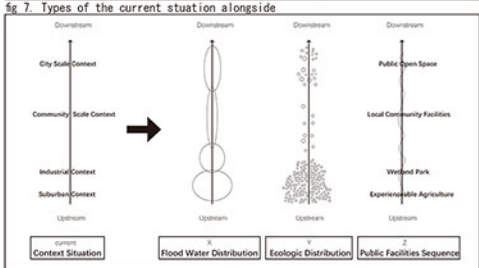
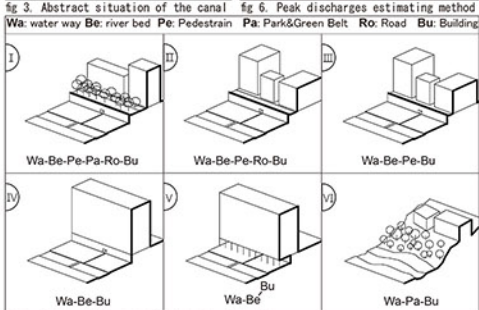
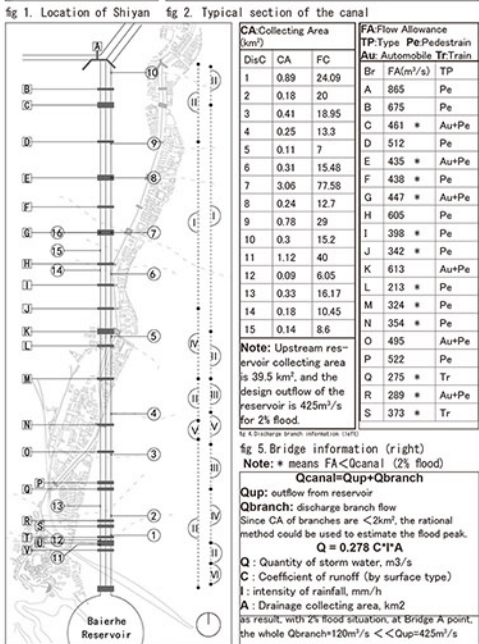
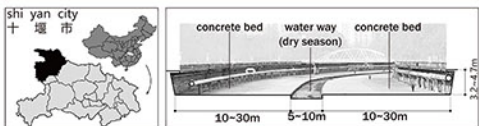


Merging the gap

Ecologic Revitalization for Public Spaces and Facilities of Baiherhe River in Shiyan, China

東京工業大学大学院 安田幸一研究室

王西 (WANG XI)



1. Introduction

Through the history, hydraulic infrastructural techniques have been developed and utilized, to take better use of the river or prevent from the disaster risk. However, the artificial infrastructures may also become or cause problems when situation changes.

1.1 General information of Shiyan City
Shiyan is a city located in Hubei Province, Mid-China (fig.1), with abundant water resources. Baiherhe river is far from the biggest but with most of residents alongside.

1.2 Development of Baiherhe River
a. Historic period (~1960s)
Baiherhe River flows through a valley with a narrow linear flooding plain which was the initial area where people settled down with agricultural activities through history.

b. Urbanization (1960s~1990s)
With the rapid industrialization and urbanization, the main urban functions have been planned along the river and the river route was made relatively straight.

c. Flood-prevention & concrete pavement (1990s~now)
In early 1990s, the local government decided to change the river into a concrete channel as flood-discharge infrastructure (fig.2).

2. Site Analyses

2.1 Hydraulic system information
A reservoir with the capacity of 1,730,000m³ is built on the upstream area to adjust the flow. The city part of river channel itself is supposed to be built with a 50 year once level (2% flood) of flood-prevention, with other 16 discharge channels (fig.3, fig.4) joined in, to prevent the city from flood. However, based on the calculation, 15 bridges could not meet the flow allowance of 2% flood, and at least 78% of the flood flow is from the upstream reservoir area, south of the city. And because of the high runoff coefficient of concrete surface, it is hard to shift the peaks. Therefore, the potential key point of improvement is to slow down the water from upstream.

2.2 Urban context
There are two main roads along the channel, one on each side, and 21 bridges (fig.3, fig.5, A~V) are built across the channel, as the main transportation structure of the city. Along part of the bank of the channel, there are pedestrian walks, or linear green belt parks built (fig.3, fig.7, type I), which are actively used by the residents nearby. However, the spaces are with limited size and unrelated to water and most of the buildings have backfaced towards to channel (fig.3, fig.7, type IV&V).

2.3 Current problems - a gap in the city
a. the channel is too wide for normal situation, becoming a gap in the city, while could not function enough for extreme flood situation;
b. the destroy of natural river ecosystem has been worsening the water quality and urban environment
c. the pale concrete surface and the difficult accessibility could not provide qualified potential public spaces.

2.4 Design Strategy
The aim of the project is to merge the gap. The concept is to turn the gap into a new river system stretching through the city, and the systematic proposal would be realized case by case based on each situation with the combinations of strategies from 3 aspects (fig.8):

X. to ensure a responsive flood-prevention system;
Y. to bring back a more ecologic system to the river;
Z. to revitalize the negative pure infrastructure into more positive public space.

3. Design Strategy

The aim of the project is to merge the gap. The concept is to turn the gap into a new river system stretching through the city, and the systematic proposal would be realized case by case based on each situation with the combinations of strategies from 3 aspects (fig.8):

3.1 Flood control

The main idea to strengthen the flood control function through a responsive way, 4 types of strategies could fit to different scales and site conditions. X1&X2 are mainly for upstream area with big capacity but need more space, while X3&X4 would be appreciated.

