Ligavatuvuce

"Hands that Offer and Uplift"

Ligavatuvuce is a architectural sculpture that embodies the Fijian philosophy of giving, resilience, and sustainability. Inspired by the sacred act of offering yaqona (kava) and the cultural gesture of open palms, the structure is both a symbol of reciprocity and a functional piece of regenerative infrastructure, harvesting solar energy and rainwater while honoring traditional Fijian craftsmanship.

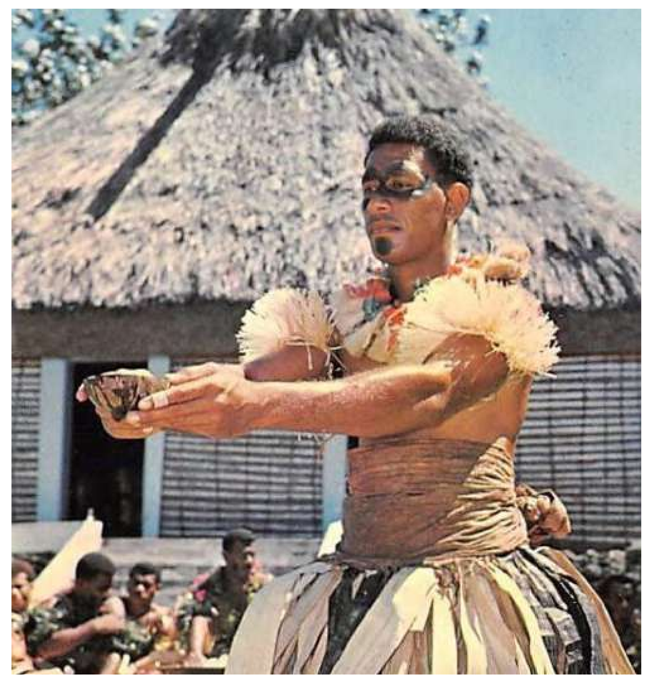
At its foundation, the structure is grounded in the land itself. A base of compacted earth is reinforced by perimeter gabion walls, designed to blend seamlessly into the landscape. These walls serve a dual purpose: providing structural stability and forming a natural water catchment system that channels rainfall into a central well. Strategically sloped drainage patterns extend beyond the site, integrating with existing rainwater runoff streams, ensuring sustainable water management.

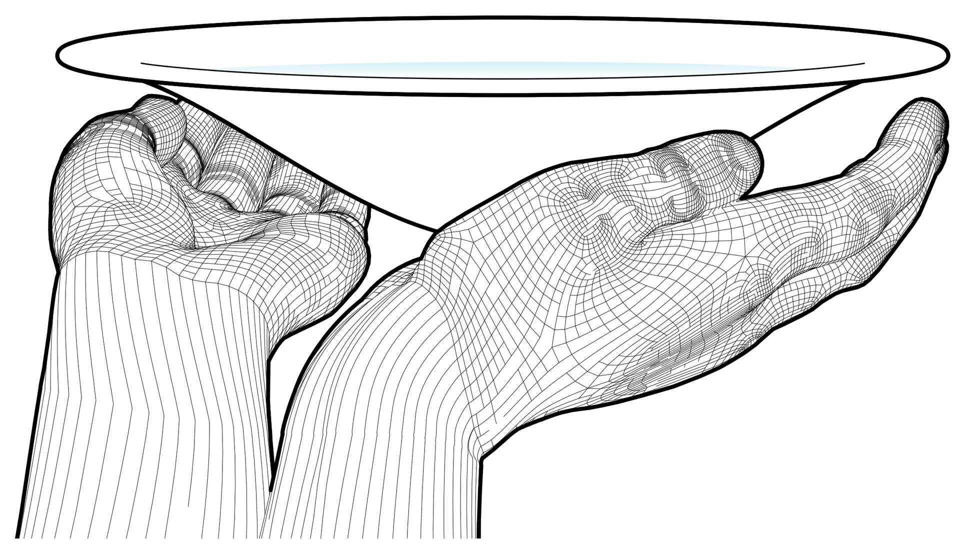
Emerging from this foundation are two immense hands, sculpted to appear as if rising from the earth, an homage to the Fijian concept of offering and upliftment. Constructed using a timber framework and finished with traditional thatching techniques, the hands embody cultural continuity and craftsmanship, connecting the past with the future. The tactile texture of the thatch recalls the warmth of human touch, reinforcing the theme of giving back to the land and people.

Resting within these hands is a half-bowl structure, symbolizing the revered tanoa (kava bowl). This component is crafted from either steel or timber, with its underside also clad in woven thatch, further rooting the design in indigenous materiality. The bowl serves two critical environmental functions: its northern-tilted surface hosts solar panels, generating renewable energy, while its concave form funnels rainwater into the central collection system, ensuring a continuous cycle of energy and water sustainability.

More than an installation, Ligavatuvuce is an invitation to gather, reflect, and engage with the core values of Fijian culture, giving, resilience, and communal harmony. It is a testament to the power of architecture to bridge the spiritual and the practical, the past and the future, and the earth and the sky.

AERIAL FROM THE WEST





CONTEXT

Marou Village is an iTaukei (indigenous Fijian) community situated on the southeast coast of Naviti Island, part of the Yasawa Group in Fiji's Western Ba Region. The village comprises approximately 67 households and is surrounded by dense tropical dry forests and mangroves, characteristic of Naviti Island's landscape.

The residents of Marou Village are actively engaged in initiatives to enhance their community's sustainability and resilience. In collaboration with the Land Art Generator Initiative (LAGI), they have launched LAGI 2025 Fiji, a design competition inviting innovative solutions to provide clean energy and reliable drinking water. This project aims to address challenges such as inconsistent electricity supply and seasonal freshwater scarcity, which are exacerbated by climate change impacts like severe flooding during the rainy season and droughts during the dry season.

Marou Village exemplifies a community striving for a sustainable future, balancing the preservation of its rich cultural heritage with the adoption of innovative solutions to meet contemporary challenges.

THE KAVA BOWL (TANOA)

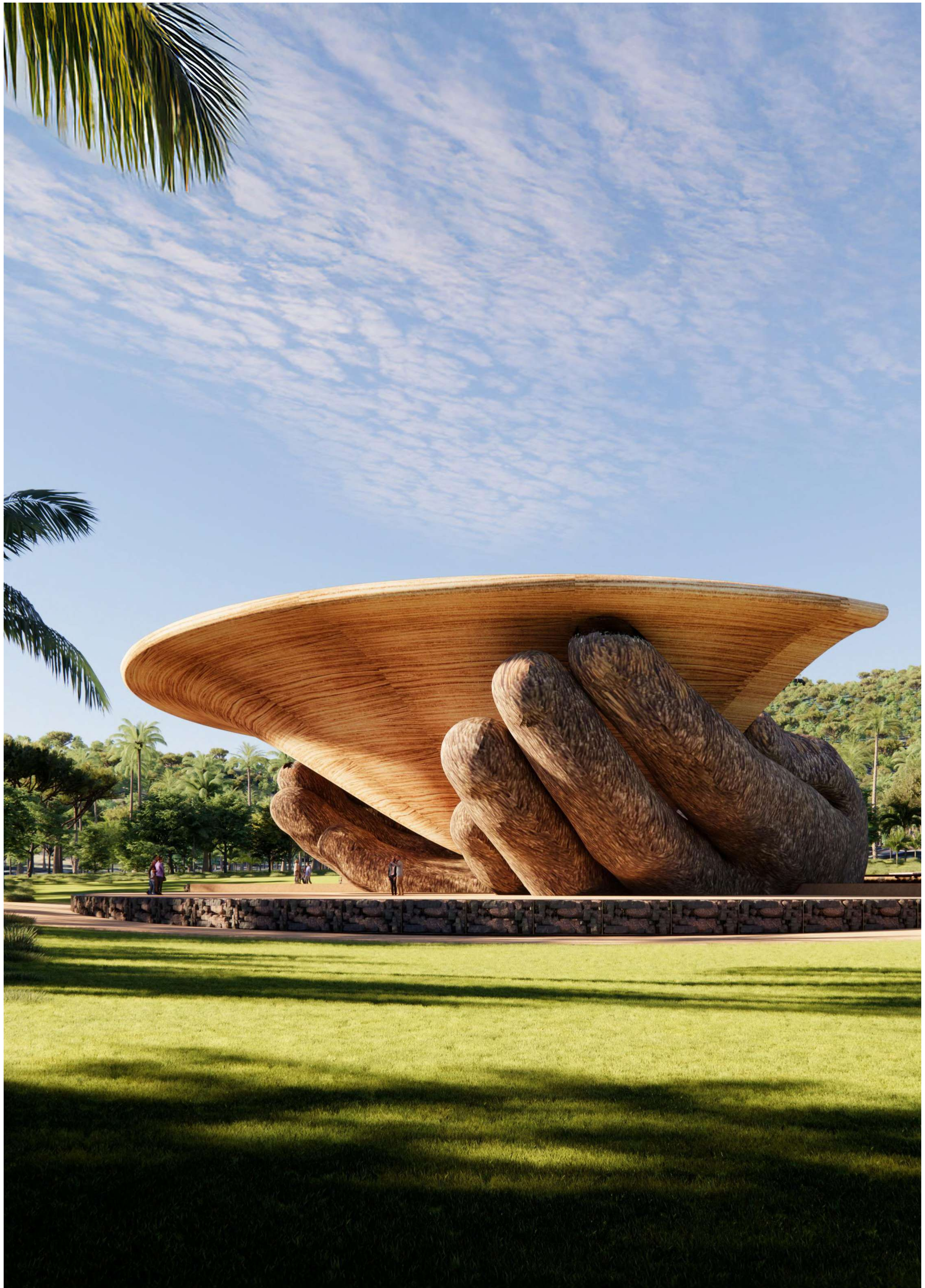
The kava bowl, or tanoa, is a deeply significant symbol in Fijian culture, representing community, respect, and continuity. Used to prepare and serve yaqona (kava), the tanoa is central to ceremonies that reinforce social bonds, leadership, and spiritual connection.

