

# **The link of mountains, seas and cities ——Yantian Seaside Boardwalk**

## **Project statement**

Yantian Seaside boardwalk is an important public space in Shenzhen' s "Mountain – Sea – City Integration" Plan, which is known as "the most beautiful coastal boardwalk" , and a significant link connecting rich blue and green resources in Yantian District. This project is built an open public corridor along the coastline to close the nature, while restoring the mountains, vegetation, and embankments damaged by storm surges, and guaranteeing the passage of biological migration. Through landscape design that conforms to nature, the boardwalk succeeds in connecting the separated urban space with the natural scenery, creating a charming and resilient coastal leisure coastline.

# Project narrative

Yantian, Shenzhen has a long and narrow strip-shaped geographical structure. The ridge zone, the urban zone, and the coastal zone are parallel to each other with insufficient connections. Citizens urgently need open public spaces to close to nature. The seaside boardwalk is the most important slow-traffic system in the coastal zone, but it lacks the connection with the urban zone and the ridge zone. It coincided with the damage of Typhoon Mangkhut, the only one slow-traffic system in the coastal zone was damaged, which caused worth influence to the tourism system of Yantian District.

In this situation, the government launched the reconstruction project of the seaside leisure system, which has completed and landed in 2020. The new leisure coastline is started from Guta Park of Zhongying Street in the west and ends at Beizaijiao in the east, length 19.5km. a variety of spots, including Seafood Street, Danjia Cultural Park, Yandunshan International Friendship Park, Dameisha, Xiaomeisha, etc., have realized the tour system, which connecting the main line with the branch line, and the big ring surrounding the small ring. In addition, the mountain-city-sea integration is built in this project, realizing the vertical connection from the mountain to the sea, and alleviating the separation problem of the mountain-city-sea in Yantian District.

The design of this project adheres to 4 major strategies: connecting and sharing, conform to nature, resilient and sustainable, and local characteristics, in order to provide Yantian residents with a more inclusive and active open space.

## 1. Connecting and sharing

From east to west, the project passes through a series of urban attractions, including Shatoujiao, Yantian Port, Yandun Mountain, Seafood Street, Dameisha, Xiaomeisha and Beizaijiao, connecting important development zone such as the Yantian Port Industrial Belt and Yantian Ancient Market, and gathering important transportation nodes like ports and bus hubs.

The whole system of the project is barrier-free, while improving the accessibility of the surrounding entrances and exits, promoting the seamless connection between the urban slow-traffic system and the public transportation system, in order to provide tourists with a smoother and more convenient slow-traffic experience through a complete wayfinding system. According to the characteristics of the venue and the needs of the crowd, multiple viewing platforms have been set up to increase the fun of the tour. The project consists of a 3-layer traffic system: the original carriageway, the newly built upper-level greenway and the lower-level coastal boardwalk.

Public service facilities such as post stations, libraries, toilets, corridors, and parking lots are added along the system for citizens and tourists. The design integrates the functions of buildings with the bay. Post stations adopt a single-story building as much as possible to reduce the artificial sense of volume and avoid affecting the natural landscape of coastline. Tourists can go up to the rooftop platform of the post stations to overlook the entire Meisha Bay, enjoy the blue sea and blue sky.

## 02. Conform to nature

The design is based on the basic principles of "respecting nature, conforming to nature, and low interference", and newly built two interwoven lines to meet the needs of different groups of people. The upper-level greenway goes deep into the mountains and forests, forming a park landscape belt for overlooking the sea and cycling in a natural environment. The lower-level boardwalk grows along the coast, facing the tide and waves.

In places where storm surges are directly hit and seawalls are severely damaged, boardwalk and seawalls are combined and built in an integrated manner. In the rocky steep places, the line selection of the reconstruction boardwalk is followed the natural law, considering that the waves are as high as 5-6 m, the boardwalk is arranged on the dry-wet dividing line of the coast to reduce the erosion of storm surges. In areas with gentle terrain and low surge height, the method of changing the boardwalk to a reef walk is adopted. When the water is low tide, visitors can directly pass the boardwalk, when the sea is high tide, the boardwalk is an resilient landscape that is allowed to be moderately submerged. Tourists are able to get close to nature most of the time by such kind of design, and it is also saved the amount of engineering to reduce excessive artificial interference on the coast.

## 03. Resilient and sustainable

In order to adapt to the typhoon, high humidity, and high salinity characteristics of the coastal area, innovative materials and methods are used in this project. The seaside boardwalk can withstand the typhoon which is happened once-in-a-century because of the safety and durability design.

The topography of the coast is fully considered in the design of boardwalk, the permeable structure is used to ensure the migration channel of organisms. The reef sections of this boardwalk is adopted a small foundation structure with planting ribs, occupying as little as possible of the original reef, to preserve the habitat of shellfish and other marine organisms. For bank slope protection, the 3D ecosystem is increased by planting greenery inside the lattice beams. The hydraulic structure of the project is based on the principles of hydrophilicity, ecology, and environmental protection, and fully considers the connection of mountain and sea biological passages, which has great value for the ecological connection of mountains and seas in Yantian. In addition, the utilize of steel grids ensures the lighting requirements for plant growth in the mountains and forests, and alleviates the impact of waves in the area that is easily affected by storm surge. The railings with independent modular design are equipped with photovoltaic panels to facilitate the sustainable use of energy and the long-term maintenance of the overall boardwalk.

The route selection design of the boardwalk retains the native trees on the site, taking into account the protection of native vegetation. Marine ecology and bird habitats are also be restoration in the project.

## 04. Local characteristics

The project commemorates the special significance of the typhoon "Mangosteen" to the site, deeply explores the native culture and characteristics to connect cultural landscape nodes. In addition, the culture of fisherman and the historical elements of the fishing village are preserved and reused in the project, forming a vibrant street with Seafood Street as the core in the project.

