

# Study on Methods of Conservation and Regeneration of the Historical Water System in a Shanshui City

- Case Study of Old Town Planning in Hue, Vietnam -

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## 1.0 INTRODUCTION

### 1.1 Background And Purpose

Many historical cities in East Asia were planned in line with the concepts of feng-shui, seeking to harmonize with their surrounding natural ecosystem. These cities, commonly called as “shanshui cities” (literally mountain and water cities), all shared a major characteristic—that is, each had a water system from the rivers flowing through the city itself. Such historical water systems were the products of environmental control technologies cultivated by each city, along the historical steps, and gradually contribute to the cities’ charms and attractiveness.

However, due to the rapid trend moving toward modern urbanization, quite a few of these cities in East Asia are facing serious challenges or even intimidations regarding their living environment. Confronted by sanitation issues stemming from an over-burdened water system, some cities are already struggling to install the water and sewage system with modern technology that would allow them to treat domestic wastewater more appropriately (or perhaps only more efficiently). Strong pressures for further regional development are also bearing down on these cities.

Against this backdrop, issues like conservation and regeneration of the historical water system, or developing the methods and techniques that suit the purposes of restoring the historical/social environment of each city, all add up to the major theme—the conservation of historical cities in East Asia.

The old town of Hue, Vietnam, is one of those historical cities discussed above. The Research Institute, an organization recognized with reputation for its experiences in implementing various studies about the old town of Hue [1], was invited by UNESCO [2], and the Institute’s researchers, the writers of this paper, are working to prepare guidelines for considerations in implementing a project to improve the water environment of the old town [3].

In this paper, the historical water system in the old town of Hue is discussed in three parts; first, the characteristics of the water system are defined; second, the value of the existing water system, if any possibility of enhancing the living environment for regional amenities is there, is assessed; and lastly,

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the features of the water system's conservation and regeneration guidelines is thus clarified from the above investigations.

## **1.2 Overview Of Hue**

The old town of Hue, being selected as the case in this study, is a citadel city, as the capital of the Nguyen Dynasty (1802 – 1945), the last unified dynasty in Vietnam. It was inscribed on the List of UNESCO World Heritage in 1993 as the “Complex of Hue Monuments,” and the citadel city has been well known for its rampart, royal buildings, imperial tombs and other historical architectures built along the Huong River during the Nguyen Dynasty. A Royal Canal and a group of lakes, small and large, were planned inside the old town of the citadel city. The plans of the entire city, ranging from its urban infrastructures to traditional houses, were systematically designed to display a rich water environment according to the feng-shui concept. The water environment was also a creative solution to tolerating the heavy rainfalls unique to monsoon regions during the rainy season and the above-floor-level flooding that comes several times per year.

After the fall of the Nguyen Dynasty, however, the urban functions of Hue changed; the old town was no longer an administrative center but a living city, and, subsequently, the Vietnam War and post-war housing congestion brought serious damages to the entire environmental framework, very regrettably including the historical urban infrastructures and the water system within the citadel city.

In the past, a large-scaled flood used to occur about once every fifty years, but since 1993, the large flood has been coming almost every three years. The citadel city has even suffered from a flooding of more than 2 meters in recent years. These frequent floods are the outcome of abnormal weather conditions from global warming and excessive deforestation in the upstream of the Huong River. Nevertheless, these floods might just as well be attributed to the incapability of the above-mentioned historical water system. The water system of the citadel city, conservation and regeneration, is therefore a pressing challenge and an issue of urban environmental development.

Under such circumstance, a project of water environmental improvement centering mainly on sewerage development is being planned in the old town. However, to ensure that the project would not damage the historical environment of the old town whatsoever, detailed project guidelines were demanded to be formulated.

## **1.3 Study Procedure**

In this study, our researchers (henceforth, we) implemented five steps below, dating from April to August 2007, with the cooperation of Hue Monuments Conservation Center (HMCC) in Vietnam.

- 1) Investigation of the actual state of the historical water system (visual observations of the interrelationship and damage conditions of existing water channels and flood gates, and the state of drainage during rainfall)
- 2) Information gathering on the historical water system through a search of bibliographic sources and interviews at the Documents and Historical Research Department of HMCC and historical museums
- 3) Acquisition of construction diagrams and plan drawings from the Hue Urban Environment and Public Works State Limited Company (HEPCO), and interviews and analyses regarding those materials
- 4) Partial excavation of water channel and canal revetments

5) Interviews of local residents on their usage of water channels and the condition of the channels during floods

The guidelines were done and prepared by the Institute of UNESCO World Heritage – Waseda University in consultation with the Documents and Historical Research Department and Technical Department (conservation, development and management division) of HMCC.

## 2.0 CHARACTERISTICS OF THE HISTORICAL WATER SYSTEM

### 2.1 Water Resources And Architectures that Composed the Historical Water System

A new finding from our survey is that the historical water system inside the walls of the old town are composed of the following ten types of water resources and buildings: (1) lakes in the Royal Palace, (2) Inner Moat, (3) Lakes in blocks, (4) Royal Canal (a large canal about 70 – 100m wide), (5) Defensive Moats, (6) Defensive Rivers (tributaries of the Huong River), (7) Huong River, (8) culverts and sluices, (9) “Side-greens,” or the traditional ditches for drainage along the sides of the road between rows of residences, and (10) East and West Water Gates and two small water gates.

