Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information	
Name	Yuqi Pu
Student number	5107148

Studio		
Name / Theme	Resilient Coastal Landscape	
Main mentor	Steffen Nijhuis	Landscape Architecture
Second mentor	Lei Qu	Spatial Planning and Strategy
Argumentation of choice of the studio	There are two main reasons for choosing the RCL lab. Firstly, I would like to enrich my theoretical knowledge of coastal landscape in the context of urbanism. I'm interested in shaping a framework in the planning aspect and zoom in to local scale. In the choices of the lab, I saw the opportunities to expand my desiring knowledge and conducting multiscale design from urban to local in the RCL lab. The second reason is related to my personal interest and my wish for a continuous building of a coherence knowledge structure of the delta region. After researching on the Great Bay Area in China in the course Globalization which I selected in Q4, I found my spectacular fascination with the study of the delta region and especially the complexity of the region from environmental, social and economic aspects. My main interest is about the 'sensitive environments' that influence people's daily life 'dominated by water system' as described in the RCL lab guide. I think the RCL lab is the most suitable one for me in which I can combine my curiosity for the coastal water system with my interest in human experience and perception in multi-scales.	

Graduation project	
Title of the graduation project	From Border to Landscape： reimage a resilient landscape corridor in Shenzhen-Hong Kong border area
Goal	
Location:	Shenzhen-Hong Kong border area, China
The posed problem	The two megacities Shenzhen and Hong Kong are located in the Pearl River Delta, which is one of the largest and rapidly developing delta regions in the world. Hong Kong, as a special administrative region of the People's Republic of China, is separated from Shenzhen in mainland China by the Shenzhen River which has been a border river since 1898. And the Frontier Closed Area (FCA), which was established in 1951, has been serving as a regulated buffer between the border and the rest of the territories. According to the policy, this border will no longer exist by 2047--50 years after the handover of Hong Kong-- which will have a huge impact on this

	region from social, economic, and also ecological aspects (Bolchove & Hasdell, 2017). As a spatial consequence, **a polarized land development** can be seen here: the Shenzhen river in the middle divides the landscape into two completely different views. On the Shenzhen side, it is highly urbanized **with limited green spaces** within the city. On the Hong Kong side, on contrary, there is a wide area of an untouched green buffer zone consisting of fishponds and mountains, with a **mono-function** of serving for ecological value nowadays. Meanwhile, the Shenzhen River, which is currently walled by hard banks and fences, has been regarded as a border for a long time, and as a result, lacks landscape values like ecological values, entertainment values, and hydrological values related to the current aquaculture today. The future challenges arise with the opening-up process of the Frontier Closed Area. On the one hand, the **urban pressure** causes an urgency of developing the land. Some plans have been made to accommodate more dwellings in the previous FCA, replacing the green buffer zone piece by piece. On the other hand, the current green buffer zone combined with Mai-po nature reserve provides important habitats for migratory birds. The land development **at a cost of declined ecological value** is accused to be unsustainable. More and more people are protesting against the increasing estate development on this precious land, asking for protection of the coastal wetlands and other natural environments. Whether to protect the natural environment or to develop the land is never binary. The idea of **protecting through development** indicates a more resilient landscape approach to deal with current issues. In the past 50 years, the development of the Shenzhen-Hong Kong border area has been primarily guided by political and economic processes. How to rethink its development from the insights of the landscape-based approach is a challenge in this project. When the Shenzhen River is no longer regarded as a border, can it be seen as a potential armature of future landscape development?
research questions	How to develop a resilient coastal landscape corridor across the Shen-Kong border from the perspective of landscape infrastructure to achieve the co-development of environment and society? Sub research questions are proposed to be answered in different stages: **SQ1**: How to understand the current landscapes of Shenzhen River and its surroundings from the perspective of hydrological, ecological and socio-cultural landscape infrastructure and what lessons can be learnt from them to engage new challenges of urban pressure and resilient development? **SQ2**: What principles can be applied to different layers of landscape infrastructure and how to further integrate them to develop a resilient landscape framework in Shen-Kong border area? **SQ3**: How can the principles be applied in different context (including

