



LIVING ENVIRONMENTS THAT PROMOTE RURAL- URBAN IMMIGRANTS INTEGRATION: URBAN TRANSFORMATION IN SONGJIANG, SHANGHAI

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Apart from those with resources, all pictures presented in the booklet are edited by
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PREFACE

The floating population, also known as rural-urban immigrants, is a typical type of domestic migration appearing in the process of urbanization in contemporary China. Due to the policy restrictions, the Floating population is in a disadvantageous position and lacks social security. Though the ultimate goal for many domestic immigrants is to transform into urban residents, the biggest challenge they are facing is the housing problem. This thesis aims at providing feasible solutions regarding this phenomenon from an urban and housing design perspective.

The preliminary study gives a general introduction to the background of the Boating population and explains the research framework. Following a literature review of the academic approaches so far and trying to give a deep understanding of the Boating population. After that, a case study on the public housing system in Singapore was introduced and show how could their achievements could be applied to the Chinese context.

The design proposal starts with a site study in Shanghai, China. By applying the urban grid system and the social cohesion theory, aiming to develop the qualities that can be used to meet current challenges. Shanghai is the city that holds the biggest portion of the domestic immigrants among many Chinese cities, it is therefore chosen as the target city to develop the proposal. The Design area is approximately 160 hectares in total, and is expected to provide housing and infrastructures to a minimum of 70,000 new residents. From an urban scale, the neighborhood is applied to a polycentric structure and is connected with the central town with the railway systems. The neighborhood scale explored the relationship between the proposed neighborhood and the existing communities to examine the potential qualities of social sustainability. The block scale presents the different qualities and benefits of different amenities and facilities.

"WE SHAPE OUR BUILDINGS,
THEREAFTER THEY SHAPE
US."

-WINSTON CHURCHILL, 1943

CONTENT

1. PRELIMINARY STUDY

1.1. Introduction of the Floating Population 02

1.1.1. Contemporary Boating populatio

1.1.2. Research aims & Questions

1.1.3. Research development

1.2. Literature review 08

1.2.1. Introduction

1.2.1.1. The Floating Population

1.2.1.2. The relationship between Boating population and their shelters

1.2.1.3. Housing system in China

1.2.1.3.1. Participating Actors

1.2.2. Section conclusion

1.3. Case study - Public housing system in Singapore 18

1.3.1. Participating actors

1.3.2. Social interaction & Existing facilities

1.3.3. Study in the performance of Infrastructures

1.3.4. Housing design in the Public Housing System

1.3.5. "The Tengah District - A home with nature"

2. DESIGN PROPOSAL

2.1. Site analyze 30

2.1.1. Site selection and study

2.1.2. Developing methodology

2.1.3. Strategies

2.2. Masterplan 55

2.2.1. Typology development

2.2.2. Masterplan

2.2.3. Analyze & Exploration

2.3. Zoom-In plan 87

2.3.1. Plan

2.3.2. The Green Corridor

2.3.3. The Community Bond

3. CONCLUSION 105

4. REFERENCE 108

5. AFTERWORD 113



CHAPTER 1. PRELIMINARY STUDY

RESOURCE: JAMES MAITRE, Jonathan Bregel Tracks the World's Largest Annual Human Migration in Short Doc 'Chunyun', Directorsnotes.com.

1.1. Introduction of The Floating Population

In 1978, The Chinese government applied The Reform and Opening up policy, which positively impact the economy and urbanization progress of the country. Since then, not just the economy transformed from the planned economy to the market economy, but also the form of settlements, nearly Pve hundred new urban areas were set up over the past four decades. The urbanization in contemporary China went through four different phases: 1. 1978 – 1992, the boosted growth of different towns leads to the rapid growth of urban areas; 2. 1992 – 2003, concentrated on varied zonings brings a swift expansion of urban spaces; 3. 2004 – 2013, constructing mixed-areas and new towns fosters a rapid continuation of the cities; 4. 2013 – 2018, old town redevelopments result in the decelerate of urbanization. (Ni Pengfei, 2018) ; (Figure 1)

Due to the tremendous labor demands from the market and different income levels between suburban and urban areas, millions of rural populations entered the growing urban areas to seek opportunities. (Figure 2). This type of domestic immigrant is usually named The Floating Population, which migrates between rural-urban areas. The common migrating pattern for The Floating Population is usually, rural-urban; west-east; inland-seaside; economic backwardness-economic developed. The pattern gives iconic duality to this large group, therefore the government developed the household registration system to manage resources and welfare distribution to limit the urban population before the Reform and Opening up. (Zhao Junjie; Zhang Xiaoxun, 2021) Due to the hysteresis of the Household Registration System¹, millions of Boating populations lack access to resources like housing and medical services even if they have been living and working in the cities for years.

Housing is one of the major dilemmas that Floating populations are facing. Although

¹ The Household Registration System in China: The household is the basic unit of residence registration while residents can only register as permanent residents in one place. (The Regulations of the People's Republic of China on Residence Registration < 中华人民共和国户口登记条例 >, article 5-6, 1958). The background of this policy is to limit domestic migration due to the limited resources in the time, for instance, education and healthcare, in urban areas. Compared with urban inhabitants, the Boating population who registered as rural residents has little access to public services. With the rapid urban expansion in the country, Opinions on Further Promoting the Reform of the Residence Registration System < 关于进一步推进户籍制度改革的意见 > (2014) giving the advice to help urban populations transform from a policy perspective.

limited companies provide dormitories to temporary labor migrants, most of the floating population have to seek their own apartments because of the imperfection of social housing and the public housing system. In common cases, the floating population only searches for rentals instead of purchasing an actual apartment for they still have the land property back in the rural area. Therefore they temporarily settled in informal settlements like urban villages. The urban village in China is the result of rapid urbanization. During the process, a huge number of rural areas were combined into the cities. Due to the different land ownerships, this type of high-dense spontaneous settlement results in semi-urban and semi-rural, but is usually not included in the municipality's overall planning, which makes it more difficult for the floating population to integrate into the city. On the one

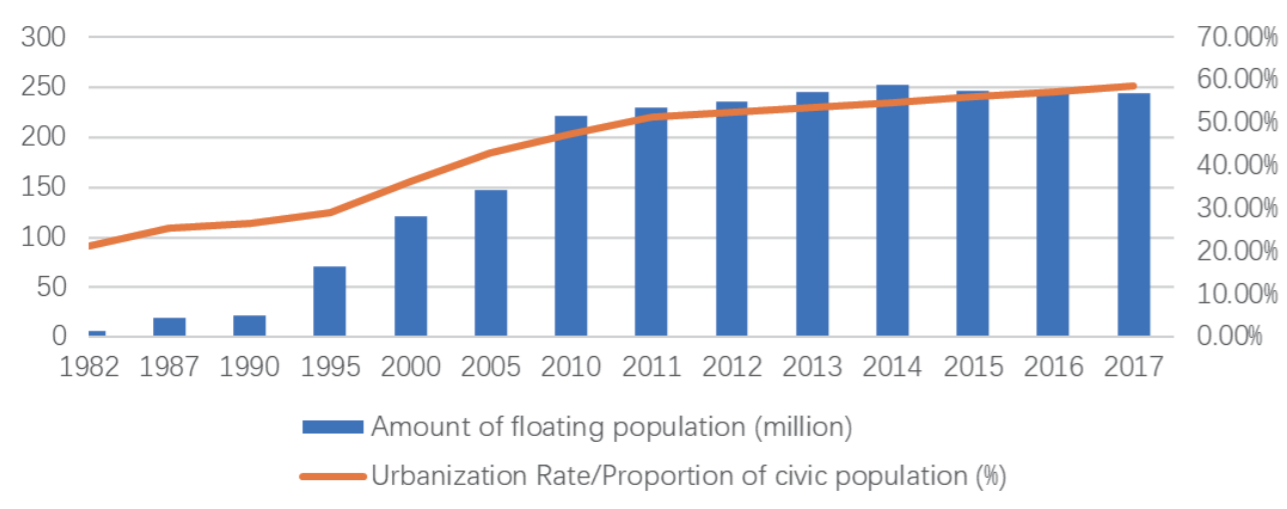


Figure 1. Growth of Floating population & Urbanization Rate)
Data Resource: National Changes in Number of Cities, Urban Population and Urban Areas in the Past Years(1978-2020)

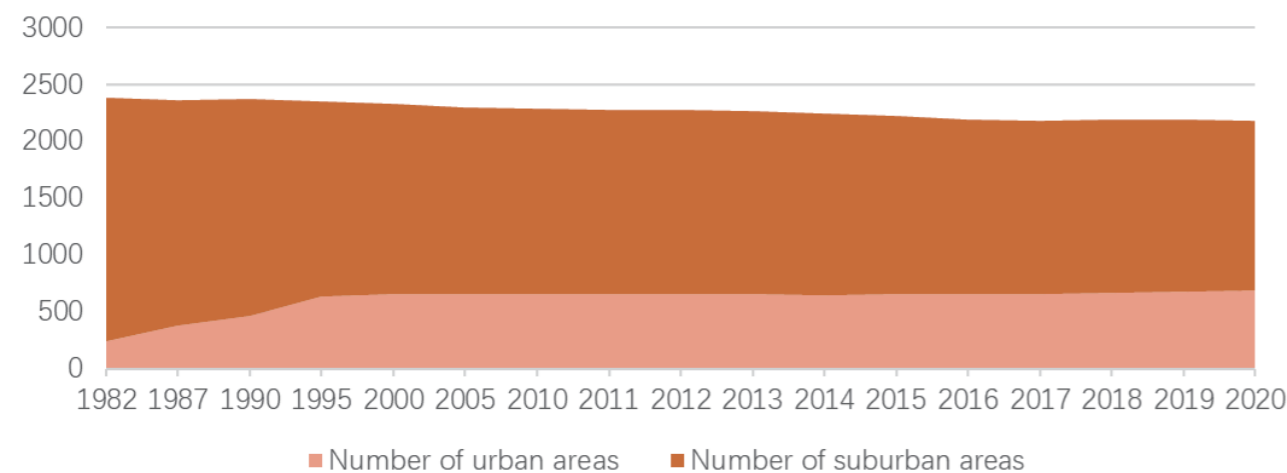


Figure 2. Numbers of countries & cities
Data Resource: National Changes in Number of Cities, Urban Population and Urban Areas in the Past Years(1978-2020)

hand, the urban village plays an important role to provide social security functions and affordable housing, which guarantee subsistence allowances for floating populations; on the other hand, the poor facilities and spontaneous system can also lead to a series of risks like crimes and conflagration. (Yu Xi; Wang Mengyuan; Dong Xin; Chen Xin; Lu Jinxia, 2021)

1.1.1. Contemporary Floating Population

At the early stage of the Reform and opening up policy, the floating population remains in limited number. Port cities like Shanghai, Ningbo, Xiamen, Tianjin and etc. were opened up to invite foreign investments and technologies. By 1990, the Pudong district in Shanghai was developed to stimulate the economy, which also brings rapid urbanization. From 1990 to 1995, the floating population in China tremendously grow from 21.3 million to 70.7 million, compared with the population amount in 1995 (Figure 3), with about 4% of the population became migrating between rural-urban areas.

With the completion of urbanization, the registered identity of rural residents will be transformed into urban residents as the previous suburban areas became a part of the cities during urbanization. In 2017, more than half of the population in China lived in cities. (Figure 4) But the amount of floating population doesn't seem to dramatic decrease with the increase in urbanization rate. (Figure 1) When seen from the household registration perspective, the number of rural residents did change with the increase

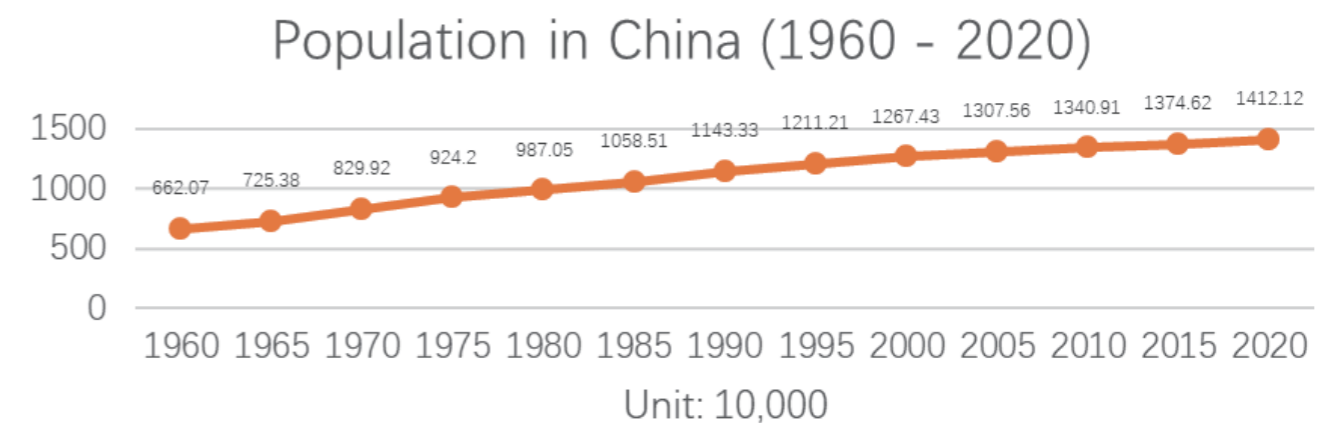


Figure 3
Data Resource: National Bureau of Statics,
Available at: http://www.stats.gov.cn/tjsz/tjsj/tjcb/tjzl/201012/t20101222_44746.html

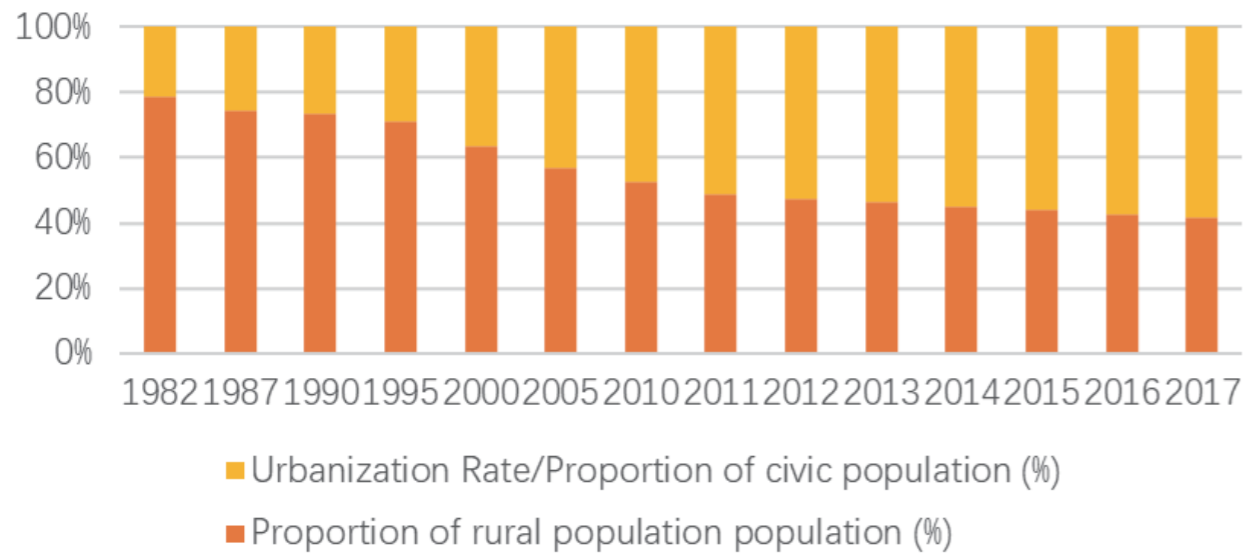


Figure 4

Data Resource: National Bureau of Statics,

Available at: <https://wenku.baidu.com/view/f0d45b6665ec102de2bd960590c69ec3d5bbdb8a.html>

of urban residents, from the data we could draw that the pattern of the major floating population has continued from rural-urban into urban-urban, in other words, residents from the economically backward areas to economically developed areas. Compared with urban-urban migrants, the rural-urban population is more intent to live in urban villages for the lack of social security and low rental, but at the same time, they have a stronger willingness to settle and integrate into the city. (Li Hua, 2021)

Even though the migrating pattern between two different types of the floating population could be varied, the duality could still be clearly explained. For rural-urban group, even if they failed to seek a decent salary in the cities, they still have a land property that can make a living. Besides, they are still emotionally rooted in where their origins, it also tells one of the main concentration modes of floating population in the cities: based on blood and geographical lineage (Guo Yongchang, 2008); As for the urban-urban group, the duality appears at the location of parents and the location of occupations. In general, the concept of roots and family did impact the floating population's settling decision. Compared with individual migration, family migration helps the floating population better integrate into the cities. (Ye Yuming, 2021)

1.1.2. Research Aims & Questions

Though researchers have explored and discussed the housing issues and the floating

population on many scales, most of the proposals are policy-making oriented. Based on relevant research, this study aims to propose a mechanism that promotes the floating population transformed into the registered population in the field of urban design and architecture. Based on the dimension of space, and exploring from three different scales: urban, neighborhood, and housing.

In order to understand how can urban and housing design promote the floating population integration, a case study will be done in order to understand the mechanism from countries that have already had succeeded in relating public well-being and housing design. The outcomes from the study will be related to the Chinese context. Since the floating population is a broad notion, several conditions will be given to specify the study subject. This research mainly focuses on the rural-urban population who also immigrated with family members, and discusses three research questions below:

Question 1. What facilities/Services should the living environment be equipped/ provide to positively affect the floating population's settling willingness?

Based on the literature study, guiding questions are thrown out to identify the accurate study subjects and contribute to further research. The framework is based on the development of living environments that promote floating population transfer. To develop the question in the Chinese context, the notion of the floating population is examined on different scales to understand what qualities are highly in demand for this particular group. The study outcomes could be referred to the maintenance of different infrastructures and public services, as well as the ability to renew the facilities that are provided, for amenities have various impacts on the occupants.

Question 2. In what way should the floating population interact with its surroundings to achieve the most benefit of social cohesion?

The pattern of the floating population has been studied by many researchers. Ye Yumin and Hu Shijia's research shows that family migration has a better integration performance compared with individual migration. Apart from that, the economy and job opportunities are the most important factor that drives the floating population, whilst public services and social interaction also impacts the target group's settling willingness. The inside mechanism that generates qualities mentioned previously on an urban level requires

further and comprehensive discussion.

Question 3. How can the living environments keep serving the public after the main problems of the floating population were solved?

Beyond the issues of the floating population and thinking of the entire city, the appearance of the floating population exposes that there is an urgent need for social security functions in the Chinese city planning system. Though the floating population shares the biggest portion of the marginal group at this moment, it would also be helpful to explore the qualities that could benefit those who are excluded from the majority group in an urban context. In the manner of sustainability, the role of public services and amenities are highlighted when helping the floating population and the registered population integrates.

1.1.3. Research Development

In order to further develop the research questions and for the purposes to understand what characteristics in a living environment help the floating population integrates, the literature review is applied to help specify the target group. Besides, as one of the most successful public housing in the world, the public housing system in Singapore is examined as a case study to understand the relationship between the housing system and social cohesion. In the end, the research approaches are applied to a site study in Shanghai, China to explore qualities that help the floating population integrates in a local context.

Overviewing existing research and studies, the focus on affordable housing and social housing in China from an urban design perspective can be barely seen. Most of the discussions are based on policy-making and city planning views. This study tries to combine the academic achievements from demography, sociology, urbanism and architecture together in order to make an interdisciplinary approach to social housing and relevant infrastructures in contemporary China. The floating population as the main actor in the context of social housing, plays an important role to understand the democratic governance and urban, suburban morphology of the future developments in Chinese cities. Migration as a common international phenomenon reveals the significant relationships between human and their living environments, which also attracts the

attention of scholars, policymakers and the public all over time. The domestic migration in China reveals the migrating preferences and fundamental demands when people move from suburban areas to urban areas, thus this study would also contribute to future researchers and/or designers in related fields.

Last but not least, the approach from this study is expected to draw a vision for affordable housing and neighborhood with social security functions and to give a feasible plan regarding the floating population in China. This paper is also aimed at giving a brief understanding to readers who are unfamiliar with the floating population and related research in China.

1.2. LITERATURE REVIEW

Research on the floating population from a macro-scale has been done and supplied by previous researchers, but the discussion on housing and the local level can be barely seen. This paper mainly focuses on the middle-low income, rural-urban floating population, and the Urban & housing system that helps them better integrate into the city.

1.2.1. Introduction

Published studies on the floating population in China have focused on many different scales. In many cases, the research on the patterns and characteristics of the floating population is from a demographic, geographical, and sociological perspective, while the housing issues, usually the urban villages and public housing, were discussed by architects and planners. Until recent thirty years, the phenomena of urban villages and domestic migration caught the scholar's attention, therefore they are still relatively new concepts to be completed. Though researchers' understandings and attitudes are changing over time, the way people understand Chinese urban villages and the floating population still share some commonalities.

1.2.1.1. The Floating Population

Existing studies are mainly focusing on the performance of social cohesion of the floating

population from sociological and demographic aspects. In general, Yang Juhua's research on the assimilation of the floating population in China (Yang Juhua, 2015), where gave four dimensions of measurements: economic integration, social adaptation, cultural acquisition, and psychological identity. Her research can be considered as an important milestone in the field of floating population research. From her conclusion, one important fact was drawn that the resistance to the household registration system was not as strong as the previous scholars expected. Both Yang Juhua and Guo Yongchang agreed that economic issues are the basic elements that decided if the floating population is going to settle down or not, while other elements are accessibility, social interaction, etc. did secondary impact.

When giving more accurate descriptions to the research subject, the rural-urban floating population could be distinguished by origins, ages, individuals or by groups, education levels and etc. Among these parameters, it seems to migrate by family is much easier to merge into the cities compared with individual immigrants. (Ye Yumin, Hu Shijia, 2021) Another research from Chen Xiaokun and Cao Yangyang shows the subjective settling willingness of the floating population and divides the integration level into two different aspects: Individual: economic, social and psychological characters; Urban: Social security, infrastructures, medical and health care.

Besides the focuses mentioned above. Some other researchers also put their attention on more zoom-in scales. Several studies by Guo Yongchang explore the behaviors and assimilation of the floating population. Based on the theory of social networks, he concluded that in order to achieve the spatial-restructuring and update social networks, which means changing the pattern of domestic immigrants, it is necessary to put industries and infrastructures into consideration. The changing footprints were also investigated, it shows that for the floating population who lives outside the city, the likelihood that they visit city centers will keep decreasing after six months when settling in a new city. (Guo Yongchang, 2006)

To sum up in the scale of time and space, when promoting the rural population transferred into the civic population, it is crucial to focus on economic issues and productive urban areas. Infrastructures should also be well developed to make sure there are sufficient exterior resources to support the process of transformation. The individual floating population should be distinguished from family immigrants for they have different



Urban Villages in Shenzhen (Resource: Sohu)
Available at : https://www.sohu.com/a/435784219_432066

performances when integrating. The daily routines from the different time period of the floating population are also important for it reflects the assimilation level.

1.2.1.2. The Relationship between Floating Population and Their Shelters

The urban village² in China was considered a hinder to urbanization for it gathers high-dense immigrants and sometimes gives birth to crimes at the first place, due to its spontaneous system, it is hard for the city and urban villages to connect with each other. Back in time, the municipalities' strategies are to tear down the urban villages in the city center and built new neighborhoods for groups like the floating population, which only give rise to the situation. (Wei Lihua, Li Zhigang, 2006) As time goes by, people began to realize that the urban village plays an important role when giving shelter to the floating population and people with low income. Whilst the government also changed its attitude

² Urban villages in China: According to the Land Administration Law of China, there are two types of land ownerships in the country. Public/government-owned lands, urban villages were owned by the farmers. (Law of People's Republic of China on Land Administration < 中华人民共和国土地管理法 >, Chapter 2, 2019) During the process of urbanization, rural areas were included in the cities. Due to different Land ownerships, public services and infrastructures cannot apply to the farmers-owned land. Therefore, they can develop self-build housing with low expenses and attract those who seek cheap housing and low living costs, which includes the majority of the floating population. Such informal settlements with semi-rural and semi-urban characters are named "Urban villages". Recommended material for the urban villages in China could refer to Hsing, Y.T., 2010. < The Great Urban Transformation: Politics of Land and Property in China >. Oxford University Press.

that the urban villages should be improved into a community with social security functions instead of being torn down. (Liu Qiang, Wang Yong, Zhou Kaiqi, 2019)

With this common understanding, the nature of the Chinese urban village is a shelter that provides social security and affordable housing to disadvantaged groups, marginalized populations and covers their daily demands when lacking access to resources in the cities. In recent years, few scholars began to explore the relationship between the floating population and urban villages. The research by Li Xiaozhuang and Li Sheng uses the concept of social integration and also built four dimensions to evaluate the integrated level of the floating population: community identities; community services; community participation and community interaction. (Li Xiaozhuang, Li Sheng, 2021). The satisfaction with housing and migration tendency of the floating population was also studied. The result shows the emergent need for public housing, infrastructures, and amenities. It also reveals the importance of mixed-neighborhood and general planning from the municipality. (Tong De, Gu Chunxia, 2021; Yu Xi, Wang Mengyuan, Dong Xin, Chen Xin, Lu Jinxia, 2021). As evidence shows, a government-led and multi-stakeholder participant mechanism can improve the floating population's satisfaction with their living environments, compared with the developers, municipalities tend to invest and improve infrastructures (Tong De, Gu Chunxia, 2021). It explains that public places have a huge impact on resident's degree of satisfaction and settling willingness (Yang Juhua, 2015),



Nantouguchen, Shenzhen (Resource: Urbanus)
Available at : <http://www.urbanus.com.cn/projects/nantou-old-town/>

Apart from the latest studies, some former researchers also emphasized the relationship between public housing and the floating population. The study by Wang Limei and Zhang Zongping explains the importance of the market-based rental housing system. (Wang Limei, Zhang Zongping, 2010) The role of developers and municipality are discussed in a recent study. As researchers reveal, only with the participation of the municipality can positively improve the satisfaction of urban village dwellers for they usually come with general planning and a focus on public welfare (Tong De, Gu Chunxia, 2021) while developers are mainly economically driven. The discovery from Meng Qian and Deng Haiping argues that a mechanism remaining the balance between capital and policy should be set up because, beneath the background of informal housing, urban village dwellers are kept searching for informal income opportunities, (Meng Qian, Deng Haiping, 2021) which have negative impacts from an economic and governance perspectives. Another earlier research by Guo Yongchang shows that besides migrating between rural-urban areas, the floating population also tends to move between different urban villages for the reason of occupation and low living expenses. (Guo Yongchang, Ding Jinhong, Meng Qingyan, 2006) Many of the floating population tend to live in places where close to their working spaces.

Just like many urban villages in China. The Nantouguchen in Shenzhen remains the characters of semi-village and semi-city. Floating populations with various geographical and cultural backgrounds guarantee a diverse community atmosphere. At the same time, due to the high population mobility, the second-hand markets are quite active. The low living costs and various optional consumption attracts a huge amount of young graduates to consider urban villages as their first destination to start a new life in the city.

To sum up the section, the urban village as one of the main settlements for rural-urban immigrants has a strong informal and spontaneous character. Though many of the housing in the urban villages are in poor conditions and lack qualities, it still guarantees low living expenses and provides shelter for domestic immigrants in the cities, which shows the importance of infrastructures like the public rental housing systems. A nice quality settlement can also help the floating population better integrate into the city, but the income level and occupation are still important when the floating population chooses their housing.

The self-supply system seems crucial to the settlements like urban villages, profits can

be generated in the daily activity to maintain the community, it would also be a proper chance to introduce a market-based competition mechanism to regular the commercial behaviors locally. The urban village in China is a collectivity that provides multiple functions; besides housing, it also contains services like restaurants, markets, and public spaces. Housing no doubt generates the most profit compared with other properties in the manner of the economy. As the government began to realize the importance of the urban village with the idea of inventory space development, the role of exterior spaces in the urban villages would be further developed.

