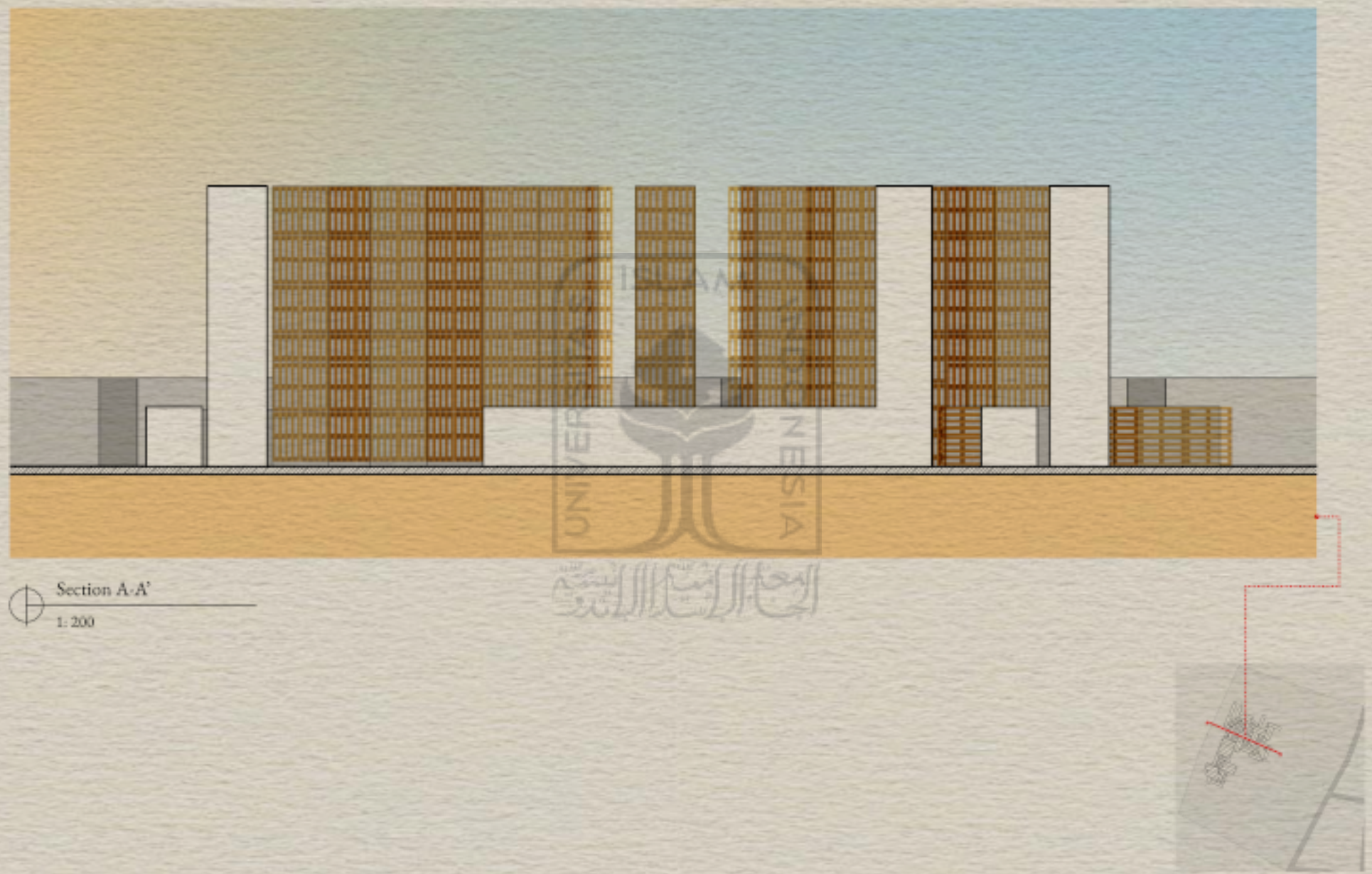


West Elevation
1: 600

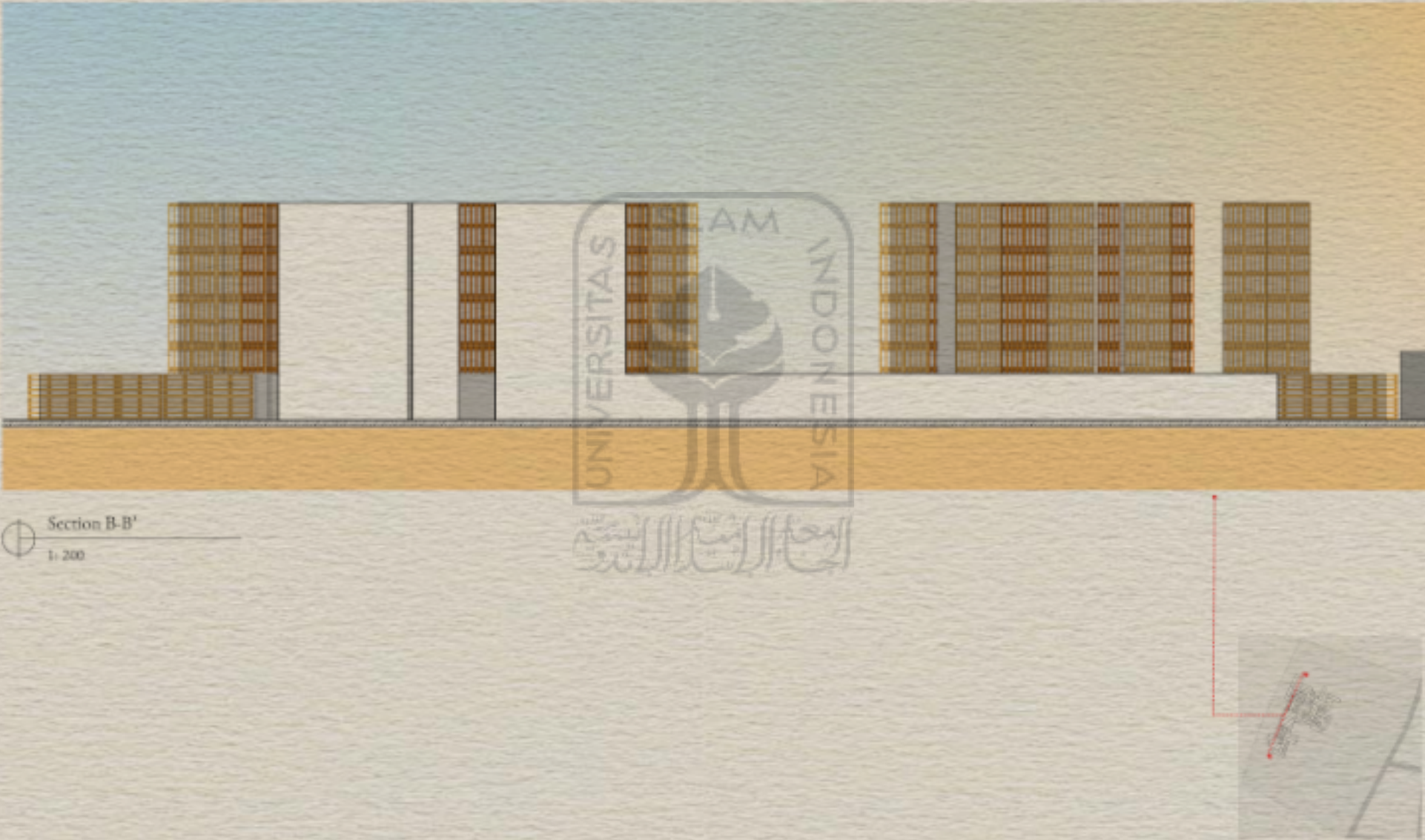
“Schematic Elevation”



“Schematic Section”



“Schematic Section”