In the Sevusevu ceremony, visitors present yaqona to the village chief as a gesture of respect, with the kava prepared in the tanoa. Similarly, in the Yaqona Vakaturaga, the first cup is offered to the highest-ranking chief, affirming his leadership and duty to his people. The tanoa also plays a role in reconciliation ceremonies, where drinking kava symbolizes forgiveness and restored harmony.

Beyond social and political rituals, the tanoa holds spiritual importance, once used in ceremonies seeking guidance from ancestral spirits. Its round shape signifies unity, while its multiple legs represent communal stability. Over time, the darkened interior, stained from years of use, becomes a metaphor for the wisdom and resilience of Fijian tradition. Whether in village gatherings or national events, the tanoa remains a powerful emblem of identity and shared heritage.

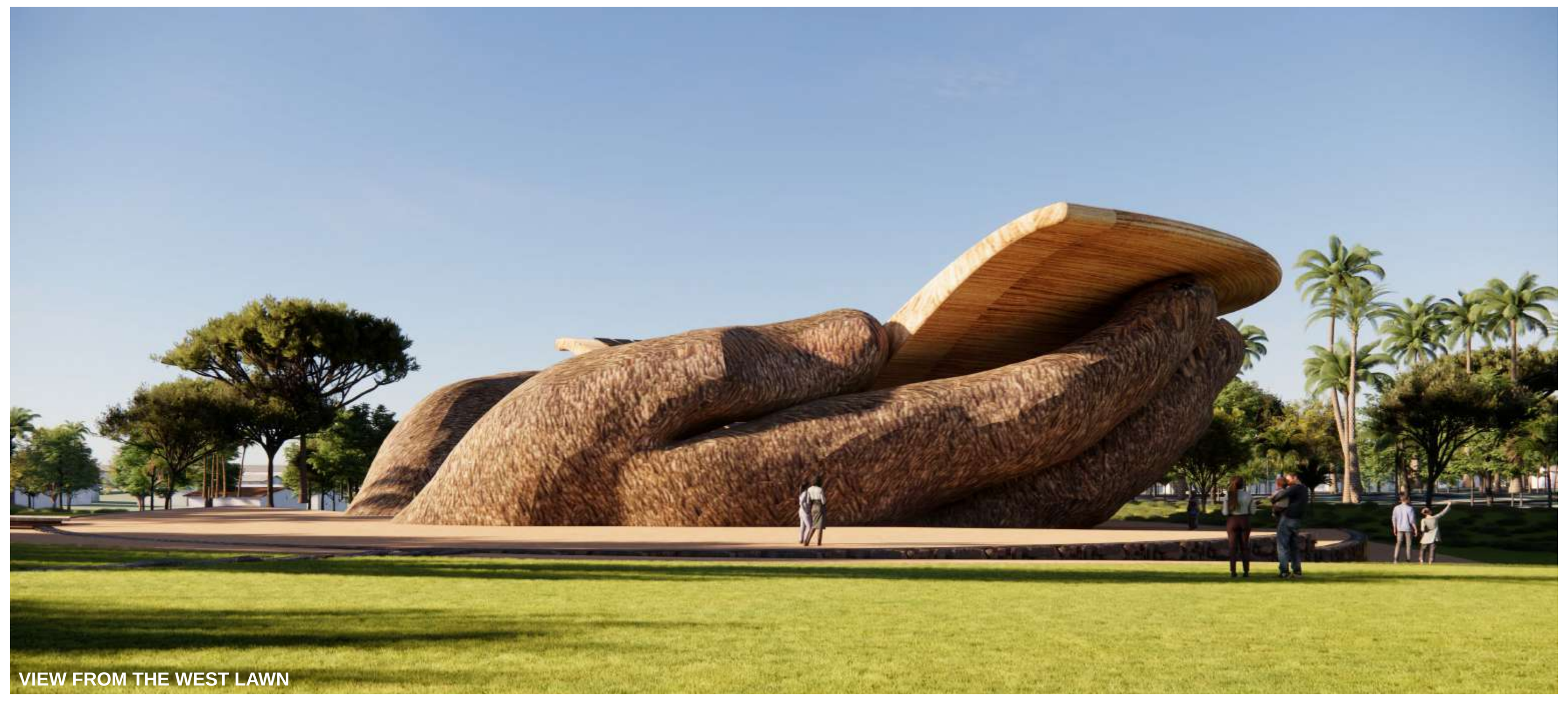
REINTERPRETATION

Rooted in Fijian tradition, Ligavatuvuce reimagines the symbolic kava bowl and open hands as a monumental expression of giving, sustainability, and cultural resilience. Inspired by the ritual of offering yaqona, the design transforms these elements into a functional and regenerative structure, where the hands rise from the earth in an act of generosity, cradling a bowl that captures solar energy and rainwater. By merging traditional craftsmanship, ecological design, and contemporary innovation, the project honors Fiji's heritage while fostering a future of self-sufficiency and community empowerment.

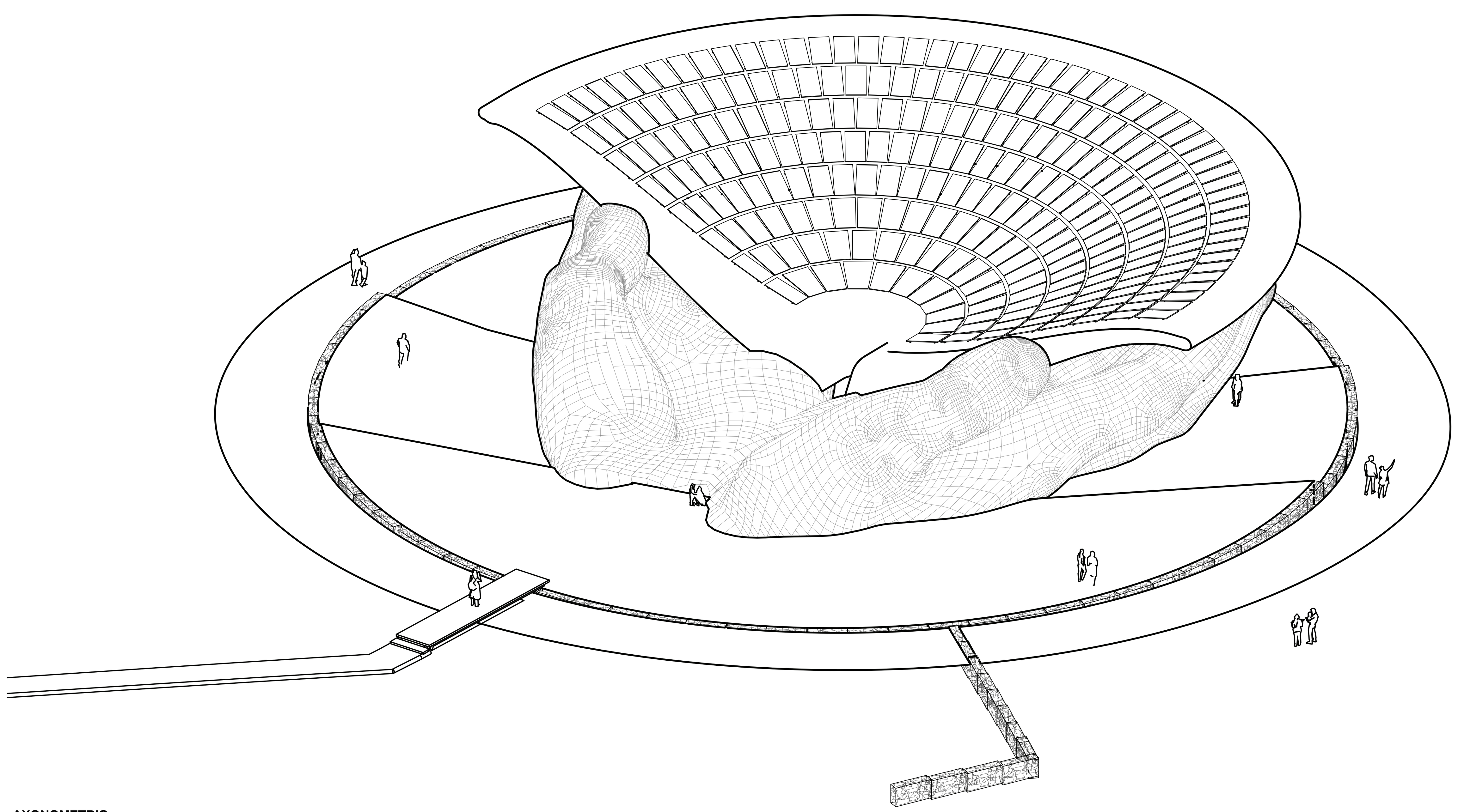


VIEW FROM THE SOUTH EAST

APPROACH VIEW



VIEW FROM THE WEST LAWN



AXONOMETRIC

THE HISTORY AND SIGNIFICANCE OF THATCHING IN FIJIAN CULTURE

Thatching has been a fundamental element of Fijian architecture for centuries, deeply intertwined with the islands' history, environment, and way of life. Traditionally used to construct bure (houses) and communal structures, thatching represents a harmonious relationship between nature, craftsmanship, and social structure. Made from locally sourced materials such as soga palm leaves, reeds, and coconut fronds, thatched roofs are not only a practical response to Fiji's tropical climate but also a reflection of indigenous knowledge passed down through generations.

The construction of a bure was a communal effort, reinforcing the values of cooperation and social responsibility. Skilled craftsmen, known as mataisau, were highly respected for their expertise in weaving and binding thatch with precise techniques to ensure durability and protection from heavy rains and strong winds. The process was guided by oral traditions, with specific methods tailored to different regions and environments. The longevity of a thatched roof depended on the quality of the materials and the skill of the mataisau, with some lasting for decades when properly maintained.

Beyond its practical function, thatching holds symbolic and spiritual meaning in Fijian culture. The roof of a bure was considered sacred, especially in chiefly or spiritual structures, where the intricate weaving of natural fibers mirrored the interwoven connections between land, people, and ancestors. The act of maintaining and renewing thatch was a ritual in itself, a cyclical process that reinforced a deep respect for nature and tradition.

