

**ISOCARP 2013 PROJECT SUBMISSION
DALIAN CHANGXING DAO MASTER PLAN**

PART I: SUMMARY:

Changxing Dao Master Plan: Creating a Sustainable Urban Archipelago

Changxing Island is the sixth largest island in China, located in the Liaoning province along the east coast of the Bohai Bay, north of the city Dalian. The character of the island and the surrounding archipelago is rapidly transforming from a rural aquaculture and agriculture based landscape an economy to an urbanized and industrialized economy centred around the newly constructed deep-water port servicing shipbuilding and petrochemical industry.

From the primarily focus on facilitating the large shipbuilding and petrochemical enterprises, the Changxing Dao Planning Bureau felt the need to review their plans concerning the proposed new towns. With the rapidly industrializing deep-water port the number of skilled employees moving to the islands was also rapidly increasing. With the expected population growth from 50,000 to 1 million people by 2030, the Planning Bureau wanted to create a more liveable and sustainable environment for all people attracted to this new economic centre.

In close collaboration, international design firms from the United States and the Netherlands, under the supervision of a locally respected architect from Hong Kong, together designed a sustainable vision.

This form of collaboration is a truly innovative method of joint forces, based on trust and open dialog.

The sustainable vision formed the collective starting point for city level master plans detailed in plot maps and guidelines, making the Changxing Dao Master Plan the first approved detailed master plan created by non-Chinese design firms.

PART II: PROJECT DESCRIPTION:

Context : Chinese Urbanization

Humanity has recently crossed a major landmark in history. The majority of people on the globe are now living in cities, seeking opportunities to improve their living standards. One of the fastest and largest urbanizing countries still is China, hitting 1 billion urban residents by 2025. China is projected to have over 221 cities with one million-plus inhabitants. Overall, it's expected that China will need to house some 300 million additional people in urban areas.

The current dominant urban model for housing the new residents is developing large blocks (400m x 400m) surrounded by wide roads anticipating on the fast growing share of private car ownership. The size for the 'super' blocks is predominantly driven by selling as much land as possible to individual developers. This big block condition combined with the building massing prescribed by the strict sun-shadow regulations form the character for the current urbanization of Chinese new cities. The result often ends in a privatized block filled with individual high rise buildings on a surface designed like a park providing the modern Chinese urban resident the desired secure and safe environment. This division between the public streets and the more private super blocks creates a disconnection between streets and buildings. Requested setbacks strengthen the possibilities of greening the streetscape, but simultaneously disturb the possibility to create dynamic active streets, like those in traditional and vibrant Chinese communities.

China's rapidly expanding industrialization and rising urbanization is also creating an ecological and environmental crisis. In a recent article in the New York Times, the cost of this environmental degradation was projected to be about \$230 billion in 2010 or about 3.5% of the nation's GDP. With rise in car-ownership and the reliance on coal-power electricity, cities in China are experiencing stratospheric levels of air pollution that are up to 40x the recommended exposure levels in cities such as Beijing. Streams and watersheds are becoming polluted which is impacting water quality and contributing to even higher levels of water scarcity. To accommodate the pace of industrialization and urbanization in China, cities must figure out a way to urbanize sustainably and minimize ecological and environmental impacts.

Changxing Dao

The city of Dalian is strategically located at the peninsula in the Bohai Bay, close to Korea and Japan. The city attracts more and more foreign and domestic investors related to sea harbour industries. To supply the need for more deep water ports the archipelago of Changxing Dao (500 sq.km) was located as new port and industrial area. Since the opening of the first shipyards and petrochemical industries large number of employees needed to be housed in new towns on the islands. By 2030 the expected population in the archipelago will be around 1 million residents.

With the current status of the urbanization in China set as context, the Changxing Dao Planning Bureau felt the urgent need to review their plans, which were already executed. With the guidance of a locally well respected architect, an international design

team was composed. Contrary to the dominant Chinese design practice (issuing competitions), the composed design team was commissioned to join their forces to advise the Changxing Dao Planning Bureau on improving the current master plan concerning sustainability, identity, and connectivity. This approach resulted in a deep understanding of the local context and an intense exchange of knowledge inside the design team and with the client.

The result of the collaboration was a conceptual master plan for the total Changxing Dao archipelago, bringing the planned urbanization more in balance with the existing landscape, improving the inter connectivity of the different planned new towns via public transportation, and strengthening the element of water in the spatial layout.

After discussing the outcome of the jointly developed conceptual master plan with the Changxing Dao Planning Bureau, the pan-atlantic team started working separately on the elaboration of the conceptual master plan by creating city level master plans for the separated new towns. During this process the individual design firms were supported by the local expert architect helping to implement the conceptual ideas in the prescriptive Chinese planning system.

