C40 CITIES



C40 Jakarta | Onrust Archaeological Museum & Islands

THE SLOW SUBMERSION

A framework trasition for a sinking heritage

Presentation of the Project

Introduction

Four Islands with Layered Histories

Our project site is a group of four islands: Bidadari, Onrust, Cipir, and Kelor. These islands are special because they have many layers of history across centuries

The historical remains are found across the four islands, making the whole area a rich and valuable heritage site. While Onrust Island already has a museum, the presence of multiple historical layers across centuries shows that the entire island cluster has strong potential to be developed further.

The Inevitable Sink

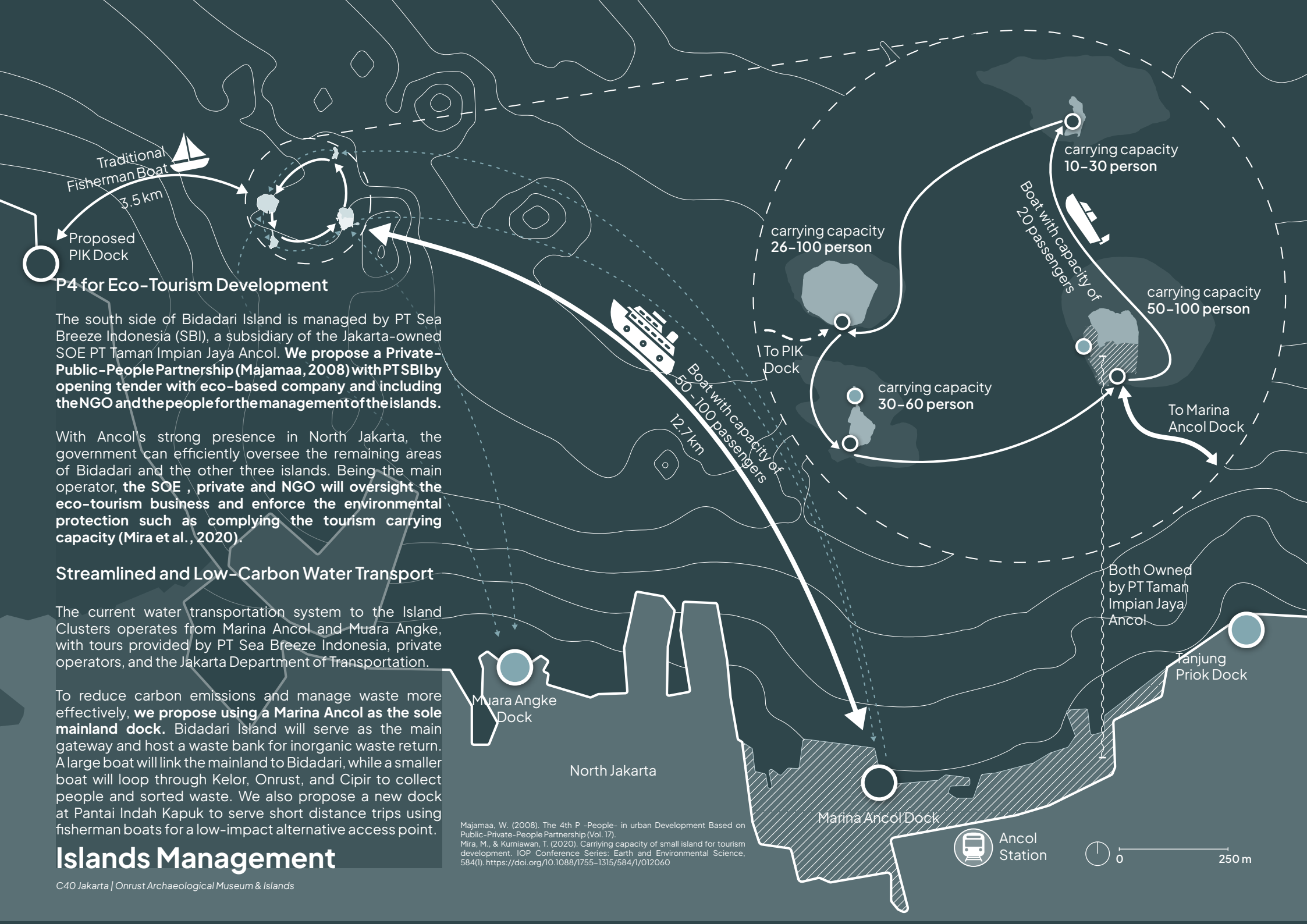
The island cluster is very low-lying, making it highly vulnerable to sea level rise. In fact, if the sea level rises by 18 meters, these islands would be completely submerged. Based on regional satellite data, the sea level in this area is currently rising at a rate of about 6 to 8 millimeters per year. However, this rise is not expected to stay constant. Due to global warming, scientists predict that sea level rise will accelerate over time. For example, if we start with 8 mm per year and assume that the rate increases by 0.2 mm each year, we can estimate when certain critical levels will be reached.

