Regenerating urban landscape: A framework for ecological urban design in Kai Tak River, Hong Kong

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ABSTRACT

The purpose of this graduate terminal project is to explore contemporary theories for landscape urbanism and ecological design to understand their applications in real world situations. I used a qualitative research approach that employed an interpretative strategy. My project involved the analysis and synthesis of contemporary theories for the formulation of theoretical frameworks. These interpretative design frameworks were applied to a project located along a segment of the Kai Tak River located in Kowloon, Hong Kong. Within this qualitative research approach, interpretive and action research strategies were both utilized.

My research goal was to gain a deeper understanding of current thinking on landscape urbanism and ecology-based design, particularly by three practicing designers (James Corner, Ken Yeang, Kongjian Yu) who are theorists. The theorists have articulated specific approaches that can serve as three different theoretical frameworks for ecological design in urban situations. As design inquiry, another important objective was to apply my interpretation of the selected contemporary theorists to a real-world project. My analysis of their work became the foundation for my synthesis of a new theoretical design framework that was applied to a site in Hong Kong. In this aspect, my project also reflected an action research strategy.

Mixed-methods were utilized during my primary research tasks and involved archival research and field observation. Archival research included the review and analysis of technical government documents, development plans, design plans and planning documents of the Kai Tak River area and Hong Kong. Field research involved field visits to the Kai Tak River area to collect data and make field observations for site and context analysis.

A key objective for this research project was to explore landscape urbanism and ecological design theories in a systematic process for application to sites in complex urban settings like Hong Kong. This graduate terminal project expands current theories on the practice of landscape urbanism and ecological design in mega cities. It also demonstrates the need for further research on theory-based methodologies that link ecology and community based design frameworks for application to complex landscape architecture projects in dense urban environments.

TABLE OF CONTENTS

Chapter 1: Introduction and Methodology

An overview of problem statement, research questions, assumptions and research method

INTRODUCTION

As urbanization has continued to grow and introduce problems to our cities, the traditional urban design attitude and approach can no longer offer solutions to our cities' environmental, social and cultural degradation problems. Traditional urban design practice deals primarily with architectural form, spatial arrangement, land use and circulation. It often ignores the different layers of ecological systems that occur in urban areas. Urban form design may allow cities to work more efficiently and create aesthetically pleasant spaces but it can also destroy important ecological linkages. This is due to the fact that it does not clear recognize ecological linkages. Landscape urbanism, a new multi-disciplinary approach to understanding our cities has emerged over the past decade. It hopes to better reflect what our cities are facing ecologically and culturally and to provide design solutions accordingly. This approach seeks to redefine our understanding of the urban fabric within new landscape and ecological paradigms that traditional urban design practice has largely ignored (Corner 2006, p.28).

Landscape urbanism creates a new platform for cross-professional disciplines to collaborate in the city-building process including art, biology, ecology, geography, urban planning, landscape architecture, architecture and interior that was traditionally handled by only the built environment industry. This integrated design approach has become significant to the re-generation and re-habitation process of inner city areas because not only does it allow urbanists to rethink urban form spatially; but more importantly our cities can be re-interpreted within the regimes of urban ecology and cultural identity. Through my review of the literature, landscape urbanism appears to require three inter-correlated dynamics: human activities, physical infrastructure and ecological services to fully function. The dynamics of each influence would have different significance in the development process depending on the site context.

Figure 1.1 Urbanized Hong Kong
(Source: Francisco Martins, http://www.flickr.com/photos/betta_design/2986498662/)

BACKGROUND FOR THE RESEARCH

Hong Kong, China is one of the most densely populated metropolitans in the world (Figure 1.1) (One World Nations Online). This has made land management in urban areas extremely challenging and difficult in Hong Kong. Much of the suitable land for development in Hong Kong's highly urbanized areas has already been transformed into skyscrapers and high-rise apartments. Ecology in the developed areas of Hong Kong has essentially been erased with a few exceptions located in the more suburban settings. This has caused fundamental ecological and social problems to the urban areas.

Open spaces in urban settings provide important ecological, climatic and stormwater management functions, i.e. reduction in urban heat island effect. Open space can create necessary ventilation in high density urban areas and circulate the heat accumulated in between skyscrapers (American Planning Association 2007). In the field of landscape architecture, it is generally known that open spaces create opportunities for recreational activities, community and social interaction, and social events.

As a technologically and economically advanced metropolitan area, Hong Kong has not been fully explored in utilizing ecology design in planning or landscape architecture. This is due to the lack of understanding for how ecological design can better enhance living quality. With the green movement at its height around the world during the last two decades, several ecological restoration projects provide

examples to educate people about conservation and environmental protection in Hong Kong. The recently completed Hong Kong Wetland Park, is a wetland park that serves educational, tourist and conservation purposes (Figure 1.4). It has been designated an ecological mitigation area (EMA) for wetlands lost as a result of the Tin Shui Wai New Town development (Hong Kong Wetland Park 2011).

This fairly new wetland park has gained huge success in promoting environmental awareness to the general public since its opening. Mai Po Nature Reserve is a Ramsar site (Wetland of International Importance) that is located in the northwestern part of the New Territories (Figure 1.2 & 1.3). This natural wetland conservation area includes an education center, a 380- acre natural conservation area, and 1,800 acres of surrounding wetland. The wetland supports a wide range of reptiles, mammals, insects, and over 350 kinds of birds ('Mai Po Marshes' Wikipedia 2011).

Hong Kong Wetland Park and the Mai Po Nature Reserve are good examples of projects that contribute to the growth of environmental awareness in Hong Kong. In terms of regulatory policies, the county park system and Site of Special Scientific Interest (SSSI) are good examples of the environmental policy established by the British before they departed in 1997. SSSI is a special area designated to protect wildlife, ecological, habitat and geographic features based on scientific interest in Hong Kong. The intent of SSSI is to ensure full account is taken when development and land use change is proposed. There are 51 SSSI locations throughout Hong Kong and many of them are in danger of losing their status because of rapid development in rural area (World Wide Fund For Nature Hong Kong 2011).

Many of the projects and regulatory policies in Hong Kong indicated above are concerned with rural land conservation i.e. regulate land use on existing natural communities and conserve places that have high ecological values. Yet, the ecological movement has not been fully explored within the urban areas of Hong Kong. At the same time other

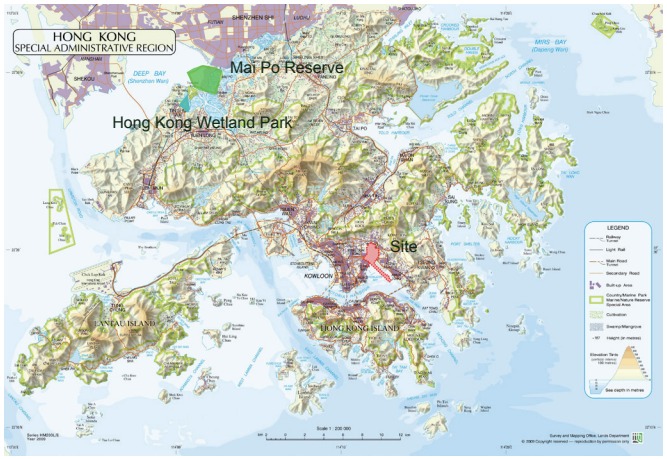


Figure 1.2 Location of Mai Po Nature Reserve and Hong Kong Wetland Park
(Source: Lands Department, Hong Kong, http://www.landsd.gov.hk/

Figure 1.3 Mai Po Nature Reserve
(Source: laurentcheung, http://www.flickr.com/photos/laurentcheung/4889530461/sizes/z/in/photostream/)

Figure 1.4 Hong Kong Wetland Park
(Source: Michael S, http://www.flickr.com/photos/atomicplayboy/3206926974/)

metropolitan areas, globally, have become increasingly aware of ways that thoughtful ecological urban design can be utilized as a catalyst for economic development, social coherence, ecological education and infrastructure device; all intended to achieve sustainable urban core areas in social, economic and ecological terms.

As China recently could have up to 400 cities with over one million people by 2020, compared to 40 in the U.S., it is crucial to recognize appropriate environmental strategies that will allow Chinese cities to continue to grow in a sustainable and healthy manner (Jones Lang LaSalle 2008).

GOALS, OBJECTIVES AND RESEARCH QUESTIONS

This graduate terminal project aims to investigate contemporary theory of ecological design as it could apply to an urban environment, particularly Hong Kong, a megacity and skyscraper environment. It will also help urbanists in China recognize the significance of contemporary theories on urban design and ways they can be customized and applied to projects in rapidly booming cities in China. The primary research question that my project sought to answer was: How can landscape urbanism and ecological design theories be applied to a highly dense urban environment?

The following questions were formulated to guide my literature review for the theories selected for analysis:

1.How are the contemporary theories investigated in this research different from conventional urban design approaches? And what are the similarities and differences among the theories that were investigated?

2.What are the emphases and concerns for each selected theory?

3.How can these selected theories be applied to an ultra urban setting like Hong Kong?

ASSUMPTIONS

Several limitations and assumptions were made for my graduate terminal project. My primary goal for the project was to apply contemporary theory to a real world site design situation. Another primary goal was to understanding the interaction of different “layers of site information” including ecological systems and human activities within a highly dense urban location and mega city like Hong Kong. Since this research dealt with design inquiry surrounding ecology and human activities,

less focus was placed on urban planning administration and policies that shape the urban area. In addition, my graduate terminal project put very little emphasis on major engineering issues but attempts to be practical. Given the limited amount of time I had for this project, I studied and focused on developing parameters and proposing design strategies for the upstream section of the river. Due to the fact that the site is located in a foreign territory which increases the difficult of data gathering, the base map for the studied area was created through aerial imagery and may not truly reflect actual dimensions.

METHODOLOGY

This graduate terminal project used a qualitative research approach that employed an interpretative strategy. Research method included both primary and secondary research. In this case, primary research included mixed methods: archival research and the review of design and planning documents; site observation; and case study analysis. Secondary research was an in-depth literature review focused on three selected contemporary theories. I also reviewed the literature on urban design as it relates to landscape architecture. As research-based design, my terminal project was based on five activities (Figure 1.5):

1) Investigate contemporary design theories on ecological design and landscape urbanism by the theorists and practitioners, Ken Yeang, Kongjian Yu and James Corner, through literature review and case study analysis

2) Develop critical analysis based on literature review and case study analysis of the investigated theories. Subsequently, the critical analysis informed the theoretical frameworks for my design application

3) Conduct site analysis in land use, stormwater management, open space, cultural and historic significance and access, circulations and transportation to understand existing site conditions in order to develop a site synthesis to identify site constraints, issues and opportunities

4) Based on the theoretical design frameworks and site synthesis, develop a set of design priorities for my design application, Kai Tak River, Hong Kong

5) Develop a new design vision for Kai Tak River, Hong Kong utilizing the design priorities as guiding principles

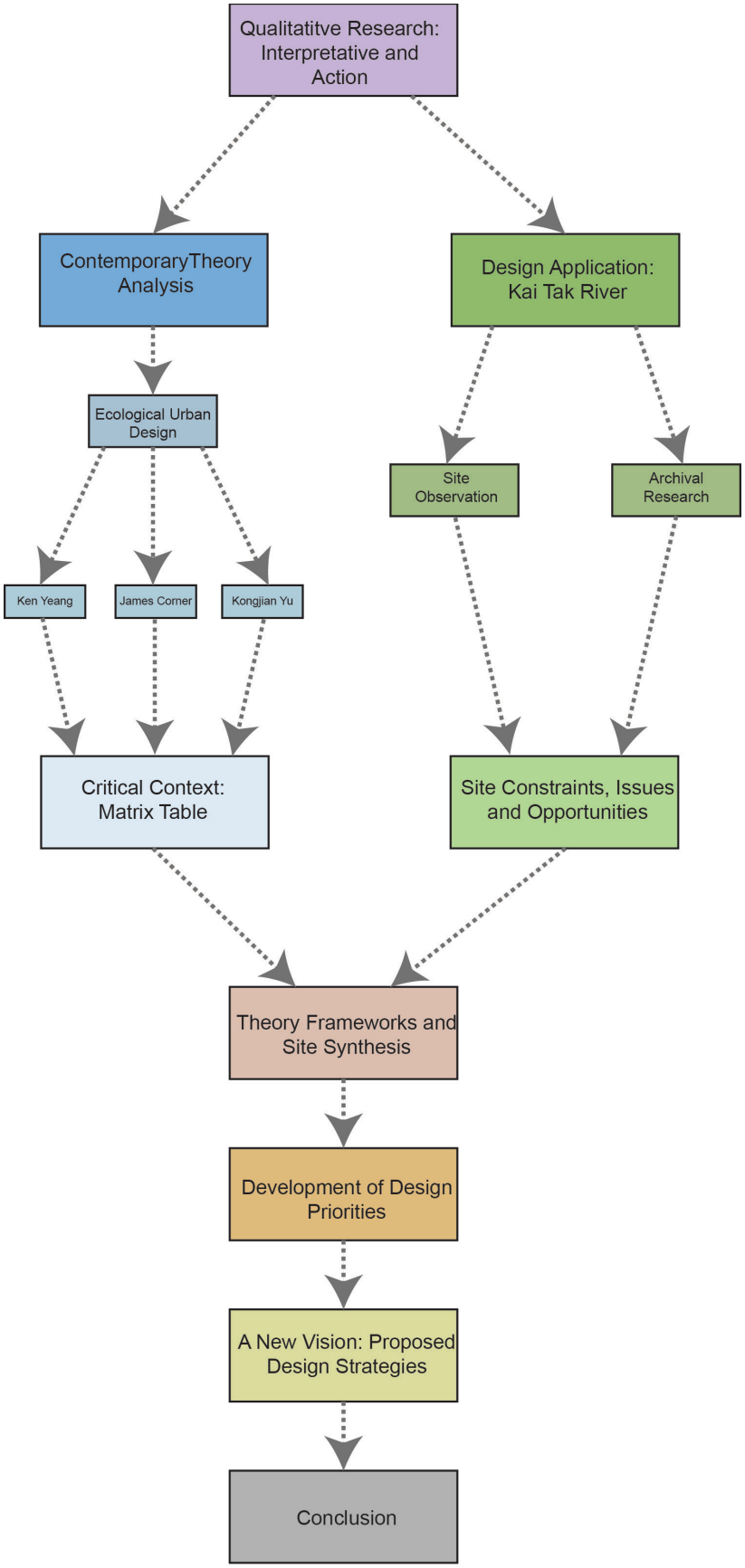


Figure 1.5 Research Design

Chapter 2: Contemporary Theory Analysis

This chapter covers a discussion of the literature by three selected theorists and designers. Analysis and interpretation of their work is discussed in the sub-section, I called Critical Context; this set the basis of my logic when formulating the theoretical design framework

INTRODUCTION

Theories developed by three different contemporary theorists and practitioners, James Corner, Ken Yeang, Kongjian Yu, were investigated and analyzed to understand their interpretations of ecological design in urban setting. They were selected based on three criteria:

1. Reputation in the professions of landscape architecture and planning
2. Involvement in both the academia and professional practice that allowed me to understand their design philosophies through their projects
3. Distinguished and innovative approaches in understanding the role of landscape and ecology in contemporary urban environment

A current or past project from each theorist and practitioner was selected as case study to further understand how each of them translates their design philosophies to real world situations. These case studies were selected to represent and reflect the designers' unique approaches in addressing contemporary planning and landscape architecture issues as well as how they implement these approaches through different design elements and programs.

THEORISTS-PRACTITIONERS

James Corner, Chair

Department of Landscape Architecture
University of Pennsylvania
Principal, Field Operations

James Corner is an internationally recognized landscape architect whose academic writings and professional works have largely been focused on developing contemporary landscape architecture as a medium or metaphor for urbanism. James Corner received his Bachelor's degree at Manchester Metropolitan University before he graduated from University of Pennsylvania with his Masters in Landscape Architecture. James Corner began his teaching career at University of Pennsylvania in 1988 before selected as the chair of the Landscape Architecture Department in 2000. He later founded Field Operations, a landscape architecture and urban design practice based in New York, NY and Philadelphia, PA and is currently the principal of the firm. James Corner, alongside with Charles Waldheim, was one of the originators in the landscape urbanism movement which seeks to re-interpret urbanism in a different notion that involves a series of ecological processes ("James Corner" and "Landscape Urbanism" Wikipedia 2011).

Corner: Time and Process

James Corner's *Terra Fluxus* (Corner 2006) is perhaps one of the most influential and important writings on landscape urbanism. In the article, he first underlines the three triggering factors of landscape urbanism: 1) ecological awareness; 2) growth of tourism; 3) sense of unique identity (Corner 2006, p.23). He further explains that landscape urbanism is different from earlier attempts to speak of urban sites as landscapes or to situate landscape in the city to fill up the "left-over" spaces. James Corner sees the significant potentials of landscape urbanism with its ability to shift scales based on ecology and allows urbanists to design relationships between dynamic environmental processes in a very complex urban fabric. James Corner introduces four parameters for the framework of landscape urbanism (Corner 2006, p.28-32):

1) Processes over time

Landscape urbanism is concerned with relationship among social, economic, cultural and ecological processes in temporal terms. It aims to create a design framework to re-store or enhance these systematic relationships over time.

2) Horizontal surface

Landscape should be seen as a means to an end in the urbanization process. The landscape surface itself becomes as urban infrastructure or accelerator to allow for flexibility in the ever changing urban fabric.

3) Operation method

Ecology is the mechanics of urbanization with social, economic, cultural systems embedded in our natural environment. Landscape urbanism is the planning of a space-time ecology that allows all the systems to exist cohesively over time.

4) Imaginary

Landscape urbanism provides room for imagination. Public spaces should not be limited to solely providing recreational opportunities. They can be a reflection of collective memory and imagination to generate new possibilities.

Case Study: Fresh Kills Park by Field Operations

Fresh Kills Park is perhaps one of the first urban parks that will follow the principles set by landscape urbanism in ecological, cultural and human implications. Field Operations, founded by James Corner, will turn what was once the largest landfill in the world into 2,315 acres of public open space creating recreational, cultural and education opportunities for New Yorkers while taking ecological considerations (NYC Department of City Planning 2006, p.6). The design concept behind Fresh

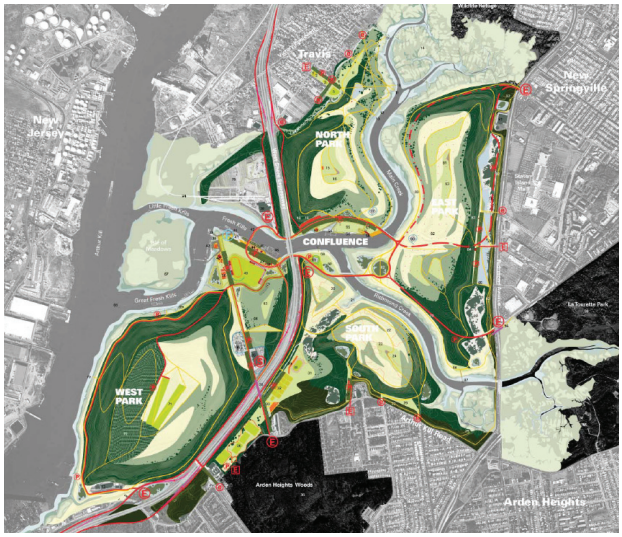


Figure 2.1 Draft Master Plan, Fresh Kills Park
(Source: NYC Department of City Planning, http://www.nyc.gov/html/dcp/html/fkl/fkl4c.shtml)

Kills Park is lifescape. '"Lifescape is an ecological process of environmental reclamation and renewal on a vast scale, recovering not only the health and biodiversity of ecosystems across the site, but also the spirit and imagination of people who will use the new park" (NYC Department of City Planning 2006, p.6). The restored or recreated system will become self-sustainable and allow for site resilience, an ability to adjust and adapt to changing processes. The design of Fresh Kills Park addresses the environmental and ecological needs yielded by the site itself and is also committed to respond to human use and activity. The new plan proposes a programmatic use to include different types of human activity, both passive and active recreational opportunities (NYC Department of City Planning 2006, p.8).

This is very different from the traditional approach to park and open space design. Traditional design approach to park and open space considers only aesthetic values, circulation and activity; the design team for Fresh Kills Park came up with detail plans in vehicular circulation, non-vehicular circulation, parking, programming, structure, art and culture, landscape and habitat and landfill mound restoration. The park is divided into five major areas: the Confluence, North Park, South Park, East Park and West Park, each with its unique set of features, habitats and program elements with the goal to increase opportunities for a diversity of activities (Figure 2.1).

