RESEARCH OF LANDSCAPE DESIGN
IN RESIDENTIAL AREA

---- Vanke Fifth Garden & Crystal City in China
Bo01 of Western Harbor in Sweden

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Karlskrona, Sweden 2009
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Acknowledgements

Many people have made invaluable contributions, both directly and indirectly to my research and thesis. My deepest gratitude goes first and foremost to my supervisor, Professor Anders Törnqvist, for his instructive suggestions and valuable comments, as well as constant encouragement and guidance on writing this thesis. He has walked through all the stages of my writing. Without his advice, this thesis could not have been reached its present form.

Secondly, I would like to express my heartfelt gratitude to Professor Jan-Evert Nilsson, Lars Emmelin, Gösta Blucher and Gunnar Nyström, for their valuable comments in the proposal and the mid-term seminar of the thesis. I would also like to express my warmest gratitude to Eric Markus and Ana Mafalda Madureira, who have been helping me during my year as a student of European Spatial Planning and Regional Development in BTH. I would also acknowledge the help received from my present classmates at BTH and former classmates at NFU. Thanks for the help with useful information on my research.

Finally, my warmest thanks belong to my nearest and dearest ones, family and friend. Thanks for the supports in all respects from my parents during the whole studies, especially the inspiration and confidence I got from you. I also owe my sincere gratitude to my friends.

Ye Jienan

2009-05-20
Abstract

The environment of residential area has a close relationship with human’s living. It is not only a significant place of human activities, but also an important constituent in urban environment. Along with the development of society and economy, the residential landscape is also changing. However, in the course of development, many problems have appeared. These issues have had negative effect on the quality of landscape and seriously hindered the development of residential landscape design for the future.

In this thesis, residential landscape was selected as the research subject. Through the systematically organized survey and discussion of the case analysis, I was hoping to put forward some effective solutions for the existing problems and future planning.

The thesis included 6 parts. Part 1 was introduction, including research background, contents and methods. Part 2 and 3 were the theoretical basis of the paper. Relational concepts and theories were presented. The Garden City theory, Neighborhood theory and the theory of organism decentralization, which had a direct role in the planning of my case studies, were fully described. In addition, based on the information from literature, the classification for landscape was made, which was also the foundation of the analyzed cases. Next three parts of the thesis were the emphasis of the thesis. Three cases, two from China and one from Sweden were selected, analyzed and discussed in which both the advantages and disadvantages of design were mentioned. By means of these studies, we could get some inspiration about residential landscape and try to avoid the redundant mistakes in future. Finally, some planning approaches and principles had come up for modern residential landscape from this study.

Keywords: residential area, planning model, landscape design, living environment
1. Introduction

1.1 Research Background

Inhabitation is a basic survival need for human. It is the most important living constituent and behavior content of human [JiaYan, 2001]. In the course of the human development the residential area has been always a base of human continuous evolution. Therefore, the environment of residential area has intimately closed relationship with human beings.

Inhabitation environment is one of necessary places of human activities. It takes its hand on the different needs of people for a better life. Whatever was the scene description of “small bridge, flowing water, people” in ancient China or the modern design construction of Wright’s "water villas", they both reflected the pursuit and infinite yearning for ideal living environment in different times and regions. In "Athens Charter", human living activities were known as “the first activities of city”. The residence construction has been considered as a momentous event in most of countries. Inhabitation environment is an important part of urban construction which relates to the national economy and daily life.

In addition, residential environment also plays a vital role in urban environment. Today's living environment is no longer the easy living space, but one of the important places for people to enjoy and communicate. With corresponding to three elements which are work, live and entertainment for modern urban people, residential area becomes the bay with natural and tranquil environment when people come home after a busy work [Wang Jianguo, 1999]. Pleasant environment is an inherent demand for urban citizen. As the people's living standard is improving, more and more residents have gradually converted from the simple pursuit of comfortable residential areas to the higher quality requirements of external environment. It is necessary to have a relaxed living environment in the leisure time. Urban people spend half and even two-thirds of the whole day in residential areas. Therefore, the quality of environment directly affects people's physical, mental and spiritual life [Wu Liangyong, 1999]. Such a development undoubtedly brings a higher demand for planners and designers. In another words, we must not only focus on residential apartment building construction itself, but also pay more attention to residential landscape.

In China, during last ten years, with the transformation of the old city and the development of new town, numerous apartment buildings have been built and the residential areas have attained a new look. China has been building a well-off type and eco-living area step by step instead of the content of living space only. Compared to the development speed of residential community, the research on residential environment and landscape design were lagging behind. In China, the subject of design did not have an integrated system. Nowadays, the majority of landscape designs in China are limited to the overall planning while ignoring the features shape of the landscape design. Moreover, in practice, people complain quite often on many problems such as the scarcity of land resources, overpopulation, environmental pollution and economic conditions. Some environmental constructions of residential areas were deviated from the principle of economy, and blindly pursuing luxurious style of the surface. This was just repeating the old way, "high consumption, high-material-based, high pollution", of
the Western countries. Some areas were emphasized on the "people-oriented" and neglected the harmony with nature, which caused great damage on natural environment. Some others were only pointed on attracting sales, and pursued the theme of exotic style, but ignored the original understanding and recognition of the local environments. The others had not adequate consideration and coordination on the relationship between cities and residential areas, leading to the imbalance between the part and the whole city. Meanwhile, due to the neglect to the local nature and culture resources, a common phenomenon is that most of the residential areas are looked alike and few of them have their own characteristics in China [Wang Chenhui, 2001]. All the problems mentioned above are necessary to be considered and understood for us.

1.2 The Objectives of the Study

The objective of the study was: (1) how to improve the comprehensive quality of residential areas, (2) how to create a residential area to be a unique and practical site, in which natural environment and artificial landscape could harmoniously combine together. (3) To better understand the status and problems of current living environment in China. (4) To provide some references for the above-mentioned problems through several practical landscape design methods and principles combined with the case study.

1.3 Research Contents and Methods

1.3.1 Contents

The research background and the objectives of the thesis have been described in the previous section. In Chapter 2, the relevant definition and concepts of landscape design, including the connotation of these concepts would be analyzed and also one classification of the residential landscape would be proposed from one perspective.

In Chapter 3, the development of landscape models of residential area in China and Europe was described. Three theoretical theories were selected and discussed as they seemed promising for providing recommendations to improve modern planning.

Chapter 4 and 5 were the main sections of the thesis, in which, some principles of urban and landscape design had been described and used to analyze and evaluate the selected cases. Three cases had been selected as example to be evaluated and analyzed. Two of them were in China and one was in Sweden.

The conclusion was described in Chapter 6.

1.3.2 Methods

Four approaches were mainly used in the thesis:

Literature study: Useful information from literatures related to the research work was collected and some case studies for the authentication purpose were summarized as well.
Research and investigation: The first-hand information on the sites in selected case studies was collected by visiting and photographing as field research was an effective and intuitive manner to collect examples. It could help to eliminating the difference between actual situation and the theory. The analysis and discussion in the thesis were mainly based on the first-hand information.

Comparative analysis: Logic analysis tools were used in the study to analyze the selected cases. The similarities and differences of landscape design, as well as their advantages and disadvantages were discussed.

Summary: The research work was summarized by theoretical analysis of relevant case-studies followed by some well-established methods.
2. Related Concepts and Connotations

2.1 Related Concepts

2.1.1 Residential Area

According to the interpretation in "Chinese Encyclopedia", as well as the definition in urban planning law, residential area is the independent area which has a certain degree of population and land size for daily life. On the other side, the residential buildings, public buildings, green space, roads and other types of engineering facilities have a closed connection.

The residential area is also surrounded by the city streets or natural boundaries. Due to the impact from many factors such as a reasonable radius of utility services, spacing of the city streets, and the administrative management system, the reasonable scale of residential area is generally 50,000 ~ 60,000 population (not less than 30,000 people), 50 to 100 hectares of land around [Zhao Min, Zhao Wei, 2003].

In addition, there are living communities and community groups subordinated to the residential area. Living community is a full lot with a fair scale that divided by the city roads or natural lines (rivers, etc.), but not crossed by the major trunk roads. There are the entire service facilities and public green space for the daily needs of residents in the living community [Zhou Jian, 1999]. It is a unit of residential areas and composed by several living groups, which refers to a combination of a number of houses and not crossed by the community road and equipped with facilities of basic services and convenient services, as well as the management and the courtyard. It is the basic unit of community living.

2.1.2 Community

Communities are often seen as a good thing. Therefore, the word is a euphemism to cover up unpopular policy. In some context, this word has become little more than a collective noun for human beings such as the Chinese community, gay community and university community.

However, when we talk about community in a population sense, there is still a clear understanding of the meaning what we want to express. Community implies a sense of belonging and pride, a common characteristic of sharing and obligations. When neighbors need help, people take the initiative to provide timely assist and support. In fact, communities, maybe, are the most basic form of human organizations dating back to the earliest hunting groups [David Rudlin, Nicholas Falk, 1999].

Most scholars defined community as a fixed geographic area with many society members who usually consider the living environment as the mainstay [Chen Jinsong, 2004]. Community could operate the social function, and create social norms meanwhile including a high degree of human’s activity:

The social unit—complete and independent;
The social community—specific and limited geographical;
The basic sites—where members of society could participate in social activities;
The Constitutive unit of society.

According to the explanation of the community from "Chinese Encyclopedia", it usually refers to a social groups based on a certain geographic area. It includes the following characteristics: having a certain geographic area; having a certain amount of population, having some common awareness and benefits among residents and close social interaction. Generally, communities are different from other social groups as the general social groups normally don’t have a certain geographical characteristics.

It shows that four elements of the formation of community should be included:

(1) The people: community is formed by people. No matter what type of community it is, people gather and interact with each other in order to meet their demands. However, there is no limit that how many people can form a community. An excessive number will make it difficult for people in the community to interact with each other, and too less people could not form a group with life-sustaining and reciprocal benefits either.