This simulation shows that even with a moderate acceleration, the long-term future of the islands is at risk. These projections highlight the importance of starting early resilience and preservation efforts to protect the unique heritage and ecosystem of the island cluster.



Projected Sea Level Rise from 2025





P4 for Eco-Tourism Development

The south side of Bidadari Island is managed by PT Sea Breeze Indonesia (SBI), a subsidiary of the Jakarta-owned SOE PT Taman Impian Jaya Ancol. **We propose a Private-Public-People Partnership (Majamaa, 2008) with PT SBI by opening tender with eco-based company and including the NGO and the people for the management of the islands.**

With Ancol's strong presence in North Jakarta, the government can efficiently oversee the remaining areas of Bidadari and the other three islands. Being the main operator, **the SOE , private and NGO will oversight the eco-tourism business and enforce the environmental protection such as complying the tourism carrying capacity (Mira et al., 2020).**

Streamlined and Low-Carbon Water Transport

The current water transportation system to the Island Clusters operates from Marina Ancol and Muara Angke, with tours provided by PT Sea Breeze Indonesia, private operators, and the Jakarta Department of Transportation.

To reduce carbon emissions and manage waste more effectively, **we propose using a Marina Ancol as the sole mainland dock.** Bidadari Island will serve as the main gateway and host a waste bank for inorganic waste return. A large boat will link the mainland to Bidadari, while a smaller boat will loop through Kelor, Onrust, and Cipir to collect people and sorted waste. We also propose a new dock at Pantai Indah Kapuk to serve short distance trips using fisherman boats for a low-impact alternative access point.

Islands Management

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Majamaa, W. (2008). The 4th P -People- in urban Development Based on Public-Private-People Partnership (Vol. 17).
Mira, M., & Kurniawan, T. (2020). Carriying capacity of small island for tourism development. IOP Conference Series: Earth and Environmental Science, 584(1). https://doi.org/10.1088/1755-1315/584/1/012060

Vision

Built to remember, ready to let go

We are committed to ensuring the longevity of this island cluster by safeguarding its rich cultural heritage and sharing its historical value with a broader public. Yet we must also face the reality that, **in the face of rising sea levels, this heritage may one day be lost beneath the water.**

When that moment arrives, we recognize that conventional preservation methods may no longer be viable. **We ensure that the site's transition is guided by ecological responsibility and long-term foresight,** allowing the islands to decline in a way that is both gentle and meaningful.

To execute this, we have 3 vision:

1. Preservation and Resilience
We are committed to maintaining the current condition of the islands for as long as possible by strengthening the islands' resilience against environmental threats such as coastal erosion and rising sea levels.

2. Sustainable Eco-Tourism
We will promote eco-tourism that respects ongoing archaeological work and highlights the layered histories of the islands. We aim to foster public appreciation for the islands' significance, both cultural and ecological.

