

**MAKING THE PAST SERVE THE PRESENT:**

**A COMPARISON OF TRADITIONAL FENGSHUI AND ECOLOGICAL DESIGN IN A  
TRADITIONAL CHINESE VILLAGE**

by

**YIQIAN LIANG**

(Under the Direction of Eric MacDonald)

**ABSTRACT**

The practice of Fengshui has been used for thousands of years in China to choose optimal sites and building placement. However, since 1919, it has largely been considered a superstition and its insights disregarded, especially in developed cities. In recent years, landscape scholars including Kongjian Yu and Qiheng Wang, have proposed that the principles of Fengshui coincide with ecology, helping to improve quality of life and reducing the impact of natural disasters such as floods. In this thesis, the author uses Hong Village as a case study to discuss the theory and application of traditional Fengshui and ecological design, and compare the relationship between these two systems. The thesis concludes that the two systems share both commonalities and differences when compared in the context of goals, theory application, and the Hong Village study results.

**INDEX WORDS:** Traditional Fengshui, Ecological Design, Hong Village

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## CHAPTER 1 INTRODUCTION

### 1.1 Problematic and Question

#### *1.1.1 Problematic*

Traditional Fengshui has been used for thousands of years in China to choose optimal sites and building placement. However, since 1919 when the New Culture Movement happened, people began to believe in Western science and abandon traditional practices, traditional Fengshui was also seen as a superstition by those in the planning professions and disregarded, especially in developed cities. In recent years, landscape scholars have posted a correlation between traditional Fengshui and ecological design, particularly with respect to how both techniques may improve quality of life and help reduce the impact of certain natural disasters. However, there is currently little formal scientific research demonstrating the similarities between these two knowledge systems.

#### *1.1.2 Research Question*

What are the similarities and differences between traditional Fengshui practice and theory, and ecological design, and how do they inform the process of choosing and building sites that best allow humans to live with nature?

## 1.2 Background

### *1.2.1 Brief Introduction of Fengshui*

Fengshui is a system of traditional folk knowledge in China that aims to help people live in harmony with nature (Wang 2005). In existence for over eight hundred years, Fengshui is used to choose sites for a wide range of human activities, including the construction of roads, bridges, tombs, palaces, gardens, villages, and cities (Cheng 2010).

However, since an ideological liberation movement called the New Culture Movement that began in 1919, many Chinese academics, designers, and builders began to follow Western methodology and knowledge systems, abandoning traditional Chinese practice because they believe them to be unscientific or even outright superstition. Fengshui was one of these abandoned traditions (Wang 2005).

#### (1) History

Fengshui showed up in 4000 BCE, when people began to develop simple concepts to guide them in choosing sites for human habitation (Lv 2010). It became a coherent theory by 211 BCE, and evolved into a formalized system of experienced practice circa 300 AD (Lv 2010). Pu Guo (276-324 CE), whose book, *Book of Burial*, is the first complete document to record Fengshui knowledge, is acknowledged as the originator of Fengshui as it is known today (Lu 2012). The book guided people in their search for optimal burial sites in cemeteries, as cemeteries held great significance in Chinese beliefs about ancestors and the afterlife (Guo 2008). Between 1368—1644 CE, during the Ming Dynasty, the practice of Fengshui encompassed city planning, palace and garden design, house construction, and even furniture design in both the noble and non-noble strata of society (Lv 2012). It served agricultural industry and daily life, and proved a

useful and reliable system of knowledge and practice developed from thousands of years of experience and observation of nature.

## (2) Fengshui's Branches

Fengshui is divided into traditional and modern forms (Dong 2002). The traditional form is an ancient system that relies on observation and experience of a site over time, guided by the principle of “the unity of humanity and nature” (Chen 2005). Modern Fengshui, appeared in the 20<sup>th</sup> century (Hui 2006), is simplified from the traditional form, and is mostly connected with urban life, such as solving people’s psychological problems and helping a businessman to make a fortune.

Traditional Fengshui has two branches: the Qi Faction and the Form Faction (Lv 2012). Qi means energy, and in the Fengshui belief system it is the original element of everything in the world; energy forms the central principle of the Qi Faction. Fengshui masters from the Qi Faction believe that the flow of Qi can be manipulated to influence human health (Gan, Yan and Chen 2014). The Form Faction is based on observing the landscape structure of sites, such as topography and hydrology, in order to choose the one that is most suitable to Fengshui criteria (Gan, Yan and Chen 2014). These two factions interpenetrate and work for the principle of Fengshui together. Both of them respect nature and seek long-term harmony (Chen 2010).

Modern Fengshui is abstracted from traditional Fengshui, by its association with architecture and place designs simplified by following Western ideas. Furthermore, since Fengshui was discarded for a long period following shifts in ideology, many aspects of its original theory and methodology have been forgotten and ignored. Traditional Fengshui ideas that have survived are often distorted for other purposes, such as fraud (Yang 2014): some

operate under the title of “Fengshui master” only in order to take advantage of those with sincere beliefs in the practice.

Fengshui theory largely consists of astronomical, geographical, and anthropological elements, combining them in an effort to create a harmonious living environment with nature (Yang 2014). The process of Fengshui exploration includes choosing a site, selecting a direction of orientation, observing natural forms, studying water and soil, and following Qi. There is a famous saying: “Qi rides the wind and scatters, but is retained when encountering water” (Guo 2002), meaning the best site to collect natural energy is ventilated but not totally cut-through, and should be close to a water source.

### *1.2.2 Brief Introduction of Ecology*

Ecology is a scientific discipline that studies the interactions between organisms and environments, including geography, geology, meteorology, pedology, physics, and chemistry (Lin and Fu 2011). As the global human population grows and the needs for resources increase, ecology has become a vital body of ideas and practices for researching environmental problems, and has been applied in many areas.

#### (1) History

Ecology, as defined by Ernst Haeckel in 1866, studies the relationships between biotic organisms and their abiotic environments (Begon et al. 2006). Ecological thoughts and ideas were evident even before this coinage. For example, in 450 BCE, Empedocles, a pre-Socratic philosopher, noticed the relationship between plants’ nutrition and their environment; Aristotle recorded animals’ habits by classifying them through different environments (Lin and Fu 2011).

Between the seventeenth century and the 1950s, ecology was gradually established and developed as a formal field of study. Scientists in many academic fields contributed to the

growth of ecology, such as René Antoine Ferchault de Réaumur, the pioneer of insect ecology, and Alexander von Humboldt, who studied the regularities of plants distribution and emphasized that every community had its specific appearance (Lin and Fu 2011). The development of physics, chemistry, meteorology and many other subjects in the early twentieth century also accelerated the development of ecology. Chapman published *Animal Ecology* in 1931, and Arthur Tansley put forward the ecosystem concept in 1935 (Lin and Fu 2011).

Beginning in the 1960s, ecology attracted more attention due to the rise in visibility of environmental problems. Population ecology (Blower, Begon, and Mortimer 1996), community ecology (Greig and Daubenmire 1968), landscape ecology (Dramstad, Olson, and Forman 1996), ecosystem ecology (Odum 1983), and other ecological sub-disciplines were largely developed during this time. During the 1970s, applied ecology increasingly became the bridge of multidisciplinary practice that linked ecological theories to real-world environmental problem-solving. Ecological design is an important branch of applied ecology.

## (2) Branches

Ecology (Fig. 1.1) can be divided into theoretical and applied ecology (Lin and Fu 2011). Theoretical ecology mainly researches on theory which is based on self-correcting process of scientific inquiry, and it cannot be utilized as a methodology (Ndubisi 2002). However, applied ecology is a practical system with specific techniques and skills, which is complementary to theoretical ecology.

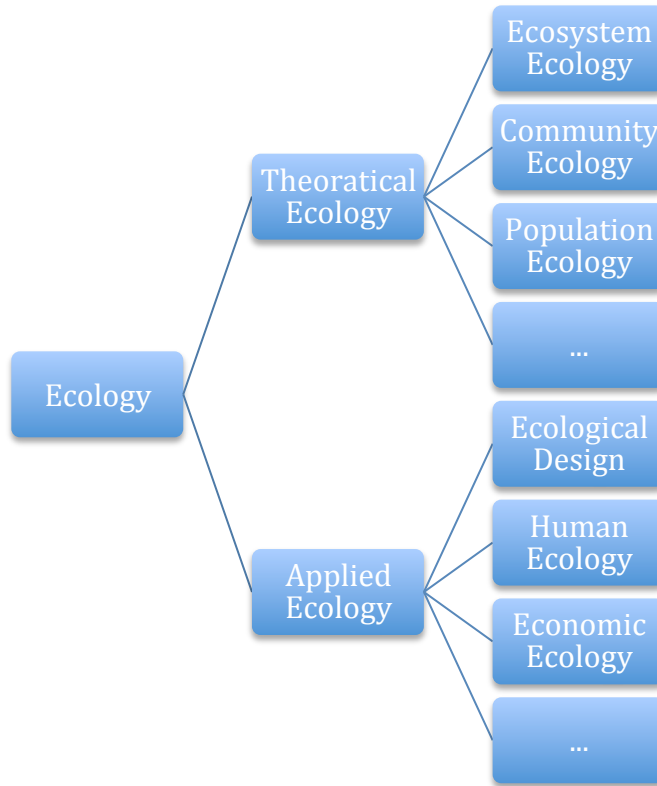


Fig. 1.1 The Branches of Ecology

### (3) Landscape Ecology

Ecology is the systematic study of the interaction among organisms and their environment; landscape is a complex land mosaic kilometers-wide, containing repeated particular local ecosystems and land uses (Dramstad, Olson, and Forman 1996). Generally, landscape ecology is an interdisciplinary subject of theoretical and applied study, concerning spatial change that involves relationships between natural biophysics and human activities (Ndubisi 2002).

### (4) Ecological Design

Landscape ecology targets human use of natural habitats and aims to reduce the negative impact of human disturbance (Gutzwiller 2002). With the theoretical support of landscape ecology, ecological design provides practical methodologies and tools to realize this goal. Among these methodologies, the landscape-suitability approaches (LSA) are the main ones for

understanding and analyzing landscapes for purposes of human environmental planning and design.

### *1.2.3 Brief introduction of the relationship between Fengshui & Ecology*

Fengshui, called “Astro-ecology” by Steven J. Bennett (1978), has been portrayed as “environmental science,” supporting the ideas of ecology and nature conservation (Bruun 2003). Many scholars from both the East and West have argued that Fengshui shares similarities with ecology. For example, Kongjian Yu analyzed the ecological values embodied in ideal Fengshui patterns (Yu 1990), and these values were examined further using computer technology by Yunfei Gao and his partners (Gao, Cheng, Wang 2007). Many scholars also have emphasized the importance of Fengshui to modern and future construction activities by studying the ecological characteristics of those sites designed according to Fengshui principles (Chen 2005, Lu 2012). However, the majority of scholastic literature only discusses the relationship between Fengshui and ecology in a qualitative way, merely describing their meaning, which fails to show the deeper relationships between theory and design process. Moreover, since Fengshui and ecology are very complex systems with many branches, research on the relationship between Fengshui and ecology tends to be too broad and difficult to draw conclusions from. Therefore, the author will use a comprehensive method utilizing both qualitative and quantitative analyses to compare traditional Fengshui and ecological design in order to discover the similarities and differences in goals, theory and application, as well as the final results of the two systems working in the context of Hong Village.

### 1.3 Significance

Although traditional Fengshui has a 6000-year history, it has been viewed as a superstition during the past century, and today it is still dismissed by many people because it includes both scientific and unscientific ideas. Accordingly, it is very important to investigate the usefulness of traditional Fengshui in order to revitalize this traditional knowledge system.

Compared with traditional Fengshui, ecological design is considered to be more rational and logical. However, because of the unavailability of some landscape data and a limited ability to account for complex but important nuances of subjective human experience, ecological design also may not always be very reliable.

To summarize, traditional Fengshui is derived from a long-history human experience and practice, while ecological design has developed as a rational, largely quantitative science. Although distinct, these two systems could be complementary, each facilitating a more comprehensive analysis and design process.

### 1.4 Methodology

The process of this thesis begins with a literature review of traditional Fengshui and ecological design; after that the author will propose a hypothesis about the general relationships between the two systems. This relationship will be used as the basis for testing the hypothesis in a case study of Hong Village.

The reasons for choosing this village as a case study include: (1) it is a typical village following traditional Fengshui ideas (Yu 1990); (2) it has been well-protected during its history,

preserving Fengshui and ecological values today much as they were originally found; (3) there have been numerous studies of Hong Village and much landscape data is available for use in a landscape suitability analysis.

The process is as follows:

First, traditional Fengshui and ecological design on this site will be analyzed separately to study the structure, function, and landscape values of Hong Village. The traditional Fengshui section will include qualitative analysis of geography, topography, water, soil, and plant species, while the ecological design section will contain both qualitative and quantitative analysis. The qualitative analysis will be descriptive documentation about the ecological design in the Hong Village; and the quantitative analysis will utilize the McHarg method and GIS-based landscape suitability analysis to test the ecological value of Hong Village.

Second, the author will compare traditional Fengshui and ecological design within the context of Hong Village to evaluate the similarities and differences in goals, theory and applications, as well as results. The goals are the original purpose of these two systems to plan and design places for human habitation. The theory and application are about the study elements in the site and detailed process of planning and design. And the results are the conclusions of each systems working on Hong Village.

Lastly, the comparison of these analyses will lead to a final conclusion about the relationship between traditional Fengshui and ecological design.

## 1.5 Limitations & Delimitation

### *1.5.1 Limitations*

In this thesis, Hong Village, with its 800-year history, is an appropriate case to examine the similarities and differences between traditional Fengshui and ecological design. However, characteristics of the landscape, such as plant species, have likely changed during the centuries following Hong Village's construction, meaning the Fengshui values will have changed correspondingly, and those we work with today might differ from those utilized in the village's founding.

In addition, because detailed GIS data for Hong Village is not available, the author will create a GIS map based on Google Maps and other publicly accessible geographic sources, with the understanding that precise data are difficult to obtain for factors such as plant species and specific soil types.

### *1.5.2 Delimitations*

The scope of this thesis is limited to traditional Fengshui and ecological landscape design. The analysis addresses traditional Fengshui only, rather than modern Fengshui, as the traditional system was that used to originally design the village. Moreover, in contrast to traditional Fengshui, which focuses on the harmony between humanity and nature, modern Fengshui is orientated more toward urban life. Therefore, modern Fengshui will not be considered in this thesis. In addition, the ecological design analysis conducted for the thesis will consider ecological patterns at the landscape scale; it will include Hong Village as well as the surrounding landscape of the West Creek Basin. The ecological design analysis will utilize the McHarg

method of landscape suitability analysis, focusing on the relationship between humans and nature, which is the same as traditional Fengshui.

According to some traditional Fengshui scholars such as Kongjian Yu and Qiheng Wang, the whole system of Fengshui is relevant to ecology and these two systems match with each other to some degree, with the ideal Fengshui pattern realized in the form of an ecologically-sound human habitat (Gao, Cheng, Wang 2007). However, since both Fengshui and ecology are complex systems, it is not within the scope of this thesis to make every possible comparison between them. Thus, the author will only consider traditional Fengshui and ecological design.

## 1.6 Chapter Summaries

Chapter two is a review of the literatures of traditional Fengshui, ecological design, and the relationship between these two systems, as studied by scholars such as Kongjian Yu. It also briefly introduces basic information about Hong Village, the case study central to this thesis. At the conclusion of Chapter 2, the author puts forward a hypothesis of the relationship between traditional Fengshui and ecological design based on review's outcome.

Chapter three explores traditional Fengshui's ideas as represented by five elements of Hong Village: geography, topography, water, soil, and species. Each element is studied according to its historical background, physical and psychological functions, and the Fengshui principles behind it, detailing how these characteristics and traditional values contribute to the suitability of Hong Village's location for human habitation.

Chapter four studies the ecological value of Hong Village through both qualitative and quantitative analyses in and around the site. The qualitative analysis includes descriptive

documentation that explain the idea and meaning of landscape ecology in Hong Village, while the quantitative analysis contains GIS-based landscape suitability analysis and other landscape data that determine the village as a suitable place for humans to live.

The study of the relationship between traditional Fengshui and ecological design in Chapter five compares three aspects of these two systems, including intention and goal, theory and application, and analysis results, to discover the similarities and differences between traditional Fengshui and ecological design.

Chapter six concludes the thesis by outlining the final relationship between traditional Fengshui and ecological design. The author will also propose future applications for a combination of these two systems, and directions for future studies in Fengshui and ecology.

## CHAPTER 2 LITERATURE REVIEW

This literature review surveys published works relevant to traditional Fengshui, ecological design, and the relationship between them. It also introduces basic information about Hong Village, as well as the concepts of Fengshui and ecology behind its development.

### 2.1 Traditional Fengshui

#### *2.1.1 Fengshui's meaning*

As defined by scholars in ancient and present-day China, as well as international researchers, Fengshui is a system of folk theory and practice about humanity and nature, used to get profits and avoid risks (Lv 2012). Fengshui practice requires knowledge of geography, geology, meteorology, hydrology, pedology, botany, aesthetics, anthropology, social psychology, and landscape (Wang 2005).

#### *2.1.2 Fengshui's Development*

Fengshui has a long history dating to primitive society in China<sup>1</sup>. Although, at that time, the term “Fengshui” had not yet been coined as an ordered system, people practiced a rudimentary form of this art when choosing sites that allowed them to meet the challenges of rigorous natural conditions, such as those encountered near rivers and facing the sun.

Fengshui developed considerably during the class society period:

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<sup>1</sup> The specific timeline of Chinese dynasties can be found in Appendix A.

