

Reviving the Heritage Water Network

A sustainable, adaptive blue-green network for Saga, Japan

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To Dr.ir. Inge Bobbink, even when the project grew too chaotic for me to handle, you calmly pointed out problems one by one and helped me overcome the difficulties, guiding me back onto the right track. Your patient support enabled me to find my own answers.

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ABSTRACT

Keywords:

Landscape Architecture, Saga city, Japan, Water Heritage, Depopulation, Adaptive Transformation, Climate Resilience, Urban Voids, Rural Revitalization, Blue-Green structure, Sense of place

Situated on the Tsukushi Plain in Japan, Saga City developed a distinctive water network in response to an extensive tidal range from the Ariake Sea and limited irrigation water from the surrounding mountains. This system enabled the city to cope with drought and flooding, becoming the cultural and spatial backbone of urban life.

With twentieth-century modernization, centralized water infrastructure, and depopulation, however, the canal network lost everyday relevance: many canals were filled, consolidated, or culverted, and remaining reaches suffer from sedimentation and overgrowth. Saga's identity as a "water city" has weakened, and vulnerability to extreme rainfall, pluvial flooding, and biodiversity loss has increased.

Adopting the framework of Landscape Biographies (Kolen & Renes, 2015), which views landscapes as continuously rewritten by human-nature interactions, this thesis reconsiders Saga's canal system as a local asset for sustainable development under demographic and climatic stress. The central question is how the forgotten water network can be reactivated as blue-green structures that strengthen climate resilience, ecological health, and community life while retaining cultural value.

The research operates from regional to community scales using a mixed methodology: archival and map analysis to trace formation and urban structuring roles; field surveys and mapping to document present conditions and adjacent land uses; and spatial analysis to identify opportunities to reconnect water with urban voids (vacant or underused sites) and community spaces. Design exploration translates these insights into testable spatial strategies.

The proposal reorganizes the water system as a low-maintenance, climate-responsive blue-green framework that respects historic structure while shifting from human-centered to nature-centered logics. In parallel, it integrates urban voids with canals to weave a fragmented city into a continuous public-space network, making hidden water visible and usable. Design principles extracted from historical water practices are implemented in these places.

Reactivating the network is expected to deliver tangible benefits (improved water management, flood mitigation, ecological connectivity, and restoration) and intangible values (civic pride, place identity, renewed appreciation of heritage). Saga's case advances an adaptive transformation beyond preservation by extracting the essence of local assets and reorganizing them in response to changing times, offering a transferable model for other regional cities.

MOTIVATION FOR SOCIAL ISSUE

Growing up in a rural area of Japan, I have deeply felt the impact of depopulation on local regions over the past two decades. The parks where I used to play as a child no longer echo children's laughter. Meanwhile, in the big cities, countless young people migrate to pursue their dreams, leaving rural areas on a path toward further depopulation.

In Japan's countryside, beautiful landscapes still exist that many of us are unaware of, rooted in past traditions. These local landscapes, shaped by the wisdom of our ancestors, are deeply interconnected with their natural surroundings, forming a symbiotic relationship that benefits both. However, the effects of climate change and depopulation are beginning to disrupt this delicate balance between humans and nature.

For the reasons above, this question has been stuck in my mind for a long time: How can landscape architecture help rural areas adapt to societal and environmental changes while keeping their value and appeal?



Figure 1 Tokyo crowded with people

Source: <https://shibuya-shimbun.com/archives/190>



Figure 2 A vacant house in Saga, Japan

FASCINATION WITH WATERSCAPES

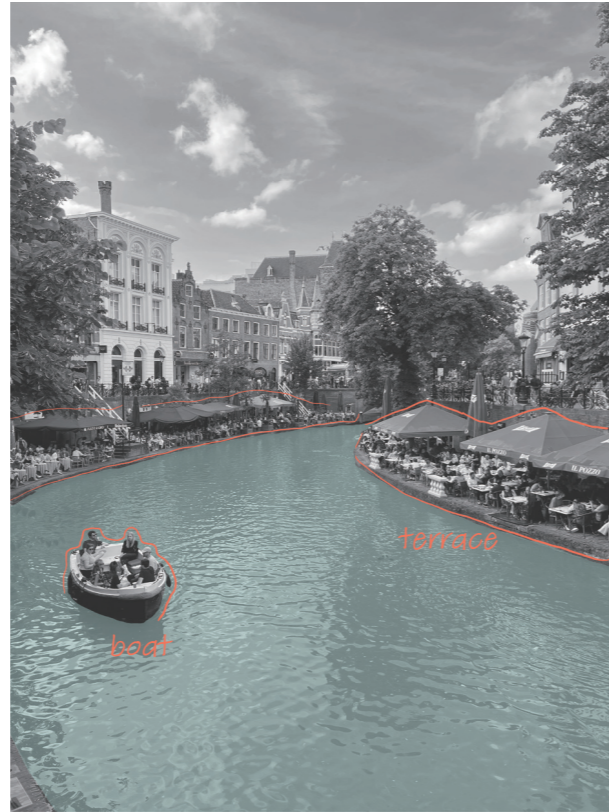
Throughout my study in the Netherlands, I have become fascinated by the lowland's waterscapes. Much of the land has been reclaimed from the sea and lies below sea level. Through centuries of drainage and water management, the country has created a unique landscape shaped by canals. These countless canals, running throughout the cities, have become part of the local identity, providing recreational places for people.

Saga City, located in the Kyushu region of Japan, has geographical features similar to those of the Netherlands, with a history of canal development. However, those canals and people's lives are not as closely intertwined as in the Netherlands.

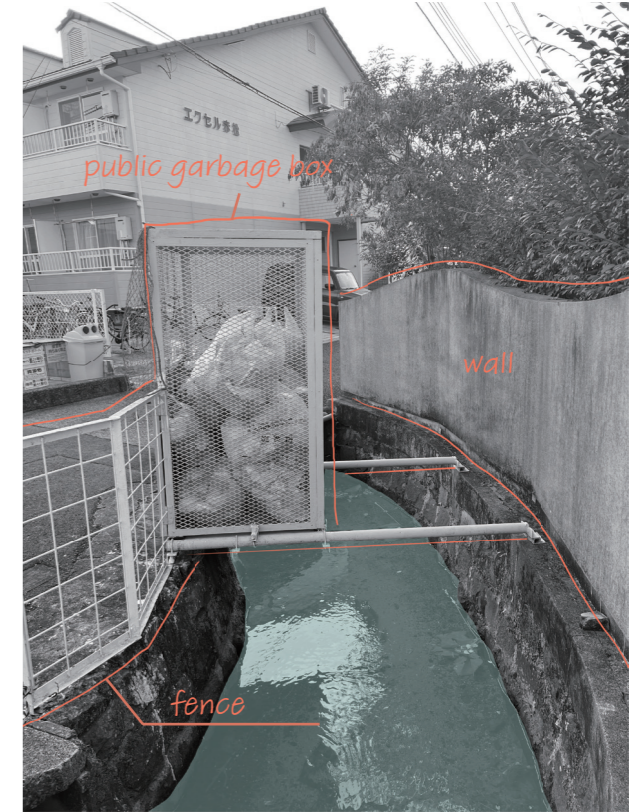
What accounts for this difference, and how can we redefine this relationship? I would like to explore this in this project while incorporating a cultural perspective and drawing comparisons with the Netherlands.



Figure 3 People gathering around the canal in Leiden, the Netherlands



the Netherlands



Saga, Japan

Figure 4 Waterscape in the Netherlands and Saga, Japan

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01

INTRODUCTION

This chapter outlines the research site of Saga City and discusses how its distinctive landscape feature -the water network- was formed and what roles it historically served. It then examines how the relationship between these water network and humans has evolved with changing times, highlighting the current challenges facing the area.

SITE CONTEXT

Saga city, Japan

Location

Saga City, located in Japan's Kyushu region, spans 431.4 km² with a population of about 227,100. It features mountainous terrain in the north and an alluvial plain in the south, connected by rivers and canals. The city's southern border faces the Ariake Sea, known for Japan's largest tidal range (up to 6 meters). Nearby major cities include Fukuoka (1.63 million) and Nagasaki (386,275).

Local Landscape: Water network

Saga City features a dense water network built for irrigating rice fields and supplying water to each community in the Edo period (1600s), with canals flowing through public areas and between buildings. Historic elements like stone washing steps, and old bridges once central to water transport also still remain, shaping a unique, historically rich landscape.

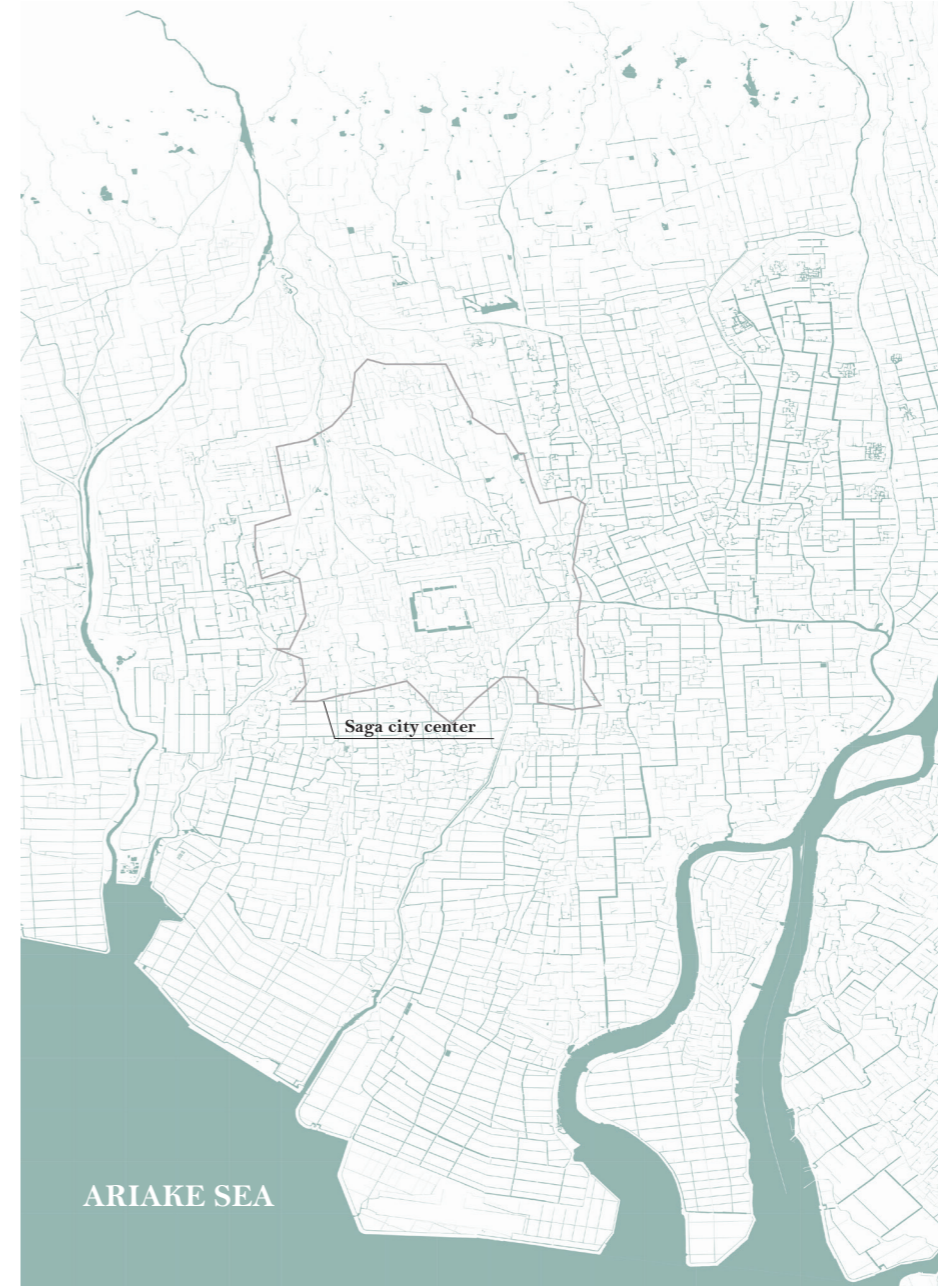


Figure 8 Water pattern of Saga city



Figure 5 Kyushu region, Japan



Figure 6 Tsukushi plain in Northern Kyushu region

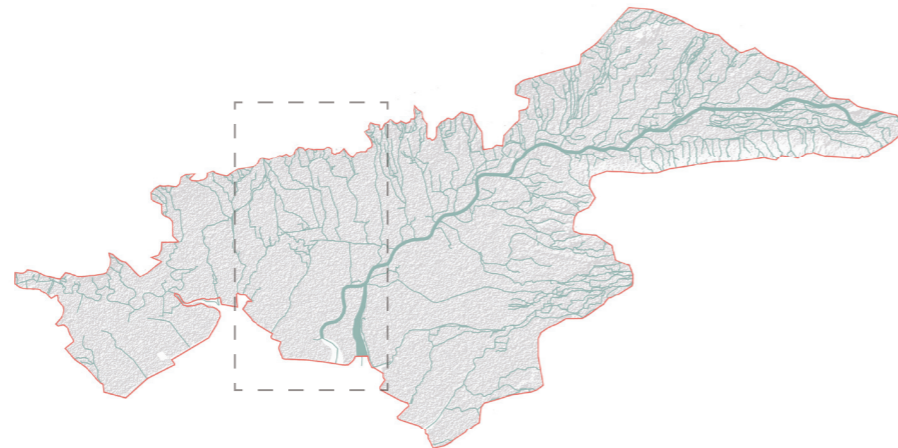


Figure 7 Saga city in the Tsukushi plain



Figure 9 Houses and canal

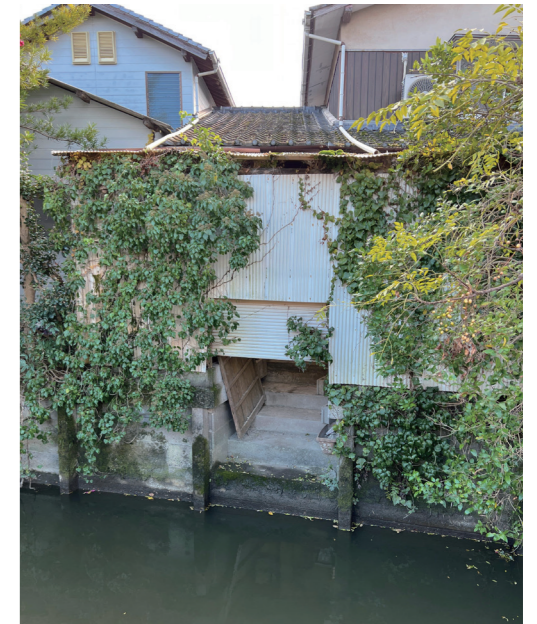


Figure 10 Old washing place

SITE CONTEXT

Climate

Climate zone:	Temperate
Sub-climate:	Cfa-humid subtropical, no dry season
Climate & Weather Averages	
High t°:	21.7°C
Low t°:	12.7°C
Mean t°:	16.9°C
Precipitation:	54.1-366.8mm
Humidity:	70%
Wind:	3.1m/s
Pressure:	1011.5hPa
Hottest Months:	August(28.2°C)
Coldest Month:	January(5.8°C)

Saga is characterized by hot summers and relatively cold winters, with significant temperature differences between day and night. Wind speeds are generally weak. Approximately 40% of the annual average precipitation occurs during the rainy season from June to early July. Combined with the typhoon season, the four months from June to September account for around 60% of the total annual precipitation.

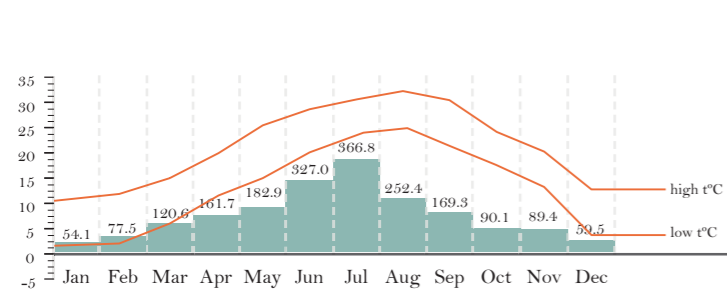


Figure 11 Annual precipitation and monthly average temperature of Saga city

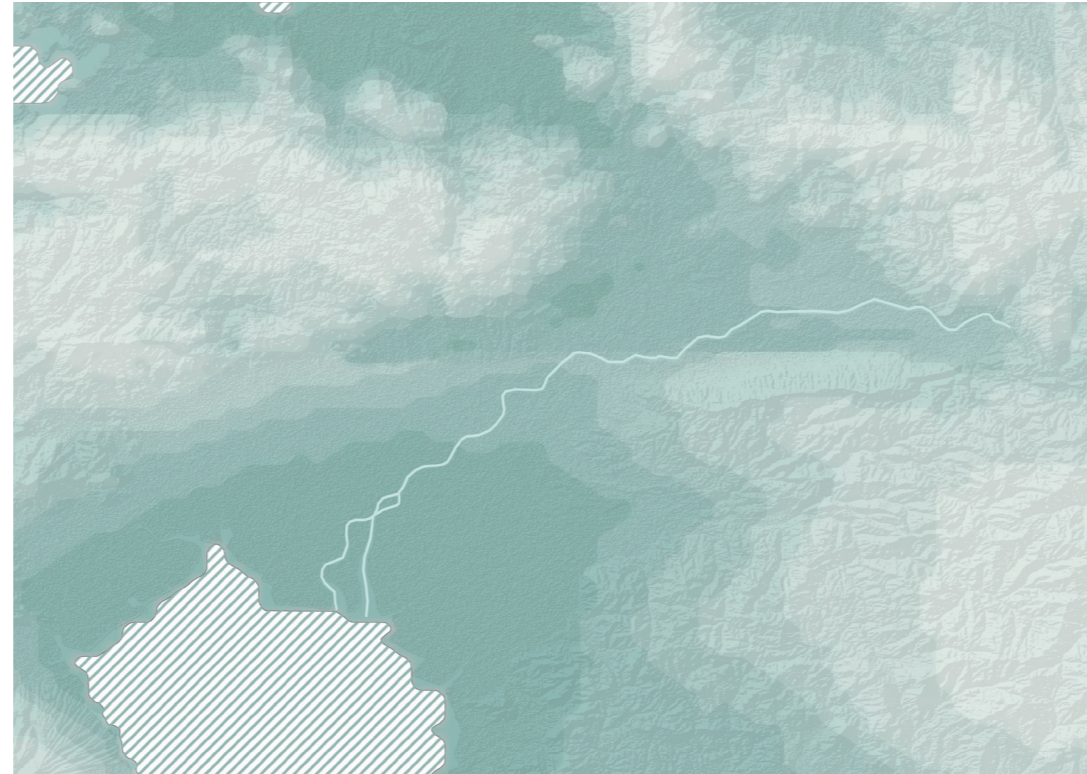


Figure 12 Average temperature (°C)

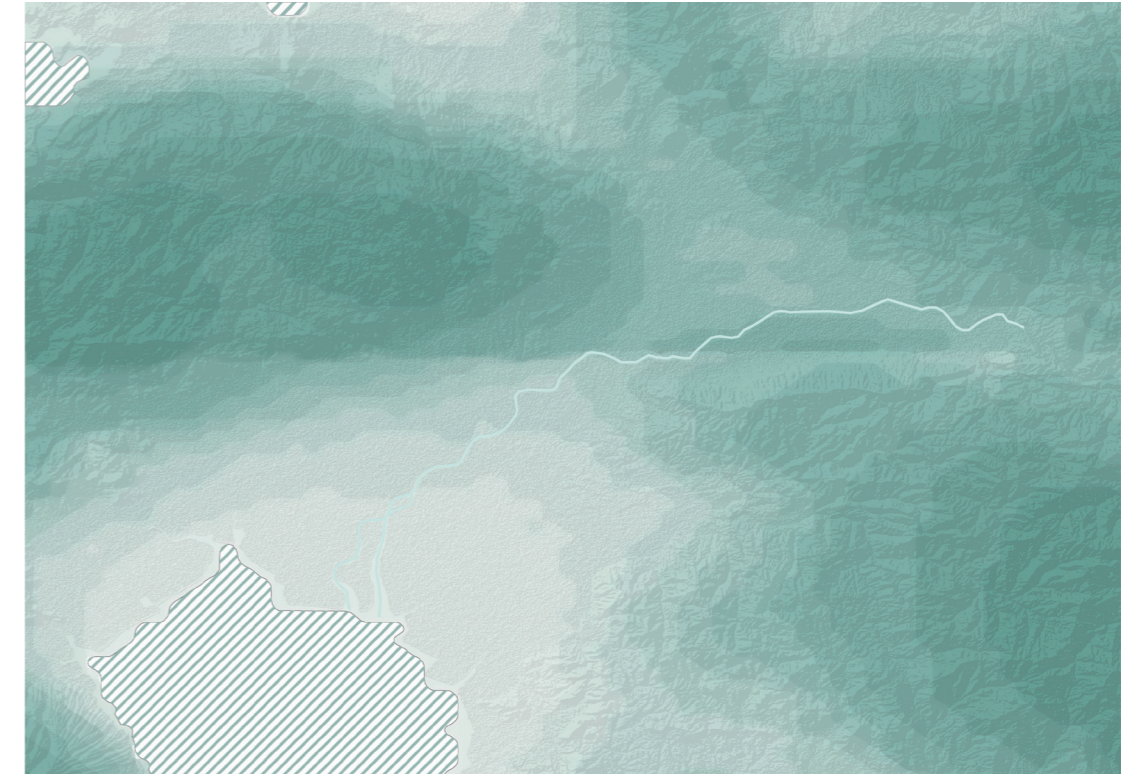
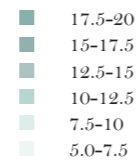
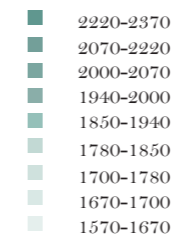


Figure 13 Average rainfall (mm)





Why does Saga has the dense water network in the first place? What is the relationship with the climate? The answer is in the historical development of the landscape and human life.

Figure 14 Canals in Saga city

THE HISTORY OF LAND AND WATER

The water network is closely connected to the development of the plain on which Saga City is situated. To begin with, it is necessary to grasp the geographical characteristics of this plain.

The origin of the plain

The Tsukushi Plain, where Saga City is located, was not originally as large as it is now. This vast plain was formed by the tidal fluctuations of the Ariake Sea, sediment carried by rivers from the surrounding mountains, and human land reclamation.

Approximately 6,000 years ago, the coastline was about 20 kilometers further from its current location. Over time, rivers deposited sediment, raising the riverbeds, and flooding created new channels, gradually expanding the plain. Around the 1600s, artificial land reclamation began to expand agricultural land.

The average gradient of areas below 4 meters in elevation is only 1/10,000. Much of this area lies below sea level at high tide. When the dike was built to prevent tidal flooding, the accumulation of mud in front of the dike was accelerated. This makes it harder to drain the backlands, forcing the construction of additional dikes further forward.

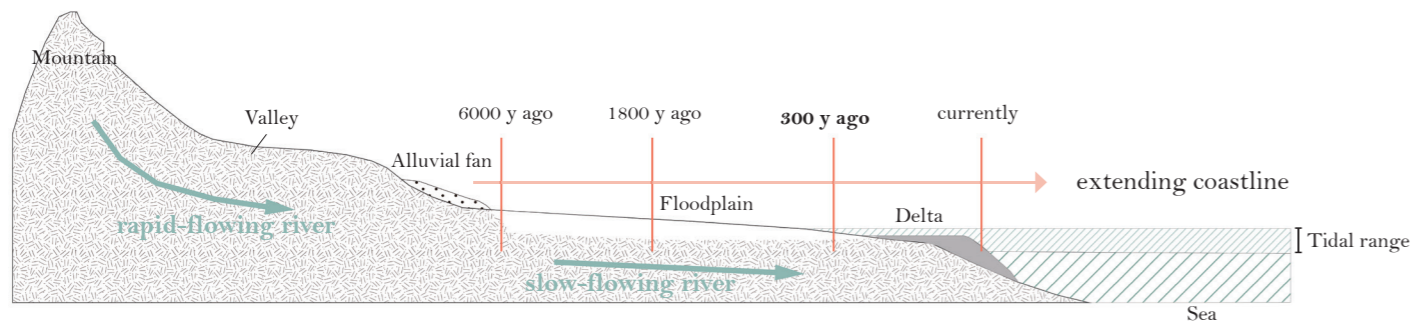


Figure 15 Sedimentation process

Consequently, in Saga, it is said that “one reclamation happens every 50 years,” with more than 20 hectares of tidal flats being converted into land each year.

However, the Tsukushi Plain had limited water sources due to the shallow depth of the Sefuri Mountains, and farmland expanded through land reclamation, consequently leading to a **severe shortage of agricultural water**.

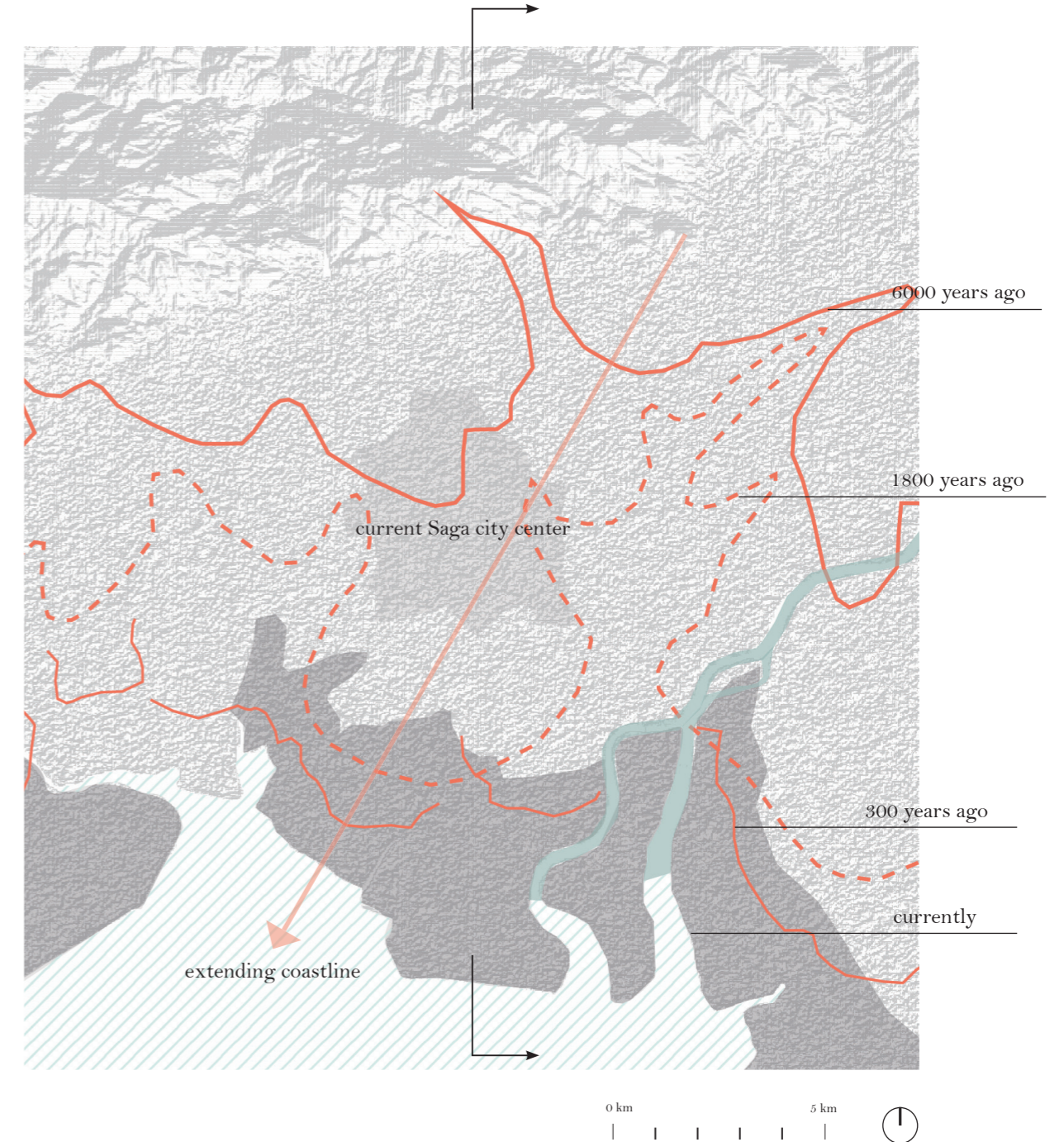


Figure 16 Coastline change of Ariake Sea through time

Saga had been suffering from water shortages, but ironically, when it rained, another problem arose.

The raised rivers and water

As humans settled in the area, they built dikes along the rivers. The rivers brought many sediments, gradually accumulating and raising the riverbeds. As a result, people needed to raise the dike again and again. Repeating this over time, the riverbeds eventually got higher than the ground level. (the formation of levees)

These raised riverbeds caused the problem. When there was heavy rain, the water overflowed easily from the rivers. Once the water entered the city, it could not return to the river. (overflow from rivers)

To make matters worse, when the tide rose, it pushed the freshwater back to the plain. (tidal effect) Therefore, when heavy rainfall and high tide occurred simultaneously, water had nowhere to go, often resulting in **severe flooding** in Saga City. (overflow and high tide)



Figure 18 The overflow from rivers



Figure 20 Tidal effect



Figure 22 Overflow and high tide

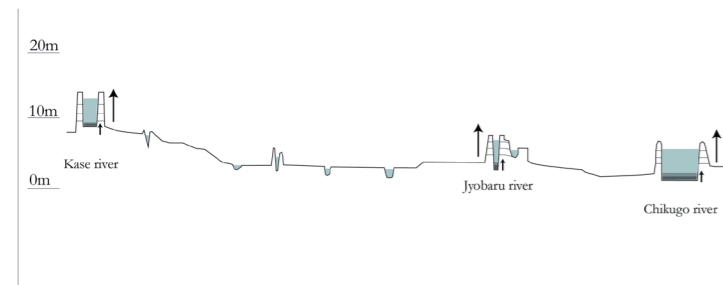


Figure 17 The formation of levees

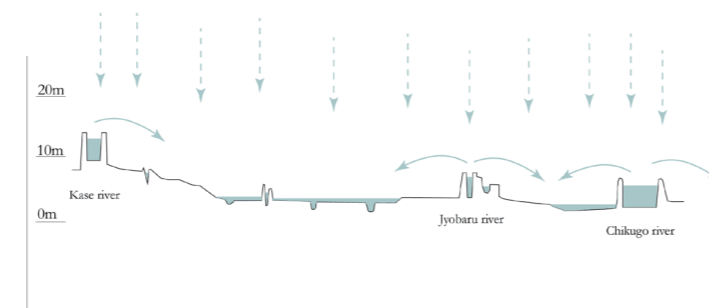


Figure 19 Section: The overflow from rivers

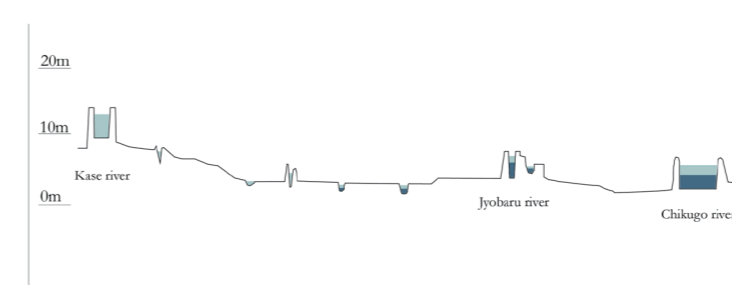


Figure 21 Section: Tidal effect

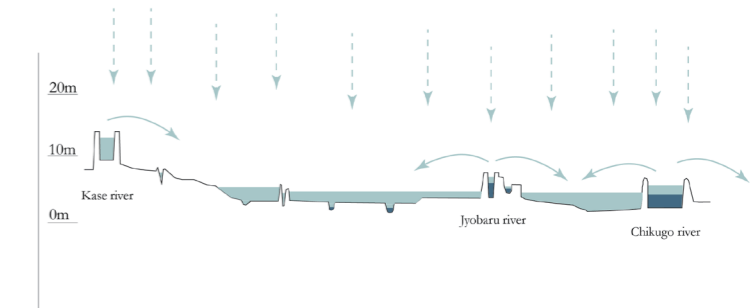


Figure 23 Section: Overflow and high tide

As shown on the previous pages, Saga has a distinctive topography and had long been described as “floods when it rains, drought when it does not”. To tackle with this issue and survive in this place, people living in Saga made a lot of efforts through time.