3. Adaptive Transition
Recognizing that long-term submergence is inevitable, we are proactively planning for a sustainable transition. We ensure that any future decline of the islands occurs thoughtfully, allowing nature to reclaim the space in a way that is beneficial.

We will expand the vision into strategies that will be implemented using practical actions.

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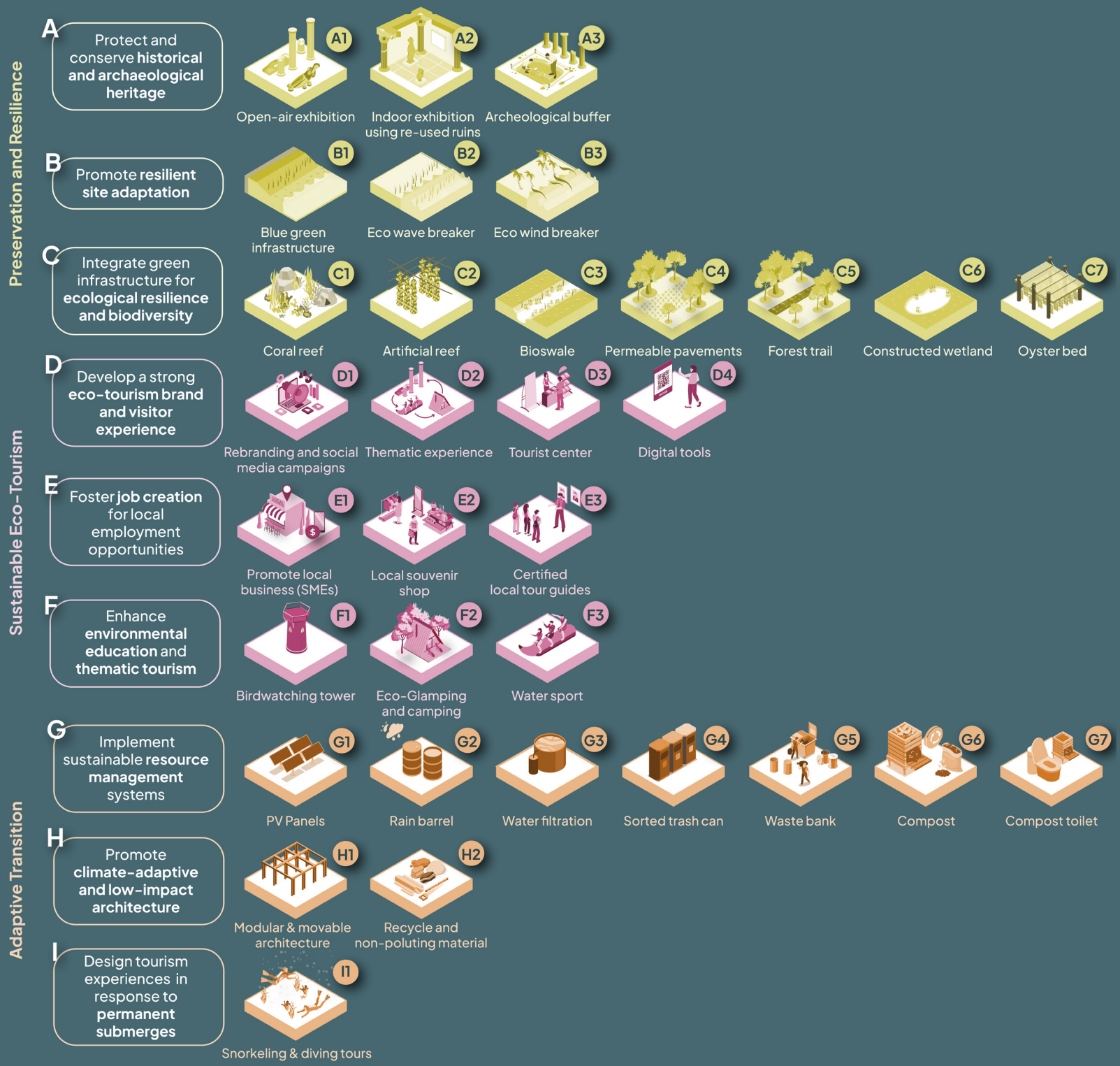


