

# An Attempt to Regain Paradise

Urban regeneration of the largest residential community  
- Paradise Gateway in Beijing -  
from the inter-scalar perspective

Yuefeng Yang - 4503910 - Complex Cities  
First Mentor - Diego Sepulveda  
Second Mentor - Dominic Stead



## Reflection

Looking back to the whole process of my graduation project, it was filled with up and downs. The subject of the research and design was settled at the very beginning, which is the mega-community of Paradise Gateway in Beijing. It is the largest community in the world, containing 700,000 residents. This community is widely reviled for its overcrowding, poor mobility condition, lack of service and public space, and illegal housing. However, no matter how people complain about it, the population of the community grows larger and larger. Although it is a modernism community that puts quantity over quality, such serious problems cannot be caused only by the issues within itself. It involves the complicated context of the city of Beijing, where intense urbanization is in the process. That is the reason why I joined the studio of complex cities.

During this year, I have tried a various approach to the subject problems. For instance, the construction density gap between the suburban mega-community and historical inner city; the fault between physical and behavior issue that contributes to the appearance of the mega-community. These are all crucial conflicts. However, as a planning-oriented project, the project's goal is solving problems by interventions. During this process, academic research helps to better understand the subject and reveal the possible solution, and design thinking helps to reason relevant findings and determine final interventions. Although the problem field is focusing on the community level, the metropolitan structure has a significant influence on the community. The vision of regional structure runs in the opposite direction than the community development reality. It is crucial to look into both levels, and then locate the mismatch between them.

The final approach is to combine the metropolitan scale and community scale, in order to come up with a series of interventions aiming at solving the problems fundamentally. According to urban land market theory (1964), as in a monocentric city structure, the residential economical zone locates within a certain distance from the city center because of the Distance Decay Relationship between land rent and distance. I found this fascinating as the theory explains the reason why mega-communities existed

in Beijing. Moreover, ring-radial mobility structure of Beijing lowers the transportation efficiency and creates a tidal effect. On the other hand, polycentric development has its advantages on balancing urban network and producing spatial cohesion. Thus, my main method is to explore how can a polycentric metropolitan structure influences the mega-community and how can the community improving its quality by adapting to the larger intermedia scale. In this approach, the relationship between regional scale and local scale is similar to the two sides of a Mobius Strip, which is closely related to the urban regeneration project. By jumping between scales, crucial reasons behind problems can be explored and resultful interventions can be carried out.

Paradise Gateway is only one of the mega-communities along the 5th ring in Beijing. The zone along 5th ring road is the area of highest affordable residence zone, because of its mediate distance from the center. Moreover, a huge amount of migrants arrived at the city in the past decade during urbanization process. The proportion of migrants in Paradise Gateway has shockingly reached 90%. Migrants in Beijing are called Drifters, whose dreams are owning an apartment and leading a life here. However, the overcrowded 5th ring, including Paradise Gateway, is wildly reviled especially by migrants. This phenomenon involves social equity between the arrival and the local.

The project has come up with a convincing metropolitan strategy. By promoting polycentric development, the role of Paradise Gateway will be shifted from the compelled choice of housing at the fringe to an alternative housing in the middle of the centrality network. The strategy highly accords with Beijing's master plan and fits the city's future vision. However, the urban design adapting to the intermedia structure is still experimental. For the next period, I would like to improve the urban design that provides public space, service, and activity with quality, and suits better with the local reality and the intermedia relationship.



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# 1. Introduction

- Motivation
- Location of Paradise Gateway
- Map and birdeye view
- Population
- Building area
- Objective group: Drifters

## 1.1. Motivation

Chinese cities are going through an intense transformation of urbanization, which the world haven't experienced before. Beijing, as the capital, is the first to be affected by both developments and problems through this transformation. The flow of people from rural to urban, and from small cities to large cities is dramatic. The phenomenon of Drifters, migrants in Beijing, started to draw the attention of the whole society since the 1980s. Economic and political restrictions made the life adventures of Drifters hard enough.

This project aims to find alternative solutions towards overcrowding densities and housing shortage crisis in

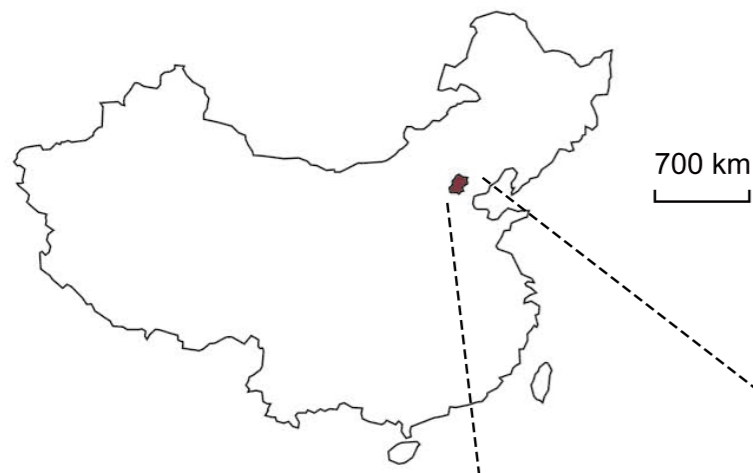
Paradise Gateway, Beijing. Although my appeal is not as strong and influential as the Red political specialists, whose lifelong pursue is to prove how our people live in rejoicing based on imagination. I found it is my duty, as an urban planner, to work on a better future for citizens, instead of benumbing people with slogans.

Born in Beijing, the author personally experienced the poor traffic condition of the city. Congestion can easily happen anywhere, especially at the peripheral of the city center, which is a clear sign of the overcrowding. Various measures towards congestion have been carried out, from the license-plate lottery to odd-and-even license plate control rule. There are rumors about tolls on ring

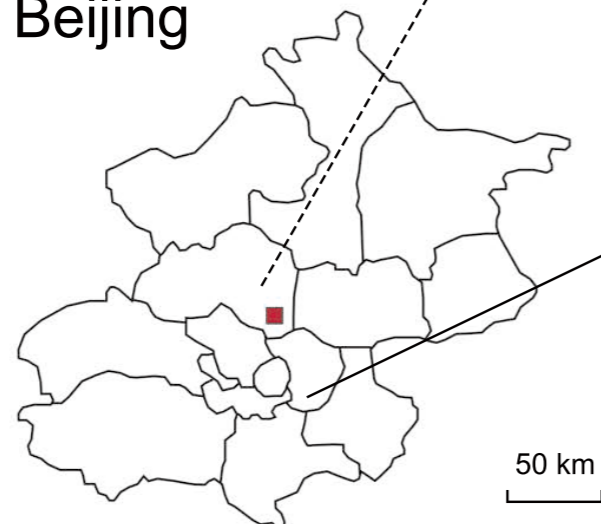
road are going to be charged in the coming 2017. 'The song for the fifth ring' gains huge popularity among Citizens in Beijing, expressing the mixed feelings about the city's infrastructure. Another part of the motivation of this project is the attempt to reveal the primary cause of congestion in Beijing.

In conclusion, the project will aim toward counteracting the quality effects of the mega-residential communities in Beijing. These communities are playing an important role in the settlement of immigrants, where living condition and traffic condition is bad. As density rises, living quality of local citizens goes down. Is there any possibility of revitalizing the giant communities?

### China

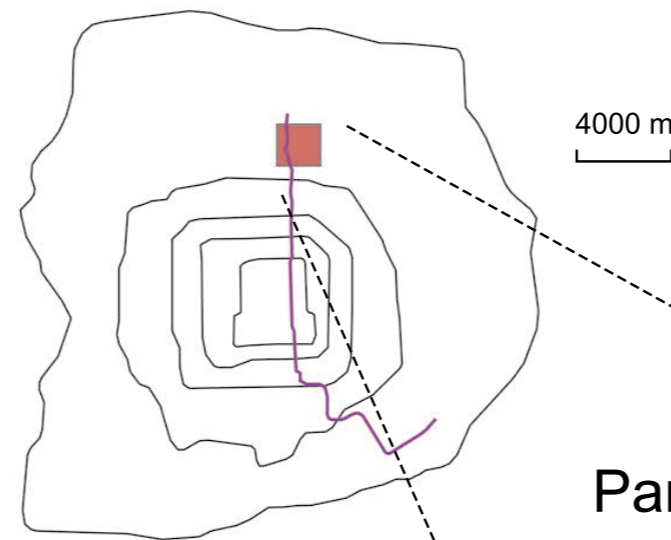


### Beijing



Map by author. The site is located in Changping District, Beijing, China. The metropolitan area of Beijing is the most north of the three metropolitan areas in the country. Take a step closer, Paradise Gateway lies outside of north 5th ring road, and at the north end of the No.5 subway line.

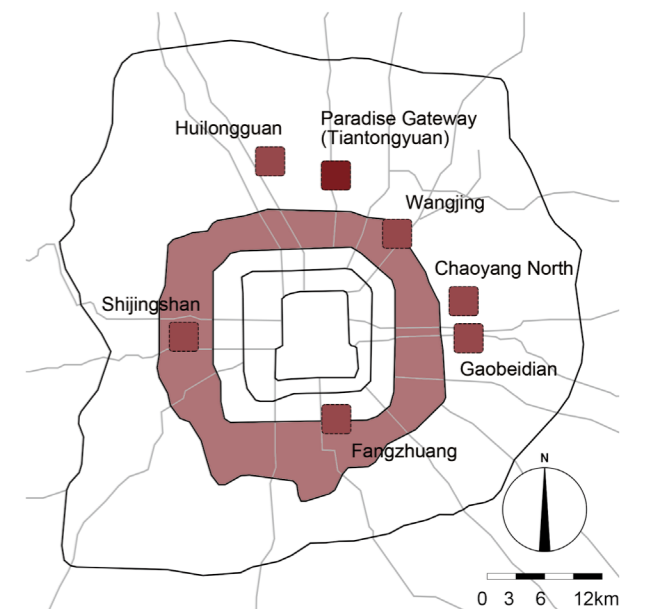
### North 5th Ring



### Paradise Gateway

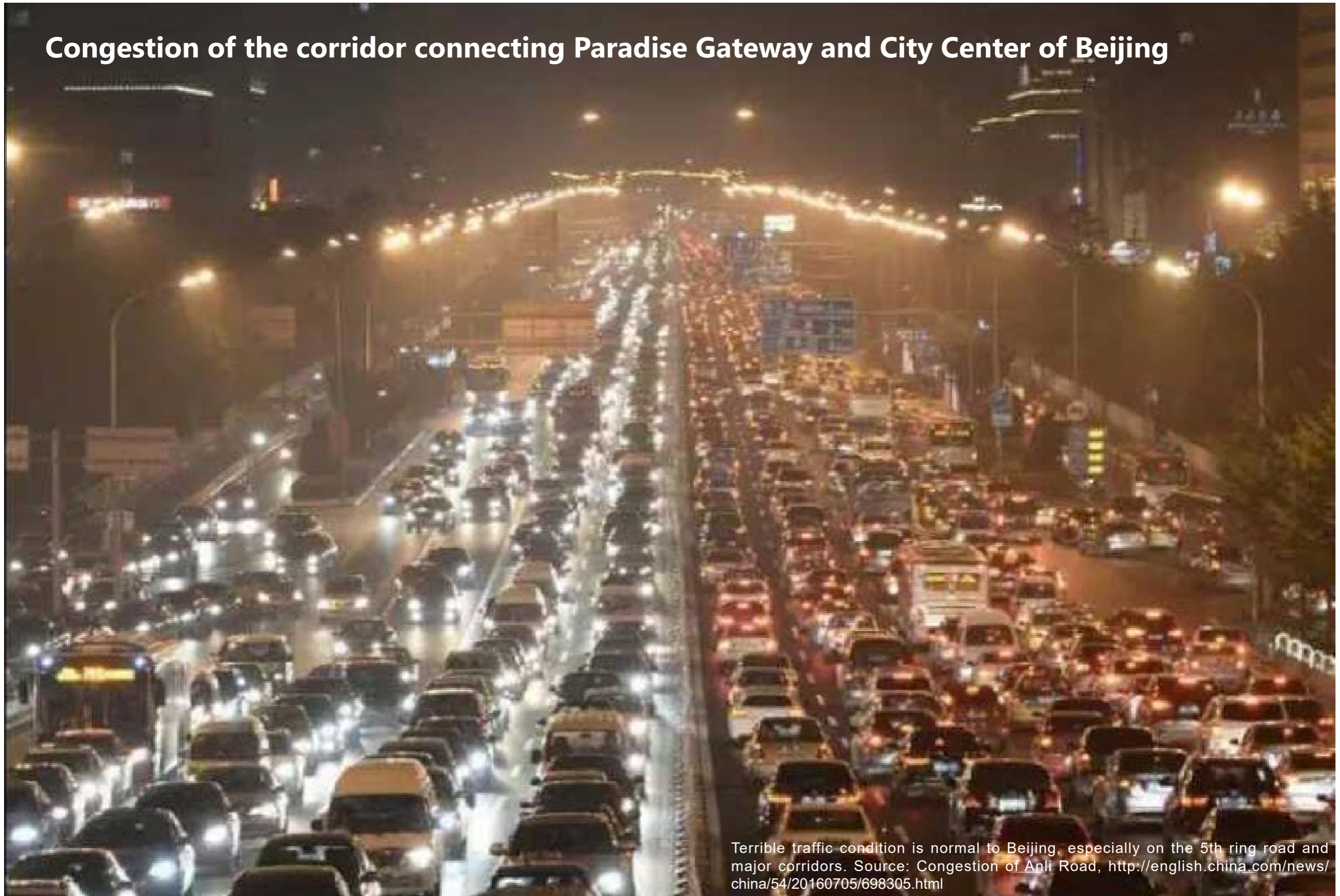


### Mega-communities along the 5th ring



Paradise Gateway is not the only mega-communities in Beijing. There are other mega-communities along the 5th ring, which are responsible for housing the increasing migrant population.

## Congestion of the corridor connecting Paradise Gateway and City Center of Beijing



Terrible traffic condition is normal to Beijing, especially on the 5th ring road and major corridors. Source: Congestion of Anli Road, <http://english.china.com/news/china/54/20160705/698305.html>

## 1.2. Basic information of Paradise Gateway

Largest Community in the WORLD

**700,000 Inhabitants**

Paradise Gateway (Tian Tong Yuan) is a residential community in Changping District, northern Beijing. Till April of 2008, it was reported to have over 400,000 residents and is one of the largest such communities in Beijing and the biggest community in the world (Hu, 2008). The number of inhabitants jumped to 700,000 by the end of 2015 (Netease Real Estate News, 2016).

**7 times of Delft's Population**

A comparison may make the context more comprehensible. Delft is a city of 22.82 km<sup>2</sup> Land with 99,737 inhabitants (Wikipedia.nl, 2014). Paradise Gateway contains seven times of Delft's population within an area of 7.7 km<sup>2</sup> (Data retrieved from google maps, 2016). The density of PG is revealed.

Perspective from ground



Anon. (2012). 20 years ago, it was nothing; 20 years later, it is a city. [Image]. <http://m.v4.cc/News-1047730.html> [Accessed 26th Nov. 2016]



## Paradise Gateway - Modern residential high-rise mega-community

Beijing, like most Chinese cities, embraces modern architecture with enthusiasm. Modernism has brought a new alternative urban plan as well a architecture typology of vertical development with a much higher density. Since 1990, high-rise residential towers began to appear in the city of Beijing in responding to rapid urbanization, in order to settle down immigrant population from all over the country.

### Aerial Photo of Paradise Gateway



Aerial photo from north, four towers in the front are 40 stories high, which are called the King Kongs of Paradise Gateway. Source: Ding, J. (2014). Aerial photography of Paradise Gateway (Tiantongyuan). [Image]. <http://www.tysq.com/thread-2940266-1-1.html> [Accessed 30th Nov. 2016]

### A crowded community of extreme density



This is a normal view of PG West Group II, where buildings have almost blocked the sky and car parking filled the courtyard. (Beneath the shed in the front is the entrance of underground parking lots.)

All together, 23 building groups, including over 700 buildings, are there in the community of Paradise Gateway. If calculated base on the 9,04 floor area ratio, index for the whole community is as follows,

- Planning land area: 770 ha
- Building area: 2,080,000 m<sup>2</sup>
- Floor area: 18,800,000 m<sup>2</sup>

Photo by author

### 1.3. Characteristic Objective Group - Drifters

Who are the people living in the Paradise Gateway? Table below is the rank for settlements of immigrants in Beijing, where the top 2 areas make up Paradise Gateway. It is an everybody-know-fact that Paradise Gateway is for the immigrants.

According to 2010 Demographic Census, only **90%** of inhabitants living in Paradise Gateway are migrants, which was 658,000.

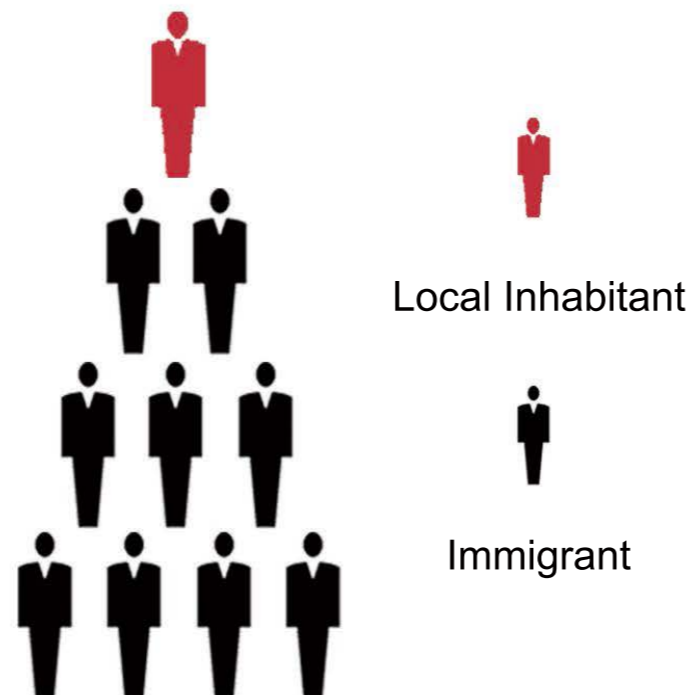
Among all immigrants, only 1.3% of immigrants share the possibility of registration in municipality of Beijing. That means, most of them will remain immigrants to the end.

District Neighborhood Immigrants

排行	区	街道	常住外来人口数
1	昌平区	北七家镇	197420
2	昌平区	东小口地区	196598
3	昌平区	回龙观地区	162896
4	朝阳区	十八里店地区	154321
5	大兴区	旧宫地区	120991
6	海淀区	四季青镇	109760
7	大兴区	黄村地区	109014
8	大兴区	西红门地区	104036
9	丰台区	卢沟桥乡	103946
10	丰台区	南苑乡	100766
11	海淀区	西北旺镇	99279
12	通州区	永顺地区	84622
13	丰台区	花乡	81824
14	丰台区	大红门街道	81653
15	朝阳区	崔各庄地区	77225
16	朝阳区	平房地区	75132
17	朝阳区	望京街道	72272
18	丰台区	卢沟桥街道	67955
19	海淀区	学院路街道	67946
20	海淀区	清河街道	67931

Paradise Gateway is the Combination of the top 2 areas. Almost **400,000** immigrants in 2010.

Proportion of Immigrants



Data from 2010 demographic census.

As is explained, the objective group of this project is the Drifters. This groups has certain characteristics. Drifters, abandoned their families and fighting to survive in Beijing, are hoping to embrace a brighter future by hardworking. Based on this motivation, three characteristics are crucial behind the birth of Paradise Gateway.

#### a. Commute to Work

Paradise Gateway is a Sleeping City for Drifters, where tens of thousands of people commute between work place and home every day (Beijing News, 2004). As a result, the daily commute on the same direction forms a tidal effect, which seriously aggravated the burden of transit, fro the pedestrian flows to the regional transport system.

#### b. Less Leisure, More Basic

Drifters are commonly under high working load as well as under high economic pressure (housing loan, rent, family affording, child raising). As a result, the demand for recreation is limited, as they have little spare time or money to spend on leisure. Apart from basic living needs, they seldom ask for more.

#### c. Limited Municipality Rights

As a unregistered immigrant, barriers are beyond count when it comes to house purchasing, job hunting, etc. The easy solution is always renting at an affordable price. Other people turn to purchase unofficial house.

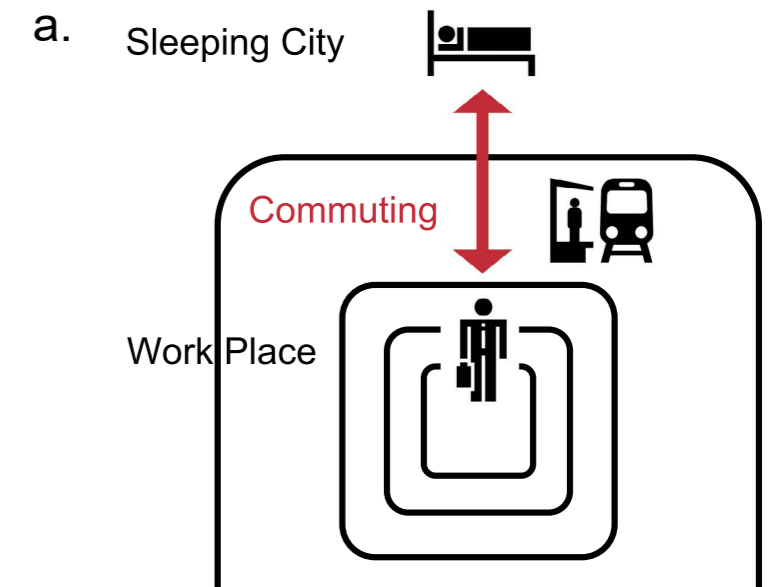


Diagram made by author



Fangtianxia Real Estate News. (2014). Drifters: Farewell my home. [news]. Available at: <http://fdc.fang.com/news/2014-07-29/13393028.htm> [Accessed 8th Nov. 2016]

#### c.



Temporary ID of Beijing. (2014). [image]. Available at: <http://baike.soso.com/h9308030.htm?sp=Snex&sp=I65565100> [Accessed 10th Jan. 2017]

## Conclusion of last chapter

Project location:  
Paradise Gateway, Beijing

It is the largest high-rise modern community of extreme density. The dominant inhabitants are migrants brought by urbanization. The main problem is overcrowding, with poor transportation condition of public space quality, which raises wide social concern.



## 2. Problem Statement

Focus of scale in this Chapter

I. Local scale

II. Urban scale

III. Regional scale

- Extreme high density and Overcrowding
- Collapsed Mobility
- Lack of Public space
- Illegal Housing
- Research Questions
- Relevances
- Synthesis

## 2.1. Problem Statement - Extreme high density and Overcrowding

It is a place where

# Efficiency is over Quality

Le Corbusier



Jan Gehl

Paradise Gateway is the community that brought Corbusier's dream into reality (shown by the comparison on the right). Over 700 high-rise residential towers created extreme density. Moreover, two or three families may live behind each door, as the most apartments are rented by rooms (around 30 m<sup>2</sup>).

Doors lining up in PG



## Corbusier's Plan for Paris



Lubin. (2013). Why Architect Le Corbusier Wanted To Demolish Downtown Paris. [image]. <http://www.businessinsider.com/le-corbusiers-plan-voisin-for-paris-2013-7?international=true&r=US&IR=T> [Accessed 10th Dec. 2016]

## Residential Towers in PG

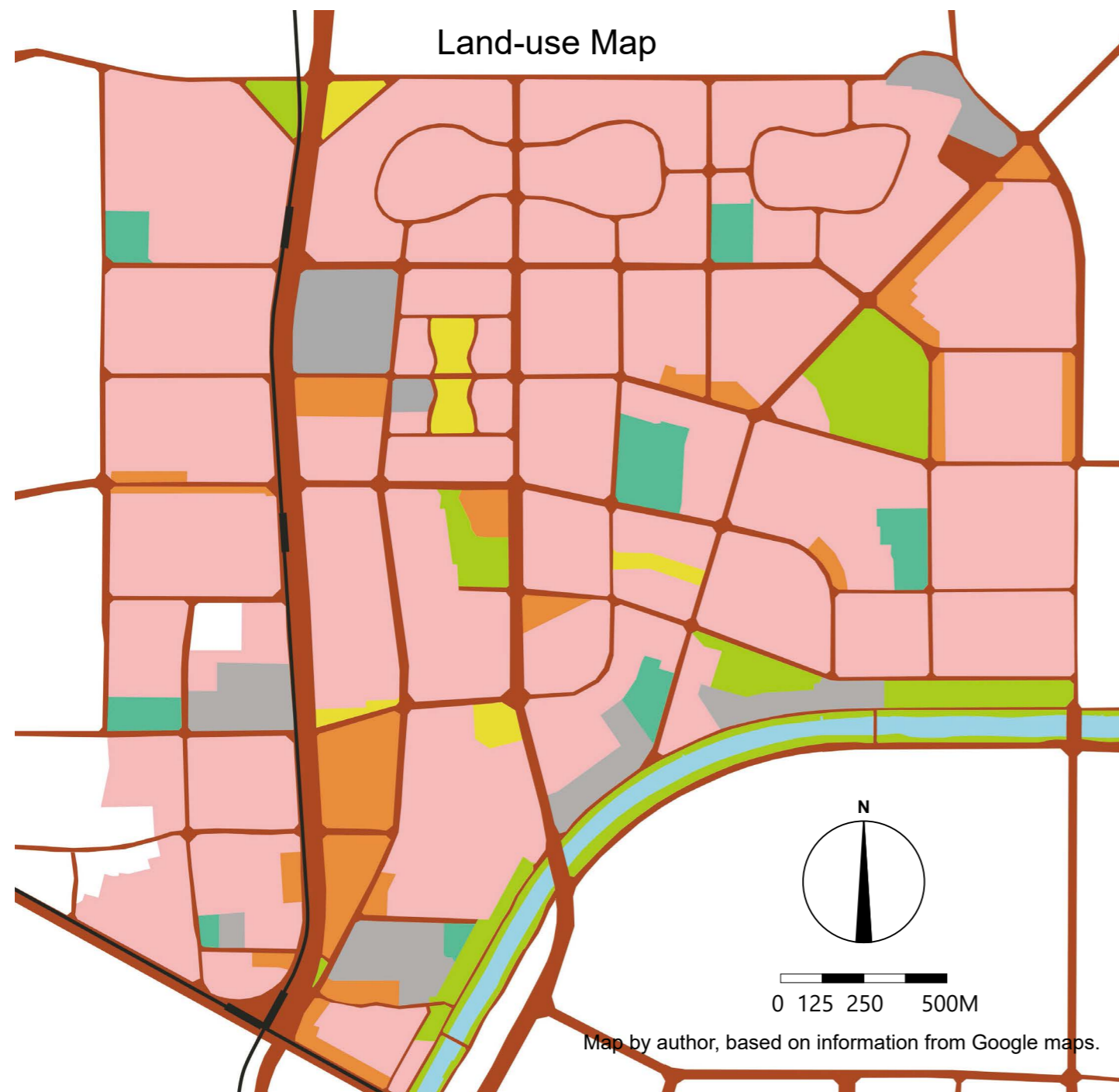
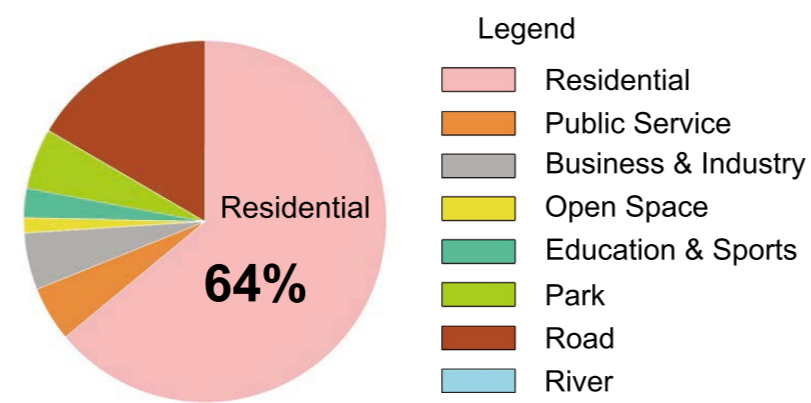


Netease Real Estate News. (2016). Paradise Gateway hosts 1/30 of Beijing's Population. [news]. Available at: <http://bj.house.163.com/photonev/4EBT0007/210512.html#p=B98QVET14EBT0007> [Accessed 3rd Nov. 2016]

## Land-use - Residential Dominated

To start with, as is shown in the land-use map below, the dominate land-uses type of Paradise Gateway is residential, which took up 63.99% of the total area. The huge residential capacity provides the possibility of housing the 700,000 people in the first place. When the population goes through the limit, problems follow.

Proportion of land-use types



## Vertical Development - A push on the density

What is the result of over 30 stories residential towers built on 63.99% of land? The answer is extremely high density. The mode of vertical development is well-received by Beijing, as high-rise towers are being built everywhere. However, when both multipliers are greatly increased in the equation of density, the consequence will be very complex to counteract.

### Towers blocking the sky



Photo by author

### Extremely High Density

Planning land area: 335,181 m<sup>2</sup>

Building area: 90,551 m<sup>2</sup>

Floor area: 3,029,654 m<sup>2</sup>

Floor area ratio: **9.04**

### Elevation of a residential tower in Paradise Gateway



Anon. (2014). Elevation of a residential tower. [image]. Available at: <http://4000708706.com/read/2778732671/> [Accessed 17th Dec. 2016]

## 2.2. Problem Statement - Collapsed Mobility

The second problem of Paradise Gateway is the collapsed mobility. Thanks to the huge amount of inhabitants, transit load has far exceeded its designed capacity. Traffic jams are bound to happen at rush hours every day. People are getting used to being tucked into others faces in a subway carriage. In fact, the main road going through Paradise Gateway is wide enough (8 lanes with 2 extra BRT Lane), and the subway arrives every 2 mins at rush hours. As a result, this collapse is not caused by lack of transport capacity but by its concentricity accessibility.

Main Road at Rush Hours



Photo by author.

Subway Station at Rush Hours



Netease Real Estate News. (2016). Paradise Gateway hosts 1/30 of Beijing's Population. [news]. Available at: <http://bj.house.163.com/photoneu/4EBT0007/210512.html#p=B98QVET14EBT0007> [Accessed 3rd Nov. 2016]

## 2.3. Problem Statement - Lack of Public Space

Paradise Gateway is also a community that lacks public services. The total area of public service and green park is quite large. However, when it comes to area per capita, the numbers are dumbfounded small (only less than 20% of national standard). To meet with the demand for services and recreation, more commuting are generated, which adds load to the traffic pressure. More importantly, living quality of locals are seriously influenced by the lack of public space and services.

### Total Area

Public Service	690,300 m <sup>2</sup>
Park	142,000 m <sup>2</sup>

### Area per capita

Public Service	0.98 m <sup>2</sup>
Park	0.20 m <sup>2</sup>

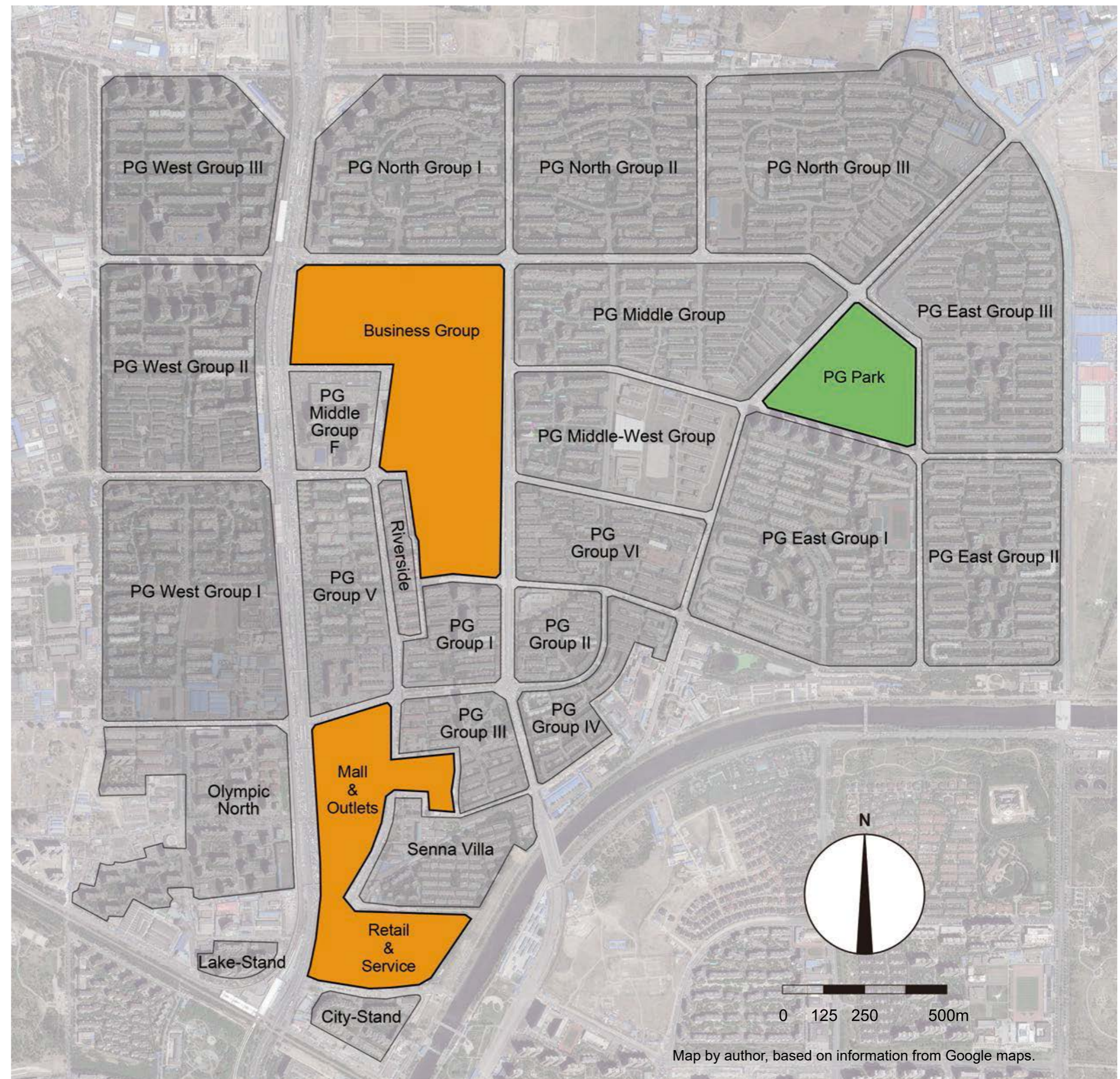
### National Standard per capita

Public Service	5.5 m <sup>2</sup>
Park	8.0 m <sup>2</sup>

### Informal Market



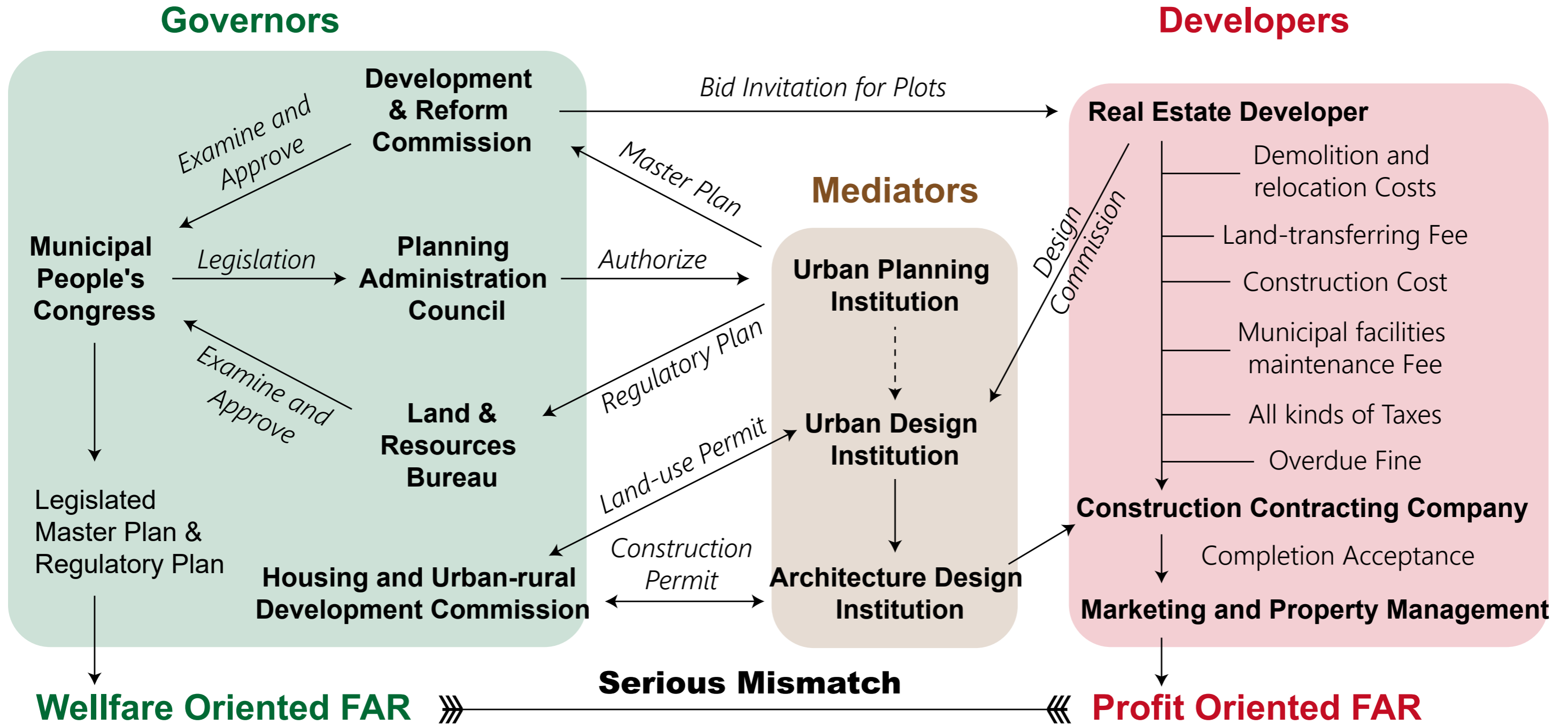
Photo by author



Map by author, based on information from Google maps.

Economy Oriented Plot Development Process

Government obligation information source: <http://www.bjghw.gov.cn/web/index.htm>; <http://www.bjpc.gov.cn/>; <http://www.bjghw.gov.cn/web/index.html>; <http://www.bjrd.gov.cn/>



Welfare Oriented FAR

Aim at the society's welfare and equity by authorization and supervise.



Profit Oriented FAR

As high density as possible, non-residential development cost as low as possible.



Land Sold by Plot

As is shown by the process chart on the left, the current system of development, the PG's actual FAR is a world of difference from the planned FAR, which is caused by the serious mismatch of orientations of stakeholders. Regulatory plan packs the land into plots, which are bidden to developers. However, the developers have to cover the costs and make a profit, and the approach to the goal is rising the FAR and density. Building and selling residential properties is the most straight-forward method of making profit. Any other development, open space, public service, parks etc. will decrease the FAR and compromise the profit.

## 2.4. Problem Statement - Illegal Housing

### The Invisible Limited-Right Property

During the urban sprawl, farmers sell their agricultural land to developers, then to the customers. Those properties are not officially residential buildings with a limited right. These properties harm the rights of buyers and are difficult to governance manage by the local authorities. As the building processes are not officially supervised, construction quality cannot be guaranteed. Names of these limited-right properties cannot be found in official files or maps, as they are expanded from farm houses. They are called limited-right because the land belongs to agriculture and the buyer cannot get a certificate of property. Building and selling those properties are illegal but living in one is not, which brought the situation into a dilemma.

The author managed to track down one of those from a real estate agency. If there is no parking or air-conditioning unit, no one would ever believe these houses are fully occupied. Under the current real estate market, these properties have distinct advantages on price. And more importantly, these properties are open to be rented by the Drifters. (People without local registration can only purchase one home, under the additional premise of continuous tax payment for five years.)



Tencent News. (2009). Housing and urban-rural development: no regulation will be published about limited-right property. [news]. Available at: <http://cd.qq.com/a/20090625/003100.htm> [Accessed 8th Nov. 2016]



Photo by author



Photo by author



Photo by author

## 2.4. Problem Statement - Illegal Housing

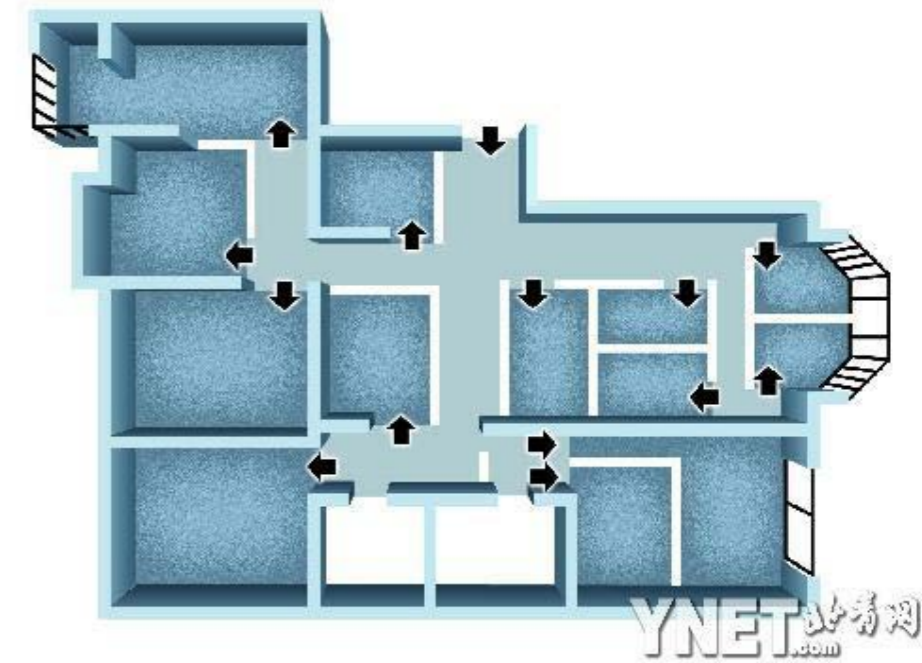
### Multiple Sublease



Delimma of 5 square meter. (2013). Available at: <http://hk.crntt.com/crn-webapp/doc/docDetailCNML.jsp?coluid=7&docid=102653190> [Accessed 7th Jan. 2017]

Multiple sublease here refers to the phenomenon of rent an apartment to more than 20 persons. Rooms are divided and bunk beds are stuck in. There are rumors that multi-sublease exists in almost every building. People living in these apartments are also invisible from demographic census, which means the population may larger than it seems to be. Moreover, such a density violates fire regulations and threatens their safety.

### Floor Plan of a Multi-Subleased Apartment

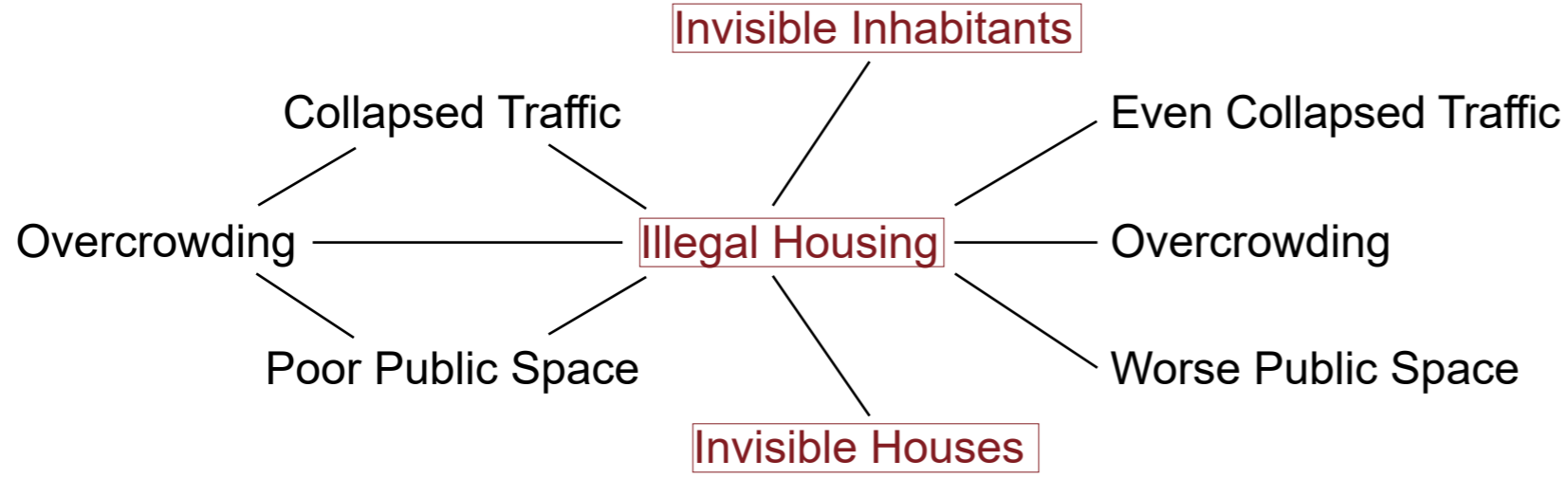


### Inside a Subleased Room

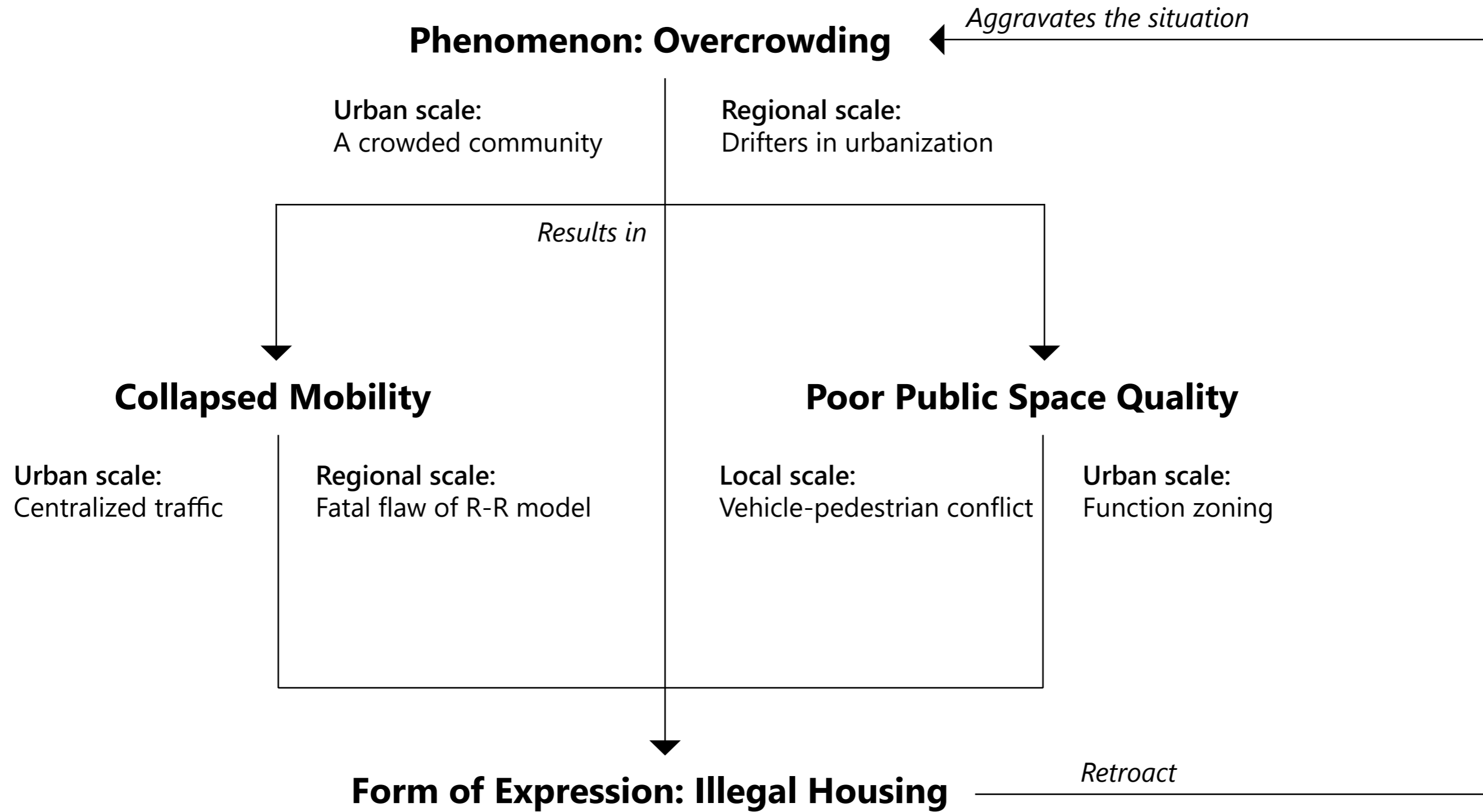


Thousands of apartments are multi-subleased in PG. (2014). Available at: [http://bj.bendibao.com/news/2014623/154401\\_2.shtml](http://bj.bendibao.com/news/2014623/154401_2.shtml) [Accessed 7th Jan. 2017]

### Retroaction Progress



## 2.5. Analytical Framework



Behavior Level: Demand exceeds supply on Real Estate Market

Behavior Level:  
Multiple sub-lease

Behavior Level:  
Limited Right Property from policy aspect

## 2.6. Synthesis

The problems of Paradise Gateway are brought by the mass arrival of drifters, as a result of rapid urbanization. The core is overcrowding. The population growth is so fast that the local mobility capacity and the supporting facility cannot keep up with. Its single dwelling function caused by the developer driving model aggravates the growth. The role of housing the city center in the regional scale pushes the population far beyond the local limit. The consequence is the failure of achieving Paradise Gateway's original purpose, an ideal home for the drifters.

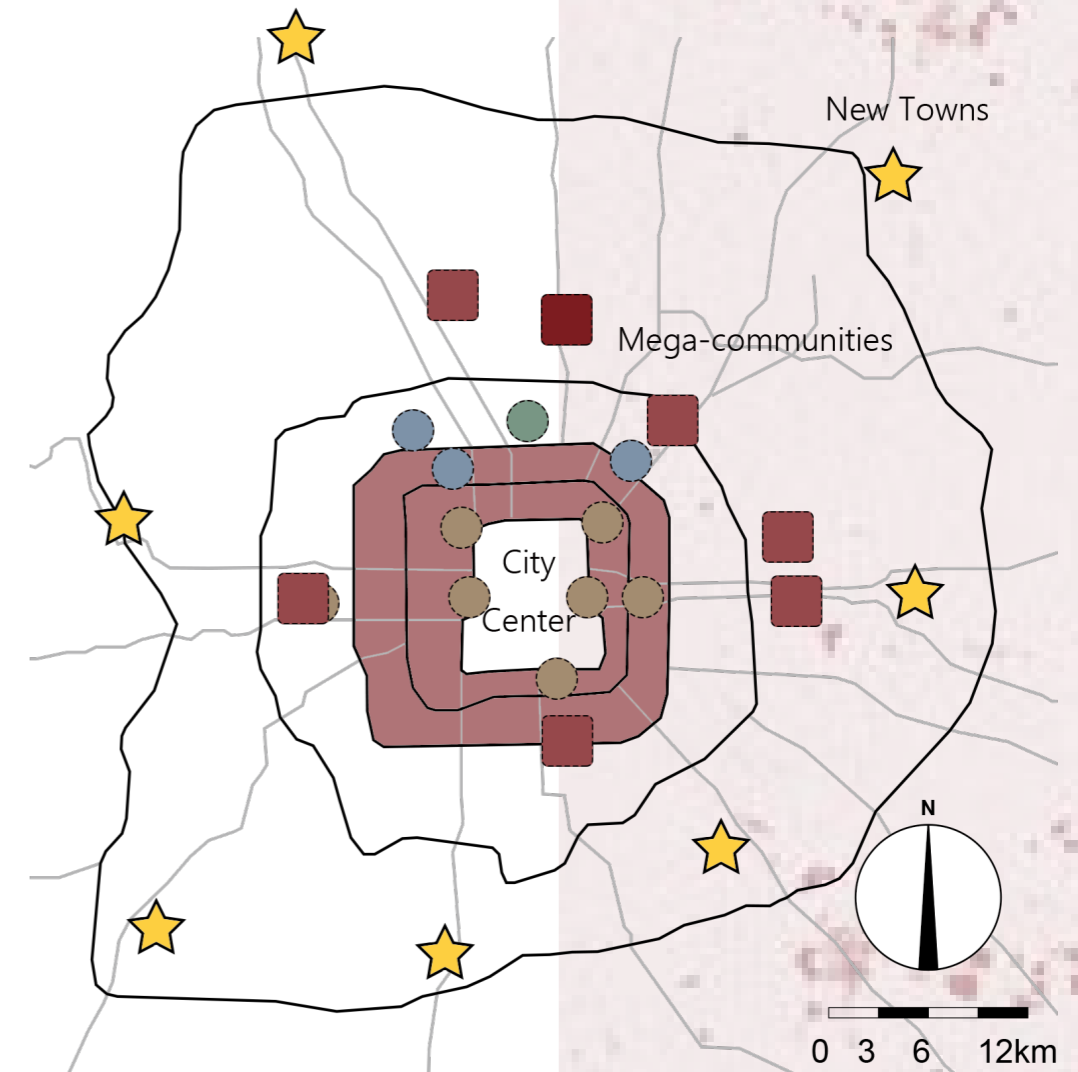


The crowd drifters at Beijing West Railway Station during the spring festival in 2015. The drifters live and work in major cities and go back to their homes every year at the spring festival. 2.8 billion person-time travel happened in two weeks nationwide. The number of travellers reflects the number of drifters. (2015). Available at: <http://www.acnw.com.au/images/portal/201602/05/060925hww8zbwxf86hx98u.jpg> [Accessed 24th Jun. 2017]



## Conclusion of last chapter

The main problem of Paradise Gateway is overcrowding, which brings other problems, for instance, mobility collapse, lack of public space. The expression is illegal housing. The project aims at revealing the reason behind the problems and searching for solutions through an inter-scalar methodology.



The city center, the mega-communities, and the new towns are the three most important sets of elements in the regional structure of Beijing.

# 3. Research Question & Proposal Integrated Approach

What to consider in a regeneration plan?

Consider how the local scale influences the community as a whole

**I. Local scale**

**II. Urban scale**

**III. Regional scale**

Consider how the regional scale guides the community as a part

- Predictable future urbanization
- Monocentric structure
- Demographic faultage-5th ring
- Severe Tidal commute
- Promises of Polycentricity
- Integrated Approach
- Vision: Regional-Local
- Methodology: Inter-scalar

Interventions

### 3.1. History review: The Opposite Outcome to What One Wishes

Lessons of history must be learned. To the right, two photos show the last road extension project in Paradise Gateway. In 2004, Anli road first experienced the congestion problem. In the following three years, the road was expanded into a 6-lane corridor, with a new subway line. There is no doubt that mobility capacity has been greatly increased, and the congestion was relieved at the moment.

However, congestion happens again several years later. Increased capacity allows the community to grow larger. In another way around, the corridor built in 2007 partly contributed the existence of this mega-residential community. That raises a question, will a plan aiming at providing more mobility and service capacity will help in the long term?

The bad reputation of horrific traffic and service shortage of Paradise Gateway has been well known all over the city for more than a decade. This warning kept home buyers with alternative choices out of PG, that in a way is shown as a resistance of the overcrowding problem. In other words, poor mobility and service have its advantage, which is the control population size.

Given the fact that the urbanization in Beijing is still half-way, and the 5th ring is the current most affordable zone of residence. If the urban regeneration is carried out according to the attempt, it is reasonable to expect that the community's population will continue to grow until reaching the higher limit.



Source: the growth of Paradise Gateway, <http://photocdn.sohu.com/20090703/lmg264959486.jpg>

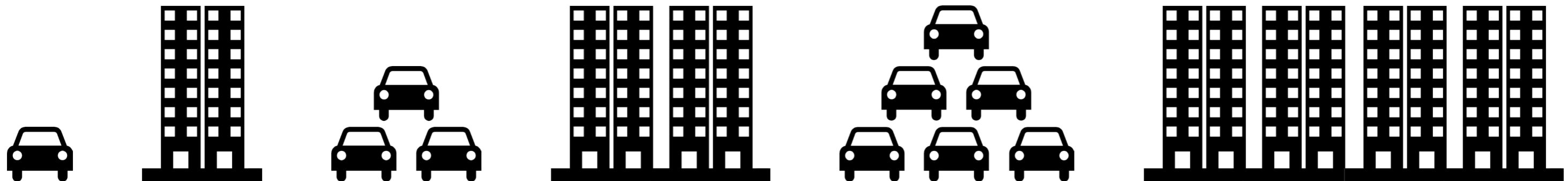
Scale of community is limited by mobility



Larger mobility capacity allow the community to grow



Further development of mobility capacity results in the mega residential community



## 3.2. Reflection: Cities are complex systems the mechanism behind Paradise Gateway must be considered

The case study of the 2005 Anli road expansion project illustrates that blindly increases transportation capacity cannot improve traffic condition in the long term, if the overall urban model is not consider within it dynamic effects and negatives externalities. Although larger capacity relieves the congestion at first, it also generates development under the current pattern. The result is an even more overcrowded community. Multiple cases in Beijing have proved that overcrowding and congestion cannot be solved simply by building wider roads.

Cities are complex systems. Development of each part influences the whole and the overall structure guides each part in reverse. Take Paradise Gateway as an example,

the corridor, Anli road, goes through the community all the way to the city center as a radial connection. The only role of Paradise Gateway is the residence. Inhabitants have to commute to their workplaces in the center through the corridor. This separated modern zoning principle shows its lack of understanding in the complexity of the city and its Metropolization process. To fully understand the formation mechanism of the mega-community and search for a regeneration plan, not only the local scale and urban scale, but also the regional scale must be considered. Reasonable interventions can only be carried out after a thorough understanding of why Paradise Gateway came into being and how it functions in the regional network.

### Regional scale:

Citywide overcrowding by arrivals under the model of modern zoning

*Regional model gives birth to Paradise Gateway*

### Paradise Gateway

*Modern high-rise community decides its pattern of flow*

### Local scale:

Collapsed mobility and Lack of public space

*Mega-community allows the city to continue developing in the current way*



*Local situation decreases the quality of Paradise Gateway*

### Regional scale:

Radial connection to city Center



Source: aerial photo of CBD, [http://blog.sina.com.cn/s/blog\\_4a664d4f0102e7jv.html](http://blog.sina.com.cn/s/blog_4a664d4f0102e7jv.html)

### Urban scale:

The corridor through Paradise Gateway



Source: aerial photo of Paradise Gateway, [http://paike.qianlong.com/a/336\\_31.htm](http://paike.qianlong.com/a/336_31.htm)

### Local scale:

Anli road - the corridor



Source: congestion costs 14.6 billion per year, [http://www.ce.cn/xwzx/gnsz/gdxw/200710/31/t20071031\\_13429299.shtml](http://www.ce.cn/xwzx/gnsz/gdxw/200710/31/t20071031_13429299.shtml)

## Problems involving factors from different scale

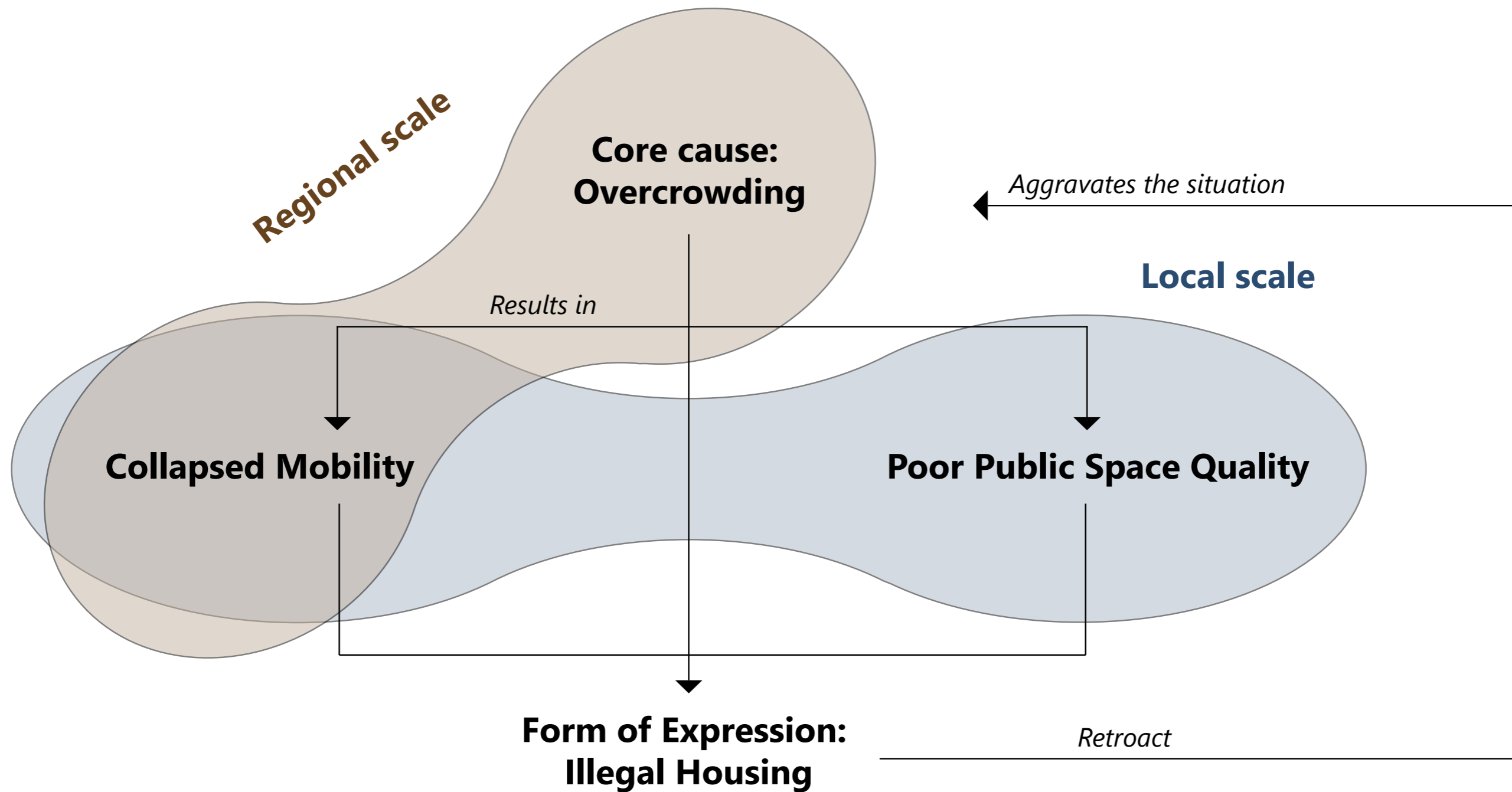


Diagram by author

Although the four problems, overcrowding, collapsed mobility, poor public space quality, and illegal housing, are expressed in the local scale within the community, the cause of them are involving factors from a larger scale. As is illustrated earlier, 90% of the inhabitants in Paradise Gateway are migrants. Where are they from and why are they arriving at this community? Besides the very basic question, why are these extraordinary mega-communities ever existed?

These questions cannot be answered by analyzing within the community, but has serious relation with the mechanism of the management at the whole metropolitan area of Beijing. Moreover, the lesson from 2005 road expansion project must be learnt. Thus, research questions are asked from both planning perspective from regional scale and design perspective from local scale.

### 3.3. Research Questions

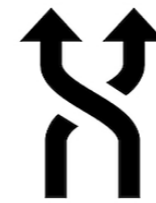
What twisted the original metropolitan vision of Paradise Gateway to become an ideal community for housing the migrants in Beijing? How to improve the situation and regenerate the community?

Although the problem field is focusing on the community level, the metropolitan structure presents a significant influence on the community development. The vision of regional structure runs in the opposite direction than the community development reality. It is crucial to look into both levels, and then locate the negative externalities between them. By a mixed approach of metropolitan strategy and community urban design, a way to fundamentally regenerate Paradise Gateway is going to be discussed.

#### Sub-Questions

#### Planning Perspective

- (1) What is the fundamental reason behind the overcrowding of Paradise Gateway?
- (2) Why the migrants are gathering here making them the majority residents?
- (3) How can planning interventions help to improve the community from a systematic perspective in a larger scale?



Interaction Effect

#### Design Perspective

- (4) How can the urban design accords with the metropolitan structure?
- (5) How to balance between the demand for transportation and public space provision and structure?
- (6) How to create public space that suits this highly dense mega-community?



Diagram by author

*Regional Planning guides detailed design*



*Urban Design accords with the metropolitan structure*



Photo by author

### 3.4. Proposal Integrated Inter-scalar Approach

Cities are complex systems.

In the case of Paradise Gateway, problems are caused by both metropolitan structure and community reality. The morphological and functional monocentric regional structure has determined its role of residential community within a persistent functionality based on the original metropolitan system dominated by one main centrality. On the other way around, profit-oriented local development has been preventing the Paradise Gateway from becoming a full-functioned sub-center.

Centripetal metropolitan network results in a hierarchical local flow, which contributes to the collapse of mobility.

The behavior issue is also expressed into the two scales involved. Migrant trend caused by urbanization. The outcome is the drifters gathering in the C zone of mega-communities. Upon arrival, drifters become commuters.

In order to carry out the urban regeneration, a mutual dependency and demand of regional and local scales/systems should be recognized. As a result, the proposed approach is an integration of intervention from a inter-scalar perspective.

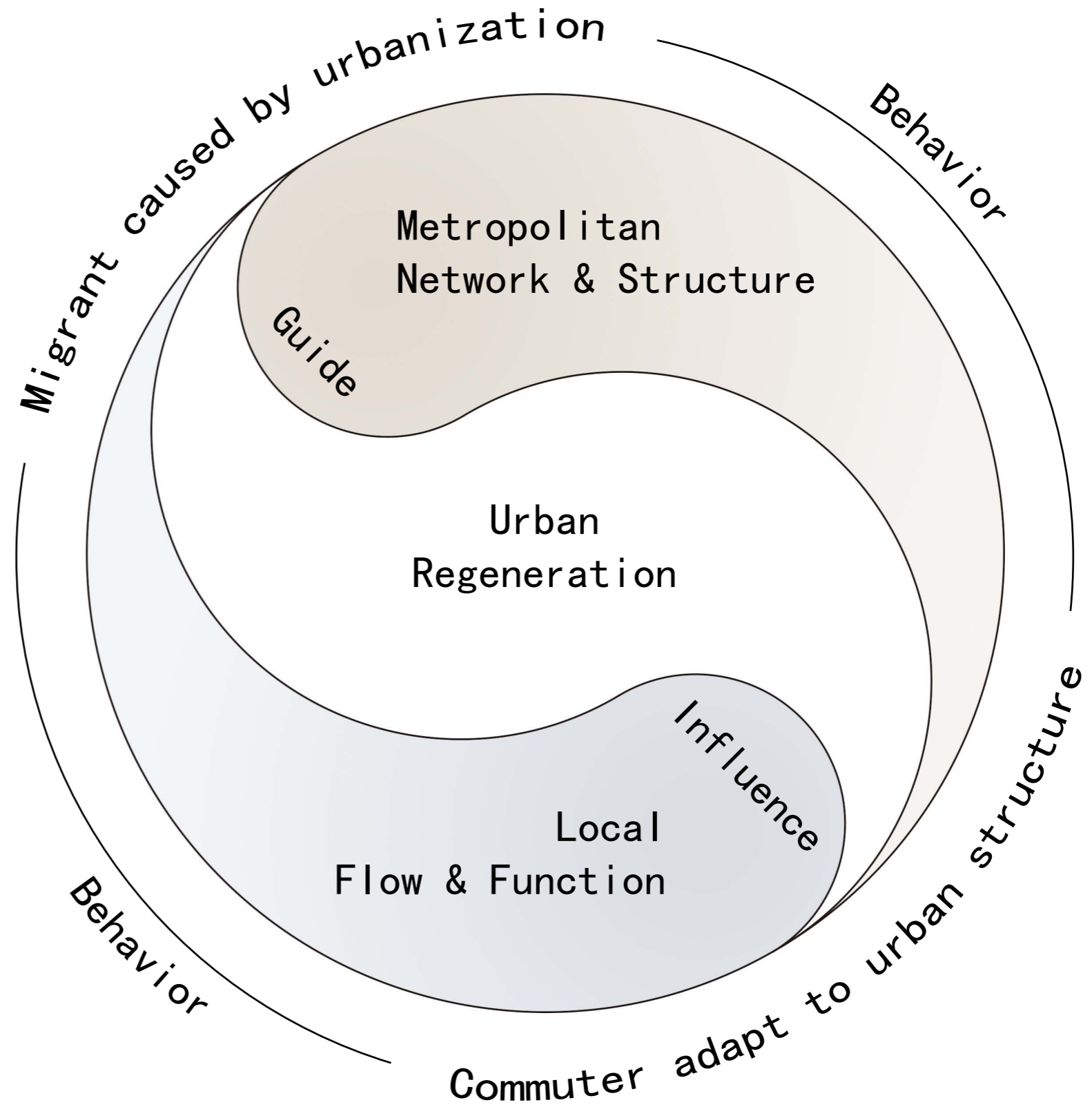


Diagram by author

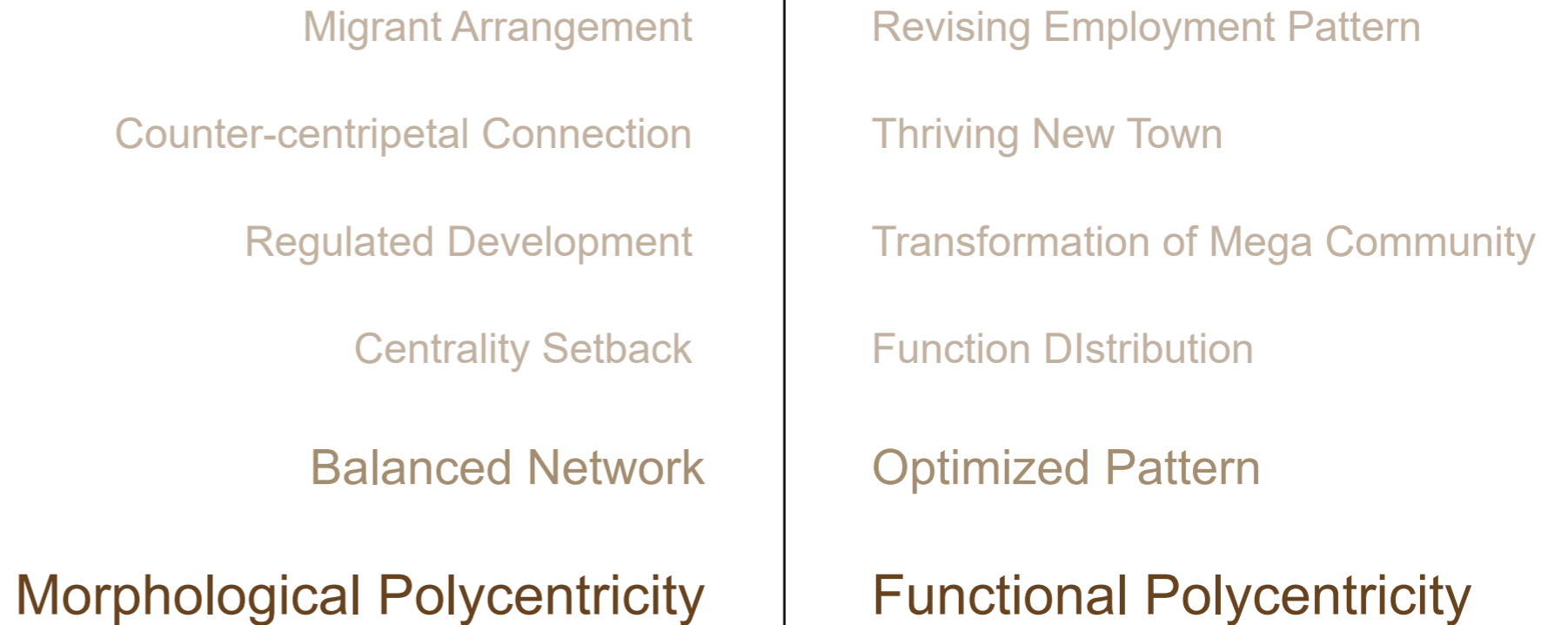
## Vision: Linking regional with local

The vision for this urban regeneration project is,

- 1) improving mobility condition
- 2) providing better service from the inter-scalar approach.

In the cloud, regional visions are above the horizon, while local visions are under. To the left, there are mobility oriented visions, while function oriented are on the right side.

Although the visions are classified into four categories, they are all closely related to the attempt of reaching urban regeneration, according to the approach. Most importantly, they serve as a set of guidelines to be considered into the coming planning and design.



Regional and local as two sides of a Mobius Strip



Regional

Mobility

Function

Local

## Urban Regeneration



### 3.5. Inter-scalar Methodology

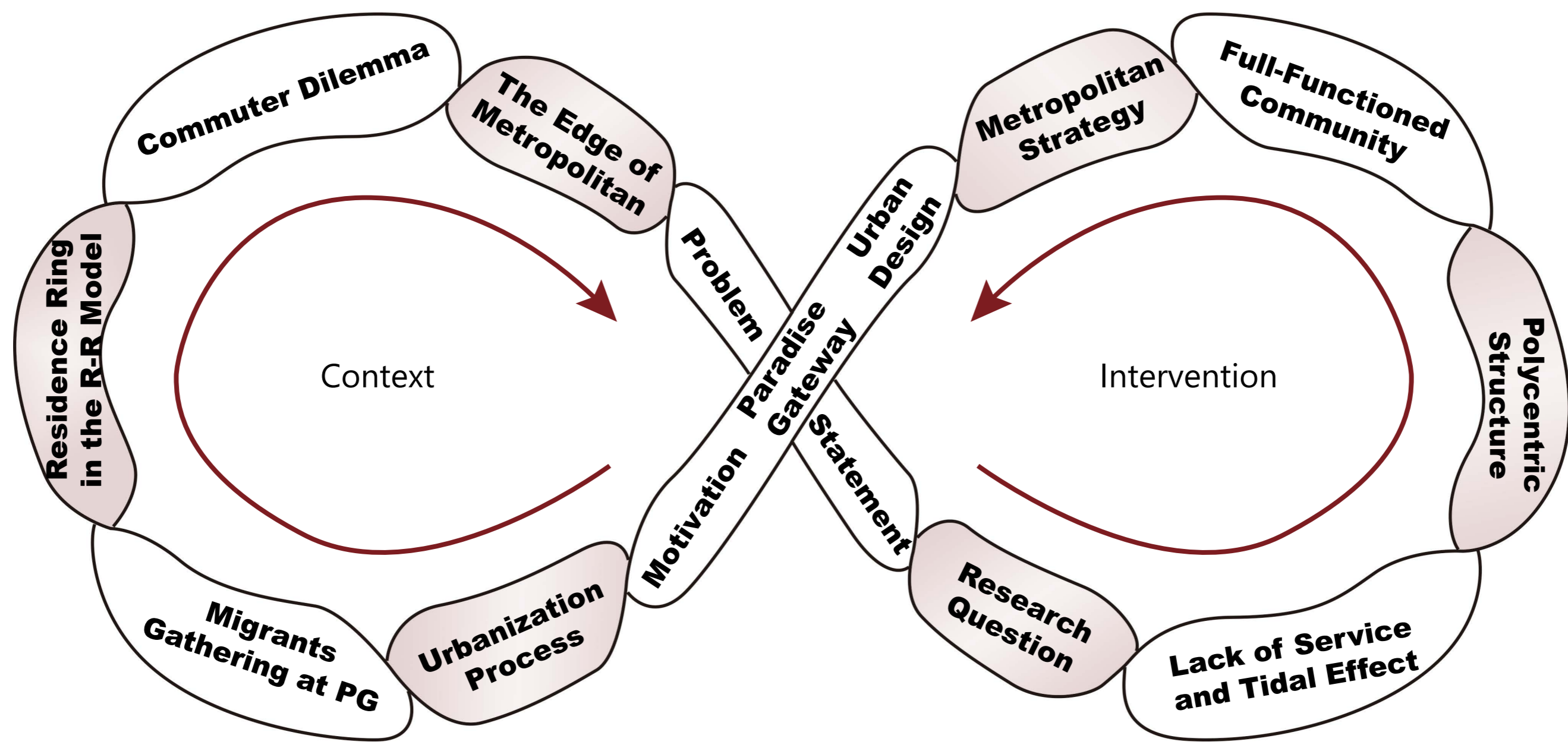
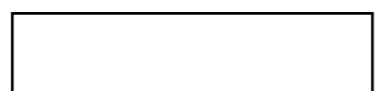

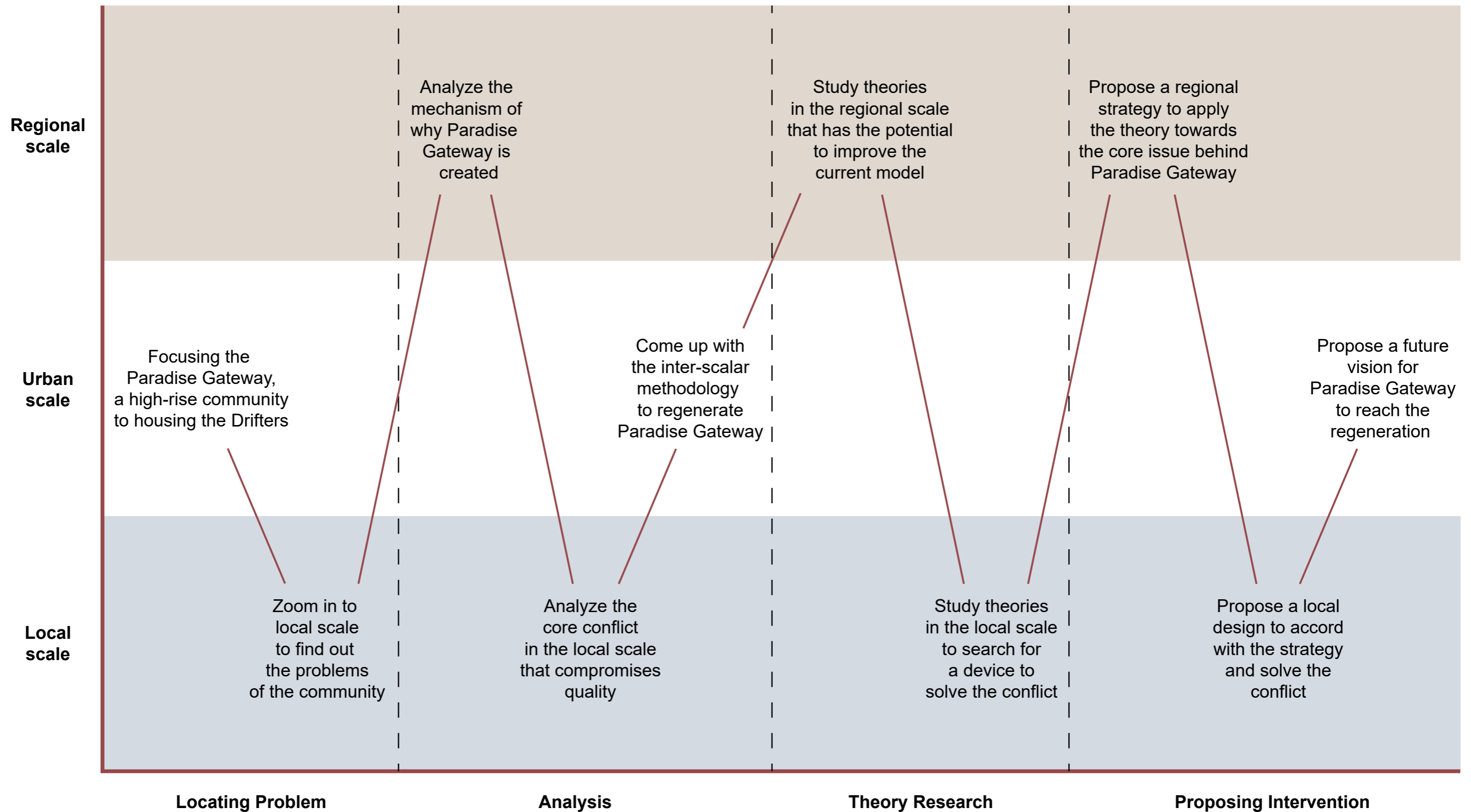


Diagram by author

 Local Scale  
 Regional Scale

 Inter-scale Relation

# Analyze, research and decision making from the inter-scalar methodology



## 3.6. Relevance - Position in academic debate

### Societal Relevance

#### Reveal Social Concern

Complaints about Paradise Gateway is not new to citizens of Beijing. Commuters living here and working in the city center have to spend more than three hours on the road every day. Apartments are separated into several rooms and rented to different tenants, including apartments without official construction permission. In spite of this, the scale of this community has been increasing and the land price has been rising. The only reason to this phenomenon is that tenants and buyers have few alternative choice. High social stress and fierce competition in the city makes the shortage of housing even serious. It is very important to search for interventions that will improve local living quality, as housing is the basic need for a human. Moreover, the problem of Paradise Gateway is not peculiar, but a common problem of large residential communities in Beijing. Through the study of this very case, the universal law of this type of problem may be revealed.