### (1) Primitive Society

The earliest records of Fengshui date back to 6000 years before the present, during the period of the Yangshao Culture. Patterns of green/blue dragons, and white tigers—symbols of Fengshui—appear in a tomb from that era. Green/blue dragon and white tiger are the gods of the east and the west. Together with red bird and tortoise, the gods of north and south, they rule the four cardinal directions in ancient Chinese cosmology (Guo 2002).

### (2) Shang and Zhou Dynasties

During the Shang and Zhou Dynasties (1600—221 BCE), there were clear classifications of topography and hydrology developed. The category of land included mountain, hill, mound, and plain, while water included sea, lake, river, spring, stream, pond, bog, and gully. These categories were recorded in the “Book of Poems” (circa 1050—550 BCE).

### (3) Qin Dynasty (BCE 221—BCE 206)

In the Qin Dynasty, the foundational parts of traditional Fengshui, such as the study of landscape structure, began to develop, and the knowledge determining site location was concluded into a systematic methodology. The idea of Qi also appeared at that time, splitting Fengshui into different branches.

“Shangshu – Yugong” (unknown author, Qin Dynasty), the first regional geographic book, divided Chinese territory into nine natural regions according to the physical features of mountain, river, and seashore. Additionally, it described over twenty mountains among the basins of the Yellow River, Huai River, and Yangzi River, which provided the theoretical basis for later development of “dragon’s vein,” a principle concept in Fengshui theory used to judge the advantages and disadvantages of a natural site through observing the direction and structure of mountain and river.

*The Book of Mountains and Seas*, written in the early Qin Dynasty, is known as the first geographic encyclopedia in China, and consists of *the Book of Mountain*, *Book of Sea* and *Book of Land*. *Book of Mountain* lists 447 mountains and is the earliest geographic book about mountains, which is also a study of landscape structure (Lv 2012).

“Tuyi,” a term commonly used in the early Qin Dynasty, conveys the idea that different soils and land are suitable for different creatures. It was explained in *Zhouli* (770—476 BCE), written in Chunqiu period. Tuyi method was widely used to find ideal living site at that time (Lv 2012).

Qi is an important idea in traditional Fengshui, and the idea of Qi also originated during the Qin Dynasty (Wang 2005). Qi means energy, the original element of everything in the world, which is the principle of Qi Faction. Specialists known as “Qi finders” made careers out of finding sites with the best Qi.

#### (4) Han Dynasty (BCE 206—CE220)

Fengshui reached its full development and popularity during the Han Dynasty. Fengshui masters were consultants for many aspects of life, such as marriage, burial, and house-moving. Considerable literature and documentation was composed at that time, among which *Tuzhai Method*, *Moving Method* and *Topography of House* were the most famous (Lv 2012).

#### (5) Jin Dynasty (265—420)

Contemporary Fengshui practice comes to us from *Book of Burial*, written by Pu Guo during the Jin Dynasty. Feng is wind, and Shui is water. Pu Guo wrote, “Qi would be spread by wind, and stopped by water” (Guo 2002). In addition, *Book of Burial* established the standard of ideal Fengshui patterns, and framed the main structure of Fengshui theory, laying the foundation for later development of Fengshui. Pu Guo’s theory that “the ideal water is the first, then the

wind” has endured for more than 1700 years, and it is still used today. Thus, Guo is called the originator of Fengshui in China (Lv 2012, Cheng 2010, Wang 2005).

#### (6) Sui (581—618), Tang (618—907) and Song (960—1279) Dynasties

After the Jin Dynasty, traditional Fengshui gradually developed in all fields during the succeeding Sui Dynasties. The growth of other subjects such as architecture also supported traditional Fengshui (Lv 2012). In Tang and Song Dynasties Traditional Fengshui was greatly developed—a lot of Fengshui masters and Fengshui documents appeared, and Form faction and Qi faction were established during that period (Lu 2005). The representative master of Form faction was Junsong Yang (Tang Dynasty), and the one of Qi faction was Wenjun Lai (Song Dynasty) (Lu 2005).

#### (7) Ming (1368—1644) and Qing (1644—1911) Dynasties

The Ming and Qing Dynasties featured the completion of a number of projects based on Fengshui principles, the most famous of these being the Ming Tombs, burial site for thirteen emperors of the Ming Dynasty. A career named “Qintian Jian” developed during the Qing Dynasty. This was a specialist hired by emperor to observe astronomical phenomena and Fengshui. The Qintian Jian was a powerful position having, as it did, the ability to influence imperial decisions.

Therefore, the development of traditional Fengshui can be dated back to primitive society in China, evolving through its initiation in the Qin Dynasty, prosperity during the Tang and Song Dynasties, popularity during the Ming and Qing Dynasties. Nowadays, although there are numerous branches, the core principle is the same as that of traditional Fengshui—the unity of nature and humanity (Dong 2002).

### *2.1.3 The Study Elements of Traditional Fengshui*

The basic traditional Fengshui elements include: Long (龙), Sha (砂), Xue (穴), Water (水), and Xiang (向). Long corresponds to topography, especially the main mountain chain; Sha signifies the small mountains that surround the site; Xue is the Qi, or energy, collection site; and Xiang refers to sunshine, airflow, and shade. The traditional Fengshui theory used to plan and design human environments is based on these five elements. In the analysis of Hong Village, the main study elements are location, topography, water, soil, and biological diversity. Location and topography incorporate Long, Sha, and Xiang, and soil and biological diversity includes deep exploration of Xue.

### *2.1.4 Ideal pattern of traditional Fengshui*

Fengshui is in itself a kind of culture and the ideal pattern behind it serves people, nature, and culture (Yu 1990). The ideal pattern of traditional Fengshui is a site with its back to the mountains, hills on both sides, and facing a river flowing through (Gao, Cheng, Wang 2007). This pattern has been proven to have high ecological values for people living on-site, such as adequate sunshine, mild wind, and a comfortable microclimate (Gao, Cheng, Wang 2007). Hong Village is an example of this ideal pattern (Fig. 2.1) applied as its structure and relationship with surrounding environment (Yu 1990). The author will discuss how the pattern provides traditional Fengshui and ecological value in Chapter three and four.

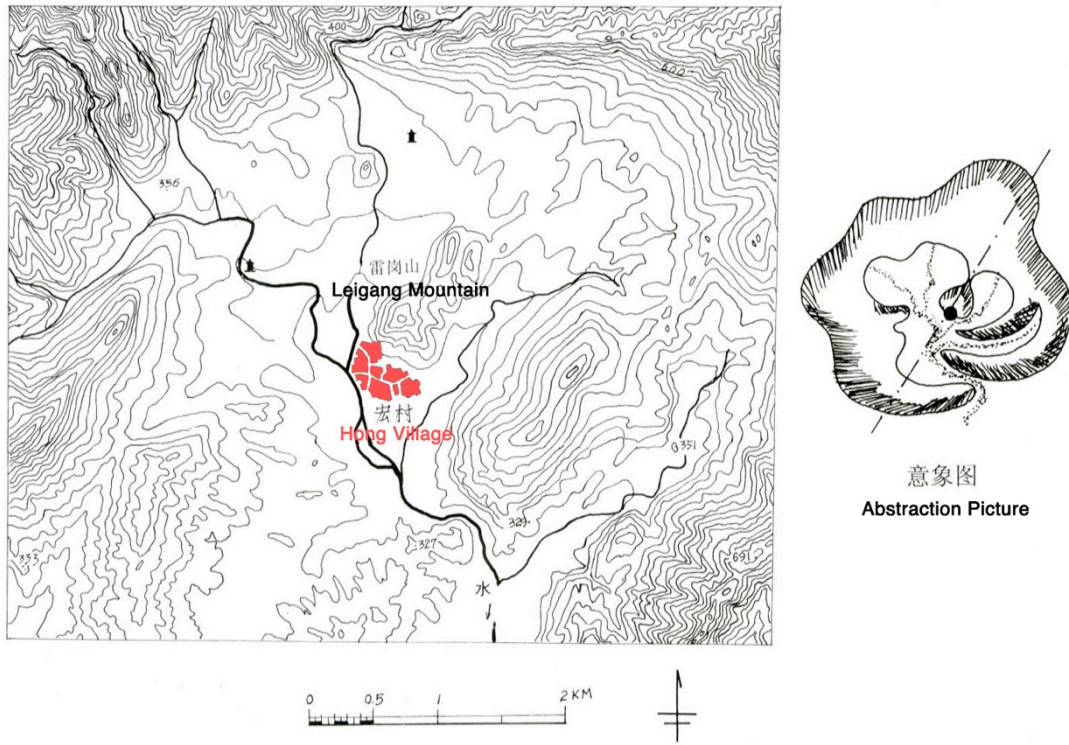


Fig. 2.1 Ideal Pattern: Master Plan of Hong Village Fengshui structure (Yu 1990)

## 2.2 Ecological Design

### 2.2.1 The Hierarchy of Ecological Design

Ecological design is the bridge between substantive theory of landscape ecology and practical ecological activities (Ndubisi 2002); thus, it includes both theory and application. In the theory aspect, there is human and non-human landscape ecology, each with different research directions. The application aspect mainly covers the landscape suitability approaches that are used to plan, design, test, and evaluate a landscape for different human purposes, such as building construction and nature conservation.

### 2.2.2 Development of Landscape Ecology

The term “landscape ecology” was coined in 1939 by Carl Troll, a German geographer who utilized aerial photographs to study the interactions between environment and ecology. At the international meeting of the Association of Vegetation Science in 1963, Troll put forward the definition of landscape ecology as a study of the entire complex cause-effect network between living communities and their environment in a landscape scale (Ndubisi 2002).

The theory of landscape ecology was also developed by MacArthur and Wilson’s book *The Theory of Island Biogeography* in 1967, which generated a general theory to explain the facts of island biogeography. This theory of island biogeography was then generalized from physical islands to abstract patches of habitats using Richard Levin’s metapopulation model, which encouraged the development of landscape ecology by providing conservation biologists with a new method to assess how habitat fragmentation affects population viability (Banaszak 2000).

Other ecologists and geographers also contributed to the definition of landscape ecology. During the 1960s and 1970s three German scholars—Ernst Neef, Josef Schmithusen, and G. Haase—developed landscape ecology by studying the ecological structure of landscapes. By the end of the 1970s, landscape ecology had become an important interdisciplinary field in Europe. John Smut and many other scholars pointed out that the idea of landscape ecology can only grow from the contributions of many disciplines (Ndubisi 2002), therefore technologies like RS (remote sensing) and GIS (geographic information system) have also provided supporting data and analysis tools to develop landscape ecology since the 1970s.

In the field of the application of theoretical landscape ecology, European landscape ecologists played an important role in dealing with land-use problems and ecological concerns in human-dominated landscapes (Lin and Fu 2011). The exploration of landscape structure,

function, and change is significant to the development of ecological planning, which is the practical application of landscape ecology (Dramstad, Olson, and Forman 1996).

In 1981, landscape ecology was introduced to North America, and U.S. scientists began to attend European conferences in this field. At the same time, Richard Forman and Michel Godron originated important ideas, including the terms “patch,” “corridor,” and “matrix,” which are widely used in today’s research (Ndubisi 2002). In 1984, the ecologists Zev Naveh and Arthur S. Lieberman raised the landscape ecological idea of studying the relationships between humans and landscapes by doing research on the theory and practical application of landscape ecology (Naveh and Lieberman 1984).

Landscape ecology has been an independent subject since 1982, marked by the establishment of the organization of the International Association for Landscape Ecology (IALE). Landmark book publications written by Zev Naveh, Arthur S. Lieberman, Richard Forman, Michel Godron established the definition, scope, goals, and methodology of landscape ecology.

Currently, landscape ecology is seen as “neither a pure science, with only the goal to increase knowledge, nor is it a purely applied science, with the sole purpose of solving problems” (Ndubisi 2002). It is both theoretical and applied knowledge that forms a discipline for ecological planning. Moreover, the growth of landscape ecology theory and application relies on advanced scientific technologies such as GIS (Geographic Information Systems), RS (Remote Sensing), and GPS (Global Positioning Systems). Precise data and models provide quantitative study and analysis to further develop this discipline.

### *2.2.3 Ecological Design*

Ecological design is the interdisciplinary subject of the landscape ecology theory and landscape ecological application (Fig. 2.2). Landscape ecology theory can be divided into human

landscape ecology and non-human landscape ecology, based on what the research focus. The leading scholars of human landscape ecology are Carl Troll, Isaak Zonneveld, and Zev Naveh, and the key figures of non-human landscape ecology are Richard Forman, Michel Godron, and Frank Golley.

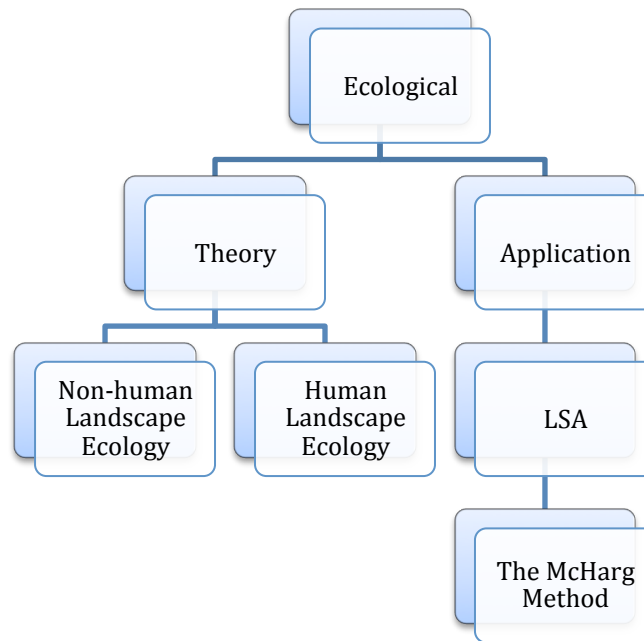


Fig. 2.2 The Classification of Ecological Design (Ndubisi 2002, Godron 1986, Naveh 1984)

### (1) Human Landscape Ecology

Human landscape ecology is defined as an interdisciplinary system that explores the relationship between human societies and their specific environment, making use of not only natural resources, but also social science and humanity (Naveh 1984, Zonneveld 1995). With this background, landscape is required to have both physical and psychological meanings (Naveh 1984), to support complex social systems and their ambient ecosystems. In addition, human landscape ecology is also guided by culture (Trepl 2012), such as aesthetic and symbolic landscape. Therefore, human landscape ecology provides knowledge for realizing the

sustainability of social populations and their ecosystems while at the same time meeting the cultural requirements of society.

## (2) Non-human Landscape Ecology

Landscape, according to Richard Forman and Michel Godron, is defined as:

*... a heterogeneous land area composed of a cluster of interacting ecosystems that is repeated in similar form throughout. Central to this concept is the existence of a cluster of ecosystems found throughout the landscape* (Forman and Godron 1986).

Richard Forman and Michel Godron (1986) defined landscape ecology as a systematic study of structure, function and change in a kilometers-wide land mosaic containing repeated particular local ecosystems and land uses. Compared to the general definition of ecology coined by Ernst Haeckel as a knowledge system of interactions among organisms and their environment, landscape ecology focuses more on the flux of energy, mineral nutrients, and species among their component ecosystems, providing environmental references for land-use issues.

Frank Golley defines landscape ecology as a study of ecosystem functions at the scale of landscape (Golley 1991). Golley bases his definition on Arthur Tansley's notion that ecosystems are part of a hierarchical system consisting of biotic creatures and their abiotic environment. As opposed to Forman and Godron, who focus on landscape mosaics, Golley pays more attention to the ecosystem concepts present in landscape ecology (Golley 1987). Both of these perspectives of landscape ecology are important and still widely used today.

## (3) Landscape Suitability Approaches (LSA)

In the landscape ecological application, landscape suitability approach (LSA) is the procedure used to identify and assess the suitability for land uses according to environmental conditions (Hopkins 1977). It is applied to find the optimal site for different land-uses.

LSA was originally applied in the field of soil science in the nineteenth century, and eventually landscape architects began to overlay hand-drawn maps to analyze landscape data in the late nineteenth century. This method was used to classify different rural landscapes based on their characteristics (McAllister 1980), and was the prototype of using LSA to evaluate alternative land-uses, including forestry and agriculture. Landscape architects then developed LSA to apply to more fields, such as historic preservation, landscape conservation, and development in both urban and rural areas (Ndubisi 2002).

There are several Landscape Suitability Analysis (LSA) models, such as the Gestalt Method, the Natural Resources Conservation Service (NRCS) Capability System, the Angus Hills Method, and the McHarg method. The Gestalt Method, put forward by Lewis Hopkins, was one of the first LSAs applied to analyze and evaluate the abilities of landscapes to support human uses (Hopkin 1977). The NRCS Capability System is a LSA for determining the ability of the soil to support proposed land-uses. It was established by the United States NRCS, formerly the Soil Conservation Service. The Angus Hills Method was set up by G. Angus Hills, and it is used to test landscape capabilities by studying soil, landforms, and vegetation (Hills 1961).

In this thesis, the author will use the McHarg method to analyze the ecological value of Hong Village, since it focuses on the relationship between nature and humanity, which is similar with the core principle of traditional Fengshui and ecological design. Ian McHarg made considerable contributions to LSA. He suggested people seek unity with nature rather than dominance over it, and the method he created analyzes the ecological sensitivity of a region by overlaying and combining different landscape information (McHarg 1995). McHarg also pointed out that natural elements, like land, water, and air represent different values and those values can be ranked (McHarg 1995), meaning some natural resources have higher values than others. For

example, lands with rich habitats are more valuable than those that offer habitat for only a small number of common species.