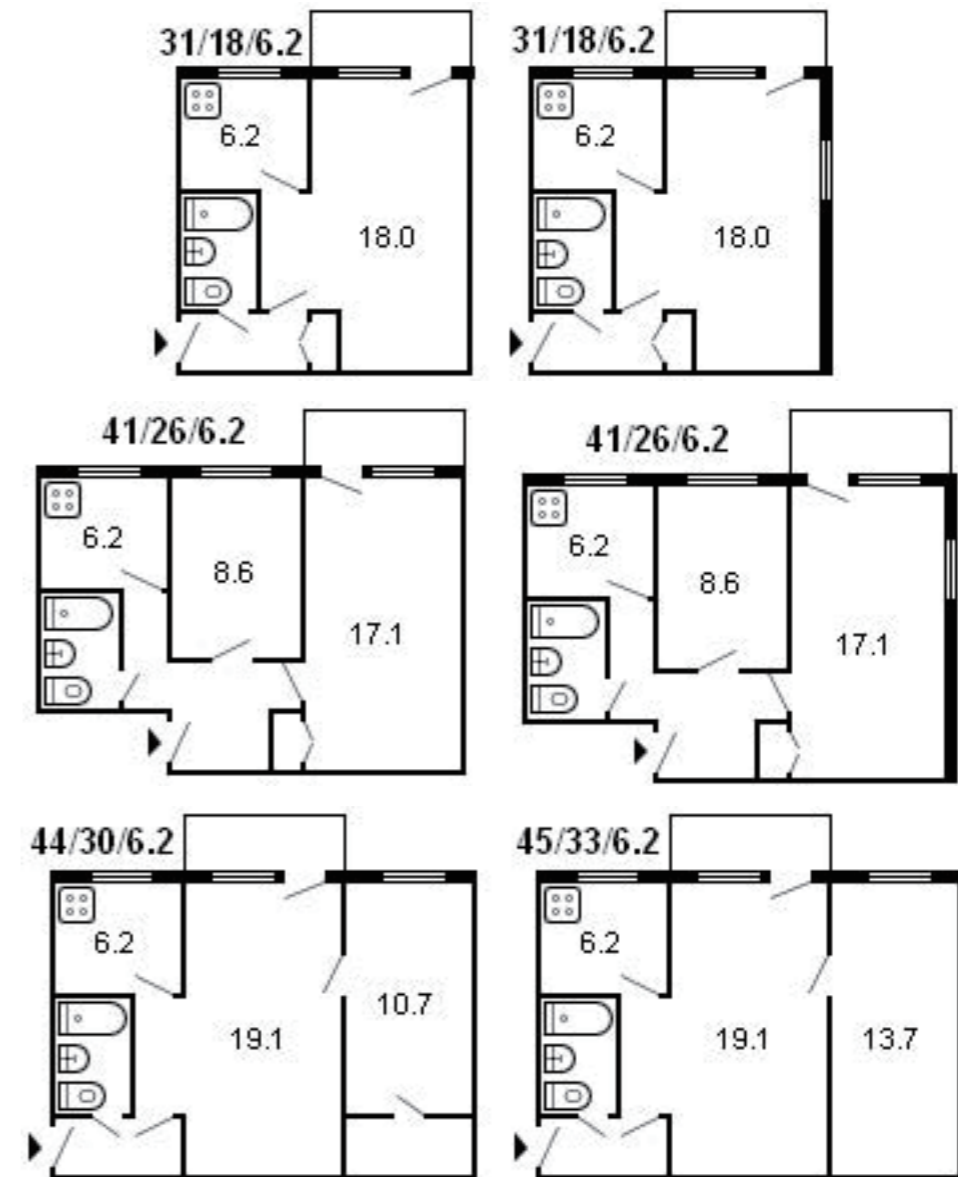
1.2.1.3. Housing system in China

The economic reform in 1978 not just changed the way the market behaves, but also the housing system and policies (Fu Hongjie, 1999). Back in the centrally planned economy period, most housing in the country were conducted and maintained by the government following a welfare system. Though there were a few rentable apartments that existed, due to the low rent and the limitation of the planned economy, it became extremely difficult for the government to return on investment, buildings that need maintenance received less and less financial support, which leads to a severe housing crisis by the end of 1978.

From the 1980s, a series of policies were applied to achieve the marketization of housing



(Plan of Khrushchyovka series 335, resource: ihome)
Available at : <https://ihome-en.expertolux.com/kvartiry/planirovka-khrushchevki>



(Housing layout of Khrushchyovka series 335, resource: ihome)
Available at : <https://ihome-en.expertolux.com/kvartiry/planirovka-khrushchevki>

and to develop the real estate industry. By the end of 1998, the welfare-nature housing distribution was removed. Today, the market is facing the risk of high housing prices and rents while the construction of affordable public housing is still in progress. Though there were few affordable housing projects built in several cities during the past years, they did not turn out well because they were located outside the cities and had little access to public services and transportation.

Before the marketization, the typical housing typology is Khrushchyovka or similar structures with Chinese characters. After that, with the introduction of the "Shared public area", which is the fare of public area to be shared in the commercial housing by the

homebuyers. Though the range of this expense does not include public areas, there is no doubt giving extra financial burden to the residents. Usually, the number of fares increases with the square meters of public space, for instance, more corridors and facilities come with more expenses. It also requires the stakeholders to develop the public area within the building efficiently.

The Khrushchyovka style buildings, also known as the Tongzilou (筒子楼), used to be common in North China to meet the needs of heavy industries development and were considered as the dormitory for workers and their families. Unlike many Khrushchyovkas with private bathrooms and toilets in Soviet, not all Tongzilou apartments provide equipment for showering. Therefore people have to go to the public baths and toilets, in the case of Shanghai, people shared the kitchen as well. Though the facilities provided limited convenience for the residents back in time, the shared facilities guaranteed public spaces for people to interact with each other and participate in public issues actively.

Currently, the major problem with providing affordable housing in China is the sources of funds, besides that, local governments also lack the sources of expenses to guarantee affordable housing (Zhang Dongping, 2012). Currently, the central government is putting efforts into the housing providence fund and housing allowance, considering the high-income gaps and housing prices, it became difficult to reform the housing system. As discussed earlier, being floated is the key characteristic of domestic immigrants in China. Overlooking the history of contemporary housing development in China, it seems that it is extremely important to provide the floating population with a stable income to guarantee the maintenance of the affordable housing system. Recent research shows that it is possible for the market to perform rent and purchase simultaneously in big cities (Luo Yikeng, 2021). Currently, the rental market in China performs in an informal way, achieving market standardization from a policy perspective could provide the condition to build rental-based affordable housing when relating to the floating population.

1.2.1.3.1. Participating Actors

1.2.1.3.1.1. Central Government

The Ministry of Housing and Urban-Rural Development of the People's Republic of China (MOHURD) is in charge of the policies that relate to housing, urban and rural planning.

MOHURD mainly focuses on government projects and issues related to infrastructures. Besides that, the ministry is also in charge of supervising the real estate market.

1.2.1.3.1.2. Local Authorities

As part of the Chinese central government, the MOHURD has many subordinate units, for instance, departments as the provincial units and boards as the city and town level units, which are rooted in various local governments. As part of the local authorities, not just the policies and instructions from the parent units ought to be applied, but they should also react locally. Evidence shows that competitions exist between different levels of local administrative departments (Yan Yan, Liu Tao, Man Yanyun. 2013). One of the most competitive strategies is the Land Transfer, which progressively benefits local finance. Though the comprehensive competitiveness of a local government was formed by different indexes. Revenue as a major component of the local government's financial income, could influence local authorities' governance capacity indirectly.

1.2.1.3.1.3. Real Estate Developers

The real estate industry in China prosperously developed with the reform of the economy. Developers are mainly focusing on the field of economic housing. Usually they bought the land use right from the municipality through an invite tenders procedure. Most of the housing in China was designed and constructed by the developers.

1.2.1.3.1.4. Collective-land owners

During the process of urbanization, villages that were absorbed by the urban area became a part of the cities. The increasing real estate values change the traditional way that farmers make their livings. Villages as a unit transform their income source from farming to rental. At the early stage of urbanization, most cities were facing either housing shortages or unaffordable housing prices. Unlike most lands owned by the government, the villages own their properties, as known as the collective land. Most of the housing built by the villages followed a spontaneous system and requires low rental from the tenants. Due to the semi-urban and semi-village character, this type of informal settlement is as known as the urban village.

1.2.2. Conclusion

In this section, the situation of the floating population was explored. It shows that the floating population differs in ages, origins, genders, households, education and income levels, etc. Their settling willingness is affected by these different variables, but at the same time affected by exterior variables, for instance, public facilities, habits, job opportunities, etc. Since most domestic immigrants are travelling between different places, they are more likely to rent housing instead of purchasing one. Considering that, in recent years the amount of the floating population is decreasing, this is partly because of the decline of the national birth rate, but on the other hand, with the completion of urbanization, quite many rural populations are transferred into urban populations, the object of the domestic immigrants has been slightly changed from rural-urban populations to urban-urban populations.

With these study outcomes, it is realized that in order to maintain the constant vibrancy of a neighborhood is understand the user groups and their characters, and how to build



*Bishan public housing area in Singapore
(Resource: Wikipedia)*

a sustainable funding system. The research question: how can the living environments keep serving the public after the main problems of the floating population were solved? Is mostly answered.

1.3. CASE STUDY – PUBLIC HOUSING SYSTEM IN SINGAPORE

Public housing and the public housing system ought to be distinguished. Regarding the research subject in this study, public housing is defined as the buildings that provide shelters to mid-income groups and mid-low-income groups, while the public housing system provides both housing, infrastructures, amenities and other functions that guarantee convenience.

A case study on the public housing system in Singapore is studied in order to understand their approaches when building public housing and urban spaces to help urban immigrants merge into the cities. Compared with many developed countries, Singapore has many advanced experiences and practices in building public housing system. The case study began with a general introduction to the public housing system in Singapore, followed by an analysis of their latest project, the Tengah district.

1.3.1. Participating Actors

1.3.1.1. Local Authorities

The Housing & Development Board (HDB), which affiliates with the Ministry of National Development, is the public housing authority in Singapore. They are in charge of designing, building, and maintaining all the public housing and infrastructures across Singapore. In the year of 1960, the HDB was set up to overcome the housing crisis and the prevalent unlivable settlements in the country. After decades of evolution, they have developed an advanced system regarding housing solutions. By 2020, 78.7% of the population lives in public housing with the value of providing quality and affordable homes. Besides that, a flexible and dynamic mechanism was widely used during the whole

process to make sure the housing & community functions match the demands of different generations.

It is known that Singapore is honored by its public housing, but the visions and practices on landscape and greenery have also been systematically developed. After the housing shortage was fulfilled, the direction has been turned to provide quality lives and build unique communities. The landscape strategies not only apply to enhance community interactions and old town renewals but also provide segments like green roofs, vertical green, etc. to improve livability. (Housing & Development Board, 2013)

Efforts were also put on the policy perspective. Due to its history, Singapore is a multiethnic country, people with different country backgrounds and habits living together. The government of Singapore published the Ethnic Integration Policy in 1989, which requires populations from different ethnic backgrounds must live together in the public housing area. The ratio is based on the percentage of different ethnic populations, for instance, the maximum portion of Chinese people in a single housing unit is 84% while 22% for Malaysians (Chengxiang Xu, 2021). Not just people who are from different backgrounds, but also people who are from various age groups. The infrastructures in public housing are also designed to make aged people and the disabled's daily life more convenient, which guarantees a vibrant neighborhood when achieving social sustainability, different qualities were emphasized: Diversity, mixed-function community, multi-participation, greenery, and accessibility.

Financial support was also provided when one decided to purchase a flat in the public housing precinct. Such a financial commitment could be stretched up to 25 years and it depends on the income level of the applicants. Usually, the monthly housing bill is affordable for the Central Provident Fund (CPF) in Singapore, which guarantees the lender wouldn't be pressured by the loan payment for 35% of the resident's monthly salary will be kept in their CPF account.

1.3.1.2. The Community

The public housing community has a wide range of dwellers for the HDB housed 80% of the population in Singapore. The household unit could be divided into 5 different types, First-timer couples, Second-timer families, Multi-generation families, singles and silver

generations. Multiple types of housing are provided for residents with different demands and income levels.

As mentioned previously, Singapore is a multi-ethnic country, which contributes to the mixed-culture atmosphere. Besides English and Chinese language, local residents also speak Indian and Malaysian. Due to the highly social development in the country, most of the dwellers are highly educated, especially females in recent years.

The concern on the future generation and social interactions also appear on the community events. Opportunities are offered by the government to encourage dwellers to take part in governance. The dwellers are also encouraged to plant their vegetation on the green area within the community to create a strong social bond (Fang Tianhong, Yang Changyu, 2021), which emphasizes the role of public spaces and landscapes when it comes to achieving the benefits of social interaction and cohesion.

1.3.1.3. Non-Government Organizations

The government invites various faculties and companies from different industries to take part in the process of creating a better living environment by setting up awards, for instance, HDB Design awards, HDB construction awards and HDB engineering awards, etc. Besides, the People's Association (PA) in Singapore, which is an organization formed up by a wide range of volunteers, has also deeply taken part in different social services. By doing so, residents tremendously expand their social network and have better access to different information. Experts with different advantages work together to construct a common living environment. The participation of NGOs is no doubt increase the willingness of residents to take part in community life (Fang Tianhong, Yang Changyu, 2021).

1.3.2. Social Interaction & Existing facilities

The public housing system in Singapore is funded by the Central Provident Fund and keeps receiving sufficient financial support from the authority, the relationship between funding and social vibrancy is unknown, therefore it won't be taken into consideration.

Social interactions are a set of different behaviors while people's performances could be defined by their surroundings. In practice, certain functions were accurately given to

the different scales of places to guide users to behave in certain ways. But it should be kept in mind the existence of spontaneous performances, which is that users don't use the place as planned, instead, the spaces were put to other uses. In the early stages of urban planning, the concept of zoning was widely applied to many cities, it turns out that crimes and traffic jams massively occurred. It could be explained that places with mono-function could be easily "invaded" by exterior urban actors. In the cases in Singapore, the spontaneous performances, mono-function and poly-functions are distinguished by the use of scale. In the farmway, or the green spine to be specific, within the study area, various scales are given to places with different functions. Those places are direct to different meeting points, for instance, gardens or pocket parks. The role of scales and connectivity perform differently under the framework of HDB.

Besides that, objects and facilities also play their roles when defining dimensions and functions. For instance, the thematic park for children is defined by the dimension of children and recreational facilities with animals or insects' appearance. Such methods are not common in Scandinavian countries, but they work well to highlight the space's characters. Many of the public housings in Singapore are high-rise buildings. Their ground floors are also part of the public spaces, in other words, the extended scale of the scale in shared areas. Linkways and void decks below the buildings are designed for community use. In some other cases, platforms were designed by half of high-rise buildings to provide



*The Transportation hub in Singapore (Resource: HDB)
Available at: <https://www.hdb.gov.sg/cs/infoweb/about-us/history/town-planning>*

public spaces for residents who live in higher storeys.

The use of scales, connectivity and objects from HDB's framework provides a new understanding of social interaction and the surroundings. A conclusion could be drawn that different scales and objects define a place and bring various user groups while connectivity provides the opportunities to meet.

1.3.3. Study in the Performance of Infrastructures

Singapore is a country with limited land area, therefore to make full use of every public house neighborhood, The service range of a neighborhood center is proximately 500-600 meters which provides public services and activities to about 20,000-30,000 residents. As a complement to earlier expression, the ground floor of each building unit is open to the public, such a mechanism is also named the Neighborhood Incubator. The other strategy is called Social Linkway, multi-function facilities were introduced into the public spaces to promote the interaction between local residents. Such a neighborhood design is also open to visitors and tourists to create economic opportunities.

The typical planning system in Singapore is: community center-new town center-groups



*The Sky Community Park (Resource: HDB)
Available at: <https://www.hdb.gov.sg/cs/infoweb/about-us/history/hdb-towns-your-home/tengah/live-well-at-tengah>*

center, which could be roughly explained as multi-neighborhoods combined into towns and towns combined into a group. Planning for connectivity is also part of the HDB's framework, apart from comprehensive transport infrastructures, the town center is usually designed into an integrated public transportation hub, which also gives access to different blocks. Besides the community centers, functions like leisure, retails and markets were provided by two other level's centers. In order to connect different centers, the TOD (Transit-oriented Development) system is applied to each public housing neighborhood. The maximum proximity distance to the nearest public transportation is 400 meters. The floor area ratio in the public housing area is usually from 3.0-3.6. But with the range 500 meters within metro station the figures are decreasing from 4.9-2.8, relevant research also shows the land use within this range: Residential (30%-60%); Commercial (7%-11%); Infrastructures (7%-11%); Greenery (2%-*8%); Roads (17%-24%) and kept some open space for future development. (Xu Chengcheng, 2021; Fang Tianhong, Yang Changyu, 2021)

The focus on the public space also goes vertical. The strategy, Checkerboard Concept, is widely used in many public housing communities. Low-rise developments like schools and

HDB Ffat types	Community Care Apartment	2-Room Flexi	3-Room	4-Room	5-Room	3Gen
Approx. floor area (Square meters)	32	Type1:35 to 38 Type2:45 to 47	60 To 68	HDB Ffat types	HDB Ffat types	HDB Ffat types
Bedrooms	1	1	2	3	3	4
Bathrooms	1	1	2	2	2	3

(Figure 7 Source: HDM)
Available at: <https://www.hdb.gov.sg/cs/infoweb/residential/buying-a-flat/new/types-of-flats>

playgrounds intersperse within high-rise residential buildings to provide visual and spatial relief. Such methods to give access to the blue structure, which refers to the sky, are quite common in the neighborhood design. The typical structure of the multi-storey car parks in Singapore is to consider the ground floor as part of the public space while the top floor will be considered as gardens or playgrounds where fitness amenities are located. Elements like fitness stairs also diversify the daily life of local residents.

1.3.4. Housing Design in the Public Housing System

The typical typology of public housing is a high-rise building. Though high-rise buildings can provide more housing units to different families, from the perspective of social cohesion and local climate, disadvantages like the ability to protect residents from tropical sunlight and the opportunities to interact with neighbors exist. The way the designers meet those challenges is to provide vertical solutions, for instance, vertical green and sky platforms. The study also shows that the appearance of each building will be painted in



(Early HDB housing types, resource: HDB)

Available at: <https://www.hdb.gov.sg/cs/infoweb/about-us/our-role/public-housing-a-singapore-icon>

different colors, but the scheme is decided by the residents, therefore it won't be taken into the discussion.

The HDB housing offers six different types of housing. From 2 rooms apartment to 5 rooms apartment. As for multi-generation families, a four bedrooms apartment is offered, among those four rooms, two of which have attached bathrooms to meet the demand of the silver generation. When it comes to disabled groups and aged groups, a community care apartment is provided as well, this type of housing is equipped with senior-friendly facilities. Since all of the public housing in Singapore have its own elevators, the community care apartment is usually close to the ground floor, top floor, where close to open public space and services.

As the plans of different housings showed, the average per capita living space is between 20 m² to 30 m², for families with old people or the community care apartment, this figure would go to 32 m².

1.3.5. The Tengah District – A Home with Nature

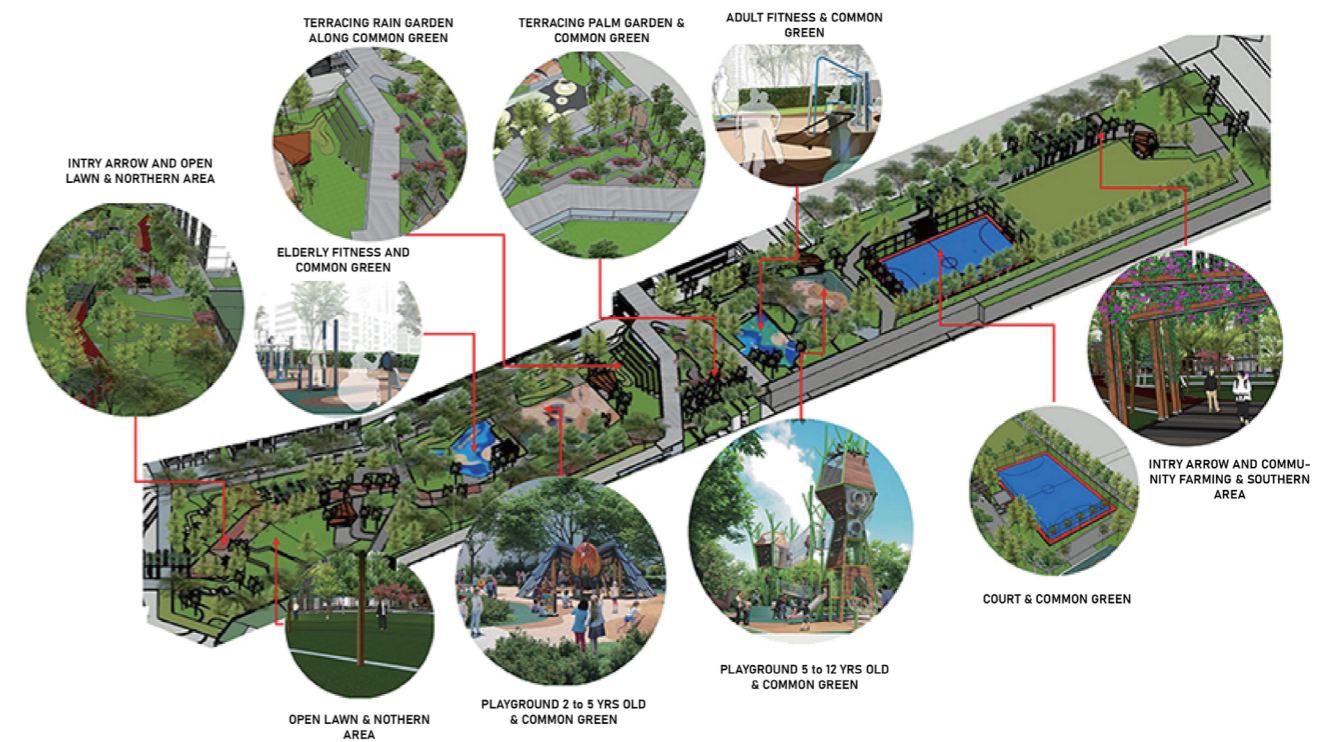


(Aerial view of the Tengah District, resource: HDB)

Available at: <https://www.hdb.gov.sg/cs/infoweb/about-us/history/hdb-towns-your-home/tengah/tengah-districts>

The Tengah District is an under-construction housing project from HDB, as the only project available on HDB's website, though it hasn't been built yet, the released materials addressed many important qualities in the public housing design. As the latest design proposal, it will be the first housing project to apply smart techniques. Since if the technique would positively impact the resident's satisfaction and social interaction is uncertain, this part of the content will not be included in the section. In this part, the focus will be put on the performance of public places and infrastructures according to the framework of HDB and UN sustainable development goals.

Within its 700-hectare area and 42,000 residential units, 5 districts with different characters will be set up and communicated with other districts alongside the borders. With the theme of "A Home with Nature", the aim is to develop the district into a living environment with a focus on green, sustainable characters and community-centric orientation as claimed in the proposal's vision. With a forest corridor by the north, the west



(The Garden Farmway at the Garden District, resource: HDB)

Available at: <https://www.hdb.gov.sg/cs/infoweb/about-us/history/hdb-towns-your-home/tengah/tengah-districts>

part of the site is the extent of the Jurong Innovation District, rest of the areas are themed, Garden District, Park District, Plantation District, Forest Hill District, Brickland District.

The Garden District and The Plantation District emphasize the function of Farmway, which provides gardening and farming opportunities as the main social-interact function. Such opportunities like local farming not only encourage local residents to communicate with each other but also emphasize the value of "Farm to table dining". Both districts use greenery as the connection to different facilities and provide thematic parks for children. The town center is located in The Park District, which provides more public services and open spaces like parks on a big scale to meet the need for gathering. The Forest Hill District is connected with the forest corridor to the north and represents the theme "Living with Nature" while The Brickland District is a living area renovated from the old brick factory.

To sum up, both Districts provide general functions like pocket parks, thematic parks, and fitness corners. To highlight the people-centric design, those different functions differ with the focus on different age groups and user groups. In many Singaporean housing areas, there would always be a central district equipped with multiple functions and services, which is surrounded by other districts, this framework applies to this project as well. One of the benefits of this mechanism is to guarantee the flow within the area. The Park District provides large volumes of structures like polyclinic and open public spaces, etc. while other secondary districts have a certain focus. Though the consideration of ecology and greenery are not mentioned in the project, with the understanding of the framework of The Tengah District, a conclusion could be drawn that different tree and bush species play different roles when meeting different functions. For instance, vegetation in productive areas like The Plantation District, symbiotic plants should be taken into consideration when choosing vegetation. When it comes to the central district with many large volume blocks, which refers to a huge traffic compared with other areas, trees with wider crown and the function of air purification should be applied.

1.3.6. Discoveries and conclusion

The study on the public housing system in Singapore has shown much helpful information regarding affordable housing, people-centric community and the value of neighborhood design. Most of the housing offered by the HDB is sold to Singaporean citizens, therefore

they are not likely to be rentable, housing expenses and relevant costs are guaranteed by the CPF system. When translating Singaporean experience to other places, the difference in mechanism should be fully considered.

The key character of the social cohesion-oriented design is to create as many meeting points as possible, besides that, the physical space which supports the meeting function should provide multi-opportunities for residents to interact with each other while making full use of the character of spontaneous. As a general principle, many of the ground floors in Singapore are designed with multi-social functions for people to interact with each other in different ways.

Unlike commercial housing, the trigger of public housing and affordable housing is the well-being and security of the majority. But at the same time, the cost and expense should be controlled in a negotiable range, in other words, to provide good living qualities to as many residents as possible. Therefore it is important to go vertical wisely and go inclusive/collective efficiently. The HDB housing projects use the checkerboard strategy for the improvement of vertical development, the idea of a traffic hub is widely applied as well. These methods not only make full use of every inch of the land but also control the expenses. Meanwhile, the inclusive design demands a high-quality polycentric design. The polycentricity could be abstract without thinking about the dimension. When it comes to various scales, it should perform differently.

A people-centric design provides a more diverse living environment and a friendly atmosphere. The design of public spaces explains how can different outdoor spaces serve users from different age groups and those with different demands. This act will no doubt encourage people to feel welcome outside and are more likely to use public spaces, which increases the possibilities for social interaction.

Lastly, the research on landscape and greenery also provides new perspectives. Like many public spaces, outdoor green also focuses on different user groups. A productive landscape can positively increase meeting opportunities, compared with lawns and vegetation barriers, the area ratio of the productive landscape is apparently larger for the potential to provide social function.

CHAPTER 2. DESIGN PROPOSAL



2.1. SITE ANALYZE

Shanghai is the city that has the biggest portion of the floating population in China. Compared with Shenzhen, the conflicts and gaps between natives and immigrants are more severe. Considering that, Shanghai is no doubt the best subject to study the integrated level of rural-urban immigrants. In order to discover the most representative areas in Shanghai, the data from the floating population investigation in 2018 and the rent & housing prices data in 2021 were chosen

By 2022, the population in Shanghai reaches 25 million. About 40% of which are the floating population. The rest 60% are registered population with their own housing while domestic immigrants are facing frequent residence changes for various purposes.

- MAIN MIGRATION DEPARTURES
- MAIN MIGRATION DESTINATIONS

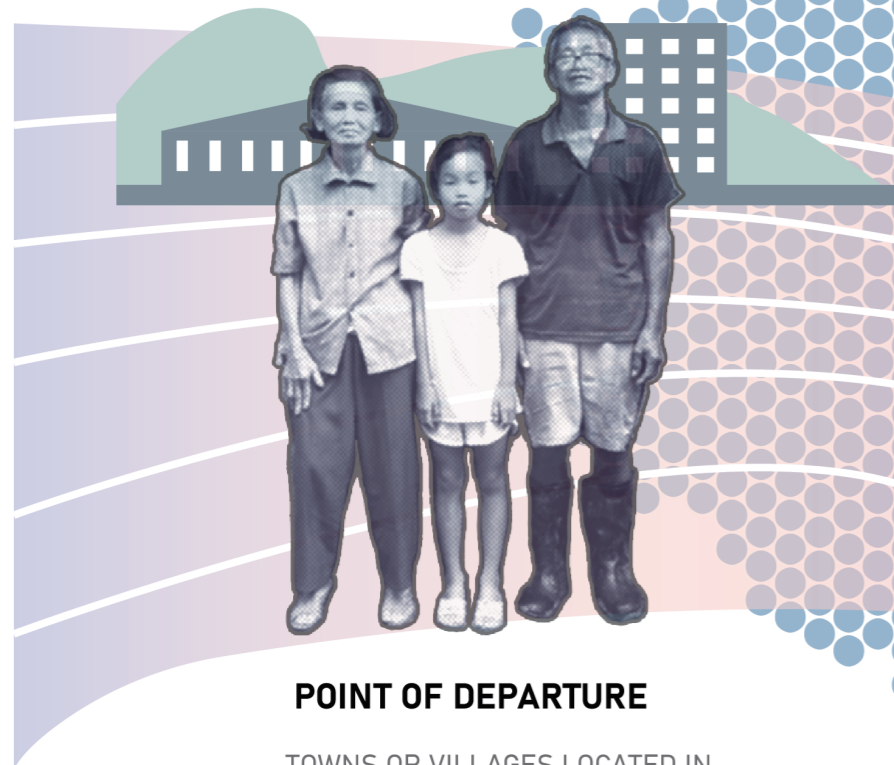
DOMESTIC MIGRATION

KNOWN AS THE FLOATING POPULATION, THIS TYPE OF MIGRANTS ARE WORKING AND LIVING IN DEVELOPED AREAS AND RETURNED TO THEIR ORIGINS DURING HOLIDAYS. THE PROPOSAL CONSIDERED FAMILY-MIGRANTS AS THE MAIN USER. FOR THEY ARE WELL PERFORMED IN SOCIAL COHESION.



SHANGHAI, CHINA

BY 2022, THE POPULATION IN SHANGHAI REACHES 25 MILLION. ABOUT 40% OF WHICH ARE THE FLOATING POPULATION. THE REST 60% ARE REGISTERED POPULATION WITH THEIR OWN HOUSING WHILE DOMESTIC IMMIGRANTS MAY FACING FREQUENT RESIDENCE CHANGES.



POINT OF DEPARTURE

TOWNS OR VILLAGES LOCATED IN HINTERLAND AREAS. USUALLY UNDER DEVELOPED WHILE AGRICULTURE IS THE MAIN INDUSTRY.



THE FLOATING POPULATION IN CHINA



BY 2022, THE TOTAL POPULATION IN CHINA IS 1.4 BILLION, WHILE NEARLY 0.38 BILLION ARE OUT OF THEIR ORIGINS, ALSO KNOWN AS THE FLOATING POPULATION.

DATA RESOURCE: BEIJING DAILY. 29TH, NOV, 2021



DESTINATIONS

ECONOMICALLY DEVELOPED SEASIDE CITIES. MOST DOMESTIC MIGRANTS ARE WORKING AS UNDERPAID LABOR.



