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PLANNING URBAN NATURE

Urban green space planning in post-1949 China:

Beijing as a representative case study

A thesis
submitted in fulfilment
of the requirements for the Degree of
Doctor of Philosophy in Landscape Architecture

at
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by
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Planning urban Nature

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by

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Planning urban landscape is part of the process of adapting the physical environment to better fit with human needs and desires. In China, urban green space is the result of such human adaptation of natural environments. This research analyses the evolution of post-1949 Chinese urban green space development in terms of how urban nature has been conceptualised, valued, used and planned within the Chinese context, and the underlying driving forces for the evolution. Beijing provides an effective, historical and comparative demonstration of this evolution because it is China’s capital and immersed in the very socio-cultural, political, economic, and environmental conditions that underpin new planning approaches.

Urban green space development in China synthesises the influences from the Soviet, the West, particular Chinese traditional values and government aspirations. This has produced a distinctive Chinese pattern of adapting natural environments: retreating from reflecting political ideology and turning to pragmatism; valuing nature more for its own sake; establishing green space as a necessary and primary land use rather than serving as a standby for other land uses.

During this evolution, various planning approaches to urban green space emerged on a “societal demand – supply of green space” basis - the quantitative approach, greenbelts and green wedges, the “filling in” approach, establishment of scenic spots and nature reserves, park hierarchy, the ecological approach, and the new Feng-shui. Overall, urban green space planning scope has extended fundamentally from a city-centred to a regional focus with a wider landscape ecological content. The prevailing subordination of urban green space planning to master planning in conventional planning frameworks has loosened. There is a growing trend towards urban green space planning as a prime determinant in urban planning process. Overall changes indicate a fundamental shift from an unconscious, reactive, narrowly focused, and in some ways contradictory view of urban green space,
towards a more comprehensive, integrated and future-focused way of conceptualising and managing urban nature.

With regard to essentially different planning philosophies and focuses, I categorised these various approaches into four types of planning strategies, namely haphazard provision, standards-oriented, usage-oriented and conservation-oriented strategy. They were compared for their strengths and weaknesses as planning tools when addressing various demands.

The study lastly calls for a systemic and flexible planning strategy - multilevel and multifunctional, with an emphasis on ecological functions to deal with today’s complex urban socio-environmental problems in China. Such a strategy would need to recognise the challenge for any one approach to address all the problems, instead adopting multiple complementary and synergistic approaches.

**Keywords**: Beijing, environmental planning, functions and values of urban nature, landscape architecture, landscaping history and evolution, landscape ecological planning, urban green space planning approaches, urban landscape and environment, post-1949 China
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Well, I do not quite know where to start.

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I know that finishing a PhD study is just a start of a long journey as an academic. Even though it might not have been directly related to my thesis, through this study, I experienced different cultures, different ideas, and some interesting topics and thoughts. These interactions did inspire me a lot. I hope I have learnt from this and can continue to develop this broad thinking through my career.
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Chapter 1
Introduction

1.1 Research background and contributions

Urban green space planning and management, as a public planned activity, is a relatively new phenomenon worldwide, although the concept of greening and beautifying our settlements (i.e. amenity planting, landscaping or private gardening) was deep-rooted in history. The world’s first public parks were established in Europe and North America following the Industrial Revolution during the 18\textsuperscript{th} and 19\textsuperscript{th} centuries, in response to public protests against stressful living conditions, and to improve social equity and livability for all, in tune with a growing liberal democratic movement (Benevolo, 1967; French, 1973; Turner, 1992).

Since then societal transformations, together with a series of environmental conservation movements have profoundly changed the views, perspectives and attitudes towards green space in the city. There accordingly emerged new green space planning strategies and practices in the West, such as greenbelts, greenways, ecological networks, green structure or green infrastructure. They emphasise the importance and roles of ecological corridors for urban biodiversity, floodplains and natural filter beds for water management, and greenways for pedestrians and cyclists - to achieve new multifunctional land uses in the city (Beatley, 2000; URGE-Team, 2004; Werquin, \textit{et al.}, 2005). Such a transformation in the way green space is configured in cities is in a sense a reflection of a basic human need to reconnect to nature and land-based roots.

While the majority of green space studies and theory are based in the West, especially European and North American experiences (such as the works of Turner, 1992; Beatley, 2000; Tjallingii, 2005a; Clark, 2006), Chinese green space planning and its evolution, has not previously been explored. However, especially after 1949 as China experienced significant reforms and then rapid urbanisation, there has been a corresponding need and desire to accelerate understanding, policy formulation and planning of the urban environment. This study sets out to document this history within the Chinese philosophical, cultural, and material context. It is anticipated that such a study may introduce further and broader understandings of the role of green space in urban planning and human adaptation of natural environments, and offer new insights in areas that overlapped urban and environmental issues. Additionally, my aim is to construct a database to provide documentary evidence for other countries’ researchers who might be interested in studying or comparing Chinese urban green space planning in relation to international conditions and trends in urban green space development or related topics.

In China, there are now numerous research studies on some specific aspects of urban planning, land use and urban development both in Chinese and English. Most of them focus on urban housing/transportation policies and administration in the pre-reform era 1949-1978 (Ma, 1979);
various types of sectoral-functional urban plans (Kwok, 1981); urban forms and planning ideology (Lo, 1987); urban design principles and practices (Xie and Costa, 1991); and also some issues on urban planning itself, such as norms, technical, methodological aspects and institutional organisations (Khakee, 1996). However, there has been little research (if any) or no integrated research conducted on the theory and methodology of urban green space planning as a whole, especially from the historical and comparative perspectives of what changes it has gone through since 1949, if it has responded to the ever-growing demands, and what we can learn from this unique oriental evolution.

China is now at the stage of reshaping its urban landscape and accelerating its urbanisation at an astonishing speed. Urban green space was relegated to a position of secondary importance. But it has been increasingly recognised and even brought to the fore when addressing issues such as conflicts between city developmental requirements and the competing need to preserve cultural and natural resources. Consequently, urban environment-related work has become one of the most rapidly-developing professional fields in China (Beijing Municipal Bureau of Landscape and Forestry, 2009). Conventionally, urban green space plans, designs, and management works are supervised by urban planners and landscape architects, but these professions are increasingly receiving support from other disciplines. It is anticipated that this analysis and resulting lessons within the specific Beijing context will reveal the bridge linking ecology, landscape planning, public administration, sociology, economics and allied disciplines, and will point the way to avoiding any observed mistakes for other Chinese cities. Such a study may form a base line for analysing and refining future developments in the course of rapid urban growth and evolution of mega-cities.

In summary, this study is the first integrated exploration of the evolution of Chinese urban green space planning history, theory and practice. The main contributions of this study consist of: internationally, to provide an understanding of how the views and perspectives of urban green space and its corresponding planning strategies have changed within the Chinese context and what relevance this has to be with the global discourses on such topics; domestically, to fill the gap of lack of a historical and comparative perspective on urban green space planning studies among a considerable amount of Chinese urban studies; and to promote awareness among policy makers, urban planners, landscape architects and social activists of the importance, potential and efficiency of developing a proactive, environmentally responsive and integrative approach to our living environment.

1.2 Research problems and questions

Rapid urbanisation and urban construction have led to much planning and development for urban green space in Chinese cities. Many cities have made great efforts to develop urban green space. This has brought encouraging changes (at least visually) in the urban environment in many cities. However, problems of green space development in Chinese cities can also be observed. These include, for example, green space development being ad-hoc rather than strategic, lack of respect for existing
natural resources, lack of consideration for relationship between green spaces, and, sometimes, a short life cycle of green spaces following a “build-demolish-rebuild” pattern (Yu & Li, 2003; author’s personal observations before beginning this study). It seems that the policy makers and urban planners lack a clear vision of how they can improve our cities’ ecological environment. This thesis describes the post-revolution history of green space development and its multiple influences in China, and thus how some of these inherent problems may be addressed.

When looking back on the post-revolutionary history of environmental planning in China, I found it intriguing that Beijing has gone from merely introducing the term “urban green space” from the former Soviet Union to today’s incorporation of ecological functional zones and large-scale regional green structure in line with global sustainability tendencies. China has moved a long way in the last six decades with respect to ideas about how their cities should look, how green space should be conceived in urban areas, and what functions and values are attached to it. This has brought promising changes in the urban environment in many cities. However, problems of green space development in China’s cities can be observed. For example, a conventional planning framework of residential/commercial land use first and last for green space arrangement, a very short life circle of green space construction following “build-demolish-rebuild” (Yu & Li, 2003). Such phenomena indicate that nowadays it seems that the policy makers and urban planners lack of intent to improve the ecological environment in the cities.

I further became curious as to why we need “worthless” green space (in terms of our increasingly expensive urban land market), especially given some opinions that “urban” is essentially the antithesis of the natural. How do these demands and uses change over time and what are the underlying factors influencing this change? How did the approaches and methods pertaining to urban green space planning develop and evolve? Can they fulfill the rising expectations and requirements of Chinese cities and their peoples? What are their strengths and/or limitations and inadequacies when dealing with increasingly complex urban problems? Is it possible to find some principles to guide future urban green space planning and management that is more real and valuable to the life of the city? My country has rich cultures and a long and splendid garden-making history, so what roles did these cultural elements play in contemporary urban green space planning and development? Although this study might be unable to answer all these questions, they provide the motivation and framework for this historic research tracing the evolution of environmental planning.

Specifically, this study analyses the evolution of urban green space planning in Beijing against the identifiable phases of urban planning and development in China. The research questions can be broken down as follows:

1. How have Chinese societal demands for green spaces evolved from the 1949 to the present?
   - What roles and functions are green spaces expected to play over time?
- And what a unique Chinese pattern for constructing urban nature has developed?

2. What planning strategies have been applied to green space over the years?
   - Do they evolve in response to the societal demands for green space in urban development?
   - What can we learn from their strengths, limitations or inadequacies as planning tools?

3. What factors and processes have driven the evolution of Chinese society’s understanding, and planning urban nature?

1.3 Research goal and objectives

Planning urban landscape is part of the process of adapting the physical environment to better fit with human needs and desires. In China, urban green space is the result of such human adaptation of natural environments. This study explores how urban green space is conceptualised, valued, used and planned within the Chinese context to contribute to a broader understanding of such interaction between people and environment. The goal is to establish the theory that green space development in China is grounded on shifting societal demand as discussed in Chapter 6. This type of demand – supply relationship differs from a purely economic viewpoint; rather it is based on evolving and changing societal perspectives on our urban green space. This study also formulates a base for progressive change and improvement in urban green space planning and management in the future through the knowledge of the current state, constraints, loopholes and opportunities that have been identified in the Beijing case study.

The overall objectives may be summarised as follows:

1. To reveal the changing pattern of Chinese perspectives on developing urban green space through examining Beijing urban green space planning from 1949 to the present. This is explored in terms of societal perception and expectations of roles and functions of green space, different planning approaches used, and the underlying influences driving these changes in the broader context of incorporating Chinese social-political-cultural milieu as well as the interaction with Western theories.

2. To discuss the existing issues underlying contemporary Chinese urban green space planning through elucidating the trends, strengths and weaknesses of various planning approaches when addressing the various pressing developmental demands.

3. To identify where China could learn from other countries’/regions’ experiences and provide suggestions for Chinese landscape architects, planners and policy-makers to guide future development towards a healthy and sustainable city; and also to consider if there are any
useful lessons from the Chinese experience for burgeoning large cities elsewhere in the world.

1.4 Research methodology

This study is based on the constructivism research philosophy, where the multiple meanings of social phenomena can be addressed. Such a philosophy is commensurate with the nature of an historical study of urban development, where a city’s development is led by complex and multiple attitudes and aspirations. The inductive research reasoning strategy is adopted by collecting data on characteristics and aspects related to urban green space development, producing descriptions, connecting findings to research questions, and eventually establishing the theory of Chinese green space development - “green space grounded on societal demand”.

The nature of the research, and associated philosophy and strategy together determine the qualitative research method for the investigation. This method usually emphasises the significance of words rather than quantification in the collection and analysis of data. I chose the case study as the main research inquiry strategy to guide the whole research design, as the case study is the preferred method when (a) “how” or “why” questions are being posed, not just what, where and when; (b) the investigator has little control over events, and (c) the focus is on a contemporary phenomenon within a real-life context (Yin, 2008).

Beijing, the capital of China, was chosen as “a representative case” because it has been the centre of debate and philosophy of city planning at a high political level and also it provides more complete documentation of the changes that have occurred in China. Many urban studies have presented that the history and form of change in Beijing mirrors or drives change that has and is occurring in large urban growth areas throughout China (see works of Chang, 1998; Gaubatz, 1999; Tang, 2000, Yu, 2007; Gu, et al., 2010).

Data collection includes government internal documents and archival records, such as historical and current plans’ text and maps, other researchers’ studies, as well as physical artefacts and direct observation. The data analysis mainly involved a coding and clustering process to identify key themes, and patterns towards a deeper understanding of Chinese urban green space. This process also incorporated the other fact that I am Chinese, steeped in the local culture, yet with the ability to view this history through the lens of having lived and studied in a western environment for the past four years. Such an advantage affords me a position to analyse the data somewhat dispassionately or at least with two balancing perspectives.

Overall, the analytical scope is limited to aspects of institutionally supported policies and planning documents, based on the document analysis of a large number of Chinese references which I translated.
into English, and assisted wherever possible by concrete examples illustrating the abstract planning policies or strategies. The detailed research design is in Chapter 3.

1.5 Thesis outline

Chapter 2 is a literature review introducing the theoretical basis for urban green space planning and summarising the comparatively influential concepts, thoughts and movements relevant to urban green space in Europe and North America. The main purpose of this chapter is to develop the theoretical framework for the Beijing case study and provide a comparative platform in a later discussion chapter. Chapter 3 elaborates the research philosophy, strategy and research design, including processes of data collection, translation and analysis. Chapter 4 introduces the ancient Chinese philosophies, cultural context and planning theories that underpin understandings of current urban green space planning and development in China. Chapter 5 examines the Beijing master plans, Beijing green space plans and other relevant government research reports and documents to explore how and why green space has been demanded and used in such ways (at city level) and what planning approaches/methods have been applied. Finally, Chapter 6 is the discussion and conclusion chapter. It starts with discussing the Chinese way of urban green space development - the unique evolving pattern of roles and functions of green space, the implications of such a evolution, the classification of green space planning strategies in China, and the influences/factors driving the evolution. All together point to the “societal demands for green space” theory which my research attempts to establish. The issues underlying contemporary green space planning and development in China are discussed based on a comparative perspective with other countries. Eventually, suggestions are provided for Chinese future urban development towards creating a healthy and sustainable city. The entire study route is shown in Figure 1-1.
Figure 1-1 The entire study route (UGS stands for Urban Green Space)
Chapter 2
Reviews of theories on urban green space

2.1 Introduction

This chapter introduces and explores relevant knowledge about urban green space and establishes the theoretical framework on which Chinese study is based. It is divided into three parts: basic concepts associated with urban green space, pertinent planning theories, and other countries’/regions’ experiences on urban green space planning and development. Through examination of the basic concepts about urban green space in Section 2.2, I identify that urban green space essentially is a continuum whether in terms of geographical locations, types or associated functions and benefits. Due to this characteristic, the core purpose of planning and management of urban green space should be to optimise its spatial configurations to support a suite of socio-cultural, ecological functions and to meet a city’s and people’s needs. This section serves as a conceptual basis for situating the concepts, standards, functions, and other discourses on urban green space within the particular Chinese context. Section 2.3 introduces the relevant planning approaches and associated theoretical basis, which underpin urban green space planning. Urban green space planning itself is not yet an independent discipline. It conventionally was, and still is in many cases, included within urban planning, as a functional plan. But in recent years it has been substantially influenced by the disciplines of ecology and landscape ecology that provide planning principles and guidelines for a sustainable landscape. As most of green space planning theory has its roots in other disciplines, it is necessary to also examine these theories. Section 2.4 mainly reviews the historical and current perspectives from European countries and North America on urban green space development. This section provides a set of criteria or a western lens through which Chinese urban green space planning approaches can be compared and evaluated.

2.2 The concept of urban green space

2.2.1 “Urban” is not just “urban”

This study is limited to urban areas. But, what is “urban”? What areas does “urban” encompass? What does “urban” in “urban green space” stand for?

Humans live in a diverse range of places, which may be categorised as urban, suburban, and rural areas. In the Websters English dictionary, the term “urban” refers to “city”, “town” or “conurbation”,
but is not commonly extended to rural settlements such as a village or a hamlet\(^1\). People often regard urban areas, or cities, as relatively large and permanent settlements occupied by buildings and other concrete surfaces used for houses, industry, commerce, transportation and institutions. These areas have many forms of transportation, such as buses, subways, or trains. Another distinguishing characteristic of urban areas is higher population densities and intensive development in comparison to rural or natural areas surrounding them. Buildings and other structures are built closer together and are much higher than those in suburban or rural areas. All of this sees “urban” as generally depicted as a separate entity from the natural environment (Beatley, 2000).

The threshold for urbanness is therefore defined based on the population density by the government. Different countries have their own quantitative definitions of “urban”. For example, the United Kingdom (UK) defines it as an extent of at least 0.2 km\(^2\) with at least 1500 census residents (Office for National Statistics, UK, 2001) while in China, an urban area is “an urban district, city and town with a population density higher than 1,500 persons per square kilometre” (Liu et al., 2003). The definitions vary considerably in different countries.

Jorgensen (1986) points out that the politically established boundaries for municipalities rarely include the entire geographical area influenced by urbanisation. “Urban”, in academia, has been increasingly seen as anywhere people live in settlements (Bradley, 1995; Edwards and Bliss, 2003). This broad understanding has contributed to a better explanation of the real meaning of “urban” in the context of “urban green space” rather than the governmental census-based boundaries of “urban” areas. And meanwhile, growing numbers of studies have demonstrated that the planning and practice scope of urban green space is not just limited to urban areas in the narrow population sense. The following section will provide a more detailed exploration of “urban green space” definition. Here it can be said that “urban” in “urban green space” not only includes “urban” in the literal meaning. It is a broad concept, which also incorporates suburban and the geographical area beyond that which is influenced by human activities.

### 2.2.2 Definition of “urban green space” as a type of land use in urban planning system

Urban green space may be defined and classified in many ways. The UK defines urban green space as “predominantly unsealed, permeable, ‘soft’ surfaces such as soil, grass, shrubs and trees together with buildings and hard covered surfaces belonging to them” (Dunnett et al., 2002, p. 9). It emphasises the character of “predominant” because green space may incorporate buildings and other forms of hard surfaces inside. Such areas include parks, playgrounds and green spaces specifically intended for recreational use, as well as green space with other origins or purposes.

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The European Union (EU) defines urban green space as “public green space located in urban areas, mainly covered by vegetation which are directly used for active or passive recreation, or indirectly used by virtue of their positive influence on the urban environment, accessible to citizens, serving the diverse needs of citizens and thus enhancing the quality of life in cities or urban regions” (URGE-Team, 2004, p. 13 in Booklet 2).

In the United States of America (USA), many studies with a focus on green space of the central city and suburban communities have been carried out. In “Taking Notice: Green Spaces in Urbanised Setting”, urban green space refers to “outdoor settings that contain significant amounts of vegetation” (Bonsignore, 2003). And also a land use/cover project defines urban green space as “urban areas whose use does not require structures, or urban areas where non-conforming uses characterised by open land have become isolated. Those included are golf courses, parks, recreation areas (except areas associated with schools or other institutions), cemeteries, and entrapped agricultural and undeveloped land within urban areas”\(^2\). However, in North America, these spaces are often referred to by the term “urban open space”, and both terms are used interchangeably (Swanwick et al., 2003; James et al., 2009).

China uses the term “urban green space” officially, referring to “all the green land/area covered by vegetation city-wide” (Ministry of Housing and Urban-Rural Development, 2002). And in China, almost all urban green space is in public ownership except for that belonging to certain organisations/companies.

Although there are differences between the above definitions in different countries, it can be seen that there are two key features in the concept of “urban green space”:

1. dominance of vegetation;
2. an entire geographical area influenced by urbanisation (the entire territorial area, not only built-up areas);

Uggla (2012) suggests that the concept “urban nature” [urban green space] is an oxymoron embracing irreconcilable elements. Compared with a built-up concrete urban area representing “extreme” intervention in the natural processes, green space in cities does not entirely change the intrinsic “naturalness” of the land (such as still providing ecosystem services and supporting natural processes). In this sense, urban green space is very helpful in the protection of some land from extreme human activities and interventions, and balancing the conflict between sealed concrete areas and unsealed natural areas.

2.2.3 Broadening the range of types of urban green space

There are also a variety of ways to classify green spaces in terms of their ownership, use, size, physical configurations, location, historical origins, composition and other characteristics. Traditionally, urban green spaces have been thought of as merely parks and gardens. Along with the progress of ecology and environmental knowledge, and information technology, more elaborate types of green space, based on the various components of vegetation or habitat could be identified and conveniently mapped out in the form of the land use/cover. The types of urban green space are therefore greatly expanded.

Researchers are broadening their scope and gradually becoming interested in any potential opportunities for urban green space. For example, in Spirn’s types (1984), the derelict industrial lands, old quarries and wastelands which were not typically regarded as green space, started to be incorporated in this wider ambit. Similar research includes increasing recent work such as the study by Freeman and Buck (2003). This study produced a GIS-based habitat map for Dunedin City (New Zealand), in which manmade habitats, modified and indigenous native remnants, as well some uncommon types (such as cliff faces, disused quarries, private gardens) are classified. Such studies employ a broad and inclusive viewpoint of ecological processes and nature in the city. And further, this broadening helps to identify the important, but previously omitted and/or excluded green spaces in the urban environment.

China has a National Standard for Classification of Urban Green Space (Table 2-2). This classification is in a rigid hierarchy, starting from five main categories at the highest level, with a number of more detailed sub-categories at lower levels. The first four main categories are based in urban built-up areas while the last one “other green space” is based outside urban built-up areas, but is still counted as being in the city (the entire territorial areas).
<table>
<thead>
<tr>
<th>Classification Source</th>
<th>Types of green space</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban/Metro Open Space Resources (Hough, 1971)</td>
<td>Street and sidewalks, alleys and lanes, public open space, golf courses, cemeteries, institutions, public works property, church property, private open space, setbacks, ravines, valleys, the waterfront, roads, railways, hydro property, vacant lots, etc.</td>
</tr>
<tr>
<td>Urban Vegetation Habitat Types (Spirn, 1984)</td>
<td>Roadsides, street medians and sidewalks; highways, urban squares and plazas, parks, sports fields, institutional grounds, private yards, remnants of native vegetation-hydro (wet), remnants of native vegetation-mesic or xeric (dry), wall, pavement, ROW-roadsides, row-canal, vacant lots (former building sites), derelict industrial land, old quarries, landfill, garbage dumps, and sewage treatment sites.</td>
</tr>
<tr>
<td>Urban Open Spaces (Francis, 1987)</td>
<td>Neighbourhood parks, playgrounds, pedestrian malls, plazas, community open spaces, neighbourhood open spaces, school yards, streets, transit malls, farmers’ markets, town trails, vacant/undeveloped open spaces, waterfronts, found spaces.</td>
</tr>
<tr>
<td>Urban Habitats (Crombie, 1992)</td>
<td>Residential streets (limited habitat), long grass, old fields with some regeneration (limited habitat), urban parks, manicured parks, residential neighbourhood, diverse aquatic habitat, diverse terrestrial habitat, mixed/paved/industrial lands (very little habitat).</td>
</tr>
<tr>
<td>Landscape Ecology: Horizontal Structure Types (Dramstad et al., 1996)</td>
<td>Riparian corridor, strip corridor, trough corridor, wildlife movement corridor, introduced patch, disturbance patch, remnant patch, environmental resource patch, administrative edge, ecological edge, stepping stone, mosaic, network.</td>
</tr>
<tr>
<td>Land Cover (Leete et al., 2001)</td>
<td>Artificial and associated areas, open water, forests, woodland, shrub land, herbaceous vegetation, non-vascular vegetation, sparse vegetation.</td>
</tr>
<tr>
<td>Parks and Recreation (Metropolitan Council, 2001)</td>
<td>Mini-park, neighbourhood park or playground, community park, county park, conservancy lands, regional park, regional park reserve, state and federal recreational lands, community playing field, linear park (trails, corridors, parkways), special features, private recreational facilities, private recreational open space areas.</td>
</tr>
<tr>
<td>Green Space in urban areas (Swanwick et al., 2003)</td>
<td>Linear green space, semi-natural green space, functional green space, amenity green space.</td>
</tr>
</tbody>
</table>

Table 2-1 Different classification schemes relevant to urban green space types
<table>
<thead>
<tr>
<th>Main Categories</th>
<th>Definition and subcategories</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1: Park</td>
<td>Access by all the public; multi-function: recreation, beautification etc.</td>
</tr>
<tr>
<td>G11: Comprehensive Park</td>
<td>Large green area with diverse types of recreation and sports facilities. Sub-subcategories include: G111: City park, G112: District park</td>
</tr>
<tr>
<td>G12: Community park</td>
<td>Green area with certain recreation and/or sports facilities, mainly to serve local residents. Sub-subcategories include: G121: Residential district park, G122: Residential quarter park</td>
</tr>
<tr>
<td>G13: Specialised theme park</td>
<td>Green areas serve specific purposes (percentage of green coverage no less than 65%). Sub-subcategories include: G131: Children’s park, G132: Zoological garden, G133: Botanic garden, G134: Historical garden, G135: Scenic spot, G136: Amusement park</td>
</tr>
<tr>
<td>G14: Belt park</td>
<td>Belt-shaped long green area with a number of recreation facilities, along road, streets, or river</td>
</tr>
<tr>
<td>G15: Street greening</td>
<td>Pieces of small green space along the roads (percentage of green coverage no less than 65%)</td>
</tr>
<tr>
<td>G2: Nursery</td>
<td>Cultivated saplings, flowers, lawn, etc. for urban greening</td>
</tr>
<tr>
<td>G3: Protective green space</td>
<td>For protecting cities, residential areas, highways, and farmland, from natural disasters, such as hurricanes, sand storms, and generally without recreational facilities</td>
</tr>
<tr>
<td>G4: Attached green space</td>
<td>Around or buffering constructions in built-up areas. Subcategories include: G41: Courtyard greening, G42: Commercial and public facilities’ greening, G43: Industrial and manufacturing areas’ greening, G44: Warehouse areas’ greening, G45: Transportation areas’ greening, G46: Road and streets’ greening, G47: Municipal utilities’ greening, G48: Special areas’ greening</td>
</tr>
<tr>
<td>G5: Other green space</td>
<td>Generally in rural areas, with a positive marginal influence on the urban environment, biodiversity protection, and recreation. Including scenic resorts, nature reserves, forest parks, soil and water conservation forests, re-vegetation on landfill, wetland.</td>
</tr>
</tbody>
</table>

**Table 2-2 Chinese Standard for Classification of Urban Green Space**

(Source: translated from the Ministry of Housing and Urban-Rural Development of China, 2002)

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3 G1, G11, G111 are the codes for the first, second and third levels of the urban green space classification hierarchy.
In this hierarchy, the criterion for the first column is based on green space function, such as recreation, production, and protection. For a G1 Park, the main aim is to meet the aesthetic and recreational needs of the local residents. Nurseries are built to propagate and grow saplings and flowers to supply the needs of urban greening. But they are believed to go beyond merely supplying plants; and often are expected to play an important role in supporting urban conservation and biodiversity. The main purpose of protective green space is to protect a city, residential areas and peri-urban farmland from gales, sand, flooding and other natural disasters and further improve urban microclimate. The last main category is “other green space”, the main function of which is to supply ecosystem services, like producing clean water, protecting biodiversity, improving urban and regional environment, absorbing urban pollution, and also providing opportunities for local residents to appreciate natural environment through eco-tours. Lower levels in the hierarchy are based on varying criteria, such as size - serving the whole city or a specific district, ownership - commercial or industrial area, and other considerations.

The range of types of green space might be bound up with the peculiarity of a country’s social, political and environmental context, but a common denominator can be found in that they are more or less defined in terms of green space functions and location, rather than design form. This way of recognising and classifying green space is very helpful for coordinating green space with other classifications of land development uses such as residential areas, industry, or commerce. This consideration of green space as a functional land use has substantially contributed to justifying the necessity of green space in land use planning, and further facilitating appropriate strategies for decision-makers with respect to various types of green space.

From these current classifications from different countries, we can summarise that the concept of “urban green space” (1) goes beyond narrow traditional park/garden definitions and instead, includes a variety of green space in the urban environment, presently and potentially; (2) is sensitive enough to reveal attributes that enhance the urban physical environment and consequent social benefits; (3) serves a vital purpose within wider land classification and in the preparation of urban planning systems.

Lastly, it should be pointed out that some other concepts are closely related to green space, such as open space, urban forest, and parks. They have slight differences, for example, urban open space is used to refer to “the whole of the external environment outside buildings” (Dunnett, et al., 2002) while urban green space is particularly used to emphasise the outdoor places with significant amounts of vegetation (Bonsignore, 2003). However, as to what level is “significant”, there is no clear boundary between them. And such differences do not influence the nature of this study. Furthermore, the government (at least in China), and even scholars, regard them as the same object in their studies (and in effect the majority of a city’s open space is green space). Therefore, the statements and arguments about these similar concepts are equally applicable to the situation of urban green space in this study.
2.2.4 Urban green space as a functional land use

Accompanying the trend of including more types of urban green space, “new” functions and contributions of green space to our urban environment and quality of urban life are constantly being “discovered”. For example, gardens in a conventional sense have been based largely on recreation and leisure provision, with little concern for conserving city biophysical and biological resources. But today in most cities, this ecological function perhaps has been given top priority at least in government political agendas.

The functions and values of urban green space have been well-documented internationally and there has been considerable progress towards a more holistic, multifunctional and integrative understanding (see relevant research or projects of Bernatzky, 1982; Wilmers, 1991; Baycan-Levent et al., 2009; Jo, 2002; Baycan-Levent and Nijkamp, 2004; URGE-Team, 2004; Gill et al., 2007; Tzoulas et al., 2007). On the whole, its function is to supply the elements of land that need to be conserved and used in relation to development (i.e. economic development needs). The detailed functional taxonomy can be catalogued under four separate but very often interrelated and interdependent aspects, which ultimately converge in the rationale for green space planning: green space is a functional land use (Figure 2-1).

![Taxonomy of UGS functions and values](image)

**Figure 2-1 A taxonomy of functions and values of urban green space**


2.2.4.1 Ecological functions

In 1997, Costanza, *et al.* (1997) put forward a monetary value of the world’s ecosystem services and in 2004, the United Nations 2004 Millennium Ecosystem Assessment formally popularised this concept, which is defined as “the benefits people obtain from ecosystems” (Millennium Ecosystem Assessment,
Ecosystem services are defined and grouped into four broad categories: provisioning services (i.e. products obtained from ecosystems), such as food, fresh water, fuel wood, fibre and so forth; regulating services (i.e. benefits obtained from the regulation of ecosystem processes), like the control of climate, and disease; supporting services (i.e. services necessary for the production of all other ecosystem services), for example soil formation, nutrient cycles and primary production; and cultural services (i.e. nonmaterial benefits obtained from the ecosystem), including spiritual and recreational benefits.

Such recognition of how ecosystems could provide more complex services to humans led to another wave of international efforts to conserve the natural environment. However, these efforts were mainly directed at large, biodiversity rich and relatively untouched ecosystems often with some endangered or threatened animals or plants. Less attention is paid to comparatively small-scale green spaces in cities and to their benefits and functions for urban residents (Swanwick, 2004). In recent decades, such areas have begun to attract growing attention from ecologists. Many studies worldwide reveal that cities can be surprisingly rich in species and may have a higher biodiversity than the surrounding countryside (see the compiled work of Beatley, 2000; Tjallingii, 2005b).

Owing to cities being impacted by frequent and intensive human activities, the demands for ecological functions from urban natural environments are somewhat different from those of large natural areas. According to Deng et al. (2008), the main ecological contributions of urban green space to cities and their inhabitants mainly exist in four aspects: maintaining urban biodiversity; improving the microclimate and alleviating urban heat island effects; reducing air pollution and purifying air; urban natural disaster prevention and refuge provision.

**Maintaining urban biodiversity**

The threats to, and decline in, biodiversity has become a major global environmental problem (See the international treaty “Convention on Biological Diversity”). Urbanisation at an unprecedented rate over the past century has destroyed local habitats and intensified biodiversity loss. However on the other hand, some studies have alleged that certain urban areas can actually support high biological diversity, including remnant species and species unintentionally introduced by people (Niemelä, 1999a), but for the best outcomes much depends on well-designed and managed plants communities and experienced maintenance workers, as well as an integrated green space network throughout the city (Erfurt Declaration, 2008; Loevenhaft et al., 2002; Petersen et al., 2007; Ignatieva, 2010; 2011 Müller & Werner, 2010).

Some feasible detailed strategies beneficial for biodiversity conservation in urban areas include: investigating and cataloguing urban flora and fauna and building a long-term monitoring network;

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4 Note: these four parts were written by the author and had been incorporated in a co-authored paper by Deng, et al. (2008).
making full use of native plants to restore local vegetation communities - the multilayers of trees, shrubs, and grasses allowing natural succession; establishing in situ and ex situ conservation habitats for rare and endangered flora and fauna, propagating dominant species for urban arboreta, parks and nurseries; and ecological planning of urban green space with integration of other land uses into the green space network to create more diverse habitats (Zhang, 1999; Loefvenhaft et al., 2002; Liu, 2006; Ignatieva, 2010).

**Improving microclimate and alleviating the urban heat island effect**

The phenomenon of metropolitan areas being much warmer than their surroundings is called the “urban heat island effect” (UHIE). Shade and transpiration of plants can significantly reduce air temperatures, increase humidity, and regulate airflow. The mechanism for and correlation between UHIE and vegetation cover have been studied in China. The Beijing study has showed that the temperature alleviation is not significant when the percentage of green area coverage is less than 37% and suggests that the ideal green area coverage should be at least 40%. If the coverage goes up to 50%, the summer heat effect can be fundamentally reduced (Li et al., 2004a; Li et al., 2004b). Such studies also include Yang et al. (2010; 2011), which provide some broad quantitative standards and design strategies when justifying the amount of land for green space in urban land use planning.

**Reducing air pollution and purifying air**

Trees can effectively reduce air pollution by absorbing gaseous pollutants, primarily through their stomata, and retaining particulate pollutants on their leaf surfaces. The characters of the leaf surface, tree canopy architecture and branch density affect the capacity for improving air quality. The capacity for dust uptake/reduction has been found to increase in vegetation types in the order: deciduous broadleaf shrubs > evergreen broadleaf shrubs > hedges > evergreen broadleaf trees > deciduous broadleaf trees > coniferous trees > grass (Zhang et al., 1997; Chen et al., 2006). The relationship between urban green space structure and air pollution has also been studied, the greater the average area and the lower the fragmentation of green patches, the greater the effect in purifying the air (Shao et al., 2004).

**Urban natural disaster prevention, reduction and refuge provision**

Many cities worldwide experience frequent natural disasters, including earthquakes, landslides, debris flows, floods, droughts, typhoons, coastal erosion, fire and sand storms. Urban green space can prevent or at least reduce the effects of some of these disasters, as well as providing an emergency refuge for urban residents. For example, such studies were conducted in Tangshan⁶ (Bao and Bo, 2004;

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⁶Tangshan is a Chinese city which experienced a magnitude 7.8 earthquake in 1976. It was reported that at least 255,000 residents were killed.
Liang, 2006) and a recent example comes from Christchurch\(^7\). The overall function of green space to contribute to rebuilding the ruined city into a dynamic and resilient community was recognised in a major “share an idea” consultation which generated over 100,000 ideas many of which expressed the wish for a greener, safe city\(^8\).

In addition to these significant contributions to urban areas, urban green space also more or less contributes the following benefits, such as C fixation and O\(_2\) release, water storage, erosion control, the transfers and exchange of flows of materials, energy, information and species in the urban ecosystem.

2.2.4.2 Socio-cultural values

Besides environmental and ecological services, urban green space provides important social and psychological benefits to human society, enriching human life with meaning and emotion (Chiesura, 2004).

Social values have always been the keystone purposes historically and even currently, in landscape design history (see the works of Pregill and Volkman, 1993; Turner, 2005) as it is the very place to express a human view and appreciation of beauty in nature. In ancient times, while the main purposes of large royal gardens were aesthetic and recreational for the nobility, the monastery gardens were for worshipping God and the private gardens were to provide a spiritual shelter for people to escape the reality of daily life. Today, the function of worshipping God in public green space has declined, while aesthetic and recreational purposes are still dominant values attached to urban green space construction, especially in intensive built-up areas. Other social benefits are introduced below.

Social interaction and public health

Natural features can encourage the use of outdoor spaces, strengthen social integration and interaction among neighbours and local residents by providing a variety of recreational activities (Coley et al., 1997). Based on the research of neighbourhood relationships, Yu (2002) summarises urban green space as providing an opportunity for communication and connection for local residents and thus improved neighbourhood relationships and enhanced internal cohesion within the community.

Such communicative relationships on the other hand greatly contribute to psychological and mental health for local residents (Tan, et al. 2007). And there are also studies in the world leading medical journal Lancet which show that there are health benefits for working class people according to the amount of green space present in their neighbourhood, thereby reducing “health inequalities” (see

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\(^7\) Christchurch is a New Zealand city, which experienced a continual series of earthquakes since 2010 when a shallow magnitude 7.1 earthquake occurred near the city. 185 people were killed in the aftershock on February 2011.

\(^8\) [http://www.centralcityplan.org.nz/](http://www.centralcityplan.org.nz/). Retrieved on 23/03/2012. During the process of rebuilding Christchurch, several websites and a “share an idea” involving the public and experts were established. Thousands of people expressed their wishes and desires for a greener city, turning the earthquake fault zones and ruined areas into wetland parks or protected green space.
Mitchell and Popham, 2008; Hartig, 2008). Green space is even referred to “Vitamin G” for human well-being (Groenewegen, et al., 2006).

**Political purposes**

Gold (1973) notes that public open space (including green space) offers an opportunity to implement the governmental “democratic ideal”. In western countries, it is a place where democracy is worked out on the ground (Thompson, 2002).

The main concern for developing urban green space stemmed from the undesirable consequences of the Industrial Revolution - environmental deterioration and residents living in crowded, impoverished and distressed circumstances (French, 1973; Turner, 1992; Pregill and Volkman, 1993). As such, the first public parks were established to reduce this social stress which threatened to destabilise the contemporary political system (French, 1973; Pregill and Volkman, 1993; Schenker, 1995) and to achieve equal justice, democracy, and livability for all (García et al., 2009, p. 4). The City Beautiful Movement flourished in the 19th century in North America was not intended to improve beauty in the cities, but rather to civilise the ordinary people, create moral and civic virtues among urban populations, and promote a harmonious social order (Bluestone, 1988). Through the provision of informal outdoor recreation in green space, local authorities can promote the unity of their citizens and display the government’s concern about social welfare and social equity.

As societal and political attitudes towards a democratic society changed, a more sophisticated understanding of the democratic process and meanings was needed. Today’s open space [green space] should be a “salad bowl” providing for diversity in needs, attitudes and expressions (such as for different ethnic groups and the marginalised sectors of society), instead of being a “melting pot” demonstrating the literal meaning of all in perfect equality (Thompson, 2002).

**Cultural identity and sense of belonging**

The environments we inhabit are inseparable from the ways in which we see, feel, remember, value and use. Reciprocally, the shaped environments could fulfil people’s emotional needs and foster in people a familiar atmosphere, a sense of belonging and attachment, and further can encourage people to contribute to their loved cities or countries (see compiled work of Proshansky, 1978). Cultural and historical heritage, such as old buildings, man-made features, and natural landscape of mountains, rivers, plants, animals, should be preserved to enhance the local sense of place. Respect for the local landscape and reflecting local values have accordingly become one of the important principles of ecological design (Van der Ryn and Cowan, 2007; Ludwig, 2008).

As an example, New Zealand, once a British colony, has had large parts of its landscape dramatically modified and consequently thousands of species of exotic plants and animals were introduced during European settlement. One reason, apart from production needs, was that the European plants could evoke nostalgia for “home” and “mother land” for the new immigrants (Meurk and Swaffield, 2007).
Now in New Zealand there is promotion of indigenous plants movements such as “Going Native” (Given and Spellerberg, 2004) and “Plant signatures” (Robinson, 1993) to reintroduce native plants and animals out of appreciation for national identity as well as ecological benefits, and to transcend colonial origins. Many European countries also, are eager to employ plant materials to create a local naturalistic landscape, such as “Naturalistic planting” in UK (Dunnett and Hitchmough, 2004) and “Spontaneous vegetation” in Germany (Kühn, 2006).

**Educational function**

Increasing attention has recently been paid to the educational function and value of urban green space from the possibility of using nature to learn mathematics as well as the lessons for sustainability (Van der Ryn and Cowan, 2007).

People living in cities (especially mega-cities) full of relentless buildings and concrete, have little chance to become close to remote nature. However, the need for places of rich experience and for risk, both for adults and children, is particularly important (Thompson, 2002). Green space in the city can provide such a place for people especially children to discover nature and obtain a vivid environmental education (URGE-Team, 2004). Many scholars, such as Goethe, Steiner and Geddes and onwards, insist on the significance of allowing children to experience growing plants and making the connection between such experiences and the food they eat (Macdonald, 1992; Fieldhouse and Harvey, 2005). Now, much research in China has recognised that environmental education is a significant component to achieving sustainable development (Yang et al., 2000; Li and Lian, 2003; Pu, 2009). Some large green spaces in cities, such as urban forest and wetland parks are becoming popular destinations for local residents and eco-tourism is becoming a significant outdoor activity.

### 2.2.4.3 Economic aspect

The economic values of urban green space stem from its production and employment opportunities. Products (such as fuel wood, fibre, fruits and compost), and employment opportunities (such as new planting projects, maintenance and management of certain areas) are some tangible economic values. For example, in recent years, “urban agriculture”, has gained attention. In western countries where city dwellers own their home gardens or community gardens, various vegetable gardens, food gardens, herb gardens and fruit gardens have become very popular. Such opportunities increase with the open space available in some of the newer eco-cities. Backyard gardens could help alleviate food shortages and save on household expenses especially in urban areas. Even American First Lady Michele Obama celebrated the first day of spring by growing an organic vegetable garden at the White House[9] and encouraged citizens throughout the USA to do the same. In China, there are no such home gardens which can provide these functions. Only plant nurseries (see section 2.2.3 Table 2-2) do, to some degree, carry out such productive functions.

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There is another intangible form of economic value: well-planned and managed urban green space can significantly improve a city’s competitiveness and productivity and help to increase the value of land and further attract more investment. Green space such as public parks, natural areas and golf courses can have a statistically significant effect on the sale prices of houses in close proximity to those resources (Bolitzer and Netusil, 2000). Studies in the Netherlands show that a garden bordering on water can increase house prices by 11%, while a view of a park increases prices by 8%, and having a park nearby raised real estate value by 6% (Luttik, 2000). Jim and Chen’s (2006a) comparative study of the impacts of different environmental elements on residential housing values in Guangzhou (China), found that views of green spaces and proximity to water bodies raised housing prices, notably 7.1% and 13.2% respectively. The other related economic value is in preventative health where green space reduces costs of health care and corresponding days off work (Mitchell and Popham, 2008).

On the other hand, from the viewpoint of the economic value of urban green space as “the total amount of welfare that nature generates for society” (Rodenburg et al., 2001), all the benefits of urban green space explained in the Section 2.2.4 Figure 2-1, contribute significant economic values. Urban green space supports natural ecosystem functions in cities and it is apparent that the total value of ecosystem services and benefits is infinite since human life could not be sustained without them (Fausold and Lilieholm, 1999). To explain this kind of invaluable benefit, Costanza et al. (1997) first comprehensively calculated the monetary value of ecosystem services around the world (see also Section 2.2.4.1). The methods they have used include the contingent valuation method (such as willingness to pay), the travel cost method, tree pricing and environmental benefit valuation. These methods are likewise applied in the calculation of urban green space values for cities and people.

2.2.4.4 Structural functions

Defining urban structure and fabric

The aspect of structural functions indicates that urban green space can provide a vital link between green space functions and urban land use that could accommodate many competing demands. Today, arranging and configuring urban green space is considered to be one of the most important items in the urban planning process given its special natural and social characteristics as well as all the benefits and values attached to green space. It is structurally influential for the urban physical environment and for providing continuity and integration of planning by a logical determination of the optimal uses of land.

At the site scale, it operates as “city serving”, dealing with the people and their roles in the functioning of the city as a living system (Wilkinson, 1983, p.27). For example, street greening in cities has played an important role in separating pedestrians and vehicles, and organising traffic for over 2000 years in China (Yu et al., 2006). Today, such parkways, boulevards and greenways still shape and channel traffic spaces and provide for different users moving on foot, bicycle or motor vehicle. Apart from the function of shaping traffic spaces, green spaces’ abilities to be a noise barrier, windbreak shelter,
visual screen, encouragement to walking and cycling, and for neighbourhoods to promote a safer and environmentally-friendly community, are also of great significance.

At the city scale, it functions as “city-forming”, influencing the structure and configuration of the urban areas and guiding future development (Wilkinson, 1983). Together with other types of land use, green space plays a key role in shaping/channelling/controlling/leading the large-scale landscape structure for cities/towns. For example, the “Linear City” by Spaniard Arthuro Savia Y Mata in 1882, the “Garden City” by Englishman Ebenezer Howard in 1898, the “Broadacre City” by American Frank Lloyd Wright, the “Finger Plan” for Greater Copenhagen in 1947, as well as some concepts of “green structure” and “green infrastructure” popular in the 20th and 21st centuries. Although their foci were different, all have more or less applied urban green space as an over-all physical control in the use of urban land.

City image

Urban green space not only makes up the physical structural framework of urban development, but also improves the overall image of a city and creates a unique branding and sense of identity. Studies have shown that natural areas in a city are one of the key qualities that make the city visually appealing (Nasar, 1997; Swanwick, 2004). As Lynch (1960) argues, because water and vegetation are pleasant to most people, they are among the city elements with high imageability, which contribute to the formation of a mental map of a city, as well as a positive image.

Nowadays, cities compete intensely with one another, nationally and internationally, to attract more intelligence and investment. A positive city image created by urban green space can greatly promote its amenities and liveability, and thus attract people to live, stay or visit in a city, and further encourage investment and generate more employment (Chiesura, 2004). An empirical study from the USA found that small companies choose parks and recreational places as their first choice of location (Crompton et al., 1997). Christchurch has specifically branded itself over the past century “The Garden City” as a draw card, and reinforced in 1997 by being a co-winner of “Carl Bertelsmann Prize” in an international competition from 620 international entries.

This is probably an important reason why Chinese local authorities are so eager to develop urban green space. Now in China, many cities carry out city branding research and pay attention to the relationship between urban green space and city image. For example, Chang (2004) analyses the challenges and opportunities around formulating an “image” for Baotou City (located in the middle west of Inner Mongolia) and designs a combination of urban green space and historical streets as a unique profile. Similar research was conducted separately in Jinan City (Dong and Cheng, 2001), Changde City (She and Hu, 2001). They all attempted to design local city branding by means of significant natural elements. Unsurprisingly, almost all local governments in China articulate such benefits in their urban development agendas.
However, inappropriately using green space as a city status symbol may have a negative effect on city functions as well as on local residents’ lives. They may seem merely ornamental, but neither structurally influential nor ecologically substantive (Duany, et al., 2001, p. 80). For example, many Chinese cities place an over-emphasis on monumental plazas. Generally they are a vast, meaningless space full of smooth lawns, regular water basins, marble statues, flower beds and the like, and costly in terms of material resources. All such efforts have been made to fulfil aspiration to achieve what might be seen as a standard “fashion” of a modern and wealthy city status on the international stage.

2.2.5 Summary: urban green space as a geographical, taxonomic and functional continuum

In conclusion, from the overview of relevant urban green space concepts above, we can see that urban green space, as understood today, exists in a geographical, taxonomic, and functional continuum (Figure 2-2). It covers urban, suburban, and rural areas and serves as a buffer zone for enclosed or peripheral natural areas, rather than being limited to urban areas per se. Green space comprises a wide variety of types from neighbourhood public parks, close to where people live, for local residents’ recreation and leisure, to vast urban forest parks or nature reserves with the main purposes of natural resource conservation.

At one end of the spectrum (Figure 2-2) there is a high level of human interference and disturbance, focused on societal development needs, and at the other end is wilderness with minimum impacts, emphasising important biophysical functions related to flora, fauna, water, soil and air. Between these two extremes, there are various types and uses of green space with corresponding levels of emphasis on functions and human intervention, services and uses.

Attention needs to be paid to these variations so that their respective resources are rationally and optimally used and managed. A balance is required between people’s relaxation, recreation, health and environmental education with conservation of natural features and processes. This is the main task and purpose for urban green space planning – identifying the conditions and dynamics of this green space continuum, understanding the competing or sometimes conflicting needs and demands, and devising policies, plans and principles for guiding designs that achieve the balance and integration of park types and elements for fulfilling those needs.

![Urban green space continuum diagram](image)

**Figure 2-2 Illustration of urban green space as a continuum concept**
2.3 Underlying theories and approaches to urban green space planning

2.3.1 Urban planning and green space

Urban green space planning, conventionally, has a close and interdependent relationship with urban planning. For some cities such as Sheffield in the UK (Beer, 2005), and many small-medium Chinese cities, without separate green space planning, it is their overall city planning system that is in charge of green space development.

In history, many revolutions and breakthroughs in the conception of green space in fact stemmed from city planning ambitions. The well-known example is Ebenezer Howard’s Garden City established in the UK in 1898. This garden city was delineated as “a new town of controlled size, planned in advance and surrounded by a permanent girdle of open and agricultural land” (Howard, 2003). Although the garden city dream did not fully come true, that proposed open space girdle evolved into the greenbelt which became one of the most influential concepts in green space planning.