3.2 Ecosystem

The ecosystem construction focuses on the relationship between vegetation and the water. Proper species would be selected according to different water conditions (fig.8 Y). Y1 shows the vegetation selection based on different flooding line; Y2 shows the filtration system for discharge branches (fig.3). And, Y3&Y4 are for the larger water space in upstream area, as wetland or agricultural system which could be associated with X1&X2.

3.3 Urban spaces and facilities intervention

With safe flood control and better ecosystem, efforts to recreate the urban spaces are in need, to make the continuous river system with pedestrian & bicycle-way system (Z1), easily accessible (Z2), and also enjoyable and flexible with necessary supporting facilities for various activities (Z3). The reform of the building-channel interface (figure.7 type IV&V) would turn the backfaced into attractive urban spaces (Z4).

4. Design Proposal

Based on the general situation of the two edges (fig.3& fig.7), 8 prototypes are proposed for the 8 types of cross sections (S1~S8, fig.9, fig.10), to show the potentials of the different combinations of the strategy types. And 3 projects (P1~P3, fig.11, fig.12) are proposed as examples to indicate how the facilities and citizen activities could actively interact with the revitalized river system.

4.1 Flea market revival under the bridge (P1)

With the under-bridge pedestrian walk and bicycle way, people could cross the 60m wide road much more conveniently. To further activate the under-bridge abandoned space, a vertical vegetation covered light frame-structure facility is proposed as additional roofed space for the current street flea market.

4.2 A shared community center (P2)

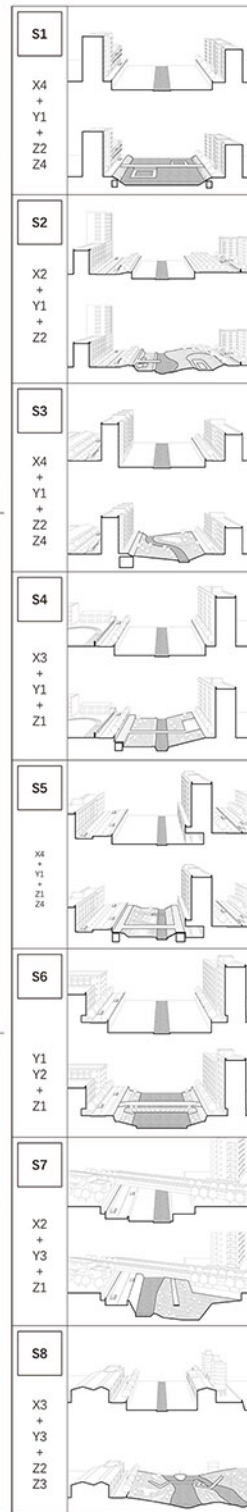
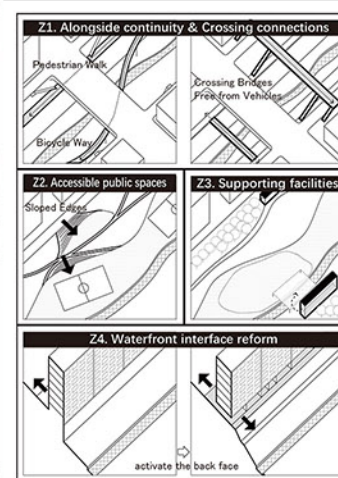
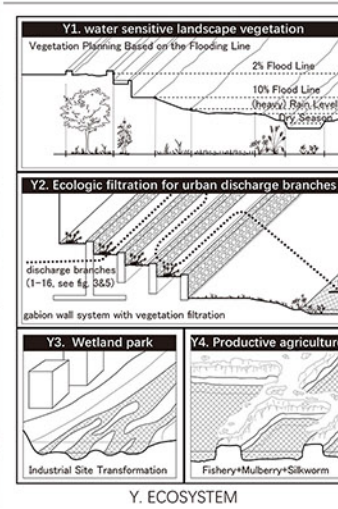
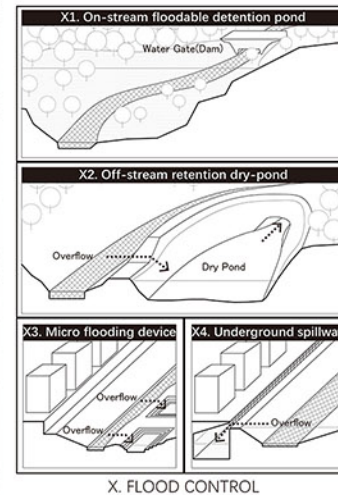
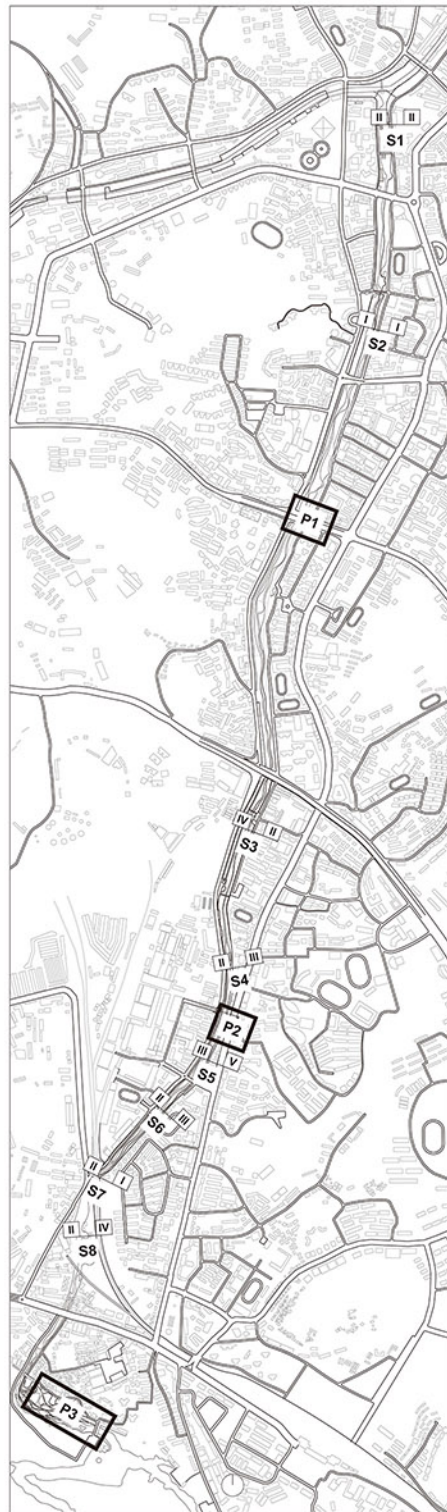
3 separated neighborhoods are again connected with a crossing foot-bridge, and a shared community center. Extended decks are added to turn the ground floor restaurants back-faces of the linear block actively connected to riverfront landscape. Meanwhile, gate-like volume creates a new welcoming interface between the city and the river.