South Elevation



North Elevation



West Elevation



East Elevation

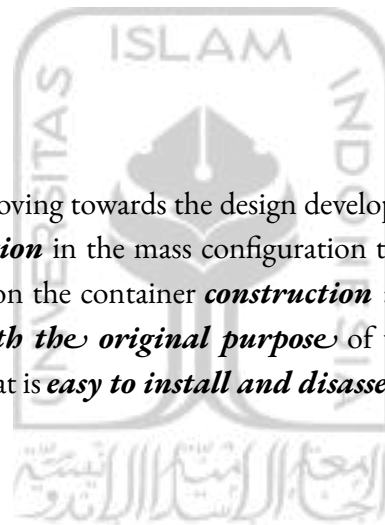


Perspective Views
Rendered by: PromeAI



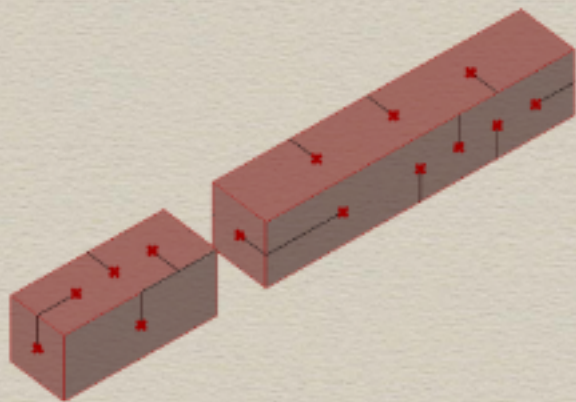
Short Reflection

“In the process of moving towards the design development stage, there was *a slight consideration* in the mass configuration that made the thought process of working on the container *construction not simple and not in accordance with the original purpose* of using the container as the main material that is *easy to install and disassemble*. ...



...Thus, the rearrangement of the container mass configuration was carried out with the same computational process and script as before, so that the orientation becomes *more horizontal to the ground* and the construction thought process is *more in line with the original design idea*, while maintaining the open area. The final result of the rearrangement is as follows:"