On the one hand, some urban planning methodologies and processes have been applied in planning green space. In urban planning, urban planners use a number of quantitative tools and formulas to forecast the required areas of housing, commercial areas, and so on. The same quantitative technique is equally applicable to allocate a certain area of green space based on projected population growth. On the other hand, inasmuch as there has been a growing awareness of green space as the carrier of social and ecological benefits for cities, many urban planning theories in turn appear to seek inspiration from the configuration and use of green space when confronting complex urban developmental problems. For example, theoretical and practical studies such as the “Urban Task Force” report (Rogers, 1999), EU’s URGE (the project of “Development of urban green spaces to improve the quality of life in cities and urban regions”) research (URGE-Team, 2004), and Green Structure and Urban Planning (Werquin et al., 2005), all endeavour to solve urban problems or prevent social ills from emerging through the approach of anticipatory green space planning, design and management (also refer to Section 2.4 other countries’ experience in green space and city development).

2.3.1.1 A short overview of urban planning

Although planning activities for human settlement have in fact existed over thousands of years (the first known planned settlement of Old Jericho was dated back to 7000 BC), contemporary urban planning vision only emerged in the late 19th century in the industrialising world (mainly in Western Europe and America). Such planning was largely in direct response to rapid urban growth, chaotic, unhealthy and polluted living conditions, vanishing green space and threatened political upheaval (UN-Habitat, 2009; Watson, 2009). It can be seen that the modern urban planning process is closely linked to the “exciting” processes of urban development and modernisation, and attempts to achieve the “scientific efficiency”, “civic beauty” and “social equity” (Krueckeneberg, 1983).
According to Taylor (1998), modern urban planning ideas experienced three stages and two paradigm changes accompanying two movements of “modernism” and “post-modernism”. During the 1950s and 1960s, the town planning paradigm shifted from a traditional design-based art to a science of rational decision-making under the context of the Modernism movement. It is believed that through rational analysis and greater scientific understanding, humans could create a better world for themselves (Taylor, 1998). Town planning was essentially seen as a technical activity, a procedural “top-down” process exercised by the government, expressed in abstract maps, master blueprints or layout functional plans with a detailed view of the future built form of a city. The logical consecutive planning sequences which was widely adopted can be summarised briefly as follows (Burton, 1976; Wilkinson, 1983): 1. State planning goals and define planning objectives; 2. Collect and analyse data. Based on the municipal budget, population and other socio-economic parameters, the planners attempt to effectively allocate land resources. 3. Formulate a plan. The plan is comprehensive and projects the future; therefore, the comprehensive plan and a series of functional plans (also called sectoral plans) are the end-products. 4. Implement plans.

The planning process under modernism, embodied the concepts of technocracy, bureaucracy, rigidity and comprehensiveness. This linear and static sequential process affected every field in urban development, such as transportation, housing, education, recreation and so forth (Stewart, 1972).

Since the 1970s, the shift from modernism to post-modernism brought the second paradigm change of town planning from “a view of planners as a technical expert to the view of the planner as a facilitator, drawing in other people’s views and skills to the business of making planning judgments” (Taylor, 1998, p.158). Post-modernism is suspicious of and criticises the pared-down simplicity of modern “functional” architecture, and advocates complexity, diversity, difference and pluralism as a reaction against modernism (Young, 1990). In relation to cities, post-modernists stress the public’s experience of places, which should be explicit in town planning (Taylor, 1998). It is a precursor to contemporary “bottom-up planning” or “communicative planning” (also called “collaborative planning”). Such a planning process, in contrast to top-down rational planning process, embodies participation, transparency, flexibility and being strategic in the long term.

Faludi (1973) distinguishes two theories of planning: substantive and procedural planning theories. The former is a theory about the “substance”, which deals with objects of planning, such as the city, the town, the transportation, and the environment. It primarily focuses on the growth and development of cities. In this sense, the early theory of physical planning and design, and the sectoral planning (i.e. transportation planning, housing planning and so like) are under this type. The procedural planning is a theory about the “process” of planning. In this sense, the rational and scientific view of planning, the “top-down” process, the “bottom-up” process, and the communicative planning clearly belong to the procedural planning theory.
This distinction remains controversial as many scholars and planners argue that “one cannot study process without an understanding of substance, and vice versa” (Taylor, 1998; Stiftel, 2000). The process of planning has to be grounded in the study of the actual substantive issues. The two categories together can greatly help understand the nature of planning. Based on this view, Ndubisi (2002, p. 220-236) also identifies substantive and procedural theories in environmental or ecological planning. Substantive theories are based on the social and natural sciences, such as anthropology, biology, ecology and geography, which allow planners understand landscape and environment. Procedural theories provide a framework or procedural recommendations for organising the substantive theories to practice and address planning problems (ibid, p. 221). The ecological approach to planning is subsumed under the category of procedural planning theories.

2.3.1.2 Criticisms and new directions

The criticisms of the conventional planning process have always been in parallel with the two paradigm shifts. Some aspects have been strongly criticised for a long time, especially in the post-modern period, including too much emphasis on quantitative standards, top-down planning process, the rigid end-state form of plans (e.g. master plans), and the mono-functional and sterile urban natural environments produced (UN-Habitat, 2009).

The conventional urban planners insisted using “a set of standards” or regulations to specify and enforce suitable efficient guidelines for urban layout, covering functional sectors such as housing, education, recreation, industry and transportation (Bracken, 1981). Representative criticisms of this “standards” approach included: “they were based upon very little empirical analysis” (Stewart, 1972, p. 21); and “the ‘standards’ represented the interests, cultural values, attitudes and biases of the urban planners themselves, who tended to act in the mistaken belief that they were planning for everybody” (Gans, 1969). The rational model of planning caused a “top-down” or “command-and-control process” which showed little understanding of the “action end” of planning, such as how plans and policies were or were not implemented (Taylor, 1998).

Another significant recent criticism of traditional, physical urban planning is that it has failed to address the increasingly degraded urban environment. Many critics argue that modernism/modern lifestyles consume too many natural resources, pollute or destroy ecosystems, increase social inequality, create urban heat islands and cause climate change. Therefore, there is growing chorus of those calling for planning for sustainable cities, with an expectation that human settlements will feature “compact, efficient land use; less automobile use, yet better access; efficient resource use; less pollution and waste; the restoration of natural systems; good housing and living environments; a healthy social ecology; a sustainable economy; community participation and involvement; and preservation of local culture, heritage and wisdom” (Wheeler, 1998; 2004).

In response to these criticisms, together with the actual recognition that planning was becoming ineffective, and also with acknowledgement of urban complexity, diversity, difference and pluralism,
some changes in urban planning have occurred. The first change can be seen in the move away from purely physical land-use criteria for planning to the more broadly based set of economic, social and environmental criteria in a strategic and structural plan following the groundbreaking 1968 Town and Country Planning Act (UK). Secondly, there was a move towards a more participative element in plan and policy making after the Skeffington Committee Report (Skeffington, 1969).

Such shifts gradually led to the emergence and development of “communicative planning” in the 1980s, which features a long-term strategic programme, involving public-private cooperation and public participation in the design and implementation of such plans (Healey, 1997; 2003). It has become one of the key concepts in the urban planning theory lexicon (Allmendinger and Tewdwr-Jones, 2002, p. 22). As Healey (1992; 1997; 2003) alleges, a new paradigm of the “communicative turn” has occurred in planning theory. This planning approach claims that all technical knowledge is inevitably infused with biases reflecting particular interpretive predilections and normative values (Barnes 1982; Innes 1990; Healey, 1992). It appears to be through communicative interchanges between planners (e.g. planners of urban master plans and of green space plans) and between planners and planning target people and any interested parties, such biases could be minimised and the shared futures of social justice and environmental sustainability could be achieved.

In summary, western town planning theory and practice have shifted significantly since post-1950s, with gradual influence in other countries. Some promising revolutions have taken place in the following aspects (Watson, 2009):

1. Planning processes and decision-making: shifting towards more participatory, democratic and integrated processes, involving wider groupings within and beyond the state;
2. Forms of spatial planning: shifting towards strategic planning on a range of scales;
3. Linking planning and natural environment: shifting towards new concerns for environmental sustainability, climate change and resource depletion.

However, it is notable that owing to the limitations of technologies, the inertia of political and government institution structures and other barriers in the real world, participatory, strategic and sustainable planning approaches are still compromised, particularly in the developing countries. Therefore, it is quite usual for innovative planning approaches to be adopted in parallel with older approaches (UN-Habitat, 2009). There is also considerable resistance from development interests in increasingly market economies who find the more collaborative, consultative process time-consuming and costly.

2.3.2 Ecological approaches to urban green space planning

As explored in Section 2.2, there was a growing awareness of the significance of urban green space in ecological functions; the use of ecology in urban planning as well as green space arrangement has
advanced rapidly worldwide. The ecological approach to planning has emerged over the past fifty years with particular influences from ecology, landscape ecology, conservation ecology, and urban ecology. The following sections will review these ecological perspectives.

### 2.3.2.1 Design with Nature and land use suitability analysis

In 1969, Ian McHarg’s landmark book *Design with Nature* comprehensively linked planning with ecological science. This ecological perspective towards land use planning was not new, and the same perception can be found in the previous works of the *Land Ethic* by American wildlife biologist Leopold (1949), *The Cological Basis for Land Use Planning* by Canadian forester, Hills (1961), and riparian planning by American landscape architect, Lewis (1969). However, McHarg’s land use suitability analysis model (also called the “layer cake model” see Figure 2-3) incorporates the wider analytical factors from geology, physiography, climate, groundwater, surface water, soils, vegetation and wildlife, and thereby provided a more coherent, comprehensive and operational ecological approach for various situations (Steiner and Brooks, 1981).

![Figure 2-3 The Layer Cake model](Source: Steiner, et al. 2000, p. 135)
The theoretical assumption behind this method is that the capacity of land to sustain a particular land use differs. If we know the biophysical attributes of the land (such as soil, vegetation and the like) and their distribution pattern and interaction processes, then we can define the intrinsically suitable areas for potential land uses (McHarg and Steiner, 1998; Steiner, 2000). This is a way of following nature. It will possibly minimise human impacts on the environment and also reduce the resources and energy required in the process of development.

The planning sequence involves five major steps (Steiner, 2000, p. 19):

1. Defining planning goals/objectives, land use needs and the planning boundary. For example, the planning goal is to identify suitable land for agricultural and residential uses respectively.

2. Establishing an inventory of the relevant physical and biological factors and mapping the factors by type. For example, slope and soil erosion are selected as key factors and then they are classified according to their limitations and potentials (capabilities in relation to a use).

3. Determining the suitability scores of each type of each factor for each land use. For example, there are three suitability scores: 1 means most suitable; 2 means moderately suitable; 3 means least suitable. Slope type A is prime suitability for housing, while type C is minimally suitable for housing.

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(1: Most suitable; 2: Moderately suitable; 3: Least suitable)

4. Mapping the scores of each type of each factor separately to obtain a series of suitability maps of each factor for each land use;
Overlaying the series of factor suitability maps to obtain each land use suitability map through addition of all factor scores.

His team’s first project was “Plan for the Valleys” - 70 square miles of valley farmlands and forested uplands north of Baltimore, Maryland (USA) in 1963 (see the work of McHarg, 1969). This suburban development plan was based on an analysis of the region’s natural resources and hazards, and organised by “physiographic determinism” (McHarg, 1969). Another good example was the Woodlands New Community (north of Houston, Texas), in the early 1970s, where an ecological inventory, including climate, geology, hydrology, soil, vegetation and wildlife factors, was adopted. Similar projects and research were presented and advanced worldwide by the followers of this philosophy, such as the works of Pham Duc and Nakagoshi (2008) for a Vietnamese example, and Yu, et al (2005) for an example from China.

According to Ndubisi’s classification of major approaches to ecological planning, the land use suitability analysis approach marked a revolutionary milestone in the theory and methodology of scientific land use planning and management (Ndubisi, 2002, p. 220-223). Furthermore, the rapid development of computer technologies and Geographical Information Systems (GIS), in particular, has made wider choices of analytical techniques for evaluating, analysing, managing and mapping landscapes available. There are increasing planning efforts that involve GIS-based land use suitability analysis. Together with the concurrent progress of landscape ecology and practices of ecological planning in a variety of urban, rural, and natural settings, there evolved an applied landscape ecology approach, and applied ecosystem ecology approach with slightly different planning foci (for the detailed arguments see the work of Ndubisi, 2002).
2.3.2.2 **Landscape ecology and landscape planning**

Landscape ecology is the discipline of studying and improving the relationship between spatial patterns and ecological processes on a multitude of landscape scales and organisational levels (Forman and Godron, 1986; Turner *et al*., 2001). Typically, such areas are larger than those studied in communities or ecosystems, such as water catchments, mountains or metropolitan regions.

A landscape is defined as a heterogeneous area of land, consisting of an interacting mosaic of elements – patch, corridor and matrix. Patch is a relatively nonlinear, homogeneous area that differs from its surroundings. Patches are the basic unit of the landscape that change and fluctuate, a process called patch dynamics (Forman, 1995). The characteristics of natural patches (e.g. the kind, size, shape, or perimeter to area ratio of forest, grassland and so on) would be critical to maintaining species diversity (e.g. a particular organism that uses a special patch type as its habitat). Corridor is a narrow strip of patch that differs from the matrix on either side. It may act as a link or barrier in a landscape. It is a functionally important landscape structure influencing dispersal of plants and migration of animals in a landscape (Haddad *et al*., 2003), while it may also serve as a barrier to provide shelter and reduce wind and water erosion (Hobbs, 1992). In urban environments, corridors include rivers, riparian strips, vegetation along highways/roads, or any green space in a linear shape. Matrix is the dominant component of a landscape with a high degree of connectivity within itself. It is the background condition and plays a major role in landscape functioning. In a city, buildings, plazas, roads and other concrete hard surfaces comprise the matrix.

The study of the temporal and spatial patterns and processes among these elements has two central applications/contributions specific to human-dominated landscapes.

1. **Evaluating**: detecting and analysing the current status, spatial pattern and dynamics of urban green space quantitatively, and further understanding the ecological implications of such patterns, i.e. how and why it matters to natural ecosystems as well as human activities.

2. **Planning and optimising urban green space structure**: concerning a better strategy of arrangement of land resources by means of emphasis on ecological and environmental attributes as the primary determinates, and linking human objectives with realistic analysis of landscape features, processes and functions in the decision-making process.

The “indispensable pattern” proposed by Forman (1995) has probably become the spatial norm in addressing land use planning for creating sustainable multifunctional landscapes (Figure 2-4). As Pietrzak (1998) says, the patch-corridor-matrix model “is at present a widely accepted, efficient method of describing landscape structure and – as it seems – an optimum proposal of landscape research for planning and designing activities in landscape” (as cited in Bastian, 2001).
To date, a myriad of similar spatial concepts derived from landscape ecology have been commonly practised in the conception of urban green space planning, such as green corridor, greenway, green patch, green structure/infrastructure, ecological network, habitat network and so on (Cook and van Lier, 1994). These concepts emphasise the importance of physical and functional connectivity and provide specific guidelines for creating sustainable spatial configurations of landscapes. They have been widely accepted as effective and sustainable strategies to improve the ecological values of green space in cities (Cook, 1991; Jongman and Pungetti, 2004, Ahern, 2007).

2.3.2.3 Conservation biology, island biogeography and nature reserve design

Island biogeography theory, originally conceptualised by MacArthur and Wilson (1967), studies the factors which affect the species richness in an isolated natural habitats. There is growing interest in the application of conservation biology and island biogeography theories for design and management of nature reserves in order to prevent the extinction of species and maintain biodiversity.

One of island biogeography’s assumptions is that the likelihood of species immigration will increase with area, but decrease with distance from a source (the species mainland). The immigration and extinction of species is affected by the size, distance, and connectivity of several isolated natural habitats. The general rules derived from island biogeography for minimising extinction rates are proposed by Diamond (1975) and later refined by Shafer (1990, p. 142). Diamond’s recommendations were incorporated into the World Conservation Strategy for guiding nature reserve design (Figure 2-5).
These principles were also combined into design of the biosphere reserve in UNESCO’s Man and the Biosphere (MAB) programme (Figure 2-6).

![Figure 2-5 Suggested general spatial principles for designing nature reserves based on island biogeography theory. Spatial configurations on the left are believed better than the right in terms of preventing species extinction. (Source: Diamond, 1975)](image)

These principles are summarised as follows:

1. the more land set aside for natural areas, the more species can be preserved (the larger the better);

2. A large reserve is better than several reserves with the same total area;

3. If a large reserve has to be divided into several disjunctive ones, these small reserves should be as close to each other as possible (nearness);

4. Habitat fragmentation and nature reserve insularisation should be discouraged. The several disjunctive reserves are better to be connected by the corridors (connectedness);

5. It is better to have buffer zone around the core habitat;

6. The reserve should be as nearly circular in shape to minimise dispersal distances within the reserve.
Figure 2-6 A simplified example of zoning systems for design of biosphere reserves suggested by UNESCO’s Man and the Biosphere (MAB) programme. In the core, no development is permitted. The buffer zones are used to protect the core areas from the direct impact of human activity. Public recreation, research and educational uses are permitted.

(Source: UNESCO, 1974, p. 48)

Many of these rules continue to be debated because of their oversimplified assumptions or lack of empirical study (Diamond, 1975; Ehrenfeld, 1989; Higgs and Usher, 1980; Simberloff and Abele, 1976a; 1976b). For example, one of the main and continuing debates concerns the virtues of a single large reserve or several small reserves (SLOSS). Simberloff & Abele (1976a) argue that several small reserves may contain more species than a large one for some particular species, while Diamond, Terborgh, Whitcomb, Lynch, Opler, and Robbins et al. prefer the large reserves (as cited in Diamond, et al., 1976). There are some empirical studies and evidences supporting both sides. Given that small reserves can preserve some endemic or unique habitats, and provide “stepping stones” between large reserves, small parks and reserves are still needed (Shafer, 1990, p. 79-83). Another main disagreement is about the functions of corridors between reserves. Some ecologists concern that corridors would be barriers for some species’ movements, increase the spread of diseases and pests or facilitate poaching and predation (Dawson, 1994, Simberloff and Cox, 1987; Shafer, 1990, p. 84). However, some ecologists promote the ideas that corridors could increase species richness through the experiments (Tewksbury, et al., 2002; Damschen, et al., 2006; Brudvig, et al., 2009).

Ecologists and scientists argue this discipline has not yet been able to provide “a ready-to-wear guide to natural area preservation” (Shafer, 1990, p. 102). But many ecologists (Wu, 1990; Haddad, et al., 2003; Gilbert-Norton, et al., 2010) think that it is a useful heuristic tool for designing nature habitats with the proviso that design is based on the study of individual target species and field study.

Although the evidence for the value of corridor, stepping stones, habitat patches is not convincing (Hobbs, 1992) and the application of conservation biology and island biogeography theories to design
of natural reserves is controversial, it may inspire spatial arrangements of urban green space in favour of maintaining urban biodiversity. First of all, the isolated status of nature reserve is equally relevant to urban green space as many green areas are fragmented and separated “natural islands” within the less favourable matrix of hard surfaces of urban concrete. Secondly, as explained before, such human-dominated areas increasingly receive attention in terms of protecting biodiversity (Erfurt Declaration, 2008). Thirdly, given the fact that biodiversity is not the sole purpose for establishing urban green space, and urban environments seldom retain particular endangered or rare species which need unique habitats and rigorous analysis, the general guidance illustrated in Figure 2-5 and Figure 2-6 still can help urban green space contain more species. In the urban context, the core can be a botanic garden, large urban forest park; a semi-natural area with high species richness. The buffers can be river riparian strips protecting the water system from non-point pollution. The corridors can be greenbelts connecting several green areas, and among these large green blocks there are small neighbourhood natural areas or gardens.

2.3.2.4 Urban ecology and green space management

Urban ecology is defined by the Urban Ecology Institute as “a new branch of environmental study that seeks to understand the natural systems of urban areas and the threats that face them” (Urban Ecology Institute, 2010). Compared to the generally more expansive discipline of landscape ecology, which mainly concerns the spatial pattern and structure of landscape at a comparatively larger scale, urban ecologists mainly study the trees, rivers, wildlife and green space found in residences, streets, neighbourhoods and cities to understand the extent of those resources and the way they are affected by external urban pressures, especially human activities, and what benefits they can bestow on society.

Although urban ecology primarily focuses on the scientific studies of organisms – urban environment relations, not directly targeted at planning issues, application of urban ecology can contribute to green space management decision-making, such as how to restore and maintain urban biodiversity, minimise resource depletion, preserve nutrient and water cycles and maintain urban ecosystem health (McDonnell, et al., 2009; Richter & Weiland, 2012). Particularly in recent years, throughout the world including China, there is an increasingly loud “anti” voice which argues against urban landscapes comprising “deserts” of mown grass with regimented standing trees in urban parks (Sukopp et al., 1995; Baines, 1999; Niemelä, 1999b; Forman, 2008; Ignatieva, 2010). The values and functions of indigenous, spontaneous, informal and more or less “uncontrolled” green space in otherwise formally-shaped cities are recognised. For example, the studies from Florgård (2000; 2004), Breuste (2004), and Stewart et al. (2004) call for the natural ecological processes of vegetation growth and succession as well as bringing back experiences of nature to local dwellers.

It is not required to turn every piece of green space into such a native wild model. However, a more ecological approach to urban green space allows natural cycles of growth and decay to occur and further allows different users to different elements in some parts of green space. Such ideas can bring flexibility to green space planning, such as acknowledging the diversity of green space types and
functions, and even retaining some waste lots and derelict sites, instead of bulldozing away all the not-perfect things. And these will contribute to multifunctionality of green space in the otherwise highly man-made sterile living environment.

2.3.2.5 Cultural aspects in ecological planning

As illustrated in Section 2.2.4, and also supported by theories from other disciplines, landscapes embrace cultural meanings and are “symbolic and expressions of human’s cultural values, social behaviour, the individual actions worked upon particular localities over a span of time” (Meinig, 1979, p. 6). Scientific physical, biotic and abiotic analysis of human living environment have been criticised for lack of attention to human’s values and perceptions to landscape (Ndubisi, 2002, p. 102-104). As many earlier ecologists and planners, MacKaye (1940), Mumford (1972), and Odum and Barrett (1971) suggested “planning, in its ultimate expression or ordering, is applied human ecology” since planning is about the organising of interrelationships between humans and their environment (as cited in Steiner, et al., 1988). These concerns attract researches from geography, anthropology, human ecology, culture ecology, psychology, sociology, and other relevant disciplines to develop approaches which are ecologically sound, and culturally sensitive.

McHarg (1981) and his colleagues (e.g. Rose, Steiner and Jackson 1979; Steiner and Brooks, 1981; Young, 1983) gradually developed human-ecological planning after they realised that human perceptions, values and interactions with nature has not received attention in his widely acknowledged land suitability approach. He suggested that landscape planning should model an interacting physical-biological-cultural system. Such analyses involve a thorough survey of local environmental history and people-place interactions. These include: 1. Analysis of historical land use, such as the initial settlement patterns; 2. Examination of changes in land use to uncover the impacts of social events, the way of resource use and technologies within local historical and ecological backgrounds, local belief systems, accumulated local knowledge and experience, etc.; 3. Investigation of current land use patterns (Ndubisi, 2002, p. 119-122).

Further research by Zube (1970; 1984), Zube, et al. (1981), Litton, et al. (1974) strove to incorporate landscape aesthetic assessment and cultural considerations into ecological planning. Zube categorised this approach into three conceptual themes as professional, behavioural, and humanistic (Zube, 1984). The professional theme is to address art and visual concerns by professionals or experts. The artistic qualities of the landscape or ecosystem, such as “form, balance, contrast and character”, or “degree of naturalness, ecological diversity”, are the foci (Ndubisi, 2002, p. 204). The behavioural theme addresses individual aesthetic preferences in the spatial compositions and physical elements of landscapes (ibid, p. 205). And the humanistic theme refers to transactions and experiences among individuals, social groups and landscapes. The outputs of this theme include “statements about landscape tastes, desirable landscape qualities, ideal beauty, and the development of the self or group” (ibid, p. 208).
The basic sequence of the landscape aesthetic assessment approach includes (*ibid.*, p. 208): 1. Defining the project goals, such as evaluating landscape quality, landscape preferences; 2. Establishing the aesthetic evaluation framework, including identifying factors or landscape units to be surveyed; 3. Conducting the survey; 4. Analysing and ranking the aesthetic quality; 5. Specifying planning, design or management measures to strengthen, sustain or alleviate aesthetic quality.

The cultural-ecology perspectives on integrating cultural considerations in ecological planning are diverse (Steinitz, 1990). It has not yet evolved into a mature approach with a unified body of concepts, and workable methodological frameworks. Many projects or cases are conducted in Europe and North America largely on a case by case basis, and are heavily contingent upon the context. Nevertheless, such cultural perspectives emphasise the need to seek guidelines for planning urban nature. The planning needs to be culturally sensitive and respect local values and knowledge through integrating bio-physical and socio-cultural inventory of the local environmental history, historic sites, and historical landscape use.

Another aspect emphasised in the cultural perspective is the importance of community engagement since people are the primary concern in the human-environment interaction. The planning often adopts a wide range of qualitative techniques from sociological fields, such as interviews, direct observation or participant observation to measure how locals view, value and adapt their environments (e.g. the Kennett region ecological planning of Rose, *et al.*, 1979). As Ndubisi points out, such ethnographic survey is not familiar to most planners, and the application has occurred on a site by site basis (Ndubisi, 2002).

### 2.3.3 Summary: two basic approaches to urban green space

The ideas about arrangement of urban green space evolved from urban planning, which was based on the quantitative analysis of demand and supply of land for a projected population. Therefore, the quantitative approach (the rational planning process) to urban green space is perhaps the most widely practised way of organising urban nature. It is evident that with the accumulation of ecological knowledge and allied disciplines, the ecological approach has become more sophisticated, and provides guides and facilitates the spatial arrangement of urban green space to sustain more ecological functions. In contrast to an urban planning rooted approach which focuses on social, economic or demographic parameters, the ecologically focused approach deals with habitat fragmentation, connectivity, integration, ecosystem functions, landscape processes and other biotic parameters, and cultural/ethnic considerations as planning concerns.
2.4 Evolution of urban green space planning and development worldwide

This section focuses on the new concepts and movements (some of which are related to the fields of urban planning, open space or other social activities) which have profoundly changed the views regarding green space in cities.

Given the vastness of the topic and associated historical material, this review necessarily provides an indication of key developments. Urban green space planning relates to many aspects and to large extent it was becoming a hybrid of social movements and environmental movements, meaning many examples could be included. Also different countries may use various terminologies, such as open space planning, park system planning, or recreation planning, complicating the situation. Even some cities, for example Christchurch, and Sheffield, have no specific “green space plan”, but instead are examples of planning where an overall city plan contains or subsumes reference to green space. Also, this review cannot claim to be exhaustive as there is as yet no general agreement upon what elements should be included in green space planning. However, such historical perspectives and improved planning practices (e.g. European green structure concept and American green infrastructure) can provide a base on which Chinese urban green space planning and development history may be compared and discussed in Chapter 6.

Key chronological milestones related to the evolution of urban green space planning are summarised in Figure 2-7. It includes reference to the first urban public park construction (Birkenhead Park, 1847), the Public Park Movement (exemplified by the Boston Park System, since 1878), the City Beautiful Movement (for example Washington DC’s National Mall as a City Beautiful Plan, since 1893), Garden City (1898), Quantitative Standards (1906), Broadacre City (1932), Greenbelt (as shown Greater London’s Greenbelt, since 1935), Green Wedge (exemplified by Copenhagen’s Finger Plan, since 1947), Design with Nature (1967), Green Structure (1980s), Greenway (since 1987, exemplified by East Coast Greenway in USA in 1991), landscape urbanism (mid1990s -2000s), and Green Infrastructure (1999).

Most of these milestones can be regarded as conceptual innovations, except for the two items of “Quantitative Standards” and “Design with Nature” (representative of an ecological approach) that are counted as theoretical and methodological breakthroughs on green space planning. The quantitative approach and ecological approach constitute the basic approaches to green space planning, which have been introduced in detail in previous Section 2.3.

10 For example, Christchurch has an overall city plan and a biodiversity strategy and structure plans for specific developments all of which incorporate reference to green/open space planning (http://www.ccc.govt.nz/thecouncil/policiesreportsstrategies/districtplanning/cityplan/index.aspx)
Figure 2-7 Key milestones in urban green space development from the 19th to the 20th centuries

(Source: Birkenhead Park: http://www.mtholyoke.edu/courses/rschwartz/hist151s05/Enlightenment.htm
Boston Park System: http://travel.gather.com/viewArticle.action?articleId=281474977663549
Mata’s Linear City: http://en.wikipedia.org/wiki/Linear_city
The National Mall as a City Beautiful Plan passed in 1901: http://sidewalksprouts.wordpress.com/history/city-beautiful-movement/
The original sketch of the 1947 Finger Plan of Copenhagen: Vejre, et al., 2007, p. 313.
The East Coast Greenway: http://south-carolina.ustrails.org/trails/East-Coast-Greenway.html)
2.4.1 European experiences

Public parks

From the middle of the 19th century, the UK’s royal parks, increasingly accessible to the ordinary people, were joined by a growing number of state or municipal parks and these became a major feature of all European cities (Borsay, 1991). In 1847, the first modern urban park- Birkenhead Park- was designed by Joseph Paxton (Newton, 1971). The public focus of the park greatly impressed American landscape architect Frederick Law Olmsted, who incorporated many of its features into his landmark design for New York’s Central Park, and subsequently the Public Park Movement (Olmsted, 1852). Olmsted highly praised Birkenhead Park as the “People’s Garden” (ibid.), and as the first explicitly designed public park it opened the door to the modern park system movement.

Linear City concept

The Linear City concept was applied in Madrid, Spain (19th century), Stalingrad in the former Soviet Union (late 1920s), and some cities in Poland (after World War II). The theory around this was put forward by Spanish civil engineer Arthuro Savia Y Mata in 1882. Such planning theory embodied an elongated urban formation which was developed along the transportation system. It emphasised that the city should run parallel to a 100m-wide linear green space consisting of parks, gardens and forest land (LeGates and Stout, 1933) and in the Soviet version it was an agricultural zone with gardens and farms. In contrast to Howard’s Garden City theory (as discussed below), Mata believed that dissipating the population along continually extending transportation lines and other utilities could efficiently lead urban growth as the concentric form of the city would cause urban sprawl (Eisner and Gallion, 1993, p. 117-118). Although the two theories have different conceptions of urban morphology, both agreed on involving urban green space as an effective tool to shape or control urban development. In China, the Linear City concept has also been applied in some new city planning, for example in the city of Qingdao, since 1978 (Zhang and Wang, 2004), which is also called the Interlocking Metropolitan Region (Zhou, 1991).

Garden City

The “Garden City” concept was conceived by social thinker Ebenezer Howard in 1898 and became one of the most influential urban planning theories of the 20th century (Taylor, 1998) and has been carried forward to the present day in modified variations.

Initially Howard aspired to achieve a utopian settlement through comprehensive urban planning, consisting of social and economic reforms (such as land reforms, cooperativism, and self-containment). Well-designed open space - public parks, recreation spaces, open spaces, radial boulevards and agricultural belts were considered to form a network extending from the centre to embrace the residential houses (Howard, 2003). Later the Garden City Association was established in 1899 to promote a practical scheme to demonstrate this idea (Hardy, 1991). Letchworth, the first garden city,
was founded in 1903 and has inspired many other similar small town/village projects worldwide (Ward, 1992). The large-scale, well-known application of the garden city principle was the plan for Greater London in 1944. After this plan, building a permanent girdle of open and agricultural land surrounding the town was proclaimed and it almost became a planning dogma in British planning theory and practice (Osborn and Mumford, 1946). The involvement of green space was also written into the New Towns Act of 1946 as a law. This appears to be the first time that urban green space was regarded as such a significant feature in urban planning that it was written into the law.

The garden city model is considered to be a cornerstone of modern urban planning in general (Alexander, 1992). Such structural principles of green space configuration, as well as the interaction between green space with other land uses, also established a model for the following successors of urban green space spatial structure, such as greenbelt, green wedge, green fingers and other relevant concepts.

Apart from the structural influences to the followers, this concept also suggested that every section or ward of the town should be planned with precise quantitative standards, such as the population densities, a radius of 1.2km from centre to edge, a city centre circular space of 5.5 acres of garden, six 120 feet-wide boulevards from the city centre to the circumference, and six 150 acre central parks (Howard, 2003). The UK seems therefore to be the first country to introduce quantitative standards for defining urban land use as well as open space (Turner, 1992). In 1906, open space was defined as an area of land with a building to land ratio less than 5% in the Open Spaces Act. In the 1944 Great London Plan, 1.62 ha per 1000 population was officially proposed as the Standards of Open Space (Turner, 1992). This official quantitative standard made open space planning much more transparent and operational, although later critics argued that standards “have resulted from years of observation, experience and consultation by top professionals in the park and recreation and allied fields” (Buechner, 1971, also refer to Section 2.3.1).

Greenbelt

Apart from the direct influences of the idea of a girdle of agricultural land surrounding the town in Howard’s utopian city, the reality - the rapid suburbanisation of London - made it imperative for the creation of greenbelt zones to prevent urban sprawl and provide leisure opportunities for residents in the 1930s (Clark, 2006).

In 1935, the Greater London Regional Planning Committee formally proposed “the London Greenbelt” to “provide a reserve supply of public open spaces and of recreational areas and to establish a green belt or girdle of open space” (Thomas, 1963, p. 17). In 1938, the Greenbelt Act was approved. It was reflected in the 1944 Greater London Plan, which established a 10km-wide greenbelt including farmlands, orchards, forests and some public institutions, and ten new satellite towns outside this greenbelt ring to prevent disorderly urban sprawl. This became a basic policy for controlling urban growth in the Town and Country Planning Act 1947 (Benevolo and Culverwell, 1980).
The greenbelt concept was developed in the UK but was widely adopted in other countries in Europe, America and China (Taylor, et al., 1995; Kong, et al., 2010). The idea of using green space in controlling urban growth seemed to give green space a uniquely prominent function in planning and thus improved its importance as a type of primary and “fixed” element in land use planning.

**Green Wedges and Green Fingers**

Copenhagen, the capital of Denmark, is an iconic green space-oriented city due to the well-known “Finger Plan” for Greater Copenhagen dating from 1947. It visualised the future urban areas as a hand, with the palm resting on the already existing city centre, the fingers representing future development along existing transportation infrastructure and the areas between the “fingers” as green wedges, forest and pastoral landscapes that would provide access to nature for all residents (Vejre et al., 2007).

Other European cities, like Stockholm (Sweden) and Helsinki (Finland) are also characterised by a finger-like urban structure. Helsinki directly uses a “Green Finger” model as its urban greening policy. Owing to this city’s natural conditions formed around water and terrain unsuitable for urban construction, the elements of green fingers were already present in the first comprehensive city master plan of 1918 and in the 1970s’ master plan. The Green Fingers of Helsinki concept was preliminarily established and became the basic concept and substantial tool used for planning the green structure in Helsinki (Huhdanmaki and Dubois-Taine, 2004; Vähi-Päkkiö and Majala, 2004). Helsinki’s Central Park, as the best known of the green fingers, penetrates well into the city centre. Similarly, Stockholm’s Royal Ecopark – a 10km-long greenbelt around and within the city centre – provides significant wilderness in close proximity to urban residents (Beatley, 2000).

To some extent, the green wedge and green finger are variations of greenbelts in form. They have the main common purpose, that is containing urban sprawl, and encouraging urban expansion along transit and green system. However, it can be found that an important advantage of the green wedge/finger model, compared with greenbelts model, is that the former improves accessibility to green space for local residents in the inner-city (particularly significant improvement in megacities).

**Green Structure**

During the 1980s, the concept of “Green Structure” emerged in Europe. Green structure is more than the sum of green space. The underlying idea is that the green aspects of planning as a physical structure are considered as forming an integral part of the city (e.g. greenbelts or green corridors), as a network of “green” elements, as a physical infrastructure playing a role in water management, in the urban micro-climate and in biodiversity, and also as a social infrastructure for recreation, reflection, relaxation, human interaction and other social activities (Werquin et al., 2005, p.13). It links town and country, including open space, public and private gardens, public parks, sports fields, allotment gardens, and recreation grounds within the city to the networks of woodlands and river floodplains in the surrounding countryside (Tjallingii, 2005a).
Good examples include Dutch cities, which developed a national and provincial ecological network and included it as a key component of their Nature Policy Plan (Beatley, 2000). In addition, two cross-country-scale research projects were carried out in Europe and a large number of case cities/areas were studied across various dimensions. One is the “Green Structure and Urban Planning” action, approved by the European Commission, involving fifteen countries from 2000 to 2004 (refer to Werquin et al., 2005). The other is the UGRE-Project under the 5th Framework Programme of the EU from 2001 to 2004, in which six countries participated (URGE-Team, 2004).

These studies point out that effective green structure planning requires both a multifunctional and multi-level planning approach. As explained in Section 2.2.4, a well-designed green structure performs a multitude of roles and functions in the urban natural environment as well as for people’s daily use. One of examples is the routes for walkers and cyclists in the residential neighbourhoods, and ecological corridors for wildlife at the landscape level.

Liu (2008, p. 49-52) summarises the four principles of European green structure planning. They include: 1. Multifunctionality: the planning needs to identify and promote green space perform multiple functions and uses; 2. Integration: the planning needs to integrate green space with other urban infrastructures; 3. Communicative and socially-inclusive: the planning needs to incorporate the cooperation, coordination and participation among different interests; 4. Strategic (long-term) consideration: the planning needs to consider long-term benefits instead of short-term economic gains.

The URGE-project also stressed the principles of interdisciplinary, intercommunicative, transparent and user-integrated in the green space planning process. For instance, Interdisciplinary Catalogue Criteria (ICC) were developed as a set of tools for analysing and evaluating the green space system at city and site levels from ecological, social and economic aspects. This toolbox contains four criteria: “Quantity”, “Quality”, “Use and Planning”, “Development and Management”, which are intended to initiate a broader participation between the public, practitioners and scientists about future ambitions and to enhance the quality of urban life (Dunnett et al., 2002; URGE-Team, 2004). Such participatory requirements on green space planning became the central issue and have attracted growing attention. Since green space is a carrier of multiple functions of urban development, it cannot be successful if “it is not firmly rooted in the public perception and public support at the level of residential neighborhoods” (Tjallingii, 2005b, p. 27). For example, a river valley, or a regional park across several districts need to be implemented in a co-ordinated and co-operative way between partners at different levels of the planning practice.

2.4.2 North American experiences

Public Park Movement

With the rapid growth of industrial cities in the USA, the Social Reform Movement was launched in the 19th Century reacting to the ills of industrialisation, one of whose countermeasures was civic
beauty through public parks. After New York’s Central Park was built in 1858, Olmsted initiated a large scale Public Park Movement around the USA. The first park system was implemented in Boston from 1878 to 1895. It later is often referred to as the “Emerald Necklace”, consisting of a series of inner-city parks, suburban parks, several parkways, and the widening and extension of existing streets (Zaitzevsky, 1982). It probably was the first time that pieces of urban green space were woven together as a system in the USA. This park system has also enormously influenced the following concepts and practices, such as the Greenway concept.

City Beautiful Movement

In 1893 the City Beautiful Movement was launched by architect Daniel Hudson Burnham and it flourished during the 1900s. This movement did not seek aesthetic effects for their own sake, but rather as a social control device to cultivate ordinary people’s merits and virtues (Bluestone, 1988). Architect and urban planner Burnham, believed parks were central to the City Beautiful Movement and such beautification could thus promote a harmonious society (Hines, 2008). Coincident with this emphasis on the importance of parks, the Public Recreation Movement occurred and many large playing/sports fields were constructed. It was during this period that planning was seen as a separate public function to be carried out by a specific government agency and the concept of a Master Plan was first developed (Wilkinson, 1983). Such increasing interest led to a requirement for general planning and design guidelines for parks and recreation. In response to this requirement, a set of standards were recommended officially by the National Recreation Association (NRA) in 1928, usually linking to urban planning needs (Wilkinson, 1983). Although the City Beautiful Movement and the Public Recreation Movement did not last for a long time, they have influenced many other places worldwide, such as New Zealand in the late 1890s (Strongman, 1999) and China in 1990s (Liu, 1999).

Broadacre City

In 1932, Frank Lloyd Wright developed the “Broadacre city” concept. He proposed decentralising the crowded cities and conceived an ideal community embedded in grand rural areas, whereby each family would be given a 4048 m² plot of land for self-sufficiency in terms of food (Wright, 1932). Wright’s Broadacre City, as it can be seen, had its roots in “utopia” (ideal cities), settling the self-contained communities into the natural environment. Later, during the 20th century, many town/urban planning theories, such as New Urbanism (starting from the 1980s), and Smart Growth (starting from the 1980s), and other similar sustainable urban development concepts, burgeoned in North America and European countries. Although their focal points and details of rules may differ from each other, a number of commonalities could be identified, such as compact land use, transit-oriented, and pedestrian-friendly urban living environments, traditional neighbourhood design with a strong sense of local history, ecology and climate (Congress for the New Urbanism, 1993; Duany et al., 2009). To some extent, they combined utopian ideas with the emerging more practical proposals of modern
design to develop a set of planning principles confronting the new challenges and addressing old problems. Amongst their principles, preserving and enhancing adequate and accessible green space appear to be the key solution to solving urban problems.

**Greenway**

Inspired by greenbelts, boulevards, parkways and park systems, the “Greenway” idea was first clearly recommended by the President’s Commission on American Outdoors in 1987.

According to Little (1995), it is “a linear open space establishment along either a natural corridor, such as a riverfront, stream valley, or ridgeline, or overland along a railroad right-of-way converted to recreational use, a canal, scenic road, or other route. It is any natural or landscape course for pedestrian or bicycle passage and an open-space connector linking parks, natural reserves, cultural features, or historic sites with each other and with populated areas”. It threads through cities and countryside “like a giant circulating system linking together the rural and urban spaces in the American landscape” (Walmsley, 1995).

The Greenway approach has been the hot topic of many studies by American researchers (Linehan, *et al*., 1995; Jongman, *et al*., 2004). And also it gained popularity worldwide, with almost all of China’s large cities applying greenway principles in practice. However, Yu *et al.* (2006) point out that although such a concept is an adaptation from the West, the function of the Greenways in China are mainly protection, productive and beautification for the city, with little concern for human uses such as recreation, cycling or hiking.

**Green infrastructure**

In 1999 a further term “Green Infrastructure” was first used in the USA, which is defined as “an interconnected network that supports native species, maintains natural ecological processes, sustains air and water resources, and contributes to the health and quality of life for America’s communities and people” (Spitzer, 1999). Such green infrastructure consisting of waterways, wetlands, woodlands, wildlife habitats and other natural areas; greenways, parks and other conservation lands; and working farms, ranches and forests is regarded as the American nation’s natural life support system (Benedict and McMahon, 2002). This concept to some extent resembles the European concept of Green Structure and carries a much wider scope than Greenway in the USA. For example, Seattle’s ongoing project – Open Space Seattle 2100 – aims to create an integrated green infrastructure for the next century (Department of Landscape Architecture, University of Washington, 2006). In a book, *Green Infrastructure: Linking landscapes and communities*, Benedict and McMahon (2006) provide more American examples and experience.

In order to effectively apply landscape ecological principles in planning, Ahern proposed 5 guidelines for planning urban green infrastructure (Ahern, 2007).
Firstly, the planning needs to articulate a concept of spatial configuration of green space. As Zonneveld points out, such concepts are often put forward as metaphors, such as “green heart”, “green fingers” and “green wedges”, they are “imaginable and understandable by the public” (as cited in Ahern, 2007). Ahern argues that “Spatial concepts are essential tools for proactive, or innovative planning, and can structure and inspire the planning process, particularly with respect to achieving genuine and effective public participation” (ibid.).

Secondly, the planning needs strategic thinking. Ahern classifies planning strategies into four types: protective, defensive, offensive or opportunistic. Protective thinking is to preserve intact, valuable landscape before they are threatened by urban development. Defensive thinking involves actions to defend landscape which are suffering from development pressure, such as establishing buffer zones. Offensive thinking takes rehabilitative actions to reintroduce green areas, such as ecological restoration projects. Opportunistic thinking seeks any new or innovative opportunities to provide green areas, such as combining with other urban infrastructures (e.g. urban roads, sewage for stormwater management).

Thirdly, the planning needs to consider greening other infrastructure. It is similar to the above opportunistic thinking advocating every opportunity for greening. Fourthly, the planning needs to consider multiple uses.

Lastly, the planning can adopt an adaptive planning approach through learning by doing. As discussed before, the ecology based principles for planning commonly lack empirical evidence, and almost all ecologists point out that any application of such principles needs careful investigation of local conditions. Therefore, Ahern suggests that plans and polices should be based on the best available knowledge while experiments and monitors should be practiced (ibid).

Based on green infrastructure practices, Benedict and McMahon (2006, p. 36-50) propose 10 principles as “benchmarks for incorporating a green infrastructure approach into existing planning activities”.

1. Connectivity is key; 2. Context matters: the analysis of the surrounding areas is important; 3. Ground in sound science and land-use planning theory and practice: conservation biology, landscape ecology, urban and regional planning, landscape architecture, and geography all contribute to green infrastructure arrangement; 4. Green infrastructure should function as the framework for conservation and urban development; 5. Green infrastructure should be planned and protected before urban development: green infrastructure as a means to encourage a proactive approach and put the natural environment and ecological services at the front of the planning process; 6. Green infrastructure is a critical public investment that should be funded up front; 7. Green infrastructure affords benefits to nature and people; 8. Green infrastructure encourages the participation of landowners and other stakeholders; 9. Beyond political boundaries: green infrastructure requires activities not only within a
jurisdiction but well beyond it, i.e. connecting a community with its city, and connecting a city with its regional areas; 10. **Long-term** commitment.

**Landscape urbanism**

Only in the last few years has “Landscape Urbanism” emerged as a theory in North America. The previous relevant urban planning theories have regarded urban landscape/green space arrangement as a subordinate part of urban development especially from the perspective of economic growth. By contrast, landscape urbanism advocates the notion of landscape replacing architecture/urban planning as the basic building block and medium of contemporary urbanism to organise urban development (Waldheim, 2006). It articulates the integration of knowledge and techniques from such disciplines as environmental engineering, urban strategy, landscape ecology and architecture to consider the complexity of contemporary urban dynamics (Architectural Association, 2005). It argues that the most important part of city planning is not the arrangement of buildings; instead, water systems, green space patches and corridors, biodiversity, the consideration of orientation and aspect, the introduction of urban agriculture, and the multiple uses of infrastructural utility corridors are all key concerns over the whole urban planning process (Bunster-Ossa, 2001).

This concept is to some extent paradoxical and complex (Corner, 2003, p. 58) and has not yet articulated clearly in relation to other theories such as smart growth (Weller, 2008). However, such the proposal that utilises landscape’s unique qualities - temporal change, transformation, adaptation and succession - to lead a dynamic urban process seems to be an “aggressive” idea pulling urban landscape especially natural landscape into the foreground as a prime factor influencing urban forms, processes, and patterns.

**2.4.3 Summary: criteria for evaluating urban green space planning approaches**

Based on the examination of green space development in these developed countries/regions and especially current green space research projects (i.e. those large-scale green structure and green infrastructure studies), and also combined with some new directions from (urban) planning and ecological planning theories, I propose three key planning principles for urban green space. They are integration, multifunctionality and participation (IMP, Table 2-3). They can be used as criteria for evaluating Chinese urban green space planning approaches to see if they encourage sustainable thinking and actions. They also provide the framework for comparing Chinese green space planning approaches with other regions.
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Interpretation</th>
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| Integration  | 1. Being integrated into regional/urban long-term development strategies;  
                2. Physically and functionally connecting green space from regional and urban, down to neighbourhood level. |
| Multifunctionality | 1. Considering combining the various functions and benefits of green space whenever possible;  
                  2. Giving more attention to ecological functions. |
| Participation | 1. Involving a wide range of communities, stakeholders and the public from decision-making to implementation and management;  
                  2. Involving interdisciplinary professions (such as ecology, and urban planning) to gain sound integrated solutions. |

**Table 2-3 Principles for planning urban green space**

*Integration*

Integration has both external and internal meanings. Firstly, urban green space planning is suggested to be externally integrated with wider meta-contexts of regional and urban development strategies. In other words, planning for urban (economic) development and green space should be performed at least simultaneously (Baycan-Levent *et al*., 2009; Werquin *et al*., 2005), the land designated for green space should not be seen as “merely as an after-thought or as a residual, the land left-over after other development has been planned” (Wilkinson, 1983). An early example is the well-known Boston park system, where the local government purchased cheap land in the initial stage of city development, on which gradually developed a chain of parks surrounding Boston. It showed remarkable foresight as over the years it has become known as “the Emerald Necklace”. Such an arrangement on the one hand can make green space woven into urban fabric and regenerate with city development; on the other hand, it can establish the most advantageous siting for building development to create, maintain, and increase site values for the city and people.

Furthermore, it is suggested that it is an effective and also feasible planning strategy to firstly think and arrange green space as a structural framework and then lay out other building development. Many theories and practices, such as green structure/infrastructure, landscape urbanism already indicate such possibility.

Secondly, the pieces of urban green space at different scales are suggested to be internally connected. At the city scale, the urban green space should be considered to connect to the regional background green land (such as mountains or large areas of forests). For example, EU green structure planning requires an appropriate regional organisation that transcends municipal territories and fits with ecological borders as it is rooted in the regional landscape. At the site scale, a well-designed green space should be extended into urban dwellers’ daily lives by connecting parks with residential green
spaces and shaded sidewalks as well as different types of leisure, recreation and sports facilities to form the green space network.