## Postscript

This project can reconnect the entire coastline as a whole, integrating the city, the mountain, the coast and life, and restores the ecology in such a narrow hinterland and high-density zone in Yantian Shenzhen, where people can share coastline as a new urban open space to relax their minds and enjoy nature. The project also promotes the development of different industries and regions, including ports, docks, streets, beaches and landscape spots, that can bring multiple benefits, to promote the long-term sustainable development of the city.



# Analysis of Shenzhen coastline

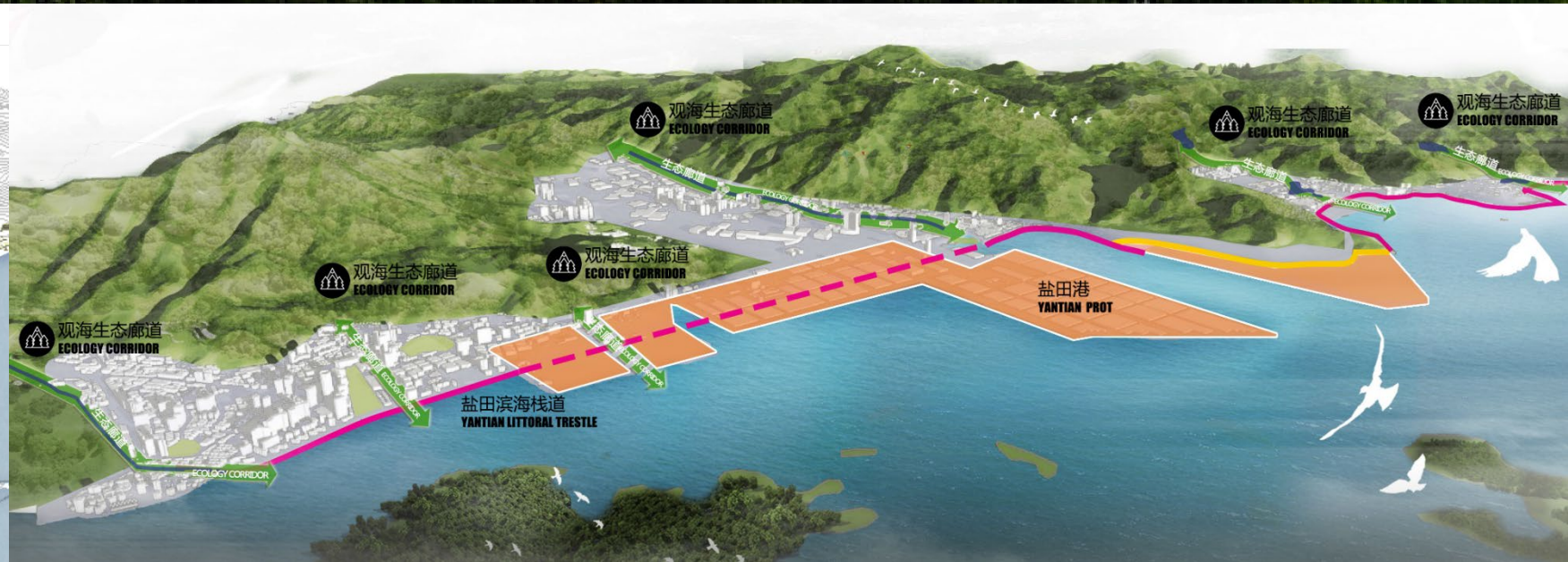
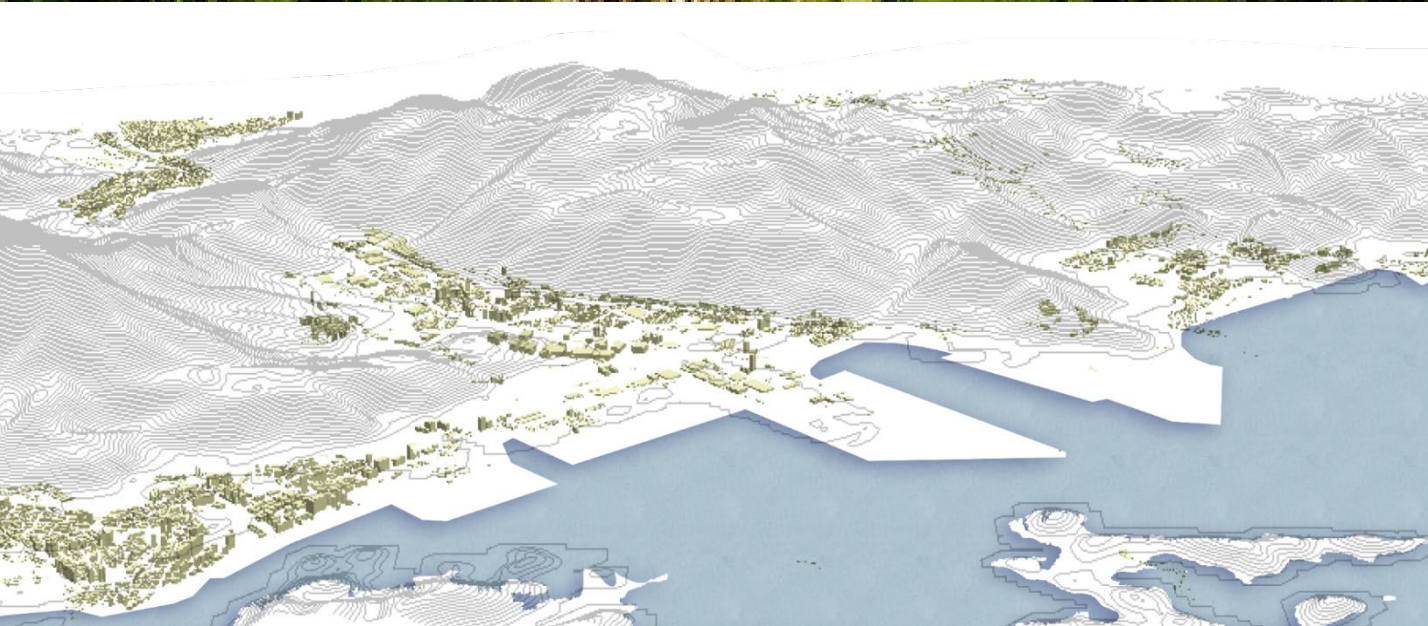
Shenzhen, is located on the southeast coast of China, with high-quality mountain and sea landscape resources. The coastline is 257 kilometers and has picturesque scenery, while it still faces the threat of Pacific typhoon storm surge.





