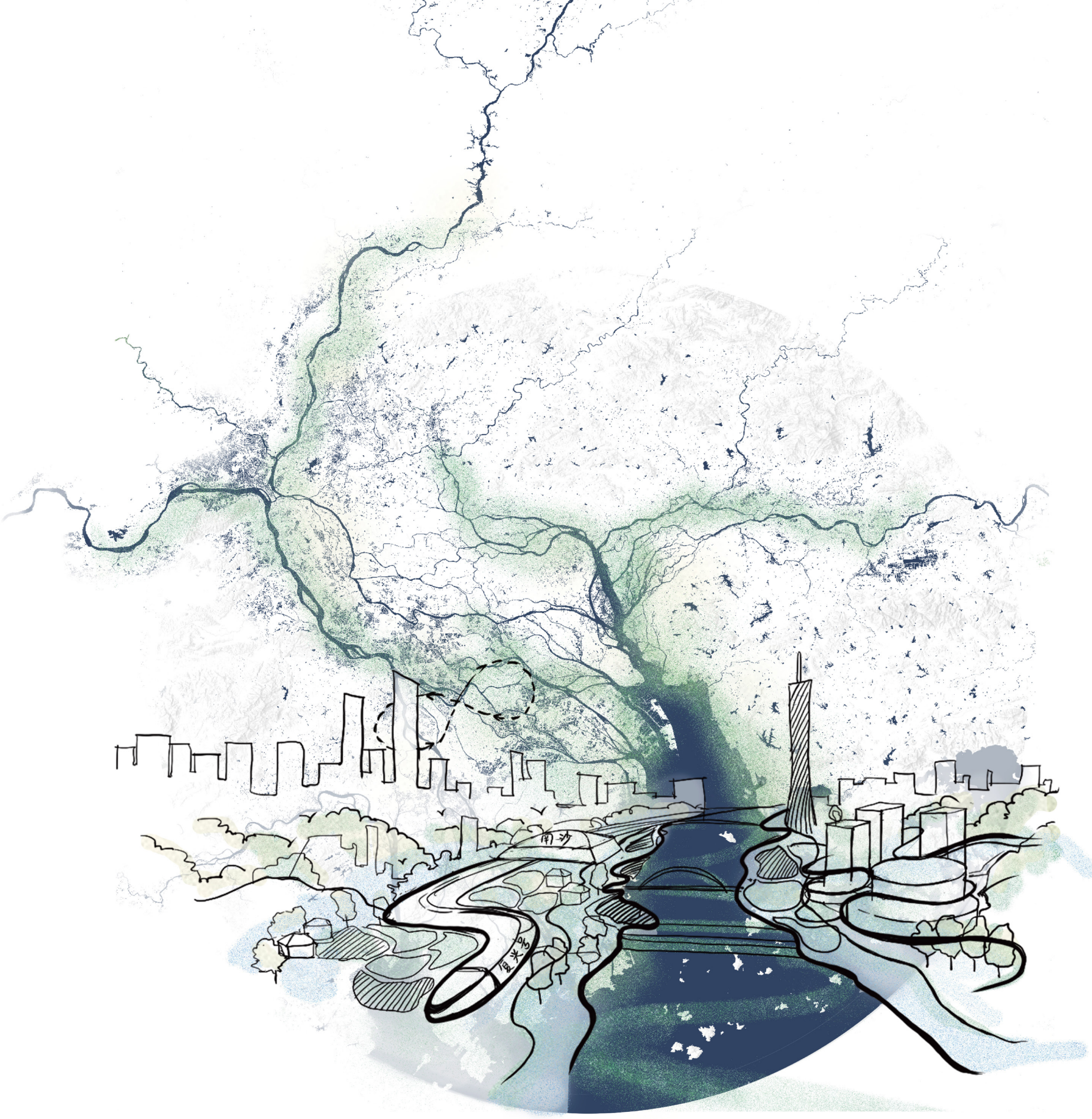



# Megaproject to Megaprocess

## 溯溺珠江

# Colophon

**Megaproject to Megaprocess**
*A dynamic vision and strategy for the Pearl River Delta*

2024
Delft University of Technology
Faculty of Architecture and the Built Environment
MSc Architecture, Urbanism and the Building Sciences
Track Urbanism

Jakob Pesendorfer, 5724562
Feline Kaaij, 5068851
Jean Bijlsma, 5089352
Yuhong Huang, 6021379
Jan Osusky, 5789281
Mahaa Ejaz, 5939453

Globalization: exploring the urban regional
adaptation 2024 - Metropolis in Transformation

Coordinator Team:
Dr. Diego Sepulveda
Dr. Gregory Bracken
Dr. Lei Qu

PolyU Team:
Prof Peter Hasdell (vice-dean)
Prof.dr. Gerhardes Bruyns



1. (title page) Megaproject to Megaprocess

# The Project in Brief

This report presents our proposal for "Globalisation Free Choice," an elective course for master's students in the Faculty of Architecture and the Built Environment at TU Delft, in collaboration with The Hong Kong Polytechnic University (PolyU). The course aims to explore sustainable and integrated development and its regional impacts.

During the 9 weeks of the course, a regional vision and strategy for the Greater Bay Area was prepared. The Greater Bay Area is a global centre for economic development located in the Pearl River Delta in the Southern part of China. In this report we describe how we want to instigate a paradigm shift from focusing on megaprojects to working in mega-processes. In the first two weeks we analysed the environmental, social and economic situation of the area to create a problem statement and define focus points. The next two weeks were spent in Hong Kong at the Polytechnic University where the morphological game boarding strategy was used to look at regional design in a more experimental way. We created two games - one focused on the social perspective including the liveability within the region, and the other based on the morphological perspective, looking at spatial changes. During these two weeks and during the playing of the game we defined two interesting zoom-in locations in the area.

The first zoom in location is the border between Hong Kong and Shenzhen, an area which is already planned to grow into an innovative tech hub. Due to the rejoining of Hong Kong with Mainland China in 2047, the border will be eliminated, opening a lot of opportunities for development. The other location is the Nansha district near Guangzhou, which lies in the heart of the delta. Major development plans consisting of various megaprojects are proposed by the Chinese government in Nansha, which will disrupt the natural cycle of the water and soil. The two zoom-in locations will be used to develop an approach to integrate the built more with the green-blue networks to mitigate floods, droughts and heat island effect.

We then returned to Delft to develop a vision and strategy for the GBA, focusing on these megaprojects and thinking of ways to change the current way in which they are executed. We used an element-based approach inspired by the book 'the Elemental Metropolis' to develop a strategy of working in a more agile, process-based way. We conclude the report by revisiting the entire Greater Bay Area to identify additional regions where the insights from our work on the two focus areas can be applied, aiming to create a resilient, adaptable, and liveable dynamic delta.

*"**Globalisation** has been a key driver of China's rapid economic development, transforming it from an isolated, agrarian society into a major global economic power. However, this transformation has also brought **challenges**, including environmental degradation and social inequality."*

Jinglian 2005

# Content



2. (previous page) The Earth, via Google Earth

# 1 Introduction

*The manifesto summarises in brief the position taken of this project. The Greater Bay Area is introduced and the main urgencies from our point of view are explored. The research questions posed in reaction to the urgencies will guide the analysis and synthesis/quest to reach a better understanding of the challenge in envisioning and strategising in the GBA.*

# Manifesto

*Delta's old rhythms,*
*Villages and fish ponds fade,*
*Progress shadows all.*

The Pearl River Delta is fast becoming a major national and global centre, signified through a massive urban expansion into the hitherto rural and peri-urban wetlands areas of the delta. Traditional land-use pattern made up of systems of fish ponds and villages are found in these deltaic areas, forming a complex but sensitive hydro-ecosystem. This vulnerable system is being claimed by megaprojects, focussing urban development in a leap-frog style of growth into creating new centralities, related to technical, financial, industrial, and educational infrastructure. The development of the megaprojects often occur in a tabula-rasa style, disrupting existing social patterns and land uses, breaking the scales of their contexts. Together with their hyper-specialization and built rigidity, megaprojects become increasingly susceptible to future uncertainties, especially connected to water and social flows in the Delta.

Using the morphological gameboarding approach we subsumed interrelationships between social movements and amenity demands, water systems and development logics, megaprojects, and policy shocks into the realization that future uncertainties show structural weaknesses with the current way of megaproject development. We thus propose a different way of thinking about development, from a "build it and they will come" approach to a more agile, longer-term process. Instead of solely economic thinking, we urge an additional strong focus on the human flows in the area, and a powerful water perspective. The large-scale rural-to-urban migration of the past decades shows the shaping power of the human flows, which in the maturing economy of China rightfully demand a concern for liveability. The water as an actor has shown its prominence through large-scale floodings in the delta, which in itself is a hyper-dynamic water-soil system.

The combination of these foci as socio-ecological processes shall be foundational components of this project, which looks beyond just its implementation. Including social and hydraulic actors, we demand a paradigm shift away from mere megaprojects towards more integrated mega processes, to positively impact the resilience of the Pearl River Delta.



# Team

*Jakob Pesendorfer*

studied Spatial Planning at the Technical University in Vienna. The integrated approach to urban design, landscape architecture, and urban planning, and especially the complex tasks continually redefined by their stakeholders, fuel his passion for the field of Urbanism.

Linked in

*Yuhong Huang*

finished her Bachelor's degree in Landscape Architecture at China Agricultural University. She is interested in addressing urban issues through landscape planning and design and aims to understand complex systems from an urban planning perspective. She is passionate exploring new possibilities for the GBA.

Linked in

*Feline Kaaij*

finished her Bachelor's degree in Architecture at the TU Delft. Interested in the coming together of design and stakeholders this project showed her how the values of different cultures can influence design decisions.

Linked in

*Jan Osusky*

studied Geospatial Engineering BSc at ETH Zurich. Exploring the intersections between complex systems, Jan is interested in thinking across the scales, from the GBA to the lives of everyday people, and finding design approaches with a human perspective.

Linked in

*Jean Bijlsma*

finished her bachelor's degree in Architecture at the TU Delft. She is interested in multi-scalar approaches and the socio-ecologic aspects in complex systems. How design on a larger scale can influence the daily life of humans, encourages her to explore design possibilities across the scales in the GBA.

Linked in

*Mahaa Ejaz*

is an architect with a bachelor's degree from the Indus Valley School of Art and Architecture in Karachi, Pakistan. Her interest lies in understanding how people perceive and interact with spaces of varying scales, and how they dynamically transform their surroundings. She is particularly passionate about creating environments that not only harmonize with the natural world but also enhance community well-being.

Linked in

# The Greater Bay Area

The Greater Bay Area (GBA) in the Pearl River Delta is rapidly evolving into a significant national and global hub. This transformation is marked by a vast urban expansion into previously rural and peri-urban wetland areas, which are traditionally characterized by networks of fishponds and villages and form a delicate hydro-ecosystem (Li et al., 2022). This fragile system is now being overtaken by megaprojects, supported by the Five-Year Plans of the Chinese government, thus creating new centres of technical, financial, educational, and industrial expansion (Yu, 2019). Often developed in a tabula-rasa manner, these projects disrupt existing social patterns and land uses. Their hyper-specialisation of functions and building typology make them increasingly vulnerable to future uncertainties, particularly those related to water and social flows in the Delta.

The GBA encompasses nine prefectural-level cities (Guangzhou, Shenzhen, Zhuhai, Foshan, Huizhou, Dongguan, Zhongshan, Jiangmen, and Zhaoqing) and two special administrative regions (Hong Kong and Macao). The integration between Hong Kong and the Pearl River Delta has been a recurring theme in policy discussions. In 2003, former Chief Executive Tung Chee Hwa proposed the idea of economic integration between Hong Kong and the Delta. Leaders continued to promote this integration, focusing on diversifying Hong Kong's economy by developing industries such as education, healthcare, environmental protection, and technology (Xu, 2019). With the full rejoining of Hong Kong and China in 2047 coming closer, the spatial question of what to do with the current border regions, as well as the social question of how to integrate the people on either side, rises among interested parties.

The Pearl River Delta has a subtropical climate, extensive marine area, and a long coastline. Over the past 60 years, significant increases in average temperatures and rapid urbanisation have increased environmental degradation (Li et al., 2022). The dynamic water-soil system of the Delta, characterized by frequent flooding, underscores the need for a robust water management strategy. Recognizing water as an active agent in development is crucial for creating resilient urban environments.

Given these challenges, a paradigm shift in development thinking is crucial. The current megaproject-driven approach, which often disturbs existing social and ecological systems, needs to be changed into a more integrated, agile, and resilient development model. This model should prioritize human flows and water perspectives, acknowledging the critical role of socio-ecological processes. The large-scale rural-to-urban migration over the past decades highlights the importance of considering liveability in development plans, especially in a maturing economy like that of China.

The term 'resilient' is frequently used in this context, but its meaning is often left undefined. In this report, we adopt the OECD's (2024) definition: "Resilient cities are those that can absorb, recover from, and prepare for future shocks, whether they are economic, environmental, social, or institutional. Such cities promote sustainable development, well-being, and inclusive growth."

This report explains the urgencies and challenges the GBA faces and introduces an alternative vision and strategy to the current development of megaprojects, looking into a way to create a process with an open ending which focuses on reflection and re-evaluation to increase adaptability. The strategy is explained using two zoom-in areas with different socio-ecological characteristics. Areas in the GBA which have similar characteristics are then later identified, where the knowledge gained through these two locations could be implemented in a similar fashion.

# Urgencies

Globalisation has acted as a catalyst to accelerate the growth of China's economy. This rapid growth has brought a lot of prosperity to certain areas of China but at the same time, it brought social and environmental challenges.

The economic growth has resulted in rapid urbanisation, in which wetlands and green areas were transformed into office campuses and neighbourhoods. Because of the decline of green spaces and the incline of paved spaces the natural cycle of the water has been disturbed. The rainwater can no longer slowly seep into the ground, but instead it directly flows to the lowest points creating flash floods and turning roads into rivers (Li et al., 2022). The water problems are stacking up and affecting the lives of the citizens. In April 2024 almost 110.000  people had to be evacuated in Guangdong due to the floodings (Ng, 2024).

The urbanisation has also increased immigration flows to the growing cities. People from the countryside and smaller cities in the east of the country move towards places with higher job availability, hoping for a more prosperous life. Therefore, they often leave behind elderly and children (Lai et al., 2022). However, most of these cities are not equipped to house such a rise of citizens. The need of housing has resulted in the semi-informal growth of surrounding villages. In Shenzhen half of almost 14 million heads strong population lives in these so called urban villages (Pan & Du, 2021).

All these challenges are the result of Shenzhen being one of the cities which was appointed as a centre for economic growth to transform the Greater Bay Area into a globally competitive megaregion through one of the Five year plans the Chinese government uses. China's Five-Year Plans are strategic blueprints set by the government to outline economic and social development goals. These plans, introduced in 1953, guide national priorities, resource allocation, and policy direction, ensuring coordinated progress across various sectors to achieve long-term growth and modernisation objectives (Translation: 14th Five-Year Plan for National Informatisation – Dec. 2021 - DigiChina, 2022).

To conclude, while globalisation has significantly accelerated China's economic growth, it has also introduced considerable social and environmental challenges. Rapid urbanisation has disrupted natural water cycles, leading to severe flooding issues, and driven significant migration to cities like Shenzhen, resulting in housing shortages and the rise of urban villages. Addressing these challenges requires sustainable urban planning and policies to balance economic development with social and environmental well-being.


4. Urban Village in Shenzhen (Own work)
5. Flooding in China 2022 (Huangdan2060, CC0, via Wikimedia Commons)
6. Artificial riverbed in Yuen Long, Hong Kong (Own work)



# 2 Approach

*To understand the viewpoint taken in this project we constructed a conceptual framework which shows the shift in perspective historically and proposed. The roadmap is a visual overview over the complete project. This project has in its strategy phase a big focus on a multiplicity of scales worked on in the GBA, which is also theoretically underpinned in this chapter.*

# Conceptual Framework

This conceptual framework outlines the perceived development direction in the GBA on the left side, supplemented by new viewpoints in this project and a main strategic goal on the right side. Before the rapid urbanisation in the late 20th century, there used to be an equilibrium between the traditional fishpond-agriculture, accompanying fishing villages, and their vernacular architecture. National Chinese policy though shifted to emphasise megaregion Metropolisation, which in the Pearl River Delta started with the megaprojects of the special economic zones in Shenzhen and Zhuhai. Specific theories supporting this narrative are processes of integration towards metropolisation (Cardoso & Meijers 2020), urban agglomeration development (Fang & Yu 2017), and the distinction between poles and centres (Bourdeau-Lepage & Huriot 2005). Socio-ecological reactions to this have been large-scale rural-to-urban migration, increased urban floodings, coupled with an urban heat island effect, all of these still persist to this day. In-situ marginalisation as described by Wang & Wu (2019) and the Arrival City described by Saunders (2010) support the perceived social urgencies.

Through the new perspectives from the water and humans, we see one hand the need to focus on spatial strategic principles to bring the spatial and social visions to life, on the other hand there is a need for processes which ensure that development can occur in a resilient manner. Recilience in this context includes the capacity of the system to not just withstand shocks, but to grow to meet them in the future (OECD, 2024)

The main measure proposed is the paradigm shift towards a mega-process: The current thinking in megaprojects is enriched with a long-term perspective on future needs, potential shocks and uncertainties, and the multitude of current and future actors and stakeholders. Acknowledging that planning follows a cyclical path, rather than a linear one, with; reflections, evaluations, future visions and projections which influence current and coming planning decisions. Posing explicit questions about blue-green, and human processes, help to keep the socio-ecological perspective current.

**Back in the day**

*humans living with nature*
*deltaic urbanisation*

**Status Quo**

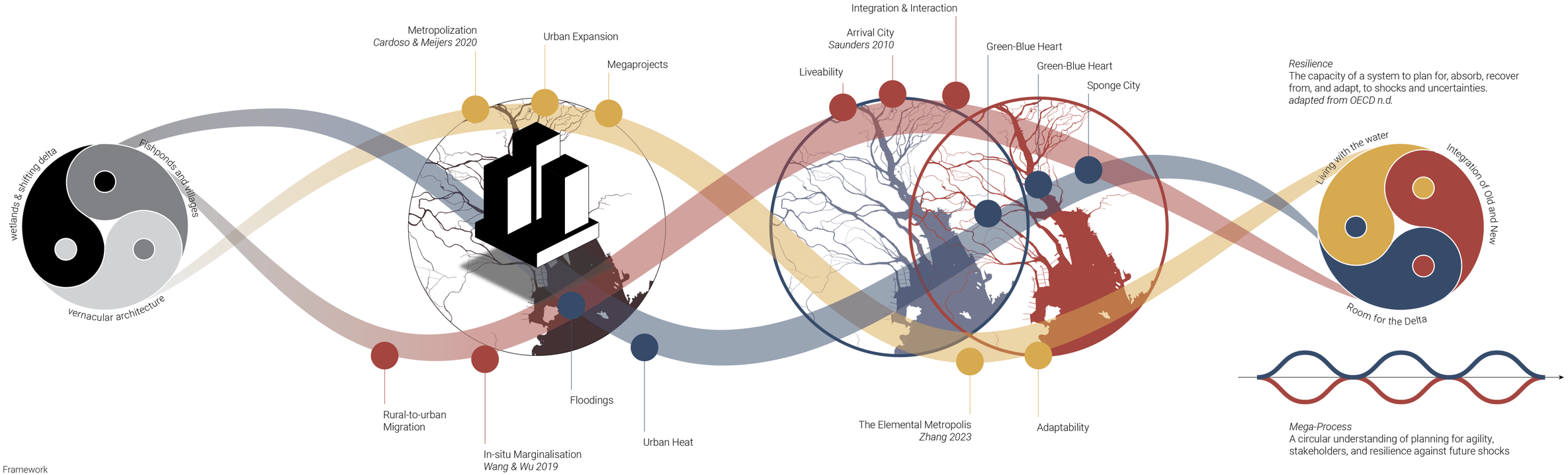
*top-down planning*
*leap-frog development*

**New Perspectives**

*water-ecology*
*socio-economic*

**Visions of the Future**

*reflections and visions*
*common prosperity*



# Roadmap

Analysis

Morphology

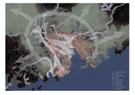
Ecology

Social

Quest

Morphology

Ecology



Social

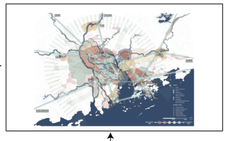
Challenge

Morphology

Ecology

Social

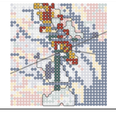
Vision (spatial)



Vision (process)

Game Findings

Dots



Conclusions

Water lense

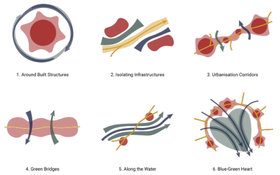
Strips

Conclusions

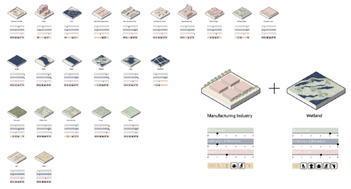
Social lense

Strategic Principles

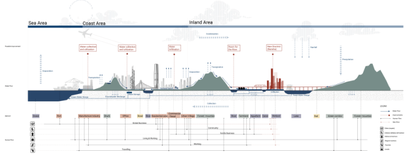
Spatial Patterns



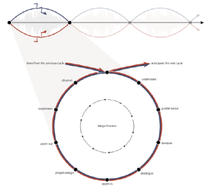

Design Elements




Systemic Section



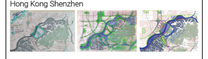

Iterative Design Process



Megaprocess

Initial Design Approaches

Hong Kong Shenzhen



Nansha

M-scale

- Spatial Patterns

Hong Kong Shenzhen

Nansha

Test Resilience

- Slow & rapid uncertainities
- Select best

Shenzhen Hongkong

Nansha

Investigate L-scale

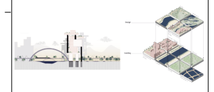
- Create design brief

Hong Kong Shenzhen

Nansha

Detail Design

- Elements combination
- Section



Learnings

- Change approach?
- Change design?
- Next iteration

Final Vision GBA

8. Roadmap

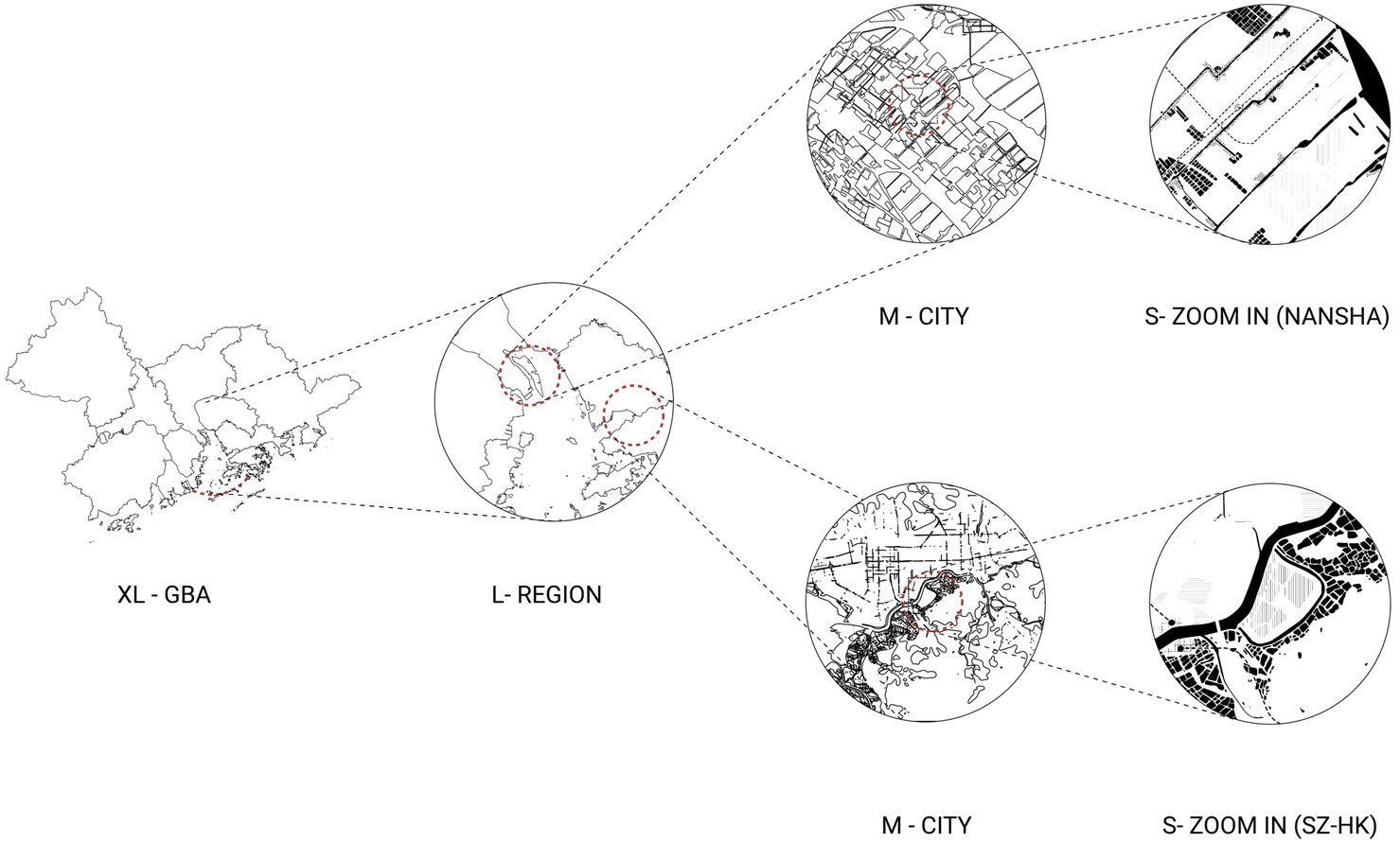
# Working through the Scales

Working through multiple scales is a crucial way to understand different types and conditions in our built environment. Therefore, the Delft approach to urban design and planning was the main principle to develop a spatial analysis to understand the importance of an integrated approach of Landscape architecture, Urban Design, Spatial Planning and Strategy, Urban Studies, Urban Data Science and Environmental Technology and Design.

The paper of Nijhuis (2017) seeks to detail the core principles of the Delft approach, which emphasises viewing the urban landscape as a continuous scale, employs design research and research through design as key educational and investigative methods. At the same time it considers mapping and drawing as essential tools for conceptualisation (Nijhuis et. al 2017).

Another important influence on our work was, the Elemental Metropolis by Zhang (2023), which examines a segment of Chinese urbanisation in the Yangtze River Delta using a deconstructive approach that uncovers the physical characteristics of the territory through mapping and redesigning its fundamental elements. It places particular emphasis on both long-term aspects and recent landscape transformations (Zhang 2023).

These methods and theories brought us to a better understanding of the high complexity of the spatial configuration of the Pearl River Delta, and made it more structured to understand which dynamics are more important on which scale.



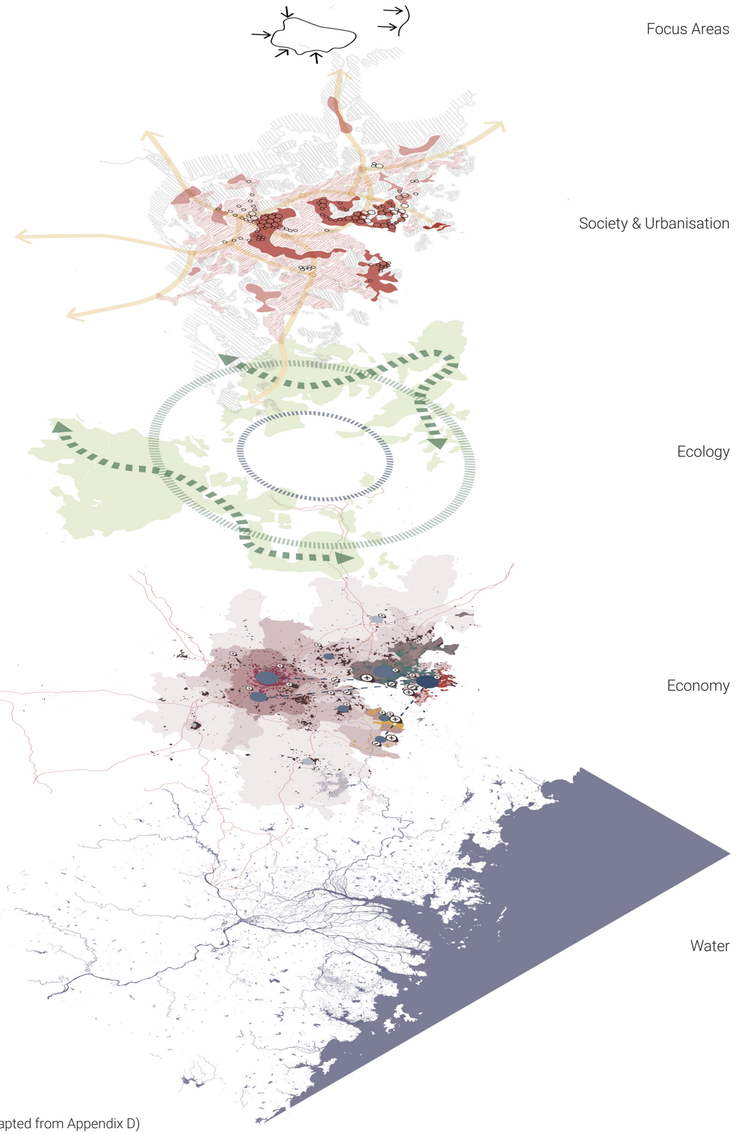

9. Working through the scales in the GBA

# 3 Analysis

*Using the layer approach, we gathered spatial knowledge about the Greater Bay Area. These are broadly clustered along the three research themes of Morphology, Ecology, and Society. These map layers will form the basis for the quest and subsequently the challenge, to help guide the project in its vision and strategy phase.*

# Layer Approach

The Delft Layer Approach to Urbanism takes different layers of an analysis apart. This model separates spatial planning aspects, based on the differences between the dynamics of the substratum, networks and patterns (van Schaick & Klaasen, 2011). This method is applied in the analysis of the Greater Bay Area, as shown in the axonometric. The three different lenses of economic flows, the ecological patches and the social patterns are examined, along with the delta's water-system. By overlapping these layers with the existing blue-green network, important interrelations are identified, offering deeper insights into the region. These insights help define our two areas of focus as the in-between or desakota areas which are facing social, ecological and economic pressures.