“Exploration of Module Variations”
By using Computational and Parametricism

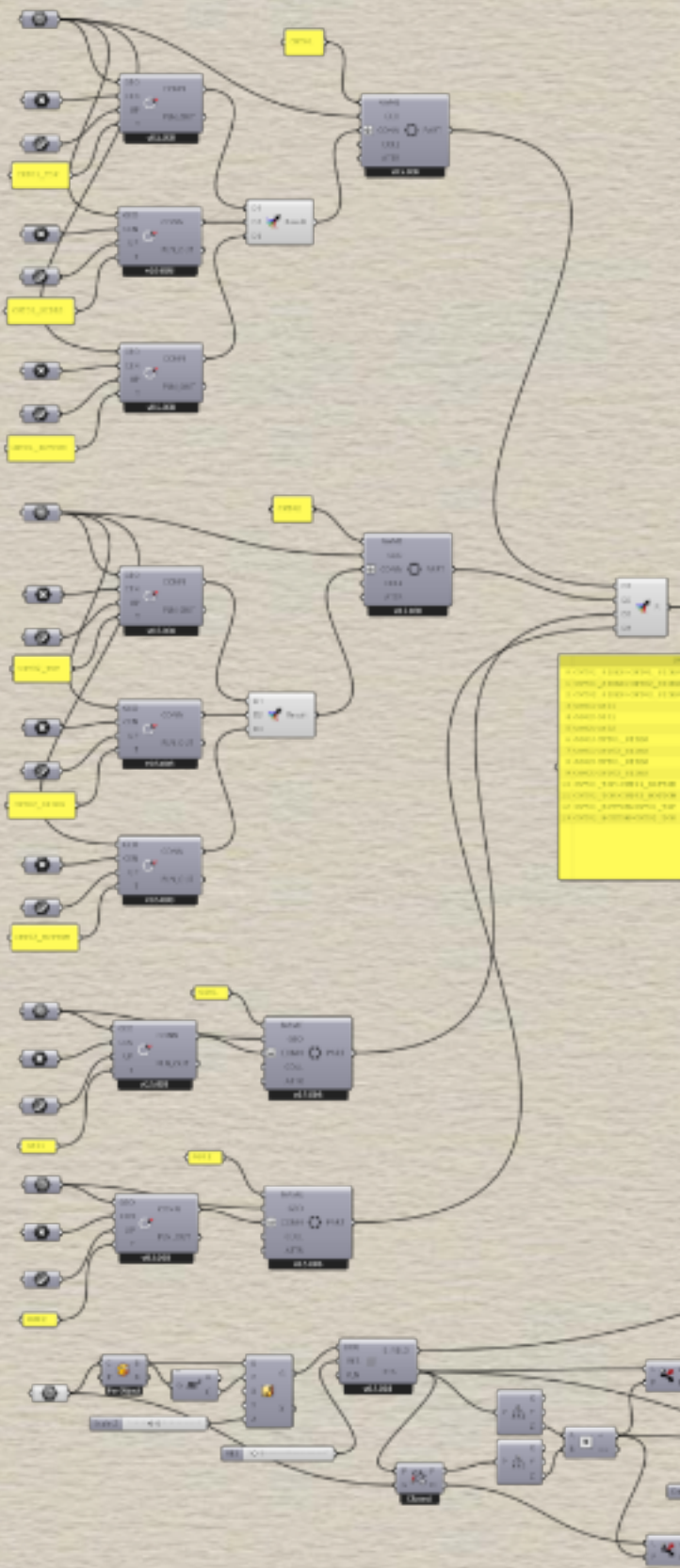


Container Module
20-Foot & 40-Foot



OpenSpace Module

INDONESIA

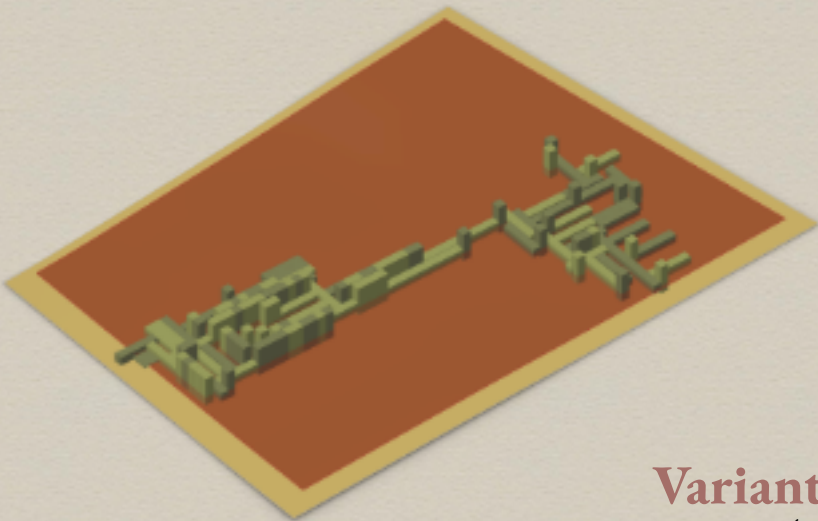


01 The module used in the mass variation search process is still the same as before, which is the basic module used is the shape of the container and open space. In accordance with international container standards, there are two types of sizes: 20-Foot Container and 40-Foot Container.

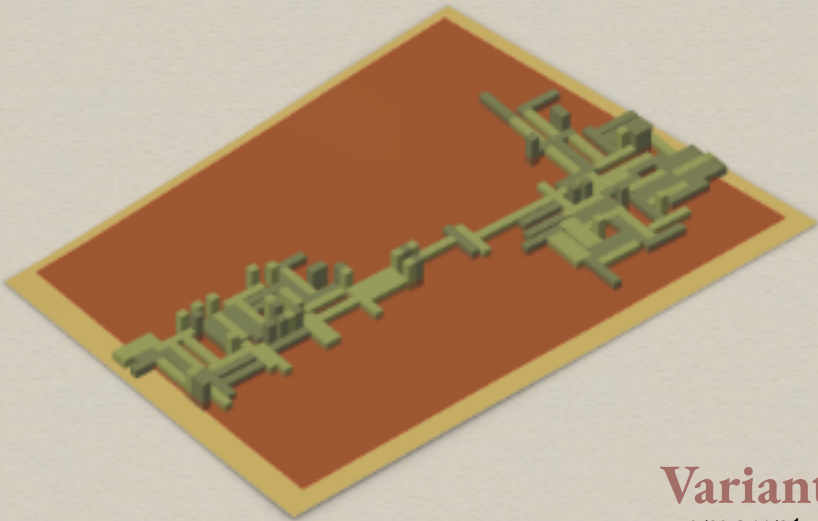
02 Some of these modules are used as the main building masses with variational parametrics plugin in Grasshopper and Rhinoceros software was 75, while this process