"Time" is considered in two aspects for Fresh Kills Park: habitat diversification and site phasing. Habitat diversification looks at the changing of habitat types over time as more overlapping inter-plantings and "spread" of seed bank and species occur which result in stratified habitat communities and diverse ecological matrices (Figure 2.2) (NYC Department of City Planning 2006, p.31). The large scale and complexity of the site means a phasing framework needs to be developed in order for park to grow in a predictable and controlled manner over time. Three 10-year phases are proposed (Figure 2.3). Phase 1 (the first 10 years) aims to provide important access, circulation and infrastructure through the site and generate public interest and enthusiasm about the project. Phase 2 (the next 10 years) enhances program setting and ecology by encouraging public involvement and investment in building new facilities in the park.

Phase 3 (the third decade) expands and promotes new uses and through adaptive management of wildlife habitat to enhance some of the earlier-stage program areas (NYC Department of City Planning 2006, p.52)

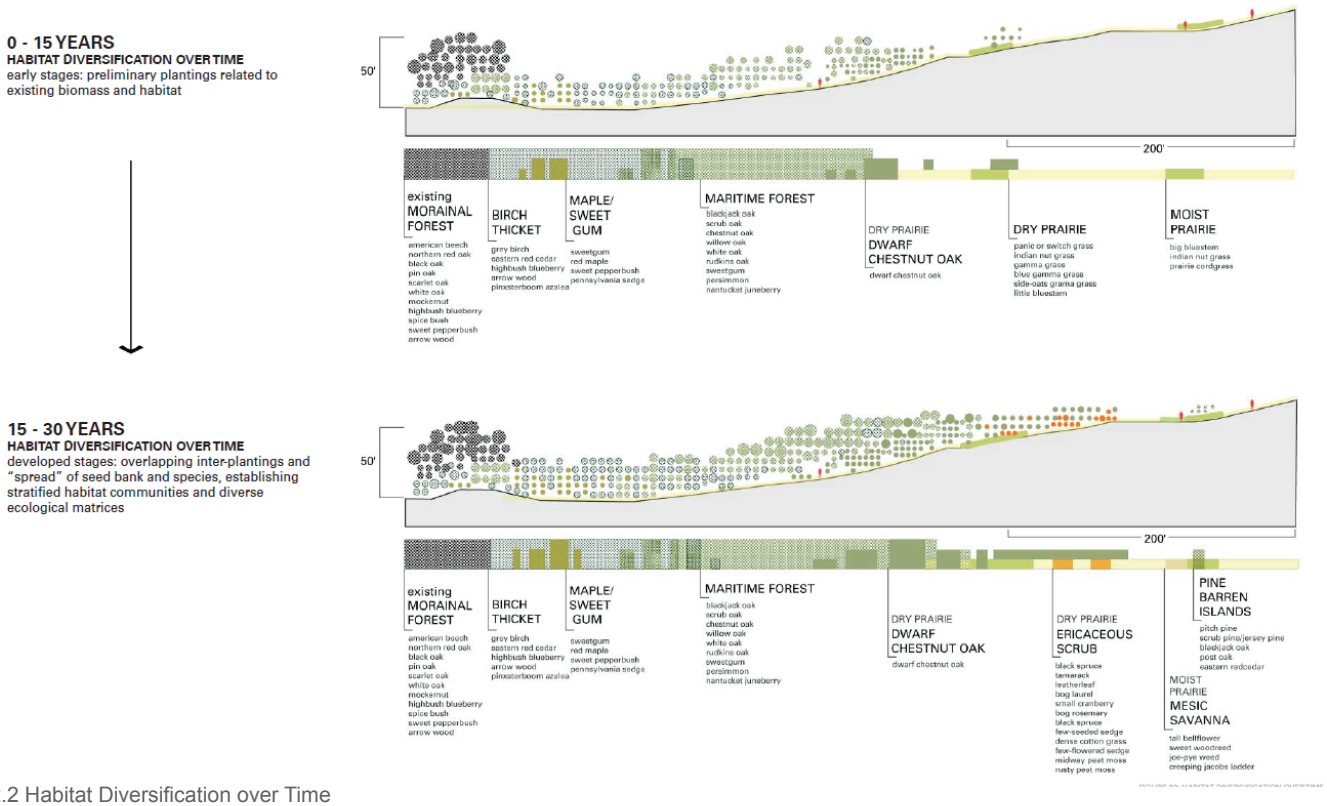


Figure 2.2 Habitat Diversification over Time
(Source: NYC Department of City Planning, http://www.nyc.gov/html/dcp/pdf/fkl/dmp.pdf)

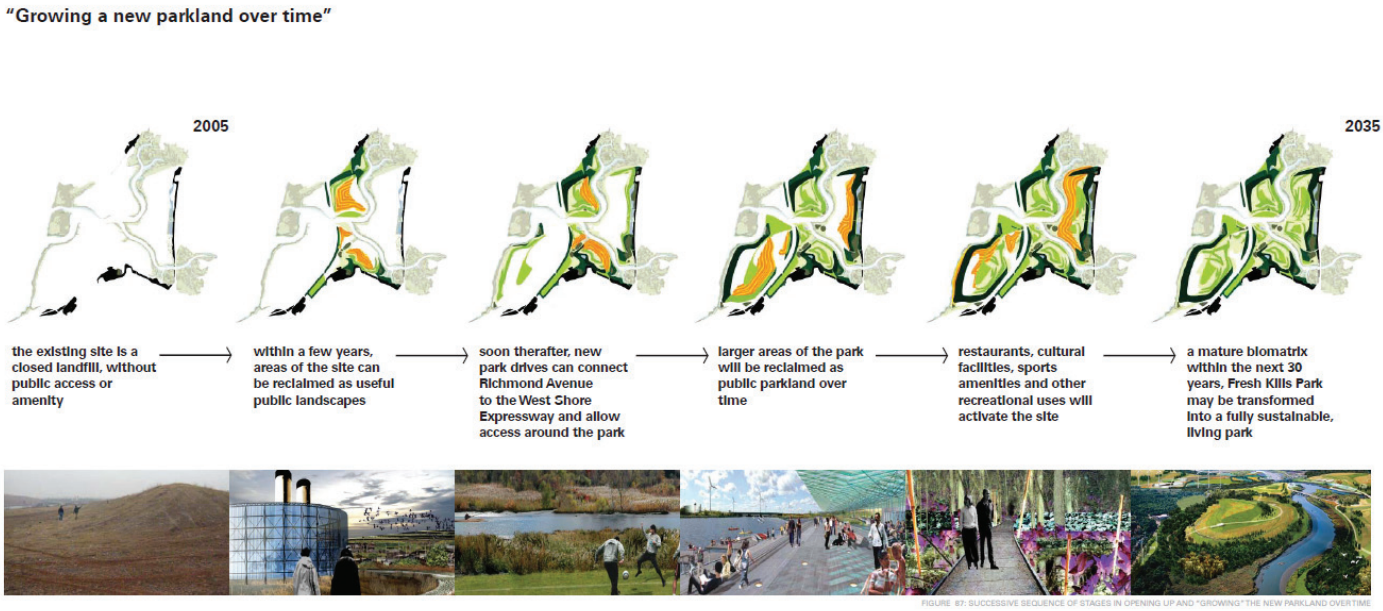


Figure 2.3 Phasing Plan
(Source: NYC Department of City Planning, http://www.nyc.gov/html/dcp/pdf/fkl/dmp.pdf)

Figure 2.4 *Ecomasterplanning* by Ken Yeang (Source: dezeen, http://static.dezeen.com/uploads/2009/07/squecomasterplanning-cover.jpg)

Dr. Ken Yeang, Principal

T.R. Hamzah & Yeang International

Kuala Lumpur, Malaysia

Dr. Ken Yeang is a leading architect-planner who utilizes the ecological design approach in his master planning and architectural projects. Yeang was born in Penang, Malaysia and received his first qualification in architecture from the Architectural Association in London before receiving his PhD in ecological design from Cambridge University entitled *A Theoretical Framework for the Ecological Design and Planning of the Built Environment* ('Ken Yeang' Wikipedia 2011). Throughout his 40 years of professional career, Ken Yeang has been an advocate for the biointegration of human and natural environments. He has authored several publications. Both his ecomasterplanning and green skyscraper design have focused on achieving eco-mimicry which he explains as the imitation of natural properties through design to promote sustainability in our built environment (Koh 2010).

Yeang: Ecomasterplanning

Ecomasterplanning (2009) (Figure 2.4), a book written by Yeang to elaborate his idea of ecomasterplanning which he explains as a customized design approach that focuses on the biointergration of human and natural environments to create a single dynamic, interactive and functional system. It is primarily concerned with ecosystem's integrity, connectivity and functioning (Yeang 2009, p.15). Ecomasterplanning seeks to understand site and context as shifting modes of interactions that are both dynamic and temporal. It describes a site as a physical state consisted of ecological processes that have the ability to adjust and adopt to changing internal and external forces. Ecomasterplanning begins with a careful study that begins with the site context to understand existing relationships among different modes of infrastructure. Understanding the site context allows urbanists to determine the most appropriate ecological planning and design strategy based on ecological resources. The following table (Table 2.5) shows different ecological design and planning strategies based on ecosystem hierarchy (Yeang 2009, p.37) and their corresponding data analysis requirements.

In areas that are higher in the hierarchy, both conversation and preservation of land of high ecological values are the priority. The goals are to avoid building anything or divert development to areas that have already been developed and posses little ecological significance. Development can segregate ecological resources and create habitat fragmentation and put many species in danger.

Ecosystem hierarchy	Site data requirements for design	Design strategy
Ecologically mature	Complete ecosystem analysis mapping Highest level of detail in analysis	- Preserve - Conserve - Avoid any building to prevent any disturbances; build carefully only in no-impact areas (if any)
Ecologically immature	Complete ecosystem analysis and mapping	- Preserve - Conserve - Build on impaired areas and areas of least impact and no ecological consequence
Ecologically simplified	Complete ecosystem analysis and mapping	- Preserve - Conserve - Increase biodiversity - Built on low-impact areas
Mixed artificial	Partial ecosystem analysis and mapping	- Conserve - Increase biodiversity - Built on low-impact areas
Monoculture	Partial ecosystem analysis and mapping	- Increase biodiversity - Built on areas of non-productive potential (non-arable areas) and least ecological impact - Rehabilitate the ecosystem and habitats
Zeroculture	Analysis and mapping of remaining ecosystem components (eg. Hydrology, remaining trees, etc.)	- Increase biodiversity and organic mass - Rehabilitate the ecosystem and habitats
Contaminated and brownfield sites	Mapping of contaminated ecosystem components	- Assess cause of damage and source of contamination - Decontaminate and remediate - Rehabilitate the ecosystem and habitats

Table 2.5 Design strategy for different site types

In areas where human intervention occurs, design and planning strategies should focus on preservation and conservation of ecological resources. It is also important to reintroduce biodiversity in those areas to reactivate ecosystems and habitats. Brownfield sites have a different set of strategies because of their high degree of contamination. The planning and design strategies for those areas should focus on decontaminating and remediating, and slowly reintroducing ecosystems.

There are two important concepts in ecomasterplanning: infrastructural layers and connectivity. Infrastructural layers are underlying systematic networks that form cities socially, economically and ecologically. Ecomasterplanning describes four important infrastructural layers in the process of site design and they are: green infrastructure, blue infrastructure, grey infrastructure and red infrastructure (Yeang p.16):

Green Infrastructure (GI) is the network of natural areas and open spaces that possess ecological values. GI is the most important infrastructural layer in ecomasterplanning because it is essentially the backbone of many ecological communities and habitats.

Blue Infrastructure (BI) is the network of hydrological management concerning

with stormwater management and water conservation.

Grey Infrastructure (GI) is the engineering networks such as road, sewage, power lines and utilities that provide important functions for urban areas.

Red Infrastructure (RI) is the human infrastructure of built environment that provides functions for social, economic and political systems.

Connectivity is concerned with the interaction within each infrastructural layer (internal) and how each layer interacts with other layers (external). An example of internal connection is introducing new habitat connectivity within the proposed green infrastructure that connects to existing habitat to create wildlife corridor using eco-bridges. Open space can also be integrated with stormwater management system to create an external connection. Good internal and external connections are crucial in ensuring material flows within each infrastructural layer as well as integrating flows between the built and natural environments.

The ultimate goal of ecomasterplanning is to create an environment that has the ability to adjust and adopt to changing internal and external processes. In many cases, site resilience and balance can be achieved through the restoration and reconnection of natural elements that have been damaged because ecological processes provide a higher degree of tolerance compared to man made environment.

Case Study: West Kowloon Waterfront Masterplan Competition entry

The competition submittal for the master plan of West Kowloon Waterfront aims to create a new ecological waterfront feature for Hong Kong (Figure 2.6). The major design component of the proposal is the continuous extent of a “green jacket” roof that offers opportunities for active and passive public spaces as well as retail and commercial area underneath. The green jacket also serves as rainwater collector and diverts rainwater to the blue infrastructure that circulates around the site. Microclimate is also considered with the introduction of eco-cell that allows daylight penetration, rainwater harvesting and other types of natural ventilation (Yeang 2009, p.56-63).

The proposal recognizes ecological connectivity in different dimensions and dynamics. The green jacket creates an overall ecological framework at a site scale that introduces ecosystems in a horizontal dynamics. The horizontal green space connects proposed open space with existing park system while it is also connected to a vertical ecosystem through a series of eco-cells that permits different types

of natural penetration including air, stormwater and sunlight to occur in a vertical dynamic. This, in turn, has created a three-dimensional ecosystem that helps introduce habitats into interior space and create a better biointergration between human and natural environment (Yeang 2009, p.61-63).

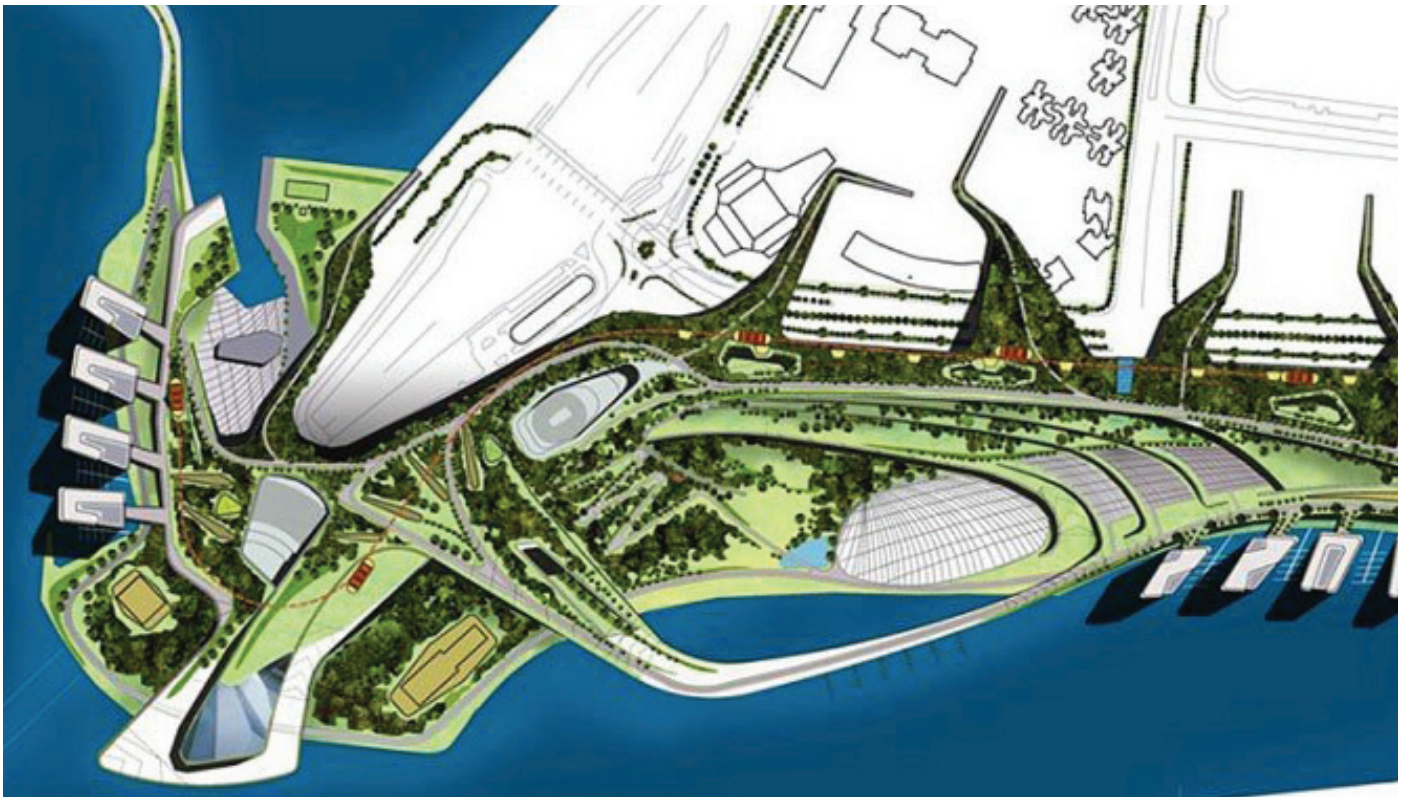


Figure 2.6 West Kowloon Waterfront Proposal
(Source: wallpaper, http://www.wallpaper.com/galleryimages/17050868/gallery/testuser5_mar2009_11_westko_yeang_jp020309_j20brz_Waje2x.jpg)

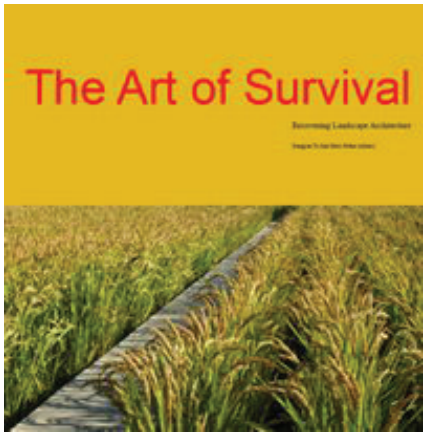


Figure 2.7 *The Art of Survival: Recovering Landscape Architecture* edited by Kongjian Yu and Mary Padua
(Source: Peking University, http://www.gsla.pku.edu.cn/upload/book/20061110104734102.jpg)

Kongjian Yu, Dean and Professor

Peking University Graduate School of Landscape Architecture
Turenscape, President and founding principal
Beijing, P.R.C.

Kongjian Yu is an award-winning Chinese landscape architecture practitioner and theorist whose works are largely focused on understanding the relationship between human and nature. Born a peasant's son, Yu was raised in a small, traditional Chinese village in Zhejiang Province and spent a lot of time working in agricultural fields. It was this childhood experience that led to Yu's interest in landscape architecture as his major when attending Beijing Forestry University in 1980 for both his bachelor and master's degrees. Yu graduated in 1987 with a degree of Master in Landscape Architecture in which he finished his thesis with a title of The Quantitative Models for Landscape Assessment. Yu taught in the same department for five years before enrolled in the Harvard Graduate School of Design in 1992 and received his Doctor of Design degree in 1995. Having spent two years in The SWA Group (Laguna Beach) after graduation, Yu returned to China and founded a new graduate landscape architecture program at Beijing University. In 1998, Yu also founded Turenscape the first private landscape architecture firm to offer professional landscape architecture services in China, Turenscape, in 1998 (Wu 2010). Yu has been active in both the academic and practice arenas in China and the world. His ecological and cultural oriented projects such as Zhongshan Shipyard Park, Shenyang Campus, productive landscape design based on rice crops, The Rice Paddy Campus and most recently Shanghai Houtan Park, have won him a number of international design awards and made him one of the most recognized contemporary landscape architects.

Yu: Vernacular Landscapes

Yu's academic writings and professional works have surrounded the concept of vernacular landscape in urbanization which he describes as the new landscape typology that focuses on creating a harmonized environment for nature, its processes and people. This typology is different from traditional place making approach that stresses cosmetic and ornamental values. In his article, *The Art of Survival: Recovering Landscape Architecture* (Figure 2.7), Yu urges the importance for the landscape architecture profession to re-evaluate the vernacular of land and people and to consider landscape as the connectivity link between land, people and spirits. He further purposes four strategies and approaches to contemporary landscape architecture to sustain urbanization (Yu 2006, p.20-24):

1. Design should harmonize with nature, its processes, patterns and the sustainable

welfare of humanity with respect to human culture and identity spirits.

2. Understanding the local culture and history of human is an important component of design process

3. Design should aim to create a common and authentic relationship between land and people that gives the place culture and identity at the first place.