(2) Place or geographic boundaries: To define the size of the community boundaries with the geographic scope is the general definition that community people could accept. On the other hand, not all communities have a specific geographic division. If the division is inappropriate, it may cause difficulties on the collection of community data.

(3) Social interaction: The residents interact with each other, in terms of interdependence and competition for their food, clothing, housing and transportation. Thus, the relevant economic, transportation and entertainment systems are established. Through the different social systems, community tries its best to meet the necessities of residents and to establish community norms.

(4) Community identity: Residents are accustomed to communicate with other community residents under the name of own community and interact within their own communities. At the same time, community residents establish a community defense system and have a clear sense of belonging and community feeling [Lele Zhao, 2009].

There are different types of communities whether in the suburbs or in the cities. ‘The first community ideal, which many people think of, is close-kint village of Miss Marple or James Herriot, a place where everyone knows each other and everyone knows their place.’ [David Rudlin, Nicholas Falk, 1999]. It is a community with churches, bars and natural focus established by the local shops, in which people could get together and share public information. ‘The other community ideal is almost the complete opposite of this, which is the urban street as described by Jane Jacobs. If the village community is a rock pool, the urban community is the shoreline washed by the ebb and flow of the tide.’ [David Rudlin, Nicholas Falk, 1999] [Jane Jacobs, 1961].

2.1.3 Environment

Environment is the physical and biological factors along with their chemical interaction that affect an organism [Yu Kongjian, 1999]. To explore the residential environment, we
have to realize that the human being is the center of organism. The environment could be overviewed as the outside world of human beings. In short, environment is the combination of all things surrounded us.

As a concept, environment is universal, but as the real state, the environment has a strong variability. It is regarded as a space-time system of human life by modern architects and environmental designers as space is fixed and time is flowing. In this combination of static and dynamic, the human beings and the environment exchange substances, energy, information and spiritual with each other [Wu Liangyong, 2001].

The external objective world of human life could generally be classified as social, natural and artificial environment. Social environment composed by people, in which culture is one of the most important elements. The natural environment includes the landscape of trees and other natural substances as well as wind, rain and other natural phenomena. The artificial environment takes the building environment as the main body and composed by the artificial structures and buildings.

2.1.4 Environment of Residential Area

Nowadays, people have more demands not only for more space for simple daily needs but also for a higher quality of living such as leisure, entertainment and harmonious neighborhood relations.

Residential environment refers to the living places, the relevant living surrounding and the corresponding cognitive psychology in the scope of residential areas [Wang Jianguo, 1999].

As an extension of the indoor environment, the outdoor environment of residential areas is the environment surrounding buildings. Residential outdoor environment is also the most basic space for people’s daily activities as indoor environment. It is a biological environment centered about human beings and composed of the natural environment, artificial environment and social environment.

2.1.5 Landscape

There are great differences about the concept of landscape in different areas. Mr. Wu Jiahua pointed out that "Initially, the 'landscape is the area which has left a footprint of human civilization ' [Wu Jiahua, 1986]. In the 18th century, 'landscape' was connected with 'gardening' as there is a close relationship between ‘Landscape' and the design industry”.

In early 19th century, the German geographer and botanist Von Humboldt brought landscape as a scientific term in geography and interpreted it as "the general characteristics of a region" [Naveh L., 1984]. Later, Berg and other Russian geographers developed a school of landscape geography with this idea. After then, landscape is not only regarded as the meaning of visual aesthetics, but also a comprehensive scene of the surface and a limited region.
In ecology, the concept of landscape is used by two ways. The first category of landscape is intuitively seen as a specific region and the scale is from a few kilometers to hundreds of kilometers. It is an ecosystem composed of some cognoscible component such as woodland, grassland, farmland, hedges and human settlements. The second category is an abstract concept. However, landscape ecologist Troll deems that the broad definition of landscape is the sum of spatial and visual in human survival space and an artificial production including the biosphere and the intelligence circles. According to the position and shape of a variety of landscape elements, landscape can be divided into three types: patch, corridor and matrix. Patch contains flora and fauna, or contains rocks, soil, roads, buildings, and so on. Corridor is banded, such as rivers, roads, forest and it plays a role of transportation, isolation, resource and ornament in landscape. The three parts build up the landscape spatial structure and also can be collectively referred as Tessrea.

Despite of the differences between the three-mentioned types of landscape, they also have five aspects in common concerning landscape: ① Landscape is the embedded heterogeneity of interacted ecological systems; ② Landscape is the special structure of topography, vegetation, land use and human habitation pattern; ③ Landscape is an organization of extended upward ecosystem; ④ Landscape is the overall system integrated with human activities and regional land; ⑤ Landscape is a beauty scene. Its aesthetic value determined by the culture.

When people understood the culture importance in landscape more and more people began to focus on the combination of original natural landscape with cultural landscape. The research subjects included the cultural landscape, artificial construction of various buildings, roads, housing and others. The patch, corridor and matrix become the organic components of regional landscape ecosystem. Navel (1994) raised the total human ecosystem concept and in his landscape classification system, he divided landscape into open landscape (natural landscape, semi-natural landscape, semi-agricultural landscape and agricultural landscape), architecture landscape (rural landscape, suburban landscape and urban industrial landscape) and cultural landscape. Human activity has changed the natural environment and landscape, and resulted in a new land use and landscape pattern, including semi-natural landscape, agricultural landscape, rural landscape, industrial landscape and urban landscape, etc. All these changes are cultural landscapes but in different levels.

2.1.6 Landscape Design of Residential Area

From a macrocosmic point of view, the design of living environment is a part of urban and even regional environmental design. Therefore, it has closed relationship with city development, urban life change, natural ecological protection and optimization. From a microcosmic point of view, it is a well-service for human behavior and psychological needs. Residential landscape is not only providing residents a scene, but also, at the same time functioning well for residents. Therefore, the combination of form and function is the point of residential areas landscape design. The constituent elements of residential areas landscape can be divided into two types. One is the composition of substances, namely: people, architecture, green, water, roads, infrastructure, and other entities. Another one is the spiritual and cultural components, namely: the history of environmental context and cultural characteristics. Residential landscape is the
inseparable unity of the two types and the spiritual connotation was demonstrated through the material elements, which is possessed of culture as well.

2.2 Residential Area Landscape Classification

According to different classified criteria, residential landscape could be divided into different types. In the section, one classified method which was commonly used will be analyzed: residential environment are divided according to the type of people outdoor activities.

Jan Gehl (2001) divided outdoor activities into three types in the book of Life between buildings: necessary activity, spontaneous activity and social activity. The requirements of each type for the physical environment are completely different. According to these three types of activities, residential landscape could be divided into three categories.

2.2.1 Necessary Activity Space

The necessary activity includes activities which are involuntary such as work, studying, shopping, waiting, etc. In other words, people are more or less taking part in the activities being as part of daily life. As most of those activities are related to walk, the road becomes an essential element regarding to the necessary activities in space. Because these activities are the ones which would be carried out by people, this kind of landscape space mainly provides the basic functions for citizen activities. The necessary activity space is the basis of other types of space.

2.2.2 Spontaneous Activity Space

Spontaneous activity space is put forward from spontaneous activities and means generated activities when people want to participate, and when the time and place is possible. Such activities include walking, playing with dog and a breath of fresh air, morning exercises and watching interesting things and so on. These activities will happen when external conditions are appropriate, just as the weather and the environment is attracting. Therefore, the activities need a high requirement for the environment and in another words, it will need an even higher requirement for the spontaneous activities. Such space environment is not only for function but also requiring more design. For example, the gravel paving patterns or stepping stone road should be more interesting than the cement road. The landscapes have a variety of objects, such as sculptures, fountains, etc. which is elements of spontaneous activity space and could rich the landscape as well.

2.2.3 Sociality Events Spaces

Societal activity refers to the various activities in public space where people would like to participate. It includes greeting, talking, children's games, small-scale leisure activities and so on. Such activities could be generated in the various occasions and could be regard as an extension of spontaneous activities.
The social activity space has a wide range and society activities could be happened in most of the public space. Of course, the quality of the space will still affect the activities. If the space has a comfortable and pleasant environment, people would like to hang around, relax, and stay in the same space. Also, it will naturally bring more various social activities and increase the communication for the residents and create active atmosphere in residential area.

2.3 The Elements of Residential Landscape

Based on the literatures and the analysis of the actual residential areas, the constituent elements of landscape could be divided into three points: natural factors, artificial factors and cultural factors.

2.3.1 Natural Factors

The natural factors of residential landscape include the topography, climatic conditions, and residents demand for the mountains, plants, waters, forests, grasslands and other natural forms. The demand also includes the air, sunlight, rain, snow and other natural phenomena. Natural factors are directly related to people's production and life. They are the foundation of human existence.

2.3.2 Artificial Factors

Artificial factors mainly refer to the various building body, architecture, etc, including housing, gallery frame, sculpture, and other small-scale landscape. It also includes roads, bridges, squares, as well as the seats and other service facilities.

2.3.2.1 Service facilities

After the enjoyment of the natural living conditions, people often start considering whether the basic material is convenient or not. Residents want to be satisfied their lives in the shortest distance, which people could use a variety of services and facilities with minimum time spending and least energy. These facilities could be divided into seven categories: commercial services, conservation education facilities, middle-aged and old cultural activity facilities, children's entertainment facilities, medical and health facilities, public facilities and administrative facilities. (Figure 2.1 and 2.2)
2.3.2.2 Landscape Elements

Landscape elements include many factors, such as green factor, water factor, paving factor, pieces factor and so on. Three elements were chosen to introduce specifically as following.

Green Space Factor

Residential green space is not only the main outdoor activity space for residents, but also a space being most widely distributed with highest using rates in urban green system (Figure 2.3 and 2.4). In the living environment, no element could replace of it. Green often exists as the edges of site and landscape background or a part of sites. In residential areas, the green is everywhere, such as the green groups between buildings, the border between different functional areas, the green plaza and the green around water. Although these green is separated, it still keeps as a whole for the space environment. It plays a positive role for regulation of the psychology and the spiritual relaxation. It could also adjust microclimate to some extent. From my point of views, green is an indispensable factor in the environment of outdoor living space.

