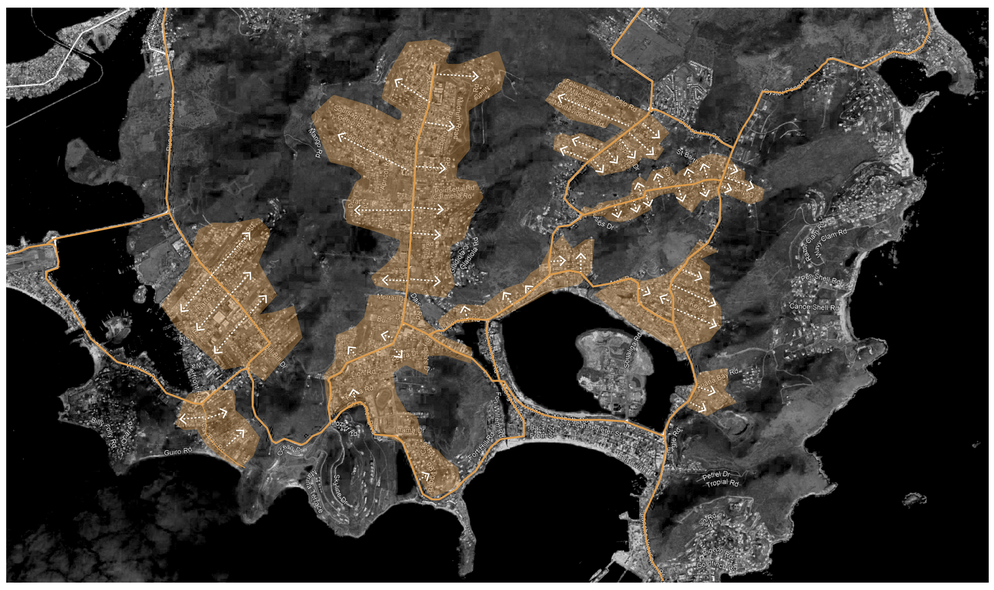
REINTRODUCING TROPICALITY TO ST MAARTEN

A residential typology rooted in the soil of the past



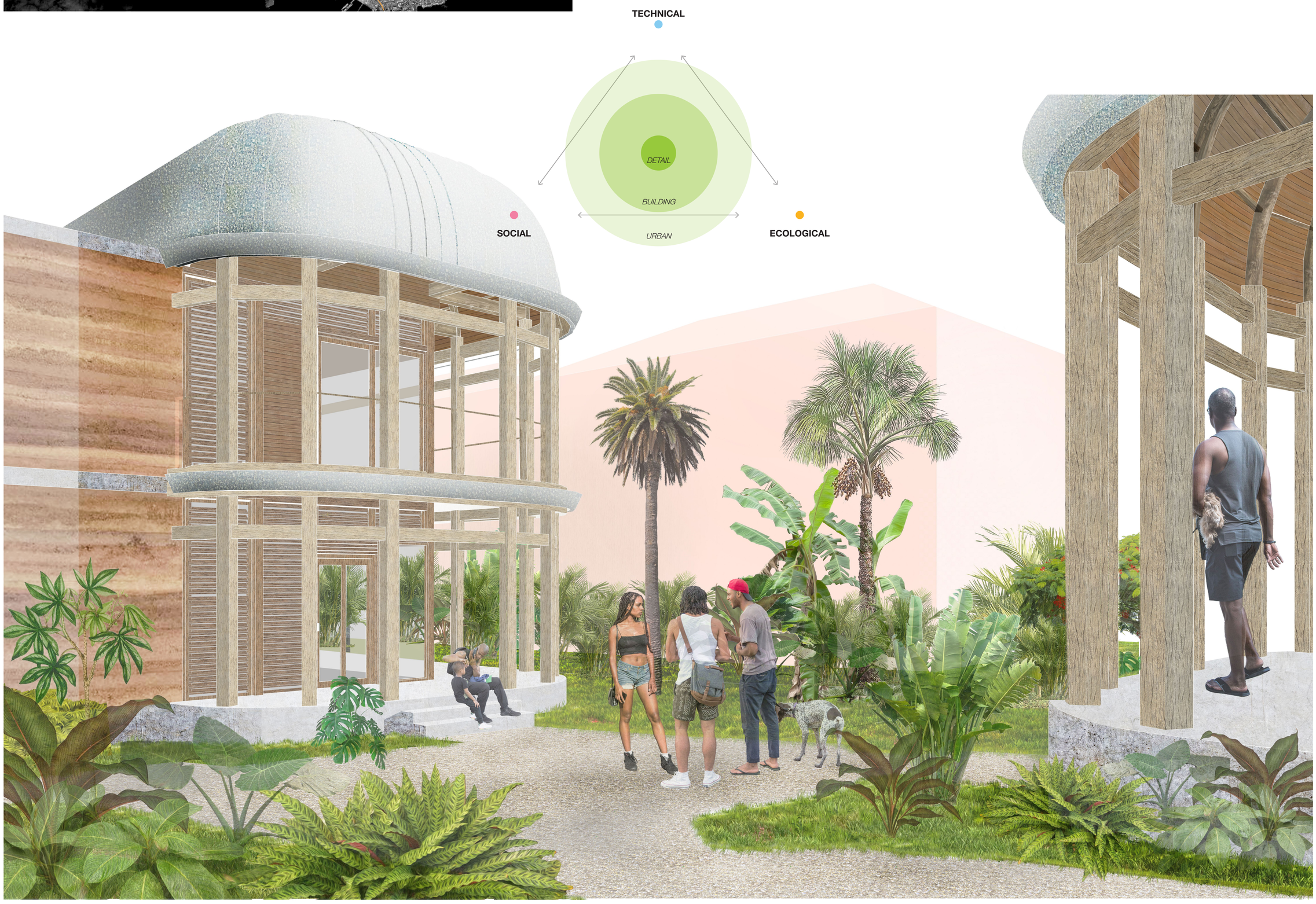
INFLUENCES OF GLOBALISATION

St. Maarten has been subject to outside influences since its existence. From the indians that traveled through the caribbean and made their stops on the island 3500 years ago until the time that the economy started to influence the way that life is lived. From the 1950s the tourism sector started to grow which provided and still provides income for the largest part of the people on St. Maarten. This increased the total population from a little over 2000 inhabitants in 1955 to around 42.000 people today, excluding the illegal immigrants which is said to be another 30.000 additional people. And that accounts only for the dutch side of the island.

As a result, the island had to expand very quickly over a timespan of only 70 years and results in relatively monotonous urban environments where public space is scarce and social interactions do not occur alot. The buildings are built in a farely standard way which are mostly bungalows constructed out of concrete. The buildings and neighborhoods do not respond to the tropical savannah climate that they are in and when walking through a typical middle class neighborhood you would not expect these buildings in a tropical climate.

This way of building was not always a normality. Before 1950 the buildings on the island looked like they did in the picture in the top left border. Buildings were constructed using a wooden frame and wood finishes placed on a foundation of local natural stones. This way of building fits the natural climate better because these buildings are light and have more openings in the facades to let i natural ventilation. Yet, there is one aspect of the climate that made these buildings disappear which is the hurricanes that occur once every couple of years. Concrete ofcourse is a stronger material and quickly became more popular when it became more affordable than wood.

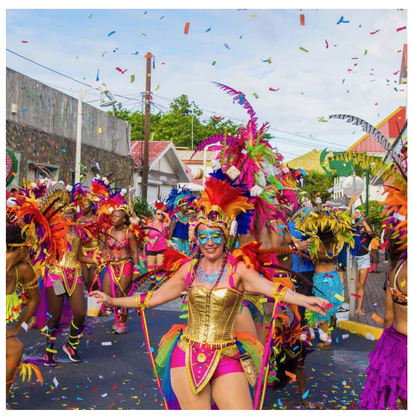
This project is a exploration to design a residential typology which not only responds to all aspects of St. Maarten's climate but also its context and culture. Below and on the other panels the result of this project is shown.