Districts in Shanghai

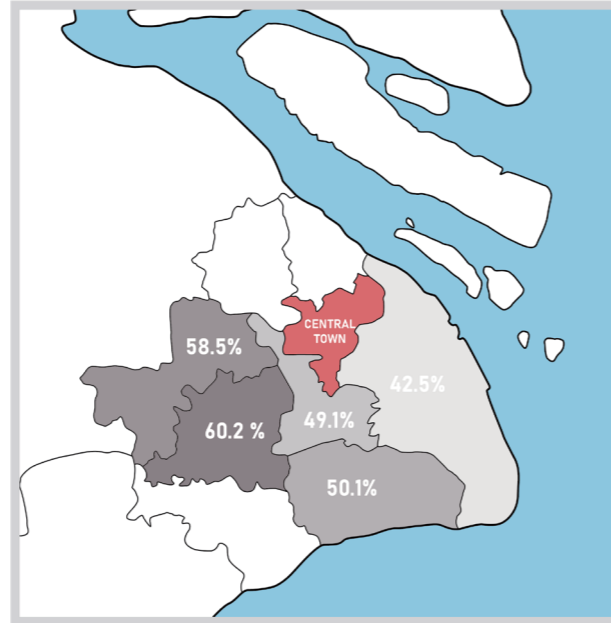


Diagram 1. The ratio of the floating population in different districts of Shanghai

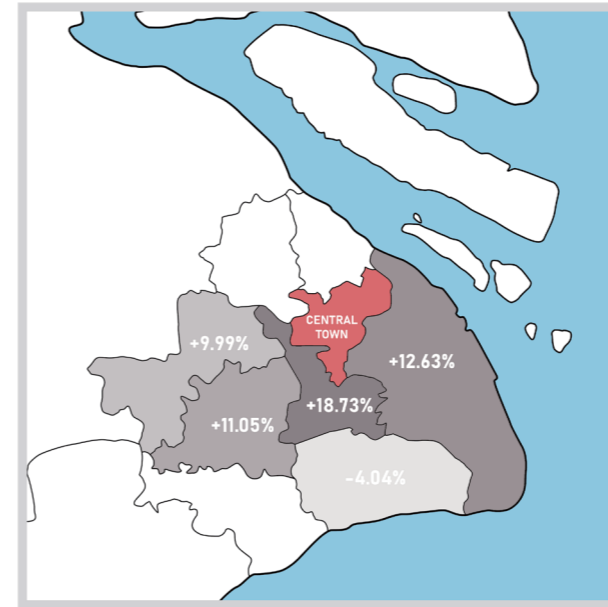


Diagram 4. Housing Price Fluctuation compared with 2020

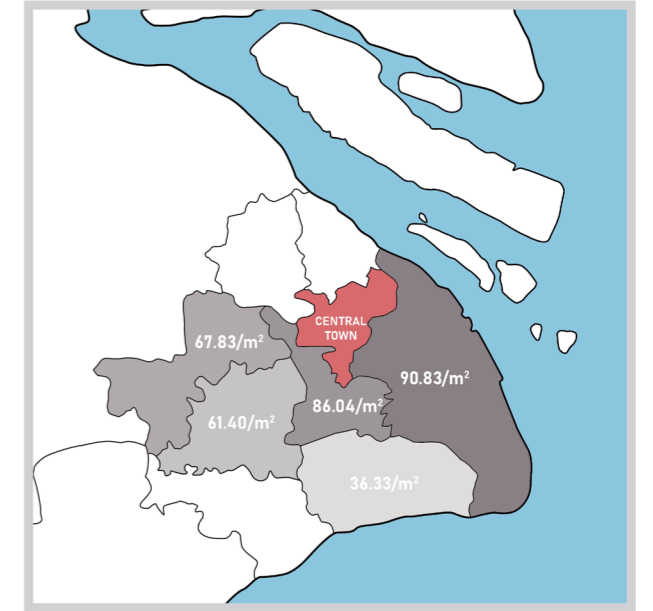


Diagram 5. Rental price divided by districts– Dec.2021. (Unit: CNY)

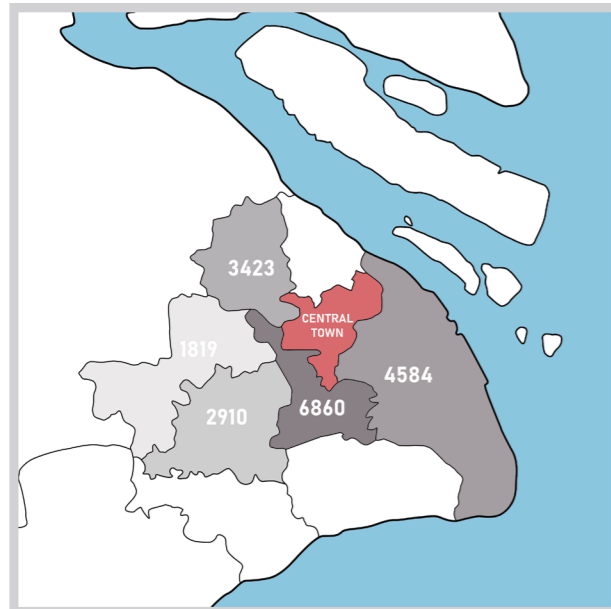


Diagram 2. Population density divided by districts (Per km²)

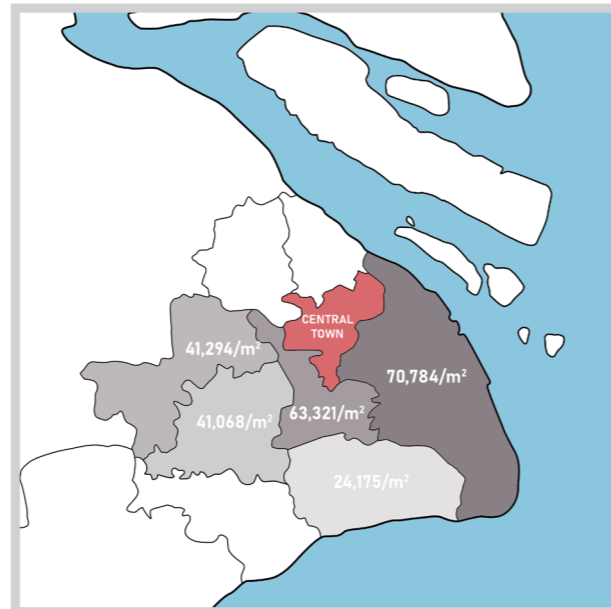


Diagram 3. Housing price divided by districts– Dec.2021. (unit: CNY)

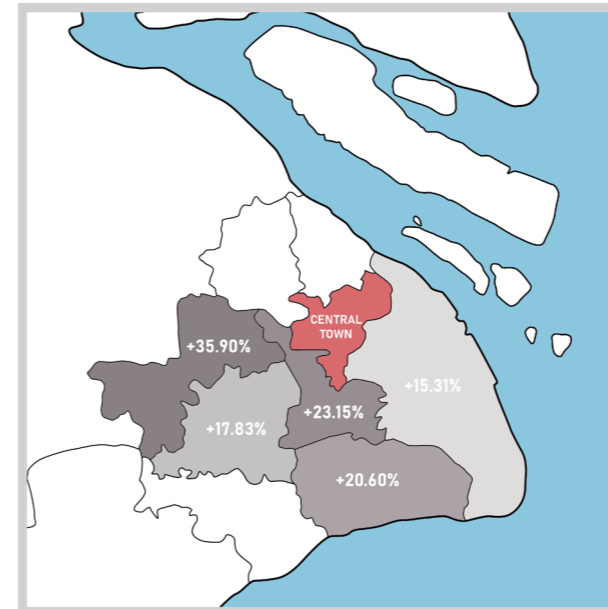


Diagram 6. Rental Fluctuation compared with 2020

Data Resource: City Real Estate Information Platform, Available at: <http://sh.cityhouse.cn/market/ranklease.html>

As it is shown in the diagrams, Songjiang, Pudong and Minhang have the most boating population and the biggest population density while Qinpu, Jiading, and Fengxian are outside the city center. So combining diagram1 and diagram2, Songjiang, Pudong and Minhang will be brought into the next phase's evaluation.

When it comes to housing and rental price, Pudong is in the first rank. But compared with the previous year, Minhang has the highest increase. Though both of the chosen districts are close to the city center, considering the future increase in housing and rental price, the focus should be put on Minhang and Songjiang.

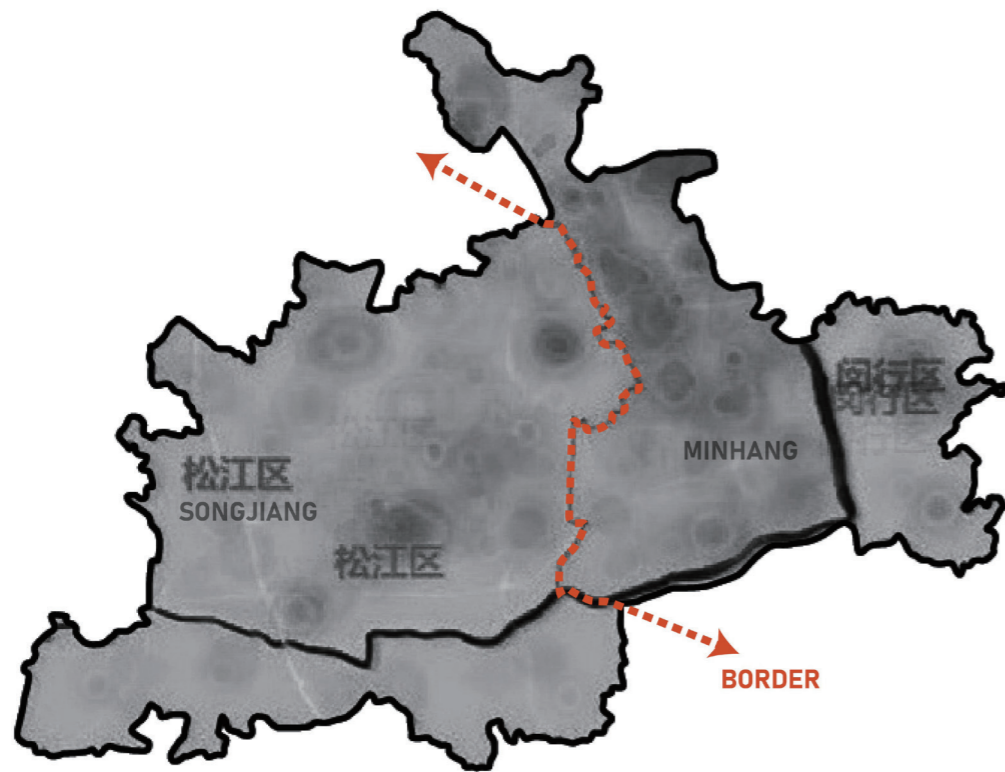
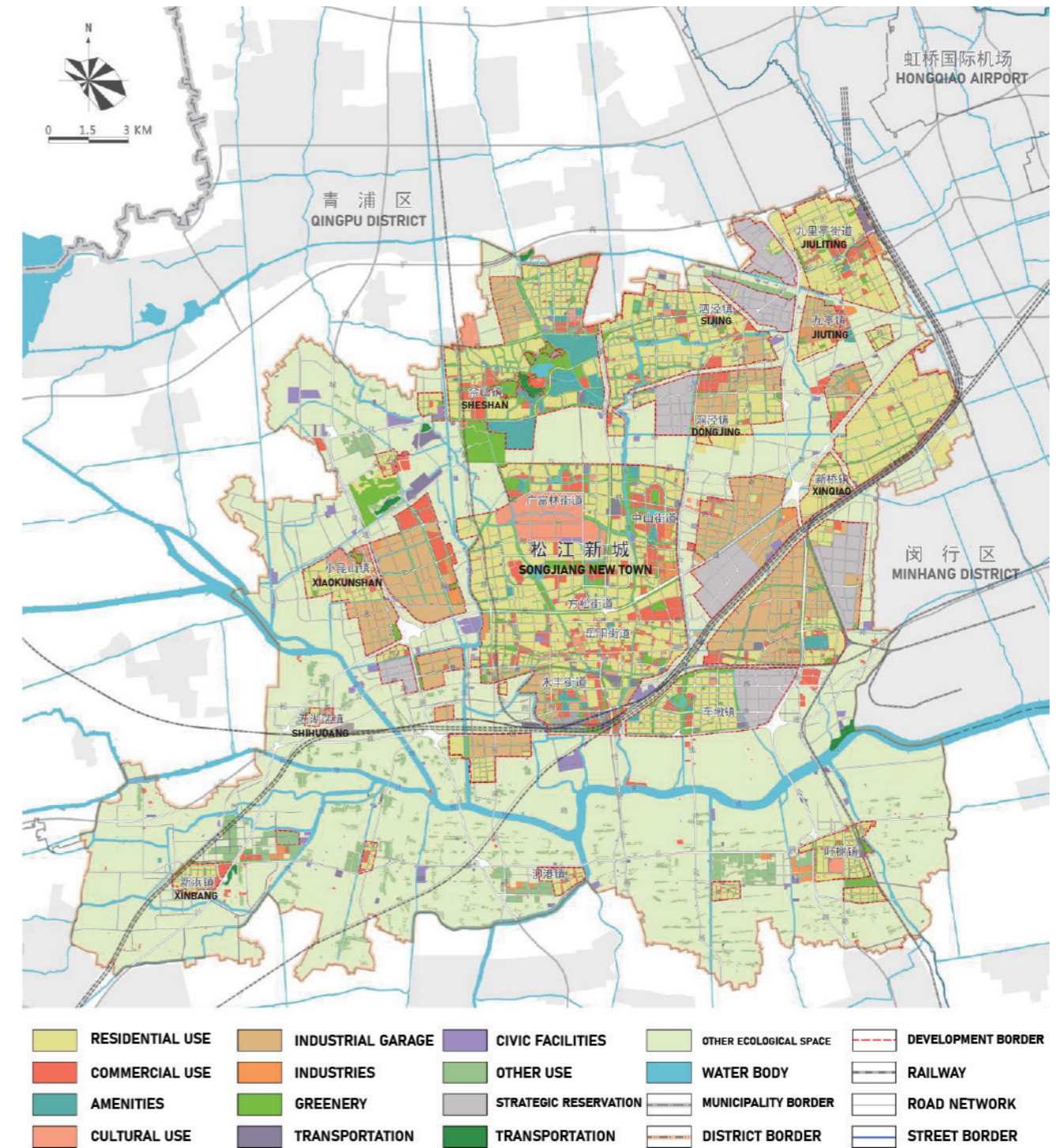


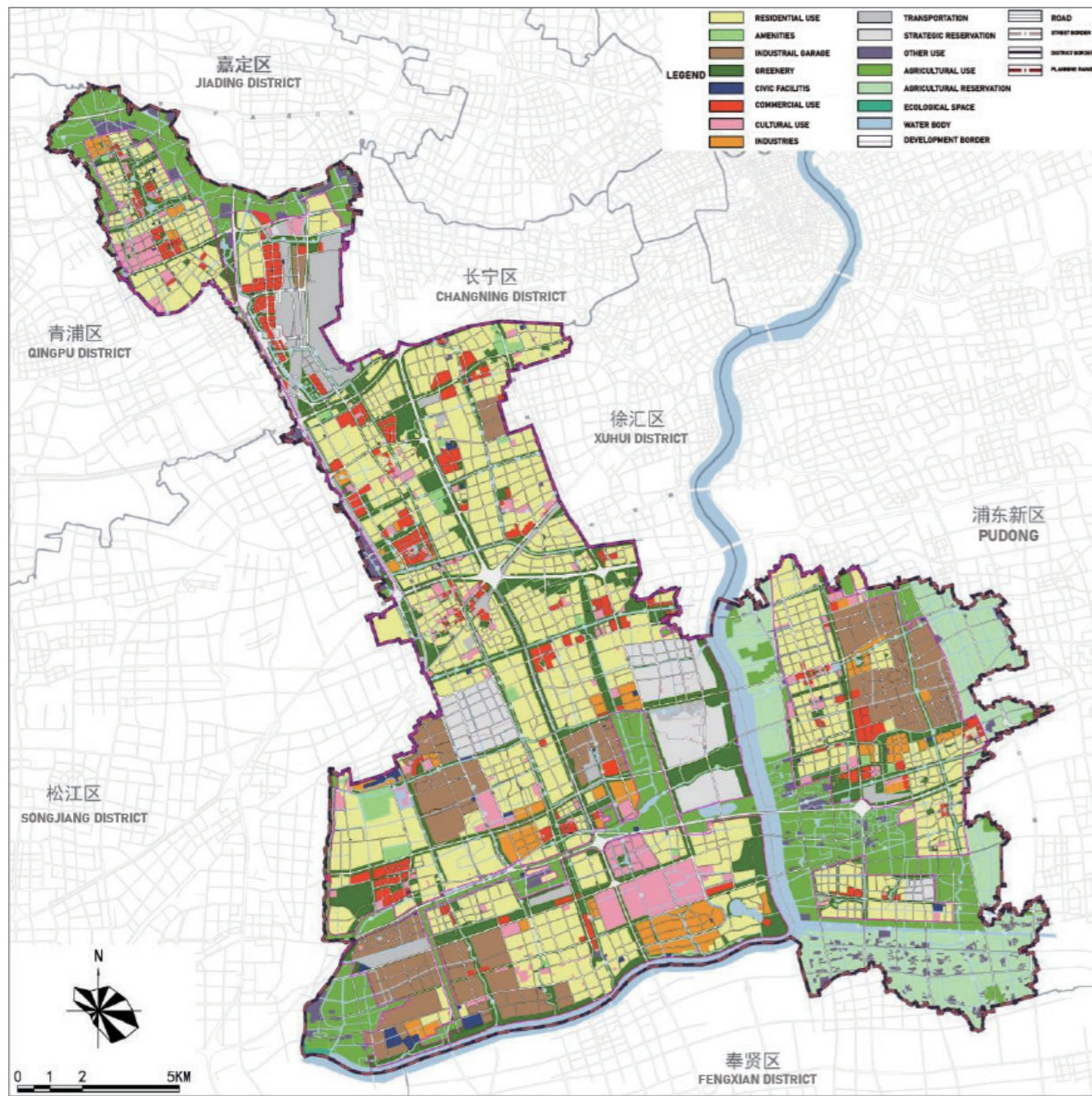
Figure 8. Map for industries density, data resource: ldrac.com.cn, edit: author

As the literature review shows, the economy and working opportunities are considered as the fundamental factors that affect the boating population's settling willingness. Based on this principle, the industry distribution map is analyzed to further identify the target block. The map shows that Minhang district has the densest job opportunities and concentrated industrial parks while the industries are separately distributed in Songjiang District. Compared with the General planning for Songjiang (2017-2v035) and Minhang (2017-2035). The job opportunities mainly occurred in the New town area and the Northeastern

area which is close to the border of Minhang; As for the Minhang district, the industries are highly concentrated in the Xinzhuang area. Besides, the railway and metro also go through this section. Based on this discovery, a conclusion could be drawn that the border area between the Northeastern area of Songjiang and the Xinzhuang area in Minhang has the potential to be further developed and considered as the start point of public housing neighborhood.



Land-use planning for the Songjiang District, Resource: Municipality of Shanghai



Land-use planning for the Minhang District, Resource: Municipality of Shanghai

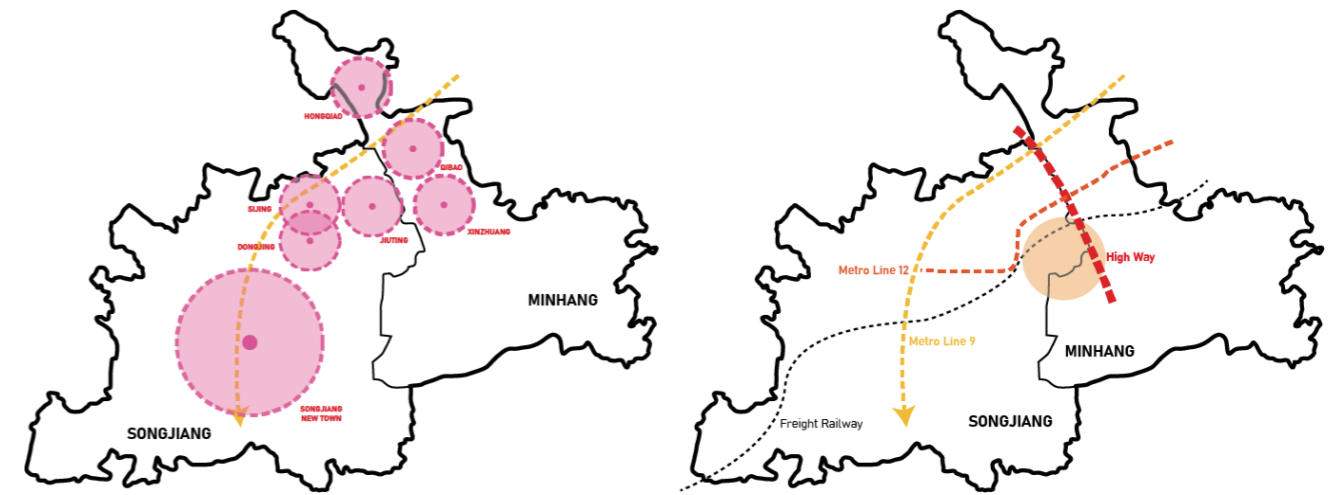
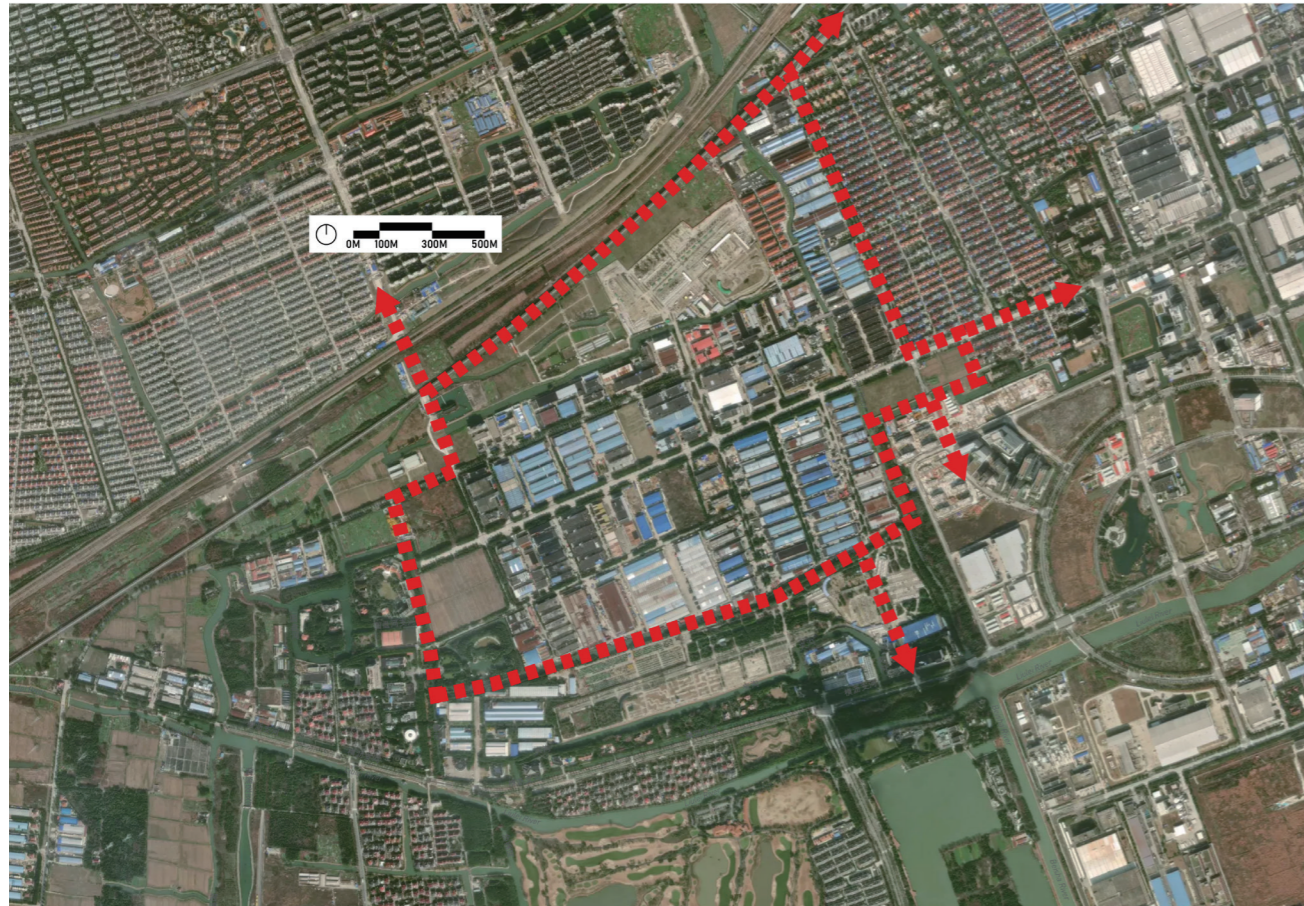


Figure 9. The potential site to build public housing, drawn by the author

As it is shown, an underdeveloped area is located in the middle of different town centers. Usually, local price level and rent increase with the development of the central town, for the floating population, affordable housing and fair services are always what there are seeking. Therefore, when doing a boundaries-oriented development, it is important to take the economic issues into the design strategies. Besides, the services range of the local government usually decreases with the expansion of borders. Therefore the governance method is supposed to be various in this context, in other words, the bottom-up spontaneous ability of the community should be encouraged in order to create a vibrant living environment.

Following the general planning from the local government, the area between the railway and Guangzhou Road was supposed to be a residential area while it currently remains as an industrial zone. Considering its location and nearby neighborhoods, it has the potential to become the testbed for the public housing community and provide a place for nearby neighborhoods to borrow (Martijn J. Burger, 2014), therefore the selected area will be chosen as the design site. The selection of the design area also takes town centers nearby into account.



Design Site, resource: Mapbox)

2.1.1. SITE SELECTION AND STUDY

The chosen site is located at the border of Songjiang District, there is a freight railway going by the northern border while the west and south part of the property belongs to the Qizhong village. The southeast part is occupied by an office area, another high-density resident area lies on the northeast side of the site. Besides the railway and the water body, the general layout of this area follows a grid system, which will be fully respected if there are no changes to the blue structure with the upcoming design. One of the biggest challenges to the site is the connectivity with the area which is split by the highway and railway, besides, how to use the space below the bridge that supports the highway is also something that should be well considered. According to the Shanghai Metro system map (2035+), three new metro lines will be introduced to the nearby area, with one metro station built across the Chunshen railway station to the east while another one bringing the residents to the train station to the west.

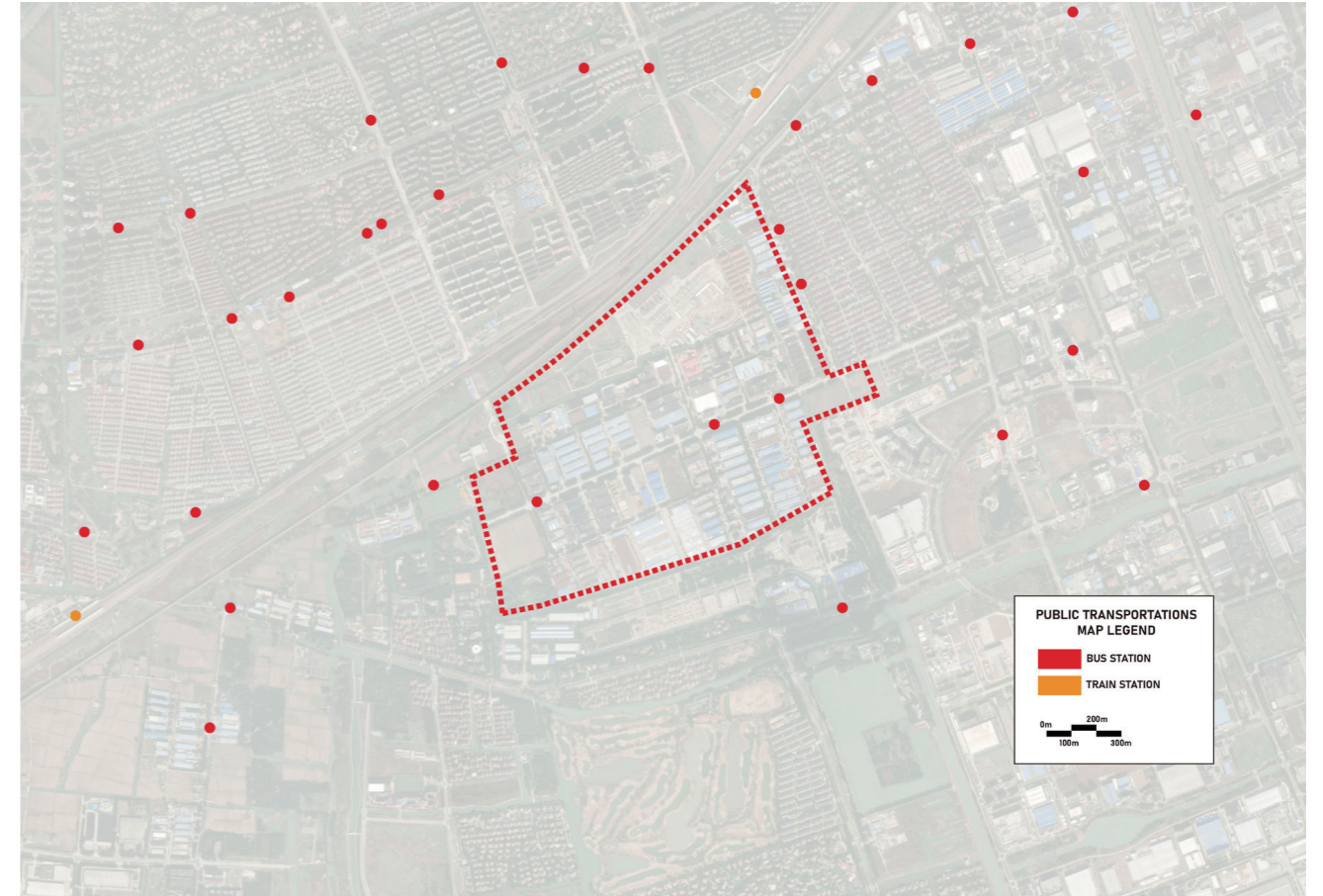


Figure 10. Mapping of public transportation stations, data source: Baidu Map

As the figure shows, there is only one bus going through the area, compared with other roads, this main street could be considered the main road (Jinduxi Road). Secondly, its morphology also tells that the Jinduxi road has the most branches, which makes sense based on the concept of space syntax. According to Figure 6, most of the work opportunities would appear in the north of the railway and highway, therefore the connection between both sides will be further explored.