4.3 Integrated agriculture park (P3)

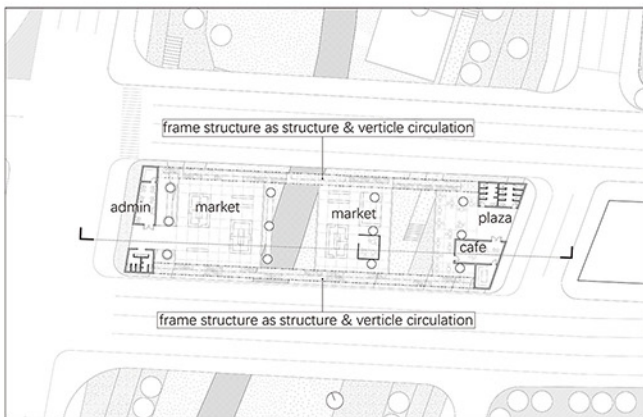
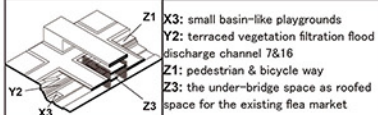
A new water-gate is proposed to turn the rural site into a detention pond, the spaces below would be changed into an integrated agriculture park based on an eco-circulation (fig.8, Y4). Along the safe line, the restaurant, renovated houses as Airbnb, and the experienceable factory are proposed as supporting facilities to fulfill the activities of the park.

5. Conclusion

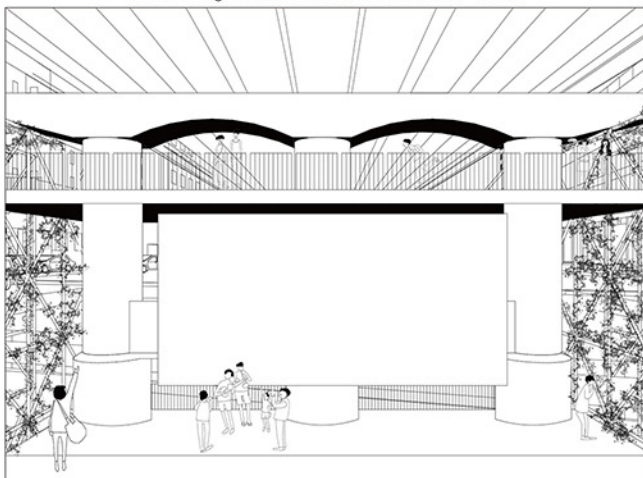
This proposal could revitalize the channel, which could ensure the flood control in an ecological way, and shows the possibilities to provide varied and characterized water-related urban spaces to the citizens.