4. Landscape should be seen as infrastructure for urban development by adopting the negative approach. The negative approach identifies critical ecological processes and cultural heritages before development plan evolves.

In his article *The Big-Foot Revolution* (Yu 2010), Yu points out that urbanization sacrifices function in exchange for ornamental values just like young Chinese girls were forced to bind their feet because natural big feet were considered rural and rustic (Yu 2010, p.282-291). He suggests ecological urbanism can provide a guide for sustainable cities in the future with urban development based on the concept of ecological infrastructure across scales. Ecological infrastructure (EI) is defined as the structural landscape network composed of critical landscape elements and spatial patterns that has strategic significance in safe-guarding the integrity and identity of the natural and cultural landscapes with secure sustainable ecosystem services (Yu 2010, p.284).

Case Study: Zhongshan Shipyard Park

Zhongshan Shipyard Park is located in Zhongshan, Guangdong Province, China (Figure 2.8). The park is a former industrial shipyard park built in the 1950s during Mao's industrial period; it went bankrupt in 1999 (Yu & Pang 2006, p.142). Just like much of China, Zhongshan has experienced tremendous changes over the last few decades moving from an agriculture based, state-owned economy to a capitalist economy that heavily relies on the manufacturing industry. This rapid transition of economy has created major social problems in cultural identity and how people perceive traditions and modernity. This atmosphere poses particular challenges for landscape architects. A designer can appropriate elements of classical Chinese gardens and assemble them into landscapes that resemble the popular image of a traditional design. Or a designer can transpose elements from projects in other parts of the world and provide a completely contemporary solution (Yu & Padua 2006. p.162). Turenscape's design strategies in Zhongshan Shipyard Park are hybrid of the two. The design team recognized the importance of retaining features of the shipyard to symbolize and celebrate its rich history and locality. On the other hand, they implemented a contemporary design approach that was alien

to the Chinese landscape architecture profession to integrate recreational uses and environmentally sensitive open space.

Through a combination of preservating old features and introducing new features, Yu and his design team created a series of focal points and experiences: the creation of a local landmark through the conversion of an old water tower into a lighthouse along the river; a pair of cranes were re-used and transformed into gateways on the western and southern edges of the park (Figure 2.9) (Yu & Padua 2006, p.164). Newly constructed features included: an ecological island built to preserve heritage banyan trees from being eliminated by flood control engineers , part of the city's river alignment project; the construction of a painted red tower, Yu's image of the structural skeleton for a water tower that was demolished; and the Red Box (Figure 2.10), red-painted steel plates that encloses reflecting pools that evokes memories of the Cultural Revolution, one of the darkest periods of modern Chinese history (Padua 2006).

Zhongshan Shipyard Park is a great example of a type of vernacular landscape and "genius loci" approach that Kongjian Yu advocates. Rather than completely eliminating existing features and designing from scratch, the design team's approach was to preserve the local cultural, political history, and ecological aspects of the site with careful introduction of contemporary design strategies. His approach also seeks to preserve the local natural habitat and important memories and values that have been rapidly taken away by modernization.

Figure 2.8 Zhongshan Shipyard Park
(Source: The Waterfront Center, http://www.waterfrontcenter.org/Awards/Images/Zhongshan.jpg)

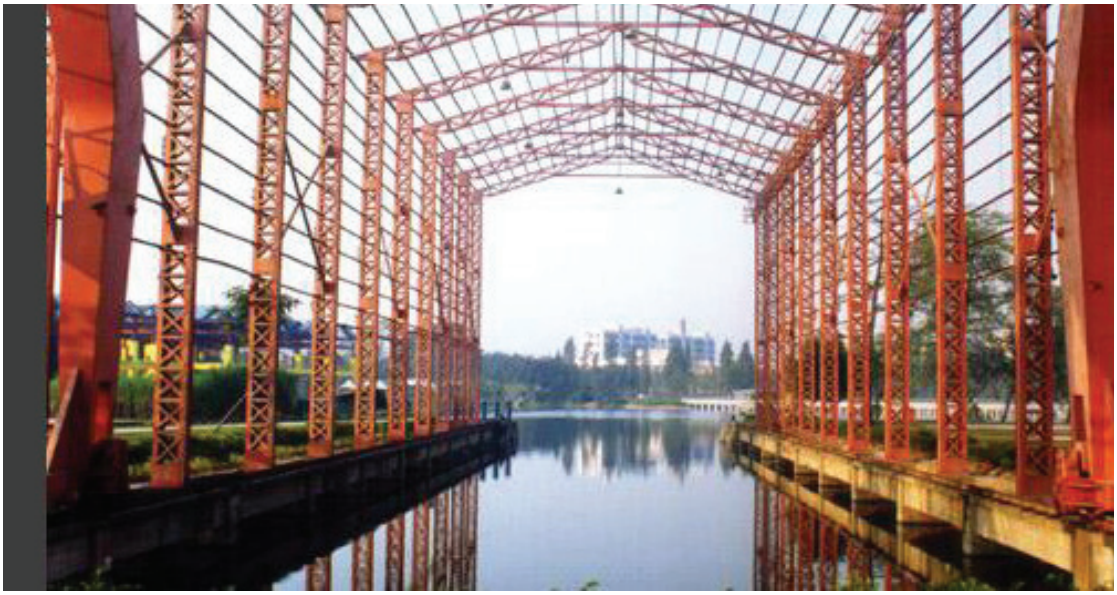


Figure 2.9 Reused crane as gateway feature
(Source: Delta Bridges, http://www.deltabridges.com/files/imagecache/Teaser/news/teaser/zs-shipyard-park.jpg)

Figure 2.10 Red Box inside Zhongshan Shipyard Park
(Source: Turenscape, http://www.turenscape.com/upfiles/1261142311.jpg)

CRITICAL ANALYSIS

Three Designers, Three Approaches

The three investigated theories all consider landscape and its underlying functions as an important component in the urbanization process. Yet, they view landscape differently in its functions, values, application in social, cultural and ecological contexts. After studying the three theories, I began to create a synthesis of the theories to understand the different focuses and principles of each theory in a more systematic approach. This led to the creation of a matrix (Figure 2.11) that summarizes the theories based on their roles and applications in the profession of landscape architecture by looking at different key factors including design philosophy, technique and tools, the role of landscape, design elements, emphasis and problems.

Designer	Design Philosophy	Technique and Tools	The Role of Landscape	Design Elements	Emphasis	Issues
Ken Yeang	Infrastructural connectivity	Layering analysis strategy Biointergration of human interventions and natural environments with concerns over ecosystem's integrity, connectivity and functioning	Landscape (green infrastructure) is the physical connector that connects all other infrastructural layers	Green infrastructure Blue infrastructure Grey infrastructure Red infrastructure	Structural Procedural Strong emphasis on physical and infrastructural connectivity (hardware) Site context driven	Ignores social and cultural connectivity (software)
Kongjian Yu	Cultural Relationship	Landscape as the connecting link among the land (ecology), the people (culture) and the spirits (history) Vernacular landscape that reflects the daily life of common people and locality	Landscape is the cultural and social mediator that links culture, history and ecology	Land People Spirits of land (genius loci)	Human oriented approach that focuses on different aspects (culture, history) of humanity Related to daily life of the common people	Sacrifices some level of comfort in exchange for locality The vague definition of "vernacular"
James Corner	Process based relationship	Inter-disciplinary design process Development of a space-time ecology that treats all forces and agents working in the urban field and consider them as continuous networks of inter-relationship	Landscape as a functional device that connects different processes together	Time Process Multi-dimensional relationship	Dynamic, multi-dimensional process that considers a variety of influential factors in our built environment	"Lost in translation" from ideology to practicality

Table 2.11 Theory Matrix

Corner's Process-based System: Landscape as a functional device

In my interpretation of Corner's *Terra fluxus* (Corner 2006, p.21-33) and his design approach in the Fresh Kills project, Corner recognizes an important role for landscape in the process of urbanization: provide a surface or spectrum to restore and regenerate ecological systems. He sees urbanization as an opportunity to redefine our urban fabric networks coordinating landscape or ecology as a framework. He proposes four new lenses to look at landscape's role in urbanization: process over time, horizontal surface, operation method and imaginary (Corner 2006, p.28-32). These lenses focus on formulating a dynamic layer that current urbanization fails to consider. Urbanization emphases specialization in each infrastructure to achieve efficiency but ignores the integration of infrastructural layers. A good example is many channelized rivers were designed to get the collected water to its destination as quickly as possible but have no real connection with human, culture, ecology and their contexts. These infrastructural layers are engineered and customized to deal with a single issue at a time. The process of these layers is often linear and follows a series of rigid and predictable steps. The end result is these systems work very efficiently individually but collectively fail to function as a complete system for cities that will sustain.

Corner's process-based approach recognizes the need for a dynamic system in urbanization where different systems would be integrated in a way that would not sacrifice the individual qualities of a place. The restoration of the site's landscape and its underlying ecological functions become a device for a multi-dimensional urbanization process. From my analysis of the Fresh Kills Project, restoring landscape and its ecosystem services and functions happens on the surface level, part of the land's functionality and systems. It is different from the conventional urban design that stresses the built form and its rigid structure. Rather than creating certain types of space, the surface-oriented approach allows the system to grow and adapt to the ever-changing urban fabric.

This approach has created another important framework for urbanists to consider: "space-time ecology". The space-time ecology describes habitat diversification and development over time. It treats all forces and agents working in the urban field as continuous and interrelated networks (Waldheim p.30). The space-time ecology framework provides important implications and advantages over form-based design:

1) Ecology as flexible, adaptive and functional systems that have strong site resilience and tolerance
2) Time as an integral part of the mutli-diemsional and dynamic design process

Yet, much of James Corner's approach to utilize landscape as a functional catalyst in urbanization reminds on paper. Fresh Kills Park is a good example of applying some of the principles he invented i.e. incorporating time and habitat diversification in design as well as utilizing landscape restoration as part of the stimulus program that introduces new uses and programs. However, the impact that Fresh Kills Park has put on the overall urbanization and change of urban fabrics at a regional scale reminds to be seen.

Yeang's Infrastructural Connectivity: Landscape as a physical connector

Based on my interpretation of *Ecomasterplanning* (2009), Yeang uses an integrative approach that seeks to understand a site as a series of infrastructural layers. Yeang's objective for ecomasterplanning is to integrate human and natural environments in a balance and sustainable manner. Yeang believes this can be achieved through physical connectivity both within each individual layer (internal) and with every other layer (external). The connectivity can be both horizontal and vertical as long as it forms a functional linkage between the two "connectees". In his professional practice, Yeang's utilizes ecomasterplanning as a structural and procedural approach to site planning and design. The green infrastructure is Yeang's fundamental layer in ecomasterplanning. This "green dimension" creates an overall ecological framework for local habitat and is the physical connector that ties all other infrastructural layers together. Yeang also believes ecoinfrastructure should be integrated with existing natural features of the locality and urban form to provide green space for ecological services such as stormwater management. He further argues that the design of this green infrastructure is different from conventional open space because it considers ecological connectivity with its functions and services for the locality's ecosystems (Yeang 2009, p.22).

Yeang focuses largely on the biointegration resulted from physical connectivity among different infrastructural layers having understood the existing site through layer-cake method (P.18 Yeang). This approach is both structural and procedural which allows designers to follow understand how each layer can inform design decisions based on its functions and services. While this approach is systematic and provides a framework for different types of connections, it merely focuses on the physicality of landscape as connector and does not recognize the cultural and history of a place that makes a place unique.

Ecomasterplanning talks about the different design and planning strategies based on existing ecological hierarchy. This approach is important for urbanists to more accurately address the issues and respond accordingly with appropriate design

techniques. Based on Ken Yeang's interpretation of ecosystem hierarchy and corresponding strategies, I developed a matrix table (Table 2.12) that further explains how this interpretation through typology can help us understand ecological design and planning specifically in urban settings.

Instead of understanding ecology in a hierarchy, I categorized ecology based on the level of disturbance. Four levels of disturbance and associated settings were created. In this particular project, the focus was put on recognizing strategies in urban areas that are severely disturbed which essentially very little or no ecological resources remind. The strategies for those urban areas are to re-create ecological resources and linkages and re-establish biodiversity by imposing a new means of landscape layers in the existing urban fabrics. This includes utilizing existing representation of ecological heritage that no longer functions ecologically to create a new ecological infrastructure. However, the re-creation should not be seen as an attempt to restore impaired ecology back to its original state. Not only is the definition of original state unclear and different among different professions but more importantly, the degree of difficulties to bring back the lost ecology that had taken thousands of years to establish is extremely high both in terms of the required technology and resources. The re-creation, however, is an intervention that considers site context and its infrastructural layers to support an ecological landscape. The ecological landscape should be dynamic, interactive and functional system that ecomasterplanning is primarily concerned with and allows for resilience with the ability to adjust to consistently changing internal and external environment.

Level of Disturbance	**Setting**	**Ecological Resources**	**Ecological Design Strategies**
Minimum	Wilderness National Forest National Park (Paynes Prairie)	- Undisturbed and fully functional ecological resources - Strong linkage among ecological resources	- Conserve - Avoid any development to prevent any disturbances
Medium	Suburb Agriculture (Gainesville)	- Some degree of disturbance in ecological resources - Fragmented ecological resources caused by human activity	- Preserve - Build on impaired areas and areas of least impact and no ecological consequence - Re-establish ecological linkage
High	Urban (Boston, San Francesco)	- Highly disturbed and little functional ecological resources - Weak linkage among ecological resources caused by extensive human activity	- Re-store ecological resources - Increase biodiversity - Build on low-impact areas - Re-establish ecological linkage
Severe	Ultra Urban (New York, Tokyo, Hong Kong)	- Very little to no functional ecological resources - No linkage among ecological resources - Strong human influence on all aspects of environment	- Re-create ecological resources and linkages - Re-establish biodiversity - Design based on existing representation of ecological heritage if appropriate

Table 2.12 Ecological design strategy based on level of disturbance

Yu's Cultural Relationship: Landscape as a mediator between nature and human

Kongjian Yu argues that the current trend of urbanization is destroying the relationship between humans and nature (Yu 2006). In this argument, Yu observes that landscape is no longer a reflection of nature but simply a representation of human activity. In the process of urbanization, landscape is no longer a functional device of nature. The landscape created by urbanization is merely a cosmetic makeover that no longer has significance as a landscape. This unbalanced relationship disconnects the meaning of true landscape from people living in urban settings.

The ongoing urbanization, however, provides an opportunity for urbanists to re-interpret the meaning of landscape in an urbanized setting. Yu sees landscape as the cultural and social mediator that re-connects the broken linkage between culture and nature in the process of urbanization. The idea of vernacular landscape is to establish a local ecological language that reflects the unique characteristics of land, people, and spirit of the place.

Landscape does not automatically translate into green space in Yu's design vocabulary. The Turenscape plan for project, Tanghe River (Red Ribbon) Park, was intended to restore and preserve the natural river habitat while enhancing human opportunities by allowing park visitors to interact with the river. His design consisted of the "Red Ribbon" fiberglass reinforced steel structure that is 500 meters in length and traverses along the riverbank to promote access for recreational opportunities including jogging, fishing and swimming. The ecological restoration is a critical part of the project but the "Red Ribbon" is equally important. It creates a reinvigorated identity for the local community. The design is perceived by the local community as representing Mao's Chinese calligraphy and it helps to promote local identity. Mao Zedong was known to visit this city and it continues to be a vacation location for central government officials. Additionally, the color red has long been associated with Chinese culture and its identity. Both the national flag of China and traditional wedding dresses in China are red; it symbolizes happiness and unity The "Red Ribbon" quickly formed a connection with the common people through the use of the local vernacular language. Yu's vernacular language extends to ecological restoration with the use of native planting materials that can better adjust to changes and increases site resilience (Padua 2008).

This design philosophy of re-establishing a relationship with nature, as part of our culture, and history can change the dynamics of urbanization. China's urbanization consistently seeks efficiency and neatness in infrastructural systems including

road network, stormwater management and open space design. Cities have become machines that do not possess any characters or identity of their own. They are simply machines designed to operate in the most efficient and aesthetic pleasant ways to maximize productivity and outlook. This approach can achieve short term efficiency and prosperity but it lacks the ability to sustain in long run. The vernacular design allows urbanists to re-envision a more human, micro-scale oriented philosophy that stresses identity and integrity with the integration of ecology and humanity. This is also a response to our ever-globalizing world.

The broad definition of vernacular or locality seems to be ignored by many practitioners and theorists. There is always a lack of reference in locality in design vocabulary. According to Yu's philosophy, locality is concerned with two fundamental functions: culture and ecology. In many cases, the meaning of locality is vague and difficult to be fully connected with. Does restoring the landscape back to its original mean bringing back locality? Or simply designing certain features to resemble the history of the place? Indeed, designing a vernacular landscape is much of a site specific issue and requires timely study of local culture, history and ecology but a more general consensus on the definition of locality in the design profession and to what extent the vernacular landscape becomes too disconnected from its people are equally important for designers to explore and understand.

Chapter 3: Design Application: Kai Tak River, Hong Kong

Study of Kai Tak River, Hong Kong through primary and secondary research that involves site observation and archival research to understand issues and opportunities of the site

Figure 3.1 Location of Hong Kong in East Asia
(Source: Broadzhii, http://broadzhii.com/en/images/asia_map01.gif)

HONG KONG: PROJECT CONTEXT AND MEGA CITY

The Hong Kong Special Administrative Region (HKSAR) is located along the South China Sea on China's south coast and it shares its northern boundary with Guangdong Province (Figure 3.1). Home to over 7 million people, Hong Kong is one of the most densely populated cities in the world. Hong Kong originally was a small fishing village until the Opium Wars (1839-42) when it was designated a British colony. Hong Kong also suffered for a brief period when it was occupied by Japan during the WWII. The handover of Hong Kong from the British to China occurred in 1997 under the principle of "one country, two systems" ("Hong Kong" Wikipedia 2011). This principle and Hong Kong's SAR designation allows Hong Kong to legally follow a different political and economic system than the Communist Party controlled central government of the People's Republic of China (PRC) (Hong Kong Tourism Board 2010). Hong Kong people refer to the PRC as mainland China. Hong Kong is one of the world's leading international financial centers; it is known as a "service economy" that is characterized by low taxation and free trade. Hong Kong is considered as one of the most wealthiest countries/territories in the world with the eleventh highest GDP per capita of USD$45,600 compared to the U.S. of USD$47,400 in 2010 (CIA 2010). Hong Kong's natural geography contains steep slopes and hilly topography. This limits real estate development, hilly terrain and the resulting lack of flat developable area has caused the creation of a globally distinctive skyscraper skyline. Hong Kong's visually dramatic skyline is due to government preservation of the viewshed from Kowloon (the mainland side) to Hong Kong island's Victoria Peak. The juxtaposition of its architectural skyline created by several international signature architects, i.e. Sir Norman Foster, I. M. Pei, Cesar Pelli, etc. , against the green backdrop created by the hilly terrain and Victoria Peak has made Hong Kong an international tourist destination. It is considered the world's densest and most vertical city, as well as one of the world's mega cities. HK government has insure that the transportation infrastructure would keep pace with the density of the urban metropolitan area as it expanded. Hong

Figure 3.2 Statellite Image of Hong Kong
(Source: Hong Kong Planner, http://www.hongkongplanner.com/images/HongKongSatelliteMap.jpg)

Kong's highly developed transportation network with the rate of use of its various modes of public transportation exceeding 90 percent, the highest in the world (China Times, 2010). Hong Kong sustains numerous high international rankings in various aspects, i.e. its economic freedom, financial and economic competitiveness, quality of life, low corruption perception, human development etc ("Hong Kong" Wikipedia 2010).

HKSAR consists of four parts: New Territories, Kowloon Peninsula, Hong Kong Island and the outlying islands covering a total land area of 1,100 km2. Harsh topography has limited urban development to only 20% of the land area. Figure 3.2 shows urban development in purple. Country parks (HK's government system of natural parks) make up a large part of land area with 40%. Unprotected areas and protected areas account for 30% and 10% respectively (Dudgeon, p.4). Hong Kong is located in the sub-tropical region with a monsoon season in summer (May to September) that accounts for 775 of the total annual rainfall (Dudgeon & Corlett 2004, p.20).