Today, while modern materials have become more common, traditional thatching remains a symbol of Fijian identity and sustainability. It continues to be used in resorts, cultural sites, and eco-conscious projects, preserving its legacy while adapting to contemporary needs. The enduring presence of thatching in Fiji serves as a reminder of the ingenuity and resourcefulness of its people, a testament to a living tradition that bridges the past and future.

SOLAR HARVESTING

Key Assumptions and Inputs

Power Output: 420 - 440 W (**430 W** used for calculations)
Efficiency: 22.8% (assumed)
Number of Panels: 181
Total Installed Capacity Range: 76.02 kW - 79.64 kW

Solar Irradiance in Fiji:
Fiji's average daily solar insolation is approximately 5.0–5.5 kWh/m²/day (**5.25 kWh/m²/day**. used for calculations)

Optimal Positioning:
Tilt Angle: Approximately 17°S latitude, facing north (Southern Hemisphere)
Azimuth: 0° (true north)
No Shading: Assumes clear skies and no obstructions

Performance Factors:
Temperature Coefficient: -0.26%/°C (HiHero spec)
Average Daytime Temperature: ~28°C (tropical climate)
(panel cell temperature may reach 60°C under direct sun, reducing efficiency)
System Losses: Account for inverter efficiency (95%), dust/humidity (5% loss), and wiring (2% loss), totalling ~12% loss
Degradation: First-year output assumes no degradation (89.4% output guaranteed after 25 years, per warranty)

Time Frame: **365 days** (1 year)

Temperature Effects

Standard Test Conditions (STC) assume 25°C cell temperature
In Fiji, cell temperature may rise to 60°C under full sun:
Temperature difference: 60°C - 25°C = 35°C
Power reduction: 35°C × -0.26%/°C = -9.1%
Adjusted output per panel: 430 W × (1 - 0.091) = **390.87 W**

Daily Energy Output

Daily Solar Insolation: 5.25 kWh/m²/day
Panel Area: 430 W panel at 22.8% efficiency under 1000 W/m² (STC) area of ~1.885 m² (calculated as 430 W / (1000 W/m² × 0.228))
Total Array Area: 181 × 1.885 m² = **341.19 m²**

Daily Energy Pre-Loss:
341.19 m² × 5.25 kWh/m²/day = **1,791.25 kWh/day** (using area method)
Using peak power: 70.75 kW × 5.25 hours (equivalent peak sun hours) = **371.44 kWh/day**

System Losses: 12% loss (1 - 0.12 = 0.88 efficiency factor).

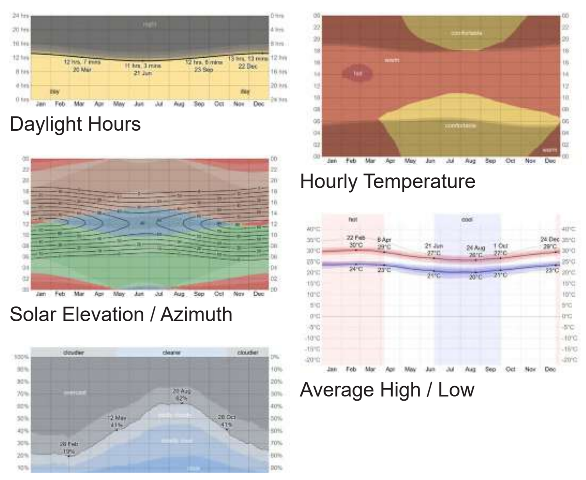
Daily Energy Output:
371.44 kWh/day × 0.88 = **326.87 kWh/day**

FINAL BREAKDOWN

Installed Capacity: **77.83 kW** (181 panels × 430 W)
Daily Output: **326.87 kWh/day** (adjusted for temperature and losses)
Annual Output: **119,308 kWh/year** (~119.31 MWh/year)

Key Factors:
5.25 kWh/m²/day insolation drives high yield
9.1% reduction due to heat (60°C cell temp)
12% system losses (inverter, dust, wiring)

WEATHER DATA



Daylight Hours
Hourly Temperature
Solar Elevation / Azimuth
Average High / Low
Cloud Cover

ADDITIONAL WATER STORAGE

Rainwater Harvesting from Catchment Area

Key Inputs

Catchment Area: 2,827.48 m² (circular shape, radius ~30 m)
Annual Rainfall Range: 2,000 - 3,000 mm (2,500 mm assumed)
Collection Efficiency: 85% (accounting for evaporation, overflow, and losses typical in rainwater systems)
Seasonal Split:
Wet season (November - April, 6 months, ~70% of rainfall = 1,750 mm);
Dry season (May - October, 6 months, ~30% = 750 mm)

Annual Water Caught

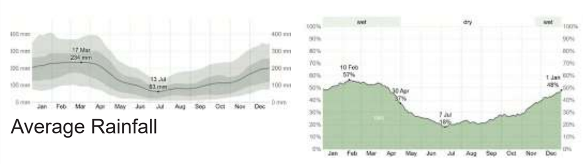
Formula: Volume (m³) = Rainfall (m) × Area (m²) × Efficiency
Calculation: 2.5 m × 2,827.48 m² × 0.85 = 6,008.15 m³
Annual Total: **6,008,150 liters** (~6 million liters)

Annual Runoff Harvested

Formula: Volume (m³) = Rainfall (m) × Area (m²) × Runoff Coefficient × Efficiency.
Calculation: 2.5 m × 1,000 m² × 0.3 × 0.7 = 525 m³
Annual Runoff Total: **525,000 liters**

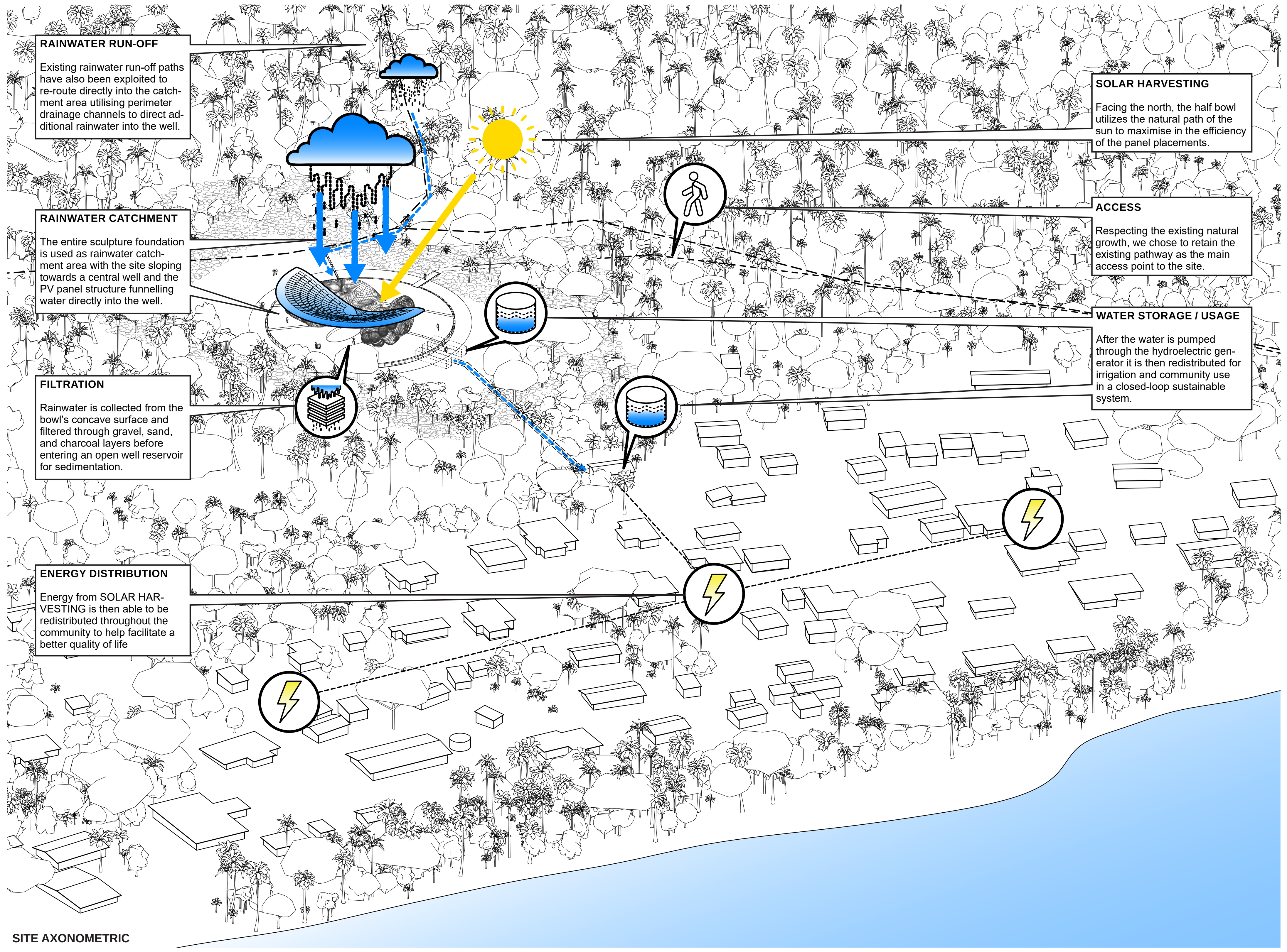
Total Potential Annual Water Harvested: **6,533,150 liters**