A GIS-based land-use suitability analysis developed from the McHarg method. It uses GIS as a tool for land-use suitability analysis, and has been applied as an ecological approach for defining land suitability for species habitat (Pereira and Duckstein 1993), environment impact assessment (Moreno and Seigal 1988), landscape and planning evaluations (Miller et al. 1998), as well as urban and regional planning (Janssen and Rietveld 1990).

### 2.3 Traditional Fengshui & Ecological Design

There are many scholars doing research on the relationship between Fengshui and Ecology these years, such as Kongjian Yu. Yu pointed out that the ideal traditional Fengshui pattern of “fronting water and with hills on the back” is the most practical and welcome in Chinese traditional design such as buildings and villages, and is also useful for modern projects (Yu 1990). In his works, Yu expressed the importance of traditional Fengshui by deeply researching the cultural and psychological meanings of traditional Fengshui and its application to modern landscape design. Qiheng Wang is another key figure who has studied the ecological meaning of some traditional Fengshui ideas from the researches on historical design of gardens, palaces, tombs, and other building activities (Wang 2005). However, his work was just qualitative descriptions of traditional Fengshui and ecological design, and lacks quantitative data to better support his works.

In addition to Yu and Wang, some other scholars have produced some work in this field. With the technology of CFD (computational fluid mechanics), Yunfei, Jianjun and Zhenwu (2007) worked out the physical environment simulation of position pattern and conducted

research on the physical environmental generation of the traditional village, proving that the residents located in ideal Fengshui positions would have healthy and comfortable residential environments. Other scholars, such as Chen and Lu, also emphasize the importance of Fengshui to modern and future construction activities by studying the ecological value of the place designed with Fengshui.

However, there has been little quantitative analysis among this previous research; most inquiries have relied primarily on qualitative documentation and abstractive maps. Many scholars just put forward an idea about the relationship between traditional Fengshui and ecological design, but they have not done detailed analysis with specific Fengshui elements or ecological inventory. In this thesis, the author will apply both qualitative and quantitative method to analyze traditional Fengshui principles and ecological design of Hong Village, and compare them rationally to get accurate result.

#### 2.4 Case study—Hong Village

Almost all the gardens, buildings, palaces, and cemeteries, as well as villages in ancient China, followed the rule of Fengshui (Wang 2005). Among these artificial environments and structures, Hong Village has been upheld as a typical example that proves the validity and reliability of Fengshui (Chen 2014).

Hong Village is a residential area of Hui-style<sup>2</sup> in China, established in 1113, during the Song Dynasty. This site was chosen as a living area through traditional Fengshui, and was built

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<sup>2</sup> Hui-style: a traditional form generally applied in Anhui Province, China. Usually, the Hui-style village is located on a flat area surrounded by mountains and streams.

by the Wang family, the original residents of the village. It has a large number of historic buildings and gardens, and one piece of architecture constructed at that time is still standing there today. Most of the older buildings, including 102 examples of Qing Dynasty architecture (1644—1912) and 34 dating from the Republic of China (1912—1949), are kept in good condition, assigning historic value to Hong Village.

Hong Village is well-sited, with several mountains and hills surrounding it, and three creeks flowing through it. The village, especially the water system, was modified during the Ming Dynasty (1368—1644) according to master Keda He's planning and design ideas (Li 2007). This water system remains one of the focal points of study of Hong Village to the present day. Xueyi Li (2007) has completed an integrated study of it, including Moon Pool, South Pool, the waterway, and some typical residential ponds. Chenjing Kan and Zemin Wu have studied the water gate landscape, especially the physical and psychological functions of plant species located at the water gate. Scholars such as Yifeng Chen have also delineated Fengshui's influence on the entirety of Hong Village, and proved that after the modifications implemented during the Ming Dynasty, the village corresponded more to traditional Fengshui theory, better serving residents.

The ecological value of Hong Village has also been studied by modern scholars such as Lixiang Wang, Xueyi Li, Haiyong Lu, Jin Duan, and Haoming Jie. Wang (2006) has made contributions to a survey of plant species in and surrounding Hong Village; Li (2007) and Lu's work (2005) focuses on the water system in the village, with Li working out the specific data of the water system, such as depth, width, and flow rate; and Duan and Jie (2009) compiled comprehensive research on the history, space, and cultural meaning of the village. These landscape data will be applied in this thesis's analysis of ecological design in Hong Village.

In this thesis, the author investigate similarities and difference between traditional Fengshui

and ecological design, based on a case study of Hong Village. Analysis of the process and results will be compared to study the similarities and differences between traditional Fengshui and ecological design.

### 2.5 Hypothesized relationship between Traditional Fengshui and Ecological Design

Based on the research and writings of Eastern and Western scholars, the author speculates that there should be many similarities between traditional Fengshui and ecological design. The literature suggests that these two systems have a similar goal: to study the relationship between nature and humanity in order to realize long-lived harmony. In addition, they have similar processes to plan and design a place. Thus the author assumes that the results of the design and analysis process will be similar as well: with the concepts of traditional Fengshui, the author will demonstrate and explain its high value to Hong Village, and with the theory and application of ecological design, Hong Village would also be proved a suitable place for humans to live with nature.

### 2.6 Chapter Conclusion

Traditional Fengshui and ecological design are both mature fields with long histories of development: They have the same goal: to study and realize harmony between nature and humanity. Traditional Fengshui has a complex cultural background, supported by Chinese philosophy, and knowledge of natural phenomena, landscape structure, and architecture. Ecological design developed from the theoretical subject of landscape ecology, and is supported by multiple disciplines as well as modern science and technology. Although these two systems

have significant difference in cultural and historic background, the author assumes they are similar in the process and result of the design of Hong Village.

## **CHAPTER 3 TRADITIONAL FENGSHUI IN HONG VILLAGE**

This chapter introduces traditional Fengshui theory and discusses its application to geography, topography, water, soil, and plant species in Hong Village. The author will introduce and discuss the background of each study element of the village, as well as both psychological and physical functions of these elements. Finally, the traditional Fengshui ideas behind these elements will be explained.

### **3.1 Basic Information**

Hong Village is located in Yi County, Anhui Province, China (117°37' East Longitude, 30°11' Latitude) (Fig. 3.1). The size of the village is 19hm<sup>2</sup>. Hong Village lies within a subtropical monsoon climate, with an annual average temperature of 15.8°C. It averages 161 rainy days per year, with 75 percent of these days occurring in spring and summer. The annual precipitation is 1681.1mm, producing a humid climate. The sunshine hours average 1815.7 hours per year, and the sunshine ratio is 41 percent (Duan and Jie 2009). All these data show that Hong Village is located in a temperate environment with a warm and humid climate suitable for habitation by humans many native species.



Fig. 3.1 The location of Hong Village in China  
(From Google Maps)

In addition to this data, the author will evaluate the Fengshui value of Hong Village in terms of its geography and topography, water, soil, plants, as the five traditional study elements (Fig. 3.2).

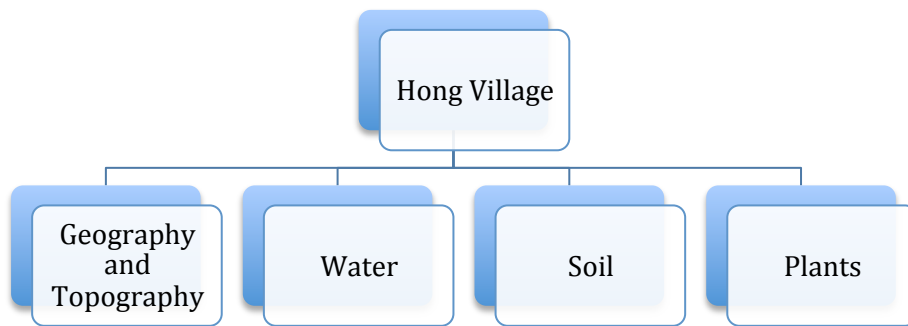


Fig. 3.2 Study Elements of Traditional Fengshui in Hong Village  
(By Author)

## 3.2 Geography and Topography

### 3.2.1 History Background and Introduction

The location of Hong Village is near the edge of several mountains (Fig. 3.3): 20 km from Yellow Mountain, 30 km from Qiyun Mountain, and 120 km from Jiuhua Mountain. The surrounding topography is mountainous, with abundant hills and creeks (Duan and Jie 2009). To the east are Leigang Mountain, East Mountain, Shizi Mountain, Huangzhi Mountain, Jiayi Mountain, and Shihui Hill; to the west are Tortoise Mountain, Shigu Mountain, and Big Shengting Mountain; to the north, Xuatang Mountain, Niuquan Mountain, Shiyou Mountain, and Yangzhan Mountain; and to the south, West Dragon Mountain and Yu Mountain (Duan and Jie 2009).



Fig. 3.3 The Mountains Surrounding Hong Village  
(From Google Maps)

Hong Village is not only located in mountains, but also surrounded by numerous streams. Yangzhan Creek, West Creek, and West Dragon Creek are the most important streams that flow

near or through the village. Yangzhan Creek and West Creek combine to form West Dragon Creek west of the village. It functions as a water source for residents, and water also flows out of the village to West Dragon Creek. East Creek, flowing from the northeast to the southwest, also joins West Dragon Creek. Generally, Hong Village is surrounded by water in three directions: east, south and west. To the north, the village is bounded by the south slope of Leigang Mountain (Fig. 3.4).

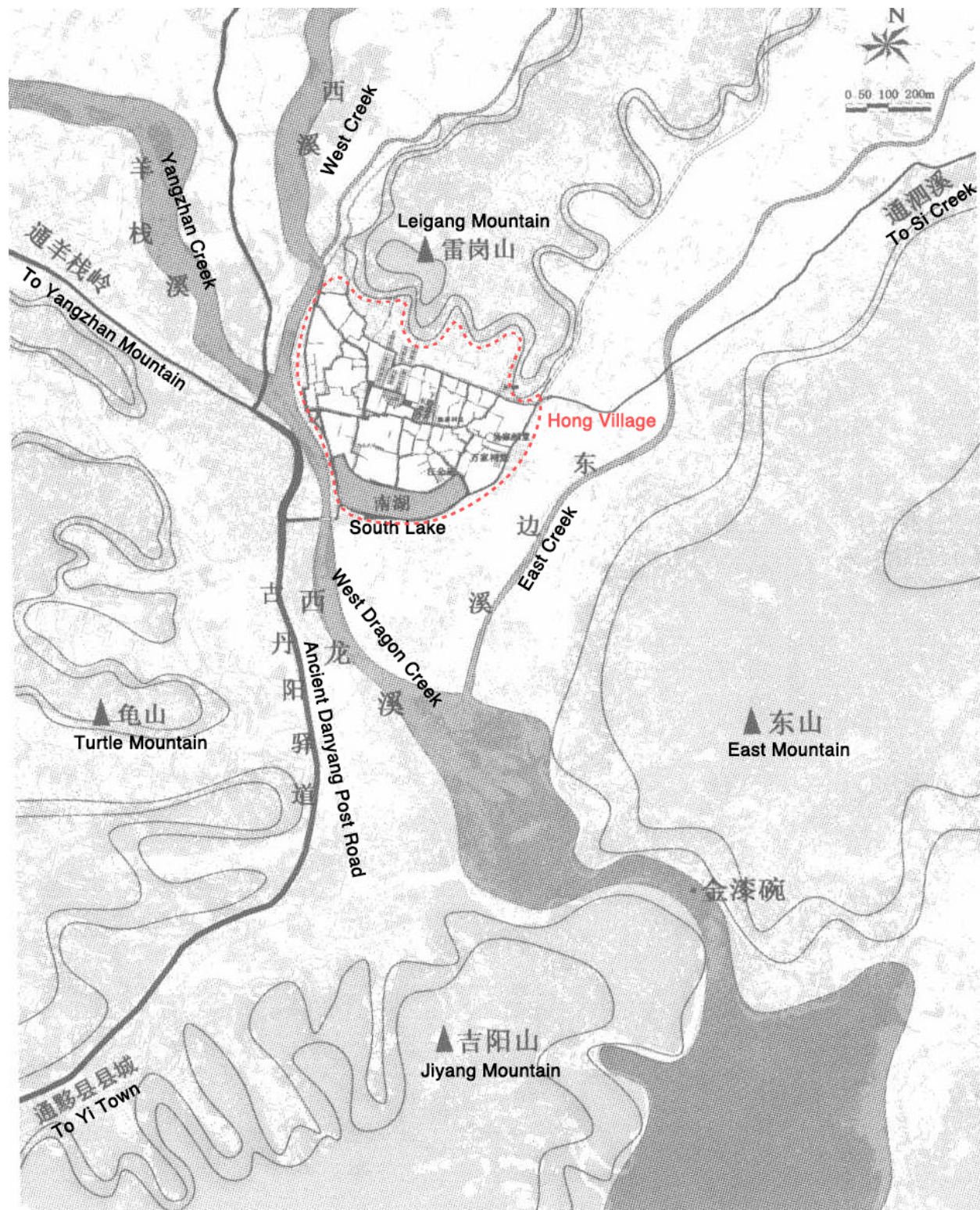


Fig. 3.4 Surrounding Environment of Hong Village  
(Duan and Jie 2009)

During the early years of the Ming (1368—1644) and Qing (1644—1911) Dynasties, Hong Village only had one road for residents to get out of West Creek Basin, and it was not convenient for people from outside to enter the village. On account of that, the Village was isolated and suffered little disturbance and exploration from the outside world, allowing it to mostly keep its original form and surrounding environment in times of rapid change and development. Thus, most of the geography and topography data we get today is quite similar to hundreds year ago, and the traditional Fengshui ideas used to cognize this village have remained remarkably consistent.

### *3.2.2 Functions of geography and Topography*

The suitable siting of Hong Village has contributed to its long life through the past nine hundred years. As mentioned in the literature review in Chapter Two, the geography and topography of Hong Village is an ideal Fengshui pattern (Yu 1990), serving both physical and psychological functions.

Leigang Mountain is to the north of the village, providing a natural protective screen to slow strong north winds in the winter, while not shielding sunshine from the south. Moreover, it offers natural resources like firewood and food for daily life as well. Creeks solve the problem of water consumption and flooding hazard. In rainy seasons, water comes down from surrounding mountains and rushes into low-altitude areas like Hong Village. The creek acts as a drainage facility to guide water out. West Creek is also the water source for the village, supporting people, animals, and plants. Other mountains and creeks also supply residents with foodstuffs such as vegetables and fruits. Since the water system of Hong Village is connected with West Creek and West Dragon Creek, the water quality is guaranteed: water keeps flowing and pollution can be discharged out of the village. This links to the idea in traditional Fengshui that water should be

always be flowing. In addition, the water system in Hong Village also purifies the water before it flows back to natural creeks and to downstream villages. This process is introduced and explained in Chapter 3.3.

Leigang Mountain and the creeks also have important psychological and cultural functions. Leigang Mountain is like a patron of villagers; thus it offers residents a sense of protection and safety. Flowing water in front of homes also provides a sense of quiet and peace. In addition, water is a symbol of wealth and luck, thus people are pleased to see water flowing in front their houses and villages.

### *3.2.3 Fengshui Principles*

#### (1) Geography

The ideal Fengshui pattern lies behind the planning of Hong Village: the site backs on to the mountains and faces the water (Guo 2002). There are four main principles: (1) avoiding “skinny” mountains, (2) avoiding valleys, (3) close proximity to water, (4) and avoidance of disaster-prone areas (Yang 2013). In Fengshui belief, “skinny” mountains are described as steep, barren, and messy, making it difficult for humans to gather natural resources. Secondly, a valley is a site usually surrounded by mountains in many directions. An unventilated environment is not a healthy one in which people can live. Thirdly, water is the most important natural resource in Fengshui theory, thus proximity to water is the most basic requirement of the site. Lastly, disaster-prone areas such as earthquake-prone regions and volcanic vents, are always unstable.

With a circumference of 2.2 kilometers, Leigang Mountain backs Hong Village on the north side, and West Dragon Creek, West Creek, and East Creek are the bodies of water that Hong Village faces. At a circumference of 10 kilometers, Hong Village is located in a flat area with several creeks flowing through it and surround by mountains.

## (2) Topography

There is an old saying in traditional Fengshui, “Sky is extended to the northeast and earth is extended to the southeast” (Cao 2007). The high point to the northeast is called the “sky gate” and the low point to the southeast is named “earth gate.” This axiom is based on the general topography of China, since most plateaus are located in China’s northwest, and water flows from high to low, that is, northwest to southeast. This pattern became a natural rule in people’s minds. Thus, Fengshui masters consider water running in this direction to be an optimal condition that is most in sync with nature. The water system in and surrounding Hong Village fits this pattern exactly (Fig. 3.5). In Hong Village, the waterway generally runs from the northwestern corner to Southern Pool, which is in the very southern side of the village. Outside of Hong Village, Yangzhan Creek and West Creek come from the northwestern side of the village and go into West Dragon Creek in a southeastern direction. Thus, the entire water system follows this rule of running in the best directions.

