AN INDICATOR SYSTEM TO EVALUATE BUILT ENVIRONMENT PERFORMANCE FOR WATERFRONT REGENERATION

By

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LIST OF ABBREVIATIONS

EXPO	Exposition
F & B	Food and Beverage
GIS	Geographical Information System
JEDC	Jacksonville Economic Development Commission
PDP	Pittsburgh Downtown Partnership
ULI	Urban Land Institute

Abstract of Thesis Presented to the Graduate School
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Urban waterfront areas in the U.S. have been through a significant depression due to the traditional industries' decay. While the waterfront revitalization comes along with the demand of sustainability and high urban living standards. More and more waterfronts have oriented their regeneration from pedestrian culture, which stands for a vibrant and sustainable space to revive the image of the cities. In an effort to explore an urban design strategy which can effectively enhance the riverfront experience, this thesis introduces an application of a weighted indicator system and draws the conclusion through comparison analysis. Furthermore, the benchmark will be built via the summarization of the case study and the outcomes quantized by the indicator system. Downtown Jacksonville will be set up as a main case to examine the feasibility and applicability of the indicator system, with comparison to the two well-known waterfront redevelopment projects – Baltimore Inner Harbor and North Shore Pittsburgh. Recommendations for Downtown Jacksonville will be reached, and the significance and limitations of the research will be discussed based on the comparison analysis.

CHAPTER 1
INTRODUCTION

Problem Statement / Justification

The proportion of the global urban population has increased from below 30% in 1950, to 47% of 2005. The urbanization has already eroded large tracts of ecological landscape and will continue developing in the future worldwide. Nowadays the U.S. has increasingly depended upon its urban areas which provide the basis of a nation's development by controlling the flow of information, energy, commerce and population (Brundtland, 1987). Cities have expanded in both populations and sizes, in order to provide the urban facilities and infrastructure for the increasing citizens. During the urban sprawl few of our cities have paid enough attention to the pressure on the natural resources and the ecological balance due to our mass developments.

Therefore sustainable development has stepped onto the stage in order to address the contradiction between urban development and natural resource preservation. In the urban context, a sustainable development is one that meets the needs of the present population without compromising the needs of the next generation (Isaacs, Falconer, and Blackwood, 2008). It is the aim of sustainable urban development to provide "more effective and efficient services, that maintain public health and welfare, whilst reducing harmful resource and environmental impacts" (Foxon, 2002).

More than any other catalyst, waterfronts hold the greatest hope for beginning a revival of confidence in the urban physical environment (Mann, 1973). "The activities of leisure, recreation, and tourism have become closely identifies with waterside locations in which the proximity to the waterside has become important in the context of planning,

design, management, and use" (Fagence, 1995, p.135). Urban waterfront has become dependent partially on leisure related uses; this is a reversal of its conventional role, which stands for the manufacture as well as water transportation-related industry. Consequently, during the revitalization process, sustainable design should be emphasized for further development.

"In spite of the introduction of a 'sustainability' strand to urban policy, there are few examples of evaluations examining the extent to which sustainable development principles have been incorporated into urban regeneration policy and practice" (Hemphill, Berry and McGreal, 2004, p.726). This research attempts to explore a specific indicator-based approach to evaluating the built environment of urban waterfronts, which could be referred for more in-depth analysis in the future relevant research. Communities, government, business, international agencies and nongovernmental organizations are increasingly concerned with establishing a mean to monitor the performance and to assess progress towards sustainable development (Hodge and Hardi, 1997). The increased environmental agenda has brought about the need to employ indicators as a key mechanism for assessing environmental impacts (Wong, 2000; Maclaren, 1996). In addition, indicators are appropriate tools to identify the environmental problems and the differences among regions.

Research Question and Objectives

Research Question

Nowadays a large number of urban renewal projects incorporate sustainability as the paramount goal. Most of the researchers regarding the assessment and analysis of the sustainable development requires considerations from at least three perspectives: social equity, economic efficiency and environmental performance. As the waterfront

areas evolve from manufacture and heavy industry sites to a revived public area with the way of life citizens aspire to, planners and designers are faced with many challenges. How could the waterfront stimulate the whole city's economic development? What are the appropriate solutions to reclaim derelict and vacant land? How can the poor environmental conditions turn out to be favorably equipped with urban infrastructure attractive to investors? "Most importantly, the process of revitalization needs to be sustainable over time in order to be truly successful" (Miller, 2011, p.1). Sustainability assessment is one of the most crucial and popular issues among all the challenges, which could be undertaken over decades due to the comprehensiveness. Because of the limitations of human and financial resources and the time period, the research mainly focuses on the built-environment. Hence how to physically evaluate and design a successful waterfront leisure area would be the main question for this thesis.

Research Objectives:

There are three primary objectives for this thesis:

- To figure out the commonality among great existing water edges.
- To formulate a design framework for sustainable waterfront redevelopment.
- To create an indicator-based evaluation system for guiding and monitoring waterfront revitalization projects' performances.

Summary of Chapters

Chapter 2 introduces the research background, including the evolution of waterfront from the prosperity right after the industrial revolution through the post-industrial rundown until the contemporary revival. Besides, some precedents regarding waterfront evaluation practice will be reviewed in Chapter 2 as well.

Methodology is the most important part for this thesis. Chapter 3 discusses the details about how the indicator system has been created. First and foremost, the author digs into 20 cities which possess wonderful waterfront places and picks up one project from each city to constitute the research pool. According to each project's performance, the similarities among these successful cases can be recognized and formulated as the principles for this thesis. In accordance with each principle, indicators and variables are defined, and a hierarchy model assigns different weights to different indicators based on the importance. Furthermore, the in-depth-three-case study will be undertaken to examine the applicability of the indicator system.

Chapter 4 is the statement of each case and the result of the comparison analysis. Further discussion about the pros and cons of this research will be presented in Chapter 5 with the final conclusion. This in-depth evaluation is mostly related to Downtown Jacksonville, so the conclusion would be the lessons learned from the evaluation, namely, the comparison to Pittsburgh and Baltimore, which are the pioneers toward waterfront redevelopment in the U.S.

CHAPTER 2
RESEARCH BACKGROUND

History of Waterfront Redevelopment

Human civilization originated from water. Most of the ancient cities were situated close to a water body, but the era of waterfronts' rapid growth didn't start until the Industrial Revolution. During that period, much of the manufacturers and heavy industries, especially shipbuilding, had been built along a waterfront, taking the advantage of transportation and waste disposal. At that time, waterfronts exerted an overwhelmingly favorable influence upon local economic development. However, most of the people simply pursued the largest benefit of a waterfront economy rather than protecting its environment for a sustainable development. Besides a myriad of heavy industrial infrastructure built on site, Low-income workers lived in the dilapidated houses near the factories along the water as well, which promoted more instabilities for the waterfront eco-system. Air and water pollutions, congestion and solid waste discharge had severely destroyed the eco-environment of the water bodies. In 1961, Lewis Mumford forecasted the potential for consequence, arguing that "The new industrial city had many lessons to teach; but for the urbanist its chief lesson was in what to avoid" (1961, p.446).

Nevertheless the temporary legendary of the economic boom based on the waterfront areas had reached its end in the middle of the 20th century. "In the 1950s and 1960s the development of the Interstate Highway System began to further congest America's urban riverfronts and also marked a major decline in water dependent transport and its associated industries" (St. Onge, 2010, p.3). Furthermore, as the global cooperation approached and became the dominant economic stimulation for the

nation, the industrial decentralization caused the abandonment of the decayed waterfront without any remediation in the 1970s.

However, “the waterfront has always held an inherent and timeless attraction for many people because of its capacity to meet such a wide range of needs and demands – survival, economic, or recreational” (St. Onge, 2010, p.2). As people gradually more concerned about the environment protection and urban growth control over the world, more revolutionists and reformers has realized the prodigious values of waterfronts for the cities. From then on researchers and urban planners became more focused on urban redevelopments in the form of waterfront reclamation. Generally speaking, the waterfront revival has passed through two periods: the first came along with the decline of old harbor sites and waterfront industrial areas in a tremendous number of cities around the world from the mid-1960s to the early-1990s; the second has been characterized by the post-modern organization of both these spaces since the 1990s until now. During the first period, “waterfront revitalization programs were designed to pursue those goals perceived by the local decision-making centers as essential to guarantee economic growth, especially in terms of employment and per capita gross product (GDP)” (Vallega, 2001, p.380). The second phase was inspired by the concepts of sustainable developments, assumed as the final goal for which any individual waterfront redevelopment ought to be measured. As a result, sustainable designs, philosophies of designing physical objects, the built environments, and services to comply with the principles of economic, social, and ecological sustainability, have been emphasized during the process of waterfront rehabilitation, especially for downtown areas.

In the U.S., Baltimore Inner Harbor in the 1970s lit the revolutionary movement for urban waterfront. Most of the American cities are continuously trying to redefine their images by promoting the transformation of local waterfronts. For example, other than Baltimore, Seattle, San Francisco as well as New York City have all adopted a comprehensive master plan for their water edges in the late 20th century. Seattle EXPO took place in its revitalized waterfront, which showed to the world a completely new Seattle in terms of vibrant and vivid waterfront areas. Nowadays owing to the intensification of the phenomenon and its crucial significance, waterfront reclamation has become the major task for urban growth, under a dynamic process with unremitting and sustainable renovation. The neglected and fragmented margin is being sewed back into the city fabric gradually.

Precedent Practice Review

This thesis focuses on how to evaluate a waterfront project and then to define a successful one from an urban design perspective. There are plenty of theories and practices about how to create an excellent urban living space, such as Jane Jacob's *The Death and Life of Great American Cities*, which can also be used to evaluate the waterfront districts. William Whyte argued that "what attracts people most, in sum, is other people" (1988, p.10), indicating that in order to revive a place, creating activities for people is paramount.

In his book *Waterfronts* (1993, p.5), Dick Rigby pointed out the "urban values":

- Concentrated versus dispersed physical development
- Integration of a wide range of activities and land uses, including cultural attractions, versus segregated uses with limited cultural assets
- A diverse versus a homogeneous population

- Mixed architecture, including older and/or historic structure, versus architectural sterility
- Walkability versus car domination (and neglect or outright hostility to the pedestrian)
- A portion of the public using public transportation versus little or no public transit
- A strong sense of place versus anonymity of place

It is consistent to take all the characteristics above into consideration when it comes to reprogram a waterfront. Moreover, the Project for Public Spaces (PPS) has examined more than 200 waterfronts all over the world. The findings have been categorized into 2 different scales – waterfront cities and waterfront places. The extraordinary waterfront cities, e.g. Stockholm, Venice, Helsinki from the result, are meant to possess a well-connected waterfront network into the rest of the cities. As for a single waterfront project, it is easier to experience the concrete strategies to make the whole area an ideal place for people, such as Paris Plage, San Antonio's River Walk and Vancouver's Granville Island.

Although numerous precedents could help define the successful waterfronts with promising elements, most approaches merely "highlight issues and in so doing raise further questions" (Hemphill, Berry and McGreal, 2004, p.726) instead of answering why differences exist - how to measure the performance of regeneration still remains as a tough question. A lot of urban design guidelines are difficult to be transferred and examined quantitatively, which might be the most possible reason why there have not been many approaches to assessing the effectiveness of waterfront reinvigoration, and the largest barrier to undertake the comparison analysis.

However, urban regeneration evaluation frameworks are increasingly following an indicator-based approach by including contextual measures to identify the baseline

assessment of the area, the conditions within which the strategy is operating and the effects of policy actions (Wong, 2000; Audit Commission, 2002). Lesley Hemphill, Jim Berry and Stanley MeGreal published their research on an indicator-based approach to measuring sustainable urban regeneration performance in 2004. “The merits of sustainability indicators are explored with a discussion of the indicator selection process and the derivation of a points scoring framework….Conclusions are drawn on the robustness of the indicators selected, the versatility of the points scoring framework in capturing the sustainability performance of regeneration projects and the potential to identify ‘best’ practice” (Hemphill, Berry and McGreal, 2004, p.729). They formulated the indicator system by 4 steps:

1. Conceptual Consolidation
2. Analytical Structuring
3. Identification of Indicators
4. Creation of an Index

Other than that, they invited 64 experts to decide the principles or aspects that were necessary for them to look into. After the hierarchy model had been created, researchers applied the model to examine waterfront areas and cultural quarters in 3 European cities: Belfast, Dublin and Barcelona. Then conclusions would be drawn through comparison and sensitivity analysis.

Their research existed as a milestone about how to transfer all the data into quantitative ones in order to examine whether the outcomes of the sustainable waterfront reprogramming match to the needs of the area regarding a coherent vision of holistic regeneration or not. There has been widespread consensus on the importance of early, persistent and rigorous evaluation of regeneration initiatives (UK Parliament, 2003). This research has successfully proved the feasibility of an indicator-based way to

monitor and assess the sustainable waterfront sites from social, economic and environmental perspectives. Moreover, the process to design the evaluation method is widely applicable to describing as both “good” and “bad” implementations of policies.

CHAPTER 3
METHODOLOGY

The methodology employed in this thesis can be divided into 4 phases (Figure 3-1): informing, framework formulating, data acquisition, analysis and conclusion.

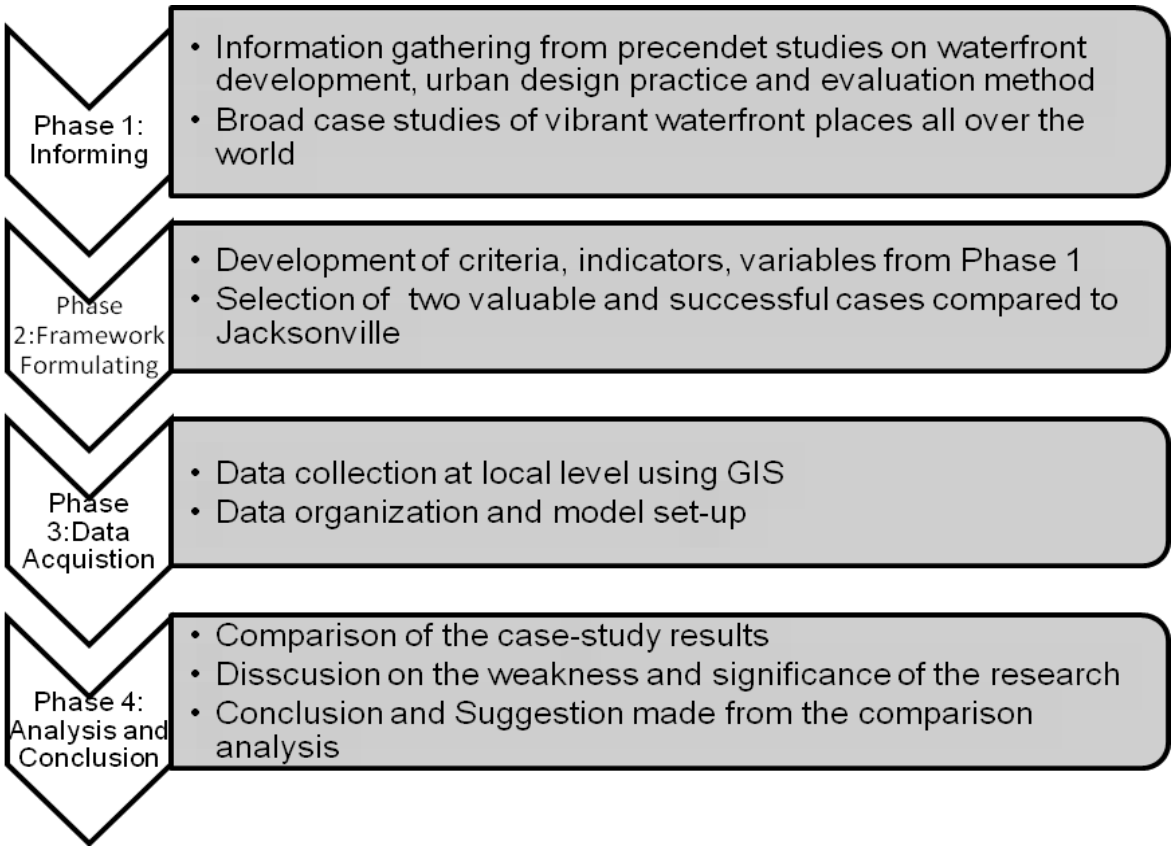

Figure 3-1. Methodological approach

Similar to the British practice which has been done by Hemphill, Berry and MeGreal in 2004, this thesis is an exploration of the application of indicator-based evaluation system in the U.S., in a limited time period. The differences from the British one are 1) the concentration on the built environment rather than the comprehensive sustainability including social, economic and environmental issues, and 2) the broad 20-

case-study method served as a compensation of lack of an expert board to clarify the basic criteria.