Such interaction and links between urban green space as well with other urban land use can also contribute to a functional structure and lead to a better conveyance of the multiple functions of urban green space.

**Multifunctionality**

More attention is required in terms of the quality and multifunctionality of urban green space (Werquin *et al.*, 2005; Thompson, 2002; Breuste, 2004), especially the environmental implications and ecological rationality for those countries/regions currently experiencing environmental degradation and loss of urban green space.

Multifunctionality of urban green space also can be understood at two levels. A single piece of green space at site level can provide multiple functions. This exists most likely at the design level, conveying as many functions as it can into the forms or components. For example, a park provides sports facilities for the youth while quiet and relaxing places for the senior. Or, all types of green space are designed to be interrelated to form an effective urban green space structure, creating more functions at landscape level that single green spaces cannot provide by themselves. For instance, a well-connected green network along rivers may perform as routes for walkers and cyclists, floodplains for water management, attractive edges for residential development and ecological corridors for wildlife. As such, it can better accommodate flows of traffic, people, goods, water and migration of animals and the dispersion of plants as well as improve the connection between different types of leisure and recreational facilities. The second level is also closely related to the first criterion of “integration” as explained above – real progress in the development of multifunctional urban green space is likely to be made only if a higher level of integration with other urban infrastructures and land use is achieved.

International examples show that it is vital to provide as many functions as possible through a well-designed urban green space structure. Economic considerations in green space construction are increasingly coming into the picture as there is an imperative to deliver more for less money. However, given that different functions might conflict with one another (such as the conservation needs and people’s recreation focus), the challenge facing urban green space planning is to balance the different demands and reconcile them truly, rather than only draw them green on the map. The functions and values attached to urban green space introduced in Section 2.2.4 can be applied as a framework for exploring functions in a specific study case.

**Participation**

In the planning field, the call for stakeholders, residents and other lay people to participate in a socially inclusive bottom-up planning process has become much more potent in recent years. This is
not limited to urban planning, in the experiences of European countries and North America, public participation to varying degree has become a regular part of green space planning projects to ensure that people’s desires, concerns and values will be included (see the compiled work of Werquin et al., 2005). Participants from different backgrounds driven by different motivations would look at the issues from different perspectives, such as the fear of the new development causing serious damage to their green environment is one motive, concern over the loss of children’s playing fields probably is another and some cultural/ethnic groups may have special perceptions and concerns over their environments. These participants are also local residents, and if planning and management can get their support, they would be significant allies for preserving green space against encroachment by urban economic development.

The literature does not include a benchmark in terms of what form to base participation in the practice of communicative planning, and in most cases, it just depends on the situations. There are arguments that the public and stakeholders have to be included from the very beginning of the planning process (Gobster, 2001; Baycan-Levent et al., 2009), while others propose that only the management stage should be performed in a cooperative way by a variety of participants (Stringer et al., 2006). Key lessons include ensuring representation from all perspectives and having facilitators skilled at preventing dominant actors from overpowering the discussion are.

In addition, due to urban green space carrying a dual characteristic of social and natural aspects, in reality its planning confronts the problems and challenges from a multiple sectors and yet has to interact with other urban infrastructural demands. There are inevitably conflicts of interest between the policy-makers from different departments (an obvious one is the conflict between land for green space and for commercial establishment). Therefore it is necessary to establish an interdisciplinary approach with planners, ecologists, landscape architects, foresters, economists, and such like, and to have skilled facilitators to mediate the engagement.

In summary, the planning theories and practices that have evolved over 150 years of city growth around the world suggest that there is a need for a considerably flexible and dynamic planning process. The process needs to allow ongoing inputs from residents, interest groups, planners, municipal departments, experts from a wide disciplinary base, and other actors to realise more functions, values and sustainability of urban green space, and meanwhile meet people’s needs and obtain their support.
Chapter 3
Research methodology

3.1 Introduction
The research philosophical worldviews, research strategy, research design, data collection and analysis methods used during this study are discussed in this chapter. Section 3.2 begins with the research philosophy, reasoning strategy, research methods and explains the selection of Beijing as the most effective case for studying China’s developing urban environment and associated planning. The following Section 3.3 then elaborates the case study process including the data collection and data analysis framework, methods and procedures. Some challenges around the case study are also explained.

3.2 Research strategy
3.2.1 Research philosophy

![Figure 3-1 The interconnection of research philosophy, strategies of inquiry, and research methods in research design](source: adapted and synthesised from Creswell, p. 5 and Blaikie, 2009, p. 33)

The philosophical worldview in a study significantly influences the direction of research. It is a basic set of beliefs about the world and the nature of study that individual researchers hold and is related to...
the ontological and epistemological assumptions of the researcher. The worldview directly guides the inquiry strategy and further the choice of research methods and techniques (Figure 3-1).

Generally there are four types of worldviews: postpositivism, constructivism, advocacy/participatory, and pragmatism. Their different emphasis and attitudes to research are summarised in Table 3-1. The postpositivist worldview is strongly associated with scientific method, in which researchers start with a theory, collect data, develop numeric measures of variables either supporting or rejecting the theory, and finally verify or refine the theory.

The constructivist worldview, also called interpretivism, addresses the multiple meanings of individual behaviours or social phenomena. Researchers who hold such a worldview recognise that their own personal, cultural and historical backgrounds and experiences shape their interpretation (Creswell, 2009, p. 8; Blaikie, 2009, p. 99). In contrast to postpositivism, the constructivist approach generates or develops a theory or pattern of research objects. Instead of focusing on the actual meaning that social participants give to a particular social action, constructivism focuses on “the nature of the meaningful social action, its role in understanding patterns in social life, and how this meaning can be assessed” (Blaikie, 2009, p. 99). Basically such a paradigm adopts a qualitative approach to research.

<table>
<thead>
<tr>
<th>Postpositivism</th>
<th>Constructivism</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Determination</td>
<td>• Understanding</td>
</tr>
<tr>
<td>• Reductionism</td>
<td>• Multiple participant meanings</td>
</tr>
<tr>
<td>• Empirical observation and measurement</td>
<td>• Social and historical construction</td>
</tr>
<tr>
<td>• Theory verification</td>
<td>• Theory generation</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Advocacy/Participatory</td>
<td>Pragmatism</td>
</tr>
<tr>
<td>• Political</td>
<td>• Consequences of actions</td>
</tr>
<tr>
<td>• Empowerment issue-oriented</td>
<td>• Problem-centered</td>
</tr>
<tr>
<td>• Collaborative</td>
<td>• Pluralistic</td>
</tr>
<tr>
<td>• Change-oriented</td>
<td>• Real-world practice oriented</td>
</tr>
</tbody>
</table>

Table 3-1 Four philosophical worldviews in research
(Source: Creswell, 2009, p. 6)

The advocacy/participatory worldview focuses on the needs of marginal groups or individuals in our society and highlights their functions in research design, collecting data and analysing information (Creswell, 2009, p. 9). It contains diverse philosophical positions, such as feminism, critical theory, etc. (Blaikie, 2009). The research process is collaborative and engages the participants as active collaborators in research. The pragmatic worldview is concerned with applications and solutions to problems in the real world. As some scholars observe, this worldview adopts multiple assumptions, and uses mixed methods for collecting and analysing data in order to solve the real, urgent problems (Morgan, 2007; Creswell, 2009).

I have taken a constructivist worldview to direct my historical study. In the development of a city, individuals keep developing subjective meanings of their experiences from where they live. Their meanings are multiple and diverse, and are the products of political manipulation, as well as the
cultural, philosophical and bio-physical context. This led me to investigate the complexity of content rather than narrowing those meanings into a singular uniform category. In other words, in the urban development chronology, I am aware that the world is composed of multiple truths instead of one truth. Rather than testing an established theory as postpositivism does, or attempting to solve here an urgent problem in the real world as pragmatism does, my historical research intends to reveal the layers of sometimes competing and contradictory demands on green space throughout the city’s development. Our cities are likely heading towards a “salad bowl” providing for diverse in needs, attitudes and expressions rather than perfect equality in one entity.

3.2.2 Reasoning strategy

There are two main kinds of logical procedures in research. One is the deductive process and another is inductive (Figure 3-2). Deductive reasoning moves from general principles to particular instances, in which researchers deduce certain hypotheses from others’ theory, and then to collect appropriate data to prove or reject the theory (Blaikie, 2009, p. 19).

![Figure 3-2 Illustration of deductive and inductive research processes](source: Rudestam and Newton, 2007)

Inductive reasoning is the reverse process starting with particular observations and then deriving general conclusions or propositions. It is also regarded as a process of theory-building, where specific facts/observations are used to describe some characteristics and the nature of social regularities, then to create a theory that explains relationships between the phenomena and allows projecting the future (Blaikie, 2009, p.18).

Given the nature of the research questions, purposes, and research philosophy, this study adopted an inductive reasoning strategy. I began by exploring in depth an “event” of green space construction in cities, including the concepts, movements, planning approaches and such like, then attempted to summarise and establish generalisations about the pattern of Chinese green space evolution and a theory around Chinese societal demand for green spaces and the planning response.
3.2.3 Ontological and epistemological assumptions

Ontological assumptions are about the nature of the social reality. They make claims about “what kinds of social phenomena do or can exist, the condition of their existence, and the ways in which they are related” (Blaikie, 2009, p. 92). Epistemological assumptions are about how we come to know the world and what criteria we use for deciding when knowledge is both adequate and legitimate (Blaikie, 2009, p. 92).

Blaikie suggests inductive research works best with the three types of ontological assumptions, cautious, depth or subtle realist, and epistemology of conventionalism (Blaikie, 2009, p. 95-97, Table 3-2).

<table>
<thead>
<tr>
<th></th>
<th>Inductive</th>
<th>Deductive</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aim</strong></td>
<td>To establish description of characteristics and patterns</td>
<td>To test theories, to eliminate false ones and corroborate the survivor</td>
</tr>
<tr>
<td><strong>Ontology</strong></td>
<td>Cautious, depth or subtle realist</td>
<td>Cautious or subtle realist</td>
</tr>
<tr>
<td><strong>Epistemology</strong></td>
<td>Conventionalism</td>
<td>Falsificationism, Conventionalism</td>
</tr>
<tr>
<td><strong>Start</strong></td>
<td>Collect data on characteristics and/or patterns; produce descriptions</td>
<td>Identify a regularity that needs to be explained; Construct a theory and deduce hypotheses</td>
</tr>
<tr>
<td><strong>Finish</strong></td>
<td>Relate theses to the research questions</td>
<td>Test hypotheses by matching them with data explanation in that context</td>
</tr>
</tbody>
</table>

Table 3-2 The logical characteristics of inductive and deductive research
(Source: Blaikie, 2009, p. 95-97)

My work is compatible with the cautious, depth and subtle realist ontology that Blaikie refers to. Reality has an independent existence and is stratified. Therefore, I took a cautious and critical attitude to reveal the three domains of the reality (green space construction in China): empirical domain – what can be observed; actual domain – what exists independently of the observer; and real domain - an underlying domain of structures and theories that may not be readily observed.

Conventionalism is “the view that a priori truths, logical axioms, or scientific laws have no absolute validity but are disguised conventions representing one of a number of possible alternatives” (Norton 1997, p. 121). Decision on what are good theories, and/or which is the better of two competing theories is a matter of judgement, not proof (Blaikie, 2009, p. 95). This claim appreciates the valuable choices, and their outcomes, that humans inherit from the past. The ontological and epistemological assumptions which I hold are represented in the following sections on elaboration of research design.

3.2.4 Qualitative research

The research philosophy and strategy determine my choice of research methods and techniques based on a qualitative research method. It is effective when dealing with understanding of a complex concept or phenomenon where little previous research has been done on it (Creswell, 2009). This method usually emphasises words/texts/discourses rather than quantification during the processes of data
Collecting and analyzing such a strategy is particularly useful for investigating the processes in which there are interrelated relations among various analysis units (ibid.) in order to reveal the multiplicity of green space development, such as competing demands, different indices in terms of assessing green space, and different influences. It is also claimed as one of the best methods for research in the areas of conservation and environmental planning (Pitt, 1985).

Qualitative research contains a series of inquiry approaches, such as the case study, grounded theory, ethnography, phenomenological research, and narrative research (Creswell, 2009). Which types of approaches are chosen depends on the research purposes and research questions. This study investigates urban green space planning and development over 60 years in the Chinese socio-political-cultural context in order to depict how and why contemporary urban green space planning has evolved in China. It is congruent with the case study approach which focuses on the types of “how” or “why” questions being asked on a set of contemporary events over which the researcher has very limited control (Yin, 2008). Therefore, the case study is considered as the main research inquiry approach for this project.

Case study is defined variously in different disciplines. Here I offer the following definition which pertains to the planning-related topic: a case study is a well-documented and systematic examination of the engagement, decision-making, implementation processes and/or outcomes of a particular case/project, which is undertaken for the purpose of informing future practice, policy, theory, and/or education (Francis, 2001). Such a strategy of inquiry allows the investigator to use multiple sources of evidence to undertake a thorough exploration of the complex social phenomena, which fit effectively into the needs of studying multi-faceted urban green space planning.

A frequent criticism of case study methodology is that it is incapable of providing a generalising conclusion since it is only based on a limited sample. In particular, the challenge facing this study is whether the evolutionary pattern of urban green space planning and development in China can be drawn from the findings of the single case of Beijing city. In other words, the question arises as to whether it is valid to claim the Beijing’s way of developing urban green space also represents the Chinese way.

The issue of generalisation has been a scholarly topic discussed by many sociologists. As suggested by Walker (1985, p. 3), qualitative techniques are intended more to discover what things “exist” rather than to determine how many such things there are. Qualitative research concerns the quest and, through interpretation, unravelling of meaning and ultimately achieving understanding of a certain phenomenon. On the other hand, both Hamel et al. (1993) and Yin (2008) argue that the relative size of the sample, whether 5, 100, or 10000 cases are used, does not transform multiple cases into a macroscopic study. Johansson (2004) argues that if the unique case is analytically and strategically selected, it is possible to generalise from such a single case. Flyvbjerg (2006) also emphasises that strategic choice of case may greatly add to the generality of that case study. Therefore, looking for a
typical case, a representative case, a frequently occurring case or a theoretically interesting case is an effective strategy (Mayring, 2007). In this way, even a single case can be considered acceptable, provided it fulfils the research’s established objectives.

### 3.2.5 Case selection

According to Yin (2008), a single case study needs an appropriate design under five rationales as shown in Table 3-3.

<table>
<thead>
<tr>
<th>Rationales</th>
<th>Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical case</td>
<td>To test a well-formulated theory; to confirm, challenge, or extend the theory.</td>
</tr>
<tr>
<td>Extreme case or Unique case</td>
<td>To understand the abnormal, rare instances.</td>
</tr>
<tr>
<td>Representative case or Typical case</td>
<td>To capture the circumstances and conditions of an everyday or commonplace situation.</td>
</tr>
<tr>
<td>Revelatory case</td>
<td>To observe and analyse a phenomenon previously inaccessible to social science inquiry.</td>
</tr>
<tr>
<td>Longitudinal case</td>
<td>To study the case at two or more different points in time to observe how certain conditions change over time (the desired time intervals need to be selected).</td>
</tr>
</tbody>
</table>

**Table 3-3 Five major rationales for conducting a single case study**  
(Source: Yin, 2008, p. 40-42)

The nature of this study, concerning urban green space planning history in China from 1949 to the present, is thus more exploratory rather than theory-testing. Therefore the logic of a “critical case” does not apply here. And neither does this study intend to understand abnormal conditions nor observe a phenomenon previously inaccessible to inquiry. The appropriate strategy of a single case selection exists more in the rationales of the “representative/typical case” and “longitudinal case”. The representative/typical case exemplifies what is considered to be a typical set of values, given some general understanding of a phenomenon (Gerring, 2007). Specifically for this study, the principle of selecting the case study therefore is to choose a progressive city with rich information which can make it possible to investigate Chinese urban green space planning history in depth (the past as well as the state-of-art). I explain these factors below.

China is a country consisting of 56 ethnic groups, extending over a large area in East Asia with diverse climates and topographies and with a civilisation that stretches back at least 5000 years. It is almost impossible to find a Chinese city which alone can represent all these complex geographical environments and different cultural backgrounds. Beijing was chosen because in general it is the capital city, is representative of the influences affecting Chinese urban planning at large and expresses most fully the range of evolutionary responses to these social, political and economic transformations. It is one of China’s most highly targeted case cities for research and associated publication. The following detailed criteria were used when identifying Beijing as the most suitable case:
A representative city with rich information

Any study area in qualitative research is a complex entity operating within a number of contexts - physical, ecological, economic, ethical, aesthetic and other factors (Stake, *et al.*, 1994). The problem is that there is often no clear-cut boundary between the study area and its context and it is even harder to sum up the common contextual conditions from substantive information when studying many study areas. One of the beneficial aspects of focusing on a single case is to be able to distinguish and clarify what is within the unit of analysis (the immediate study topics) and what is outside it (the context for the study). For this study, the historical, cultural, social as well as institutional aspects of the planning system in Beijing and across broader China are defined as “contextual conditions” (illustrated in Chapter 4), while the detailed discourses addressing urban green space planning in Beijing are the immediate topics (interpreted in Chapter 5). Beijing, as the nation’s capital, has provided abundant and exhaustive information whether in regard to the specific research focus of Beijing or the broader Chinese background.

![Figure 3-3 Beijing location and some historic events (as discussed in detail in Chapter 4)](image)

Beijing, as the second largest city in China, has a population of about 19.6 million and a total area of 16,410.54 km², where plain area accounts for 38.6% and mountainous area with 61.4% (Beijing Municipal Statistical Bureau, 2010). It is situated on the northern North China Plain (39°38’ - 41°05’N and 115°25’ - 117°30’E) within continental warm temperate climate zone and is one of the most...
important agricultural heartlands of China (see Figure 3-3). This region is one of the earliest centres of human civilisation and settlement in China. It has served as the political and cultural centre for the nation since the Yuan Dynasty (1271-1368, refer to Appendix A). Historically and today, this region has been the cradle of many political and social events and reforms (some examples are listed in Figure 3-3 and the detailed information will be discussed in Chapter 4). And in such cases, new concepts and ideas were inaugurated here and then tentatively promoted to other lesser cities if they had been proved suitable and feasible in Beijing. The patterns and processes of urban change emanating from Beijing have far-reaching implications for change in cities throughout China.

This city’s spatial form was initially shaped by Chinese traditional values and philosophies, such as Feng-shui theory and ancient urban planning principles. It is the city where the theories and practices of urban green space were first introduced from the Soviets and then more widely practised in China. Today as an international and modern metropolis, Beijing has been reshaped by diverse global thinking. Sometimes there is a mix of contradictory social, cultural and environmental values despicied in Beijing’s city image. For example, on one side there is an apparent exercise of Europeanised and Americanised visions of a highly maintained urban environment, but on the other side the concepts such as “nature in cities”, “sustainability”, “eco-friendly”, and “amenity” are strongly advocated and represented.

Beijing is the Chinese city model which has stood the test of time and change in dynasties or governments, as well as their ruling philosophies, and thus records the social and cultural norms of the entire nation (Sit, 1995; 1996). It is a pilot city for China, highlighting both the challenges of urban sustainability and the range of obstacles other Chinese cities may face in the process of shifting development directions (for example, the government institutions reforms during the transition from a planned economy to a market mechanism). Beijing case study therefore acts as a representative case in all senses, which did and will continue to provide rich information to study, precautionary lessons, as well as provide a thorough insight into the broader contextual conditions.

**Generalisation to broader Chinese contexts**

Beijing ranks above all other cities in scale and influence, and is the focal point of the nation for all matters of political, planning and administrative significance, indicating that developments here can be generalised to a wider Chinese situation. Cities in China operate and function in a hierarchy, with cities differing only in scale, not in the principles of their layout and functions (He, 1985). China’s top-down urban planning system leads to the application of similar approaches to urban green space planning and development across these lesser cities. Many of the key features such as the relevant standards in urban green space construction, urban green space planning and the favoured styles in greening projects in all Chinese cities followed Beijing’s examples closely.

Today the developmental problems confronting Chinese cities such as intensifying competition between different land uses for limited land and natural resources, urban environmental degradation,
the loss of cultural identity, and socio-spatial segregation, all happen in Beijing, but may vary in form and intensity. Beijing, being a microcosm and embodiment of China’s rapid urbanisation, stands at the forefront of urban change in China. Therefore, understanding the processes of urban green space planning and development in Beijing can serve as a model for understanding other Chinese cities.

**An accessible case**

In China, documents relating to urban plans were once regarded as top secrets by the government. While government documents and information are now much more transparent and available to the public, some precious first-hand documents remain inaccessible. Researchers who want to use these documents in their research are not welcome, owing to the fear that they may obtain some results which could taint the image of the government.

Apart from these limitations on research materials, Beijing is a comparatively accessible case for researchers. First of all, compared with other Chinese cities, the capital city has more accessible and complete historical documents on urban development policies and planning systems, which are the key to this generally documents-based study. And moreover, this city holds comparatively more open and tolerant views to academic and public debate and even some criticism (which otherwise very rarely occurs in Chinese society as this country has been practising Confucian governmental morality for thousands of years).

Secondly, selecting Beijing as a case study is also related to my own study experiences. I undertook my masters at the Research Centre for Eco-Environment Sciences, Chinese Academy of Sciences, studying a national research project on ecological function zones in some Chinese cities (including Beijing) at that time. Part of this research was used by the Beijing government planning departments in the preparation of its newest urban master plan and other relevant land use plans (which will be discussed in more detail in Chapter 5, Section 5.3.4). I was fortunate to have partly participated in this project (carrying out the preliminary field survey, and having opportunities to talk with other ecologists and planners), and to have further used this topic for my own Master’s research (about applying ecological approaches in Beijing green space planning). Later by another chance in 2009 I participated in the Beijing environment and landscape signs system planning for the Beijing 12th Five-Year Plan (2011-2015). By means of these planning projects, I had a chance to review the past 60 years of Beijing’s urban master plans and green space plans as well as relevant reports and policies, which greatly enhanced the ease of data collection.

### 3.3 Case study process

The entire study route is presented in Chapter 1 Figure 1-1. Steps include elaboration of the theoretical base and Chinese background; case study investigation and analysis of Beijing green space planning process; and discussion and suggestions relating to Chinese urban green space planning in general. In
particular, this section outlines the case study process (Figure 3-4) and explains it in the following subsections.

Overall, the process started with data collection. It then involved coding and analysis of the documents to identify key themes to answer the research questions. Then lastly there was a further analysis of the interrelationships between themes and building up an understanding about Chinese urban green space planning and development.

![Diagram](image.png)

**Figure 3-4 The framework of Beijing case study**

### 3.3.1 Data collection procedures

Stake (1995) and Yin (2008) identify at least six sources of evidence in qualitative studies: documents (such as agendas, administrative documents, newspaper, articles, etc.); archival records (organisational records, etc.); interviews (opinions from respondents); direct observation (field visit); participant-observation (researcher being an active participant); physical artefacts (tools, instruments, or other physical evidence). In order to increase data collection quality and ensure research validation, there are three overriding principles (Yin, 2008, p. 114-124): (1) multiple sources of evidence (evidence from two or more sources, converging on the same facts or findings); (2) a case study database (a formal
assembly of evidence distinct from the final case study report); (3) a chain of evidence (explicit links among the questions asked, the data collected, and the conclusions drawn).

A major strength of a single in-depth case study is the opportunity to use multiple sources of evidence to facilitate a process of triangulation of data collection, whereby the diversity of evidence can provide multiple measures of the same phenomenon (Yin, 2008). As to what types of evidences should be adopted, it is dependent on the nature of the study as well as the feasibility of collecting such data.

In tracing the history of planning, I investigated the societal demand and use of green space, corresponding planning strategies and underlying influences from the whole society’s perspective, rather than the individual views. As China has been a country with strict social hierarchy and monarchical political system, the government has been taken for granted as the representative of the aggregation of all the values of the whole society. The whole societal understandings of urban green space were therefore revealed by green space discourses in relevant government documents (such as urban development policies and urban master and green space plans). In other words, how green space has been conceived in urban planning and development documents and what functions and values are attached to green space reflect Chinese perception, values, use and adaptation of urban environment and landscape.

Consequently the suitable choices for the sources would be institutionally supported documents and archival records, including historical and current planning documents and maps as well as physical artefacts (green space project examples collected through direct field trip and observation). Overall the evidences employed in this study can be categorised into documentary data and physical artefacts as follows.

**Documentary data**

Urban development and planning documents and relevant laws, regulations, guidelines and standards are the major data sources. Through my previous Master studies, and my contacts with urban planners and landscape architects in the government departments, I gathered as many as possible of the relevant documents. First-hand documents were preferred, although in some cases the original hard copies of reports were difficult to access or they had become lost. In fact, during the unstable period of the Cultural Revolution 1966-1976, many governmental documents were burned and destroyed, including planning documents. As explained above, my previous Beijing green space research experience and some planning practice was useful and I was able to acquire these otherwise hard-to-access documents. For some lost documents, I had to substitute second-hand documents, gaining information through other reliable studies or reports.

These documentary data can be classified into three types: policy, planning documents with statutory power, and repertory documents which were compiled by various departments in the government. There is a hierarchy of government policy documents and planning documents. There are two levels
within the study municipality. Under the catalogue of policy documents, those that have the highest authority are national laws, regulations, guidelines, norms or standards. Then Beijing municipal policies have the second degree of authority. Under the catalogue of planning documents, Beijing master plans have higher status than the green space plans. Table 3-4 lists the reviewed official policies and plans pertinent to research topics (for detailed explanations of the planning institutional system refer to Chapter 4, Section 4.3).

<table>
<thead>
<tr>
<th>Types of data</th>
<th>Hierarchy of data</th>
<th>Data</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy documents</td>
<td>National laws, regulations, guidelines, norms or</td>
<td>City Planning Law (1989, and 2008); Environmental Protection Law</td>
<td>The State Council; Ministry of Housing and Urban-Rural Development;</td>
</tr>
<tr>
<td></td>
<td>standards</td>
<td>(1989); Regulations on Urban Greening (2002); Classification and</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Standard of Urban Land Use (2002); Guideline for Urban Green Spaces</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Planning (2002), etc.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Beijing laws, regulations, norms or standards (if</td>
<td>Regulations on Beijing greening (2010)</td>
<td>Beijing Municipal Government</td>
</tr>
<tr>
<td></td>
<td>any)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>documents</td>
<td>Beijing green space plans</td>
<td>Beijing green space plan 1958, 1982, 1992, and 2004</td>
<td></td>
</tr>
<tr>
<td>Repertory</td>
<td>Reports, studies, research etc.</td>
<td>Yearbook of Beijing Landscape and Gardening, 1991, 1995, 2000, and</td>
<td>Beijing Statistics Bureau; Beijing Municipal Bureau of Landscape and</td>
</tr>
<tr>
<td>documents</td>
<td></td>
<td>2005 Ten Years of Nurseries Development in Beijing (1949-1959)</td>
<td>Forestry; Beijing Municipal Administration Centre of Parks</td>
</tr>
</tbody>
</table>

Table 3-4 Overview of study data

The key data were extracted from often massive documents and translated to form a “planning documents database”. The challenge during this process exists in “translation”. This in itself involved much effort. All the government documents, regulations and laws are written in Chinese. I endeavoured to translate them into reader-friendly English. For example, some terminologies, such as “urban green space”, “park”, “percentage of greenery coverage”, and “percentage of green space
coverage” have corresponding official English translations. For some terms without official translation, I attempted to find the corresponding English translation from reliable English research articles on the relevant topics. However, for the overwhelming majority of documents without English translation, I kept in mind that I should keep them readable and maintain an academic distance so that my translation was as objective as possible, for example preference was given to selecting neutral words and phrases.

Picked up in the course of this investigation were many historical aspects and complex background materials or points, which are necessary for a better understanding of particular Chinese situations but somewhat tangential to the main line of the thesis. I put them in footnotes or attached them in the Appendices so as not to interfere with the main argument.

**Physical artefacts**

Through the literature study in Chapter 2, it is clear that in many cases the concrete examples (e.g. specifically a piece of green land, or a park) at the project level were referred to when illustrating and discussing green space planning even at both urban or regional levels. In my study, I also used the green space projects as the evidence to support the arguments over how urban natural environment has been used and adapted with time, how it conformed to the plans, as well as how they illustrated/revealed some detailed urban green space planning issues in China. The key criteria of choosing these projects are: (1). they were built during various periods; and (2). they are still preserved in their authentic way.

Observing the landscape itself is an effective way to investigate landscape characteristics, to discover cues to cause, and to the sequence of events that led up to the current state. This “allows us to deal with results rather than opinions, with the past as well as the present, and is the logical point of departure for a field which is fundamentally concerned with environment and places” (Meinig, 1979, p. 176). During my visits to these projects I observed their situations through walking, sitting and experiencing inside the space, taking photos for different landscape components and making notes of some impressions. For example, in a park built in the Soviet time, an area established for people’s social intercourses and socialist education at that time is still very welcoming to this day. Only the education materials displayed in the show windows have been changed from socialist profiles to today’s environmental protection materials.

However, field survey and direct observations did not produce a great amount of concrete data for this case analysis. They generated, however, vivid experiences of planning circumstances and policies on the ground which could be triangulated with the official documentary information. These dual experiences enabled me to deepen my understanding of urban green space planning policies and approaches in China.
The relevant data were mainly collected during a four month field trip to Beijing (May-September, 2010, summer season in Beijing). Apart from this, my previous experiences played an important role in the data collection.

Lastly, it is worth noting that interview data could have provided a further source of information. The survey, via interviews with key actors at the time (government officials/urban planners/landscape architects/other participants), would have provided an in-depth view of how the actors perceived the role of green space in urban planning, the stories behind the planning formulation, and their understanding of the relationships between relevant policies, urban development, planning strategies as well as the broader social background. However, this was abandoned for a number of reasons. The key factor prohibiting interviews was the impossibility of finding those planning actors from the first planning stages (many have passed away, and some even persecuted to death during the Cultural Revolution. For the historical background refer to Chapter 4, Section 4.3.3). Even though I could possibly find the planners from the last three stages, I anticipated that they may feel threatened to speak openly or be constrained in what they say because of their high-level status and Chinese political culture. And in most cases, these persons need to give their approval to release comments.

Planning in the West is regarded as an interactive joint process with stakeholders involving the government and the public with reactions and responses. Therefore, many English planning studies incorporate the research design of interviewing the stakeholders or the public. However, the urban planning system in China, as I will explain in the following chapters, is totally a top-down process. Although there is a growing call for participation, the planning decisions have not yet involved direct input from the public (but there is some indirect input through the studies and surveys of public demands and needs financed by the government).

### 3.3.2 Data analysis procedures

The procedure of qualitative data analysis involves “preparing the data for analysis, conducting different analyses, moving deeper and deeper into understanding the data, representing and recombining the data, and making an interpretation of the larger meaning of the data” (Creswell, 2009, p. 183).

There are seven common analytic techniques in a case study: time-series analysis, coding, clustering, explanation building, logic model, cross-case synthesis, pattern matching (Table 3-5).

<table>
<thead>
<tr>
<th>Analytic techniques</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time-series analysis</td>
<td>Narratives of the events that took place, organised by date.</td>
</tr>
<tr>
<td>Coding</td>
<td>Sorting data according to concepts and themes.</td>
</tr>
<tr>
<td>Clustering</td>
<td>Categorising cases according to common characteristics.</td>
</tr>
<tr>
<td>Explanation building</td>
<td>Explaining the interrelationship between identified factors.</td>
</tr>
<tr>
<td>Logic model</td>
<td>To stipulate a complex chain of events over an extended period of time.</td>
</tr>
</tbody>
</table>
Cross-case synthesis | Specific for the multiple-case studies to ground a description of real-world decisions and actions.
---|---
Pattern Matching | To compare an empirically based pattern with a predicted one. If the patterns coincide, the results can help a case study to strengthen its internal validity.

### Table 3-5 Analytic techniques in the case study
(Source: summarised from Marschan-Piekkari and Welch, 2004; Yin, 2008)

This research lies at the city scale, where spatial and temporal changes of green space in relation to urban form and urban development take place. According to the nature of the study, data analysis followed two dimensions. One was in a longitudinal dimension framed by the time-series analysis method. In qualitative research, this method is a dynamic approach particularly suited to capture the progressive nature of social and political phenomena. Two clear advantages over a static method can be identified: allowing the researcher to incorporate time into the explanation of the effects of relevant public policies; and allowing the researcher to capture the dynamic nature of (social) movement outcomes (Giugni and Yamasaki, 2006). I therefore provided a story line of urban green space in Beijing organised by chronological time periods.

And the other is a latitudinal dimension. Within each planning stage of urban green space development, I organised data analysis thematically. Given the majority of the data is from governmental written documents and statements, such as urban policies and relevant planning documents, the most important analytical process involved coding and clustering these documents to discover and allow retrieval of key themes and patterns. Furthermore, I linked the analysis with broader parts of society in relation to practices, institutions, power structures, and ideology towards building an understanding of Chinese urban green space.

#### 3.3.2.1 Data analysis units

The first research concern is Chinese societal demand and use of urban green space. As explained previously in data collection, it is reflected through green space discourses in planning and development documents, which are about how green space has been conceived in urban planning and what functions green space is expected to perform. These functions are not a matter of land itself, such as the flow of energy and nutrients; rather, they are in their direct relation to Chinese society and urbanisation process. Through the literature review, especially the review of other countries’ experience; I found that within different development stages in society the desired roles and functions of green space differed. Therefore, one of the research propositions is that these functional preferences would vary with time in fairly direct response to city developmental requirements, such as desires for economic growth, and environmental improvement.

The second research concern is associated with green space planning strategies. The research proposition is that these strategies are affected and led by the desired functions of urban green space within the context of wider, complex socio-political, cultural, economic and environmental influences.
As stated in the literature study, organising and planning nature in an urban context is an interdisciplinary subject, which can range from cultural ideology to scientific ecology. Accordingly, it is hard to see consensus about what to include in the analysis of the planning process. Based on the literature review of two basic approaches to green space planning, and combined with the real situation of the Beijing case study, the analysis units for urban green space planning include planning background, planning goals and objectives, planning approaches/methods, planning scope, planning institutions and actors, and relationships with urban master planning (the terminologies will be explained in Section 3.3.2.3). As China has a top-down centralised planning system, the institutions and main actors of urban green space planning have inevitably always been the government departments (as explained in Chapter 4). Therefore, during the analysis of Beijing’s green space planning strategies, the actors are not analysed in particular unless there are some unusual “external forces” involved in the planning process. A summary of my data analysis units is presented in Figure 3-5.

![Figure 3-5 Data analysis units](image)

### 3.3.2.2 Framework and criteria for assessing and interpreting data

The literature review of global studies on urban green space concepts and functions set up an analytical framework (“SEES”: Socio-cultural values, Economic benefits, Ecological functions, and Structural values, see Chapter 2 Section 2.2.4). I based my case study analysis on this framework and further sought commonalities, connections and/or contrasts to uncover more meaningful emergent patterns within the particular Chinese context.

Because of the diversity of urban green space planning through place and time, it is hard to establish a set of consistent criteria to make judgements about the differing planning strategies. My assessment and analysis were supported by the literature review about the critique of traditional urban planning theories and newly rising ecological approaches, underpinned by many other scholars’ work and my own previous planning study of Beijing (Chen, 2008; Chen and Deng, 2010). In particular the three principles of integration-multifunctionality-participation identified from the review of western countries’ experience provided a set of conceptual criteria for comparing and evaluating Chinese green space planning strategies (see Chapter 2 Section 2.4.3).
In addition, the unique Chinese cultural, philosophical, and political context has significantly affected the use and plan of urban green space. The extensive investigation of the Chinese context (explained in Chapter 4), thus provided a necessary basis for evaluating and interpreting the data.

3.3.2.3 Document analysis

In my tracing of history, even though the documents have been preliminarily selected and filtered, there was still extensive “messy” document data to be processed. For instance, one may feel overwhelmed and fail to see what green space planning approaches were adopted in the original planning documents because most of planning documents as well as their supplementary reports did not specify what planning approaches they were applying. Through the analysis of the planning background, planning goals/objectives, planning scope, and other analysis units, I could identify and name the different planning approaches during each historical stage, and further use them as headings to organise each section.

Figure 3-6 presents an illustration of the coding and analysis process for the study materials. This simplified example suggests a linear, hierarchical way of building from the bottom to the top, and moving from raw documents to the increasingly abstract themes. However, in my analysis process, the coding analysis was an inductive and iterative process which involved working back and forth between the database and the themes until a comprehensive set of themes were established. During the coding process, the various analysis stages were interrelated and not always visited in the order presented (Creswell, 2009, p.185). These stages were explained in the following step by step approach based on Miles and Huberman (1994) and Creswell (2009).
Figure 3-6 Document analysis with a coding process, exemplified by the first planning stage (1949-1981)

(Note: due to the limitation of space, not all the data are listed.)
Step 1. Reviewing all the collected data (in Chinese), selecting the relevant data and translating into English

This step enabled me to obtain an overall sense of the documents to prepare the data for next step of coding. I also annotated the documents to connect the review to broader general ideas about the roles of green space in urban planning.

Terms definitions and explanation

During the translation of Chinese planning documents into English, I found that several Chinese terms, translated as “goal”, “objective”, “policy”, and “strategy”, were frequently used interchangeably in the originals. In this study, these terms were defined within the planning study field.

First of all, planning is defined according to the Merrian-Webster Dictionary as “the act or process of making or carrying out plans; specifically, the establishment of goals, policies, and procedures for a social or economic unit”\(^\text{11}\). Hodge (2003) defines a goal as “a general long-term direction for progress that is frequently difficult to measure” (as cited in McWilliam, 2007, p. 5), and an objective as “a measurable target indicating that the goal has been achieved”. A policy is “a definite course or method of action selected from among alternatives and in light of given conditions to guide and determine present and future decisions; or a high-level overall plan embracing the general goals and acceptable procedures especially of a governmental body”\(^\text{12}\). In a simplistic way, policy is what government does to and for citizens (Hofferbert, 1990). Strategies are broad conceptual approaches to planning, design and management of a resource to achieve a desirable goal (Manning, 1979).

Specifically applied to the study of urban green space planning, the “planning goal” is actually the realisation of the roles and functions of green space which are generally expected and required in urban master plans and urban development agenda. The “planning objective” is reflected by the time-dependent, concrete, measurable and often quantitative standards, such as the requirement of “by 2020 the green area should account for 35% of the built-up area”. Such objectives are often presented in urban green space plans.

The “planning approach/method” is the major characteristic to distinguish different “planning strategies”. There is no agreement upon what constitutes a green space planning approach given that it may originate from different planning theories (as illustrated in Chapter 2 Section 2.3). In my study, I defined it as the framework for organising the relevant theories about green space to achieve desirable planning goals and objectives. I identified them by exploring two aspects. What are the planning major concerns in the planning stage? The answers may be the different types of green space. How does the planning propose that the concerns be addressed? It is about planning parameters, that is, quantitative

planning standards/indicators such as “how much area”, or qualitative standards/indicators such as “users’ needs”, or “ecological integrity of landscape”.

Planning scope is the area covered by planning consideration and implementation. For example, it can broadly embrace three spatial levels - urban scope (such as neighbourhood, built-up areas, rural, and natural areas), regional scope (such as metropolitan areas); and national scope.

The purpose of studying the relationship between green space planning and urban master planning is to identify to what extent the green space planning was integrated with urban development. One way to approach this is through the investigation of the relative timing of the two planning activities and the other is through analysis of the planning approaches. As Chapter 2 Section 2.3 has already implied, in the conventional planning process, green space planning is an after-thought and subordinate to urban master planning. But ecological approaches advocate the notion that natural environmental planning should occur before urban planning and urban development (refer to Chapter 2).

Step 2. Coding data to establish themes

Coding the data “involves taking text data or pictures gathered during data collection, segmenting sentences (or paragraphs) or images into categories, and labelling those categories with a term, often a term based in the actual language of the participants or documents (called an in vivo term)” (Creswell, 2009, p.186). To serve the research questions, my coding process explicitly connects to the notion of Chinese societal demands for green space and corresponding planning methods. Taking the first planning stage (1949-1981) as an example, the following two paragraphs are pieces of text from different ministerial conference reports respectively (already included in Chapter 5, Section 5.2.1). I extracted the key words/phrases: widespread distribution of trees, general greening, residential (home) greening, city’s beautification, and so on. I sorted these data and created a theme “to green and beautify the city” (also refer to Figure 3-6).

“…during the following twelve years from 1956 to 1967, the bare waste land, mountains and any places, where natural conditions permit and where there is enough manpower to undertake the greening task, should be planted and clothed with green…”

“With limited financial investment for urban greening, the emphasis is not to lay out large parks, but to develop nurseries first, conduct a widespread distribution of trees, add more green to the city, improve the local climate gradually, and spend less money but with greater effect on the city’s greening and beautification. Only on the basis of urban general greening requirements and availability of funding, can the creation of parks be considered step by step. Do not just pay attention to the creation of parks whilst ignoring the urban general greening, especially that of residential areas which is the principal guideline and task for the urban greening development at this moment. Therefore, current work is mainly to actively take
various measures and mobilise the masses to plant trees and flowers to make the residential areas green.”

As I was coding, I also found that the same document could be coded more than one time, and fit in more than one theme. Still taking the above second paragraph as an example, the phrase “nurseries first” could possibly answer to the theme of “to contribute to economic growth”. In addition, the phrase “mobilise the masses”, combined with the way language was used, showed that there was a noticeable government enthusiasm and eagerness for green space construction. Such a process establishes a way of breaking down massive documents so that I can subsequently identify key themes that characterise the body of materials.

Step 3. Categorising and interpreting the pattern of the data

Lastly, I look for a pattern of the ways that green space is being used and planned, with specific concerns over green space functions, and responsiveness of the planning strategies. The pattern is the essence of the study that “goes beyond description and theme identification and into complex theme connections” (Creswell, 2009, p.189). This requires the process of exploring the meanings, and/or connections among data at the abstract and conceptual levels that often involve the researcher’s own experience, thought, reflection and deeper knowledge of the subject, as well as in connection with the wider literature.

Creswell (2009, p. 189-190) suggested three flexible forms to convey such a pattern – personal culture background, research-based, and action meanings:

1. It could be the researcher’s personal interpretation based on her/his own culture, study background and experiences;

2. It could be a meaning derived from a comparison of research findings with information gleaned from the study of literature;

3. It could be calls for action agendas for reform and/or change formed from a theoretical basis.

There is no clear-cut boundary between the above forms towards establishing the main arguments of my study. In the final chapter, I look at the overall picture of all roles and functions of urban green space investigated to assess whether the pattern of these changes can be discovered. And finally, I could apply the combination of research-based findings, together with the comparison of findings with literature, to discuss some of the factors that may help to explain how this pattern has come about.

In summary, the coding process was instrumental in generating themes as well as the connections between various themes. This on-going and iterative process considerably inspired and enabled me to refine the research questions and analysis framework, and to organise the detailed rendering of massive information about green space development in Beijing. The identified themes appeared as major findings and again were used as the main structure of the case analysis and case presentation.
Additionally, the data analysis process was based on fusing the Chinese data sources with a western perspective. For example, the data analysis units, including the roles and functions of green space and planning parameters, were all grounded on the literature review of western theories and practices. The data assessment and interpretation were also closely connected with western literature to seek the commonality and/or contrasts between the Chinese way and the West.
Chapter 4
Historical, cultural and institutional roots of urban green space development in China

4.1 Introduction
This chapter provides an overview of the general background for understanding contemporary Chinese urban green space planning and development from three perspectives - the philosophical and cultural background, the broader progression of Chinese society and city development through the history, and contemporary urban planning systems in China. It aims to provide further insight into the reasons why things happen the way they do in Beijing as well as in China. Section 4.2 presents the Chinese philosophies which were of the most significance in shaping the natural environment in cities in the past and are still influencing the current urban landscape and environment. Section 4.3 roughly introduces Chinese societal development since 1840, positioning the contemporary urban green space development in a larger picture. Section 4.4 focuses on current urban green space planning and institutional processes in China. The statutory urban and green space planning system is explained in detail, including relevant laws, regulations, norms and organisations responsible for urban and environmental issues. Through this section, the position of urban green space planning in the whole planning system is broadly discussed.

4.2 Philosophies and cultural perspectives on nature and the city
Ancient Chinese religions and philosophies mainly include Daoism, Confucianism, and Buddhism, which are the foundation of the whole of Chinese society's values and traditions. Derived from these philosophies, there are many associated cultures and theories, such as Feng-shui theory (or Chinese geomancy), and Shan-shui culture (Mountain & water culture). All together, they are reflected in the long-standing traditions of Chinese city and urban environment construction.

4.2.1 Daoism and Nature

4.2.1.1 Daoism
In terms of the environmental aspect, Daoism (from 500BC; for the chronology of Chinese history refer to Appendix A) intrinsically concerns nature and has immensely influenced Chinese understanding about the relationship between humans and nature. Dao means “the law of nature” and its cosmological views and theories can be summarised into three core principles as follows:

1. 道法自然 dao fa zi ran (literally “following nature”). This comes from a well-known saying of Daoism: “Man is controlled by the earth, the earth by heaven, heaven by the divine law, and
the divine law follows nature” (Laozi, translated by Daszak, et al., 2008). Here, zi ran (literally nature) are actually two Chinese words, meaning “it-self-so-ing” (Mosley, 2005).

2. 无为而治 wu wei er zhi (literally “non-action”), which means “without (conscious or purposeful) action” or “action which does not go against the grain of nature” (Laozi, translated by Kirkland, 2004). “Wei”, in Chinese, means “forcing things” – any intentional or deliberated action, in the human’s own interests without regard to the intrinsic principles of nature. Practising “wu wei” implied learning from Nature by observations (Needham, 1956, p. 71-75).

3. 阴阳平衡 yin yang ping heng (literally “dynamic balance”). Daoism believes there are only two basic elements in the world, symbolised by “yin” (i.e. negative, feminine, yielding, intuitive, tolerant, and mystical, such as the moon, earth, night and the like) and “yang” (i.e. positive, masculine, rational, domineering, and managerial, such as the sun, heaven, daytime and the like). Such seemingly contrary forces are actually not opposing each other, rather than forming complementary opposites - interconnected and interdependent in the natural world that one cannot be addressed without invoking the other. Daoism believes that only if there is a dynamic balance of yin and yang, there is harmony and wellbeing.

Overall, the essence of Daoism is that everything should emulate the way of the natural world, and yield to and follow the natural rhythms and processes. In modern sense, it can contribute to the “harmonious use of senses and technologies, rather than the imposition of form or moral judgment upon life’s processes, in order that humanity maintains a consciousness of participation in the cosmos” (Jenkins, 2002).

The traditional philosophies regard the world as a holistic, dynamic and interactive system within which human beings should understand and yield to nature. This general world-view is also practised and reflected in Chinese agricultural activities and living environment establishment. In a modern sense, such practice essentially can be counted as a type of ecological design based on the principle of self-sustained and recycling resources. For example, in ancient times, people living in the south of China often practised a mulberry bank - fish pond model for their livelihood (Figure 4-1). Simply speaking, in this model, the mulberry trees can breed silkworms for the sericulture, and the waste from the silk cocoons and dung are extra food for the fish, while the accumulated waste of the fish in the mud at the bottom of the fish pond is used as fertiliser for the mulberry trees along the banks. This is an integrated system to maximise the use of land and water resources, recycle nutrients and energy and maintain the balance in the ecosystem (Zhong, 1982; Ruddle, et al., 1983). This model can be seen as the embryo of application of a modern ecosystem theory, which applies a systematic viewpoint of the world. Even now, this model is still commonly applied in the south of China and shapes a unique local living landscape (Figure 4-2).
4.2.1.2 Feng-shui theory

The contributions of Daoism to Chinese planning and design professions (from the large-scale natural landscape to the house interior) are not merely limited to the cosmological level as a religious and ethical guideline, but also in the concrete down-to-earth practices. Evolved from Daoism, Feng-shui theory, also known as Chinese geomancy (from 276–324AD), is a practical and pragmatic environmental tool and quasi-science and has been used to address the relationship between built and natural environments. Such practical theory developed to involve a wide range of disciplines, from urban environment planning to the individual psychological benefits of the living environment (He, 1990). Over thousands of years in China, Feng-shui has been applied in diverse environment-related...
situations, such as site-selection for cities/towns, residential areas, farms and markets in the macro-scale, composition and decoration for private gardens/courtyards, the interior of a house in the micro-scale.

There were two schools (branches) of Feng-shui historically: one makes use of Luo pan (compass) focusing on the relationship between direction and astrology, while the other depends on an assessment of land form or landscape. The Compass School involves many mysterious supernatural factors, which are not related to this study. The Form School examines the physical forms such as spatial arrangement, structure, order of the elements, and symbolism in the environment. The process of practising the Form School starts with observing the surrounding environment, such as landforms and terrain, and then determines the best location, orientation and other factors for a city/town or a house.

The whole process is based on a thorough analysis of five geographical factors, namely Dragon, Sand, Water, Cave and Direction (Figure 4-3). Dragon is a metaphor for mountains, which guarantee the settlement location is on elevated spots, preventing the village being exposed to floods. Cave represents the best niche for humans living. Another concept closely related to Cave is Ming tang (literally “bright open hall”), which is similar to the concepts of open space/public space in the present day. The Dragon (mountains) carries the Qi, and the Cave is the rallying point of Qi. Qi - literally “living energy” - represents the “cosmic spirit that vitalises and infuses all things, giving energy to human beings, life to nature, movement to water and growth to plants” (Skinner, 1989). Sand represents the surrounding hills or soil condition, which protects the Cave from wind and harsh environment. Chinese use four emblems to name the surrounding sands: the Red Peacock (south), the Black Turtle (north), the Azure Dragon (east) and the White Tiger (west). Water carries the Qi, flowing from the mountains and going through the Ming tang.