In the historical water system, water resources (1) to (7) are mutually connected by water channels (8) and (9), and the connections are controlled by (10) (Figure 1).

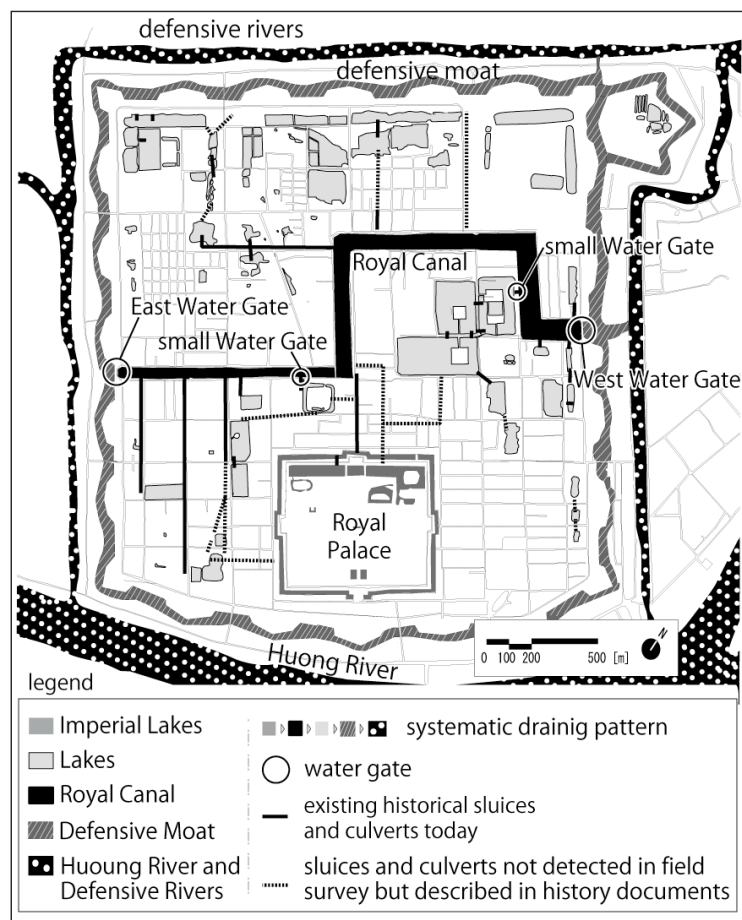


Figure 1: The Water Resources and Architectures that Composed the Historical Water System

### 2.2 Three Characteristic Features Of The Historical Water System

Also, as a discovery from our survey, we were able to ascertain that the historical water system of the Old Town had three main functions and roles: drainage of rainwater and sewage (domestic wastewater), water transportation control, and landscaping. An overview of each function is provided below.

#### 1) Rainwater And Sewage Drainage

Based on the present flow of water and the structures of existing flood gates and buildings, we assume that the historical water system served to drain rainwater and sewage from the citadel city in the

following manner. First, rainwater from the royal palace, housing lots, and road spaces inside the citadel city, and wastewater from homes quickly flowed into ponds (3) which served as collecting basins via the Huong River (7) and culverts and sluices (8). Water from those ponds was channeled to the Royal Canal (4) via water channels and drained to the Huong River (7) through the defensive moat (5) and tributaries of the Huong River (6). These water routes were realized by differences in water levels (Figure 2).

We also examined the structures of castle gate and East and West Water Gate openings in the citadel city, and found that even if the gates were rebuilt as they originally existed, there is no structure for preventing external water from flowing into the citadel city. Since the city would most certainly suffer heavy rainfalls almost every year, we may say that the water system built in the old days inside the wall city of Hue would inevitably take and tolerate a certain degree of above-floor inundation and emphasis were laid to be able to subside the floods promptly and efficiently.