Broad Case Study

Besides the precedents of similar studies obtained from the literature review, in order to acquire a general idea of how a successful waterfront looks like, the author researched on 20 cities with a functional and vibrant waterfront as shown below (Table 3-1).

Table 3-1. Case study projects

	Project Name	City	Country	Water Type
1	East River Waterfront Esplanade	New York, NY	US	Riverfront
2	North Shore	Pittsburgh, PA	US	Riverfront
3	Inner Harbor	Baltimore, MD	US	Seafront
4	Navy Pier	Chicago, IL	US	Lakefront
5	Cruise Ship Port	Key West, FL	US	Seafront
6	River Walk	San Antonio, TX	US	Riverfront
7	Waterfront Park	Seattle, WA	US	Seafront
8	East Bank Esplanade	Portland, OR	US	Riverfront
9	Pier 39	San Francisco, CA	US	Seafront
10	Port Vell	Barcelona	Spain	Seafront
11	Nyhavn	Copenhagen	Denmark	Riverfront
12	Riva Split Waterfront	Split	Croatia	Seafront
13	International Terminal	Yokohama	Japan	Seafront
14	Sculpture Museum	Qingdao	China	Seafront
15	Houtan Park	Shanghai	China	Riverfront
16	West Kowloon Promenade	Hong Kong	China	Seafront
17	The Waterfront	Kota Kinabalu	Malaysia	Seafront
18	Downtown Waterfront	Singapore	Singapore	Seafront
19	Circular Quay	Sydney	Australia	Seafront
20	New Quay	Melbourne	Australia	Seafront

All the 20 cities have been widely recognized as successful cities with attractive waterfronts. 9 of them are from the U.S., 6 from Asia, 3 from Europe and 2 from Australia. Brief introductions of the projects are listed at the end of this thesis in Appendix A. Included in the summaries are location, quantitative measures such as length and width, completion and review comments.

Table 3-2. Typological analysis

	Project Name	City	Water Type	Function Type
1	East River Waterfront Esplanade	New York, NY	Riverfront	Open Space
2	North Shore	Pittsburgh, PA	Riverfront	Open Space
3	Inner Harbor	Baltimore, MD	Seafront	Retail & Business
4	Navy Pier	Chicago, IL	Lakefront	Retail & Business
5	Cruise Ship Port	Key West, FL	Seafront	Others
6	River Walk	San Antonio, TX	Riverfront	Open Space
7	Waterfront Park	Seattle, WA	Seafront	Open Space
8	East Bank Esplanade	Portland, OR	Riverfront	Open Space
9	Pier 39	San Francisco, CA	Seafront	Retail & Business
10	Port Vell	Barcelona	Seafront	Others
11	Nyhavn	Copenhagen	Riverfront	Retail & Business
12	Riva Split Waterfront	Split	Seafront	Retail & Business
13	International Terminal	Yokohama	Seafront	Others
14	Sculpture Museum	Qingdao	Seafront	Open Space
15	Houtan Park	Shanghai	Riverfront	Open Space
16	West Kowloon Promenade	Hong Kong	Seafront	Open Space
17	The Waterfront	Kota Kinabalu	Seafront	Retail & Business
18	Downtown Waterfront	Singapore	Seafront	Open Space
19	Circular Quay	Sydney	Seafront	Retail & Business
20	New Quay	Melbourne	Seafront	Retail & Business

In addition, the author carried out the typological analysis so as to summarize the similarities among the 20 projects. As is shown in Table 3-1, the water type varies in sea, river and lake. However, the quality of the waterfront area does not necessarily

relate to the type of water. Therefore, in the light of the initiative of the program, a further analysis mainly separates the projects into open-space dominating and retail/business dominating categories. There are also other types of function, for example, Prot Vell from Spain is a logistics port, and terminals from Key West and Yokohama are for the cruise ship use. The result is shown as Table 3-2.

Except the terminals listed above, there are 9 open-space-dominating waterfronts and 8 retail-and-business-dominating ones (Table 3-2). Places with a larger variety of activities are more prone to become the most popular sites in the city, indicating that both locals and visitors are willing to go and stay for leisure and recreational use if there are diverse activities going on. As is mentioned in Chapter 2, people is the most fundamental catalyst to attract other people and thus generate more vigor for the community. Retail/business dominating waterfronts not only strengthen the internal water advantages as public open spaces, but also emphasize on the mixed use development to allow more land use types facilitating each other's growth, in order to reach the prosperity of the community with numerous possibilities for people to enjoy the waterfront life.

All the cases presented in this thesis have achieved a high publicity, and every waterfront has provided its own city with a unique branding opportunity. The author has summed up 7 commonalities from the 20 great waterfront places as the successful characters that a waterfront revitalization project should attempt to establish. These characters are publicity, connectivity, accessibility, walkability, diversity, changeability and identity. Further discussion on the 7 characters will be embarked on in the evaluation criteria part in the next section.

Indicator System

The essential part of this thesis is the indicator-based evaluation as a method to measure the physical environmental performance against urban design criteria. The quantification of each concept is still a giant challenge, given the difficulty to create an index by individual in a limited time. In order to address the ambiguities recognized from the literature, such as measuring design elements' influence on the waterfront reinvigoration, a "top - down" approach has been applied to this thesis. "The 'top-down' approach requires a preliminary analysis of the concept, before breaking it down into a typology of factors" (Hemphill, Berry and McGreal, 2004, p.732). Then a set of variables will be created according to the factors, followed by a weighted scoring model.

Evaluation Criteria

Clarifying the basic concept is fundamental in the process of developing the indicators. The criteria have been concluded from the previous researches as well as from the broad case study. Thomas et al. (2003) evaluated sustainable urban design through 7 perspectives: transportation, landscape, building, energy and information, material, water, waste and resources. Owing to the emphasis of the built environment in an urban planning and design scale, 7 common characters among the 20 great waterfront places have been identified: publicity, connectivity, accessibility, walkability, diversity, changeability and identity. Nevertheless, the presence of these 7 attributes cannot guarantee the success of the project, but the absence of these components might cause the failure of the redevelopment.

Publicity

As more cities envision their waterfronts as lively public destinations that keep people coming back, the renovation goal should adhere to the principle that the water

edge is a public asset, with a shared community vision. As is shown in the broad case study, most of the waterfront projects in the U.S. have transformed from private industrial sites into public areas with the lure of leisure and recreational activities. Above all, publicity is the most important character to realize if a city considers to revive waterfront as a new image. Without publicity, there is no way to accomplish connectivity, accessibility and other attributes for vibrancy.

Connectivity

From the inbound, the key is to establish continuity, especially when it comes to pedestrian experience. A high efficiency to connect each destination within waterfront area allows each to strengthen the others. For example, Houtan park in Shanghai demonstrates the green infrastructure technologies by creating different landscape nodes of diverse art works, urban furniture, and plantation strategies. The park is well connected as an integral wetland to provide an ‘urban green lung’ among modern buildings for citizens to breathe fresh air and enjoy natural scene.

As for the outbound, waterfronts should be knitted into the city fabric rather than an isolated area. Districts with continuous connections both in transportation and view are much more desirable, the interruption in terms of even small stretches could result in an experience decrease. Chicago is famous for its skyscrapers, with not only the architecture but also the well-organized groups of buildings creating multiple view corridors to the lakefront. The author interviewed Mr. Paul Crawford, the deputy executive director from JEDC (Jacksonville Economic Development Commission) about their urban design guidelines toward the riverfront in Jacksonville. He mentioned that connection is a tremendously important issue. They made the connections to the inland portion of downtown through the design elements. For instance, they paved with the

same durable materials as in the past to achieve the connection to the history as well as the inland of the city. The same concept also took place in lighting, color and arts systems.

Accessibility

Since the primary goal is to achieve publicity, it is essential that the waterfront be accessible for people's use for water. Therefore, the support for multiple modes of transportation is a prerequisite to success. The author went to the east river esplanade in New York City after it opened in May, 2012. Along the water edge is a highway, which severely blocked the waterfront open space from the inland. There are no efficient entrances built for the site, and people have to come across the fast traffic to reach the waterfront. Therefore the public usage of this area have been deteriorated, except the pet playground, and there are not many people hanging along the esplanade after work time. A positive example involves the Circular Quay in Sydney. The area serves as a huge transportation hub connecting the Opera House and The Rock. Millions of locals and tourists visit this area by multiple transportation modes, such as buses, trains, water taxies and ferries.

Furthermore, access also means interaction. People can actually interact with water in many ways – fishing, dining, swimming, feeding the ducks, etc. A concrete example is the Fisherman's Wharf in San Francisco. Since 1989, California sea lions have started to haul out on Pier 39 of the wharf, which attracts a large number of tourists every year.

Walkability

A walkable community brings lots of opportunities to enjoy urban life for people, with a proper scale of open space and streetscape, as well as a limitation for private

vehicles. A pedestrian-friendly district also improves the surveillance, social networking as well as commercial and recreational functioning. New York City and Shanghai are both worldwide well-known metropolitan areas with hundreds of skyscrapers. The skylines of the two city look similar, but if one wants to experience the street life, it could be magnificently different. Streets in Shanghai are too wide to generate activities, which also put pedestrians in jeopardy due to the widened vehicle roads. As crowded as Shanghai, the Manhattan island has been developed oppositely. The denser grid system structured the entire island into a highly walkable area, with plenty of activities going on the streets, which enriched the city's stories to make it a charming and interesting place to visit. The environment has been created for the communication between people, no matter commercial or social behaviors. Retail shops, parks, theatres and F & B facilities constitute a comprehensive network for people to experience the multiracial culture of New York City.

Walkability has widely become the desire of officials and citizens to tame the effects of automobile on communities and to offer alternatives such as bicycling and walking. Since the 1980s, the New Urbanism movement has stressed on promoting a walkable neighborhood not only for cars but also for pedestrians and bicycles, followed by a series of urban design theories and strategies such as TOD and smart growth, whose primary goal is to achieve walkability as well. TOD, namely transit-oriented development, is a type of residential and commercial mixed use development generated by the center of a public transit station. Public ridership is encouraged to reduce the utilization of private vehicles. Similarly, smart growth advocates the redevelopment of the existing urban area by increasing the density of mixed use development to realize

that people are able to live, study, work and relax in the same or adjacent areas, rather than extending the urban boundaries. No matter to change the commuting mode or to shorten the commuting time, the essence of the ideas is to create a walkable community.

Diversity

The most apparent reflection of diversity is land use. In 1983, Black listed a number of advantages of mixed use development: the ability to share capital facilities and costs (such as parking and infrastructure improvements), more opportunity for the user of the facilities and activities, a more efficient use of land, and more convenient access to alternative activity. Mixed use is the most suitable development mode in an effort to reclaim the waterfront with the concern of many different interest groups. No predominate single use also ensures the diverse and layered activities instructed by the urban design guidelines.

Changeability

The landscape, hardscape as well as structures and buildings should cooperate together to build up a vivid atmosphere, which owns different scenes in every season, with a variety of activities. The North Shore of Pittsburgh is a very successful project regarding changeability. The shoreline has two layers. The lower one is the continuous river walk, with interactive fountains; the upper one contains large lawns as the open panels for public gathering of festivals or celebrations. There are also a bunch of civic buildings along the waterfront, such as the PNC Park and Heinz Field. The big panels in the upper level has become the ideal place for people to enjoy get-together when events take place in these civic buildings.

Identity

A stand-alone, iconic building or structure, or even unique open space can be a boon to the waterfront, attracting natives and visitors to come back again and again. For instance, every year the Nobel Prize ceremony is held in the City Hall in Stockholm, Sweden. The building is the busiest one along the waterfront, surrounded by parks and plaza. With a strong identity of place, the waterfront has been endowed with a distinctive icon.

Moreover, the cities have built the whole waterfront into an iconic plan, to define their images. San Antonio is well known as a river city, resting on its river walk all along the banks of San Antonio River; Venice is one of the most popular tourism destinations because of its dependency on water transportation. Waterfront can be an effective catalyst to create a vibrant city, as long as it has been emphasized enough.

Mostly all the characters could achieve and facilitate each other. Optimizing public access also contributes to the connectivity; mixed use is able to bring a diversity of activities, based on a highly walkable district. A better understanding of these 7 characters should not only be their complementary nature, but also proper implementation. For instance, uniqueness is not equal to isolation or exclusivity, but an integration with the rest of the city with its own sense of belonging.

Indicator and Variable Creation

Based on the discussion of the criteria above, an index of indicators has been created (Table 3-3).

Table 3-3. Identification of indicators

Concept	Indicator
Publicity	Nature of land use
Connectivity	Connection between each theme inside the waterfront area
	Connection to adjacent parcels
Accessibility	Physical access types and routes
	Visual accessibility
Walkability	Block scale
	Pedestrian network
	Amenity installation
Diversity	Mixed use
Changeability	Time change design
	Spatial variation design
Identity	Iconic place making

In order to interpret all the indicators appropriately, a set of variables has been further created as below (Table 3-4).

Table 3-4. Identification of variables

Concept	Indicator	Variable
Publicity	Nature of land use	Land ownership from GIS parcel data
Connectivity	Connection between each theme inside the waterfront area	Design elements for inside connection
	Connection to adjacent parcels	Design elements for outside connection
Accessibility	Physical access types and routes	Number of types of access, such as water taxi, private vehicles
	Visual accessibility	Series of buildings, structure or landscaping which facilitate people to catch the waterfront view
Walkability	Block scale	Width of the blocks
	Pedestrian network	Number of streets connections per mile
	Amenity installation	'Street Smart' walk score
Diversity	Mixed use	Pattern of mixed use to encourage activity
Changeability	Time change design	Design approaches to developing changeable and interesting scenes according to daily or seasonal change
	Spatial variation design	Design approaches to developing changeable and interesting scenes according to spatial variation
Identity	Iconic place making	Number of landmarks for the city

A scale of 0-5 will be assigned to each variable based on the performance of the cases, where 0 means no contribution to the waterfront revitalization and 5 represents an optimal demonstration to promote the renewal.

However, the individual indicators do not contribute equally to the regeneration. The fact that waterfront revival encompasses such a wide range of issues requires an appropriate way to synthesizing the proposed variables into a single index according to their relative importance. Besides, “The scoring and weighing system developed can still provide an overall indication of performance whilst illustration areas where improvement is necessary” (Hemphill, Berry and McGreal, 2004, p.734). Therefore a weighted system has been selected allowing each variable to show its overall achievement of waterfront regeneration (Table 3-5). The system has been formatted largely based on the extensive literature review and the broad case study, as well as the author’s design experience.

Table 3-5. Weighting System

Concept	Indicator	Weight (100%)
Publicity 12%	Nature of land use	12%
Connectivity 18%	Connection between each theme inside the waterfront area	9%
	Connection to adjacent parcels	9%
Accessibility 18%	Physical access types and routes	9%
	Visual accessibility	9%
Walkability 18%	Block scale	6%
	Pedestrian network	6%
	Amenity installation	6%
Diversity 12%	Mixed use	12%
Changeability 16%	Time change design	8%
	Spatial variation design	8%
Identity 6%	Iconic place making	6%

Furthermore, the final step would be the ranking of every factor due to the performance of the projects. Hence a benchmark could be established, and recommendations could be made after the comparison analysis.

In-depth Three Case Study

This part aims to test the evaluation approach. Whether it is applicable and feasible will be determined through the comparison analysis among Jacksonville, Pittsburgh and Baltimore. In addition, the shortcomings of the research and the recommendations for the main case Downtown Jacksonville will be concluded in the last chapter based on the outcomes of the in-depth three case study.