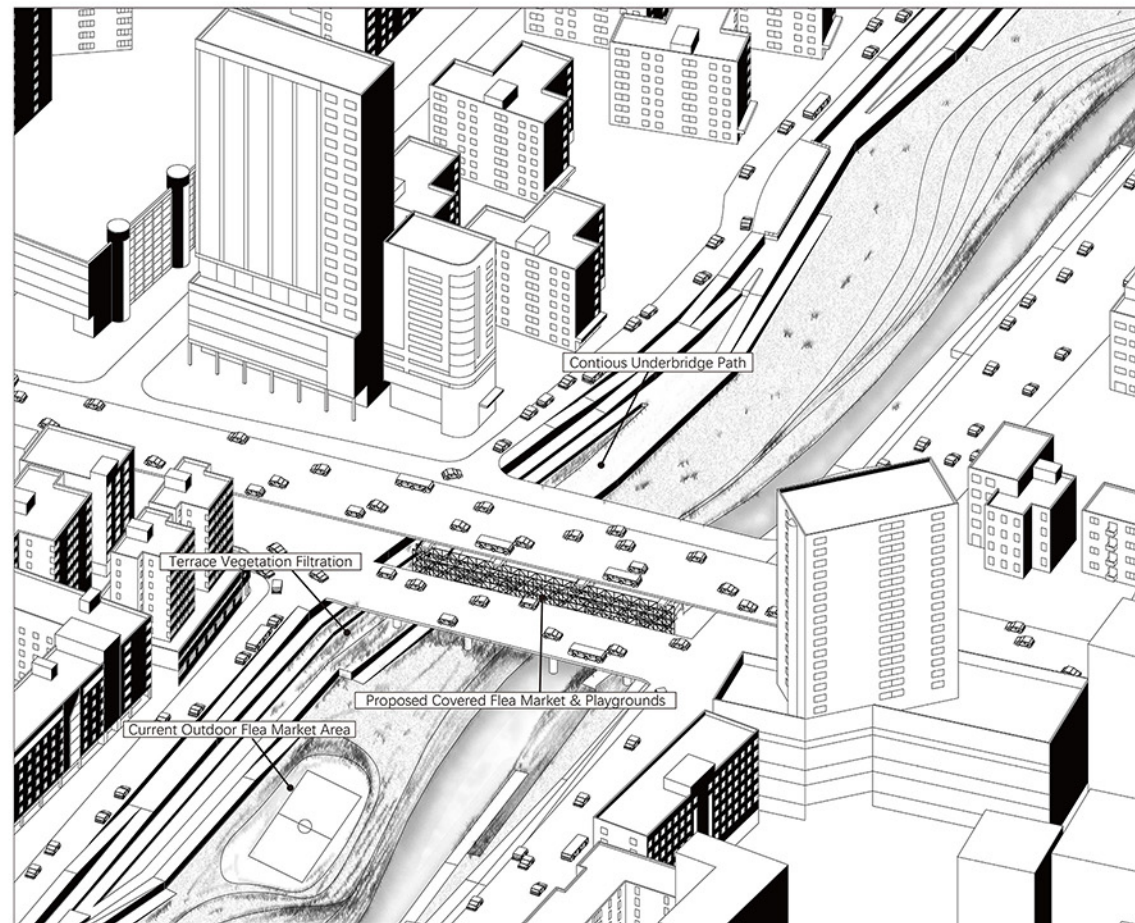
P1 Flea Market Revival



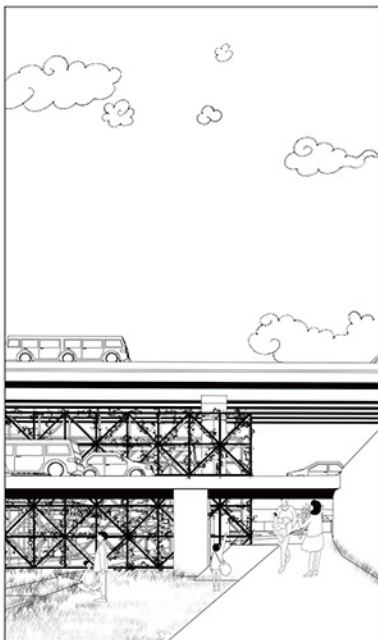
Under-bridge Flea Market ROAD LEVEL PLAN 1/500