The collectively developed design agenda formed the general starting point of each new town. The keywords for this agenda are, adding identity, encouraging walking and cycling, integration of important landscape features, minimal ecological impact and designing with water. Under this common agenda, five unique project areas with strong spatial characteristics on city level were identified and developed.

Northern Comprehensive City

The revision of the master plan for the Northern Comprehensive City was complex due to the fact that the city was partly built already and still under construction during the revision of the master plan. The vast majority of the city's road structure was already constructed. The focus on the plan revision was to create a more liveable and walkable central spine in the city combined with the creating a more open network of road, connecting the city level roads with the block level infrastructure. Along the city level roads active frontages were set in the block guidelines.

Southern Lake City

For the layout of the Southern Lake City a study was conducted to research the possibilities between building on the hills of Changxing island and the to reclaim new islands in the lake. Inspired by some of the world's most liveable water cities and analysis of the flow of water the individual islands in the Southern Lake city were configured to create a series of islands that promoted the water related culture present in the indigenous Changxing Dao community. Besides this important cultural aspect creating the islands also has an important positive economic and ecological impact through phasing a well designed reclamation strategy making investments and returns more in balance, and doubling the land/water edges which created enormous new natural habitats for a large variety of species.

Changxing Dao Transit Hub

Being an archipelago of islands means a limited number of infrastructural connections from the separate islands to the main land. The central point of the infrastructural modes entering the archipelago forms the ideal location for further distribution off the increasing north-south flows of people. Combining all different modes of transport at this point creates the possibility to make an efficient transit Hub. The hub is designed with a large green roof on top of all facility buildings. This large green roof is accessible for pedestrians and connects the Hub with the adjacent hill-site landscape. The green roof naturally reduces the need for cooling the building's interior during the hot summers.

Due to being positioned at a narrow connection between the southern lake and the sea, limited area of land was available. This made the Hub a compact urban environment on land. In balance with the dense program on land, floating houses in very low density were connected to a series of small stretched islands. The shape of the islands was designed to simulate the water flow between the lake and the sea, and to mitigate siltation.

CBD

The Central Business District of Changxing Dao was designed entirely on reclaimed land and is set to accommodate over 250,000 people and providing over 300,000 jobs in the process. Specific attention was paid towards designing the land/water edge using the organic patterning of the existing aquacultural edges. In addition this waterfront edge became a critical strategy to achieve urban resiliency. Optimal site orientation was used to capture solar energy and prevailing winds and to minimize climate extremes. Particular attention was paid to water management ensuring water quality is addressed through ecologically based storm and wastewater techniques. In addition, intermittent channels and flood-zones were incorporated throughout the development to accommodate storm-water discharge and buffer against flooding and storm surges.

Fengming Dao

Fengming Dao is inspired by the most livable resort cities. The goal of city is to be among the most desirable places to live in China with emphasis on the creation of a place and enhancing the quality of life. Key elements of the placemaking strategy include optimizing the cities connection to the water, focusing on creating distinctive and unique urbanscapes, and ensuring that the cities have a human-scaled character and scale where memorable and defining events may happen.

Discreet communities within the city were designed as distinctive but unified archipelago of islands creating compact, walkable and bikeable communities that both protect and enhance the scenic natural beauty of the islands. Naturalistic water edges with plants that thrive in brackish water were designed as buffers between incompatible uses such as industrial and residential uses and new waterways were designed while existing waterways were enhanced to ensure that the natural landscape can continue to be a key amenity of Fengming Dao.

Conclusion: In 20 years, the coastal landscape of China will look very different with the lightning scale pace of urbanization. Will the scenic and natural beauty of the coastal areas be embraced and enhanced or will the coastal edge of the country be forsaken and become polluted and fragmented? If China continues its “business as usual” urban planning model the result will be pollution, congestion and rampant developer speculation. The Changxing Master Plan offers a viable alternative planning model that demonstrates how an alternative high-density urban strategy can be developed that balances growth with the enhancement of the coastal edge. While it's a daunting task, the Changxing Dao Master Plan seeks to promote such an alternative development paradigm that balances development efficiency with connectivity, ecology, and placemaking in a way that can be easily and sustainably implemented at the regional, city and local level.

PART III : ANALYSIS

CONTENT:

The Changxing Dao Master Plan is comprised of four parts that provide guidance for the implementation of the master plan from the regional level all the way to the plot level. With an urban agglomeration as large and as complex as the one proposed in Changxing Dao, one cannot micro-manage each minute detail of the master plan. Recommendations have to be reasonable guidepost at each planning scale to allow sufficient guidance but also ensure adequate room for interpretation.

