



# A Breathing Sea Wall: Haikou Jiangdong Beach Park

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## FEATURES

Climate Adaptation; Living Shoreline;  
Ecological Restoration; Resilient Coast;  
Nature-based Solutions; Haikou Free Trade  
Zone

EDITED BY Tina TIAN

1. Concrete was removed from shrimp farm dykes, exposing earth to boost ecology. The spongy, porous landscape can control monsoon rainfall runoff and urban stormwater, mitigating potential salinization and nurturing indigenous flora.
2. Pre-existing site condition: a concrete sea wall exacerbated soil salinization damaging the vegetated and amplified erosive forces, and barren concrete fish ponds.

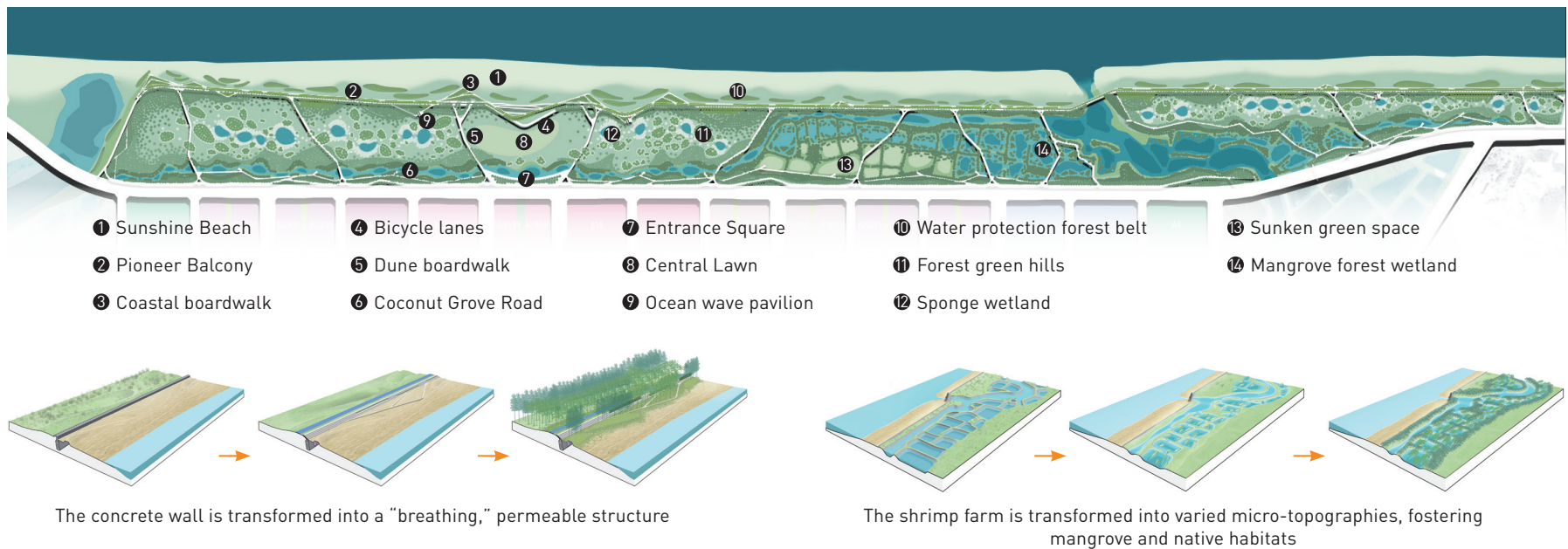


Pre-existing: concrete sea walls, degraded inland habitats, and lifeless shrimp farm



Transformed: breathing sea wall, spongy lush inland, and restored mangrove and native habitats

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The concrete wall is transformed into a “breathing,” permeable structure

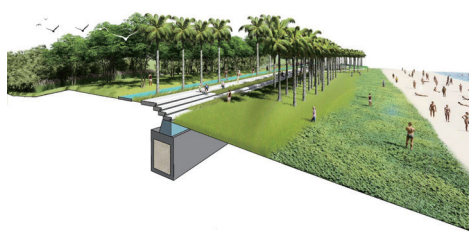
The shrimp farm is transformed into varied micro-topographies, fostering mangrove and native habitats