### Scientific Relevance

#### Revise Metropolitan Strategy

Beijing, compared to most European cities, is a mega-city whose inhabitants reaches 21.7 million. In addition, Chinese economy oriented development model and its unique national situation (socialism after dramatic capitalist reform) give birth to urban issues that the world has not experienced before. The main cause of the quality crisis of Paradise Gateway is the imbalanced urban structure. Beijing's solution, mainly illustrated through 2004 master plan, which is applying a polycentric urban system, which is the dominant form of metropolitan areas in Europe. However, the same theory cannot be transplanted into the other side of the continent without proper adaptation. This project aims to combine international theories and practices with local situations and trends, of which the outcome can be of vivid Chinese characteristics and recognized its particularities. The building of a link international and local urban studies is a valuable feature of this project.

### Ethical Relevance

#### Reach Social Equity

Chinese national strategy since 1978 is stimulating the economy by encouraging the gap between rich and poor. The Major group of Paradise Gateway is drifters, who are immigrants fighting to survive in Beijing. Life quality of these people is not concerned by the municipality as most of them are not officially registered. Social equity is violated in this case, as each citizen should share equal right. The ethical issue draws more attention, especially as the Drifters are one of the main contributors to the city. This project aims at providing alternative interventions to relieve the inequality, at the same time, complying with Beijing's goal of economic development and regional collaboration.



## Conclusion of last chapter

An attempt plan has been made to improve mobility and public service condition in Paradise Gateway from the local scale, by increasing transportation capacity. However, the historical case proves that blindly build new roads cannot work in the long term. Mechanism of the larger scale must be considered.



# 4. Analysis of Regional scale

the birth of Paradise Gateway

Focus of scale in this Chapter

I. Local scale

II. Urban scale

III. Regional scale

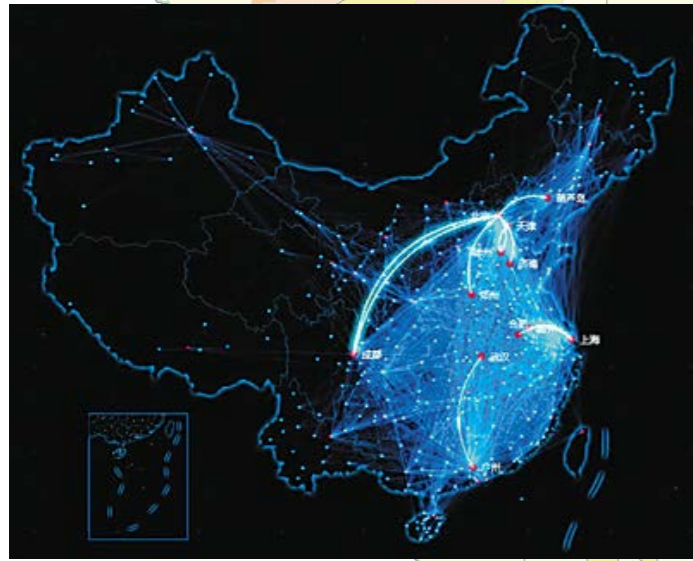
- History review of urbanization
- Rapid urbanization of Beijing
- Migrant and Population growth
- Monocentric structure
- Urban land market theory
- Force from real estate market
- Birth of Paradise Gateway

as a mega-community

## 4.1. Result of Urbanization: Three Metropolis - Poly-centricity in the macro scale

Three large metropolis have been established in China since economic reform in 1979. Beijing is the core city of Bohai Bay Metropolis. A Polycentric model in the macro scale has been created.

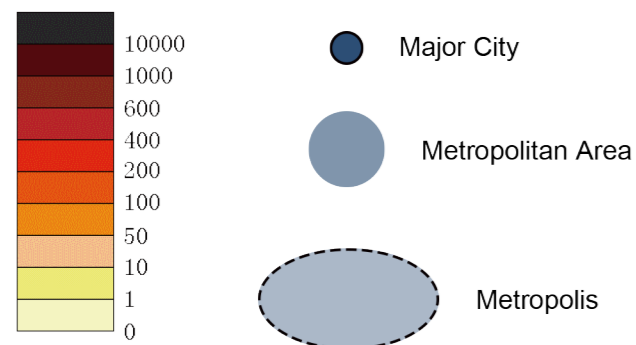
Migrant flow of Urbanization



Shen, M. (2014). 3.6 billion person-time traveller's routes during the spring festival. The People's Daily. [news]. Available at: [http://paper.people.com.cn/rmrbhwb/html/2014-01/27/content\\_1384054.htm](http://paper.people.com.cn/rmrbhwb/html/2014-01/27/content_1384054.htm) [Accessed 8th Nov. 2016]

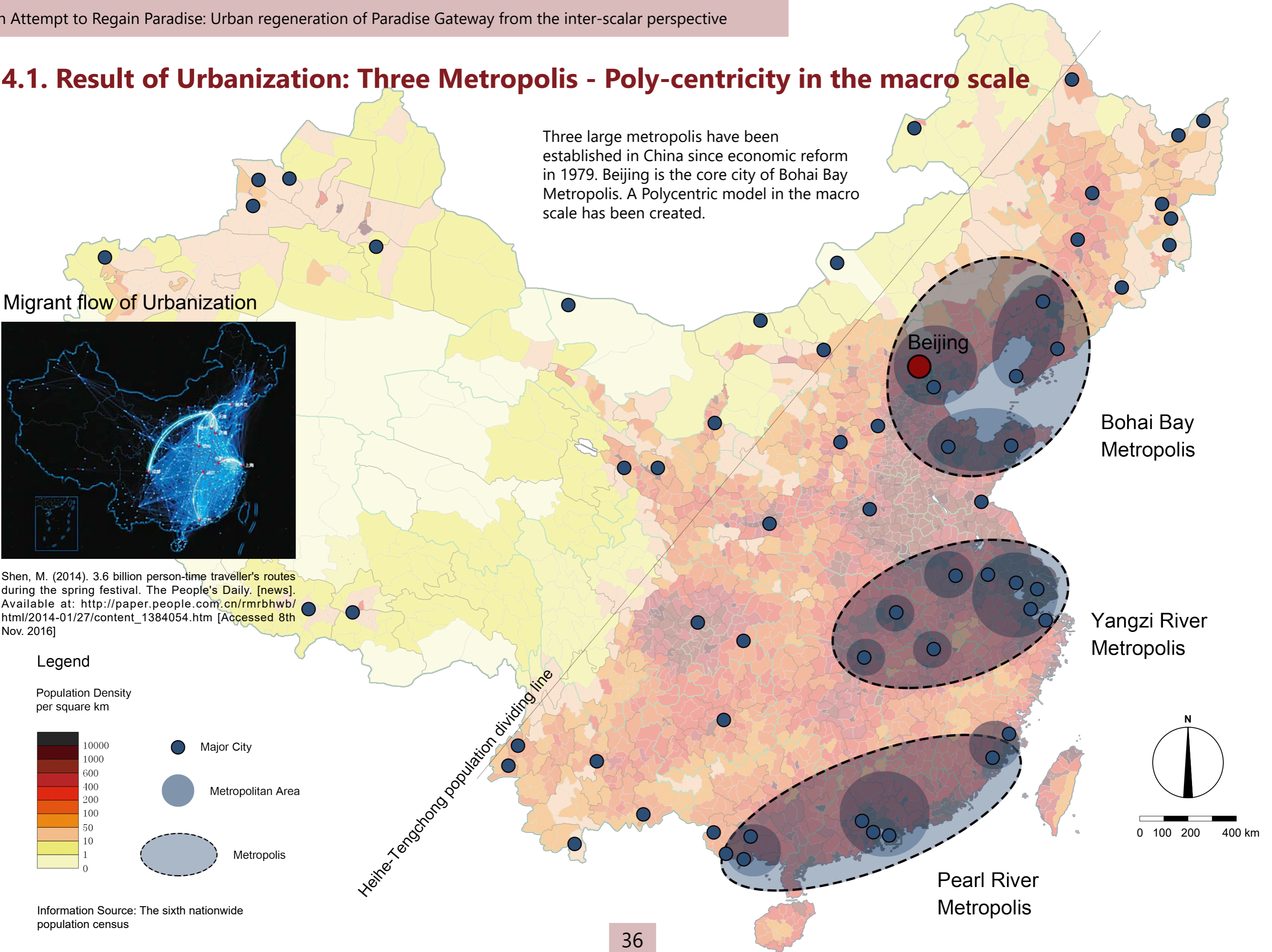
### Legend

Population Density per square km



Information Source: The sixth nationwide population census

Heihe-Tengchong population dividing line



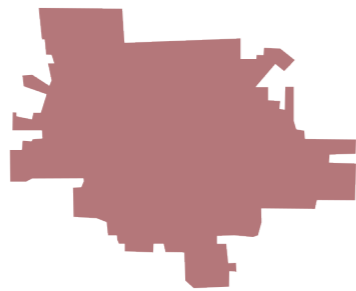
## 4.2. Development of Urbanized Area in the city of Beijing

1267 51 km<sup>2</sup>



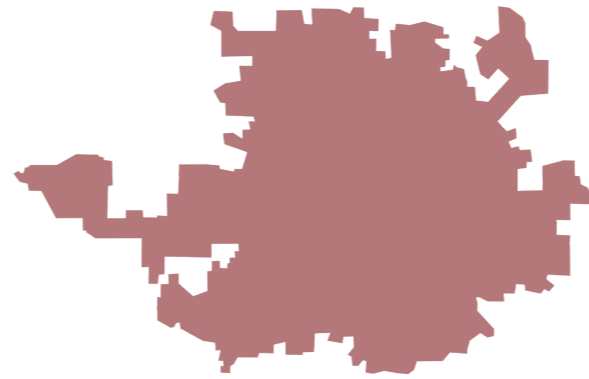
Sheng, Q. (2011). Changing Centralities under Urban Configurational'scale-structure'-Pondering the spatial conditions for market and retail areas in Beijing.

1968 172 km<sup>2</sup>



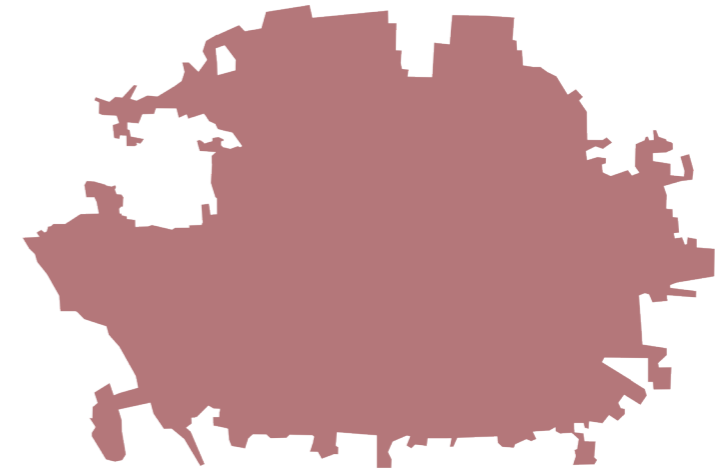
Source: [http://www.wikiwand.com/en/History\\_of\\_Beijing](http://www.wikiwand.com/en/History_of_Beijing)

1990 356 km<sup>2</sup>



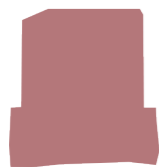
Source: <http://www.bestway-imc.com/image/2020120095/>

2010 627 km<sup>2</sup>



Source: [http://www.dianliwenmi.com/postimg\\_4173239\\_21.html](http://www.dianliwenmi.com/postimg_4173239_21.html)

1916 63 km<sup>2</sup>



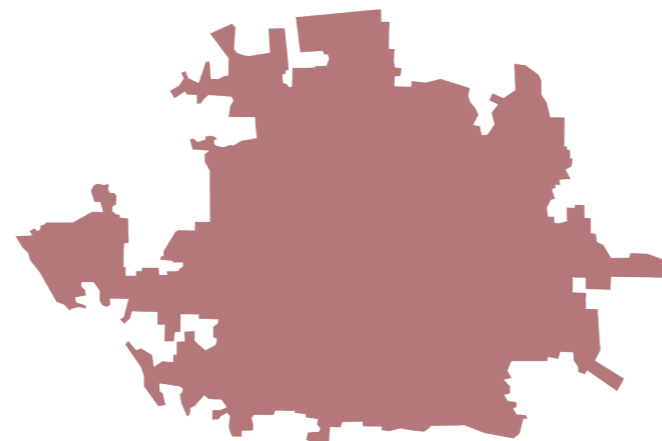
Source: [http://www.drben.net/ChinaReport/Beijing/MapsofBeijing/Historic\\_Maps\\_Beijing/1916AD/Beijing-1916\\_City\\_Plan-1a.html](http://www.drben.net/ChinaReport/Beijing/MapsofBeijing/Historic_Maps_Beijing/1916AD/Beijing-1916_City_Plan-1a.html)

1976 209 km<sup>2</sup>



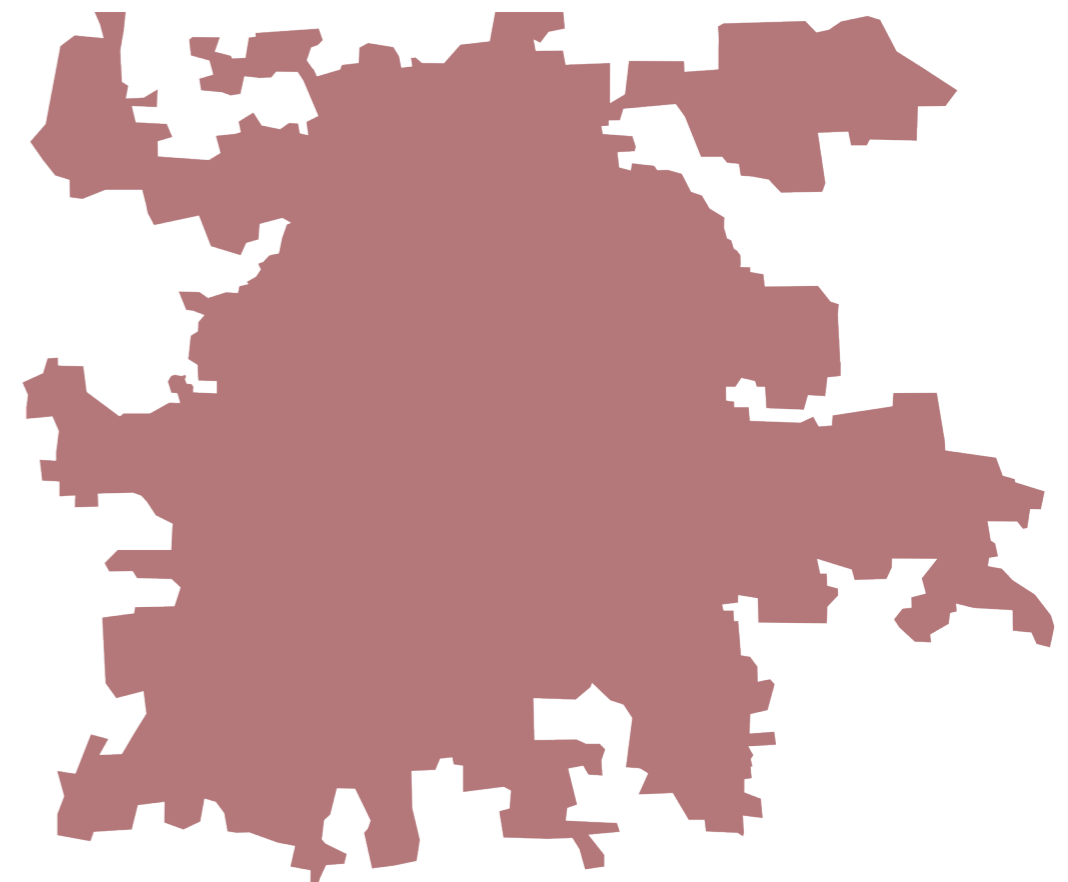
Source: [http://news.xinhuanet.com/city/2015-06/14/c\\_127913990.htm](http://news.xinhuanet.com/city/2015-06/14/c_127913990.htm)

2000 457 km<sup>2</sup>



Source: <http://beijing.virtualcities.fr/Maps/Collection>

2016 1675 km<sup>2</sup>



Source: Google Maps

# A map of Beijing during the Qing Dynasty (1636-1912)

Beijing is a city of over 3000 years of written and lived history, which has been the capital of several dynasties. Limited by the ancient construction capacity, urbanization was mild. Take the latest Qing Dynasty as an example, urbanized area are inside of the ancient city wall, which is exactly the location of current 2nd ring road. The historic center within 2nd ring road become later the core center of the monocentric structure of metropolitan Beijing.



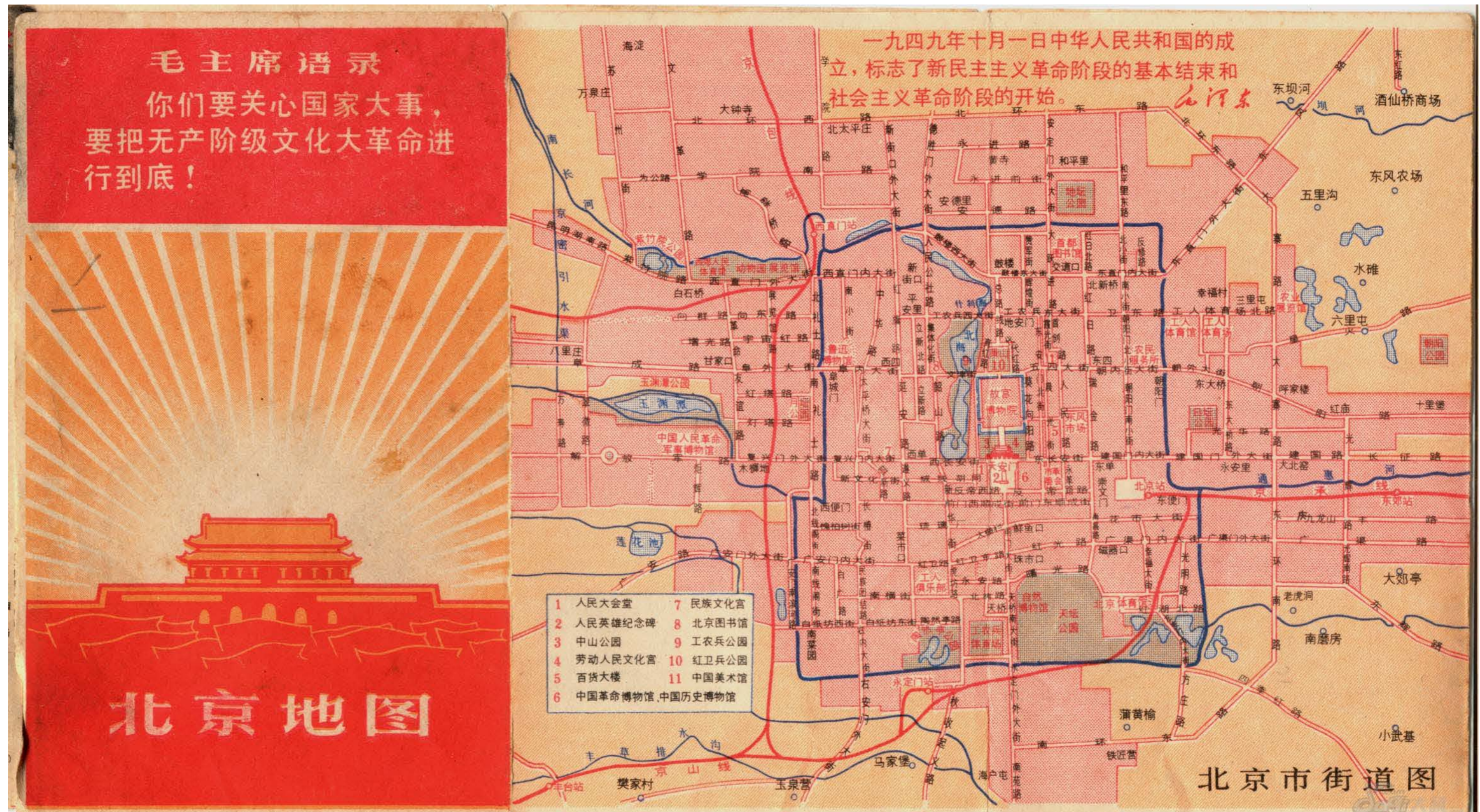
COPYRIGHT 1936 BY FRANK DORN, PEIPING.

FEIYANG PRESS LTD. TIENSIN-PEIPING.

Information Source: A Map and History of Peiping (Beijing). Explanatory Booklet. By Frank Dorn, Peiping. Lithographed and Published by The Peiyang Press, Ltd. Tientsin-Peiping. 1936.

## A map of Beijing during the Early Communist Period (1968)

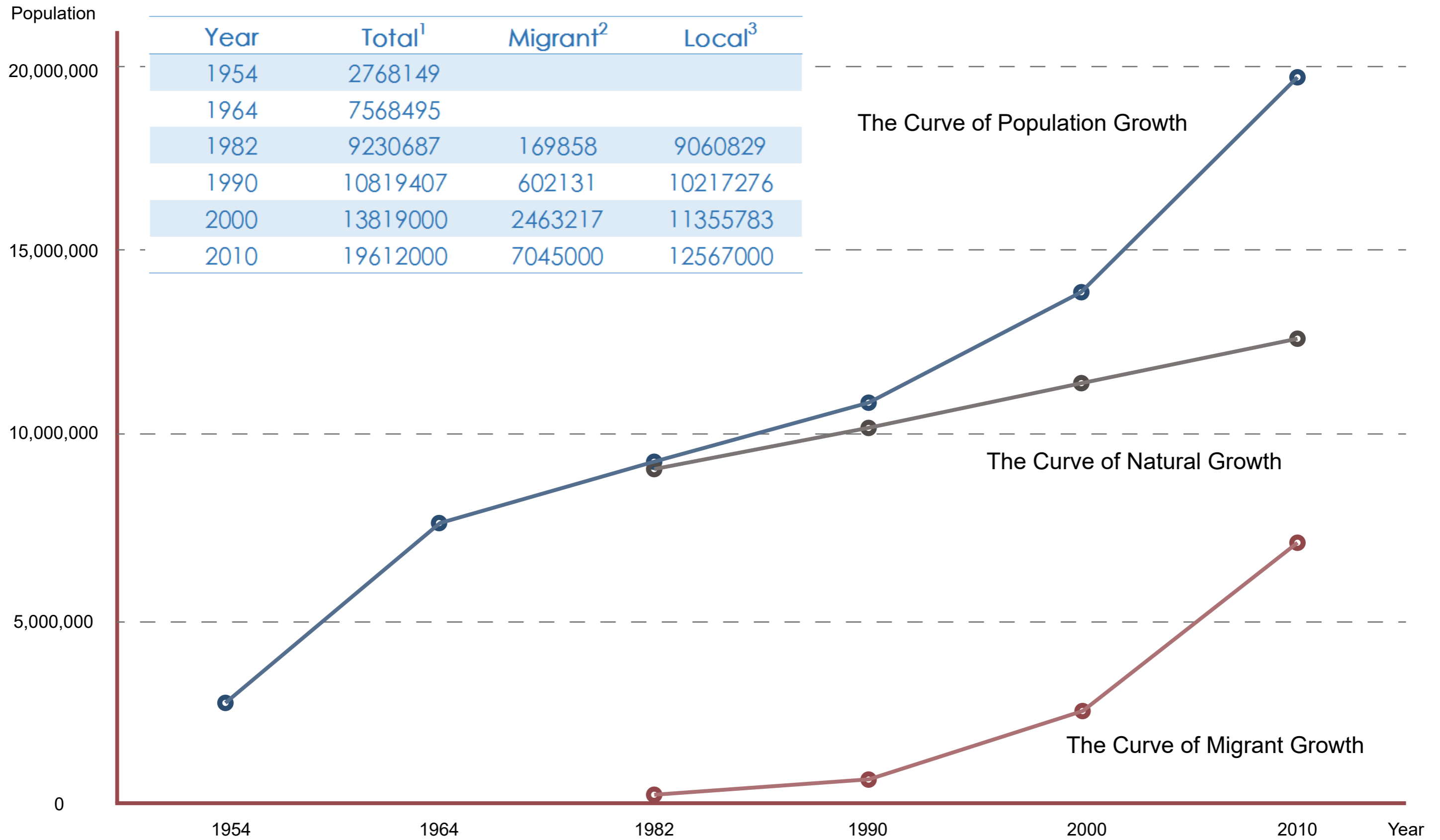
Since 1949, Beijing was once again the capital city of the newly established communist country. Under the Soviet-Sino Friendship Association, a master plan for capital came up by the Soviet planners and it was rapidly authorized. The vision of the Soviet master plan was structured within a strong heavy industrial development perspective. Although the controversial plan did have flaws, urbanization process of Beijing started in the radical red times and the urbanized area extended to outside 2nd ring.



Map of Beijing from red radical times. On the left it wrote, "Thy must concern the nation, and pursue the course of proletarian revolution!".

Source: By Rosemania [CC BY 3.0 (<http://creativecommons.org/licenses/by/3.0/>)], via Wikimedia Commons

### 4.3. Migrant as the Main Force of Population Growth

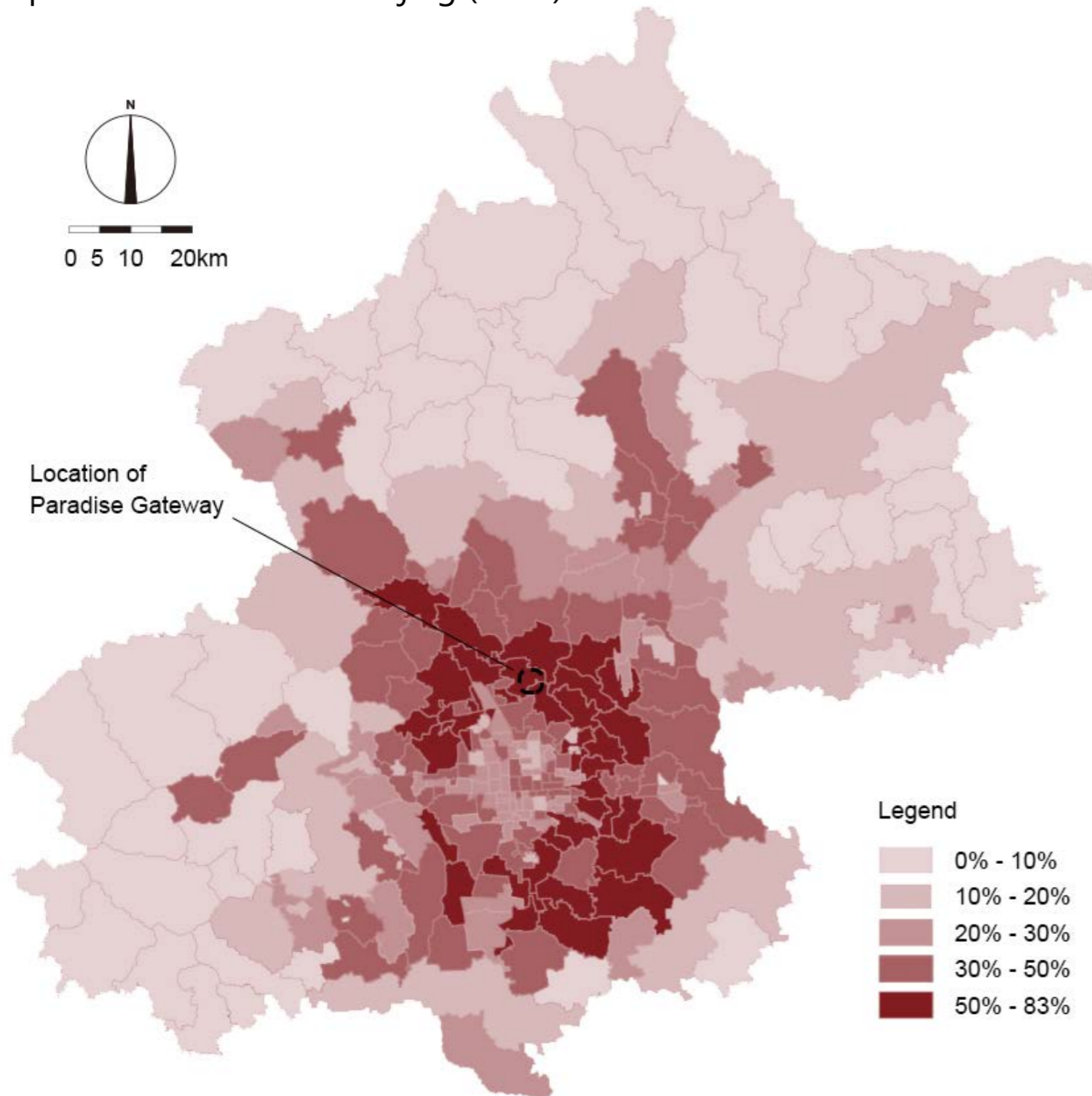


Source: 1) Total population from six national demographic census, <http://www.stats.gov.cn/tjsj/tjgb/rkpcgb/qgrkpcgb/>; 2) Migrant demographic information: Feng, J., Zhou, Y. (2003). The Latest Development in Demographic Spatial Distribution in Beijing in the 1990s. City Planning Review, 27(5), 55-63. Sun, X., Wang, H. (2016). The Evolution of Chinese Floating Population since 2000. Population & Development, 22(1), 94-104. 3) Local = Total - Migrant.

## Drifters - Outcome of Urbanization

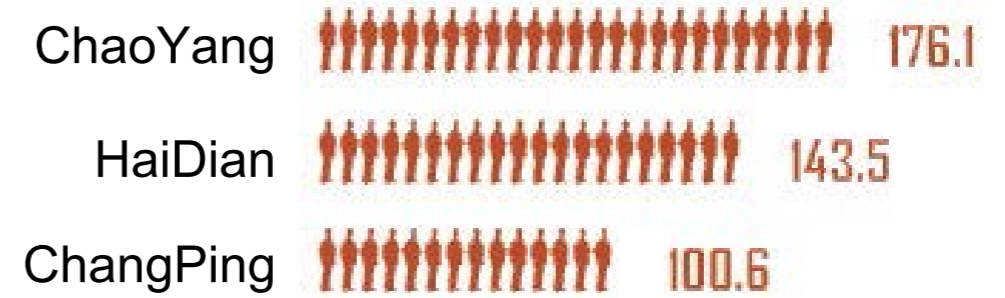
Unregistered immigrants in Beijing are given a cool name, the Drifters. The Drifters settled down in the three neighbor districts which have the largest population, where the Paradise Gateway locates right at the middle. The majority's reason for moving to Beijing is a search for employment and business opportunities. Other reasons including family and education.

### Proportion of Drifters in Beijing (2010)

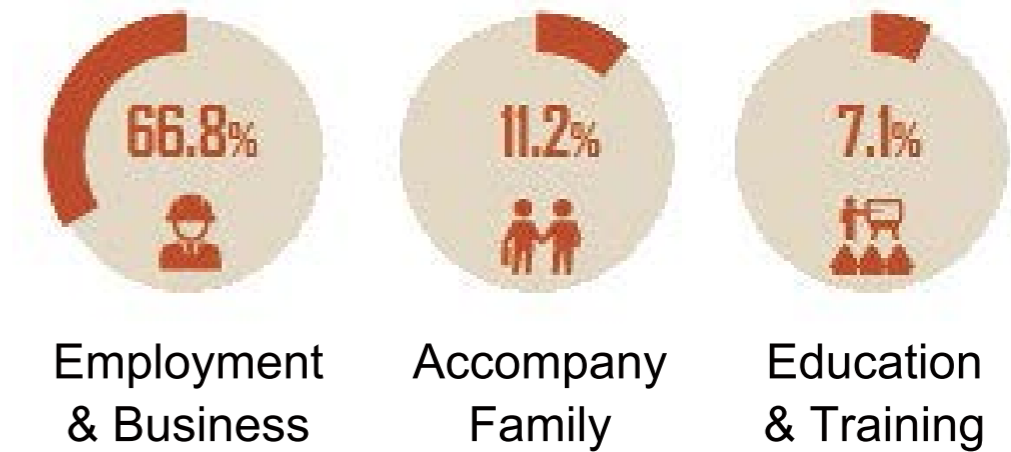


Demographic information source: Cai, A., Zhang, H., Tang, Y., Liang, J. (2016). The Spatio-Temporal Evolution of Beijing Population Since 1982. Northwest Population, 4(37), 1-8.

### Where the Drifters settled down? (numbers in ten thousand)

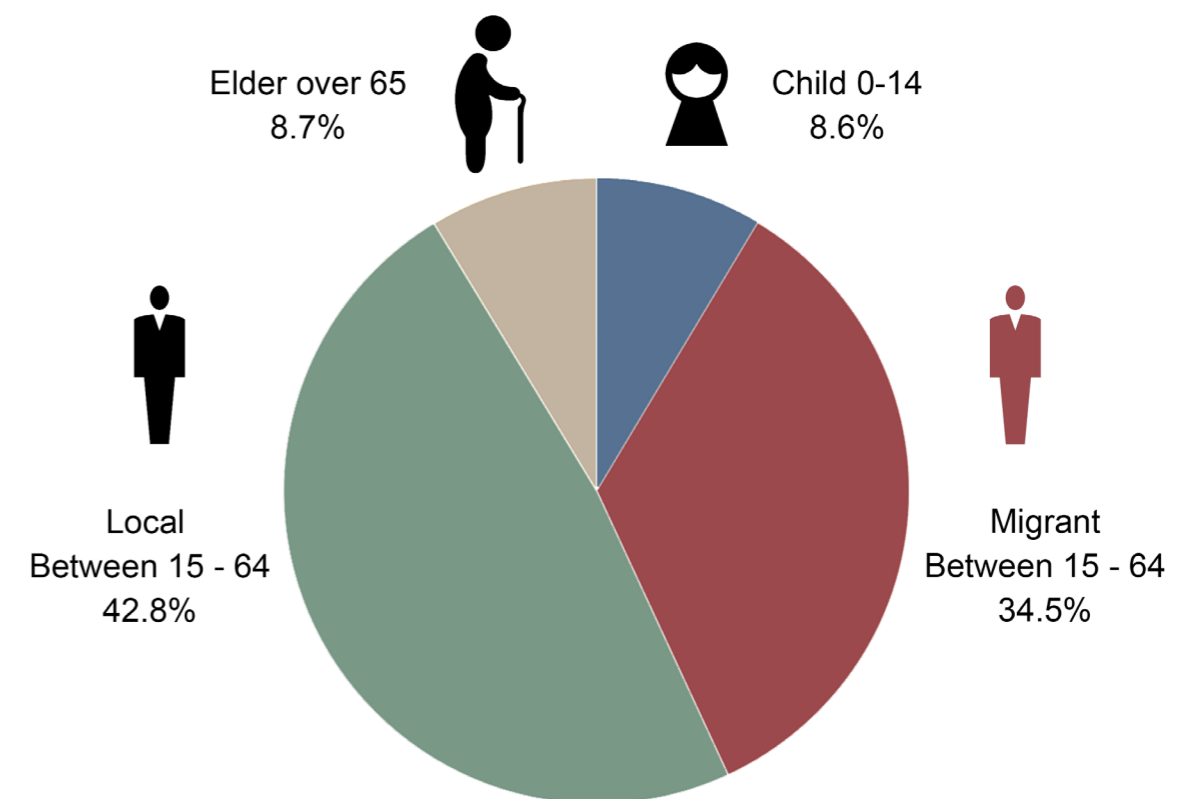


### Why the Drifters moved to Beijing?



Netease Data. (2015). Beijing's Demographics Trend in the past three decades. [news]. Available at: <http://data.163.com/15/0522/01/AQ6D62HS00014MTN.html> [Accessed 8th Nov. 2016]

### How many are the Drifters in Beijing?



The sixth nationwide population census, <http://www.stats.gov.cn/tjsj/tjgb/rkpcgb/qgrkpcgb/>

## 4.4. Ring and Radial Model of Beijing - A monocentric structure

The inner city's strong attraction is created under the development model of the metropolitan area.

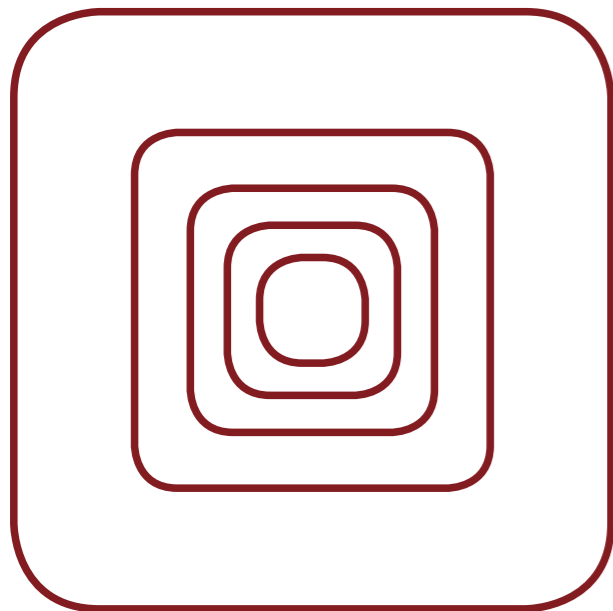
Beijing's main spatial structure and infrastructure strategy is a combination of rings roads and radial arteries. Ring roads of Beijing serve as a milestone in urban development. As urbanized area sprawls into the rural, the construction of ring roads followed. The fast velocity of growth pressured the systems. Dramatically, as is developed in different time periods, the type and function of centralities of different rings vary (1981-2009).

Table: General situation of Beijing's ring roads

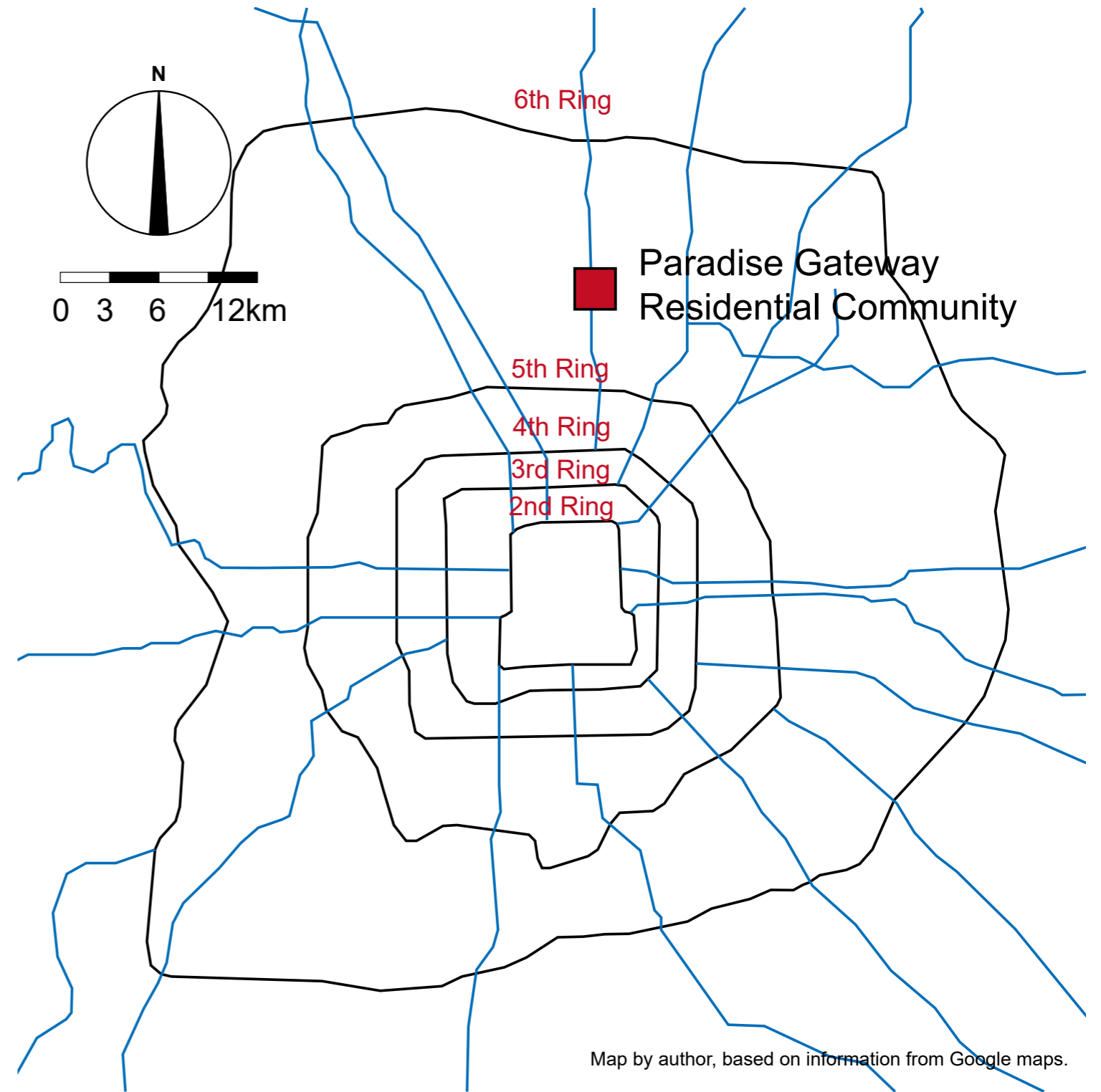
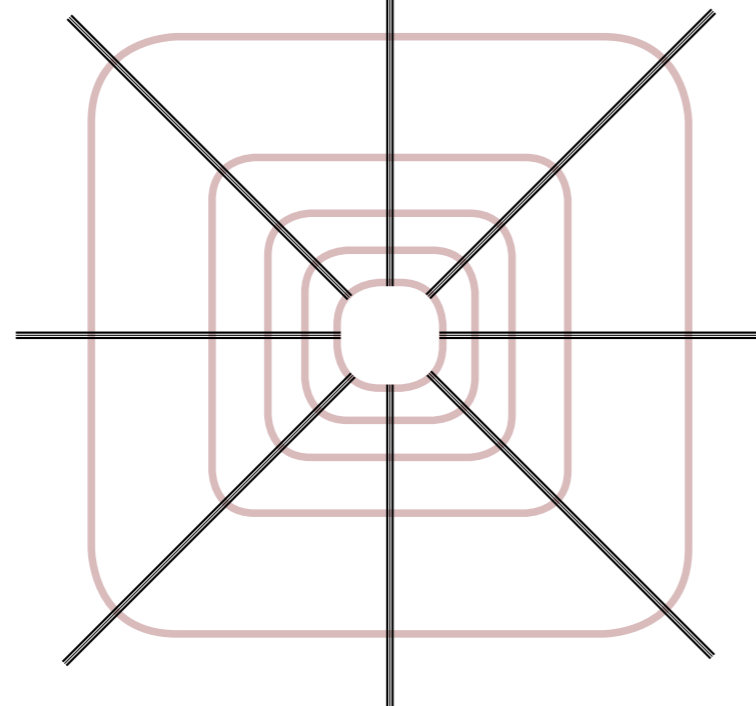
Road name	Finished year	Length	Overpasses
2nd Ring Road	1992	32.7km	29
3rd Ring Road	1981	48.3km	44
4th Ring Road	1999	65.3km	147
5th Ring Road	2003	98.6km	70
6th Ring Road	2009	187.6km	-

Information Source: [http://baike.baidu.com/link?url=0Vc5YjqUsHKm67yRF8Bbka8kA5LX4SqebaFPmEiZWXSmIGtTtoVpPLYvEe8C4gxjn0SAxEEK\\_8ZdAZgRF09-q](http://baike.baidu.com/link?url=0Vc5YjqUsHKm67yRF8Bbka8kA5LX4SqebaFPmEiZWXSmIGtTtoVpPLYvEe8C4gxjn0SAxEEK_8ZdAZgRF09-q)

Rings



Radials



Map by author, based on information from Google maps.

As the famous saying goes, form follows function. The structure of rings and radial arteries can be conceptualized into the model on the right page. As the function is determined by the rings inside out, administrative and historical in the inner city, and dynamic economic engines following by residential dominated 5th ring. It makes sense that complementary functions are linked by the radial arteries.



## 4.5. From the Thünen Rings to Urban Land Market Theory

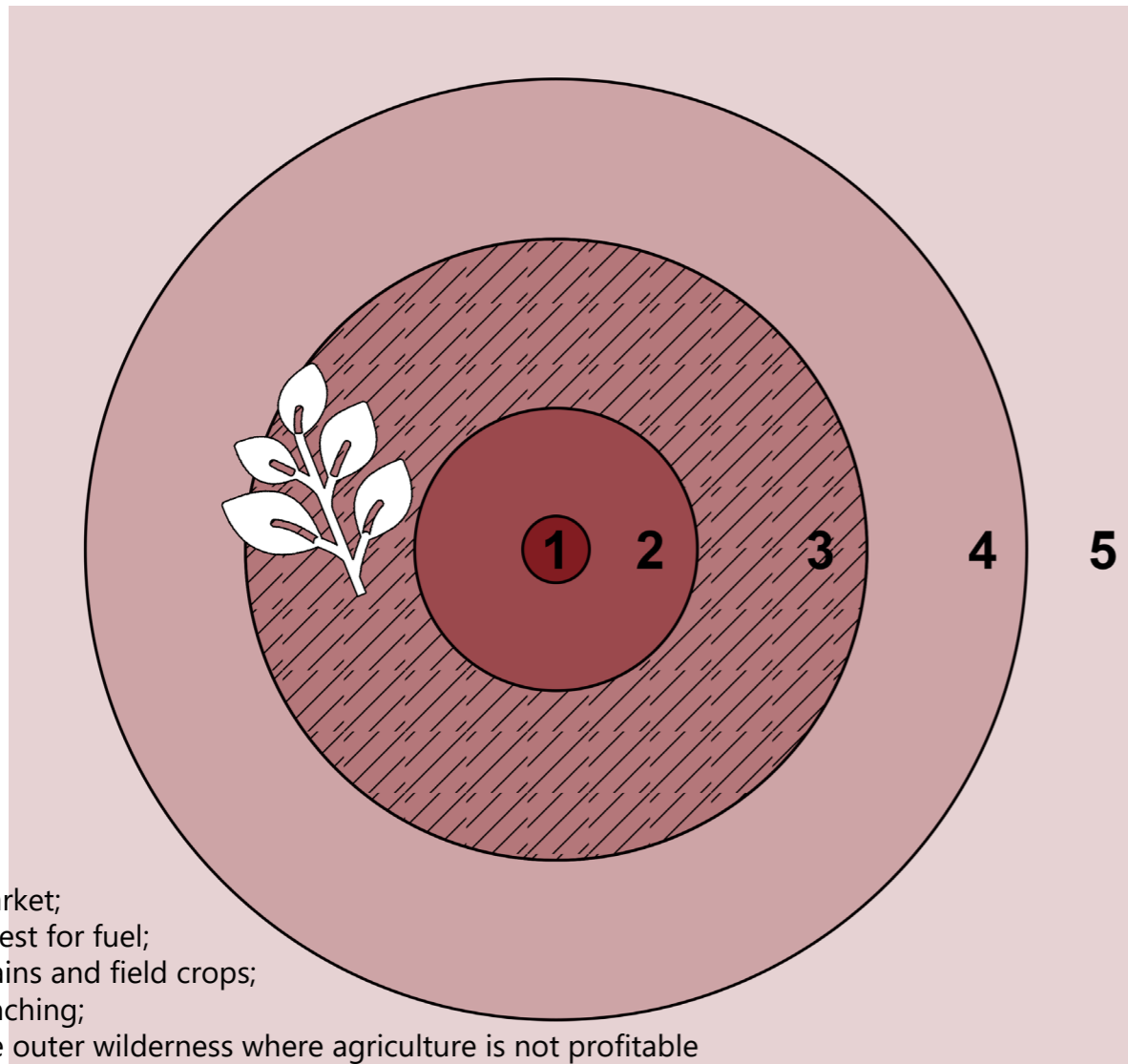
To understand this phenomena a theoretical review is required so to be able to reveal the basic concepts under the conception of the Urban models as the same time help to evaluate its failures.

### Johann Heinrich von Thünen's Thünen Rings

$R = Y(p-c) - YFm$ , where  $R$  = land rent;  $Y$  = yield per unit of land;  $c$  = production expenses per unit of commodity;  $p$  = market price per unit of commodity;  $F$  = freight rate (per agricultural unit, per mile);  $m$  = distance to market.

The cultivation of a crop is only worthwhile within certain distances from the city: beyond that, either the cost of land becomes too high, with increasing distances transport costs also increases. As a result, for each product, there is a certain distance from the city, where its production would be worthwhile.

### Thünen Rings of Agricultural Land (1826)



Von Thunen, J. H. (1966). Isolated state. P. G. Hall (Ed.). Pergamon.

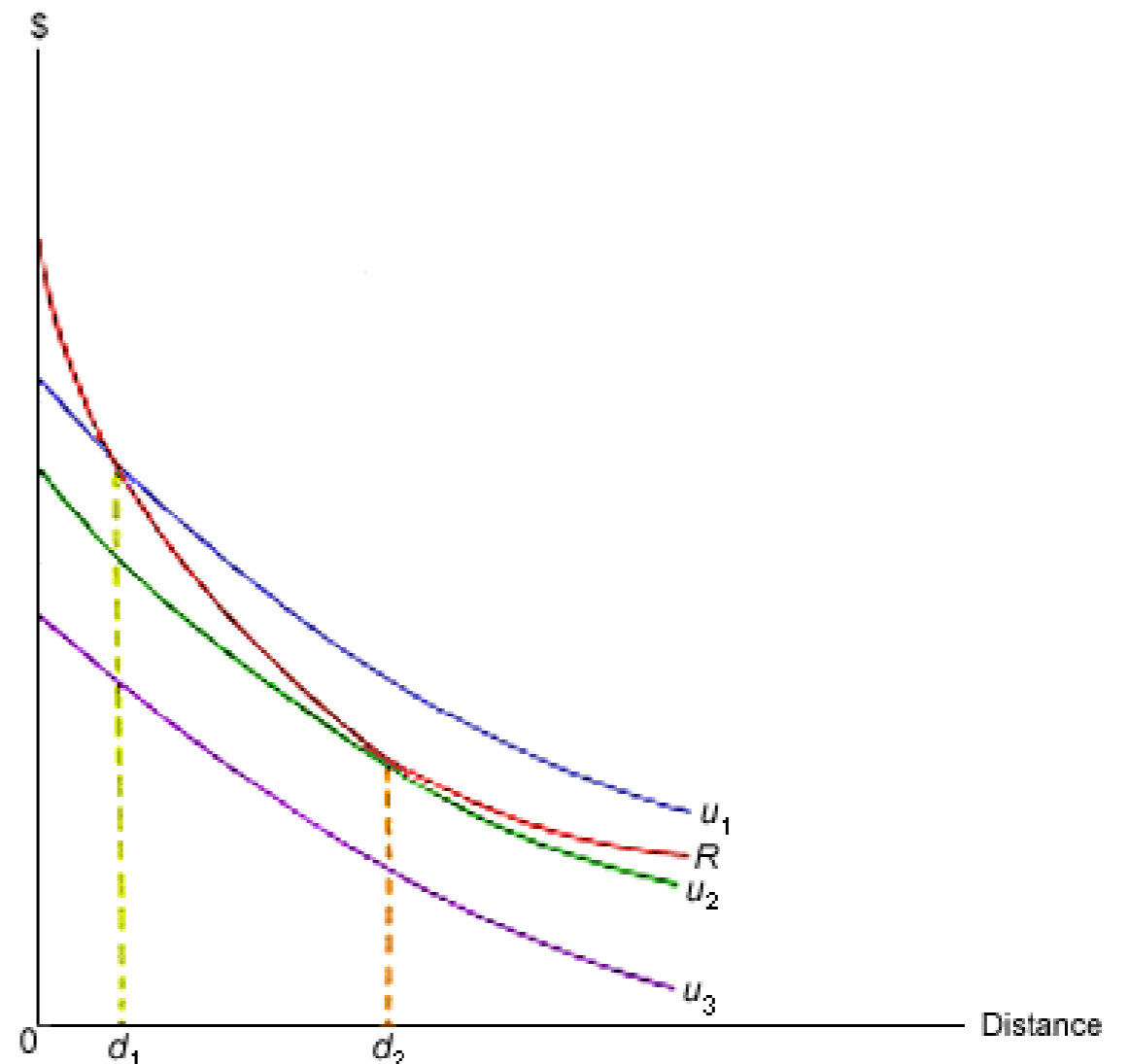
### William Alonso's Urban Land Market Theory

The theory is based on three assumptions:

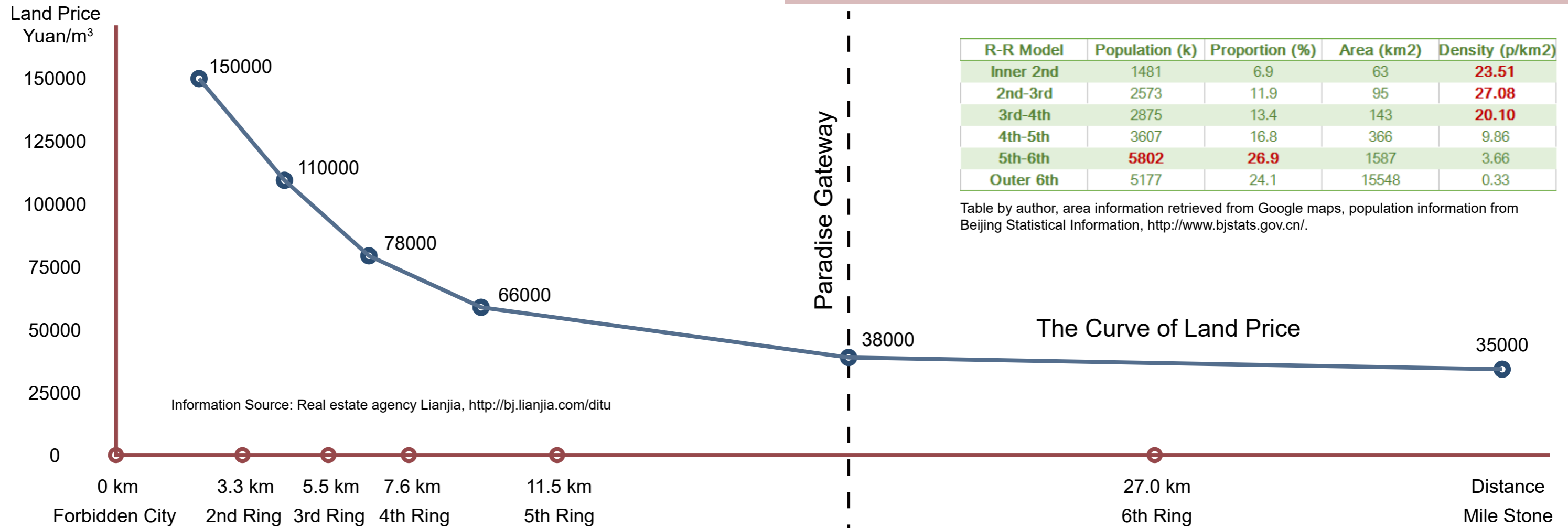
1) monocentric city, 2) flat landscape, 3) continuous urban area.

There is a Distance Decay Relationship between land rent and distance from the CBD. Bid-Rent Curves are downward sloping, where rent decreases with distance from the city. The further a household lives from the city center, the more it will have to spend on commuting and less it will be able to spend on housing. Alonso' urban land rent theory provides a static description and explanation of residential land use.

### Bid Rent Curves and Residential Location (1964)

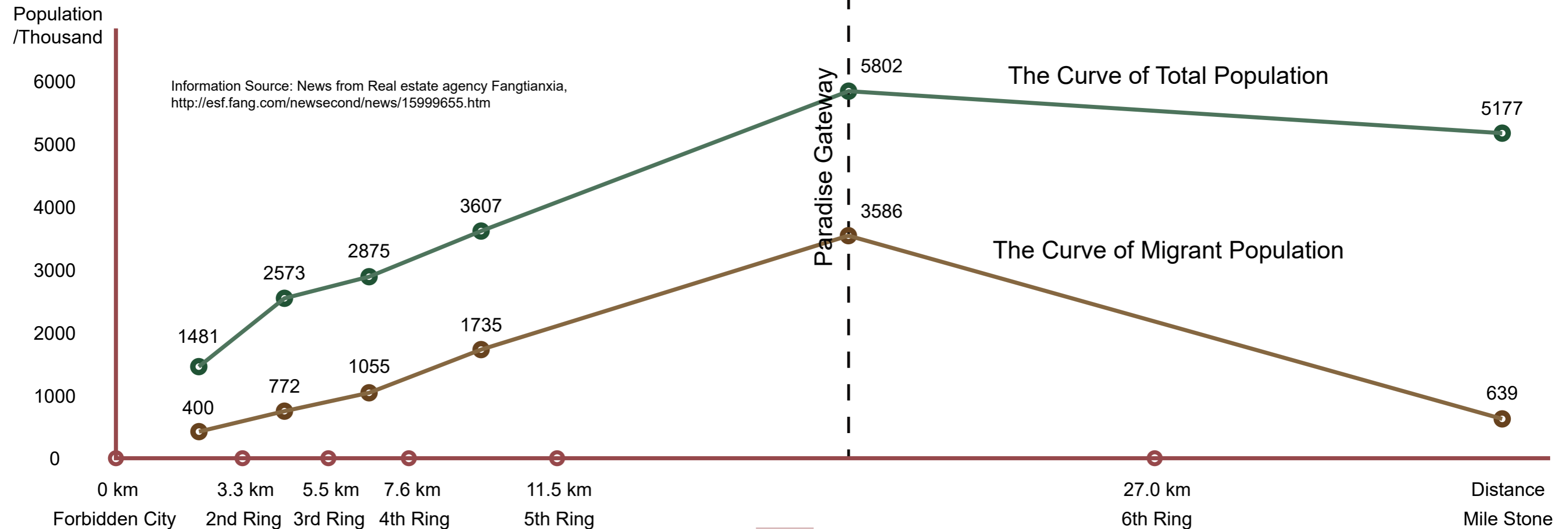


Alonso, W. (1960). A theory of the urban land market. Papers in Regional Science, 6(1), 149-157.

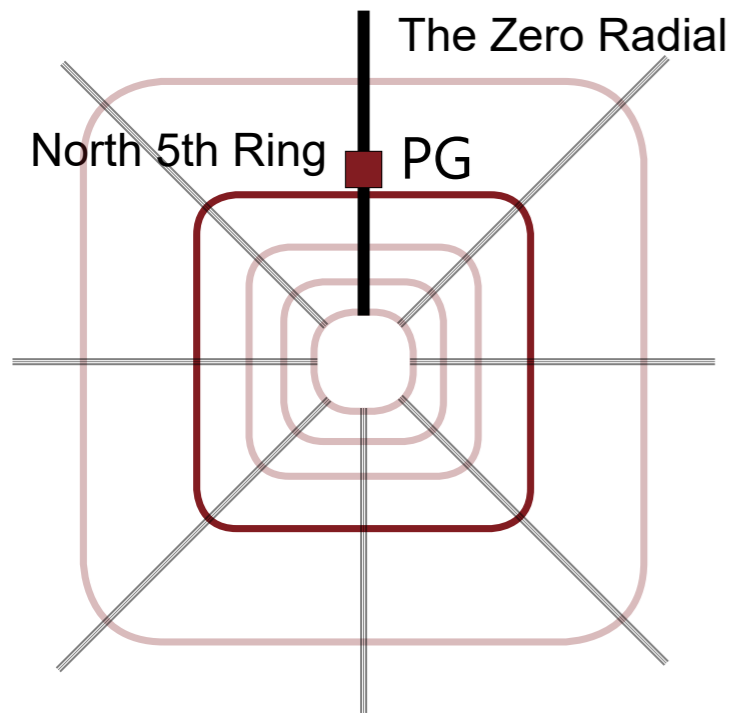


R-R Model	Population (k)	Proportion (%)	Area (km <sup>2</sup> )	Density (p/km <sup>2</sup> )
Inner 2nd	1481	6.9	63	<b>23.51</b>
2nd-3rd	2573	11.9	95	<b>27.08</b>
3rd-4th	2875	13.4	143	<b>20.10</b>
4th-5th	3607	16.8	366	9.86
5th-6th	<b>5802</b>	<b>26.9</b>	1587	3.66
Outer 6th	5177	24.1	15548	0.33

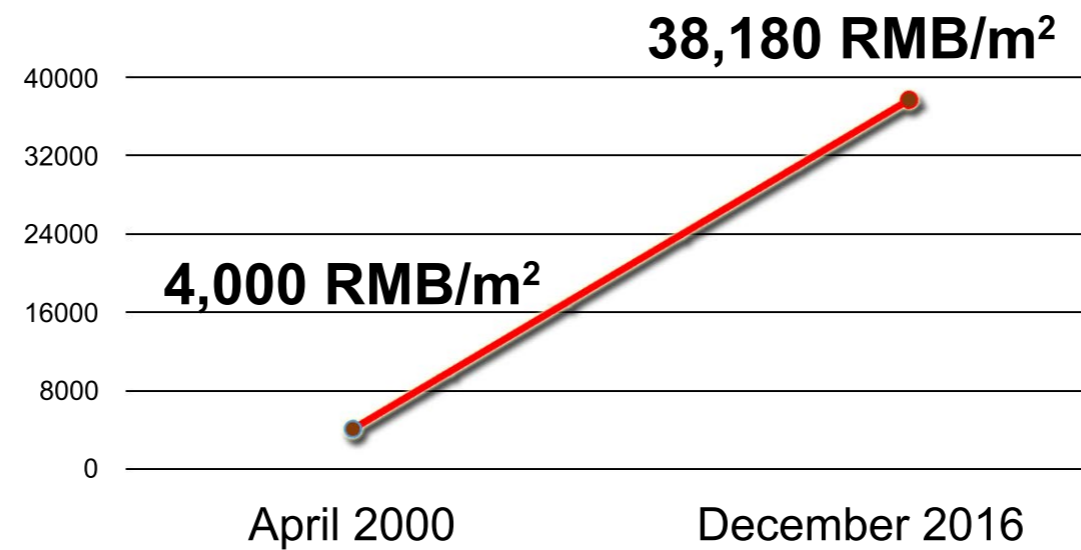
Table by author, area information retrieved from Google maps, population information from Beijing Statistical Information, <http://www.bjstats.gov.cn/>.



## 4.6. Real estate market in Beijing forcing migrants out of city center



Rocket Launching Price of PG



According to the Telegraph (2016), Beijing is the most expensive city worldwide for renting a home, where

Average Cost of Housing  
is **122.9%** of  
Average Net Earnings.

126,000 RMB/m²

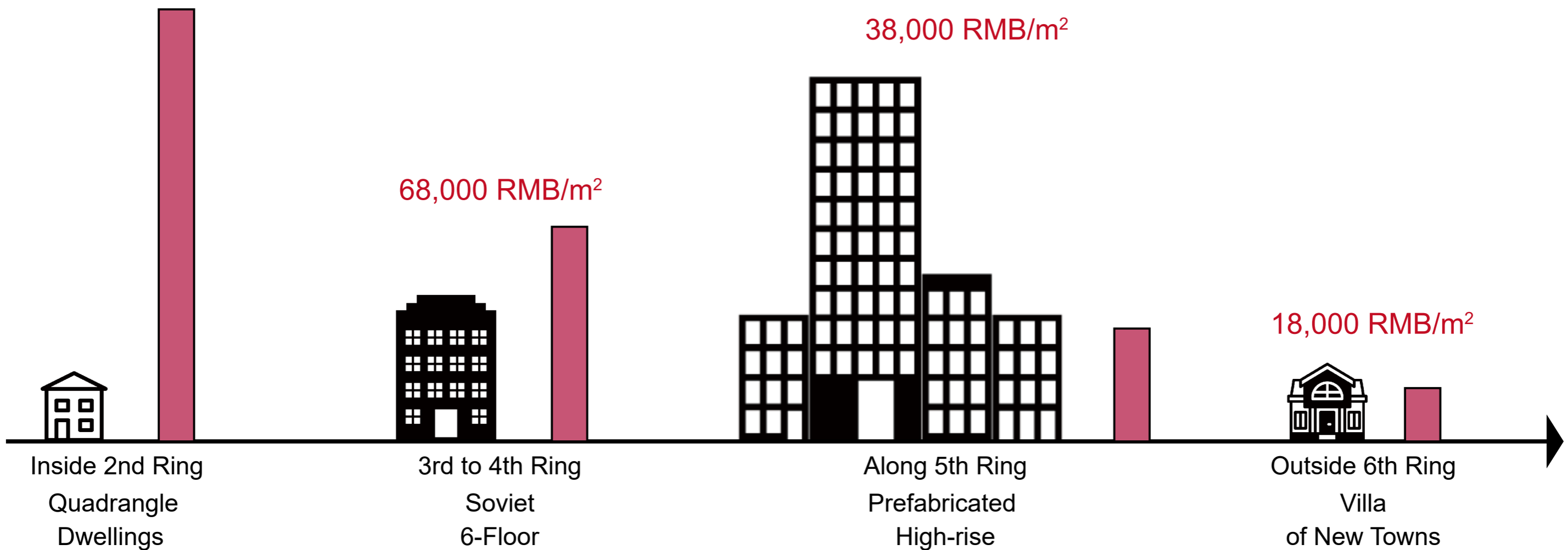


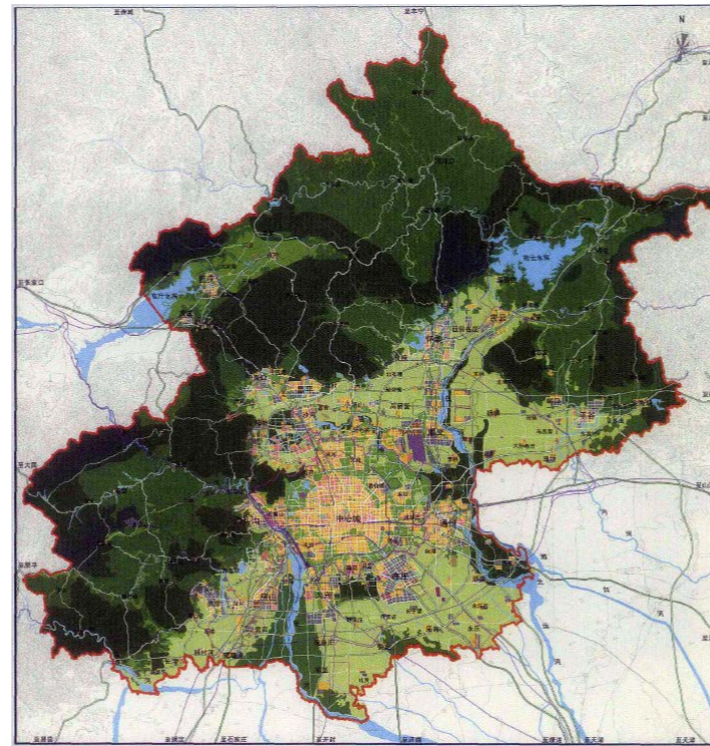
Diagram by author

Diagram by author

One of the main goals of the 04 plan is to lower inner-city density, to prevent crowding and congestion from happening. This goal is accomplished by the rising of the inner-city land price. Under this real estate market, homes are becoming unaffordable.

People are forced to outskirts of the city by the economic lever, where land price is cheaper. This phenomenon fits well in the Johann Heinrich von Thünen's Thünen Rings and William Alonso's Urban Land Market Theory. Drifters, as the main force of urbanization, are vulnerable to the force because of limited income. As a result, this caused the appearance of Paradise Gateway essentially.

Land-use Plan of the Whole City



from Municipality of Beijing. (2005). The Beijing city master plan (2004-2020). Beijing Planning Review, page 5-51.

Rocket Launching Price of PG



News of home buyers. (2013). Home or Life, it is a tough choice. [news]. Available at: <http://news.foryoo.cn/a/201303/1s241168.shtml> [Accessed 6th Nov. 2016]

Economy as the hand to push people out of inner-city

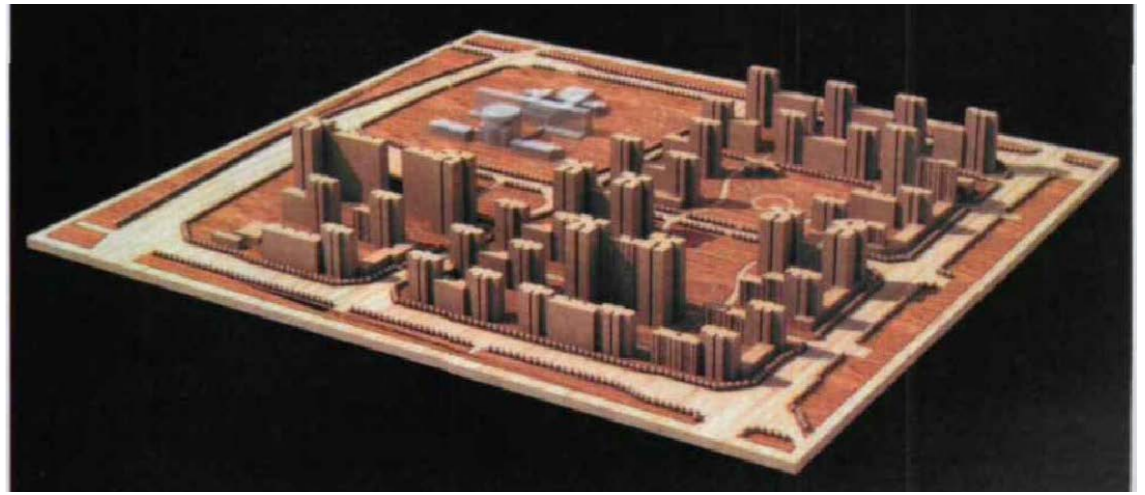


Diagram by author

### 4.7. Monocentric regional structure gave birth to PG

Back to 1998, residential community Paradise Gateway was put forward as one of the core projects of affordable housing construction. Upon finished, residential floor space would reach 500 hectares, and become home to ones of urgent housing demand (Liu, 2006). However, the floor space reached 1880 hectare in 2016.

Tiantongyuan, the Chinese name of this community, means the garden that led to heaven. The name has the implied meaning of anyone can start a life here, which makes the community a path towards happiness. However, the expected outcome is never realized and it is becoming an overcrowded problematic community.



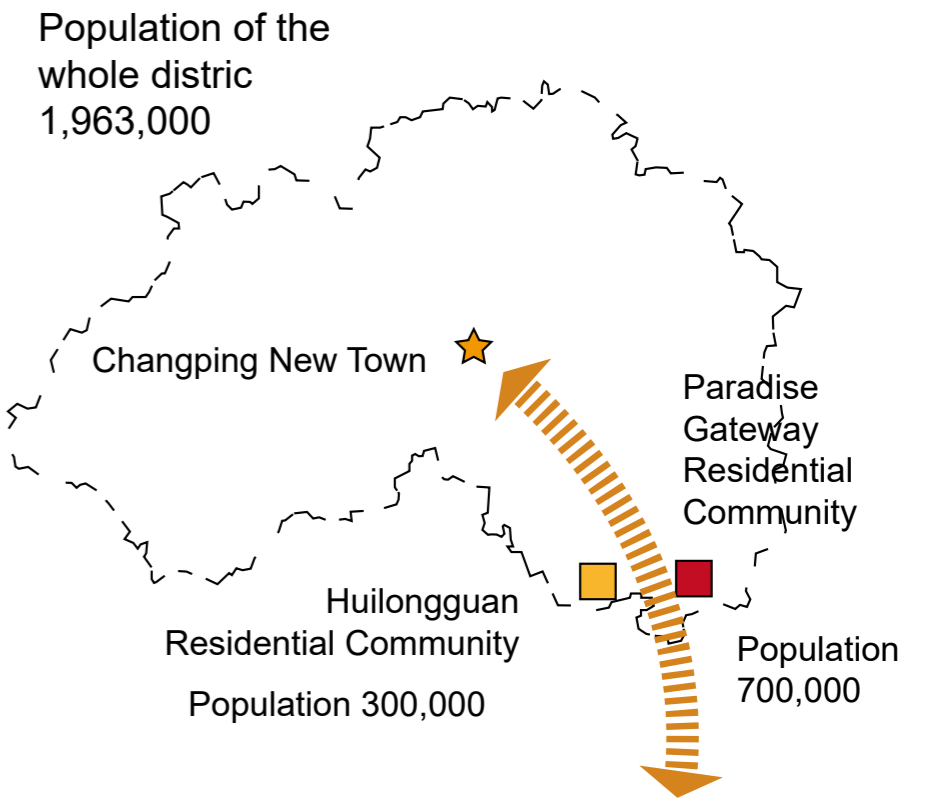
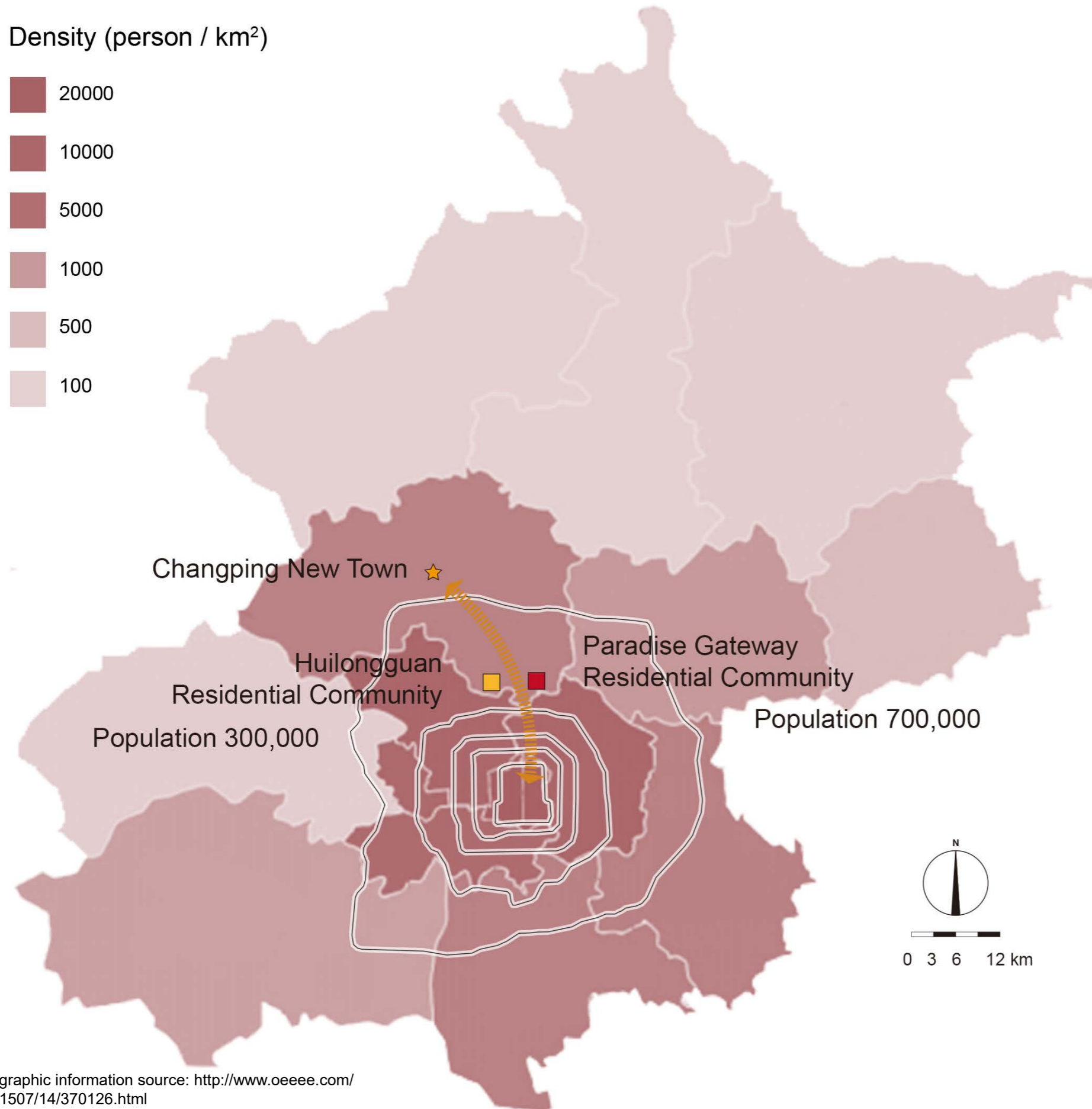
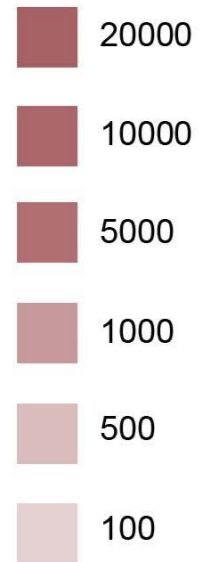
Original Urban Design of Paradise Gateway



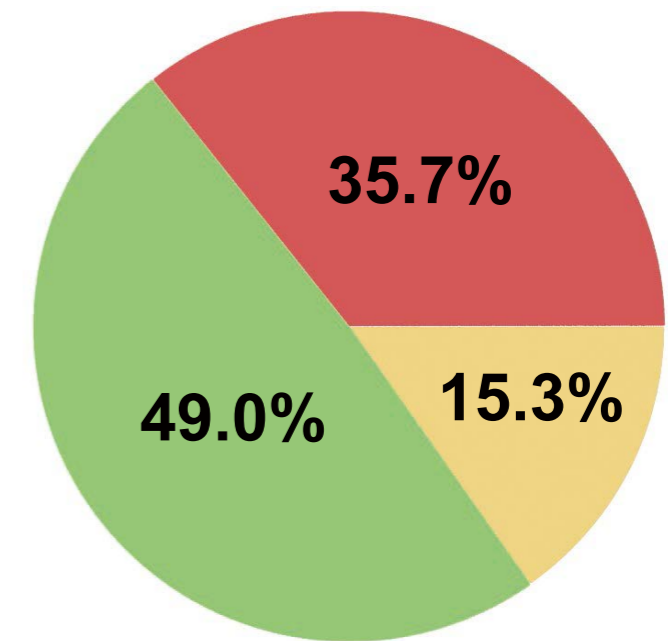
Original design of Paradise Gateway's core neighborhood, including park and business area. Liu, Y. (2006). Urban Design of Central Area of Paradise Gateway. Archicreation, 2006(2), 129-131. (Both image from the same source)

PG at the North fringe of city center

Density (person / km<sup>2</sup>)



Proportion of inhabitants of Changping District



Two mega residential communities, Paradise Gateway and Huilongguan, gathered more than half of the whole Changping District's population at the edge of the inner city. The phenomenon shows the strong attraction of the inner city.

