**Voivoi Future Narrative**

    1. Concept Narrative

\* Discuss materials, concept, visitor and community experience, co-benefits, shared land uses, and any other important aspects of your design.

Traditionally, weaving and crafting are a women's tradition in Fiji. Our proposal designs to preserve this heritage of Fijian crafting technique indigenous to the local Fijian culture, celebrate the delicacy of the traditional craftsmanship, and invite the Marou community to explore a future where the tradition interacts with contemporary technologies.

The process starts by initiating genuine care for the material source - palm tree species such as Cocos nucifera (Common coconut palm), Pritchardia pacifica (Fiji fan palm), and Pandanus tectorius (Screw pines or Voivoi in Fijian). The construction and maintenance of the prototype will become a manifesto of a sustainable material flow chain proposed as a way to encourage palm tree species conservation efforts in Marou and Fiji in the future.

We propose the prototype as a system of networks with three major programmed sites within and near the site boundaries. It includes a conservation/nursery site dedicated to nurturing palm tree species, a flexibly programmed and deconstructable, deployable modular-based pavilion land art that is co-created and built by both the community and the designers, and a series of landscape designs that enhance environmental stewardship and provide programs for local outdoor activities.

Specifically, the programs include a nursery, a space to store and dry harvested leaves, a place for the community to co-weave, a place to showcase crafts, a place to hold art markets, a space for the youth of Marou to participate in crafting lessons, a to celebrate festivals, a playground for kids to learn about material reuse while exploring nature, a place to meditate, an open ground for sports games and a shared community garden.

The modular land art consists of two structural systems: core supporting, foldable, and fog-collecting indigenous bamboo (or local material alike, such as trunk material from Voivoi species) structures and solar energy-collecting, palm leaves, and bamboo stripes weaved roof. The roof has silicon solar cells "weaved" into the surface, collecting solar energy and generating electricity. During wet seasons, water will slope down the roof surface into surrounding bioswales for filtration, water storage underground, and groundwater recharge. During dry seasons, the fog collector mesh built into the foldable structure will condense water from the air and collect it at the bottom of a well-like space. The underground water tanks are to have options either to be stand-alone tanks that will require the community to collect water on-site, or be developed into a larger infrastructure underground in the future that sends stored water to existing water tanks used by the community or directly to households.

The prototype is designed to prepare for future climate change. It is expected that the future climate of the area will become more extreme with drier conditions and wetter conditions, hence more heat on open ground, drought seasons, and more areas susceptible to flash floods and seasonal flooding. The project is designed with the ability to withstand strong winds, not fight extreme cyclones, be able to be deconstructed, and with a landscape system that collects, guides, filters, and mitigates excess flooding.

    2. Technical Narrative

    \* What technologies does your design incorporate? Why did you choose them?

    \* How much energy and water does your installation generate each year?

    \* What are the system inputs? What are the system outputs?

The project integrates both high-tech and low-tech solutions to deliver sustainable energy and water generation while respecting the local vernacular architecture. The roof design combines photovoltaic (PV) solar technology with traditional palm weaving techniques, creating a lightweight, modular, and repairable surface. Instead of conventional rigid, glass-covered panels, we use standard silicon solar cells (200mm x 200mm) embedded into palm-weaved surfaces via specially designed bounding frames. This innovation allows for a soft-hanging structure that adapts to the curved geometry of the pavilion—ranging from near-vertical to near-horizontal orientations—without compromising efficiency. The result is a system that is both culturally resonant and technically advanced.

The pavilion employs 1346 m² of active PV surface, producing approximately 372,000 kWh of electricity per year, far exceeding the program requirement of 75 kW. In fact, only three of the seven constructed modules are needed to meet this demand, showcasing the flexibility and scalability of the design. This overcapacity demonstrates the potential for expanded energy-related functions, such as EV charging, community cooling, or storage integration.

    Our system inputs are solar irradiance (averaging 5.5 kWh/m²/day in Fiji) and air moisture. The PV system captures solar energy, with a panel efficiency of 18% and a performance ratio of 0.85. Adjusting for curved installation and orientation, the system generates about 1019 kWh/day, translating to the annual figure above.

    For water, the design includes two collection methods. First, the main structural elements double as fog catchers, with 392 m² of mesh surface extracting moisture from humid air. This system harvests between 33,600 and 151,200 liters annually, depending on atmospheric conditions. Second, the roof’s curvilinear form channels rainwater toward the pavilion’s perimeter, where it is filtered through surrounding biowales and stored in underground tanks. This method yields approximately 6.48 million liters per year, supporting non-potable uses such as irrigation, cleaning, or greywater systems.

    The system outputs include clean electricity for lighting, ventilation, and device charging, and stored water for daily community or event use. The installation demonstrates how high-yield systems can emerge from low-cost, locally maintainable construction techniques. By embedding renewable technologies into the cultural and environmental context, the pavilion serves not only as an energy node but also as a prototype for adaptable, self-sufficient infrastructure across Pacific island communities.

The pavilion is a responsive fusion of renewable energy generation, sustainable water harvesting, and cultural integration, meeting and exceeding program needs while offering a replicable and locally empowering design.

    3. Prototyping and Pilot Implementation Statement

\* How will your team approach the prototyping process and full-scale pilot implementation process? How will you collaborate with the local community in both of those efforts?

In approaching the prototyping process, the construction of the prototype will become a collaboration with local stakeholders, an empowerment process of local craftsmanship, and an acknowledgment and respect for local construction methods. During the process of prefabrication, nursery establishment, material preparation and crafting, we wish to use this pilot and future prototyping implementations at other sites as an incentive to create local employment opportunities, community strengthening, and education efforts for Fijians who have the local knowledge to perform the tasks or are willing to learn and master the tasks.

