WATER RESILIENT INDUSTRIAL TRANSFORMATION

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FASCINATION

ECOLOGICAL

SOCIAL

CULTURAL
FASCINATION

BEFORE - WORK & LIVE WITH NATURE

Dike - fish pond system
Water village
Dense water network
Transport by water

AFTER - INDUSTRIALIZATION

Factories replace farmland
Road dominated traffic
Filling and narrowing waterways
PROBLEM STATEMENT - WATERLOGGING
PROBLEM STATEMENT - WATERLOGGING

Flooding → Water logging → Impermeable pavement → Channelization → Industrialization & urbanization → Water problem

Before

Dike

Outside of dike

I have no space

Sorry, I'm trying

Water inside of dike

Hurry up!

After industrialization
PROBLEM STATEMENT – UNCONTROLLED INDUSTRIALIZATION

Before 1978

1978 - 1992

2010

Industrialization (2010)

Built-up area/Whole area: 52.32%

Industrial area/Built-up area: 45%

Low-efficiency industrial area/: 66%

Broken industrial area: 74%
ABANDONED INDUSTRY IN SHUNDE
Can we make use of the chance of industrial transformation to explore landscape strategies for water resilience?
OBJECTIVE & RESEARCH QUESTIONS

"Identify and explore landscape based strategies and design principles for water resilient industrial transformation in Shunde district."

To develop the thesis, the following 5 sub-questions need to be answered:

1. What is the difference between the existing water management system and historical water management strategies in Shunde district? Why the existing water management system cannot satisfy the discharge assignment?
2. What is the relationship between waterlogging and industrialization? Except for waterlogging, what are the other problems caused by industrialization?
3. What landscape-based principles and design strategies can help water resilience and industrial transformation work in an intergrown way?
4. How to apply the design strategies into the site and what are the potentials for landscape development in different scales?
5. What are the lessons learned from combing water resilience and industrial transformation?
## METHODOLOGY

<table>
<thead>
<tr>
<th>OBJECTIVE</th>
<th>RESEARCH QUESTIONS</th>
<th>METHODOLOGY</th>
</tr>
</thead>
</table>
| Water resilient industrial transformation | **Understanding** water resilient industrial transformation  
- analysis  
- existing water management system | relationship  
between water problem and industrialization  
| existing condition of industrial area | MAPPING  
LITERATURE REVIEW  
DESIGN RESEARCH  
FIELD TRIP |
| Landscape based strategies | **How to improve water resilience in industrial transformation**  
- principles  
- strategies  
- strategies for water resilience  
| strategies for industrial transformation | CASE STUDY  
LITERATURE REVIEW |
| Design exploration | **Design exploration**  
- design  
- green and blue structure  
| water contribution  
| reuse of public space  
| process | MAPPING  
RESEARCH BY DESIGN |
| Reflection |
HISTORICAL WATER STRATEGIES – WORK WITH NATURE

- Store rainwater in the lower area

- Natural water flow

- Small elements for water management
THE RELATIONSHIP BETWEEN VILLAGE AND INDUSTRIAL AREA

A. The entire village is surrounded by factories

B. Scattered factories around the village

C. Factories along the road

Legend:
- City
- Village
- Most polluted factory
- Medium polluted factory
- Light polluted factory
THE RELATIONSHIP BETWEEN WATERLOGGING POINTS AND INDUSTRIAL AREA

Legend:
- Factory
- City or village
- Important internal river
- River
- Main road

Village-owned factory → Scattered industrial area

Flooding & water logging
(Crossland of external river, Low elevation, Unpermeable pavement)
CONCLUSION

From the analysis of industrial areas in Shunde, the conclusions are as follows:

Most of the industrial areas have the waterlogging problem because of the lower terrain and impermeable pavement. Scattered factories also cause landscape fragmentation in Shunde. The quality of green space is low and people are lacking space for public activities. Most industrial areas are distributed along the main road and the main river. It blocks people’s way from backland to waterfront and makes it more difficult for people to experience water.

There are two main types of the industrial area, historical factories and village-owned factories. They both have problems with low-efficiency landuse and facing industrial transformation. These types of factories are closely related to water because of the convenient transportation and water supply.
TWO TYPES OF INDUSTRIAL AREA

HISTORICAL FACTORY

NORMAL VILLAGE-OWNED FACTORY

LOCATION

SECTION
<table>
<thead>
<tr>
<th>PATTERN</th>
<th>EXISTING CONDITION</th>
<th>CHARACTERISTIC</th>
<th>POTENTIALS</th>
</tr>
</thead>
</table>
| ![Pattern Image](image1.png) | ![Existing Condition Image](image2.png) | ![Characteristics Icons](image3.png) | **PUBLIC PARK**  
**WITH RESILIENCE FUNCTIONS** |
| ![Pattern Image](image1.png) | ![Existing Condition Images](image2.png) | ![Characteristics Icons](image3.png) | **NEW INDUSTRY + WATER RETENTION BOX**  
**(FORM A NETWORK)** |

- old buildings & facilities
- convenient transportation
- identity
- scattered in the whole city
CONTEXT OF DESHENG NEW DISTRICT
SCATTERED GREEN PATCHES AND SINGLE CANAL

Lack of connectivity between green spaces

Discharge all the water into this canal
Lack of space for public activities

Waterfront space is occupied by factories

Legend:
- Residential area
- Industrial area (abandoned)
- School
- Business area
- Pocket garden
- External river
- Shunde sugar factory
MOBILITY

From backland to waterfront

From east to west

Bad quality of walking system
SUMMARY OF ANALYSIS

WATER ISSUES
1. The waterlogging problem is severe.
2. Lack of space for water retention, lack of water circular system.