	aquaculture land, Gei Wai, FCA village, Urbanized area) to create better living environments for both human and ecological entities, transforming the current monofunctional land to multifunctional landscape? SQ4: How to evaluate the current land development plan within Shen-Kong border area using the proposed landscape framework and principles? SQ5: What are the knowledge and experience can be gained in this project to advance the idea of resilient landscape infrastructure in different scales?
design assignment in which these result.	The design assignment will focus on seeing Shenzhen River as the backbone, transforming it and its surrounding into a resilient landscape corridor, benefiting both human and ecological entities. This corridor would be a living corridor for human, a natural corridor for ecological entities, and a cultural corridor for border history. To achieve so, the hydrological landscape infrastructure, ecological landscape infrastructure, and socio-cultural landscape infrastructure will be studied and further developed together. Meso scale: On the scale of Shenzhen River watershed, an inclusive landscape framework, based on resilient hydrological, ecological, and socio-cultural landscape infrastructure will be proposed to give principles to develop a multifunctional landscape corridor in general. The framework project will serve as a guiding map to bring together the main values and outline the key strategies for the site landscape. Micro scale: Critical areas will be chosen to apply the design principles to create a resilient living environment for both human and ecological entities. The flow of the water system will be particularly studied on this scale. A better water quality, flood capacity, rainwater harvesting shall be achieved through a detailed water distribution plan to achieve an adaptive and dynamic hydrological landscape infrastructure. The social connection needs to be re-link to reinforce the interrelationship of communities. A migratory bird routine including multiple habitats including mountain, waterfront, fishponds, Gei Wai, freshwater wetlands, and coastal marshlands will be designed to achieve a continuous ecological corridor. Nano scale: Detailed design of streets and public space will be conducted to reflect human experience and how people live with the newly proposed water system. Also, planting design combined with hydrological and ecological layers will be conducted. Materials will be studied in this scale.

[This should be formulated in such a way that the graduation project can answer these questions.
The definition of the problem has to be significant to a clearly defined area of research and design.]

Process

Method description

[A description of the methods and techniques of research and design, which are going to be utilized.]

The idea of design research and research by design will be applied through the project. And for each stage, methods and approaches will be used to help answer the sub research questions.

1. Interpretation stage (to answer SQ1)

1.1 Mapping analysis and layer approach

From the perspective of landscape infrastructure, I deconstruct the landscape into 3 layers: Hydrological landscape infrastructure, ecological landscape infrastructure, and socio-cultural landscape infrastructure. To conduct the layer analysis, the tool GIS will be used in this process.

a) Hydrological landscape infrastructure analysis:
For meso scale, the elevation map works as the base map to indicate the flow direction of the water. The elements include Shenzhen River watershed, channel network, tributary drainage outlet, rainwater discharge outlets, water pollution, flow direction. And for micro scale, the water systems of fishponds and Gei Wai are studied through mapping and section to understand the water flow in these two particular water features on-site.

b) Ecological landscape infrastructure analysis:
For meso scale, the land use map is used as the base map, highlighting the difference between urban and green. The green area is classified into wood, scrub, grassland, fishponds, Gei Wai, park, and the wetland is particularly pointed out since it is important habitat for migratory birds in this area. Also, the type of animals living in certain habitat is pointed out in different green categories.

c) Socio-cultural landscape infrastructure analysis:
For meso scale, the infrastructure map works as the base map showing the connection via traffic. 7 types of settlements including fishpond settlements, walled villages, new towns, new estates, Gei Wai settlements, FCA villages, and SZ urban villages are pointed out on the map. And a detailed map showing the pattern of these 7 types are made with micro scale, indicating the relationship between settlements, water, and public space, and telling the story of the human on the landscape.

1.2 Literature review

a) Layer approach and ecological method proposed by McHarg (1967) to help me understand the landscape system.

b) To understand the landscape as a living system, history and spatial experience, I read the literature “Landscape Authencity” written by Nijhuis (2020).