![Figure 2.3 & 2.4 Green space in residence](source: taken by author, 2009)

Water Space Factor

The water body is a landscape factor with larger change and can form different patterns. People have instinctive requirements to water and emotionally people are also hydrophilic. The distinct characteristic of water is its variability and plasticity. Beautiful water scene will bring a pleasant mood (Figure 2.5 and 2.6), and even has a therapeutic effect. By the romantic color, water is able to stimulate more and more emotions and inspiration. The water body of outdoor environment in residential area includes swimming pools, fountains, artificial waterfalls, and other forms. Landscape water body should be combined with hydrostatic and hydrodynamic and then it will constitute a complete outdoor environment with other facilities together.
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Pieces Factor

Pieces are very important part in the landscape elements and its scopes are quite broad including sculpture, fountain, gallery frame, construction and other pieces. They are usually rich in expressions, but also easily attract people's attention and interest. Pieces can be a focal point of space as well as the concentrated expression of the place spirit and has more plasticity in all landscape elements. (Figure 2.7 and 2.8)

2.3.3 Cultural Factors

Contemporary environmental design should not only stay on the surface of appearance, but also pay attention to cultural expression of landscape features. For residential landscape, the expression of the culture is reflected from individual intentions of architecture or landscape and also the mental of residents and cultural atmosphere of communities.

Figure 2.5 & 2.6 various water landscapes in residence
Source: taken by author, 2009

Figure 2.7 & 2.8 The landscape pieces
Source: taken by author, 2009
The Cultural Intentions of Architecture

Mentioned to residential areas, the main body must be living buildings. The building is the best carrier of the cultural intentions. Whether the form of building structure, color creating or residential layout, it should integrate the essence of the local history and cultural context, and combined with modern design concept. It creates residential areas not only to meet the daily using of the residents, but also to become a bearer and transmitter of city culture.

Such as the Chinese ancient residential area named Anhui Hongcun is an good example. The building has a strong classical Anhui style and the residential layout retains the most primitive pattern. It becomes a model of residential groups in South China. (Figure 2.9 and 2.10)

![Anhui Hongcun residential groups](Figure 2.9 & 2.10 Anhui Hongcun residential groups Source: www.baidu.com)

Cultural Space

In the daily life, people spend most of the time at home and in external environment. The interpersonal relations of residents are a crucial part of the social relations. Neighborhood communication could provide material and spiritual assistance, emotional and intellectual exchange, as well as the constraints on behavior. Sometimes it could also provide leisure pastime. Therefore, residential landscape should pay full attention in spiritual and cultural level, which contains the local traditional culture, society, lifestyle, aesthetic taste, folk traditions, religious beliefs and other factors. To establish harmony between the neighborhoods, the residents should have a sense of belonging, which is conducive for social stability and unity.

These elements, which should be considered by designers at the initial work, are indispensable in the landscape environment of residential areas. Therefore, this framework was used to analyze and evaluate the landscape design in the thesis. In addition, some ideas and methods for design were proposed for the different characteristics of each element.

To better understand about the relationship between these elements, a framework listed as a chart was done for these elements.
Elements

- Natural factor
  - Geography
  - Climates
  - Resources

- Artificial factor
  - Service Facilities
  - Green space
  - Water space
  - Pieces

- Cultural factor
  - Landscape Factors
  - The cultural intentions of architecture
  - Cultural space
3. The Development of Landscape Models and Theoretical Research in Europe and China

Landscape patterns of residential area reflected not only the development process of society, but also an important carrier of human civilization. From ancient to date, the residence patterns have developed from the primitive hut to earthen hut, until today, the modernization of housing, which experienced a long period of evolution. Meanwhile residential landscape construction has been developing. Therefore, it is important to understand the historical evolution and morphological characteristics of landscape.

3.1 The Explore of Residential Planning Model and the Theoretical Research in Western

3.1.1 The Research of Residential Theories in Western

By modern large-scale industrial production coming out, city size was expanding rapidly, but accompanied with the increasingly serious problems of environmental pollution and city life. To solve these problems between city and countryside, as well as building space and natural space, many philosophers had put forward a variety of planning doctrines, theories and models by a long-term and unremitting practice and exploration on the ideal solution of living environment in the last hundred years. Of which, the well-known planning theories were:

(1) Linear city, a planning theory proposed by Spain engineer Arturo Soria Y Mata. It was suggested that layout of a city could be long and narrow. The principle of this theory was that traffic arteries was the main skeleton, and the land space of city life could be arranged with the traffic layout in parallel. In this case most of the residents could be on and off duty between the corresponding residence zones and industrial parks by walking.

(2) Garden City, proposed by the British social activist Howard in 1898.

(3) Theory of Organic Decentralization. This theory was brought forward by the Finnish architect E. Saarinen and concerned the development and layout structure of the city. In his theory, he attempted to alleviate the defects generated by over-concentration of the city [Sardine, E. 1942].

(4) Broadacre City. The famous American architect F. L. Wright proposed it at the 30s of last century. This was a planning idea about "dispersed city" [Wright, F. L. 1932], which was also elaborated in his subsequent book Broadacres.

(5) Neighborhood units, put forward by the American Architects C. Perry in 1929.

(6) New Urbanism. Aimed to recreate a vibrant urban community, it raised in the United States at the 80's of 20th century as a design philosophy and social thought. Its basic idea was to reconstruct a compact and favorite neighborhood community with local characteristics and culture in order to replace the "suburban model" which lack of attractiveness.(David Rudlin, Nicholas Falk, 1999)
In the thesis, the Garden City, Neighborhood Units and the Theory of Organic Decentralization were chosen to be analyzed. The reason for these was that they played important roles in the theoretical development of residential areas and created a systematic theory, and these models were fairly comprehensive, covering the scale and the building pattern, as well as ideas for traffic planning, social and commercial services. These aspects had a direct role in guiding to the case studies. Meanwhile applications of these models had been existed in many different countries, which provided a broad spectrum of variation and examples to study.

3.1.1.1 The Development of Garden City

The idea of Garden City was developed by Ebenezer Howard, an obscure English stenographer and shorthand writer. ‘After much unpublished rehearsal during the 1890s, Howard’s proposals finally appeared in print in 1898, in his book *To-morrow: A Peaceful Path to Real Reform*. What he offered was a comprehensive vision of social and political reform involving the gradual transformation of the existing concentrated cities into a decentralized but closely interrelated network of garden cities, collectively called the social city’[Stephen V. W., 1992]. The concept outlined in the book was not simply one of urban planning, but also included systems of community management. For example, the Garden City project would be financed through a system that Howard called "Rate-Rent", which combined financing for community services with a return for those who had invested in the development of the City. The ‘Garden City’ was not his original term. It was a new term instead of his easier choices ‘Unionville’ and ‘Rurisville’. But whatever, there is no doubt that its directness, simplicity and potent imagery helped people to understand and accept it widely [Beevers R., 1988].

![Figure 3.1 Garden City and Rural Belt, showing the relationship of the individual garden city to the surrounding rural estate. Source: Stephen V. Ward, 1992](image)
In Howard’s Garden City, each individual garden city would have a population of 30,000, with a further 2,000 in the surrounding agricultural estate. In his view, the urban combined with rural areas means, firstly, city itself was surrounded by agricultural land and the agricultural land area should be more than 5 times bigger than city. Howard determined that the diameter of Garden City should not be more than 2 km. In such conditions, we could walk up to all the external green belt. It was convenient for old people and children day-to-day walk. He planned a wide range for public green area, such as the Central Park’s land area was up to 60 square hectares. With the exception of the external forest park, the city also full of flowers and lush green. There were wide boulevards, residential gardens, vegetable gardens and the forest trails along the radial street layout. Howard suggested that everyone should have more than 35 square meters urban public green area and each house should be an average of 20 square meters green. (Figure 3.1)

At Howard's initiative in 1904, 35 miles away from London, the first garden city was finished in Letchworth (Figure3.2), which was about 1514 square hectares. Barry Parker and Raymond Unwin were appointed architects and 16 km² of land outside Hitchin were purchased for building. In keeping with the ideals only one tree was felled during the entire initial construction phase of the town, and an area devoted to agriculture surrounding the town was included in the plan - the first "Green Belt" [Howard E., 1898]. The early Letchworth was pervaded by a spirit of social experiment, attracting much ridicule from respectable Edwardian society [Pearson L.,1988]. While its power as a practical demonstration should not be underestimated, the demonstration was largely understood as a model environment not a
model society [Miller M., 1989]. Today, Letchworth has a population of around 33,600 and there are several housing estates that have been added to Letchworth since its inception. To the north of the town, the Grange began construction in 1947 and Jackmans was built in 1961 to the south east. These were municipal housing estates with many residents originally coming from the London overspill. Two more prosperous (and private) estates - Lordship and Manor Park - were built in 1971 to the south west. Its development inspired another Garden City project at Welwyn Garden City in 1919, as well as many other smaller projects worldwide, such as the Australian capital and Hellerau Germany influenced by its design concepts, which had great influence on future town planning and the New Towns movement.

In the twenty-first century, Howard's Garden City idea is still improved continuously. Our residential area is like a small society, which has a system containing multiple elements. Using Garden City idea to plan residential areas is a good method, especially in Western countries such as USA and Germany with the nice natural conditions and less population. However, in the Chinese city with a large population and land shortage, this idea most likely needs to be improved.