Grasshopper Scripts

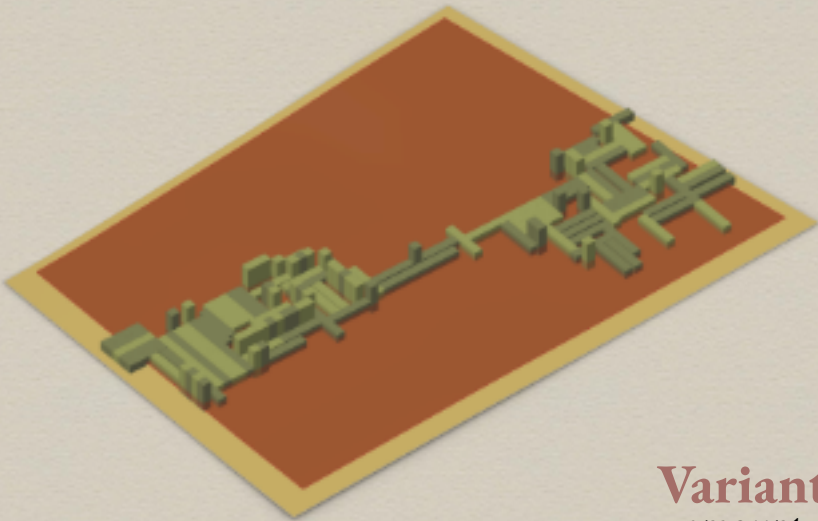
By using WASP as plugin



Variant A
amount: 135



Variant B
amount: 135



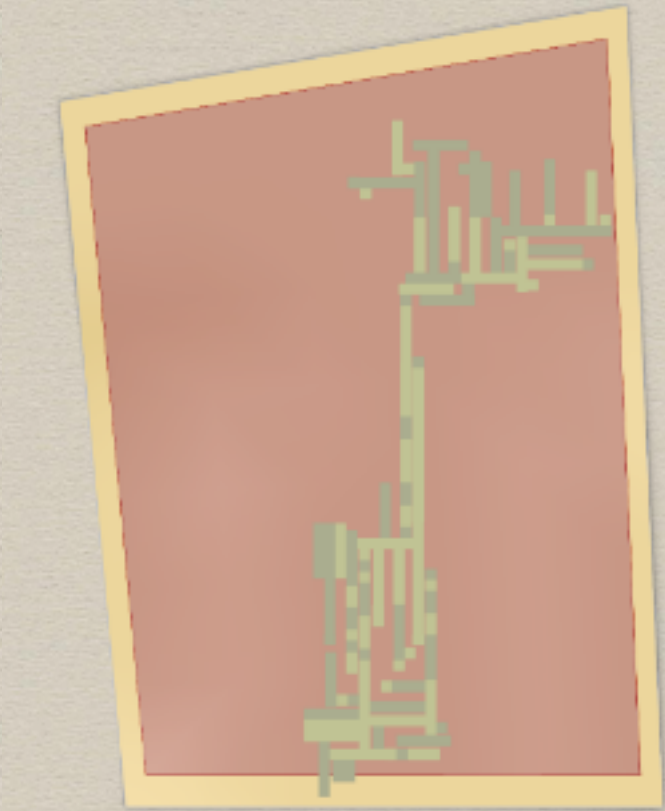
Variant C
amount: 135

in components in the process of developing
processed using the WASP + Ruler Grammar
re. Previously, the number of modules targeted
ss targeted 135 modules.

03 After the building massing process using the script from the WASP plugin in Grasshopper is successful, several variations of the container arrangement will appear. These variations can change according to the Ruler Grammar that has been created and the number of containers that we think is best, according to our needs, and according to client requests.

“Analysis of Variants”

Based on Needs of Area & Arrangements



Variant A

In 'Variant A', the building mass configuration generated from the grasshopper script is more container modules oriented horizontally than those oriented upwards, which has advantages in the arrangement of spatial functions. However, the disadvantage of 'Variant A' is that the open space for communal and gardening between the containers is narrow, so that the achievement of farming needs is not maximized.



Variant B

While in 'Variant B', the configuration of the building mass is more container modules oriented horizontally than those oriented upwards, which has advantages in the arrangement of spatial functions and denser. The consequence is that the open space for communal and gardening between the containers becomes smaller and narrower. Open space for communal and gardening is created. One of the advantages of the building mass configuration is that the container modules can be used for farming needs.