Under the structure of the Registration System in China, when the rural inhabitants travel to the urban area, which means they are out of the jurisdiction of their original regions, they are required to obtain a Temporary Residence Permit (暂住证) in the destination city to be registered. This policy was controversial because it limited rural-urban migration. In 2015, The Temporary Permit was replaced by the Residence Permit¹ (居住证). Though the measures may differ by different municipalities, with this new policy, the floating

¹ Residence Permit: The residence permit is an improvement of the Temporary Residence Permit. Compared with the temporary ones, the floating population who obtained a residence permit share the same services and convenience as the registered population while the previous one is simply a proof of identification. The Residence Permit in China for the domestic population is different from those for foreigners.

population is granted more rights and convenience when settling in a new city. According to the latest measures on the Residence Permit from the Municipality of Shanghai (2018), the Boating population has access to resources like education, health care services, etc. like many other local residents. Besides, an optional credit system was also set up. It claims that the applicants would be evaluated by age, education levels and professional skills, etc. as long as the credit has gone to 120 scores, the credit system would guarantee the next generation of the floating population to take quality education in Shanghai and relevant public services. It is clear that the Boating population is encouraged to settle in Shanghai as families from the policy perspective. When taking this understanding into the programming, public services like education, healthcare, and skill training which refers to higher skill levels providing higher scores, will be considered on-site.

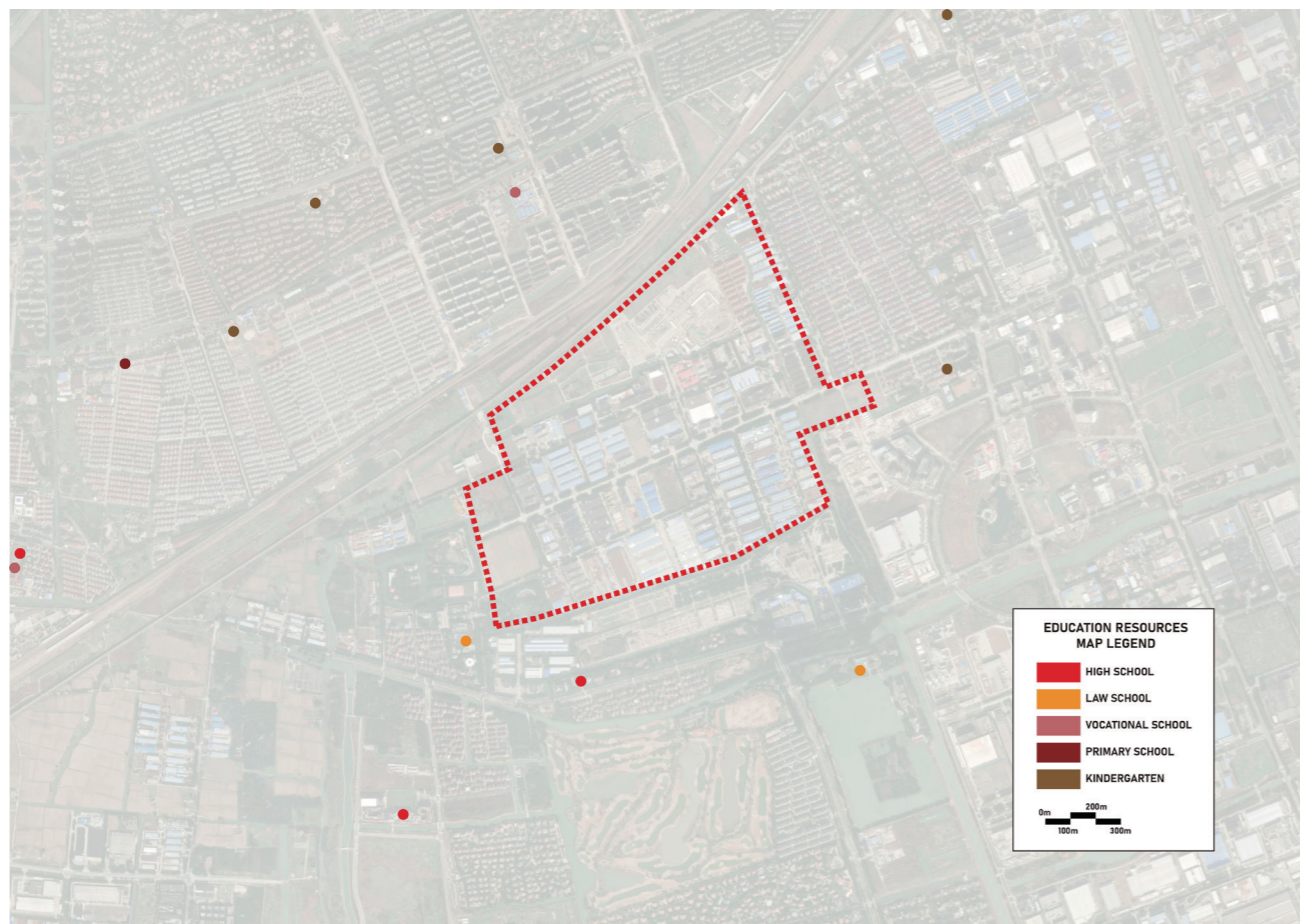


Figure 11. Mapping of education resources, data source: Baidu Map

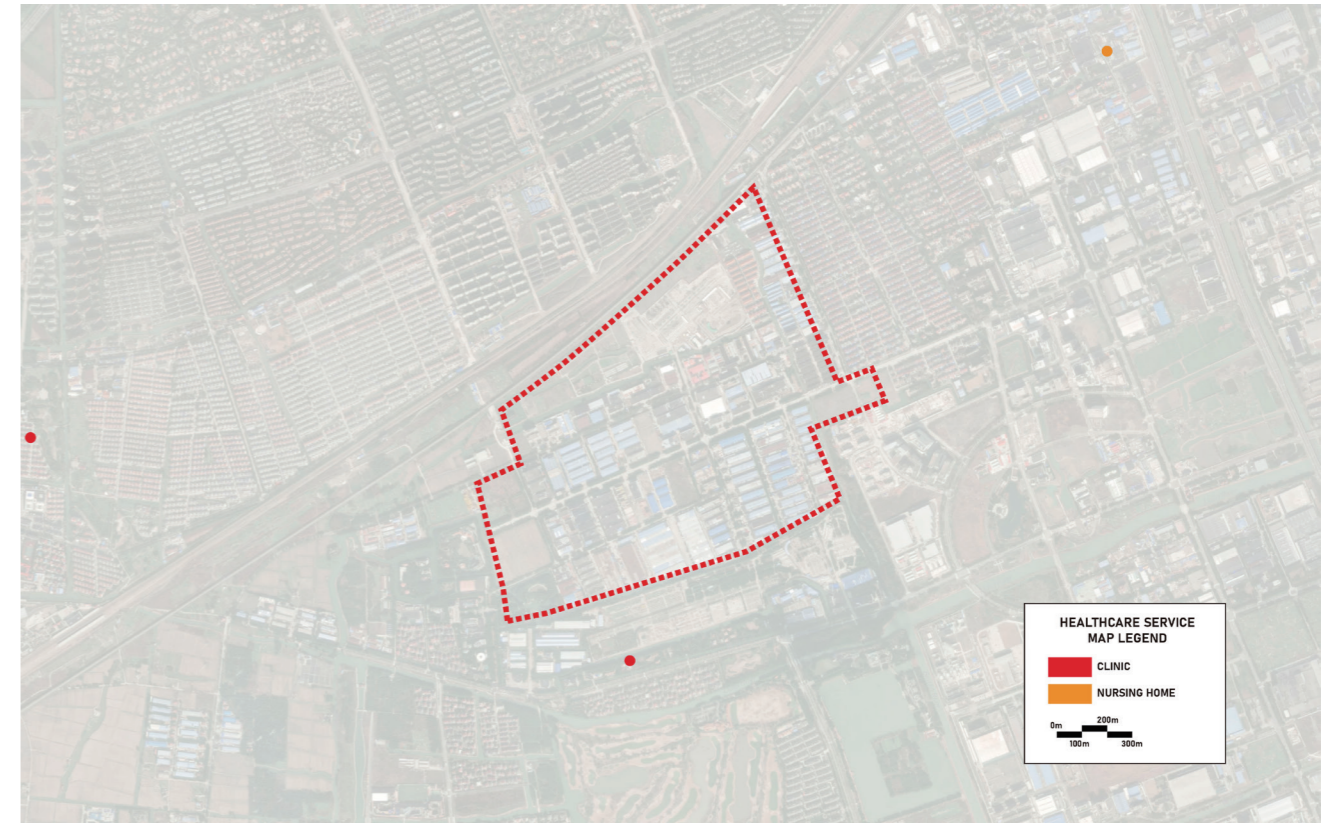


Figure 12. Mapping of healthcare services, data source: Baidu Map

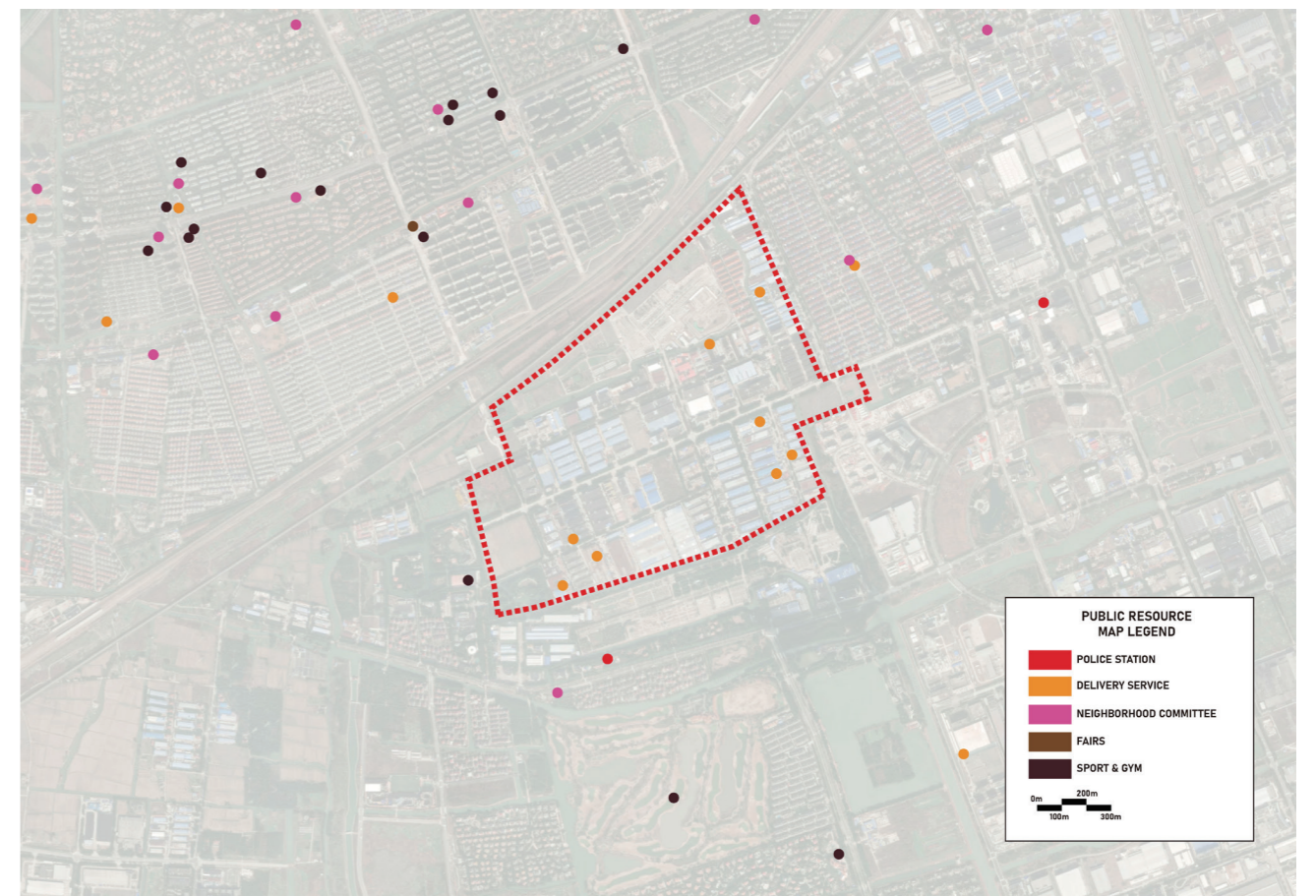


Figure 13. Mapping of public resources, data source: Baidu Map

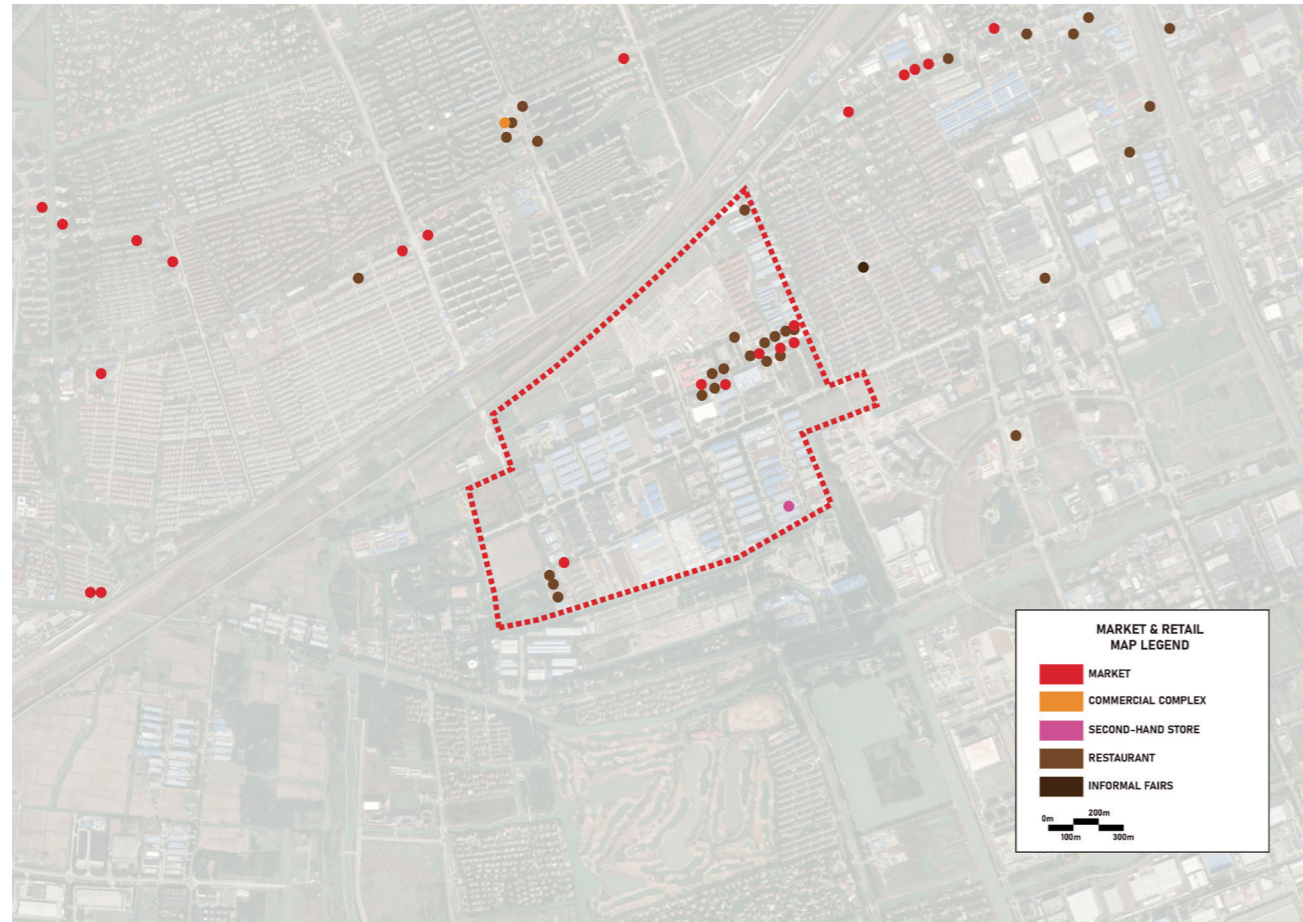


Figure 14. Mapping of markets and retails, data source: Baidu Map

The size of the chosen site is Aprx.165 hectares (Aprx.1.65km²). As figure 9 shows, compared with other types of educational resources, primary schools seem in a shortage while delivery services are active within the site according to Figure 12. Due to the railway by the north, people who currently live around the site have no access to the resources and services on the other side of the railway. Taking aging as a trend into consideration, as Figure 10 shows, the area doesn't seem to provide sufficient services and infrastructures in the nursery. It is suggested that more services and facilities should be provided to the children and silver generations from the study outcome. By 2021, the average per capita living space in Shanghai is 37.2 m². Considering the portion of public areas and services, the Figure would be tripled, which enables the site to provide housing for approximately 70,000 residents. Taking the latest standard for urban residential area planning and design in China (GB50180-2018) into consideration, the building heights would be set between 10 storeys to 18 storeys.

City	Storeys	Per Capita Living Space (m ²)	Living Area Ratio	Neighborhood Constitution (%)				
				Residential	Infrastructures	Greenery	Roads	Total
Shanghai	10-18	26-34	1.2-1.5	48-52	16-23	11-16	15-20	100

Figure 15. Land Use Index for 15-min Neighborhood in China

STRENGTH

1. Potential underdeveloped land area;
2. Existing large scale lawn has the potential to be developed into a public space not just the area, but also for the city;
3. Relatively even block size when relating to urban grid.

WEAKNESS

1. Flood risk during rain seasons;
2. Road dimensions are designed for cars, would be challenging to make a transformation;

1. Existing domestic migration neighborhoods provides the potentials to identify themselves in the proposed design
2. Close to rich work opportunities;
3. Potential to connect different neighborhoods nearby and strength city edges management;

1. Poor public transportation and Infrastructures;
2. Lack of public space;
3. Separated and independent neighborhoods nearby;

OPPORTUNITIES

THREATS

2.1.2. DEVELOPING METHODOLOGY

The objective of this section is to focus on an urban scale, taking connectivity and meeting points into consideration. Using Space syntax as the major tool to analyze current urban morphology and trying to give an optimization regarding the connection to the north border. Besides, also using this method to identify the main connection.



Figure 16

Based the existing road network, the figure shows that two of the streets in the site have the most connection compared with the rest. The one on the west has 5 connection while the other one have 6. Therefore they have the potential to be taken into further exploration in order to identify the main connection of the area.



Figure 17

The street on the east side is considered to be preserved and discussed its role as the potential main street. The north side of the street would be extended to bring more connections.



Figure 18

Another street from east-west direction was selected to join the subject to created a main road network. Such a system could guaranteed a high accessibility, which has the potential to develop multiple meeting points for the future users.

Comparing two connections from northwest to southeast, the result shows that the road to the right side has a better performance and potential to be further developed. The origin morphology presents a typical grid structure, as an industrial area in use, the system guaranteed high mobility for lorries and logistical transportation. One of the challenges to applying this discovery is to transform vehicle-oriented into pedestrians & bikes-oriented. Most vehicles travel in a linear movement while people's walking follows a wave line. (Jan L. Souman, Ilja Frissen, Manish N. Sreenivasa & Marc O. Ernst, 2009) The difference in movement reveals that different velocities follow traveling logic differently. It is also highlighted landmarks and natural lighting can help those who are in the slow-wave system located themselves according to Souman's research. In other words, feedback is demanded when traveling around the streets. Due to the highly identical dimension and street patterns in the standard grid system. Pedestrians in the slow-wave system would find it difficult to locate and identify themselves within the uni-dimension.

Redefining the local grid system refers to the relocation of traveling priorities. By separating pedestrians and vehicles, the levels between private and public would be much clearer by limiting motor noises and car vehicle movements, changing the traffic priority would also changing the form of grid plan. Apart from that, the difference in the size of the blocks and road networks also deconstruct the influence of industrial heritage, but most of all, it guarantees the possibility to provide more feedback for residents to identify both the space and themselves (Figure 17). In the practical situation, the spaces that help residents to identify themselves could be functional-oriented, like services and infrastructures, or symbolic-oriented.

PEDESTRAINS & BIKES
CARS

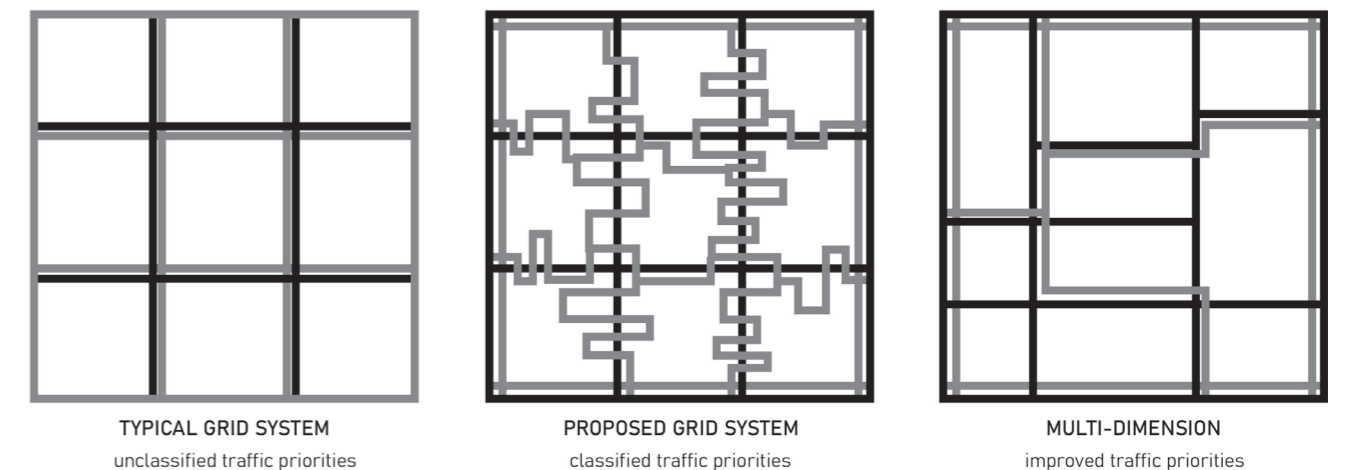


Figure 19, Inspired by Bo01, Malmö. Available at: <https://www.urbangreenbluegrids.com/projects/bo01-city-of-tomorrow-malmo-sweden/>

**GRID SYSTEM CASE STUDY - B001
MALMÖ, SWEDEN**



01. EXISTING PUBLIC SPACE

 PUBLIC SPACE

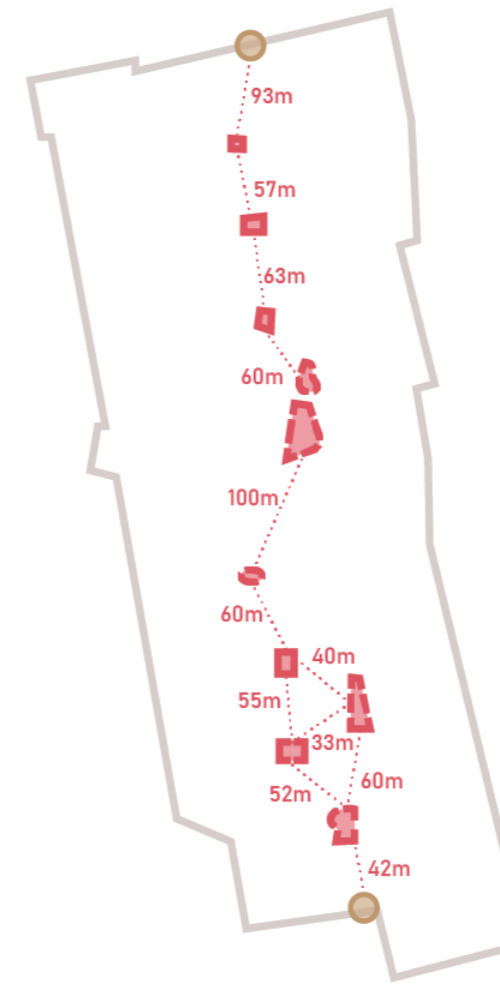
THE MORPHOLOGY OF B001 PRESENTS IN A SURROUND STRUCTURE, WHILE THE HOUSING AREA INTERSECTING WITH COMMUNITY GARDENS AND LARGER OPEN SPACES.




02. TRAFFIC PRIORITIES

-  VEHICLES
-  PEDESTRAINS & BIKES
-  PEDESTRAINS

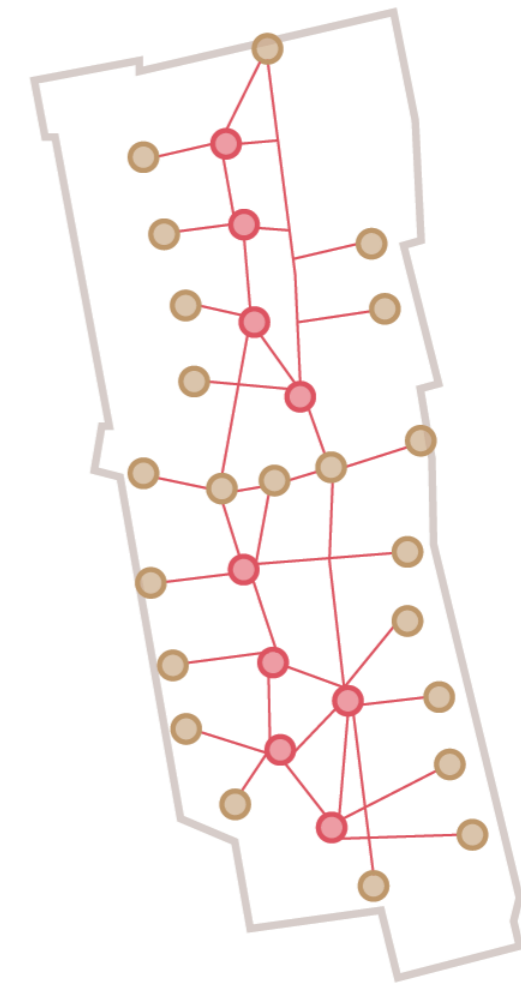
THE URBAN STRUCTURE GIVES SEPARATED BUT INTERSECTED TRAFFIC FLOWS.





03. PAVEMENT

 FP-ENTRANCE

AT THE PEDESTRAIN-DOMAIN AREA, FEEDBACK POINTS COULD BE MET IN EACH 3-4 MINUTES.