Case Study Selection

Due to the proximity and data availability, the author decided to select a project within Florida as a primary case. Jacksonville is well known as a river city, where Florida begins. Downtown Jacksonville is a typical waterfront reprogramming project which has been through the post-industrial decay and heading to its prosperous revival contemporarily. The city has been removing its industry and public facilities out of the waterfront by incorporating mixed use for recreational, residential as well as commercial use because of the urgent request for downtown extension and redeveloping. This thesis examines the area from the Jacksonville Landings to the Everbank Field out of the downtown area (Figure 3-2).

Figure 3-2. Study area in Jacksonville (Source: Good Earth, Last Accessed August, 2012)

Among the 20 projects the broad case study encompasses, the North Shore in Pittsburgh is the most similar one to Downtown Jacksonville. Pittsburgh is also recognized as a river city, because the city is situated at the confluence of Monongahela, Allegheny and Ohio river. The core of Pittsburgh occupies both sides of the three rivers. “This unique geographic setting has made the rivers an integral part of the city’s infrastructural system for over 250 years and it has always defined the image of Pittsburgh” (St. Onge, 2010, p.19). The riverfront plays an overwhelmingly essential role

in planning the whole city. In 2002, the master plan for Pittsburgh's waterfront regeneration has won AIA Honor Award in Urban Planning and Design. The study area for this thesis is from Heinz Field to the expressway Veterans Bridge (Figure 3-3).

Figure 3-3. Study area in Pittsburgh (Source: Google Earth, Last accessed August, 2012)

Finally, the allocation of points should be decided on the grounds of a potential benchmark. Hemphill et al. (2004) contended that the application of indicators has little or no meaning unless set against a scoring system whereby a case-study scheme can be evaluated in terms of its performance against a benchmark established. Hence, it is

necessary to make comparisons with a generally accepted successful case. Baltimore Inner Harbor has been named “the model for post-industrial waterfront redevelopment in the world” by ULI. The redevelopment began in the 1970s, the largest success of which is replacing the manufacturing and industrial business by mixed-use development.

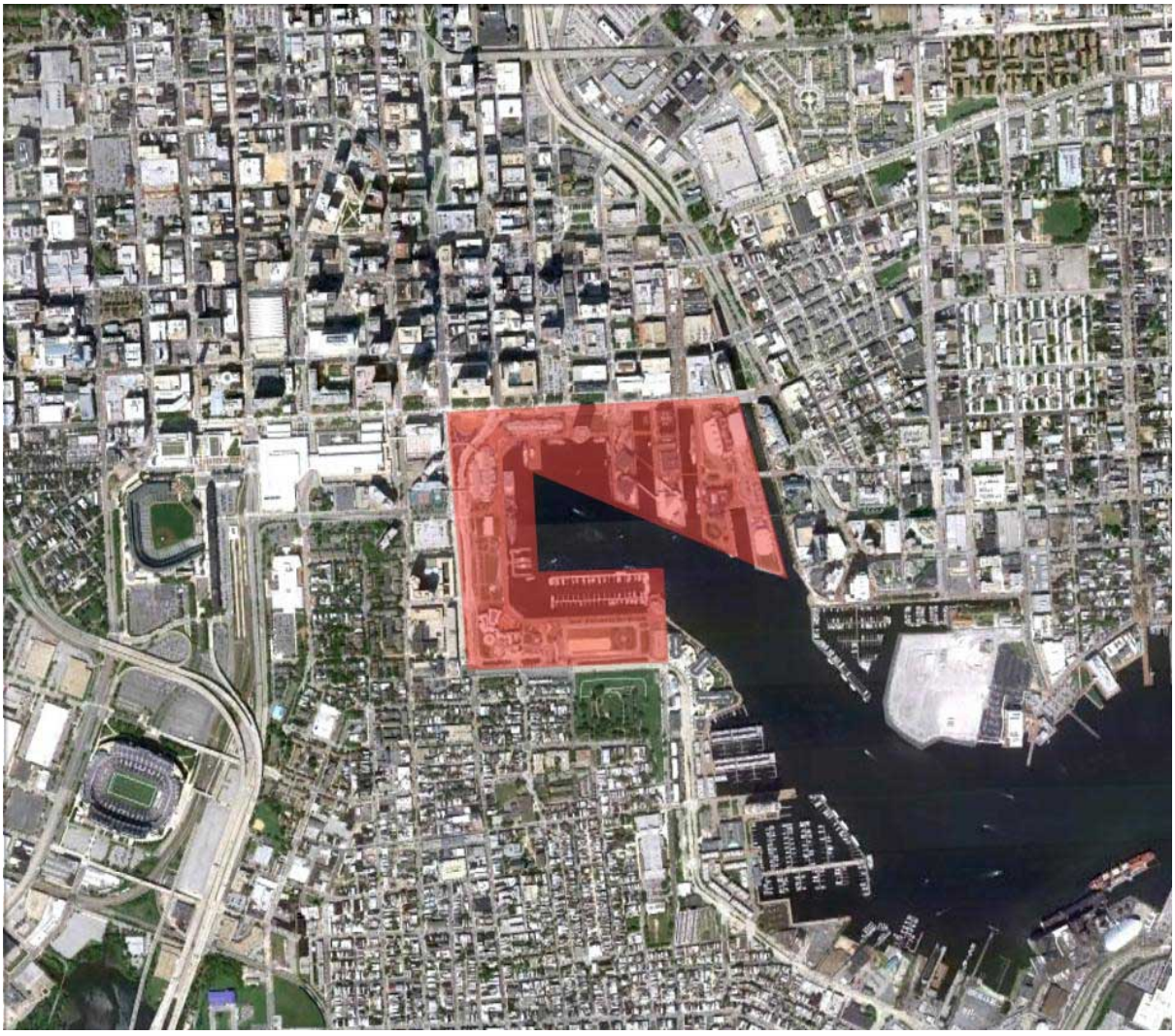

Figure 3-4. Study area in Baltimore (Source: Google Earth, Last accessed August, 2012)

In brief, these three cases have been through the same ages with the same impetus to reinvigorate. The similarity of the background has triggered off a highly comparative assessment of how a project performs against another, meanwhile

allowing the individual indicators to be compared in any location. By doing that, an opportunity of comparing the overall score has been provided to examine what characters of successful waterfronts need to be accomplished before the phase is described as unsuccessful.

Data Collection

The data collection consists of observation, interview, downloadable GIS data and the physical documentation and plans of these three projects.

This thesis has concentrated on the evaluation of the physical design elements, therefore on-site observation is of great importance. In an effort to conduct the research in an orderly and timely fashion, the author only conducted the on-site observation and interview for the primary case Downtown Jacksonville. But substantive supporting data could be hunted via secondary data collection such as relative researches, planning documents and consensus records. Mapping and diagrams for analysis are also indispensible for the comparison. As a consequence, GIS data serves as the fundament for this research.

CHAPTER 4
IN-DEPTH CASE STUDY ANALYSIS

Cases' Introduction

Downtown Jacksonville

According to the interview with Mr. Paul Crawford, the riverfront was occupied by ship-manufactories and public buildings including the city hall, the court facilities and the large parking lot in the 1950s. In the 1980s, the mayor emphasized the renaissance of the downtown area. Most people who look at Jacksonville waterfront think it is unique, a large area beside St. John river. People are drowned to come and exist the river area to memorize the river which has created the city (Figure 4-1). In the old time, most of the lands were underutilized and privately owned. At the very beginning, the public investment had been devoted to the improvement of the infrastructure after the local government acquired the land from the private owners. About 10 years ago, the city hall was moved off the river to the inner city, and currently the government is on the projection to move the courthouse from the riverfront to the inside part of the city as well. By relocating the manufactories and turning the shipyard into public parks, the riverfront attracts more and more private developers to invest in residential and office uses.

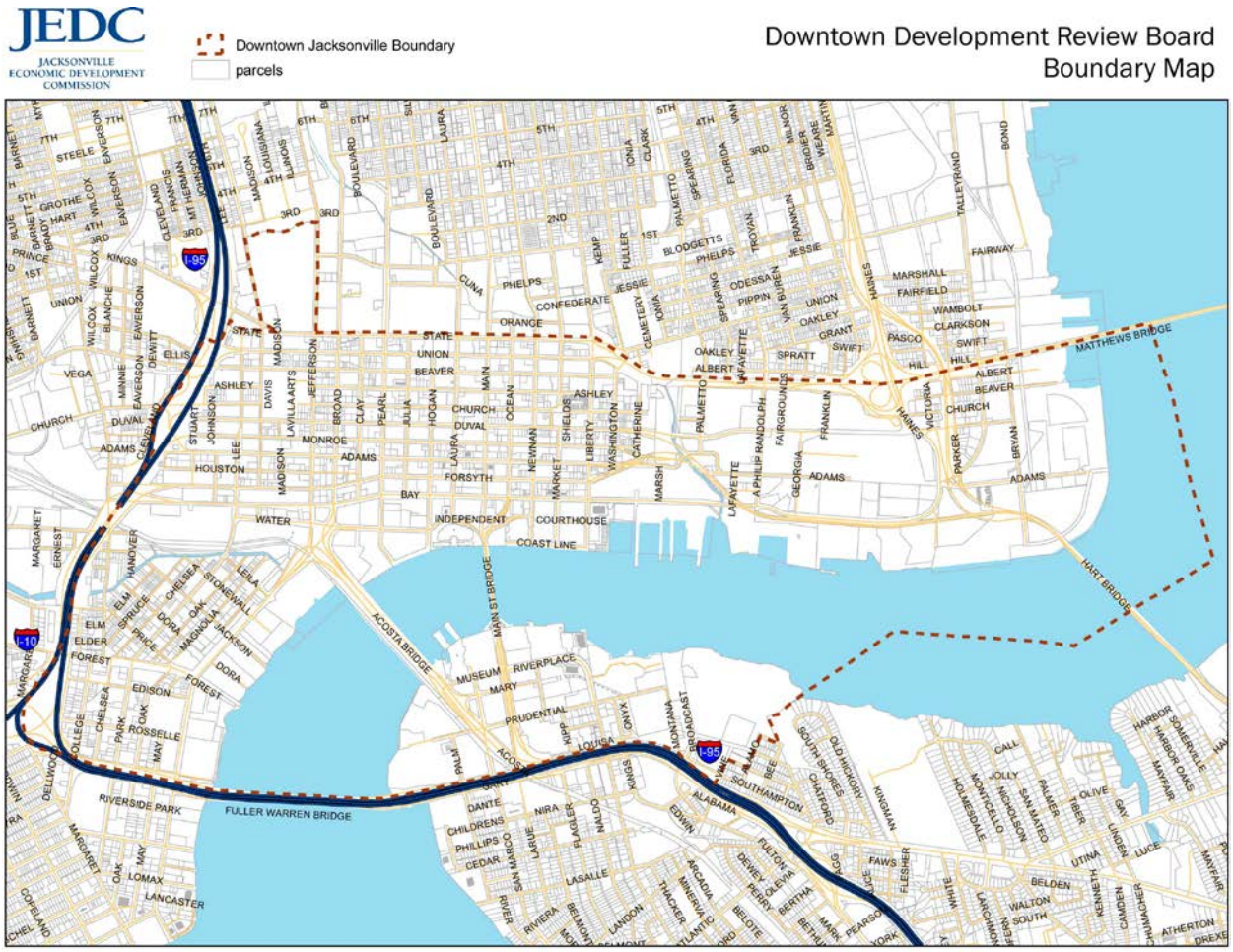

Figure 4-2. Downtown Jacksonville boundary (Source: http://www.coj.net/departments/office-of-economic-development/docs/downtown-development/ddrb-map.aspx Last accessed October, 2012)

Through the combined endeavor of the public and private sectors, the downtown area has been gradually reconfigured by a mixed-use reprogramming. From the 2009 progress report of Downtown Jacksonville, $1.7 billion has been invested in 1,740 acres generating 51,000 job opportunities, 2,365 residents, 2,153 hotel rooms, 7.3 million square feet of commercial office space and more than 100 F & B businesses, with 12.5 million visits annually (JEDC, 2009). Furthermore, in order to enhance the local tourism and recreational activities, the city proposed a Riverwalk Enhancement Plan on both sides of St. John River, and the south bank was completed 25 years ago. Nowadays the

redevelopment is still undergoing aiming to achieve the goals of improving walkability, making downtown a destination as well as a neighborhood and ensuring a framework for sustainable success (JEDC Downtown Action Plan, 2007).

The study area (Figure 4-2) is selected from the north side of the river, covering 3 distinct themes of planning: Market District, Residential Marinas and Sports Park Riverfront.

Figure 4-2. Study area in Jacksonville

North Shore

In the 1960s, the collapse of the steel industry, the dominant economic engine for Pittsburgh, dilapidated the urban riverfronts along the Allegheny, Ohio, and Monongahela Rivers. Like Jacksonville, Pittsburgh has strived to revitalize its riverfronts to redefine the city image. The quality of life has been improved a lot since The River

Life Task Force was appointed to initiate a master plan for future riverfront regeneration in 1999 (Figure 4-3).

Figure 4-3. A vision for greater downtown area in Pittsburgh (Source: A Vision Plan for Pittsburgh's Riverfronts, prepared by River Life Task Force)

North Shore belongs to the greater downtown Pittsburgh, right outside the business improvement district across the river. The North Shore River Park (NSRP) was accomplished in 2001, which used to be a massive paved parking lot. "There is a

growing list of amenities that attract users to the park including kayak rentals and a functional wharf that encourage public use of the water" (St. Onge, 2010). Today the neighborhood has already been developed into an entertainment destination. The north shore also provides an unobstructed view of the downtown area across the river. Besides NSRP, the study area is extended to the Veteran Bridge in order to create a similar scale to the one in Jacksonville with multiple uses (Figure 4-4).

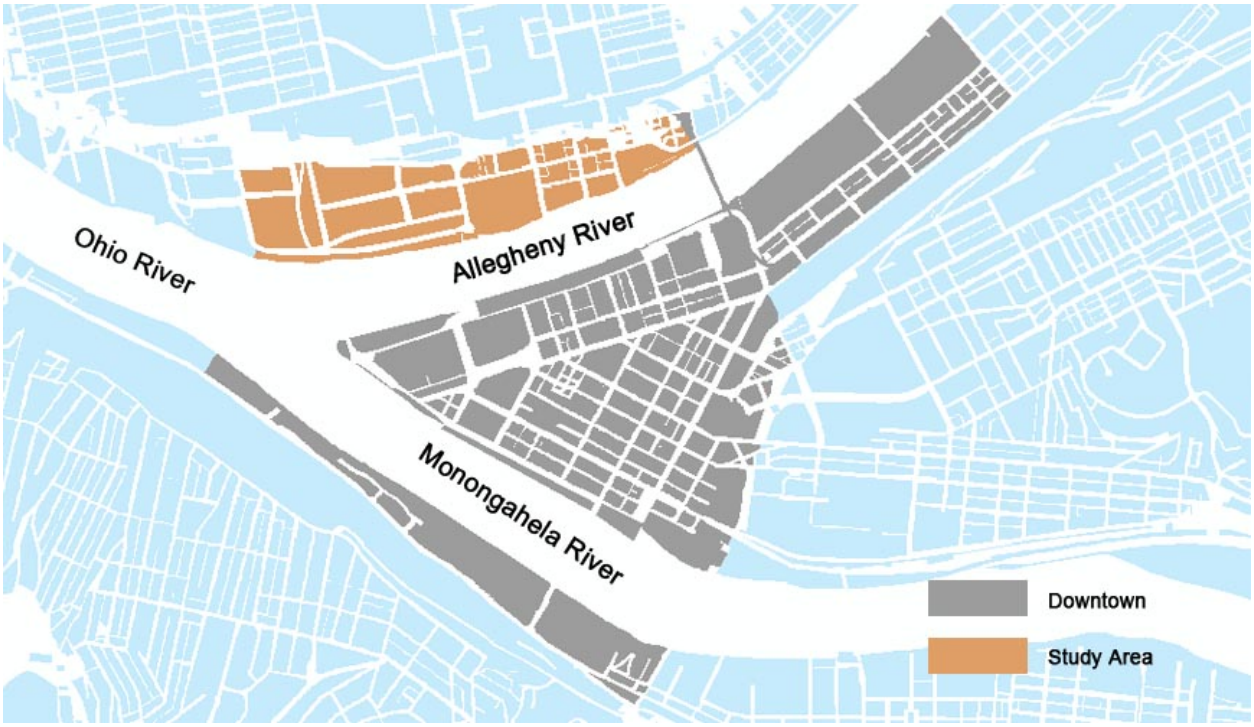

Figure 4-4. Study area in Pittsburgh

Inner Harbor

In the 18th century, Baltimore Inner Harbor used to be the second largest seaport for the entry of immigration to the U.S. and a major manufacturing center. As Baltimore shifted to a service-oriented economy after the turndown of manufacturing, the Inner Harbor started to replace its rotting warehouses and piers with plenty of green open space along the waterfront. The construction of Charles Center lit the revitalization of

Baltimore Inner Harbor in March, 1958. Hotels, office buildings, as well as leisure attractions were built into the site surrounded by parks and plazas. In the 1970s, Baltimore Inner Harbor successfully reversed the city's mammoth economic decline and became the cultural center of the city. The blossoming of the waterfront and its far-reaching and overpowering influence on the local economy pioneered the worldwide waterfront reinvigoration with more than 40 award-wining projects nationally and internationally. Nowadays a bunch of places of great interest charmed millions of visitors every year, such as Maryland Science Center, National Aquarium, Baltimore Maritime Museum and Harborplace.