Given its size, Hong Kong is considered to possess high biodiversity with large variety of habitat communities. According to The World Wide Fund for Nature Hong Kong's Ecological Database, published in 1993, highlighted the SAR's large number of species: 210 seaweeds; 175 ferns; 1,900 flowering plants, including 120 orchids; 2,000 months; 200 butterflies; 93 dragonflies; 96 freshwater fish; 23 amphibians; 78 reptiles; 422 birds; and 57 mammals. And, Recent surveys indicate that there have been further increases in the numbers of some local species: 107 dragonflies; 232 butterflies (one sixth of the total butterfly species in China); 452 birds (one third of the total bird species in China) (Hong Kong Nature Net 2011). The long shoreline and hilly environment have helped create different ecosystems in Hong Kong aquatic communities including mangroves, rocky shores, streams, freshwater wetlands and sandy shores.

SITE: KAI TAK RIVER

Kai Tak river is about 3,000m long and runs through the districts of Wong Tai Sin, Sun Po Kong, Kowloon City and the new Kai Tai development (Figure 3.5). The site area was agriculture based back in the 19th century. As shown in one of the earliest maps drawn by the British military when they first arrived in Hong Kong in 1846 (Figure 3.7), the area was predominantly agriculture based. There were fisherman villages in the area because of the proximity to the sea. The existing channelized Kai Tak River was built under the supervision of the Imperial Japanese Army during the Japanese occupation in World War II (The Conservancy Association, 2011). The river currently receives three types of water and directs them to Victor Harbor: treated sewerage from Shatin Sewage Treatment Works and Tai Po Sewage Treatment Works, stormwater runoffs from its catchment basin and stormwater runoffs from the upland of West Kowloon via a tunnel under the Kai Tak Transfer Scheme (Hong Kong Planning Department 2007). Illegal hazard waste to the river from the San Po Kong industrial district had been a major contributor to the contamination problems between the 1970s and 1990s. Significant improvement on the water quality of Kai Tak River has been seen in recent years due to the closure of industrial factories and warehouses in the San Po Kong district and the higher standard of treated sewerage. Initially in the early 2000s, the plan was to cover up the entire section of the river but a number of stakeholders and interest groups opposed and proposed transforming the nullah into a green infrastructure corridor.

Figure 3.3 Site Location
(Source: Lands Department, Hong Kong, http://www.landsd.gov.hk/mapping/en/download/download/map/hm200le.jpg)

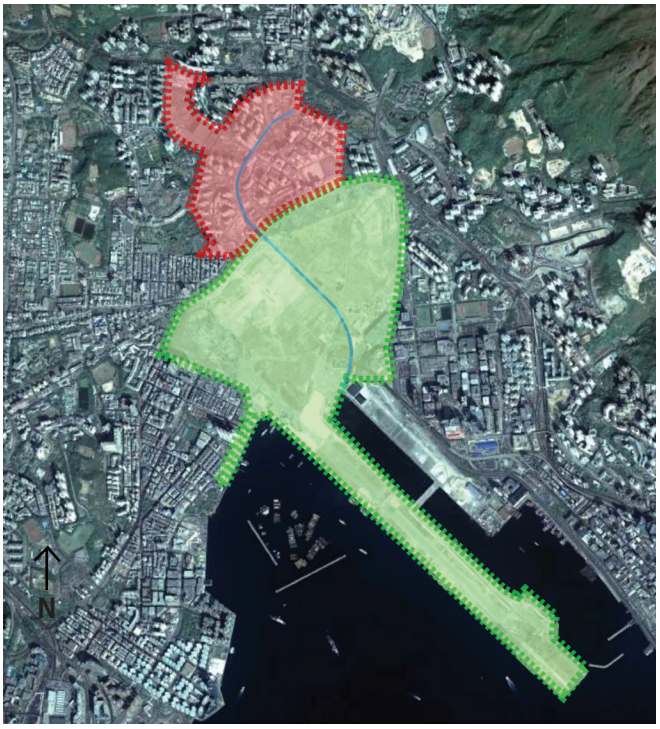


Figure 3.4 Upstream and Downstream Kai Tak River
(Source: Google Earth 2011)

Kai Tak River can be divided into two major sections (Figure 3.4). The upstream section begins from Kowloon City Community Hall to Prince Edward Road East (1,000m). The downstream section starts from Prince Edward Road East and ends at Kwun Tong Typhoon Shelter (2,000m).

My analysis is concerned with the upstream section of Kai Tak River and its existing surrounding context. The site analysis for my project was based on a combination of field observation, review of government documents, and secondary research.

Figure 3.5 Kai Tak River and its surrounding neighborhoods
(Source: Google Earth 2011)

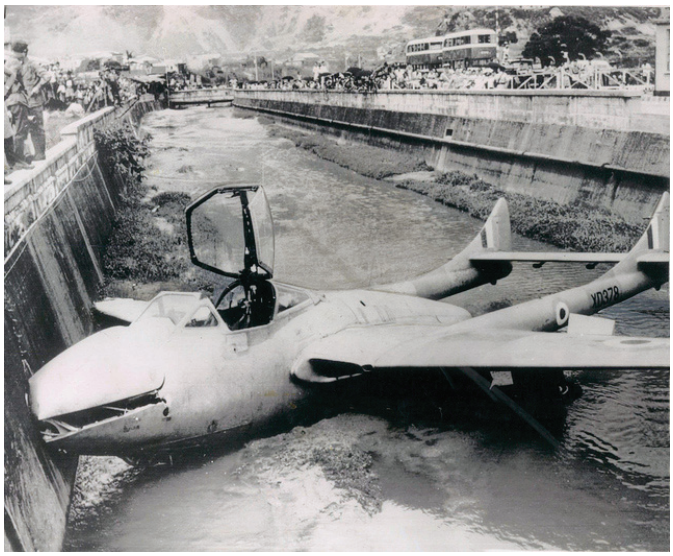


Figure 3.6 Kai Tak River in 1955
(Source: eternal1966c, http://www.flickr.com/photos/49943850@N05/4612202470#/)

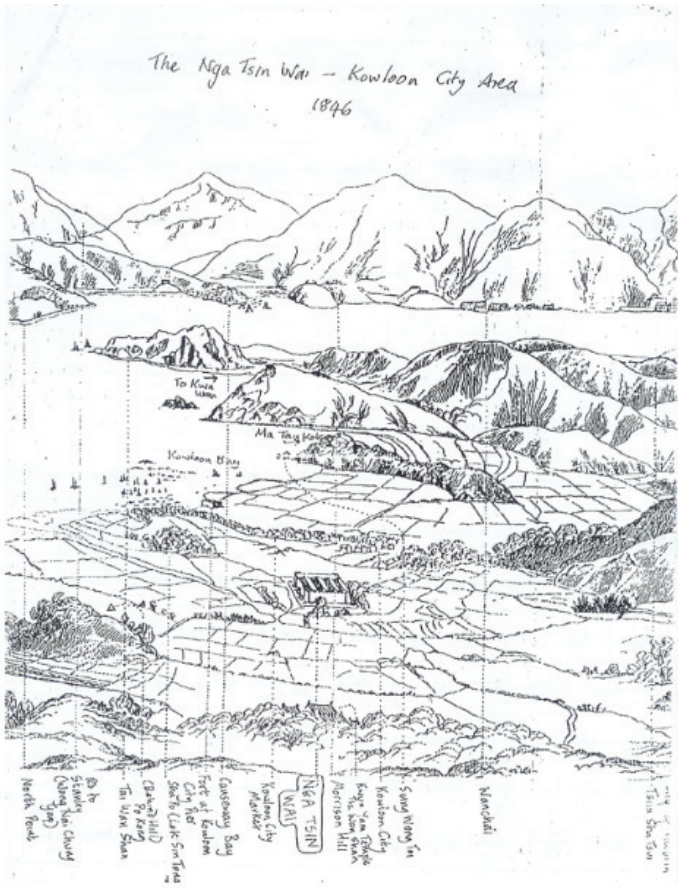


Figure 3.7 The Nga Tsin Wai- Kowloon Bay Area
(Source: http://www.housingauthority.gov.hk/hdw/content/static/file/en/about-us/events/qualityhousing/seminar/06bCUDrWallaceChangPART1.pdf)

UPSTREAM: EXISTING NEIGHBORHOODS

The study area is approximately 85 hectares and covers the upstream section of Kai Tak River and its surrounding neighborhoods including Tung Tau Estate, Sun Po Kong, Wong Tai Sin Lower Estate and Morse Park (Figure 3.8). The site analysis examines current conditions: building use, recreation and open space, stormwater and water quality, circulation and transportation, building height and urban design, and cultural and historic significance. The analysis also touches on the spatial quality and character of the site.

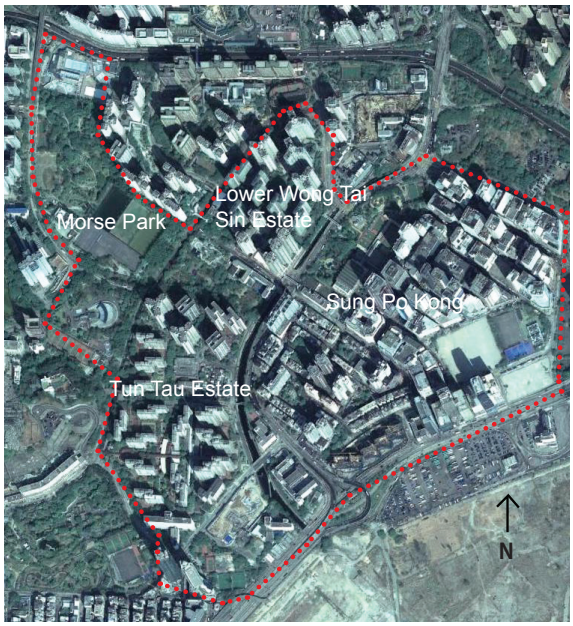


Figure 3.8 Upstream Study Area
(Source: Google Earth 2011)

Character of Space

The overall imageability, which Kevin Lynch defines as the quality of physicality in creating a vibrant image (Lynch 1960), of the space is weak (Figure 3.10). The channelized river destroys the human scale and touch of the area. The river can easily be perceived as a dominating force and completely out of its context (Figure 3.9) . The inconsistent circulation systems and planting design make the space difficult to navigate and create conflicts between pedestrian and vehicular movements. There is also a lack of nodes with characters to make the riverfront area vibrant and lively.

Figure 3.9 Typical Section of Kai Tak River

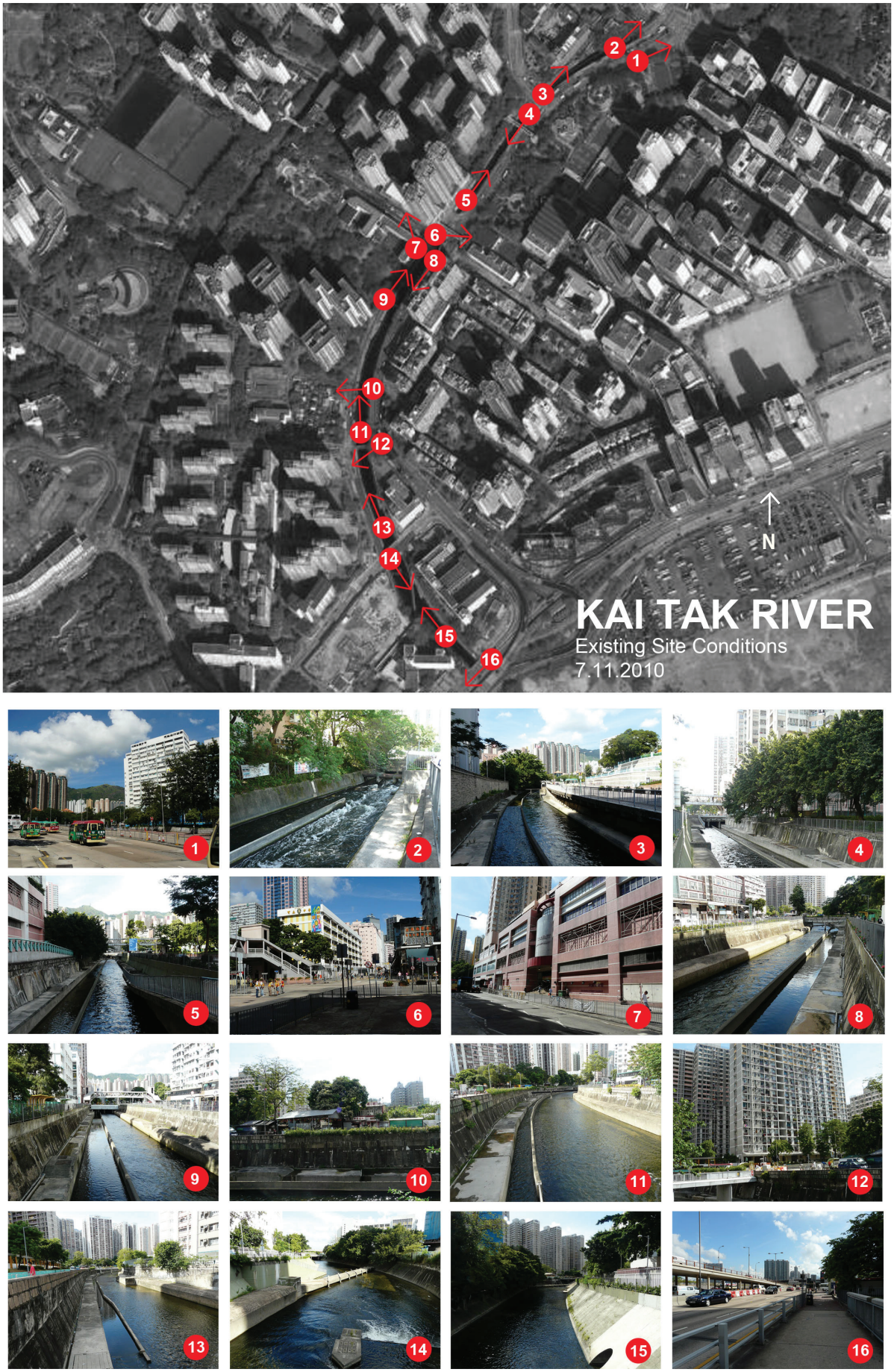


Figure 3.10 Kai Tak River existing conditions
(Source: Author's own)

Building Use

In the upstream section of Kai Tak River, along its western edge, land use has been dominated by Wong Tai Sin residential district. Light industrial use and San Po Kong residential district can be found east of the river and the along the east bank of the river are clusters of education and institutional uses along the river. Wong Tai Sin District, located on both sides of Kai Tak River, has one of the highest numbers of public housing projects in Hong Kong with Tung Tau Estate, and Lower Wong Tai Sin Estate situated alongside the river (Figure 3.13).

The 1980s was an important era for public rental housing projects in the study area. Both Lower Wong Tai Sin Estate and Tung Tau Estate (Figure 3.11) were completed in that decade. Lower Wong Tai Sin Estate was completed between 1989 and 1991, and composed of twenty-four towers providing more than 8,500 rental flats for approximately 11,000 residents. Tung Tau Estate was constructed between 1981 and 1991with one tower built in 1967. The estate currently houses more than 4,000 residents in twenty-one towers of about 4,000 rental flats. Both the current Lower Wong Tai Sin Estate and Tung Tau Estate were built after the demolition of the temporary housing projects at their locations (Hong Kong Housing Authority 2011).

The San Po Kong district has a more diversity of land uses. The district had been prominently a light industrial area (Figure 3.12) with small manufacturing businesses due to the easy road access to the area through Prince Edward Road East and Choi Hung Road. Many of the industrial buildings were modified into offices and godowns in the 1980s after the manufacturing industry relocated to China due to lower labor and maintenance costs. Residential buildings are mostly located in the southwestern and eastern part of the district.

There is a strong concentration of educational buildings along the upstream section of Kai Tak River (Figure 3.13) with five elementary schools and four secondary schools within ten minute walking distance to the river. In terms of institutional

Figure 3.11 One of the residential buildings in Tung Tau Estate (Source: Author's own)

Figure 3.12 San Po Kong industrial buildings (Source: flickr_10g, http://www.flickr.com/photos/flickr_10g/581742307/sizes/z/in/photostream/)

and use, Wong Tai Sin Police Station is located on the upper section of the area. The other two institutional buildings in the area include Hong Kong Examinations and Assessment Authority and Robert Black Health Center in the San Po Kong district.

Figure 3.13 Existing Building Locations and Uses

Open Space

In my analysis, I found three types of open space around the upstream area: 1) passive; 2) active; and 3) scenic landscape These categories in my analysis are defined as follows. Passive landscape is defined as a space that provides opportunities for less intensive recreation, i.e. strolling, seating, people-watching and dog-walking. Active landscape is for formal recreational and cultural events, i.e. active sports and events including soccer, basketball and music concerts. Scenic landscape is greenery or landscaping that provides very little recreational opportunities and is mostly used for ornamental decoration and often put in places that are highly inaccessible but easy to be viewed i.e. slopes, highway underpasses.

The site area has a mixture of passive, active and viewing landscapes (Figure 3.17). Morse Park occupies more than 15 hectares and is one of the largest urban parks in Kowloon ('Morse Park' Wikipedia 2011). Morse Park provides a variety of active and passive recreational facilities including lawns, arboretum, soccer fields, amphitheatre, tennis courts, tai chi court, sports center, skate area and swimming pool and basketball courts (Figure 3.14). Morse Park has four subparks and is connected to Kai Tak River through Morse Park no.1 near the intersection of Tai Shing Street and Choi Hung Road (Figure 3.15). Choi Hung Road Playground is a district park with a range of facilities including hockey field, pavilion, tennis courts, basketball courts, badminton center, sports center, food vendors, pebble walking trail and fitness corner for elderly. The park is located northeast of the upstream section of Kai Tak River.

Many public housing projects especially those that were completed in the last two decades have dedicated outdoor space within the communities (Figure 3.16). Many of them were designed to provide only basic recreational facility i.e. seating, canopies and pavilions for local residents. There are a number of pocket parks located in the San Po Kong district that provide seating and basic recreational equipments for the local neighborhood.

Figure 3.14 Swimming Pools at Morse Park no. 3
(Source: baycrest, http://www.panoramio.com/photo/23569055)

Figure 3.15 Morse Park no.1
(Source: Author's own)

Figure 3.16 Courtyard of Tung Tau Estate)
(Source: Christopher Dewolf, http://www.flickr.com/photos/christo-pherdewolf/2488617318/sizes/z/in/photostream/)

Shek Ku Lung Road Playground, Kowloon Walled City Park and Carpenter Road Park are located southwest of the upstream section of Kai Tak River and not directly connected to Kai Tak River. There is a landscaped area to the southeast of the upstream section under the Prince Edward Road bridge that is underutilized and inaccessible to the public.

Although the site study area offers a number of parks and playgrounds, the majority are created for human activity with substantial amount of hardscape. These hardscaped areas are not considered to have significant ecological value. In the case of Morse Park, the paved soccer fields are situated in the middle of the Park and separate the two green areas. Furthermore, no real connection exists among the parks. Many of these parks are separated by roads and buildings. Geographically, Kai Tak River offers a central location that has the potential to connect the parks and establish a more systematic network of green infrastructure. This new green infrastructure has the potential to provide ecological functions that the current green spaces fail to produce i.e. stormwater filtration, food production, biodiversity and energy saving.

Figure 3.17 Existing Open Space

Stormwater Management

The upstream section of Kai Tak River is relatively flat (Figure 3.18) with Lion Rock to the northwest and Kowloon Peak to the north. The entire upstream section of Kai Tak River is located within the same catchment basin (Figure 3.19). The catchment basin is 1,124 hectares and divided into thirteen sub-catchment basins (Kai Tak Planning Review 2007). The upstream of the catchment basin is characterized by Kowloon's hilly terrain that includes Kowloon Peak, Tai Lo Shan and Tsz Wan Shan. The downstream of the catchment basin consists of a mix of residential and industrial uses that are somewhat high density. The upstream section of Kai Tak River falls within the N2 catchment basin (Figure 3.19).