CULTURAL IMPRESSIONS

DOMINO
popular game in Latin America

FOOD
there is a prominent food culture on the island with barbecue at its centre



CARNIVAL
peak of St. Maarten culture expression through colour, dance, music and clothing.

FOOD
local vegetables and fruit are sold next to most streets

ART & COLOUR
Flamboyant tree
national tree of St. Maarten

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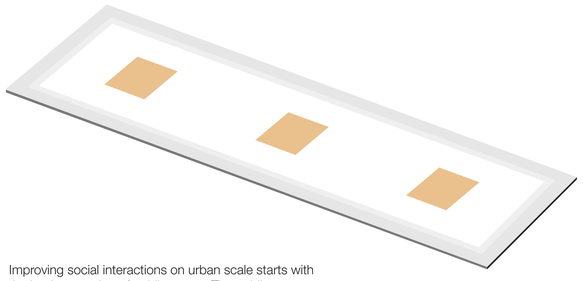
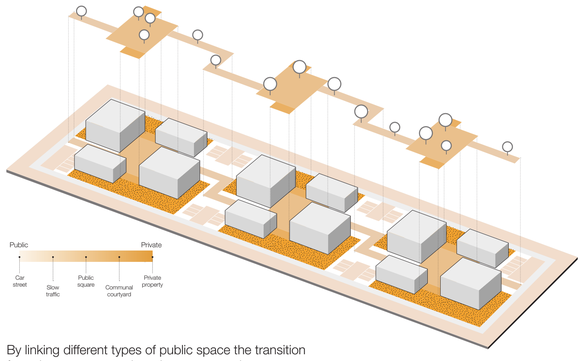
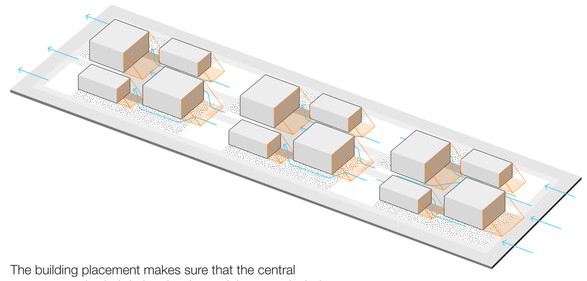
URBAN CONCEPT



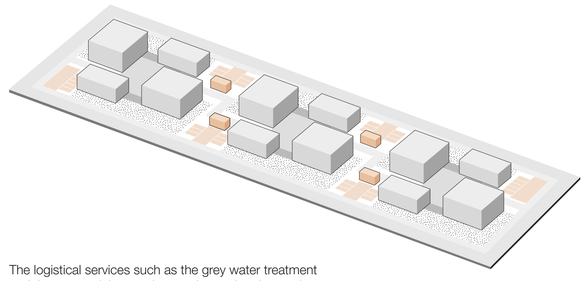
Improving social interactions on urban scale starts with the implementation of public space. The public squares are the central point of a building cluster and can be used for social events.



By linking different types of public space the transition from the car street to the private property becomes softer which gives the feeling of intimacy and security once you arrive at your home.



The building placement makes sure that the central squares are shaded during the day and the natural wind flow can pass through the public spaces and reach the buildings.



The logistical services such as the grey water treatment and the waste pick-up points are located at the service buildings next to the parking places.

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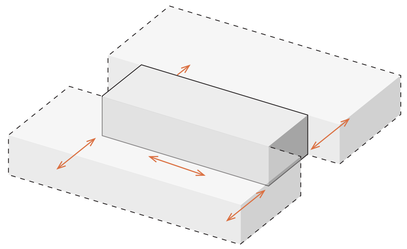
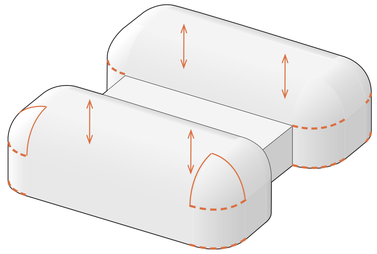
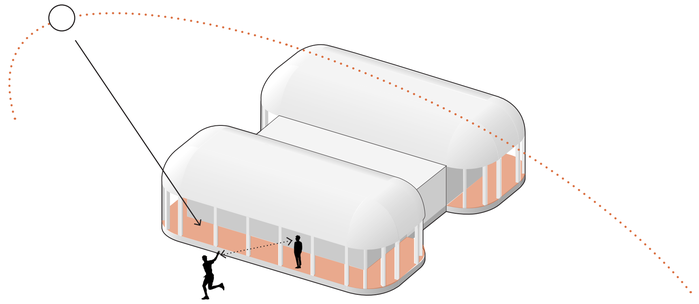
BUILDING CONCEPT



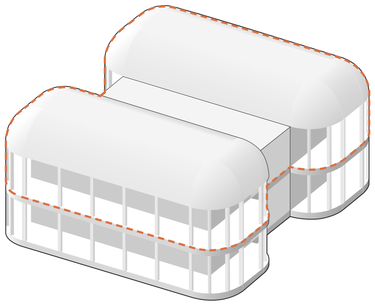
The building concept is based on the synergy between a central core which can withstand hurricanes and two blocks of living spaces. The core provides stability for all segments and allows for natural ventilation through the spaces.



The round shapes are a design feature that improve the drag coefficient of the building in high-windspeed condition. Meaning that less pressure builds up on the skin of the building.



Veranda space is important in climates like the one in St. Maarten. It provides shading to protect the indoor spaces from heating up during the day. Furthermore it is a element of the building where people can interact with each other which works really well with the newly introduced public spaces.



The building is easily expanded upwards due to its modular building elements. The building above is the building that I developed further in my drawings.

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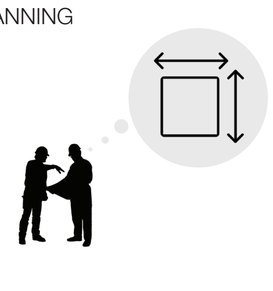
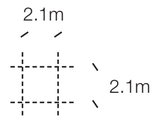
PLANNING



1.

In the planning phase the owners decide how large the house will be. Depending on size of the household and available resources they will choose the size of the two main elements of the typology:
A. core
B. living attachments

TYPOLOGY FLEXIBILITY



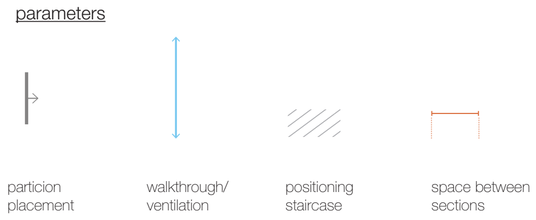
The overview below shows which parameters determine the size of each element based on the grid of 2.1 by 2.1 meters.