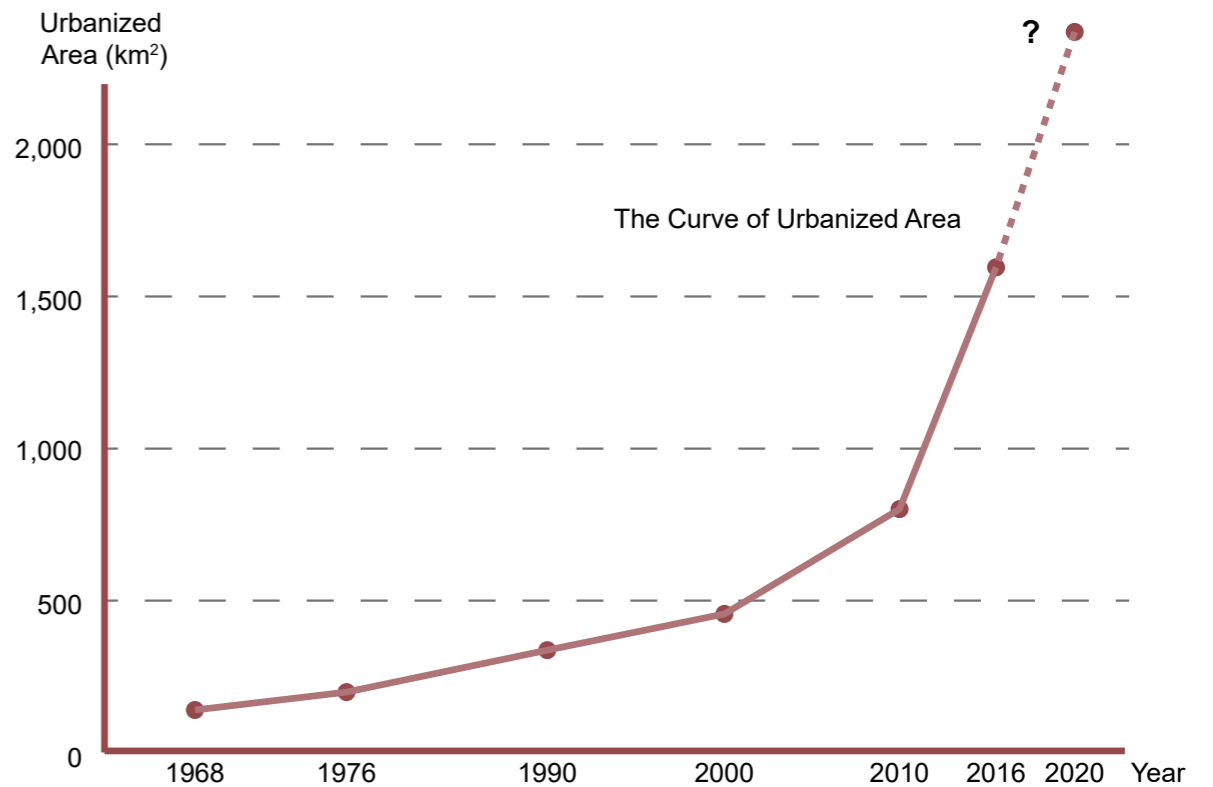
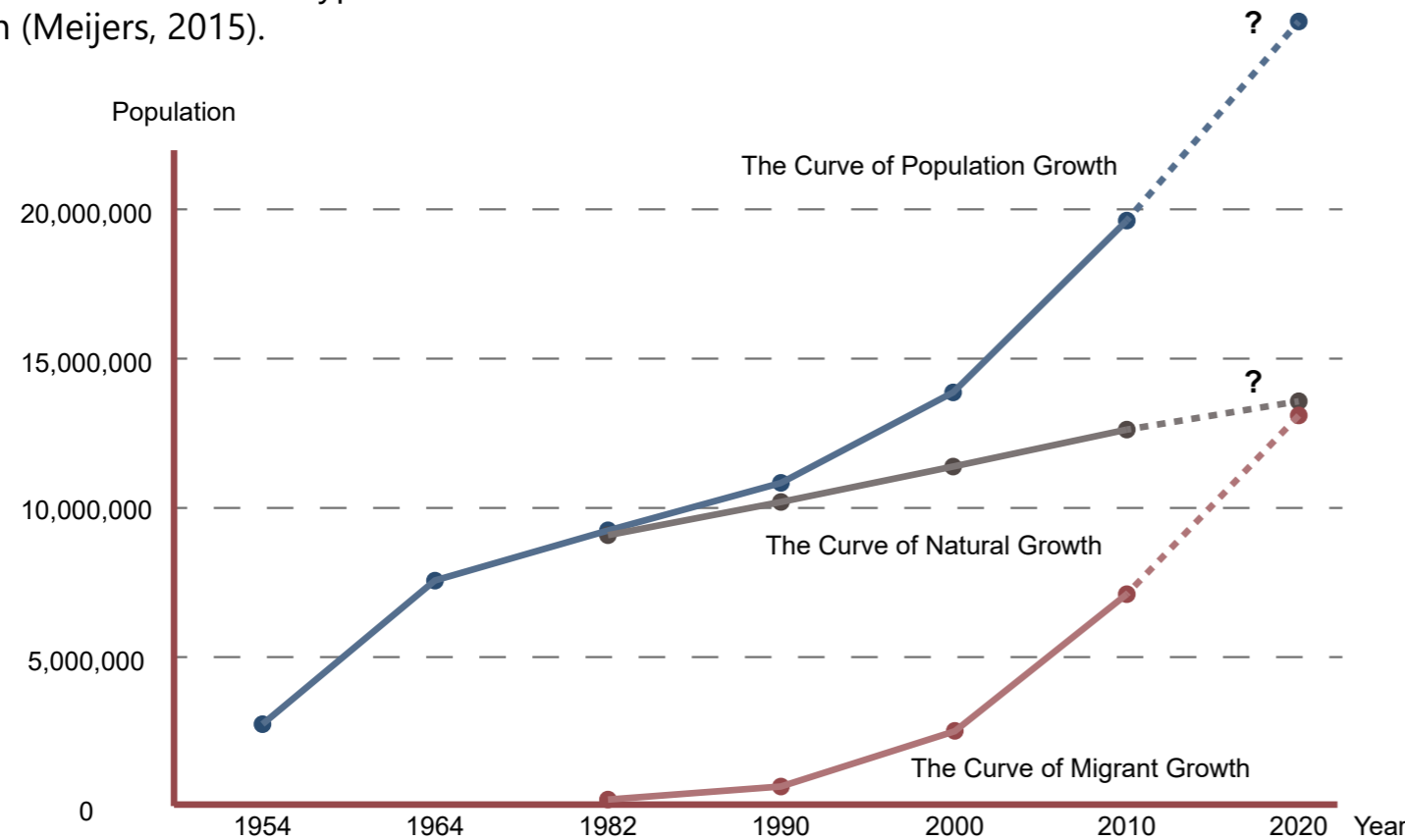
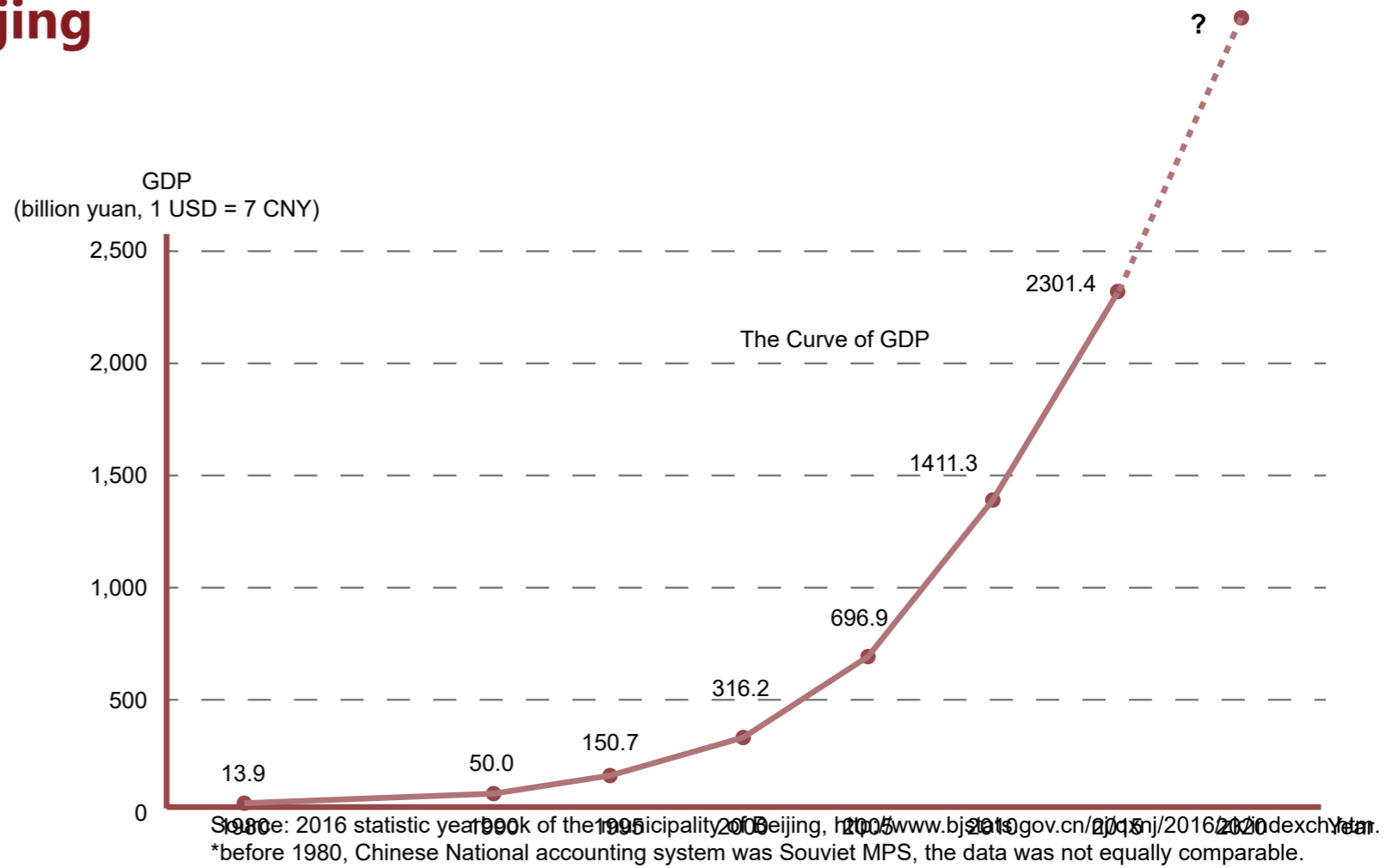
Demographic information source: <http://www.oeeee.com/nis/201507/14/370126.html>

## 4.8. Predictable Future Urbanization of Beijing

China is a developing country and will still be in the short future. The speed of its development is fast enough to result in considerably problematic urbanization process. Take the city of Beijing for example, its GDP was 14 billion in 1980. However, 35 years later, the number was 2300 billion in 2015, 165 times larger. The growth rate has been and will be steady in the short future.

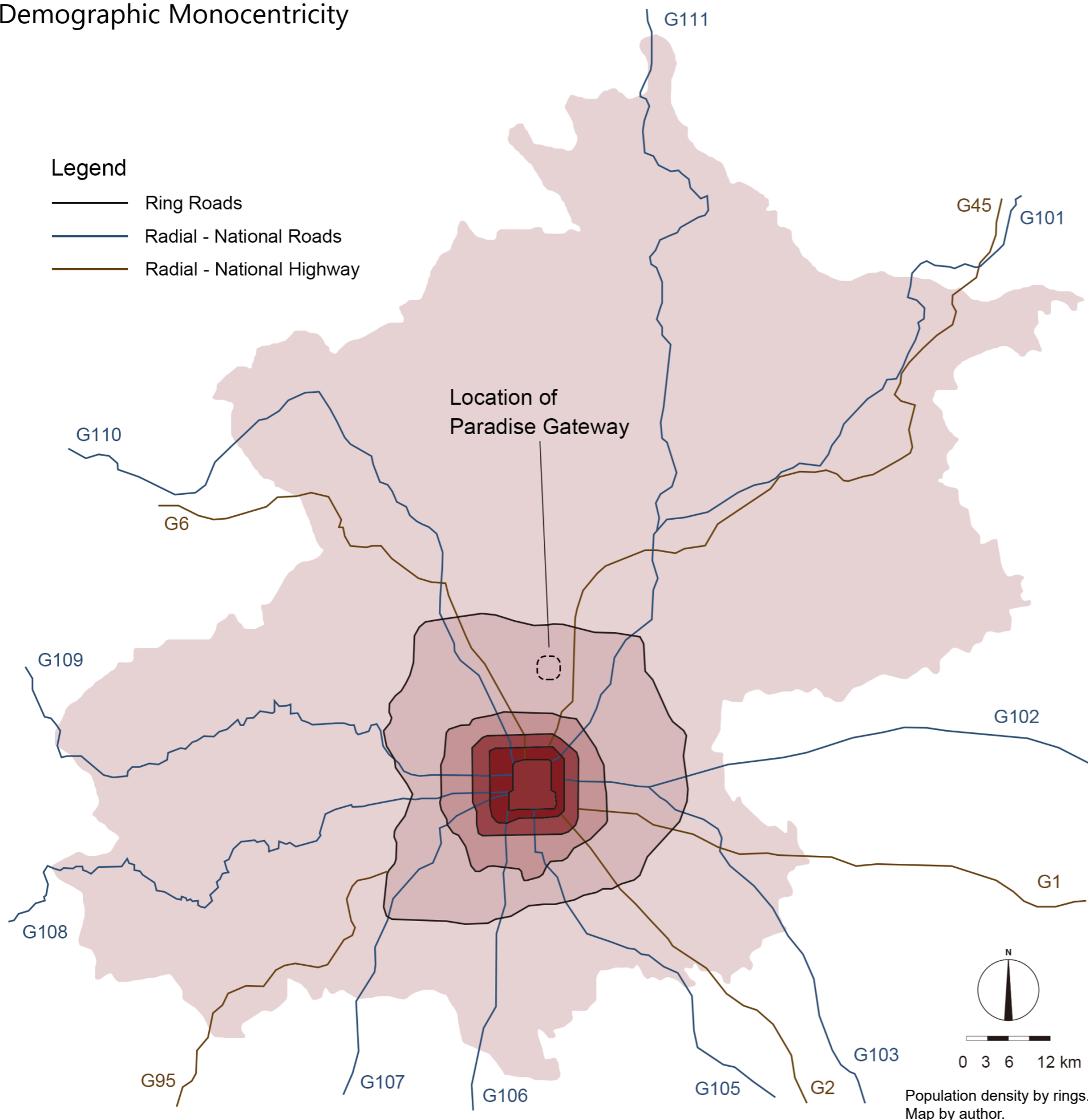
What follows this trend is the strong flow of migrants and expansion of urbanized area. I have every reason to predict that migrants will continue to arrive at the city and urbanized area will grow larger. The fact raises a doubt, whether providing more mobility and service capacity can solve the problems or not?

As was explained in the context above, the core reason behind the existence of Paradise Gateway and other mega residential communities is a concurrence of intense urbanization and monocentric regional structure. The thesis aims to search for a sustainable solution, which means interventions should be made towards the core conflict. The core conflict is a failure of recognition of the transition from a monocentric dominated system towards a polycentric one, which should be system of complementary functions, diverse type of centralities in a search for the spatial cohesion (Meijers, 2015).



Source: 1) Total population from six national demographic census, <http://www.stats.gov.cn/tjsj/tjgb/rkpcgb/qgrkpcgb/>; 2) Migrant demographic information: Feng, J., Zhou, Y. (2003). The Latest Development in Demographic Spatial Distribution in Beijing in the 1990s. City Planning Review, 27(5), 55-63. Sun, X., Wang, H. (2016). The Evolution of Chinese Floating Population since 2000. Population & Development, 22(1), 94-104. 3) Local = Total - Migrant. 4) Source of urbanized area see P.9

### Demographic Monocentricity



### Population Density Divided by Rings

The map on the left shows the population density of Beijing. Density decays according to rings. The outer the lighter red it is, which means the density is lower. National roads are numbered clockwise connecting the whole metropolitan area. Although the center has higher density, the area between 5th and 6th ring contains the most people, 5.8 million, including Paradise Gateway.

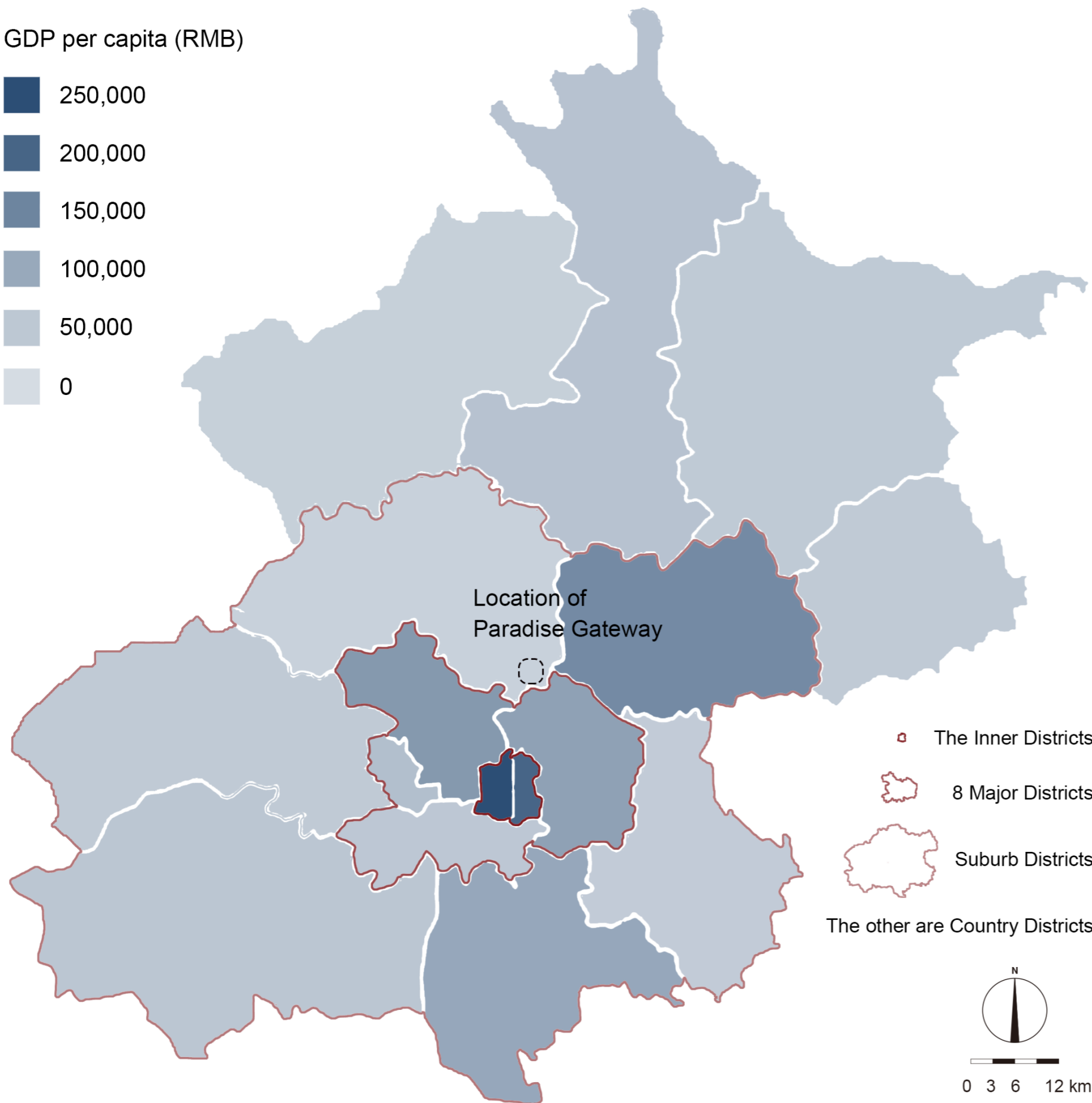
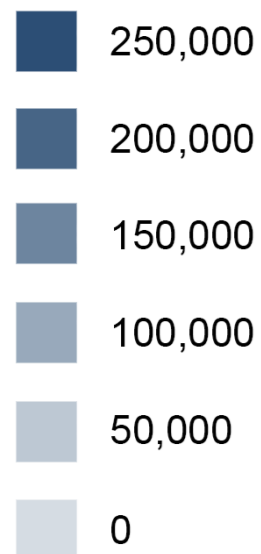
### Investigate on the Population and Density

R-R Model	Population (k)	Proportion (%)	Area (km <sup>2</sup> )	Density (p/km <sup>2</sup> )
Inner 2nd	1481	6.9	63	<b>23.51</b>
2nd-3rd	2573	11.9	95	<b>27.08</b>
3rd-4th	2875	13.4	143	20.10
4th-5th	3607	16.8	366	9.86
5th-6th	<b>5802</b>	<b>26.9</b>	1587	3.66
Outer 6th	5177	24.1	15548	0.33

Table by author, area information retrieved from Google maps, population information from Beijing Statistical Information, <http://www.bjstats.gov.cn/>.

### Economic Monocentricity

GDP per capita (RMB)



GDP of districts in Beijing.  
Map by author.

### Functions Divided by Distance to the Center

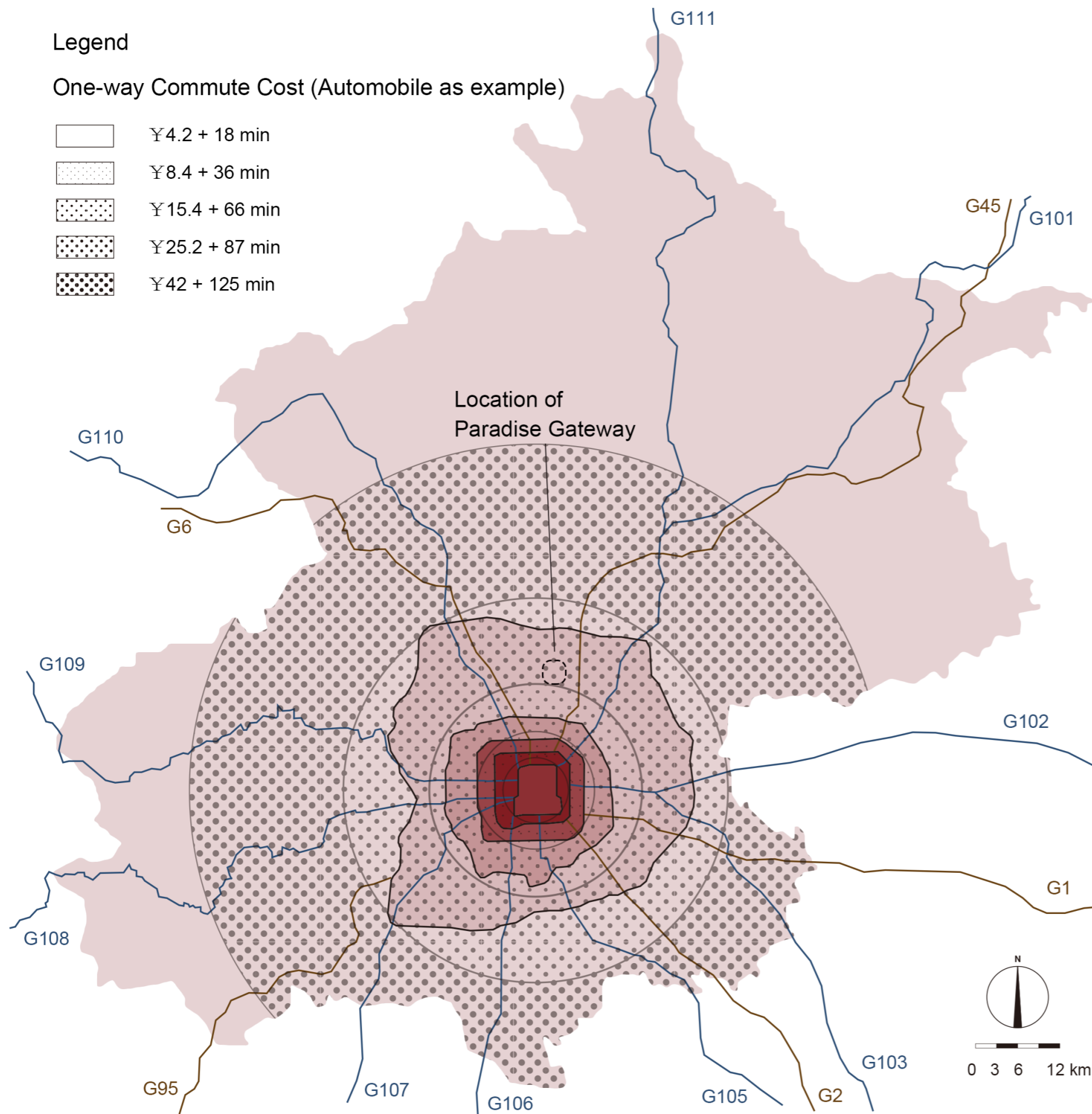
The map on the left shows the average GDP per capita. The bluer color shows a district with higher average income citizens are located. Beijing's economic structure is also monocentric. The two core districts, west and east inner, have the highest income among the whole municipality, followed by the 8 major districts. Paradise Gateway is in the third echelon, the suburb districts. Unfortunately, it is the district of the lowest income, as the main role of this district is housing.

### GDP Difference between Districts

Districts	GDP per capita (RMB)	GDP (billion RMB)	Population (thousand)
West Inner	251957	327.04	1298
East Inner	205282	185.78	905
Shunyi	141265	144.09	1020
Haidian	124892	461.35	3694
Chaoyang	117325	464.02	3955
Daxing	101895	159.16	1562
Shijingshan	65982	43.02	652
Huairou	60990	23.42	384
Fangshan	53031	55.47	1046
Fengtai	50340	116.99	2324
Miyun	47328	22.67	479
Mentougou	46916	14.45	308
Pinggu	46383	19.62	423
Tongzhou	43142	59.45	1378
Yanqing	34188	10.74	314
Changping	33484	65.73	1963

Table by author, GDP information from Beijing Statistical Information, <http://www.bjstats.gov.cn/nj/main/2015-tjn/indexch.htm>

## Future migrants will still arrive at PG and other mega-communities



Population density overlapped by commuting cost. Map by author.

The reason why the drifters chose to settle down along the 5th ring is that it is the zone of both affordable land price and lower commute cost. This is caused by the monocentric attraction. If more migrants are arriving, their choice of residence shall be the same. If the regional structure remains the same, the problems of Paradise Gateway and other mega-communities will become even worse.

## Mixed influence

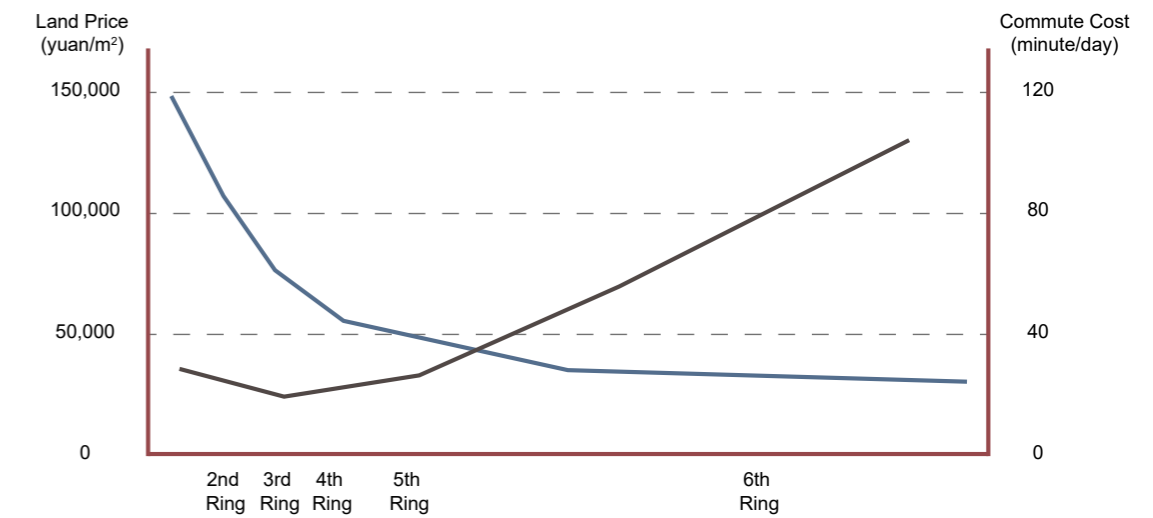


Diagram by author.

## Monocentric Attraction

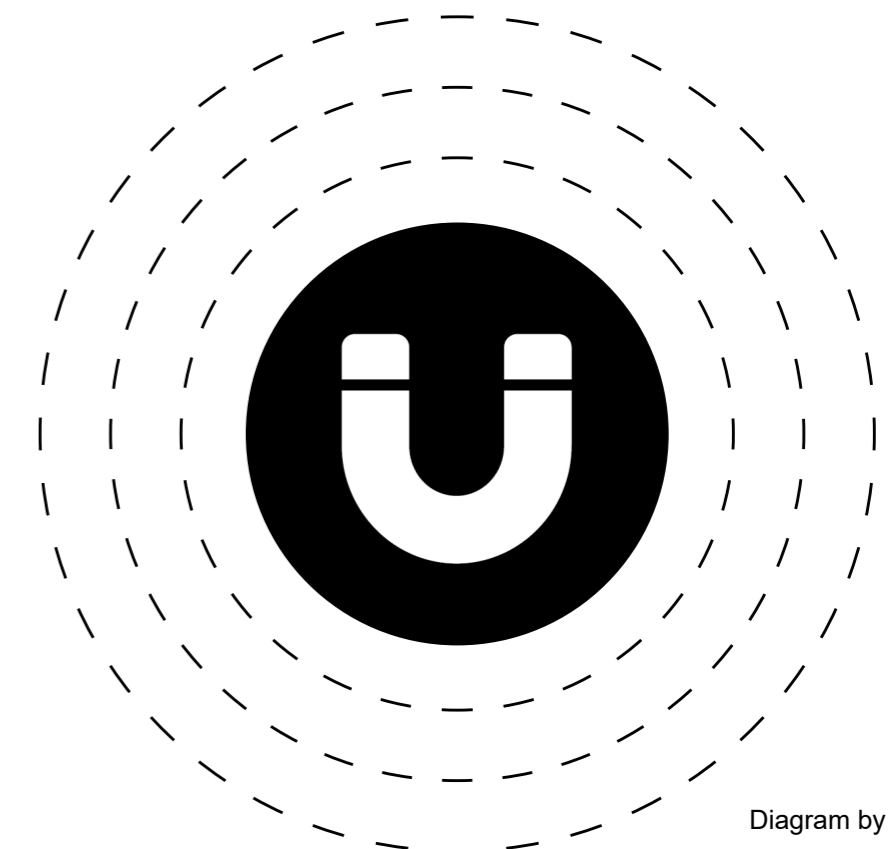


Diagram by author.

## Conclusion of last chapter

Rapid urbanization has been happening in Beijing in the last 70 years, of which the outcome is a huge amount of migrants. According to Urban land market theory (Alonso, 1964), affordable housing locates at a certain distance to the center in a monocentric city. High land price in the center pushes migrants out to the mega-communities, which is the reason why Paradise Gateway is overcrowded.

# 5. Proposal Regional Vision

to overcome overcrowding by the development of an functional polycentric model

Beijing

Langfang

Focus of scale in this Chapter

I. Local scale

II. Urban scale

III. Regional scale

- Goal: Polycentricity
- Current centrality and flow
- Challenge and Opportunity
- SY and CP New Town
- Strengthen CP as a sub-center
- Complementary cohesion belt
- Vision for intermedia structure
- Adapt to Paradise Gateway

## 5.1. The Goal: Polycentric Metropolitan Structure

The reason of being of Paradise Gateway and its problems is the persistent monocentric metropolitan structure, which causes the drifters to gather in the 5th ring. The hierarchical metropolitan structure categorizes people into classes, which is a ladder of power and wealth. Everyone, including local and migrants, is crazy to climb higher or nearer to the center. However, the ceiling made of Hukou (citizenship registration mechanism) and the land price keeps most migrants out of city center. New towns, compared to the center, do not have the enough functional attraction to the migrants. Houses are for people live in, but not for money making. In order to fight against the hierarchical structure, the goal is a healthy polycentric network, which can balance the flow of migrants. Without this, any intervention made inside the community cannot work in the long term.

Current Monocentricity with C Zone

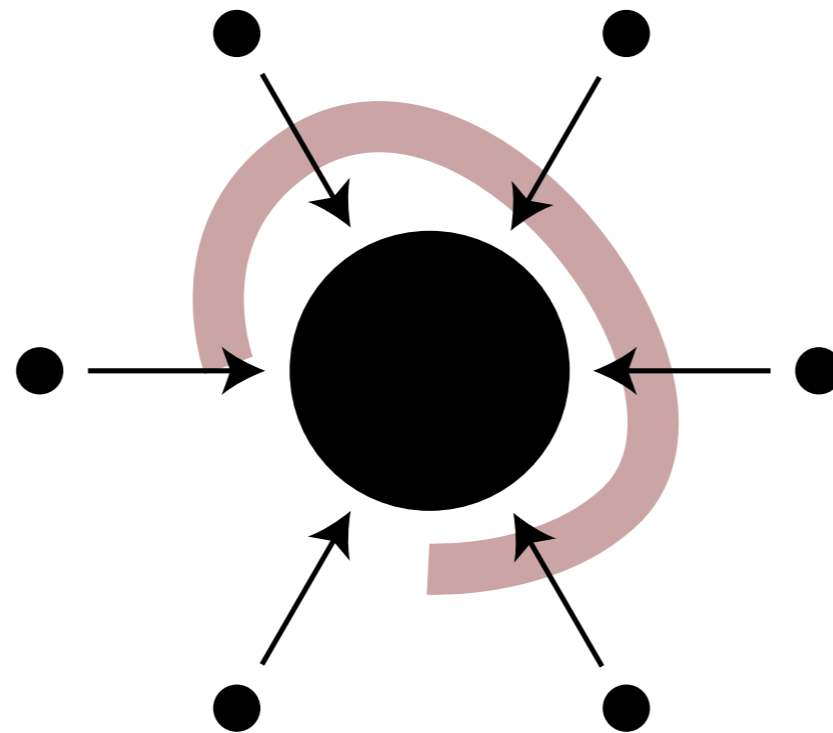


Diagram by author

Hierarchical Metropolitan Structure as a Ladder

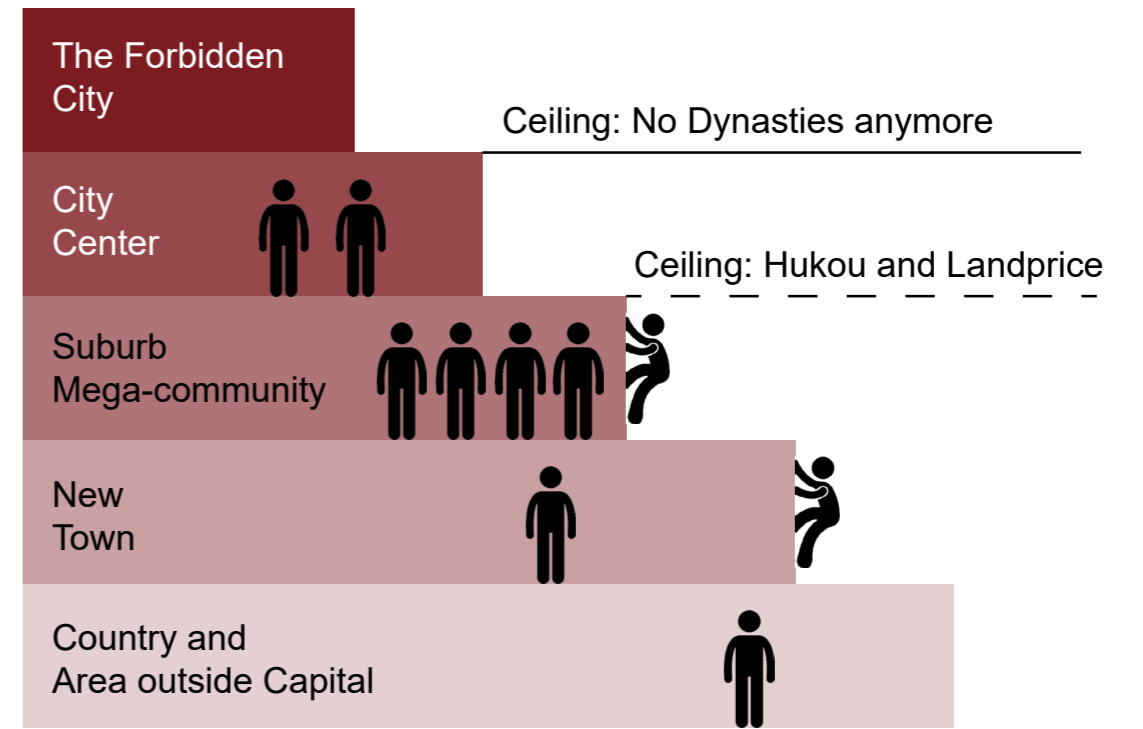


Diagram by author

The Goal: Polycentric Network

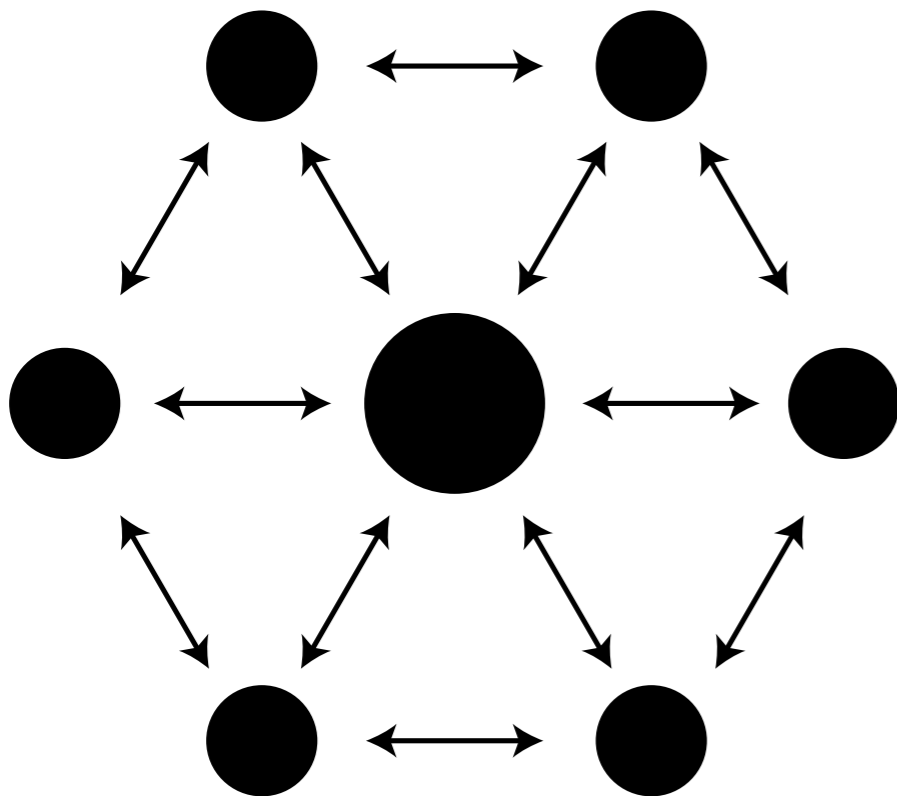


Diagram by author

As in land price model: New peak at the new towns makes PG at valley

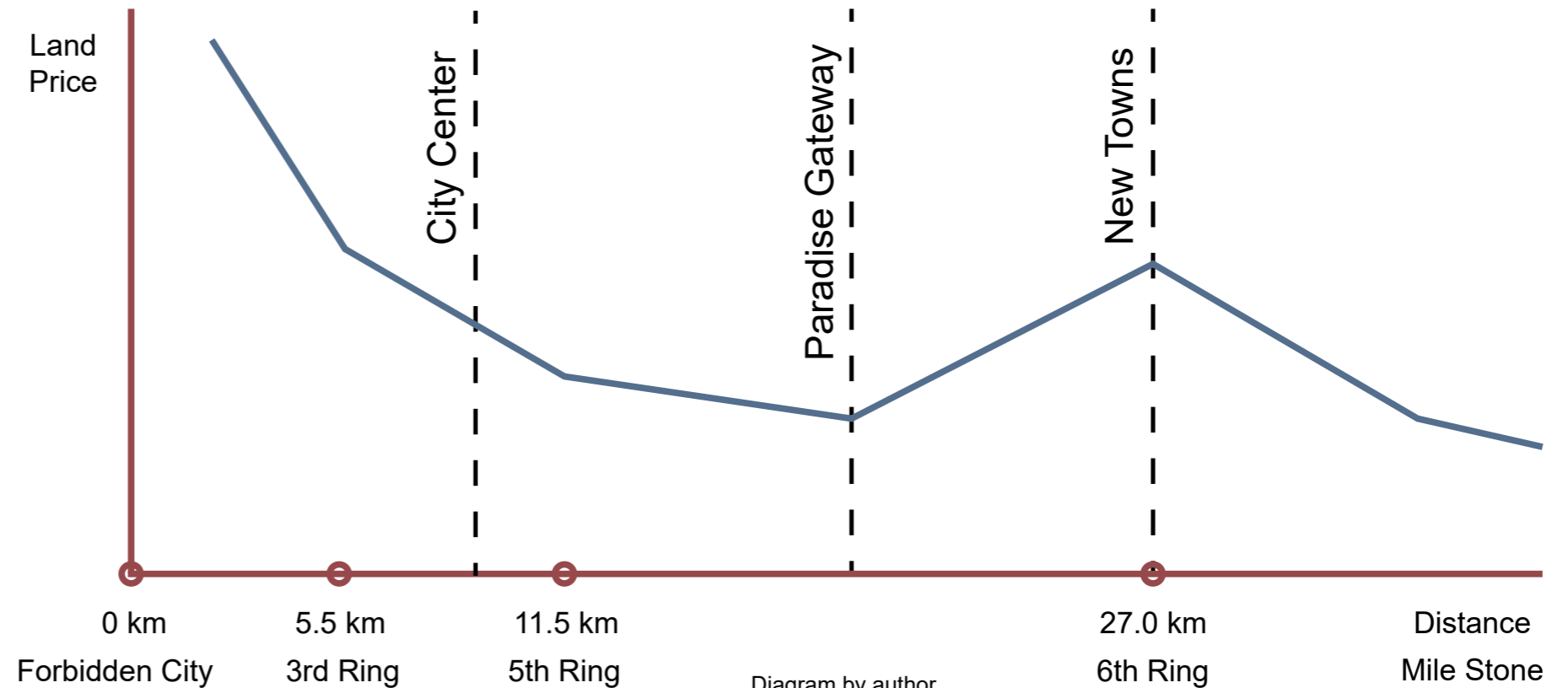


Diagram by author

## 5.2. Literature Review of Polycentricity:

### Counteract on tidal commuting and concentrated overcrowding

In conclusion of the regional analysis, overcrowding and mobility collapse of Paradise Gateway and other mega-communities are caused of the monocentric structure of Beijing. According to Urban land market theory (Alonso, 1964), affordable housing locates at a certain distance to the center in a monocentric city. High land price in the center pushes migrants out to the mega-communities, which is the reason why Paradise Gateway is overcrowded. Huge radial commuting is generated between residential zone and workplace in the center. In order to fundamentally solve the the overcrowding and mobility collapse of Paradise Gateway, a shift must be made from monocentricity to effective polycentric structure in the regional scale.

#### The Goal of Polycentric Development

As is explained by Waterhout (2005), the goal of polycentric development is a combined objective of cohesion and competitiveness, which is hard to separate one from another. Cohesion focuses on reducing the geographical imbalance in a urban system, and on the other side, competitiveness aims at fostering cooperation between multiple cities as a functional entity. Coincidentally, the network metaphor is mentioned in a variety of European countries' planning policies, which indicates for unity and synergy of a region (Meijers, 2004). The statues that synergy tries to achieve is  $1+1>2$ , which means a network of cities may stronger than the sum of parts.

According to Burger and Meijers (2012), balancing the internal centrality of centers can be reached by either decrease the core's nodality or increase other centers' external centrality and internal flows,

$$C_{ci} = N_c - C_{ce} - L_c$$

$N_c$  represents the total employment in center  $c$ ;  $C_{ci}$  represents the incoming commuting in center  $c$  from places situated within the city region;  $C_{ce}$  represents the incoming commuting in center  $c$  from places situated outside the city-region, and  $L_c$  represents the number of employees in center  $c$  that also live there. In this,  $C_{ci}$  and  $C_{ce}$  add up to the total centrality of a center.

**In other words, to decrease unwanted radial commuting  $C_{ci}$  of the city center,  $C_{ce}$  should be increased in this case of Paradise Gateway (outside the center), which means to increase the centralities of the surrounding sub-centers in the region.**

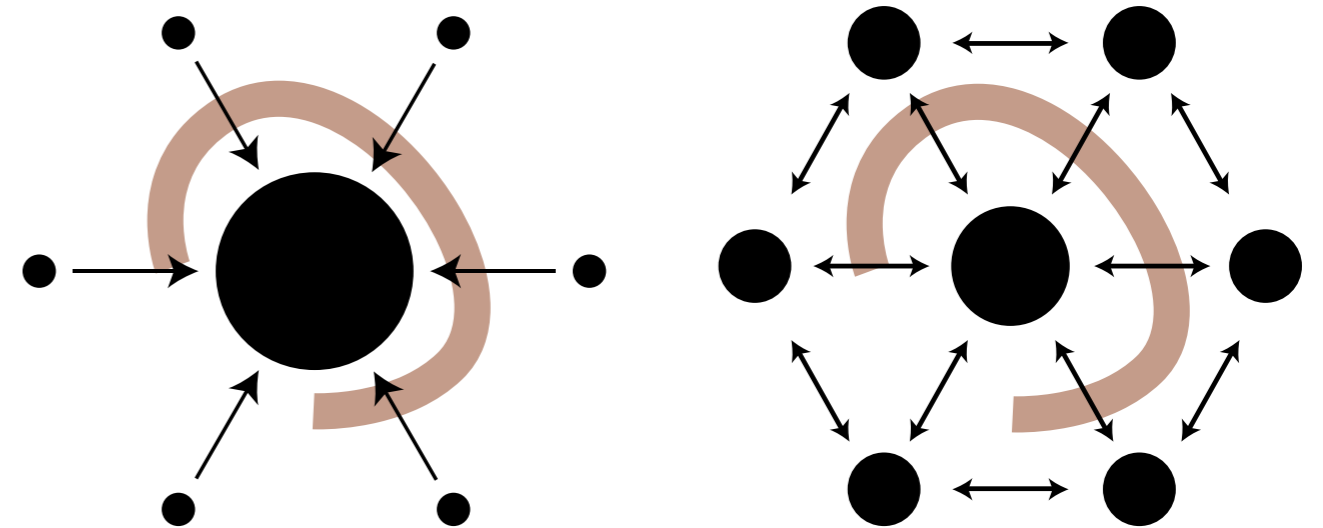
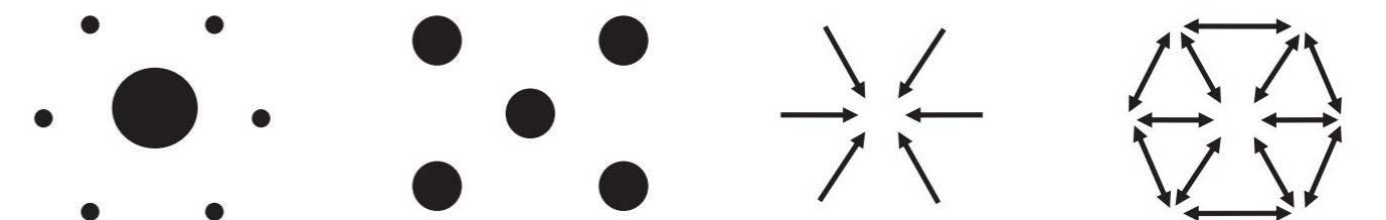


Diagram by author

**The 2004 Master Plan of Beijing has made polycentric development Model as the core principle. Planners try to fight the current problems by introducing a polycentricity vision to the whole urban system. However, the 2004 Master Plan only realized a morphological polycentricity, but was not articulated by a functional one (detail see Appendix II: Theoretical essay). In order to form a cohesive network of centralities to counter tidal commuting and concentrated overcrowding, polycentricity must reach by articulating the functional level.**

#### Morphological polycentricity versus functional polycentricity

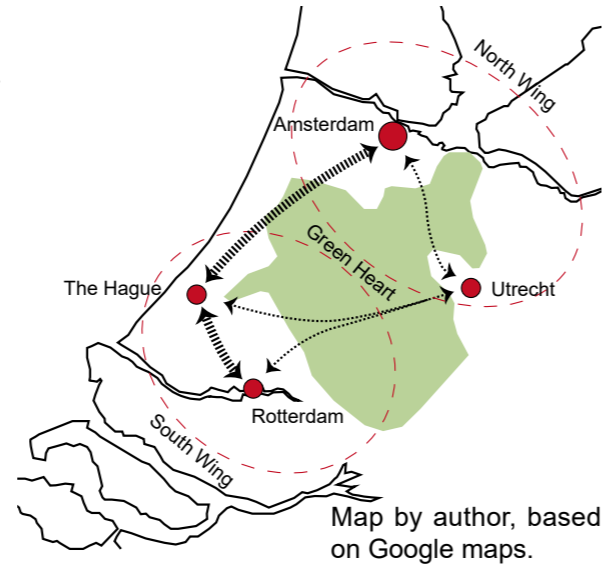


Morphologically Monocentric Morphologically Polycentric Functionally Monocentric Functionally Polycentric

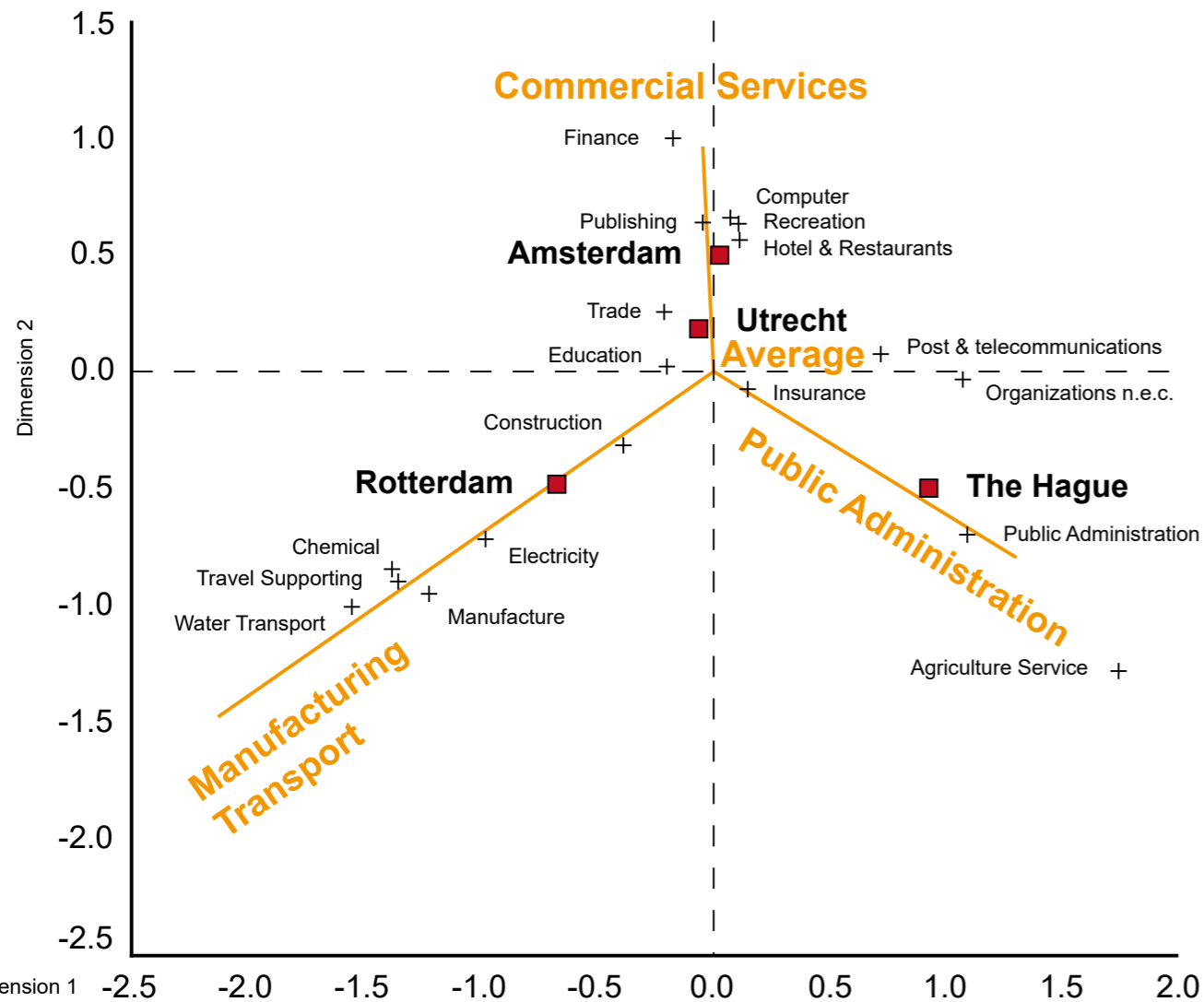
Morphological polycentricity versus functional polycentricity. Source: Burger, M., & Meijers, E. (2012). Form follows function? Linking morphological and functional polycentricity. Urban Studies, 49(5), 1127-1149.

### Case Study - Randstad

It would be interesting to compare Beijing to Randstad, which have similar area and population. Randstad is recognize as a highly functional polycentric metropolitan area (Hall, 2005), where the four major cities have their own distribution on economic activities. Amsterdam specializes in commercial services, The Hague in public administration and Rotterdam in manufacturing and transport. On a deeper level, different functions ensure a balanced transportation demand on the quadrangle infrastructure. In simple words, no tidal flow of traffic.

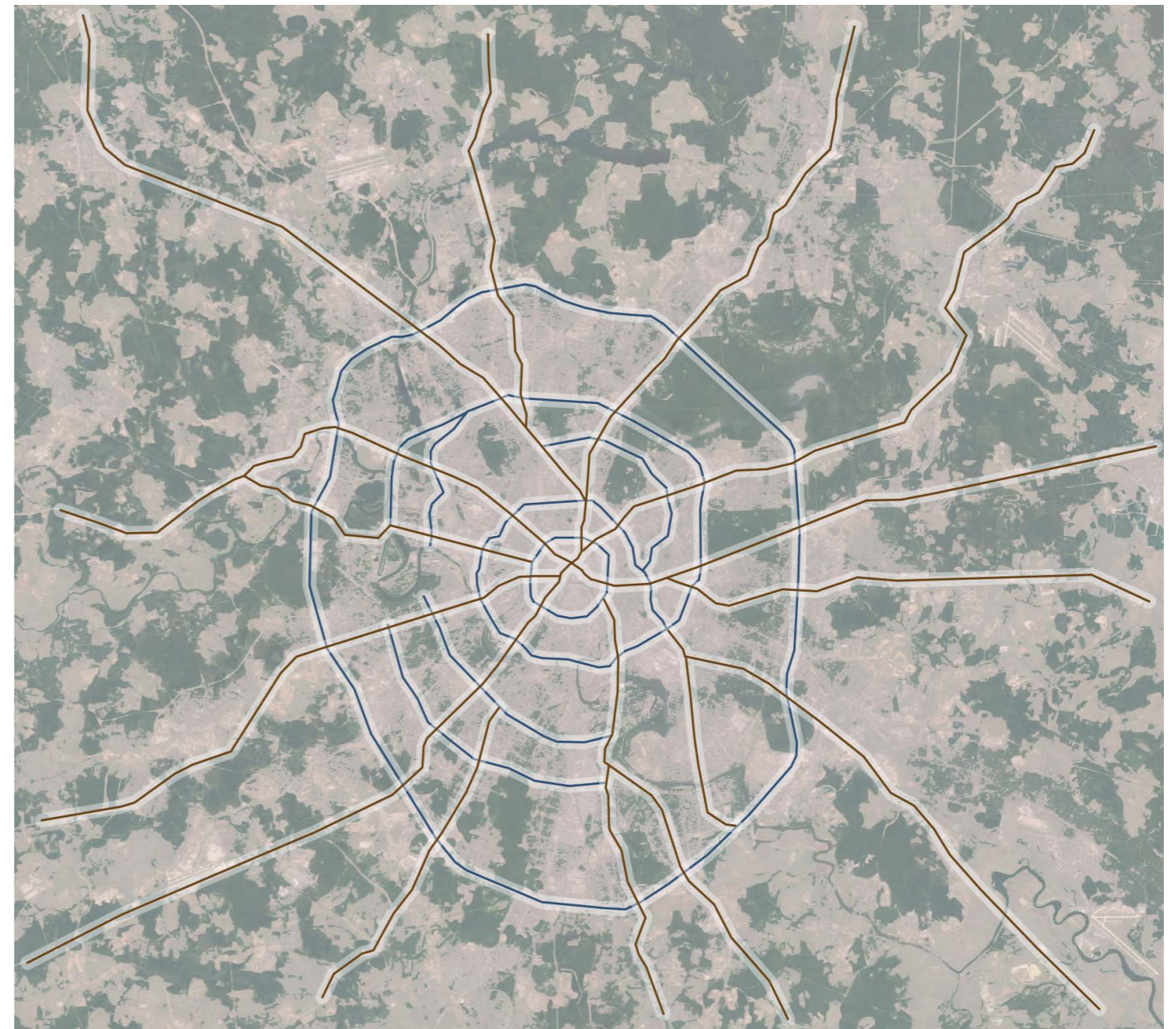


### Case Study: Distribution of Economic Activities in Randstad



Meijers, E. (2005). Polycentric urban regions and the quest for synergy: is a network of cities more than the sum of the parts?. Urban studies, 42(4), 765-781.

### Case Study - Moscow



Map by author, based on Google maps.

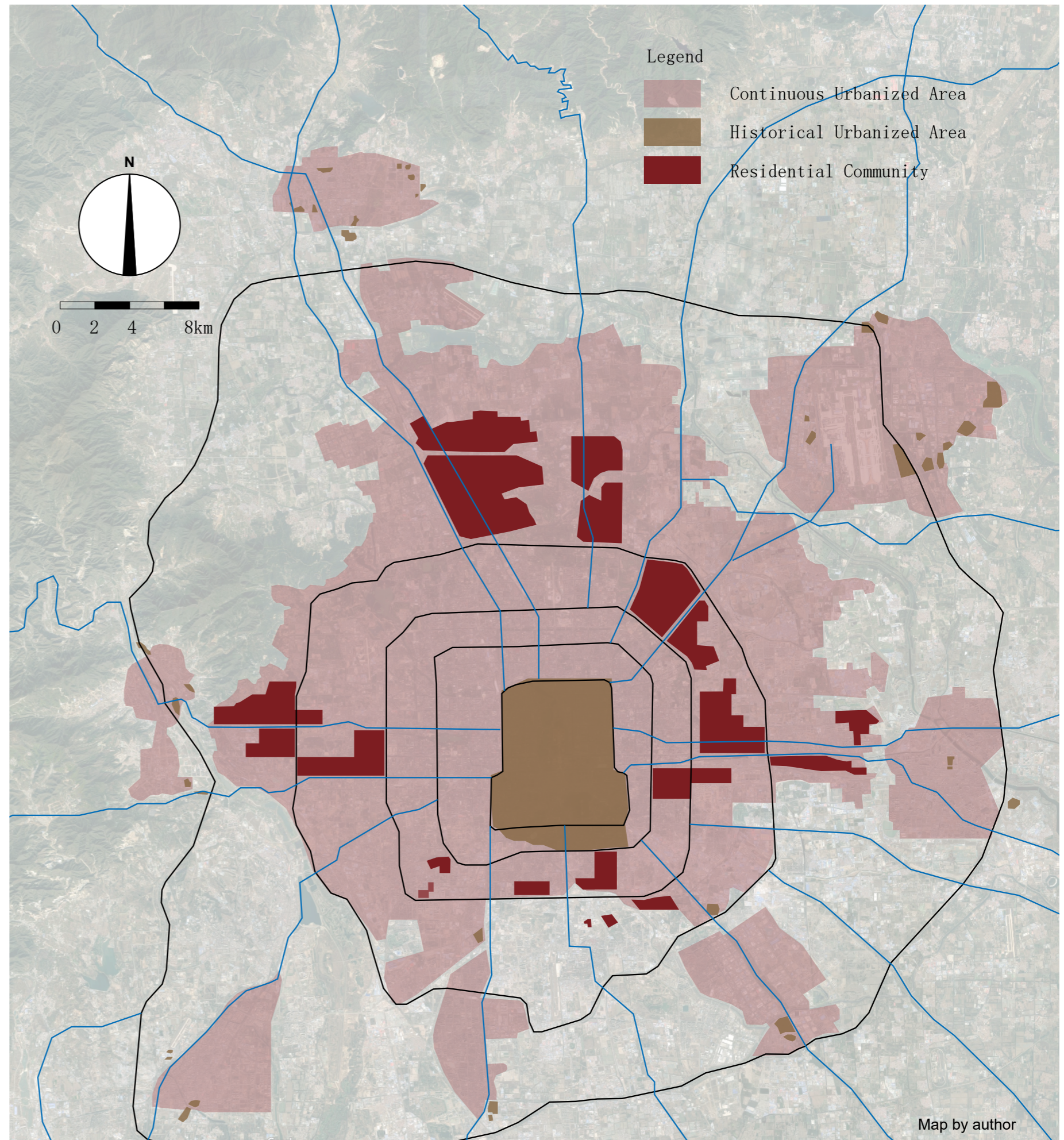
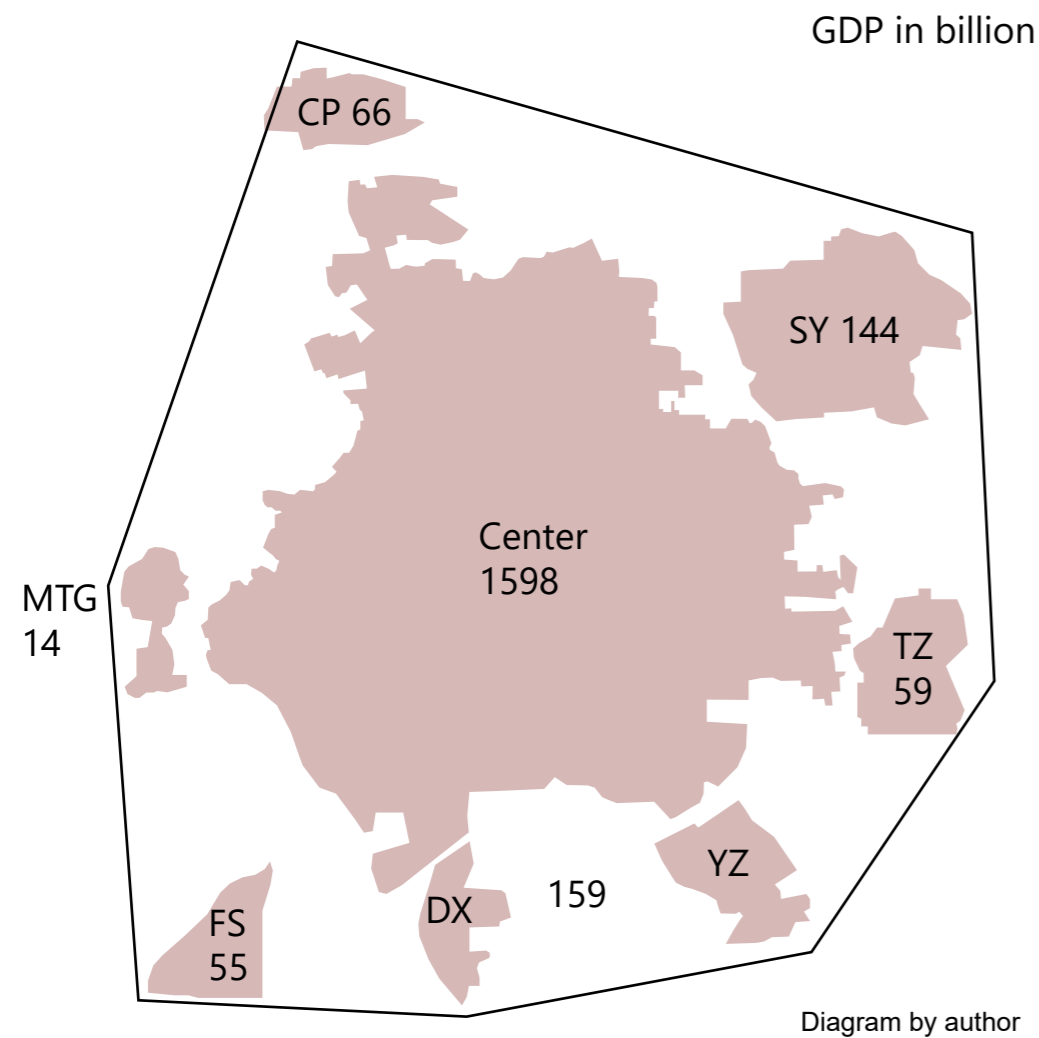
### Morphological polycentricity versus functional polycentricity

Metropolitan Area	Morphological	Functional
Randstad	Polycentric	Polycentric
Moscow	Polycentric	Monocentric
Beijing	Monocentric	Monocentric

### 5.3. Current Monocentric Structure

By tracing the continuous urbanized area, the scale difference between the center and the new towns is showed. Although they are called new towns, they have been urbanized as the marketplace of the county for centuries. 04 master plan has made them new towns of the city, which brought development. Even so, they do not have functional mix, which compared to the center, are not even close. Metropolitan area of Beijing is a textbook monocentric structure, just like the diagram. The huge gap between the centrality of the center and new towns caused the appearance of concentrated residential community in the middle. These communities are suffering from overcrowding. To counter overcrowding, new towns should be more inviting by increasing their multi functionality and provide employment. The way towards that is polycentric development Model. Expected outcome is a healthy network of centers and equity in accessible services.

#### Administrative Hierarchical Threshold

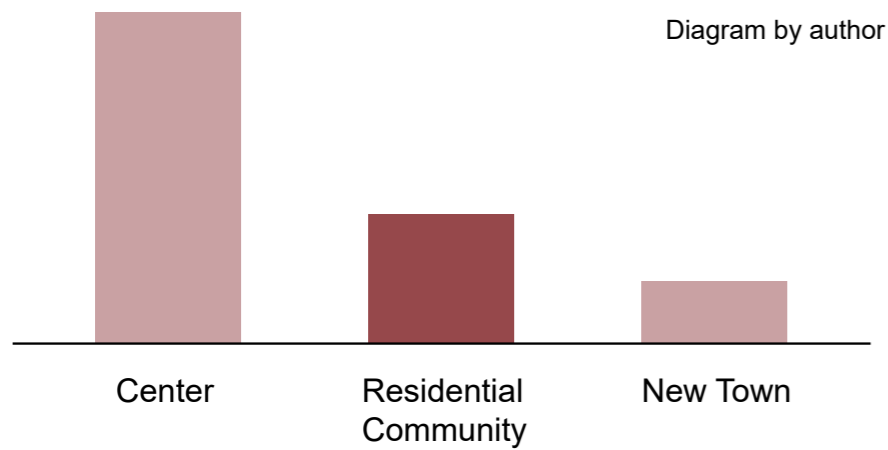


## Ring Structure of Centralities

Much focus has been paid on the monocentricity and the plan for new towns in the past decade. Kong (2005) illustrates that the new towns have low attraction, which leads to a huge development gap between them and the center. Li (2003) points out that the new towns do not have a clear own role in the metropolitan area, where the planning is a blind copy of other cities.

The first ring contains the centers of highest mix uses, following by the communities. Although the communities are mainly residential, they provide considerable employments within the area. The outer ring of new towns, compared to the other two, have the lowest level of mix use. While new towns are underdeveloped, the center is suffering from overcrowding. The reason behind is that the new towns are only general market sub-center of its surrounding area, without a clear role of function. Such sub-centers cannot compete with the city center, as a result, the communities highly rely on the city center functionality.

### Current Nodality



### Goal Nodality

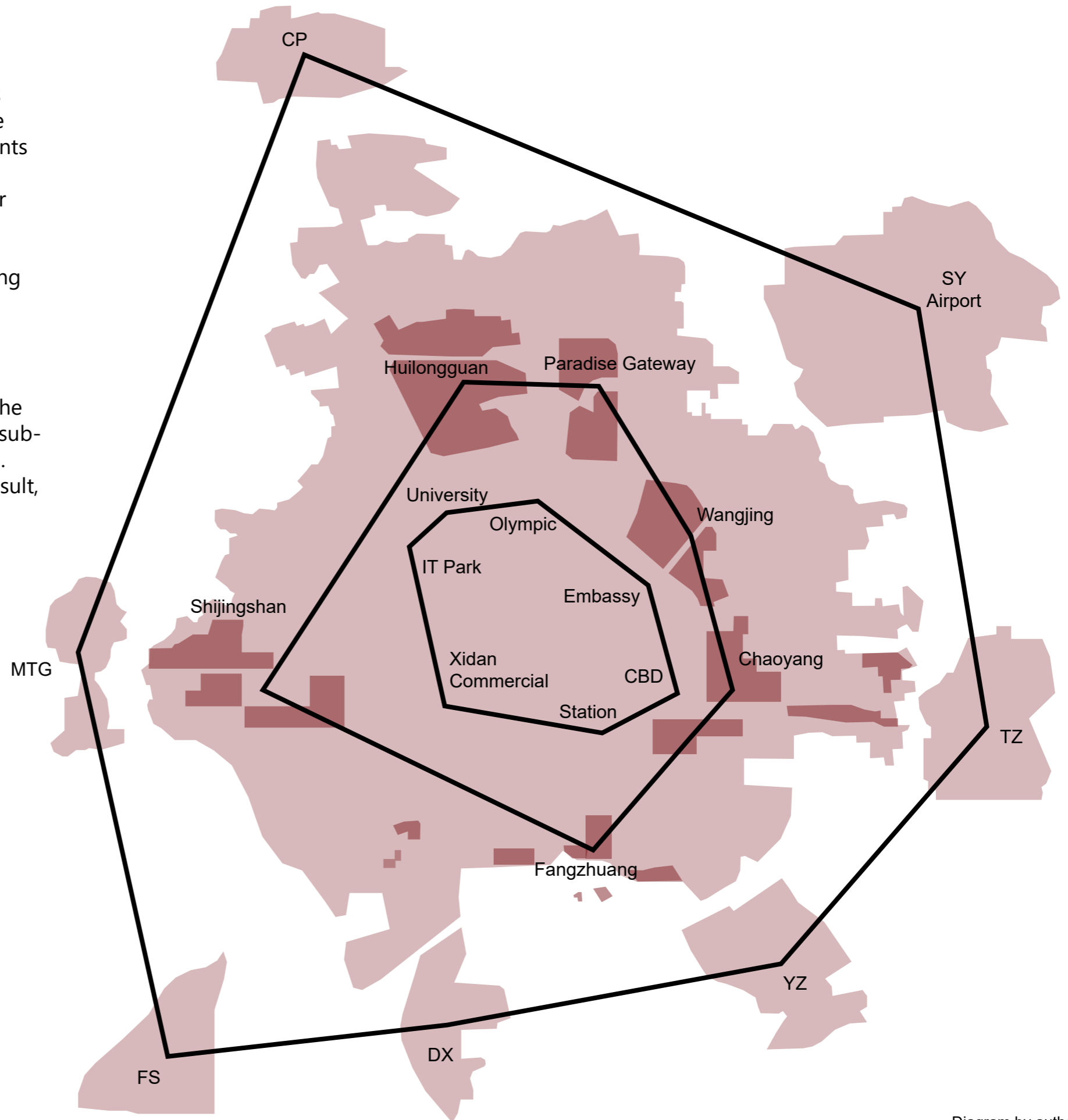
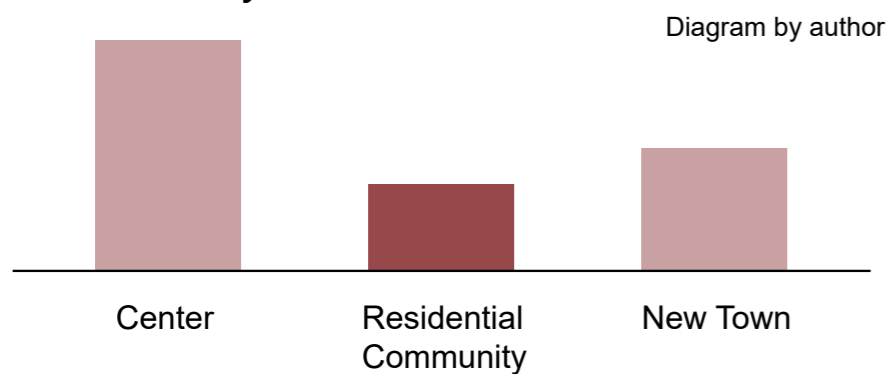


Diagram by author

## 5.4. Current Policy Analysis:

### Promotion of new towns under 2004 Master Plan of Beijing

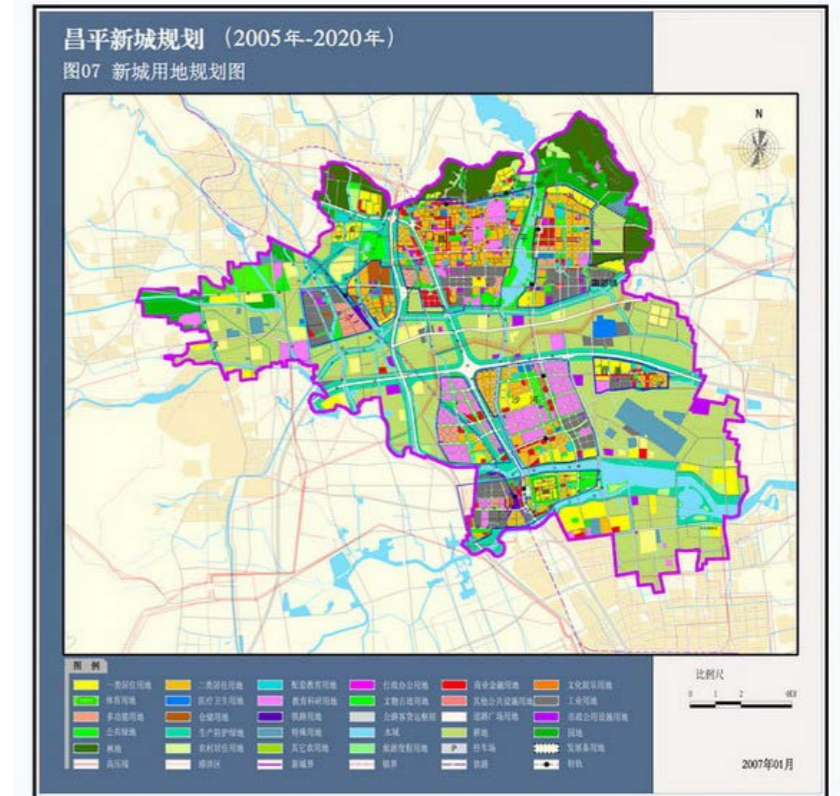
11 new towns, surrounding the center, were promoted by 2004 master plan of Beijing. 2004-2020 master plan is the current valid plan, it was a revised version from the 1991-2010 plan. Conforming to the 11th (2006-2010) and 12th (2011-2015) five-year plan, the main goal of 2004 master plan was a proposal to coordinate five systemic interrelations: between urban and rural, center and surrounding, social and economy, human and environment, domestic and foreign. In the chapter of urban spatial structure and urban-rural coordination, 2004 master plan set the structure of two-axes, two-belts, and a polycentric structure.

Article 22.1 stated that the range of city center includes the mega-community Paradise Gateway and Huilongguan with the area of 1085 square kilometers. From the perspective of Paradise Gateway, serving as the largest

residential community of the central area stimulated the growth and caused the current problems.

Article 22.2 mentioned that the 11 new towns are promoted from the traditional satellite cities to redistribute population from the center. These new towns, surrounding urbanized area in the left page, are ShunYi, ChangPing, etc. Although the 2004 master plan built a vision of each new town and the polycentric model in Article 31 to 45, it was general and vague. Beijing municipal planning commission authorized 2005-2020 plans for each new town in 2005. However, the limit of jurisdiction resulted in the lack of cooperation between new towns and the center. As is mentioned, the current polycentricity is only a morphological one. Even till today, the size, population and GDP of new towns are still not comparable to the ones in the center.

