Università Politecnica delle Marche
Doctoral School on Engineering Sciences
Curriculum in Environmental Heritage and Sustainable Changes, XXXI cycle

The quality of Hue Citadel in the urban development of Vietnam, approach from Architectural Heritage and Landscape Value

Ph.D. Dissertation of:

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Tutor:

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Prof. Fausto Pugnaloni

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Ancona, February 2019

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Acknowledgements

The first of all, I would like to express my sincere gratitude to my tutor Professor Antonello Alici for the propagating scientific knowledge, opportunities of conference participation, creating all the legal procedures in the research that helped me complete this thesis. These are the great knowledge that will accompany me in the current and future research.

My sincere gratitude would like to give to my co-tutor Professor Fausto Pugnaloni, who has pioneered for the international collaborative project on science and technology between Polytechnic University of Marche - Italy and Hue University of Sciences - Vietnam. It was precisely this premise that made me and many other colleagues to be in Ancona for our research. I recorded a lot of knowledge from him. Besides, I would also like to sincerely thank to Dr. Cecilia Carlorosi who shared her expertise, experience in science and project implementation.

I would like to express my thanks to the Department of Civil and Building Engineering, and Architecture (DICEA), PhD Office, Polytechnic University of Marche as well as the Professors in DICEA for supporting facilitating administrative procedures, research, participating in the conference, workshop and seminar.

I would like to thank to the Hue University of Sciences, Faculty of Architecture which have facilitated the time and procedure for research, moreover I want to thank to the professors, lecturers and friends who helped enthusiastically and facilitated for my contact and collecting data contributes a great deal to research. Besides, I express thanks to the Department of Construction of Thua Thien Hue Province, Institute of Planning and Construction of Thua Thien Hue have helped me with the reference data for the thesis.

My gratitude would like to thank to Professors Le Manh Thanh, Nguyen Van Tan, Hoang Van Hien, former Rectors and Rector of Hue University of Sciences, who led the collaborative research on science and technology under the Protocol in Vietnam to make opportunity for us in research.

Lastly, I express deep gratitude to my family and my wife have been very hard working during three years to take care of two our babies, making all the time and material conditions for me to finish this thesis.

Ancona, November 2018

Vo Ngọc Duc

Abstract

Process of Hue urban formation, in the periods of the Nguyen feudal Dynasty during 1802-1883 and colonial invasion by the French during 1884-1845, created a unique city in Vietnam. In this context, Hue Citadel is a relevant example of urban planning for sustainable development. It was built in 1803, as an unusual combination of human and nature, the East-West architecture, i.e. the principles of Western military architecture meeting the ideology of Eastern philosophy and Vietnamese traditional architecture. The outer Citadel followed the fortification model of Sébastien Le Prestre de Vauban, while the two inner ramparts - the Imperial City and the Forbidden City - were built according to the type of the ancient oriental architecture. The fortification model of Vauban type harmoniously united with Feng Shui principle, applied local natural elements such as mountain, water, topography to form the identities of ecological and historical city. Besides, the process of urban expansion by the French was respectful of the local architectural identity, and provided a model of development in harmony with local characters and the tropical climate.

In the last decades, Hue City has experienced major changes by the impacts of urbanization such as the increase in population, land encroachment, environmental pollution, flood, causing heavy alteration of the traditional landscape characters, and damaging of the heritages. The urbanization and expansion of urban planning have not totally evaluated the urban qualities, modern technologies and ideas in the late 20th century tend to ignore the identity of local place. It is very important to understand the true meaning of the urban form and the historical values. The agenda for the preservation of a sustainable model is oriented towards the Feng Shui methodology, which will identify the urban structure and the characters of the landscape. In the same way, the theory of the garden city is suggested a model of clear hierarchy and cooperation between the centre and the satellite urban structure. Since 1993, the complex of Hue Monuments has been written on the List of World Heritage by UNESCO.

Keywords: *Hue Citadel; identity; urban heritage; landscape; value; sustainability.*

Abstract

La tesi si focalizza sul processo di formazione urbana della città vietnamita di Hue. Le attività della dinastia Nguyen (1802-1883) e la successiva invasione coloniale da parte dei francesi (1884-1845), crearono una città unica in Vietnam. In questo contesto, Hue Citadel è ancora oggi un esempio rilevante di pianificazione urbana in favore di uno lo sviluppo sostenibile. Fu costruito nel 1803, con un'insolita combinazione di elementi umani e naturali, con elementi architettonici tratti sia dalla tradizione militare occidentale, sia dalla filosofia orientale che dall'architettura tradizionale vietnamita. La Cittadella esterna seguiva il modello di fortificazione di Sébastien Le Prestre de Vauban, mentre i due bastioni interni - la Città Imperiale e la Città Proibita - erano costruiti secondo tipologie già presenti nell'antica architettura orientale. Il modello di fortificazione di Vauban si è unito armoniosamente ai principi del Feng Shui, armonizzandosi con gli elementi naturali (la montagna, l'acqua, la topografia del sito) e creando l'identità della città ecologica e storica. Inoltre, il processo di espansione urbana da parte dei francesi è stato rispettoso dell'identità architettonica locale e ha fornito un modello di sviluppo in armonia con ila popolazione locale e il clima tropicale.

Negli ultimi decenni, Hue City ha subito i principali cambiamenti dovuti agli effetti dell'urbanizzazione, quali l'aumento della popolazione, i consumo di suolo, l'inquinamento ambientale, le inondazioni, causando pesanti alterazioni dei caratteri tradizionali del paesaggio e il danneggiamento del patrimonio architettonico. L'urbanizzazione e l'espansione urbana recente non hanno saputo comprendere le qualità della città storica, anche grazie al fatto che sia le moderne tecnologie, sia le idee urbanistica della prima metà del XX secolo tendono a ignorare l'identità locale dei luoghi. È molto importante capire il vero significato della forma urbana e i suoi valori storici. L'agenda per la salvaguardia di un modello sostenibile è orientata verso la metodologia del Feng Shui, che identifica la struttura urbana e i caratteri del paesaggio. Allo stesso modo, la teoria della città giardino è suggerita da un modello di chiara gerarchia e cooperazione tra il centro e la struttura urbana satellite. Dal 1993, il complesso dei Monumenti di Hue è stato iscritto nella Lista del Patrimonio Mondiale dall'UNESCO.

Parole chiave: *Hue Citadel; identità; patrimonio urbano; paesaggio; valore; sostenibilità.*

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Introduction

1. Research motivation

Vietnam had a long history of over 4000 years through archaeological evidences. The living and economy mainly based on the agriculture and slowly developed. Before the 10th century, Vietnam almost depended on the Northern, until year 968 when the King Dinh Tien Hoang unified the country, creating Dai Co Viet State (former name of Vietnam) established the first state of Vietnam. Before Christ, Vietnam had just the Co Loa Citadel but until year 968, Hoa Lu City was built, opening the urban planning of fortification architecture in Vietnam. From the 10th century, Vietnam became the independent State and developed until today.

While the Capitalism was flourishing in Europe in the mid-nineteenth century, then under the power of Nguyen Dynasty, Vietnam's economy was still based on agriculture, a backward decadence. Most farmers lived on agriculture, while industry and commerce were not only developing but also were restrained by feudal rules.

In the 16th century, European missionaries entered into Vietnam. In 1790, Nguyen Anh chose Saigon as the capital, named Gia Dinh and then he depended on Olivier de Puymanel and Théodore Lebrun who were two French army officers, with the bishops Ba Da Loc, Tran Van Hoc for the sketching of European fortification to create Gia Dinh Citadel (Octagonal Citadel). In August 1858, the French expeditionary force attacked the Da Nang port and then pulled into the south to invade Saigon. Nguyen Dynasty did not fight back, made concessions from three southeast provinces to six south provinces. In 1873, the French conquered Hanoi, and established their power in Indochina, implementing the colonial and semi-feudal policies. In June 1884, the Patenoote peace Treaty was signed in Hue Capital, which divided Dai Nam (former name of Vietnam) into three regions: Cochinchina which was a French colony, Tonkin and Annam under the protectorate of France with Nguyen Dynasty still nominalized in control.

During the first phase (1984-1920), most of the main buildings of the French colony were originally copied from France such as Governor Palace in Saigon, House of the King, Supreme Court, Hanoi railway station, etc. These followed European Neoclassical style with strict symmetry axis, column and structure beam system as the Renaissance style. Thereafter, the second phase (1920-1945), the French continued to maintain the architecture of European style, combining the research of local climate conditions to make up the colonial architecture with the adaptability and identity shape.

Parallel to this process, long time ago, in East Asia and Southeast Asia, there was very special sense of environment, philosophy of environment. In the same direction, the Vietnamese predecessor smoothly applied philosophical ideology in design and urban planning by using the local natural elements. The idea of human and physical setting is belonging to nature. Human and nature would exist forever together.

Besides, the feudal period from 1802 to 1945, Nguyen Dynasty also applied the Western military architecture for the constructive planning of defensive city from North to South in Vietnam with the thirty three citadels and small fortresses according to the model of Sébastien Le Prestre de Vauban (French military engineer), referred to Vauban type[1]. Main and typical citadel was the Capital of the Nguyen Dynasty, was built since 1803 in Hue, as

[1] Ardant du Picq, *Bulletin des Amis du Vieux Hué,* Vol. 1924, No. 12.

an unusual combination of East-West architecture, the principles of Western military architecture meeting the ideology of Eastern philosophy and traditional architecture of Vietnam.

Before 1884, most of the Hue urban expansions were designed as the traditional oriental architecture, thereafter, when the French dominated, the cities were built according to new type, import of materials, techniques and Western technologies. This result created an urban morphology which respected of the local identity, and also provided a development model in harmony with traditional features and tropical climate, the urban model of sustainable development. An extremely unique city mixed East-West characters with existence and parallel development of both indigenous and colonial architecture. Consequently, Hue Citadel was the highest of the art of fortification architecture, the harmonious combination of Western military architecture, Feng Shui principle and traditional oriental architecture. This result was also demonstrated since in 1993, the complex of Hue Monuments - including citadel, palaces, temples, shrines, tombs of Nguyen Dynasty - has been recognized as UNESCO World Heritage. But what the values of Hue Citadel have not clearly written on any books. Especially, there was no book which researched in urban morphology, origin of Hue Citadel.

In the agenda of terminology of Citadel, the history of the Nguyen Dynasty and some of the authors had not been clearly defined, as they sometimes referred to themselves as large wall; on the other hand, they referred to the whole area of the Citadel, which was located on an area of about 520 hectares. This area which was later called Thanh Noi and is today the residential area of the people. Besides, in the some French books, they clearly separated the meaning of the two definitions 'the Hue Citadel' *(La Citadelle de Hué)* in general and the defensive military fortress surrounding it in particular *(L'Enceinte fortifiée de la Citadelle de Hué)*. On the context of this thesis, the author wants to mention that Citadel is outer large wall and the whole area of the Citadel inside because they closely related together.

In the last decades, Hue City has experienced major changes by the impact of urbanization such as the increase in population, occupation of new land, environmental pollution, flood, causing heavy of the traditional landscapes, and harming of the heritage. After 1986 - the renovation period, there were new impacts such as market economy, expanded land, commercial life which made up the houses using their surface for commerce with the diverse livelihood activities, affecting greatly traditional structure of Hue City. The series of new architecture, Eclectic Architecture, caused to be the messy facade on the street as well as the urban expansive planning with fragmentation, traditional urban structure was at the risk of being destroyed. Most of precedent ideas tended to ignore the identity of the local place. Thus identities of true meaning of the urban form and the historical fabric as well as landscape value are very important. These values could apply for the preservation, restoration, development in urban design and planning towards the sustainable model.

Although many studies have reported regarding the investigation of the influence from the Vietnamese researchers, the Japanese scholars, French researchers, however most of these studies have been independent, detached with general historic context. So far, there is not yet comprehensive assessment of the value of urban morphology of Western military architecture, colonial architecture and planning of the French in the urban development of Hue City; the role of Feng Shui methodology, the values of traditional urban structure of the predecessors; and the value of the combination of philosophical ideas of Eastern architecture with Western technique science. Previously, there was no

book to study fully and comprehensively of Hue Citadel. Occasionally, some works, articles referred in general terms or an issue such as the book *]'Hue Citadel"* on 'history event' by Phan Thuan An, the PhD thesis "*Studying and organization on urban open space in Hue Citadel"* on 'open space' by Dang Minh Nam. Besides, there were also some records related on some separate parts of citadel as below:

- Do Van Ninh, *Vietnam's ancient Citadel,* Technique Science Publisher, Hanoi, 1983.
- Tran Duc Anh Son, Vu Huu Minh, *The lakes in Hue Citadel,* Thua Thien Hue Science and Technology Information, 1993, No. 2.
- Phan Thuan An, *Hue Citadel,* Thuan Hoa Publisher, Hue, 1999.
- Dang Minh Nam, *Studying and organization on urban open space in Hue Citadel,* PhD thesis, Polytechnic University of Marche (UNIVPM), Ancona, 2007.
- Fausto Pugnaloni, Cecilia Carlorosi, Le Ngoc Van Anh, Francesca Ottavio, *Landscape Heritage in Vietnam,* Ripesi Editore, Ancona, Italy, 2011.
- Tran Đinh Hieu, *A Study and Design Proposal of The Network of Travel Wharf in Hue City and Surrounding Areas,* PhD thesis, UNIVPM, Ancona, 2012.
- Nguyen Vu Trong Thi, *Vietnam Citadel system under the Nguyen Dynasty and the case of Quang Tri Citadel,* PhD thesis, UNIVPM, Ancona, 2016.

Basing on these above-mentioned research, under the support by Protocol project of bilateral international cooperation on science and technology between Polytechnic University of Marche-Italy and Hue University of Sciences-Vietnam which led by Prof. Fausto Pugnaloni, we continue to deeply research this topic.

2. Research methodology

2.1 Historical method

That bases on the logical process of the history of formation and transformations of the dynasties that once existed in the Vietnamese history to search for the source and characters of culture, architecture, and urbanism. Also it uses the historical references of phases to detect relationship of architecture styles, urban forms from the many countries with different cultures and origins.

The research bases on the two main historical sources. The first source is the collection of books such as *"Đại Nam nhất thống chí" (Dai Nam Comprehensive Encyclopedia), "Đại Nam thực lục" (Chronicle of Greater Vietnam), "Khâm định Đại Nam Hội điển Sự lệ"* written by The Association of History of the Nguyen Dynasty (Quốc sử quán triều Nguyễn) and by The Cabinet of the Nguyen Dynasty (Nội Các triều Nguyễn) which compiled only official history from 1821 to 1945 in Vietnam. These books documented the official geographical record, the true record of the Dai Nam (former name of Vietnam), the activities of Dai Nam under the Nguyen Dynasty. The second source has also an important role, the collections *"Bulletin des Amis du Vieux Hué" (BAVH)* written by French scholar wrote about colonial Indochina. Although each collection has its own opinion, both sources confirm that the outer Citadel was built following Western Vauban type, the two inner ramparts according to Vietnamese feudal style.

In addition, some studies of famous historical researchers such as Phan Thuan An, Do Van Ninh, Do Bang, Phan Thanh Hai, Tran Duc Anh Son, and data of the Hue Monuments Conservation Center also play a relevant role for the understanding of the formation and transformation of Hue Citadel.

2.2 Feng Shui method

Long time ago, in East Asia and Southeast Asia, there were very special sense of universe, philosophy of environment. The idea of man and physical setting is belonging to nature. This was a method of ancient origin, characterized by Eastern oriental people in design and urban construction. In the same direction, the unusual character of ancient Vietnam city was based on the Eastern philosophy. This idea was closely applied for Vietnamese cities, Hue Citadel, and also written down in some ancient books of Vietnam and China. In this context, the Feng Shui methodology was important mode and remarkable urban design in Vietnam. It could be application for global environment in 21st century. By use of available natural elements, Feng Shui method was strictly applied in choosing location, direction, layout of city. It was based on three premises such as the Yin Yang Theory, the Three Element Theory (God, Earth, and Human) and the Five Element Theory (Metal, Wood, Water, Fire, and Earth). According to Feng Shui method, it suggested a model with front Screen, back Pillow, left Dragon, right Tiger, reassembling the water surface, and Ming-Tang element, philosophy of the Universal Changes (locating in the north and facing the south), and the Five Elements (the emperors' palace was in the center, the tomb and temple in the west, and the market was in the east). As this result, Hue Citadel was a clear demonstration of the application of the Feng Shui for creating an urban settlement.

2.3 International Charters on preservation and restoration, cultural tourism

One of main key on explanation and proposal for theory of urban planning should be referred to the international Charter on preservation and restoration, heritage site, cultural tourism. There are the Legend, Charter, International Agreement on definition, value, method, etc. of the advancement of architectural heritage and natural heritage. These regulations are used as the premise base for suggestion of way which have been accepted by many international scientists.

Using international Charters, Agreements as well as Vietnamese laws, regulations are the methodology as a bridge between history and the present in order to suggest proposals. There are sometimes conflicting views and principles, based on the values of history, heritage, predecessors, climatic and cultural characters of the Orient, to apply the appropriate Charter to produce viewpoint, principle, bring suitable ideas for Hue City in the future towards sustainable development.

2.4 Field survey method

A complete survey data collection - based on measurement, archival research and interviews - aims to document the changes, as destruction of monuments and ecological structure of urban landscapes of Hue after 1945. Especially in 1968, Mau Than War seriously destroyed almost all the heritage buildings. In 1986 (the renovation together with market economy) a lot of projects were built according to new architectural types, most types were also greatly affected the traditional system of urban heritage. Besides, the survey materials of Hue Citadel by Urban Design Laboratory - Waseda University - Japan, Hue Monuments Conservation Center, and Faculty of Architecture of Hue University of Sciences- showed us the structure of natural ecosystems, habitats, and the activities of the local people.

Besides, the methods of layout mapping, diagrams by the graphic software (AutoCAD, Photoshop, Google Earth) help us to understand clearly location, layout, scale of the

transformation of Hue urban architecture. Dissecting method of spatial space is applied to divide the characters such as history, functional use, visual art, etc. to consider and analyze. After all, they are compared to find out the scientific basis and explanation of the relationships, values and characters of each space.

2.5 Research structure

The thesis structure consists of the Introduction, five Chapters and Conclusion.

Chapter 1. Urban morphology of Star-shaped Citadel in the world

By the historical method, it was research on the urban morphology of some Western cities and Eastern cities which had similar features to Hue Citadel. The research focuses on the origins, shapes, characters of the Star-shaped Citadel (fortification and city structure) in Western country after Renaissance, and the Square-shape Citadel (shape of urban boundary and city structure) in Eastern country.

For the Western, the chosen time of after the Renaissance was equivalent to the time when Lord Nguyen Hoang (the first Lord of Nguyen Dynasty) opened the border, immigrating to South Vietnam (Thuan Hoa area in Ai Tu) in 1558 to find the location and how to build the his Capital. This was the premise for the Hue Citadel in the next phases (from 1803). For the Eastern, the chosen time was different, dated back to the Before Christ when the Eastern ancient cities were created according to archeology. There was a long historic process of Vietnamese cities. The first was the period of Co Loa Citadel - the capital of the Au Lac Kingdom (the 3rd century BC). The second was period of the influences of China during 1000 years from the 1st century to 10th century, and then in year 968, the King Dinh Tien Hoang unified the country, creating Dai Co Viet State (former name of Vietnam), established the first state of Vietnam – first feudal State in the history of Vietnam. The origin and characters of Hue Citadel were explained from these data.

After all, the lessons were learned in the process of urban development and expansion under the urbanization though some cities such as Rome, Ancona, Paris, Amsterdam, Venice and Beijing to have some experiences for Hue City in the future.

Chapter 2. History of Citadel architecture in Vietnam

Historical materials, French scholar showed the characters of Vietnamese urban ramparts before the Nguyen Dynasty, the rampart types without bastion at almost cities from 10th century to 15th century. After 1858, when France began to set foot in Vietnam, they made the influences of French architecture on Vietnamese architecture during the domination and the influences of Western military architecture, Vauban fortification type on Vietnamese cities under Nguyen dynasty. Besides, history data also showed the influences, varieties and different layouts of the Chinese City on Vietnamese City, through the Citadel and Imperial City and Forbidden City.

Chapter 3. Formation and transformation of Hue Citadel

Historical method showed the history of formation and transformation of Hue Citadel. The process from the premise phase found out the location of the city though the reaching to the southern boundary by Nguyen Lords before 1802. It researched the ideas on the planning of the Citadel and the process of forming the Citadel, Imperial City, and Forbidden City under the Nguyen Dynasty from 1802 to 1945, in which there were influences and interactions of French architecture during the colonial process. The

database - survey, analysis, synthesis, and mapping - described the appearance, characters of the Hue Citadel in history and showed the changes of today's Hue architecture.

Chapter 4. Values and Risks of Hue Citadel

From the above data, the analysis and synthesis suggest the risks to the capital city under the impact of urbanization. Identify the characters and type of spatial organization of the Citadel, and demonstrate the value of the architectural heritage and landscape value as well as the role of the water system of predecessor in the role of ecological regulation for long-term development.

Chapter 5. From value to management, restoration and development strategy for historic eco-tourism

ICOMOS and UNESCO regulations, as well as local urban management regulations are as a bridge from history to present for proposal urban planning and design in the future. From these, find out valuable views and principles basing on the values of the past to apply them for contemporary urban planning; Suggest from values to the management, conservation and enhancement strategy for historic eco-tourism; Propose a functional zoning diagram, restoration and promote the role of the divine axis as well as propose a historic eco-tourism route to spread architectural heritage and raise income sources for the local people.

3. Research results

The research aims is finding out the identities of Hue Citadel. Identify of urban quality of the heritage of Nguyen Dynasty (1802-1945), Western military architecture, colonial architecture (1884-1945) in Hue City. Besides, evaluate role of the Feng Shui methodology, the water system, and the landscape values of traditional urban structure of the predecessors.

Moreover, propose ideas of model and the managed policies of sustainable development such as diagram of function area for garden city; route of historic eco-tourism; restoration of divine axis; in order to protect and enhance the value of urban structure of Hue City for sustainable tourism.

The proposed products can be used as reference materials, research for architectural students, architectural planning consultants and architects in the Thua Thien Hue Province, National Library of Vietnam, Center for Historical Research, Thua Thien Hue's Urban Planning Institute, Hue Monuments Conversation Center. It also provides multi-dimensional information for tourism in Thua Thien Hue Province.

Chapter 1. Urban morphology of Star-shaped Citadel in the world

1.1 Star-shaped Citadel in Western country after the Renaissance

From the Roman period, the city model of two main axes of the horizontal, vertical, and centered structure were the commerce that was applied by the Romans to the design of their cities to form the cultural and social structure of Roman civilization. This was the basic premise of the formation of geometric fortifications in the Renaissance.

The article *'Urban Roman architecture: Cities'* mentioned the conception 'urban form' of city as *"Roman city is basically composed by a number of identic components, disposed in a special way - parallel and equal-distant- separated by streets. The whole forms a unit of rectangular design surrounded by a perimetral wall with watchtowers. All the streets are equal except for two: the North-South one -kardo maximus- and the East-West one -decumanus-. Both are wider and end at the four doors of the exterior wall. At the cross of both streets are the city's forum and the market."*[2]

At the cross of both main streets are the city's forum (basilicate, termae) and the market. In these cities, kinds of housing could be divided into house, domus, insula and villa (figure 1.1).

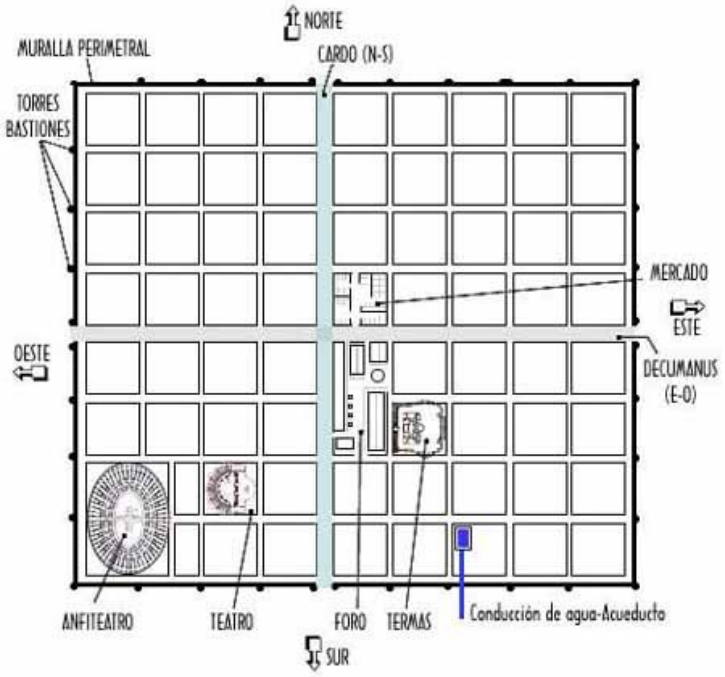


Figure 1.1 Model for the plan of a Roman city
(source:http://www.spanisharts.com/arquitectura/i_roma_urbano.html)

In the Renaissance, the conception 'ideal city' was used by Giorgio Vasari, a painter, architect, and historical researcher in his work since 1598. Other researchers then used conception of ideal city for urban theoretical models of Renaissance authors.

[2] http://www.spanisharts.com/arquitectura/i_roma_urbano.html

Renaissance ideal city models focus on defenses, aesthetics and urban technology, with little attention to population, social structure and urban economic issues. Proposals, especially in urban design, have long-term significations for the development of the art of urban space composition. In the formation and development of the urban Renaissance theory, Vitruvius' influence, through his books *"Ten Books on Architecture"* is enormous (figure 1.2 and 1.3).

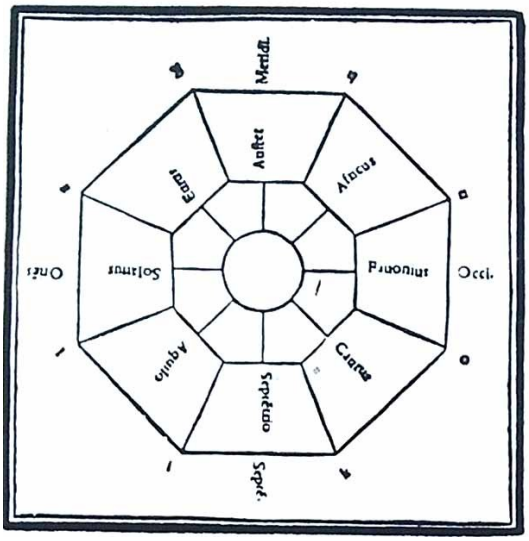


Figure 1.2 Wind Rose used in the urban design by Vitruvius (source: Mario Morini, *Atlante di Storia dell'Urbanistica,* Editore Ulrico Hoepli Milano, 711-582, 1963, p. 202)

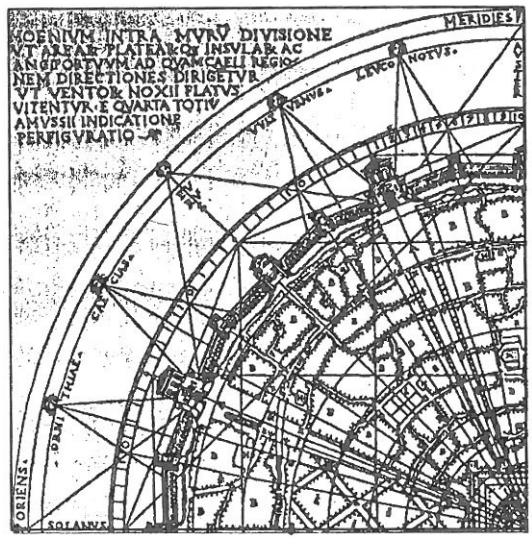


Figure 1.3 City Map of Vitruvius (source: Mario Morini, op. cit., p. 202)

Some famous authors in this period are Leon Battista Alberti (1404-1472), Antonio Averlino Filarete (1400-1469), Leonardo da Vinci, Pietro Cattaneo, Vicenzo Scamozzi, Francesco di Giorgio Martini (1439-1501), Bartolomeo Ammanati (1511-1592), Giuliano da Sangallo (1443-1516), Girolamo Maggi (1523-1572), etc.

From urban theory of the Renaissance city, the model of a Star-shaped Citadel was applied, built, developed by many European countries for the fortification system of living and defense. Table 1 statistics show a lot of citadel in the Netherlands, Italy and France.

Table 1.1 The quantity of Star-shaped Citadel in some European countries

	European Country	**Quantity of Star-shaped Citadel**
1	Netherlands	97
2	Italy	36
3	France	28
4	United Kingdom	14
5	Spain	13
6	Germany	11
7	Portugal	10

(source: synthesis of data from Wikipedia)

1.1.1 Fortification

The studied urban morphology consists mainly of contour of city and inner division structure. There are three types of urban boundary's form in the Renaissance as below:

a. Circle shape

An ideal model was chosen by some architects, urban researchers to build urban models. Architect Bramante was one of the foremost leaders in the use of the circles.

Architect Antonio da Sangallo took another step using many circles to organize his city. Contour of city was circle, adding a second circular inner circle, and the square was also circle (figure 1.4).

Leonardo de Vinci used the circle in the design study of the Milan's urban planning. The circles were widely used in urban space research before 1540. Then, due to the appearance of artillery, the circle did not adapt the requirements of defense, so it gradually less used (figure 1.5).

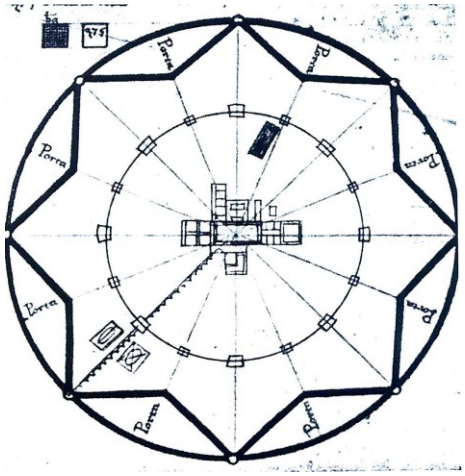


Figure 1.4 City map of the ideal "Sforzinda" by Antonio Averlino Filarete (source: Mario Morini, op. cit., p. 198)

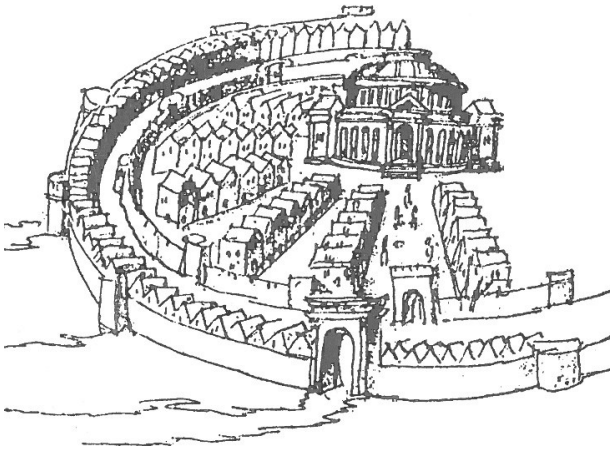


Figure 1.5 The city of Milano in a circular shape by Leonardo da Vinci (source: Mario Morini, op. cit., p. 204)

b. Square shape

Square was not the shape that urban Renaissance researchers prefer in defining contour of the city, partly because of the poor defensibility of the wall in straight lines, and on the other hand due to its simplicity (figure 1.6).

However, in actual construction, squares were used quite commonly, especially when convex fortification system was invented outside in square form, against artillery shells, adapting defensive requirements of city (figure 1.7). The square, along with its variants, was used extensively in layout of gardens and parks.

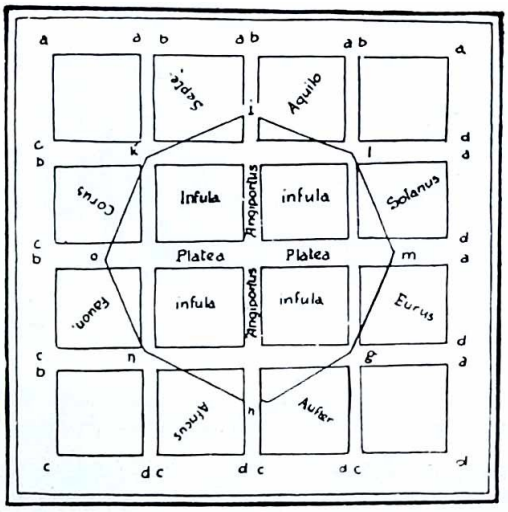


Figure 1.6 A square plan by Philippi de Giumta published in 1513 in Fieze (source: Mario Morini, op. cit., p. 202)

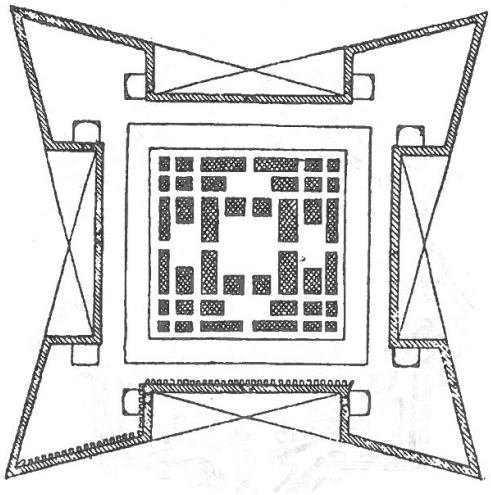


Figure 1.7 Square city plan with fortress system at the four corners by Pietro Cattaneo (source: Mario Morini, op. cit., p. 204)

c. Edge polygon shape

The polygons were the most studied research by Renaissance urban theorists, especially in the creation of defensive walls in the form of convex fortress. Normally the number of edges was usually 8, sometimes more edges (figure 1.8 and 1.9).

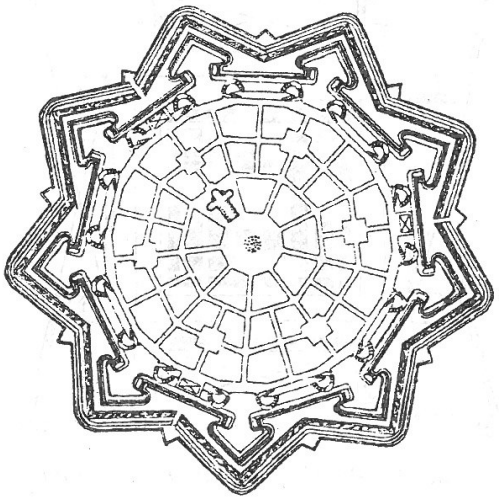


Figure 1.8 City plan of polygon edges by Bonaiuto Lirini (source: Mario Morini, op. cit., p. 208)

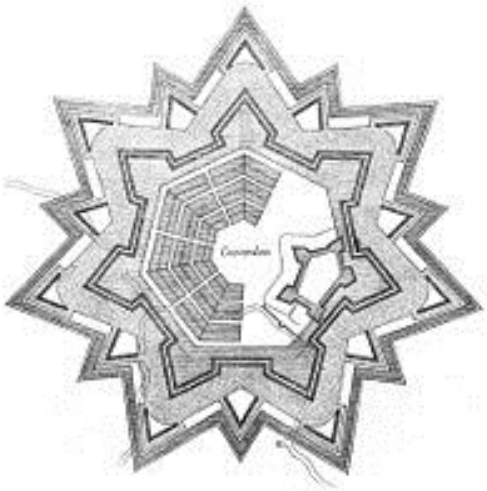


Figure 1.9 City plan of polygon edges by Coevorden, Netherlands, 17th century (source: https://en.wikipedia.org/wiki/Coevorden)

In the Barocco period, in the 17th and 18th centuries in Europe, the defenses were of great significance, especially for fortress-like cities in strategic locations such as France and Austria, between the North Europe and the Baltic countries.

For the fortified system of 17th-18th centuries, we cannot fail to mention the most important contributor, French Marshal Sesbastien Le Prestre de Vauban (1633-1707). He was a military engineer and a true warrior, and the author of the urban defense system that was considered most effective at that time.

The principle of Vauban's defenses varies a lot of kind, depending on the specific natural terrain of the site. Vauban's defense system is concentrated in the outer wall with complex moat and fortress. Inner city plan is often the polygon with the number of edges is not much from 5 to 6 edges (figure 1.10 and 1.11). His experience in warfare helped Vauban to constantly improve the art of designing and constructing urban defenses, so that the Vauban system was widely spread throughout Europe and the world in later years

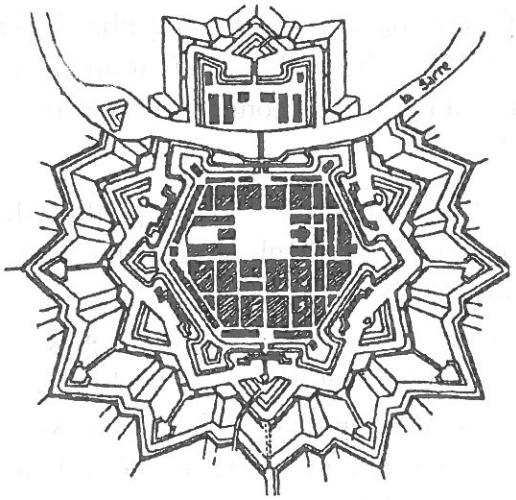


Figure 1.10 City plan Sarrelouis (France) designed in 1679 by S.P.Vauban (source: Nguyen Quoc Thong, *Constructive history of Ancient and Medieval City in Western*, Construction Publisher, Hanoi, 2000, p. 208)

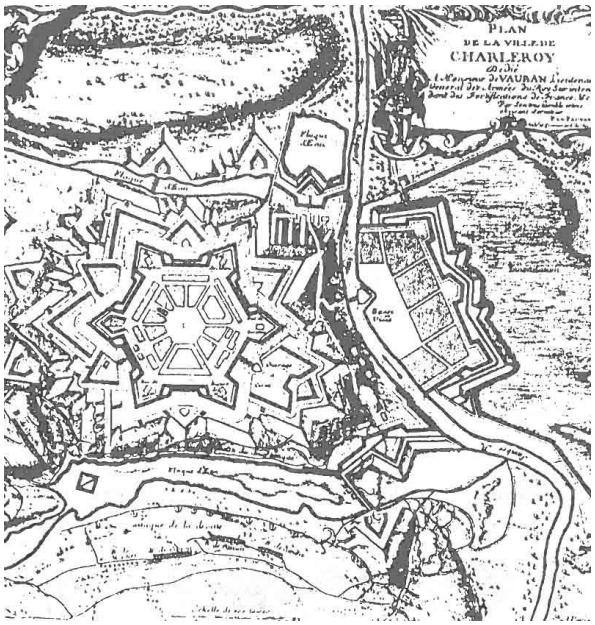


Figure 1.11 Charleroi City (Belgium) was designed according to Vauban concept (source: Nguyen Quoc Thong, op. cit., p. 209)

General shape of urban model in the Renaissance had the features such as geometry form, symmetry, focusing perspective, unification, balancing. The characters of the structure of fortifications, fortresses, defensive system were spread by European countries and built in their colonies. For example, it was reflected in the system of thirty three citadels and many small fortresses, built from the North to the South in Vietnam under the Nguyen Dynasty.

1.1.2 City structure

a. Type of radial street

Urban structure was based on the radial network. The routes were distributed steadily, from the central square to the gates or corners. The number of routes depended on the

number of gates and the angles or number of edges of the outer walls. For example, the number of routes is 8 or 10 lines as in the urban model of Filarete, Sangalo, Martini.

The radial route was designed by the Renaissance urban architects because it was easy to create a central perspective that was majestic, suitable for military mobility and easy to control in the event of a war (Figure 1.12 and 1.13).

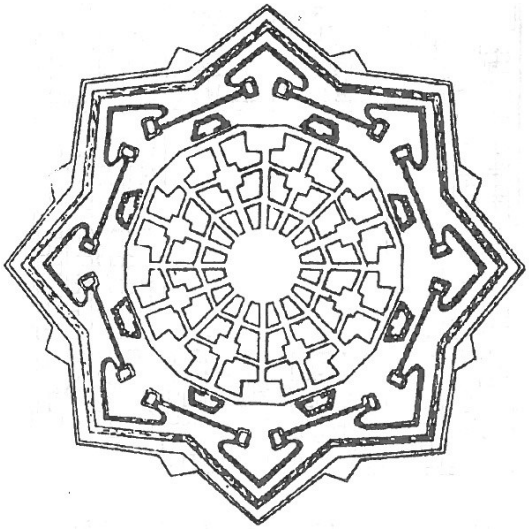


Figure 1.12 City plan according to radial line type by Pietro Sardi (source: Mario Morini, op. cit., p. 208)

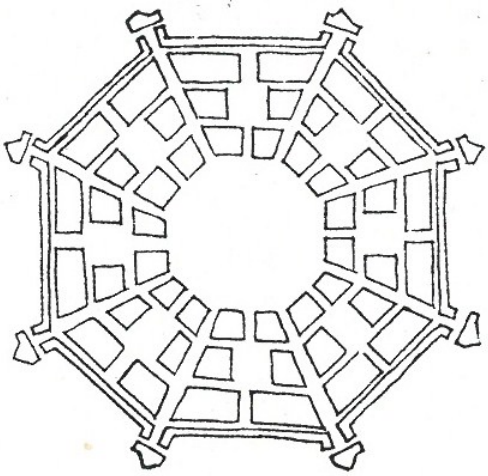


Figure 1.13 City plan according to radial line type (source: Mario Morini, op. cit., p. 200)

b. Type of chessboard

The chessboard layout was interested in research by Pietro Cattaneo, Scamozzi and especially Giorgio Vasari. In order to create richness in the layout, architects organized street networks, squares and lots of different shapes and sizes. Compared with the radial street, the chessboard pattern appeared less in the studies of the urban form of the Renaissance (figure 1.14 and 1.15).

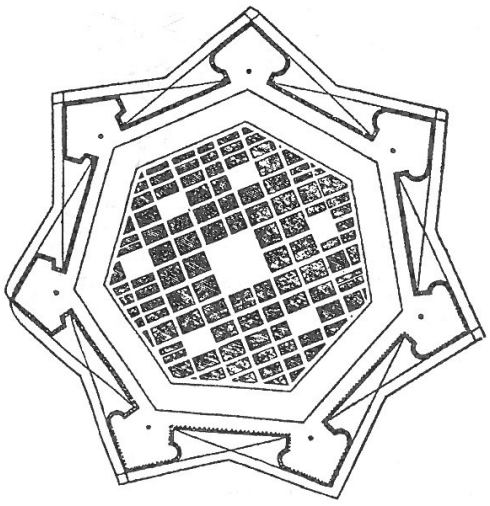


Figure 1.14 Chessboard urban plan of chessboard by Pietro Cattaneo (source: Mario Morini, op. cit., p. 204)

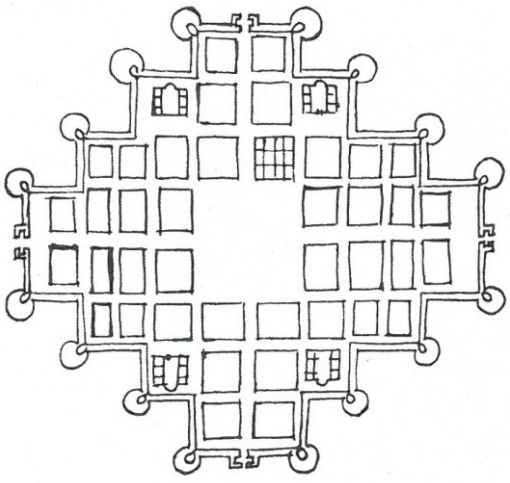


Figure 1.15 Chessboard urban plan of chessboard by Francesco di Giorgio Martini (source: Mario Morini, op. cit., p. 201)

The urban structure model of chessboard was a common model which the Spaniard applied in the construction of their colonial cities in the 16th century in Americas. Although this model was not a popular model used in Spain at that time, it was due to the rationality of this type of model that the Spaniards had chosen to apply in their colonies. Then, in the 17th, 18th century, this model was applied by the French and the British in their colonial urban construction.

c. Type of spiral

Urban spiral or other complex types were not uncommon, but mentioned about the urban design's ability of Renaissance architects. Leonardo da Vinci, Martini argued that humans could not create simple and beautiful morphology as natural, so he advocated imitation of urban forms like some animals as snails. Spiral model had many advantages in defense. The complexity of the layout created the discoveries of people living in the city (figure 1.16 and 1.17).

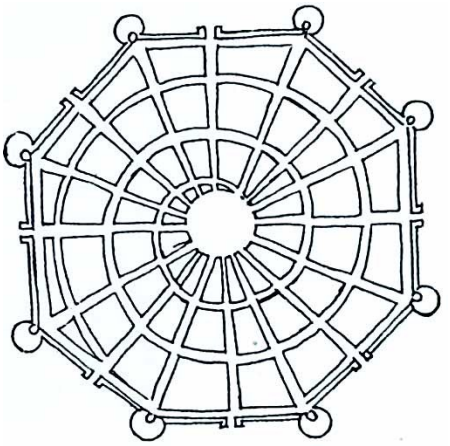


Figure 1.16 The plan of the spiral network by Francesco di Giorgio Martini (source: Mario Morini, op. cit., p. 200)

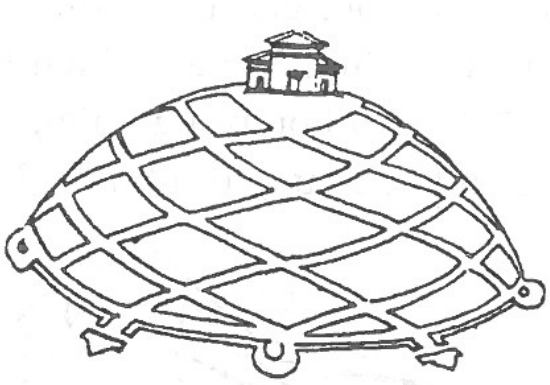


Figure 1.17 Type with road determined by the intersection of multiple spirals (source: Mario Morini, op. cit., p. 200)

1.2 Square-shaped Citadel in Eastern country

1.2.1 Shape of urban boundary

Due to the different origin and culture, the general shapes of Eastern cities were some characters being difference with Western cities. The concept of the European monuments emphasize visual beauty through its original material and authentic document, while the conservation principles in the East Asian and East-south Asian societies are determined in relation to the spiritual message and naturalistic sensibilities. The significance of spiritual message behind the urban structure was very important for the idea of city. They were not only geometry form, symmetry but also spiritual message, harmony with nature, water system, and without fortresses.

Michael E. Smith (2007) had valuable remarks about the 'form and meaning' in some ancient cities in his article on '*Form and Meaning in the Earliest Cities'* and Marten Kuilman (2013) also mentions 'The square/rectangular cities' in his article on paper *'Quadralectic Architecture'* that *"The first, high-level meaning directs to supernatural symbolism and can be positioned –*

in a quadralectic interpretation – in the First (I) and/or Second Quadrant (II). The ancient cities were seen as images or 'cosmograms'. Mircea Elide (1959), recognized four types of cosmological significance in his influential book (on the myth of the Eternal Return): 1. A parallel between heavens and life on earth; 2. The link between earth and cosmos in the axis mundi; 3. The cosmos as laid out in four cardinal directions and 4. The need for divination and augury identify the sacred places on earth."[3]

The Eastern philosophy from ancient people argued that there were close connection between the man and universe. Each major element of city symbolized for each stars in the universe. That belief showed the heavens were round and the earth was square. The square expressed the completion and sufficiency as an ideal shape for fortunate living. Thus the square shape was the form which was always used in design of city form.

Víctor Lluís Pérez Garcia (2016) mentioned the 'square-shape' and 'central axis' in his artical on paper *'South-East Asian Fortified Stone Walls: Angkor Thom (Cambodia), Ho Citadel (Vietnam) and Ratu Boko (Indonesia)'* that *"According to the ancient Chinese texts referring to architecture and urbanism, the ideal city consisted of a square, a theory which may have derived from the belief that the heavens were round and the earth was square. And just as the earth has four cardinal points, also the city should have gates in those directions, connected by main roads which would serve as the central axis for arranging the inner space according to a grid pattern, symbol of order etc. Thus, Feng Shui recommended to locate cities on level land with a river in the front and a mountain behind. In the capitals, the imperial palace should be placed in a pre-eminent position, which varied from the centre to the north depending on the historical period."*[4] (figure 1.18 and 1.19)

The papers showed that the city form often were quadrangular plan, thick walls, wide moats in ramparts for example Angkor Thom (Cambodia), Ratu Boko (Indonesia), Ho Citadel (Vietnam), Beijing (China), etc. There were monumental gates in all the main points often covered with arch type and provided with wooden upper structures.

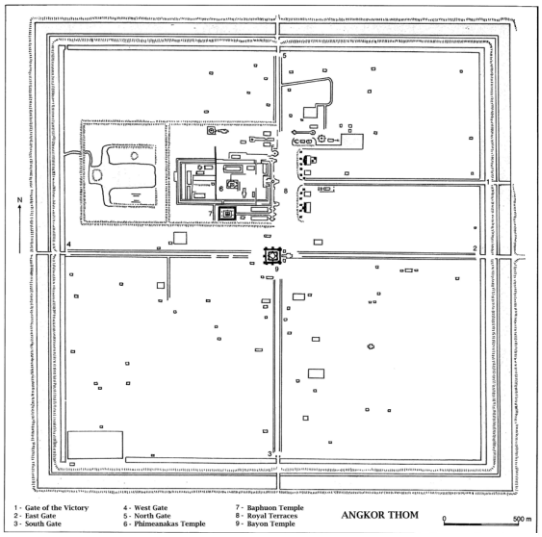


Figure 1.18 Angkor Thom plan, Cambodia (source: Víctor Lluís Pérez Garcia, op., cit., p. 240)

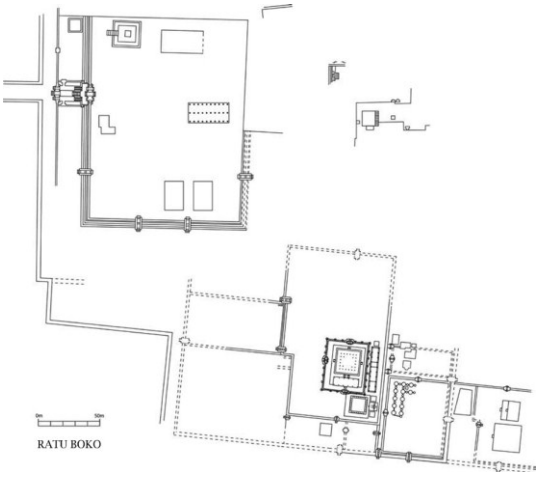


Figure 1.19 Ratu Boko plan, Indonesia (source: Víctor Lluís Pérez Garcia, op., cit., p. 243)

[3] Marten Kuilman, *Quadralectic Architecture*, ISBN 978-90-814420-0-8, Falcon Press, 2013.

[4] Víctor Lluís Pérez Garcia, *South-East Asian Fortified Stone Walls: Angkor Thom (Cambodia), Ho Citadel (Vietnam) and Ratu Boko (Indonesia),* Journalist, ResearchGate, vol. 28, 2016.

Charles M. Nelson (1988) remarked on the 'square form' in Chinese cities in his article on '*Urban Planning in Pre-Industrial China*' that *"The synthesis of these four principles led, in the pursuit of urban planning, to Han reinterpretation of the Zhou li, an ancient document attributed to a statesman of the early Zhou period (ca. 900 BC). This synthetic Han view established an elaborate structural and organizational ideal which has been a major influence in the development of all subsequent traditional cities in China. The ideal capital city is a perfect square, each nine li on a side, bisected by a central meridional axis so that it forms the ideographic character for earth and China, and models the structure of the earth which the Han thought to be square."*[5](figure 1.20 and 1.21)

The oriental ideal city had often a rectangular shape with gates. The layout of city was built following a uniform urban planning, dominated with a central axis went through from north to south.

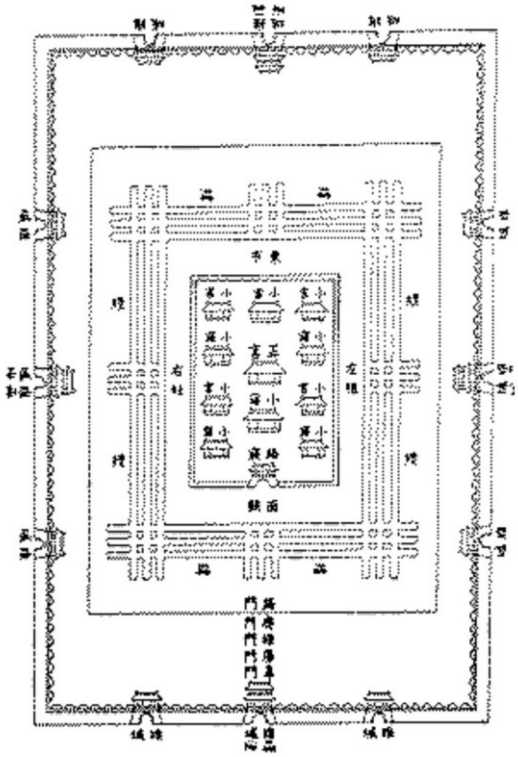


Figure 1.20 The ideal structure of the capital as conceptualized during the Han dynasty (source: Paul Wheatley, *The Pivot of the Four Quarters*, Aldine, 1971).

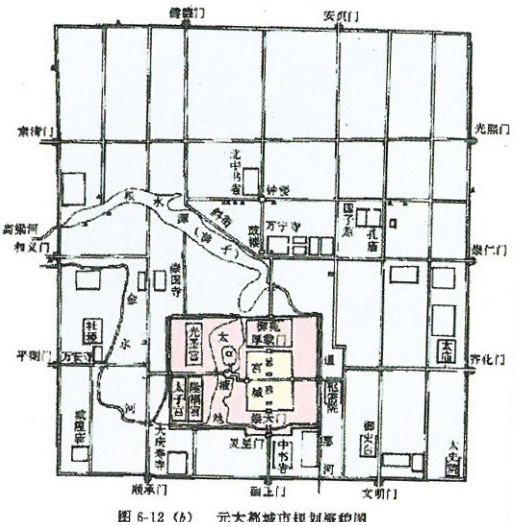


Figure 1.21 The plan of the Dadu or the Great Capital of Yuan Dynasty (source: Linan LIU, *Old Beijing: Capital of Five Dynasties and Her Five Characteristics,* in "*Knowledge and Architectural Design in Beijing*," Fausto Pugnaoni, Cecilia Carlorosi, Giovanni Issini, Sino-Italian Workshop on knowledge and architectural design, Polytechnic University of Marche - Italy and Beijing University of Civil Engineering and Architecture, Italian Embassy, Giancarlo Ripesi Publisher, Ancona, Italy, 2011, p. 38)

1.2.2 City structure

The oriental ancient city structure was normally organized following the order of universe with the cosmos elements and symbolism of city. It also applied the Feng Shui principle, orientation auxiliary axis, and function of the center in urban design.

[5] Charles M. Nelson, *Urban Planning in Pre-Industrial China, US*- China Review, Vol. XII, No. 2, pp. 17-21, 1988.

Marten Kuilman (2013) mentioned 'city structure' in his article on paper *'Quadralectic Architecture'* and Paul Wheatley (1971) remarked 'symbolism of city planning' with his book *"The Pivot of the Four Quarters'* that *"It deals with the genesis of the city and the diffusion of city life during the Shang and Chou dynasties in China. The function of ceremonial centers is highlighted. The cultures of Meso-America, Central Andes, Africa, Mediterranean, Asia and eastern North America are brought together in a cross-cultural approach to search for a chronology of urban genesis. Finally, the cosmo-magical elements and symbolism of city planning (geomancy, orientation, axiality and the function of the center) are discussed."*[6] (figure 1.22 and 1.23)

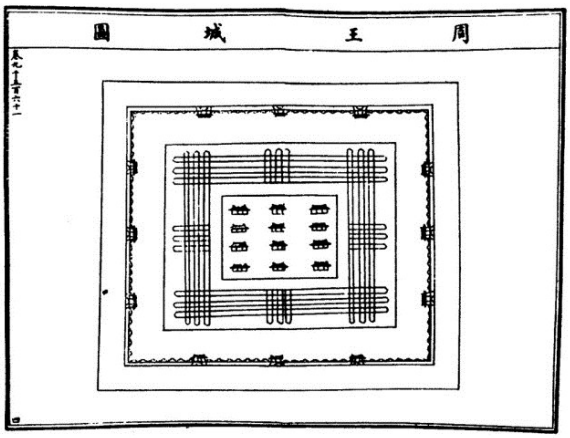


Figure 1.22 The plan of the ideal city of Wang-Ch'eng followed a canonical plan as it was laid out in the *K'ao-kung Chi* (or *Kaogong Ji*, Record of Trades, presumably written in the first century AD), which is part of the Ritual of Zhou (source: Marten Kuilman, *Quadralectic Architecture*, ISBN 978-90-814420-0-8, Falcon Press, 2013)

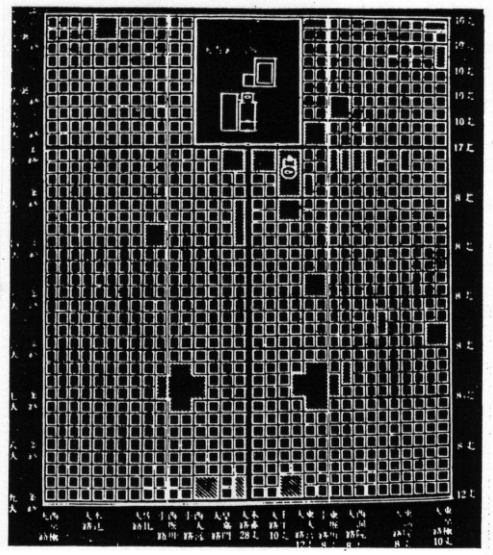


Figure 1.23 Heiankyo (Kyoto, AD 784) was a Japanese centralized town modeled after the Chinese city of Changan (Xi'an) (source: Marten Kuilman, op. cit.)

Marten Kuilman (2013) mentioned the 'cosmological order' and 'Feng Shui' that *"The traditional concept of Chinese urban planning reflects a cosmological order based on Confucian ethics and Feng Shui (geomancy). The former seeks a rational order with an emphasis on the centrality of relationship, while the second was focused on a harmony with nature. The 'science' of Feng Shui may literally point to 'wind and water'. It can be a 'mere short-hand for an environmental policy of "hindering the wind and hoarding the waters" (FIELD, 1998)."*[7]

Figure 1.24 and 1.25 show the order and meaning of the each element in main axis of city model according to the Feng Shui principle. Each country has a little different meaning basing on the local place and culture but all were always following the main axis to express the meaning of elements.

[6] Marten Kuilman, *Quadralectic Architecture*, ISBN 978-90-814420-0-8, Falcon Press, 2013.

[7] https://quadralectics.wordpress.com/4-representation/4-1-form/4-1-3-design-in-city-building/4-1-3-3-the-squarerectangular-model/

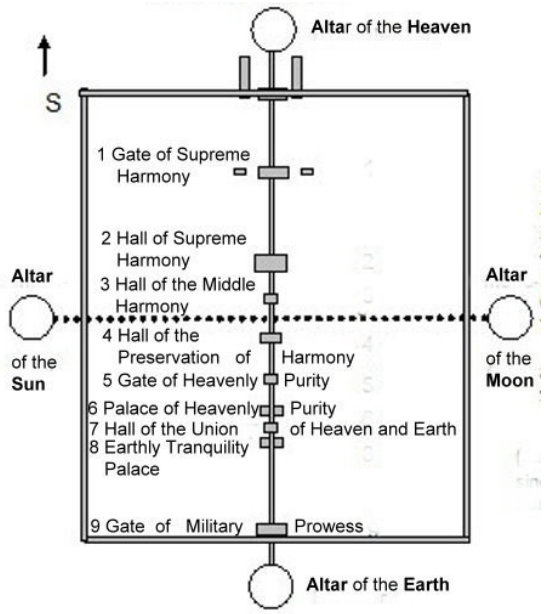


Figure 1.24 Structure of ancient city according to universe opinion (source: Hoang Nghiem (严黄), *What is the Forbidden City and its relevance to Chinese History?,* 2018)

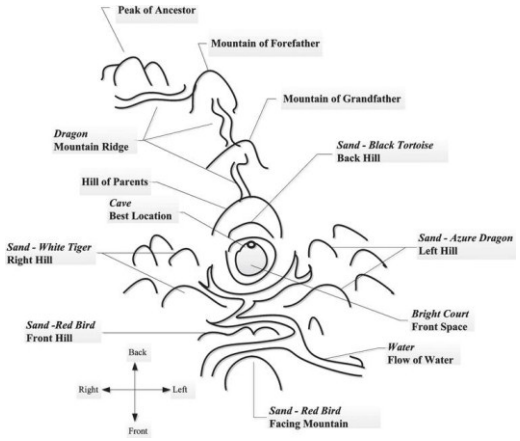


Figure 1.25 City image from Feng shui principle (source: Yi Ding, Yu Lu, Hong Yong, *Geomancy and the selection of architecture placement in ancient China,* Hebei: Hebei Science and Technology Press; 1996 [in Chinese])

Víctor Lluís Pérez Garcia (2016) mentioned the 'major axis' and 'center function' in his artical on paper *'South-East Asian Fortified Stone Walls: Angkor Thom (Cambodia), Ho Citadel (Vietnam) and Ratu Boko (Indonesia)'* that *"According to Indian technical treatises on architecture and urbanism (vastu-shastras) compiled in the Antiquity and influential until the arrival of Muslims, a military camp, fort, village or town, either circular or square in plan, should be encircled by ramparts and moats and were supposed to have two major axial roads aligned with the four cardinal points. A capital city not only served as the political center of the state and the seat of the monarchy, but also it was a representation of the whole Indian universe, like a microcosm. The main temple was a replica in the Earth of the mythological Mount Meru, and the whole city was erected around it. Hence, the main temple was installed at the central crossing of the two axial roads, while the king palace to its north etc. Angkor Thom is a perfect example of this conventional foundational plan of a Hindu capital city."*[8]

The Chinese and Japanese cities applied the the square and rectangular layout which was part of a wide range of city plans.

Marten Kuilman (2013) mentioned the 'imperial palace position' that "*The 'Forbidden City' in Peking (Beijing) was built in a similar fashion as Xi'an, but the two cities have also fundamental differences (Steinhardt, 1986; Kostof, 1995). Xi'an (Chang'an) under the Tang dynasty (7th – 9th centuries) had the imperial palace at the north end of the central axis. Beijing and its capital scheme were of a much later date. It seemed that the Mongol ruler Khubilai Khan revived the old scheme in 1267, when he built his Mongolian capital Dadu on the present location of Beijing, just to confer his legitimacy of his non-Chinese regime. The later building of Beijing retained the resurrected type and the conservative Ming dynasty held on to the classical cosmology used for town planning. The palace is in Beijing in the*

[8] Víctor Lluís Pérez Garcia, *South-East Asian Fortified Stone Walls: Angkor Thom (Cambodia), Ho Citadel (Vietnam) and Ratu Boko (Indonesia),* Journalist, ResearchGate, Vol. 28, 2016.

center of the city."[9] Figure 1.26 showed the position of imperial palace was on the main axis, the end of axis or the center of axis in Chines cities.

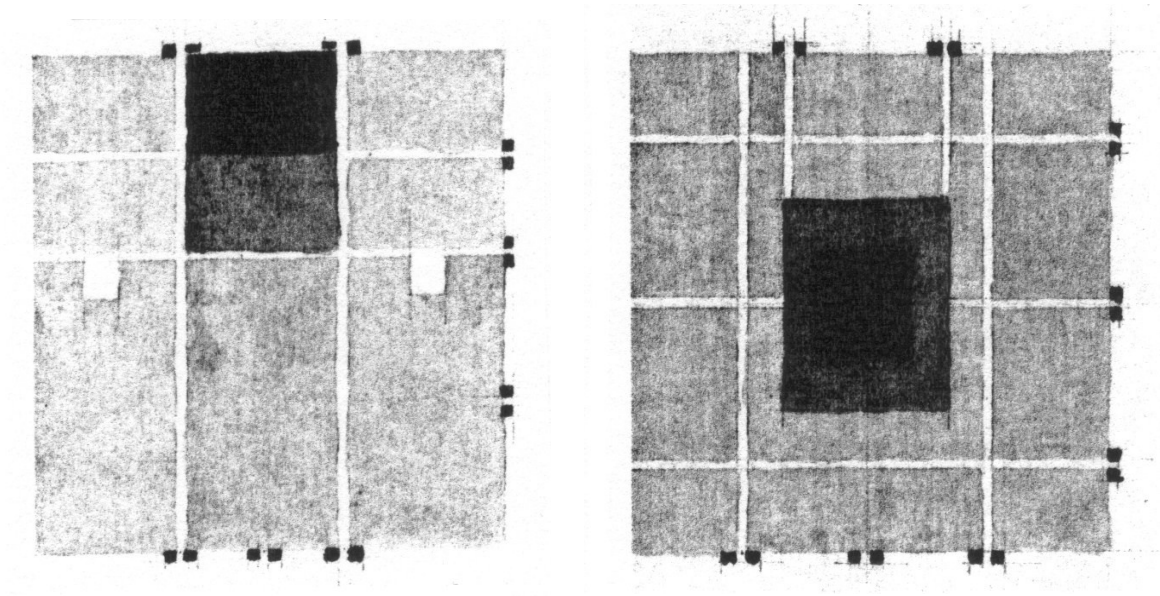


Figure 1.26 The two ancient schemes for Chinese imperial capitals, according to Spiro KOSTOF (1991). The royal palace of Chang'an is situated on the northern site of a central axis (left), while the palace takes a central position in the plan of Beijing (right) (source: Spiro Kostof, Richard Tobias, *The city shaped: Urban patterns and meanings through history,* Edition Thames and Hudson, London, 1991)

Figure 1.27 showed the structure of outer city of Chang-an. The main axes divided outer city into four quarters as districts. There were twelve city gates, these gates define a grid work of major street structure. Palaces, administrative city, temples, ancestral halls, markets, residence, parks were in specific spaces within the city in accordance with their culture and political functions following to the cosmos structure.

The analysis data showed the ideal city structure with the meaning of elements and symbolism of city as well as the orientation axis, and function of the center in urban design. The ideal capital city is a perfect square, central axis so that it forms the ideographic character for earth, and models the structure to be square. The palace city is at the center, surrounded by an administrative complex and finally the outer city, mirroring the division of the universe into three levels as well as symbolizing the moralist division of oriental society into the emperor, scholar-administrators, and commoners.

[9] Marten Kuilman, *Quadralectic Architecture*, ISBN 978-90-814420-0-8, Falcon Press, 2013.

