

**An agreement between the city and agriculture as a structure of
urban sustainability in Bangkok**

Pre-diploma FALL 2018

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1 INTRODUCTION

SUMMARY

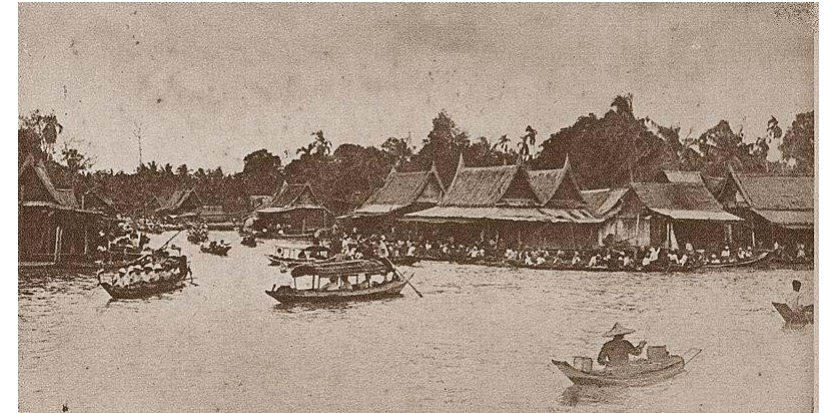
Agriculture is a cultural landscape of Bangkok. The city is greatly benefited from the location of central riverbank that originated from the rivers from the northern region. Overall, Bangkok water system is an essential condition. The canals were excavated as a layer of agricultural water sources, transportation paths, human settlement, and flooding protection when the city was established in 1782.

In the present, because of the city's expansion, Bangkok turn its back on the canal and thus reducing its diversity. The demand for new housing and road create more degradation which makes the agriculture area and canal site narrower, leading the city to lack of public open spaces and flooding situation turns to negative.

As a consequence, the city is at the crossroads between growing by eating up agriculture and natural condition, reducing its ecological function or choosing to become more adaptive situation with an agreement between the city, agriculture, and nature.

To help mitigate the issue, this diploma focuses on making win-win solution between the housing development and existing agriculture. Having roles as a pilot project, the selected site is at Bang Prathun village where is located in the intersection between the city and rural area of Bangkok.

The idea is that the raised structure housing typology will serve as a type of collective dwelling and provide more adaptive situation and free the ground dealing with the existing water and agriculture. It is not an urban farm that sounds like planting the trees at the balcony or backyard. However, this typology will be about respectfulness to the cultural landscape that works a productive landscape, also a potential open space to the city.



The early settlement in 1824
Source: National archives of Thailand



The first road and tramway in 1874
Source: Walter Armstrong Graham, Siam, 1913

2 LOCATION

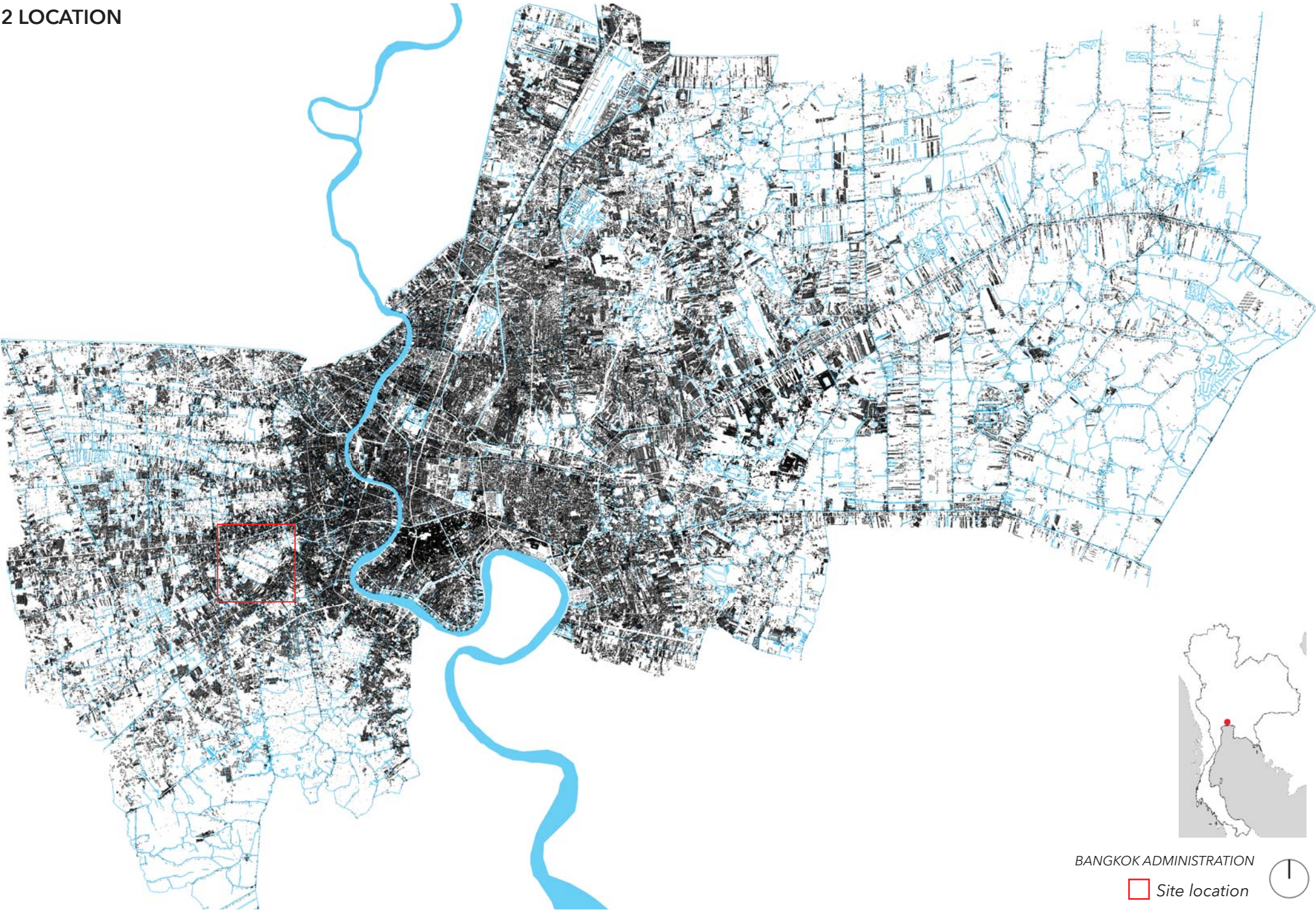


Site aerial view

THE SITE

Having roles as cultural agriculture, Bang Prathun community is one of the earliest canal settlement in Bangkok that agriculture has still remained as the main function for more than a century since 1847. The inhabitants have a strong attitude to inherit their traditional feature as agricultural society, among an urbanization that is forming around them, leading the site to the degradation from the mass production house development.