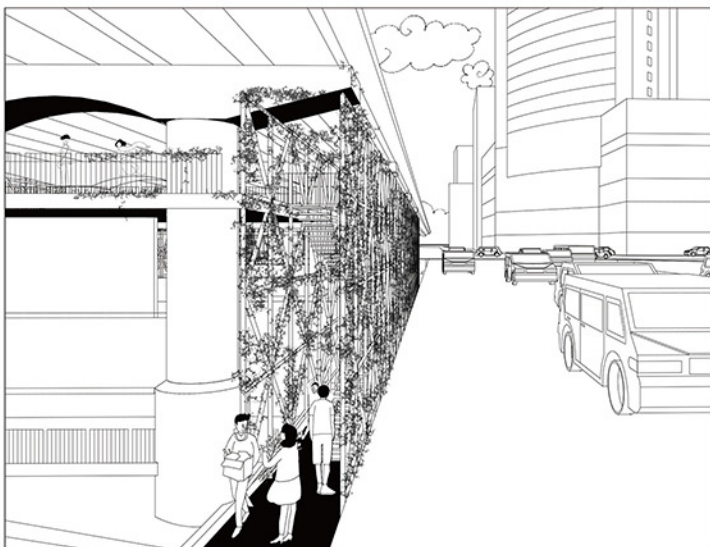
Under-bridge Floating Amphitheater



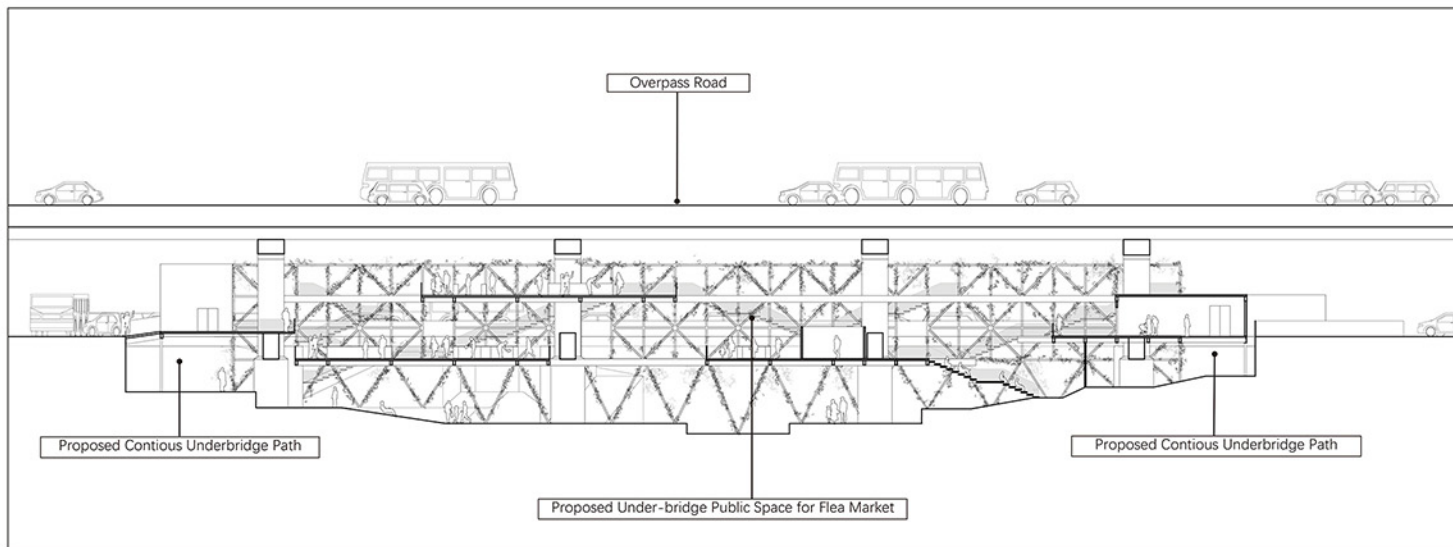
AXONOMETRIC



View from the Under-bridge Continuous Walk



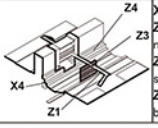
View from the Ground Road Level, Buffered from the Heavy Traffic



SECTION 1/250

P2

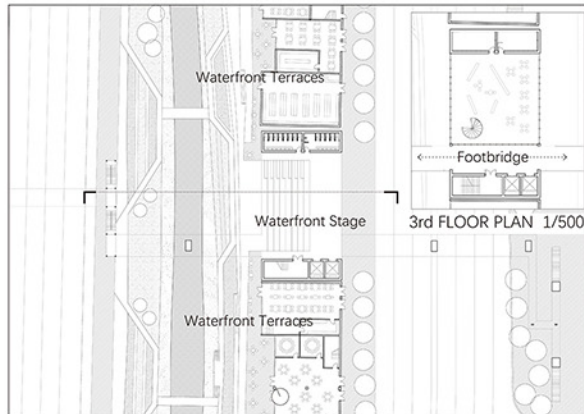
Shared Community Center



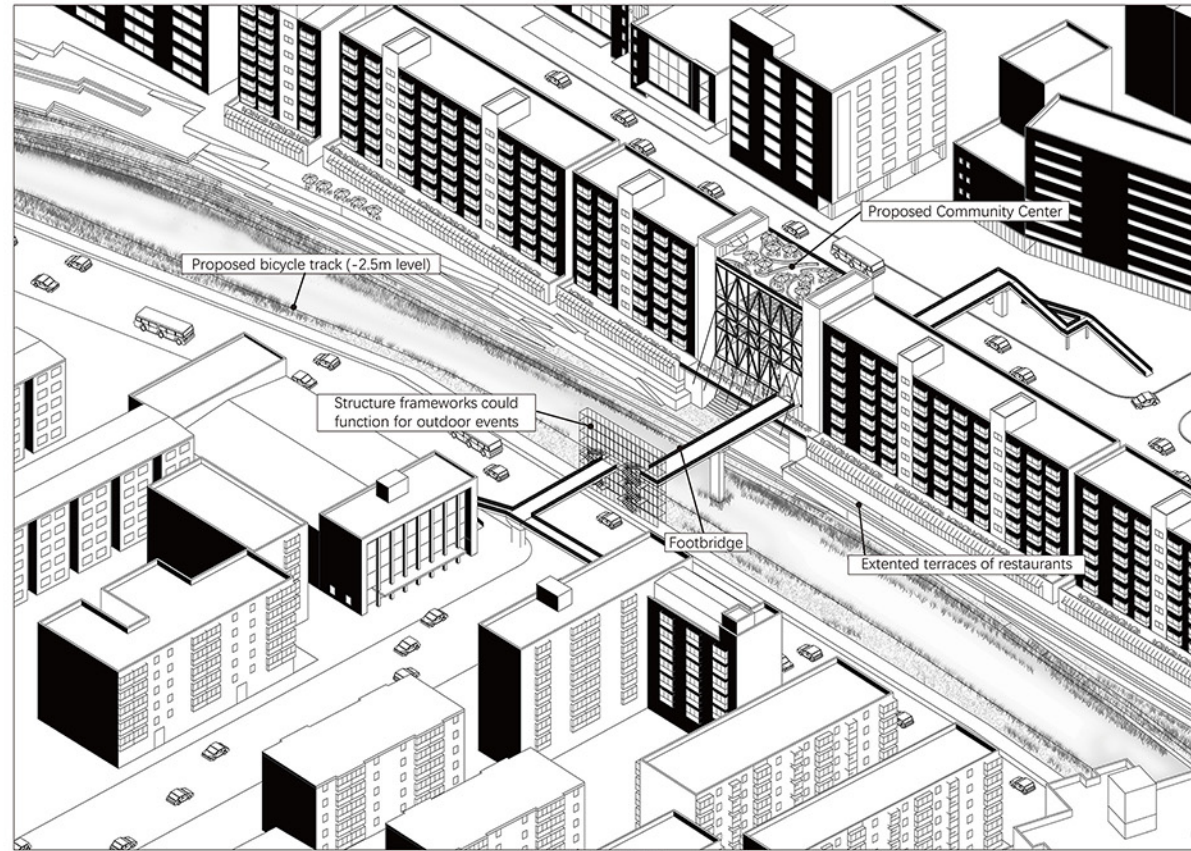
X4: spillway to drain the overflow
Z1: foot bridge connecting the 3 neighborhood
Z3: the frame structure could also serve for outdoor events
Z4: terraces to activate the negative back face of restaurants