3.1.1.2 The Development of Neighborhood Unit

Concept of residential area came from the early Neighborhood Unit. In 1929, American Architects C. Perry first proposed the planning idea -- "Neighborhood Unit". Such planning thought was the continuation of Howard's "garden city" and Corbusier's "living unit". As orderly society morphology, it was germinated in the civilized era from late 19th century to early 20th century and prevailed in Europe and America during the 20th century. Neighborhood Unit required a unified plan for living area in the larger framework so that each "neighborhood" had become a "cell" of living space (Figure 3.3). Both the direction of house and the quietness and safety of the residential area were all important. Beyond that, C.A Perry tried to find a solution for the problems such as growing motor traffic on city roads, traffic accidents happening, a serious threat to the elderly and children crossing the street, as well as too many intersections and the poor residential directions. In neighborhood unit, there were an elementary school, some public buildings and facilities for daily using of local residents. Meanwhile, we could control a neighborhood population and land scale. In addition to these, there must have a division of external and internal roads to prevent external traffic. Regarding the arrangement of residential building, it also had more consideration on the direction and spacing [Clarence P., 1923]. The theory made a great impact on residential area planning for Europe and the United States. Currently, it is still widely used in residential planning.

C. A Perry believed that neighborhood unit was "a community plan for organization of family life" [Clarence P., 1923]. Therefore this scheme should not only include housing and their environment, but also had the corresponding public facilities, such as at least one primary school, retail shops and entertainment facilities. He also believed that at the auto transporting time, the most important issue of environment was the street safety. For this reason, the best solution was to build a road system to reduce conflict between pedestrian and motor vehicles and keep car traffic completely outside the residential areas.
Based on C. A. Perry exposition, a neighborhood composed of six principles:

(1) Scale: to control a neighborhood population scale based on the reasonable primary school scale the pupils did not have to go to school through the city roads. The walking distance was not more than half a mile (0.8 km). The actual land using scale of a neighborhood depended on the population density. The general population was 3000-5000 people.

(2) Boundary: a neighborhood surrounded by city roads. City roads could not pass through the interior of neighborhood, but should be enough width for spur track settings.

(3) The open space: a neighborhood should have small parks and open space systems.

(4) Social welfare sites: at the neighborhood center or public land, there should be appropriately a neighborhood school and other social welfare agencies.

(5) Lot Shop: there must be arranged one or several shopping areas around a neighborhood to meet the demands of the residents. The best site would be near the main road of neighborhood and similar areas.

(6) The internal street system: the neighborhood unit must provide a special street system. The main street should be consistent with the possible traffic load in proportion. Neighborhood streets within the whole network should be designed to facilitate the operation and keep away cross-border traffic [Yao Shizhang, Wang Ping, 2000].

This neighborhood unit theory and planning principle was caught attention at the United States during the late 40’s. Then, in the world, especially in Sweden, the United Kingdom, the former Soviet Union and some other countries, the theory was used in the construction and development of new town after war. For example, in New England, the first generation
residence had been planning by neighborhood unit. However, the second-generation, such as Scotland's Cumbernauld, was abandoning the principle of neighborhood units. From the 60's, the new city construction re-using the concept again. The scale of Neighborhood Unit was different with greater flexibility. In 1942, Chicago was planned as 4000 ~ 12,000 people; the London, United Kingdom was planned for 6000 ~ 12000 people in 1944; in 1972, American Institute of Architects recommended that neighborhood unit should be 500 ~ 3000 families (1700 ~ 10000 people). The principles of neighborhood units have been criticized by a number of planners and sociologists due to its contribution for society's fragmentation and isolation. However, as a concept of overall community-building, Neighborhood Unit has had a significant impact to residential areas around the world.

### 3.1.1.3 The Theory of Organic Decentralization

Theory of organic decentralization was put forward by Finish architecture E. Saarinen and the theory was an idea concerning city development and layout construction.

In the book named *The city, its growth, its decay, its future*, Saarinen established the system on organic decentralization in 1942.

This theory was for the outward evacuation problems when major cities developed to a certain stage. In his plan for city of Helsinki, the city transferred the centered layout into a both decentralized and coupled organism. Green belt network providing fresh air for the city separated the city center and suburbs.

The theory of organic decentralization had two principles. The first one was the areas for people's working and life, which was named as "daily activities" by E. Saarinen, should be concentrically arranged together. The other one was the area for the non cyclical "occasional activities”, which was not constrained in a specific location, could be arranged dispersed. The daily activities should be arranged as much as possible in certain range, and the transportation needed by the activities could be reduced to the least level, even the mechanized vehicles were unnecessary. On the other hand, for the shuttle traffic of the occasional activities, the longer distance could not cause a problem since the main traffic artery providing the high speech transportation was developed in the outer margin of the daily activities area.

The same as Garden City theory, the theory of organic decentralization had a profound impact on urban development and design for urban ecological landscape.

### 3.1.2 The Explore of Residential Planning Models

With the development of planning theory, the Western living space was constantly evolving. At a very long period, in Western, the main form of residential areas was super-block. In early stage, roads looked like net, and almost no overall design for the environment of living area. During this period, the design of living environment was mainly for brownstone courtyard, private residence and Villa Park. Until the seventeenth century, large-scale complex were designed for residential areas in France, which affected the shape of city planning. Based on the literatures, the development of Western residential design had the following typical stages.

#### 3.1.2.1 The Original Residential Plaza
This form came up in the seventeenth century in French. During that period in Paris, the main plaza of the residential was intended to meet the needs of middle-class, as they desired to live in a palace looking like the Palace of Versailles. A number of central plazas were built in a city and the houses were built around the town plaza. The plaza was generally symmetric designed and looked like a center of circle. Each facet of the plaza seemed as a medium-sized palace. The residential buildings expanded radically around plaza. There were 6-8 ranks residential buildings which had four or five floors.

3.1.2.2 The Dark Terrace

‘The traditional image of the nineteenth century home was of drab uniform rows of terraced housing in the shadow of ‘dark satanic mills.’ [David Rudlin, Nicholas Falk, 1999] This image had been fuelled by the accounts of the nineteenth century reformers such as Peter Gaskell’s. In his book of Manufacturing Population of England (1833), he stated ‘The housing of great numbers of the laboring community in the manufacturing districts present many of the traces of a savage life. Filthy, unfurnished, deprived of all the accessories to decency or comfort; they are indeed but too truly an index of the vicious and depraved lives of their inmates.’[Peter G., 1833, reprinted 1972]. In actual facts Freidrich Engels wrote in 1844 ‘House of three or four rooms and a kitchen from throughout England, some parts of London accepted’ (Figure 3.4) [Freidrich E., 1844, reprinted 1952]. The worst housing conditions were largely confined to overcrowded cellars, lodging houses and older tenements graphically described in book such as Jack London’s Edge of the Abyss. After then, the development of the ‘through’ terrace represented even greater progress. This form had changed city’s character and by the second half of the nineteenth century the through terrace had become the norm [David Rudlin, Nicholas Falk, 1999].

![Figure 3.4](image)

3.1.2.3 The Romantic Suburb Home and Flats

Another equally significant trend in the middle of the nineteenth century was the middle-class suburbs. The symbol of this way of life was the middle-class home or villa [David Rudlin, Nicholas Falk, 1999]. As Stefan Muthesius had described, for much of the nineteenth century these middle-class aspirations were achieved in terraced housing. ‘This housing was grander, in some cases far grander’ [Stefan M., 1982]. Street life and public pleasure had been emphasized [Donald Olsen, 1986]. After that, due to the increase in population density, the number of apartment was gradually raised. By 1870 Peabody had produced more than 5,000
flats in dense six-storey blocks, something which had never happened before in England.

3.1.2.4 Suburb Residence after World War II

After World War II, the spread of the suburb residence was the major phenomenon in Western countries, particularly in United States. During this period, the residential-style was the detached house with public facilities. But buildings and planning were extremely monotonous, such as the building forms were all the same and roads were straight always. In addition, environmental design did not combine with the natural environment. Community atmosphere was weak. Although this form could resolve the large-block mode problem and provide enough private land to people, it had neglected to create the environment of public space. This form could not protect natural environment very well, therefore it was not a high-quality life.

3.1.2.5 New Urban Residence

Post-war Europe needed urgently its own reconstruction and new residence. For example, the Cumberland in United Kingdom was planned as a high density new urban. Its average density was twice than the early batches. Although the density of population increased, there was still a large open space left. However, its layout was different. Larger venues such as sports grounds and parks were surrounded the residential area rather than placed in the center. The design of Cumberland City was in accord with Howard's Garden City idea quite much that the main living area was low-rise residences, in which private gardens and small-scale public open spaces were connected with the green belt.

On the other hand, the group concept was introduced in the new urban. This system could provide an attractive public open space and conduct to create a nice landscape. The land saved from some high-rise individual apartment could be used as community land for public facilities or used for cycling and the sidewalk at a small town. In short, the development of new urban showed the understanding of a relationship between residence and nature had changed entirely. Group’s life in the community based on New Urban was high quality life as there were lower housing prices and convenient public facilities. The residents in the community were friendly to each other. It had become an acceptable developed model in Western countries and also had been more widely accepted in the world [Douglas Kelbaugh, 1997]. For instance, the seaside city in United States was the most famous one of new towns and residential community.

3.1.3 The Overall Characteristics of Western Living Space

Based on the research about the evolution of Western residential area, two considerations in Western living environment were always concerned.

(1) Attitude to nature for understanding of the relationship between nature and urban development. In western countries, this attitude had a series of changes. From fighting off thoroughly to taking up cautiously, the relationship between the square of houses and nature was improving. Then the natural sight became the better option to the romantic house of suburb. These changes were enough to demonstrate that natural place was getting more and more important to the planning of residential area, and gradually it would be an integral part of the residential area planning.
(2) An understanding of the relationship between public field and private areas. During post-war era, there was too much emphasis on the private space rather than public space. Green system composing of semi-open public green space and private garden in residential plaza appeared. No clearly boundary existed between the public and private space. In this condition, living landscape was more practical and ornamental.

3.2 Evolution and Morphological Characteristics of Chinese Living Landscape

3.2.1 Traditional Houses

Traditional Chinese houses were equipped with a variety of spatial organizations and architectural style. They were given full consideration to the livability of humanity. Although the consideration was very simple due to the limited conditions, this idea has still had influence on the development of residential areas today. For instance, large number and wide distribution of "courtyard-style" has become a typical Chinese traditional residential pattern.