Variant B

ation of the building mass in the
ontal than towering, but looks denser
t the open space for gardening also
space as a communal area cannot be
'Variant B' is that the horizontal
utilized as "rooftop farming".

selected

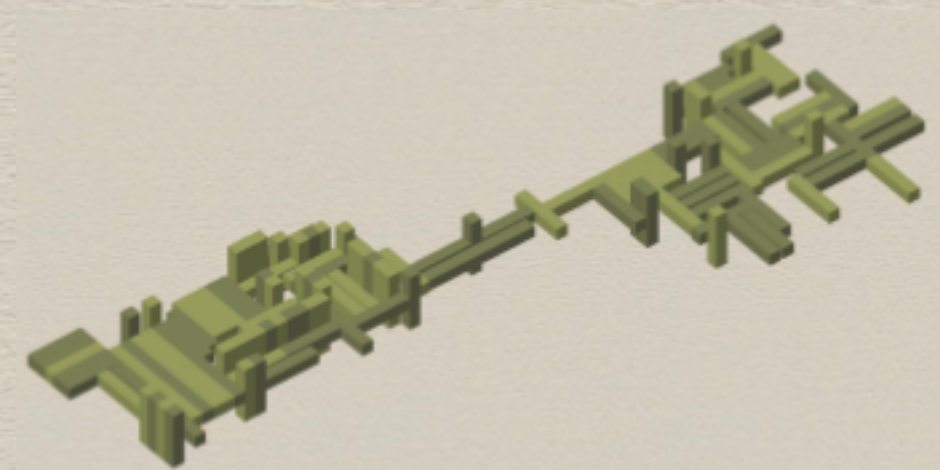


Variant C

Finally, in 'Variant C', a more equitable building mass configuration was found in terms of the orientation of the container modules. Some are horizontal and some are elevated. Then, a lot of open space in the middle of the building's container modules is created, which can be utilized as farming space. The towering container modules can be utilized as vertical gardens. Circulation as access for users is also better created by following the horizontal container pattern.

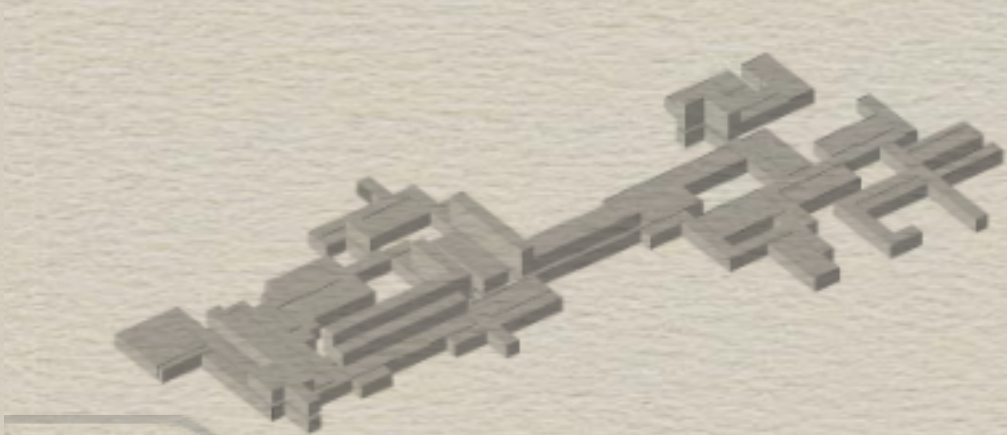
“Building Module Transformations”

By Using Archicad



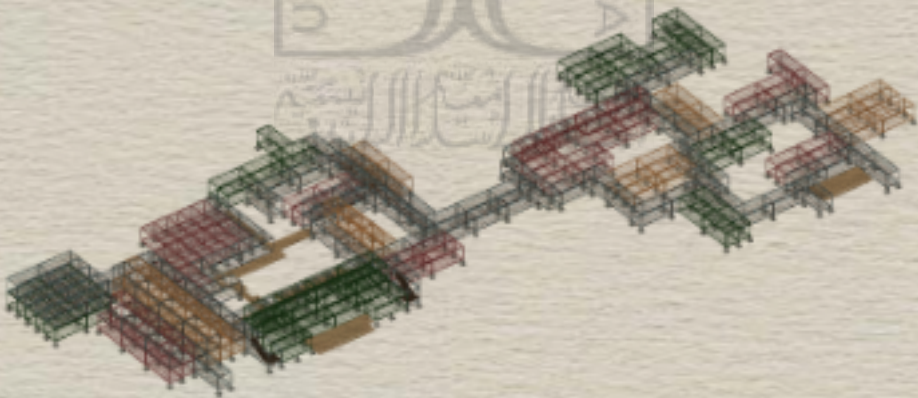
Base Module

01 The modules that have been created from computational results using Grasshopper and WASP become the basic building mass modules. However, because this is still the result of a computer, the composition still does not fulfil the comfort of space and circulation properly. Thus, a slight adjustment is needed based on the building function and space requirements.