2 LOCATION



BANGKOK ADMINISTRATION

Site location



2 LOCATION

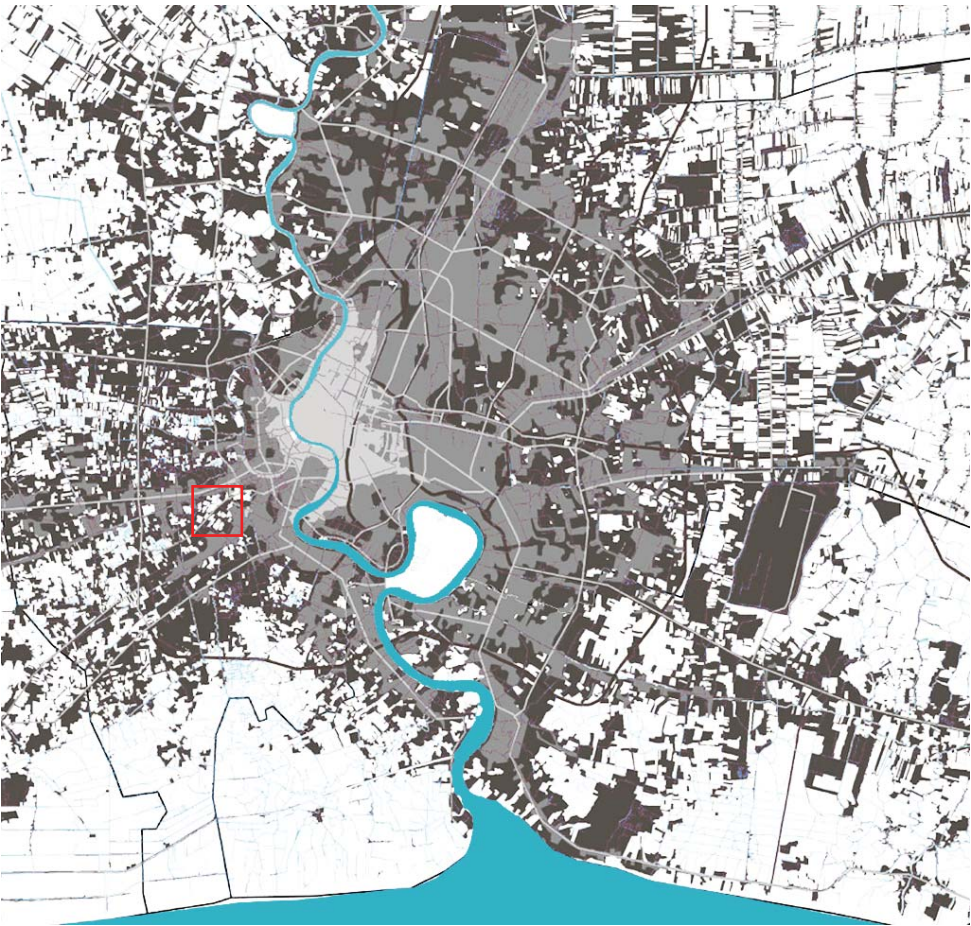


Site aerial view



3 SITUATION

3.1 The urbanization and regulation city plan



Bangkok's urbanization

Source: Urban design & development center, Thailand, 2015

1910s 1990s 2010s Site location



1998



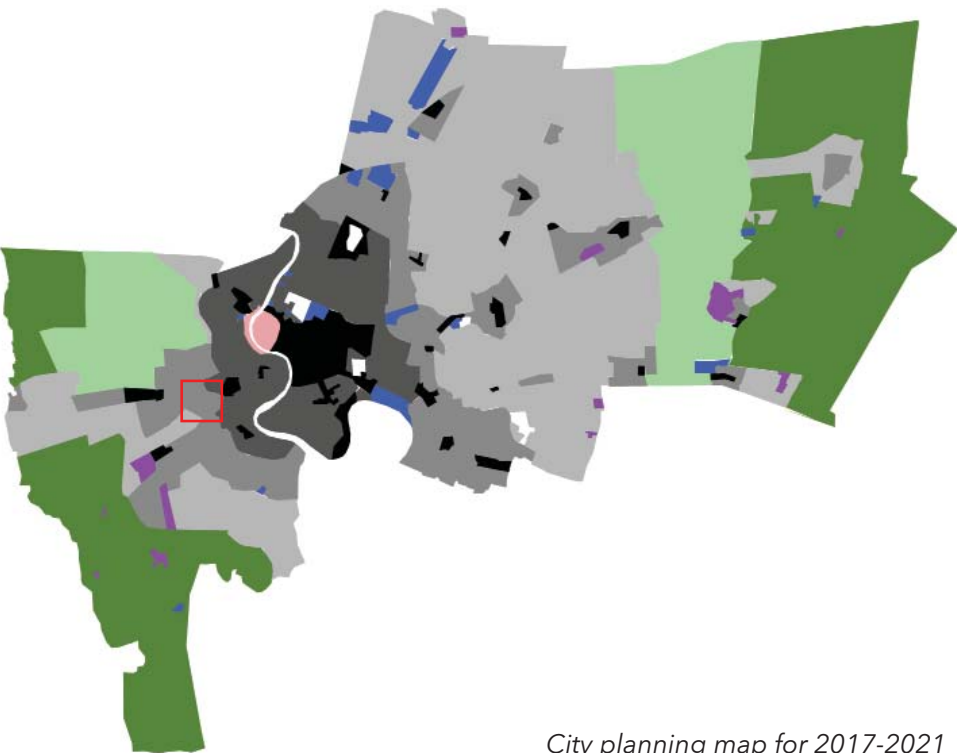
2008



2018

3 SITUATION

3.1 The urbanization and regulation city plan

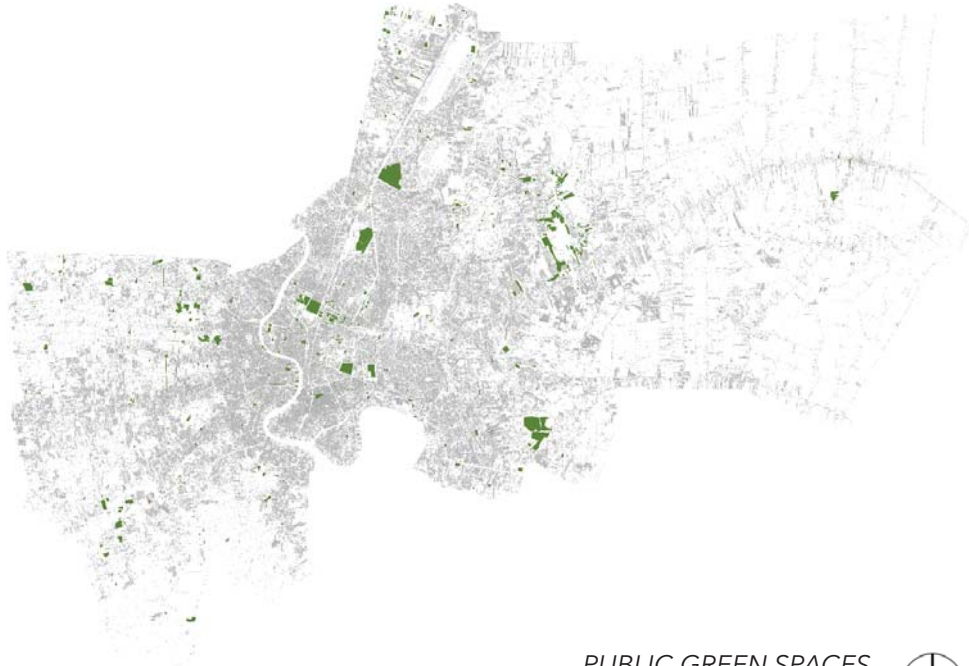


City planning map for 2017-2021
Edited from: City planning map, Department of city planning, Thailand, 2017

	Site location	
	Rural agricultural area	FAR 1:0.5-1.1
	Agriculture and green belt area	FAR 1:0.5-1.1
	Low density residential area	FAR 1:1-1:3
	Medium density residential area	FAR 1:4-1:5
	High density residential area	FAR 1:6-1:8
	Commercial area	FAR 1:5-1:10
	Industrial area	FAR 1:2-1:15
	Government area	FAR -
	Historical heritage area	FAR -

3 SITUATION

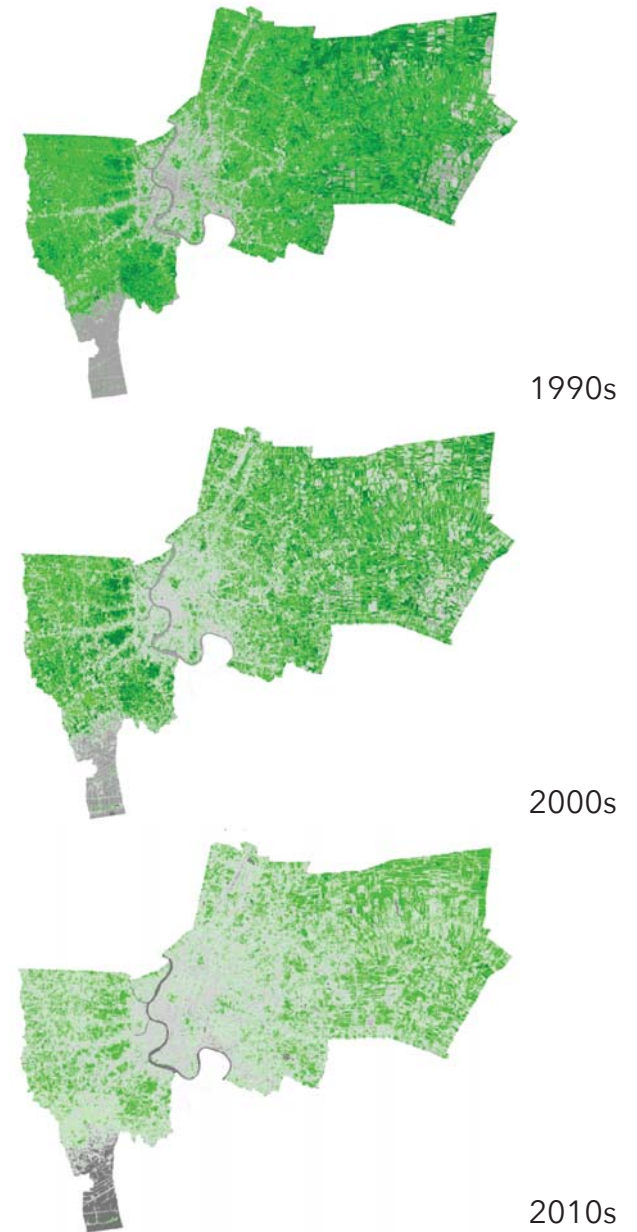
3.2 Public green spaces and vegetation abundance



PUBLIC GREEN SPACES
Source: Bangkok metropolitan administration, Thailand, 2018



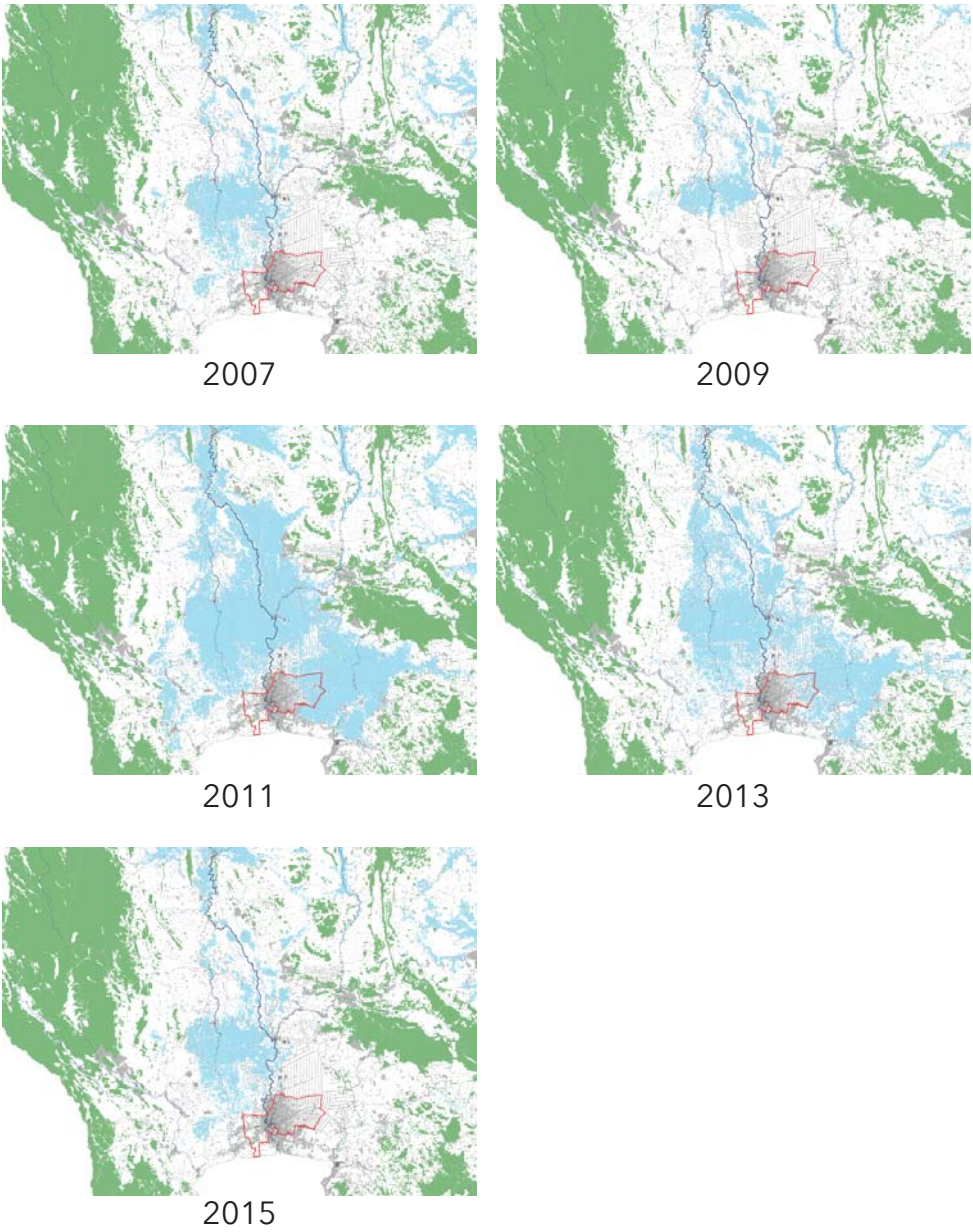
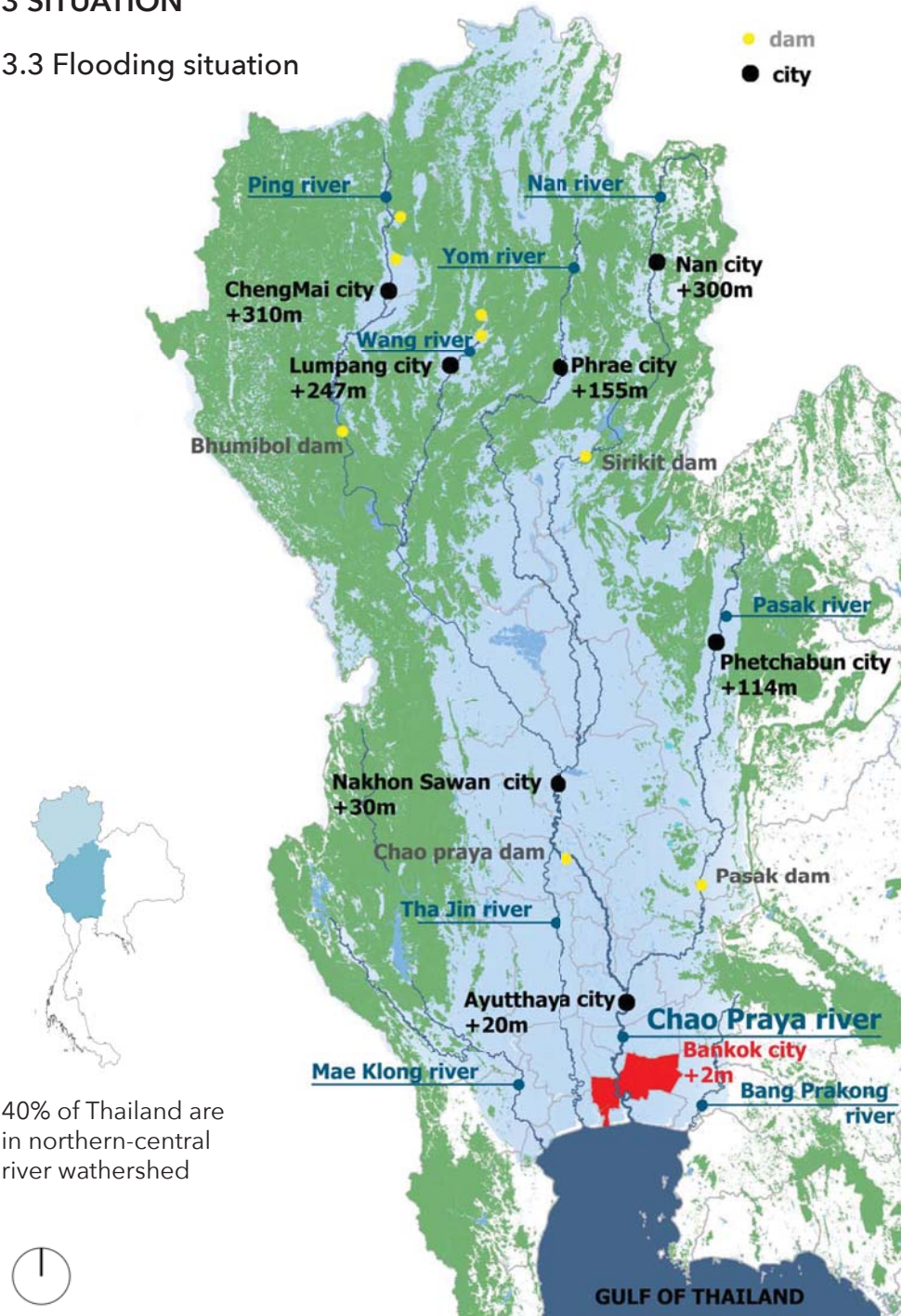
7,953 parks
37,835,200 sq.m. (2.4% of Bangkok)
Park area per habitant 6.6 sq.m./person



The vegetation abundance study
Source: Saga University, Japan, 2012

3 SITUATION

3.3 Flooding situation



The record of flooding situation 2007-2015
Source: Thailand flood monitoring system, 2017

4 OBSERVATION

4.1 OBSERVATION 1: "TYPOLOGY"

Nowadays, the housing projects that are built in Bangkok are contrary to their geography and hydrology.