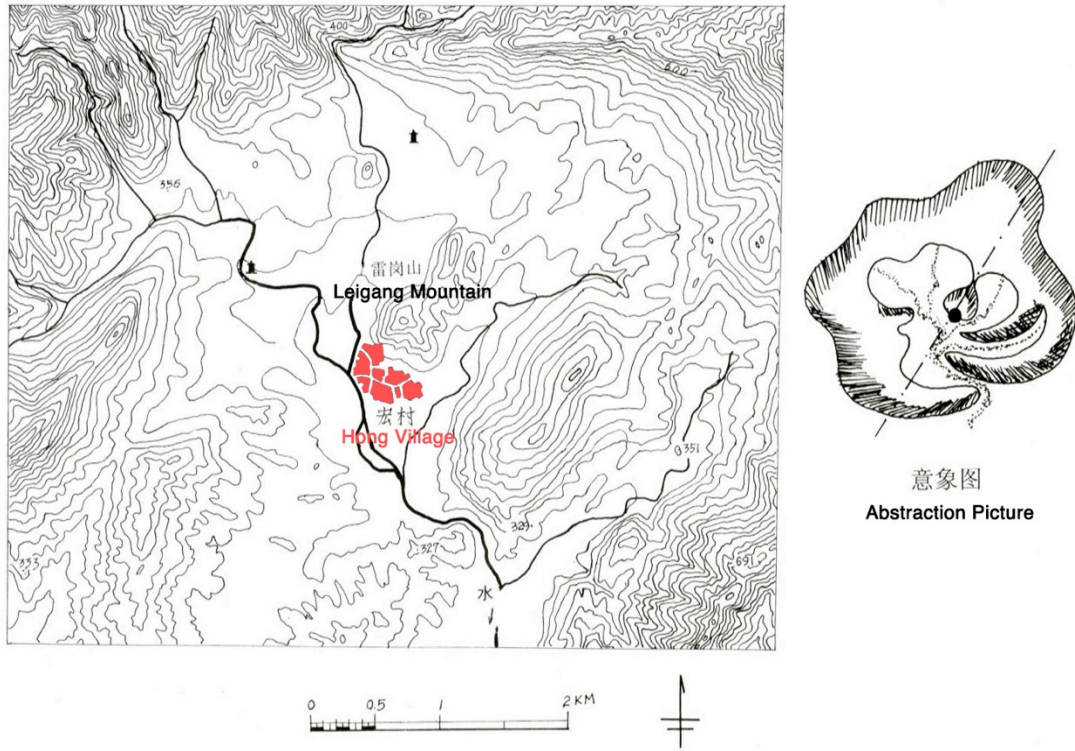


Fig. 3.5 Master Plan of Hong Village Fengshui Structure (Yu 1990)

### 3.3 Water

#### *3.3.1 History Background and Introduction*

The water system in and surrounding Hong Village, which exhibits a typical water pattern in the Hui-Style residence, plays a key role in the traditional Fengshui planning and design process (Li 2010). Four basic elements of the water system, including pool, pond, creek, and waterway, are the main forms in the village.

Three main streams named West Creek, Yangzhan Creek, and East Creek surround Hong Village, and they all flow into West Dragon Creek to the south, which provide enough water for local villagers. The natural creeks flowing out of the village are called “outside water” (外阳水),

a term indicating they surround the site, influencing the village (Li 2010).

One man-made lake called South Pool is located south of Hong Village, where the water flows from the waterway and runs into West Dragon Creek and nearby farms. South Pool is the water gate of Hong Village in traditional Fengshui, so designated because it is the main exit of the water system. It is also “medium water,” (Chen 2015) the connection between “inner water” (内阳水) and “outside water” (Fig. 3.6).

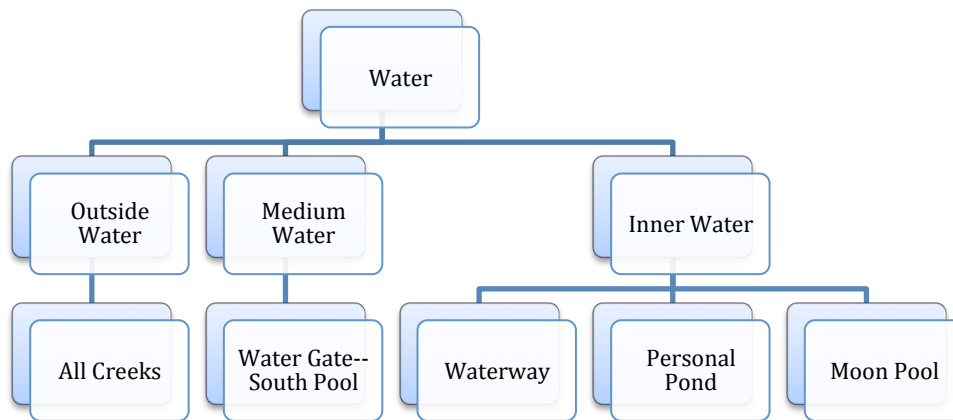


Fig. 3.6 The Classification of Water in and surrounding Hong Village (Chen 2015, Li 2010)

In 1190, Hong Village was a small-scale settlement located at the base of Leigang Mountain and facing a southeastward-flowing natural creek. During the Ming Dynasty (1368—1644), Wang Family, who are the residents of Hong Village, invited Fengshui master Keda He to plan and design Hong village. He proposed the ideas of the Moon Pool and the waterway for both functional and psychological reasons (Li 2010). Functionally, the water in the Moon Pool was collected from a spring to its north; both of these sources are “inner water” in traditional Fengshui theory, and were deemed necessary to extinguish fire in the neighborhoods. Psychologically, the water acts a traditional symbol of wealth, its presence indicates good luck and financial fortune.

The existing waterway was designed based on a riverbed by residents early in the village's history (about 1403—1423), because flash floods coming from West Creek forced the creek to redirect from the southeast to the south. Therefore West Creek combined with Yangzhan Creek at the northwest side of Hong Village, with the new waterway being called West Dragon Creek. On account of that, West Creek became a seasonal river that flowed during spring and summer and dried up during autumn and winter.

The main structure of this water system was completed prior to 1607; South Pool was added at that time. According to traditional Fengshui, South Pool functioned as “medium water” to slow the water coming from outside of the village in order to gather its Qi.

#### (1) Outside Water—All Natural Creeks

The term “outside water” designates all streams outside the village, including West Creek, Yangzhan Creek, West Dragon Creek, and East Creek. These are the main sources of water in Hong Village; they also connect with the inlet and outlet of the main water system. The water inlet is located at the northwestern corner of the village, and water runs from West Creek into the waterway. The outlet, South Pool, is also a water gate of Hong Village; it is located at the south side of the village, connecting with West Dragon Creek. East Creek does not join with Hong Village directly, but remains a water source for farms.

#### (2) Inner water—Waterway

A waterway (Fig. 3.7) was constructed in the Yongle Period (1403—1423) of Ming Dynasty (1368—1644), and is the most important part of Hong Village's water system, since it supports the majority of water consumption per day (Lu 2005). The waterway was formed from the old river bed, and more curves were added to increase its length, making it more convenient for villagers to gather their daily water.

The waterway is 716 meters long in total, and is divided into two parts before entering the Moon Pool. The larger section flows toward the west, while the smaller one flows into Moon Pool, and then enters South Pool. The larger section is 0.5—0.9 meters deep and 0.4—1.15 meters wide, although most parts are about 0.6 meter wide. The smaller waterway is 0.4—0.7 meters deep and 0.3—0.4 meters wide. The average slope of the entire waterway is 0.55 percent, the average water speed is 21.6m/min, and the flow is 7.95m<sup>3</sup>/min. Both the speed and flow are perfectly suitable for daily village use for washing clothes and dishes by the river.



Fig. 3.7 The Waterway of Hong Village<sup>3</sup>

### (3) Inner Water—Moon Pool

The Moon Pool (Fig. 3.8), located at the center of Hong Village, is a water collection basin. In traditional Fengshui theory, Moon Pool functions as a kind of inner water in the water system. The shape of Moon Pool is a semicircle, which seems smooth and full. According to Fengshui master Keda He, Moon Pool was excavated for the purpose of slowing water speed and storing

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<sup>3</sup> Source of Fig. 3.7: <http://www.yododo.com/area/guide/012BF1EDBF5B4687FF8080812BEF4DC4>

water for daily use. About 33 households in Hong Village get water from Moon Pool, accounting for 8.64 percent of the total population (Lu 2005).



Fig. 3.8 Moon Pool

Moon Pool is also a place to gather Qi. The flat and peaceful surface is quiet, making people feel that Qi accumulates in the water. This type of Qi gathering is always oriented on the main axis of a village, in order to show the importance of the point. Because of this, the main axis of Hong Village passes through Moon Pool, and adjacent buildings are granted a higher status than those located elsewhere in the village (Duan and Jie 2009).

#### (4) Medium Water—Water Gate—South Pool

The term “water gate” comes from a traditional Fengshui idea meaning the main gate of a water system in a certain area, either the entrance or exit or both of water flow. The history of the water gate dates back to the Tang Dynasty (618—907) or even earlier (Kan and Wu 2009). The water gate design is a significant part of the planning and design of a Hui-style village where the design process is guided by Fengshui. Special scenery with auspicious implications, such as centuries-old trees and symbolic architecture, are typical elements in water gate design, intended to express people’s hopes and dreams for their future (Ma 2013). Even the name of the water

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<sup>4</sup> Source of Fig. 3.8: <http://liaoxuanhong.blog.163.com/blog/static/11590955200921604836496/>

gate tree is very important in traditional Fengshui, as it is an auspicious term that pleases residents when they speak and hear it.

South Pool (Fig. 3.9) is the water gate of Hong Village and it also functions as the water outlet of the whole water system. South Pool was excavated during the Wanli Period (1573—1620) of Ming Dynasty (1368—144) and it is located at the end of the Hong Village water system, functioning as a water collection basin for daily use. It is shaped like a boat, with an area of 20,247m<sup>2</sup>, and a depth of 1.5—1.8 meters. Normally the water depth is 0.8—1.1 meters, and the height difference from the bank is about 0.7 meter. The difference in height between the pool surface and West Creek is 1.5 meters. The water inlet is located in the middle of the north side of the pool. There are five outlets, one connecting back to West Creek, and another four that are used to irrigate farmlands. At the water inlet a small fan-shaped pool created by piled stones is used to purify water going into South Pool. In addition, this small pool can also slow down the flow of water, thereby protecting the riverbed.



Fig. 3.9 South Pool

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<sup>5</sup> Source of Fig. 3.9: [http://www.colourhs.com/html/huizhoucunluo/huizhou/2012/1015/4701\\_6.html](http://www.colourhs.com/html/huizhoucunluo/huizhou/2012/1015/4701_6.html)

### *3.3.2 Functions of the Water System*

The water system in Hong Village consists of a waterway, Moon Pool and South Pool. The author will discuss the physical, psychological, and psychological functions of each water body.

First, the water system have physical functions on daily use and it could adjust microclimates. Water is the most important element for the survival human beings and other creatures. When tap water isn't available, natural streams are the most common water resource. Hong Village residents guided creek water into the village, controlling the flow and gathering systems, guaranteeing basic living conditions. Water is also beneficial to the adjustment of a microclimate in a small area, allowing it to absorb heat on hot days and humidify the air on dry days. The weather of Anhui Province is typical of a subtropical monsoon climate, and always features hot summers. However, the water system cools down Hong Village and its people. The water system also has psychological functions, contributing to visual aesthetics and psychological comfort. Just like outside creeks, the water system also makes residents feel peaceful, and functions as a symbol of wealth and luck.

Second, the waterway also has physical and psychological functions. Physically, it supports daily use. The waterway serves most of the population of Hong Village, totaling about 680 residents, which are 57.6 percent of the total village population. People wash food, dishes, and clothes in the waterway and also get drinking water from it. Moreover, the waterway is convenient for fire control. Due to the high density of buildings, as well as the main wooden constructions of Hong Village, fire spreads easily in a short amount of time. The waterway is where people gather water at the first sign of fire. Thus it guarantees the safety of both humans and their homes. Psychologically, the waterway's function is similar with the whole water system, which is psychological comfort. Flowing water is seen as vitality and wealth in people's

minds. Thus they perceive the water as coming from the outside and bringing good fortune as it flows through the village.

Third, Moon Pool supports local residents with physical and psychological functions, too. Physically, it provides water consumption, and modifies microclimate, which is similar to the function of the whole water system. In addition, it slows down the water flow rate, depositing debris in the bottom of the pool. The valve on the southern side is used to drain out water allowing people to clean the bottom regularly. Psychologically, Moon Pool is the village center, which makes the whole residential area like a giant garden, satisfying residents' aesthetic needs. Moreover, based on the slow flow rate of water, Moon pool is a quiet and peaceful space to gather Qi as well as wealth in traditional Fengshui.

Lastly, South Pool have both physical and psychological functions as well. Physically, the pool is the water gate of Hong Village's water system and has irreplaceable functions, it is a sign of village boundary and entrance, and it is where people take a break and wash themselves before going inside (Kan and Wu 2009). South Pool, is also a public open space for regular meetings and activities. In traditional Hui-style villages, villagers all joined together to build a public space for holding meetings and activities. The water gate is the best choice for locating such spaces since it is always open and serves as a transitional space between the outer and inner village. Inhabitants of other villages were not allowed to enter through water gate if there was a conflict between villages; thus the Water Gate was a space for the resolution of local disputes. Moreover, South Pool provides protection against outside aggression and disasters, such as fire hazard. South Pool could also gather water and slowing down water rate. As the largest water body in Hong Village's water system, South Pool holds the most responsibility for collecting water. There are about 200 residents who gather their water from South Pool, accounting for

about 18 percent of the population in Hong Village (Lu 2005). South Pool is also a facility to slow down the rate of water flowing from the inner water system to outside creeks, in order to purify water and prevent runoff, and the quality of the water consumed by downstream could be guaranteed as well. Psychologically, South Pool is the water gate of Hong Village to gather fortune and wealth and prevents good fortune from leaking out. It is also a symbol of Hong Village: people know where they are when they see it.

### 3.4.3 Fengshui Principles

There is a theory in traditional Fengshui that says, “If you call a water nice, it must meet four requirements. The shape of the waterway and water body should be curvy; there should be a place to collect water; water should be clean; and water surface should be peaceful” (Cao 2007).

#### (1) Curvy shape

Curvilinear shapes are the most common form of water in ancient design, since they signify good fortune according to traditional Fengshui. There is a famous saying in *The Water Book*, “The straight Qi harms people.” Qi goes with water, and Fengshui says auspicious Qi moves in curves, while ominous Qi moves in a straight line. Both the inner and outer water systems of Hong Village follow this rule.

The ideal site should be surrounded by water in three directions, also known as the “golden area” in Fengshui theory. The geography of Hong Village is precisely this golden area, as it is surrounded by West Creek, West Dragon Creek, and East Creek.

#### (2) Collection of water and Qi

Compared with waterways, which convey the aesthetic effects of moving water, Moon Pool and South Pool represent the still water aspect of the whole water system. They are water collection basins. Not only do they collect water, they also gather Qi. According to traditional

Fengshui, “When water flows, Qi flows; when water stops, Qi is collected” (Guo 2002). Hong Village has two main pools, Moon Pool and South Pool, which function as Qi collectors, and which are valued by villages as harmonious and peaceful places.

### (3) Clean water

In the Hong Village water system, there are three rules for maintaining clean water: the first is that the water source is clean; the second is that the water keeps running without interruption; and the third is that there are aquatic plants to filter and purify the water.

The water source is the mountain spring, generated by purified rainfall. Since the environment surrounding Hong Village is clean and has little pollution, and the site has little disturbance and exploration from outside, water from the mountain spring can be consumed without further effort. In addition, only flowing water can remain fresh. Based on rigorous calculations during the design process of the shape, depth, width, and flowing rate by Keda He, there is no dead corner in Moon Pool and South Pool, let alone in the water gate and waterway. This design was confirmed by contemporary scholars (Li, 2010). Lastly, aquatic plants also significantly improve water quality. Lotus and other plants help clean the water and guarantee its health benefits. On account of those three reasons, the water in Hong Village can remain pure.

### (4) Peaceful water surface

Peace means harmony, calmness, and quiet in traditional Fengshui theory. In the Hong Village water system, peace is expressed as the gentle flowing rate of water in the waterway and calm surface of the pools.

In addition, there is also a balance among inner water, medium water, and outside water. Hong Village has a complete water system which includes inner water (the Moon Pool and waterway), medium water (South Pool), and outside water (West Creek, and West Dragon

Creek); they are all in balance in size, scale, and flowing rate. Balance is a significant requirement in water design based on traditional Fengshui. The idea of balance comes from Chinese philosophy: similar proportions of inner and outside, Yin and Yang, bright and dark. In Hong Village, the balance of water system is shown in the arrangement of inner, medium, and outside water.

Lastly, as mentioned in the Fengshui ideas of topography and geography in Chapter 2, water running from northeast to southwest is considered to be the best direction of flow in traditional Fengshui. Therefore, the whole water system in and surrounding Hong Village, including the natural creeks and man-made water bodies, are all in good condition and able to meet needs of humans and nature.

### 3.4 Soil

#### *3.4.1 History Background and Introduction*

Soil is an essential element in traditional Fengshui because it relates to agriculture, building construction, and other human activities. The ingredients of soil include particles, liquid, and gas in different ratios that lead to different physical properties. The ideal soil should be, “smooth but not loose, humid but not dry, bright but not dark” (Cao 2007). This is the basic method to determine the soil quality according to Fengshui. Moreover, it is said the best soil consists of five colors: red, yellow, white, green and, black (Jiang 2010). The more color types a soil has, the more nutrients it contains, and the better grain grows.

The soil type surrounding Hong Village is called yellow cinnamon soil, a kind of slightly acidic soil distributed in mountainous areas of the subtropics and temperate zones. The growing environment of yellow cinnamon soil should be a high-temperature summer and cold winter,

with the average temperature between 14—16°C; and an average rainfall between 760—950mm. Over 50 percent of annual rainfall occurs during June to August. The soil color mainly includes red, yellow, and black, indicating it is full of iron and silicon elements.