Canal networking

From around 600 AD, people dug tidal inlets called “mio-suji” to create waterways, which led to the development of agriculture.

In the 1600s, building upon this tradition, castle towns developed around these waterways. Shigeyasu Naridomi, a prominent civil engineer in the early 17th century, made significant contributions to the development of an extensive water network.

His projects, carried out alongside the construction of Saga Castle, laid the foundation for the present-day canal system by improving flood control, irrigation, and transportation. The main reforms he implemented are as follows:

1. Water diversion from the Tafuse River to the castle town via the Ishii sluice

To supply clean water to the castle town, the Ishii sluice was constructed at the branching point between the Kase River and its former course, the Tafuse River. This also benefited nearby villages.

2. Freshwater intake through the Ego waterway

Taking advantage of seawater flowing upstream in some rivers, freshwater flowing backward from the Chikugo River into the Ego waterway (remnants of old tidal inlets) was efficiently utilized. Sluice gates were installed to control water inflow and outflow, allowing the Ego waterway to

serve as a secondary water source. (See page 30-31)

3. Organization of the previously irregular water network

Existing canals were interconnected using sluices, creating a coherent water management system that improved overall efficiency across the region.

This water network, built through this innovation, drastically changed humans’ lives and existed as the center of their daily life and economy for over 200 years thereafter, and some of the structure of the water system still remain in the Saga city now.

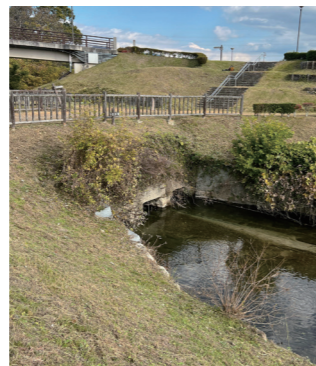


Figure 24 Ishii sluice



Figure 25 Moat for the Saga castle



Figure 26 Water network in 1600s-1800s

Freshwater intake through the Ego waterway

Due to the remarkable tidal range of the Ariake Sea, during high tides, seawater flows from the Ariake Sea -> Chikugo River -> “Ego” waterway -> Canal, reversing the direction from the sea into the plain. (“Ego” refers to the tidal inlet, a groove formed by the tide’s ebb and flow, which is deepened and widened over time.) The seawater moves beneath the freshwater due to its higher density.

As a result, the seawater obstructs the river’s flow, and the freshwater is pushed upward, causing the water level to rise. The local people called this freshwater “Ao” (meaning “blue” in Japanese because of its clarity), and they took advantage of this natural phenomenon for their water system.

Since the water catchment area in the mountain was not large enough to supply water to the whole plain, people needed to get more freshwater. Thus, they used sluices to draw this raised freshwater “Ao” from the “Ego” waterway into canals and irrigate rice fields. It was an ingenious system that efficiently utilized limited water resources by taking advantage of the difference in specific gravity between seawater and freshwater and the rise in water levels.

There were about 200 locations to intake the freshwater in the past.

Farmers installing private sluice could lead to water disputes. Therefore, sluice and water management were handled at the community level. (The boundary lines of the agricultural villages in the map are “assumed” based on current historical administrative data.)

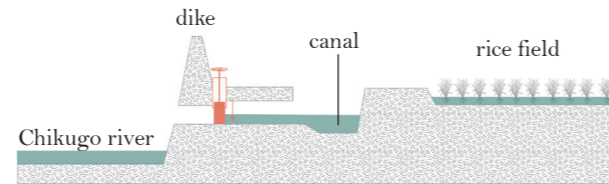


Figure 27 Low tide

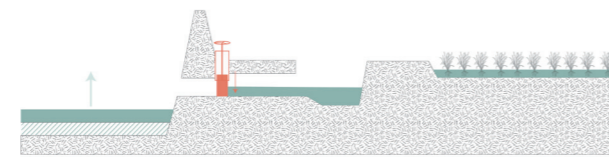


Figure 28 Sea water flows upstream in the river

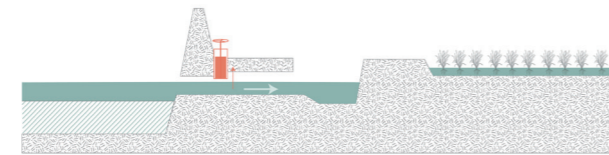


Figure 29 Intake only freshwater

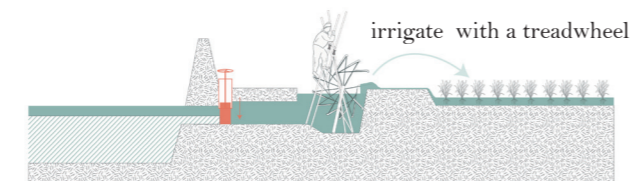


Figure 30 High tide

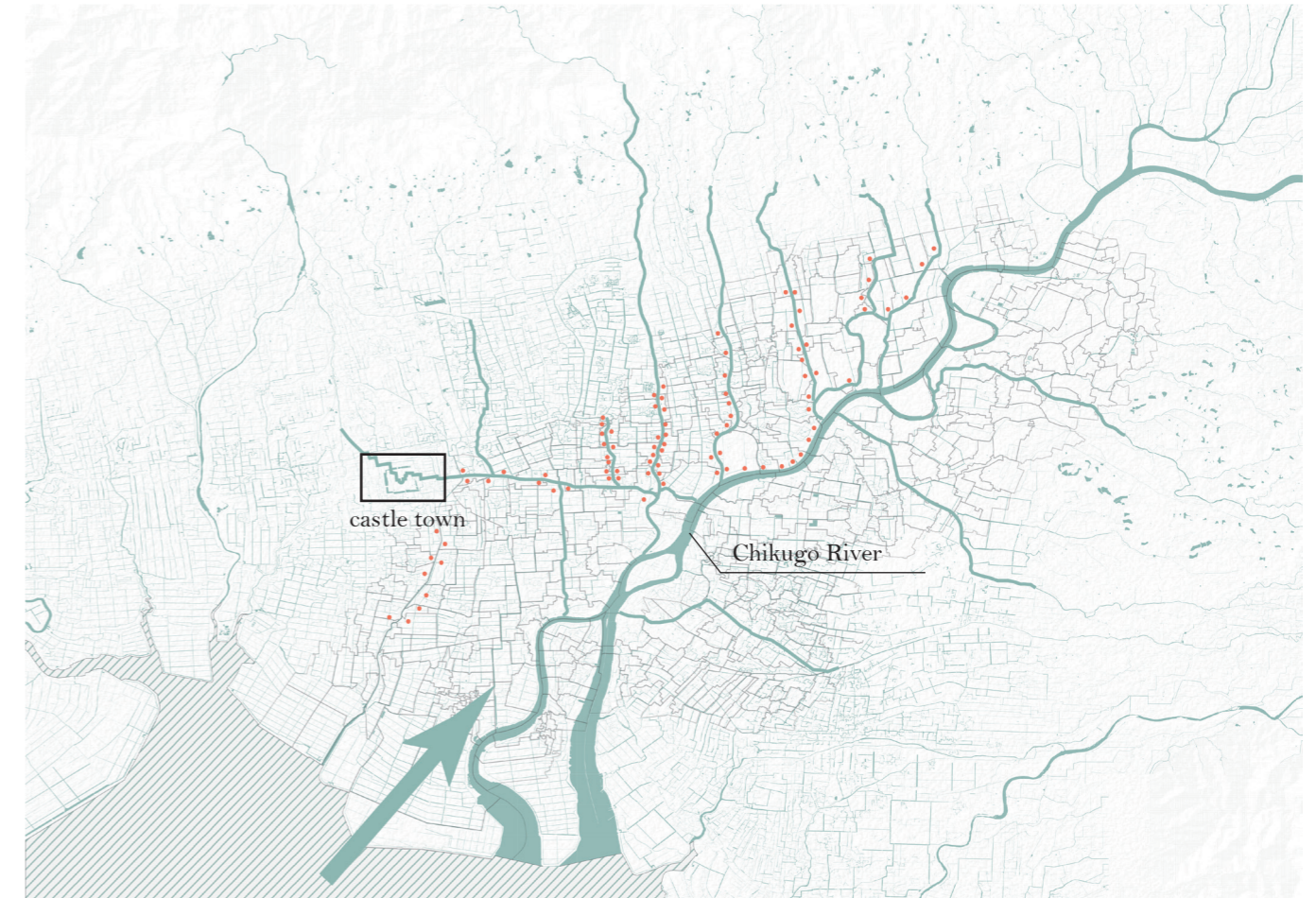


Figure 31 Freshwater intake area

- Sluice
- ▨ Sea
- (Estimated) border of villages using freshwater intake system
- River or “Ego” waterway
- Canal
- ➔ High tide flow



Human life and water system

The canals during the 1600s to early 1900s were multi-functional canals closely connected to people's daily lives. Essential to everyday life, these canals were managed collectively by the local community, with regular dredging and cleaning activities. Fish and aquatic plant seeds harvested from the canals were popular cooking ingredients, while the dredged mud was spread over paddy fields as fertilizer. Although tasks such as dredging and using treadwheel irrigation were physically demanding, the canal system's critical role ensured that the water environment was preserved in an optimal state, fostering a sustainable cycle of human maintenance and natural processes.

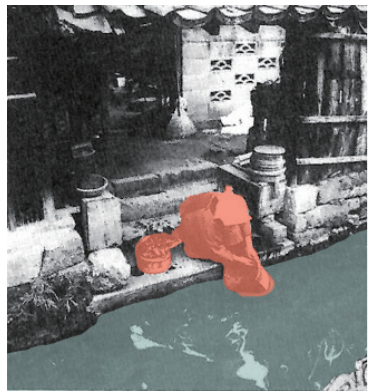


Figure 32 A woman washing clothes
Source: Edited by author. Retrieved from Naojiro Ichiba.(1972,p.31). 日本の民俗 41・佐賀.



Figure 33 Water chestnut harvest
Source: Edited by author. Retrieved from Tatsugoro Eguchi and Yonezo Miyaji. (1977,p101). 佐賀平野の水と土.



Figure 34 A sluice steward checking the salinity of freshwater
Source: Edited by author. Retrieved from Tatsugoro Eguchi and Yonezo Miyaji. (1977,p218). 佐賀平野の水と土.

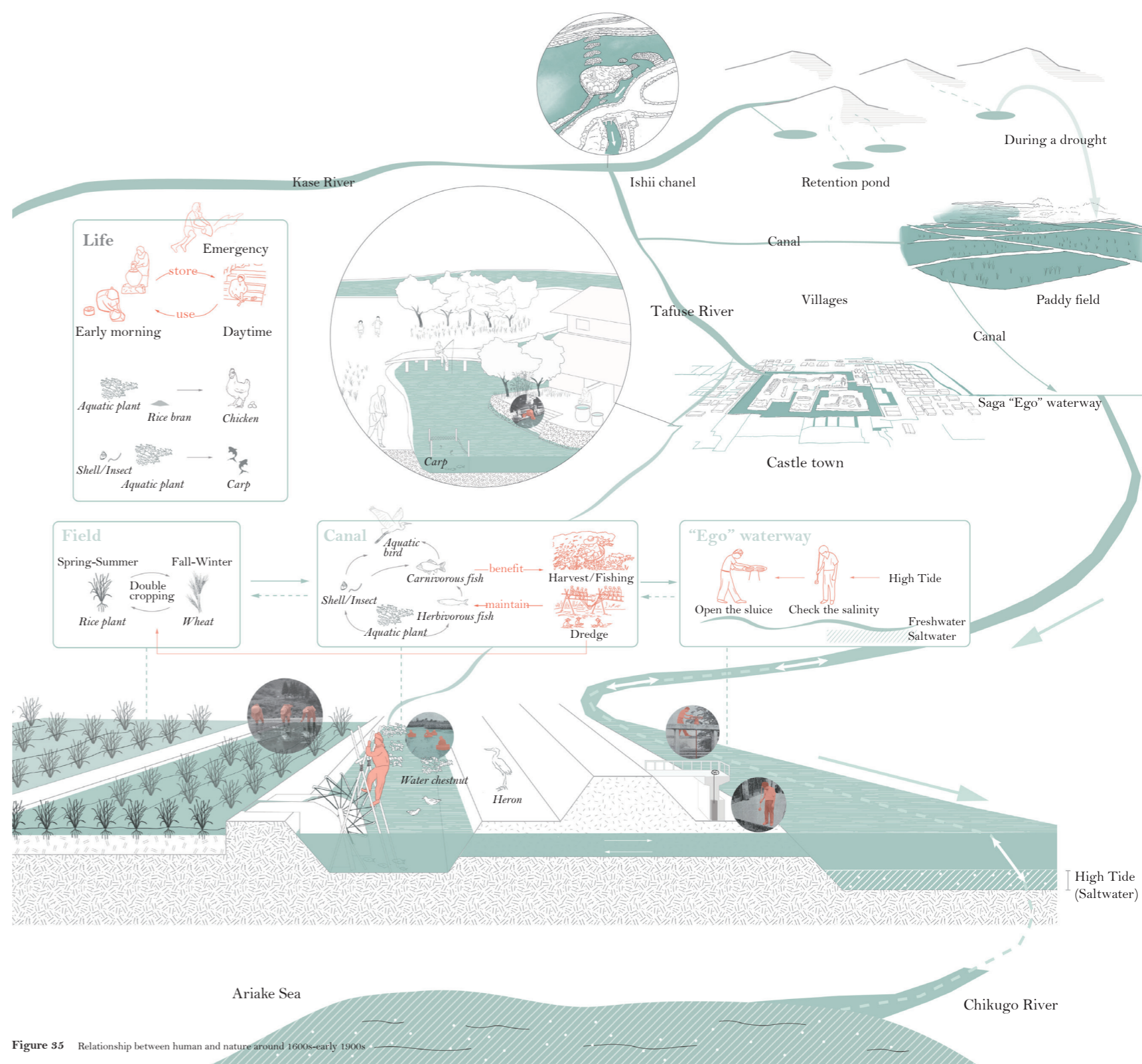


Figure 35 Relationship between human and nature around 1600s-early 1900s



Figure 36 People dredging the canal (1955)
Source: <https://suido-ishizue.jp/daichi/part2/05/11.html>



Figure 37 People looking for fish in the canal (1977)
Source: <https://www.saganature.jp/tansuigyoyomimono/999.html>



Figure 38 People looking for fish in the canal
Source: Yokotake creek park



Figure 39 People gathering around bridges
Source: Yokotake creek park

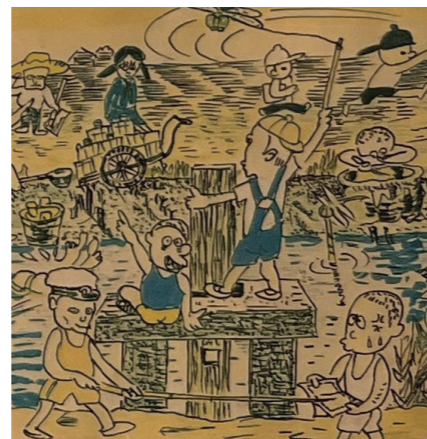


Figure 40 Sluice as landmark for children
Source: Yokotake creek park



Figure 41 Washing place



Figure 42 Stone bridge in neighborhood



Figure 43 Sluice next to the moat

People gathered around water in the past

How about now?



Figure 44 The overgrown canal in one of the residential area of Saga city

THE FORGOTTEN NETWORK

The relationship between the water network, the city, and its people has shifted over time in response to changing societal and urban conditions.

FORCES OF CHANGE IN MODERN ERA

Force1: Urban growth (1945-1995)

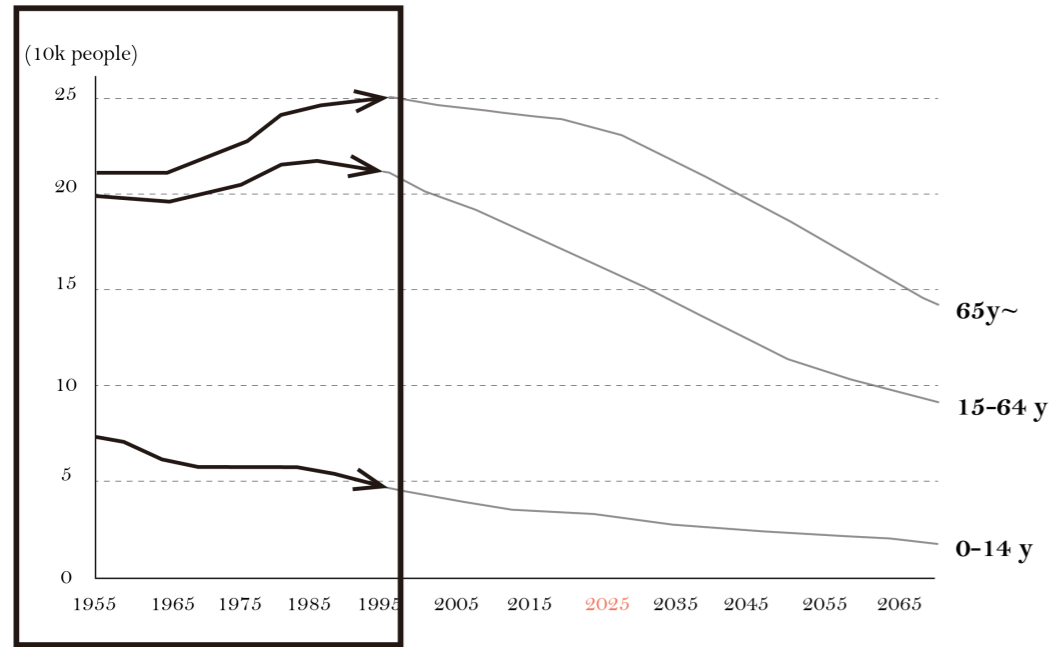


Figure 45 Population graph of Saga city (1955-1995)

Population growth

After World War II, Japan's population continued to grow until the early 2000s. According to the 1947 census, the population of Saga City was 187,000, increasing to 242,000 by 1985.

Furthermore, as people's lifestyle shifted from being agriculture-centered to becoming modernized, various urban functions such as transportation systems became concentrated in the center of Saga City and gradually expanded during this period.

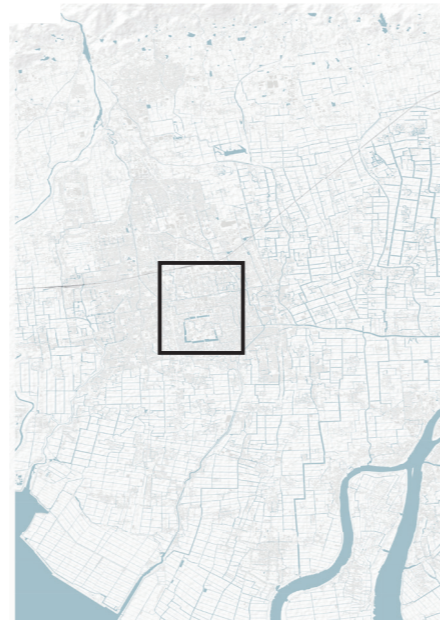


Figure 46 The location of city center of Saga

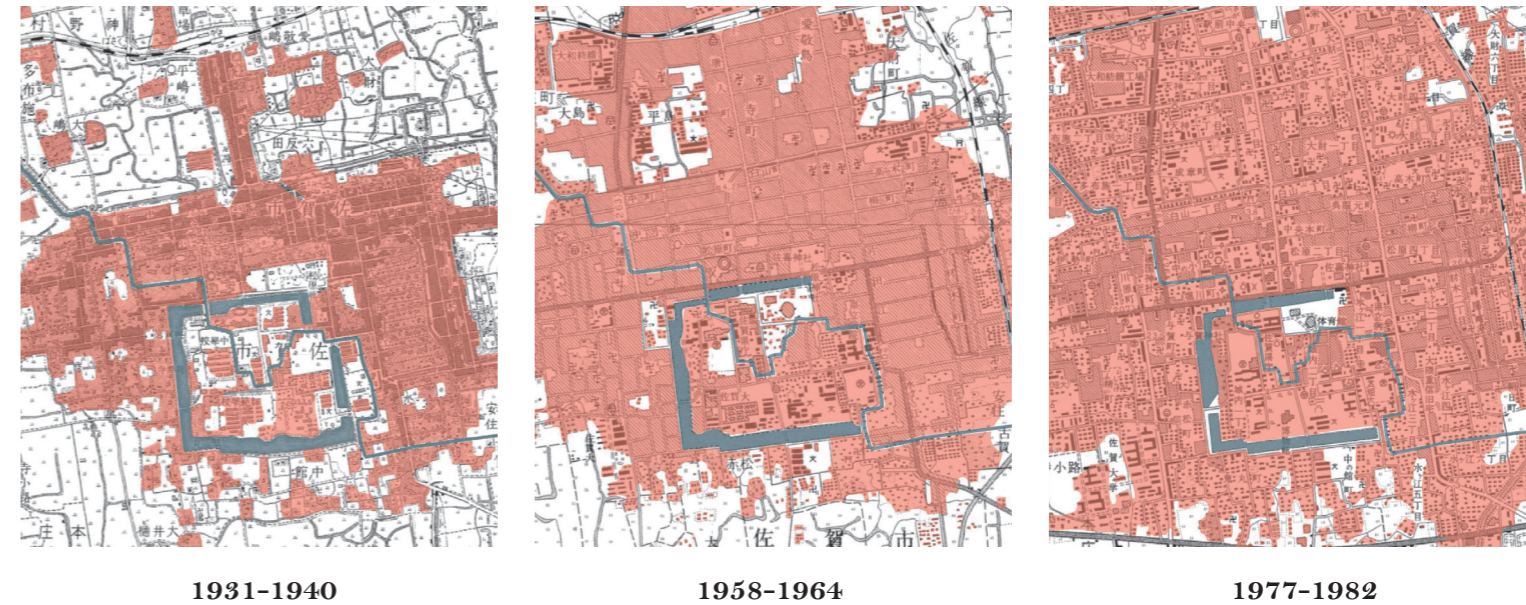


Figure 47 Urban expansion through time
Source: <https://ktgis.net/kjmapw/>, edited by author.

- Rice fields
- Human settlement

Water infrastructure development

As the population grew, cities also developed. To ensure a stable water supply to urban areas, water infrastructure was improved. Dams were constructed in the Sefuri Mountains, and weirs were installed on the Chikugo River. These projects enabled the city to move away from the unstable tidal-based water supply method and adopt a modern lifestyle independent of the canal network.



Figure 48 Hokuzan Dam
Source: <http://www.sa-tochi.jp/construction.html>



Figure 49 Chikugo Weir
Source: <https://www.f-suiki.or.jp/go-chikugo/chikugo-gallery/>



Figure 50 Water infrastructure development

Canal consolidation

As a result, during urbanization, the canals that once crisscrossed every corner of the city were filled in or consolidated. Some were widened and reinforced with concrete, further altering their original form and function.

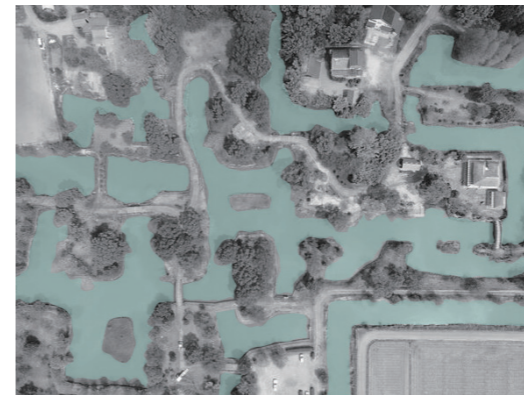


Figure 51 Original landscape pattern
Source: Provided by The Saga Shimun. Edited by author.



Figure 53 Canal after consolidation
Source: <https://www.pref.saga.lg.jp/kiji00386038/index.html>. Edited by author.

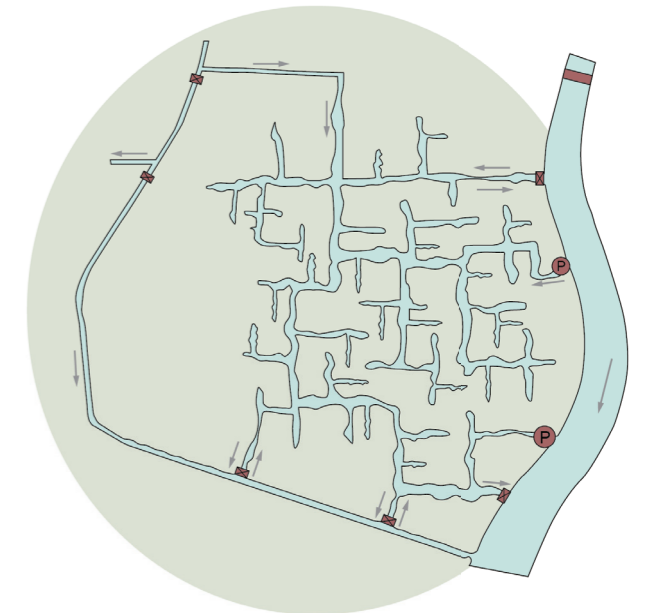


Figure 52 Original landscape pattern
Source: redrawn by author. Information from 水資源機構筑後川局事業概要「筑後川下流用水事業」

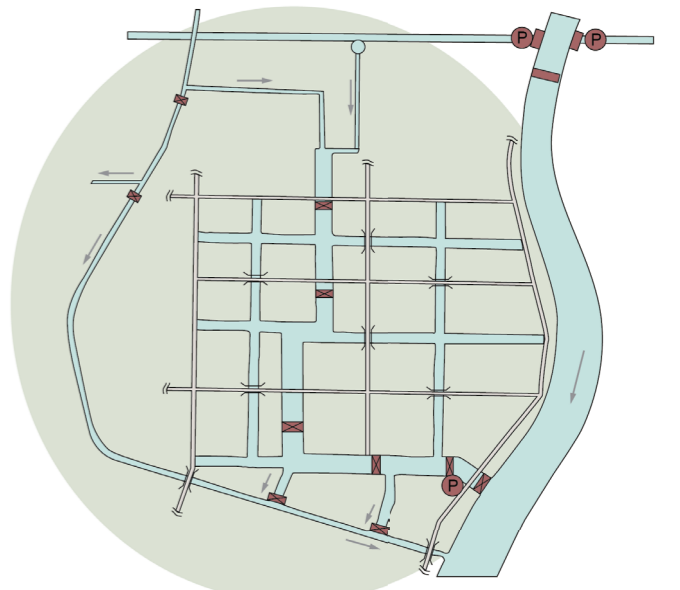


Figure 54 Landscape pattern after consolidation
Source: redrawn by author. Information from 水資源機構筑後川局事業概要「筑後川下流用水事業」

These modern reforms brought about lifestyle changes, separating the multifunctional network of waterways that had once been closely linked to people's lives from their living spaces, eventually limiting their role to drainage. The water was covered for the sake of gaining spaces for vehicles and buildings. People gradually forgot what these canals were for, and it is now treated as if they never existed.



Figure 55 Enclosure



Figure 56 Waste water running to the ditch



Figure 57 Paved canal



Figure 58 Buried canal running underneath the parking lot

FORCES OF CHANGE IN MODERN ERA

Force2: Depopulation (2005-)

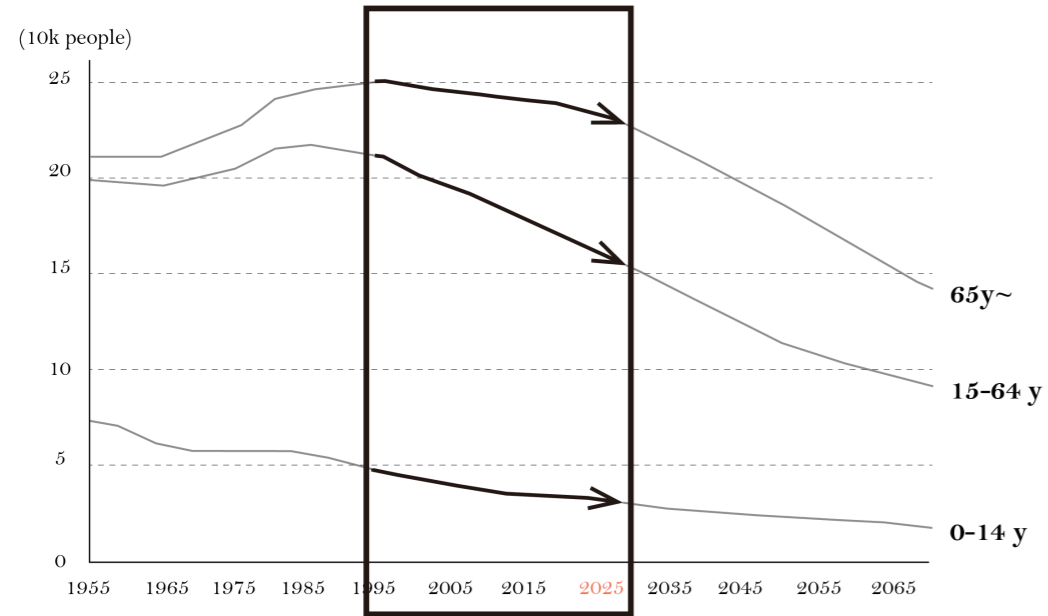


Figure 59 Population graph of Saga city (2005-)

Urban void emergence

Saga City, which experienced rapid urban expansion after World War II, began to see a steady decline in its population around the year 2000.

This demographic shift, characterized by youth migration to larger cities and an aging population that reached approximately 30% by 2020, has led to the emergence of numerous vacant lots and an excessive number of parking areas.

As a result, the urban core has become increasingly fragmented, with these underutilized spaces forming noticeable “voids” in the cityscape.



Figure 60 Saga city center in 2025

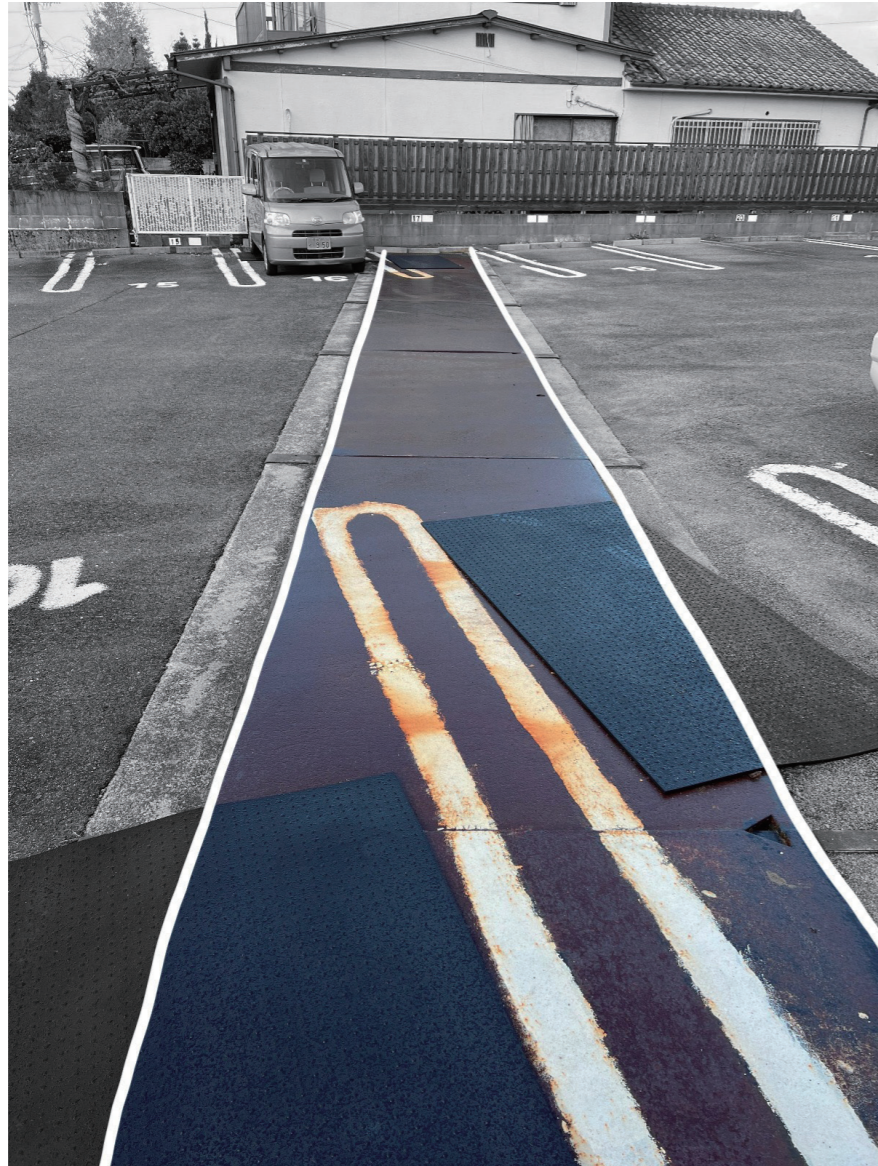


Figure 61 A former canal running beneath the parking lot



Figure 62 The parking lot next to a canal

Lack of maintenance

Such social trends have also had a significant impact on Saga's water network.