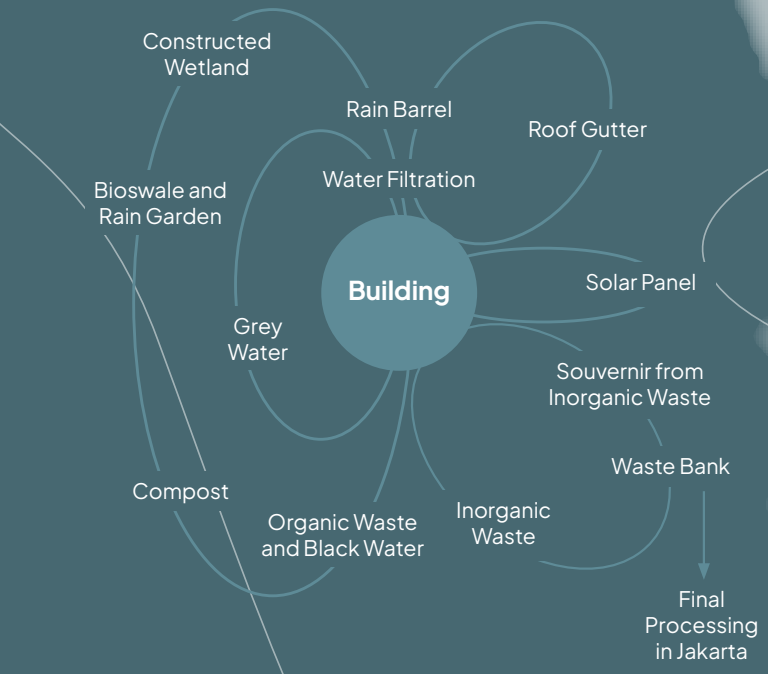
The Circular Islands

Circular Experience

Each island will have its own theme based on its unique characteristics and heritage. Through a designated tour route and cohesive storytelling, **these distinct islands will be unified under a shared tourism narrative** that celebrates their diversity while providing a seamless and enriching visitor experience.

Circular Utility

Since achieving complete self-sufficiency on small islands is challenging, this integrated utility strategy focuses on **minimizing waste, maximizing local water reuse, and generating renewable energy on-site.** By combining rainwater harvesting, solar energy production, and a circular waste management approach (with residual waste responsibly sent to Jakarta), the system significantly enhances the islands' sustainability and resilience.



0 — 125 m

Second Stop: Kelor Island

A strong impression with its striking ruins and raw, natural setting. With no modern structures, it highlights military heritage, making it one of the most unique and photogenic stops on the tour.

B1 B2 B3 C1 C2 D3 G4 G7



Boat with capacity of 20 passengers



A1 A2 A3 C3 C6 D3 E1 E2 G1 G7 H1

Third Stop: Onrust Island

An adventurous experience as the main historical attraction. Rich in colonial relics, the island features ongoing archaeological excavations, allowing visitors to witness history in the making.

First and Final Stop: Bidadari Island

A restful start or end to the journey, with cottages for overnight stays and the first bastion nestled in natural surrounding. Ideal for recharging or preparing for the trip.

A1 B1 C1 C2 C3 C5 C6 D3 F1 F2 G5





A1 B1 C3 C7 D3 E1 E2 F3 G1 G7 H1

Fourth Stop: Cipir Island

A relaxing and fun break with watersports, dining, and scenic ruins. With added amenities like gazebos and a gift shop, the island blends leisure with light heritage exploration.