### ChangPing New Town Plan (2005-2020)

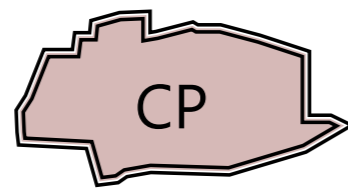


source: [http://www.bjghw.gov.cn/web/static/articles/catalog\\_431/article\\_7473/2009-10-27\\_1025503834851596\\_4270200999673730048.gif](http://www.bjghw.gov.cn/web/static/articles/catalog_431/article_7473/2009-10-27_1025503834851596_4270200999673730048.gif)

### ChangPing New Town

ChangPing became a city since 2178 BC, as a county of You state. It has went through all the dynasties. In 1984, modern urbanization started to build ChangPing into a satellite city of Beijing.

source: <http://www.cpweb.gov.cn/changping/lishi/201305135687.html>



### ShunYi New Town

ShunYi city established in 202 BC in Han Dynasty, as a county of Yuyang state. In 1958, Beijing capital international airport was built in ShunYi. Also in 1984, Shunyi became another satellite city of Beijing.

source: <http://www.bjshy.gov.cn/Item/42456.aspx>

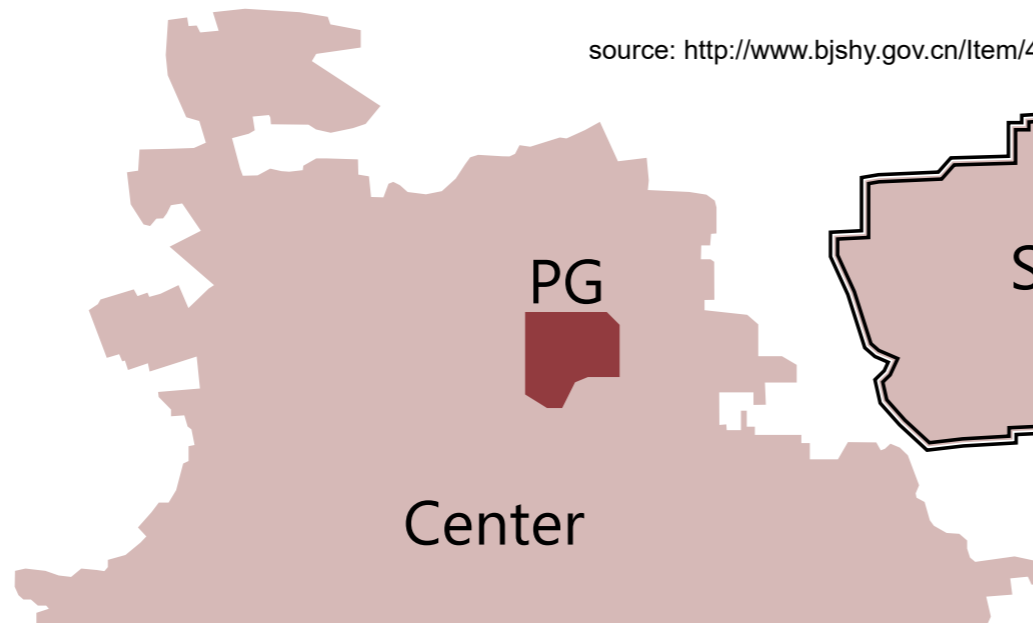
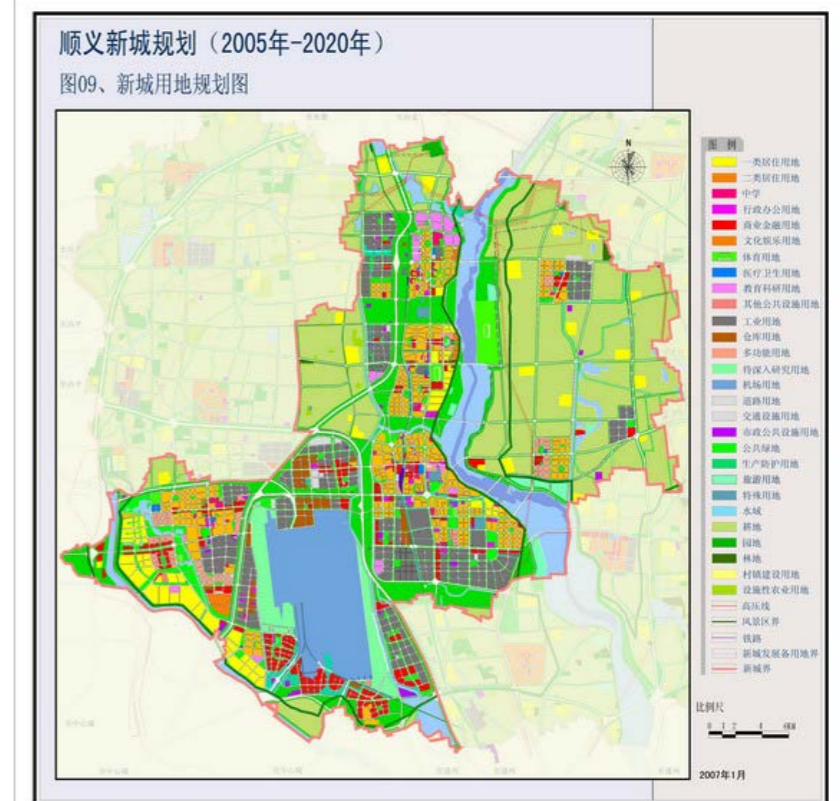


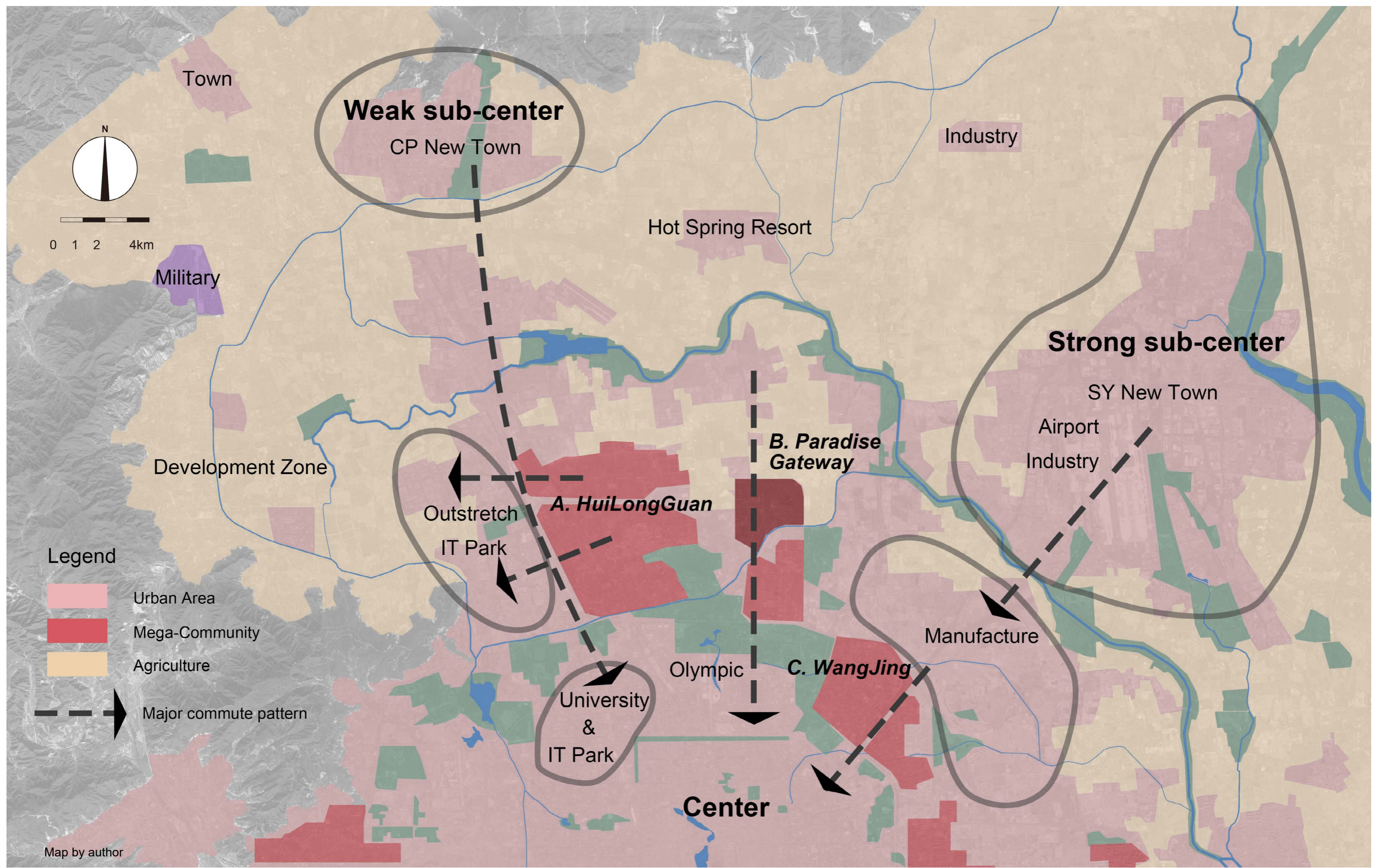
Diagram by author

### Shunyi New Town Plan (2005-2020)



source: [http://www.bjghw.gov.cn/web/static/articles/catalog\\_431/article\\_7480/2009-10-27\\_1025869880818596\\_3458163037137718272.gif](http://www.bjghw.gov.cn/web/static/articles/catalog_431/article_7480/2009-10-27_1025869880818596_3458163037137718272.gif)

### 5.5. Current major commuting pattern - Centripetal



## A. HuiLongGuan Mega-community



source: [http://upload4.hlgnet.net/bbsupfile/2011/2011-08-11/20110811120324\\_24.jpg](http://upload4.hlgnet.net/bbsupfile/2011/2011-08-11/20110811120324_24.jpg)

## C. WangJing Mega-community



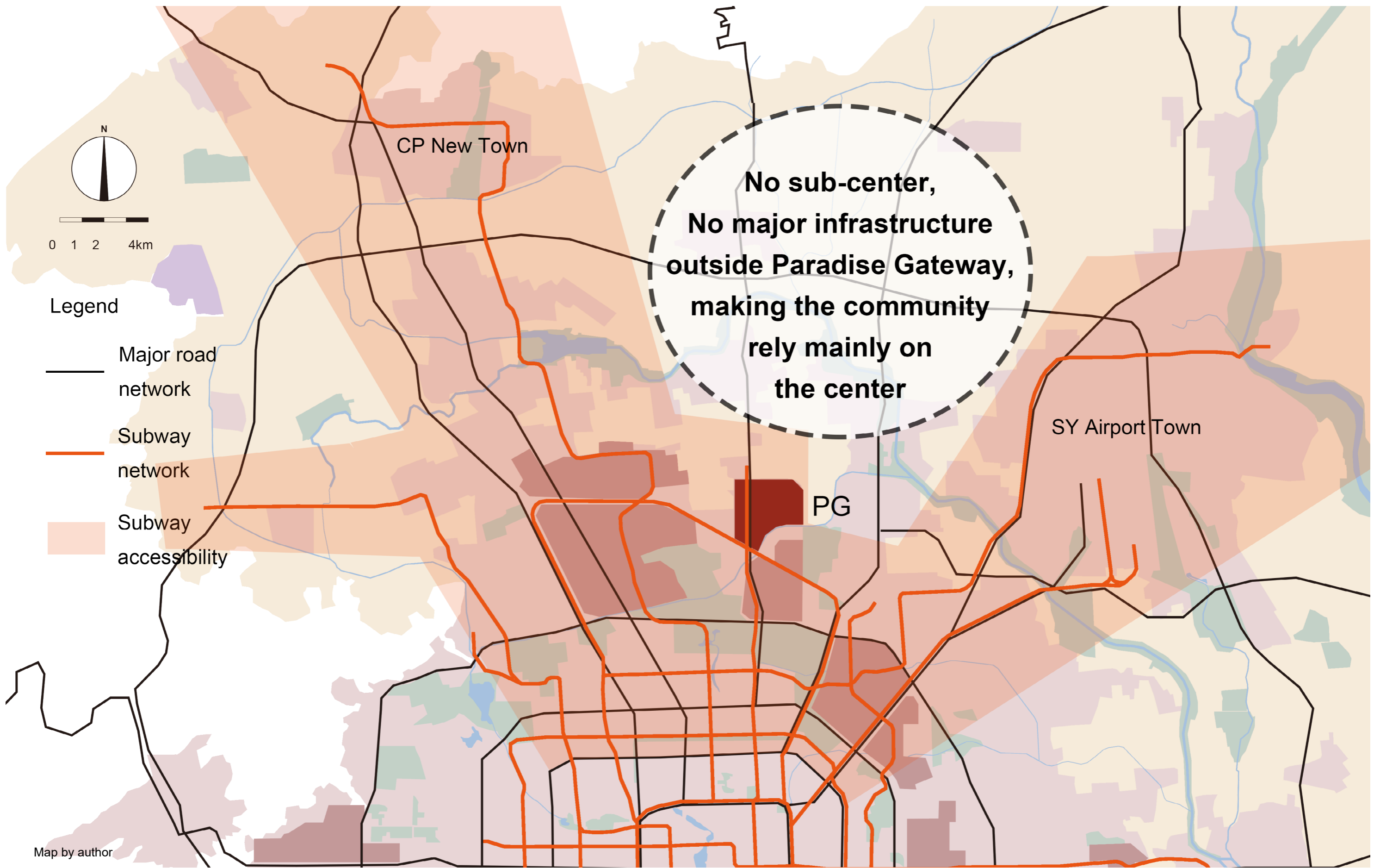
source: <https://wujie.tuchong.com/12770584/>

Zooming into the surrounding of Paradise Gateway, the mid-north part of Beijing, the most striking phenomenon is three major radial commuting corridors. As is explained earlier, the metropolitan model of Beijing is structured into a Ring-Radial system. The radials are a set of infrastructures to connect the city center and outer rings. Daily commuting follows this structure. Not surprisingly, there is a mega-community on each radial outside city center according to the urban land market theory. The names of the three mega-communities are HuiLongGuan, TianTongYuan (Paradise Gateway), and WangJing.

However, the three mega-communities have different characters. Paradise Gateway (700,000 inhabitants) is the specialized residential mega-community with extreme density. Residents of Paradise Gateway rely highly on the Beijing's city center for employment. HuiLongGuan (300,000 inhabitants) is also a specialized residential mega-community, but has a comparatively low density. The building height of HuiLongGuan is six-storey, which is the maximum height a building can be without an elevator according to Building Regulations. Another difference is that HuiLongGuan is next to the outstretched ZhongGuanCun IT park. Thus, HuiLongGuan has a lower dependency on the city center. WangJing (300,000 inhabitants), different from the others, has a strong business and service district within itself. WangJing Soho, Wal-Mart, IKEA and other malls and office buildings, Central Academy of Fine Arts and several universities, and the 798 art district can all be found in WangJing. WangJing is dedicated to becoming a full-functioned city, which allows a large part of residents to work at local.

The three mega-communities share one common purpose, which is to house the city center. HuiLongGuan and WangJing are midway between new towns and the city center. But Paradise Gateway, among the three, rely on the center to a high degree, which makes it unique.

### 5.6. Possible path toward an effective polycentric model



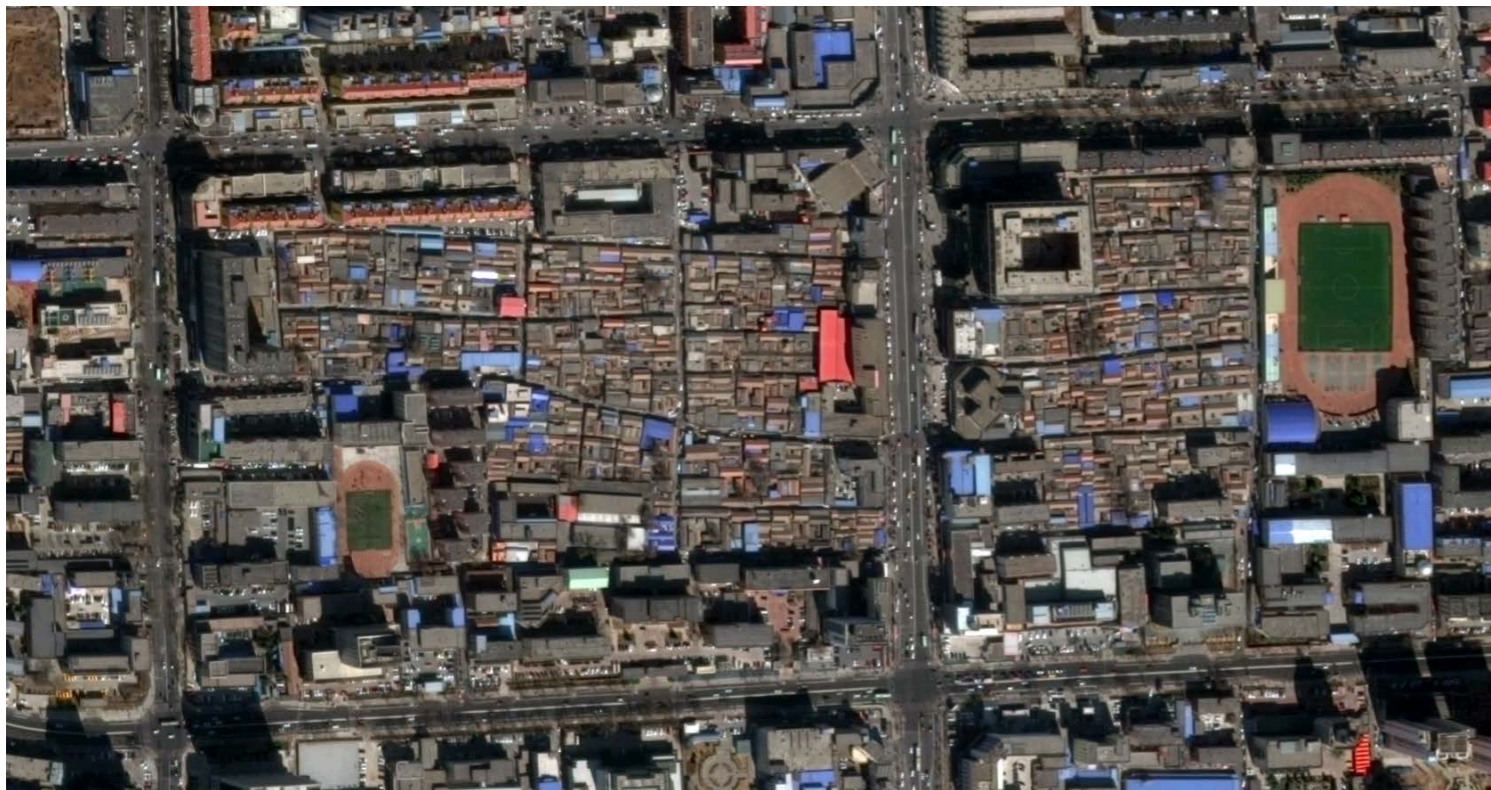
Map by author

## Historical area of SY (ShunYi) New Town



The historical area of SY New Town is to the west of the capital airport, source: <https://map.baidu.com>

## Historical area of CP (ChangPing) New Town



The historical area of CP New Town is surrounded by modern development, source: <https://map.baidu.com>

As is analyzed before, mega-communities are created to house the monocentric city of Beijing. In the current monocentric Ring-Radial model, the affordable housing is at a certain distance to the center. The reason why the former attempts to regenerate Paradise Gateway did not work is that the core cause of problems remain unchanged. In order to lower the population pressure and relieve the overcrowding of Paradise Gateway and other communities, an intervention must be applied on the regional structure.

According to Article 22.1 of 2004 master plan of Beijing, the task of Paradise Gateway is to house the center. As the center growing larger and higher, the population of Paradise Gateway has far exceeded its limit. A wise plan should be a far-sighted decision, other than narrow solutions. Monocentricity is the very core cause of the mega-communities. Thus, a regional strategy should be included in this urban regeneration project.

The goal of regeneration of Paradise Gateway is not simply restraining the population of the community by forcing people out. However, it can be realized by leading residents with employments. The city is a whole system where centralities interact with one another. By increasing the centralities of new towns, a functional polycentric structure will be created to lower the population pressure of Paradise Gateway and generate city-wide development.

Why not provide employment at local in the community? The community itself is fully constructed in an extreme density, where there is no space or capacity for a business centers or other economic activities. Why not build a new sub-center next to the community? Paradise Gateway is in the middle of two other mega-communities, and agriculture land to its north. The most promising intervention is to build on the current trend of new town development, under the goal of an effective functional polycentricity, and the need to recognize its transitional process need to be considered.

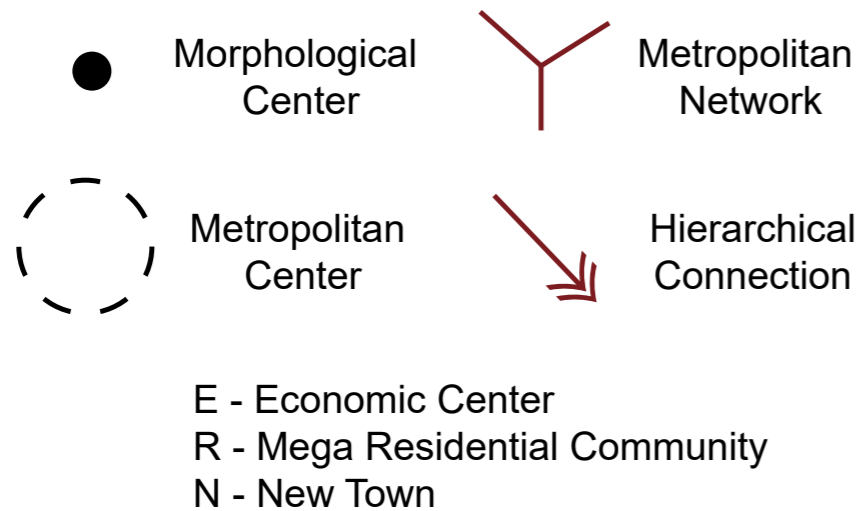
SY (ShunYi) and CP (ChangPing) new towns are within the intermedia scale of Paradise Gateway, which are all historic ancient cities over two thousand years. Despite their rich history and culture, recent developments, for instance the capital airport, have strengthened them. By given them a direction of a role in the network, a functional polycentricity will be reached in the intermedia scale of Paradise Gateway. This positive trend will be considered at the proposed approach, the value of intermedia scale functional cluster as a way to counteract the functional dependency on the main metropolitan cores.

## 5.7. The revise vision towards an functional Polycentricity

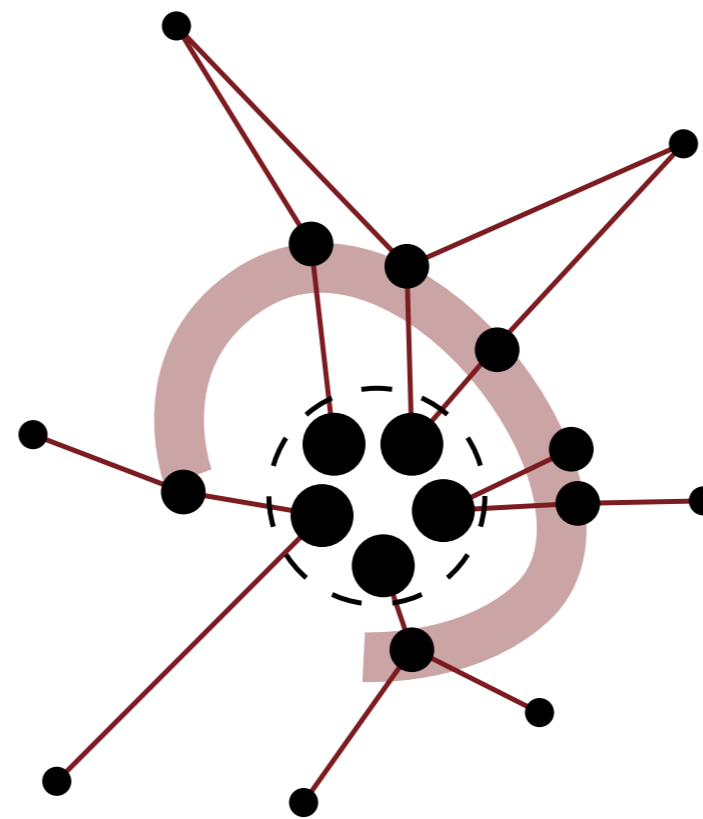
As is shown in the case study, the metropolitan area of Beijing shows a thig high level of monocentric functionality. Beijing cannot be the same as Randstad, considering that the population is too large compare to Netherlands. But Moscow managed to reach a morphologic polycentric structure with the same ring and radial model. That case shows hope. The land price model under the monocentric structure forces migrants to gather at the C zone, where the land price is affordable and the commute cost is acceptable.

On one way, the metropolitan pattern prevents mega-residential communities from becoming full-functioned sub-centers. A hierarchy of centers has been set inside out. On the other, local communities are not realizing that the problems they are suffering from are caused by the monocentric structure. Their role in the metropolitan is the residence. They blindly follow the path, grow larger and higher, until the traffic and service capacity are far behind from need. Till here, the urban context of Paradise Gateway is fully revealed. The dilemma of the community is inter-caused by a hierarchical monocentric metropolitan structure and uncontrolled short-sighted community development. Some of the cases studied, also shown more diverse functional roles and manage better to reach certain levels of functional identities, that allow more mix used and reduce the dependency on the main metropolitan cores.

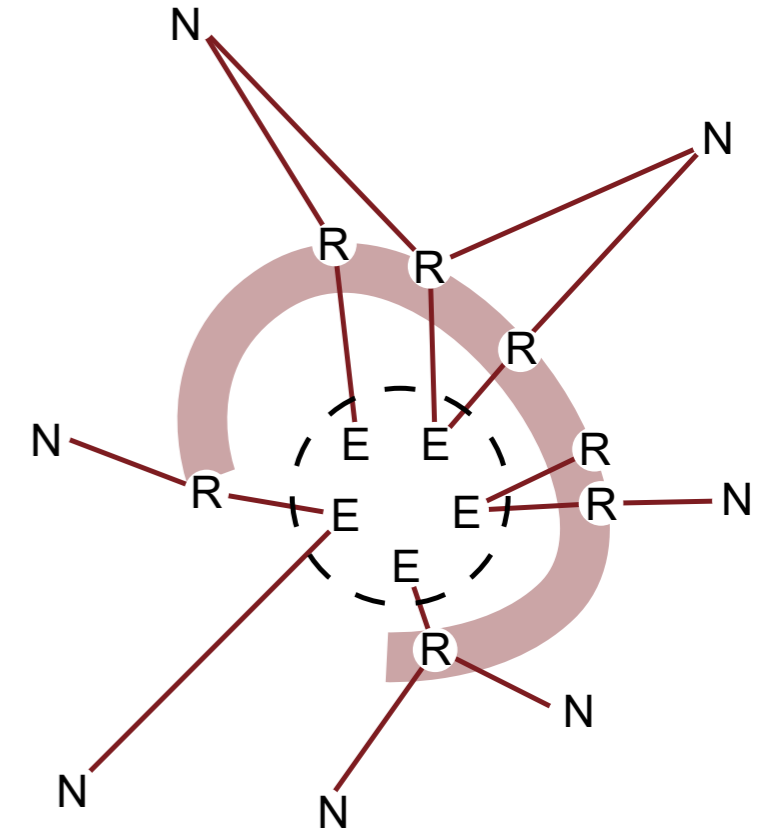
### Legend



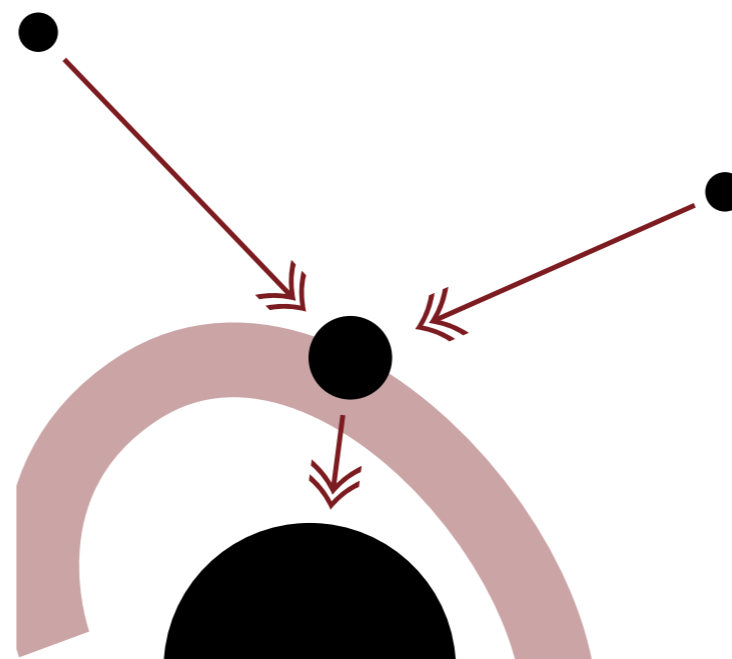
Morphological Metropolitan



Functional Metropolitan



Morphological Community



Functional Community

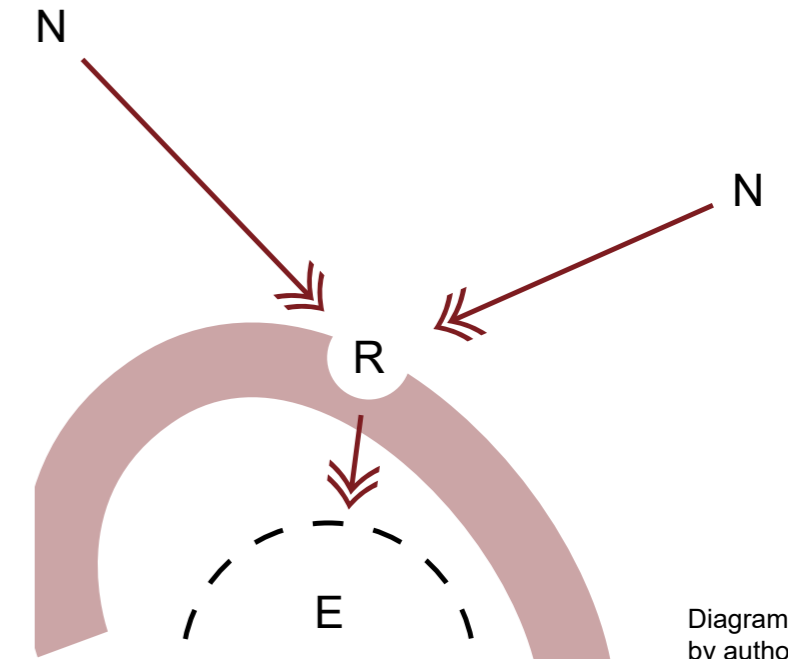


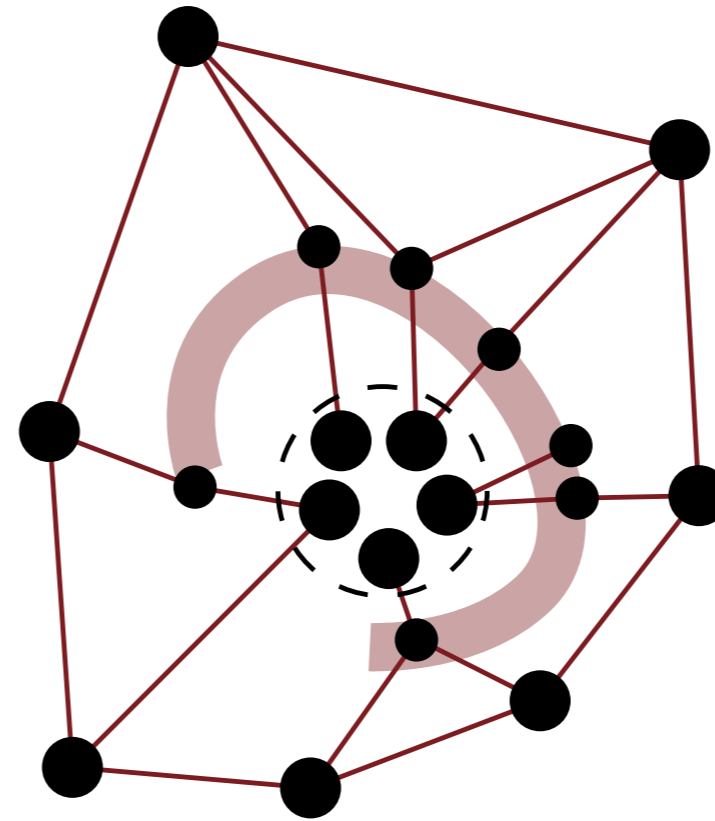
Diagram by author

## Goal: Polycentricity

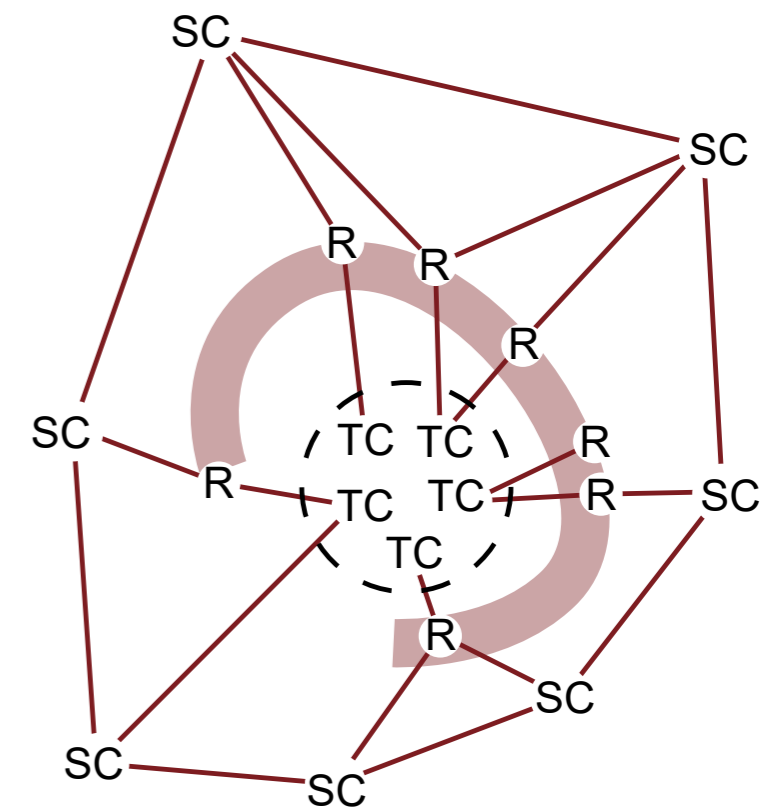
The overall goal of this project is to solve problems mentioned before, express on the relation of an emerging metropolitan polycentric model and the transition at the first new town with still shows a clear dependency on the strong functional nodes. So the proposal is articulated recognizing the interdependency of the new polycentric model and the urgent needs of the residential new town for urban regeneration. For metropolitan strategy, both morphological and functional polycentricity should be realized by balancing the network and optimizing the pattern of its interrelations. Instead of being at the bottom of hierarchy, new towns are developing into important sub-centers.

Thus, mega residential communities in the C zone can generate interactive connection both inner and outer, by planning new corridors. This meant on one hand a recognition of the intermedia scale systems so to facilitate more local interactions at the sub-cores. On the other the proposal considers the value of the formation of commercial clusters and recreational ones inside the community, this can provide local employment and recreation, in order to decrease the need for the commute. Considering this three levels a new urban regeneration plan can be structure, so to facilitate the more effective Metropolitan structure and at the same time gave direct guidelines for the community regeneration within the process of consolidating a functional poly-centricity at each level.

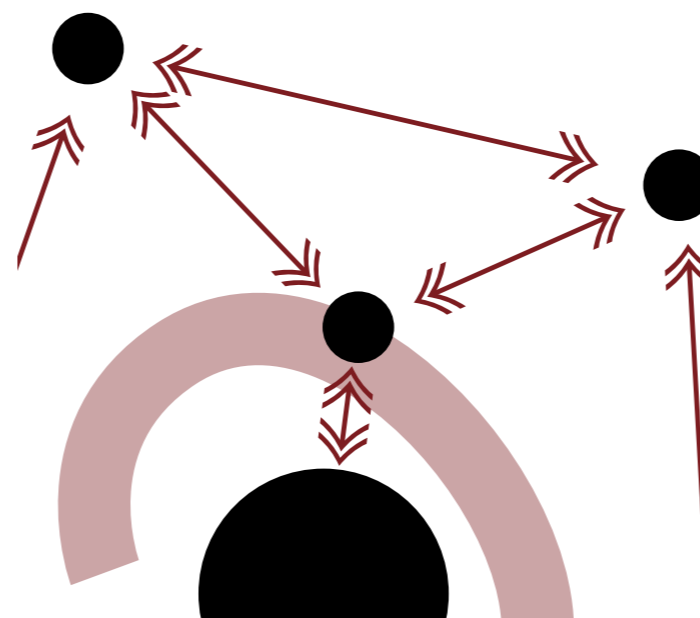
Morphological Metropolitan



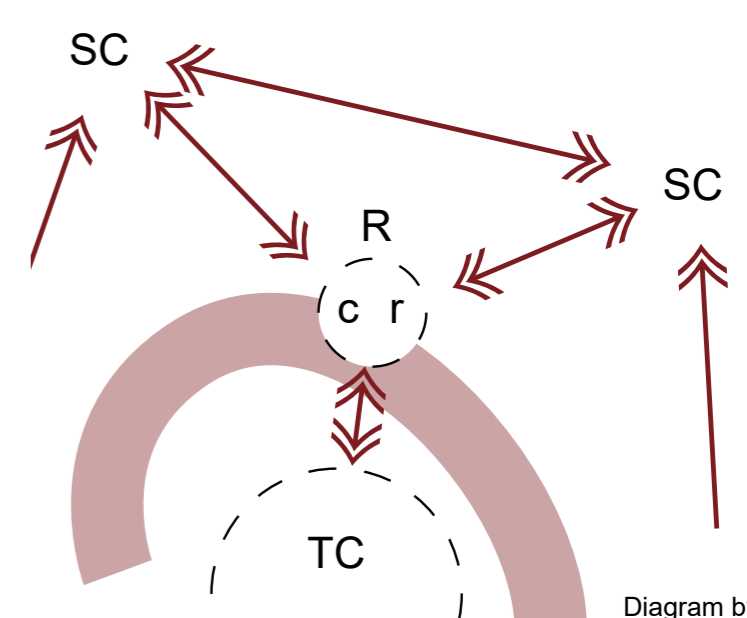
Functional Metropolitan



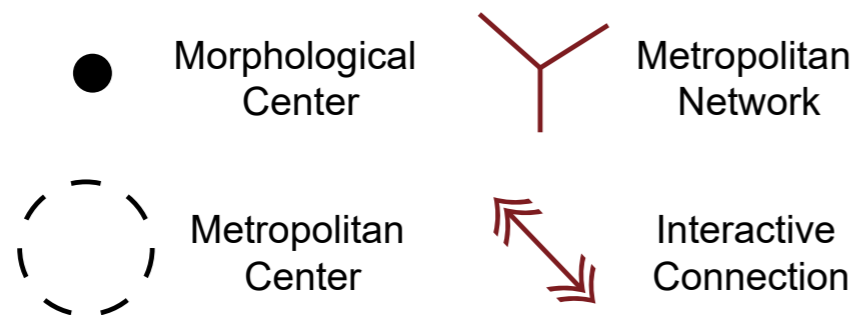
Morphological Community



Functional Community



### Legend



TC - Traditional Center  
 R - Mega Residential Community  
 SC - New Town as Sub-Center  
 c - commercial group  
 r - recreation group

Diagram by author

## 5.8. Case study: Successful ShunYi new town exploring positive externalities and the conditions behind them

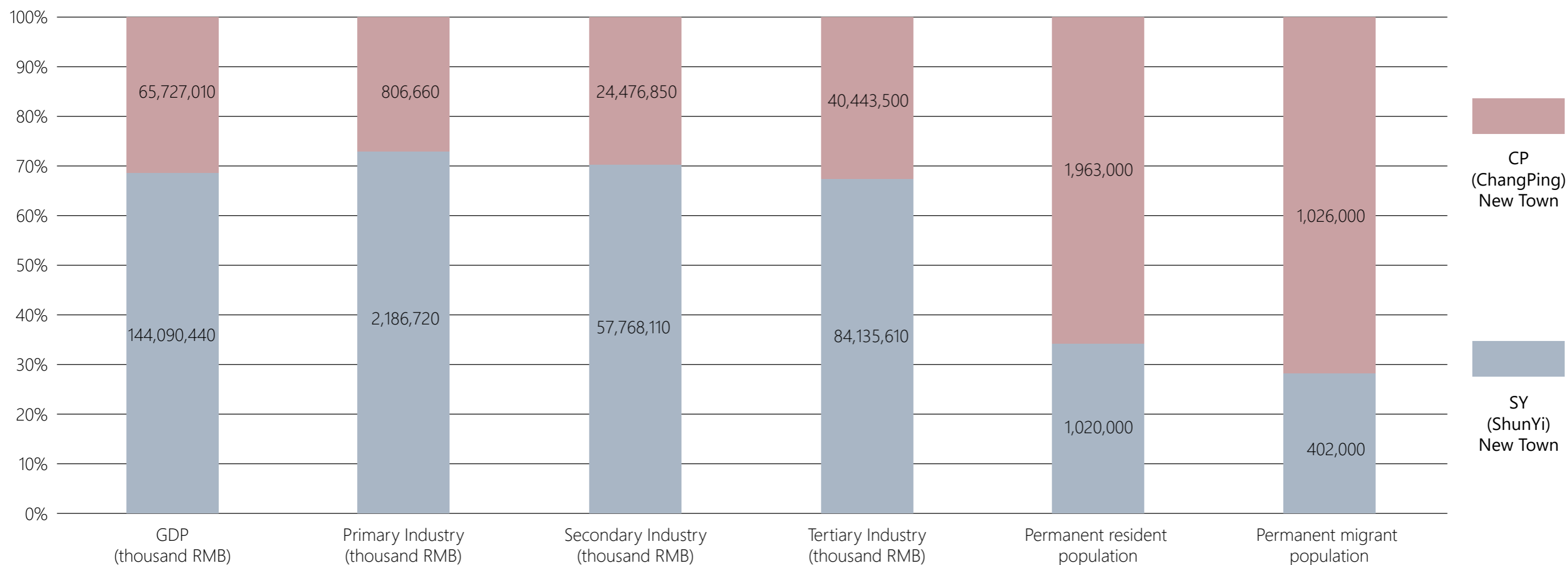
Again, the most practical and efficient way of creating functional polycentric structure is to build upon the current new towns. SY (ShunYi) and CP (ChangPing) new towns are in the intermedia scale of Paradise Gateway. Although the 2004 master plan promoted them from satellite towns into new towns, specific strategy was vague for each one.

The bar chart below shows the overall comparison between SY and CP from economic and demographic perspective. From the economic level, SY is twice in number than CP in every aspect, including Gross domestic product, Primary industry, Secondary industry, and Tertiary industry. However from the demographic level, the population of SY new town is merely half to CP in both local resident and migrant population. The main reason behind that is Paradise Gateway and HuiLongGuan mega-communities are

belonged to CP new town, which made its current role is housing the center, instead of a strong industry.

This situation makes CP new town the short slab in the potential functional polycentric structure. Although large in population, CP is short in economy and employment providing. On the other hand, SY is of the highest centrality among all the 11 new towns around the center of Beijing. The success of SY thanks to its unique role in the metropolitan system, as the airport town. What is lacked of CP new town is an distinct role in the system. Rather than merely housing the migrants brought by urbanization, CP new town should also generate it own functional role to interact in the intermedia network by exploring its strength and seizing the spatial cohesion opportunity.

Comparison of major economic and demographic statistics between SY and CP new town



Source: Beijing regional statistical yearbook of 2016, <http://www.bjstats.gov.cn/nj/qxnj/2016/zk/indexch.htm>

## Analysis of SY's Role - Airport Town

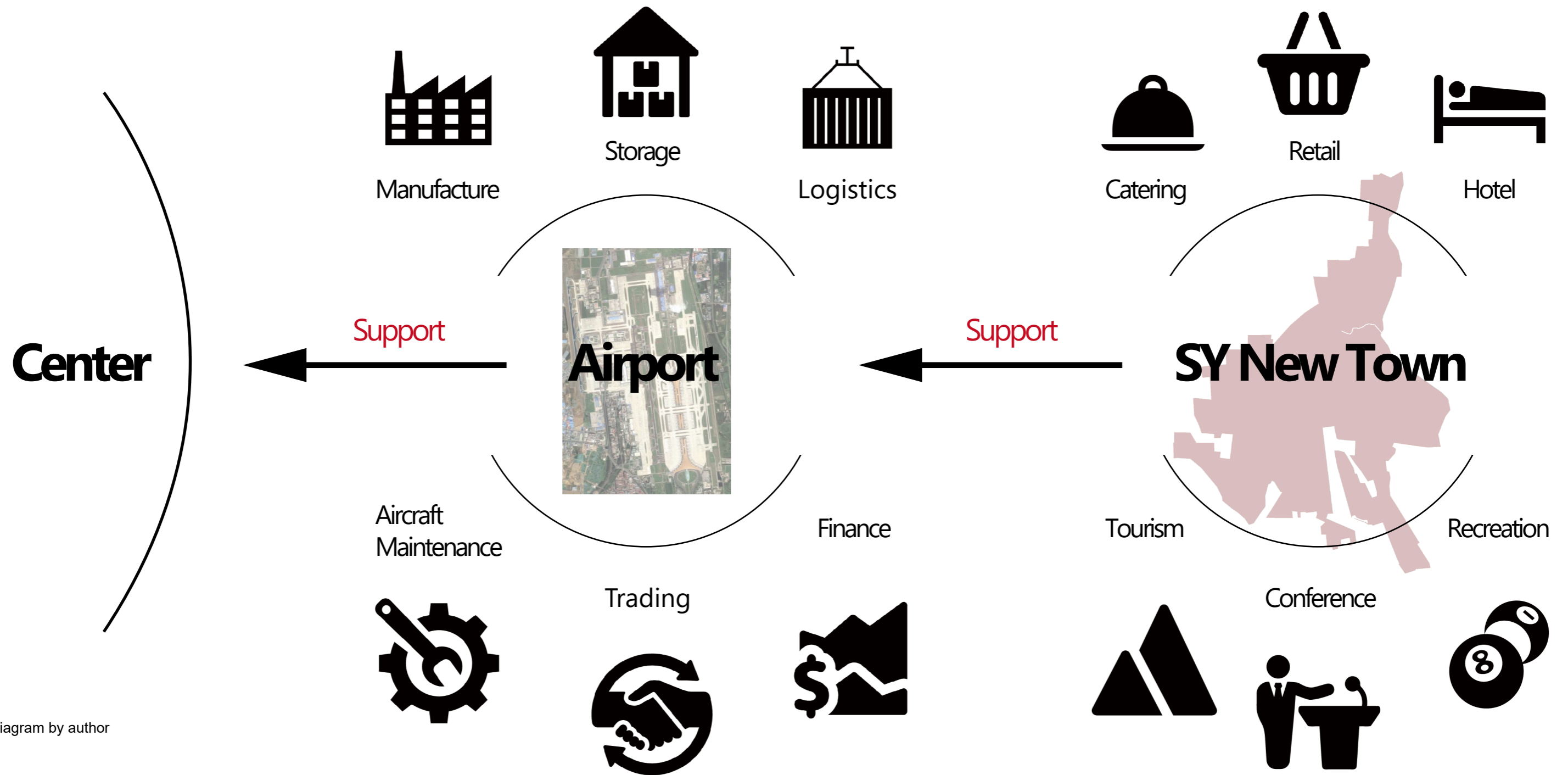


Diagram by author

In the current land use map, two sets of economic chains can be found, which are the airport-manufacture and university-IT park. The international airport of Beijing located in SY new town, provides it a specific role. Development and the tax-protected zone around the airport support it with related industries, which contributes 70% of SY new town's GDP. Then the new town supports the airport with all kinds of services. SY is the only one of the 11 new towns that have fulfilled its goal of becoming an attractive sub-center of Beijing.

On the contrary, CP remains a general node with a small service radius. The other chain, university-IT park, is also very potential, where knowledge and practice go hand in hand. However, the outstretch stops at the 5th ring, and never reaches CP new town. Although development zones are being built in CP new town, the process goes slow. The bright side is, radial infrastructure connection has been built between the two new towns and the center. Unfortunately, few development happens in the due north outside Paradise Gateway, which enhances PG's rely on the main center.

## 5.9. Proposal role of CP new town Innovation-Production-Recreation

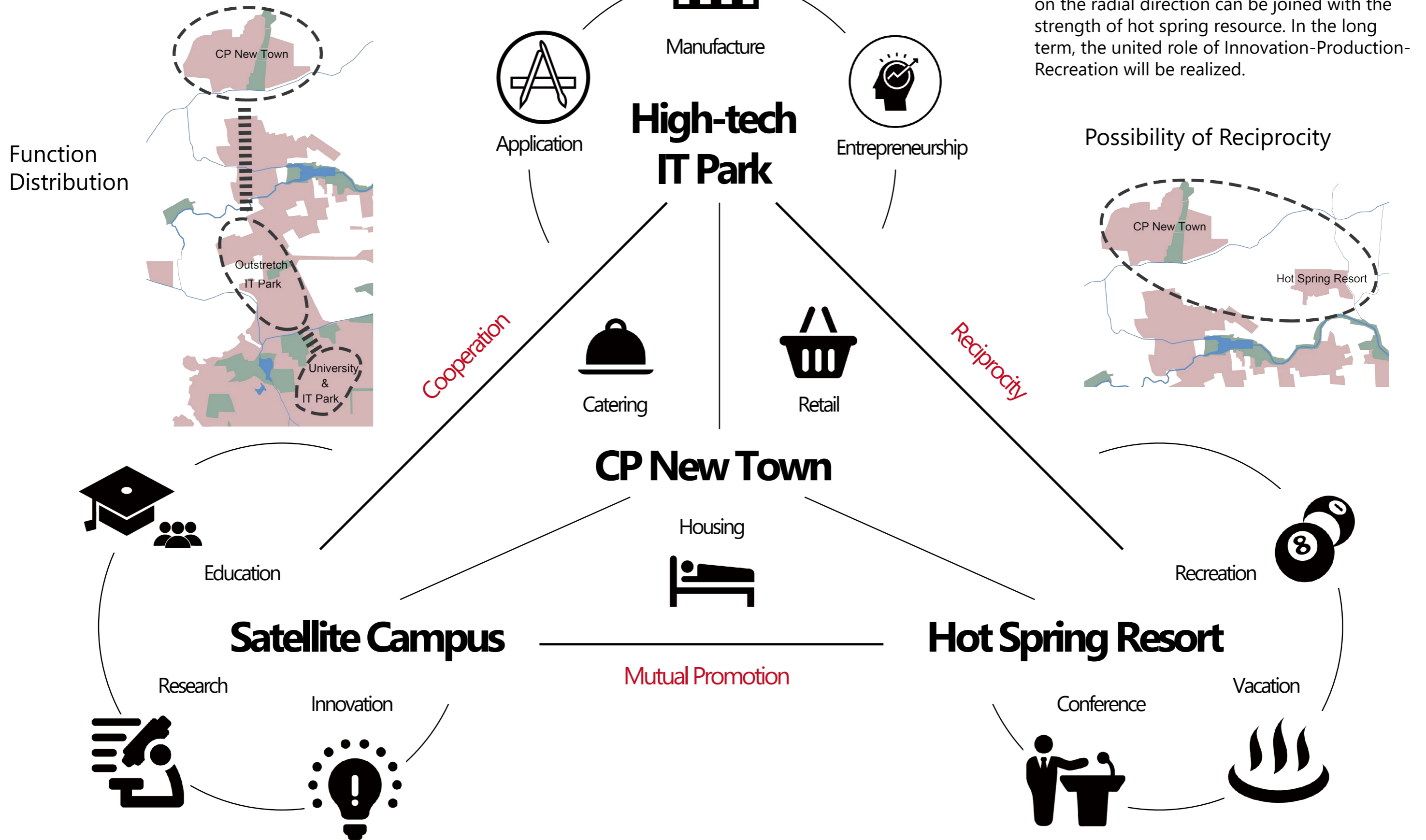
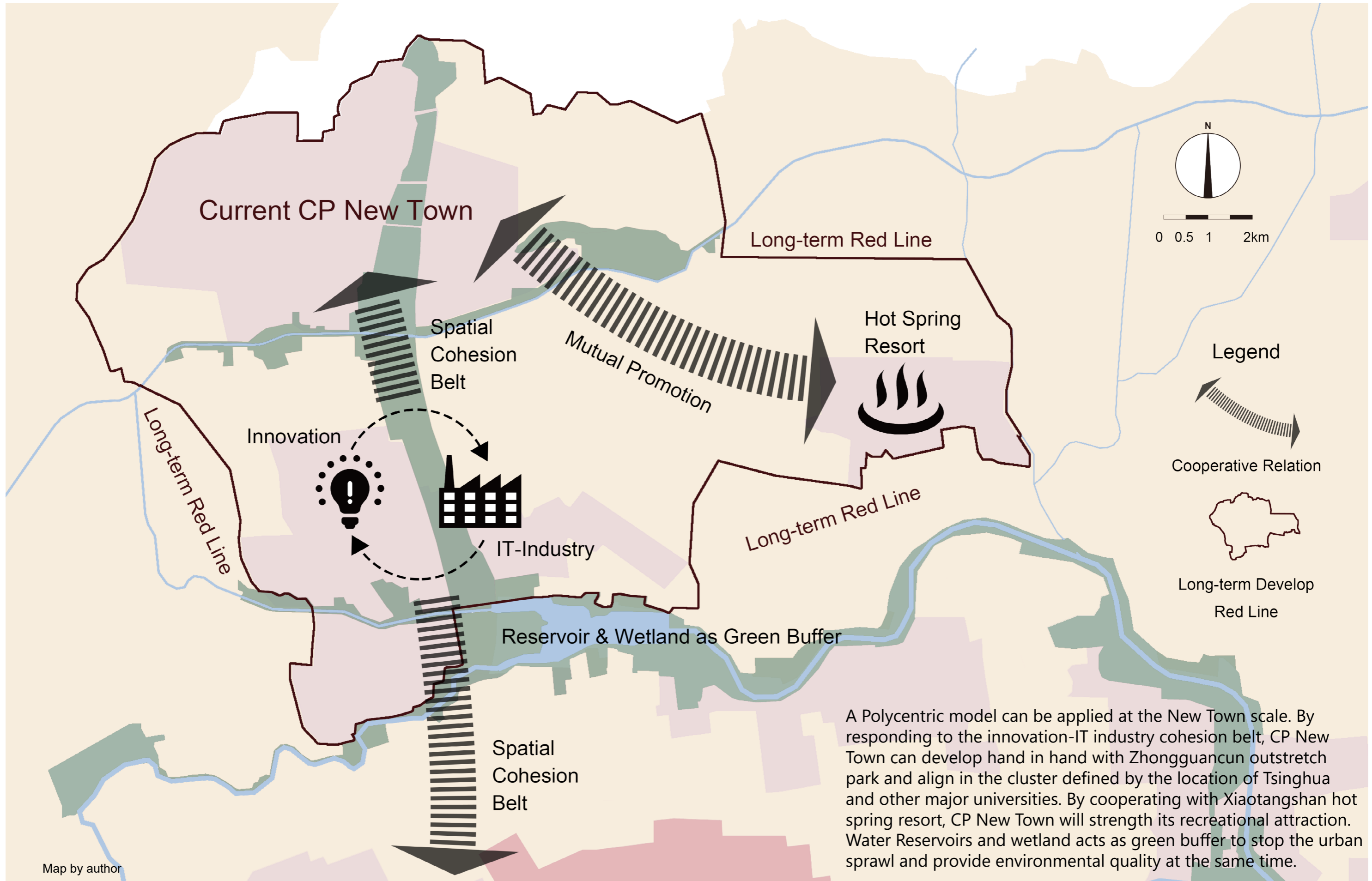
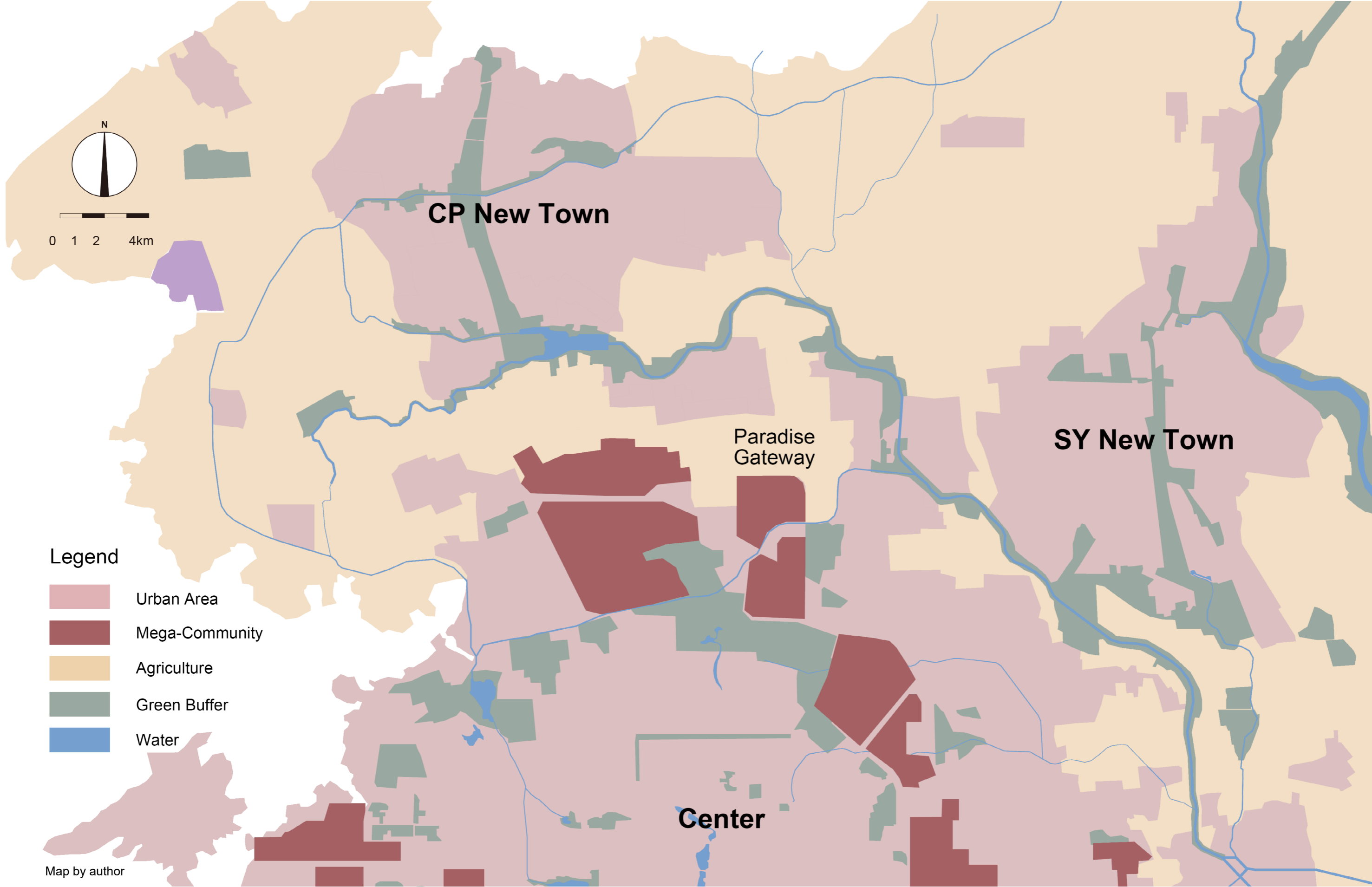


Diagram by author

Action: Strengthen CP New Town by a new Role to build a Strong Sub-center



### 5.10. Land use plan of the intermedia scale



Map by author

## Challenge

### 1) Search for a solution to the crowded mega-community

Paradise Gateway is the most famous and complained mega-community in Beijing, but it is only the tip of the iceberg. Mega-communities of high density are common along the 5th ring. The problems that happen in Paradise Gateway are also express in the same ways into every mega-community. Paradise Gateway has its particularity, it has the highest rely on the center than other. As we argued before, the problems of the mega-communities cannot be solved within the community. It is urgent to search for a solution in the intermedia scale. Bad condition of mega-communities has raised high social concern, especially social equity when the major residents are the drifters. Mega-communities are symptoms of an unhealthy metropolitan network, which will hinder future development.

### 2) Jump out of the centripetal Ring-Radial model

The current metropolitan network can be concluded as Ring-Radial. It was a logic and well-organized model, which ensured the formation of a powerful center. However, when the population reaches its maximum capacity, a shift must be made to jump out of the centripetal model. According to Wang (2005), new towns are destined to perform an anti-centripetal attraction. The challenge is how to realize this goal. Although the 04 master plan of Beijing has settled the location of 11 new towns, most of them are not yet competitive or attractive. Sadly, the overall functional value of the main center is generally accepted for decades. It is hard to change the situation unless real improvements within the recognition of the transitions need to be accomplished.

### 3) Deal with the mobility collapse

According to Amap's 2015 annual traffic analysis report, Beijing is the most congested city in China. 2014 labor report made by Beijing Normal University suggests that 97 minutes are spent daily on the commute in Beijing in average, top of the list as well. Although mobility problem is common among large cities, it is also a difficult problem to solve. Among all the roads, the traffic condition of the 5th ring is the worst, where 26.9% of the population is. It is another challenge of the metropolitan strategy to deal with the mobility collapse, especially the tidal traffic.

## Opportunity

### 1) New town development supported by 04 master plan

04 master plan of Beijing set 11 new towns to enforce the goal of polycentric development. New towns are established upon the old satellite towns, which will be responsible for attracting industry and citizen out of the center. New towns will boost the development of the surrounding area. Even though the centrality of the new towns is still low, development policy inclines to the new towns.

### 2) Appearance of spatial cohesion belts

Spatial cohesion belts appear according to the radials. On the northeastern direction, the international airport is surrounded by related industries, including manufacture, storage, logistics, aircraft maintenance, trading, and finance. Multiple free-trade zones and develop zones work hand in hand with the local industry area. On the northwestern direction, the university-IT park belt managed to thrive. In 2001, Zhongguancun IT park was built next to Academy of Sciences and Tsinghua University. This combination made the industrialization process of new technologies smoothly. An outstretch, Zhongguancun life science park, was built later on. Spatial cohesion belts show the great potential of cooperation between the center and new towns.

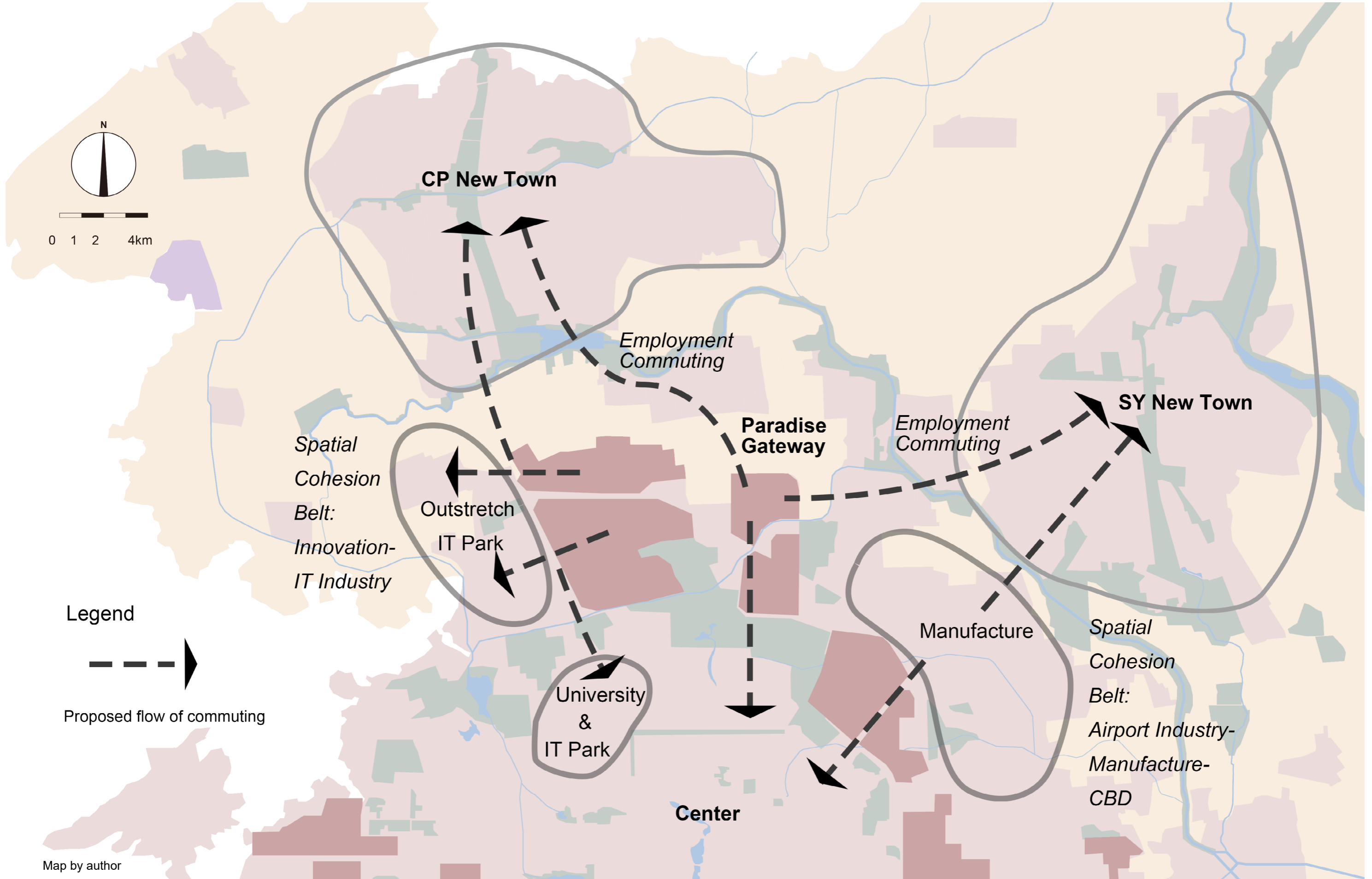
### 3) Abundant skilled labor force in mega-community

Compared to the south, citizens from mega-communities in the north are of higher education and income. They are more likely to be skilled employees. Giving the population of these communities, it is assured that there is abundant skilled labor force that supports modern industry clustered in the area (an active intermedia scale).

### 4) Successful case of SY new town as the airport town

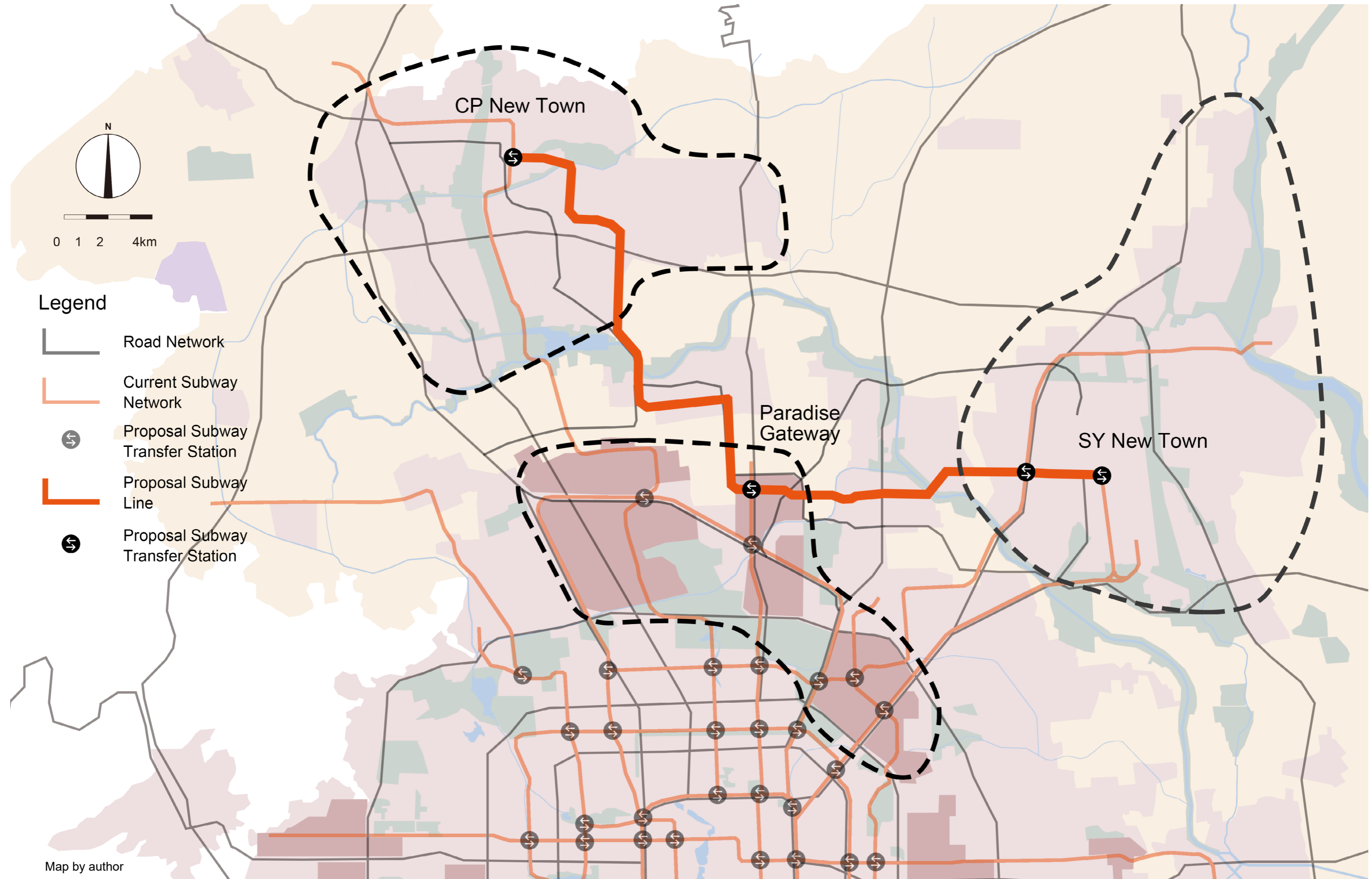
Among all the new towns, SY (Shunyi) new town managed to develop into a competitive sub-center that has a strong attraction. The GDP per capita of SY new town is now at the 3rd place among all the districts. The urbanized area of SY new town is also of considerable scale. The reason is that SY new town has a clear role in the metropolitan system, which is the airport town. A specific role can greatly increase its centrality, instead of being a general marketplace for surrounding area.

## Proposal complementary cohesion belt: New Town - Community - New Town



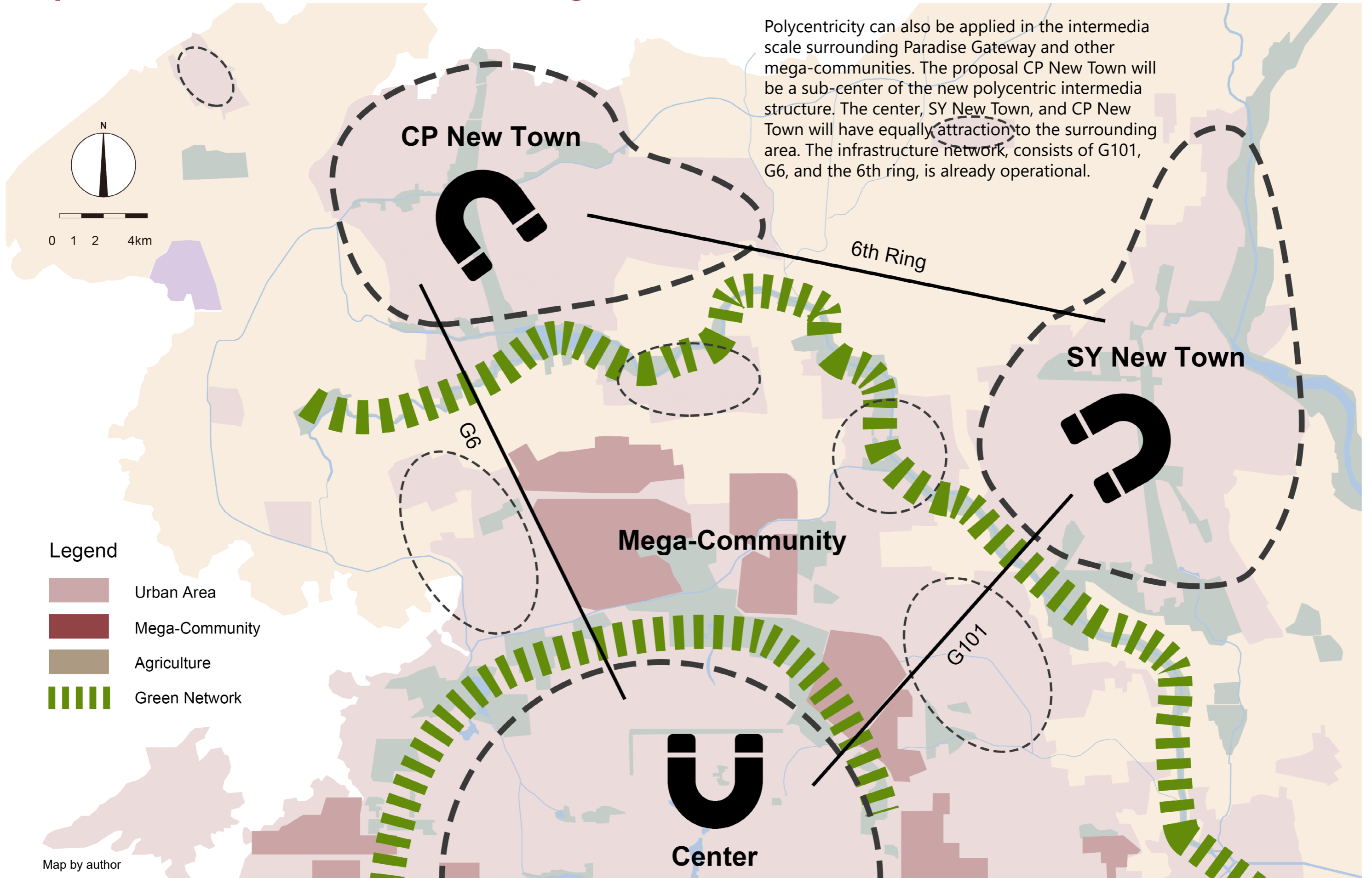
Map by author

# Action: Infrastructure connection CP - PG - SY



Map by author

## Proposal Intermedia Structure: Three Magnets



## Regional Vision

### 1) Crucial development point of CP new town

The success of SY new town dues to its explicit role of airport town. By giving CP new town its own functional role, development here is likely to be boosted. Spatial cohesion belt of university and high-technology industry has already formed on the northwestern radial. The combination of innovation and production is promising. Meanwhile, CP new town has the advantages of low land price, quality environment, and abundant labor. CP new town locates at the foot of the mountain, where is rich in hot spring resources. A famous group of resorts exists in the area. Recreation function is of reciprocal with the innovation-production cohesion.

### 2) Attraction of two sub-centers

Upon the thriving of CP new town, two attractive sub-centers are established. With specific function, CP and SY will become competitive nodes in the north. Then, the vision of functional polycentricity can be realized. Strong industry and job opportunity are efficient attractors for residents. Citizens will be spontaneous moving to the new towns in search for better employment and environment, instead of driving by restricting municipality registration. Moreover, the functions of CP and SY have a huge prospect of cooperation, which will strengthen the metropolitan network.

### 3) Intermedia structure - three magnets center, mega-community, new towns

According to the plan, the thriving of two new towns will change the intermedia structure. Main city center, SY, and CP new town will all be important nodes around mega-communities in the north. Current infrastructure ensures the connection of the three nodes, which are national road G101, highway G6, and the 6th ring. Meanwhile, the infrastructure plan includes one subway line linking the two new towns and Paradise Gateway, and a set of roads to strengthen the network. With this intermedia structure, polycentricity at local and higher levels will be realized. Center and new towns provide a similar attraction to the region.

### 4) Green buffer's function

According to Marco and Laura (2010), the green belt is appreciated as planning efforts to prevent sprawl and provide a servicing boundary at the fringe. It also gives access to recreational space, which increases local quality. A system of parks and buffer zones are established along the 5th ring. The second layer of green buffer will be built

along the river between new towns and mega-communities, which aims at preventing excessive urban sprawl and promoting local quality. The two layers of green buffer also restrict the mega-communities from merging into the new towns.

### 5) Relationship between urbanized area and agriculture

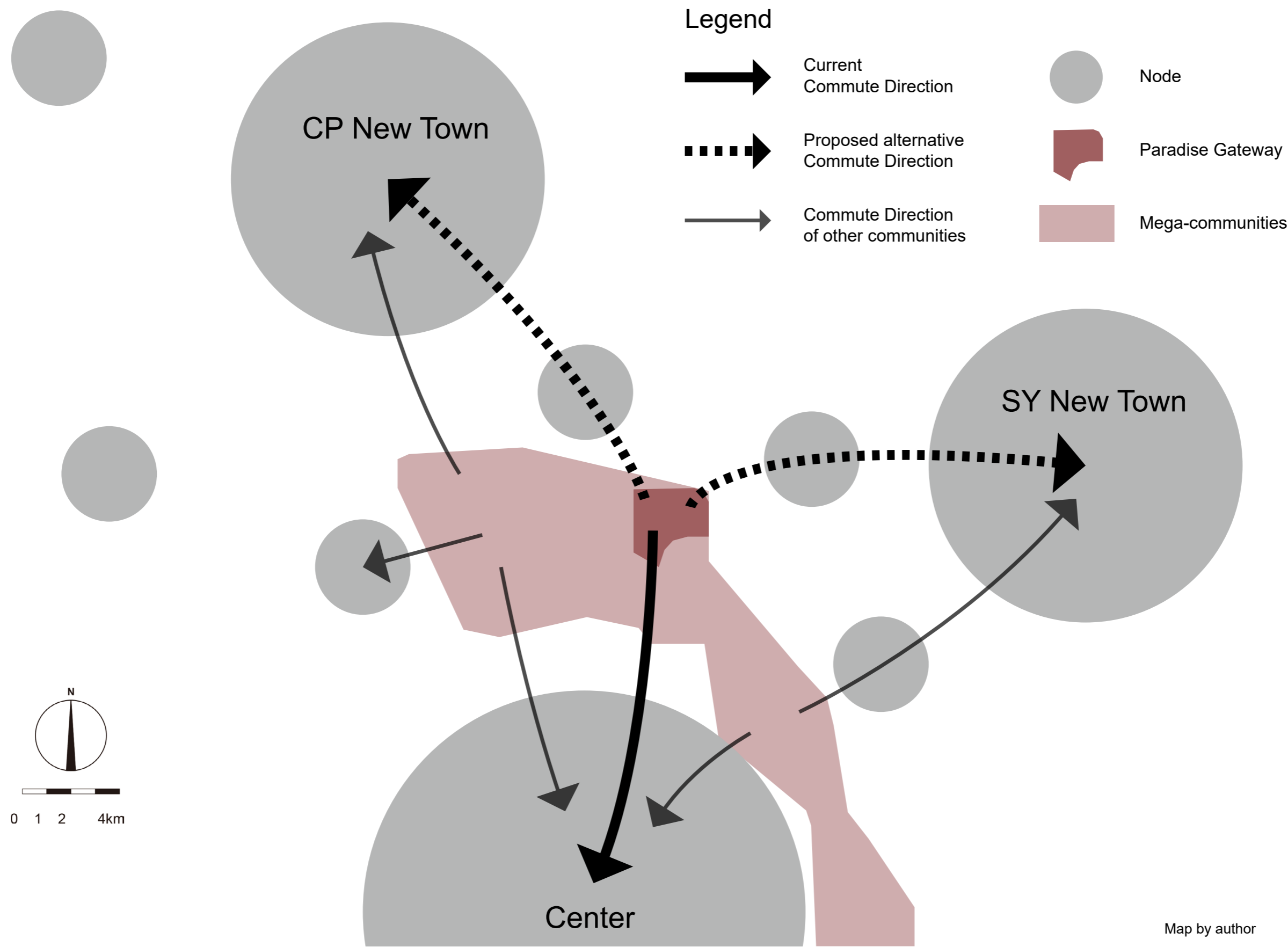
China has a very strict farmland protection policy, that every new development into agriculture boundary lines must be examined and approved by the Land and Resources Bureau. Equivalent exchange of land use will be applied to the proposed plan. The Urban sprawl of poor quality at the fringe will be transformed back into the agricultural land, in exchange for the new development of new towns. This strategy is also helpful for controlling urban sprawl of the center.

### 6) A shift of mega-communities' role

Under the new polycentric structure, the role of the mega-communities shifts, especially for Paradise Gateway. Paradise Gateway used to rely simply on the center, as the provider of residence at the edge of the metropolitan area. The commute was focusing on the center, which caused a tidal effect. In the new network, the mega-communities become the middle of nodes, and the commute is separated into three directions. A diverse direction of the commute can prevent congestion from happening. Meanwhile, Paradise Gateway is shifting from a rigid and compelled choice of residence to an alternative one, as both new towns provide considerable housing by themselves. This shift can relieve the overcrowding situation once and for all.