Yellow cinnamon soil is not a high-yield soil in dry farming, but it is very suitable for agriculture that includes irrigation. Hong Village is a place with abundant creeks and pools, where yellow cinnamon soil works the best.

#### *3.4.2 Functions of Soil*

Yellow cinnamon soil is suitable for growing numerous plants such as rice, tea, and mulberry, which are important sources of food for residents, and are also main income in Hong Village.

#### *3.4.3 Fengshui Principles*

The main principles of soil in traditional Fengshui is “smooth but not loose, humid but not dry, bright but not dark” (Cao 2007). The yellow cinnamon soil’s smooth and humid texture, as well as its bright color, meets the standard for an ideal soil type in Fengshui. Through eight hundred years of history, this soil has fed three hundred generations, proving its suitability and sustainability.

### 3.5 Plant Species

#### *3.5.1 History Background and Introduction*

The plants in and surrounding the water gate are called “water gate trees,” or “water gate forest.” According to traditional Fengshui, a healthy water gate tree or forest should be

flourishing and long-lived. Based on this idea, the species around Hong Village's water gate, South Pool, are mainly *Pterocarya stenoptera*, *Liquidambar formosana*, *Salix babylonica* and *Populus tremula*, with the main aquatic species being lotus. The water gate trees and forest are not allowed to be cut down or destroyed. One notable Chinese Wingnut (*Pterocarya stenoptera*) is the water gate tree of Hong Village (Fig. 3.10), known locally as the Fengshui Tree. It is about 500 years old and was planted during the Ming Dynasty (1368—1644). The shape of its branches are patulous and graceful. In local people's eyes, the health of the Fengshui tree symbolizes of prosperity of Hong Village.



Fig. 3.10 Fengshui Tree of Hong Village

### 3.5.2 Functions

Because of the special location in the village, the water gate tree and forest are like the throat of a village. Together with the water gate which is an open and peaceful place in Hong Village, the water gate tree and forest are used to gather Qi, and they are the symbols of good luck and fortune. Physically, the water gate species is a signage that signifies the entrance to

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<sup>6</sup> Source of Fig. 3.10: <http://img1.yododo.com.cn/files/photo/2011-10-03/0132C991E6552D7EFF80808132C622E3.jpg>

Hong Village. In addition, the water gate tree of Hong Village is Chinese Wingnut, which is a typical protection tree. The leafy branches provide shelter for people and buildings.

Psychologically, the Chinese Wingnut gives people a sense of safety and wealth with its leafy branches, and signals a prosperous future for the village and residents.

The lotus (Fig. 3.11), which is the main species in South Pool, also have physical and psychological functions. Physically, lotus functions as a purifier of water. Thus before water flows from the waterway into South Pool, it is cleansed, guaranteeing safe water consumption. Psychologically, the lotus, because of its growth and habitat, is a symbol of remaining pure in the midst of filth. Specifically, the lotus grows in mud and silt, but the flowers are pure colors of pink and white. Chinese people traditionally compare it to the noble potential of the human spirit, wanting to have such a pure spirit themselves: living in a complex world but keeping a clean heart.



Fig. 3.11 The Lotus in South Pool

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<sup>7</sup> Source of Fig. 3.11: [http://pic3.nipic.com/20090514/2415311\\_154203095\\_2.jpg](http://pic3.nipic.com/20090514/2415311_154203095_2.jpg)

### 3.5.3 Fengshui Principles

The water gate is seen as a source of wealth to village residents, and has the function of gathering Qi. The water gate tree must be a tall and lush arbor, to stop wind and aid in collecting Qi. Usually, *Cinnamomum camphora*, *Pterocarya stenoptera*, *Salix babylonica*, *Populus tremula*, and *Castanopsis sclerophylla* are ideal species for planting around the water gate (Ma 2013). They all have similar features: elegance, lush foliage, and ease of planting. These trees also have traditional connotations of health and wealth. Specifically, *Cinnamomum camphora* and *Populus tremula* have slow growth rates and are long-lived, thus they are seen as symbols of good health and longevity. *Pterocarya stenoptera* has the meaning of “keeping,” and *Salix babylonica* has the meaning of “staying,” representing a willingness to keep fortune and health inside, not letting it leak out. For this reason they are usually planted at the water gate.

### 3.6 Chapter Conclusion

Based on the analysis of the theory and application of traditional Fengshui in Hong Village, all the design and planning processes followed traditional Fengshui ideas, expressed in the elements of siting, topography, water, soil, and species. The design and planning details all have supposed physical and psychological benefits to help develop the village and residents. Traditional Fengshui principles applied in the design of Hong Village also appear to be supported by logical reasons, and the village is suitable for people to live among West Creek basin.

## **CHAPTER 4 LANDSCAPE ECOLOGY IN HONG VILLAGE**

This chapter explores the ecological value of Hong Village through the McHarg method, which include both qualitative and quantitative analyses in and around the site. The qualitative analysis contains descriptive documentations that explain the idea of landscape ecology in the village, and the quantitative analysis includes GIS-based landscape suitability analysis and other landscape data that determine the village to be a suitable place for human habitation.

### 4.1 The Method and Procedure of landscape suitability analysis (LSA)

According to the McHarg method (McHarg 1995), the procedure of landscape suitability analysis consists of:

- (1) defining the goals, objectives, and boundaries of the land-uses in a certain area;
- (2) creating an inventory of biotic and abiotic features of the target site which are related to the proposed land-uses;
- (3) documenting and mapping the information and data of the inventory by layers;
- (4) determining which areas are suitable for each proposed land-use based on each layer;
- (5) overlaying all the relevant layers with different ratios based on the target land-uses, and deciding the landscape suitability.

During the whole process of the suitability analysis, step 1 and step 2 are qualitative, while step 3, step 4, and step 5 are quantitative analysis. These combined approaches provide a scientific method to evaluate the ecological value of Hong Village.

In the following analysis of Hong Village, the study is divided into qualitative and quantitative analysis. The qualitative portion includes the planning and design goals, proposed land-uses, site boundaries, inventories, and descriptive landscape information. The inventories consist of topography, water, soil, and plant species. The quantitative portion includes mapping landscape information, particularly GIS data. The author will also complete GIS-based land-use suitability analysis with these data, and determine:

- (1) the most suitable location for Hong Village when using the criteria of traditional Fengshui and landscape ecology, and
- (2) whether human modification of the site has affected the ecological value.

## 4.2 Qualitative Analysis

### *4.2.1 Planning and Design Goals*

The original intention of planning Hong Village was to create a healthy and beautiful dwelling place with abundant natural resources. The Wang family, who had experienced fire disasters in their former villages, wished to find a more secure and reassuring site on which to build. They also needed the environment to fulfill both physical and psychological functions. With the help of Keda He, a Fengshui master at that time, the Wang family decided to establish Hong Village to the south of Leigang Mountain and to the east of West Creek. Moreover, they also modified the environment to make the site better fit their living requirements while maintaining harmony with nature.

### *4.2.2 Site and Boundaries*

Leigang Mountain and West Creek are the natural boundaries of Hong Village, protecting

and providing resources for residents. This thesis's study area comprises the site of Hong Village, but the surrounding environment is also taken into consideration. In the GIS map, the study area covers West Creek basin, which is along West Creek, West Dragon Creek, Yangzhan Creek, and East Creek.

#### *4.2.3 Inventory*

In order to compare ecological design with traditional Fengshui practices, the landscape suitability analysis inventory is mostly based on the study elements of Fengshui, which include topography, water, soil, and local species. To better understand the ecological value of these elements, they are analyzed through the characteristics of slope, orientation, floodplain, distance from surface water, species biodiversity, and soil quality, which are the basic objects of analysis in landscape ecology.

#### 4.3 Quantitative Analysis

The quantitative analysis consists of two parts: GIS-based landscape suitability analysis, and other descriptive landscape data. Multidisciplinary-based suitability analysis is a scientific and efficient method to convey the ecological value of Hong Village, and to compare the village site with surrounding areas. GIS is the main method used to perform the analysis in this thesis. Basic data including topography and hydrology are from Google maps, and analysis of slope, floodplain, water distance, direction, and species are done by GIS layer. Other landscape data includes water information, specific plants, distances from surface water, and soil condition, which provide quantitative evidence to support the ecological value of Hong Village.

### 4.3.1 GIS-base Landscape Suitability Analysis

#### (1) Topography (Fig. 4.1)

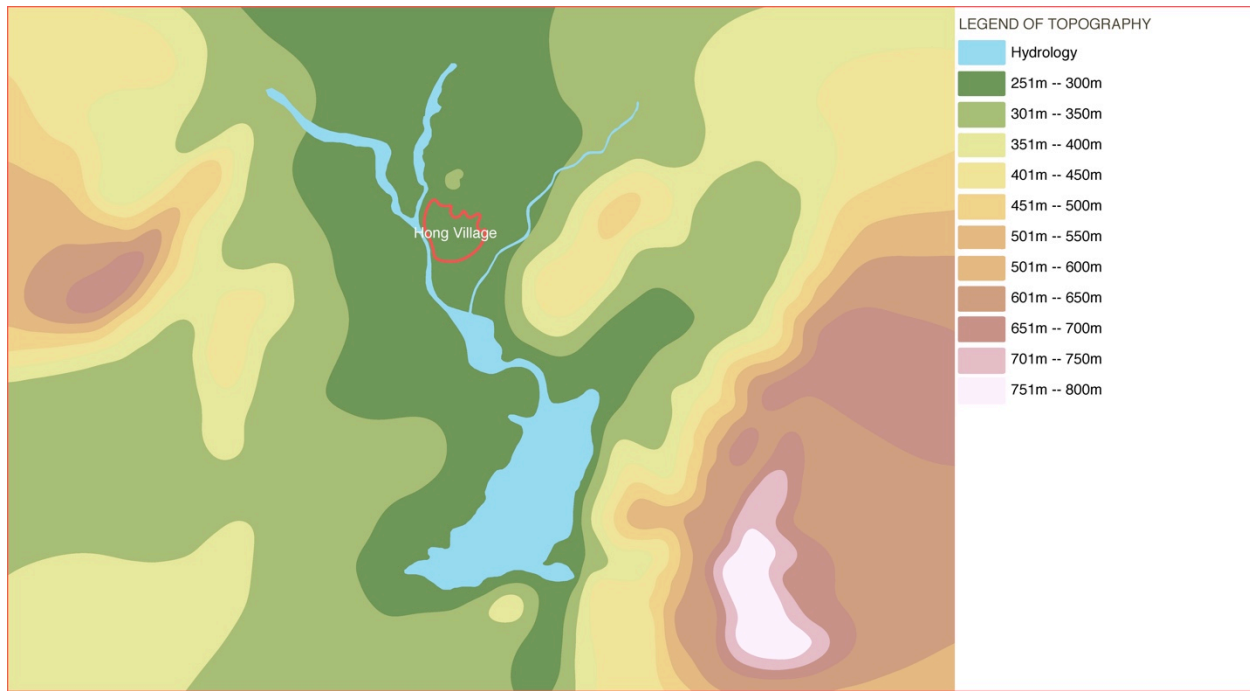


Fig. 4.1 GIS Map of Topography  
(By Author)

The altitude of West Creek basin ranges from 251 to 800 meters high, with Hong Village located at the 251 to 300 meters level.

#### (2) Slope (Fig. 4.2)

The slope map is derived from Google Maps topography information. Slopes between 1 percent and 5 percent are most suitable for human habitation, since they are nearly flat and offer good drainage. Slopes below 1 percent and those between 5 percent to 10 percent may also be appropriate. However, moderate suitability exists where slopes are more than 10 percent, especially over 20 percent. In such steep areas, farming and construction are difficult.

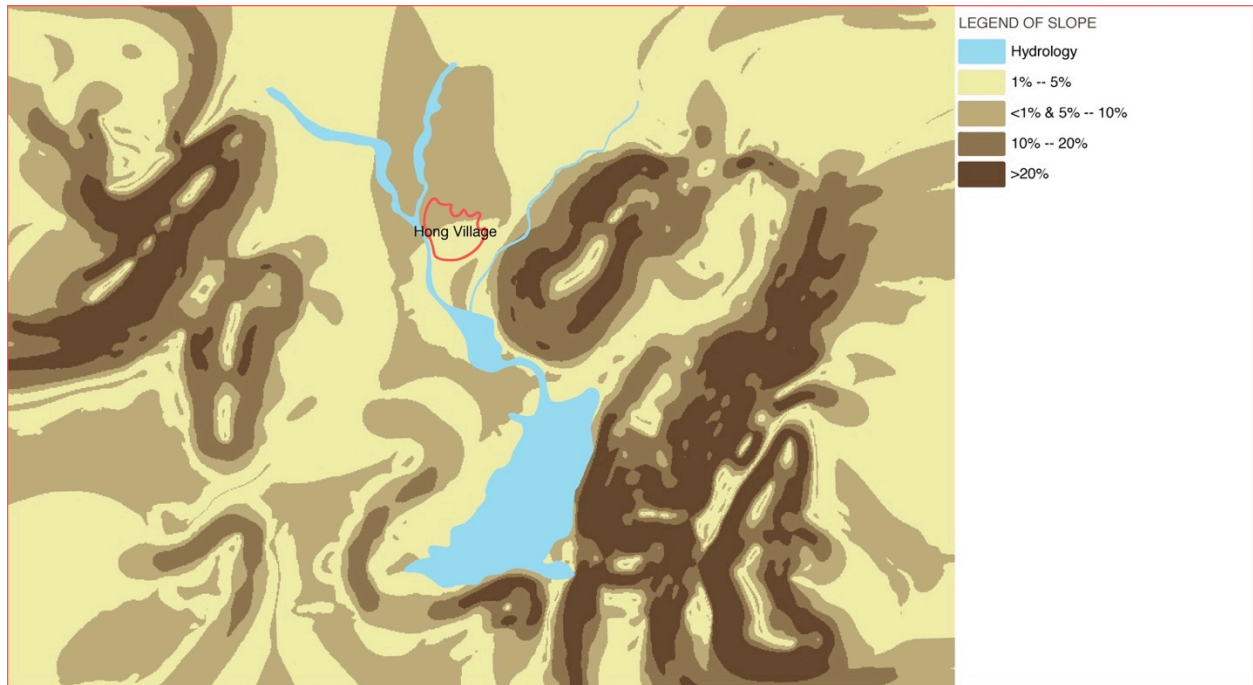


Fig. 4.2 GIS Map of Slopes  
(By Author)

Thus in the slope suitability analysis, slopes from 1 percent to 5 percent were assigned the highest value, slopes less than 1 percent and from 5 percent to 10 percent were assumed the second highest value, slopes from 10 percent to 20 percent were third highest, and slopes over 20 percent were given the lowest value.

The slope of Hong Village is below 5 percent, and more than half of the area is between 1 percent to 5 percent, which means the slope is very suitable for human habitation.

### (3) Floodplain (Fig. 4.3)

Based on local topography and hydrology, much of area is in a floodplain. In the GIS suitability analysis, the area outside of the floodplain is suitable for human habitation, while sites within the floodplain are not suitable.

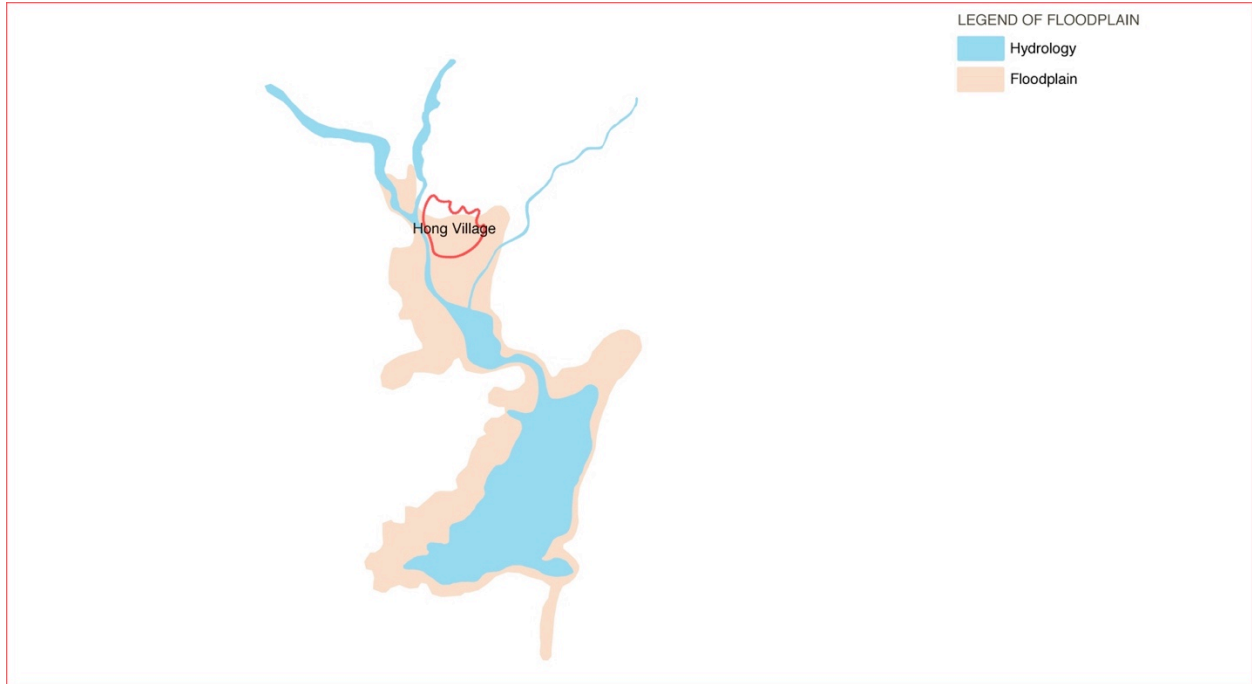


Fig. 4.3 GIS Map of Floodplain  
(By Author)

As the map shows, most of Hong Village is in the floodplain. However, with the help of a human-engineered water system, the frequency of floods are reduced and floodwater could be quickly drained away during rainy seasons.