1.3 Site visit (via google earth, aerial photography, and videos)

a) Go through the site via google earth helps me to have an understanding of the atmosphere of the site. Photos are used to show detailed circumstances of the current river status and how people interact with the environment.

b) https://720yun.com/t/a7vki97wrqe?scene_id=33732519 This website offers online aerial photos of the Shengzhen River.

2. Develop landscape framework and principles (to answer SQ2)

2.1 Literature review

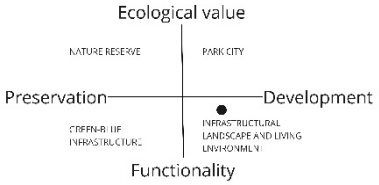
To have a further understanding of resilient landscape infrastructure, 3 important literatures are seen as the guidance before developing a landscape framework. They are: “Infrastructure as landscape” by Strung (1996), “Urban landscape infrastructures” by Nijhuis and Jauslin (2015), and “Resilience thinking” by Walker and Salt (2006) as the guiding principles of the generating of the framework.

2.2 Case study

For case study, some landscape framework projects provide insights of how the landscape framework is developed and how it functions and guides the design in the next scale. An outstanding project called “GIRONA’S SHORE. THE FRAMEWORK PROJECT” located in Catalunya developed by EMF M. Franch gives a great example.

2.3 Scenarios

As for the future vision of the site, there is a complex and even opposite interrelationship between ecological value and functionality, and between preservation and development. Four scenarios in the four quadrants indicate different strategic framework towards the future. In this case, I need reasons to explain my position as landscape architect.



2.4 Layer approach

3 different layers focusing on 3 aspects including the natural corridor, the living corridor, and the cultural corridor can be drawn with plans separately. The layers help me to identify the critical demands from different "expert's" perspectives. And by overlapping them, commons and conflicts will be shown. In the end I will have an integrated framework plan based on the understanding of these 3 situated layers and their relationships.

2.4 Toolbox

Toolbox will be developed base on the proposed principles to help with further modular design in micro scale.

3. Design exploration (to answer SQ3)

3.1 Categorizing (typologies)

I'll categorize the water feature typologies and settlements typologies to apply the toolbox into the site design.

3.2 Experiment and modeling

Since a water distribution plan is included in design exploration stage, I'll experiment on digital and physical models to test the river morphology. The goal of the experiment would be looking for the best solution to balance the flood capacity and ecological value for the SZ river.

3.3 Multi-scaler approach

The general principles will be applied and tested in 3 scales: meso scale (Shenzhen River watershed), micro scale (critical sites), and nano scale (streets and public space). The content will explore the strategies for macro principles to be applied in micro scales and also the potentials for micro strategies to carry macro effects towards future.

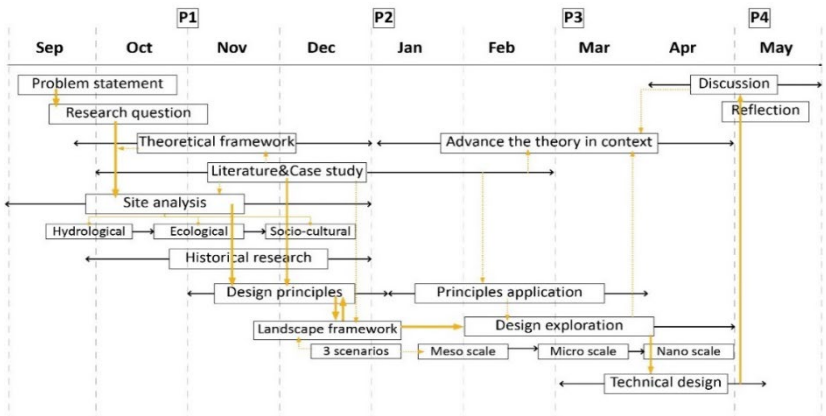
4. Evaluation and reflection (SQ4&5)