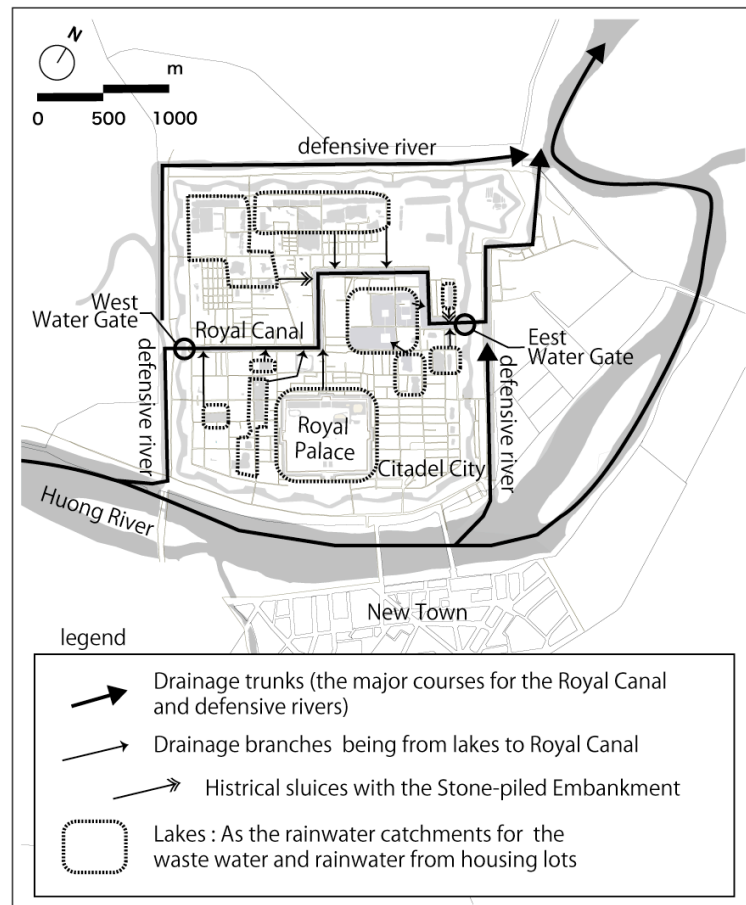


Figure 2: The Structure of Historical Drainage in the Citadel city—Hue

## 2) Water Transportation Control

Historical literatures note that during the Nguyen Dynasty, the Royal Canal, lakes, and the water channels connecting them all together, were used for transporting goods by boat and as a means for leisure transportation by the Imperial Family. In a field survey, we found a kind of stone structure that was very likely designed to hang wood doors, and these stone structures were built both on the East and West Water Gates that were constructed for the Royal Canal to penetrate the east-west rampart and on two small water gates by which the Royal Canal and the Lakes in the city were linked. The door of the East Water Gate and West Water Gate appears to have been raised and lowered using a fixed pulley, and the doors of the small water gates appear to have double doors. These vestiges indicate that the historical water system functioned as the goods transportation and the entry of the lakes for boating pleasure enjoyed by the Imperial Family.

## 3) Landscape Formation

Water resources and buildings with respect to habitation, administration, and traveling by the Imperial Family, including part of the Royal Canal, lakes inside the royal palace, and lakes in the vicinity of the Imperial Family's leisure destinations, mostly formed an open water environment surrounded by a masonry bank. These segments of the water system not only provided a revetment, but were designed with a conscious awareness of creating natural scenery. For example, they were designed so that mountains and structures, which are considered important aspects of urban planning according to the geographic concepts of *feng-shui*, were positioned along the extension of the water channels and canals. In other words, the historical water system had a function of creating a landscape based on the systematic concepts of *feng-shui*.

In sum, the three functions described above were brought together to compose the historical water system of the Old Town.

### **3.0 TRANSFORMATION OF THE HISTORICAL WATER SYSTEM AFTER URBANIZATION**

In our survey, we noticed that the damages from repeated wars and subsequent population influx, and the expansion of housing land, had significantly changed the functions and roles of the historical water system described in the previous section. Three major changes are as follows.

#### **1) Weakening Of The Rainwater And Sewage Drainage Function**

To begin with, mud and sand for many years have accumulated in the Royal Canal and the tributaries of the Huong River, which provided the main channels of sewage flows in the old town. This accumulation has affected the flowing rate and flowing velocity of the water channels, and has significantly impaired the drainage function in the citadel city. In order to allow the historical water system to drain the rainwater out of the citadel city via the Royal Canal, it is foremost necessary to dredge the deposited mud and sand.

The historical sidegreens and sluices, which composed the lower end of sewage facilities in the historical water system, were replaced after the Vietnam War by a construction system of modern roadside culverts. Today, almost 70% of the water channels leading to the collecting basins in the city have been improved. However, even though improvements in certain areas have been made, rainwater from housing lots do not necessarily flow smoothly through the modern sewage facilities, and roads become submerged in places during daily squalls, due to large volumes of rainwater flowing into the sewage system all at once. Moreover, private construction activities accompanying urbanization are also impeding the water flow in areas where historical sidegreens and sluices still exist. Domestic wastewater is also discharged into these sidegreens and sluices. Under such circumstance, there is cases found in many areas where water channels from housing lots are connect either with the historical water system or with modern sewage facilities.

Furthermore, it is assumed that the segmentalization of large traditional residential land that included agricultural fields and green spaces and their conversion to general housing lots have undermined the rainwater absorption capacity of the land and its capacity to temporarily retain water.

#### **2) Disuse Of The Water Transportation Control Function**

Today, goods are no longer transported by vessels from the periphery of the citadel to the old town, and boating pleasure trips in the lakes by the Imperial Family have disappeared since the end of the Nguyen Dynasty. And also, after the Vietnam War, it is no longer necessary preventing any entry of external, hostile forces from getting in the citadel. The function to control the water transportation by using Water Gates and small water gates thus become completely unnecessary; the gates then collapsed and left abandoned to be in a state of ruin. However, as the local residents today wish to travel along the Huong Rive by boats and to grow vegetables on the surface of the banks of Royal Canal, the water transportation culture, still, may be pleasantly observed today.