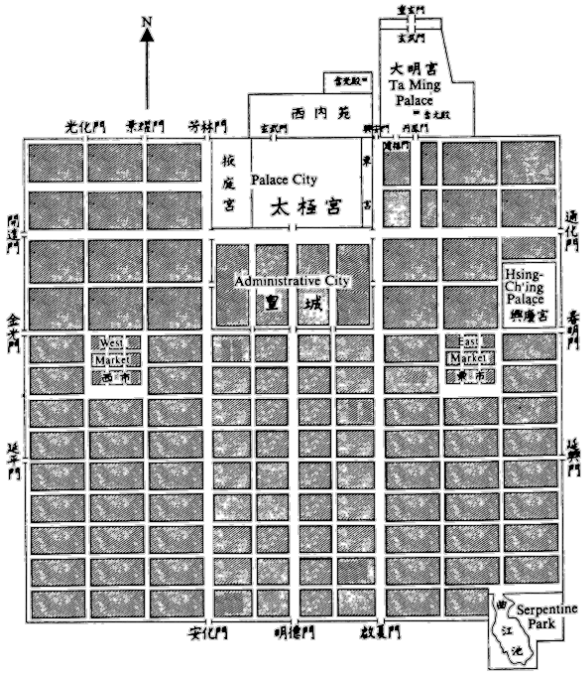


Figure 1.27 The Tang capital of Chang-an, (source: after G.W. Skinner, *The City in Later Imperial China*, Stanford University Press, 1977)

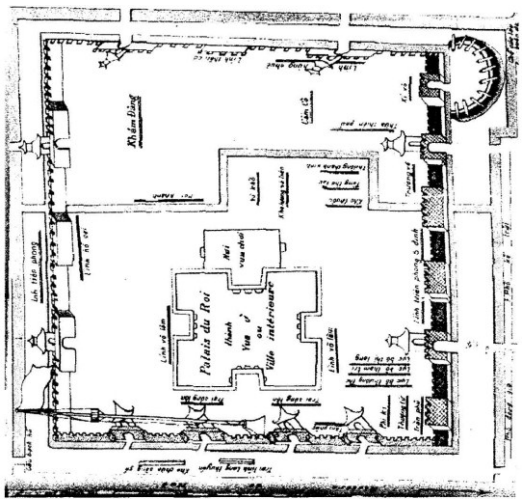


Figure 1.28 Map of Hue Citadel (simple drawing by Nguyen Thu) (source: Ardant du Picq, *Bulletin des Amis du Vieux Hué,* translator: Ha Xuan Liem, Thuan Hoa Publisher, Vol. XX, 1933, Hue, p. 82)

1.3 The process of extension urbanism of some Cities in Italy, France, China and experience lessons

The urbanization is inevitable process of the rules of development. However, each of cities has different urban expansion. Look at some cities in the world, the image of city created its identity. Rome, Paris, Beijing are the complex of characteristic monuments while Amsterdam and Venice have special water system. The experience is from the analysis some beautiful cities such as Rome, Paris, Amsterdam, Venice, Ancona, and Beijing to understand their characters which have made these cities better. They were divided into two groups as natural eco-system and urban heritage to analyse the character of city. The survey data show that the cities of the Eastern and Western country, despite their different resources, have similar characters, in addition to their defensive functions, but also towards their significance. Table 1.2 shows that Vietnam Citadel is combination of characters between Western cities and Eastern cities.

Table 1.2 Similar characters of citadel architecture between Vietnam and Italy, France, China

	Character	Vietnam	Italy	China	France
Natural element	**Natural eco-system**				
	Relation with topography	x		x	
	River system	x		x	
	Lake	x			
	Green	x			x
	Square	x	x	x	x

Fortification	**Urban heritage**				
	Wall	x	x	x	x
	Star fort	x	x		x
	Shooting wall	x	x		x
	Multiple rampart layers	x	x	x	x
	Defensive road	x	x	x	x
	Defensive moat	x	x	x	x
	Geometry form	x	x	x	x
	Chess-broad street system	x	x	x	x
Orient tradition	Royal palace	x		x	
	Garden house	x		x	
	Altar, Temple	x	x	x	x
	Community house	x	x	x	
	Feng-Shui principle	x		x	

Thus, it is very important to understand the main elements which kept the identities of these cities in the urbanization. These lesson experiences are very useful for the urban planning development in Vietnam.

a. Rome-Italy

From a city of one million people with a system of ancient buildings, Rome in the early years of the 15th century was only a ruined city with a population of 30,000 people.

Rome's reconstruction revolutions focused mainly on the Vatican area, the Capitol Hill area, the new streets, the Campus Martius area, and the famous hills area. In the 15th-16th centuries, Rome attracted a great number of outstanding artists and architects of the Renaissance who revived the appearance of Rome's urban architecture.

There were two main points. The first point was to promote the role of the Church through the restoration and construction of a large-scale church system, in addition to enhancing the heritage values of the rest of the ancient architecture. The second point was emphasis only the church's role, did not attach importance to the architectural heritage of the past. The first point was proper with the basic idea of the Renaissance in the early (15th century). The thought of respecting the past raised the issue of preserving the architecture. The second point developed at the end of the Renaissance (the end of the 16th century)

Pope Nicolas V had the opinion as the first point, proposing to focus on restoration and transformation of the function of ancient buildings, adding to the new urban architecture towards the Renaissance style. Rome became the 'Museum', a place where had many styles and ancient styles, medieval and Renaissance styles which coexisted together.

It was works such as restoring urban technical works such as the system of walls, roads, bridges and water supply systems; the utilizing and incorporating new functions into important ancient buildings such as transforming Hadrien's tomb into a castle, transforming the Pantheon into a church, Capitol into the administrative center; Restoring Catholic churches and the construction of a Vatican Hill being near St. Pietro's Basilica to the center of the Christian church.

At the end of the 16th century, Pope Sixte V (1585-1590) implemented a large-scale reconstruction of Rome, and emphasized the dominant role of the Church.

- Improving the Vantican area: expanding the library, adding more decorative details. Reconstruction and expansion of St. Pietro's Church, creating a new street axis connecting the whole square to the city (figure 1.30).
- Building a new church system, scattered throughout the city and along the Tiber River.
- Expanding and building more new roads.
- Creating new building, especially production building, requiring a lot of area and space. No hesitating destruction the ancient monuments.
- Expanding construction on the hills of Rome.
- Expanding the suburbs by using garden house systems to create large green areas.
- Building more water supply system.

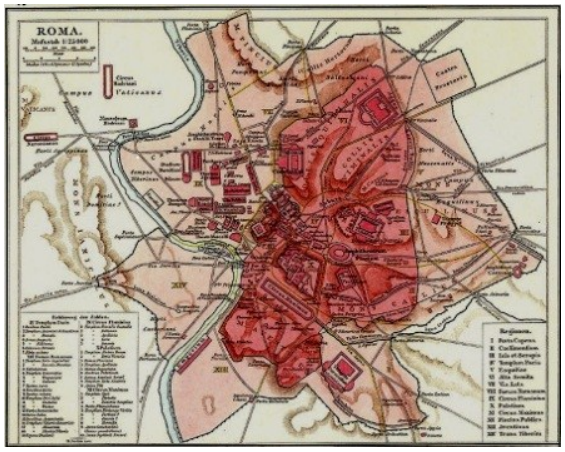


Figure 1.29 Ancient Rome (source: https://www.exurbe.com/the-shape-of-rome/)



Figure 1.30 Rome in 1585 (source: Antonello Alici, Giovanni Bellucci, *History of contemporary Architecture,* lecture, Polytechnic University of Marche, 2016)

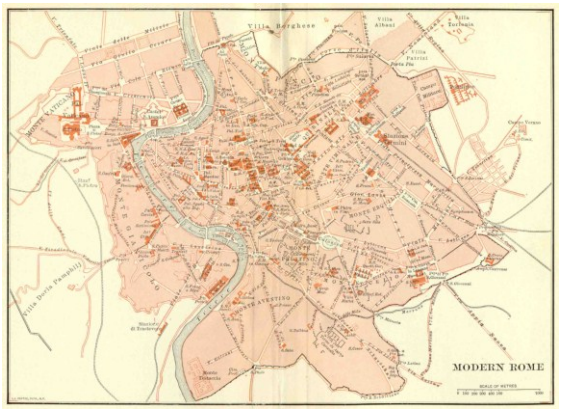


Figure 1.32 Modern Rome (source: http://www.artnews.com/2015/09/29/morning-links-ancient-rome-edition/)

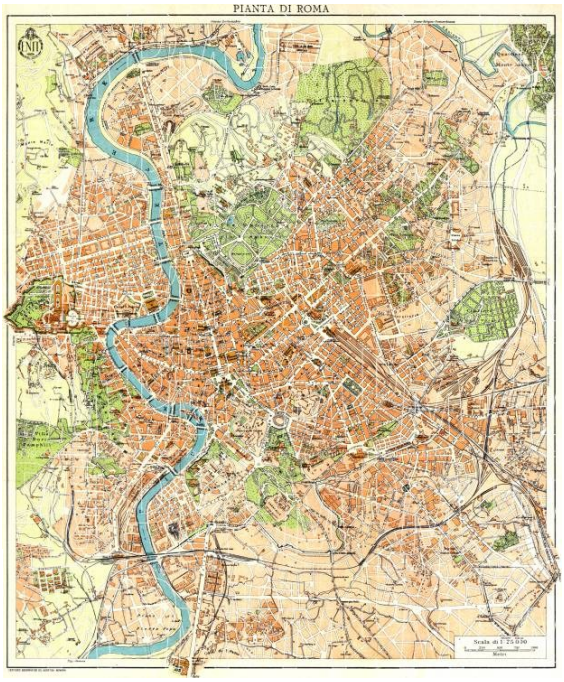


Figure 1.31 Rome in 1933 (source: https://www.discusmedia.com/maps/rome_city_maps/6514/

Basing on two major points in construction, the Rome today becomes the 'Museum' with many ancient styles, medieval and Renaissance styles which coexisted together (figure 1.31 and 1.32).

b. Paris-France

In medieval period, Paris was a large city in Europe with an area of 440 ha, population of 100,000 people. The city was part of the citadel built by King Charles V in 1370, consisting of three main components (figure 1.33):

- Small Island on the Seine.
- The Latin Quarter on the left bank of the Seine.
- A town of crafts and commerce on the right bank of the Seine.

In the 16th century, Paris continued to extend city with a population of 300,000 people. Then the devastating religious war lasted from 1589 to 1594 severely damaged the city.

In the early 17th century, Henri IV implemented a large-scale renovation of Paris. The program includes:

- Expanding the medieval citadel to the right bank of the Seine.
- Reorganizing the street system and infrastructure of urban drainage.
- Building some Baroque-style squares.
- Expanding the Louvre Palace.

After process of reconstruction and expansion in the 17th century, Paris became an open city, no longer closed as it had been for centuries. The population of Paris, in 17th century was 500,000 people and the area was 1,200 ha.

The urban structure of Paris 17th – 18th century had the following the characters (figure 1.34):

- Many large-scale urban architectures were scattered.
- Urban architectural general were independent, fully researched, designed and built in the spirit of the Baroque style.
- Independence and the scattered construction of urban architecture had created the characters of the urban morphology of Paris as an intervening between rural landscapes and urban landscapes, moreover being short of harmonious relationship and the tight organization of a unified urban entity.



Figure 1.33 Paris in the Renaissance (source: https://arteofthebooke.com/products/renaissance-map-of-paris-france-16th-century-city-map-fine-art-reproduction-mp011)



Figure 1.34 Paris in 1857 (source: http://www.arthistoryarchive.com/arthistory/architecture/Haussmanns-Architectural-Paris.html)

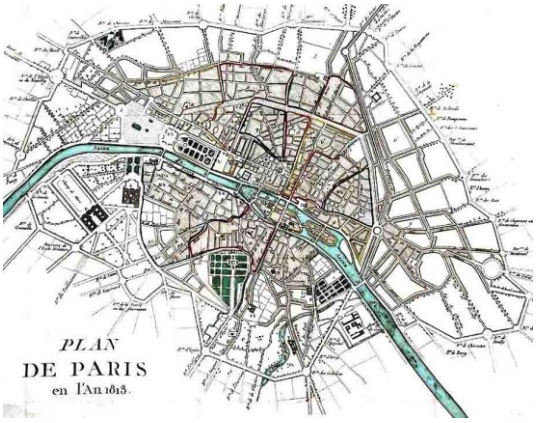


Figure 1.35 Paris in 1813 (source: https://in.pinterest.com/pin/446982331741679523/)



Figure 1.36 Map shows age of buildings in Paris (source: http://geoawesomeness.com/map-shows-age-buildings-paris/)

The scattered independence cities with combination of design opinions have created the identity of Paris today. Besides, the harmony is between the landscapes and heritages make the unique urban complex perfect (figure 1.35 and 1.36).

c. Amsterdam-Netherlands

The Netherlands has harsh natural conditions, low terrain so that it often had to cope with tides and storms. Amsterdam was founded about year 1300, from a small fishing village on the marshes. Since 1600 Amsterdam became an important commercial and economic center of the Nordic region with a population of about 50,000 people. The city had an area of about 750 ha, was developed on a canal system with three main converging canals: Herengracht Canal, Keizersgracht Canal and Prinsengracht Canal. The combination with the road, the canal system created the land plot being narrow and long. In addition to the housing architecture, some plots of land were used for the construction of churches, markets and parks. The city had half a circle and was protected by an 8 km long citadel with 26 bastions and 7 main gates (figure 1.36).

The urban planning was designed by architect Pieter Bast in 1597 and was supplemented by other architects such as Balthasar Floriszoon in 1625, architect De Ram in 1690. Chief architect Daniel Stalpaert (1615- 1676) was the implementer of planning intentions. Specific work was the embankment of three main canals, construction of shops and large residences for merchants along the main canals, preparation of the west area - Jordaan area to build factories, other areas to build housing for migrant workers (figure 1.37).

Ordinance on construction in 1665 states as follows:

- Lot of construction land was 8 x 55m.
- The construction area might not exceed 56%.
- In the residential area, it was strictly forbidden to build works of iron, forging, stone making, soap making, etc.
- Specifying types of materials which were required for each type of works.

Amsterdam developed in the 17th and 18th centuries. Population was from 50,000 in 1600 to 170,000 in 1650 and 200,000 in 1700.

The identity is the canal and water as the unique landscapes for the city. The urban structure is organized basing on the water system. The urban characters are closely linked

with the water system, which is a valuable lesson for urban development and expansion. This is a specific feature of the identity of urban design.

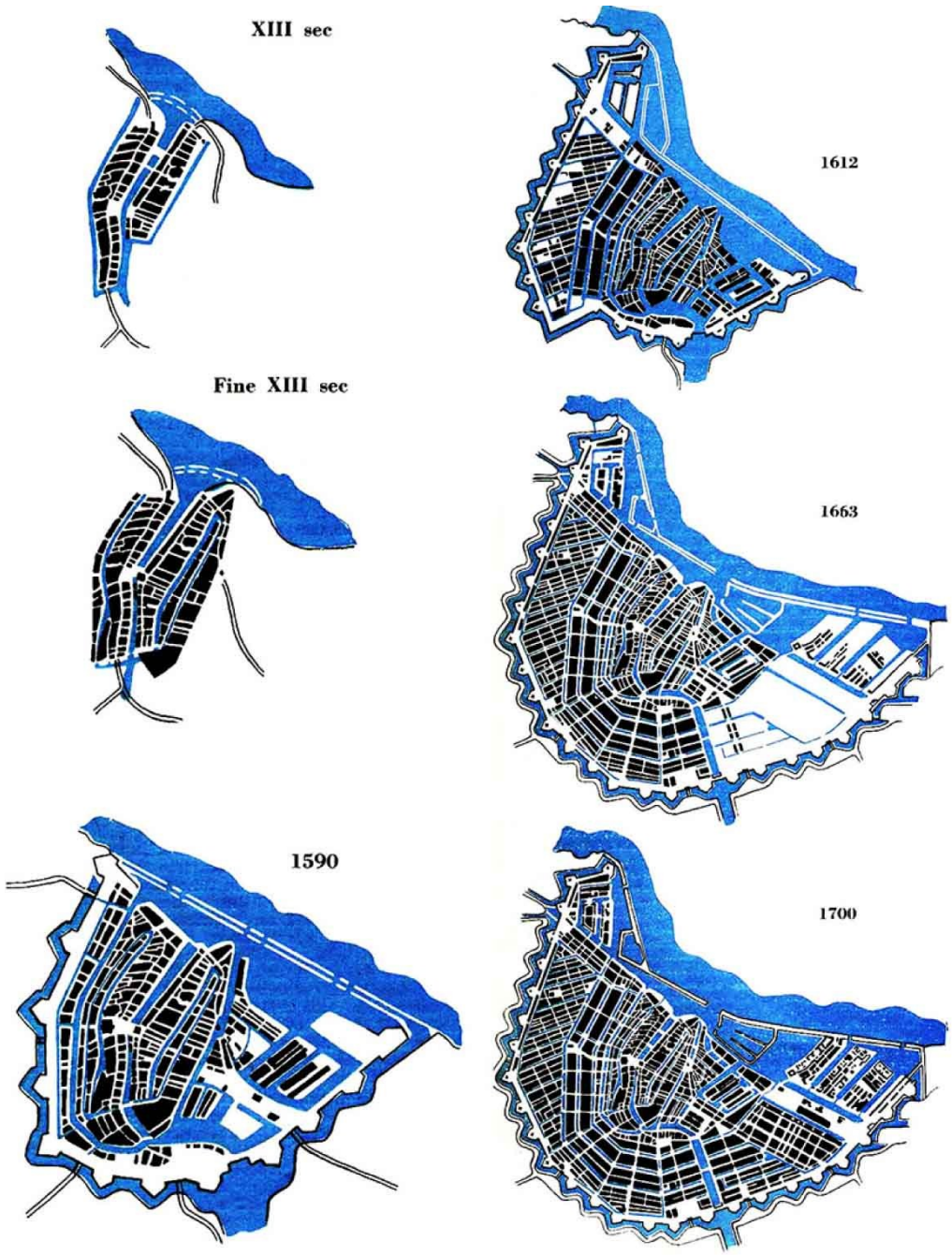


Figure 1.37 The process of extension of Amsterdam (source: Antonello Alici, Giovanni Bellucci, *History of contemporary Architecture,* lecture, Polytechnic University of Marche, 2016)

d. Ancona-Italy

Ancona, Capital of the Marches Region, lies on Monte Conero. Founded by the Greeks, the city experienced remarkable development when the Emperor Hadrian extended the small port for great strategic importance of the traffic across the Adriatic.

Split into two parts consist the historic center on Monte Guasco and the modern part on the coast. The historic center had a lot of monuments such as the Cathedral of San

Ciriaco, the National Archaeological Museum of The Marches, the 11th - Century Church of Santa Maria della Piazza (the Romanesque origin), Trajan's Arch (year 115), and the Mole Vanvitelliana (a military construction in the 18th century), the Roman Amphitheatre (1st century AD). Besides, is had also the Citadel as a military building belonging to the Renaissance Age, it was realized during the 1532 on the top of the hill Astagno by the architect Antonio da Sangallo the Young. The Citadel was one of the most gorgeous landscapes of Ancona.

The process of expansion of Ancona urban planning kept the old part and extents some areas along of the coast and then to the south (figure 1.38 and 1.39).

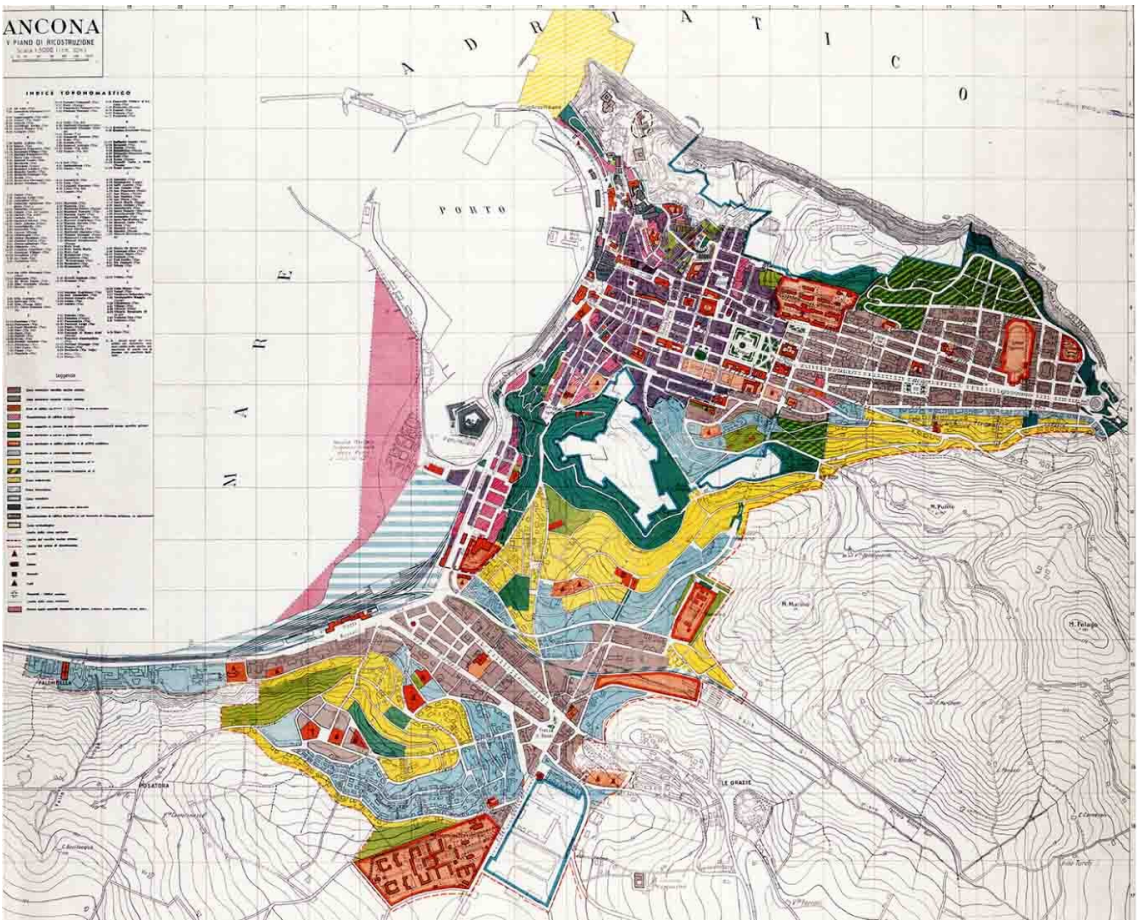


Figure 1.38 Ancona Citadel plan of reconstruction in 1945-1956 (source: Antonello Alici, Giovanni Bellucci, *History of contemporary Architecture,* lecture, Polytechnic University of Marche, 2016)

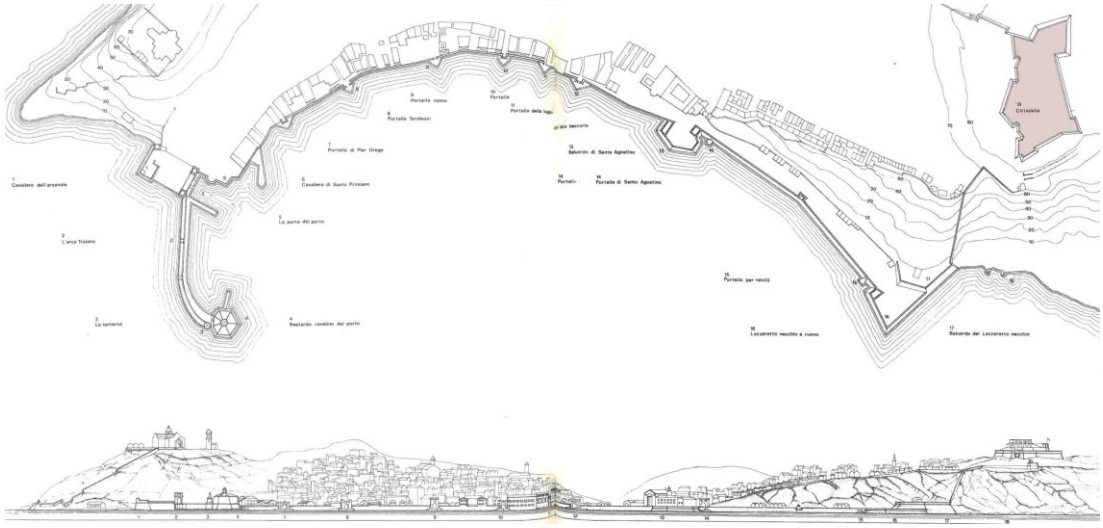


Figure 1.39 Ancona Citadel with the urban expansion (source: Carlo Mezzetti, Fausto Pugnaloni, *Dell'architettura militare: l'epoca dei Sangallo e la Cittadella di Ancona,* published by Università di Ancona, Facoltà di Ingegneria, Istituto di disegno e composizione, 1984, p. T43)

e. Beijing-China

According to Linan LIU (2011) in his paper *'Old Beijing: Capital of Five Dynasties and Her Five Chracteristics'*[10] that the history of urban formation in Beijing could be dated from the 5th century BC when small Marquis of Yan unified the territory of the Marquis of Ji, creating the Ji City, new capital during the Warring States Period (475-221 BC).

Figure 1.40 shows the transformation of Beijing which was as the capitals of five dynasties from 10th century to the early of 20th century. The Khitans of the Liao Dynasty (916-1125 occupied Ji and made it as their second capital, Nanjing City. It was reconstruction project of new palaces so that the capital was the wall city with 18 km^2 in dimension.

In the early 12th century, the Jurchen totally conquered the Liao and established the Jin Dynasty (1115-1234). In 1153, the Jurchen moved the Jin Capital to Nanjing of the Liao and renamed it Zhongdu. The reconstruction in large scale of the new city expanded the wall to the east, west and south. The new expanded city was determinate to 5 km in circumference with approximately one million people.

In 1271, Kublai Khan founded the Yuan Dynasty and rebuilt the new city during 30 years, named Dadu-the political center for vast empire. The Dadu was a rectangular city wall over 50 km^2 in area and more than 30 km in circumference with eleven gates. It had a central axis through from north to south, large main streets.

In 1368, Ming military invaded the Dadu and renamed the Beijing City. In 1421, the Emperor Yongle moved his capital from Nanjing to Beijing and official named the Bejing City. The large reconstruction was implemented in the large scale. The urbanism of Beijing basically formed in the Yuan Dynasty, after urban expansion during the Ming and Qing

[10] Linan LIU, *Old Beijing: Capital of Five Dynasties and Her Five Characteristics*, in "*Knowledge and Architectural Design in Beijing*," Fausto Pugnaoni, Cecilia Carlorosi, Giovanni Issini, Sino-Italian Workshop on knowledge and architectural design, Polytechnic University of Marche - Italy and Beijing University of Civil Engineering and Architecture, Italian Embassy, Giancarlo Ripesi Publisher, Ancona, Italy, 2011.

made it famous with had thousands halls and twelve gates which arranged symmetrically a north-south axis. The city wall of Beijing was 32 km in perimeter and 38 km^2 in area.

The old city had experienced three major destructions (1950's, 1980-2000 phase, after 2001) in widening streets, improving urban transportation, renewal of historic sites, demolishing traditional courtyards for estate interest. Fortunately, traditional house and palaces have been kept as achievements in historical identity.

From the different approach, the Beijing City changed a lot of locations. It was not as the concept of the Western cities which emphasized visual beauty through its original material and authentic document, while the conservation principles in the Eastern and Asean cities were determined in relation to the spiritual message and naturalistic sensibilities. Old Beijing is nowadays the core of complex of Beijing even the large expansion (figure 1.41 and 1.42).

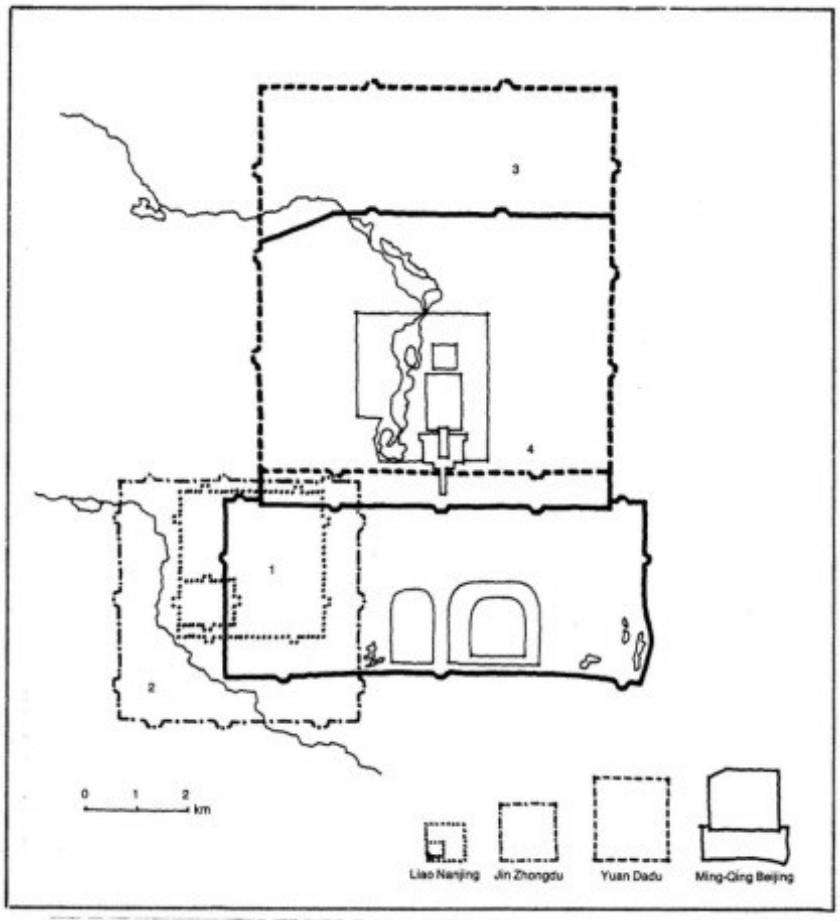


Figure 1.40 The various stages and positions of the capital Beijing through the ages. 1. Nanjing (Liao Dynasty); 2. Zhongdu (Jin Dynasty); 3. Dadu (Yuan Dynasty); 4. Beijing (Ming-Qing Dynasty) (source: Marten Kuilman, *Quadralectic Architecture*, ISBN 978-90-814420-0-8, Falcon Press, 2013)

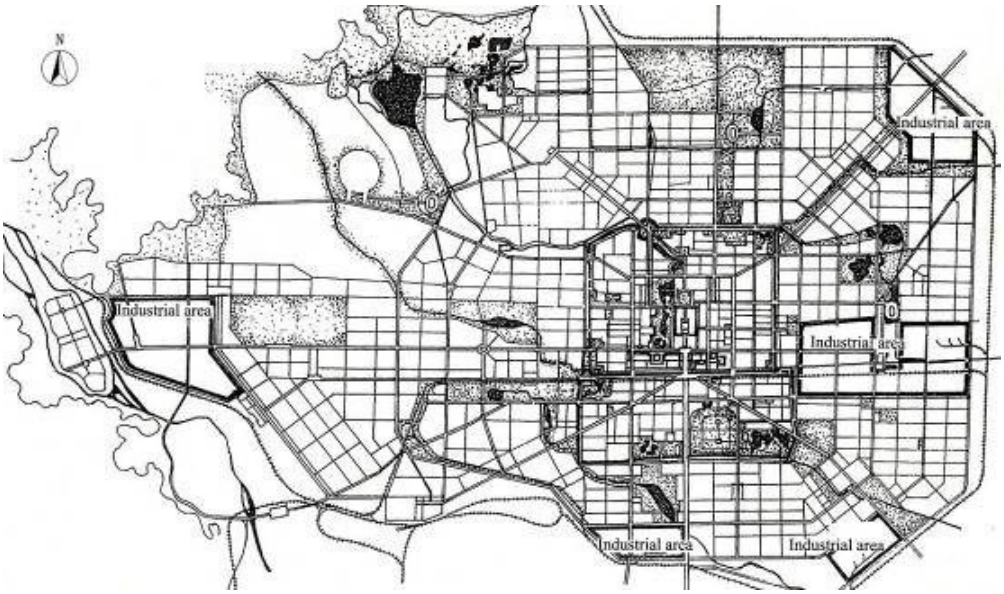


Figure 1.41 Beijing Plan in 1953 (Hua's Proposal) (source: Dong, *Historical Capital Beijing: Changes and Evolution 50 Years,* Nanjing: Dongnan University Press, p. 28, 2006)

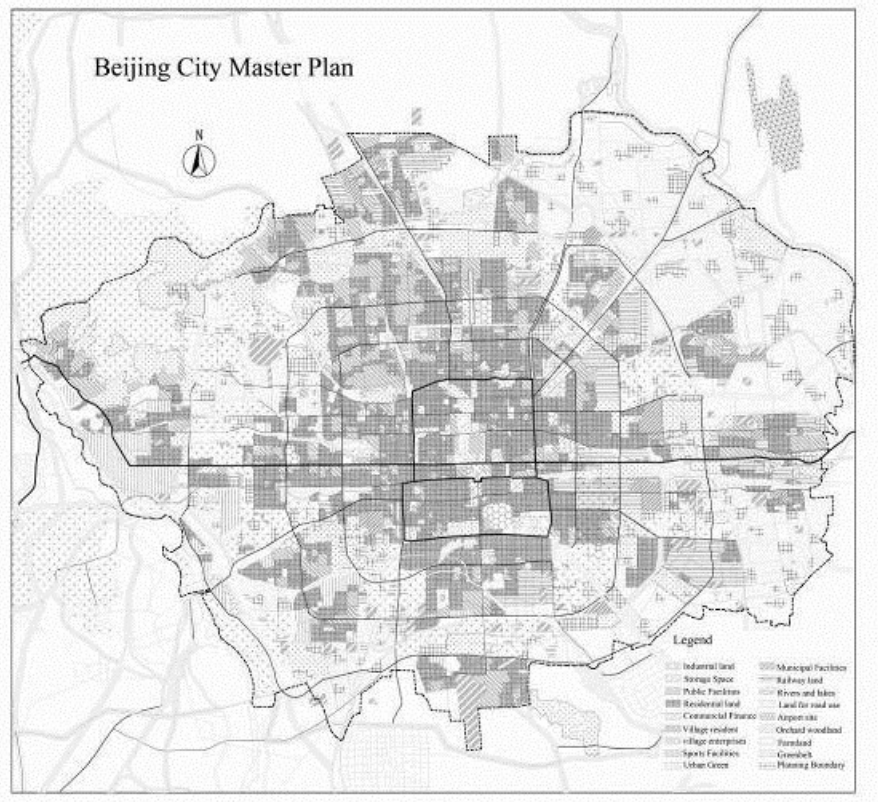


Figure 1.42 Beijing Master Plan 1992 This reaffirmed the opening up and modernization of China via links with the West (source: https://www.researchgate.net/figure/Beijing-Master-Plan-1992-This-reaffirmed-the-opening-up-and-modernization-of-China-via_fig8_265082594)

Chapter 2. History of Citadel architecture in Vietnam

2.1 Vietnam's fortification citadel history before the Nguyen Dynasty

2.1.1 General characters of Vietnam's Citadel

In the early days, the architecture of the military fortress was primitively built in simple form: just the wooden planks covering human habitation, both to protect and prevent the beasts attacking and it was also a defense against neighboring tribes.

In the meaning and character, there were not only fortifications the purpose of creating as a military base, but also the citadel the political, economic and cultural center of the country - usually the capital of feudal dynasties, such as Co Loa, Hoa Lu, Thang Long and Hue. There were also the citadels of the mandarins who ruled during the Northern domination (China) such as Lien Lau, Dai La, or the local administrative center (Nam Dinh, Son Tay, Nghe An, Bac Ninh, etc.).

Because of city was a political and military center with many inhabitants, and so the need of big consumption outside the city was inevitably forming a service area such as purchasing, selling and service activities for the life escaped production of residents in the city, it was the market. The development of this commercial relationship led all types of the population from merchants and artisans to people who performed jobs such as porters, worker, etc. at markets. They were gradually increasing the economy, leading to the formation of markets, market streets[11]. Thus, city and market, city and street had a close relationship with each other.

On construction materials of military defense architecture, the first citadels were mostly covered with soil: Co Loa (mid-3rd century BC), Me Linh. Normally, at every site where people dug the ground at this site, the excavated soil created moat system that ran around the citadel and was an important part of the same defensive structure of the citadel. In Vietnam, there were also the citadels built on the natural terrain, the river, the mountain which connected, closed as the Hoa Lu (year 968). In the next period, people used the green stone, bee stone (Ho Citadel, 1937) to build rampart, in the plain when the baked occupation, people used brick and lime to build rampart such as Thang Long Citadel (11th century), Hue Citadel (year 1803).

Vu Tam Lang mentions the 'shape' and 'structure' of the Vietnam's city in his book *'Vietnam's Ancient Architecture'* that *"Military architecture in ancient Vietnam has a layout of enough shape such as square, rectangle, regular polygon, circle, star shape, etc. and more specifically, the citadels took advantage of the natural terrain that was built without the indefinite geometric shape. Normally, it was divided into two: inner parts and the outer part (suburban), depending on the natural condition of the city which had the layout of architecture. In case of building in the capital, there might be up to three or more ramparts, the outer rampart was called the citadel.[12] etc. The outer rampart of Thang Long Citadel was Dai La, with the capital of the Nguyen Dynasty, Hue was divided into three distinct ramparts: the Citadel, Imperial City and Forbidden City. The inner city was usually used for the architecture of palace, the administrative center, the residence of the King etc. the outer area of the Imperial City was arranged military camps and houses of the resident. In general, since the Le dynasty until before the 18th century, the ancient Vietnamese citadels have been structured according to an oriental style."*[13]

[11] A lot of authors, *Vietnam's ancient City,* 1993.

[12] Vu Tam Lang, *Vietnam's Ancient architecture,* Construction Publisher, Hanoi, 2008, p. 24.

"By the end of the 18th century, the Nguyen Dynasty had colluded with the French colonialism through some of French merchants and traders such as Phillippe Vannier, Jean Baptiste, Chaigneau, De Forcans, and Olivier De Puymanel to help him design and build a series of citadels according to Vauban of Western type".[14] Vauban type was popularly applied by the Nguyen Dynasty from the late 18th century to the 19th century for all citadels' model and fortresses from north to south in Vietnam.

Besides, Vietnam's ancient city was characterized by formation of 'market' (thị) before 'city' (đô) that did not depend on the monarchy state, quite different in the West. It was this characteristic that the Vietnamese fortress did not have a fortification system as a European military architecture.

It also confirmed through Louis Bezacier was a French scholar who studied military fortification's art in Vietnam. After studying and surveying the citadels under the reigns in Vietnamese history, he has divided Vietnam's Citadel into two different types: *"The first bastion type derived from China, was built since the invasion by China (111 BC – 939) to the 18th century, such as Co Loa Citadel, Thanh Long Citadel, Ho Citadel, which were quadrangular, without bastion, without angle bastion (sans bastions ni lunettes d'angles) etc. The secondary bastion type originated from France through mediated person - Colonel Olivier de Puymanel, with the first citadel was Gia Dinh Citadel (1790)."*[15]

Figure 2.1 shows the periods of Vietnam's urban history in comparison with the process of architectural styles in Europe. Before the 18th century, the Vietnam's citadels were built according to the traditional oriental type without bastion. After the 18th century, it also was the time (1790) when the French influenced on the Vietnam's citadels and made the changes of fortification with bastion model in the citadel. These features made Vietnam's Citadels different to other citadels in the ASEAN.

[14] Vu Tam Lang, *Vietnam's Ancient architecture in Vietnam,* Construction Publisher, Hanoi, 2008, p. 25.

[15] Phan Thuan An, *Hue Citadel,* Thuan Hoa Publisher, Hue, 1999, p. 62.

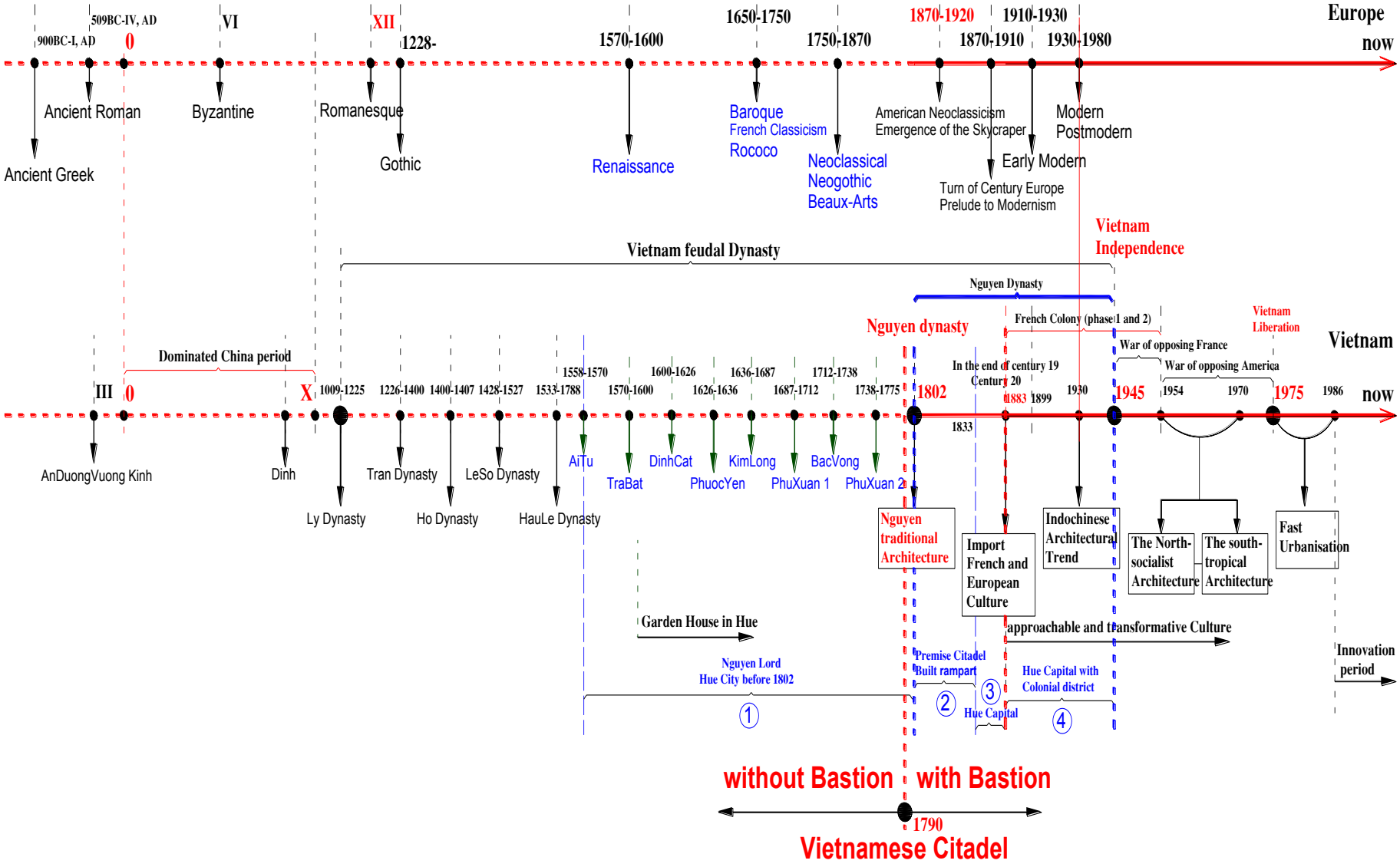


Figure 2.1 Diagram of the periods of Vietnam's urban history in comparison with Europe

2.1.2 Water system in Vietnam's Citadel

Sticking to river civilization, water element was not separated in Vietnam's city. The citadel of the Vietnamese people from the ancient time was flexible to the river, using the system of natural water as a defensive barrier. According to Prof. Tran Quoc Vuong had the general: the core of Vietnam's city always laid in a water quadrilateral, and a corner (that we called the river's gate), being a fork of the river where there were the markets on the side of river.[16]

Vietnam's cities were created from 'city' and 'market' in the riverside. When it mentioned to 'market city' or 'street city', it meant that the center was made up of city and market or city and street that were close to the river. The examples showed the close relationship between ancient city and water.

Co Loa Citadel was a combination of land ramparts with a zigzag river, but firm and special effort because it used Hoang River wrapped in the western and southern part, had a system of hills, the simple way was the connection river and ramparts to make it the solid.[17]

Hoa Lu Citadel was solid and craggy, but not much construction, because all the limestone mountains were used as walls.[18] The river system combined with mountain systems make up the city.

Dai La Citadel - Thang Long Citadel was located on the plain land, the Thang Long Citadel was full of conditions to build a square rampart. However all the kings from Ly to Tran, Le Dynasty did not forget to take advantage of the terrain of the Red River, West Lake, To Lich River.[19]

Hue Citadel with Huong River was surrounded by the east, north-east, south-east. The other sides were Defensive Moat (Ho Thanh Hao), through the middle of the citadel was Ngu Ha River, the river network was also replenished by a system of lakes. With 520 hectares of Hue Citadel, there were 43 lakes, including natural lakes, man-made lakes. The Hue Citadel was the embodiment of a water city.[20]

2.1.3 Vietnam's Citadel before the Nguyen Dynasty

a. Co Loa Citadel – Hanoi

Co Loa (the 3rd century - 179 BC) is located in Dong Anh, Hanoi, is the oldest citadel, unique structure in the history of the building of the ancient Vietnamese. Citadel was built in the natural terrain, utilizing the height of the hills and mounds, to add more land to build two outer walls, so the two these walls had a curved line following the topography, did not be straight line like the center wall. The wall materials were earth, stone and broken pottery, etc.

Co Loa Legend had nine circular spirals, there are still only three walls. The circumference of outer wall was 8 km, the middle wall was 6.5 km, inner wall was 1.6 km, and the central area was up to 2 km². Wall was built by the method of excavation to where, the ditch to that; the embankment to where, built to that. Outside wall was vertical

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16 Tran Quoc Vuong, *Vietnam Culture,* Ethnic Culture Publisher, Hanoi, 2000, p. 467.
17 Do Van Ninh, *Vietnam's ancient Citadel,* Technique Science Publisher, Hanoi, 1983.
18 Do Van Ninh, op. cit.
19 Tran Hung, Nguyen Quoc Thong, *Thang Long Hanoi - Ten centuries of urbanization,* Contruction Publisher, 1995.
20 Tran Duc Anh Son, Vu Huu Minh, The *lakes in Hue Citadel,* Thua Thien Hue Science and Technology Information, 1993, No. 2, pp. 11-20.

slope, inside wall was inclined for defense. Average wall height was from 4 m-5 m, especially a height of 8-12 m. The width of wall sole was of 20-30 m, the width of wall was 6-12 m (figure 2.2 and 2.3).

The inner wall was rectangular shape, average height of 5 m, the wall width from 6-12 m, sole width from 20-30 m, perimeter of 1,650 m. The center wall was a natural wall, 6,500 m in length, with a maximum height of 10 m, an average width of 10 m, five gates in east, south, north, northwest and southwest. The eastern gate connected to the Red River. The outer wall was terrain-shaped, not clear shape, longer than 8,000 m, average height of 3-4 m.

There were moats around the walls, with the moat width from 10 m to 30 m. The moats were connected to each other and connected to the Hoang River. The combination of rivers, moats and walls were not a clear shape. It was a military zone which was not only good for attack but also good for defense.



Figure 2.2 Ancient Co Loa Citadel (source: http://www.hoangthanhthanglong.vn/blog/co-loa-thanh-co-va-truyen-thuyet/471)

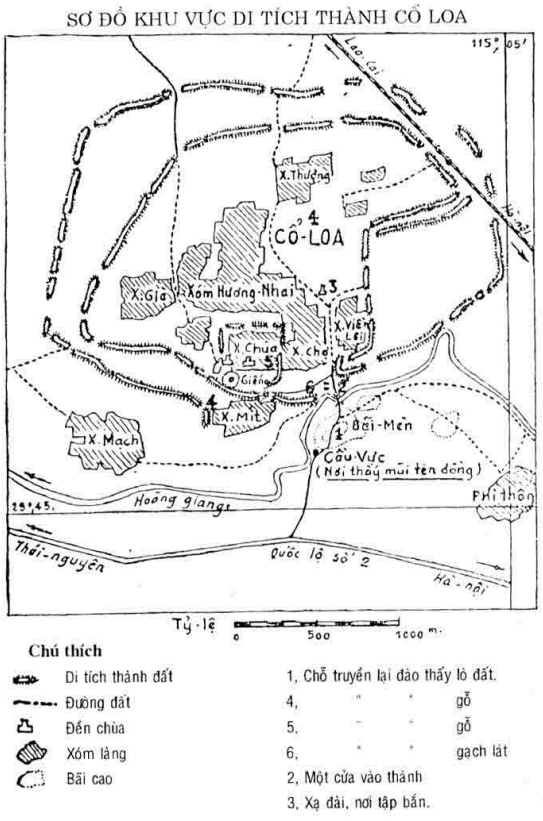


Figure 2.3 Map of Co Loa Citadel (source: Journal of historical research, No. 8, 1959)

b. Hoa Lu Citadel – Ninh Binh

Hoa Lu capital is located on the border of Hoa Lu, Gia Vien district and Ninh Binh City. It was the first capital of feudal Vietnam, 42 years (968-1010), was associated with the succession of three dynasties, the Dinh Dynasty, pre-Le Dynasty and Ly Dynasty.

Hoa Lu Citadel consisted of two adjacent walls next to each other and an adjacent mountain. The citadel was divided into three walls: East, West and South. South wall was a rugged military base, defending its back which was often referred to as the Trang An

Citadel, the second walls was the place where the palace should be called also known as Hoa Lu.

Hoa Lu capital was surrounded by many mountains, the dynasties were based on the natural terrain to build ten walls connecting the rocky mountains, with an area of over 300 ha. Hoa Lu Citadel had many entrance by road and waterway. Hoa Lu Citadel has two walls close together: the outer wall called the East, the inner wall called the West. The traffic between the two walls was very convenient. Both walls took advantage of the Chao Khe River, which flowed along the city, both as a natural moat and as a waterway, which served to move out into the city. A general citadel consisted of two separate walls, very convenient for the layout of each court, mandarin or military (figure 2.4 and 2.5).

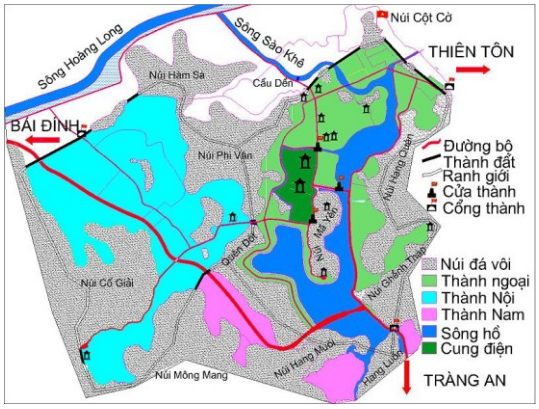


Figure 2.4 Map of Hoa Lu Citadel
(source: http://www.wikiwand.com/vi/Hoa_L%C6%B0)



Figure 2.5 Hoa Lu Citadel today

c.Imperial Citadel of Thang Long

Relic of Thang Long Imperial Citadel linked to the history of Thang Long - Ha Noi, starting from pre-Thang Long period (Annam 7th century) exist under Dinh – pre-Le period, develop under Ly, Tran, Le and exist with the name- Hanoi citadel under Nguyen dynasty

Thang Long Imperial Citadel is the world heritage. There are three special characteristics: History throughout 13 centuries, continuity of heritage as a center of power, and many relics.

Thang Long Citadel was built by the Imperial City and the Citadel. The outer wall was La Thanh, being both a defensive fortress and a place to prevent flooding of 30 km long. In this area, there were many districts, streets, hamlets, markets, etc. places where people could trade and produce handicrafts and living of mandarins. The structure of the citadel consisted of sixty-one districts, four gate markets and thirteen agricultural farms. Imperial City was a head of the state and feudal government built of brick, inside there was Forbidden City, which the place for the King and his family living. Three walls wrapped in each other, reinforced solidity, defense and protection of the building (figure 2.6 and 2.7).



Figure 2.6 Thang Long Imperial City in Ly Dynasty (source: https://vi.wikipedia.org/wiki/T%E1%BA%ADp_tin:Doan_Mon_xua.jpg)

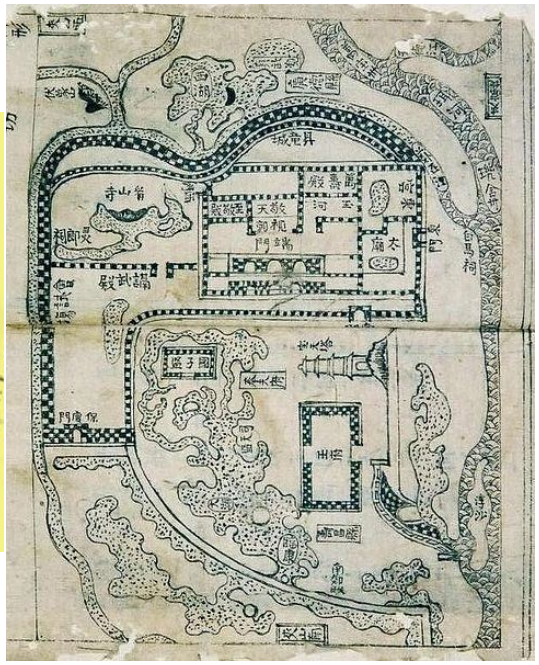


Figure 2.7 Dai La Citadel, Hanoi (source: http://www.hoangthanhthanglong.vn/en/di-tim-dau-tich-la-thanh/682)

d. Ho Citadel – Thanh Hoa

The Ho Dynasty was the capital of Dai Ngu (the national name of Vietnam during the Ho Dynasty), located on the territory of Thanh Hoa province. This was a permanent citadel with unique architecture of rocks in Vietnam, valuable, original and unique remnant in Southeast Asia and one of the few rock citadels in the world.

Citadel was built in 1397 under the Tran Dynasty led by Ho Quy Ly. Following the official history, the city was built in just three months. Citadel was in a quite craggy position, the advantage of military defense rather than political, economic and cultural center. There were rivers, mountains around, both strategic defense and promote the advantage of water transport. Citadel consisted of inner and outer city. Outer wall was made of earth with a 50 m deep surrounded moat. Inner wall was a rectangular area of 870.5 m x 883.5 m. The outer side of the inner wall was made of stone blocks of 2 m x 1 m x 0.70 m in size, covered inside earth. Four gates in the south - north - west - east direction. The gates were arched, in which the largest was the main south gate, including three arched doors of 33.8 m in length, 9.5 m in height, 15.17 m in width. The stone blocks were special large (up to 7 m long, 1.5 m high, weighing about 15 tons).

Today, these palaces, mansions in the citadel has been destroyed, the current heritages are four stone gates, wall and specially Nam Giao Esplanade of Heaven (figure 2.8 and 2.9).



Figure 2.8 The main gate of Ho Citadel today (source: http://thanhnhaho.vn/tabid/347/People-s-Committee-of-Thanh-Hoa-province-promulgated-the-regulation-on-management-protection-and-promotion-of-Ho-Citadel-World-Heritage-site%E2%80%99s-values-.aspx?ArticleId=2507&&CategoryId=357)



Figure 2.9 The general map of Ho Citadel (source: http://hanoi.citynet.vn/47139p1c25/dong-do-va-dong-quan-doi-song-xa-hoi-thoi-ho.htm)

2.2 French influence on the architecture of Vietnam's Citadel

2.2.1 Historical background, the French invasion and Western architectural import into Vietnam

a. Historical background, Western architectural import into Vietnam

While the Capitalism was flourishing in Europe in the mid-nineteenth century, then under the power of Nguyen Dynasty, Vietnam's economy was still based on agriculture, a backward decadence. Most farmers lived on agriculture, while industry and commerce were not only developing but also were restrained by feudal rules.

Through Christian evangelists, the Europeans came to Vietnam from the 16th century. They also brought architecture of monasteries and churches into Vietnam. In August 1858, the French expeditionary force attacked the port of Da Nang and then pulled into the south to invade Saigon. Nguyen Dynasty did not fight back, made concessions from three southeast provinces to six south provinces. In 1873, the French conquered Hanoi, and established their power in Indochina, implementing the colonial and semi-feudal policies. In June 1884, the Patenoote peace Treaty was signed in Hue Capital, which divided Dai Nam (former name of Vietnam) into three regions: Cochinchina which was a French colony, Tonkin and Annam under the protectorate of France with Nguyen Dynasty still nominalized in control.

In the late 19th century, the peak of these architectures was the Notre Dame Cathedral in Saigon (1880), Hanoi Cathedral (1884). Phat Diem Church in Ninh Binh was built for nearly 30 years with many items completed in 1896 was also a unique combination of European cathedral architecture with Vietnamese architecture.

According to researcher Nguyen Dinh Toan, French architecture in Vietnam had three phases as follows:

"Phase 1: 1873 - 1900. Pre-colonial architecture.

Second phase: 1900 - 1920. Colonial architecture formed and confirmed.

Third phase: 1920 - 1945. Colonial architecture developed and formed the identity. It is also possible to consider a small phase from 1945 to 1954 when France occupied Hanoi and other provinces, however the development of architecture during this period was negligible due to the war."[21]

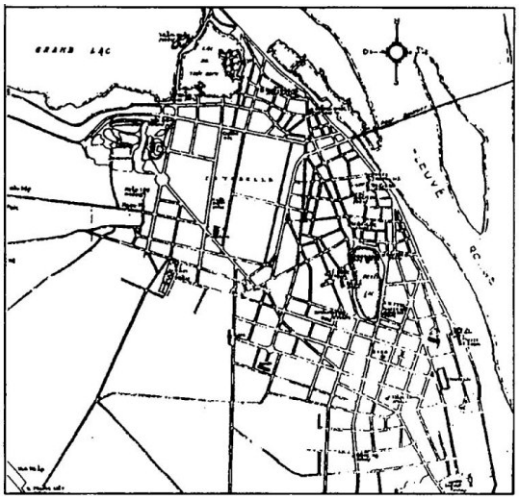


Figure 2.10 Map of Hanoi in the French colonial period (source: Nguyen Dinh Toan, *Vietnamese architecture through Dynasties,* Construction Publisher, Hanoi, 2010, p. 176)



Figure 2.11 Map of Saigon in the French colonial period in 1923 (source: Nguyen Dinh Toan, op. cit., p. 182)

The first phase 1873 - 1900

At this phase, the French started construction of solid works on the concession area, officially opening the phase for their large construction in Hanoi and the provinces in Vietnam with the method of urban construction according to European style which was imported. The overall structure was based on the principles of organizing European trade in the overseas countries with the traditional layout of symmetrical axes and streets in geometric form (figure 2.10 and 2.12).

[21] Nguyen Dinh Toan, *Vietnamese architecture through Dynasties,* Construction Publisher, Hanoi, 2010, p. 173.

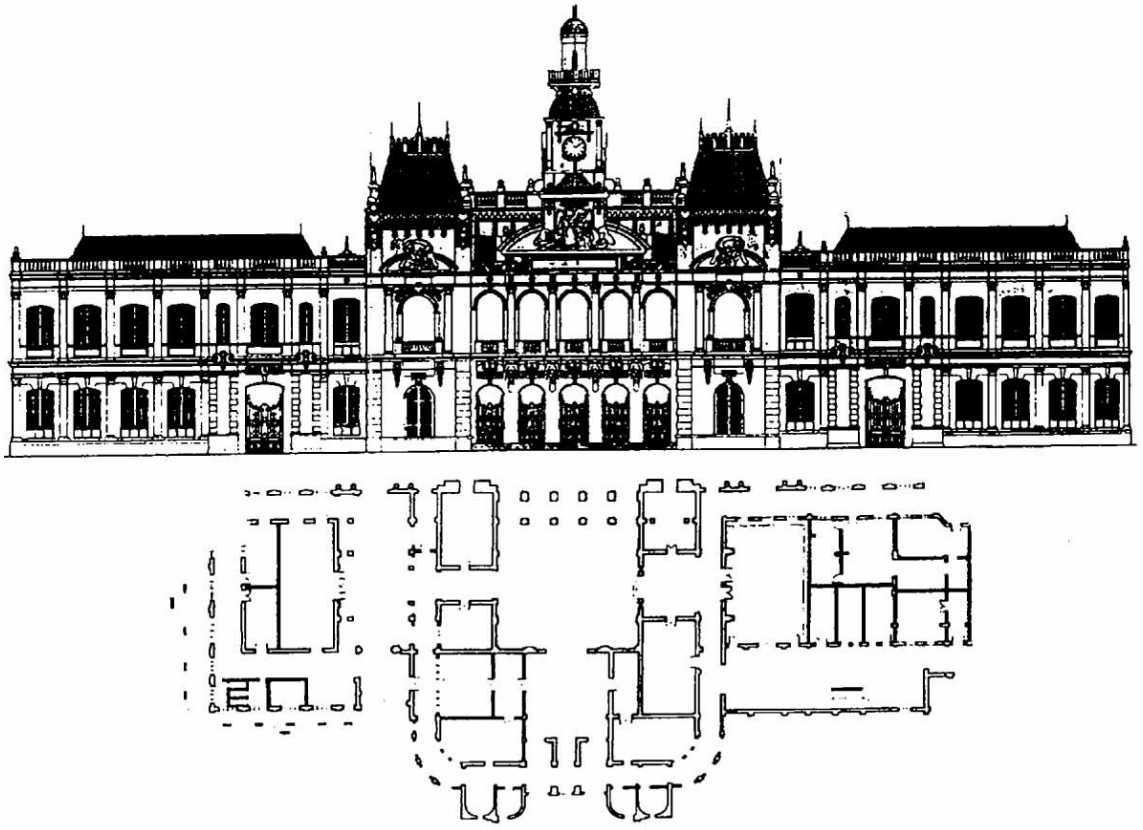


Figure 2.12 City Hall and Saigon Region (Mairie et Région Saigon) (source: Nguyen Dinh Toan, *Vietnamese architecture through Dynasties,* Construction Publisher, Hanoi, 2010, p. 190)

The second phase 1900 - 1920

Since 1900 the French government in Indochina had carried out the construction of the headquarters in Hanoi, the architecture was mainly the type of buildings, mansions, offices or half-mansion buildings, some official architectural styles from France (tile roof, with roof basement).

The architecture of this phase was also deeply studied in order to get rid of the simple functionalism of pre-colonial architecture. Neoclassical architecture style was popular in the offices of the French colonial administration, with the symmetry layout being exploited to express the grandeur and splendor of the main facades with architectural form which was heavy downstairs and focused on the decoration of the details (figure 2.13).

Architect Auguste Henri Vildieu was the head of the Hanoi office for all construction works.



Figure 2.13 Morin Hotel in Hue in 1906
(source: http://www.songvang.net/Writings/KhachSanMorin.htm)

The third phase 1920 - 1945

New architectural styles were experimented to replace the classical French architectural styles imported from the original. It was a trend to explore Asian-European combinations, that was, to exploit traditional architectural features as well as to pay attention to the local climate and materials. A significant movement in this phase was the Art Deco style with its modern architectural features, which escaped from the classical architectural details, towards simple geometric and linear forms. It became a powerful, parallel development that existed in Indochinese style. Both of which had legated many valuable architectural works (figure 2.14).

Significant contribution of Governor Maurice Long (1921) in the use of excellent architects brought from France and other colonies such as Emest Hébrard, Arthur Kruze, etc.

The French made the tropicalisation as "Western Quarter" in Hanoi, Saigon, Hue, Hai Phong, Nam Dinh, etc. and the seaside resorts in Da Lat, Nha Trang, Vung Tau, Bach Ma, Do Son.



Figure 2.14 Hue University (source: Hue University)

At the same time, the French imported new materials, techniques and construction technologies that changed the city facade such as cement, reinforced concrete, iron, tile, brick-fired technique, water sewer pipes of iron, ceramic, etc.

While the French built architectural works for them, Vietnamese architecture continued to develop in the traditional folk architecture in the royal palace, the villages. The architecture of urban areas, towns and rural areas in Vietnam during the Nguyen dynasty under French colonial rule continued to grow. The houses were mainly made of traditional materials such as brick, wood, tile. The difference between rural and urban areas was not far in appearance.

b. Interplay between the two architecture style to colonial architecture in Vietnam

French architecture - infiltrated into Vietnam - had gone through a long process of parallel development with indigenous architecture. In that process, there were two opposite trends such as Europeanization and anti-Europeanization both in culture and architecture.

In the early phases, traditional elements were replaced by new architectural elements. But in the early 20s, French architecture had been transformed to adapt to the natural environment and indigenous culture, Vietnamese architecture also had influenced in the French architecture.

During the first phase (1984-1920), most of the main buildings of the French colony were originally copied from France such as Governor Palace in Saigon, House of the King, Supreme Court, Hanoi railway station, etc. These followed European Neoclassical style with strict symmetry axis, column and structure beam system as the Renaissance style. Thereafter, the second phase (1920-1945), the French continued to maintain the

architecture of European style, combining the research of local climate conditions to make up the colonial architecture with the adaptability and identity shape.

The process of exchanges had begun to transform the architecture in aspect, making Vietnamese architecture turned to new trend.

c. Types and styles of colonial architecture

The French had legated many types of architecture in the process of domination Vietnam such as Citadel, Construction of a military camp, Housing architecture, Public building, Churches and monastery, Architecture of trees flower gardens, landscape architecture.

Besides, a very important contribution was to create a variety of architectural styles such as Prehistoric colonial architecture, Neo-classic style, Local French architectural style, Art Nouveau or Art Deco style, Indochina architectural style.

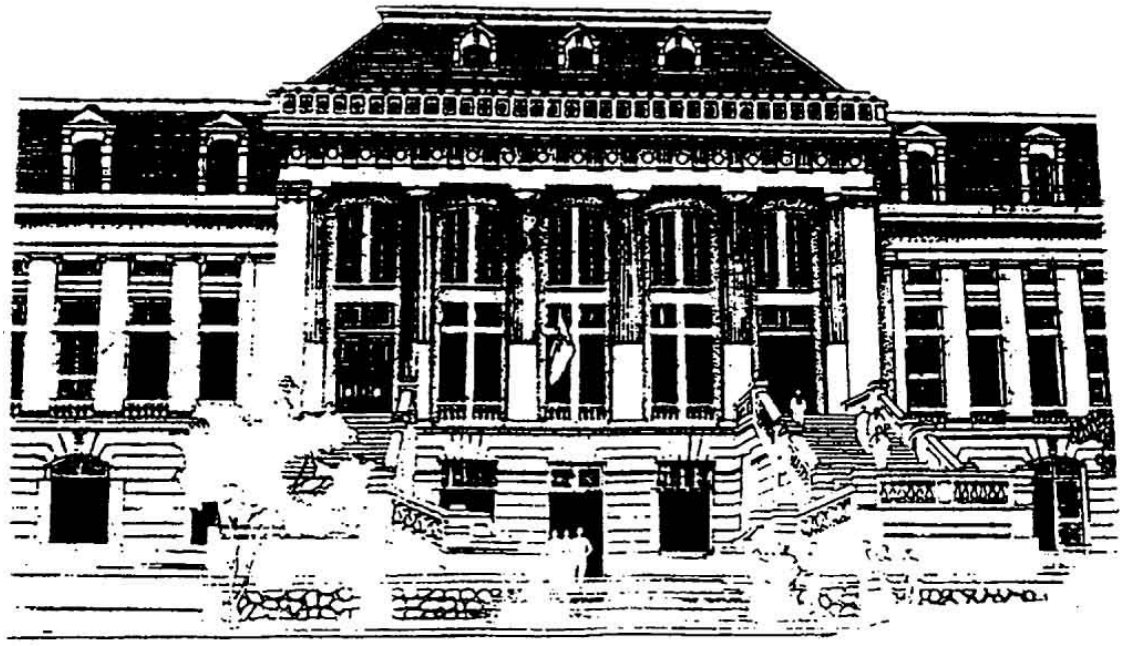


Figure 2.15 Hanoi Supreme Court (source: Nguyen Dinh Toan, *Vietnamese architecture through Dynasties,* Construction Publisher, Hanoi, 2010, p. 190)

2.2.2 The influences of French on Nguyen Dynasty's fortification designs from the late 18th to the early 19th century

a. Vauban fortification Citadel import into Vietnam

In the 16th century, European missionaries entered into Vietnam. In 1790, Nguyen Anh chose Saigon as the capital, named Gia Dinh and then he depended on Olivier de Puymanel and Théodore Lebrun who were two French army officers, with the bishops Ba Da Loc, Tran Van Hoc for the sketching of European fortification to create Gia Dinh Citadel (Octagonal Citadel). In August 1858, the French expeditionary force attacked the port of Da Nang and then pulled into the south to invade Saigon. Nguyen Dynasty did not fight back, made concessions from three southeast provinces to six south provinces. In 1873, the French conquered Hanoi, and established their power in Indochina, implementing the colonial and semi-feudal policies. In June 1884, the Patenoote peace

Treaty was signed in Hue Capital, which divided Dai Nam (former name of Vietnam) into three regions: Cochinchina which was a French colony, Tonkin and Annam under the protectorate of France with Nguyen Dynasty still nominalized in control.