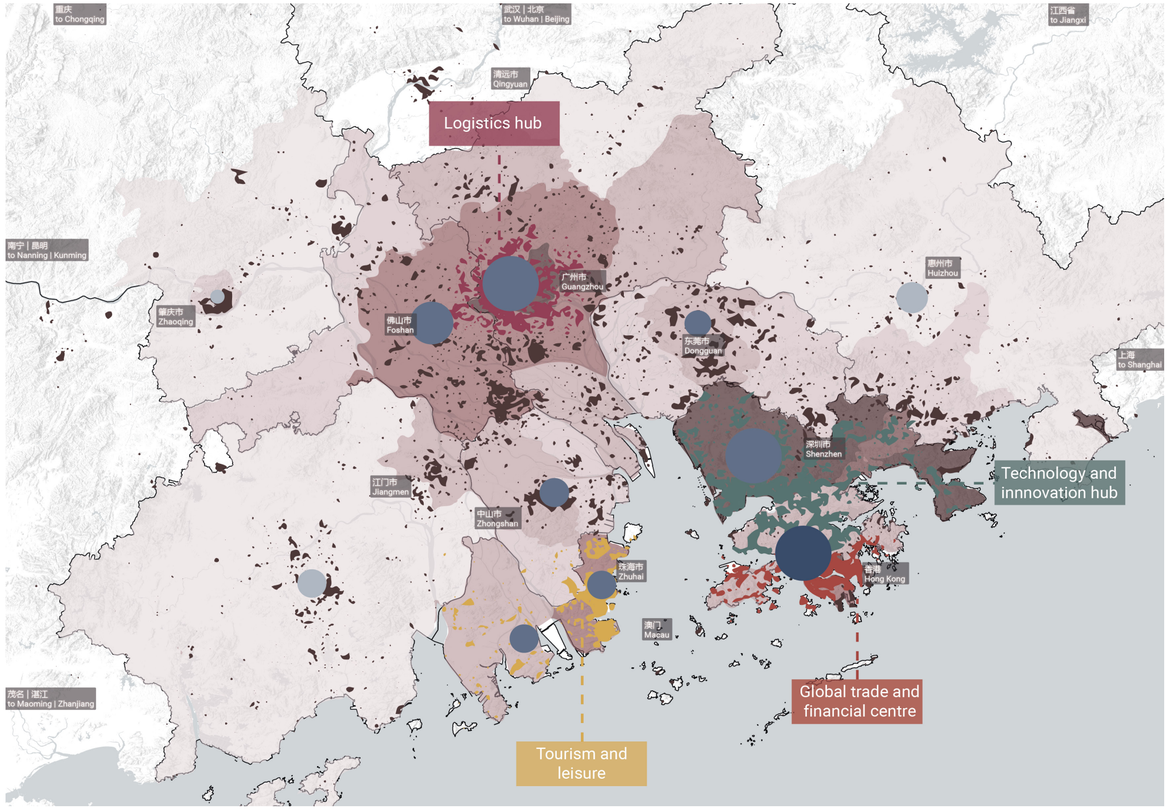

10. Layer approch (adapted from Appendix D)



# Population Density & GDP

At the end of 2022, the Greater Bay Area consisting of around 56,100 square kilometres, has nearly 87 million inhabitants. This region includes two special administrative regions, Macau and Hong Kong, and nine cities of Guangdong province (Textor, 2023). Shenzhen, the city with the second highest population density in the GBA, has transformed from a fishing village into a large technology and innovation hub. The special administrative region of Hong Kong is known as a global trade and financial centre. Guangzhou, the capital of Guangdong province has the most railway connections and is therefore known as the logistics hub in the region. Together with a high population density, these three cities also have the highest GDP in the Greater Bay Area. With the Hong Kong-Zhuhai-Macao Bridge, Macao is better connected and well-visited through tourism and leisure (Textor, 2023).

11. Population density and GDP in the GBA

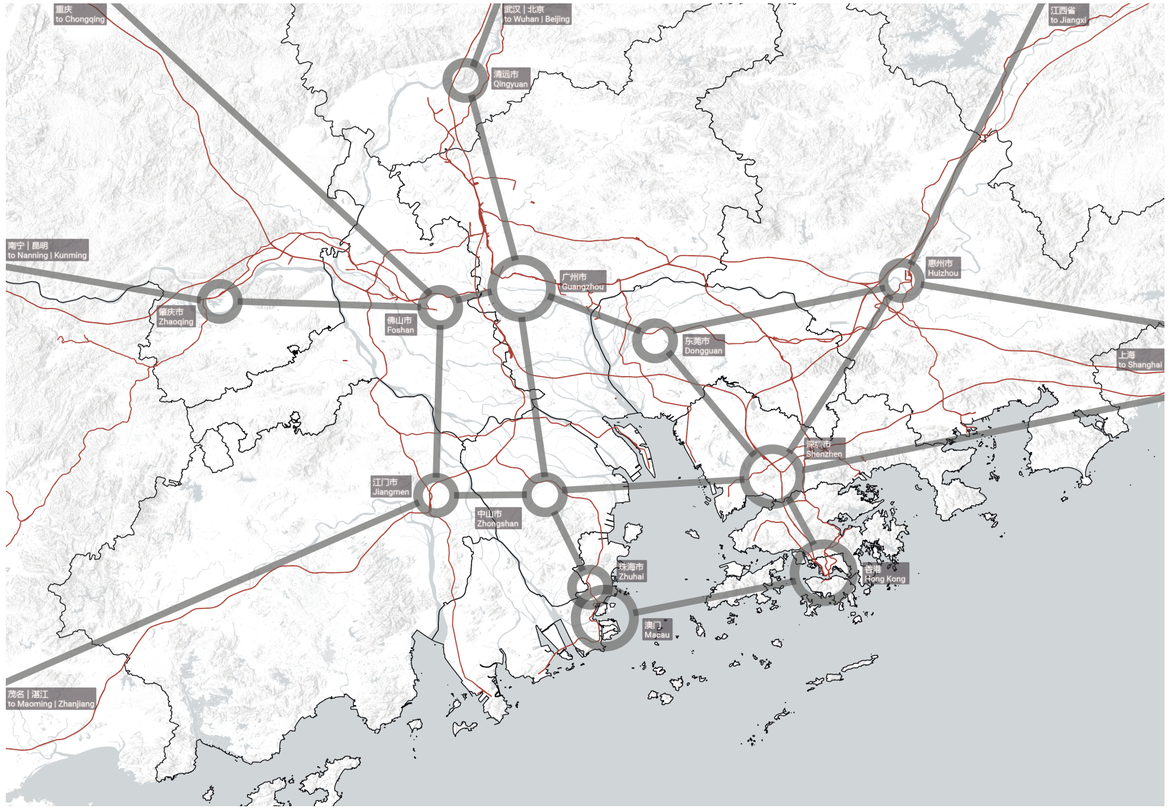



# Existing structure of the GBA

The main urban city cores in the Greater Bay Area are spatially positioned according to administrative boundaries, infrastructural connectivity and economic productivity. The main cores (Hong Kong, Shenzhen, Dongguan, Guangzhou, Foshan, Zhongshan, Zhuhai and Macao) form a ring around the Delta and are well-connected through railway lines, to the cities of Huizhou, Jiangmen and Zhaoqing in the hinterland. The cities are seen as industrial nodes with specialist functions, clustered around the main largest cores, Guangzhou and Shenzhen. This ring of connected neighbouring provinces promote economic co-operation in the Delta (Chung, 2020).

12. Existing structure of the GBA

- Roads
- Train connections between cities
- Water
- Land and mountains
- 50 km



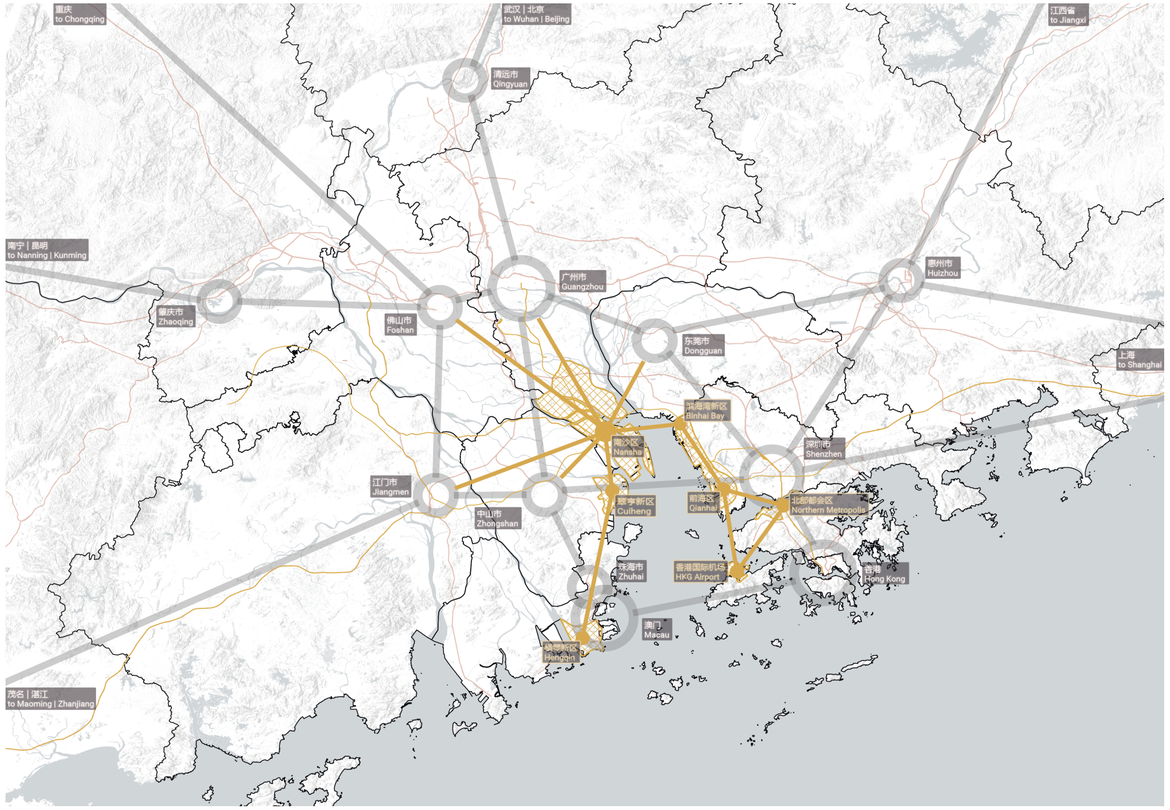



# New structure of Megaprojects

The Greater Bay Area continues to develop even further and has a strategic mission to become a globally competitive modern industrial system, which is highly connected and focused on innovation and technology (Guangdong-Hong Kong-Macao Greater Bay Area - Outline Development Plan, n.d.). This mission leads to new districts with new megaprojects in the Greater Bay Area, creating an inner ring of development in the central zone of the Delta. New infrastructure lines will be developed, also going beyond the Delta, connecting the current and new cores within all of China. An example of a district in development is the 'New Nansha District', centrally located in the region with a national strategic position at the estuary of the Delta (News-Guangdong-Hong Kong-Macao Greater Bay Area, n.d.). The Nansha District is already developing high-tech industries, port facilities and will be known for innovative development and high-quality living (Chung, 2020).

13. New Structure of Megaprojects

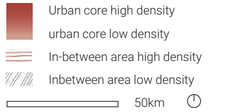
- Current cities and trainconnections
- Megaprojects and main connections
- Water
- Land and mountains
- 50km

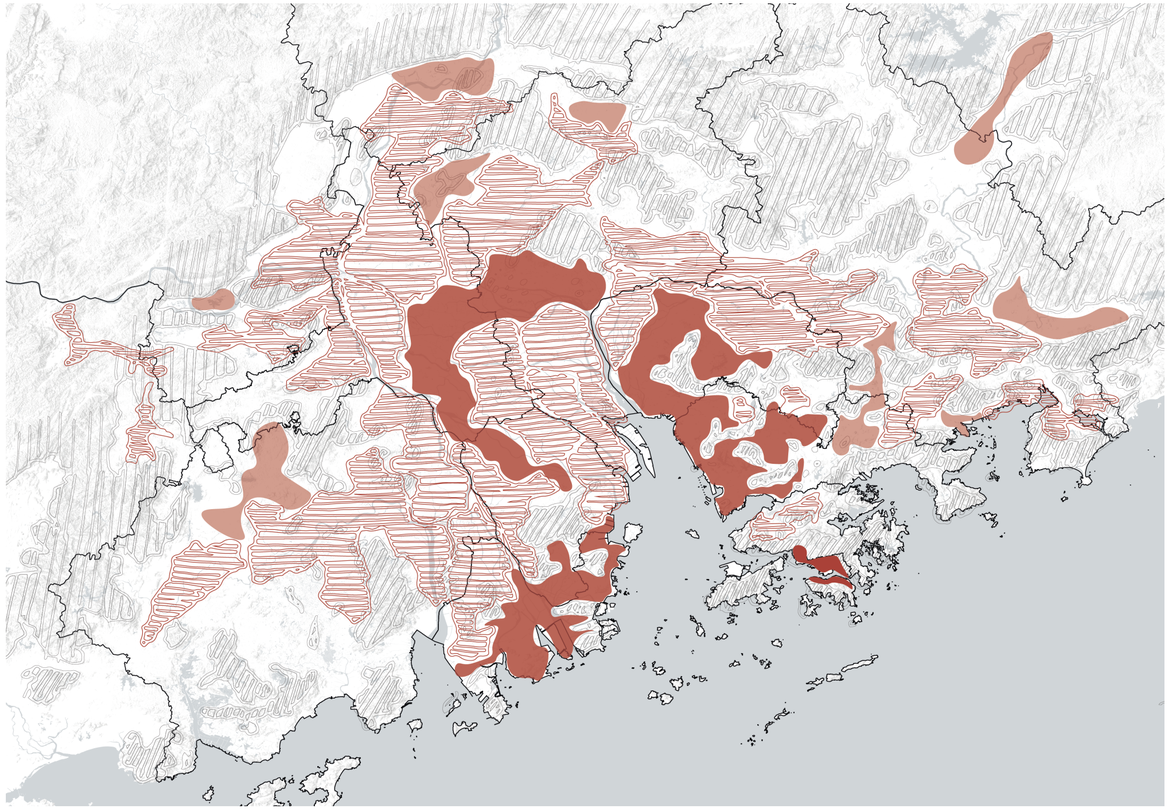


# Urban cores and in-between areas

The highly urbanised region of the Greater Bay Area can be distributed in main cores, second cores and in-between spaces. This built-up space is restricted to the elevation of the mountains. The main cores are situated in the centre of the Delta, and the second cores are surrounding cities that are well-connected with these main cores. These in-between spaces can be defined as areas where urban forms are fragmented and integrated with rural landscapes, also known as the Desakota. The concept 'Desakota' can be defined in the Indonesian language as desa (village) and kota (city). This concept is used to identify peri-urban areas (Liu, 2023). The Desakota differs from the characterisation of the traditional city. The main features of a Desakota are dense population, farmers, rice cultivation and decentralized management style (McGee, 1991).

14. Urban cores and In-between areas



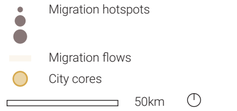



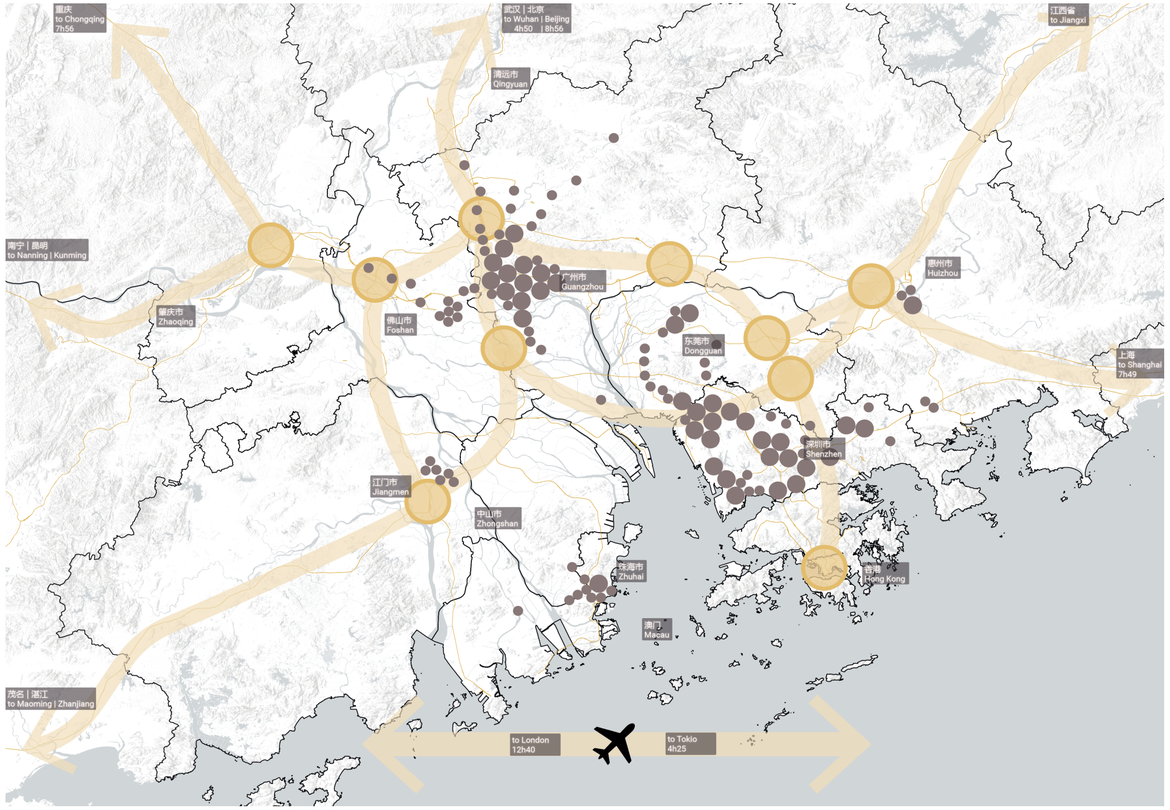


# Migration flows & transportation

With the rapid urbanisation in the Greater Bay Area, the migration of population has become a social phenomenon in China (Zhou et al., 2024). People often prioritise a job over their living environment, which leads to migration flows towards cities with better job opportunities. In the Greater Bay Area, a lot of internal migration mostly happens in Shenzhen, but also in Guangzhou and Foshan. Guangzhou and Shenzhen, the core cities of the region, provide many job opportunities and therefore show substantial immigration (The Education University of Hong Kong & Personal, Social and Humanities Education Section, Curriculum Development Institute, Education Bureau, 2022). These migration flows are possible due to strong connections between cities. The number of strong connections in the region is rapidly rising, shortening the time and spatial distance between cities, and therefore promoting the interconnection within and beyond the region (Yang et al., 2024).

15. Migration flows and transportation

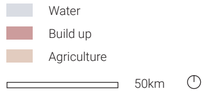


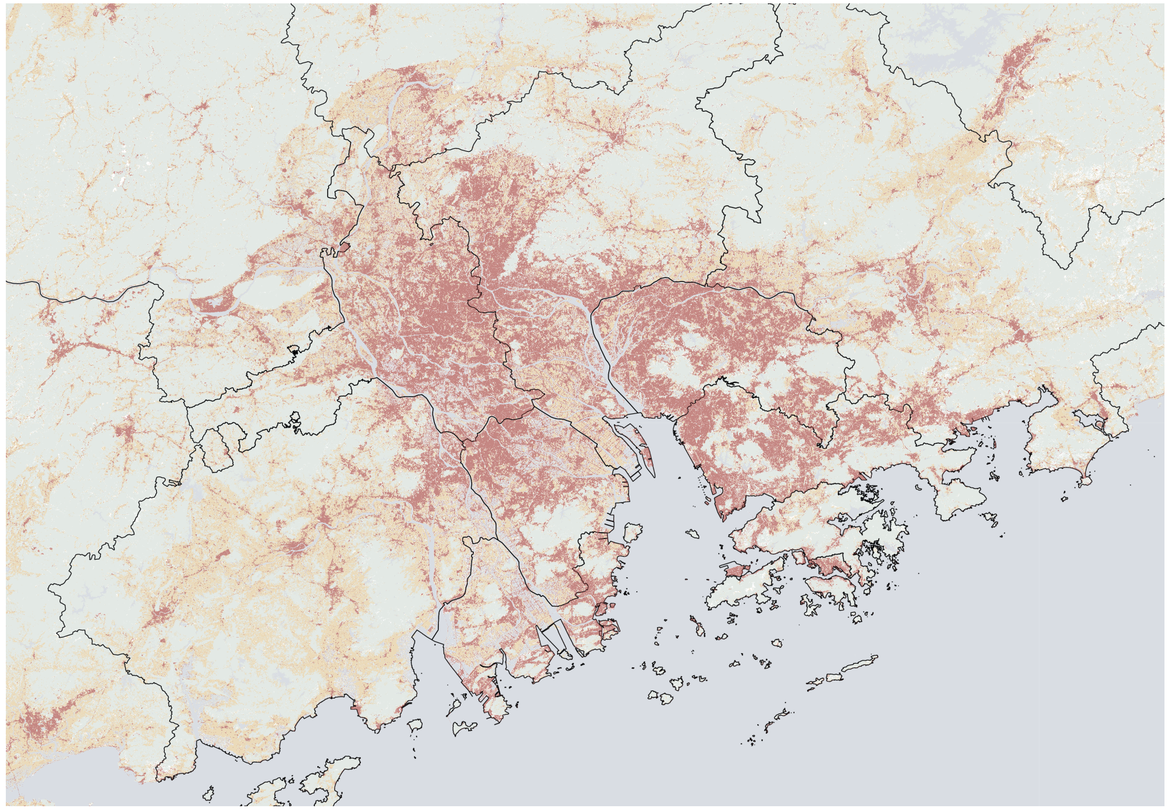



# Land use

The main land use types in the Greater Bay Area are forest, shrubland and grassland, water and wetlands, agriculture, and built-up areas. From 1979 to 2016 the region faced a loss of 81% in agricultural land. Due to developments in the social and economic sector, such as population growth and transportation routes, the land use changed a lot among the different districts in the Greater Bay Area. Zhongshan rates the highest in terms of changes of land use and Huizhou rates the lowest (Chu et al., 2021).

16. Land use



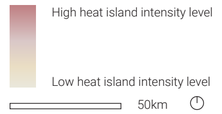



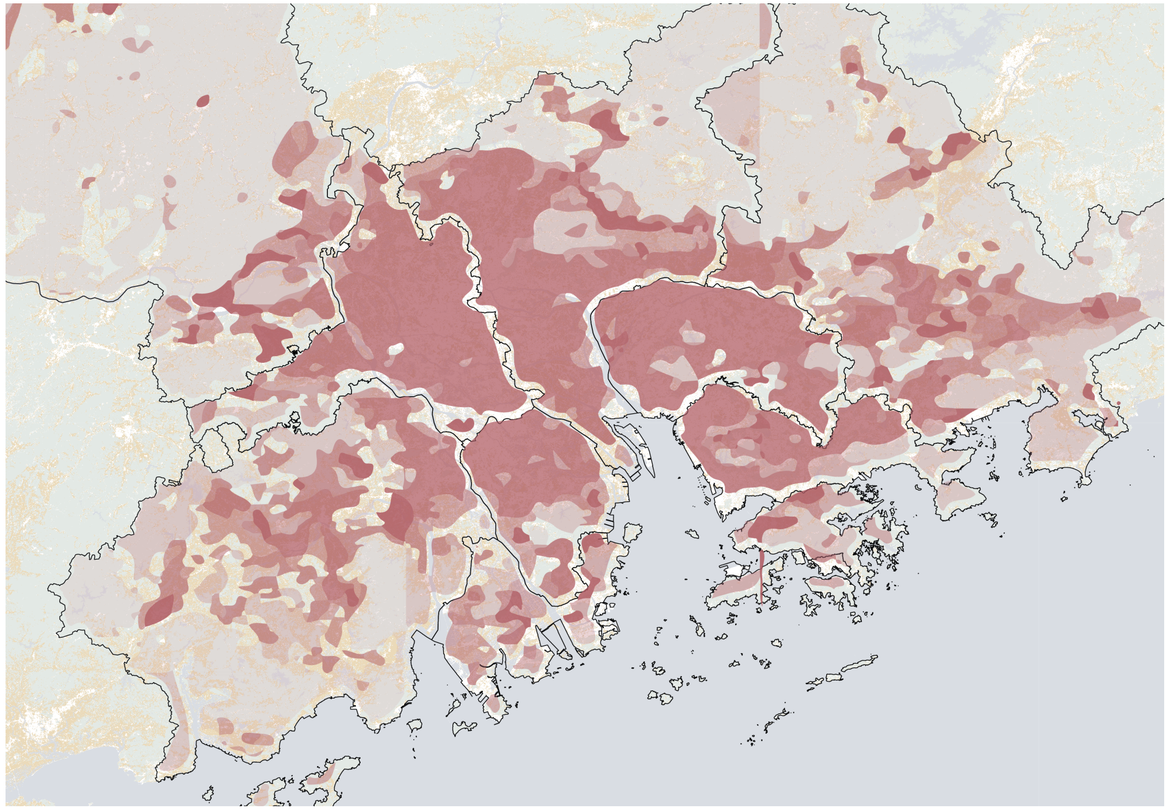


# Urban heat island

The Greater Bay Area has a large space that has a high urban heat island effect, mainly situated in the central area around the Delta. The study of Yu-Jiao and others (2020), reveal that the urban heat island effect in the Greater Bay Area has increased substantially over the years of 2003 to 2018. The urban heat island effect is mainly caused by high-density infrastructures together with a decrease in vegetation and wetlands (Pacheco-Torgal, 2015). From this central area, the cities of Dongguan, Shenzhen, the confluence of Guangzhou and Foshan, Zhongshan and Huizhou have the highest rating in the urban heat island effect (Yu-Jiao et al., 2020).

17. Urban heat island



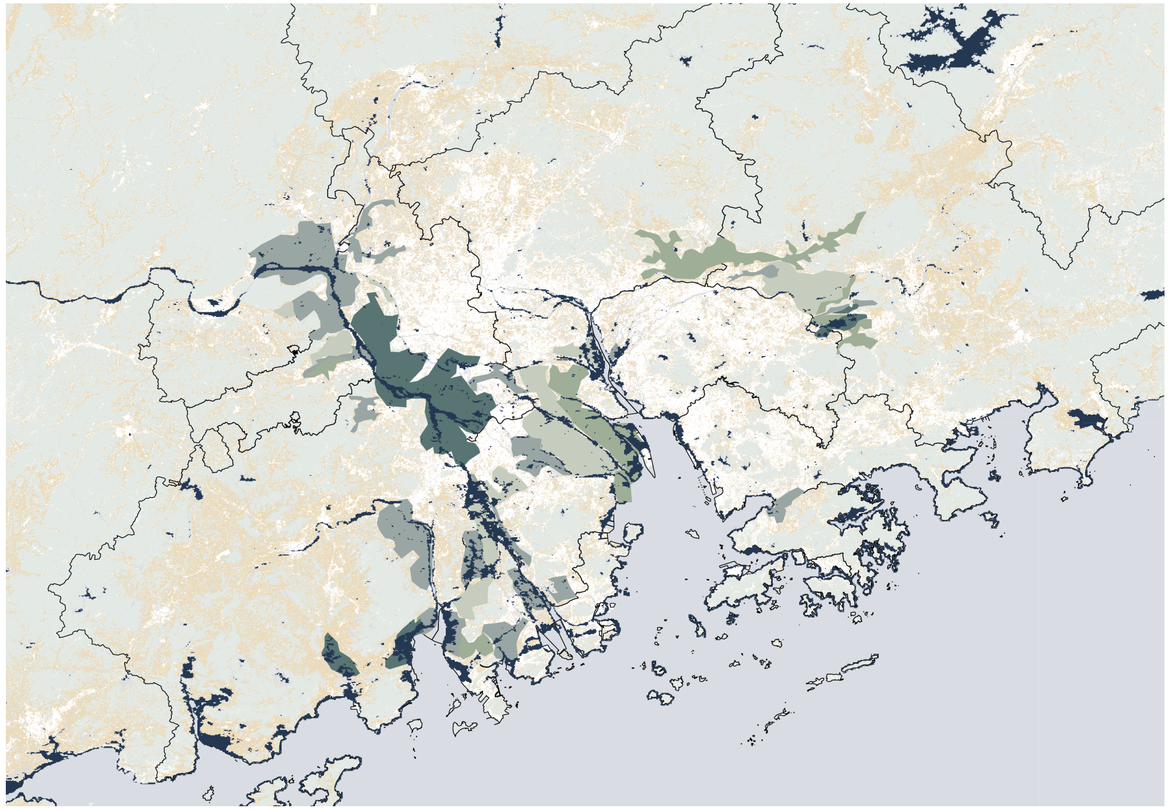
# Flooding & Agriculture

The Greater Bay Area consists of many large coastal cities, such as Hong Kong and Shenzhen. These urban areas are facing coastal and urban flooding, due to the rapid developments in the Delta. These water-sensitive areas are situated along the rivers flowing in the Delta and form its estuary. Pluvial and fluvial flooding forms a threat for the socio-economic aspects of the region and its cities (Chan, 2021). Different types of agriculture are situated at these water-sensitive areas and along the rivers of the Delta. Some of these areas consist of aquaculture ponds which are based on historical development and landscape patterns. These aquaculture areas are a big part of the culture and history of the Delta, and are a model of coexistence between humans and nature (Li et al., 2020).