#### **3) Degradation Of The Landscape Function Observed In The Collapse Of Masonry Banks**

Water resources with masonry banks, the lakes and the Royal Canal for instances, still play important roles in the making beautiful landscape today; yet a significant part of the masonry banks have either collapsed or now lie buried in dirt. Furthermore, many waterside areas are illegally occupied by private residences, and the local government has been actively promoting the relocation of those occupants under a resettlement policy since 1992. Even the waters are being used to grow water spinach, sedimentation areas are being converted to agricultural fields, and most places along the water resources are otherwise being transformed into living environments.

#### 4.0 MULTILATERAL ASSESSMENT OF THE VALUE OF THE HISTORICAL WATER SYSTEM

When attempting to conserve and restore the historical water system of the Old Town of Hue, which has undergone a transformation into a living city, it is necessary to assess not only the functional aspects and historical significance of the system, but also its modern values from diverse perspectives including awareness-raising of local residents, regional promotion, and tourism, in consideration of the regional environment and social circumstances today, as described in the previous chapter. Therefore, in this chapter, we present methods of assessing the values of the water resources and buildings that compose the historical water system in the Old Town, mentioned in section 2-1. This task is necessary for assessing the significance and priority of implementing conservation and restoration projects relating to these water resources and buildings. It also provides a basis for selecting targets and deciding on the content of the guidelines.

The significance and priority of implementing conservation and restoration projects have been assessed for each water resource and building based on the following five indicators (Table 1).

**Table 1: a partial list covering the value of the multilateral assessment of the rehabilitation subjects**

No.	Important structure for the water system	Rehabilitaiton Subject	Historical drainage system			Control system of water transportation			Landscape formation			Effective Envir Education	Urgency	Validity of linkage with the project	Compliance criteria of 8 basic policies
			Functional	Historical	Tourism Resource	Functional	Historical	Tourism Resources	Local Scenery	Historical	Tourism Resources				
1	Old tunnel outside Kim Thuy Lake to Royal Canal	Archeologic investigation	B	A	B	A	A	A	B	A	A	-	-	-	Policy 8
2	Historical Revetments of Royal Canal and Defensive Moats	Revetment restoration and Dredging	A	A	A	-	A	A	-	B	B	-	-	A	Policy 3,4,6
3	Two water gates at both ends of Royal Canal	Restoration of water gates	B	B	B	B	A	A	-	A	A	-	A	B	Policy 4,8

1) The values of the three characteristics and functions of the historical water system described in section 2-2 (rainwater and sewage drainage, water transportation control, and landscape formation) were assessed from the three perspectives below, assuming they are to be conserved and restored under the existing conditions of the region.

- Functional assessment: Assessment of the priority of restoring the functional aspects, such as the drainage function
- Historical assessment: Assessment of the historical value of the water system and buildings
- Assessment of tourism values: Assessment of impacts on tourism and benefits for tourists

2) The possibility and danger of the collapsing of water resources and buildings were analyzed, and the urgency of their restoration was assessed.

3) The significance of candidate projects was assessed in terms of their effectiveness in teaching and raising awareness of the significance of the water environment. I.e., the projects were evaluated by how well they could promote an understanding of the significance of the water environment to the residents and tourists, including for example, whether they could be a model project for architectural activities in private sites.

4) Candidate projects were assessed in terms of the appropriateness of their implementation within the framework of the sewage improvement and restoration project implemented by Japan's ODA.

5) Candidate projects were evaluated with respect to the value of the entire ecological system of the Huong River Basin in Hue, by assessing their relationship to the eight basic policies concerning urban and regional environmental conservation (Table 2) [4], which were agreed on by local administrative

authorities at the International Symposium on Historic Urban & Rural Environment Conservation in the Huong River Valley Region held in August 2005 [5].

**Table 2: Eight basic policies proposed for the conservation and the environmental regeneration of Hue and the basin of Huong River.**

<p><b>1/8: Conserving a unique city structure of Hue.</b> Planned by the order of natural ecology according to the Feng Shui methodology, the conservation and regeneration are proposed for the amenities of Hue, the city's surrounding mountains, the parallel Huong River and the river basin.</p> <p><b>2/8: Conserving unique ecological system in Hue.</b> The aim is to reconstruct the water systems of Hue and its region for reviving the ecological system of the Huong basin.</p> <p><b>3/8: Updating a traditional technologies for developing Hue with appropriate technologies.</b> To preserve and revive the local techniques found in history and then apply these techniques for the ecological-friendly environments as the foundation of the amenities of the cities, villages and regions.</p> <p><b>4/8: Creating an ecological and safe transportation system.</b> It is needed to prepare a strategy in the system of traffic management for environmental friendly and pedestrian-oriented Huong River regions.</p> <p><b>5/8: Establishing a guideline of historic cultures and landscapes.</b> To preserve the historical scenes and landscape from absorbing the historical heritages, it aims to offer the Huong basin an environment harmonious to its natural ecology.</p> <p><b>6/8: Conserving traditional life styles and building types for improving historical areas.</b> The styles of modern dwelling spaces are to be the prolongation from becoming accustomed to the environmental order and accepting the historical and cultural heritages.</p> <p><b>7/8: Keeping a compact city form for attaining a sustainable development of Hue.</b> The compact-scaled towns are respected and built along the Huong river basin, basing upon a proper scale and amount of production, circulation and consumption, to avoid ambitious, disordering sprawling of town expansion.</p> <p><b>8/8: Developing sustainable tourism system for enabling Hue residents/tourists to enjoy all resources in Hue.</b> Considering the prolongation of Tourism, a Historical-Eco Museum shall be considered with the programs of environmental education including history of the traditional villages.</p>
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## **5.0 STRUCTURE AND FEATURES OF THE GUIDELINES FOR CONSERVATION AND RESTORATION OF THE WATER SYSTEM**