According to researcher Do Van Ninh, *"Since the exile, Nguyen Anh received books which has been translated into Vietnamese by Eveque d'Adran to study the construction of the French fortification. Then the French men Philippe Vansier, Jean Baptiste Chaigneau, De Forcans and especially Olivier de Puymauel helped Nguyen Anh build the first Vauban citadel in Saigon in 1790.*
Then, from Gia Long to Minh Mang reign, the next Kings based on the Vauban structure and built almost all the major cities such as Hue, the provinces of Hanoi, Cao Bang, Lang Son, Bac Ninh, Tay Son, Hung Yen, Hung Hoa, Nam Dinh, Hai Duong, Thanh Hoa, Vinh, Quang Nam, Quang Ngai, Binh Dinh, Phu Yen, Khanh Hoa, Bien Hoa, Vinh Long and small fortress as Ngoc Vung, Co To, etc."[22]

It also confirmed through the French researcher, Louis Bezacier was a French scholar who studied military fortification art in Vietnam. After studying and surveying the citadels under the reigns in Vietnamese history, he has divided Vietnam Citadel into two different types: *"The first bastion type derived from China, was built since the invasion by China (111 BC – 939 AD) to 18th century, such as Co Loa Citadel, Thanh Long Citadel, Ho Citadel, etc. which were quadrangular, without forts, without angle fort (sans bastions ni lunettes d'angles) etc. The secondary bastion type originated from France through mediated person - Colonel Olivier de Puymanel, with first citadel was Gia Dinh Citadel (1790)."*[23]

In the Vietnamese history, the first person - contacted with the French army and their aid, and then received the French fortification technique - was Nguyen Anh. For defense, Nguyen Anh King chose the fortification model of Sébastien Le Prestre de Vauban, calling the Vauban style. This military citadel was a typical style of the West in this period, the zig zich type was selected as a model for rampart. The Citadel was built in the square, with entrances, forts, high thick walls, observatories in corners, surrounding moat system in the front. According to Phan Thuan An researcher: *"At that time, most of Vauban's bastions were built according to the square or polygons plans with five, six or eight edges. Between two adjacent edges formed a convex angle bastion. The steadily convex angles looked like the shape of a star. Bastions were built in this way, a complex system of buildings which closely related to each other and was strong defensive. In general, it included the main parts from the inside to outside such as rampart, fort, or angle fortress, wall connecting two forts, fired walls, covered road, defensive moat, closed roads, etc."*[24]

The Vauban bastion type prominently featured layout of bastions, lunette d'angle, embrasure, berm, glacis, etc. which appeared in the condition that the military was armed with firing weapons fired by gunpowder. So it was clear that before contacting with the West and armed with these weapons, this citadel type was not to occur in Vietnam (figure 2.16).

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[22] Do Van Ninh, *Vietnam's ancient Citadel,* Technique Science Publisher, Hanoi, 1983, p.130.

[23] Phan Thuan An, *Hue Citadel,* Thuan Hoa Publisher, Hue, 1999, p.62.

[24] Phan Thuan An, op. cit., p. 62.

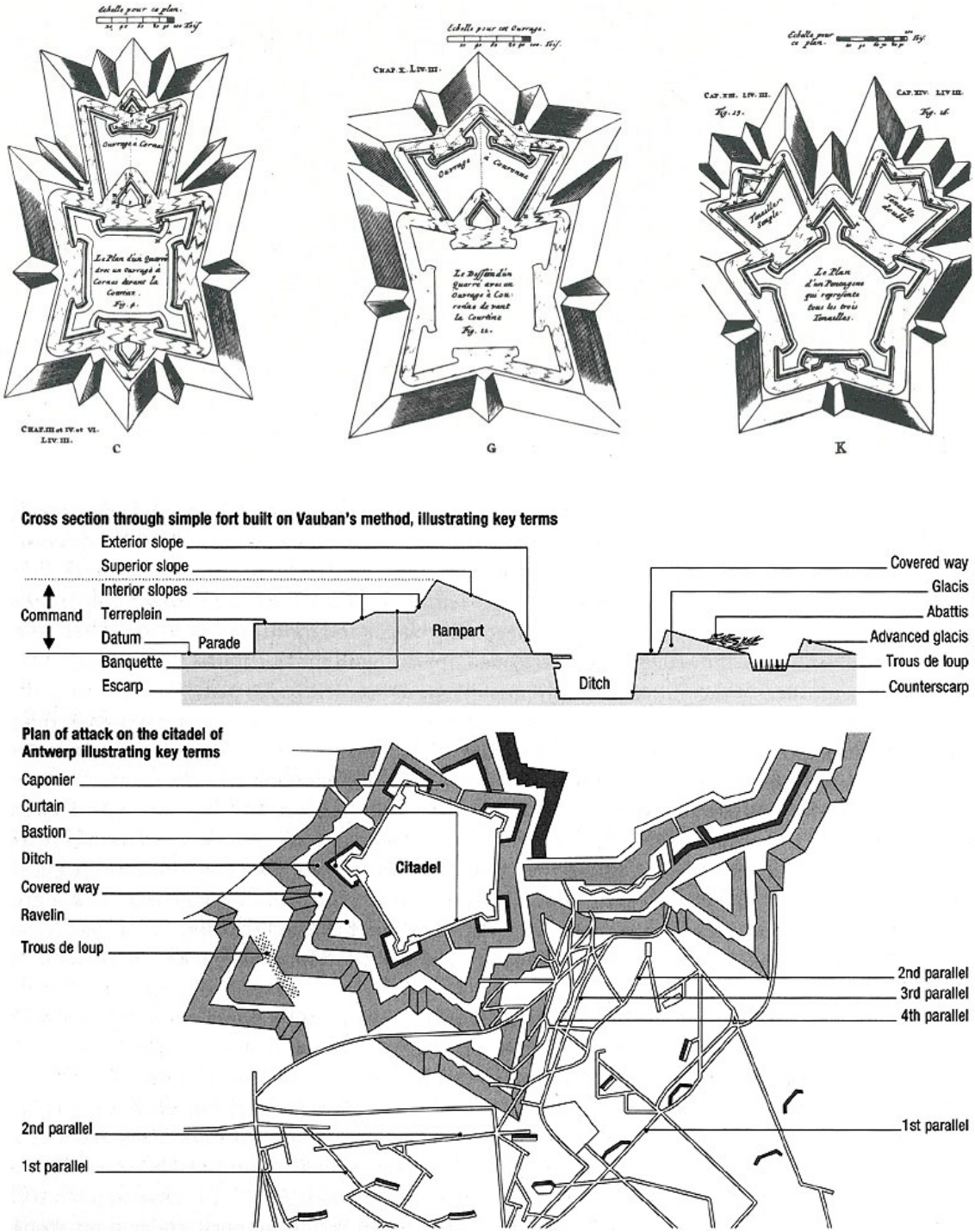


Figure 2.16 Structure of a Vauban bastion style (source: Mario Morini, *Atlante di Storia dell'Urbaniica,* Editore Ulrico Hoepli Milano, 711-582, 1963, p. 241 and http://slantchev.ucsd.edu/courses/ps143a/readings.html)

b. Gia Đinh Citadel, the first Europe style's fortification in Vietnam

Bat Quai Citadel was ordered by Nguyen Phuc Anh to be built in Tan Khai village, Binh Duong district, Gia Dinh (former name of Saigon) following the combination between Eastern and Western architecture on 4/2/1790, based on a design by Frenchman Olivier

de Puymanel. Citadel was built with 8 edges as to be called 'Eight Trigrams' (Bát Quái) (figure 2.18).

There are eight gates, the south were the Can Nguyen and Li Minh gates, the north were the Khon Hau and Kham Hien gates, the east were the Chan Hanh and Cam Chi gates, the west were the Thuong and Doai Duyet gates. Minh Mang reign, it renamed the gates: the south were the Gia Dinh and Phien An gates, the north were the Cung Than and Vong Thuyet gates, the east were the Phuc Vien and Hoai Lai gates, the west were the Tinh Bien and Tuyen Hoa gates.

The residential area, architectural works were formed since the Minh Huong people came here about 1680. The architectural works were military base, warehouses, the govern palace as the Thao Quan warehouse, Tan Thuan palace, Nien Nung palace, with the system of soldier bases in Ben Nghe port. Religious buildings and markets - were served the needs of the people, soldiers - formed as the Dieu Khien market, Cay Mai pagoda. At the same time, some places reflected the formation of residential areas such as Bau Tron, Thi Nghe and Dat Hoi.

This was also the place where the Nguyen Dynasty allowed the French (businessmen, clergy etc.) exploited natural resources to reward their work to help recover the country. The government made all economic incentive policy, allowed the use of Ben Nghe port for ship repair etc.

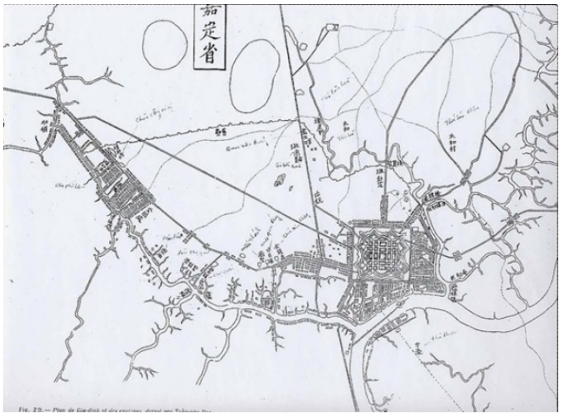


Figure 2.17 The general map of Sai Gon in 1815 (source: http://quankhoasu.blogspot.com/2013/04/ban-o-sai-gon-tu-khi-thanh-lap-en-nay.html)

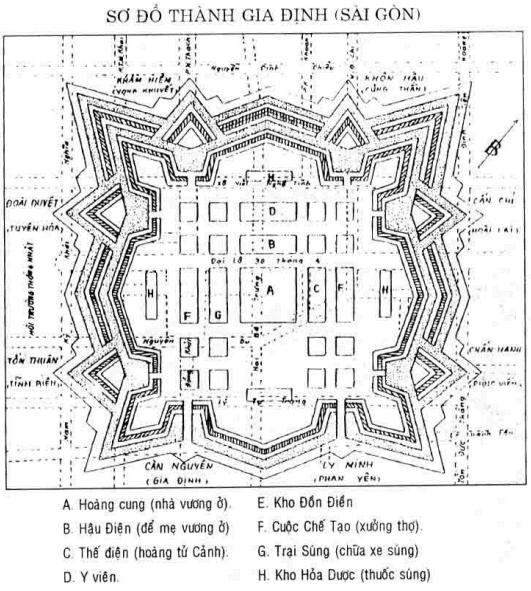


Figure 2.18 Map of Gia Dinh Citadel in 1815 (source: https://vn-zoom.org/threads/gia-dinh-thanh-quy-thanh-bat-quai.2904/)

d. Vauban bastion, a network of dense fortifications in history under Nguyen Dynasty

Vietnam were assisted by engineers, learned and built a lot of defensive system to maintain and protect their feudalism. That was reflected in the system of thirty three citadels and many small fortresses, built from the North to the South under the Nguyen Dynasty in Vietnam.The citadel system of the Nguyen Dynasty was decentralized according to the

administrative management of the central Imperial City of Hue, the defensive Citadel (Gia Dinh Citadel in Saigon and North Citadel in Hanoi), the provincial citadels.

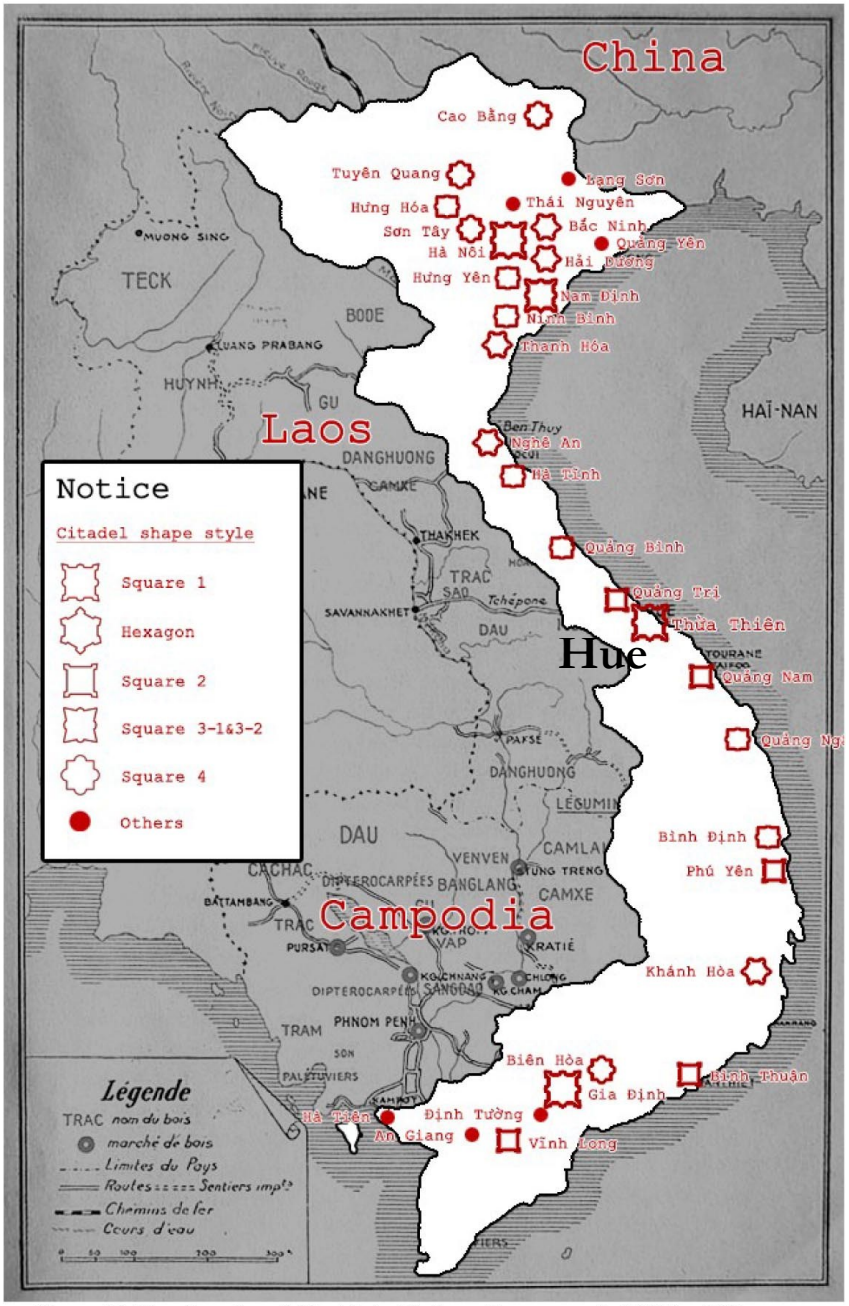


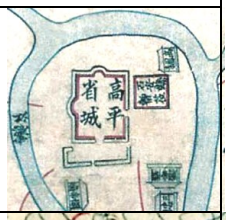
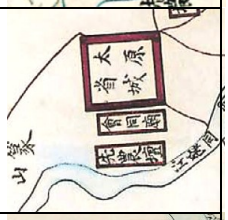
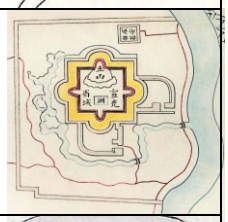
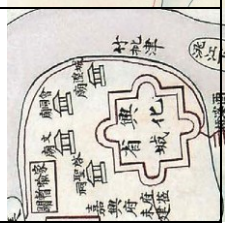
Figure 2.19 The location of Citadels in Gia Long Emperor period 1820-1841 (edited, source: Pour l'exposition colonial, [1931]. "Cartes de la localisation des bois"; Nguyen Vu Trong Thi, *Vietnam Citadel system under the Nguyen Dynasty and the case of Quang Tri Citadel,* PhD thesis, UNIVPM, 2016)

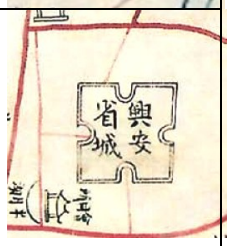
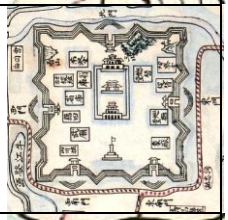
During the invasion of Vietnam from 1858, the French not only assimilated to the culture and religion, but also established many military techniques in the construction of the Vauban-type fortifications. Typically, the lords and kings of the Nguyen Dynasty applied thirty three citadels and many fortresses from north to south in Vietnam (figure 2.19 and table 2.1).

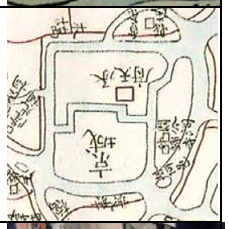
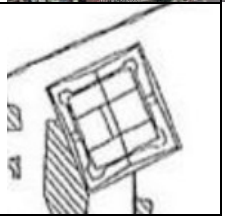
According to the book 'Dai Nam Nhat Thong Chi', beside Hue Citadel and Thua Thien Hue Prefecture, there were 29 provinces, each province had a citadel.

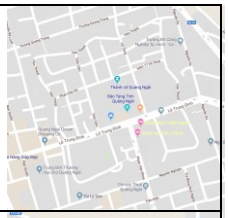
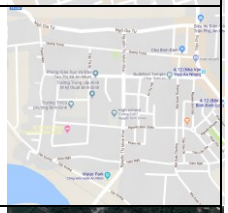
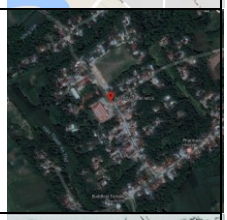
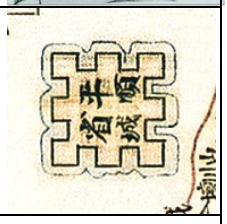
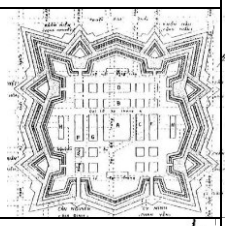
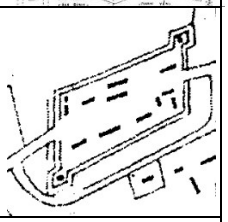
- North Vietnam had 13 provinces: Hanoi, Son Tay, Hung Hoa, Tuyen Quang, Cao Bang, Lang Son, Quang Yen, Hai Duong, Bac Ninh, Hung Yen, Nam Dinh, Ninh Binh, Thai Nguyen.
- Central Vietnam had 11 provinces of Thanh Hoa, Nghe An, Ha Tinh, Quang Binh, Quang Tri, Quang Nam, Quang Ngai, Binh Dinh, Phu Yen, Khanh Hoa, Binh Thuan and Phu Thua Thien
- South Vietnam had 06 provinces: Phien An (renamed Gia Dinh in 1836), Bien Hoa, Dinh Tuong, Vinh Long, An Giang, Ha Tien.

Table 2.1 Statistical databases of the Citadels during Minh Mang Emperor's period (1831)

No.	Citadel of	Current Location	Con-truc-tion time	Pirime-ter (m)	Wall's Heig ht (m)	Wall's Thick-ness (m)	Moat's Width (m)	Moat 's Dept h (m)	Wall's mate-rial	Shape
1	Cao Bang	Cao Bang City	1836	748	2.98	4.25	4.25-5.53	2.13 - 4.25	Brick & Soil	
02	Lang Son	Lang Son City	1834	2,520	4.37				Brick & Laterite & Soil	
03	Thai Nguyen	Thai Nguyen City		1,384	2.98	1.91 & 7.65	8.5	2.13	Brick & Soil	
04	Tuyen Quang	Tuyen Quang City	1814	1,105	4.12		2.13-4.25	2.13 - 4.25	Soil	
05	Hung Hoa	Phu Tho Prov-ince	1822	1,347	5.14	3.87	11.9	3.83	Laterite & Soil	

06	Quang Yen	Quang Ninh Prov-ince	1826	1,254	3.83				Soil	
07	Hung Yen	Hung Yen City	1831, 1834 - 1837	1,357	4.25	5.1	38.25	1.62	Brick & Soil	
08	Bac Ninh	Bac Ninh City	1824	2,262	3.83	0.77 & 1.28	38.25	4.25	Brick & Soil	
09	Son Tay	Son Tay Town	1822	1,386	4.68	4.04& 6.38	28.48	4.25	Laterite & Soil	
10	Hai Duong	Hai Duong City	1824	2,342	4.76		46.75	2.55	Laterite & Soil	
11	Nam Dinh	Nam Dinh City	1833	3,531	3.91		42.5	2.55	Brick & Soil	
12	Hanoi	Hanoi	1820 - 1831	5,464	4.68	17	21.25-34	25.5	Brick & Soil	
13	Ninh Binh	Ninh Binh City	1824	1,674	4.63		17	3.4	Brick & Soil	

14	Thanh Hoa	Thanh Hoa City	1828	2,678	4.25		39.53	2.98	Brick & Laterite & Soil	
15	Nghe An	Vinh City	1831	2,678	4.89		34	3.4	Laterite & Soil	
16	Ha Tinh	Ha Tinh City	1824	819	4.25		10.63	0.94	Brick & Laterite & Soil	
17	Quang Binh	Dong Hoi City	1824	1,959	4.25	1.28 & 1.7 & 12.75	29.75	2.98	Brick & Laterite & Soil	
18	Quang Tri	Quang Tri Town	1833, 1837	2,081	4.55	0.72	34.85	2.13	Brick & Soil	
19	Hue (capital)	Hue City	1805, 1822, 1832	10,571	6.46	21.25	24.23	4.25	Brick & Soil	
20	Da Nang	Hai Chau District	1822	591	5.1		19.13		Brick	
21	Quang Nam	Dien Ban District	1833, 1835	2,081	4.76		19.13		Brick	

22	Quang Ngai	Quang Ngai City		2,126	4.25		10.63		Laterite & Soil	
23	Binh Dinh	An Nhon Town		2,566	4.67		31.87		Laterite & Soil	
24	Phu Yen	Song Cau Town	1838	1,445	3.61		12.75		Soil	
25	Khanh Hoa	Dien Khanh Town	2.714	3.4		19.12			Soil	
26	Binh Thuan	Ham Thuan District	1837	1,717	2.64	0.51	5.1		Soil	
27	Bien Hoa	Bien Hoa City	1934, 1937	1,649	3.61		2.89		Laterite & Soil	
28	Gia Dinh	District 01	1829, 1835	2,230	5.53	31.88	65.88	5.96	Laterite & Soil	
29	Dinh Tuong	My Tho City	1825	1,496	4.04		34		Soil	
30	Vinh Long	Vinh Long City	1832	2,125	4.25		25.5		Soil	
31	An Giang	Long Xuyen City	1834	1,539	3.83		20.,74		Soil	
32	Ha Tien	Ha Tien Town	1834	396	2.98				Laterite	

33	Trieu Tuong	Ha Trung District	1821	774			12.75	1.28	Brick & Soil	

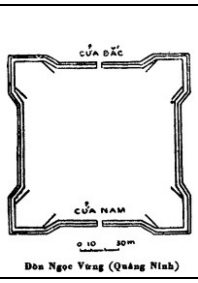
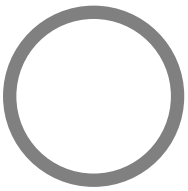
(source: Ngo Duc Tho, Nguyen Van Nguyen, Philippe Papin, *The Descriptive Geography of the Emperor Đồng Khánh,* École francayse d'Extrême-Orient, Institute of Chinese language Research, Map Pubisher; *Do* Van Ninh, *Vietnam's ancient Citadel,* Technique Science Publisher, Hanoi, 1983; Quốc Sử Quán triều Nguyễn (The Association of History of the Nguyen Dynasty), *Đại Nam nhất thống chí (Dai Nam Comprehensive Encypaedia),* Translation: Institute of History, Social science Publisher, Hanoi, 2006; Exhibition of "*Archive de la cité de l'architecture, Paris*", (1930); Gallois, Chabert, *Atlas Général de l'Indochine*, 1909; Romanet du Caillaud, F., *La conquete du delta du Tonkin*, 1877; Cadière, L., *Bulletin des Amis du Vieux Hue - Những người bạn Cố đô Huế, Vol.16,* ([1929]2003); Bibliothèque nationale de France; Nguyen Vu Trong Thi, *Vietnam Citadel system under the Nguyen Dynasty and the case of Quang Tri Citadel,* PhD thesis, UNIVPM, 2016; and Google Map)

Provinces were built on different projects, but generally based on Vauban type. Citadel was initially embanked soil, then was built of brick, stone or laterite depending on the local materials. The perimeter citadel was from 300-400 trượng[25]. Nam Dinh Citadel was the largest, with a circumference of 830 trượng 7 thước 3 tấc. Particularly the smallest Ha Tien, the circumference was only 96 trượng 2 thước.

Besides, there was also a system of posts, fortresses, coastal fortresses in estuaries. This fortification system was built quite solid with durable materials such as brick and stone.

About the shape of the citadels: the square plan was the most common in the citadels and fortresses in Nguyen period. Citadel shape was a square, but sometime the four sides were the same size, or different a little bit. Besides, there were also hexagon shape, especially circle shape and semicircular shape (table 2.2). The corners had a convex fortress. Each corner fortress had two sloping ramps in the two sides to the fortress.

Table 2.2 The shapes of citadel and fortresses were built in Vietnam by Nguyen Dynasty

Name	Hexagon	Square	Circle (Bien Son fortress)	Semicircle (Nguyet fortress – Ngoc Thanh)
Shape types				

(source: Do Van Ninh, *Vietnam's ancient Citadel,* Technique Science Publisher, Hanoi, 1983)

2.3 Chinese influence on the Vietnam's city structure

2.3.1. Applying Feng Shui principle in urban design

[25] Trượng, thước, tấc - measurement units in ancient Vietnam. According to Hoang Phe in book *'Vietnamese dictionary'* (p. 1093), 'Trượng' has 2 meanings: 10 thước of ancient China (about 3.33 m) or 4 thước mộc (about 1.70 m).

In the oriental cultural region with a long history of urban formation, China had some influences on the Vietnam's city structure. These influences were in a lot of aspects such as politics, religion, culture, as well as architecture. One of this was the unusual design of ancient Eastern cities which was created according to the Eastern philosophy. This idea was closely applied for lot cities in China, Vietnam and also written down in some ancient books. In this context, the Feng Shui methodology was important mode and unique urban design in East Asia and Southeast Asia. These can be referred some papers as below.

Charles M. Nelson (1988) mentioned 'Eastern philosophy' in his article that *"Organicism was elaborated in the context of the Confucian tradition form the augury system in the 'Book of Changes', the school of the Five Elements, the Dao elaboration of the ideal world, the school of opposites (yin-yang) and the theory of emblematic numbers in which three, nine and twelve were of particular importance. Three is the number of components in the universe. Nine is three times three and is emblematic of the ancient Chinese world because Emperor Yu established the original nine provinces of China. Twelve is nine plus three and the number of months in the year. Divided by the four seasons, which quarter time just as the directions quarter space, twelve yields three months, devolving to the root of all fundamental numbers. Hence, the central government was headed by a cabinet of three ministers for finance, defense, and public works. Lower in rank were nine administrative ministers for other essential state functions."*[26] (figure 2.20)

Marten Kuilman (2011) also mentioned 'Eastern philosophy' in his article on paper *'Quadralectic Architecture'* that "*The cosmic scheme was called the 'Great Plan with its Nine Divisions' (Hung Fan Jiu Chou), which was first mentioned in the 'Book of Historical Documents' (Shoo King). This 'Great Plan', with nine squares as its base, might represent an ancient Chinese categorical system (Tze-Wan Kwan, 1995). Spiro Kostof (1991) pointed, in his inspiring book on the city as a cultural artifact, also to the axial alignment, which is so typical in Chinese urbanism. The square or rectangular form was aligned in the four cardinal directions and a separation into functional zones was eminent. Adjustment took place in line with topographical conditions."*[27] (figure 2.21)

[26] Charles M. Nelson, *Urban Planning in Pre-Industrial China, US*-China Review, Vol. XII, No. 2, pp. 17-21, 1988.

[27] Marten Kuilman, *Quadralectic Architecture*, ISBN 978-90-814420-0-8, Falcon Press, 2013.

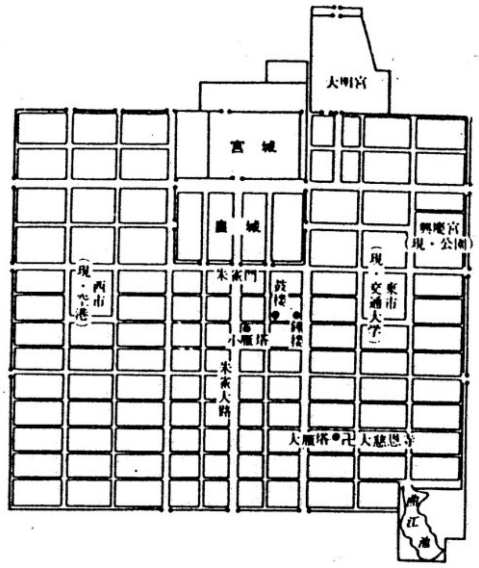


Figure 2.20 A reconstruction of the city of Xi'an (Chang'an) during the Tang Dynasty (618 – 907 AD). The regular street pattern was a well-planned effort to reach for the Ideal City. The Ta-ming Palace is situated in the north eastern corner of the city with the Lotus Garden in the southeastern corner. The T'ai-chi Palace and the governmental center lies on the northern part of the central axis (source: Marten Kuilman, *Quadralectic Architecture,* op. cit.)

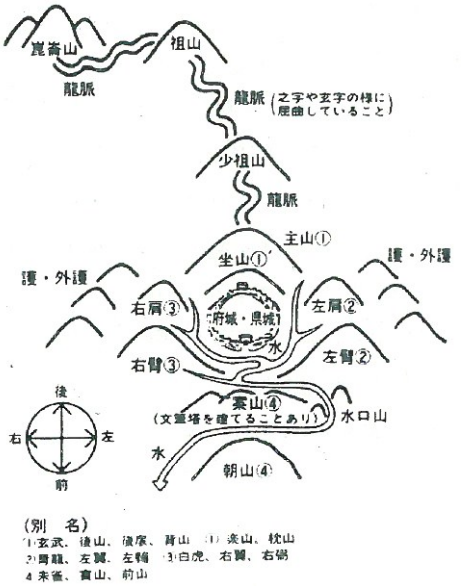


Figure 2.21 City image according to Feng Shui principle (source: Shigeru Satoh, *Towards Conservation for Historical Urban & Rural Environment in Hue area,* International Workshop and Symposium on *"Conversation of Historical Urban and Rural Environment along the Huong River Valley",* Hue, Aug, 5-20th 2005)

The Vietnamese historical book recorded that in early 1687, when the land of Phu Xuan village was selected first time to establish the capital of Annam, the architects of urban planning designed as *"Use the mountain in front (i.e. Ngu Binh Mountain) as a Screen, fill up the wall, build a palace, dig in front of a large lake etc."*[28]

And Japanese author Prof. Shigeru Satoh (2005) mentioned Feng Shui in his article on paper *'Towards Conservation for Historical Urban & Rural Environment in Hue area* that *"In east Asian and east-south Asian regions we have very particular sense of environment, philosophy of environment. The idea is people and physical setting is one belonging to the nature. Natural and geographical setting could exist there, forever. We should maintain the harmony of natural and physical environment, which was made up based on local topographical form. This is Feng Shui Theory. In each region of east and east-south Asian, they developed their own Feng Shui Methodology to adapt it to each characteristics of delicate nature."*

These were the concept associated with the universe, the theory of Yin-Yang, the Five Elements, the axis of the deity, the center of emphasis, were similar and applied in the construction design of Vietnam Citadel and especially in Hue Citadel.

Figure 2.22 - 2.25 show the similar characters such as the enclosed ramparts and main and auxiliary axes between the Hue Citadel, Hue Imperial City and Beijing Citadel and Beijing Imperial City.

[28] Quốc Sử Quán triều Nguyễn (The Association of History of the Nguyen Dynasty), *Đại Nam thực lục* (*Chronicles of Greater Vietnam),* Vol.1, Translation: Institute of History, Social science Publisher, Hanoi, 2004.

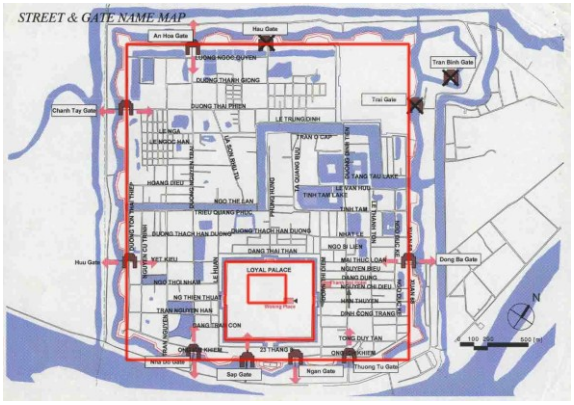


Figure 2.22 Hue Citadel in 1803-1833 period (source: Waseda university)

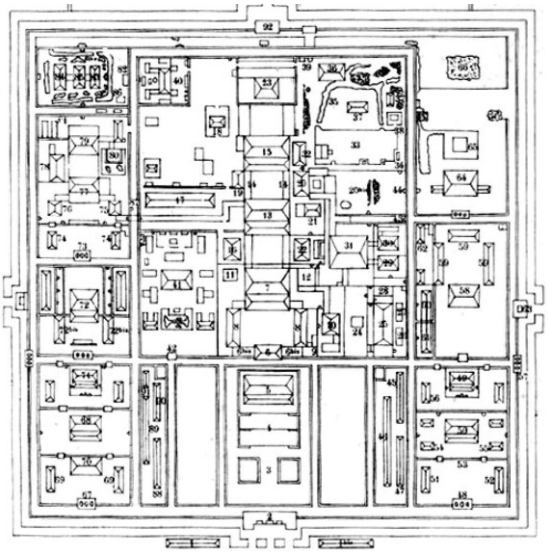


Figure 2.23 Imperial City and Forbidden City of Hue in 1804-1833 period (source: Ardant du Picq, *Bulletin des Amis du Vieux Huế*, No. 2, 1928

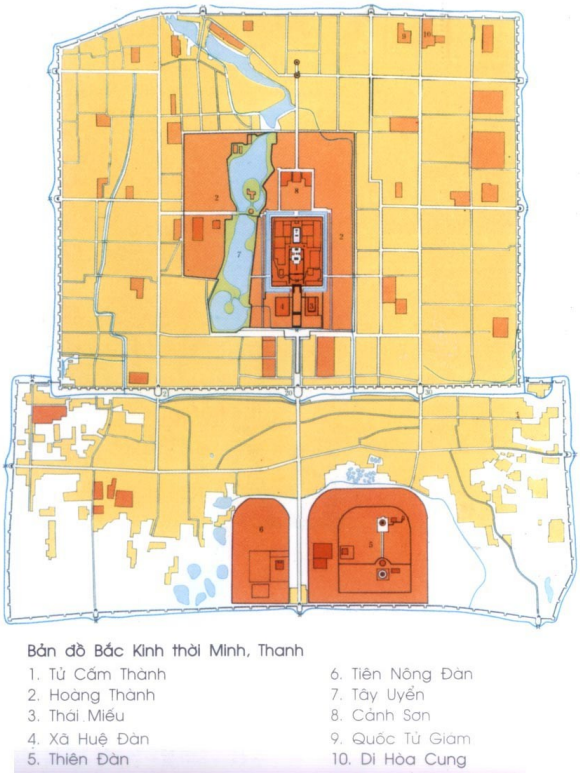


Figure 2.24 Chinese Citadel

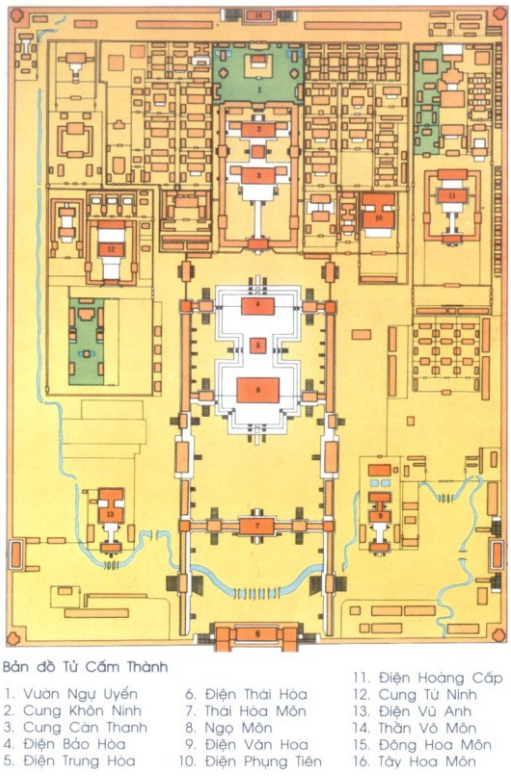


Figure 2 25 Chinese Forbidden City

(source: Art of Architecture, *Beijing's Ancient Architecture,* Kim Dong Publisher, Hanoi, 2003)

2.3.2 Main axis orientation, assistant axis in urban structure

In urban structure, the ramparts were arranged on the north-south axis. On this axis they were arranged the main and important buildings. The layout of the buildings along

the sides of main axis according to the Eastern traditional regulation: *men on the left woman on the right (tả nam hữu nữ), literature mandarin on the left martial mandarin on the right (tả văn hữu võ).*

All major buildings of three ramparts were planed symmetrically in a same main axis. Axial spatial organization enabled synchronous orientation for main buildings, facing to a good direction (south or southeast). This solution created depth axis to form spatial layers for building orientation, important hierarchy of architectural space.

2.3.3 Function layout and pavilion planning with garden, chessboard street system

The main axes divided outer citadel into quarters as districts. There were many city gates, these gates define a grid work as a chessboard of major street structure. In citadel, the position of Hue's Imperial City and Forbidden City were at the starting point on the north-south axis while Beijing's Imperial City and Forbidden City were at the end of axis. Palaces, administrative city, temples, ancestral halls, markets, residence, parks were in specific spaces within the city in accordance with local culture and political functions following to the cosmos structure. However all of elements of Beijing's city (32 km in perimeter and 38 km^2 in area) were bigger than Hue's City (10 km perimeter and 38 km^2 in 5,2 km^2 area).

Marten Kuilman (2013), mentioned the 'cosmological order' in urban structure that *"The traditional concept of Chinese urban planning reflects a cosmological order based on Confucian ethics and fengshui (geomancy). The former seeks a rational order with an emphasis on the centrality of relationship, while the second was focused on a harmony with nature. The 'science' of fengshui may literally point to 'wind and water'. It can be a 'mere short-hand for an environmental policy of "hindering the wind and hoarding the waters."*[29]

The comparison data showed cosmological order in both cities' structure with the meaning of elements and symbolism of city as well as the orientation axis, and function of the center in urban design. The palace was at the center, surrounded by an administrative complex and finally the outer city, mirroring the division of the universe into three levels as well as symbolizing the moralist division of oriental society into the emperor, scholar administrators, and commoners.

Due to the traditional rules, Eastern citadels were chosen location, design plan; wall construction technique, foundation solution, material; decorative art, wood sculpture, ceramic tile, etc. which were built in similarity of the construction methods of Eastern traditional architecture. Some buildings such as gate, observable tower, tower, following ancient architectural style. Citadel layout layered spaces with axial orientation.

Citadel architectural solutions were organized in harmony with natural landscape. The composition of architectural space in garden house, palace were dispersed in layout, several spatial layers intervening with natural elements. The spaces tended to horizontality, spreading, flexibility, creating the ventilation for building by patio, garden, outside long corridor, joining bridge, lake, etc. The structural frame, beam columns made of wood with rustic style, simpleness; the linking, forming following traditional style. The components of landscape such as fence, wall, gate, natural elements had usually small scale, modestamente, friendly people, authentic material. The chess network system, divine axis, water system, layout of the traditional buildings on the one hand showed the power of the feudal monarchy and also created a synchronization, consistent, orientation to the buildings.

[29] Marten Kuilman, *Quadralectic Architecture*, ISBN 978-90-814420-0-8, Falcon Press, 2013.

Chapter 3. Formation and transformation of Hue Citadel

3.1 From the Capital of the Nguyen Lords, to the Capital of the Tay Son

3.1.1 Eight times remove and build the Capital of the Nguyen Lord (1558-1775)

The struggle for power in the North of Vietnam between the Le, Mac, Trinh and Nguyen clans from the first half of the 16th century pushed Nguyen Hoang to take charge of Thuan Hoa from 1558. He and his generations (Nguyen Lords) would continue to complete the south movement in order to open a complete Dai Viet country in the early 18th century.

The first stop of Nguyen Hoang was Ai Tu in Quang Tri. Since then, this area had become a new political and administrative center, commonly known as the capital of Thuan Hoa. Through the nine Nguyen Dynasties, which lasted 217 years (1558 - 1775), including the fact that they were both fighting the Trinh army in the north and strengthening their forces in the south, Ai Tu was not only metropolis, it was built and moved up to 8 times in 8 different locations in Thuan Hoa.

These eight positions were recorded in time: Ai Tu, Tra Bat, Dinh Cat (Quang Tri province today), Phuoc Yen, Kim Long, Phu Xuan, Bac Vong and Phu Xuan (Thua Thien Hue province today). The displacements of capital were more or less meaningful (figure 3.1).

Ai Tu (1558-1570)

Built in the Ai Tu Village of Vu Xuong District - Trieu Phong Area. Today it belongs to Trieu Giang Commune - Trieu Phong District - Quang Tri Province.

Tra Bat (1570-1600)

Built 1 km away from the site of Ai Tu Palace, downstream of Thach Han River. Today it is in Tra Lien Village, Trieu Giang Commune - Trieu Phong District, Quang Tri Province.

Dinh Cat (1600-1626)

Built in the south of Thach Han River and could be the place where Quang Tri Citadel was built later. According to historical records, in this period the Nguyen Lords began to build their own foundations in Annam. The Palace was only temporary and a defensive place, not sustainable constructions for long-term purposes. However, it had also formed the residential areas, towns, where the density of residents was high, where the formation of craft villages for the construction of the Palace as well as for life of the people in these areas.

Phuoc Yen (1626-1636)

Built in Phuoc Yen Village, Quang Dien District, located in the north of the Bo River, 13 km northwest of Hue. Today it is in Quang Tho Commune, Quang Dien District. In this period, the architecture of the Palace as well as the resident community had not been paid attention. However, it created a crowded residential area as a precondition for the development of Sia Town later.

Kim Long (1636-1687)

Built in Kim Long Village to Bach Yen River. Today it belongs to Kim Long District, Hue City. During this time the constructions were considerably invested. According to the records of Alexandre de Rhodes (1591 - 1666), Kim Long was called 'Hue' (Kẻ Huế) and it was considered as a city with *"Pretty houses, mostly made of wood, columns, carved trussed rafter".*[30] Moreover according to Dac Lo that *"The houses of the Prince, the mandarins at that time were praised by Dac Lo as beautiful, carved columns, carved trussed rafter, and all houses with around the garden".*[31]

This confirmed that the architectural buildings at this period had been significantly invested. The feudalism of the Nguyen Lords affirmed the long-term strategy in Thuan Hoa. Also during this period, Thanh Ha Port on the lower Huong River was formed. It was a commercial port that plays an important role in trade exchange with the whole country as well as with foreign countries. It made the process of urbanization developed stronger.

Phu Xuan (1687-1712)

Built in Phu Xuan Commune, Huong Tra District. Today it is located in the Hue Citadel. The architectural buildings in this period were evaluated to be extremely beautiful. According to Le Quy Don, *"In this new Palace, the Lord... planted trees, built the walls, made beautiful roads. The house was covered with tiles, the walls were built of brick, yellow palace, the treasures were splendid luxury."*[32]

The construction of the new Phu Xuan next to the old Kim Long made the northern area of the Huong River from Kim Long to Thanh Ha Port more capital. Many projects of the Prince, the mandarins and the merchants were built.

Bac Vong (1712-1738)

Located in the North of the Bo River, about 4 km from Phuoc Yen Palace. Today it is in Quang Phu Commune, Quang Dien District. The reign of Nguyen again resided in the land of Quang Dien, creating conditions for the residents to develop in the craft village, as well as the growing trade.

Phu Xuan (1738-1775)

Capital of Annam kept the location in Bac Vong until Nguyen Phuc Chu (1691 - 1725) and Nguyen Phuc Chu (1725 - 1738). When Lord Nguyen Phuc Khoat came to the throne (1738), he immediately set up *"the former main Palace in Phu Xuan".*[33]

At that time, according to Le Quy Don, Phu Xuan Citadel had two wall layers in which outer wall had with four gates, but, according to Jean Kofiler, a missionary who was

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[30] Quốc sử quán triều Nguyễn (The Association of History of the Nguyen Dynasty), *Đại Nam nhất thống chí (A book on the united Dai Nam), Thua Thien Palace,* translated by Nguyen Tao, T. Thuong, NVHBQGGD Publisher, Saigon 1961, p. 61. This river is now filled.

[31] Phan Thanh Hai, *Kim Long Capital and the appearance of Hue before 1687,* Journal of Ancient and Today Hue, No. 23, 1997, pp. 6-17.

[32] Le Quy Don, *Phủ biên tạp lục (Frontier Chronicles),* translated by Le Xuan Giao, Phủ Quốc Vụ Khanh Đặc Trách Văn Hóa (Publisher of Secretary of State for Cultural Affairs), Saigon, Vol. I, 1972, p. 98.

[33] Quốc sử quán triều Nguyễn (The Association of History of the Nguyen Dynasty), *Đại Nam thực lục,* translation: Institute of History, Vol.1, Historical Publisher, Hanoi, 1962, pp. 201; 216.

present in Nam Ha from 1740 to 1755, there were 3 wall layers in which the outer wall had 7 gates:

"The square Palace was surrounded by three wall layers. The outer wall had seven main gates: the most beautiful gate with gazebo towards the river, creating the facade of the building etc. Second wall was smaller than the first wall. It was surrounded by corridor system, paved floor, on the pillars with a roof. This wall had four doors to the top of the wall etc. Inside the third wall was the king's palace, the King living. There were five buildings in which the most important building had three floors, the top of which was a tower that used as an observation tower. From this tower, it could be seen not only the citadel, but also the surrounding area as well as the surround river, creating a beautiful panorama etc."[34]

According to Léopold Cadière, the new Capital of Lord Nguyen Phuc Thai was built above the Capital of Nguyen Phu Phuc Khoat a little and under the Imperial City today, near the location of the National Educational School, it meant that two locations of the old and new Phu Xuan was only about 100 m.[35]

Another researcher Phan Thuan An said, *"The old Phu Xuan Capital (1687 - 1712), where used Ngu Binh Mountain as a screen, probably in the Imperial City area today, because the Citadel in general and the Citadel in particular used Ngu Binh Mountain as a screen. The center of the City of Lord Nguyen Phuc Khoat, the capital of new Phu Xuan (1738 - 1775), was the current Tam Toa area as recorded history."*[36] (figure 3.2)

[34] Jean Koffler, quoted by Léopold Cadière, *Les Resdidences des Rois de Cochinchine (Annam) avant Gia Long*, pp. 73-75.

[35] Léopold Cadière, *Les Resdidences des Rois de Cochinchine (Annam) avant Gia Long,* op. cit., p. 67.

[36] Phan Thuan An, *Hue Citadel,* Thuan Hoa Publisher, Hue, 1999, p. 44.

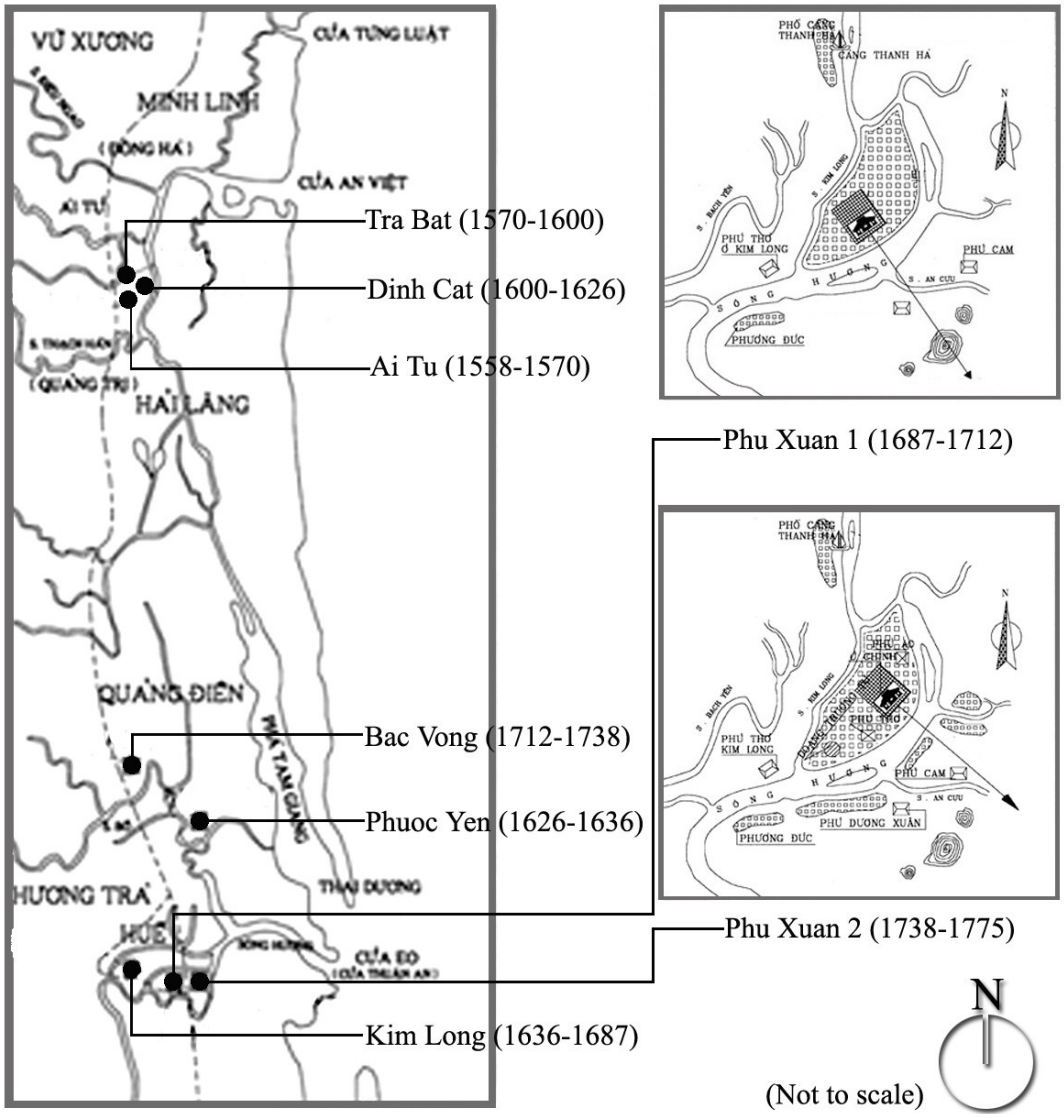
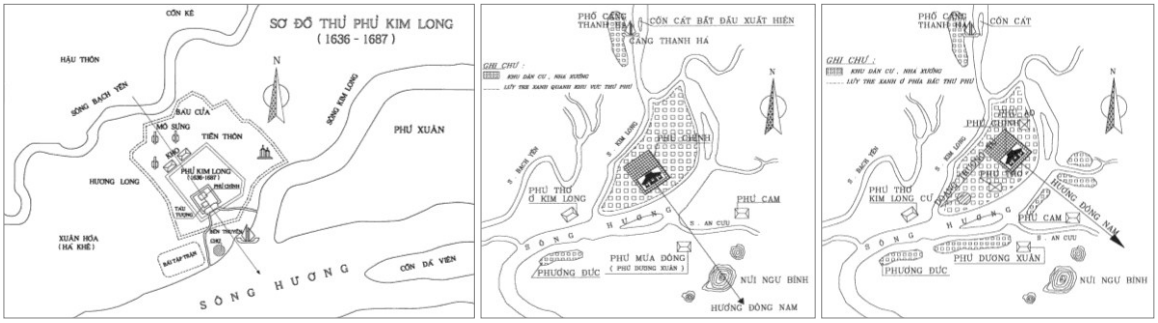


Figure 3.1 The position of the Palaces of Nguyen Lords (source: Nguyen Ngoc Tung, Vo Ngoc Duc, *The transformation of architectural morphology in Hue Citadel,* conference on *"Thua Thien Hue urbanism: historical feature and developing demonstration,"* Proceeding, Thua Thien Hue People's Committee, Association of Science and History, Hue, 2013, pp. 70-81)



Map of Kim Long Map of Phu Xuan 1 Map of Phu Xuan 2

Figure 3.2 The displacement of Capital of Nguyen lord before 1802 (source: Thua Thien Hue People's Committee, *The Modification of Hue City's Masterplan 2030 and Vision 2050*, Koica project, 2013)

In general, eight times displace of the Capital of the Nguyen lords during two centuries (1558-1775), we can divided their construction into three phases:
- Phase 1: the Palace (Dinh) of Lords: Ai Tu Palace, Tra Bat Palace, Cat Palace.
- Phase 2: the Palace (Phủ) of Lords: Phuoc Yen Palace, Kim Long Palace, Phu Xuan Palace, Bac Vong Palace.
- Phase 3: the capital city: Phu Xuan Capital (1738 - 1775).

The process of formation and transformation from Palace to Capital, in the size of construction and architectural value, there has been a clear change. They have evolved and matured in the direction of the development of the Nguyen Dynasty and the expansion of the territory, population growth, economic development, culture, military, economic and foreign affairs in Annam.

3.1.2 Phu Xuan Citadel in Trinh period and Tay Son period (1775-1801)

After more than two centuries of domination and territorial expansion in Annam, the Nguyen Lords established in Phu Xuan a vast beautiful Citadel system and Palace. In 1765, Lord Nguyen Phuc Khoat died. The Tay Son revolted in Quy Nhon, opposed the local government and expanded influence in some neighboring provinces. Moreover, Lord Trinh Sam in Tonkin used to take charge of Thuan Hoa - Phu Xuan (1775). Nguyen Phuc Thuan gave up Phu Xuan Capital to run in the South for exile to hope for a chance to restore his plan.

After mastering Thuan Hoa for eleven years (1775 - 1786), thousands of Trinh soldiers were expelled by the Tay Son forces from Quy Nhon. Phu Xuan Citadel once again changed the owner. In 1788, in Phu Xuan, Nguyen Hue came to the throne as Emperor with the Quang Trung name. Phu Xuan became the Capital of the Tay Son Dynasty from that time until the end of Canh Thinh period (1793 - 1801).

In the short time when the Trinh army occupied Thuan Hoa (1775 - 1786), the appearance of Phu Xuan Capital did not change much. In 1778, a British merchant Chapman arrived in Phu Xuan, and recorded in his memoirs that the citadel there as *"a 900 m long rectangle, 60 m. There was outside a wall, behind mound, about 3 meters in height etc. The wall had not shot holes, the gun was pointed out, through the holes at the wall sole etc. Inside the citadel, it divided into several square built bricks surrounding each area. The area for the market, for paddy store, military camps, horse stables, elephant stables etc."*[37]

Under the Tay Son period, most of the royal buildings (the citadel, palace etc.) were preserved for further use, meaning that the architectural appearance of Phu Xuan was not changed. Under the three phases of change of sovereignty, from the time of Nguyen Phuc Khoat to Tay Son, Phu Xuan Citadel remained the same place and all had the traditional architectural style of the nation.

[37] Chapman, *Relation d'un voyage en Indochine en 1778*, P. J. Honey is quoted in *"Background to Vietnam history"*, re-quoted and translated by Ho Tan Phan, "*Phu Xuan Citadel in Tay Son period,*" Journal of Science and Technology Information, Department of Science, Technology and Environment, Thua Thien Hue Province, 1992, p. 18.

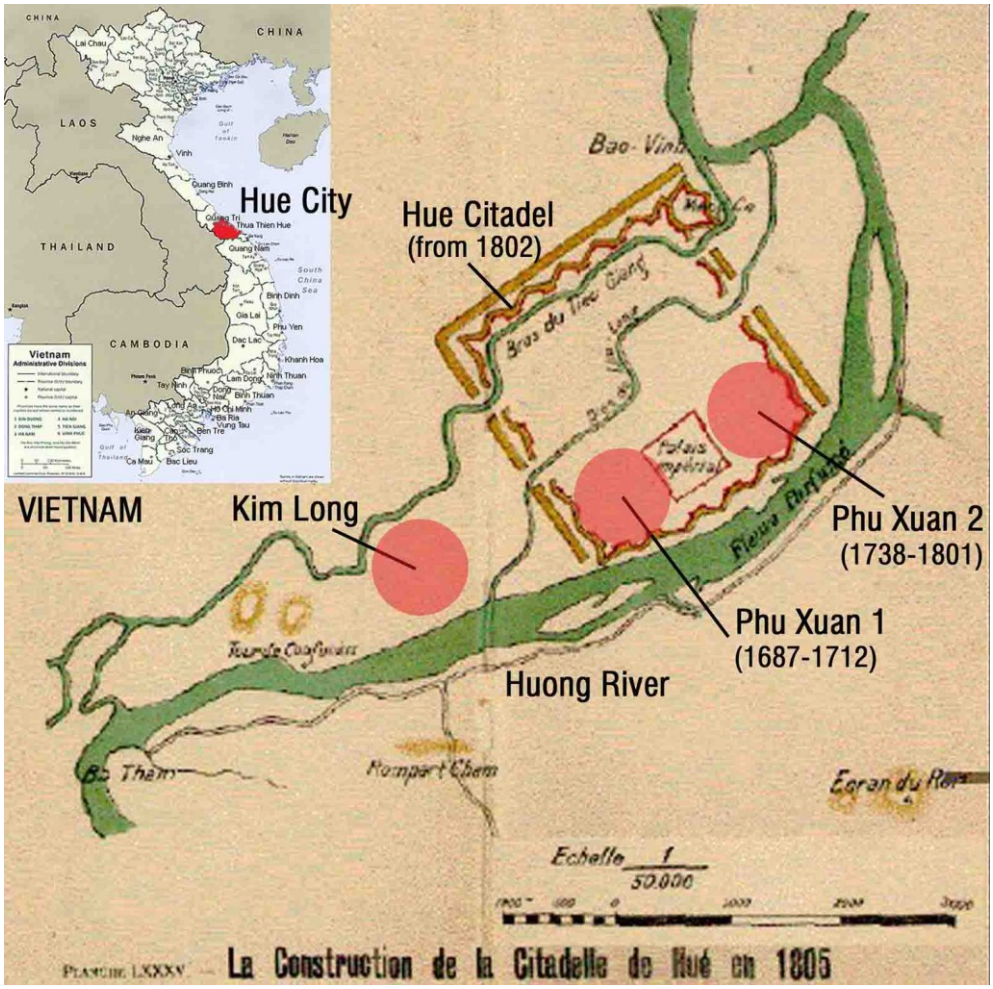


Figure 3.3 The process of moving Hue urban space Historical process of change the location of Hue City before 1802 (edited, source : Ardant du Picq, *Bulletin des Amis du Vieux Hué,* Vol. 1924, No. 3, p. 244)

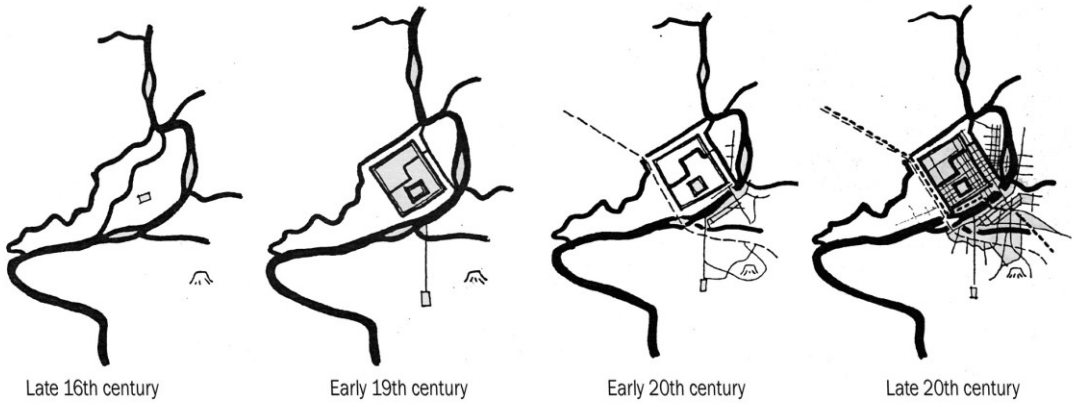


Figure 3.4 The urban spatial transformation of Hue through phrase (source: Adamson M. and Ejdeholm L.M., *At the Heart of Hue: Assessment of The Public Spaces along The Song Huong,* Department of Architecture, Lund Institute, 1999)

In 1801, Nguyen Anh returned to occupy Phu Xuan. In 1802, he came to the throne with the Gia Long name. Phu Xuan was chosen as the capital of the country. In 1803, Gia

Long King started on the planning, design and preparation of the project "Capital Planning". Under the Gia Long Reign, architectural space of urban Hue began to be clearly formed.

In the process of development for 330 years (1687 - 2016), Hue city had experienced many times in planning. On administrative aspect, it was called as Phu Xuan, a village located on the northern of Huong River. Since 1687, when Lord Nguyen Phuc Thai chose Phu Xuan as the political center of Annam, it began to be urbanized as a palace, and then was built by Lord Nguyen Phuc Khoat to become a capital (1738-1775). But it was until the early 19th century, after King Gia Long's unification and the imperial throne, the Hue city was re-planned and expanded to be worthy as the capital of the country. On this architectural planning, the Citadel was considered to be the core of the whole city. Since then, the main characters of the urban Hue with its original functional quarters had remained virtually unchanged (figure 3.3 and 3.4).

3.2 Ideology in Hue Citadel planning: Feng Shui principle

As early as the 19th century, the Nguyen Dynasty was especially interesting in the environmental sense and the Eastern philosophy ideology in urban planning. They were the constructive planning criteria, which based on the Feng Shui methodology, being a main idea in the general planning of the architectural layout of Hue Citadel.

The Vietnamese historical book recorded that early 1687, when the land of Phu Xuan Village was selected first time to establish the capital of Annam, the architects of urban planning designed as *"Use the mountain in front (i.e. Ngu Binh Mountain) as a Screen, fill up the wall, build a palace, dig in front of a large lake etc."*[38]

Shigeru Satoh (2005) mentions Feng Shui in his article on paper *'Towards Conservation for Historical Urban & Rural Environment in Hue area* that *"In east Asian and east-south Asian regions we have very particular sense of environment, philosophy of environment. The idea is people and physical setting is one belonging to the nature. Natural and geographical setting could exist there, forever. We should maintain the harmony of natural and physical environment, which was made up based on local topographical form. This is Feng Shui Theory. In each region of east and east-south Asian, they developed their own Feng Shui Methodology to adapt it to each characteristics of delicate nature."*

N. H. Dung, V. N. Duc mentioned the 'Eastern philosophy' in our article that *"Long time ago, in East Asian and Southeast Asian, there were very particular sense of environment, philosophy of environment. In the same way, the Vietnamese predecessor smoothly used philosophical ideas for design and urban planning basing on the natural elements. The idea of people and physical setting is belonging to the nature. Nature and human could exist there forever.*

According to the universe opinion and human opinion of the ancient Eastern people, they were aware that there should be no antagonism between man and nature: "man-nature unification". This was the principle of Eastern architectural art thousands of years ago that humanity nowadays calls as landscape architecture. Base on natural geographies, Hue urban planning utilized surrounding natural resources and tropical climate to create a suitable living environment."[39]

Relation to the plan layout of planning project, Five Element Theory had an important role. According to the old people, each element has its own characteristics and

[38] Quốc Sử Quán triều Nguyễn (The Association of History of the Nguyen Dynasty), *Đại Nam thực lục* (*Chronicles of Greater Vietnam),* Vol.1, Translation: Institute of History, Social science Publisher, Hanoi, 2004.

[39] Nguyen Hong Dung, Vo Ngoc Duc, *Identification of the natural elements for sustainable development in the urban structure of Vietnam: the case study of Hue City,* Journal of Environmental Science and Development (IJESD, ISSN: 2010-0264), 2018, Vol. 9(9).

associations with different aspect of nature, such as direction, color, shape, could be the Table 2.3.

Table 2.3 The relationship between Five Elements and directions, colors, shapes

Five elements	Metal	Wood	Water	Fire	Earth
Direction	West	East	North	South	Center
Color	White	Blue	Black	Red	Yellow
Shape	Round	Rectangular	Undulating	Angular	Square

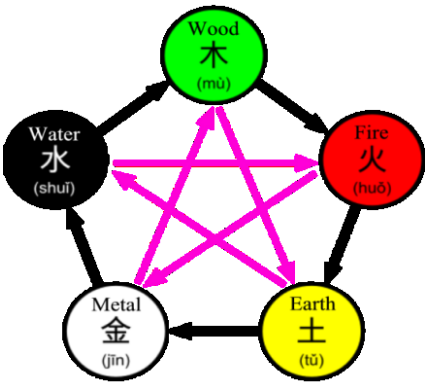


Figure 3.5 Five Elements
Generating interaction
Overcoming interaction



Figure 3.6 Yin and Yang Elements

Five Element Theory argues that the world changes according to the five elements' generating or overcoming relationships. Generating and overcoming are the complementary processes of the Yin and Yang (figure 3.5 and 3.6).

Urban structure according to Feng Shui principle

The position, direction and layout of components of Hue Citadel were carefully selected, containing full geographical features such as rivers, mountains, plain and special natural features. The historical book records that early 1687, when the land of Phu Xuan village was selected first time to establish the capital of Annam, the architects of urban planning designed as *"Use the mountain in front (i.e. Ngu Binh Mountain) as a Screen, fill up the wall, build a palace, dig in front of a large lake etc."*[40] According to the Feng Shui principle, Huong River and Ngu Binh Mountain as front Screen for Citadel, two small islands were two factors left Blue Dragon and right White Tiger, forming general space of Hue urban Masterplan (figure 3.9).