18. Flooding and Agriculture

- Green
- Agriculture
- Aquaculture ponds
- Mixed agriculture
- Mixed agriculture
- Agricultural field

50km





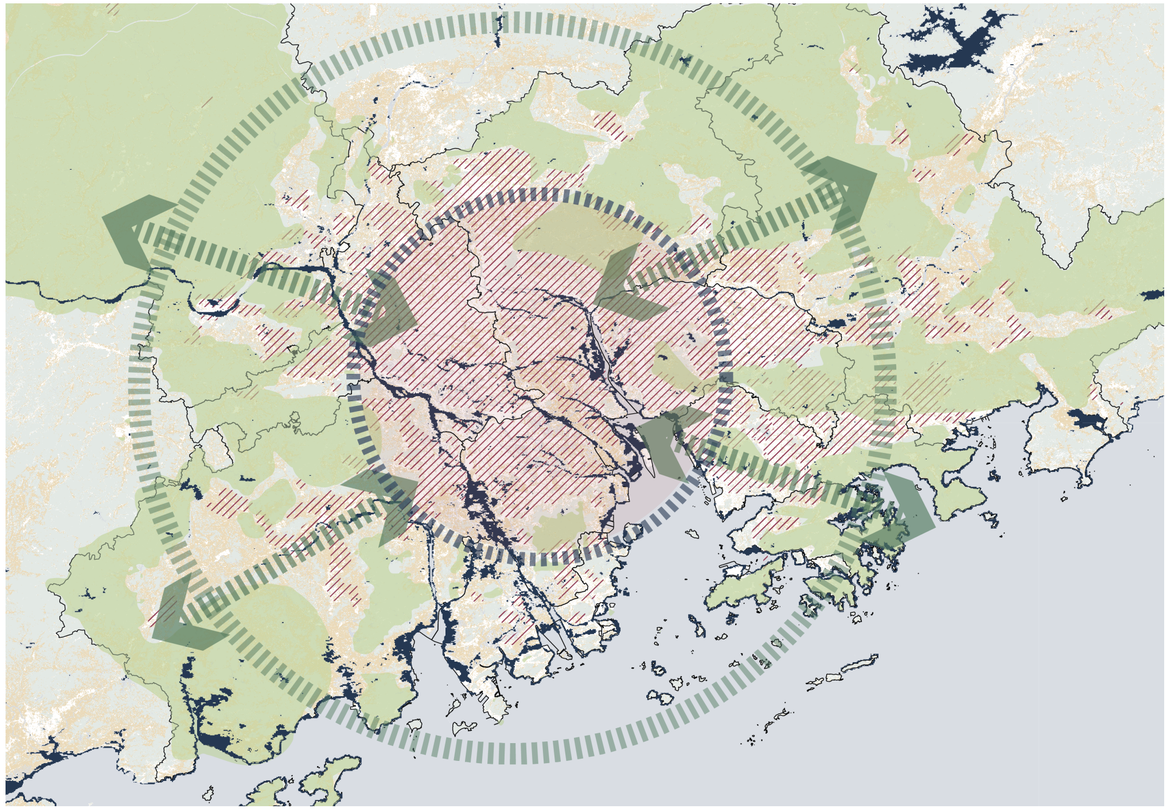
# Large-scale green structure

The urbanisation is restricted to the elevation of the mountains, leaving this space for a large green space, consisting of forests with agricultural areas in-between. The ring of the main cores in the Greater Bay Area puts a lot of pressure on the surrounding green and the central zone at the estuary of the Delta. This urbanisation zone also disconnects the central zone of the Delta from the outer belt of green space. This leads to an opportunity for ecological corridors along the waterways, guiding the green inside the heart of the Delta.

19. Green structure

- Green
- Agriculture
- Green
- Build
- Green connections

50km



# 4 Quest & Challenge

*To guide the project, we create three quest maps, to visualise how we read the landscapes of the Pearl River Delta and which urgencies we foresee. Formulating three challenges based on the quest, these guide the vision and strategy process later on in the project.*

# Morphology Quest: Urban Agglomerations and Megaprojects shape new Centralities in the GBA

*"As the world's second largest economy and most populous nation, a national strategy of actively promoting and developing urban agglomerations sends a clear message that the urban agglomeration is likely to be the viable future spatial organization of cities and urban development in China."*

Fang & Yu 2017

The Greater Bay Area is characterized by its core cities, like Hong Kong, Shenzhen and Guangzhou. Together with other urban cores, these cities form a ring of core cities around the Delta. This ring is highly connected through different kinds of infrastructure, such as railways and highways. In future developments new megaprojects are being implemented in the delta, creating new districts. These new districts are located in the middle of the Delta, creating this new inner ring of development. An example of a new development area is the Nansha district, which is located in the centre of the Pearl River Delta and will be connected to almost every major city surrounding this new district. New railway lines will not only connect this new inner ring with the existing structure in the Delta, but also form connections beyond the delta, linking these core cities with the entire country.


20. Morphology Quest Map

- Existing centrality of the GBA
- New centrality of megaprojects
- Megaproject footprint
- Urban core areas
- Secondary core areas
- In-between areas
- Major river network
- Major railway lines
- Major airports
- Major ports

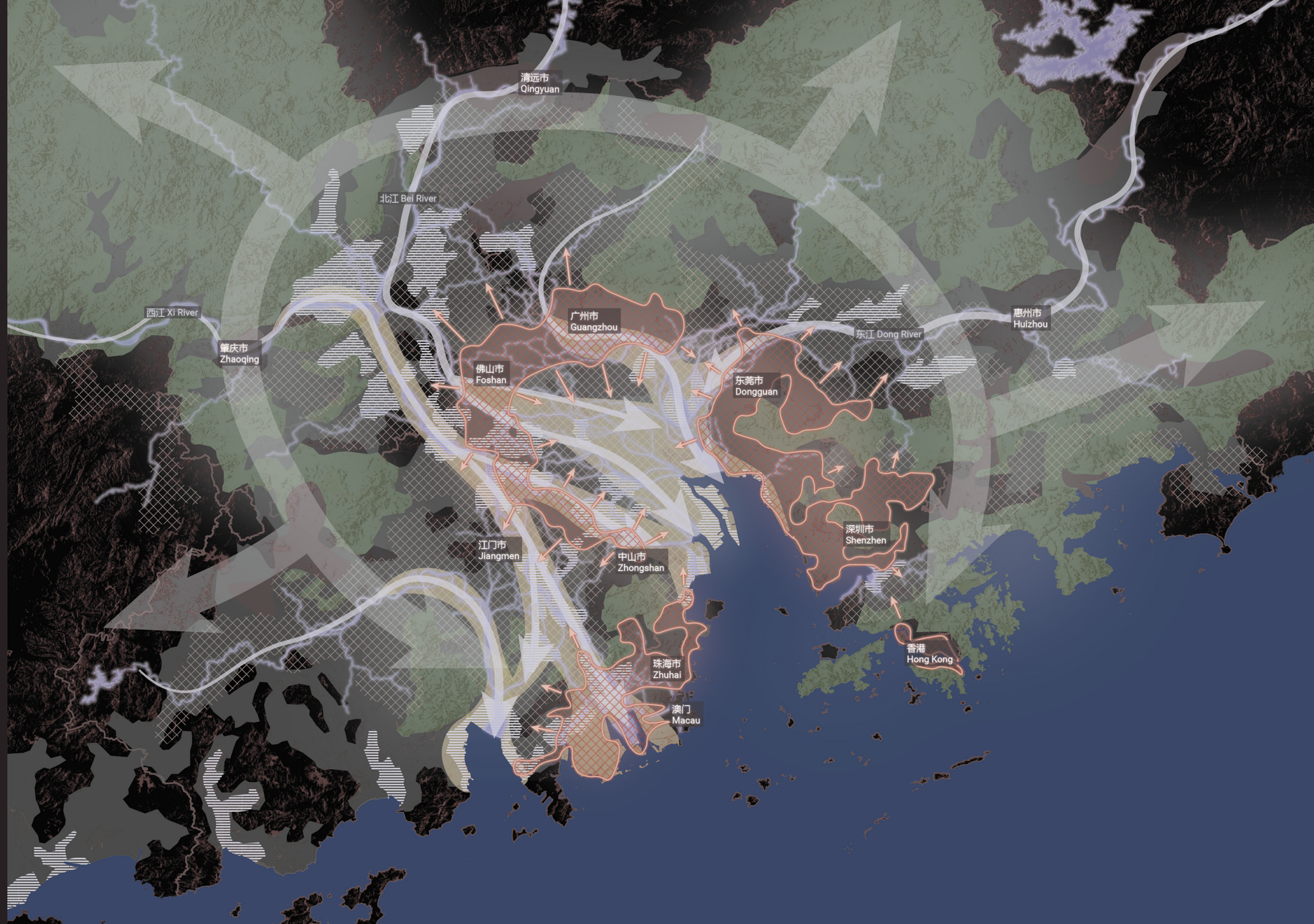
50km

# Ecology Quest: Unchecked Urbanisation Threatens the Pearl River Delta's Ecology

*"[...] in future rounds of urbanization, if the urban expansion scale and development intensity are not actively controlled, the ecological resilience level of cities in the Pearl River Delta will likely decrease further."*

Wang et al. 2022

The urban core cities in the Greater Bay Area form a ring of urbanisation in the Delta. This ring puts pressure on the area at the heart of the Delta. The surroundings of this urbanisation ring are large green spaces, forests with agriculture in-between, that is located in the mountains of the Delta. The urbanisation ring disconnects the heart of the Delta with those large green spaces, which asks for more ecological corridors that bring the green back in the central zone of the Delta. Many rivers flow into the delta, and also form the estuary of the region, resulting in a region prone to pluvial and fluvial flooding. This leads to environmental challenges in which water-sensitive areas with increasing risks of flooding and disrupting natural water flows.




21. Ecology Quest Map

- Large ecological connections
- Main river flows
- Urbanisation pressures
- Wetlands
- Flood-prone areas
- Major river network
- Main urban cores
- In-between areas
- Natural/woodland areas
- Agricultural areas

50km

# Society Quest: Economic Priorities Undermine Resident Well-being

*"[...] we find that the residents have not been relocated but are instead suffering from declining public services and environmental quality from surrounding industrial developments. The root cause of this problem is the municipal government's prioritisation of its strategic objectives of economic development over the livelihood of local residents."*

Wang & Wu 2019

The development of megaprojects and new districts in the Delta have an impact on the different social actors in the region. These social actors include, local communities, children & elderly, migrant workers, fishers & farmers, expats, and tourists. Their surroundings are influenced both negatively and positively due to these new developments. New connections between cities and villages are examples of a positive effect, but their surroundings can be negatively affected due to these industrial developments, that lead to a lower environmental quality, causing air and water pollution and less green space. While these new developments bring economic growth, the environmental degradation has an effect on the liveability of the surroundings of the social actors in the area. The region also experiences a lot of internal migration, mostly in Shenzhen, but also in Foshan and Guangzhou. This can be a result of migrant workers moving to the city for work, but also due to the decreasing liveability of their surroundings.

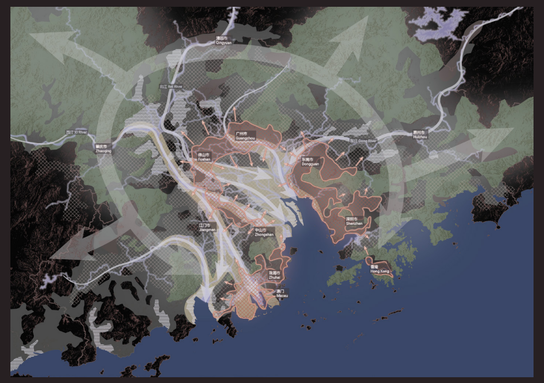

22. Society Quest Map

- Migration inflows
- Urban core areas
- Secondary core areas
- In-between areas
- Major river network

50km

**Challenge**

*How can the development of megaprojects become more adaptive, not just considering economic motives, but also incorporating their impact on the social and water systems to create a more robust morphology of the greater bay area?*



*Considering the strong blue-green structures present in the Pearl River Delta, how can urban heat island effects and flood threats be addressed, and pressure on the sensitive areas of the delta alleviated?*

*In the face of large-scale megaproject development, how can existing populations, as well as arriving migrant workers be included in this environment, and how can more integrated and liveable places be provided for people from different socio-economic conditions?*

**Vision & Strategy**

# 5 Games

*The morphological gameboarding approach was used to understand the challenges facing the GBA and to propose ways of moving forward. Using the morphological shapes of points and strips, two separate gameboarding experiments were launched, the first one using strips focussing on liveability, the second one using points focussing on patterns of development and water-sensitive design.*

# Game 1: Liveability - Game of Life

*Aim of the game*

This game board we used to get a new perspective on the social layer of the GBA, with a particular focus on the Hong Kong-Shenzhen border. Using strips to represent types and intensity of amenities the players tried to make the hexagon patches optimally liveable for the four stakeholders; Children, Young Adults, Adults and Elderly. Each of the stakeholders has a card with the amenities in order of their priority.

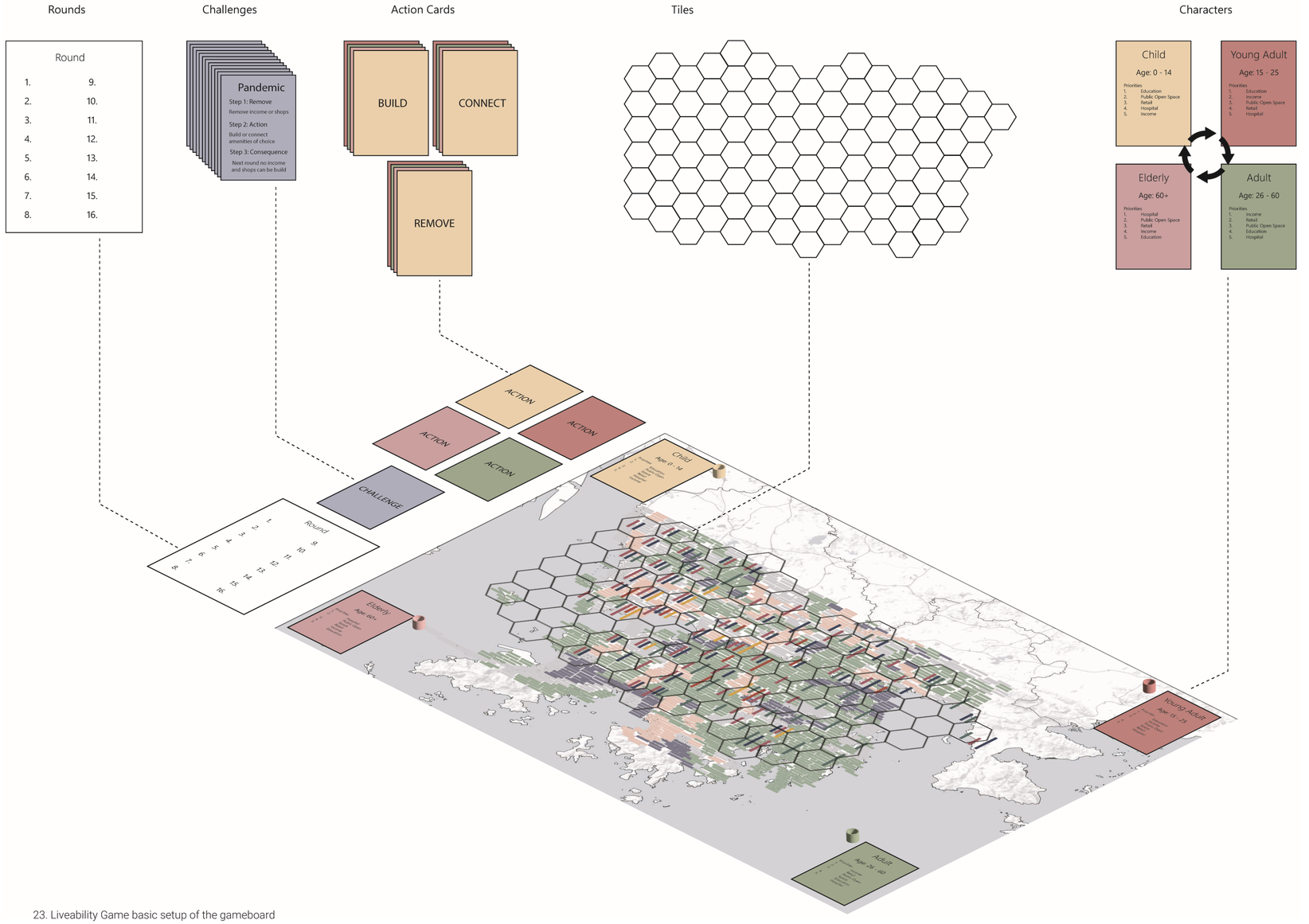
*How to play*

1. During a round a player is allowed to move one tile in any direction and build, connect or remove an amenity on this patch according to the cards they possess.
2. An action card can only be used one time, after playing the player has to take a new card from their stack which can hold any of the actions at random.
3. A player is not allowed to move to a tile they already build on before.
4. Connections cannot be made on the pink parts of the base layer.
5. Every 4 rounds the character cards are moved one player to the right. This player now has to take into account the priorities of their new character.
6. After round 4, 8, 12 and 16 one challenge card is taken and the steps mentioned on the card executed

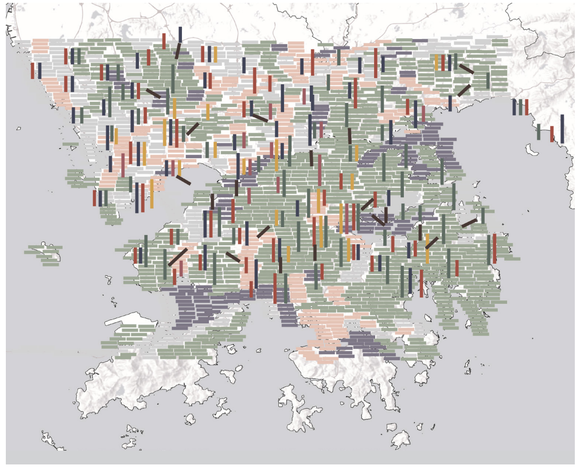
*Goal of the Game*

The goal of the game in general is to Build, Remove, and Connect amenities to make the area as liveable as possible for the different characters.

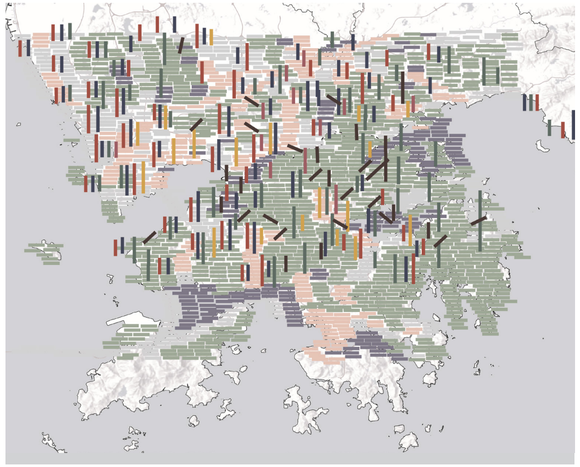
The goal of the game for the project is to recognize the spatial differences of the area's and patches on the map, dissect the reasons why the characters move in the patterns they do, and why they prefer the areas they gravitate for the different starting scenarios.



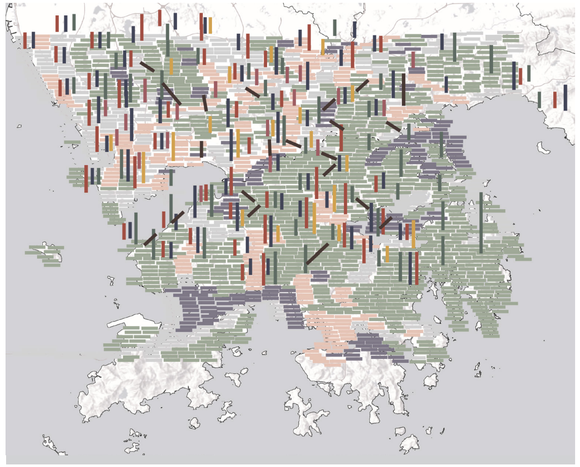

23. Liveability Game basic setup of the gameboard



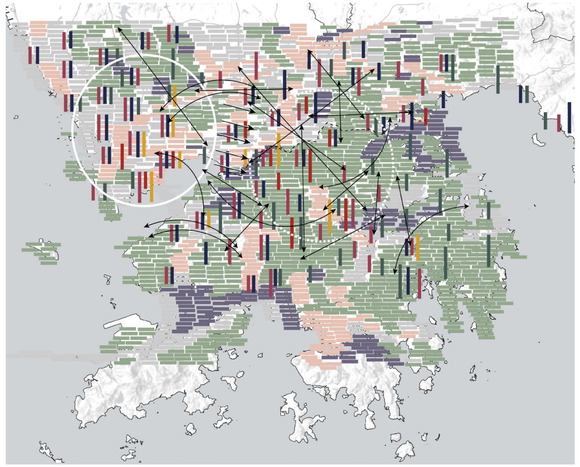
24. Liveability Game: scenario 1



25. Liveability Game scenario 2



26. LIveability Game scenario 3



27. Liveability Game conclusion diagram

# Scenarios

We developed three scenarios that differ in challenges and the starting point of the characters. The game is played on the same gameboard with the same rules to find differences and similarities between the three scenarios.

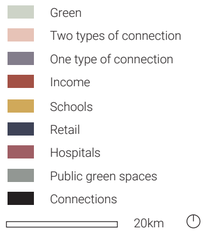
In the first scenario the four characters start at the edges of the gameboard. They have to deal with the challenges of a pandemic, a flooding, an economic crisis and a drought, which impacts their direct surroundings. The result of this scenario is a multifunctional cluster with every amenity in the centre of Shenzhen, and a monofunctional cluster of hospitals going cross-border built by the elderly.

In the second scenario the characters all start at the border between Hong Kong and Shenzhen. This starting point leads to the outcome of many cross-border flows of the characters, together with cross-border connections. In this scenario the characters have the challenges of an earthquake, flooding, mass migration, and pollution. A big education clusters pops up in Shenzhen built by the children and the young adults.

The characters start in the deep-centres of the two cities in the last scenario. One deep-centre in Shenzhen and the other located in Hong Kong, which are based on the existing clusters of amenities. In this scenario the characters deal with aging population, a drought, a flooding, and an earthquake as challenges. The outcome of this scenario results in a need for accessibility at the border between Shenzhen and Hong Kong, where a cluster of connections is formed. The characters also do not cross the border as much as in the first two scenario's, but they rather build connections to their surroundings.

# Conclusions

The game demonstrates that the liveability of an area is influenced by personal characteristics. To make a space as liveable as possible for a diverse range of people, it should offer a wide variety of amenities to cater to different preferences. Challenges were shown to have the greatest impact on areas with a high density of amenities, making these areas the most vulnerable. These challenges can decrease liveability for one group, prompting them to leave, while simultaneously attracting another group to the same area. In all scenarios, the variety of amenities around the border improved, and it became the area with the most added connections, highlighting it as an interesting location to focus on.



# Game 2: Shaping the Delta

*Aim of the game*

Using the morphological form of the dot, we created this gameboard to investigate the patterns of development of urban and ecological structures under the influence of uncertainties. These uncertainties are national policy, water-sensitive design and megaprojects.

*How to play*

The game is played by three players: One controlling development of industrial and housing areas (yellow and red dots, respectively), another controlling green and wetland areas (dark green and light blue), and the third one controlling policy - Five Year Plans. The two developing players aim to achieve a high score, while the policy player aims to keep the scores of the other two in balance.

The development players can earn one point for each dot of their colours added to the board. They can earn bonus points by achieving certain configurations of dots as set out on their points charts. If the other player replaces their coloured dots, or if they are destroyed during uncertainties, points are deducted.

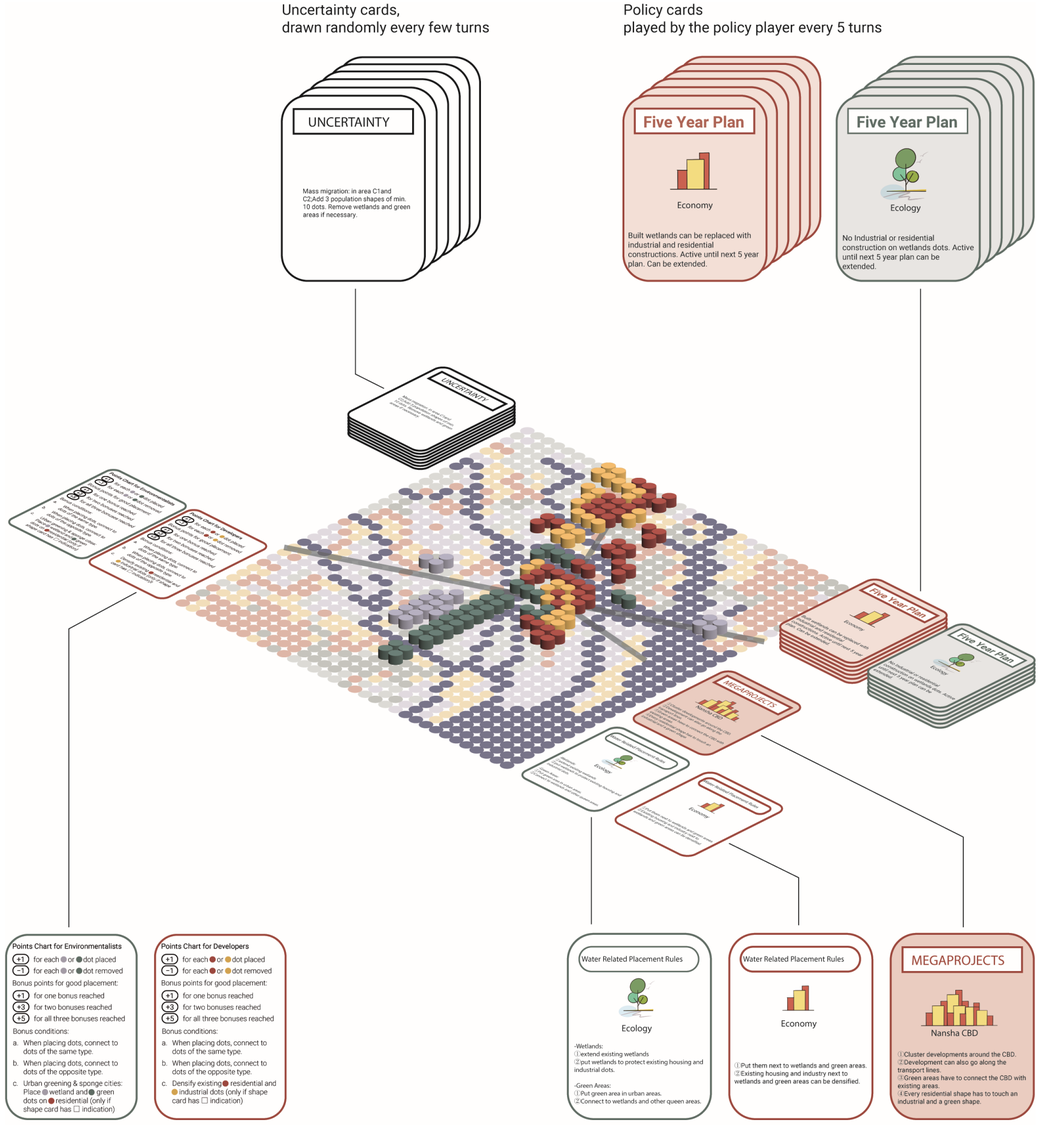
Uncertainty cards randomly appear every few turns. They consist of floodings, droughts, economic crises, mass immigration, or oil spills. They trigger special conditions on the board, which may impact one or both players. These cards symbolize possible events in the GBA and aim to push the players into a more resilient style of play.

Every five years, the policy placer may add one "Five Year Plan"-card. These cards are aimed at helping, or hindering one of the developing players, and introduce new game rules to follow for the next five turns. This simulates the government intervening to achieve certain strategic goals; Here, to balance economic and ecologic growth.

*At the end of the game*

The game is designed to be played for 15 rounds, representing 15 years and 3 Five Year Plans. The outcome of the game is analysed, based on the shift in land use, by counting the changes in the number of dots, the spatial structures that may have developed, and the points growth of each player over time.

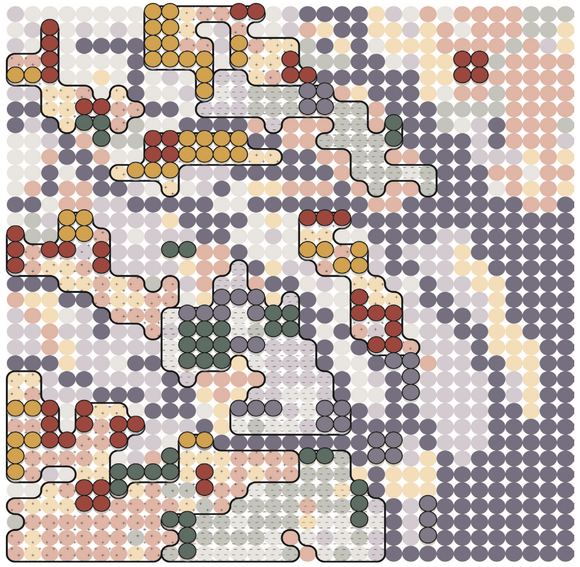




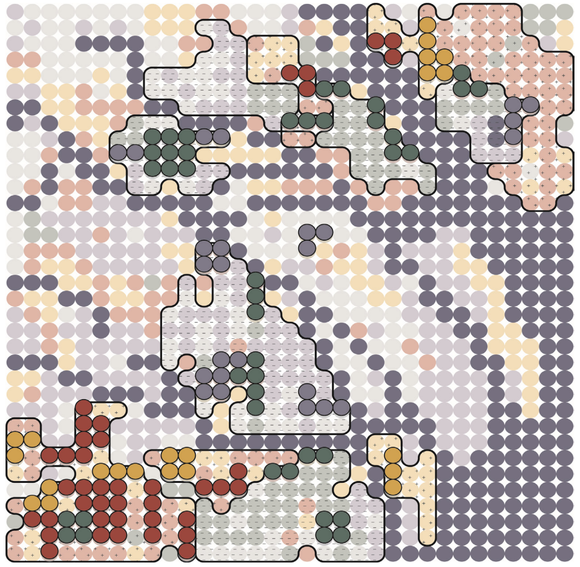

28. Shaping the Delta: basic setup of the gameboard

Points chart for the environmental and developer player, respectably.