(4) Distance from Surface Water (Fig. 4.5 and 4.6)

The distance to surface water determines how convenient it is for people to get water for drinking and daily uses. Due to the current situation of local residents, the water distance is divided into four levels: less than 50 meters; 50 to 100 meters; 100 to 200 meters; and more than 200 meters. The distance of less than 50 meters is most suitable, 50 to 100 meters is good, 100 to 200 meters is adequate, and over 200 meter is least suitable.



Fig. 4.4 GIS Map of Distance From Surface Water (By Author)  
The map depicts landscape before construction of the human-engineered water system.



Fig. 4.5 GIS Map of Distance From Surface Water (By Author)  
The map shows landscapes after modification of water system to create more optimal access to water.

The author carried out two analyses—one pre-human design, and one post-human design, to show the changes that people made to the study area to improve its ecological value. The water system provides more optimal access to surface water, making Hong Village a better site for human habitation.

Although Hong Village is surrounded by creeks in three directions, only half of its residents live within 200 meters of these natural waters. However, due to the constructed water system inside Hong Village, every house is within at least 100 meters of a potable water source<sup>8</sup>, with most residents located within 60 meters (Lu 2005).

#### (5) Orientation (Fig. 4.6)

The orientations of south, southeast, and southwest are most favorable for human habitation and local vegetation, since maximum sunshine is typically available from southern exposure. This is especially the case because China is located in the Northern Hemisphere, and Hong Village is north of the Tropic of Cancer. Thus most Chinese dwelling sites and buildings face southward. In addition, a southern orientation supplies a greater diversity of plant species than a northern orientation (Wang 2004).

In the GIS suitability analysis of orientation, south-facing slopes were assigned the highest value, southeast- and southwest-facing slopes were given the second highest value, east- and west-facing slopes were assigned the third highest value, and northeast-, northwest- and north-facing slopes were considered least suitable.

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<sup>8</sup> Potable water: water that is safe enough to be consumed by humans.

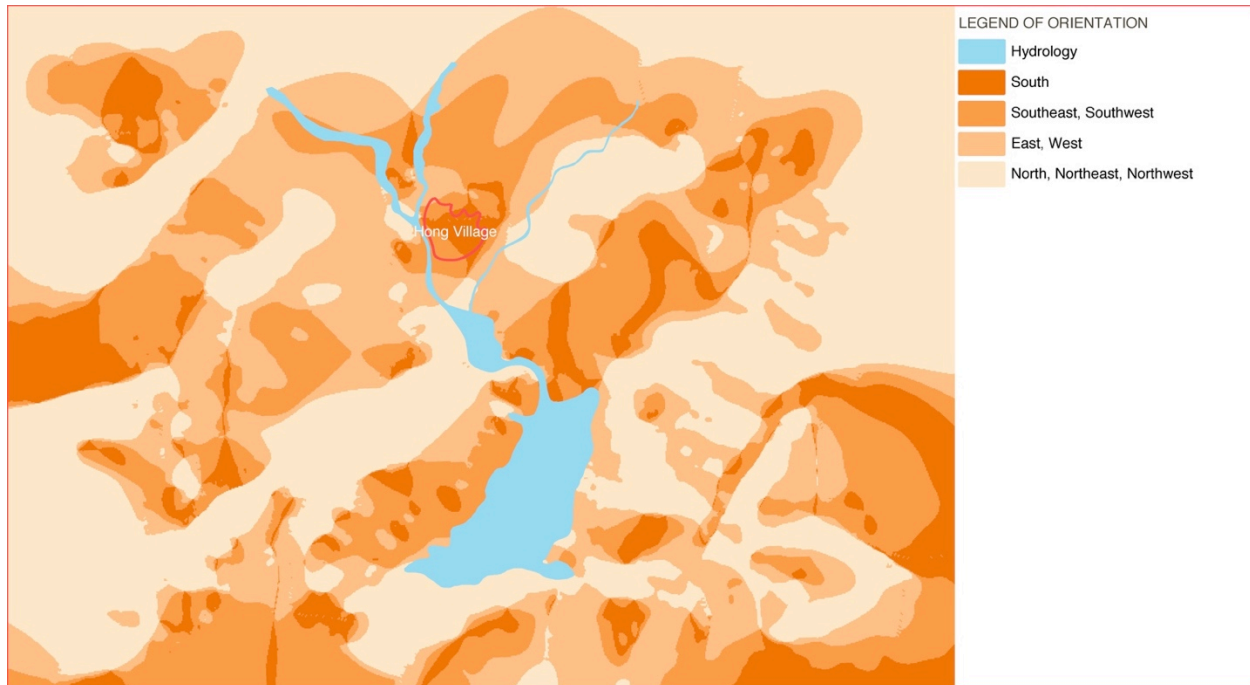


Fig. 4.6 GIS Map of Orientation  
(By Author)

According to the topography around Hong Village, the main orientation is toward the south, with part of the site facing southwest. Thus, the orientation value of Hong Village is comparatively high.

#### (6) Botanical Diversity (Fig. 4.7)

For this study, the value of non-human habitat is mainly evaluated in terms of potential botanical biodiversity. Mountains over 700 meters in height typically support more kinds of plants than elevations of less than 700 meters, with south-facing slopes tending to have more biological diversity than north-facing ones (Wang 2004). Thus, the south-facing slopes (including south, southeast, southwest, and east) of over 700 meters in elevation were assigned to the highest potential for botanical diversity value, the south slopes below 700 meters were also considered medium value, the north-facing slopes (including north, northeast, northwest and

west) over 700 meters in elevation are deemed to medium value, and north-facing slopes less than 700 meters of elevation have the lowest value.

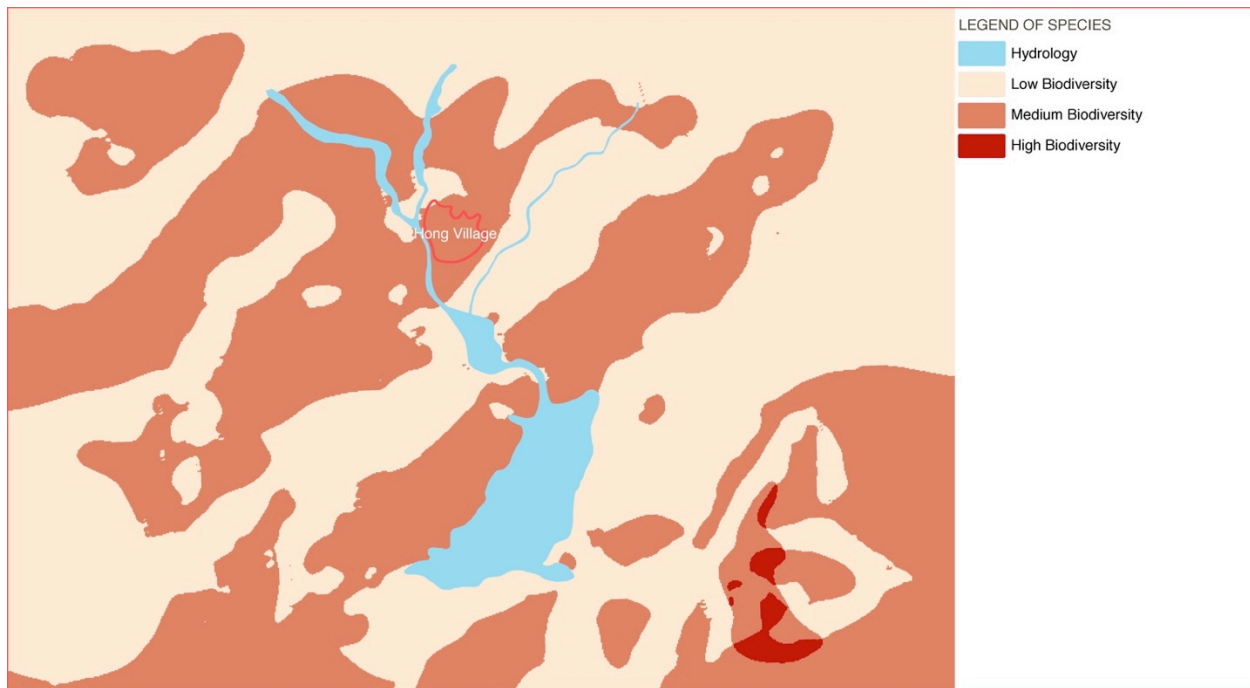


Fig. 4.7 GIS Map of Species Biodiversity  
(By Author)

The potential biological diversity value of Hong Village is almost completely medium, since the altitude is below 700 meters and the orientation is south and southwest, which leads to a medium biodiversity.

#### (7) Soil (Fig. 4.8 and 4.9)

The soil in and surrounding Hong Village is mostly classified as yellow cinnamon soil. This kind of soil is suitable for many types of crops such as rice and corn, which are the staple food of the local people. The soil supports human settlement better when the environment and climate are humid and warm. Therefore, residents of Hong Village are able to rely on the surrounding yellow cinnamon soil.

Since the types of soil are the same, and have similar PH and mineral composition, the

value is uniform throughout the study area. Therefore, soil has no influence on the GIS analysis, and it is not shown in the GIS-based suitability analysis.

#### (8) GIS Weights

According to Ian McHarg, Richard Forman, Michel Goldron, and other ecologists, natural conditions, such as topography and species biodiversity, have higher values than human conditions, such as distance from surface water. The topography could be analyzed in terms of orientation, slope, and floodplain. Of these, the floodplain is the most important element. Thus, a weight of 35 percent is given to floodplain, species biodiversity has 25 percent, slopes have 15 percent, distances from surface water have 15 percent, and orientations have 10 percent weight in the GIS maps (Fig. 4.8 and 4.9).

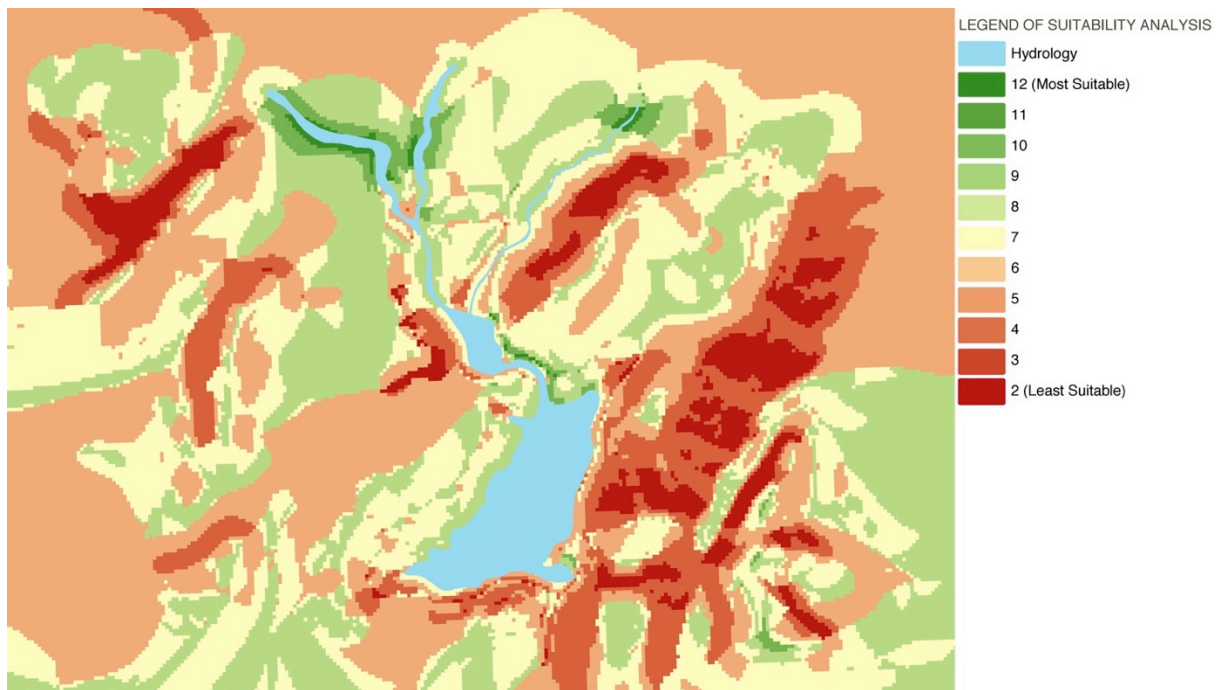


Fig. 4.8 GIS Suitability Analysis (By Author)

The map depicts landscape before construction of the human-engineered water system.



Fig. 4.9 GIS Suitability Analysis (By Author)

The map shows landscapes after human modification of water system to create more optimal access to water.

Based on the suitability analysis of the original site (Fig. 4.8), the ecological value of Hong Village is not the best in the study area. However, in the map of modified Hong Village (Fig. 4.9), the site is more obviously suitable. This raises two questions:

Why is the original site not very suitable?

Firstly, the floodplain is an important inventory element in this analysis, since it occupies an 18 percent weight in the GIS maps. Most of Hong Village is in the floodplain, which lowers its suitability. Secondly, the banks of streams and ponds are more suitable than other places shown on the map (Fig. 4.8). However, as a site in the bank area, Hong Village has the same value as other bank areas even though it is surrounded by water in three directions. If the GIS analysis considered both the distance from surface water and the proportion of water in the surrounding area, the site of Hong Village would have higher values.

What makes Hong Village a suitable place to for human habitation?

The main difference between the landscape structure before and after human design and engineering is the water system inside Hong Village. It largely increased the ease of access to water, and reduced the hazard of flooding via human-controlled valves to drain water in rainy seasons and collect water in dry periods. From the GIS map, it is clear to see the site is most suitable in West Creek basin.

#### *4.3.2 Other Landscape Data*

Other landscape data contain quantitative information about water, soil, and species types. These data cannot be shown in GIS maps, but are still useful for testing the ecological value of Hong Village. They are descriptive data about water and soil, as well as specific types of botanical species.

##### (1) Water

The water system was designed to meet the needs of residents, including daily use, fire prevention, and irrigation. It also prevents floods. protecting people and buildings, and serves surrounding environment by irrigation.

The waterway is 716 meters long in total, and over 200 families get potable water from it. The average slope of the entire waterway is 0.55 percent, the average water rate is 0.36m/s, and the flow is 0.13m<sup>3</sup>/s. Both the speed and flow are perfectly suitable for villagers to use for washing clothes and dishes by the river.

Moon Pool is in the shape of a semicircle, with an area of 1206.5m<sup>2</sup>, and a perimeter of 136m. The average depth of the basin is 1.5—1.6m, and the water is 1.2m deep. The water source of Moon Pool is mainly West Creek, and the average flow rate is 0.0087m<sup>3</sup>/s.

Moon Pool functions as a settling basin, a concrete or earthen structure used to slow down

water flow rate and collect sediment and pollution. A valve in the bottom of Moon Pool is used to drain water in order to clean the pool. With the Moon Pool in the Hong Village water system, the water slows down and becomes purified; the pool also helps control flooding during rainy seasons via its large volume and adjustable valve.

The shape of Moon Pool also corresponds with rational analysis. The Moon Pool gate is located at the pool's west side, while the outlet is at the east. Another water valve at the southern side is used to draw off water to clean the bottom of the pool. After water comes into Moon Pool from the northwest gate, it flows toward both the east and south sides. In addition, since the inlet and outlet are not linear, the water is dispersed throughout Moon Pool. In addition, the curvilinear bank line allows water to flow smoothly and quietly. The whole process makes Moon Pool a running water pool, where residents are able to get fresh water from any point on the bank.

The height difference between water surface and the sidewalk surface is consistently about 20 centimeters, which is convenient for people to access the water, and also sufficient to prevent flooding of the sidewalk and adjacent buildings.

The total area of South Pool is 20,247m<sup>2</sup>, and it is 1.5—1.8 meters deep. Normally the water depth is 0.8—1.1 meters, and the difference from the water surface to the bank is about 0.7 meters. The distance in elevation between the pool surface and West Creek is 1.5 meters. A small fan-shaped pool created by piled-up stones is used to slow down and purify water going into South Pool. This small pool also slows down the water flow rate, thereby protecting the riverbed. A large amount of lotuses are planted in South Pool to purify water and add aesthetic enjoyment. Thus, as the end of the water system in Hong Village, the South Pool slows down water flow rate and controls flooding, greatly enhancing water quality.

According to the local Surveying and Mapping Institute, most Hong Village residents live within 60 meters from water, and the farthest distance is less than 100 meters (Table 4.1). Due to the waterway design guided by Fengshui master Keda He, it is very convenient for people to get water for daily use and in the case of emergencies such as fire.

Water Source	Waterway		Moon Pool		South Pool		Well		Total
	Amount	%	Amount	%	Amount	%	Amount	%	
Households	218	57.6	33	8.64	67	17.54	64	16.75	382
Population	677	62.74	90	8.34	196	18.18	116	10.75	1079

Table 4.1 Distance from Surface Water  
(Lu 2005)

## (2) Soil

The soil condition of Hong Village and the surrounding environment is rich and slightly acidic, which is ideal for forest growth (Table 4.2).