Figure 4-3 Feng-shui sketch diagram
(Source: redrawn from Yi, et al., 1996)
Ancient Beijing city has always been the best example of the application of the Feng-shui theory, which was thus believed to be a blessing and prosperous place (Wang, 2002). As such it was favoured by many dynasties’ rulers and has been a capital city almost continuously for more than a thousand years. Figure 4-4 shows the procedure of placing Beijing city in a large-scale regional landscape and Figure 4-5 illustrates the relationship between the Imperial City (the core of Beijing city) and its surrounding environment.

Figure 4-4 The Feng-shui pattern of Beijing in the wider Beijing-Tianjin-Hebei region. (Source: adapted from Chen, 2010. Note: There are a number of mountains surrounding Beijing and rivers running through from the north to the south and thus it formed an ideal place for human settlement according to Feng-shui theory. a. Sitting the city at the ideal Ming tang site (also a central position relative to its surrounding environments); b. Forming a central axis referring to the main mountain; c. Considering and borrowing scenery from the surrounding landscapes; d. Completing the final interactive structure of region, city mountains, water, and other natural sceneries.)

Figure 4-5 The Feng-shui pattern in the old Imperial city and surroundings. (Source: adapted and redrawn from Liu, 1997, p. 36; Zhou, 1999, p. 28)

Beijing city meets all the criteria and principles of the ideal Feng-shui model from the location selection at the wider regional level and the city layout at the city level. Specifically from the viewpoint of urban-environment interaction, Beijing has the following characteristics as a Feng-shui model city:
1. Beijing sits between two arms of Xi Mountain and Yan Mountain to the left, back and right, to protect Beijing from strong, cold and dusty winds from the north. Greenery on these Dragon mountains is considered an important criterion of good Feng-shui. Ancient Chinese believed that flourishing forests could retain living energy (Qi) to guarantee prosperity and harmony for the country/city/family. Historical records show that in 1635 suburban Beijing teemed with thick lush pine forests, and the trails inside the forests were only wide enough for one horse (Wang, 2006).

2. The Forbidden City faces the South to ensure the city can enjoy adequate sunshine.

3. The Beijing water system also perfectly matches the standards of good Feng-shui. Natural springs and man-made moats, act as a Red Peacock in front of the Forbidden City. The dense woods surrounding Beijing also nurtured many water resources. The areas, for example, Diaoyutai, Yuyuantai, and Jinyuchi had spring water all the year around (see the middle picture in Figure 4-5). In a modern sense, they are greenways or green corridors connecting the city centre with the surrounding mountain landscapes.

4. Large royal gardens, such as the Summer Palace and Yuanmingyuan Park, were situated outside the Forbidden City for royal families’ hunting and recreation. They are analogous with the current nature reserves, with the large green patches in the city matrix.

5. Construction of urban Ming Tang: its function mainly was to provide open space for gathering and trade. Generally, it was just like a public patio and greening was not necessary. Therefore, there was no green space or similar concepts in ancient Chinese cities. Almost all the green areas within the settlement were private, for royal families or the nobility.

4.2.1.3 Shan-shui culture (Mountain & Water culture)

Figure 4-6 Some examples of typical Chinese Shan-shui painting.
“Shan” literally means “mountain” and “shui” means “water” in Chinese. As mountains and water are regarded as the representatives of nature, and also the most important elements in the yin and yang of Feng-shui theory, Shan-shui culture (Mountain & Water culture) was developed to present the symbolic version of Daoism philosophy and Feng-shui theory. Such a simplified concept for complex cosmological philosophies is much easier to be disseminated widely around the population and also transmitted to succeeding generations, while Feng-shui once was confined to a few astrologers and was considered to contain and advocate supernatural elements and mysteries. “Shan-shui culture” was therefore further developed into the most important culture with substantial influences on all spheres of Chinese literature and art such as landscape poems, landscape painting, garden design, as well as ancient urban planning. Koichi once noted that “the interest of loving Shan-shui culture became the basic quality of Chinese society…there was not one poet who never composed Shan-shui poems…there was not one poem without descriptions of Shan-shui” (Koichi, 1989). Figure 4-6 shows the popular paintings expressing Chinese appreciation of mountains and water landscapes. Such themes in China form one of the largest painting genres—“Shan-shui painting”.

Apart from a strong connection with Daoism and Feng-shui theory, Shan-shui culture was also highly praised and esteemed by Confucianism. For example, there is a well-known saying in Confucius’ Analects: “the wise man find delight in water, the virtuous man find delight in mountains” (Confucius, translated by Legge, 1893). The mountains and water were personified to have human virtues such as lofty and high-minded attributes and therefore were often the objects of scholars and poets expressing their admiration and sentiments about this world. It can be seen that nature in ancient Chinese is valued so highly that it has had many symbolic and ethical values attached to it.

In addition to these symbolic, aesthetic and religious meanings in Shan-shui culture, the mountains and water were also used for their functional and technical aspects in ancient urban planning practice. For example, the main mountain acted as the reference for the creation of the urban axis (refer to Figure 4-3 and Figure 4-4) and one of the important tasks for urban planning was to bring the mountain scenic views into a city so that they could be appreciated in the city. Such an approach was also called “借景” in Chinese (borrowing the view). The mountains were also used for their military aspects (e.g. defence), while water can also be used as a means of urban transportation.

The Shan-shui culture were the soul of city/town’s arrangement and classical garden art in ancient China (Wang, 2002) and to a large extent, ancient cities and gardens are the direct spatial reflection of Chinese philosophies and cultures. Figure 4-7 illustrates how the “Shan-shui Culture” expresses itself in human settlement at city and site (private residential garden) scales. At the city level, the Shan-shui model is expressed as “mountain-city-water”, while at a site scale, such as in a private garden, this
model is reflected through “rocks-house-pond” where the rocks and ponds are supposed to mimic the natural mountains and water system. In spite of different scales and appearance, the essence is the same, that is, the combination of “shan and shui - mountain and water” in the living environment.

Figure 4-7 Analysis of Shan-shui culture in a city and a private garden
(Source: drawn by the author)

4.2.1.4 Shan-shui-city

As Chinese appreciate the beauty and noble characteristics of mountains and water, they attempted to settle their towns in the place naturally surrounded by mountains and water, or made every effort to create these elements into their living space through a man-made landscape. The prosperity of many well-known ancient Chinese cities, such as Beijing, Suzhou and Hangzhou\(^{13}\), relied on their natural mountains and water system. The network of rivers and canals went throughout these cities, and alongside the rivers were often monumental cultural buildings, private gardens and other heritage which have been conserved today.

Therefore, the “Shan-shui-city” was a unique spatial concept in China’s ancient urban planning. It combines urban construction and the natural environment which is mainly composed of mountains and water.

Although this concept is deeply-rooted in thousands of years of Chinese history and practised widely across the country, the term as such only dates back to 1980s and 1990s, coined by the famous Chinese architect Wu Liangyong in his research on the city planning of Guilin (a city in the southwest of China, with long-renowned scenery). Wu argued that the beauty of Guilin city was not only because of the beauty of the mountains and the water itself, but also because of the unique natural structure configured by the connection and integration of the two elements, as well as the penetrative

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\(^{13}\) Suzhou is located in the lower of Yangtze River. It has a history of more than 2500 years and is a well-known city as China’s silk industry centre and cultural centre with outstanding garden achievements. Some of its classical gardens, including Humble Administrator’s Garden, Master of the Nets Garden, Lingering Garden, in Suzhou were listed as World Heritage Sites by UNESCO in 1997 and 2000. Hangzhou is near Suzhou, and is also one of the most renowned cities in China due to its historical, cultural and natural sceneries.
relationship with the city built-up areas (Wu, 2003). Wu also analysed the Shan-shui pattern in Sanya city and Wuxi city (Wu, 2003). In 1990, Qian Xuesen\(^{14}\) wrote a letter to Wu proposing the establishment of the concept of “Shan-shui-city” for the Chinese city of tomorrow, which tried to reintroduce the traditional idea of the Shan-shui model into Chinese contemporary urban planning, and to make the city “a big garden” (Bao and Gu, 1996; Qian, 1996). On the other hand, Howard’s “Garden City” thought influenced China at that time as well. To a large extent, the “Shan-shui-city” is the Chinese version of Howard’s “Garden City”, intrinsically meaning a pleasant urban living environment (Li, 1999; Jia, 2000). Furthermore, the title of “Shan-shui Garden City” was coined to popularise the government’s goal for a promising city. This idea led to an extensive discussion and became influential in the fields of urban and green space planning and development in China.

### 4.2.2 Confucianism and the hierarchical layout of the city

Confucianism was developed by the Chinese philosopher Confucius (551-478BC, refer to Appendix A). It evolved into a complex socio-political system with respect to philosophical, moral, and quasi-religious thought, rather than a pure religion (Bo, 2009). It has a very wide range of influences on the culture and history of many Asian countries (such as Japan). Compared with Daoism, which is usually regarded as a philosophy concerning the relationship between man and nature, Confucianism attempts to seek the social harmony and the relationship between man and man within the framework of the society and family.

The Confucians classified the social hierarchy into five relationships (五伦 wǔ lún): “Ruler to Ruled; Father to Son; Husband to Wife; Elder Brother to Younger Brother; Friend to Friend” (translated by Traylor, 1988). Through these relationships, it attempted to promote human morality such as politeness, personal, family filial piety and social duties, and loyalty and humanity. It focuses on a strict hierarchical society based on the concepts of humanity, ritual, loyalty, family filial piety, social/country duties, and gentlemanly behaviour (Lau, 1979). Historically, Confucianism has been adopted as the official state doctrine since it centres on individual service to one’s sovereign.

The representation of Confucianism in ancient urban planning was therefore reflected in the search for a geometrical relationship and orderliness to conform to such strict social relationship and hierarchy. Such a city layout is symmetrically square, with the imperial palace (for the national capital) or administrative quarter (for a lesser city) sitting in the centre of a north-south axis to symbolise centralisation of power where the rulers can perform the son of Heaven to communicate with the masses and receive the blessing from Heaven. City walls and straight roads form a rigid grid and

\(^{14}\) Qian Xuesen (1911-2009) was a scientist in the missile and space fields of both America and China. For his important contributions, he became known as the “Father of Chinese Rocketry”. In his later life, he became interested in a number of areas, such as geography science, social science, education, and Chinese literature and art. He advocated scientific investigation of traditional Chinese philosophies and values, such as Shan-shui culture.
symbolises the emperor’s reign on earth. The best example of a Confucian city plan is the Forbidden City in Beijing (refer to Figure 4-5).

4.2.3 Buddhism

Buddhism is the only important yet foreign influence that became an integral part of ancient Chinese life (Lin, 2001). It was introduced from India in the Han Dynasty (206BC-220AD) and became popular during the chaotic Wei and Jin Dynasties (265-420AD), and the Southern and Northern Dynasties (420-534AD), when Daoism rose and Confucianism declined.

Similar to Daoism, Buddhism also emphasises leaving the chaotic world and encourages humans to “live a simple and moderate lifestyle away from both extremes of self-deprivation and self-indulgence” (De Silva, 1987). It also follows Daoism in cultivating nature and providing a refuge from the pains and vicissitudes of earthly life (Lin, 2001). It believes that the world is ‘dynamic and kinetic, and nature is constantly in a process of undergoing change’ (De Silva, 1987).

In the cosmos, Buddhism proposes five natural laws: “physical laws, biological laws, psychological laws, moral laws, and causal laws” (Liu, 2009), which demonstrate that “man and nature are bound together in a reciprocal causal relationship with changes in one necessarily bringing about changes in the other” (De Silva, 1987).

Buddhism believes that it is human beings’ morals that substantively affected the natural processes, and thus it requires humans to have “loving-kindness” towards all creatures living in the cosmos (Liu, 2009). Man and other species can live harmoniously only if man regards all lives with compassion and respect. With little doubt, there is a reverential attitude towards long-standing trees, which are respected as “lords of the forests” among the Buddhists. These monks used these natural areas for contemplation and also were always willing to share these spiritual areas with others. Therefore, it is not surprising that around the Buddhist temples, there are many pleasure groves, lush forests and/or lakes for the ordinary people to use. And in modern sense, these areas are endowed with much higher biodiversity since all species are respected and conserved well. Recent research also confirms the value of such areas for conserving urban biodiversity (Fujita, 2012).

After the Northern and Southern Dynasties, Buddhism became the dominant religion and culture in China and later was much more prevalent than Daoism among the ordinary people. Like Daoism, a large number of Buddhist temples were also built in natural areas, such as high mountains remote from those human settlements. Because of popularity among the ordinary people, these temples (for the Buddhist or Daoist) in China gradually developed into the objects of recreation rather than of edification. As Kubin (1990) observed, these temples touch the aesthetic sense and nature appreciation in the Chinese mind rather than their moral or religious sense. Usually there were superior rooms for any visitors in these temples, and the pilgrims could live for a while, wandering around and talking with the monks while taking a cup of green tea and having their energy and spirits refreshed.
Lin (2001) describes the travelling scene in old times:

“…in spring, thousands of pilgrims, old and young, men and women, may be seen on the trail carrying sticks and yellow bags, travelling nights and days to the sacred temple. Among them the spirit of jollity prevails and tales are told on the way…”

Through it, the ordinary people who were not able to have their own private gardens could enjoy the beauty of nature and also relax themselves. This activity had evolved gradually into a kind of festival - spring/autumn tours with more aesthetic, leisure, recreational, and educational purposes. Even today in China, the schools and universities officially hold such activities for their students every spring and autumn (without any religious purposes). And also most of Chinese take such tours with their families and regard them as precious experiences for family reunion.

4.3 Background of urban greening in Modern China

Although contemporary Chinese green space only has a history of six decades, understanding its planning theories and practices has to be tracked back to a broader and complex history within the time frame of the last 200 years. China has gone through momentous cultural and social transformations as a result of its encounter with the West and now is entering a period when it seems to have found some ways of dealing and integrating with the West.

According to historians and urban researchers, “modern time” in China started from 1840. It can be broadly divided into four distinctive societal development phases according to the political and social transformations: semi-colonial and semi-feudal period, National Government period, the preliminary period of Communist Government, and the period after the Open Door policy.

4.3.1 1840-1912 Semi-colonial and semi-feudal (Qing Dynasty) society

After China partly became a western colony in 1868, the “Huangpu Park” was built in the British and American Concessions in Shanghai (Shanghai News Agency, 1984). It was the first public park in China but merely pandered to westerners (see Figure 4-8). In 1903, Chinese overseas students in Japan first introduced the term “public park” (in Chinese “公园 gong yuan”) into China, which was appreciated as a public space by the whole society. Shanghai, as the first Concession of the French and the first International Settlement in China, gathered large numbers of foreigners, as well as state-of-the-art ideas and practices, and therefore became the cradle of modern public parks in China.

Along with more cities occupied by western countries, more public parks were constructed in their concessions such as British Concessions, French Concessions, and Russian Concessions in Tianjin city, Dalian city and other Chinese cities (Chen, 2004). On the other hand, this “fashion” of building public parks also influenced the local authorities who began to fund construction of new public parks, such as “Tianjin Park” in 1907 in Tianjin (Takunpao News, 26/04/1907) and “Lianchi Park” in
Baoding (Takunpao News, 24/07/1907). Other public parks for the masses were also funded by some enlightened Chinese capitalists.

Parks for the public was a concept entirely resulting from western colonisation in China (Li, 2000). To a large extent, it was a response to the initial awareness of openness (albeit being forced) and accordingly liberal democracy in China’s long-existing feudal society (Chen, 2004). In spite of the fact that China was still in a situation of chaos with external invasion and internal wars, going to the park and enjoying some fresh air and relaxation proved to be a fashion or at least a “fad” among the ordinary people. It brought some fun and comfort to the people in the war time.

Figure 4-8 Old pictures of the Huangpu Park in 1930s
(Source: http://www.taimeiad.com.cn. Retrieved on 03/01/2011. This park applied a classical English picturesque style with trees grouped in clumps and a smooth shaven lawn, a modern gazebo where a western fashionable concert was in progress. Foreigners and the high classes in China were enjoying themselves.)

4.3.2 1912-1949 National Government - Period of the Republic of China

In 1912, the event of Qing Emperor Xuantong’s abdication indicated that 2000 years of feudal society had ended in China. China was then led by the National Government (by the Chinese Nationalist Party) until 1949 and public parks became a part of civic construction (also including transportation, the urban plan in this period refer to Appendix D). The cities of Shanghai, Beijing, Nanjing, Tianjin, Guangzhou, Qingdao, Chengdu, Wuhan, Hangzhou, Xi’an, Suzhou, Wuxi, Jinan, and even Guangxi whose social and economic development fell behind other cities, had been eager to establish public parks (Liu, 1999).

In addition, at the same time some imperial or nobles’ private gardens were reshaped and gradually opened to the public. First in Shanghai, many old private gardens, such as the Zhang Garden, Xu Garden, Yu Garden, and Xi Garden, were open to the public freely or with a small charge (Xiong,

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15 Chinese Nationalist Party was one of the dominant parties and built up the Republic of China. In 1949, it retreated to Taiwan after being defeated by the CCP. Today it remains one of the main political parties and currently is the ruling party in Taiwan.
In 1914, the Interior Minister Zhu Qinyin suggested opening the imperial gardens in Beijing in order to “enjoy with the populace” to show an enlightened government (Shen Daily Circulation, 02/06/1914). As a consequence, the first public park in Beijing, known as the “Central Park”, was opened up to the public. It was originally an imperial garden built in 1421, where the emperors of the Ming and Qing dynasties (refer to Appendix A) worshipped and made sacrificial tributes to the “God of Earth and Agriculture”. In 1928, it was renamed “Zhongshan Park” in memory of Sun Zhongshan, the “Father of the Nation”, who founded the Republic of China (the National Government, 1912-1949). Many newspapers at that time reported opening of these once imperial gardens as a grand gesture of the government to the people:

“…yesterday it was exclusively a garden for the royal families; today it is really a park for the mass”; “the population in the capital go around the park, hand in hand, with unbelievably high spirits” (Wang and Yan, 2008).

Other parks, such as Xianmongtan Park (built in 1420 and opened in 1916 as a public space), Beihai Park (built in 928 and opened in 1925), and Ditan Park (built in 1530 and opened in 1925) were consecutively opened to the public.

Following the actions of central government, the local authorities began rebuilding the old official gardens and opening them to the people, like Zhongshan Park in Chengdu city (Zhou, 1943); Zhongyang Park in Guangzhou (Guangzhou Municipal Government, 1934); and Nanshan Park in Chongqing (Chongqing Municipal Government, 1936). Public parks were actually regarded as an effective tool for the government to “cultivate civilised manners and habits among the general public and thus reduce alcohol, drug opium use, gambling and prostitution” (Shi, 1998).

In this period, China was still at war. It was impossible for the National Government to provide more financial support and make more efforts on public parks. The government once enacted a Law on Urban Planning but only put it into practice in a few cities (Wang, 1984). Little effort was made to systematically implement it. There were therefore no statutory plans established for urban park or urban green space development. Nevertheless, the transformation of private gardens to public parks, together with the public parks built by philanthropic capitalists, was a prelude to the Chinese green space development.

4.3.3 1949-1978 Communist Government - Mao and Soviet Era

It was only when the People’s Republic of China was established in 1949 by the Chinese Communist Party (CCP) that nationwide attention was paid to urban development, as well as relevant green space construction. However, during the time period of 1949-1978, a series of political and economic campaigns influenced all spheres of life and caused urban and green space development many ups and downs, back and forth, in a winding path.
Learning from the Soviets

The success of establishing the “New China”\(^{16}\) by CCP owed much to the former Soviet Union military and economic support. And also during the Cold War (1945 - 1991), of the political and military tension between the western capitalist world (led by USA) and the communist world (led by the Soviet), China had to rely heavily on the Soviet support in all aspects. The poster “Learning everything from our big brother – the Soviet Union” was everywhere, which indicated a very close relationship between the two countries. Under the enormous assistance of the Soviet experts, China embarked on the 1\(^{st}\) Five-Year Plan\(^{17}\) in 1953. Its key goal was to follow the “big brother” to rapidly build up an industrialised and modernised communist country.

Local governments began to concentrate on economic development. The top priority was given to heavy industry, which was believed to the foundation and life blood of an industrialised country. In order to facilitate economic production activities, every city inaugurated its own urban development plan. However, the CCP had little knowledge or experience and thus had little choice but to resort to the Soviet model and planning principles. For example, the size of the city was restricted through stringent land use quota, as well as limiting population, all land was stated-controlled, and the non-productive activities (such as wholesaling, retailing, storage, finance, and other services) were reduced or kept in secondary status.

In the area of parks construction, the typical Soviet model – the Park of Culture and Recreation theory (Парк Культуры и Отдыха in Russian) - was introduced and widely put into practice (Zhao, 2009). This method highlighted functional zones and corresponding strict land quota for a park to provide social, cultural and recreational activities for the working masses.

At this time, massive Soviet documents on urban green space were translated and flooded into China; just to name a few; Afforestation (Zhu et al., 1956), Urban Green Space Planning (Cheng, 1957), and Urban Green Space in Soviet Union (Lin et al., 1959). Through these documents, the term “urban green space (system)” was first introduced into Beijing and spread in China. Since then, China has used “urban green space” officially as a generic term for “the artificial green space managed inside built-up areas or natural urban forests in the non-built-up areas” (Zhu et al., 1956). And the term “urban green space (system) planning” has since been applied to “rationally and scientifically arrange the overall spatial layout of green space in a city and their construction” (Cheng, 1957).

In March 1963, the Ministry of Architecture & Engineering (1963) issued *Regulations on Urban Green Space* (still valid now), in which China first created its own typology of urban green spaces.

\(^{16}\) The period time after 1949 also refers to the “New China”.

\(^{17}\) Five-Year Plans are a series of social and economic development plans normally established for the whole of China. The first one completed during 1953 to 1957 was aided by the former Soviet Union, and later at five year intervals the Chinese government issued a Five-Year Plan. But in 2006, the name of the 11\(^{th}\) Five-Year Plan was changed to the 11\(^{th}\) Five-Year Guideline to imply that, unlike in the communist centralised economy, the government just plays a guiding role in the Chinese market economy.
mainly with reference to Soviet classification in *Afforestation* (Table 4-1). Compared with the Soviet version, China added another two items - productive greening and scenic areas - based on the real circumstances and Chinese long-standing traditions. At that time the whole country concentrated on tangible economic production and hence setting productive greening (such as nurseries) was compulsory in urban planning. On the periphery of the city was a large area of mountains and former imperial gardens, which were readily designated as green space.

Through learning from the Soviet, the view of urban green space was widened from traditional private gardens to parks, and scenic areas at urban and suburban level. This progress indicated that since the start, green space in China has been conceptualised and established as a functional part of urban planning and land use management.

<table>
<thead>
<tr>
<th>Types</th>
<th>Soviet classification</th>
<th>Chinese classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public green space</td>
<td>Cultural park, sports park, botanic garden, zoo, children’s park, garden, boulevard, street greening, green spaces of administration and public spaces (bus station, library, museum), forest park, nature reserve</td>
<td>Park, zoo, botanic garden, street greening, plaza greening</td>
</tr>
<tr>
<td>Attached green space</td>
<td>Kindergarten, school, university, hospital, institute, factory and plant, sanatorium, summer camp</td>
<td>Residential areas, public service places, school, military bases, factory and plants, sanatoria</td>
</tr>
<tr>
<td>Specific purpose green space</td>
<td>Protective greening for factories, soil and water conservation forests, windbreak, cemetery, nursery</td>
<td>Protective greening, cemetery, sanatorium^18</td>
</tr>
<tr>
<td>Productive greening</td>
<td>Not given</td>
<td>Nursery</td>
</tr>
<tr>
<td>Scenic areas</td>
<td>Not given</td>
<td>Surrounding the city, consisting of grand mountains and lakes</td>
</tr>
</tbody>
</table>

Table 4-1 A comparison of the urban green space types between the former Soviet Union and Beijing

(Source: translated from the Ministry of Architecture & Engineering, 1963)

^18 This concept “sanatorium” was also borrowed from the Soviet Union. In Russia and other former Soviet Union republics, the term “sanatorium” is referred to “a combination resort/recreational facility and a medical facility to provide short-term complex rest and medical services. It is similar to spa resorts with medical services.” (http://www.websters-online-dictionary.org/definitions/sanatorium?cx=partner-pub-0939450753529744%3A0qd01-tdq&cof=FORID%3A9&ie=UTF-8&q=sanatorium&sa=Search#906; http://en.wikipedia.org/wiki/Sanatorium. Retrieved on 22/07/2011).
The Great Leap Forward campaign and National Landscaping campaign

During 1958-1961, Chairman Mao (Mao Zedong), the leader of the CCP and the founding father of the “New China”, launched the “Great Leap Forward” (大跃进) economic campaign. He attempted to rapidly transform poor agrarian China into a modern developed communist country through a crash course in agriculturalisation, industrialisation and collectivisation. “Catch up with and even surpass the Great Britain and America as early as possible” was one of the most popular slogans at that time. It called for a rapid transition towards a communist city where the social class differences – the “Three Great Differences” (三大差别) between worker/peasant, urban/rural, and intellectual/worker, were eliminated (Beijing Construction History Editorial Committee, 1987).

However, this desire for “overnight” surpassing those developed countries thoroughly violated the laws of social, economic and natural development and thus was totally unrealistic. Under this political climate, the social atmosphere was dominated by boasting and exaggeration. Mao saw grain and steel production as the key indicators for economic development; consequently, local government leaders falsely reported ever-higher grain production figures to flatter and please their political superiors. The reported production numbers were exaggerated up to 10 times the actual production amounts. The effect of false grain income, combined with the naturally occurring grain shortage during 1959-1962 (well-known as “Three Years of Natural Disasters”, 三年自然灾害), caused a nationwide famine and tens of millions of people to starve to death during this period. The Great Leap Forward was criticised as “coercion, terror, and systematic violence” and it “motivated one of the most deadly mass killings of human history” (Dikotter, 2010).

Within such a context of changing the whole of China overnight, Mao launched the National Landscaping campaign (大地园林化) in 1958 with the aim of “making all of China green and beautiful” (Chen, 2002a; Chen, 2002b). Later in the same year, the 1st National Greening Conference was held, which inaugurated competitions across the country and encouraged all cities to exchange ideas and experiences to find the gaps and to learn from the most advanced cities. This conference called for “mobilising everyone to plant in every inch possible” and “embracing a ‘great leap forward’ in urban greening” (Liu, 1999, p. 4-6). Many cities made their own goals of achieving a whole greening within a certain short period. Under this greening enthusiasm from top to bottom, and also under the assistance of the Soviet urban planners, construction of a greenbelt in Beijing was first proposed in the 1958 Beijing green space plan. However, the government did not take serious action on it. These urban development goals were often too high to be realised and eventually faded away, although the overall effect of greening for the whole country was improved.

The Cultural Revolution and the unstable period

Soon after the Great Leap Forward campaign, the Great Proletarian Cultural Revolution (known simply as the Cultural Revolution, 文化大革命), a political campaign launched by Mao, took place
during the ten years from 1966 to 1976. It aimed to purge capitalist thoughts and enhance socialism within the nation. This campaign involved much violence, chaos and turmoil across the country, caused by Red Guards against those whom they thought were trying to restore capitalism, such as landlords, rich peasants, intellectuals or Mao’s political enemies and opponents. As a result, hundreds of thousands of such people were violently persecuted to death or committed suicide under the political pressure. For example, many professionals, intellectuals and artists whose work was believed to be bourgeois or anti-socialist were prohibited from working (Gao, 2008). Landscape architects and urban planners who were unable to escape the purge were sent to prison or the rural and remote areas to work in labour camps.

In the historian Thurston’s view of this movement, it “led to loss of culture, and of spiritual values; loss of hope and ideals; loss of time, truth and of life; in short, loss of nearly everything that gives meaning to life” (Thurston, 1988). This ten-year period was the most gloomy and “darkest” period in the contemporary history of China.

Indeed, the scale of this campaign has been such that hardly anything has been left untouched – almost all spheres of public affairs and policy, central and local government, and economic activities ranging across the nation. The emphasis of the whole country had transformed from economic development to the stress of politics and class struggles and thus almost all the economic and social activities were halted. The government as well suspended the green spaces construction and launched “no urban planning for three years” (Wang, 2005; Zou, 2005).

Furthermore, Mao believed that “although the bourgeoisie has been overthrown, it was still trying to use the old ideas, culture, customs, and habits of the exploiting classes to corrupt the masses, capture their minds, and endeavour to stage a comeback” (Peking Review, 1966, 6-11). Decision of the Central Committee of the Chinese Communist Party Concerning the Great Proletarian Cultural Revolution stated that:

“At present, our objective is to struggle against and crush those people in authority who are taking the capitalist road…to criticise the ideology of the bourgeoisie and all other exploiting classes and to transform education, literature and art, and all other parts of the superstructure that do not correspond to the socialist economic base, so as to facilitate the consolidation and development of the socialist system” (Peking Review, 1966, 6-11. English version)

Therefore, the slogan of “Destroy the old world; Forge the new world” (砸烂旧社会, 创建新世界) became the motto. Removing the Four Olds was therefore one of the most important goals of the Cultural Revolution during this time. The Four Olds indicated “Old Customs, Old Culture, Old Habits,

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19 Red Guards largely consisted of young students during the Cultural Revolution (1966-1976). They were mobilised by Mao who was also referred to as “Red-Commander-in-Chief”. These enthusiastic young students aimed to protect Mao and his revolutionary movement, to overturn the old system and eventually to make the whole China “red”.

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and Old Ideas” (除四旧). All types of religious affairs, such as temples, churches, monasteries, places for cemeteries and classical Chinese texts were shut down or converted to other uses (such as churches being turned into kindergartens), or directly destroyed by Red Guards with hammers (see Figure 4-9 and Figure 4-10). Buddhism and other religious and traditional cultures were depicted as superstition and people were required to become atheists.

Through this phase of destroying all old things, some real feudalist evils, such as women’s foot-binding, arranged marriage, child marriage and women not being allowed to obtain an education and so forth, were terminated. New ideas, such as “women can hold up half of the sky”, “men and women must receive equal pay for equal work in productive activity”, were replicated in Mao’s Analects “Little Red Book” which were learned by the whole country as “Bible” (refer to Mao, 1990). However, numerous invaluable historical materials were unfortunately destroyed along this campaign.

During these ten years, countless ancient buildings, artefacts, antiques, documents, paintings, and writings were destroyed or access to them was forbidden. China’s traditional cultures, as well as tangible and intangible heritages, have been totally disregarded and trampled down since then. The succession of political campaigns and their enormous impacts on urban development ruined Beijing’s old city structure - most of ancient city walls, gates and towers were torn down and many heritage sites, particularly the imperial gardens, regarded as “a product of the bourgeoisie luxury”, were replaced by those new grand constructions or converted to cropland, orchard or nurseries. For example, Tiananmen Square was expanded to four times its original size, and the Mao Memorial Hall, the History Museum of the Chinese Revolution and other communist structures were newly built on the sites of demolished old palaces or buildings.

During this period, the whole country was in chaos once again, not to mention the disruption to urban development and green space construction. Official government agencies and organisations for urban and green space planning and management were dissolved in 1970, including the Ministry of Housing and Urban-Rural Development (Zou, 2005). Education of the area of green space construction, the relevant curricula in my university, the Beijing Forestry University with the longest-standing landscape architecture programs, were terminated and the whole university had to move from Beijing to Yunan (which is located in the south-western area of China. The university came back to Beijing in 1979). Many of the traditional parks/gardens have been altered throughout the ages with little consideration for preservation.

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20 The former name is “Ministry of Construction” and the new name “Ministry of Housing and Urban-Rural Development” was inaugurated in 2006.
Figure 4-9 The Red Guards destroying the Buddha sculpture in a temple

During the revolution, the religious temple was viewed as a symbol of the old regime and was pillaged and vandalised by angry mobs.)

Figure 4-10 An example of a ruined Buddha in a garden in Suzhou

4.3.4 1978-the present - after the Open Door policy

After Mao’s death in 1976, Deng Xiaoping gradually gained power and prestige within the party. China was closed to the West until the Open Door policy in 1978 under Deng’s capitalist-inclined system. Also in this year, the Communist Party Congress was held proclaiming a break with the Soviet style of a centralised planned economy and insisting on China’s development towards a “socialist market economy” or “market economy with Chinese characteristics” (有中国特色的社会主义市场经济). Deng’s development philosophy is based on facts and utility, rather than ideology. He has a household saying: no matter if it is a white cat or a black cat; it is a good cat as long as it can catch mice (不论黑猫白猫，抓到老鼠就是好猫).

Following this change of direction, urban development was also back on track. Urban green space construction staged a rapid recovery. In 1979, a quantitative indicator “Percentage of greenery coverage” (refer to Appendix C for definitions of terminology) for urban and green space planning first appeared in government documents. The enactment of the 1989 City Planning Act marked a starting point and was a significant milestone in modern Chinese urban planning. It attempted to re-establish and formalise the urban planning system in China. Since then, a series of laws or regulations pertinent to urban green space planning have been set up. In 1992, the central government enacted Regulations on Urban Greening. In 1993, Regulations for Indicators of Urban Green Space Construction was issued and established three indicators “Public green land per capita”, “Percentage of greenery coverage” and “Percentage of green land coverage” (for the explanation refer to footnote 49 and Appendix C) as statutory measurements applied in urban and green space planning. This set of standards is still valid today. In the same year, Standards for Urban Park Design was issued to specifically guide the plan and design of urban parks, including the basic principles and detailed indicators which new parks are required to fulfil.

Accompanying the shift from following the Soviets to an “open door” to the West, many western ideologies gradually gained favour in China. At the same time, with more frequent exchanges between the West and the East, tens of thousands of mayors and government officials were sent to visit some renowned western metropolises for the purpose of studying the lessons of western urban development (Yu and Padua, 2007). It was the grandiose plazas, manicured lawns and wide boulevards of European Renaissance-Baroque-Classical-Modernist styles that deeply impressed these Chinese officials. They tended to believe a modern and wealthy city should be built up in that way. Consequently, during the 1990s, national competitions of “National Garden City” and “National Garden Region” were launched enthusiastically across the country. It seems to be another “great leap forward” – endeavouring to rapidly transform Chinese cities into the modern western grand style. China became a member of the

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21 “Socialist market economy” or “market economy with Chinese characteristics” follows the principles of mixed economy consisting of state-owned and private companies. Therefore, it is characterised by the co-existence of the planned economy and the market economy.

22 This saying first appeared in his speech on How to Recover Agricultural Production in 1962.
World Trade Organisation (WTO) in December 2001, and this meant more western investment accompanied by western values and thoughts has entered and made China “the world’s factory”.

As a consequence, Europeanised and Americanised urban landscape visions have become fashionable and obtained uncritical applause around the profession as well as the public. China looks like a huge experimental field, where planners, architects and landscape architects (mainly from America and Western Europe) experiment with their ideas. A so-called globalised landscape can be observed everywhere in China: huge plazas, large areas of smooth lawns, peaceful lakes and scattered broad-leaved trees, or regular flower beds with nearly the same species across broad geographic areas (see Figure 4-11).

![Figure 4-11 Century Plaza in Shanghai](Source: Yang and Volkman, 2010, p. 210)

With China embracing high speed urbanisation and capitalistic growth, massive suburbs and business districts mushroomed, which encroached on already-fragmented urban natural environments. The urban ecosystem has thus further deteriorated and become more fragile.

Along with the wave of environmentalism that has swept over the world, environmental protection has been put on the political agenda and become a basic national policy since the China Local Agenda 21 was approved in 1994 soon after the 1992 United Nations Conference on Environment and Development (UNCED) (also named the Rio Conference). The policies related to protection and management of resources and environments were stressed more than ever in the 11th Five-Year Plan (2006-2010), where several sections were set to deal with urban and environmental issues. One of the
sections - “protect and restore the natural environments” required a shift in the values and attitudes towards the environment from “treatment after pollution-already-happened to a proactive protection; from man-made constructions in a short run to a natural vegetation succession process in the long term” (The State Council of P. R. China, 2006). This plan especially emphasised the sustainable use of water resources and preservation of land, forest, grasslands and ocean resources to build up a resource-efficient and environment-friendly harmonious society.

With the growing chorus of the calling for fundamental transformation, ecological and sustainable thinking about issues of urban and environment began to catch government attention. Some urban development research projects have paid more attention to treating these fragmented pieces of nature in cities as a whole and started to adopt advanced ecological approaches to seek solutions. Some cities, especially the developed ones, like Beijing, Shanghai, Shenzhen, have practised ecological planning and design with advanced technologies in their urban development. The Shenzhen city was the first city in China to use the concept “Green Line”\(^\text{23}\) and called for the city to “stick to the green line at any expense” to protect urban green spaces from a long term perspective (Shenzhen Municipal Government, 2008). Beijing also carried out large-scale research on urban ecosystems and the planning of ecologically important areas.

From 2000 to 2002, four influential regulations or guidelines on urban green space were issued by the Ministry of Housing and Urban-Rural Development, including *Chinese Standards of National Ecological Garden City* in 2000, *Chinese Standard for Classification of Urban Green Space* in 2002 (September), *Administration of Urban Green Line Management* in 2002 (September), *Guideline for Formulating Urban Green Space System Planning (Pilot Version)* in 2002 (which will be returned to in more detail in the following section. Also refer to Appendix B and C).

This was the first time that the roles, goals, tasks, implementation and other considerations of urban green space development were defined and standardised in a legal way. In the *Guideline for Formulating Urban Green Space System Planning (Pilot Version)*, it clearly pointed out that “…the approved texts and maps of urban green space planning have the same legal validity with urban master plans…” (Ministry of Housing and Urban-Rural Development, 2002). These regulations have substantively contributed to the development of urban green space planning in China. It indicated that the work of urban green space planning was therefore transformed from “arbitrary” to “standardised, procedural and institutionalised” arrangement (Xu, 2005).

\(^{23}\) “Green Line” is to describe the boundary of green areas. In Shenzhen Master Plan 2007-2020, besides “green line”, there are “yellow line” (urban infrastructure land use boundary), “blue line” (water boundary), “orange line” (major hazard installations land use boundary), “purple line” (historical area protection boundary); all together five lines, so this master plan is also called the “Shenzhen Five Lines Plan”. 

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4.4 Structure of the statutory urban planning and green space planning system in China

This section introduces the contemporary urban and green space planning system in China, including basic norms, laws and regulations, relevant legislative institutional structure, plans formulation, approval and implementation, as well as the relationship between urban planning and green space planning in planning institutions.

4.4.1 Urban planning process

Planning system

Greatly influenced by the former Soviet Union’s urban planning system, a two-level planning system, i.e. a master plan and a detailed layout plan, was still employed in the 1989 City Planning Act. In 2008 a new law, 2008 City and Rural Planning Act, replaced the previous 1989 one and became the national urban planning law. Although the new one retained the majority of the stipulations in the old law, it added some new requirements and involved some changes, such as shifting the old two-level planning system to a multi-level system, emphasising the coordinated development between the urban areas and surrounding rural countryside, connecting the city and regional development to achieve sustainable development in terms of environment and resource, and social and economic growth (see Figure 4-12). Owing to the limitations and obstacles of funding, technology, and information resources, especially for many medium-small sized cities, their urban planning is still mainly built on the old Act. Only the mega-cities, such as Beijing, Shanghai and Shenzhen, adopted the new Act in their latest urban plan, for example Beijing Master Plan (2004-2020), and Shenzhen Master Plan (2007-2020).

![Figure 4-12 Current statutory urban planning system hierarchy in China](Source: drawn by the author based on the 2008 City and Rural Planning Act and the 1989 City Planning Act)
There are five hierarchical planning levels stipulated in the new law: state, province/region, city/town, county/rural and village. The lower level planning has to closely follow the requirements from the higher level planning. Urban planning at province/region and city/town levels primarily defines the population size limit and spatial distribution of urban and suburban districts. It aims to achieve rational and scientific distribution of resources and arrangement of urban functions and activities. It usually includes two parts, i.e. an overall master plan and a series of sectoral plans (such as transportation plan), which were the main parts in the old urban planning law and are still the most important parts in the new law.

A master plan outlines general planning principles and rules for zoning each type of land use and designates the corresponding functions, the development goals, the standards, norms and criteria for the main building construction, the overall layout for various types of land uses and projects the extent of built-up areas and population size (Ministry of Housing and Urban-Rural Development, 2007). Generally speaking, the master plan serves as a fundamental guide in decision-making for the future development of the city. It guides city economic development and urban physical morphology in a relatively fixed time span – 5 years which coincides with the National Five-Year Economic Plan and 20 years which is consistent with the long-term national socio-economic development strategies.

The master plan in China is also named the “comprehensive plan”. It generally includes several independent sectoral plans: a transport system plan, a municipal engineering plan (including a few sub-plans: water supply, sewage, power supply, communication, heating and gas supply and other urban infrastructures plans), an urban green space plan, an environmental protection plan, an underground space utilisation and air defence plan, an earthquake protection and disaster prevention plan and a historic conservation plan. The newest update is to add an “environmental and ecological restriction zones plan” (however, this is only applied in some developed cities).

Inferior to the master plan is the “detailed plan” for the districts within the city. It is supposed to be “on the basis of the comprehensive plan for the city, including a concrete plan for the various construction projects to be undertaken in the immediate development area of the city” (Ministry of Housing and Urban-Rural Development, 1989. English version). The detailed plan for a city defines the land use boundary for each construction project within the planned plot and provides the control indicators, such as building density and building height (ibid.). Generally speaking, it leads to the achievement of the rational use of space and land for the near future (normally 1 to 3 years) through zoning and regulating land use, and orienting the construction and design of buildings at the site level.

**Institutional structure for formulating and implementing plans**

Plans with different levels are supposed to be formulated by corresponding administrative organisations. These organisations are widely set up within governments at national, provincial (autonomous region or municipality), city and county levels. They generally consist of an official bureau within the government and attached academic organisation which is responsible for the
scientific studies and analysis of local situations and further formulating the plans. Figure 4-13 shows the hierarchical framework of the present organisations responsible for formulating urban plans, including green plans.

Figure 4-13 The framework of the present urban plan formulating organisations
(Source: compiled by the author)

Approval of plans

As stipulated in the 2008 City and Rural Planning Act, different levels of urban plans are supposed to be examined and approved by corresponding authorities (Table 4-2). In China, the administrative hierarchy includes the provincial capital, the municipality, the autonomous city, the city with a population of more than 1 million, the prefectural city, the county, and the village. The provincial capital, the municipality, the autonomous city and the city with more than one million in population (urban permanent residents) are directly under the jurisdiction of the State Council (the chief administrative authority of People’s Republic of China, also called Central People’s Government). Therefore, their master plans must be submitted to the State Council for review and approval. The master plans of other ordinary cities, towns or county level settlement are supposed to be examined and approved by the relevant higher level of government, such as the provincial government, or autonomous government. The district and detailed plans of a city are supposed to be approved by their city government.
<table>
<thead>
<tr>
<th>Types of plans</th>
<th>Formulating organisations</th>
<th>Approving organisations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nationwide Urban System Plan</td>
<td>The Ministry of Housing and Urban-Rural Development</td>
<td>The State Council</td>
</tr>
<tr>
<td>Provincial Urban System Plan</td>
<td>The provincial construction &amp; planning bureau; the municipal provincial construction &amp; planning bureau</td>
<td>The State Council</td>
</tr>
<tr>
<td>Master Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cities directly under the jurisdiction of the State Council</td>
<td>The provincial construction &amp; planning bureau; the municipal provincial construction &amp; planning bureau</td>
<td>The State Council</td>
</tr>
<tr>
<td>Other general cities/towns</td>
<td>The city/town construction &amp; planning bureau</td>
<td>The City’s People’s Government</td>
</tr>
<tr>
<td>Counties</td>
<td>The county construction &amp; planning bureau</td>
<td>The County’s People’s Government</td>
</tr>
<tr>
<td>Detailed Plan</td>
<td>The city/town/county construction &amp; planning bureau</td>
<td>The City/Town/County’s People’s Government</td>
</tr>
</tbody>
</table>

Table 4-2 The formulating and approving organisations for the corresponding types of plans
(Source: summarised and translated from the Ministry of Housing and Urban-Rural Development, 2007).

Implementation of plans

After approval by the above legislative authorities, the city/town/county planning bureaus also are responsible for the implementation of plans on the ground, including allocating the resource, registering the projects, issuing site-selection notes (evaluations and opinions of site-selection for a certain project), planning permits and building permits, and punishing those who breach the approved plans. All these measurements aim to facilitate the coordination between urban planning and economic planning, as well as between planning blueprint and economic activities on the ground. Different from the old law, the new planning law has bestowed on the planning authority the power to implement urban plans (Yeh, 1999). In the old planning law, the planning authority could not terminate an illegal project because it might be under the supervision of other departments in the government which were on a par with urban planning department.

4.4.2 Urban green space planning system

The urban green space plan, as an important independent sectoral plan of the urban master plan is required to follow the overall requirements from the master plan as well as other higher level plans.
Analogous with the hierarchy of urban master plans, the urban green space plan also is composed of several levels (see Table 4-3) according to the type of a city (i.e. provincial capital, the municipality, etc.).
<table>
<thead>
<tr>
<th>Planning levels</th>
<th>Types of UGS plan</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>Nationwide green space ecological network</td>
<td>Attempt to build up a national level green space network to protect natural areas(^{24})</td>
</tr>
<tr>
<td>Province/Region</td>
<td>Regional UGS plan</td>
<td>Mainly to consider the structure and distribution of green space at the regional level and connection with green space in the cities; To manage natural resources; to integrate the surrounding green space with green space in the cities(^{25})</td>
</tr>
<tr>
<td>City/Town/Village</td>
<td>UGS Plan</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Comprehensive UGS plan</td>
<td>To establish the overall planning principles, goals, types, time span, the structure and distribution of green space in the whole city, principles for vegetation planting; To implement the requirements of the urban master plan and provide guidelines for the lower-level green space plans</td>
</tr>
<tr>
<td></td>
<td>District UGS plan</td>
<td>Similar to the above, but focusing on the districts; To connect the comprehensive plan to the district plans</td>
</tr>
<tr>
<td></td>
<td>Regulatory detailed UGS plan</td>
<td>To control requirements for types, percentage, functions, locations and scale of green space; To adjust the higher-level UGS plans</td>
</tr>
<tr>
<td></td>
<td>Constructive detailed UGS plan</td>
<td>To focus on landscape elements, recreational facilities, circulation system, planting design principles; To provide direct guidelines for a particular piece of green space design (like a park)</td>
</tr>
<tr>
<td></td>
<td>Other special UGS plans, such as the 1st and 2nd greenbelt plans in Beijing, Green Line plan in Shenzhen and so forth</td>
<td>Subject to the particular needs of an area.</td>
</tr>
</tbody>
</table>

Table 4-3 **Current statutory urban green space planning system in China**
(Source: summarised and translated from the Ministry of Housing and Urban-Rural Development, 2002; Liu and Wei, 2004; Liu and Wang, 2010)

\(^{24}\) Note: It is proposed and advocated within the academic fields, so this level is still under negotiation.

\(^{25}\) Note: This level only exists in some mega-cities, such as Beijing, Shanghai, etc.
According to the Guideline for Formulating Urban Green Space System Planning (refer to Appendix B), it is not necessary to prepare all levels of urban green space plans and it depends on the hierarchy and particular administrative divisions as discussed before. However, some special municipalities, for example Beijing, have all levels ranging from the regional green space planning to the great detailed plan but this only started from the last few years. Some medium-small cities include only a comprehensive green space plan and a detailed constructive plan.

**Formulation, approval and implementation**

The formulation and approval processes of urban green space plans are the same as those of the urban (master) planning. The basic rule is that the administrative organisations at a lower level formulate detailed plans and further report to the higher-level organisations for approval.

However, the implementation of urban green space planning (including construction and management) involves two departments in the local government: the Landscape Architecture Bureau (园林局 yuan lin ju) and the Forestry Bureau (林业局 lin ye ju). They independently deal with two types of greening tasks with clear-cut boundaries in the city. In the built-up areas, the greening tasks belong to the landscape bureau, while the greening work outside of built-up areas, but within the jurisdiction of the city (such as rural counties), are carried out by the forestry bureau. And often the two bureaus enacted their own policies and inaugurated programmes with different focuses. For example, the Landscape Architecture Bureau concentrates on ornamental effects of greening, while the Forestry Bureau is mainly concerned with productive and protective greening (refer to Table 2-2 in Chapter 2 Section 2.2.3). Such divisions lead to complex situations. For example, on a road extending from the city centre to the rural area, half of the greening along the road is landscape bureau’s responsibility and the other half is attended to by the forestry bureau. The compartmentalisation of the programmes, institutions and analytical efforts has not ameliorated fragmentation of urban natural environments but has added to it, as there are no agents responsible for the overall effectiveness. To a large extent, such fragmentation was thus taken for granted as policies dealt with it without regard to their interrelated totality. After identifying this somewhat ironic segmentation, some municipalities, like Beijing, have merged the two bureaus into a unified bureau since 2006 to achieve a coordinated, comprehensive and integrated development. However, the phenomenon of two bureaus separately in charge of urban greening business is still very common in China’s cities. But Beijing has established a good example, and there is a tendency towards merging the two bureaus.

As to the detailed design for a piece of green space or a park, the local authorities usually entrust this to the affiliated academy of planning and design. However, in recent years, the local authorities tend to organise design competitions open to any public or private entries, or sometimes to invite bidders from well-known domestic or overseas companies. Private design companies are therefore able to be involved in urban landscape design. Overall, the green space planning process is a pure government-
controlled behaviour, while the design and implementation process has more flexibility, thereby potentially more stakeholders can participate in it.

**A summary of relevant laws/regulations on urban green space development**

Along with the progress of establishing an urban planning system in China, the “urban green space plan” and the “environmental protection plan”, have received increasing attention. Many specific legislative documents have been issued to manage the development of urban green space. These laws, regulations and rules have been introduced in Section 4.3, and summarised in Table 4-4.