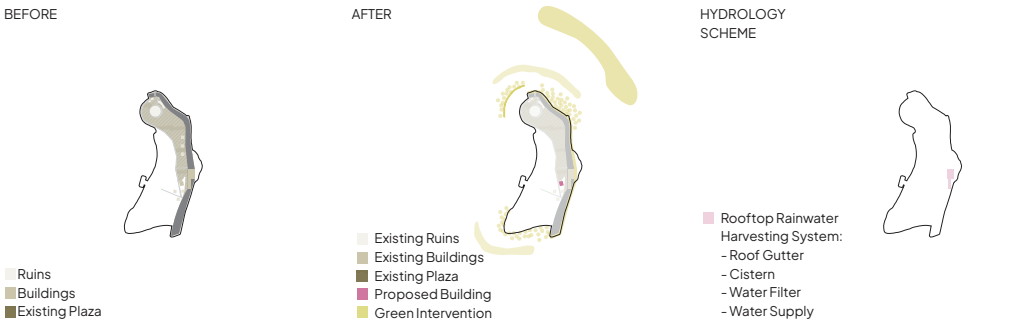
To Marina Ancol Dock

Boat with capacity of 50 - 100 passengers

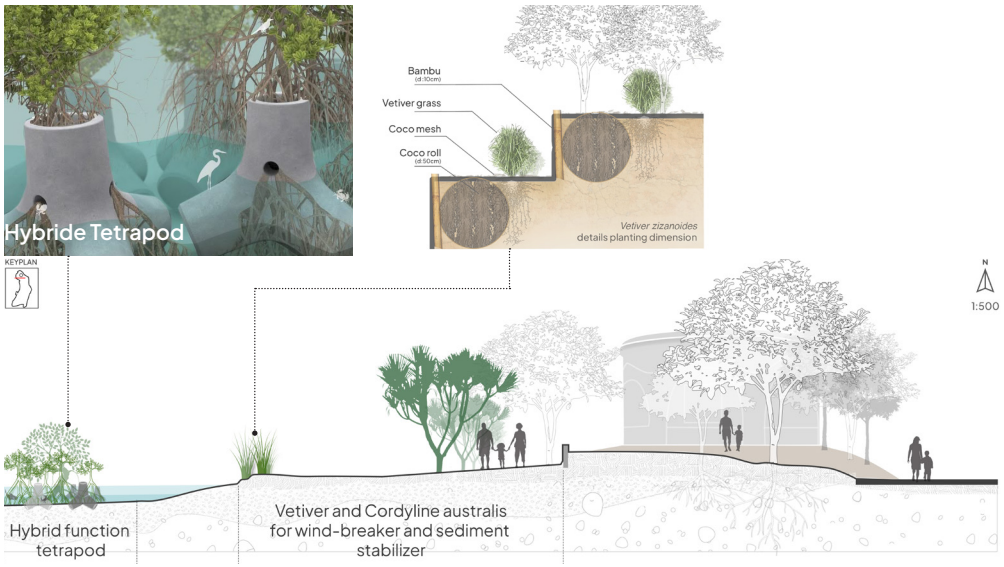
01.Kelor Island

Initial historical statement

Kelor Island is the smallest and most ecologically fragile among the nearby islands, located at the outer edge of the island cluster, making it highly exposed to wave action and erosion. Despite its size, it holds cultural significance due to the presence of the Martello tower ruins. To strengthen the island's resilience, a series of ecological interventions have been implemented.



Starting from the coastline, existing tetrapods provide a foundation for reducing wave energy and can be integrated with mangrove planting to enhance shoreline protection. Behind the mangroves, a vetiver belt helps stabilize the recently filled sand areas, while tree vegetation further inland acts as a wind-breaker and enriches the island's habitat. Offshore, artificial reef structures also serve as wave barriers and support a coral garden, increasing marine biodiversity. These layered strategies work together to preserve Kelor Island's ecological integrity and historical value.