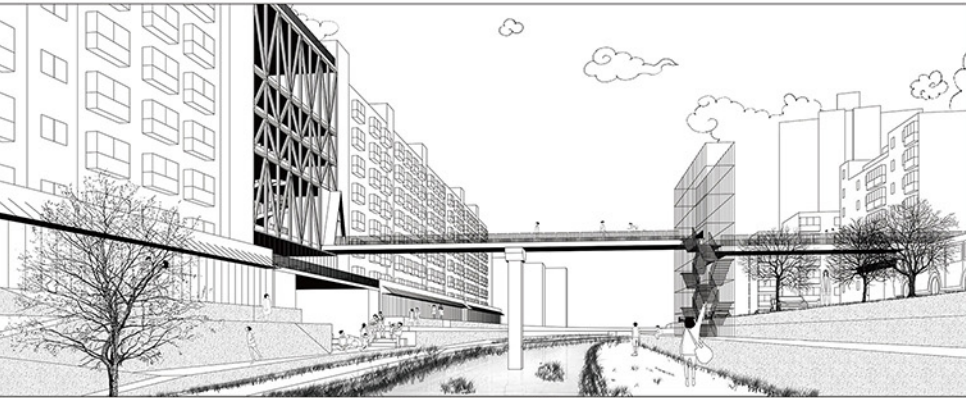
View from the most important trunk road in this city



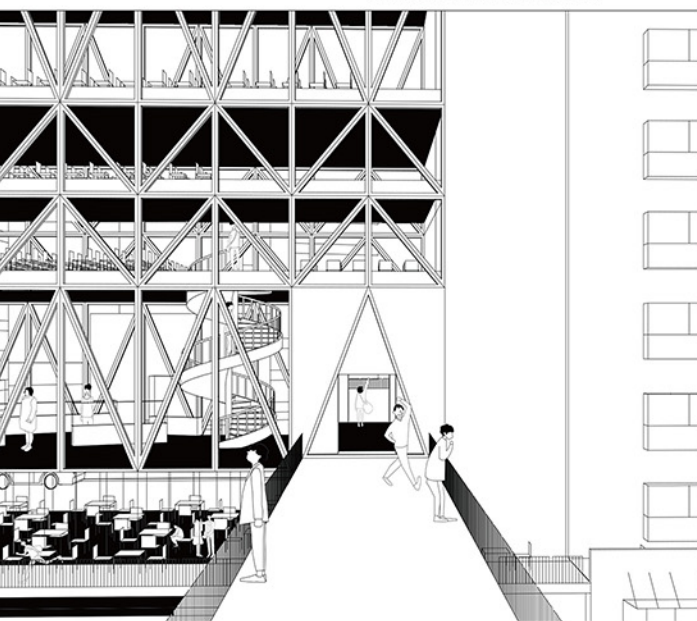
Shared Community Center GROUND FLOOR PLAN 1/500



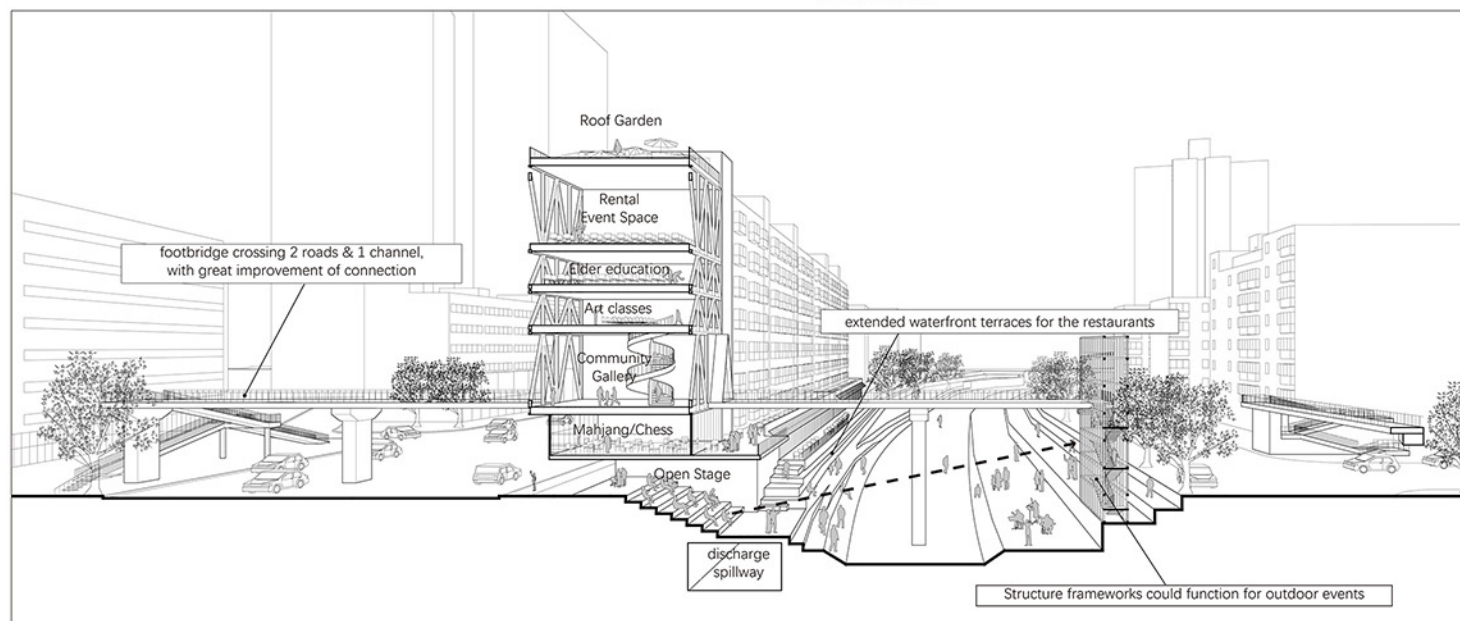
AXONOMETRIC



View from the Restored Channel



View of Crossing the Bridge (west side of the community center)