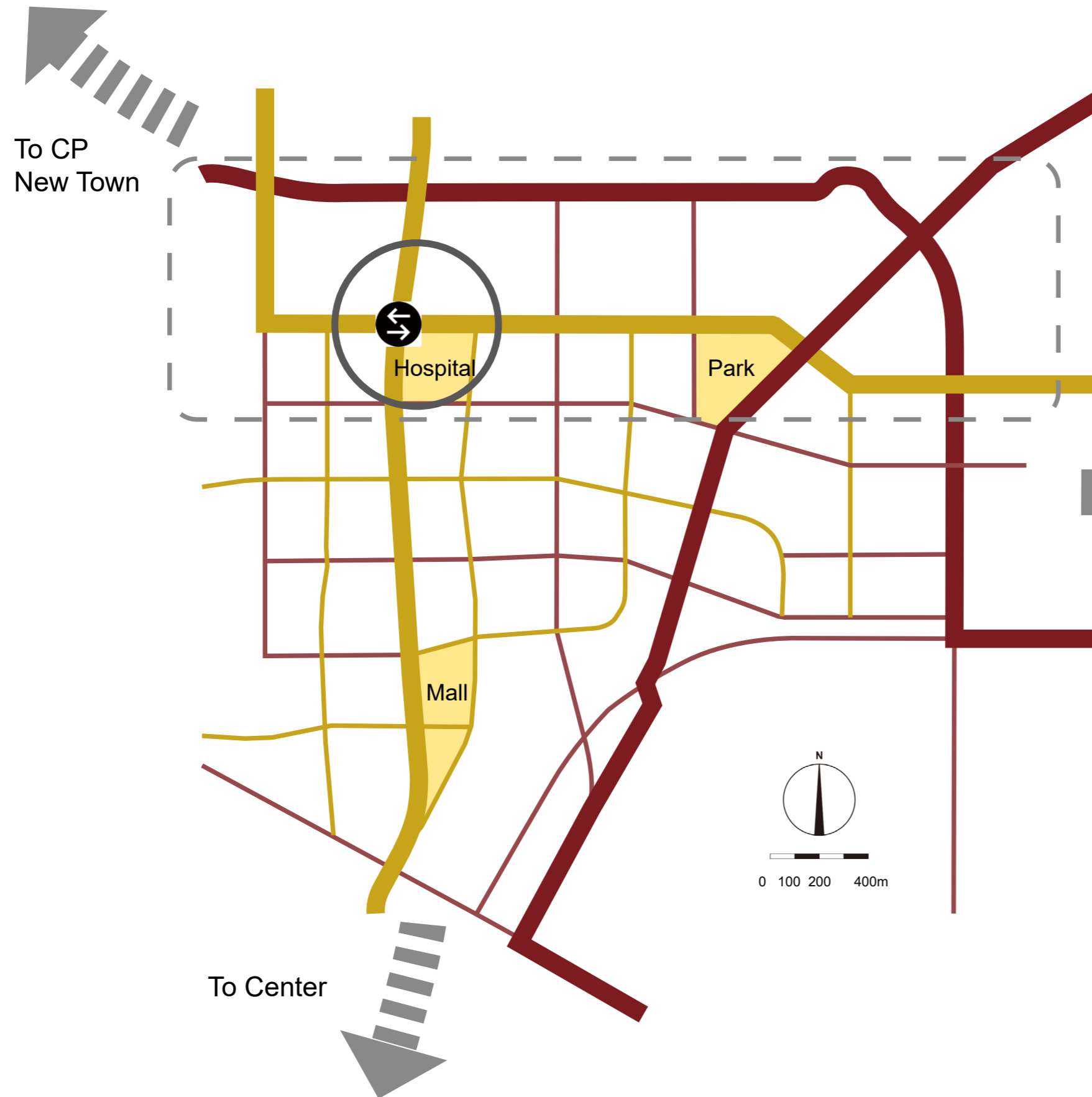
### 5.11. A shift of mega-communities' role: Surmount the overcrowding problem

From the compelled choice at the fringe of center to an alternative housing in the middle



## Action: Adapt the intermedia structure into Paradise Gateway

### Connecting not only the Center but also the New Towns








In order to fundamentally solve the problems in Paradise Gateway, the intermedia structure of three magnets shall be realized into the community. Instead of the old commute pattern of focusing on the city center, the future Paradise Gateway will serve as residential community of both the center and the new towns. This regional cooperation will be realized by an infrastructure network, consisted of public and private transportation.

The north part of the community used to be the far neglected fringe, where most of high-rise towers are. They contain a huge population. Most importantly, these neighborhoods are connected directly to the new towns, which makes them the critical to the goal of fulfilling the revitalization. How to carry out detailed interventions will be explained in the upcoming urban design.

To SY New Town & Airport

#### Legend

- |                                                                                       |                                                                                       |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |
| Corridor for Public Transport                                                         | Corridor for Automobile                                                               |
|  |  |
| Service Network                                                                       | Transport Network                                                                     |
|  | Crucial area for intervention                                                         |

## Conclusion of last chapter

The monocentric structure of Beijing brings serious tidal commuting between the mega-communities and the center. If future development continues in this pattern, the situation will only become worse. The functional polycentric structure shows a promising future to mega-communities by creating a cohesive network. As a result, the approach of the regeneration project is an integration of local and regional scale. The regional plan will guide local design.



# 6. Analysis of Local scale

to search for solutions for transportation and public space

Focus of scale in this Chapter

- I. Local scale
- II. Urban scale
- III. Regional scale

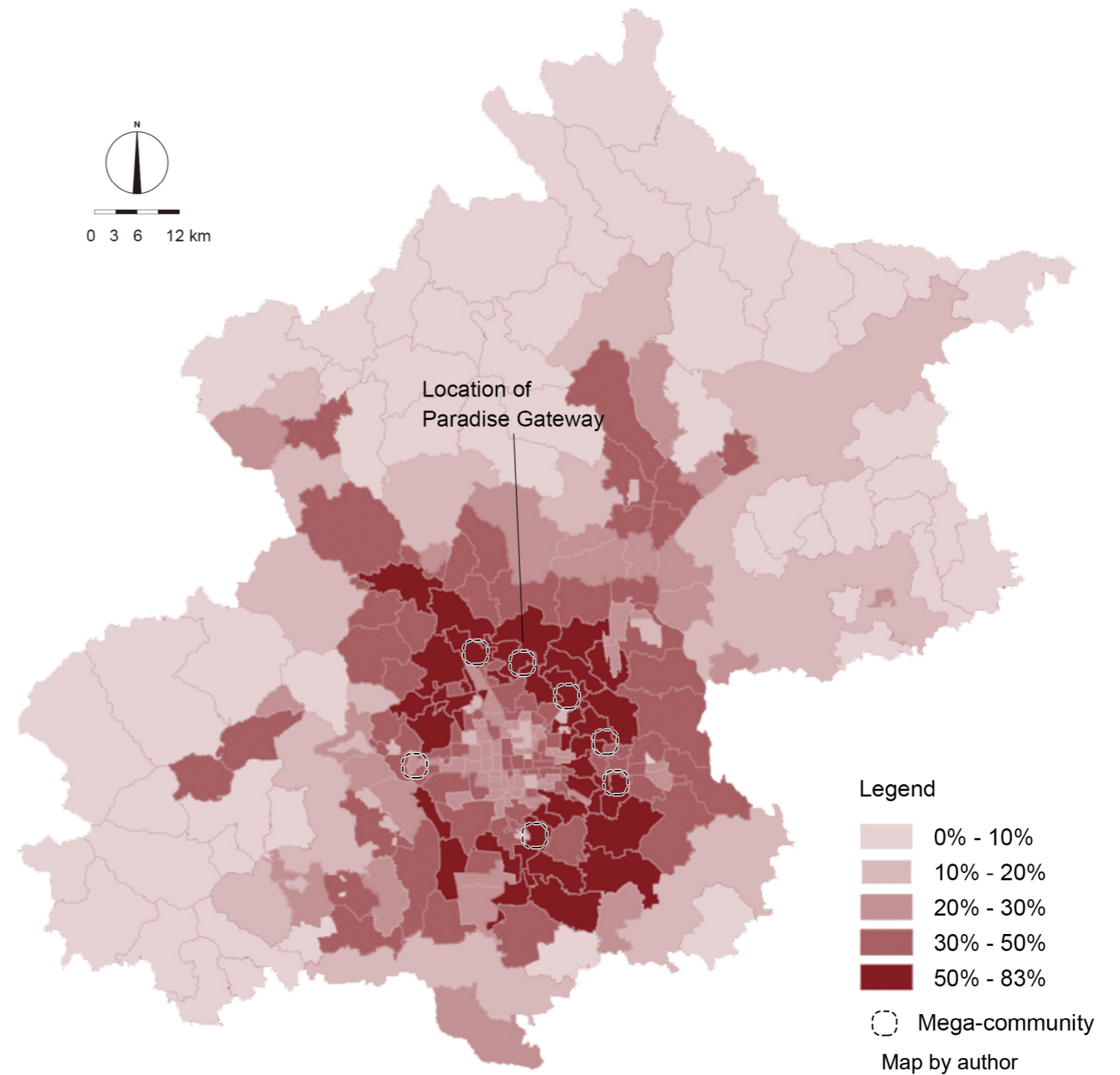
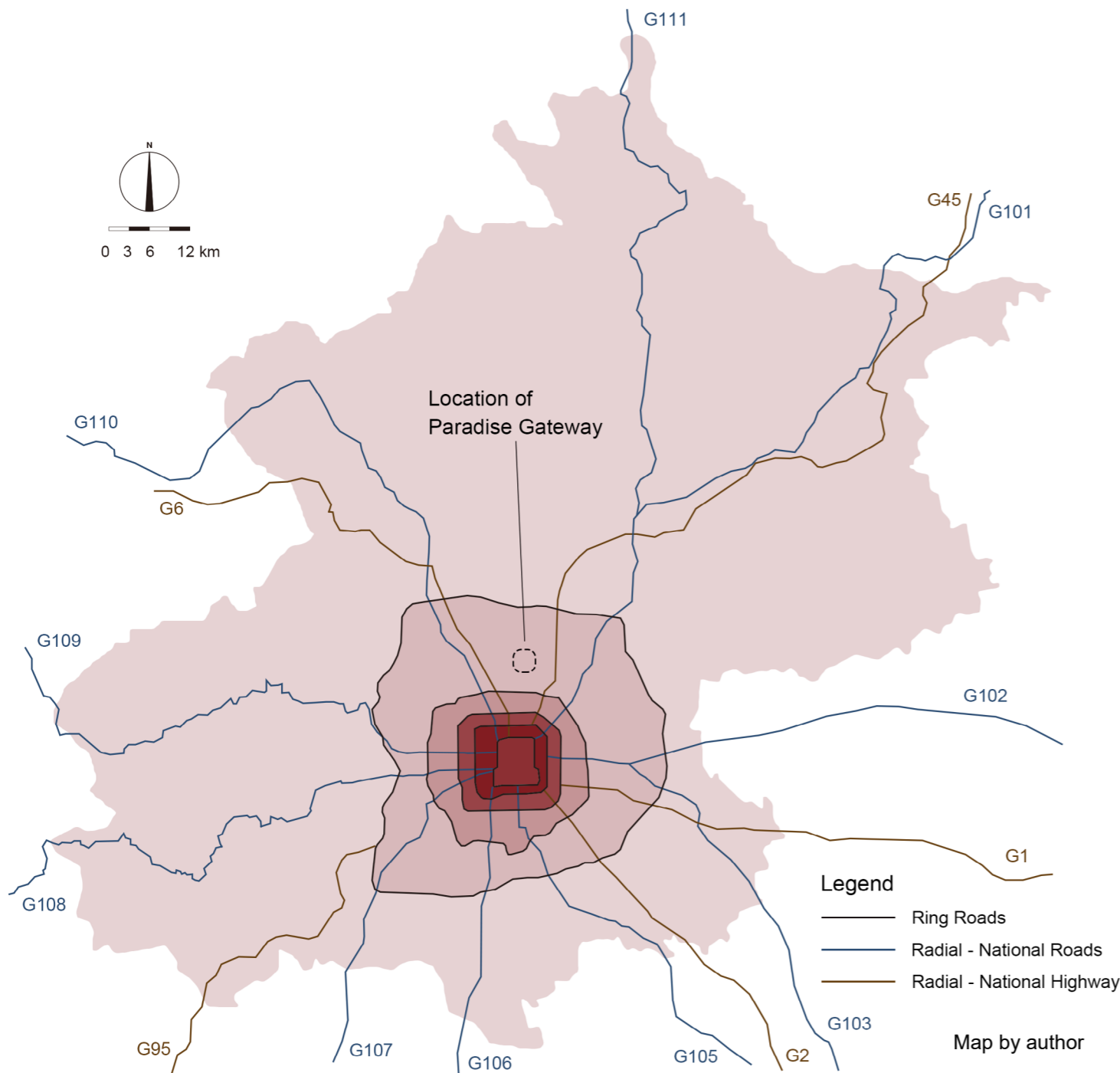
- Tidal mobility status
- Hierarchical flow
- Transit-related development
- Structure of Community service
- The conflict between Public Space and Transportation
- The vision of Transit-Oriented Development

## 6.1. The extraordinary tidal commuting of Paradise Gateway

### The city center of high density and mega-community of Drifters along 5th ring

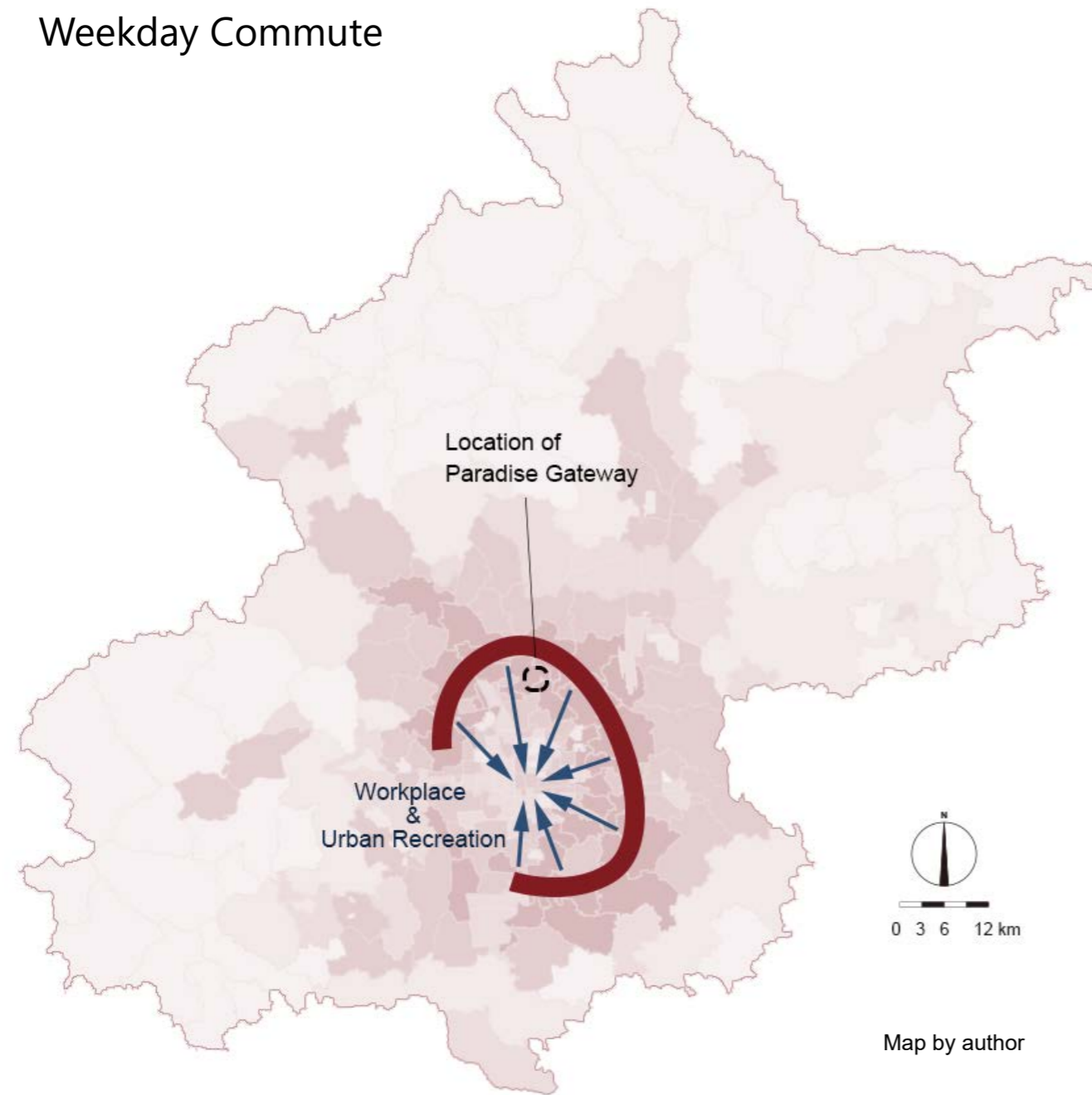
The city center of high density and mega-community of Drifters along 5th ring  
 As is explained before, the metropolitan functionality is explained in a structure of the monocentric ring-radial model, which is supported by the infrastructure network. The map on the left shows the overall density of population, however, the map on the right illustrates the distribution of drifters. A demographic mismatch is hereby revealed. The 5th ring is acting as a boundary. Native citizen has dominated the developed area inside 5th ring long before the drifters arrived. So they gather outside the 5th ring to settle down, where the land price is not too high but still not too far away from the

center. The outcome is the aggregation of drifters forms a C-shaped zone. One of the characters of drifters is that their commute needs are firm and high. When the everyday commuting demand of 3.5 million drifters that travel back and forth to the city center, the poor mobility condition caused by tidal commuting is not surprising. Inefficient regional land-use pattern and rapid urbanization expressing the monocentric structure is the background context. The focus of proposed urban design is to attach the local reality to the proposed regional vision.

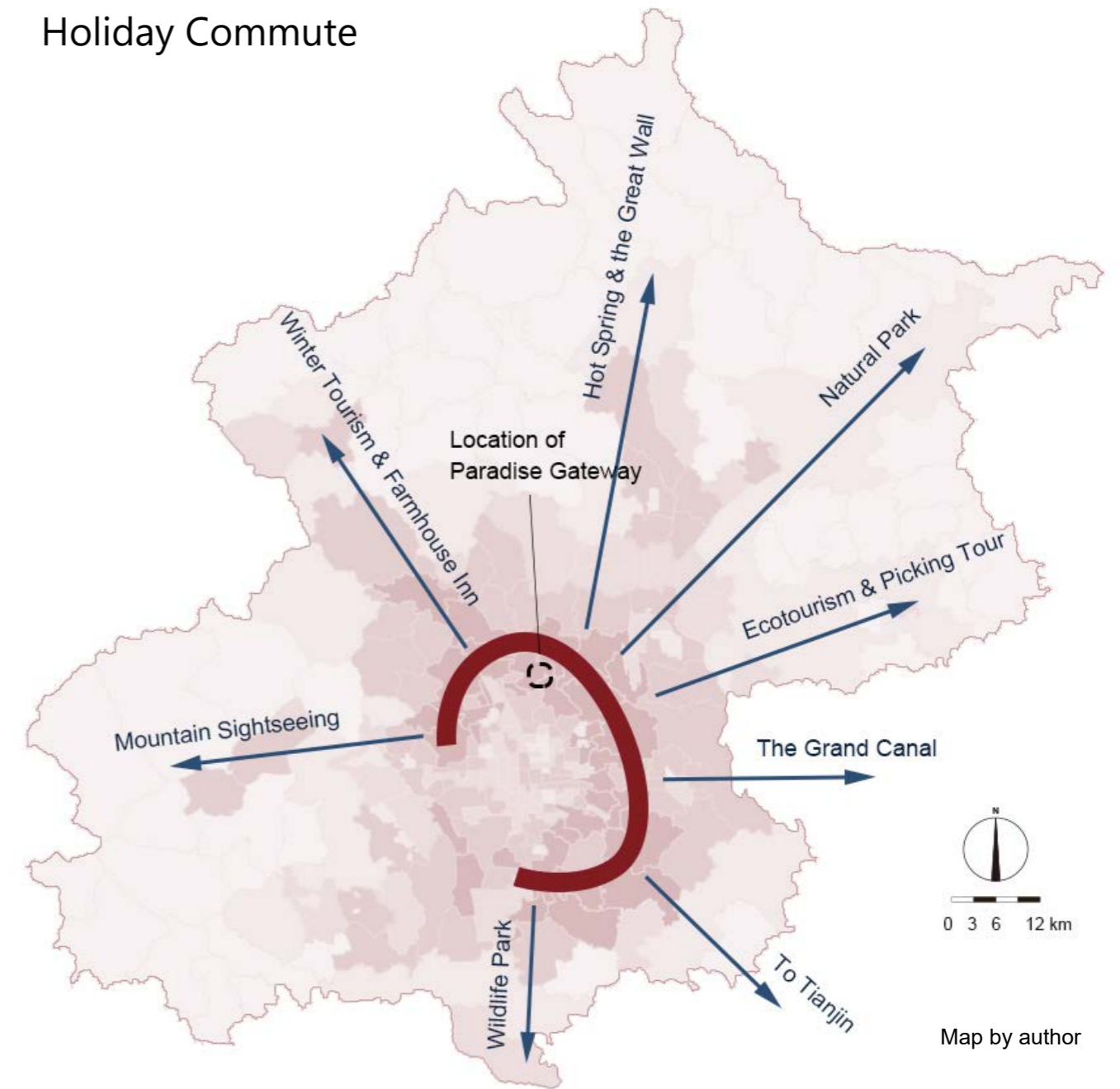


## Tidal Commuting on the Two Direction

### Weekday Commute



### Holiday Commute



At weekdays, commuters rushing from the mega-communities into the center in the morning and getting back after work. The radial connections are facing high traffic pressure. The photo on the right is taken at a radial outside the east 3rd ring. Traffic is heavy on the side towards high-rise buildings. The other side is almost empty.



Source: Morning peak in Beijing, People.cn, <http://bj.people.com.cn/n/2014/0928/c82840-22468686-3.html>

At holidays, the direction of commute reverses. As natural recreation and tourist resources are all located in the country, the direction of traffic is from the mega-communities to the outskirts. The photo on the right is taken at a radial outside north 5th ring near Paradise Gateway. The road towards city center is almost empty.



Source: Beijing Times, <http://dy.163.com/v2/article/T1374539093785.html#9ORBF3HJ00964KK7>

### Tidal Effect on the Corridor in Paradise Gateway

Outward direction is under high traffic pressure at evening rush hours, but the other direction is mostly empty



In the direction opposite center, traffic is congested in evening rush hours. Photo by author.



In the direction towards center, the road is almost empty. Photo by author.

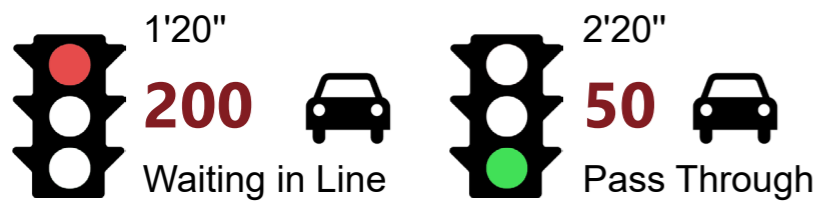
## Private Transportation Failure

The car is the dominant type of transportation in PG, which can be proved by the enormous linear parking lot locates along the main artery. All together, there are about 60,000 cars registered in PG. At crossings in rush hours, far more cars arrive at a red light than the cars pass through at the green. Although driving is a comfort, the negative externality is serious.

**60,000 x** 

Go to the center in the morning and  
Head back to Paradise Gateway **Everyday**

At a two-way six lanes crossing in rush hours,



Beijing Daily. (2015). 1.5 hour for 2.3 km when sharing with 60,000 cars. Available at: <http://bj.house.163.com/15/0924/17/B49U54EQ00074N6P.html> [Accessed 19th Dec. 2016]



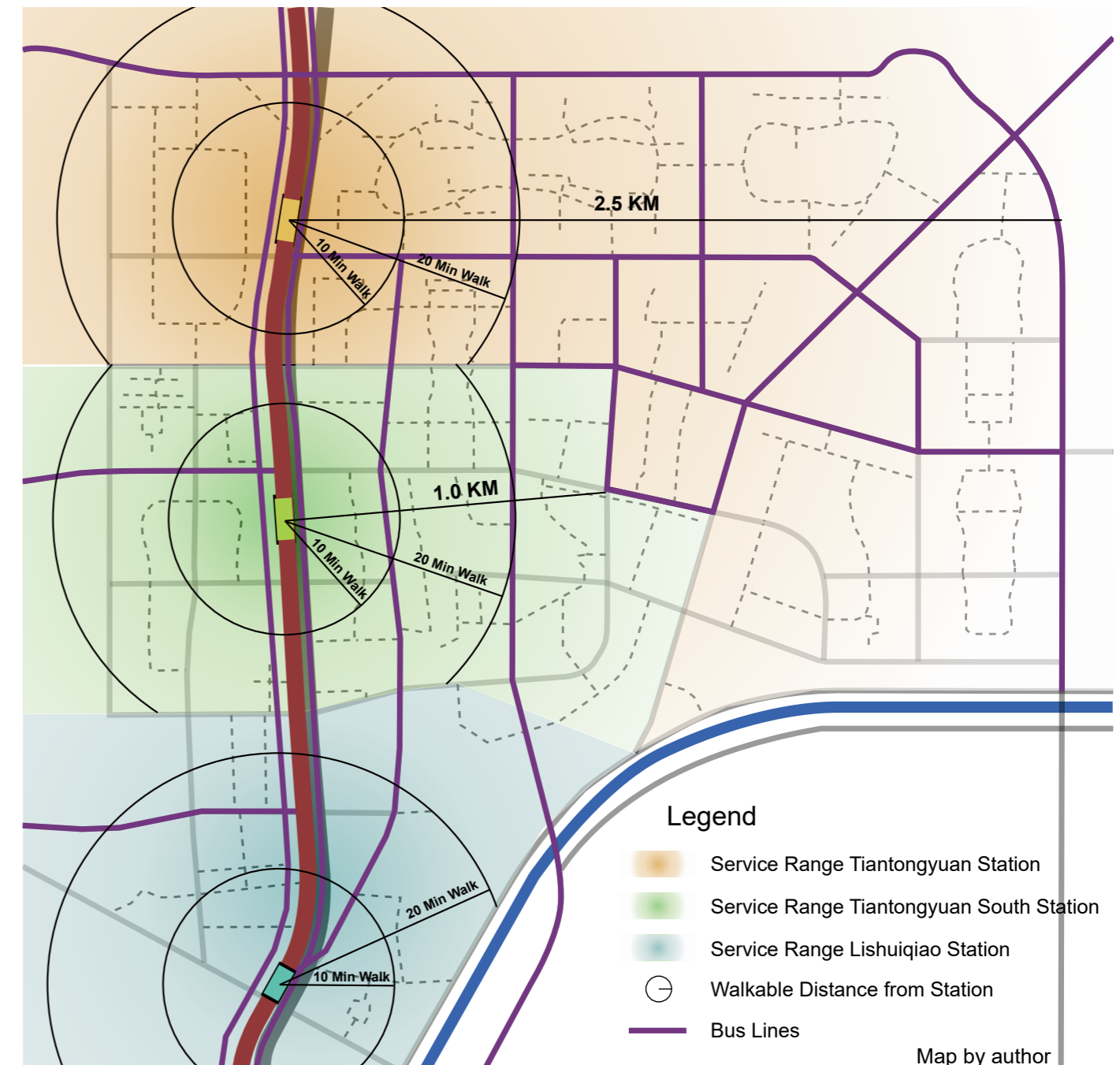
Car parking along the corridor under elevated subway. Photo by author.

## Public Transportation Collapse



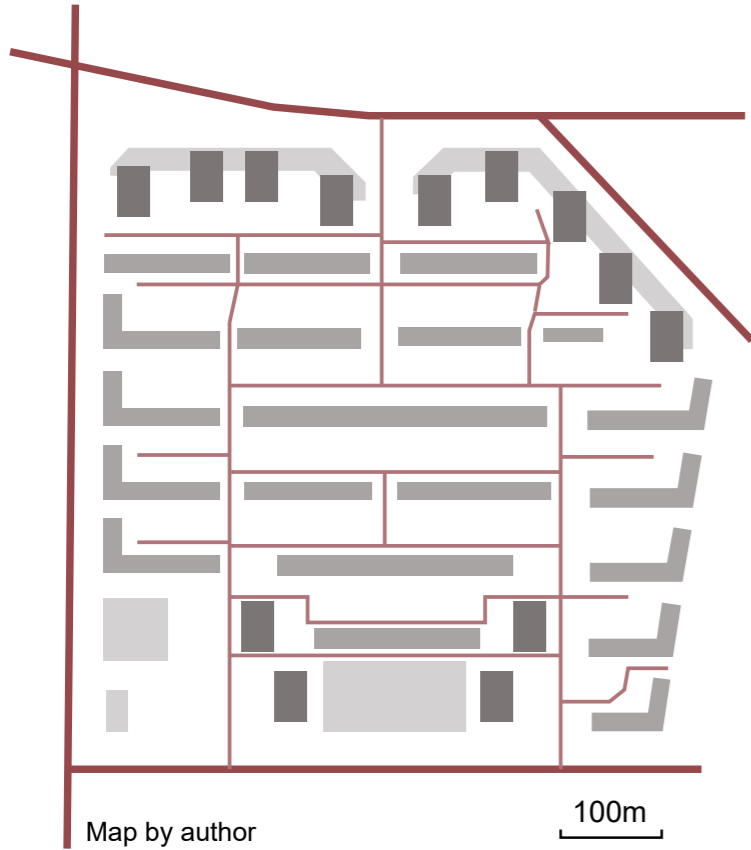
Waiting in line for subway. Netease Real Estate News. (2016). Paradise Gateway hosts 1/30 of Beijing's Population. [news]. Available at: <http://bj.house.163.com/photone/4EBT0007/210512.html#p=B98QVET14EBT0007>

Why not take the public transport? The mode of public transport is walking or taking a bus to the corridor, where the subway stations are. The result of this convergent effect is that all passengers end up at the subway. The worst situation happens at Tiantongyuan Station, where a man was crushed to paralysis by the crowd on 4th April, 2017. As is shown, most bus lines end at the north station, which gives it the largest service range.



## 6.2. Hierarchical Flow: concentrating on the corridor to center

Private: Neighborhood to Main Road



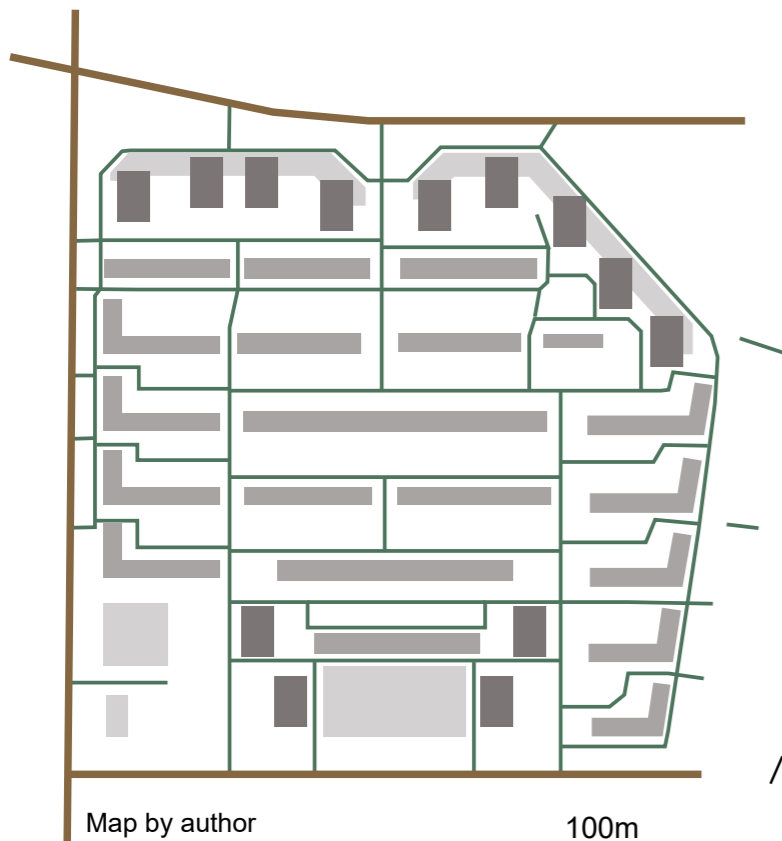
Private: Main Road to Corridor



Private: Corridor to Center



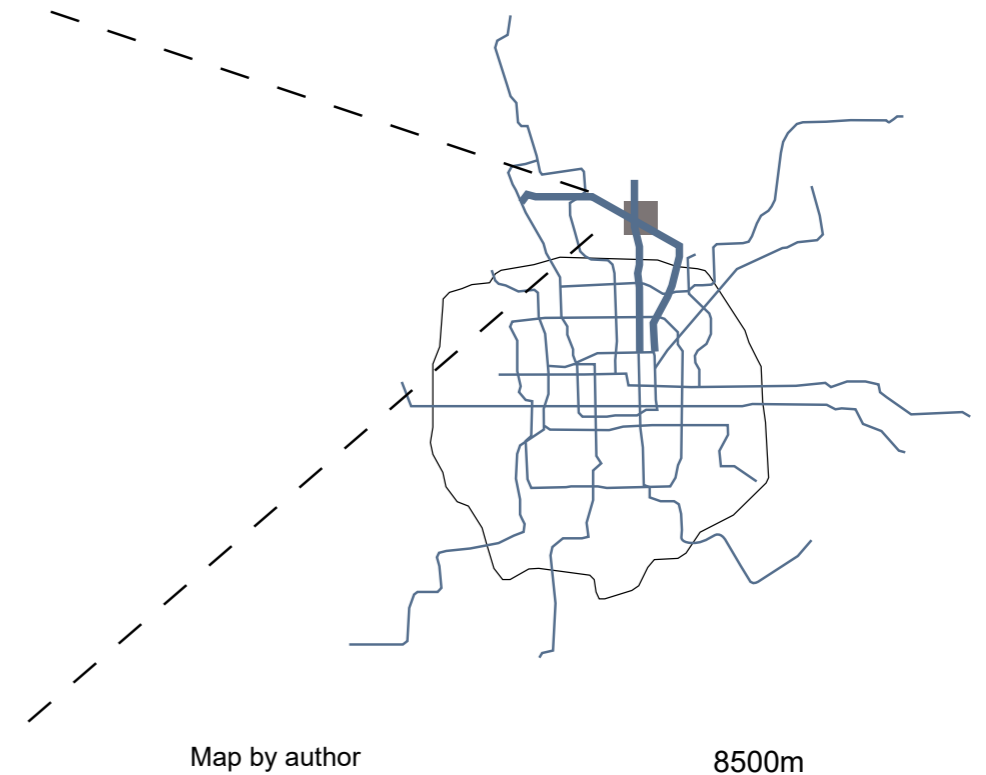
Public: Pedestrian to Bus



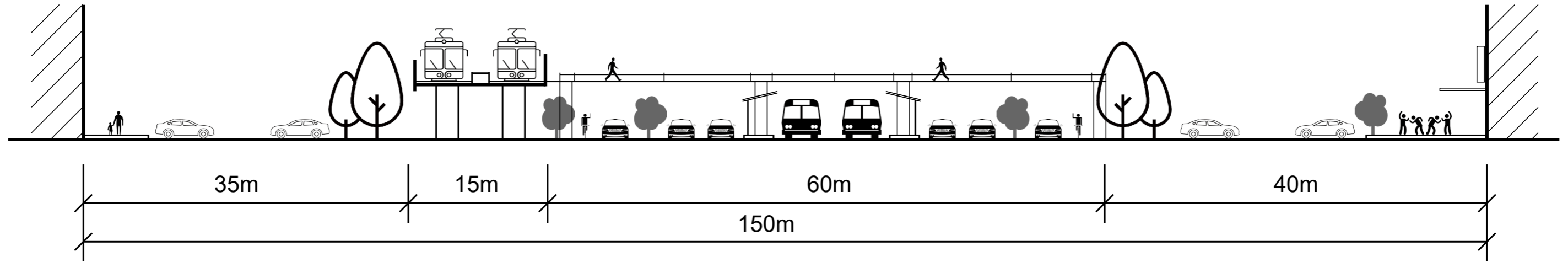
Public: Bus to Subway



Public: Subway to Center



### Section of Corridor

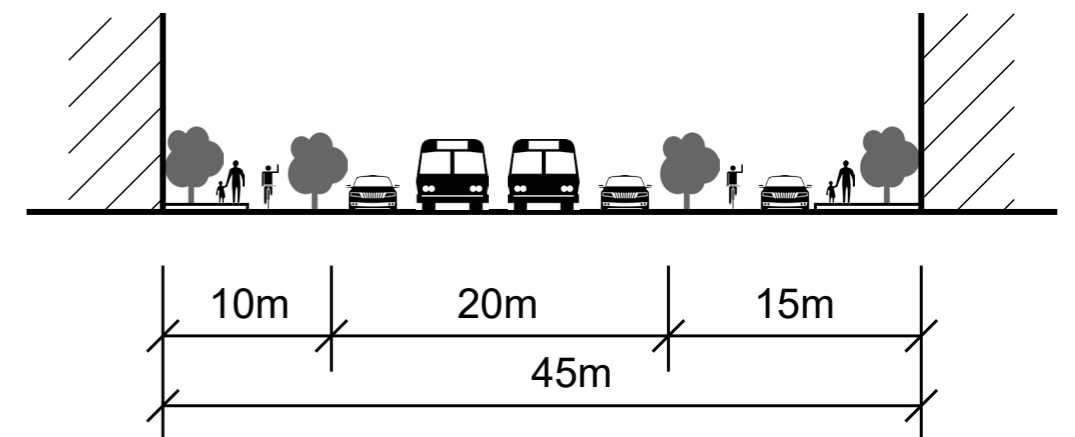


Both private and public transport flow in Paradise Gateway are hierarchical. Commuters rely fully on the only one corridor to the city center for work and recreation. Road width and capacity of the community road is far lower than the corridor, and all roads are connected to it. The corridor acts as one of the radials in the current monocentric regional structure. For public traffic, the only subway line is also located in the corridor. As a result, pedestrians leave their neighborhood to transfer to the bus, then take the subway to go to the city center eventually. In conclusion, the whole traffic volume to the city center is loaded into the corridor. This could well

explains why the road width of the corridor already reaches 150 meters. However, it cannot meet the transport demand of the 700,000 inhabitants.

This concentrated solution of transportation lacks foresight, as no one has expected such fast development 20 years ago. In the long term, the infrastructure connection to the new towns should be built to decrease the dependency on the city center. In the short term, there is an urgent demand for the implementation of another corridor to share the transportation pressure to the city center.

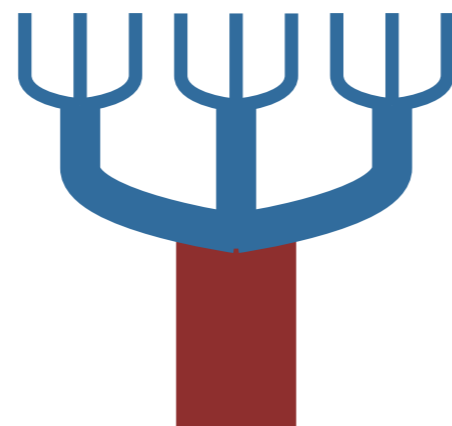
### Section of Major Road



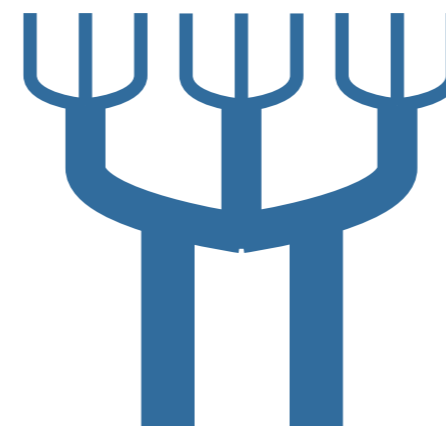
### Legend

- Automobile flow of community road
- Automobile flow of corridor
- Automobile flow of metropolitan system
- Pedestrian flow of neighborhood
- Bus line of community
- Subway line of corridor
- Subway system of metropolitan
- the 5th ring

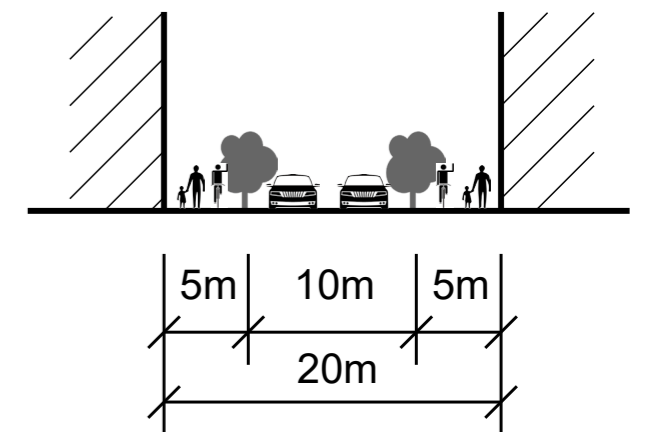
### Concentrated pressure on one corridor



### Add another corridor to share the pressure



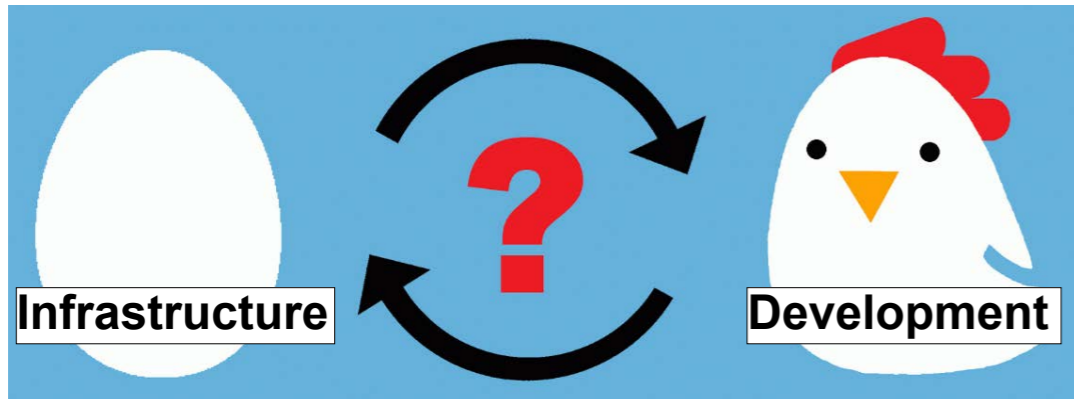
### Section of Neighborhood Path



Sections made by author

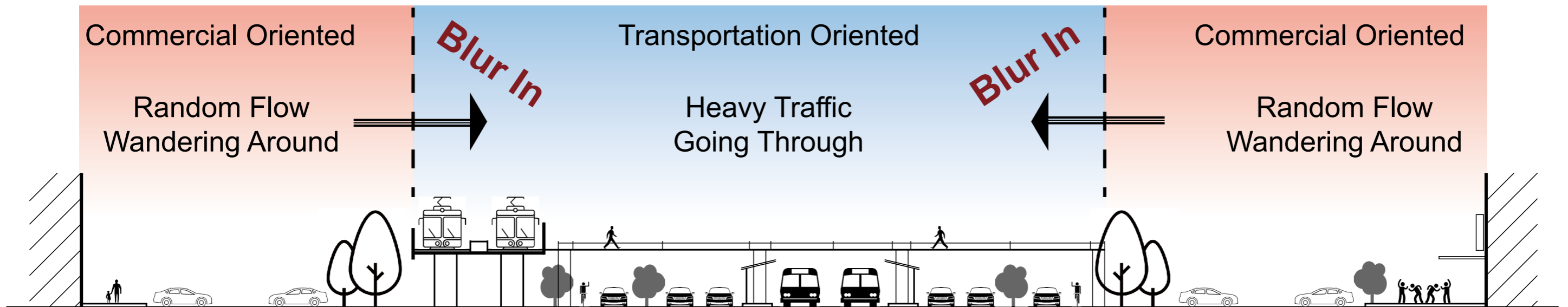
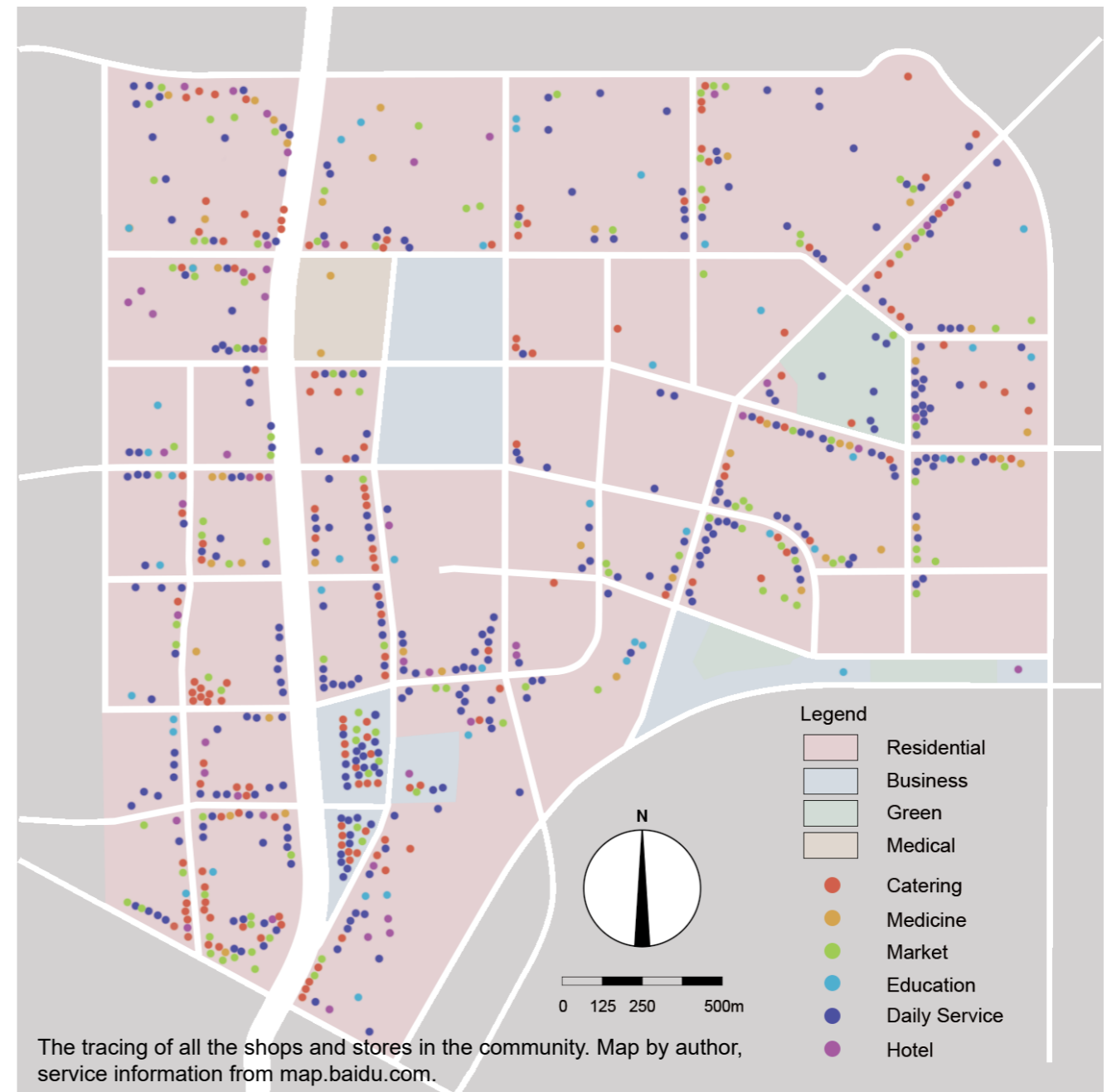
### 6.3. Current Transit-related development

A chicken-egg problem in TOD -  
 Infrastructure brings Development?  
 Development generates Infrastructure?



Heavy Commute Demand + Infrastructure = Highway  
 Heavy Commute Demand + Commercial Development = Boulevard  
 Heavy Commute Demand + Infrastructure + Commercial Development = **JAM**

The traffic flows on the corridor could enhance local development. However, the current pattern is only transit-related local development. Public services, for instance, shops, restaurants, and parking lots are gathering along the corridor. Private transportation is the main type of mobility and takes up a huge amount of space, which shows a low efficiency. The negative externality of automobile mobility compromises the quality of the public space.



Sections made by author

# Vehicles take over Ground

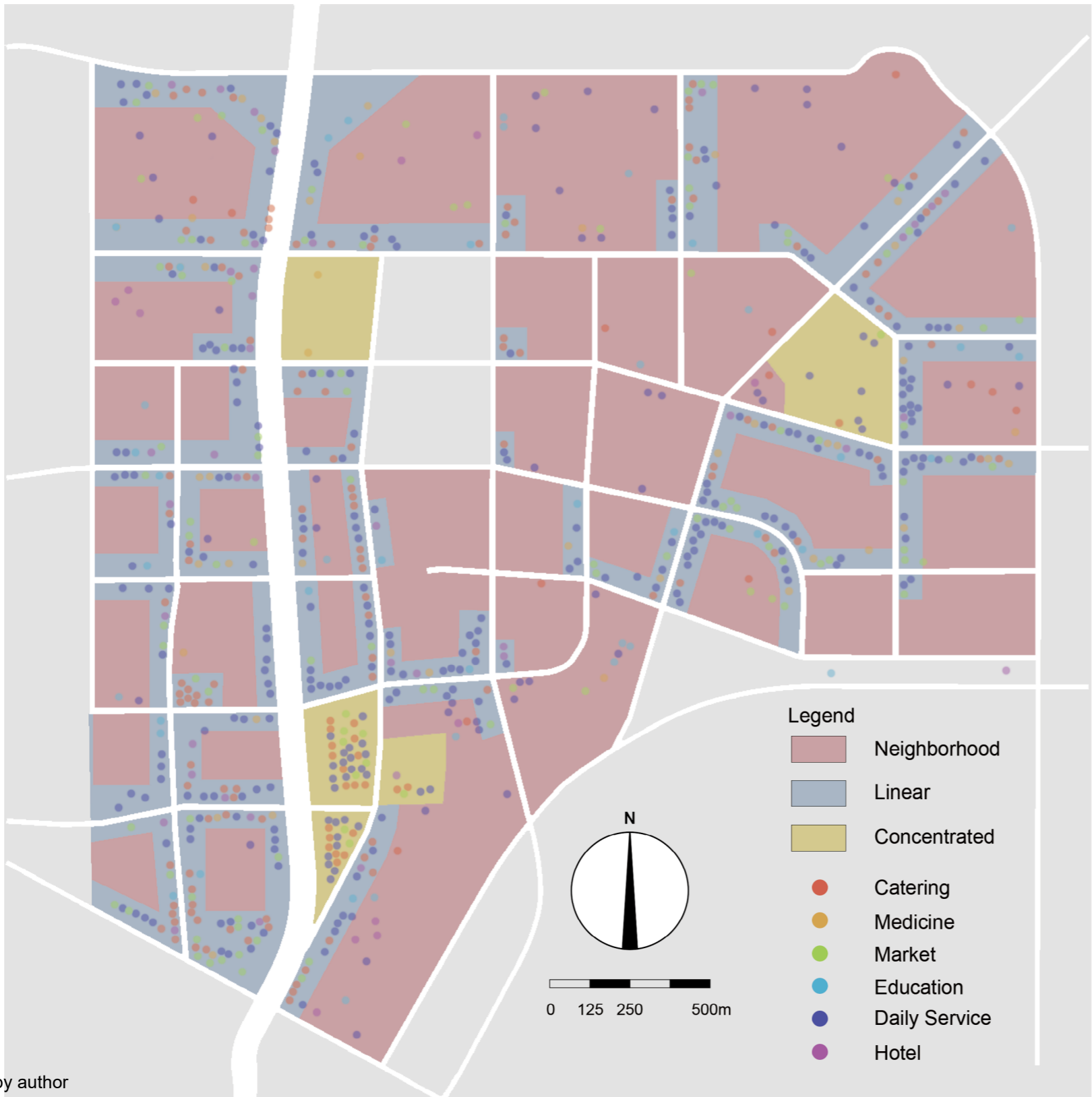


Photo by author

### Pattern of public service: following Street

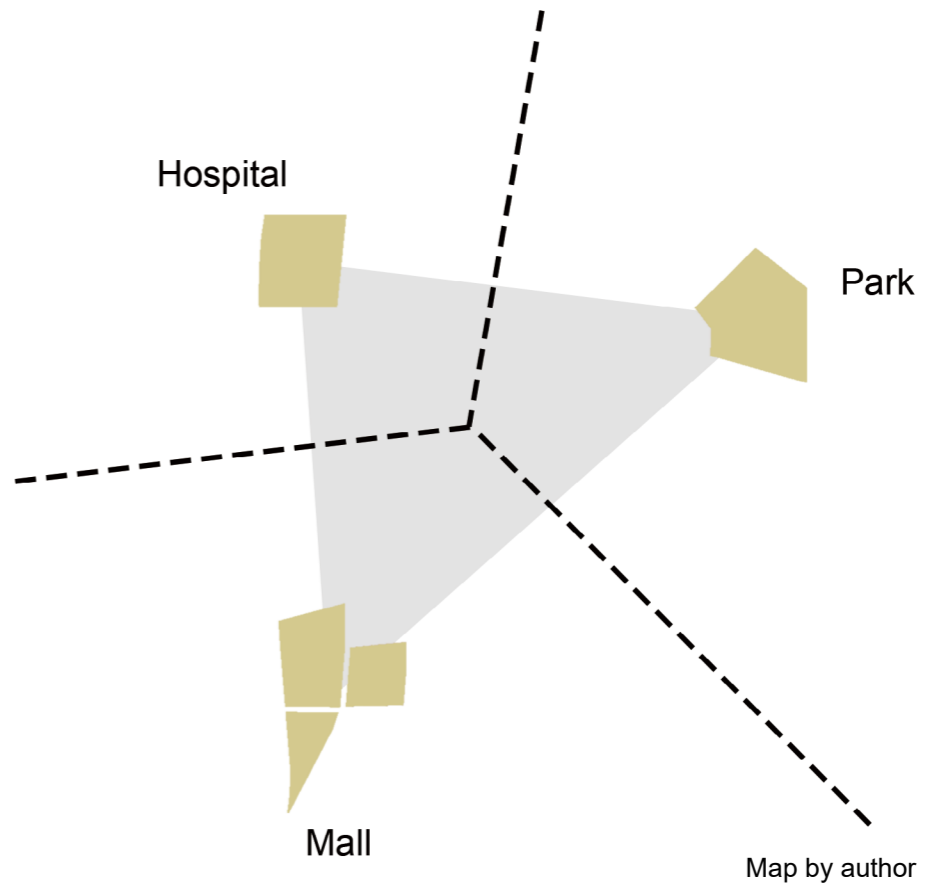
By tracing all the services providers in the community, the author observe three concentrated areas, including a hospital, a park, and a mall. Most of other markets and shops are in a linear form following the street layout. Although traffic stimulates the

development on the corridor, interference between transportation and public services show the conflict between the vehicles and pedestrians. The modern transportation model has both positive and negative influence on the public services distribution.



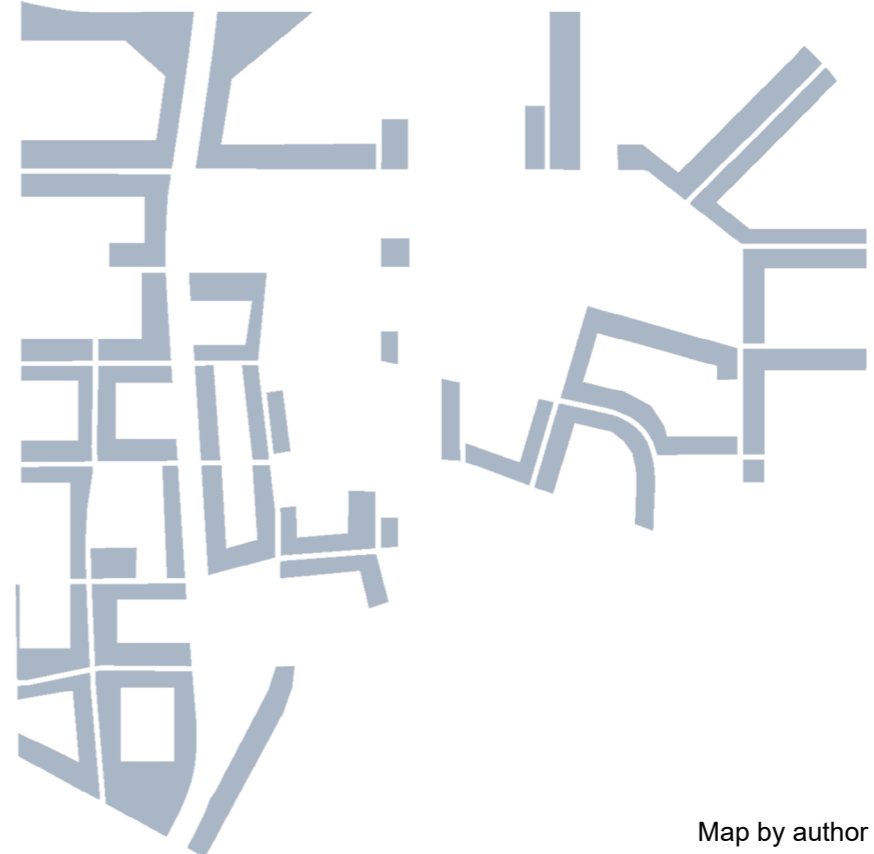
Map by author

### Three concentrated service blocks



Map by author

### Non-cohesive functional structure



Map by author

## The conflict between Public Space and Transportation

### Chaotic Street



Photo by author

### Crowded waiting area of Subway



Photo by author

### Property Line as Division



Photo by author

### Parking Issue



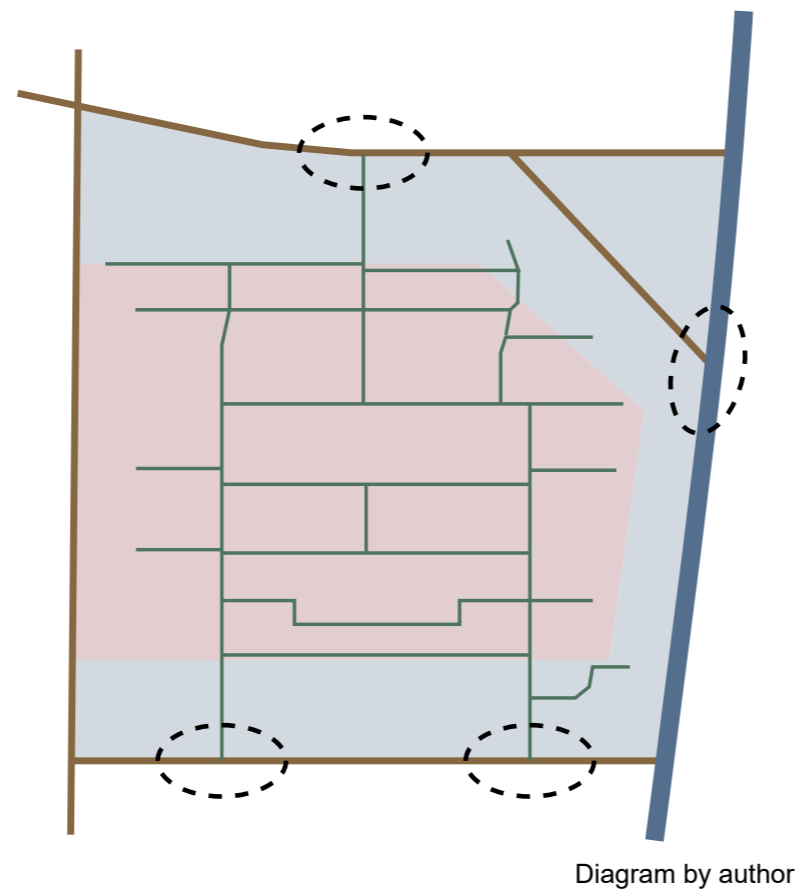
Photo by author

### The vertical development of community complex

#### Flow between systems

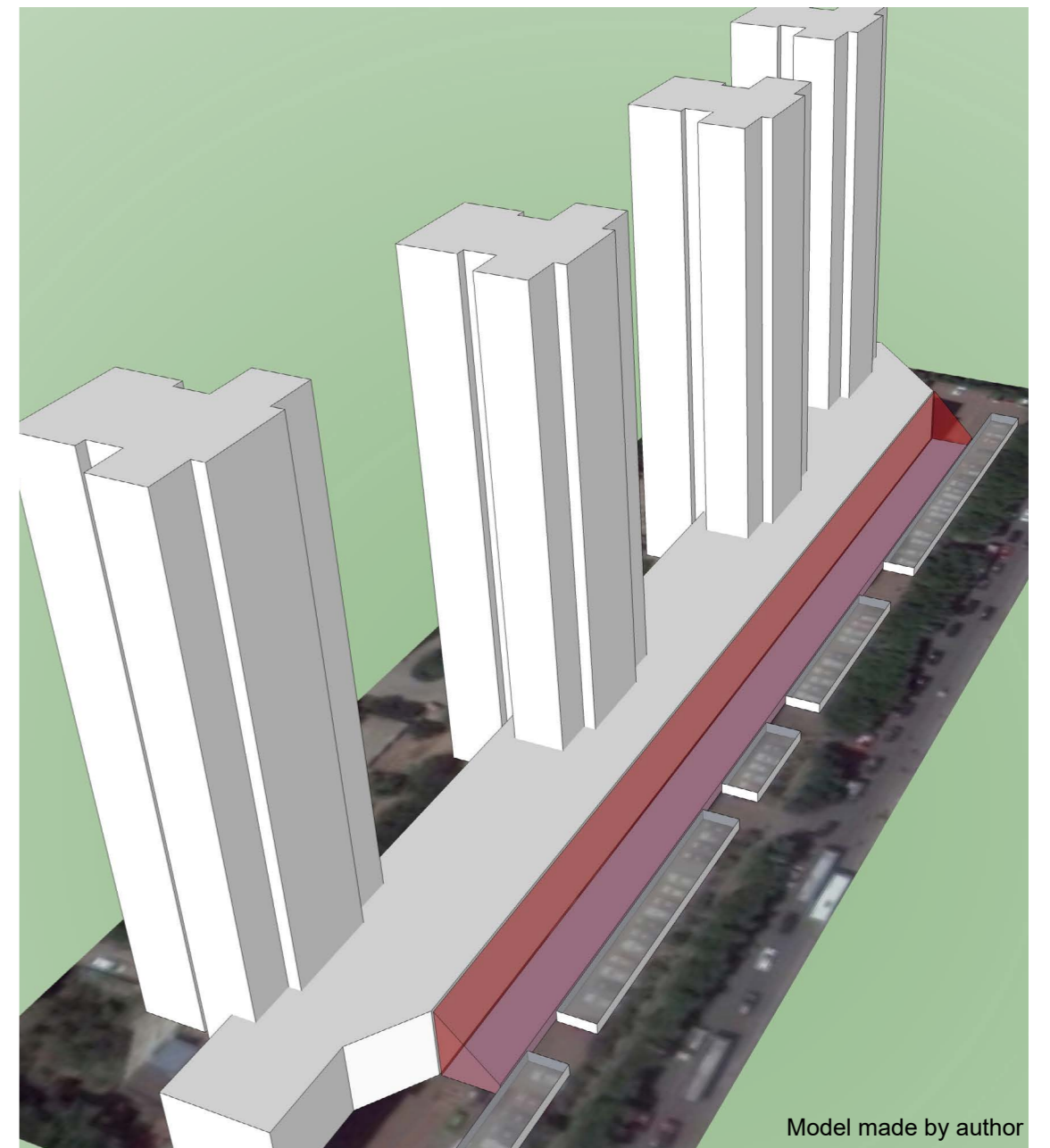


#### Periphery, where systems meet

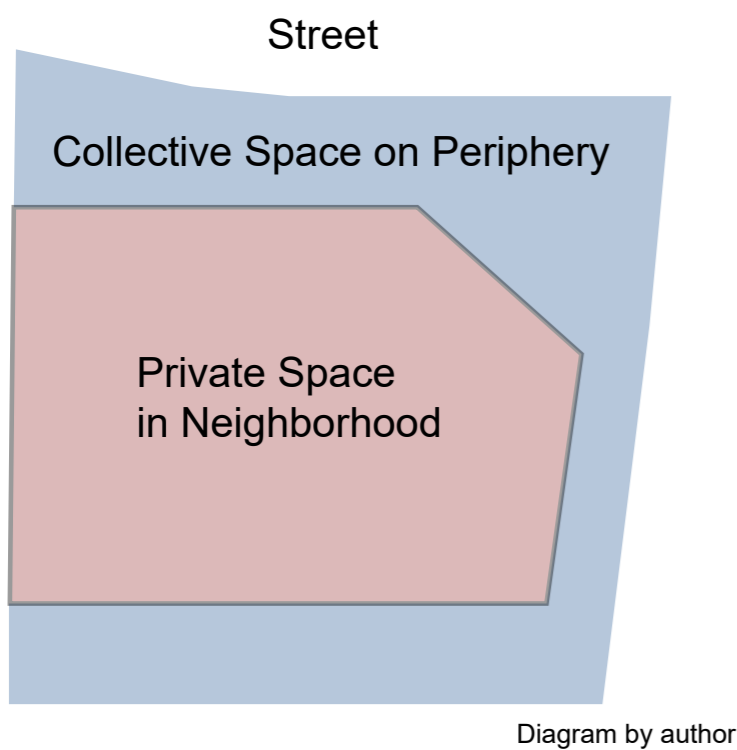


The reason why services are in a linear arrangement is based on the pattern of collective space in the community. The main forms of the collective space are the expression of community complex, located at the periphery of the neighborhoods. The periphery is in-between a private neighborhood and the street. As the saying goes, when systems meet, new opportunities arise. The collective space secures the privacy of the neighborhood and opens to the street at the same time. Lower floors are used as interior collective space to provide services. This complexity is the perfect form to combine services and housing to deal with high density with the vertical strategy. However, the present transportation situation falls short on all the demands, as is observed of the public transport, private transport, pedestrian, etc.

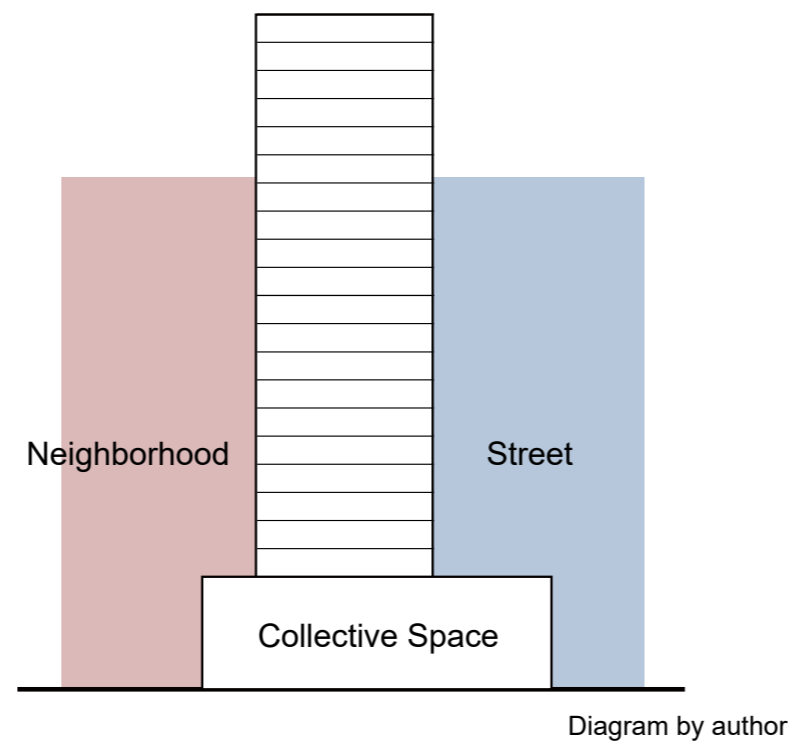
#### The community complex as physical platform



#### Private, Collective to Public



#### Complex as Divider



## 6.4. The vision of Transit-Oriented Development:

The proposal on TOD is structured on some concrete goals

### a. To balance the public and the private transportation

Belzer and Autler (2002) value the historic and define the future transit-oriented development. They classified on the four stages as development-oriented transit (the early 20th century), auto-oriented transit (the post-war years), transit-related development (today), and transit-oriented development (tomorrow).

*TOD has the potential to contribute to improvements in retrofitting existing neighborhoods. More intensive mixed-use development alone can allow an increase in walking and bicycling within the neighborhood. Less automobile use means less consumption of fossil fuels, less air pollution, and lower spending on transportation. When a transit connection is added to the mix then auto-free travel to other parts of the metropolitan area become more feasible. In short, transit-oriented development can be a central part of a development paradigm that is more environmentally sustainable and more socially just, and that contribute to both economic development and quality of life.*

The vision of future TOD model described by Belzer and Autler is exactly what Paradise Gateway needs to become. The local mobility and services problems can be solved with a trend of mix-use development with a public inclined transportation system.

However, the auto mobility as the main private transportation is still the main transport type at Paradise Gateway. The reason is simple price: the price of 4 square meters of an apartment in Paradise Gateway equals to an average car. Anyone who owns an apartment is very likely to own a car. For the apartment renters, the car is also a good choice for commuting, as it provides a direct transport mean between home and workplace. But besides the low efficiency and high energy consumption, the cars cannot interact with the services of the street. The wide road for auto mobility flow creates a large no-entry zone that is not accessible for pedestrians, not to mention public spaces. Unfortunately, the auto mobility will continue to act as one of the major type of transportation in the future. Thus, in order to encourage TOD in Paradise Gateway, the major auto mobility flows must be set apart from the public transportation to avoid the conflict. A customized TOD mode should be applied to the mega-community so as to provide mix-use for public transportation and public services and, at the same time, guarantee the smooth decline of private auto flows. It should be a complex system to accommodate the pedestrian, public transportation, public space and services, private auto and the parking lots.

### Current narrow bus stop in the middle of auto roads



Photo by author

### Current narrow pedestrian path next to the corridor

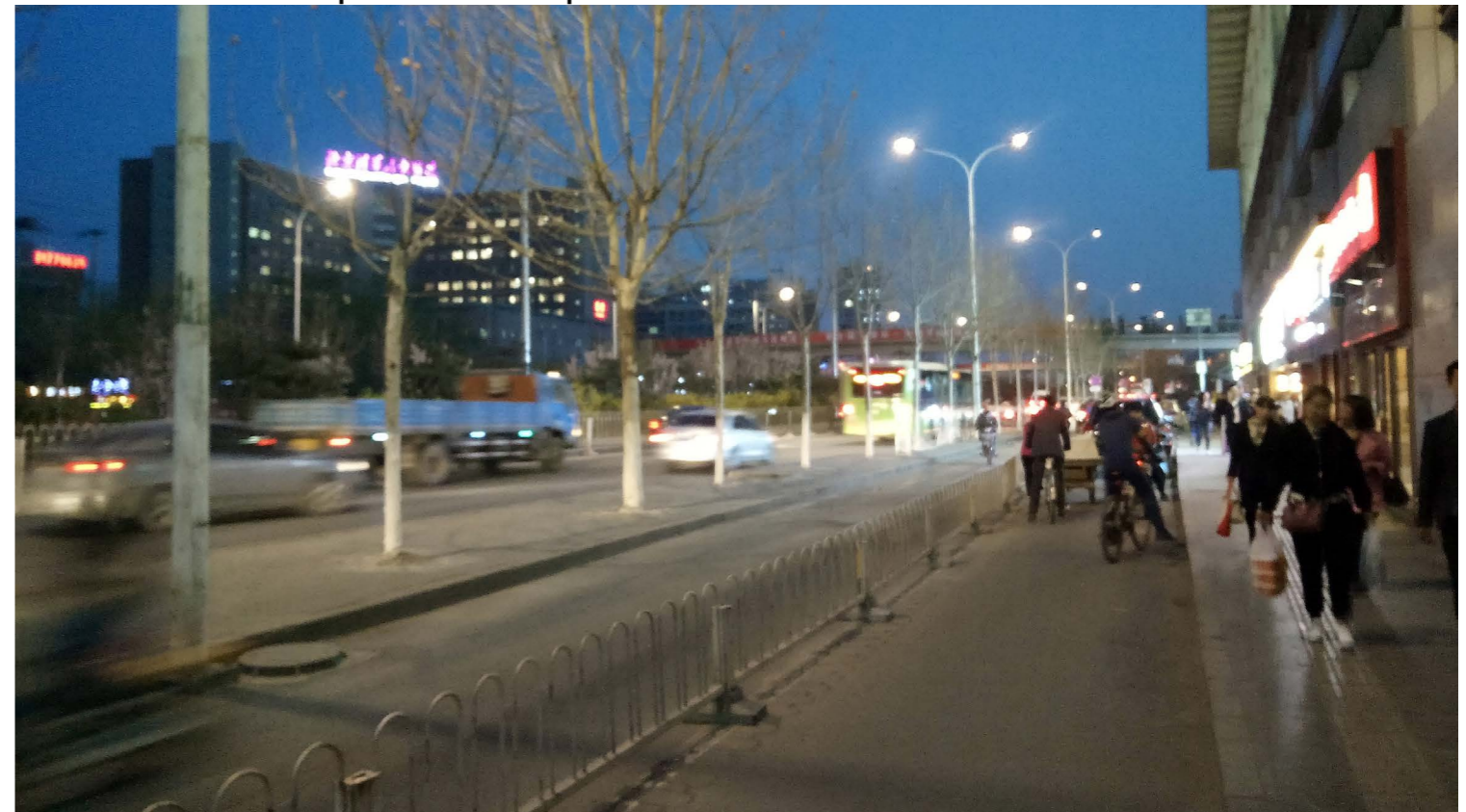


Photo by author

b. To integrate the regional and the local vision

When it comes to the issues of Paradise Gateway, the relationship between regional scale and local scale presents unprecedented complicated and important relationship. The birth of this mega-community is the result of a rapid urbanization with a distinct monocentric functionality in the whole region, but the main problems are expressed within the community on the local scale. As a major mega-community that takes the responsibility of housing the employees from the city center, the population grows along with the development of the city center. The high interdependency between the scales determines that the revitalization of the local area must be carried out in an inter-scalar approach.

The proposed regional vision has been described in the last chapter. The regional vision searches to guide the local improvement. By encouraging functional new-town development and regional cooperation, the overcrowded population of Paradise Gateway can be decentralized as a pre-condition to make an improvement. This shift allows Paradise Gateway to increase its housing quality instead of housing quantity. It also reorganizes the commuting pattern, so as to relieve the current transportation congestion. On the other hand, the local scale also responds to the regional scale functionality. The local TOD vision on public transportation is the device to achieve a feasible connection in the regional scale.

As a result, the integration of the regional and the local vision is important. The proposed infrastructure must merge into the current transportation system of Beijing as a whole. On the one hand, the current transit connection to the city center should be enhanced to lighten the congestion. The current corridor of Paradise Gateway named S213 (S stands for municipality governed roads). Building a bypass of G45 through Paradise Gateway as another corridor to the center is the most feasible solution (G stands for national governed roads). Unlike S213, G45 is a exclusive highway, which provides larger capacity. This adjust allows the current corridor to concentrate on public transportation. On the other hand, a transit connection to the new towns should also be created. By linking Paradise Gateway to S28 and the 6th ring, the transit between the mega-community and the new towns is more feasible. Moreover, the proposal subway line (see page 75) operates on the same route to provide public transportation.

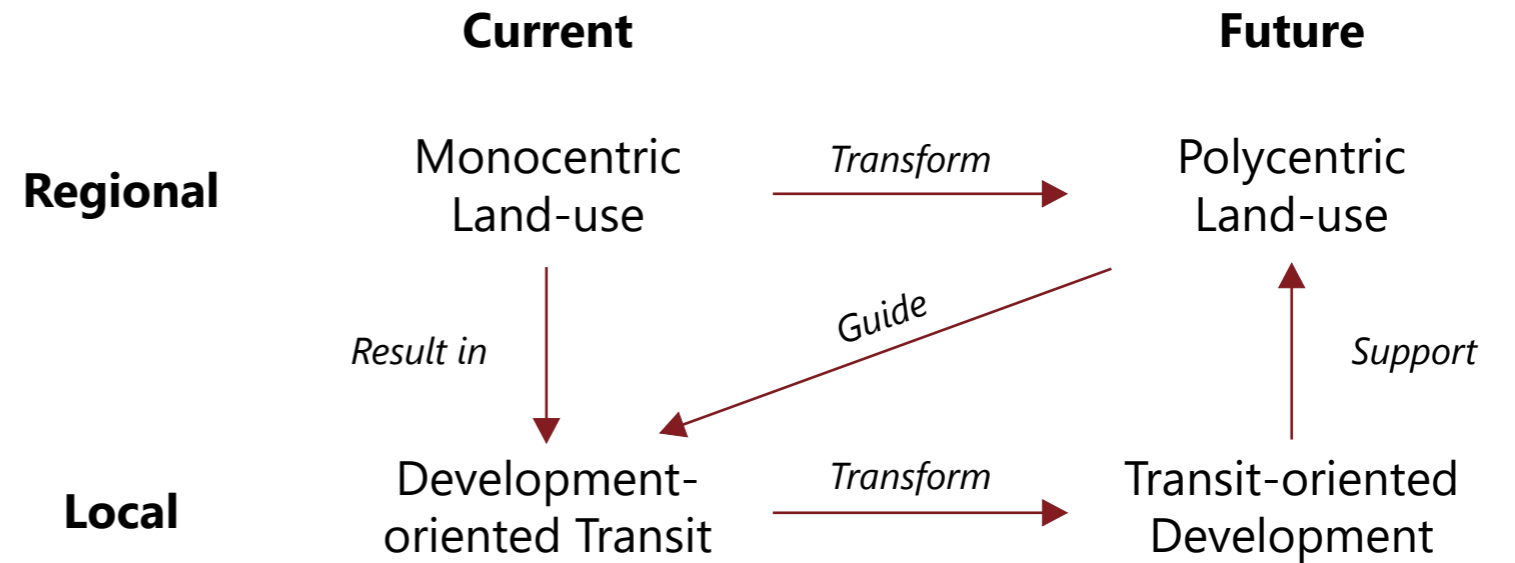
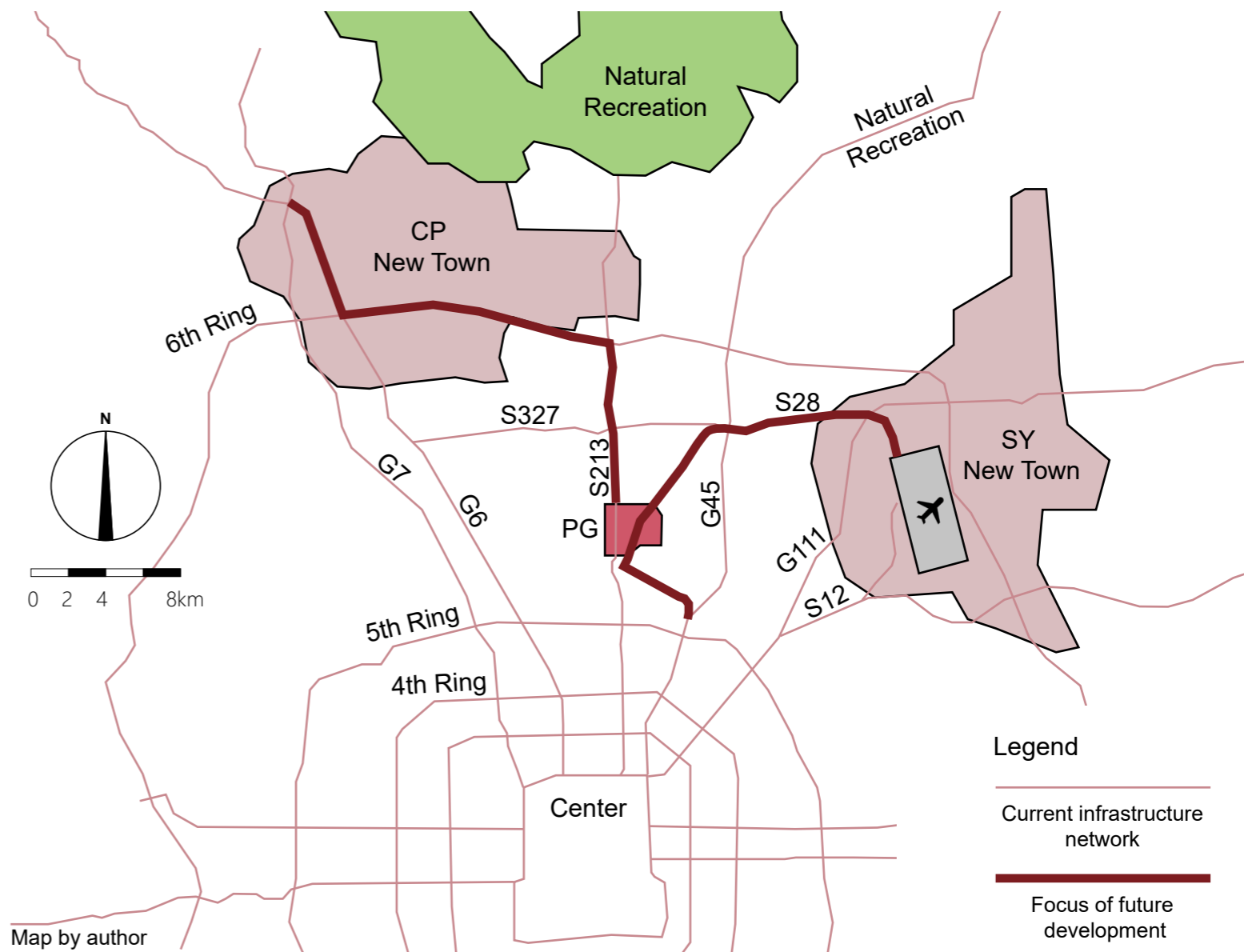


Diagram by author



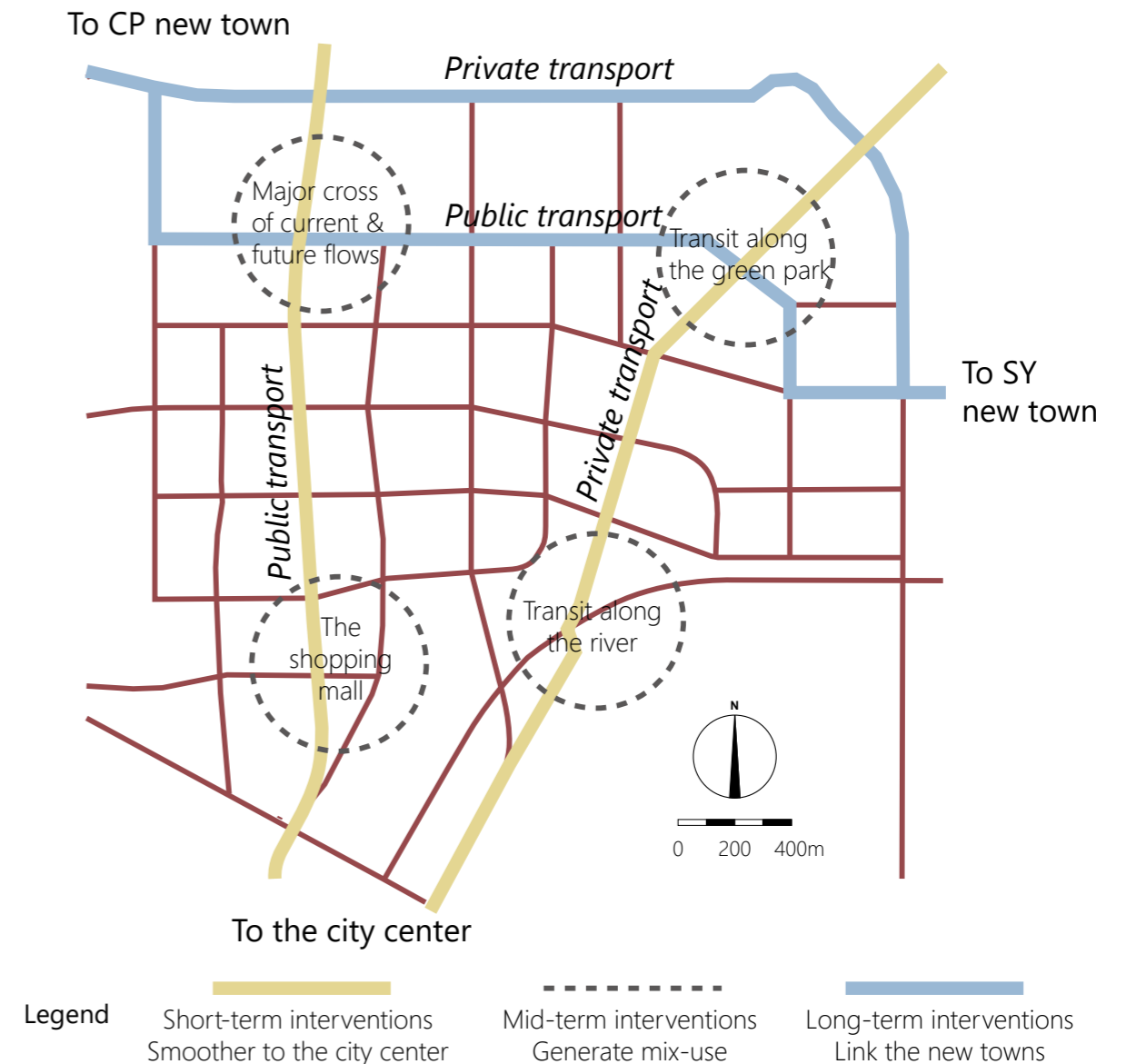
Map by author

### c. To link the short-term plan and the long-term vision

Attention should also be paid to the procedure of transforming from the current situation to the future vision. The future cannot be true immediately. The transformation of the commuting pattern is a long-term vision, which will be finished after the thrive of new towns in the following 20 years. But in the next 10 years, the numerous amount of inhabitants in Paradise Gateway will still rely on the main city center for employment and recreation. Thus, a short-term plan should also be prepared to improve the situation and pave the way for the future mix-use that TOD mode demands.