# Analysis of blue and green resources in Yantian

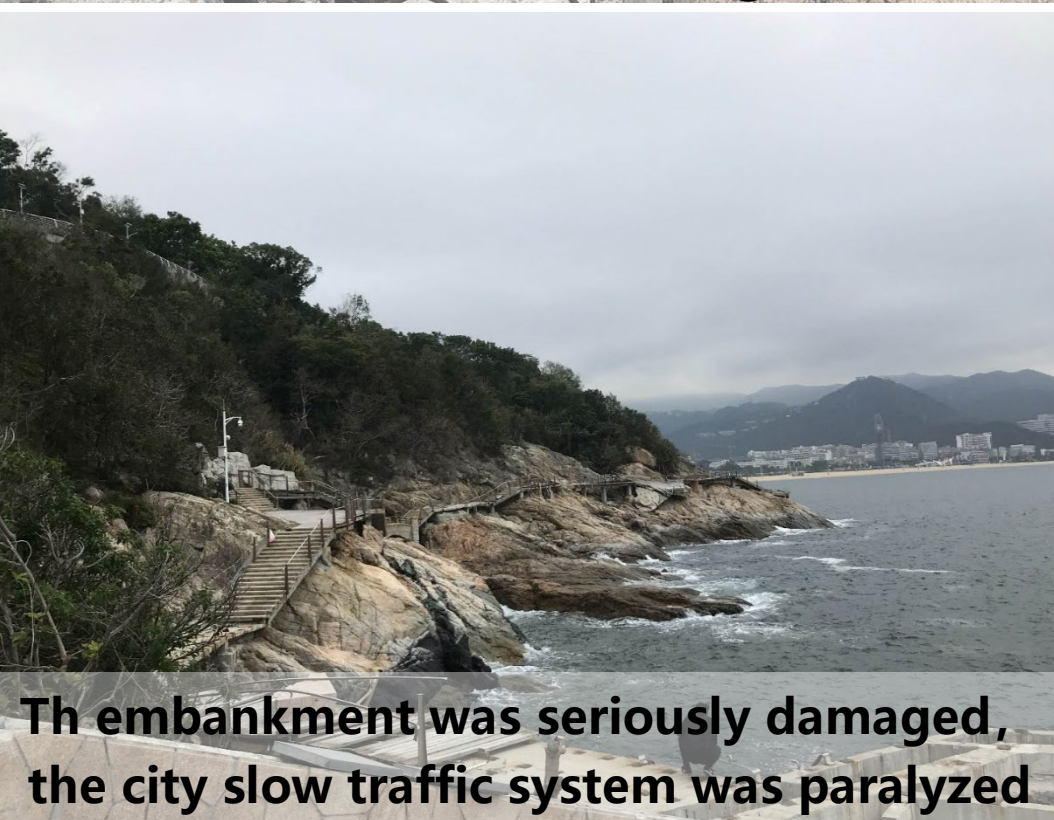
Yantian has abundant blue and green resources, including ports, coasts and beaches. It has huge port zone with small urban zone. These resources are linked together by a coastal walkway.





# Challenges

Because of the impact of typhoon, the original boardwalk has extremely destroyed, and the seawall has dilapidated, some of the commercial buildings along the coast were damaged as well.





# Masterplan

The total length of this walkway is 19.5 kilometers from the west to the east. There are two interwoven lines, Greenway and Coastal Boardwalk, in this project are designed. That is connected to Ancient Tower Park in the west, pass through the Port, Yandun Mountain, and Seafood Street to the east Beach Bay. This project enable the city, mountain and sea connect to each other.