Bangkok has been the flooding city so far. Geographically, Bangkok is located at the outlet of the river delta area, where is flooded naturally on JUL-OCT every year. The relationship between flooding situation and Bangkok was positive. The settlement, housing typology, and agriculture had adapted itself to the water. But now, flooding situation is turned to negative.

In recent years, the housing projects that are planned and built in Bangkok, are contrary to their geography and hydrology. The projects are aimed to achieve the investment speculations. It is forced to resist the nature then leave the duty of flood-proofing to the structures such as dams, drainpipes or walls more than contributing to the sense of "living with water."



Ancient Thai house by Simon de la Loubère, 1687
Source: National archives of Thailand

4 OBSERVATION

4.1 OBSERVATION 1: "TYPOLOGY"



Thailand flooding situation in 2011

4 OBSERVATION

4.2 OBSERVATION 2: "DENSITY"

The population growth due to rapid urbanization and the demand for new housing in the area around the city center has caused Bangkok to suffer from lacking public open space.

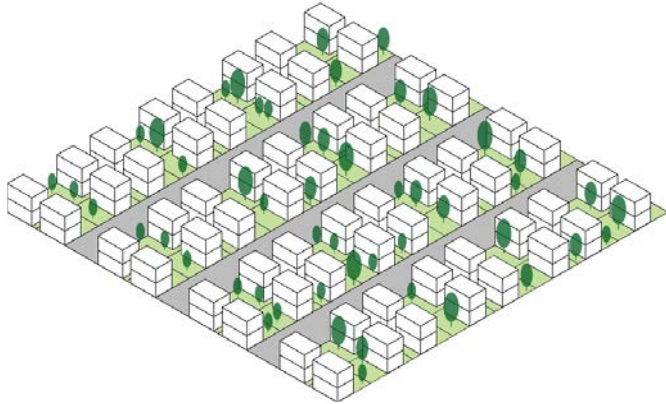
Instead of developing the urban residence that is responded to the urban changes with more density and using less ground. The mass productions of single housing has built rapidly. Due to the characteristic of single housing has led the open spaces to encounter with the isolated layout and have the low sense of community.



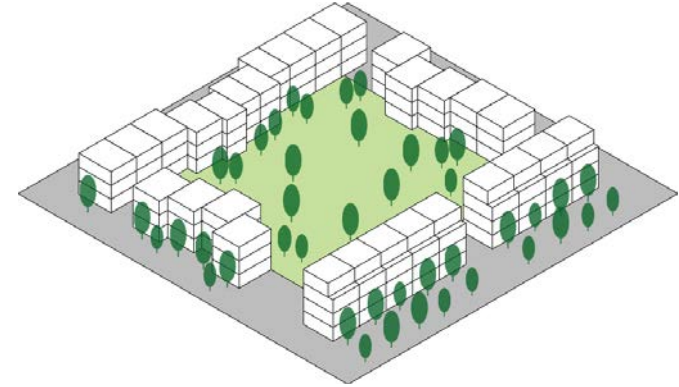
*The mass production of single housing in Bangkok
Source: Nation news, Thailand*

4 OBSERVATION

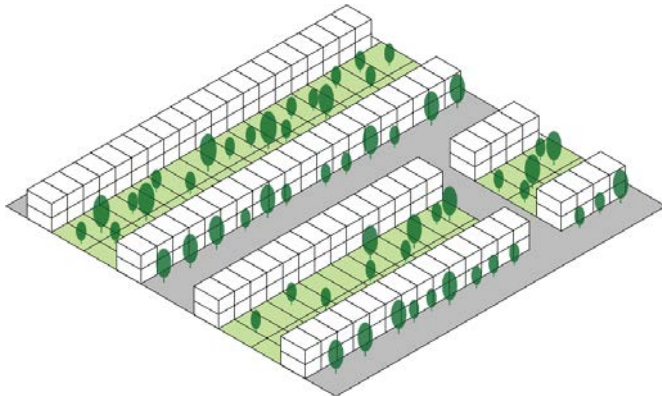
4.2 OBSERVATION 2: "DENSITY"



Single housing
An isolated open space layout



Series of blocks enclosing
A collective open space layout



Row housing
A terraced open space layout

The different forms of planning that achieve the same density, 65-75 units per hectare, show that the open space and density can be achieved in different ways. This leads to the conclusion that different housing typologies can accommodate the requirements for densification.

Edited from "The Urban Task Force", Richard Rogers, 1999

5 THESIS

The project will investigate the agreement between the housing development and existing agriculture as a structure of urban sustainability in Bangkok

Research question

- How can agriculture work as a public park?
- What type of housing can be densified and situated without destroying the existing natural condition?
- What typology of architecture and landscape can deal with the flooding probability?



6 APPROACH

Agriculture as a potential open space

The project will investigate in an existing landscape; water and agriculture, to create the installation of the raised structure, circulation and park framework, also free the ground for natural condition as a potential open space, finding the possibility to connect the installation to the existing such as the canal, farmer's house, temple, and public transportation.

- see precedent study P. 31-43 and P. 44-49

Typology and density

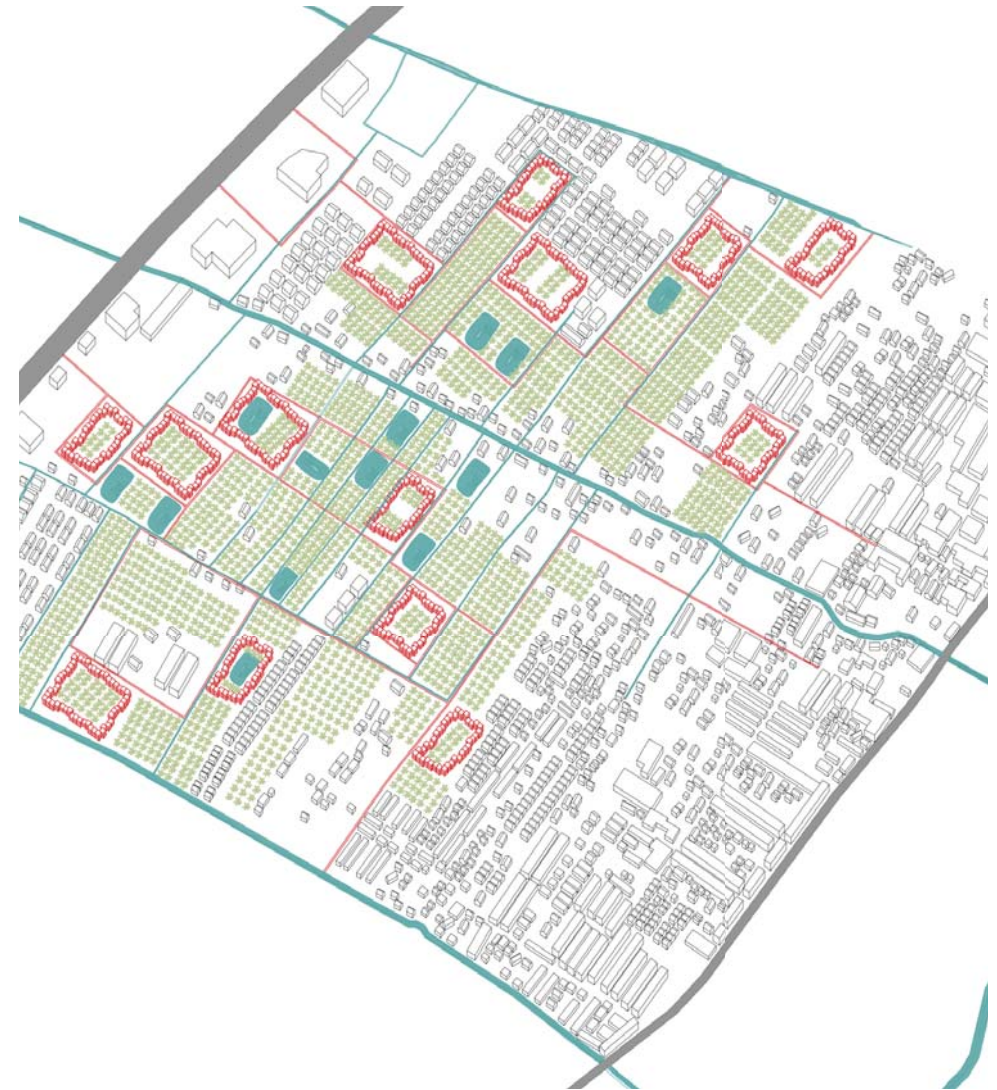
The approach focuses around doing research through the act of designing to continue the relationship between water, living, and agriculture provided by traditional architecture and local plantation. Also, the collective planning is purposed to the typology to achieve the high density and provide more open space.

- see precedent study P.50-55

Design proposal

- A master planning aspect aims to provide the organization of the agricultural park framework. The collective and integrated strategy is purposed in accordance with the existing land use to preserve the cultural landscape.

- An architectural aspect dealing in the building scale of the housing typology aims to create more adaptive and collective situation, where the design aims to re-establish a relationship between people to landscape, people to nature and people to people.



The sketch idea

7 PRECEDENT STUDY

7.1 THE GREAT GREEN LUNG

Project name: The urban oasis, Bang Krachao
Architect: Royal forest department
Year: 1991-On going
Location: Samutprakan, Thailand
Scale: City planning

Project's focus

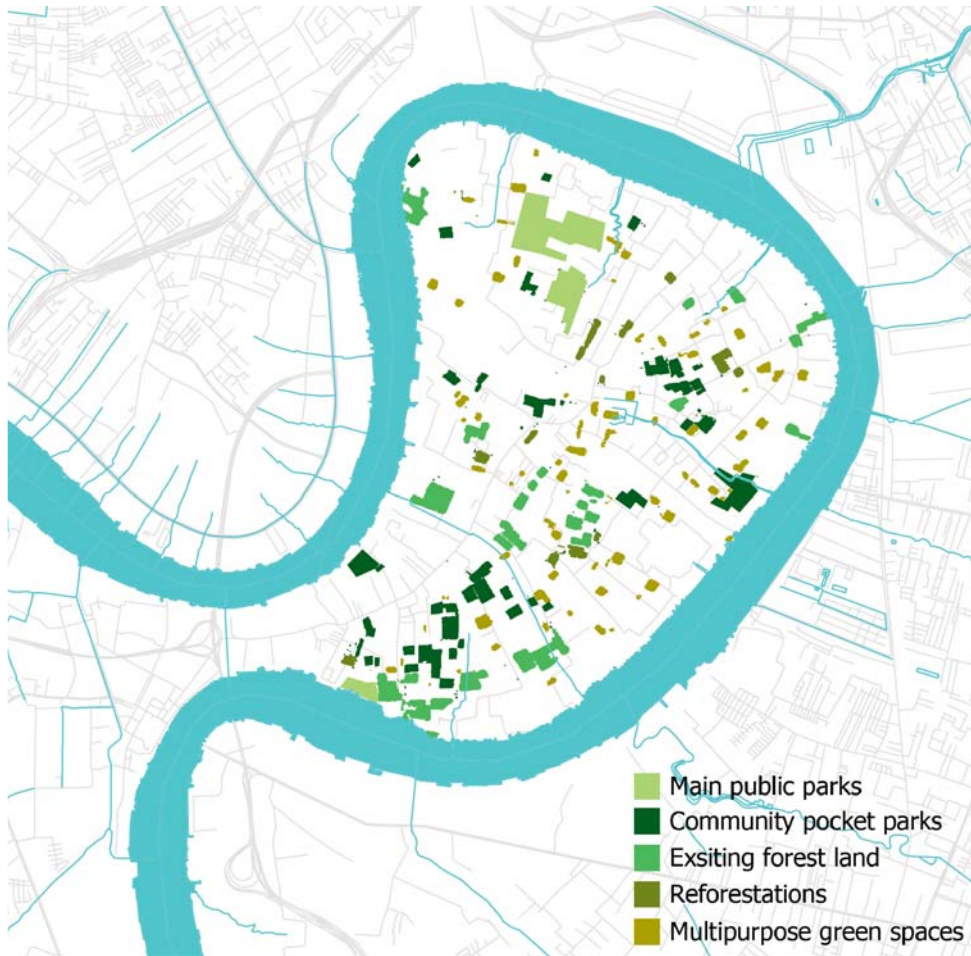
The Royal project aim to preserve the agricultural island, Bang Krachao, as a huge public green space among the urbanization of Samutprakan city and Bangkok metropolis. The project aims to develop a strong position from the private agriculture lands to more diversity of function.