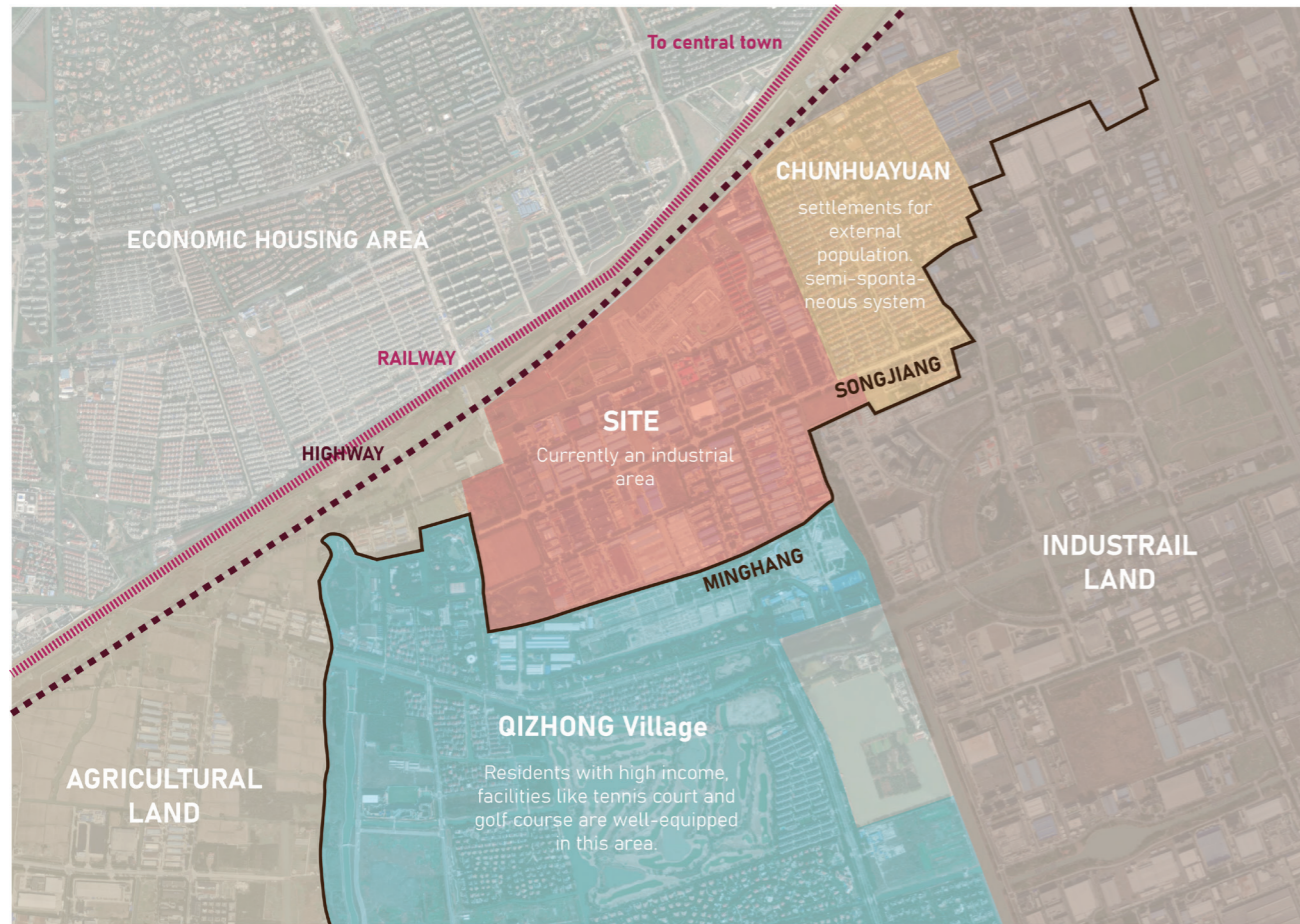
04. SPATIAL STRUCTURE

-  FP-ENTRANCE
-  FP-COMMUNITY

THE FEEDBACK POINTS WITHIN THE AREA ARE UNIFORM DISTRIBUTED AND, AT THE SAME TIME, APPEARING AT CROSSROADS.



1. FP: FEEDBACK POINT



2.1.3. STRATEGIES

The objective of this section is to focus on both urban scale and local scale, taking connectivity and meeting points into consideration. And trying to give an optimization regarding the connection to the north border.

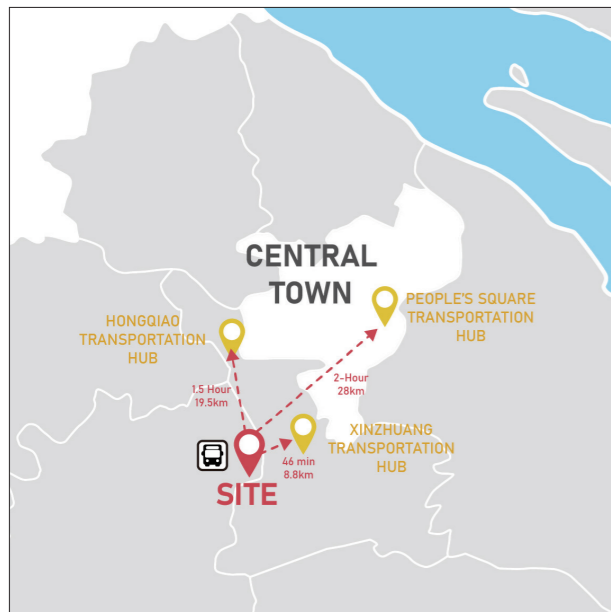


Figure 20

The single travelling option makes it difficult for the residents who lives both in the design site and nearby neighborhoods to commute in the city.

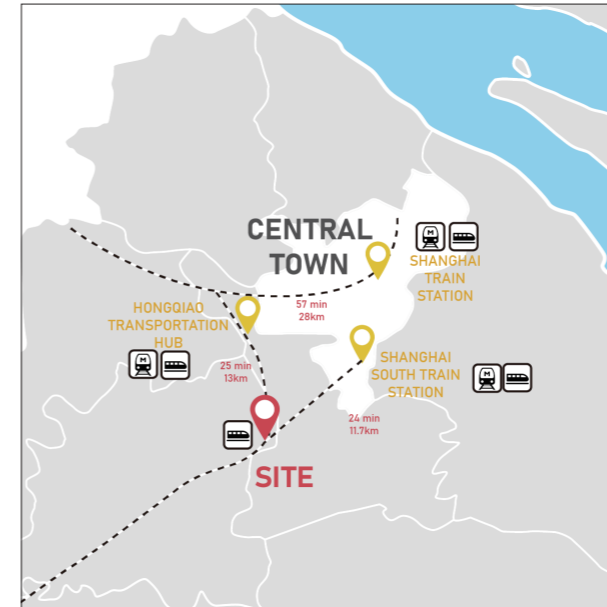


Figure 21

The railway goes through the site is primary for the freight. In the vision the railway could be further developed to both benefits freight and passengers, which become a commuting railway, this would tremendously increased the travelling efficiency.

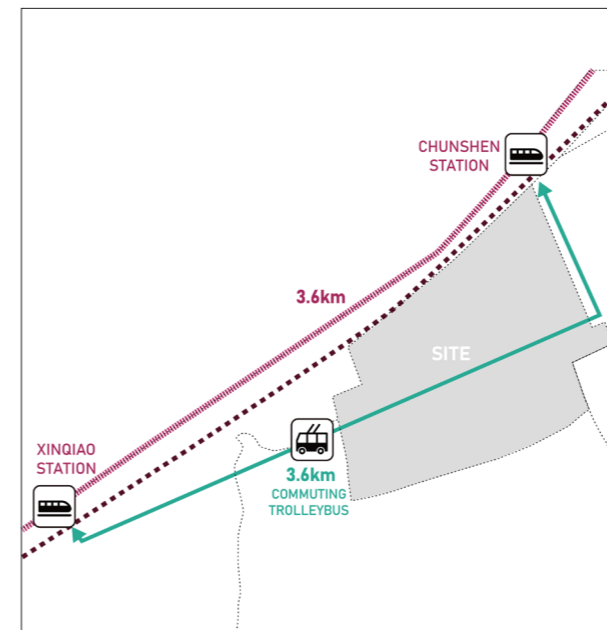


Figure 22

There are two train stations close to the site. It is proposed that a commuting trolleybus route could be setted up to improve the conviency. Comparing tram or trackless tram, the trolley bus are more flexible in a Chinese context.

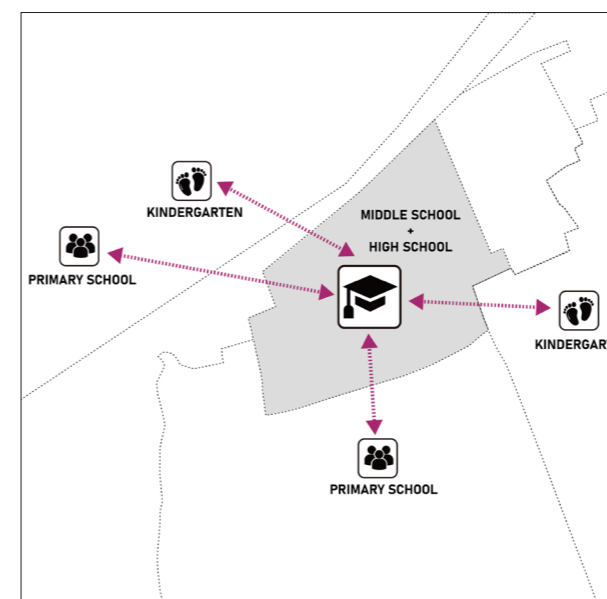


Figure 23

The previous study showed that the surrounding neighborhoods are lack of middle schools and high schools. Therefore the site could provided those public services to invite the students who lives nearby and at the right ages.

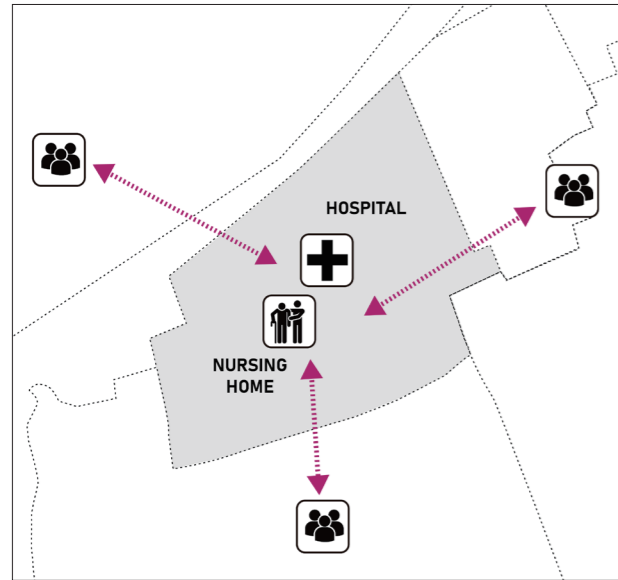


Figure 24

Nearby neighborhoods are extremely lack of hospitals and nursing home. With the background of aging in Chinese society, setting up nursing home for the elderly and community hospital could invite people from other surrounded communities to visit the site.

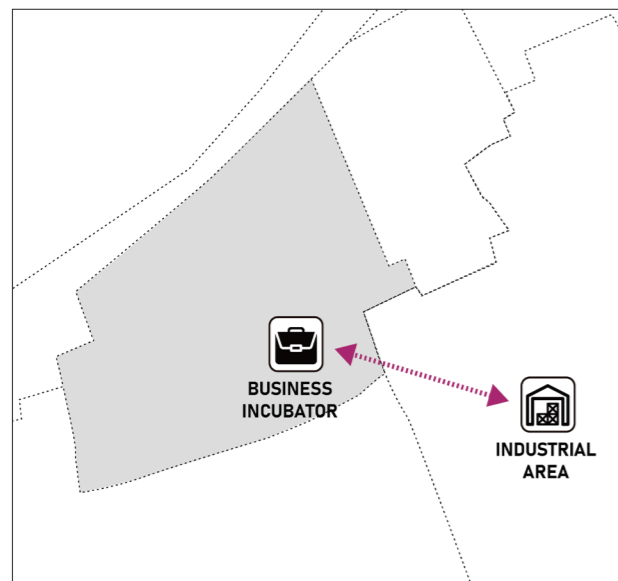


Figure 24

The east side of the site lies a vast industrial area, as well as warehouses and garages. Proposing a business incubator could not only benefits local economy, but also strengthen the economical prosperous in a wider range.

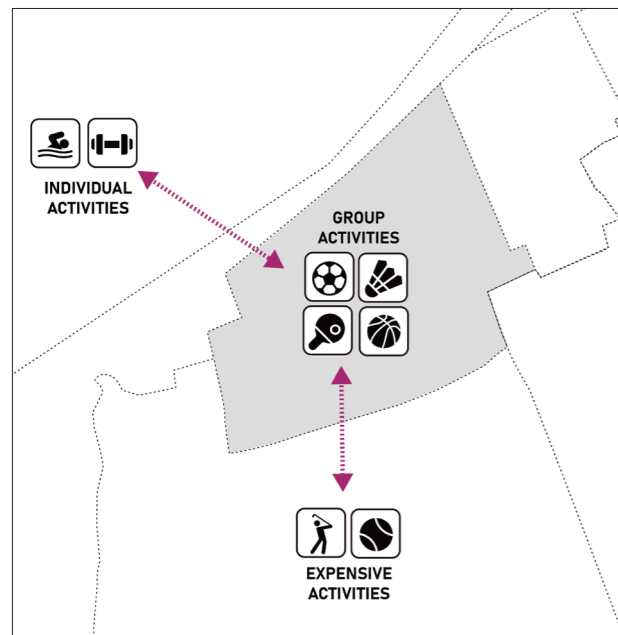


Figure 25

Existing fitness facilities in nearby neighborhoods are either for individual or too expensive for middle low-income groups to afford. In order to strengthen the bond between different communities, the design area proposed a various of group activities, for instace, football, basketball, etc.

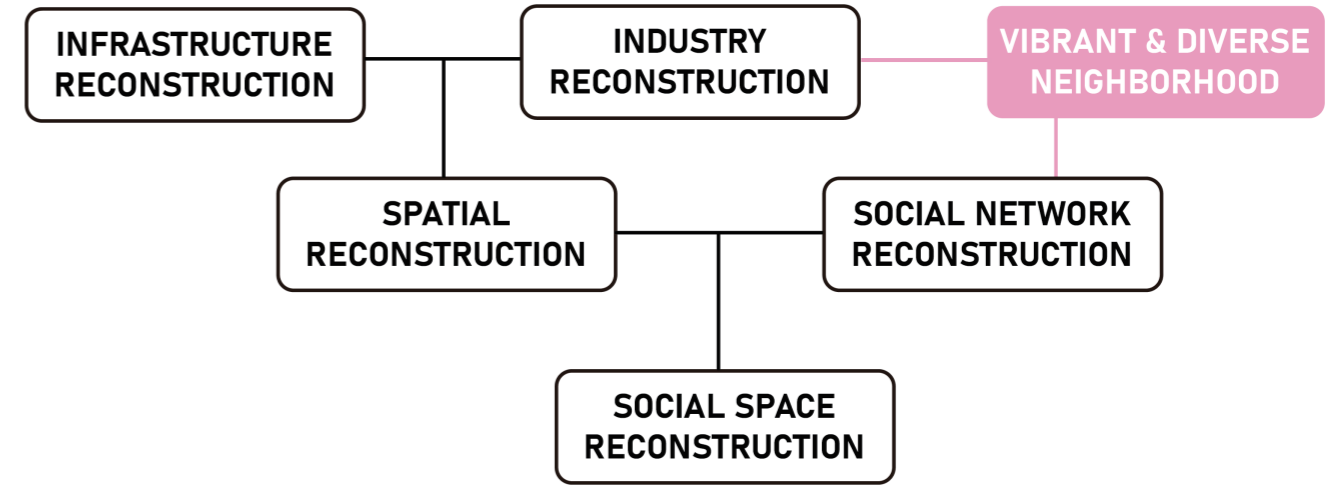
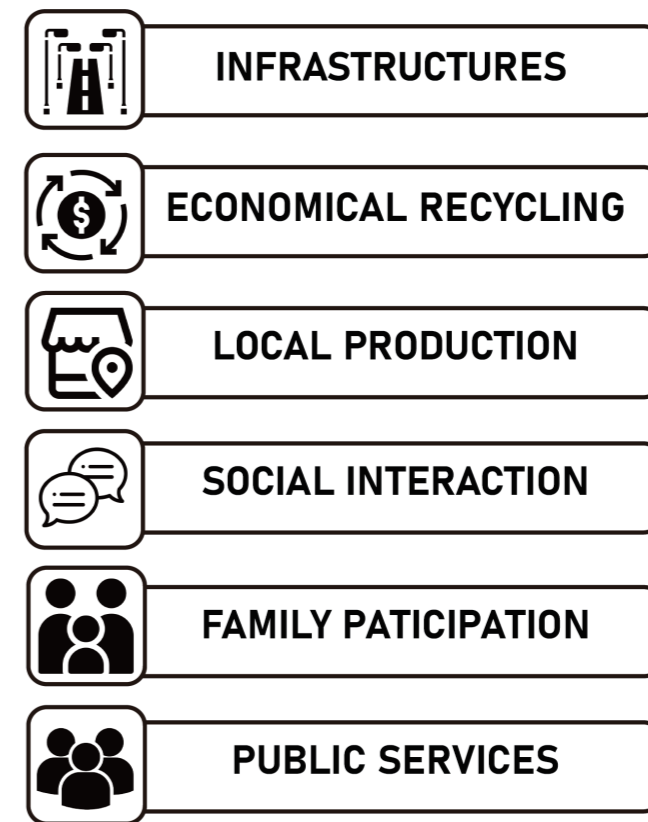


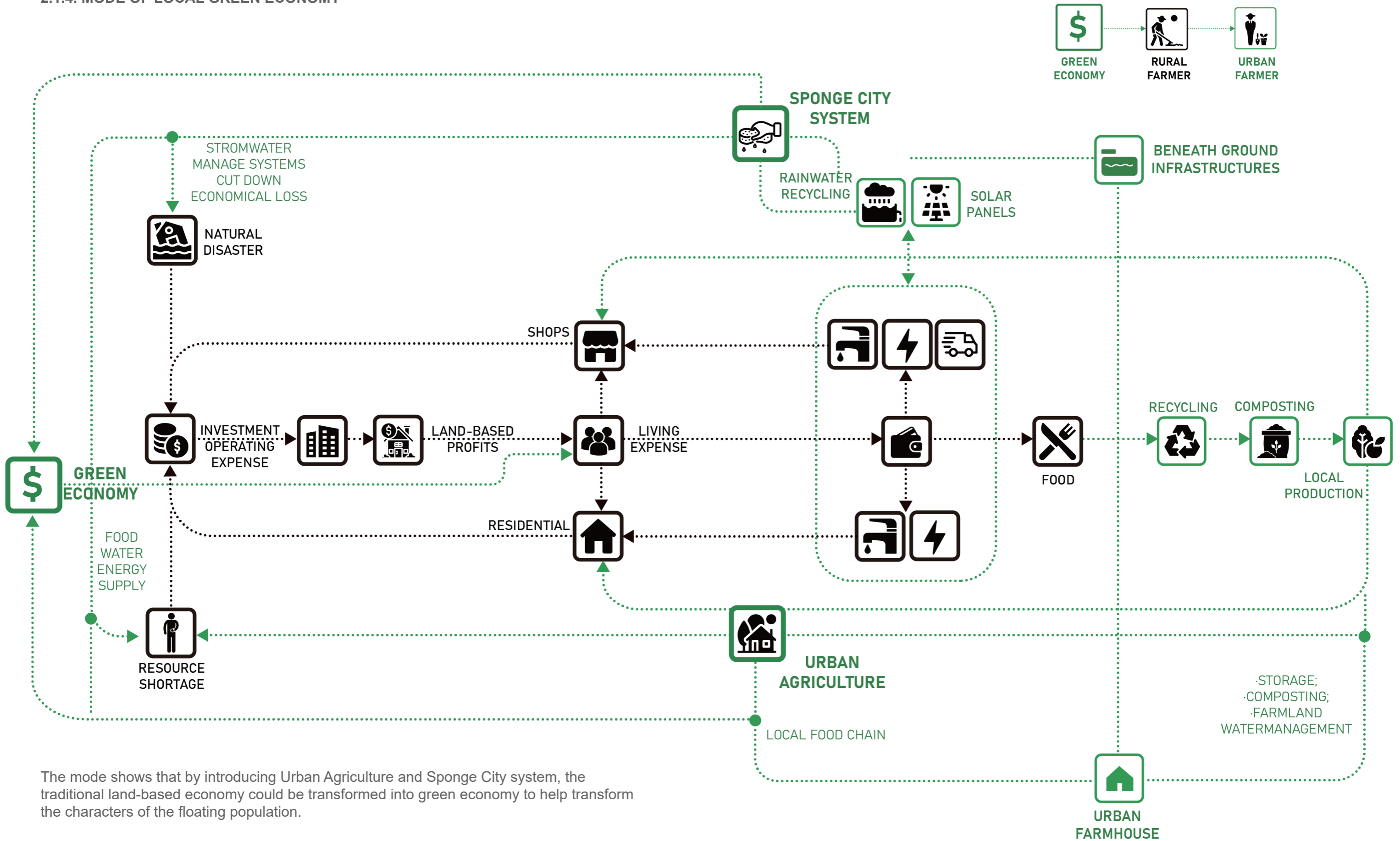
Figure 25

The restructured mode of immigration in the marginal region of megapolis. Guo Yongchang, 2006.



Based on the literature study, a social restructured mode by professor Guo Yongchang(figure 25) was highted and related to the proposal, Based on his model, the concept of vibrant neighborhood was added to develop the theory from an urbanism perspective. The diagram above shows the six basic principal of the neighborhood design.

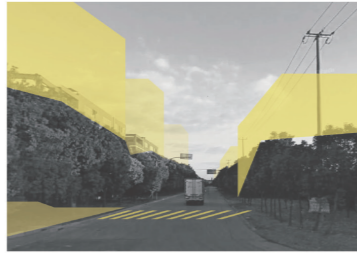
2.1.4. MODE OF LOCAL GREEN ECONOMY



The mode shows that by introducing Urban Agriculture and Sponge City system, the traditional land-based economy could be transformed into green economy to help transform the characters of the floating population.

2.2. MASTER PLAN

At the beginning of the section, the site study has been taken further and explore what qualities can be brought into the site based on previous the study.



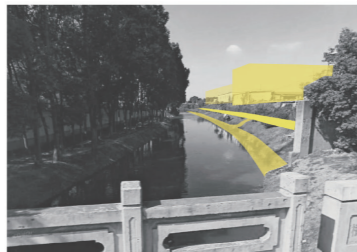
01.

HIGHER CONSTRUCTIONS CHANGE THE STREET DIMENSION, BUT CREATED A NEW PERCEPTUAL OF THE SPACE.



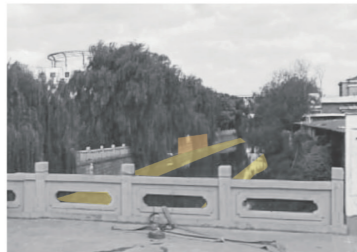
02.

HIGH LEVEL BUILDINGS ALSO CHANGE THE DIMENSION IN WATER-FRONT AREAS. THUS, THE PUBLIC SPACES SHOULD GIVE MORE LAYERS.



03.

A STEPWISE SIDEWALK DESIGN SHOULD ALSO APPLIES TO THE WATER-FRONT AREAS.



04.

WHEN WORKING WITH HEIGHTS, VARIOUS CONNECTIONS SHOULD ALSO BE CONSIDERED.



05.

PLACES FOR INFORMAL BUSINESS SHOULD BE CONSIDERED AS A PART OF THE LOCAL ECONOMY SYSTEM.



06.

THE STEPWISE STRATEGY COULD ALSO BENEFIT THE AVENUE TO DIVERSIFY AND DENSIFY THE URBAN AREA.



THE STEPWISE DESIGN STRATEGY

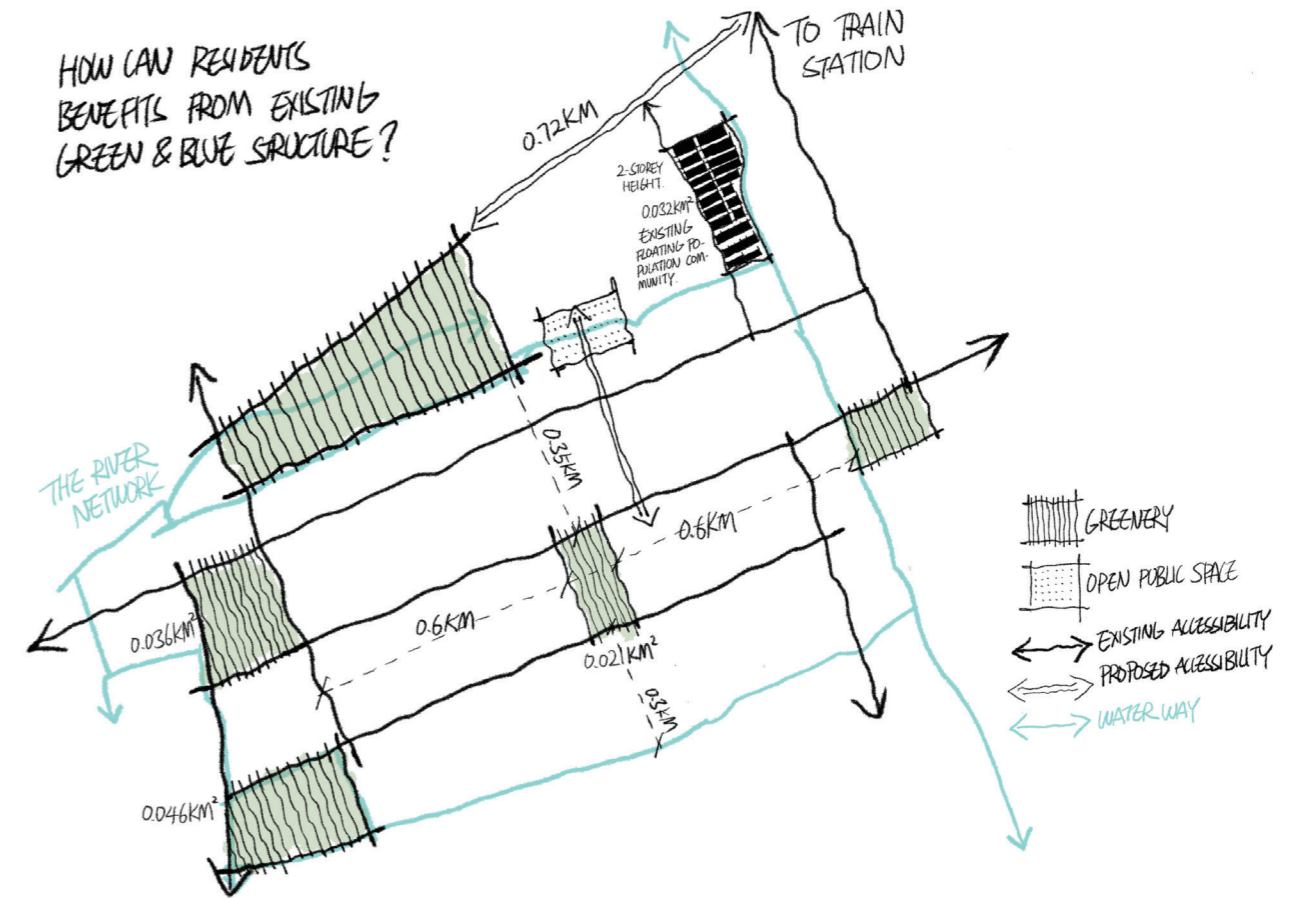
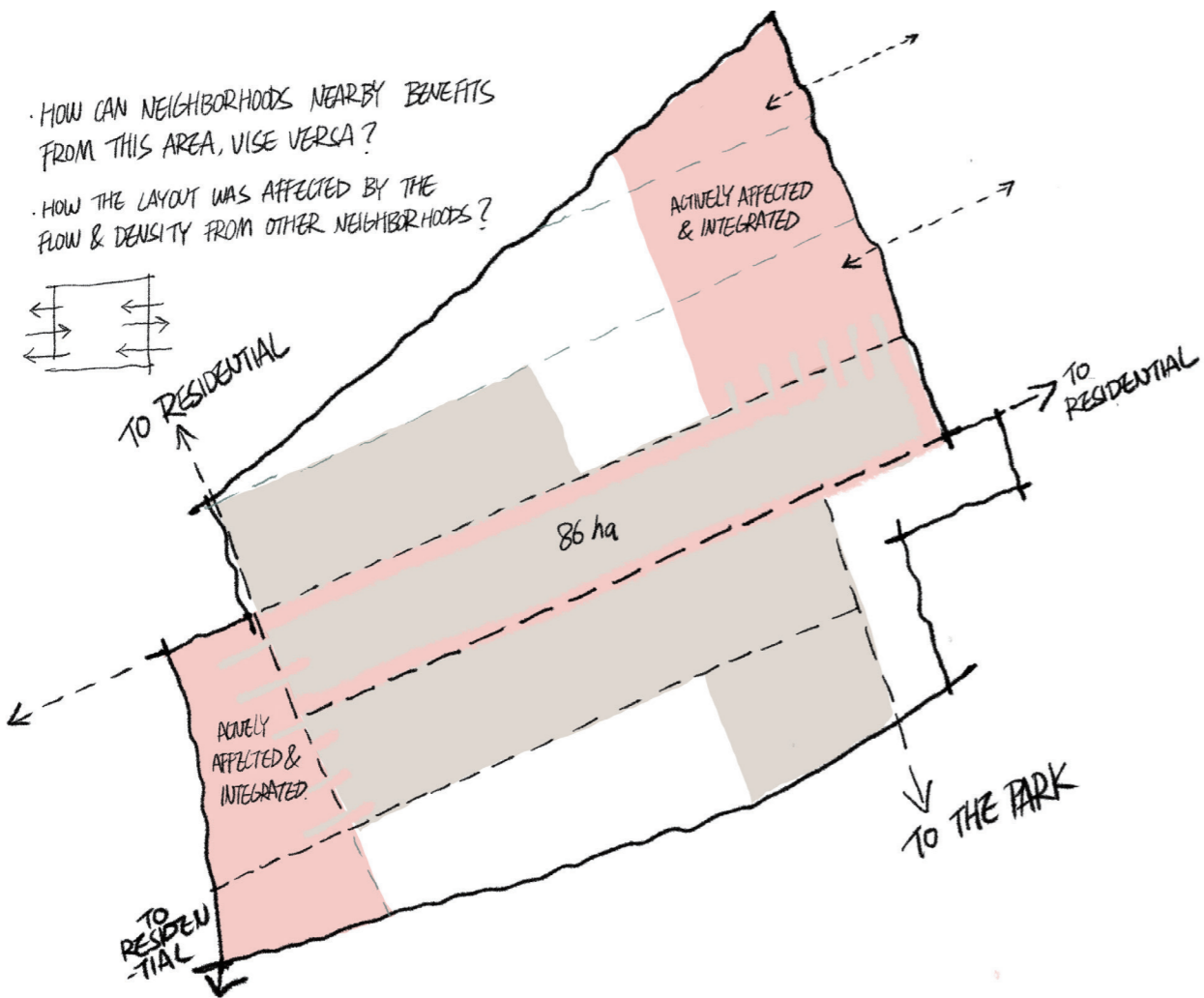


BEFORE

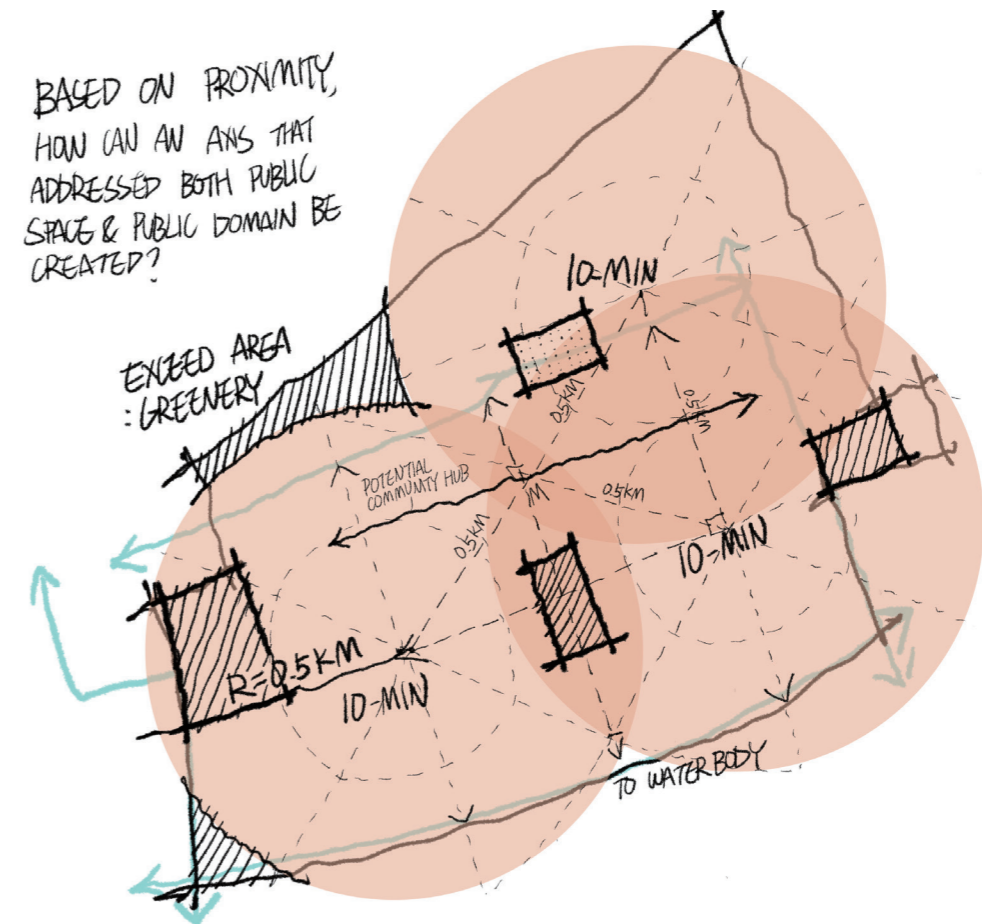
AFTER

2.2.1. Concept

Based on the site, three sketches presents the different focuses on the potential of the site and existing elements. The drawing starts with several guiding questions to outline the vision from the spatial planning perspective.