### **5.1 Status Of The Guidelines**

In this chapter, we will present the structure and features of the conservation and restoration guidelines of the historical water system that we have formulated based on the state of the existing system and modern assessment perspectives discussed in the previous chapters.

The guidelines adopt the above-mentioned eight basic policies concerning urban and regional environmental conservation, as a means for the realistic achievement of urban development.

### **5.2 Basic Structure and Purpose of the Guidelines**

The basic structure of the "Hue Water Environment Conservation and Restoration Guidelines" is divided into two parts. First, it defines the value of the historical water system in the Old Town of Hue and provides environmental standards that should be achieved when conserving and restoring the system. Second, it presents measures for achieving those standards and provides technical proposals (manual). Rather than specifying technical methods only, it begins by discussing the environmental values of the system and target standards using both pictures and words, in order to ensure that the best conservation and improvement methods are adopted in flexible consideration of technical, financial, and legal constraints in the developing country.

More specifically, the guidelines identify ten items (main items) for sewage improvement and restoration of the historical water system using modern technologies (Table 2). They include an item on the basic policy concerning sewage improvement in the Old Town as a whole; eight items for each of the components of the water system that drain rainwater and sewage from within the royal palace, housing lots and road spaces → culverts and Side-greens → lakes inside the citadel (collecting basins) → culverts and Side-greens → Royal Canal (main wastewater drainage in the citadel) → defensive

moat → Huong River; and an item concerning the conservation of rainwater absorption spaces within housing lots.

Each of the ten main items are supplemented by two to six detailed items and presented on a single A4-size page or a spread of two A4 pages (Figure 3). Their main policies can be summarized as follows.

a) Dredging of the defensive moat, Royal Canal and lakes inside the citadel, and regeneration of the drainage function and landscape inside the citadel through the restoration of historical revetments

b) Regeneration of the functions and landscape of water channels and flood gates connecting the above-mentioned water resources

c) Conservation and regeneration of historical road spaces by integrating the historical water system (Side-greens) and modern drainage system using appropriate technologies

d) Elimination of unlawful occupation of water spaces by buildings and agricultural fields, in principle, and their conversion to land for public use

e) Conservation and restoration of rainwater absorption spaces in housing lots modeled after historical houses

f) Technical construction methods and considerations concerning public and private construction works designed to achieve the above items

The policies of the guidelines have been adjusted in response to exchanges of views held with the representatives of relevant local administrative authorities during the survey period, and have been finalized following repeated revisions until approval was obtained by all local parties.

### 5.3 Features of the Guidelines

Below are some salient features of the guidelines that have been considered when establishing the above policies.

#### 1) Provision of Wide-Ranging Alternative Proposals

A number of alternative proposals are provided under each main item, to achieve the spatial image recommended by the guidelines. This is also to allow for flexible responses to technical, financial, and legal constraints, as mentioned earlier, as well as to promote the effectiveness of the guidelines and provide seeds for discussion of management methods among diverse stakeholders, including the Vietnamese central government, local businesses, and Hue Monuments Conservation Center.

#### 2) Utilization of Appropriate Technologies

The alternative proposals do not simply aim at regenerating historical buildings and improving the sewage system and other urban infrastructures of the historical water system in the Old Town of Hue

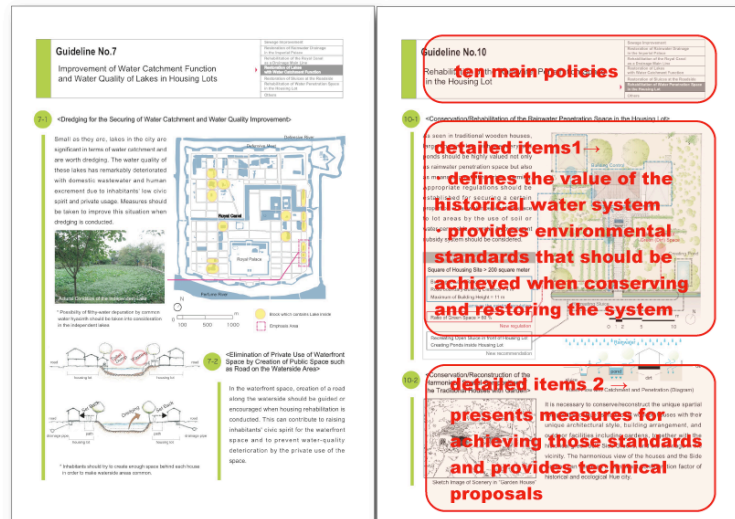


Figure 3: the presentation and application of each sub-items proposed in the 10 guidelines



based on modern technologies. They respect the environmental control and landscape formation technologies that have supported the three original functions of the historical water system, and propose to make them visible. This means the water system must be conserved, improved, and managed using technologies appropriate to a shanshui city that has long coexisted in harmony with its surrounding environment.