The central business district is to the north of the harbor. The study area is exactly within the Inner Harbor boundary shown as below (Figure 4-5)

Figure 4-5. Study area in Baltimore

The three projects have all been through a post industrial decay in the U.S. and revitalized in the second half of the 20th century by means of a mixed use development. The similar scales make the three highly comparable as well.

Table 4-2. Comparison of the 3 projects' scale

Project	Area (M2)	Length (M)	Width(M)	Water Body Width (M)
Downtown Jacksonville	414,000	2,400	230	450
Pittsburgh North Shore	421,120	1,880	280	250
Baltimore Inner Harbor	405,600	1,990	230	260

Comparison Analysis

Publicity

The achievement of publicity is highly related to the land use types. Before the waterfront regeneration, all the tracts of land from these 3 projects were occupied by the industrial and transportation use, which was semi-private or private. But now, after the mixed use development took place, the uses for the waterfront are diversified into residential, commercial, office, institutional, park, sports, leisure and recreational use. Furthermore, commercial use comprises retail, F & B, Hotels and so on. Among all these uses, only residential and office could be completely private. Others could achieve publicity or at least semi-publicity.

According to the GIS parcel and land use data, the 3 projects' performance regarding publicity are as below (Figure 4-6)

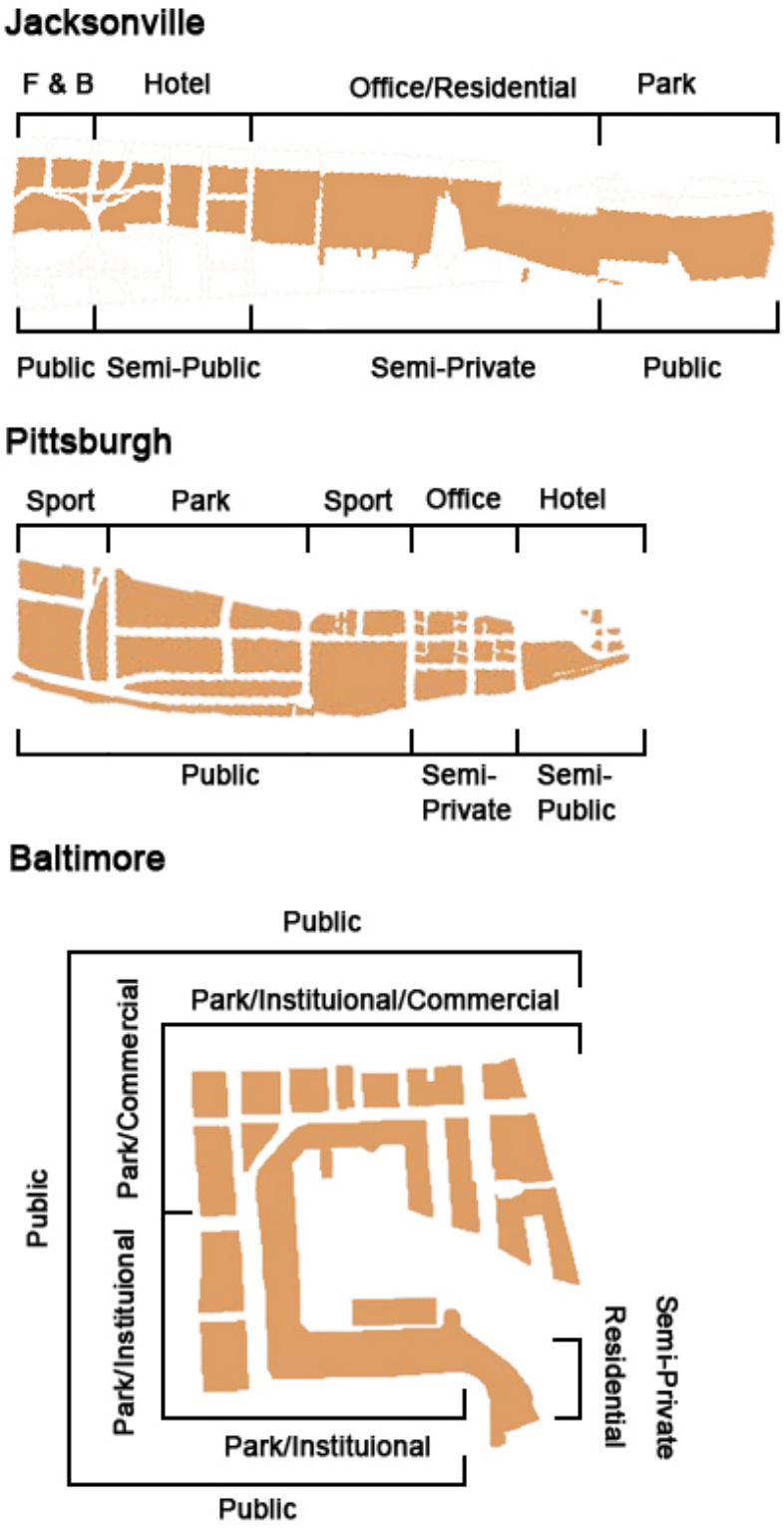

Figure 4-6. Publicity performances of the 3 cases

From the analysis, in an effort to achieve publicity, residential and office use should be decreased, given their private-need nature. Apparently the scores for Jacksonville, Pittsburgh and Baltimore should be 1, 3, 5 respectively, out of a full score at 5.

Connectivity

From an urban design and planning perspective, connectivity refers to the design and planning methods, approaches and elements which develop links and continuity between different themes all throughout the site. Possible connectivity could be achieved by means of transportation organization, building sequences, planning themes, open and green space, urban furniture and so on.

As for the waterfront reconfiguration, most of the sites could easily reach the unity of the urban furniture, plantation due to the urban design guidelines issued by the local governments, including the 3 cases discussed in this thesis. Pedestrian routes are the most suitable mode for creating a welcome waterfront, so interesting nodes and lineal design to coordinate with the pedestrian system are part and parcel. Hardscape such as architecture, bridges and landscaping structures is another vital consideration to establish connectivity.

According to the indicator system, the connectivity will be evaluated from inbound and outbound. The inbound focuses on the connections between different planning themes on site (Figure 4-7); the outbound is related to the inner land of the city (Figure 4-8).

Jacksonville

Pittsburgh

Baltimore

Figure 4-7. Comparison of the 3 sites' existing plan (Source: Google Earth, Last accessed October, 2012)

Jacksonville ..... Site Boundary

Pittsburgh

Baltimore

Figure 4-8. Comparison of the 3 sites' correlation with the surroundings (Source: Google Earth, Last accessed October, 2012)

All the 3 sites have realized a continuous pedestrian walk along the waterfront. Especially for the Inner Harbor, the pavements are unified in color and material all through the harbor front. As for the open space, Baltimore designed the Inner Harbor as a whole; Pittsburgh performed much better between the two stadiums; Jacksonville is trying to replace where used to be a large shipyard into residential buildings now, so except the eastern park on this site, there are no public parks or playgrounds. Provided that the Inner Harbor comprises a bunch of civic institutional buildings, each building owns its distinctive characteristics, which contribute to the entire area as a tourist destination. However, the building sequences are not well instructed regarding continuity in Jacksonville or Pittsburgh. Moreover, the large parking lot between the two stadiums in Pittsburgh has inevitably cut the waterfront from the city fabric. Therefore, for the on-site connectivity, the distribution of the score is 1, 2, 4 for Jacksonville, Pittsburgh and Baltimore.

When it comes to the connection to the inner city, there is not a giant difference between these 3 projects. Due to the embracing topography of the Inner Harbor, the area has developed a favorable dialogue between each side of the waterfront, because each side locates civic buildings and large shopping complex with plenty of leisure and recreational activities. However, the scale of the buildings are more similar to the central business district rather than the areas to the south of the Inner Harbor. The city fabric could be further strengthened by a transition of building sequence. The sites in Jacksonville and Pittsburgh are both within the downtown area, but Jacksonville basically develops its downtown around the waterfront, and the north shore serves as an marginal open space for its downtown across the river. In addition, the freeway along

the North Shore has severely blocked the waterfront to the inner land on the other side. Consequently, for the outer connectivity, 3,1,3 out of 5 will be assigned to Jacksonville, Pittsburgh and Baltimore.

Accessibility

The first indicator for accessibility is transportation. All the 3 waterfronts can be accessed by buses and water transportation, but the water taxi in Jacksonville and the river shuttle in Pittsburgh are quite limited. However, Jacksonville has built a trolley line and a skyway system specialized for the downtown waterfront, fortifying the riverfront accessibility a lot. Pittsburgh and Baltimore own a light rail system as well. In addition, there are still a free shuttle called Charm City Circulation travelling over the places of interest within the city of Baltimore including the Inner Harbor area. Given the excellent performances among all the 3 cases, each one deserves a full score of 5 regarding the physical access.

Secondly, the visual accessibility has much to do with the building sequences as well as the green and open space. The street network and the size of the blocks also exert a significant effect on the formulation of view corridors, which should be stressed in urban design guidelines. Blocks structure the grid system of the city, meanwhile, create the view corridors along the straight streets directly to the waterfront; the waterfront also calls for large open panels within or close to the site so as to broaden the view of it.

The density of the streets in downtown Jacksonville in the west is higher than that in the east (Figure 4-9). Only in the market district are there enough view corridors. Besides, the park assuming a positive role on enlarging the view is merely the one in front of Ever Bank Field in the east of the site.

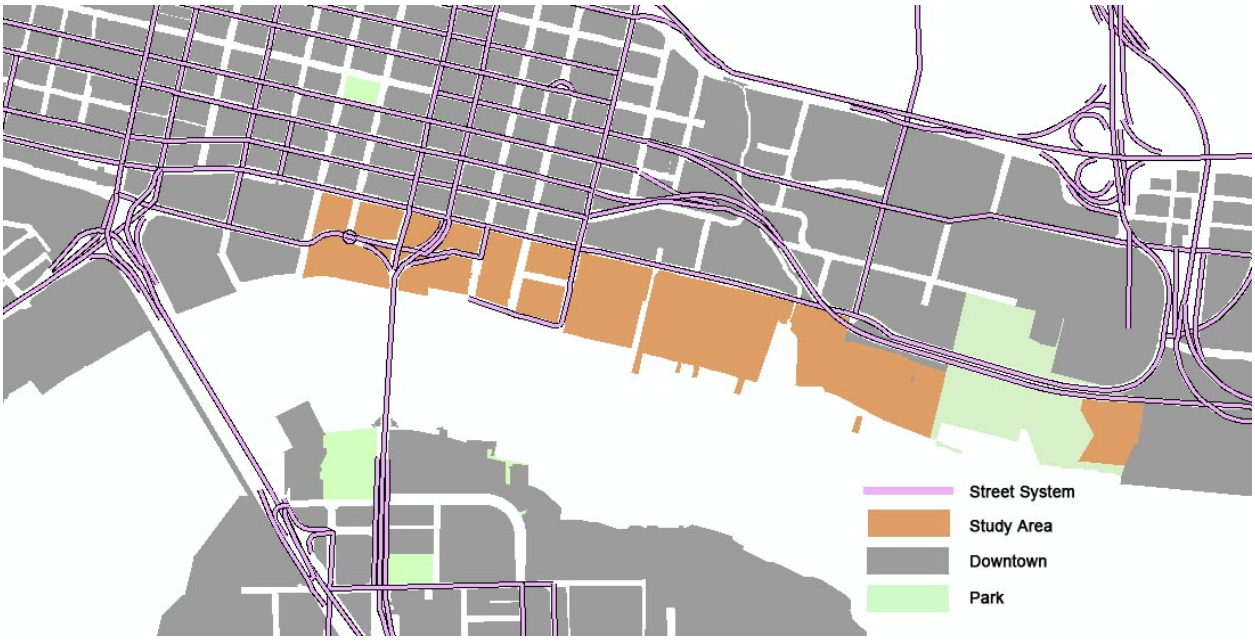

Figure 4-9. View accessibility analysis for Downtown Jacksonville

The streets throughout to the waterfront disperse evenly in North Shore, Pittsburgh, with a larger number of view corridors compared to Jacksonville (Figure 4-10). The large panels along the shore also helps expanding the view of the riverfront across the river. But the viaducts along the inner edge of the waterfront districts impede the view permeability from inside of the city.

Baltimore Inner Harbor performs the best out of the 3 cases regarding the view accessibility. More than 10 view corridors have been designed towards the harbor front (Figure 4-11). Two thirds of the harbor were transferred into open and green space, making it possible to share the waterfront view from across the bay.

In conclusion, the allocation of the score for Jacksonville, Pittsburgh and Baltimore should be 2, 3, and 5.