The existing Kai Tak River is a major drainage system within the larger stormwater catchment area. It has a width about 12m at the upstream near San Po Kong and increases to about 22m near Prince Edward Road East. The channel width further increases to about 30m at the downstream end connecting to the Kai Tak Approach Channel. Apart from surface runoff, the Kai Tak Nullah also receives treated sewage effluent from Sha Tin Sewage Treatment Works (STSTW) and Tai Po Sewage Treatment Works (TPSTW) under the Tolo Harbour Effluent Export Scheme (THEES). The current flow discharging from these two treatment works is about 4m3/s and will be increased to about 6.6m3/s in

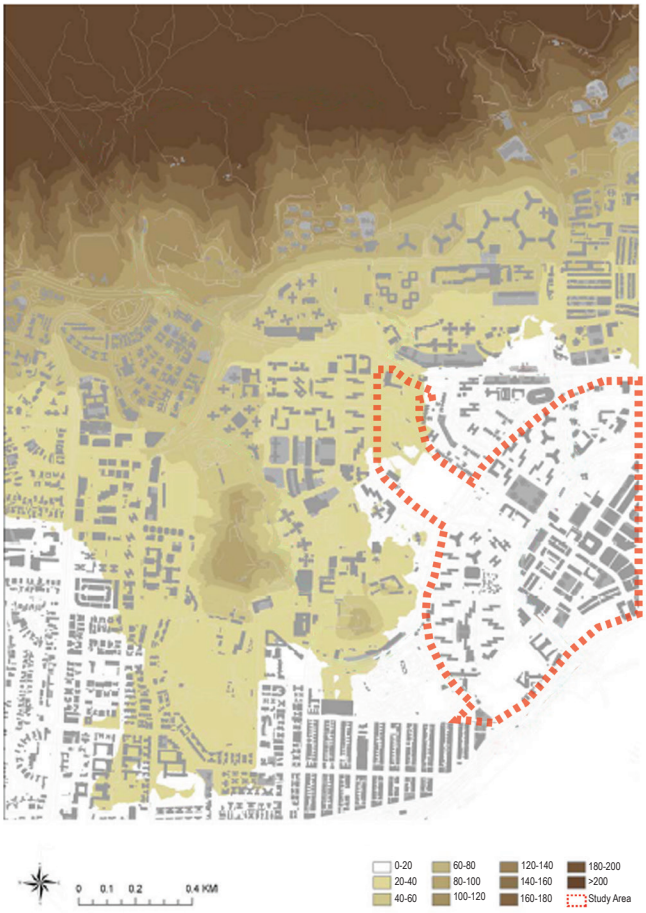


Figure 3.18 Digital Elevation Map (DEM)
(Source: Planning Department, Hong Kong, http://www.pland.gov.hk/pland_en/info_serv/ava_register/ProjInfo/AVRG53_AVA_FinalReport.pdf)

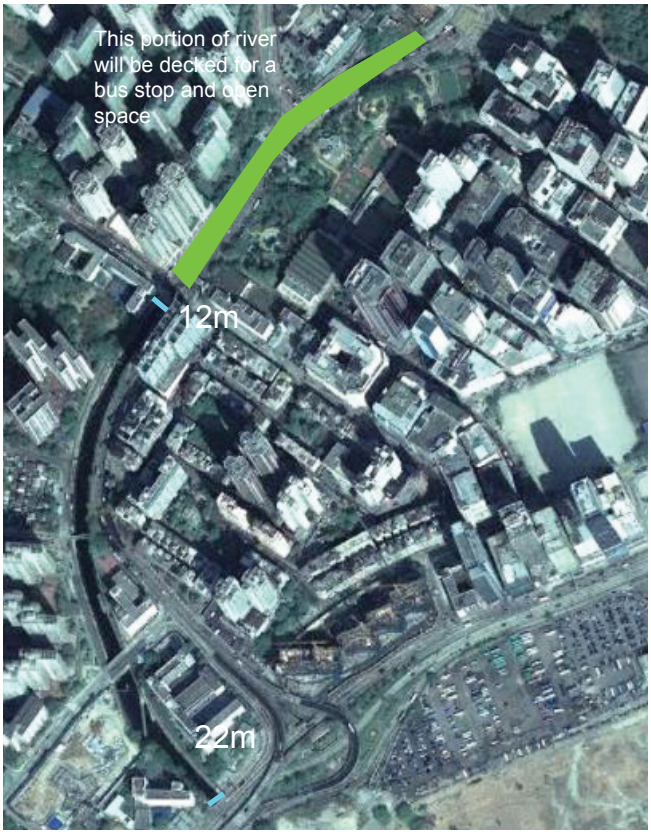


Figure 3.20 River Width and Future Plan
(Source: Google Earth)

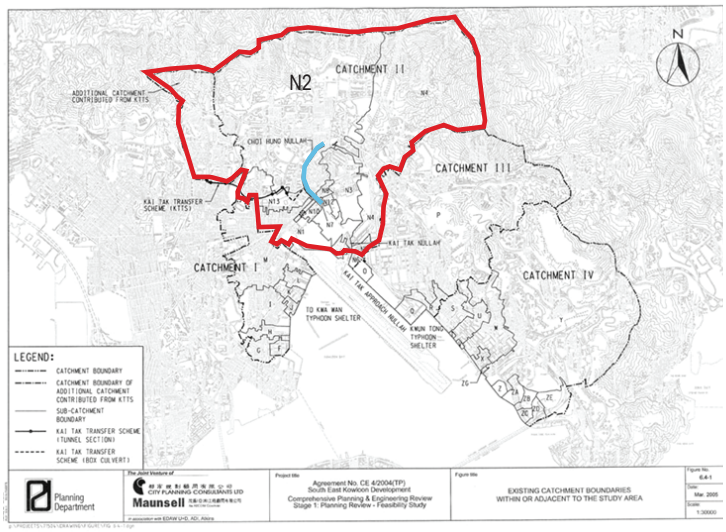


Figure 3.19 Catchment Basin Map
(Source: Planning Department, Hong Kong, http://www.pland.gov.hk/pland_en/p_study/prog_s/sek_09/website_chib5_eng/english/TR1/Figure_6.4.1.jpg)

the future after complete development at Pak Shek Kok. Besides, the Kai Tak Nullah also receives stormwater runoffs conveyed from the upland of West Kowloon via a bored tunnel under the Kai Tak Transfer Scheme (KTTS). This Scheme would relieve flooding risk in West Kowloon and greatly reduce part of the pipe upgrading works in that congested urban area. It is estimated that the KTTS will divert a maximum flow of about 40m3/s and 33m3/s respectively for a 1 in 50 year and 1 in 10 year design rainstorm event into the Kai Tak Nullah (Kai Tak Planning Review 2007). The construction of decking over a section of about 400m from Po Kong Village road to Tai Shing Street has been approved to create room for bus terminal and open space (Figure 3.20 & 3.21) (South East Kowloon Development 2007).

Water Quality

The overall water quality of Kai Tak River has improved significantly over the past two decades. This is primarily due to the 1990's Victoria Harbour Water Control Zone and the Sewerage Master Plans. The plans included the construction of flow interceptors to capture polluted flow and removal of pollutant connections that were polluting the river. Old weather flow interceptors along the river were upgraded and transformed into an enclosed conduit that helped reduce the bad odor problem. The recent upgrading of the treatment works that direct sewage effluent to the river has also significantly improved the quality of water (Environmental Protection Department 2007). While all the monitoring stations recorded "Bad" or "Very Bad" water quality in the 1980s and 1990s, the water quality survey in 2009 showed that three of the six monitoring stations achieving an "Excellent" WQI grading, and the remaining three graded "Good" (Figure 3.22) (EPD Annual River Quality Report 2009) (Environmental Protection Department 2009). During my visit to the river, I was able to see signs of fish in the river. However, it is important to note that even with its significant improvement in water quality of the past few decades, Kai Tak River is considered as a grey water river or non-potable. This means that direct human contact with the river is considered unsafe and should be prohibited.

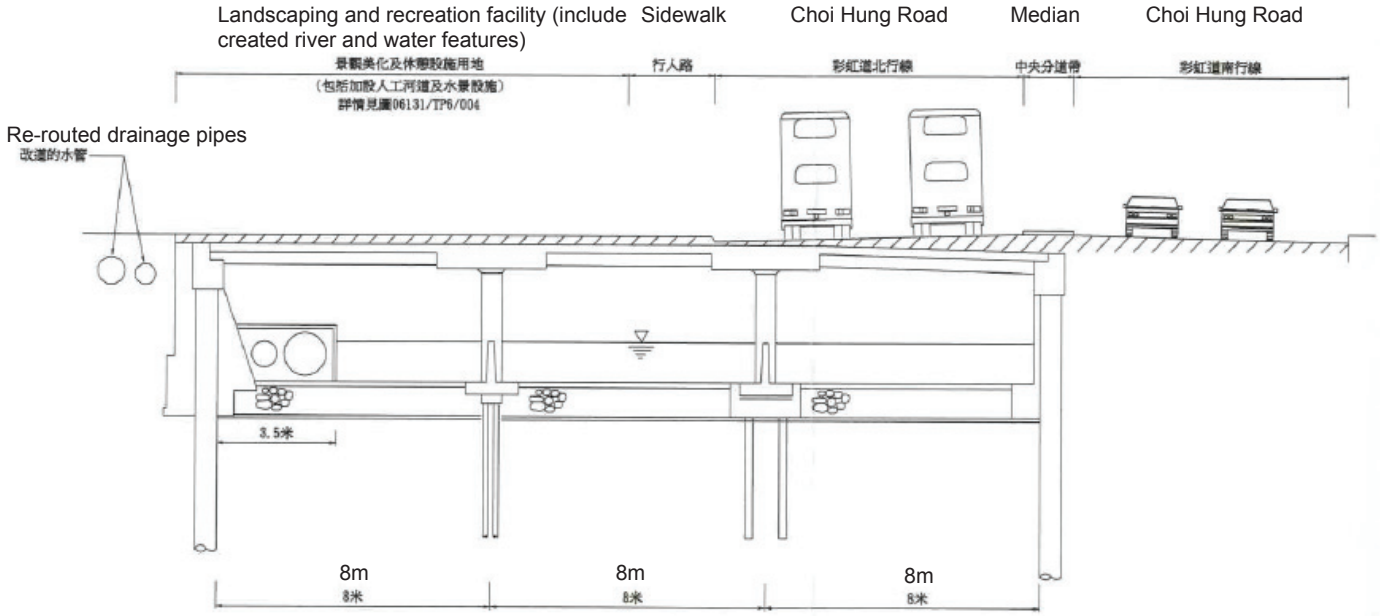


Figure 3.21 Preliminary section of decking
(Source: Drainage Department, www.districtcouncils.gov.hk/wts_d/pdf/2008/E_M3_2008_019.pdf)

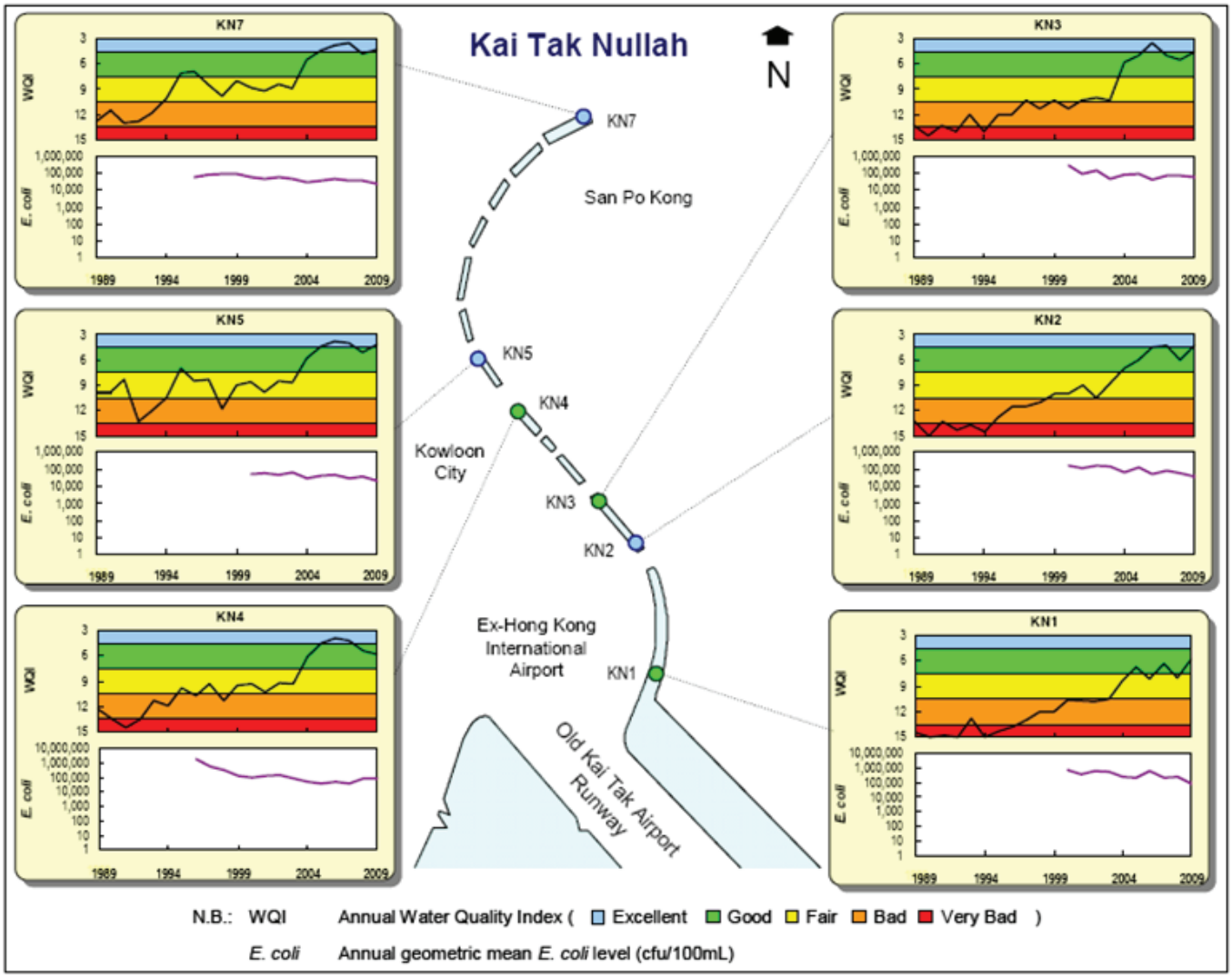


Figure 3.22 Water Quality of Kai Tak River
(Source: Environmental Protection Department, Hong Kong, http://www.epd.gov.hk/epd/english/environmentinhk/water/river_quality/files/Report-2009Combined.pdf)

Figure 3.23 Choi Hung Road
(Source: Author's own)

Figure 3.24 Sidewalk on eastern edge
(Source: Author's own)

Figure 3.25 Sidewalk on western edge
(Source: Author's own)

Access, Circulation and Transportation

Road Network

There are two major circulation modes in the site area: pedestrian and vehicular. The area is served by two key arterial roads; Lung Cheung Road and Prince Edward Road East. Both roads have relatively high speed limits and act as both visual and physical barriers to the site area (Figure 3.26). The site area is served by a north-south secondary road, Choi Hung Road, which runs parallel with Kai Tak River from Po Kong Village Road to Yin Hing Street (Figure 3.23).

Public Transportation

Hong Kong's Mass Transit Rail (MTR) is the major mode of public transportation that includes an underground network of rail lines serving the HKSAR region. The closest MTR station called Wong Tai Sin, is approximately a ten to fifteen minute walk from my study area (Figure 3.26). The study area is mainly served by buses and mini-buses. More than nine bus routes and three mini-bus routes run on Choi Hung Road in the study area.

Pedestrian

Pedestrian circulation is the major circulation type in the area. There are sidewalks along both edges of the riverfront but they remind inconsistent in terms of width, safety and connectivity. The sidewalk along the eastern edge of the river varies between 1.5m to 2.5m in width. There is a planer attached to the railing in some part of the sidewalk which denies people from getting right up to the railing (Figure 3.24). There is no cohesive planting design in terms of plant species and placement width on the eastern edge.The western edge of the river is more pleasant to walk on because it has better shades and a more consistent sidewalk (Figure 3.25).

Bicycle

Similar to many other urban districts in Hong Kong, there are no designated bike trail systems in the study area. Most people use the sidewalks for bicycling.

The site area doesn't have a comfortable pedestrian environment or good walkability. This is mainly due to the lack of shade and seating areas on both sides of the river. Given these deficiencies, it provides the opportunity to introduce a multi-modal circulation system that encourages the use of bike in the area. The redesign of the surrounding streetscapes would create enhanced walking experience. Vegetation and tree planting could create a buffer to the busy vehicular traffic on Choi Hung Road. Historically, Kai Tak River has acted as the divider that separated the industrial use in San Po Kong and the residential use in Wong Tai Sin. There is the potential for a design opportunity to offer a different mode of crossing Choi Hung Road that could create a new connection between these two districts.

Figure 3.26 Existing Pedestrian and Vehicular Circulation Patterns

Building Height

The majority of the buildings in the upstream section of Kai Tak River are under 100 meters in height with a few exceptions: the southern area will contain new residential projects with the new height regulation that exceeds the lower height limits of the former airport building density (Figure 3.27). Building Density is relatively high in San Po Kong and Tung Tau Estate with little air paths created for air ventilation. There are opportunities to increase the number and quality of air paths especially in the Tung Tau Estate area by introducing green corridors to reduce paving.

Figure 3.27 Existing and Proposed Building Heights

Cultural and Historic Significance

Wong Tai Sin and Kowloon City Districts are some of the oldest districts in Kowloon with more than 300 years of history and possess rich cultural and heritage significance. These districts contain a number of historic temples, walled villages, cultural parks and nunnery within a 30 minute walking distance from f the stud area:

1. Wong Tai Sin Temple

Wong Tai Sin Temple is located northwest of Kai Tak River in Wong Tai Sin and is widely considered locally as one of the most famous shrines in Hong Kong (Figure 3.28). This Taoist temple was built in 1921 and named for Wong Tai Sin a shepherd who began following Taoism at the age of 15. By the age of 55, it is said that he reached enlightenment and gained immortality. It is believed that Wong Tai Sin rescues the dying, heals the wounded, and punishes all evil. Taoists also believe that he has the power to grant whatever is requested of him (A view on cities). For that reason, thousands of visitors come to Wong Tai Sin Temple each year to have their fortunes told and to make a wish at the altar. The Wong Tai Sin Temple is constructed in the traditional Qing dynasty Chinese style. The temple boasts large, ornate red pillars and a magnificent gold roof. The roof is decorated with blue friezes, many carvings of various colors, and ornamental yellow latticework.

Figure 3.28 Wong Tai Sin Temple
(Source: Merryly, http://www.flickr.com/photos/89636780@N00/399032345/)

2. Chi Lin Nunnery

Chi Lin Nunnery is a Buddist temple complex located northeast of Kai Tak River in Diamond Hill (Figure 3.29). The 8.2 acre complex is consisted of a nunnery, temple halls, Chinese gardens, visitor's hostels and a vegetarian restaurant. The Chi Lin Nunnery was first founded in 1934 but was rebuilt in 1990 based on traditional Tang Dynasty Chinese architecture with special interlocking systems that do not require iron nails. ("Chi Lin Nunnery" Wikipedia 2011)

Figure 3.29 Chi Lin Nunnery
(Source: Rich238, http://www.flickr.com/photos/rc238/2229476610/sizes/m/in/photostream/)

3. Nan Lian Garden

The 8.6 acre Nan Lian Garden is situated northeast of Kai Tak River in Diamond Hill with Chi Lin Nunnery connected to the North. The garden was designed and built by the Chi

Figure 3.30 Ning Lian Garden
(Source: Ning Lian Garden, http://www.nanliangarden.org/content-pages/104/20070329_20061124_chi%20lin%20042_resized.jpg)

Figure 3.31 Nga Tsin Wai Village
(Source: DeWolf, http://www.cnngo.com/hong-kong/visit/nga-tsin-wai-kowloons-last-walled-village-981338)

Figure 3.32 Artist Impression of the Redevelopment of Nga Tsing Wai Village
(Source: URA, http://www.ura.org.hk/html/c800000e36e.html)

Lin Nunnery, entrusted by the Government. The Garden resembles the classical Chinese garden style of the Tang Dynasty with plenty of meandering paths, waterscapes,and rockscapes. The garden's wood structures "borrow the scenery" of the mountain range to the north, a Chinese traditional garden device where the mountains re used as a scenic backdrop for the garden. This device also a series of quiet and intimate scenes and locations for the visitors to enjoy. of Kai Tak River in Diamond Hill with Chi Lin Nunnery connected to the North. The garden was designed and built by the Chi Lin Nunnery, entrusted by the Government. The Garden resembles in the classical garden style of the Tang Dynasty with plenty of meandering paths, waterscapes, rockscapes and wood structures utilizing the mountain range to the north as background to create a series of scenes and provides intimacy and quietness for its visitors.

4. Nga Tsin Wai Village

Nga Tsin Wai was located along the upstream of Kai Tak River. Its location provides an important memory of the area's historical local identity (Figure 3.31). Nga Tsin Wai was established in the mid 14th century by Ng, Chan and Lee clans. The majority of the original villagers were fishermen who built a temple to honor the sea goddess named Tin Hau. The Tin Hau temple currently remains intact. In 1724, walls were built to protect the village from pirates. Construction of the Kai Tak airport replaced the defensive walls and the seaside village vanished. Apparently, the village layout remains more or less the same as it was hundreds of years ago, with three narrow streets and six laneways lined by small tile-roofed houses (DeWolf 2010).