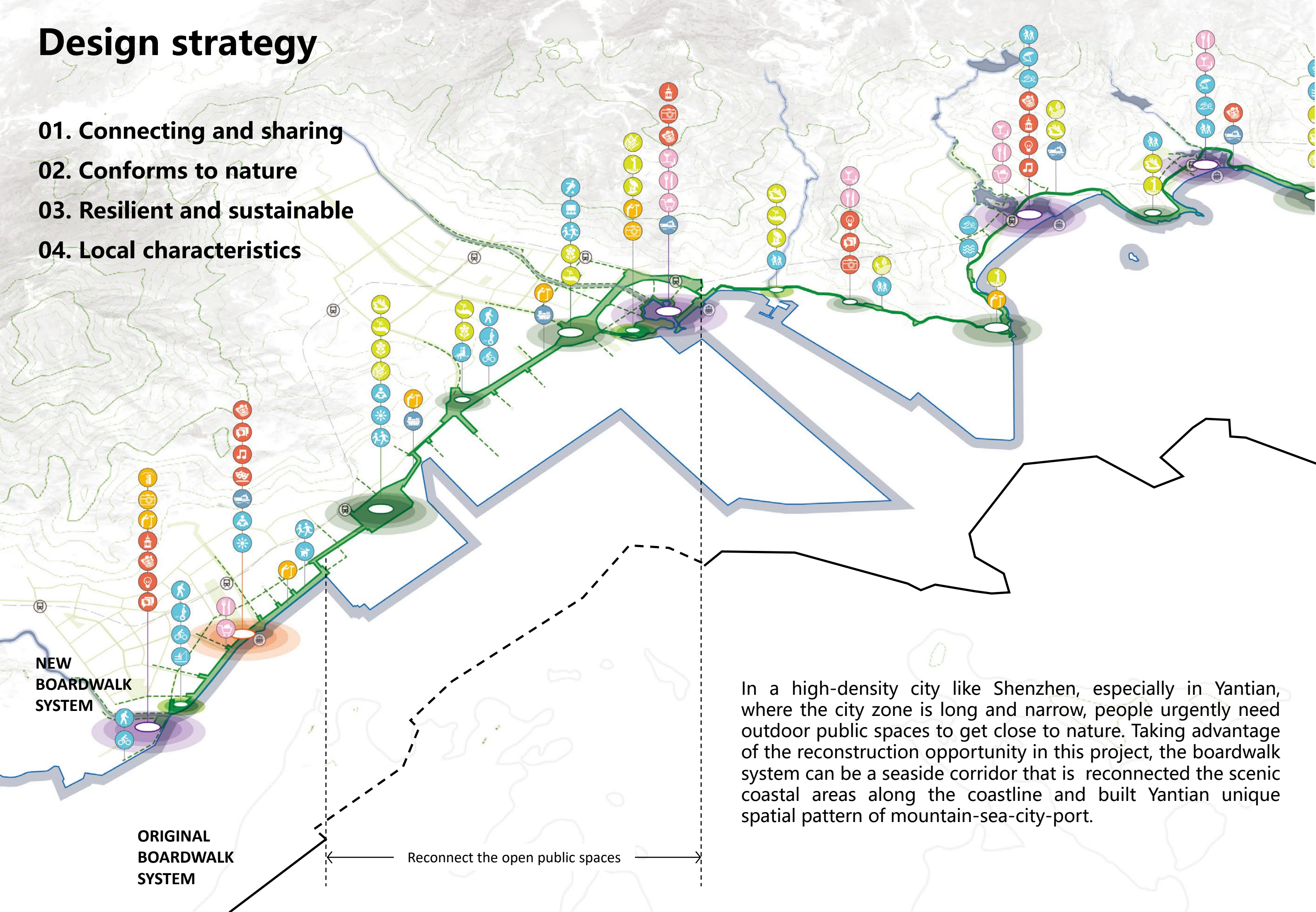
# Design strategy

01. Connecting and sharing

02. Conforms to nature

03. Resilient and sustainable

04. Local characteristics



NEW  
BOARDWALK  
SYSTEM

ORIGINAL  
BOARDWALK  
SYSTEM

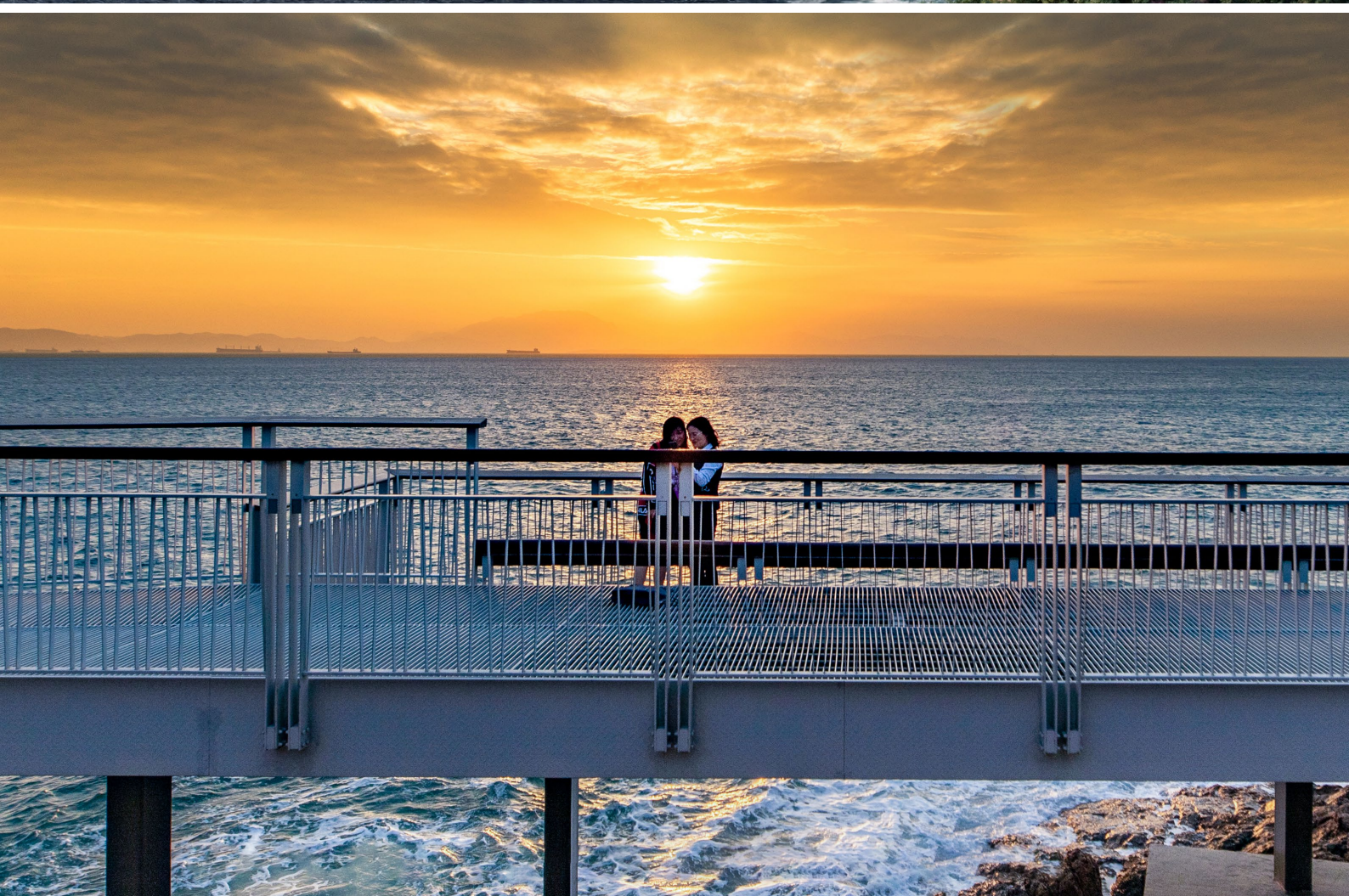
Reconnect the open public spaces

In a high-density city like Shenzhen, especially in Yantian, where the city zone is long and narrow, people urgently need outdoor public spaces to get close to nature. Taking advantage of the reconstruction opportunity in this project, the boardwalk system can be a seaside corridor that is reconnected the scenic coastal areas along the coastline and built Yantian unique spatial pattern of mountain-sea-city-port.



# 01. Connecting and sharing

From east to west, the project passes through a series of urban attractions, including Shatoujiao, Yantian Port, Yandun Mountain, Seafood Street, Dameisha, Xiaomeisha and Beizaijiao, connecting