A. CORE

spaces

- vertical travel
- kitchen
- bathroom(s)
- storage space

parameters

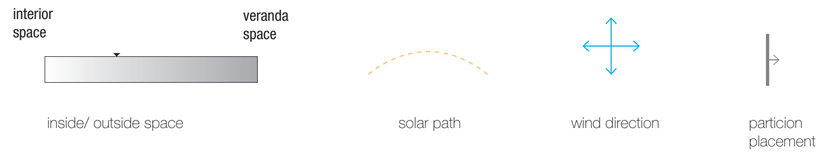


spaces

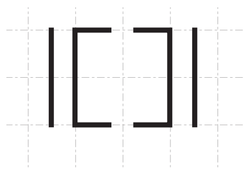
- living room
- study
- dining room
- entrance
- bedroom

B. LIVING ATTACHMENTS

parameters

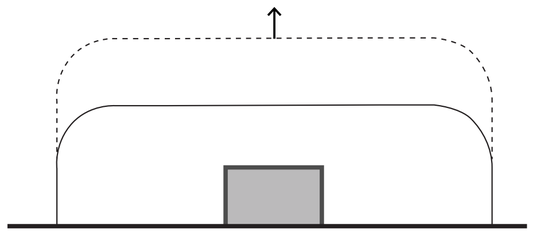


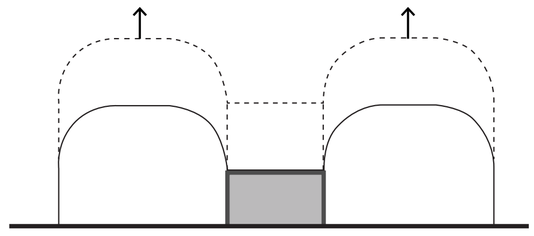
layout possibilities (plan)



base configuration

layout possibilities (section)





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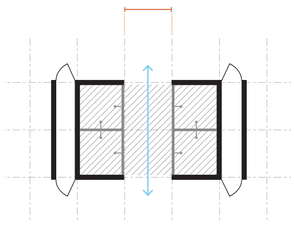
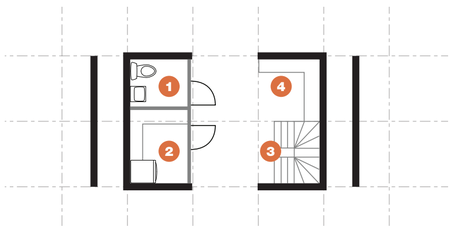
rules



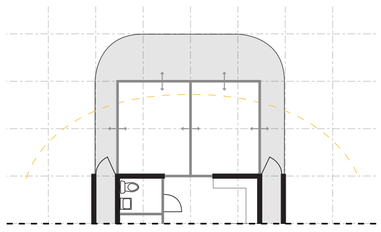
core - **25 m²**

layout example



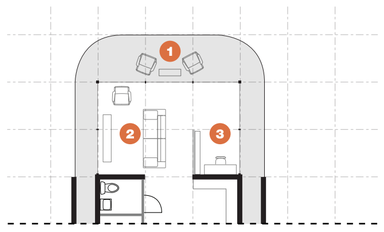
1. bathroom (3 m²)
2. storage (5 m²)
3. stairs
4. kitchen (5 m²)

rules



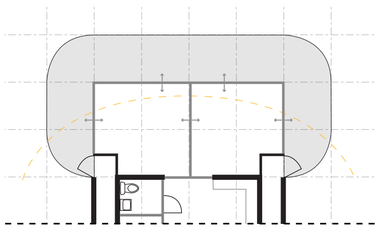
living - **40 m²**

layout example



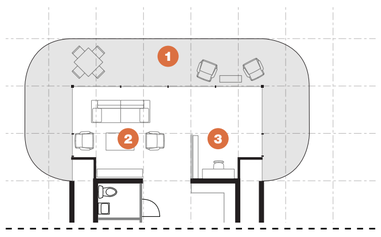
1. veranda (25 m²)
2. living (17 m²)
3. study (8 m²)

rules



living - **40 m²**

layout example



1. veranda (25 m²)
2. living (17 m²)
3. study (8 m²)

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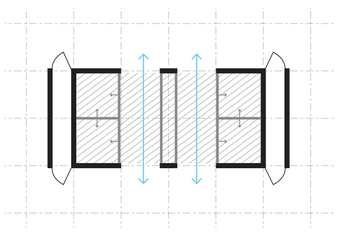
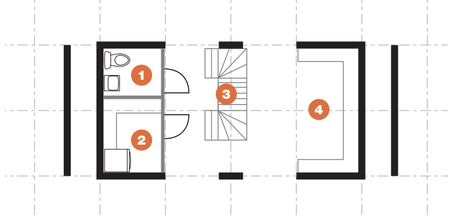
rules



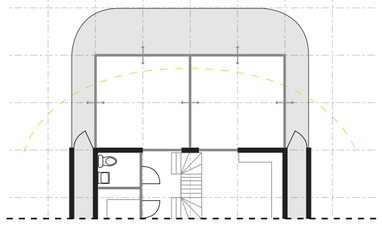
core - **35 m²**

layout example



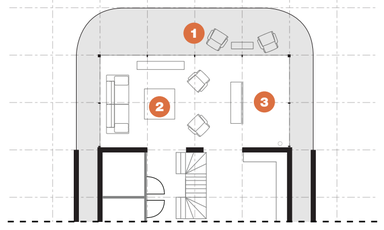
1. bathroom (3 m²)
2. storage (5 m²)
3. stairs
4. kitchen (8 m²)

rules



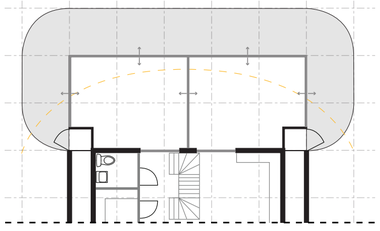
living - **60 m²**

layout example



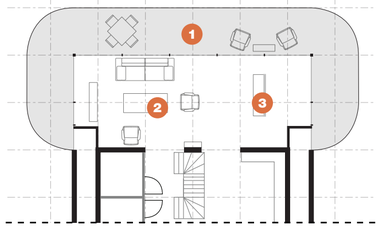
1. veranda (30 m²)
2. living (25 m²)
3. entrance (8 m²)

rules



living - **60 m²**

layout example



1. veranda (30 m²)
2. living (25 m²)
3. entrance (8 m²)