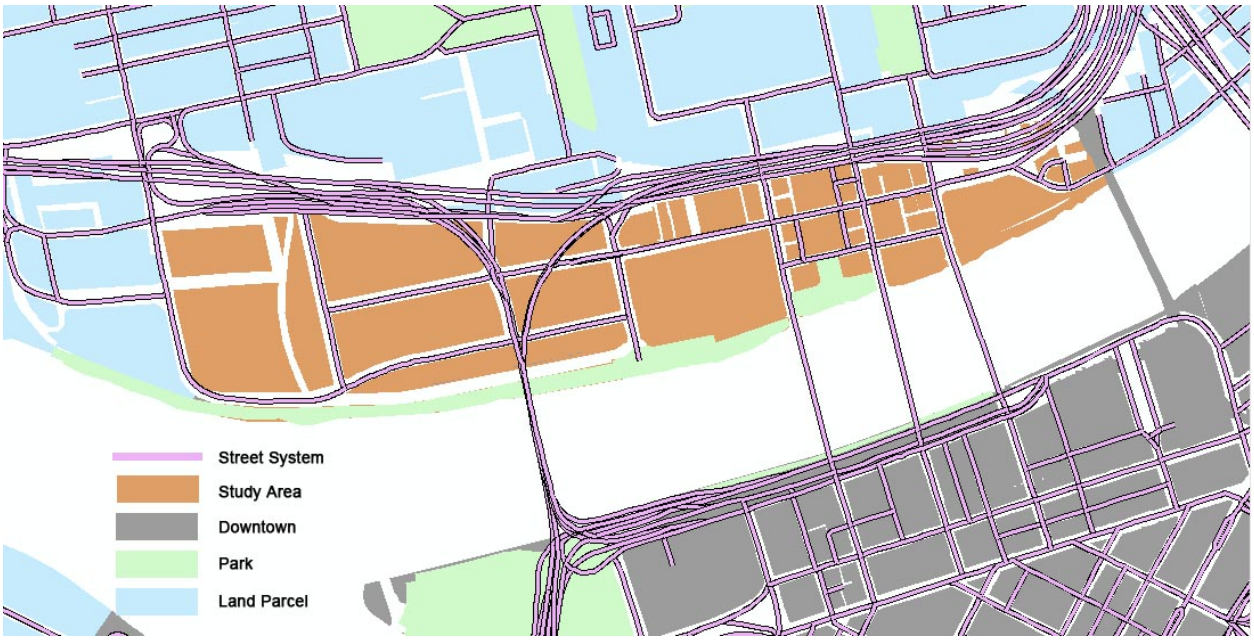

Figure 4-10. View accessibility analysis for North Shore, Pittsburgh

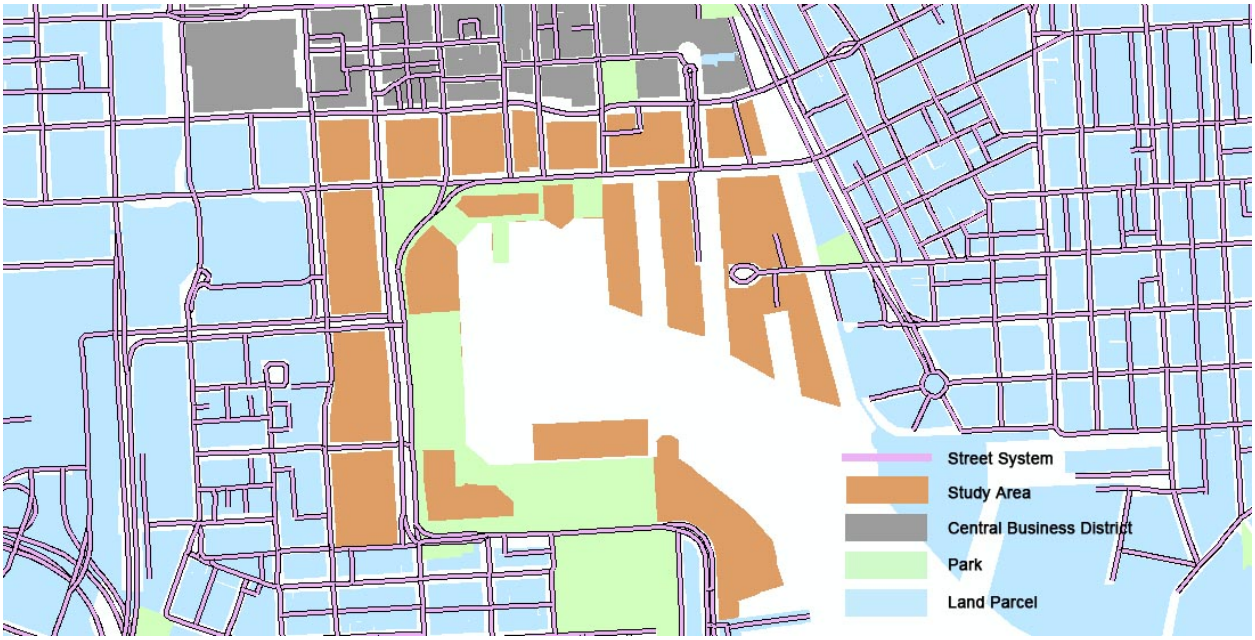

Figure 4-11. View accessibility analysis for Baltimore Inner Harbor

Walkability

Nowadays the most popular tool to quantify a neighborhood's walkability is the 'Walk Score'. It's originally designed for housing hunters to find an ideal place to live. The score is calculated based on the distance to the nearby amenities within walking

distance, such as parks, theaters, schools, grocery stores and so on. The application has an update version called ‘street smart walk score’, which highly relates to the geographic information system. The advantages of this newer one are the illustration of the block length and the intersection density, and the consideration of an actual walking route. Some larger barriers such as a water body or a highway will be taken into account when the score is calculated. The ‘street smart’ also assigns different weights to different amenities according to the frequencies people use daily. This thesis is designed for waterfront areas, so the interruption of the water body can be a fatal problem for walkability.

Another concern is that the online application is not specialized for the 3 projects, but when the name of the district has been typed in, it measures a larger area including the study area shown in this thesis. Therefore, the outcome is still persuasive though not accurate. In an effort to enhance the transparency of the reasoning, the amenities which are supposed to be measured within the walking distance - 1 mile - will be listed after the score.

Given the results below (Figure 4-12, 4-13, 4-14), the allocation of the score for walkability should be:

Table 4- 2. Score allocation for walkability

Indicator Project	Block Scale	Pedestrian Network	Amenity Installation
Jacksonville	5	3	4
Pittsburgh	3	2	2
Baltimore	5	5	5

Downtown, Jacksonville

81 out of 100, Very Walkable

Street Smart Walk Score is calculated using walking distances to the following amenities.

Category	Points	Name	Distance
Groceries	**15** out of 20	Winn-Dixie	.5 mi
Restaurants and Bars	**17.6** out of 20	Dive Bar	.2 mi
		Olio Restaurant	.3 mi
		Bay Street Cafe	.3 mi
		Dos Gatos	.3 mi
		Casa Dora Italian Cafe	.4 mi
		Trellises Restaurant at Hyatt Regency Jacksonville Riv...	.4 mi
		Indochine	.4 mi
		CoWork Jax | Downtown	.5 mi
		City Hall Pub	.6 mi
		Jax Landing Hooters	.7 mi
Shopping	**12.6** out of 15	The Letter Shop	.2 mi
		Sophies-Boutique-Online	.2 mi
		Winn-Dixie Pharmacy	.5 mi
		Professional Tailoring and Alterations	.5 mi
		Noland	.6 mi
Coffee	**14.1** out of 15	Olio Restaurant	.3 mi
		Jax City Cafe	.4 mi
Schools	**0.3** out of 6	Pathways Academy High School	1.2 mi
Parks	**5.1** out of 6	Hemming Park	.7 mi
Books	**6** out of 6	Duval County Law Library	.2 mi
Entertainment	**5.6** out of 6	Florida Theatres Performing Arts: Office	.3 mi
Banking	**5.9** out of 6	City & Police Federal Credit Union	.2 mi
Pedestrian Friendliness	**-0.8**	(see below)	
Total Walk Score	**81** out of 100		Agree Disagree

Pedestrian Friendliness

Short blocks and lots of intersections are better for walkers.

Average Block Length: 361 feet
Good

Number of Intersections: 126 per sq mi
Fair: -1% penalty

Walkability by Category

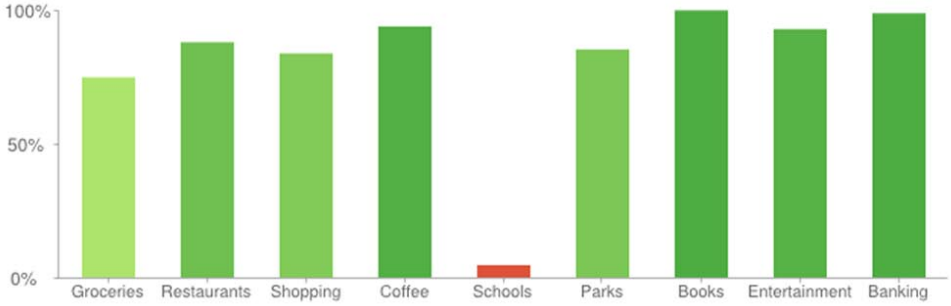

Figure 4-12. Walkability report for Jacksonville (Source: http://www.walkscore.com/, Last accessed October, 2012)

North Shore, Pittsburgh

59 out of 100, Somewhat Walkable

Street Smart Walk Score is calculated using walking distances to the following amenities.

Category	Points	Name	Distance
Groceries	**8.3** out of 20	Loblaws	.7 mi
Restaurants and Bars	**16.8** out of 20	Jerome Bettis' Grille 36	.1 mi
		Tilted Kilt Pub & Eatery	.1 mi
		Rivertowne North Shore	.1 mi
		Hyde Park Prime Steakhouse	.3 mi
		McFadden's	.3 mi
		Clark Bar & Grill	.5 mi
		SoHo	.6 mi
		Mullen's Bar & Grill Inc	.6 mi
		Atria's Restaurant	.7 mi
		Modern Cafe	.8 mi
Shopping	**5.7** out of 15	Piper Jaffray & Co	.5 mi
		The Pittsburgh Fan	.6 mi
		Rite Aid	1.1 mi
		CVS	1.1 mi
		Walgreens	1.1 mi
Coffee	**10** out of 15	Hyatt Place Pittsburgh-North Shore	.3 mi
		Modern Cafe	.8 mi
Schools	**1.7** out of 6	Cardinal Wright Regional School	.8 mi
Parks	**6** out of 6	Heinz Field	.3 mi
Books	**3.9** out of 6	Allegheny Campus Library	.6 mi
Entertainment	**5.6** out of 6	Carnegie Science Center	.3 mi
Banking	**3.9** out of 6	Farrell & Co	.6 mi
Pedestrian Friendliness	-2.5	(see below)	
Total Walk Score	**59** out of 100		Agree Disagree

Pedestrian Friendliness

Short blocks and lots of intersections are better for walkers.

Average Block Length: 518 feet
Fair: -1% penalty

Number of Intersections: 66 per sq mi
Poor: -3% penalty

Walkability by Category

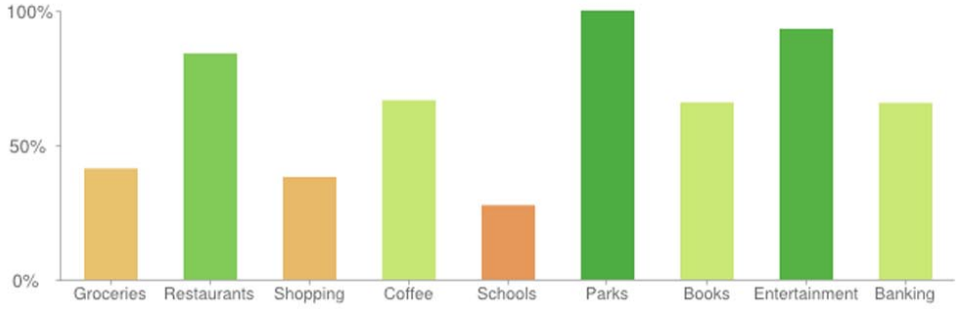

Figure 4-13. Walkability report for Pittsburgh (Source: http://www.walkscore.com/, Last accessed October, 2012)

Inner Harbor, Baltimore

96 out of 100, Walker's Paradise

Street Smart Walk Score is calculated using walking distances to the following amenities.

Category	Points	Name	Distance
Groceries	**20** out of 20	GNC	.1 mi
Restaurants and Bars	**20** out of 20	Hooters	.1 mi
		Edo Sushi	.1 mi
		La Tasca	.1 mi
		M & S Grill	.1 mi
		Tir Na Nog Bar & Grill	.1 mi
		Sullivan's Steakhouse	.1 mi
		Watertable	.1 mi
		Bistro 300	.2 mi
		J Paul's	.2 mi
		Center Club Inc	.2 mi
Shopping	**15** out of 15	Banana Republic	.1 mi
		Wet Seal	.1 mi
		Foot Locker	.1 mi
		Urban Outfitters Inner Harbor	.1 mi
		Brooks Brothers	.1 mi
Coffee	**15** out of 15	Starbucks	.1 mi
		Boheme cafe	.2 mi
Schools	**2.9** out of 6	New Foundations	.7 mi
Parks	**6** out of 6	General Sam Smith Park	.1 mi
Books	**5.9** out of 6	John H. Murray	.3 mi
Entertainment	**5.4** out of 6	Ita Atlantic City	.4 mi
Banking	**6** out of 6	Merrill Lynch Wealth Management	.0 mi
Total Walk Score	**96** out of 100		Agree Disagree

Pedestrian Friendliness

Short blocks and lots of intersections are better for walkers.

Average Block Length: 318 feet
Good

Number of Intersections: 227 per sq mi
Good

Walkability by Category

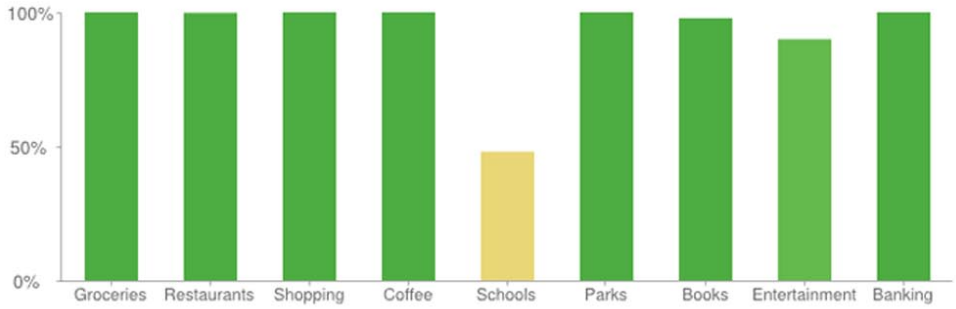

Figure 4-14. Walkability report for Baltimore (Source: http://www.walkscore.com/, Last accessed October, 2012)

Diversity

Diversity exerts a vital influence upon the vivacity of a place. It can be reflected from various aspects of the built environment, such as urban furniture, plantation, architecture style and pavements. Nevertheless, the most important one is land use, because the land use strategy dominates what kinds of activities take place on site. As has been discussed for publicity, the land uses that call for privacy should be avoided, for instance, residential, office or industrial use. To the opposite, any type of land use which can generate communications between people should be encouraged, such as commercial, or public institutional use.

From the land use map below, all the 3 waterfronts have successfully been transferred from industrial use into mixed use (Figure 4-15). However, there is still a large ship yard being constructed into a mixed use development with office, residential and commercial in Downtown Jacksonville. Additionally, Jacksonville lacks a comprehensive park and green system to attract people. Both Pittsburgh and Baltimore have achieved a completely open area system along the waterfront. Due to the two sports stadiums, the lands between the two in North Shore have been occupied by parking lots. Jacksonville and Pittsburgh own a much higher percentage of residential and office buildings within the study area, while except the high density residential building in the south, Baltimore has built its harbor front into an entire tourism destination with a large variety of leisure and recreational activities. The inner development is mainly oriented by residential-and-commercial mixed use, with parking lot inserted. Therefore, 2, 3, 5 should be assigned to Jacksonville, Pittsburgh and Baltimore for diversity.

Figure 4-15. Land use comparison

Changeability

Cities not only grow in size but also in complexity. Traditional urban design and planning approaches have definitive design system, which cannot cater to the constantly changeable urban environment. The contemporary urban societies call for flexible urban space to meet citizen's multiple needs. A successful urban area should provide a comfortable environment for people's daily life; meanwhile, it should be capable of staging a big event or festival celebration.

North Shore in Pittsburgh is usually the venue for various sports events. Besides the PNC Park and Heinz Field, the riverfront holds several races every year. The capability of holding diverse sports events results from the two layered design. Large lawns on the upper layer are able to host hundreds of people when the big game day comes; the linear riverfront park in the lower level is an ideal place for people to embrace the nature and also served as a running site for both daily morning run and running race. In addition, the interactive fountain in the lower layer attracts citizens, especially children to have fun with the water.

Although the Baltimore Inner Harbor has not incorporate a layered design, the harbor front are renowned for a myriad of art and cultural events and festivals. Buildings in the Inner Harbor are either high density commercial or public institutional use. Similar to the North Shore, the large open space between each building cooperate with the buildings to create a favorable festival place every day. Visitors can always be able to join various activities on site, due to the concentration of the civic buildings.

However, Jacksonville has not developed a flexible and vibrant riverfront as the first two do. The only attraction on site is Jacksonville Landing, a huge commercial complex. Hence for flexibility, Jacksonville can only secure 1 for each indicator;

Pittsburgh is able to obtain 3 and 5 for time change and space change separately; Baltimore owns 4 and 4 respectively.

A further on-site observation will solidify this principle a lot, but owing to the time limit, the author is not able to explore the spatial relationship between the hardscape and landscape by visiting the sites.