While the network has undergone some changes in form alongside urban expansion, the rivers flowing from the Sefuri Mountains continue to carry sediment gradually, making regular dredging and cleaning necessary.

The small and aging population in Saga city makes it challenging to deal with this issue since there are a total of approximately 2000km of canals, and fewer residents recognize the importance of regularly maintaining canals that are not used daily. Moreover, maintenance exceeds the capacity of local government authorities.

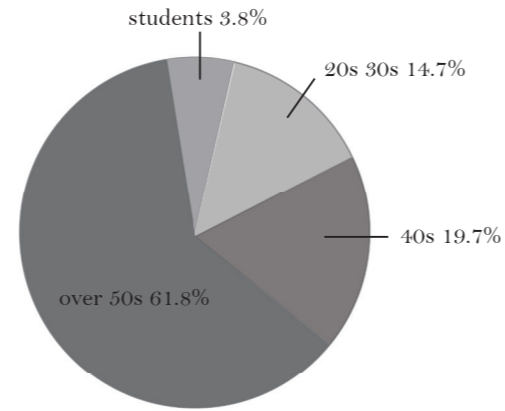


Figure 63 Dredging participation rate by age
Source: H26 水対策市民会議総会資料, 2014, redrawn by author



Figure 64 Local people dredging in the canal
Source: <https://saga-kankyo.jp/20170416kasen/>

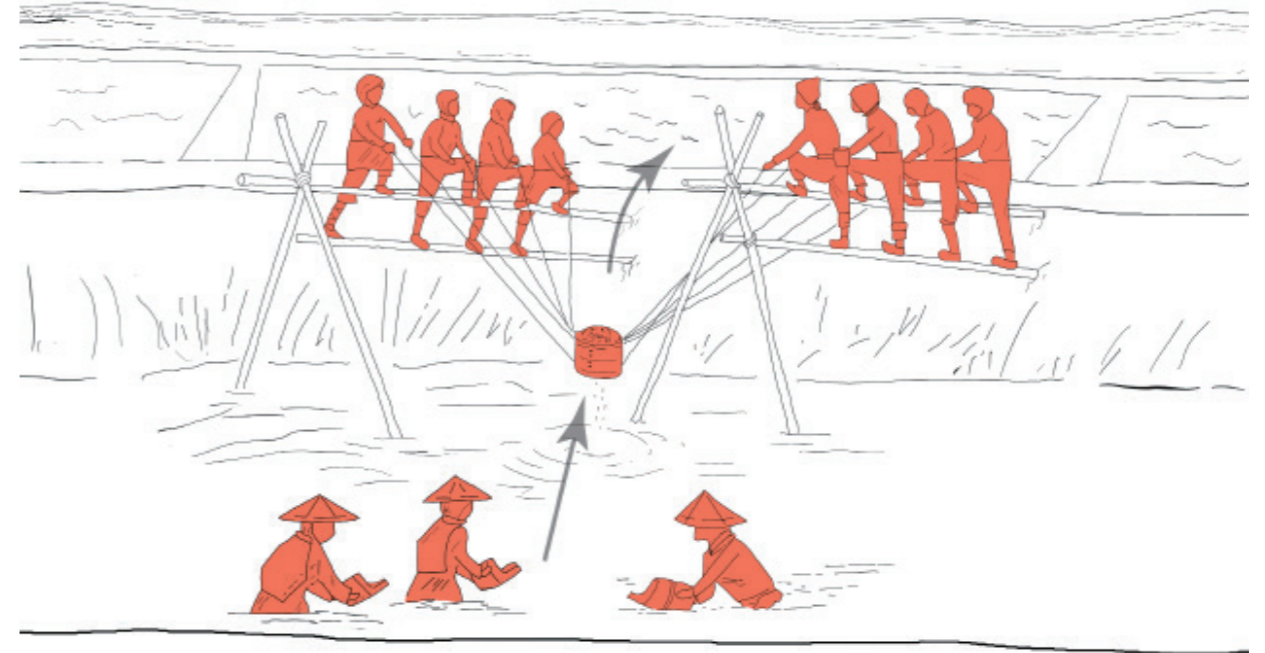


Figure 65 Dredging activity in the past

While people relied on the water network for living in the past, dredging was necessary activity for them because the water carried the sediment from the mountain and they tended to accumulate in the canal.

After the water has been drained, three or four people entered the canal and gathered the mud. They scooped the mud into buckets, and the people waiting above lift them up and threw the mud toward the rice field.

WATER HERITAGE DEGRADATION

This water system has been maintained for nearly 200 years through meticulous management by local people, bringing prosperity to this region.

However, the recent reduced engagement has led to uneven maintenance across the city, resulting in sediment buildup and stagnant water.

Residents who lost their attachment to water began to regard the canals as mere drainage channels. Walking through Saga city, it was evident that most stone bridges had become garbage dumps, while stone steps that were once designated washing areas were either demolished or overgrown with weeds.

These physical changes reflect a broader weakening of the public's connection to this local canal landscape.



Figure 66 Overgrown canal and bridge as garbage dump



Figure 67 Sluice covered by weeds
Source: Historical cultural archives of Saga

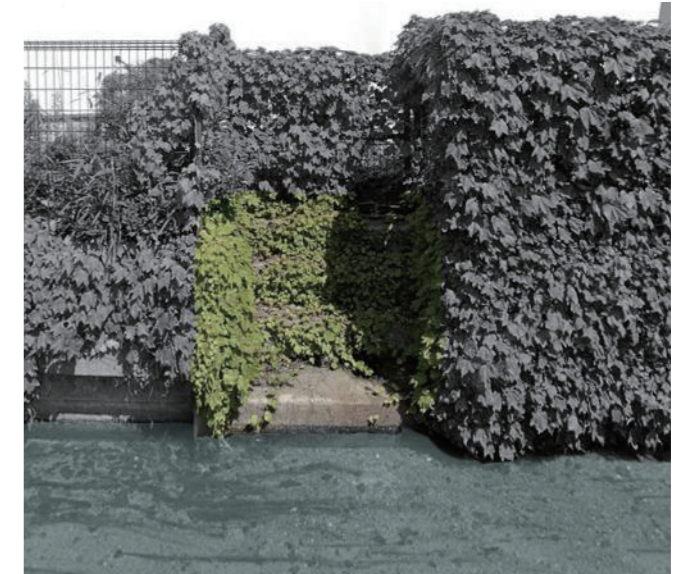


Figure 68 Former washing place covered by plants
Source: Google map

Lost pride

As canals have become increasingly disconnected from daily life and insufficiently maintained as part of the landscape, people's attachment to them has diminished even further. The current environment surrounding these canals reflects the deteriorating relationship between residents and water. Moreover, many people are unaware of how the canal network was originally developed or what roles it once played.

A survey of residents' perceptions of the canal system in central Saga City revealed that older generations tend to have a stronger emotional connection to the local landscape. This seems to be significantly influenced by formative experiences during childhood, such as swimming in the canals or drinking canal water. In contrast, younger generations—whose lifestyles have changed and whose ties to the community have weakened—tend to show relatively low interest in or appreciation for the canals and surrounding scenery. (Araki.H et al., 1990)

*What is special about this landscape?
I thought this was everywhere in Japan...*

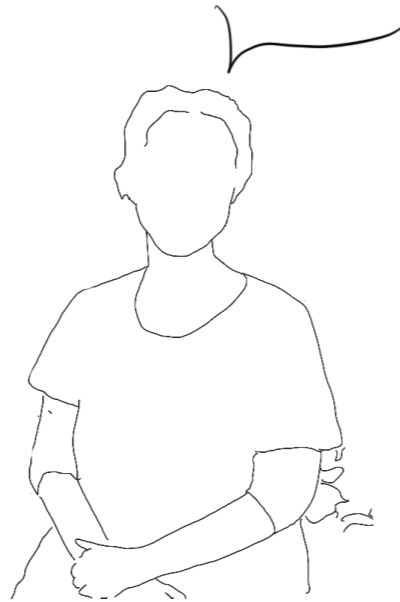


Figure 69 A woman whom the author talked to in Saga



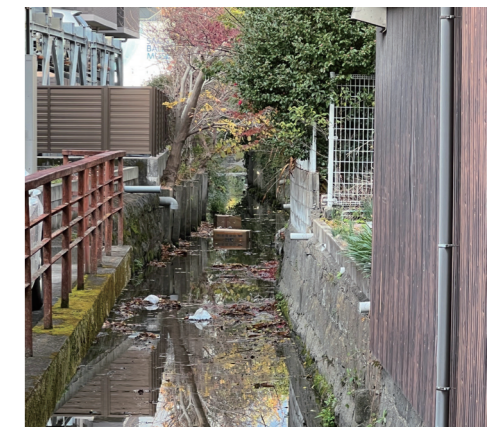
Figure 70 Signs saying "Don't throw garbage here"



Figure 71 Garbage dump above the canal



Figure 72 Garbage floating onto the water



Source: <https://www.city.saga.lg.jp/main/108679.html>

Source: <https://www.city.saga.lg.jp/main/108679.html>

CONSEQUENT PROBLEM OF LACK OF MAINTENANCE

Canals that are not adequately managed are losing their original function, which could eventually have a negative impact on human life and the ecosystem.

Floods

The former Saga water network served not only to secure water for agriculture but also to store rainwater during floods and reduce runoff into rivers.

However, due to inadequate maintenance, the current canals have a reduced water capacity, resulting from accumulated silt and overgrown aquatic plants, which increases the risk of flooding during heavy rains.

In recent years, with abnormal weather patterns becoming a growing concern, Saga City has experienced an increasing trend in annual precipitation (See figure x), and heavy rains that were once predicted to occur every 100 years at the end of the 20th century are now expected to occur more frequently in the future. (JMA, 2025)

Under these circumstances, as the importance of the city's water capacity increases, the rainwater retention and drainage functions of the canals have deteriorated, resulting in frequent flooding of farmland and roads during heavy rainfall.

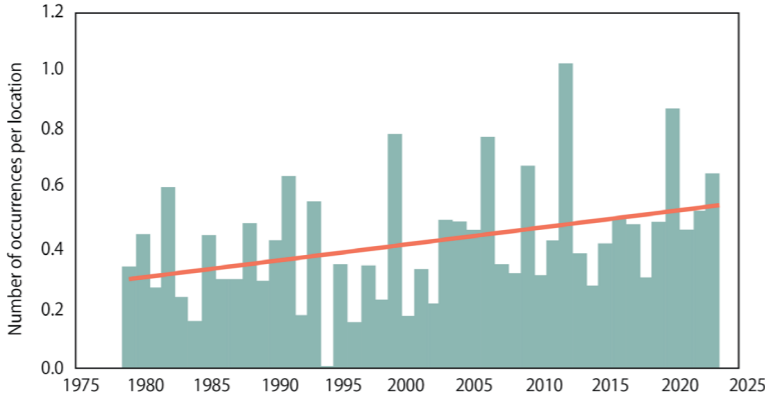


Figure 73 Annual occurrence of rainfall exceeding 50mm/h in northern Kyushu region from 1979 to 2024
 Source: Japan Meteorological agency, redrawn by author

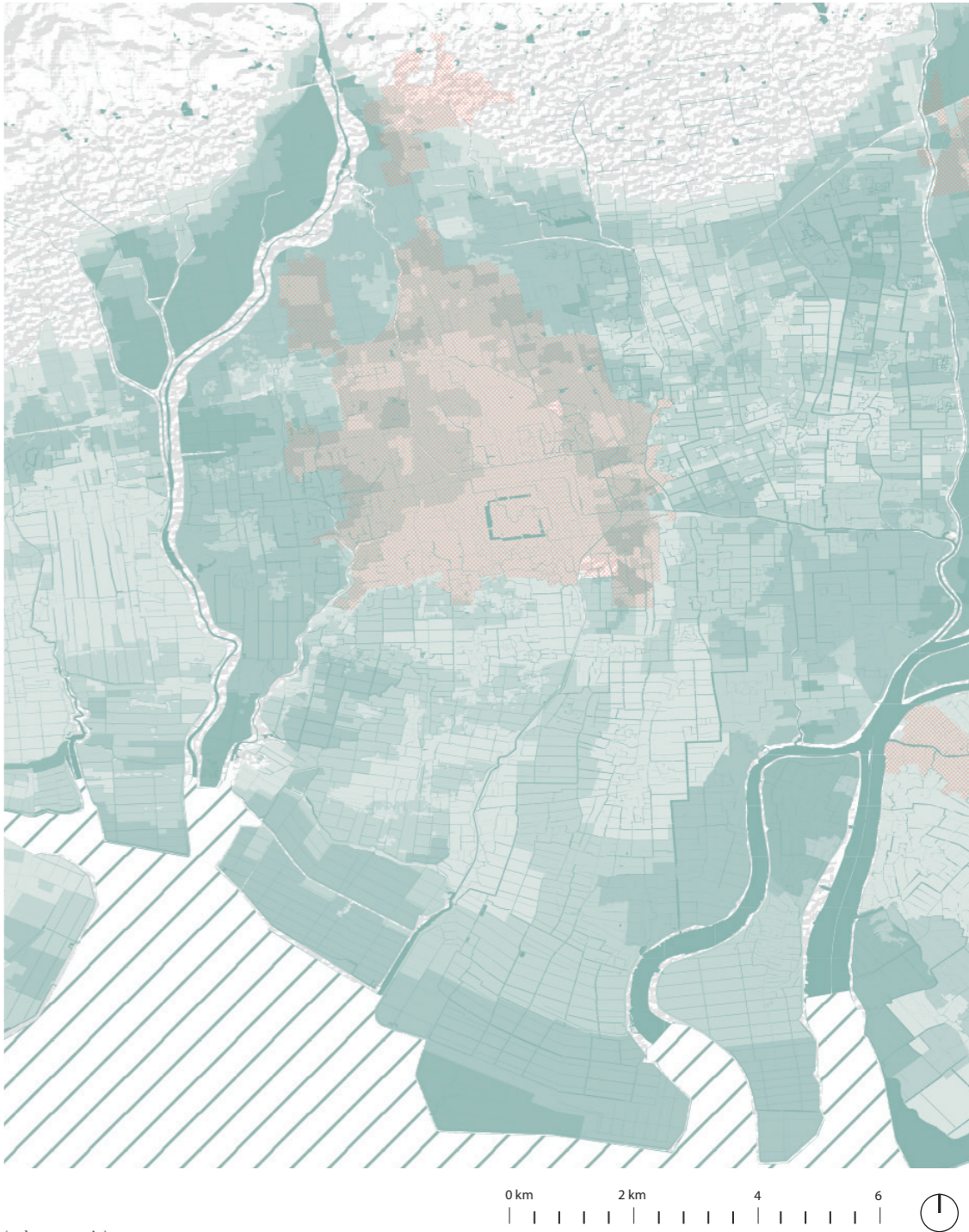


Figure 74 Potential inundation map(630mm/48hrs scenario)
 Source: <https://nftp.mlit.go.jp/ksj/gml/datalist/KsjTmplt-A31.html>(2022), redrawn by author



Figure 75 Children walking along a flooded road
Source: <https://www.nishinippon.co.jp/image/205336/>



Figure 76 The flooded Saga station
Source: <https://www.nishinippon.co.jp/image/124146/>

Lack of biodiversity

In the canal network, insufficient maintenance and spatial homogenization resulting from urbanization have become significant factors contributing to biodiversity decline.

Firstly, inadequate maintenance has led to significant sediment accumulation and overgrowth of vegetation. This has reduced water flow and degraded habitats necessary for the survival and reproduction of aquatic organisms. In particular, the dominance of certain plant species favors specific organisms while contributing to habitat homogenization, ultimately resulting in structural imbalances within the ecosystem.

Furthermore, urban-driven modifications such as the concreting and straightening of banks and slopes have created highly uniform physical environments. These alterations have eliminated the geomorphological and vegetative diversity that once supported a variety of microhabitats. Consequently, niche differentiation and species segregation have become increasingly difficult, thereby reducing the functional diversity of local ecosystems.



Figure 77 Old man saying “Children used to come here for fishing before.”
Source: <https://www.fnn.jp/articles/-/793413?display=full>

News reporting that weeds have grown rampant, covering the water surface in green.



Figure 78 Canal surface covered by plants



Figure 79 Monotone edge by concrete

02

RESEARCH APPROACH

This chapter builds on the findings presented in the previous chapter to formulate the problem statement and derive the research questions. It then outlines the theoretical framework and the overall structure of the study, clarifying how the research will be conducted.

PROBLEM STATEMENT

In the past, the canals in Saga served as agricultural water sources and temporary reservoirs during floods, playing a vital role in supporting daily life and shaping the city's character. Over time, however, with postwar urban development and modernization, these canals were gradually excluded from the urban fabric and faded from people's everyday awareness.

Today, the canal network—originally sustained through collective management—is facing neglect as awareness of its value has waned. Demographic shifts, including youth migration to larger cities and a rapidly aging population, have made it increasingly difficult for local communities to maintain the canal. As a result, many canals have deteriorated, while vacant lots resulting from population decline are slowly overtaking the urban landscape.

Amid the increasing frequency of floods caused by climate change and the ongoing outflow of population from regional cities, Saga faces complex and interconnected urban challenges. In this context, redefining the role of canals in today's urban environment and reexamining their value offer a meaningful opportunity to address both environmental resilience and cultural continuity. Recognizing the potential of these water systems—once integral to daily life—may serve as a key to shaping a more sustainable and uniquely local urban identity for Saga in the future.

RESEARCH QUESTIONS

To address these interconnected issues, this study poses the following research question;

“Can the Saga water heritage be revalued by transforming it into a climate-adaptive and ecologically responsive environment, fostering public interaction and a sense of attachment to water?”

Sub questions

1. How can the existing water network system from the past contribute to mitigating flooding in Saga City?
2. How can the proposed water network be integrated with the green network to enhance the area's ecological value while transforming and incorporating vacant lots into the system?
3. How can design enable communities to shape the local landscape in ways that preserve cultural heritage and promote sustainable tourism?

APPROACHES

This project employed a range of methodological approaches to support comprehensive understanding and analytical inquiry from multiple perspectives. The following section elaborates more about the purpose.

Traditional water system research

The first step of this project is to understand the characteristics of the Tsukushi Plain, where Saga City is located, along with the cultural and historical context of the water network constructed by humans in this region. By analyzing how people in the past lived in relation to canals, it becomes possible to identify Saga's unique landscape and discover its value as a cultural heritage.

Literature study

Based on the traditional water system research, the project examines how social factors have transformed the landscape of Saga City, how these changes have affected human life and the relationship with water to identify key issues.

Fieldwork

The purpose of the fieldwork was to collect data to verify the findings from the research, which had been conducted online. The fieldwork focused on three main activities: 1)interviews with local people, 2)document collection, and 3) photographic documentation.

1)Interviews

Interviews were conducted with various stakeholders, including two professors from Saga University, a local architect, individuals involved in the irrigation system, a staff member from the River and Erosion Control Division of the city hall, a freelance researcher, and residents encountered

in public spaces. These conversations yielded insights into the diverse perspectives held by people from various fields regarding Saga's waterways, providing valuable qualitative data for the development of persuasive and contextually grounded proposals

2) Document collection

For document collection, visits were made to three local libraries and three museums to obtain copies of relevant materials. In addition, past research documents and brochures were provided during interviews with key informants. These materials serve as a foundation for facilitating a more comprehensive analysis of the current situation.

3) Photographic documentation

Regarding the photographic documentation of the canals, Saga City was divided into six areas, and each location was systematically photographed to illustrate the current conditions of retention ponds and canals and their interactions with the surrounding environment. This method helped uncover subtle yet significant issues and opportunities that may not have been apparent through other observation forms.

Precedent study

Exploring the potential design approaches in areas with similar contexts.

Analysis through scales

In response to the extensive water network that connects upstream and downstream regions in Saga City, this project adopts a systematic approach that begins with an analysis at the regional scale—where the root causes of key issues are located—and gradually scales down to the community scale.

1) Water system analysis

By analyzing the current water system in Saga through four key aspects — sediment flow, canal hierarchy, typological classification, and water flow — this research aims to clarify its primary features and key issues.

2) Green structure analysis

Investigate the typologies of urban open spaces, including vacant lots, and clarify how they are distributed.

PRECEDENT STUDY 1: REPURPOSE WATER HERITAGE

Restoration Utrecht's Catharijnesingel canal / Utrecht, the Netherlands

The Restoration of Utrecht's Catharijnesingel canal reopened a historic canal, which once replaced by a motorway. The project reconnected the canal around the city center, improved biodiversity, enhanced climate resilience, and created green public space for walking and cycling, celebrating its medieval heritage.

Takeaway:
Heritages that have fallen into disuse can regain their value and become central to people's lives by changing perspectives. In addition, water heritage in cities has the potential to be linked not only as public spaces but also as ecosystems and disaster mitigation systems.



Figure 80 Catharijnesingel canal -Before-
Source:<https://worldlandscapearchitect.com/bringing-water-back-catharijnesingels-journey-back-from-highway-to-canal/?v=1a13105b7e4e>



Figure 81 Catharijnesingel canal -After-
Source:<https://worldlandscapearchitect.com/bringing-water-back-catharijnesingels-journey-back-from-highway-to-canal/?v=1a13105b7e4e>

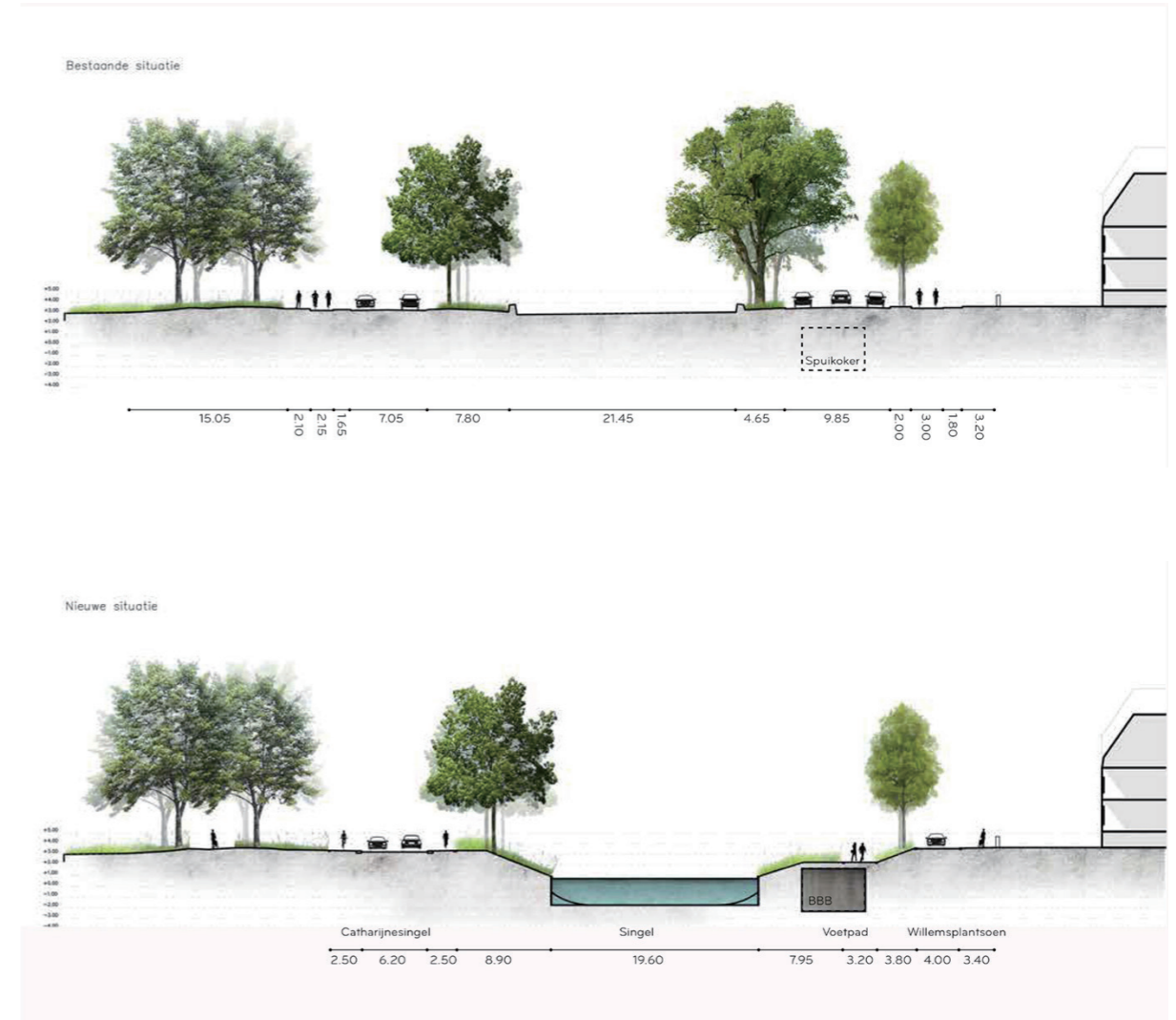


Figure 82 Catharijnesingel canal sections
Source:<https://www.metalocus.es>

PRECEDENT STUDY 2: REPURPOSE WATER HERITAGE

Kokeiyosui square / Gifu, Japan

Kokeiyosui Square is a public space developed in front of Tajimi Station in Gifu Prefecture, Japan. Initially, the Kokeiyosui was a canal constructed during the 1600s for agricultural purposes and has supported the local community for many years. However, with urbanization, its presence faded from people's memories, and the surrounding area began to decline. This project revitalized a part of the canal, transforming it into a space that seamlessly integrates water and open areas. By preserving the local history, the project has revitalized the station front as a gathering place where people can stroll, creating a new face for the city.

Takeaway:
By redesigning car-centric land into spaces that are more conducive to people staying, it is possible to revive the city's vitality. Furthermore, by linking the history of the land, which has been lost due to urbanization, to the design of public spaces, it is possible to create a unique city.

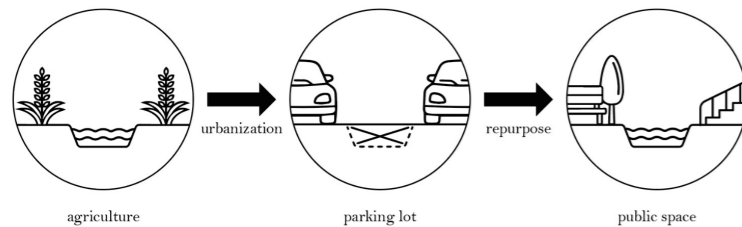


Figure 83 Project summary



Figure 84 The site before the project
Source:

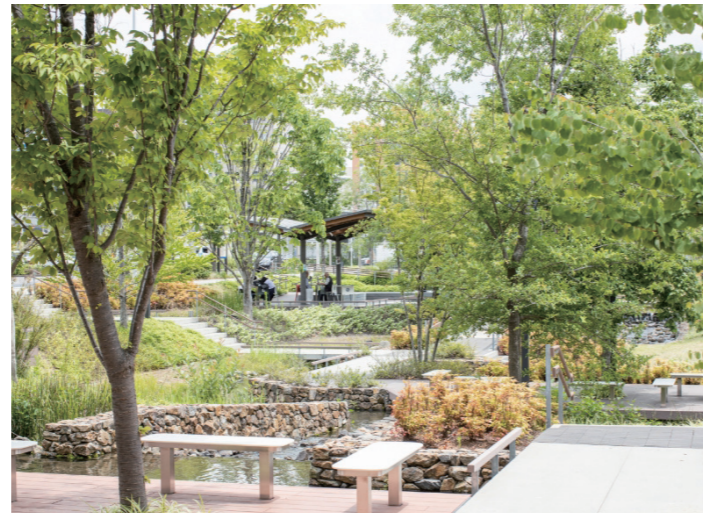


Figure 85 Kokeiyosui square
Source: tajimi-dmo.jp



Figure 86 Kokeiyosui square map
Source: kokei-tajimi.com

PRECEDENT STUDY 3: COMMUNITY PARTICIPATION IN HISTORICAL CITY

Pocket park initiative / Gujo Hachiman, Japan

The “Pocket Park Initiative” in Gujo Hachiman is a regeneration project that creates refreshing and interactive public spaces throughout the town by utilizing its historical water network and traditional water culture. Small-scale public spaces have been developed in vacant lots, alleys, and along canals across the town. Each space allows visitors and residents alike to experience the unique scenery and cultural identity of this “town of water.”

In terms of design, traditional water-use elements, such as water boats, canals, and waterwheels, are integrated as motifs. Local stone materials and traditional architectural techniques are used to ensure harmony with the townscape and reinforce regional identity.

A key feature of this initiative is its participatory approach to community development. Residents took part in municipality-led meetings and contributed ideas from their own perspectives—for example, offering vacant land next to their houses or suggesting the expansion of washing areas into small plazas. Moreover, the pocket parks are also maintained with the cooperation of local people.

Takeaway:
Residents can easily participate in neighborhood scale project.
By spreading similarly themed spaces throughout the town, a connected network is formed.

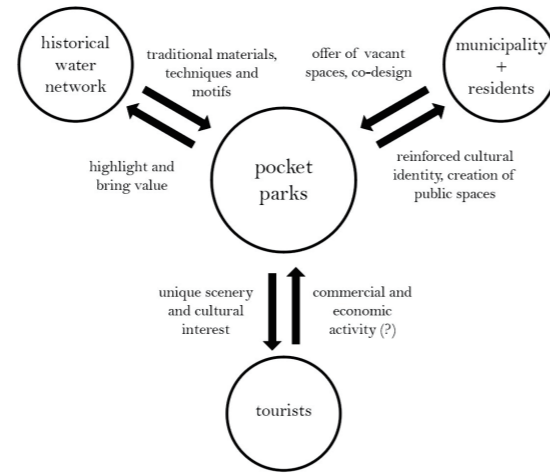


Figure 87 Project summary



Figure 88 The site before the project and after
Source: NPO 法人郡上八幡水の学校 水のまち 郡上八幡 (2017)

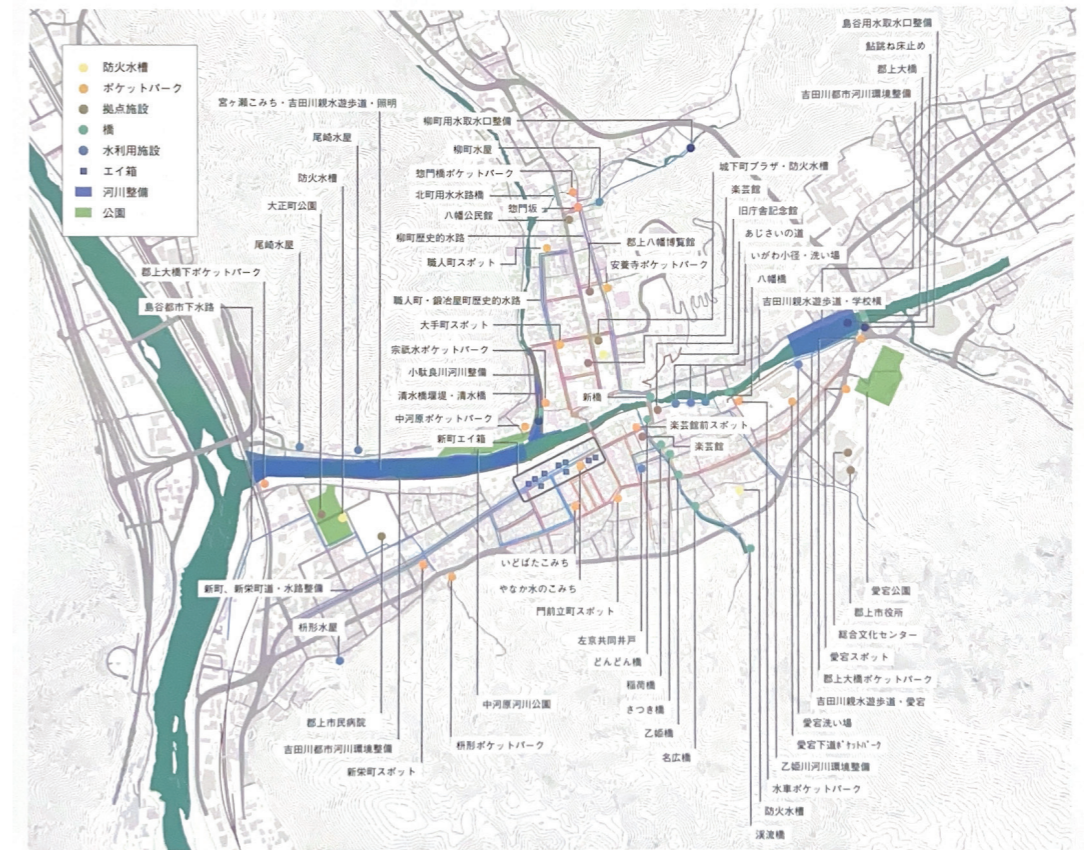


Figure 89 The locations of public spaces utilizing water features
Source: NPO 法人郡上八幡水の学校 水のまち 郡上八幡 (2017)

More than 33 pocket parks are in the town, functioning as connectors between water, history, and everyday life.