important development zone such as the Yantian Port Industrial Belt and Yantian Ancient Market, and gathering important transportation nodes like ports and bus hubs. This project is consisted of 3 layers of traffic system: the original carriageway, the newly built upper level greenway and the lower level coastal boardwalk.





# 01. Connecting and sharing



## Open public corridor

Some boardwalk sections is widened in this project, that is brought a vibrant coast and stimulated the seaside spaces. A large number of citizens and tourists come here to enjoy their leisure time, to eat, to drink, to bike and even just to seat.



# 01. Connecting and sharing

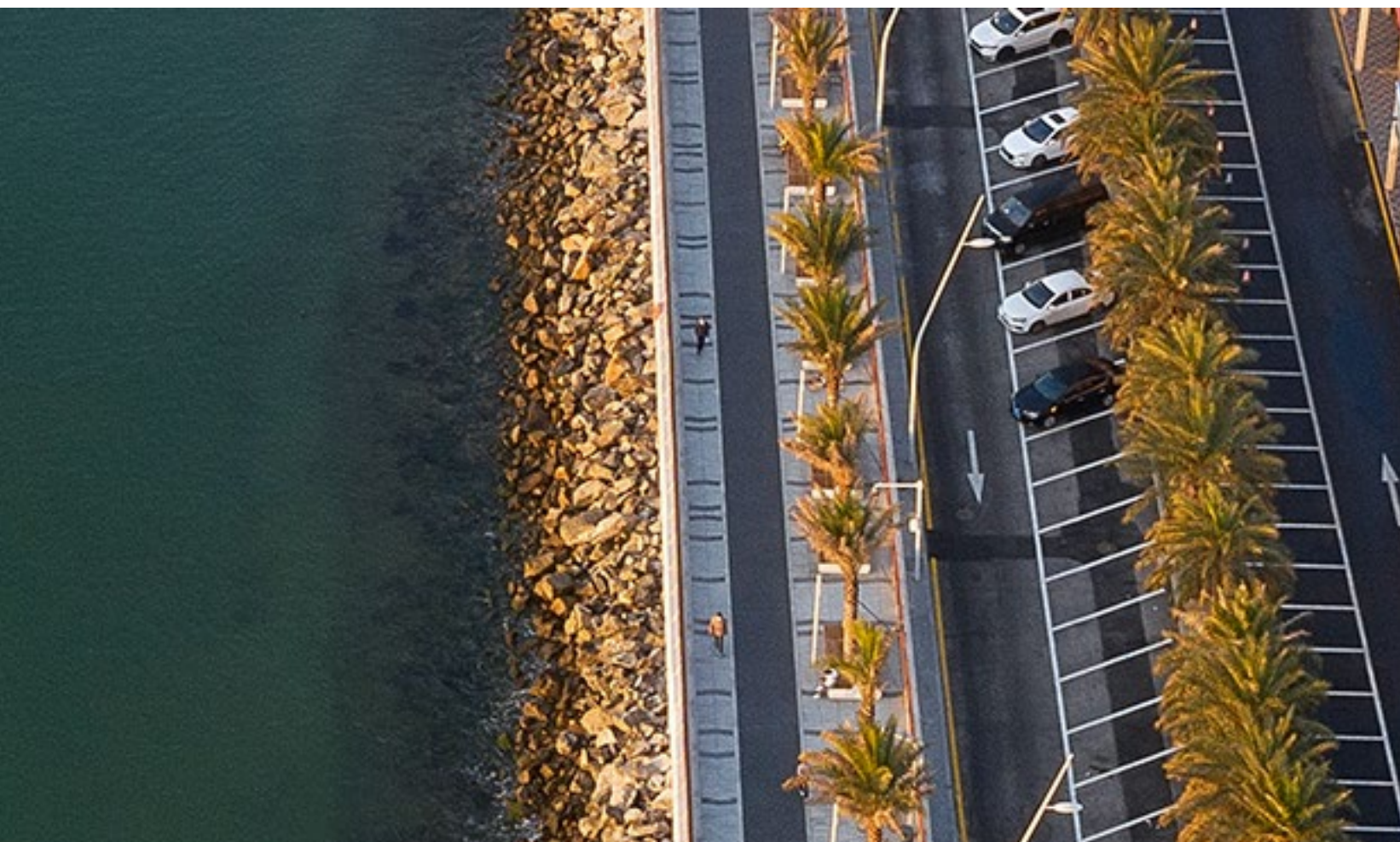


## Viewing platforms

Places with better views along the whole boardwalk are properly elevated and a viewing platform should be added, which not only reduces the impact on the original vegetation, but also provides better view and rest space.