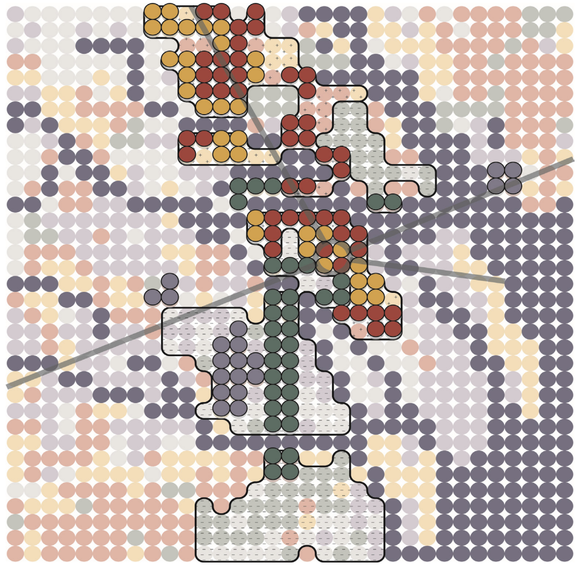
Scenario-related gamerules



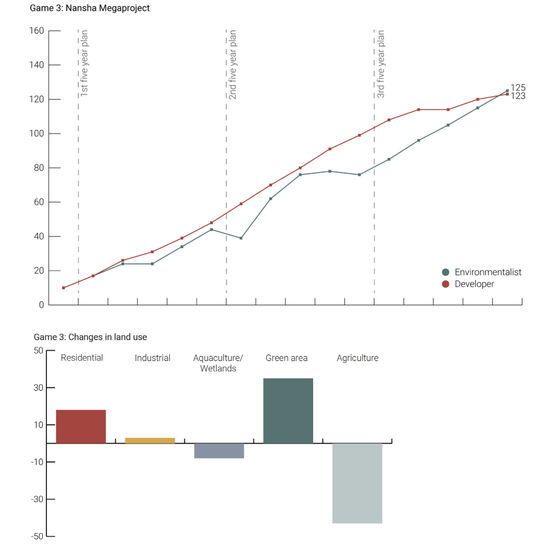
29. Shaping the Delta scenario 1



30. Shaping the Delta scenario 2



31. Shaping the Delta scenario 3




32. Shaping the Delta scenario 3 final points and land use change statistics

# Scenarios

We developed three evolutionary scenarios, each improving the one before it. These scenarios were all played on the same gameboard with the same basic set up, just changed by adding new game rules, in order to simulate certain development logics.

The initial scenario aimed to show the growth of urbanisation, mostly based on agglomeration effects, without specific spatial guidance or ecologic protections. Here, the bonus points, through creating configurations of dots, had a major impact on the outcome on the board. The major shortfall of this scenario was an imbalance in the points growth, with the urbanisation player consistently outpacing the ecology player.

The second scenario aimed to introduce some principles of water-sensitive design. Here, new rules, regarding the placement of residential or industrial dots next to rivers and wetlands, were introduced. The aim of these new rules are modelling synergies between land uses to strengthen flood resilience. The outcome of this game was a balanced points growth, and an overall shift in land use to blue-green uses.

The third scenario is developed to investigate the existing plans of building a megaproject in the gameboard, on the site of the planned Nansha train station. Next to the water-sensitive design rules, the urbanisation player now had to cluster their developments around a pre-defined spot on the map and along infrastructure lines newly introduced to the gameboard. The outcome of this was a strong spatial focus of urbanisation, with the most agriculturally and wetland-relevant areas left untouched. Here too, a balance of points growth was achieved.

Original residential
Original Industrial
Original wetland
Original green area
Original agriculture
New Wetland
New Residential
New Industrial
New Green area
New Agriculture

20km

# Conclusions

On the gameboard, we found that rules of clustering development and creating synergies with water and wetland dots have the strongest impact on the spatial outcome. These two also positively impact the resilience of the development against floods.

Highly relevant for our project is the insight of water-sensitive design being a part of our vision and strategy. Megaprojects may strongly shape the development patterns in the GBA. Achieving a balance in economic and ecologic growth requires strong interventions, which in turn requires a robust planning framework and then also can adapt to meet future uncertainties. Lastly, these uncertainties are highly relevant in the central delta. Water related events affect the area strongly, but also population and economic events need to be considered.

# 6 Vision

*Based on the Challenge and informed with the conclusions of the gameboarding method, we set out this vision for the GBA 2050. There is a spatial vision (map), and a social vision, both of which are the base for the strategic approaches and zoom-in designs to take shape.*

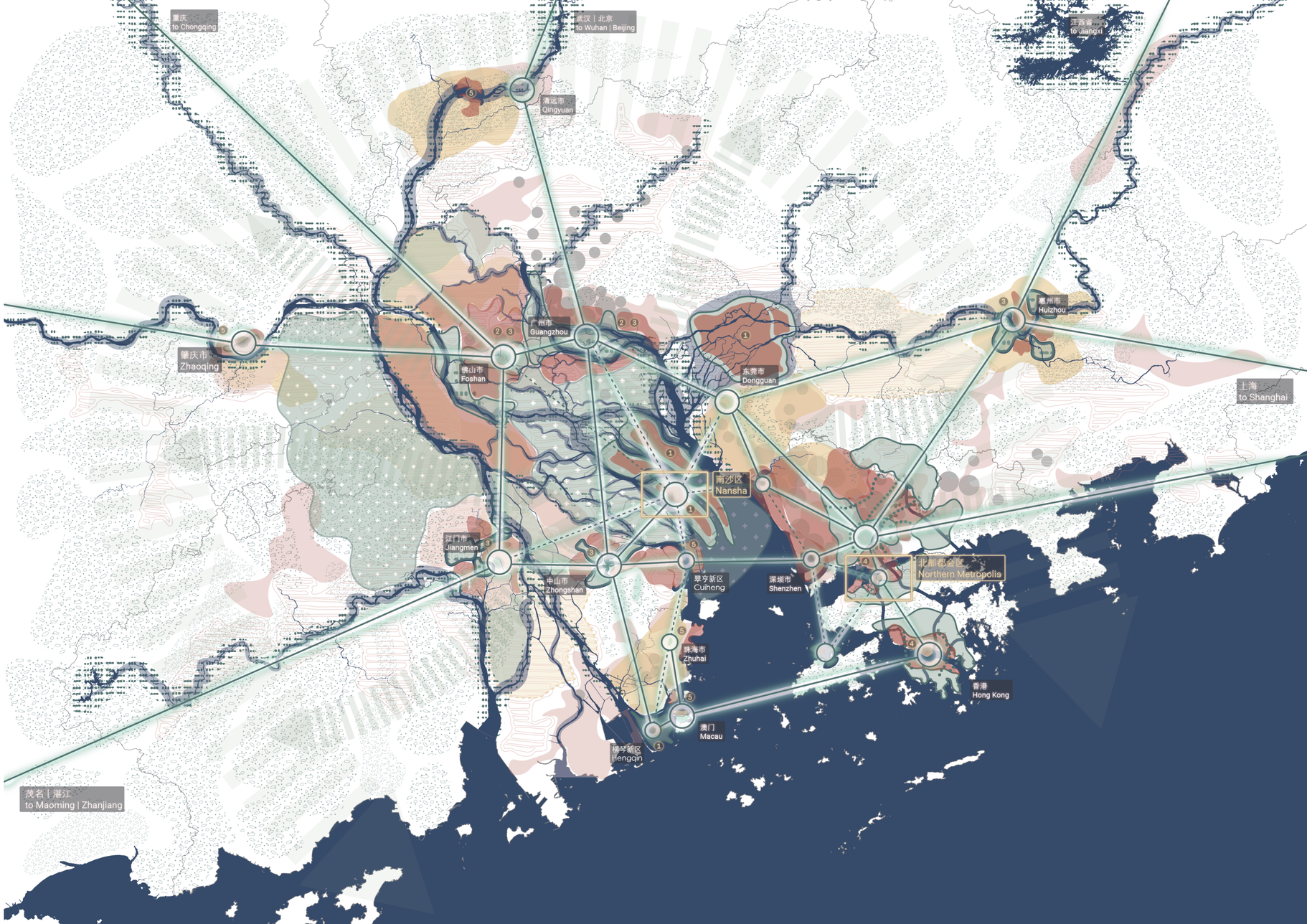
# Spatial Vision

This vision advocates for a shift from economically driven megaprojects to agile, long-term mega-processes that integrate socio-ecological perspectives. Emphasizing human flows and water systems, it aims to enhance liveability and resilience, addressing the needs of a maturing economy and the dynamic Delta water-soil system. The goal is to create sustainable mega-processes that ensure the Pearl River Delta's prosperity for future generations.

To achieve sustainability and resilience, six key principles are applied to existing and future urban cores, balancing built environments, blue-green networks, and infrastructures. These principles are further explained in the next chapter, 7. Strategic Approach. In the vision the principles are applicable in multiple similar conditions in the Greater Bay area (number one to six in map).


With future expansion likely, a gradient of growth zones allows both urban and green areas to expand. This gradient ranges from built-growth zones to semi-built growth zones and ecological-growth zones. Within this approach it is possible to bring the focus, based on future trends like economic growth or migration flows, to the specific subregions of the Greater Bay Area. Especially the "New Nansha district" can be mentioned as one key strategic target point. This new urban core functions as an important transportation node for national and global networks and provides an innovation and technology hub for future industries. It is important to mention, that these new developments will take place in the water sensitive central Delta, which is highly influenced by fluvial and pluvial floodings. Therefore the "around the built approach" provides a more water sensitive urban design approach to be better prepared for future shocks.

The blue network, supported by new green corridors, directs ecological growth towards the heart of the Delta and connects the central environments with the forests in the hinterland. This area focuses on nature restoration strategies to enhance biodiversity and to provide an ecosystem for natural water flows.




33. Spatial Vision

- Water
- Room for the river
- Forest
- Agriculture
- Green corridor and connections
- In-between area
- Centralities
- Connecting infrastructure
- New Connections
- ① Agriculture
- ② Green corridor and connections
- ③ In-between area
- ④ Centralities
- ⑤ Connecting infrastructure
- ⑥ New Connections

25km

# Social Vision

The vision explores a mega-process that establishes a socio-ecological equilibrium, prioritizing healthy living environments by harmonizing human activities with ecologic and economic networks. This vision aims to improve the living conditions in the GBA, and better accessibility for all community members, including children and the elderly, migrant workers, fishers and farmers, locals, foreign professionals, and tourists. Better accessibility leads to more liveable environments, making the surroundings more attractive for everyone. The social layer of the vision outlines the needs and wishes of the different social actors, and focusses on the improvement of their amenities in the region. Balancing human flows with natural ecosystems, fosters vibrant, well-connected communities that thrive within a regional network. Connectivity defines attractability, and by enhancing it, the liveability of the delta will improve. The mega-process supports economic growth, while nurturing social well-being and environmental resilience.

# 7 Strategic Approach

*To be able to follow the vision to arrive at a design proposal, the main tools used in the design are elaborated. Spatial patterns inform the strategic approach on the GBA-scale. The systemic section highlights interrelationships between human, blue-green systems, and spatial elements in the landscape. The latter are catalogued into an overview of design elements used in the design process. Lastly, the megaprocess is elaborated.*

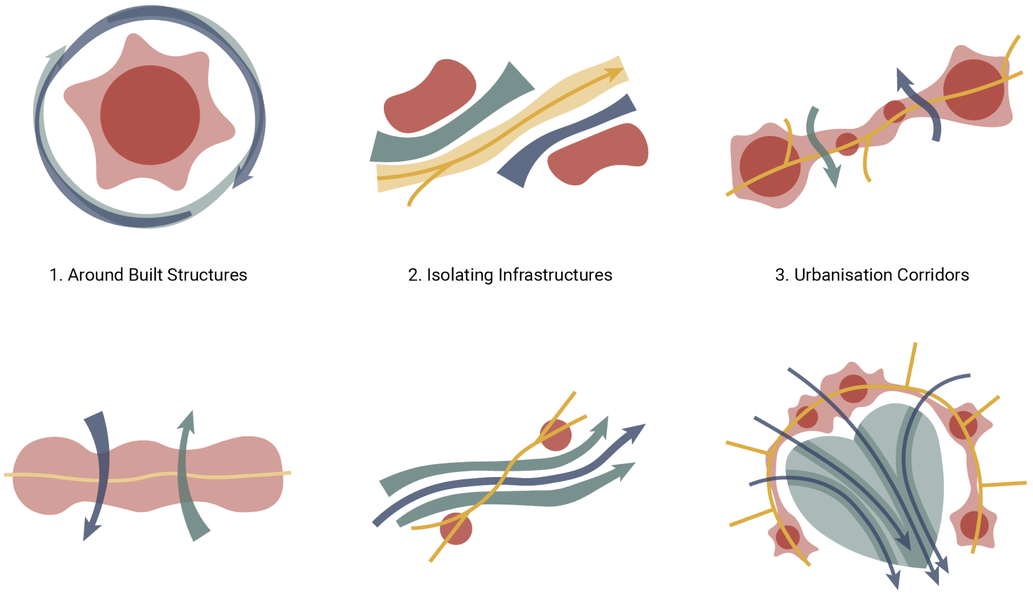
# Spatial Patterns

In the strategy, six principles are applied on the scale of the Greater Bay Area. The design principles are explored further in the zoom in areas, where the strategic principles of the larger scale are translated into design elements on a smaller scale.

The strategic principles are implemented to initiate the transformation of megaprojects to mega-processes, with a strong focus on the water and social perspective. The principles are applied at the existing and future planned cores of the region. Each principle is defined by specific local conditions, and is proposed for the core that has similar local conditions. The principles envision a network with four main perspectives, the built (red), infrastructure (yellow), the blue, and the green.

The following spatial patterns are used as guiding principles for development on the GBA scale:

1. Around Built Structures: Using green belts to protect the landscape and to provide access to green areas for residents.
2. Isolating Infrastructure: Using grey infrastructure as blue-green corridors to improve ecological connections between different systems.
3. Urbanisation Corridors: Instead of dispersed urbanisation, focusing it within certain corridors.
4. Green Bridges: Intersecting blue-green structures through the city to create ecological connections along parks and rivers.
5. Along the Water: Creating room for the river by adding green structures and using the rivers to align infrastructure developments.
6. Blue-Green Heart: Creating large-scale ecological areas in the central delta, and between Hong Kong and Shenzhen.



1. Around Built Structures
2. Isolating Infrastructures
3. Urbanisation Corridors
4. Green Bridges
5. Along the Water
6. Blue-Green Heart

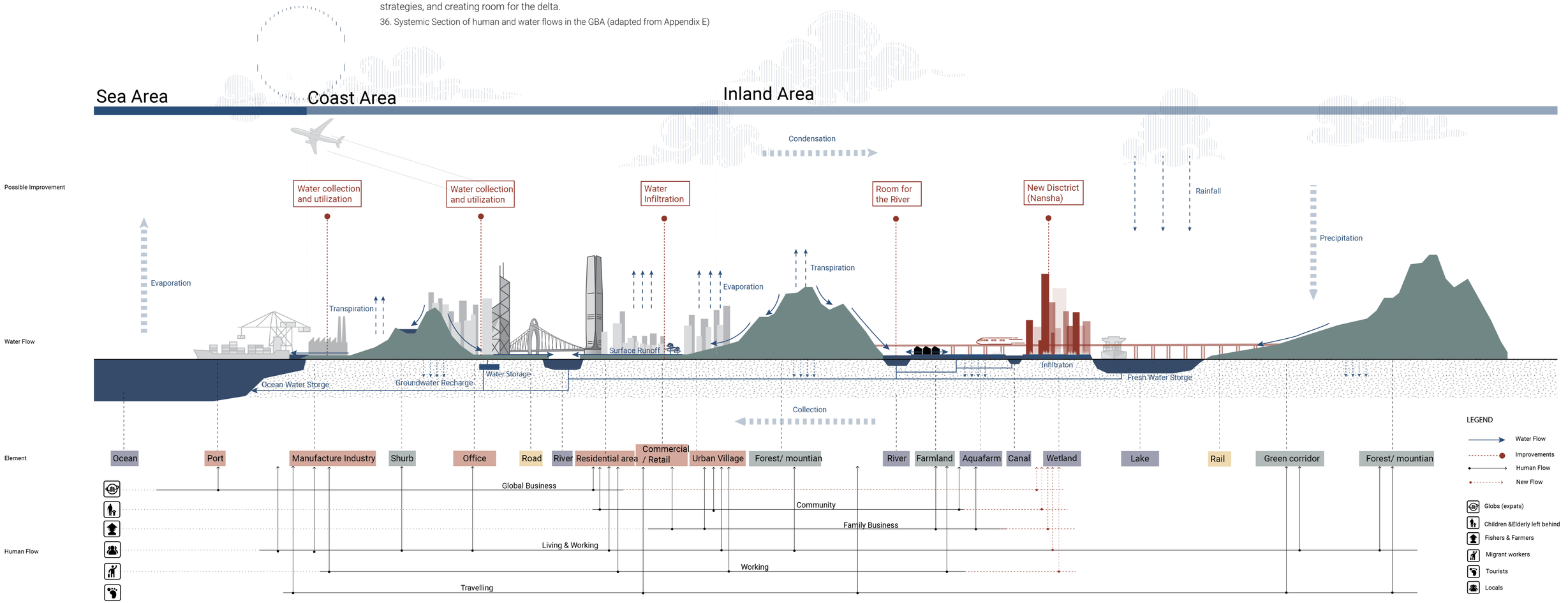
35. Spatial patterns applied on the GBA-scale

# Systemic Section

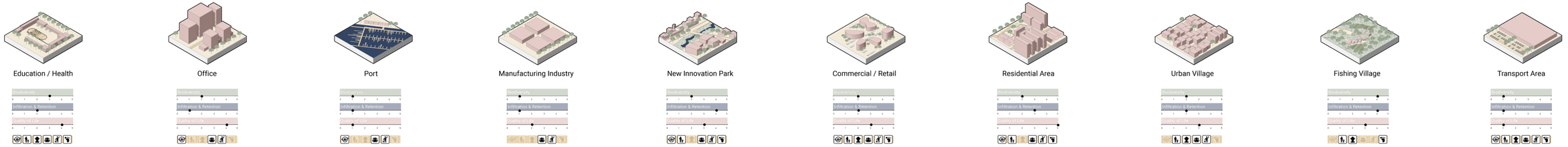
The section provides a comprehensive overview of the Greater Bay Area, categorizing its land and water usage into three primary zones: Sea Area, Coast Area, and Inland Area. It illustrates the integration of built-up areas, water bodies, natural and green spaces, and transportation infrastructure, showcasing water and human flow, along with future possibilities involving the hinterland.

The diagram depicts water movement through evaporation, transpiration, surface runoff, groundwater recharge, and collection. Human flow is illustrated through various activities such as global business, living and working, traveling, and community engagement. Specific user groups include expatriates, children and the elderly, fishers and farmers, migrant workers, tourists, and locals. Highlighted areas indicate potential improvements and new district developments, such as water collection and utilisation strategies, and creating room for the delta.

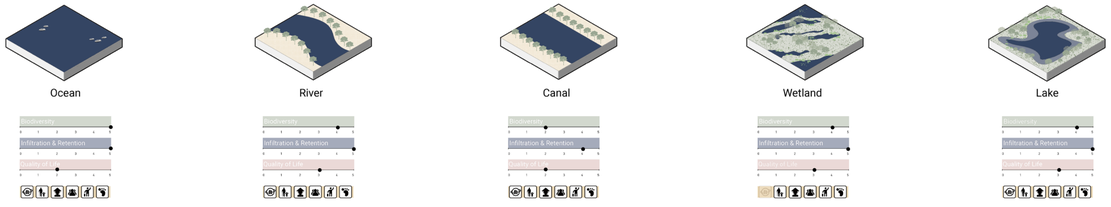
36. Systemic Section of human and water flows in the GBA (adapted from Appendix E)



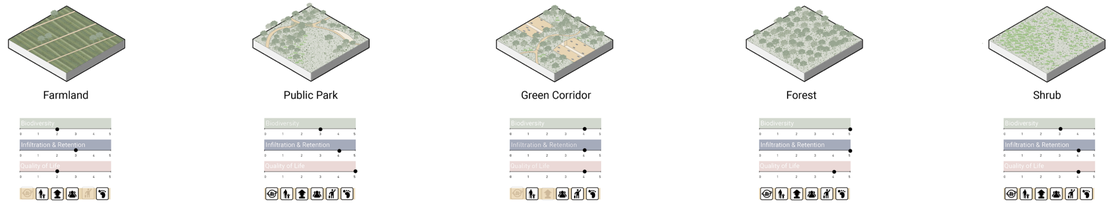
Built-Up Elements



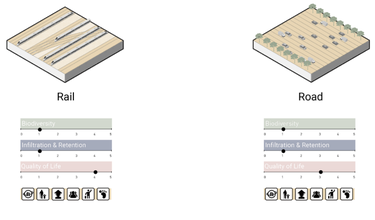

Water Elements




Green Elements




Transportation Elements




37. Catalog of elements with blue-green and social resilience, and identified user groups operationalised.

# Designing with Elements

We have summarized and categorized the most important and common design elements in the Greater Bay Area into four categories: Built Up Areas, Water Bodies, Natural and Green Spaces, and Transportation Infrastructure. Under each category, we have illustrated different axonometric diagrams to depict their functions spatial forms and the group of actors they involve.Built Up Areas.

- Education/Health: Facilities dedicated to education and healthcare services.
- Office: Spaces for corporate and administrative activities.
- Port: Infrastructure supporting maritime activities and logistics.
- Manufacturing Industry: Areas designated for industrial production and manufacturing ·processes.
- New Innovation Park: Zones focusing on technological advancements and innovation.
- Commercial/Retail: Areas for shopping, dining, and commercial businesses.
- Residential Area: Housing zones for the community.
- Urban Village: Mixed-use areas combining residential, commercial, and cultural spaces.
- Fishing Village: Communities centred around fishing activities.
- Transport Area: Zones facilitating transportation and logistics.

*Water Bodies*

- Ocean: Large marine bodies contributing to biodiversity and climate regulation.
- River: Freshwater ecosystems supporting diverse wildlife and human needs.
- Canal: Man-made waterways facilitating transportation and irrigation.
- Wetland: Critical habitats for wildlife and natural water filtration systems.
- Lake: Inland bodies of water important for ecology and recreation.
- Aquafarm: Areas dedicated to aquaculture for fish and seafood production, and rice cultivation.

*Natural and Green Spaces*

- Farmland: Agricultural areas for crop cultivation and livestock.
- Public Park: Recreational spaces for community activities and nature enjoyment.
- Green Corridor: Natural pathways connecting various green spaces and promoting biodiversity.
- Forest: Dense wooded areas providing habitat, carbon sequestration, and recreation.
- Shrub: Areas covered with shrubbery, supporting various species and preventing soil erosion.

*Transportation Infrastructure*

- Rail: Rail networks facilitating long-distance and urban commuting.
- Road: Road networks supporting vehicular movement and transportation.

Each element is evaluated and scored based on three key aspects: biodiversity, water infiltration and retention, and quality of life. Additionally, we have identified the user groups for each of these elements. This detailed representation provides a comprehensive overview of each land use type's role and significance in urban and natural landscapes, assisting urban planners, environmentalists, and policymakers in making informed decisions regarding land use and infrastructure development.

After organising and evaluating the elements, we can more intuitively observe their spatial forms and the actors involved. The next crucial step is to combine these elements within different configurations, which is the inspiration provided by "The Elemental Metropolis" (Zhang, 2023). By analysing the arrangement of these elements, we assess the current conditions of the site and create new types of spaces by combining these elements. This includes, but is not limited to, changing spaces or integrating functions of certain areas. Through the combination and re-creation of these elements, we can provide possibilities for new regions while still being able to conduct detailed evaluations of aspects such as quality of life, water resilience, and biodiversity.

# Mega-process

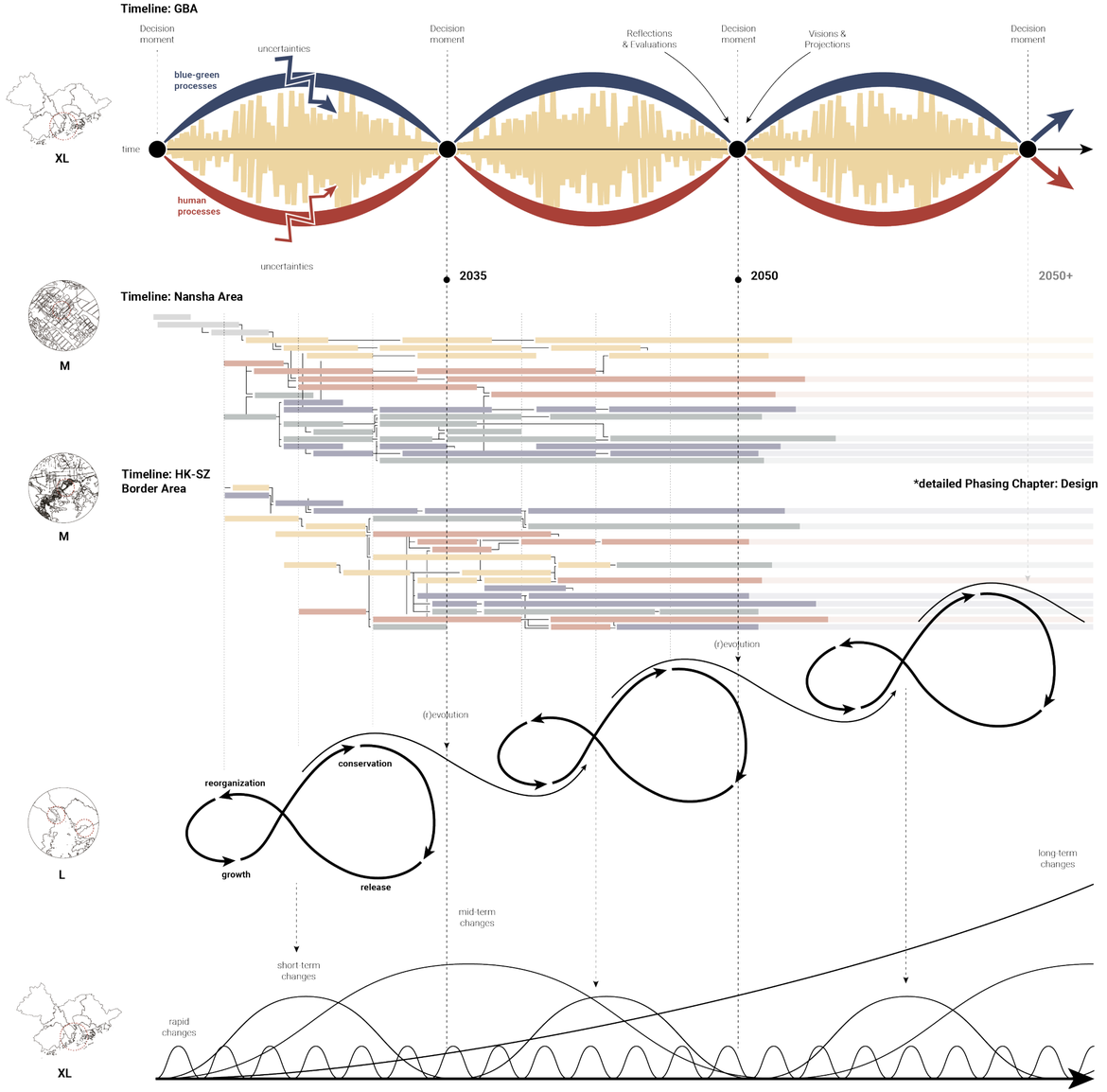
The term mega-process is a combination of two concepts we see as central for more resilience in the GBA: Firstly referring to the standard process of development, the mega-process acknowledges that one such development process is never detached from others, bundling multiple processes into a mega-process. At the same time it is also a reference to the term megaproject, proposing a related, but different view onto megaproject development, similarly bundling multiple processes explicitly across time-scales into one collective viewpoint.

Our proposed mega-process involves the water and human perspectives as laid out in the conceptual framework. Through the circular action of opening and closing, there is a space for discussion, deliberation and creation, and there is a moment of decision and moving forward. In the opening phase there is also agility to incorporate uncertainties and shocks, which in the phase of closing can inform the decision through reflection and evaluations, but also through visions and projections.

As compared to the following detail design investigations, the mega-process is a bundling of the individual processes which make up the transformation of a place. The timelines in the graphic represent this relationship, and also caution against a simplistic reading of the mega-process diagram: In reality it is a complex overlay of many different processes happening in different paces and on different scales.

The mega-process is explicitly linked to panarchy theory of resilience (Garmestani et al. 2009), especially the four-phase adaptive cycle (Simmie & Martin 2010). In this theory, the resilience of a system is on a cyclical path of growth, conservation, release, and reorganisation. Through evolutionary changes this cycle is adapted to (ideally) a level of higher resilience. This change is decided in the closing phase of the mega-process.

Another viewpoint incorporated is the Pulse of the Greater Bay Area, an Idea adapted from Urhahn (n.d.). Activities in the GBA are a layering of very short-term processes like individual day cycles, medium-term processes like the changing of the seasons, and long-term processes like advancing global warming and its local impacts. With this last point, it is clear that uncertainties can also be thought of in this viewpoint, with global warming being a gradual uncertainty, while a flooding event being more of a rapid change, a sudden shock.




38. The megaprocess visualised and set into context with implementation steps, panarchy and rythms of life (adapted from Garmestani et al 2009, Urhahn n.d.)

# 8 Zoom-In Design

*To specify the illustrated vision and propose strategic actions, zoom-ins into two strategically important and critical sites within a design process are explored: The border region between Hong Kong and Shenzhen, and the Nansha hub area in Guanzhou city.*

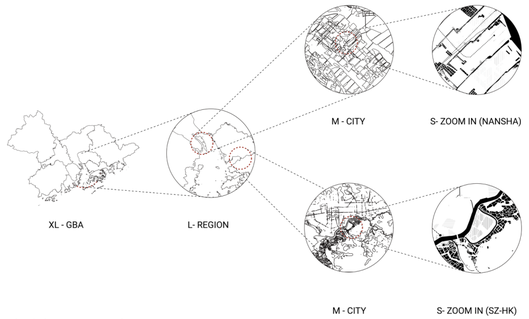
# Introduction - Through the Scales

In the Greater Bay Area, we examine possibilities across four primary scales. Our analysis focuses on areas closely linked to water bodies and mega projects, zooming in on the Pearl River Delta estuary. Subsequently, we identify two key areas: the Nansha District in Guangzhou and the Hong Kong-Shenzhen border. Finally, we zoom in further to the mega projects within these areas, specifically the Nansha transport hub and the new innovation park at the Lok Ma Chao Loop.

The Hong Kong - Shenzhen site is important because by 2047 this border will no longer exist. The 'One Country Two Systems' policy will also transform into one combined system (Bolchover & Hasdell, 2016). Within this border region is the Lok Ma Chau Loop, a very critical area in terms of land ownership but also ecologically as it includes a network of wetlands and floodplains. As the Shenzhen river's course was altered and straightened, and the Lok Ma Chao area went from being under Shenzhen's administrative control to Hong Kong's (Bolchover & Hasdell, 2016). Thus the Hong Kong government's 2030+ strategy plan involves building the Hong Kong-Shenzhen Innovation and Technology Park ("Hong Kong 2030+," 2018), which is meant to act as a bridge between the two areas. This project aims to take forward the idea of a science park but revisit its spatial language into a more compact, lifted development that gives room to the river and its wetlands. The existing wetlands are expanded and integrated with the innovation park to create a more inclusive connection between Hong Kong and Shenzhen. Ecological aspects are central to the design, ensuring that development does not lead to environmental degradation. The wetlands are envisioned as vital urban components, providing valuable eco-system services and recreational opportunities that enhance residents' and visitors' quality of life.

