### **1. Concept Narrative**

The core concept of our design centers around the creation of a lake, formed by damming the local stream at the site’s lowest point—where water would naturally collect. This body of water becomes both a visual focal point and a functional anchor for the surrounding community spaces. Around this newly established lake, we have organized modular, multifunctional communal structures designed to serve as both gathering places and private retreats.

The use of natural, locally available materials such as timber, reed and bamboo reflects our commitment to sustainability and cultural appropriateness. These materials are not only environmentally friendly, but they also resonate with local architectural traditions. Modularity is a key feature of the design, allowing for future expansions or adaptations in response to evolving community needs.

The community space is designed with flexibility and inclusivity in mind. It features areas that support large-scale communal gatherings, such as performances or educational workshops, as well as more secluded zones for reflection and individual use. Each modular unit is topped with solar panels, contributing to the generation of clean energy and making the project self-sustaining.

Community functions within the site include a multi-purpose event hall that can transform into an outdoor classroom, a community library, spaces for recreation and wellness, a shared kitchen, a performance stage, and even a designated area for swimming and leisure. A communal fire pit further supports social interaction and traditional gatherings.

The structures are equipped with large sliding doors, enabling open-air use during calm weather and offering protection during storms or high winds. This adaptive feature enhances resilience and supports year-round usability.

Our design reimagines the relationship between community and land, combining energy generation, water retention, and shared spaces in a way that celebrates both culture and climate resilience. The installation will not only serve as a practical infrastructure solution, but also as a destination that invites both residents and visitors to engage with sustainability in a meaningful and experiential way.

### **2. Technical Narrative**

Our design incorporates photovoltaic (PV) solar technology as the primary energy generation system. The installation consists of modular community units, each fitted with 6 solar panels of 6 square meters surface area. There are a total of 8 such modular units. Additionally, a larger communal structure is included, which supports 18 solar panels of the same size.

In total, the installation integrates 66 solar panels (8 × 6 + 18 = 66 panels), each contributing approximately 300–350 watts under optimal conditions, depending on the exact panel specification selected during procurement. This configuration ensures that we meet and exceed the minimum requirement of 75 kW total photovoltaic capacity for the site, aiming towards an installed capacity of approximately 80–85 kW.

The energy generated will be stored in a battery bank system, using lithium iron phosphate (LFP) batteries for their safety, longevity, and resilience in high-temperature, remote environments. This allows for nighttime energy usage and system stability during overcast periods.

For water generation, rainwater harvesting systems are integrated into all rooftops. Water collected from the surface area of the solar panels is funneled into filtration systems and storage tanks. Assuming an annual average rainfall typical to Naviti Island, the system can collect tens of thousands of liters of freshwater annually, supporting the community’s needs especially during the dry season.

**System Inputs:** Solar radiation and rainwater.

**System Outputs:** Electricity for residential, communal, and educational uses; freshwater for drinking, cooking, and cleaning.

The choice of technology emphasizes modularity, resilience to cyclonic events, and ease of maintenance. All components are chosen for their proven durability in marine island environments and for compatibility with low-maintenance operational models, ensuring sustainability and replicability.

### **3. Prototyping and Pilot Implementation Statement**

Our approach to prototyping begins with the development of a scaled-down module of one of the community structures, including the integrated photovoltaic system and rainwater harvesting components. This prototype will serve as a testing ground for materials, structural performance under local climate conditions, and the integration of energy and water systems. It will also provide an opportunity for hands-on feedback from the Marou community.

The prototyping phase will be conducted in close collaboration with local craftspeople, builders, and youth groups, ensuring both knowledge exchange and capacity building from the very beginning. Workshops will be organized where community members are invited to co-create elements of the structure using bamboo, timber, and other indigenous materials, blending traditional techniques with new sustainable technologies.

Following the successful testing and refinement of the prototype, we will move toward full-scale pilot implementation. The modular nature of the design facilitates a phased construction process that can grow according to available resources and evolving needs.

During implementation, we will partner with local stakeholders, including the Village Council and schools, to coordinate logistics and to ensure that the project aligns with cultural expectations and environmental sensitivities. A community liaison team will be formed to maintain communication between the design team and village residents, and to support decision-making throughout the construction process.

We envision the pilot site becoming a center for training and innovation in sustainable architecture and renewable energy systems for the Yasawa Islands and beyond. The collaborative, participatory nature of the project will foster a strong sense of local ownership, helping to ensure long-term success and replicability in other island communities.

### **4. Operations and Maintenance Statement**

Our design is guided by the principle that long-term success relies not only on technical resilience, but also on community engagement and ownership. To this end, we have prioritized simple, low-maintenance systems and materials that are familiar or easily learnable by local residents.

Operation of the solar energy and water systems will be supported by a dedicated local team trained during the pilot implementation phase. We will organize a series of capacity-building workshops in partnership with technical experts and educators, equipping community members with the skills needed to monitor and maintain the photovoltaic system, battery storage units, and water harvesting infrastructure.

The modular design enables easy access to key components for maintenance, and standardized parts will be used wherever possible to simplify repairs and replacements. A maintenance handbook, co-created with the Marou community in both English and Fijian, will serve as a practical and culturally appropriate guide for everyday use and troubleshooting.

We propose the formation of a Community Operations Committee, including representatives from different age groups and professions within the village. This committee will oversee regular checks, coordinate with external technical support if needed, and manage a small maintenance fund supported through revenue-generating activities hosted at the site (such as workshops, performances, or eco-tourism visits).

Ongoing use of the space for community events will encourage continuous care and connection to the installation. The communal kitchen, library, and performance stage will serve as active, shared spaces that promote stewardship. In times of severe weather, the site will double as a safe refuge thanks to its storm-resilient design.

By embedding maintenance and operations within the fabric of daily life and social organization, the installation becomes more than infrastructure—it becomes a living part of Marou’s future.

### **5. Environmental Impact Assessment**

Our project is designed to harmonize with the natural landscape and minimize any ecological disruption. The proposed lake, formed by carefully damming an existing stream at the site’s natural low point, takes advantage of existing topography where water already collects. This helps mitigate flood risk and creates a new microhabitat for local biodiversity, including aquatic life and bird species.

All materials used in the installation are locally sourced, biodegradable, or recyclable. Timber and bamboo will be harvested responsibly, with an emphasis on species that regenerate quickly and are non-invasive. No imported living materials or foreign species will be introduced to the site, in full compliance with biosecurity standards of the Yasawa Islands.

Construction processes will avoid any activities that could cause soil erosion or disrupt stormwater channels. All foundations will be light-touch and removable, ensuring that the land can be restored in the future if needed. Areas of vegetation that are cleared will be replanted with native species, guided by local ecological knowledge.

The water systems are designed to improve resilience to both drought and flooding, without drawing from underground aquifers or causing any additional runoff into the ocean. Rainwater harvesting, natural filtration, and slow-release irrigation methods will support healthy soil moisture levels and help reduce erosion.

To protect wildlife and maintain ecological balance, no artificial lighting will be used in sensitive natural zones, and all communal lighting will be solar-powered, shielded, and motion-activated to minimize light pollution.

A long-term environmental monitoring program will be developed in partnership with local schools and youth groups, encouraging the next generation to observe and learn about the impacts of climate-adaptive infrastructure. This participatory approach ensures transparency, accountability, and environmental stewardship that is rooted in the community.

Ultimately, the project aims not only to avoid harm, but to restore and enhance the local environment—offering a replicable model for integrated, regenerative design in vulnerable island ecosystems.