Altitude (m)	Soil Type	Parent Material	Soil Thickness (cm)	Rock Ratio (%)	PH
>800	Yellow Cinnamon Soil	Phyllite	87—100	20—31	5.5—6.5
500—800	Yellow Cinnamon Soil	Phyllite	70—100	17—32	4.5—6.5

Table 4.2 Landscape Data of Soil  
(Wang et al. 2004)

”Five-color soil” (red, yellow, white, blue, and black) is considered to be the best in traditional Fengshui (Jiang 2010). According to the soil analysis, the yellow cinnamon soil has abundant nutrients for plant growth and is good for drainage as well. Red coloration is obtained from iron oxide, yellow from quartz and other nutrients, white from calcium carbonate or

gypsum, blue from clay, and black from carbon and other materials. Among these elements, iron oxide, quartz, and calcium carbonate are particularly beneficial for the growth of plants; a certain amount of clay is helpful for moisture retention. Thus, the five-color soil is suitable for many plant species, farming, building construction, and flood prevention.

In traditional Fengshui, the ideal soil should also be “smooth but not loose, humid but not dry, bright but not dark (Jiang 2010)”. The effect is a similar concept to capillary action. It is important for plants to obtain ground water without the assistance of external forces. Therefore, this kind of soil is better for absorbing and retaining water to raise plants and prevent flooding.

### (3) Plant Species

The average forest coverage rate is more than 75 percent of the area surrounding Hong Village, and most of these forest areas have high biodiversity ecosystems<sup>9</sup>. Main native plant species include *Cyclobalanopsis glauca*, *Lithocarpus henryi*, *Castanopsis sclerophylla*, *Cinnamomum japonicum*, *Phoebe sheareri*, *Machilus thunbergii*, *Litsea coreana var sinensis*. Other native plant species include *Torreya grandis*, *Taxus chinensis*, *Emmenopterys henryi*, *Ginkgo biloba*, *Cinnamomum camphora*, *Pseudolarix kaempferi*, and *Sassafras tzumu*.

The main forest located at an altitude of about 700 to 1000 meters is an evergreen and deciduous broadleaved mixed forest, consisting of *Cyclobalanopsis glauca*, *Cyclobalanopsis myrsinaefolia*, *Albizia kalkora*, *Aphananthe aspera*, *Photinia serrulata*, *Liquidambar formosana*, *Taxus chinensis*, *Albizia macrophylla*, *Lindera chinensis*, *Lindera reflexa*, *Ginkgo biloba*, *Celastrus angulatus*, *Myrica rubra*, *Glochidion puberum puberum*, *Indiogfera*, *Dalbergia hupeana*, *Lindera glauca*, *Magnolia officinalis*, *Ailanthus altissima*, *Eucommia ulmoides*, *Rhamnus utilis*, *Itea chinensis* Hook. Et Arn. Var. *oblonga*, *Mallotus repandus*, *Euscaphis*

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<sup>9</sup> The following plant names are sourced from the Yi County Forestry Bureau, the Hong Village Bureau, and the Yi County Planting Planning Introduction

*japonica*, and *rubus*. Herbaceous species include: *Miscanthus floridulus*, *Agrimonia*, *Hemerocallis fulva*, *Indocalamus longiauritus*, *Sanguisorba officinalis*, *Moliniopsis hui*, *Fimbristylis*, *Achyranthes bidentata*, *Emilia sonchifolia*, and *Erigeron annuus*, *Carex*. In the area above 700 meters, the forests mainly include *Cunninghamia lanceolata*, *Phyllostachys edulis*, human-cultivated timber plantings of *Pinus massoniana*, and natural mixed forest.

Leigang Mountain is located north of Hong Village, with a height of 362 meters. There were about 800 *Corylus heterophylla* originally on its slopes; now only 82 of them remain. In addition, *Liquidambar formosana*, *Cinnamomum camphora*, pines, *Dalbergia hupeana*, *Loropetalum chinense*, *Lindera glauca*, *Rhododendron* and *Sapium sebiferum* are scattered in the forest.

East Mountain is covered with human-cultivated *Pinus massoniana*, mixed with a small amount of *Phyllostachys edulis*. The bottom elevations are mostly tea garden and mulberry forests that are used by villagers for daily life and business.

In the village, the ratio of green space to total area is 26 percent, and the main species are *Phyllostachys edulis*, *Sapium sebiferum*, *Magnolia denudate*, *Ziziphus jujuba*, and firs. They are usually planted in yards or near houses.

#### 4.4 Chapter Conclusion

The ecological value of Hong Village is proved through both qualitative and quantitative analyses, showing the village's suitability as a site for humans to live in harmony with nature. The qualitative analysis includes descriptive documentation explaining the concepts and ideas of landscape ecology behind the design process of Hong Village; the qualitative analysis includes the McHarg method, utilizing GIS-based suitability analysis, as well as other landscape data such

as distance from surface water and plant species, to evaluate Hong Village's ecological value.

The final analysis result is that the site of Hong Village is a suitable but ideal site pre-human design, but it becomes the most suitable place with highest GIS value after human modification.

The design of Hong Village's water system was the main influence on this result.

## **CHAPTER 5 COMPARISON BETWEEN TRADITIONAL FENGSHUI AND ECOLOGICAL DESIGN IN HONG VILLAGE ANALYSIS**

This chapter will compare three aspects of traditional Fengshui and ecological design: intention and goal, theory and application, and analysis results. The intention and goal pertain to the original purpose and expected results of applying the two systems, while theory and application encompass the practical details of the two different ways of conceptualizing and assessing the environment, especially with regard to design of Hong Village. The final results analysis serves as a conclusion, summarizing similarities and differences. The comparison between traditional Fengshui and ecological design from these three perspectives is intended to reveal the relationship between the two systems.

### 5.1 Intention and Goal

The main principle of traditional Fengshui is “the unity of humanity and nature” (Guo 2002), first put forward in the realm of philosophy by Zhuang Zi, and then extended to Fengshui and other fields. It assumes that humans are part of nature, and at the same time that nature also belongs to humans. The goal of traditional Fengshui is to guide people to live in harmony with nature.

Generally, landscape ecology is a complex science that studies the interactions between ecosystems and their environment at a landscape-size scale (Dramstad, Olson, and Forman 1996). In addition, it connects bio-ecology and human ecology (Naveh and Lieberman 1984), which means it studies both natural biotic species and human habitation as well as the relationships

between them. The intention of landscape ecology is to study such relationships, while ecological design, especially landscape suitability analysis, aims to use conclusions about these relationships to better support the health of both nature and humanity. In the case of landscape architectures, ecological science is used to guide decision-making about land-use, planning, design, and management.

The similarity between traditional Fengshui and ecological design is that the goals of them are both based on nature and human beings. As systems of knowledge, they attempt to study and solve problems between nature and people.

There are also differences between traditional Fengshui and landscape ecology. Traditional Fengshui is a complete system of traditional knowledge that has accumulated over time, therefore, it can research the interaction between nature and humanity with multiple subjects and real experience of long-history practice, and solve real problems with those research results. However, landscape ecology is a system of theory that studies based on self-correcting process of scientific inquiry, and it cannot be treated as a methodology, although it is based on the scientific method. Thus, it needs a form of ecological design such as landscape suitability analysis for application in practice.

## 5.2 Theory and Application

### *5.2.1 Theory Composition*

The basic purpose of traditional Fengshui is to create a harmonious place with suitable natural conditions while minimizing human intervention, in order to realize a unity with nature. As Fengshui evolved, it became a comprehensive philosophical system, including empirical geography, geology, meteorology, hydrology, pedology, botany, aesthetics, anthropology, and

social psychology. Eventually, it formed a complete theoretical body representing traditional Chinese science, architecture, and perspectives on environment (Wang 2005).

Landscape ecology is a comprehensive interdisciplinary science, incorporating aspects of geography, soil science, hydrology, geo-botany, geology, zoology, anthropology, and various applied sciences and arts (Naveh and Lieberman 1984, Zonneveld 1995). Landscape ecological theory focuses on spatial heterogeneity, landscape-scale ecosystem process, and landscape changes brought about by human agency (Turner et al. 2001).

Traditional Fengshui and landscape ecology are similar because they are both multidisciplinary knowledge systems that address basic natural phenomena such as geology, geography, and hydrology. In addition, both are concerned with human beings as they both incorporate anthropological knowledge. They are interdisciplinary with respect to humans and nature, and both have the strong theoretical support of other disciplines and subjects.

These two systems also have differences in the development of theories. The knowledge base of Fengshui is mostly derived from human experience that has accumulated over several centuries, some of which has no scientific corroboration. However, ecological design is continually empirically tested and proven, being developed largely during the final decades of the twentieth century. Landscape ecology is also viewed as an objective and scientific discipline.

### *5.2.2 Study Elements*

The traditional Fengshui theory used to plan and design human environments is based on five elements of Long (龙), Sha (砂), Xue (穴), Water (水), and Xiang (向). In the analysis of Hong Village, the main study elements are location, topography, water, soil, and biological

diversity. Location and topography incorporate Long, Sha, and Xiang, and soil and biological diversity includes deep exploration of Xue.

The applied landscape ecological inventory of Hong Village considers slopes, orientations, distance from surface water, floodplain, species types and biodiversity, and soil. Among these, slope and orientations pertain to topography; distance from surface water and floodplain pertain to hydrology; and species type and biodiversity and soil relate to the life forms supported by the study area.

The category of study elements common to both traditional Fengshui and ecological design are landscape features such as topography and water. Through studying the landscape structure, people come to know the function and change of nature, and how they can be used to better support human habitation.

Although both systems seek to analyze the structure of nature, traditional Fengshui's elements focus on natural topographic forms, while ecological design is concerned with accurate landscape structure and specific data. Due to the limitations of science and technology in ancient China, people could only judge a site by experienced observation and exploration. Thus, the process is quite qualitative and often inaccurate, resulting in very subjective data. However, landscape ecology interprets a site through quantitative analysis. Utilizing precise data related to variables such as species types and soil nutrients, landscape ecology is capable of more accurate research, leading to the public perception of landscape ecology as being more scientific and reliable.

However, ecological design can still be inaccurate in some circumstances. For example, when people use GIS-based landscape suitability analysis to design a site, they need to have access to all the landscape data that could influence their decision-making, such as topography,

land-use, and transportation. If one study element is ignored, or if incorrect data is used, the design result could be compromised. By contrast, traditional Fengshui judges situations by deep observation, exploration, and experienced rules confirmed via previous successful cases. Thus the design result was always reliable in ancient times. However, as the world has developed and changed since the appearance of traditional Fengshui, some of these older concepts and experiences might not be suitable for present-day society.

### *5.2.3 Principles*

The principle behind traditional Fengshui is a cumulative system of belief, knowledge, experience, and practice. It concerns the balance between human beings and their living environment, and is aimed at realizing long-term sustainability. From its beginning, traditional Fengshui has concerned itself with both the physical and psychological functions of place, the surrounding environment, and people.

In contrast, ecological design is a scientific and rational method of knowledge generation since it uses objective and logical processes to analyze a site. It mainly focuses on the interactions between biotic ecosystems (including human) and their environments, and studies how interactions work and how to optimize them.

When considered from standpoint of the principles applied in Chapter three and four, traditional Fengshui and ecological design both study the relationship between humans and the environment, and the designs based on these two systems incorporate physical functions on the site and people, such as adjusting microclimate and preventing flooding.

However, the main difference between traditional Fengshui and ecological design is that traditional Fengshui judges the environment by observation and former experience, while ecological design analyzes landscape data with scientific tools and rational procedures.

Traditional Fengshui theory is perhaps a kind of Traditional Ecological Knowledge (TEK) because, like other forms of TEK, it is an empirical system that accumulates knowledge from historic experience. In addition, landscape ecology is mainly concerned with physical functions within a landscape, while traditional Fengshui also accounts for the psychological effects beyond the physical environment. A comparison of these two systems is shown in Table 5.1.

Traditional Fengshui		Ecological Design	
Geography & Topography	<ul style="list-style-type: none"> <li>The site backs on to the mountains and faces the water.</li> </ul>	<ul style="list-style-type: none"> <li>Flat areas are suitable for human habitation.</li> </ul>	Slopes
		<ul style="list-style-type: none"> <li>Southward is the west.</li> </ul>	Orientation
Water	<ul style="list-style-type: none"> <li>Curvy shape</li> <li>Collection of water and Qi</li> <li>Clean water</li> <li>Peaceful water surface</li> <li>Balance among inner water, medium water, and outside water</li> <li>The water goes from northeast to southwest</li> </ul>	<ul style="list-style-type: none"> <li>Humans' houses should be out of the floodplain.</li> </ul>	Floodplain
		<ul style="list-style-type: none"> <li>The nearer, the better.</li> </ul>	Distance from surface water
Soil	<ul style="list-style-type: none"> <li>Smooth but not loose</li> <li>Humid but not dry</li> <li>Bright but not dark</li> </ul>	<ul style="list-style-type: none"> <li>Soils should be suitable for the built environment.</li> </ul>	Soil
Species	<ul style="list-style-type: none"> <li>The water gate tree must be tall, lush, love-lived and easy to plant.</li> <li>The water gate tree must have an auspicious name.</li> </ul>	<ul style="list-style-type: none"> <li>The more species, the better.</li> <li>Invasive species threaten biodiversity.</li> </ul>	Species Biodiversity

Table 5.1 The Comparison between Principles of Traditional Fengshui and Ecological Design  
(By Author)

#### *5.2.4 Application Process*

As shown from the analysis of the Hong Village planning and design process, the traditional Fengshui method of siting the human environment involves research, observation, exploration, and modification. First, the history, culture, and other backgrounds of the place must be checked, to verify it is not a disaster-prone site. Second, the Fengshui master must observe the site, especially its topography, hydrology, and wind flow patterns, with special attention paid to the Qi collection areas as alternative sites for building palaces, villages or tombs. Third, the Fengshui master must engage in more detailed exploration, such as tasting the water and surveying the soil, to ensure the site's suitability for buildings, farming, and human habitation. Lastly, in order to meet all Fengshui rules and people's needs, the Fengshui master often would modify the site by adding or removing certain landscape elements. Furthermore, in traditional Fengshui there is a hierarchy of importance assigned to each element, such as water. In the design of Hong Village, master Keda He modified the water system of the site in order to provide residents with more convenient access to surface water.

The typical application of ecological design concepts to the design and analysis process is usually through the method developed by Ian McHarg, which is also the process used to analyze Hong Village in this thesis. The main process includes defining goals, boundaries, and land uses; creating inventories of GIS-base suitability analysis; documenting and mapping landscape data by layers; determining suitability on each layer; overlaying all layers; and determining the final landscape suitability. During the process of overlaying layers and weighted overlay, the value of each layer is dependent on the proposed land use and the discretion of the planner, especially as these values relate to the goals of the design. Due to projects focusing on ecosystem problems, the value of species biodiversity is potentially ranked higher than other study elements. However,

to other design goals, such as solving flooding problems, the floodplain might have the highest value. These differences are based on the ultimate goal of the project.

Although the steps of traditional Fengshui and applied landscape ecological design seem different, the basic procedures are similar. They both have logical workflows, with deep understanding of the goals for the site in order to determine the suitability for certain land uses. In addition, in the interest of respecting nature, their final decisions aim to find the balance between human necessity and the existing conditions of nature.

However, ecological design is more rational than traditional Fengshui in some fields. Since traditional Fengshui is a cultural phenomenon (Yu 1998), certain methods follow historical experience and folk knowledge. For example, the name of the species selected to be the Fengshui tree carries great importance. People like plants with auspicious names which indicate health and wealth. Although it is not scientific, traditional Fengshui gives humans psychological comfort and pleasure to some degree, while ecological design is much more rational, performing quantitative analyses with the support of precise landscape data and tools such as GIS.

The sequence of study is also different in these two systems. Traditional Fengshui prioritizes water, soil, and topography, while ecological design determines the significance of study elements by proposed land uses and design goals.

### 5.3 The Analysis Result

Based on traditional Fengshui, Hong Village is an ideal site for people to live in West Creek's basin, and the planning and design of the village makes it fit for optimal daily use. The site's suitability for human habitation is proven by Fengshui theory and practical use through 800 years. In the analysis presented in Chapter 3, the five elements, including geography, topography,

water, soil, and species biodiversity, are shown to be logically chosen and designed by Fengshui masters and local residents.

However, Chapter four shows that the location of Hong Village in West Creek basin is not ideal according to both traditional Fengshui and landscape ecological values and ratios in GIS-based landscape suitability analysis. The final values of GIS analyses for the area only rank the site as having medium suitability for human habitation. However, the analysis results of post-design Hong Village show it to have the highest suitability values within the study area in both GIS maps.

According to the analyses of traditional Fengshui and ecological design, Hong Village post-human design is suitable for human habitation and has a good ecological environment. Although the comprehensive value of the site is not the highest in West Creek basin based on GIS maps, it is still a relatively suitable site. In addition, post-design Hong Village is shown to be the most suitable in GIS maps, presenting the same results as traditional Fengshui analysis.

The main difference between the results of traditional Fengshui and ecological design is the suitability value of the site before human's modification: traditional Fengshui determines Hong Village to be the ideal place with high Fengshui value for human habitation in West Creek basin, while ecological design proves that the site of the village is not most suitable. The two knowledge systems do not match with each other in siting a place for people to live in the case of Hong Village.

#### 5.4 Chapter Conclusion

Traditional Fengshui and ecological design have much in common in goals, theory and application, and analysis results. They both attempt to study and solve environmental problems

and realize a harmony between nature and humans. Furthermore, the theoretical bodies of these two systems are multidisciplinary, with similar study elements. Their design and analysis processes are logical workflows, with a deep understanding of the site determining the design of land-uses. Lastly, the analysis results of the two systems prove that Hong Village is the most suitable post-design place for people to live in West Creek Basin.