4.1 Evaluation index

4.2 Paper writing

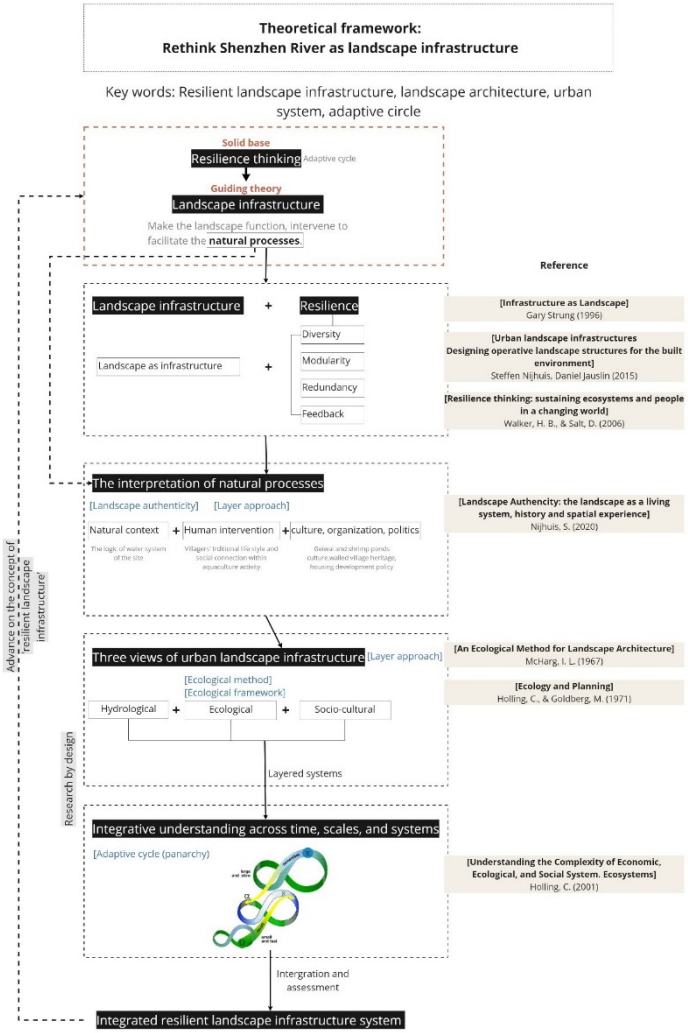
Some land development plan has already been made in the green buffer zone area. After my landscape framework, principles and designs, I will write the paper reflecting on the current plan and give my evaluation and suggestions.

Process



Literature and general practical preference

This project focuses on using the landscape approach to rethink the relationship between river and city, environment and society, human and nature in the coastal context. Shenzhen River, as an estuary river also a border river, depicts the typical problems as results of urban pressure and climate change, and provides potentials to explore the future regional and local development. The "**resilience thinking" and "adaptive cycle**" is regarded as a solid base for the research in this project, indicating an integrated understanding of the interrelationship of the **social-ecological system** (Walker & Salt, 2006). And the concept of "**landscape infrastructure**" is chosen as the guiding theory.



This project aims to advance the idea of "**resilient landscape infrastructure**" in the context of Shen-Kong border development by applying the idea of landscape infrastructure and deconstructing it into hydrological landscape infrastructure, ecological landscape infrastructure, and socio-cultural landscape infrastructure. And integrate the 3 layers across scales to head towards a synthetic co-development to reach a resilient coastal landscape.

Through **design research** and **research-by-design**, the approaches that could adapt to enhance the co-development of environment and society in Shen-Kong border area will be discussed within different proposed landscape scenarios in further framework development and design stages.

Reference literatures:

Bolchover, J., & Hasdell, P. (2017). Border ecologies : hong kong's mainland frontier. Birkhauser.

Holling, C. (2001). Understanding the Complexity of Economic, Ecological, and Social System. *Ecosystems*, 390-405. doi:I0.1007/sl0021-00I-OIOI·5

Holling, C. S., & Gunderson, L. H. (2002). Panarchy: Understanding transformations in human and natural systems. Island Press.