## 1 Challenges and Context

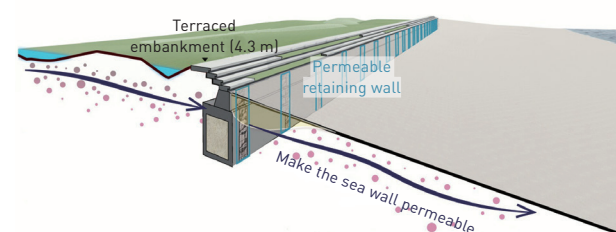
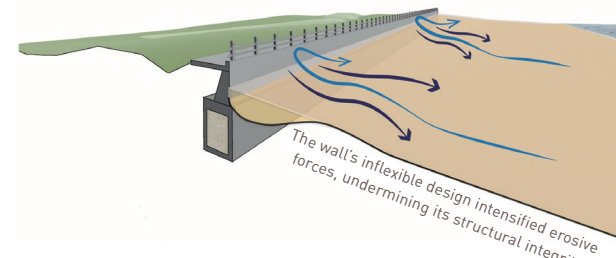
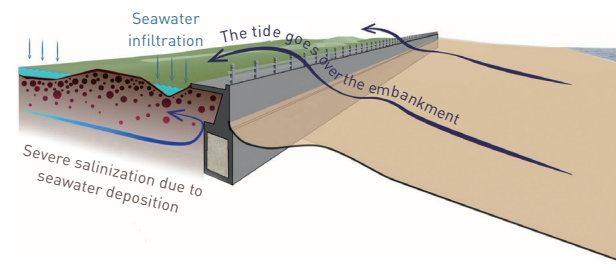
In the context of the newly established Hainan Free Trade Zone, the design of Haikou Jiangdong Beach Park, encompassing an area of 370 hm<sup>2</sup> along a 3.72-kilometer long beach, faced significant environmental challenges. The pre-existing 4-meter high concrete sea wall, originally constructed for protection, impeded natural sea-land interactions, leading to soil salinization and damage of the protective vegetative windbreak. Moreover, the inflexible design of the wall intensified erosive forces, undermining its structural integrity. Additionally, the site was previously occupied as a shrimp farm, leaving vast areas of barren concrete ponds that replaced the native mangrove habitats, which would further complicate the ecological restoration efforts.



Pre-existing: a concrete sea wall exacerbated soil salinization, damaging the vegetated and amplified erosive forces



Transformed: a “breathing,” permeable structure, reshaping it into terraced planters for vegetation and water flow



## 2 Innovative Design Solutions

The project’s design strategies included:

1) Transforming the primary concrete wall into a “breathing” permeable structure by reshaping it into terraced planters,

enhancing vegetation growth and water flow, and significantly improving beach accessibility. The original foundation of the sea wall was preserved underground, while the visible part was removed. This modification was designed to allow

3. Site plan: the project transforms a solid sea wall and a desolate fish farm into a verdant, resilient public area.
4. The permeable structure with terraced planters has replaced the original concrete sea wall, which exacerbated soil salinization and erosive forces.



5 © Turenscape

6 © Turenscape

occasional surges, happening every one or two years, to surpass the terraced structure and flow into an inland porous green space, effectively acting as a buffer zone. A segment of the concrete flood wall on the western side of the site, bordering the lagoon, was transformed into a permeable riprap flood wall.

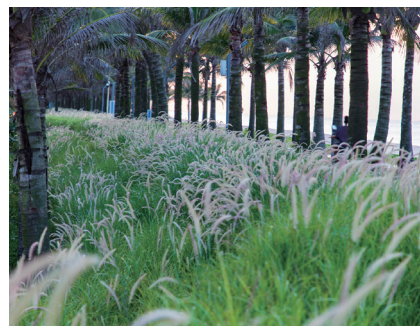
2) Crafting a resilient landscape that adeptly manages monsoon rainfall runoff and urban stormwater, to reduce the risk of salinization while fostering indigenous flora. The degraded inland area has been skillfully transformed into a spongy, porous landscape using minimal cutting-and-filling techniques, interspersed with numerous bioswales for enhanced ecological benefits.