PRECEDENT STUDY 4: URBAN BLUE-GREEN NETWORK

Cloudburst plan / Copenhagen, Denmark

The Copenhagen Cloudburst plan is a flood mitigation initiative that proposes Blue-Green solutions integrated into the urban surface, increasing the water network's capacity and drainage during heavy rainfall. The project was commissioned after an extreme 1000-year storm event, a Cloudburst, hit the city of Copenhagen in 2011, flooding the city with three feet of water and causing up to USD1 billion in damage.

The joint effort of public-private partnerships and the involvement of multiple disciplines and stakeholders resulted in the development of a toolkit and strategy to face these extreme flood events. By combining V-shaped "cloudburst roads" that direct the water flow, upstream detention streets and public retention areas, the system prevents flood damage with Blue-Green surface-level interventions that also enhance the landscape's spatial quality. When compared to a conventional "grey" piped solution, it was concluded that a Blue-Green approach increased potential savings and brought additional qualitative social benefits for the local population.

Takeaway:

By utilizing underused urban land, vacant lots, and road spaces to develop green areas, waterways, and public plazas that temporarily store and infiltrate rainwater, cities can not only reduce flood risks and enhance urban ecosystem services but also improve the quality of public spaces.

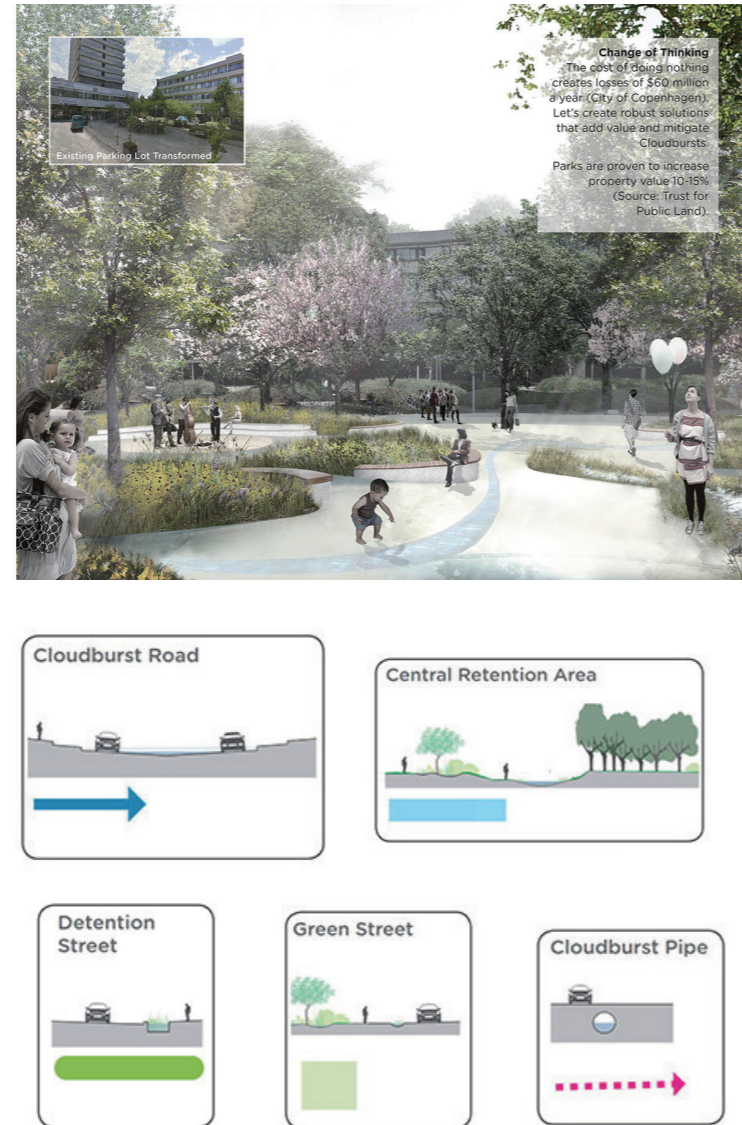


Figure 90 Perspective drawing and the design principle
Source: www.asla.org

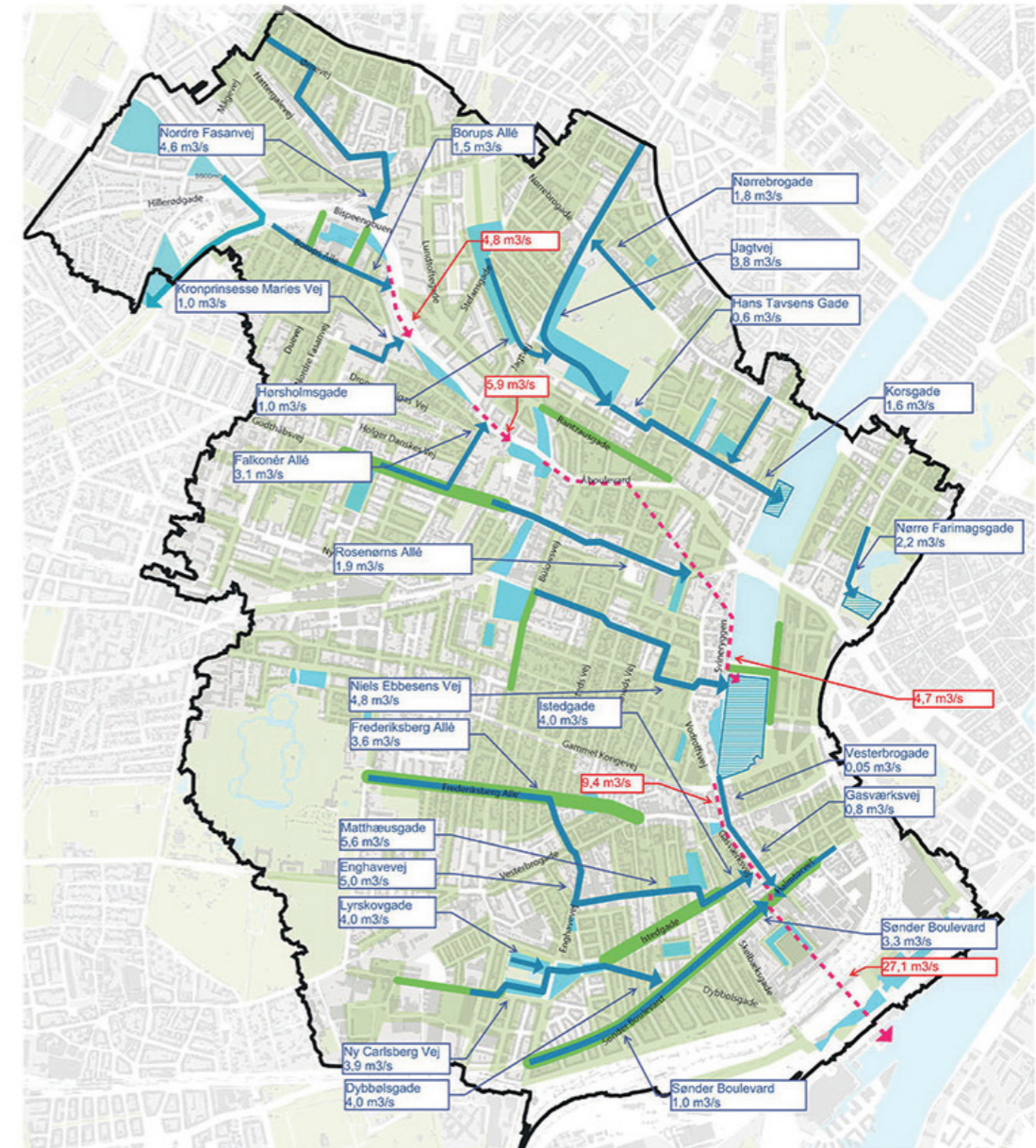


Figure 91 Vision map
Source: www.asla.org

THEORETICAL FRAMEWORK

The core of this thesis is based on (1) Landscape Biographies, which supports the overall direction of the thesis. Under the umbrella of “Landscape Biography”, the thesis refers to three other theories: (2) Water management, (3) Urban Acupuncture, and (4) Local Assets and Community Engagement.

A combination of these multiple theories forms the foundation that directs the analysis, concept development, and design processes, and by applying and adapting these theories to fit the context of Saga, this thesis establishes its own theoretical framework.

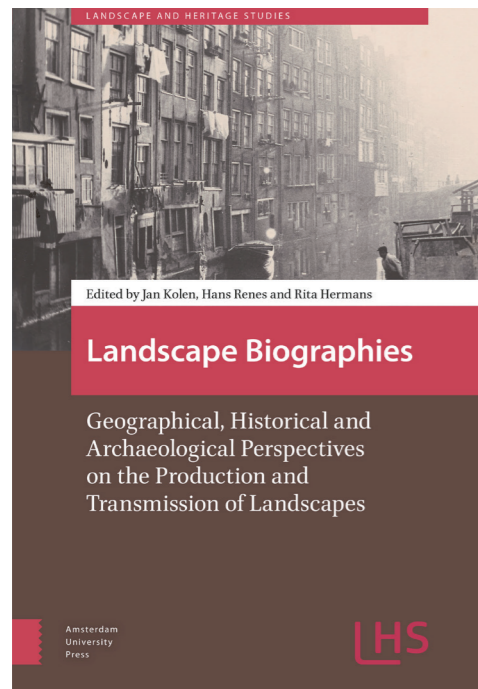


Figure 92 Landscape Biographies
Source: <https://www.routledge.com/>

Landscape Biographies

The concept of landscape biographies approaches landscapes as if they have “life histories” — narratives of origin, transformation, and transmission — shaped through continuous interaction between human and non-human agents over time, rather than as static entities.

From this viewpoint, every landscape is both a product and a producer of social life. Its present form embodies layers of past actions, decisions, values, and meanings, while also influencing current and future practices. Landscape biography therefore integrates geographical, historical, archaeological, and anthropological methods to trace how landscapes come into being, change, and are remembered, forgotten, or re-imagined.

This thesis does not aim to explore methods for replicating and preserving the historic water network of Saga during its heyday. Instead, it focuses on the process of change in the relationship between the water network and the people of Saga, which has evolved alongside the historical context of the region. From the time when the water network was an indispensable part of daily life, to the present day when it is disappearing from people’s memories and abandoned due to modernization, this thesis seeks to transform the water network into a socially and environmentally resilient landscape.

The literature Landscape Biography presents the following four core questions as guiding principles for research based on this concept. This thesis applies these questions to the case of Saga to construct the concept of landscape

biography in the theoretical framework.

1. *Who (or what) are the “authors” of a landscape?*

When a landscape is treated as a “biography,” the author can be anything that brings about change to that landscape. Authorship extends beyond humans to include technologies, infrastructures, and non-human agents such as animals or ecological processes.

The groundwork of earlier generations originally shaped the current water network in Saga, which was then altered through factors such as water-supply infrastructure and land reclamation projects.

During this time, humans and animals have changed their positions, as if in a story, from protagonists to bystanders or outsiders. However, if we understand the landscape as a multi-layered “co-script” between conscious human actions and non-human factors, then Saga’s water network emerges as a living text: one in which planned interventions, natural hydrological dynamics, and the activities of aquatic species and vegetation have each written their chapters. This interplay forms not a single linear history, but a palimpsest continually rewritten by multiple agents, offering insights for both historical understanding and future landscape design and management.

2. *Are landscapes ‘socialized nature’?*

Landscape biography challenges the binary of “natural” versus “cultural” landscapes. Landscape biography does not treat landscapes simply as “nature modified by humans,” but instead redefines the relationship between nature and

society itself as “socialized nature.”

For example, the water network in Saga is a typical example of “socialized nature” that cannot be understood by the dichotomy of nature and society. While natural processes such as terrain (e.g., tidal flats and low-lying wetlands), hydrological conditions, and tides have shaped the foundation of the landscape, humans have developed flood control and water utilization technologies over time, transforming the water system into one suitable for agricultural production and urban life. Land reclamation and irrigation canal construction during the Edo period (1600s-1800s) were efforts to readjust the constraints of the terrain and reconstruct it into a form convenient for agriculture and daily life. In modern times, water supply infrastructure and land reclamation projects have further altered the shape and function of waterways.

In these processes, nature has not merely served as a backdrop but has acted as an “active agent” that guides human choices through forces such as water flow, flood risks, and tidal movements. Simultaneously, human society has reorganized the natural environment through institutions, technology, and cultural values, thereby changing its use and meaning. The water network of Saga is a text of “socialized nature” that has been multilayered and rewritten over time through the interaction of natural and social processes.

This concept demonstrates the importance of treating nature as a subject that will continue to change in the future, rather than as a passive object, in conservation and restoration. As a result, planning and design become flexible and context-sensitive approaches that expect change rather than fixation.

3. How does the temporal dimension of landscapes take ‘shape’ in rhythms, transformations, layers and memories?

Saga’s water network has changed its form over time, but these changes have not been a single, clean layer added to the city. Instead, they should be thought of as layers from various eras intersecting and forming a mottled pattern. In some areas, remnants of the old castle town materials remain, while in others, canals have been consolidated and reinforced with concrete, creating a modern landscape. As you walk through Saga city, you can still find old bridges connecting various canals. In this way, the timeline of human history and the timeline of the landscape are not the same.

Landscapes have their own temporalities and rhythms, in relation to but distinct from individual human life cycles. (Renes & Kolen, 2015, p38))

The temporality of landscapes not only unfolds over time. The past is also always present in the landscape of ‘today’. (Renes & Kolen, 2015, p40–41))

From this, it is important to keep in mind that even in design projects, the landscape should not be viewed as something to be “completed,” but rather as an ongoing work that is shaped by the accumulation of human choices, memories, and expectations.

4. How can planning and design contribute to the landscape’s life history?

Considering social factors such as population shifts, society requires different tasks from heritage, making more dynamic solutions necessary. Urban and rural heritage is ever more a ‘driver’ for socio-economic and spatial developments, such as cultural tourism and recreation (‘leisure landscapes’), the creative industry, and the shaping of urban regions. (...) these new developments make them accessible for a growing group of interested people. (Renes & Kolen, 2015, p41-42))

Landscape is a vessel that can accommodate various changes. However, within that, landscape biography plays a role in supporting the creation of new values appropriate for the times by helping to give new meaning to the landscape within the context and needs of the location, while ensuring that it does not deviate from a consistent narrative axis.

When considering the future of Saga’s dilapidated canal network, not all types of interventions are justified. The interventions should reflect on relevant social issues to be solved.

Water Management

Over the centuries, living with water has involved the creation of a system of institutions and practices, as well as buildings, cities and landscapes that embody the lived history of water heritage and adaptations to local geographies, histories and conventions (Hein, Mager, Rocco, 2019).

However, due to modernization, improvements in organizational capabilities and technology have made people’s lives progressively more convenient. Traditional water systems and the associated water cultures, once closely related to daily life, fell out of alignment with contemporary needs and were increasingly neglected.

As climate change has intensified in recent years, increasing attention has been given to reducing disaster risks by utilizing heritage properties built with an understanding of local geographical characteristics. Many World Heritage properties explicitly relate to water, as they were created to provide or treat water, to utilize water for various purposes or protect against it (Dai 2023). Hence, new investigations of water history and heritage can help us move forward with sustainable and resilient water management; they are relevant to the redevelopment, redesign, and reuse of existing and ancient water systems as well as to the design of new systems. Historical systems can make an important contribution to the resilience and quality of life of communities, and to their sense of place and identity (Hein, Mager, Rocco, 2019).

Therefore, integrating water management in the conservation of heritage properties is crucial. This integration should focus on preserving sites in the face of climate change, while respecting or adapting them in line with historical water management practices (Chen 2016).

In the case of Saga, the canal network, once constructed throughout the city to mitigate floods and droughts and enable coexistence with water in the lowlands, has now been disconnected from daily life and is treated as little more than a drainage ditch. However, given the recent increase in flood frequency in Saga, it is worthwhile to revisit the historical background and functions of these canals and explore their potential for reuse as part of an effective flood management strategy.

In this light, the synergy between water and heritage can contribute to innovative water management approaches that extend beyond heritage contexts.

Urban Acupuncture

Urban acupuncture is a theory proposed by Jaime Lerner that involves small-scale, strategically placed interventions within cities to transform urban dynamics positively and sustainably (Lerner, 2014). These targeted interventions, often minimal yet impactful, aim to revitalize neglected or underperforming areas and stimulate broader urban regeneration.

Urban voids—vacant, abandoned, or underutilized spaces that have been associated with urban decline—are

increasingly recognized as valuable opportunities for urban resilience and renewal. Urban acupuncture theory positions these voids as strategic nodes capable of initiating positive urban transformations. They can serve as flood retention areas, permeable surfaces for stormwater management, and ecological corridors that support biodiversity, thereby significantly contributing to urban resilience (Ahern, 2011; Omar & Saeed, 2019; Meerow et al., 2016).

Saga City, like many shrinking cities in Japan, features numerous scattered urban voids resulting from demographic decline. By applying urban acupuncture principles to these voids and strategically reconnecting them with the city's historic canal network, Saga can establish an adequate blue-green infrastructure. This approach can enhance ecological connectivity, promote climate regulation, boost public health, and strengthen cultural identity, fostering greater ecological resilience and community well-being.

Local assets and Community engagement

Rural areas in Japan are rich in local assets such as nature, landscapes, culture, food, traditions, and history. However, many places are unable to achieve revitalization because they are unaware of the local assets at their doorstep or are unable to utilize them effectively. However, their resources possess the potential to vitalize a region by communicating its charm and value. The uniqueness of a region is shaped through historical changes and human intervention, and even if other regions attempt to replicate it, they cannot do so easily due to differing environmental conditions. Local assets are all unique to their respective regions, and

by refining these unique characteristics while engaging in regional development, the value and appeal of the region are created. (Yusa, 2017)

In the context of Saga as a regional city, which generally finds it more challenging to attract people compared to large metropolitan areas, developing a town that incorporates Saga's unique attractions can enhance the area's distinctive value, promote external interest and exchange, and foster pride and attachment among local people. In this regard, the historically rich canal network could serve as a potential local asset, with the capacity to revitalize the local economy, create job opportunities, and strengthen regional identity.

From the perspective of Landscape Biography, landscapes reflect the relationships between people and their land; therefore, activating dormant local assets requires active human engagement.

This perspective aligns with the first question posed in "Landscape Biographies": "Who (or what) are the "authors" of a landscape?". In this context, residents' participation plays a crucial role in ensuring alignment with community values, thereby enhancing authenticity and sustainability (Lee&Jan,2019) while promoting ownership and maintaining long-term cultural integrity.

DESIGN APPROACH

Based on the precedent study and theoretical framework, the design approach is structured around three key perspectives with four scales in the next page.

Water as Framework

In response to increasingly frequent flooding caused by extreme weather, this approach examines technical strategies to adapt the heritage water network—whose original disaster mitigation functions have been diminished by shifts in modern lifestyles. The goal is to harness the network's inherent potential while enabling it to respond to both contemporary societal changes and climate-related challenges.

Embracing the Voids

Focusing on underutilized vacant lands distributed throughout the city, this approach proposes designs that reconnect these spaces with the water network. The aim is to enhance flood resilience while also restoring habitats lost due to urbanization, thereby supporting both ecological recovery and hydrological function.

Involving People

This approach focuses on rebuilding the social relationship between people and the water network, which has long been overlooked in everyday life. Through inclusive programs and spatial design, it aims to reintegrate water spaces into the rhythms of daily living and foster a renewed sense of connection—both for local communities and for visitors.



Figure 93 Design approach

ANALYSIS/DESIGN THROUGH SCALES

In this project, the former castle town area has been selected as a key site for design proposals. Historically, the castle town was the center of water networks, culture, and economy, where diverse elements once converged. From a landscape perspective, traces of its historical spatial composition remain clearly visible today, making it a place where past and present overlap. For this reason, it is regarded as a core element of the city's identity, and by positioning it as the starting point of the project, it is also expected to inspire the revitalization of the neighborhood in the long run.

In addition to the proposals at the castle town scale, the water systems of Saga City are analyzed at two broader scales—the regional scale and the sub-regional scale. In the end, the project zooms in further from the key site to specific locations, developing proposals for spaces that foster social interaction as well as more personal spaces focused on their local life.

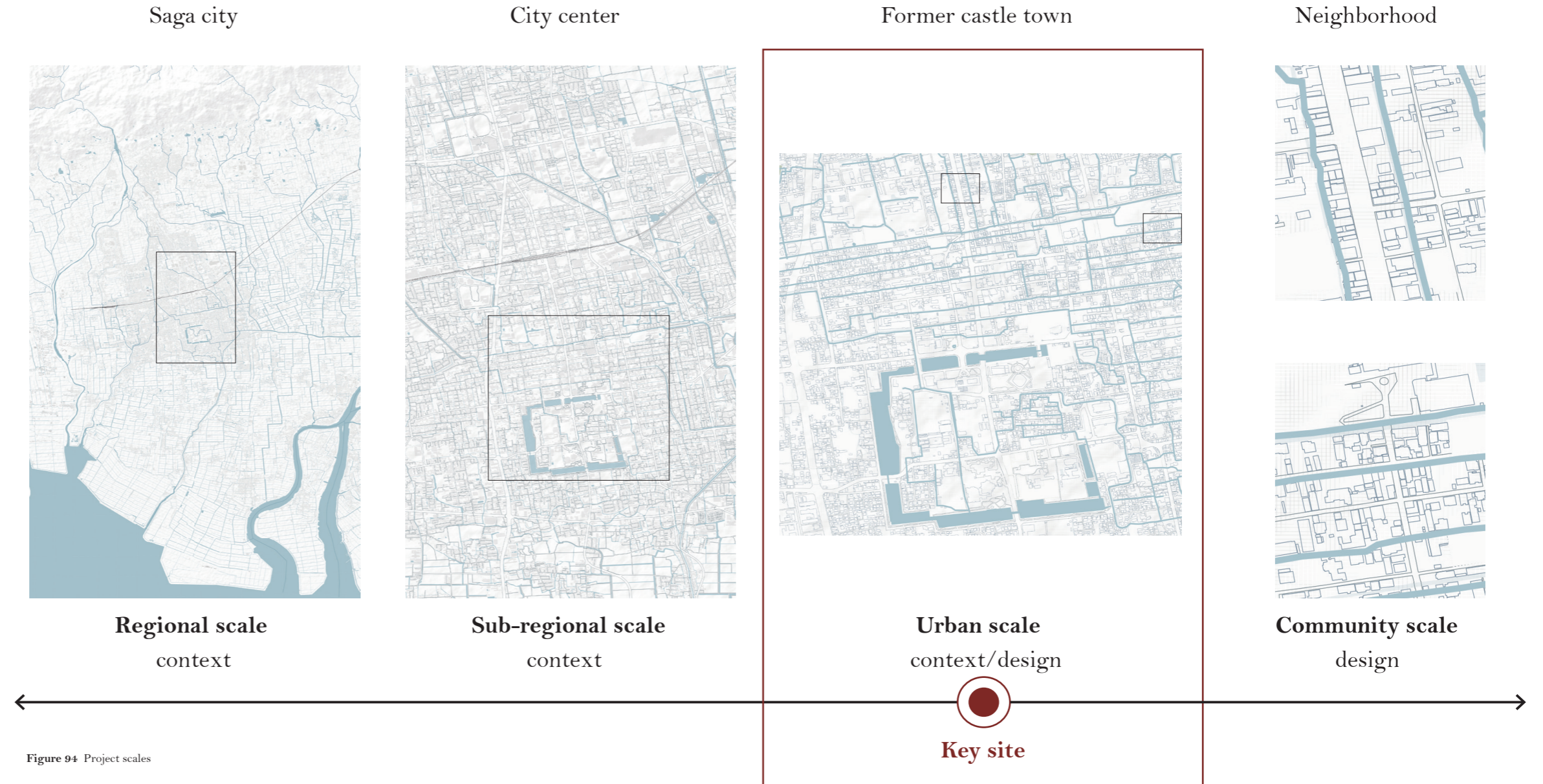


Figure 94 Project scales

03

WATER AS FRAMEWORK

This chapter examines the original characteristics of the water network remaining in Saga and how these can be adapted to meet contemporary needs in the **regional scale and sub-regional scale**.

TRACES OF THE PAST WATER SYSTEM

Canal hierarchy

The water network in Saga City can be classified into three hierarchical levels based on spatial characteristics and functional roles: primary canals, secondary canals, and tertiary canals.

1. Primary Canals

Primary canals constitute the main channels within Saga City's water network. Spatially, these canals are relatively wide, carrying water and sediment from upstream areas toward downstream regions, ultimately reaching the Ariake Sea. Additionally, primary canals form an integral part of the city's historical urban structure, notably in areas of the former castle town.

2. Secondary Canals

Secondary canals function as connecting channels between the primary canals and smaller local waterways. These canals are characterized by moderate width and depth, distributing water spatially throughout areas enclosed by primary canals. By delivering water across multiple neighborhoods, secondary canals play a critical role in maintaining interconnected water circulation within distinct urban districts.

3. Tertiary Canals

Tertiary canals are smaller waterways intricately dispersed throughout residential neighborhoods. Many of these canals persist in their original form because they were excluded from consolidations associated with urbanization.

As a result, tertiary canals often occupy narrow spaces between roads and buildings, closely conforming to the city's intricate spatial structure. The widths and depths of these canals frequently vary, reflecting adjustments to property boundaries and urban planning constraints. This fine-scale spatial arrangement contributes distinctively to the local landscape character, fostering an intimate and unique environmental quality within urban neighborhoods.



Figure 95 Primary canal



Figure 96 Secondary canal



Figure 97 Tertiary canal

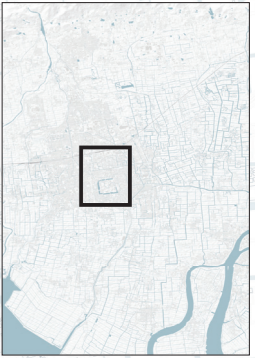


Figure 98 The location of the map



Figure 99 Canal hierarchy

TRACES OF THE PAST WATER SYSTEM

Unequal water flow

The Tafuse River is the primary water source for the water network in the center of Saga City, but the flow rate is high in the upper reaches of the Tafuse River and its surrounding canals, and it gradually decreases as the water flows eastward due to branching and water intake.

In areas where the flow rate decreases, water tends to stagnate, making it easier for sediment to accumulate compared to areas with higher flow rates. As a result, many canals with dense vegetation are observed.

The reason for the decreasing flow rate as the canals progress downstream and eastward from the Tafuse River is not only due to the physical basic structure of the water network, but also because the original water source itself does not have sufficient water volume.

This water network was initially constructed to irrigate the water-scarce Saga Plain, which cannot rely solely on water from upstream rivers. It was designed to incorporate tidal flows from downstream. With the abolition of the tidal water intake diversion, it is likely that areas near the Chikugo River are not receiving sufficient water.

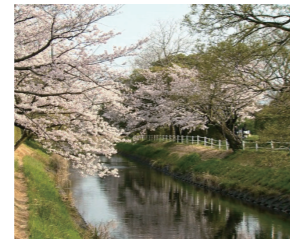


Figure 100 Tafuse river
Source: <https://www.city.saga.lg.jp/>

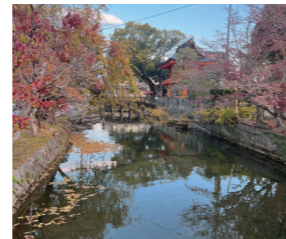


Figure 101 Spot A



Figure 102 Spot B



Figure 103 Spot C

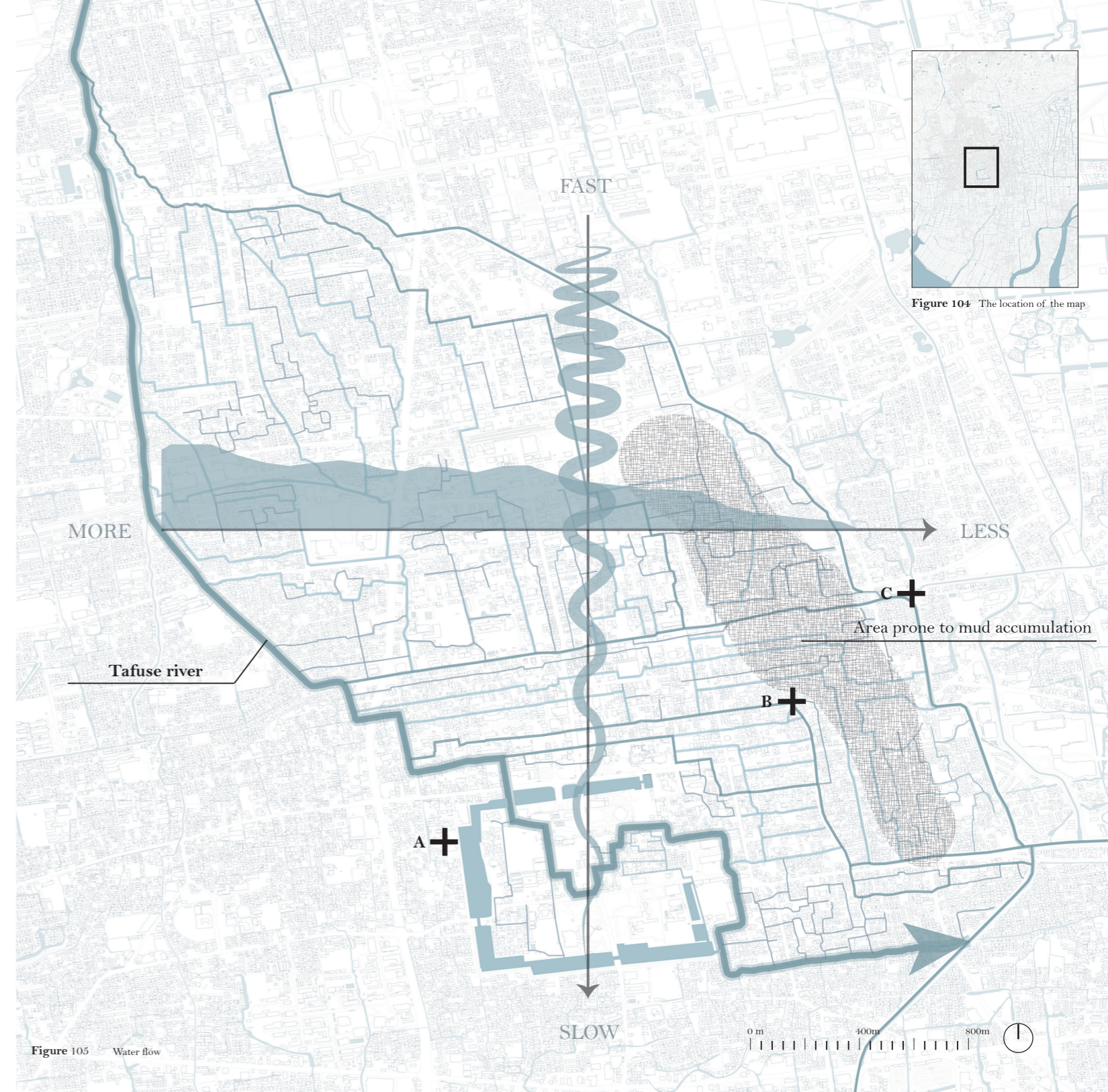
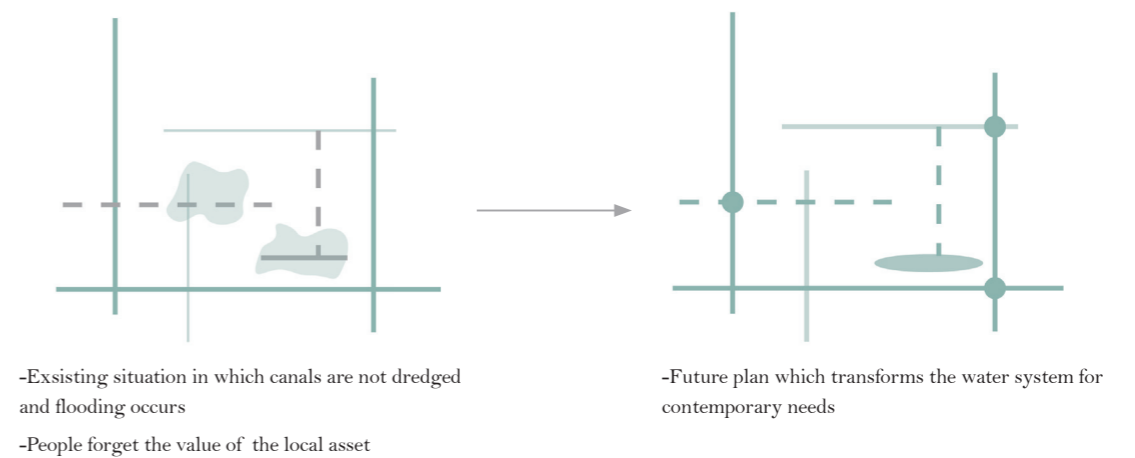


Figure 104 The location of the map

Figure 105 Water flow

“New investigation of water history and heritage can help us move forward with sustainable and resilient water management; they are relevant to the redevelopment, redesign, and reuse of existing and ancient water systems as well as to the design of new systems.”