interior impression

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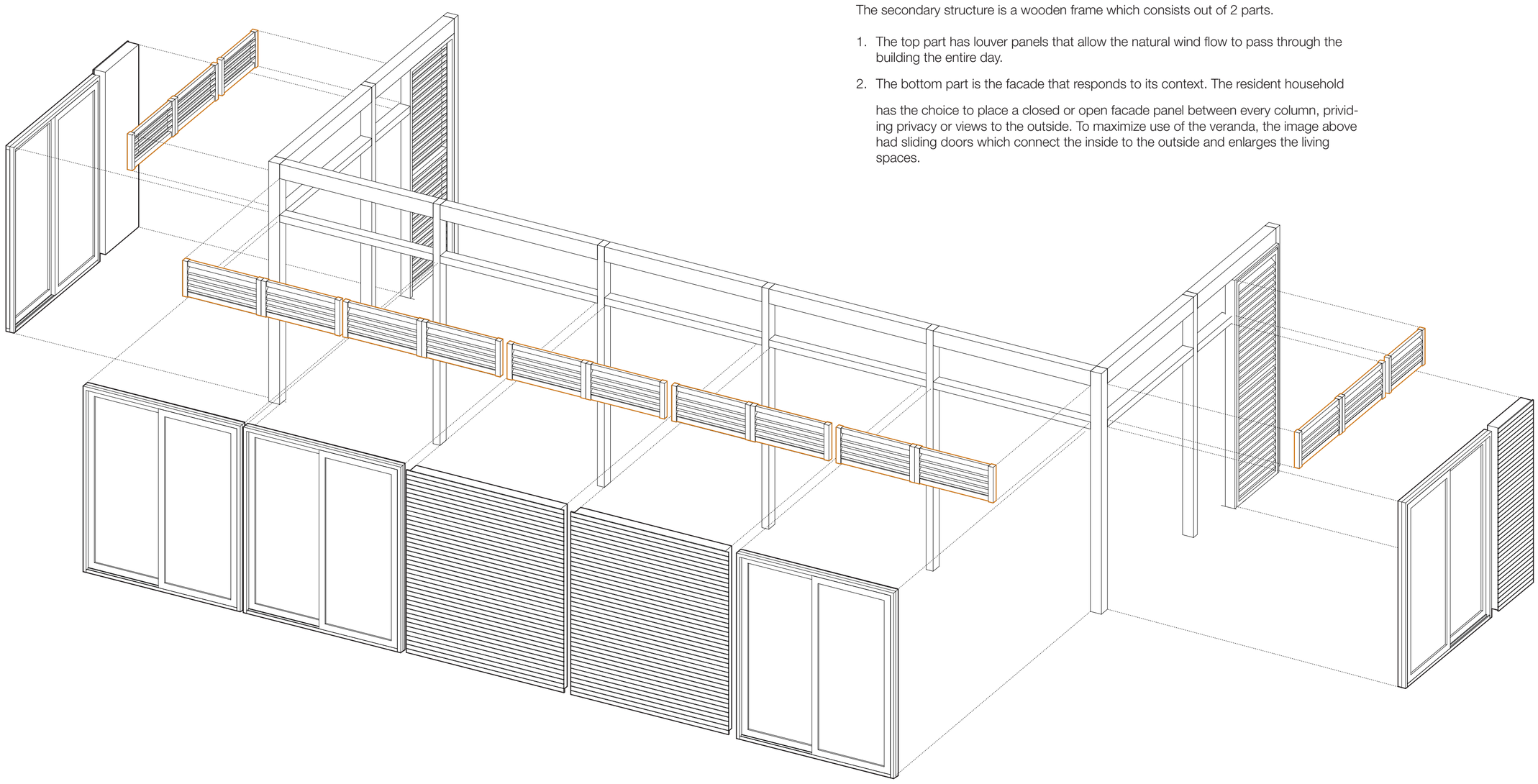
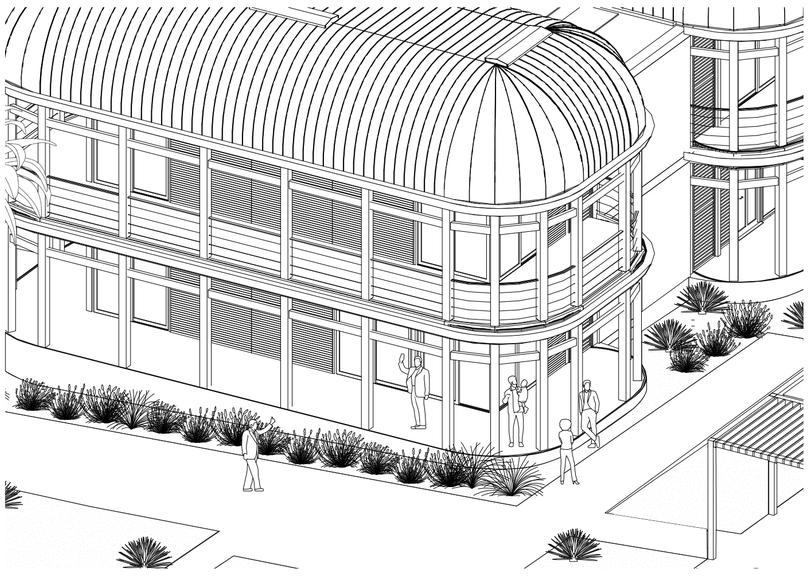
FACADE ADAPTABILITY

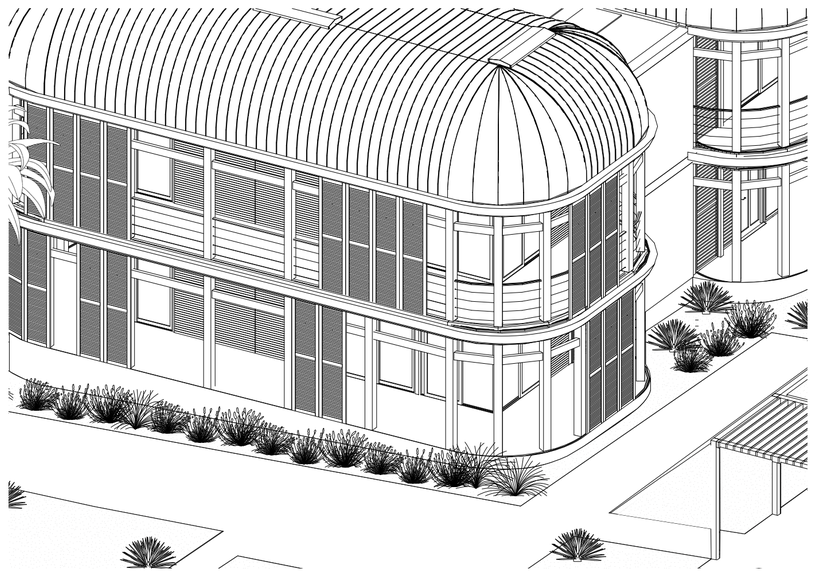
The secondary structure is a wooden frame which consists out of 2 parts.

1. The top part has louver panels that allow the natural wind flow to pass through the building the entire day.
2. The bottom part is the facade that responds to its context. The resident household has the choice to place a closed or open facade panel between every column, prividing privacy or views to the outside. To maximize use of the veranda, the image above had sliding doors which connect the inside to the outside and enlarges the living spaces.

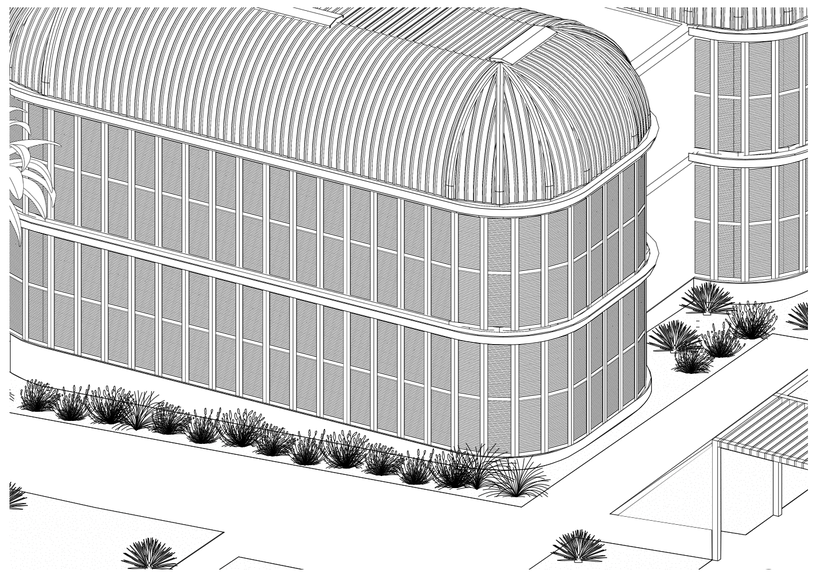




the soft borders and open character of the veranda increases social interaction within the neighborhood.



on the other hand, privacy might be needed at times. the storm panels can function as privacy screens but also to block the low hanging sun rays.



storm panels are primarily usefull to provide a protective skin around the building in the event of a hurricane.