Bang Krachao Island

Source: The urban oasis project, Royal forest department, 1991

Project's main strategy - The park



Edited from: The urban oasis project, Royal forest department, 1991

Creating 2,041,600 sqm. of the green structure consists of 500+ parks consist of the ordinary parks, botanical gardens, wetland garden, forestation and agriculture park where work as the main recreation area for the island.



The ordinary park as social space

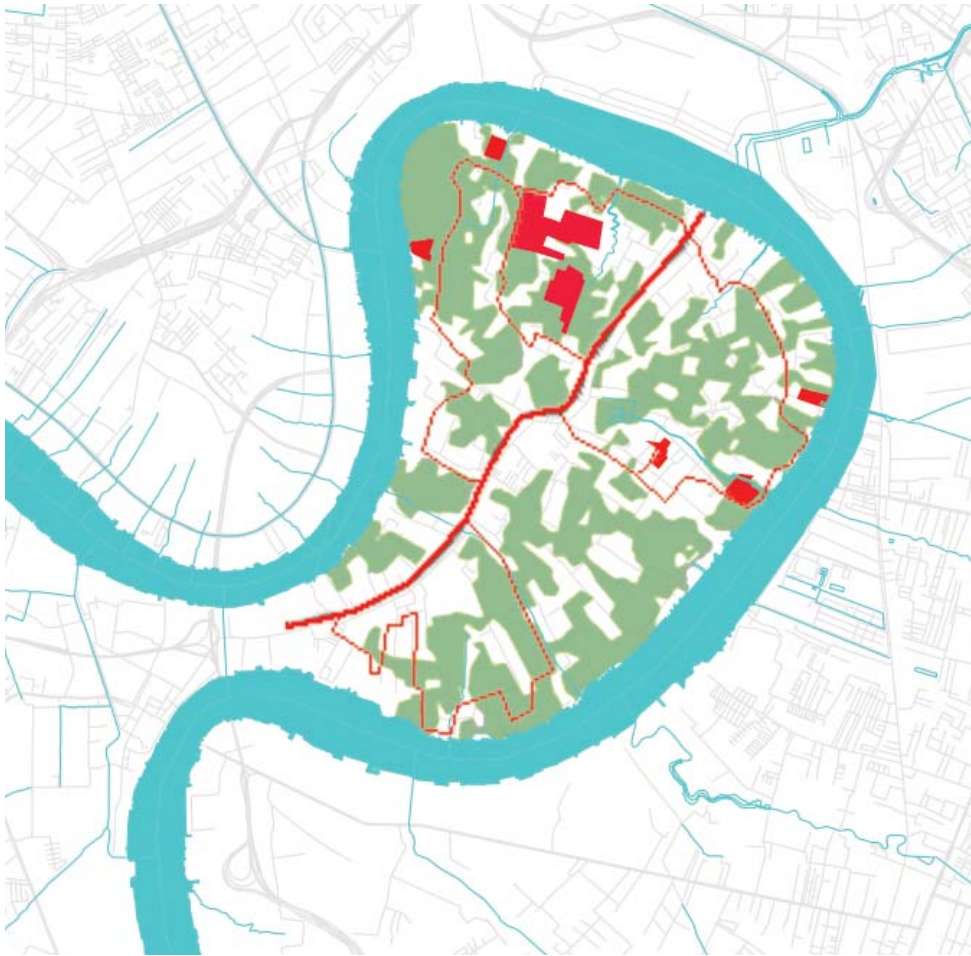


The park as a water storage



Agriculture as a pocket park

Project's main strategy - The pedestrian



Edited from: The urban oasis project, Royal forest department, 1991

Making the whole area become an urban park by creating the passages through the private agricultural area in the agreement of participatory methodology with the villager and preserving the existing pathways in the gardens connecting to the public space such as the parks, ferry landing, temples, markets, and administration buildings.



The passages, biking trails, connect the park to local paths and other public areas.



The raised walkways that criss-cross the fruit gardens



The existing pathways in the gardens

Project's main strategy - The water



Edited from: The urban oasis project, Royal forest department, 1991

The watergates and control stations were placed at the outlets of the canal network, controlling the water level that needs for agriculture activities. The parks work as the retention pond as well as wetland forests are preserved as the natural flooding storage.



Watergate and control station



Water groove vegetation

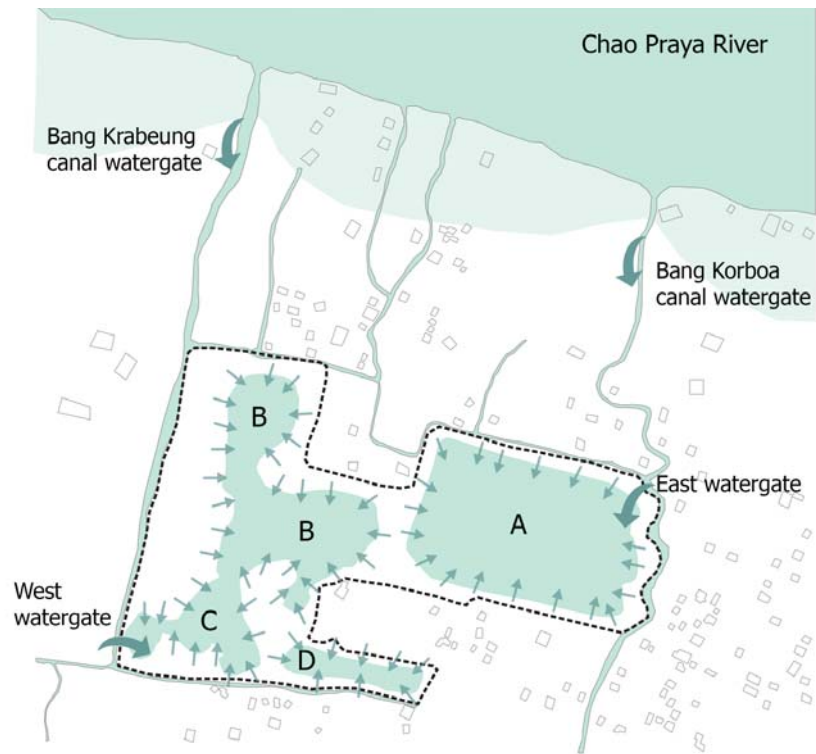


Wetland forestation

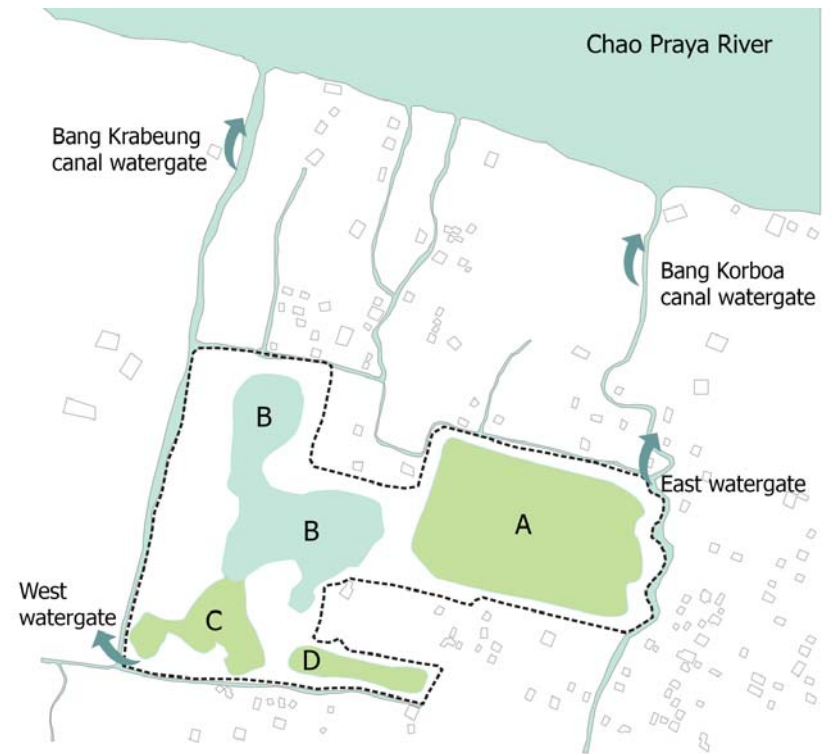


Sri Nakhon Khuean Khan Park and Botanical Garden
Source: *The urban oasis project*, Royal forest department, 1991

The parks are in the part of hydrological system of the island. It provides the structure of water management such as retention pond, wetland agriculture, wetland forest and botanical park.



Strom period: Rainy season
JUL-OCT



Dry period: Winter & summer season
NOV-JUN

- A: Wetland zone
- B: Lake zone
- C: Agriculture zone
- D: Local botanical zone
- Overflowing area
- Hydrology
- Watergates



Edited from: Sri Nakhon Khuean Khan Park and Botanical Garden,
Thai Association of Land scape Architects, 2012