3.2.2 Industrial society

In the late 19th century, Western culture was introduced gradually into China with colonialism. Chinese people had recognized that they must learn from foreign advanced technology to achieve further development. In this context, the Western building construction technology, as well as living culture also came to China. Afterwards, there was more and more western-style houses appeared in Chinese cities. The differences between Western-style and Chinese traditional houses were mainly manifested in: ① a combination of brick structure with wooden structure; ② increased layers; ③ the concentration of internal space in residential area; ④ weaken the courtyard area.

In the early days of twenty centuries, in order to improve the living conditions, Chinese people used the neighborhood unit as the main organization forms of residential area, such as Caoyang residential area in Shanghai. Many houses had 2 or 3 layers and the layout is relatively free and flexible. Points, lines and surface of the houses are combined with each other and open green belt was marked along water as a skeleton.

In 50's of twenty centuries, a number of multi-storey residences were built to resolve the housing problem for working class. The layout of these settlements was imitated the Soviet Union's "Neighborhood" model. Due to too much emphasis on the geometric symmetry plane composition, lots of dead ends in the external environment were occurred and the ventilation and lighting system was not well built, such as Baiwanzhuang workers residential area in Beijing. In the last 50 years, residential community became a main form and a large number of residential communities had increased. These settlements were emphasized on the arrangement of groups. The main characteristics of the external environment were green and a small garden was just like Hepingli community in Beijing.

Thereafter, due to social instability and economic reason, people did not attach importance to
urban planning and construction. By limited funding, the welfare-type residential was not enough to meet people’s need. This welfare-type residence with multi-layered was just for place to live, but far from comfortable.

3.2.3 Modern Residence

After the 80's, Chinese residential area was planned in line with local conditions. There was more abundant space and a "community - groups - yard" model gradually became the basic framework of community function [Kim Li-ming, 2001 (7)]. First of all, the public green space was shared by all community residents; secondly the green groups were the semi-public green space so that residents could have a belonging sense. In addition, children could play nearby and parents could easily take care of them. Usually, it was the activity space mostly used by residents in the community such as Hefei Amber Garden, Nanjing Sunshine Garden, and Nanjing Zijin Garden and so on. However, this model also had its limitations, which the living environment was often tediously repetitious. Only little creation on spatial characteristics and geographical differences in the external environment were made [Bai Dehan, 1991]. On the other hand, commercial residential housing began to develop during this period.

In short, residential development in China has gone through several different stages. From early welfare housing to the current commodity housing, the stages had significant differences with Western countries. In China, the real commercial residential was just developing rapidly after the reformation and opening up in 1978. Compared to western commercial history, it was still too short time. Therefore, there is still a long way to go for residential development in China, particularly compare to the countries, which real estate industry has developed into a highly sophisticated stage, such as USA.
4. The Evaluating Standards and Principles of the Quality of Residential Landscape

Residential landscape is an important part of the city environment as mentioned above. Its quality will have directly effect on the city image, even the whole society. The question is what's the high quality landscape?

Three cases was selected to be studied and based on the literatures, a standard and principle for evaluation were established. It included following contents.

4.1 Evaluating Standards

4.1.1 Site Selection

The overall environment around the area will have great effect on the quality of the residential landscape. Generally, the density of people will be lower and people could have more activity space if the district is far away from the city. On the other hand, the quality of the living is not at high level.

This situation could be evaluated by:

- site area
- building area
- building density
- plot ratio
- greening rate
- green space area per capita
- water area per capita

4.1.2 Overall Planning

It is whether or not landscape has special features.

Due to the situation of same planning style in Chinese residential area, layout style and features were regarded as an important evaluate standard. A good landscape has to have its own style, and it can be accepted by most of people.

It is whether or not landscape design is in line with regional character.

In different regions, subject to different natural conditions, the residential landscape design
also has diverse requirements.

For this aspect, the following elements should be gained more attention:

✧ Local Climate

✧ Local topography

✧ Resource distribution

✧ Surrounding environmental characteristics

For example, it is warm all-year around, in Shenzhen, China and the trees there are evergreen in four seasons. In my opinion, more plants can be planted in landscaping. There could appropriately increase the amount of green space, which could create a pleasant green environment and effectively improve micro-climate as well. Furthermore, there could be more fountains and any other waterscape. On the contrast, the place called Heilongjiang in north of China is very cold, especially in winter. It is not suitable for residential areas to have a large water area. It needs avoiding security risks resulting from freezing in winter. The use of evergreen plant species to avoid the sight without green in winter also should be considered in landscape.

**It is whether or not landscape has historically and rich culture.**

Historic and cultural landscape is a prerequisite for city construction. As an important part of urban landscape, living environment, which played the transmission role, should also respect to local history and culture. Residential areas design should provide full resection for landscape which has the historical and artistic value.

In this aspect, the evaluation is based on these considerations:

✧ Highlighting its history, culture and local characteristics. (Yes or No)

✧ Maintain the local style houses. (Yes or No)

✧ Reflect the city's architectural and cultural environment (Yes or No)

✧ Reflect the elements of the urban landscape and environment.(Yes or No)

**4.1.3 Landscape Function**

This includes the following principles.

**It is whether or not the residential area has complete supporting facilities.**

Residential area is a small community. In addition to living buildings, the perfect supporting facilities also have effect on the overall quality of the landscape. The supporting facilities include:
Schools (Nursery school, Primary school and Secondary school)

Hospitals

Restaurants

Fitness center

Shops (Shopping mall or Supermarket)

Other places of relevance to daily life.

It is whether or not the landscape could meet the need for the basic usage.

Residential landscape is the important space for people’s daily life. Whatever the landscape is, it has to meet the different need of people's basic usage. It is not acceptable for landscape without any function.

Furthermore, the residents are composed in residential areas by different social classes, ages and genders. The common and different requirements for different people on the environment should be respected. As a good residential area, the environment and facilities should meet the needs of various residents within residential areas.

During evaluation, some practical facilities would be focused and observed as follows:

- Facilities for rest (Chairs, benches, etc.)
- Facilities for leisure (Sculpture, fountains, etc.)
- Facilities for children entertainment.
- Facilities for transport (Street lamps, signpost, etc)
- Facilities for disabled person
- Facilities for sanitation (Trash bins, shelters, etc)

4.1.4 Decorative Landscape

While the landscape meets the need of people, another important function for people is decoration and entertainment. In general, they are the most unintuitive standard to evaluate landscape. The evaluation will be given from two different views:

It is whether or not the landscape is according with the whole style of the inhabitation.

The outdoor environment of inhabitation is created by variety kinds of space, green, landscape pieces and service facilities. These elements combine together and do not exist independently.
This part of the evaluation includes:

- The color and shape of landscape
- The texture of landscape
- The scale of landscape
- Green layout
- The layout of residential buildings and other groups

### 4.1.5 Space Combinations

**Is there a comfortable public space?**

Public space is the main space in residential area, including roads, green spaces, and squares and so on. Therefore, whether there is a comfortable shared space will affect the quality of the environment in the residential areas. Meanwhile, the comfort is also a basic requirement of the landscape design.

In this context, the evaluation in these aspects is as follows:

- The establishment of comfortable road system.

The roads seem like skeleton and the reasonable design of road system has directly effects on the residents traveling and security;

- The appropriate scale of space

For sharing space, the appropriate scale could enhance the using efficiency and improve the comfort as well.

- A multi-level green area.

Green is not only the most extensive and frequently used part of living environment, but also the closest natural environment and having the greatest influence on residents in urban landscape. The multi-level green has better ecological and optical effects than the large areas green. If a residential district has some multi-level green area, its landscape quality will be better.

**Is there a suitable private space?**

The same as shared public space, private space is also an indispensable element in landscape design. The residential area having a suitable private space or not is one of the appraisal criterion. It includes:

- The number of private space
The scale of private space
The extent of its privacy
Surrounding environment
Reliability and security

4.1.6 The Sustainability of the Landscape

Initially, the concept of sustainable development referred to the natural environment and resources issues. However, by improvement of the ecological theory and the sustainable development, ecology and sustainable development issues have been caught more attention. Sustainable development is the strategic principles to guide urban construction and the solution to human survival and development, as well as the requirements and objectives of residential areas and environmental construction [Zhou Ganzhi, 1998].

Due to these reasons, the sustainability also becomes one of the standards in the evaluation. It consists of following respects:

✧ It is whether or not protecting the nature and human environment which have been in designing and planning.
✧ The rational development and resources use. (Yes or No)
✧ It is whether or not the landscape could meet or adept the changes and development in future.
✧ Use the high-performance and durable building materials and renewable energy. (Yes or No)
✧ To prevent or control environmental pollution and ecological destruction.

4.2 Evaluating Framework

According to the standards mentioned above and the situations of each case, a framework for guiding the study is as follow:
5. Case Study

In this paper, three cases were selected for comparison and analysis, which included two Chinese cases and one Swedish case. The two Chinese cases, Vanke Fifth Garden and Crystal City, were developed and constructed by Chinese most famous real estate developer Vanke in different periods. They were located in the South and North China, respectively and on behalf of the best in Chinese development and construction of residential areas. The Swedish case was Malmo Western Harbor, which was a well-known as a high-grade ecological community. Due to the different period and background, these three cases had different characteristics with a unique style. They would provide us a variety of landscape design inspiration from different perspectives on the residential area.

On the other hand, as no planning project was perfect, the three cases also had disadvantages in design. These defects would be discussed to avoid occurring in the future design.

5.1 Vanke Fifth Garden– Complex Mood of Chinese Tradition

5.1.1 The Natural Factors and Overview of the Fifth Garden

Natural factor and site analysis

The Fifth Garden was located in the southern part of the city in Shenzhen, which was named as a flower city with sub-tropical climate and warm all-year around. The Fifth Garden was a Vanke’s large-scale development of living community in Shenzhen in 2004. At present, the total construction areas have gotten 250,000 square meters, in which the total project areas are 220,000 square meters with floor area ratio 1.1 and 30% greening coverage.

Architectural style and regional analysis

The Fifth Garden was a comprehensive residential area, in which the main building consisted of united villas, detached house and courtyard housing. The whole area was divided into five regions (Figure5.1).