WEATHER DATA

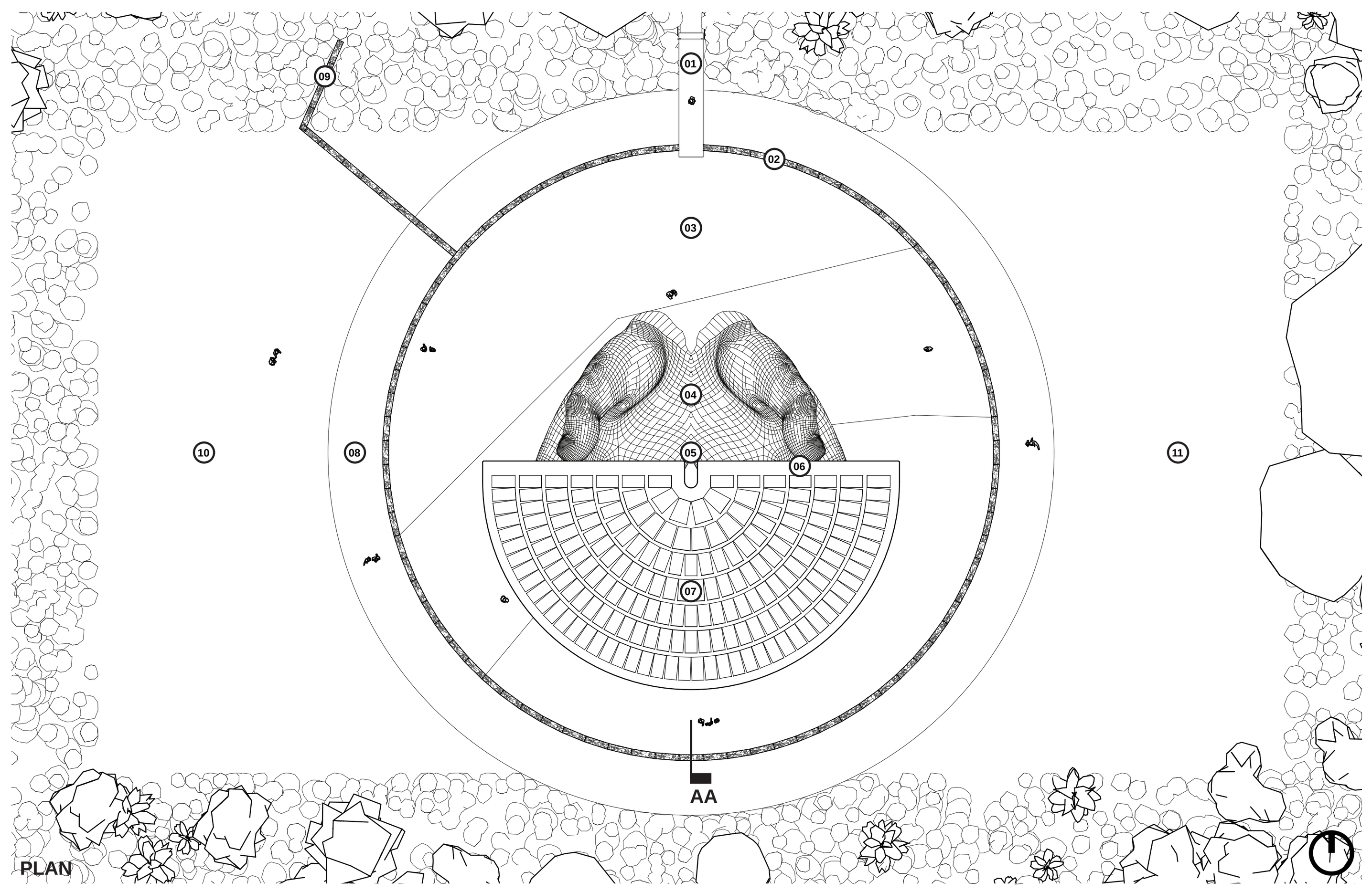


Average Rainfall
Chance of Precipitation

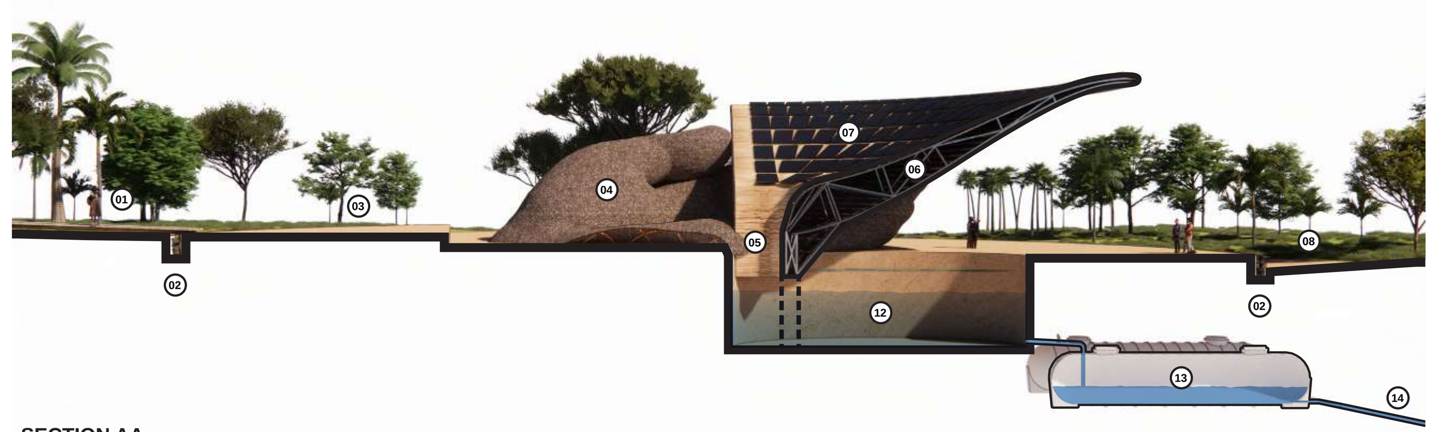
EXPLODED AXONOMETRIC



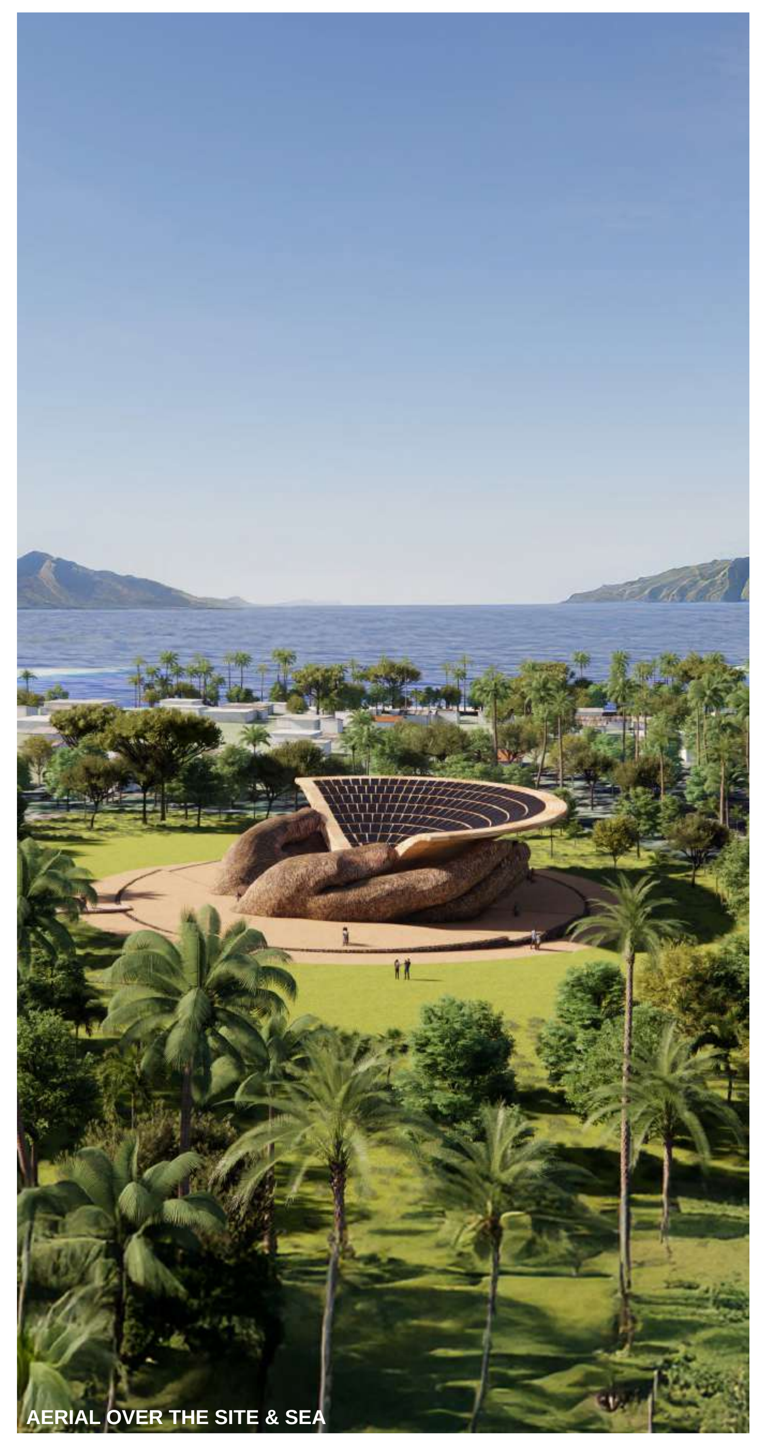
SITE AXONOMETRIC



PLAN



SECTION AA



AERIAL OVER THE SITE & SEA

SOLAR HARVESTING IN FIJI

Fiji's solar market prioritizes reliable, cost-effective, and climate-appropriate solutions over the absolute highest-efficiency panels due to its unique context as a small island nation with a dispersed population and tropical conditions. As of February 2025, the globally top-performing solar panels—such as Maxeon 7 (24.1% efficiency) and AIKO ABC (24.2%)—lead in raw efficiency but lack confirmed widespread presence in Fiji. Instead, Canadian Solar, with efficiencies up to 22.8% (e.g., HiHero series), emerges as the most prominent high-efficiency option already established in the country, distributed by local installers like Solar Fiji. QCells (up to 21.7%) is also prevalent, reflecting a focus on proven, affordable technology.