Adjustment by Function

02 Adjustments to the building mass modules can be made by adjusting the function of the building, which is plantation and animal husbandry. The building function requires sufficient open green space, which can be utilised as an area for gardening and animal husbandry. Also, some modules are slightly moved to fulfil spatial needs.



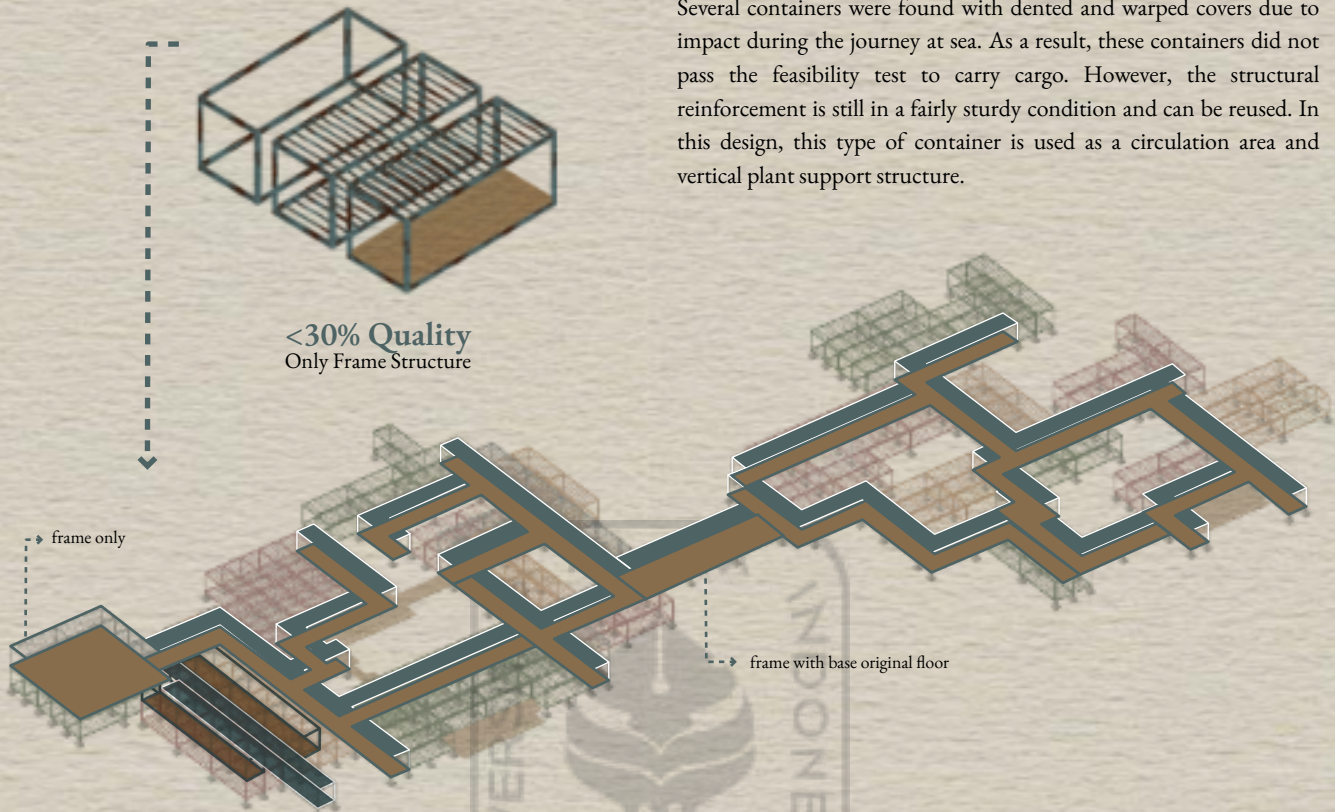
Structuring Module

03 After the building mass modules have been adjusted to their functions, the building structure can be arranged. The building structure used is a container structure and wooden pallets that are reused as a form of response in reusing container waste which is quite abundant in Batam City.