[40] Quốc Sử Quán triều Nguyễn (The Association of History of the Nguyen Dynasty), *Đại Nam thực lục (Chronicles of Greater Vietnam),* Vol.1, Translation: Institute of History, Social science Publisher, Hanoi, 2004.



Figure 3.7 Scheme of La Kinh (compass) for the indication of good direction. Note: A: The position of Thai Hoa Palace (place of the throne), BCDE: wall of Imperial City, abcde: wall of Citadel, B'A': the axis of Imperial City and Citadel (source: Phan Thuan An, op. cit., p. 113)

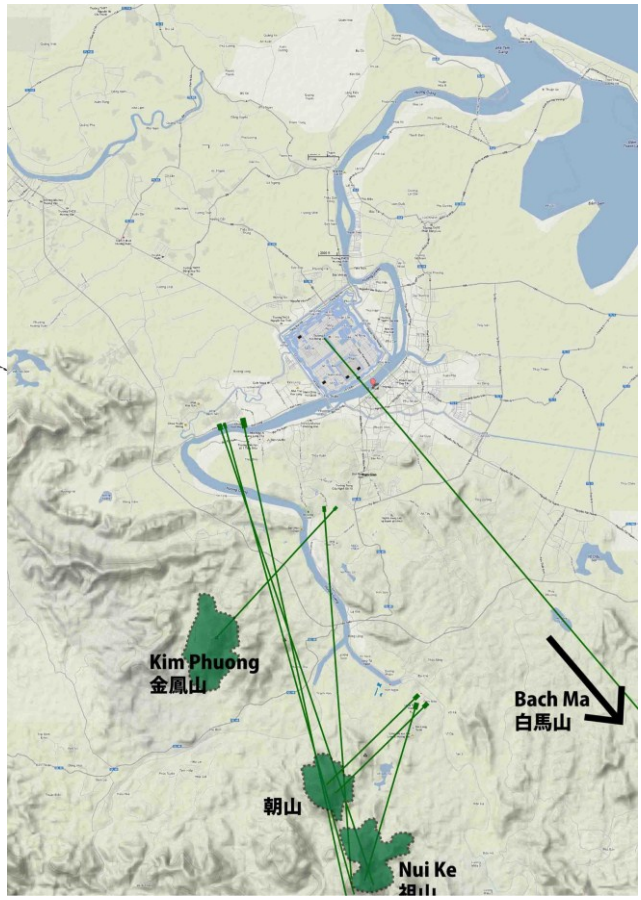


Figure 3.8 Main divine axis and relationship between Hue Citadel, the Royral Tombs and special natural elements (source: Waseda University)

The oriental people used a compass which has several concentric circles having the symbols of the Eight Trigrams (Bát quái) to find a good position and orientate a good direction (figure 3.7). Besides, the idea of axis towards mountain top was also applied closely to the design in the Royal Tombs and Temples in the west south and west landscape of Hue City (figure 3.8).

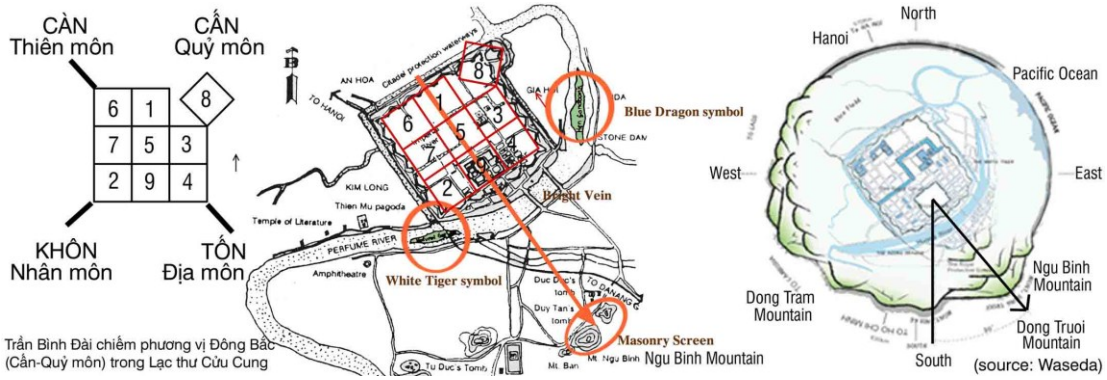


Figure 3.9 Nine squares (Lạc Thư Cửa Cung), main divine axis and relationship between Hue Citadel with special natural features

Following the concept: *"Son of Heaven - Emperor had to direct his face to the South to rule world the people",*[41] and also took the advantage of good land position to create the city. Their buildings were arranged symmetrically by a main axis, calling divine axis. In reality, in Hue Citadel, this axis was towards the east-south because of the location and retaining of the main idea of Feng Shui theory.

In layout, the walls were arranged on the longitudinal axis (located in the direction Northwest - Southeast), including Ngu Binh Mountain, Nghenh Luong Hall, Phu Van Lau, Flag tower, Ngo Mon Gate, Grand Gate, Thai Hoa Palace, Can Chanh Palace, Can Thanh Palace, Khon Thai Palace, Kien Trung Pavilion, Tu Phuong Vo Su Pavilion. This was the main and important axis. The arrangement of the two sides on the main axis is according to the Eastern traditional regulation.

Vietnam has the same position with China, Korea, Japan, etc., so it was also influenced by the ideology of Confucianism, the Yin Yang theory, Five Elements theory, Three Element theory. The ideology of Confucianism used "Rite" word to control activities for creation of regulations relating architectural rules which established stratified different levels in architecture. The Yin Yang and Five Element theory specified located emperor's palace in center (center of the universe). The theory of emblematic numbers expresses that three and nine were very important. Three shows the relationship between universe and house, Three is the number of components in the universe as God, Human, and Earth (figure 3.10). Nine is the emblematic of the ancient Eastern world. This theory also influenced deeply into interior layout, parts and structures of building such as length, width, height, columns, doors etc. as the parts of Ngo Mon Gate (main gate of Imperial City) followed with the numbers on the principles such as No.5, No.9, No.100. The five gates of Ngo Mon symbolized the Five Elements, in which King Gate belonged to Earth element with yellow color.

The position, direction, layout of city according to this way creates a sustainable model which harmoniously adapts to the natural resources. This solution also enhances the convenient elements and reduces the disadvantage from natural conditions such as hot sun, wind, rain etc.

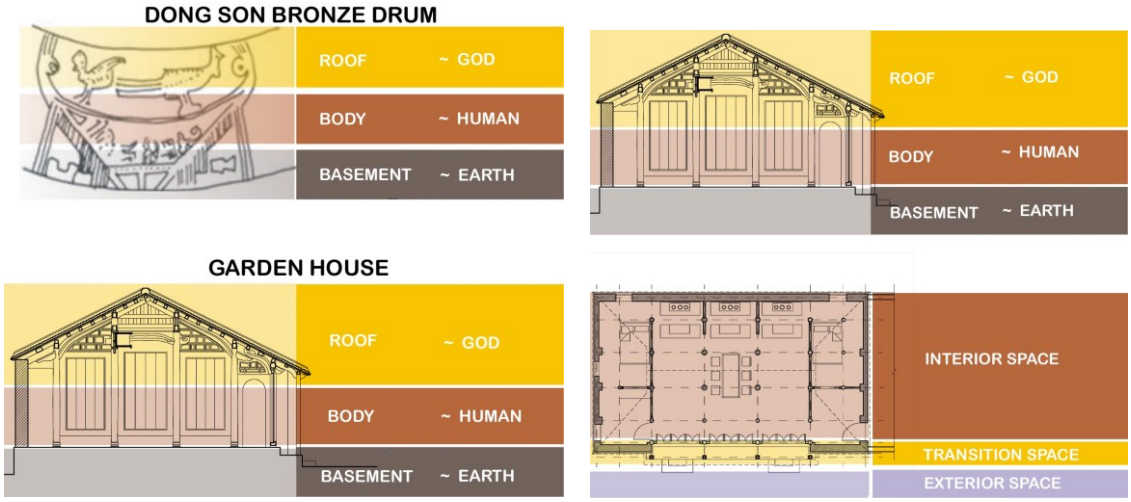


Figure 3.10 Hue Garden house's layers with Three Element Theory

[41] *Chu Dịch bản nghĩa (trong bộ Ngũ Kinh độc bản)* by Han, Khải Minh Thư Cục re-published, Hong Kong, 1953, p. 71, re-cited by Phan Thuan An, op. cit., p. 112.

3.3 Planning of Hue Citadel

3.3.1 The process of Hue Citadel building from 1802 to 1883

In 1801, Nguyen Anh returned to retake Phu Xuan. In 1802, he was crowned Gia Long Emperor and chose Phu Xuan as the Capital of the country. In 1803, Gia Long King embarked in the planning, design and preparation for the project 'Capital Master Plan'. Under Gia Long reign, the urban architectural space of Hue City began to become clearly, basically in urban planning.

The Citadel location fronted the Huong River with convenient water transportation, was also surrounded by mountains for easy protection. Hue Citadel was built of three square shapes from inside to outside including: the Imperial City, Forbidden City (built on 05/9/1804), and Citadel (built on 05/28/1805). The Citadel was 520 hectares in area. The rampart system with several major buildings was built on a same axis from west-north to east-south. In this period, the Huong River were the major transportation, their artificial and natural branches were as secondary routes use to move inside Citadel. These river branches, which flowed through the Citadel, combined with forty-one lakes and tree system, creating the ecological landscape's system, self-regulating water flow for the local residents.

Hue Citadel was planned on 05/01/1803. According to researcher Phan Thuan An quoted in his article[42], *"The King said that the galaxy was determined, want to expand the Capital to be the place of the four directions meeting. Capital will go to Kim Long Commune, east to Thanh Ha Commune, see the terrain of the place. According to Commander Nguyen Van Yen, the new capital will go out of four faces outside the old Phu Xuan Capital to more expand. The King determined how to build wall etc."*[43]

From that time, the relationship of the City to the river system was closely linked. In the overall urban planning, Capital lies on two branch Huong River which impeded the construction. The Nguyen Dynasty's historical books did not record clearly and coherently the solutions to solve this difficult problem. However, in the early decades of the 19th century, two French researchers, Léopold Cadière and Ardant du Picq, came there to understand and give their ideas.

In his article on *'Ngu Ha River'* (inside the Citadel), published in the journal *'Ancient Capital' (Bulletin des Amis du Vieux Hué)* in 1915, Léopold Cadière began to study the relationship between the old Kim Long River and Ngu Ha Rivers. He mentioned the river branch of Kim Long from the ancient times and its disappearance after the construction of the Citadel (figure 3.11).

Before 1802, the Capitals of the Nguyen lords were built on a land where the south bank was the Huong River and the north bank was the Kim Long River. According to some Western authors who were present in Hue in the 18th century, this area was known as 'Île du Roi'. One of the witnesses wrote in 1747 that *"the Kim Long River flows around the back of the Island."*[44] (figure 3.12)

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[42] Phan Thuan An, *Architectural planning of Hue Citadel in the beginning of the 19th century and its sustainable humane values in Hue City,* Journal of Research and Development, No. 6 (132), 2016.

[43] Quốc Sử Quán triều Nguyễn (The Association of History of the Nguyen Dynasty), *Đại Nam thực lục*, translation, op. cit., Vol III, p. 116.

[44] Cited by Léopold Cadière, *Le Canal Impérial, Bulletin des Amis du Vieux Hué*, 1915, p. 23.

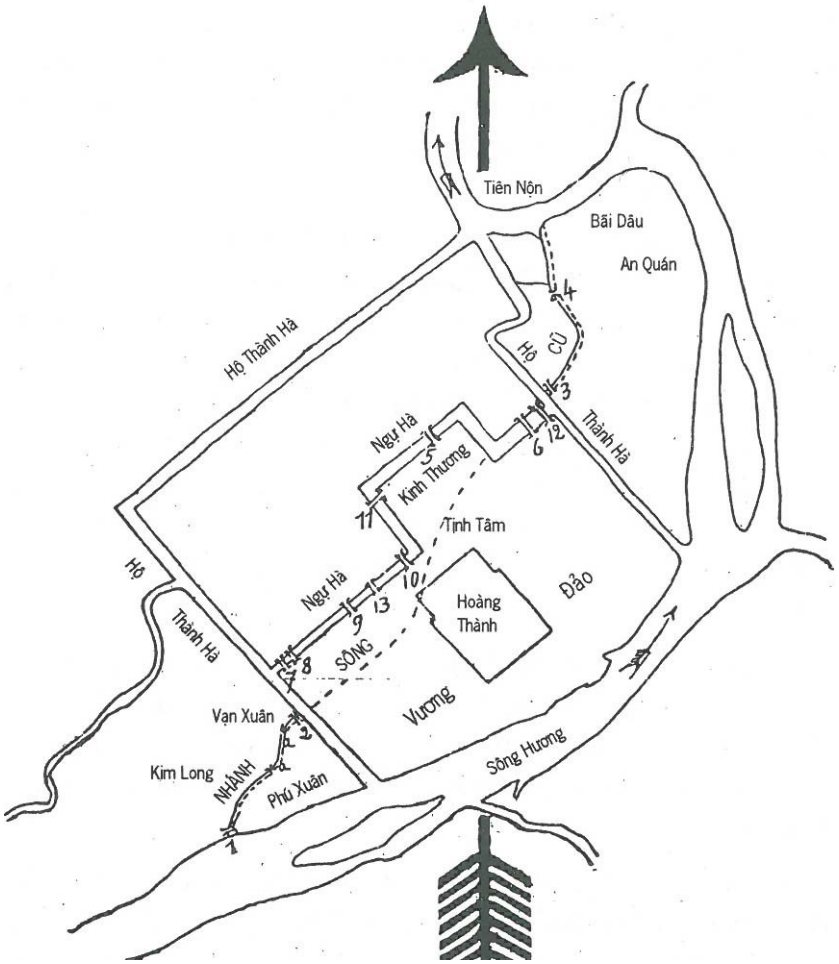


Figure 3.11 Diagram of flow system in the vicinity of the Hue Citadel
Note: 1. Kim Long market Bridge, 2. Ke Van market Bridge, 3. Lai The Bridge, 4. Brick Bridge, 5. Ngu Ha Bridge, 6. Thang Long Bridge, 7. Hoang Te Bridge, 8. Tay Thanh Thuy Quan Bridge, 9. Vinh Loi Bridge, 10. Khanh Ninh Bridge, 11. Bac Te Bridge, 12. Ham Te Bridge, 13. Wood Bridge. (source: Léopold Cadière, *Le Canal Impérial, Bulletin des Amis du Vieux Hué*, 1915, p. 91)

In 1924, the French named Ardant du Picq mentioned to the distortion of the second branch of the Huong River (the Bach Yen River). After studying the geographical appearance of this area through history and comparison with what was investigated in the Citadel, studying the military defense architecture of the citadel, he gave the hypothesis that the Bach Yen River was also buried a half of lower section of river to build the citadel since 1805. This was also mentioned in '*Bulletin des Amis du Vieux Hué*' in 1924.[45]

[45] Ardant du Picq, *Les fortifications de la Citadelle de Hué,* in "*Bulletin des Amis du Vieux Hué*," No. 3, pp. 221-245.

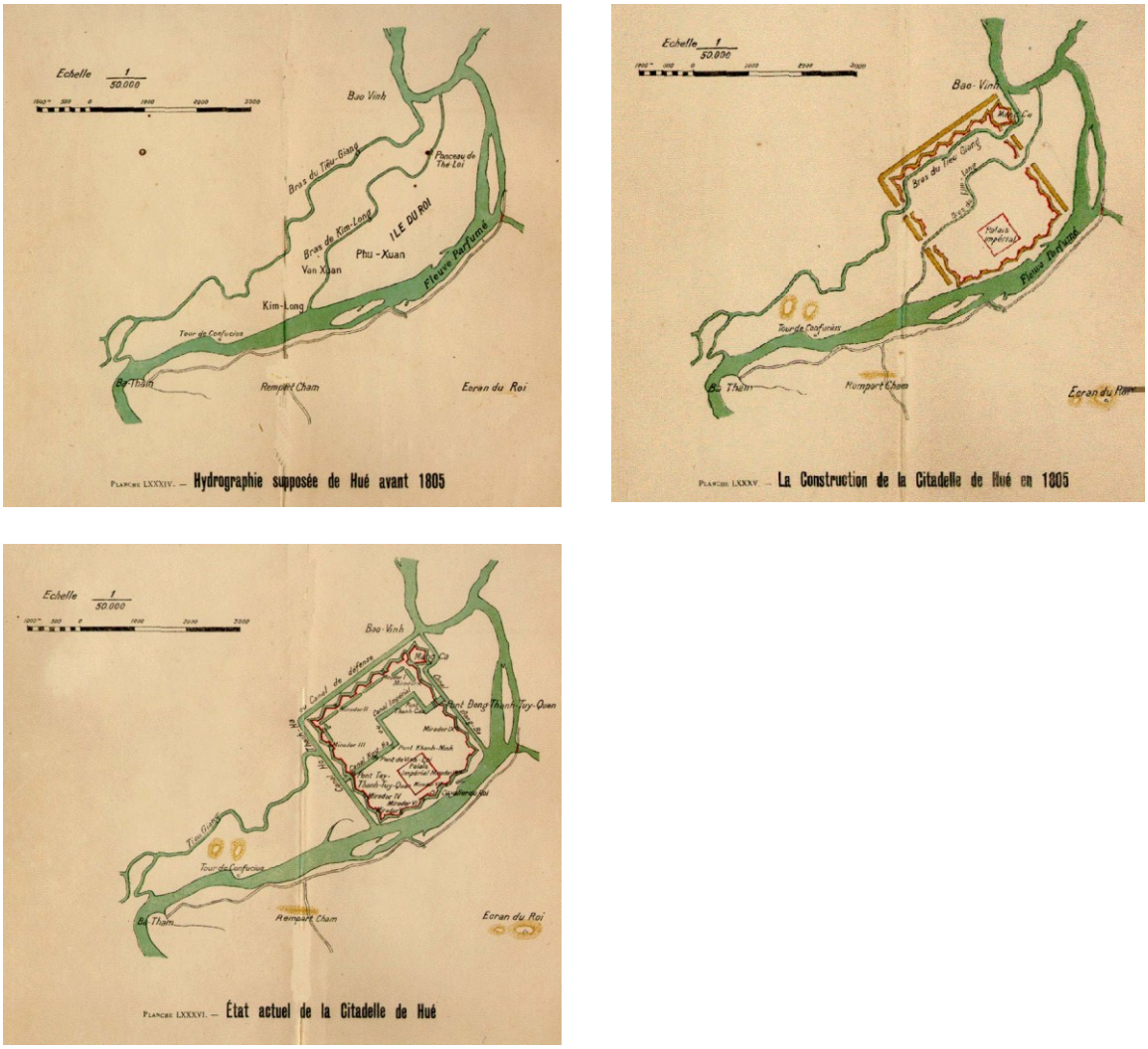
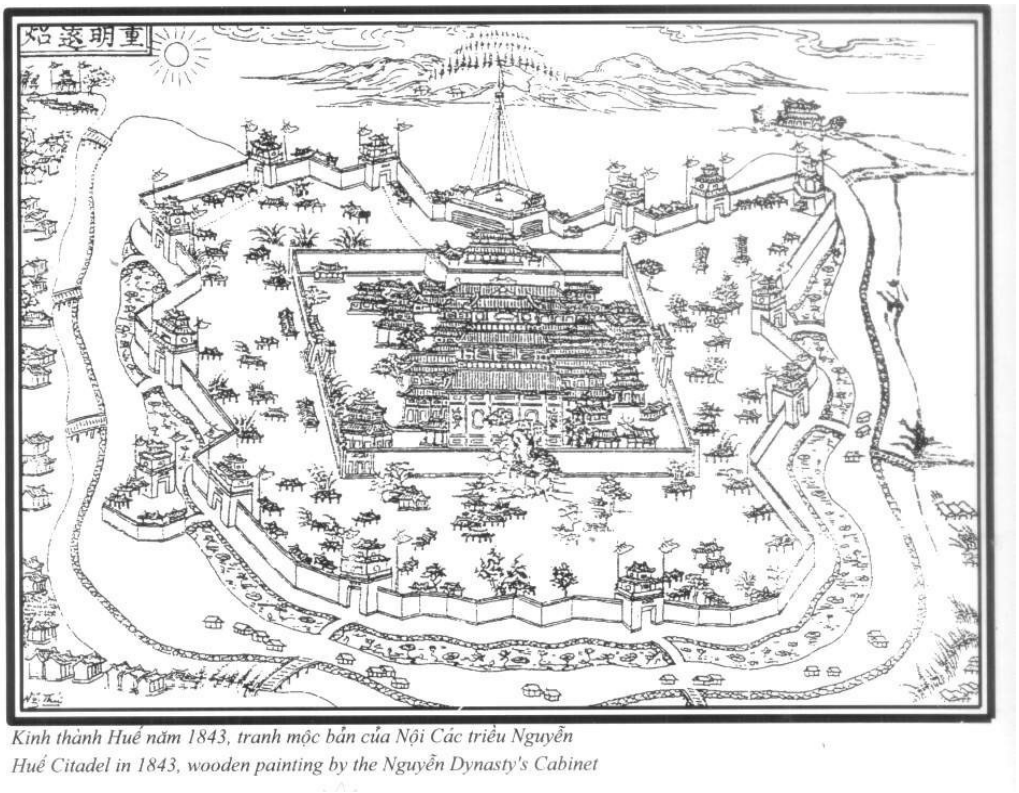


Figure 3.12 Diagram of flow system in the vicinity of the Hue Citadel according to Ardant du Picq (source: Ardant du Picq, *Les fortifications de la Citadelle de Hué,* in *"Bulletin des Amis du Vieux Hué",* Vol. 1924, No. 3, pp. 244-245)



Kinh thành Huế năm 1843, tranh mộc bản của Nội Các triều Nguyễn
Huế Citadel in 1843, wooden painting by the Nguyễn Dynasty's Cabinet

Figure 3.13 Hue Citadel in 1843, wooden painting by Nguyen Dynasty Cabinet (source: Nội Các triều Nguyễn (The Cabinet of Nguyen Dynasty), *Khâm định Đại nam Hội điển Sự lệ,* Vol. 13, Thuan Hoa Publisher, Hue)

According to the historical books of Nguyen and *'Bulletin des Amis du Vieux Huế*, the structure of the citadel consisted of three walls surrounding each other, built as follows:

The outer wall: the Hue Citadel was a work of unique architectural art, built for twenty seven years (1805-1832), the great and powerful fortification than any other capital cities in the history of Vietnam feudalism. It followed the fortification model of Vauban style with typical elements from the European military architecture. The similar square shape has 2487 m in length of each side, 9000 m in circumference, 6.6 m in height, 4 m in width; eleven gates, twenty four forts, inside chess-board street system[46]. Initial Citadel made of earthen, until the end of Gia Long Reign, it was changed to made of brick. At the northeast corner, there was a small citadel, called Tran Binh Dai tower, was built hexagon shape, 1000 m in circumference, with a connecting door to the Citadel. Surrounding outer wall was the space of covered moat and river. Particularly, the canal system (Ho Thanh Hao) is both function of protection and water transportation with the length of 7 km (In the west is the Ke Van River, the north is An Hoa River, the east is Dong Ba River, and the south is Huong River). This rampart kept the tight defensive role for Hue City. The Citadel was the living place of offices and inhabitants (figure 3.13 and 3.14).

During the period of rampart building, it was said that the materials for the rampart building were one of kind of the land used by the man-made river moats outside to build the rampart. The rampart and defense system were related closely. During the time of Hue

[46] Quốc Sử Quán triều Nguyễn (The Association of History of the Nguyen Dynasty), *Đại Nam thực lục* (*Chronicle of Greater Vietnam),* Vol. 1, Translation: Institute of History, Social science Publisher, Hanoi, 2004.

Citadel construction (1805-1832), both Ho Thanh Hao and Rampart were built at the same time. According to the National historiographer's Nguyen Dynasty:

"The Citadel was built on the date of Quy Mui. Four sides of the ramparts are 2.487 meters in length 4 meters in height 7 meters in width; four sides of the moats are 2.503 meters in length, 4 in height, 7 meters in width"[47]

Or according to the book *'Dai nam nhat thong chi'*:

"The perimeter of moat is 19 meters in length, 7 meters 5 in width, 1 meter in depth. All the gates of moats have the stone bridges"[48]

Historical documents of Nguyen Dynasty also mentioned many times to the renovation of the damaged and landslides moats, especially during the duration of four first reign Kings of Nguyen Dynasty, from Gia Long, Minh Mang, Thieu Tri to Tu Duc. And until the war happened long period, Citadel was seriously damaged. The waterway system of Citadel and Defensive Moat was no longer interested and became forgotten gradually.

Defensive Moat (Ho Thanh Hao) was the waterway systems outside the Citadel. According to the Cabinet of Nguyen Dynasty:

"The moat system has eleven gates around with 5 meters 7 in width, 1 meter in depth and the stone bridges are used for each gate, outside of the bridge having a square building. Two sides of moats are the mountainous rocks, outside of the moat, there is the guard city walls built by land, the right side is 338 meters 5 in length, the left side and back side are 415 meters in length of each side."[49]

The two banks of Defensive Moat were built by the mountainous rocks, stones, and taking from the mountainous areas of Hue City. According to Ardant du Picq, the thickness of the embankment was from 1 m – 1.5 m, and because of this additional embankment makes the banks of Ho Thanh Hao narrow, its origin is actually about 40 m in width:

"In 1805, between the canal and the rampart, the moats of the Hue Citadel were dug at 30 m in width, 4 m in depth and there was a road with 10 m wide along the moat in the layer of moat and layer of rampart, etc. The rampart of bricks was built in 1818-1819 to the south side, west side and north side, and then the rampart to the east was made by brick under Minh Mang Reign in 1822. It is supposed that the rampart was added to the outside of the old ramparts which didn't destroy. So it could explain that the bank of rampart is narrow than the old bank of rampart from 10 m down to 8.5 m, (average 7 m ground + 1.5 m in thickness of the trenched rampart). So in 1822, the moats had not still thick walls keep the embankment from 1 m to 1.50 m, obviously, because the embankment rampart was built later, when the width of the trench initially was 40 m."[50]

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[47] Quốc Sử Quán triều Nguyễn (The Association of History of the Nguyen Dynasty), , *Đại Nam thực lục,* op. cip., Vol. 1, p. 630.

[48] Quốc Sử Quán triều Nguyễn (The Association of History of the Nguyen Dynasty), *Đại Nam nhất thống chí,* op. cit., 1969, p. 14.

[49] Nội Các triều Nguyễn, *Khâm định Đại nam Hội điển Sự lệ,* Vol. 13, p. 119, Thuan Hoa Publisher, Hue.

[50] Ardant du Picq, *Bulletin des Amis du Vieux Hué,* Vol. 1924, No. 3, p. 227.

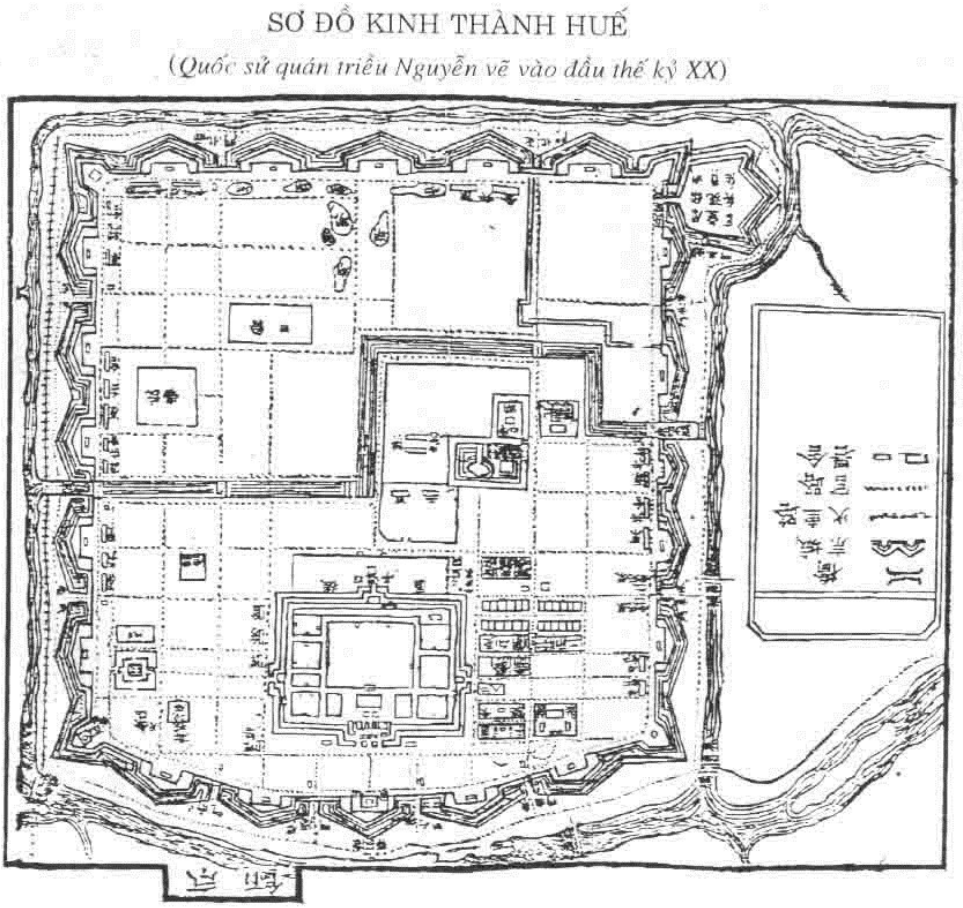


Figure 3.14 Hue Citadel in Nguyen Dynasty period (source: Quốc Sử Quán triều Nguyễn (The Association of History of the Nguyen Dynasty), *Đại Nam thực lục* (*Chronicle of Greater Vietnam),* Vol.1, Translation: Institute of History, Social Science Publisher, Hanoi, 2004)

The inner wall: the Imperial City also knew as the Imperial Palace, was rectangle shape with 606-622 m in dimension. The wall made of brick with more 4 m in height, about 1 m in thickness, 2356 m in circumference, and 37.5 ha in area. The inside of the Imperial City was divided into spaces with different functions. It opened four doors, and there was around green space of rampart including protective moats and trees. The Imperial City was the place for work, worship of the King (figure 3.15).

The last inner wall: the Forbidden City was the center of the Citadel and Imperial City, rectangle shape with 290 x 324 m in dimension, 9ha in area and 1228m in circumference. It opened seven gates; 3.1m in height of wall, 0.72 m in thick. The Forbidden City was the residence and activities of the King, Queen and their children.

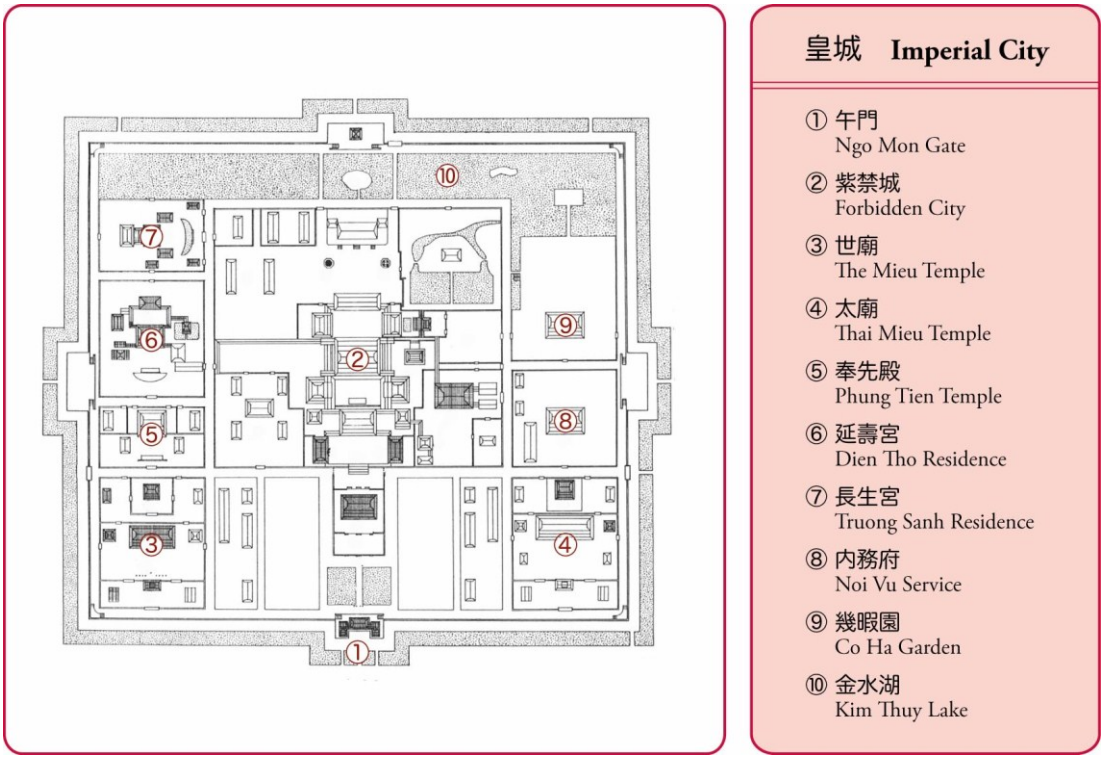
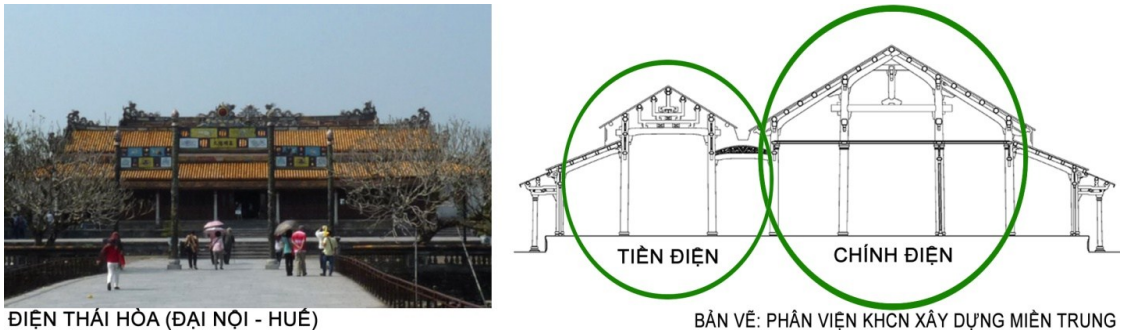


Figure 3.15 The Imperial City and Forbidden City in 1804-1833 period (source: Waseda University)

The palace buildings in the Imperial City and the Forbidden City were built in the traditional Vietnamese style. In this thesis the author limits the focus to the architecture of the Citadel and the type within the Citadel. The Royal architecture is mentioned in another matter (figure 3.16 and 3.17).



ĐIỆN THÁI HÒA (ĐẠI NỘI - HUẾ)

BẢN VẼ: PHÂN VIỆN KHCN XÂY DỰNG MIỀN TRUNG

Figure 3.16 Architecture of Thai Hoa Palace, Imperial City (source: Nguyen Van Tan, Dang Minh Nam, Hoang Van Hien, Vo Ngoc Duc, Nguyen Quang Tuan, *Establishment of the database for the restoration and conservation of Van Thanh and Vo Thanh historical monuments in Hue City basing on the application of information technology*, The mission of international cooperation in science and technology by Protocol project between the Polytechnic University of Marche in Italy and Hue University of Sciences Vietnam, Hue, 2013)



Figure 3.17 Architecture of Hien Lam Cac Pavilion and Phu Van Lau Pavilion (source: Nguyen Van Tan, op. cit.)

In the next of half century (1834-1883), at the north bank of the Huong River, Hue Capital continued to develop in traditional architectural style, expand gradually many different spaces outside the Citadel. The buildings in the Imperial City not only followed the traditional style of the North but also integrated special style of southern city as Hoi An. The urban spaces as Kim Long, Vi Da, etc. were also formed during this period.

3.3.2 The urban formation of Hue Citadel during feudal period from 1884 to 1899

In June 1884, the Patenoote peace Treaty was signed in Hue Capital, which divided Dai Nam (former name of Vietnam) into three regions: Cochinchina which was a French colony, Tonkin and Annam under the protectorate of France with Nguyen Dynasty still nominalized in control.

"When the French claimed Hue as a protectorate through the Treaty of Hue, the city once again experienced upheaval. To fortify their base in Hue – the political center, the French desired to be transferred military and residential land in the city from the Nguyen Dynasty (figure 3.18), and they won the success through political negotiations. In the last twenty-six years of the 19th century, in the so-called political region, right on the opposite side of the Hue Citadel over the Huong River, arose a modern French quarter, including national offices such as the French Residence Superior of Annam (Résidence Supérieure de l'Annam), Department of Gendarmes; public infrastructure such as Hue National School, Dong Chua Cuu The and Phu Cam Churches, Hue Hospital, and the Hue Post Office; and a residential zone with several villas, shops, restaurants, and small workshops. Right inside the citadel, the French Mang Ca

military base was set up in 1884, and expanded in 1886 into the Tran Binh concession area, which was located on the northeast edge – the most vulnerable part of the citadel, where they could observe and control every move from Thuan An Sea-gate to the Huong River and a turning flow.[51]

The area differed from the old citadel in that it now had a modern zone with new roads named after deceased French soldiers, as well as military bases, banks, restaurants, libraries and food storehouses in the concession area appeared."[52]

In a last attempt to improve the local economy, in 1899, the Hue Court built the Dong Ba Market right on the foot of the citadel to enable the local people to share the benefits from commerce at Hue with the Chinese, and French.55) However, somehow, the Chinese merchants were able to make themselves present among the native people in this market, and also the new lively commercial center – Truong Tien Street (now called Tran Hung Dao Street), located along the Huong River, where it appeared the Dong Ba Market)[53]

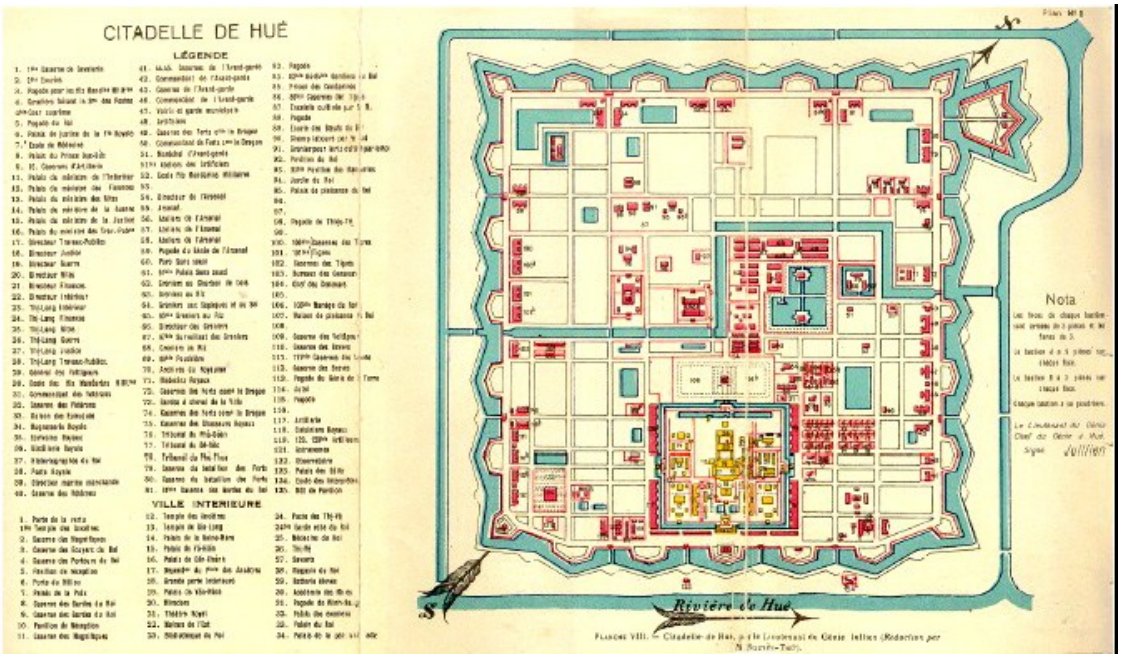


Figure 3.18 Hue Citadel in colonial period (source: Ardant du Picq, *Bulletin des Amis du Vieux Hué,* Vol. 1933, No. 1-2, p. 65)

In short time, under the influence by French power, Hue lost its role of being the capital of Vietnam by the end of the 19th century, long before the official collapsable of the Nguyen feudal Dynasty in 1945.

[51] Nguyen Thi Thanh Ha, *The Hue Citadel Area in the Transition of Urban Composition The Hue Citadel Area in the Transition of Urban Composition,* Journal of East Asian Cultural Interaction Studies, Kansai University Institutional Repository, 2010, pp. 529-544.

[52] Nguyen Thi Dam, Huynh Kim Thanh, *The transition appearance of Hue city in the end of 19th century and the beginning 20th century,* Southeast Asia Studies, Vol. 05, 2006, p. 33.

[53] Tran Kinh Hoa, *Minh Huong village and Thanh Ha street of Thua Thien province,* Journal of University, No 3, July, 1961, p. 118.

3.3.3 The urban formation of Hue Citadel under French colonization from 1900 to 1945

Since 1900, the French government in Indochina had carried out the construction of headquarters in Hanoi, Hue lost its role of being the capital of Vietnam by the end of the 19th century. Most of the architectures were of the type of buildings, mansions, offices or half-office buildings, some forms of official architecture were imported from France.

The architecture of this phase was also deeply studied in order to get rid of the simple functionalism of pre-colonial architecture. Neoclassical architecture style was popular in the offices of French colonial administration.

After 1920, new architectural styles were experimented to replace the classical French architectural style, imported from the country. It was a trend to explore Asian-European combinations, that was, to exploit traditional architectural features as well as to pay attention to the local climate and materials. A significant trend in this period was the Art Deco with its modern architectural features, which escaped from the classical architectural details, towards simple geometric and linear form. It became a powerful trend, parallel developing with Indochinese architectural style, both of which had left many valuable architectural works.

French people had been tropicalized as 'Western quarters' in Hue (figure 3.19). They introduced new materials, techniques and construction technologies from European to change the appearance of the city such as cement, reinforced concrete, iron, tile tiles, brick heating technology, iron pipes, ceramic etc (figure 3.20).

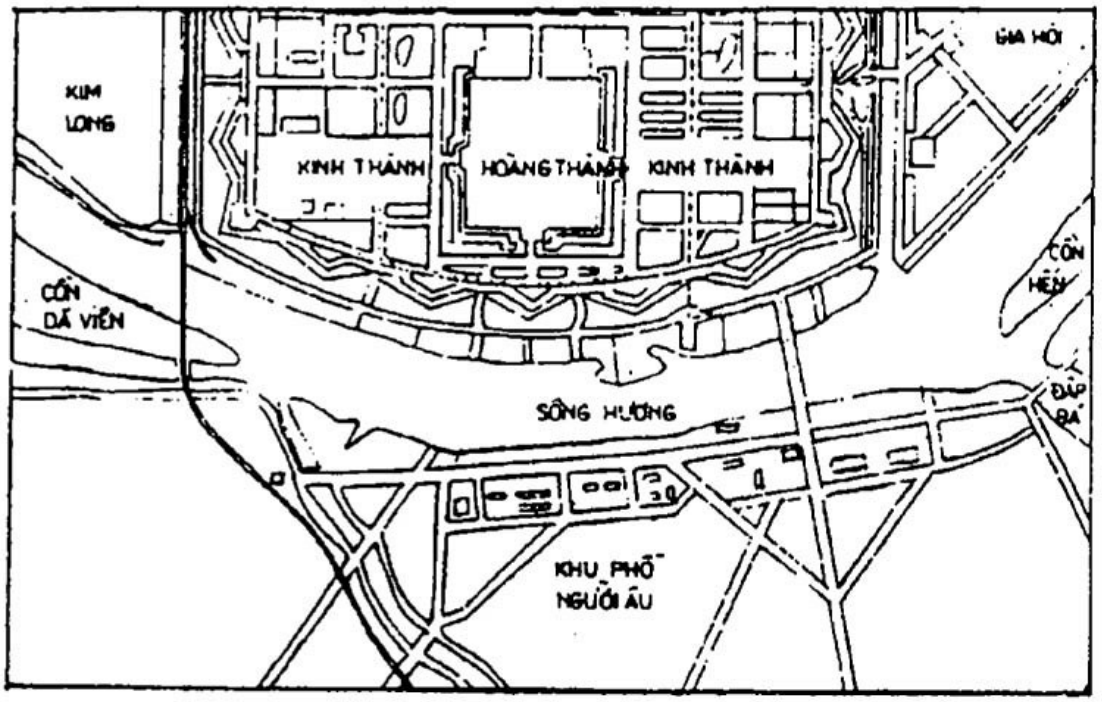


Figure 3.19 The Western Quarter in Hue of Huong River (source: (source: Nguyen Dinh Toan, *Vietnamese architecture through Dynasties,* Construction Publisher, Hanoi, 2010, p. 180)



Figure 3.20 Some colonial buildings in Western Quarter in the south of Huong River

As most other cities in French Indochina, in Hue Capital, the colonial government established a new neighborhood following European architectural style, opening up new urban spaces at the southern bank of the Huong River. These spaces were formed from Dap Da to Hue station to the south of the city. The French created an area following modern architectural style with concrete material from Europe. A style of garden villas adapted to suitable local climate as slope root with reaching out of wall, thickness wall, double-layer windows, etc. This architectural style proved itself to adapt to tropical climate with hot humidity and many rain. The new space on the southern bank of the Huong River existed parallel with the space on the northern bank.[54] In his article, the famous Hue researcher Nguyen The Truyen commented: *"Althought the quarter was built by the French, it was lucky because the planning designer created a Western Quarer in a conscious way, respecting the beauty of the nature, the Huong River in particular, and the beauty of overall architecture of Hue Citadel in general. Therefore, they were not opposed to natural scenery and monuments, the buildings and villas were built with consciousness in which were far from old city and did not block the view to the river."*[55] (figure 3.21)

Thus, during the long time (until 1954), two types of the architectural space on both sides of Huong River were created in two historical periods, with different backgrounds and functions, being not same style but coexistence in harmony, following a common

[54] Vo Ngoc Duc, Antonello Alici, *Urban morphology of Western military architecture in the urban development of Vietnam: the case study of Hue City,* International Conference on "Changing Cities III: Spatial, Design, Landscape & Socio-economic Dimensions" organized by The Laboratory of Urban Morphology & Design; Department of Planning & Regional Development, School of Engineering, University of Thessaly Volos, Greece on 26-30/06/2017.

[55] Nguyen The Truyen, *Exploiting the characteristic spaces, elements make up the identity in Hue urban planning,* Construction planning Magazine, Urban planning Institute, Ministry of construction, No. 4(5) 2003, Hanoi, p. 17.

opinion which preserved and respected the local natural landscape. With two completely different forms, they were not only antithetical but also retained poetic harmony.

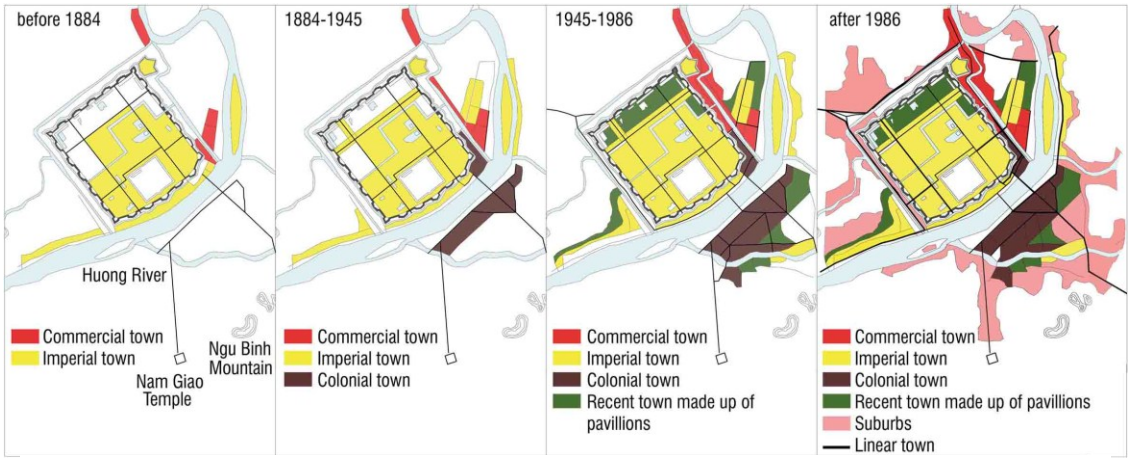


Figure 3.21 History of the formation and transformation of Hue Citadel space

Thirteen Nguyen Dynasties successively followed for 143 years (1802-1945) along with the treasure, effort and wisdom of the people of the country to build a historical capital with a general complex, arranged in a unified, tight, balanced and harmonious way, including many spaces that today had become a unique cultural heritage.

3.3.4 The architectural status of Hue Citadel after 1945

In 1945, Bao Dai King acknowledged the termination of the Nguyen Dynasty. Then, Vietnam experienced the war against French (1945-1954), the war against American and the "old regime" (1954-1975). The impact of the war destroyed heritage monuments and ecological landscape system. Especially, Mau Than War in 1968, most of the heritage buildings in the Citadel severely demolished such as the Imperial City, Forbidden City, Luc Bo, Tan Mieu, Thuong Mau Vien, etc. Hue City was also place where people took cover into bullets, artillery, bomb, etc., the war made rapidly the changing of urban form.

Until 1945, when the last king of the Nguyen Dynasty, Bao Dai, abdicated, the imperial architecture system in Hue was still maintained rather complete. But, from the beginning of 1947, it was severely damaged by the severe storms, the destruction of time, and even the hands of the unconscious. Since 1954, except for some ruins, the remaining buildings became relics and they were preserved in difficulty as the war continued.

After Vietnam became a unified country (1975), due to the influence of urbanization, market economy; and thus, a large number of immigrants moved into city, they occupied the land, built houses in many several types, even some buildings were located on the rampart and surrounding cover moats with different appearance of surface. Moreover, human diverse activities encroached on the land with many participants, daily activities, and environmental pollution. As the result, the urban heritage and ecological landscape structure changed a lot, urban morphology is no longer original. The process and survey show that the activities of local people in the area around the Citadel took regularly include doing exercise, walking, resting, daily activities, agricultural mining, animal poultry, livestock, trade services, festivals, sightseeing, tourism etc.

The process which transformed garden house into tube house was also formed in this period because of population growth and expansion in area of housing. The need used

sidewalks in business, making appearance of street changing with typical style of commercial business, affecting urban aesthetic surface.

After 1975, the end of Vietnam War, all the complex of Hue monument were devastated seriously, in which the Forbidden City was mostly eliminated, the King tombs, temples inside and outside of the Citadel were damaged badly. Besides, some of other reasons are the lack of taking care, devastation of nature, the erosion of weeds and the lack of dredging river systems. The new government had just established and met with serious difficulties, therefore, the protection of Hue relics failed into the oblivion or even using of the relic constructions were uncontrolled or unsuitable purposes.

3.4 Appearance of Hue Citadel in history

3.4.1 Fortifications and defensive lines

When the country was reunified, Nguyen Anh wanted to build a strong, solid Capital, and manifest its political and military power. Thus, he applied Vauban's type of defense, a typical of the western ramparts of that time for construction. Because this was a heavily-structured military work, so besides the wall, there were also defensive lines outside of it. Those were the system of terreplein, rampart, defensive road, moat, covered way. Citadel was built in the square shape, had all 11 gates, 24 fortresses, thick and high wall, the corners were observation towers, around the moat system.

According to researcher Phan Thuan An said that *"Most of the Vauban fortifications were square or polygonal shape with five, six or eight sides. Between two adjacent sides was a convex corner forming the fortress. These steady corners looked like the form of the wings of a star etc. This fortification was a complex system of closely related structures and solid defense. Generally, it consisted of the main parts from the inner wall to outer wall such as rampart, fortress, corner fortress, wall connecting two fortresses, shot wall, artillery, defensive road, moat, covered road etc."*[56]

Louis Bezacier was a French scholar who studied military fortification art in Vietnam. After studying and surveying the citadels under the reigns in Vietnamese history, he has divided Vietnam Citadel into two different types: *"The first bastion type derived from China, was built since the invasion by China (111 BC – 939 AD) to the 18th century, such as Co Loa Citadel, Thanh Long Citadel, Ho Citadel, etc. which were quadrangular, without forts, without angle fort (sans bastions ni lunettes d'angles) etc. The secondary bastion type originated from France through mediated person - Colonel Olivier de Puymanel, with first citadel was Gia Dinh Citadel (1790)."*[57] All the citadels in Nguyen Dynasty were built according to the Vauban type.

"With the Vauban type fortification, the Hue Citadel is considered the most important Star-shaped citadel in the world today. There was an international conference on 'International Star-shaped citadel Cities Summit' in Hakodate City (Japan) in 1997. Hue City, where it has a Citadel, was one of the 10 members in the world has been invited for the participation."

3.4.2 The general shape and dimension of the fortifications

According to historical documents, many authors had drew the Hue Citadel with a rectangle, as shown in the plans by Le Rey (1819), by Don Carlos Palanca (1863), by Puech (1868), by J. Masson (1885 - 1886) etc. And even Michel de Chaigneau, the author of

[56] Phan Thuan An, *Hue Citadel,* Thuan Hoa Publisher, Hue, 1999.
[57] Phan Thuan An, op. cit., p. 62.

Souvenirs de Hué wrote: *"Phu Xuan was isolated among other parts of the city because of a river that was dug by a human, joined to a large river and delimited by a square all."*[58] (figure 3.22)

Because the Citadel plan had such convex lines created by the fortresses, therefore, at the International Conference on the Ancient City of this type in Hakodate (Japan) in 1997, we called the Hue Citadel was one of the star-shaped citadel in the world.

In their dimentions, the historical records of the Nguyen Dynasty, such as *'Hội điển', 'Đại Nam Thực lục', 'Đại Nam nhất thống chí',* etc. were showed that the general Vietnam units were 'trượng', 'xích', 'thốn', 'phân' (a 'Trượng' is about 0.425 m according to Le Thanh Khoi has).[59] The documents mentioned are not the size same. Among them, 'Hội điển' was the original book for the most complete measurements of these walls (table 2.4).

Table 2.4 Citadel perimeter

	Trượng	**Meter**
Front wall face	641 trượng	2,724.25 m
Left wall face	608 trượng 7 thước 9 tấc	2,587.3575 m
Right wall face	625 trượng 8 thước 9 tấc	2,660.0325 m
Back wall face	611 trượng 6 thước 8 tấc	2,599.64 m
Perimeter	**2.487 trượng 3 thước 6 tấc**	**10,571,28 m**

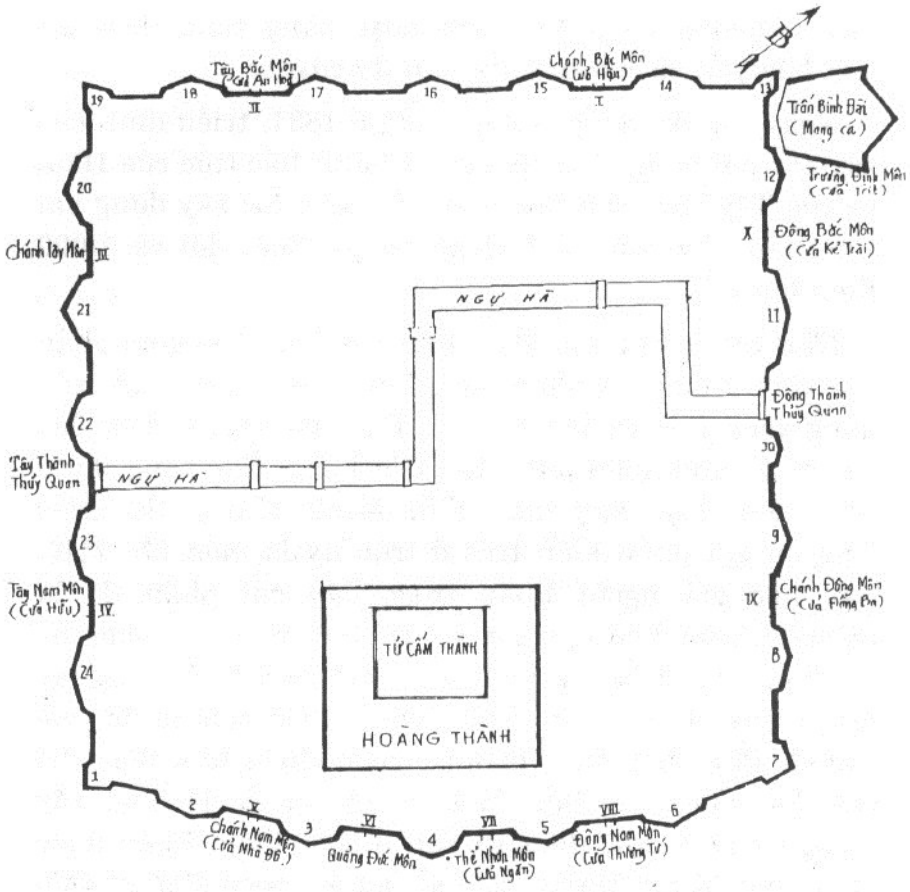
		Trượng	**Meter**
Perimeter		2.487 trượng 3 thước 6 tấc	10,571.28 m
Wall width of wall		5 trượng	21.25 m
Wall height	Outer wall face	1 trượng 5 thước 2 tấc	6.46 m
	Inner wall face	9 thước	3.825 m

The book 'Hội điển' also mentioned the length of the inner wall face

	Trượng	**Meter**
Front wall face	376 trượng 3 thước 5 tấc	1,599.4875 m
Left wall face	272 trượng 1 thước 4 tấc	1,581.595 m
Right wall face	356 trượng 6 thước 7 tấc	1,515.8475 m
Back wall face	339 trượng 1 thước 8 tấc	1,441.515 m
Perimeter		**6,138.445 m**

(source: Phan Thuan An, op. cit., pp. 175-176)

[58] Michel Duc Chainneau, *Souvenirs de Hué,* ESditions Typhon, Shanghai, 1914, p. 130.
[59] Le Thanh Khoi, *Histoire du Viet Nam des origines à 1858,* Sudestasie, Paris, 1992, p. 403.



LƯỢC ĐỒ KINH THÀNH HUẾ

với vị trí các cửa thành, các vọng lâu và các pháo đài

Chú dẫn:

I, II, III, ... X: Số thứ tự vọng lâu trên các cửa thành.

1, 2, 3, ... 24: Tên các pháo đài ở 4 mặt thành

MẶT NAM	MẶT ĐÔNG	MẶT BẮC	MẶT TÂY
1 Nam Minh	1 Đông Thái	1 Bắc Định	1 Tây Thành
2 Nam Hưng	2 Đông Trường	2 Bắc Hòa	2 Tây Tuy
3 Nam Thắng	3 Đông Hòa	3 Bắc Thanh	3 Tây Tịnh
4 Nam Chánh	4 Đông Phụ	4 Bắc Trung	4 Tây Dực
5 Nam Xương	5 Đông Vĩnh	5 Bắc Thuận	5 Tây An
6 Nam Hanh	6 Đông Bình	6 Bắc Điện	6 Tây Trinh

Figure 3.22 The general map of Hue Citadel (source: Phan Thuan An, op. cit., p. 136)

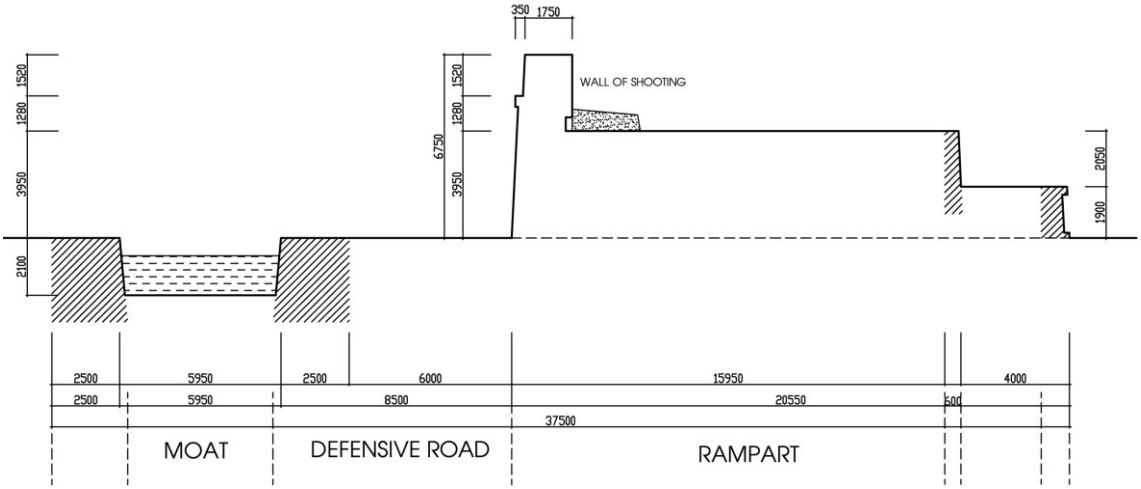


Figure 3.23 Cross section of the structure of rampart (edited, source: Phan Thuan An, op. cit., p. 180)

a. Bastions, firewood store

The Citadel was a Western military structure, the bastions played a very important fortification. Around the wall, there were all twenty four sections built convexly of the wall. Each citadel side had five bastions and each corner was an angle bastion (table 3.1 and figure 3.23).

Table 3.1 The bastions in Hue Citadel

South	1. Nam Minh Bastion		North	13. Bắc Định Bastion
	2. Nam Hưng Bastion			14. Bắc Hòa Bastion
	3. Nam Thắng Bastion			15. Bắc Thanh Bastion
	4. Nam Chánh Bastion			16. Bắc Trung Bastion
	5. Nam Xương Bastion			17. Bắc Thuận Bastion
	6. Nam Hanh Bastion			18. Bắc Điện Bastion
East	7. Đông Thái Bastion		West	19. Tây Thành Bastion
	8. Đông Trường Bastion			20. Tây Tuy Bastion
	9. Đông Gia Bastion			21. Tây Tịnh Bastion
	10. Đông Phụ Bastion			22. Tây Dực Bastion
	11. Đông Vĩnh Bastion			23.Tây An Bastion
	12. Đông Bình Bastion			24. Tây An Bastion
				25. Tây Trinh Bastion

In the bastion structure, each bastion included two main sections: a salient was the part of an acute angle out of wall; two bastion hips were a wall next to two bastion side. Each pair of the bastion was connected the straight wall called curtain (figure 3.24).

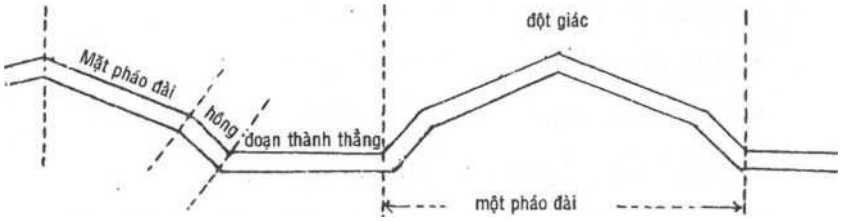


Figure 3.24 Plan a part of one bastion (source: Phan Thuan An, op. cit., p. 185)

Following the author of '*Les Fortifications de la Citadelle de Hué*', the minimum wall was 166.25 m and the maximum was 243.20 m[60] (figure 3.25).

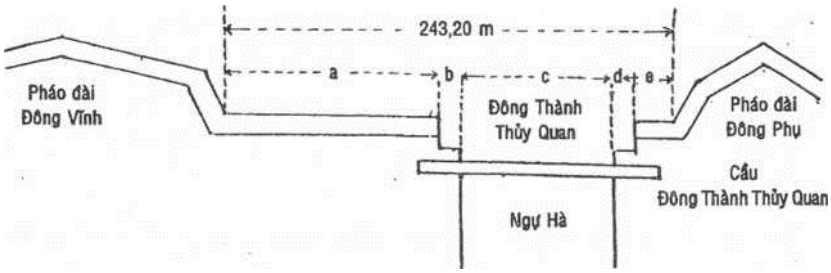
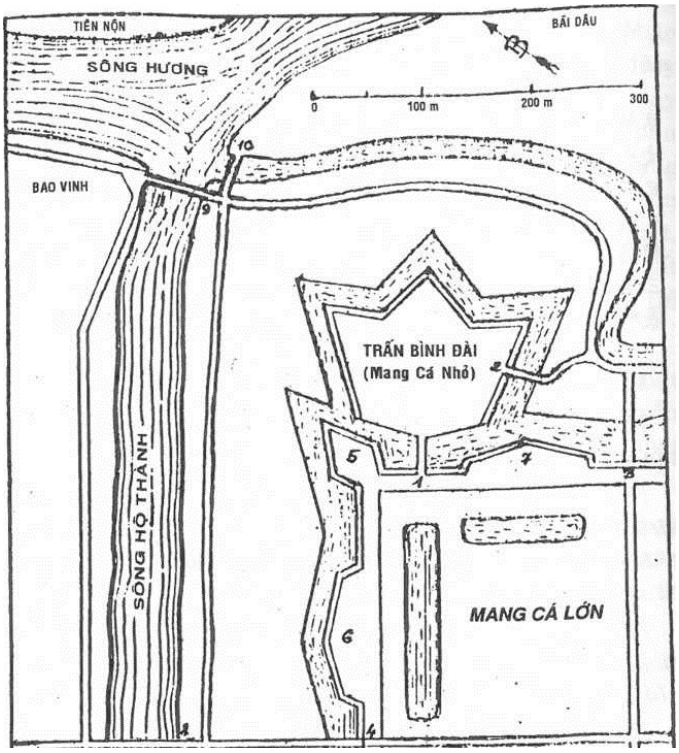


Figure 3.25 Plan of the wall at Dong Thanh Thuy Quan Gate (source: Phan Thuan An, op. cit., p. 187)

On each bastion put an artillery store. These were small houses used to store ammunition rather than cannon.

Also within the bastion, along the firing wall, there were the embrasures to put the gun. This gun was a cannon, cast by metal (copper, iron). At the artillery, there were three embrasures on each hip and five embrasures on each side of it. The embrasures were 5 m on the outside and 4 m on the inside of the firing wall.

b. Tran Binh Bastion



Note:
1. Tran Binh Gate
2. Truong Đinh Gate
3. East north Gate
4. North Gate
5. Bac Đinh Bastion
6. Bac Hoa Bastion
7. Đong Vinh Bastion
8. Cau Hau Bridge
9. Bao Vinh Bridge
10. Bai Dau Bridge

Figure 3.26 Map of Tran Binh Bastion and northeast corner of the Citadel (source: Phan Thuan An, op. cit., p. 194)

[60] Ardant du Picq, Ardant du Picq, *Les fortifications de la Citadelle de Hué,* in *"Bulletin des Amis du Vieux Hué",* Vol. 1924, No. 3, p. 234.

Tran Binh Bastion was a suburb of the Citadel, and was completely military, in that there was not any palace or a civil or cultural building. During the construction of the Hue Citadel, architects of the Gia Long period considered carefully this building to protect the capital from the northeast (figure 3.26 and table 3.2).