There are five types of legislative documents for urban green space development arranged according to their relative power. The most powerful are the laws issued by the National People’s Congress or its Standing Committee. Then the National administrative regulations, rules, technical norms and standards, have the secondary importance and are issued by the State Council, or the Ministry of Housing and Urban-Rural Development. This is followed by local administrative rules and regulations issued by local government, the local People’s Congress or its Standing Committee. The lowest level is the documents issued by the planning or greening bureau/department in a local government. The last two types of legislative documents vary and depend on the situations in different local government. For each level of documents, it is likely that there are relevant supplementary documents to support the main documents.
<table>
<thead>
<tr>
<th>Types</th>
<th>Legislative and administrative documents</th>
<th>Relevant supplements</th>
<th>Issued by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministry regulations (部门法规 bu men fa gui)</td>
<td>Regulations for Indicators of Urban Green Space Construction (1993); Guideline for Formulating Urban Green Space System Planning (Pilot Version, 2002); Administration of Urban Green Line Management (2002)</td>
<td>/</td>
<td>The Ministry of Housing and Urban-Rural Development</td>
</tr>
<tr>
<td>Nationwide professional norms and standards (专业术语和标准 zhuanye shuyu biaozhun)</td>
<td>National Standards for Garden City (1990s); Standards for Urban Park (CJJ 48-92, 1993); Standards for Plan and Design of Road Greening (CJJ 75-97, 1998); Code for Scenic area Planning ( GB 50298, 1999); Standards for Terminology of Landscape Architecture (CJJ/T91, 2002); Chinese Standard for Classification of Urban Green Space (CJJ/T85, 2002); National Standards for Ecological Garden City (Pilot Version, 2004); Standards for Urban Green Space Design (GB 50420, 2007).</td>
<td>/</td>
<td>The Ministry of Housing and Urban-Rural Development</td>
</tr>
</tbody>
</table>

Table 4-4 Current laws, regulations, norms and standards for urban green space
(Source: summarised by Li, 2008)
It has to be pointed out that although urban green space has an independent planning process and corresponding guidelines; there are no independent “law-level” legislative documents specifically directed at green space issues (refer to Table 4-4). Generally, urban green space planning is regarded as an extension of urban master plans, and consequently there is no separate independent “law”. The City and Rural Planning Act involves some “law” related to urban green space planning, but only in a very limited way. The top level legislative document for urban green space is Regulations on Urban Greening (1992), which clarifies the importance of urban green space and defines its basic status in urban development.

Technical norms and standards, such as national standards (国标 Guo Biao, abbreviated as GB), and professional standards (Chenzhen Jianshe, Jianshe Bu, abbreviated as CJJ) provide the official definition, classification and measurable indicators to guide urban green space construction in terms of quantitative and qualitative aspects, such as the percentage of water and vegetation areas in a park, the public green land per capita in an old/new developed residential area and other requirements (the detail refers to Appendix C). And at particular time, some norms or standards are specifically issued. For example, the standards related to national garden cities were promulgated when a garden city competition was organised nationwide. Such special norms and standards to some extent drew attention to urban green space construction from the official to the public level, and significantly contributed to the improvement of urban green space planning.
Chapter 5
Evolution of Beijing Green Space Planning

5.1 Introduction

This chapter analyses urban green space planning and development in Beijing in terms of the evolution of the city, the societal demand and use of urban green space, the different planning approaches used, and the underlying influences from 1949 to the present.

Section 5.2 focuses on how urban green space has been conceived in urban planning over the years and what functions and values are attached to it. By examining the discourses and arguments for green space in relevant urban development policies and documents, the meanings, functions and use of urban green space in Beijing can be discerned. The documentation illustrated that there is a positive correlation between the use of green space and the evolution of the city. Specifically, the processes of re-assessing, re-adjusting and re-arranging Beijing’s roles, economic sectors\(^{26}\) and city spatial structure have caused changes in the demand and use of urban green space in Beijing.

For example, in conjunction with the change of Beijing’s role in emphasis from “economic centre”\(^{27}\) in the early planning stage, to today’s “world-famous ancient city and international metropolis”, the expected functions of green space have changed from “providing economic production” to “recovering/enhancing old city images”. In parallel, the strong demand for shifting Beijing’s spatial structure from a monocentric to a polycentric pattern further requires urban green space to play a role in limiting urban sprawl and benefiting regional coordinated development. Overall, a situation has emerged in which urban green space has a much more prominent and influential place in the urban development policy-making process.

Section 5.3 tracks the evolution of planning approaches to urban nature by analysing the four Beijing green space plans with respect to the relationships between urban green space plans and urban master plans, urban green space planning scopes, planning parameters, planning focuses, and the underlying influences for planning activities.

Through this thorough analysis, a clear developmental trajectory in urban green space planning can be seen. Initially, urban green space plans were merely produced in fulfilment of master plans’ regulations (e.g. land quotas, some political urgency and other requirements from the upper level planning or policies). The term “subordinate” is used here to describe such a relationship, whereby urban master plans dictated the green space development direction. Along with increasing recognition

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\(^{26}\) Economic sectors are the industrial components and percentages of a country’s economy. Generally they consist of three sectors: primary (e.g. industry for iron, steel, coal, wood, etc.), secondary (e.g. manufacturing industry) and tertiary industry (e.g. financial, catering services, etc.).

\(^{27}\) The phrases, sentences and text in quotation marks are author’s translation unless particularly noted.
of the importance of urban green space, green space plans accordingly separated from master plans to form an independent theme. Furthermore, it is found that the relationship between urban master plans and green space plans has been reversed, where green space plans are, to a significant extent, determining master plans and leading future urban development with more consideration of ecological benefits. This tendency has already emerged in the latest formulation of the Beijing master plan.

It appears that new green space planning approaches emerge at each planning stage in response to the changing view of urban green space as well as the broader socio-cultural, political and other influences at the time. It is found that these planning approaches in Beijing have become subject to quantitative approaches, as well as greenbelt and green wedge models, the “filling in” method, scenic spots and nature reserves, the park hierarchy, the ecological approach, and the modified Feng-shui. A certain type of approach might emerge and dominate a particular planning stage, but it is noted that each one does not totally supersede the previous ones.

Some identifiable influences can be seen to have shaped Beijing’s green space development and driven its changes: namely socialist and communist ideology (Soviet and Maoist thinking), western concepts and Chinese traditions.

The Soviets introduced green space planning into China in the early 1950s, an era of a highly planned economy. It has been widely acknowledged that the set of Soviet theories and methodologies laid the foundation for the whole of China’s green space planning even though its direct influences faded away in the 1960s. After 1978, modern western planning theories and concepts started to have an effect on urban green space planning of Beijing through Chinese researchers studying the experience of developed countries. They substantially advanced the formulation of urban green space planning, as well as its position and influences in urban development policy-making. Although Beijing has an extensive history of Chinese classical garden-making, it has not had much influence at the planning level, as green space planning is something new in China. However, some new signs of re-introducing traditional values, for example, establishment of scenic spots in the mountains and later re-interpretation of Feng-shui in current planning philosophy, are emerging and receiving increasing attention and publicity. With the positive and/or negative effects of all of these influences and their convergence, it seems that China is attempting to develop its urban green space with Chinese perspectives which are distinguished from those of the West.

Figure 5-1 summarises the research analysis units, and the research findings obtained from this chapter. This figure also integrates some significant socio-political-cultural events which have already been discussed in Chapter 4, allowing for linkage between what is discussed in this chapter with the wider social background.
5.2 Societal demand and use of urban green space from 1949 to the present

Since the establishment of a socialist system in China by the Chinese Communist Party (CCP) in 1949, there have been six main statutory Beijing master plans in response to Chinese social and economic reforms, namely the 1953 Beijing Master Plan, the 1958 Beijing Master Plan, the 1973 Beijing Master Plan, the 1982 Beijing Master Plan (1982-2000), the 1992 Beijing Master Plan (1992-2010) and the 2004 Beijing Master Plan (2004-2020). All these plans involve two scopes - the whole jurisdiction of the Beijing metropolitan area and the city centre. A new plan was issued almost every ten years except for the unstable periods of the 1950s, 60s and 70s. Based on the previous explanation of Chinese socio-political transformations in Chapter 4, and combined with the period intervals of issuing Beijing master plans as well as their differences, the urban planning process in post-1949 Beijing can be broadly categorised into four planning stages, i.e. 1949-1981, 1982-1991, 1992-2003 and 2004-present.

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28 In the title of a plan, the first number means the year in which that plan was issued. For example, “1982 Beijing Master Plan” means it was issued in 1982. The range (in brackets) is the statutory period for realising the planning goals. It was only from 1982 that Beijing master plans began to employ a statutory term for realising their planning goals.

29 As introduced in Chapter 3, Beijing Municipality has an area of 16,410km² and governs 14 districts, 2 counties, which comprise 119 towns, 24 townships, 5 ethnic townships and 125 sub-districts. In this sense, the whole metropolitan area can be regarded as a regional scope for study.
Through the investigation of these planning documents and other development agendas, it is apparent that during Beijing’s rapid urbanisation there are three aspects directly affecting the discourses concerning the roles and functions of green space in the city, namely Beijing’s roles (for the country), the economic sectors and the spatial structure. It clearly shows that with the changes in these three aspects, urban green space has been expected to help to enhance Beijing’s role and position as the national capital, attract tertiary industry and overseas investment, and configure urban physical morphology. Beijing’s development increasingly hinges on the quality of its urban natural environment.

The relevant urban master planning documents were coded and summarised in Table 5-1 in terms of Beijing’s roles, the economic sectors and the spatial structure, pertinent discourses on urban green space and general principles of urban development in these six urban master plans.
<table>
<thead>
<tr>
<th>Stages</th>
<th>Roles of Beijing</th>
<th>Economic sectors</th>
<th>Spatial structure</th>
<th>Discourses relevant to urban green space</th>
<th>General principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>Socialist capital; National model; Political, economic and cultural centre; Industrial base</td>
<td>Heavy industry</td>
<td>Monocentrism³⁰</td>
<td>Altering Beijing’s harsh environmental conditions for industrial development; Combining economic production with urban green space construction; Creating a beautiful environment and providing social activities for the working class to erase class differences; Building extensive green space.</td>
<td>To retain the central part (the old city) as the location of the new central government; To develop a socialist city suitable for communal life; To diminish the old style buildings.</td>
</tr>
<tr>
<td>(1949-1981)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage 2</td>
<td>Political and cultural centre</td>
<td>Restrict heavy industry; Mixed industrial structures – primary, secondary and tertiary industry</td>
<td>10 Scattered Groups around the city centre; 11 Satellite Towns</td>
<td>Making Beijing the cleanest and the most beautiful city of China; Recognising the importance of “greening” for the city, such as air pollution reduction; Improving urban infrastructure, urban environment and landscape to create an attractive investment environment.</td>
<td>To constrain the population of Beijing; To insist on the development of scattered groups around the central city; To conserve sites with valuable cultural and historic heritage.</td>
</tr>
<tr>
<td>(1982-1991)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage 3</td>
<td>Political and cultural centre; Open and modern international metropolis</td>
<td>Tertiary industry</td>
<td>10 Scattered Groups around the central city, 11 Satellite Towns</td>
<td>Enhancing cultural and city nature protection to establish Beijing as a civilised garden city; Strengthening green space structure to support scattered groups and satellite towns.</td>
<td>To fully support the tertiary industry and high-technology industry; To shift emphasis from urban expansion to inner-city improvement; To protect the historic and cultural heritages at the city scale rather than focusing on a single spot.</td>
</tr>
</tbody>
</table>

³⁰ Monocentrism here is a type of urban land use spatial arrangement. The monocentric city model has only a single centre, in which all businesses are concentrated. Urban population densities, building heights, and rent for land lease, all decline with distance from the city centre (Arnott and McMillen, 2006).

³¹ In order to balance the development between the central urban area and satellite towns, a concept of “scattered group” was proposed, similar to the concept of “suburb” in the West. Each scattered group was located between city centre and satellite towns and separated by green wedges and greenbelts.
<table>
<thead>
<tr>
<th>Stage 4 (2004-present)</th>
<th>Political and cultural centre; World-famous ancient city and international metropolis</th>
<th>Tertiary industry</th>
<th>Two axes; Two belts; Polycentrism(^{32}): 11 Satellite Towns</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Paying more attention to the construction of “other green space”, such as mountain greening, wind-dust protection greening, greenbelt, scenic spots, nature reserves, forest parks and wetlands, for their merits of prevention of unreasonable ecological risks and effective regional natural resource management and environmental protection; Helping to build up a resource-efficient and environment-friendly society; Helping to recast the Beijing age-old Shan-shui-city pattern in an innovative manner; Contributing to an international Olympic city (Green Olympic)</td>
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<td></td>
<td>To constitute a coordinated regional development; To develop “two axes, two belts, and multiple centres”; To further adjust industrial structure and reallocate resources reasonably; To balance the relationship between the exploration of historic and cultural heritage and their protection; To seize the opportunity of the 2008 Olympic Games and the 11th Five-Year Plan to improve the construction of the municipal infrastructure and regional environment</td>
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Table 5-1 A summary of urban greening discourses in Beijing urban planning in four planning stages\(^{33}\)

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\(^{32}\) Polycentrism here is a type of urban land use spatial arrangement. Opposite to monocentrism, it advocates organising a region around several political, social or economic centres (Hall and Pain, 2006).

\(^{33}\) More detailed information refers to Appendix D urban master plans and urban green space plans.
5.2.1 Planning stage 1 (1949-1981)

The planning theories, standards and methodologies during this stage were entirely modelled on the former Soviet Union’s socialist urban planning. Overall, its main characteristic can be summarised as a rigid and hierarchical top-down planning system with land absolutely controlled by the state and urban planning mostly seen as a tool to translate the goals of economic development on the land. This profoundly affected the pattern and process of urban land uses as well as the way in which cities functioned and were planned.

The roles of Beijing were explicitly defined as “the socialist capital; a model city for the nation, the country’s political, economic and cultural centre; and an industrial base” (Beijing City Planning Commission, 1953). The overall guideline for Beijing’s development was “to serve production, serve the central government; fundamentally, it is to serve the proletariat” (Beijing City Planning Commission, 1953). Almost all of Beijing’s development policies were formulated to conform to the political urgency in pursuit of socialist modernisation and industrialisation. A particularly vital component of urban master plans during this stage was allocating areas for (heavy) industry development and also other services which could facilitate and promote the establishment of the industry.

Under such planning philosophies, urban green space was expected 1) to contribute to economic growth (either to serve industries’ interests, or to have production within green space itself); 2) to raise socialist consciousness and mould Chinese revolutionary character; and 3) to green and beautify the city.

5.2.1.1 To contribute to economic growth

In the second half of the 1950s, the newly established Beijing City Planning Commission (now the Beijing Municipal Commission of Urban Planning, 北京市规划委员会) began preparing the first master plan. Meanwhile, a Soviet team of urban planning experts were officially invited to assist and lead Beijing planning work and eventually proposed the 1953 Beijing Master Plan. This plan firstly noted that Beijing lacked sufficient water resources, and also was plagued by sandstorms from the northwestern Mongolian areas, thereby severely affecting and even hampering industrial production. One of the urban development principles was stipulated as:

“…[Beijing’s] natural environment of water sources shortage, dry climate, and frequent sandstorms, should be altered, in order to create a better environmental condition for industry development” (Beijing City Planning Commission, 1953)

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34 The 1953 plan experienced several fine-tuning revisions in 1954, 1957, 1958 and 1959 respectively by those Soviet experts. These modified plans only further incorporated the Soviet experiences and paid more attention to industrial and economic production.
Consequently, this plan urged that such harsh environmental conditions should be mitigated by “extensive green space” (*ibid.*). The first important function of urban green space was therefore expected to serve the industries through establishing protective sandstorm buffers (*ibid.*).

Another aspect highlighting green space’s economic function was revealed in the discourse “combining the economic production with the urban green space construction” in the 1953 plan (*ibid.*). Chairman Mao claimed many times in congresses and conferences that it was necessary and imperative to “combine greening with production” (*绿化结合生产*). This saying almost became a motto in urban green space construction. Many historical archives explicitly manifested this preference. For example, the *National Programme for Agricultural Development (1956-1957)* insisted that:

“…in addition to timber trees (including bamboo groves), the utmost use should be made of all manpower and uncultivated land in the cities and countryside to plant other trees of economic value, such as fruit trees, mulberries, Mongolian oak, tea plants, varnish trees and oil-bearing trees…” (Ministry of Agriculture, 1956, translated by Zhao, 2008, p. 45).

Nevertheless, the First and Second National Working Conference on Urban Landscaping held in 1958 and 1959 added and stressed that:

“…to develop urban landscape architecture in a greater, faster, better and more economical way, combining urban green space with production must be paid attention... The productive activities in green space should be carried out without doing harm to hygienic conditions, cultural recreation and city visual... Production is not the complete concern and visual quality is needed... The principal functions of urban green space should not be impaired and at the same time economic benefits can be achieved” (Liu, 1999, translated by Zhao, 2008, p. 51).

Apparently, as the above documents suggested, incorporating economic values into green space was not supposed to be an over-emphasised or exclusive rule. However, under the overarching influences of the Great Leap Forward economic campaign (1958-1961), the Three Years of Natural Disasters (1959-1962), and Cultural Revolution (1966-1976), this discourse was somewhat distorted and economic functions of urban nature were exaggerated to be the solo use of urban green space.

There was a popular metaphor that “productive greening is the heavy industry in urban greening” (35) (Beijing Landscape Architecture Bureau, 1960) to promote the notion that more green space should be built for economic functions. In the street greening, for example, the roads/streets were expected to be planted with economic plants, for example, the cotton plants as road greening (see Figure 5-2). It is intriguing to find that in order to respond to the “Great Leap Forward” movement, the shrub cotton

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35 As explained before, during the period of the 1st Five-Year Plan, heavy industry development was regarded as the top priority, this metaphor therefore described the importance of productive greening by referring to it as heavy industry.
plant was exaggerated as growing into a giant cotton “tree” overnight and gardeners were harvesting the cotton joyfully (Liu, 1999).

![Image of a popular propaganda poster on urban street greening in Beijing during 1950s and 1960s.](http://jack223.blogone.net)  
**Figure 5-2** The picture on the left shows a popular propaganda poster on urban street greening in Beijing during 1950s and 1960s. First of all, it promoted the government preference for plants with economic values. Secondly, such values were blown up out of all proportion under the social climate of boasting and exaggeration. By contrast, the picture on the right shows the normal size of cotton plants, which are a type of shrub (*Genus gossypium*). (Source: [http://jack223.blogone.net](http://jack223.blogone.net), [http://www.qiucinews.com/xinwen/content/2011-02/12/content_80680.htm](http://www.qiucinews.com/xinwen/content/2011-02/12/content_80680.htm). Retrieved on 01/09/2009)

Furthermore, many imperial gardens, including the Yuanmingyuan, Summer Palace, and newly built parks were transformed from the “useless” gardens to “useful” crop land for the sake of overcoming the food shortage in the urban context, as well as reflecting the Cultural Revolution’s spirit, such as to crush the old decadent gardens and serve the masses (also refer to the background in Chapter 4, Section 4.3.3).

### 5.2.1.2 To raise socialist consciousness and mould Chinese revolutionary character

The Soviet model of urban planning was also characterised by a strong desire for the elimination of social class differences in the new China (refer to Chapter 4 Section 4.3.3).

Much attention was thus focused on public parks in the early 1950s since parks were seen to be the ideal places for manifesting the social equity – “serving all the socialist working class (the proletariat) equally rather than only feudalist rulers” (Beijing Municipal Administration Centre of Parks, 1963).
Furthermore, parks were also seen as a “battleground” initiating the masses in socialist and communist knowledge and further fostering their spirit of communism and socialist patriotism (*ibid*).

Socialist activities, such as drama performances and Soviet-style ballroom dancing were often organised in the parks (Figure 5-3). There was a political dominance of the view that such activities were “the embodiments of the brand new healthy lives” in the socialist era (Beijing Municipal Administration Centre of Parks, 1963, p. 26).

![Figure 5-3 The left photo shows dancing practice in Taoran Park, and the right photo shows Taiji exercises (one type of Chinese Kongfu) in Zizhu Park. Such “dancing ponds” were simply large hard open space with several rows of trees for shade. They are still popular today for dancing, practising Taiji and other social activities. (Source: taken by the author, 2010)](image)

Such political meanings and ideological orientation were also manifested through the recreational facilities, sculptures or monuments set up in the green space. For example, in the children’s playground zone of Taoran Park, the slide was shaped to emulate the scene of the Red Army’s Long March passing through the Great Snowy Mountains (Figure 5-4). The primary intention was to educate the next generation’s revolutionary spirit through their play.

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36 Taoran Park and Zizhu Park were built under Soviet influences in 1952 and 1953 respectively, ones of the earliest parks built in the new China. They were regarded as model parks across the country and are still popular today.

37 Chinese landscape architects used “ponds” as a metaphor to describe such dancing place.

38 In the civil war between the Chinese Communist Party (CCP) and the Nationalist Party (1927-1950), to evade the pursuit of the Nationalist Party, the CCP launched the Red Army’s Long March during 1934 to 1935. It was a 12,500 km heroic journey. The CCP endured extreme hardship and battle against the odds to win the final victory and this greatly helped found new China. Of this, passing through the Great Snowy Mountains is one of the most dangerous and well-known parts, which is also often used to illustrate the CCP’s great revolutionary spirit.
Figure 5-4 The “Snowy Mountains Slide” is still kept in Taoran Park. When children climb up to its top and slide down smoothly and happily, they were reliving the experience of the Red Army soldiers – arduously working their way through the snowy mountains and ultimately winning victory\(^\text{39}\).

(Source: taken by the author, 2010)

Not only were these tangible structures established in the park so noticeably to serve the government’s political and didactic ends, but also the plants were organised purposefully to enhance the socialist/communist ideology. For example, the Gao-Shi sculpture in Taoran Park was set up in memory of two great revolutionaries - Gao (1896-1925) and Shi (1902-1928)\(^\text{40}\) who devoted themselves to the socialist dream of building a new China (Figure 5-5). This sculpture was guarded by a line of Beijing local pine trees (\textit{Pinus bungeana Zucc. ex Endl.}). These trees were not primarily for decorative uses, rather they were personified and symbolised Chinese revolutionary spirit – “having characters of fortitude and perseverance even in the very harshest time” (Beijing Municipal Administration Centre of Parks, 1963).

\(^{39}\) Such Children’s play facilities were welcomed and erected in many parks across the country. There was a similar but smaller slide in Xiangshan Park in my hometown (Huaihe, a medium city in northern Anhui Province, the middle of China). I still remember, when I was a child, the primary school often organised the spring and autumn tours for students in this park. The teachers vividly narrated the Red Army stories to us and let the students “never ever forget” the glorious and heroic past and the people’s heroes who devoted themselves for today’s happy life.

\(^{40}\) They were both progressive youths and Gao was one of the earliest party members of the CCP. This loyal couple fought side by side against imperialism and called for a new world during their life. And their comradely love story through a hard life was also as highly praised as their revolutionary spirits. These loyalties were acknowledged by Prime Minister Zhou Enlai in 1956 when reviewing and inspecting the master plan of Beijing. He stated that: “Revolutionary work does not conflict with a love relationship” and encouraged youths not to forget about having a family when striving for the great communist career. Because of Zhou and other national leaders’ support, this Gao-Shi sculpture, as well as their tomb, has been established and well preserved in this park.
5.2.1.3  To green and beautify cities

Mao himself paid much attention to urban green space (especially general greening rather than man-made artistic gardens or parks). Out of goodwill for changing the condition of the whole nation being impoverished by decades of wars, in 1956 he even offered his personal artistic calligraphy several times (see Appendix E Figure E1) to motivate a nationwide campaign for extensive tree planting. And further at the Beidaihe Conference41 in Beijing in 1958, Mao called for “Green our Homeland” (绿化祖国, 大地园林化) - “We should turn all the lands of our country green and further into a garden, make it beautiful everywhere, and eventually change the face of China” (Liu, 1999). This National Landscaping campaign highlighted “green every corner” - wherever it was possible trees should be planted, such as in barren wasteland, mountains, around the houses, villages, and along roads and rivers in order to make every inch of land green and beautiful (Chen, 2002a; 2002b). Such policy was subsequently officially approved by the Second Session of the 2nd National Congress in April 1960.

“… during the following twelve years from 1956 to 1967, the bare waste land, mountains and any places, where natural conditions permit and where there is enough manpower to undertake the greening task, should be planted and clothed with green…”

Mao’s individual opinions on urban greening carried more weight than all the academic and professional decisions and contributed more to the recognition of green space values in the government agenda as well as wider public interests. In China, the man-made designed landscape

41 The Draft of the National Programme for Agricultural Development (1956-1967) (also called 12-Year Agricultural Development Plan) was proposed at this conference, and finally approved in April 1960 by the Second Session of the Second National People’s Congress of the People’s Republic of China.
features (such as pavilions, towers, and sculptures) have been the focal points in developing green space, since Chinese classical gardens have developed for thousands years and have dominated people’s perspectives of green space (Liu, 2008). The significance of Mao’s landscaping campaign was that the general greening for a city received the same attention as park and garden construction (or even more attention). The National Working Conference on Urban Construction held by the Ministry of Construction further strengthened the status of general greening and promoted such advocacy widely in 1956 (Liu, 1999; translated by Zhao, 2008, p. 47):

“With limited financial investment for urban greening, the emphasis is not to lay out large parks, but to develop nurseries first, conduct a widespread distribution of trees, add more green to the city, improve the local climate gradually, and spend less money but with greater effect on the city’s greening and beautification. Only on the basis of urban general greening requirements and availability of funding, can the creation of parks be considered step by step. Do not just pay attention to the creation of parks whilst ignoring the urban general greening, especially that of residential areas which is the principal guideline and task for the urban greening development at this moment. Therefore, current work is mainly to actively take various measures and mobilise the masses to plant trees and flowers to make the residential areas green.”

From Mao and the government’s efforts on green space, a new Chinese term was actually coined and widely spread in urban and green space planning, as well as urban construction - “绿化 (lv hua),” which literally means making the land green through the large-scale extensive tree planting.

In addition, the Soviet “rational and scientific” urban planning approach and top-down planning process made this extensive greening feasible through assigning stringent land quotas. As the national model city, Beijing gained more generous provision of green space (Sit, 1996). For example, between industrial and residential districts there were green separation belts (at least 30m wide), and between each scattered group, there was a planned sizable “green wedge” (accounting for 45% of the built-up area). Each scattered group contained several self-contained microdistricts (Микрорайон in Russian, see works of Ryabyschin and Glasichev, 1980; Xie and Costa, 1991). It provided generous open space and green space for tenants to fulfil the calling for no-difference socialist relationships between members of the working class. A new type of urban green space, i.e. “居住区绿化” (Juzhuqu lv hua, neighbourhood/residential greening in English) was consequently developed (Figure 5-6). Because this type of green space was close to where people lived and worked, it was also regarded as the right

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42 This collective dwelling model was also learned from the Soviets. A typical Chinese microdistrict contained numbers of smaller square or rectangular shaped lots or parcels of land blocks (e.g. of 30-60 hectares with 10,000-20,000 residents), and was typically bounded by widely spaced, high-speed, circulating routes rather than by local streets. Usually, it carried a full complement of retailing, educational, recreational and social facilities and a balanced mix of factories, offices and apartment complexes (4 to 8 storeys). And thus it generally had a short commuting distance to residents’ work places. In addition to general greening attached to each building, four apartment buildings enclosed a common area to form a community garden, which was designed in accordance with a simple formal form.
place by Mao to mobilise people to plant trees and green their homeland as much as possible (Liu, 1999).

Figure 5-6 A typical microdistrict of Beijing in the 1950s-1970s  
(Source: redrawn from Cheng, 1957)

In summary, under the overall goal of building a powerful industrialised and modernised socialist city model during the “Soviet and Mao Era” planning stage, the whole country, as well as Beijing, were preoccupied with developing heavy industries and cities that celebrated and promoted socialism. Urban green space construction therefore mainly responded to politically urgent needs of economic growth and cultivating socialist values among the masses. With little doubt, the way urban green space was conceived and used as productive land, or educational land, and the like during this era was substantively impacted by the political ideology about the new socialist/communist society.

Beijing has consequently changed from a once imperial administrative centre with a human-scale liveable environment, to one of the country’s major industrial bases, a producer city. Such sweeping transformation caused threats to and deterioration in the quality of Beijing’s urban environment. Furthermore, it triggered on-going concerns about what is later referred to as “a series of complex and interrelated environmental and urban issues syndrome”, such as urban sprawl, traffic congestion, loss of cultural heritage and city identity, and further decline in quality of urban life. The next planning stages seemed to enter a period of correcting these errors. This in turn accelerated understanding of the

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43 The period from 1949 to 1978 in Chinese urban planning history, was often named the “Soviet and Mao Era” (Zhuang and Zhang, 2002).
role of green space in urban development and highlighted its values and contributions to the city and people, regardless of socialist or communist ideology.

5.2.2 Planning stage 2 (1982-1991)

The indiscriminate development of industry, without regard to Beijing’s rich natural and cultural heritage, as well as insufficient natural resources, was subject to wide criticism after Mao’s death and Deng rose to power. Under the new development philosophies of open and economic reforms since 1978, the 1982 Beijing Master Plan made a significant change. The role of Beijing was changed to “the national political and cultural centre”, where the discourses related to “national industrial base” were totally erased from the master plan and any other urban development agendas.

Under such circumstances, green space was primarily expected to provide functions from two aspects which partly resonated with the new role set for Beijing. One aspect was to reduce urban pollution caused by previous ill-conceived urban development strategies. The other aspect - beautifying Beijing - continued to be stressed but with different meanings from those in the Soviet and Mao Era.

5.2.2.1 To reduce urban pollution

As illustrated before, in the early 20th century, Beijing was still portrayed as one of the most liveable cities in the world with large royal parks and surrounding majestic mountains. Industrialisation and modernisation in Beijing only began from the middle of the 20th century with the aim of creating an industrial giant. Many state-owned heavy industries boomed, such as electronic industries, textile mills, machinery and construction companies. One of its steel companies – Capital Iron and Steel Corporation – was even ranked as one of the largest nationwide steel producers (it was shifted out of the city from 2006 onward). This industrialisation process inevitably resulted in serious urban air pollution. Only within the last 50 years has Beijing been labelled one of the top ten most polluted mega-cities in the world by the United Nations (Chen, 1996).

Such a label apparently harmed Beijing’s image as the national capital. Urban air quality problem became the focal point from the central government to Beijing local government. The requirement of “making Beijing a clean and hygienic city” was brought to the fore in the 1982 plan. One important means was through promoting green space construction, apart from an appeal for restructuring industries to low-energy, less resource consumption, and pollution-free tertiary industries (i.e. financial services and high-tech companies) (Beijing Municipal Commission of Urban Planning, 1982).

It was believed that although green space cannot directly and immediately solve the problem of urban air pollution, it could at least reduce the pollution effects to some extent.

As a result, the research on how green space can efficiently absorb air pollutants and purify air was funded by the government in order to support urban development decision-making (Zhang et al., 1997). A sub-section in Chapter 2, Section 2.2.4.1, reviewed some of these studies undertaken during this period. In addition, a series of research projects was funded by the National Science and

These studies provided and devised a wide range of strategies targeting urban pollution especially improvement of air quality, such as establishing the database of the selected plant species, studying the appropriate proportion of trees, shrubs and grass (i.e. 70% trees and shrubs, and 30% grass) and configuring the vertical structure of a plant community, and optimising the spatial structure of green space. They have been regarded as very useful guidelines for planning and managing urban green space. The Beijing Greening Regulations 1990 issued at this time actually incorporated these study results and attempted to promote them into practice.

5.2.2.2 To create an attractive investment environment
Since Mao’s time, the importance of urban green space in beautifying the cities and making a positive city image has never been compromised. The discourse has been imbedded with different meanings in the successive Beijing planning documents and urban development agendas.

As introduced above, the government inaugurated a large-scale industry restructuring at this time. This process has been increasingly contingent upon the sources of foreign capital and global investors since 1979 when the Fifth National People’s Congress approved the first law on the direct foreign investment in China.

Yusuf and Wu (1997, p. 182) define the first wave of foreign direct investment in China as being from 1978 to 1991, which focused on capital investments in manufacturing and other primary industries; and the second wave beginning in 1992 has been directed towards urban infrastructure, tertiary industries, and land development by overseas investment.

Accompanying the two moves, urban landscape and environment was expected to be devoted to high-profile foreign icons and be oriented to investors’ tastes. The Beijing government enthusiastically encouraged and endorsed the incorporation of a variety of features and symbols of western landscape symbolising European wealth and sophistication in order to create “an attractive investment environment” (Beijing Municipal Commission of Urban Planning, 1982).

As Chapter 4 Section 4.3.4 indicated, the advocacy of western landscape spread from Capital Beijing to the local cities. And in some scholar’s term (Yu, 2003; Yu and Padua, 2007), it resulted in a “city cosmetic movement”, which means green space was given too much attention to if it looks modern and beautiful. Many scholars (e.g. Liu, 2005; Liu, 2008; Selugga, 2007; Yu, 2003; Yu and Padua, 2007) have criticised this as it “lacks sensitivity to culture, local identity and ecological integrity and are more demonstrative of local officials’ preferences and ambitions rather than the needs and desired of their communities” (Yu and Padua, 2007).
In summary, the planning stage 1978 to 1992 was a rehabilitation period when social and economic activities eventually recovered after almost twenty years of instability. The 1982 master plan was also regarded as a “rehabilitation plan” or “transition plan” from a highly controlled urban development to one open to the outside and transition to a market economy. This led to the recovery and acceleration of urban green space development (which had been stopped during the unstable period) and the recognition of some new functions of green space. It was the stage of awakening, when western influences started to take action and changed the Chinese view of city and its natural environment.

5.2.3 Planning stage 3 (1992-2003)

In 1990, Beijing successfully hosted the 1990 Asian Olympics, which was the first time that Beijing and also China held an international festival. Coupled with the emergent trend of more and more international events occurring in Beijing, a new role of “an open and modern international metropolis” for Beijing was established, in addition to continuously emphasising the role of “national political and cultural centre”. In parallel, as introduced in the previous section, the second and much larger wave of overseas investment was starting from 1992. More greening projects were needed as the government increasingly believed that a green cityscape with unique Beijing cultural elements within the green space would greatly help to “build a civilised garden city and upgrade Beijing’s image on the international stage” (Beijing Municipal Commission of Urban Planning, 1992).

5.2.3.1 To protect the historic and cultural heritage for a civilised garden city

At this stage, the master plan called for the transformation of the development focus from urban expansion to rehabilitation and revitalisation of decaying inner-city areas, “not seeking solutions by simply expanding the urban built-up areas” articulated in 1992 Beijing Master Plan. According to Beijing Statistics Bureau (1993, p. 388), in 1992, there were 48 inner-city renewal projects, involving 20,627 households and 0.52 km$^2$ of housing.

This large-scale property-led development project also encompassed a wide range of the features associated with the regeneration of urban landscape and environment within Beijing. As a fortuitous “by-product”, many valuable historic and cultural heritage and/or relics were “discovered”. The local government attempted to “protect this heritage by connecting these historic sites as a whole at a city scale, instead of only focusing on the preservation of a single spot” (Beijing Municipal Commission of Urban Planning, 1992). Meanwhile, the master plan required to “make every effort to ensure their authenticity during the processes of conservation, restoration or exploration” (Beijing Municipal Commission of Urban Planning, 1992). As a result, an innovative, well-designed protective network combined with old city restoration and green space was suggested in this master plan.

As explained before, the deep resentment against the old city and thus demolition of many historic buildings, gardens and other old Beijing features during the unstable period invoked wide criticisms in Chinese society. The government realised such mistakes and started to conserve and preserve the remaining historic and/or cultural sites. However, largely due to the limited knowledge about heritage preservation at that time, such preservation was carried out on a site by site basis. As a consequence, many restored/recovered buildings stood alone, immersed among the modern high-rise buildings (Shan, 2009).
The network manifested the functions of urban green space in protecting the historic and cultural landscape and further enhancing Beijing’s cultural identity. A series of heritage parks were consequently proposed and built during this planning stage, to name just a few: the Yuan Dynasty City Wall Relic Park (first built in 1988, and rebuilt in 2003), the Ming Dynasty City Wall Relics Park (2002-2007) (Figure 5-7), the Qing Dynasty Imperial Wall Relics Park (finished in 2001), and the Changpu River Park (finished in 2002). Among these, the city wall parks attracted more attention and initiated a “fashion” of restoring city walls across the country, such as Xi’an (Zhang, et al., 2010), Jinzhou (Wang, et al., 2011), Chongqing (She and Tan, 2003), Nanjing (Cai and Yao, 2009).

Despite the fact that in many cases only a few fragmented pieces of wall relics or structure foundations remain, the once unrealised Liang’s city wall park conception was partly materialised 50 years after it was proposed. Figure 5-8 presents this conception. It originated in the “Twin cities plan for Beijing”, also known as the “Liang & Chen Plan” proposed by Liang and Chen in 1950s. This plan suggested preserving the whole ancient Forbidden City intact (including all the surrounding old city walls and gate towers), and establishing a new administrative centre far to the west of the imperial city. Liang and Chen opposed the Soviet plan for Beijing, and argued that the Beijing should be a political and cultural centre, rather than an industrial giant. The city’s long-established symmetrical structure and the grid texture of Beijing’s streets, the whole system of enclosures by city walls, and north-south axis were all supposed to be preserved to maintain the unique historical and cultural landscape of Beijing.

In order to preserve this precious heritage, and meanwhile to provide more recreational areas, this plan conceived an innovative way to change these old city walls into city wall parks. On the top of the 10 metre wide walls, prostrate shrubs, ground covers, and colourful flower beds could be planted. Such a terrace would provide a perfect place for people to stroll and enjoy a view of the city. The gate towers on the walls could be refurbished into reading rooms, teahouses, museums or opera buildings for people. Eventually, it was intended to transform old walls into elevated 3-dimensional parks forming a park ring network encircling the old city (Liang, 1986. See Figure 5-8). Unfortunately, this park model was abandoned with the rejection of the twin cities plan in the 1950s.

Figure 5-7 Views on the top of the city wall
(Source: taken by the author, 2010. The photo on the left was taken around the Corner Tower. Some traditional buildings are not far away, which were used as rest rooms for soldiers in the old days. The photos in the middle and on the right show some parts of the city wall had once been ruined and become derelict, but are still accessible to visitors.)
Along the wall there is a large area of green land, forming a precious green belt in city central areas.

![Image of a park]

**Figure 5-8** The City Wall Park conception in the abandoned “Twin cities plan for Beijing” by Liang and Chen, where the tower buildings and sentry posts would be changed to tea houses or museums for the public. (Source: adapted and redrawn from Wu, 2001, p. 85-89)

Through combining cultural heritage protection with green space construction, the government attempted to realise the development goal of “building a civilised garden city”. As illustrated before, Howard’s “Garden City” concept had been officially introduced in China. It was particularly proclaimed by Beijing authorities largely due to the fact that this concept was very in line with Beijing’s long-established reputation for having abundant large imperial gardens and surrounding green mountains. However, an authentic “Garden City” in the English version has no chance of being realised since Beijing city pattern had already been established. In most cases this concept is simplified to be a symbol to indicate a strong desire from government for a beautiful urban environment with many gardens inside. “Civilised” was added here to emphasise improving people’s morals and virtues partly through creating a beautiful environment.

**5.2.3.2 To control urban sprawl and shape urban physical morphology**

Although the greenbelt and green wedges were established as early as in the first Beijing master plan, the local government did not really give attention to it until the aggravation of urban sprawl and associated problems became evident. Along with large-scale urbanisation and loosening of policies on
domestic immigration restrictions under an open market mechanism, Beijing began to expand. From 1949 to 1992, the built-up area increased from 62.5 km$^2$ to 397 km$^2$ and signs of more rapid urban growth were evident. Alongside the “Garden City” concept and other western urban planning theories and approaches entering China, the local government expressed a growing interest in greenbelts in light of their contributions to urban morphological development. To some extent, the greenbelt in China was even regarded as a “panacea” for limiting urban expansion and resolving relevant urban structural issues.

Correspondingly the 1992 Beijing Master Plan proposed the 2nd Greenbelt, consisting of reserved agricultural lands, villages and forest parks between the 5th and 6th Ringroads, with an urgent demand that “the urban areas should be separated from the rural areas by the greenbelt in order to curb the spread of the planned city area of Beijing” (Beijing Municipal Commission of Urban Planning, 1992).

In addition, the master plan reiterated the “significance and imperative” of using greenbelts to orient Beijing’s urban morphology from monocentrism to polycentrism. If the 1st Greenbelt and green wedges plan was mostly the result of learning from the Soviet Moscow master plan in the 1950s (which will be returned to in more detail in Section 5.3.1), the 2nd Greenbelt seems to have been a “consciously” reactive plan established as a countermeasure to emergent urban problems.

In summary, the 1992 plan encouraged steady and healthy social and economic development for Beijing. This city was newly set as an “open and modern international metropolis” and one of the city development goals was to be “a civilised garden city”. The priority function expected from urban green space at this stage was correspondingly in order to protect the historic heritage to contribute to such aspirations.

The issue of urban physical morphology was highlighted at this planning stage. The single city centre with a series of concentric ringroads established by the Soviet experts might have worked well under the highly planned economy and strict urban growth restriction policies. However, this no longer fit into the new rising market economy after 1978. The expanding super big city centre (more than 1000km$^2$ in the 2000s) led to traffic disorder and urban environment degradation. The 1982 Beijing Master Plan has already noted this unsuitable urban spatial structure and began to conceive the satellite towns. And the 1992 plan highlighted the polycentric pattern of 10 Scattered Groups around the central city, and 11 Satellite Towns in the outer suburbs. Accompanying this process of restructuring urban spatial structure, there was an upsurge of interest in the structural functions of urban green space, but much more concentrating on constricting urban expansion, instead of directing urban development to areas best suited for it.

45 Such declarations are not necessarily an omen of anything, as it should be remembered that such discourses already appeared in 1982 Beijing Master Plan.
5.2.4 Planning stage 4 (2004-2020)

Despite all these government efforts, urban and environmental problems have continued to generate concerns. Even though they may get spectacular attention on the political agenda, it did not necessarily imply that such issues have been resolved. And by this stage, new problems had continued to arise while a number of old urban problems caused by previous urban development strategies had accumulated to a certain critical level. The challenges to Beijing’s development have grown more rather than less complex. For example, there were increasingly recognised regional environmental issues (e.g. water scarcity, climate change and the like), and unbalanced regional development. Beijing itself faced an unbearable growth pressure as its built-up areas kept increasing by 13.10 km$^2$ every year since 1978 (Piao and Ma, 2006). But paradoxically, its surrounding cities/towns (such as in Hebei province) in the same region were very underdeveloped, which caused the Beijing-Tianjin-Hebei economic zone on the whole was lagging much behind the other two China’s economic zones in terms of cooperation in economic, technological and environmental protection.

The Beijing government pinned hopes on a new round of urban development strategies, especially environment-related plans, to solve or at least mitigate some of above problems. Two moves were therefore made in the new urban planning: a regional approach was proposed to further reverse Beijing’s inefficient monocentric urban expansion pattern and to integrate Beijing’s development into the Beijing-Tianjin-Hebei regional development; and a new requirement of “building up a world-famous ancient city” was added to Beijing’s development goals. Correspondingly, urban green space at this time was highlighted and valued from two aspects: 1) to configure regional green structure for resource management and environmental protection, and 2) to enhance Beijing’s image as “a world-famous ancient city” and “an international Olympic city”.

5.2.4.1 To configure regional green structure for resource management and environmental protection

The metropolitan area of Beijing in the 2004 plan was supposed to be oriented towards a slightly different polycentric structure, which was configured as “two axes, two belts and multiple centres” (Figure 5-9). One of the two belts was a regional green structure, namely the “ecological belt” (西部生态带). It went through Beijing’s western and northern part and linked Beijing’s built-up areas with the wider regional background.

The main body of the regional green structure is the “other green space” mainly consisting of forest parks, conservation forests, and so on (refer to Table 2-2 in Chapter 2, Section 2.2.3). Although Chinese urban green space classification already included the catalogue of “other green space”, such areas are generally so far from built-up areas that they have been valued less compared with ornamental green space within the city.
Figure 5-9 The two axes-two corridors-polycentric Beijing urban structure plan

The 2004 plan showed great interest in the “other green space”. It called for that:

“focusing great attention to the construction of ‘other green space’, and conducting more work on mountain greening, wind-dust protection greening, greenbelt, scenic spots, nature reserves, forest parks, wetlands and other wildness areas.” (Beijing Municipal Commission of Urban Planning, 2003)

One of the noticeable reasons was the critical location of “other green space” and its associated structural values (Figure 5-10). As it was articulated in the planning documents:

“‘Other green space’ can geographically function as a linkage connecting Beijing with other surrounding cities/towns to configure the regional development structure.” (ibid.)
This arrangement of green space from a regional perspective was expected to “benefit efficient usage of natural resources as well as regional environment protection, and to achieve the goal of a resource-efficient and environment-friendly society” (Beijing Municipal Commission of Urban Planning, 2005). As earlier master plans have pointed out, Beijing is plagued by water shortage. Many studies have pointed out that in fact, not only Beijing, but many cities and towns in the same region also suffer from water scarcity, and water has become the bottleneck to the regional economic development. Thus water conservation and storage became an imperative urged by the central government on the Beijing government. The mountainous greening projects were listed as key projects for their water storage, erosion control and relevant ecological functions. It was hoped that:

“…through these projects, not only can Beijing gain the benefits, but also the surrounding areas which have a common water catchment with Beijing can potentially mitigate their water crisis, prevent ecological risks (such as sand storms, landslides, etc.), preserve natural habitats and species, and ecological processes.” (Beijing Municipal Commission of Urban Planning, 2003)

5.2.4.2 To enhance the sustainable city image

The role of Beijing was reconfirmed as the “political and cultural centre and international metropolis”, but a new item “world-famous ancient city” was added in this new plan. The government hoped to
recover Beijing’s old “Shan-shui-city” (山水城市) image through a cohesive green space structure consisting of historic and cultural heritage parks in the inner-city, green space in the suburbs and “other green space” (especially mountains) on the outskirts (Beijing Municipal Commission of Urban Planning, 2003).

As explained in Section 5.2.3, urban green space has been expected to provide protection for historic and cultural heritage to configure a whole structure of built elements and green space in the inner-city renewal projects since 1990s. The new chorus of “Shan-shui-city” furthered this move towards a larger and complete picture for the whole Beijing and thus demanded green space to play a more adhesive and overarching role serving as the glue for integrating various elements together to restore Beijing’s old image.

“For those remaining imperial gardens (such as the Summer Palace, Yuanmingyuan Park and the like) which have already formed a mature green space network consisting of various landscape elements, they already become the “post card” for Beijing even for the whole country on the international stage. For those remaining stand-alone historic buildings, it should make every effort to build new green space around them. On the one hand, green space can protect the valuable cultural and historic artefacts, and on the other hand enhance the city’s visual appeal…Meanwhile, the city [Beijing] should refer to its rich resources in terms of natural environment and cultural heritage and make full use of them to shape a “Shan-shui-city” in a new sense to strengthen local identity and the sense of place belonging and attachment.” (Beijing Municipal Commission of Urban Planning, 2003)

One of the key projects contributing to the “Shan-shui-city” image was the Beijing Olympic Park. Many aspects, such as the site selection, the overall layout of the park and detailed arrangement of landscape elements (for example, the man-made hills and lake, refer to Figure 5-11), were designed to resonate with ancient philosophical thinking and recast the “Shan-shui-city” pattern. Since this park was also used as an example elucidating “the modern version of the Feng-shui approach to green space”, more details about how this park was conceived to respond to the demand of Beijing’s old city image are discussed in Section 5.3.4.
From the year 2004 to the present was a key period for Beijing’s development because of two influential events in China: the 29th Olympic Games were held in 2008, and the 11th Five-Year Plan (2006-2010) began its enactment in 2006. The 2004 plan required to “seize the opportunity of the 2008 Olympic Games and the 11th Five-Year Plan to improve the construction of the municipal infrastructure and regional environment” (Beijing Municipal Commission of Urban Planning, 2003). There were more demands for a high quality of urban environment to echo with the commitment of “Green Olympics, Hi-tech Olympics, and People’s Olympics” and the high standard of an international Olympic city.

“Environmental protection is a key prerequisite for designing and constructing the Olympic Games’ facilities, while strict ecological standards and systematic guarantee systems will be established. Urban and rural afforestation and environmental protection will be widely

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46 Penglai Fairyland is one of the three well-known supernatural mountains inhabited by gods and immortals in Chinese mythic legends.
enhanced in an all-round manner...” (Beijing Organising Committee for the Games of the XXIX Olympiad, 2008. English version)

The latest ecological technologies and materials were therefore encouraged to be incorporated into the green space development to highlight the “Green” and “Hi-tech” themes. For instance, the whole park was designed to make full use of reclaimed water, storm water and reused water (the water treatment procedure see Appendix F Figure F1, F2). The surface water system contained subsurface flow wetland, free surface wetland, oxidation pond, biology function zone, to form a sophisticated system for bubbling air into the water for purification (Figure 5-12).

![Figure 5-12 A man-made wetland in Olympic Forest Park](Source: taken by the author, 2010)

Many green space projects were advocated and listed as “image projects” (形象工程) or “Green Olympic Display Window” (绿色奥运展示窗口) for 2008 Olympic Games (Beijing Municipal Institute of City Planning & Design, 2004). For example, a “Green Bridge” was designed over Beijing’s 5th Ringroad as an ecological corridor connecting the northern and southern parts of the park (Figure 5-13). It is 270m long and 60-110m wide, totally about 8000m$^2$ and carries considerable vegetation to provide connections for pedestrians, cyclists as well as a pathway for the movement of wildlife (Hu and Zheng, 2009).
As indicated in Chapter 2 Section 2.2.4.4, the use of green space as the conveyance of city image and status can lead to positive or negative outcomes. The previous advocacy of green space for a wealthy modern city image was criticised as superficially copying modern western landscape (refer to Chapter 4 Section 4.3.4 and previous Section 5.2.2.2), and thereby raised a series of problems in terms of economic inefficiency, cultural discontinuity and ecological destruction. By contrast, in the new planning stage through the efforts of incorporating cultural values and ecological considerations, green space construction can be more responsive to the requirements of a green sustainable image of a city.