This dynamic stems from several factors: Fiji's reliance on imports through regional hubs like Australia, the need for panels to endure high heat and humidity (favoring brands with low temperature coefficients like Canadian Solar), and a market scale that doesn't yet demand premium, ultra-efficient models designed for space-constrained or high-income regions. Rural electrification and off-grid systems dominate, where durability and cost outweigh marginal efficiency gains. While cutting-edge panels like Maxeon 7 or AIKO ABC could be imported, their higher cost and limited local distribution make them less practical compared to established options like Canadian Solar, which balances efficiency, reliability, and availability for Fiji's needs.

PANEL OF CHOICE: *Canadian Solar HiHero CS6.1-54TD*

Manufacturer: *Canadian Solar Inc.*
Model: *HiHero CS6.1-54TD*
Technology: *Heterojunction (HJT) with monocrystalline silicon cells* (HJT combines crystalline silicon with thin amorphous silicon layers, enhancing efficiency and temperature performance.)
Nominal Power Output range: *420–440 W* (varies by specific variant)
Module Efficiency: Up to *22.8%* (maximum listed for the series)

SUSTAINABLE WATER MANAGEMENT SYSTEM

The project's water management system is designed to efficiently collect, purify, store, and distribute rainwater, ensuring long-term sustainability for the Marou community. At its core is an open well filtration system that naturally purifies rainwater through a multi-layered filtration process before storing it for community use. Rainwater is first funnelled from the concave surface of the kava bowl-inspired structure, optimizing collection efficiency. It then passes through a gravel and sand pre-filtration bed, which removes large debris before entering a bio-filtration system composed of charcoal, sand, and fine gravel, further purifying the water. The filtered water collects in an open well reservoir, where natural sedimentation occurs, providing a clean and reliable water source for drinking, irrigation, and groundwater replenishment.

To ensure efficient storage and distribution, the system is integrated with three 100,000-liter underground storage tanks, positioned at a higher elevation to utilize gravity-fed water distribution. This design minimizes reliance on mechanical pumping while ensuring steady water pressure throughout the community. The system is also scalable, with the potential for additional high-capacity tanks to be placed at even greater altitudes if needed. To facilitate this expansion, solar-powered water pumps can be incorporated to efficiently transport water to elevated storage points, further enhancing distribution. By combining passive gravity-fed flow with renewable energy solutions, this approach reinforces community resilience, self-sufficiency, and long-term water security, ensuring that Marou thrives in harmony with its natural environment.

LEGEND

01. Entry path
02. Perimeter gabion wall / Catchment area drainage channels
03. Compact Earth Foundation
04. Hands sculpture
05. Drainage funnel
06. Half bowl structure
07. Photovoltaic panels
08. Perimeter circulation path
09. Rainwater run-off drainage channels
10. West lawn
11. East lawn

12. Rainwater collection / filtration pool
13. Underground water storage tanks
14. Pipes connecting to hydroelectric generators

“The O”

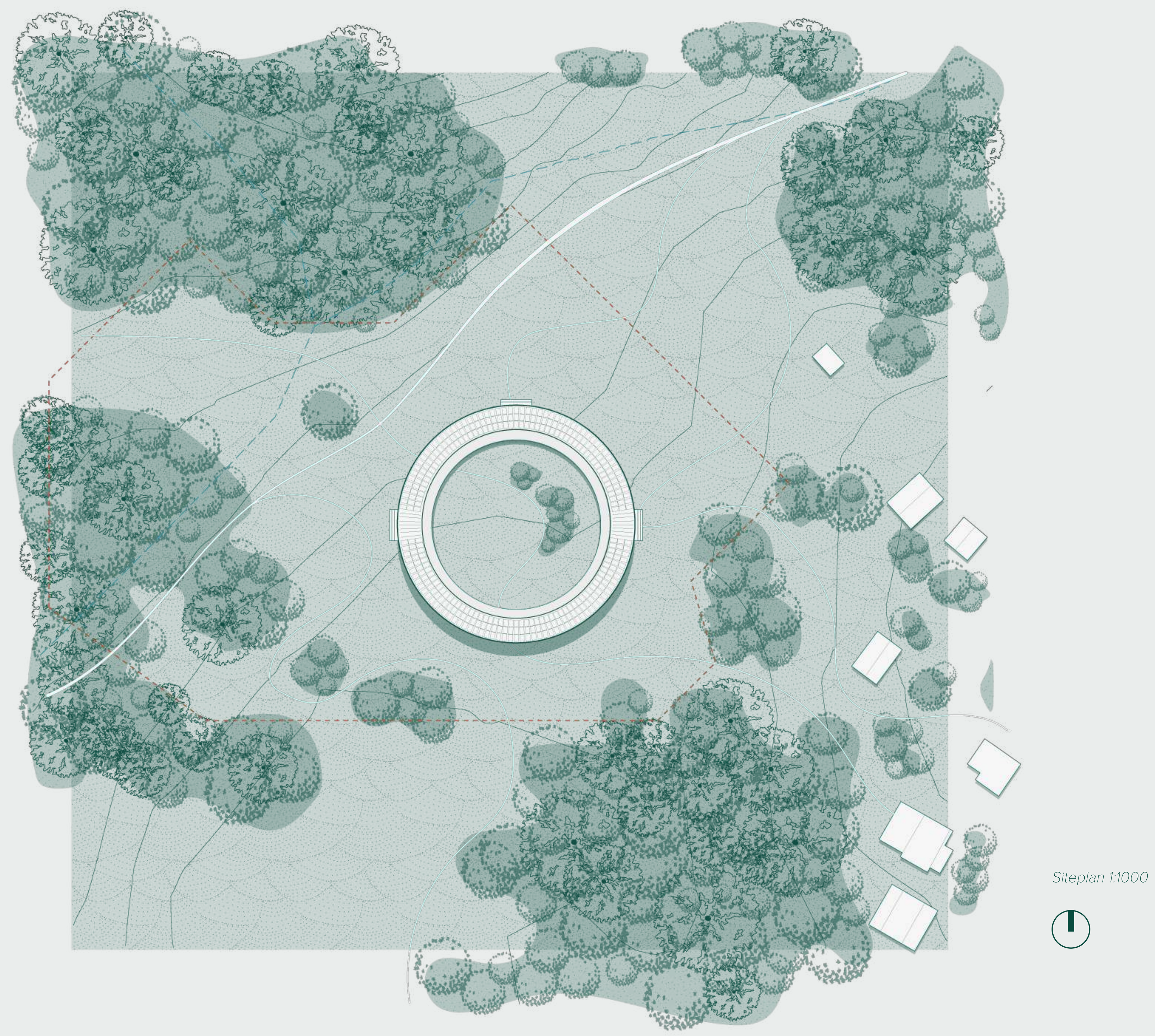
“The O” is a symbol of harmony between landscape, energy, and architecture.
Shaped as a perfect circle, it embodies the infinite cycles of nature, the continuous flow of energy, and the deep interconnection of all life.”

“The O” is a multifunctional installation that unites energy generation, water harvesting, and social spaces into a single, poetic gesture – supporting the Marou community in their transition toward a more sustainable and self-reliant future.
Shaped as a 40-meter-wide circle, the installation blends gently into the rich Fijian landscape, while actively contributing to its vitality. Its elevated solar canopy, crafted from over 300 monocrystalline solar panels, generates renewable energy, collects rainwater, and shelters over 700 square meters of shaded space beneath, offering a platform for everyday community use.
Constructed primarily from timber, the installation embodies a dialogue between ecological sensitivity and technological innovation, with its solar canopy rising as a distinctive symbol of resilience and regeneration.
Ultimately, “The O” is envisioned as a platform which can be customised and adapted according to the needs of Marou community. Through workshops, co-design sessions, and other forms of engagements, the aim is to develop a strong collaborative framework where people are active part of the design.

150 MWH OF CLEAN ENERGY

1,2 MILLION LITERS OF HARVESTED WATER

700 M2 OF MULTIUSE SPACE



A PLACE THAT RESPECTS AND CONNECTS WITH THE LANDSCAPE
“The O” blends respectfully into the landscape and offers a strong relationship through its 360° structure.

A PLACE THAT MAXIMISES SUN AND WATER HARVESTING
“The O” uses one simple element - the canopy- to efficiently integrate and maximise sun and water harvesting.

A PLACE THAT OFFERS SPACES FOR MULTIPLE ACTIVITIES
“The O” offers unique flexible space for multiple activities e.g. events, lectures, classes, farm support, recreation.

A PLACE DEVELOPED WITH THE COMMUNITY FROM DAY 1
From the pilot project, the community will be involved in both further conceptualisation and practical design.

x 52

A PLACE THAT IS SIMPLE TO BUILD AND MAINTAIN
“The O” follows the principle of simplicity and modularity, where large structure is created with the use of simple modular pieces.

A PLACE THAT IS AN EXAMPLE OF REGENERATIVE DESIGN
“The O” uses mainly low carbon materials and circular design strategies to be an example of sustainability and align with broader FIji 2050 Sustainability Vision.