- Hein, Mager, Rocco, 2019



Water as Framework

Figure 106 Water as Framework

WATER AS FRAMEWORK

In order to enable this transformation, the study must begin by situating the issue within the regional scale.

Sediment control

Rivers originating from the Sefuri Mountains supply not only water but also sediment to the canal network in central Saga City. To mitigate sediment accumulation within the canals and reduce the associated maintenance burden, this study proposes the installation of erosion control structures (sabo dam) in the upper reaches of the contributing rivers.

A suitable location for such intervention is the area upstream of the Kasegawa Dam, particularly in the vicinity of Fuji Town, where significant sediment runoff is generated due to the weathering and collapse of granite and shale formations.

The sediment retained by these sabo dams can subsequently be transported downstream via the Kase River and repurposed as construction material for reinforcing coastal levees along the Ariake Sea.

This approach is expected to enhance the hydraulic efficiency of the canal system in central Saga City by ensuring more consistent and unobstructed water flow.



Figure 107 Sediment flow map



Figure 108 Sabo dam
Source: https://www.hrr.mlit.go.jp/kanazawa/hakusansabo/09woman/fe16/fe16_0801.html

Sabo dam: A traditional Japanese structure built in mountain streams to trap sediment and debris, protecting downstream areas from floods and buildup.

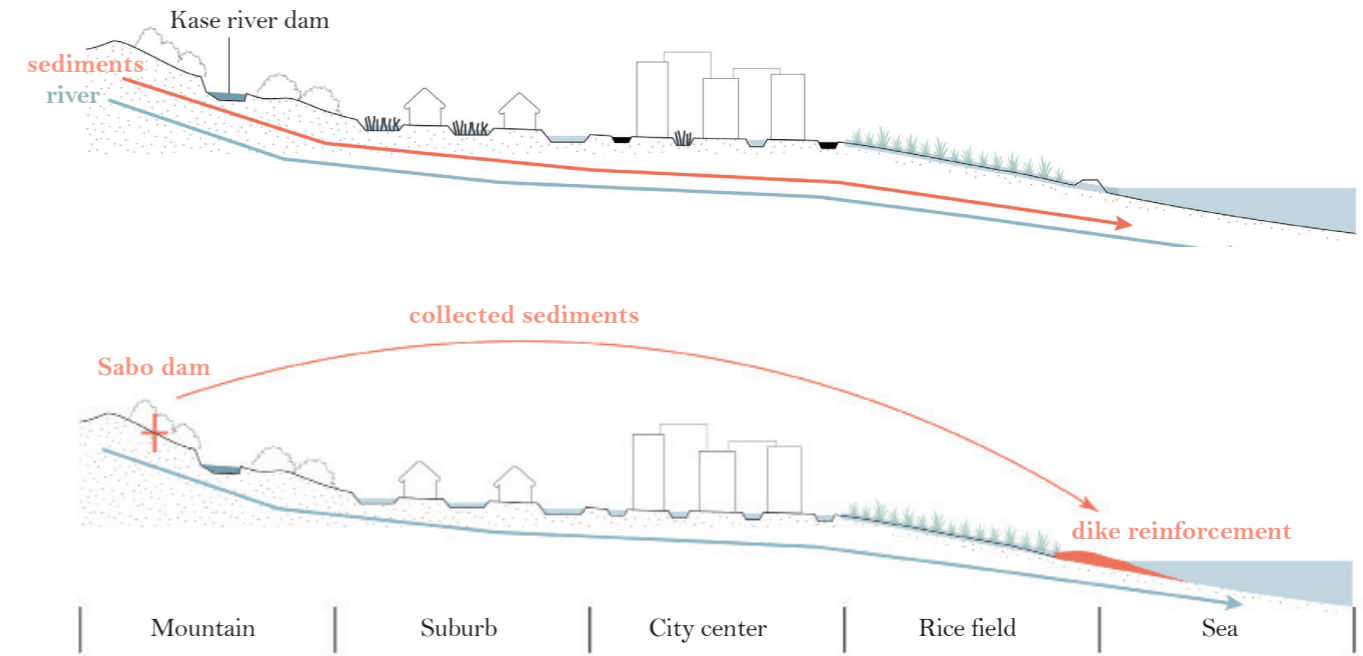


Figure 109 Sediment control

WATER AS FRAMEWORK

Principles for the canals

Given the effective control of upstream sediment discharge, this study develops a strategic framework comprising three core components for canals—Flow, Retain, and Sub retain—to ensure water reaches all parts of the city more easily. This strategy was considered to equalize the flow of water, which was originally designed to favor the castle. In allocating the three functions to each canal, the hierarchy shown on page 81 was referred, designating the primary canal as flow, the secondary canal as retain, and the tertiary canal as sub retain. (Including minor adjustments)

1. Flow

This type of canal delivers water evenly throughout the water network in central Saga City. At canal bifurcation points, hydraulic structures such as weirs and culverts are installed to regulate the volume of water distributed to other canals, ensuring an adequate water supply and its delivery to the downstream ends of the water system.

2. Retain

The canal receiving a smaller allocation under the Flow strategy is designated as the retention canal. It serves as a source for tertiary canals and provides temporary water storage during rainfall events, particularly when water levels in the “flow” canal rise above normal thresholds.

3. Sub retain

The tertiary canals, which retained their old irregular shapes without being consolidated during urbanization, serve as sub-retention at the community scale. When the retention canal exceeds its water capacity during heavy rains, water flows into this area.

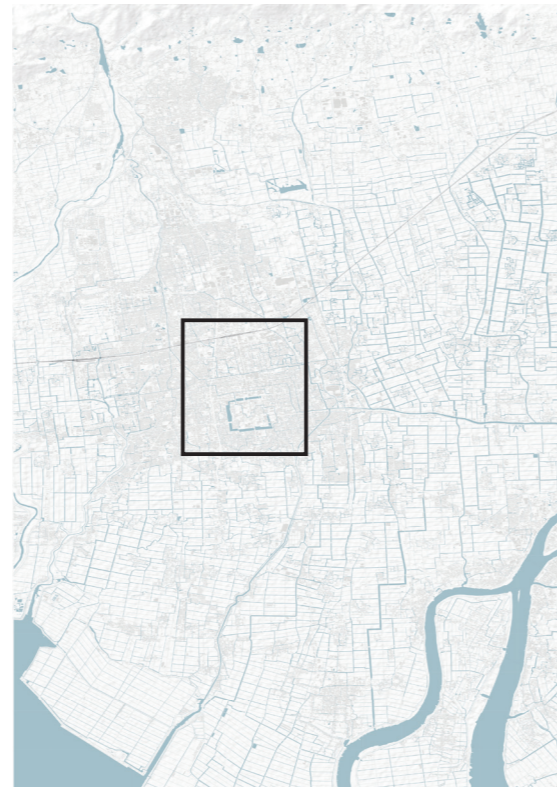


Figure 110 The location of the map on the right page

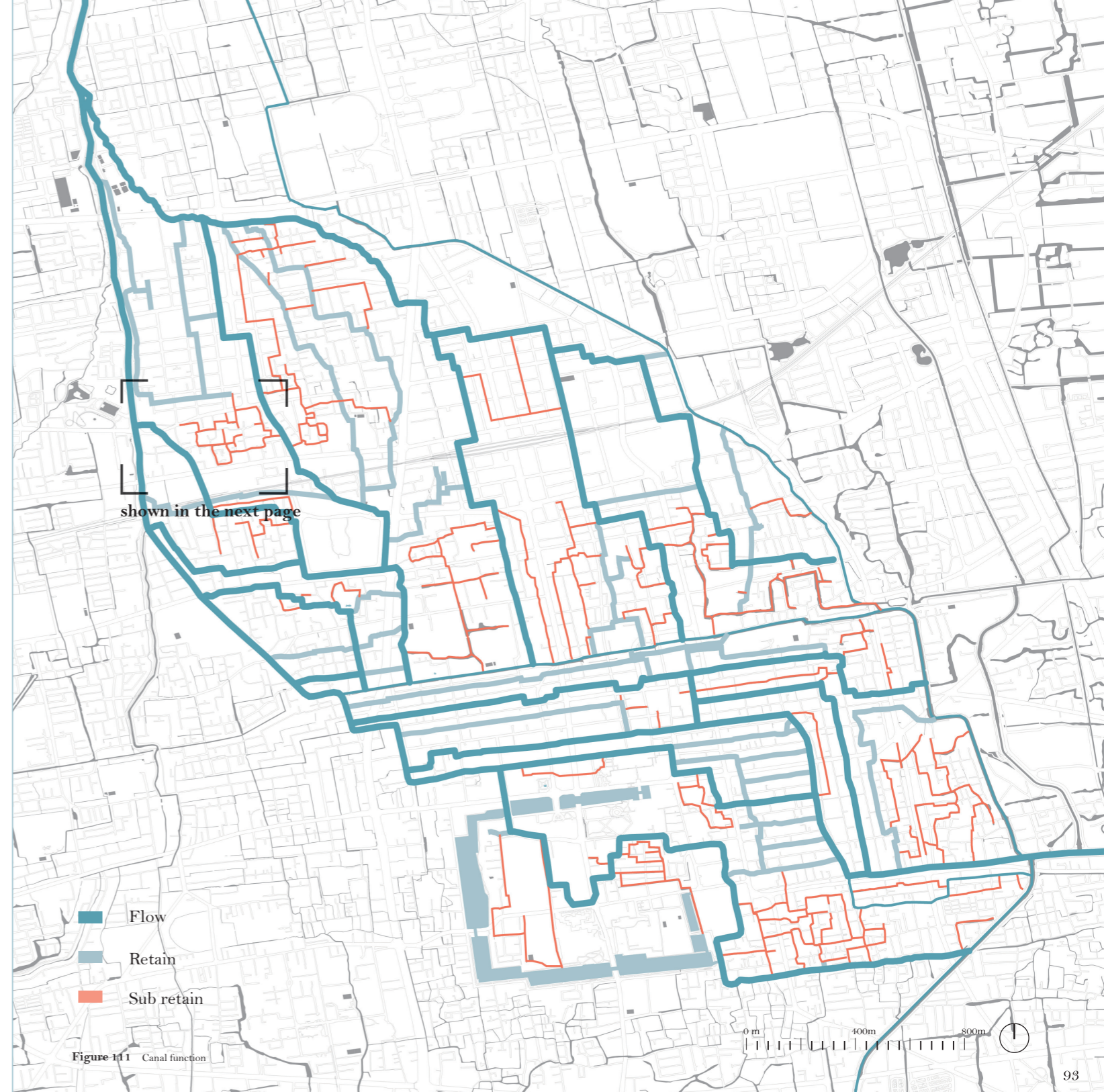


Figure 111 Canal function

Regular situation

Under normal conditions, the water flowing into the retaining canal and the sub retain area is regulated by the “flow” strategy, maintaining a steady volume. Compared to the flowing canal, the water volume in these areas is smaller.

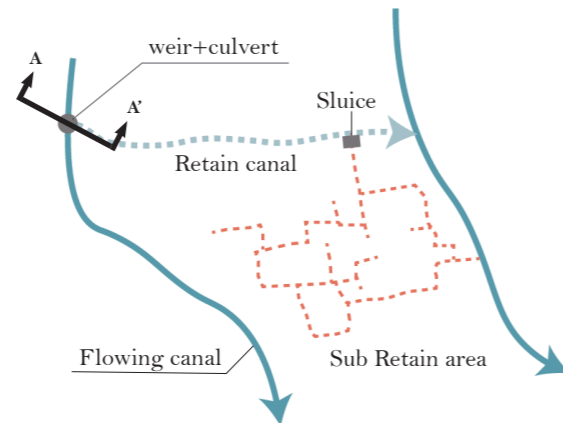


Figure 112 Regular situation

Rainy day

When the flowing canal can no longer handle the excess water, the overflow is directed into the retaining canal for temporary storage.

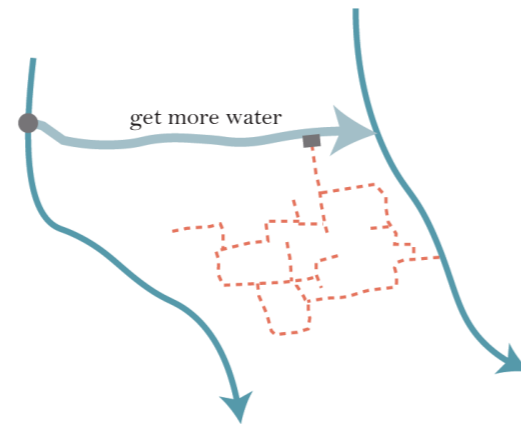


Figure 114 Rainy day

Rainy day in wet season

If the retaining canal becomes overwhelmed, the excess water flows through sluice gates into the sub retain area. In this way, the sub retain area functions as a backup to the retaining canal during emergencies.

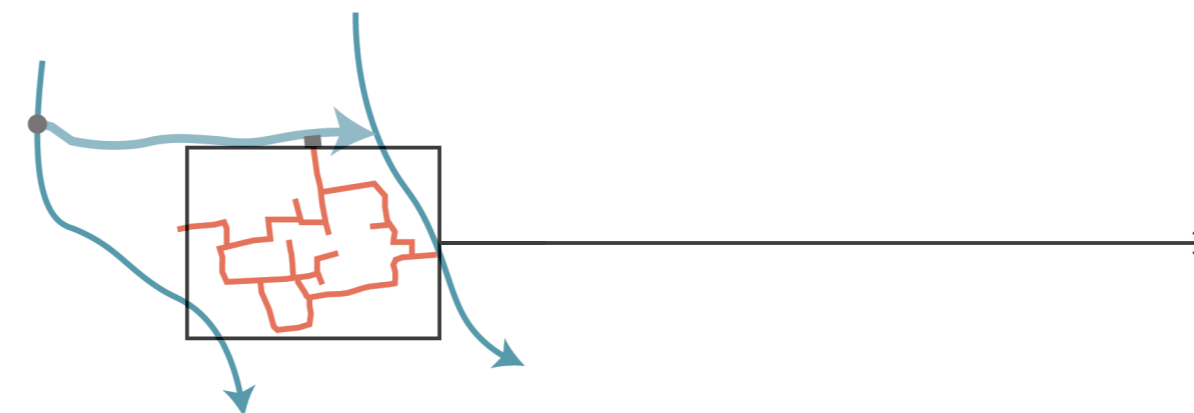


Figure 116 Rainy day in wet season

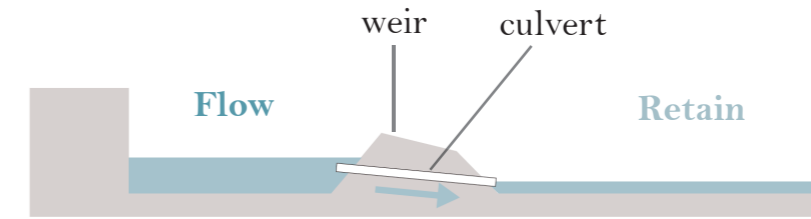


Figure 113 Section AA' in the regular situation

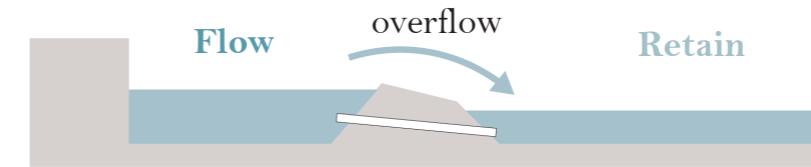


Figure 115 Section AA' in rainy day

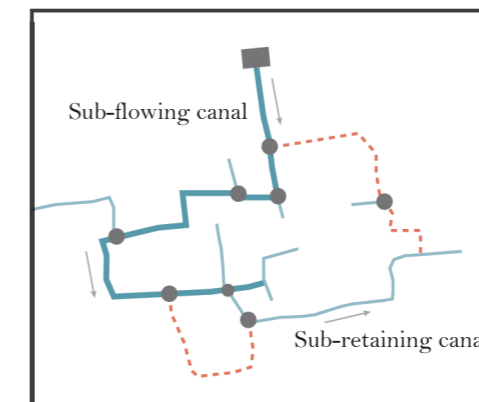


Figure 117 Sub retain area

Sub Retain area

Within this area, three strategies—guide, retain, and sub retain—are also applied and repeat the same process.

04

Castle town and Water

Building on the adjustment of the water network from its castle-town-oriented form to a contemporary version mentioned in the previous chapter, this chapter zooms in to the scale of the castle town to explore concrete approaches for the spatial quality around the water.

CASTLE TOWN ANALYSIS

Historical layer: Castle town structure

The castle town—the middle of Saga city— was once the economic and political center of Saga, and from a landscape perspective, its unique town layout is recognized as an iconic location in Saga. Additionally, as the heart of the water network, it is an ideal starting point for considering future town development that leverages the town's identity.

The basic structure of a castle town typically consists of the following elements:

- 1.Castle – the central facility of the town
- 2.Samurai residential district –residences of the warrior class, arranged according to status, from the high-ranking samurai located near the castle to the lower-ranking soldiers living further out.
- 3.Temple and shrine – usually located at strategic points for defense purposes
- 4.Merchant and artisan districts – commonly organized by profession

The moat –surrounding the Saga castle– used to serve as a defensive system. It consists of double layers (Inner moat and outer moat). As current situation, a part of the east moat is buried under urbanization, but it was the widest among the other sides.

The map in the next page also shows the location of stone bridges which used to be the important social interaction points between land and water in the past. The canal which has more stone bridges means that it served as the important transportation route for the boat

at the time. The fact that the merchant district and outer moat have a lot of stone bridges also support this theory.

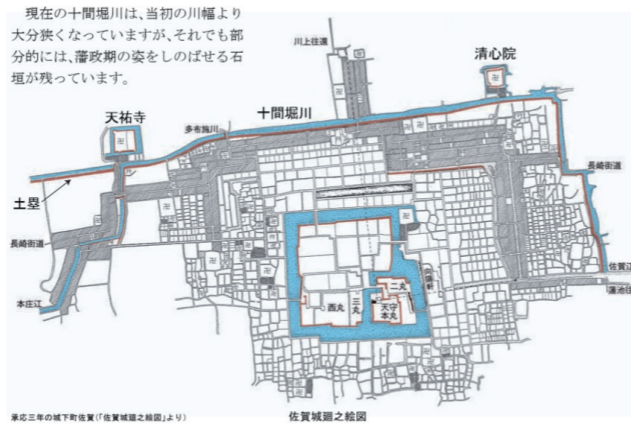


Figure 118 Castle town structure previous research
Source: city.saga.lg.jp

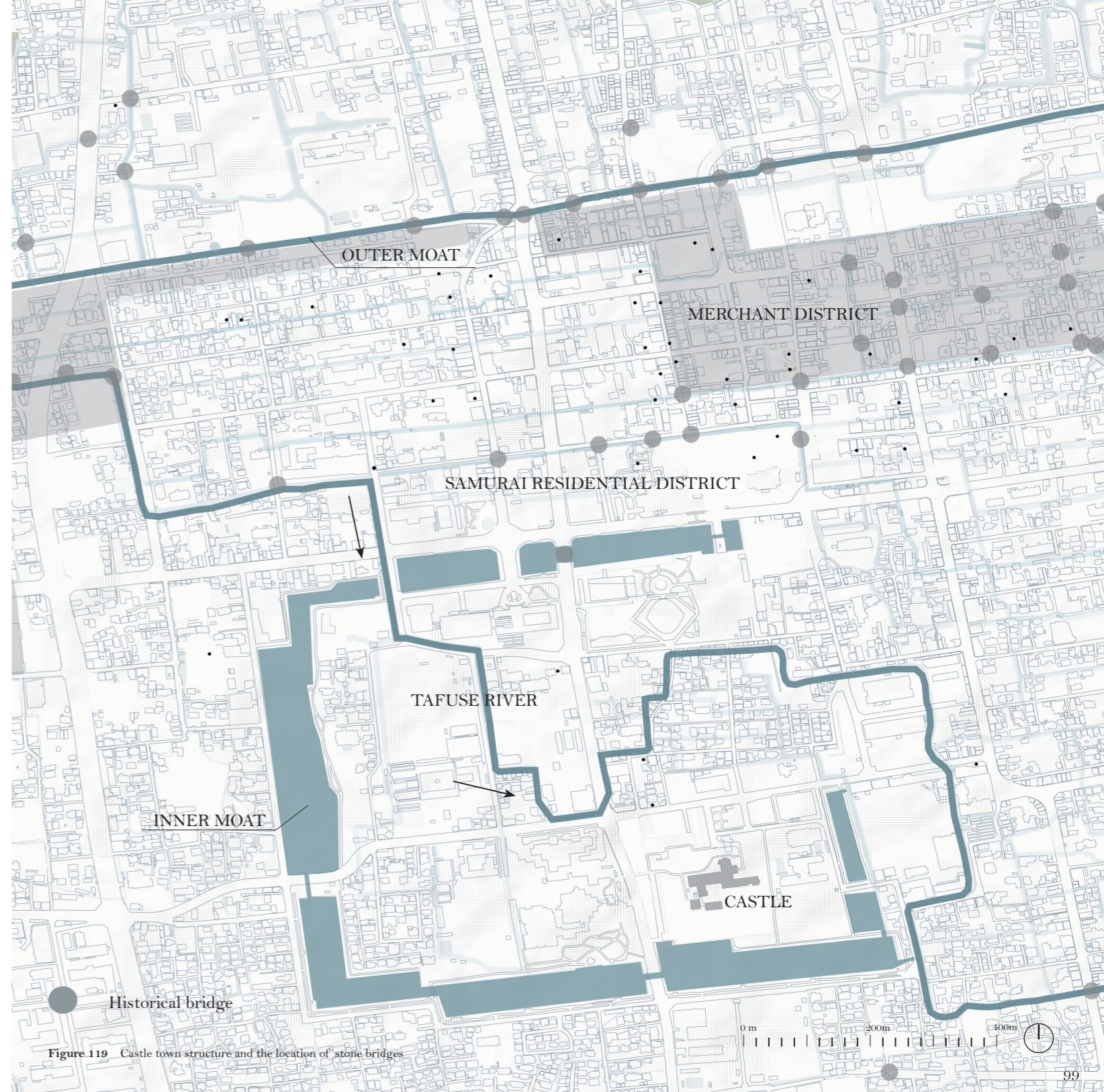


Figure 119 Castle town structure and the location of stone bridges

CASTLE TOWN ANALYSIS

Current castle town -land use and urban voids-

Saga City has retained the basic spatial framework of its former castle town — including the moat structure and canal network — while gradually developing its own distinctive land-use pattern. Examining the current land use reveals a clear urban structure: commercial zones extend along the main road that runs through the city center, surrounded by dispersed residential areas. Inside the former castle moat, public institutions such as schools, museums, and the prefectural office are concentrated, alongside a notable presence of open spaces.

Along with the ongoing population decline, the increasing number of voids has also become an integral part of Saga’s urban landscape.

The map on the right illustrates current land use together with existing vacant lots and parking areas. The voids in each area differ in both their spatial characteristics and the ways in which they have been formed.



Figure 121 Residences and void



Figure 122 Parking lot and water in commercial area



Figure 123 Buried east moat
Source: Google map



Residential area

Voids emerge as vacant houses are demolished, so each individual void is roughly the size of a dwelling unit. The current vacancy rate in Saga City is 15.64 %, and it is expected to continue increasing.



Commercial area

Compared to residential areas, individual voids are larger in size, and parking lots currently occupy a significant portion along the canal.



Public squares

Within the castle area, facilities such as the art museum, Saga Castle Ruins Park, and schools are located. While tourist spots are scattered about, there is little opportunity to notice the water network. Existing voids hold the potential to create space for this.

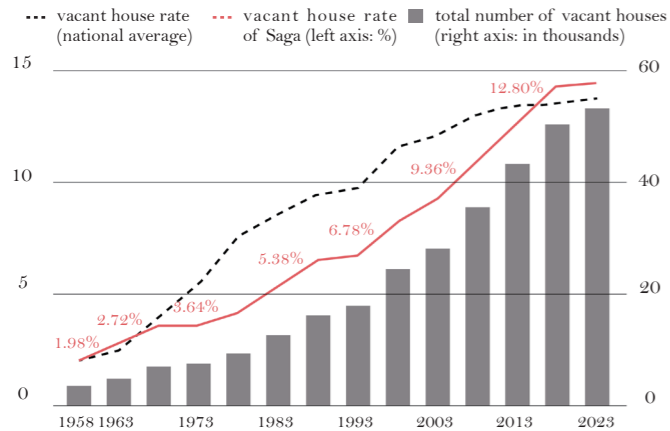


Figure 120 Vacant house rate of Saga
Source: <https://diamond-fudosan.jp/>. Edited by author

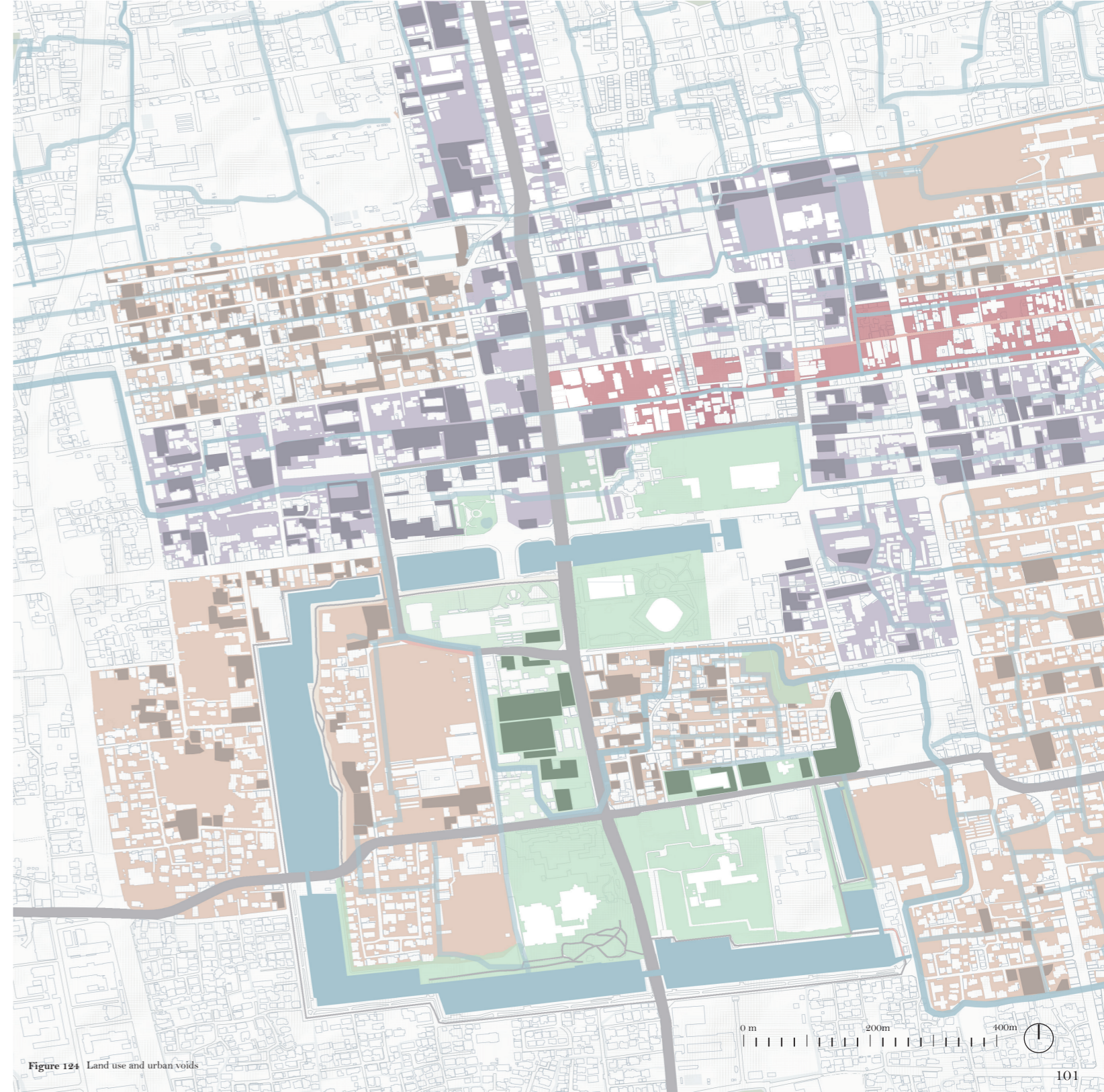


Figure 124 Land use and urban voids

CASTLE TOWN ANALYSIS

Urban void typology

After clarifying the basic structure of the current castle town and the void situation, here will focus on each void character and relationship with water to find their potentials.

The relationship between water and voids can be broadly categorized into three types:

(1)Adjacent, (2)Isolated, and (3)Buried.

(Composite versions of these categories also exist.)

Looking at the map on the right, adjacent types dominate the landscape. This is precisely because, in the past, houses in Saga were built straddling canals. Now, as those areas become vacant lots, the once-hidden canals are becoming visible.

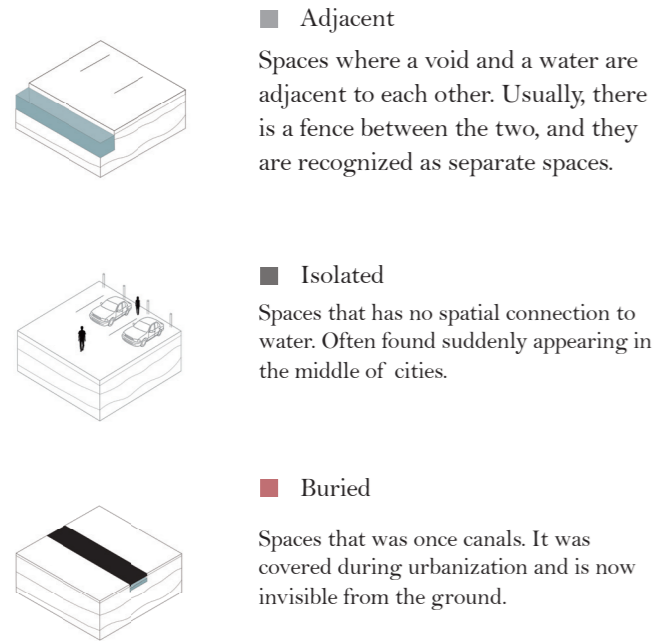


Figure 125 Urban void typology



Figure 126 Urban void typology -Adjacent-
Source: Google map



Figure 127 Urban void typology -Isolated-



Figure 128 Urban void typology -Buried-



Figure 129 Urban void typology mapping



“Urban acupuncture revitalizes a ‘sick’ or ‘worn out’ area and its surroundings through a simple touch of a key point. Just as in the medical approach, this intervention will trigger positive chain-reactions, helping to cure and enhance the whole system.”