(1) Medium residential area. It was the heart and front of the district. Most of residents were living in this area.

(2) Low-density residential area. This area included united villas, detached house and courtyard housing. The four side buildings were enclosed to each other (see the picture). It created the center space as a courtyard, which embodied the centripetal force and affinity of space, and ensured the private space and sense of security and belonging. This style was kept close to the nature and offered nice visualization as well.

(3) Public space. This was a place for public activities, where people could do some leisure exercise. There were squares, clubs, small garden, etc inside.
Target Customers

The people of high-income groups with a strong Chinese national feeling were considered target customers of the project.

5.1.2 Analysis of Overall Planning and Cultural Factors

5.1.2.1 Overall Planning

The overall planning of the Fifth Garden was based on the theory of the Garden City from Howard and the neighborhood units from C. Perry.

The Fifth Garden was built as one of the Garden cities surrounding the central area of Shenzhen city. It located in the suburbs area and a bit far away from the city center with two main roads connecting to the central city. It was also surrounded by agricultural land being natural green-belt. The inner planning for the Fifth Garden was similar with Howard's Garden City as well. A public green space in the central of the Garden was equivalent to Central Park for the Garden City. Four main roads, which divided the city into four zones, radiate to outside area from the center. Apart from the main road, many small paths intertwined in the park and provided very convenient transportation.
In addition, the planning for the Fifth Garden was also in uptake the theoretical method of neighborhood planning units. Communities should have primary schools, hospitals, clubs, fitness centers and other facilities to meet daily needs of residents. The community as a whole was divided into several independent small communities in accordance with the different type of housing. In these small communities, each of the two adjacent buildings formed into a group space, which was a relatively independent and closed. Motor vehicle traffic was prohibited between group and group, to provide safety to people to walk across.

The two theories simultaneously applied to planning and design practice were an innovation for the Fifth Garden. Based on the local realistic situation, the designer combined the selected elements in the two theories together, which had gotten a better result.

5.1.2.2 Cultural Factors—the Residential Characters

"The more the nation, the more the world", this remark was applied equally to real estate in China (Figure 5.2 and 5.3).

Visiting the Fifth Garden, I had the deepest feeling that Vanke Fifth Garden was a highly personalized modern residential area, which was full of the Chinese tradition style (Figure 5.4 and 5.5). It was a great example of combination between traditional and modern style. The main design idea was to express complex motion of Chinese tradition. It incorporated the essence of many Chinese-style architectures, such as four court gardens in Guangdong and traditional courtyard named Siheyuan in Beijing, and modern architectural features and culture to form a unique new modern Chinese architecture, and adhered to the "original modern Chinese" concept. However there was neither simple copy of the courtyard, nor mechanical imitation of Chinese architectural symbols, nor only the spirit of Chinese architecture. While retaining the essence of culture, it was satisfying a modern space requirement.
For thousands of years in China, either residential or palatial constructions, the wall was a core of outstanding external manifestations. In particular Chinese residential areas, the combinations of long or short and high or low wall formed Chinese-style houses (Figure 5.6 and 5.7).

For sure, the external walls of traditional houses for defense could not match modern life, but its privacy protection was valuable for owners. Therefore, it was very important to avoid the drawbacks of too much suppression if people would like to use these walls for the privacy and scene intention. From my point of view, the basic architecture element of The Fifth Garden was the wall. However, obviously, a large number of improvements had been made on these walls. They retained in visual aspect, but changed in functions. For instance, while they maintained the basic form, the traditional "little windows wall", there were also "large windows wall," "multi-windows wall" and "low windows wall" (Figure 5.8). This design would not make people feel depressed like before. In this way, it not only inherited the tradition, but also met the needs of modern living.

(1) White Wall and Green Bamboo
In addition, several holes were dilled in some of the walls in the Fifth Garden. Among them, one was vertical gap and the others were horizontal narrow gaps. But no matter what, they were all opened either very high or very low (Figure 5.9). Therefore, it is difficult for outsiders to look through the hole. The glass brick wall was also used in the design, which could ensure good ventilation and lighting system and privacy as well. The rooms were full of nature light all the time. Meanwhile, large-scale of "double wall was adopted" with outer and inner walls. The outer walls were designed with small holes, narrow gaps, and glass bricks, which built outside of the courtyard and the inner walls were in accordance with needs of modern design, which were the main building separated by the space. Both of them are beautiful and practical.

![Figure 5.8 & 5.9 The small windows on the wall](Image)

Source: taken by author, 2009

**(2) Courtyard and Villages: Chinese "small world" Complex**

In the Fifth Garden, the courtyard was the favorite part of the designer as Chinese people still would like to have their own "small world." This was also in conformity with their implicitly introvert temperament. (Figure 5.10, 5.11)

![Figure 5.10 & 5.11 Courtyard and lanes](Image)

Source: taken by author, 2008
Villages

In my opinion, the community seems like a large village with clearly border. It is composed of many small villages with different construction styles. The constructions are linked with each other by a semi-ring road and the main road in the area. Trails, walking paths and leisure space are scattered in each small village. Such a pleasant scale constitutes a comfortable living space full of human kindness and has also an embodiment of neighborhood relationship.

Lane

As mentioned above, the Fifth Garden had borrowed some elements of Guangdong Gardens. Among of them, cold lane and bamboo house were mostly adopted. In the Fifth Garden design, designers had fully utilized the light and shadow to enrich the landscape space in the small courtyard, wall, window, corridor, holes, etc. Simultaneously, the owner of the house could enjoy the sun and breeze. Also, the design had improved the landscape comfort and the energy consumption.

Courtyard

Courtyard house was the common style of neighborhood relations in the south to Yangtze River in China. The Fifth Garden design had considered the local climate characteristics. So, in space aspect, it highlighted the advantages of courtyard and made an effective communication between open and private space in modern architecture.

In the community, the most prominent expression for the courtyard would be in the Townhouse, which had its own inner courtyard. Several townhouses were combined together as a Siheyuan garden or Liuheyuan garden. Villa looked like a three-dimensional compound combined with courtyard and balconies. Small multi-storey and high-rise houses were combined together as a large courtyard. If the inner courtyard, Siheyuan and Liuheyuan were on behalf of the living tradition of Chinese people, the large courtyard would be the modern urban living form in China.

Through the courtyard, one could sense the unique implicit character of Chinese civilization. However, the courtyard was not just a Chinese residential feature as palaces, temples and some other architecture were also taking courtyard as the activity center.

(3) Simple Color: Black and White

For thousands of years, Chinese residential buildings were very modest all the time and the blank color was a key feature. Black, white and gray were the main expression. Black and white was usually used in southern China and Gray was used in the northern China. Obviously, the Fifth Garden was an extension of using the Southern style color. Once you were in the garden, the brightness with strong visual impact would catch your attention immediately. A Large area with white walls had an intense contrast to the black building roof, which created a simple and peaceful world out of the complex one.
5.1.3 Analysis of Artificial Landscape Factors

The successful design of the Fifth Garden was not only due to the overall planning and architecture style, but also the specific landscape.

5.1.3.1. Service Facilities

The master plan of the Fifth Garden was based on Neighbourhood Unit and Garden City theory. In the community the quality of life was improved by a variety of facilities, including libraries, grocery stores, schools, fitness centers, activity hall, hospital, etc, which were designed to meet not only the basic daily living but also higher quality living needs.

5.1.3.2 Landscape Factors

(1) Green Space Factor

Many bamboos were planted in the yard besides the side walls, lanes and the corners, which were treated as a green background and a relatively independent barrier between different spaces. Furthermore, as it is an upright symbol in Chinese culture, it reflects the harmony between green landscape and spirit environment. This kind of design could alleviate the monotony and depression of white wall. On both sides of the main roads, trees and shrubs are the best choice. (Figure 5.12 and 5.13)

![Figure 5.12 & 5.13 The green space of Fifth Garden](source: taken by author, 2009)

(2) Water Space Factor

The design of the Fifth Garden adopted a large water area as the main landscape rather than decorative or symbolic scenery as it was mainly based on the southern classical garden theory. The water surrounding the house was integrated with sky and created illusion image (Figure 5.14 and 5.15).
(3) Pieces Factor

The pieces factor in Fifth Garden was not full of features. Its style looked the same with other place. It was just the appending of the layout. In the following charts, there was a modern sculpture (Figure 5.16). Four rectangular stainless pieces were got together in order to express unity and harmony. However, this sculpture was not matching with the overall style of the residential area. This design can not be regarded as a success. Oppositely, the stone lion in right picture was a good example (Figure 5.17). Although its body was small, it was in harmony with the overall atmosphere of residential areas and improving the landscape quality.

(4) Public and Private Space

In the Fifth Garden, there was no significant distinction between public and private space. Probably, due to the impact of traditional Chinese-style, no large-scale public space was inside. It prefers more small courtyards or bridges than squares. So, some big lot was still separated by different paves. The private environment was generally combined with mostly low shrubs and bamboo (Figure 5.18 and 5.19). These plants had spatial segregation function and also created better environment. In general, the design of the Fifth Garden was a good example of integrations between residential style and its environment.
5.1.4 Some Disadvantages

Although the overall design of the Garden was going well, there were still some small design drawbacks. For example, the overall space was neglected in order to highlight the small courtyard. Local landscape was quite exquisite, and on the contrast, public space was too simple. At present, the public green area seems too small and no large public recreation center is available. Besides, sunlight reflection is a serious problem in the summer in the entire district due to the large-scale use of the white walls. Moreover, the white wall gets dirty easily and not suitable for long-term use.

For the evaluation criteria of view in terms of sustainable landscapes, the design of the Fifth Garden did not match the requirements well either. Water resources would be inevitably wasted in order to maintain large water body areas although it could create nice scenery. Also, no any particularly energy-saving system was included in the design. These issues should be avoided in future planning.

In short, the design of the Fifth Garden was a successful case in business and received good comments from the majority of the customers, which also provided an excellent example in the application of Chinese traditional garden art in residential landscape.