elevation A
1:50

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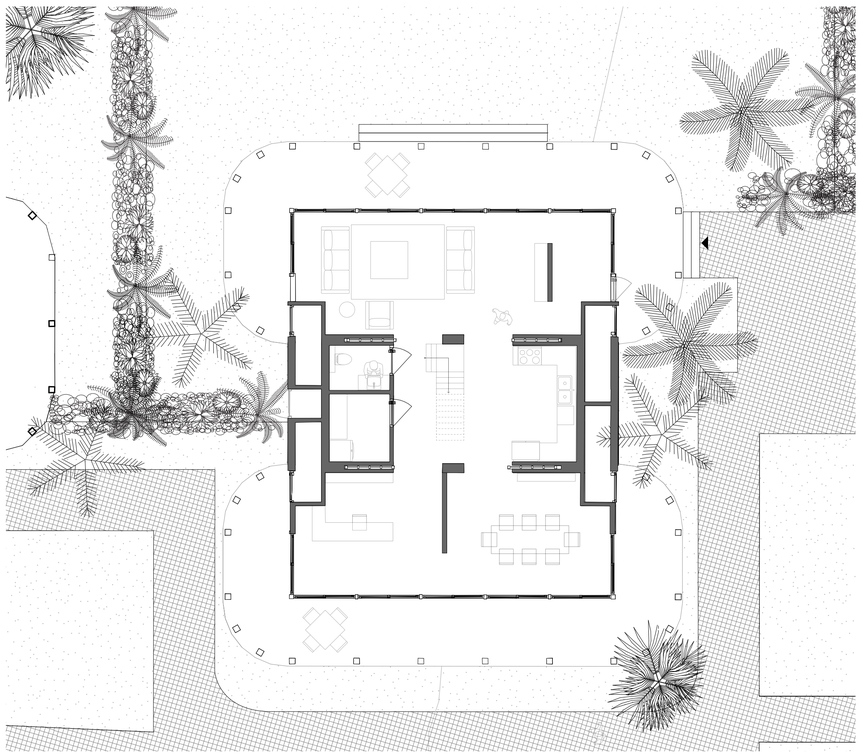
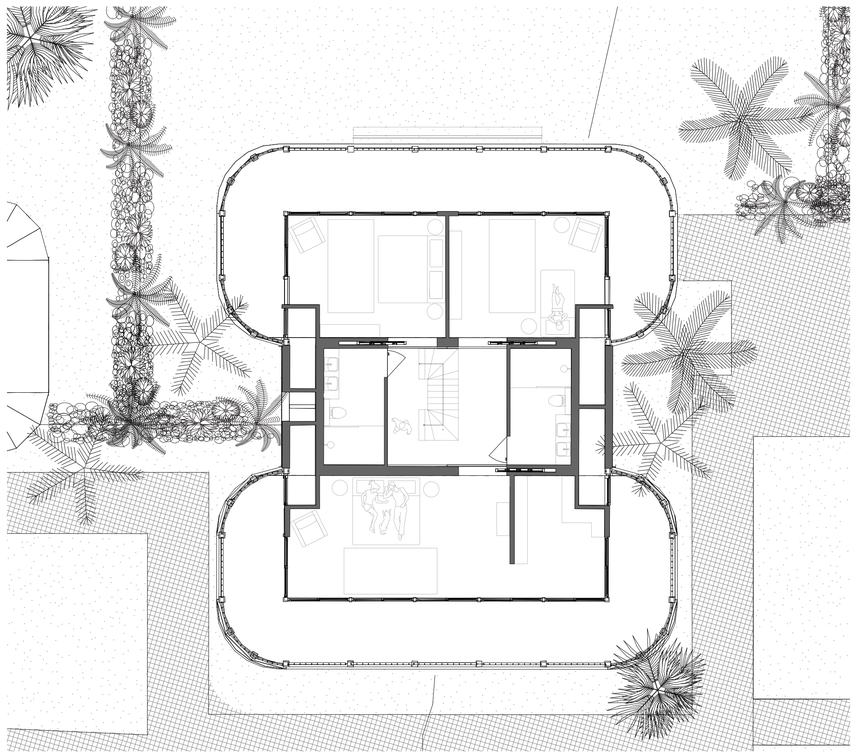
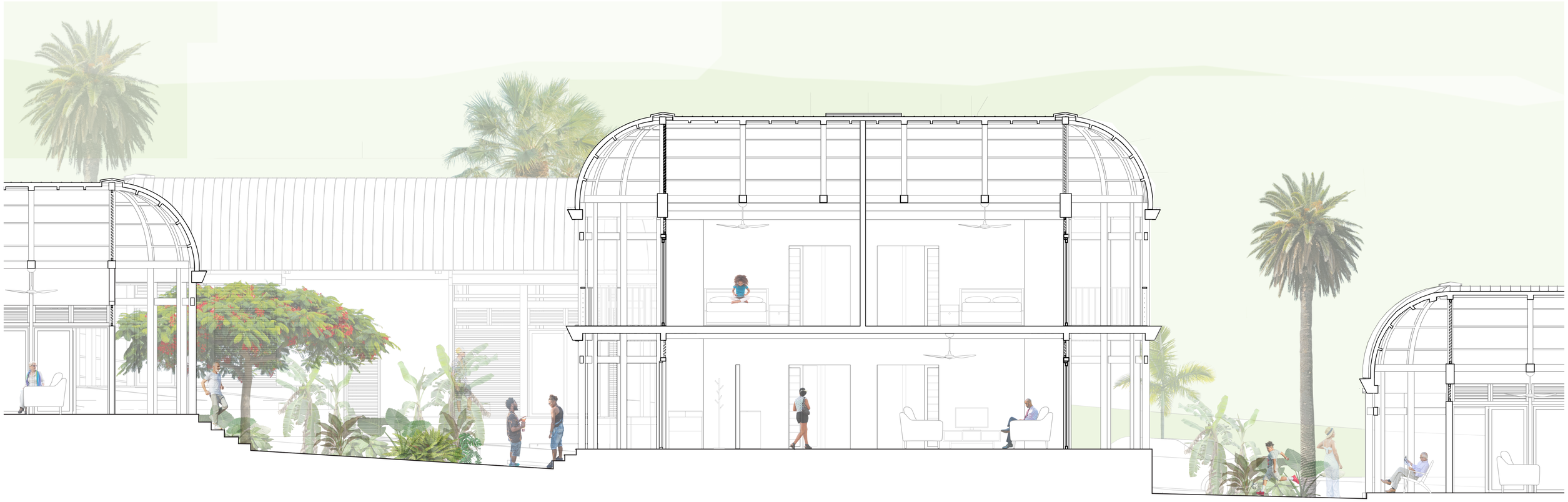


plan ground floor
1:100



plan second floor
1:100



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BUILDING SEQUENCE

Foundation

After excavation the concrete foundation is cast on-site. The concrete used for the foundation is a sustainable mix of the following parts:
- fly ash to minimize cement use
- sand
- construction waste which is grinded and used as the gravel component normally present in concrete
- cement

Rammed earth core

The walls are build with excavated clay loam soil which is available on site. To ensure durability and a equal load distribution on the walls, a concrete ringbeam is cast on the walls.

Primary structure

The primary load bearing structure is placed on the perimeter of the foundation and attached to the core. The structure is stabilised by a second row of beams.

First floor: rammed earth core

The walls are build with excavated clay loam soil which is available on site. To ensure durability and a equal load distribution on the walls, a concrete ringbeam is cast on the walls.

First floor elements

The floor is made from prefabricated wooden elements which are made on the island from standard dimensional lumber pieces which are imported to the island.

First floor: primary structure

The primary load bearing structure is placed on the perimeter of the foundation and attached to the core. The structure is stabilised by a second row of beams.