INDUSTRIAL TRANSFORMATION
Some industrial heritage should be kept.

PUBLIC SPACE
1. Lack of public space with quality.
2. Lack of connectivity among green spaces.

MOBILITY
1. The connection from back land to the waterfront is blocked.
2. The quality of the slow walking path from the sub-city center to the waterfront is low.
Increase water retention

Inside of dike, it should increase water retention area. Outside of dike, it should leave some room for river.

Reuse industrial heritage

Some buildings and facilities in sugar factory can be transformed for new industry, for example, creativity industry or technique park.

Construct green corridors

It is lack of connectivity among green spaces and lack of high quality of green space for public activities.

Improve connectivity

The connection from back land to waterfront should be improved. The quality of slow walking path from sub city center to waterfront should be improved.
PRINCIPLES

GREEN AND BLUE GRID

TRANSFORMATIVE PERSPECTIVE
Strategies for water resilience

**WATER STRATEGY:** COLLECTION, PURIFICATION, REUSE

**Collection**
- Terrain (grassland)
- Permeable path
- Green roof
- Water tank

**Purification**
- Sunken garden
- Bioswale
- Reparison wetland
- Wetland

**Reuse**
- Music fountain
- Urban agriculture
- Canal
- Train track
STRATEGIES

Strategies for water resilience

Top: Green roof

Ground: Grassland / permeable path

Underground: Canal / sunken park
STRATEGIES

Strategies for industrial transformation

INDUSTRIAL TRANSFORMATION STRATEGY: ADDING, SUBTRACTING, DISASSEMBLING, DECORATION

Adding
- Chimney – climbing stairs
- Rail track – plant box
- Corridor – stairs

Subtracting
- Water tank – water collection
- Water plant – sunken garden
- Water reservoir – outdoor theater

Disassembling
- Quay – platform

Facade decoration
- Warehouse – green facade
STRATEGIES

Strategies for public space

- Diversity of outdoor space
- Walkability
- Greater biodiversity
- Flexibility
- Sense of control and identity
- Human scale
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WATERFLOW AND RUNOFF FLOW

Water Flow
Runoff flow

WATER COLLECTION
- Terrain grassland
- Lotus pond

WATER PURIFICATION
- Bioswale
- Riparian wetland
- Plant box
- Sunken garden

WATER REUSE
- Music fountain
- Recreational canal
- Productive use
- Water theater
TERRAIN GRASSLAND AND NATURAL STREAM
WATER COLLECTION AND WATER PURIFICATION
WATER PURIFICATION -- NATURAL STREAM

Offices with green roof

Artificial forest (block noise)

Biking path

Natural stream with flood plain (purification)

Infiltration, purification, retention
WATER SYSTEM – TRANSFORMED FROM INDUSTRIAL FACILITIES
TRANSFORM WATER TANK INTO LOTUS GARDEN
PROCESS OF THE TRANSFORMATION OF WATER PLANT

Transform from water plant into sunken rain garden: Maximize to preserve historical traces, dealing with functional measures.

STEP 1: Remove the top cover

STEP 2: Selectively preserve the internal structure

STEP 3: Add pedestrian path and vertical transportation according to original structure

STEP 4: Create a stormwater purification system by keeping the vegetation nearby and adding vegetation to the bottom of the pond
WATER PURIFICATION – TERRACE WETLAND
WATER REUSE – REVITALIZE CANAL

Inundation tolerant  Emergent  Submergent

Creativity industry  Environmental graphics

Educational opportunity  Fishing

Water flow
OUTSIDE OF DIKE – MAKE ROOM FOR RIVER
OUTSIDE OF DIKE – MAKE ROOM FOR RIVER

STEP 1: Remove dike to innerland

STEP 2: Add terraces for recreational function and catchment of sedimentation during flooding

STEP 3: Set sand-fix plant

STEP 4: Provide environment for events
THE IMPLEMENT OF DEVELOPMENT PLAN IN PHASES

PHASE 1: CONSTRUCT COMPLETED WATER RESILIENT SYSTEM

The first step is based on existing facilities and space to construct a completed water resilient system with functions of water collection, water purification and water reuse. It can solve the waterlogging problem efficiently and also prove water safety in this area. At the same time, the environment in the factory is improved and more and more people will be attracted here for public activities.

PHASE 2: ACTIVATE INDUSTRY RENEWAL

Then we introduce the new industry to this area to make full use of the old buildings and public spaces. For example, the production workshops are transformed into the sugar museum park, old offices can be reused and old warehouses can be refunctioned for the creative industry. The connection between north to south is improved and more economic value is added to this site.

PHASE 3: ACCELERATE THE SURROUNDING INDUSTRAIL TRANSFORMATION

With the successful transformation in this site and the expansion of the sub-city center, it will accelerate the speed of industrial transformation in the surroundings and integrate to the sub-center very well.
VISION IN LARGE SCALE

Future development 1
- Existing condition
- Terrace
- Riparian wetland

Future development 2
- Connect dead-end canal connection water reservoir with canal
- Integrate agricultural production with research and civic amenities

Future development 3
- Flooding prone zone
- Runoff collection

Future development 4
- Building outside of dike
- On top of dike
- Inside of dike
Can we make use of the chance of industrial transformation to explore landscape strategies for water resilience?

- Reflection on my research objective

(Explanation on next page)
THANKS!