For example, in monsoon regions that receive heavy rainfall in a short period of time, a large-capacity wastewater culvert would need to be constructed, if the rainwater is to be drained all at once. However, through its long history of experience, the historical water system in Hue controls local inundations caused by the surge of water from concentrated downpours by gradually draining the water that is temporarily collected in ponds in housing lots, Side-greens, and lakes located in each district. In recent residential development projects in developed countries such as Japan, measures are often taken so that regulating ponds that temporarily collect rainwater can normally be used as parking lots and parks. However, in the historical water system in Hue, green belts in the city had served the same role, and therefore should be conserved with respect to this function.

### **3) Considerations for the Living Landscape**

The guidelines also place certain value on the landscape that has evolved from the temporal and spatial accumulation of waterside lifestyles led by the residents of Hue since the transformation of the citadel city of Hue from an administrative city to a living city, and propose to conserve and develop that landscape as an alternative proposal.

This type of landscape, which expresses the long, accumulated history of the lifestyles of the people in a given area, is regarded by recent landscape studies in Japan as having significant value, and is called “living landscape” [6].

In Hue, the living landscape that has emerged from its unique water environment has become the original landscape to the residents of Hue. To tourists from the Western countries, the scene of the Hue people’s lifestyles, where historical buildings blend in with the natural environment, tend to be a common source of attraction [7]. Therefore we included considerations for the living landscape of Hue in the guidelines also from the standpoint of regional promotion through tourism.

## **5.4 Authenticity**

Some of the above concepts relate to the issue of authenticity that frequently arises in reference to the conservation and restoration of cities and buildings designated as a world heritage. Generally, such heritages are to be either completely restored to their original appearance or preserved in their existing state, in principle. However, we have included the concept of a landscape derived from the lifestyles of local residents among the alternative proposals of the guidelines, because it can be interpreted as an important cultural asset.

The following chapter provides details regarding this issue.

## **6.0 GUIDELINES PERTAINING TO APPROPRIATE TECHNOLOGIES AND THE LIVING LANDSCAPE**

### **6.1 Guidelines for Conservation and Restoration of The Functions and Landscape of Historical Side-greens**

Guideline No.9 proposes conservation and restoration methods for historical Side-greens in the area that used to be a government office district during the Nguyen Dynasty. In this area, there are Side-greens along the vehicular road today. Advanced residential land development projects in the United States and other developed countries systematically create such green zones in order to reduce

wastewater burden on rivers that increases temporarily but rapidly as a result of urbanization, as well as to create a verdant roadside landscape. However, such characteristics and functions had already existed in the Old Town of Hue, owing to originally developed “appropriate technologies.” Based on this understanding, and in consideration of the fact that historical Side-greens in the Old Town are gradually disappearing in conjunction with urbanization and the development of modern sewage systems and roads, proposals for their conservation and restoration were included in the guidelines. A proposal of reviving the traditional “Side Greens” is to combine the traditional techniques with the modern construction techniques by separating ditches in the Side-greens for rainwater from sewerage pipes, i.e. the rainwater-waste water pipes, under the roads in the event of a light rain, and by channeling the overflow from the historical Side-greens to sewerage pipes under the roads in the event of a heavy rain. (Viet Nam government generally maintains combined sewer system, i.e. rainwater-waste water pipes, around the country today.)

The proposals aim to restore the historical spatial composition and technologies of the Old Town and simultaneously prevent contaminated domestic wastewater from emerging on the ground surface, as is presently occurring due to urbanization activities. They also address the reduced capacity of housing lots inside the citadel city to absorb and retain rainwater due to high-density housing development, by providing measures for securing a high-volume drainage function (Figure 4).