Holling, C., & Goldberg, M. (1971). Ecology and Planning. Journal of the American Institute of Planners, 37:4, 221-230. doi:10.1080/01944367108977962

McHarg, I. L., & Ndubisi, Forster O., Texas A&M University, College Station Texas, USA. (2014). The ecological design and planning reader. In An ecological method for landscape architecture : landscape architecture (1967) (pp. 341–347). essay, Washington, DC : Island Press/Center for Resource Economics : Island Press.

https://doi.org/10.5822/978-1-61091-491-8_29Meyer, H. (2014). Delta-Urbanism: New Challenges for Planning and Design in Urbanized Deltas. Built Environment, 40(2), 149-155.
Nijhuis, S. (2020). Landscape Authencity: the landscape as a living system, history and spatial experience. Bulletin KNOB, 32-37.
Nijhuis, S. & de Vries, J. (2019). Design as Research in Landscape Architecture. Landscape Journal 38(1-2):87-103. doi: 10.3368/lj.38.1-2.87
Nijhuis, S., & Jauslin, D. (2015). Urban landscape infrastructures. Designing operative landscape structures for the built environment. Research In Urbanism Series, 3(1), 13-34. doi:10.7480/rius.3.874
O'Brien, K. L., & Leichenko, R. M. (2000, October). Double exposure: assessing the impacts of climate change within the context of economic globalization. Global Environmental Change, 10(3), 221-232.
Strang, G. (1996). Infrastructure as Landscape. Places, 10(3), 8-15.
Walker, H. B., & Salt, D. (2006). Resilience thinking: sustaining ecosystems and people in a changing world. Washington: Island Press.

Practice precedent:

1. "Girona's Shore. The Framework Project." Location: Girona, Catalunya. Author: EMF M. Franch
2. "The Los Angeles River Reimagined: 51 Miles of Connected Public Open Space." Location: Los Angeles. Authors: Jessica M. HENSON, Mark HANNA
3. "Buji River Regeneration." Location: Shenzhen, China. Team: MLA+, IHE Delft Institute for Water Education
4. "Dasha River Ecological Corridor". Location: Shenzhen, China. Team: WLA

Reflection

1.What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?

My graduation project use landscape infrastructure as the main theory to guide my research and design, which also response to the general concept of "flowscape" for landscape architecture track. The project will take account spatial design, functionality, material, culture and society, multi-scale and the change in time to develop strategic framework in urban scale, and also acupunctural landscape design in local scale to achieve a resilient landscape infrastructure in the site context. Meanwhile, my project locates in the Pearl River Delta region, an estuary river called Shenzhen River is the main study object, which fits the idea of Coastal Resilient Landscape studio.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework.

Scientific and professional relevance:

The outcome of the project will provide potential principles and strategies in the coastal context to develop a resilient living environment under the idea of resilient landscape infrastructure. This research helps deepen the understanding of the traditional aquaculture system and inspires natural processes in this area, providing insights to understand a sustainable social-ecological system. Moreover, the applying of the landscape-based approach and the nature-based tool provides a perspective that landscape works initially as the armature to guarantee a resilient future with further social-economic development. Through the lens of this project, the landscape architecture field is emphasized in both urban planning and local design.

Societal relevance:

Firstly, from border to landscape, this project repositions the design and management of border river landscape. Getting rid of the previous urban design dominated by economics and politics, this border area can be re-given a

landscape identity beyond political stereotype by focusing on the social-ecological system. And instead of seeing the two cities apart, I try to see them as one system integrated within the Shenzhen River watershed from the perspective of landscape. In this case, the boundary no longer exists but transforms into a potential multifunctional landscape interface.

Secondly, the outcomes of the project would provide different possibilities of developing a landscape corridor to tackle coastal cities' social and ecological issues with nature-based solutions. The resilience thinking during the research helps to evaluate the currently proposed plans and give development suggestions accordingly. Moreover, the project helps to equip the area with strategies to cope with future changes including social change and climate change.