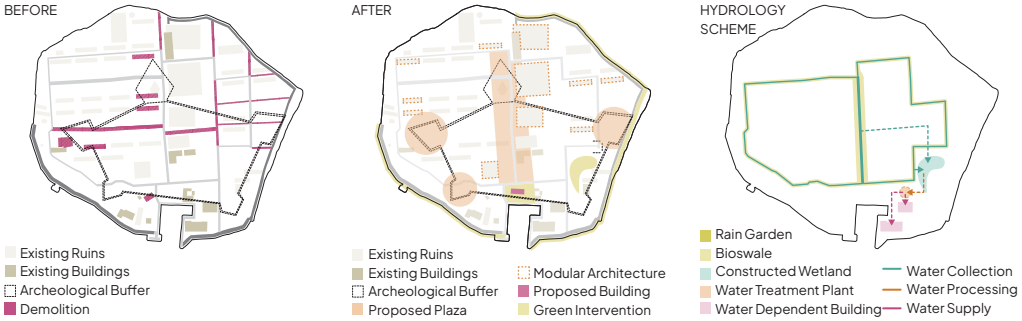


02. Onrust Island

Historical Open-air Museum

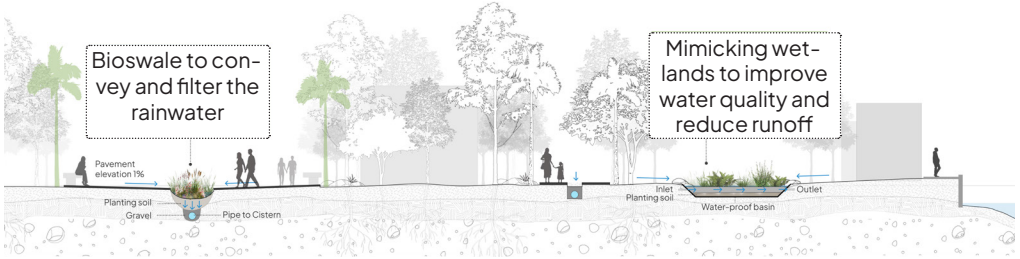
Onrust Island is deeply rooted in rich historical significance, with multi-layered archaeological artifact spanning from different centuries that are still actively being excavated. It is home to a historical museum, and together with its diverse ruins, it holds great potential to be transformed into an open air museum that integrates the existing heritage and the ongoing archaeological excavation process for a more immersive experience.

KEYPLAN



Modular structure is designed with flexibilities to hold the needs of outdoor exhibition spaces that can be placed in between the ruins, engaging the historical ruins as a part of the museum experiences. The center plaza make a clear axis for the visitor, connect all the ruins and act as the rain water catchment.







A1 Open-air Exhibition
A2 Indoor Exhibition
A3 Archaeological Buffer
C3 Bioswale
C6 Constructed Wetland
E1 Local Business (F&B)
E2 Local Souvenir Shop
D3 Tourist Center
G1 PV Panels
G7 Compost Toilet
H1 Modular Architecture