Identity

The 3 cities have all successfully redefined their city images by reclaiming their waterfronts. The mixed use waterfronts act as a city calling card to welcome and attract people from all over the world. The promotion of the waterfronts for the tourism industry is an indispensable contribution for the native economic revival. Thanks to the healthy and livable environment along the waterfronts, the land value there has increased exponentially. However, in order to strengthen the vibrancy of the waterfront, the uniqueness can never be emphasized enough. Without iconic components within the waterfront, it can never realize the rejuvenation.

As for the specific place making, Jacksonville only has 1 iconic one; Pittsburgh has developed the north shore into a sports theme waterfront; Baltimore Inner Harbor is unique for its harbor culture with several public institutional buildings and high density art galleries and commerce (Figure 4-16). In brief, the score of Jacksonville, Pittsburgh and Baltimore are 3, 4, 5 for uniqueness.

Figure 4-16. Iconic places in the 3 projects.

CHAPTER 5
CONCLUSION AND DISCUSSION

Results of In-depth Case Study

The performance of each case has been compared for each indicator in the last chapter. This chapter delivers an overview toward regeneration performance benchmarking. “Benchmarking enables the comparison of quantitative performance data, identifies how performance differs from other areas, how it has changed over time and whether it can act as the spur for improvement or an example of how to achieve ‘good practice’” (Audit Commission, 2000). In retrospect, the performance is summarized below:

Table 5-1. Score distribution

Concept	Indicator	Jacksonville	Pittsburgh	Baltimore
Publicity	Ownership of land	1	3	5
Connectivity	Connection between each theme inside the waterfront area	1	2	4
	Connection to adjacent parcels	3	1	3
Accessibility	Physical access types and routes	5	5	5
	Visual accessibility	2	3	5
Walkability	Block scale	5	3	5
	Pedestrian network	3	2	5
	Amenity Installation	4	2	5
Diversity	Mixed Use	2	3	5
Flexibility	Time Change Design	1	3	4
	Spatial Variation Design	1	5	4
Uniqueness	Iconic place making	3	4	5

Roughly Baltimore might performs the best out of the 3 cases. In an effort to interpret the qualitative data more efficiently, indicators will be evaluated in a weighted scoring framework. The full score of the framework is 500; according to the weights assigned to each indicator, the full score for each one is as below:

Table 5-2. Scoring Framework

Concept	Score	Indicator	Score
Publicity 12%	60	Ownership of land 12%	60
Connectivity 18%	90	Connection between each theme inside the waterfront area 9%	45
		Connection to adjacent parcels 9%	45
Accessibility 18%	90	Physical access types and routes 9%	45
		Visual accessibility 9%	45
Walkability 18%	90	Block scale 6%	30
		Pedestrian network 6%	30
		Amenity Installation 6%	30
Diversity 12%	60	Mixed use 9%	60
Flexibility 16%	80	Time change design 8%	40
		Spatial variation design 8%	40
Exclusivity 6%	30	Iconic place making 6%	30
Total 100%	500	Total 100%	500

Furthermore, a set of score levels will be created to weigh each case's performance (Table 5-3).

Table 5-3. Performance level

Score Range	Scaling
400-500	Excellent
300-400	Good
200-300	Fair
100-200	Limited
0-100	Weak

After adjusted by the weighting system, the finalized performance and ranking are shown as below:

Table 5-4. Final performance

Concept	Indicator	Jacksonville		Pittsburgh		Baltimore	
		Score	Ranking	Score	Ranking	Score	Ranking
Publicity	Ownership of land	12	3	36	2	60	1
Connectivity	Connection between each theme inside the waterfront area	9	3	18	2	36	1
	Connection to adjacent parcels	27	1	9	3	27	1
Accessibility	Physical access types and routes	45	1	45	1	45	1
	Visual accessibility	18	3	27	2	45	1
Walkability	Block scale	30	1	18	3	30	1
	Pedestrian network	18	2	12	3	30	1
	Amenity Installation	24	2	12	3	30	1
Diversity	Mixed Use	24	3	36	2	60	1
Flexibility	Time Change Design	8	3	24	2	32	1
	Spatial Variation Design	8	3	40	1	32	2
Uniqueness	Iconic place making	18	3	24	2	30	1
Total		241	3	301	2	457	1

The results place Baltimore as the best performer collectively corresponding with its well-recognized significance and contribution to waterfront redevelopment. The outcomes of the research accord with the expectation when the 3 projects were chosen. Even though Pittsburgh is not so excellent as Baltimore, it can still be considered as a

‘good practice’, followed by Jacksonville, whose score falls in the ‘fair’ level. Baltimore also ranks No. 1 toward almost all the indicators. Therefore, a benchmark has been established, which complementarily confirms that the 7 criteria presented in this thesis are the key principles for a waterfront to revive. Baltimore’s success also demonstrates that the principles are inter-related, and it is crucial to share the community vision to avoid locking one single project into a prescribed solution. Hence the transformation should incorporate a public enthusiasm, which initiate and guide the physical environment designed for people. All the principles are oriented from the concern of users’ demand and feeling, which drive the market need and the economic pursuit. In 2009, Brown argued in his book, *America’s Waterfront Revival*, that “the deserted waterfront offered large sites that soon became attractive to non-maritime interests, including parks and marinas….At the same time, the environmental movement was gaining momentum, leading to pollution controls that sought to clean up old industrial sites like those on the waterfront to make them appropriate for these new uses.” Baltimore has successfully stimulated the domestic economy by initiating a mixed-use and sustainable waterfront redevelopment and undertaking a dynamic urban design and planning process.

The North Shore in Pittsburgh is characterized distinctively. The main constructions there are two sports stadiums and one linear park. It is true that the sports use has brought a lot of energy to the site, but in the meantime, it causes problems as well. Firstly, lack of commercial atmosphere has hampered the further development of the area in terms of a dominant sports use. Secondly, the large civic buildings call for the transformation of large tracts of valuable lands along the waterfront into parking lots.

Thirdly, the big blocks for the sports fields and parking lots hurt the local walkability. However, Pittsburgh develops the waterfront as a whole comprising the north shore, the south side riverfront, the Allegheny riverfront and so on. The North Shore is on the edge of the downtown area, where most commercial and office use concentrate. It is still a successful waterfront with agglomeration effect about sports use.

Lesson and Learn for Jacksonville

The author conducted this research mainly based on the success of every project, so there are barely cases performing less successfully than Jacksonville. However, some lessons can still be learned from the broad and in-depth case study. The newly opened east river esplanade in New York City has inevitably improved the waterfront space with playgrounds for children and pets, but after work time, the usage of the esplanade is very low. The reasons might be the bad maintenance and lack of attractions. In order to revive a dilapidated space, the generation of people's activities should be foremost. The incorporation of commercial and cultural structures will significantly increase the charm of the area. A second example is the North Shore in Pittsburgh. Large parking lots along the waterfront have severely harmed the fabric of the city and interrupted the continuity of the waterfront open space system. The land value can be increased a lot after the riverfront regeneration, so a compact development mode would help realize the profit maximum along the river. Large parking lots should be avoided in an effort to make full use of the land and to establish the connections and pedestrian assesses for the waterfront.

In contrast, a few recommendations to Jacksonville can be made in light of the individual indicator performances. Outstanding waterfront is supposed to be a high-energy gatherings filled with people day and night. Thus it should not be limited by

residential, industrial or office use, which prevent 24-hour activity from flourishing. As a result, the principal recommendation should be the extension of land uses which are capable of generating diverse activities, such as commercial, public institutional, leisure and recreational use. Moreover, a cohesive green and open space system should be incorporated into the redevelopment. Parks should not only serve as the tourist destinations but also the connection between each waterfront themes. Since waterfront is one of the most attractive place in the city, so visual accessibility should be formulated by the building sequences and blocks. Other than that, the public access should be optimized as well. Jacksonville needs to enhance its water transportation associated with tourism and limit the use of private vehicles. The riverfront also lacks an ideal public get-together place, such as a large lawn, or a amphitheatre. More civic buildings' involvement in the waterfront redevelopment would be preferred to provide the imputes for people to get together. These buildings could improve the iconic sense of waterfront and illustrate a more vivid waterfront scene of the city.

There will never be a terminated urban design existing. As the city grows, it can be endowed with different functions and implications. Through the comparison with other waterfronts, Jacksonville can bring its waterfront to a new era. The river city is the gateway for the sunshine state; the revitalization of the riverfront in Jacksonville can be the main attraction for visitors out of the state. The indicator-based evaluation has provided a detailed remain-to-do list for the city, and the benchmark has been illuminated as well. The river is the life blood for Jacksonville; the view of the riverfront redefines and reinforces the image of this 21st century river city, where Florida begins.

Discussion on the Indicator System

Shortcomings and Limitations

This thesis focuses on how to evaluate a waterfront project and why certain cities have achieved success in their waterfront regeneration. Robert Yin described a multiple-case study as “the preferred strategy when ‘how’ or ‘why’ questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context” (Yin, 1983, p.13). Therefore the author has incorporated both a 20-case study and a 3-case one into the research.

However, the research also remains to be improved from several aspects. First of all, it has been widely advocated that the expert opinions are the most efficient and authoritative way to establish the criteria. Owing to the lack of experts both in numbers and diversity, the criteria can only be acquired mainly through a broad case study approach. The weightings also call for expect opinions to become more appropriate. Secondly, in an effort to accomplish the thesis in a timely and orderly fashion, the author has not made full use of several data collection methods. For instance, on-site observation would extend the examination of flexibility to the configuration of local landscape and urban furniture, which is impossible to obtain from the GIS data. Further interview with the chief designer and planner would be very helpful to understand the specific issues. The acquirement of the users’ opinions toward the built environment would also be a very efficient way to quantify useful information by different levels of both locals and visitors’ satisfaction.

Even though the above shortcomings could have been eliminated if the research were conducted in a longer time period and a more organized way, there are still several limitations. The evaluation criteria have been summarized from the broad case

study by the author, but a successful waterfront must have incorporated other features or design principles that are not limited to the ones presented in this thesis. However, the measurement of the 7 characters remains some problems as well. First, it is true that the achievement of publicity has a lot to do with the ownership of the land, but a private-owned land can still be open to public. Due to the lack of on-site observation, the publicity has not been elaborately examined. The similar situation happens to walkability. The ‘smart walk score’ calculates the distance to the adjacent public facilities, so there must be a hypothesized spot existing, which remains in doubt that whether the spot can represent the entire project or not. Furthermore, the definition of each criterion should be further strengthened and clarified. For example, diversity not only indicates the mixed-use development, but also stresses on various activities and environmental experiencing creations by spatial design. But this can cause the ambiguity with other characters, such as changeability. Therefore, another possible enhancement could be the differentiation of the definitions of each character.

As for the comparison analysis, some potential limitations might result in the unfairness. First of all, the urban land forms for the 3 cases are different. Baltimore Inner Harbor is an enclosed pattern, which is more likely to consider the dialogues between each bank than the linear form of both Jacksonville and Pittsburgh. Other than that, 20 years more waterfront regeneration experience than the other two cases can also benefit Baltimore as the best practice in this research. Although the 3 cases are highly comparable regarding the scale, the overall configuration and timing should be taken into account. Another instance of the configuration is the width of water bodies. St. John’s river through Jacksonville is 200 meters wider than another two cases, which is

more difficult for designers to build the connectivity for pedestrian assesses. The bias of the author to make Baltimore and Pittsburgh as the potential benchmark also contributes to the score difference between cases.

Significance

Given numerous regeneration projects going on nowadays, a general concern has been raised at “the lack of intellectual sophistication and rigor in evaluation of regeneration outputs and that much of the supporting evidence is narrowly focused, subjective or anecdotal” (UK Parliament, 2003). This thesis aims to create a more concrete and persuasive methodology for examining redevelopment outcomes. “Most indicator-based approaches do not provide answers as to why differences exist, but merely highlight issues and in so doing raise further questions” (Hemphill, Berry and MeGreal, 2004, p. 726). But the comparison analysis based on the indicator system allows differentiating cases by individual indicator and overview together. The GIS application is the key resource of important data to facilitate the comparison process. The attempt to supplement all the indicators with quantitative and qualitative data is a breakthrough for assessing the influence from the beneficiaries’ point of view.

A hierarchical indicator-based model is becoming overwhelmingly significant in evaluating waterfront regeneration outputs. The weighted indicators and a points allocation system are proved very applicable by the in-depth case study to different regeneration situations and urban contexts pertaining to policies and city characteristics. This thesis explores the possibility to evaluate the performance of waterfront revitalization with a high inclusiveness in terms of 7 concepts and 12 indicators, which remains considerably under-researched. A greater significance of this model is the capability of operating at an indicator level. For instance, although Jacksonville has

performed the worst out of the 3, the project can still performed the best for one or two indicators such as walkability and physical accessibility. Equally apparent for the policy makers are the other elements ranked the lowest like publicity and uniqueness. This helps to develop a more niche-targeting policy and plan for further improvement. Moreover, the research demonstrates that the more mature redevelopment project (Baltimore Inner Harbor) performs better than the areas which are less well developed (Downtown Jacksonville), underlining the importance of timing in waterfront renewal sites. Baltimore, with more than 30 years experience than Jacksonville on waterfront revival, is supposed to performed better than Jacksonville.

In all, the indicator-based system makes it possible to evaluate the waterfront revitalization specifically by comparison, to the extent of integration of each indicator delivered within the urban waterfront renaissance. It is true that whether the waterfront regeneration is a huge success or not can never merely depend on the physical environment, but the system can still extend its evaluation to the economic and social aspects, to define the success more comprehensively in the future research.

APPENDIX A
BROAD CASE STUDY SUMMARY

A.1 East River Waterfront Esplanade

- Completion: Still under construction, Phase 1 completed and opened in May, 2012
- Length: 2430 Meters
- Width: 18 Meters (Phase 1)
- East River Waterfront Esplanade is located in the south of Manhattan and is part of the entire Manhattan waterfront master plan. The project appropriately draws the city fabric into the waterfront area, which was underutilized and inaccessible. The renewal brings more open space and opportunities for human interaction with the sea. The challenge is to create a place for recreation, community and maritime activities incorporated the nearby neighborhood, commerce and offices.

Figure A-1. Location of East River Waterfront Esplanade (Source: Google Earth. Last accessed August, 2012)

Figure A-2. Renewed esplanade (Source: http://assets.inhabitat.com/wp-content/blogs.dir/1/files/2011/07/East-River-Waterfront-Esplanade-01-537x331.jpg Last accessed September, 2012)

A.2 North Shore

- Completion: 2001
- Length: 980 Meters
- Width: 25-80 Meters
- A Vision Plan for Pittsburgh's Riverfronts won the 2002 AIA Honor Award in Urban Planning and Design. North Shore is part of the vision and has become a very popular local outdoor space. The neighborhood is still experiencing rapid growth nowadays, especially between the two stadiums – PNC Park and Heinz Field. Two layered design contributes to a high public usage. The first layer is the river wall and river walk, providing a continuous walking tour along the water edges. The second one consists of native landscaping and large open panels.

Figure A-3. Location of North Shore (Source: Google Earth. Last accessed August, 2012)

Figure A-4. Open space in North Shore (Source:http://www.flickr.com/photos/owensboro-org/368140667 Last accessed September, 2012)

Figure A-5. Interactive Fountain (Source:http://www.pps.org/graphics/gpp/north_shore_pittsburgh_water_steps_large Last accessed September, 2012)

A.3 Inner Harbor

- Completion: The area started to be reclaimed in 1960s, and the new master plan has been issued in 2003. Some projects are still under construction.
- Length: 1100 Meters
- Width: 90 Meters
- Baltimore Inner Harbor has been described by ULI (Urban Land Institute) to be “the model for post-industrial waterfront redevelopment in the world.” As the extension of the city structure, the mixed use development mode has brought significant economic benefits to the city by replacing the manufacturing and industrial businesses. Nowadays, the Inner Harbor has already become a landmark for the city as a highly walkable community and a tourists’ destination.