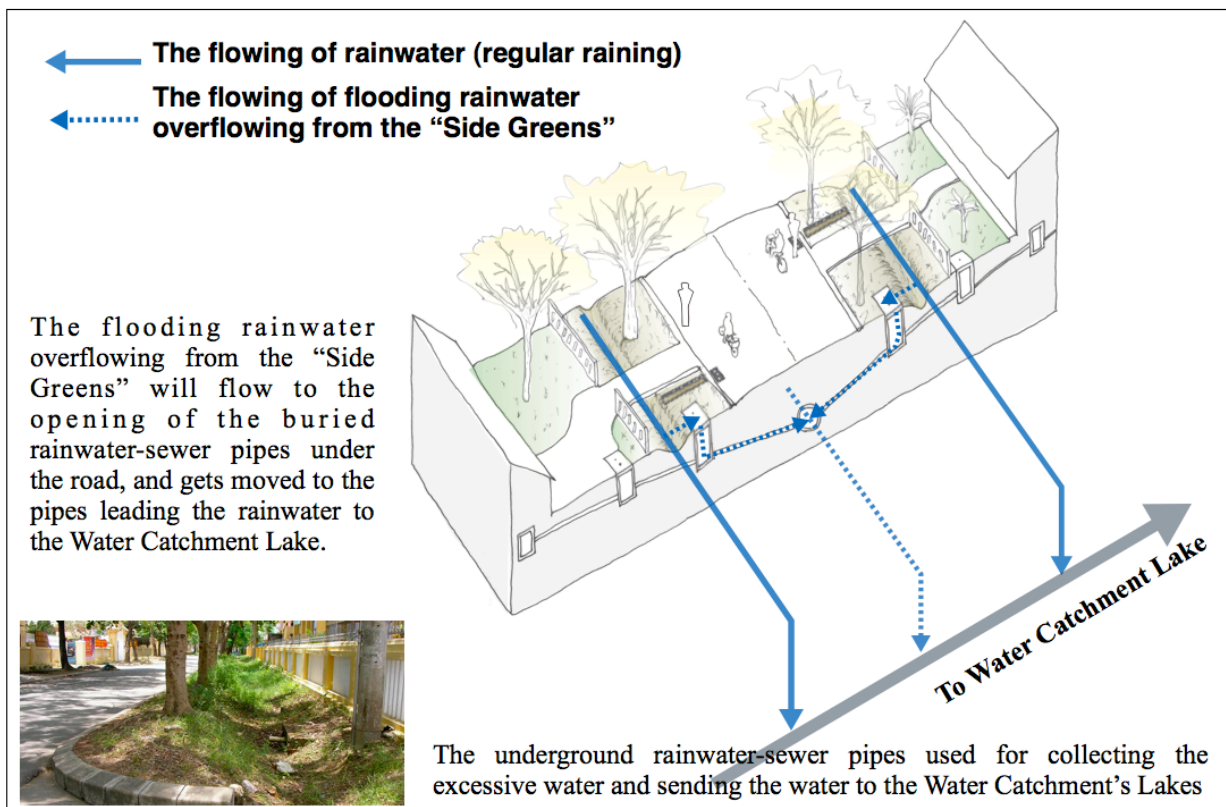


Figure 4: a structure of the system for the rainwater and wastewater drainage regarding to the historical side-greens

## 6.2 Guidelines for Restoration of the Functions and Landscape of the Royal Canal and Conservation of the Living Landscape

Guideline No.3 proposes conservation and restoration methods for the Royal Canal. In addition to providing measures for restoration of the canal’s drainage and landscape formation functions, it also provides alternative proposals for the partial conservation of the living landscape and scenery produced by the harmonious blending of man-made structures and the natural environment.

From the perspective of the above-mentioned concept of authenticity and the significance of restoring the drainage function of the Royal Canal, the canal should perhaps be thoroughly dredged and rebuilt to restore its original appearance, and the cultivation of water spinach and such should perhaps be prohibited. However, the harmonious landscape of historical buildings and the natural environment which has emerged from the vital energy of nature that is unique to monsoon regions is also worth conserving. So is the living landscape created by the accumulation of people's lifestyles along the canal. Therefore, while providing a thorough dredging plan as the basic proposal, we have also selected a strategic location that would offer a rich view of nature and proposed to conserve, in part, the

landscape of flood channel grasslands and water spinach cultivation that can be observed from that location. Additionally, to that end, we have specified the utilization of modern technologies for analyzing the flow of water and implementing earth retaining work to maintain the ecosystem of the sedimentation area that will not be dredged (Figure 5).

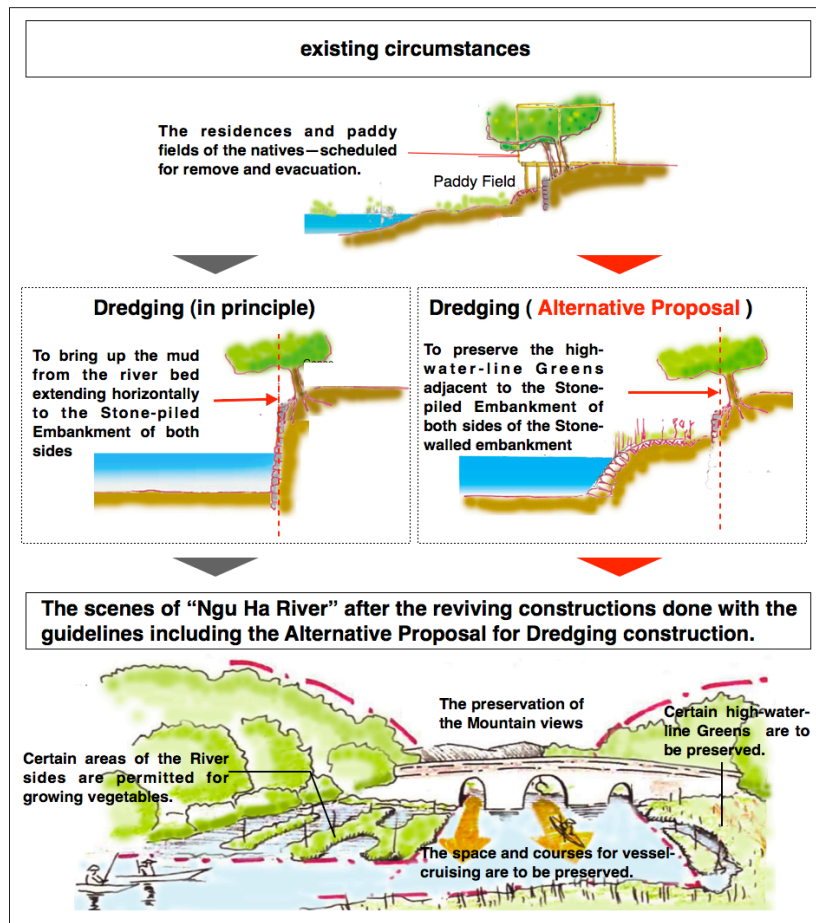


Figure 5: a general rule for Restoration of the Functions and Landscape of the Royal Canal and Alternative Proposal