A2.Interactive Indoor Exhibition

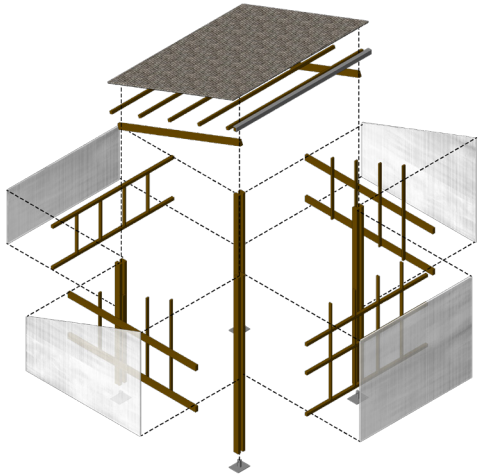

A3.Archaeological Buffer


C3.Bioswale Channel


C6.Constructed Wetland


Plaza seating area

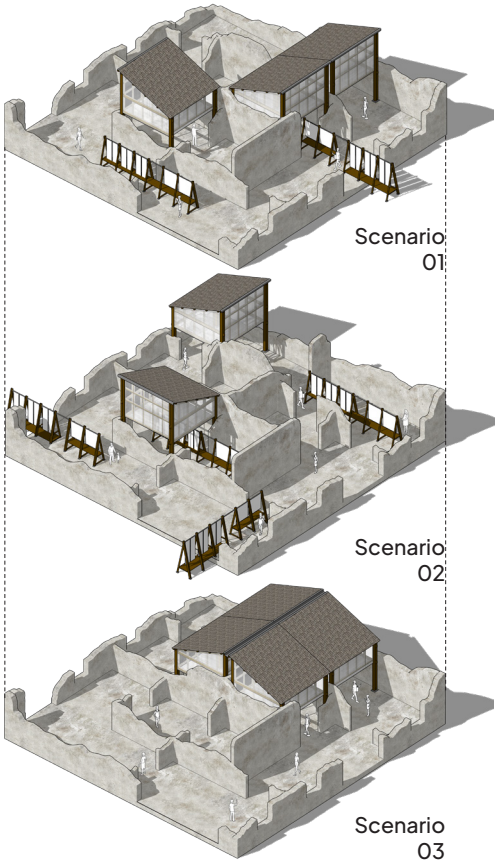
Modular Architecture: Enabling flexibilities in reusing the ruins







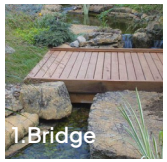
Using Merbau wood, the structure is designed to be modular to cater the flexibility of the museum exhibition. It use a knock-down joint system to enable the structure to be moveable and easily dismantled.





Center plaza: connecting the ruins, act as the main rain water catchment area

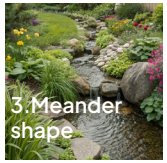




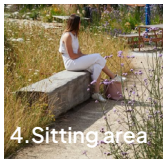
This element helps widen user movement without disrupting the bioswale's flow and also serves as a spot to pause, observe the water closely, and connect with the landscape.



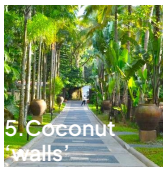
The selection of low-maintenance and non-invasive vegetation can enhance ecological value. Incorporating multiple shrub species can lead to better outcomes.



Mimicking the shape of a natural stream brings a sense of nature to the plaza while also helping to control rainwater flow, aided by strategically placed stones.



Besides serving as an evacuation point, the sitting area can also provide a spot to enjoy the stream after strolling around the island's historical sites.



The line of coconut trees not only serves as a tropical visual feature but also adds architectural value by creating a sense of enclosure and guiding visitors to the next point.

03. Cipir Island

Leisure and light heritage exploration

Cipir island holds some of the significant historical traces along with Onrust island. Therefore, outdoor exhibition areas with modular architecture is implemented, together with some leisure activities (such as water sport) that are also placed to embrace the visitor to have a relaxing experience as it is also the last journey in the historical museum area.



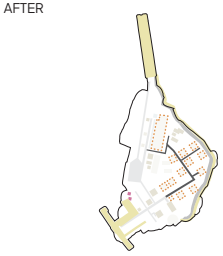
KEYPLAN

BEFORE



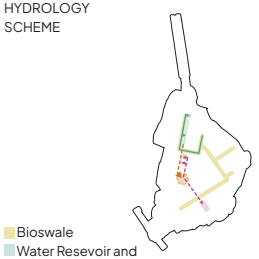
Existing Ruins
Existing Buildings
Existing Water Resevoir and Artesian Well