The Nansha District, part of Guangzhou city, is the second area of focus with an emphasis on the proposed future Nansha transport hub. Since this station is meant to become a major node in the transport network between Guangzhou, Macao and Hong Kong ("Think GBA, Think Nansha," 2022), a new method of flexible planning is proposed that accommodates the river and its flows, while also adapting to the existing context of fishing villages. Design considerations include mitigating potential disruptions to local communities and preserving cultural and economic activities. The integration emphasizes sustainability and resilience, enhancing connectivity while respecting Nansha's historical and ecological context.

Addressing the unique scales and contexts of the Nansha and HK-SZ border sites demonstrates a nuanced approach to urban development. It integrates large-scale infrastructure with local environmental and social contexts, ensuring sustainable and inclusive growth. This dual focus on mega-structure accommodation and ecological preservation highlights innovative urban solutions that balance development with conservation. Through these very different locations, the idea of making adaptive and flexible structures is explored so that they become part of larger mega-processes.




39. (right) Overview of Zoom-in areas




Nansha
Area




Hong Kong-Shenzhen
Border

# Hong Kong-Shenzhen Border

The Hong Kong-Shenzhen border is defined by the Shenzhen River that flows between Shenzhen's high-density megaproject developments and Hong Kong's Northern territory, which includes fishponds, villages, and industrial areas. The blue structure is clear from the wetlands to the Shenzhen reservoir as an ecological corridor.

Border control points necessitate substantial infrastructure for trains and cars, facilitating the frequent daily movement of people between the two cities for commercial, educational, and other purposes. The Mai Po wetlands in the south-west play a crucial role in regulating the river's flow. In 2017, the Lok Ma Chau Loop became part of Hong Kong after the river's course was altered. The current government proposal aims to create a programmatic link between Hong Kong and Shenzhen (Bolchover & Hasdell, 2016). This includes developing a public/private research and development park and a university that integrates with the existing infrastructure (Bolchover & Hasdell, 2016).

However, this wetland park is also a vital corridor for birds (Territorial Spatial Planning of Guangdong Province 2020-2035, 2019). The proposed dense development of the innovation park could adversely affect biodiversity by obstructing bird routes. Since Shenzhen was also a fishing village before its rapid development, our proposal introduces new wetlands on the Shenzhen side to restore the historical landscape. Given that water flows from Shenzhen into the river at the border, including contributions from the Shenzhen reservoir, it is essential to allow more room for the river, especially during floods. By enhancing water retention capabilities for both floods and droughts, the wetlands' role can be preserved while the proposed innovation park can be designed as a raised structure with a minimal footprint.


42. Hong Kong Shenzhen border

- Water
- FIshponds
- Build
- Agreen
- Important Train connection
- Existing bird corridor
- Floodplain
- Border crossing

0,5km

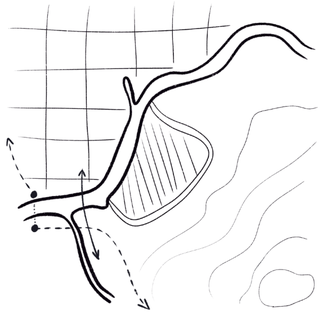
40. (previous page, left) fishponds in the Nansha District (own work)
41. (previous page, right) fishponds in Hong Kong, Shenzhen in the back (own work)

# Design Exercise

To provide a higher variety in the design, we used the method of a design sprint for both sites. Based on our analyses, three group members worked individually on three different designs. In the end, we discussed in a round table situation all designs and negotiated the most important elements, to morph it than in one final design.

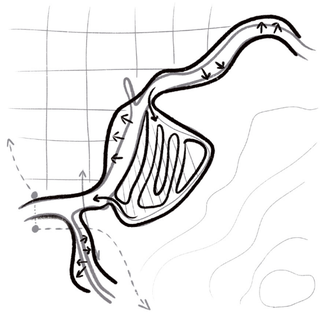
In the Hong Kong - Shenzhen case, the focus on and around the new innovation park, and how the two countries can be better connected after 2047, was present. While Jakob focused more on the morphology of the river and the island of the innovation park itself, Jean and Yuhong focused more on the interconnection between ecological environments between both sides of the river to generate a green-blue system.

43. (below) four design sketches in the Hong Kong-Shenzhen Area (based on Appendix A)
44. (right) Satelite view of Lok Ma Chao Loop



**Status Quo**

**Jakob**



**Scetch 1**

**“Floating Island”**

**Jean**

**Scetch 2**

**“Green Connectors”**

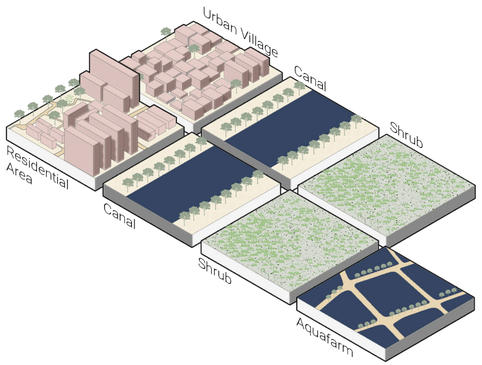
**Yuhong**

**Scetch 3**

**“Green Bridges”**

# Current

The Lok Ma Chau site lies between two starkly contrasting landscapes: the densely built high rises that now define Shenzhen's skyline and a network of Hong Kong's wetlands interspersed with fishing villages and industrial areas. These existing elements will be reconfigured to show greater integration between the two boundaries. Our goal is to expand this wetland area on the Shenzhen side, creating more room for the river while preserving the existing ecological corridor for birds. We believe that the border between Shenzhen and Hong Kong will be unnecessary after 2047. The border control areas will then transform into recreational public spaces that also allow space for the water. The fishing villages in this area are also an important part of its culture and identity, and by expanding and integrating them further with different elements, we want to retain local values.




45. Hong Kong Shenzhen border current state

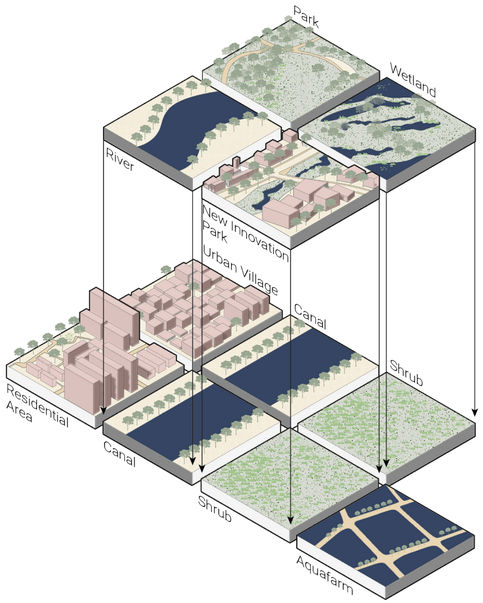
- River
- Canals
- Wetlands
- Aquafarms
- Lakes/Ponds
- Farmland
- Shrubs
- Public Parks
- Manufacturing Industry
- Commercial and Office
- Residential
- Urban Village
- Fishing Village
- Education and Health
- Transport Area
- Road
- Rail
- Green corridor

0,5km

# 2050 Design

Rather than the proposed dense urban innovation park, we envision an integrated mix of fishing villages with educational and health facilities and an innovation park. By combining these with elements of public parks and wetlands, we aim to create a new configuration that brings diverse people together and fosters a more inclusive environment.

Consequently, the border control areas, which currently occupy a significant portion of the land, will become into seasonal floodplains, connecting and expanding the green areas from Hong Kong into Shenzhen. Shenzhen will also see the addition of more green corridors adjacent to existing residential areas, providing locals with access to public spaces, parks, and other essential amenities. There is also more room given to the river by making it wider with more gradually sloped riverbanks, and by fragmenting the Lok Ma Chao area into wetlands and fishponds. This transformation will result in a more diverse waterfront for both Hong Kong and Shenzhen, featuring seasonal floodplains that also serve as public parks.




46. Hong Kong Shenzhen border 2050 design proposal

- River
- Canals
- Wetlands
- Aquafarms
- Lakes/Ponds
- Farmland
- Shrubs
- Public Parks
- Manufacturing Industry
- Commercial and Office
- Residential
- Urban Village
- Fishing Village
- Education and Health
- Transport Area
- Road
- Rail
- Green corridor

0,5km

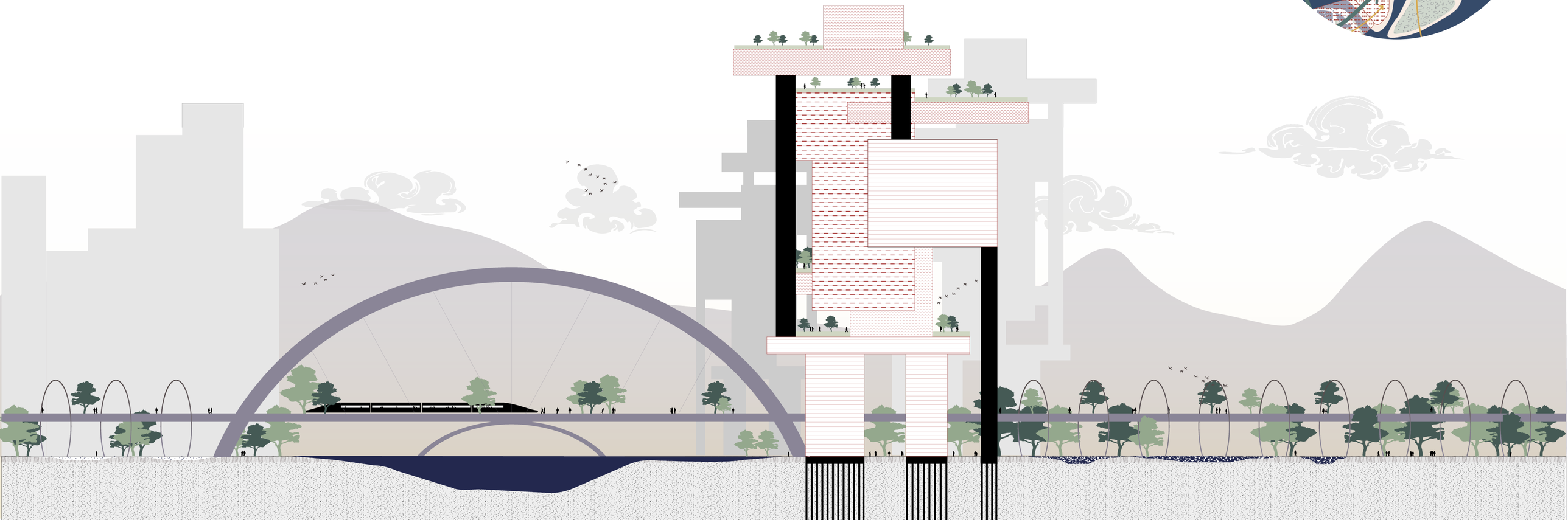
# Detail Section

The section cuts through the Shenzhen waterfront and Lok Ma Chao innovation park. The Shenzhen Hong-Kong bridge can be seen expanding into a green corridor, while the innovation park is a more compact, multi-functional space above the porous landscape of wetlands and public parks. The riverbed has a more gradual slope that accommodates fluctuations of the water level. Additional wetlands help with water retention and the lifted structure of the innovation park allows for more recreational spaces along the river.To ensure this mega-process actually will be built as a process which is adaptable instead of a project, this phasing diagram

47. Hong Kong-Shenzhen Border detail section

- River
- Canals
- Wetlands
- Aquafarms
- Lakes/Ponds
- Organic topsoil
- Alluvial deposit
- Public Parks
- Manufacturing Industry
- Commercial and Office
- Residential
- Urban Village
- Fishing Village
- Education and Health
- Transport Area
- Road
- Rail

50m



# Human Scale

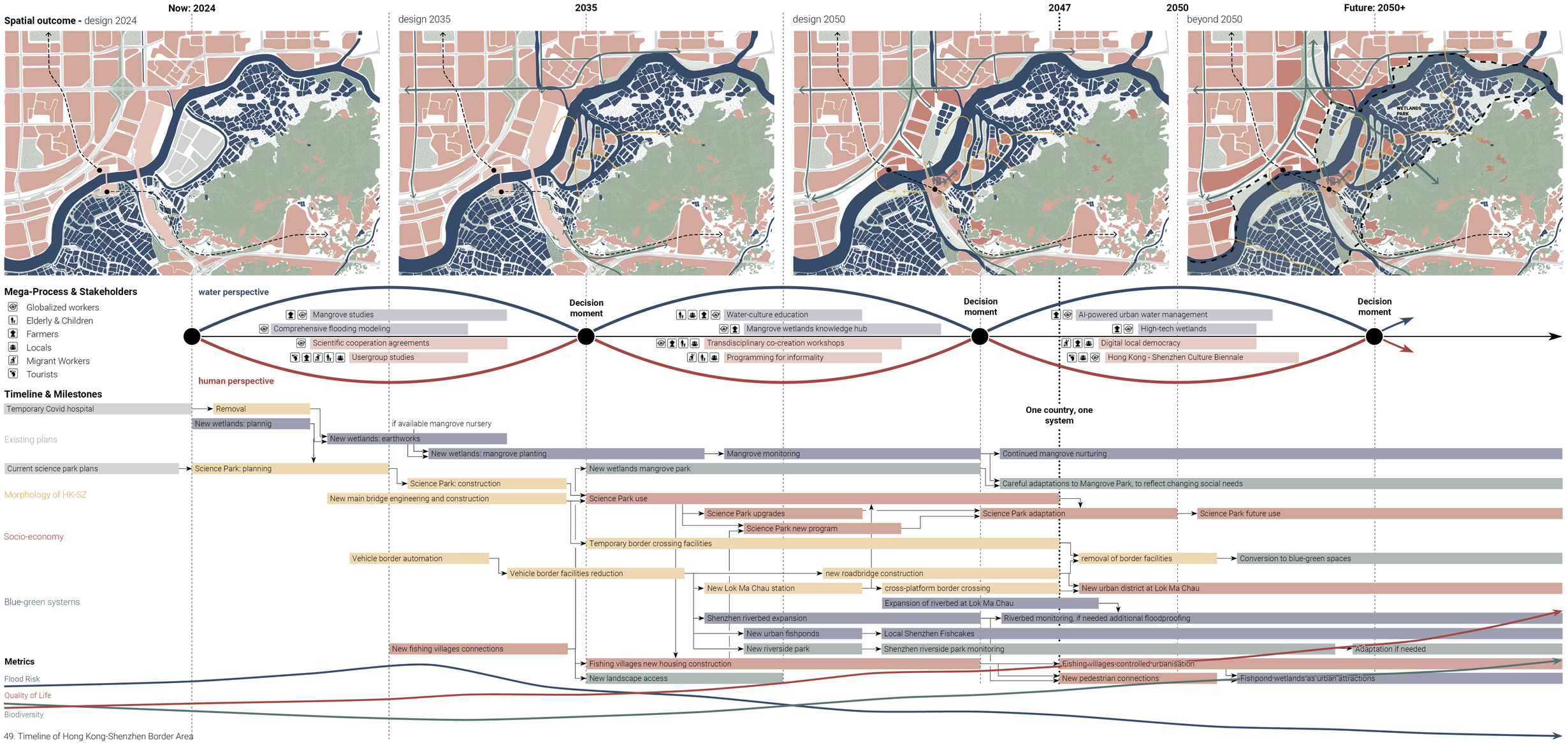
48. Collage of the future innovation park in the Lok Ma Chao loop

"The former border is no longer there, making travel between Hong Kong and Shenzhen much more convenient! This is exactly what I was hoping for."

"The new waterfront wetland park is very interesting. It can store water during floods! It's ecological and beautiful."

"Have you heard? Urban fish ponds have become quite popular recently. We can even participate in making fish cakes there!"

"I never thought I would fall in love with a science and innovation park like this. It is livable and water resilient, making it a great place to live and work. We can also come up with joint proposals to make it even better."




49. Timeline of Hong Kong-Shenzhen Border Area

# Nansha Area

Nansha, an administrative district in Guangzhou, hosts the significant Nansha Port, designed to attract foreign investment. Nansha aims to rival Hong Kong by establishing a major technology innovation platform and fostering high-tech industries (HKTDC Research, n.d.). To support this, the proposed Nansha Station will serve as the central transport hub for the Guangdong-Hong Kong-Macao Greater Bay Area. Several megaprojects for this site are shown, including a Nansha Station hub area adjacent to the existing automobile manufacturing industry, surrounded by various science and technology parks. The government's proposal envisions Nansha as a densely developed district like the Shenzhen Special Economic Zone area. Their proposal retains the coastal wetlands in the south but does not consider that Nansha is one of the most flood prone areas of Guangzhou.

The site's periphery contains crucial wetlands and fishponds which help in flood mitigation. Given this, we examine how to propose new developments and megaprojects while expanding existing wetlands. Our goal is to enhance Nansha's resilience to floods and droughts and improve the liveability of this agricultural and industrial area by ensuring all necessary amenities are accessible.


50. Nansha Area

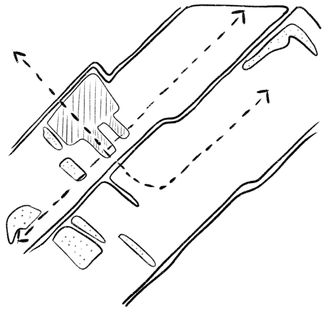
- Water
- FIshponds
- Build
- Agreen
- Important Train connection
- Existing bird corridor
- Floodplain
- Border crossing

0,5km

# Design Exercise

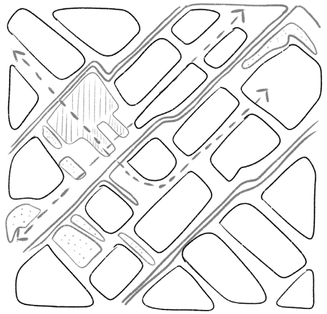
We applied in the Nansha case the same approach by using design sprints to develop our combined design. The Nansha Design case followed a different principle, due to the fact that most of the planned development is still not developed at the moment. Therefore, the experimentation of a new organisation of the space was more flexible. While Feline focused on the development of built innovation clusters, Mahaa reconfigured the edge of the river to a more fragmented one. Jan focused on a strong spine structure, where the future development can align next to it and develop in a more flexible and adaptable way.

51. (below) four design sketches in the Nansha Area (based on Appendix A)
52. (right) Satelite view of the site of the future Nansha Mobility Hub



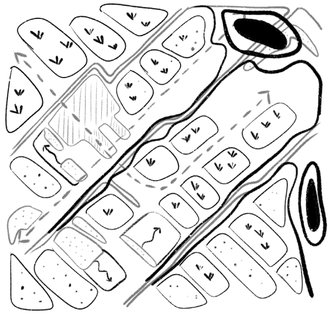
**Status Quo**

*Feline*



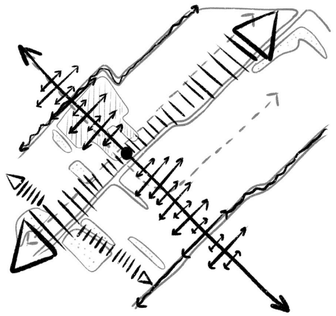
**Scetch 1**
**“Focus Built”**

*Mahaa*



**Scetch 2**
**“Focus Ecology”**

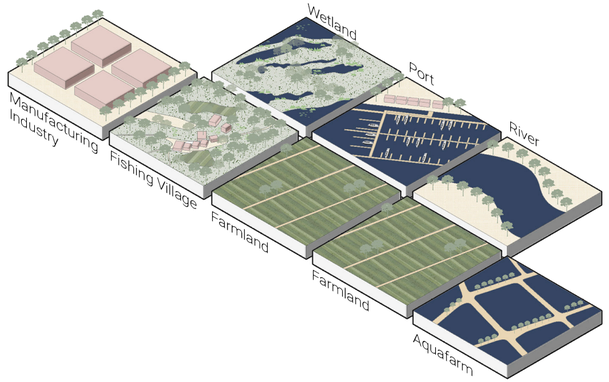
*Jan*



**Scetch 3**
**“Focus along the Spine”**

# Current

The Greater Bay Area's core cities, including Hong Kong, Shenzhen, and Guangzhou, are interconnected by extensive infrastructure, forming a ring around the Delta. Future developments will create a new inner ring of districts, like Nansha, connected to major cities and the entire country through new railway lines. Nansha transport hub area is thus proposed to link the Nansha Port Railway, Shenzhen-Maoming Railway and the Guangzhou-Zhongshan-Zhuhai-Macao High-Speed Railway (Nansha Station Architectural Concept Plan, n.d.-b). Being one of the newer areas undergoing major development, Nansha currently consists of elements such as manufacturing industries, fishing villages, farmland and construction sites. Since this region is almost entirely made through controlled sedimentation of the delta, our proposal aims to fragment the periphery next to the river to create more wetlands and mangrove forests. This new, softer edge is meant to help mitigate floods while also creating more space for recreation for the residents. The train station also remains but is more compact and raised above the ground to allow the continuity of the green-blue networks underneath. We believe that development is essential for income and housing but want to propose a more controlled structure for it.




53. Nansha area current state

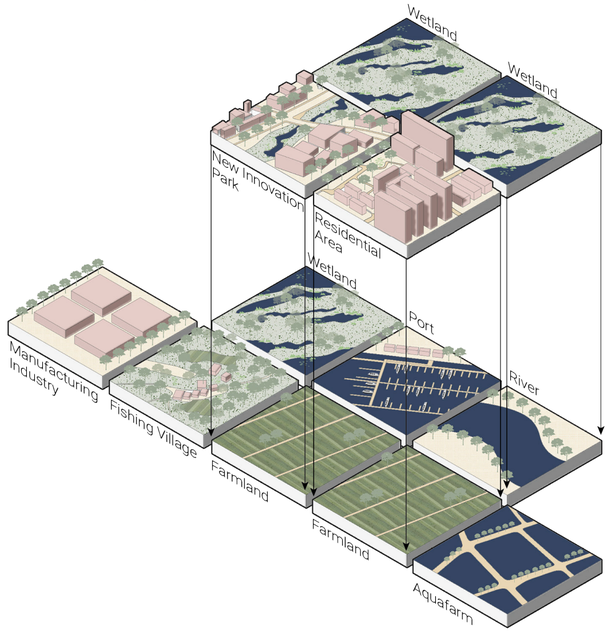
- River
- Canals
- Wetlands
- Aquafarms
- Lakes/Ponds
- Farmland
- Shrubs
- Public Parks
- Manufacturing Industry
- Commercial and Office
- Residential
- Urban Village
- Fishing Village
- Education and Health
- Transport Area
- Road
- Rail
- Green corridor

0,5km

# 2050 Design

Zooming in on the future Nansha railway station site, we propose a departure from the typical master plan. Instead, we envision an organisational structure that supports future expansion and adaptation. The station will be a floating structure above the existing landscape, with a green spine along the main longitudinal axis serving as the central connector between built functions. These functions cluster around the spine to minimize their footprint, leaving peripheral areas available for wetland expansion into a network of mangrove forests, aiding flood mitigation. There is a gradation of denser green-blue spaces from the river inward to the green spine, albeit built functions move outward, creating a more integrated structure. Smaller parks and green spaces around the built areas connect to the spine, while wider canals and an increased number of fishponds and lakes, help with water retention during both flood and drought seasons. The vehicular bridge in the Northeast will be transformed into a green bridge with an integrated public park.

A key aim of this proposal is to preserve important cultural elements, such as the fishing villages and the authentic structure of the land. The scale of the megaprojects is reduced to a human level through these villages, which are buffered by public parks and green belts to enhance their surroundings. Clusters of built areas along the spine will include essential amenities like hospitals, educational institutes, commercial and office buildings, and recreational areas to improve residents' quality of life. By integrating the built and the green-blue networks through a densely built spine and a natural mangrove coastline, the area in between becomes a buffer that is also a seasonal floodplain. The comparison of existing elements with the proposed reconfiguration shows how the river is prioritized, integrating the built environment with the site's existing green-blue structure.




54. Nansha area 2050 design proposal

- River
- Canals
- Wetlands
- Aquafarms
- Lakes/Ponds
- Farmland
- Shrubs
- Public Parks
- Manufacturing Industry
- Commercial and Office
- Residential
- Urban Village
- Fishing Village
- Education and Health
- Transport Area
- Road
- Rail
- Green corridor

0,5km

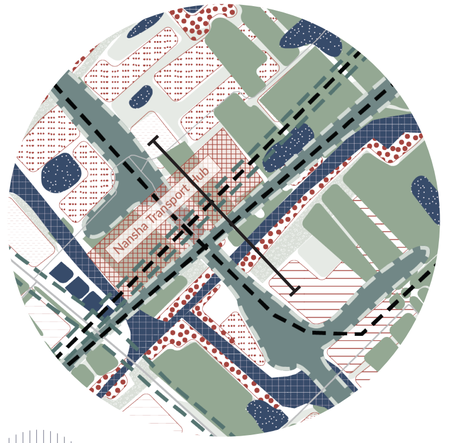
# Detail Section

The section through the proposed station shows how the scale of development is brought gradually down from the larger scale developments to the fishing villages at the centre. The green spine can be seen as different densities of green corridors at different levels. The station is on stilts, which allows blue-green structures to go underneath. Between the station and the fishing village is an undefined space which can become dynamic, maybe with a market, food street, entertainment district or something else. Thus, the local economy can flourish along with the global. Local actors can appropriate these in-between spaces as they like. Podium level developments of the new areas can strengthen social interactions and allow for urban life to continue during floods on the level above the ground. Locals can thus adapt to changing flows of the river with minimal interruption or loss.

55. Nansha Area detail section

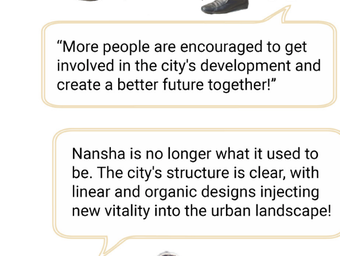
- River
- Canals
- Wetlands
- Aquafarms
- Lakes/Ponds
- Organic topsoil
- Alluvial deposit
- Public Parks
- Manufacturing Industry
- Commercial and Office
- Residential
- Urban Village
- Fishing Village
- Education and Health
- Transport Area
- Road
- Rail

50m

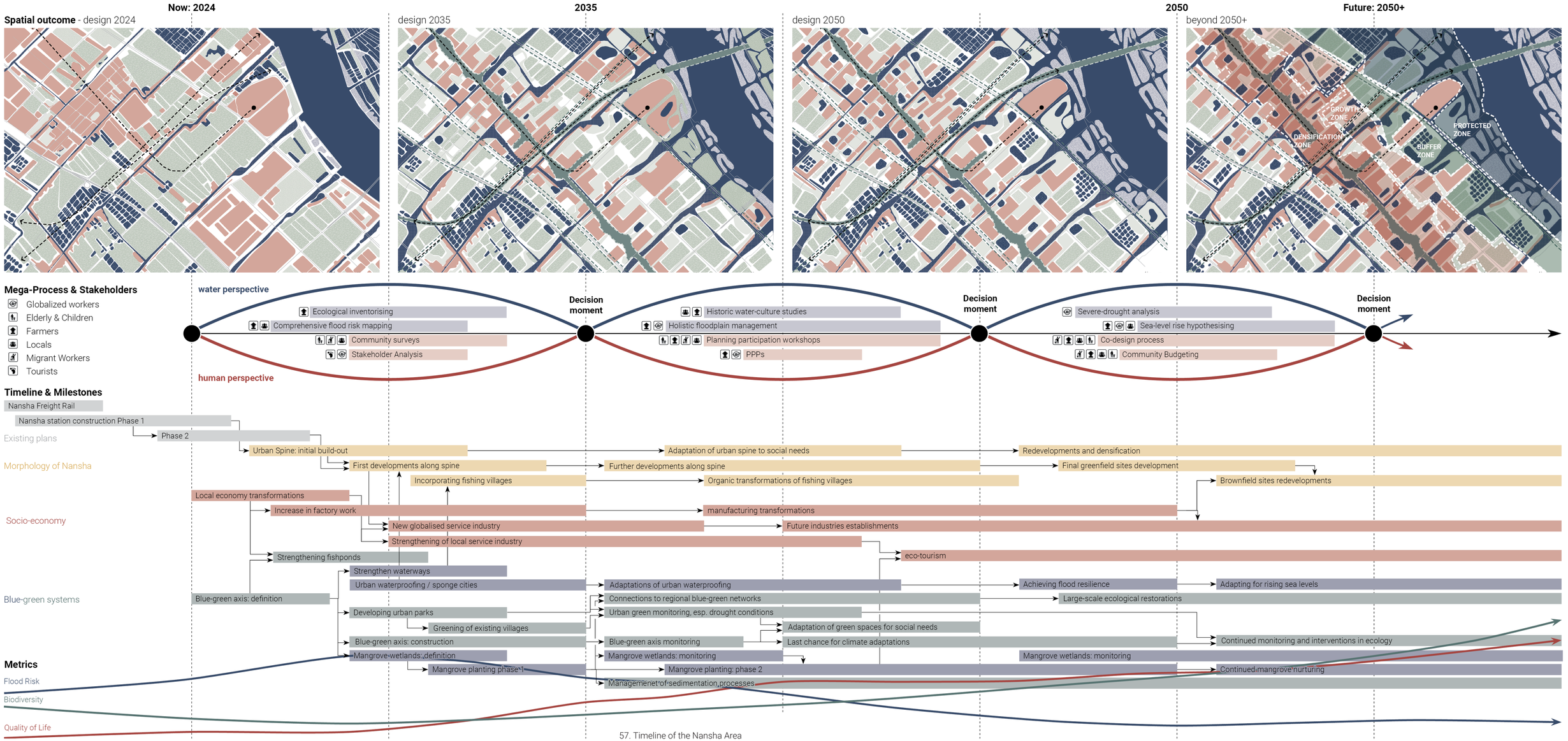


# Human Scale

56. Collage of the fishing village in the Nansha mobility hub






57. Timeline of the Nansha Area

# 9 Conclusion

*After the strategic approach and the zoom-in design steps, we conclude the project by exploring possibilities to transfer the knowledge gained in the Hong Kong-Shenzhen Border area and the Nansha area onto different geographies in the GBA. Thus we can scale up the local vision onto the larger scape to arrive at a vision for the future.*