Merging Traditional Materials & Modern Technology in a Poetic Geometry

While timber suggests tradition and craftsmanship, the solar canopy evokes innovation

Key Architectural Elements

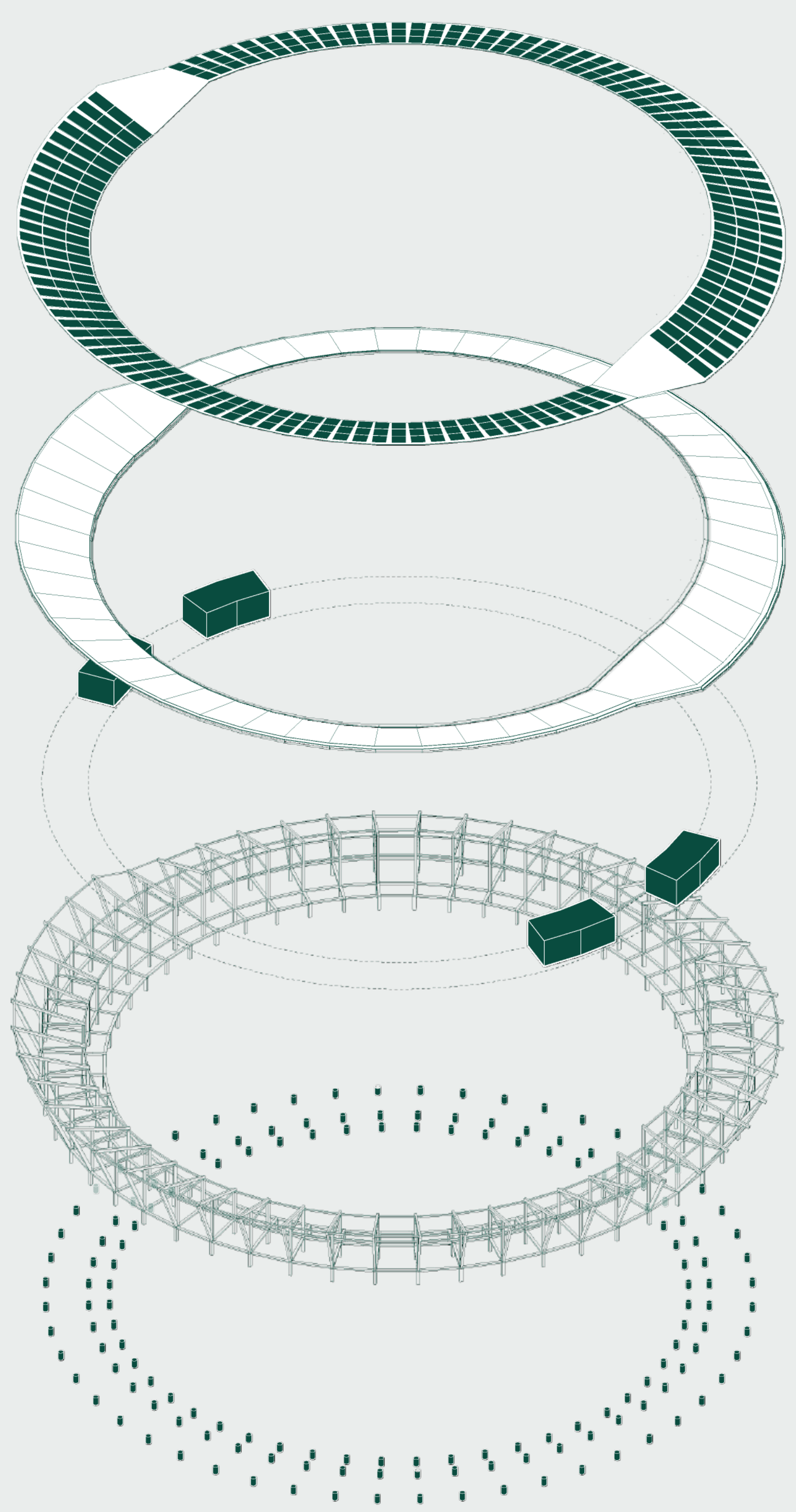
Solar Panels
336 black monocrystalline solar panels are placed in modular group of three and cover the all canopy. They all tilt 19° following the two north-facing roof faces.

Roof System
The roof system is composed by modular rigid panels to support the rails and the PV system. The all surface is covered with rainproof membrane to ensure an efficient water collection.

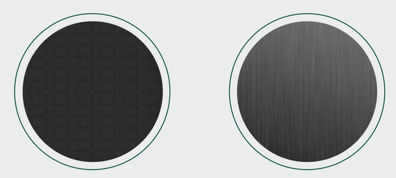
Rooms
Enclosed spaces made of wooden planks are integrated into the structure according to the modular rhythm. The room for battery storage is insulated. Additional rooms can easily be added if required.

Structure
The circular structure is made up of modular timber elements that are easy to assemble and transport, with good strength, flexibility and a reduced carbon footprint.

Foundations
Screw pile foundations are used to minimise the impact on the ground and allow vegetation to grow across.

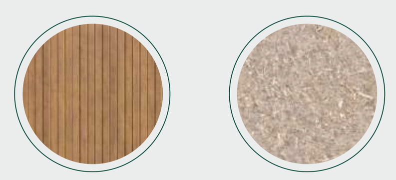


Sustainable and Low Carbon Materials

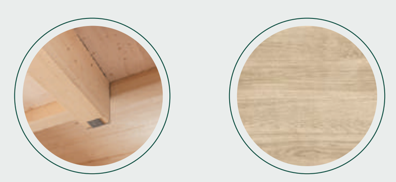


Highly Durable Monocrystalline Panels (full black cells and rainforced frame design)

Timber Panels (compressed bamboo or plywood) + dark Rainproof Membrane (ETFE or recycled rubber)



TImber Planks (regionally or locally sourced) + Insulation Panels (hemp or whool)

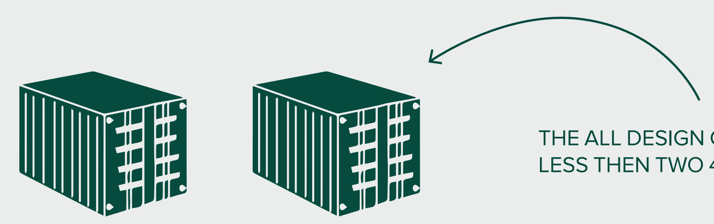


Naturally Durable Hardwoods (teak, kwila/merbau ironbark, vitex)

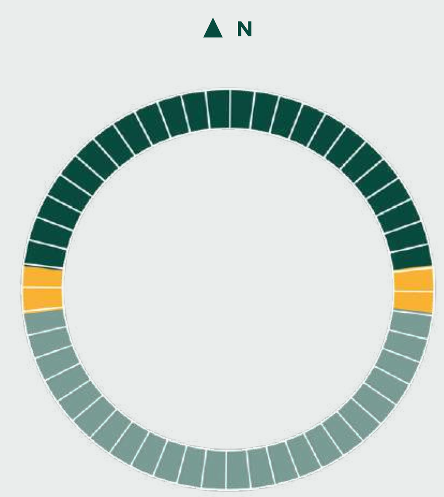
Steel Screw Pile Foundation (punctual concrete can be alternative depending on soil conditions)