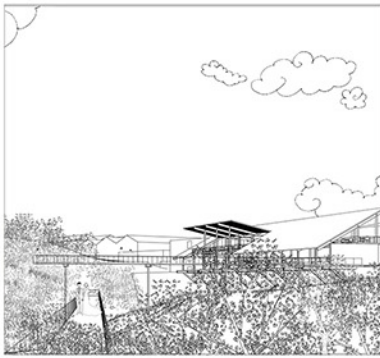
SECTION PERSPECTIVE 1/250

P3

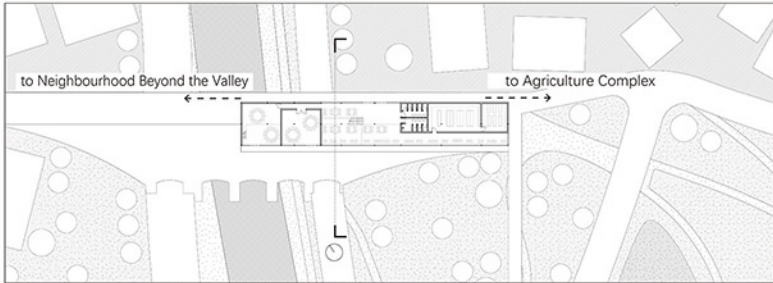
Integrated Agricultural Park

Z1: Addition of a water gate for a capacity around 400,000m³ of detention, 1/4 of the existing reservoir.
 Y4: Fish-mulberry-silkworm system as the main agricultural system

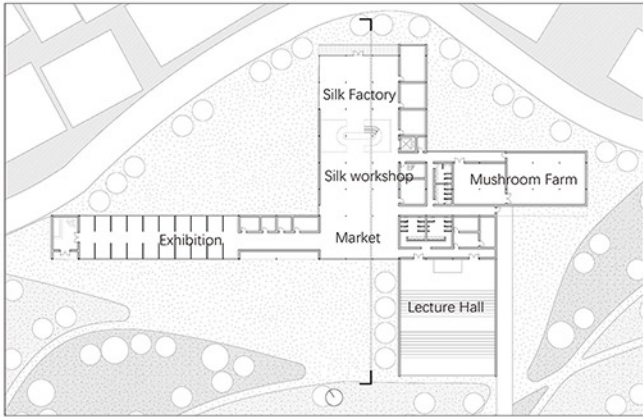
Z1: The water gate would serve as a bridge, and a short path connecting the separated neighborhoods separated by the valley.
 Z3: The agriculture park is an experienceable and educational facility of farming activities with various attractive scenes such as exhibition and silk workshop for the urban citizens all over the city.



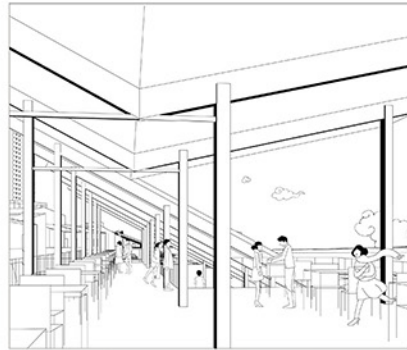
View from the restaurant on the proposed water gate



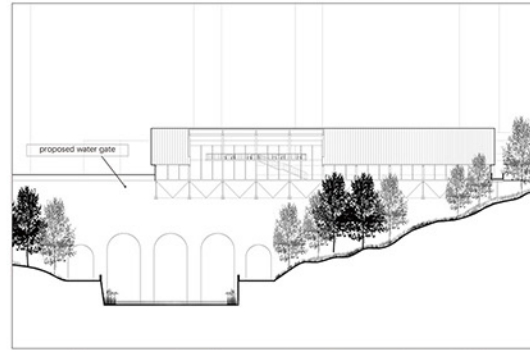
Restaurant GROUND FLOOR PLAN 1/500



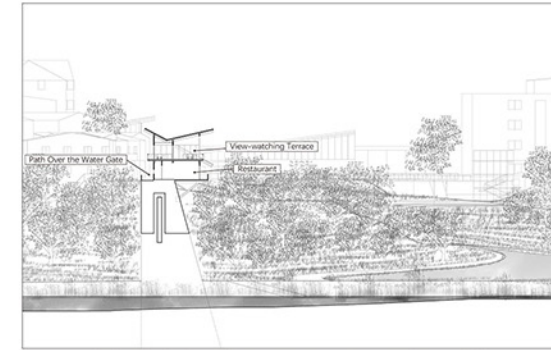
Agriculture complex GROUND FLOOR PLAN 1/500