5.2.5 Summary

In summary, through the four planning stages, Beijing experienced significant social and economic transformations. Overall, the direction of urban development shifted from the Soviet model to a western orientation. Much evidence indicated that the political attributes of Beijing were gradually played down and the socialist/communist ideology attached to Beijing’s development has since been much less highlighted than it was in the 1950s. In other words, the socialist/communist ideology was seldom regarded as justifying green space development decisions. It tends to be the use of green space that gives its purpose, rather than the political ideology.

Increasingly serious environmental problems are becoming the “catalyst” for getting green space much higher on to the development agenda. The way in which urban green space was conceived as a countermeasure to the environmental crisis, however, shows a reactive, narrowly focused and uneven way of developing green space. The latest plan established a regional lens to envision green space and to integrate it with other urban infrastructure and regional future development. Such an ecosystem-based perspective indicates a radical step towards a proactive, less polarising and comprehensive way of developing green space in urban areas.
5.3 Urban green space planning strategies from 1949 to the present

There have been a total of four urban green space plans since 1949, namely the 1958 Beijing City Centre Green Space Plan, the 1982 Beijing Green Space Plan (1982-2000), the 1992 Beijing Green Space Plan (1992-2010), and the 2004 Beijing Green Space Plan (2004-2020). Only the 1958 green space plan involved a single scope, focussing on Beijing city centre. Other plans considered the whole scope of the metropolitan area as well as the city centre. Through examination of these planning documents, the relationships between green space plans and urban master plans, green space planning approaches, the planning scope and the major influences in each planning stage are identified and summarised in Table 5-2.

As introduced in Chapter 4, Section 4.4, with regard to the Chinese urban and green space planning legislative system and institutional structure, specifically, the Beijing government has two relevant departments taking responsibility for urban green space development. The Beijing Municipal Commission of Urban Planning (the former name in the 1950s was Beijing City Planning Commission) is in charge of urban green space planning and relevant policy and decision making. Affiliated to the commission, the Beijing Municipal Institute of City Planning & Design takes the responsibility for the formulation of various types of urban and rural plans, including urban green space plans. Generally urban green space plan is one of sectoral plans in the blueprint of urban master planning so it is urban planners that are also the main actors of urban green space planning (practising a strict top-down process). And the Beijing Municipal Bureau of Landscape and Forestry (which was a merged government department from two separate bureaus of landscaping and forestry, as introduced in Chapter 4 Section 4.4.2), is in charge of green space planning implementation, green space maintenance and management. Under this bureau, there are several offices, such as Beijing Municipal Administration Centre of Parks, specifically in charge of public parks management.
<table>
<thead>
<tr>
<th>Planning stages</th>
<th>Highlights</th>
<th>Relationships with urban master plan</th>
<th>Approaches</th>
<th>Scopes</th>
<th>Influences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning stage 1 (1958 green plan)</td>
<td>A green space structure of point-shaped, line-shaped and polygon-shaped greening; 1st Greenbelt; National Landscaping Campaign; Greening combined with economic production</td>
<td>Subordinate</td>
<td>Quantitative standards; Greenbelt and green wedge model: “Filling in” method</td>
<td>Focusing on city centre</td>
<td>The former Soviet Union; Chairman Mao Zedong</td>
</tr>
<tr>
<td>Planning stage 2 (1982 green plan)</td>
<td>Firstly proposing scenic spots and nature reserves</td>
<td>Indispensable (still subordinate)</td>
<td>Scenic spots and nature reserves</td>
<td>Extending to suburbs, rural areas</td>
<td>Chinese traditional values</td>
</tr>
<tr>
<td>Planning stage 3 (1992 green plan)</td>
<td>2nd Greenbelt; “Melons on the vines” green space structure</td>
<td>Indispensable (still subordinate)</td>
<td>Park hierarchy</td>
<td>Entire metropolitan area of Beijing</td>
<td>The West</td>
</tr>
<tr>
<td>Planning stage 4 (2004 green plan)</td>
<td>For the first time, being regarded as a dynamic and complex ecosystem; Green space structure based on environmentally sensitive areas and ecologically critical areas analysis; A network of green space and cultural heritage sites for the Beijing Shan-shui-city</td>
<td>Separated and leading</td>
<td>Ecological approach; the modified Feng-shui</td>
<td>Interregional scale</td>
<td>The West; Chinese traditional values</td>
</tr>
</tbody>
</table>

Table 5-2 A summary of findings in Beijing green space planning in each planning stage
5.3.1 Planning stage 1 (1949-1981)

As introduced before, in August 1958, Mao launched the National Landscaping campaign with the aim of “making all of China green and beautiful”. To respond to this campaign, the first urban green space plan in China - the 1958 Beijing City Centre Green Space Plan - was proposed.

This green plan was in fact based on the previous 1953 Beijing Master Plan. It was not until 5 years later that the first green plan was issued. A probable reason was that “the new government had to pay more attention to industrial development” (Liu, 1999). As discussed in Section 5.2, the earliest 1953 master plan was led by the Soviet experts, and one of the general principles was “the predominance of production over non-productive activities” (Sit, 1996). The master plan accordingly considered the land resources requirement for industrial development as the top priority, thereby formulating the corresponding land quotas and drawing up locations beneficial for production activities rather than for green space. In this way, the prototype of green space structure for Beijing therefore was already settled in the 1953 master plan, and was primarily based on left-over land from other land use (i.e. industrial development), as well as some readily available pre-existing green space (such as old gardens).

The term “subordinate” is used here to describe this connection between urban green space planning and urban master planning, where there was a considerable time gap between the two plans, and the last seemingly “valueless” piece of land was left for developing green space. This relationship was in turn unintentionally enhanced by Mao’s “green every corner” landscaping policy which highlighted greening the poor left-over land (refer to Section 5.2.1). Overall, a normative planning sequence evolved: in the master plan, the industries, transportation, and commercial uses take first priority for land - then land of less interest is for greening – the green space plan then has to finish the greening tasks required by the master plan - the land becomes filled with green.

The concept and classification of “urban green space” adopted from the Soviet at this stage (refer to Table 4-1 in Chapter 4, Section 4.3.3) stated clearly that the types of natural areas outside of the built-up areas were also a component of urban green space. However, the 1958 green space plan only focused on the city centre, presumably due to the time lag in the application of relevant knowledge at that time (note: that Soviet concept and classification were issued in 1963 while the first Beijing green space plan was issued in 1958).

Although there was only one green space plan during these three decades (from 1950s to 1970s), the Soviet as well Mao’s thinking, policies, and approaches to urban greening undoubtedly have profound influences on later Beijing urban green space planning. Even though from 1960 the Soviets no longer supervised Chinese urban development, many researchers argued that their key concepts and standards held sway until the later plans of 1982 and 1992 (Sit, 1996; Yeh, 1999; Gu et al., 2010). The quantitative standards, greenbelt and green wedge model, and the “filling in” method applied during
this stage established the methodological groundwork for urban green space planning in China. And they all continue to remain the most commonly applied approaches in use today.

5.3.1.1 Soviet quantitative approach

The Soviet quantitative approach was well-known as a “rational and scientific tool” in China. Through the 1958 green space plan, two basic aspects were identified, concerning the quantitative standards in planning green space in the cities: “how many” and “where”.

“How many” standards were based on the amount of different types of green space, the number of public parks, the proportion of green space in a certain area, the number of cultural or recreational facilities in a public park, a particular amount of green space per person and the like. For example, the 1953 master plan had already designated a total area of 568 km² of land for green space construction, accounting for 30% of the Beijing city centre at the time. The overall land quotas for greening were further broken down by the 1958 green space plan. Among the 568 km² of green space, public parks accounted for 270 km², and productive green space (nurseries, orchards and urban farmland) was supposed to have a total area of 298 km². Furthermore, there was to be at least 6 m² of public park per person. In a public park, the percentage of green space coverage of each functional zone was required to meet the standards in Table 5-3. A portion of the total area of residential development for green space was also required in a Soviet-style microdistrict (refer to footnote 42 in Section 5.2.1.3). Such standards requirement was clearly stipulated in the 1953 Draft of Reconstruction and Extension of Beijing as follows (Beijing City Planning Commission, 1953):

“The microdistrict should be constructed with comprehensive master planning, design and implementation, and provide cultural, recreational and sports facilities, green space and children’s playgrounds per dwelling unit…Green space should account for at least 25% of the total area of the microdistrict…”

<table>
<thead>
<tr>
<th>Zones</th>
<th>Land quota of the whole park (%)</th>
<th>Hard surface (roads, squares, buildings)</th>
<th>Trees and Shrubs</th>
<th>Lawns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreational zone</td>
<td>5-7</td>
<td>35</td>
<td>40</td>
<td>25</td>
</tr>
<tr>
<td>Cultural and educational zone</td>
<td>4-6</td>
<td>35</td>
<td>40</td>
<td>25</td>
</tr>
<tr>
<td>Sports zone</td>
<td>16-18</td>
<td>40</td>
<td>35</td>
<td>25</td>
</tr>
<tr>
<td>Quiet zone for rest</td>
<td>60-65</td>
<td>10</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>Administration zone</td>
<td>2-4</td>
<td>50</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Children’s playground zone</td>
<td>7-9</td>
<td>20</td>
<td>50</td>
<td>30</td>
</tr>
</tbody>
</table>

Table 5-3 Green space portions in a Park of Culture and Recreation

47 It can be found that the productive green space alone took more than half of the total area of urban green space. This further demonstrates the emphasis on the economic production function of urban green space at this stage analysed in Section 5.2.

48 Also learned from the Soviets, public parks in Beijing adopted the “Park of Culture and Recreation” model, to fulfil diverse demands of cultural-enlightening work, relaxation, sporting activities and rest in optimum natural surroundings (Gorokhov and Lunts, 1985). In Chinese practice, the park was generally required to be divided into six functional zones: “sports zone”, “cultural and educational zone”, “recreational zone”, “children’s
The set of “where” standards were concerned with green space location. In addition to the consideration of existing old imperial gardens and greenery areas (such as mountains), allocating green space primarily relied upon other “more important” urban infrastructures’ distribution. As illustrated previously in section 5.2, opposed to the Soviet proposal of building Beijing as a producer city, the Liang & Chen Plan only established the southeastern and southwestern suburbs outside of the old city as industrial areas according to Beijing prevailing wind directions (also refer to Appendix D and areas with blue colour in Figure D2). However, the 1953 master plan greatly increased the amount of industrial areas and distributed them almost in every direction of the city (refer to areas with dark purple colour in Figure 5-14). It initiated the best-location land for those “production activities”, such as industry, transport, construction and communication, and then concerned the districts for the “non-productive activities”, including catering, wholesaling and retailing, residential and educational areas, as well as recreational areas.

Planning attention to location was far less than that of quantitative land-related standards. It seemed that the main application of the “rational and scientific tool” in green space planning was to break down the overall land quota from the master plan and thus secure the government funding for green construction. Combined with previous explanations of green space being expected to serve economic interests (refer to Section 5.2.1), green space was planned as an “add-on” infrastructure to development.

Nevertheless, the whole set of Soviet quantitative standards formed a rudimentary version for the later national standard - Regulations on Urban Green Space Planning Indicators (Ministry of Housing and Urban-Rural Development of China, 1993), where the minimum ratios of urban green space coverage among various land use types (such as old/new residential areas, commercial areas and so forth) were systematically set up.

However, during the unstable period of time, in reaction to Mao’s movement of “Great Leap Forward” on Beijing greening - turning Beijing into a big garden- higher benchmarks were set up. For example, 40% of the urban area and 60% of the suburbs were required to be devoted to green space. These proposals far exceeded a realistic situation. Urban planners had become too focused on addressing the government’s impractical requirements of the socialist capital model, rather than catering for people’s real needs for green space. It brought chaos during the implementation, including false declarations, exaggeration of statistics, and ignoring of trees’ mortality (College of Architecture & Urban Planning, Tongji University, 2003). These numbers were set aside arbitrarily and only “flattered” Mao’s ambition of greening all of China. In this sense, the setting of generous green space standards was

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playground zone”, “quiet zone for rest” and “administration zone”. And meanwhile these functional zones should also meet the land quota standards.
further proof of political ideology being imposed on urban green space planning and development, as opposed to being based on sociological or ecological requirements.

5.3.1.2 Soviet greenbelt and green wedge approach

With the direct aid of the Soviet urban planners who had experienced Moscow’s master plans, constructing a greenbelt and several green wedges in Beijing was advocated. It is evident that Beijing’s urban and green space spatial structure in the 1953 Beijing Master Plan (Figure 5-14) as well as in the 1958 Beijing City Centre Green Space Plan (Figure 5-15) shared significant similarities with the 1935 Moscow Master Plan (Figure 5-16) - all representing a mono city centre surrounded by scattered groups; several green wedges penetrating into these groups to supply recreational facilities for the working class and meanwhile preventing these groups from growing into a larger agglomeration; a greenbelt on the outskirts encircling the built-up areas (see the comparative diagrams in Figure 5-17).

This greenbelt was planned to cover an area of about 240 km$^2$. Within the belt, agricultural cultivation was the dominant land use, together with a range of other productive land uses (such as nurseries, and orchards), parks, and a few residential areas. Certainly, combining the main productive purpose with some recreational use was a basic greening principle for this greenbelt at the time (Liu, 1999). Such a greenbelt formed the foundation of the later 1st Greenbelt planning for Beijing, which was repeated in every planning stage.

![Figure 5-14 1953 Beijing Master Plan](Source: redrawn from Beijing Municipal Commission of Urban Planning, et al., 2006, p. 35)
Figure 5-15 1958 Beijing City Centre Green Space Plan
(Source: redrawn from Beijing Municipal Commission of Urban Planning, et al., 2006, p. 244)

Figure 5-16 1935 Moscow Master Plan
Figure 5-17 Simplified diagrams illustrating the spatial concept of Beijing’s and Moscow’s greenbelts, green wedges and ring road systems (left is Beijing, right is Moscow)
(Source: drawn by the author)

Based on the Soviet greenbelt and green wedge model, the Beijing green space spatial structure presented as “the combination of point-shaped, line-shaped and polygon-shaped green space” (点线面结合) was eventually conceived and articulated in the 1958 green space plan (Beijing City Planning Commission, 1958. the illustration diagram refer to Figure 5-17). The point-shaped green space indicated the individual public parks (such as those imperial gardens) dotted in the city. The line-shaped green space indicated the extensive road greening along those ringroads and the greenbelt encircling the built-up areas. And the polygon-shaped green space indicated those comparatively large areas of green wedges.

This proposed spatial concept is essentially analogous to Forman’s “indispensable pattern” examined in Chapter 2 Section 2.3.2.1, where ideal spatial configuration of green areas is a few large natural vegetation patches connected with several corridors and small natural areas throughout built-up areas. Today such concepts are advocated because not only they have functions of buffering between city zones, organising people’s activities, sustaining ecological functions, but also defining urban structure and form and leading future development (refer also to Chapter 2 Section 2.2.4). However, as stated in Section 5.2.3, these structural functions provided by green space had not found recognition until the 1992 Beijing Green Space Plan. At this early planning stage, incorporating greenbelt and green wedges into Beijing green space development strategies was mostly a result of Soviet assistance, rather than out of urban structural or environmental concerns.

According to Russian scholars, the Soviets developed this concept as part of the socialist approach to creating balanced and comfortable conditions in cities for the working class in the 1930s (Kuznetsov and Ignatieva, 2003). It is assumed that this concept was probably transmitted indirectly from the West (i.e. from the UK) through Russia to China. The main purpose of such greenbelt construction in Beijing was to organise agricultural activities where farmland, orchards, and nurseries were major
components. Apparently, the proposed Beijing green space structure was a synthesis of learning from Soviet Moscow’s urban green space structure in form, combined with economic production to satisfy Beijing circumstances.

However, owing to the underestimation of urban growth, lack of participation by key stakeholders (e.g. farmers and residents within the greenbelt), weak legal status, and slack effective implementation policies (Yang and Zhou, 2007; Xu et al., 2011, Chen, 2008), the encroachment on the greenbelt and green wedges has been ongoing since the 1980s. In fact, in the 1982 master plan, the greenbelt was required “to be well kept for future urban construction”. It tends to convey an implication that urban green space was developable land, a transitional place but eventually for economic development, rather than conserved for people’s recreation use or natural values. In 1998, the vegetation coverage within this belt only accounted for 15.8% of the total 240km² area (Yang and Zhou, 2007), and today the 1st greenbelt actually exists in name only (the greenbelt plans will be specifically discussed in Section 5.3.4).

5.3.1.3 “Filling in” approach starting from Mao

As discussed before, Mao once called for a general and extensive greening. His purpose was to actively mobilise the masses to take any chance to plant trees to make the post-war land green and beautiful as quickly as possible. However, this policy later evolved into a “filling in” (见缝插针) method in urban green space planning - “see space, insert green; find space, insert green; create space, insert green” and “taking every opportunity for greening” (Liu, 1999).

This approach became popular and was practised through every Beijing green space plan. However, it has aroused wide criticism owing to its advocacy of allocating green space in those places in poor conditions, such as the edges of the roads, embankments of rivers, steep banks and various other locations of this kind of “left-over” land, and thus “caused a large number of small, sporadically spread green spaces” (Wang, 2009).

A term of “haphazard provision of urban green space” is used here to describe this “filling in” approach. The government concerned over the provision and establishment of urban green space on the ground without any thoughtful strategy of meeting needs or applying systematic planning analysis process. Under the circumstances of economic development receiving the top priority, this way could satisfy all the requirements of land quota quantitative standards from the master plan. However, the quality of urban green space in terms of how its benefits and values can best function has been neglected.

Based on the planning approaches/methods used during this period, it is found that, on the one hand, from this early start, Beijing green space planning has been linked with Soviet advanced scientific and technological experience and achievements, while on the other hand there was some enthusiasm to follow the opposite direction - the non-planning “filling in” method, implying a subjective haphazard approach to urban green space. This is in some ways contradictory, reflecting the incompatible
understandings of the roles of green space in urban development. One placed great weight on green space as an effective means of realising a grand (socialist) country, while the other held it in contempt (as a waste of land) compared with economic development.

However, it can be found that the so-called “rational and scientific” planning approaches were mostly based on Soviet experience, rather than on a set of research/surveys in terms of people needs, geographical accessibility, or any other variables in Beijing or Chinese circumstances. It can even be argued that socialist views and urban green space planning in China tended to overlook the social, historical and natural aspects of the city. Consequently their approaches to developing solutions can be described as narrow and ideological but failed in terms of addressing the needs for green space in the real Chinese context in which urban and green space planning exists.

After all, this period saw the inception of urban green space planning in China. Since urban green space planning was a new thing and China had no experience of it, the Soviet planning approaches helped Chinese planners to set up a workable scheme whereby urban planners could quickly develop strategies to fulfil the requirements from upper level master plans or development policies. Moreover, the major contribution of these approaches was that they together became the methodological paradigm that distinguished urban green space from other items in urban planning.

During the planning process, the role of the planner was limited to a neutral technician, and public interest and the long-term benefit to society were assumed to be represented by the socialist government. The green space plan was unquestionably formulated within the ideological framework where two major forces were manifested: the Soviet experience on developing socialist cities and Maoist thinking about the roles of the city and functions of green space. The two influences often proceeded in an intimately interactive manner, serving as the key drivers on urban green space planning and development and adding the identifiable characteristics of Sovietism and Maoism to China’s urban green space planning.

5.3.2 Planning stage 2 (1982-1991)

As explained before, the 1982 Beijing Master Plan was regarded as a rehabilitation plan; and so was the 1982 Beijing Green Space Plan. It mainly reaffirmed the planning principles and approaches in the 1958 green plan, such as insisting on the green space structure of “the combination of point-shaped, line-shaped and polygon-shaped green space”. The catalogues of quantitative standards for guiding urban green space planning and management were slightly expanded. For example, in 1979, a new quantitative standard “percentage of greenery coverage” was first appeared in *On Improving Urban*

49 The indicator “percentage of greenery coverage” is slightly different from the previous “percentage of green land coverage”. The new indicator’s formula is: projected area of all types of vegetation (grass, shrub, and tree) / built-up area. Because the projected areas of plants change with the seasons, this indicator is different in each season. For example, in summer, it is bigger than the indicator of “percentage of green land coverage” compared to winter. This indicator was subject to criticism later as it is dependent on the indicator of “percentage of green land coverage”, rather than an independent variable, which would cause confusion in statistical work. The reason it was advocated at the time was that to some extent it can indicate how green the city is (Wu, 1990).
Green Space Construction Work by the Ministry of Housing and Urban-Rural Development, in order to better evaluate how green the city was. It became a widely used quantitative standard, although it was subject to some criticisms.

Meanwhile, this plan corrected these previously unachievable green space development objectives and re-set the greening objectives for 2000\(^5\), which were 38.9% of the “percentage of greenery coverage”, 52 km\(^2\) of “public green space” in the central city (including 40 km\(^2\) parks) and 10m\(^2\) of “public parks per capita”.

5.3.2.1 Establishment of scenic spots and nature reserves

Although it was a rehabilitation plan, there was a major improvement from the 1958 green space plan. The planning attention was expanded to the suburbs and remote rural areas, rather than only concentrating on the city centre.

Based on a survey and assessment of landscape aesthetic qualities and natural assets, the 1982 green space plan for the first time designated 1744 km\(^2\) of the mountainous areas to 6 scenic spots and 4 nature reserves, namely Song Mountain, Yunneng Mountain, Wuling Mountain and Baihua Mountain (see Figure 5-18). The criteria for establishing scenic spots included how many historic sites were left, and how well they were preserved (Beijing Municipal Commission of Urban Planning, 1982; Liu, 1999). For example, the scenic spot “Tanzhe-Jietai Temples” was based on the sites retaining two significant historic temples Tanzhe Temple and Jietai Temple\(^51\). And the scenic spot “Badaling - Ming Tomb” was based on the sites retaining the Badaling Great Wall and the underground tomb palace of emperors of Ming Dynasty (1368-1644)\(^52\).

The planning for nature reserves largely relied on the basic ecological inventory, such as how many species (flora and fauna) are present, what is the vegetation diversity, how many of the first and second grade state/municipal protected animals (Beijing Municipal Commission of Urban Planning, 1982). For example, Baihua Mountain (literally means the mountain of hundreds of wild flowers) was designated as nature reserve as it was identified as one of the most bio-diverse areas in Beijing. It is 2050m above sea level at the main peak and is the third highest in Beijing. It maintains 130 plant families, 485 genera and 1100 species. Among these are 400 species of Chinese medical herbs. There

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\(^{50}\) As explained in the footnote 28 in Section 5.2, in the 1982 Beijing Green Space Plan (1982-2000), the planning goals are projected to the year of 2000.

\(^{51}\) Tanzhe Temple (literally means Temple of Pool and \textit{Cudrania tricuspidata} Tree) was a Buddhist temple built in Jin Dynasty (307) and has a history of more than 1700 years old. It is one of the oldest and important temples in Beijing as well across China. More buildings and halls were built during the Ming and Qing Dynasties (1368-1911) and eventually formed a palace for emperors and royal families worship the Buddha. Its reputation also attracted some well-known foreign Monks from Japan and India to receive more education on Buddhism (Zhao and Yang, 1986). Jietai Temple (literally means Temple of Ordination Terrace) was also a Buddhist temple built in Tang Dynasty (622). It remained the oldest and biggest Buddha altar in the nation (Zhao and Yang, 1986)

\(^{52}\) Badaling is a section of the whole Great Wall. It was finished in Ming Dynasty (1505) and becomes one of the most popular tourist attractions after open to the public. Ming Tomb is the ground and underground palace complex of Ming Dynasty Emperors. Apart from the high artistic achievement in the architecture, thousands of treasure and artefacts, such as porcelain, China, etc. were found. In 2003, it was designated as a World Heritage Site by UNESCO.
are 170 animal species. According to historical records, First-Grade State Protected Animal, such as *Panthera pardus* (a leopard), *Crossoptilon mantchuricum* (a bird), and *Ciconia nigra* (a bird) exist in this area.

It can be found that the design of these nature reserves is different from that of nature reserves based on island biogeographic theory, which requires rigorous scientific analysis of target species (as explained in Chapter 2, Section 2.3.2.2). The UNESCO’s MAB programme also suggested the nature reserve has a spatial structure of core and buffer, and in the core areas, no visitors apart from limited scientific activities are permitted (as illustrated in Chapter 2, Section 2.3.2.2). By contrast, the concept of nature reserve in Beijing is more like natural scenic spots, encouraging residents and visitors to have tours for appreciating nature beauty. And also some universities or research institutes were encouraged to establish field work bases for teaching and research in such areas.

As stated in Chapter 4, it has long since been a tradition for the Chinese to have tours for religion, leisure and recreational purposes around mountains with temples, lush forests and/or rivers or lakes (refer to Chapter 4). Generally such wilderness lands, far from developed areas, were endowed with outstanding visual scenic beauty and religious/cultural values. Establishing scenic spots to protect the cultural and/or natural sites actually has received attention in the early 1950s. In 1963, the earliest classification of urban green space types already incorporated the item “scenic spots” (refer also to Table 4-1 in Chapter 4, Section 4.3.3). However, the consequent socio-political instability suspended further implementation.

In the Third National Working Conference on Urban Landscaping in 1978, the issues of establishment and management of scenic spots were officially under discussion. It required that: “the sites endowed with historical and cultural architecture, buildings and any other valuable constructs, if the area is large and retains the ancient buildings, monuments and other artefacts in the original integrated site, and/or old (ancient) trees, it should be set aside as a cultural scenic spot. And the repairs and maintenance work should be carried out... The large-scale and intact natural areas with unique or complex landform, diversity of vegetation, a high degree of wilderness, and outstanding landscape view, should be set aside as natural scenic spots... Neither industry nor profitable businesses are permitted” (Liu, 1999). Further, the Guideline for Evaluating Scenic Spots issued in 1981 highlighted the protection of large natural areas for their ecological, aesthetic, and cultural integrity and for recreation and the appreciation of natural beauty for current and future generations.
Not only those scenery areas, more types of green space located on the outskirts of the city, were proposed in this plan, where 6676 km² of mountain greening, 2800 km² of water and soil conservation forests, 266 km² of firewood forest, and 1866 km² of economic forests (for timber, fruits and other economic production) were established (Beijing Municipal Commission of Urban Planning, 1982). It is also identifiable that the economic functions attached to green space were no longer as highlighted as in the 1958 green plan. The plan advocated all efforts for “water and soil conservation forests” in the mountains; thereby the large-scale afforestation on the areas of barren, eroded hillsides and bluffs in the remote area again received attention once as in Mao’s times.\footnote{As discussed before, Mao did, to some degree, give more attention to and improve the status of “other green space” through the landscaping campaign. However, after Mao’s death, wide-spread criticism of his ruling philosophies and associated policies almost led to repudiation and reversal of, not only his mistakes, but also, his achievements including some valuable aspects in his greening policies.}

Unlike the 1958 green space plan which was noticeably five years behind the master plan, the 1982 green space plan was considered during the process of formulating the 1982 master plan. After Beijing’s overall development decisions were made, and objectives and tasks were broken down and assigned to different sectoral planning (i.e. economic development planning, transportation planning, housing planning and the like). The 1982 green space planning was subsequently undertaken.
Here I use the term “indispensable” to describe this improved relationship between urban green space planning and urban master planning, although the activities related to urban green space were still less important than other urban economic activities. The 1982 green space plan was the first plan after the 1978 open door policy. But the evidence shows that to a large extent this plan was still a conservative plan since the openness to the world had not yet impacted on green space planning and the act was still within the confines of master plan requirements, and a range of traditions or customs (i.e. establishing scenic spots).

5.3.3 Planning stage 3 (1992-2003)

The effects of economic growth and populations’ growing incomes, coupled with increasing amounts of leisure time and changing lifestyle, resulted in a vastly increased demand for green space especially recreational opportunities from the public. During the 1990s, research on how to meet people’s needs was accordingly funded by the National Natural Science Foundation of China and the Ministry of Housing and Urban-Rural Development (refer to a series of research reports of Huang et al., 1998a; 1998b; 1998c; 1998d; Zhou, 1998). This nationally supported research undertook a wide and in-depth study across the main developed countries (mainly the European countries and North America). Furthermore, several surveys about Chinese demand for green space were initiated in almost all major Chinese cities in 1994. The data comprised widespread interview surveys of 800 professional people (on issues of planning, design and management of green space), and questionnaire surveys completed were completed by 2490 citizens in the parks of Beijing.

This research challenged the old ideas of green space standards, and claimed that quantitative standards alone were unable to deal with the complexity of local residents’ demand for outdoor recreation. The research found that even if all quantitative standards met the objectives, there would still be a deficiency of green space in some areas. The importance of “the necessity for lessening the discomforts of living conditions by increasing park space, recreational and other facilities, especially in old crowded cities” was highlighted (Huang, 1998b). Therefore, it particularly suggested to the government that the requirements of spatial distribution of green space should be reflected in the national standards for guiding green space planning.

5.3.3.1 Park hierarchy based on service radius

Partly supported by this research, the 1992 Beijing Green Space Plan proposed an even spatial distribution of urban green space to provide local residents reasonable access to green space by foot or bus within a maximum of 20 minutes. Today’s studies on this topic clearly present that such accessibility is associated with various factors, such as attractiveness of green space itself, available transport modes, the roads’ condition, individual economic situation and other variables (refer to the studies of Zhou and Guo, 2003; Hu et al., 2005; Ma and Cao, 2006). But at this planning stage, the

54 As introduced in Chapter 4 Section 4.3.4, the Regulations for Indicators of Urban Green Spaces Construction in 1993 officially established three indicators “Public green land per capita”, “Percentage of greenery coverage” and “Percentage of green land coverage” as quantitative standards in urban green spaces planning.
measurement of accessibility was simplified by calculating the walking or taking bus distance to estimate the service radius (also called “the catchment area”) of a green space in an ideal situation.

The following configuration was stipulated in the 1992 plan: a 3-5km service radius (10-20 minutes by bus) for comprehensive parks (of 0.1-1km² area), and a 0.5-1km service radius (10-15 minutes walk) for residential district parks (of 0.05-0.1km² area) and 0.3-0.5km (5-10 minutes walk) for residential quarter parks (of at least 0.5ha) and belt-shaped parks were stipulated. A well-designed green space with different types, functions, size and location would form a hierarchy which ideally was supposed to cover all the built-up areas (refer to Figure 5-19). As such, all the local residents could readily access them by bus or walking.

![Figure 5-19 Illustration of a park hierarchy system based on service radius](source: analysed by the author)

Through this approach, the “blind spots” could be detected and might become a key area to assign greening tasks. This approach was also applied in the inner-city renewal projects (explained in Section 5.2.3), and thus many areas’ lack of green space for local residents were identified. Coincidentally, during the inner-city renewal projects, many cultural heritage/relics were discovered. By means of combining green space with historic sites protection, not only can the heritage be set aside considerably safely, but also green deficiency areas can be filled to meet the locals’ growing demand for accessible green space. This synergy between historic sites and green network integrated the activities and functions of the various urban infrastructures thereby contributing more to the urban living environment.

Based on this park hierarchy, the previous green space structure of “the combination of point-shaped, line-shaped and polygon-shaped green space” was replaced by a new proposed version termed “melons on the vines” (藤上结瓜) in the 1982 green space plan (refer to Figure 5-20 and Figure 5-21).
“Melons” were referred to “the hierarchy of parks ranging from smaller local parks close to people’s houses to large nature parks on the urban fringe”, and “vines” was a metaphor for rivers and the riparian strips, linear general greening along major roads, ringroads and railways, linking those parks (Beijing Municipal Commission of Urban Planning, 1992). More new scenic spots and nature reserves were therefore proposed and intended to link and form a green network consisting of natural and semi-natural areas on the outskirts of Beijing (Figure 5-20).

![Figure 5-20 “Melons on the vines” in the entire Beijing area](Source: Beijing Municipal Commission of Urban Planning, et al., 2006, p. 250)
Figure 5-21 A simplified diagram illustrating the spatial concept of “melons on the vines”. Melons are parks with various size, including small community parks to large nature reserve parks, while vines refer to linear greening, such as major road greening, river riparian strips, etc.

(Source: drawn by the author)

The park hierarchy approach attempted to ensure a rational spatial distribution of urban green space through a hierarchical park system. Since the relevant standards were simplified and did not require familiarity with the individual circumstance, it was easy to follow in a planning process. The later Chinese national standard - *Chinese Standard for Classification of Urban Green Space* (also refer to Table 2-1 in Chapter 2 Section 2.2.3) officially included such service radius measurement as mandatory planning parameters.

As this approach focuses on the distribution aspect and thus improved the “where” standard (refer to Section 5.3.1), it is a valuable complement to the previous simple quantitative figures which can only control the overall proportion of green space in the city.

However, as introduced before, because of research and knowledge limitations at the time, the service radius was set aside without consideration of the complex social and ecological environment. The service radius of green space is actually very complex and influenced by many factors. Turner (1992), in London’s open space planning history, observed that if a metropolitan park had poor visual quality and lack of facilities, it might not provide for a large catchment area, while some small parks with good status might provide extensive services. Today in China, research on this type of accessibility standard/indicator to support an adequate green space supply has incorporated many aspects, such as residential demographic densities, users’ behaviours, urban land use pattern, economic status in
different districts and the like. But these are only confined to the academic areas and have not yet been applied to the statutory green space planning.

In addition, this approach primarily focused on parks, including the items listed in the catalogue of “park”, as well as forest parks, scenic spots, nature reserves listed in the catalogue of “other green space” in Chinese national classification standard in Table 2-1 in Chapter 2, Section 2.2.3. The attention given to nature parks in rural and mountainous areas promoted and enlarged green space planning scope to the entire metropolitan area of Beijing. However, the approach did not consider “attached green space”, and other informal wild green space in remote areas. Such areas can still provide plenty of opportunities for outdoor leisure, recreation, and other social activities. It is apparent that the recreational usage is emphasised in this approach while other potential ecological and environmental uses and benefits to the city are of much less of a consideration.

Urban green space planning was still confined by dictation from the upper level urban master plans even though it was given more weight. New functions were identified and more land was designated for green space construction. Compared with the previous planning phases, some significant steps have been taken towards to care about what people really need rather than political demands or assumptions of what people “should” need or “may” need.

5.3.4 Planning stage 4 (2004-2020)

As discussed in Section 5.2.4, a regional perspective to address Beijing’s future development became imperative in order to lessen conflicts between environmental pressure and rapid but unbalanced urbanisation in the region at this stage. The 2004 Beijing Green Space Plan accordingly adopted “a regional perspective to organise green space structure and consider the entire Beijing metropolitan area as a whole ecosystem linked with the ecosystems of surrounding Tianjin city and Hebei Province” (Beijing Municipal Institute of City Planning & Design, 2004, p.18).

Overall, the role of green space in the Beijing region was articulated as “the natural ecosystem for creating a reasonable spatial structure and a unique natural image of Beijing; the carrier of urban and rural leisure, recreation and eco-tourism; the carrier of a sustainable environment for Beijing as well as other cities and towns in the regional areas” (Beijing Municipal Institute of City Planning & Design, 2004, p. 8-9)

5.3.4.1 Regional green space structure based on an ecological approach

In 2002, the Ministry of Housing and Urban-Rural Development explicitly redefined one of the main tasks of green space planning in China as being “to scientifically arrange the construction of urban parks and other green space and the overall spatial layout of green space for a larger regional environment”. In the 2004 green space plan, the regional scale of green space structure was proposed including three levels (Figure 5-22). Level 1 was the overall green space structure in the entire Beijing metropolitan area (around 16,410 km²). The basic regional ecosystem determined the backbone of the
green space spatial structure. This structure consisted of three “ecological buffers” (生态缓冲带) defending the city, including mountain greening as the first ecological buffer, the 2nd greenbelt as the second ecological buffer, and the 1st greenbelt as the third ecological buffer, and ten green wedges penetrating from the outskirts to the city centre in all directions (as illustrated in Figure 5-23).

Level 2 was the green space located in the central city (around 1,088 km²). It was expected to focus on enhancing the cultural landscape to contribute to Beijing’s unique brand – a unification of the world-class famous ancient capital and international metropolis. Level 3 was the green space distributed in each satellite town. Its functions varied from different towns. However the leading principles were articulated as “ecological functions as first priority” (生态功能优先) and “follow the local circumstances; urban green space should take advantage of local natural environment and cultural heritage to create the vernacular landscape” (Beijing Municipal Institute of City Planning & Design, 2004, p. 36-38).

Coupled with the regional environmental protection efforts, it was hoped to have the visual effect of “green maintains and blue rivers” (绿水青山), and eventually to revive Beijing’s old “Shan-shui-city” pattern but in a modified way.

Figure 5-22 The 2004 Beijing Green Space Plan - Green Structure Plan
(Source: Beijing Municipal Institute of City Planning & Design, 2004, p.45)
The detailed greening strategies respectively to these three levels as well as other specific types of green space plans (such as wetland plan, greenbelt plan and so forth, refer to Appendix D) were all supported and guided by scientific research on Beijing’s natural ecosystem. This study was undertaken by the cooperation of Research Centre for Eco-Environment Sciences (a national research institute) and the Beijing Municipal Environmental Protection Bureau. It took more than two years and involved a multidisciplinary team of biologists, ecologists, engineers, planners and landscape architects, which was set up to inventory abiotic, biotic, aesthetic, cultural and historic features. During the survey and analysis process, the latest landscape ecological methods, such as land suitability analysis, and also 3S technologies were applied to facilitate the process of planning and decision-making.

The planning procedure has three phases: analysis of ecological, social and cultural data; formulation of ecological functions zoning plan; and land recommendation for urban development.

The first phase involved two analyses - environmentally sensitive areas analysis (ESA analysis) and ecologically critical areas analysis (ECA analysis).

ESA analysis helps planners and developers identifying the spatial distribution of selected key ecosystem components and complexes which are vulnerable to the potential impacts of land use, development and other human activities. The sequence of planning activities is analogous to the sequence followed in McHarg’s land suitability analysis and layer-cake technique (as discussed in Chapter 2, Section 2.3.2):

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55 As explained in Chapter 3, Section 3.2.2, I partly participated in this research and further used the data for my own master study.

56 3S technologies include GPS-Global Positioning System, RS-Remote Sensing, and GIS - Geographic Information System.
1. The analysis goal was to identify environmental sensitive areas and planning boundary was Beijing metropolitan area.

2. Five key aspects were considered: soil erosion, desertification, underground water, ground water recharge and urban heat island. Under each aspect, there are several factors (physical and/or biological characteristics of Beijing region) were gathered, evaluated and ranked in GIS. For example, under the soil erosion, the factors, soil types, slope, vegetation, and precipitation were regarded as playing the key role in determining which areas are sensitive to soil erosion.

<table>
<thead>
<tr>
<th>Aspects</th>
<th>Analysis factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Areas sensitive to soil erosion</td>
<td>Soil types, slope gradient, vegetation cover, and precipitation</td>
</tr>
<tr>
<td>Areas sensitive to desertification</td>
<td>Index of soil moisture, soil texture, and vegetation cover</td>
</tr>
<tr>
<td>Groundwater sensitive areas</td>
<td>The data of aquifers, filter beds, water usage data, distribution of groundwater withdrawal</td>
</tr>
<tr>
<td>Surface water sensitive areas</td>
<td>The distribution of drinking water source, greywater, agricultural irrigation water, and drainages.</td>
</tr>
<tr>
<td>Areas sensitive to urban heat island effects (the analytical area is city centre)</td>
<td>Vegetation cover, the surface water distribution</td>
</tr>
</tbody>
</table>

Table 5-4 The selected aspects and factors for analysis of environmental sensitive areas
(Source: summarised and translated from Research Centre for Eco-Environment Sciences and Beijing Municipal Environmental Protection Bureau, 2005)

3. These factors were evaluated, ranked and overlaid in GIS to form a map of areas sensitive to a certain aspect. For example, the factors of soil types, slope, vegetation and precipitation were rated respectively and overlaid to form the area sensitive to soil erosion map.

4. Each aspect-sensitive map was rated as five sensitive degrees: extremely sensitive, highly sensitive, moderately sensitive, slightly to moderately, and slightly sensitive.

5. The five maps of areas sensitive to each aspect were used as inputs into a Beijing ecological functions zoning plan and land use suitability study.

In parallel, the significance and values of ecosystem services were evaluated to determine the ecologically critical areas. The planning sequence is similar to environmentally sensitive areas analysis. The selected aspects of surface water, groundwater, soil and water, biodiversity, natural and cultural landscape aesthetics, flood control, wind prevention and sand stabilisation, were synthesised to indicate ecological values for land units (Table 5-5, and Figure 5-24).
### Aspects

| Areas contributing to maintaining surface water quality | Reservoir, rivers, wetland and their surrounding areas which can hold water, slowly release it and remove the pollutants. |
| Areas contributing to regional/local groundwater recharge | Based on analysis of groundwater sensitivity |
| Areas contributing to soil and water conservation | Based on analysis of soil erosion sensitivity |
| Areas contributing to maintaining biodiversity | Areas with high plant/animal species richness, areas containing provincially/nationally rare species. |
| Areas important to natural and cultural landscape aesthetics | Areas containing historical/cultural sites, representative land features/processes which were instrumental in creating regional/local landscapes |
| Areas contributing to flood control | Land elevations, historical data of precipitation intensity and flooding areas |
| Areas important to wind prevention and sand stabilisation | Historical data of sand storm sources, routes, and impact areas, land with sandy loam, sandy soil over granite bedrock |

### Table 5-5 The selected aspects and factors for analysis of ecological critical areas

(Source: summarised and translated from Research Centre for Eco-Environment Science and Beijing Municipal Environmental Protection Bureau, 2005)

The ESA analysis much more focused on the abiotic characteristics in an ecosystem, and was more likely to protect areas frequently exposed to natural disasters and hazards caused by humans. In comparison, the ECA analysis focused on unity and diversity of biotic and cultural characteristics, and tended to protect the areas which could also be historic, cultural and scenic interest, ranging from areas declared by national law as a natural reserve, scenic spots, to areas which are traditionally occupied by the cultural and/or ethnic communities.
Figure 5-24 Analysis of Beijing’s ecologically critical areas

(Source: drawn from Research Centre for Eco-Environment Sciences and Beijing Municipal Environmental Protection Bureau, 2005)

The second phase is to generate the Beijing Ecological Functions Zoning Plan (Figure 5-25). It was a color-coded composite map, indicating the ecologically important and valuable areas in Beijing to support multiple uses. And at the same time, the existing zoning or status quo (e.g. greenbelts) and community interest (e.g. eco-tourism and agricultural areas) were incorporated.
In the third phase, the land use suitability for urban development was determined based on the consideration of ecological compatibility and socio-economic profiles. The Land Use Suitability for Beijing Future Development was proposed (Figure 5-26). It aimed to provide planners with information about the choice of locations for buildings, and whether urban economic and building activities would potentially damage the unique or irreplaceable natural/cultural environments.

Three types of land use suitability zones, the zone of construction-forbidden, the zone of construction-restricted, and the zone of construction-suitable indicate progressively less limitations for urban development.

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57 Construction-suitable zone means this area is suitable for urban construction and development. Construction-restricted zone means the land provides actual or potential ecological linkages, contains low grade hazards, or supports considerable number of small but important features; therefore it allowed some building activities and urban development which are assessed and proved to not have irreversible impacts on natural environments. In the construction-forbidden zone, land contains highest ecological values (such as critical areas for underground water recharge) or unavoidable natural hazards (such as areas of severe soil erosion or desertification); therefore, no development is allowed.
economic activities. The latest 2004 Beijing urban plan and its series of sectoral plans were undertaken in accordance with these land management recommendations.

Figure 5-26 Land Use Suitability for Beijing Future Development
(Source: Research Centre for Eco-Environment Sciences and Beijing Municipal Environmental Protection Bureau, 2005, p. 50)

This ecological approach to green space can equip green space planning with a much stronger science-based declaration to “ask” for more land for conservation purposes as well people’s recreation needs. For example, through involving more newly identified ecologically important areas, the 2004 green space plan set a higher green space construction benchmark for 2020. The number of nature reserves was expected to be 48 with a total area of 2350km$^2$, accounting for 14.3% of the total metropolitan area of Beijing, and further the number of forest parks to be 100 with a total area of 1330 km$^2$. There proposed 18 scenic spots covering 5481.5 km$^2$ in 2020, which is 2.5 times the area of scenic spots in 2004. These areas, also generally endowed with rich historic and recreation values, were defined to be vital to the long-term maintenance of biological diversity and natural and cultural heritage management in Beijing.

Another significant advantage of this ecological approach is that the planning principles and recommendations can be formulated to the specific requirements of each land unit as identified in the ecological functions zoning plan. For example, in terms of plant species selection and intensity of management practices for supporting the dynamic natural process, in the biodiversity hotspots (in the ECA analysis, as illustrated in Figure 5-24), more local native plants mimicking natural stands could
attract more wildlife. In areas exposed to sand storms (in the ESA analysis), dense and tall multi-layered plants barriers could form walls to prevent windblown sand. In areas with soil and water conservation requirements (in the ECA analysis), certain plants could be used to improve soil structure and fertility, such as fixing the nitrogen in the soil and making a much stronger soil base for other successive plants. In eco-tourism areas (in the ECA analysis), selecting local plants with more aesthetic and scenic values is probably a better choice; while in agricultural areas, companion planting can be beneficial and improving agricultural production.

In summary, compared with previous approaches to green space planning, three significant improvements from the ecological approach can be seen as follows:

1) Highlighting ecological functions
The leading principle of the 2004 green space plan was “ecological functions first”. In particular, natural and semi-natural areas were highly valued for both humans and other species. The ecological approach focused on the urban ecosystem as a basic concept and provided practical suggestions on management of natural resources and wildlife habitats, and maintenance of natural processes. Urban green space itself is thus treated as a natural ecosystem with unity and integrity, rather than consisting of distinct and separate resources (i.e. water, soil, vegetation and so on) and systems (i.e. green space located in built-up areas, or non-built-up areas).

2) Integrating with cultural protection
Since the 1950s when the new central government was centred in Beijing’s old imperial city, its imperial palaces, city walls, ancient towers and traditional residential courts have been gradually encroached on by new modern high-rises and on-going urban expansion. From the 1980s, the Beijing government has initiated protection for these historic and cultural sites. However, simply focusing on built elements caused many buildings to become isolated but surrounded by modern high-rises. The roles and significance of green space in protecting historic heritage have gradually found recognition since 1992 master plan (refer to Section 5.2.3.1). The ECA analysis incorporated such cultural considerations with other elements to achieve urban physical and functional integration, and thus addressed the historic/cultural protection in a more integrated and systematic way.

3) Leading urban development
Through analysing the natural features of Beijing, sites identified as highly valued for conservation were set aside for green space uses and the rest of the land was then assigned for urban construction. In this way (the inverse of the previous strategy of development first and green space arrangement later), it appears that urban green space planning has been freed from the framework set by the master planning, and to a significant extent, is becoming the first-concern in organising urban development and leading its future. It is the first time that green space has such a high status in the initial stage of urban development decision-making (Xu et al., 2007).
Because this method broke the boundaries between different administrative districts/towns/villages, green space could retain its integrity and rationality in terms of ecosystem services and spatial patterns. Many analytical factors (e.g. environmental and cultural considerations) were integrated into a unified framework which allowed planners to better understand the character of the land for better decisions on its appropriate use or management.

5.3.4.2 Reiteration of greenbelt planning

Although the greenbelt was conceived by the Soviets in the 1950s and has been repeated during every version of urban master plans and green space plans, it appeared to be just words - to express what the greenbelt consisted of in the documents rather than to have real action or legal regulations/laws to protect it.

Generally, the Beijing government articulated the urgency of curbing uncontrolled urban growth. Urban planners relied on the greenbelt planning. The master plans accordingly distributed land quota for greening and then passed the task to the green space plans which broke down the quota according to various types of green space, and executed the detailed requirements on the ground. However, under China’s remarkable economic boom, urban development plan could not catch up with development, and planning was to “follow rather than to lead urban development” (Gaubatz, 1999). In many cases the areas designated for greening in the plans may have already been occupied by buildings and construction during the period of preparing the plans. And in the planning implementation process, green space construction has, overall, been secondary to economic “imperatives”, and greenbelts do not even have any legislative protection. Thus the assigned greening tasks seldom were completed in the face of the obstacles.

Many researchers were critical of this “construct first and plan later” approach, and claimed that the government’s slack attitudes and lack of serious action was partly responsible for the failure of the 1st Greenbelt (refer to Yang and Zhou, 2007; Yang, 2008). The authority determined to improve the greenbelt plan and implementation to the legislative level. Such determination was also largely motivated by the imperative for “Green Olympics” of the 2008 Beijing Olympic Games (Yang, 2008). As a consequence, in this new round of urban development policy-making, the greenbelt plan has been separated from the green space plan to be a parallel special theme plan (Figure 5-27).

58 The planting of the 1st Greenbelt was completed in 2003. The planned area was 240 km², but only 102km² land had been converted into green space by 2004 and it failed to contain the urban sprawl, and did not achieve the desired construction goal. The 2nd Greenbelt was proposed in the 1992-2010 Beijing Master Plan and the construction is still underway.
The 1st Greenbelt still remained on the map, even though there was only 104 km$^2$ green space out of the originally planned 240 km$^2$ of total area. According to the 2004 Beijing Green Space Plan, the desired function of the 1st Greenbelt has noticeably shifted from containment of urban expansion to provision of more recreational and scenic benefits for the local residents and people working nearby, being “a park circle around the city centre” rather than for agricultural or nursery production (given also the fact that agricultural land was reduced dramatically during Beijing’s rapid urbanisation). The 2nd Greenbelt was planned to be a total of 1650 km$^2$ in area of which the green space will account for 64.3% while the built-up area will constitute 35.7% within it. It was expected to have two main structural functions: an ecological buffer to control urban sprawl and simultaneously constituting a green structure linking green space in the city with the surrounding mountain environments (Beijing Municipal Committee of Urban Planning, 2003).