– Lerner, 2014

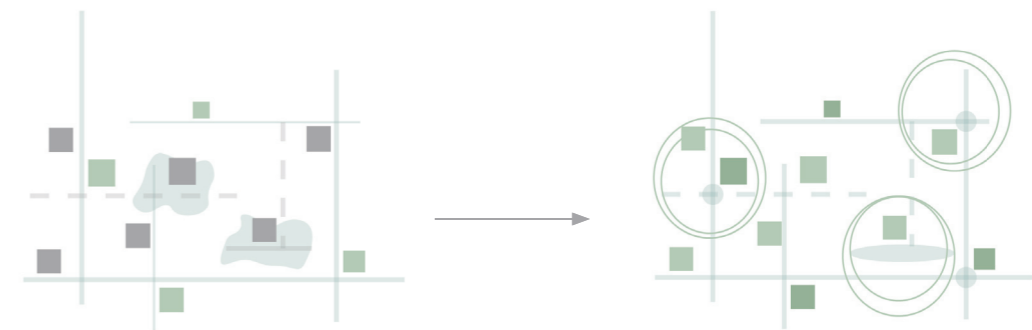


Figure 130 Embracing the Voids

Embracing the Voids

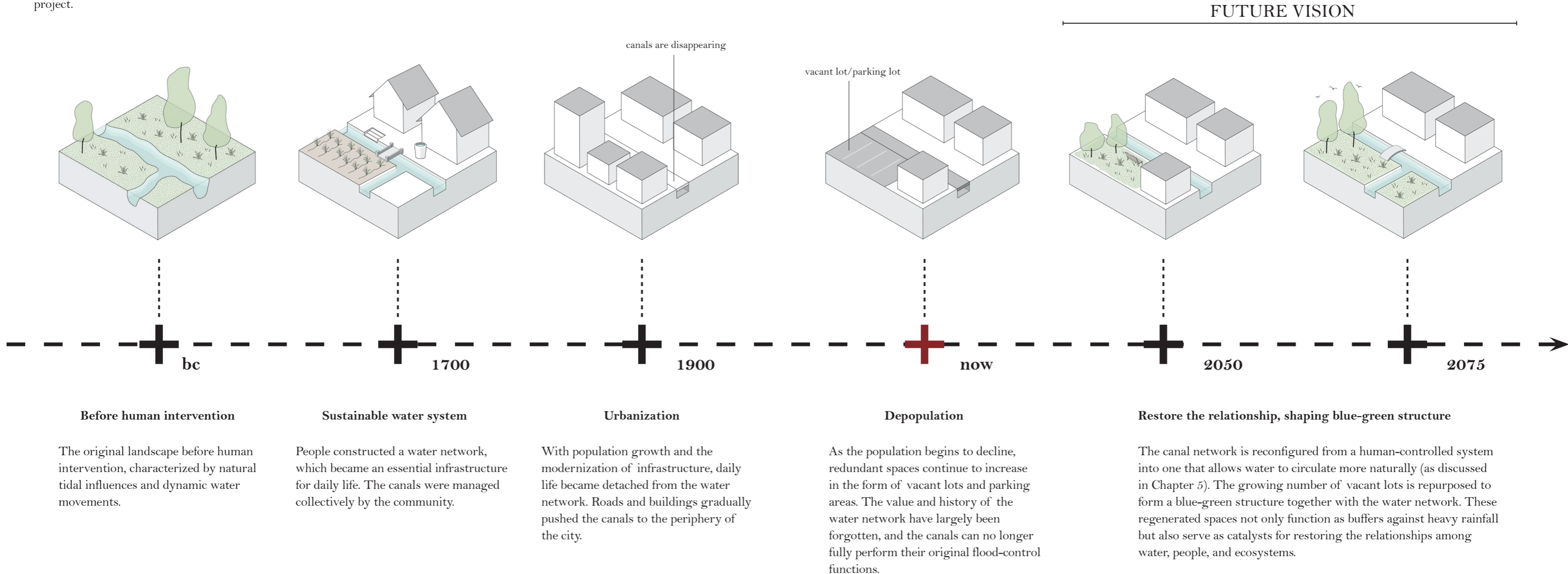
The project aims to enhance the water retention and drainage functions of the water network in Saga City by utilizing vacant lots, parking lots, and other surfaces and urban spaces that serve as “urban voids,” thereby forming Blue-Green Infrastructure. This initiative aims to mitigate flood damage during heavy rainfall while enhancing the quality and ecological value of these spaces.

EMBRACING THE VOIDS

Landscape Biographies of Saga and its future vision

So far, this study has examined the formation of Saga's water network and the relationship between human society and the water within the city. Building upon this understanding, Figure X conceptually illustrates the process of transformation and, as an extension, shows the vision of this project.

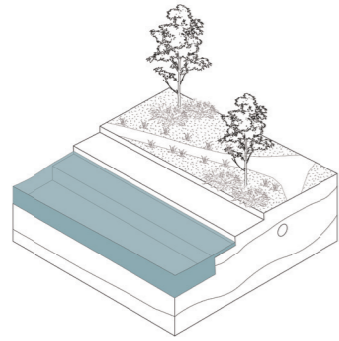
Figure 131 Landscape Biographies of Saga



EMBRACING THE VOIDS

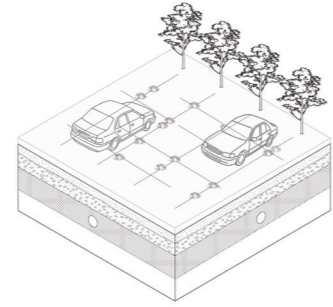
Design strategy for urban voids

By taking the urban voids as space for opportunity to strengthen the proposed water network in the previous chapter, the three types of voids turn into serving to collect rainwater and direct it to adjacent canals in usual occasion.



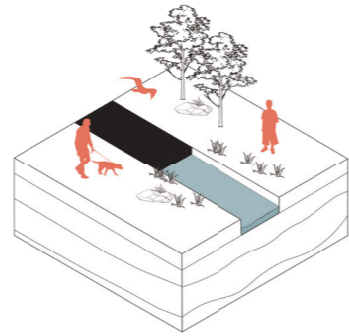
void type 1: adjacent

■ Overflow



void type 2: isolated

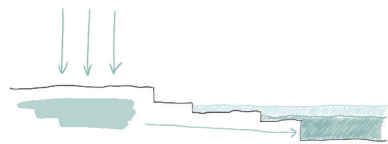
■ Infiltrate



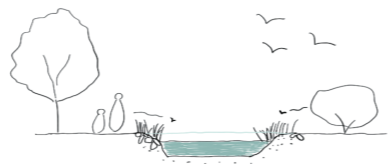
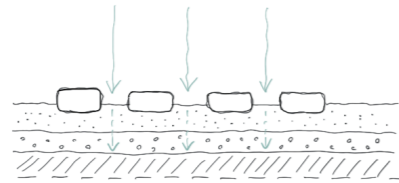
void type 3: buried

■ Revive

The adjacent canal and void space work together. The voids are transformed into rain-absorbing infrastructures such as bioswales, allowing rainwater to infiltrate the ground and flow into the canal. The boundary between water and void becomes more gradual, so when rainfall exceeds the canal's capacity, the void receives overflow from the canal.



This space still works as a parking lot, but the ground will be transformed into permeable pavement. The water soaked into the ground will merge with nearby waterways or drainage channels from underground pipes.



Open the underground waterways which were filled in during the urban expansion, and increase the water capacity.

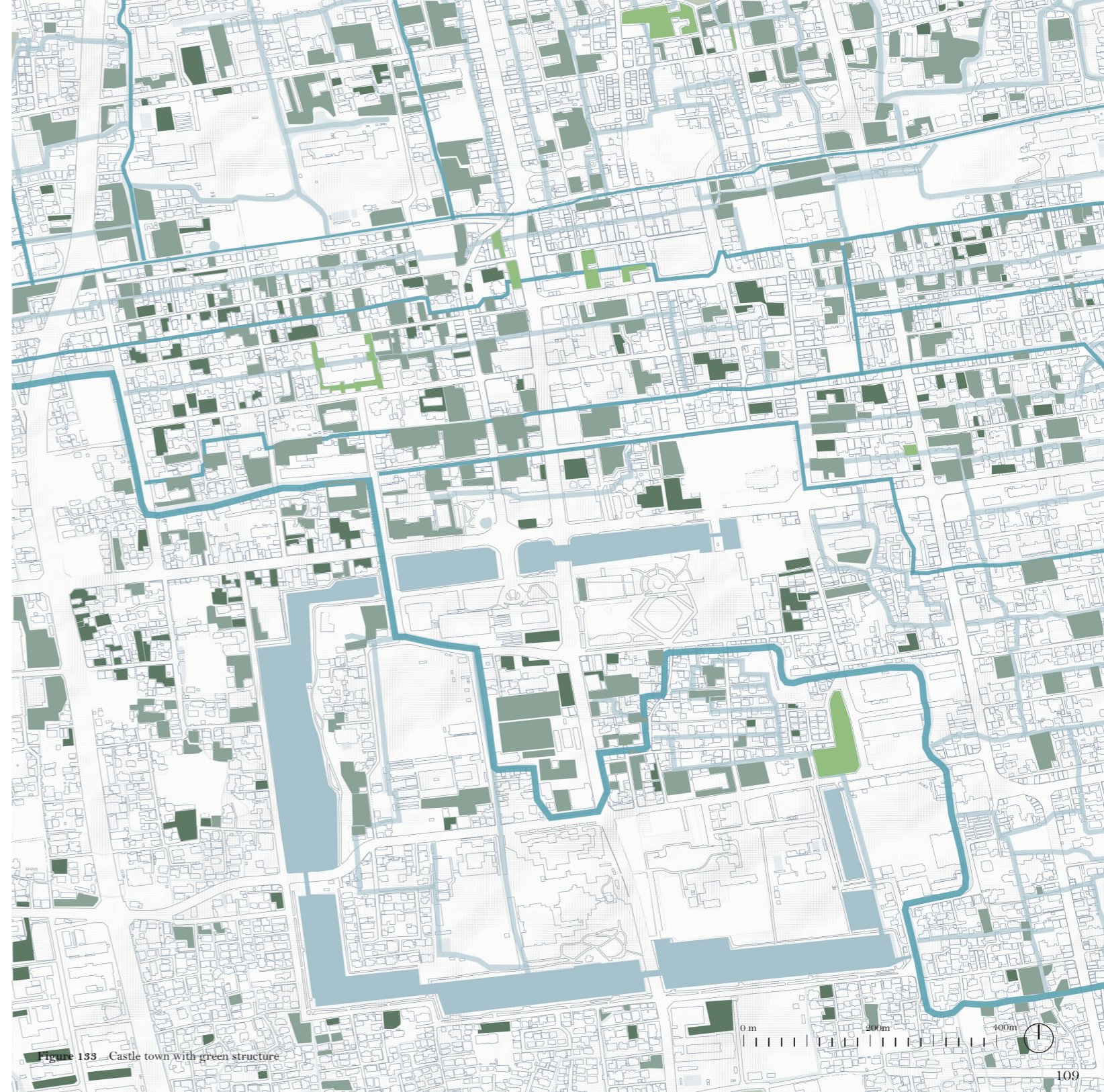


Figure 133 Castle town with green structure

Figure 132 Design strategy for urban voids

What is the historical value of Saga's water network? What can we learn from the history?

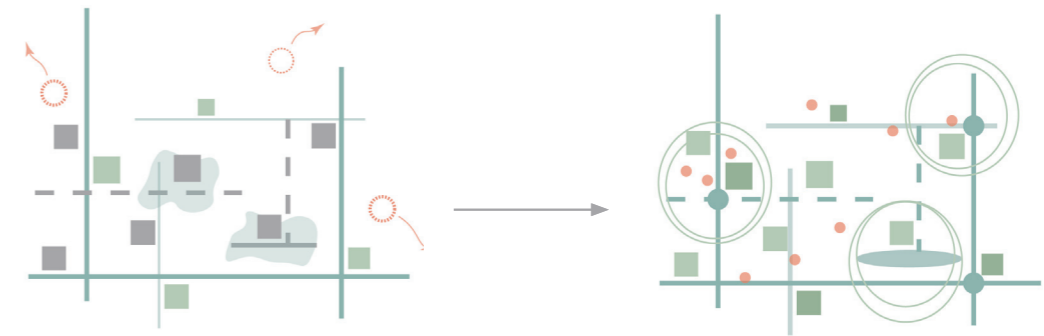


Figure 134 Involving people

Involving people

By forming a blue-green structure within the city of Saga, it becomes possible to create spaces where people, plants, and animals can engage with the waterfront environment.

Before considering the specific ways in which these interactions might take place, it is important here to look back at the historical value of Saga's canal network.

INVOLVING PEOPLE

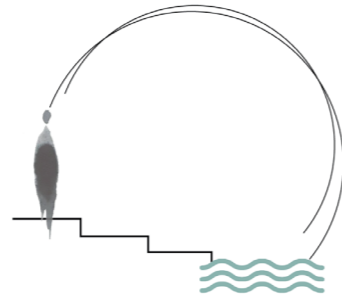
Design principle from history

The water network will provide opportunities for various stakeholders to interact with water.

In considering the spatial qualities necessary to achieve this vision, it is important here to address the value inherent in the water network.

The historical value of Saga's water network lies in **the relationship between the people of the past and the network itself**, not only in the fact that the water system was ingenious.

Although this value is now fading with time, the relationship between people and water in the past can be seen as a hint at how people living in Saga can create points of contact with this local landscape even in the modern era. This project aims to **define and extract the value as a design essence through reinterpretation**, integrating it into city planning.

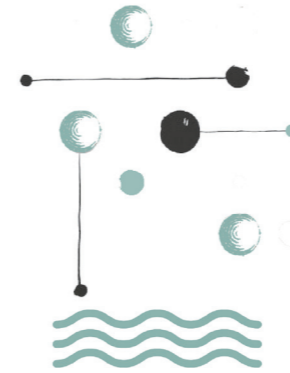


Access to the water

Approaching water was once an everyday act in Saga, enabled by features such as stone steps along the canals. These physical interfaces fostered familiarity and attachment, turning water into an integral part of daily life and local identity. Building on this history, reinterpreting the act of approaching water in contemporary design can help revive human-water relationships and provide new meaning for the city today.



Figure 135 A woman washing clothes at Kawaji Figure 136 Kawaji (stone steps)

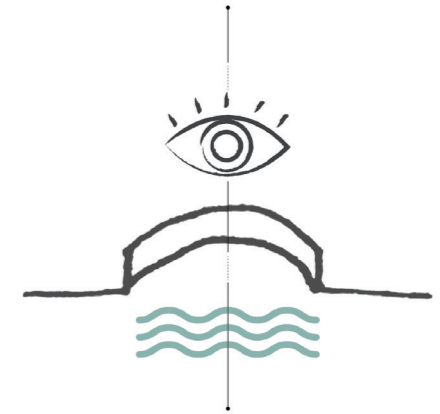


Icons of water use

Tools once used when the water network was the primary infrastructure for daily life are now rarely seen in Saga. This project explores how such disused objects can be repurposed to evoke connections with water. For example, while the water jars people once used to filter and store water are no longer used for that purpose today, the same objects can be repurposed as drinking fountains, bringing them back into the cityscape while retaining their visual essence, telling the story.



Figure 137 A woman pouring water to the jar Figure 138 Water jar exhibited in a park



Landmark as viewpoint

The bridge now serves as a landmark for a garbage dump, but it was once an intersection between land and water. It functioned not merely as part of a road, but also as a “point”—a place where people gathered to communicate. This project reinterprets the bridge as a space that guides the viewer's perspective, attempting to integrate it into the waterscape.

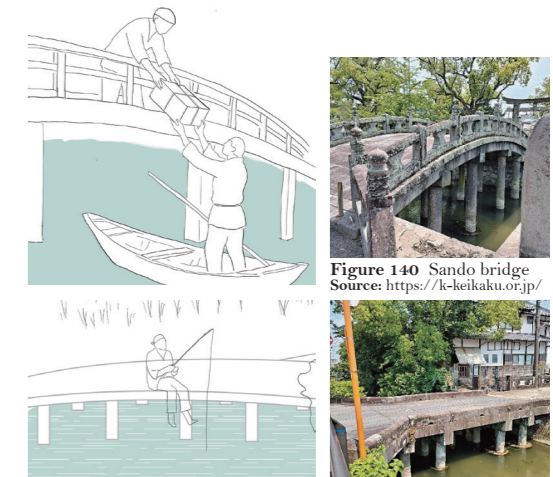


Figure 139 Human interaction with bridge Figure 140 Sando bridge Source: <https://k-keikaku.or.jp/> Figure 141 Zenja bridge Source: <https://k-keikaku.or.jp/>



Connection to the nature

As discussed in the previous chapter, the natural environment of the canals was sustained through human intervention. Within this maintained environment, people not only managed the canals but also deepened their engagement with nature by creating small spaces in the canal to raise carp etc. Today, however, such opportunities to engage with the canal environment have largely disappeared in Saga. This project seeks to explore ways of reactivating human interaction with the water environment.



Figure 142 Fishing



Figure 144 A woman harvesting water chestnut

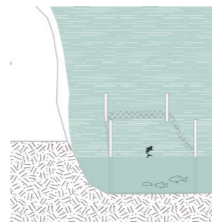


Figure 143 Raising small fish



Water as carrier

The canals were once used for transportation, with small vessels delivering goods and forming part of Saga’s waterscapes. Although the water network no longer serves this function today, the acts of “passing through the spaces between houses by boat” or “viewing the city from the water” can be reinterpreted as recreational experiences and reintroduced into the contemporary urban landscape.



Figure 145 Delivery

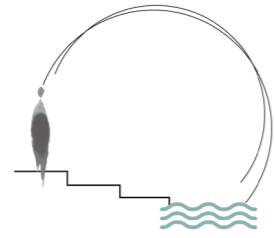
The following pages show how the five principles extracted from the historical relationship between people and water can be translated into more concrete design strategies.

INVOLVING PEOPLE

Design strategy

The design strategies shown on the right are methods intended to create opportunities for rebuilding a new relationship between people and water—one that aligns with the contemporary context—derived through an interpretive reading of their historical interactions.

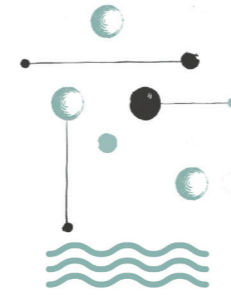
Through these opportunities, people will regain their awareness of the water network that has been pushed to the margins of the city.



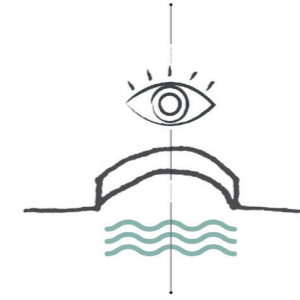
Access to the water



Connection to the nature



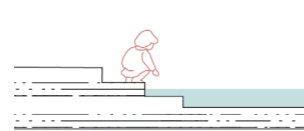
Icons of water use



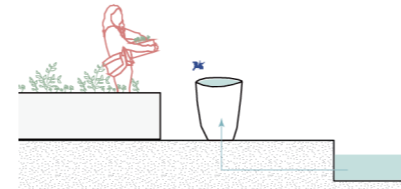
Landmark as viewpoint



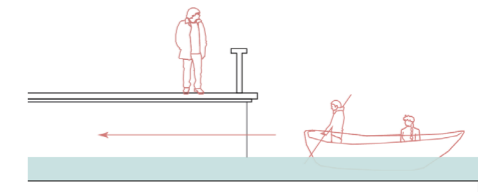
Water as carrier



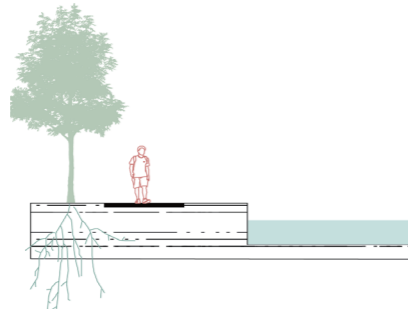
Steps as resting spot



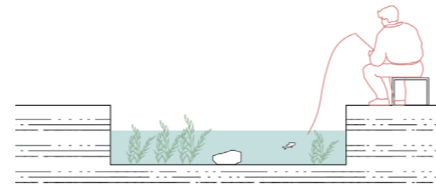
Gardening



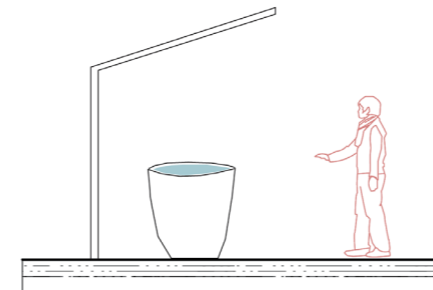
High bridge:
Cultural route for visitors



Pathway along the canal



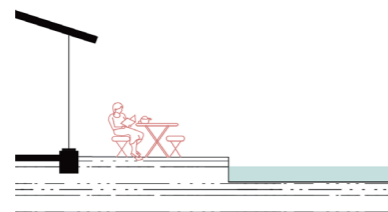
Fishing



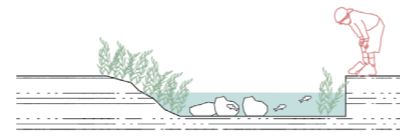
Tourist sign



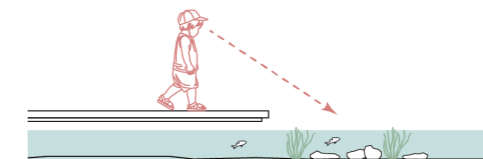
Boat experience



Waterside terrace



Biotope



Low bridge:
Microhabitat and the observation spot

Figure 147 Design strategy for involving people

DESIGN PHASE

Synthesizing the strategies

Starting with the modification of the water network at the regional scale demonstrated in Chapter 3 (Phase 1), this project moves to the next phase, gradually regenerating the relationship between water and people at the test scale in central Saga, while incorporating the void strategy and spatial design principle. In the phase 2, zoning plans tailored to the respective land uses will be applied.

Phase 2-1 targets commercial areas and open spaces within the castle area. These areas currently have a high proportion of vacant land (including parking lots) and were judged to be easier to partially implement plans and do so immediately compared to residential areas. At this stage, proposals are made for economic activities utilizing the waterscape in central Saga and for realizing tourism that effectively communicates Saga's appeal to visitors.

Paying attention to the residential areas, the vacancy rate is expected to increase in the future, necessitating proposals for addressing this issue. Therefore, Phase 2-2 will introduce zoning plans for those areas and propose new lifestyles that coexist with the canals.

Within the new spatial configurations generated by these zoning plans, the design principles extracted from the reinterpretation of historical contexts are embedded, ultimately realizing a contemporary vision of local life with the water network in Saga.

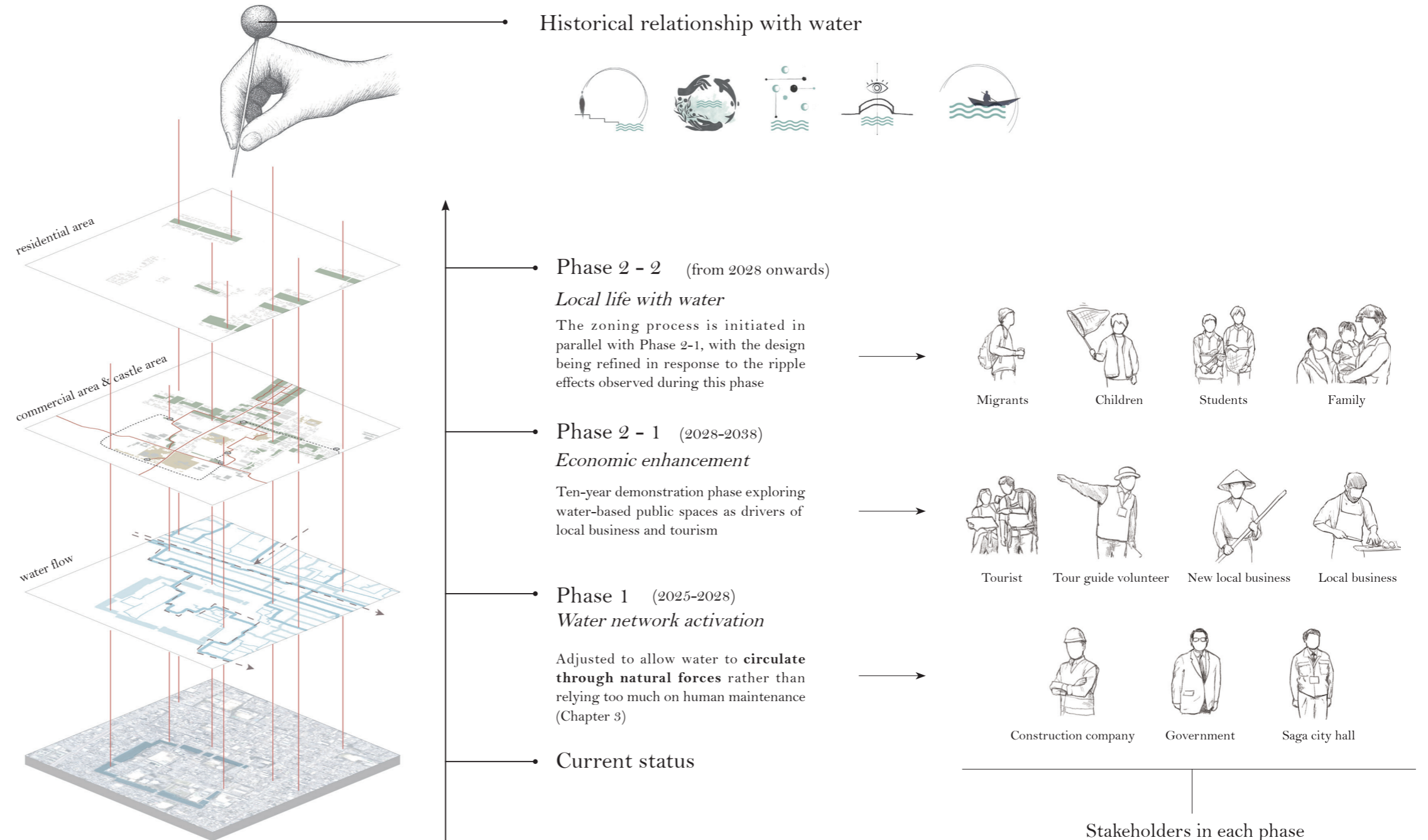


Figure 148 Design phase

PHASE 2-1 :
ECONOMIC ENHANCEMENT
 Zoning strategy

Phase 2-1 focuses on voids, including parking lots, that remain underutilized within the commercial and business areas and the castle area. Rather than simply introducing new functions, the zoning plan seeks to reorganize these spaces as catalysts for urban activity—linking canals, public spaces, and commercial zones—to revitalize central Saga and enhance its identity.

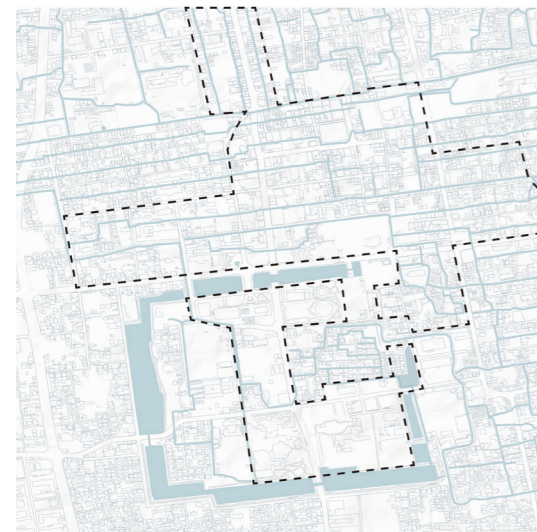


Figure 149 Zone for Phase 2-1

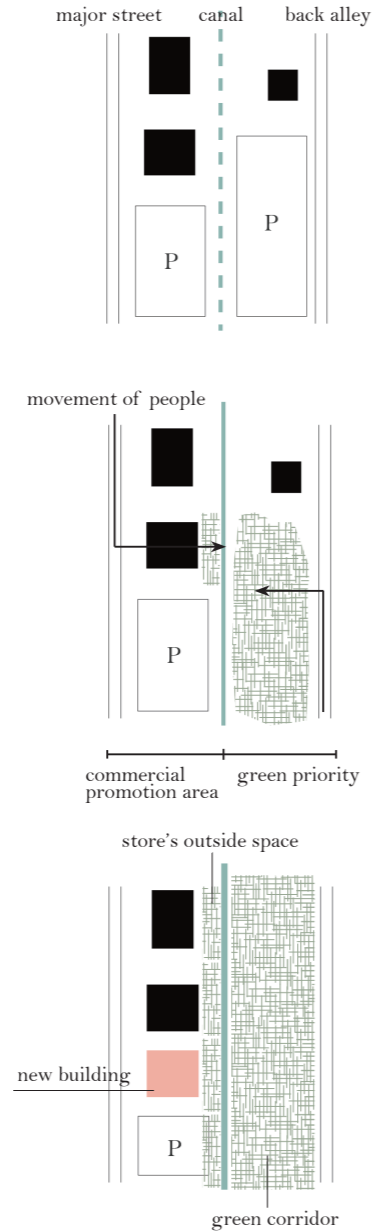


Figure 150 Zoning strategy for commercial and business area

Commercial and Business areas

Current structure

The layout often features canals sandwiched between buildings. Consequently, the voids created in this area also adjoin the canals. However, these canals are largely invisible to the public.

Phase 2-1-1: From void to green patchwork

By analyzing the relationship between the canal structures and the surrounding land, the areas adjacent to canals are designated as Green Priority Zones. Within these zones, vacant lands and parking lots are gradually converted into public spaces accessible to users of nearby shops and facilities.

Phase 2-1-2: Patchwork comes together

Once the green spaces begin to form a patchwork across the area, the municipality subsidizes the relocation of remaining shops or facilities from the Green Priority Zones to designated Commercial Promotion Areas. Over time, the zones transform into continuous green corridors along the canals, serving as key recreational spaces for the community.

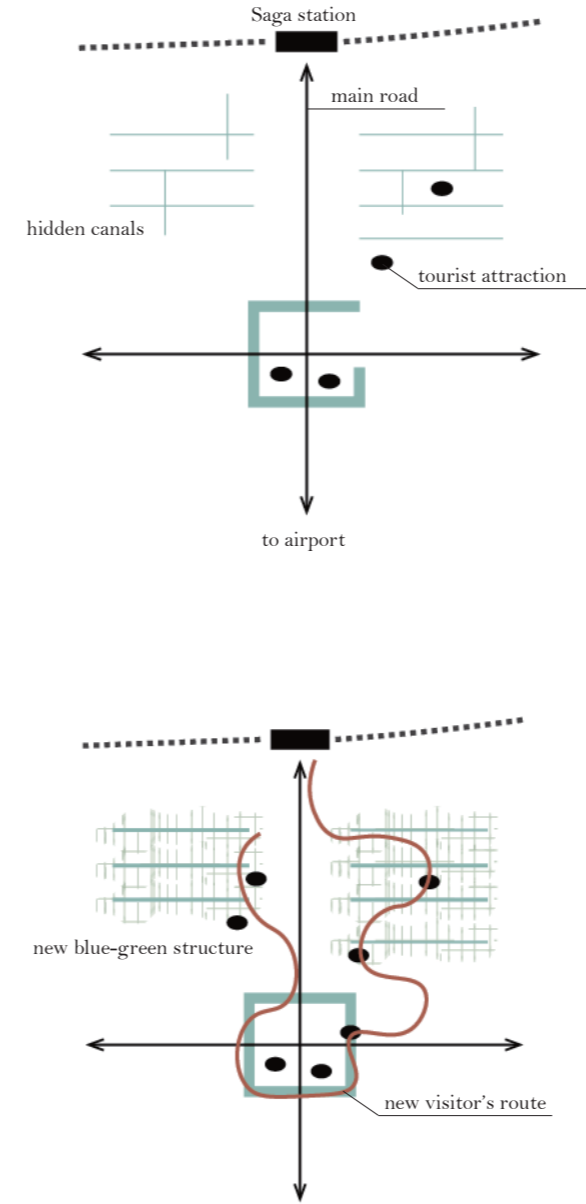


Figure 151 Visitor's route concept

Visitor's route

Current situation

Saga City's tourist attractions, such as Saga Castle ruins and museums, are concentrated around the castle areas. However, there is little opportunity to notice the water network while traveling from the station/airport to the castle area.

Phase 2-1: Connect the appeal

This phase proposes to connect the voids in the castle area and commercial district with existing tourist spots, thereby suggesting a route that allows visitors to experience the distinctive atmosphere and spatial character of Saga.

PHASE 2-1 : ECONOMIC ENHANCEMENT

Vision

In Saga, shaped by its zoning strategy, new ways of engaging with the local landscape are cultivated from the perspectives of both residents and tourists.

Local Businesses and Residents' perspectives:

In commercial area, local restaurants and shops can enhance the attractiveness of their commercial environments by utilizing the spaces behind their buildings—particularly those facing the canals—as extensions of their activity zones.