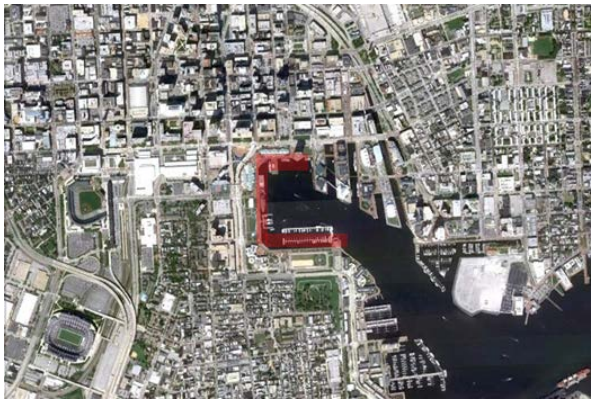

Figure A-6. Location of Inner Harbor (Source: Google Earth. Last accessed August, 2012)

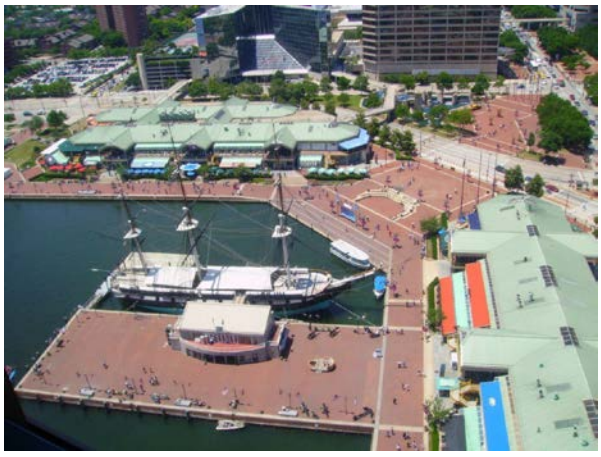

Figure A-7. Inner Harbor open space (Source:http://images.travelpod.com/tripwow/photos/ta-010d-0daa-c962/day-7-baltimore-inner-harbor-baltimore-united-states+1152_12997989020-tpfil02aw-20877.jpg Last accessed September, 2012)

A.4 Navy Pier

- Completion: 1916, but keep being improved over times
- Length: 1010 Meters
- Width: 130 & 86 Meters
- Navy pier sits on the shoreline of Lake Michigan, known as No. 1 tourists' destination for Chicago. It has multiple functions including public gathering, navy training center, commercial pier and entertainment. The attractions are diverse as well, such as the dinner cruise and the ferry wheel. In 2010, ULI recommended that navy pier should improve its commercial and part-like features to enhance the festival celebration identity while retaining its current role. Possible improvements could be enlargement of Chicago Shakespeare Festival space and creating a concert venue.

Figure A-8. Location of Navy Pier (Source: Google Earth. Last accessed August, 2012)

Figure A-9. Navy Pier on the lake (Source: http://upload.wikimedia.org/wikipedia/commons/e/e4/Navy_Pier_from_the_shoreline.jpg Last accessed September, 2012)

A.5 Cruise Ship Port

- Completion: 2001
- Length: 385 Meters
- Width: 13 Meters
- This cruise ship port is located in Key West, Florida, surrounded by a library, hotels, Key West art & history museum and Mallory Square. The waterfront area is single use, only for cruise ship passengers. Cruise ship ports identify themselves by semi-public design, with a public open space and an exclusive port function during a certain period. The urban furniture is well inserted with the security fence system. Although it is single use, the enjoyable sea view and breeze still attract a large number of people for leisure and recreational uses.

Figure A-10. Location of Key West Cruise Ship Port (Source: Google Earth. Last accessed August, 2012)

Figure A-11. Port esplanade with urban furniture (Source: http://enriquesantos.com/wp-content/uploads/2011/07/cruise_ship_keywest_medium1.jpg Last accessed September 2012)

A.6 River Walk

- Completion: 1941, but still in growth until May, 2011 so far
- Length: 4023 Meters
- Width: 7.4 Meters
- The River Walk in San Antonio initiated along San Antonio River as an enormously successful pedestrian network. The streets are narrow, but a variety of landscape provide pedestrians with countless possibilities for leisure and recreational use, for example, jogging, sight-seeing, shopping, outdoor dining or sitting in tranquility. The walking system includes 21 bridges, 32 stone stairways, connecting the river with downtown San Antonio streets. Furthermore, there are also culture or smaller-scale community events taking places.

Figure A-12. Location of San Antonio River Walk (Source: Google Earth. Last accessed August, 2012)

Figure A-13. River Walk in San Antonio (Source: http://www.destination360.com/north-america/us/texas/images/s/riverwalk.jpg Last accessed September, 2012)

A.7 Waterfront Park

- Completion: Its recreational character started in 1960, the investment came in 1968.
- Length: 267 Meters
- Width: 5-35 Meters
- Extended from Pier 57 to Pier 59, this park is part of Seattle's central waterfront, serving as the backyard of Seattle Aquarium. Both has become the landmark for the city. The park has been featured with picnic tables, coin-operated telescopes, benches, plants and so on. Sculptures and water fountains raise the artistic atmosphere as well. One can also enjoy the beautiful views of the city's skyline, the bridges and the nearby islands.

Figure A-14. Location of Seattle Waterfront Park (Source: Google Earth. Last accessed August, 2012)

Figure A-15. Waterfront Park in Seattle (Source: http://blog.seattlepi.com/thebigblog/files/library/250waterfrontstatue.jpg Last accessed September, 2012)

A.8 East Bank Esplanade

- Completion: May, 2001
- Length: 2414 Meters
- Width: 6 Meters
- The east bank esplanade in Portland, OR is basically served as a pedestrian and bicycle path under the highway. It well connects the eastside neighborhoods to the river, and improves the water restoration as well as fish and wildlife habitat. There is a 1,200 foot floating walkway on the river with seasonal fluctuation, the longest one in the US. The esplanade was once closed for 21 days in 2011, because of the raising level of the river.

Figure A-16. Location of East Bank Esplanade (Source: Google Earth. Last accessed August, 2012)

Figure A-17. East Bank Esplanade (Source: http://blog.oregonlive.com/travel_impact/2009/02/ip.time18.4482.rwh.jpg Last accessed September, 2012)

A.9 Pier 39

- Completion: 1978
- Length: 340 Meters
- Width: 50-110 Meters
- Pier 39 is famous for California sea lions hauling out from 1989. It is located at the edge of Fisherman's Wharf, close to Chinatown in San Francisco. As a popular tourist attraction and shopping center, the pier has been built into a unified native building group and a walkable area. The shopping culture there is part and parcel. Other than retail shops, there are a bunch of restaurants, an interpretive center for marine mammal center, a video arcade and streets performances everywhere.

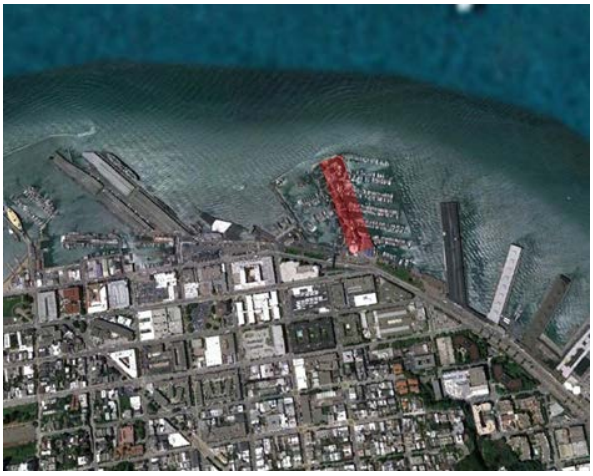

Figure A-18. Location of Pier 39 (Source: Google Earth. Last accessed August, 2012)

Figure A-19. Shopping center in Pier 39 (Source: http://www.staysf.com/upload/attraction/20080519150850_san%20francisco%20pier%2039.jpg Last accessed September, 2012)

A.10 Port Vell

- Completion: 1992
- Length: 900 Meters
- Width: 52 & 15 Meters
- Port Vell is part of the Port of Barcelona. It was renewed for 1992 Barcelona Olympics. The port has 3 sections: commercial port, logistic port and old port. It transferred from a run-down area into a focal point of the city with plenty of open space. Fully integrated into the city, the renewal of Port Vell emphasized on historic preservation. Besides the logistic use, the largest aquarium in Europe and a pedestrian network have been built into the site to stimulate local activities. The project was triggered for the preparation of the Olympics.

Figure A-20. Location of Port Vell (Source: Google Earth. Last accessed August, 2012)

Figure A-21. Pedestrian area in Port Vell (Source: http://www.iemss.org/iemss2008/uploads/Main/pont_port_vell-600.jpg Last accessed September, 2012)

A.11 Nyhavn

- Completion: 1673
- Length: 420 Meters (each side)
- Width: 7.5 Meters
- Nyhavn is a 17th century recreational waterfront, also known as a “Heritage Harbor”. The canal comes with colorful 17th and early 18th century building sequence along both sides, stretching from Kongens Nytorv to the harbor front. Although Nyhavn is the oldest waterfront this thesis has dug into, with a history of more than 300 years, the waterfront is still very vibrant and active, owing to the local commercial climate consisting of retail shops, F & B and so on. Nowadays Nyhavn is also conceived as one of the excellent historic preservation sites in Copenhagen, Danmark.

Figure A-22. Location of Nyhavn (Source: Google Earth. Last accessed August, 2012)

Figure A-23. One side of Nyhavn canal (Source: http://www.nyvold.dk/images/Denmark/Nyhavn.jpg Last accessed September, 2012)

A.12 Riva Split Waterfront

- Completion: 2007
- Length: 250 Meters
- Width: 55 Meters
- Riva Split Waterfront is one of the most interesting and specific places in Mediterranean. It is also the cruise ship port for Split, Croatia. As an highly accessible and urbanized renewal waterfront, Riva attracts millions of tourists every year. This historic site has been well rearticulated and harmonized with modern elements to create a newly integrated surface. The promenade is often used for local festival events as the city's main public square. Lines of palm trees and white street lamps separate the area into hardscape with various retail shops, F & B, and hard banks with rectangular planters inserted.

Figure A-24. Location of Riva Split Waterfront (Source: Google Earth. Last accessed August, 2012)

Figure A-25. Riva promenade (Source: http://www.e-architect.co.uk/images/jpgs/croatia/riva_split_waterfront_3lhd270209_db_3.jpg Last accessed September, 2012)

A.13 International Terminal

- Completion: June, 2002
- Length: 480 Meters
- Width: 100 Meters
- Yokohama, Japan used to fill the sea to obtain more lands, the international terminal for cruise ship is part of the sea-fill land. This is a very modern site, which divides the public space outdoor and the private section indoor aptly. The whole design is a hybridization of infrastructure, landscape and architecture. The wood roof is landscape-like curving, served as the open space, without columns and is cantilevered up to 56 feet.

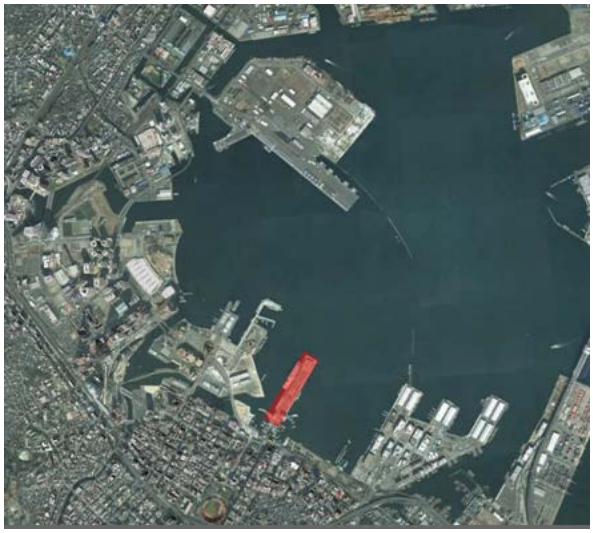

Figure A-26. Location of international terminal, Yokohama, Japan (Source: Google Earth. Last accessed August, 2012)

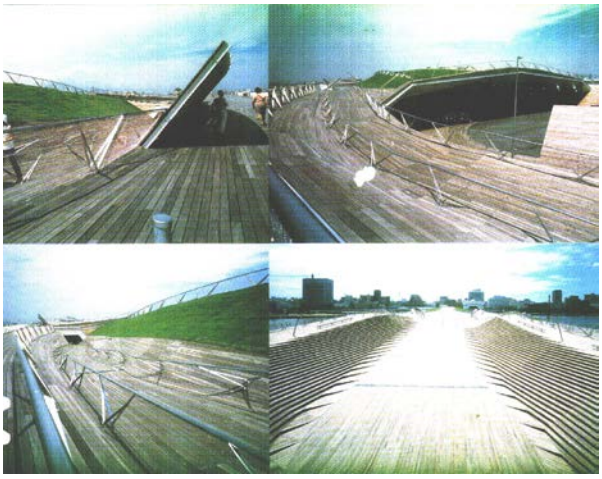

Figure A-27. International terminal open space on top of the roof (Source: http://eliinbar.files.wordpress.com/2008/06/microsoft-word-yokohama4.jpg Last accessed September, 2012)

A.14 Sculpture Museum

- Completion: May, 2000
- Length: 800 Meters
- Width: 100 Meters
- The museum is located on the seashore of Qingdao, China. Qingdao is a city surrounded by mountains and shorelines. The outer space with sculptures of the museum integrates the topography of native mountain area and ample seashore landscape harmoniously, giving prominence to the features of the sculpture garden. The museum is erected in accordance with the natural terrain, which could provide a maximum vision of the sea horizon. Along the path there are squares, sculptures, water pools and tree matrix as the landscape nodes.

Figure A-28. Location of sculpture museum in Qingdao, China (Source: Google Earth. Last accessed August, 2012)

Figure A-29. Garden outside of the sculpture museum (Source: http://www.29trip.com/jd/UploadFiles_jd/200807/20080731222558219.jpg Last accessed September, 2012)

A.15 Houtan Park

- Completion: 2010
- Length: 1700 Meters
- Width: 30-80 Meters
- Houtan Park in Shanghai, China is a preparation for the EXPO 2010 to demonstrate the green technologies. The project turned a brown field into a linear waterfront park. The reclamation strategies offer ecological services such as flood control, water treatment and food production. The park also symbolizes the past – agriculture and industry and the future – post-industrial eco-civilization. A living and circle system is also demonstrated in the park, where the ecological methods are able to provide a variety of services for urban life as well as for the society.

Figure A-30. Location of Houtan Park, Shanghai, China (Source: Google Earth. Last accessed August, 2012)

Figure A-31. One sculpture of Houtan Park on the wetland (Source: http://www.shfu.edu.cn/news/news_images/UploadFile/20103411112725.jpg Last accessed September, 2012)

A.16 West Kowloon Promenade

- Completion: Open to public in September, 2005; fully finished in February, 2007.
- Length: 1170 Meters
- Width: 7 Meters
- The West Kowloon Promenade is situated along Victoria Harbor, at the southern tip of west Kowloon, Hong Kong. The project used to remain stagnant for a long time because of the debate whether Hong Kong needed a public park on an underutilized reclamation. The waterfront is decorated with dragon lanterns, timber boardwalk and pillars of wind chimes. All the wooden strips are made from construction waste.

Figure A-32. Location of West Kowloon Promenade, Hong Kong (Source: Google Earth. Last accessed August, 2012)

Figure A-33. West Kowloon Waterfront Promenade (Source: http://upload.wikimedia.org/wikipedia/commons/6/65/West_Kowloon_Waterfront_Promenade_200710-1.jpg Last accessed September, 2012)

A.17 The Waterfront

- Length: 1900 Meters
- Width: 12 Meters
- The waterfront is situated in Kota Kinabalu, Malaysia, famous for its dinning culture. The exotic style contributes to a popular hangout both for locals and visitors. One can be very spoilt for choice when it comes to dinning. The waterfront is also an excellent destination to enjoy the sunset over the sea along the 2 kilometers boardwalk. The night life is very enjoyable given that the waterfront locates the largest dance club in Kota Kinabalu. Besides, the waterfront is home to a myriad of shops, especially for Sabah souvenir hunters.