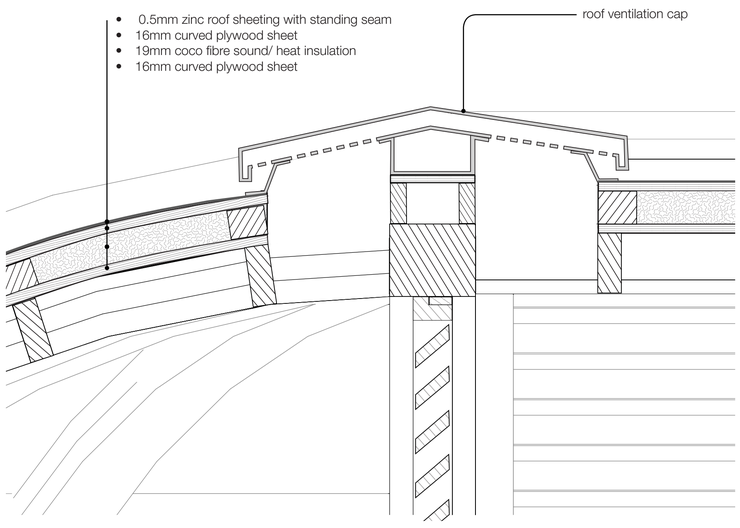
Roof

The roof structure is prefabricated and transported to the site to be assembled. The structure is mounted to the primary structure whereafter the roof is finished with insulation and zinc sheeting similar as to other buildings on the island.

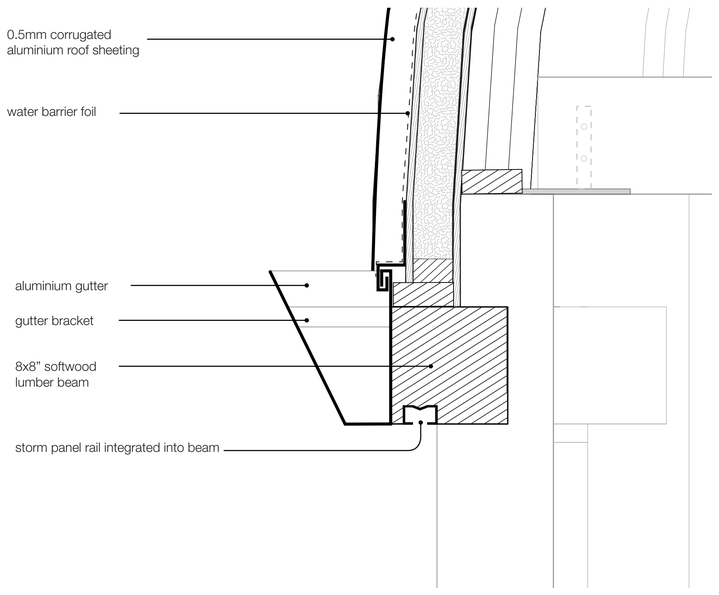
Secondary structure: facade

The secondary structure is placed according to the wishes of the inhabitants. Then the facade panels can be placed to finish building construction.