In business area, where hospitals and office buildings are located, the introduction of green corridors along the canals can provide new opportunities for daily use, such as walking paths for patients or relaxation spaces for office workers.

Visitors' perspective:

City center of Saga has excellent accessibility from multiple directions:







Hakata to Saga: 40 minutes by train

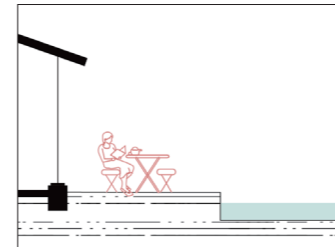
Tokyo – Saga: 2 hours by plane

Yanagawa – Saga: 30 minutes by car

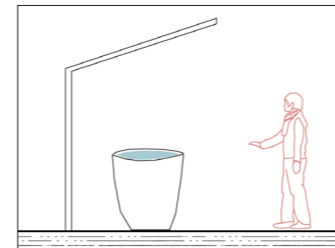
Nagasaki – Saga: 1 hour by car or train

Visitors arriving by train or plane travel along the main road leading from the station to Saga Castle. Along this route, commercial streets offer opportunities to encounter the canals through adjacent public spaces. The coexistence of boat and pedestrian routes enables diverse modes of urban exploration, allowing visitors to directly experience the charm of Saga's local landscape—something that might otherwise remain unnoticed from only the main streets.

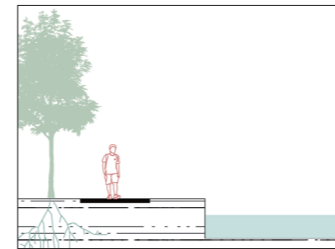
-  New green structure
-  Existing fragmented green structure
-  Open space in castle area
-  Schoolyard
-  Commercial area
-  Business area
-  Current residential area
-  Water network
-  Potential visitor route
-  Boat stop



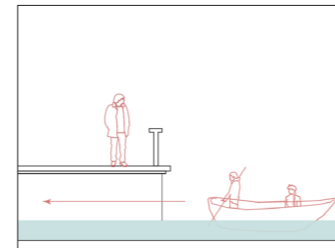
① Terrace seat along the canal



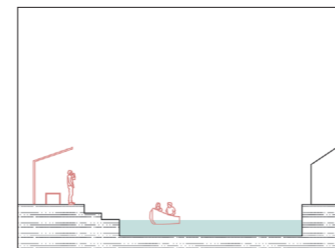
② Tourist sign



③ Pathway along the canal



④ Photo spot from historical bridge



..... Boat experience

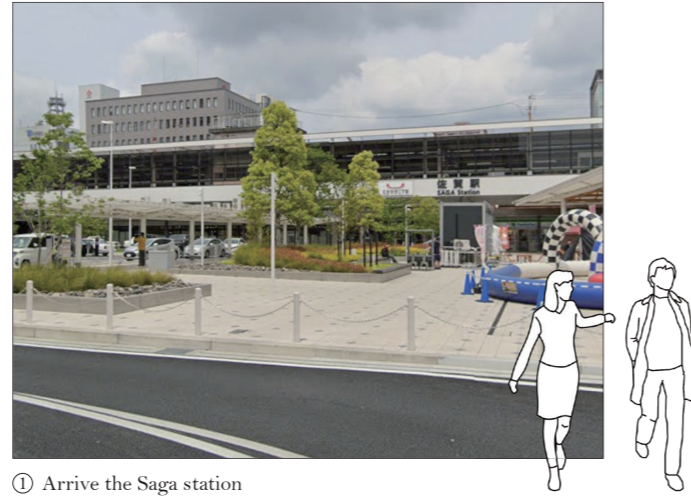


Figure 152 Vision map of phase 2-1

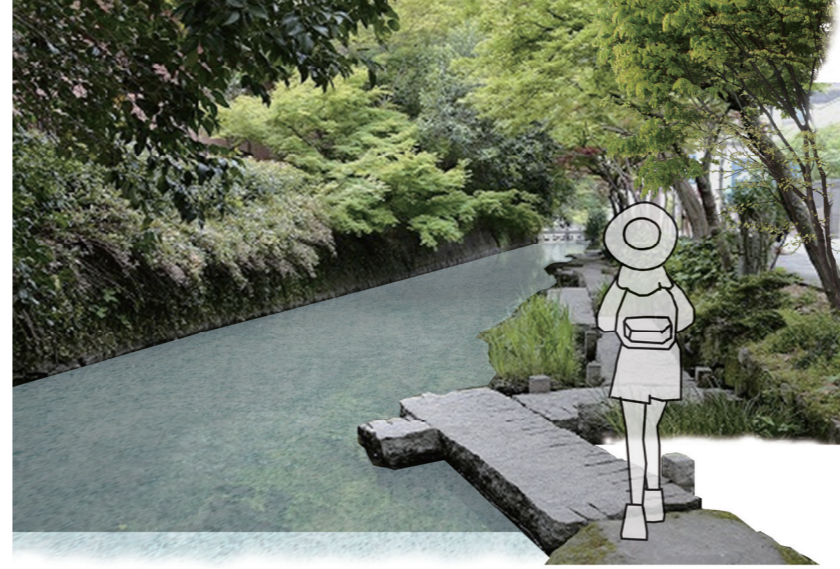
PHASE 2-1 :
ECONOMIC ENHANCEMENT

Visitor route

By increasing points of contact with water through void manipulation and scattering historical design principles throughout the city, visitors to Saga can experience its charm from both land and water routes.



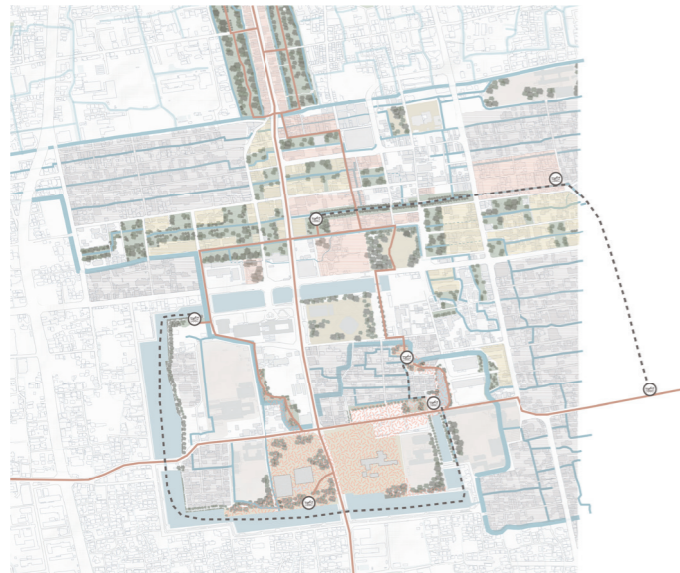
① Arrive the Saga station



② Walk along the canal behind the shopping street



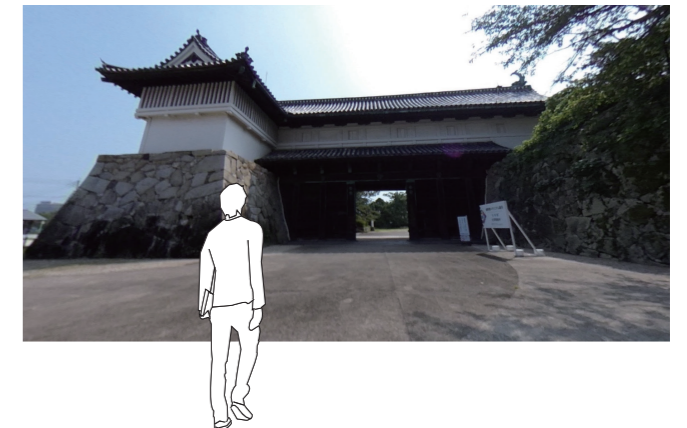
③ Take a boat tour and go underneath the historical bridges



④ Go behind the houses in the historical preserved area



⑤ Get off the boat and take a walk around the revived east moat



⑥ Go to see the Saga castle ruin and learn the local history

Figure 153 Visitor route

PHASE 2-2 :
LOCAL LIFE WITH WATER
 Zoning strategy

In the residential areas addressed in Phase 2-2, where the number of vacant houses is expected to continue increasing, the zoning strategy is applied gradually over time to regulate and guide new housing development, aiming to secure larger, cohesive community spaces. This control will transform the canals—once private spaces within the historic castle town layout—into public spaces, creating opportunities for residents and the landscape to forge new relationships.

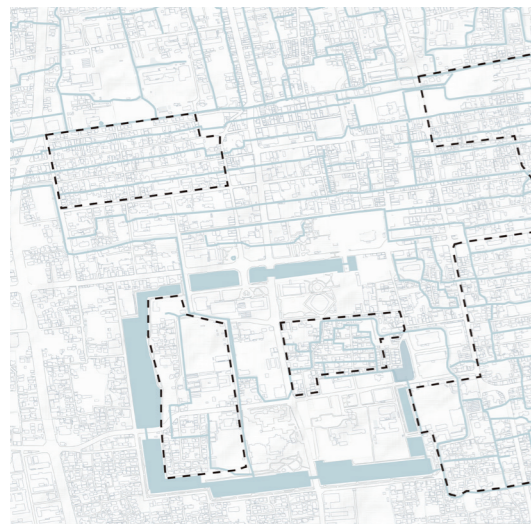


Figure 154 Zone for Phase 2-2

Figure 155 Zoning strategy for residential area



PHASE 2-2 : LOCAL LIFE WITH WATER

Community engagement

The newly built community space in the residential area encourages residents to discuss how they will use it together, embracing diverse ways it can be utilized. At this stage, the landscape architect, the River Sediment Control division, the Greenery Promotion division and the Urban Strategy division of the Saga city hall act as mediators, providing advice on how to meaningfully utilize the canals while applying design strategies derived from historical relationships.

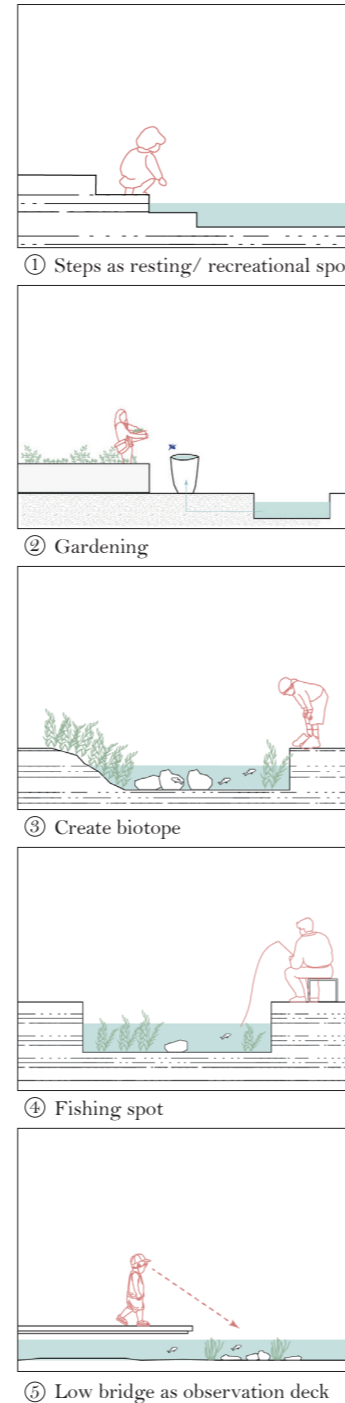
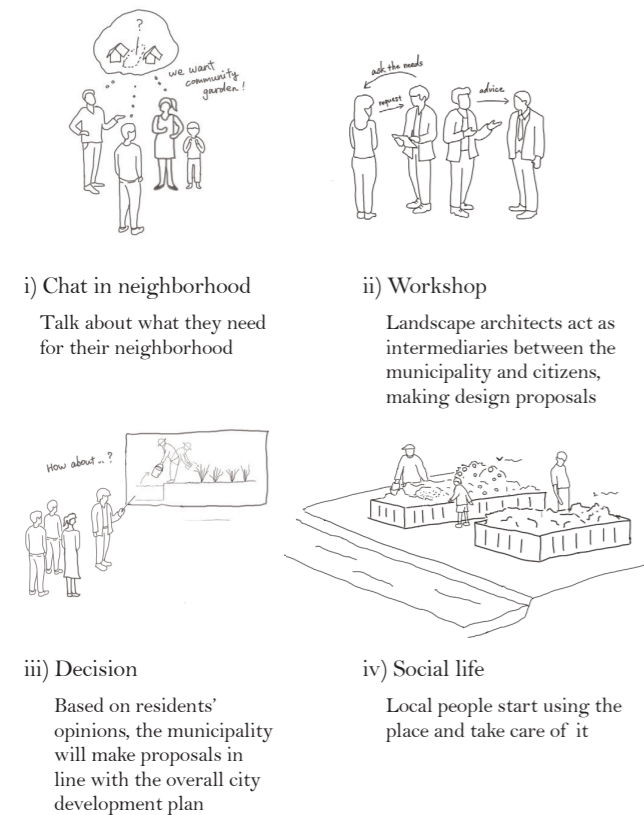


Figure 157 Vision map of phase 2-2

SECTION TRANSITION IN PHASES

Phase 1: Water network activation (2025-2028)

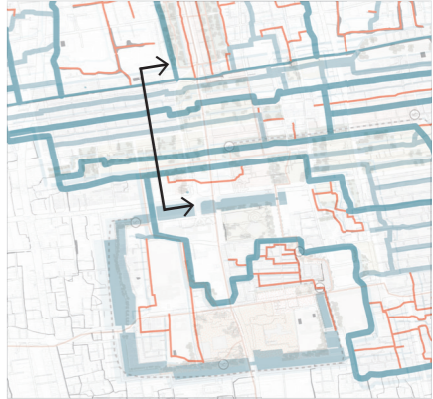


Figure 158 Section location

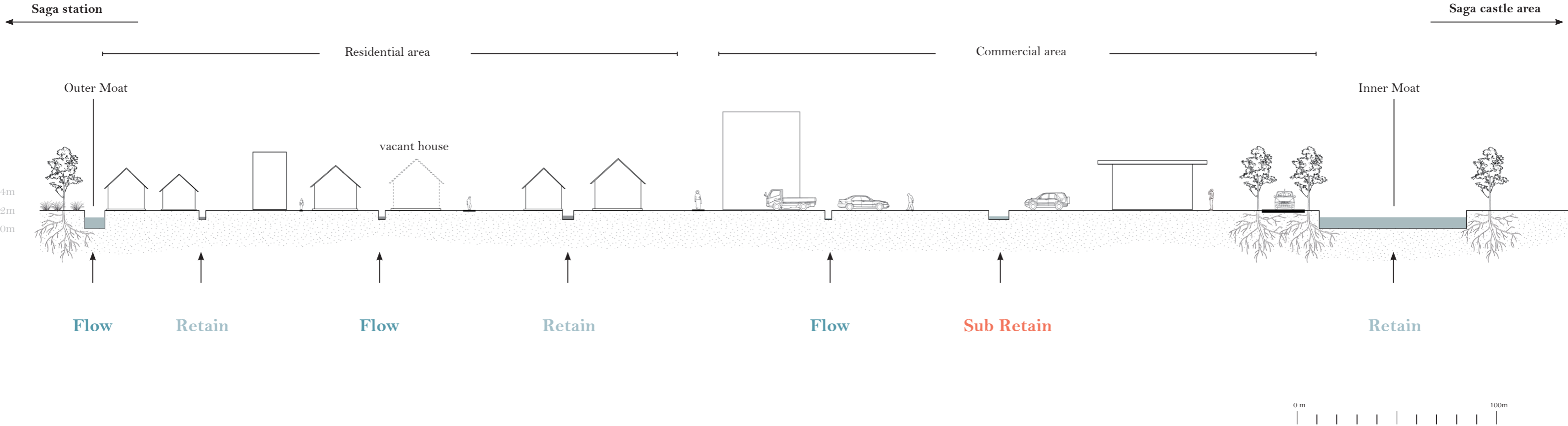


Figure 159 Section phase 1

SECTION TRANSITION IN PHASES

Phase 2-1: Economic enhancement (2028-2038)

Depending on the characteristics of each canal, a diversity of vegetation and wildlife will begin to emerge.

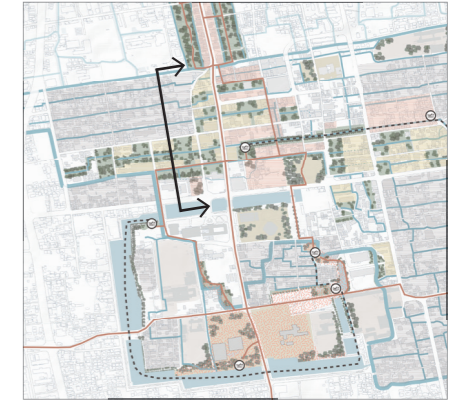


Figure 160 Section location

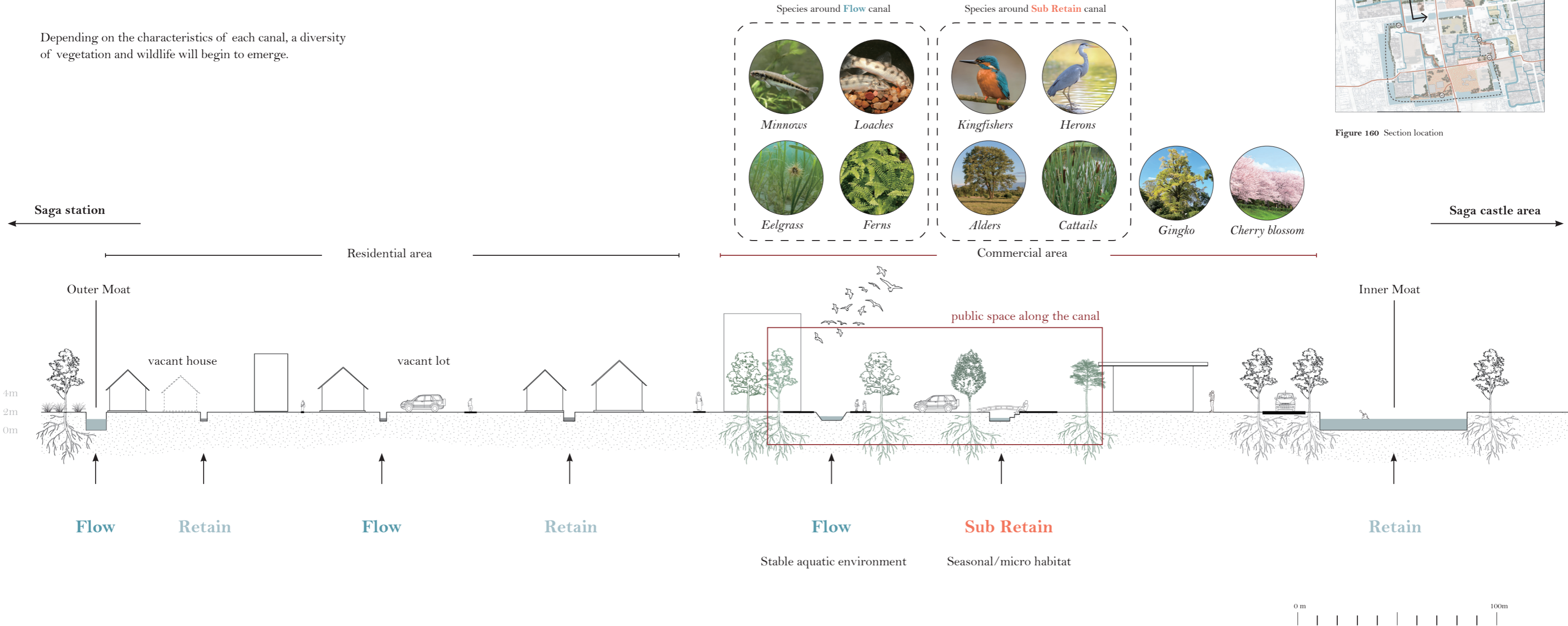


Figure 161 Section phase 2-1

SECTION TRANSITION IN PHASES

Phase 2-2: Local life with water (from 2028 onwards)

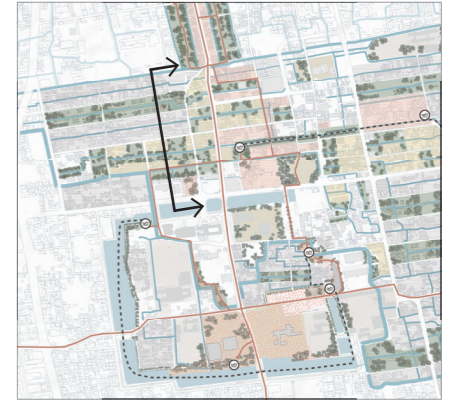
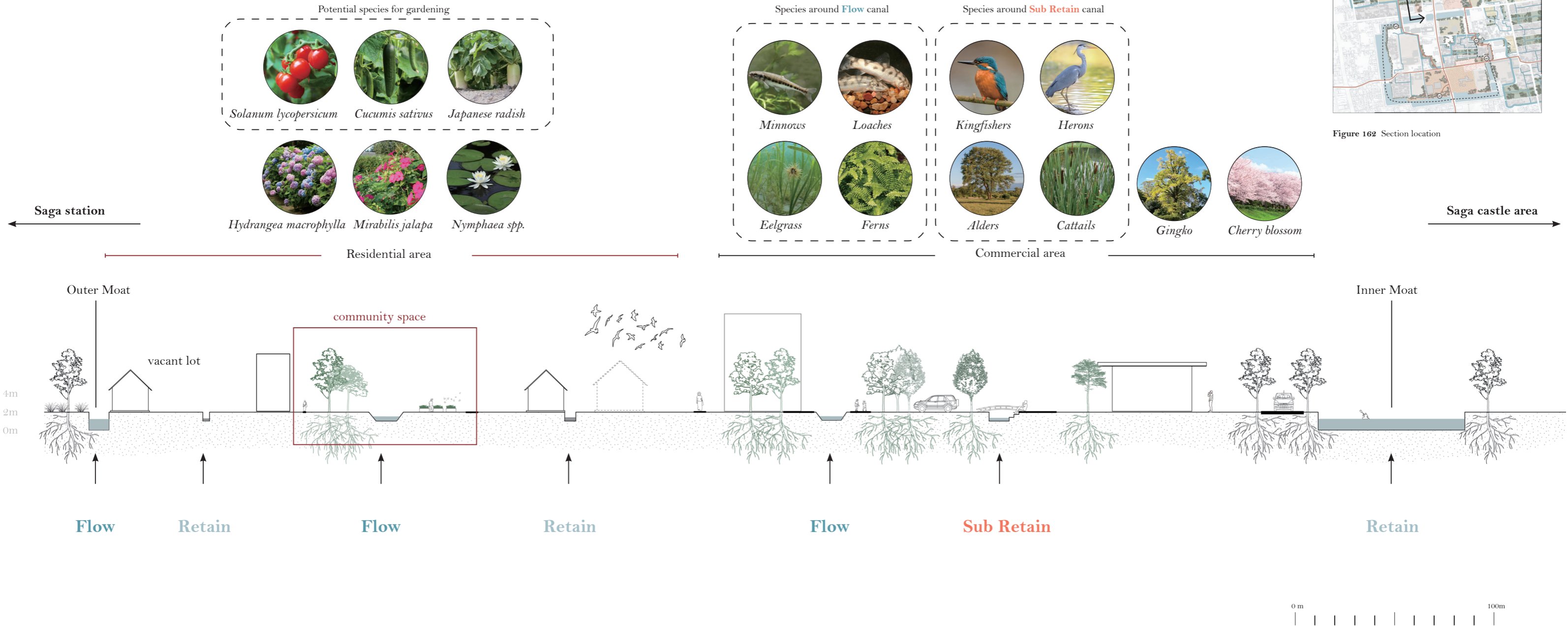


Figure 162 Section location

Figure 163 Section phase 2-2

WATER SYSTEM

Section- water design integrating the canal and urban void

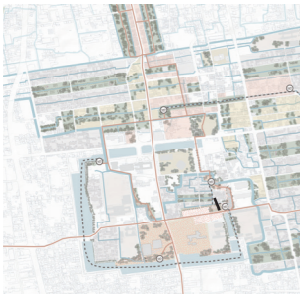


Figure 164 Section location



Figure 165 Current situation A
Source: google map



Figure 166 Current situation B
Source: google map



Figure 167 Current situation C
Source: google map

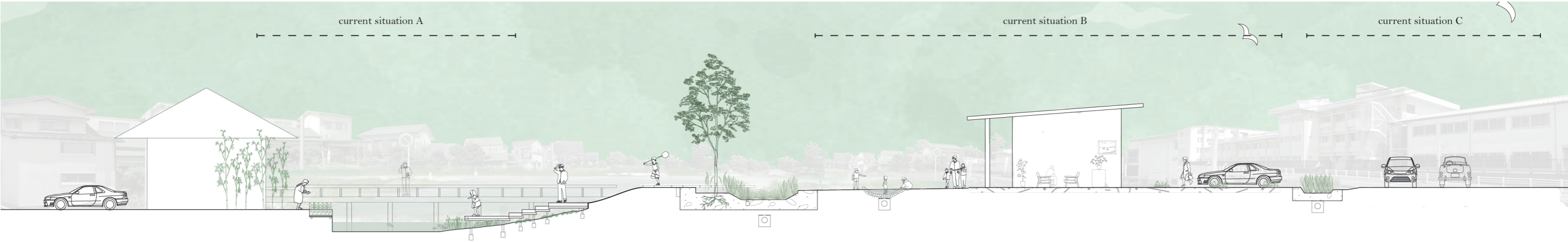


Figure 168 Water design section -regular situation-



WATER SYSTEM

Section- water design integrating the canal and urban void

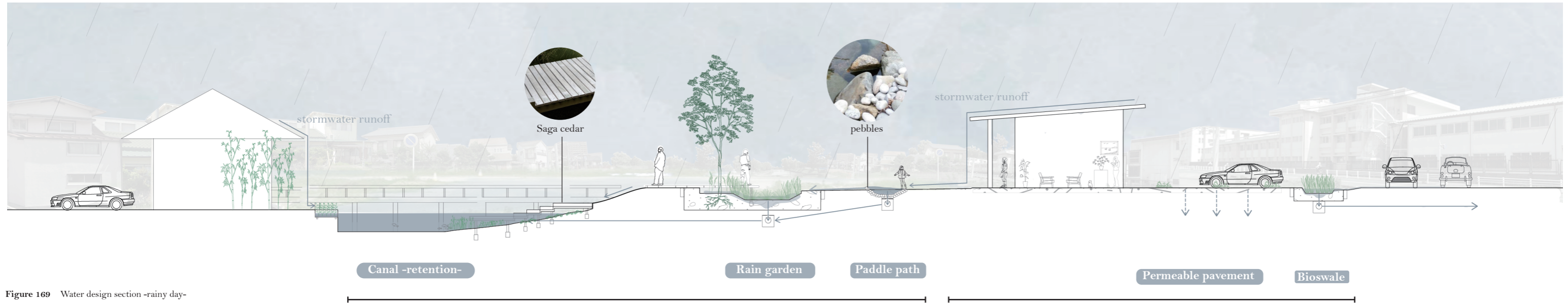
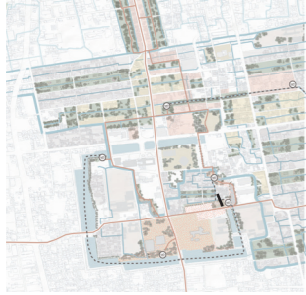


Figure 169 Water design section -rainy day-

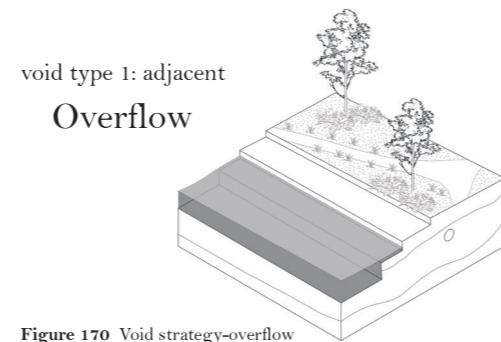


Figure 170 Void strategy-overflow

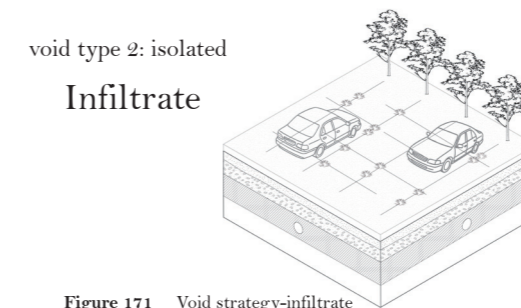


Figure 171 Void strategy-infiltrate



05

Design Exploration

In this chapter, building upon the design proposals presented in the previous section, two sites within central Saga are selected to illustrate more concretely the spatial qualities of the project and to discuss the emerging relationships between people and the landscape.

SITE 1:
COMMERCIAL AREA
Current cityscape



A shopping district in central Saga. Shutters are down, and it's deserted.

Figure 172 A shopping street in Saga city
Source: <https://4travel.jp/>

A canal flowing behind the commercial district (viewed from the bridge). The canal remains unnoticed unless one moves to the rear side of the buildings.

Figure 173 A canal behind the commercial district



Beside a local shop retaining its former building style, a path leading to the backyard could be seen.

Figure 175 A path next to a shop leading to the backyard



The road leading to the historic preservation district. It's hard to notice the canal existence from the main street.

Figure 174 The road leading to the historic district



Figure 176 Stone steps in the backyard of the shop. The backyard faces the canal, offering a glimpse into the atmosphere of Saga that cannot be experienced from the main street.

**SITE 1:
COMMERCIAL AREA**
Local business encouragement

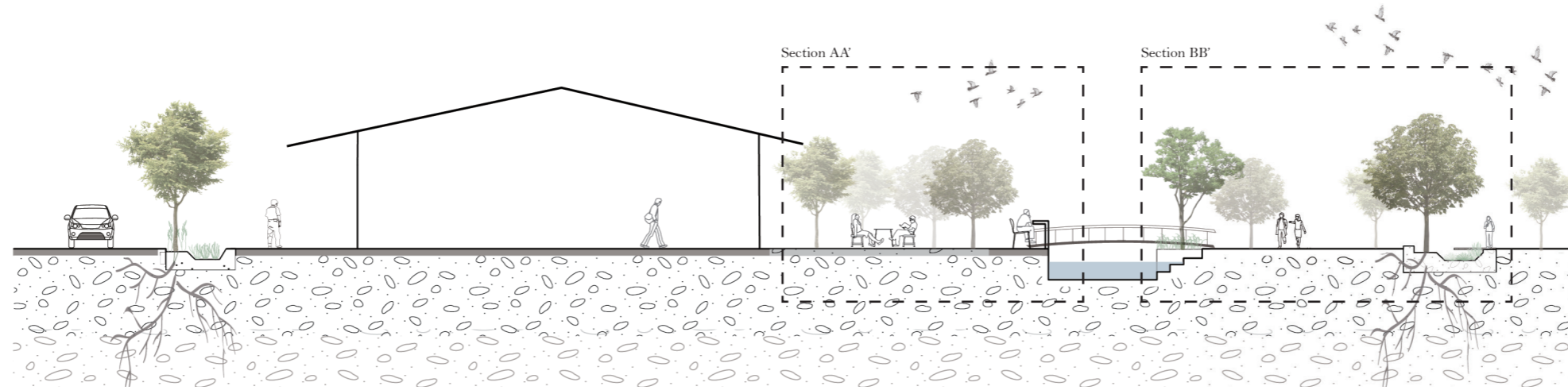
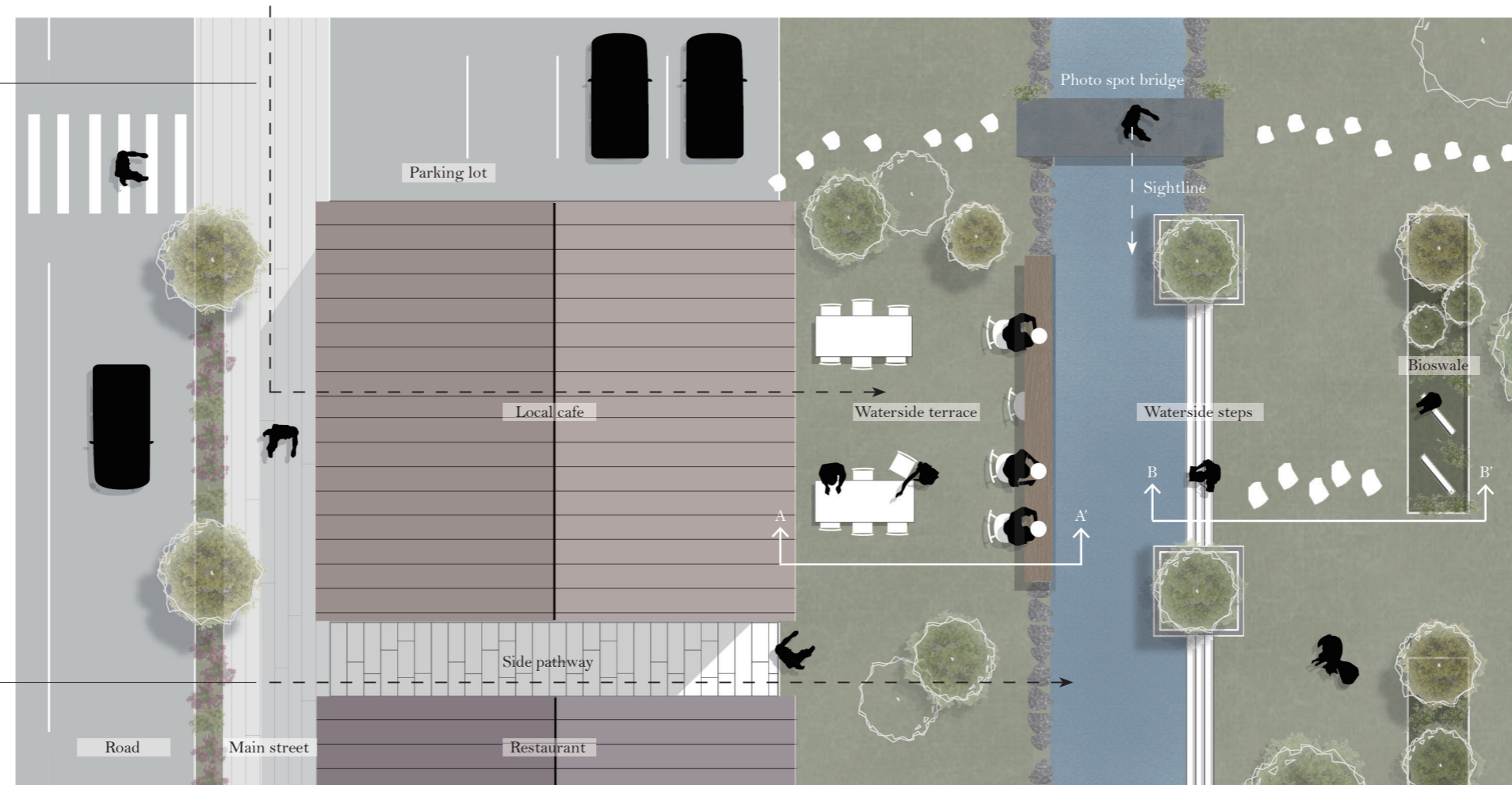


Figure 178 Site 1 section



Figure 177 Site 1 location

Upon entering the shop from the main street, the presence of the water flowing behind becomes perceptible.