3) Maintaining the shrimp farm's original layout: concrete was removed from dykes not only to reveal natural earth and enhance ecosystem connectivity, but also to be repurposed for island creation and the construction of varied micro-topographies, fostering mangrove and native habitats. Artfully constructed paths and bridges now offer immersive experiences in this revitalized, rewilded landscape.

4) Fusing recreation with ecology: this project establishes linear pedestrian pathways to bolster coastal resilience and filter storm surges, fostering vegetation growth and offering immersive experiences in native vegetation. The park combines ecological restoration with amenities like bike lanes, trails, and storm-resistant pavilions for locals, CBD residents, and tourists.

5) Detailing and materials: pre-fabricated concrete slates were employed for pedestrian areas, elevated from the ground to minimize ecological impact and expedite vegetation establishment.

5. The "breathing," permeable sea wall allows lush vegetation to get established and become a resilient green infrastructure. The aerial view shows that the former concrete sea wall and degraded beach have been transformed into lushly vegetated resilient coastal greenway.
6. Linear pedestrian pathways are built to bolster coastal resilience and filter storm surges, minimizing the impact on vegetation growth.
7. The back side of the living sea wall with lush native vegetation.
8. Details of the pavilion as a shelter and an artful sculptural installation that appears in different forms when viewed from different angles.
9. The park combines ecological restoration with amenities like bike lanes, trails, and bridges for local residents and tourists.



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8 © Turenscape



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Weather-resistant pavilions inspired by ocean waves function as both shelters and sculptural focal points, enhancing the beach's appeal.

### 3 Conclusion and Impact

This project successfully transformed a concrete sea wall and a barren shrimp farm into a vibrant public space, in response to sea level rise and soil salinization. The innovative design has proven its resilience by withstanding numerous tropical

storms in the past two years. The project also integrates recreational amenities, establishing a benchmark in urban design that harmonizes nature with community needs. This project redefines the role of landscape architecture in shaping sustainable, adaptive urban futures in the era of climate crisis.

**Competing interests** | The author declares that he has no competing interests.

**Location:** Haikou City, Hainan Province, China  
**Size (area):** 370 hm<sup>2</sup>  
**Client:** Haikou Dyke Engineering Construction Management Center  
**Landscape Architecture:** Turenscape  
**Principal:** Kongjian Yu  
**Design Team:** Tianhao Chen, Ning Wang, Yuyue Sun, Chen Wang, Yuqi Guo, Jian Zong, Ang Lu, Mingyu Cao, Jin Li, Yanxian Zhao, Cheng Gao, Shuaixing Wang, Jinglong Bi, Wenwei Lai, Shuang Huang, Fei Shao  
**Construction:** Haikou Dyke Engineering Construction Management Center  
**Design Time:** 2016  
**Completion Time:** 2022

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## 会呼吸的海堤：海口江东海滨公园

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项目关键词

气候适应；生态海防；生态修复；韧性海岸；  
基于自然的解决方案；海口自贸区

编辑 田乐

**项目地点：**海南省海口市江东新区

**项目面积：**370hm<sup>2</sup>

**项目委托：**海口市堤防工程建设管理中心

**景观设计：**北京土人城市规划设计股份有限公司

**首席设计师：**俞孔坚

**设计团队：**陈天昊、王宁、孙玉玥、王晨、

郭钰琦、宗建、鲁昂、曹明宇、李瑾、赵彦贤、

高诚、王帅星、毕京龙、赖文蔚、黄爽、邵飞

**施工单位：**海口市堤防工程建设管理中心

**设计时间：**2016年

**建成时间：**2022年