# 01. Connecting and sharing



## Service facilities

public service facilities such as post stations, libraries, toilets, corridors, and parking lots are added along the trail for citizens and tourists.



# 01. Connecting and sharing

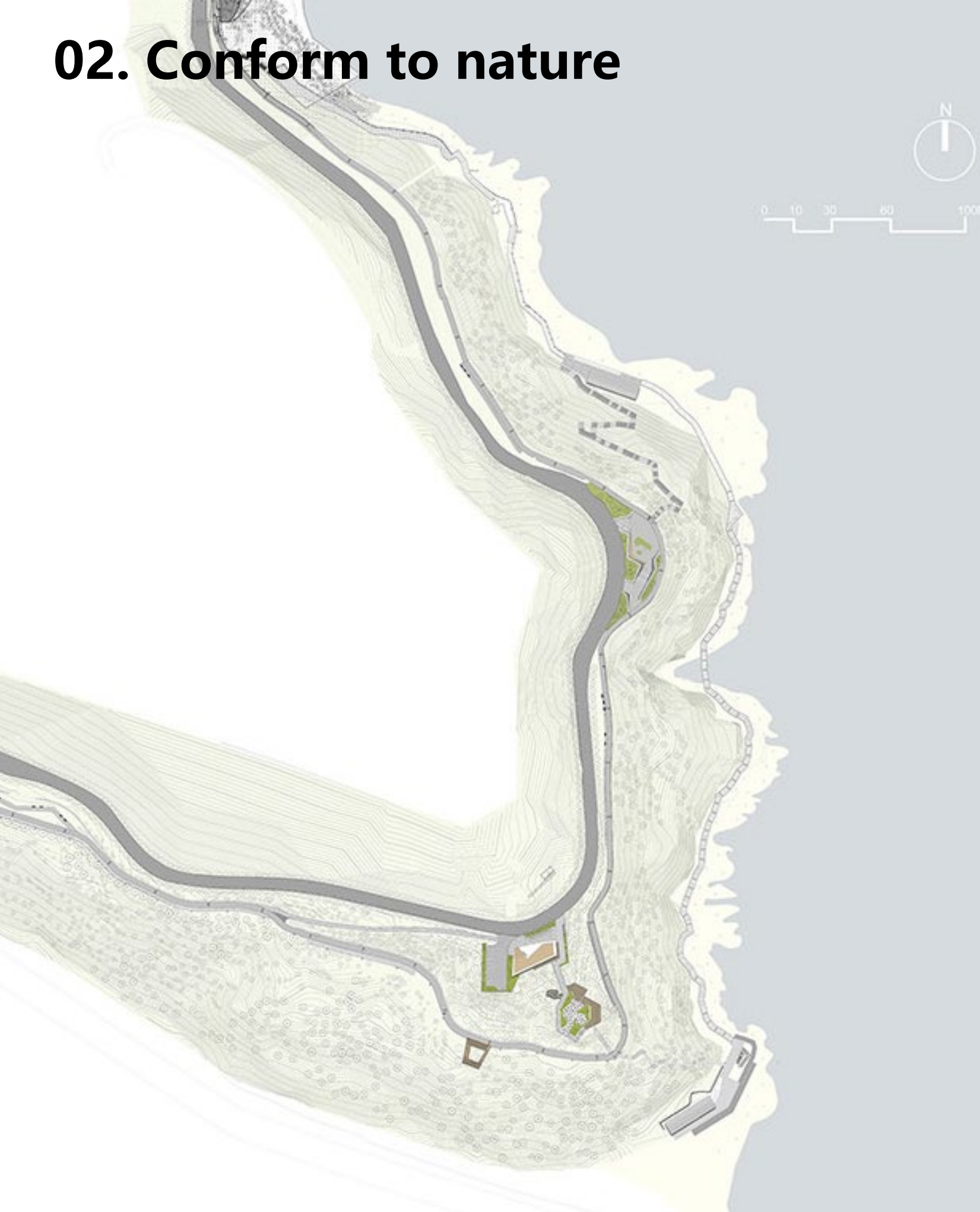


## Post stations

The design integrates the functions of buildings with the bay. Post stations adopt a single-story building as much as possible to reduce the artificial sense of volume and avoid affecting the natural landscape of coastline. Tourists can go up to the rooftop platform of the post stations to overlook the entire Meisha Bay, enjoy the blue sea and blue sky.



## 02. Conform to nature



Boardwalks and Vegetation were destroyed during the Typhoon Mangkhut in 2018. It gives a chance for planners and citizens to re-think the relation between the city and nature, construction and resilience.



**AFTER | February, 2021**

Dameisha West Boardwalk aims to restore an adaptive, eco-friendly walkway system in terms of conservation of memories the Super Typhoon Mangkhut.



### Interwoven lines

Upper-level greenway caters for bicycles and barrier-free access. The lower-level line near the seaside is a boardwalk with steps. The two lines are parallel and connected to each other to meet the use of diverse groups of people.