5. 2 Vanke Crystal City – The Future on the History

5.2.1 The Natural Factor and Overview of Crystal City

(1) Natural Factor and Site Analysis

Vanke Crystal City is located in the south of Tianjing city, which is in the north of China, and a heavy industrial manufacturing city as well. It was established as a comprehensive and high quality residential area in 2003. Originally, the site was used by the Tianjin glass factory, which was surrounded by a river. Vanke Crystal City had 507,200 m² residential area and 384,100 m² land area, in which 45% greening rate and 2600 houses with 8323 population were in the construction area. (Figure 5.20) It is usually dry and cold in Tianjin. The temperature is usually below zero in winter.
(2) Architectural Forms

In Crystal City, there were various residential types, including united villas, single-family villas, small high-level house, and courtyard house, etc.

(3) Target Customer

Mid-class+

5.2.2 Analysis of Overall Planning and Cultural Factors

5.2.2.1 Overall Planning

Groups with Various Characteristics and Neighborhood Space

To match the allocation of district resources, the residential buildings were divided into three categories: the scenery combination, townhouse and apartment.

(1) The scenery combination

The whole district was created by the concept of neighborhood unit. (Figure 5.21) Two residential buildings with opposite entrances from each other were designed as a neighborhood unit and formed a neighborhood space. It emphasized the flow of indoor and outdoor space and improved the opportunistic for residents to communicate.

The spatial scale was followed the principles of behavior. As the human scale was taken into account, citizens could have security and comfort sense. The ground elevation and
landscape configuration were different from the external space. Meanwhile, the neighborhood group was a relatively closed area. A relaxed resident area with peaceful atmosphere was created as traffic outside the neighborhood was avoided.

![Figure 5.21 The group space and neighborhood space](source: Crystal City homepage, 2009)


(2) The combination

① Courtyard in front of building

② Landscape along the river

③ Artificial channel

④ Roads

⑤ Public green area

⑥ Sub-district roads

Besides the river, each group had its public space connecting to the river bank and their own gardens and children's venues. Different constructions combination created a relatively independent to external but rich for inner. (Figure 5.22)
Efficient Transportation System

(1) The gate settings

Taken into account the residential location and the planning of external traffic flow, four entrances were built for the community. The southeastern one was designed to be the main residential entrances for both citizens and vehicles.

Remarkably, the residents could reach any entrance from their home by a 5-minute comfortable walk as the distance between them had been designed as short as possible.

(2) Road design

The four entrances were connected to each other by the primary-ring roads. Part of the road was designed for parking but still enough for vehicles to get all groups efficiently. The clear traffic network was a good circulatory system to ensure efficient traffic flow inside the community.

(3) Parking System

According to the study, there were several different parking solutions in different regions with the population density in Crystal City. By making full use of the spaces like road parking space, space gap between groups and the overhead layer, a part of ground parking problem could be solved. The separated garage was designed in united Villa to enhance the residential quality and the underground garages were in apartment buildings. All these solutions provided the convenience by shortening the distance between parking place and home and by reducing the noise and visual disturbance. (Figure 5.23 and 5.24)

(4) Road System

In the community, vehicle lanes and pedestrian lanes were separated. Walking system was an independent system to make sure that residents could do exercise conveniently and safely in the district.
5.2.2.2 Cultural Factor—the Residential Characters

Compare to the community mentioned above, the design of residential area in the Crystal City was European-style. (Figure 5.25)

Combining the historic heritage and the current situation was the main characteristic of the design of Crystal City, in which the historical factor was the first consideration. The designers had reserved the originals from the glass factory as much as they could by conscious selection and integrated them into the planning of the community. This was a bold attempt, but also a unique feature for residential design.

Figure 5.25 The European style residences
Source: taken by author, 2008
Construction and garden factor were generally two forms of historical reservation, such as the large hammock workshop, well-grown forest and complete retention of the railway (Figure 5.26 and 5.27). Both were historical elements and also an important symbol of the community, which could create a free and natural landscape.

There was a different aspect that in Crystal City, the relationship between old things which inherited from the history and modern style buildings was overlapping. The new construction superposed on the old ruins. Due to the constant stimulation from the outside world, the old things could have more development to become a sustainable factor in community. For this reason, I think Crystal City is historical as well as modern.

For instance, the central zone of new buildings and old building was superimposed. The cultural area, which was named by us, was pedestrian-oriented. In this area, a strong superimposing was created by the road network, spaces, as well as a sense of scale. The cultural area was designed to be the joint point of small residential area, a small center of the public living, the center of avenues and the center point of all the natural forest belts. It could be viewed as a mix of two completely different styles of today and yesterday.

In addition, the central hall was designed on a place where it was a huge material depot in the past time. It worked as the public living room of the community just like a square of a city in European. It was located on the "Y" point of landscape in overall planning. Also, it was the geometric center and visual focus of the area.

In the community, both new and old elements were integrated together everywhere. For example, the entrance was designed in modern style and looked like a large glass box, which helped to highlight the theme of the area and catch people's attention. Meanwhile, several courtyards and many old trees inside the buildings had been reserved from original site. These two factors did not have conflict effect to each other, but match each other.

5.2.3 Analysis of Artificial Landscape

5.2.3.1. Service Facilities
In the community, elementary school and kindergarten had 13,000m² and 4,000m² area, respectively. Besides the school facilities, a 4,400m² and a 6,900m² area in the community were for community clubs, business and shopping center. In addition, surrounding area of the community had become a living center including supermarkets, shopping malls, hospitals, schools and some leisure facilities for both elderly people and children as well. It was a well-developed community with all needed service and completed facilities. (Figure 5.28 and 5.29)

5.3.2.2 Landscape Factors

(1) Green Space Factor

Illustrated in the pictures below, these were two resident leisure places in Crystal City. It consisted of rows of trees and a number of small venues which broke the mode of inherent pattern of the whole square. (Figure 5.30 and 5.31)

Within this area, there were lawn, various shrubs, small trees and also a number of seats, stone bench, and wall. The space in the area was enriched by the layout and looked more alive. Particularly, a streamlet running through residential area allodia had brought more
dynamics to the landscape. The landscape then became more alive and full of vitality and therefore, it attracted residents staying as hydrophilic nature of human being.

(2) Water Space Factor

There were several water landscapes in Crystal City, in which two of them marked in the picture were very impressed.

![Figure 5.32 & 5.33 The fountain and water space](Source: taken by author, 2009)

The water sculpt in the first one was designed as a square shape with fold water, in which soft and decent black marble was used on the outside wall. The other one was circular water sculpts built with marble and sandstone, which were disposed along the flown line of the circle. Both of them were unique water sculpts with limited shallow water volume about 30cm depth according to the principle of the landscape design of inhabitation. This design was also considering the safety for both children and old people, especially in summer time, children could play in the water. (Figure 5.32 and 5.33)

(3) Landscape Pieces retained from Relic

The designers had chosen some parts of the items from the Glass Company, transformed and re-shaped them to be a sculpture used in the area (Figure 5.34 and 5.35). They were the witness of the city during industrial time and became a symbol of Crystal City. They provided the significance information on history to the community and reminded people to memorize that period. Meanwhile, they also embodied the culture and spirit of the district. As Tianjian was an industrial city in old times and with rich history in modern times, reservation from the inherited elements in design could combine the old and current history of the city together. Meanwhile, it also highlighted the unique characteristic of the city.
(4) Public Space and Private Space

Compared with the Fifth Garden, Crystal City had plenty of public and private areas with clear boundary between them. Public areas included tree plaza, fountain plaza and culture plaza, which showed the construction process of Crystal City. These public areas could provide comfortable environment for communication. In other words, the private space was divided into two categories. One was the group space independent of public space. The other one was a space separated from public space by plants and other barriers. Both of the two were covert and safe. (Figure 5.36 and 5.37)

5.2.4 Some Shortcomings

In Crystal City, plant species were not well selected as most of them were deciduous plants and did not match the regional characteristics. Due to Tianjin is in the northern China with cold winter, there would be no green at all in winter. If more evergreen species were planted, this situation would get much better.
5.3 Bo01-Area in Western Harbor

5.3.1 The Natural Factor and Overview of Bo01

(1) Natural Factor and Site Analysis

Bo01 was selected as the focused case study as it was the first development stage of Västra Hamnen (The Western harbor) and also it has been developed pretty well nowadays.

The Western Harbor is located in Malmo, the third largest city in Sweden with 265,000 inhabitants, and situated on the southern tip of the country close to the Oresund Bridge that leads to Copenhagen. (Figure 5.38) The residential area is closed to the Baltic Sea by oceanic climate. There is windy and sunny in summer, but cold in winter.

Only a few decades ago, the site was a contaminated industrial area and shipyard, but today this neighborhood of 1,000 homes combines the high density with largest green area of an urban centre. The project planning started in 1997 and the energy system was finished and in use in May 2001. Eventually, about 30,000 people would live and work in this area, in which 10,000 people are residents and others are business persons.

(2) Architectural Forms

In general, Bo01 areas included combined buildings by the apartments with roof-platform and independent houses with separate balcony. Most of the construction of the buildings was designed with 3-6 floors (Figure 5.39 and 5.40).
5.3.2 Analysis of Overall Planning and Cultural Factor

5.3.2.1 Overall Planning

The overall planning of Bo01 area did not follow the theory of Garden City or the neighbourhood unit. Instead, it had been infiltrated by theory of organic decentralization, in which Saarinen suggested that residential areas should be away from the city centre in order to achieve a better living environment.

The design of Bo01 area was just as what Saarinen suggested. It was not located in the city centre, but with well-developed transportation system. A bus station about 300 meters away from the settlements was built and every 7 minutes, the bus connected to the city's main roads. Three sides of the residential area were facing sea and the other side was along with the new technology development area. The entire area was surrounded by beautiful nature.

The selection of location was considered to combine the advantages both in urban and in rural areas, and fully compliance with the Saarinen’s idea of the city planning. In the design, the areas for activities in regional arrangements were centralized to minimize the traffic problem. Residents could walk and cycle to the area instead of taking public transportation. This also reduced environment pollution.