### 6.3 Guidelines for Regeneration of the Historical Water Transportation Function

Guideline No.5 pertains to the conservation and restoration of the collecting basins in the city and connecting water channels. Based on the understanding that they were used for transporting goods by boat and as a means of leisurely travel by the Imperial Family, the detailed items of the guidelines propose to restore the water transportation system as a source of boat tours for tourists, in addition to conserving and restoring the flood gates that used to control entries and exits. The experience of a boat ride from the Huong River to the Royal Canal, and to the lakes inside the city through flood gates, might promote tourism and a better understanding of Hue's water system(Figure 6).

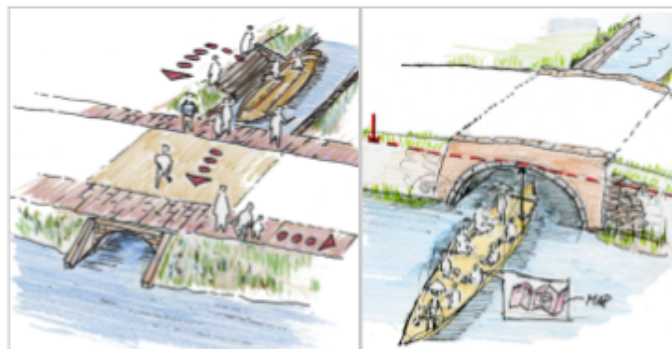


Figure 6: a Vision of the alternative proposal to better the tunnel passage for cruising tourism today

When implementing the above, boat routes could be made more flexible by modifying the shape of tunnels under existing roads so that boats could pass. However, this would certainly alter the original appearance of the water system. Whether or not to place priority on “restoring” the history of the water transportation system used by the Imperial Family is an issue that is attracting diverse views within the local government and among researchers, and should therefore continue to be discussed in the future.

## **7.0 CONCLUSION**

Above, in this paper we have reported on the methods and clarified the significance of restoring an urban system that coexists with nature, which is characteristic of historical cities in East Asia, while improving the living environment as is demanded by modern cities, by analyzing plans for projects designed to conserve and improve the water environment in the citadel city of Hue in Vietnam. The guidelines formulated through the study regards the appearance of the harmonious coexistence of man-made structures and nature, and the “living landscape” created by the lifestyles of its people, as values worthy of conservation, even if they are values that have transformed and emerged after the initial construction of the city. As their greatest feature, the guidelines present a new concept to the issue of authenticity, which is one of the most important aspects of UNESCO world heritages, by proposing principles that take into consideration the unique characteristics of the East Asian monsoon region.

To ensure efficient operation of the guidelines, the establishment of a management committee composed of members from relevant departments of the local government, academic experts, and UNESCO, is being considered. Additionally, issues concerning the implementation of environmental education and technical support to local residents and construction companies are planned to be addressed in the future.

## **NOTES**

[1] These are surveys conducted by the Institute of UNESCO World Heritage – Waseda University Comprehensive Research Institute and Waseda Institute of Urban and Regional Studies.

[2] The Institute of UNESCO World Heritage – Waseda University received a request from the UNESCO Hanoi Office in FY2007 to implement the “Study of the Historical Water Environment in Hue, Vietnam.”

[3] Refers to the SAPROF (Special Assistance for Project Formulation) study for the water environment improvement project implemented by Japan Bank for International Cooperation (JBIC) in FY2007.

[4] The eight basic principles were presented in the “Huong River Basin Historical Eco Museum Concept” prepared by the Waseda Institute of Urban and Regional Studies in April 2005.

[5] Refers to the International Symposium on Conservation of Historic Urban and Regional Environment in Hue Area (Aug. 2005) held jointly by the Institute of UNESCO World Heritage – Waseda University and Hue Monuments Conservation Center.

[6] “Living landscape” is a landscape concept that has been discussed and assessed by the Landscape Subcommittee under the Research Committee on Urban Planning and Design of the Architectural Institute of Japan, from 2000 to 2007.

[7] Based on the results of a questionnaire to participants of an experimental tour through the Old Town on a cyclo (three-wheeled bicycle taxi), carried out under the “UNESCO World Heritage Site of the Complex of Hue Monuments and Plans for Its Environmental Conservation, Section 4: Inner-city Tourism” (2002 – 2006, Research Representative: Takeshi Nakagawa), a project sponsored by the MEXT Program for Promoting Advancement of Academic Research at Private Universities.