“Container Structure Application & Arrangement”

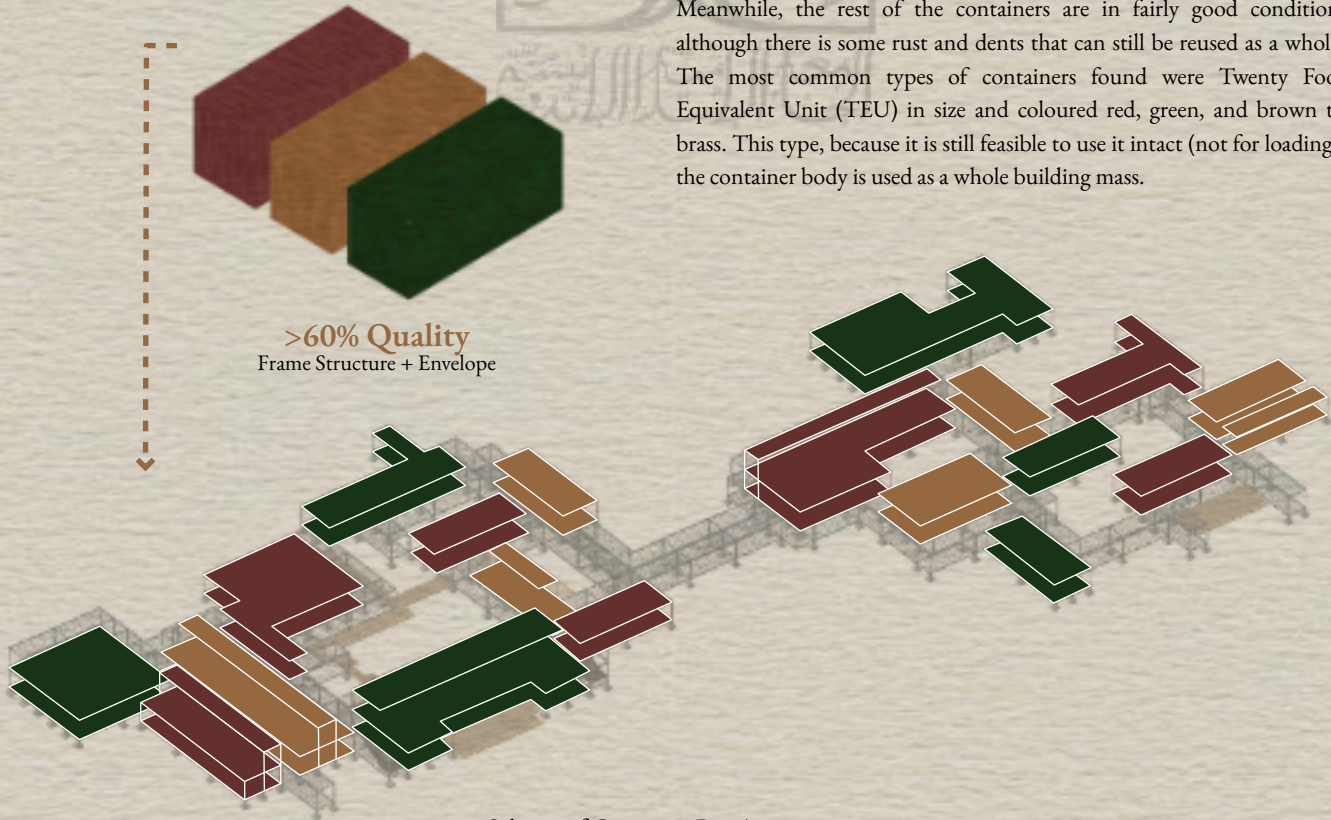
Based on Condition of Container

Several containers were found with dented and warped covers due to impact during the journey at sea. As a result, these containers did not pass the feasibility test to carry cargo. However, the structural reinforcement is still in a fairly sturdy condition and can be reused. In this design, this type of container is used as a circulation area and vertical plant support structure.



Scheme of Container Frame Structure Application

Meanwhile, the rest of the containers are in fairly good condition, although there is some rust and dents that can still be reused as a whole. The most common types of containers found were Twenty Foot Equivalent Unit (TEU) in size and coloured red, green, and brown to brass. This type, because it is still feasible to use it intact (not for loading), the container body is used as a whole building mass.



Scheme of Container Box Arrangement