7 PRECEDENT STUDY

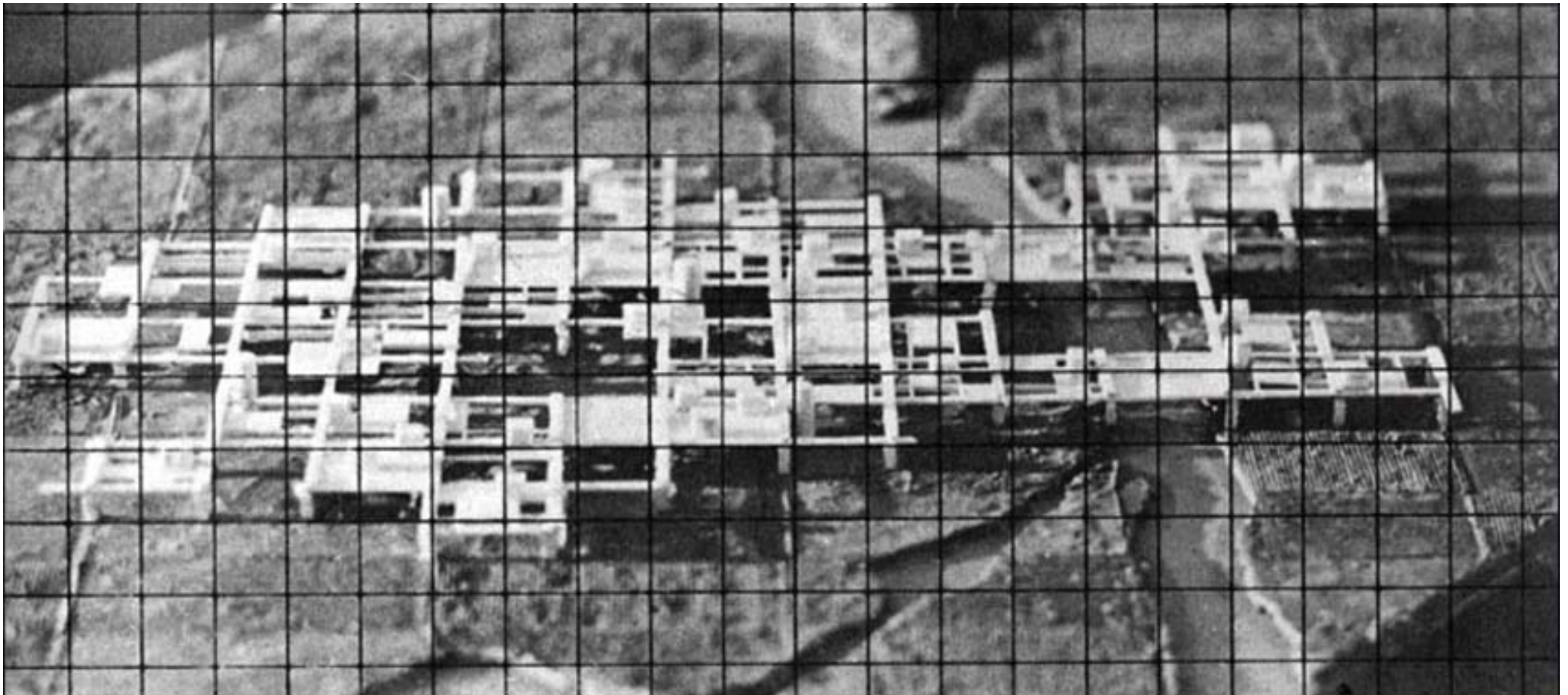
7.2 AGRICULTURAL CITY

Project name: Agricultrual city plan
Architect: Kisho Kurokawa
Year: 1960
Location: Aichi, Japan
Scale: City planning

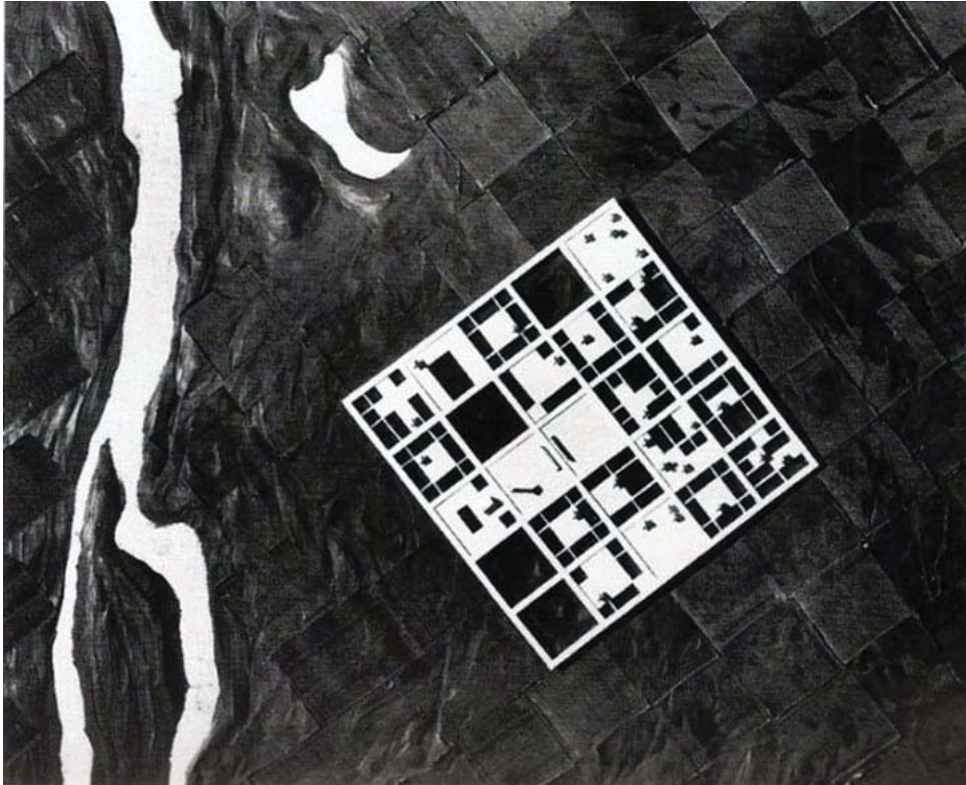
Project's focus

"The agriculture community should be located in compact and well-planned suburban areas so as to form ties with the urban area, and because these suburban area may, in the future, be cities themselves"

-Kisho Kurokawa, metabolism in architecture, 1977



*Model, Agricultural city
Source: Kisho Kurokawa, 1960*



Model, Agricultural city
Source: Kisho Kurokawa, 1960

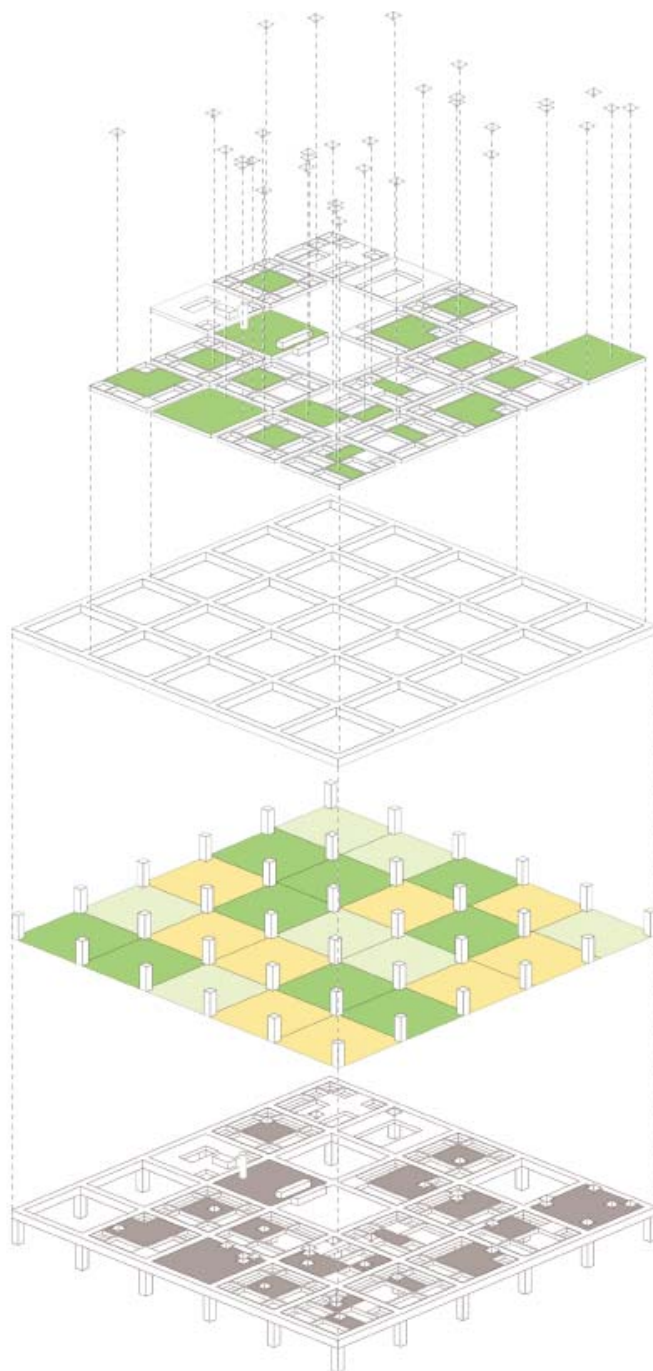
Project's main strategy

Natural growth of the agricultural city is provided by a grid system of streets containing the utility pipe underneath. While each of the square units composed of several households is autonomous, linking these units together creates a village.

The living units multiply spontaneously without any hierarchy, gradually bringing the village into being as the traditional rural settlement has developed throughout Japanese history

The earth is then free for agricultural use while the private dwellings are above the installations so as to protect them from floods.

-Kisho Kurokawa, *Agricultural city*, 1960



the private dwellings are above the installations so as to protect them from floods.

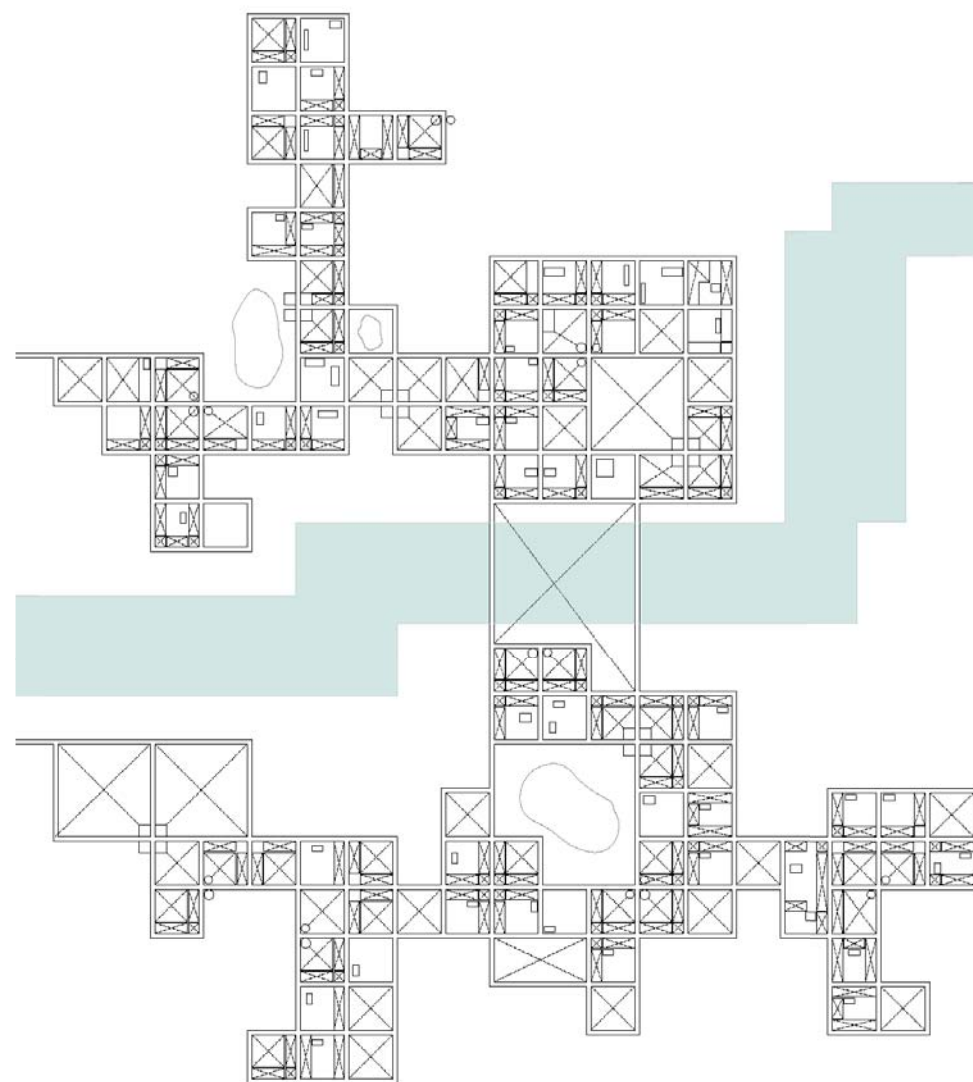
The grid system organized around public facilities and located on artificial soil over pilotis, off ground, where all the installations and circulation meet.

500x500 metres a grid system of streets, creating from the agricultural pattern, contains the utility pipe underneath.

The earth is free for agricultural use and common handling.

A 500 m x 500 m frame is the basic unit of the community. It consists of twenty five 100 m x 100 m blocks for 200 people.