# Transferability

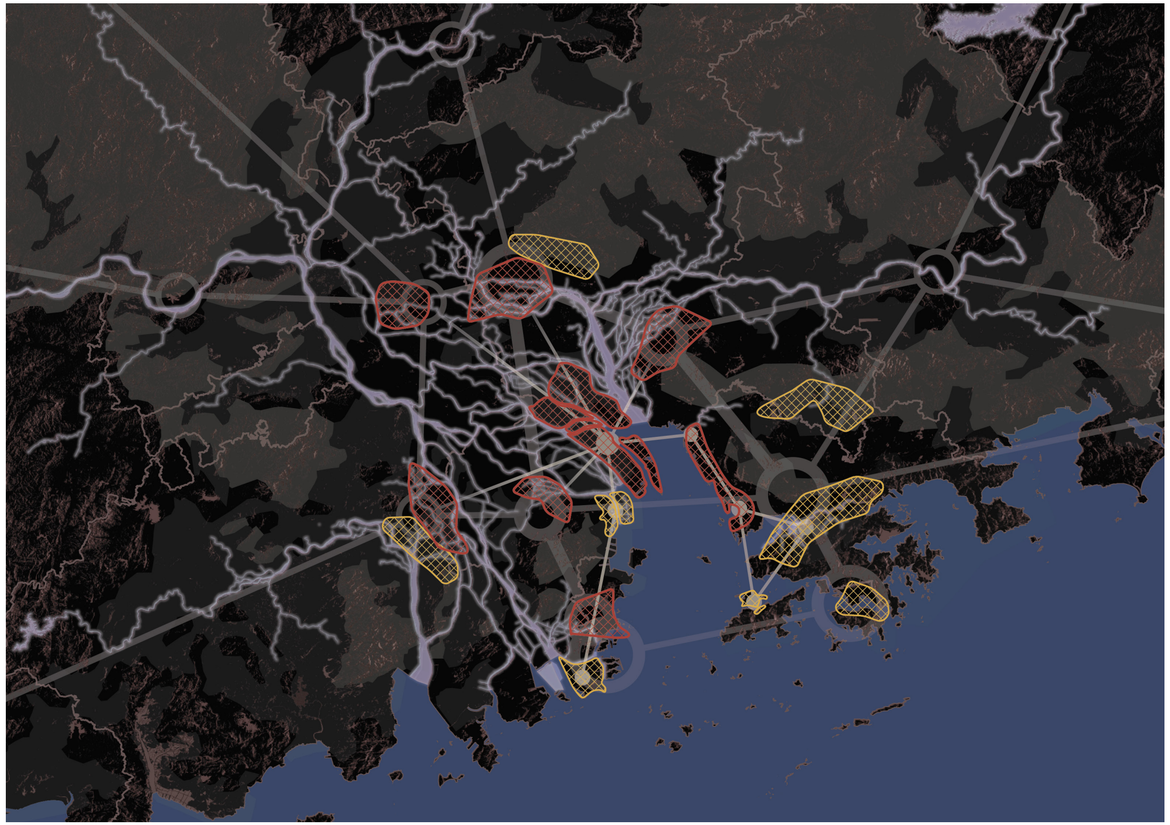
58. Transferability map

- Nansha strategy
- Hong Kong-Shenzhen border strategy
- Agricultural areas
- Natural reserves
- Existing centrality of the GBA
- New centrality of the megaprojects
- Rivers

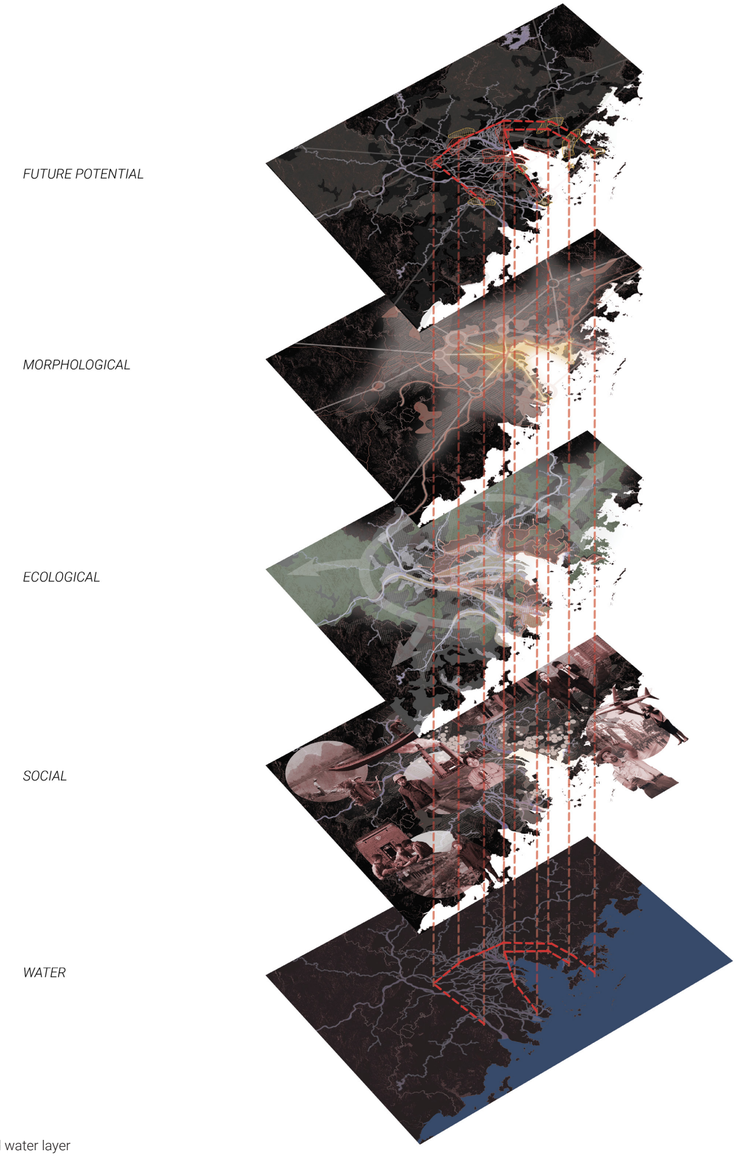
20km

From the Greater Bay Area urban planning project, we learned valuable insights into strategic intervention and knowledge transfers across different urban settings. By overlaying our quest maps, we identified critical points where interventions could be effectively implemented, drawing parallels between distinct regional characteristics. The red areas, akin to Nansha, are adjacent to rivers or coastlines and earmarked for significant mega-project developments. In contrast, the yellow areas resemble the Hong Kong border, where natural reserves converge with dense urban environments. This approach allows us to envision a cohesive and dynamic Pearl River Delta. By transitioning from a focus on mega-project to mega-process, we aim to create a resilient and liveable urban landscape, integrating environmental preservation with urban growth.

Both the Nansha and the Lok Ma Chau areas are planned to be highly developed in the coming years. With the adaptions to the plan, we hope to have created a way to go through with these developments but with changes which makes the design more resilient, liveable and a supporter rather than a denier of the existing nature and most importantly the delta.








59. Comparing the Transferability sites with the quest maps and water layer

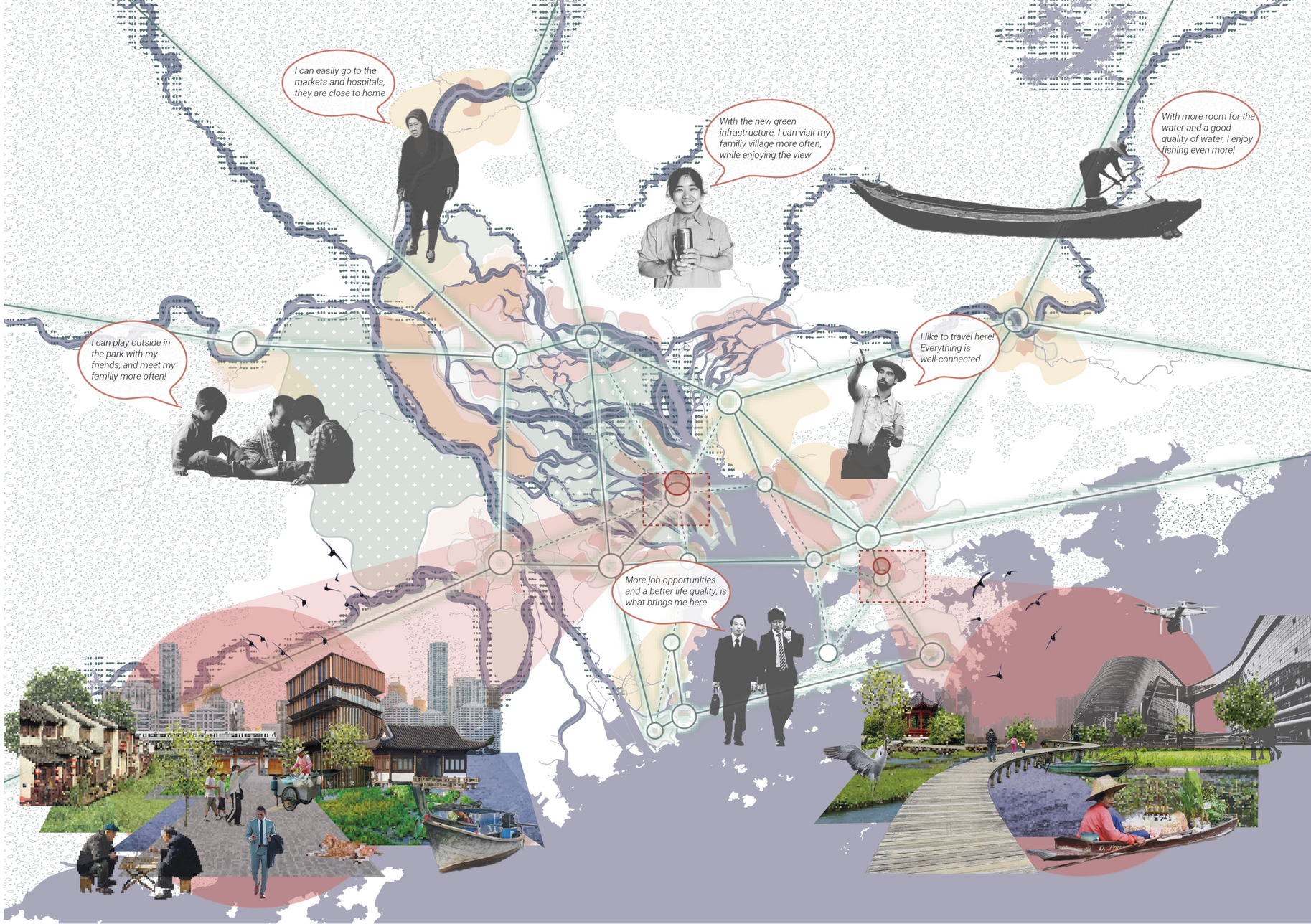
# Visions of the Future

Our vision for the future GBA transitions from economically driven megaprojects to sustainable mega-processes that integrate socio-ecological perspectives. By emphasizing human flows and water systems, we aim to enhance liveability and resilience across the Pearl River Delta. Applying six strategic principles to urban cores, we balance built environments with blue-green networks and resilient infrastructures.

Future expansion will follow a gradient of growth zones—from built to semi-built to ecological—ensuring harmonious urban and environmental development. The New Nansha district will become a pivotal innovation hub and transportation node, fostering sustainable industries within a water-sensitive urban design framework. The blue network, enhanced by green corridors, promotes ecological growth and connectivity, restoring biodiversity and natural water flows throughout the Delta. In Lok Ma Chau and beyond, our approach focuses on resilience and synergy with nature, ensuring development supports rather than compromises the region's ecological integrity. Our vision aims to create sustainable mega-processes that ensure the GBA's prosperity for generations, grounded in resilience, liveability, and a profound respect for the Delta's natural systems.

Addressing our challenge, we mitigate urban heat island effects and flood threats by leveraging the Delta's strong blue-green structures. Our strategy reduces pressure on sensitive areas through resilient infrastructures and balanced development. By prioritizing water-sensitive design and integrating ecological corridors, we create a robust urban morphology that adapts to social and environmental needs. Megaprojects become more adaptive by incorporating socio-ecological considerations, enhancing the social and water systems. This ensures a more resilient and interconnected Greater Bay Area. Existing populations and arriving migrant workers are included through integrated, liveable environments. Our approach provides equitable living spaces, accommodating various socio-economic conditions and fostering community well-being.

In conclusion, our vision for the GBA involves sustainable mega-processes that uphold ecological integrity while promoting prosperity, resilience, and liveability for future generations.




60. Visions of the future

# 10 Reflection


The Globalisation Course of the year 2023-2024 examines the Greater Bay Area in the southern part of China, starting with reading literature about the region to understand the social, economic and ecologic perspectives better. With this information we analysed the delta, creating challenges, which we examined through design and resulted in a vision and strategy for the Greater Bay Area. Within this course, we had the chance to go on a fieldtrip for three weeks to Hong Kong, where we studied for two weeks at PolyU.

Process

A big part of this process was trying to combine the Delft and the more design-based approach from Hong Kong in our project. In a two-week field trip to Hong Kong at PolyU, we explored the Greater Bay Area using the morphological game boarding approach to find new insights on the Greater Bay Area and a topic of focus for further research. Our team was divided into two teams, one using the points approach, the other using the strips approach. The teams focused on different challenges in the region and different areas, one in the Nansha district and the other at the Hong Kong-Shenzhen border. Back in Delft, combining the Delft and Hong Kong approaches was both challenging and interesting, pushing us to think out of the box. The Hong Kong approach was much more focused on design, while Delft works with more emphasis on research by design. The morphological game unveiled structures and relationships within the Greater Bay Area, and it would also be useful as a design tool, but in terms of a complete project it was necessary to move beyond the points and strips and towards a thinking in processes and systems. An added barrier to explore the game boarding approach further was the need to combine the two games into one single project. In the end we looked more into elements and patches, in relation to, but departing from, the points approach. To conclude the method of the morphological game is interesting to apply as a design exercise, but not as the entire project.

Working together in a team with diverse skills, ideas, and cultural backgrounds was both challenging and enlightening. Effective communication was essential in navigating discussions in which we needed to integrate different viewpoints. We believe these discussions did strengthen our project, combining different viewpoints to new insights for our project.

Significance of the project

The holistic approach to urban development within the Greater Bay Area is an important way of addressing the identified urgencies. By prioritizing sustainable mega-processes over traditional mega-projects, the designs for Nansha and Hong Kong-Shenzhen border emphasize integration with natural ecosystems and resilience to environmental uncertainties.

These initiatives are crucial for several reasons. First, they aim to enhance the region's liveability by preserving green spaces, promoting ecological connectivity, and improving water management. Second, they support the economic ambitions of the area by fostering innovation hubs and transportation nodes like Nansha Station, which is envisioned to become a central transport hub linking major cities. Third, by integrating blue-green networks, the plans seek to restore and enhance biodiversity and natural water flows, crucial for maintaining ecological balance in the Pearl River Delta.

Ultimately, these developments are not just about infrastructure and economic growth but about creating sustainable communities where residents can thrive amidst urbanisation. They serve as models for urban planning that prioritize environmental sustainability, resilience, and inclusive growth, setting a precedent for future urban developments in rapidly growing metropolitan regions worldwide.

Limitations

In this project, we had to acknowledge both specific challenges we encountered during our project and the constraints of the course itself.

When doing the analysis on the Greater Bay Area, we used the Delft Layer Approach to find interrelations between the different aspects. Within this layer approach we focused on the physical aspects of the Greater Bay Area. In our vision and strategy, we also integrate a social vision with its social actors, but an analysis of the social layer is somewhat superficial in our project.

Next to the layer approach method, another possibility to gain knowledge is space syntax. This method could have provided valuable insights into spatial configurations and user interactions within the site. However, due to time constraints, we were unable to incorporate this analytical tool into our process. This leads us to our second limitation, the absence of a thorough stakeholder and actor analysis. We did think about the different social actors in region and about their needs and wishes, but we did not completely understand their perspectives and roles in the Greater Bay Area. This is crucial, especially in a foreign context, where culture and context play a significant role. Nonetheless, an analysis of the stakeholders was challenging due to the project's foreign setting and the language barrier.

Next to limitations of the project, we also found out some limitations of the course. A primary limitations was the lack of time allocated for research. From our perspective, the structure of the course was not emphasised, prioritising agility and exploration over structured research, which left little room for in-depth investigation and analysis. More research could have helped with decision making, forming more evidence-based decisions. Next to the lack of time for research, a clear overview of the course was also lacking. In the last weeks of the course we ended up with puzzle pieces that needed to be brought together. However this did give us more freedom to explore on a design level, which was very interesting.

Further Research

Multiple additional methods can be applied to more adequately investigate every lens of the project. Within this research, a stakeholder analysis, also considering actor-network theory, is recommended. On-site research to gather first-hand insights and feedback, to refine the design to better meet the needs and expectations of the local context, is important for any spatial project, especially in a foreign context. This context also made it difficult to find policies. Doing a proper policy analysis can help with understanding the economic context of the Greater Bay Area better. Finding out which strategy implementations are realistic within these policies would have been helpful. The last aspect that is recommended for further research is finding a approach to asses our design. A method for this could be a quantification of the elements in the design. Each of these elements are subdivided into four main topics, infrastructure, build, green, and blue. The amount of elements from each topic can be quantified in the status quo and in the design and be compared with each other. With this the design proposal can be assessed. To conclude, having more time for more in-depth research and the quantification of the elements could improve our process and project even more.

61. The team on a field trip to the new territories in Hong Kong

Page intentionally left blank.

# 11 Figures

# 12 Sources

## Literature


Bolchover, J., & Hasdell, P. (2016). Border Ecologies: Hong Kong's mainland frontier. http://hub.hku.hk/handle/10722/218301

Bourdeau-Lepage, L., Huriot J.M. (2005). "On Poles and Centers: Cities in the French Style." Urban public economics review 3: 13-36.

Cardoso, R., Meijers, E. (2020). The process of metropolisation in megacity-regions. In: Sorensen, A and Labbe, D (eds.) The International Handbook on Megacities and Megacity Regions. Cheltenham: Edward Elgar. https://doi.org/10.4337/9781788972703.00034

Chan, F (2021). Urban flood risks and emerging challenges in the Greater Bay Area: the case of coastal megacities. Disaster Risk Reduction Knowledge Service CopyRight. School of Geographical Sciences, University of Nottingham Ningbo China. https://drr.ikcest.org/info/9f9d3

Chu, Y., Tian, C., Zhang, Q., He, W., & Chen, Y. (2021). Analysis of land use/cover change in Guangdong-Hong Kong-Macao greater bay area from 1979 to 2016. https://doi.org/10.1117/12.2625678

Chung, T. (2020). The Greater Bay Area: Integration, Differentiation and Regenerative Ecologies. ArchDaily. https://www.archdaily.com/942022/the-greater-bay-area-integration-differentiation-and-regenerative-ecologies

Fang, C., Cui, X., Li, G., Bao, C., Wang, Z., Ma, H., Sun, S., Liu, H., Luo, K., & Ren, Y. (2019). Modeling regional sustainable development scenarios using the Urbanisation and Eco-environment Coupler: Case study of Beijing-Tianjin-Hebei urban agglomeration, China. Science of the Total Environment, 689, 820–830. https://doi.org/10.1016/j.scitotenv.2019.06.430

Fang, C., Yu, D. (2017). Landscape and Urban Planning, Volume 162, 2017, Pages 126-136, ISSN 0169-2046, https://doi.org/10.1016/j.landurbplan.2017.02.014https://doi.org/10.1016/j.landurbplan.2017.02.014. (https://www.sciencedirect.com/science/article/pii/S0169204617300439)

Fang, C., Yu, D. (2017). Urban agglomeration: An evolving concept of an emerging phenomenon. Landscape and Urban Planning, 162, 126-136, ISSN 0169-2046 'China has invested both financially and academically to facilitate the formation and growth of urban agglomerations (Fang & Yu, 2016).'

Guangdong-Hong Kong-Macao Greater Bay Area - Outline Development Plan. (n.d.). https://www.bayarea.gov.hk/en/outline/plan.html

HKTDC Research. (n.d.). https://research.hktdc.com/en/article/MTEwMjQ4NDEzMg

Hong Kong 2030+. (2018). In Planning Department - Government of the Hong Kong SAR. Planning Department - Government of the Hong Kong SAR. https://www.pland.gov.hk/pland_en/p_study/comp_s/hk2030plus/document/2030+Booklet_Eng.pdf

Lai, Y., Shibuya, K., & Fong, E. (2022). The intention to migrate from more developed to less developed areas: evidence from Hong Kong. Asian Population Studies, 18(2), 129–149. https://doi.org/10.1080/17441730.2022.2087933

Lau, S. (2019). China's Guangdong-Hong Kong-Macao Greater Bay Area: a new development opportunity for Hong Kong. Public Administration And Policy, 22(1), 8–14. https://doi.org/10.1108/pap-04-2019-0007

Li, M., Zhang, Y., Xu, L., He, L. Liu, L., Tang, Q. (2020). China eco-wisdom: a review of sustainability of agricultural heritage systems on aquatic-ecological conservation. Sustainability 2020: Special Issue Sustainable Natural Resource Management, 12(1), p. 60. https://doi.org/10.3390/su12010060

Li, Q., Wu, J., Su, Y., Zhang, C., Wu, X., Wen, X., Huang, G., Deng, Y., Lafortezza, R., & Chen, X. (2022). Estimating ecological sustainability in the Guangdong-Hong Kong-Macao Greater Bay Area, China: Retrospective analysis and prospective trajectories. Journal Of Environmental Management, 303, 114167. https://doi.org/10.1016/j.jenvman.2021.114167

Liu, S. (2023). Towards a Sustainable and Liveable Desakota: Designing for sustainable industry transition in the peri-urban territory of the Greater Bay Area. Delft University of Technology. http://resolver.tudelft.nl/uuid:a39973d6-f497-4857-9ee9-9ece204ec180

McGee, T. G. (1991). The emergence of desakota regions in Asia: Expanding a hypothesis. In N. Ginsburg, B. Koppel, & T. G. McGee (Eds.), The extended metropolis: Settlement transition in Asia (pp. 3–25). Honolulu: University of Hawaii Press

Nansha Station architectural concept plan design. (n.d.-b). Copyright © 2017 Sohu.com Inc. All Rights Reserved. https://www.sohu.com/a/550290140_100116740

News-Guangdong-Hong Kong-Macao Greater Bay Area. (n.d.). https://www.cnbayarea.org.cn/english/News/content/post_1038495.html

Ng, K. (2024). Guangdong: Tens of thousands evacuated from massive China floods. https://www.bbc.com/news/articles/cp0gd5ezj9lo

Nijhuis, S., Stolk, E., & Hoekstra, M. (2017). Teaching urbanism: The delft approach. Proceedings of the Institution of Civil Engineers - Urban Design and Planning, 170(3), 96–106. https://doi.org/10.1680/jurdp.16.00013

OECD. (2024). Resilience - OECD. https://www.oecd.org/climate-change/theme/resilience/

Pacheco-Torgal, F. (2015). Introduction to eco-efficient materials to mitigate building cooling needs. In Elsevier eBooks (pp. 1–9). https://doi.org/10.1016/b978-1-78242-380-5.00001-7

Pan, W., & Du, J. (2021). Towards sustainable urban transition: A critical review of strategies and policies of urban village renewal in Shenzhen, China. Land Use Policy, 111, 105744. https://doi.org/10.1016/j.landusepol.2021.105744

Saunders, D. (2010). Arrival city: How the largest migration in history is reshaping our world. Random House. ISBN 978-1-40-707178-7

Territorial Spatial Planning of Guangdong Province 2020-2035. (2019). Department of Natural Resources of Guangdong Province. https://nr.gd.gov.cn/attachment/0/413/413359/3225138.pdf

Textor, C. (2023). Topic: Greater Bay Area in China. Statista. https://www.statista.com/topics/5333/greater-bay-area-in-china/#topicOverview

The Education University of Hong Kong & Personal, Social and Humanities Education Section, Curriculum Development Institute, Education Bureau (Reds.). (2022). Learning and Teaching Resources on Guangdong-Hong Kong-Macao Greater Bay Area (Greater Bay Area). https://www.edb.gov.hk/attachment/en/curriculum-development/kla/pshe/references-and-resources/geography/Population_E.pdf

Think GBA • Think Nansha. (2022). South China Morning Post. https://www.scmp.com/presented/business/topics/think-gba-think-nansha/article/3186761/think-gba-think-nansha?campaign=3186761&module=perpetual_scroll_0&pgtype=article

Translation: 14th Five-Year Plan for National Informatisation – Dec. 2021 - DigiChina. (2022). DigiChina. https://digichina.stanford.edu/work/translation-14th-five-year-plan-for-national-informatisation-dec-2021/

van Schaick, J., & Klaasen, IT. (2011). The Dutch layers approach to spatial planning and design : A fruitful planning tool or a temporary phenomenon? European Planning Studies, 19(10), 1775-1796. https://doi.org/10.1080/09654313.2011.614387

Wang, S., Cui, Z., Lin, J. et al. (2022) The coupling relationship between urbanization and ecological resilience in the Pearl River Delta. Journal for Geographic Sciences 32, 44–64. https://doi.org/10.1007/s11442-022-1935-3

Wang, Z., & Wu, F. (2019). In-situ marginalisation: Social impact of Chinese mega-projects. Antipode, 51(5), 1640-1663. https://doi.org/10.1111/anti.12560 https://doi.org/10.1111/anti.12560

Wu, J. (2005). "Understanding and Interpreting Chinese Economic Reform." Thomson Learning Asia, 2005.

Yang, Z., Li, X., Wang, F., Chen, R., & Ma, R. (2024). Spatial structure and network characteristics of the coupling coordination innovation ecosystems in the Guangdong–Hong Kong–Macao Greater Bay area. Scientific Reports, 14(1). https://doi.org/10.1038/s41598-023-50771-4

Yu, H. (2019). The Guangdong-Hong Kong-Macau Greater Bay Area in the making: development plan and challenges. Cambridge Review Of International Affairs, 34(4), 481–509. https://doi.org/10.1080/09557571.2019.1679719

Yu-Jiao, D., Yao-Dong, D., Jie-Chun, W., Jie, X., & Wei-Si, X. (2020). Spatiotemporal characteristics and driving factors of urban heat islands in Guangdong-Hong Kong-Marco Greater Bay Area. Shengtaixue Zazhi, 39(8), 2671. http://www.cje.net.cn/EN/abstract/abstract23651.shtml

Zhang, Q. (2023). The elemental metropolis : the past and future of the extended urbanity in the Yangtze River Delta, China. Springer. https://doi.org/10.1007/978-3-031-36409-9

Zhou, Y., Chen, H., & Fang, T. (2024). Spatial Analysis of Intercity Migration Patterns of China's Rural Population: Based on the Network Perspective. Agriculture, 14(5), 655. https://doi.org/10.3390/agriculture14050655


## Illustrations


Animalia (n.d.). Kraanvogel. [Photograph]. Animalia. https://animalia.bio/nl/common-crane

Asad Photo Maldives. (n.d.). Malé, Male, Maldives. Aerial Photo of Person Walking on Brown Road Near Green Field. [Photograph]. Pexels. https://www.pexels.com/photo/aerial-photo-of-person-walking-on-brown-road-near-green-field-1266826/

Campderrós-I-Canas, J. (n.d.). Chinese houses by the canal. [Photograph]. Flickr. https://www.flickr.com/photos/joanet/17005067040

Cc0-Photographers. (n.d.). Gratis Afbeeldingen : water, wit, vijver, zwemmen, oranje, zwart, geel, vis, Japan, Japans, China, koi, geluk, mirroring, wateroppervlak, rijkdom, cultivar, brokaat karper 4752x3168. [Photograph]. Pxhere. https://pxhere.com/nl/photo/637978

Cc0-Photographers. (n.d.-a). Free Images : horizon, architecture, skyline, building, city, skyscraper, cityscape, downtown, landmark, tower block, miami, metropolis, condominium, urban area, residential area, geographical feature, human settlement, metropolitan area 5923x3949. [Photograph]. Pxhere. https://pxhere.com/en/photo/1409793

Cc0-Photographers. (n.d.-b). Free Images : water, boat, river, canal, canoe, vendor, vehicle, hat, market, floating, trip, leisure, waterway, thailand, boating, bangkok, traditional, damnoensaduak, watercraft rowing 5036x3362. [Photograph]. Pxhere. https://pxhere.com/en/photo/626963

Cc0-Photographers. (n.d.-c). Free Images : landscape, bridge, park, leisure, japanese garden, gardening, pavilion, botanical garden, estate, shinto shrine, outdoor structure 3264x2448. [Photograph]. Pxhere. https://pxhere.com/en/photo/662291

Cc0-Photographers. (n.d.-d). Gratis Afbeeldingen : stad-, paleis, stad, downtown, vakantie, plein, mijlpaal, toerisme, openbare ruimte, Cuba, Stadsplein, d300, lahabana, buurt, tours, menselijke nederzetting 3865x2567. [Photograph]. Pxhere. https://pxhere.com/nl/photo/413301

Cc0-Photographers. (n.d.-e). Free Images : landscape, tree, nature, forest, wilderness, plant, wood, field, lawn, meadow, prairie, countryside, sunlight, leaf, hill, flower, green, jungle, pasture, grassland, vegetation, wetland, plantation, woodland, habitat, ecosystem, rural area, biome, natural environment, geographical feature, grass family 5184x3456. [Photograph]. Pxhere. https://pxhere.com/en/photo/181662

Cc0-Photographers. (n.d.-f). Gratis Afbeeldingen : architectuur, fabriek, hemel, stadsgezicht, vervoer-, milieu, mijlpaal, industrieel, industrie, bedrijf, elektriciteit, energie, macht, pijpen, gebouwen, torens, verontreiniging, schoorstenen, elektriciteitscentrale, outdoor structuur 5200x3467. [Photograph]. Pxhere. https://pxhere.com/nl/photo/1269407

Chinese Welfare Association. (2021). History of Chinese New Year. [Photograph]. CWA. https://www.cwa-ni.org/history-cny/

Chris. (n.d.). Chinese girl in the Street Zhangmutou 樟木头 Town China. [Photograph]. Flickr. https://www.flickr.com/photos/dcmaster/8065608688

Chris. (n.d.-a). Suzhou industrial area China. [Photograph]. Flickr. https://www.flickr.com/photos/dcmaster/5236873311/