1. Conceptual framework

Starting from the regional context, the design team created high-level visioning and design principles for the Changxing Island Archipelago encompassing over 500 sq. km. of land, emphasizing on regional framework, landuse, transportation integration, water demand analysis, and land reclamation strategy analysis.

2. City level master plans

At city level the design teams created land-use plans, focusing on establishing mixed use areas along the main roads. Road sections were designed, balancing the required space for cars with improving the walkability. An open space plan combined with view corridors and transit system completed the city level master plan.

3. Detailed District Plans

In each city detailed district plans were made for the city's central area that provides the Changxing Dao Planning Bureau a more in detailed design and guidelines to serve as guidance to prospective developers. The detailed plans contained detailed land use maps and plot maps, massing and architectural guideline that provide a more robust design to serve as guidance to prospective developers by laying out a fine grain of streets, blocks, and public realm.

4. Plot Guidelines and Massing

For each defined plot, plot maps and 3d massing formed the specific form-based plot guidelines. These guidelines lay out prescriptive requirements such as FAR, Building heights, open space ratio and land use percentages that will provide a clear direction for developers looking to meet the livability goals defined by Changxing Planning Bureau.

IMPLEMENTATION PROCESS:

The initial idea of the Changxing Dao Planning Bureau was to divide the overall Changxing Dao Master Plan in separate areas for each design firm, at the start of the project. After the initial analysis of the existing Master Plan by all involved parties, the conclusion was drawn that improvements on the separate areas should only be made as a result of an integrated conceptual vision for the total master plan area.

Due to the flexible attitude of the Changxing Dao Planning Bureau the design firms were asked to collectively create an improved conceptual framework for the total archipelago. An intense charette week with the design firms was organized under the guidance of the supervising architect. The outcome of the charette formed a new conceptual framework for the total Changxing Dao archipelago. In the new conceptual framework, water, connectivity and identity got a central position in the design. After the new conceptual framework got approval from the Changxing Dao Planning Bureau, the implementation phase started and city level master plans were drawn. During this phase intense communication with the Changxing Dao Planning Bureau was crucial for the success of the project as parts of the plan were still being executed as parts of land were sold to developers, the design had to keep up with this real time adjustments of the plan. Without the intense communication, this wouldn't be possible.

INNOVATION:

The Changxing Dao Master Plan was the first official approved Chinese master plan, from conceptual plan until the detailed plot maps executed by non-Chinese design firms. This was made possible due to the intense communication between the Changxing Dao Planning Bureau and the design firms, guided via the supervisor architect.

This unique design process of joint forces resulted in a set of sustainable and implementable master plans for the Changxing Dao archipelago that it provides an alternative development paradigm that still meets all the prescriptive requirements of Chinese planning code but does so in a way that creates development that is more livable and human-scaled. In addition, the master plan spends considerable attention focused on developing a process and specific scale-based requirements that will be able to create such a bold and innovative vision. The plan is not just an innovative vision, but provides a well-defined road-map that shows exactly how such a vision can be achieved given the stringent Chinese planning codes and established practices.

SUSTAINABILITY:

The Changxing Dao Master Plan provided the ideal framework to create a sustainable urban environment that is human-scaled, livable, market viable, and implementable. Introducing water as central element in the city's lay out promotes a holistic approach to development which seeks to balance ecology, connectivity, and placemaking in ways which will create mutually beneficial outcomes.

- Storm water collection, and purification sheds resulted in a more resilient plan for water scarcity.
- Large variety of natural habitats were created, improving the biodiversity in the urban areas.
- Integrating water in the urban layout reduced the volume of reclaimed land compared with the initial master plan minimizing the need for excavation
- Improvements in the streetscapes, by adding indigenous trees, adding street parking and reducing the setbacks, helped to create a much vibrant and walkable city.

- Reduced energy usage was achieved through tree plantings together with the prescribed green roofs, with solar panels and promotion of other renewable energy.
- The fine grain of proposed public transit modalities in the master plan will enlarge the share of public transit use, making the inhabitants less independent on private motorized vehicles.

Concluded, the Changxing Dao Master Plan is focusing on creating new urban areas based on the principles of sustainable urbanism. However to really create a urban sustainable environment the Changxing Dao Master Plan is only the crucial first step. The implementation of the designed master plan is crucial on the ultimate success of this region and will require determined control and focus from the professionals at the Changxing Dao Planning Bureau as they execute the Changxing Dao Master Plan in the years to come.