Edited from: Agricultural city, Kisho Kurokawa, 1960

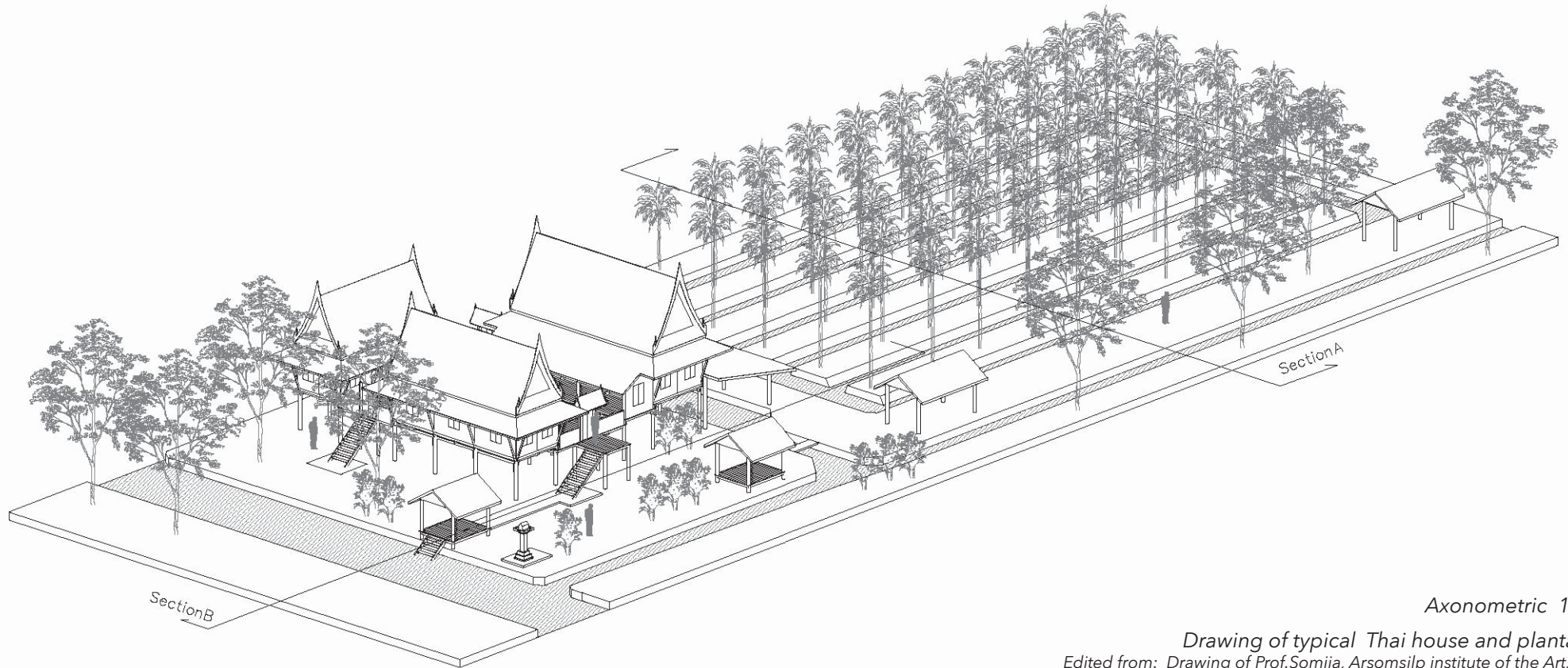


Plan
0 100 200 500 meters

Edited from: Agricultural city, Kisho Kurokawa, 1960

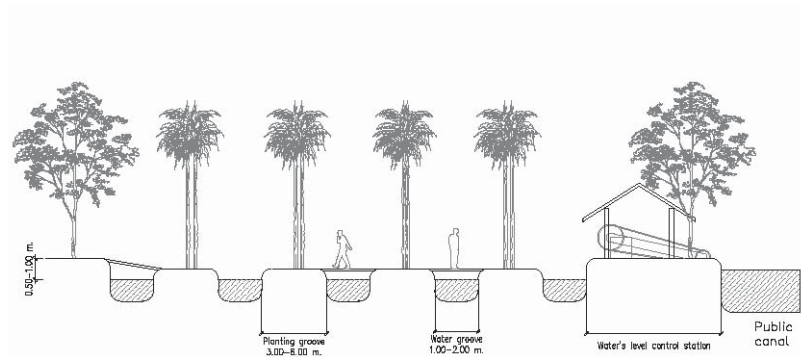
7 PRECEDENT STUDY

7.3 TRADITIONAL THAI HOUSE AND PLANTATION IN THE CENTRAL REGION



Axonometric 1:350

Drawing of typical Thai house and plantation
Edited from: Drawing of Prof.Somjia, Arsomsilp institute of the Art, 2016



Section A 1:350



Section B 1:350

Edited from: Drawing of Prof.Somjia, Arsomsilp institute of the Art, 2016

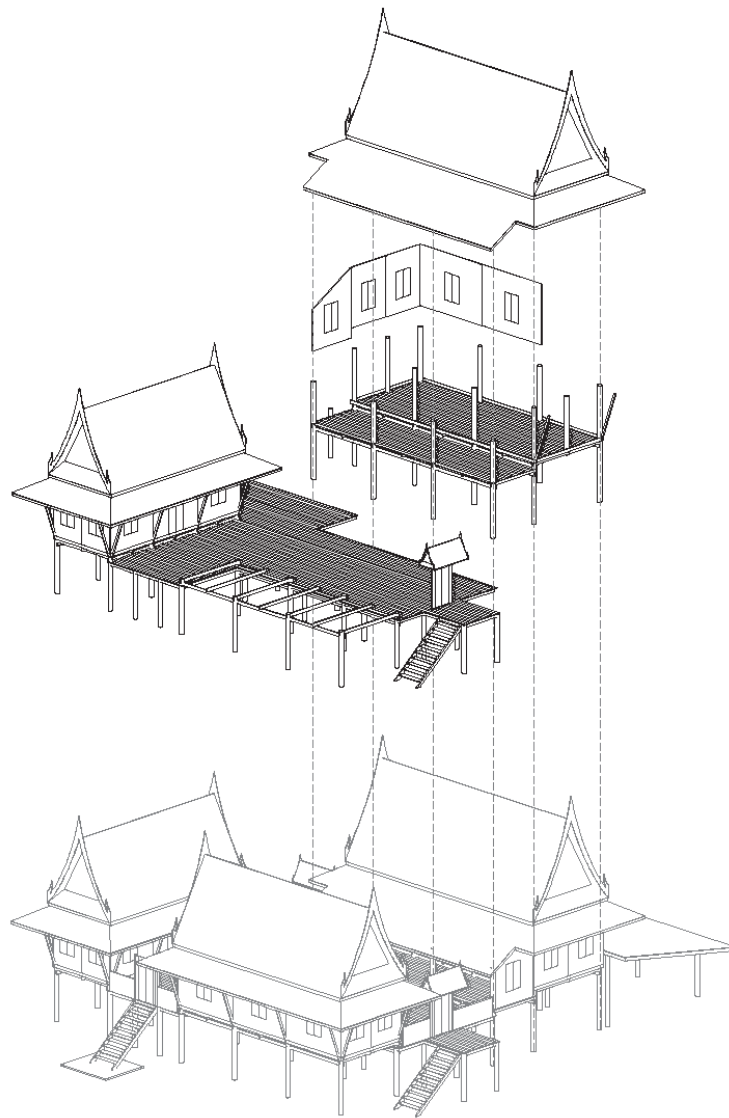
The folk water groove plantation

It is a way to grow crops by digging around agricultural plots and trenches to raise the inside to high. The digging grooves are used for water storage and to water the plants.

The cropping was developed and adapted from the concept of farmers in the central region, where dikes were plotted around agricultural plots to prevent floods each year by digging up grooves in their plots to allow for water retention and a source of water for plants. It also makes it easier to plant water. The plants grown in this system include fruits and vegetables.

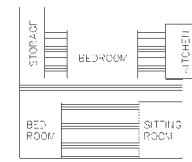
The traditional house typology

To living in the canal site, the houses are located facing to the public canal and using a boat for the transportation. The boat dock is used not only as a dropping point but also it is a meeting and waiting area for the visitor. The minor waterways are excavated to the back of the house, where the boat storage and plantation are the functions. The house sits on the raised structure to avoid flooding and also space under the house is used as tool storage, animal husbandry, and cart parking.

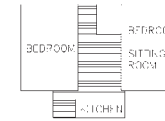


Thai house

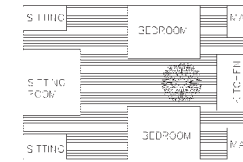
Edited from: Drawing of Prof.Somjia, Arsomsilp institute of the Art, 2016



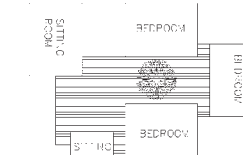
Suksomwat clan's house



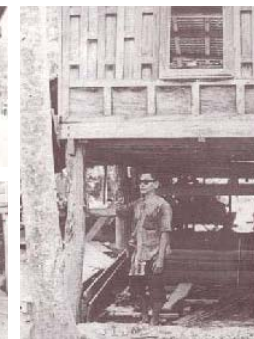
Kantabutta clan's house



Thup Kwan Palace



Buntakanchanakul clan's house



Collective planning

The rooms are clustered together around the outdoor space at the center of the house. The sun deck acts like common area as the collective space and transition space of the house

Prefabrication

Because of canal site, all components are prefabricated in a carpenter house and the house are built on ground before raise it on the structure.

Space under the house

Not only it is a design for facing flooding probability but also the space under the house is used as agriculture's tool storage, animal husbandry, cart and boat parking.

Source: Construction of Traditional Thai-Style Wooden House, Chulalongkorn university, 2013

8 SITE

WATER

The site of Bang Prathun village is located along the Bang Prathun canal which is connected between two main canals that they flow from the central river. The canal is used as transportation for people and goods. There are the various minor waterways that are excavated from the canal through the land to serve the water for agricultural activity. Moreover, it creates the water network as a secondary circulation using in the community.

-see the mapping P.58-63

AGRICULTURE

Bang Prathun's agriculture is the cultural landscape and it also is a productive landscape where still remain the way of folk plantation producing the foods to the city for more then 200 years. The agricultural lands are located on the water network among the best location, connecting to the local markets and social places; temple. Not only temple is a space for religion, but also there are a roles as cultutal, social and economic area.

-see the mapping P.64-71

URBANIZATION

From the eary settlement along the canal in 1800s til late 1900s, Bangkok went from agriculture city to a huge metropolis. The canal are degraded and the roads become the main circulation for the city. Bang Prathun canal was divided by the new road which connect between two city ring roads. The urban settlement started to take over the folk, starting from 1950 and make the agricultural land and the water system narrower by the mass production of housing development.

-see the mapping P.72-83

In the other hand, the urbanization also bring the public transportation. The site is greatly benefited from the location among the various public service such as the metro, regional railway, Bus line and boat line.