The current corridor is where the private transportation strongly conflicts with the public transportation. As the private cars cannot be replaced in the short-term, an imminent task is to reorganize the automobile flow. The proposed bypass of Highway G45 can ease the conflict and make room for future mix-use development by pulling the cars out of the corridor. There is a clear difference between the proposal in this thesis with the 2005 corridor expansion project. The improve of transportation capacity is executed so as to reach the long-term vision.

Then, how the corridor interacts with the neighborhoods can be improved. The emphasis of the mid-term proposed goal is the merging of pedestrian flow and public transportation within the company of public services provision. The important area in this phase is marked with dotted circles on the map. Among all, the cross-point of the current corridor and the future commuting path to the new towns will be designed in detail, as it will be the most important joint of a large volume of commuters. Afterward, the method could be applied to the whole community. After all the short-term and mid-term preparation, the long-term interventions, linking Paradise Gateway and the new towns, can be carried out.



Map by author

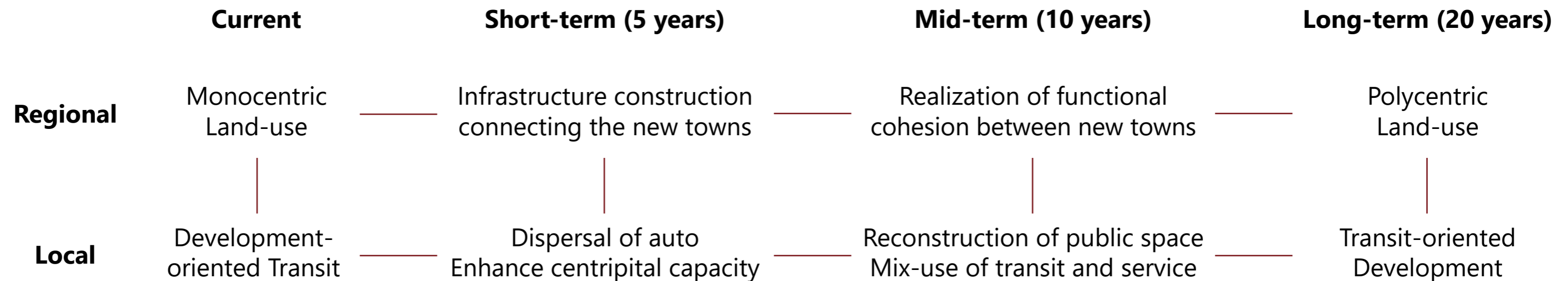


Diagram by author

## Conclusion of last chapter

Proposal polycentric model provides a solution on the regional scale. By strengthen CP New Town with innovative-IT industry, a cohesive belt will be created between Paradise Gateway and the New Towns. The role of Paradise Gateway will be shifted from the compelled housing choice of the center to an alternative housing in the middle of centralities, which will surmount the overcrowding and mobility problem. TOD strategy will be applied to the local scale considering the public-private relationship, inter-scalar integration, and timeline coordination.



# 7. Urban Design

as a tool to revise local development by regional vision

Focus of scale in this Chapter

I. Local scale

II. Urban scale

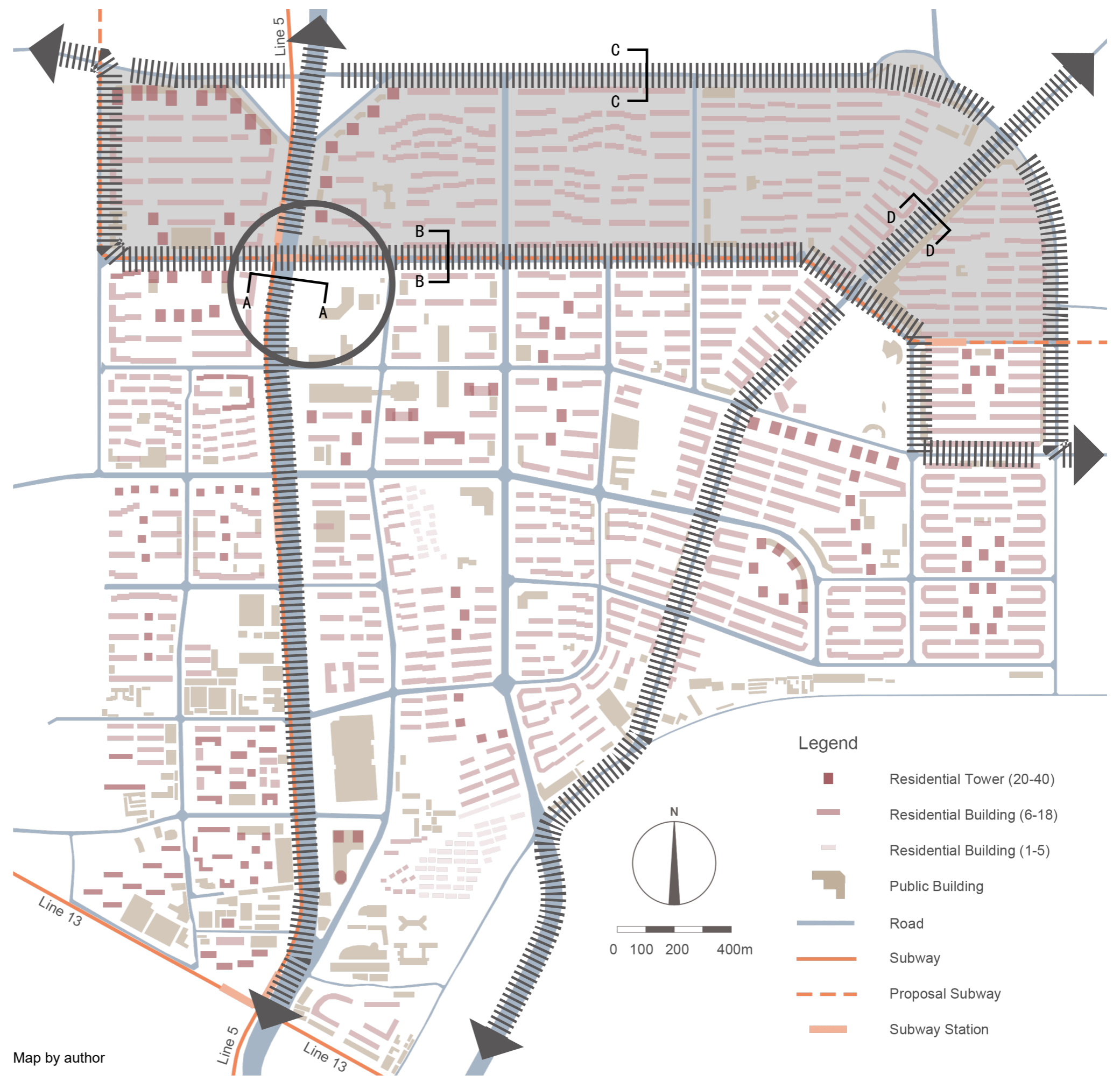
III. Regional scale

- Plan of infrastructure backbone
- Flow and landuse of the crossing
- Multi-layered transportation
- Design of the pedestrian square
- Adapt multi-layered transportation to the neighborhood
- Detailed design

# 7.1. Infrastructure Backbone and the Focus of Design

Following the long-term vision, a set of backbones of mobility infrastructure are built on the aim of providing connections to the new towns, so as to reach the revitalization of Paradise Gateway. The cross point of the current corridor and proposed subway line raises attention as it is the crucial point of merging the commuting connection to the center and to the new towns.

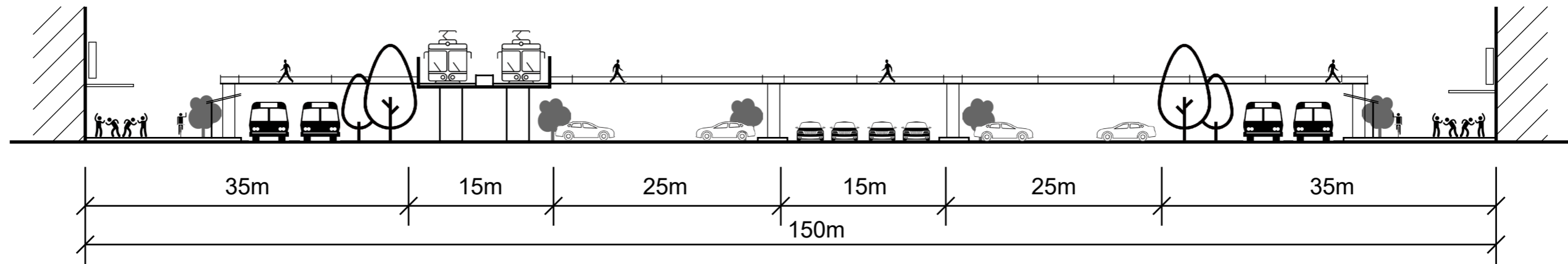
This crossing area is in urgent need of improving public space condition because of the large scale high-rise neighborhoods in the north fringe present a huge population density. It is also the crossing point where severe conflicts between public and private transportation, where is precisely the Tsinghua Memorial Hospital in Paradise Gateway is located.



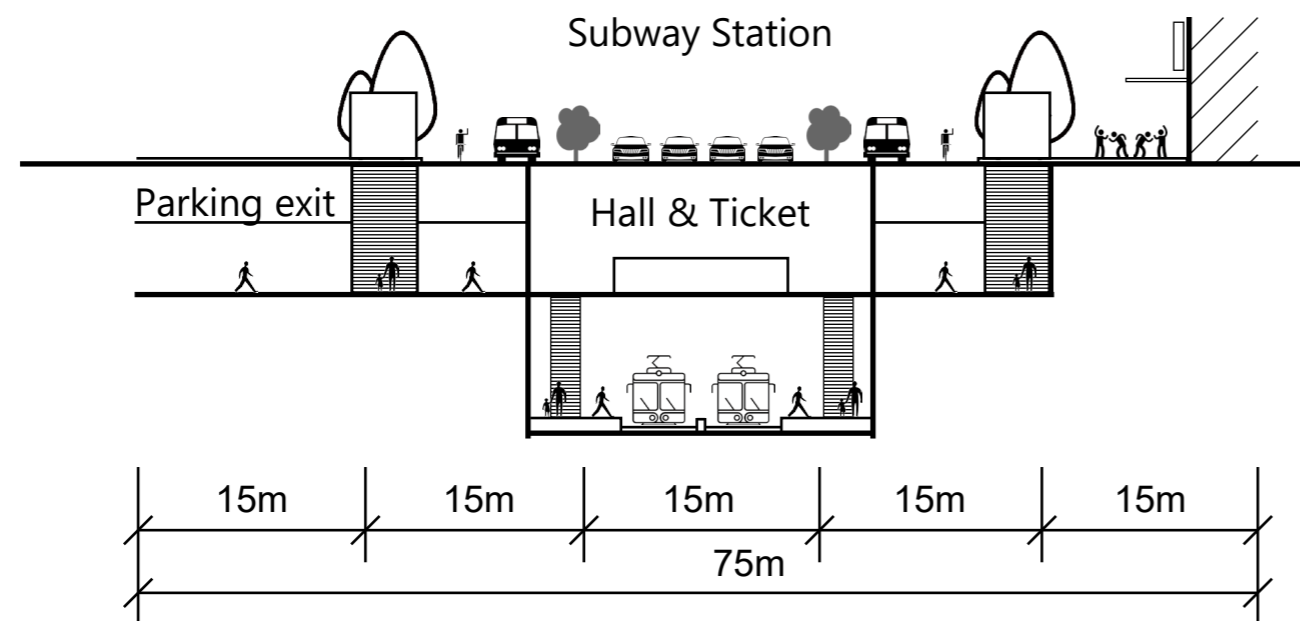
Action: reconstruction of road sections

Section by author

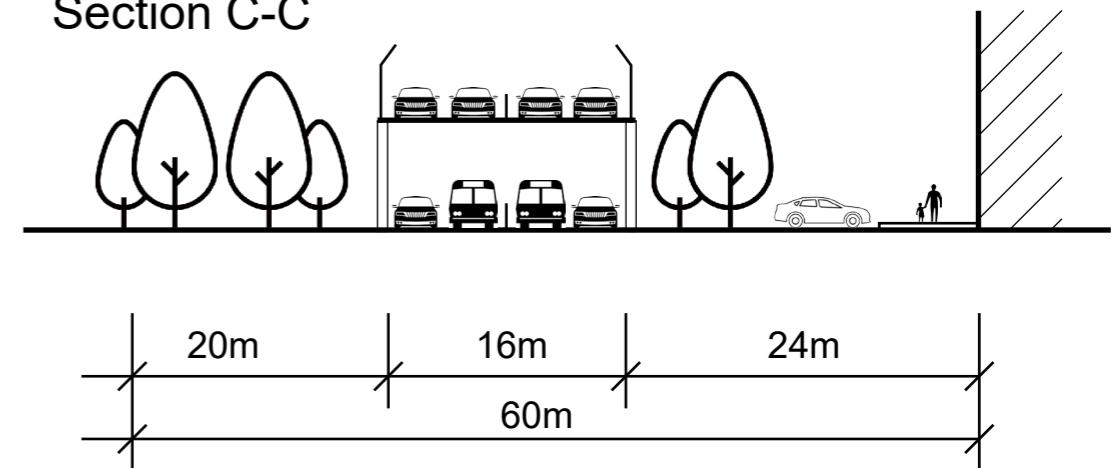
Section A-A



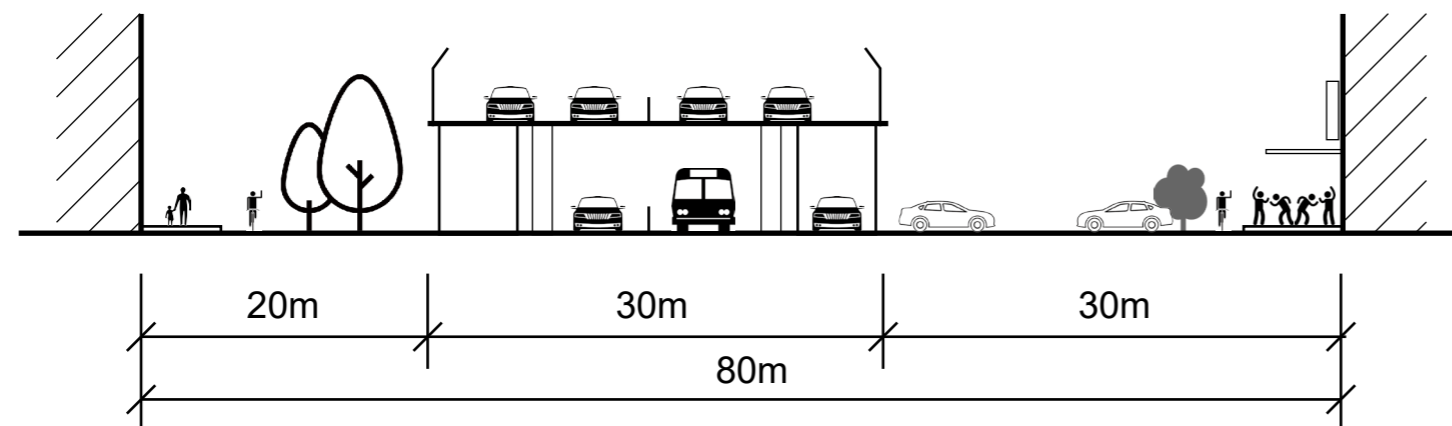
Section B-B \*To be explained in the following design



Section C-C



Section D-D



The drawings above shows the detailed sections of the infrastructure backbones. Section A-A and B-B are public transportation oriented. Section C-C and D-D are private transportation oriented, which will be responsible for pulling the cars out of the corridors.

It needs to be emphasized that Section A-A, the current corridor, is modified to integrate public transportation and services. The BRT (Bus rapid transit) lanes are moved to the sides to merge into the public spaces of the sidewalk. Together with the elevated subway line, a better public system will be created following TOD. The car lanes and parking will be switched so as to the middle to ease the conflict. Section B-B shows the detailed plan of the new subway line connecting the new towns through Paradise Gateway. The line will be built underground to prevent noise and interruption of the subway from the neighborhood. The crossing of Section A-A and B-B shows the focus of the urban design.

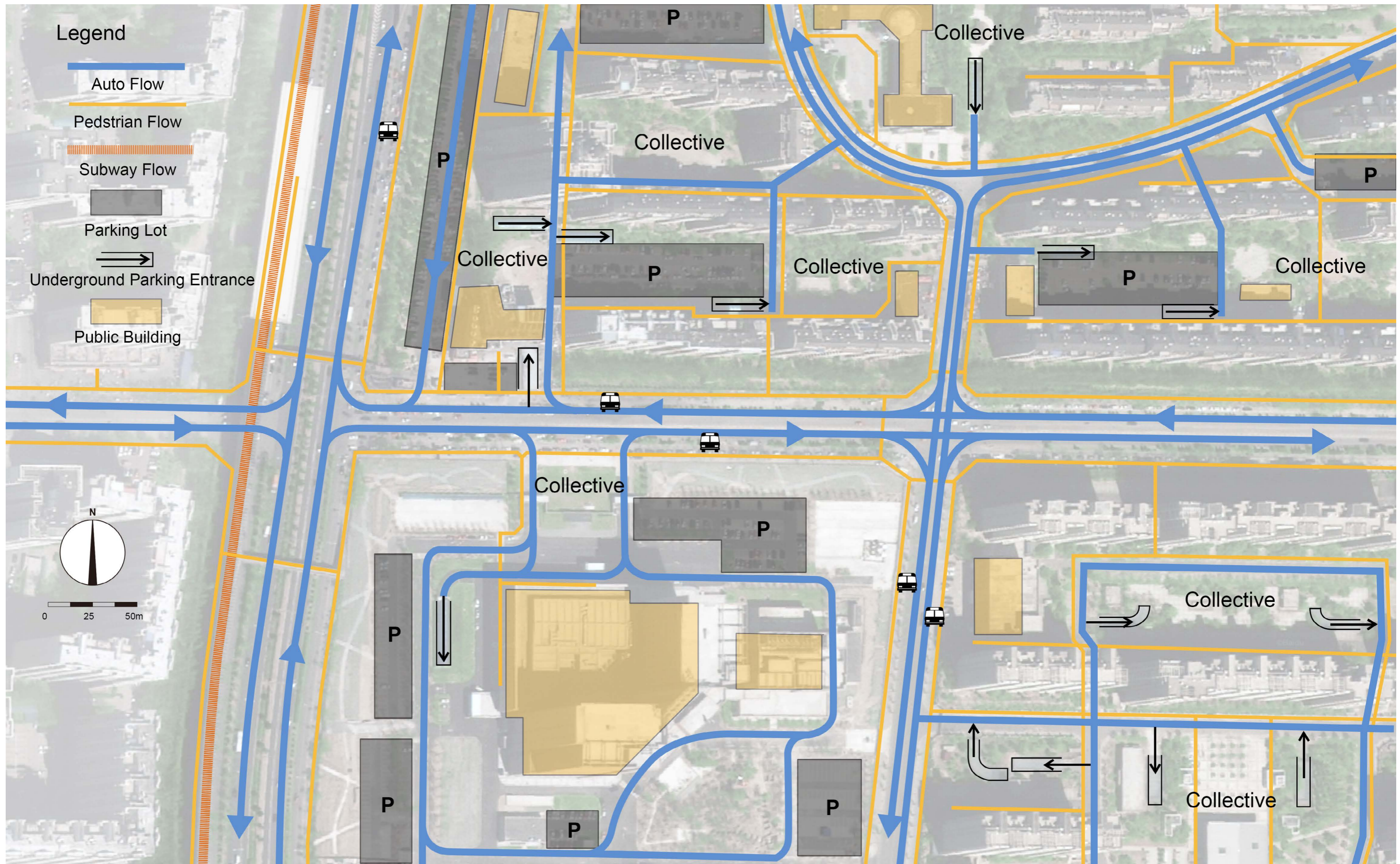
## 7.2. Analysis of the crossing

The crossing is the most unique and important spot in the revitalization of Paradise Gateway, which is the transfer spot of two directions of the commuting. The existence of Tsinghua Memorial Hospital raises the expectation of traffic volume. Again, as the Urban Land Market Theory illustrates, as further it is to the city center, the lower the land price is. As is shown in the map, several high-rise residential towers over 30 stories are located on the northern fringe of the mega-community. Thus, this area is also high in building and population density.

The most striking phenomenon here is the conflict of private and public transportation. It is expressed by the conflict between cars and pedestrians. The high-speed car lanes divided the street into parts, lowering the accessibility of public transportation and jeopardizing the safety of the pedestrian. Fences are installed everywhere as a reluctant action. An integrated TOD solution should be implemented to resolve this conflict.

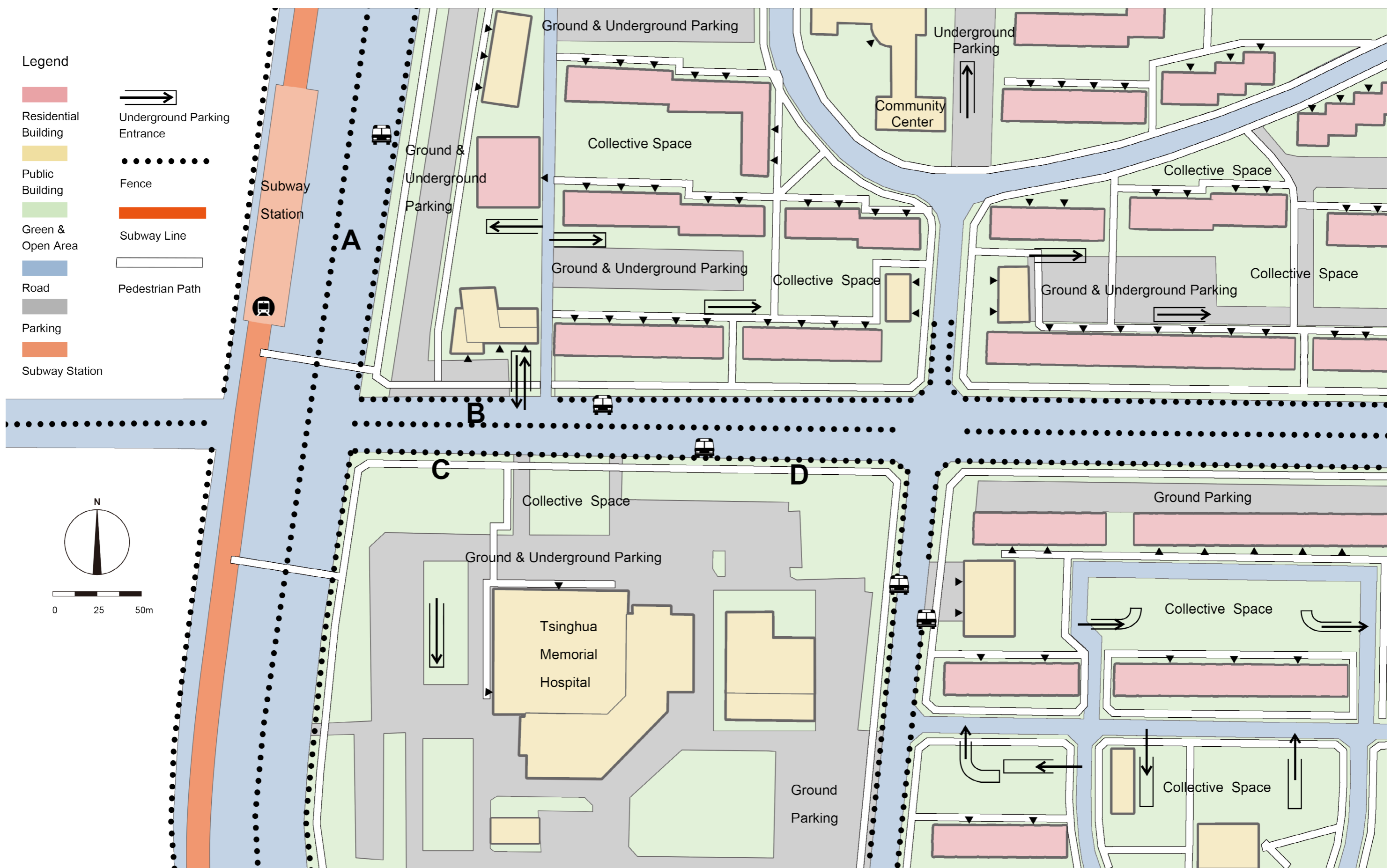


# Flow of Automobile and Pedestrian



Map by author, background map source: <http://map.baidu.com/>

### Land use: the Conflict between Auto and Pedestrian



Map by author

## Fences Everywhere: Divider of Transport and Public Space

### A. Fences between Lanes



Photo by author

### B. Fences between Auto and Pedestrian



Photo by author

### C. Fence as divider of Land Ownership



Photo by author

### D. Fences restraining Pedestrian Area



Photo by author

### 7.3. Integrated solution for Transportation and Service

As is shown in the previous analysis and photos, the conflict between pedestrian and vehicle is serious. The vehicles, as well as roads and parking lots, have taken up a lot of ground space. The public space for the pedestrian is squeezed to corners. Slow traffic, commercial, and recreation activities are in chaos.

Hilberseimer's (1924) proposal of elevated street provides a solution for high-rise urban area in terms of density, program, and infrastructure. His approach has been labeled as radical, as it didn't fit in the general urban context of his time. As the appearance of modern mega-city, his approach was gradually accepted, especially in Asian cities. The vertically separation of pedestrian and vehicle reduced the conflict, provides safety and quality of public space, and guarantees vehicle transportation efficiency at the same time.

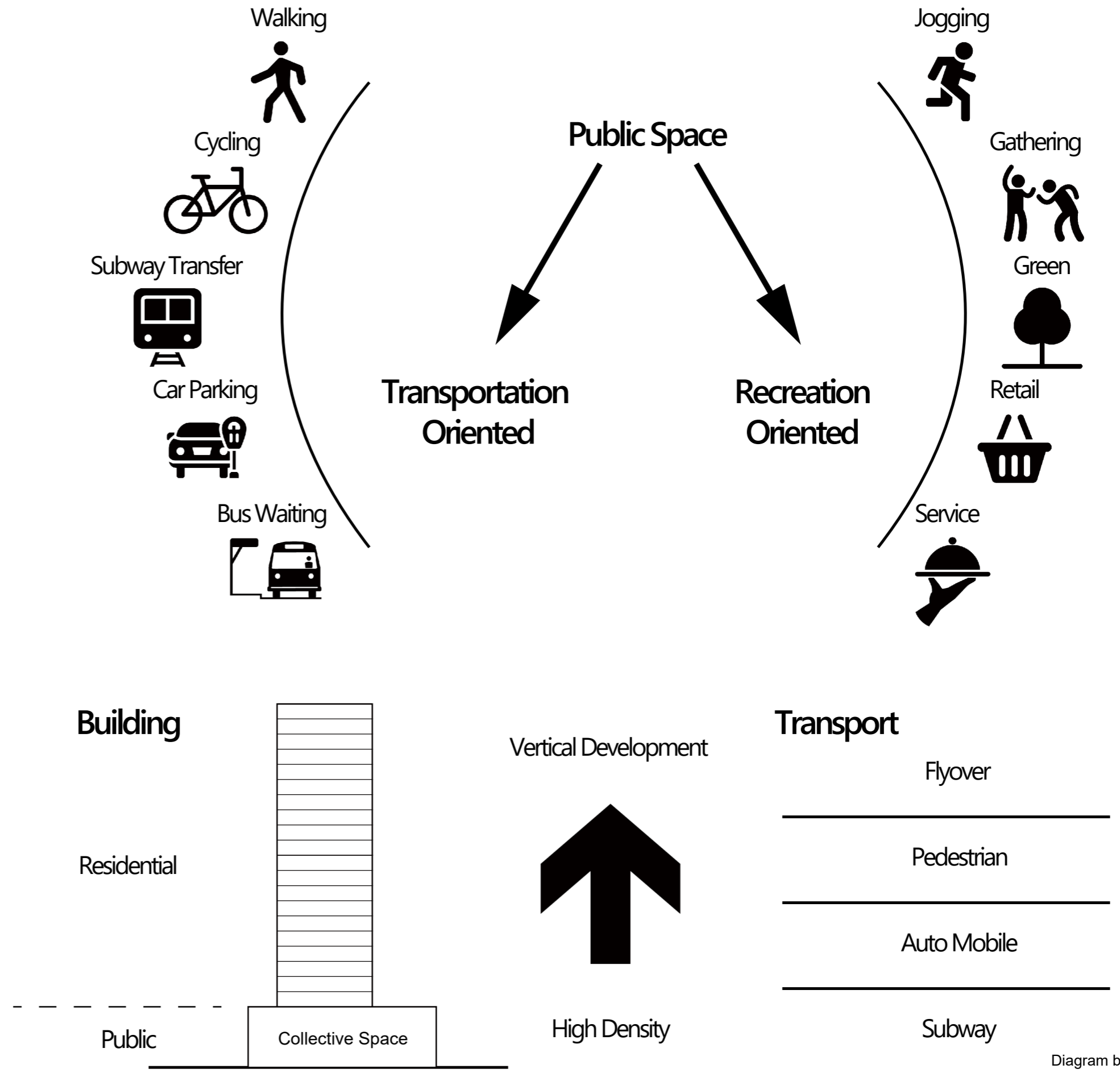
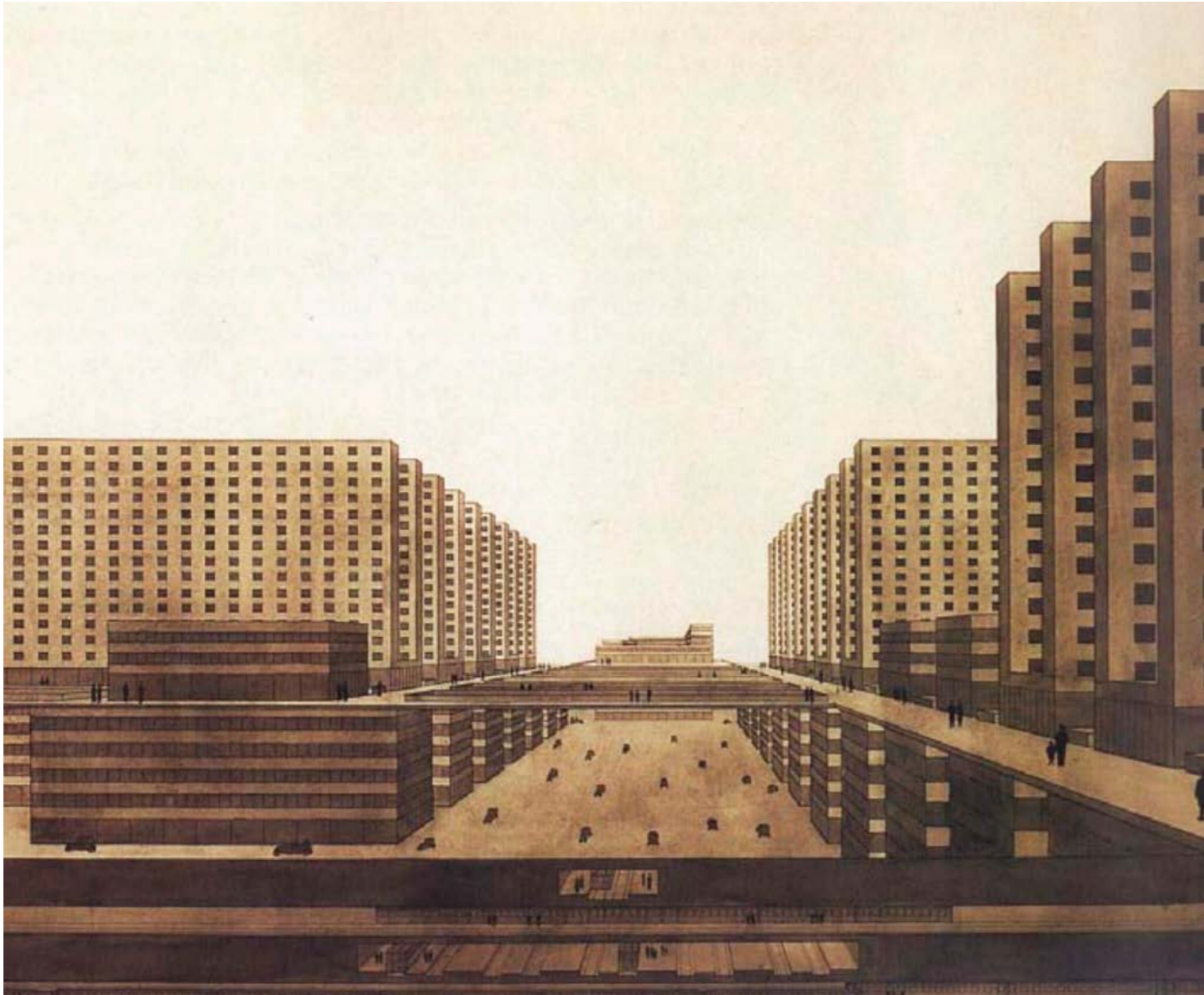


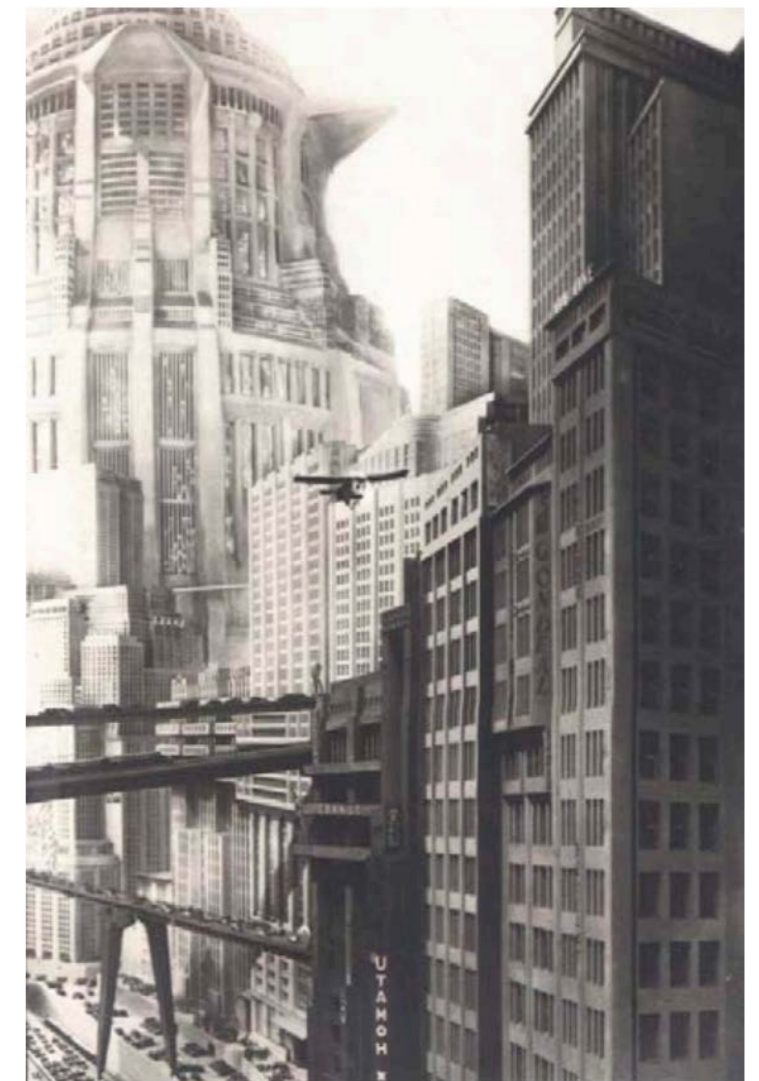
Diagram by author

## Theory: Ludwig Hilberseimer and the High Rise City (1924)



View of the high-rise city project. (L. Hilberseimer, 1924) Large-town architecture. Julius Hoffman publishing house, Stuttgart

Hilberseimer (1924) proposed different solutions for the American traffic problems of his times, including the upper floor streets solution, that was a very influential on the project of the High Rise City. The plan was published in Large-town architecture (1927). The drawing on the left is the most famous upper floor streets plan, which is the first design of the approach describing a multi-layered transportation.

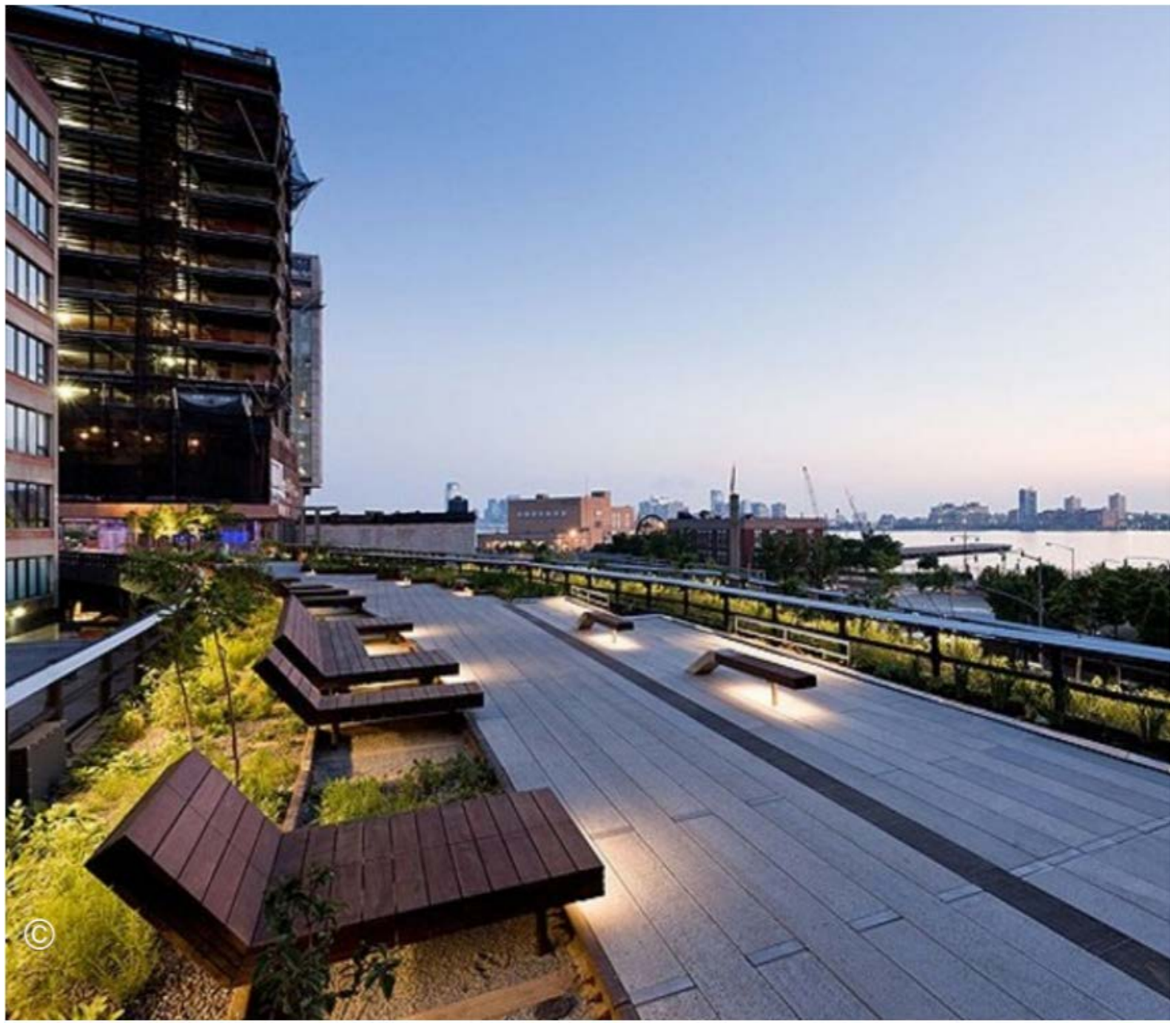
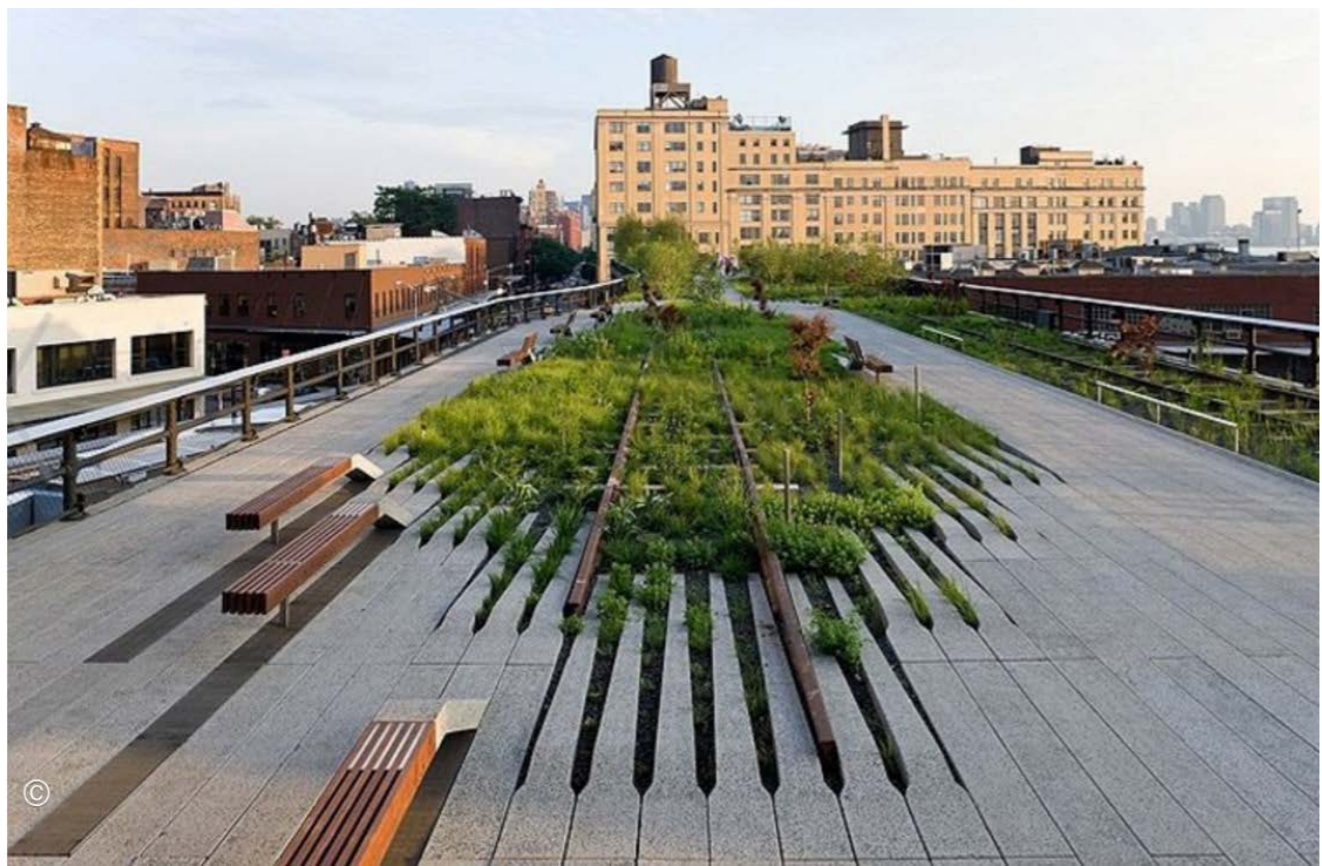


20's American skyscrapers view and futuristic collages, Vertical transportation concept in 1927

Case study: The New York High Line (2009)



The High Line, which is under the jurisdiction of the Department of Parks & Recreation, was the former West Side industrial railway. It is a 1.45 mile-long elevated, steel structure built in the 1930s for freight trains; the last train ran on it in 1980. In 2003, an open competition was held to convert the existing infrastructure into a public park. The winning proposal by James Corner Field Operations with Diller Scofidio + Renfro includes over a dozen access points to the elevated park.



The New York High Line officially open. (2009. )<http://www.archdaily.com/24362/the-new-york-high-line-officially-open/>

## Case study: Chinese cities' plan for multi-layered transportation

## Underground plan for Tianjin Coastal New-region (2013)



As Chinese cities are fast and intensely developing, the need for relieving the conflict between traffic and pedestrian is becoming urgent. Hilberseimer's approach, once considered radical, now is being welcomed by the cities of high density. The urban complexity as expressed on an elevated pedestrian platform and underground public space can be found in every major city in China, as can be observed in the underground plan for Tianjin Coastal New-region (2013) and plan of Shenzhen Qianhai seaport of modern service industry zone (2015). Multi-layered transportation is a combination of public space, pedestrian path, public transportation and car parking. It separates different functions by layers to prevent conflict from happening. Multi-layered transportation is an attempt to provide quality and efficiency at the same time in a high-density area.

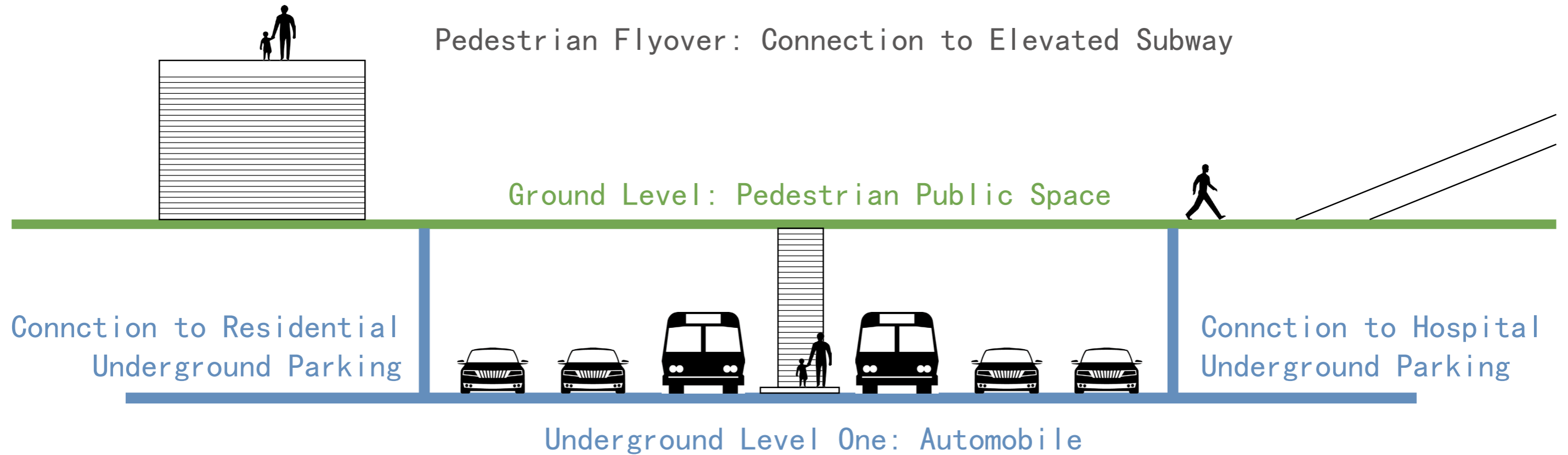
## Plan of Qianhai sea port of modern service industry zone, Shenzhen (2015)



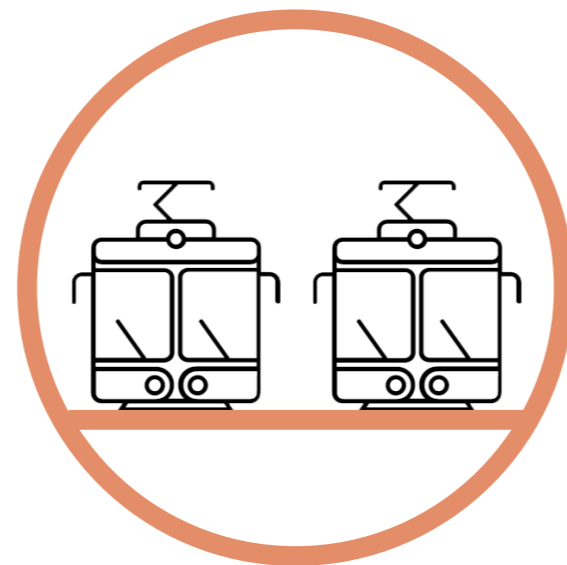
Tianjin Bohai Urban Planning & Design Institute. (2013). <http://www.tjbupd.com/projects/detail/99?t=22&p=1>

Qianhai sea port's plan of 40 meters underground development. (2015). [http://news.ifeng.com/a/20150923/44718731\\_0.shtml](http://news.ifeng.com/a/20150923/44718731_0.shtml)

## 7.4. Proposal Solution: Multi-layered Transportation

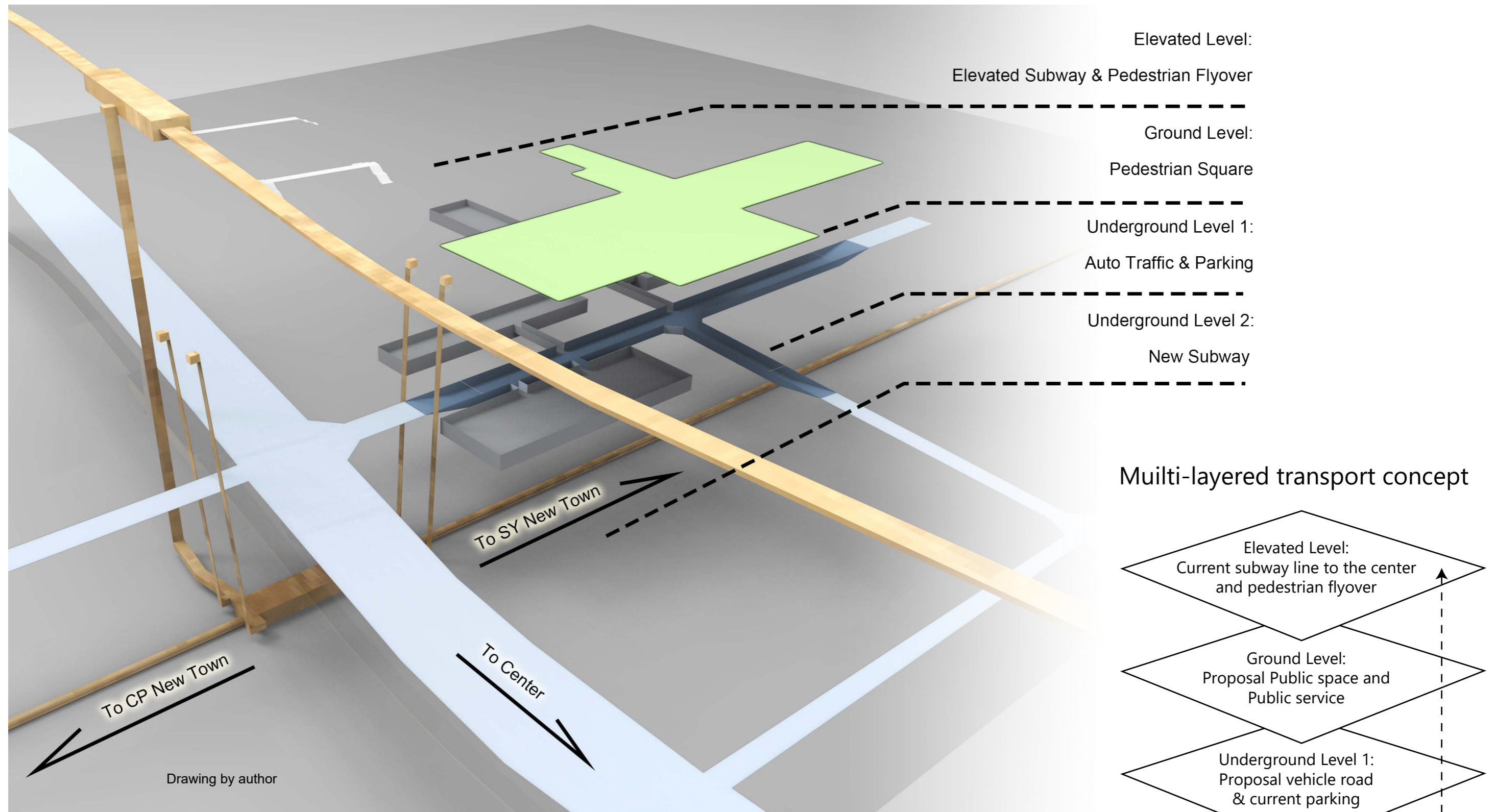


In order to provide an integrated transit-oriented system and increase traffic efficiency, a tailored mode vertical transport system should be applied in order to allow different systems to cooperate with each other. In the case of the crossing of Paradise Gateway, four layers are included. The core principle here is to return the ground to the pedestrians and create a walking-friendly environment with convenient access to public transportation. On the other hand, the multi-layered transportation system encourages the efficiency of all kinds of transportation in an organized and undisturbed system.



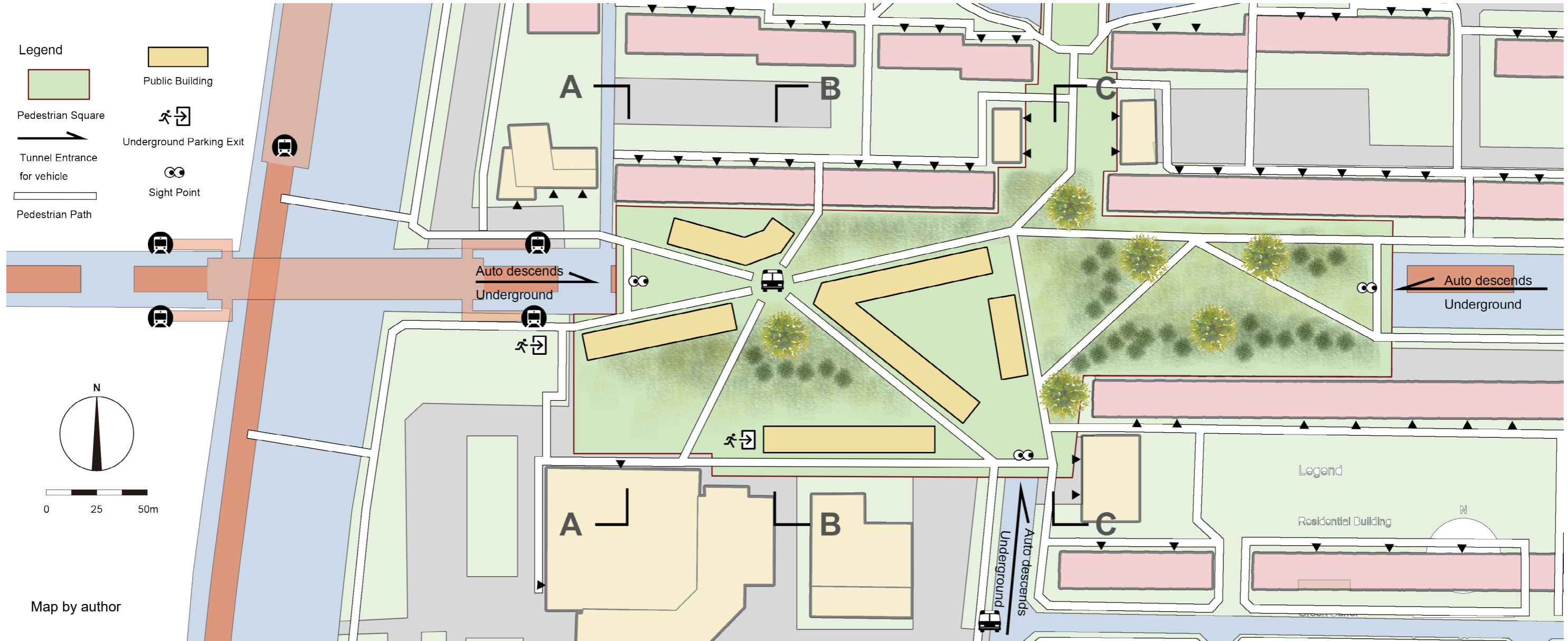
Underground Level Two: New Subway

Proposal: Perspective of proposal Multi-layered Transport System for Paradise Gateway

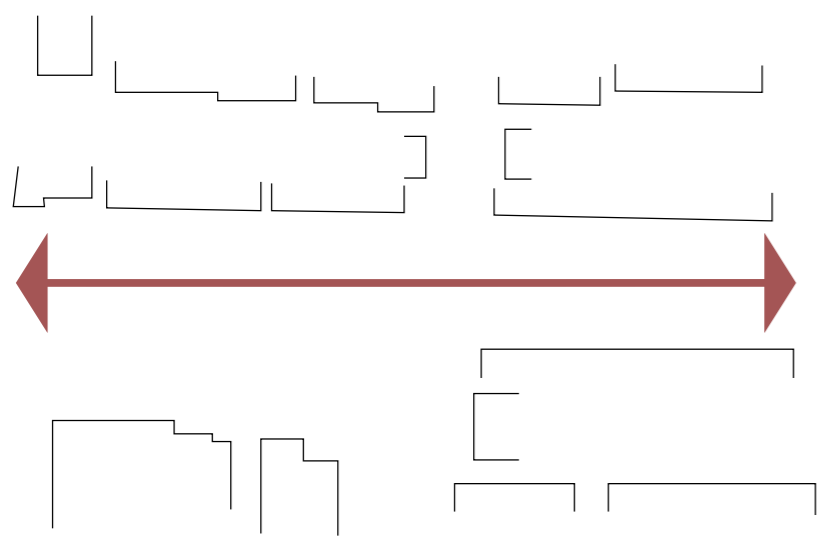


The square on the ground level achieves the goal of returning ground back to pedestrians, which provides a bonus to the public area for nearby neighborhoods. Flyovers connect the square with the elevated subway. Car traffic is moved to the underground, in order to make room for pedestrian while directly linking the parking area at the same time. The proposed subway line, connecting the two new towns, lies at the bottom, with transfer passageways between the elevated subway and the square. In this system, the square is also acting as a buffer area for subway stations.

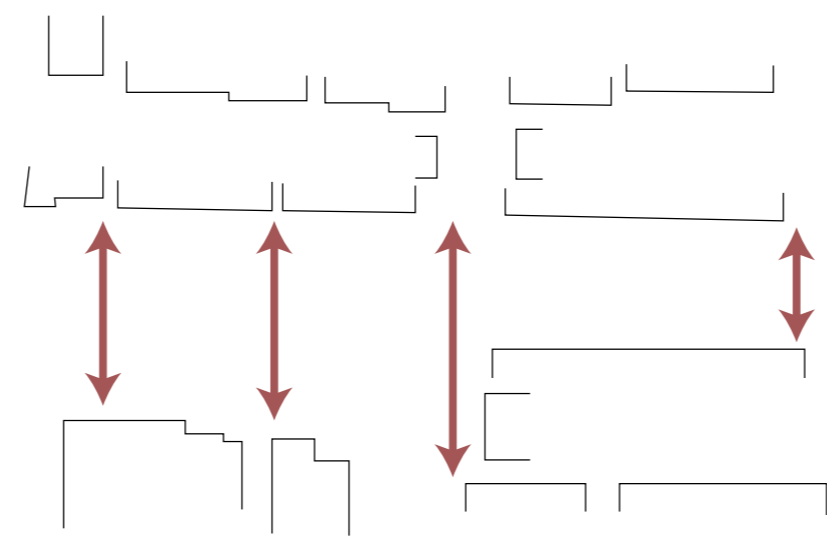
# 7.5. Core Principle: Return the Ground to Pedestrians



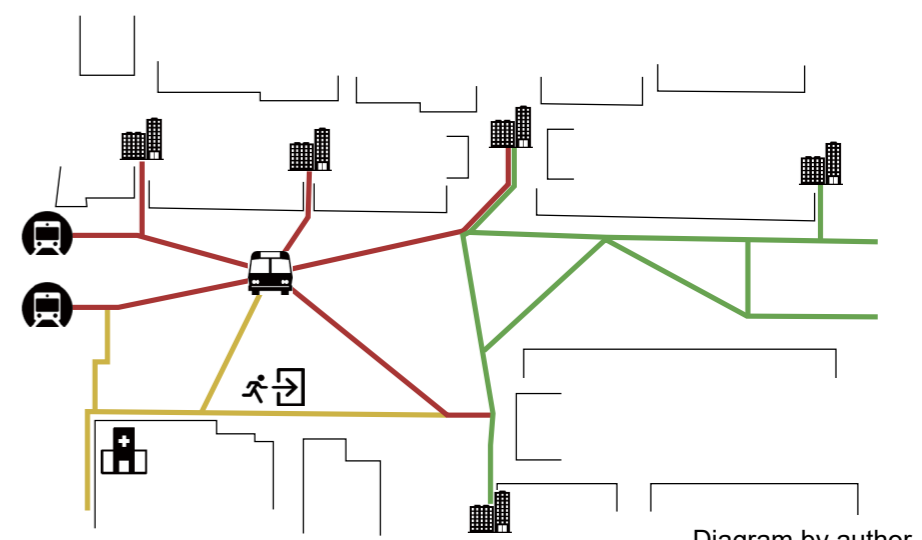
Slow traffic west-east



Accessibility between north-south



Transition between functions



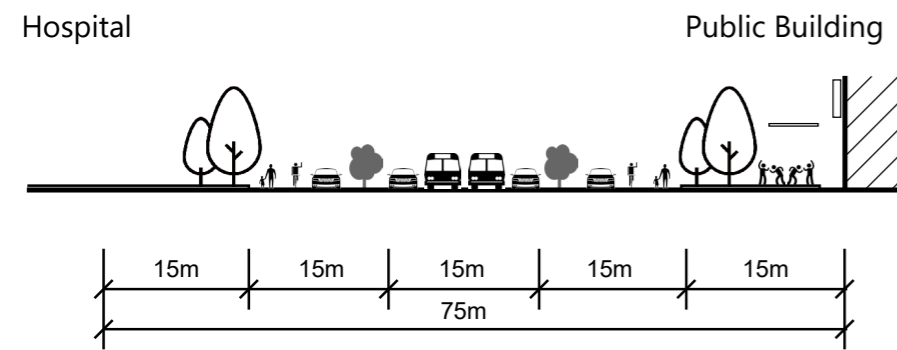
# Section plan of Reconstruction

## Section A. Subway entrance

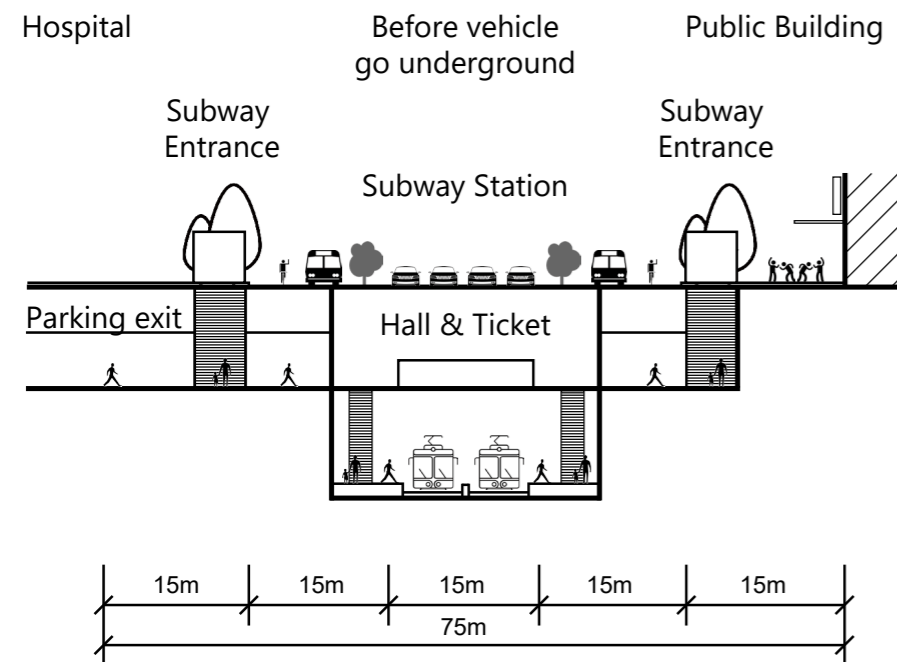
**Current**



Source: map.baidu.com



**Reconstruction**



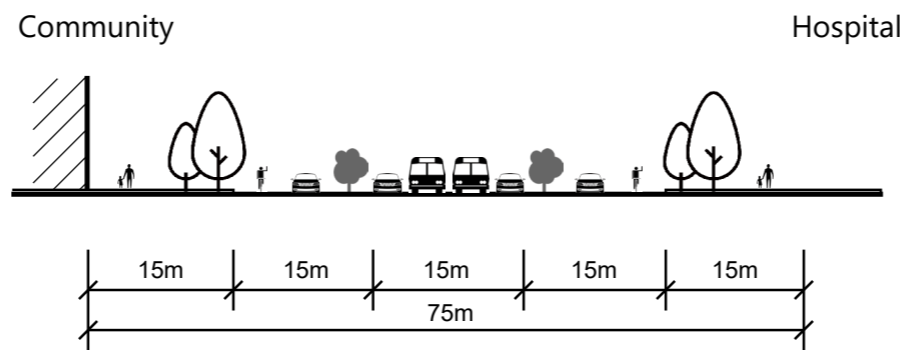
Section by author

## Section B. Bus entrance

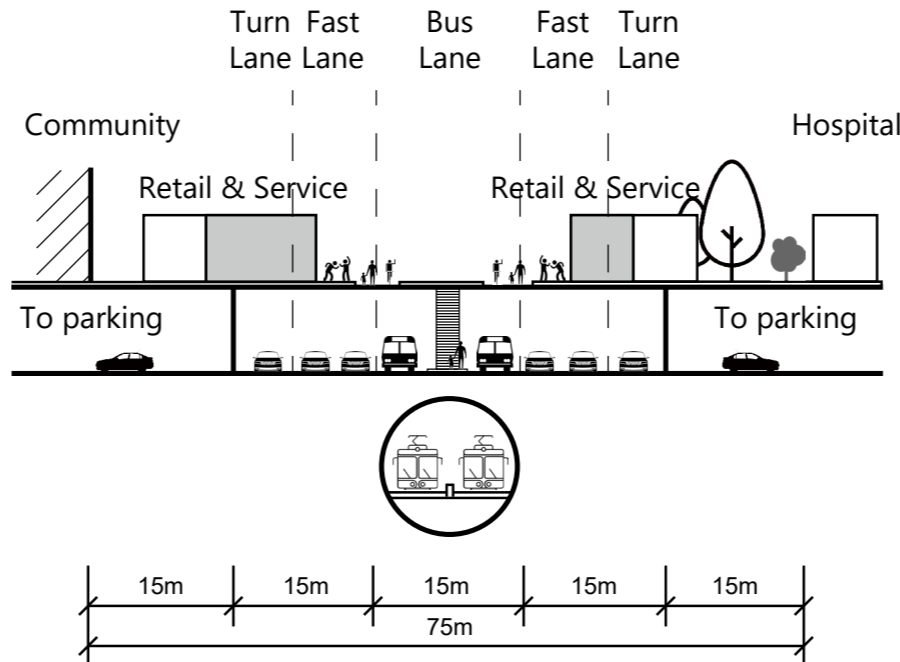
**Current**



Source: map.baidu.com



**Reconstruction**



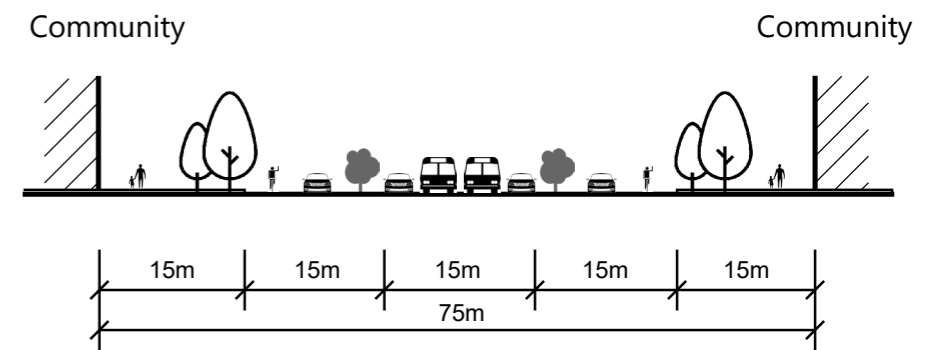
Section by author

## Section C. Park between community

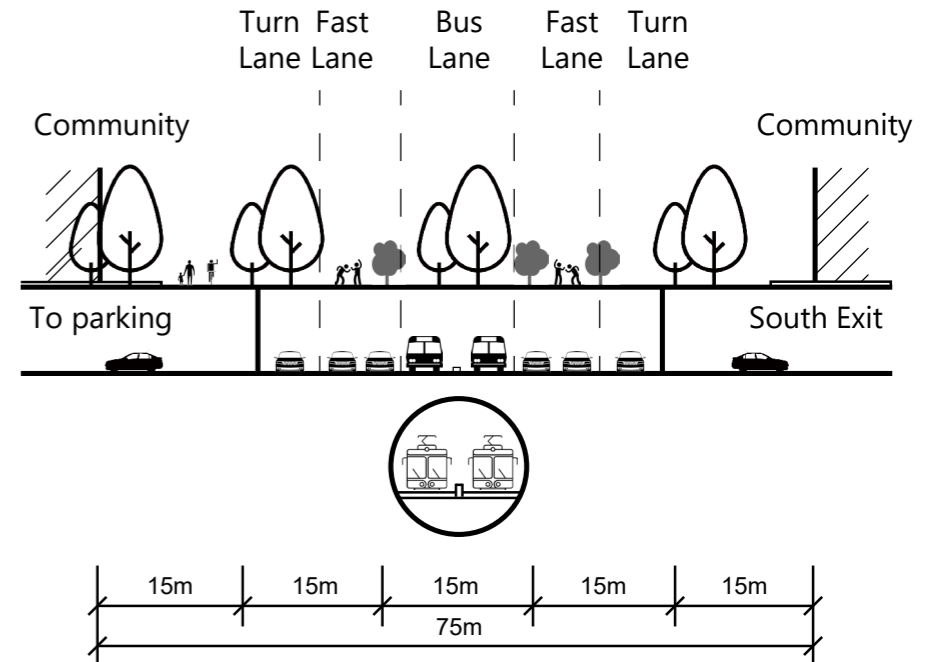
**Current**



Source: map.baidu.com



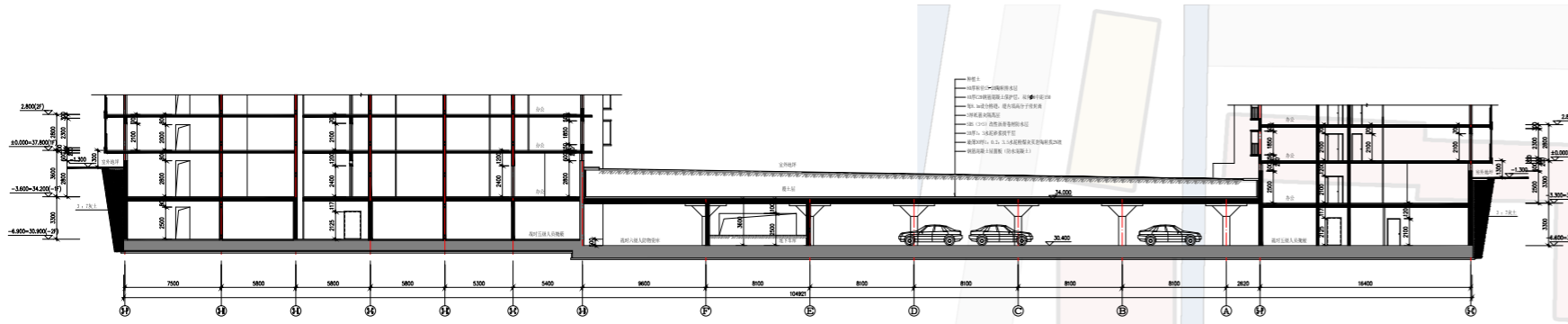
**Reconstruction**



Section by author

## 7.6. Vehicle Underground: Merge into current underground Parking system

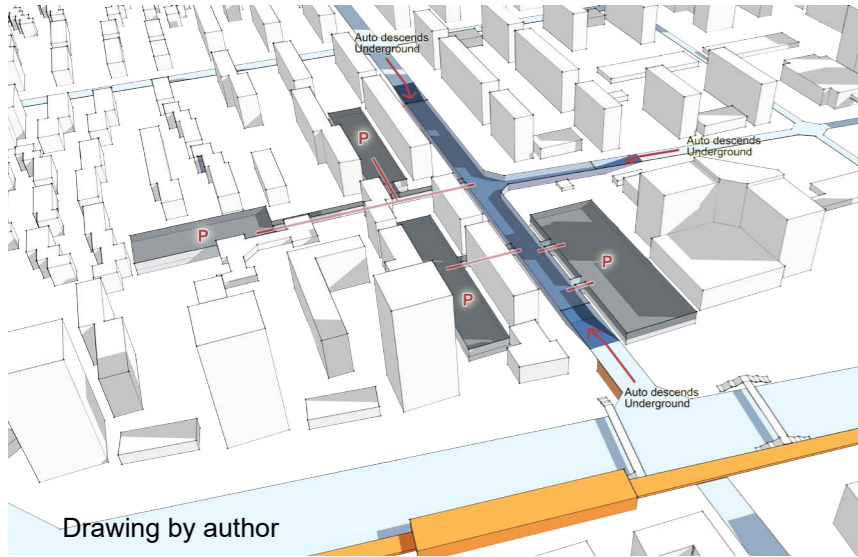
Construction section of underground parking