BASED ON PROXIMITY, HOW CAN AN ANS THAT ADDRESSED BOTH PUBLIC SPACE & PUBLIC DOMAIN BE CREATED?



-  SOCIAL FUNCTION
-  ECOLOGICAL FUNCTION
-  DISASTER PREVENTION
-  GREEN STRUCTURE
-  BLUE STRUCTURE
-  CHANNEL



2.2.2. Study on green & blue structure

An existing river isolated the majority of the site into a geographical island. Such a situation gives the challenges of flood and storm water. Therefore a defense mechanism was designed to cut down the risk stepwisely. Two existing wetland could be preserved and improved to protect local ecology. The lawn in the center area could be designed into a large public space that welcomes every residents and visitors.

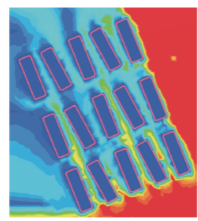
2.2.3. GENERAL PLAN

The original road network presents a typical urban grid. Therefore based on the dimension, the general plan introduces four types of dimension, public transportation and logistics, cars and pedestrians.



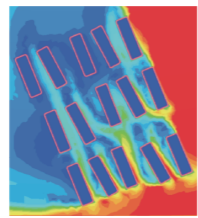
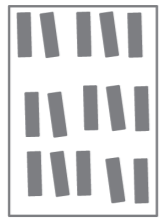
2.2.4. GRID-BASED TYPOLOGY DEVELOPMENT

1. EVEN GRID LAYOUT



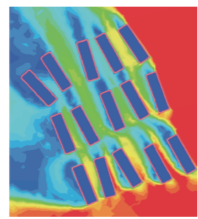
even & strong wind

2. OPEN WIND TUNNEL



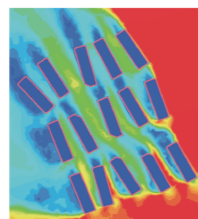
uneven & strong wind

3. ROTATION



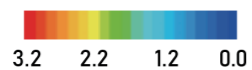
even & strong wind & main wind tunnel

4. SMOOTH CORNERS



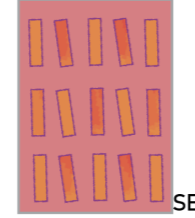
even & strong wind & various wind speed areas

VELOCITY: m/s

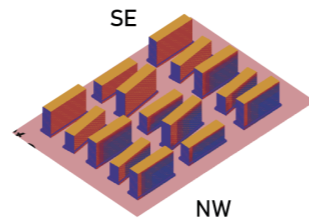


WINTER SOLSTICE, 21st, DEC

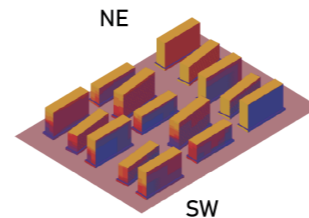
NW



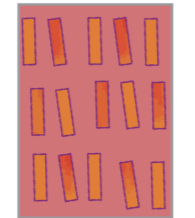
short buildings gain limited solar radiation



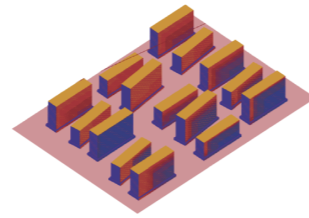
northern part receives limited solar radiation



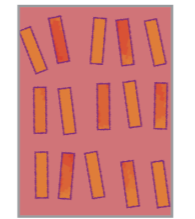
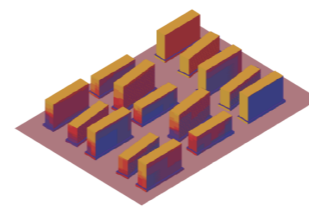
southern part receives the most solar radiation



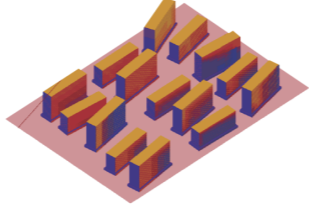
extra distance provides additional solar radiation



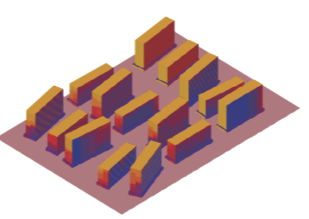
no obvious impacts on facades



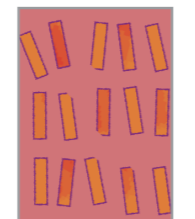
rotating and changing position provide extra sun light



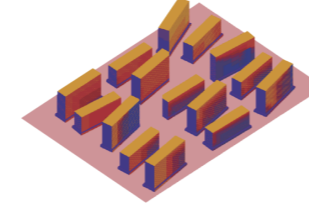
rotating and changing position provide extra sun light



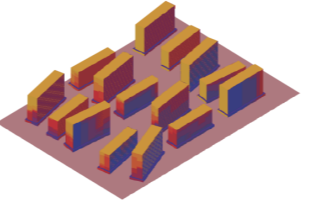
no obvious impacts on facades



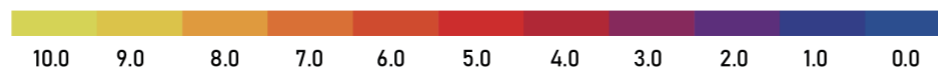
no obvious impacts on plans



corners provide extra solar angles

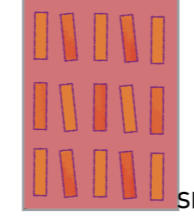


DIRECT SUN HOURS

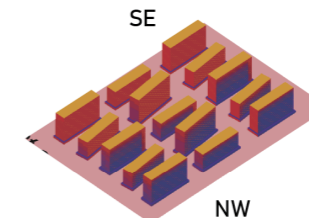


SUMMER SOLSTICE, 21st, JUN

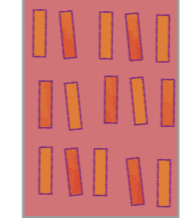
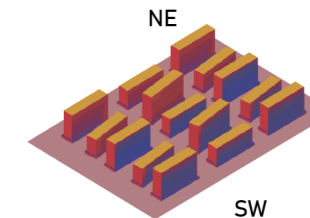
NW



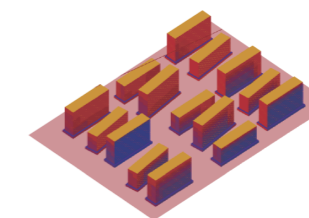
short buildings gain more shadings



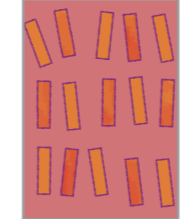
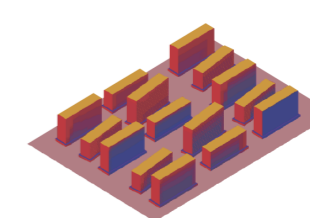
northern & southern parts receive a similar amount of solar radiation



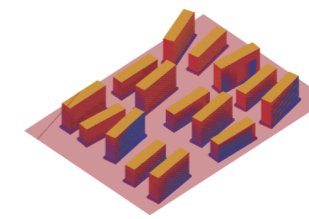
no obvious impacts



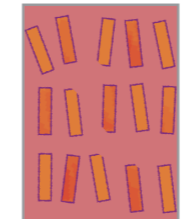
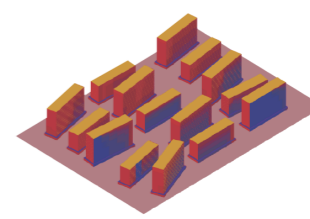
no obvious impacts



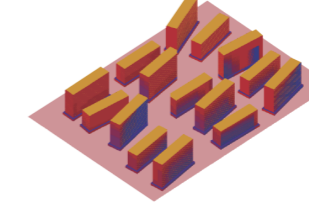
units would lose shading due to the extra distance



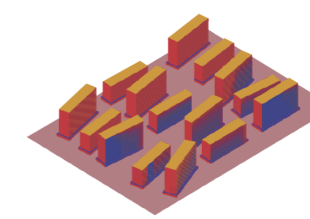
rotating and changing position reduce shadings



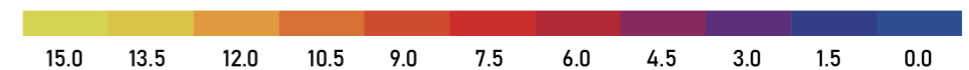
no obvious impacts on plans



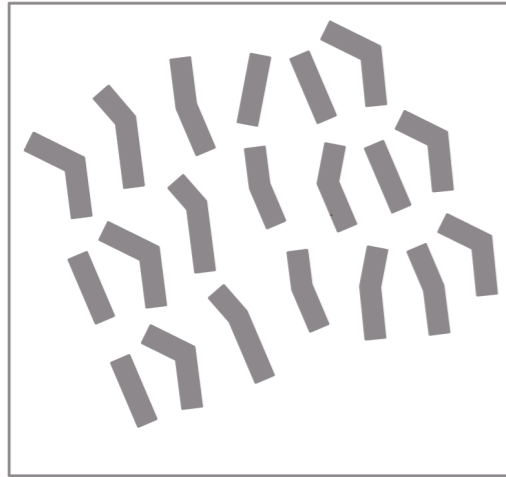
corners provide extra solar angles



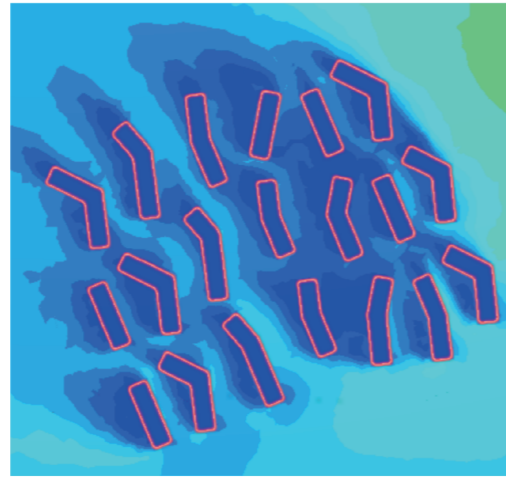
DIRECT SUN HOURS



TYPE A

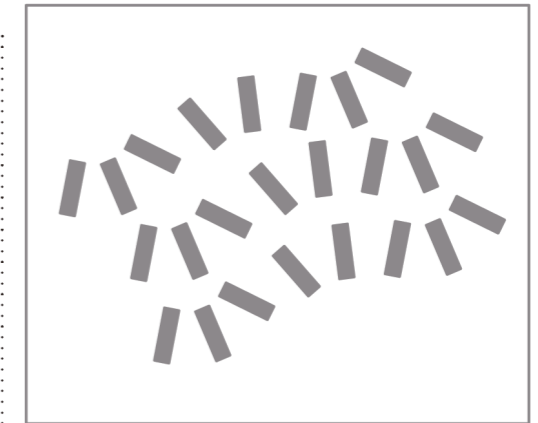


SUMMER WIND FLOW

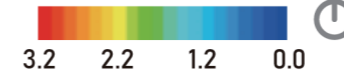


several wind tunnels and abundant wind flows

TYPE B

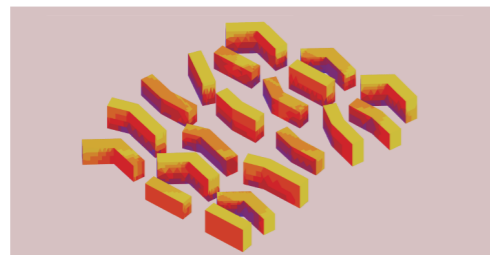


VELOCITY: m/s



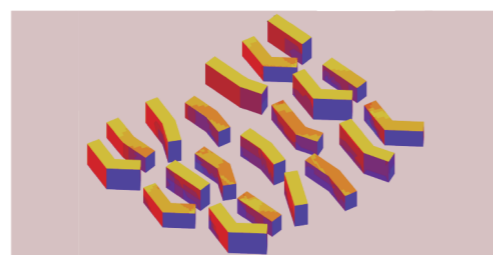
a main wind tunnel and abundant wind flows

WINTER SOLSTICE, 21st, DEC

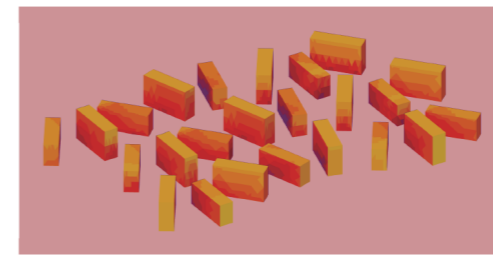


more shading areas appear on the bottom of the buildings

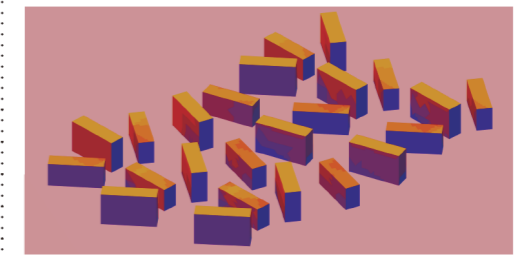
DIRECT SUN HOURS:



the bent shape provides extra solar radiation to the buildings

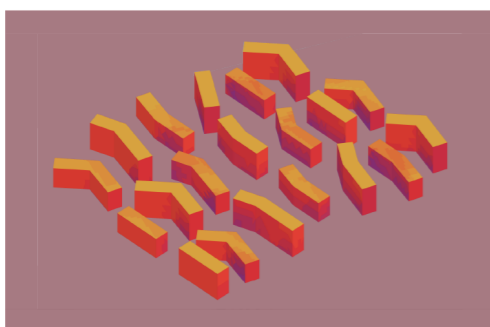


south and southern west sides receive sufficient solar radiation



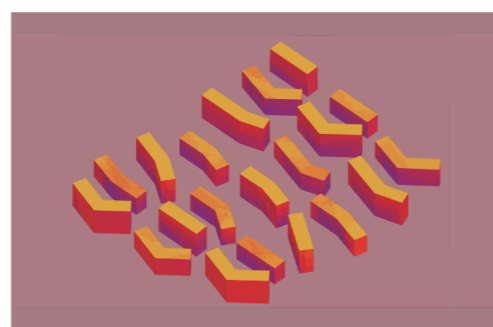
north and northern east sides receive relatively low solar radiation

SUMMER SOLSTICE, 21st, JUN

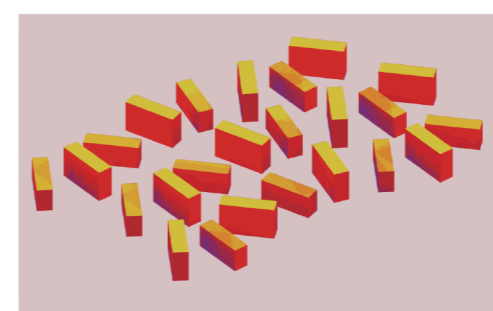


more shadings on the facades

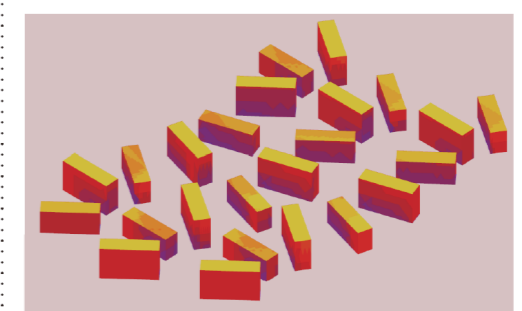
DIRECT SUN HOURS:



the bent shape provides more shading to the buildings

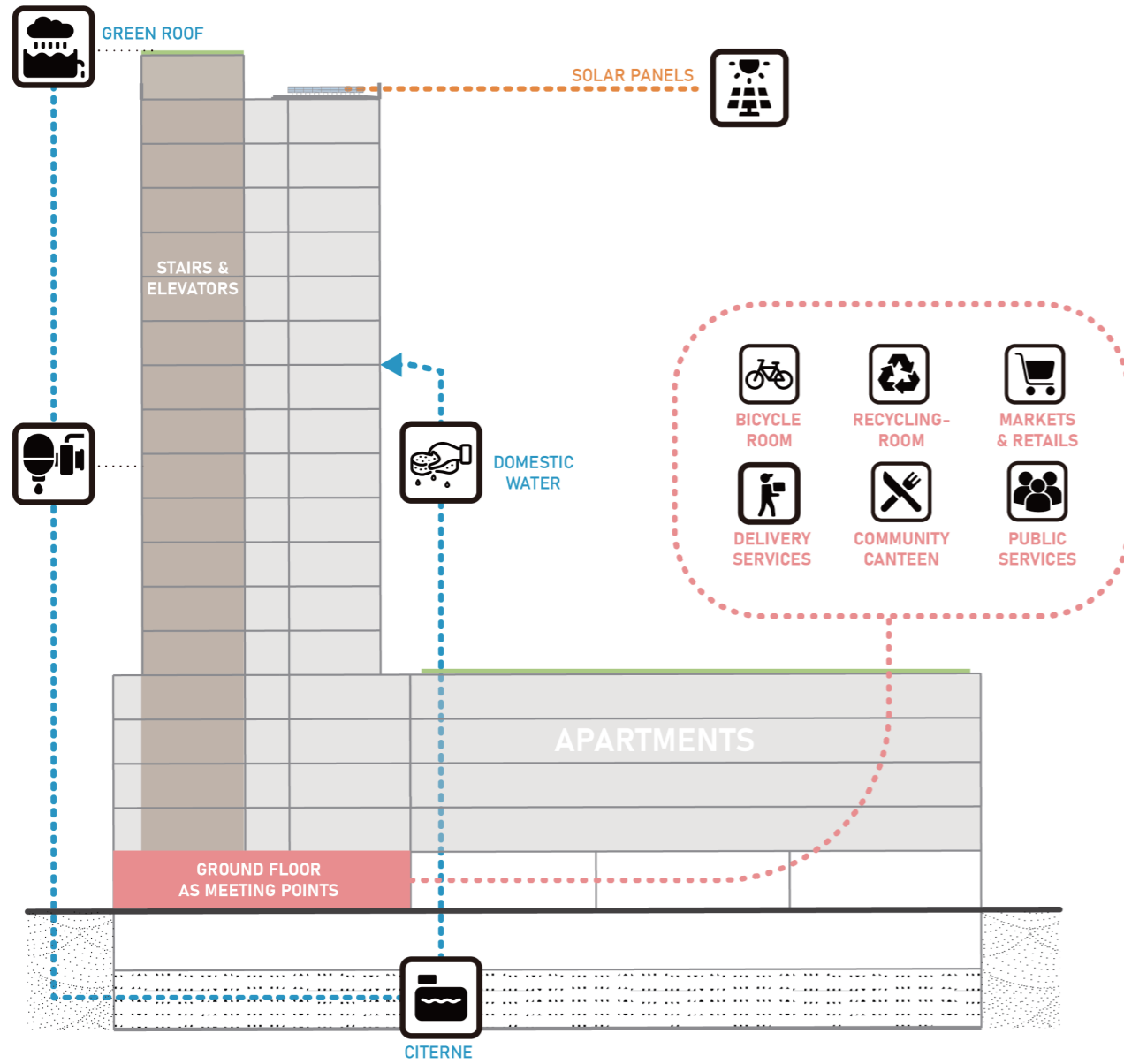


south and southern west sides receive limited shadings



north and northern east sides receive sufficient shadings

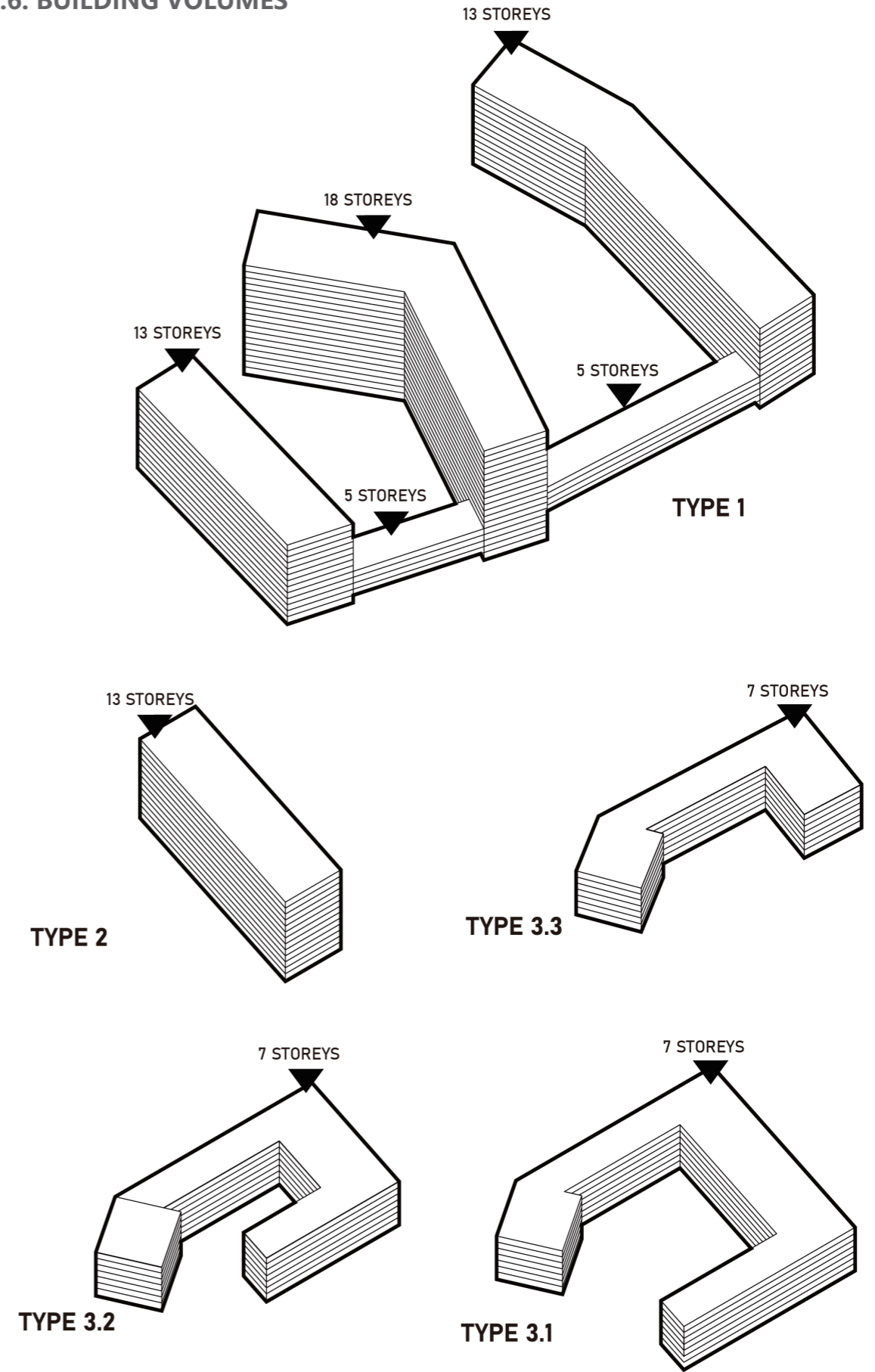
2.2.5. BUILDING INFRASTRUCTURES





THE HOUSING TYPOLOGIES WERE DIRECTED BY THE IDEA OF CLEAN ENERGY. THE SOLAR CELLS ON THE ROOF GENERATES ELECTRICITY TO SUPPORT ELEVATORS AND INDOOR LIGHTING. THE GREEN ROOF AS PART OF THE WATER MANAGEMENT SYSTEM ABSORBS RAINWATER, AND EVENTUALLY BEING RECYCLED AS DOMESTIC WATER.

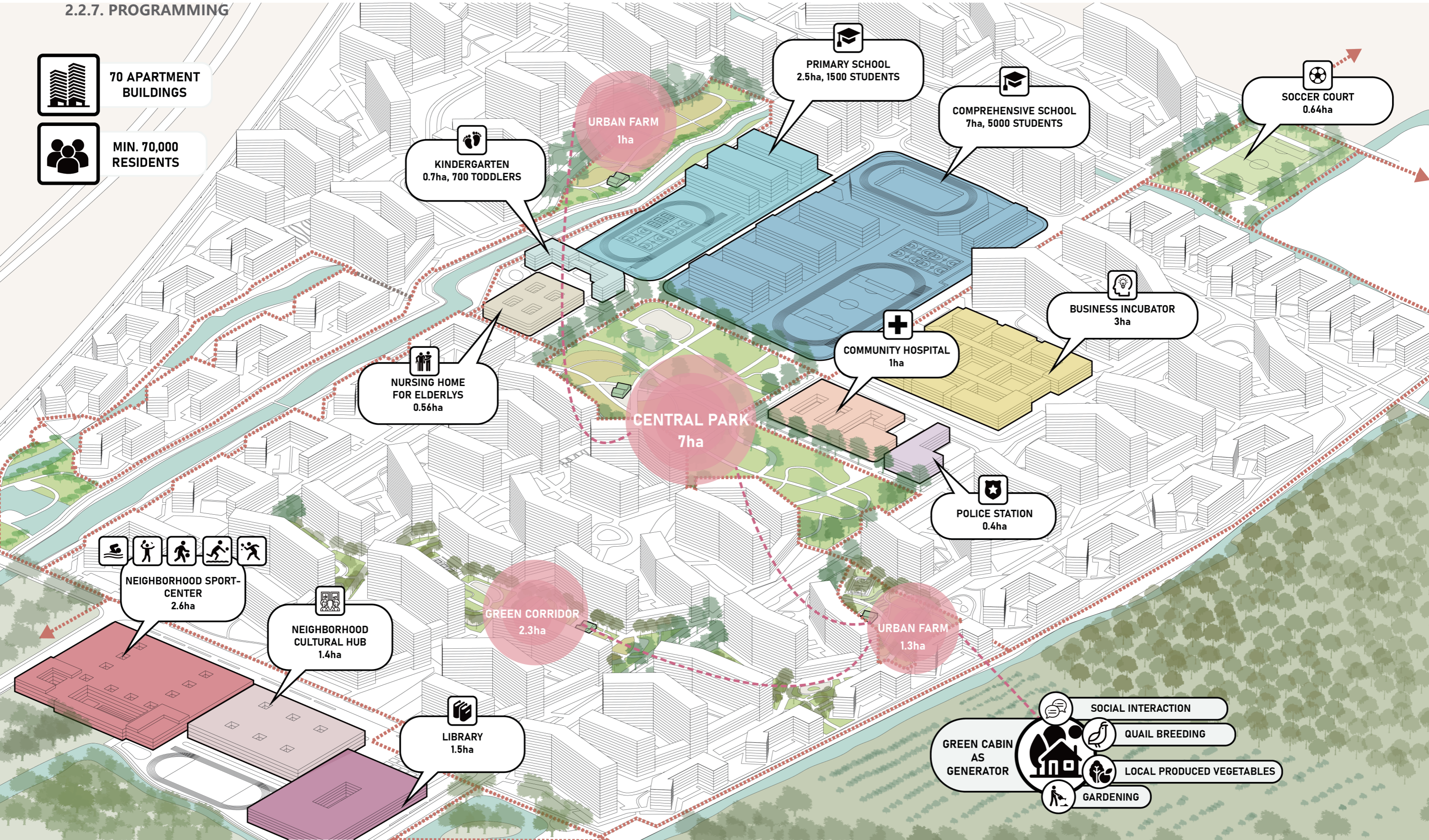
THE GROUND FLOOR OF EACH BUILDING WAS CONSIDERED AS THE EXTENSION AND COMPLEMENT OF EXTERIOR PUBLIC SPACE, AND PROVIDES MULTIPLE FUNCTIONS AND SERVICES TO THE PUBLIC TO CONTRIBUTE TO A VIBRANT COMMUNITY.