Table 3.2 Dimensions of Tran Binh Bastion

Some architectural components	**Cabinet of Nguyen Dynasty**	**Ardant du Picq**
- Wall width	14.87 m	14.75 m
- Firing wall width	1.19 m	1.28 m
- Wall height:		
• outer side	5.10 m	5 m - 5.80 m
• inner side	2.84 m	2.78 m
- Defensive road width	7.37 m	8.60 m
- Moat width	31.87 m	33,50 m

(source: Phan Thuan An, op. cit., p. 200)

c. The Gates of Citadel

When planning and building the Citadel, Vietnamese architects in the early 19th century created a very convenient gate system for convenient transportation between the citadel and peripheral areas. This transportation system was established by road and waterway.

The history of the Nguyen Dynasty as well as reality showed clearly the Citadel had all thirteen gates, including eleven road gates and two waterways (table 3.3 and figure 3.27). The two waterways of Dong Thanh Thuy Quan Gate and Tay Thanh Thuy Quan Gate will mentions in the next part of Ngu Ha River. There were ten main gates and one (Tran Binh gate). Ten gates for the roads had above pavilion, including four front gates, and two gates on each side of the Citadel.

Table 3.3 The Gates in Hue Citadel

Gate	The Nhan Gate
- 4 front gates	Quang Duc Gate
	South Gate
	East-south Gate
	East Gate
- 2 left gates	East-north Gate
	West Gate
- 2 right gates	West-south Gate
	North Gate
- 2 back gates	West-north gate

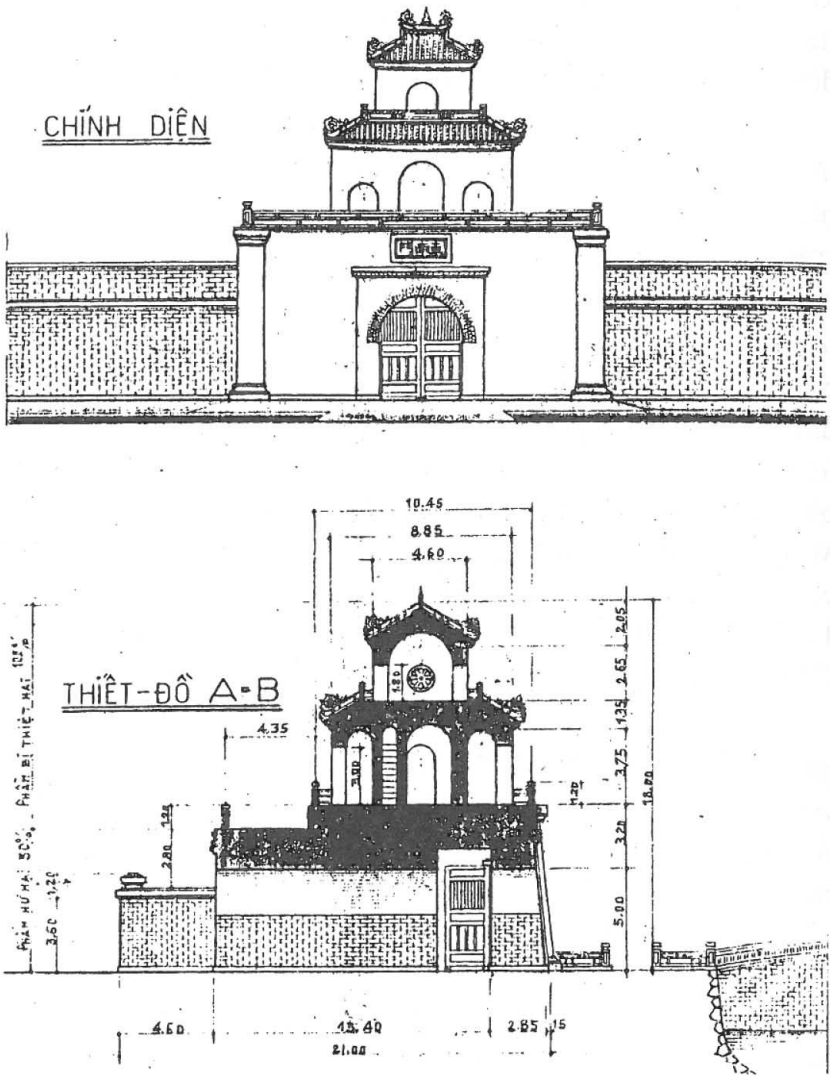


Figure 3.27 Typical structure of one city Gate (source: the restoration drawing by Nguyen Phuc Chiem Nguyen in 1973, re-quoted by Phan Thuan An)

d. Flag Tower and South Observatory (Quan Tuong Tower)

Flag Tower and South Observatory were built on the citadel wall. The functions of both buildings were needed at a certain high elevation, so they had been built on the upper wall in front of them.

It located directly south of Ngo Mon Gate, on the edge of the South Bastion, was a bastion located in the center of the wall. Following the historical books that: *"The Flag Tower had three floors, 4 trượng 1 thước in height. In the lower floor, the south side was the wall foundation, the north side was 5 trượng (21.25 m) in width, the left side was 8 trượng 4 thước 5 tấc (34.9125 m) in length, the right side was 8 trượng (34 m) in length. This floor was 1 trượng 4 thước (5.95 m) in height. In the middle floor, the north side was 19 trượng 4 thước (82.45m) in width, the right side was 9 trượng 2 thước (39.10 m) in length, the right side was 8 trượng 9 thước (37.825 m) in length, the south side was 20 trượng 3 thước (86.275) in width. This floor was 1 trượng 4 thước 5 tấc (6.1625 m) in height. Outer wall was built by brick. Arched gate was 1 trượng (4.25 m) in width. In the upper floor, the south and the north face were 8 trượng 5 thước (36.125 m) in width, the left and right face were 4 trượng and 5 thước (19.125 m) in length. This floor was 1 trượng 5 thước (6.375 m)*

in height. Four sides were built by brick, the lower wall was 5 thước (2.125 m) in thickness, upper wall was 2 thước 8 tấc (1.19 m) in thickness. The arched gate was 5 thước (2.125) in width. The flag had 2 floors, 7 trượng 3 thước 8 tấc (31.365 m) in height. On the tower, there were eight gun turrets and two pavilions with tile roof".[61]

The South Observatory (Quan Tuong Tower) was located in the southwest corner of the Nam Minh bastion of the citadel. The South Observatory was a tall tower used to view astronomical, climatic and other natural phenomena, 1 trượng (4.25 m) in height. On the bastion, there was Bat Phong Pavilion to view landscape, and the flag to see the wind.

After the construction was completed only two years, that was in 1829, the South Observatory was repaired.[62] The South Observatory consisted of two parts: the below sole and the above Bat Phong Pavilion. Following the 'Hội điển' said the sole was a trượng (4.25 m) in height. On the front facade, the observatory sole was 18.65 m in width, at the top 16.80 m in width. On the other side, the sole was 14.85 m in width. The tower was surrounded by brick, outside plastered. Along to the edge of the tower, in the past there was a system of railing, columns located in four corners, now see only vestige of the foot of the railing.

e. Outside fortifications

Next to the outer wall of the citadel, there were defensive lines used to aid the protection of the citadel, including two roads and two waterways. From the wall, including: berme, moat, defensive road, and defensive river.

Following the *'Khâm định Đại nam Hội điển Sự lệ',* described as:

The extra land out of the wall was 2 trượng 5 thước in width (10.625 m).

The moat run around 11 gates, was 5 trượng 7 thước in width (24.225 m), 1 trượng in depth (4.25 m). At each gate was stone bridge, outside the bridge put a square pavilion. The moats were built of stone.

Outside more, there were defense built of earth. The right side was 338 trượng 5 thước (1,438.625 m). Both the left and the left were 715 trượng (3,038.75 m).

In addition, Defensive River surrounded three sides of the left, right, back, and was 18 trượng 5 thước (78.625 m) in width. Both sides of the river were built of stone, and Perfume River was one river on the front.

3.4.3 Urban structure of Hue Citadel

Following the '*Hue Imperial City: Layout and significance',*[63] the architectural general of the Imperial City was planned and built mainly under Gia Long reign (1802-1819) reign. But it was upgraded and completed under Minh Mang Reign (1820-1840). The successors of the king, from the Thieu Tri Reign (1841-1848) to the Bao Dai Reign (1926-1945), reduced some buildings and changed some architectural styles, but in general, layout and appearance of old Imperial City was still the architecture system of Minh Mang Reign.

In the layout, the plan was designed by two main axes: one vertical axis and one horizontal axis. The vertical axis was the general axis of the entire Hue Citadel architecture complex (from west-north to east-south) (axis No.1, figure 3.28), which run from Ngo

[61] Nội Các triều Nguyễn (Nguyen Cabinet), *Khâm định Đại nam Hội điển Sự lệ,* Vol. 209, p. 4ab.

[62] Nội Các triều Nguyễn, *Khâm định Đại nam Hội điển Sự lệ,* Translation: Institute of History, Vol. 13, Thuan Hoa Publisher, Hue, Vol. 209, p. 6b.

[63] Phan Thuan An, *Hue Imperial City: Layout and significance,* Cultural Heritage Journal No. 3, Department of Cultural Heritage, 2003.

Mon Gate to Thai Hoa Palace, Imperial Great Gate, Can Chanh Palace, Can Thanh Palace, Khon Thai Palace, Kien Trung Pavilion, to Tu Phuong Vo Su Pavilion. The architectural works on the two sides of axis followed hierarchical order by basing on traditional oriental regulation: men on the left woman on the right (tả nam hữu nữ), literature mandarin on the left martial mandarin on the right (tả văn hữu võ). Other one, horizontal axes were parallel lines, which combined with vertical axis to created chess-board street system for citadel (axes A, B, figure 3.28).

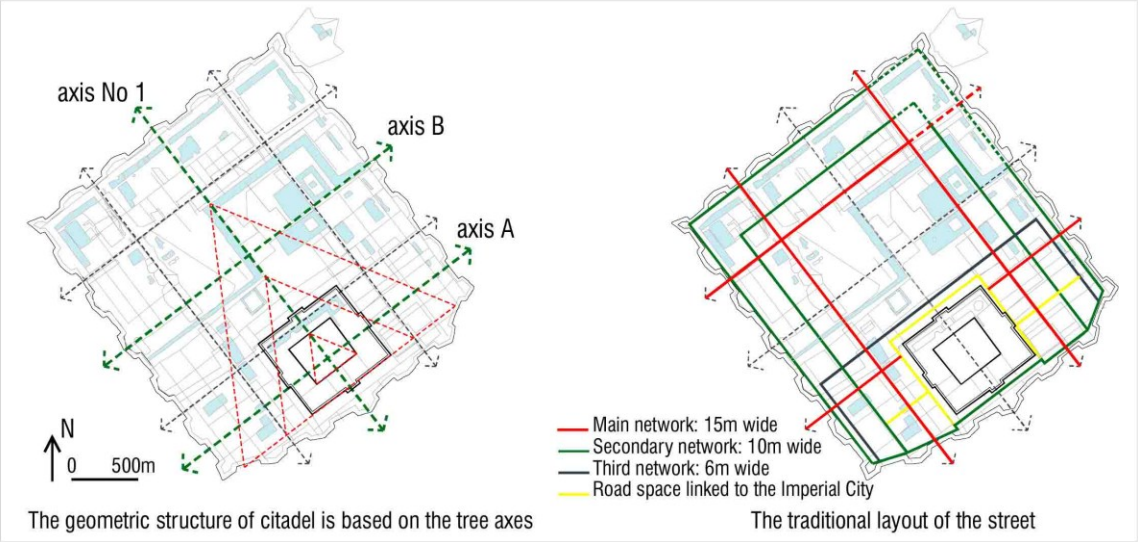


Figure 3.28 The structure of axes and transportation system of Hue Citadel

The mapping method between existing street system and square grid showed the structure of Hue Citadel which was building according to the oriental nines squares to create Chessboard Street. The position of the Imperial City was the second lower square (figure 3.29, 3.30).

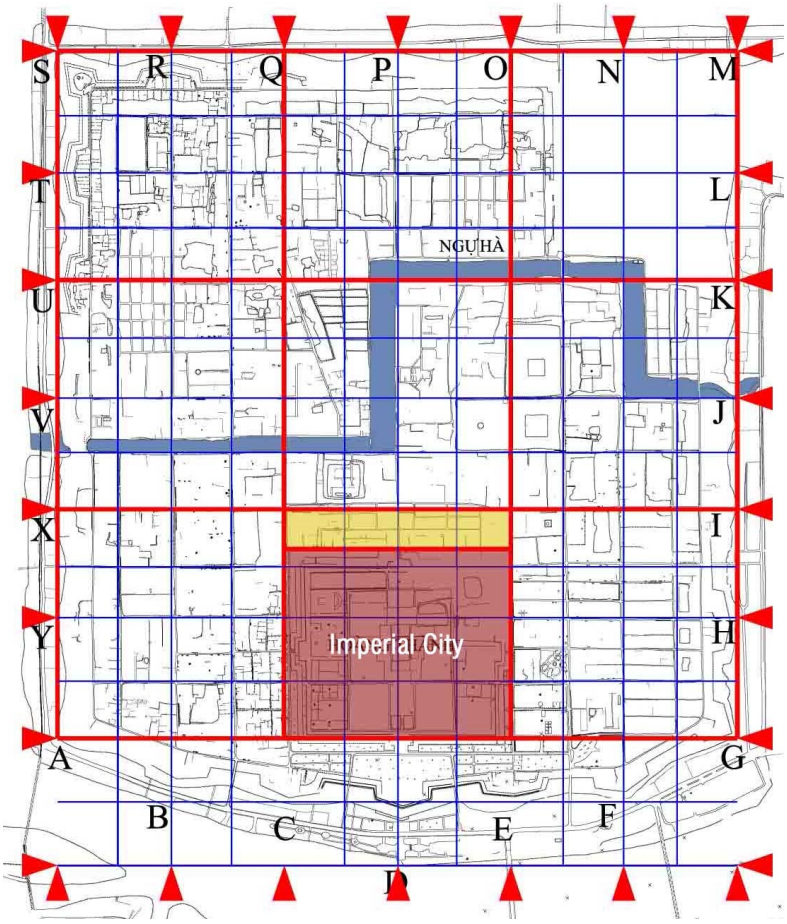


Figure 3.29 The structure of square grid of Hue Citadel



Figure 3.30 Architectural model of Hue Citadel structure

3.4.4 Water system, Ngu Ha River and their role in the natural drainage system inside Citadel

a. The formative process of Ngu Ha River

The inner city area is 520 hectares. Average annual rainfall in Hue is the highest in the country (2,995.5 mm). Floods often occur on the Huong river basin, causing flooding in the whole area and the Imperial City. Therefore, establishing a drainage system for the citadel is an indispensable work of the ancients.

Ngu Ha River was formed under the Emperors Gia Long and Minh Mang. This river was both natural and artificial. When planning and preparing the ground for the citadel construction, architects of the Gia Long King had backfilled some sections of the Kim Long River to make. This river was complete under Minh Mang Reign.

The river starts from the north of the Citadel, parallel with the Vo Kho, flows around north, east, south and east again, go outside the Citadel to connect to defensive river.

b. Ngu Ha River's role in the natural drainage system inside Citadel

In the stele of the Khanh Ninh Bridge, King Minh Mang spoke about the two functions of Ngu Ha River. One was that this river was very convenient for everyone in the travel to work public as well as private. Secondly, Ngu Ha's water could be provided for eating and using for the military and the people.

Besides, following the the history and reality, Ngu Ha River was also the other functions:

The transportation by waterway

Michel Đức Chaigneau, a history of the Gia Long reign said that: *"This channel, only uses for all, was used for transportation of the building material and others inside Citadel, the main of the rice which were taxied from the provinces, as well as coins from North. In Nam Ha, the transportations by road were very difficult; Annam people had habit of using vehicle and animal as in Europe".*[64]
Besides, it was also used for the dragon boat of King.

The natural supply and drainage system inside Citadel

The issue of drainage had been mentioned from the beginning of planning and construction of the citadel. The early 19th century predecessors set up a system of water control which was very clever and reasonable for the inner city. In this area, besides Ngu Ha, there were also about forty-one lakes everywhere. It could be divided into two types: natural lakes and artificial lakes. Most of the natural lakes were the vestige of Kim Long River and Bach Yen River. These lakes were from the parts of the river that were backfilled and formed such as Lap Lake, Tinh Tam Lake, and Hoc Hai Lake etc. The artificial lakes were dug by people for landscape or serving different activities, such as Xa Tac Lake, Kham Lake, Kim Thuy Lake, Thai Dich Lake etc (figure 3.31).

Experiencing the variations of history and society of the people in the area, today, this drainage function has become the most important function of Ngu Ha River.

The water system in the Citadel is formed by four main river systems: the Huong River, surrounding rivers, surrounding water moats, Ngu Ha River, and by a system of forty-one lakes in the Citadel. Some main lakes are located in Thuan Loc, Thuan Hoa, Tay Loc District and Thuan Thanh District. Besides there are also Tinh Tam Lake, Hoc Hai Lake, Sen Lake in Thuan Loc District; Vo Sanh Lake, Tan Mieu Lake in Thuan Hoa District;

[64] Michel Đức Chaigneau, *Souvernirs de Hue,* Éditions Typhon, Shanghai, 1941, p. 139.

and Moc Duc Lake and Huu Bao Lake in Tay Loc District. Moreover surrounding moat system of the Citadel has the Kim Nguu Lake and outside Kim Ngu Lake. These four river systems are linked together to create a flow of water of the Huong River to regulate drainage of the Citadel.

The water system of Citadel, with its canals and lakes, is an ecosystem which plays a very important role in protecting the environment. Formerly the Huong River and the underground waterway were connected, at the present waterway hardly remains.

Therefore, water becomes the main tissue of a possible system of eco-districts, and the strategy has to be based on the logic of the landscape as its foundational element: environmental concern, working on the quality of the local sites and the relationships between open spaces, improving the living conditions of individuals while keeping alive the spirit of past traditions. As a result, the elements the eco-districts are composed of, are: greenways, waterways, villages, the implementation of ruralism and the application of technologies for the prevention of disasters caused by seasonal floods.[65]

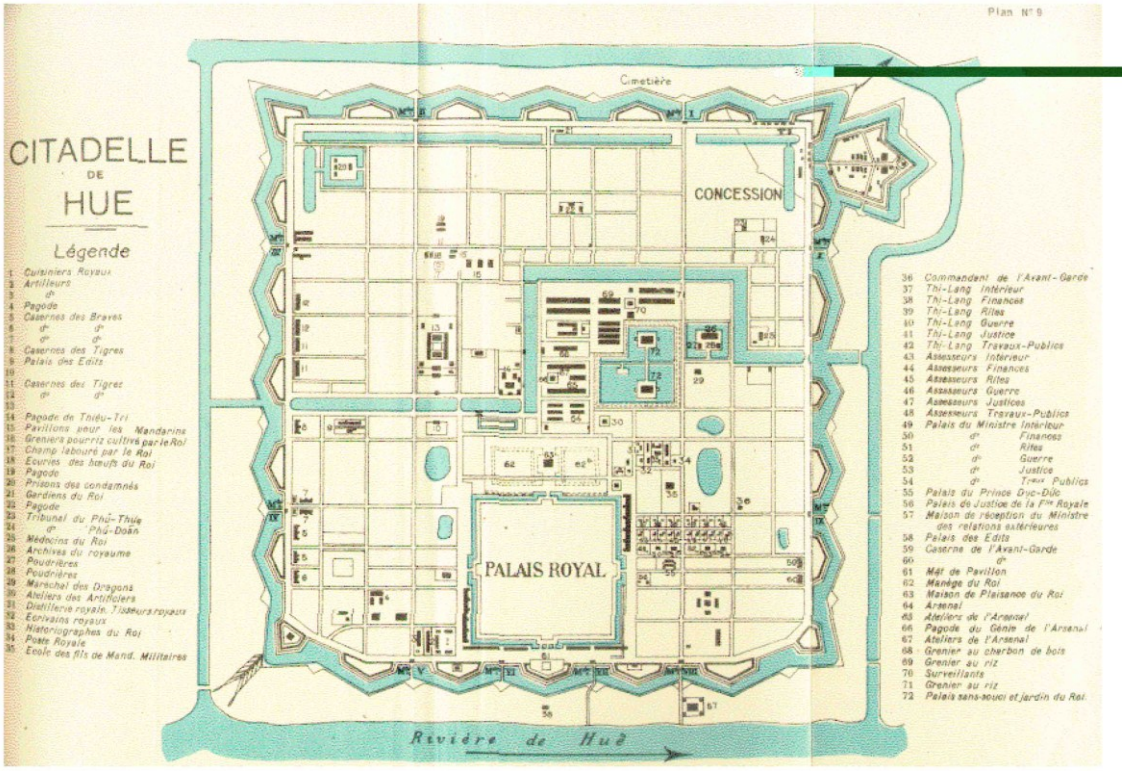


Planche IX. – Citadelle de Hué (Réduction par M. Nguyễn -Thứ).

Figure 3.31 The water system in Hue Citadel (source: Ardant du Picq, *Bulletin des Amis du Vieux Hué,* Vol. 1933, No. 1-2, p. 65)

3.5 The architecture of Hue Citadel today

3.5.1 Wall, Gate

[65] Vo Ngoc Duc, Cecilia Carlosori, *Approach to the natural elements for sustainable development in the urban structure of Hue City***,** International Workshop on *"Hue Citadel into the Future: Managing Natural Hazards, Environmental Pollution, Tourism and Community Resettlement"* organized by Hue University of Sciences and University of South Australian in Hue, Vietnam on 3-13/06/2017.

The wall of Hue Citadel is now kept the original shape and dimension. The wall is complex of a military system, the bastions which play a very important fortification. Together with the wall, there are all twenty four sections built convexly of the wall. Each citadel side has five bastions and each corner is an angle bastion.

However, some parts of wall are damaged by living activities of local people. The local government has some projects to move the people houses in Eo Bau area (on citadel) to relocation and restore some the parts of wall (figure 3.32).



Wall and gate



House of local people on the wall



Planting tree on the wall



Embrasure to put cannon

Figure 3.32 Status of Hue Citadel's wall

The Hue Citadel has ten main gates, one auxiliary gate connecting Tran Binh Bastion and two waterways. The main gates were arched in 1809, the pavilion has two floors built in 1824, 1829, 1831.

The architecture of the citadel was built in the Western Vauban type, but the gates were oriental type, symmetrical structure, the architecture of the 'small upper part and big down part' to create a solid. The gate structure was mainly made of bricks, the gate sole was made of the stone. The gate frame and pavilion structure were made as the form of outer brick wall and inner earth. The roof tile followed royal glazed tiles, traditional decoration.

Under the influence of nature, war as well as people activities, the gates were severely degraded, subsided, cracked and collapsed. Currently, under the coordination of the Hue Monuments Conversation Center and the Vietnam Institute for Building Science and Technology in Hue, the gates have been completely restored (table 3.4 and figure 3.33 - 3.34).

Table 3.4 Restoration's work of ten gates in Hue Citadel was carried out

No.	Gate name	Other name	Built year	Degree of damage	Restoration year
1	Quang Duc Gate	Sap Gate	1829	Collapse of body	10/1997-3/1998

				gate - 1953	
2	North Gate	Back Gate	1831	Subsidence of body gate	11/2003-6/2004
3	The Nhon Gate	Ngan Gate	1829	Subsidence of body gate	01/2004-6/2004
4	East-south Gate	Thuong Tu Gate	1829	Disappearance of pavilion -1968	3/2004-8/2004
5	South Gate	Nha Do Gate	1829	Total collapse -1953	7/2004-4/2005
6	West-north Gate	An Hoa Gate	1831	Damage of gate and surface	02/2006-6/2006
7	West-south Gate	Right Gate	1829	Total collapse -1953	02/2006-8/2007
8	West Gate	West Gate	1829	Total collapse -1953	12/2006-12/2008
9	East-north Gate	Ke Trai Gate	1824	Damage of gate and surface	8/2008-4/2009
10	East Gate	Dong Ba Gate	1824	Disappearance of pavilion -1968	2/2009-10/2009

(source: Hue Monuments Conversation Center)

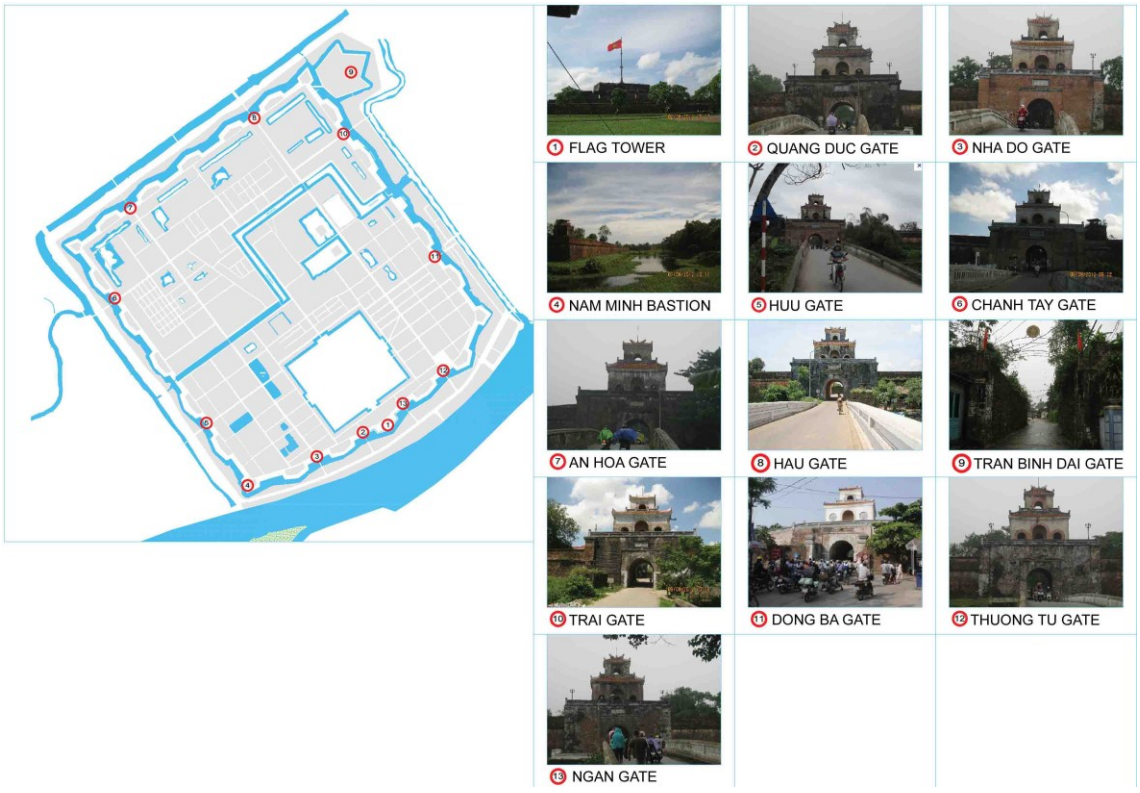


Figure 3.33 The status of Gates in Hue Citadel



Figure 3.34 The status of bridge in Hue Citadel

3.5.2 Heritage building

The ancient architectural buildings in the citadel divided into many different types, timber structure, tile roof depending on the function, decorative details following traditional architecture. Statistical and survey data are as follow:

a. Religious belief architecture

Soul Temple

Address	Function	Values of history and architecture	Status of architecture	Status of use	Height
73 Ong Ich Khiem Street, Thuan Hoa District	It is a place of worship sacrificial souls martyrs – dead people in the incident of the falling capital day on 5/7/1885 (23/5 At Dau)	Ancient architecture of folk house	-The building was badly damaged. -The landscape is encroached by surrounding houses.	Building abandoned, not used	1 floor





Xa Tac Altar

Address	Function	Values of history and architecture	Status of architecture	Status of use	Height
Xa Tac Street	A place to worship God to keep the safety country	-Typical style for the architecture of the Nguyen dynasty. -Historical cultural relics, used for festival tourism.	-Temple has just restored. -The surrounding landscape is affected by the local people.	-Used for worship gods. -Used to restore the worship festival.	1 floor





Xien Vo Shrine

Address	Function	Values of history and architecture	Status of architecture	Status of use	Height
168 Mai Thuc Loan Street, Thuan Hoa district.	Place for worship	Ancient architecture of folk house	-It has just restored. -The landscape is damaged. -The area of the	Currently located in the Hue Center of regular education	1 floor

			relic is encroached.		





b. Historic revolutionary relics

House of Uncle Ho

Address	Function	Values of history and architecture	Status of architecture	Status of use	Height
158 Mai Thuc Loan Street, Thuan Hoa district.	Place of Uncle Ho lived with his family from 1895 to 1901	-Ancient architecture of folk house. -Typical style for Hue garden house.	-Still retains traditional space. -The surrounding landscape is encroached by the house.	It is the place where Uncle's souvenirs are kept	1 floor





Soul Temple

Address	Function	Values of history and architecture	Status of architecture	Status of use	Height
Alley 4, Mai Thuc Loan street and Le Thanh Ton Street	Memorial to the martyrs of the Mau Than Festival in 1986	New architecture type with historically valuable	Landscape is encroached as a place for store	Still retains the spiritual value	1 floor





c. Imperial palace architecture

Imperial City

Address	Function	Values of history and architecture	Status of architecture	Status of use	Height
23 August Street	The residence of the king, and the activities of the court	Recognized as world cultural heritage	Accounting for 70% of the damage	Historical cultural heritage, used for festival and tourism	1 floor, 3 floors

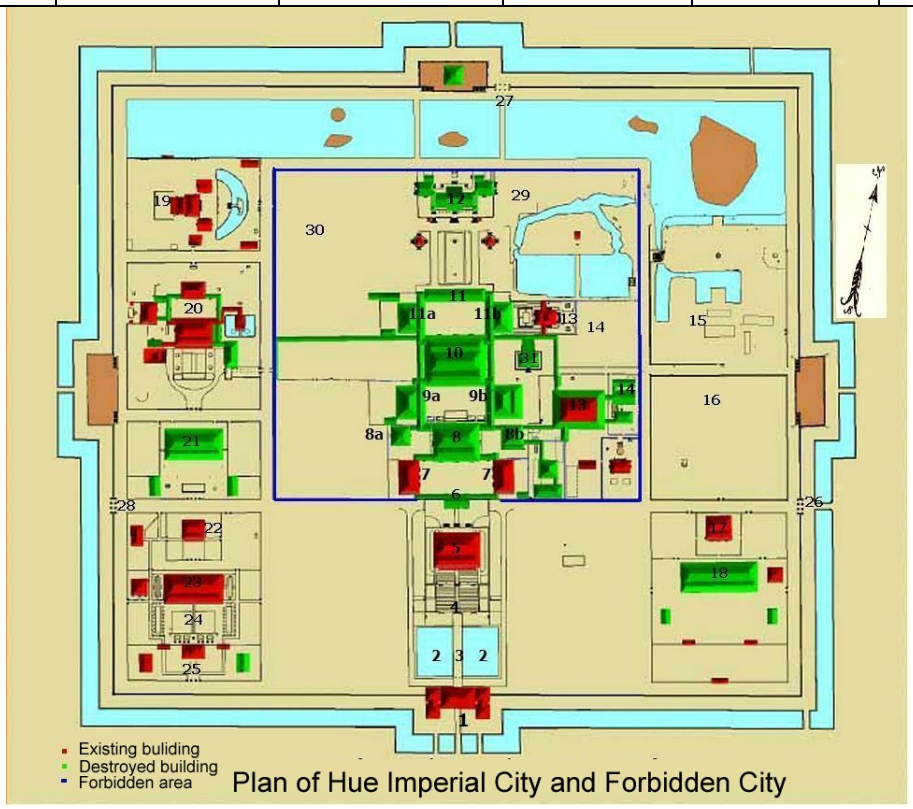


Figure 3.35 Organizing the space in the Imperial City and Forbidden City (source: Hue Monuments Conversation Center)

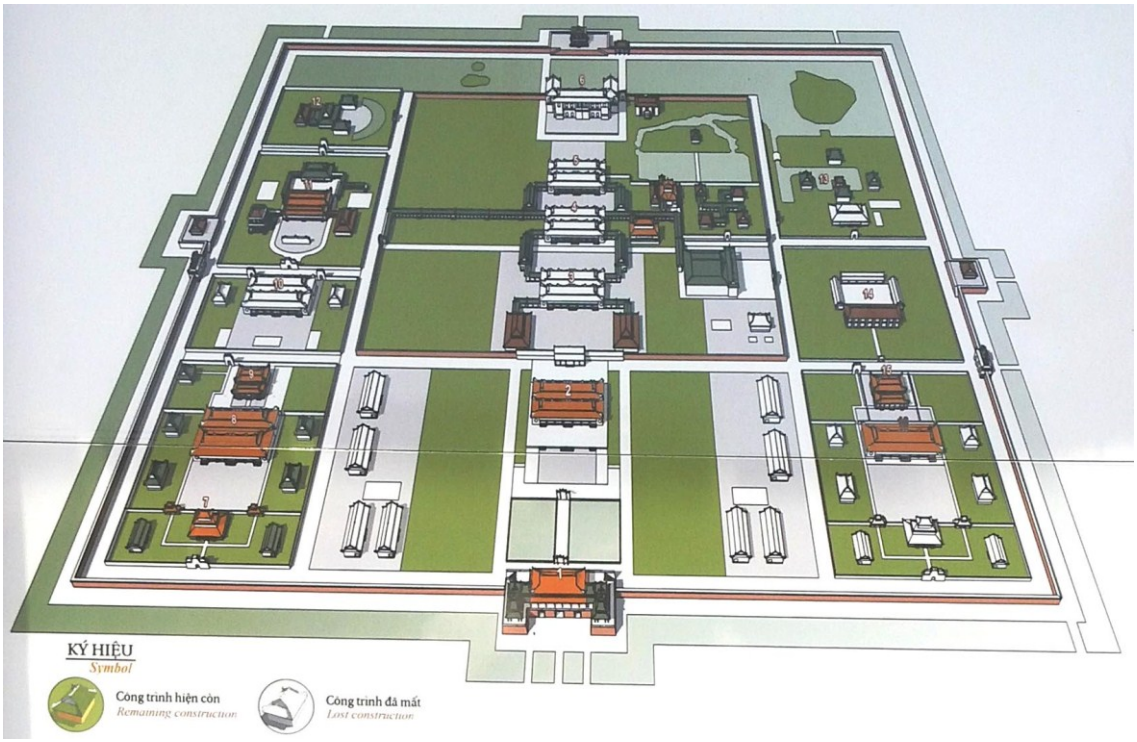


Figure 3.36 Diagram of overall view of Imperial City (source: Hue Monuments Conversation Center)

Long An Palace

Address	Function	Values of history and architecture	Status of architecture	Status of use	Height
3 Le Truc Street	Library for National Educational School.	Hue Imperial architecture	The value of architecture and landscape	-Museum of royal ancient artifacts in Hue. -Cultural history value, used for tourism.	1 floor
					

National Educational School

Address	Function	Values of history and architecture	Status of architecture	Status of use	Height
23 August Street	Composition of the National Assembly's documents for the Nguyen Dynasty	Hue Imperial architecture	The value of architecture and landscape.	-Museum of history and revolution in Hue. -Cultural history value, used for tourism.	2 floors





Co Mat Institute

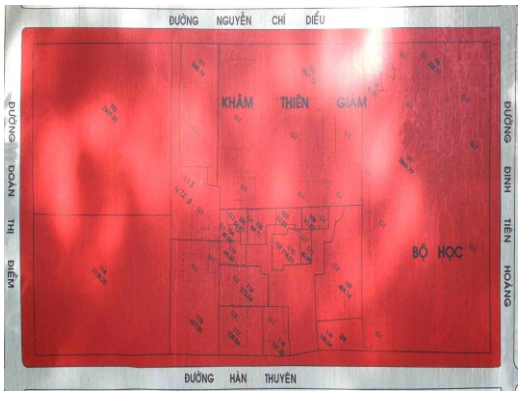
Address	Function	Values of history and architecture	Status of architecture	Status of use	Height
23 Tong Duy Tan Street	The supreme council of the king	Hue Imperial architecture	The value of architecture and landscape	-Thua Thien Hue People's Committee. -Hue Monuments Conversation Center.	1 floor, 2 floors





Kham Thien Giam

Address	Function	Values of history and architecture	Status of architecture	Status of use	Height
Han Thuyen Street	The residence of senior mandarin of the court	Hue folk architecture	-Completely destroyed by war. -Encroaching on land.	-Used for bar. -The residence of 18 households.	1 floor





Bo Hoc

Address	Function	Values of history and architecture	Status of architecture	Status of use	Height
76 Han Thuyen Street		Hue folk architecture	Severely damaged	-Thua Thien Hue People's Committee. -Company of Education book and school Equipment.	1 floor





Binh An Temple

Address	Function	Values of	Status of	Status of use	Height

		history and architecture	architecture		
01 Dang Thai Than Street	For royral female in the Forbidden City to disease	Hue traditional architectural house	Newly restored	Currently used as a bakery	1 floor





Tang Thu Library

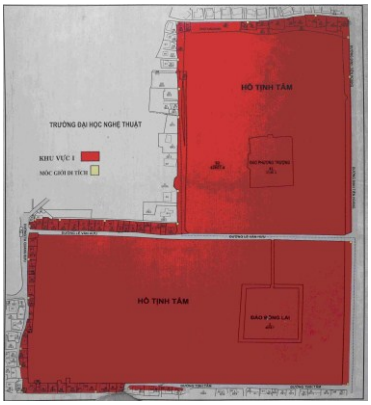
Address	Function	Values of history and architecture	Status of architecture	Status of use	Height
Dinh Tien Hoang Street.	Library of Nguyen Dynasty	Colonial architecture	Severely damaged	-Being abandoned and encroaching by households. -Ngoc Huong Pagoda is also located inside the monument.	2 floors





Tinh Tam Lake

Address	Function	Values of history and architecture	Status of architecture	Status of use	Height
Dinh Tien Hoang Street.	Place for relax of King	Value of landscape	To waste, almost only the foundation	Being abandoned	1floor





Ton Phu Nhon

Address	Function	Values of history and architecture	Status of architecture	Status of use	Height
	It is the human management of the Nguyen family	Hue traditional architecture	Destroyed completely by war	On the ground floor is a parking and bar	2 floors

Prison

Address	Function	Values of history and architecture	Status of architecture	Status of use	Height
	It is a place to detain prisoners	Hue traditional architecture	Destroyed completely by war	Second school is on the ground	1 floor

Tran Binh Bastion

Address	Function	Values of history and architecture	Status of architecture	Status of use	Height
Don Mang Ca Area	The protection for Citadel	Belong to the Citadel, UNESCO World Heritage	Damaged slightly	It is a military camp of the Vietnamese People's Army	1 floor

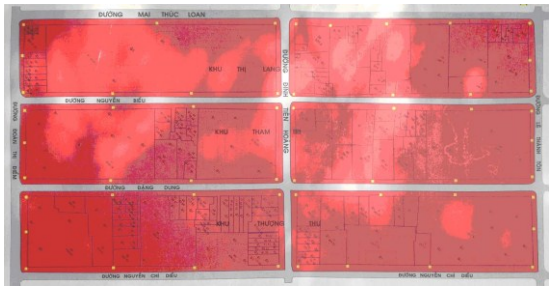




Six Ministries under Nguyen Dynasty (Bo Lai, Bo Ho, Bo Le, Bo Binh, Bo Hinh, Bo Cong)

Divided into: - Thi Lang area
- Tham Tri area
- Thuong Thu area

Address	Function	Values of history and architecture	Status of architecture	Status of use	Height
Nguyen Chi Dieu, Le Thanh Ton, Mai Thuc Loan, Doan Thi Diem Street	The executive government, the legislature of the court	Hue traditional architecture	Damaged hard about 60%	Use for government	1 floor





d. Folk architecture

Phu Xuan Community House

Address	Function	Values of history and architecture	Status of architecture	Status of use	Height
Thai Phien Street	Worship's place of Head of village	Hue traditional architecture	The value of the landscape architecture	Being degraded	1 floor





Tay Loc Community House

Address	Function	Values of history and architecture	Status of architecture	Status of use	Height
	Worship's place of	Hue traditional architecture	Some buildings are traditional	Being degraded	1 floor

	Headof village		structure		

Traditional garden house

Address	Function	Values of history and architecture	Status of architecture	Status of use	Height
In Citadel	Living of residence	Hue traditional architecture	Some houses are traditional structure	Some houses are original, some houses change, add other parts	1 floor

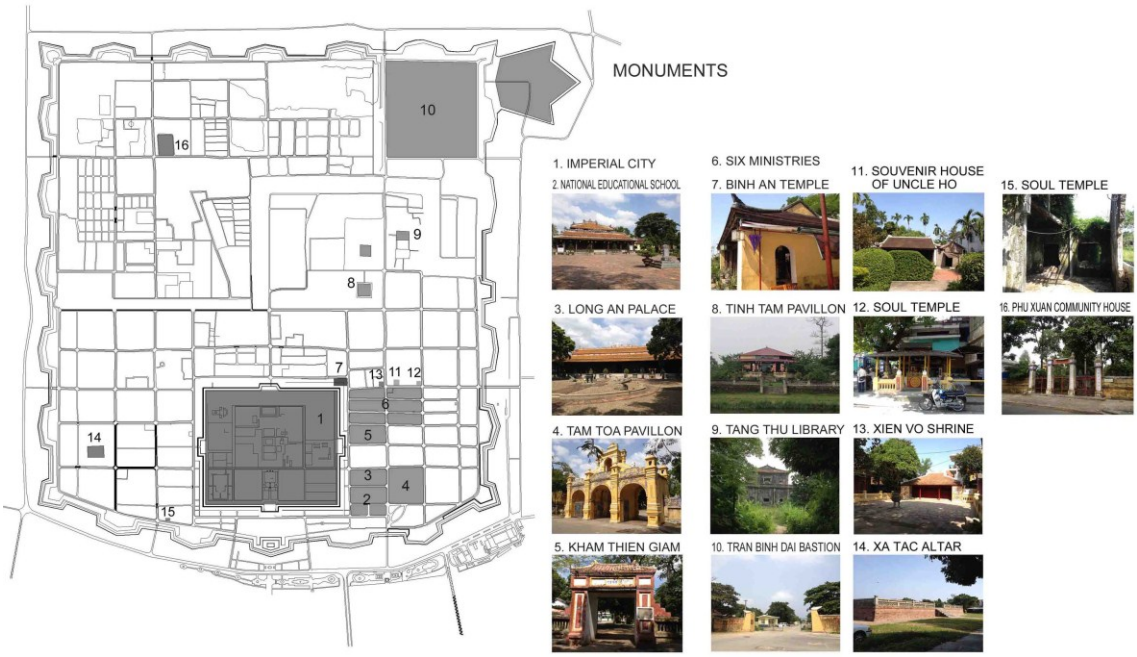


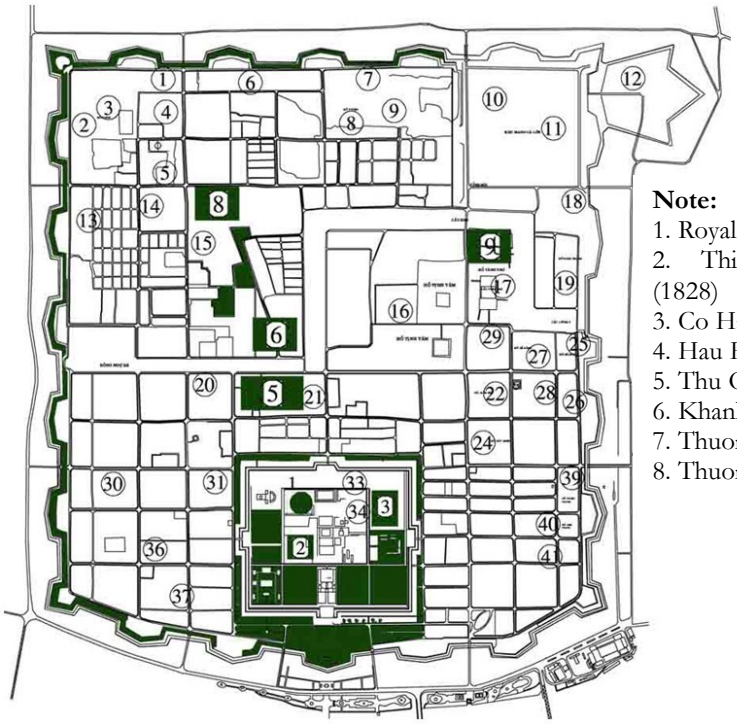
Figure 3.37 Ancient buildings in Hue Citadel

3.5.3 Green

a. Royal garden system

Figure 3.38 shows eight royal garden in citadel. However, this system is currently being severely damaged and growing freely of tree types. Only the system of tree green in the Imperial City is carefully planned and maintained, thus maintaining its own characters, while the system of Royal gardens outside Imperial City is almost growing freely. There are only Ngo Mon square, the park in front of the Han Thuyen Street and park in Tinh Tam Lake.

Trees in the relic area, next the vestiges of the ancient monuments have a large area but almost as grass land.



Note:
1. Royal Garden (1821)
2. Thieu Phuong Garden (1828)
3. Co Ha Garden (1828)
4. Hau Ho Garden (1821)
5. Thu Quang Garden (1836)
6. Khanh Ninh Garden
7. Thuong Mau Garden (1840)
8. Thuong Thanh Garden

Figure 3.38 Royal garden system in the citadel of the Nguyen Dynasty

b. The system of civil green trees

Green space is an important element of the landscape in Citadel. The system of gardens and parks in the Citadel is growing freely. The data of survey shows that the density of trees is high, but it disorder and unplan (figure 3.39).

Green system in the Citadel is quite rich and diverse. The density of trees in the inner city is high and most of them are perennial trees. This ecosystem creates a green environment for the citadel, but most green trees are still growing freely. Today, due to the urbanization process, houses have been built with high density, which make the density of trees decrease.

Park green areas in the area with some garden house are large but are dissimilarly distributed, mainly along Le Thanh Ton, Ngo Duc Ke, Tran Nguyen Dan, Thai Phien Street etc. some greens spread in the Thuan Hoa, Thuan Thanh Districts etc. Most trees are shade, fruit trees. These ecological trees are taking care by the owners, so they maintain their beauty.

The green surrounding defensive moat has a large number of green trees but is unevenly distributed and unplanned, some densely planted areas are the north and west of moats. A lot of areas are covered with weeds and low shrubs.

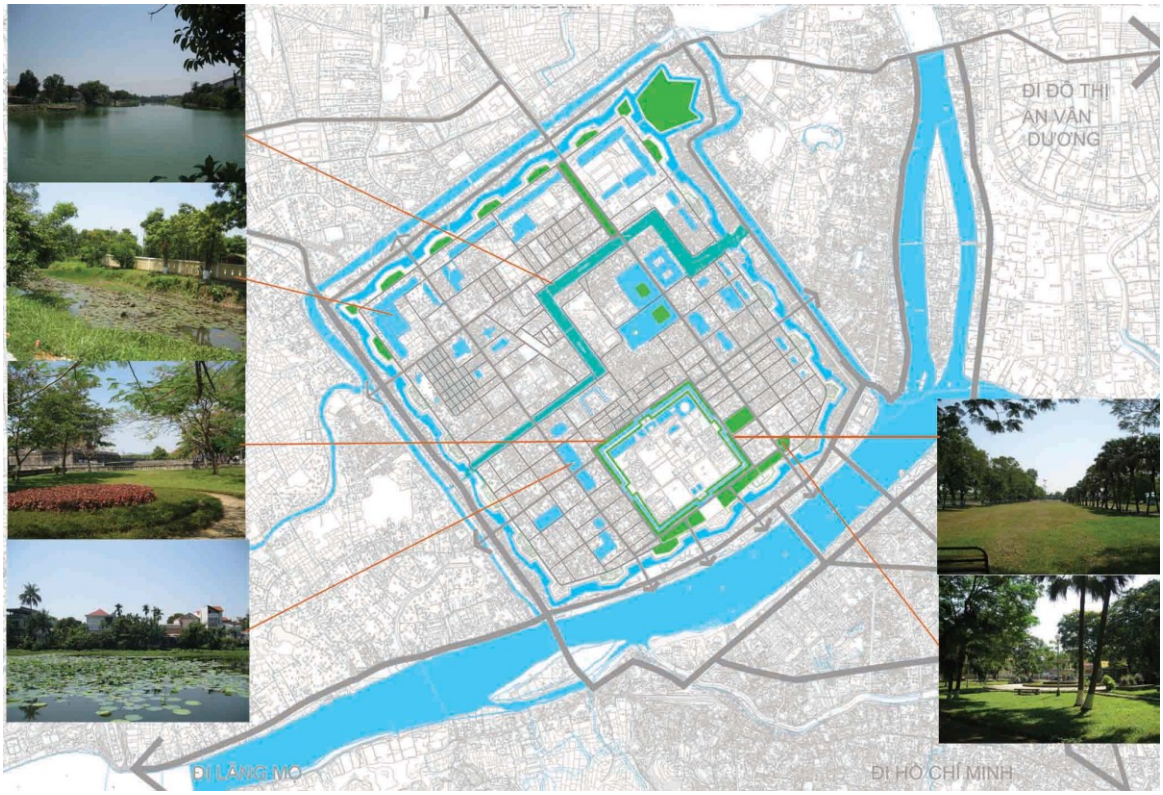


Figure 3.39 Map of green and water surface status in Hue Citadel

3.5.4 Water

The water system is one of the special identities in Hue Citadel. It is a diverse ecosystem, playing a very important role in the landscape, transportation, environmental protection, regulating the water system for city. There are four parts such as defensive River (Ho Thanh Ha), defensive Moat (Ho Thanh Hao), Ngu Ha River, system of lakes.

a. Defensive River (Ho Thanh Ha)

Formation history	Landscape character	Function	Activity
-Minh Mang King named in 1821. -Length of 12km, Huong River is natural river, the other 3 rivers are dug rivers. -Created embankment in 1837 (Gia Long, Minh Mang Reign) 1837.	-Surround river system of citadel	-Protecting the city (the first defensive line). -An important waterway around the city. -Taking charge of Feng Shui function.	-Water regulation is natural

The Defensive River system consists of Huong River to the south, An Hoa River to the north, Ke Van River to the west and Dong Ba River to the east. The four rivers are essentially still in shape, however there have been some changes.

West defensive River (Ke Van River) has been narrow in width and depth as well due to frequent sedimentation. Some of the north-west parts have blocked water that the boat

cannot pass during dry season. The connection to Ngu Ha River also dried up in the summer. The connection to defensive moat on both sides is also quite serious accretion. The data of survey in reality also shows that the whole river has not bank.

East defensive River (Dong Ba River) is heavily filled up. In particular, the fact the living of fishermen along the river have increased the amount of waste, both to fill up and to pollute the river, especially in the summer.

South defensive river (Huong River) is perhaps the least affected, as it is a natural river with relatively high flow rates. However, since the left bank tends to accrue relatively quickly, so far there is virtually not see the original bank.

North defensive River (An Hoa River) basically still has its shape, but at the end (outside the northeast of the citadel) is also a place of gathering of thousands of fishermen so it is also filled up and polluted pretty heavy in summer.

Until 1995, there were 2,557 residential houses illegally built in the first zone (the protective area of the citadel). In that number, there are 452 houses, invading defensive area of Ngu Ha River.

b. Defensive Moat (Ho Thanh Hao)

Formation history	Landscape character	Function	Activity
-Associated with the history of construction and restoration of Citadel	-Surround river system of citadel. -Made of mountain stone.	-Protecting the city (the second defensive line). -Decorate the beauty of the Capital. -Water regulation and supply, drainage for the entire city.	- Water regulation is natural.



Figure 3.40 Current cross section of Defensive Moat

Figure 3.40 shows the change of the defensive River system which has been severely changed and degraded. Around the four sides of the Citadel, due to the crowded population, more and more encroachment on the land of the citadel. According to the survey data of the Hue Monuments Conservation Center, in 2003, there were 1035 households living on this area of the household and 164 households living on the defensive road. Exception for the south, there have been cleared by the government who try to clear and made up Defensive River. Other river areas have been encroached and degraded seriously.

c. Ngu Ha River

Formation history	Landscape character	Function	Activity
This is a dug river in 1820	-Length 3388.5m. -Width is uneven. -Water depth of 1.5-2 m -Connecting water with Huong River and defensive River.	-Water transportation.. -Supply of clean water. -Drainage in the area when there are big floods. - Create natural beauty for the Capital City. -A place for the king to relax.	-Water regulation is natural. -Closely connected with Huong River and defensive River.

For a long time, the Ngu Ha River has dried up a lot due to sedimentation over time, the natural grass tree with planted tree of inhabitants make block the flow of water. In addition, there are more than 260 households living on the banks of the Ngu Ha River, encroaching and regularly pouring into the river a large amount of waste.

At present, the government has some dredging Ngu Ha River and clearance of the houses of the river bank, bring the beauty of the Ngu Ha River.

d. System of lakes in Citadel

Formation history	Landscape character	Function	Activity
- Natural lake. -The lake was the vestiges of old rivers. -Lake was dug in the Nguyen Dynasty.	-Important landscape	-Contains water, environmental control. -Balance the ecological environment by regulating drainage. -Historical monuments, landscapes -Supply water for production.	-Regulate the water between the lakes together. -Regulate water with Ngu Ha River.

Figures 3.41 and 3.44 show the variety of water in citadel. There are forty-one lakes which connect to Ngu Ha River to create the water system.

However the lake system in the citadel has shrunk a lot, even the lake was completely disappeared due to rapid population development. It is estimated that the water surface inside the Citadel is only about two-thirds that of the original, but is shallow due to the sedimentation over time.

The unconnection between lakes and Ngu Ha is formed. Under the Nguyen dynasty, due to a system of canals and drainage was quite perfect connection between the lakes and Ngu Ha River, so the water system was really a useful system. But so far many sewers have been destroyed, many canals are completely filled up causing many lakes to be isolated, not to circulate with water outside. Therefore, the flood inside the citadel more tends to increase.

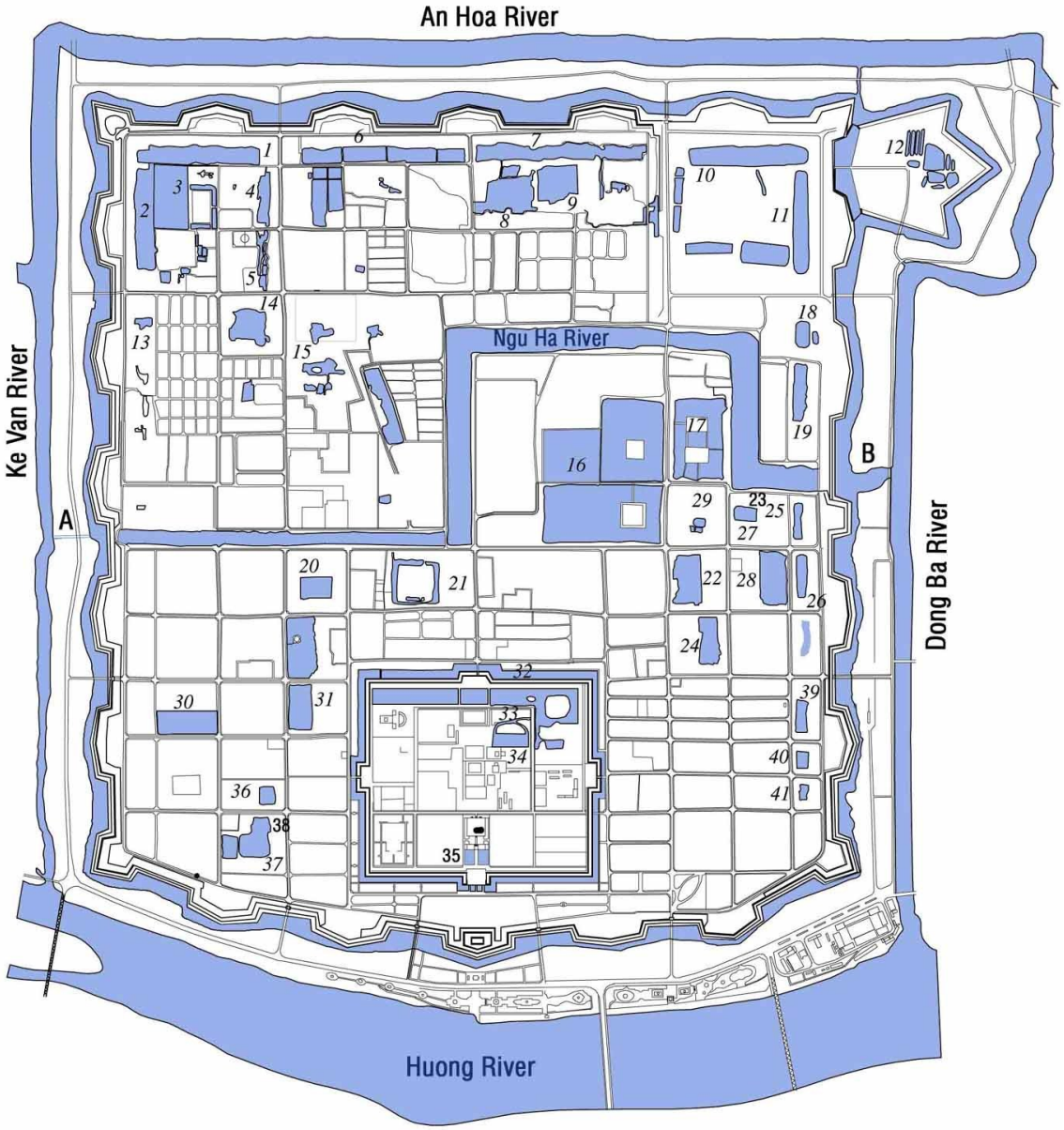


Figure 3.41 Water surface status, 41-lake system is still being invaded

Note:

I. Natural Lake

1.Huu Bao Lake
2.Tay Lake
4.Doai Lake
5.Vom Lake
6.Tien Bao Lake
7.Ta Bao Lake
8. Vuong Lake
9. Chua Lake
10.Hau Bao Lake
11.Ky Vo Lake
12.Tran Binh Dai Lake
13.Hung Nhue Lake
14.Moc Duc Lake
15.Thanh Ninh Lake
18.Giam Thanh Lake
19.Tien Y Lake
21.Sau Lake
22.Te Sanh Lake
23.Hoa Phao Lake
24.Nhan Hau Lake
25.Sen Lake
26.Long Vo Lake
27.Vo Sanh Lake
28.Phu Van Lake
29.The Lake
31.Cong Chua Lake
32.Kim Thuy (inside) Lake
33.Kim Thuy (outside) Lake
36.Lap Lake
37.Thanh Hoang Lake
38.Ho Ve Lake
39.Dong Thai Lake
40.Duc Hung Lake
41.Ba Vien Lake

II. Heriatge Lake:

3. Kham Lake
16. Tinh Tam Lake
17.Hoc Hai Lake
30.Xa Tac Lake
34.Ngoc Dich Lake
35.Thai Dich Lake

A. Drainage of Dong Thanh Thuy Quan
B. Drainage of Thanh Long

The daily life of the local people, especially those living near the lake directly and negatively affect the water surface. Especially, households have been encroaching on Phan Dang Luu, Tran Hung Dao, Dao Duy Anh Street, causing waste and pollution. Besides agricultural production, tree plant, and poultry raising activities bring economic benefits to the people and also pollute the water source. The dam building makes more drained water, the drainage block obstructs the water regulation function of forty-one lakes with the Ngu Ha River and Defensive Moat (figure 3.42, 3.43).



Figure 3.42 Status of Thuy Quan Drain



Figure 3.43 Status of Thanh Long Drain

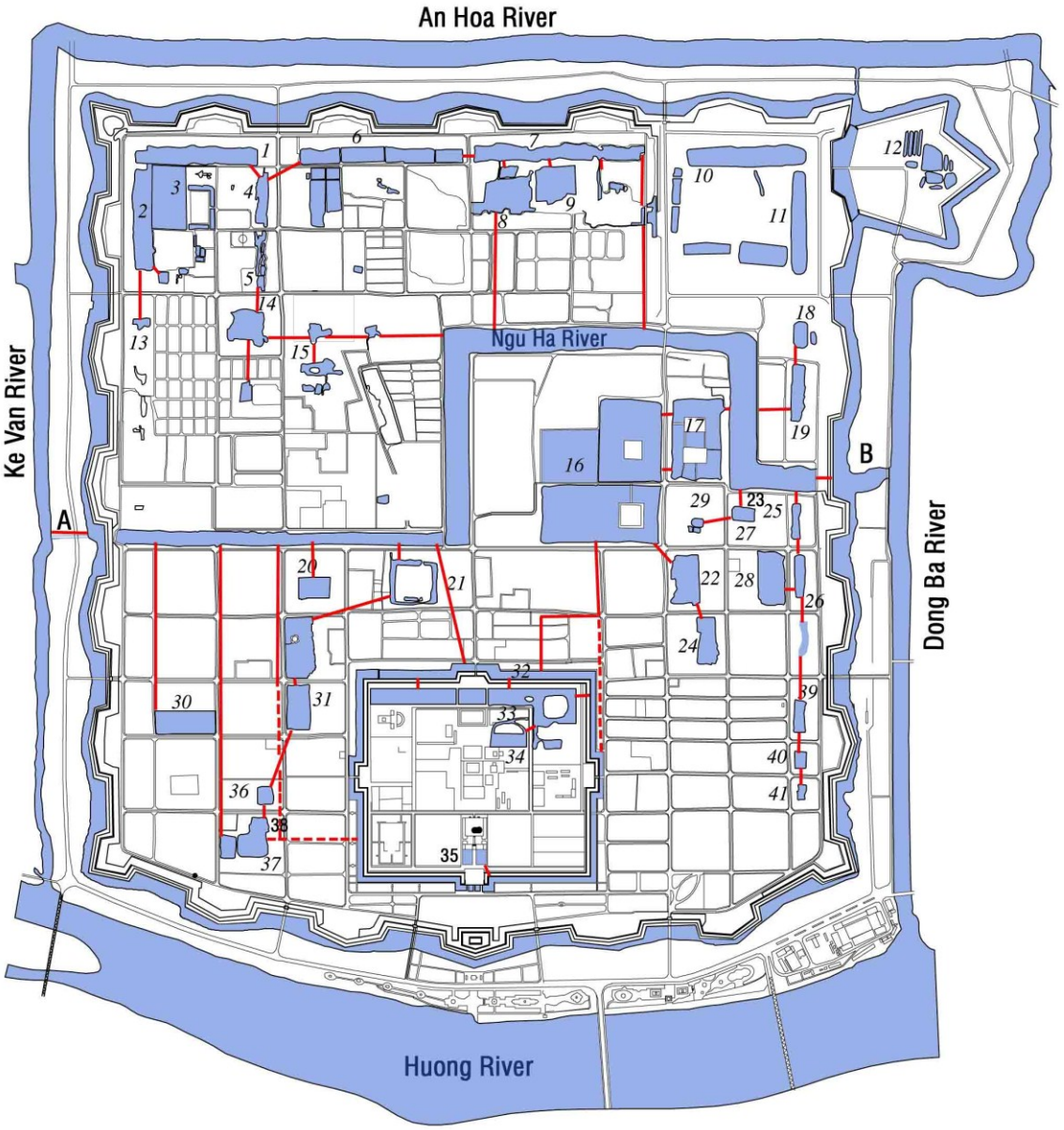


Figure 3.44 Map of connected pipes (red color) of the lakes in Hue Citadel

Over time with the impacts of history, nature and human, the water systems of Citadel has changed deeply, leading to the change of the original function, with serious effect on the lives of residents and the conservation of cultural heritage in this area.

3.5.5 Civil building

After 1975, there a large number of immigrants move from country to the city to find job. The resident import reach to the need of house, built their houses in different types in the city center. That has created a great change in the morphology of the citadel today.

In addition to the monuments, the system of civil (housing and public) is distributed everywhere in the Citadel, beside the main residential buildings, there are the school, sports building; religious beliefs building; market; military construction etc. which mainly are built after liberation (figure 3.45 - 3.49).



Figure 3.45 Maps of current status of land use of Hue Citadel

Hue Citadel consists of four districts such as Thuan Thanh, Thuan Loc, Thuan Hoa, and Tay Loc District. The monument buildings, are concentrated mainly in Thuan Thanh Districts, was formed during the Nguyen Dynasty, which today is named Hue Monuments Conservation Center, Museum of Arts, and Binh An Temple. At present, some relics are used as administrative buildings. For example, the area of Luc Bo of Nguyen Dynasty was transformed into factories and administrative buildings, while the Hue Monuments Conversation Center is the former Giac Hoang Pagoda built by Emperor Minh Mang in 1839 and 1903, the Co Mat Institute was built here. In addition, some religious buildings and monuments can also be found in other districts such as Tay Linh Pagoda (Thuan Loc District), Tay Loc Pagoda and Tay Loc Church (Thuan Loc District), and Cac Tuong Pagoda (Thuan Hoa District).

Kindergartens, primary and secondary schools are located at four districts, while universities are located in Thuan Thanh District. Commercial building types include commercial services, mechanical repair, printing services, grocery stores, internet sales, and small shops can be found along commercial roads such as Mai Thuc Loan Street and Dinh Tien Hoang Street in Thuan Loc District, Nguyen Trai Street and Nhat Le Street in Thuan Hoa District. Along these streets, most of the houses are in the shop houses. Markets can also be found in each of the districts. Tay Loc Market is located in Nguyen Trai Street (Tay Loc District) is the largest market in the citadel area.

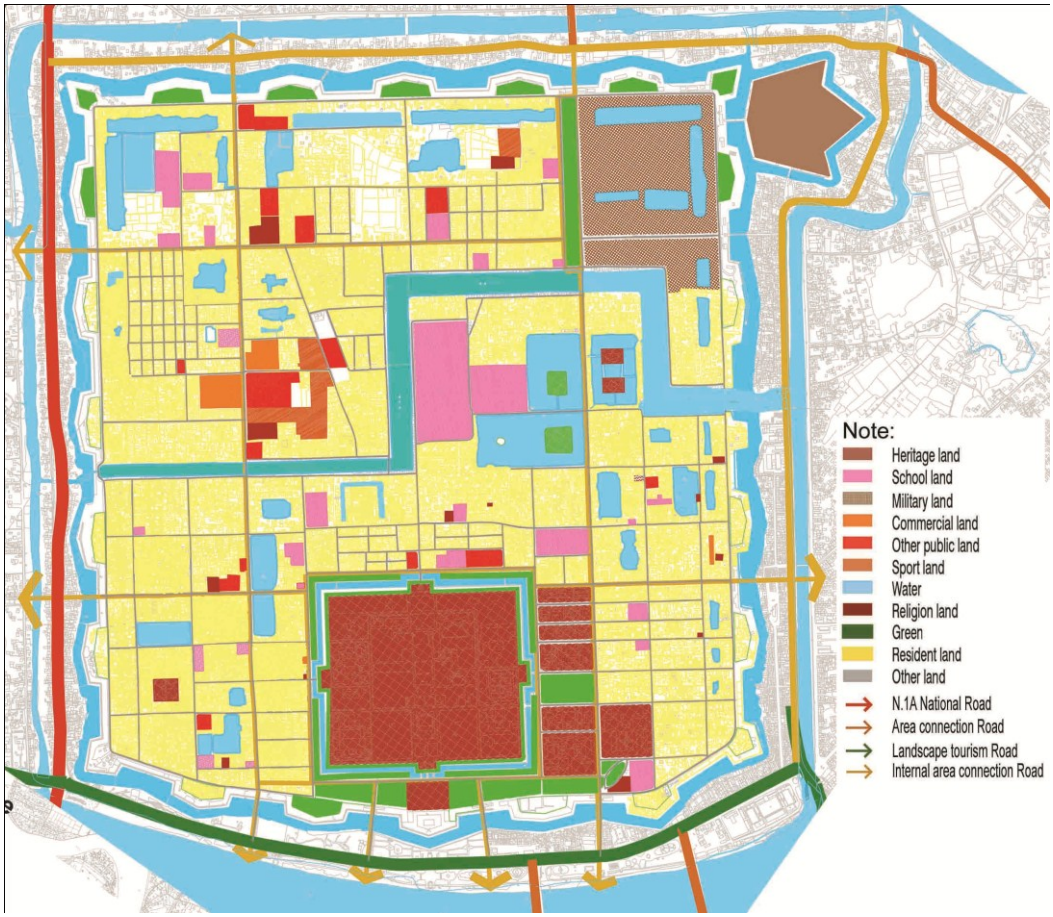


Figure 3.46 Map of the current status of land use



Figure 3.47 Map of the current status educational buildings in Hue Citadel



Figure 3.48 Map of the current status of sport buildings, markets in Hue Citadel



Figure 3.49 Map of the current status religious and belief buildings in the Hue Citadel

3.5.6 People activity

In Hue there are a lot of the ways which are used for moving in daily activities. The local people normally move by private vehicle such as car, bicycle and motorcycle, and hardly on foot. The public transportation is not used widely. The traffic density is heavy in the morning and evening when the people start going to work and come back their home (figure 3.50 and 3.51).