Also the two greenbelts plan was supported by the ecological function zones analysis. Within the greenbelts, areas with different ecological values, and areas containing permitted or prohibited zones, were mapped out and given specific recommendations for construction. Moreover, a series of comparatively strict guidelines and standards supported by the “Green Line” policy have been issued and attempted to ensure the 2nd greenbelt fulfils the plan objectives. Additionally, the construction was not only financed by the government, but private parties such as real estate developers and residents/villagers were most welcome and gradually become an important means of funding resources (Cheng and Zhang, 2005; Yang, 2008). By this move, the government hoped to encourage more stakeholders to participate in the urban environment construction.
5.3.4.3 The modern version of the Feng-shui approach

As introduced in Chapter 4 Section 4.3, many Chinese traditional values were forbidden from the 1950s as they were regarded as the symbols of old feudalism. Along with the government’s increasing awareness of the importance of traditional values in “creating a united nation and harmonious society” (Beijing Municipal Commission of Urban Planning, et al., 2006), Shan-shui culture, Feng-shui theory, and other traditional philosophies have been welcomed back (Beijing Municipal Commission of Urban Planning, 2003). Through many comparative studies about Chinese traditional gardens, the government realised that many Chinese traditional values (e.g. “harmony of man and nature” philosophy in Daoism) do conform to contemporary ecological principles. Therefore, from the top level of urban development agendas, re-interpreting the traditional values and upgrading the old with the new has found greater recognition.

In ancient times the Feng-shui approach was often applied in the initial stage for assessing and choosing a suitable settlement. In this sense, it has little chance to be used in today’s existing cities since their urban morphology is already established. Nevertheless, it is still regarded as a useful tool to locate and design new parks, especially large national parks or nature reserves.

An example of re-introducing the Feng-shui approach to the planning urban environment was the Beijing Olympic Park (including the Olympic Forest Park). Built between 2003 and 2008, it has an area of 11.35 km², out of which the Olympic Forest Park covered 6.8 km² and is the largest park so far in China. Green space accounted for 60% of the total area while the rest was buildings and hard surface. As the whole park was endowed with almost all the infrastructures and functions of a city, to some extent it could be regarded as a miniature city. From this point of view, application of Feng-shui in this national park can be an example and a source of inspiration to other new towns/cities in the search for new thoughts in urban and environmental arrangement.

However, it must be pointed out that the “authentic” Feng-shui method is quite complex, and today with respect to the modern circumstances, it has been very simplified into several aspects. And in most cases it is carried forward as a symbol of China’s unique cultures. In the Olympic Park case, Feng-shui was mainly applied from the following aspects: the site-selection, the overall structure, arrangement of nature and built elements, and associated cultural/symbolic meanings.

1) Site-selection

The park was long ago designated as a key greening project for the 1st Greenbelt (see the park location in Figure 5-28). It initially was a derelict area of mixed rural residential properties, and spontaneous weeds and vegetation.

59 Most of this kind of research was published in the Journal of Chinese Landscape Architecture, which was officially founded by relevant government departments and was the earliest and leading professional journal in landscape architecture and related topics with the highest circulation in China.
This site was a culturally desirable place. It was selected primarily with reference to the location of Beijing’s Central Axis and the philosophical thinking about the layout of the whole city (Wu, 2008). This park was located at the northern extension of old Beijing’s Central Axis (see Figure 5-28). This imaginary central axis was 7.8km long and has always served as the most important reference for the construction of Beijing. Starting from the south, it included the ancient Qianmen Gate, the Imperial Palace, and went through the Drum and Bell Towers at the north. Today, this axis contains contemporary monuments and landmarks such as Chairman Mao’s Mausoleum, Tian’anmen, and the central government buildings. Almost all the most important or monumental buildings nationwide were supposed to be placed in this central axis. To a large extent, this axis is not only the core of Beijing, but also the centre for the whole country.

Along this new extension part symmetrically settled the new monumental buildings for the Olympic game - National Stadium, the National Aquatics Centre, the National Indoor Stadium and other significant buildings (refer to Figure 5-29). Such the arrangement was intended to further strengthen the symmetry, order and hierarchy of Beijing city’s overall form, which are believed to be the main Confucian characteristics reflected in urban planning (refer to Chapter 4, Section 4.2.2).

Meanwhile through this extension part, the old central axis was reincarnated with a new meaning - the end of old axis was expected to “dissolve” into forests, symbolising that Beijing’s future will eventually stride towards nature as well towards a harmony between man and nature (Wu, 2008; Hu and Zheng, 2009). Through this site selection of the Olympic Park, it was supposed to recall and enhance the positive impacts of Chinese traditional values on the city, people and natural environments.

Figure 5-28 The location and axial relations of the Olympic Park in Beijing
(Source: drawn by the author)
2) Overall structure

As illustrated in Chapter 4 Section 4.2, an ideal site/landscape structure in Feng-shui theory is seen to be one in which a “mountain ridge protectively runs around the site with watercourse embracing it in a smooth curve” (Lee, 1986). Therefore, in Beijing Olympic Park, Yang Mountain sits on the axis and at the foot is a large lagoon - the Ao Sea and its rivers and streams in the shape of a dragon (Figure 5-29) to respect Feng-shui. It is identified that there was an innovation in this new Shan-shui pattern that buildings have been arranged along the river and green riparian margin rather than gathered all in the “Ming tang” site in the ancient time (also refer to Figure 4-3 in Chapter 4 Section 4.2.1). Such arrangement seems partly analogous to Mata’s “linear city concept” where cities were developed along narrow green space (refer to Chapter 2 Section 2.4.1). As Lynch once noted, natural environments could not effectively shape an urban form, unless the natural landscape itself has magnificent geographical advantages, such as the ocean, a river or a mountain (Lynch 1960). In this Beijing Olympic Park case, such a modified Feng-shui or Shan-shui pattern - a green space structure consisting of man-made mountains and running river system, integrated with buildings and other urban infrastructure sitting along the river - might provide an effective and replicable structure model for organising urban natural environments and buildings.
Figure 5-29 The left is the overall layout of the whole Olympic Area (also called the Olympic Park). The purple line is the northern extension of the old Beijing Central Axis. Along the extension part sat newly built stadiums for the 2008 Olympic Games. The right is the spatial concept of the park – the main surface water and the green areas form a modified Ying-Yang pattern.


Incorporating some elements from traditional values in today’s urban green space provides an opportunity for Chinese cities to connect with their history and thereby enhance local identity - since many cities (not only Beijing) were established from ancient traditions. Notably, such re-introduction of “old thinking” does not necessarily conflict with modern ecological technology. For example, the Ao Sea and its rivers and streams, going through the whole park, were also designed as a man-made wetland equipped with advanced water treatment technology for water purification and recycling use. Such integration of traditional values with today’s ecological science and technologies may provide a prospect for China to create its own unique approach to developing urban green space.

In summary, the 2004 Beijing Green Space Plan is so far the most comprehensive and integrated planning on urban green space in China. Except for green space plans for the metropolitan area and the city centre respectively, other more detailed items were proposed separately, including the Beijing Greenbelt Plan, the Beijing Wetland Plan, the Beijing Nature Reserve Plan, the Beijing Wind-dust...
Protection Greening Plan, as well low-level urban green space plans for 11 satellite towns (see Appendix D). From a theoretical point of view, the 2004 green space plan was a breakthrough in its emphasis on the quality of green space and especially its ecological values, since all previous approaches only focused on the quantity or spatial distribution of green space. It also greatly promoted integration of various functions of green space, as well as integration of green space with other urban infrastructure.

By this stage, many planning approaches (as discussed before, such as the quantitative approach, the greenbelt model, park hierarchy, and the like) coexist and the new approach appearing in each period does not seem to supersede the previous ones. For instance, the 2004 green plan also articulated that park hierarchy based on service radius. To do so, more small-medium sized green spaces could be mapped out and thus possibly guarantee “a green space network of no more than 500 metres access” (Beijing Municipal Commission of Urban planning, 2003), whereas the ecological method can only consider the issues at a landscape and regional level, and focuses on city environmental protection needs. It has proved that various methods with different scales and focuses can complement each other well to form a green structure for the regional environment as well as for people’s daily needs within their walking distance. The way in which the innovative planning approaches were adopted in parallel with old ones, the larger-scale with the small-scale, could be more effective to provide and arrange green space.

The previous subordination of urban green space planning to master planning appears to be reversed by requiring any economic activity and urban construction to initially obtain “permits” from the land use suitability plan. This significant improvement greatly endows green planning with more power to coordinate the conflicts between economic development and natural and cultural conservation.

5.3.5 Summary

Green space planning in China is a strictly top-down process where there is little opportunity for direct intervention except for in the case of Soviet influences (their urban planning experts were invited by the local government at the outset of urban planning). The earliest green space proposal and its approaches were primarily based on Soviet experience and some adaption of Beijing’s circumstances. They promoted the idea that green space planning should be separated out and as a sectoral function plan in parallel with other aspects in the urban planning system. The Soviet green space planning theories, standards and methodologies marked, without a doubt, a starting point and laid the foundation for the whole of China’s green space planning.

Mao did not specifically say the left-over land should be designated for green space. His intention of using left-over land was to grab every opportunity to make the land green and beautiful. Circumstances to the emergency of “filling in” method are clear: the distribution of economic land use had top priority, and yet agreed quantitative standards settled in master plans for green land needed to be achieved. As such, designating left-over land for green space construction seemed satisfying, on the
one side, giving the best land to productive land uses; while on the other side, fulfilling the land quotas
requirements for development.

The evaluation and establishment of scenic spots and nature reserves was descriptive and based on
Chinese long-standing traditions of respecting and preserving forests or mountains with temples and
old trees, rather than based on scientific ecological analysis. However, it is a good start that cultural
values and aesthetic appreciation of landscape are institutionalised in the planning and management of
landscapes.

In recent decades, the park hierarchy and ecological approach have come in through Chinese academic
society carrying out research on western countries’ experiences. Unlike the direct imposition of the
Soviets, this is a diffuse influence of western ideas and methodologies on green space planning in
China.

The park hierarchy approach mainly focuses on improving the distribution of parks. This method fits
quite well into Beijing’s situation where a large number of remaining historic and cultural
buildings/constructs were “hidden” in old residential areas (e.g. Beijing inner-city) or surrounding
mountains. Green space based on these historic sites greatly promoted the concept of
multifunctionality of green space. On the one hand, green space as a buffer protects the heritage from
encroachment by the urbanisation process and; on the other hand, it fills the green deficiency and
responds to people’s demands for accessibility to green space.

Since the park hierarchy approach falls short in considering the “other green space” and its associated
ecological and environmental functions, the ecological approach may remedy this inadequacy.
Through identifying the ecologically important areas as well as their intrinsic functions and values, it
greatly promotes a new planning philosophy frame. It is both ecologically sound and culturally correct,
and is able to carry the desired social change of heading towards sustainable development.

As for Feng-shui, in the Beijing case study, it is only performed within the scope of a national park,
but some new cities in China do incorporate a few elements of Feng-shui into their green planning at
the city level (see the case study of Hangzhou by Fu, 2009; of Wanzhou, Chongqing by Wang, 2009).
The example of the Beijing Olympic Park with the fusion of Feng-shui and modern ecological
concepts may inspire other counties in terms of innovative use of traditional elements in urban
landscape.

Each green space planning approach seems to emerge in relation to various social, economic or
environmental demands through time for green space. With respect to these different focuses and
emphasises, each approach has its own strengths and limitations. Today, there is a growing complexity
in urban and environmental problems as well as diverse demands, such as the urban physical
dimension, people’s recreation needs, regional environmental protection, urban economic
development and the like. An integrated approach that builds on the beneficial aspects of past
approaches could be able to better cope with, as well as adapt to, complex problems and ever-growing demands.
Chapter 6
Discussion, conclusions and suggestions

6.1 Introduction

This thesis examines urban green space planning history in Beijing and across Chinese society in general. In Chapter 5, societal understanding, demand and use of urban green space and the corresponding planning approaches during each stage of Beijing’s development have been interpreted in detail. This chapter consolidates themes from all the chapters, explore their connections and generalises conclusions from the Beijing case study to the wider Chinese context, as well as connecting with western theories and practices.

Section 6.2 discusses the changes in the desired functions of urban green space in China from four aspects - socio-cultural values, economic benefits, ecological functions and structural functions. The following is a discussion of the changes in urban green space planning strategies culminating in the evolution of societal understanding and use of green space. To a large extent, these changes form the Chinese perspective on the meanings, purposes, functions and uses of urban nature, while still intersecting with a number of similar aspects in other countries.

Based on the examination of these strategies in Chapter 5, and planning theories in Chapter 2, I propose a classification of the four planning strategies to urban nature. Their responsiveness to the societal demands and effectiveness (strengths, limitations and inadequacies as planning tools) are compared and pointed out. Lastly, in this section, external and internal, and direct and indirect influences which account for all of these changes are discussed.

Section 6.3 then discusses several issues existing in contemporary Chinese urban green space planning in comparison with western urban green space planning theories and practices, as presented in Chapter 2. Four types of recognised planning strategies are evaluated to see whether or to what extent they can accommodate and realise the effective planning principles of integration, multifunctionality and participation.

The chapter finishes with conclusions and theoretical implications, as well as suggestions for the future of Chinese urban green space construction and research in the fields of landscape architecture, urban planning, social sciences, landscape ecology and other relevant disciplines.

6.2 Changing pattern – the Chinese perspective on developing urban green space

Urban green space concepts and relevant planning systems are very new phenomena for China. They paralleled the commencement of building a “new China” but were grafted onto a pre-existing cultural
platform that had survived at least in vestigial ways. Mediated through the period of extraordinary social and economic reforms in Chinese society, the demand and use of urban green space has dramatically changed. These initial influences and fusion of the particular Chinese experiences, traditions, reforms, intellectual attention and trial-and-error on the ground, have led to the Chinese perspective on conceptualising, strategic policy formulation, planning decisions and managing of land use in general and urban nature in particular in China.

6.2.1 The changes in demand and use of urban green space

As revealed in Chapter 4 and Chapter 5, the meaning of green space in cities has undergone a remarkable transformation in 20th century China, one that is on-going. In general, less than a century ago, green areas in China were enclosed, privileged, nature-miniatures based on the thousand-year-old private gardens tradition. After 1949, they were radically transformed according to Soviet and Maoist thinking about the roles of green space in the economic growth and revolutionary ideals of new socialist urban life. During the 1980s and 1990s, yet another crucial transformation starting from economic reforms in areas such as property development, old city redevelopment and overseas investment, led to the transformation of urban roles as well as green space functions at every level. Green space was expected to facilitate in adjusting urban economic sectors, urban spatial structure and improving city images internationally, meeting the local growing demand for recreation, leisure, quality of life, public health and the like. Today, on-going worldwide concerns about urban environments and efforts undertaken to bring environmental problems under control, have resulted in the emergence of more comprehensive and integrated functions for regional resource management.

This kind of (societal) demand - supply (of green space) differs from economics or rational planning frameworks which are based on quantitative demand – supply (of products). But it is based on what society demands (as opposed to a monetary influence or an absolute quantitative standpoint), which can be a series of evolving and changing perspectives on green space.

6.2.1.1 The changes in “socio-cultural values” and political-cultural characters of developing Chinese urban green space

The understanding of “socio-cultural values” attached to urban green space (also refer to Chapter 2, Section 2.2.4.2), has been substantively impacted by the processes of re-setting Beijing’s roles as well as the wider Chinese political and cultural philosophies.

Since 1912, as Chapter 4 has illustrated, the role of enlightening and civilising the masses by public parks has been dominant in Chinese society. After China started to use “urban green space” as a generic term for the tasks of urban planning and greening, these socio-political values continued within a new framework of socialist and communist ideology. During the Soviet and Maoist Era (1949-1978), the primary function for urban green space was to promote social equity and solidarity, and strengthen the political education about communist revolutionary spirit among the proletariat. Furthermore, Chairman Mao often used greening activities as a form of political campaigning to
promote mass enthusiasm for building an attractive and uplifting ideal communist country. As noted in Chapter 4 and Chapter 5, even during the unstable and chaotic period, urban green space itself was a place to demonstrate the government’s resentment and rejection of old feudalism and new bourgeois hedonism by changing it from “wasteful” uses to other types of productive and revolutionary land use, or demolishing it completely as an ultimate rejection.

Today, this continuing socio-political function is reincarnated with a new meaning. By provision of attractive green space to enhance the city image, it is perhaps one of the most “visible” ways for government officials to demonstrate their achievements to urban economic growth and increased wealth status during their tenure (Liu, 2008).

It seems that regardless of Soviet or Chairman Mao’s socialist/communist ideology, or today’s bureaucratic eagerness for a positive city image and concerns about urban sustainability, green space in China has been politicised and continues to carry the government’s political purposes. This evinces the realities of political rhetoric on the ground. Yet such demonstration in China is distinguished from that in the western world, which attempts to show a democratic and multicultural society through providing open/green space (refer to Chapter 2, Section 2.2.4). In addition, the political intention manifested in China is strongly purposeful. Such differences in appearance and intensity between the West and China are ultimately expressions of China’s age-old political and cultural systems. It can be argued that the reflection of political ideology was one of the most outstanding functions ingrained in Chinese urban green space development.

The evolution of socio-cultural values, on the one hand, was caused by the government’s changing political ideologies and ruling philosophies, and on the other hand, paralleled the changes in perception and treatment of traditional values. The importance of green space in preserving historic landscapes and creating local cultural identity has become increasingly recognised in China over recent decades, partly to repair past wrongdoings of rejection towards traditional values at the beginning of the revolutionary era. Today, almost all relevant planning discourses suggest making every effort to connect with historic preservation, to restore old gardens or even the remains of historic relics, and the construction of new classical-style gardens. Such a noticeable “U-turn” attitude to traditions was reflected through the medium of green space. This indicated that the other distinctive function of Chinese green space is to carry a continual thread of culturally ingrained rules, norms and conventions.

An increasing number of studies have also firmly supported that the Chinese traditional approach could still serve effectively as inspiration for modern/contemporary design (Wu, 1999; Yang and Volkmann, 2010). Assimilating Chinese traditional values into contemporary urban green space construction, and further making creative use of traditional elements, has become a strong trend recently. This can embrace many dimensions in practice. Based on Beijing’s experience, it may range widely from large scale – such as the re-application or modern interpretation of Feng-shui and Shan-
shui-city model to organise the overall green space structure; through to small scale - such as the restoration of the remains of ruined city walls and heritage sites. Even intangible philosophical concepts, such as “men and nature in harmony” and “non-action to nature”, can be re-appreciated or reinterpreted in a modern form. The incorporation of traditional values and interests into green space development promotes a view of urban environment that is not predominantly instrumental but comprehensive, and to some degree, assigns intrinsic values to the environment in urban areas.

6.2.1.2 Other changes and the emerging trends

In “economic benefits” - shift from tangible to intangible benefits

Tangible economic benefits, such as producing real products (i.e. timber, fuel wood, fruit, etc.), were once emphasised to a somewhat uncontrolled degree during the 1950s. Today such discourses are only limited to the topic about plant nursery construction. In the new national standard of urban green space classification, only the category Nursery has been required to provide tangible economic benefits (refer to Chapter 2 Section 2.2.3, Table 2-2). The view has shifted to an emphasis on intangible or indirect economic benefits of green space development, that is, green space is acknowledged to be a significant contributor to a more dynamic, competitive and sustainable city.

In “ecological functions” - shift from reactive to proactive approaches

Concerns over ecological functions go back to the very beginning of Beijing’s development during the 1950s. Early concerns, however, were more inspired by a fear of Beijing’s harsh environmental conditions, such as sand storms or the dry climate, rather than by ecological considerations. The real intention of developing urban green space was for industrial development where green space was merely seen to be an attachment or add-on land to serve other land uses. During the 1980s and 1990s Beijing confronted severe air pollution - an immediate consequence of heavy and noxious industrial development. Consequently, the desired function of green space was shifted specifically to reducing urban (air) pollution. Green space was conceived as a means of overcoming the aggravation of urban environmental problems. The use of green space in Beijing typically concentrates on mitigating the situation and effects instead of on the source or reasons for these effects. The result, without much doubt, is planning strategies that are passive, reactive and piecemeal.

Although the first nature reserves and scenic spots were formally established in the 1980s, this progress was not so much due to nature conservation per se as to long-standing traditions in China that ancestral mountains and certain other sacred landscape features should be protected. Such demand for green space might be seen as an early recognition of ecological values; however, they were more inspired by human interest than by a concern over the ecosystem for its intrinsic value.

As a consequence of the growing complexity of urban and environmental issues, as well as the accompanying interest in sustainable development, a great deal of effort is now spent on nature conservation by the government. Urban green space is recognised as a source of nature for its own
sake, and as an integrated self-sustaining ecosystem in urban areas. Such value change has stimulated the formulation of planning strategies, which have shifted to take proactive stances, rather than passively remedying, urban and environmental problems.

In “structural functions” - shift from limiting urban sprawl to configuring regional structures

Only in recent years, has the idea of using green space to define urban structure become a focal point in urban planning worldwide as well as in China. In the Chinese context, this function was practised earlier by the Soviets through their planning of the greenbelt and green wedges during the 1950s. The Chinese planners did not take the initiative to practise and advocate such a structural function in urban planning until the 1990s. This was when metropolitan growth resulted in the city greatly expanding into the countryside, and there became a stronger demand for shifting Beijing’s spatial structure from a monocentric to a polycentric form. Subsequently, this function has gone beyond “limiting urban sprawl” and is expected to configure regional physical morphology and guide future development.

6.2.1.3 Summary

Through the changing views of urban green space in the Chinese context, a noticeable pattern of how green space has been conceived can be seen. This can be categorised into three aspects - retreating from reflecting political ideology and turning to pragmatism; valuing nature more for its own sake; establishing green space as a necessary and primary land use rather than serving as a standby for other uses in urban development. These value shifts together enhance the position of green space in urban planning, which has been indicated in Chapter 2, green space as a positive and functional land use that should be designated and planned for, and coordinated with other development in the use and management of land resources.

6.2.2 The changes in planning strategies

From 1949 to the present, the planning scope of urban green space has extended from a city-centred to an interregional focus. The prevailing subordination of urban green space planning to master planning in conventional planning frameworks has loosened, and there is a growing trend towards urban green space planning acting as a prime determinant in urban planning. This evolutionary progression has intensified not only in planning scope and such issues, but also in applying the diversity of strategies. I propose a classification of four planning strategies – haphazard provision, standards-oriented, usage-oriented, and conservation-oriented strategy (Table 6-1). Each strategy reflects a particular way of responding to urban developmental needs, and people-environments interaction. They are on a “demand-response” basis and presented as discrete stages but in reality may be overlapping or operate side by side.

Compared with other countries’ practices, it can be found that these planning strategies are not limited to China. Their trajectory is comparable and compatible with that of other countries in that outside influences have introduced this country to similar approaches. However, the specific convergences of
these various outside influences within the particular Chinese philosophical, political and cultural context, imbued the planning approaches with somewhat political and cultural colour.

<table>
<thead>
<tr>
<th>Strategies</th>
<th>Planning scopes</th>
<th>Strengths</th>
<th>Inadequacies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haphazard provision</td>
<td>Built-up or remote areas</td>
<td>Increase green space by chance;</td>
<td>Neither respond to people’s needs nor provide systematic protection of natural resources</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Allow diverse green space - informal, “loose-fit” urban environment.</td>
<td></td>
</tr>
<tr>
<td>Standards-oriented</td>
<td>Built-up areas</td>
<td>Easily be followed and operated;</td>
<td>Too fixed; neither respond to people’s needs nor provide systematic protection of natural resources</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ensure land allocation and funding.</td>
<td></td>
</tr>
<tr>
<td>Usage-oriented</td>
<td>Built-up areas and rural areas</td>
<td>Pay attention to distributional and proportional requirements of land types and their best productive use;</td>
<td>Neglect or even negate ecological functions in urban areas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Focus on socio-cultural functions;</td>
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<tr>
<td></td>
<td></td>
<td>May shelter green areas from urbanisation encroachment.</td>
<td></td>
</tr>
<tr>
<td>Conservation-oriented</td>
<td>Rural and regional wilderness areas</td>
<td>Proactive; inclusive, responsive; Give priority to nature conservation.</td>
<td>Complex planning process; May omit green space at small scale; Difficult to define appropriate planning boundaries for analysis of the ecological factors</td>
</tr>
</tbody>
</table>

Table 6-1 A comparison of planning strategies used in Beijing green space planning and the relative responsiveness and effectiveness with respect to the associated or potential values

6.2.2.1 **Haphazard provision**

As illustrated in Chapter 5, the strategy of haphazard provision refers to the “filling in” method. Such a strategy mainly occurred in response to the demand for greening/beautifying cities that needed to be done over a short period of time.

Maruani and Amit-Cohen (2007) propose an “opportunist model” in planning open space, which was based on land donation by the king to the citizens, the opportunities from the demolition of slums, and
space left over after planning in the western context. In comparison, the Chinese situation is based on three situations: 1) already existing public gardens (such as old gardens being opened to the masses in the case of Beijing); 2) larger surviving places that are fortuitously readily available (such as some sacred mountains or forests with temples); and 3) areas added on after the “core” of other land use has been determined on the ground (generally being poor land of little value for agriculture or building, or remote areas of little value for commercial purposes).

The leading principle of this strategy is to seize every opportunity to make the land green regardless of its quality. It depends on the circumstances: it might have excellent attributes, for example, based on some existing historic sites, or it might have low quality if built on narrow sidings or corners of houses, or based on some abandoned heavy industry-polluted land, waste lots or derelict gap sites awaiting redevelopment.

Some Chinese scholars (e.g. Liu, 1999; Wang, 2009; refer to Chapter 5, Section 5.3.1) have criticised this ad hoc planning model as it may cause a large number of fragmented and unevenly distributed green spaces – often leaving out areas of greatest need. Fragmentation and edge effects associated with small or narrow reserves are regarded, in landscape ecology, to be among the most serious threats to habitat protection and biodiversity conservation (refer to the study of landscape ecology and conservation ecology in Chapter 2, Section 2.3.2).

However, given the fact that natural areas are under ever increasing pressure in and near urban areas, this approach still can be helpful as a supplementary planning strategy to others in increasing green space. The EU’s green structure planning research also supports the notion that through in-fill projects and urban renewal, the urban environment can gain a green quality, even if the overall quantity of green is reduced (Tjallingii, 2005b).

Beijing’s “filling in” planning approach has resulted in many places undergoing general greening done by the population. These areas generally lack formal design, intensive management and maintenance. So after a period of time, many native pioneer and opportunistic vegetation types might occur spontaneously, thereby creating more diversity, and also greater interest to users. This seemingly under-designed or unregulated space is referred to as a “loose-fit” environment in recent western studies (see works of Franck, 2000; Franck and Stevens, 2007), or “emergent ecologies” in some landscape design philosophies (e.g. refer to Downsview Park Toronto competition, Czerniak, 2001). The land is presented as a living groundwork to allow the combinations of life to emerge (Corner and Allen, 2001, p. 58-65). It can be argued that a leave-alone attitude to urban nature is quite analogous with the “non-action” principle in Daoism (refer to Chapter 4 Section 4.2.1), which advocates following natural laws and supporting self-organising flows. Such spaces are found to provide new functional values or opportunities for functions not well served by conventional parks (often over-managed and manicured): for example, encouraging the functioning of natural systems within the
urban fabric (Kühn, 2006; Ignatieva et al., 2008) and meeting a wider range of different, or plural social and cultural needs (Thompson, 2002; Franck and Stevens, 2007).

6.2.2.2 Standards-oriented strategy
This strategy emphasises quantitative standards. It has been applied since the commencement of Beijing urban planning and laid the methodological foundation for green space planning throughout China. The government regards this process of following comprehensive regulations, criteria, standards and norms as a path to the rational and efficient use of resources to make this socialist homeland more attractive. It narrowly concentrates on finishing the land quota task assigned from the master plans with little regard to green space quality or accessibility for local people or other site-specific circumstances. It seems that it was a kind of “tick box” approach so that there was little heart or soul in the implementation, or consideration of responding to the people’s needs or natural resources protection.

As discussed in Chapter 2, Section 2.3, the arrangement of urban natural environment is rooted in urban planning in pursuit of scientifically organising human activities. The use of standards as a planning tool for public open space and recreation facilities has been widely used in the West, such as USA (Grabow and Heskin, 1973), Canada (McFarland and Parks, 1970) and the United Kingdom (Turner, 1992), after World War II in the city construction. It was highly influential in “shaping both the present overall approach to urban open space planning and the contemporary character of the physical system and resultant set of opportunities for recreation/free-time activities and appreciation of urban open space” (Lockhart, 1974; Wilkinson, 1983). But many scholars have been strongly critical of this approach. The major criticisms have been summarised by Wilkinson (1983, p. 104; 1985). First, it is too fixed and arbitrary. Standards developed in a specific set of circumstances in one place are not always applicable to other places with different conditions. Second, it lacks of consideration for the quality of the spaces themselves or for the users’ experience, such as enjoyment or satisfaction.

The reasons behind widespread application of this method were discussed by Wilkinson (1983; 1985). First, it is easily followed since most standards are clear and simple without the requirement for detailed knowledge of the sites’ social, economic and ecological attributes. Therefore, it arguably is a simple and immediate way to ensure land and government funding resources are allocated for greening. Secondly, while still conforming to the conventional planning paradigm of rational and scientific decision-making, the authorities and urban planners prefer figures and numbers, and wish to achieve scientific efficiency with measurable and visible results. Particularly in China, since the planners or authorities purport to represent people’s interests and needs in the socialist country, few can oppose these politically and bureaucratically legitimised figures. This, in essence, reflects the political dimension in the arrangement of urban green space.
6.2.2.3 Usage-oriented strategy

The usage-oriented planning model sets priorities for meeting the demand for recreation, leisure, cultural protection, city image and other relatively “visible” services for human society. The typical representative of this model is the park hierarchy approach. The same approach was also applied in London’s open space planning around 1976 (Turner, 1992).

In the case of Beijing, it can be applied in either built-up areas or among remote areas, but mostly it focuses on formal gardens and park areas particularly for recreational and/or sports purposes. As this model primarily pays attention to what people want; and as Wilkinson (1983, p. 104) noted earlier, no one would feel shamed by the inflation of park statistics, unsurprisingly, such space is mostly welcomed by the people and the government.

However, this model reflects a dominant utilitarian and human-centric mentality, which highlights green space as a service provider for people’s tangible needs. It is more of a market strategy, valuing the welfare of the present generation of humans with minimal concerns about other species or users.

In spite of this narrow focus, it might be an effective way at present to remain and protect green areas in the cities. As implied earlier in Chapter 5, a paradoxical process resides in urban green space construction in China. On the one side, the wider natural and rural areas are being threatened and gradually encroached on by uncontrolled urban growth. The areas of greenbelts, for example, have kept decreasing despite local government repeating its existence in every master plan. On the other side, within large-scale urban development, urban green space construction in built-up areas, especially parks, is strongly promoted. From national level laws and policies to the local agendas, the necessity for conservation of green space is being highlighted more than ever. Accordingly, local governments set ever-increasing planning standards for green space. Green space statistics (Beijing Municipal Administration Centre of Parks, 1980; 2011), show that the number of parks has increased from only seven in 1949 to 1163 in 2008, and the area of green space per capita in 2010 (15 m$^2$/person) has almost tripled the number in 1979 (5.07 m$^2$/person). This means that green space, especially semi/natural habitats, is threatened by urban development, at the same time, it, especially parks, is also being promoted by urban development.

Beijing’s experience suggests that one way to save these decreasing semi-natural/natural areas is to transform and reclassify these “informal” wilderness areas into parks. For example, the purpose of the 1st Greenbelt had to be modified to provide more recreational opportunities in the form of parks, rather than dominant agricultural and rural land uses. Through endowing these areas with more tangible benefits and usages for people, they become more valued, and thus can survive well in the intensively competitive urban land use market.

6.2.2.4 Conservation-oriented strategy

Ecological approach
Wilkinson (1983) summarises the main problem of normative planning practice (some of which has been presented above) - as being reactive rather than proactive, anthropocentric rather than environmental, and reactionary rather than innovative. As discussed in Chapter 2, the emerging ecological approaches as anticipatory and proactive strategies may eliminate these problems to some degree.

Compared with the other planning strategies discussed above, this strategy is based on a very different planning philosophy. As introduced in Chapter 2, it emphasises sustaining ecological functions and landscape processes as the cornerstone for green space planning; and planning needs to occur before urban development. Generally, the conservation-oriented strategy focuses on wilderness areas, with minimum human interference, which are either inaccessible or accept a limited number of visitors (e.g. scientific researchers), such as some strictly protected nature reserves. As such, they can encourage dynamic ecosystem processes of plant growth and succession, erosion, siltation and filtration of water bodies, and non-human life forms to exist regardless of their contributions to human society. This type of environmental ethic relates to the studies about deep ecology (Naess, 1973; 2003; Beatley, 1989).

This strategy has different planning standards - criteria used are categories such as connectivity, integrity, landscape diversity, vulnerability or uniqueness of landscape and ecosystem components (refer to Chapter 2, Section 2.3 and 2.4). In the Beijing case, the planning standard for “location of green space” following the usage-oriented strategy requires a park within a 3-5 minute walk from home or workplace, but in ecological approach green space location is determined by the environmental attributes from the analysis of ecologically important and valuable areas.

As discussed previously, there is a paradox in green space development; the wilderness areas seem vulnerable compared with parks under urban development pressure. This strategy for their protection most likely demands national laws, regulations and other potent legal measures to ensure the effectiveness of its planning implementation. Therefore, the new proposed 2nd Greenbelt consisting of rural and natural areas was planned under the overarching umbrella of the national “Green Line” policy in order to prevent the failure of the 1st Greenbelt from recurring.

Thus it implies that the greenbelt and green wedge planning approach can either be usage-oriented, for example, the 1st Greenbelt was directly and tangibly for people’s recreation, or conservation-oriented, i.e. the 2nd Greenbelt was emphasising natural values protection.

The limitations of the conservation-oriented strategy have been summarised by Maruani and Amit-Cohen (2007) as follows: 1) the planning process of ecological approach is complex, requiring profound ecological knowledge and skills, 2) its implementation may be more expensive and complicated than other planning methods, and 3) there is subjectivity inherent in the process of evaluating ecological data.
Many scholars (Thompson, 2002; Ndubisi, 2002, p. 229) argue that another challenge for an ecological approach to planning is the lack of sufficient knowledge in determining planning boundaries. Should it be determined by administrative district, urban (built-up) areas, water catchment, surveyed environmentally sensitive zones, biological or geographical frames? In the Beijing case, the real planning analysis (including environmentally sensitive areas and ecologically critical areas analysis) is still limited to the Beijing’s metropolitan boundaries even though the planning authority called for regional consideration. This raises the question of whether these political frames are adequate for effective environmental and/or ecological factor analysis because it has been acknowledged that ecological functions and processes, particularly in terms of nutrient and energy flows, and species movements, rely on the connectivity and integrity of and between ecosystems (also refer to Chapter 2).

Another concern is about planning scale (Chen, 2008): what level of detail best suits the planning needs, 1m x 1m, 100m x 100m, or 1km x 1km? This resolution directly affects planning decisions when one gets closer to the neighbourhood level. Taking Beijing as an example, the ecological approach was undertaken at a regional scale - an area of 16,808km², with resolution of the land use maps at 30m×30m. This means that areas less than 900m² will be “missed out”. In other words, many small local pockets of green space are not included in planning considerations. The issue of scale in planning is of crucial importance as it is likely to seriously affect the study of ecological functions and landscape patterns (O’Neill, et al., 1996; Wu, 2004). For example, the stepping stone function of these small scattered areas may be excluded from the analysis of the ecological functions in this area.

**Cultural-ecological approach**

As illustrated in Chapter 2, Section 2.3.2, cultural/ethnic consideration in ecological planning is gradually being given attention internationally, although it is widely realised that there is no defined approach to it. As Forman (1995, p. 492-496) advocates, “cultural cohesiveness” is essential for sustainable planning and management of land use and environments. And Gold (1974) argues that it is “[ecologically] suitability in conjunction with the values [i.e. social, political, economic, cultural, etc.] people place on the use of intrinsically suitable lands that should determine the correct allocation”. It promotes the cohesiveness of human’s cumulative experience, philosophies, and modern technologies in applying ecological knowledge to planning. Beijing’s experience of setting aside scenic spots and nature reserves, and new Feng-shui practices, may fit into this type of planning strategy.

The previous Section 6.2.1.1 has explained that the emergence of such considerations in China was in tune with changing Chinese perspectives on historic and cultural heritage. Therefore, the planning of scenic spots and nature reserves tended to focus on the protection of cultural elements, given that primary planning parameters were how much and how well the cultural heritage was kept (as explained in Chapter 5, Section 5.3.2).
The Feng-shui approach has been regarded as a closely connected concept to the essence of western ideas of landscape and environmental planning since “it fundamentally deals with the earth, the land and natural resources (hills, water, wind, flora, fauna, etc.) in a holistic way” (Dillingham, 1991). The modified Feng-shui, as illustrated in Beijing Olympic Park, created sustainable spatial configuration of the landscape as advocated by ecological planning theories. At the site scale, ecological engineering technologies (such as man-made wetlands, ecological water treatment, etc.) can also fit into the overall Feng-shui framework. This presents the innovation of placing ecological functions in a vernacular cultural context. It is the congruence between ecologically suitability and culturally desirable locations. Through reinforcing the spiritual and cultural components, it might promote overall feelings of wellbeing associated with green spaces. As stated before, such a cultural-ecological approach to environmental planning is determined case by case, but it may offer uniquely useful perspectives for enriching the substantive and procedural theories of urban green space planning.

6.2.2.5 Summary

There are rationales underlying each planning approach, and each strategy, to varying degrees, responded to the particular demands and has its own inability to resolve some other problems. Therefore, arguably what is required is an integrated approach to green space planning and urban environmental management. Such an approach would require ecological investigation that establishes an all-embracing planning framework adapted to the reality of today’s metropolitan or regional territories, while other intermediate and small scale methods are incorporated into it. This hierarchical and flexible approach is likely to lead away from a narrow definition of urban green space planning and towards a truly comprehensive, and responsive approach that would recognise the opportunities, and also to adapt to, the multiple demands and roles of urban environments.

Another reason for this integrated way of planning green space is that, as discussed in Chapter 2, there is a wide range of urban green space types, functions and locations in a continuum - from smaller, local parks close to people’s houses to larger parks and open spaces at the regional fringe. Each type has various main functions and so should be managed accordingly. Maruani and Amit-Cohen (2007) also support the notion that no single approach is likely to adequately address all green space functions and needs.

6.2.3 The influences driving these changes

As Dorney (1989) and Ndubisi (2002, p. 54-56) argue, landscape evolution is driven by varying human needs and values, political realities, institutions, new technologies, and economic circumstances. In this study, changes in the meanings, functions and use of urban green space occurred seemingly as responses to the process of re-setting city’s roles/functions, economic sectors restructuring, and the city’s spatial restructuring. However, deep influences/drivers underlying these three processes are contextualised in the particular Chinese historical, socio-cultural, and political
settings. These influences and its derivatives are converging and forcing a re-think and reassessment of the way cities and hence their green spaces are planned and managed.

I categorise these influences into two types (although in effect they work interactively without clear-cut boundaries; see Figure 6-1). One is external, such as influences from the former Soviet Union’s concepts, standards and approaches to green space, and western countries’ planning theories and methods. Locally derived influences come from China itself, including government (the sole decision-maker of urban master and green planning, such as Chairman Mao, and government officials), and Chinese traditional values.

Chapter 5 implied that these external and internal influences are interconnected, complementary and reinforce one another at some points. The Soviet influence and the Chinese Communist Party’s advocacy and the government’s eagerness to revolutionise urban planning were synergistic and synthesised to lend a socialist and communist flavour to Chinese urban landscape and environmental development. The later western style of a modern grand city lived up very well to the government’s desire for a new city image reflecting the resultant dynamic economic conditions of post-1978 economic and social transformations (Yu and Padua, 2007; also refer to Chapter 4, Section 4.3.4). The two forces significantly reinforce each other in China’s rapid urbanisation process and thereby accelerate the process of the spread of western concepts in China.

Another complementary pair is western ecological science and Chinese endemic ecological thoughts. Both, to some extent, can be consolidated to play a positive role in the development of green space. The modified Feng-shui is the best example for this fusion.

The co-existence of various forces (except for the Soviet) is likely to continue to influence Chinese green space planning and development. In addition to direct impacts by introducing the basic concepts, theories and methodologies, and relevant policy-making, their influences are more diffuse in their effects on the more radical social and value changes - altering the social environment in which green space is conceptualised, valued, used and planned.
Figure 6-1 Influences and evolution of contemporary Chinese urban green space development
6.3 Issues underlying contemporary Chinese urban green space planning

This section links international urban green space planning principles (integration, multifunctionality, and participation) summarised in Chapter 2 to the Chinese situation to discuss the existing issues which may affect and potentially threaten Chinese urban green space planning and development. Furthermore, the four planning strategies recognised in Section 6.2.2 are also evaluated to see which have the greatest potential to accommodate these planning principles or avoid looming problems (Table 6-2).

6.3.1 Integration

According to the “integration” principle, urban green space planning should be considered as an integral part of urban development strategy. The core question is how to appropriately accommodate green space planning within wider and higher levels of urban planning.

The Beijing case study has showed the very promising signs of this tendency in the latest urban and green plans, that is, green space plan occurred before urban master plan. More flexibility and higher status have also been gradually given to green space development in other cities over the last decade (see Liu’s research on Weihai city, 2008). However, an urban green space plan is still a lower level plan in most cases, since in China the urban green space plan is legislatively circumscribed as “a sectoral part in the urban master plan” (Ministry of Housing and Urban-Rural Development, 2002. See Appendix B).

This inferior status can be recognised in many aspects as illustrated in Chapter 5. In addition, through the coding analysis of the six Beijing master plans, I found that there is in fact not much substantial content relating to green space development in the five early master plans. In some cases, the term of “urban green space” appeared to be “an accompaniment” to other themes and discourses; while in some cases, only several short sentences mentioned it.

There are probably three reasons behind this. First of all, the prevailing normative values in urban development perceive green space as a minor position in the city. Generally during the rapid urbanisation process in developing countries, economic growth is believed to be the ultimate goal and is given first priority in making relevant policies. Liu’s research on Chinese government policymakers’ attitude on green space planning shows that very often these officials believe that urban green space is an “anti-development” ploy to keep the land unoccupied by urban concrete, thereby threatening economic growth (Liu, 2008). Long-term, sustainable urban environmental management appears to be compromised when facing short-term, tangible economic gain and the desire for grand city images in China’s cities.
Such conflicts have also occurred in developed countries during their early development stages. Wilkinson (1983, p. 15) criticised the way of urban and environmental development in western countries:

“The conventional patterns of urban growth have been based largely on the extension of services of roads or on socio-economic design concepts, with little concern for the natural environment. Usually, open space [green space] has been regarded merely as an after-thought or as a residual, the land left-over after other development has been planned”.

The zoning scheme of urban planning system in China is like sharing the “cake” - the last piece left over at the end is for developing green (Chen, 2008). Green space is disadvantaged and has less priority compared with other urban development elements and land uses.

Secondly, Chinese local governments lack the innovative institutional frameworks to formulate policies and measures to achieve a comprehensive picture of functional and structural integration. The long-dominant institutional paradigm established under the planned economy takes for granted that green space planning ought to be constrained by the requirements of urban master plans, be consistent with the Chinese top-down hierarchical planning system, and be ready to give way to economic development needs. The attachment to existing ways of life and thinking, and even more the inertia of Chinese socio-political processes, exert formidable counter-pressures to attempts at a drastic shift of emphasis at a national level. Within the current institutional framework, many proposals and solutions, especially those more radical ones, would not be advocated, or not be implemented for decades. Even in Beijing, the government had to appeal to the national research institute to support the progressive ideas. It seemingly came from the government officials’ requirements, instead of a part of statutory planning process.

Thirdly, another major reason for the failure of this integration appears to be a methodological deficiency. In former times there was no corresponding sound planning approach/method to recognise, let alone encourage, some degree of weaving together and merging in normative planning frameworks. The situation is improving through greater degrees of consideration of ecological benefits and regional green structure. Through the Beijing case, it is clear that the ecological approach establishes a better and stronger foundation for green space planning to break out of erstwhile urban planning constraints. And it makes such integration possible by reversing the past dominance and prioritisation of development to a new paradigm which starts with surveying pre-existing or potential natural values to pre-emptively define “where-not-to-build” as new land quota for urban development.

However, it is still difficult to promote this planning strategy across the country. Even in Beijing, this kind of city development with emphasis on ecologically-sound land management is still in its infancy,

60 United States Department of Interior issued a report “where-not-to-build” to elaborate open space planning in 1958. Here, I borrow this phrase to express the notion that green space plans can have an important position in master plans through taking the initiatives to exclude development in those ecologically/culturally significant places.
and in a very tentative stage. As to its effectiveness, it is too early to be able to assemble much evidence of concrete outcomes. Most other cities still stick to the conventional “filling in”, or quantitative and park hierarchy planning approaches. It can be fairly said that in China, integration has begun, but is only just beginning.

6.3.2 Multifunctionality

As noted in Chapter 2, the planning principle of “multifunctionality” applies at two scales: combinations of various functions provided, by an individual piece of green space at the site scale, or by well-designed green space network at the city scale. This study did not provide in-depth studies at the site scale to examine how much the individual green space involves multiple functions. However, Chapter 5 has implied that single pieces of green space have long been valued for doing so. The best examples at the site scale are the parks newly built during the 1950s that were required to have six functional zones. At the city scale, the investigation of the changing roles and functions of urban green space substantively supports the conclusion that multifunctionality in green space has been required and advocated by Chinese governments. For example, there were combinations of economic products functions and socialist educational services during the revolutionary era, and later the synergy of cultural heritage protection and green space construction.

In this Chinese version of “multifunctionality”, the majority of attention appears to be given to socio-political and cultural focuses rather than the ecological functions as highlighted in western discourses on multifunctionality. Such a difference between China and the West is essentially the reflection of the particular Chinese political and cultural context. The political reasons have been discussed in Section 6.2.1. As to the cultural aspect, Chinese views about nature reflected in both traditional garden-making and broader philosophical thinking, substantively contributed to the difference between China and the West.

In Chinese traditional gardens, architectural and cultural elements were the main body of the scenery, and “nature” was a condensed and highly man-made entity serving the construct (Keswick, et al., 2003). Classical gardens have been regarded as one of four centuries-old fine arts, alongside calligraphy, music, and poetry. As Dillingham (1991) observes, gardens in China appeared as an extension of the “art” of exterior place and space construction. Chinese have long appreciated recreation, leisure, aesthetic, and cultural values in gardens for thousands of years.

Liu’s research has showed that the cultural and aesthetic attributes, rather than natural aspects, are still dominant in contemporary urban green space construction, and that urban green area development continues to have a much closer relationship with art rather than with modern ecology (Liu, 2008). Jim and Chen’s recreational behaviour study of modern Chinese in Guangzhou have also supported this argument:
“It appears that their [Chinese people] nature appreciation has a confined scope, limiting to the static, passive and scenic features such as landscape trees, and the green ambience serving largely as a backdrop for outdoor recreation. It also hints at an inherent preference for the visually dominant plants rather than the more transient, mobile, if not elusive, animals in urban green spaces. The lack of relevant information and knowledge on urban wildlife probably has hindered this aspect of nature appreciation…” (Jim and Chen, 2006b, p. 91)

The natural environment itself, in Chinese eyes, has been culturalised and personalised (Han, 2006, p. 216). This is very different from the “nature” or “natural process” as understood by the West, which tends to appreciate the loose-fit environments and emergent ecologies (refer to Section 6.2.2.1).

Nassauer (1995) points out that it is not easy to accept the ecological functions involved when the appearance of many indigenous ecosystems and wildlife habitats are not consistent with cultural norms and values for landscape appreciation. This is very applicable in China’s conditions where a conflict exists between potent, long-dominant traditional norms and modern ecological aesthetic values.

Even though China has remarkable ecological thinking and practices, such as Daoism and Feng-shui, they are more on the philosophical, conceptual, or experiential level. For example, the land use model of Mulberry Bank - Fish Pond presented in Chapter 4 Section 4.2.1 was mostly based on an accumulation of practical experiences of generations. This is fundamentally different from the modern ecological science highlighting ecological processes and specialising in scientific facts and accurate assessment of compositional elements, such as soil, water and vegetation.

Since urban green space is a continuum with a wide range of types and functions, it needs to relate to various design styles to articulate human’s aesthetic and artistic expressions. However, as open land in cities is very precious, urban green space as a valuable functional land use could be have been used more responsibly to achieve a sustainable and liveable city. If urban green space itself needs intensive management and high maintenance, such as use of machinery and herbicides and demanding more energy and funds to maintain the superficially attractive appearance, it may consume more natural resources (such as water), or cause urban non-point pollution (herbicides and insecticides). How can we expect it to make those contributions for urban sustainability?

Given urban environmental values are now more strongly represented and weighed against other interests worldwide (Erfurt Declaration, 2008), and the benefits are demonstrable, it is time that much more attention is given to these vital roles of green space such as biotopes, biocorridors, treatment trains and climate regulators in the Chinese urban environment.
6.3.3 Participation

The principle of “participation” suggests two dimensions: one based on professionals of different backgrounds (from relevant disciplines such as ecology, environmental engineering, and social science), and the other involving stakeholders and the general public.