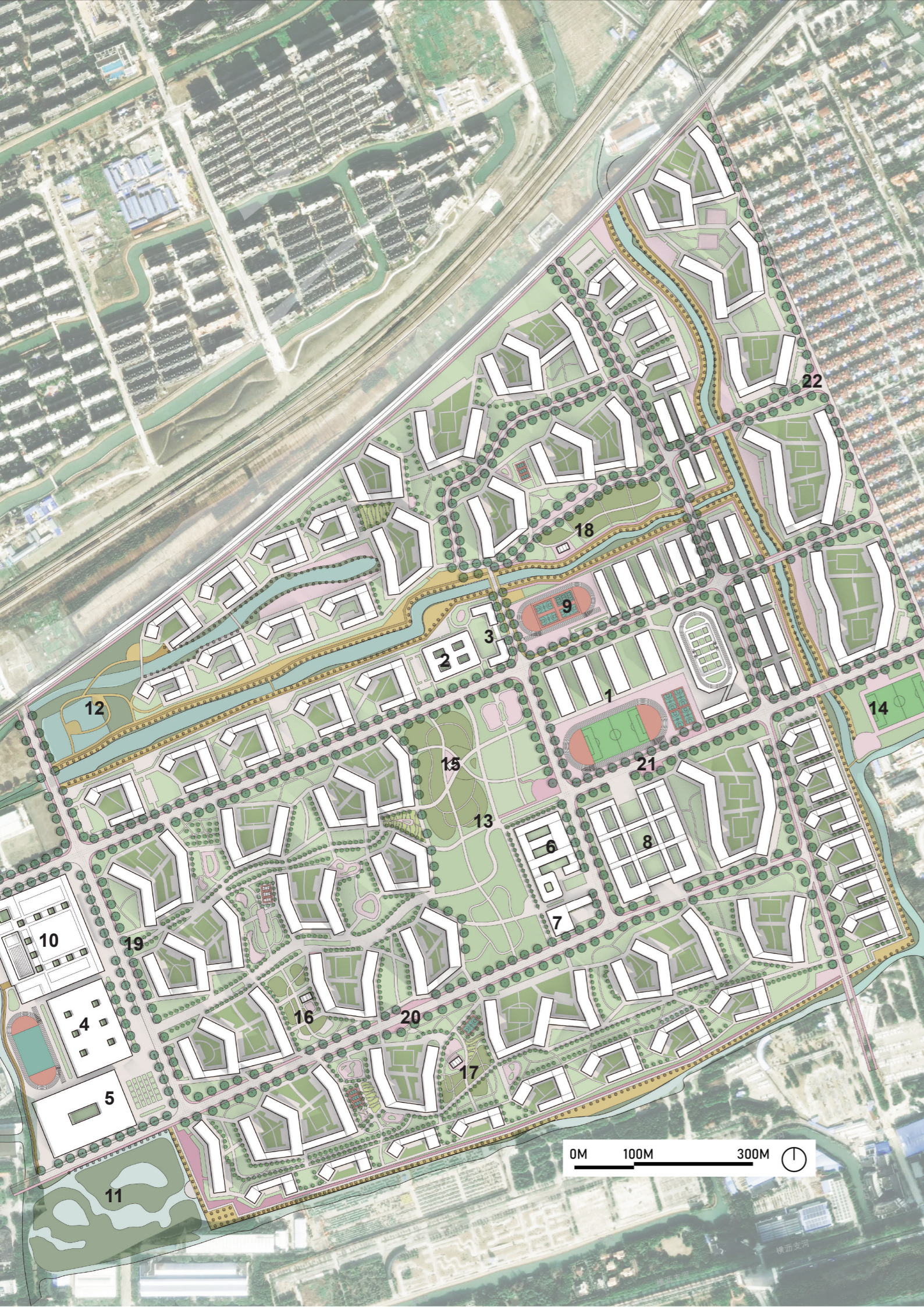
2.2.6. BUILDING VOLUMES



2.2.7. PROGRAMMING

-  70 APARTMENT BUILDINGS
-  MIN. 70,000 RESIDENTS





LEGEND

	LAWN		WETLAND		WATERFRONT PLATFORM
	COURTYARD		PUBLIC SPACE		RIVER SIDEWALK
	URBAN FARM		PEDESTRAINS		
	URBAN GARDEN		ROAD NETWORK		

- | | |
|-------------------------|--------------------------|
| 1. COMPREHENSIVE SCHOOL | 16. URBAN FARM B |
| 2. NURSING HOME | 17. URBAN FARM C |
| 3. KINDERGARTEN | 18. URBAN FARM D |
| 4. CULTURAL HUB | 19. TROLLEYBUS STATION 1 |
| 5. LIBRARY | 20. TROLLEYBUS STATION 2 |
| 6. COMMUNITY HOSPITAL | 21. TROLLEYBUS STATION 3 |
| 7. POLICE STATION | 22. TROLLEYBUS STATION 4 |
| 8. BUSINESS INCUBATOR | |
| 9. PRIMARY SCHOOL | |
| 10. FITNESS CENTER | |
| 11. WETLAND PARK 1 | |
| 12. WETLAND PARK 2 | |
| 13. CENTRAL PARK | |
| 14. SOCCER COURT | |
| 15. URBAN FARM A | |

0M 100M 300M






BUILDING HEIGHTS

Height of the residential buildings varies from 16m to 55m. The lowest apartment building is overheaded to connect the ground floor with the public spaces and infrastructures. Storeys between 1-4 are public buildings which the floor heights changes with the demands.



BUILDING FUNCTIONS


The public services including comprehensive schools, kindergarten, nursing home for silver generation, community hospital, police station and business incubator. The Public Space plays the role to welcome and integrate residents both from interior and exterior. The ground floor of residential buildings provides functions like community canteen, bicycle rooms, recycling rooms, etc..

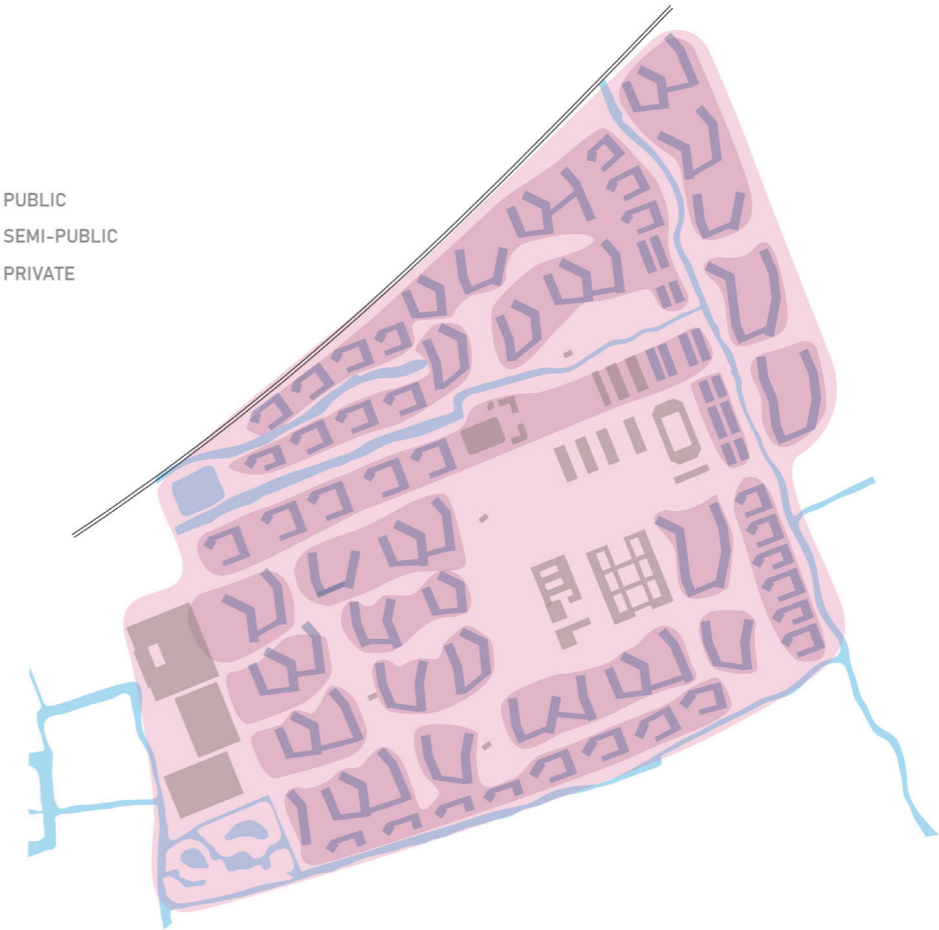
-  NEIGHBORHOOD INCUBATOR
-  CORE SERVICES
-  NEIGHBORHOODS



COMMUNITIES

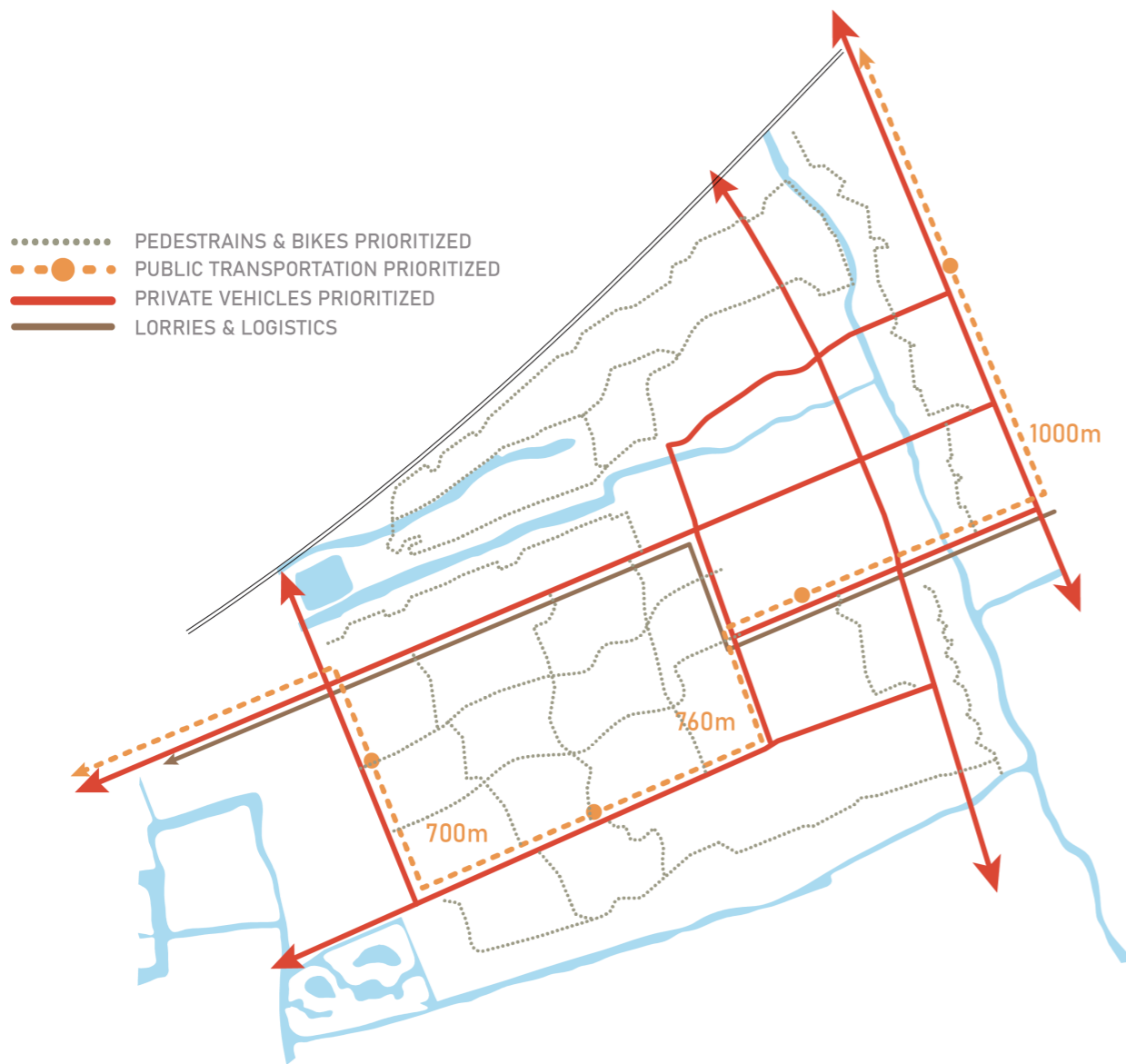
The area in red colour plays the role as integration incubator, which means that the places and functions provided by these spaces could attract people who not only lives in this neighborhood, but also those from exterior , to create more chances for interactions and social cohesion.

-  PUBLIC
-  SEMI-PUBLIC
-  PRIVATE



TRANSPARENCY

Soft edges are applied to the boundaries between public space and semi-public space. But the semi-public space could be transformed into public spaces on certain occasions. The private spaces are limited in the building level to create more spaces and opportunities for people to meet and interact with each other.



TRAFFIC PRIORITIES

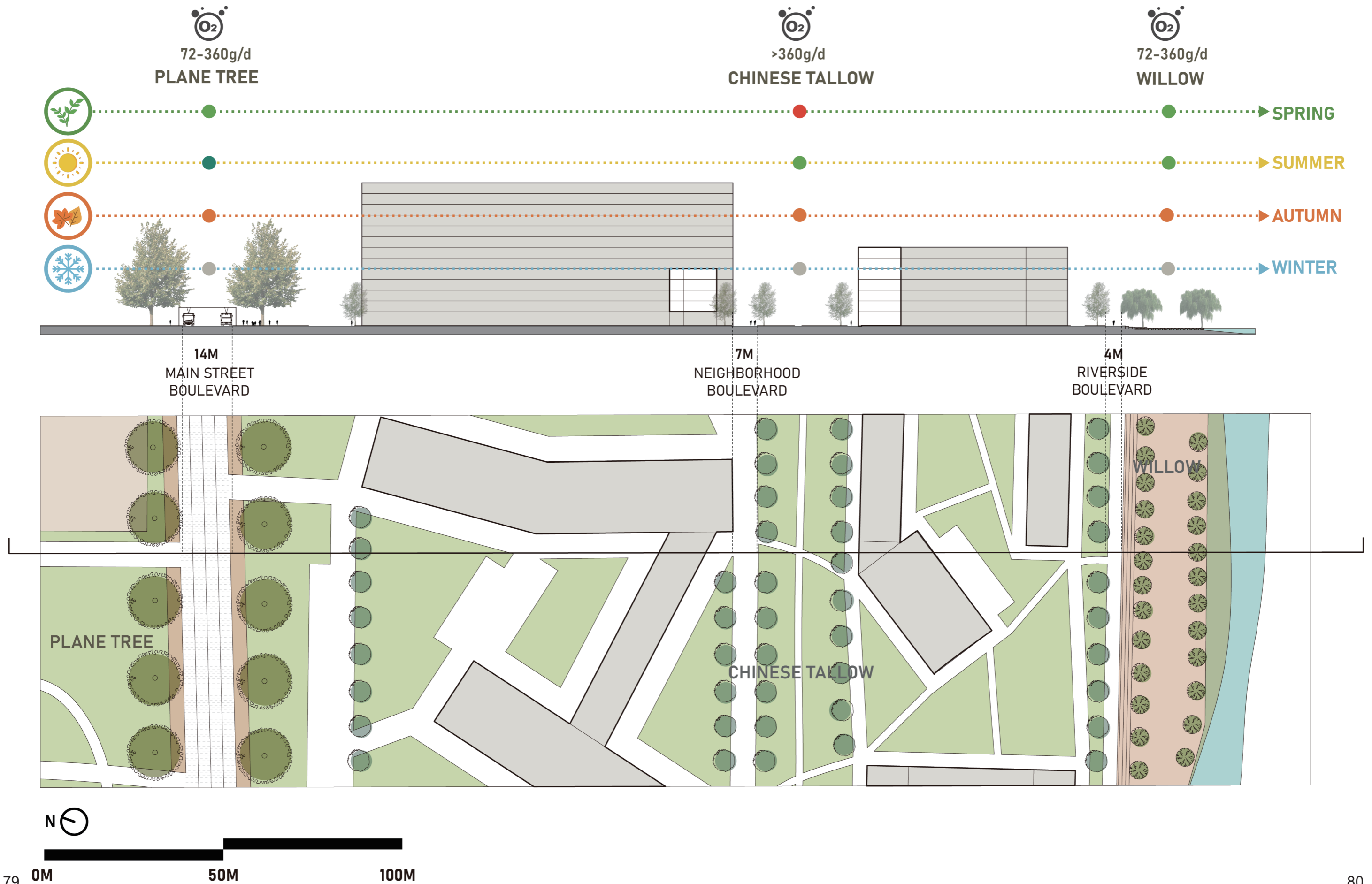
There are four types of traffic in the neighborhood. The traffic priority enables certain users to have easy access throughout the area. Among them, though vehicles have access to go through the pedestrians-prioritized areas, the pattern of roads limits their travelling speed, as well as the amount of cars.



BOULEVARD

Three different types of boulevards are applied to the area. The benefits could be various. Generally, the vegetation provides shading during summer, besides, different tree species provides different dimensions and features to characterized the space.

2.2.8. PLANT SCHEDULE





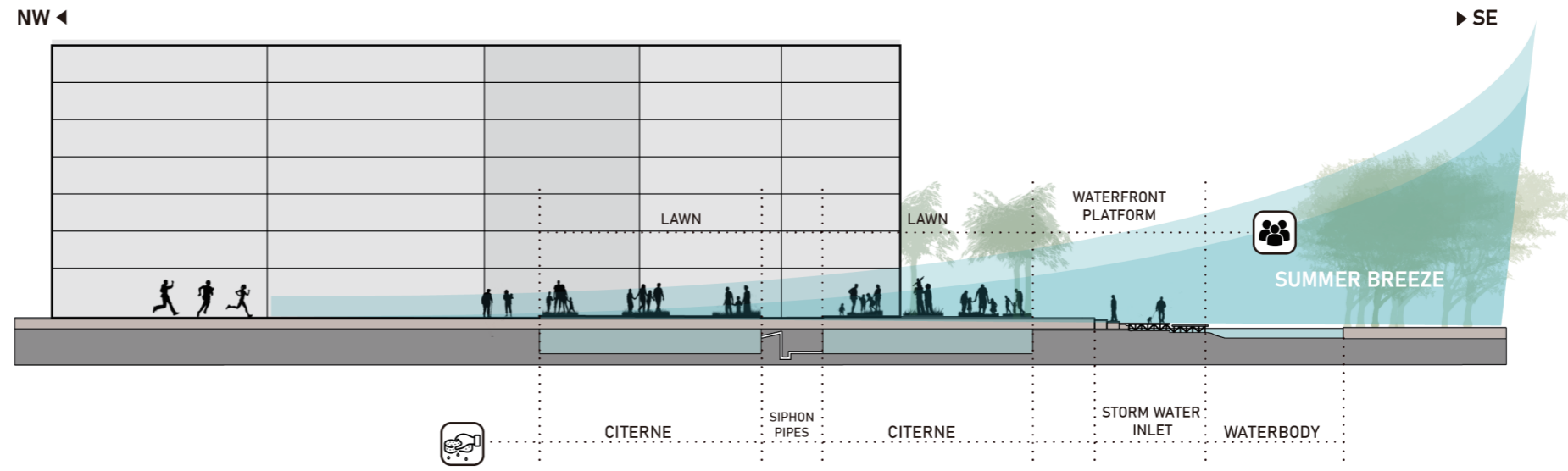
GREEN STRUCTURE

The green structure contains different spaces to guarantee a vibrant neighborhood. The urban agriculture allows residents to plant their own vegetables and fruits while the community gardens provides the opportunity to bond those who lives here. At the same time, the wetland park helps purify the water and plays an important role during the flood season.

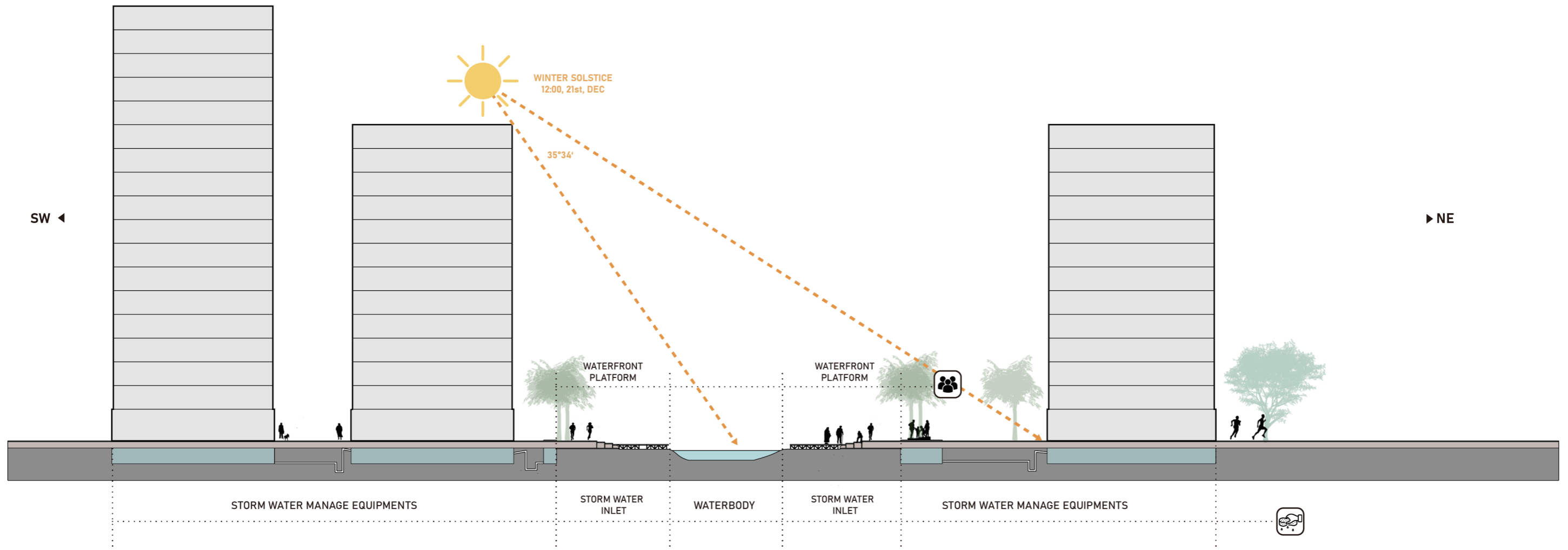


RIVER WALKWAY

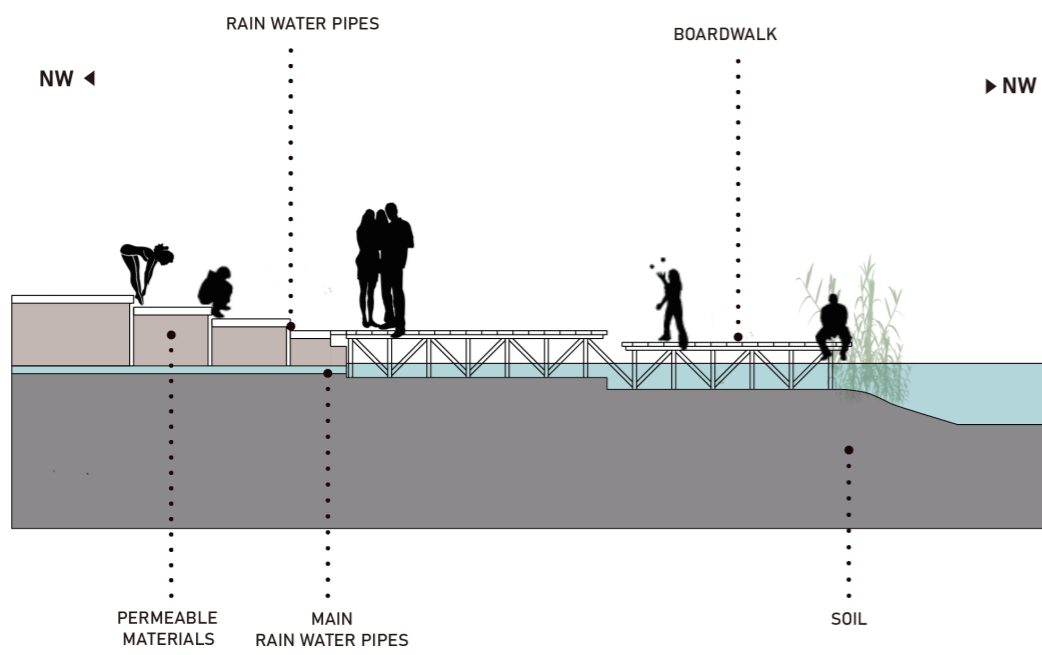
The walkway connects every residents by providing a long sidewalk throughout the entire area. The open space by the walkway provides extra public space for the residents to arrange their activities.