In 2007, HK government announced its plans to redevelop Nga Tsin Wai Village. The redevelopment project is managed by the Hong Kong Urban Renewal Authority (URA) and their redevelopment goal is to provide over 580 residential flats, 24,962 sqft of commercial space and 15,070 sqft of open space (Figure 3.32)(Urban Renewal Authority 2011). URA has decided that the design of the project should be 'Conservation Paramount' and set out 5 aims: 1) Preserve historic relics and re-create the village ambience 2) Retain the original village

layout 3) Preserve the Tin Hau Temple, the gatehouse, the “Hing Yau Yu” stone tablet, the Central Axis and the lane pattern, and the old houses along the Central Axis 4) Retain existing trees as far as practically possible and create green buffer zones through vertical greening; and 5. Preserve underground relics excavated, if found (The Conservancy Association, 2011).

The redevelopment plan aims to preserve important components of the village by retaining the Ting Hau temple and incorporating the original village layout into the open space program. While I think the URA has done a good job in redeveloping the village by both keeping the old and introducing the new, it fails to recognize the river as an important social infrastructure. Based on design perspectives and planning documents from the URA website, the redevelopment plan does not recognize Kai Tak River as part of the design program. It provides no spatial and social connections to the river and the surrounding context. The road that goes around the redevelopment creates a physical barrier between the proposed open space and the riverfront area. It is crucial to recognize design strategies to integrate the redevelopment plan with the surrounding context by providing physical and social connections to the adjacent neighborhoods.

5. Kowloon Walled City and Kowloon Walled City Park

The Kowloon Walled City Park west of Kai Tak River was built where the historic Kowloon Walled City was once situated. Kowloon Walled City is known as one of the most historic urban communities in the history of Hong Kong. The walled city was first established in the 15th century because of its important military strategic location overlooking at the Victoria Harbor. The walled city had been used as a military fort until it became a closed community after the New Territories were leased to Britain in 1898. After WWII, Kowloon Walled City was controlled by the Triads (organized crime gangs) and became a destination for drug dealing, prostitution, illegal dental and medical services and gambling. In 1987, the Government announced plans to demolish the walled city and replace it with park. The government plans included the preservation of many remaining historic features including the yamen building, foundation of the former wall, flag-stone path next to the drainage ditch located along the foot of the inner wall, old cannons, couplets, and column bases (LCSD 2004).

The three hectacre Kowloon Walled City Park was opened on December 22, 1995 (LCSD 2004).. The design of the park was inspired by Jiangnan landscape style of the Qing Dynasty, the traditional Chinese garden style that utilizes rockery, waters and plants to create a “miniature” landscape, symbolizing an idyllic type of nature that consisted of mountain ranges, rivers and forests in nature.

Figure 3.33 Existing Cultural and Historic Sites
(Source: Google Earth)

SUMMARY OF ISSUES AND CONSTRAINTS, AND OPPORTUNITIES

Issues and Constraints

1. Lack of identity in the area given the strong presentation of Kai Tak River
2. Kai Tak River is disconnected to people and context
3. Inability to modify existing channelized river as it provides important stormwater services
4. Choi Hung Road as a major visual and physical barrier to the adjacent neighborhood of Sun Po Kong
5. The redevelopment of the Ngai Tsin Wai village fails to recognize Kai Tak River as part of the design program which creates uncertainty about future characters of the space
6. Walkability is poor in some parts of the area
7. Underutilized open space in some parts of the area

Opportunities

1. To enhance pedestrian experience by introducing a systematic circulation network
2. To utilize the river as a public amenity to create a vibrant open space program along the riverfront
3. To utilize the riverfront area as a connector to link the surrounding park systems to form a ecological infrastructure network
4. To introduce new programs to underutilized open space

Chapter 4: Design Process

Combine developed theory frameworks and site synthesis to a generate new design language for Kai Tak River, Hong Kong

THEORY FRAMEWORKS AND SITE SYNTHESIS

The critical analysis of the three investigated theories created the basis for theoretical design frameworks. The intention of the frameworks is to establish an appreciation and understanding of the role of landscape and ecology in the site planning and design process for an urban environment. These frameworks were based on utilizing landscape for different purposes: physical connector, mediator and functional device. Landscape can be applied as a physical connector in the form of open space to provide important linkages between elements. Greenways and boulevards are good examples of utilizing landscape as enhanced connector. Urban development has detached people with its original context and the nature. Landscape can also be seen as a mediator between the nature and the humans to reconcile the two. It creates interactive opportunities through design, planning and management. Landscape and its underlying functions provide important functions and services to both human activity and ecology. It forms a medium for recreation, food and resources and a regulatory agent for processes like air and water purification, biodiversity and nutrient cycles. The theory framework, however, is thought of as a set of parameters and were not intended to address the specific local issues and concerns. Applying theory to local design and management can be difficult and in many cases, the resolution of theory is lost in the process. Yet theory provides a theoretical argument and basis which makes decision making process more logical and defensible.

Very little ecological resources currently exist in the Kai Tak River. The channelized river is a mere representation of the physical location for the original river alignment; but it does not necessarily provide any ecological functions and services that the original river possessed. At the same time Kai Tak River has been very critical component of the East Kowloon catchment area and stormwater management. The channelized river provides an important role and directs both rain water and treated water to Victoria Harbor; but it remains largely segregated from its social, cultural and ecological contexts. The re-activation of the river has the potential to connect the river with its surrounding context, the local community. A new design for the river environment that offered accessibility, ecological services, and recreation and education opportunities while ensuring health, safety and welfare of the community is critical. The redesign of the Kai Tak River study area does not aim to restore or return the river back to its original state. In this case, restoring and recreating the river is economically unfeasible . This is due in part to the fact that the study area is part of a larger river system embedded within the existing urban fabric. The river has important infrastructural values as it diverts stormwater in the most effective and efficient way. Instead of restoring Kai Tak River, the proposed design strategies aim to create a new ecological infrastructure and corridor that

is built and superimposed upon the existing urban fabric. The design goal aims to connect social, cultural and ecological layers while retaining the important stormwater functions of the river.

THREE DESIGN PRIORITIES FOR ECOLOGICAL URBAN DESIGN IN KAI TAK RIVER

Based upon my analysis of the three selected work by theorist-practitioners, I was able to find a way to consider the landscape in three different dimensions: physical connector, mediator and functional device. The site synthesis presented three major issues and opportunities for the Kai Tak River site: walkability, disconnection to its people and context, and linkages to surrounding park systems to form a network of ecological infrastructure. To address specific site issues with an application of theoretical frameworks, three design priories were developed. These design priorities became the facilitators between theory and real world problems. The design priorities are non-motorist circulations, social spaces and ecosystems.

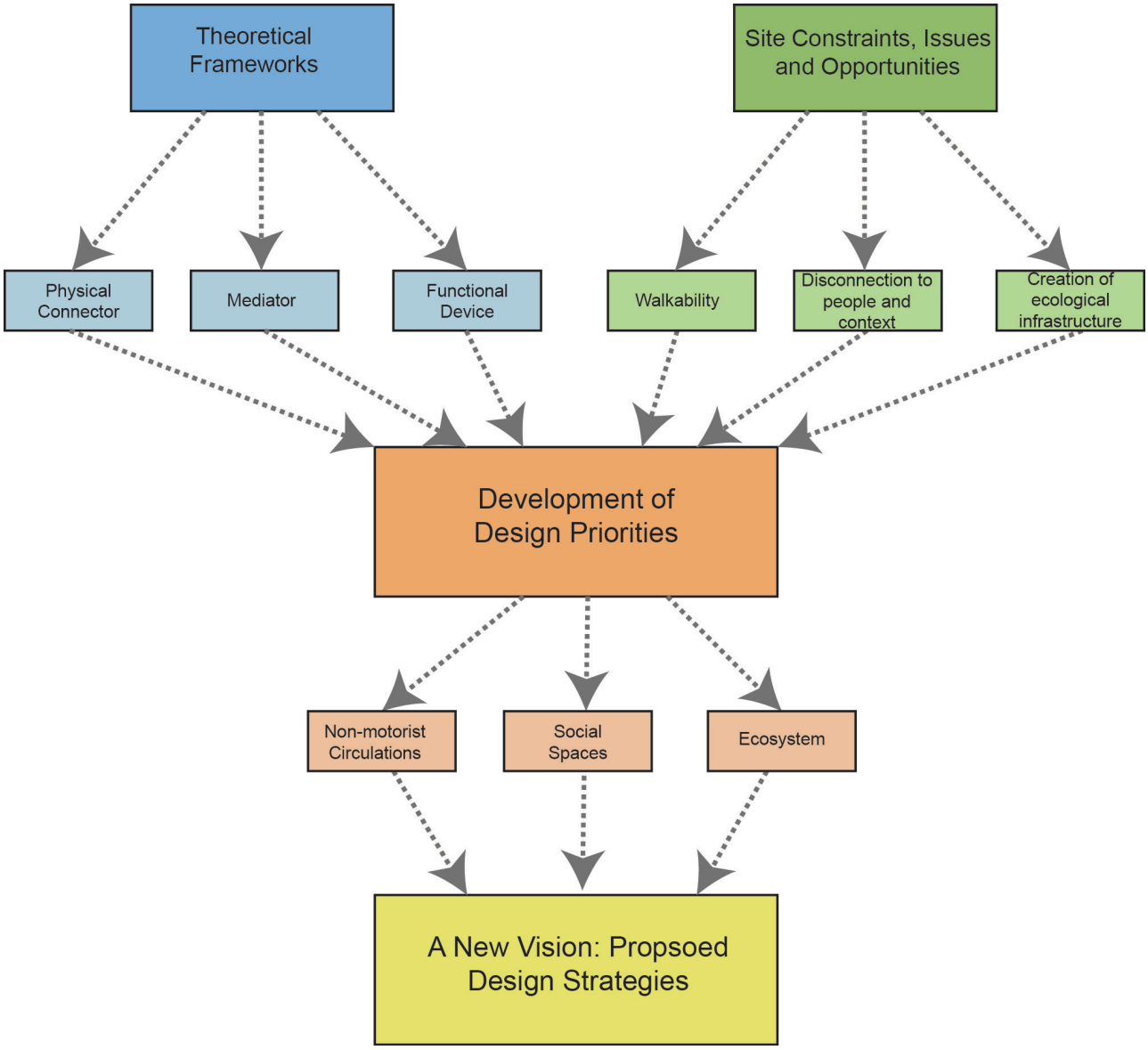


Figure 4.1 Design Process

Design Priorities

Non-motorist circulations

Non-motorist ciruclations are concerned with ways people move through a particular space and can be put in three categories:

1. Function

This circulation type emphasizes efficiency and has the purpose of getting from point A to point B at the quickness route and often associated with a routine task i.e. walking home from the market. Functional routes should be designed to minimize interference of existing movement patterns and enhance efficiency.

2. Passive

This circulation type is considered as the “scenic” route and one that stimulates users’ senses with different points of interest and landscapes. Passive routes will be designed to include a series of experiences and different points of scenic interest.

3. Active

This circulation type serves health and recreation purposes i.e. jogging path and bike trail. Active routes should be designed to minimize conflicts with other types of circulation.

Social Spaces

Social spaces are nodes where people interact. I have identified two types of social spaces:

1. Neighborhood

Neighborhood spaces are “everyday” places for local residents. These spaces are usually more inmate should be designed for a variety of daily activities including tai chi, chatting and sitting.

2. Public

Public spaces are gathering places that are open and accessible to general public for events and activities. They should be designed for a variety of public events including famer’s market, mid-autumn festival and ghost festival.

Ecosystem

Ecosystem is a system formed by interaction of living and non-living organisms. Ecosystem provides critical services and functions to our society include air purification, water cleansing, recreation, cultural implications, food and resources. By introducing a new ecosystem to the site area that connects Kai Tai River with existing open space programs, it will strengthen the ecological network in the area and hence the overall ecosystem services and functions.

The design priorities have tangible connections with theoretical frameworks and site issues. The physical connector is associated with non-motorist circulations to address walkability. The social mediator deals with the community and development of meaningful social spaces to re-establish connection to Kai Tak River with its context and people. The third dimension, functional device deals with the natural environment and ecology with the opportunity of creating new ecosystems to re-introduce habitats and biodiversity to the site area.

The design priorities were studied at three different scales: district, master planning and pedestrian. At the district scale, the design priorities were investigated separately to identify design opportunities for each design priority in the regional setting. This allowed me to understand how these design priorities can help Kai Tak River to better fit with its surrounding context through enhanced circulations, social spaces and ecosystem. At the master planning scale, two specific locations were selected and studied within the study area to understand how all three design priorities come together to create different types of spaces. At the pedestrian scale, a series of digital models were built to understand human's direct experience with ecology at a personal level. The study of these design priorities at various scales created a scope which helped inform specific design strategies to address current site issues and opportunities. It also helped me understand the relationship between different parameters at different scales. For example: to design a specific landscape where people can interact with the ecosystem requires a district scale study of the proposed ecosystem to understand the most appropriate place to introduce interactive feature with ecosystem.

DISTRICT FRAMEWORK

Proposed non-motorist circulations

Figure 4.2 Proposed district non-motorist circulations

DISTRICT FRAMEWORK

Proposed non-motorist circulations

There are opportunities for a non-vehicular circulation network to be established by introducing three different types of circulations discussed above: function, active and passive (Figure 4.2). The criteria for placing one verse the other at a specific location include the following factors:

1. Existing non-motorist circulation patterns
2. Land use
3. Existing road and street conditions
4. Proposed ecosystem design
5. Proposed social spaces

The circulation opportunities include establishing a passive (green) and active corridor (yellow) along the west and east bank of the river respectively. Both corridors link Morse Park and Shek Ku Lung Road Playground which will be connected with the new Kai Tak Development. The separation of the two corridors will minimize conflicts between the two very different user groups. The east bank of the river has been under-used and making it an urban bike and joggling path will create a nice screening buffer between Choi Hung Road and Kai Tak River but at the same time providing a different mode of circulation network to the area. The passive corridor along the west bank of the river will provide a connected scenic experience along the river that is currently lacking and defragmenting. The west bank passive corridor is further connected with east-west scenic routes to the surrounding residential neighborhoods. The inner roads further west will remain as the functional corridors that provide important daily circulation.

DISTRICT FRAMEWORK

Proposed social spaces

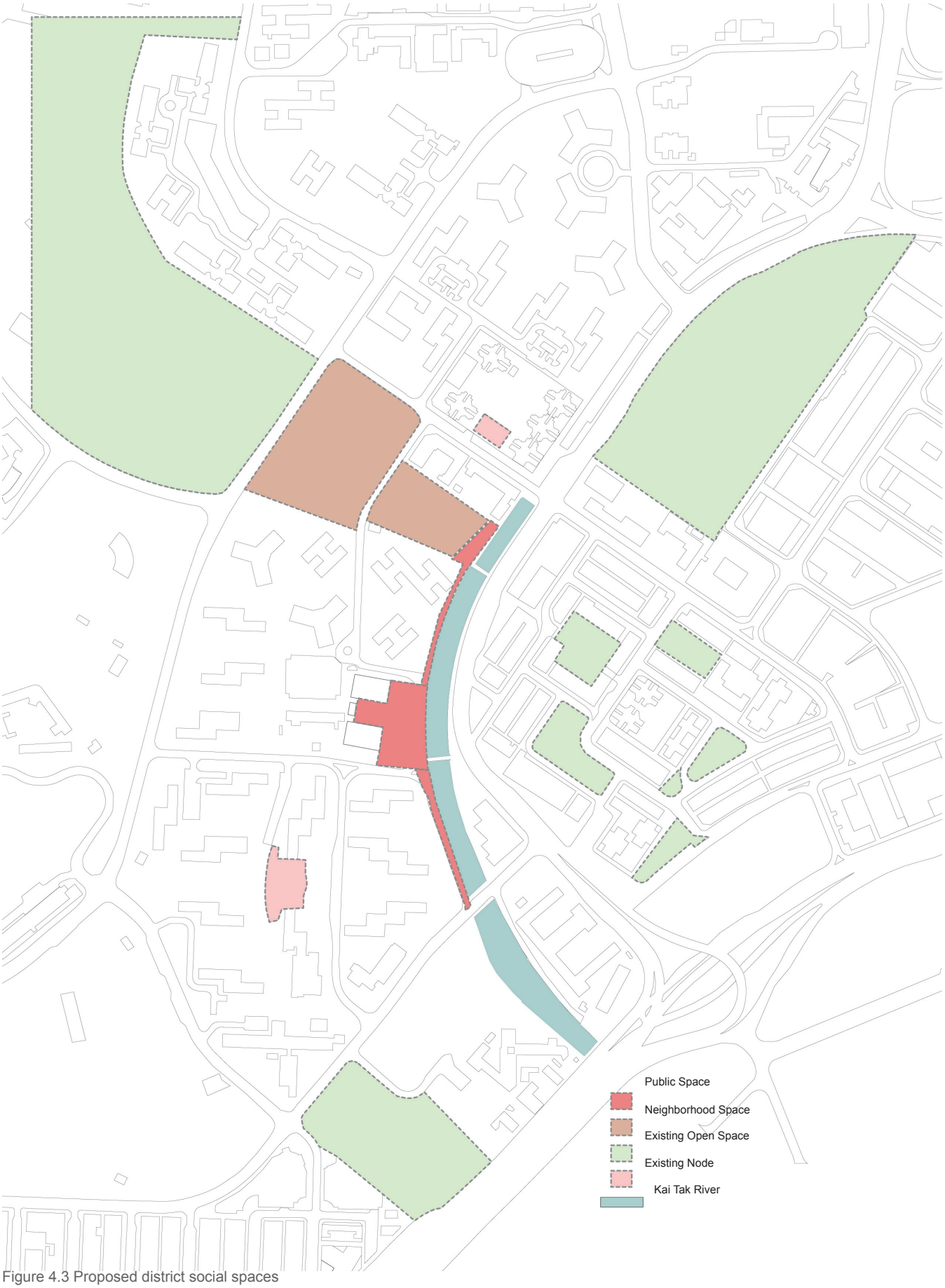


Figure 4.3 Proposed district social spaces

DISTRICT FRAMEWORK

Proposed social spaces

The proposed social spaces include a neighborhood space in the existing Morse Park No. 1 and public space along the west bank of Kai Tak River (Figure 4.3). The criteria for locating social spaces include:

1. Existing type of open space
2. Existing circulation pattern
3. Proposed ecosystem design
4. Proposed non-motorist circulations

The proposed neighborhood space will enhance the existing passive open space in the same location by providing a community gathering space for local residents. The existing Morse Park No. 1 and 2 are underutilized and by introducing a new design program and use, it will become a neighborhood destination for daily activities. There is an opportunity to integrate a public space program along the western edge of Kai Tak River and in front of where the old village used to be situated. This segment of the river is currently lacking a cohesive design that brings different elements together. By creating a public promenade that introduces focal points and interest to the area, the public space aims to create a vibrant, open and celebrative experience that caters toward general public and tourists.