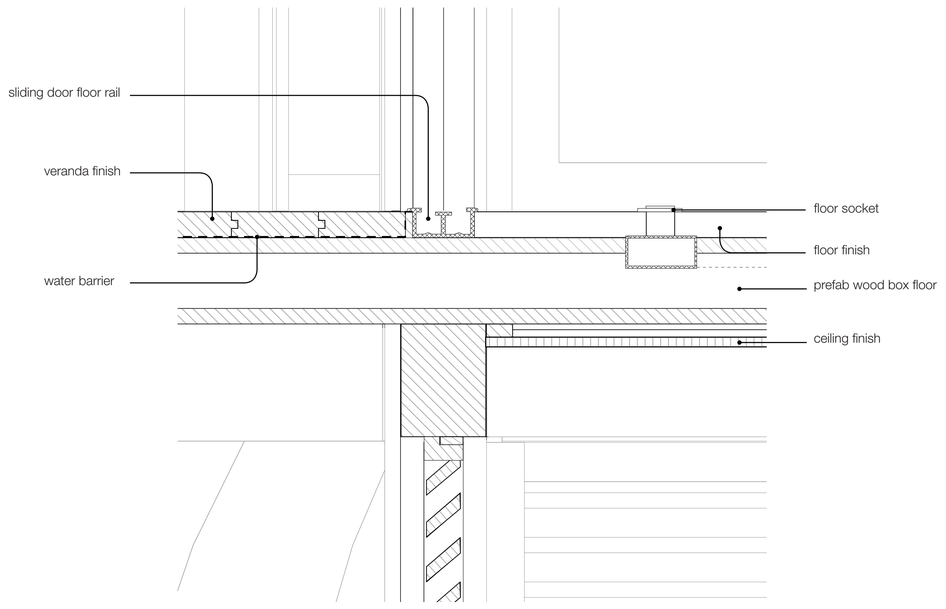
DETAILS



detail 1 - roof ridge vent
1:5

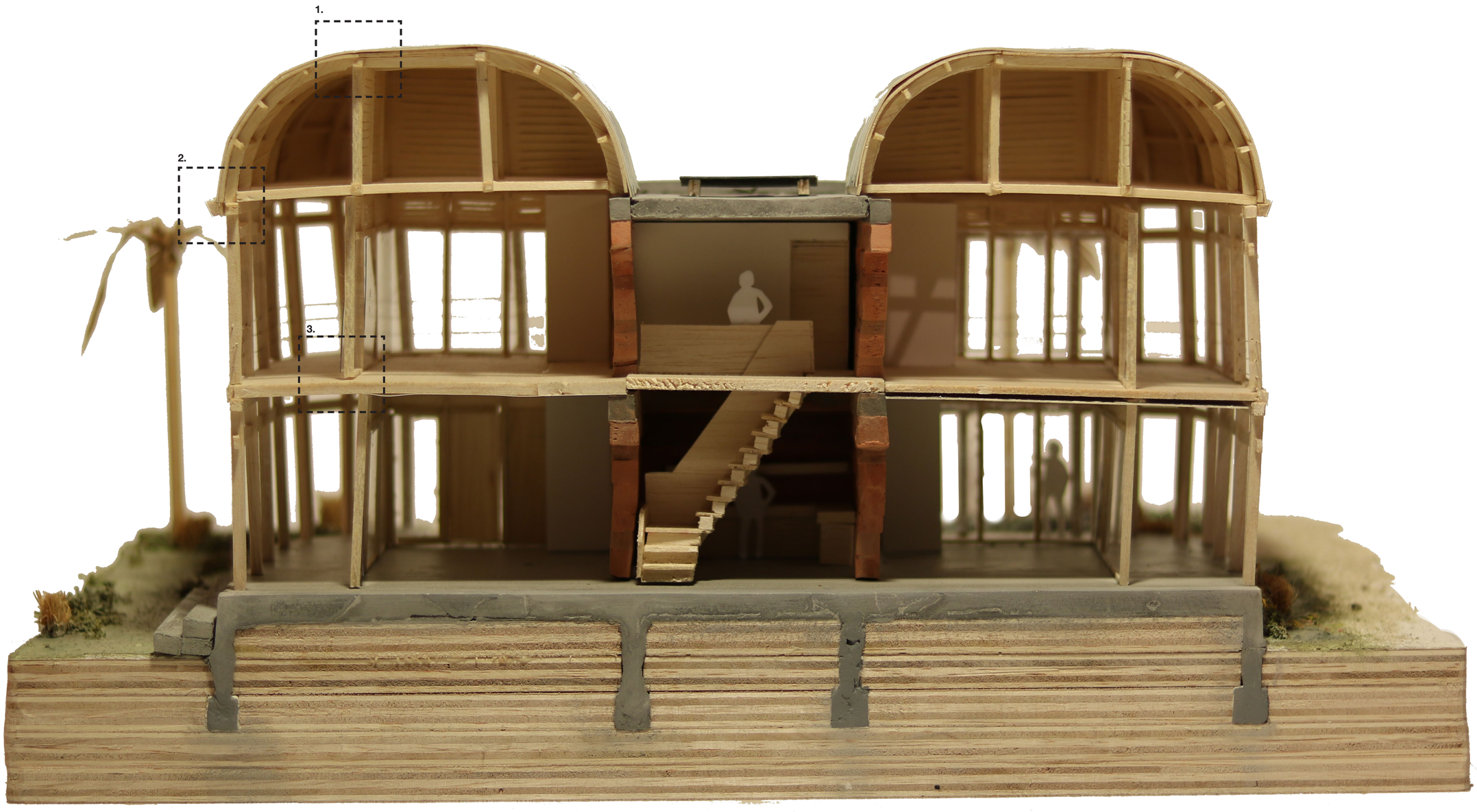


detail 2 - roof gutter
1:5



detail 3 - 2nd floor connection
1:5

SECTION



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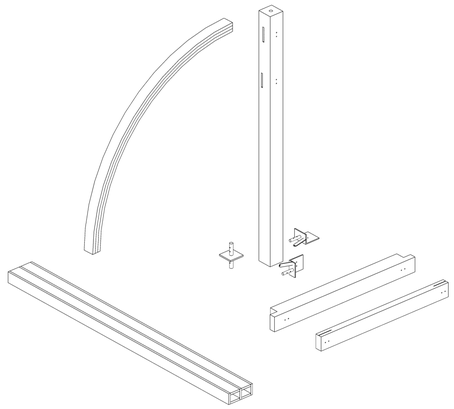
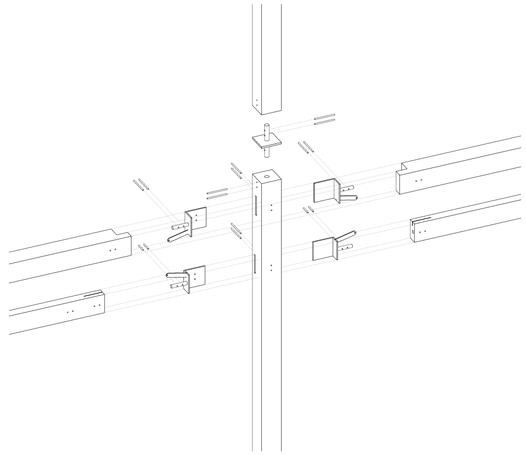
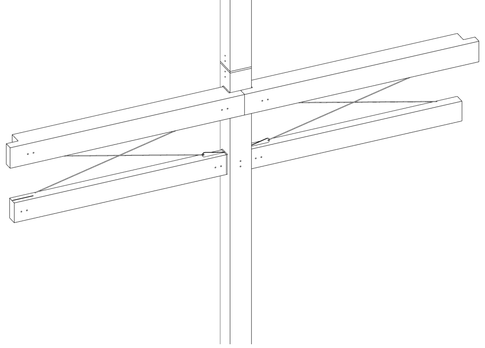
BUILDING ELEMENTS



standardized prefabricated elements - easy construction, adjustability and expandability.

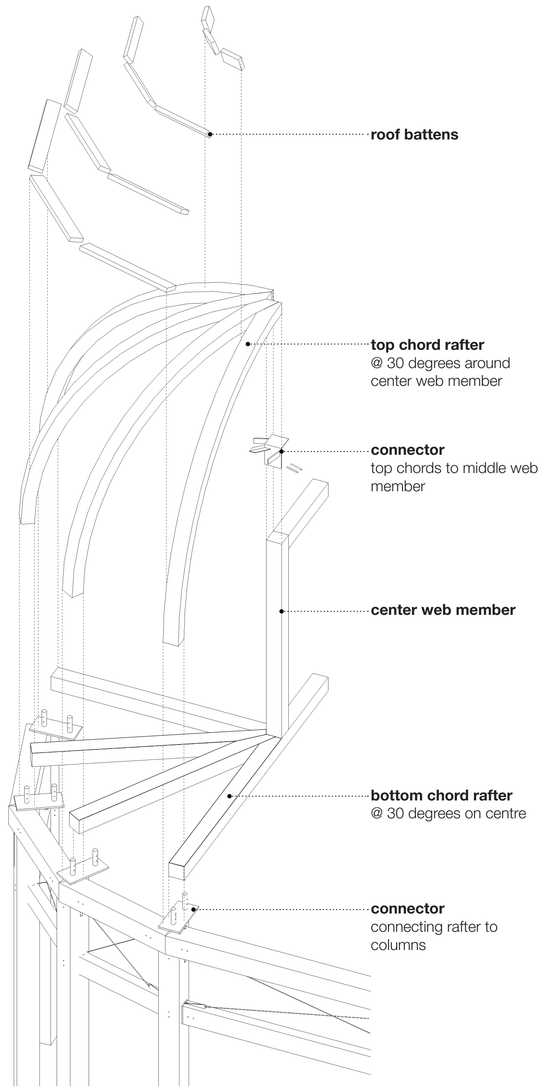


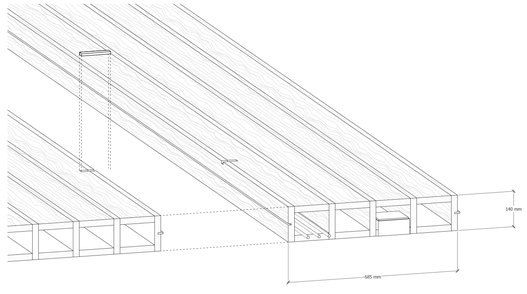
drift-pin connectors - easy construction and adjustable



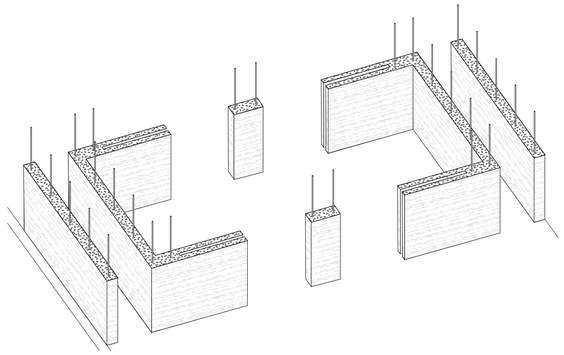
column connection - clean and stable

tools - easy connection where only a hammer is necessary.