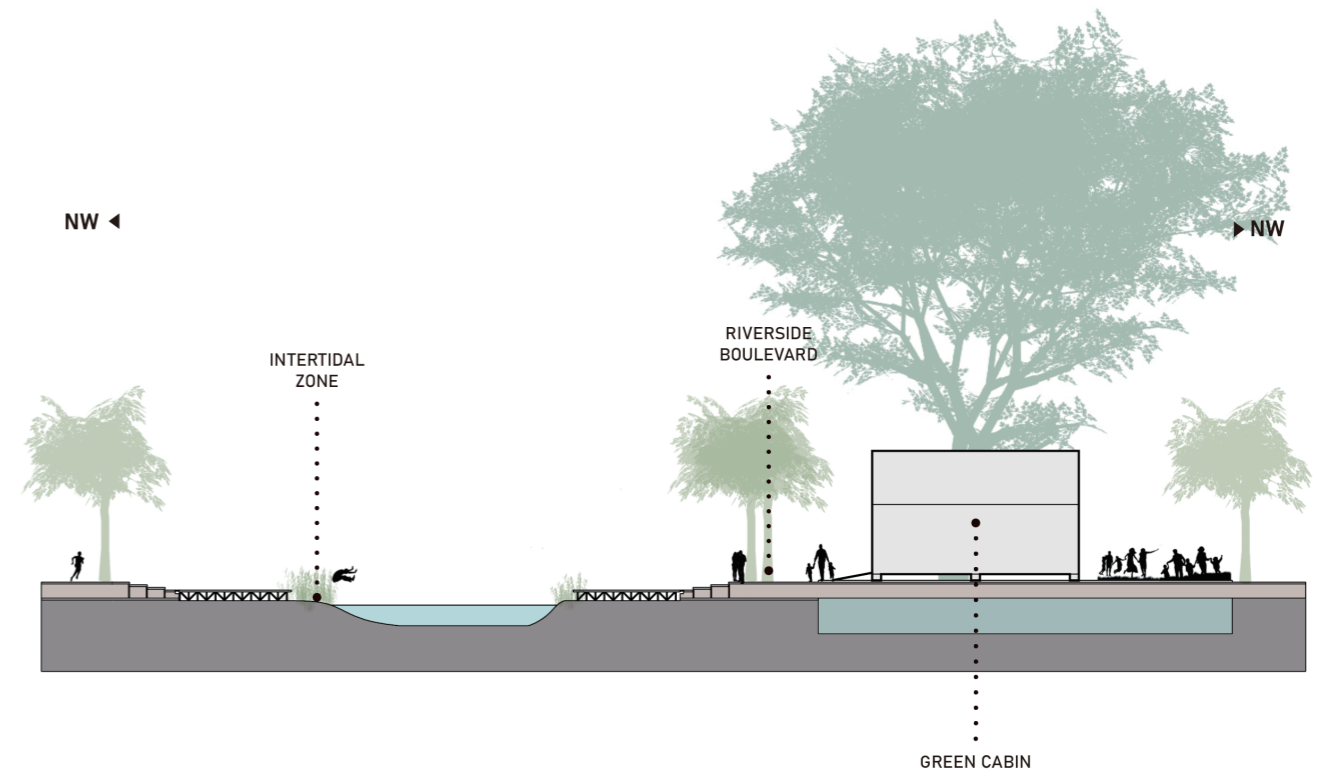
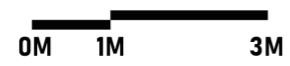
SECTION A-A



SECTION B-B



SECTION A-A

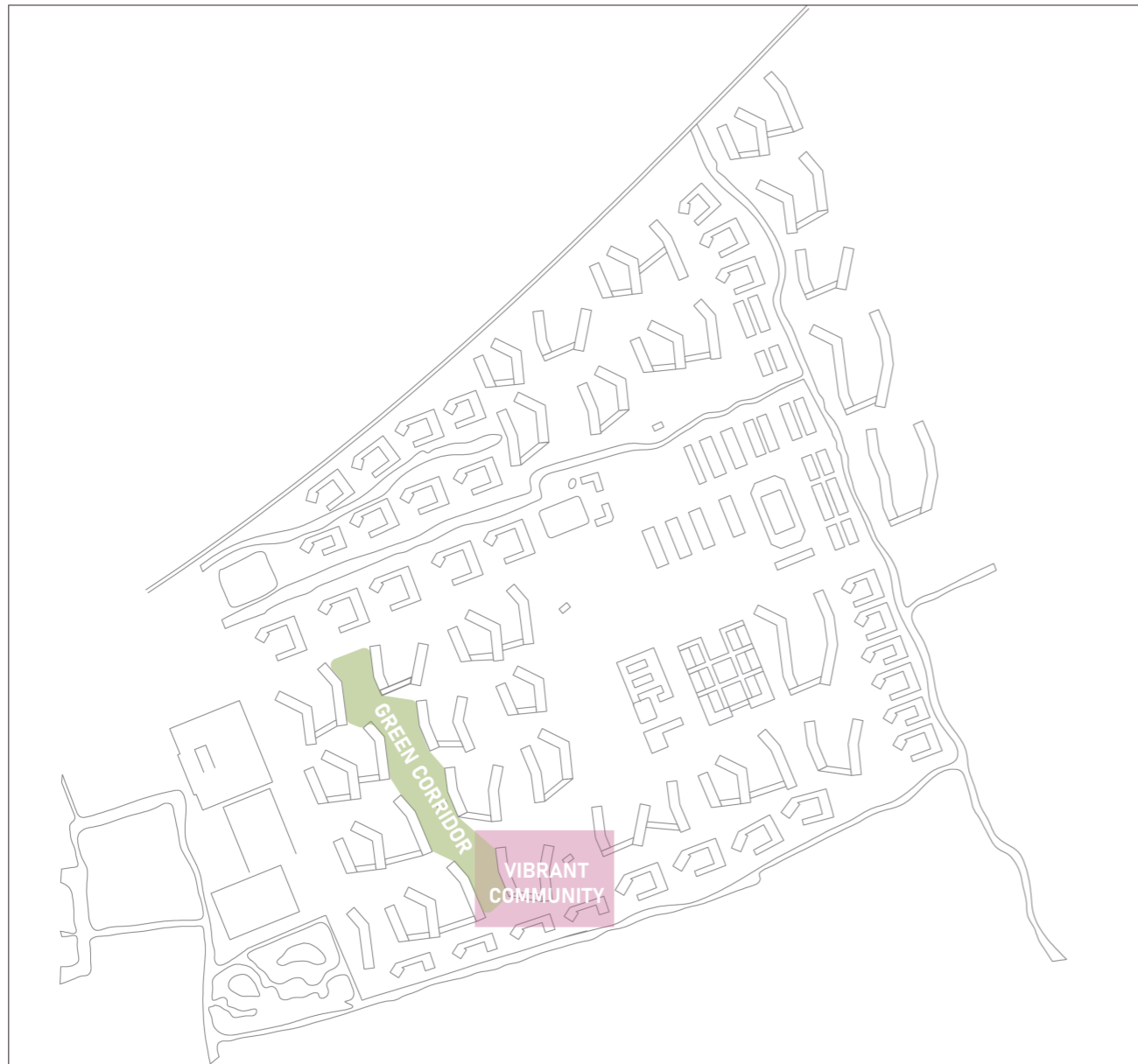


SECTION C-C



2.3. ZOOM-IN PLAN

The detail plan focusing on two different parts of the area. The exploration on the typical public space, which is the green corridor, discussed the qualities of diverse functions, and both public spaces and public domain. The vibrant community explores the quality of different yards and how the building ground floor is considered as the extension of exterior public space.



Street view sketch



BASKETBALL COURT

COMMUNITY GARDEN

GREEN CABIN

COURTYARD

COMMUNITY FARM

VOLLEYBALL COURT

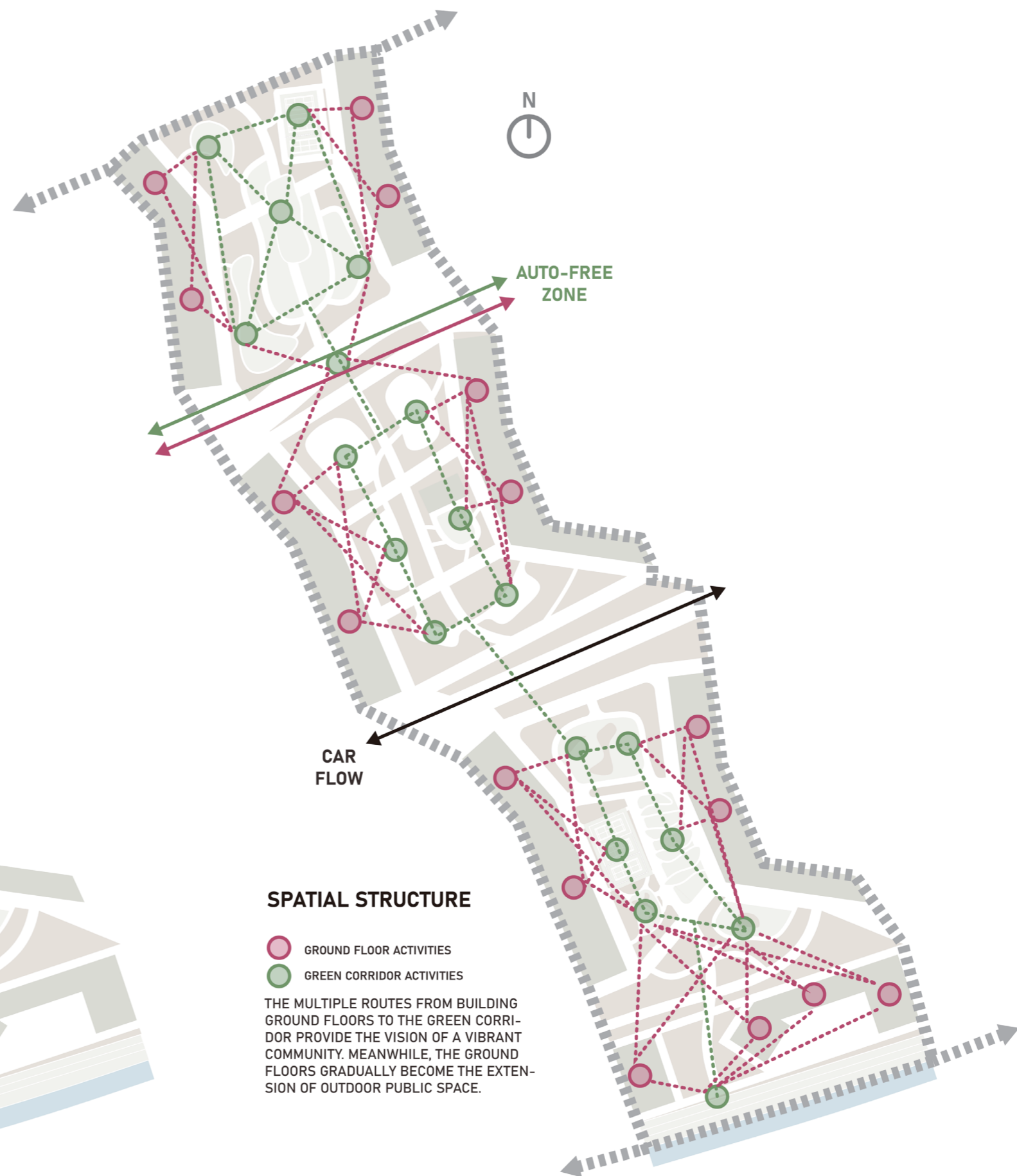
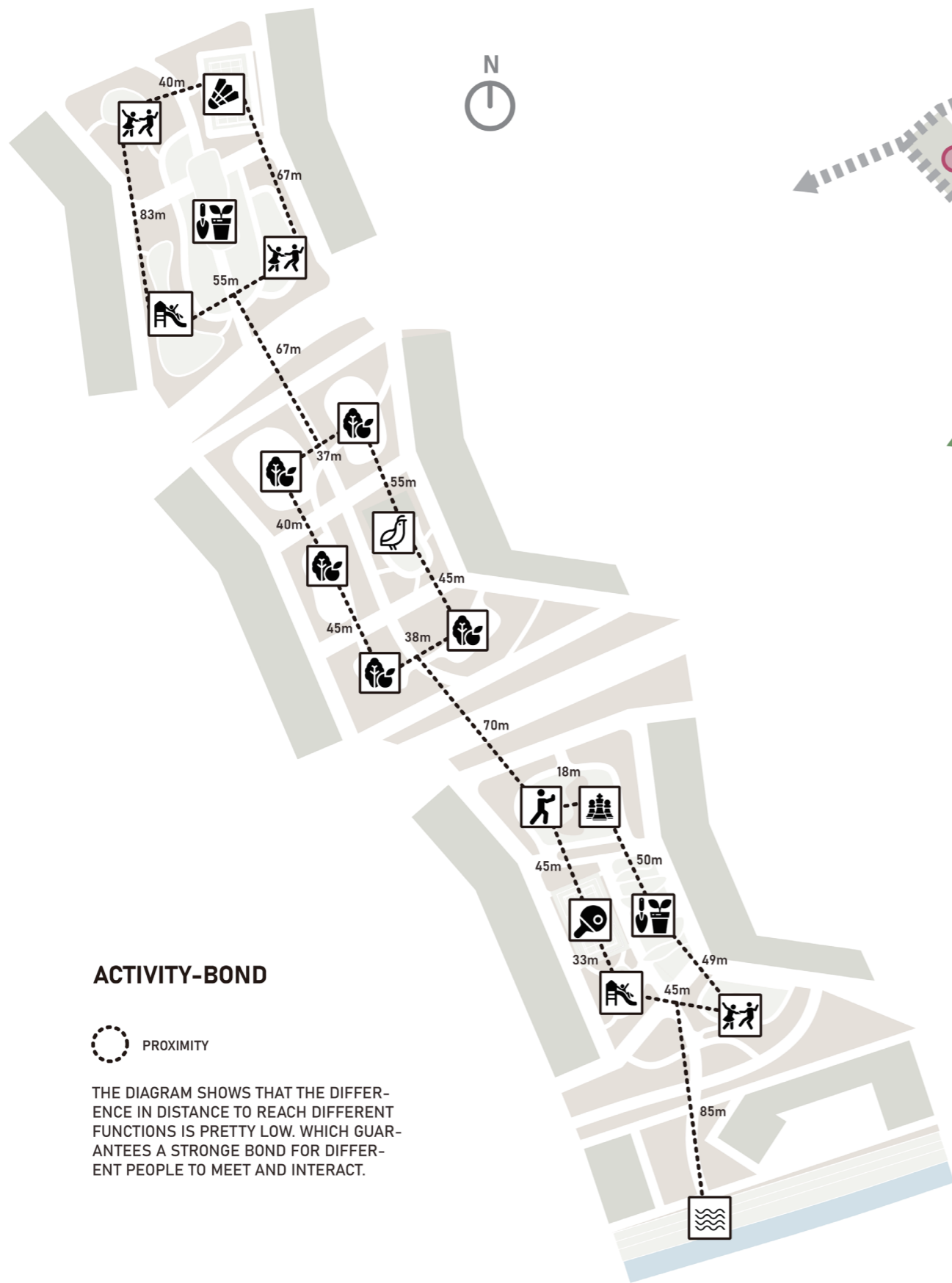
COMMUNITY GARDEN

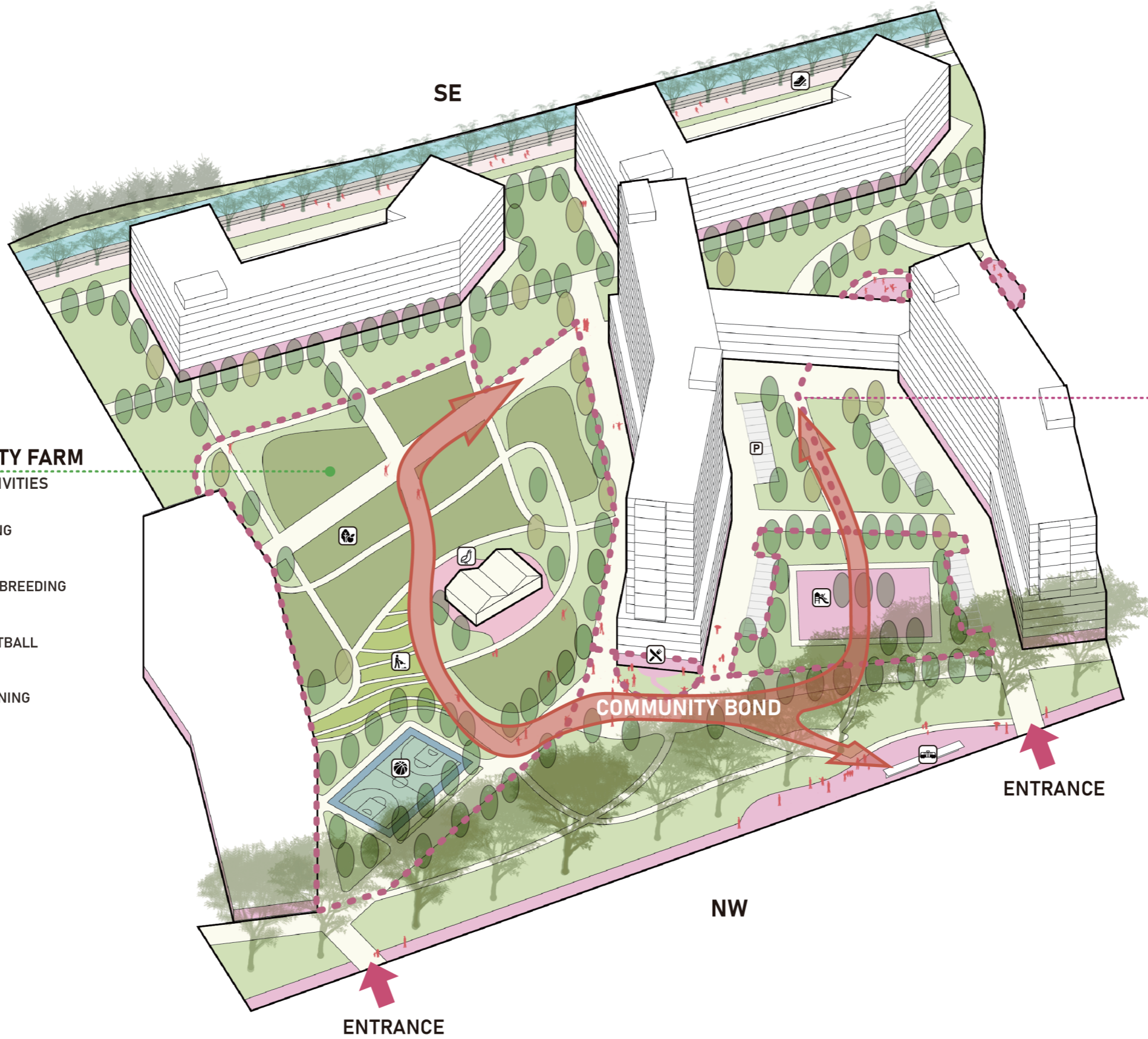
WATERFRONT PLATFORM

0M 20M 40M









COMMUNITY FARM
SUPPORT ACTIVITIES



FARMING



QUAIL-BREEDING



BASKETBALL



GARDENING



ACTIVE COMMON AREA



COMMON LAWN



COMMON GARDEN



COMMUNITY AGRICULTURAL LAND

COMMUNITY
SUPPORT SERVICES



TROLLEYBUS STATION



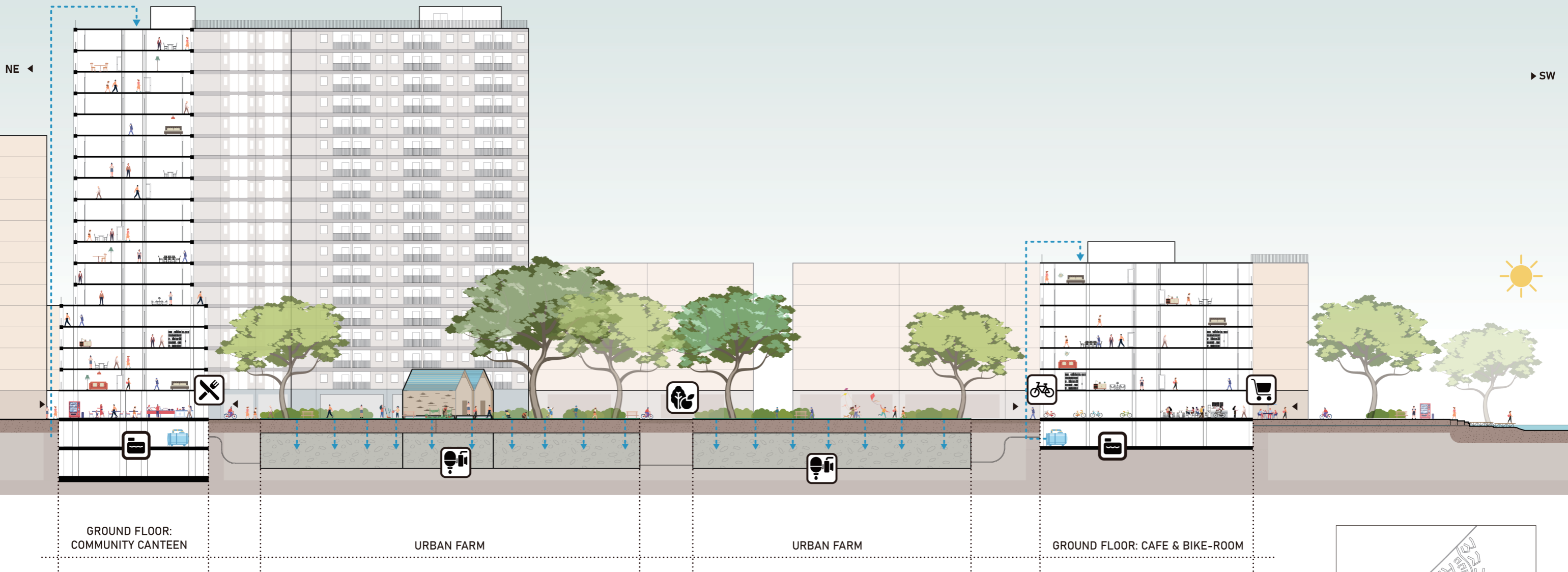
COMMUNITY CANTEEN



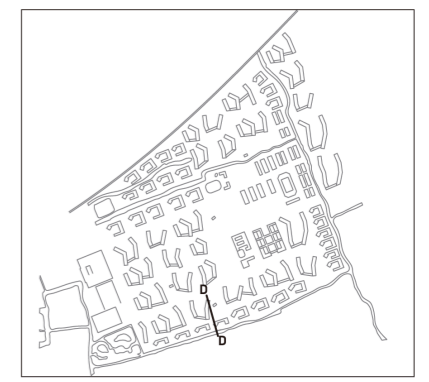
CHILDREN'S PLAYGROUND



BROADWALK



SECTION D-D



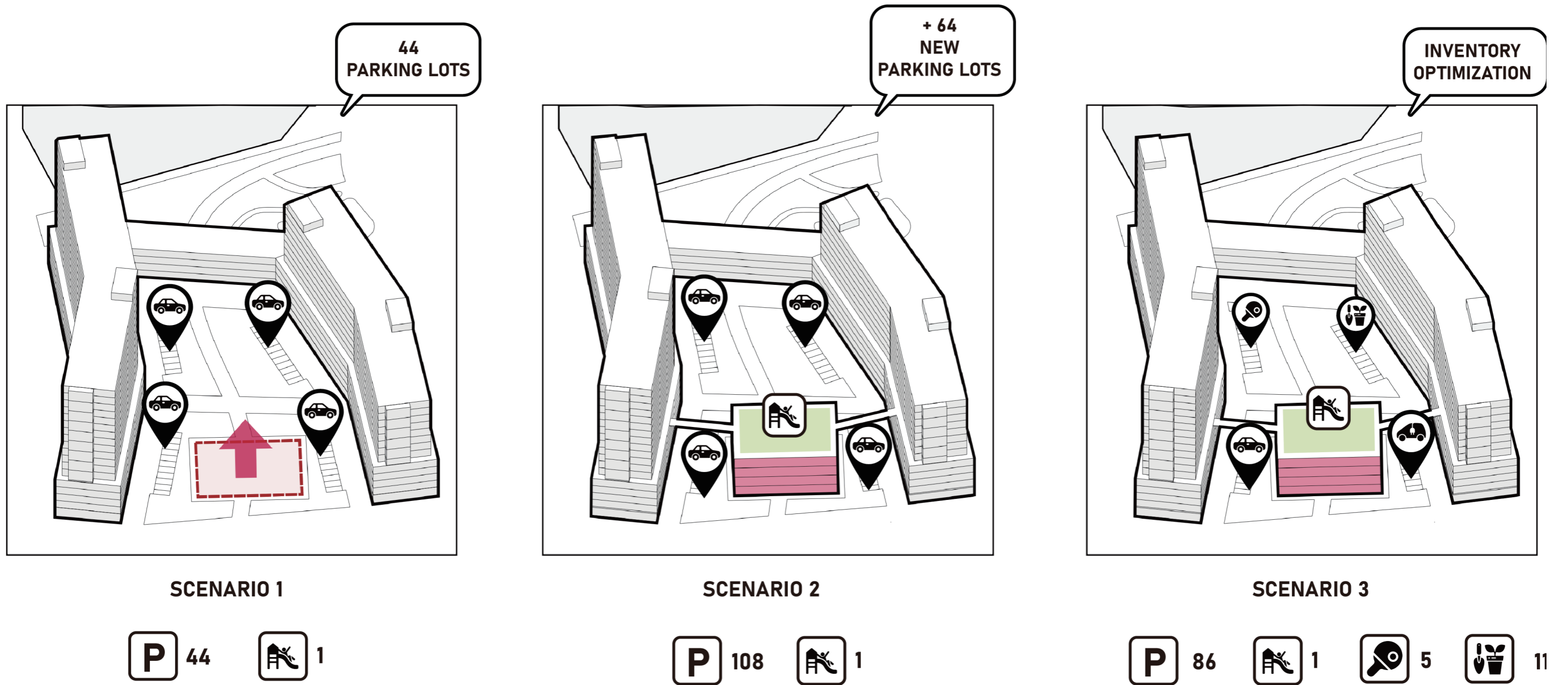


GROUND FLOOR DURING DAY TIME



GROUND FLOOR AT NIGHT

2.3.1. DIMENSION-BASED PARKING LOTS REDEVELOPMENT



THE INCREASE AMOUNT OF CARS IS DIFFICULT TO FORESEE, THEREFORE THE OPEN SPACE BETWEEN EVERY RESIDENTIAL BUILDINGS ARE DESIGNED WITH THE DIMENSION OF STANDARD PARKING LOTS (5m x 2.5m) AND BE READY TO MEET FUTURAL DEMANDS.

IN THE SCENARIO 2, THE ORIGIN OPEN SPACE WERE LIFTED UP AND DEVELOPED INTO A ROOF GARDEN, AND CONNECTING WITH BUILDINGS FROM BOTH SIDES. THE NEW PARKING BUILDING PROVIDES 72 NEW PARKING LOTS.

THE SCENARIO 3 FORESEES THE DECREASE DEMANDS FOR CARS, THEREFORE EXCEEDING PARKING LOTS COULD BE DEVELOPED INTO SMALL SCLAE UNITS THAT PROVIDES DIVERSE FUNCTIONS, FOR INSTANCE, GARDEN, TABLE TENNIS COURTS, ETC.

CHAPTER 3.

CONCLUSION

The Floating population is an enormous and complicated social phenomenon. This paper focuses on rural-urban immigrants with family units and how they transferred from rural populations to urban residents. In order to understand the population characters and identify the dynamic mechanisms. This research started by answering three questions from the very beginning.

Question 1. What facilities/Services should the living environment be equipped/ provide to positively affect the floating population' s settling willingness?

The Floating population's settling willingness could be affected by many factors, but the primary factor could be the economy. As much research reveals, economic issues play a crucial role for the floating population. Because of the low unstable income and lack of proper social security, seeking affordable housing and settlements with low living costs makes them different from other residents. Though good quality public services and amenities did have a positive impact on their settling willingness as well, the inflation of prices would always push them to seek neighborhoods with low living expenses. Combining the discoveries from the research, to answer this question, advice from a practical perspective are given:

1) Cost control is the leading principle when providing any type of facilities /services when building such a living environment. The cost mainly includes construction and operation.

The facilities and services should be able to help support the daily operation, of such a community, which could positively impact the local production. For instance, spaces that provide skills training, temporary markets, etc.

2) Efficient land use. In order to gain the most benefit of local production. The role of multi-function, segmentation and collective function should be emphasized. The case study from Singapore shows the importance of segmentation and collection. Functionally,

there are places for people to meet certain demands and places for everyone to gather together. But in practice, those functions could be collected in the same physical containers, which provides more discussion at the design phase.

3) Highly-developed accessibility and proximity to meet different demands. Transit-oriented development guarantees the opportunity for residents to travel outside their neighborhood while the discussions on proximity are more from a community perspective. As mentioned above, multi-function could also refer to multi-proximity.

Question 2. In what way should the floating population interact with its surroundings can achieve the most benefit of social cohesion?

Communication and interaction play an important role when promoting social cohesion. In the context of this study, the family is considered the basic unit of the floating population instead of individuals. But a family is usually a combination of people who differs in gender and age. People with different characters have different demands for communication and interaction. Therefore when it comes to the physical container where interaction and communication take place, which is the public place, the facilities and opportunities that were provided should be various to meet those different demands. In the case study of Singapore, the importance of participating in common activities and sharing mutual values are raised to a high level. Based on these study outcomes, it could be explained that participating in activities with others in a diverse public space could give them opportunities to build common values and understandings, which could tremendously contribute to social cohesion.

Question 3. How can the living environments keep serving the public after the main problems of the floating population were solved?

A living environment that promotes social cohesion and shelters to whom is in a disadvantaged situation can continuously create values and new lifestyles for the users could constantly affect society in a positive way. When doing further research, it was realized that migration is a common situation throughout the world in all times. As a community that provides social security functions, such neighborhoods not only sheltered currently disadvantaged groups like the floating population, but also those in the future. From a polycentric perspective, such neighborhoods could also invite those who intend

to live and work in sub-center areas. Besides, nowadays many countries are facing population aging, a community that is based on the ideas mentioned above could provide them with convenience. From a mathematical perspective, it is important to highlight the transformation between different dimensions. For instance, a standard parking lot is 6m x 2.5m while the parking lot for bikes is 2m x 0.6m, in that case a standard vehicle parking lot could be parked 10 bikes. To sum up, the nature of a public housing community is where provides people with social security and well-being, on the other hand, it is important to take dimension into consideration, similar dimensions could be considered as a set, examining the relationship between different sets and calculating their mathematical relationships. By applying this mechanism, more certainty would be added to the future development.

Many evidence and clues show from the research show easy access for the users to meet their demands are extremely important, which brings the third part of the study. In order to improve study outcomes into a feasible mechanism, a site with the potential to provide those qualities is carried out. By using the method of space syntax, the accessibility and proximity are examined on different scales. It shows that with different ways of traveling, the morphology should be presented variously, though space syntax shows the distance, traveling time and speed should also be taken into consideration. This discovery will no doubt contribute to the design proposal.

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5. AFTERWORD

The floating population is a complicated phenomenon that requires comprehensive understanding. It's the result of a systematic operation, which requires a solution that obeys a similar principle. In many cases, it would be difficult to balance qualities and quantities when it comes to public housing. On the one hand, there is an enormous group demanding affordable housing, on the other hand, ignoring the qualities of public housing could lead to a series of negative consequences. For instance, accessible public transportation and infrastructures that relates to public services. In practical cases, preliminary erroneous judgments could lead to segregation and marginalization, etc. Due to the social security function of the public housing, the task is usually given to the government and relies on the public budget. From the perspective of urbanism and social sustainability, the concept of density could not only apply to the housing, but also to the outdoor spaces that provide various public activities to encourage social cohesion. Another obvious benefit of the dense urban area instead of sprawl is that, in practice, controlling the expense in a reasonable range and improving the land utilization rate from my point of view.

It could be tricky when we talk about people-oriented or people-centric design, because people are a combination of various and diverse populations. Each different user groups have different demands regarding public spaces and outdoor activities. Those differences depend on their income level, lifestyles, backgrounds and occupations, etc. Designing for a general "people" could lose focus and result in the failure to meet the proposed vision. At the same time, balancing each different urban actor could also make the task too difficult for architects and urbanists, such a situation would get much more challenging when the scale expands. A common way to work with such a scenario is to focus on the commonalities of different user groups, which is a highly concluded "people". When working on the thesis, I learned that not only discuss the physical scales of the space, but also the abstract scales of the people and amenities. From the "people" to the main urban actors, there are many spaces for such a discussion, and I shall take those thoughts into my future works.