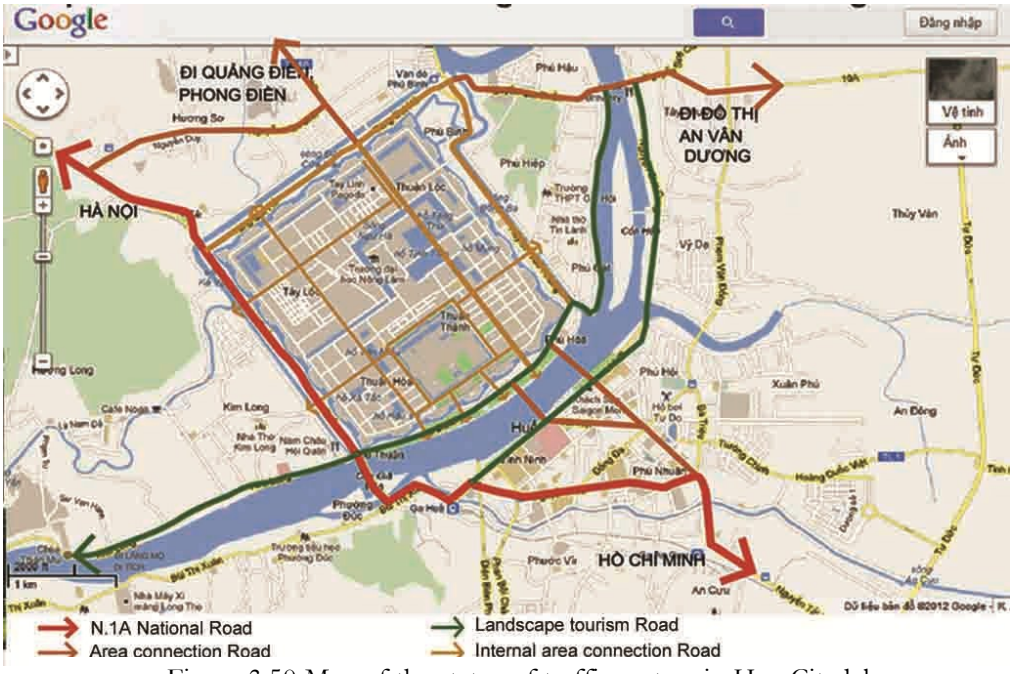


Figure 3.50 Map of the status of traffic system in Hue Citadel

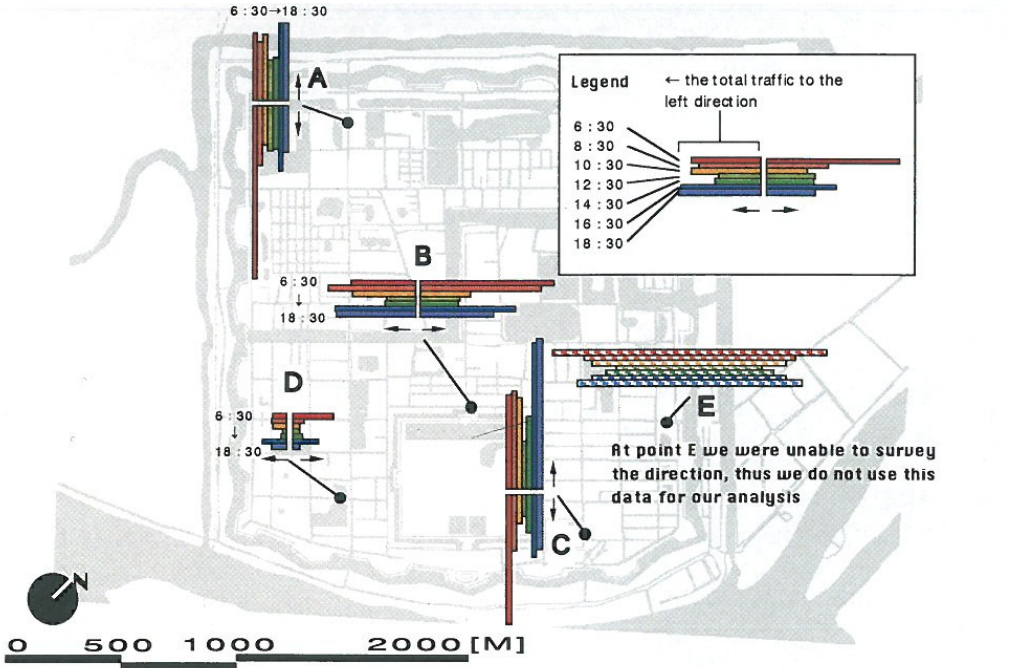


Figure 3.51 Traffic movement (source: Shigeru Satoh, *Information Notes of Hue, towards the Historical Eco-City, Hue*, Proceeding of International Conference, Waseda University Publisher, Tokyo, Japan, 2002)

In the other hand, human activities in the citadel are diverse with many participants, many normal activities. Classification and statistics of people's activities in this area as below:

a. Classification by activity frequency

Table 3.5 shows the variety of local people activities on the rampart.

Morning: + Exercise
+ Transportation
+ Take a walk, relax
+ Shop: food, cafe
+ Services: grocery stores, commercial shop, motorcycles

Afternoon: + Rest
+ Parking
+ Shop: food, cafe
+ Services: grocery, electronics stores, electric appliances, pedicabs, motorcycles
+ Fishing, entertainment

Evening: + Services: grocery, electronics stores, electrical appliances ...
+Shop, food, coffee

b. Infrequent activity

+ Festivals (festival, cultural exchange)
+ Sightseeing tour, tourism

Table 3.5 The daily activities around and on the rampart

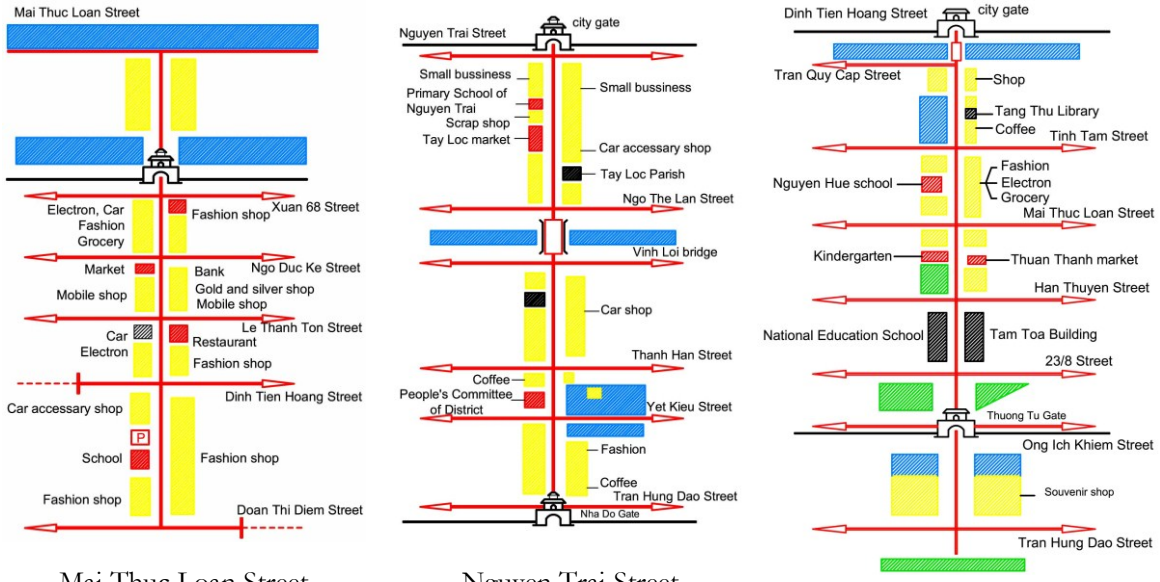
TIME (hour) / ACTIVITIES	MORNING									AFTERNOON						EVERNING								
	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	0	1	2	3
Exercise																								
Doing exercise																								
Rest, sightseeing																								
Small business																								
Eating, drinking																								
Transport																								

Notice:

Teenagers

Middle-aged, older

Figures 3.52-3.53 show the people activities of commerce on the street. They change a lot the appearance of façade. And Figure 3.54 is the synthesis of spatial layers' data and situation of land encroachment of Hue Citadel, they show the cause which make citadel quickly changing.



Mai Thuc Loan Street Nguyen Trai Street Dinh Tien Hoang Street

Figure 3.52 People activities on the street

Table 3.6 Frequency of people activities on major streets



Pavement of street has become an indispensable part of the everyday life of the local people, as this is not only a place of living but also a place of their commercial. In these activities, living and commercial activities have a great influence on the urban landscape, due to the lack of awareness of the people.



The commercial service on Dinh Tien Hoang Street

Fashion	Vehicle	Computer	Grocery	Coffee	Restaurant	Repair	Make up	Internet service
22	7	5	1	10	1	8	6	13	4	9	6	6	8	5	1	5	2
29/119	6/119	11/119	14/119	17/119	15/119	14/119	6/119	7/119
24%	5%	9%	12%	14%	13%	12%	5%	6%

Figure 3.53 People activities on Dinh Tien Hoang Street

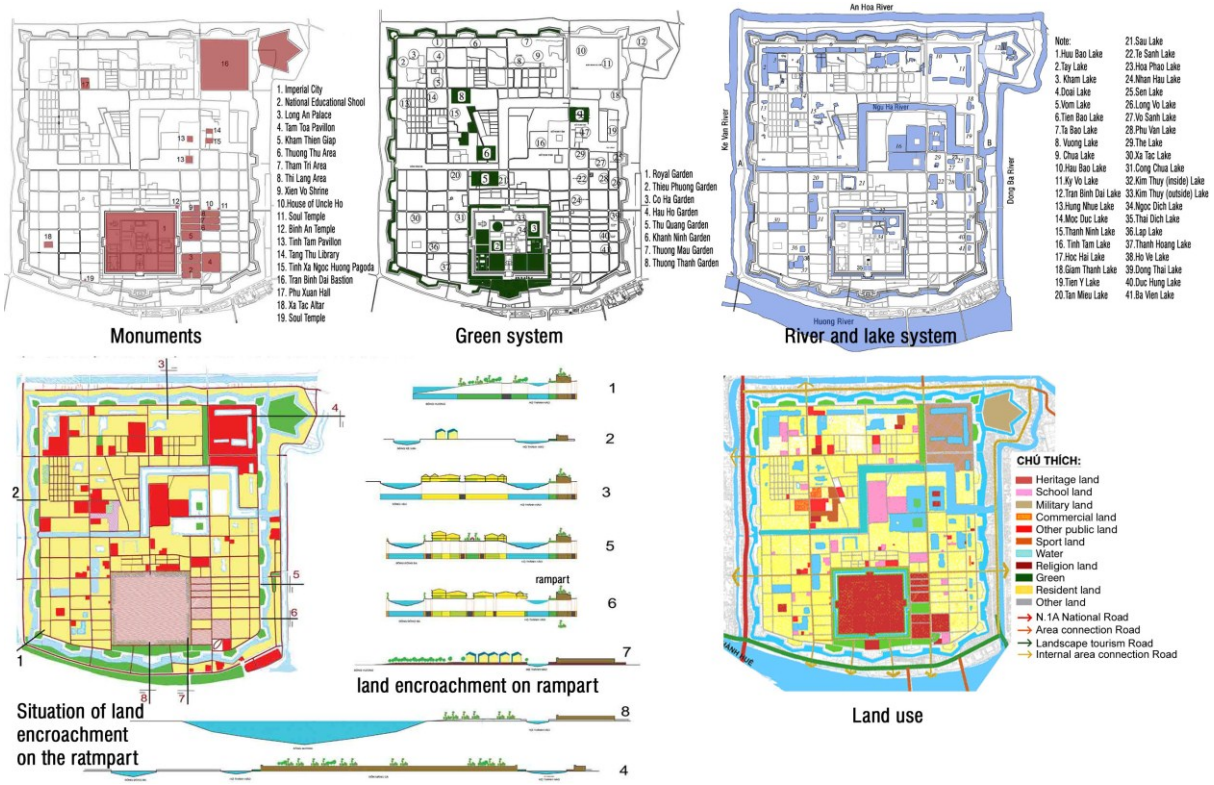


Figure 3.54 Analysis of spatial layers and situation of land encroachment of Hue Citadel

Chapter 4. Values and Risks of Hue Citadel

4.1 The Risks of Hue City

4.1.1 The extension of Hue City

The Hue Citadel was built in 1803 and has experienced many historical periods, its appearance and scale have changed and developed during the last the centuries, could be summarized three phases.

First phase was the formation and consolidation of Citadel under the Nguyen Dynasty with the traditional characters. They were as Nguyen Anh planned to build a citadel in the north of the Huong River in 1802; and Construction of Hue Citadel (Minh Mang Reign) from 1805 to 1898.

Second phase was domination and invasion by the French colonialism with the combination characters of western and eastern architecture (Decision of the establishment of Hue City in 1899); and Upgrading Hue to become a city of third type in 1929.

Third phase was destroyable by war and reconstruction, urban expansion with a many architectural types: An administrative center of Thua Thien Hue Province from 1945 to 1975; After the unification of the country, restoration and urban development in 1975; The complex of Nguyen Dynasty's cultural heritage was recognized by UNESCO as World Cultural Heritage (11th Dec 1993); The project of Hue City's urban planning from 1997 to 2020 in 1997; Upgrading Hue to a grade-1 city belonging to Thua Thien Hue province in 2005; The Prime Minister ratified Hue as the Festival City of nation and internationality (Decision No. 143/2007/QD-TTg) in 2007; The Politburo decided to develop the whole Thua Thien Hue to become a Central City, a center of culture, tourism, technical sciences, health and education in Central Vietnam and strive to become an national and international Center of economy, culture, technical science, medical and educational by 2020 (according to decision No. 48 on 25th May 2009 of the Politburo on Construction and Development of Thua Thien Hue Province and Hue City to 2020) in 2009; The Modification of Hue City's Masterplan to 2030 and Vision to 2050, Koica project in 2013.

Due to the urbanization process, Hue City now has many urban expansion planning projects, but most of them are developed separately and independently. The local government has oriented on planning ideas but the connections between the urban planning projects are still sporadic. Almost the planning projects have solved major needs for land expansion of living and transportation, while they have been not interesting in the historical values and identity of local place from its predecessors since the 19th century. There are many urban planning projects such as Hue City's urban planning, An Van Duong's urban planning, Tu Duc - Thuy Duong's urban planning, etc.

The project of Hue City's urban planning from 1997 to 2020

The development orientation of Hue City to 2020 is defined as the population size of 410 thousand people (304,000 people in 2002). The modification of projects revised in 1999. After more than 4 years of implementation, the urban spaces expected to grow has been pretty much. However, these have not met the requirements of urban development so that the conservation areas have been harmed. The intersection of new houses in the old quarters have created the overload of infrastructure, bad impact on the environment and urban landscape. An expansion of the An Van Duong urban area in the east next to

the lagoon ecological system has met the need for residential land, but has not paid much attention to the landscape and the lagoon structure and the variety of water surface ecosystem.

Another suggestion by the institute of urban planning is for city extension to west to take advantage of the elevation of the terrain to avoid annual floods. However, this issue should also be considered because the urban expansion to the southwest would destroy the quiet landscape of the Royal Tombs and the mountain landscape.

Beside the addition to the advantages, Figures 4.1 - 4.2 show to see the following disadvantages

- Old City will be at risk of being disrupted by the urbanization process and it is difficult to preserve the historical identity and ecological urban landscape.
- Some new areas have not really considered to urban design, free development less associated with old urban.
- New urban areas in the process of expansion and construction have studied the issues: existing architecture; constructive density, control of building height, combination city with satellite cities etc. however they are not yet done thoroughly.

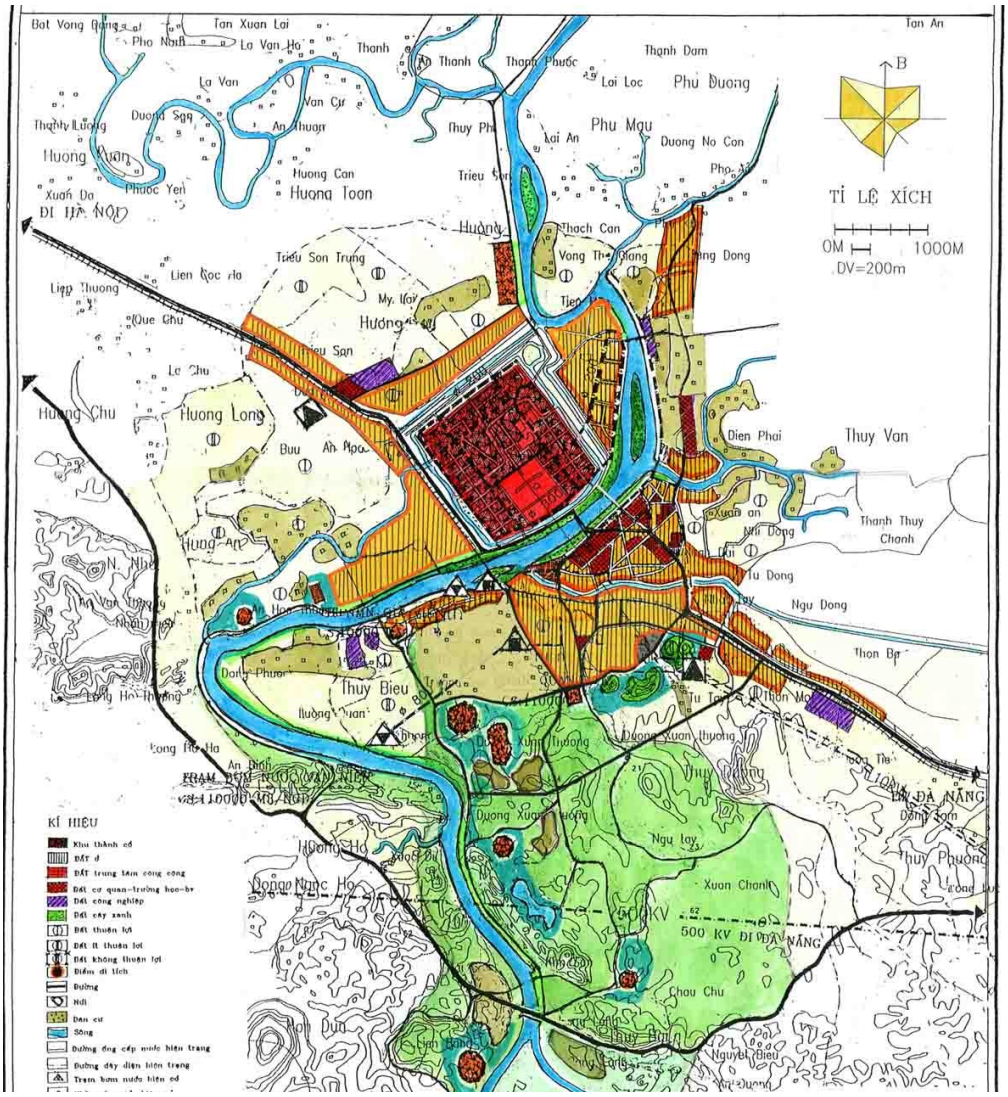


Figure 4. 1 Map of current land use in Hue City (source: Urban Planning and Rural Development Institute, Ministry of Construction)

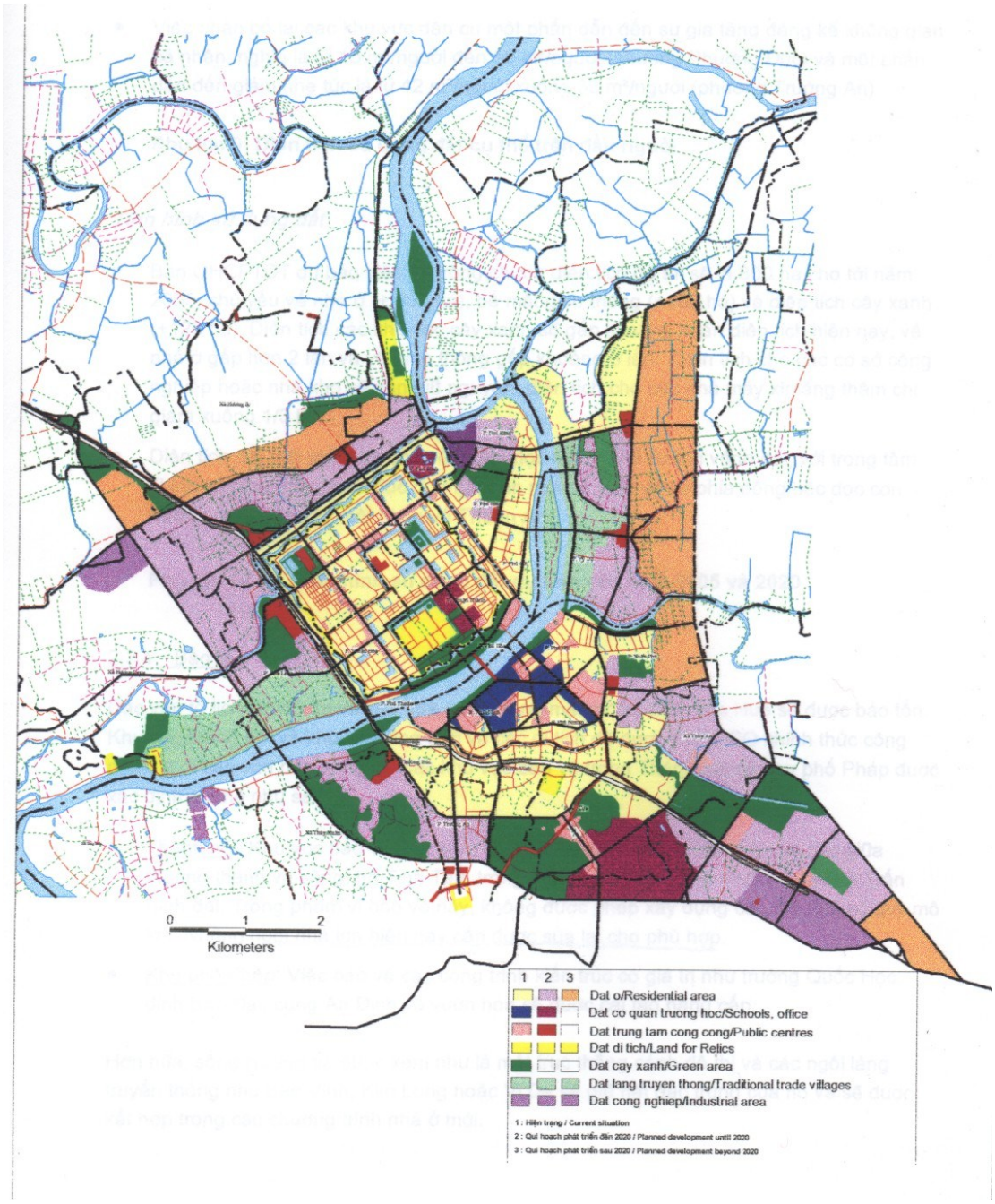


Figure 4.2 Map of Hue City's Masterplan to 2020 (source: Urban Planning and Rural Development Institute, Ministry of Construction)

The Modification of Hue City's Masterplan to 2030 and Vision to 2050 Koica project

It overcomes some limitations of the project in 1997, the development orientation along the North-South and East-West axis, combining the satellite city model, creating a green space's connection on the west hills to water ecology of the lagoon system on the east. This is a very good point that needs to be more developing, however practical

management and implementation have not been in very close touch yet and the planning boundary has almost designed according to the administrative area (figure 4.3).

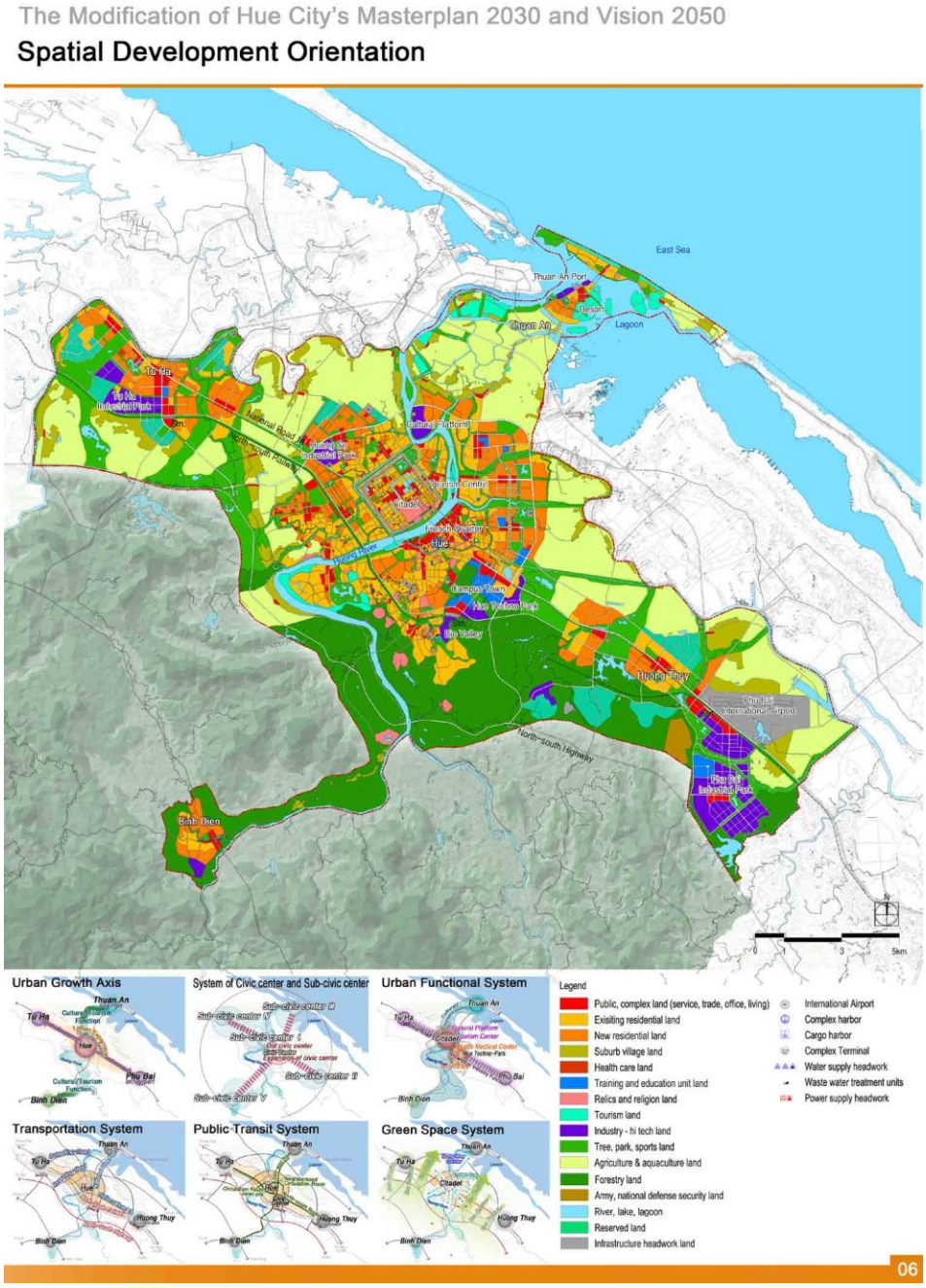


Figure 4.3 The modification of Hue City's Masterplan 2030 and Vision 2050 (source: Thua Thien Hue People's Committee)

4.1.2 Hydrology element, block of water and damage of flood

Natural conditions, climates, territory have a big influence on the architecture and landscape of Thua Thien Hue Province. There are a lot of types of impacts and impactive levels are shown in Table 4.1.

Table 4.1 Impactive levels of natural disasters in Thua Thien Hue Province

Strong impact	Medium impact	Light impact

Flood	Flash floods	Tsunami
Storm, tropical low pressure	Land erosion	Earthquake
Water surge	Coastal erosion	
Hurricane	River bank erosion	
	Drought	
	Salinization	

(source: Thua Thien Hue Province's Department of Science and Technology, *Climate - hydrographic characters in Thua Thien Hue Province,* Thuan Hoa Publisher, Hue, 2004)

a. Hydrology

In overall territory, Hue City is directly affected by Huong River hydrographical regime. The Huong River system consists of three branches such as Bo, Ta Trach and Huu Trach River, deriving from the mountain slopes of the Truong Son Mountain on the west, and flowing through Hue City to the lagoon system on the east. This system has a basin area of 2,830 km^2, accounting for 56% of the total area of territory, 104 km in length (figure 4.4). Besides, the southern branches of the Huong River include An Cuu, Nhu Y and Phat Lat Rivers, linking together to form a natural drainage network. The northern branches of the Huong River are Bach Yen, An Hoa, Ngu Ha Rivers, Defensive Moat and lake system. These create a water network for flood control's systems of the whole capital.



Figure 4.4 General of Huong River system with Hue Citadel in territory

In Thua Thien Hue Province, the average annual rainfall is about 182-187 days, reaching to maximum in November with 19-22 days/month and minimum in April, May with 8-10 days/month. Rainfall is approximate 2000-4000 mm/year, divided into two different seasons: rainy season from September to December or January next year, and another dry season from February to August. Rainfall is the largest in the country, the annual average rainfall is about 2,800 mm. However, the rainfall is almost concentrated in the rainy season, especially in October and November (table 4.2 and 4.3). These climate characters make disadvantages such as drought in dry season and flood in rainy season.

Table 4.2 Changing trend of average rainfall in July

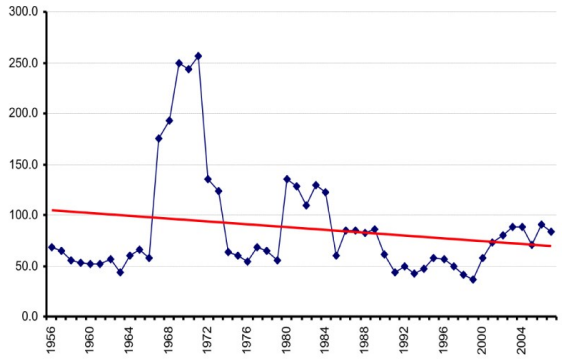
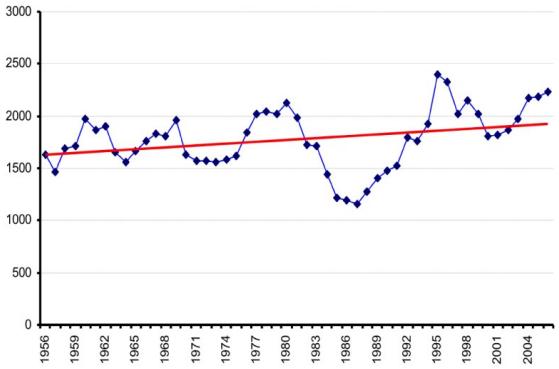


Table 4.3 Changing trend of average rainfall from September to November



(source: USAID, ISET, M-BRACE, *Hue City Action Plan, climate change adaptation in Hue City 2014-2020 period, 2014)*

b. The block of water

For a long time, the rivers and lakes in Hue City have been not dredged, and now they have to store discarded waste by residents. The Defensive Moat and the lakes have been dried up because of the sedimentation, and the sewage system is blocked. The connection system between the lakes was not good so that the water was blocked, dirty. In the sunny summer, the amount of water is not much to give the water as its function in the past. While it rains, the water is flooding to roads, gardens, houses (figure 4.5-4.49).

Up to that time, more than half of the land and water surface of rivers and lakes in the citadel was exploited by the local people to make rice fields and grow crops. They depend on these agricultural activities to live.

In general, due to the various reasons, water system in Ngu Ha River, lakes, sewers, which were used for regulating, supplying and draining within the City, have seriously deteriorated. This situation has been destroying the ecological environment in Hue Citadel. For instance that is also the cause makes the historic flood in 1999 in Thua Thien Hue Province (figure 4.10).



Figure 4.5 Map of water surface's status of Defensive Moat in Hue Citadel



Figure 4.6 Drying status in Defensive Moat in the dry season



Figure 4.7 Flooding at the city Gates in the rainy season



Figure 4.8 Water block by residence



Figure 4.9 Drying status in Defensive Moat in the dry season



Figure 4.10 The big flood in 1999 in Thua Thien Hue Province (source: internet)

c. Damage of the flood

Beside the activities of local people, the natural disasters also cause the changes. The basin of Huong River has concentrated rainfall and high flood frequency so that Hue City is always affected heavily by flood. The water level's survey data at Kim Long station in Huong River from 1977 to 2006, there were 33 floods in which top water level was higher than 3.0 m (water level in Le Loi Street along Huong River is about 3.2 m); 5 floods in which top water level was higher than 4.5 m; 10 floods in which top water level was higher than 4.0 m.

According to the monitoring data from 1977 to 2006 on the Huong River, on average, there are 3.5 floods more than or equal to the level II alarm, the maximum number of years is 7, the minimum is 1, of which 36% are large and especially large flood. In the years of the La Nina phenomenon, the number of floods was significantly higher. Floods are extremely dangerous with high intensity, devastating power, causing damage to Thua Thien Hue annually (table 4.4).

Table 4.4 Monthly distributed flood events in Huong River (1977 – 2006)

Month / Events	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
H>3.0 m	0	0	0	0	1	1	0	1	5	14	10	1
H>4.0 m	0	0	0	0	1	0	0	0	1	6	2	0
H>4.5 m	0	0	0	0	0	0	0	0	0	4	1	0

(source: Pham Viet Tien, *Flood Hazard Mapping Project in Huong River Basin of Thua Thien Hue Province,* in Flood hazard mapping training course JFY 2008)

Research results of the Netherlands Climate Change Support Program entitled *"The Impact of Climate Change on the Huong River Basin and Adaptation in the Coastal Zone of Phu Vang District, Thua Thien Hue Province"* that:

+ Annual rainfall in Hue city increases of 7%.
+ Rainfall in the dry season (February - May) reduces of 10-15%, while rainy season (September - November) increases of 10-24%.

+ Rainfall reduces dry season and rapid increases in rainy season, causing of serious drought and floods for Hue City.

+ Based on the analysis of the effects of climate change for year 2100, the most serious of the six scenarios studied in the fourth assessment report IPCC (scenario A1F1) was used. If this will be the case, in Hue, the highest flood level will be 6.44 m, an increase of 11%, the inundation area is 453.7 km2, an increase of 17%, compared to the situation of the historical flood in 1999 (figure 4.11 and 4.12).

According to a study by *Project for Building Disaster Resilient Societies in Central Region DRSC (JICA 2011),* when rainfall increases and sea level rises due to climate change, the flood frequency of 20 years is calculated with the following results: the deepest part of the Bo River is 5 m, most of the downstream part of Bo River is submerged, part of downstream basin of Huong River submerged, the flood situation occurs in southwest.

Analysis results indicate that the risk of flooding in the city is very high if no preventive solutions are taken.

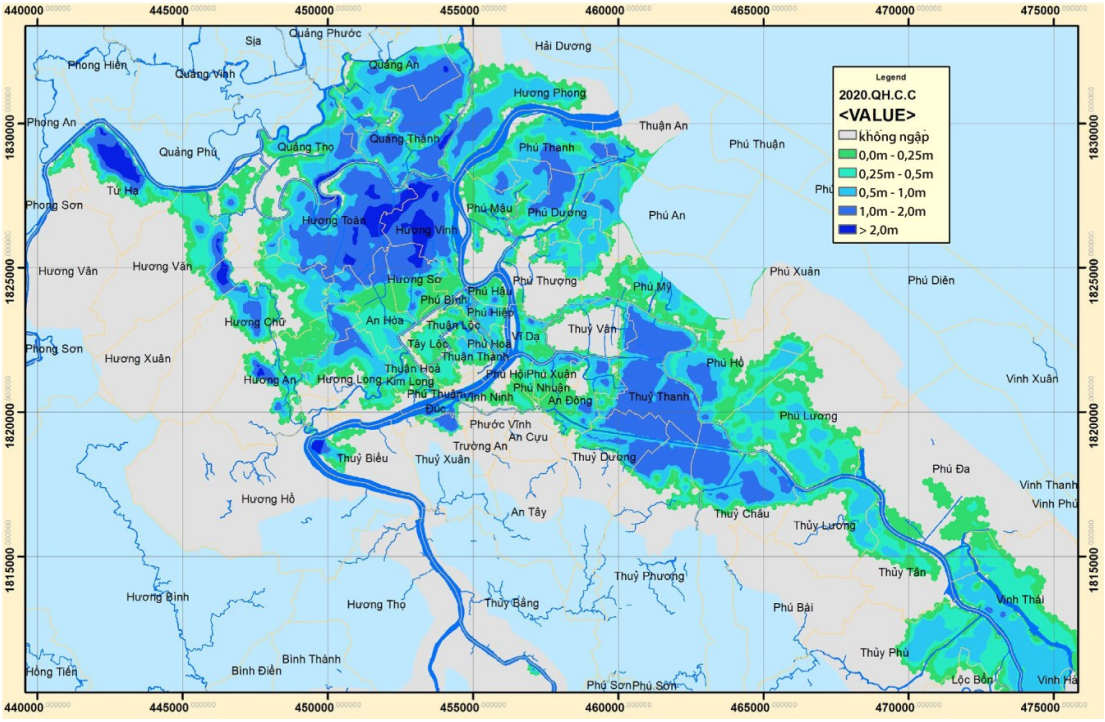


Figure 4.11 The flood map in Hue in 2020, the case study of absence of regulation of the water reservoir (source: USAID, ISET, M-BRACE, *Hue City Action Plan, climate change adaptation in Hue City 2014-2020 period,* 2014, p. 32)

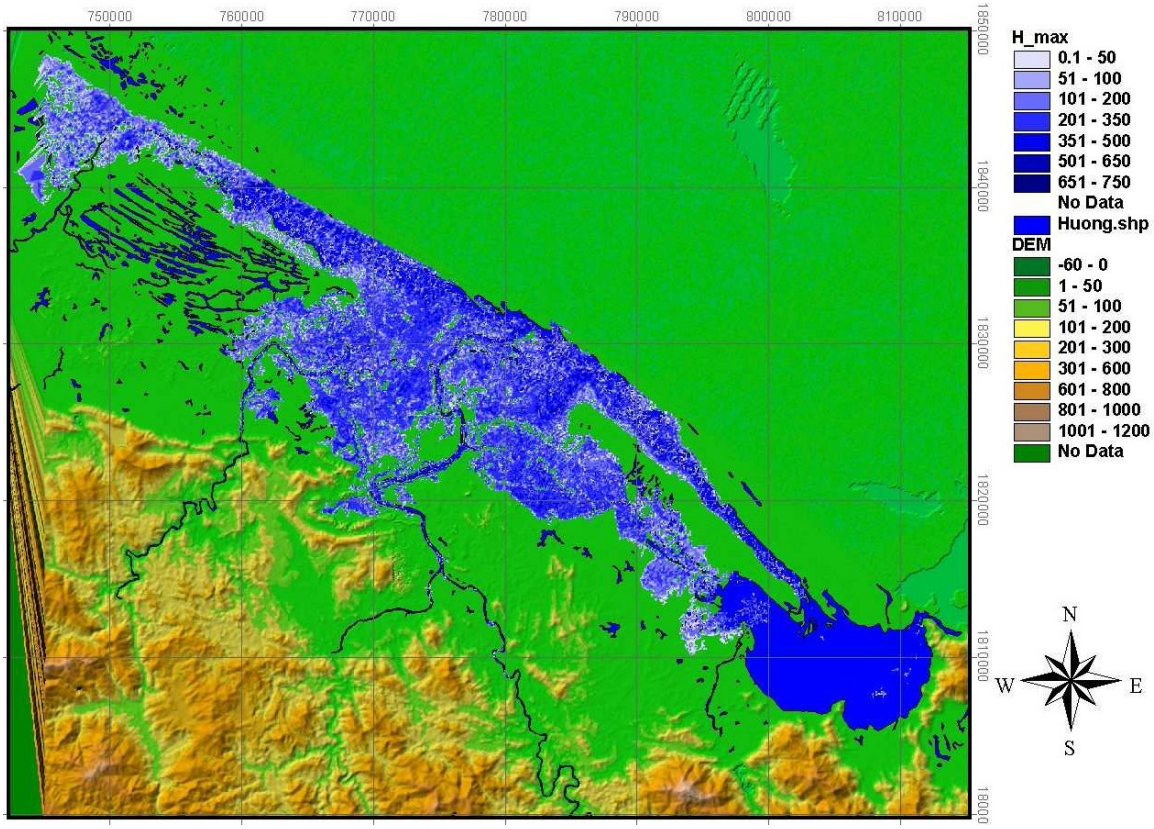
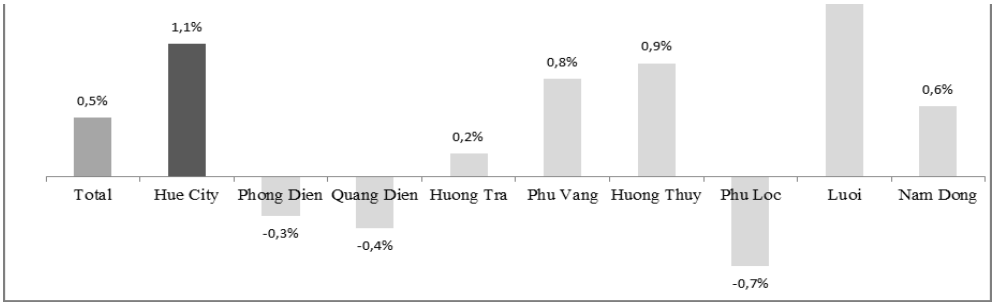


Figure 4.12 Analyzing the effects of climate change using the A1F1 scenario (source: Impacts of climate change in the Huong River basin and adaptation in the coastal area of Phu Vang District, Thua Thien Hue Province, NCAP)

4.1.3 Social and economic dimensions

After Vietnam became a united country (1975), the large immigrants entered the citadel for their residence. That was causes why there were a lot of houses in the Citadel, even on the rampart. Table 4.5 shows the increase of annual rate of growth population in Thua Thien Hue. Moreover, many small roads were formed and the Hue Citadel was divided into many plots with different shapes. The traditional urban structure were changing a lot.

Table 4.5 Annual average rate of growth population in districts and city of Thua Thien Hue



(source: Thua Thien Hue's People Committee, *The Modification of Hue City's Masterplan 2030 and Vision 2050,* Koica project, 2013)

In the last decades, Hue City has quickly changed due to the impact of urbanization such as population outbreak, land encroachment, environment pollution, and flood. Thus, there have been some residents living around Defensive Moat, lakes' system, Ngu Ha River and on the rampart. Residential activities around these areas have been diversified with different components and daily activities. The data of survey showed that the activities of people include: commerce, doing exercises, walking, living activities, agricultural plant, festivals, tourism, etc. The variety of kinds of human activity has become a part of local people life. The encroachments of water are most of the lakes and Ngu Ha River to plant vegetables, discard dirt. Besides, the waste's discharges put down moats, causing seriously pollution, affecting to urban identity etc. Moreover, dam constructions also cause the moat surface getting dry, the water congestions which make changes flow function of water system. All of the encroachments of local people are breaking traditional landscape structure, harming the system heritage and water (figure 4.13).



Thuy Quan Drain clogged sewage Growing vegetables in Nam Minh Observatory

Figure 4.13 The status of exiting land use around defensive moat and rampart

4.1.4 The transformation of architecture

a. Contemporary type of building

The urbanization process which makes Vietnam developing is also affecting Hue. It has a large impact on the architecture, landscape, and life style of the local people. Residence and commercial areas are making the quick changes with the difficulty of uncontrollability, determining the characters of the area. In this context, architecture should be more consideration as a means of studying the charms and characters of Hue that have not been lost in the social developing process.

At present there are a lot of contemporary types of buildings in Hue Citadel. The survey data shows the various forms of building which can be roughly classified into eight types, as below (figure 4.14):

A. Garden house
B. Traditional style building with dense housing
C. Urban house of exclusive residential type
D. Traditional style building for commercial and residential use

E. Shop House for commercial and residential use
F. House with farmland
G. Terraced house
H. Squatter at river side



A. Garden house



B. Traditional style building with dense housing



C. Urban house of exclusive residential type



D. Traditional style building for commercial and residential use



E. Shop House for commercial and residential use



F. House with farmland



G. Terraced house



H. Squatter at river side

Figure 4.14 Contemporary type of building in Hue Citadel

b. **Transformation of architecture**

The buildings of Hue have had various forms and types, from the traditional house 'Garden house' to the commercial house 'shop house'. The local people have been changing their life style by adapting it to already existing streets and buildings. Streets in commercial areas have been developed to function both as grounds for busy trading and as residential areas. For instance, activities normally carried out indoors may be seen out on the streets. This characteristic is long used of commercial space on the street.

In Hue Citadel, there are 3 streets which are great influence by commerce such as Mai Thuc Loan, Dinh Tien Hoang and Nguyen Trai Street. Nguyen Trai Street is the commercial street for daily life and it has many stores for daily necessaries. On the other hand, Mai Thuc Loan Street is the commercial street for less-daily life and it has many stores such as amusement, precious metals, and high-class garments.

Transformation of buildings of commercial and residential use the building types of commercial and residential use which were changed and developed together with commercial areas stabilized as the shop house (figure 4.15 - 4.17).

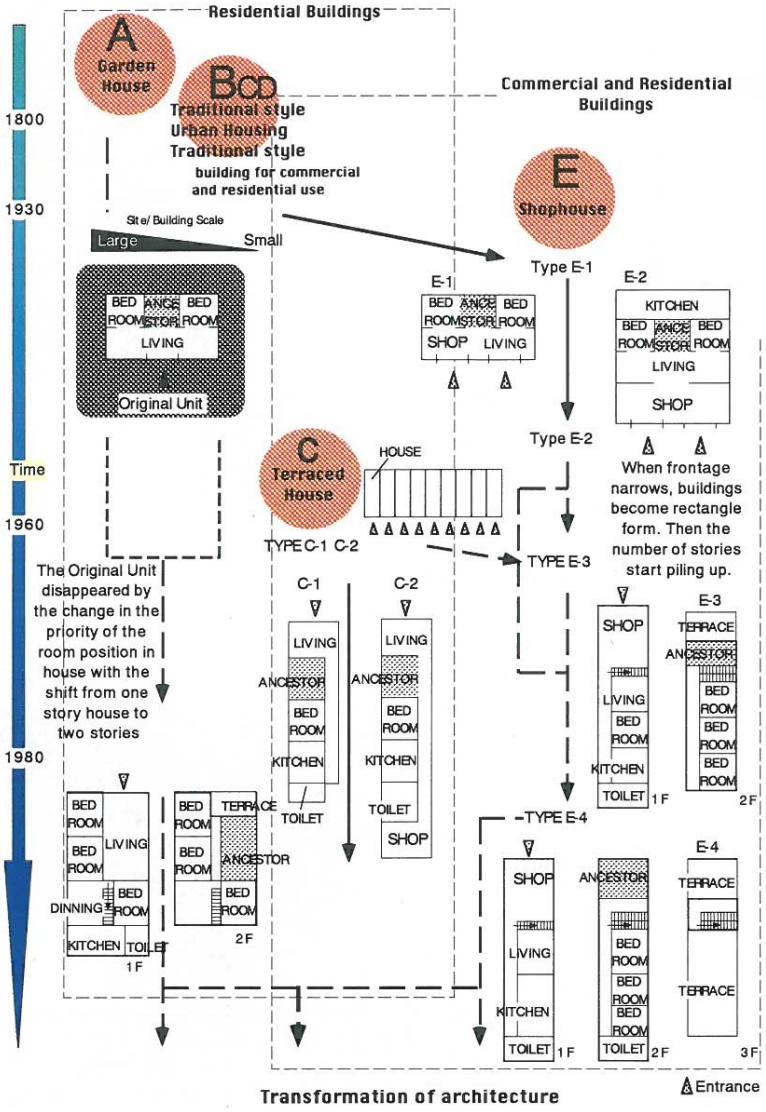


Figure 4.15 Transformation of architecture (source: Shigeru Satoh, *Information Notes of Hue, towards the Historical Eco City, Hue*. Proceeding of International Conference, Waseda University Publisher, Tokyo, Japan, 2002)



Tran Hung Dao Street before 1986 Tran Hung Dao Street after 1986

Figure 4.16 The change of architecture in Tran Hung Dao Street

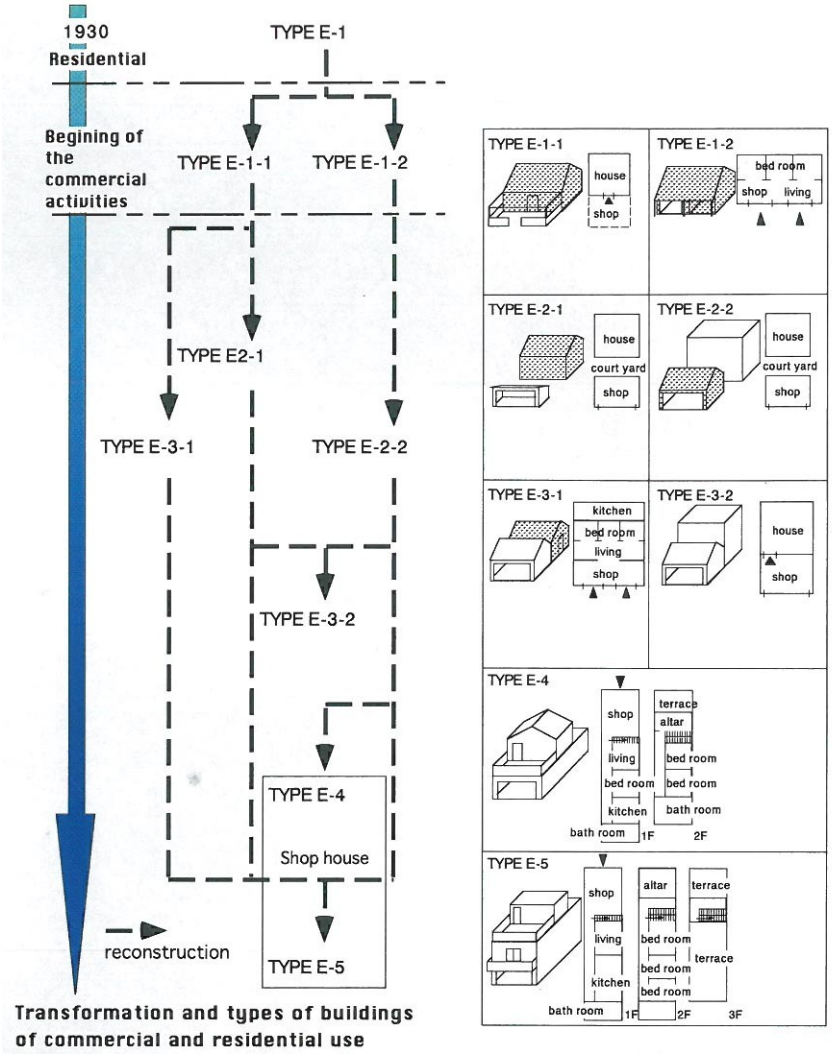


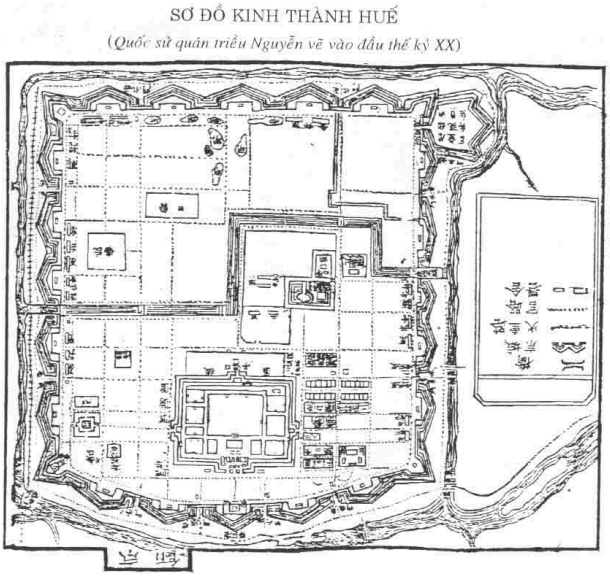
Figure 4.17 Transformation of architecture (source: Shigeru Satoh, *Information Notes of Hue, towards the Historical Eco City, Hue*. Proceeding of International Conference, Waseda University Publisher, Tokyo, Japan, 2002)

c. The reduction of green space

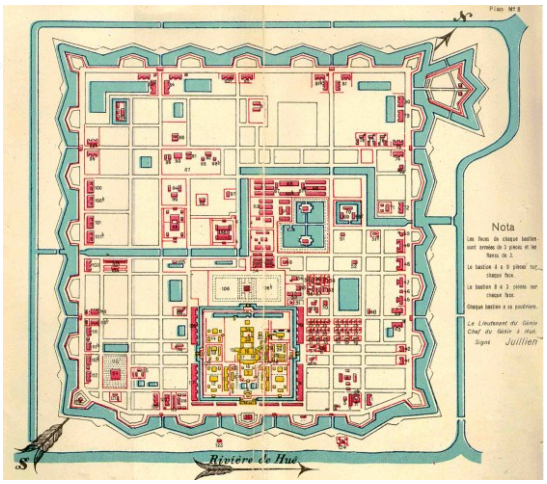
The transformation from Garden house to a commercial house, the increase in population leading to land encroachment, the expansion of the house so that the green density significantly reduced the amount of urban green space.

Figure 4.18 shows the increasing density of constructive needs, living needs from 19th to 21st century. So that the green area quickly reduces, making the quality of local people's life low.

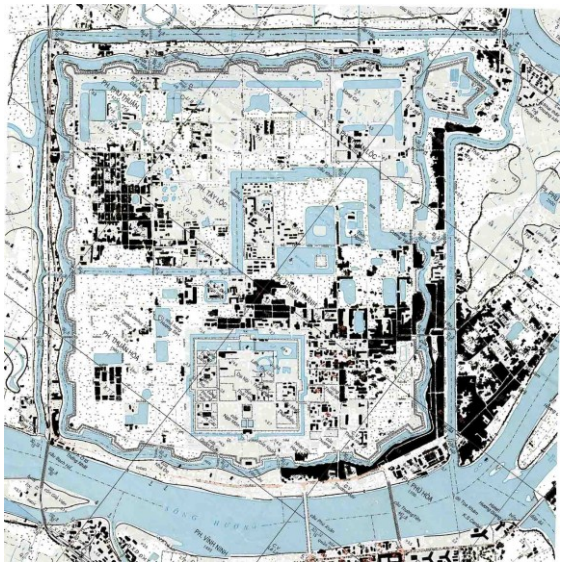
Although the Government has the rules to control the construction, however the building of housing is free by the local people due to the business, government management is not strictly.



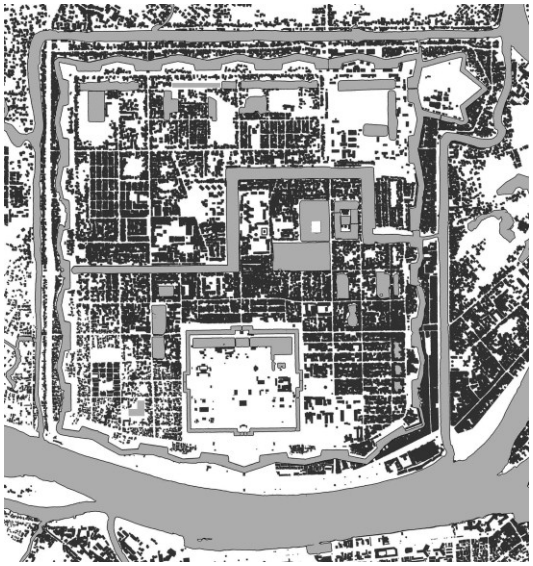
1. Hue City in the early 19th century



2. Hue City in 1920



3. Hue City in the 1980's



4. Hue City in the 2017

Figure 4.18 The green reduction due to increase of constructive density in Hue Citadel (source: Picture 1: Quốc Sử Quán triều Nguyễn (The Association of History of the Nguyen Dynasty), *Đại Nam thực lục* (*Chronicle of Greater Vietnam),* Vol. 1, Translation: Institute of History, Social Science Publisher, Hanoi, 2004; Picture 2: Ardant du Picq, *Bulletin des Amis du Vieux Huế,* Vol. 1933, No. 1-2, p. 65; Picture 3: design by author, data synthesis from Department of Survey, Mapping and Geographic information Vietnam; Picture 4: design by author, data synthesis from Hue City people's Committee and Google Map)

4.2 Hue Citadel in urban structure

4.2.1 Hue Citadel in territory

This architectural complex of Hue, from the general to each constituent unit, has been established in the context of nature. The close relationship, which was between architecture and nature, created an artistic value, called landscape architecture (figure 4.20).

Looking back at the image of Hue ancient Capital through written materials (historical books, magazines), drawing materials (diagrams, maps) and especially photographic materials, one can say that the harmony between ant architecture and nature have reached the great level and the spatial organization of the urban architecture system has become complete (figure 4.19).

After 1975, some experts and officials of UNESCO have the opportunity to inquire into the situation of the monuments in Hue, have identified that the Hue Monuments Complex still carry high values of history and culture, Hue is still a *"Masterpiece of urban architecture poetry" (un chef-dœuvre de poésie urbaine)*.[66] Since then, the preservation of monuments here is accelerating, especially after the Vietnamese Government applied the innovation policy in 1986.

One of the consequences of this work is that the Hue Monuments Complex was listed by UNESCO on the World Heritage List on 11/12/1993. The World Heritage Committee recognizes that *"The Complex of Hue Monuments: The first Capital of Unified Vietnam, the city was built at the beginning of the 19th century with eastern philosophies and Vietnamese tradition. Its melting with the natural environment, the beauty of the exceptional architecture and decorated building are a unique reflection of the old Vietnam Empire at its height"* [67]

In this Heritage Complex, the unit which, is special concerned by UNESCO, is the Citadel, as it represents many issues related to history, culture and especially the art of architecture.

In the past, the Capital occupied a vast landscape architecture from the Truong Son Mountains to the East Sea, from the Cau Hai Lagoon to the Bo River.



Figure 4.19 Maps of some available natural elements of Hue City (source: The Descriptive Geography of the Emperor Đồng Khánh)

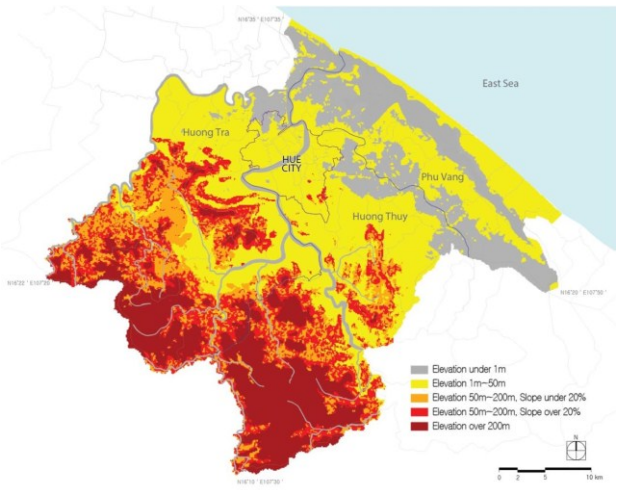


Figure 4.20 Hue in territory (source: Thua Thien Hue's People Committee, 2013. *The Modification of Hue City's Masterplan 2030 and Vision 2050*, Koica project)

4.2.2 Identification of spatial areas of Hue City

Hue's architectural value is not only individual buildings, but also general planning. Each space has a unique, all combine to make the Hue identity. In the planning of Hue City, it is

[66] Appel from UNESCO Director-General Amadou-Mahtar M'Bow from Hanoi on 25/11/1981 after the visit to Hue: *Pour la Protection, la Préservation, la Restauration et la Mise en valeur de la vill de Hué,* p. 1.
[67] UNESCO, *The World Heritage Newsletter,* No. 4, Mar 1994, p. 7.

necessary to harmonize the relationship between construction, development and conservation, restoration. They need to be preserved, enhanced, make Hue own identity. Figure 4.21 shows seven typical main spaces in Hue City.

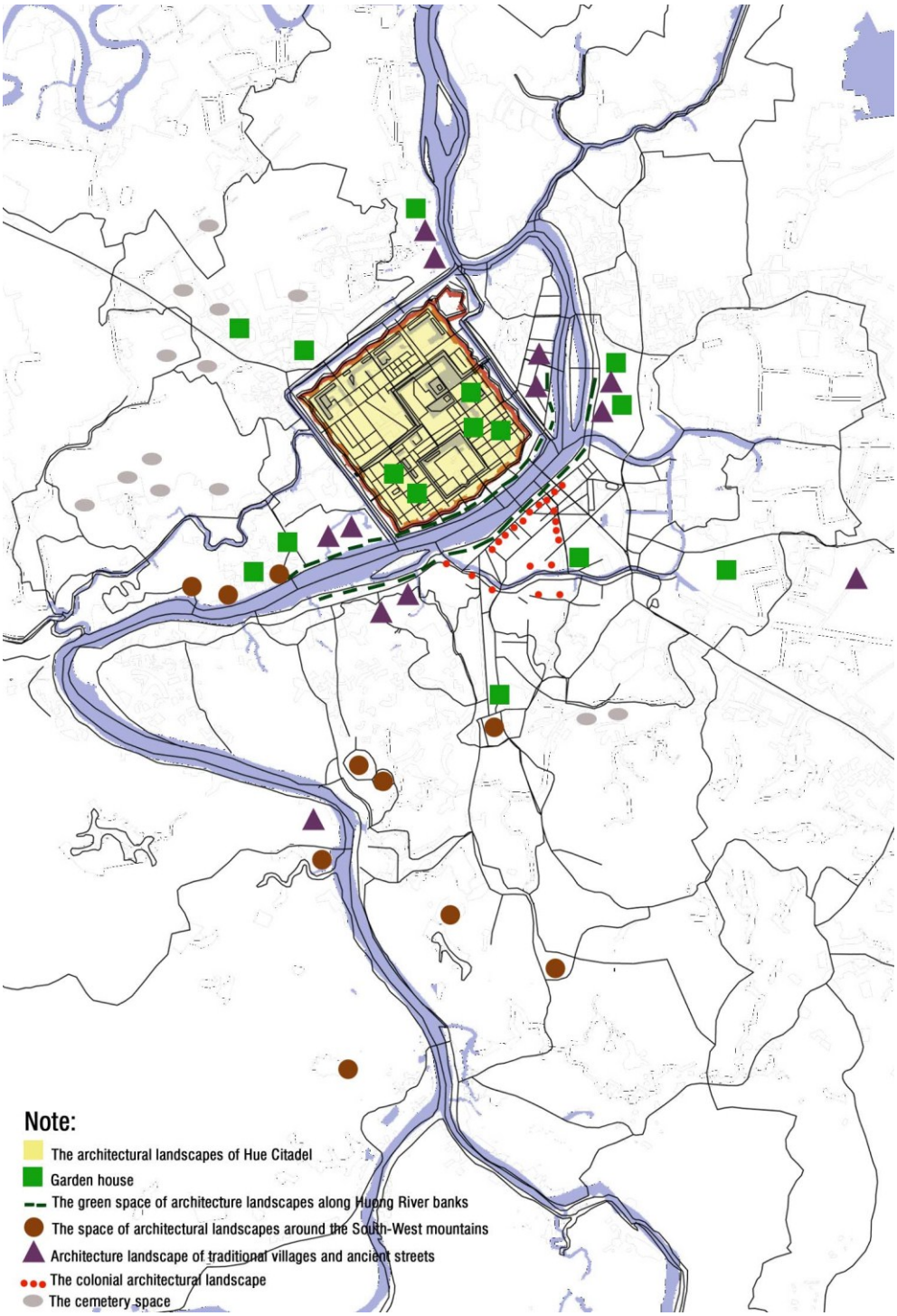


Figure 4.21 Seven spatial areas of architectural landscape

a. The architectural landscapes of Hue Citadel

This is a collection of buildings of architecture Nguyen Dynasty, with an area of nearly 520 hectares. Most importantly, the Citadel together with the Palace complex and dozens of Nguyen dynasties such as the Luc Bo, Co Mat Vien, National education School, the Museum, Do Sat Institute, Tang Thu Pavilion, Ton Nhon Hall, and many architectures of Landscape such as Ngu Ha River, Tinh Tam Lake, Co Ha Garden etc. which most concentrate in the area of Imperial City, where the most important administrative activities of the Nguyen feudal court, the place where the king and the court.

With an exemplary planning, the Hue ancient Capital was built quite well, its architecture balanced so natural harmony that people forget the human made it. It is because of the historical and artistic values that today Hue has become the cultural heritage of mankind. In the area of the city, people also witness the urban structure with the way of the street and the craft village in the process of urbanization of the 19th century, quite typical not only in Hue, but also the whole country in terms of old urban architecture and royal architecture. This space is very deep, ancient, and unique (figure 4.22).



Figure 4.22 The architectural landscape of the Imperial City (source: VinGG)

b. Garden house

Hue is a place to keep some traditional villages such as Kim Long, Vi Da, Nguyet Bieu, Gia Hoi, Cho Dinh etc. with hundreds of ancient garden houses. Over functional use, the Garden House is Vietnamese culture which represented a layout solution in the garden, the art of planting trees, carving art and construction techniques. Garden House is planned according to Feng Shui principles. Beside traditional main house with one 'gian' two 'chai', in front of house is the screen and penjing. Surrounding the house are gardens where many fruit trees are planted in suitable locations. The garden layout shows the harmony of nature with the house (figure 4.23 and 4.24).