The on-site nursery for the palm tree species establishment and environmental analysis of the site’s existing soil condition can start simultaneously. We plan to prefabricate the bamboo core pavilion structures near the material source, not necessarily in Marou. We primarily consider the bamboo species Schizostachyum glaucifolium, locally known as bitu dina, to be used in the core pavilion structures. The prefabricated structures will be folded, packed, and transported to Marou by boat (size b: 4x14m). Once transported onto the pilot site in Marou, the structures can expand and be prepared for installation.

In the meantime, locally recruited members will harvest leaves from selected existing palm tree species and dry them to prepare for crafting while other members establish nurseries for tree planting and maintenance in Marou. The initial landscape work can start while the leaves dry. The project is designed to work with existing topography to minimize cut and fill. As the foundation layout and positioning of the pavilion finishes, skilled community members will be recruited to start testing pre-designed weaving patterns and work with integrating the solar modules. The entire prototyping process will not only engage with recruited skilled individuals but also open to a spectrum of Marou village members, children, and students from Yasawa High School to engage in the process by helping test weaving pattern options and creating small patches of arts weaved into the roof. The process will become both an educational opportunity and a playful exploration task for the youth and elderly of the community.

Depending on local needs, the prototype can start with three modules that meet the proposed requirements and also fulfill programmatic functions. The modules are designed to have different combinations and arrangements by connecting individual modules to create a larger project. The results of these options will depend on practical terms, energy and space, and aesthetic preferences of the people of Marou and future communities. Due to the adaptability nature of our proposed system, these options can be installed at other future sites in Marou or other islands of Fiji, with each option coupling a local nursery, water treatment strategies, and landscaping.

    4. Operations and Maintenance Statement

\* How will your design be operated and maintained during its life? How will the local community contribute to operations and maintenance?

The natural materials we proposed to use in the project are preferably conditioned beforehand to increase their structural ability and enhance their properties in preparation for natural wear from the environment. The project is also designed and expects some materials, such as the palm leaves fabric to be worn through time as we want to acknowledge this natural material cycle instead of building against this nature.

We expect especially the weaved roof fabric to be maintained periodically by a team formed by recruited community members. The roof surface is composed of smaller, panelized patches of smaller areas of fabric separated by the radial grid system. Each patch of surface is designed to be able to be taken down and maintained over time. Due to the weaving nature of the surfaces, each patch also allows a smaller area of repair by trimming, cutting, patching, and replacing worn-out surface areas, just like treating a piece of garment. This repairing becomes an opportunity to test material and weaving pattern longevity and in the case of having patchwork to do to the surface, the maintenance team will arrange sessions of community activities that invite interested youth or other individuals for chances to design their artwork or patchwork.

Over time, we expect the roof surface to evolve into a “patchwork” collective masterpiece. The roof becomes a canvas that is “painted” and “crafted” by different community members, genders, ages, personalities, and generations.

In facing extreme environmental hazards, the project is designed to be able to deconstruct and preserve the materials from immediate risks. The roof will be deconstructed into smaller patch segments and will be able to be rolled up or stored in a safer condition to shield it from hazards. The bamboo structures will also be able to collapse to a smaller volume and be stored away. If the materials inevitably get destroyed during this process, the maintenance team will need to re-initiate the prefabrication, harvest, and weaving process, which builds into the designed renewable material cycle of promoting more effort in taking care of palm tree species growth.

    5. Environmental Impact Assessment

    \* What effects might your installation have on natural ecosystems? What steps can be taken to mitigate any foreseeable issues?

    The installation serves as a land art punctuation in Marou that aims to initiate a large-scale conservation effort for palm tree species, especially the indigenous palm tree species Pandanus tectorius (Screw pines or Voivoi in Fijian) that are culturally and ecologically significant to the Marou and Fiji context. Environmentally, the cover of palm tree species on a climate zone like the island of Marou and Fiji as a nation helps mitigate consistent environmental risks to human and wildlife safety. For example, the coverage provides a vast area of shade that mitigates the micro-climate of the area, provides food for both humans and wildlife and shelter for species such as mammals and reptiles. Due to their physical properties, they can withstand strong winds and tolerate droughts. The planting of palm tree species will also stabilize the soil in the fringe mountainous regions next to the site. This effort will reduce future risk of mudslides that will directly become a risk for the village. The material use and cycle of maintenance of the pavilion and landscape design both are part of the material cycle that sustains and promotes the conservation effort of the species.

    In terms of specific landscape design strategies next to the modular land art, bioswales and programmed landscapes will serve as a local sponge, increasing the area's resiliency to increasing future flood events. They collect and filter stormwater runoff and alleviate flooding by serving as a buffer between the higher-elevation mountainous area that hosts the upper segment of the stream and the Marou village at a lower elevation. The amended landscape surface will be strengthened by plants' roots which help with erosion control. Plant species selection will need to be carefully discussed with local communities for native species options and to make sure they support microclimate-dependent biodiversity.

    For bioswale plant selections, our initial assessment is to provide native grasses, sedges, rushes, and herbaceous perennials. The specific list will need to be determined after analyzing the existing soil and future moisture conditions of the site. Our projected list of species includes native gahnia (sawsedge, saw-sedge) species that tolerate both drought and wet seasons. We will need to collaborate and research with local nurseries and experts for specific recommendations based on our site and future prototypical sites. The plants will help slow water flow, filter pollutants, offer visual aesthetics for the Marou community, and provide further habitat for native wildlife. Together with the conservation effort of palm tree species, the project emphasizes the importance of landscape design at both small and large scales to create a codependent and diverse habitat for both the village of Marou, future villages, and different ecosystems of carefully intervened meadows and palm tree forests.