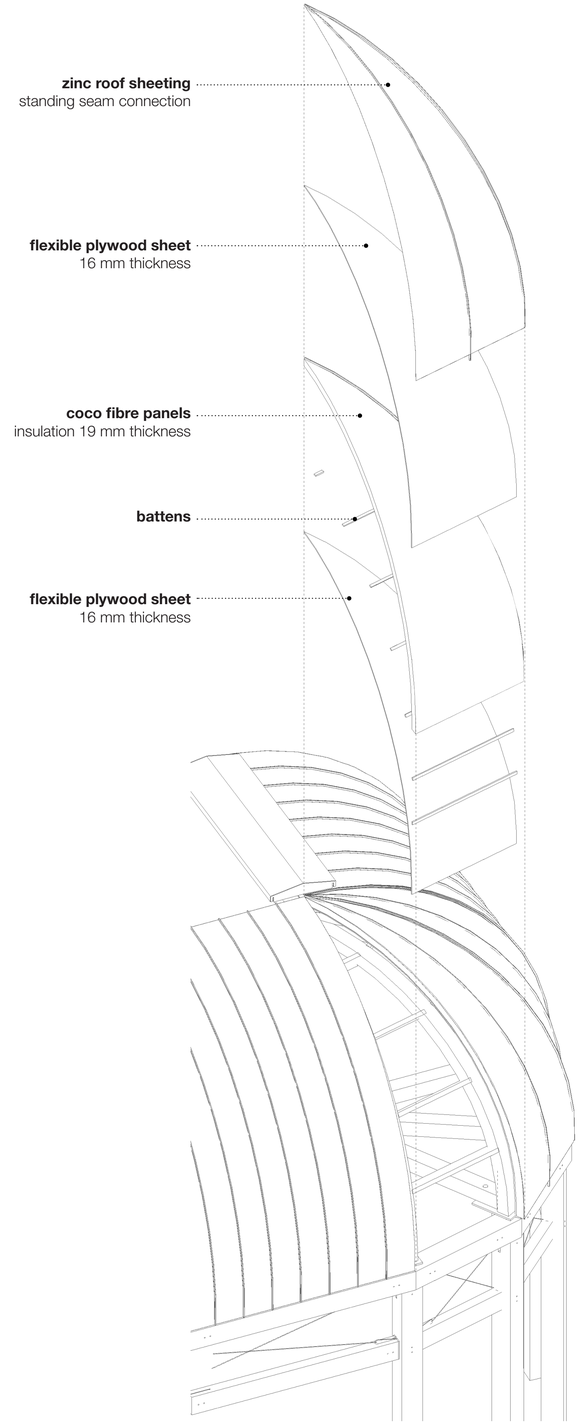




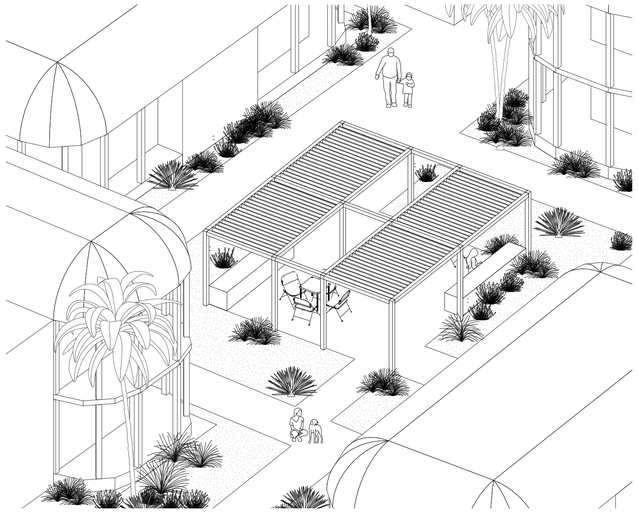
floor box elements - interconnected to form



core construction - stabilised and reinforced rammed earth walls



REINTRODUCING TROPICALITY TO ST MAARTEN
A residential typology rooted in the soil of the past



A. public square

B. communal courtyard

C. public walkway

situation drawing
1:200

REINTRODUCING TROPICALITY TO ST MAARTEN
A residential typology rooted in the soil of the past

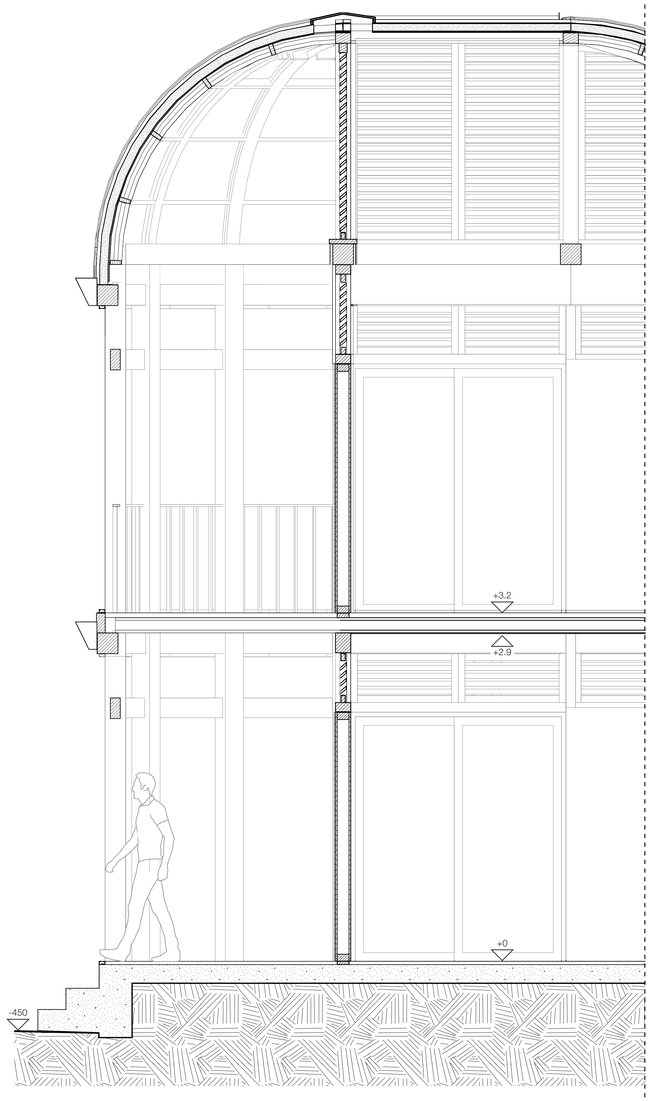
FACADE FRAGMENT
1:20

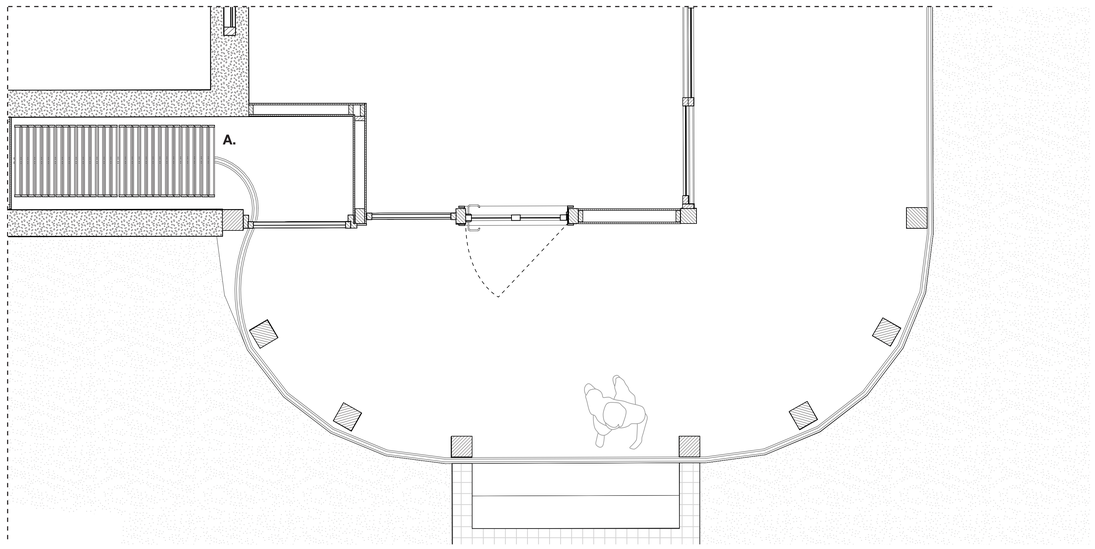
zinc sheets
- reflectivity
- durability
- standing seam plate connection for rounded corners

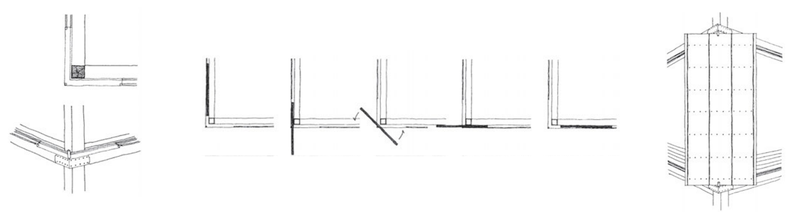
US size dimensional lumber
- familiar materials
- light compaired to a concrete structure
- workable (connections and on-site assembly)
- renewable resource

rammed earth walls
- sustainable alternative to concrete
- durability
- soil of the land visible in structure

cast on-site concrete base
- familiar way of working
- dependable in hurricane conditions
- moisture resistant
- potential to reuse construction waste and fly ash







A.
Amado storm panels as used as seen in traditional Japanese architecture. Besides being used during tropical storms, they can provide shading for low angled sun and for privacy when needed.