Figure 4.23 Map of distribution the Garden House in Hue Citadel

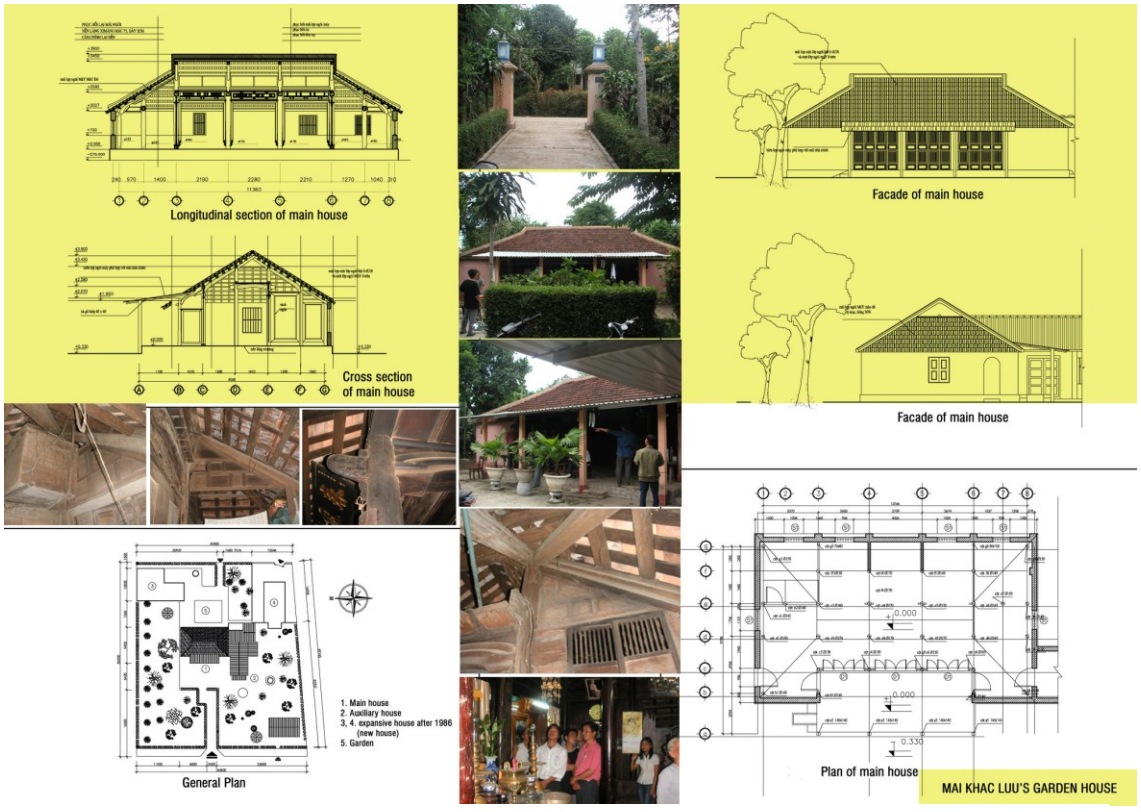


Figure 4.24 The landscape architecture of Garden House

c. The green space of architecture landscapes along Huong River banks

The Huong River has a beautiful layout of Hue city. The location of the Citadel is not separated from the Huong River, Le Quy Don said: *"Towards south-east, leaning on the mountains, standing in the back row, the large river in front of the face like a hand. The center of the height is like Dragon-Tiger shape. A beautiful place, God dedicated to the king for making the capital"*. The river flowing through the city has formed a spatial axis which was functions as the transitional center of the northern Citadel (the old capital) and the southern part (architecture developed from the end of the 19th century present). Both banks of the Huong River should be viewed with a more reasonable scale, starting at the Tuan junction (upstream of Huong River) to Bao Vinh Ancient Street (figure 4.25).

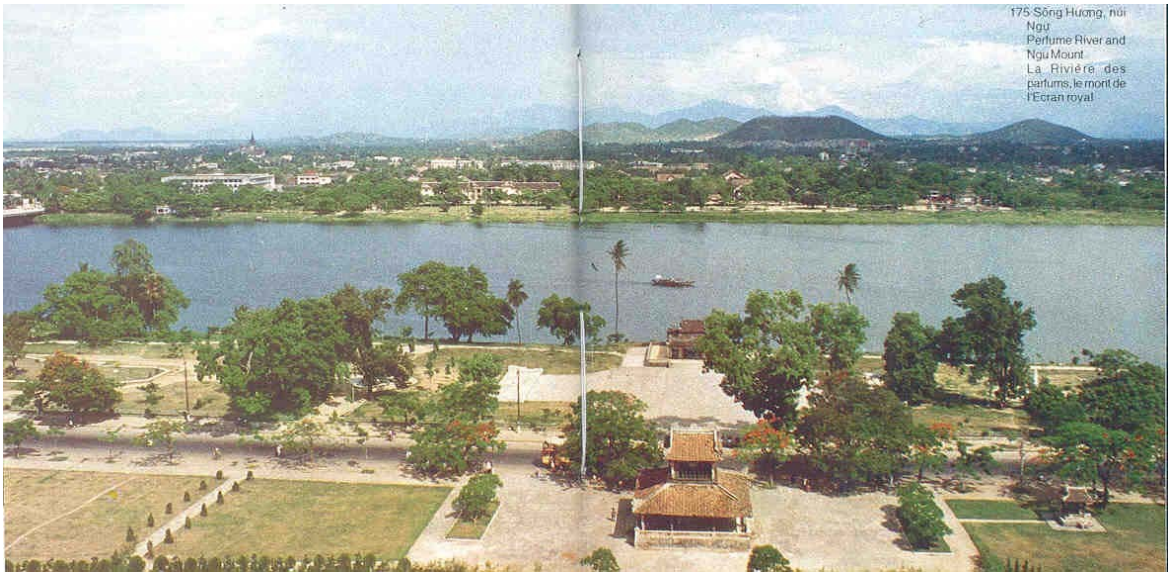


Figure 4.25 The architecture landscape along Huong River (source: Région Nord Pas de Calais, *Hué-Capitales de Légende*, Les Editions d'indochine)

d. The space of architectural landscapes around the South-West Mountains

Hue has diverse terrains such as rivers, streams, mountains, plains, lagoons etc. The diversity of territory creates variety in the urban space structure. A special space of Hue is still preserved, it is the hilly landscape in southwest of the city. Mountain, pine trees and old architectural systems in beautiful land such as Tam Thai, Ngu Binh, Thien Thai mountain, Ke, Kim Phung Mountain, Vong Canh Hill, which create the City. This is also the site of the Royal Tombs of Nguyen Dynasty and many temples, lying hidden on the quiet hills of this area as still retain the wildness (figure 4.26 and 4.27).

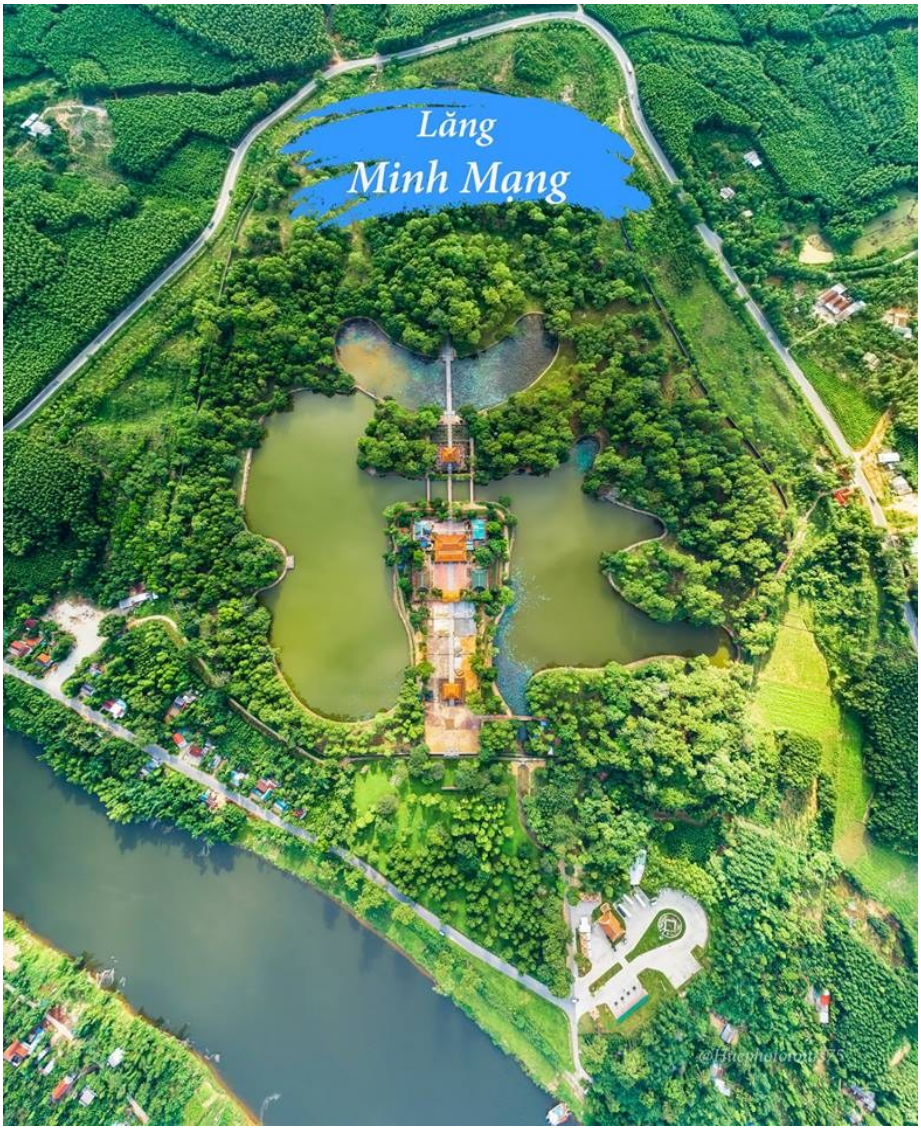


Figure 4.26 Landscape of Minh Mang Tomb (source: HuePhotoTours75)



Figure 4.27 Landscape of Gia Long Tomb (source: HuePhotoTours75)

e. Architecture landscape of traditional villages and ancient streets

From a long time, Hue was an important political and economic center of Annam, with relatively early interference. From the 16th to 17th centuries, a crowded urban area was built in Bao Vinh Street, Gia Hoi Street, Dinh Market. This was an ancient urban area associated with the formation and development of the Capital including many diverse structural systems of ancient cities in Hue such as Prefecture, ancient temples, ancient temples, traditional street markets of Vietnamese, Chinese; associated with the temples, pagodas and halls of Chinese and Indian merchants. Although there are some deformation, change, but Bao Vinh, Gia Hoi Street, Dinh Market still reserve the system of ancient urban structure. There are still about twenty of the royal prefectures of old officials. System of pagoda, communal house and temple have more than twenty valuable buildings such as the National Emperor Dieu De Pagoda, Dieu Hy Pagoda, Tang Quang Tu Pagoda, Kim Hoan House, Temple of India, Phuc Kien Pagoda. Especially the old house system, traditional house have nearly sixty buildings (figure 4.28 and 4.29).



Figure 4.28 Bao Vinh ancient Street



Figure 4.29 Chi Lang ancient Street

f. The colonial architectural landscape

As most of our cities, during the French rule, colonial Government in Hue established a new neighborhood, commonly known as the West Quarter. This area is located south of Huong River, gradually spreading to An Cuu River. Although it is designed by French, it is a sense of respect for natural values, particularly the Huong River, and harmonious beauty of the overall Hue Capital in general. They did not create a rivalry between the natural landscape and the buildings that were consciously built. From the buildings on the street, through the green and the water, they create connection and harmony between architecture and nature.

In this area, there are a lot of architectural buildings from the French period, including many beautiful buildings such as the National School, Hai Ba Trung School, An Dinh Palace, Truong Tien Bridge, Morin Hotel, Hue City People's Committee, The monument to the dead of Hue, the Governor Palace, the archbishop Palace etc. with many different architectural styles such as Prehistoric colonial architecture, Neo-classic style, Local French architectural style, Indochina architectural style. There is no study on this urban space. Identifying the spatial extent of the French Quarter and defining the values of the Art of

Planning and Architecture is a necessary for the City to plan to preserve and conserve an important architectural space of special historical period of the nation (figure 4.30).



Figure 4.30 The colonial architectural landscape

g. The cemetery space

This is a very characteristic space of Hue City. Since ancient times, local people have paid close attention to burial sites after death. Deriving from the sense of respect for the dead people, and the lack of planning in the past so that it was formed of a dead space inside of the city (figure 4.31).



Figure 4.31 Landscape of cemetery

4.3 Characteristics and identification of spatial organization of Hue Citadel

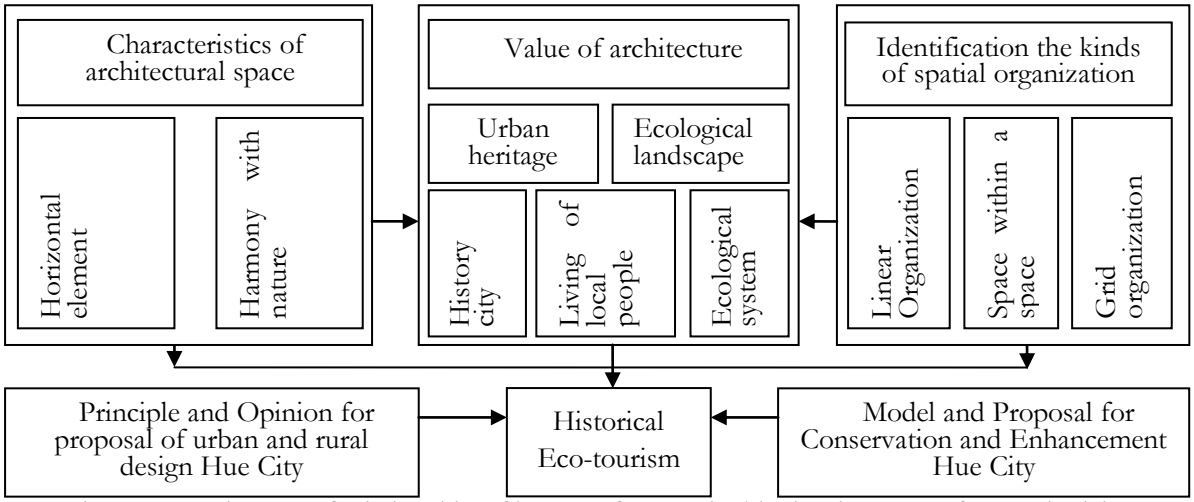


Figure 4.32 Diagram of relationship of impacts for sustainable development of Hue Citadel

4.3.1 Characteristics of spatial organization of Hue Citadel

a. Horizontal Element

One of the characteristics of Hue Citadel architecture is the emphasis of horizontal layout of the plan. Many authors argue that this is not the result of backwardness in construction techniques. That may be true, but one of the important reasons is that the ancients did not want someone to be able to see the whole of the building from a view point. All of them have not perspective, big small, bold light in the spirit. An architectural complex (the Imperial City, Garden House, Palace etc.) is like a small universe, multifold shape, multi-scene, constantly changing. This is a unique of Easter architecture, is the harmonious combination between architecture and nature. With the idea of organizing buildings follows the form of dispersement, basing on spatial organization of clear hierarchy with the purpose. In this architectural layout, it not to focus on a beautiful main building, but is the combination of many small components into a whole (figure 4.33-34).



Figure 4.33 Space of Thai Hoa Palace



Figure 4.34 Left Palace and Right Palace

b. Harmony with nature

The structure of the open space is harmonious between the architecture and the surrounding environment. That is outstanding characteristics, very adaptable to hot and humid climate, heavy rain in Hue. This solution creates the ability to resist the inconvenient conditions of nature while still bringing nature intertwined into the building.

This is a very characteristic feature of the architecture of Hue Citadel, the harmony between architecture and nature with the following characters:

- Space and architectural forms are organized in harmony with nature as an organic element of the natural landscape.
- Architectural component spaces in the garden, the palace, shrines etc. are scattered in layers, interweaving between the building and nature. The spatial layers are horizontal, spreading, flexible and highly dynamic, facilitating the ventilation of structures such as courtyard structure, tombs, lakes etc.
- Trees, water surfaces are always arranged interweaving in the architecture to improve small climate and bring mental satisfaction. The patio space, connected to the front yard (garden house, communal house etc.) and green spaces, creating a continuous open space environment. The space under the eaves is a kind of multi-space and flexible space. It forms the identity of traditional architecture in adaptation with humid tropical climates.

- The patio space is always used in the space organization of the capital. These patios contribute to the close connection among architectural elements. The inner courtyard, water and open space with the green of nature create silence in traditional architecture.

4.3.2 Identification the kinds of spatial organization of Hue Citadel

The research results of the history, current survey, spatial layer dissection and synthesis, we propose the relationship of creative impacts of urban structure and four types of spatial organization, in particular the linear organization which follows the Feng Shui is very important for the urban structure. Besides, the architectural types and spatial characteristics also play a major role for preservation and enhancement the model of sustainable development of Hue City (table 4.6).

Table 4.6 Some of the buildings in Hue which authors surveyed the spatial layers

No.	**The types of construction**	**The parts of architecture**									**Characteristics**				
		Rampart	Perron	Left - right house	Stair architecture	Screen	Garden house	Patio, landscape	Joining house	Buffer space	Open space with nature	Linear space	Dynamic, multi space	Scale of space	Expressive space
1	Hue Citadel	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2	Hue Palace	•	•	•	•		•	•	•	•	•	•	•	•	•
3	Xa Tac Esplanade	•			•					•	•	•	•	•	•
4	Phu Xuan village		•		•		•			•	•	•	•	•	•
5	Garden house	•				•	•			•	•		•	•	•
6	Traditional architecture							•		•			•	•	•

a. Linear Organization

Due to the Feng Shui principle, the main buildings of the Imperial City such as Can Chan Palace, Thai Hoa Palace, Ngo Mon Gate, Flag Tower, Phu Van Pavilion, Nghenh Luong Pavilion, Ngu Binh Mountain etc. are organized along the axis. Figure 4.36 shows the relationship between the monuments and mountains via the axis. This type of organization contains a series of similar spaces that move along a line. The component spaces are directly linked to one another or through another separate linear space. The form of linear motion can be linear, curved, or linear rule.

In order to emphasize a certain component space on the line, it focuses on the size and shape of the spaces to show the important space. The importance of these spaces is emphasized when it is located at the end of the line or located at the intersecting point, or the separation of the line. This spatial organization shows the direction of movement (figure 4.35).

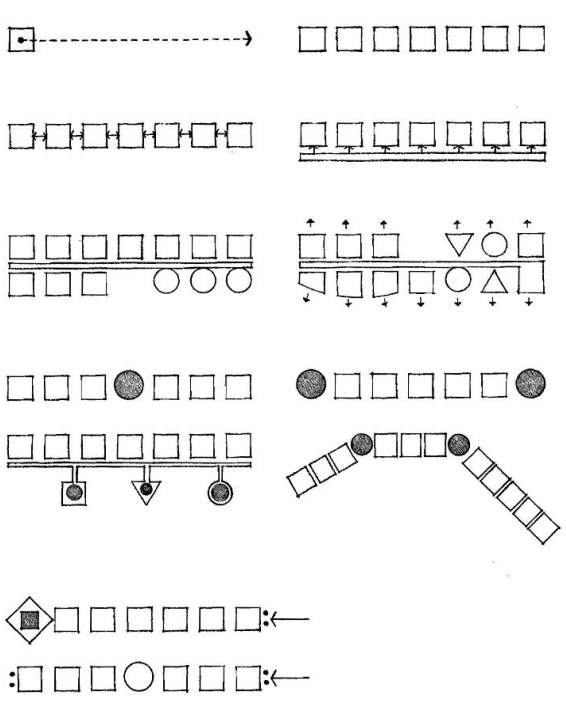
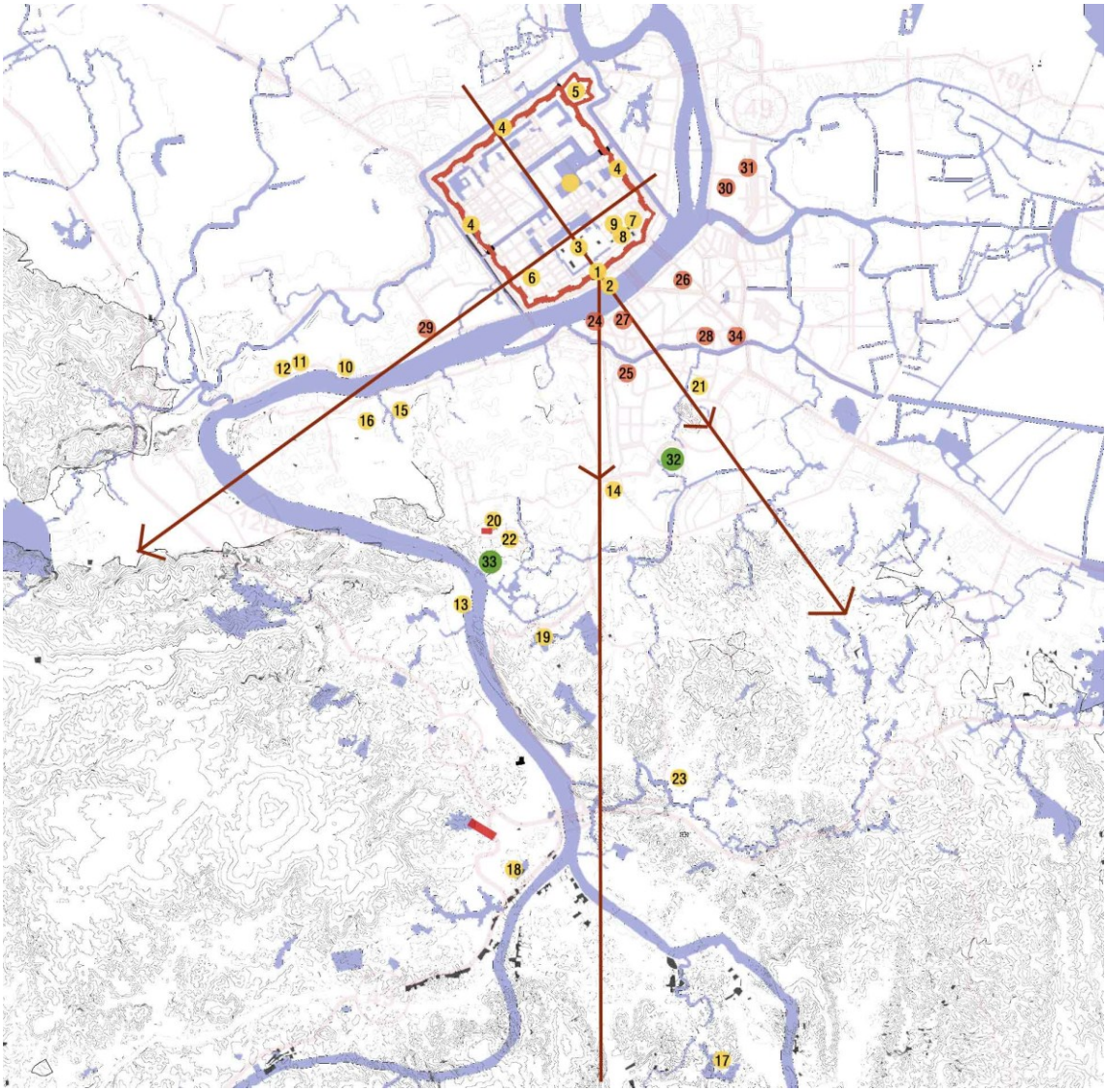


Figure 4.35 Feature of structure of type of linear spatial organization (source: Francis D.K. Ching, *Architecture-Form, Space, and Order,* I.T.P. A Division of International Thomson Publishing Inc., 1996)



Note:

1.Flag Tower
2.Phu Van Pavilion
3.Imperial City
4.Citadel
5. Tran Binh Bastion
6.Xa Tac Esplanade
7.Consul of Ministers
8.Thua Thien Hue Museum
9.Long An Palace
10.Thien Mu Pagoda
11.Temple of Military
12.Temple of Literature
13.Hon Chen Temple
14. Nam Giao Temple of Heaven
15.Royal Atena
16.Voi Re Temple
17.Gia Long Tomb
18.Minh Mang Tomb
19.Thieu Tri Tomb
20.Tu Duc Tomb
21.Duc Duc Tomb
22.Dong Khanh Tomb
23.Khai Dinh Tomb
24.Ho Chi Minh Museum
25.Phan Boi Chau Mausoleum
26.Center Post Office
27.Quoc Hoc Hight School
28.The Mother of Terletual Help Church
29.Dien Phuoc Princess Temple
30.Temple of Ton That Han
31.Lai The Commual House
32.Ngu Binh Mountain
33.Vong Canh Hill
34.An Dinh Residence

Monuments within the Hue historic building complex- The World Heritage Site
Other celebrated monuments
Landscapes

Figure 4.36 Diagram of main axes between Citadel, Monuments and Mountain

b. Space within a Space

The enclosing circles such as the Citadel, Xa Tac Altar, the Garden House etc. are organized in the type of space within space. This kind of layout is a large space that can

cover a smaller space. Putting a small space in a large space changes the spatial continuity and visual continuity.

In this type of this spatial layout, the small space contained can be the same shape or difference shape with the large space. This creates a secondary space and a dynamic space within the larger space. That is showed very clear in the circles of the city (figure 4.38).

The contained space may be different from the containing space in the form to emphasize it as an independent object. This form contrast shows the difference in function or meaning of the contained space. The contained spaces are variety of shapes and sizes, transformation by the containing space.

Figure 4.37 shows the relationship of space within a space in Imperial City.

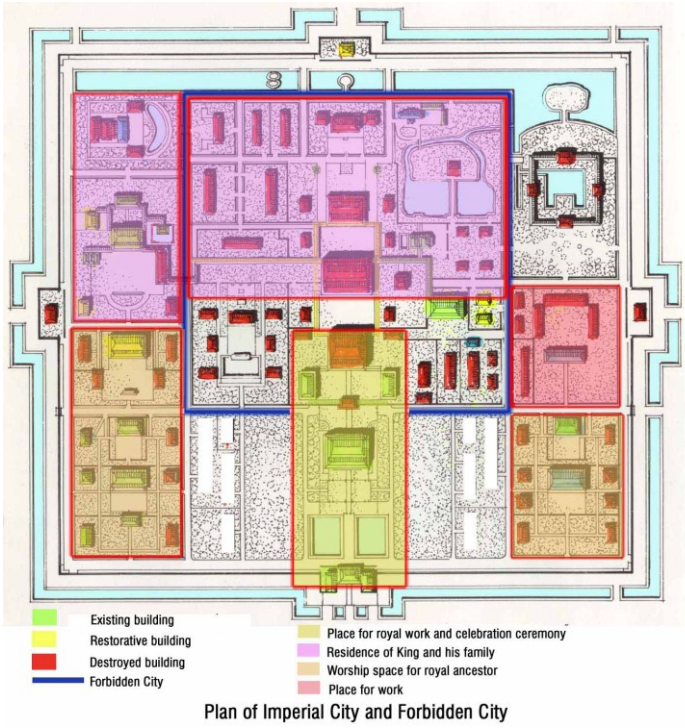


Figure 4.37 Spatial organization within space in the Imperial City and Forbidden City

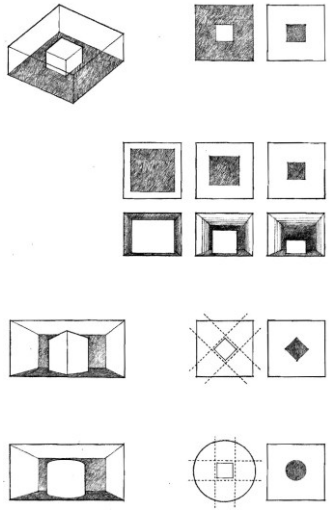


Figure 4.38 Feature of structure of space within another space (source: Francis D.K. Ching, *Architecture-Form, Space, and Order,* I.T.P. A Division of International Thomson Publishing Inc., 1996)

c. Grid Organization

The Citadel is composed of nine squares linked together in the network. This kind of spatial organization creates spatial and negative spatial layers. Parts of the network can change continuity, rotation or interruption, focusing a main space or adapting to the natural terrain (figure 4.39).

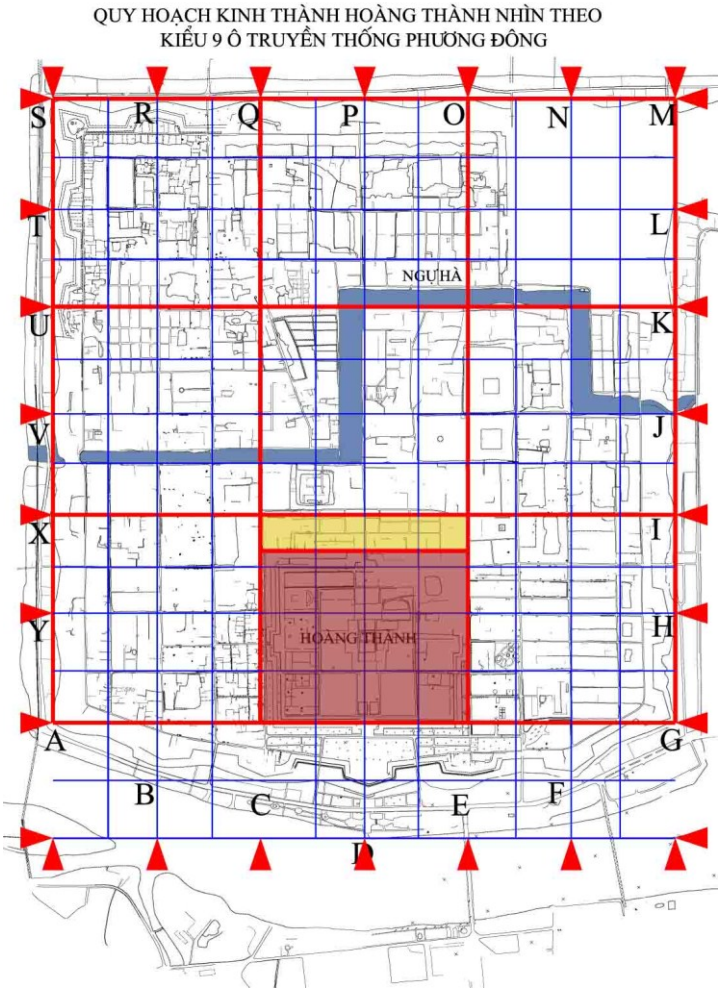


Figure 4.39 The structure of grid of the Hue Citadel

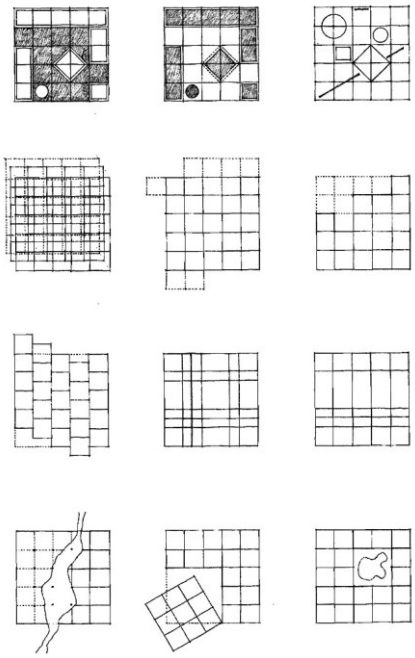


Figure 4.40 The feature of structure of grid (source: Francis D.K. Ching, *Architecture-Form, Space, and Order,* I.T.P. A Division of International Thomson Publishing Inc., 1996)

The most familiar network is the square grid. Grid network is referenced on the third dimension generating a spatial network. From this module, many forms and spaces are variety arranged in shape, size and space, and adapt to the natural terrain (figure 4.40).

4.4 The Values of architecture of Hue Citadel

4.4.1 Architectural heritage value for urban national identity

a. Historical value

It is mark of the history of the transformation periods of the Citadel such as the Nguyen architecture, colonial architecture, the combination between Western military, Eastern philosophy and Vietnamese traditional architecture (figure 4.41-4.43). The architecture of the citadel reflects the brilliant reception of cultures from the Ly, Tran Dynasty etc., the interference, the transformation of the Chinese culture, France architecture. The spaces closely relate together in the overall architecture of the buildings. Hue City reflects the mark of interference, cultural progress, indigenous architecture as well as foreign. This shows the existence of independence to keep identity and conscious reception to develop the architecture of Hue today. Besides, it also shows the art of

organizing military architecture combined with natural scenery. The harmony is between human and nature.



Figure 4.41 Map of the relics in Hue Citadel

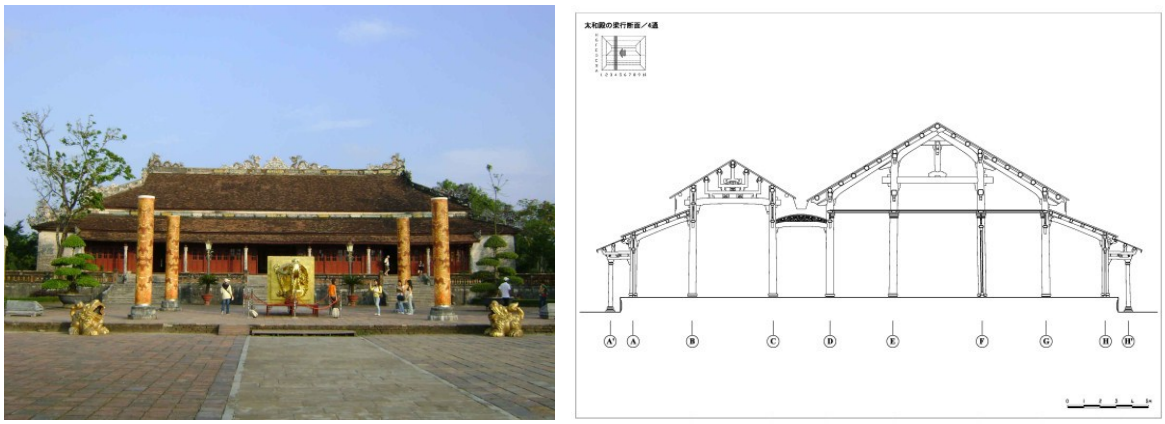


Figure 4.42 Style of Royal Architecture of the Nguyen Dynasty, Thai Hoa Palace (Constructed in Gia Long period) - Traditional style

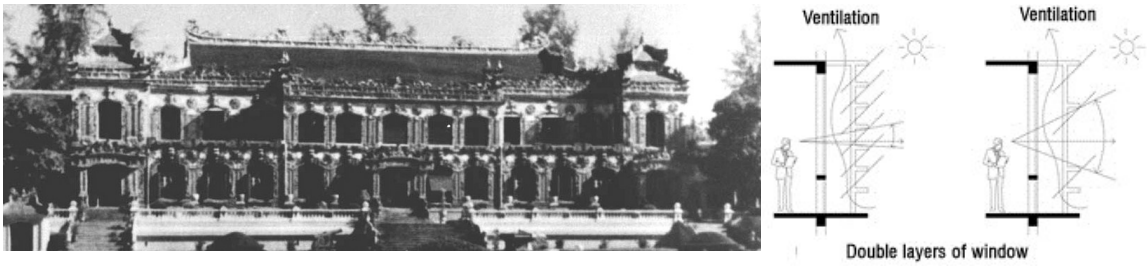


Figure 4.43 Kien Trung Palace (Constructed in Khai Dinh period) - Colonial style (source: Hue Monuments Conversation Center)

b. Value of use, adapting tropical climate

The layout of scattered layout, horizontal spread has adapted to the culture, tropical monsoon climate of the local place. The horizontal layout spreads, interwove between the houses with the garden to be effective and sustainable over time. This type of model creates buffer spaces (patios, corridors, sub-space etc.) which have the effect of air ventilation, creating a transitional space when approaching the main space (figure 4.45).

The traditional truss structure, in addition to anti-heat, anti-cold, also has the ability to resist storms very effectively. This is an experience lesson adapts to local climate, long-term development model for sustainable development (figure 4.44).

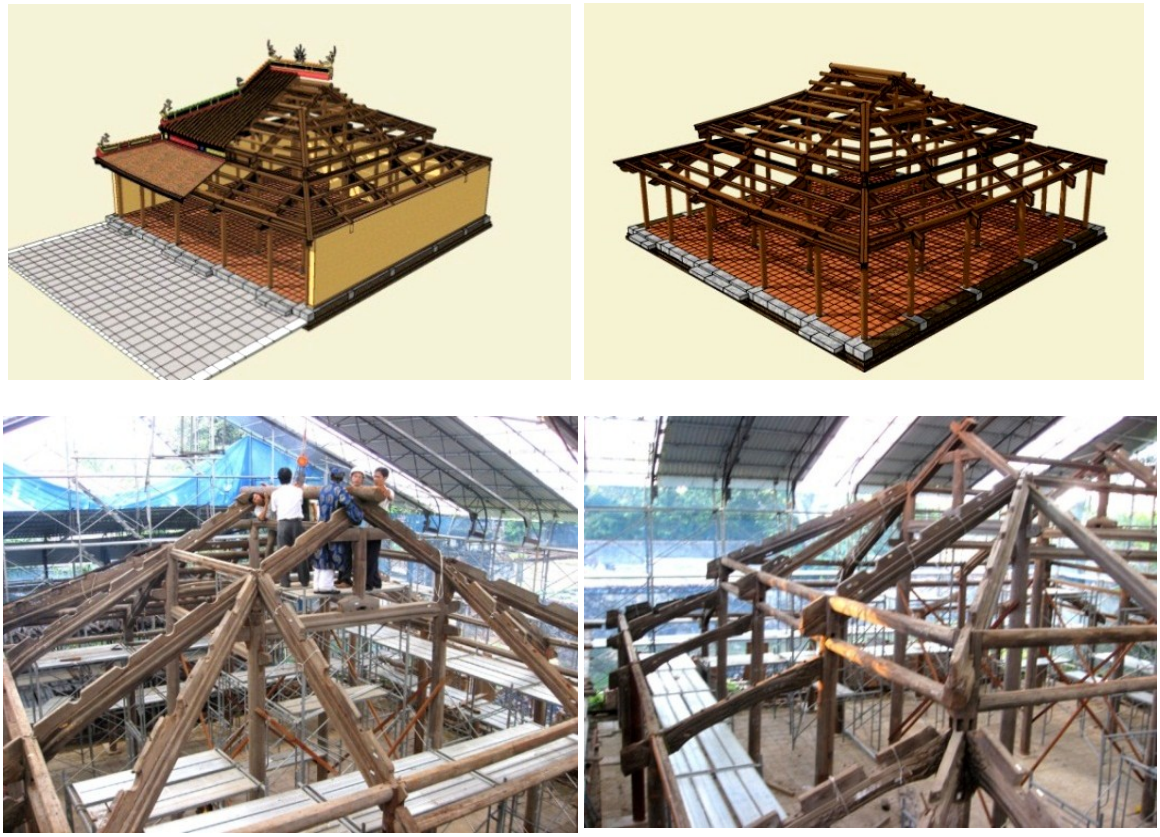


Figure 4.44 The wooden system of traditional house (source: Hue Monuments Conversation Center)

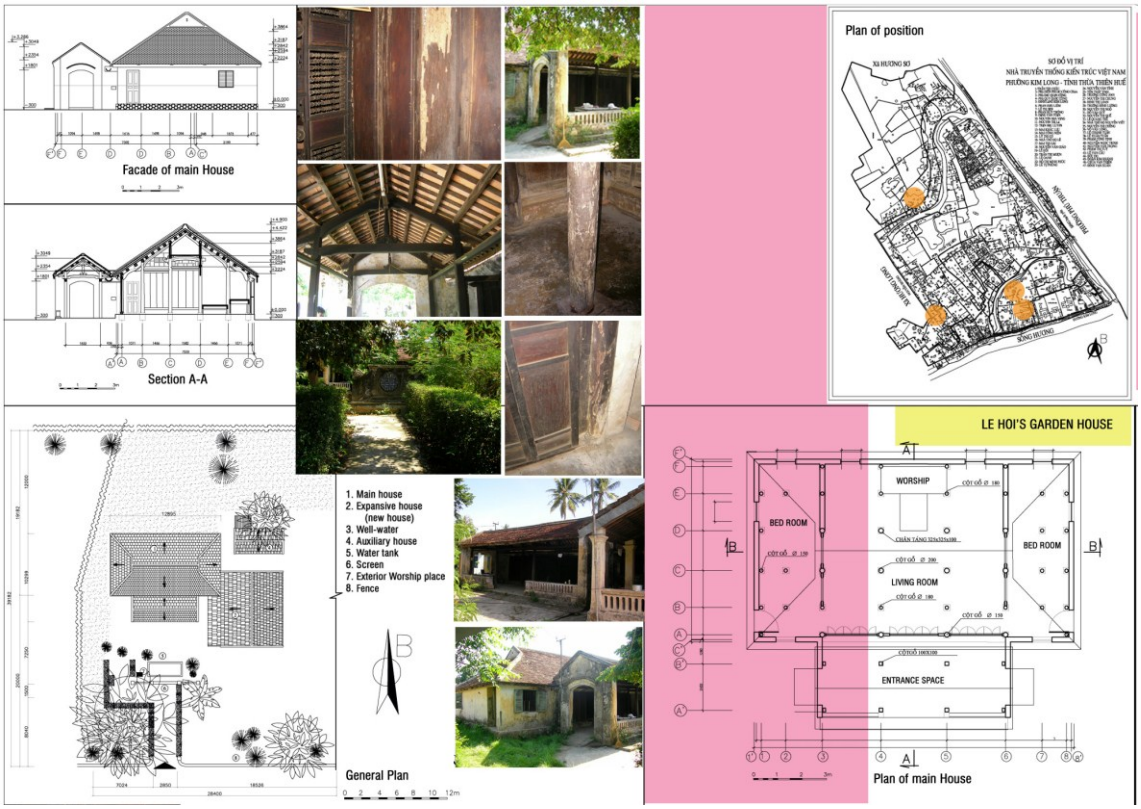


Figure 4.45 Traditional house - Garden House

c. Value of culture and art

The type variety of the traditional spatial organization also partly reflects the architectural aesthetics of them. The diversity of types and modes of connections allows for the variety of architectural solutions, the layout solutions that create the historical symbolism, the source of human (figure 4.48).

Horizontal space, many layers create the movement, the rhythm in traditional architecture, while creating the positioning and especial images in urban space (the Flag Tower, Ngo Mon Gate, Nghenh Luong Pavilion etc.). Space layers create harmony between buildings and nature. The Hue Citadel has a master plan of multi-layered architecture, which is very well integrated with the natural landscape, as well as still expresses the power of feudalism.

The traditional space expresses the horizontal aesthetics which is very characteristic of Hue. Rhythm of the roof structure creates a variety of the traditional wooden structure, the roof structure which creates the beauty of the variation in interior (figure 4.46 and 4.47).

The square of Ngo Mon Gate, the communal yard are public gathering place. There are educational activities of social culture, education of the values of traditional culture, gathering the people to remind the merits of the country, with the people. It is the community activities with social character, cultural education which show respect, preserve the values of the nation.



Figure 4.46 The truss structure of Hung To Altar



Figure 4.47 Auxiliary Gate of Can Thanh Palace



Figure 4.48 Map of buildings with cultural value in the Hue Citadel

4.4.2 Landscape of the ecological system, urban structure for sustainable development

a. Local topographical structure

Along with the features of tropical climate, the complex includes the variety of natural elements such as the mountain system, the topography on the west; the lagoon system, sea and sand dunes on the east; the plain with many rivers, lakes and diverse ecology in the center. Hue City is wonderfully designed as an urban center combining natural conditions and the cultural identity as model of sustainable development.



Figure 4.49 Maps of some available natural elements of Hue City (source: Picture 1: The Descriptive Geography of the Emperor Đồng Khánh; Picture 2: internet; Piture 3: Thua Thien Hue's People Committee, *The Modification of Hue City's Masterplan 2030 and Vision 2050,* Koica project, 2013)

Hue City's location is on a narrow plain and has slope terrain from west to east, with two types of topography (figure 4.49):

- The topography system of hill and mountain is eroded and developed on sedimentary rocks, distributes on the west, in Nam Dong and A Luoi District.
- The topography of the plains is on the north and east of Hue City, divides into two major areas: northern Huong River and southern Huong River. The northern Huong River area is plain with the Citadel, from 1.8 m to 3.5 m in height. The southern Huong River has altitude from 2.5 m to 7.5 m in height, particularly with some hills are 12m-18m high, fields and ponds are less than 1.5m high.

Hue's topography and cultural landscape contain a valuable potential which create unique identities for tourism, modernization and sustainable development. In master plan, the indigenous culture merges with the images of mountains, rivers, lagoons and sea. Within the 20 kilometer radius, Hue consists the ecological system which spread from the mountains, across plains to the lagoons and the sea. The network of rivers unites the landscape system, Huong River connects the mountains to the sea.

Hue City is designed as an urban center combining natural condition and the cultural identity as model of sustainable development.

b. Local ecological appropriate technology adapted to local geography, stream of water and wind

Circulated waterway system, used for a variety of purposes. The lakes and river system in Hue Citadel were designed with self-regulating water flow and connecting natural to Huong River. The water system of Citadel was a diverse ecosystem which played a very important role in protecting the environment, regulating the water system in the Citadel.

Formerly the Huong River and the underground waterway were connected. It can be that the water control created in Nguyen Dynasty is very useful for the regeneration of the historical environment. This is the proper soft engineering solution as an appropriate local technology for environmental self-regulating.

Wind breeze method controlling micro-climate. The firstly, spatial organization directs buildings to south or southeast (the layout of the Hue Citadel, Imperial City, Palaces, Garden House etc.). This method takes cool south wind and avoids hot west dry. The secondly, spatial organization follows to spread, interweaving multiple spatial layers, using nature for ventilation and air conditioning. The direction of city according to this choice creates a sustainable model which harmoniously adapts to the natural resources. This solution enhances the convenient elements and reduces the disadvantage from natural conditions such as sun, wind, rain etc.

Landscaping methodology creates harmonious with surround topography. Using the surrounding natural elements as elements attached to the building. These are the mountains, rivers, water, available natural landscapes (figure 4.50). The landscape system is considered as an ecological local technology to make the environment better. These values have been confirmed sustainable development over time. Besides, the model of garden city, urban center structure and hierarchical satellite cities are proposed on the basis of the geographical advantage of natural elements.



Figure 4.50 The value of heritages with landscape in the Hue Citadel

4.4.3 Water system

The water system is unique element in citadel planning. The canals and the lakes were not only made from the dig to fill the ramparts, but also created ecological water. Besides, surrounding moat system of the Citadel has the inside Kim Nguu Lake and outside Kim Ngu Lake. These four rivers are linked together to make a flow of water of the Huong

River to regulate drainage of the Citadel (figure 4.52). Thus, the water from raining season can be collected and reserved in the lakes and when flood, the excessive water could run to Huong River, lagoons, fields as buffer areas which would help drain the water and preserve the water in drying season (figure 4.51-52).

The water system of Citadel was a diverse ecosystem which played a very important role in protecting the environment, regulating the water system in the Citadel. Formerly the Huong River and the underground waterway were connected. It can be that the water control created in Nguyen Dynasty is very useful for the regeneration of the historical environment. This is the proper soft engineering solution as an appropriate local technology for environmental self-regulating.



Figure 4.51 The circulation of the water system of Hue Citadel with river system and lagoon



Figure 4.52 The connection of the water system in Hue Citadel (source: Waseda University)

Chapter 5. From value to management, restoration and development strategy for historic eco-tourism

5.1 Act of statements and principles on preservation and restoration

5.1.1 ICOMOS and UNESCO regulations on preservation, restoration principle

a. ICOMOS - The Venice Charter in 1964 on Protection of Cultural Heritage Sites

From history to present, there are a lot of Charters and views from many of the countries in the world and famous researchers on the concepts of conservation, preservation, restoration, maintenance, heritage, architecture, landscapes, values, vulnerability. Some of them are same view and others are contradictory. Even the views of UNESCO have been adjusted to suit the reality by the time. Although the same point of view is to promote values for human life, however, for each different location has different approach. The Western views and approaches are different from the Eastern and ASEAN due to their different origins and geographical locations.

In 1964, the 2nd international congress of architects and technicians of historic monuments on conservation and restoration of Monuments and Sites, meeting in Venice, by ICOMOS (International Council on Monuments and Sites) mentioned term 'bound' of historic monument that: article 1. *"The concept of a historic monument embraces not only the single architectural work but also the urban or rural setting in which is found the evidence of a particular civilization, a significant development or a historic event. This applies not only to great works of art but also to more modest works of the past which have acquired cultural significance with the passing of time."*[68]

The ICOMOS Charters provide guidelines for the preservation and protection of cultural heritage sites recognized and widely adopted by the International Council of Monuments and Sites. The Charter provides full guidance on the significance of culture, protective policy, research and reporting procedures, ethical principles that exist in the protection of meaningful sites.

The Venice Charter is still a key document today, emphasizing material authenticity of historic monuments. Though it allowed a degree of restoration, the forbade conjectural restoration and stressed that valid contributions from all periods of building should be respected. It also reinforced the need for a systematic and scientific approach.

From this, Hue City should be approached in this way, it means that it is not single, not only building including city, also village surounding, rural and natural sites. Monuments remain to the present day as living witnesses of their age – old tradition. People regard ancient monuments as a common heritage. Common responsibility is safeguard for future generation. It is our duty to hand them on in the full richness of their authenticity.

According to the ICOMOS charter, some terms as below:

- "The conservation and restoration of monuments must have recourse to all the sciences and techniques which can contribute to the study and safeguarding of the architectural heritage. The intention in conserving and restoring monuments is to safeguard them no less as works of art than as historical evidence."[69]

- "Preservation means safeguard a structure in site at its current state and inhibiting the degradation of the structure.

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[68] ICOMOS, *International Charter for the Conservation and Restoration of Monuments and Sites,* IInd International Congress of Architects and Technicians of Historic Monuments, Venice, 1964.

[69] ICOMOS, *International Charter for the Conservation and Restoration of Monuments and Sites,* IInd International Congress of Architects and Technicians of Historic Monuments, Venice, 1964, art. 2 and 3.

- Restoration means putting an existing structure of a site back to its previous state by removing the components that add or merge the existing components that are dropped or not placed and not to put new materials.

- Reconstruction brings a site back to a previously known state by introducing new material into the structure, to distinguish it from restoration."[70]

According to the above mentioned meanings of the task of promoting the values of Hue for the strategy of restoration and development needs clarification. The first aspect is restoration heritage back to previous status. This is the first priority to keep up the value of culture, education, inherent architectural value in the past. Together with the task of restoration, promotion of the values that should be mentioned to improve economic efficiency for local people, this is the key for long-term and sustainable development.

In this context, it should be better to add more landscapes to tourist services, promoting cultural activities into the festival cultural space. This work aims to promote self-sufficiency of relics. This is also a problem with many different arguments. However, the second aspect is not preferred, only when it is really necessary, trying to add only the activities without affecting the original value.

The ICOMOS Charter suggests a cautious approach to change, the way takes to preserve and make it useful, another way if it is less as possible to keep the place less change.

The cautious approach by ICOMOS is based on respect for the structure, links and meaning that exists, only changing what is needed but less as possible. Site modifications must not distort the evidence of the existence and other evidence in place, nor may it be based on speculation.

The protection, restoration must be considered in all aspects of cultural values, the relationship with the surrounding relics and natural scenery of the Huong River, mountain landscape. Additional traces, changes, and structural treatments of a previous site are evidence of the history and use of the place, and may have contributed to the cultural significance of the site. The protection must help to understand the evidence rather than to hinder.

b. A need for a different approach for Eastern countries – the spiritual and naturalistic sensibilities

The geographical location, climate, territory of Western countries are different to the Eastern countries so that the adaptations of each location are also not similar. The researcher Seung-Jin Chung mentions the different ways between Western and Eastern on 'conservation' in his article. The Venice Charter has been opinions as a foundation document reflecting the international philosophy for protection of architectural heritage in over the world.

"It has skewed all conservation thinking towards the concept of the European monument, that emphasizes visual beauty through its material substance. Thus, some of the basic tenets of the Venice Charter seem ill-suited to East Asian architecture, which is conceived in a different spirit from its European counterpart.

The conclusion is that conservation principles in the East Asian societies are determined in relation to the spiritual and naturalistic sensibilities of East Asian culture and architecture."[71]

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[70] Institute of Science and Technology of Construction, *Science and Technology on Conservation, Restoration of Architectural Monuments,* Construction Publisher, Hanoi, 2003, p. 207.

[71] Seung-Jin Chung, *East Asian Value in Historic Conservation,* Journal of Architectural Conservation, 11:1, 55-70, DOI: 10.1080/13556207.2005.10784935

The approach follows the opinion 'spiritual and naturalistic sensibilities' in East Asian giving different way which may be proper method for Eastern basing on the original site.

Due to the geographical site, the special features of Hue Monuments are almost made of wood. By the time the wooden structure cannot be supported durable by the monsoon tropical climate. It is totally different the Western stone structure which can be support for a long time. From this point, it cannot be possible to keep the authenticity through the original materials. It is need for different approach for East Asia and Vietnam. The spiritual message, which hides into the monument structure, is very important. By the historical method and Feng Shui principle, the results of collection and analysis the materials of citadel, heritage, landscape of Hue City and a few military architecture and cities in Italy, France, China show that the concept of the European monuments emphasize visual beauty through its original material and authentic document, while the conservation principles in the East Asian and Vietnamese societies are determined in relation to the spiritual message and naturalistic sensibilities.

c. Statement of UNESCO about the Complex of Hue Monuments

Since 1993, the complex of Hue Monuments has been written on the List of World Heritage by UNESCO. The definitions of UNESCO on 'authenticity' and 'protection' are

"The authenticity of the Complex of Hue Monuments may be understood through the unique layout of the design of the site, which became the imperial capital of the Vietnam Empire in the 19th and early 20th centuries. The basic architectural and landscape features of the site have been maintained intact since their original construction in the early 19th century CE.

The natural setting of the Perfume River, within which the citadel, temples and tombs have been laid out in accordance with geomantic principles, demonstrates the symbolic meaning, beauty and significance of the site. The original plan within this setting remains evident. However some of the attributes that allow the understanding of the wider relationship with the river are outside the boundary. The overall setting of the town within its landscape could be compromised by urbanization and development of infrastructure."

Protection and management requirements:

"The completion of the Management Plan is a priority. The Plan should be based on the approved Statement of Outstanding Universal Value. Re-zoning of the protected area is being considered in order to control increasing urbanization and development of infrastructure.

In addition to development, climate change and natural disasters are other potential problems for the long-term management of the property. To reduce the impact of recurrent floods, three dams are being constructed upstream along the Perfume River. In addition the traditional water network and drainage system within and around the Citadel will be restored.

The level of tourism at the Hue Monuments is growing such that it needs to be managed so as not to exceed the capacity of the site."[72]

UNESCO shows clearly the boundary of relic site, the heritage value, the cope with flood and the promotion of tourism. The heritage is not only the monuments but also the surrounding landscape of monuments. Other way, the approach for promotion the heritage value accepts the adding tourism as not to exceed the capacity of the site.

5.1.2 Vietnamese regulations on preservation, reparation and restoration of historic-cultural relics and scenic places

a. Vietnamese regulations and decisions on preservation, reparation and restoration of historical-cultural relics

[72] https://whc.unesco.org/en/list/678

Vietnamese heritage acts have adopted the regulations by UNESCO and ICOMOS. For instance, the Complex of Hue Monuments is guided by the 1972 Convention on the Protection of the World Cultural and Natural Heritage, the Vietnamese Heritage Law (2001, revised in 2009), and some provincial regulations and decisions, the Hue Monuments Conservation Centre, placed directly under the Thua Thien Hue Provincial People's Committee. These guidance on the management of the complex and the protection them values with all issues including zone, research, tangible and intangible heritage preservation, traditional material reproduction, visitor, as well as the planning and protection of the landscape, the buffer zone and surrounding area.

According to the act by Vietnam's Prime Minister No. 105/QĐ-TTg in 1996 mentioned that "*Hue planning project of conservation and promotion of Hue Monument: Protection and enhancement of urban landscape and natural landscape in general territory, not separate architectural landscape and natural elements of Complex of Hue City.*"

Besides, the Complex of Hue Monuments should be attention in the social economic development. In addition, an Adjusted Planning Framework for the Complex of Hue Monuments (2010-2020) was approved by the Prime Minister on 7th June 2010.

b. Regulations on preservation, reparation and restoration of historic-cultural relics and scenic places by the Ministry of Culture, Sport and Tourism

This Regulation guides on preservation, reparation and restoration activities related to relics which have been approved by the Prime Minister. The Ministry of Culture and Information (now the Ministry of Culture, Sports and Tourism), the chairman of the People's Committees of the Province and City will decide on the ranking of relics or ranking submission to Ministry in their location.

Some terms under this regulation:

- Restoration of monument is an activity aimed at restoring historical-cultural relics, landscape that have been destroyed on the basis of scientific data on historical-cultural relics and landscape.
- Reparation of monument is activities aimed at enhancing the use and promotion of the monument's value but still ensure the integrity and harmony of the monuments and historical-cultural scenes of the monuments.

These regulations have similar concepts to the ICOMOS Charter. The concept of restoration and reparation is similar to concept of ICOMOS. In the this sense, we have paid attention to the enhancement of usability to promote economic potentials for the relic site, basing on no change the meaning of material values and cultural values of the relics. According to the process and principles of the regulation:

- Protecting historical-cultural relics and landscape under bad impacts of the natural environment and social environment.
- Maintaining the maximum preservation of the authenticity and the original values of the relics in terms of location, structure, materials, traditional techniques, functions, interior, exterior and landscape, relation as well as other elements of the monument to protect and promote the monument's value.
- Maintaining the harmony between the monuments and surrounding landscape.

5.1.3 The documents, decisions, regulations by Hue City People's Committee on urban planning and management

a. Acts and documents on urban planning and management in Hue City

Table 5.1 The decisions on urban planning and management in Hue City

No.	Name of project	Size	Investor/Design organization	Approval decisions/Year
1	The Modification of Hue City's Masterplan to 2030 and Vision to 2050, Koica project		Thua Thien Hue Provincal People's Committee	2013
2	Conservation, restoration and reparation systems of Hue Citadel.		Hue Monuments Conservation Centre, and Hue People's Committee	1918/QĐ- Thua Thien Hue Provincial People's Committee 14/09/2011
3	Detail planning on position of two buildings residential under project of construction infrastructure to clearance, restoration monuments of Hue, Huong So Commune, Hue City.	4030 m^2		2415/QĐ Thua Thien-Hue Committee on 17/10/2006
4	Detail planning on Relocation for project of clearance, embellishment, reparation Ngu Ha River and project of restoration and embellishment Rampart, Bastion	6,7 ha	Unit of Project Management and Construction of Hue City	1529/QĐ- Thua Thien Hue Provincial People's Committee on 16/6/2006
5	Detail planning of Hue Citadel	486,23 ha		2317/QĐ - Thua Thien Hue Provincial People's Committee on 07/10/1999
6	Hue City's urban planning from 1997 to 2020		Institute of Urban and Rural Planning, Ministry of Construction	1997

b. Evaluating the Hue City's urban planning projects

At present, the center of Hue City has a high density, the system of trees and open space is maintained, but the speed of urbanization will affect and threaten to break down the urban structure. In recent years, the urbanization process has developed more rapidly with Chan May economic zone; Phu Bai, Tu Ha, Phong Dien industrial zones etc.; Thuan An, Lang Co and Bach Ma tourist areas. Many urban projects in the North, South East and South West are being implemented such as Huong So, An Cuu, An Van Duong, Thuy Xuan project, and resettlement areas for sampaniers etc. The restoration of relics is accelerating progress. Besides, many big projects on irrigation, hydropower, afforestation etc. have been deployed towards sustainable development.

In 43 years of construction and development, Hue has been identified as the capital city, the center of culture-tourism, service and education of the country, the important traffic point of the region and the country.

The project of Hue City's urban planning from 1997 to 2020

Figure 5.1 shows the City's urban planning by Institute of Urban and Rural Planning, Ministry of Construction.

Advantages:

- Maintaining the Hue Citadel of the north bank of Huong River and the tombs of the south west.
- Keep the architecture-landscape of the Huong River.
- The functional area is suitable and appropriate for the development trend of Hue city.
- Convenient transportation system north and south west.

Disadvantages:

- Old cities are at risk of being disrupted by the urbanization process and it is difficult to preserve the historical and ecological urban landscape.
- North-south space expansion is right but not yet promotion the landscape values of the western hills and ecosystems, the lagoon in the east.
- Some new areas have not much attention to urban design, free development less associated with old city.
- New urban areas in the process of expansion and construction have studied the issues such as existing architecture; construction density, uncontrolled building height, model satellite cities.

The Modification of Hue City's Masterplan to 2030 and Vision to 2050, Koica project

Figure 5.2 shows the City's Masterplan by Koica (Korea International Cooperation Agency). This is a large scale project. Design organization is Korean company with a lot of experience. The proposal has many advantages over the disadvantages of the project of Hue City's urban planning from 1997 to 2020 project.

Advantages:

- To keep the capital of the North bank and architecture-landscape of the Huong River.
- The two directions of urban development are proper north and south.
- Functional zone, transportation system is good and convenient.
- There is a green space connection, utilizing the east-west axis ecosystem.
- The structure of satellite urban is reasonable.

Disadvantages:

- Old cities are at risk of being disrupted by the urbanization process and it is difficult to preserve the historical and ecological urban landscape.
- It has not assessed the important role of the Citadel, not promote the axis.
- The expansion of the north-south axis is true, but it has not brought into full role of the landscape value in the western hills and the ecosystem of the water surface, the lagoon in the east.
- Some new areas have not paid much attention to urban design, yet have not fully promoted urban identity.

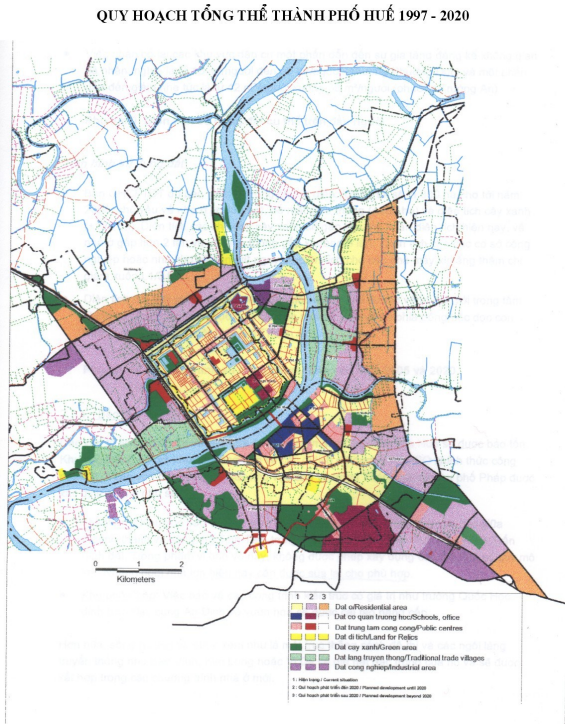


Figure 5.1 Hue master plan map to 2020 (source: Thua Thien Hue Architecture Planning Institute)

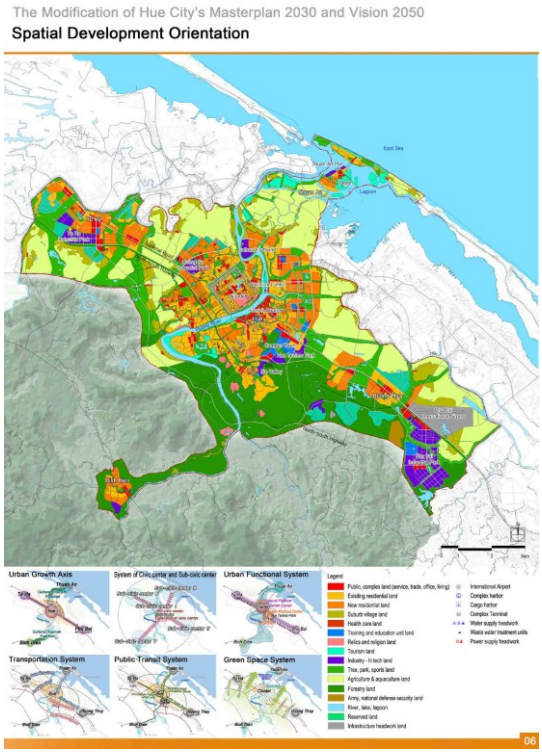


Figure 5.2 The modification of Spatial Development Orientation of Hue City's Masterplan 2030 and Vision 2050 (source: Thua Thien Hue people's Committee)

5.2 Viewpoint and principles for proposal of urban and rural design of Hue City

5.2.1 Viewpoint

In the view of Nguyen Hoang from the past when building Hue has deliberately framed Hue in the magic landscape from Ngu Binh Mountain to Vong Canh Hill, to Tam Giang Lagoon and Cau Hai Lagoon.

With the view of ICOMOS and Vietnamese regulations on conservation and preservation of cultural heritage values, Hue's urban development planning must start from the viewpoint of preserving and enhancing the value of Hue ancient capital, respect the main ideas in the ancient architecture of Hue with the traditional principles of royal architecture art in Vietnam.

Characteristics of the city of Hue are the whole ancient capital relic existing in the new city, the ancient capital lives with the new city which is growing up modern. So the conservation of the old does not hold the new development, in contrast the development of the new does not overlap the old that must harmonize together. It is necessary to combine the renovation of urban construction and restoration to revive the cultural and historical heritage of the nation, to protect and improve the natural landscape. Hue city should be the harmony of the overall space architecture - people - natural landscape.

In the last decade, the appearance of Hue city's architecture has been gradually changing with many new constructions, and people's living has been improved. However, the number of beautiful, modern and spacious architecture is not much. The common and

popular architecture – is not beautiful, less the aesthetic – is trying to reach to the modern and forgetting the national identity. The copy of foreign architectures has become quite popular and has become a trend. Design studies often focus on surface decoration. Others some ways go in the direction of reproducing the traditional architectural details without regard for space organization, refusing local climate conditions. And consequently the architectural face is messy, fragmented, mixing all kinds of east west.

The 5th Congress of VIII Course of the Communist Party (6/1998) has set the aim of "Building an advanced culture with deeply national identity". In order to develop an advanced Hue architecture with national identity, we must first affirm what is the core, the particularity special element for the art of Hue architecture. That requires architects, architectural planning managers who have to closely coordinate the survey of traditional architecture; study the relationship between traditional architecture and natural, economic, social and Hue customs; synthesize and analyze the experiences of traditional architecture adapted to local climatic conditions; enhancing the teaching and education on ethnic architecture for the young generation.

5.2.2 Principles

- Comply with ICOMOS views and principles on the protection of cultural heritage sites.
- Complying with the Law on Cultural Heritage No. 28/2001/QH10 and the Law on the revision and supplementation of a number of articles of the Law on Cultural Heritage No. 32/2009/QH12 of the National Assembly of the Socialist Republic of Vietnam on Cultural Heritage.
- To comply with the Regulation on preservation, restoration and restoration of historical-cultural relics and scenic places of the Ministry of Culture and Information (now the Ministry of Culture, Sports and Tourism).
- Respect the rule of Feng Shui in spatial organization and the traditional principles of royal architectural art.
- Exploiting open space between architectural space and landscape environment adapting for tropical monsoon climate.
- Enhancement the national identity of local place.