However, there are also differences between traditional Fengshui and ecological design. Traditional Fengshui is derived from human experience and only provides qualitative guidance for the site, while ecological design is able to support both qualitative and quantitative analyses. Moreover, ecological design is more rational than traditional Fengshui, since Fengshui concerns for, and beliefs about, physical and psychological functions do not always have empirical data to support them. The analysis results of the pre-human design suitability also differ. The site, proved by traditional Fengshui to be the most suitable in West Creek basin, is not the best place in GIS-based analysis.

Therefore, traditional Fengshui and ecological design have many aspects that match with each other, but also have many differences based on their historic and cultural backgrounds.

## CHAPTER 6 CONCLUSION

### 6.1 The Fengshui value of Hong Village

The design of Hong Village is steeped in Fengshui value, as proven by its 800-year history. The traditional Fengshui master Keda He helped local residents choose its site and optimize the landscape structure through his assessment of the five natural elements: geography, topography, water, soil, and species biodiversity. Each element follows the rules of traditional Fengshui, and provides both physical and psychological functions for residents. Traditional Fengshui principles applied in the design process also appear to be supported by logical reasons, and Hong Village is suitable for human habitation among West Creek basin.

### 6.2 The ecological value of Hong Village

The ecological value of Hong Village is judged by qualitative and quantitative analyses, which consists of both conceptual and detailed landscape data, in order to ensure reliable scientific results. The qualitative analysis includes landscape documents and water data, as well as soil and species data, all of the data proven to have ecological benefits for people and nature in Chapter four. The quantitative analysis follows the McHarg method, and includes GIS-based landscape analysis to determine the suitability of the site of Hong Village both before and after human intervention. The results show that the site in West Creek basin before design was not optimal, but it was made more suitable after modifications by humans.

### 6.3 The relationship of traditional Fengshui and ecological design in Hong Village

This thesis opened with one central question: what are the similarities and differences between traditional Fengshui and ecological design in the way they site and build the best places for humans to live in harmony with nature?

This question is answered based on the analysis of both traditional Fengshui and ecological design, as well as the comparison between them in the Hong Village case study. It is not difficult to find that these two systems have similarities and differences in goals, theory, application, and results.

First, they share the goal of realizing harmony and balance between humans and nature. Traditional Fengshui pursues “the unity of nature and humanity,” and landscape ecology is used to understand the interactions between ecosystems (including human-based ones) and their environment.

Second, the theories of the two systems derive from multi-disciplinary bodies of knowledge related to natural and human subjects (Wang 2005, Lin and Fu 2011). However, since traditional Fengshui is an empirical system of traditional culture like TEK, it incorporates more cultural and psychological perspectives for people than ecological design (Lu 2012), which is viewed as a rational and objective science. Furthermore, landscape ecology uses scientific tools like GIS to analyze and design places (Ndubisi 2002), while Fengshui masters achieve this through observation and site-exploration (Guo 2002). Nevertheless, the main procedure of both systems exhibit logical workflows, from deep research on the background of the study area to careful analysis of each element in the site. The characteristics that are inventoried also are similar, including natural elements like water, soil, and topography.

Third, the results of traditional Fengshui and ecological design analysis also have strong

similarities, although there is a difference in the comparison of siting: traditional Fengshui contends that Hong Village's site in West Creek basin is best, while landscape ecology shows it is not the most suitable, according to the ecological criteria. The author hypothesizes this is because of the different methods used in the analyses. Traditional Fengshui sees proximity to water as an advantage but doesn't take into account loss of ecosystem services due to building within the floodplain. Thus, according to this belief, Hong Village, being surrounded by two creeks in three directions, is the best site in West Creek basin. However, in the GIS-based landscape suitability analysis, hydrology data exists as a layer containing all creeks. Therefore the site of Hong Village has the same value as other sites along the water in the GIS map (Fig. 4.4). It also has the risk associated with being located in a floodplain, lowering the site's suitability in the GIS analysis. However, even though the two systems generate different evaluations of the suitability for human habitation before design, the post-design results are similar: Hong Village is the most suitable place for people to live in the study area, and human modification of the landscape, especially the design of water system, made the site more suitable for human habitation. Thus, both analyses yield similar results with respect to planning and design.

However, in contrast to landscape ecology, which only studies the physical effects of the site on humans and the environment, traditional Fengshui addresses both physical and psychological functions on people, according to the human desire to realize health and peace from the surrounding environment, explaining why they sincerely pursue Fengshui. Compared with traditional Fengshui, landscape ecology has a more rational approach to solving physical problems and more closely follows modern science and technology.

#### 6.4 The Application Potential of the Methodology in Future Studies

Traditional and modern knowledge systems are always developed in different historical and cultural backgrounds, that Chinese traditional Fengshui and ecological design are the same; therefore, it is difficult to compare these systems through direct analysis of their theories and application. One or more suitable cases are needed in this situation. Hong Village filled this role for this thesis. It is a like a bridge to connect both systems, using them to do analysis and evaluation, and then comparing the two systems based on the case study. Once this is done, it is easier to see the similarities and differences in purpose, theory, and application, as well as the analysis result, and then to find the general relationship between them.

However, because of missing partial GIS landscape data (for example, plant distribution), the accuracy of the analysis results suffers. If all the detailed landscape data for Hong Village were available, the results of the GIS-based landscape analysis would be more precise and convincing. But the method of comparison used in this thesis is still useful for discussion of general ideas and research directions.

#### 6.5 Directions for Future Investigation

There are also some questions that this thesis cannot answer. First, based on the similarities between the results produced by applying these two systems to an analysis of Hong Village, one might argue that the McHarg method has proven the validity of traditional Fengshui. However, one case study is not enough to make such a general claim. To get more holistic and accurate assessment, more case studies are needed, as well as more detailed landscape data. Second, the author could not compare every principle of these two systems, since traditional Fengshui focuses more on the cultural and psychological functions while ecological design only

addresses physical problems. In this respect, however, these two systems could be complementary, and they might be applied together to realize a “win-win.” In addition, it is sometimes difficult to judge which system is better when there is a difference between traditional Fengshui and ecological design. Ecological design is demonstrated by science, while the usefulness of traditional Fengshui is proven by its long history. Maybe a third method or system is necessary. For example, TEK could be a bridge to connect them, because it is a traditional knowledge and it also has ecological ideas.

The research completed for this thesis also revealed some directions for future investigation of the relationship between Fengshui and ecology. From the comparison of traditional Fengshui and ecological design, the author found they share similar goals, study elements, application processes, and the evaluation results of suitability analysis. Thus the author suspects there might be other relationships between ecology in other branches of Fengshui. For example, Fengshui has a branch called Qi faction which focuses on energy flow, while ecology has a branch called ecosystem ecology which also studies the flow of its own conception of energy. The difference is that the energy in Qi faction is abstract, while ecosystem ecology is able to empirically measure its energy with certain calculations. This is due to the difference in technical skills and cultural background, but they share the same core idea. Therefore, a potential future collaboration between Fengshui and ecology could focus on research in this field, providing proof to strengthen the relationship between Fengshui and ecology systems.

In addition, in future research, as well as in planning and design, traditional Fengshui and ecological design could be used together to complete a project, so that people could not only learn from historic experience, but use scientific analysis to develop a final plan that incorporates

both physical and psychological functions for humans. This potential project, a good test for the combination of traditional Fengshui and ecological design, should be isolated from urban development and the disturbance of a large population, since traditional Fengshui is not suitable for solving urban social problems. In addition, the site of the project should have detailed landscape data available for the convenience of the ecological landscape suitability analysis. Moreover, since traditional Fengshui is qualitative and based on accumulated human experience, while ecological design is quantitative and scientific, each system could be used to evaluate the other one based on their complementary characteristics. With the support of both systems, landscape architects, ecologists and Fengshui scholars could comprehensively find, analyze, and solve future problems.

## REFERENCES

- Banaszak, Jo. *Ecology of Forest Islands*. Bydgoszcz: Bydgoszcz University Press, 2000.
- Begon, Michael, and Colin R. Townsend. *Ecology: From Individuals to Ecosystems*. 4th ed. Malden, MA: Blackwell Pub., 2006.
- Bennett, Steven J. "Patterns of the Sky and Earth: A Chinese Science of Applied Cosmology." *East Asian Science, Technology, and Medicine* 3 (1978): 1-26.
- Blower, J. Gordon, Michael Begon, and Martin Mortimer. *Population Ecology: A Unified Study of Animals and Plants*. 3rd ed. Oxford: Blackwell Science, 1996.
- Bruun, Ole, and Stephan Feuchtwang. *Fengshui in China Geomantic Divination between State Orthodoxy and Popular Religion*. Copenhagen, Denmark: NIAS Press, 2003.
- Cao, Lindi. "Siting and Fengshui of Chinese Garden." *Forum Collection of Sustainable Development of Folk and Regional Architectural Culture*, 2007, 37-44.
- Cheng, Jianjun. *Fengshui and Architecture*. 1st Edition ed. Beijing: Central Compilation & Translation Press, 2010.
- Chen, Yi. "Discussion on the Ecological Ideology in Geomantic Omen." *Journal of Zhejiang Wanli University* 18, no. 3 (2005): 57-60.
- Chen, Yifeng. "The Analysis of Fengshui in Anhui Hong Village." March 12, 2014. Accessed February 23, 2015. <http://qing.blog.sina.com.cn/tj/8a30c74a33004r7z.html>.
- Dong, Bin, and Shuping Dong. *The Identification of Modern Feng Shui*. Taipei Wuling Press, 2002.
- Dramstad, Wenche E., James D. Olson and Richard T. T. Forman. *Landscape Ecology Principles in Landscape Architecture and Land-use Planning*. Island Press, 1996.
- Duan, Jin, and Minghao Jie. *Spatial Analysis of the Ancient Village of Hongcun World Cultural Heritage*. 1st Edition ed. Dongnan University Press, 2009.
- Greig-Smith, P., and R. Daubenmire. "Plant Communities: Textbook of Plant Synecology." *The Journal of Ecology*, 1968, 307.
- Gan, Na, Tingzhen Yan, and Qibing Chen. "The Influence of Traditional Fengshui Culture on Chinese Garden Design." *Chinese Culture Forum*, 2014, 1-26.

- Gao, Yunfei, Jianjun Cheng, and Wuzhen Wang. "Ecology Physical Environment Computational Simulation of Ideal Fengshui Position Model." *Architectural Science* 23 (2007): 19-23.
- Golley, Frank B. "Introducing Landscape Ecology." *Landscape Ecology* 1, no. 1, 1-3.
- Guo, Pu. *Book of Burial*. Chinese Economic Press, 2002.
- Gutzwiller, Kevin J. *Applying Landscape Ecology in Biological Conservation*. New York: Springer, 2002.
- Hills, G. A. *Ecological Basis for Land-use Planning*. Ontario Department of Lands and Forests, Research Branch, 1961.
- Hopkins, Lewis D. "Methods for Generating Land Suitability Maps: A Comparative Evaluation." *Journal of the American Institute of Planners* 43(4) (1977): 386-400.
- Hui, Yuan. "Ten Principles of Modern Fengshui." *Resources and Human Habitation* 6 (2006): 34-37.
- Janssen, Ron, and Piet Rietveld. "Multicriteria Analysis and Geographical Information Systems: An Application to Agricultural Land Use in the Netherlands." *Geographical Information Systems for Urban and Regional Planning*, 1990, 129-39.
- Jiang, Nan. "Five-color Soil." Fengshuidashi. January 1, 2010. Accessed February 1, 2015. <http://fengshuidashi.diandian.com/post/2010-01-26/17275819>.
- Kirchhoff, Thomas, Ludwig Trepl, and Vera Vicenzotti. "What Is Landscape Ecology? An Analysis and Evaluation of Six Different Conceptions." *Landscape Research*, 2012, 1-19.
- Kan, Chenjing, and Zemin Wu. "The Water Gate Landscape and Condition in Hui Zhou." *China Academic Journal* 1 (2009): 63-68.
- Lin, Xueyi. "Analysis of Water System Design of Hongcun Village with Blending of Sense and Geomantic Omen." *Chinese Environment and Art Design*, 2007, 200-06.
- Lin, Yuzhen, and Rongshu Fu. *Ecology*. 2nd Edition ed. Beijing: Science Press, 2011. 1-8.
- Lu, Haiyong. "Aesthetic Characteristics of Water System Form Design of the Ancient Village in Hui Zhou—Analysis of the Water Environment of Hong Cun in Yi Xian." *Huazhong Architecture* 23, no. 4 (2005): 144-46.
- Lu, Yongpeng. "The Relationship between Fengshui Development and Human's Ecological Practices." *The Yangtze University Academic Journal (Social Sciences)* 35(1) (2012): 177-178.

- Lv, Ting. "On the Evolution of Feng-shui Culture." *Higher Education of Sanjiang University* 8(4) (2012): 57-62.
- Ma, Jie. "The Regional Characteristics and Cultural Quality of the Plant Landscape of the Ancient Village in Huizhou – Hongcun." *Architecture and Culture* 8, no. 037 (2013): 96-97.
- McAllister, Donald M. *Evaluation in Environmental Planning: Assessing Environmental, Social, Economic, and Political Trade-offs*. Cambridge, Mass.: MIT Press, 1980.
- McHarg, Ian L. *Design with Nature*. Garden City, N.Y.: Published for the American Museum of Natural History [by] the Natural History Press, 1969.
- Miller, William, Michael G. Collins, Frederick R. Steiner, and Edward Cook. "An Approach for Greenway Suitability Analysis." *Landscape and Urban Planning* 42(2-4):91-105.
- Moreno, D., and M. Seigel. "A GIS Approach for Corridor Siting and Environmental Impact Analysis." *GIS/LIS'88, Proceedings of the Third Annual International Conference, Exhibitions and Workshops*, 1988, 507-14.
- Naveh, Zev. "What Is Holistic Landscape Ecology? A Conceptual Introduction." *Landscape and Urban Planning* 50(1) (2000): 7-26.
- Naveh, Zev, and Arthur S. Lieberman. *Landscape Ecology: Theory and Application*. New York: Springer-Verlag, 1984.
- Odum, Howard T. *Systems Ecology: An Introduction*. New York: Wiley, 1983.
- Pereira, José M. C., and Lucien Duckstein. "A Multiple Criteria Decision-making Approach to GIS-based Land Suitability Evaluation." *International Journal of Geographical Information Systems* 7, no. 5 (1993): 407-24.
- Turner, Monica Goigel, and R. H. Gardner. *Landscape Ecology in Theory and Practice: Pattern and Process*. New York: Springer Science & Business Media, 2001.
- Wang, Lixiang, Huichong Zhang, Jianxin Fan, and Xudong Huang. "Exploration of Ecological State and Sustainable Development of Hongcun Village." *Journal of Huangshan University* 6, no. 6 (2004).
- Wang, Qiheng. "The Exploration and Research on Fengshui's Theory." In *The Theoretical Study of Fengshui*. Second Edition ed. Tianjin University Press, 2005, 1-15
- Yang, Jun, and Zijie Jiang. "Rational Expression of the Traditional Feng Shui Theory in Ecological Architecture." *China Population, Resources and Environment* 24, no. 5 (2014): 376-79.

Yang, Zemao. "Modern Society and Traditional Fengshui." Modern Society and Traditional Fengshui\_Zemao Yang\_Sina Blog. January 21, 2014. Accessed March 1, 2015. [http://blog.sina.com.cn/s/blog\\_8ba6144d01016bem.html](http://blog.sina.com.cn/s/blog_8ba6144d01016bem.html).

Yu, Kongjian. "The Ideal Environment Model for the Chinese and Its Ecological Origin." *Journal of Beijing Forestry University* 1, (1990).

Yu, Kongjian. "The Ideal Fengshui Pattern." In *The Ideal Landscapes – The Meanings of Fengshui*. Beijing: Commercial Press, 1998.

Zhou, Weiquan. *The History of Chinese Traditional Garden*. Beijing: Qinghua University Press, 1999.

Zonneveld, Isaak Samuel. *Land Ecology: An Introduction to Landscape Ecology as a Base for Land Evaluation, Land Management and Conservation*. Amsterdam: SPB Academic Pub., 1995.

## APPENDIX A

### Timeline of Chinese Dynasties

Dynasty		Period
Xia		BCE 207—BCE 1600
Shang		BCE 1600—BCE 1046
Zhou	Western Zhou	BCE 1046—BCE 771
	Eastern Zhou	BCE 770—BCE 256
	Spring and Autumn Period	BCE 770—BCE 476
	The Warring States Period	BCE 475—BCE 221
Qin		BCE 221—BCE 206
Han	Western Han	BCE 206—CE 23
	Eastern Han	25—220
Three Kingdoms Period	Wei	220—265
	Shu	221—263
	Wu	222—280
Jin	Western Jin	265—316
	Eastern Jin	317—420
Sixteen Countries		304—439
Northern and Southern	Southern	420—589
	Northern	386—581

Sui		581—618
Tang		618—907
Five Dynasties and Ten Countries	Late Liang	907—923
	Late Tang	923—936
	Late Jin	936—946
	Late Han	947—950
	Late Zhou	951—960
	Ten Countries	902—979
Song	Northern Song	960—1127
	Southern Song	1127—1279
Liao		916—1125
Western Xia		1038—1227
Jin		1115—1234
Yuan		1271—1368
Ming		1368—1644
Qing		1644—1911
Republic of China		1912—1949
People's Republic of China		1949—Now

(Zhou 2008)