AFTER



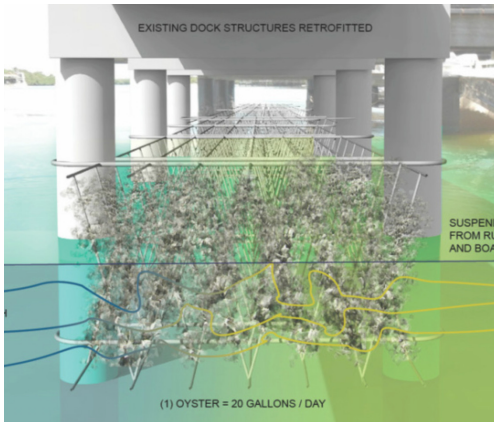
Proposed Path
Existing Ruins
Existing Buildings
Modular Architecture
Proposed Building
Green Intervention

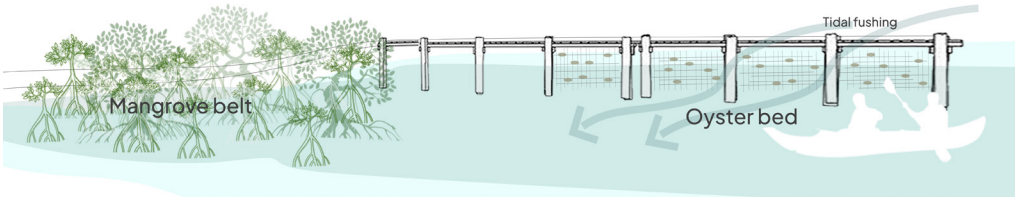
HYDROLOGY SCHEME



Bioswale
Water Resevoir and Artesian Well
Water Treatment Plant
Water Dependent Building
Water Collection
Water Processing
Water Supply

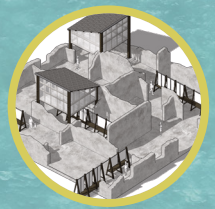
Integrating oyster beds beneath the decking structures offers a sustainable approach to both ecological enhancement and coastal protection. It could promote natural filtration, reduce wave energy, and encourage sediment accumulation, thus strengthening the shoreline's resilience. This design supports marine biodiversity and also aligns with nature-based solutions for erosion control. When combined with decking, the structure allows for public access and educational engagement while minimizing disturbance to the intertidal zone. By merging ecological function with recreational design, oyster beds beneath decking embrace the harmonious design that engage with coastal ecosystems.







A1 Open-air Exhibition
B1 Blue Green Infrastructure
C3 Bioswale
C7 Oyster Bed
D3 Tourist Center
E1 Local Business (F&B)
E2 Local Souvenir Shop
F3 Water Sport
G1 PV Panels
G7 Compost Toilet
H1 Modular Architecture



A1.Open-air Exhibition



C7.Oyster Bed



F3. Water Sport

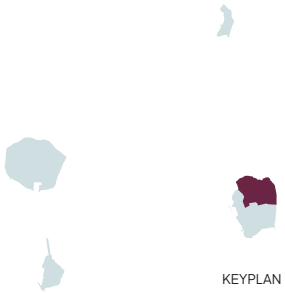


G1.PV Panels

04. Bidadari Island

Nature exploration

Bidadari Island features a central constructed wetland that functions to collect and purify rainwater, supporting sustainable water distribution across the island. Water flows into the wetland not only from rainfall but also through a bioswale system that runs along the main pathway. Located within a forested area and connected by nature trails, the wetland offers both ecological benefits and a space for visitors to engage with the landscape.





The island is divided into two zones, with the upper area owned by the government and the lower section managed by Ancol. While the wetland design is concentrated in the upper part, visitor access begins at the Ancol-owned entrance, creating a gradual transition from a more urban edge to a natural core. Enhancing this journey are the island's Martello buildings, preserved colonial-era structures that add historical depth and reinforce Bidadari's identity as a place where ecological design and cultural heritage come together.



C2.Artificial Reef



C3.Bioswale Channel



C5.Forest Trail



C6.Constructed Wetland