Ernie. (n.d.). Outside xidan bookstore. [Photograph]. Flickr. https://www.flickr.com/photos/kouchi/117991639/in/photolist-UkAuQs-211fT5K-5Np1zp-2gkJMLF-G3zbnU-4B1y2c-Png7XB-bqo7Us-KDjvan-23hfpLh-wk6cni-2kRNigL-bwxfv3-bqJNB-5N5HtU-5BxLTJ-3F7Cjf-f5yV2y-EEzVr-ad3ZFz-fzN4Xs-91veBs-6iQa2k-pdv5WW-2kiNwYG-aUSoGe-bVNe1R-8Vz2Tm-6drZpc-m2Q3sM-nDpsHN-wDxdRW-dgHdbJ-AAZ6NR-o5WQX-5XkaWT-9EMLqV-9254WP-bwcwM-fqtqGD-5avXeF-2kmtVsJ-2hBZmvV-6dw6FU-eWhu4i-4r2cEG-ksoCL-29VA3i5-2atNUzE-2iuE456

Garmestani, A. S., Allen, C. R., & Gunderson, L. (2009). Panarchy: Discontinuities Reveal Similarities in the Dynamic System Structure of Ecological and Social Systems. Ecology and Society, 14(1). [Illustration]. JSTOR. http://www.jstor.org/stable/26268048

Guineapig. (n.d.). Nanjing Road Shopping Street. [Photograph]. Flickr. https://www.flickr.com/photos/gunman47/49787924073

Jiang, M. (2024). View of a Train on a Railway Bridge over a River. [Photograph]. Pexels. https://www.pexels.com/photo/view-of-a-train-on-a-railway-bridge-over-a-river-20300802/

Kidder, S. (n.d.). Tourists. [Photograph]. Flickr. https://www.flickr.com/photos/skidder/3066271536/in/photolist-5EXrGC-cnsYsC-qKLTAs-9bHF9k-8xoTFb-H7VDRP-26LMHeg-2fTBykb-2htXuEi-Zfn7nb-rHmYZV-2aDSiNt-2mtUst9-2osYinU-2mPozWg-av6VWo-2ixjrBv-ZwSgFC-2kV6K3R-N5EeyY-2ixkBTX-2ph4LUx-2nKKBgS-2iY5g2s-EBDayP-7fTfGh-23iRB87-2oc9FDU-4YCm5k-sDFt-awqxrn-KsUgUQ-aEVhNF-4Nqbx4-pWz5eg-2myikFi-pWAtAT-8RXwwU-2mmpn-RP-2eawMvx-2mhyUcQ-sz4V7Y-2okakyC-Q939qz-2pg4ZVi-2mCLbgL-2hwfhuk-2i9tG3m-2ipwniz-2oyM11C

Lakeridgervresort. (n.d.). Playground. [Photograph]. Flickr. https://www.flickr.com/photos/57276661@N02/8138831414/in/photolist-dpcD2y-9ua7GD-UeLwuE-MGgpPM-cdmZps-dt9PtW-VgzS9Q-rscgGW-bxwzm2-aoRxZZ-dahGpR-8uQ3qv-UGvqQj-fUc5kJ-WS1Hdj-nyahG6-vAT4X4-T9etQ3-avgeMh-dNsTNs-rK8dZe-capF7A-mUsDdZ-nfNtFH-94FYwh-AM9Dby-9VCvDe-cEMFBS-8q6fQU-QZX9uy-bCxFzX-RyPMTm-jbwozF-egFxvJ-ohfNuS-n5QAp6-bWjvKi-6UR77K-ponffr-BSKZ3A-ceGaYj-cWLpyo-rbxgrE-eamLRA-XWruEs-8VXE5T-c7JWgJ-ahTWW5-r8D7z7-ayjg8T

Laogephoto. (2013). Linzhi, Tibet, China by laogephoto on DeviantArt. [Photograph]. DeviantArt. https://www.deviantart.com/laogephoto/art/Linzhi-Tibet-China-365181840

M, M. (n.d.). Businessmen. [Photograph]. Flickr. https://flickr.com/photos/maispace/4140640158/in/photolist-uaxyY7-5F5vV9-8yC1SU-fgpfiZ-8T9uxC-VgSB-8M4xcp-RdXSX-fh9Pvc-a8E7Cr-4ZNLSR-2fJABi1-4Eanc-rv6qpf-xy2xQx-2nYgpeB-2oAthda-9KWxQ2-2j5Usj9-8GpYb8-r7Rfp9-4ZNsfP-4ZNLNZ-sENYJZ-5TGsJ4-2j3uDKS-DjF9DE-y64qrT-rTnt7r-etA6sY-5bxBSK-24cC9Pa-bfUM9z-bzYNUq-4ZSEkG-dxTh5A-2e5D4t-7iTS4y-57ujqB-ykSbM-qwmGNZ-4ZSZtu-onwNx-8dZofu-4ZNLAX-hvMLPd-oRX96b-4ZSZ8J-bbNUQH-QGiZqj

Malayi, B. (n.d.). 716657753E. [Photograph]. WordPress.org. https://wordpress.org/photos/photo/716657753e/

McCullough, D. (n.d.). Drone and Moon. [Photograph]. Flickr. https://www.flickr.com/photos/69214385@N04/8725078749

Metrotrekker. (n.d). A Stroll Around Hong Kong Wetland Park. Hong Kong, China. [Photograph]. Metrotrekker. https://www.metrotrekker.com/china-hong-kong-hiking-wetland-park

Meye. (2021). Malus domestica. [Image]. Meye. https://meye.dk/project/malus-domestica-s3936/

Meye. (2022). Prunus padus. [Image]. Meye. https://meye.dk/project/prunus-padus/

Miat, J.C.B.B.M.P.M. (n.d.). Chinese bound feet(1). [Photograph]. Flickr. https://www.flickr.com/photos/johnbullas/501778146

Ming, M. (n.d.). Migrant worker style. [Photograph]. Flickr. https://www.flickr.com/photos/matianming/12085578295

Paradise, P. (n.d.). The pearling community. [Photograph]. Flickr. https://www.flickr.com/photos/pearlparadise/3415913510/in/photolist-6cRs5w-mQXXFW-c77L4N-kSmuSR-FZr7rH-frQGHJ-QjfYyD-CPZg2C-RK7sk4-ZW4W3V-oRyjBY-UcNc8R-YRnX4N-qDy6fK-ZTj55C-YRpUs1-2dZY4ed-2eyiCgP-UeUAKB-H8ps1t-gH3tiG-ZTm5gL-7Kh7Gb-CPZ975-ZTm5G5-8Z58Za-YRq1dQ-2759jak-ZW2Ntv-YRnJMo-S6AYRq-2dRyBjd-R7hjwW-HLvLeH-CPZdcu-8sy5Po-Vmw4FE-ZW2MAi-gH3xiX-oz76h7-6kDTMb-CPZco5-6xwTWg-8sv5mF-oRyPDq-oRknK6-dgYTY4-ZW2LHg-98ic35-y5uN

S, S. (n.d.). Xixi Wetland Park- love the foreground! [Photograph]. Flickr. https://www.flickr.com/photos/shankaronline/35777314894

Simmie, J. and Martin, R. (2010) 'The Economic Resilience of Regions: Towards an evolutionary approach', Cambridge Journal of Regions, Economy and Society, 3(1), pp. 27–43. [Illustration]. doi:10.1093/cjres/rsp029.

Snuffy. (n.d.). Kun Lung Wai, Fanling, New Territories, Hong Kong 粉嶺龍躍頭覲龍圍. [Photograph]. Flickr. https://www.flickr.com/photos/snuffy/33879507

Stanley, D. (n.d.). Chinese food vendors. [Photograph]. Flickr. https://www.flickr.com/photos/davidstanleytravel/48599394157

Tatters. (n.d.). Chinese tallow tree. [Photograph]. Flickr. https://www.flickr.com/photos/tgerus/6795304261

Torn, K. (n.d.). KLM PH-BXU Boeing 737-8BK. [Photograph]. Flickr. https://www.flickr.com/photos/68359921@N08/53325052653/

Touw, D. (n.d.). Guilin China. [Photograph]. Touw. https://www.touw.com/guilin-china/

Trimming, P. (2011). River Arun Flood Plain, Sussex. [Photograph]. Geograph. https://www.geograph.org.uk/photo/2609359

Urhahn (n.d.) Polsslag van de verandering. [Illustration]. Urhahn. https://www.urhahn.com/goede-straat/

Vila, J. (n.d.). Chinese children. [Photograph]. Flickr. https://www.flickr.com/photos/joanetvila/4011344291

Wikimedia Commons. (2007). Yuanyang hani farmer.jpg. [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Yuanyang_hani_farmer.jpg

Wikimedia Commons. (2007-a). Apus apus flock flying.jpg. [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Apus_apus_flock_flying.jpg

Wikimedia Commons. (2007-b). China railways CRH2 unit 001.jpg. [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:China_railways_CRH2_unit_001.jpg

Wikimedia Commons. (2010). Fishing village, near Krabi town.jpg. [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Fishing_village,_near_Krabi_town.jpg

Wikimedia Commons. (2010-a). Xiangqi-Chinese-Chess.jpg. [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Xiangqi-Chinese-chess.jpg

Wikimedia Commons. (2012). Sky Office Tower 01.JPG. [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Sky_Office_Tower_01.JPG

Wikimedia Commons. (2013). Hong Kong Wetland Park868.jpg. [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Hong_Kong_Wetland_Park868.jpg

Wikimedia Commons. (2015). Gate - Tazishan Park - Chengdu, China - DSC02926.JPG. [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Gate_-_Tazishan_Park_-_Chengdu,_China_-_DSC02926.JPG

Wikimedia Commons. (2016). Adi Constantin 2016 (Unsplash).jpg. [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Adi_Constantin_2016_%28Unsplash%29.jpg

Wikimedia Commons. (2017). Businessman leaving the office (Unsplash).jpg. [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Businessman_leaving_the_office_%28Unsplash%29.jpg

Wikimedia Commons. (2017-a). Scandinavian Butler rollator white.jpg. [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Scandinavian_Butler_rollator_white.jpg

Wikimedia Commons. (2019). Fishers and small island in Lake Burullus - Egypt.jpg. [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Fishers_and_small_island_in_Lake_Burullus_-_Egypt.jpg

Wikimedia Commons. (2021). 2021-06-16 09 10 03 View of the Delaware Water Gap from the Delaware River Viaduct over the Delaware River on the border of Knowlton Township, Warren County, New Jersey and Upper Mount Bethel Township, Northampton County, Pennsylvania.jpg. [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:2021-06-16_09_10_03_View_of_the_Delaware_Water_Gap_from_the_Delaware_River_Viaduct_over_the_Delaware_River_on_the_border_of_Knowlton_Township,_Warren_County,_New_Jersey_and_Upper_Mount_Bethel_Township,_Northampton_County,_Pennsylvania.jpg

Wikimedia Commons. (n.d). 中国北京市昌平区 China Beijing, Changping District, China Xinjia - panoramio (1).jpg. [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:%E4%B8%AD%E5%9B%BD%E5%8C%97%E4%BA%AC%E5%B8%82%E6%98%8C%E5%B9%B3%E5%8C%BA_China_Beijing,_Changping_District,_China_Xinjia_-_panoramio_%281%29.jpg

Wikimedia Commons. (n.d.-a). Asakusa Culture Tourism Center.JPG. [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Asakusa_Culture_Tourism_Center.JPG

Wikimedia Commons. (n.d.-b). Beijing Cbd China (246466607).jpeg. [Photograph]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Beijing_Cbd_China_%28246466607%29.jpeg

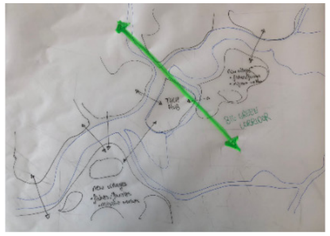
World Bank Photo Collection. (n.d.). A migrant worker in her dormitory. [Photograph]. Flickr. https://www.flickr.com/photos/worldbank/9579099406/in/photostream/

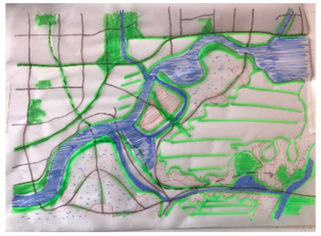
Zwegers, A. (n.d.). Zhaoxing. [Photograph]. Flickr. https://www.flickr.com/photos/azwegers/41627615961

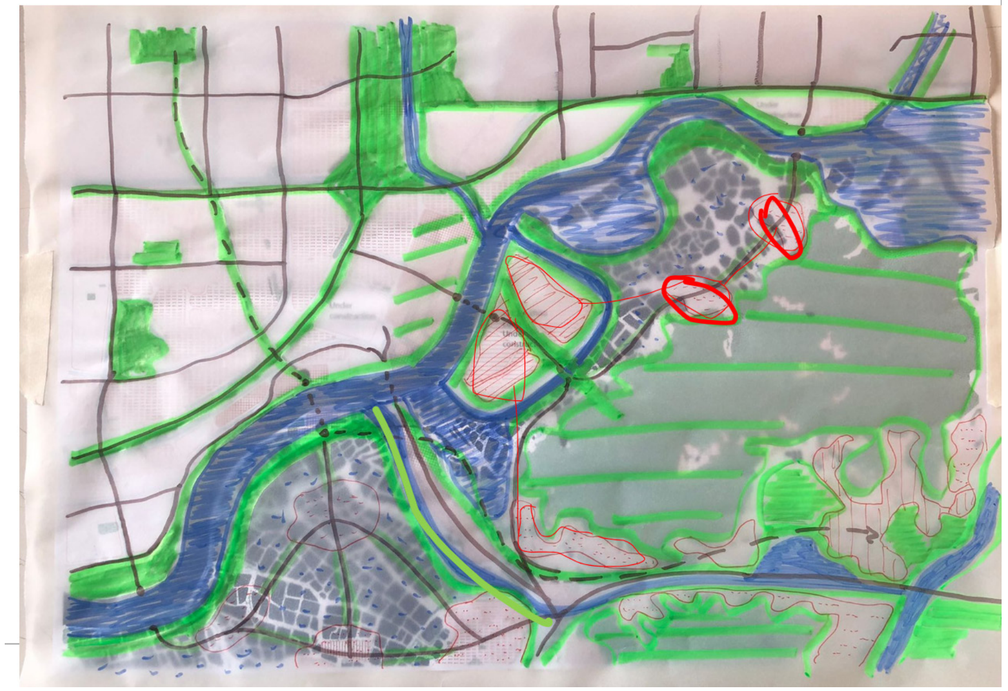
俊阿. (n.d.). CHINA. [Photograph]. Flickr. https://www.flickr.com/photos/kk9k/3989426817

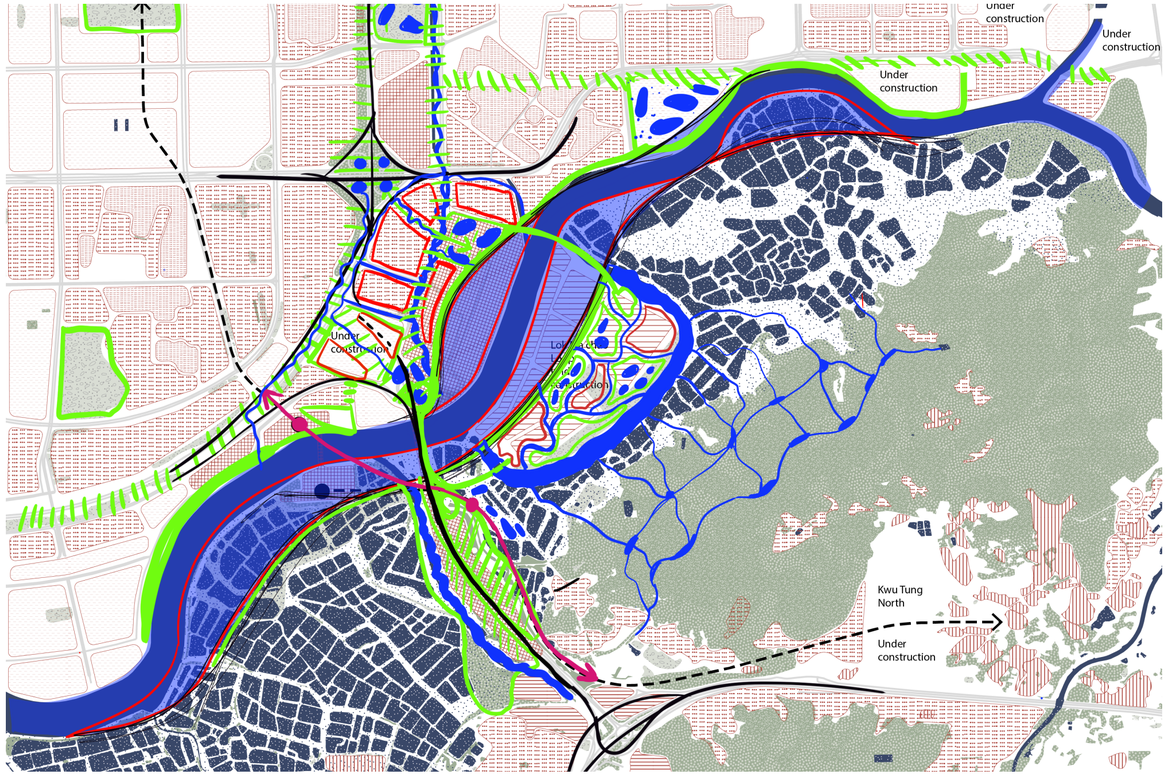
# Appendix

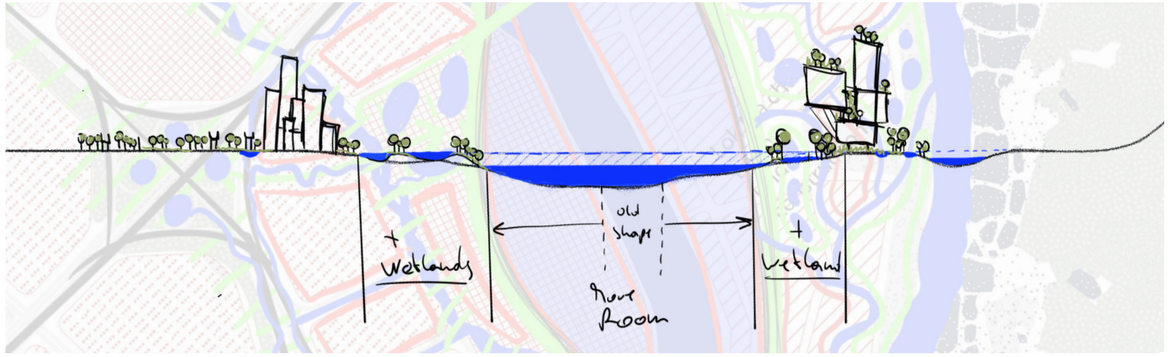
## A. Six Design Zoom ins



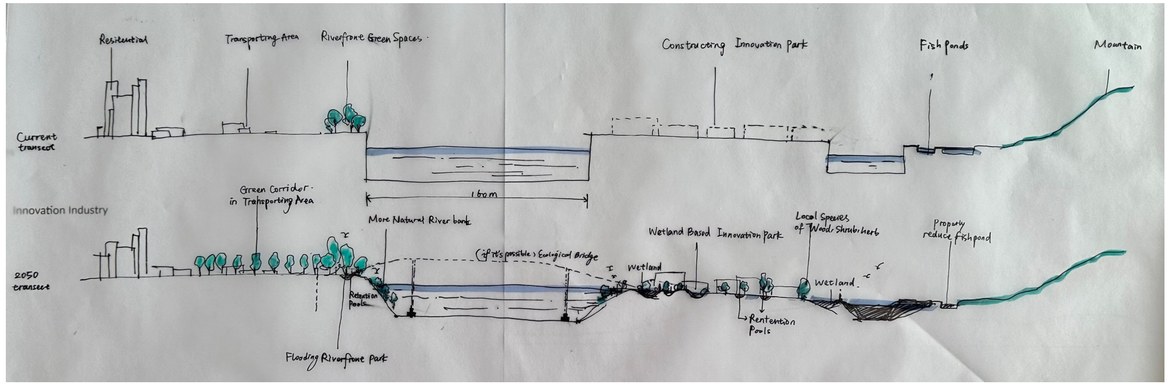




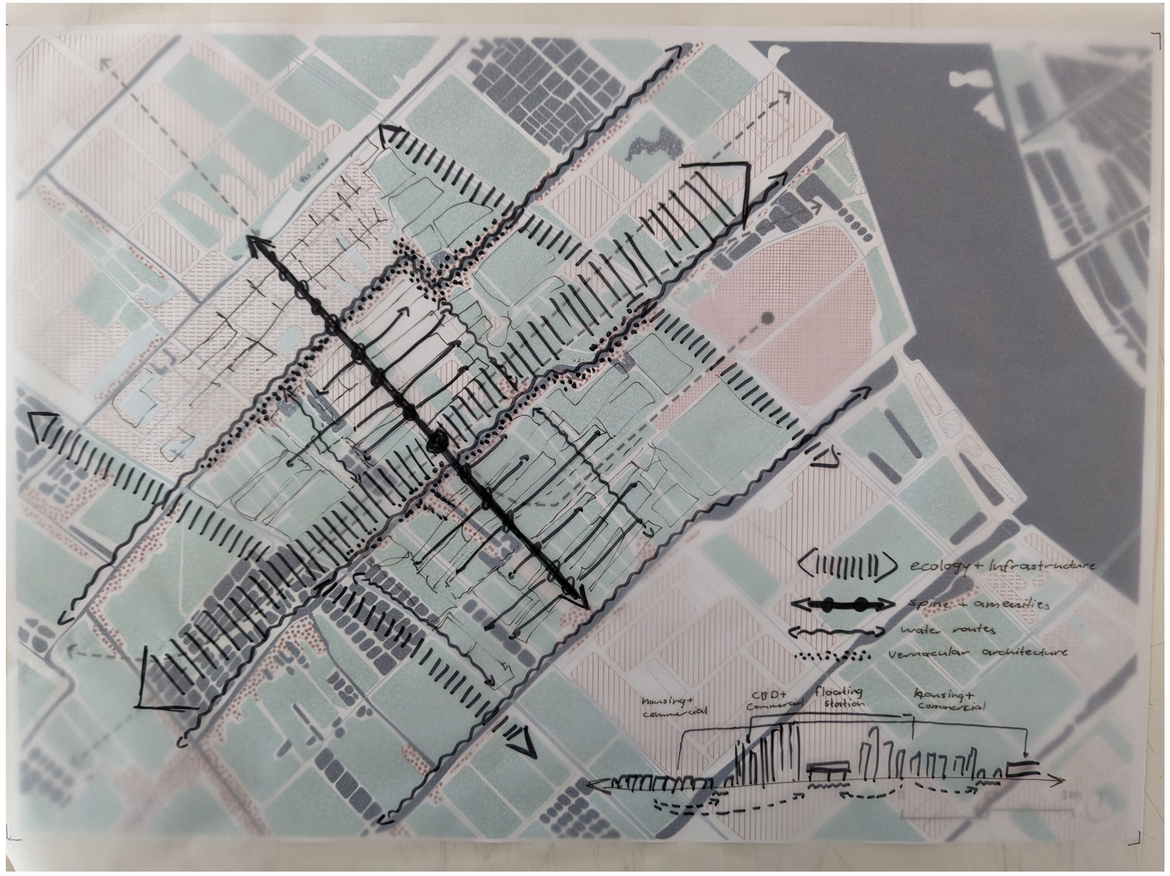



Residential
Transport
green&blue corridor
challenge
wetlands
wetland-based Innovation Park
Ecological Bridge (if possible)
Flooding Parks
Under construction
Under construction
Under construction
Under construction
Under construction
Kwu Tung North


Residential
Transporting Area
Riverfront Green Spaces
Constructing Innovation Park
Fish Ponds
Mountain
Current transect
1 km
Innovation Industry
Green Corridor in Transporting Area
More Natural River bank
Wetland Based Innovation Park
Local Species of Wood, Shrubs, herb
Property reduce Fish pond
2050 transect
(if it's possible) Ecological Bridge
Wetland
Wetland
Retention Ponds
Flooding Riverfront Park


Room for the River
mangrove islands as buffer
canal
residential
canal
ecopark
canal
adventure


ecology + infrastructure
spine + amenities
water routes
vernacular architecture
housing + commercial
CBD + Commercial
floating station
housing + commercial

# B. Satellite imagery development
# Shenzhen


1986


1996


2004


2014


1991


1997


2007


2019


1992


1999


2010


2022

# C. Satellite imagery development
# Nansha

1986

2000

2016

2020

1984

2007

2018

2022

1990

2010

2019

2024

# D. Layering

## DELFT APPROACH

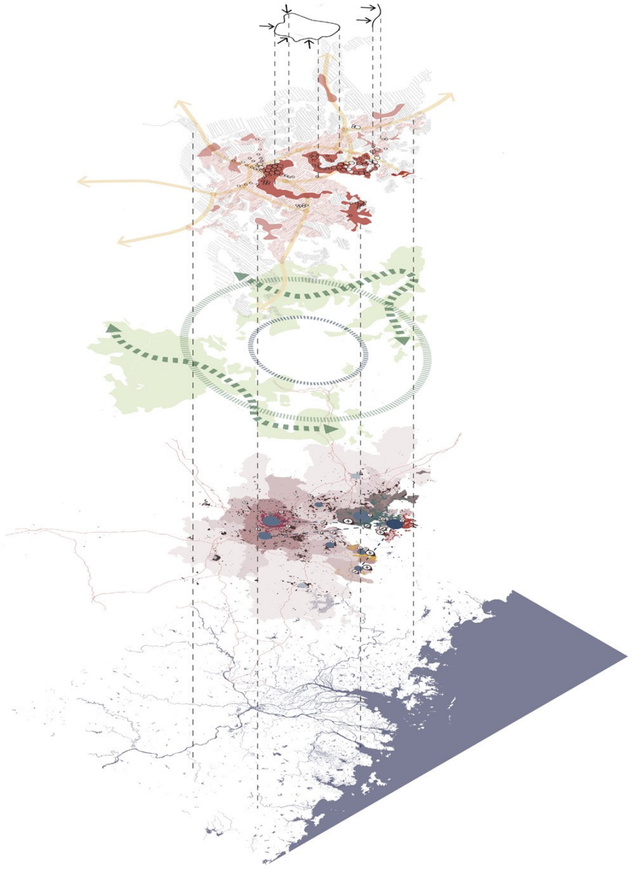
Focus Areas

Humans + Flows

Ecology

Economy

Water



## DELFT APPROACH

Waterbody

Elevation

Remote Cores

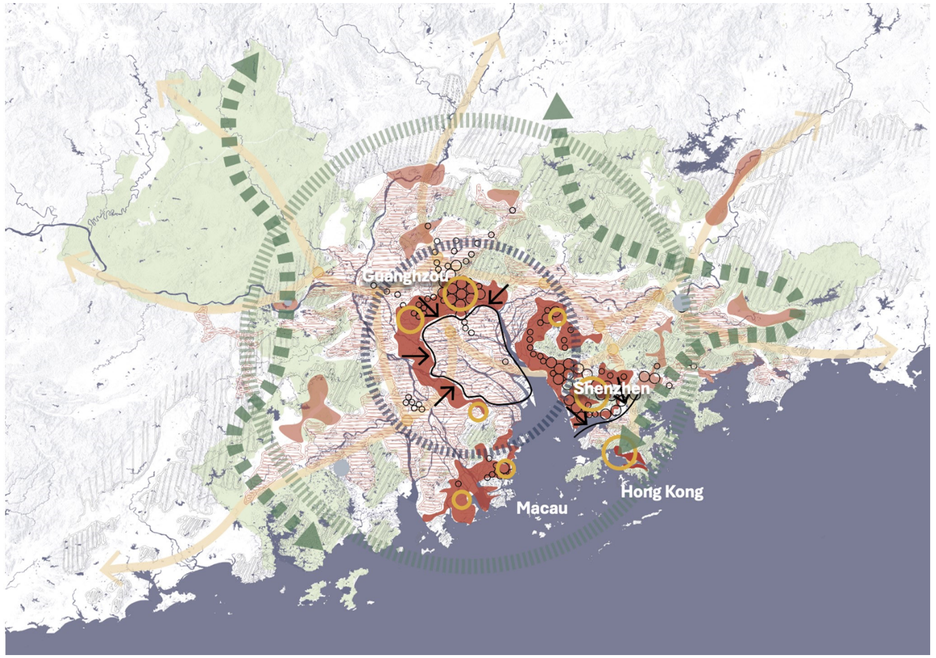
Urban Cores

Desakota - "the in-between" Transport Corridors

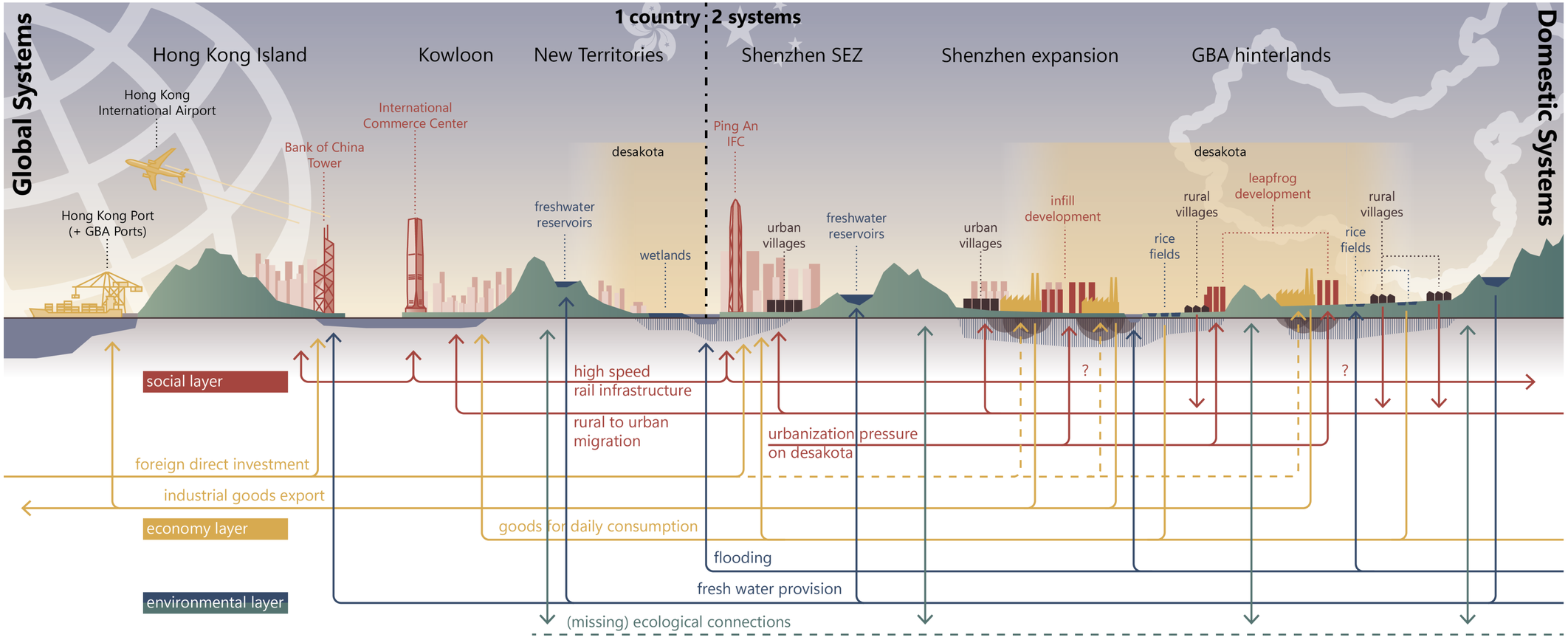
Mobility Hubs (intersections)