Source: Beijing Institution of Architecture Design

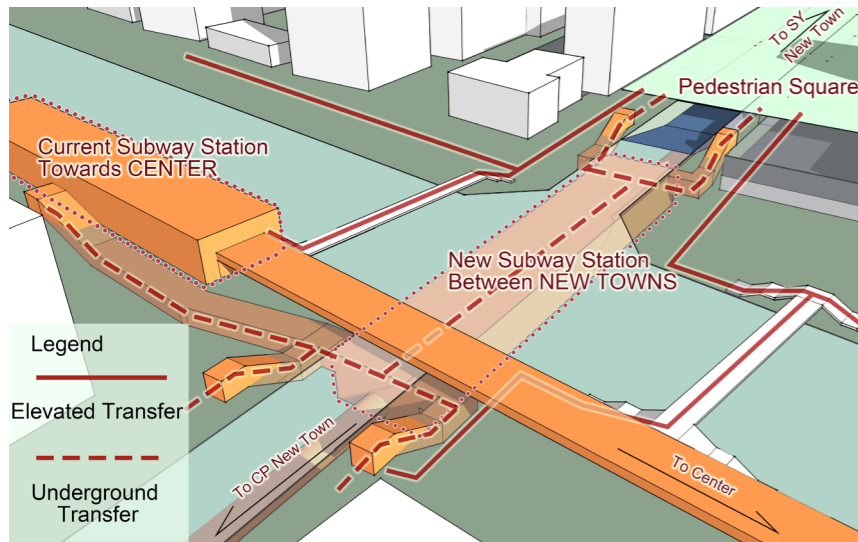
4#车库1-1剖面 1:100

Perspective view of the system



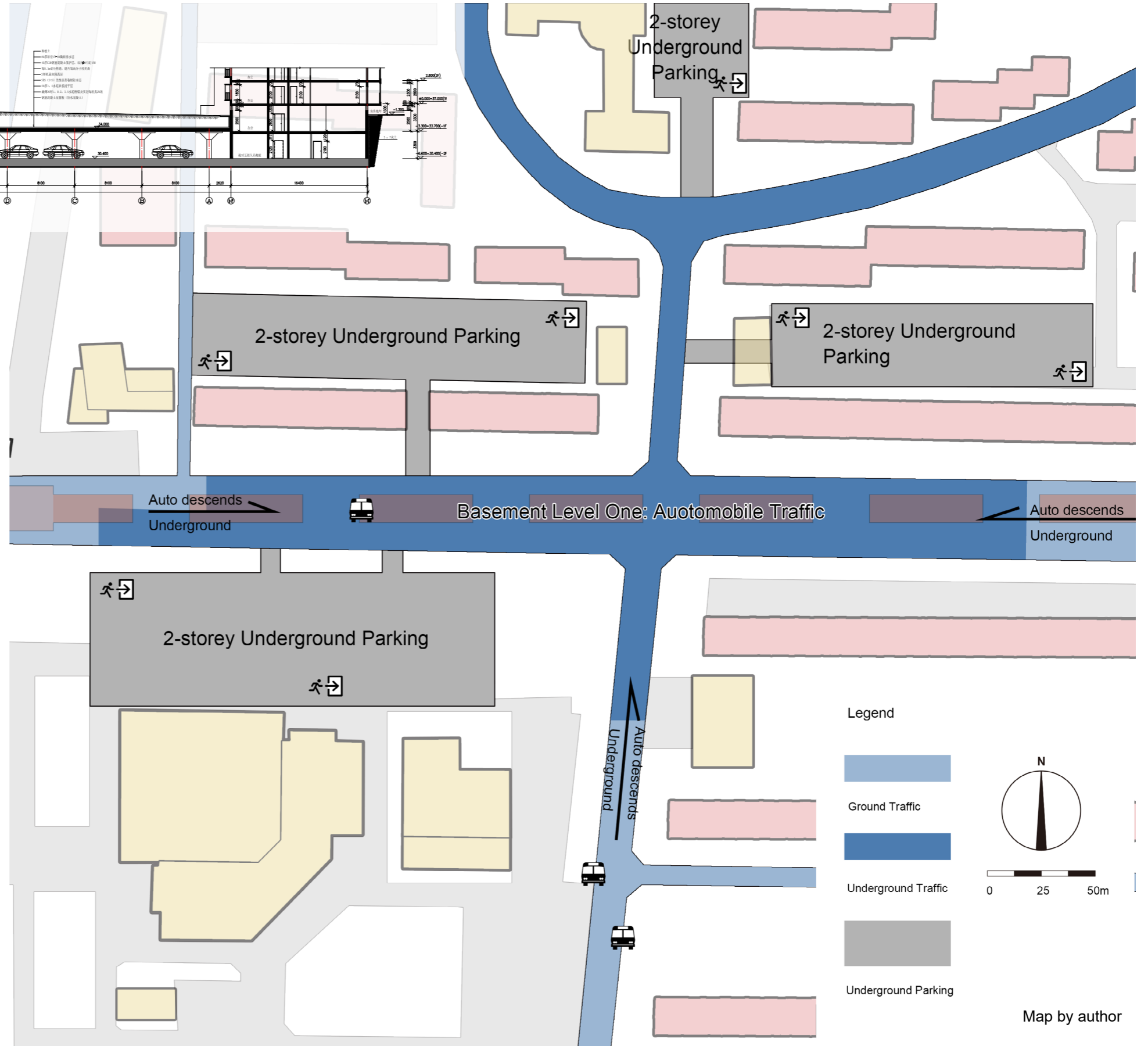
Drawing by author

Square as buffer zone of subway transfer



Drawing by author

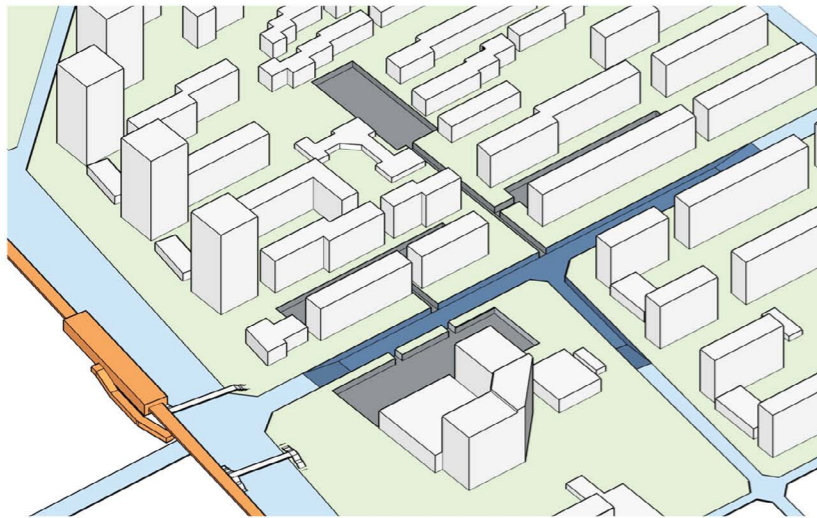
Underground road system



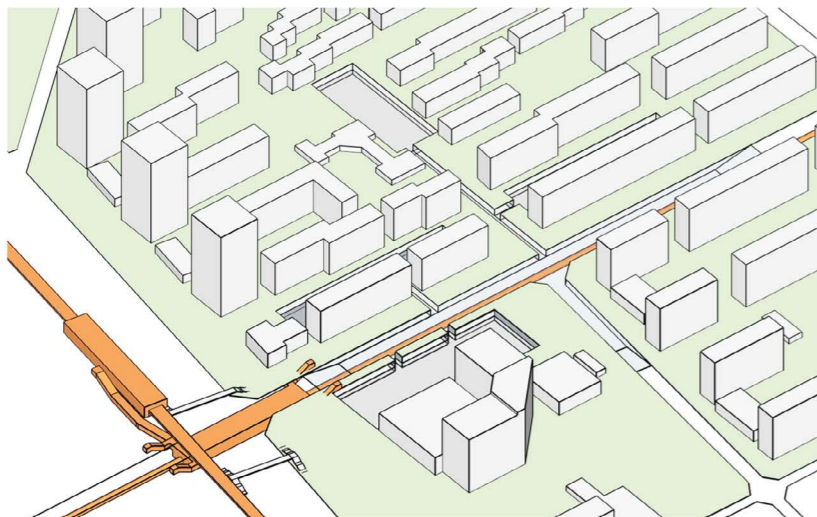
Map by author

## Reconstruction Sequence

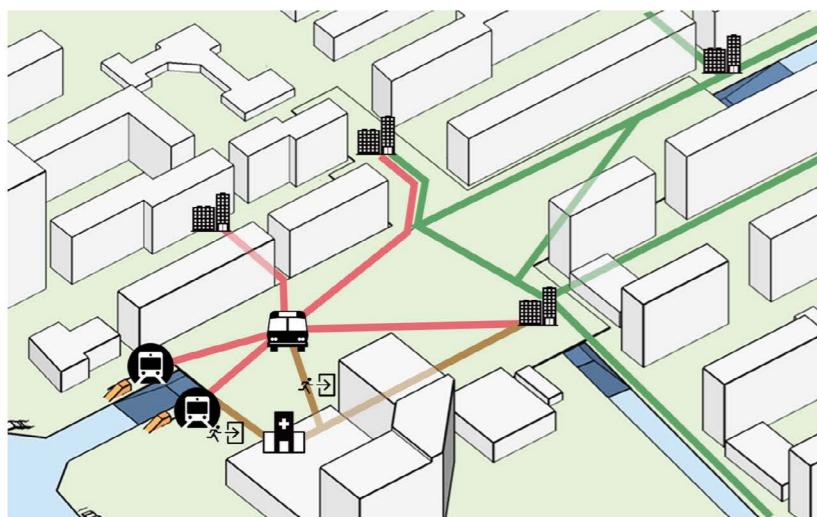
1. Underground vehicle road



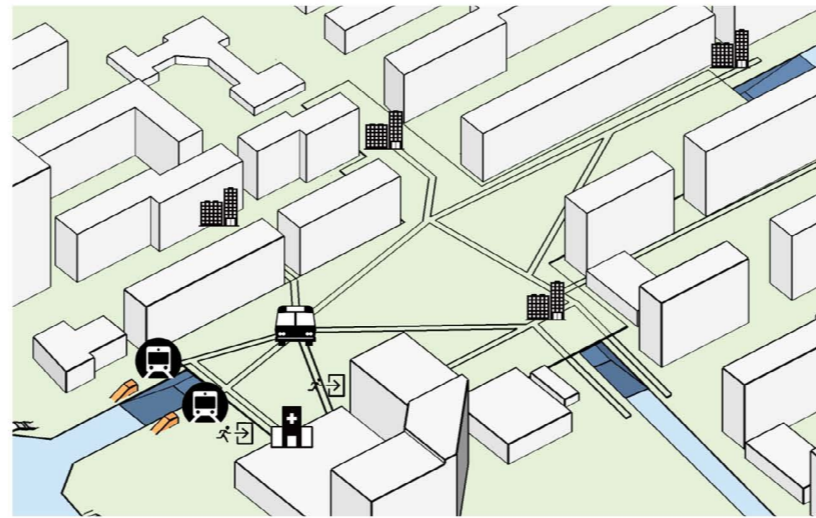
2. Underground subway



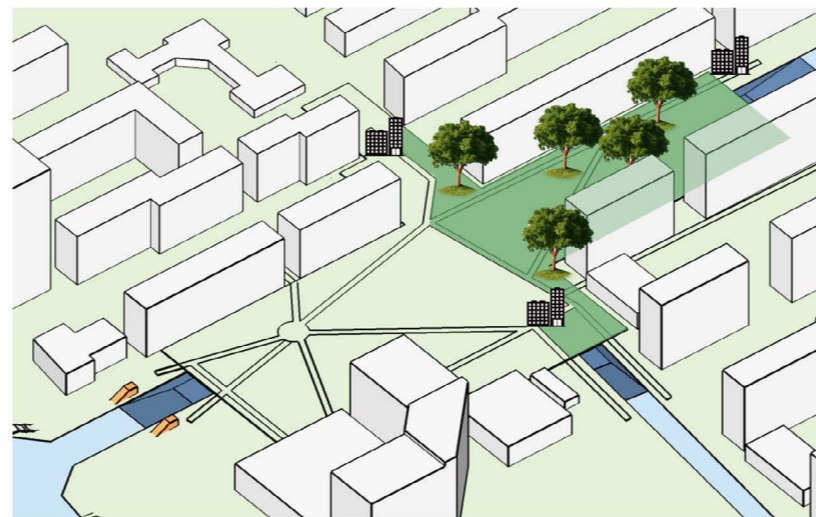
3. Three types of flow



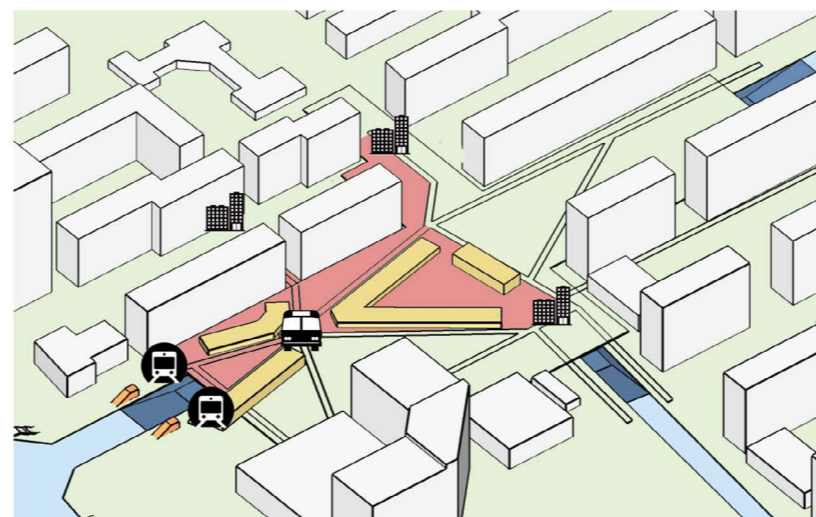
4. Path according to flow



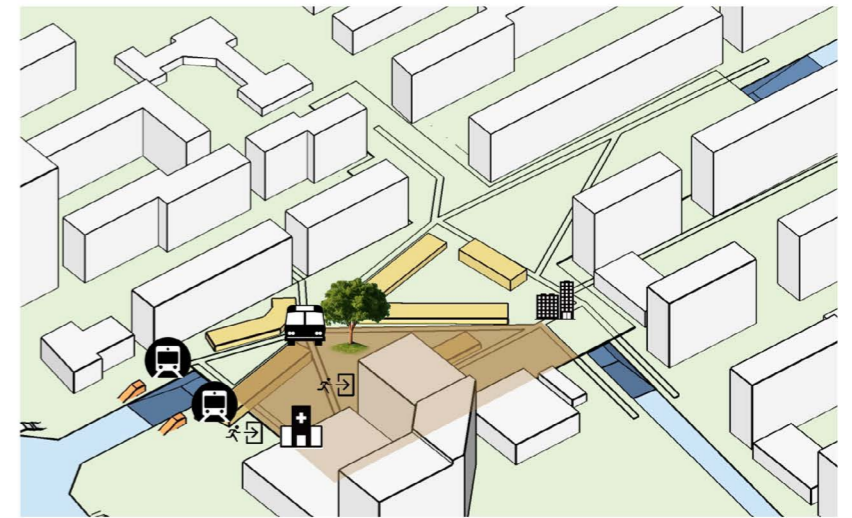
5. Green and open area



6. Commercial and service area



7. Combined area



8. Plan for square

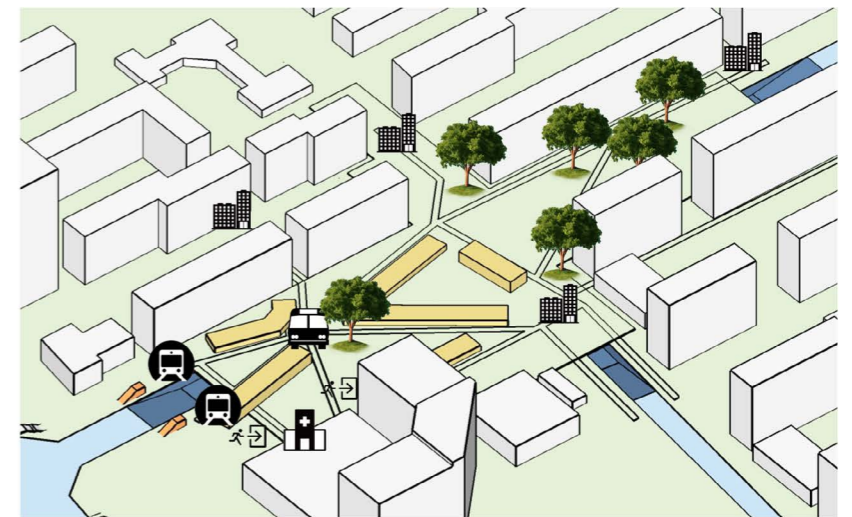


Diagram by author

The start point of the multi-layered system is the construction of underground vehicle road and subway. Three types of flow can be concluded here. Community-community path is in need of green and open area, where recreation is the main function of public space; Community-transportation path is in need of commercial and service area, as it is the route of commuters; Transportation-hospital and Community-hospital path has a combined function compared to the former two paths. The multi-layered square provides extra green and service to the neighborhood and increases transportation efficiency at the same time.

### 7.7. Visualization of the square's west part: Public service between community and transportation



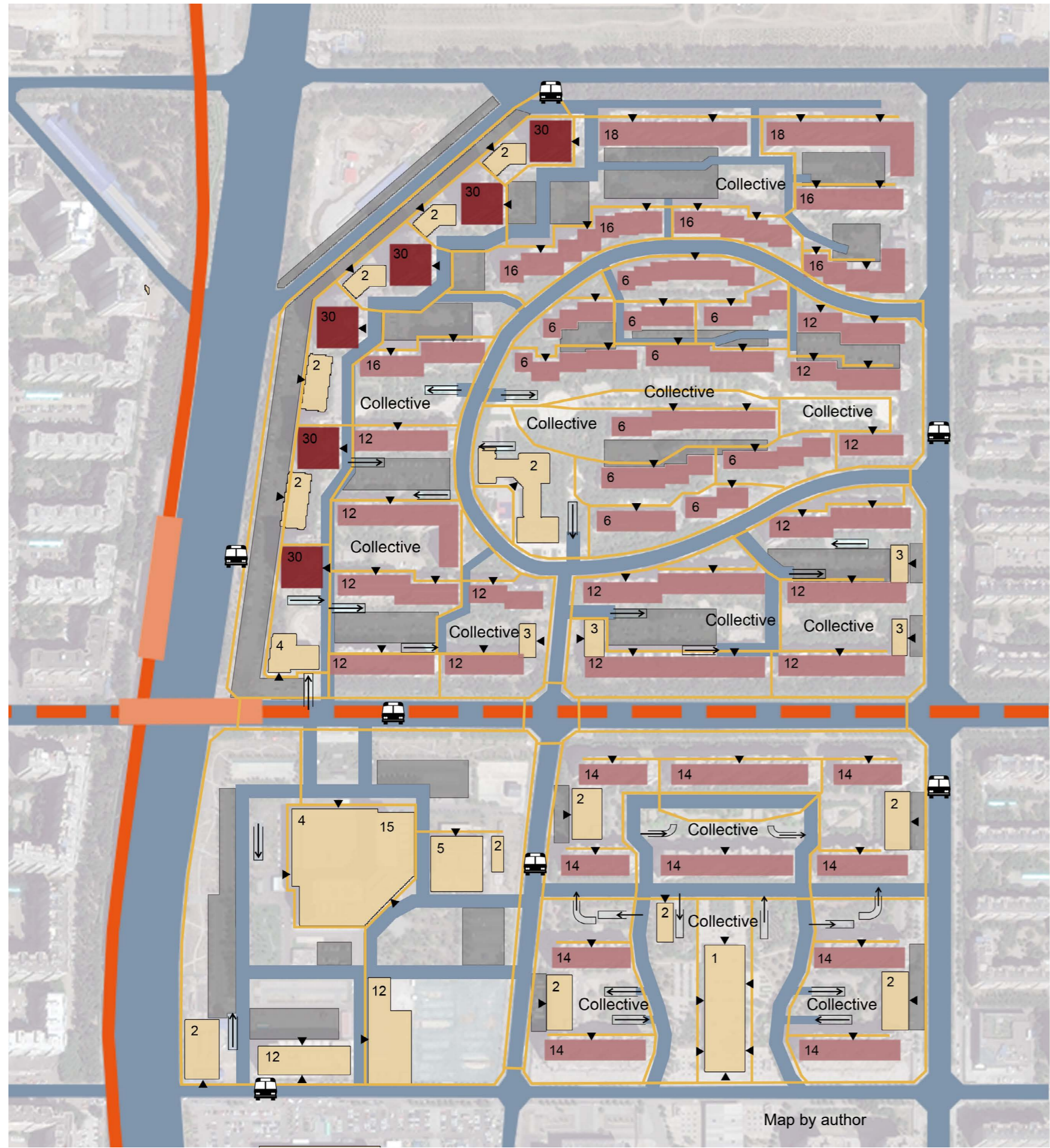
Visualization by author

## Visualization of the square's east part: Green between neighborhoods



Visualization by author

# 7.8. Adapt Multi-layered Transport System to the Neighborhood



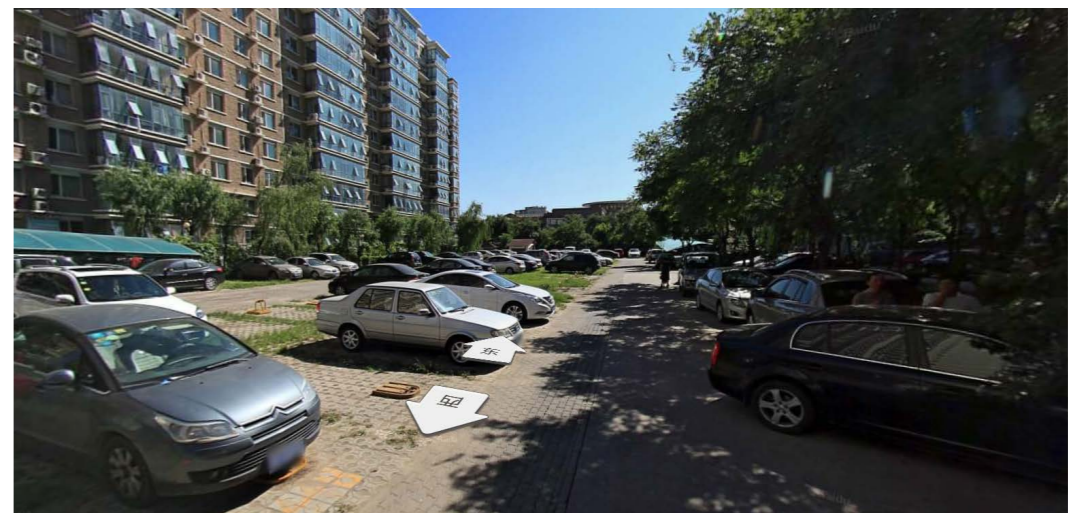
Map by author

Map by author

### Vehicle everywhere, takes up Public Space


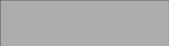

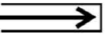






Photo by author



Source: map.baidu.com

### Legend

	Auto Flow		Parking Lot
	Pedestrian Flow		Underground Parking Entrance
	Subway Flow		Public Building

# Program Design: Public instead of Vehicle

Vehicle Related  
**Remove to Underground**



Pedestrian Related  
**Slow Traffic System**

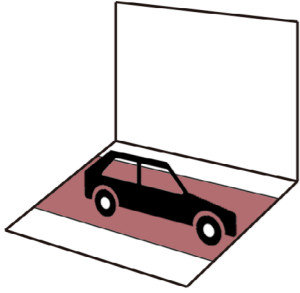



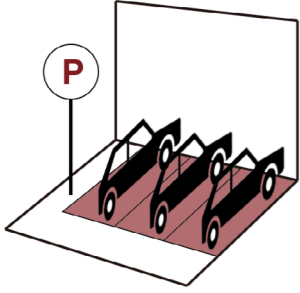

Service Related  
**Recreation & Activity**

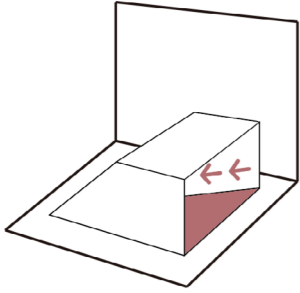



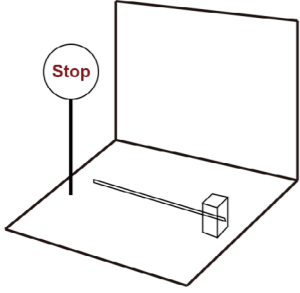

Public Space Related  
**Green Infrastructure**

**X**

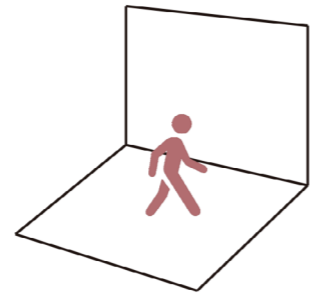
1. Vehicle Road  

2. Vehicle Parking  

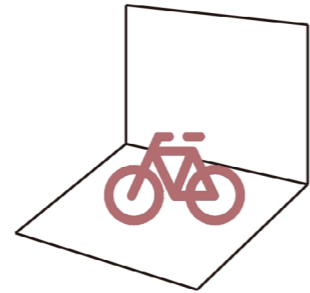
3. Underground Entrance  

4. Vehicle Control  

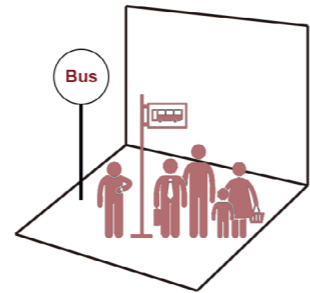
5. Walk



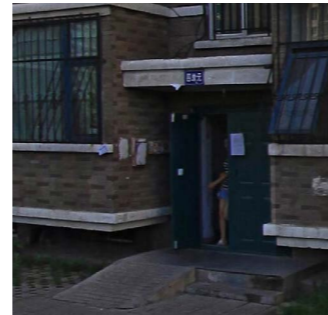
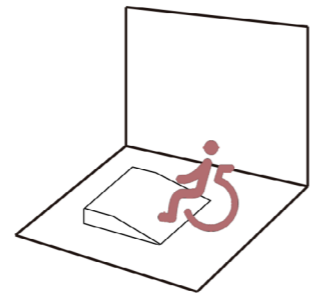
6. Bicycle



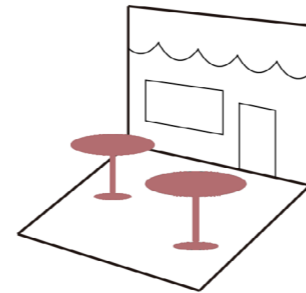
7. Public Transport



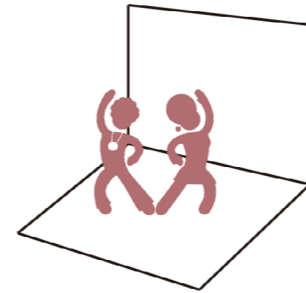
8. Barrier Free



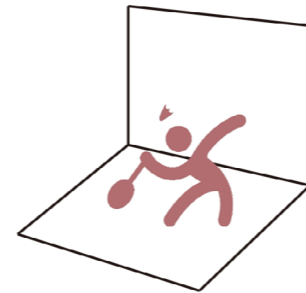
9. Outdoor Area of Store



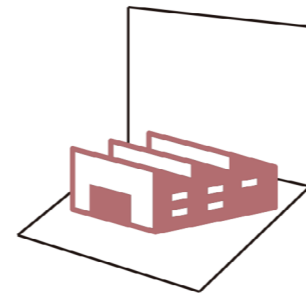
10. Square Dancing



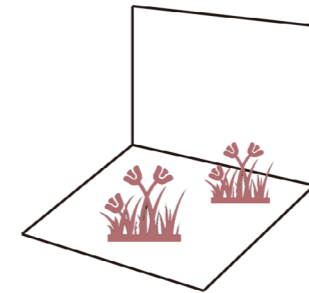
11. Sport



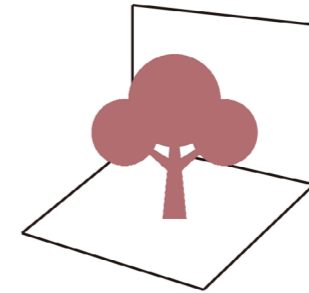
12. Community Center



13. Lawn



14. Tree & Shade



15. Garden & Bush

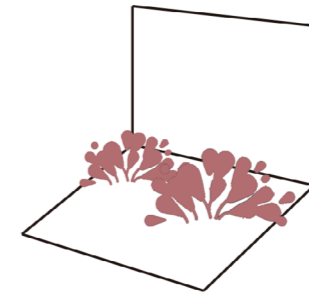


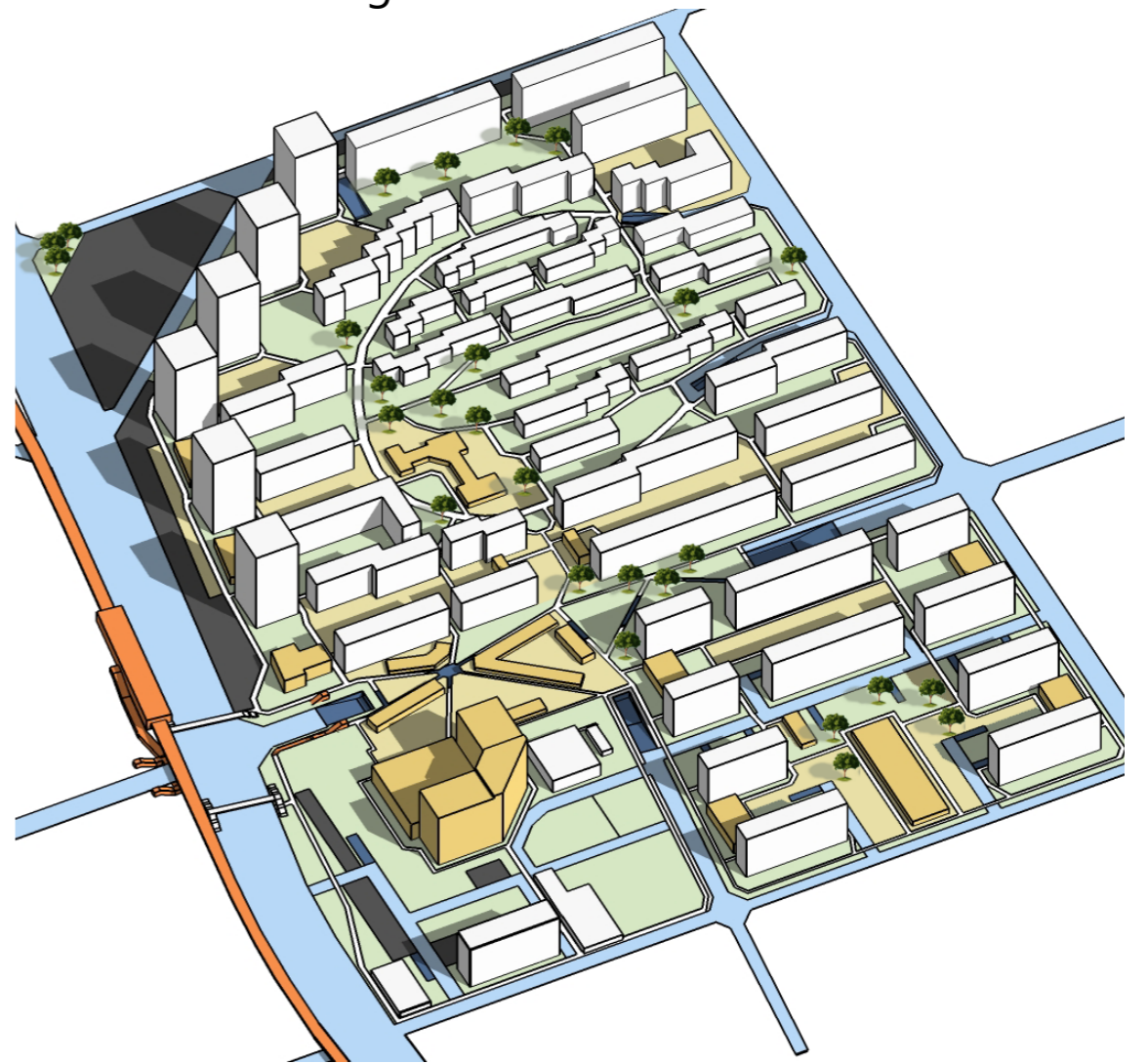
Diagram by author, photo 4, 8, 12, from map. baidu.com, photo 10: A thousand people square dancing together in Paradise Gateway, <http://news.dichan.sina.com.cn/2015/10/23/1129660.html>, photo 11: Primary sports meet of Paradise Gateway, <http://www.chpedu.net/news/201204/11442.shtml>, the others taken by author.

# Plan of Ground Level: Pedestrian paths and Public services



Map by author

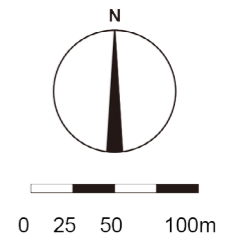
Pedestrian paths and Public services are the main functions on the ground floor



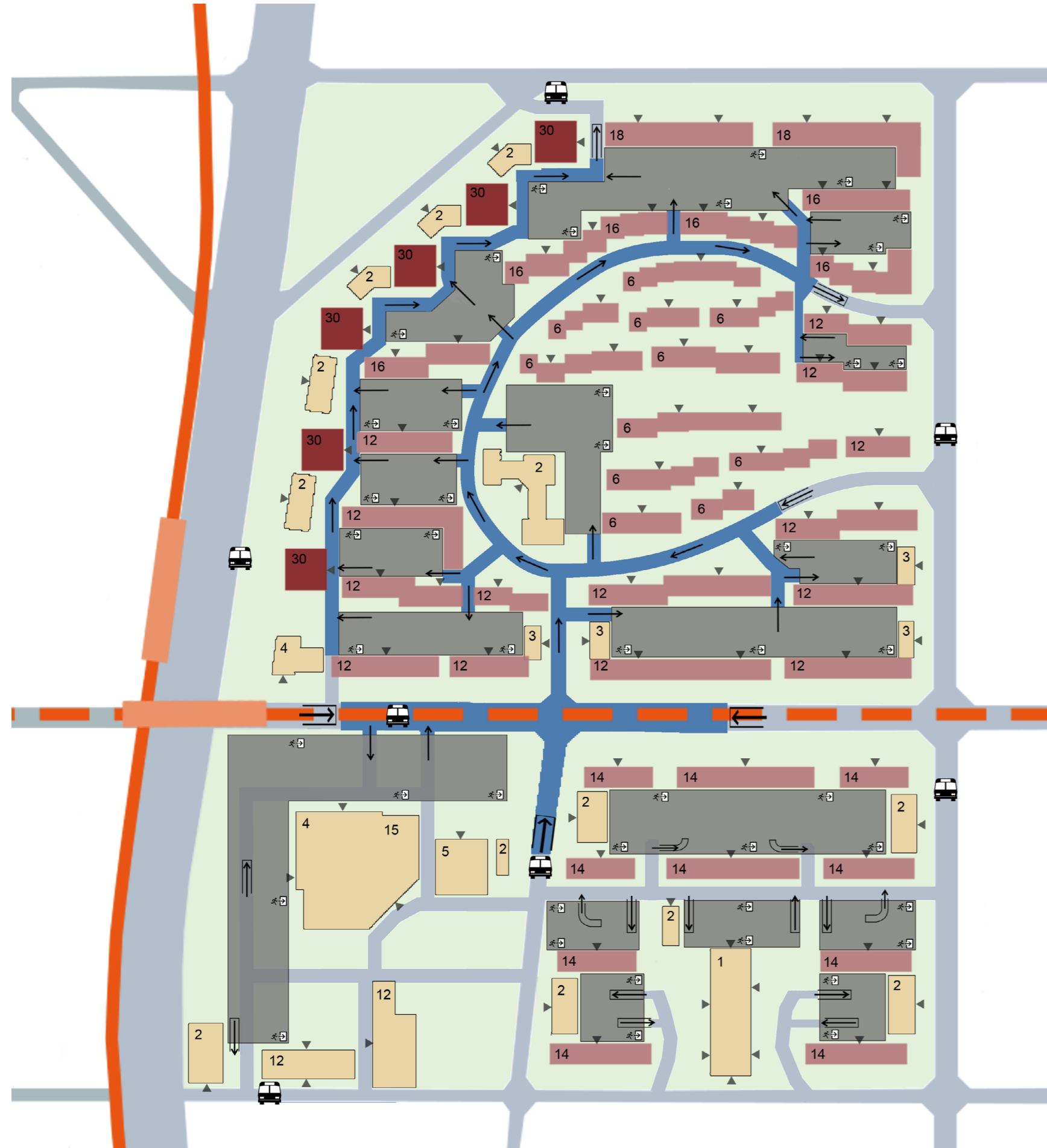
Model by author

### Legend

- Pedestrian path
- Subway Line
- Vehicle road
- Ground Parking
- Public Building
- Service & Activity
- Green Area
- Underground Driving Entrance
- Underground Driving Exit

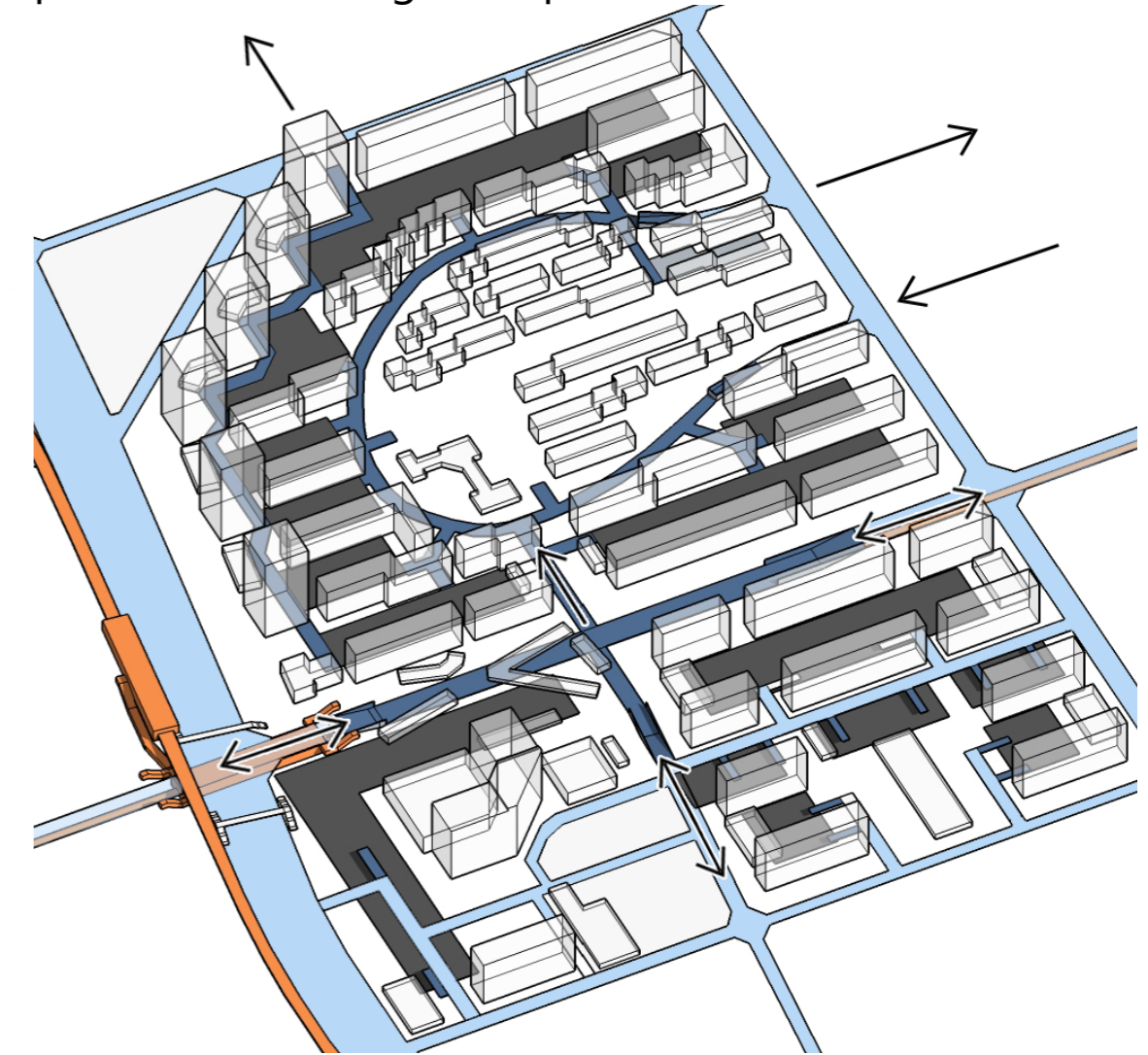


# Plan of Underground Level: Vehicle solution







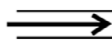
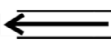

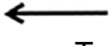
Map by author

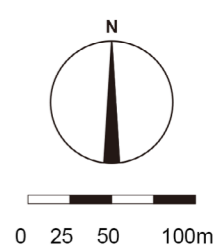
Vehicle roads are partly moved to underground to prevent conflicting from pedestrian



Model by author

## Legend

-  Ground vehicle road
-  Underground vehicle road
-  Subway Line
-  Underground Parking
-  Underground Driving Entrance
-  Underground Driving Exit
-  Underground Walking Exit
-  One-way Traffic Direction



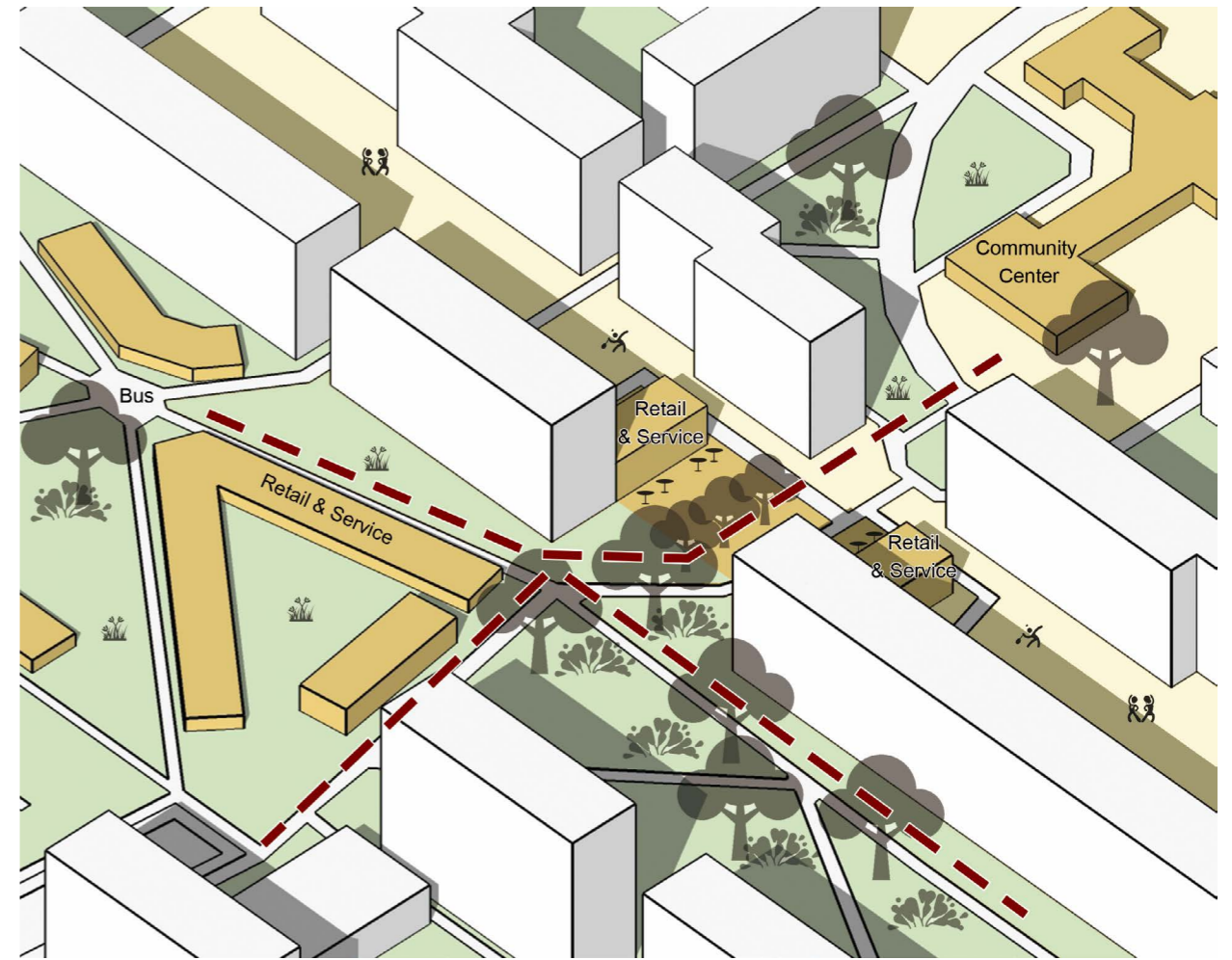
## 7.9. Design Spot 1 - Vehicle road to Slow traffic: South entrance of Neighborhood

Current situation of South Entrance



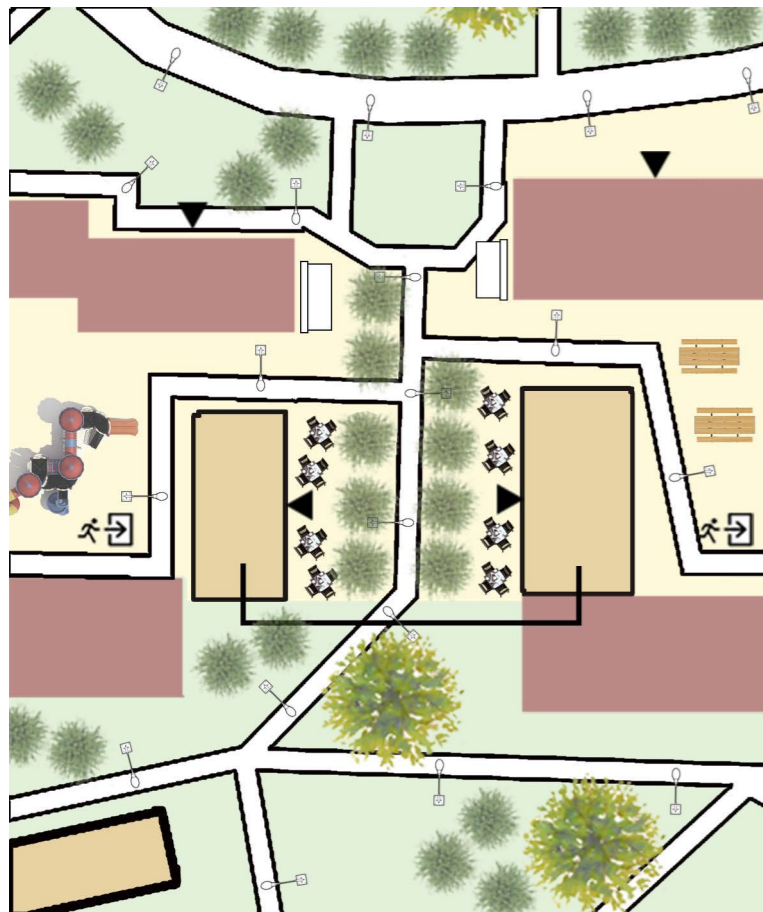
Source: map.baidu.com

Proposal slow traffic between community and transport



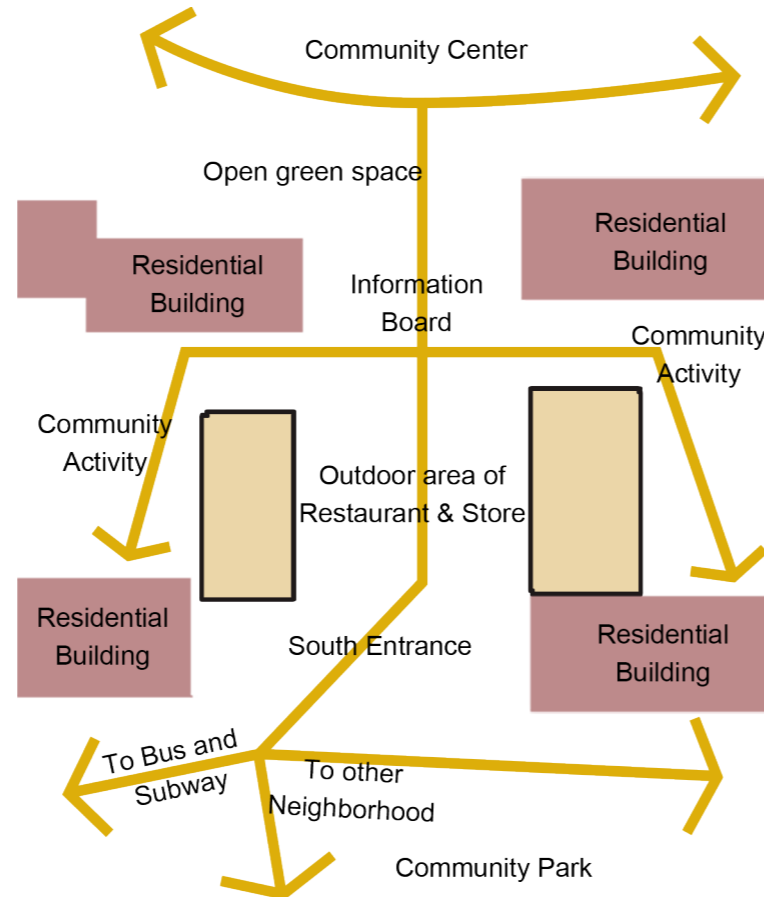
Model by author

Plan of South Entrance



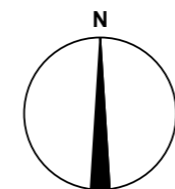
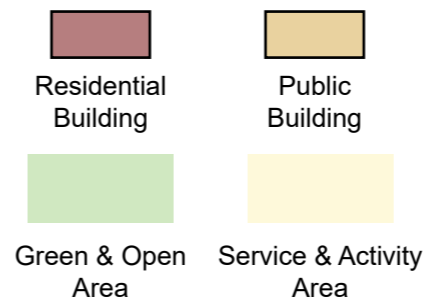
Map by author

Pedestrian Flow

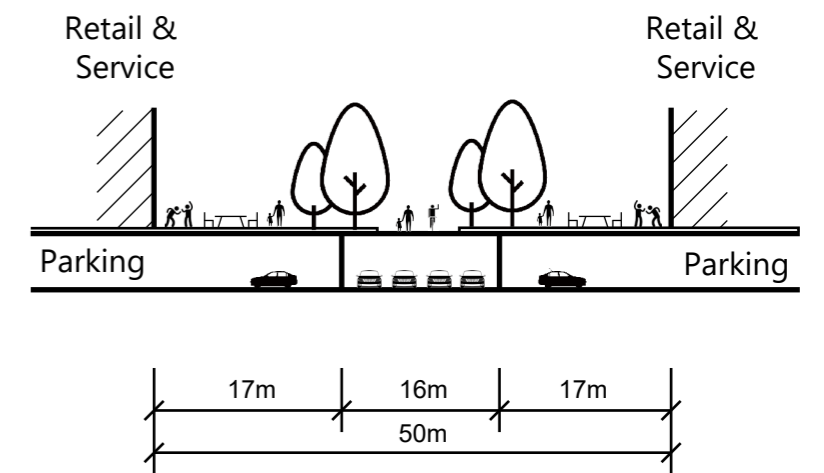


Map by author

Legend

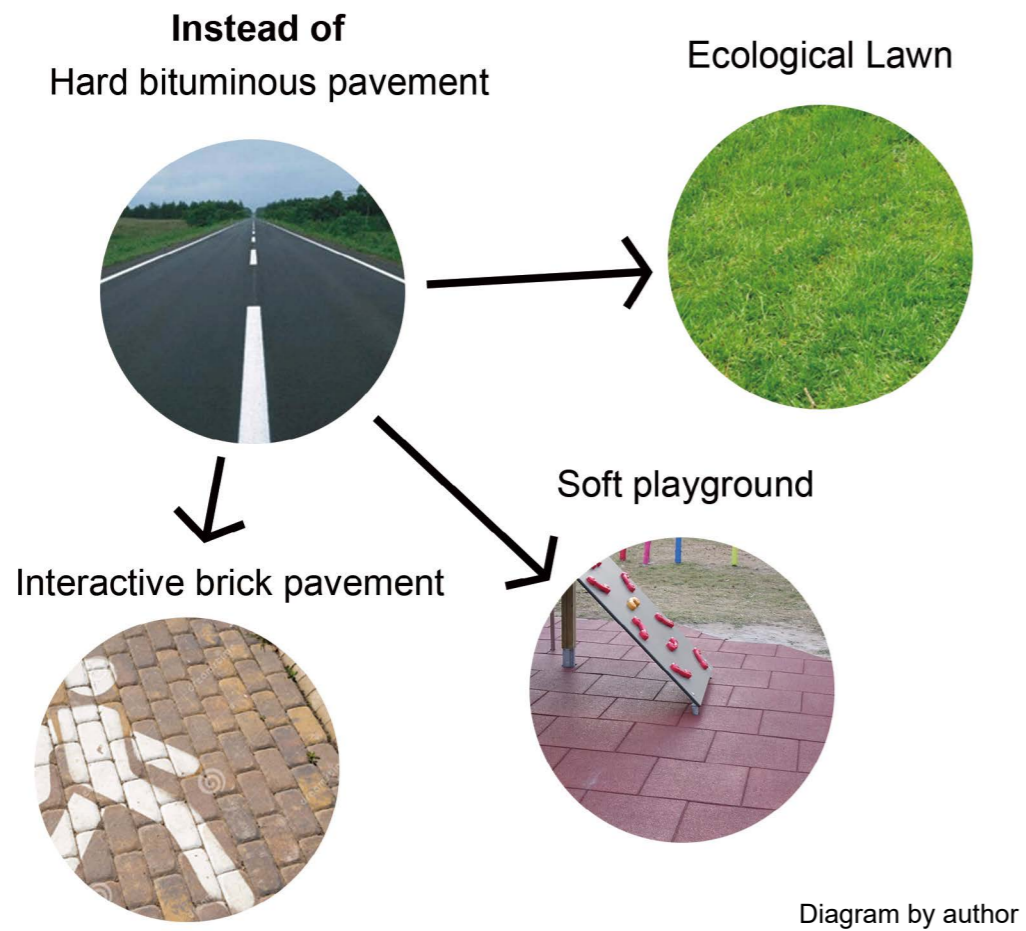


Proposal section

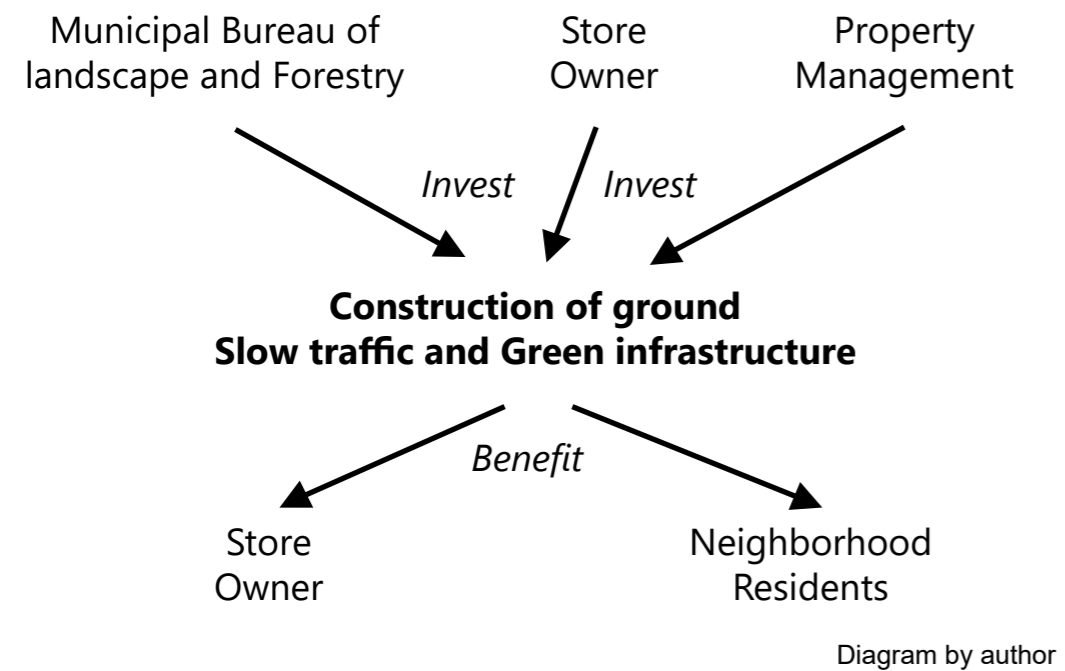


Section by author

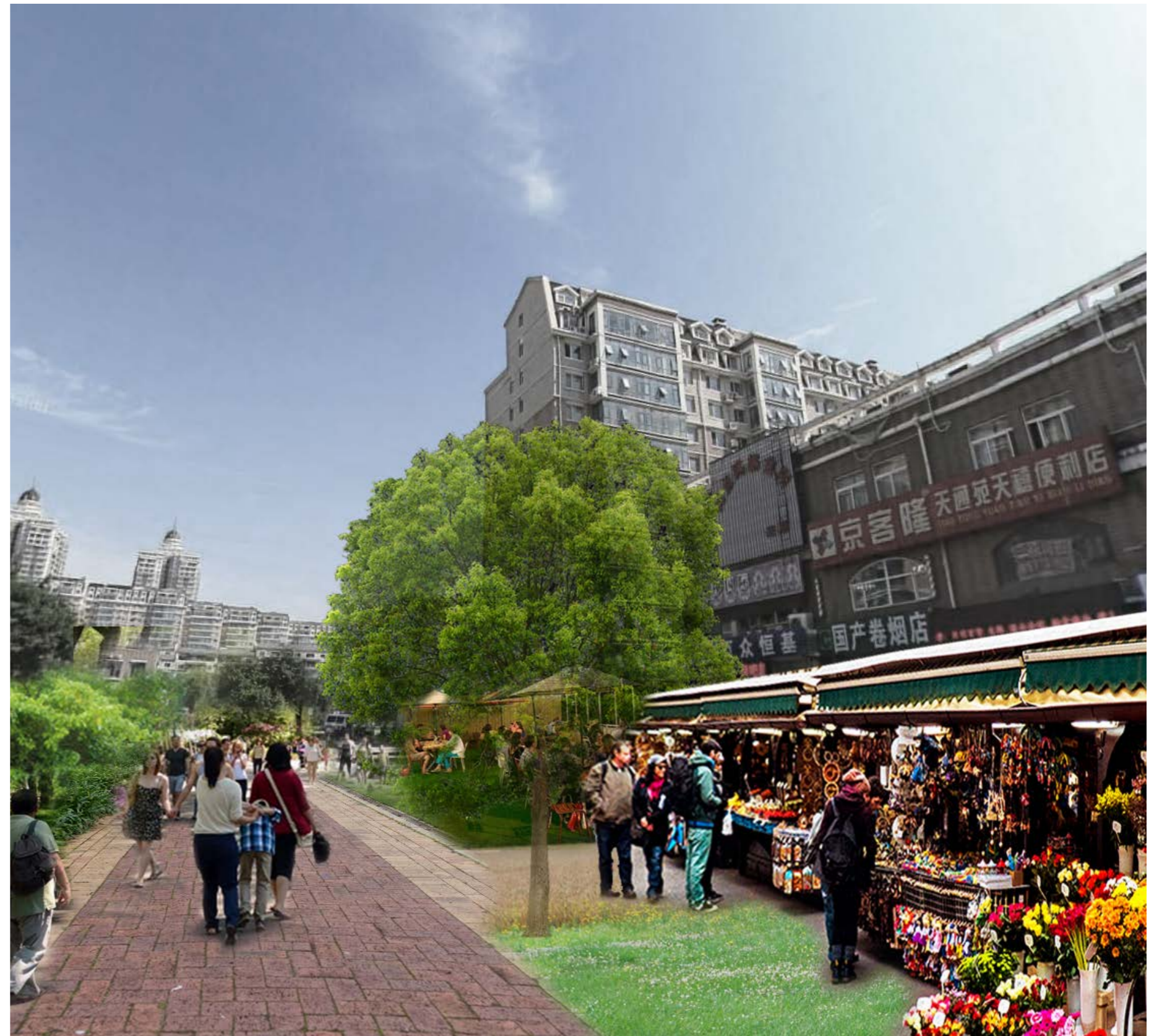
### Materialization - Pavement



### Stakeholder



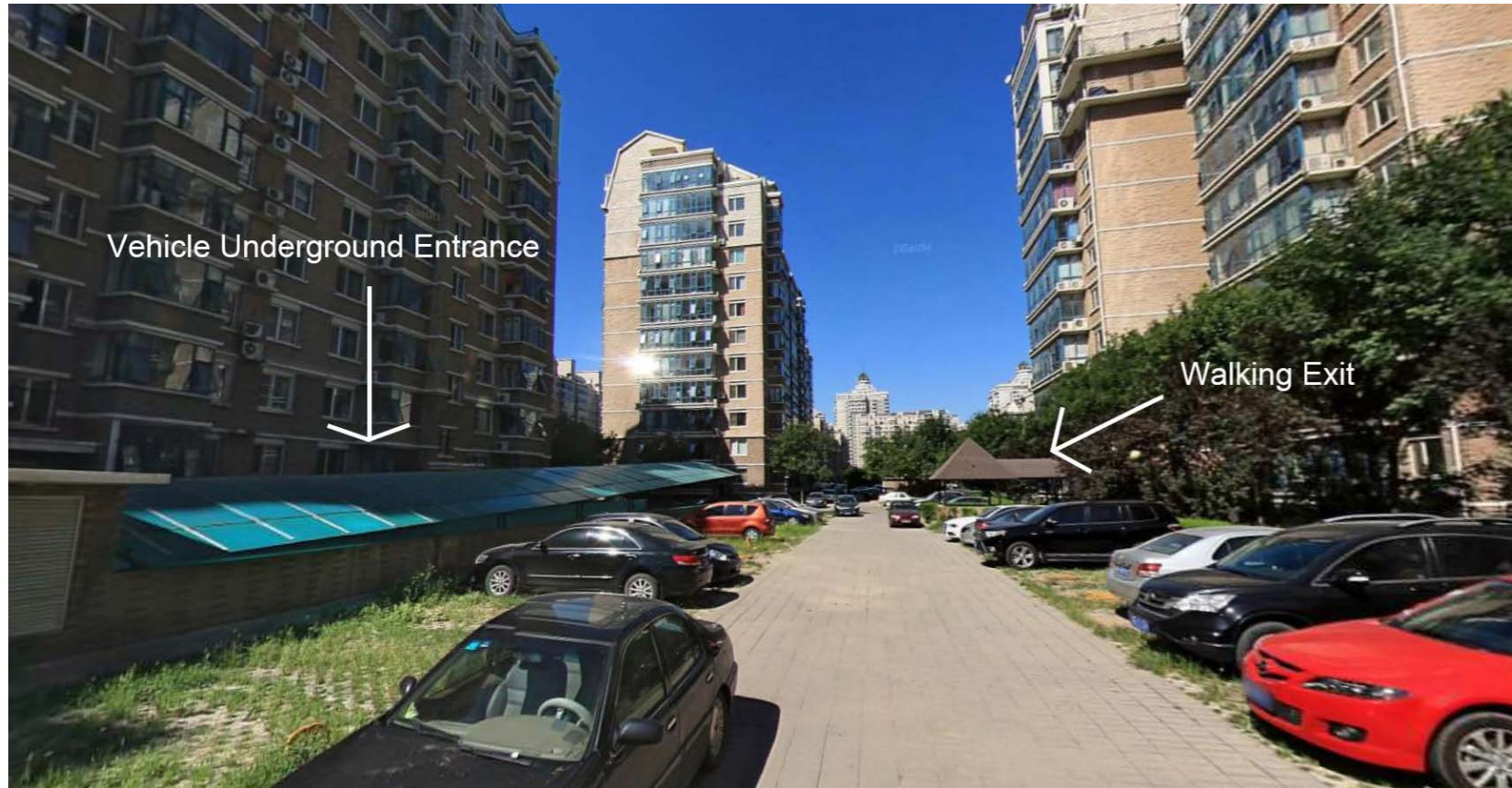
### Visualization of proposal slow traffic at south entrance



Visualization by author

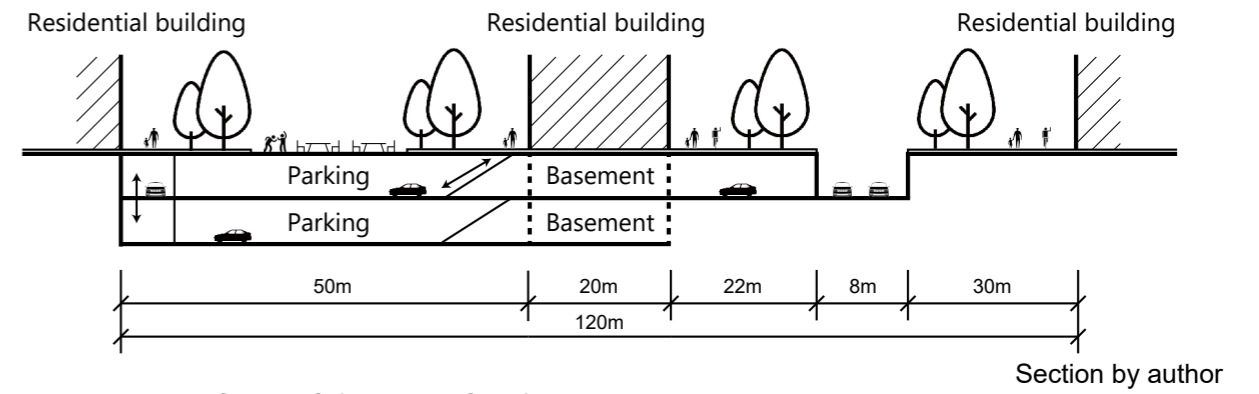
## Design Spot 2 - Underground parking entrance to Green infrastructure

Current situation: Ground parking and entrances between buildings

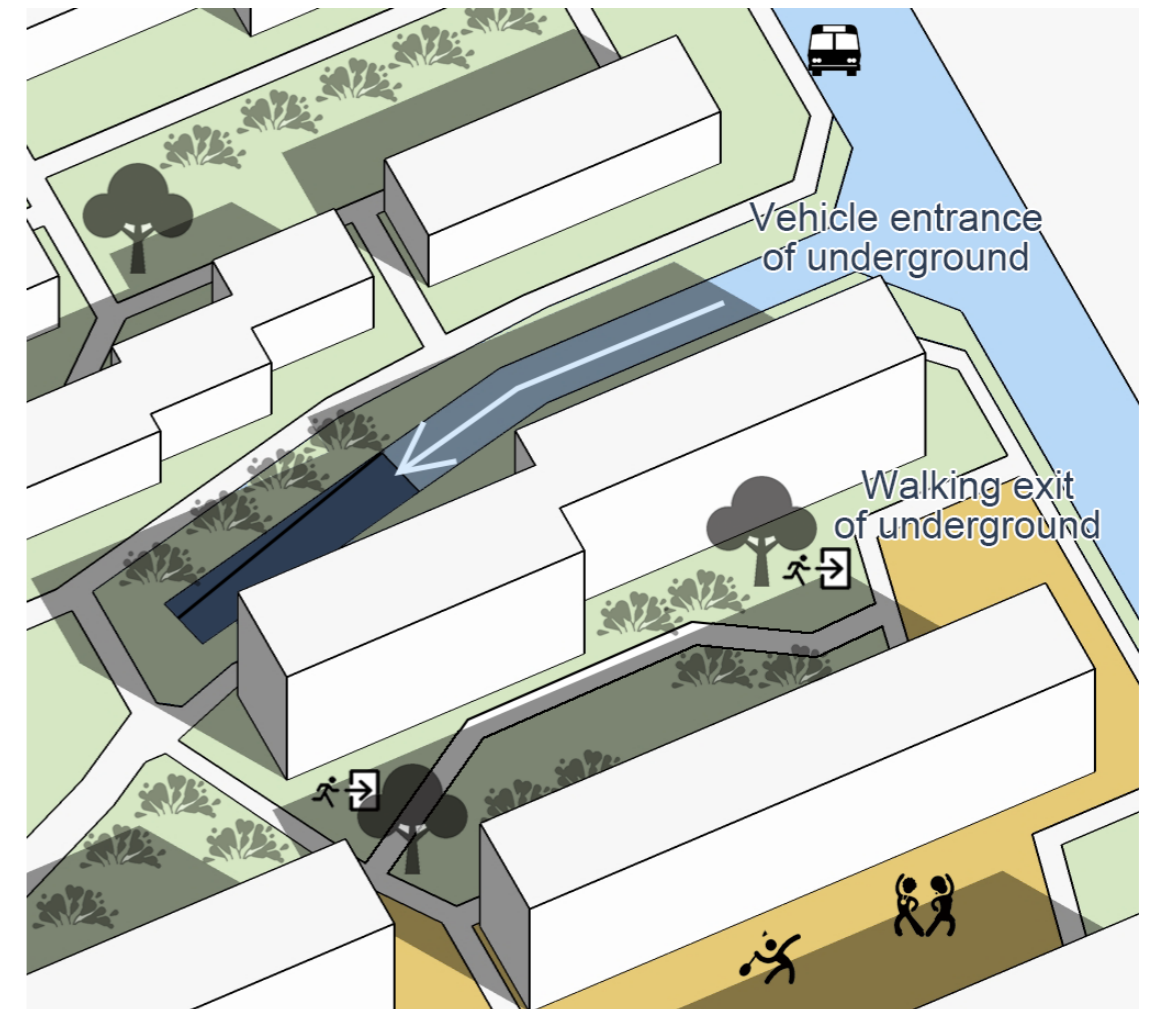


Source: map.baidu.com

Proposal section

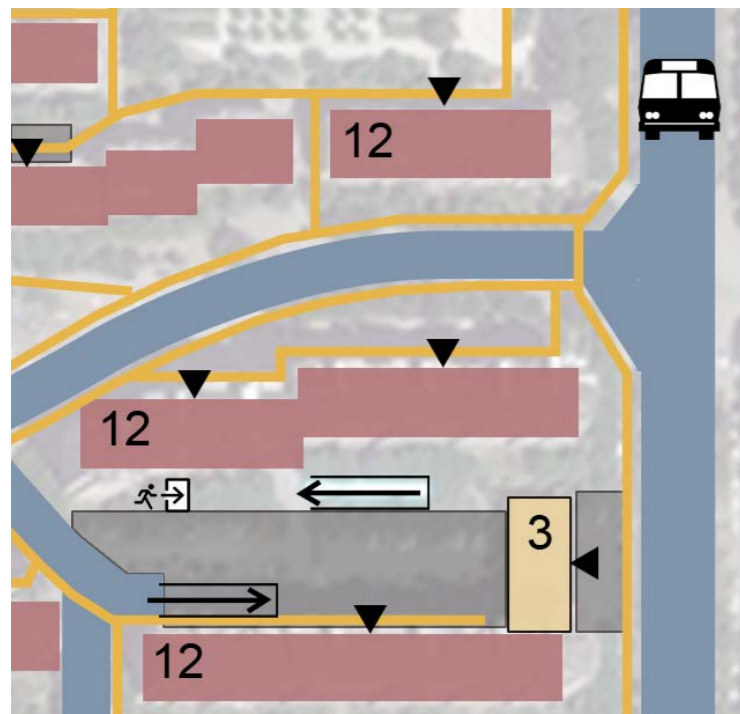


Proposal parking solution



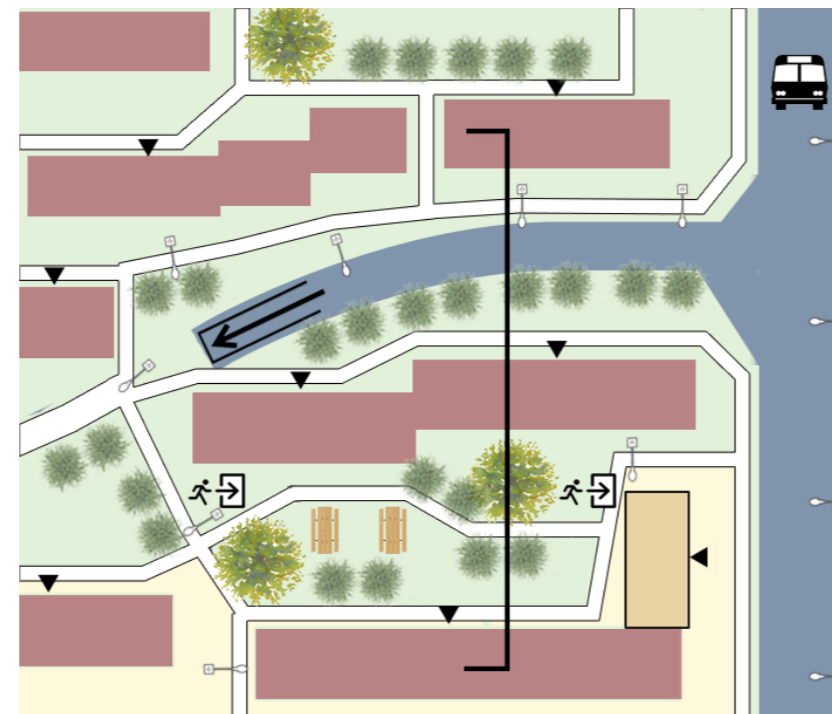
Model by author

Current situation



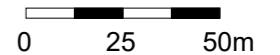
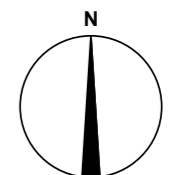
Map by author

Multi-layered transportation Applied

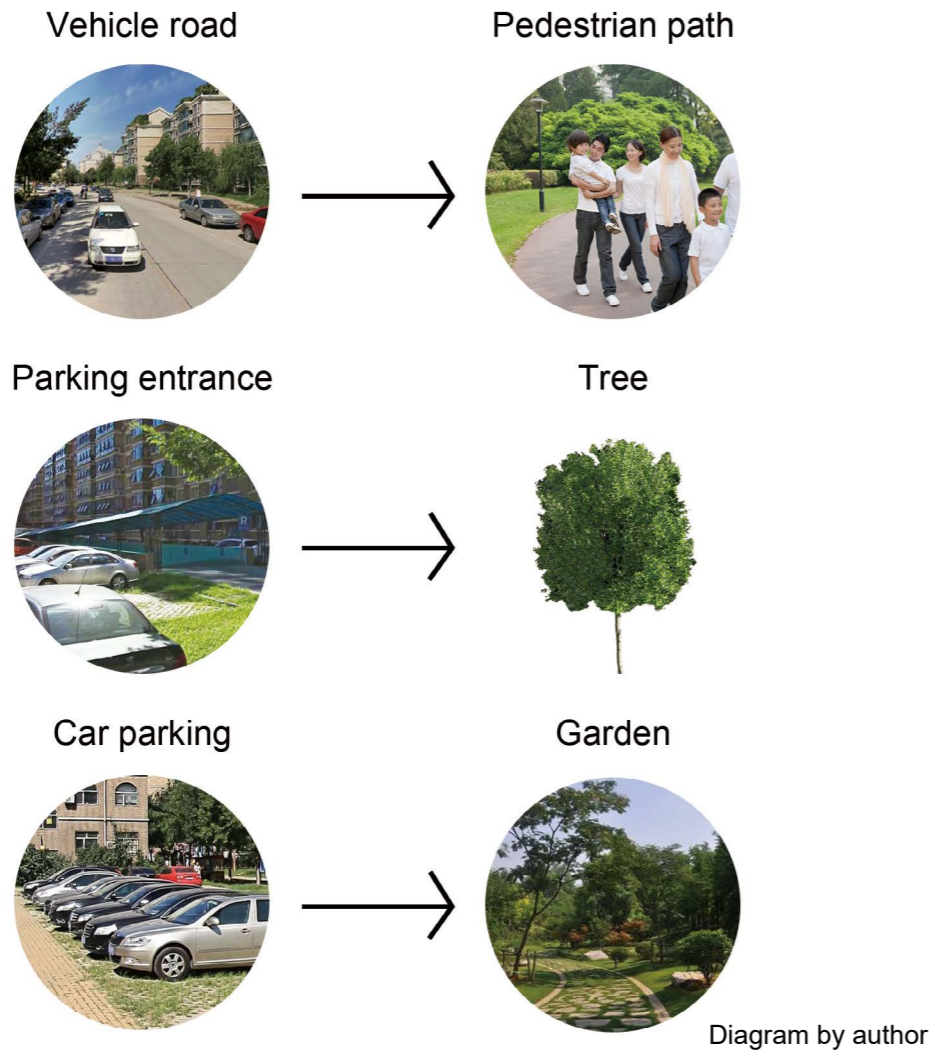


Map by author

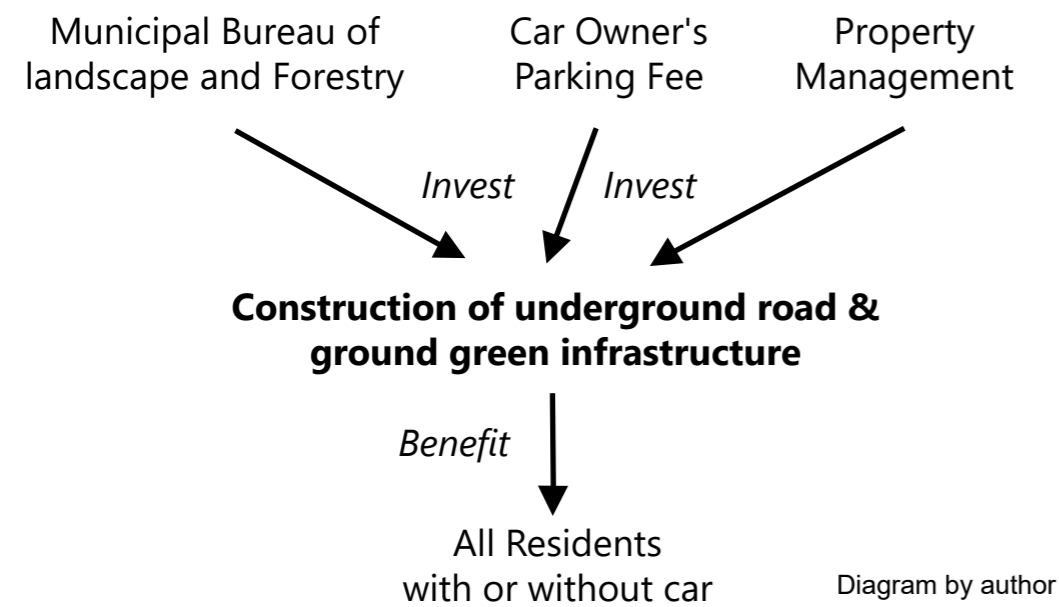
Legend



### Materialization - Ground elements



### Stakeholder



### Visualization of proposal green infrastructure



Visualization by author

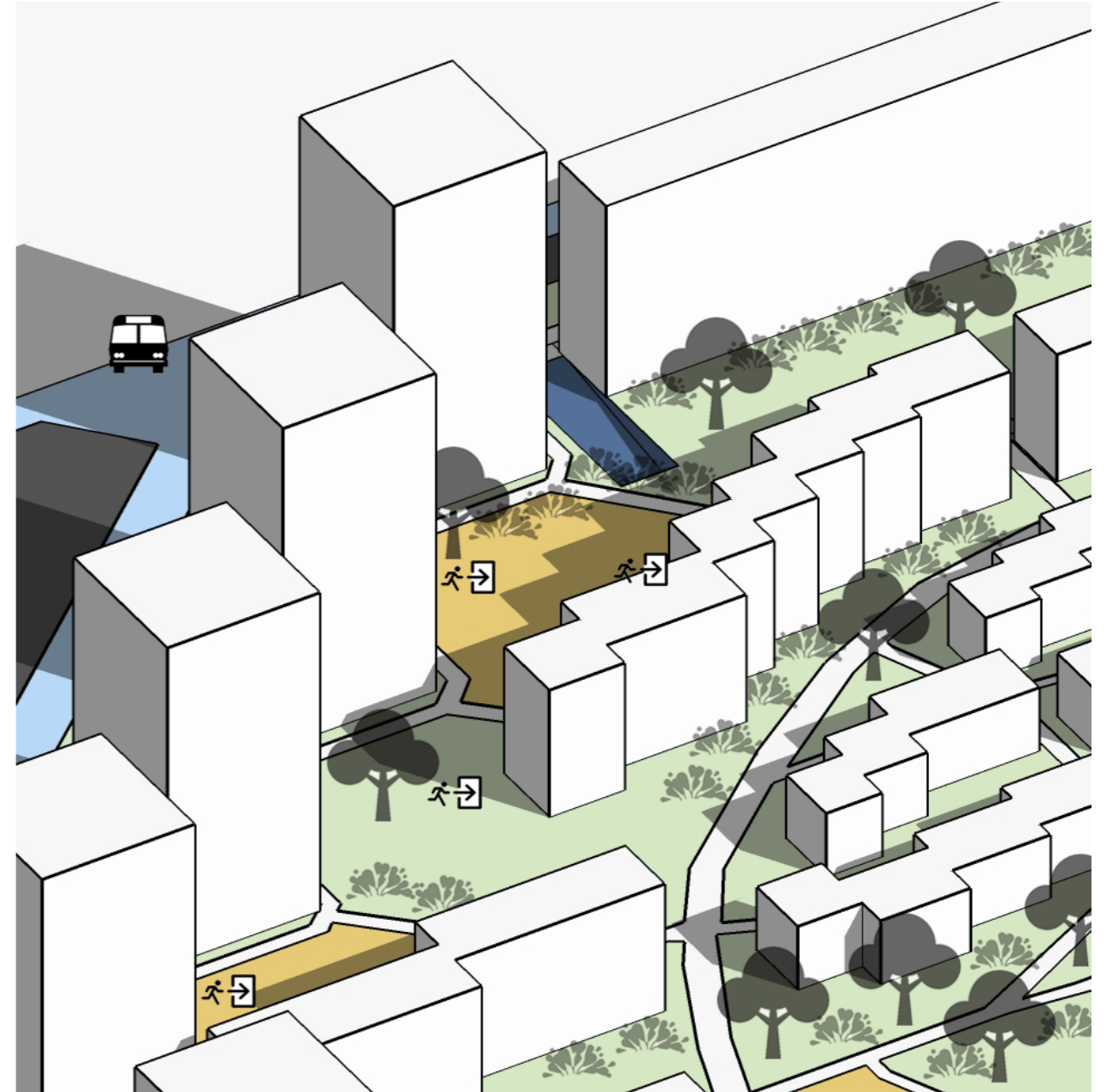
## Design Spot 3 - Ground parking to Neighborhood activities

Current situation: Ground parking between buildings



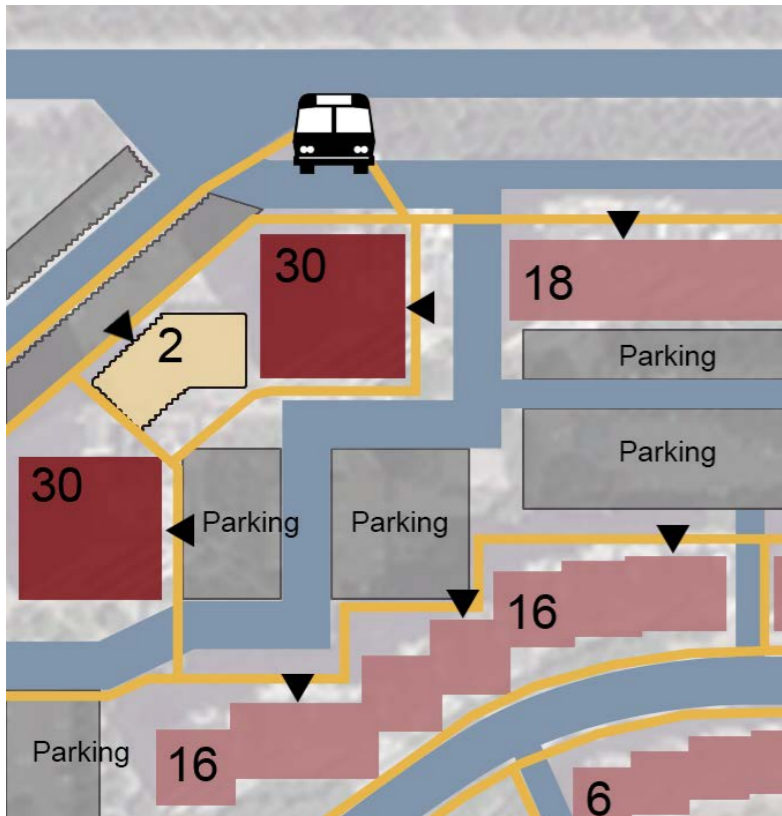
Source: map.baidu.com

Proposal collective space around high-rise towers



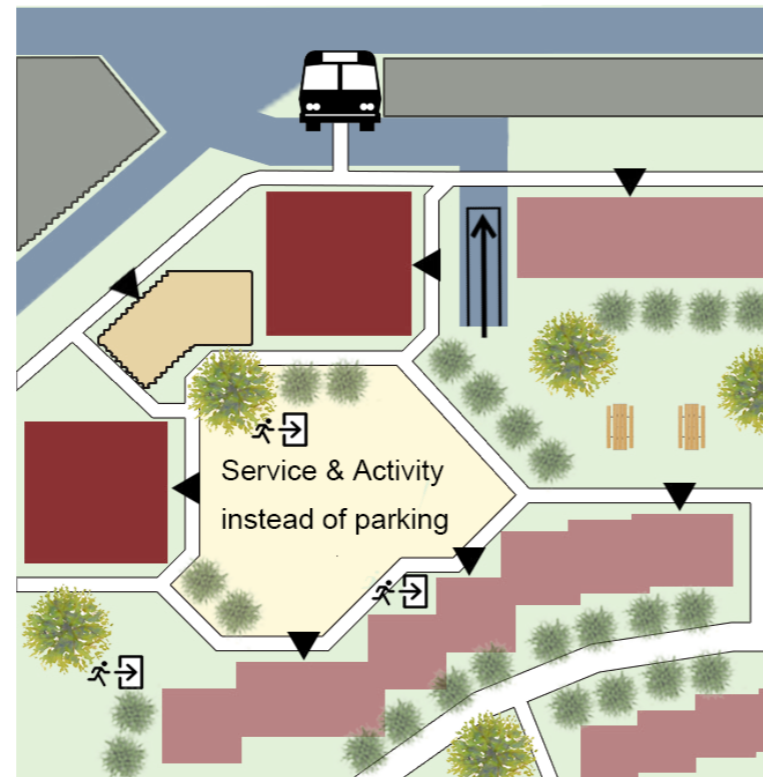
Model by author

Current situation



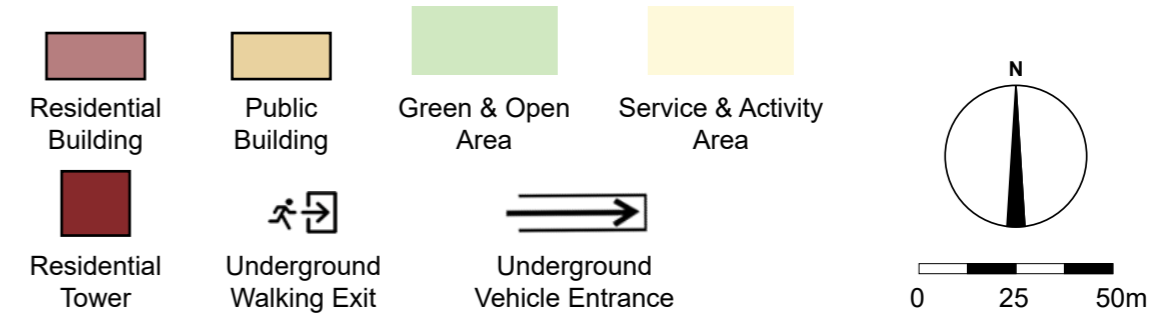
Map by author

Creating enclosed collective space



Map by author

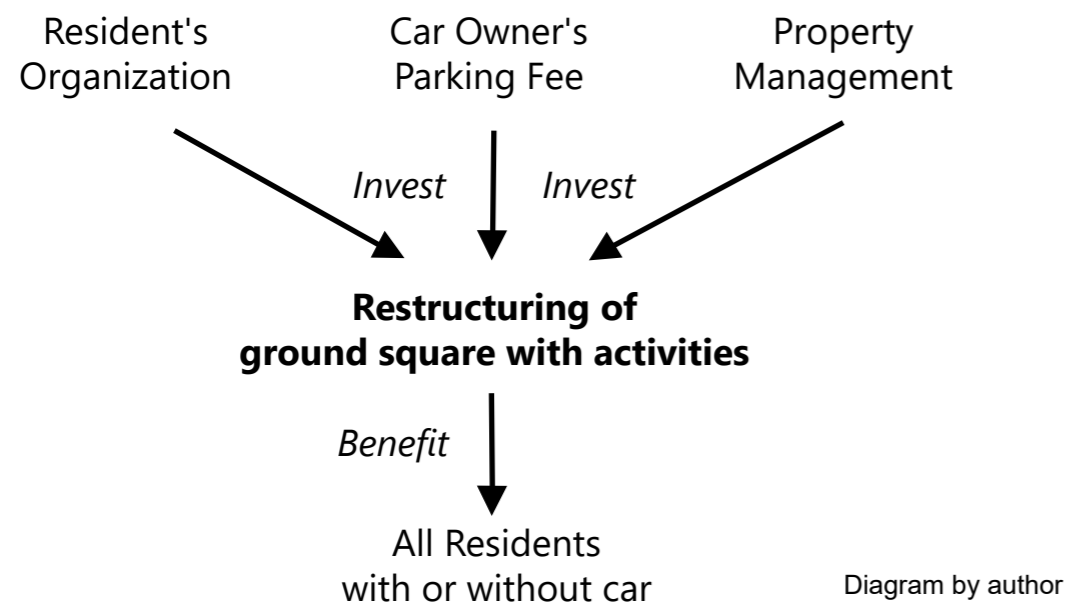
### Legend



Program: change of ground activities



Stakeholder



Visualization of proposal activities under high-rise tower



Visualization by author

## Conclusion of last chapter

Proposal urban design is carried out at the crossing point of Community-New Town cohesion belt and current corridor towards the center. Multi-layered transportation is applied to separate pedestrian and vehicle flow in this area of extreme density, in order to create qualified public space and efficient transportation at the same time. Underground vehicle solution has a better accessibility to underground parking. Meanwhile, ground space can be freed to serve all kinds of neighborhood activities, which generates a mix-use development.