## 02. Conform to nature

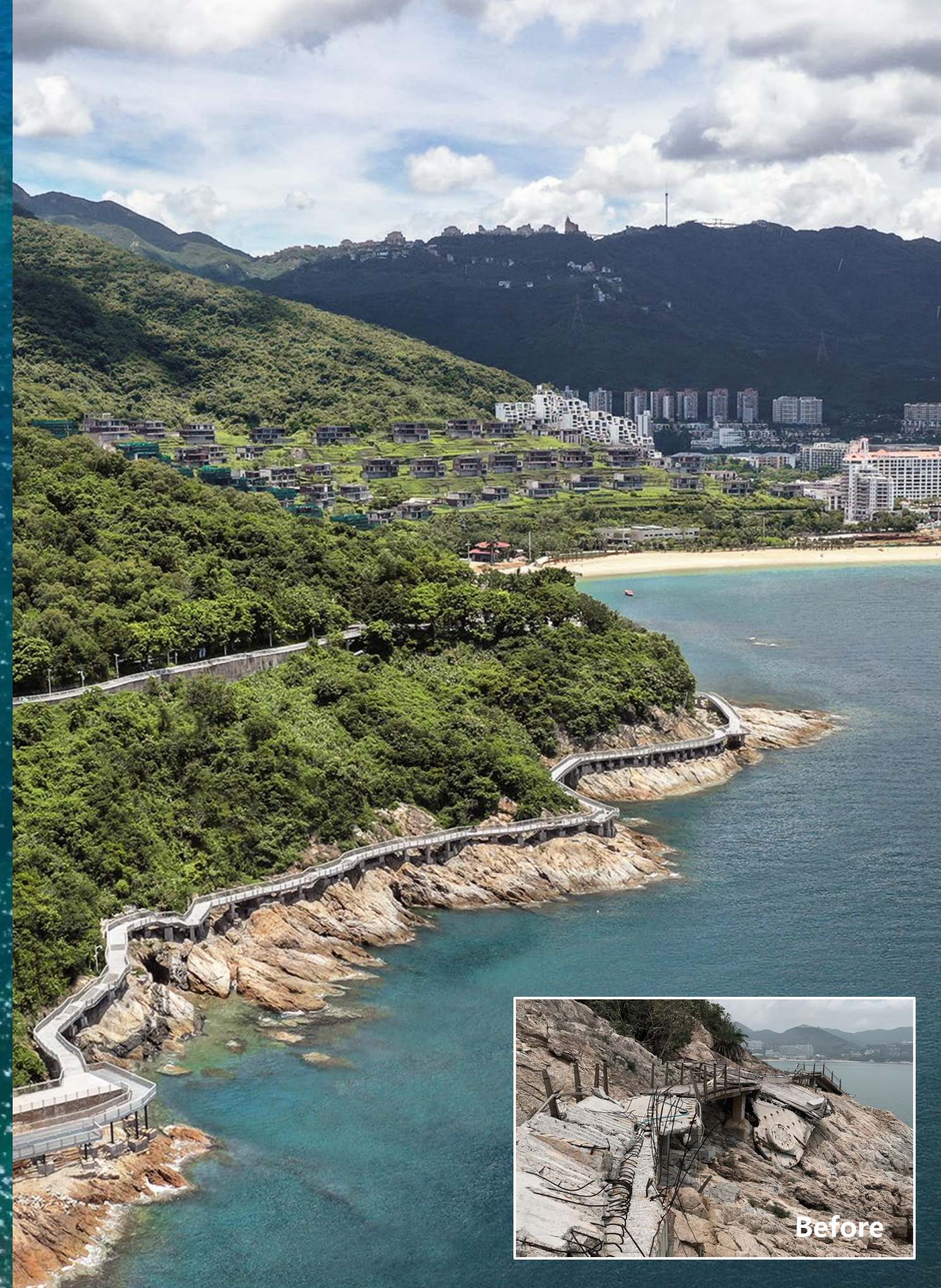


### Greenway

The whole greenway can meet the barrier-free passage, linking the scenery and connecting the park, forming a park belt, and at the same time, it can satisfy the citizens to stop and rest on the greenway and watch the sea.



## 02. Conform to nature



### Rocky steep place

In places with steep rocks, the height of the storm surge can reach more than 6 meters. The line selection of the new coastal boardwalk is basically required to be higher than the height of the storm surge, to reduce its damage to the trail and its impact on creatures.



## 02. Conform to nature



### Gentle terrain place

In areas with gentle terrain, the reef can weak the energy of the waves, so the elevation of the boardwalk is designed lower and close to the ground, that allows people to get close to the sea while avoiding make barriers to creatures. When the tide is high, the pavement can be submerged by sea water, which is a resilient landscape.



## 03. Resilient and sustainable



### Boardwalk structure

The reef sections of this boardwalk is adopted a small foundation structure with planting ribs, occupying as little as possible of the original reef, to preserve the habitat of shellfish and other marine organisms. In areas that are easily impacted by waves, grid panels with gaps are used to build boardwalk, which enable waves to pass through, and reducing the damage impact from waves.



### 03. Resilient and sustainable



#### **Sustainable energy**

The railings are equipped with photovoltaic panels, comparing with traditional cables, the unitary solar power supply can avoid the physical connection and eliminating the impact of line breaks and the leakage risk caused by seawater corrosion, which further enhances the safety of the boardwalk.



### 03. Resilient and sustainable



#### Modular design

The grille panels and railings adopt a modular design, even if it unfortunately damaged, only the damaged unit needs to be replaced. This is conducive to the long-term maintenance and repair of the boardwalk.