DISTRICT FRAMEWORK

Proposed ecosystem

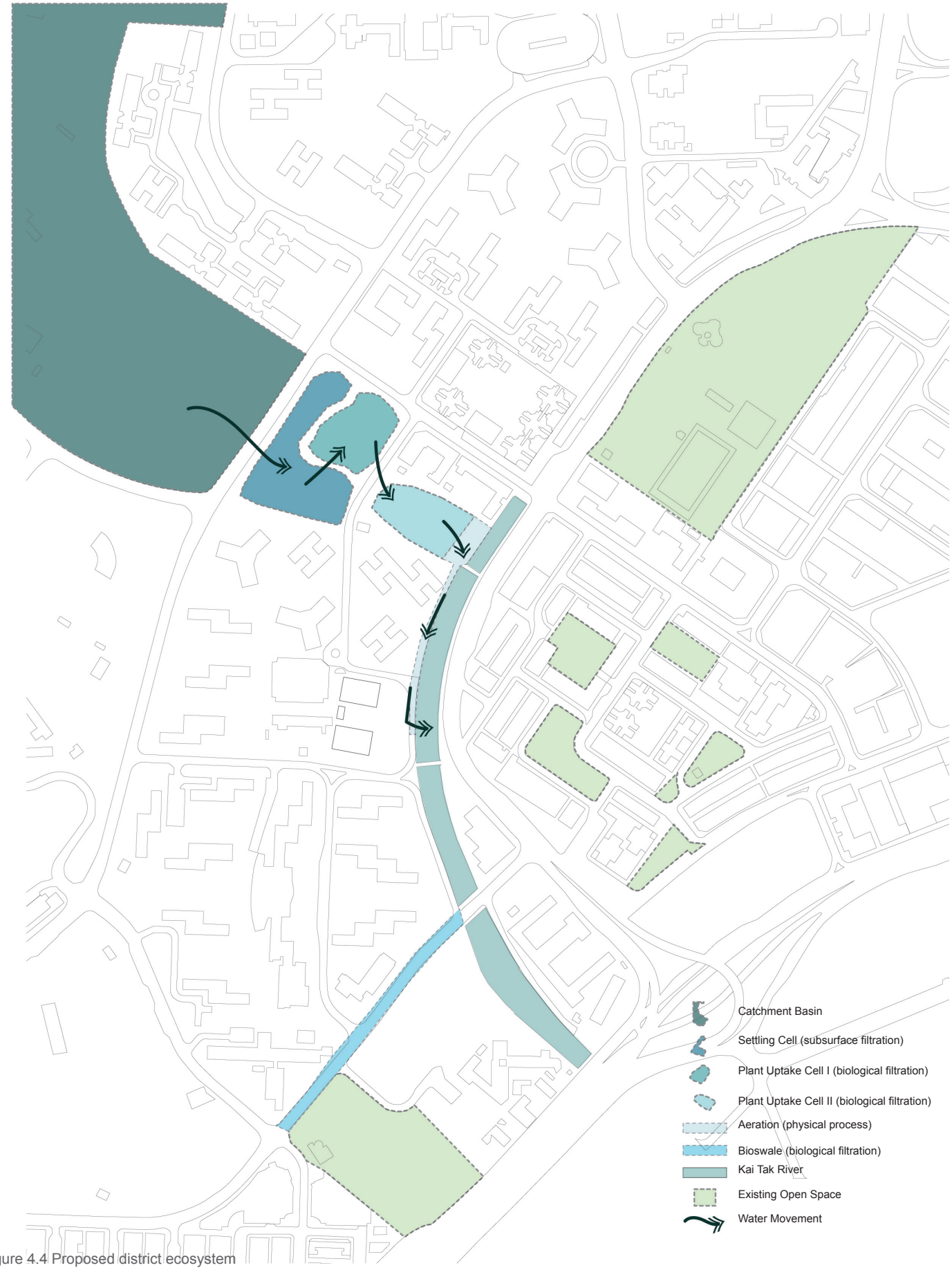


Figure 4.4 Proposed district ecosystem

DISTRICT FRAMEWORK

Proposed ecosystem

The cost and resources required to restore the existing Kai Tak River to a green corridor is extremely large. Therefore, instead of restoring the existing Kai Tak River, a new ecosystem is proposed to be integrated with the existing urban fabrics and systems (Figure 4.4). Existing underutilized open space will be readopted for a new design program. The proposed blue infrastructure will link existing Morse Park to Kai Tak River and there will be a separated system that runs along Lok Sin Road to connect Kai Tak River and Shek Kui Lung Road Playground to collect runoff from the street (Figure 4.4). The criteria for locating the blue infrastructure in that specific location include:

1. Existing land use
2. Existing vehicular circulation pattern
3. Topography
4. Existing open space and ecology
5. Proposed non-motorist circulations
6. Proposed social spaces

The overall objective is to create a new blue infrastructure that will connect Kai Tak River with surrounding open space to formulate an eco-network. The new blue infrastructure allows stormwater to be held and treated locally before it gets discharged back to Kai Tak River. It will reduce the quantity discharged and increase the quality of stormwater that goes back to the river. Furthermore, by introducing a new ecosystem to the existing infrastructural system, it will reconnect the river system with its people and reclaim the river as a public amenity. The new blue infrastructure is consisted of five components:

1. Catchment Basin (Morse Park)

The catchment basin for the blue infrastructure includes the entire Morse Park area which is made up of approximately 13.1 hectares of urban open space. The catchment basin has a fair amount of hardscape despite its open space character. The quality of stormwater collected is determined to be good as there is no major sources of pollution inside the park.

2. Settling Cell

The first treatment cell is a settling pond located southeast of the catchment basin. This settling pond is characterized by shallow depth and limited vegetation to allow for subsurface filtration.

3. Plant Uptake Cells

The plant uptake cells are located southeast of the settling cell. These treatment cells utilize vegetation to encourage biological purification to achieve nutrient removal.

4. Aeration

This is the last stage of treatment system before the treated water is discharged back to Kai Tak River. The aeration channel intents to increase oxygen content in the treated water through a series of variations in water speed.

5. Bioswales

A separated street scale blue infrastructure is developed along Lok Sin Road to catch, hold and treat surface runoff from the road.

MASTER PLANNING FRAMEWORK

The objective of master planning framework is to design an integrative system that will allow the three design priorities (social spaces, ecosystem and non-motorist circulations) to operate cohesively at a more refined scale to create different types of spaces. Based upon the proposed social spaces in the district framework, two specific locations were further studied at the master planning scale (Figure 4.5):

1. The proposed neighborhood space southeast of Morse Park
2. The proposed public space in front of Nga Tsin Wai Village

Figure 4.5 Location of the proposed neighborhood and public spaces

MASTER PLANNING FRAMEWORK

Proposed neigborhood space

Figure 4.6 Proposed neighborhood space

MASTER PLANNING FRAMEWORK

Proposed neigborhood space

The objective for the neighborhood space is to strategically design the three design priorities to provide a series of spaces (open, semi-open and intimate) hence a variety of experiences (Figure 4.6). This is achieved through using planting and paths as buffering, and ecosystem as a programmatic amenity. Major entry points were identified to understand the circulation patterns in the future in order to develop a efficient circulation system. The multimodal path along the south end of the space will become the major circulation corridor that provides active, passive and function circulations. The space in between the wetland and circulation corridor will be dedicated as a transitional zone to provide neighborhood space for local residents. The neighborhood space will become the main focus of the area to provide space for everyday activities such as Tai Chi, strolling, exercising and chatting.The zone is physically buffered from the wetland but still provides a viewshed to the wetland.

MASTER PLANNING FRAMEWORK

Proposed public space

Figure 4.7 Proposed public space

MASTER PLANNING FRAMEWORK

Proposed public space

The objective of the public space focuses on celebrating the integration of the three design priorities at the local level (Figure 4.7). A hierarchy of spaces was developed to create a variety of spaces. It includes a courtyard that serves as more private uses, a public stage for public festivals and gathering like concerts and community meetings, a public plaza for general public events include farmer's market, mid-autumn festival. The spatial arrangement of space creates a strong focal point with the public space. This public space will become a place where the three priorities merge and no clear boundaries are defined among them. A new connection to the San Po Kong area will be established to allow for a more efficient circulation system.

PEDESTRIAN FRAMEWORK

Pedestrian framework is concerned with one's direct experience with ecology. This direct experience can vary based on spatial relationship. The focus of this pedestrian framework was to understand the different types of experience with ecology a person will get along the proposed aeration path which is about 200m on the western edge of Kai Tak River both in the perspectives of strolling and sitting. Different typologies were developed through the use of materials, planting design combined with dimensions, scale and arrangement.

Each studied typology presented a different way of understanding the relationship between ecology and human activity. Whereas some typologies focused more on providing seating opportunities that provoke an appreciation of nature and its services, other typologies stressed more on creating a scenic and aesthetics promenade.

Figure 4.8 Location of proposed aeration path

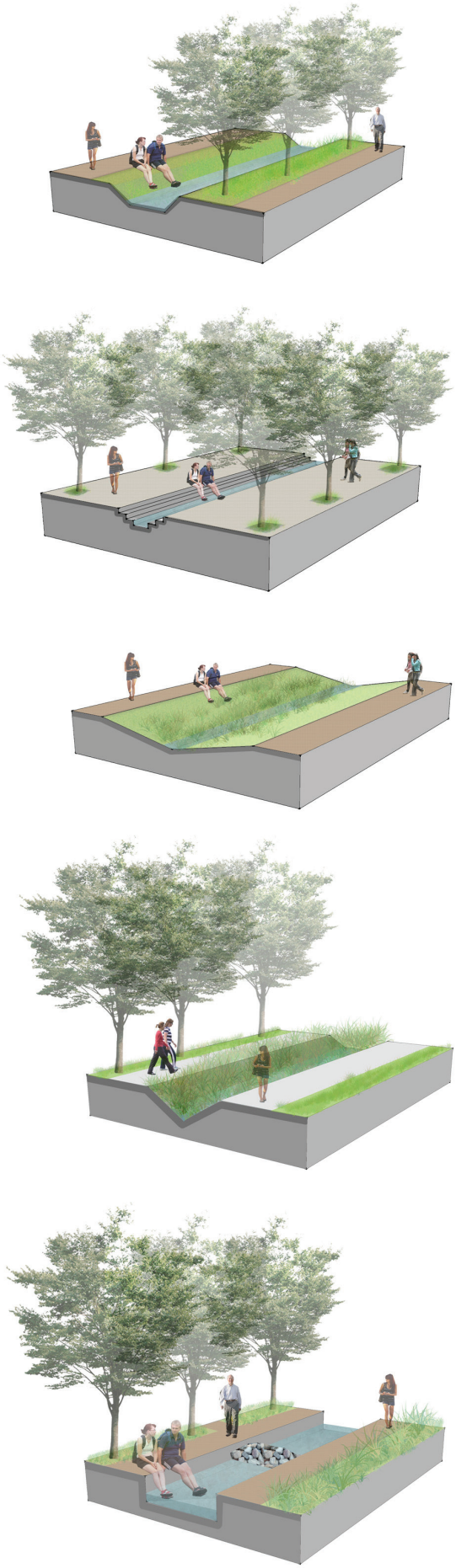


Figure 4.9 Aeration Typology Study Models

Chapter 5: A New Vision

A new design vision was developed for Kai Tak River, Hong Kong to connect people back to the river by integrating non-motorist circulations, social spaces and ecosystem through landscape

CONNECT, CONGREGATE, CLEANSE

The new vision is to reclaim and reconnect Kai Tak River to its people and context by utilizing landscape as a medium that reconciles circulations, social spaces and ecosystem in a single surface (Figure 5.1). The current state of detachments consists of a lack of networking approach to ecosystem and social detachment from the river. These disconnections are recognized as the potential to create a new relationship between the water and the community. Connect, Congregate, Cleanse is a design response to the vision to form a cohesive landscape that creates values through social, ecological means along the riverfront area of Kai Tak River.

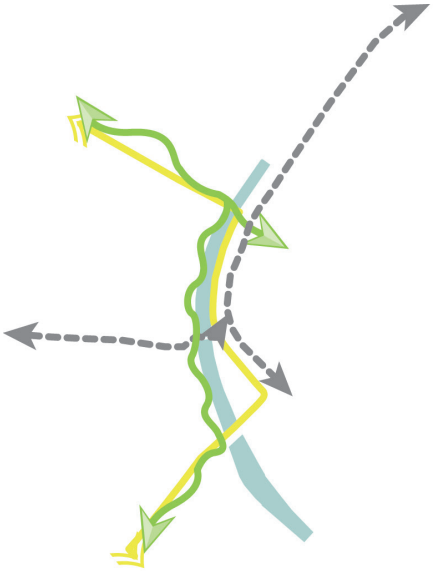
DESIGN PROGRAM

The backbone of the program is the creation of a new ecosystem, a stormwater cleansing system that connects the existing open space to Kai Tak River and creates values and spaces alongside. The proposed stormwater cleansing system intents to link Kai Tak River with the regional open space program to form a ecological network. The proposed stormwater cleansing system will serve three major purposes:

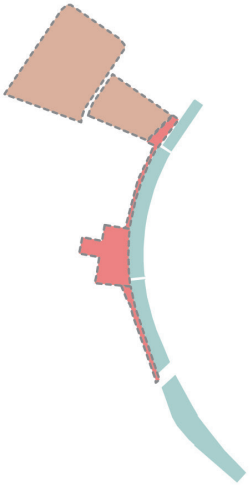
1. Reduce stormwater surge and improve the quality water quality
2. Reintroduce biodiversity and habitat communities
3. Provide opportunities to increase human interaction with ecology by creating different types of spaces that promote recreation activity (jogging path along the wetland), passive activity (seating facility and overlook decks),and interaction (water path).

The program features three types of spaces: neighborhood, public and education. Neighborhood spaces are created to provide gathering places for daily activities such as tai chi, dance classes for local residents. Public spaces provide community places for events, festivals and town meetings. Educational spaces are created in response to the surrounding context of high concentration of primary and high schools. The intent of these spaces is to facilitate outdoor learning experience in sustainability and ecology.

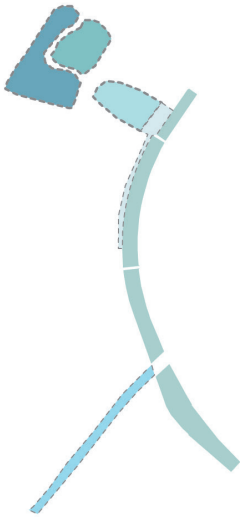
The new ecosystem can not fully function in an urban setting like Kai Tak River without systematic and efficient circulation system. The new proposed non-motorist circulation network addresses different user groups: bikers, joggers and pedestrians. The active circulation system of bike and jogging trails is separated from pedestrian circulation to minimize potential conflicts between the two user groups.



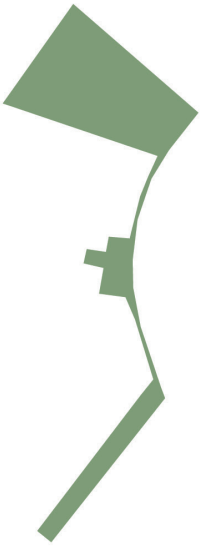
Non-motorist circulations



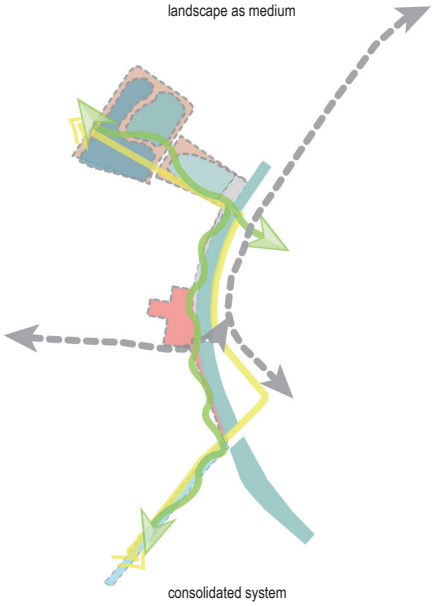
social spaces



ecosystem



landscape as medium



consolidated system

Figure 5.1 Design Concept

Figure 5.2 Master Plan

Urban Wetland: Neigborhood Space

Urban wetland is approximately 2 hectares and consists of three types of treatment cells and promote a variety of biological and physical cleansing processes (Figure 5.3). Settling cell is the first stage of the treatment process and allows water to settle and gets soil-filtrated. The second stage includes two shallow marsh cells for biological filtration. The last stage is plant uptake cell that utilizes wetland plants for nutrient removal. The treated water then enters a physical process of aeration.

The wetland is not detached from human use. The creation of different spaces allow different types of human interaction with ecology. There is a jogging path around the settling pond to foster recreation interaction with the wetland. Boardwalk, amphitheatre, canopy shelters and overlooks are designed to promote passive interaction. The neighborhood plaza provides a transitional space between the multimodal path and wetland which also uses wetland as an important backdrop to create a viewshed (Figure 5.4).

Figure 5.3 Urban Wetland Plan

Figure 5.4 Neigborhood Plaza and Settling Cell

Figure 5.5 Urban Wetland

Riverfront: Public and Education Spaces

Riverfront can be divided into three parts: aeration path, public plaza and education node (Figure 5.6). The aeration path is the last stage of stormwater cleansing. It aims to increase the oxygen content by moving the water. The aeration path starts out with about 1.5m and ends with less than 30cm in the public plaza. This change represents a slowly disappearing ecosystem. The aeration path represents an important eco-process that is currently lacking in the study area (Figure 5.7). Instead of restoring Kai Tak River's ecosystems, the aeration is part of the new man-made system that blends ecosystems and human processes within the existing parameters. The public plaza is a celebrative place for events (Figure 5.9), festivals and community activities such as street market, food stalls, mid-autumn festival, ghost festival and town meetings with a stage in the center and seating overlooking the river. The education node is a program response to the high concentration of education in the area (Figure 5.8). It includes a learning lab with urban farm where students will learn about urban agriculture and seed their own food. The education trail provides another learning experience where students can get close to the river, take water samples and bring them back to the learning lab. The vertical green installation along the river's walls soften the existing materials by creating a more human and organic texture and image to the area.

Figure 5.6 Riverfront Plan

Figure 5.7 Aeration Path

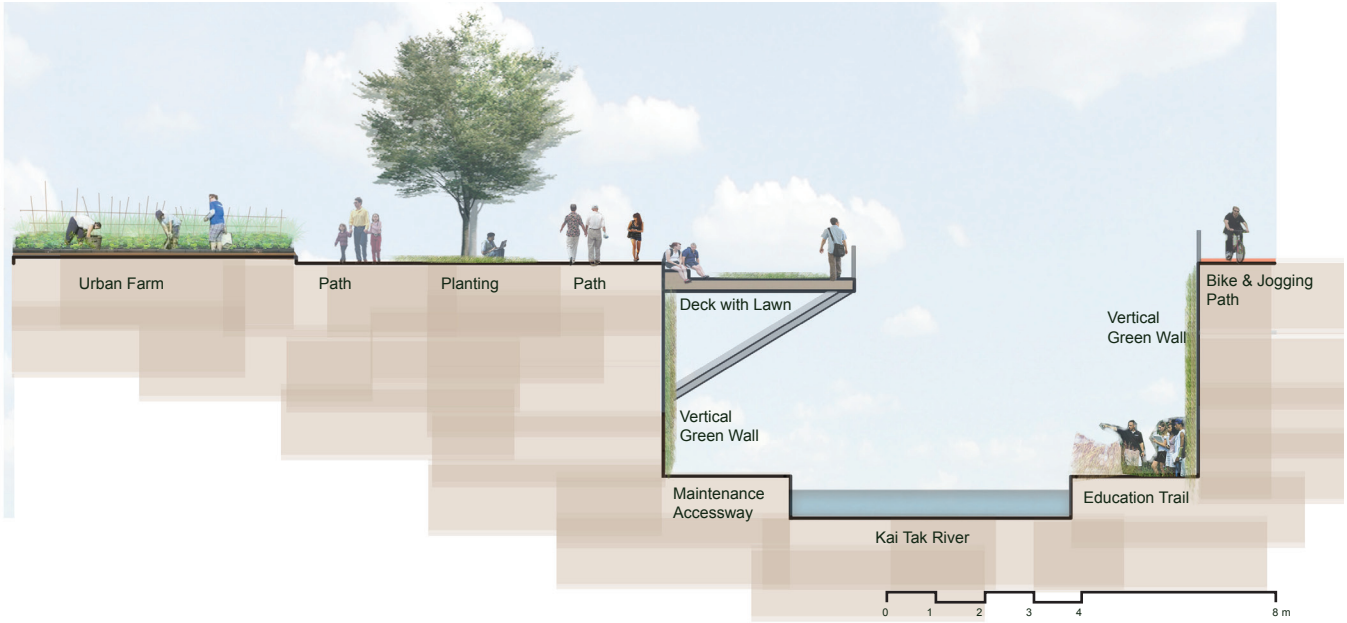


Figure 5.8 Urban Farm and Education Trail

Figure 5.9 Public Plaza

Chapter 6: Conclusions

A summary of insights and learning

CONCLUSION

Ecological urban design is a complex topic that requires a multi-dimensional understanding of context across scales within urban fabrics. The goal of this project was to interpret and analyze the three selected ecological urban design theories and apply their essence in a real world situation. Translating from theory and practice or ideology to implementation is not always easy. This issue was tackled in this project through the following systematic approach: 1) understanding the fundamental principles for ecological design in urban applications; 2) recognizing existing site issues and constraints; and 3) reconciling the two to create a customized design approach.

The creation of a matrix table that summarized the three selected theories allowed a structural and consistent approach to understand the investigated theories. This was very important and critical to synthesize and understand different approaches for contemporary ecological design in a summary format. The matrix table provides a simplified and condensed way to understand the different characteristics and philosophies for each theory. More importantly, the matrix table identifies the different roles of landscape in each theory. This can potentially help landscape architects and urbanists to understand ways that landscape can be utilized in mediating between urban development and ecological restoration.