From the narrow passage between buildings, the sound of water and human voices can be heard, evoking a sense of curiosity and invitation.

The canal that once flowed hidden behind the commercial district gradually becomes a public space over time. Each store can incorporate the public space behind it into its business operations. Instead, the stores in that area collectively take responsibility for regularly cleaning the canal, enabling them to maintain the local landscape.



Figure 179 Site 1 plan

Section AA' - Waterside seat of the cafe

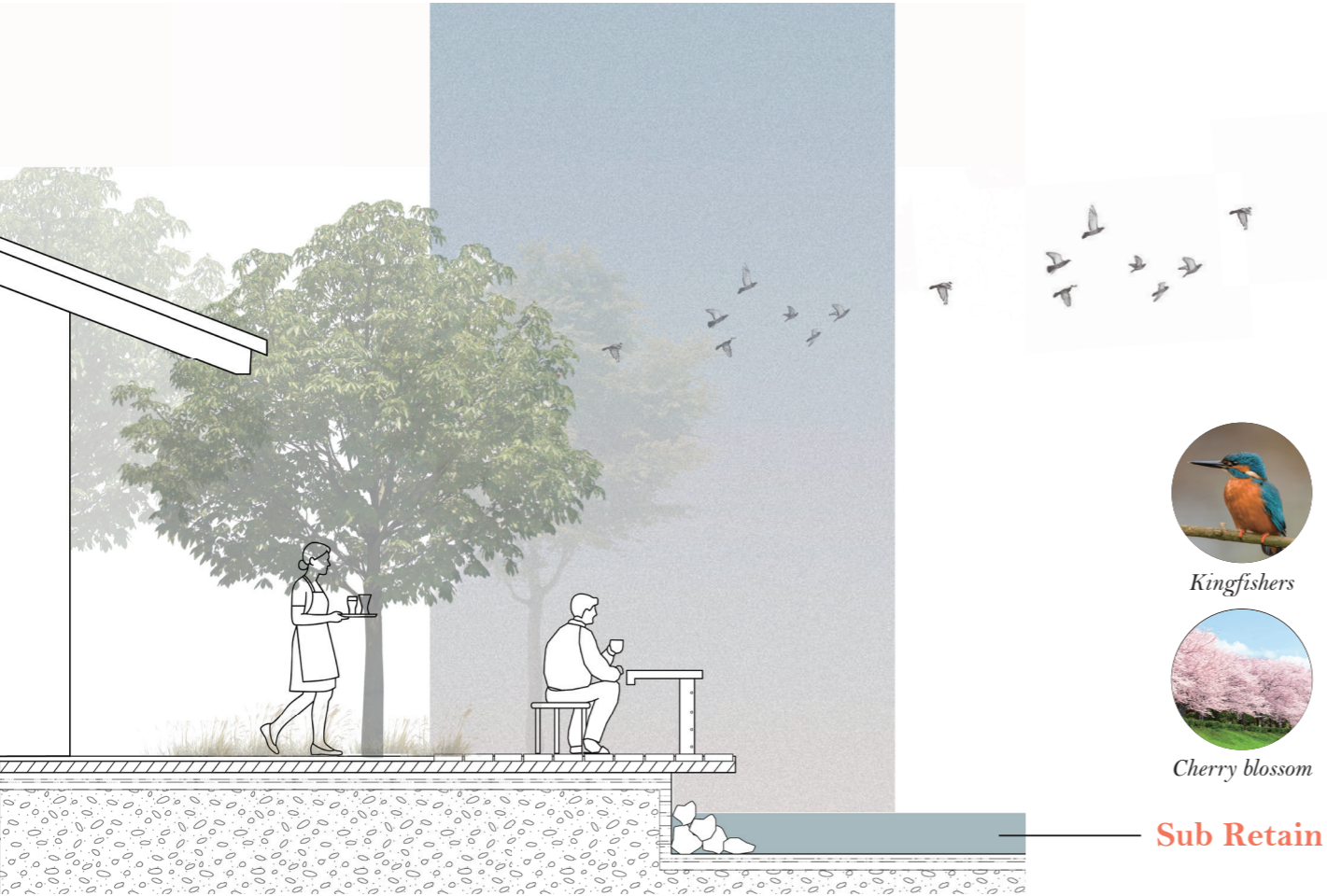


Figure 180 Section AA'

People can sit at the terrace seats behind the restaurant/cafe and enjoy the local waterscape while having a meal. This attractive space enables the local shops to attract more customers, including tourists, making their business more unique in the local context.

Section BB' - Green corridor and steps toward the canal



Figure 181 Section BB'

The space across the canal from the shopping street becomes a green corridor, beloved as a place for people to relax. The steps along the canal can be used for sitting and relaxing, or as a place to play with the water.

**SITE 2:
RESIDENTIAL AREA**
Test location's current situation



Figure 182 Site 2 location

Located near an elementary school, a kindergarten and temples, this residential area is traversed daily by not only local residents but also children and visitors. Taking this into account, this project examines new zoning configurations and design approaches that respond to these patterns of daily use.



○ Existing bridge

Figure 183 Site 2 current situation
Source: Google earth



A parking lot adjacent to the canal. Small bridges connect it to the road.

Figure 184 A parking lot adjacent to the canal
Source: Google earth



The canal flowing between the elementary school and the houses is overgrown with grass. The bridge is garbage dump now.

Figure 186 The overgrown canal next to the school
Source: Google earth

Potential:
Some residents are growing plants in the space in front of their homes.

Figure 185 Spontaneous garden
Source: Google earth

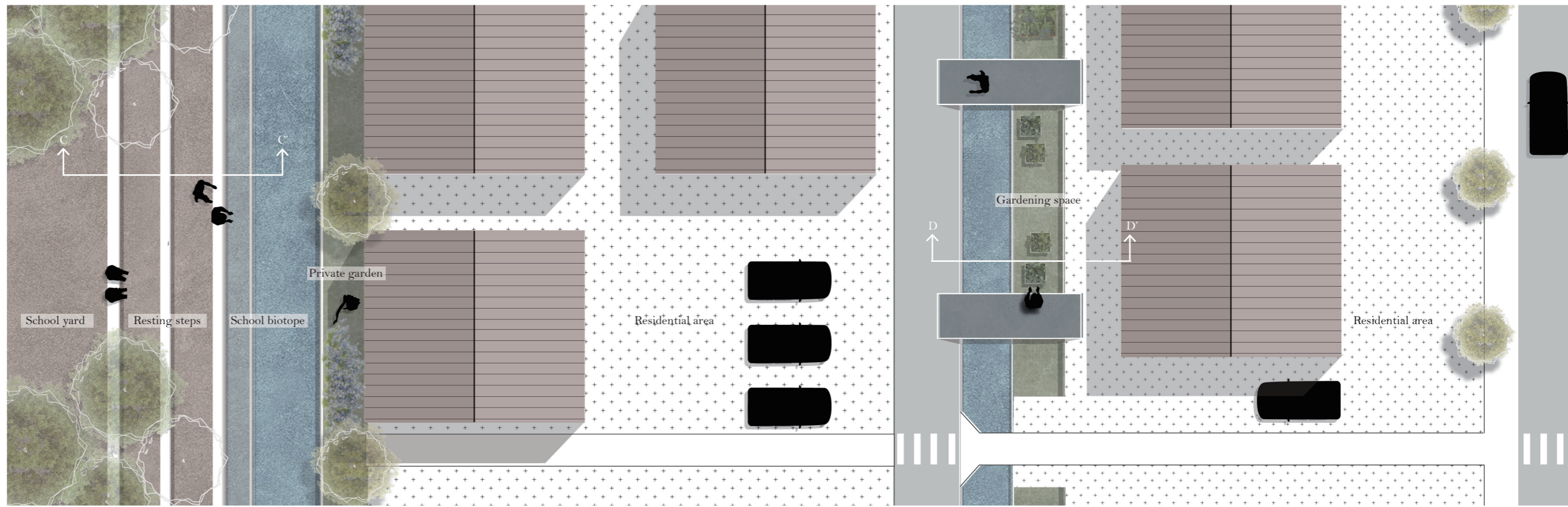
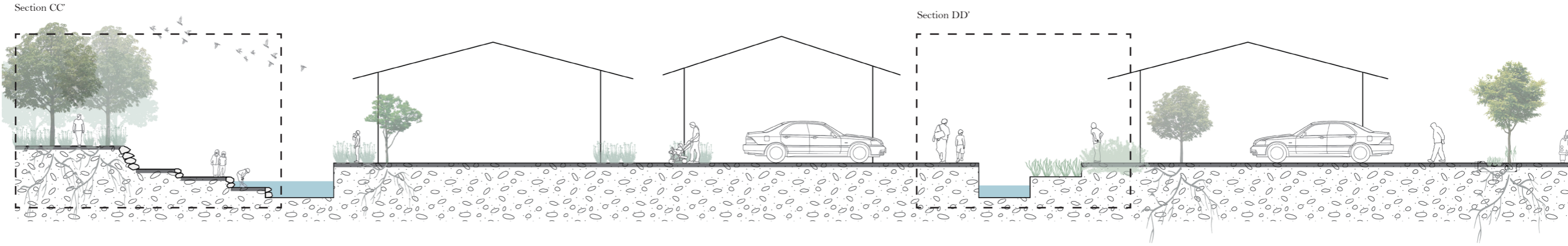


The road leading to the elementary school. To the right in the photo is the kindergarten. The stone bridge blends seamlessly into the road, and the canal space is not very noticeable.

Figure 187 Route to school
Source: Google earth



SITE 2:
RESIDENTIAL AREA
Local life with water



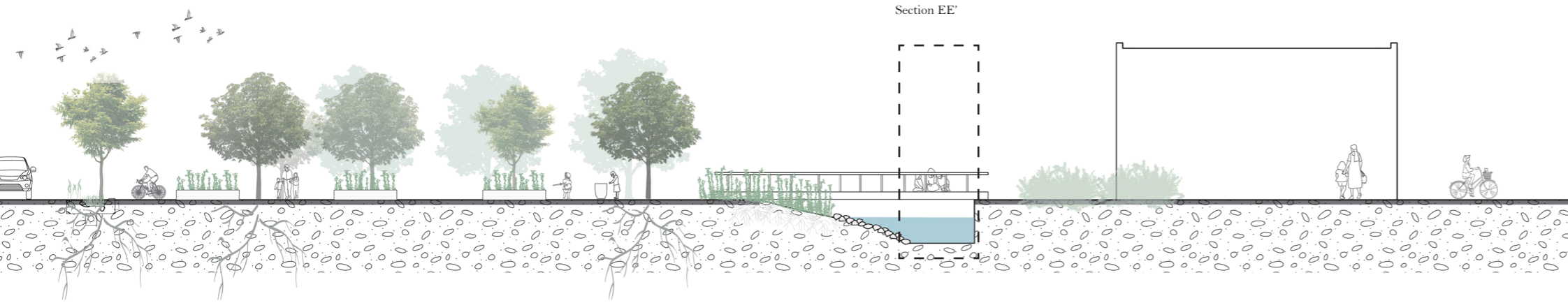


Figure 189 Site 2 section



Figure 188 Site 2 location

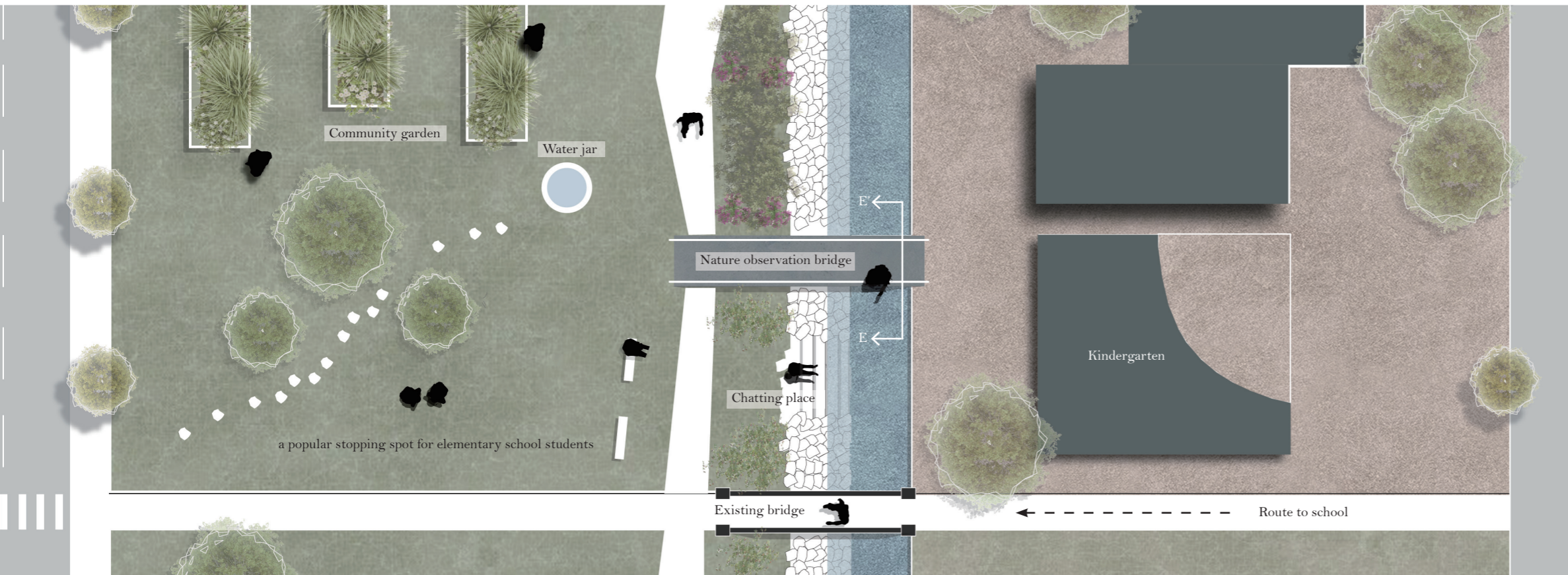


Figure 190 Site 2 plan

The use of each canal differs according to its location and the stakeholders involved, subtly revealing the presence of everyday life within the community.

The next page presents three sections from this area, portraying scenes of daily life from the viewpoint of local residents.



Section CC' - School biotope



Figure 191 Section CC'

The canal beside the elementary school can be used as a biotope for children's environmental education. Through year-round observation, they deepen their understanding not only of the water network history but also of the animals living there, fostering a sense of attachment to the water.

Section DD' - Gardening space

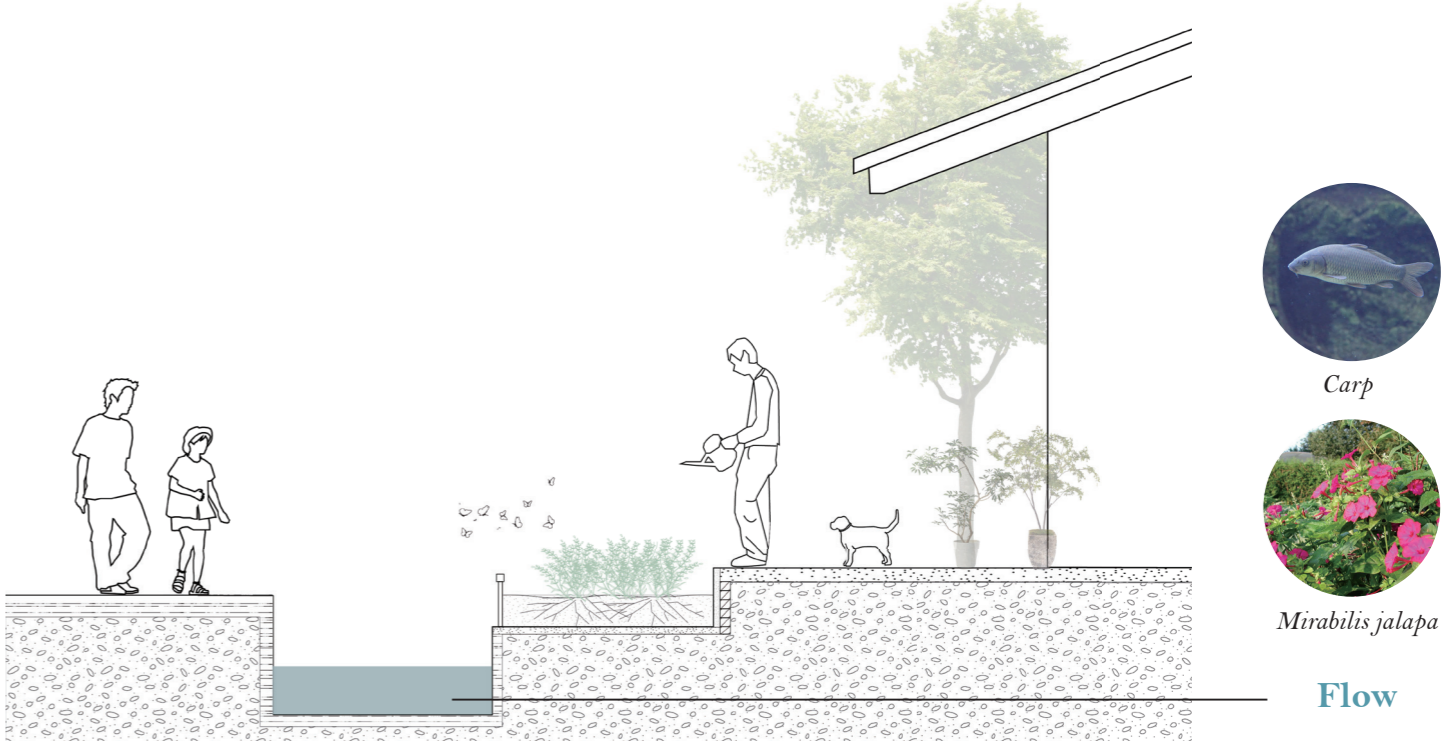


Figure 192 Section DD'

New houses to be built in the residential permission area in the future will be set back from the canal, creating space where residents can garden. The canal space, adorned by residents, will attract pedestrians and enhance the community's value.

Section EE' - Low bridge in the community space

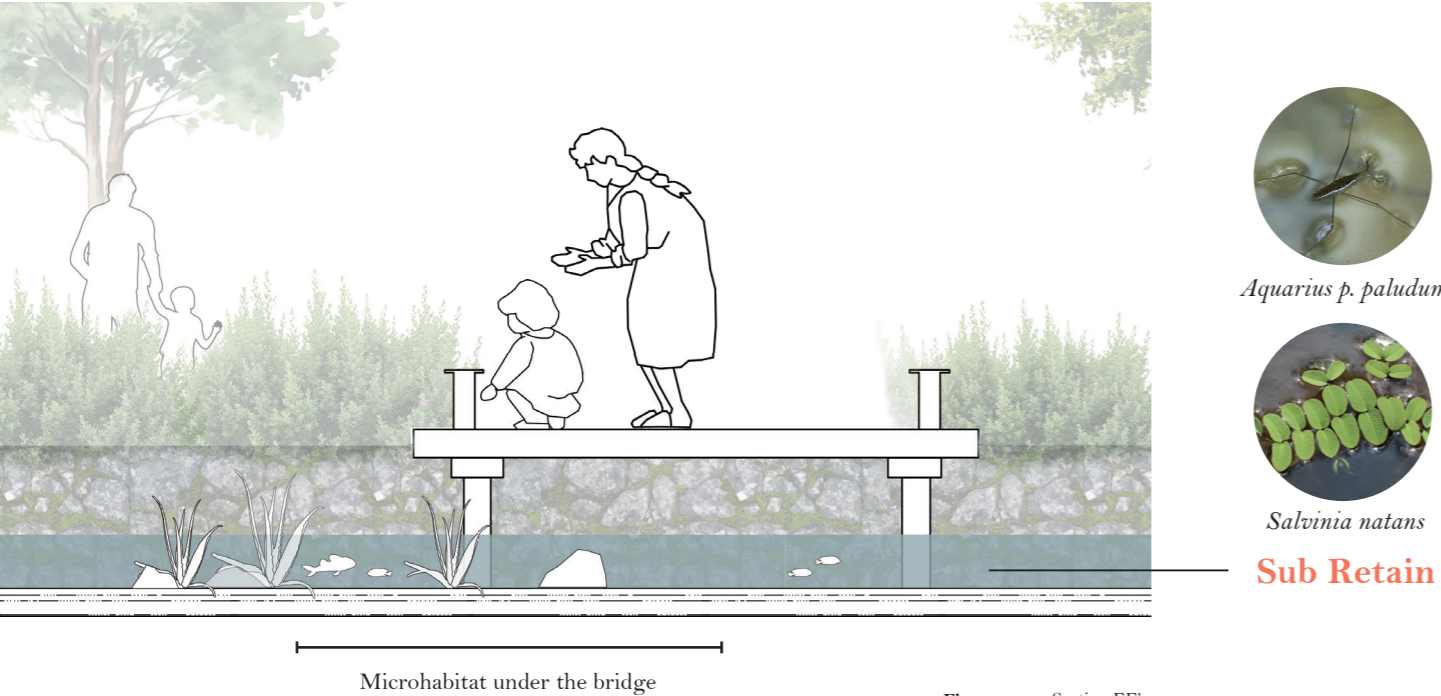


Figure 193 Section EE'

The bridge connecting the kindergarten and the community space creates opportunities for the children to interact with water. The canal flowing beneath the bridge has a low water level, allowing children to peer into the water or touch it from the bridge. Moreover, the low bridge gives the shade to the water, which creates the microhabitat around the bridge.

06

Conclusion and Reflection

CONCLUSION

This thesis set out to explore how Saga's historical canal network—once the foundation of daily life and ecological balance—could be reinterpreted as a landscape-based framework for sustainable urban development in the face of depopulation and climate change. Guided by the theory of Landscape Biographies (Kolen & Renes, 2015), the research approached the water network not as a static heritage element but as a dynamic record of human–nature interactions that continues to evolve.

The investigation revealed that Saga's forgotten canal network still holds substantial ecological and cultural potential to structure and revitalize the city. Once central to the daily routines of its citizens, the network remains physically embedded in the urban fabric even after decades of neglect. Field analysis and mapping confirmed that sedimentation, vegetation overgrowth, and disconnection from the community have weakened its performance, yet its physical traces still offer a resilient framework for adaptive reuse. Though partially invisible, Saga's water heritage continues to define the city's morphology and provides a foundation for addressing contemporary social and climatic challenges.

Saga's current issues—depopulation, vacant housing, biodiversity loss, and recurrent flooding—are deeply linked to the loss of interaction between people and water. Rather than treating these problems separately, the study reframed them through the lens of landscape, viewing them as opportunities to rebuild the reciprocal relationship between humans and nature and to strengthen environmental resilience. The historical canal

network, once sustained through collective maintenance, is reinterpreted as a medium through which local identity, ecological performance, and community life can once again converge.

The design process developed across four interrelated scales—regional, sub-regional, urban, and community—combining historical analysis, field observation, and design experimentation. At the regional level, the project reorganized the existing water structure as blue-green structures, shifting from a human-centered to a nature-centered management logic that adapts to climate variability while preserving the city's historical form. At the urban level, the strategy integrated urban voids—vacant and underused spaces—into the canal network, weaving a continuous ecological and social structure across the city. At the community level, public spaces were reimagined as interfaces where residents and visitors engage with water through reinterpretations of historical practices. Through these multi-scalar interventions, the project proposes a gradual and process-oriented transformation that reintroduces water as both infrastructure and identity.

The proposed strategies demonstrate that the historical water network can function as a dynamic heritage infrastructure—simultaneously ecological and cultural in nature. The tangible outcomes include improved water management, ecological restoration, and enhanced public space quality. In contrast, the intangible outcomes include renewed civic pride, a strengthened sense of place, and collective awareness of water as a shared resource. These

findings contribute to the broader discourse on how heritage water systems in rural Japanese cities can be transformed into adaptive frameworks for sustainability and resilience.

By applying the lens of Landscape Biographies, this study expands the understanding of urban heritage beyond preservation toward adaptive transformation—extracting the historical essence of local assets and reconfiguring them in response to changing times. The case of Saga demonstrates that reactivating historical water networks can provide a new model for rural revitalization and climate adaptation, integrating landscape, culture, and community into a coherent framework of sustainability. The research bridges historical continuity with contemporary necessity, positioning landscape as a living medium of change.

While the thesis focused primarily on design-based exploration, future research could deepen the quantitative assessment of hydrological performance and community engagement. Further studies also examine governance frameworks and participatory management systems to support the proposed blue-green infrastructure, ensuring its social and ecological sustainability over time.

Ultimately, the renewal of Saga's water heritage is not about returning to the past but about transforming it into a living, adaptive system that reconnects ecology, history, and society. By revealing the city's hidden waters and allowing them to shape new public spaces, the project envisions a future in which Saga's landscape once again

mediates between people and nature, between memory and change. Through this transformation, Saga's canals may once again define the rhythm, continuity, and resilience of the city—linking its past wisdom with its future survival.

REFLECTION

1. The role of landscape architecture under depopulation

Japan's rural areas are facing severe population decline, compounded by climate change, making it increasingly difficult to sustain heritage landscapes. Saga, the site of this project, exemplifies this challenge. Landscapes created through human intervention can only persist with continued care; yet as regional contexts change, new forms of coexistence must be explored.

Landscape architecture can respond in two ways. First, by integrating artificial landscape elements into natural dynamics, balancing ecological cycles with human management. Second, by designing programs that foster human engagement, enabling local residents and visitors to rediscover, share, and communicate the value of place. Such rediscovery cultivates regional pride, supports cultural dissemination, and can generate new forms of livelihood, including tourism.

In an era of depopulation, one key role of landscape architecture is to adapt to shifting contexts and reconstruct the relationships among heritage landscapes, natural environments, and people.

2. What is “heritage” for you?

This was a question I received from my second mentor during the Q&A session on P2. For a long time, I struggled to find my own answer to this as I progressed with the project.

What I wanted to achieve through this project was neither the restoration nor the preservation of the heritage, nor was it to create a design that exaggerated them to attract attention.

The reason the heritage can hold its value as a “heritage” is that **people** in the past gave it **the meaning** of its existence. Arguments about its visual appeal or other such qualities come later.

Therefore, the priority in design should be deciphering how past people interacted with the heritage and extracting hints from those relationships that can be applied today. This is the very **essence** that has given heritage its value and the core that should be passed on to future design.

While the form and status of heritages change with the times, preserving their essence within human lives and spirits, and the city is what constitutes conservation in a true sense.

3. Between clay and blocks

Looking back objectively, I realize that my approach to this thesis was rather unconventional. I grew up in an environment that encouraged one to “move first and think later,” much like shaping clay with one's hands. By contrast, I now find myself in a context that insists one must “think first and act,” like carefully stacking building blocks. These two opposing worlds often left me bewildered.

Even when I attempted to proceed logically, my body resisted adapting, and I often found myself caught in an awkward in-between state. At times I wandered off course, stumbled into pitfalls, and remained stuck for a while.

Looking ahead, my challenge is to cultivate a mindset that skillfully balances two modes: the logical rigor of steadily building upon a consistent storyline, and the playful boldness of running toward a stone thrown far into the distance, all while maintaining a degree of flexibility.

4. Limitation of the research

This thesis covers a broad range from regional to community scale and employs approaches from systems analysis to community program design. However, these remain at the conceptual level. Considering actual implementation on the ground requires more detailed research. Strategies derived solely from data analysis are difficult to apply directly, and exceptions are expected. To make them more realistic, a resident-based approach is necessary—such as conducting interviews at the community level by actually visiting the site.

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OUR VOICE.

In considering approaches to community development from each standpoint, reference was made to both field interviews conducted on-site and literature reviews of newspapers, books, and news media. The following excerpts summarize the impressions of Saga and their motivation/interests for urban development from each perspective.

CITIZENS



Mr. Kawasaki
(local architect)

“I want to utilize the canal as a waterfront that can be used on a daily basis.”

“We need to let more people know about the value of this local asset.”



Yokotake creek park staff

SAGA CITY HALL



We want to enhance the history, culture, water, and greenery of the Saga Castle town while maintaining the castle town center and improving the quality of life, vibrancy, and educational and cultural functions.

(the Saga city center revitalization plan, 2015)

LOCAL BUSINESS

https://editors-saga.jp/editors/kizuki/20220314_1331.html



glasses shop owner

While you can look up anything online nowadays, expanding your horizons comes from real-life interactions with people. Especially for children to develop a sense of pride in their hometown, they need a connection to the community. Even if they play online games, having places like town squares or cafes where they can play together can provide opportunities for such connections.

Many people say, “There’s nothing in Saga,” but we want to bring back the vitality of the town by highlighting Saga’s unique charm.



Caffe owner

EDUCATIONAL COMMUNITY



Prof. Goto (Saga University)

“Various efforts have been made to utilize Saga’s waterways so far, but they have not developed very much, and it seems that everyone has given up. That is why we need proposals from a different perspective now!”



Koshikan high school students

We are involved in environmental conservation activities for rivers and canals through our club activities. We want to take the lead in conveying the importance and enjoyment of environmental conservation activities to other students.

<https://www.morikawakaito.org/team/4446/>

VISITORS/POTENTIAL MIGRANTS

“I want to see a historic water town.”

“I long for the slow pace of life that I can’t experience in a big city.”

“I want to start a unique, community-based business.”



Regarding the description of perspectives on tourists and potential migrants, this section is based on the case study of Gujo Hachiman presented in Chapter 4 (p. x) and on interviews conducted by the author with residents in Yanagawa City, a nearby waterfront city in Saga Prefecture.

As shown here, when listening to the voices of individual people in Saga, it is not necessarily the case that all opinions are negative. Some express an interest in town development, such as wanting to do something that leverages Saga’s unique characteristics or taking action for the future of Saga.

Figure 194 Stakeholders positions