### 03. Resilient and sustainable

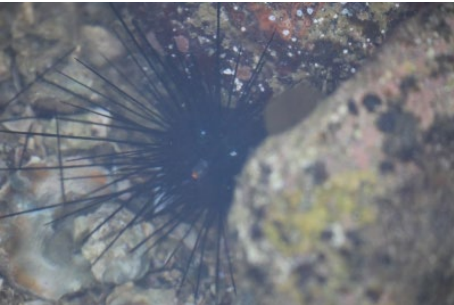
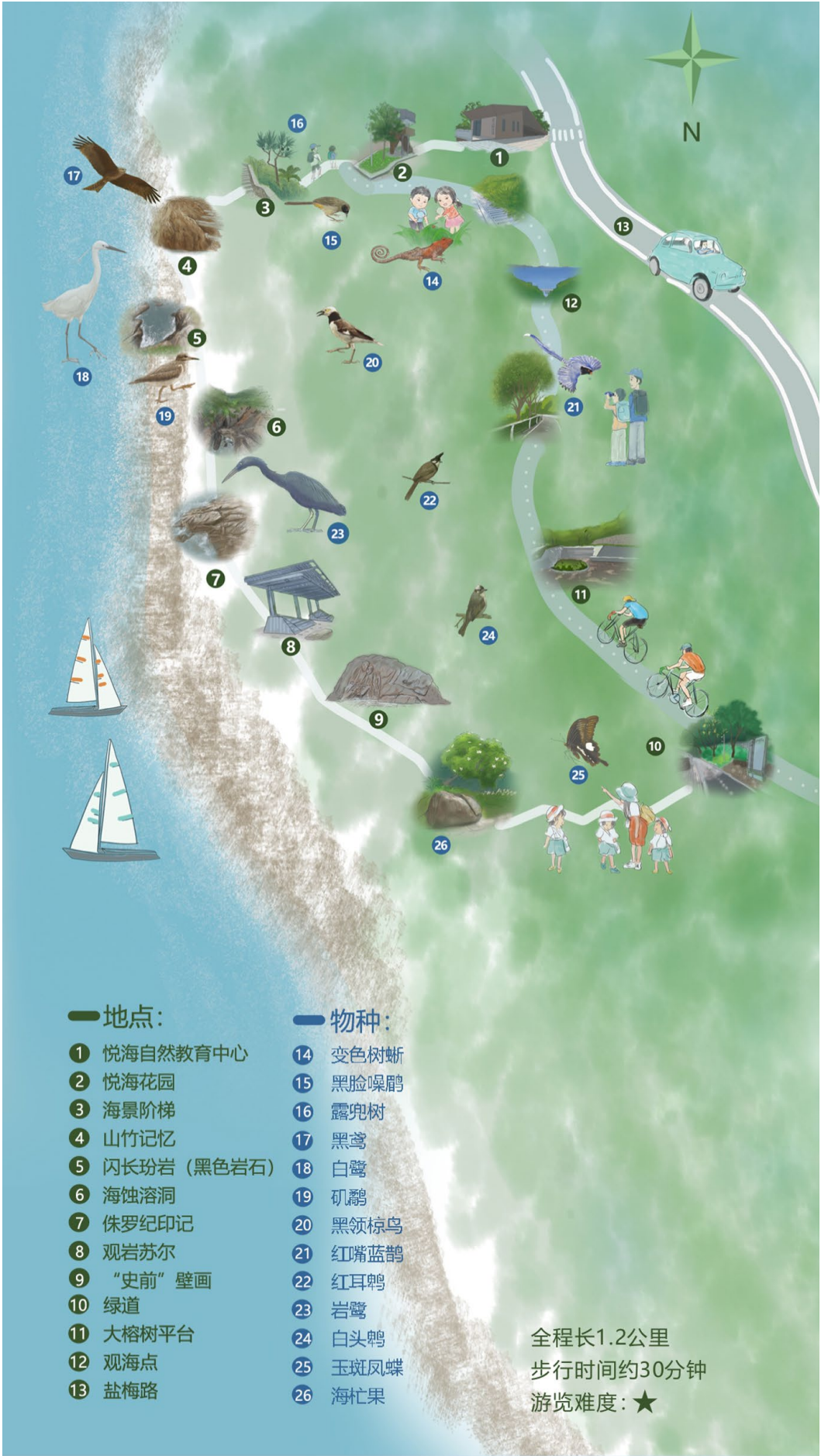


#### Original flora protection

In order to protect the native flora, the route selection of the boardwalk is avoid big trees as much as possible, and holes are dug on the pavement according to the needs of trees. The steel grid material is used as the main construction material to ensure the lighting needs of plants growing on the mountain.



# 03. Resilient and sustainable



Diadema setosum



Capitulum mitella



Streptopelia chinensis



Eudynamys scolopaceus



Ligiidae



Tetracita squamosa



Copsychus saularis



Sturnus nigricollis



Liolophura japonica



Holothuria leucospilota



Parus minor



Pycnonotus jocosus



Spheractis cheungae



Calotes versicolor



Pycnonotus sinensis



Egretta garzetta



Duttaphrynus melanostictus



Fejervarya multistriata



Motacilla alba



Milvus migrans

## Coastal ecological restoration

Coastal ecosystems have been restored, with sandy beaches, vegetation and riprap forming diverse habitats, attracting a large number of animal habitats.



### 03. Resilient and sustainable



#### Bird habitat restoration

Delineated protected areas, restored natural shorelines and mangroves, restored mudflats, and protected bird habitats and feeding places.



## 04. Local characteristics



### Memory of typhoon “Mangosteen”

The design retained the ruins of the platform destroyed by Typhoon "Mangosteen" in 2018, based on this, a new sea-viewing platform was designed to express the awe of nature.



## 04. Local characteristics



### Cultural landscape spots

Deeply excavate the cultural resources of the site, and connect characteristic landscape spots along the boardwalk, including Meteorological Garden, Beacon tower heritage, Jurassic Garden, love cape, etc.



## 04. Local characteristics



### Fisherman culture

There was a fishing village, and people lived in boats in history. The design combined the historical fishing culture of the wharf, traditional cuisine, and seafood street, etc., to revive new vitality.



# Postscript

This project can reconnect the entire coastline as a whole, integrating the city, the mountain, the coast and life, and restores the ecology in such a narrow hinterland and high-density zone in Yantian Shenzhen, where people can share coastline as a new urban open space to relax their minds and enjoy nature. The project also promotes the development of different industries and regions, including ports, docks, streets, beaches and landscape spots, that can bring multiple benefits, to promote the long-term sustainable development of the city.