-see the mapping P.84-87



Site location

HYDRROGY
1:75000

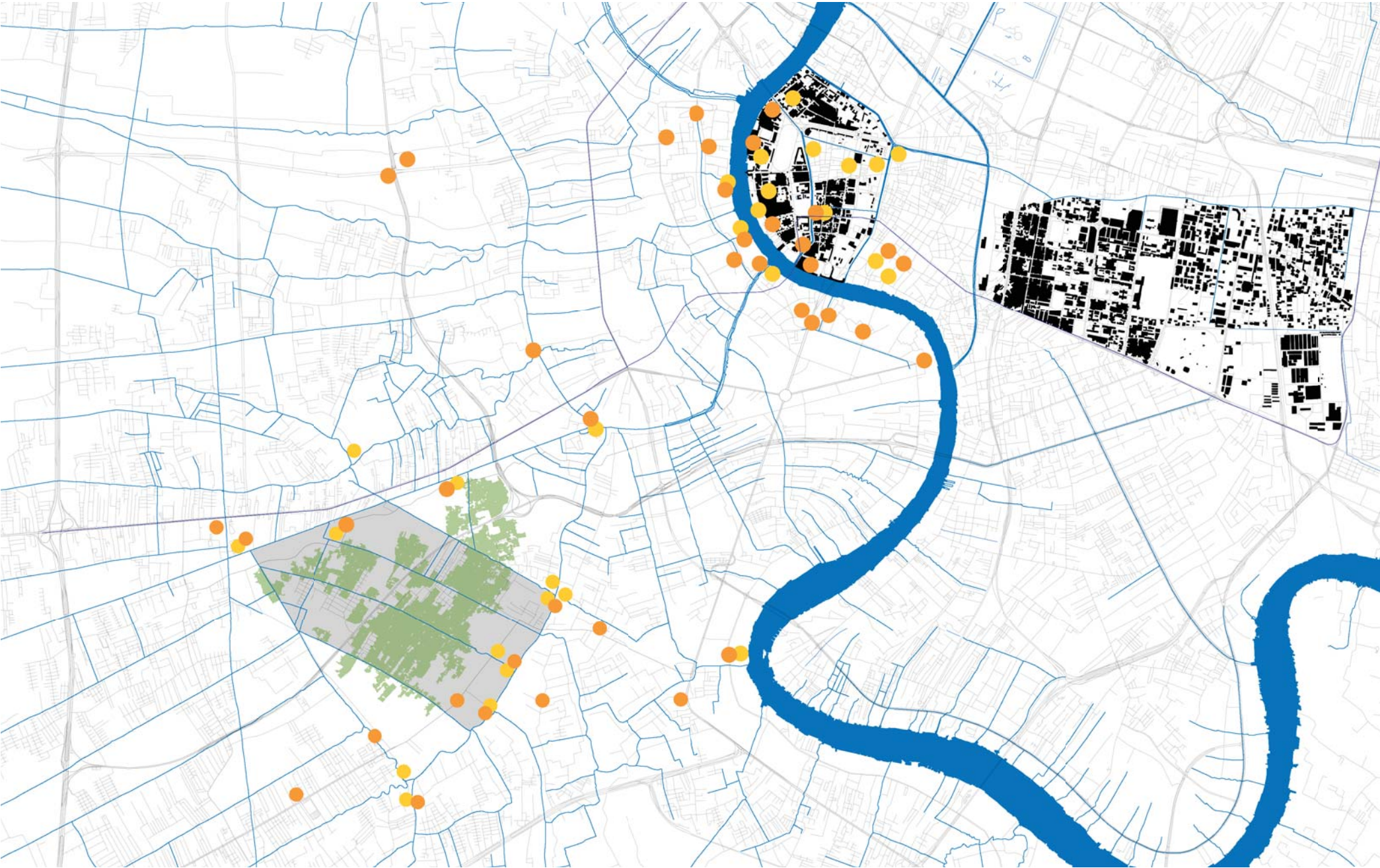




Site location



The canals work as a network of transportation.







Water groove plantation



Water field plantation



The house faces to the canal.



Agriculture is the back of the house.

The existing agriculture is a cultural landscape and it is also a productive landscape.