Bo01 living area was a loose network structural construction. This kind of residential network would provide different route for pedestrians and welfare facilities for family life.

5.3.2.2 Cultural Factor---The Residential Characters

The Western Harbor is a typical urban redundant industrial land with contamination and having negative effect on environment. On the other hand, this area has many positive

(3) Target Customer

Mid-class+

Figure 5.39 & 5.40 Concise and modern residences in Bo01
Source: taken by author, 2009
aspects in terms of the location facing the sea and next to the beach and the city centre. Therefore, Swedish government has launched a project to build a 100% ecological area in Malmo. The aim of the project was to establish an eco-area as an internationally leading example based on the local environment of a dense urban region. Meanwhile, it would also become a driving force in Malmö’s development towards environmental sustainability.

Ecological Sustainability was the main idea of the project and the main feature of the area as well. This concept was permeated in the whole process of planning and construction work. Many innovative ideas and new techniques were used to enhance the environmental standard of the area.

(1) Energy System—100% Locally Produced Renewable

It has been developed a new energy system for the district based on 100% locally renewable energy. This was an innovation in city construction especially for residential areas. In Bo01 area, the system could provide energy from renewable resources for 1000 homes, in which, a large wind power station (2MW) and a 120m² solar system were built in Norra Hamnen (the north harbour). Both could provide electricity for the apartments.

![Figure 5.41 & 5.42 The roof with photovoltaic panels](source: taken by author, 2009)

Most of the areas on the roof with photovoltaic panels, it could provide heat and cooling for buildings (Figure 5.41 and 5.42). Solar energy could produce in excess of twice of the energy required for housing. Excessive amount of energy sold to the Swedish heating plants and then returned through heating by residential area. In addition, all the buildings glasses had three layers, which could able to achieve the purpose of insulation. The most outside layer of transparent could make the whole room become warmer through the air flow in the argon gas.

A unique part of the energy concept was that the plants were linked to the energy systems in the city for district heating, district cooling and the electricity grid. The 100% renewable energy equation was based on an annual cycle, meaning that at certain periods of the year, the city district borrowed from the city systems and at other times the Bo01-area supplied the energy systems with its surplus. This connection also provided reserve capacity for the area.
(2) Waste Disposal System

Besides the renewable energy, the Bo01 area was also a community with eco-system. Different waste was separated from each other through a unified way and recycled, such as biological waste and recycling material including newspaper, glasses and cardboard. To achieve better result in practice, the waste separation unit was built up close to the houses, which provided convenience for people to follow the eco-idea. Furthermore, two parallel systems have been set up for food waste.

Sustainability and recycling of the material used for road and buildings in public areas have been fully taken into account. For example, the foundation of the street road has been built by recycling material.

(3) Local Storm Water Management

Usually, water disposal system is regarded as an important indicator to judge the urban development. Being a new district, the design of Bo01 area has paid more attention on water disposal system. In addition to the general water treatment about life and production, a local storm water management was in this area. There was a unified collection of storm water. This area could save plenty of water resource every year by the implementation of the program. I think some other cities and residential areas could learn some lessons from it. (Figure 5.43 and 5.44)

This system is not only good for saving resource, but also better for green plant. Cities grow and green areas shrink, both in Malmo and the rest of the world. A plenty of the rainfall could not infiltrate into the ground and be taken up by plants. Therefore, the open storm water run-off system was a significant feature for the Bo01-area. Rain was delayed on green roofs, in courtyards and public spaces and then transported in open channels and ponds to sea. The visible waterways combined with trees and lush undergrowth provided beautiful and irretentive urban environment. Today, people feel more and more difficult to meet increasing need for access to nature. I think the ideas implemented in the Bo01-area show us how we can minimize the effect of urban sprawl and make the local environment better and greener.
5.3.3 Analysis of Artificial Landscape

5.3.3.1. Service Facilities

Lots of facilities were designed in the community, including facilities for disabled person. Shops, restaurants and canteen are in the first floor of the houses. However, there were no hospital, school and fitness centers in the area.

5.3.3.2 Landscape Factors

(1) The Green Space Factors

In the Bo01 area, the houses were built close to each other for sustainable reason to use less land. On the other hand, the layout of the house provided enough spaces and did not create crowded feelings to people. The plenty of green vegetations and ponds in the courtyards together with green building roofs and liana species created green space element system (Figure 5.45, 5.46). These green spaces could improve the microclimate and also the residential environment.

![Figure 5.45 & 5.46 The public green space](source: taken by author, 2009)

(2) Water Factors

Bo01 is surrounded by the sea on three sides so that sea scenery is the best landscape for settlements. On the connection between sea and the road of inhabitation, there are many of big rocks, the width of it is from 1-2 m and becomes a natural buffer zone. This design provided not only very nice visualization effects, but also people with a comfortable water environment. People could lie down on the rocks listen to the sound of the sea and enjoy the sea breeze and sunbath. This beautiful place also attracted many tourists.

In addition to natural sea landscape, a water body landscape was also designed at the entrance of the settlements which was set off the bottom of building and expressed the perfect combination between movement and stillness. However, it inevitably looked miscellaneous in such environment.

(3) Landscape Pieces Factors
In contrast with the other two cases in China, Bo01 area had the least number of landscape pieces. The reason for this is, perhaps, due to the natural-style gardening in Sweden. As Sweden has rich natural resources with small population, most of the landscape derived from the natural landscape. People are also happy to enjoy the nature. Only a few artificial landscape pieces were designed in the district including two similar pieces of rainfall as the water resource. As lacking of rain, the pieces become sculpture. Such unique design shows the sustainable concept again. (5.47, 5.48 and 5.49)

Figure 5.47, 5.48 and 5.49: Landscape pieces
Source: taken by author, 2009

(4) Public Space and Private Space

In this area, the layout of most of the houses were designed to form a “U” shape-like, which includes one round side and one open area on the other side. This arrangement provided more public space and meanwhile created many small courtyards in street area, in which a quite and warm private space formed as green garden. (Figure 5.50)

The main public space in the settlements included a Plaza with steps next to the sea and
a glass greenhouse. In addition, a number of coffee shops and outdoor cafes were scattered and people could have a rest with a couple of coffee or tea. In order to provide sufficient space for activities, there were large areas of lawn extended to the other end of settlements in the space (Figure 5.51). Large areas of lawn extended to the other end of the settlement were designed to provide enough activity spaces.

The public and private spaces were related to each other although they looked like independently. Such design brought nice impression to passers and combined the buildings and nearby spaces.

![Figure 5.50 & 5.51 The public space and private space](source: taken by author, 2009)

### 5.3.4 Some Shortcomings

Although less artificial water features were designed in the settlements, this still caused serious water pollution as garbage and algae were floating on the surface of the water, which had strong negative effects on both the overall ornamental landscape and people’s life. This problem should be resolved urgently to prevent getting worse.

In general, the design of Western Harbor is a successful case with ecological and sustainable idea. Meanwhile, it brings a new concept to the design of residential area and urban development. Latter designs could borrow the concept. However, many historic heritages including beautiful industrial buildings were located in this area and, those reservations did not have impact on the development of the region. On the contrast, they brought the unique identity to the region.

In the future program, different types of house will be designed to meet people’s needs. In urban area, the environment should be designed to integrate to nature and form a well-balanced community by combining the building, green areas, activity spaces, school and all service facilities together.
6. Conclusion

Landscape designers have been paid more attention to the development of residential landscape all the time. The environment of residential district has very close relationship with human’s life. Meanwhile, it has vital effect on the city’s development. Therefore, creating a nice living environment becomes the common goals. As the residential area is not only a place to live, but also a place to have activities for residents and the quality of the residential landscape also has strong effect on people’s life, landscape designers should focus on the aspects to meet people’s needs including both physical and spiritual.

The common problems in development of residential areas in China, such as the similar layout design and sustainability neglect, have been discussed in the thesis. Meanwhile, some concepts and classification related to residential area and landscape were provided. Also, three specific cases have been selected to analyze part of the design methods and principles of residential landscape based on the planning theory and models for development.

Through the analysis of the selected cases, the design methods and principles for landscape were summarized to provide useful information and hopefully, to have some help in landscape design in future.

1. The issue of high similarity in design and lack of characteristics for residential landscape. First of all, the reasonable utilization and development planning based on the local situation in the residential area should be the guideline philosophy in the design. Then, further unique design should be added on the basis of inspiration from historical and culture resources by taking essence from raw materials. The landscape will have its own characteristics and be more viable if the historical and culture factors were integrated into the design. Being such, the design of the Fifth Garden and Crystal City are good examples. In addition, it has different ways to highlight the characteristics of the landscape by, for example, combination of artificial and natural landscape.

2. The issues of emphasis only on the landscape styles, but lack of functions in the design of residential area. The first consideration in residential area design is the basic function of the areas to meet different people’s needs at most, such as quite space for elder people, entertainment place for children, and especially the facilities for disabled person, which needs to be specially designed. Based on the functions, more detailed designs could be added to enrich the landscape, which are not only decorations, but also could bring more interests to people. The layout and style of the design then should be considered after this.

3. The issues of energy-consuming and pollution in residential area in every step of residential construction. First of all, a sustainable perspective should be added in the planning of residential area, in which the sustainable energy and material should be used. Eco-friendly and energy-saving material for construction should be first considered, such as solar energy and wind power. This is not only saving energy resources, but also having good impact on environment. In this case, Bo01 was a good example. In the scenery design in terms of energy efficacy and sustainable landscape, the design should match the local natural conditions. For example, the water landscape would be the first choice in the region with rich water resource by using recycling water system. However,
large artificial water products should be avoided to prevent water resource waste.

In conclusion, landscape being an important part in residential area has been caught much more attention as nice landscape could provide convenience, entertainment and ‘high quality’ life. However, the design of residential construction is still ongoing and in progress along with the development of the society. Hopefully, the result of the study could also provide some useful information for Chinese residential construction.
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