5.3 Idea and Proposal on Preservation and Enhancement of Hue City

5.3.1 Guideline for urban planning orientation

- Grand vision for the Historic Eco-City.
- Ecological urban structures including design of a total waterway system, including variety of moat, river, pond, water circulation, etc.
- Integration of historical and new building types with urban design plan, and design guidelines.

a. Preservation orientation

- Determining the scope and boundaries of the protective zones of grades 1, 2 and 3. Regulating the density of construction, height, style and function of building in protective zones are very important to perverse the monuments (figure 5.3).
- On each heritage project:
  + Identify and evaluate existing buildings that need to be protected (figure 5.4).

+ Identify and evaluate the architectural works to be restored.

+ Identify and evaluate the buildings to be restored, embellished.

+ Identify the types of components and materials necessary for restoration and reconstruction.

+ Identify measures for restoration, reconstruction and embellishment.

b. Master planning

- Close relating the clusters of relics with the landscape and surrounding environment.
- Protecting and embellishing the landscape of the Huong River, Ngu Ha River landscape and lake landscape as an inevitable organic part.
- Clearing, relocating buildings, households are encroaching on the site.
- Adjusting the street, sidewalk for traffic, creating ventilation to improve sanitary conditions, clean and improve the area for parking.

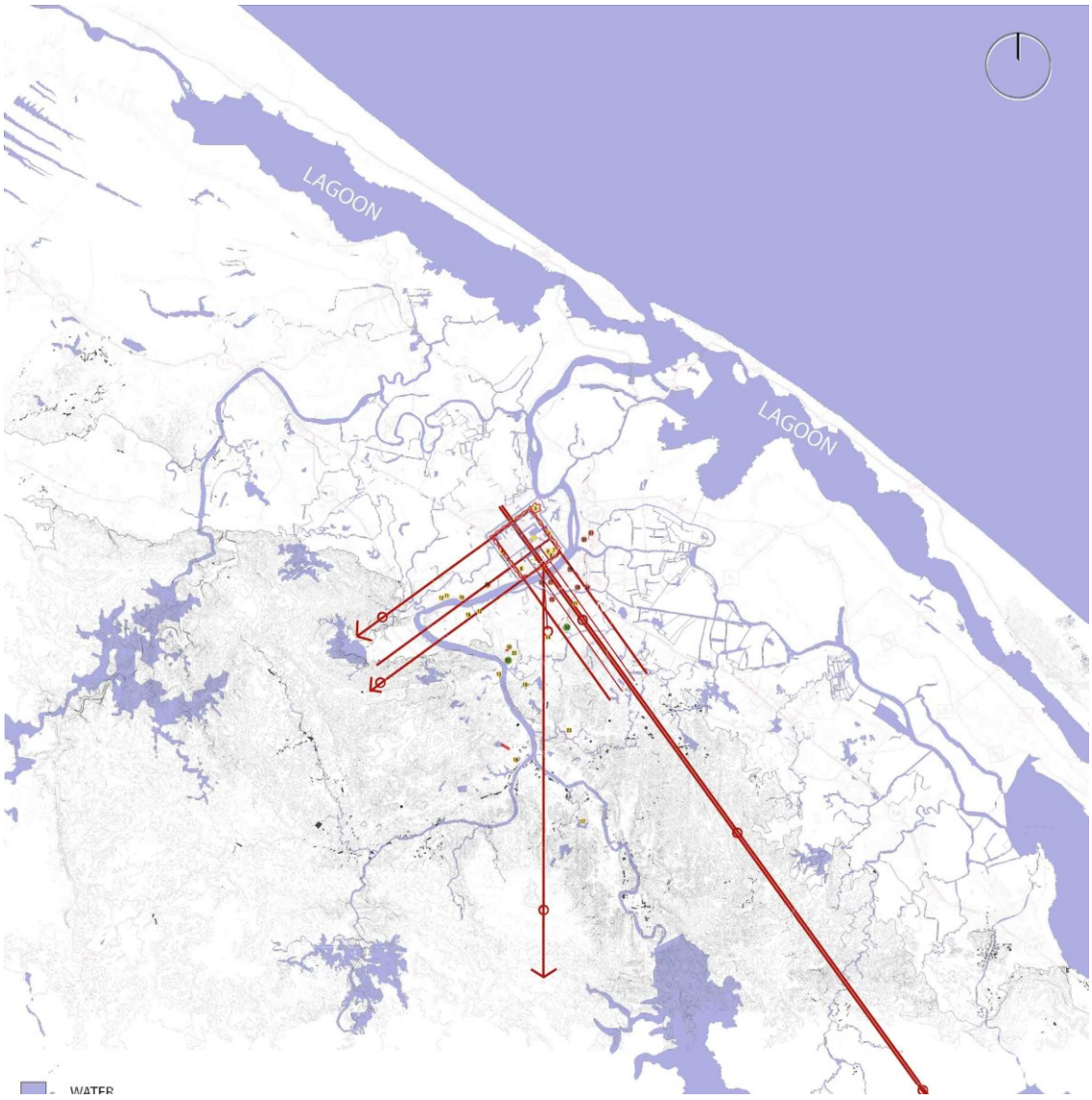


Figure 5.3 Map of determining the scope of the protective heritage zones in Thua Thien Hue



Note:

1.Flag Tower
2.Phu Van Pavilion
3.Imperial City
4.Citadel
5. Tran Binh Bastion
6.Xa Tac Esplanade
7.Consul of Ministers
8.Thua Thien Hue Museum
9.Long An Palace
10.Thien Mu Pagoda
11.Temple of Military
12.Temple of Literature
13.Hon Chen Temple
14. Nam Giao Temple of Heaven
15.Royal Atena
16.Voi Re Temple
17.Gia Long Tomb
18.Minh Mang Tomb
19.Thieu Tri Tomb
20.Tu Duc Tomb
21.Duc Duc Tomb
22.Dong Khanh Tomb
23.Khai Dinh Tomb
24.Ho Chi Minh Museum
25.Phan Boi Chau Mausoleum
26.Center Post Office
27.Quoc Hoc Hight School
28.The Mother of Terletual Help Church
29.Dien Phuoc Princess Temple
30.Temple of Ton That Han
31.Lai The Commual House
32.Ngu Binh Mountain
33.Vong Canh Hill
34.An Dinh Residence

● Monuments within the Hue historic building complex- The World Heritage Site
● Other celebrated monuments
● Landscapes

Figure 5.4 Map of Hue heritage Sites

Orientation for development of Hue becomes the first class city under the Central. According to Decision No. 48KL/TW by the Politburo on construction and development of Thua Thien Hue province, it is stated that Thua Thien Hue will become a central City in the next few years and will be the center of the region. Central and one of the major centers of the country in terms of culture, tourism, science and technology, specialized health and multi-disciplinary education and training, multi-field, high quality etc.

There are a lot of the potentials in Hue, it should develop the Hue's potentials, potential natural resources (forests, mountains, sea, Tam Giang, Cau Hai lagoon, Huong River, ecological zones etc.); Heritage system (ramparts, mausoleum, palace, pagoda etc.); Intersect point of many domestic and international branches and up to 2020 to building Thua Thien Hue is a national urban center (figure 5.3). Orientations for development of urban space according to topographical and regional characteristics are as follows:

- The central city: the political-diplomatic center; focusing on commercial activities and the conservation-tourism center, ancient-historic center of Hue City and a new development part.
- Urban satellite clusters: developing to the southeast (Huong Thuy Town, Phu Bai District), West North (Huong Tra Town, Tu Ha District), West South (Huong Tra Town, Binh Dien Commune)
- Maintaining the architectural heritage system of the Nguyen Dynasty and a part of French architecture. Architectural trends need to inherit the traditional features.

5.3.2 Diagram of function areas of Hue in territory

According to the predecessors, the soft ways were usefully applied to preserve and protect Hue Citadel. The hard engineering ways were always expensive, and require additional others. In this context, rice, farmland, landscape, and rural villages in between mountain, plain, the citadel and the coast could be kept the balance of water level in overall territory. This direction provided an appropriate buffer area around the monuments and relics. This approach adapted several long term. While people had supported in this environment for many centuries, Hue City was located significantly inland which had likely always been more resilient to flooding. It could be argued that the model of original city had in the past helped the local people to cope properly with natural disasters. Farming land, eco-landscape and other agricultural areas on unstable land provided natural flood plains for water's collection, and wetlands had function as natural sponges outside city center. In history, people who did live in the lagoon lived in temporary structures that would often allow for quick recovery after disaster (figure 5.5 - 5.9).

In the same way, the Koica project of the Modification of Hue City's Materplan 2030 and Vision 2050 is also applying this idea (figure 5.8). Adaptive living with inconvenient natural elements could be a good way for a sustainable development model in future.

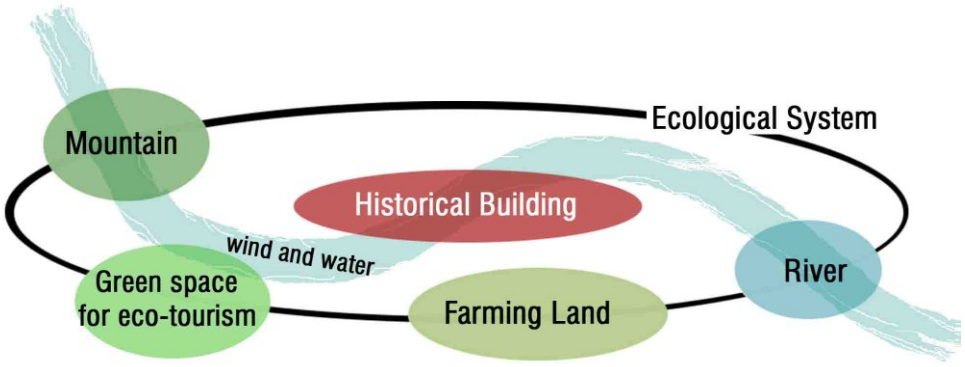


Figure 5.5 General diagram of control of the water system for environmental self-regulating

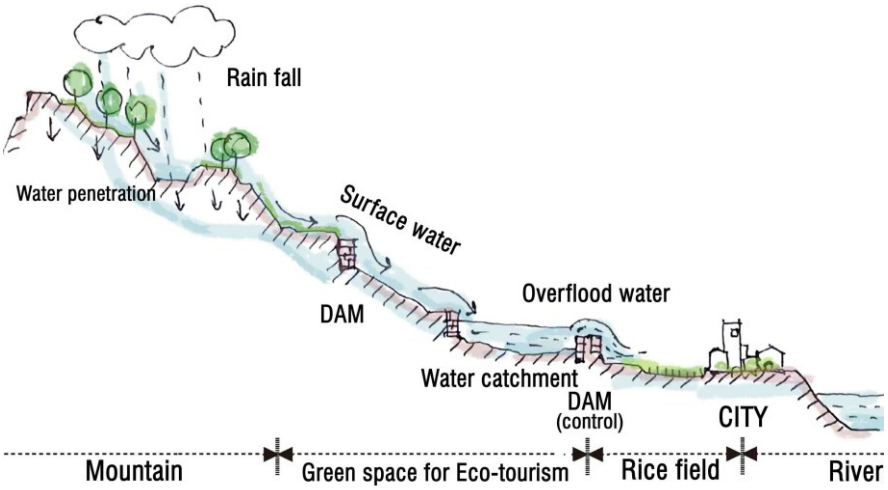


Figure 5.6 Topographical section of control of the water system for environmental self-regulating from west to east

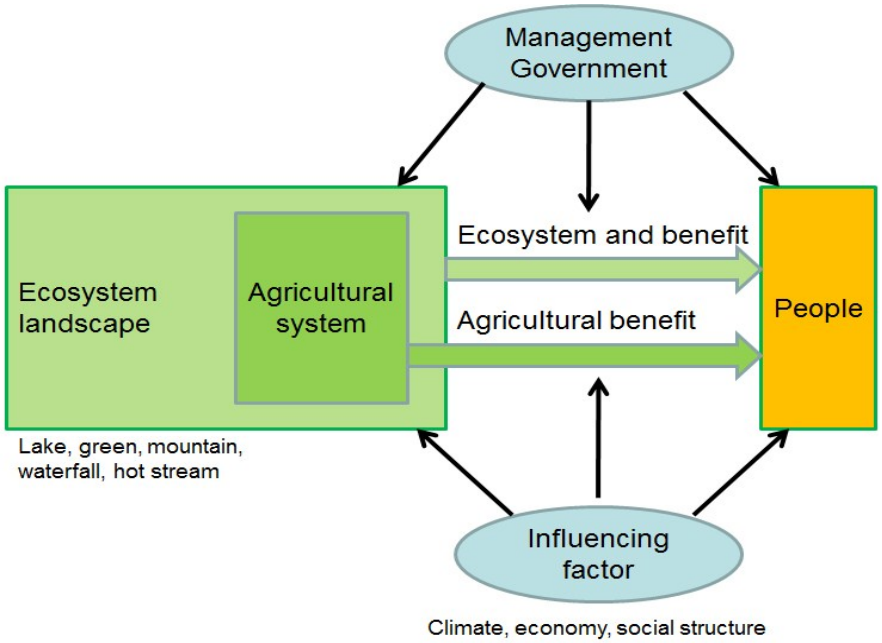


Figure 5.7 Proposal of people activities from the natural conditions for economical enhancement

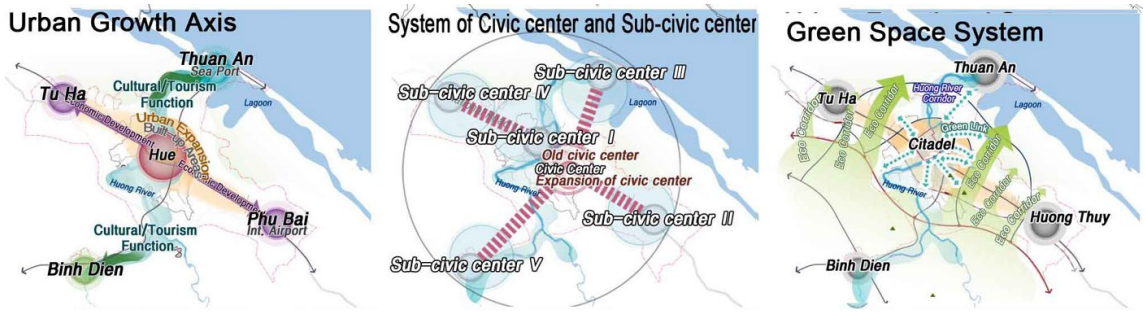


Figure 5.8 Proposal of urban center structure and hierarchical satellites for Hue City (source: Thua Thien Hue People's Committee, *The Modification of Hue City's Masterplan 2030 and Vision 2050,* Koica project, 2013)

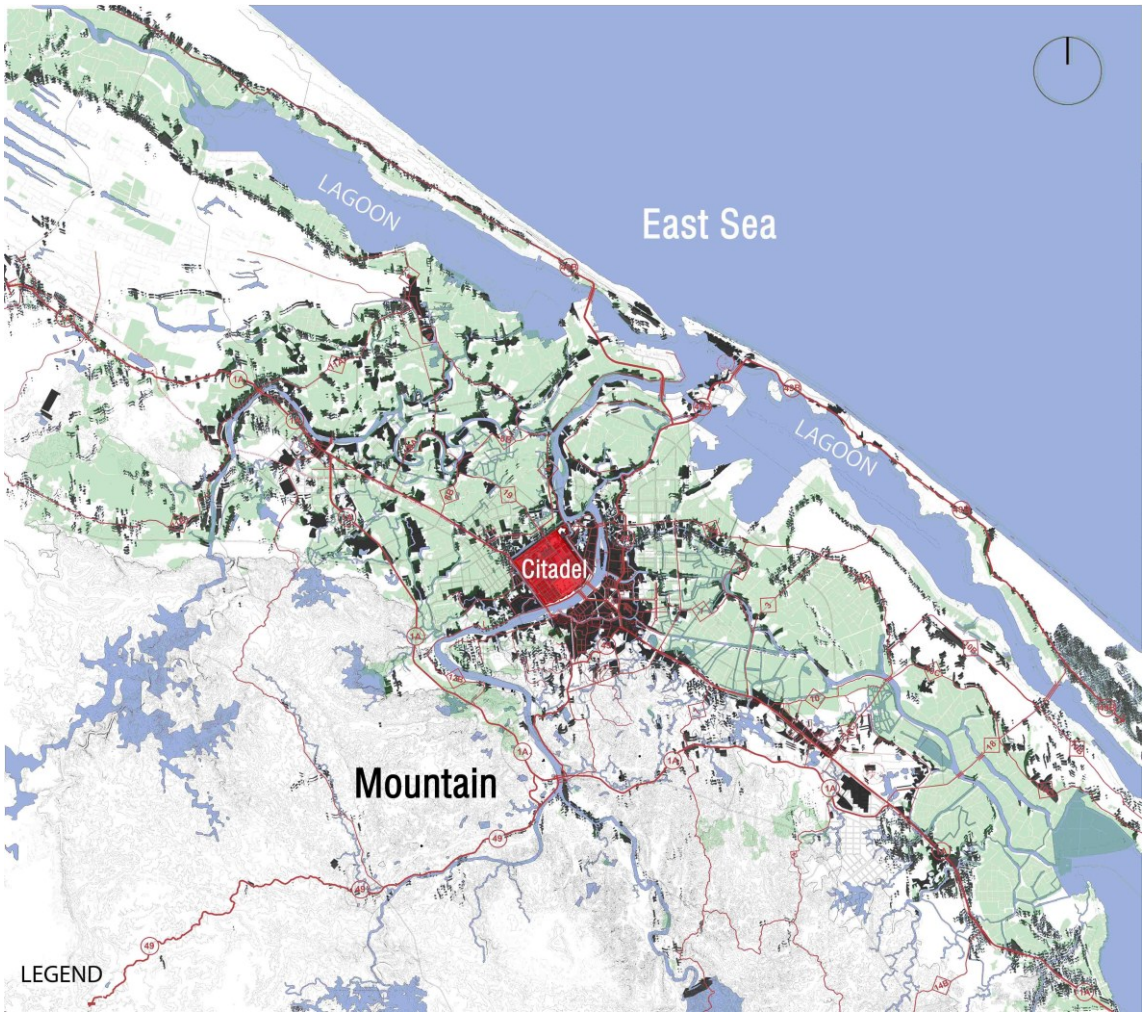


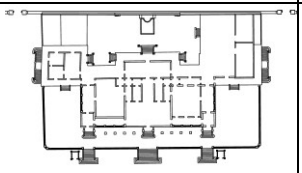
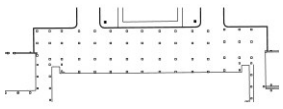
Figure 5.9 Proposal of agriculture and water production in Hue territory

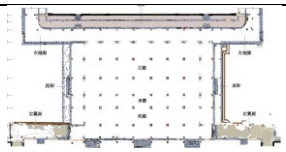
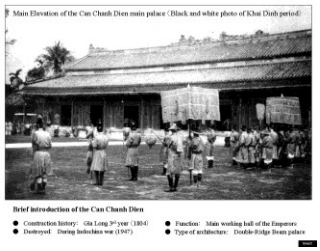
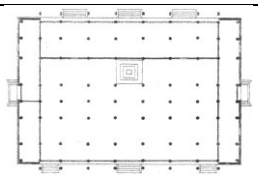
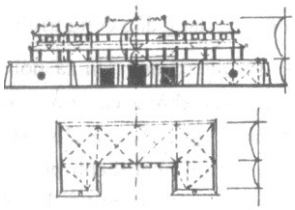
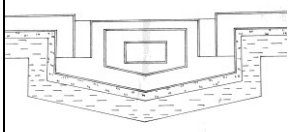
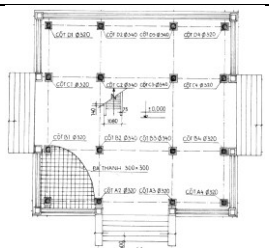
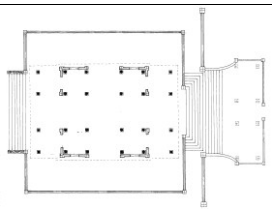
5.3.3 Proposal of spatial organization of Hue City along the line, axis basing on respect and preservation of the spiritual main axis of Hue Citadel

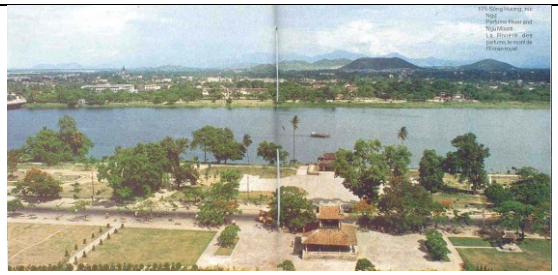
Maintaining and promoting the Feng Shui principle of the ancient, architectural landscape on the divine axis has created the orientation and main structure of Hue City. Linear spatial organization represents important buildings, the main point in the Asian thought. The image of the city is formed on the basis on the main axis. In addition, cultural factors, this type of orientation greatly balance the thermal regime and landscape environment of buildings to help prevent heat and improve microclimate. The orientation of the project must ensure the best wind direction and sun direction.

In aspect of use, on the basis of temperature, frequency and wind speed analysis in many different ways in Thua Thien Hue Province, the best direction is the southeast or south. When building orients to east or west, sun rays penetrate deep into the house making the room heater more than south or north. The north-south direction reduces the cost of sunshades and anti-glare. In addition, the direction of the north south axis also ensures good ventilation in summer and limits cold wind in winter.

Table 5.2 The monuments on the main axis from the Forbidden City, Imperial City, Citadel to Ngu Binh Mountain

Name of Monument	**Plan, perspective**		**Function**	**Position**
Tu Phuong Vo Su Pavilion			Relaxing, study of Prince, Princess	Imperial City
Kien Trung Pavilion (height 10,8m)			King's sighting place	Forbidden City
Khon Thai Pavilion			Accommodation and living of Imperial Noble Consort	Forbidden City

Can Chanh Palace (height 10.871m)			Working place of King	Forbidden City
Thai Hoa Palace			Meetings, special events of King	Imperial City
Ngo Mon Gate (height 15m)			Main Gate of Imperial City	Imperial City
Flag tower (height 55m)			Landmark of Citadel	Citadel
Phu Van Lau (height 9.5m)			Observatory, relax	Citadel
Nghenh Luong Dinh Temple (height 7.85m)			Observatory, relax	North of Huong River

Huong River		Water, transportation	South of Huong River
Phu Cam Church		Festival, meeting	South of Huong River
Ngu Binh Mountain (height 105m)		Screen of Citadel	South of Huong River

Proposed solutions to spatial layers of space to preserve the Hue Citadel

Dividing the spatial organization as follows:

- Follow the planning orientation of Hue City to 2020 with a vision to 2030; the general planning of Hue City to 2030 and vision to 2050 by the Koica design consultant which was approved by the Prime Minister in Decision No. 649/QĐ-TTg dated 6th May, 2014 with the aim of preserving and promoting the heritage values of Hue ancient Capital, building a city with urban architecture in harmony with nature and cultural heritage.
- Maintaining and protecting the existence of the Hue Citadel structures to connect the architectural space of the North and South. Suggestions to classify the space on the divine axis from Ngo Mon Gate to Ngu Binh Mountain as follows (figure 5.10 - 5.14):

+ Creating additional layers of green square (An Cuu River, Phu Cam Church), connected with green spaces on the divine axis.

+ Promoting the green space of Ngu Binh's cultural Center.

+ On the spatial layer along the axis should build the buildings with low constructive density, the depth of facade, creating more green space and build the architecture with the application of traditional values.

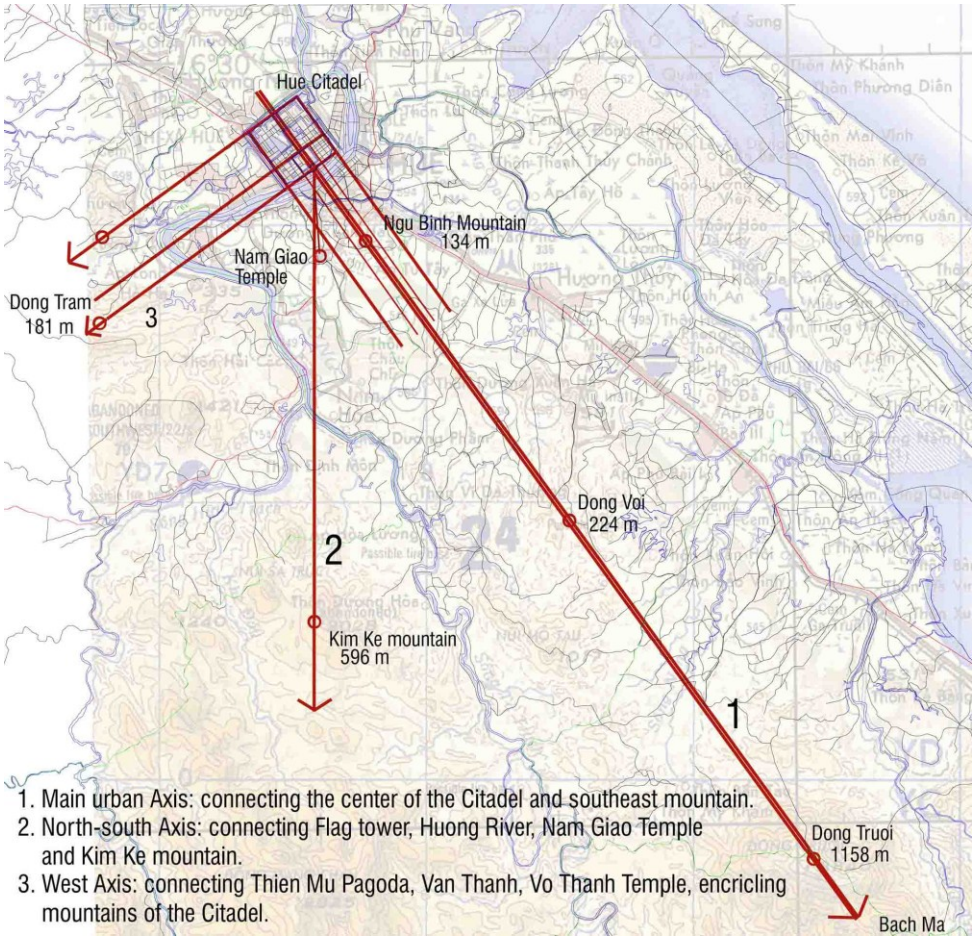


Figure 5.10 Proposal axes from the Imperial City, Citadel to Ngu Binh Mountain, Dong Truoi

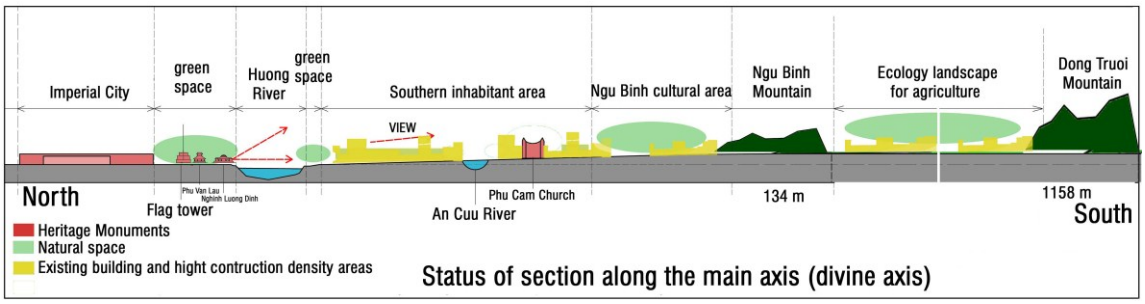


Figure 5.11 Status of spatial layers on the section of the divine axis from the Imperial Citadel to Ngu Binh Mountain, Dong Truoi

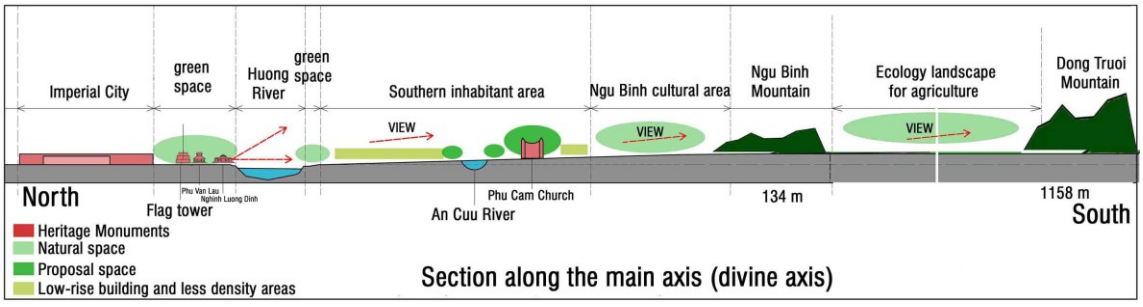


Figure 5.12 Proposal spatial layers on the section of the divine axis from the Imperial Citadel to Ngu Binh Mountain, Dong Truoi

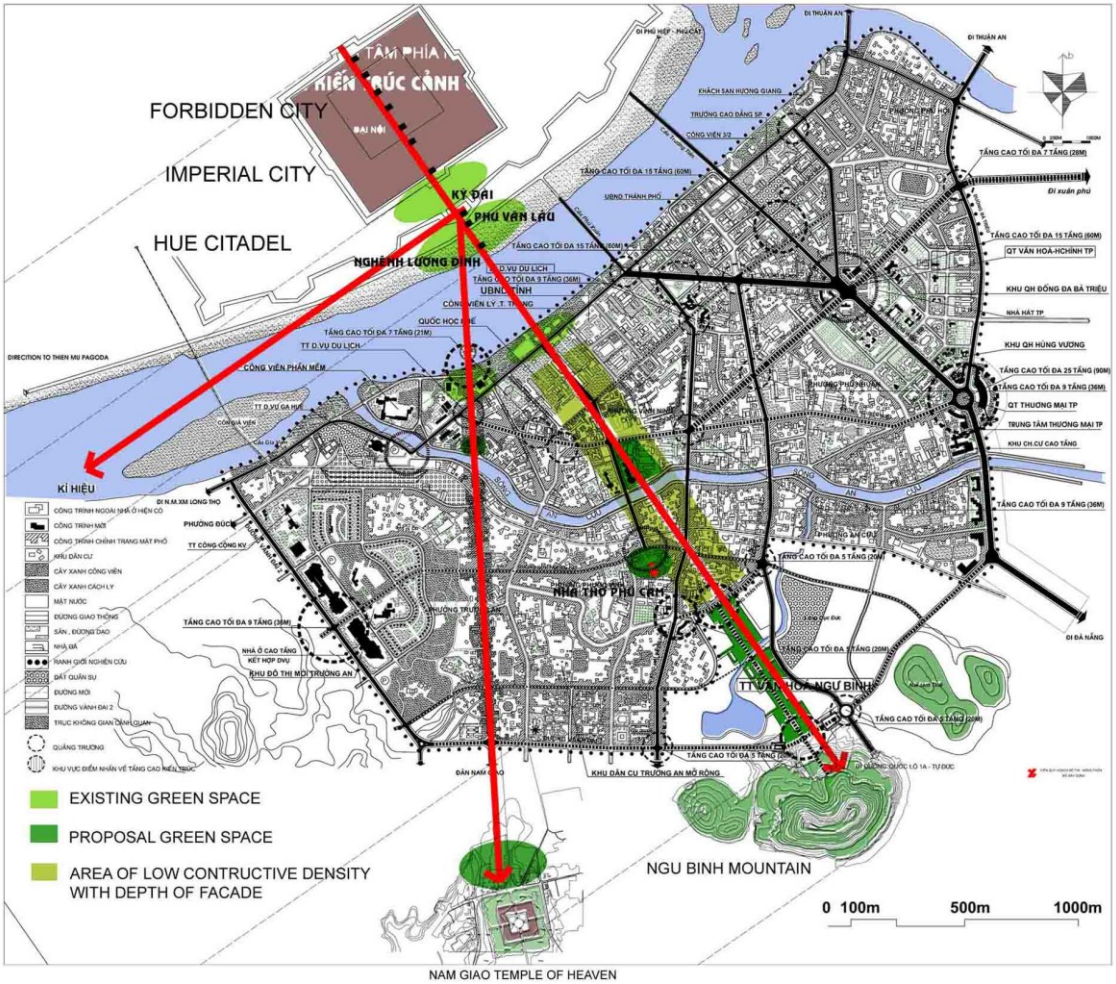


Figure 5.13 Proposal axes from the Imperial City, Citadel to Ngu Binh Mountain





Figure 5.14 Proposal of linear spatial organization along the divine axis (source: VinGG)

5.3.4 Proposal of historic eco-tourism route inside Hue Citadel

Following the definition of ICOMOS on 'cultural tourism' at the places of heritage significance mentions that *"Heritage is a broad concept and includes the natural as well as the cultural environment. It encompasses landscapes, historic places, sites and built environments, as well as*

bio-diversity, collections, past and continuing cultural practices, knowledge and living experiences."[73] Of course, it is rather cautious because the tourism participation may disturb the local culture. Regarding this point, Hue Citadel has the long processes of historic development, creating the indigenous identities and is a part of contemporary life. It should enhance local potentials for growth and development of the local people's living condition. The architectural heritage and ecological landscape are important and irreplaceable for development for now and the future.

Besides, the importance of local people's activities has been widely stressed by the ICOMOS International Cultural Tourism Charter (1999) – in which emphasizes that *"Conservation and tourism programmes should present high quality information to optimise the visitor's understanding of the significant heritage characteristics and of the need for their protection, enabling the visitor to enjoy the place in an appropriate manner"*[74]

As this result, the tourism routes by vehicle and boat should be proposed to promote the value of heritage and landscape.

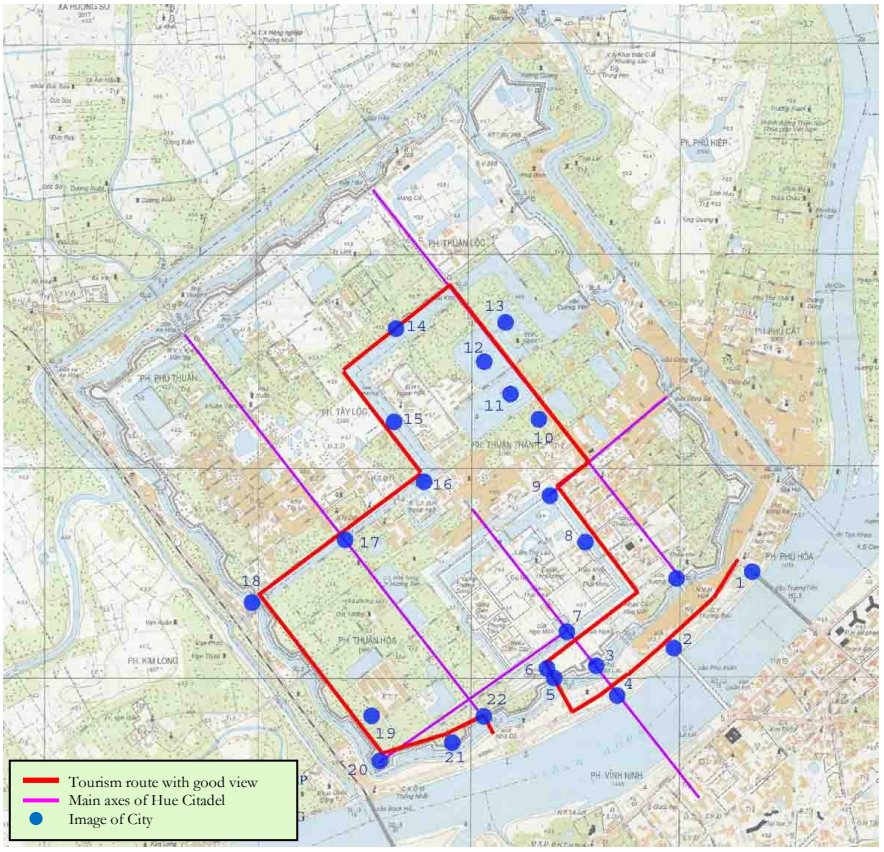
a. Tourism route by vehicle

Basing on the actual monuments and research data, a tourist route is proposed to bring visitors some of the special urban images of Hue Citadel. This way could enhance the qualities of citadel and give suitable model for a long time.

For example, it is promoting the values of monuments for tourism development. Based on the tourism potentials of Defensive Moat, we propose a tour by vehicle such as Defensive Moat, City Gate, Flag Tower, Imperial City, Monuments, Ngu Ha River. Figure 5.15 - 5.17 show the route and images of citadel which are the impressive point.

[73] ICOMOS, *International Cultural tourism Charter Managing Tourism at Places of Heritage Significance,* the 12th General Assembly in Mexico, October 1999.

[74] APROHA (Asociatión Profesional Espanola of Historiadores del Arte), *Cultural Heritage & Sustainable Tourism,* Interpretation, presentation and dissemination of Spanish Cultural Heritage: awareness, professionalization and celebration, 18 April 2017.



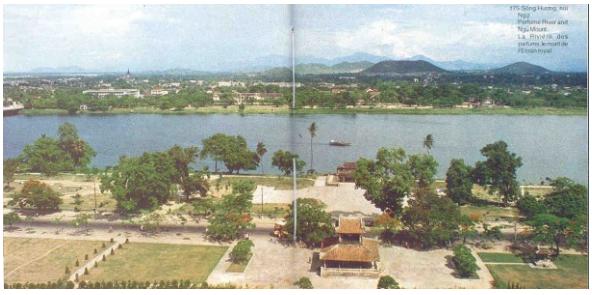
NOTE:
1.Truong Tien Bridge
2.Phu Xuan Bridge
3.Flag Tower
4.Nghenh Luong Hall
5.Quang Duc Gate
6.Cannon Monument
7.Ngo Mon Gate
8.Hien Nhon Gate
9.Binh An Temple
10.Garden House
11,12.Tinh Tam Lake
13.Tang Thu Library
14.Ngu Ha River
15.Garden House
16.KhanhNinh Bridge
17.Tay Loc Drain
18.Thuy Quan Drain
19.Garden House
20.Nam Minh Observatory
21.Nam Trung Bastion
22.Nha Do Gate

Figure 5.15 The historic eco-tourism route inside Hue Citadel


1. Truong Tien Bridge


2. Phu Xuan Bridge


3. Flag Tower


4. Nghenh Luong Hall


5. Quang Duc Gate



6. Cannon Monument



7. Ngo Mon Gate



Rampart



Defensive Moat



Section of rampart



8. Hien Nhon Gate



9. Binh An Temple



10. Garden House



11. TinhTam Lake



12. TinhTam Lake



13. Tang Thu Library



14. Ngu Ha River



17. Tay Loc Drain



18. Thuy Quan Drain



19. Garden House



20. Nam Minh Observatory



22. Nha Do Gate

Figure 5.16 The main heritage point inside Hue Citadel



Figure 5.17 Proposal for restoration of community space of Defensive Moat (source: Vo Ngoc Duc, with Ha Xuan Du, Vo Van Qua, Nguyen Minh Phung, Ho Thi Uyen Phuong, *Research and proposal for restoration the landscape of the defense system in Hue Citadel*, a scientific research project, Hue University of Sciences, 2012)

b. Tourism route by boat

From the boat station on the Perfume River, dragon boats (tourism boat) can travel along the two rivers Van Xuan and Dong Ba to enter the Citadel via Ngu Ha River and Defensive Moat system. There will be two small boat stations locate in water Gates in East and West Citadel. The function of these two boat stations is a place to rest, convert the boat into a small boat for tourists. Tourists can take a small boat into Ngu Ha River or go along Defensive Moat in front of the citadel to admire the beauty of Hue Citadel.

Figure 5.18 – 5.19 express the water route and identity for visitor.

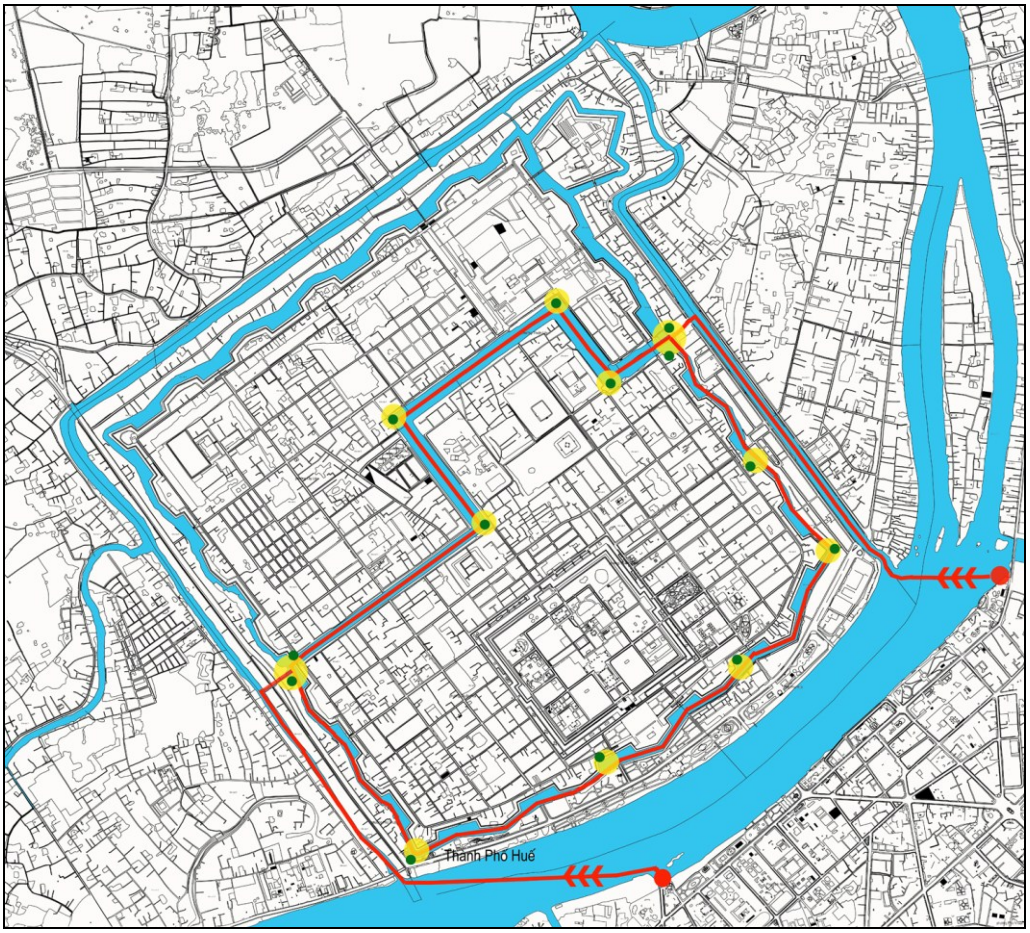


Figure 5.18 Proposal water tourism line in Hue Citadel



Figure 5.19 Landscape architectural model in Defensive Moat (source: Vo Ngoc Duc, with Ha Xuan Du, Vo Van Qua, Nguyen Minh Phung, Ho Thi Uyen Phuong, op. cit.)

5.3.5 Proposal Tinh Tam Lake

The research data shows the characters of the Hue Citadel, the case study is the area along Dinh Tien Hoang Street passing through Tinh Tam Lake and Tang Thu Library. This is a beautiful scenic area of historic value that is currently being encroached by the urbanization process. The landscape of the street is encroached on by business activities of local people to destroy the sight of the neighborhood.

Figure 5.20 – 5.30 show the proposal of the design concept for Tinh Tam Lake to protect and enhance the value of the heritage and landscape.

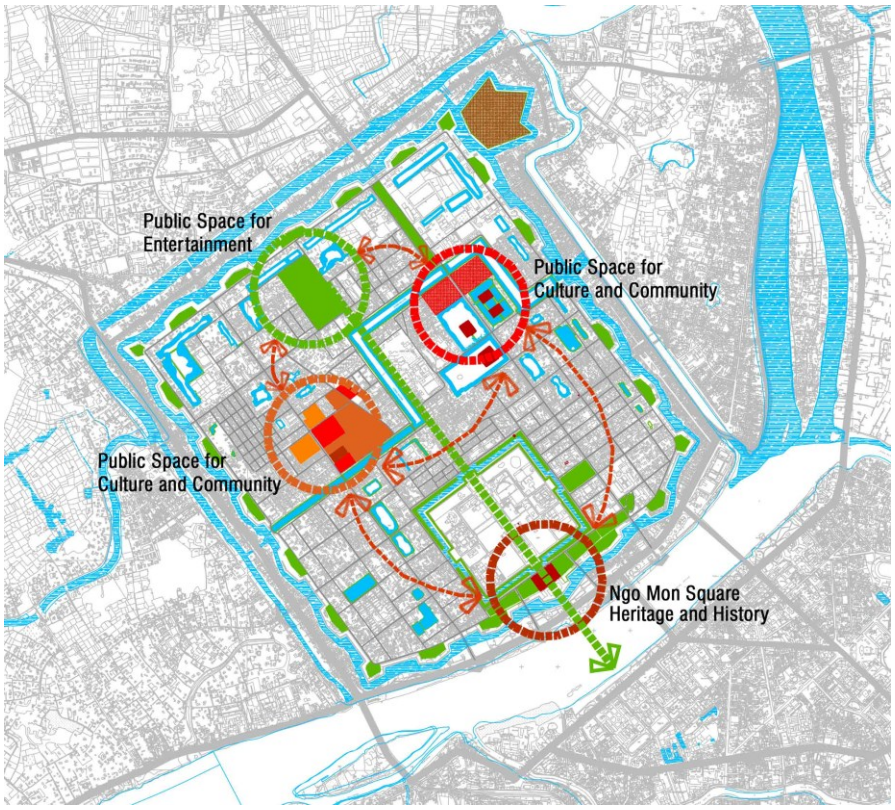
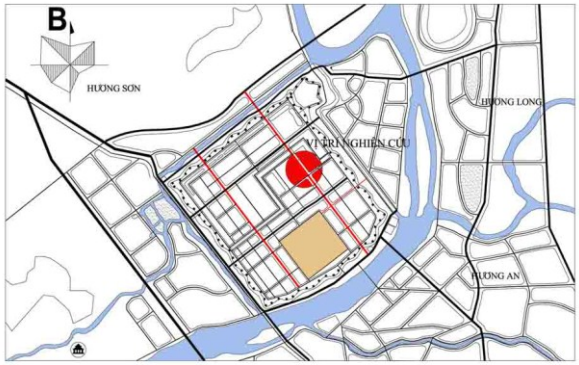


Figure 5.20 Map of the public spaces in Hue Citadel



Study location: Dinh Tien Hoang Street along Tinh Tam Lake

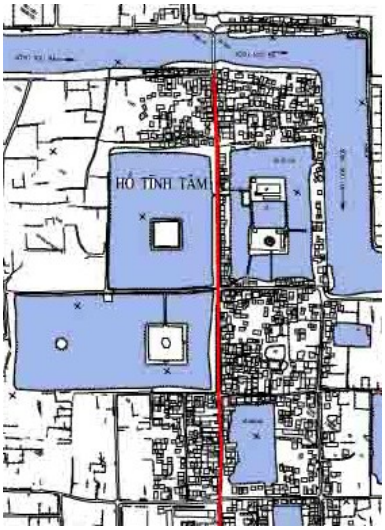


Figure 5.21 Tinh Tam Lake

a. Investigate, assess the current situation, limit the scope

- The status of landscape architecture and activities of local people

+ Land use right, current status of land use, and architecture: this is the area of overlapping, building houses for the local people after 1975.

+ The pavement of Dinh Tien Hoang Street was encroached for business, the sidewalks of the lake side was not cared for and turned into a public landfill.

+ Houses were built indiscriminately intermingled with the traditional houses, architectural façade cluttered, scattered such as the house along the Street next to the Hoc Hai Lake and around the Hoc Hai Lake.

+ The Tang Thu Library on the Hoc Hai Lake is a valuable monument of the Nguyen dynasty, used to living of the military collective.

+ The water surface is polluted water due to the agriculture growing of local people.

+ The density of large trees is advantageous to create a beautiful landscape. There are many perennial trees are valuable.

+ Lack of space for community activities.

- Historical cultural value: this place is a holiday resort, sightseeing scenery. There are beautiful scenery and historical value such as Tinh Tam Lake and Tang Thu Library.

b. Data analysis

- The Function:

+ Land use: relationships between public and private spaces are divided. Community space is lacking, mainly spontaneous of the people. The water surface of the lakes is beautiful but not exploited. It is mainly used for growing water spinach and is used for people's daily living.

+ Urban traffic: Traffic is blocked beautiful view due to the construction status, encroaching of the houses along the lake. There is lack of parking. The pavement system is not properly exploited and used, causing the situation of spontaneous use, urban beauty disorder.

- Landscape: there are beautiful views but not yet effectively exploited and partially broken by the urbanization process. The density of the lake house is dense, the view from the house through the street to lake is blocked.

- Use activity: use efficiency of the area is not high, mainly spontaneous by people for living. There is lack of water supply and drainage infrastructure.

- Enhancement and conservation: exploitation and use of land, water surface and pavement are the cause to destroy the historical monuments of the Nguyen Dynasty.



Status of trees, water surface



Land use status



Current use of pavement



Status of architecture

Figure 5.22 The main landscape around Tinh Tam Lake



Figure 5.23 The status of Dinh Tien Hoang Street and Hoc Hai Lake



Figure 5.24 Relationship between figure and ground of Tinh Tam Lake

c. Principles of renovation

- Follow the urban planning of the Citadel.
- Attention to Feng Shui principles.
- Maintaining the local identity

+ Preserving traditional values of the city while solving the problem of modern housing and benefit the trend of modern development. Preserving, restoring and embellishing houses of various historical values.

+ Using the local ecological system (water surface, trees, wind ...) to preserve and promote the value of the urban environment, creating a historical context linking green space and water surface.

+ Creating more space for community relaxation activities.

+ Restoring beautiful view points.

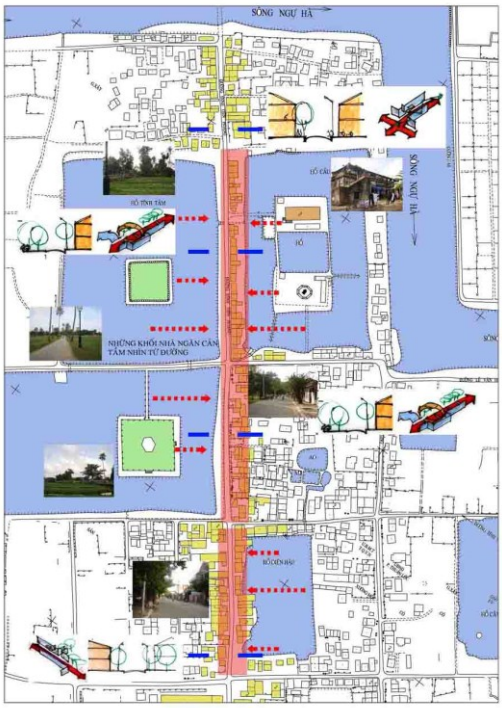


Figure 5.25 Proposal spatial connecting between areas

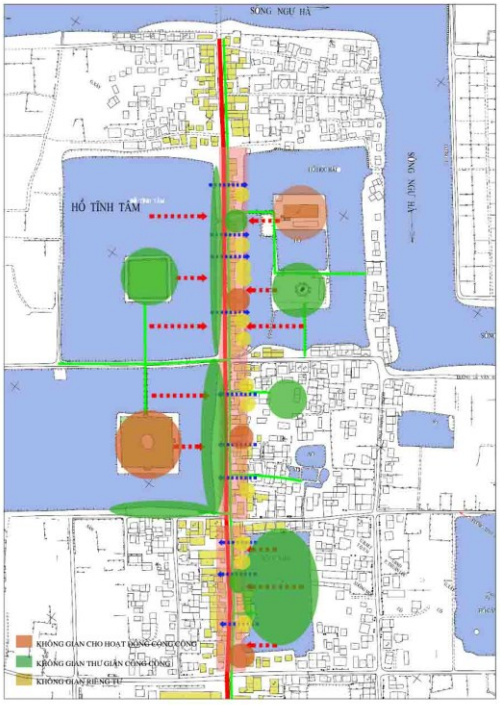


Figure 5.26 Proposal spatial relationships between areas

d. Detail proposal

- Restoring the Tang Thu library, the display house of cultural values of the Nguyen.
- Renovating the façade, sidewalks of Dinh Tien Hoang Street, from Nhat Le to Tran Quy Cap Street, basing on establishing business, stabilizing the facade effectively.

+ Creating a proper parking.

+ Creating a business area which planned on the basis of stabilizing the pavement order and business for the local people. Meeting the needs of people, exploiting the pavement to serve business are suitable but still ensuring the historical value inherent in the area.

+ Stabilizing the facades of modern houses to serve the life of people.

- Creating some space for public activities, expanding some views from Tinh Tinh Lake to Hoc Hai Lake, creating ecological environment, beautiful scenery.
- Restoring and improving the infrastructure of waste water and daily life for the area. Opening drainage gates create traffic between the reservoirs and the Ngu Ha River system.
- Design of garbage dumps with specific characters.



Figure 5.27 Creating more community spaces by removing of some of the degraded houses that are no historic value

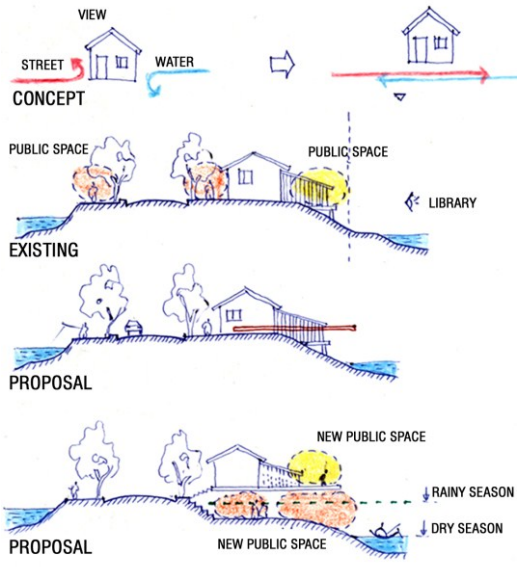


Figure 5.28 Suggesting proposal for Dinh Tien Hoang Street through Tinh Tam Lake

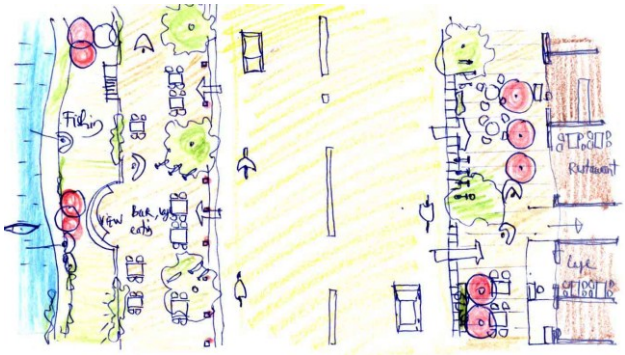


Figure 5.29 Proposal of using pavement on Dinh Tien Hoang Street

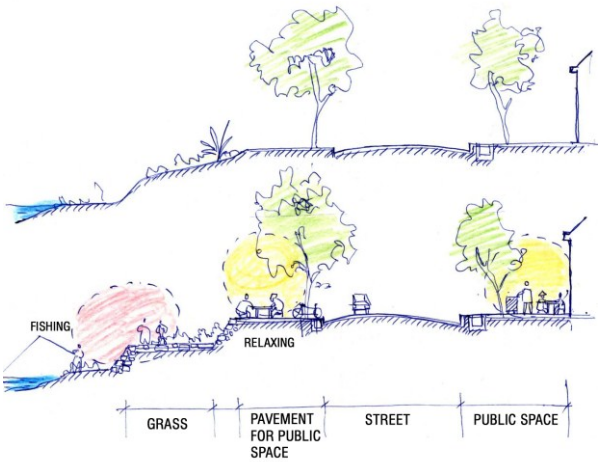


Figure 5.30 Proposal of the cross section through the pavement of Dinh Tien Hoang Street

Concluding Remarks

Over time, the urban structure of Hue City has confirmed its value through the process of the formation and transformation in scale, structure and urban morphology. It is very important to understand the identity of the urban form and its historic value. The value of urban heritage and ecological landscape of the Nguyen Dynasty and French were very precious.

The thesis is the continuation of a long lasting research cooperation between Polytechnic University of Marche - Italy and Hue University of Sciences - Vietnam through collaborative research on science and technology under the Protocol project. Some of the results refer the research and development topics from previous studies, assessment and deepening.

The research has achieved some results:

- The scientific data on the origin, process of formations, transformation, and characters of Hue Citadel. That is an unusual combination of human and nature, the East-West architecture, Western military architecture meeting the ideology of Eastern philosophy and Vietnamese traditional architecture. Identify of urban quality of the heritage of Nguyen Dynasty (1802-1945), Western military architecture, colonial architecture (1884-1945).

- Finding four Risks to the architecture of the citadel by the urbanization process such as the extension of Hue City, the block of water and damage of the flood, the influences of social and economic dimension, and the transformation of architecture. These results can be used for warning and preserving of damage to Hue Citadel.

- Research data on the subject to affirm three Values of citadel structure such as architectural heritage, ecological landscape, and the role of water system. Besides, evaluating role of the Feng Shui methodology in combination the water system, mountain system and the landscape with people in urban structure. Identifying two Characteristics and three Kinds of spatial organization of the citadel structure. These results can be used for proposal the model of sustainable development.

- From research data, in comparison with ICOMOS, UNESCO regulations and local management regulations, these propose the managed Policies for application of traditional qualities in the strategy for preserving and promoting the values the architecture of Hue Citadel; proposing the overall model and Diagram of the functional areas for garden city as well as Route of historic eco-tourism to increase the diffusion of heritage values as well as promoting local economic resources.

- Restoring and enhancing the role of the main divine Axis is as the key essence of urban structure by the Feng Shui methodology for sustainable model, harmonizing new and old city, not to rigidly apply ancient architectural types to modern urban development.

These results can be applied in research, study and small contribution to the management of urban planning. The thesis clearly states the ability to exploit the value of architectural heritage and landscape values in the development of Hue, a new architecture with national identity. Through the thesis, the author wants to bring out a new approach, using the values and modes of traditional spatial organization in the preservation and enhancement of Hue's urban architecture for the strategy of sustainable development.

Besides, the science and technology products have been achieved:

a. Scientific publication

a.1 Scientific paper publication: nine articles

- Vladimir Bojkovic, Michela Galassi, Emma Paci, Monica Prencipe, Clara Urbinati, Vo Ngoc Duc, *Ancona e la modernità - Tre Architetture "in attesa",* Conservazione, tutela, ridestinazione per l'architettura italiana del secondo Novecento in Polytechnic University of Turin, responsibility by Prof. Antonello Alici, 2016. Available: https://www.youtube.com/watch?v=bsBE3Fpb5Gs.

- Vo Ngoc Duc, Antonello Alici, *Urban morphology of Western military architecture in the urban development of Vietnam: the case study of Hue City,* International Conference on "Changing Cities III: Spatial, Design, Landscape & Socio-economic Dimensions", Proceeding, paper with review**,** The Laboratory of Urban Morphology & Design; Department of Planning & Regional Development, School of Engineering, University of Thessaly Volos, Greece, June 26-30, 2017.

- Vo Ngoc Duc**,** *Culture and Architecture,* Memory ceremony of 22 year of Education and Development of Faculty of Architecture, Hue University of Sciences, Hue, Feb 2017.

- Vo Ngoc Duc, Cecilia Carlosori, *Approach to the natural elements for sustainable development in the urban structure of Hue City***,** International Workshop on *"Hue Citadel into the Future: Managing Natural Hazards, Environmental Pollution, Tourism and Community Resettlement"* organized by Hue University of Sciences and University of South Australian in Hue, Vietnam on June 3-13, 2017.

- Vo Ngoc Duc, "*The quality of Quang Tri Territory among Cultural Heritage and Landscape Value,"* in book *DMZ & Military Architecture, Levels for a Landscape, Thành Cổ Quảng Trị Việt Nam*, Fausto Pugnaoni, Cecilia Carlorosi, Protocol project, Polytechnic University of Marche - Italy and Hue University of Sciences - Vietnam, Quang Tri Province, Giancarlo Ripesi Publisher, Ancona, Italy, 2017.

- Nguyen Ngoc Tung, Vo Ngoc Duc, *"Damaged Heritage: Constructive analysis,"* in book *DMZ & Military Architecture, Levels for a Landscape, Thành Cổ Quảng Trị Việt Nam*, Fausto Pugnaoni, Cecilia Carlorosi, Protocol project, Polytechnic University of Marche - Italy and Hue University of Sciences - Vietnam, Quang Tri Province, Giancarlo Ripesi Publisher, Ancona, Italy, 2017.

- Nguyen Ngoc Tung, Vo Ngoc Duc, Nguyen Van Tan, *Fortification architecture in Nguyen Dynasty,* Architecture magazine of Vietnam Association of Architects, ISSN 0866-8617, vol. 1, Hanoi, 2018.

- A lot of authors of UNIVPM, *Paris: Portraits of Cities,* booklet of Educational journey in Paris, funded by Polytechnic University of Marche, responsibility by Prof. Antonello Alici, Paris, May 3-7, 2018.

- Nguyen Hong Dung, Vo Ngoc Duc, *Identification of the natural elements for sustainable development in the urban structure of Vietnam: the case study of Hue City,* Journal of Environmental Science and Development (IJESD, ISSN: 2010-0264), 2018, Vol. 9(9). It also was presented and reviewed in the 9th International Conference on Environmental Engineering and Applications (ICEEA 2018), Amsterdam, Netherlands, July 10-12, 2018.

a.2 Participating in bilateral international cooperation on science and technology under the Protocol project

- Italy side was led by Prof. Fausto Pugnaloni, UNIVPM: Participated in publishing two books which were supported by the Ministry of Foreign Affairs (MAE) and by the Ministry of Education, University and Research (MIUR) Italy.

+ *"Champa Architecture Vietnam towers road",* The study results from 2010 by the UNIVPM in collaboration with Hue University.

+ *"DMZ & Military Architecture, Levels for a Landscape, Thành cổ Quảng Trị Việt Nam,"* The study results from 2013 by the UNIVPM in collaboration with Hue University.

- Vietnam side was led by Prof. Nguyen Van Tan, Hue University of Sciences (HUSC): International project of Protocol *"Survey basing on the application of archaeological technology, geological technology, biological technology and information technology for restoration the landscape of QuangTri citadel*" organized by the UNIVPM and HUSC. The project is also supported by Ministry of Science and Technology and Ministry of Education and Training, Vietnam.

b. Some of the values from thesis

- Maintaining scientific cooperative relationship and international student exchange program between Polytechnic University of Marche and Hue University of Sciences.
- Contributing the scientific data to advance undergraduate and postgraduate training in the Faculty of Architecture, Hue University of Sciences.
- The proposed products can be used as the references, research for architectural students, urban planning consultants, and architects in Thua Thien Hue Province.
- Approaching a new method on preservation and enhancement from the application of the traditional values of architectural heritages and landscape.

c. Some other achieved results

- Providing data for the National Library of Vietnam, Center for Historic Research, Thua Thien Hue's Urban Planning Institute, Hue Monuments Conversation Center.
- Proposal a small guide of managed policy for Hue City People's Committee in urban management.
- Providing multi-dimensional information for tourism in Thua Thien Hue Province.

Through the survey, analysis, synthesis and evaluation of the architectural heritage and landscape value, the topic are all related to the organic relationship with the components and basic elements of urban architecture. However more specific and deep understanding, it also needs the participation of the different fields such as culture, history, tourism, and environment as well as other scholars. The participations of other scientific disciplinary sectors are very important and useful to improve the full proposal.

In the framework of PhD thesis, the research finds out the historic source, characters of Hue Citadel, identifying the values and risks and proposal for the preservation the city. Some results are used for the urban planning, the thesis also orients to detail proposals for architecture and preservation in some important historic area. Thus the next future, this research will carry on with the proposals for the detail of the historic area. The next steps, the topic will also study in depth to exploit the values for modern architectural composition in which orients an advanced Vietnamese architecture with national identity.

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Appendix

LIST OF TYPES OF ARCHITECTURAL BUILDINGS
(Belong to Complex of Nguyen Heritages in Hue)

No	Type	Terms		
		Hán	English	Vietnamese
1	Điện	殿	Palace	Nhà thờ, đền đài, cung điện
2	Miếu	廟	Temple, Shrine	Lăng mộ, thờ cúng
3	Đường	堂	Hall, Temple, Room	Nhà lớn
4	Doanh	楹	Building	Nhà, đơn vị để tính số phòng
5	Doanh, Dinh	営/營	Barrack	Doanh trai (Binh doanh)
6	Thự	署	Salon, Station	Công sở, trạm
7	Các	閣	Pavilion, Castle tower	Tháp, lầu
8	Viện	院	Building, House, Institute	Toà nhà, hội sở, chổ ở
9	Vu/Vũ	廡	Eaves, Wings	Mái hiên
10	Đài	臺/台	Altar	Đài hoa, bệ cao
11	Đàn	壇	Altar	Bệ cao, lễ đài
12	Đình	亭	Hall	Nhà nhỏ, chỗ tụ họp
13	Đình	庭	Court, garden	Cái sân, vườn
14	Tạ	榭	Floating house	Nhà tạ, thuỷ tạ
15	Quán	館	Hall, Public hall	Toà nhà, nhà trọ
16	Lâu	樓/楼	Pavilion/Observation tower	Nhà lầu, tháp cao
17	Tự	寺	Pagoda	Chùa (Phật tự)
18	Phối	配	Elemental building	Phối hợp, phối viện
19	Từ	祠	Shrine	Đền thờ
20	Am	庵	Hermitage	Nơi ẩn dật, am miếu thờ Phật,
21	Hiên	軒	Balcony, Wings,	Mái nhà
22	Nha	衙	Office	Văn phòng (chính phủ)
23	Môn	門	Gate	Cửa, cổng
24	Quan	關/関	Frontier post	Hàng rào, quan ải
25	Phòng, Bàng	房	Room, Chamber, Ward	Cái buồng
26	Khố	庫	Store	Kho
27	Trù	廚	Kitchen	Nhà bếp
28	Phủ	府	Residence, Prefecture	Công sở, thủ phủ
29	Viên	園	Garden	Vườn
30	Uyển	苑	Garden	Vườn, công viên
31	Giám	監	Control, direction	Xem xét, coi sóc
32	Gia	家	House, family	Nhà, gia đình
33	Ốc	屋	Buliding, Shop	Mái, nhà, tiệm (bán hàng)
34	Sở	所	Office, Place	Văn phòng, chỗ, nơi chốn

35	Lang	廊	Corridor, Gallery	Hành lang, chái nhà, phòng trưng bày
36	Tẩm	寢	Temple, Palace for soul	Nơi an nghỉ (của linh hồn)
37	Xá	舍	House, Dwelling	Nhà ở
38	Xá	社	Shrine	Đền miếu
39	Xưởng	廠	Studio, Factory	Xưởng làm việc, nhà xưởng
40	Ty	司	Service	Quản trị
41	Sảnh	廳/庁	Office building	Văn phòng làm việc của chính quyền
42	Từ Đường	祠堂	Ancestral hall, worship hall	Nhà thờ họ
43	Tháp	塔	Tower, Pagoda	Tháp, chùa

(source: Hue Monuments Conversation Center)