Kai Tak River presents technical issues and constraints to prohibit for a significant change in the existing alignment and functions of the river. It is financially and structurally not feasible to restore the river to create a green corridor. Instead, the design strategy asked for a new ecosystem to be built on top on the existing infrastructure. This new ecosystem, in this case, a blue infrastructure, intended to not only address ecological problems in the area but also an issue that the site currently fails to address: connect to its people. The introduction of various types of spaces integrated with the new blue infrastructure aimed to foster human interaction with ecology that has long been lost in the area and highly urbanized Hong Kong.

The new vision was a hybrid of the three developed theoretical frameworks: physical connector, mediator and functional device with a stronger emphasis on utilizing landscape as a functional device, in this case, a blue infrastructure. The blue infrastructure became a facilitator that integrates the other two frameworks. Specific design elements and techniques from the matrix table were used to create this integrative design approach (Figure 6.1):

- Infrastructural layers were utilized to understand and construct proposed design priorities at a district scale
- Landscape was understood as a social mediator between ecology and people in the new vision

- Landscape was identified as a functional device (blue infrastructure) that connects different processes including both physical (circulations) and human (social)
- There was a strong emphasis on creating a dynamic, multi-dimensional process by studying the design priorities at various scales to understand the relationship between them

Designer	Design Philosophy	Technique and Tools	The Role of Landscape	Design Elements	Emphasis	Issues
Ken Yeang	Infrastructural connectivity	- Layering analysis strategy - Biointergration of human interventions and natural environments with concerns over ecosystem's integrity, connectivity and functioning	- Landscape (green infrastructure) is the physical connector that connects all other infrastructural layers	- Green infrastructure - Blue infrastructure - Grey infrastructure - Red infrastructure	- Structural - Procedural - Strong emphasis on physical and infrastructural connectivity (hardware)	- Ignores social and cultural connectivity (software)
Kongjian Yu	Cultural Relationship	- Landscape as the connecting link among the land (ecology), the people (culture) and the spirits (history) - Vernacular landscape that reflects the daily life of common people and locality	- Landscape is the cultural and social mediator that links culture, history and ecology	- Land - People - Spirits of land (genius loci)	- Human oriented approach that focuses on different aspects (culture, history) of humanity - Related to daily life of the common people	- Sacrifices some level of comfort in exchange for locality - The vague definition of "vernacular"
James Corner	Process based relationship	- Inter-disciplinary design process - Development of a space-time ecology that treats all forces and agents working in the urban field and consider them as continuous networks of inter-relationship	- Landscape as a functional device that connects different processes together	- Time - Process - Multi-dimensional relationship	- Dynamic, multi-dimensional process that considers a variety of influential factors in our built environment	- "Lost in translation" from ideology to practicality

Figure 6.1 Specific elements from matrix table that were applied in the design process

What did i learn?

Often time, designers understand design as a linear process that involves different stages. During my investigation, I learnt that design is an iterative process that requires constant feedback. For example, it was important in my project to constantly go back to re-interpret the investigated theories even after I conducted my site analysis to find the correlation between specific elements in the theories and issues with the site. Furthermore, given the complexity of urban environment, ecological urban design requires a multi-scale investigation to fully understand the relationship between different components. My project created frameworks at three different scales. The district scale framework identified opportunities to incorporate Kai Tak River and the surrounding area to form a more integrated and consolidated network. The master planning scale framework studied two particular locations within the study area to understand how different processes and infrastructural layers come together to create different types of space. The pedestrian scale framework focused on recognizing human's direct experience with ecology. This multi-scale investigation enabled me to understand relationships at various scales which is crucial not only in ecological urban design but also in any design process that stresses the integration of human activity and development with ecosystems.

Highly urbanized areas like Hong Kong, Tokyo and New York may require a different approach and understanding in ecological restoration. Restoration may not be appropriate in those areas as ecological resources are often completely destroyed and restoring these resources to re-create ecosystems is frequently not feasible. In this project, I explored the opportunity to impose a new ecosystem on the existing urban environment. This customized, man-made ecosystem demonstrated a better fit between urban development and ecological preservation because

it takes consideration in both existing human intervention and level of disturbance in ecological systems rather than attempting to fully restore the highly disturbed ecological resources that are not longer functioning.

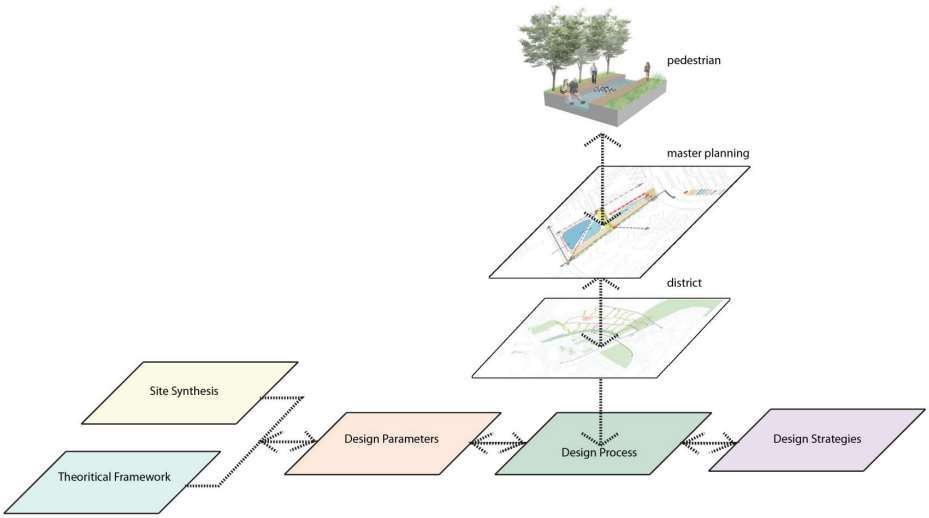


Figure 6.2 Design as iterative process at multiple scales

So what now?

Given the time constraints that I had, my project focused on the physical quality and human interaction of space. Time also constrained me from further exploring other elements in the matrix table that I developed. Although I looked at the historic and cultural context of the site but it never became the focus of my project. The aspect of intangible qualities of a space in culture and history is equally important in the physicality of it. Ultimately, spaces are created as accumulation of cultural and historic values and events. Understanding the relationship between history, culture, people and spirit of place and how landscape and ecology can play a role in facilitating between all these elements is crucial in contemporary city building. Time is another aspect that is worth further investigation. Time has become an important design tool in contemporary urban landscape as cities have increasingly been portrayed as dynamic systems. The relationship between time, ecology and urban development can be an intriguing topic to explore. This ties with the notion of sustainability and how urbanists should understand time as a spectrum to work with and design for urban systems that are self-sustainable and resilient in long term, in which, ecology can play a significant role in the spectrum because of its unique qualities with time.

Landscape urbanism or ecological urban design is more than a buzz word. It is an evolution in landscape architecture thinking that should continue to be studied more deeply as a persuasive tool to use in our profession. The designed landscape has a unique ability to serve as a flexible and resilient surface that allows functions, systems and activities to occur at different scales. This ability to shift scale is valuable in our urbanization process to provide critical ecological, social and economic functions. My research on theorists operating in ecological design can be re-interpreted and applied as Landscape Urbanism. This work offers a new spectrum for analyzing spatial design that validates my interpretation of Landscape Urbanism and recognizes cities as a series of dynamic inter-related processes (not just building blocks). It can be extremely valuable for landscape architects when practicing in a crucial role as urbanists to understand cities..

APPENDIX

Graduate Terminal Project Final Proposal

Committee

Chair

Associate Professor Mary Padua, ASLA, CLARB, RLA

Member

Associate Professor Sara Katherine (Kay) Williams, FASLA

Work Title

Regenerative Urban Landscape: A framework for ecological and cultural urban design in Kai Tak River, Hong Kong

Topic Area

Landscape Urbanism, Sustainable Urban Design

Problem Statement and Definition of the Problem

Hong Kong is one of the most densely populated metropolitans in the world with only about 25% of the land is suitable for development. This has made land management in urban area extremely challenging and difficult in Hon Kong. With much of the suitable land for development in highly urbanized Hong Kong has already been turned into skyscrapers and high-rise apartments, ecology in the developed area in Hong Kong has essentially been erased with a few exceptions in the more suburban settings. This has created fundamental ecological and social problems in urban area. Open spaces in urban setting provide important ecological, climatic and stormwater management functions. An example is reduction in urban heat island effect. Open space can create a breezeway in high density urban area and circulate the heat accumulated in between skyscrapers. Socially, open spaces create opportunities for recreational activities and social events.

As a technologically and economically advanced metropolitan, Hong Kong falls behind in environmental and ecological planning compared to other Asian metropolitans namely Singapore and Seoul. The lack of understanding of how ecological design can better enhance living quality, capitalism driven economy and short sighted government policies are the primary limitations for Hong Kong to become more environmental conscious. With the green movement at its biggest hype around the world during the last two decades, there have been several ecological restoration projects attempting to educate people about conservation and environmental protection in Hong Kong.

Hong Kong Wetland Park is a wetland park that serves education, tourism and conservation purposes. It is an ecological mitigation area (EMA) for wetlands lost because of the Tin Shui Wai New Town development. The created wetland park has gained huge success in promoting environmental awareness to the general public since its opening in 2000. Mai Po Mashes is a natural reserve located in the northwestern part of New Territories. The natural wetland includes education center, a 380 acre natural conservation area, and 1,800 acres of surrounding wetland. The wetland supports a wide range of reptiles, mammals, insects, and over 350 kinds of birds. These are good examples of projects that contribute to the growth of environmental awareness in Hong Kong. In terms of regulatory policies, the county park system and Site of Special Scientific Interest (SSI) are good examples of the environmental policy left behind by the colonial Bristish that need updates and reinforcement in executing. SSSI is a special area designated to protect wildlife, ecological, habitat and geographic features based on scientific interest in Hong Kong. The intent of SSSI is to ensure full account is taken when development and land use change is proposed. There are 67 SSSI locations throughout Hong Kong and many of them are in danger of losing their status because of rapid development in rural area.

Many of the projects and regulatory policies that have been discussed above are concerned with rural land conservation i.e. regulate land use on existing natural communities and conserve places that have high ecological values. Yet, ecological movement has not been fully explored in urban area in Hong Kong while other metropolitans have become increasingly aware of how a thoughtful ecological urban design can be utilized as a catalyst for economic development, social coherence, ecological education and infrastructure device to achieve highly sustainable urban core area in social, economic and ecological terms.

Traditional urban design practice deals primarily with architectural forms, spatial arrangement and circulations. It often ignores the different layers of ecological systems that impose on urban area. Urban form design may allow cities to work more efficiently but it can also destroy important ecological linkages. Landscape urbanism provides a new way of reinterpreting our cities. Landscape urbanism can be defined as the process that promotes cohesive landscapes through ecological and functional devices and design. The theory was evolved in the late 1990s with the intention to rethink and reorganize our urban centers functionally, economically, socially and more importantly ecologically. Historically, architectural elements had played a dominant role in shaping urban landscapes with landscape architecture often acted as a supplement to design the “pocket spaces” or left over voids between buildings. With the green movement has continued to shape our cities and ways of living, landscape architects have become increasingly influential in the urban revitalization process. This is due in part to the acknowledgement that ecology, green infrastructure and sustainability have been widely considered as potential solutions to environmental deterioration and problem generating of our urban area.

Landscape urbanism itself has become significant to the re-generation and re-habitation process of inner city areas because not only it allows urbanists to rethink urban form spatially but more importantly to reinterpret at a more comprehensive design approach that includes sustainable practice and historic preservation. Landscape urbanism occurs in three inter-correlated dynamics: human activities, physical infrastructure and ecological functions. It does not and should not exist at a particular point instead its existence should intersect with different areas of human activities because ultimately human beings are the users of these spaces. The theory has not only created opportunities for urbanists from different professions to understand contemporary urban landscapes at different scales but also a platform for them to recognize how human factors should be interpreted in relation to the reintroduction of ecological elements.
While landscape urbanism focuses a comprehensive approach to contemporary urban landscape, Yeang’s theory on ecomasterplanning seeks to look at different layers of influence in ecological design at a site scale. There are five infrastructure layers in ecomasterplanning and they are red (human), blue (stormwater), grey (engineering) and green (open space and natural resources). Ecomasterplanning aims to identify existing layers of infrastructure and design based on connectivity among those layers of influence.

My graduate terminal project aims to investigate and reveal the relationships between ecological functions and cultural activities in an urban setting and understand how these relationships can influence the process of urban regeneration. Both landscape urbanism and ecomasterplanning provide a theoretical basis for innovative ecological urban design and surprisingly only a handful of projects in Asia have utilized ideas from landscape urbanism and ecomasterplanning. Hong Kong offers an intriguing opportunity to test these western theories and to understand the constraints

As China is going to add 400 more cities by 2020, it is important to recognize strategies that will allow Chinese cities to continue to grow in a sustainable and control manner. Both landscape urbanism and ecomasterplanning are theories that focus on the temporal and procedural components (history and ecology) of urbanization which are equally important as spatial form and circulations stressed in conventional urban design. My graduate terminal project helps connect the missing linkage between western theory and eastern application. I think it is important for Chinese urbanists to recognize contemporary theories on urban design and how they can be customized and applied in rapid booming cities in China. There are several limitations and assumptions that I have to make regarding my graduate terminal project. My primarily approaches for the project are transplanting a contemporary theory to a real world site design situation and understanding how different layers of urban fabrics concerned with ecological systems and human activities interact in a ultra high density urban location. Less focus will be placed on the planning administration and political climate that shape the urban area. In addition, my graduate terminal project puts very little emphasis on the engineering issues but should be practically logical.

Research Questions

There are several research questions that I am going to examine in my graduate terminal project:

1. What are landscape urbanism and ecomaserplanning? How are they different from conventional urban design?
2. In what ways can landscape urbanism and ecomasterplanning guide a design?
3. What are the strengths and constraints of utilizing landscape urbanism and ecomasterplanning in ecological urban design?
4. In what ways can landscape urbanism and ecomasterplanning be incorporated with historic and cultural landscape design in the urban regeneration process?
5. Can landscape urbanism be applied to ultra high density setting like Hong Kong?
6. What kind of modifications need to be made when applying a western developed theory like landscape urbanism in an Asian urban setting with cultural and geographic differences?
7. How can other local theoretical approaches (i.e. Feng Shui) be incorporated with landscape urbanism and ecomasterplanning in ecological urban design in Hong Kong?

Research Strategy

There are three research strategies in my graduate terminal project and they are theoretical, interpretative and action research. The first step of my graduate terminal project involves interpretative research to study contemporary and local theories like landscape urbanism, ecomasterplanning and other relevant theories. The second part of my project is concerned with theoretical research that aims to develop design principles that are region-specific to Hong Kong. The final part of my project is action research that seeks to develop practical results and to solve real problems based on the theoretical and interpretative research in the first two steps.

Research Design

Research methods are corresponded with the selected research strategies. The research approach for my graduate terminal project is qualitative. This includes both primary and secondary research methods with a focus on secondary research method. Primary research method is conducted through interviews with experts in the topic of ecological urban design in Hong Kong and local residents who live near the site. Another primary research method is field observation to examine existing site conditions. Secondary research method consists of literature review of landscape

urbanism, ecomasterplanning and local theories. My secondary research also focuses on case studies in the topic. Cheonggyecheon in Seoul, Korea is an example of case studies that shares similar theoretical approach and design strategies with my project. The other secondary research method includes technical report review i.e. water quality reports, EIA for the site and achieve review that studies the history of ecological design in Hong Kong as well as the types of urban parks in Hong Kong.

The above graphic shows the critical path of this project from theoretical review to site design. It is important to note that theoretical knowledge basis is a critical component in formulating design principles.

Anticipated products

The anticipated products for my graduate terminal project include:

1. Detail explanation and investigation on landscape urbanism, ecomasterplanning and other theories concerned with ecological urban design.
2. Detail explanation and investigation on how cultural and historic landscape design can be incorporated into ecological urban design.
3. Case studies and analyses of ecological design around the world
4. History of ecological urban design in Hong Kong
5. Types of urban parks in Hong Kong
6. Design principles for ecological urban design in Hong Kong
7. Site inventory and site analysis
8. Site design with master plan, sections, elevations and perspectives

Preliminary Site Location

The preliminary selected site is Kai Tak River located in east Kowloon near the old airport area. The river has a section of about 3,000m that is currently daylighted. Kai Tak River reminds as one of the few natural streams left in urban area in Hong Kong. It has a very unique location with the Kai Tak development to the south which will be one of the biggest mixed use development projects in Hong Kong in many years. The area also has a lot of historic and cultural heritage landmarks such as Nga Tsin Wai, Hau Wong Temple, remnants of the Kowloon Walled City. With the rich ecological and historic contexts, the site provides an exceptional opportunity to study ecological and cultural urban design.

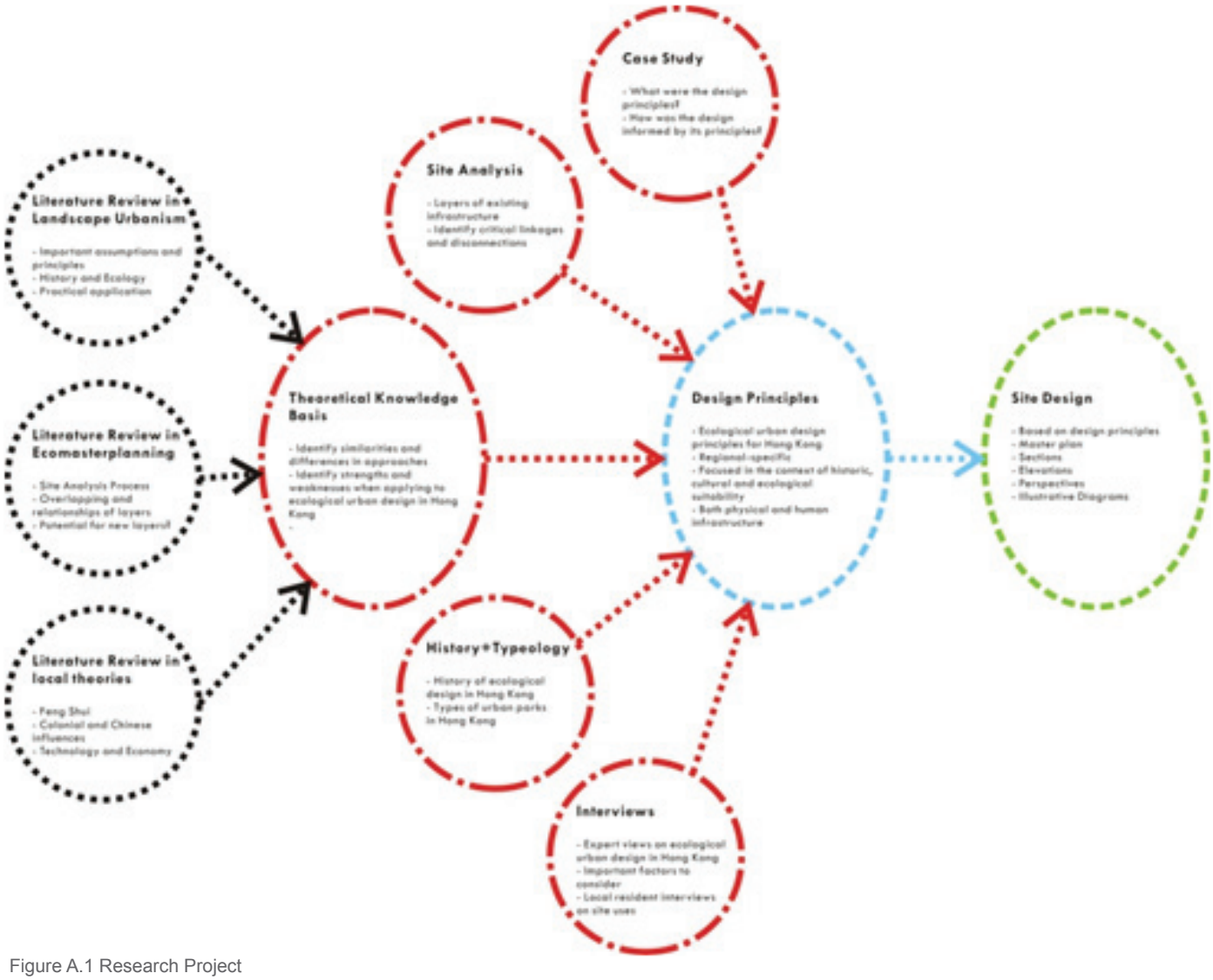


Figure A.1 Research Project

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