Since green space planning deals with both natural and social processes, as illustrated in Chapter 2, many academics and professionals have realised that domain-specific knowledge was inadequate for understanding and managing green space, it is essential to include interdisciplinary methods and tools, from rigorous quantitative criteria to qualitative socio-economic assessments. This has been achieved in the Beijing case by government authorities officially committing researchers of different backgrounds to cooperating and preparing the latest urban master plan.

However, citizen participation in the decision-making process of Chinese urban planning as well as green space planning even in Beijing is not apparent, although the newest urban and green plans encouraged the cooperation of business developers and city/village residents. In many western countries, community engagement, collaborative learning and stakeholder consultation has become a regular part of green space and urban development planning projects. For example, recently in the “share an idea” event for the Central City Plan presented in Chapter 2 Section 2.2.4, more than 100,000 ideas from the public were shared with council in developing a plan for the rebuild of earthquake ravaged Christchurch. According to western countries’ experiences, truly multifunctional green space and long-term benefits for future generations cannot be accomplished without involvement of stakeholders, public participation provisions and duties to consult (Tjallingii, 2005b). A more open decision process like this can in turn facilitate integration by information gathering and mutual adjustment from different sectors.

The main reason for the lack of public participation in China is most likely the long-dominant role of governments as well as high degree of concentration of exclusive power in planning. Through analysis of the Chinese planning system’s background and history and the Beijing case study, it is apparent that in China the planning system is centralised, top-down, and non-participatory, producing rigid end-state lower level or other sectoral plans (e.g. transportation plan, urban water system plan and the like).

More private stakeholders have been taken into account in urban green space construction on the ground (e.g. residential developers are now the major decision-makers for greening projects in the real estate market), but paradoxically residential stakeholders (the users) are still not involved in any planning or decision-making process. There is no communication or negotiation between public planning authorities and the local residents, whose real needs and opinions about their land are normally ignored. Without their cooperation, it is difficult to fulfil the goodwill of green space planning, especially with regard to long-term public benefits. The failure of Beijing’s 1st Greenbelt is probably the most convincing case.
To solve this problem, what is needed is a planning approach which can integrate a communication strategy into the policy and decision-making process. For example, in greenbelt planning, at least those immediately affected stakeholders – thousands of farmers living and working inside this space – ought to be consulted when their villages were proposed to be turned into public green areas. In the construction of park systems, the citizens and local residents could be involved in the design of multifunctional green space, determining what it is that these users most want. Furthermore, such an engagement in the initial stage is also beneficial for the later management and maintenance of these green areas. After all, people know these areas are being set aside for them and next generations, and eventually for serving their needs, rather than serving government officials or planners, and so they could become allies for preserving green space against urban encroachment by economic development.

This solution is not unrealistic for today’s China as there is a rising civic consciousness among the general public in recent years. Some studies, such as Jim and Chen (2006b), Zhong and Mol (2008), and Shan (2011), demonstrate that Chinese have positive attitudes and strong willingness towards participation in decision-making of urban development and green space planning and management. They all appeal for an open and inclusive government which can develop effective governance planning strategies to promote this participatory decision-making. It again points to the need and imperative for government institutions to be reformed or restructured to establish a new planning framework that advocates integration, multifunctionality and participation in green space planning.

As usage-oriented and conservation-oriented planning strategies both essentially need input from users and stakeholders; they at least provide some opportunities to integrate more voices into urban development. As suggested before, no planning system is perfect, but at least it needs to ensure that there is the chance to be heard if the ideas are sound. Many western studies have demonstrated public participation techniques which might be integrated into these strategies, such as setting up working groups, public hearing seminars, local forums and discussions. Further investigations are needed to examine whether such approaches are applicable to China’s circumstances, and further explore and establish the Chinese way of involving public participation.

<table>
<thead>
<tr>
<th>Criteria Strategies</th>
<th>Integration</th>
<th>Multifunctionality</th>
<th>Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haphazard provision</td>
<td>Low</td>
<td>Depending on situations, may have high diversity of functions</td>
<td>Low (but in Mao’s mobilisation of the population for tree planting, it is very high)</td>
</tr>
<tr>
<td>Standards-oriented</td>
<td>Low (subordinate to urban master plans as discussed in Chapter 5)</td>
<td>Very low</td>
<td>Low</td>
</tr>
<tr>
<td>Usage-oriented</td>
<td>Low (subordinate to</td>
<td>High with stress of socio-</td>
<td>Prospectively high</td>
</tr>
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urban master plans as discussed in Chapter 5) political-cultural functions

| Conservation-oriented | High (green space first and urban development later) | High with emphasis on ecological functions | Prospectively high |

Table 6-2 A comparison of planning strategies about whether they accommodate the criteria of integration, multifunctionality and participation in the planning trends

6.4 Conclusions, implications and suggestions

6.4.1 Conclusions

Because of the attributes of urban nature as explained in Chapter 2, its planning and development is fundamentally a hybrid activity, ranging from setting quantitative standards to the involvement of the ideology, identity, and values of a nation. This complex, hybrid quality leads to difficulties in analysing the planning and development process. The theoretical study of urban green space, including its definitions, functions, the relevant planning theories and other countries’ experience, is therefore of crucial importance to my study. It effectively provides a conceptual framework and perspectives within which the case study of Beijing can be performed, compared and evaluated.

Through focusing on a particular case over an extended time frame, I was able to map the complex and somewhat disparate themes within a defined context. Through the translation and analysis of the large number of government documents, I could plot the key shifts in terms of green space planning and development in relation to the evolution of the city. It is argued that, given that green space-related topics overall occupy a small proportion of the massive urban development documents, and in most cases their words and language are rhetorical and express ideological commitment; there is a necessity to complement the document analysis with supporting concrete evidence to illustrate how they were conceptualised and formulated.

These research approaches together allow me to capture the meanings, values and purposes that underlie the surface of Chinese planning texts and further to contribute to the understanding of the dynamics between land, city and human efforts in creating preferred living settings. The main findings and implications can be summarised as follows:

1) Urban green space development in China is a synthesis of the influences from the Soviet, the West, particular Chinese traditional values, and government aspirations. The combination of these influences is expressed in a distinctive pattern for constructing nature in the urban context: retreating from reflecting political ideology and turning to
pragmatism; valuing nature more for its own sake; establishing green space as a necessary and primary land use rather than serving as a standby for other uses in urban development.

2) The consideration of the multifunctional urban green space development has long since been “unconsciously” operationalised but with overall emphasis on its political and cultural dimensions, rather than ecological consideration. This suggests two distinct characteristics of Chinese urban green space development - political purposes on the one hand, and cultural continuity on the other. Construction of green space is not only a combined “socio-environmental arrangement” as understood in the West (Swyngedouw, 2007; Uggla, 2012), but it also has a highly political intervention in the Chinese context.

3) Societal demand and use of urban green space and underlying wider influences affected and led to the emergence of various planning approaches to Chinese urban green space over 60-years. Overall, the planning scope of urban green space has extended fundamentally from a city-centred to an interregional focus. The prevailing subordination of urban green space planning to master planning in conventional planning frameworks has loosened, and there is a growing trend towards urban green space planning acting as a prime determinant in urban planning. There is a general shift from unconscious, reactive, narrowly focused, and in some ways contradictory views of urban green space, towards a more comprehensive, integrated and future-focused way of conceptualising and managing nature in urban areas.

4) Four planning strategies are recognised in China (and elsewhere): haphazard provision, standards-oriented, usage-oriented and conservation-oriented. There are existing rationales underlying each planning strategies and any singular approach has its own flaws and inabilitys to address today’s complex urban socio-environmental problems. Therefore taking the best aspects of each strategy is likely to provide the best outcome.

The integrated approach should learn from each of these planning strategies and synthesise their advantages if possible: 1) be multilevel – involving the lowest neighbourhood planning level to the regional landscape level (defined by biogeographical boundaries such as water catchment areas, rather than arbitrary administrative boundaries). A promising combination of compact buildings with green space inside cities and a green structure policy at the regional scale can be achieved. As such, the problem of losing small pieces of green space discussed in the conservation-oriented strategies may be solved. 2) be multifunctional – balancing people’s recreational demands for green space and conservation of natural values, and providing more benefits by integrating green space structure with other urban infrastructure such as the protection of historic and cultural sites, water systems, and traffic systems.
6.4.2 Theoretical implications

The co-evolutionary relationship exists between Chinese socio-cultural, economic and political systems and the way people perceive, value, use, adapt and plan natural environments. This supports current western landscape planning theory, in that meanings of natural landscapes are socio-culturally established, and planning is ultimately the expression of interactions between people’s cultural and ideological values and their biophysical environments, instead of a purely technical conveyance.

The role of planning urban nature is not to defend nature, but to establish a structure to meaningfully organise, plan and direct the use and management of land uses towards ecologically sound and culturally desirable outcome. Considering green space should be systemic since green space itself is a continuum and it is no longer sufficient to solve the problems of nature preservation and concerns for aesthetics or recreation on a piecemeal basis, nor in isolation from other land uses. There is a dialectical relationship and coexistence between “natural environments” and “urban”, or “nature” and “human”, which is like Yin and Yang, and issues concerning “nature” cannot be addressed without invoking the other.

The adoption of a systemic view argues against both a utilitarian view and a purely ecologically deterministic approach. Rather, the view requires a melding of two directions in an effort to truly balance environmental and developmental interests for “man and nature in harmony”.

6.4.3 Suggestions

Contemporary Chinese urban green space planning and development has evolved by absorbing different influences externally and internally, employing a variety of approaches over the past several decades in the ideas of what urban green space planning should be. Internationally, new planning ethics are emerging continually and rapidly, especially from the beginning of the 21st century (refer to Chapter 2, Section 2.4). With regard to China’s rapid urbanisation, as well as further political and economic system reforms, not only its history but also the enormous shifts in global understanding of green space planning need to be considered. Lastly, I provide some suggestions for improving Chinese urban green space planning. And also from my research, I have identified a number of important topics for future research.

Suggestions for improving Chinese urban green space planning and development

1) There is a need for a transparent planning and implementation system with stakeholder involvement and public participation as today there are more complex land ownership situations involved in the Chinese market system. Therefore, in terms of the particular Chinese circumstances, an “experts and government-led” planning team, combined with public participation, would be a better strategy to organise green space planning processes. Such the collaborative planning could be accomplished only through a reform with the government institutions.
2) Special attention, even some “bias”, is suggested as a means of incentivising more ecological functions. Today urban green space has been given much attention by government. However, such attention should not concentrate just on the aspect of framing neat appearance of urban landscape. It is necessary to organise the green space structure based on ecological knowledge to enhance ecosystem services for urban areas. My research indicates that there is a matter of some urgency to transition to this new inclusive and holistic state if urban environments are to survive sustainably.

3) There is a need to promote integration between urban master planning and urban green space planning. Regarding urban green space’s significant structural influence and ecological importance, the conventional arrangement of firstly the urban master plan and lastly considering the urban green space plan is identified unsuitable for complex urban and environmental issues. Urban green space should be endowed with more power to lead the way in future urban development. Therefore, a research-based department in the government could be established to promote such a major shift since institutional reform can be potentially more effective method of enhancing planning policy performance compared with efforts directed at improving the substance of planning and policies (Majone, 1989, p. 95-100).

4) Ancient Chinese ecological thoughts, such as Feng-shui, have been recognised in current western ecological theories and attitudes to harmony, balance and consideration of ancient wisdoms of indigenous peoples. It is appropriate that China develops its own unique approach to urban green space plan by incorporating traditional values in thoughtful and creative ways as described for the Olympic Park in Beijing. This might also be a valuable reference for other countries that seek: (1) innovative and harmonious spatial configurations of green space and cities; (2) integration of their own traditional features with modern urban landscape concepts. However, whereas ecological concepts were embedded in ancient wisdoms, they failed to be developed in a sufficiently explicit and quantitative way to be easily incorporated in assessment, evaluation, decision-making and management. Therefore, these ancient philosophical ideas should not substitute for, but complement, modern ecological science. Taken together, “following nature” and “non-action to nature” could be carried out scientifically, studying plant community compositions, spatial distribution, the processes and interactions of natural ecosystems.

Suggestions for future research

Today urban green space development is tending to take the leading part in urban planning where there is a recognition and need for multifunctional urban development, and sharing understanding of
different ideas about green space as well as desired urban futures. These ideas, methods and solutions need support from research. The following aspects are suggestions for future studies.

1) Studies focusing on green space planning methodologies. As discussed before, each planning approach and method used over the years for Beijing’s green space has its limitations; how can we minimise these flaws and appropriately combine their merits into a more effective planning approach within the local circumstances?

2) Studies focusing on traditional values. To a certain extent, today’s scientific ecological thoughts and part of Chinese philosophies on humans and nature are essentially in line with each other. How can Chinese age-old traditions be incorporated into today’s planning and management framework? How can a continuity of local history and culture be maintained against a background of globalisation in a creative way rather than the uncritical acceptance of the old?

3) Studies focusing on preventing planning failure and ensuring effectiveness of urban green space plans on the ground. Research questions would include: developing a framework for monitoring planning, design, implementation and management effectiveness. For example interactive communication, decision-making and assessment tools for better transferring planning concepts into practice for each specific type of place (it would have been useful to refer to EU’s ICC toolbox for the sustainable development and management of urban green space, refer to Chapter 2, Section 2.4.1).

4) Studies focusing on realising multifunctionality of urban green space for urban environments and people in the long-term instead of short-term visual effects. Research questions may include the following aspects. How the urban ecosystem functions in a highly stressed environment? What is relationship between green space structures with these functions? In other words, what spatial structure and arrangement should urban green space take to maximise the environmental benefits of green space? How best to balance ecological functions of green space while meeting urban dwellers’ social and cultural needs?

5) Further study on the planning images themselves. In this current research, I have cited many planning maps. An investigation into how these images were produced (in hand drawing, AutoCAD software, or GIS software); and what keynote colours were designated for these images and their elements, may provide insights into conscious or subconscious importance and recognition given to different factors and elements relating to green space. These detailed considerations may reflect the seriousness of responses to societal demands regarding city development. Such further investigation could reveal new dimensions around my theory of green space development grounded on societal demands.
6) Further investigation incorporating an interview research method. As explained in Chapter 3, as a junior research student, I abandoned the interview data collection method (see Chapter 3 Section 3.3.1). But a full-time researcher at a relevant planning department should apply the interview method to generate more thorough and robust data in terms of the functions and values of green space as described in the text and how this is interpreted and played out by the senior planning actors. This would strengthen the theory of “societal demands for green space” and the planning response.
References

Primary sources used for decoding:


**Secondary sources used for literature review:**


Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. SAGE publications, Inc.


## Appendix A

### Chronology of Chinese History

<table>
<thead>
<tr>
<th>Year</th>
<th>Dynasty/Period</th>
<th>Society</th>
<th>Broad phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-history</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2704-2100 BC</td>
<td>Five Emperors</td>
<td>Late Neolithic, tribal society</td>
<td></td>
</tr>
<tr>
<td>2070-1600 BC</td>
<td>Xia</td>
<td>Stone and Bronzes, Territorial State</td>
<td></td>
</tr>
<tr>
<td>1600-1046 BC</td>
<td>Shang</td>
<td>Bronzes, Territorial State</td>
<td></td>
</tr>
<tr>
<td>1046-771 BC</td>
<td>Western Zhou</td>
<td>Bronzes and Iron, Feudalism</td>
<td></td>
</tr>
<tr>
<td>770-221 BC</td>
<td>Eastern Zhou,</td>
<td>Iron, Contending States</td>
<td></td>
</tr>
<tr>
<td>211-206 BC</td>
<td>Qin</td>
<td>Empire, Unification, Authoritarianism</td>
<td></td>
</tr>
<tr>
<td>206 BC-220</td>
<td>Han</td>
<td>Empire, Unification, Feudalism</td>
<td>Ancient China</td>
</tr>
<tr>
<td>220-280</td>
<td>Three Kingdoms</td>
<td>China divided</td>
<td></td>
</tr>
<tr>
<td>265-420</td>
<td>Jin</td>
<td>Empire, Unification, Feudalism</td>
<td></td>
</tr>
<tr>
<td>420-589</td>
<td>Southern Dynasties</td>
<td>China divided</td>
<td></td>
</tr>
<tr>
<td>386-534</td>
<td>Northern Dynasties</td>
<td>China divided</td>
<td></td>
</tr>
<tr>
<td>581-618</td>
<td>Sui</td>
<td>Empire, Unification, Feudalism</td>
<td></td>
</tr>
<tr>
<td>618-907</td>
<td>Tang</td>
<td>Empire, Unification, Feudalism</td>
<td></td>
</tr>
<tr>
<td>907-960</td>
<td>Five Dynasties</td>
<td>China divided</td>
<td></td>
</tr>
<tr>
<td>902-979</td>
<td>Ten Kingdoms</td>
<td>China divided</td>
<td></td>
</tr>
<tr>
<td>960-1279</td>
<td>Song</td>
<td>China divided into North Song and South Song</td>
<td></td>
</tr>
<tr>
<td>1271-1368</td>
<td>Yuan</td>
<td>Unification, Feudalism, Ruled by minority</td>
<td></td>
</tr>
<tr>
<td>1368-1644</td>
<td>Ming</td>
<td>Empire, Unification, Feudalism</td>
<td></td>
</tr>
<tr>
<td>1644-1911</td>
<td>Qing</td>
<td>Unification, Feudalism, Ruled by minority, a semi-colonial and semi-feudal society since 1840</td>
<td></td>
</tr>
<tr>
<td>1912-1949</td>
<td>Republic of China</td>
<td>A semi-colonial and semi-feudal society</td>
<td>Modern China</td>
</tr>
<tr>
<td>1949-date</td>
<td>People’s Republic</td>
<td>Communist and Socialist</td>
<td>Contemporary China</td>
</tr>
<tr>
<td></td>
<td>of China</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B

Guideline for Formulating Urban Green Space Planning (Pilot Version)


《城市绿地系统规划编制纲要(试行)》中华人民共和国住房和城乡建设部（2002）

This Guideline is made in order to: (1). implement “Regulations for Urban Greening” (the State Council, 1992. No.100 Command 《城市绿化条例》(国务院【1992】100 号令)) and “the State Council’s Circular About Strengthening the Development of Urban Greening” (the State Council, 2001. No. 20 《国务院关于加强城市绿化建设的通知》(国务院【2001】20 号令); (2). systematise and standardise the preparation of “Urban Green Space Plan” in China; (3). ensure the quality of the plan (planning) and fully promote the ecological-environmental benefits, socio-economic benefits and landscape-cultural functions.

“Urban Green Space Plan” is a sectoral plan of “Urban Master Plan”. It deals with in-depth and detailed issues of “Urban Master Plan”. “Urban Green Space Plan” is supposed to be prepared by collaboration between a city’s statutory department for urban planning and its statutory department for urban parks. “Urban Green Space Plan” should be included into “Urban Master Plan”.

The main tasks of “Urban Green Space Plan” are: (1). to scientifically define the norms for the development of various types of urban green space; and (2). to reasonably arrange the construction of various types of urban park green space and the spatial layout of greening for the larger regional environment. The planning must be based on thorough investigation and research projects of local urban environments, and conform to the relevant quotas assigned by the “Urban Master Plan”, such as the development goals, land use layout and the like. The goals of “Urban Green Space Plan” are: (1). protecting and improving urban ecological environment; (2). optimising the environment of urban human settlements; and (3). promoting sustainable development.

The output of “Urban Green Space Plan” includes four parts: planning text, planning manual, planning illustration and basis materials for planning. Among these, approved planning text and planning illustrations have the same legal effect. The interpretation of this guideline refers to the Ministry of Housing and Urban-Rural Development of P.R.China (2002). The guideline takes effect from date it is issued. All the cities in China should obey this guideline during the preparation and evaluation process of “Urban Green Space Plan”. During the implementation, cities can actively explore (the use of the guideline) and report (to the Ministry) as soon as problems are identified, so that the guideline can be further enriched and improved.
### Table B1. Planning text

<table>
<thead>
<tr>
<th>Names of chapters</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>General principles</td>
<td>Including planning border, planning basis, planning guiding philosophy and principles, planning period and scale etc.</td>
</tr>
<tr>
<td>Planning goals and norms</td>
<td>/</td>
</tr>
<tr>
<td>Regional green planning</td>
<td>/</td>
</tr>
<tr>
<td>Urban green space planning – structure, layout and zones</td>
<td>/</td>
</tr>
<tr>
<td>Planning for various types of urban green space</td>
<td>Introduction of planning principles, key elements and norms for various types of urban green space.</td>
</tr>
<tr>
<td>Plants planning</td>
<td>Planning the amount, areas, location, species composition of plants.</td>
</tr>
<tr>
<td>Biodiversity protection and construction planning</td>
<td>Including planning goals and norms, protection measures and countermeasures.</td>
</tr>
<tr>
<td>Ancient trees and precious woods protection</td>
<td>Amount of ancient trees and precious woods, their species and growth situation</td>
</tr>
<tr>
<td>Planning for construction in stages</td>
<td>Divided into short-term, medium-term and long-term plan, emphasis on clarifying the short-term projects and their cost and benefit estimations.</td>
</tr>
<tr>
<td>Measures for plan implementation</td>
<td>Including measures in terms of laws and regulations, administrative, technical, economic and policies aspects.</td>
</tr>
<tr>
<td>Appendix</td>
<td>/</td>
</tr>
</tbody>
</table>

### Table B2. Planning manual

<table>
<thead>
<tr>
<th>Names of chapters</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>General introduction &amp; existing situation</td>
<td>1. General introduction. Including natural, social, environmental condition and the general situation of the city etc.</td>
</tr>
<tr>
<td></td>
<td>2. Existing situation of green space and analysis. Including statistical analysis of various types of existing green spaces, advantages and impetus, main existing problems and constraints for urban green space development.</td>
</tr>
<tr>
<td>General planning principles</td>
<td>1. Significance of the preparation of the plan</td>
</tr>
<tr>
<td></td>
<td>2. Basis, time frame, geographical scope and dimensions of the plan.</td>
</tr>
<tr>
<td></td>
<td>3. Guiding philosophy and principles of the plan.</td>
</tr>
<tr>
<td>Planning goals</td>
<td>1. Planning goals</td>
</tr>
<tr>
<td></td>
<td>2. Planning norms</td>
</tr>
<tr>
<td>Regional green planning</td>
<td>Clarifying the structure and layout of the regional green system plan, and the development plan of various types (of urban green space). Constructing a green space system, which is based on the central city as a core, covers the whole city region, and integrates city and countryside.</td>
</tr>
<tr>
<td>Structure, layout and zoning of Urban Green Space Plan</td>
<td>1. Plan structure</td>
</tr>
<tr>
<td></td>
<td>2. Plan layout</td>
</tr>
<tr>
<td></td>
<td>3. Zoning of the plan</td>
</tr>
<tr>
<td>Urban green space planning for various types of urban green space</td>
<td>1. Urban green space classification</td>
</tr>
<tr>
<td></td>
<td>2. Planning for Public Park Green Space (G1)</td>
</tr>
<tr>
<td></td>
<td>3. Planning for Nursery (G2)</td>
</tr>
<tr>
<td></td>
<td>4. Planning for Protection Green Space (G3)</td>
</tr>
<tr>
<td></td>
<td>5. Planning for Attached Green Space (G4)</td>
</tr>
<tr>
<td></td>
<td>6. Planning for Other Green Space (G5) Describing separately the planning principles, planning (main) contents and planning norms of various types of green spaces, and identifying the basic species, key species and ordinary species (for various green spaces).</td>
</tr>
<tr>
<td>Plants species planning</td>
<td>1. Basic principles for plants species planning.</td>
</tr>
<tr>
<td></td>
<td>2. Identify the vegetation zone of the city. Including climate zone,</td>
</tr>
</tbody>
</table>
regional vegetation type, plant communities and their key species, and soil types.
3. Technical and economic norms. Define proportion of gymnosperm and angiosperm, proportion of evergreens and deciduous vegetation, proportion of trees and shrubs, proportion of woody plants and herbs, proportion of native species and exotic species (and preparing ecological security analysis), proportion of fast-growth, moderate-growth and slow-growth species. Defining vegetation index of green space (family, genus, species and the units below).
4. Selection of basic species, key species and ordinary species.
5. Selection and suggestion for city flower and city tree.

Biological (mainly plants) diversity protection and construction planning

1. General existing situation
2. Goals and targets for biodiversity protection and construction.
3. Levels and plan for biodiversity protection and construction (including species, genes, ecosystem and landscape diversity planning).
4. Measures and ecological management countermeasures for biodiversity protection and construction.
5. Protection and countermeasures for precious and close-to-extinction plants.

Ancient trees and precious woods protection

/ 

Planning for construction by stages

Implementation of urban green space plan can be divided into three stages: short-term, medium-term and long-term. When arranging planning goals and key projects of various stages, it should respect the urban green space’s development pattern and characters. The short-term plan should define planning goal and key tasks, as well as the concrete projects and their scale and budget estimation; medium-term and long-term construction planning mainly include projects, their plans and rough estimation of budget.

Implementation measures

Discussing the measures in terms of laws and regulations, administrative, technical, economic and policies aspects.

Appendix

/

Table B3. Plan illustrations

<table>
<thead>
<tr>
<th>Name of the Plans/Maps</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location and Relationships Map</td>
<td>/</td>
</tr>
<tr>
<td>Existing Situation Map</td>
<td>Including city’s comprehensive existing situation map, existing situation map for built-up areas, existing situation map for various green space, and distribution map of ancient trees and precious woods, and historical sites etc.</td>
</tr>
<tr>
<td>Urban Green Space Existing Situation Analysis Map</td>
<td>/</td>
</tr>
<tr>
<td>General Plan</td>
<td>Illustrating green space’s spatial structure, the major types, etc. at the city level</td>
</tr>
<tr>
<td>Plan for Greening Regional Large Scale Environment</td>
<td>Illustrating green space’s regional structure and the connection between regional level and urban level</td>
</tr>
<tr>
<td>Plan for Various Types of Green Space</td>
<td>Including plans for park green space, nursery, protection green space, attached green space and other green space.</td>
</tr>
</tbody>
</table>
Short-term Construction Plan

Note: Scale of the maps is generally identical to the Master Plan, 1:5000 – 1:25000; the scale of the Location and Urban Districts Relations Map can be smaller (1:10000– 1:50000); the scale of the Plan for Various Types of Green Space can be bigger (1:2000 – 1:10000); Insert the “wind rose”.

Table B4. Collection of basic materials

<table>
<thead>
<tr>
<th>Name of the chapters</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>General condition of the city</td>
<td>1. Natural condition: geographical location, geology and landforms, climate, soil, hydrology, fauna and flora species.</td>
</tr>
<tr>
<td></td>
<td>2. Economic and social conditions: economic and social development level, city development goals, population condition, various land use condition.</td>
</tr>
<tr>
<td></td>
<td>3. Environment protection material: main pollution source of the city, distribution of the heavily polluted areas, pollution control situation and other environmental protection data.</td>
</tr>
<tr>
<td></td>
<td>4. Urban history and culture data.</td>
</tr>
<tr>
<td>Existing condition of urban green space</td>
<td>1. Green space and relevant land use data: location, area and landscape structure of existing various green spaces; location, area and degree of utilisation of various cultural landscapes; location, area, rate of flow, depth, water quality and degree of utilisation of the main water systems.</td>
</tr>
<tr>
<td></td>
<td>2. Technical and economic norms: greening norms (area of park green space per capita, green coverage percentage of built-up area, greening rate of built-up area, average green space per capita, park green space service radius), the flow of visitors to park green space and landscape woodlands in working days and holidays; nursery stock amount, type, standards, degree of self-sufficiency of the nursery stocks; amount, location, age, and growth condition of the ancient trees and precious woods.</td>
</tr>
<tr>
<td></td>
<td>3. Ornamental fauna and flora data: existing ornamental flora species data base, fauna data base; status of main plant diseases and insect pests.</td>
</tr>
<tr>
<td>Management data</td>
<td>1. Management organisation: name and sectors (e.g. construction sector, agricultural sector or forestry sector); organisation set up, regulation system.</td>
</tr>
<tr>
<td></td>
<td>2. Personnel situation: number of staff (ratio of 10,000); ratio of employee hierarchy of professional staff, workers and technicians.</td>
</tr>
<tr>
<td></td>
<td>3. Research on urban green space (including plants).</td>
</tr>
<tr>
<td></td>
<td>4. Budget and equipment</td>
</tr>
<tr>
<td></td>
<td>5. Urban green space maintenance and management condition.</td>
</tr>
</tbody>
</table>

Public green space means the green land is well designed, open to the public. The total green area is more than 50%, and contains some recreational and sports facilities serving a certain population.
Appendix C
National norms for urban green space planning and development

Table C1. Main terminologies concerning urban green space planning in China
(Source: Jia, 2000, p.12-14; Ministry of Housing and Urban-Rural Development of China, 1999; translated by Liu, 2008)

<table>
<thead>
<tr>
<th>Terminologies</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area of urban green space (m²)</td>
<td>The sum of area of all public parks, neighbourhood green spaces, green spaces in residential areas, green spaces owned by companies, green spaces along the roads, production green spaces, protection green spaces, scenic forests, and so on.</td>
</tr>
<tr>
<td>Percentage of green land coverage (%)</td>
<td>In a certain region or area, the percentage of the total land use area for various green space types in the total area of the region or area.</td>
</tr>
<tr>
<td>Area of greenery coverage (m²)</td>
<td>The vertically projected area of the trees, bushes and perennial plants.</td>
</tr>
<tr>
<td>Percentage of greenery coverage (%)</td>
<td>In a certain region or area, the percentage of perpendicular projection of the total actual vegetation in the total area of the region or area.</td>
</tr>
<tr>
<td>Average green space per capita (m²/person)</td>
<td>The average area of urban green space per person.</td>
</tr>
<tr>
<td>Area of public green space (m²)</td>
<td>The sum of all the public green space in the built-up area.</td>
</tr>
<tr>
<td>Average public green space per capita (m²/person)</td>
<td>The average public green area per person.</td>
</tr>
<tr>
<td>Park green space service radius (m)</td>
<td>The distance that the park can serve the people. From the park entrance to visitor’s home.</td>
</tr>
</tbody>
</table>

Table C2. Regulations for Indicators of Urban Green Spaces Construction (1993)
(Source: Ministry of Housing and Urban-Rural Development of China, 2002, adapted from Liu, 2008)

<table>
<thead>
<tr>
<th>Indicators</th>
<th>By 2000</th>
<th>By 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average public green space per capita (m²/person)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For cities with average built area per capita under 75m²</td>
<td>≥ 5</td>
<td>≥ 6</td>
</tr>
<tr>
<td>For cities with average built area per capita between 75 – 105m²</td>
<td>≥ 6</td>
<td>≥ 7</td>
</tr>
<tr>
<td>For cities with average built area per capita more than 105m²</td>
<td>≥ 7</td>
<td>≥ 8</td>
</tr>
<tr>
<td>Percentage of greenery coverage (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>≥ 30</td>
<td>≥ 35</td>
</tr>
<tr>
<td>Percentage of green land coverage (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Of a whole city</td>
<td>≥ 25</td>
<td>≥ 30</td>
</tr>
<tr>
<td>Of new residential area</td>
<td>≥ 30</td>
<td></td>
</tr>
<tr>
<td>Of old residential area</td>
<td>≥ 25</td>
<td></td>
</tr>
<tr>
<td>Percentage of roads greening coverage (%)</td>
<td>For major roads</td>
<td>≥ 20</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>-----------------</td>
<td>------</td>
</tr>
<tr>
<td>For secondary roads</td>
<td></td>
<td>≥ 15</td>
</tr>
<tr>
<td>Width of protection forest belt along river, sea, lake, and railway (m)</td>
<td></td>
<td>≥ 30</td>
</tr>
<tr>
<td>Percentage of attached green space coverage (%)</td>
<td>Average</td>
<td>≥ 30</td>
</tr>
<tr>
<td>附属用地绿地率</td>
<td>Industry, warehouse and business centre</td>
<td>≥ 20</td>
</tr>
<tr>
<td>Note: for old built-up area can be 5% lower than the norms</td>
<td>Industry with pollution, (In addition, protection forest belt)</td>
<td>≥ 30</td>
</tr>
<tr>
<td></td>
<td>School, hospital, governmental institution, public recreational facility, military base</td>
<td>≥ 50m</td>
</tr>
<tr>
<td>Area of land use for nursery in total city area (%)</td>
<td>/</td>
<td>≥ 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table C3. Main indicators for “National Garden City” in China</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Source: Ministry of Housing and Urban-Rural Development of China, 1992, adapted from Liu, 2008)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Basic indicators</th>
<th>Location of the city</th>
<th>Large city</th>
<th>Medium city</th>
<th>Small city</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average public green space per capita (m²/person)</td>
<td>South of Qinling Mountains and Huai River</td>
<td>6.5</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>人均公共绿地面积</td>
<td>North of Qinling Mountains and Huai River</td>
<td>6</td>
<td>6.5</td>
<td>7.5</td>
</tr>
<tr>
<td>Percentage of green land coverage (%) 绿地率</td>
<td>South of Qinling Mountains and Huai River</td>
<td>30</td>
<td>32</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>North of Qinling Mountains and Huai River</td>
<td>28</td>
<td>30</td>
<td>32</td>
</tr>
<tr>
<td>Percentage of greenery coverage (%) 绿化覆盖率</td>
<td>South of Qinling Mountains and Huai River</td>
<td>35</td>
<td>37</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>North of Qinling Mountains and Huai River</td>
<td>233</td>
<td>35</td>
<td>37</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table C4. Other indicators for “National Garden City”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of green land coverage of residential area (%) 居住区绿地率</td>
</tr>
<tr>
<td>New residential area</td>
</tr>
<tr>
<td>Old residential area</td>
</tr>
<tr>
<td>Percentage in the length of a road (%)城市街道绿化按道路长度普及率和达标率</td>
</tr>
<tr>
<td>With road planting</td>
</tr>
<tr>
<td>Reach greening standard</td>
</tr>
<tr>
<td>Percentage of green land coverage (%) 绿地率</td>
</tr>
<tr>
<td>City main road</td>
</tr>
<tr>
<td>Parks</td>
</tr>
<tr>
<td>Percentage of protection green space in total area of the city (%)</td>
</tr>
<tr>
<td>Percentage of self-produced plants in total plants used for greening (%) 绿化所用苗木自给率</td>
</tr>
</tbody>
</table>
Appendix D

Urban and green planning illustration documents

D.1 1946 Beijing Master Plan

According to archive documents, during the National Government period, there was only one urban planning for Beijing. It merely remained those open gardens and had few advanced moves – only proposing a new zoo, golf course and stadium (Beiping Work Bureau, 1947)

Figure D1. Beijing Urban Planning Draft Map in 1946
(Source: Beiping Work Bureau, 1947)

These planning documents (text and maps) are all in Chinese, and translated by the author. For the legends in the maps, because different planning stages, different land use classification and terms were adopted, I only list the legends related to urban green space. Other land use including residential area, business area, industrial land, warehouse land, transportation land, are not marked. This appendix forms a database of urban master and green space planning documents. Because each planning stage has been explained in the previous chapters, repetition is inevitable here.
D.2 1949 – 1981 Planning stage 1

D.2.1 Urban master plan

Liang Sicheng, the well-known “Father of Modern Chinese Architecture”, and Vice-Director of the Beijing City Planning Commission, together with another well-known Chinese urban planner and architect Chen Zhanxiang (Charles Chen), put forward the proposal *Recommendations for the Location of the Administrative Centre of P. R. China*. It was also known as *Twin cities Plan for Beijing* (Figure D2). They suggested preserving the whole ancient Forbidden City intact (including all surrounding old city walls and gate towers), and establishing a new administrative centre far to the west of the imperial city (Figure D3).

In the *Twin cities plan for Beijing or Liang & Chen Plan*, a new administrative centre would be established to the west of the old city. The northwestern outskirts were designated for higher education land use and resort areas due to Haidian District’s long-history gorgeous imperial and private gardens. The new industrial districts were located outside of the old city in the southeastern and southwestern suburbs of the city based on prevailing wind directions and the orientation of major drainage systems.

*Figure D2. Proposed Twin cities Plan for Beijing 1949*
(Source: Adapted from Beijing Municipal Commission of Urban Planning, *et al.*, 2006. Note: pink dash line outside is the old Beijing boundary; red colour inside is the old Beijing city core, where six royal dynasties sat; green colour is the proposed new Beijing city centre in order to protect historical sites and balance the city development structure.)
However, the Twin Cities Plan was rejected. Instead, in November 1953, the 1953 General Planning of Beijing (also named as Draft Plan on Reconstructing and Expanding the Beijing Municipality) was approved based on Soviet experts’ planning. This was the first authoritative plan for modern Beijing (Figure D4), and was implemented during the 1st Five-Year Plan period (1953-1957).

Figure D4. The 1953 Beijing Master Plan (Revised in 1954)
Figure D5. The 1953 Beijing Master Plan (City Centre)

(Source: Beijing Municipal Commission of Urban Planning, et al., 2006. Compared with Liang’s plan of Figure D2, the distinctive differences also include the area and distribution of industrial area except for the location of the new administrative centre. The 1953 plan designated much more lands for industrial development.)

This plan concurred six planning principles as a socialist capital and model for other cities in China (Sit, 1996):

1. The central part of the city should become the location of the central government. It should be the centre of the city as well as the focus of the whole country;

2. The capital should be the country's political, economic and cultural hub; it is especially important for it to be the nation's main industrial base and centre of technology and science;

3. The city should be developed into a socialist city suitable for communal life and socialism;

4. The major danger in planning for Beijing is an extreme respect for old architecture, such that it constricts the perspective of development;

5. Beijing lacks sufficient water resources, and is plagued by wind and sand. Such environmental conditions should be altered to provide better conditions for the development of industry;

6. In reforming the road network, the existing situation should be adhered to as much as possible.

D.2.2 Urban green space plan

In 1958, the first urban green space system planning was proposed based on 1953 Beijing Master Plan.
Figure D6. The 1958 Beijing City Centre Green Space Plan


Highlights of this plan: Ring-shape green areas would be built surrounding old city wall relics and moats. Gardens near the inner city would be linked to green areas in the outskirts of the city. The 1st greenbelt, consisting of parks, nurseries, farmland, would encircle the outskirts and separate the scattered groups.
D.3 1982 – 1991 Planning stage 2

D.3.1 Urban master plan

In 1982, the new Beijing Master Plan (1982-2000) was approved (Figure D7, Figure D8). It relocated the role of Beijing as “the national political and cultural centre” and further offered a blueprint of Beijing in 2000. Beijing was supposed to be the political centre of the nation, and the centre for China’s dealings with foreign countries, and should be developed into one of the best cities in the world with social order and morality, cleanliness and hygiene, rich culture, high technology and highly educated, economic prosperity, convenience and stability. In this version, although the role of being an economic centre was relinquished, it did not mean that Beijing gave up economic development. Instead, it started industrial restructuring, which preferred to low-energy consumption, low-water needed, low occupation of land, pollution-free industries (Beijing Municipal Commission of Urban Planning, 1982). Beijing urgently encouraged developing service and high-tech industries.

Figure D7. The 1982 Beijing Master Plan (1982-2000)
Figure D8. The 1982 Beijing City Centre Master Plan (1982-2000)

(Source: Beijing Municipal Commission of Urban Planning, et al., 2006. It is noteworthy that in this plan, the green space was drawn with sports land. Does it reflect that the authority had a fuzzy and uncertain attitude to urban green space in terms of functions and goals/targets of green spaces?)

This plan presented seven planning principles as follows (Beijing Municipal Commission of Urban Planning, et al., 2006):

1. The capital was to be the “political and cultural centre” of the nation;
2. The plan reaffirmed the need to constrain the population of Beijing to 10 million and 4 million in the city centre by the year 2000;
3. It stressed improving the city’s environment and put forward “Greening the mountains; bluing the water; preventing pollutions”. It recognised the importance of “greening” for the city and the need to protect and conserve its natural environment. The target is to make Beijing the cleanest and most beautiful city nationwide;
4. It insisted the development of scattered groups around the central city, renewing the old centre and making it modern; improving the infrastructure of suburban areas and actively promoting the growth of the outer suburbs;
5. It fostered the growth of satellites in the outer suburbs;
6. More stringent requirements were laid down for the conservation and preservation of the cultural and historical heritage of the city.

7. It clearly specified the need for a ratio between housing and its related services and established the “residential district” as the basic unit in the planning of residential areas.

**D.3.2 Urban green space plan**

Beijing set up 38.9% of greenery coverage as its 2000 greening goal. In addition, “Public green space” in the central city should achieve 5200ha, including 4000ha parks. Thus, everyone will account 10m$^2$ of parks. Outside of the city, 6676 km$^2$ of mountain greening, 2800km$^2$ of water and soil conservation forests, 1744 km$^2$ of scenic spots, 266 km$^2$ of Firewood forest, and 1866 km$^2$ of Economic forests (for fruits and other products).

![Figure D9. The 1982 Beijing Green Space Plan (1982-2000)](image)

(Source: Beijing Municipal Commission of Urban Planning, *et al.*, 2006. Note: Key greening consists of nature reserves and scenic spots as new attractive greening projects.)
Figure D10. The 1982 Beijing City Centre Green Space Plan (1982-2000)

(Source: Beijing Municipal Commission of Urban Planning, et al., 2006. It is noteworthy that the scenic areas were paralleled with orchard lands.)
D.4 1992 – 2003 Planning stage 3

D.4.1 Urban master plan

In the early 1990s, the Beijing Master Plan 1992-2010 (Figure D11, D12) was approved and started to implement. Compared with the 1982 plan, there was mainly one different principle highlighted: Beijing urban development future should be directed according to socialist market economy with Chinese characteristics\(^{62}\), not the free market economy of an American-style. In detailed, the new five principles as follows (Beijing Municipal Commission of Urban Planning, et al., 2006):

1. In addition to further accentuate the role of Beijing as “the national political and cultural centre”, the goal of “building Beijing into an open and modern international metropolis” was put forward as a new construction goal;

2. Make more great efforts to continuing the industrial restructuring and further develop the tertiary industry and high-technology industry;

3. Two-shift Strategy: to shift development from the inner city to satellites towns; to shift emphasis from urban expansion to inner-city improvement;

4. Protecting the historical and cultural places was required at the city scale rather than focusing on the single spot, i.e., making this protection systematic;

5. Speed up urban infrastructure and environment construction to establish a garden-style civilised Beijing.

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\(^{62}\) The socialist market economy with Chinese characteristics is a mixture of socialist centralised planning with a capitalist/market economy (before this, the private sector was absolutely forbidden in China). It was conceived by Deng Xiaoping in the early 1980s, primarily applied in the field of economic development.
Figure D11. The 1992 Beijing Master Plan (1992-2010)

Figure D12. The 1992 Beijing City Centre Master Plan (1992-2010)
D.4.2 Urban green space plan

Since the new *Chinese Standard for Classification of Urban Green Space* was enacted in 2002 (refer to Chapter 2 Section 2.2.2), Beijing started to adopt the new classification in green space statistics work and physical planning. The goals of green space construction include that park area is expected to increase to 64.74km$^2$ from 30.73km$^2$ and 10m$^2$ per person; meanwhile, the percentage of greenery coverage will increase from 28% to 40%.

Based on the 1982 version, another three Nature Reserves were proposed and the number of Nature Reserves would arrive five and scenic spots would increase to thirteen, which was intended to be adjacent and connected to each other. Mountains greening received great attention, where “Three key projects” and “Three base constructions” were proposed. “Three Key projects” include 1. “water and soil conservation forests” in the mountains, upstream of rivers and around Miyun and Huairou reservoirs; 2. greening at the foot of the mountain; 3. remediation of some watersheds. “Three Bases construction” include 1. economic forest base; 2. fuel-wood forest base; 3. larch forest (see Figure D13, D14).

Figure D14. The 1992 Beijing City Centre Green Space Plan (1992-2010)

D.5 2004 – 2020 Planning stage 4

D.5.1 Urban master plan

Some main principles were translated as follows (Beijing Municipal Commission of Urban Planning, *et al.*, 2006):

1. Urban development goals: a mature Socialist market economy; harmonious socialist society; regional cooperation between urban and rural areas; to promote a overall, coordinated and sustainable development; a liveable city;

2. To improve the Jing-Jin-Ji regional coordinated development in terms of city infrastructure, industrial structure and distribution, environment preservation and other aspects (Figure D15). As the core of this region, Beijing has been well developed and owns the advantages in the fields of finance, trade and hi-technology, therefore, Beijing should play a leading/motivating role to strike a better balance between developments of Beijing and surrounding Tianjin city, and Hebei province. To strengthen the regional infrastructure construction between them and gradually constitute an elaborate regional development blueprint;

3. The main development strategy was “two urban axes (North-South axis and East-West axis), two development corridors, and polycentric urban structure”, which aimed to break down the dual spatial structure of urban area and rural area, abandon the inefficient pattern of monocentric urban development model and thus transform the focus of urban development from central urban areas to the underdeveloped periphery (Figure D16);

4. Reconfirm the role of Beijing as the capital of P. R. China; the national political and cultural centre; the world-famous ancient city and international metropolis;

5. The extension of planning and development should be the entire administrative area of Beijing, where the uniform planning and management would be implemented. A new polycentric pattern is formed by three parts: in the centre is the central city; outside of the central city are 11 new cities (also called “satellite towns”), to be developed to help absorb the pressures of population and development in the central city. Between the two parts, there are some small towns (refer to Figure D16);

6. To promote a coordinated development between economy and society. To further readjust industrial structure and reallocate resources reasonably. To make full use of technological and cultural advantages of Beijing, modern service and hi-tech businesses are urged to accelerate the pace of development;

7. To build up a resource-effective and environment-friendly society. To pay more attention to the construction of mountain greening, wind-dust protection greening, greenbelt, scenic spots, nature reserve, forest parks and wetland (Figure D17 and Figure D18);
8. Protect the historical and cultural places, especially the old city at the city scale. To balance the relationship between their redevelopment and protection;

9. Seize the opportunity of the 2008 Olympic Games and the National 11th Five-Year Plan to improve the construction of municipal infrastructure and environment, to build a “clean, neat, tidy, beautiful and nice” of well-designed urban landscape.

Figure D15. Regional structure plan aim to form Beijing-Tianjin-Hebei (Jing-Jin-Ji Region) development zone

Figure D16. Two axes-two corridors-polycentric Beijing urban structure plan
Actually, a polycentric pattern has long since been proposed in Beijing master plan (1982-2000). However, the old planned polycentric pattern failed to control urban growth from spreading out of the existing built-up centre since it lacked mixed-used development, employment opportunities, public transportation and other infrastructure services. After realising the failure, the point of polycentric pattern was shifted to consider regional development and attract the investment from the surrounding cities; define the area on a large scale with more attention to environmental protection; bring the market factors that affect urban structure into the planning process; and discard the former goal of creating equally sized satellite towns (Huang, 2004).

Figure D17. The 2004 Beijing Master Plan (2004-2020)
D.5.2 Urban green space plan

In this version, urban green space planning is established as a special planning theme. Under this theme, the detailed items are planned separately. Except for the general overall plans of the Beijing municipal area and city centre (Figure D20 and D21), others include Beijing Greenbelt Plan, Beijing Wetland Plan, Beijing Nature Reserve Plan, Beijing Wind-dust Protection Greening Plan, as well the elaborate urban green space planning for 11 satellite towns.
Figure D19. Three ecological buffers plan
(Source: Beijing Municipal Institute of City Planning & Design, 2004)

Figure D20. The 2004 Beijing Green Space Plan (2004-2020)
(Source: Beijing Municipal Institute of City Planning & Design, 2004)
Figure D21. The 2004 Beijing City Centre Green Space Plan (2004-2020)
(Source: adapted from Beijing Municipal Institute of City Planning & Design, 2004)

Figure D22. Beijing Ecological Corridors Structure Plan (2004-2020)
(Source: Beijing Municipal Institute of City Planning & Design, 2004)
Figure D23. Beijing Nature Reserve and Forest Park Plan (2004-2020)
(Source: Beijing Municipal Institute of City Planning & Design, 2004)

Figure D24. Beijing Wetland Plan (2004-2020)
(Source: Beijing Municipal Institute of City Planning & Design, 2004)
Figure D25. Beijing Wind-dust Protection Greening Plan (2004-2020)
(Source: Beijing Municipal Institute of City Planning & Design, 2004)

Figure D26. Beijing Farmland Plan (2004-2020)
(Source: Beijing Municipal Institute of City Planning & Design, 2004)
Figure D27. Beijing Scenic spot Plan (2004-2020)
(Source: Beijing Municipal Institute of City Planning & Design, 2004)

Figure D28. Beijing Historic and Cultural Heritage Sites Plan (2004-2020)
(Source: Beijing Municipal Institute of City Planning & Design, 2004)
Other green plans include the green structure plans and detailed plans for 11 satellite towns. I list Huairou Town green space plan as an example (Figure D29).

Figure D29. Huairou Town Green Space Structure Plan (2004-2020)
(Source: Beijing Municipal Institute of City Planning & Design, 2004)
Appendix E

Figure E1 Mao’s calligraphy of “绿化祖国” (Green the Homeland) and “实行大地园林化” (Turn all the land green and into a garden)
(Source: http://www.gsgreen.gov.cn/admin/news_view.asp?newsid=700;
Appendix F

Figure F1 Water treatment trains in the Olympic Park
(Source: Hu and Zheng, 2009)

Figure F2 Concept diagram of water cycling and utilisation in the Olympic Park
(Source: adapted from Beijing Institute of Water, 2009)
The principles of water utilisation in the Olympic Park (Beijing Institute of Water, 2009):

1. Increase the liability of the entire water treatment system;

2. Demonstrate a variety of water treatment technologies;

3. Integrate water treatment functions with scenic effects;

4. Construct a natural and ecological treatment system;

5. Provide an educational centre for ecological education.