Migration flows

Time-space Compression

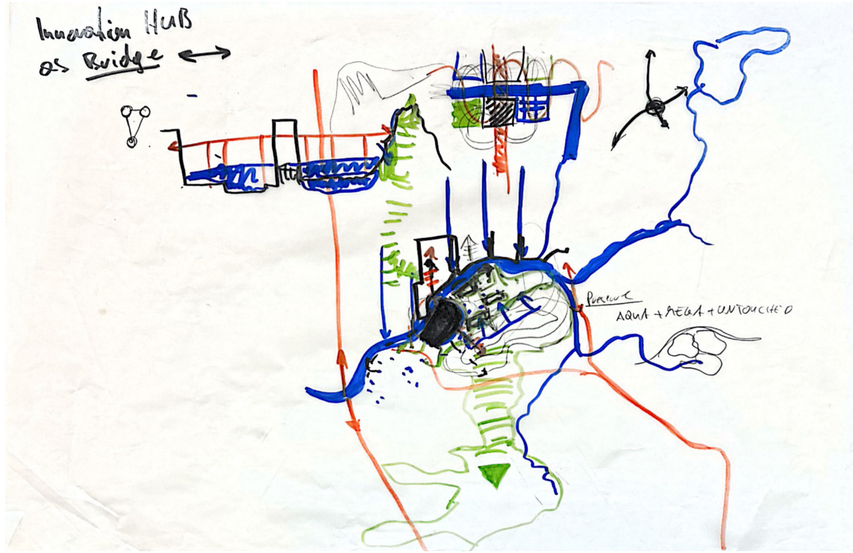


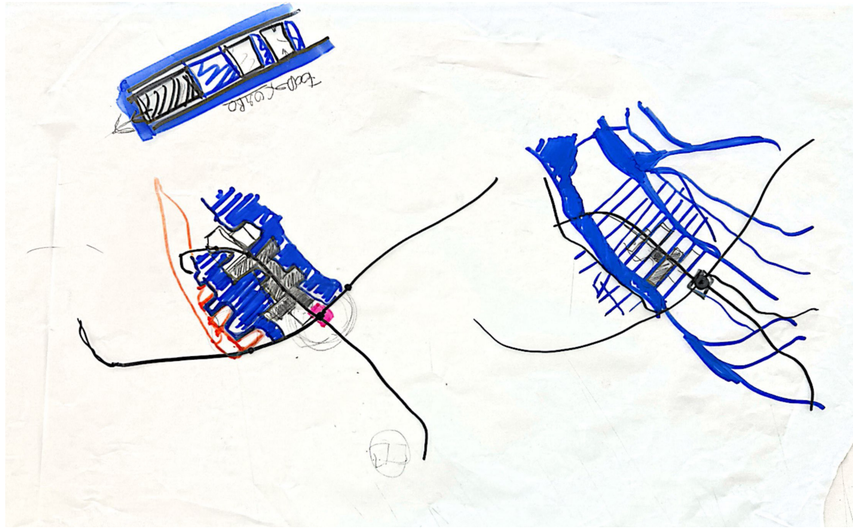
# E. Systemic section

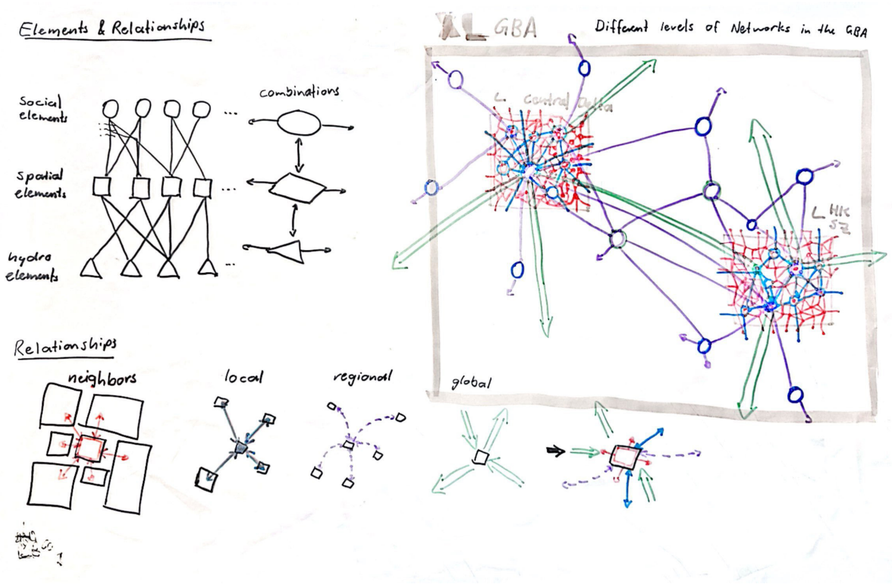


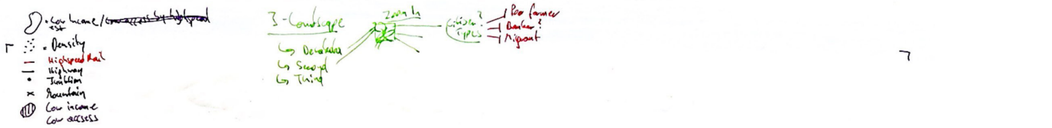
# F. Scetch collection


**Please enter**

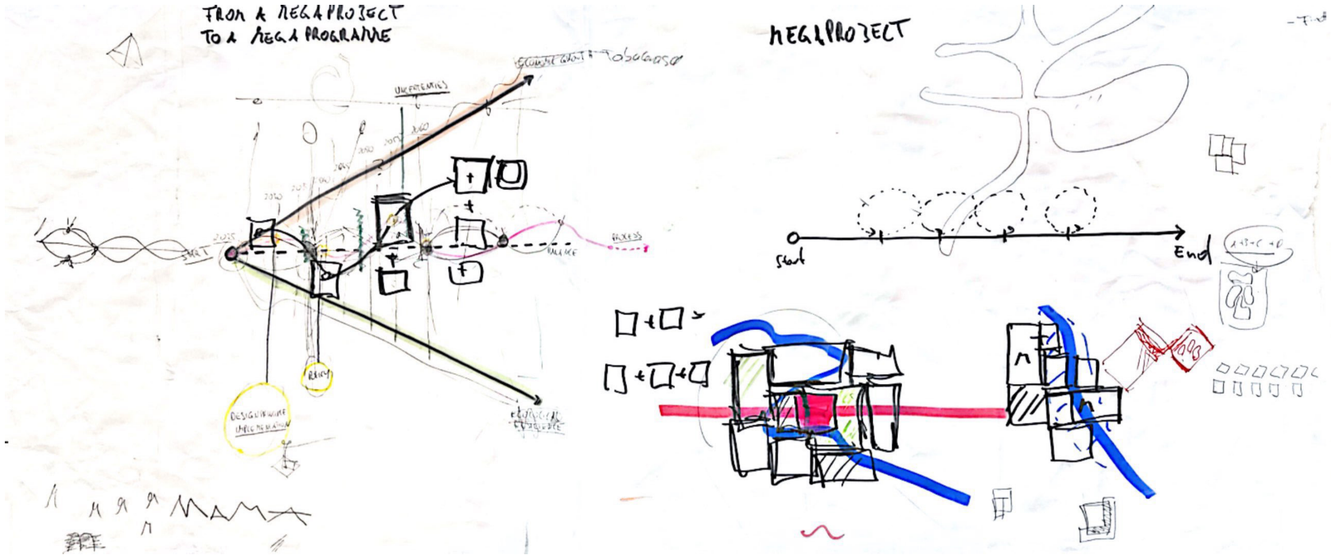


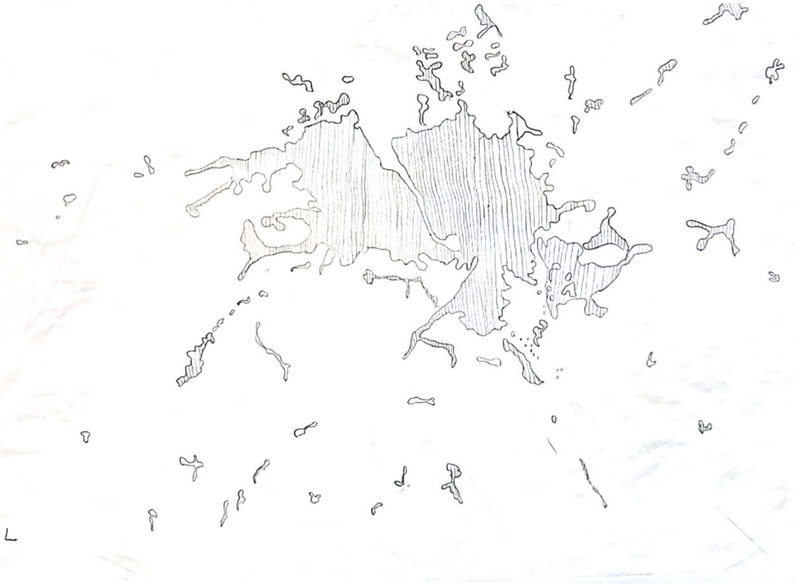



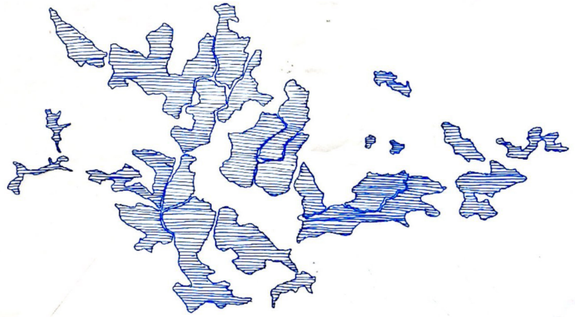

Elements & Relationships
Social elements
Spatial elements
Hydro elements
combinations
GBA
Different levels of Networks in the GBA
Relationships
neighbors
local
regional
global

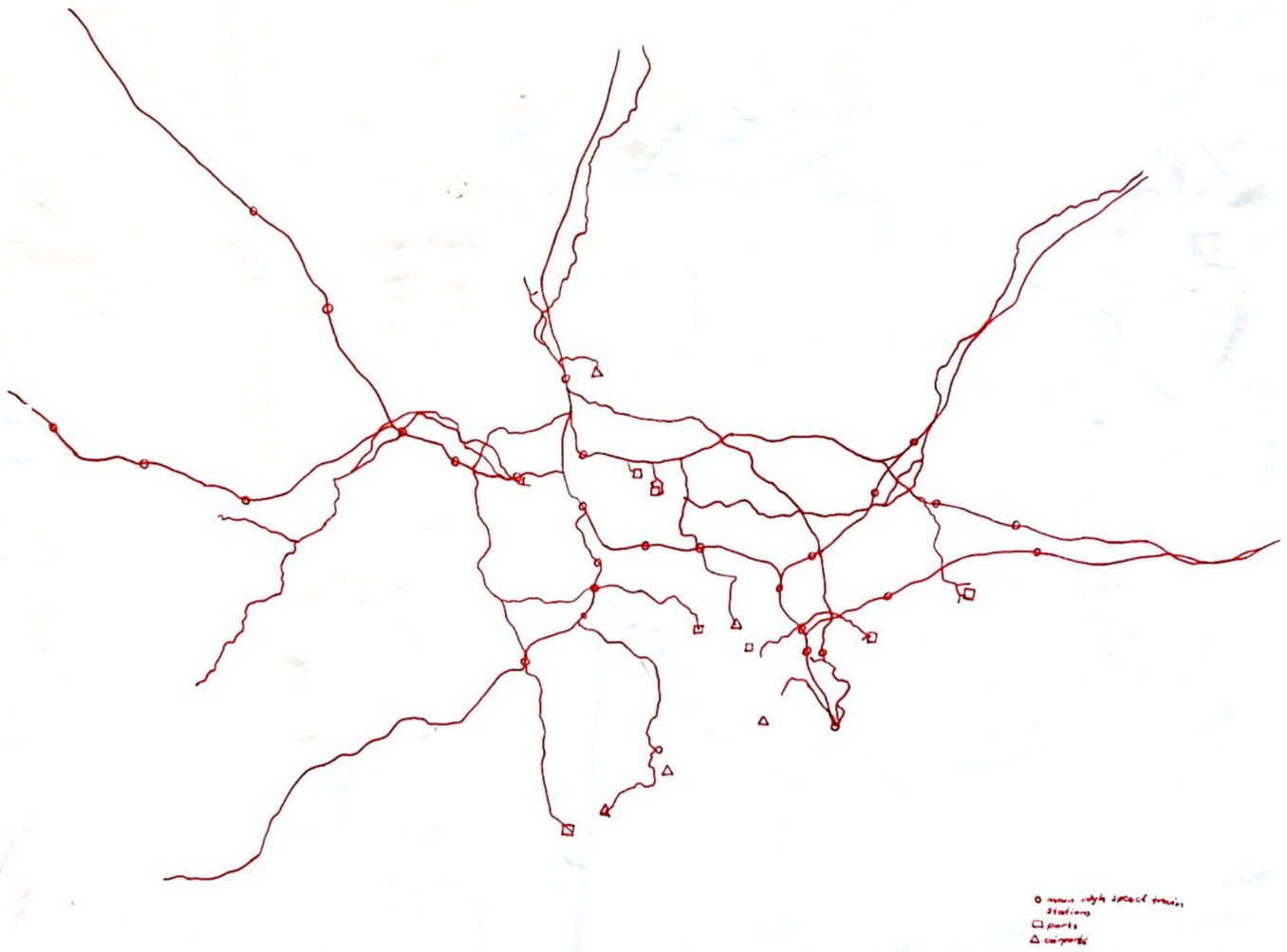

density
3-Landscape




FROM A MEGA PROJECT
TO A MEGA PROGRAMME
MEGA PROJECT
start
End

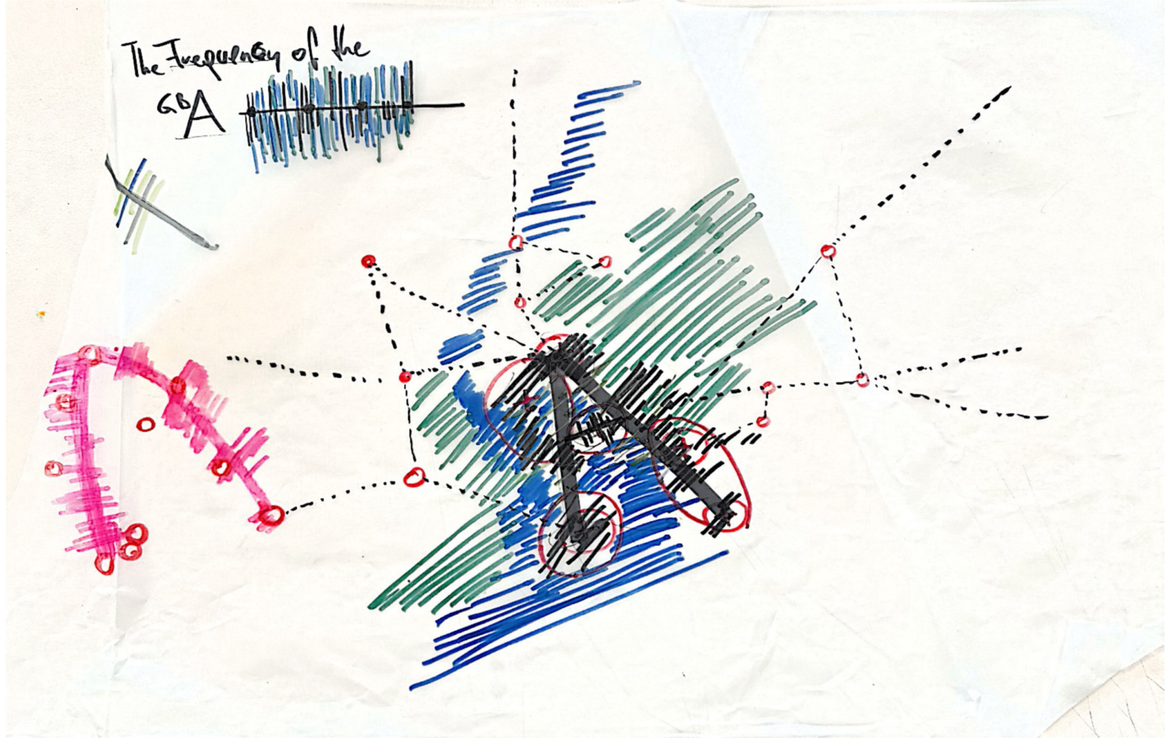


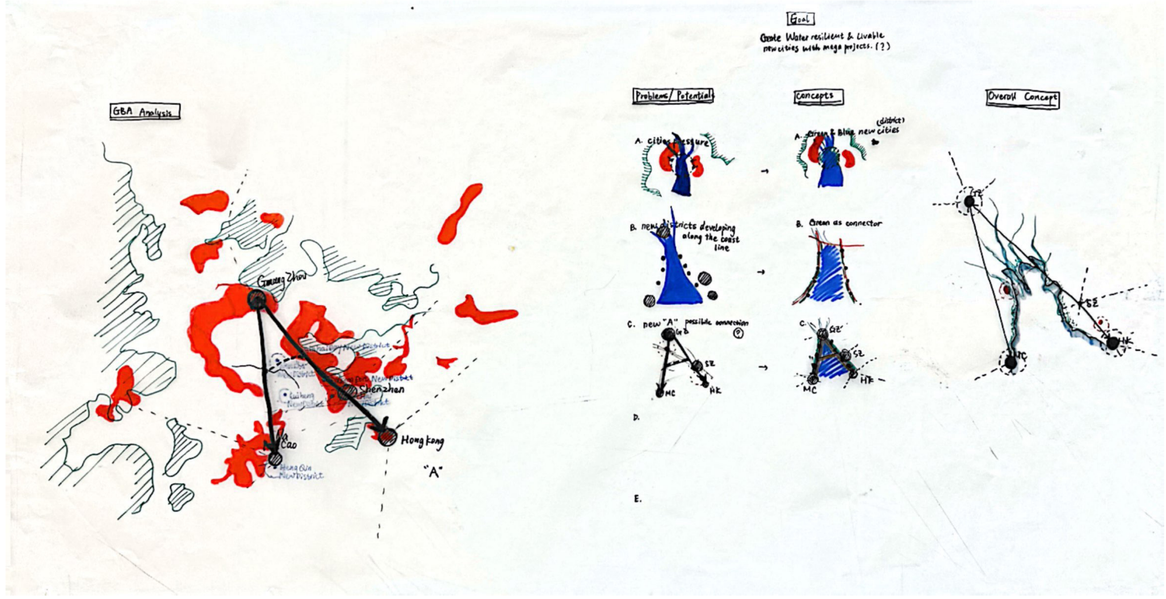


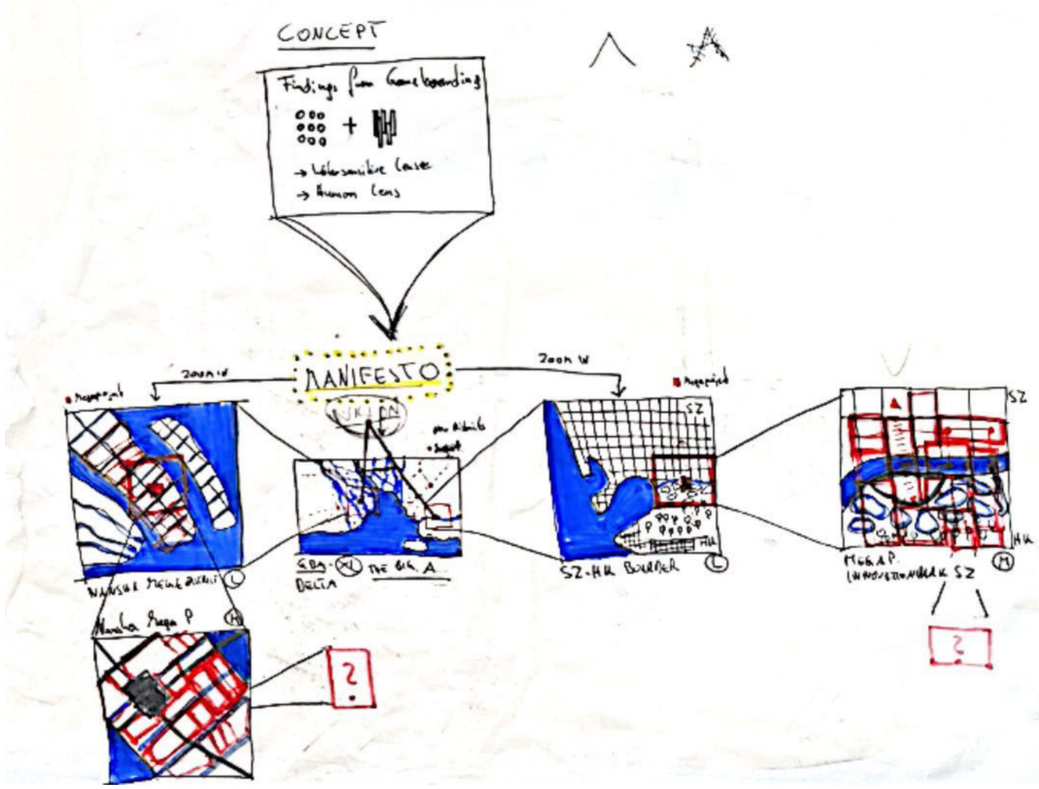


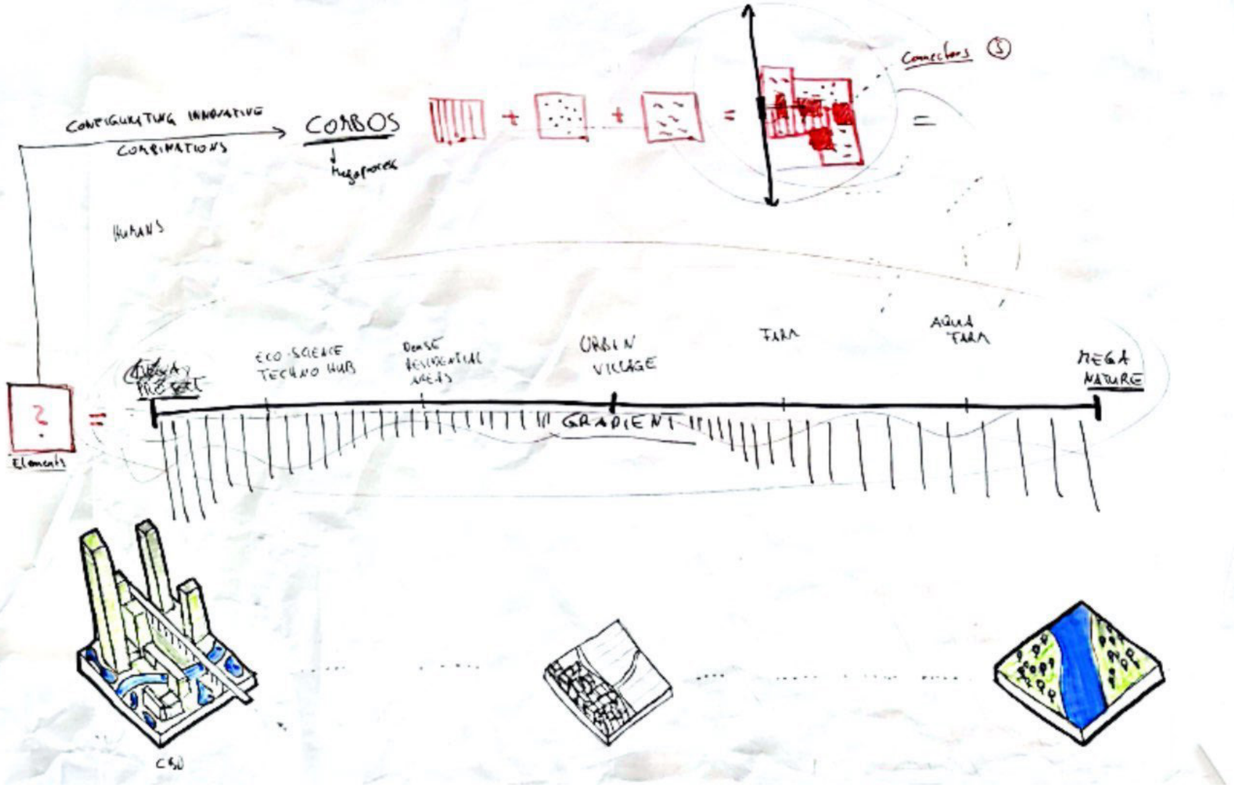


**The Mega Mega!**


The Frequency of the
GBA

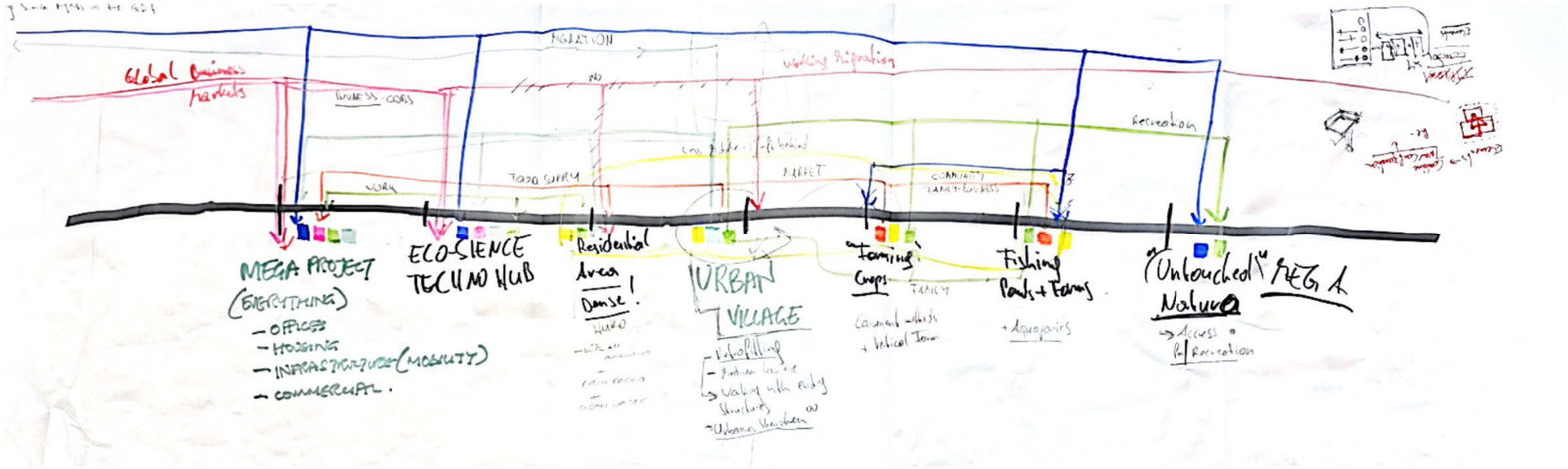

Goal
Create Water resilient & livable
communities with mega projects. (??)
GBA Analysis
Problems/ Potential
Concepts
Overall Concept
Guangzhou
Shenzhen
Hong Kong
"A"
A. Cities pressure
B. new projects developing along the basis line
C. new "A" possible connection
D.
E.
A. Green & blue new cities
B. Green as connector
C.
GZ
SZ
HK
MC
HZ

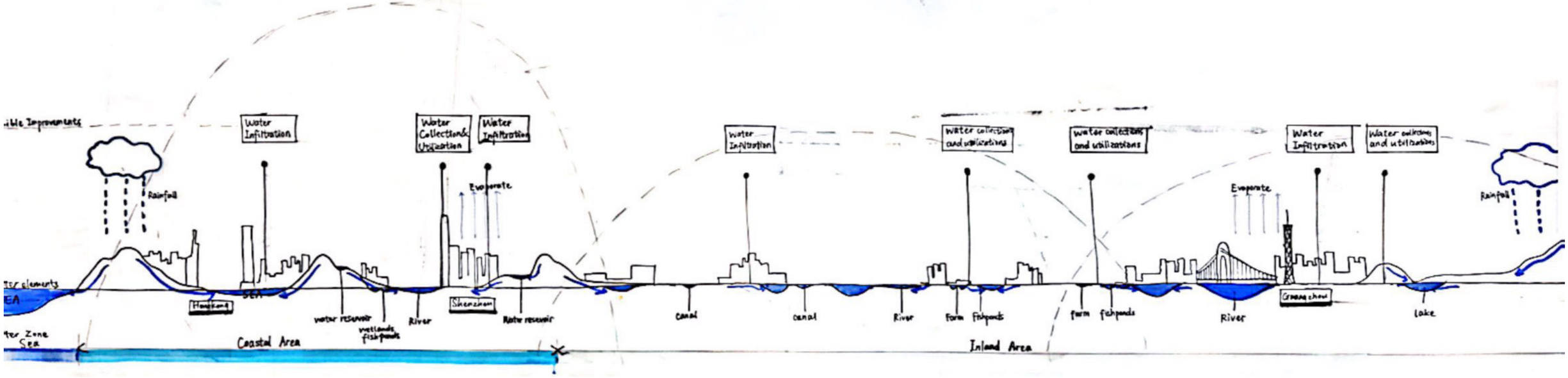





**Biophysical Systems!**




**Totally clear!**