A Simple & Modular System

Easy to manufacture, easy to transport, easy to assemble, easy to maintain

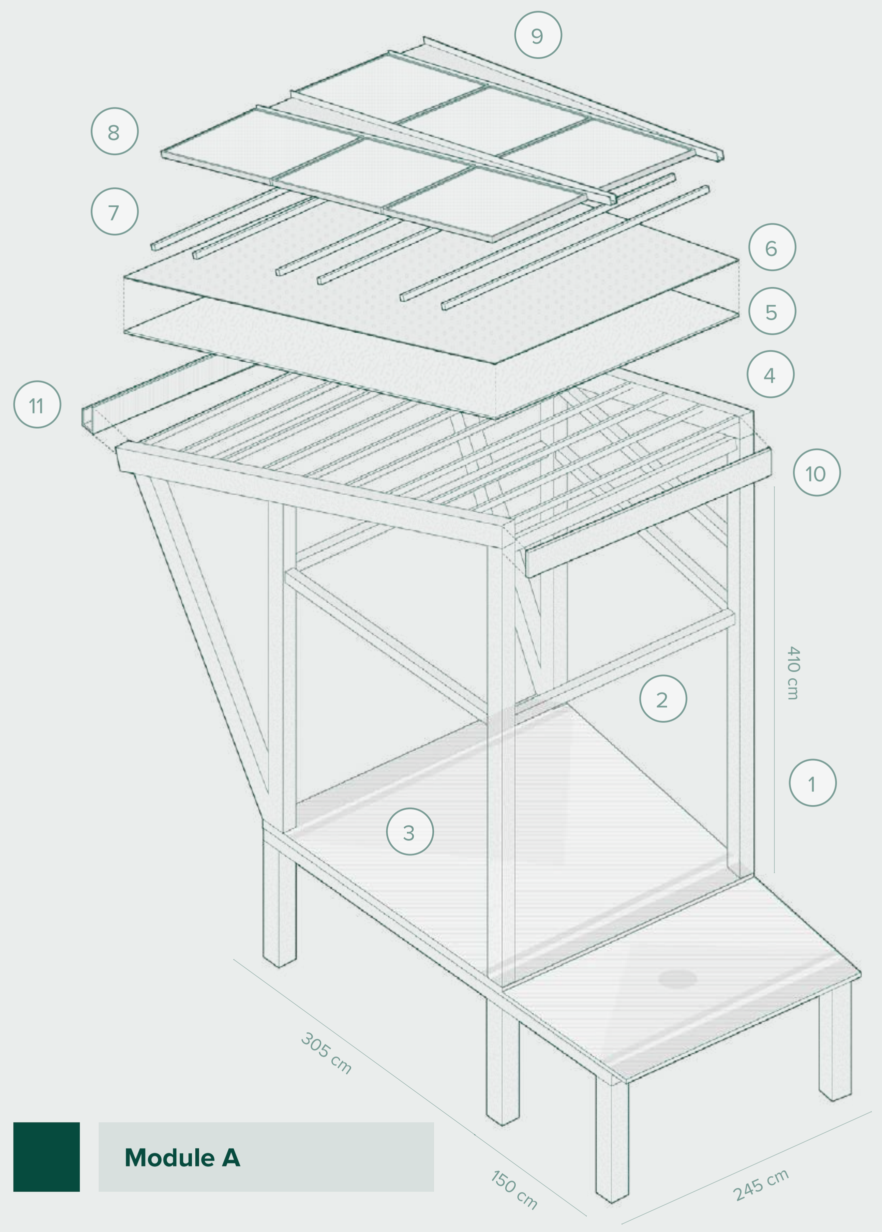


THE ALL DESIGN CAN BE PACKED IN LESS THEN TWO 40FT CONTAINERS



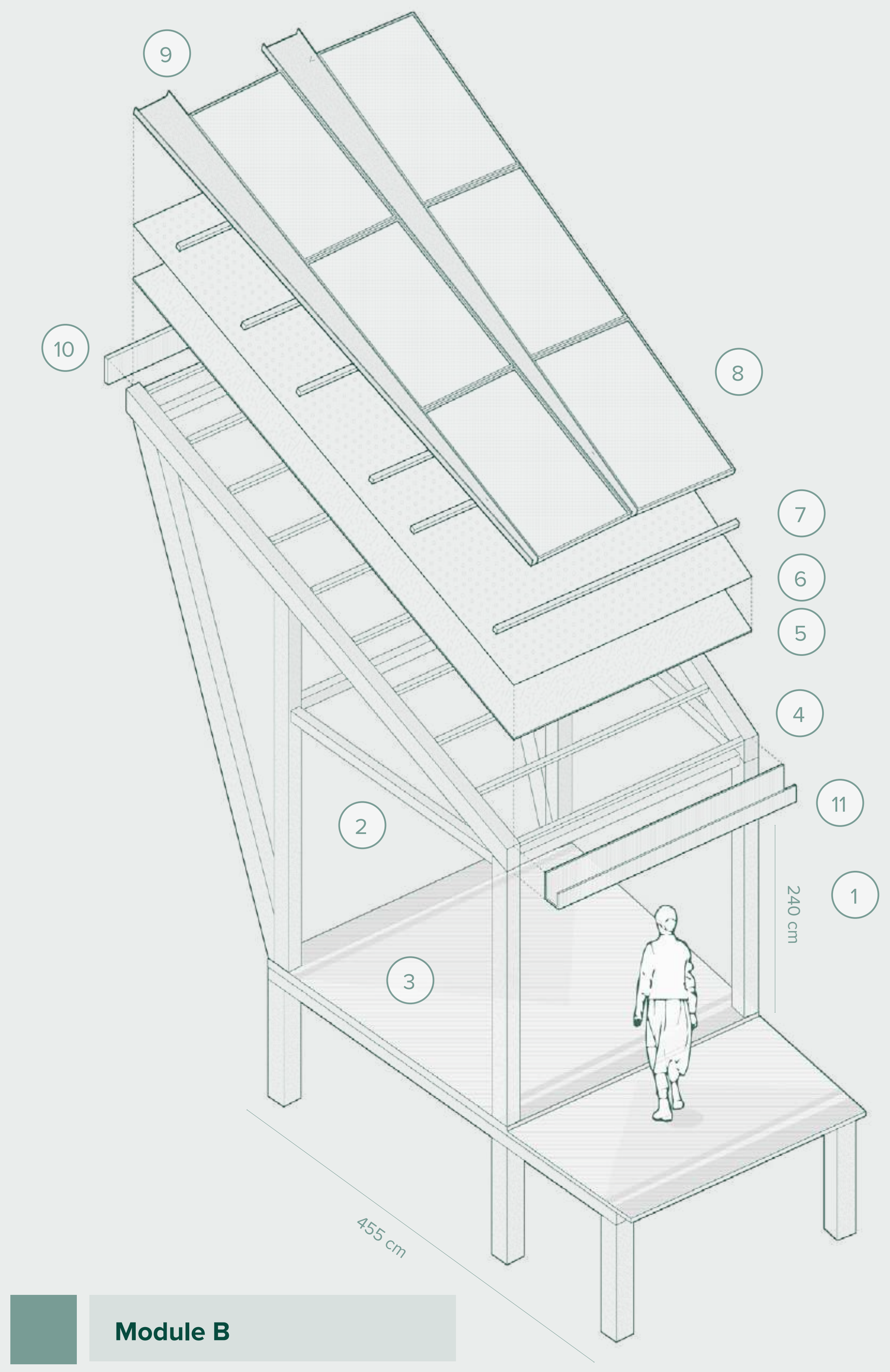
MODULE A MODULE B MODULE C

The design of the structure is based on simple, modular and small elements that can be easily manufactured, transported and assembled. The design is driven by two primary modules, which define the overall geometry, and a third module that connects them. There are 24 modules of type A, 24 modules of type B, and 4 modules of type C. The longest element measures 5.5 meters, while the average length is less than 2 meters.

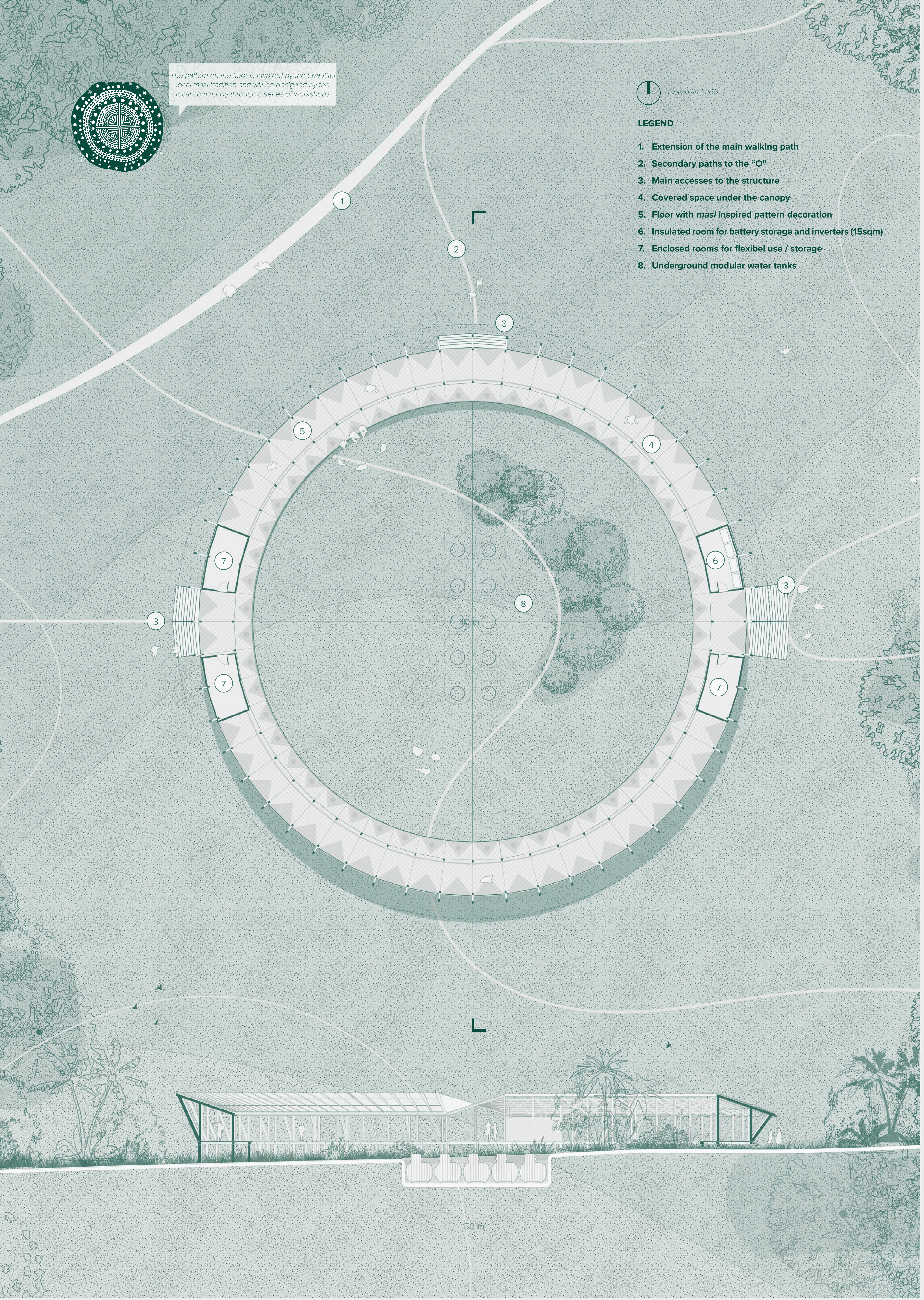


Module A

1. Timber primary structure (20x15 cm)
2. Timber secondary structure (10x10 cm)
3. Timber flooring (with *masi* geometries potentially developed with the community)
4. Timber roof supports
5. Rigid panel
6. Rainproof membrane
7. Rails support for PV
8. Standard size monocrystalline PVs
9. Metal profile between PVs
10. Profile for protection & aesthetic
11. Gutter for efficient rain collection

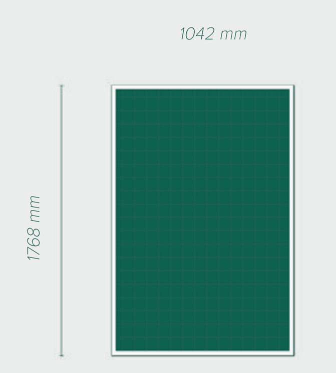


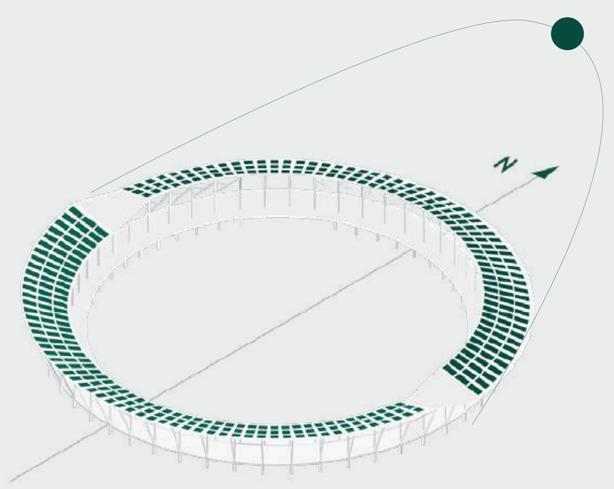
Module B

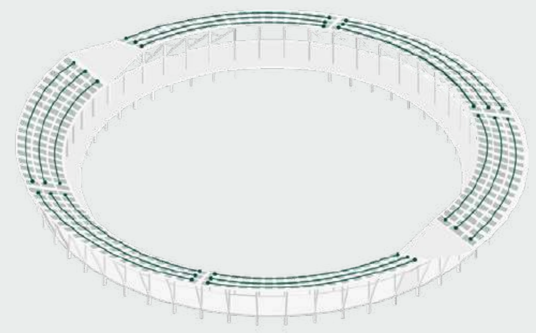


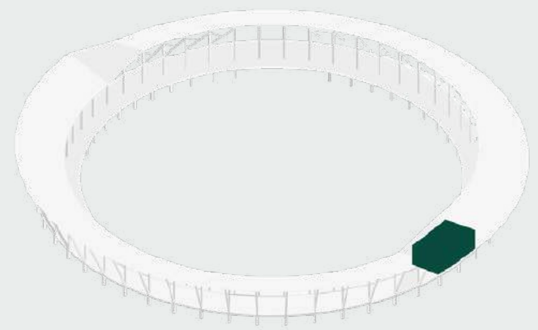
Energy Production

Producing 150MWh per year with a modular and reliable system









Standard Monocrystalline Panel
To guarantee durability, efficiency and easy mountability, the project proposes the use of standard dimension monocrystalline full-black panels. LG NeOn H Black has been used as reference. 120 cells, 370 W.