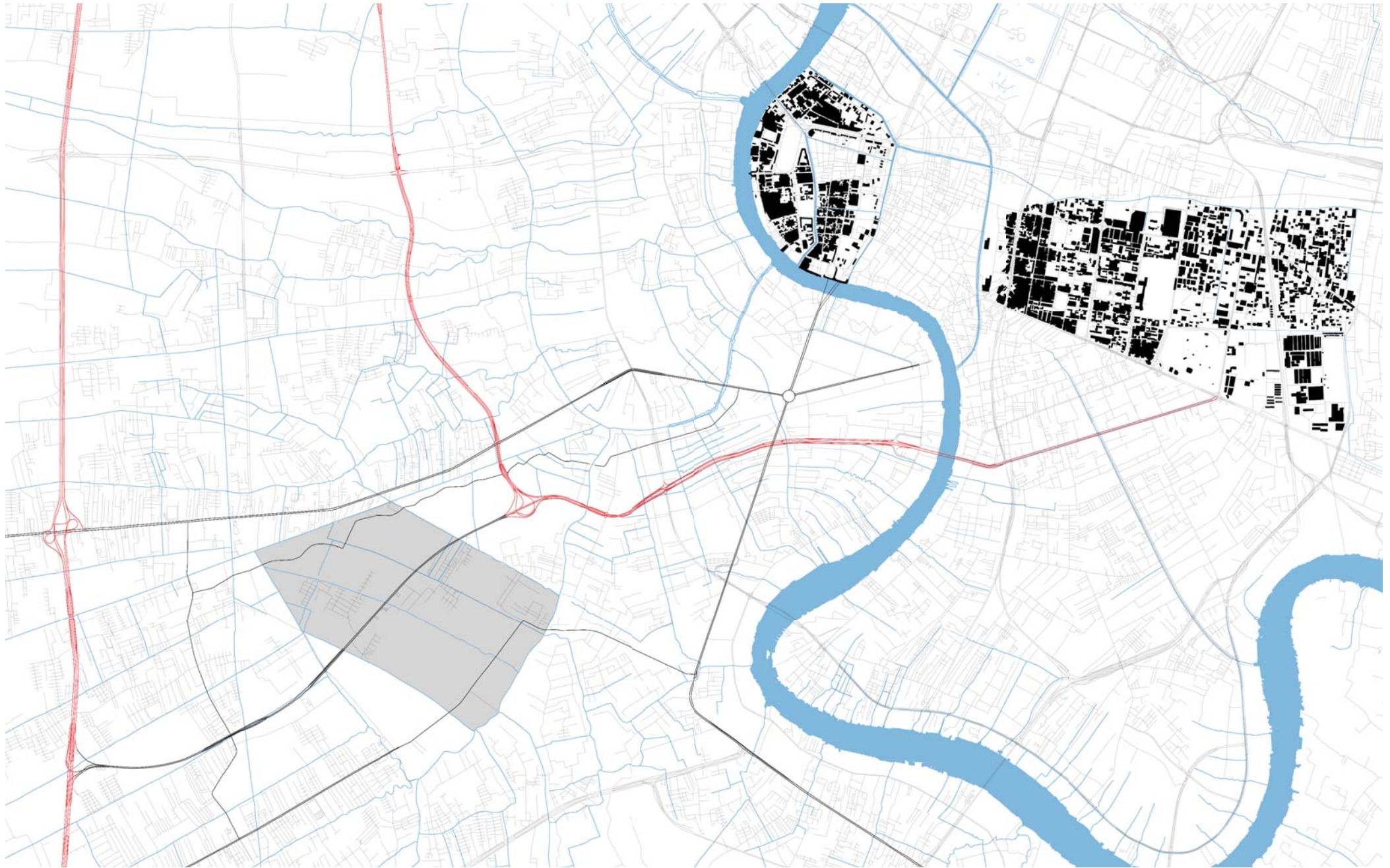


Floating market

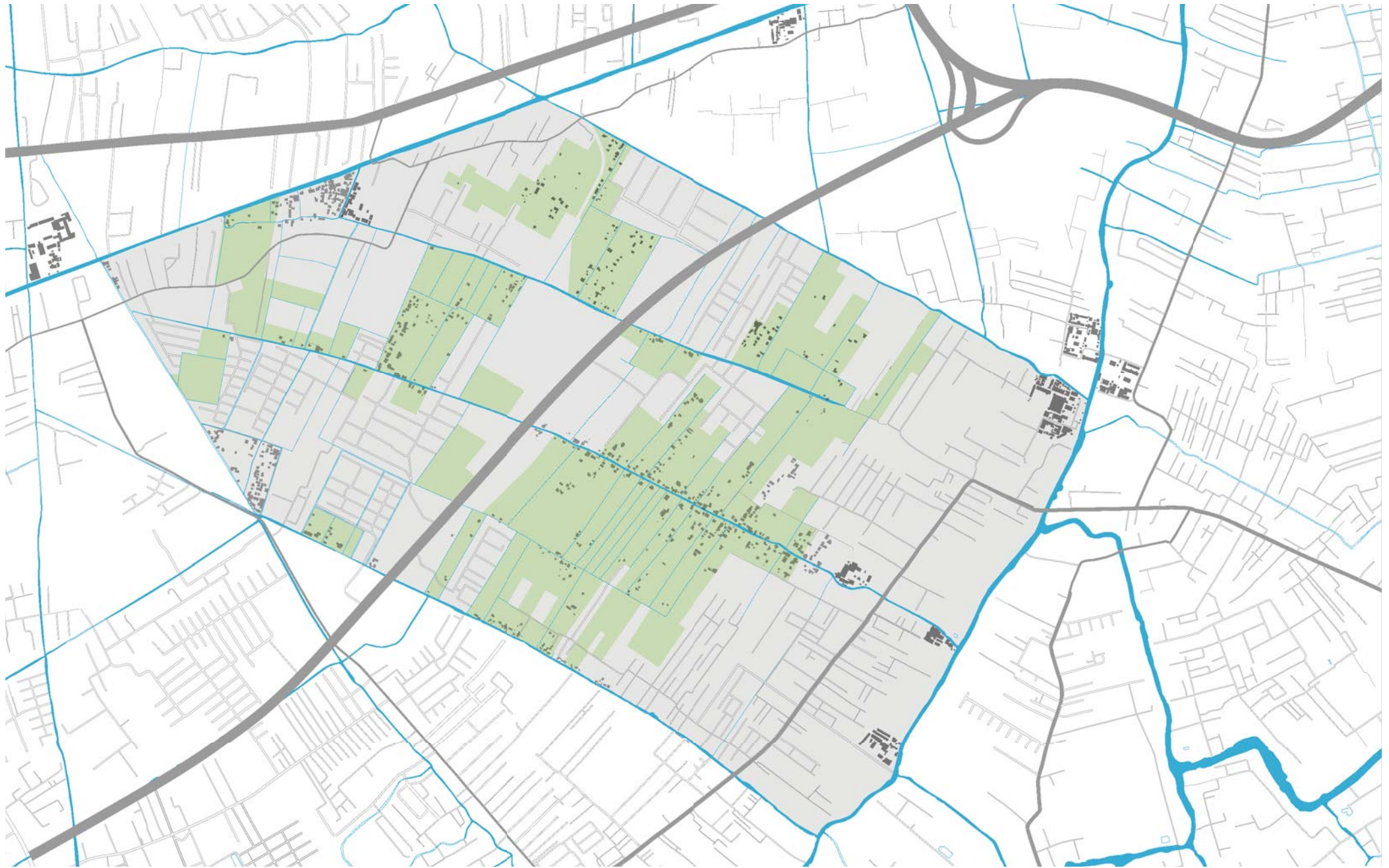


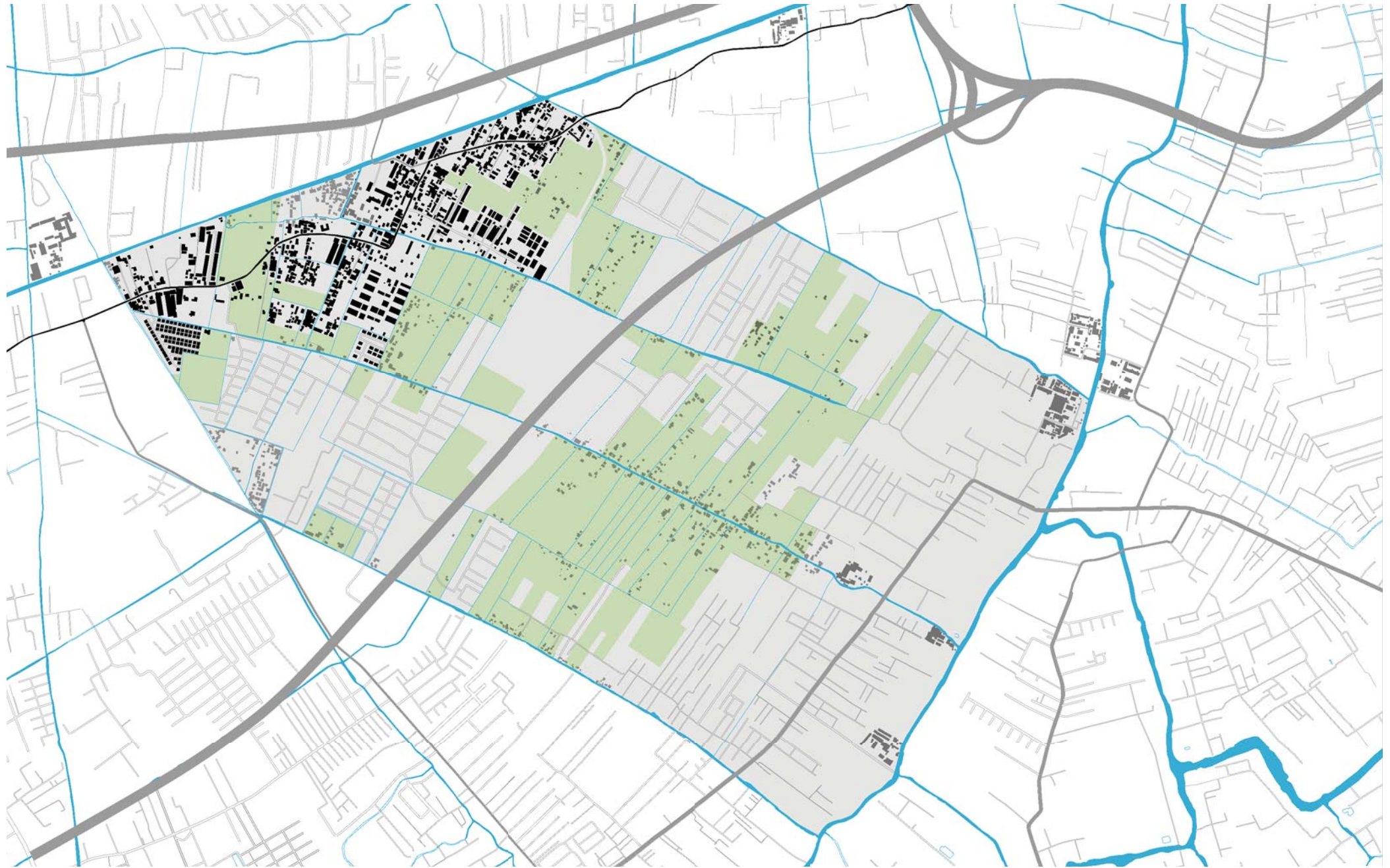
Community's cultural event

Not only temple is a space for religion, but also there are a roles as cultural, social and economic area.



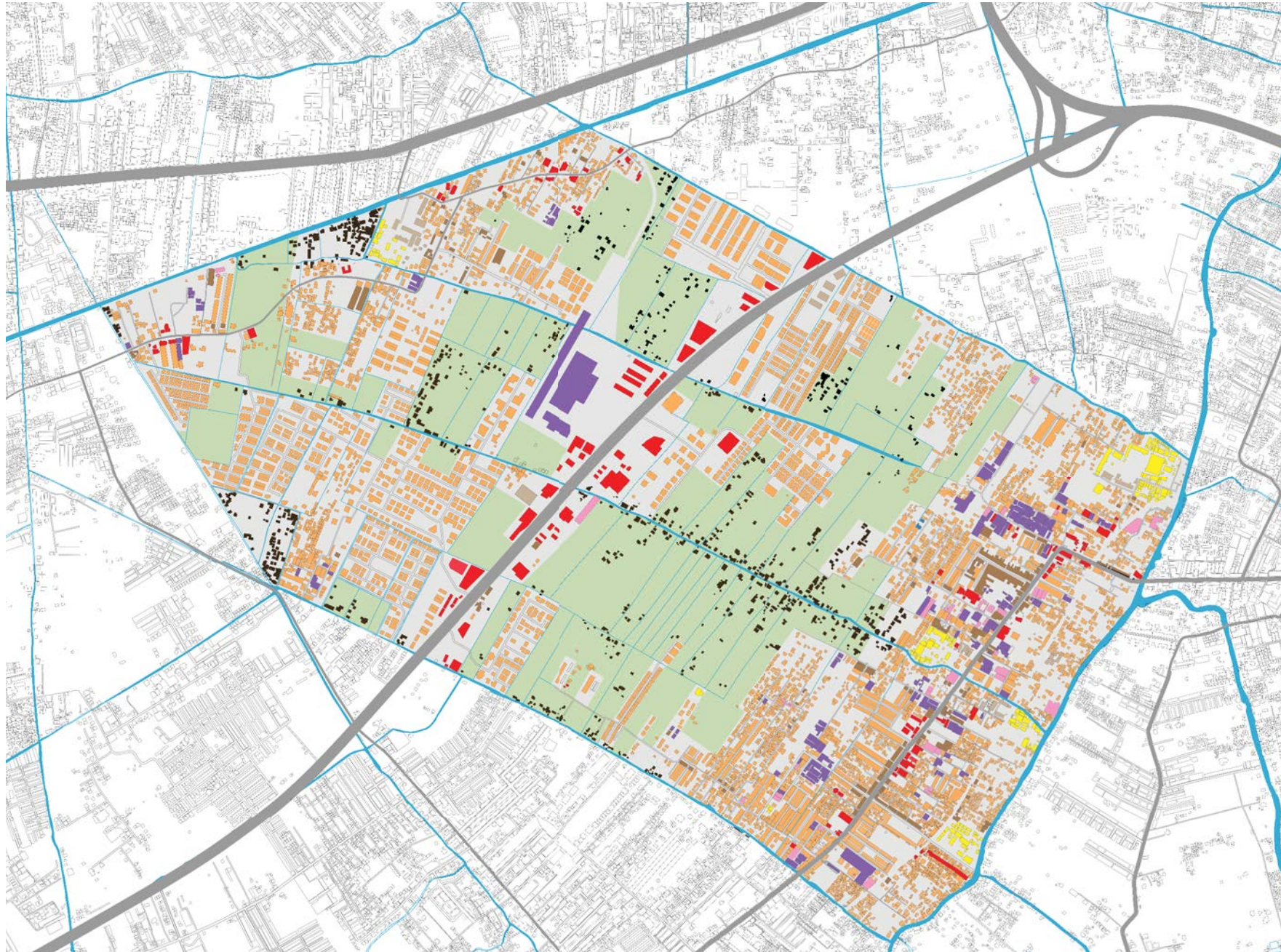
Site location Ring road Ordinary road





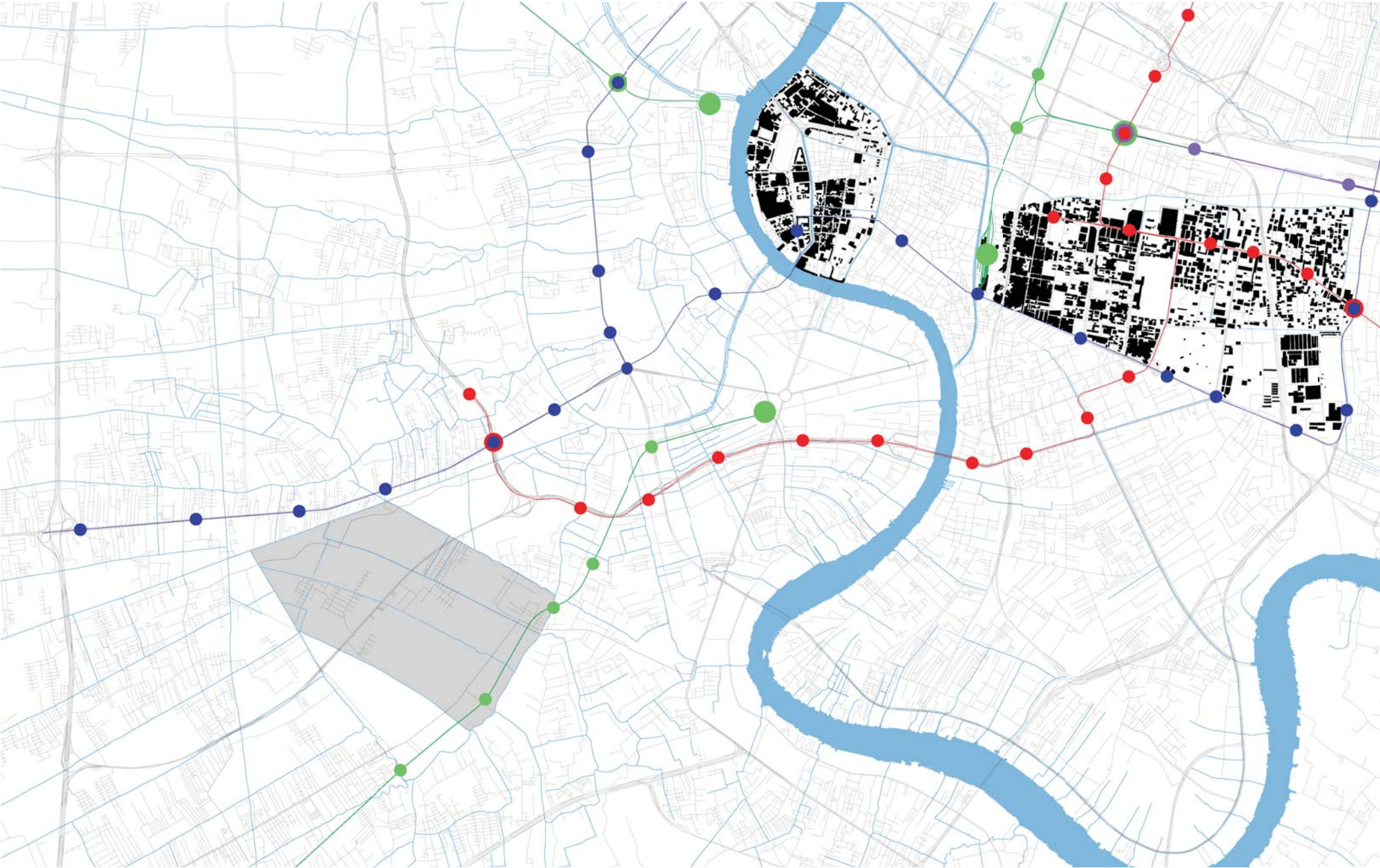






- Site location
- Agriculture
- Canal settlement
- Residential building
- Temple
- Commercial building
- Industrial building
- warehouse building





This map displays a river network with a grey-shaded catchment area. A blue polygon highlights a specific sub-catchment within the grey area. The map includes various colored dots (blue, green, red, grey) and lines (blue, grey, red, green) representing different features like rivers, roads, and infrastructure.

This map illustrates a river network and a specific catchment area. The catchment is shaded in light grey and contains a blue building icon. The river network is shown with blue lines, and various colored dots (blue, green, grey, red) are placed along the rivers and roads, likely representing monitoring stations or specific locations of interest. The map also shows a network of roads and other geographical features.

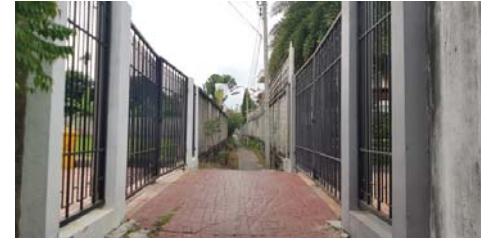
Site location Regional train MRT (Metro line) BTS (Sky train) AIRPORT LINK Bus stand Boat dock

Site location Regional train MRT (Metro line) BTS (Sky train) AIRPORT LINK Bus stand Boat dock

8 SITE



SITE TOUR: WALKING ROUTE



KEY PLAN

8 SITE



SITE TOUR: CANAL ROUTE



KEY PLAN

9 MATERIAL / SCHEDULE

Planning	
Masterplan	1:750
Situation sections/perspective	
Housing typologies	
- Plan	1:200
- Sectional perspective	1:200
Site models	1:750
Housing models	1:50
Diagrams / Illustrations / Sketches	

SURVEY & STUDY	JAN	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	<ul style="list-style-type: none"> - Understanding the urban and social context - Mapping the site: drawing the existing and its surroundings. - Site 3D/DWG model and plan
	FEB	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28	<ul style="list-style-type: none"> - Understanding people's behaviour at the site - Deep investigation of the vernacular building and agriculture - Spatial organisation testing models. - Spatial experiments in drawing and physical model.
CONCEPTUAL DESIGN	MAR	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	<ul style="list-style-type: none"> - Understanding the programs - Diagrams of the spaces - Strategies of space organisation - Physical models of the separate functions.
	APR	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	<ul style="list-style-type: none"> - Developing the final project and program. - Strategies for the organisation of the whole spaces - Physical spatial models - DWG drawings for plans, sections and elevations.
DESIGN DEVELOPING	MAY	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	<ul style="list-style-type: none"> - Finalise all the drawings and presentation model - Submission and final review

10 REFERENCE LISTS

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