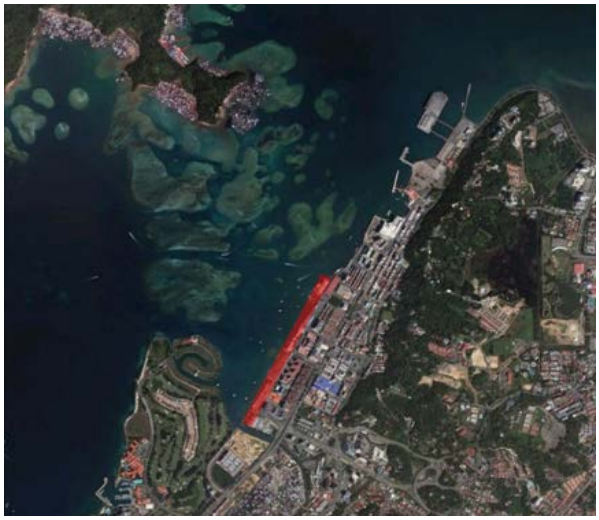

Figure A-34. Location of The Waterfront, Kota, Kinabalu, Malaysia (Source: Google Earth. Last accessed August, 2012)

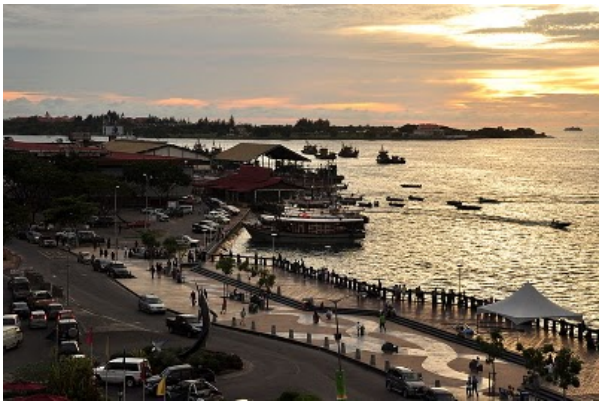

Figure A-35. Sunset in the waterfront (Source: http://upload.wikimedia.org/wikipedia/commons/thumb/6/6d/KK_WaterFront_View.jpg/640px-KK_WaterFront_View.jpg Last accessed September, 2012)

A.18 Downtown Waterfront

- Length: 340 Meters
- Width: 12 Meters
- Singapore is a highly urbanized country, with skyscrapers everywhere and a tremendous number of masterpieces regarding architecture, urban design as well as landscape architecture. Downtown waterfront is a precious place for local people due to the tranquility atmosphere in the crowded world. The linear park can also hold a bunch of recreational and leisure activities, for instance, the amphitheatre. The adjacent civic buildings such as the floating stadium and the theatre on the bay bring thousands of people to the waterfront, where one can find peace and quietness away from the noisy metropolitan area.

Figure A-36. Location of Singapore Downtown Waterfront (Source: Google Earth. Last accessed August, 2012)

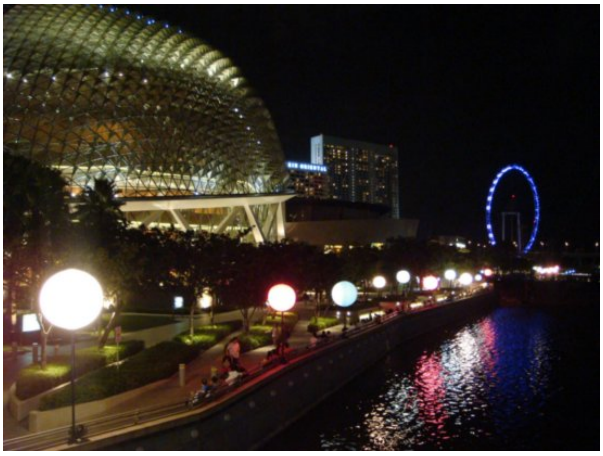

Figure A-37. Nigh view of Singapore Downtown Waterfront (Source: http://images.travelpod.com/tw_slides/ta00/cb6/b8e/the-esplanade-theatres-downtown-waterfront-singapore.jpg Last accessed September, 2012)

A.19 Circular Quay

- Length: 1170 Meters
- Width: 13.5 Meters
- The Circular Quay constitutes Sydney's history "original village", also as a transportation hub. The south end of the quay connects the famed Sydney Opera House, and the other links to the Rock. Buses, water taxies, ferries, subways and trains all come together into Circular Quay, but the area is still well designed for the pedestrians. The Quay also plays a crucial role as a transition between downtown and the docks. The vibrancy of this area results from not only the transportation importance, but also the various shops, bars and restaurants along the quay area. Both citizens and tourists enjoy the comfortable and well-maintained open space that Circular Quay provides.

Figure A-38. Location of Circular Quay, Sydney, Australia (Source: Google Earth. Last accessed August, 2012)

Figure A-39. Night view of Circular Quay (Source: http://upload.wikimedia.org/wikipedia/commons/0/0f/Across_Circular_Quay.jpg Last accessed September, 2012)

A.20 New Quay

- Length: 1100 Meters
- Width: 15 & 47 Meters
- New Quay has revived the western Melbourne central business district with a vibrant promenade full of cafes, retail shops, restaurants and bars. Beside, New Quay itself is a very strong business and residential community, hosting thousands of residents and millions of visitors each year. There is a set of inspiring public artworks incorporated into the design of the waterfront, such as the famous "cow on the tree". Different from the Circular Quay in Sydney, New Quay has triggered the business development locally instead of a transportation center.

Figure A-40. Location of New Quay, Melbourne, Australia (Source: Google Earth. Last accessed August, 2012)

Figure A-41. Group of sculptures on New Quay Promenade (Source: http://destinationdocklands.com.au/wp-content/uploads/2012/01/Silence-940.jpg Last accessed September, 2012)

APPENDIX B
INTERVIEW QUESTIONS AND RESPONSES

I interviewed Mr. Paul Crawford from JEDC (Jacksonville Economic Development Commission) at 1:00 pm on Mar. 16, 2011. The interview lasted for one hour in their conference room, and was under the approval of the IRB (Institutional Review Board) at the University of Florida.

Mr. Paul Crawford is currently the Deputy Executive Director (2006-present) at Jacksonville Economic Development Commission. After he graduated from Louisiana State University with the Bachelor degree of Landscape Architecture (1988-1992), he once positioned in Director of Parks and Recreation at City of Jacksonville (June 2005-June 2006), City Council Liaison at Mayor's Office - City of Jacksonville (2002-2004), and Project Manager at Bessent Hammack & Ruckman (1994-1998).

Questions and Response:

RQ1 can you give me a brief introduction of the waterfront development history in Jacksonville?

Sure, are you talking about the public part or private part? (Both, I answered). I guess we have to get back to the 1950s, if you look at some of the photographs, primarily wharfs, and ship-manufactories lining along the river. The public buildings were put on along the river as well, including the city hall, the court facilities, and the large parking lot.

Over time, Jacksonville has begun to change. In 1980s, the mayor emphasized the renaissance of the downtown area. (as well as the waterfront area) The city moved the public buildings off the river and put them in the core of the city, providing that we

were be able to sell the property on the riverfront. (so what was the leading industry at that time for the waterfront area?) the shipping and ship-building, so we underutilized the property at the old time. 10 years ago, we moved the city hall off the river and inside the city and currently we are on the projection to move the courthouse from riverfront to the inner core of the city. Now we have a new hotel built and have sold the property noticed the shipyard, for the city required that land, turned it and sold it. So we are trying to implement the redevelopment along the river. Now we are turning another shipyard into a public park. When it comes to the area around downtown (I guess Paul mean the area not just on the river), we turned them into mainly residential and office use. In order to further emphasize the river, the city has built a riverwalk only on the south side, which was about 25 years ago, to the north side, we are continuing to build it for the last 25 years. (so in the old times, the property belonged to the public and now it more belongs to the private?) No, it is always the combination of the public and private. The shipyard is private and the public buildings belong to the public. But on the river we have more property belong to the public and now we turn the land into recreation use, for example, the riverwalk along the bank. Also we built some green space adjacent to the private properties beside the riverwalk, we aim to build the riverwalk area as public open space.

RQ 2 When you implement the plan, how do you deal with the relationship of historic preservation and the redevelopment? What is the function of the historic districts or buildings?

Mostly there was only industrial uses and most buildings are industrial features without architectural and historic value. Now there are some buildings outside

downtown with historic features. The majority of the historically significant buildings are out of downtown. All the buildings along the river were really industrial.

RQ 3 What is the role of DDA or JEDC play in the downtown project?

We are the regulatory arm of the government, as well as the master developer of DRI(Development Regional Impact). We are assigned the development rights, we also monitor or regulate the construction of the buildings. We have the downtown master plan, implementation plan, action plan. (yeah, I download them from your website, can you give me some information about the action plan?) The action plan have 19 criteria to implement the downtown master plan and has very concrete information for the construction, even for some special events. (so you do not have any consulting or design companies to cooperate with during the redevelopment process?) We have had the cooperation since 2007, only in occasion that we have some special project, for example, related to the streetscape. We would hire some other company to do the conceptual design, or the construction plan. But we have never asked other company to do the master plan. We do it by ourselves.

RQ 4 As we can see the waterfront area is usually very large, so there must be some phasing strategy for the redevelopment, what is that for the downtown area in Jacksonville? What is the criteria for choosing the land parcel to develop first?

You have to understand that the majority of the land along the river is privately owned. So you are not able to tell the landowner that you cannot develop your land until your next door neighbor does, so we do not tell one landowner they can do something

while others cannot. As a result, we look at what we control, the public investment, so we firstly put the infrastructure in, for the development to be successful, but we require the development that comes along, also invest in the infrastructure adjacent to them. For example, the parcel along the river, if someone want to develop, we tell them to develop the riverwalk, or they need to improve the streetscape, or they do their portion which is adjacent to their property. (so the thing is if you want to develop the land, you first build the infrastructure and then attract the developers?) Yeah, that is how we encourage the development. The example could be the Laura Street, from the Landing to the Haimin Plaza. That streetscape we hope to attract the adjacent properties to develop. Once we succeeded, the land near the street would develop like the model near it in the following. Another example could be the new courthouse we build now, which can bring lots of offices and some other similar uses to stimulate the development nearby.

RQ 5 What do you think should be the main reason for the success of the Jacksonville waterfront redevelopment?

That is an interesting question, because most people who look at Jaksonville waterfront think it is unique, it is a large area beside St. John river. People are drowned to come and exit the river area to memorize the river which created the city. And they said oooooh, the land along the river should be developed, and then we can come again. So we try to turn the waterfront area to be attractive, such as the riverwalk. And then we consider to mixed-use the land, to build residential area, hotel or office inside. Those combination is the main reason why the project success. (any other reasons you

can think about?) Well, I should say another reason could be the good market, I mean lots of people can see the profitability of the land and then invest after we put the infrastructure in.

RQ 6 What do you think should be the largest impediment when undertaking the redevelopment project?

I think it should be the difficulty for us to get the permission from the river agency which is responsible for protecting the river. Their jobs include the environmental protection, and insure the entities have engaged how the development impact the river. The previous condition of the properties along the river were industrial and then had been found some environmental issues. (Can you give me a concrete example how you solve the problem?) Well, I do not think there is a specific example. (well, at first maybe the agency will not allowed you to implement the project because of the contamination...) No, they will not allow you to do it, it is all about money. If they think the project will influence the environment badly, or may cause the expansion of the contamination, they will charge the developer much more money. (I see, so you mean the largest impediment is to coordinate between the developers who are not willing to pay much for the environment protection, and the agency whose responsibility is to protect the river by charging the developer more money?) Exactly.

RQ 7 What is the economic development mode for the area? (note: the resource of financing capital; cooperation of government and private sectors? How is the

profitability of that area and how to enhance the profitability, how does the area generate the public/private interests?)

I would say 2 things. First, you have to look at the past, and then you have to see the existing conditions and the future. The past has provided the opportunity for private funding with high returns on their investment. Nowadays, the market is not ready to take the risk to forward the project. The market does not want to put their own money into it, because it is too risky. And they ask the more and more investment from the government to back up the deals. (why the market thinks it is too risky to put the money in?) Because now we do not have a residential market to go up, which means there are not enough people who are willing to move in, therefore the developers are not able to sell their homes. Nowadays the purchaser is very conservative. And then there is no support for the retail establishment. So the bank does not want to lend money to the developer. Now let us see the future. The future will be quite different from the past and the existing conditions, with lower return, and you have to change the expectation of the developing community on their investment, and then you will be competing with things that may have better return, once a standard return is defined, which is what the acceptable return on your investment is. For example, in the past you could get 16 percent on your investment, now you can get 8 percent, and this will take a while, and people will understand what the standard is. Once this happens, you have to know how to attract the private capital into development. In the past, if you have 2 percent down, now you will have 25 percent down, which means you will have your 25 percent investment at risk.

RQ 8 What are the special design guidelines for the waterfront area?

Overtime, we think it should be durable material, not wood, as in the past. For example, we have to change the features we used in the 1980s and now we are trying to find a material that could stand the test of time. Secondly, you have to make the connections to the inland portion of the downtown through the design elements, wether the lighting, wether the pavement, wether the use of color or art. At the same time, you need to consider the isolation as well. So the new elements that you introduced to, need to match the motive that is trying to create along the riverfront. (so you have to keep the unique characteristics of the waterfront and at the same time you focus on the connection to the inner land, how do you manage to do that?) We have to choose the element that can stand more than 25 years as well as can identify the waterfront from the inner land. (Okay, do you have any skyline planning about the waterfront?) Now we are not necessarily too concerned about the skyline because it is not the point related to the development and investment directly. Again, you should address your market every time.

RQ 9 I noticed that you are the staff leader for the pedestrian, open space and the river part in the action plan, how do you create the connection to the adjacent area through this part? Do you think the redeveloping area has created a very good site for people to have some recreational activities related to water? And also for the ecological aspect, the waterfront helps the city to keep the balance between nature and man-made environment? (For the connection question we have discussed before)

We require the public open space for the public along the river to enjoy the waterfront. (How do you guarantee that people will go to the waterfront?) Whether through building or whether through our riverwalk. The riverwalk is how we connect everyone long the river. We regulate or require that the projects along the river have enough access to the river.

For the ecological part, I would not say that we have considered about it. As the riverwalk is man-made feature, if you are thinking about an urban place, the only location that you can experience the natural things, is in the park. The park is the spot that may not be nature, but it has a lot of green space. We have green space that along the riverwalk, and we do have the green space in the park. The majority of the urban area are hardscapes, so when I say nature, I mean green space. (So the green space attracts people to come to the river?) No, it is the river that attracts the people, the green space is only the complimentary component of the development. It is not why the developers come. (The green space just act as the part of the infrastructure to help attracting the investment?) No, like I said ,it is the river. The developer would rather there is no public facilities on their land. They only want their land to make the maximum profit such as the office, the residential buildings and they can use the facilities adjacent to their land. Consequently, it is our job to explain the importance of the infrastructure to their land development. And mostly, the developers will build some into their land.

RQ 10 What are the important changes for the land use part? And Why?

In the past, it was industrial and public facilities such as city halls and public parking lot. It is important to put all your hope on mixed use. Because when you only

have one kind of use, once it fails, you will get nothing. If you are able to have office, retail, residential, even some institutional, you should profit most possibly. (Do you think the mixed-use type should be the waterfront future all over the world?) It should be, we can never develop such a large area using a single land use. Also the developers are less risky if they choose the mixed use. And the market will encourage the mixed use also because it is less risky.

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BIOGRAPHICAL SKETCH

Hongtao Xie received a bachelor's degree in engineering at the Beijing University of Civil Engineering and Architecture. In the final year as the program required for internship, he has worked as Urban Designer in Beijing Haoyifengcheng Architecture Design and Consulting Company Ltd. for one year. In 2010, he began to pursue the Master degree of Urban and Regional Planning at the University of Florida. His concentrations are urban design and GIS (Geographic Information System) application.

Hongtao started the internship with LandDesign, a landscape architecture and engineering private firm from June, 2012. During the three-month internship, he mainly worked on the master plan for five counties in the mountain area, North Carolina and the Batumi waterfront design in Georgia.

Equipped with the professional skills and knowledge for urban planning and landscape architecture both from China and the U.S., Hongtao has his career objective of working as an urban designer and planner, with the specialties in urban design and GIS.