A Circular Solar Canopy
The solar panels are placed along the canopy in three lines, with a 19° tilt to maximise sun exposure across the year. Since not all the panels are perfectly aligned to north, this layout has an efficiency of 76-78%.

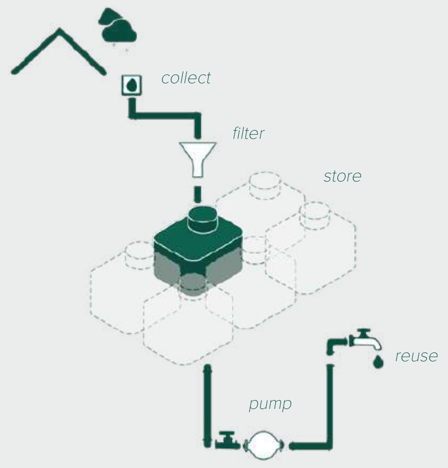
Clustering & Inverters
The panels are clustered in 18 strings of 18-19 panels to optimise energy output and reduce electrical losses by managing voltage and current efficiently, with a cost-effective, easy to maintain system.

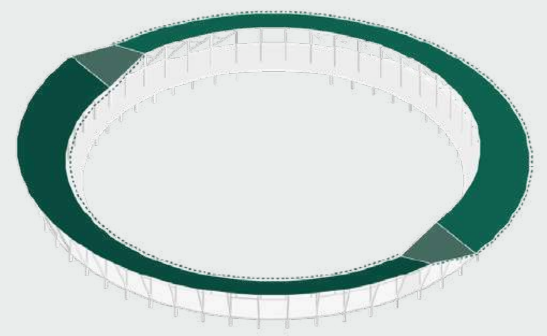
Control Room & Battery Storage
A 15 m2 insulated room provides space for 15 batteries (120x60x50cm) of 50kWh each and 4 inverters (80x60x30cm) + DC combiner boxes and a Battery Management System. The room is mechanically and naturally ventilated.

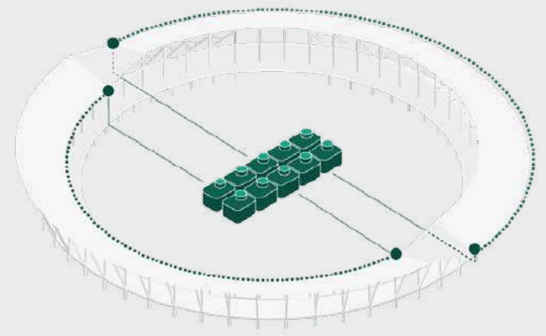
PANEL DIMENSION mm	MODULES units	TOTAL AREA m2	PANEL CAPACITY W/m2	TOTAL CAPACITY kW	SYSTEM EFFICIENCY %	TOTAL CAPACITY Efficiency Adjusted - kW	ANNUAL OUTPUT Fiji Factor 0.21 - MWh	SOLAR OUTPUT kWh/day	BATTERY CAPACITY kWh
1768 x 1042 x 40	336	537	200	107,52	76	**81,72**	**150,32**	**411,84**	**750**

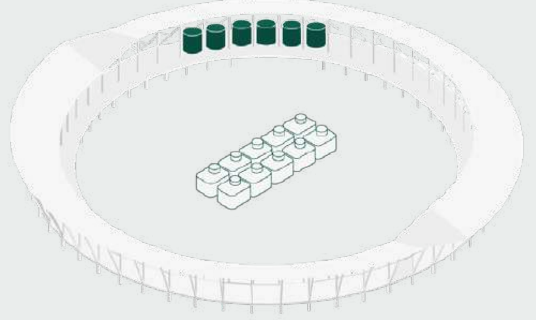
Water Harvesting

Harvesting 1,2 millions liters of water and transform it into freshwater for the dry season









A Modular and Flexible Tank System
To limit aesthetic disturbance and protect from temperature and climate agents, the project proposes 10 modular and durable underground water collection tanks of 10.000 liters each, with a total capacity of 100.000 l of water.

A Large Harvesting Surface
The harvesting system uses the generous 768 sqm roof as the main collection surface, with the potential to collect over 1,2 million litres per year. The continuous roof ensures easy and efficient water harvesting.

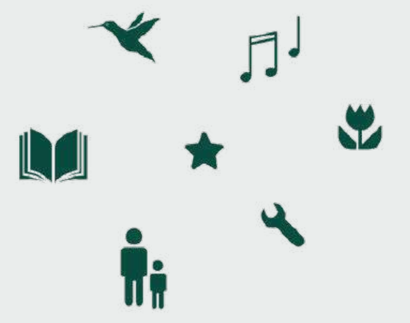
A Compact Layout
After falling on the roof, the water is collected by two gutters that run across the roof, taken to the ground by four pluvial pipes and then connected to the tanks by underground pipes that first pass through membranes and filters.

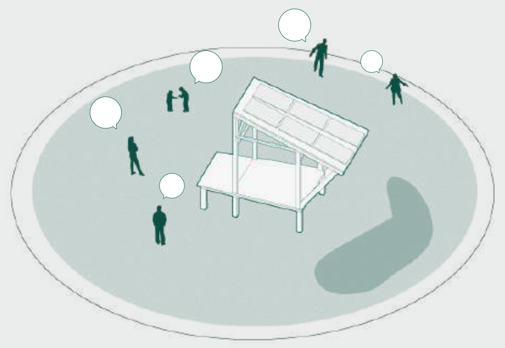
Potential Expansion
The system can be expanded in different ways. For example by adding another row of underground tanks, or if excavation want to be limited, by integrating ground tanks in part of the circular structure.

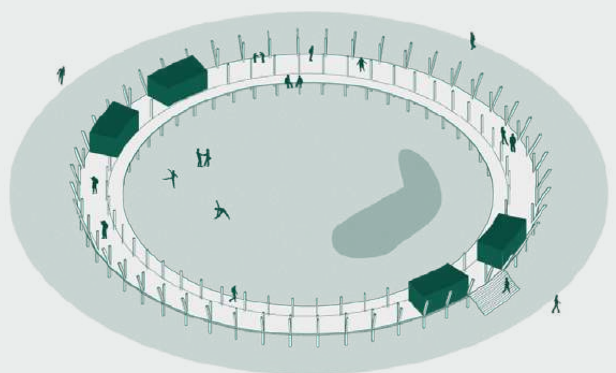
EXISTING CAPACITY l	TOTAL RAINFALL mm per year	TOTAL CATCH AREA m2	HARVEST POTENTIAL l per year	HARVEST POTENTIAL l per year - Efficiency Adjusted	HARVEST POTENTIAL l per day	STORAGE TARGET days	TANK CAPACITY l	TANK NUMBER unit	CAPACITY PROVIDED l
900 000	2 000	768	1 536 000	1 228 800	3 367	30	10 000	10	**100 000**

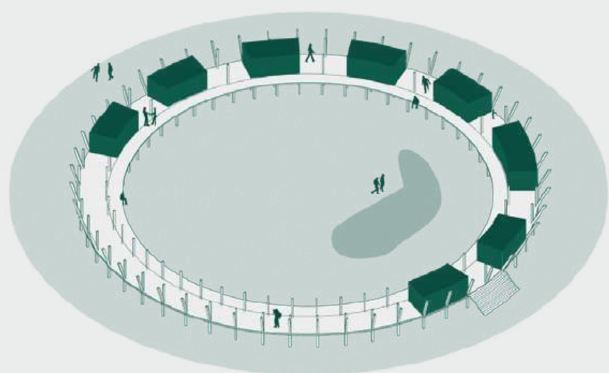
A New Social Heart

A platform for the community to use, share and customise









A Multiuse Space for the Community
The design offers approximately 700 m2 of flexible and adaptable space surrounded by nature which can host a variety of activities, with will be determined by the Marou community based on their needs and desires.

Collaborative From the First Pilot
The proposed design acts as a platform for community interaction and customisation. In the first pilot phase, workshops will engage the community in defining materials, floor decorations, and additional design elements.

A Symbol of Connection & Awareness
The circular shape creates a strong connection with the surrounding nature and the solar canopy itself, making every interaction an important moment of awareness of the interrelationship between natural resources and sustainability.

A Platform that can Evolve
For its very modular, and regular geometry, the structure can be easily adapted and modified for specific events or seasons. More rooms or enclosed spaces can be created, as well as dedicated spaces for specific activities.

TOTAL SPACE AREA m2	COVERED AREA m2	NO-COVERED AREA m2	ENCLOSED ROOMS m2	AREA X 1 MODULE m2	LAND WITHIN m2	PEOPLE CAPACITY seated	PEOPLE CAPACITY standing / event	WALK TIME slow pace	WALK TIME avarage pace
712	487	225	15 x 4	9	1 320	up to 290	up to 500	3 min	2 min