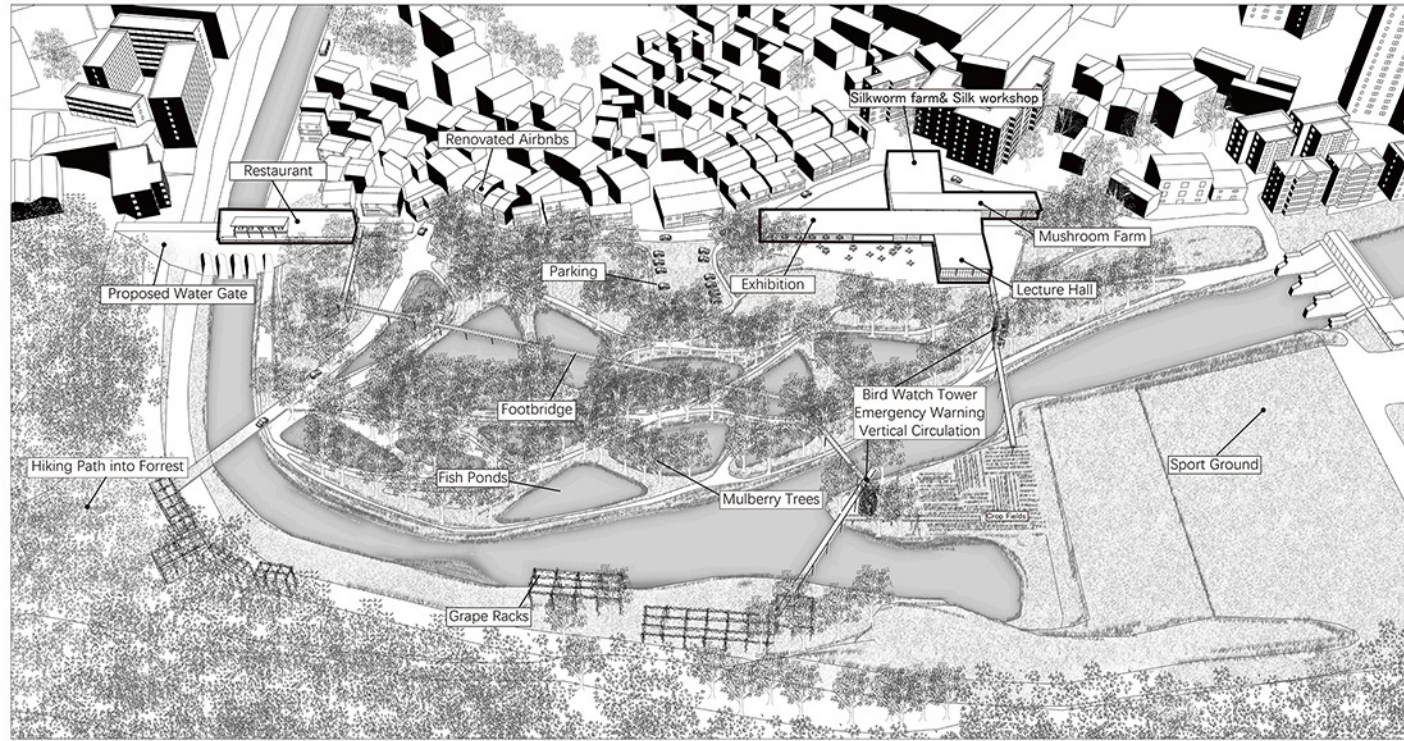
View from the restaurant on the proposed water gate



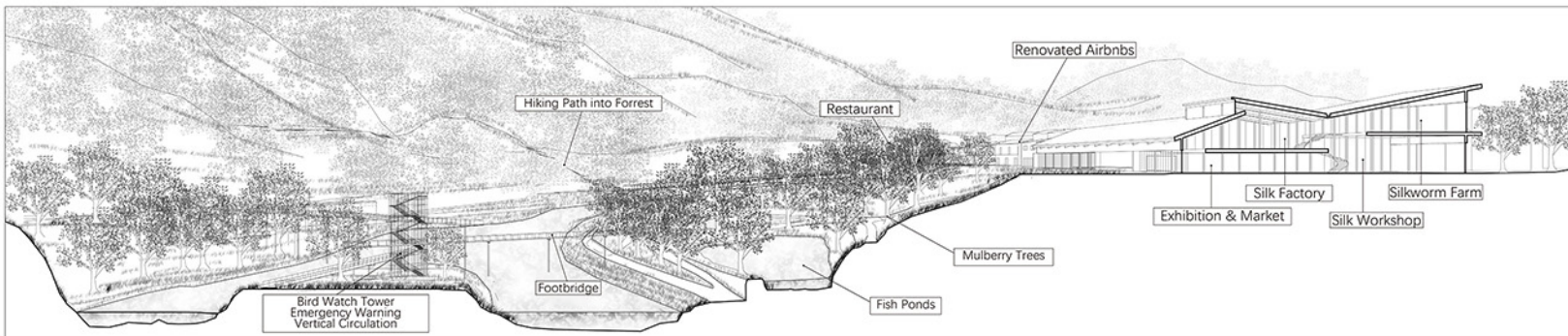
SOUTH ELEVATION of the restaurant & Water Gate 1/500



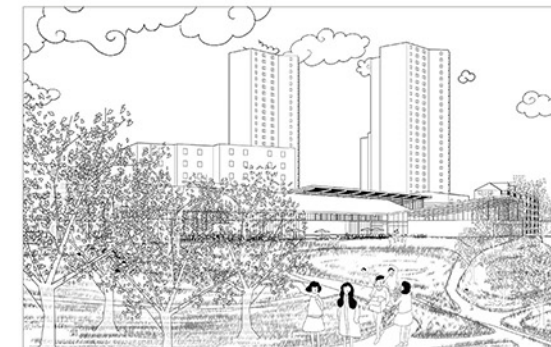
SHORT SECTION of the restaurant & Water Gate 1/500



BIRD VIEW PERSPECTIVE



SECTION PERSPECTIVE of the agricultural complex 1/500



View of the Agriculture Complex from the Fields