## 8. Feasibility & Conclusion

Focus of scale in this Chapter

I. Local scale

II. Urban scale

III. Regional scale

- Timeline:

History review and future intervention

- Feasibility of polycentric regional vision

- Feasibility of infrastructure intervention

- Feasibility of multi-layered transportation:

value and revenue

- Conclusion

## 8.1. Timeline: History review and Future intervention

History



### Construction of first neighborhood

Project Paradise Gateway was operated as affordable housing, and the first neighborhood started construction.



### 2005 corridor expansion project

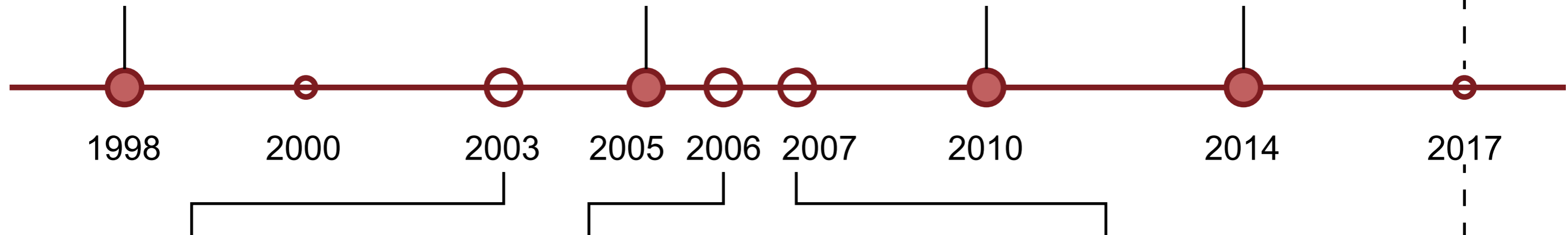
Main corridor Anli Road opened to traffic, and became the main connection between Paradise Gateway and Center.



### Follow-up development

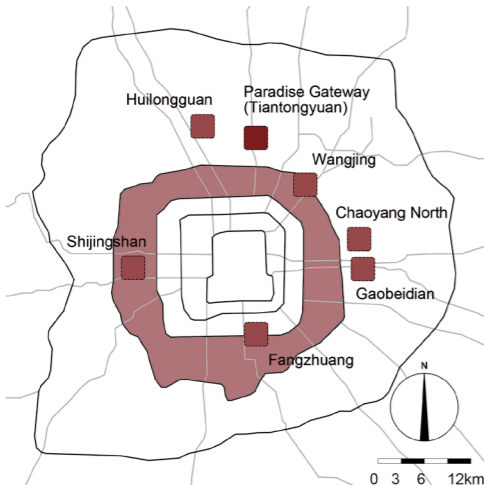
North group finished, marking all neighborhoods are completed, and the construction finished.

Tsinghua Memorial established as the only large hospital.



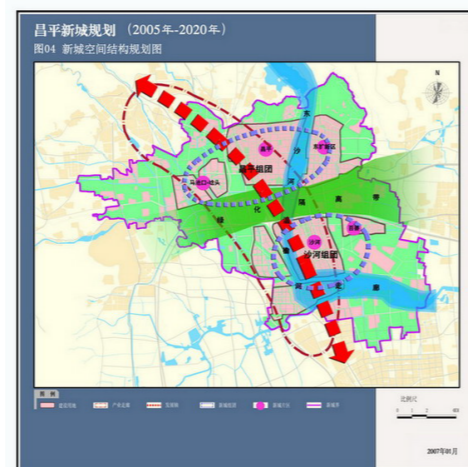
### Construction of the 5th ring

5th Ring Road opened to traffic, provided the physical connection between mega-communities.



### New town promotion

SY Airport New Town plan (2005-2020) was approved by the capital planning and construction committee.

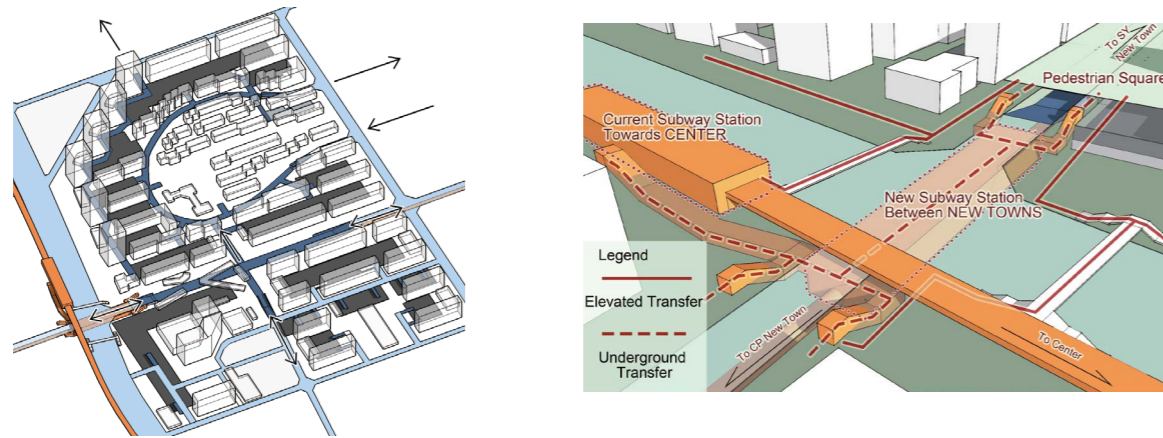


### Subway construction

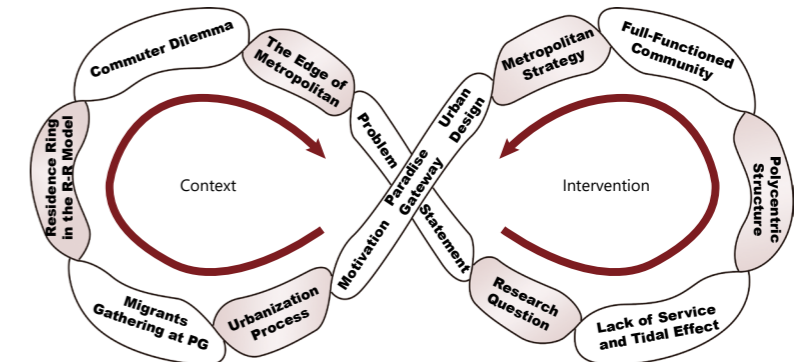
Subway Line 5, the first north-south subway line, started operation. Because of the huge commute demand towards center, the line has been highly overloaded since then.



### Intervention



### Methodology



### Road Administration

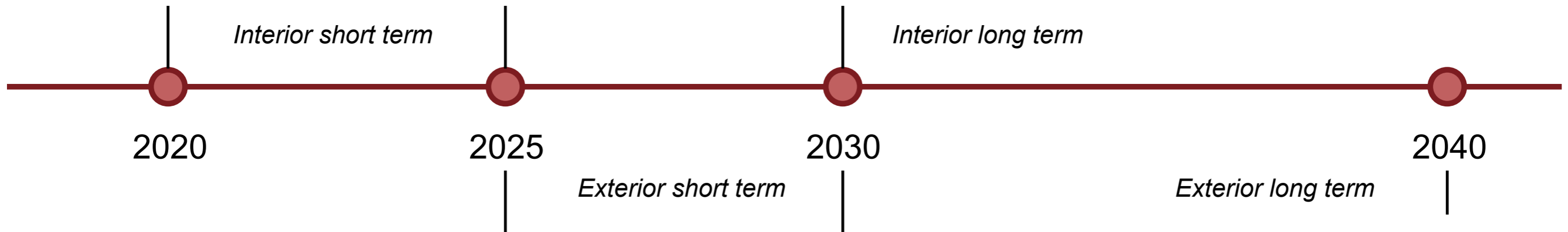
Proposal underground vehicle road will be built in areas of extreme density.

### Subway Company

Proposal Subway station and inter-transfer system will be completed.

### Real Estate Developer

Proposal multi-layered transportation with pedestrian friendly public space that suits high urban density will be completed.



### Subway Company

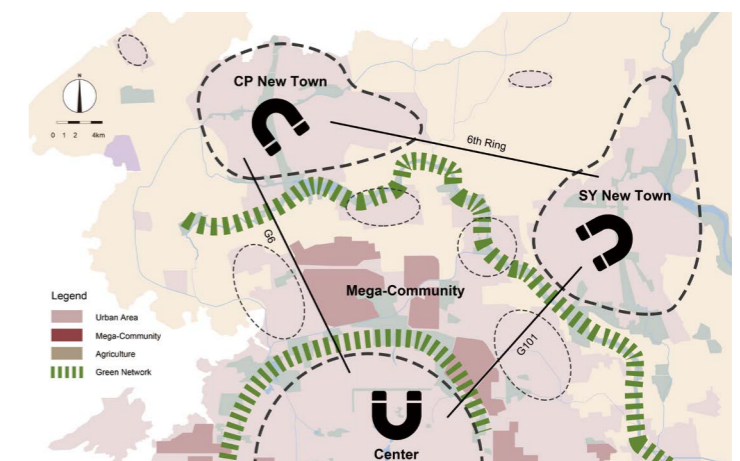
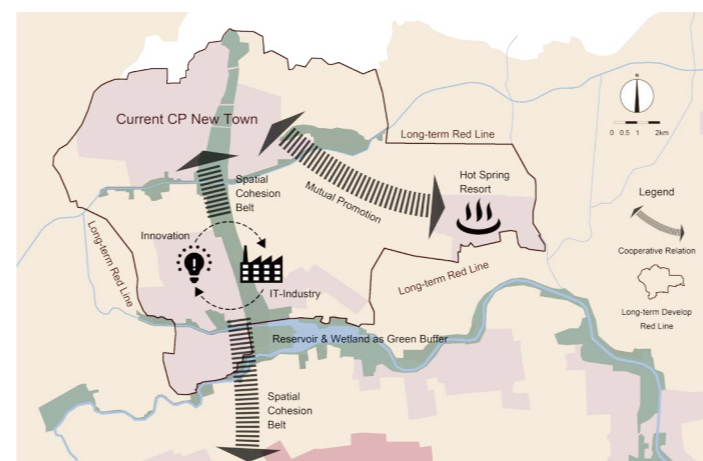
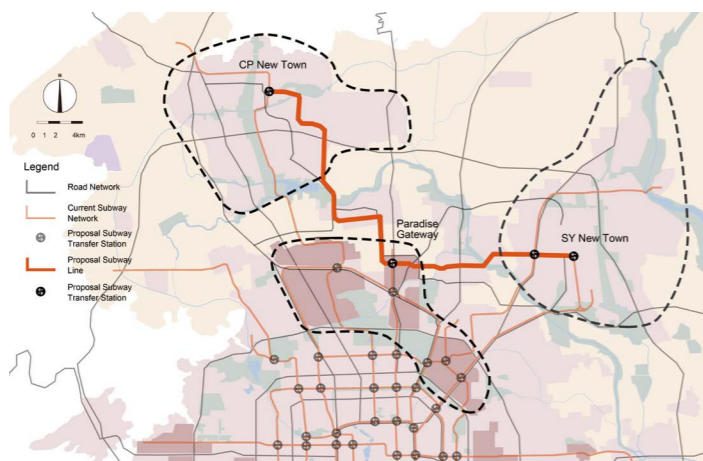
Proposal Subway line between New Towns and Paradise Gateway will be completed.

### Development Commission

Spatial cohesion belt of innovation and IT-industry between Zhongguancun and CP New Town will be completed.

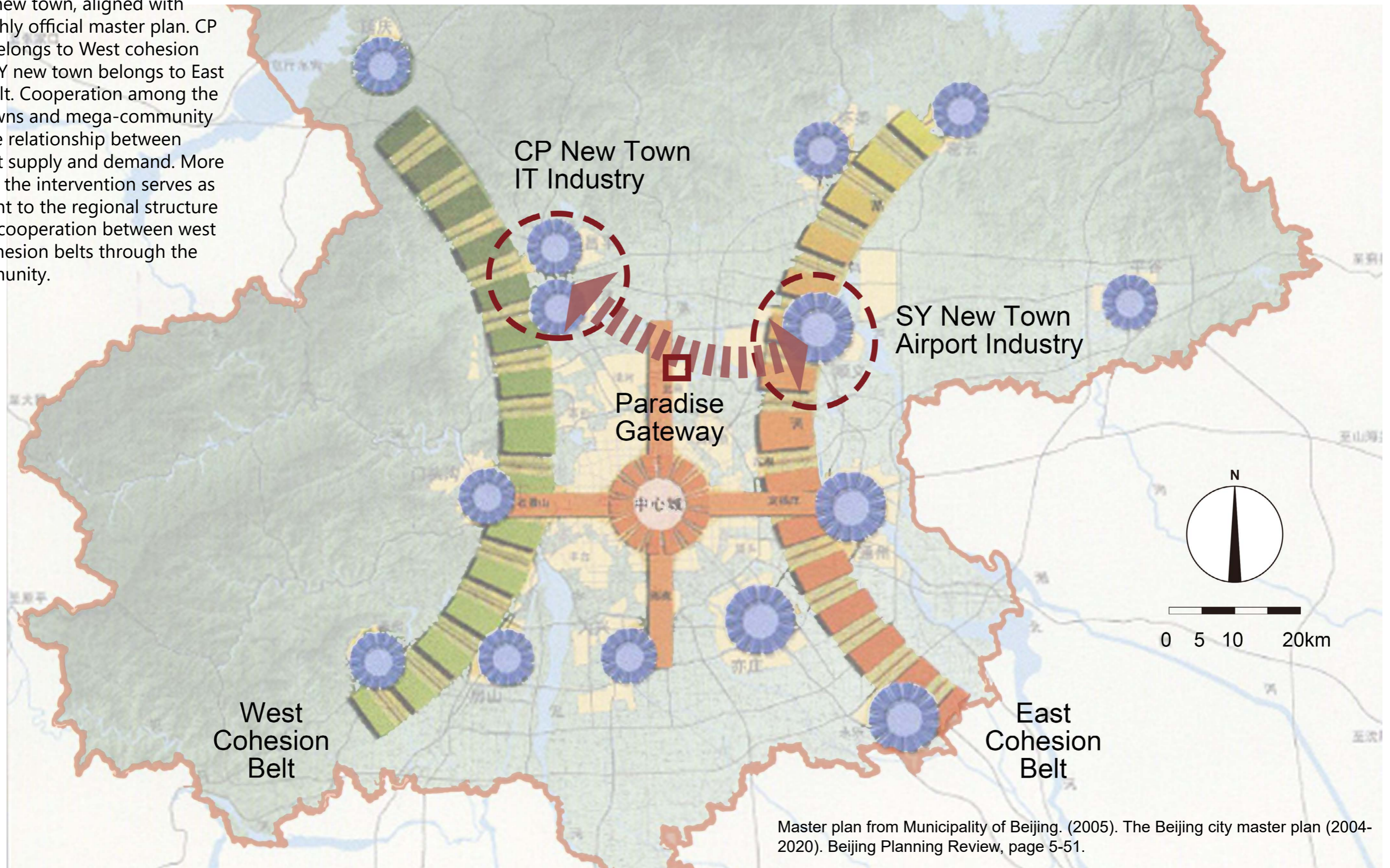
### Planning Administration Council

The thrive of CP New Town will be reached as a crucial sub-center in north part of Beijing, which will help the city out of concentric rings and realize polycentric structure.



## 8.2. The feasibility of polycentric regional vision: Intervention accords with the official master plan

The intervention of promoting a triangular intermedia structure, Center, CP, and SY new town, aligned with Beijing's highly official master plan. CP new town belongs to West cohesion belt, while SY new town belongs to East cohesion belt. Cooperation among the two new towns and mega-community balances the relationship between employment supply and demand. More importantly, the intervention serves as a supplement to the regional structure by creating cooperation between west and east cohesion belts through the mega-community.



Master plan from Municipality of Beijing. (2005). The Beijing city master plan (2004-2020). Beijing Planning Review, page 5-51.

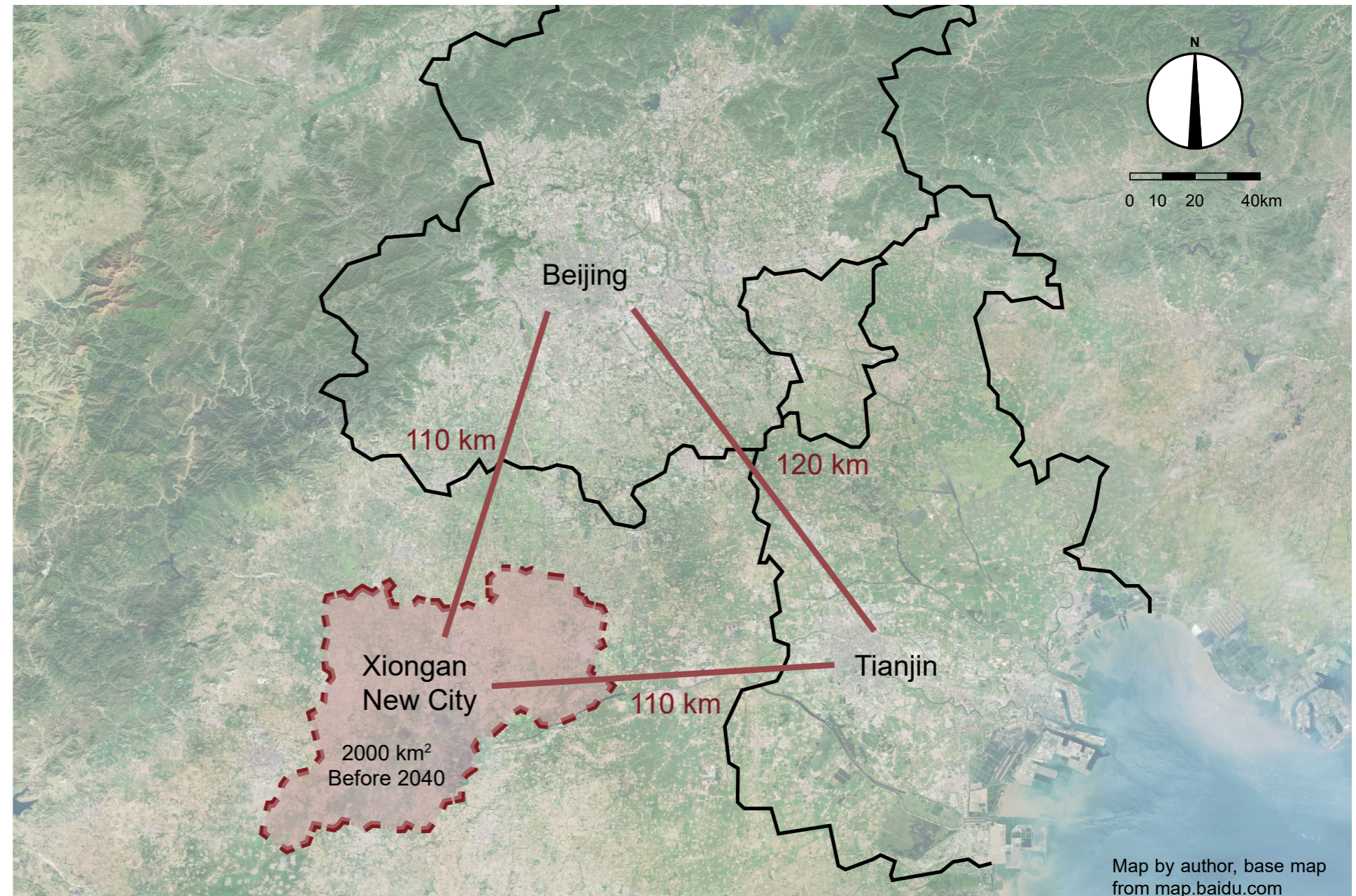
## Urbanization still in process: the strategy of Xiongan New City

On April 1st, 2017, the central government of China announced that it would establish the Xiongan New City so as to resolve the non-capital functions of Beijing, as part of the measures to advance the coordinated development of the Beijing-Tianjin-Hebei region. The main purpose aims at relieving the overcrowding situation of Beijing and creating a polycentric macro metropolitan structure. Till 2040, major state-owned enterprises will move to the new city and the urbanized area of the new city will reach 2000 square kilometers.

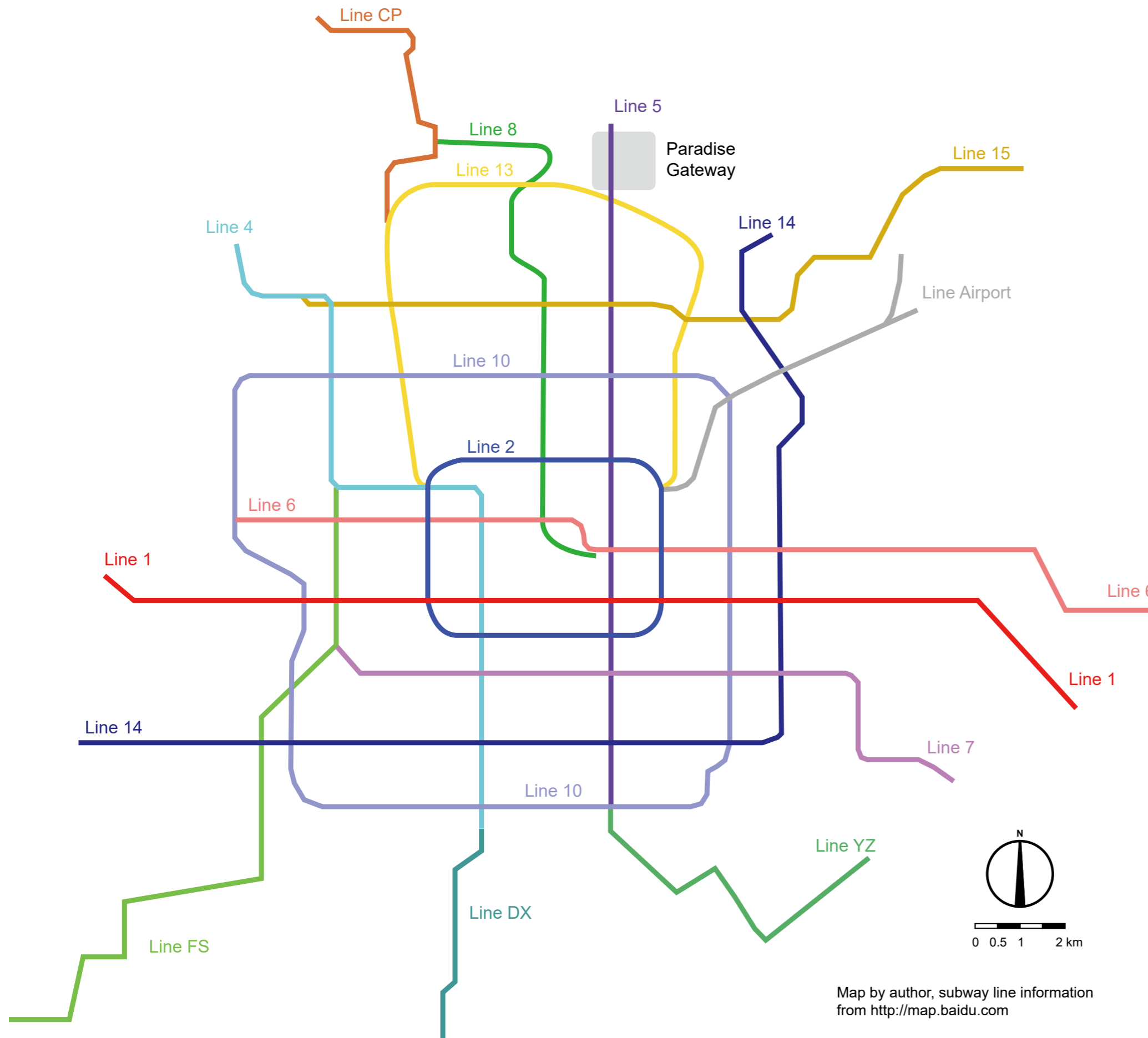
It is a surprising coincidence that the triangular polycentric structure is very similar to the proposal of regional vision in this project. Beijing is the core city of the new metropolis in the perspectives of culture, politics, international communication, and high-tech industry. Tianjin is the sea port, which is strong in logistics, economy, and manufacture. The Xiongan new city aims at solving the overcrowding problem in Beijing by taking on the non-capital functions (industries that do not belong to the four functional orientations of Beijing as the capital). The mass urban construction of Xiongan new city provides the third pole that generates the functional polycentric structure in the Bohai Bay Metropolis from the macro scale.



The Xiongan new city is next to the Baiyangdian Lake. It has not only the regional location advantage, but also the environmental advantage. Source: [http://pic1.hebei.com.cn/003/013/023/00301302322\\_55d53c90.jpg](http://pic1.hebei.com.cn/003/013/023/00301302322_55d53c90.jpg)



### 8.3. The feasibility of infrastructure intervention: Coordination with the subway system



According to Beijing Daily (2016), municipality budget for subway construction in 2016 was

**¥ 53,020,000,000**

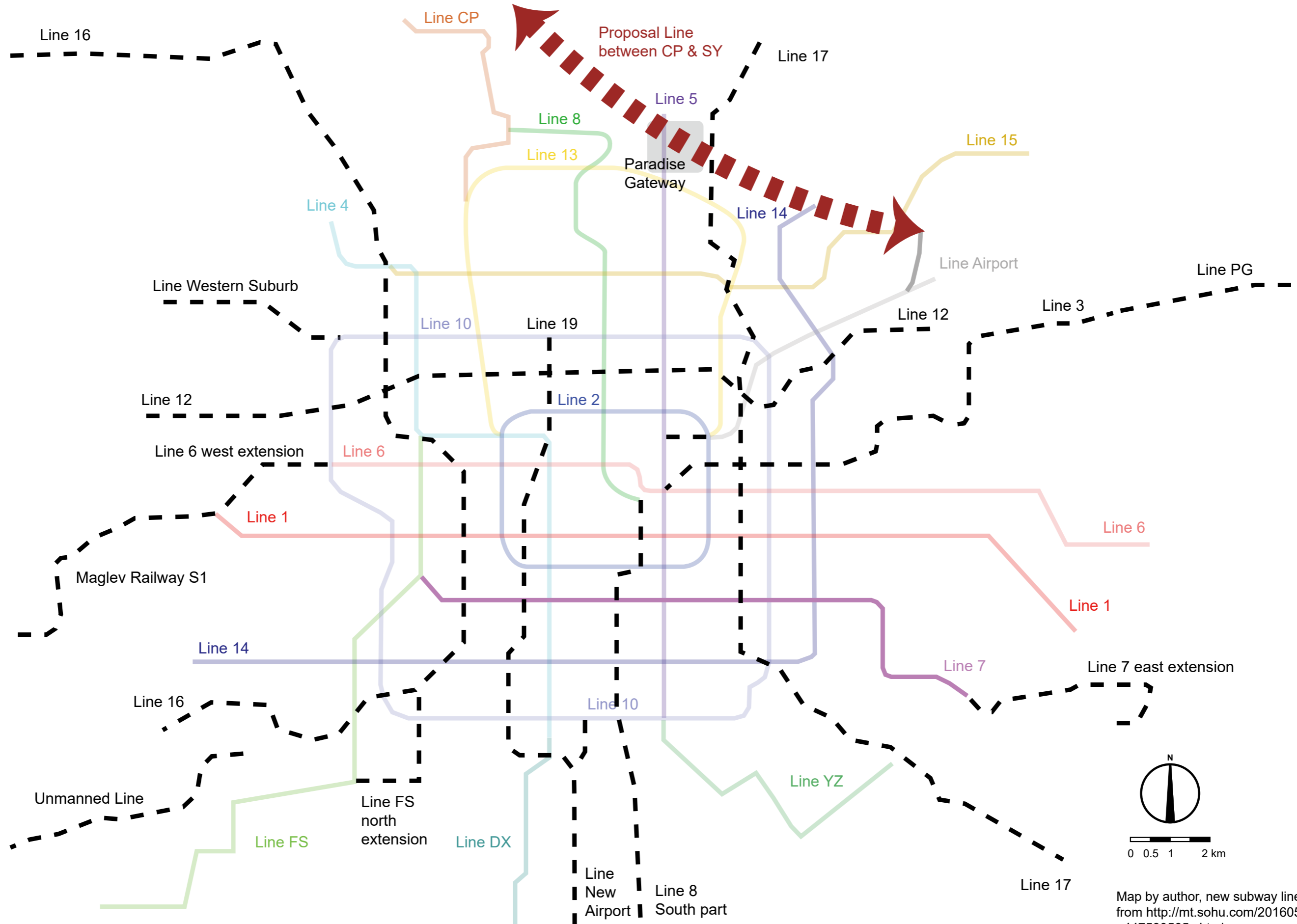
including 15 subway construction projects, aiming at promoting public transport and relieving urban congestion. It reveals the municipality's will to encourage city-wide public transit.

Although the subway network plan 2020 is enormous and ambitious, it is still based on the current commuting demand. The more connections from the suburb to the city center, the more effective of the ring-radial structure will be. This is a typical development-oriented transit model.

The proposal subway line will merge into Beijing's subway system plan for 2020, which the municipality budget can easily cover. On the other hand, the proposal subway line is fundamentally different from the rest of lines. The CP-PG-SY line will act as a connection between sub-centers, which will lead the future polycentric transition in the intermedia scale. It is an attempt to plan ahead of time following the concept of transit-oriented development.

Map by author, subway line information from <http://map.baidu.com>

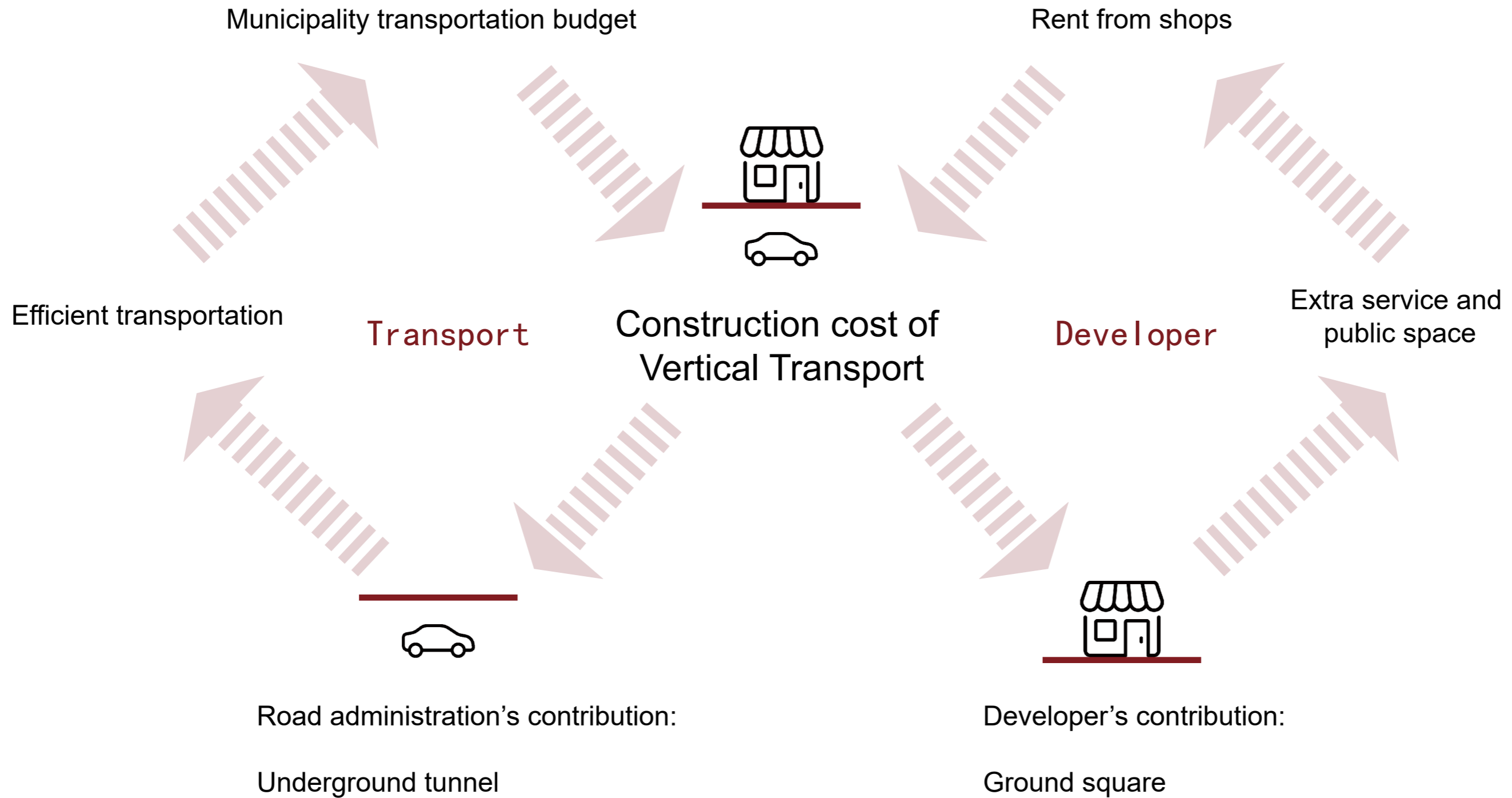
15 new subway lines under construction in 2016: to be finished before 2020



Map by author, new subway line information from <http://mt.sohu.com/20160504/n447580565.shtml>

## 8.4. The feasibility of multi-layered transportation: Economic chain of investment and revenue

Diagram by author.



The construction of a new subway line is covered by the subway company. Even so, the construction cost of an underground tunnel and a ground pedestrian square can still be high. The investment and revenues chain can be divided into two parts. Road Administration covers the underground part by the transportation budget, as the undisturbed tunnel increases transportation efficiency. Developers covers the ground part, as extra service and public space can not only increase the quality of community but also profits from the rent of shops. Details will be explained later.

The major stakeholders involved at Paradise Gateway are shown on the left page. They are arranged in a power-interest analysis chart. The developers group are the most crucial party as they can invest in the construction and profit from the selling of property. The development sequence of the community is Government, Mediator, Developer, and Residence. Even they are separately responsible for different parts, a proper division of work and cooperation towards the same goal can ensure the implementation.

## Stakeholder analysis: Power-Interest

In the power-interest analysis, the vertical axis shows the powerfulness of a stakeholder and the horizontal axis shows the interest it has in the project. Stakeholders are grouped up by category, while the arrow shows the executive sequence. After the Government authorises a project, it will be planned and designed by Mediators. The groups of Developer and Transport are in charge of execution. Upon finished, the property will be sold to Residence.

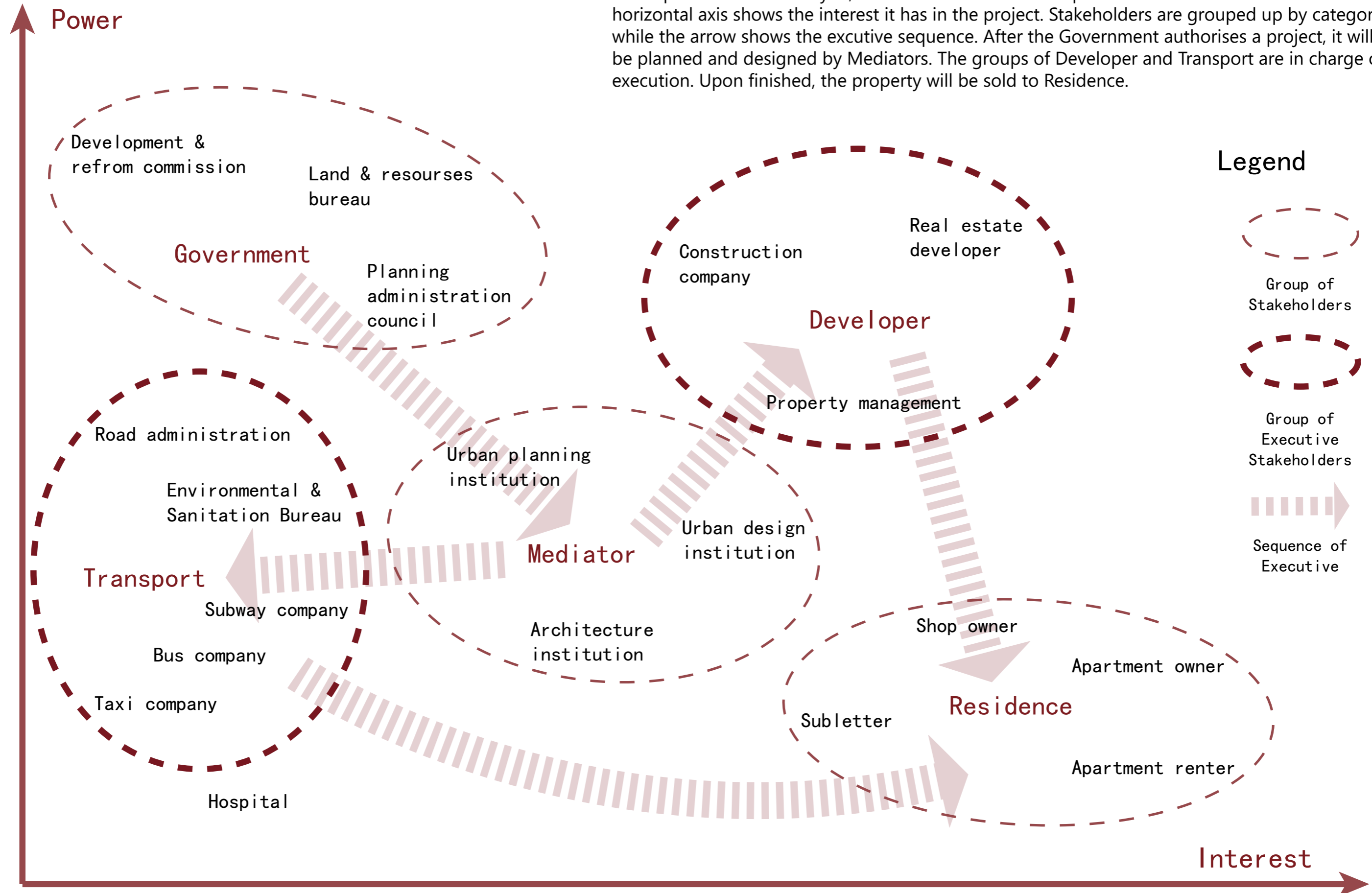


Diagram by author.

Value provided and Economic revenue

d1. Mega-community of mixed functions generated by TOD

d2. Transportation efficiency

d3. Service accessibility

d4. Public safety

d5. Environmental Quality

d. Value provided as Leaf

e. Economic revenue as Fruit

**Revenue:**

- e1. Revenue from subway line operation
- e2. Profit from vehicle parking fee
- e3. Rise of land price (for developers) and property value (for inhabitants)
- e4. Revenue from retail and restaurant
- e5. Various external benefits:
  - environmental (air quality, shade, walkability)
  - public safety (lesser traffic accident)
  - time and efficiency (faster transfer, lesser public transit time, lesser congestion)

c. Multi-layered infrastructure as Trunk

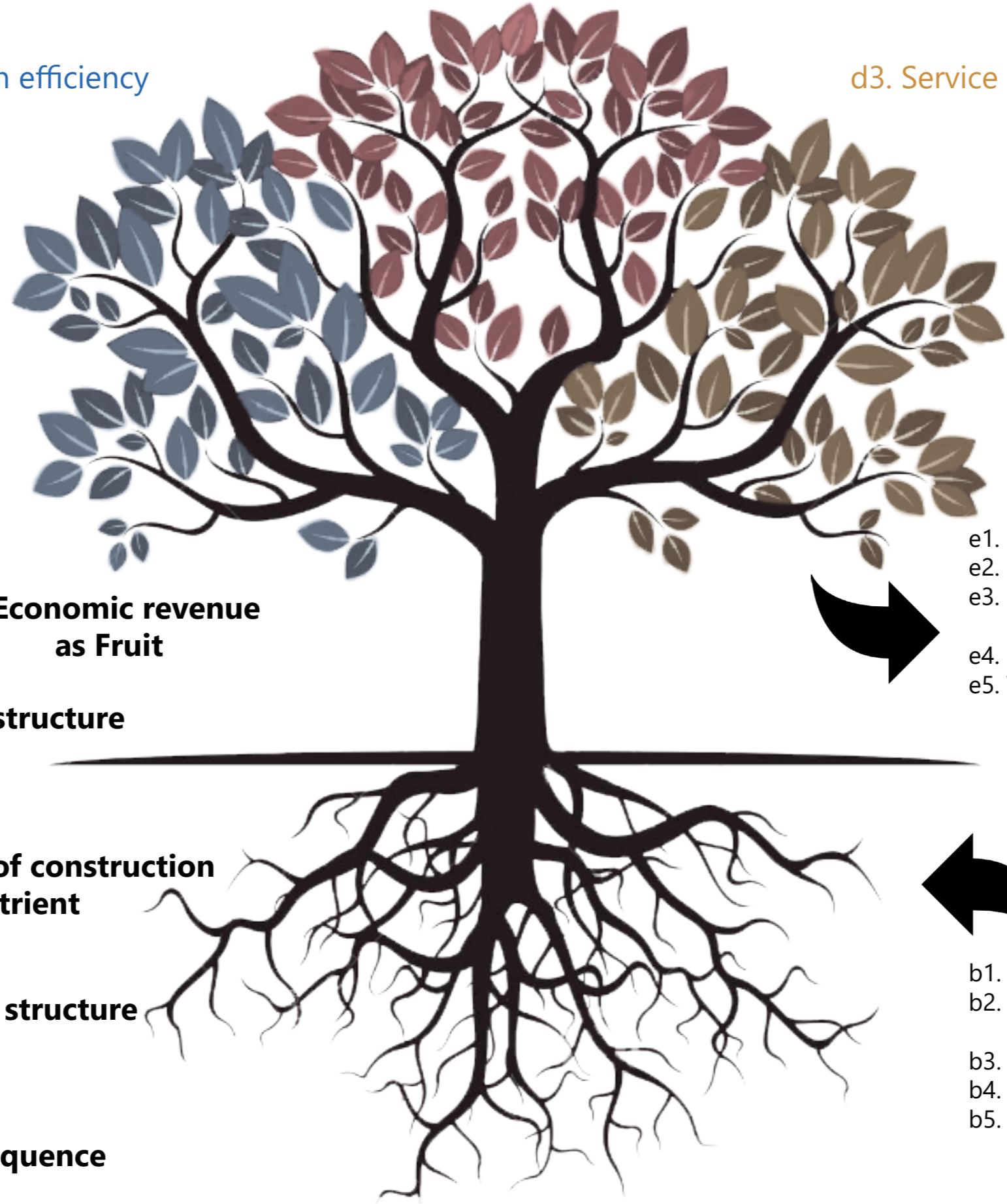
**Investments:**

- b1. Construction cost of subway line
- b2. Construction of underground vehicle road and connection to parking
- b3. Construction of pedestrian underground exit
- b4. Cost of pedestrian pavement and greening
- b5. Building cost of retail and restaurant

b. Investment of construction as Nutrient

a. Polycentric regional structure as Soil

The implementation sequence



## 8.5. Conclusion

The project focuses on the mega-community of Paradise Gateway in Beijing, which hasn't fulfilled its purpose of becoming an ideal home for the drifters. As the function of Paradise Gateway in the Metropolitan of Beijing is providing residence for the city center, the overcrowding phenomenon is raised by the rapid urbanization. The huge commuting demand to the city center leads to the failure of public transportation and traffic congestion. The extremely large amount of inhabitants results in the insufficiency provision of public space and services. The analysis of the regional scale reveals that the birth of Paradise Gateway and many other similar mega-communities are functionally related to the monocentric structure of Beijing. The role of this area as housing the continuously rising amount of new inhabitant arrivals is a load that the local realities can never bear. The analysis on the problems of Paradise Gateway reveals a lack of awareness on the role of the regional structure's influence on the local scale. As a result, the thesis's proposed methodology is based on an inter-scalar approach by analyzing the current situation and planning future vision from not only the local scale but also the urban scale and regional scales. The author attempt to understand the dynamic functional relationship between Paradise Gateway and the metropolitan area of Beijing within a complex perspective of the metropolitan dynamics and the polycentric urban model in formation. Interventions proposals are made also from different scales. On the regional structural vision, a transformation/consolidation from monocentric to a polycentric structure is considers as a necessary pre-condition that paves the way for the urgent local revitalization. If the overcrowded situation remains unchanged, no intervention can be effective. On the local proposed plan and design, the proposal explores a solution for the pedestrian-vehicle conflict and search conditions to generate mix-land-uses and improve the public space provision and design guided by TOD perspective. In the end, the feasibility of each intervention from an active functionality interdependency is shown by recognizing the diverse actors and its diverse demands considering the different scales. The proposal is then discussed and tested by a critical assessment of the proposed design against the selected and revise development goals on the search for the maturity of a functionally polycentric model.

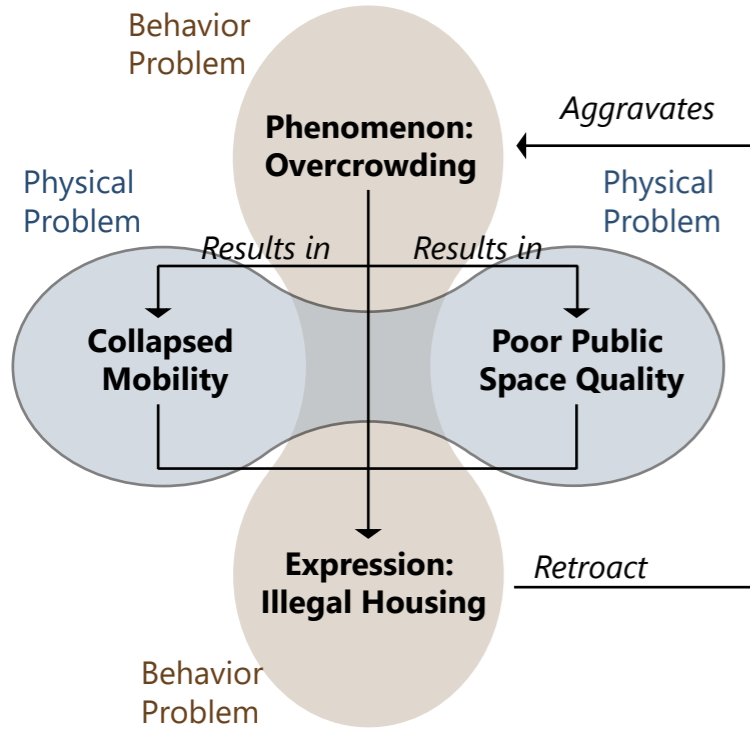
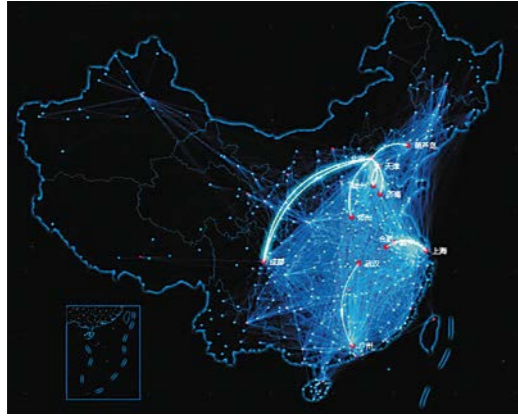
The essence of the proposed inter-scalar methodology is to value the crucial relationship between regional and local. The influence of the regional structure to the local communities is commonly ignored, which is especially critical in the case of Paradise Gateway. The combination of inter-scalar integrated interventions ensures the revitalization through a concrete perspective of a more balanced regional structure and a more integrated local solution. It has a promising future if the transition from the regional polycentric model and the role of the intermedia scales is considering. However, the proposal structural vision is not a low-hanging fruit. The achievement of the overall goal needs the cooperation and consideration of every stakeholder from different executive sequence and governance levels. It is never easy to bring everyone

to a united front, but the cooperation is fruitful and necessary. Another challenge to consider is the huge infrastructure construction investments. Although the cost of the investment can be high, the revenue in mid and long terms is also impressive as is illustrated earlier. As a common saying goes in China, 'infrastructure is the road to wealth'. The infrastructure investment brings not only the values and revenues on the local scale but also generates the overall and balanced development at the regional scale if in aligned recognizing the local adaptations within a new regional structuring. Another factor to consider is that the continuity of the timeline. The short-term regional intervention directly links to the mid-term local intervention, and the long-term regional polycentric structure involves the revitalized Paradise Gateway as an important part. In conclusion, there are of course both strengths and weaknesses of this project. But anyhow, it is a meaningful attempt to explore the dynamic interaction between the community, the city and the overall platform of a metropolis in formation.

The community of Paradise Gateway has raised commonly social concern by its bad reputation. Beijing construction commission announced in 2006 that no more affordable housing project of such scale will be never authorized again. However, Paradise Gateway and its problems are an established fact. Paradise Gateway, although the largest, is not only one of the many mega-communities alongside the 5th ring in Beijing, which share similar origins and so similar problems. The set of interventions proposed in this thesis has some universal value to the mega-communities, as both the communities (alongside the 5th ring) and the new towns (alongside the 6th ring) share the same typological structure. To transfer the solutions to other mega-communities could be an estimable next step. Recently, the latest draft version of the master plan of Beijing (2016-2030) is currently going through public notification. The new plan learns from the flaws and sets up a new goal for 2030, including plans for lowering the population density, steadier urbanization, better environment, cleaner air, more comprehensive heritage protection, and stronger values at its sub-centers. I am glad to see with my own eyes that the shortcomings of the municipality of Beijing could improve in the coming years by the search to fulfill the above goals. But as is proposed in this thesis, each affected settlements need to recognize its own values and structure as well its functional position within the metropolitan dynamics so to co-create a better and cohesive urban system. This thesis only provides very limited thoughts and contributions, but with the effort of all urban planners, Beijing could definitely be a better metropolis tomorrow.

**Background:** Drifters of urbanization

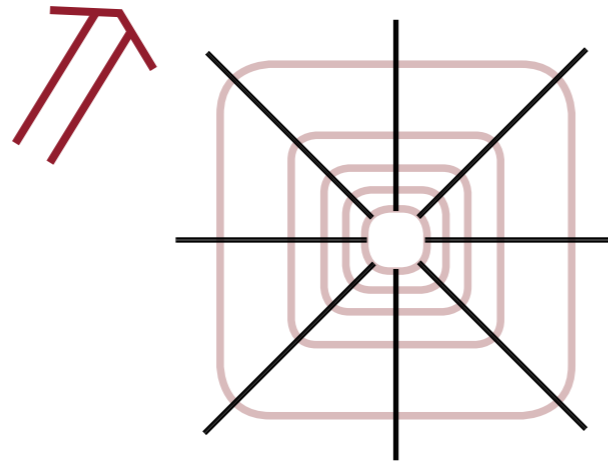
**Theory:** Saunders' Arrival City (2011)



**Expression:** Illegal Housing



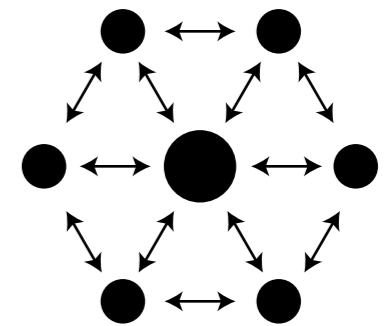
**Current:** Rapid urbanization under Ring-Radial Model results in concentric monocentric structure, which causes extreme high density and urban sprawl.



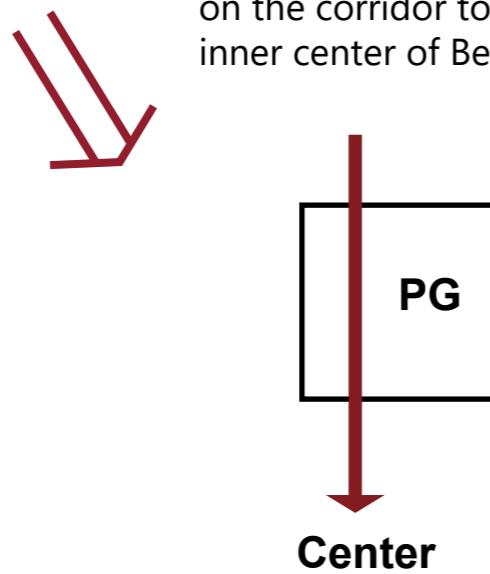
**Problem:** According to Urban Market Theory (1964), monocentric structure causes affordable residences locates at a certain distance from the center, and creates mega-communities.



**Theory:** Polycentric development, aiming at cohesion and competitiveness (2005), creates morphological network and functional cooperation (2012).



**Current:** Heierarchical flow of the community results in the concentration of commuting on the corridor toward inner center of Beijing.



**Current:** Collective space and public service of Paradise Gateway follows transportation infrastructure under the platfrom of urban complex.

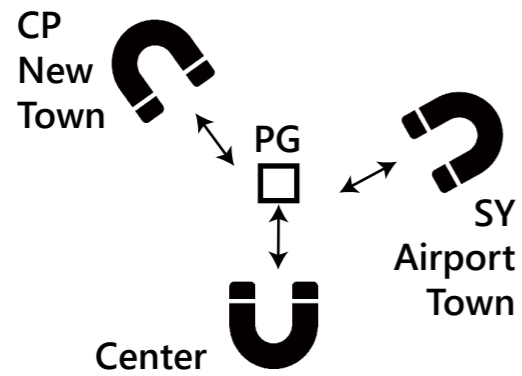


**Problem:** Serious conflict between vehicle and pedestrian in the high-rise community causes a lost in both quantity and quality of public space.



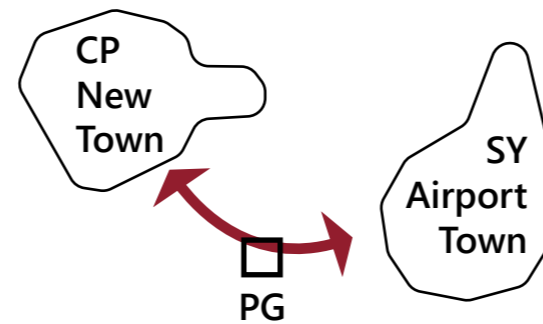
**Proposal:**

Introduce polycentric development to the intermedia structure of Paradise Gateway in the form of three magnets, which shifts its role from compelled fringe residential zone to alternative housing choice.



**Proposal:**

Built physical connection linking CP New Town, Paradise Gateway, and SY Airport Town in the form of subway line, which is a counter tidal way of commuting between work places and housing.



**Vision:**

Regeneration of Paradise Gateway combines a set of interventions from different scales, in order to fundamentally make the community again a paradise for migrants. The vision consists of a **polycentric model** to control overcrowded population and counteract on tidal commuting **in the regional scale**, and a **multi-layered transportation system** to provide efficient transport and pedestrian friendly public space **in the local scale**.

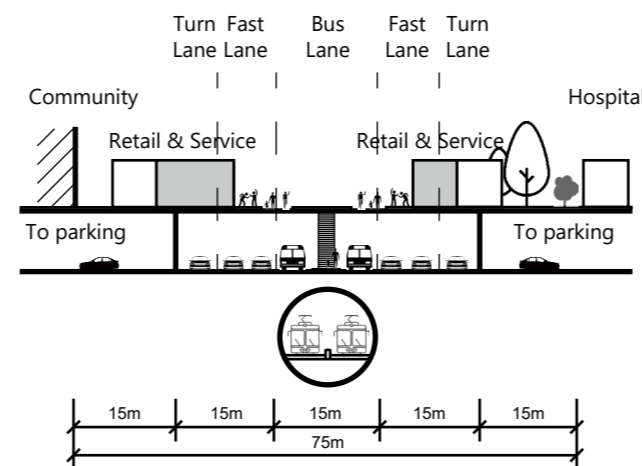
**Theory:**

Ludwig Hilberseimer proposed upper floor streets in the High Rise City (1924). This multi-layered transportation approach is broadly accepted by Chinese cities in 21st century.



**Proposal:**

Apply multi-layered transportation to Paradise Gateway in area of extreme density, aiming at providing efficient transportation and qualified public space at the same time.



SY New Town  
Airport industry



Public transportation

Private transportation

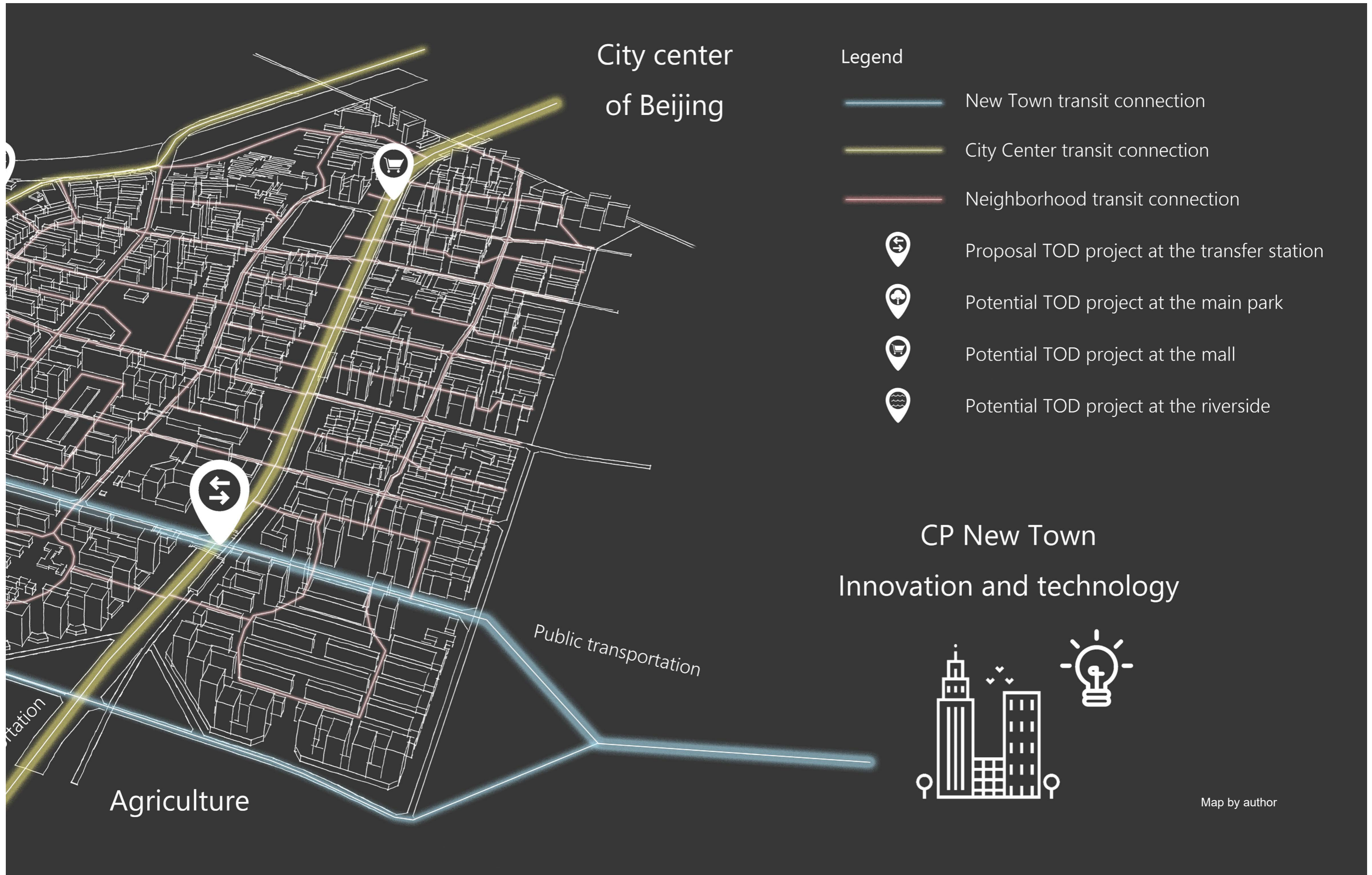
### Mega-community Paradise Gateway

In the future, the mega-community of Paradise Gateway will become the crucial point in the polycentric regional transformation, by supporting the development of CP new town and SY new town. TOD projects in the form of multi-layered transportation will generate the mix-use development at the important nodes, aiming at public space quality and transit efficiency. Paradise Gateway will be the ideal home again.



Private transportation

Public transport



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## Appendix II: Theoretical Essay

# Polycentricity - An Introduced Exotic Savior?

## Feasibility of Applying Polycentric Strategy to Beijing under the Intense Urbanization Process of China

AR3U022, Theory of Urbanism

Yuefeng Yang

4503910 \_ [Y.Yang-13@student.tudelft.nl](mailto:Y.Yang-13@student.tudelft.nl)

January, 2017

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**Abstract** – Polycentricity is the dominant structure of urban system in Europe, and the Netherlands is one of the leading countries in developing polycentric city network. The two main characteristics of polycentricity is cohesion and competitiveness (Waterhout, 2005). Beijing, as a mega-city with 21 million inhabitants, is suffering from severe congestion, excessive population agglomeration, and over-spread of urban sprawling, etc. Beijing wants to relieve itself by applying polycentricity to the city, in order to developing the surrounding and control the core area. New challenge arise when grafting this European theory into the Oriental. The 2004 master plan of Beijing put forward this vision of polycentric metropolitan, which will be realized by strictly control of the inner city and dauntlessly establish 11 new towns. In reality, the master plan is ironically boosting the centrality of inner-city. Can polycentricity becomes the savior? What is the possible strategy for Beijing towards the challenge?

**Key words** – polycentricity, Beijing metropolitan area, urbanization, new towns, Drifter

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## 1. Introduction

The theory of polycentric development has been widely accepted by European countries. Polycentricity thrives on this well urbanized metropolitan area. Compared to Europe, Asia cities are still under the process of urbanization, and higher density and vertical development are provided by modern technologies. The urban context of the two continents is of a world of difference. China is one of the largest economic entities, where economic growth is kept on a high speed. On the other hand, Europe is emphasizing on quality of city life. Dramatically, when Beijing encountered severe congestion and overcrowding brought by fast development, the city turned to polycentricity for help. This paper aims at discussing whether it is suitable for developing polycentricity in Beijing, and if so, what are the possible adjustments to be made in order to fit this European theory better into local situation.

## 2. Polycentricity Literature Review

### 2.1. Europe's warm welcome to Polycentricity



**Figure 1:** Polycentricity in Europe. Source: by PBL Netherlands Environmental Assessment Agency <http://themasites.pbl.nl/cities-in-europe/>

As is repetitively illustrated by Meijers (2008, 2010, 2012), polycentricity has become a buzzword among spatial planners and applied as development strategy for European countries, including the Netherlands, Belgium, Germany, Switzerland, Denmark, Portugal, Norway, etc. ESDP in May 1999 (European Spatial Development Perspective) addressed the discourse of mobility and polycentricity, which is under the context of spatial challenges European Union is facing whilst attempting to balance the disparate regions of Europe (Richardson, 2000). Among European countries, the Netherlands is the leading force of polycentric development according to PBL, where lies the Dutch Randstad region. Under the support of Inter-municipal Statutory Regulations (WGR), municipalities work jointly on economy, employment, housing, transport, recreation, housing and social affairs that reaches a higher scale of cohesion (Meijers, 2008).

### 2.2. Origin and Development of Polycentricity Theory

When it comes to polycentricity, the theory of Christaller's central place cannot be avoided. Based on the test field of south Germany, goods marketing centers form levels of hierarchy under hypothetical ideal assumptions (Christaller, 1966). As is concluded by Burger (2011), two different paths has been built on central place theory. On the one hand, economic studies that extended and modified the model, and on the other hand, empirical research viewed the theory in an analytical way towards city-hinterland relationships. More importantly, the theory is flexible and referential on service hierarchy and employment (Mulligan, 1984). According to Parr (1987), when it comes to contemporary urban systems, the central place framework can be extended to the presence of study of commuting flows. Burger (2011) suggests that higher-order functions are more often found in large cities, where attract higher-ranked employees and consumers. To reflect this on the Randstad, the employee flow of Randstad fits well into the model, where the four major cities are the providers of jobs and employee from surrounding cities commute in between.

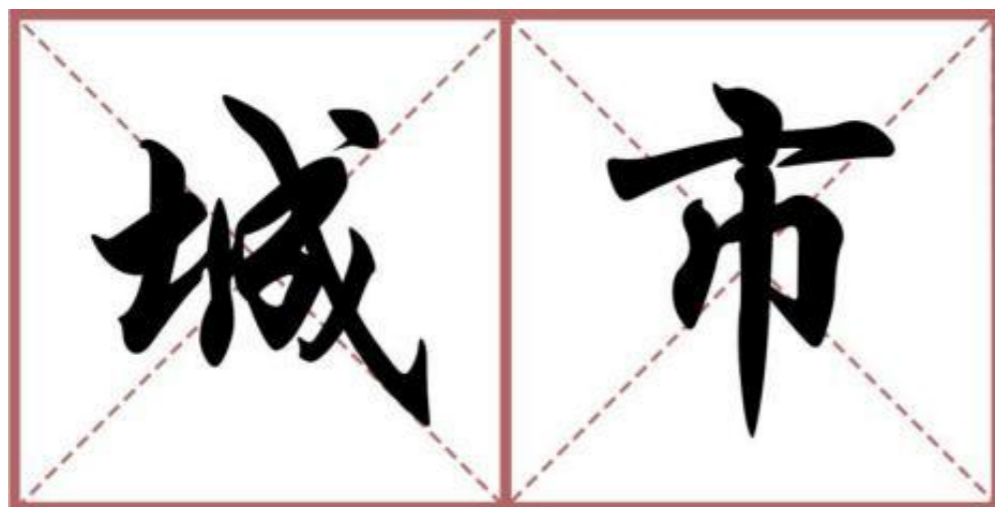
### 2.3. The Goal of Polycentric Development

As is explained by Waterhout (2005), the goal of polycentric development is a combined objective of cohesion and competitiveness, which is hard to separate one from another. Cohesion focuses on reducing the geographical imbalance in a urban system, and on the other side, competitiveness aims at fostering cooperation between multiple cities as a functional entity. Coincidentally, the network metaphor is mentioned in a variety of European countries' planning policies, which indicates for unity and synergy of a region (Meijers, 2004). The

states that synergy tries to achieve is  $1+1>2$ , which means a network of cities may be stronger than the sum of parts. When compared to Asian cities, European cities have the characteristic of small size and population but dense distribution, which is the perfect soil for polycentricity to grow upon. To review this perspective, polycentricity is the most reasonable development strategy for clusters of small cities in Europe fundamentally. However, Beijing, as the capital city of China, has a population of almost 30 million under a single nuclear structure. Under the intense urbanization process for the past two decades, the population growth is around 18 million, which caused the city serious overcrowding, lack of housing, and traffic congestion. Routine-breakingly, Chinese planners try to fight these problems by introducing polycentricity to the city.

### 3. Formation of the monocentricity in Beijing

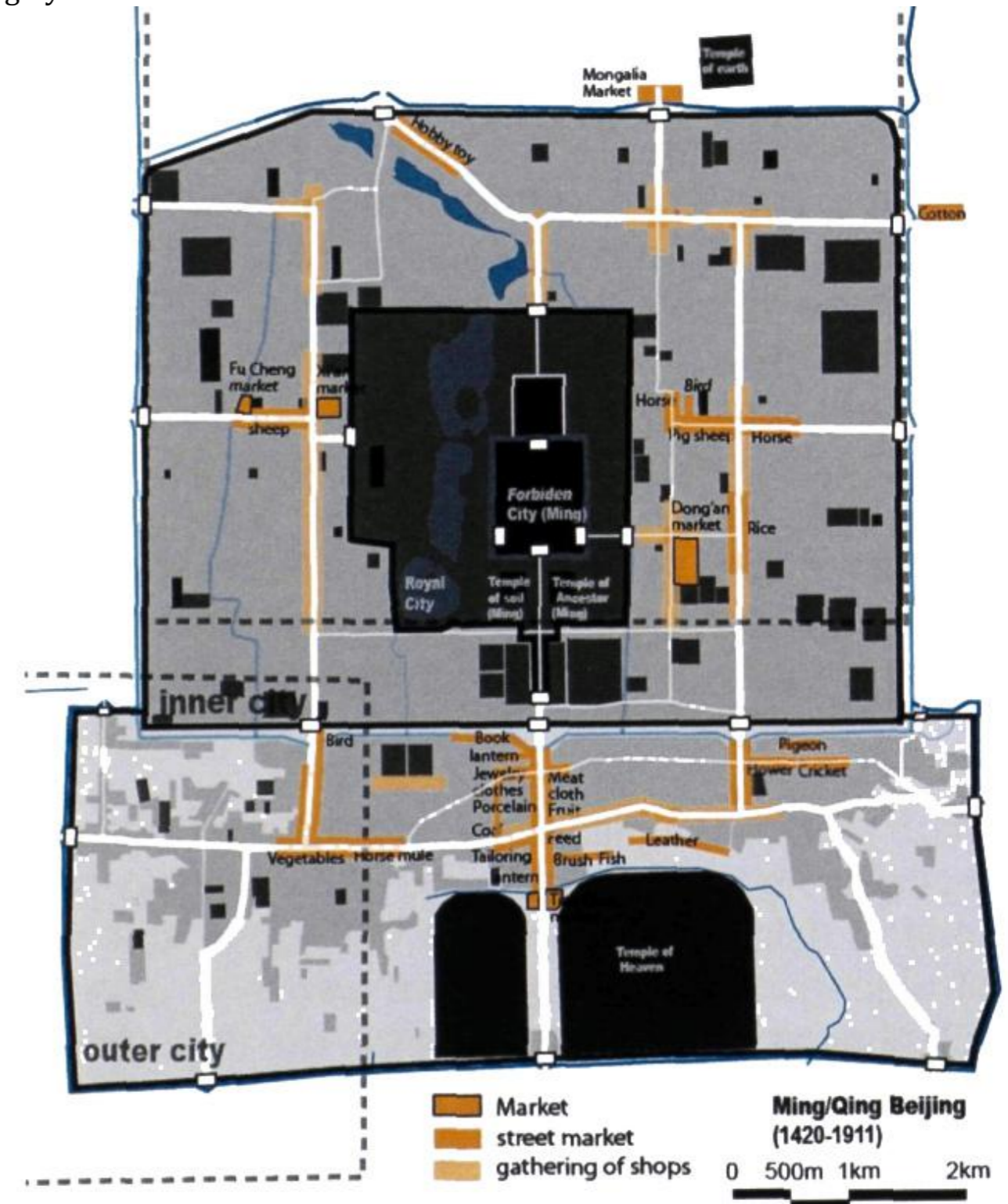
#### 3.1. Beijing under Imperial Power - Phase one (1122 BC till 1912 AC)



**Figure 2:** Chinese Characters for the word 'city' that explains an unique perspective. Source: made by author

The word 'CITY' in Chinese is consisted of two characters, which have well explained its two basic functions of an ancient city. The first one means defense wall and the second one means market. Beijing is similar to European ancient cities, where the wall provides security and protection, and the market provides service and economy. The first written record of Beijing was finished in 1122 BC. As the city has been the capital of several dynasties, Beijing was well planned and developed. When it comes to 1636, Qing Dynasty occupied the city and settled the urban structure that last till today. The structure, from inside out, is as follow,

the forbidden city (imperial) - the royal city (administrative) - the inner city (luxury oriented market and rich area) - the outer city (normal market and residential area), which is divided by sets of city walls. Power and capital are highly centralized since then.

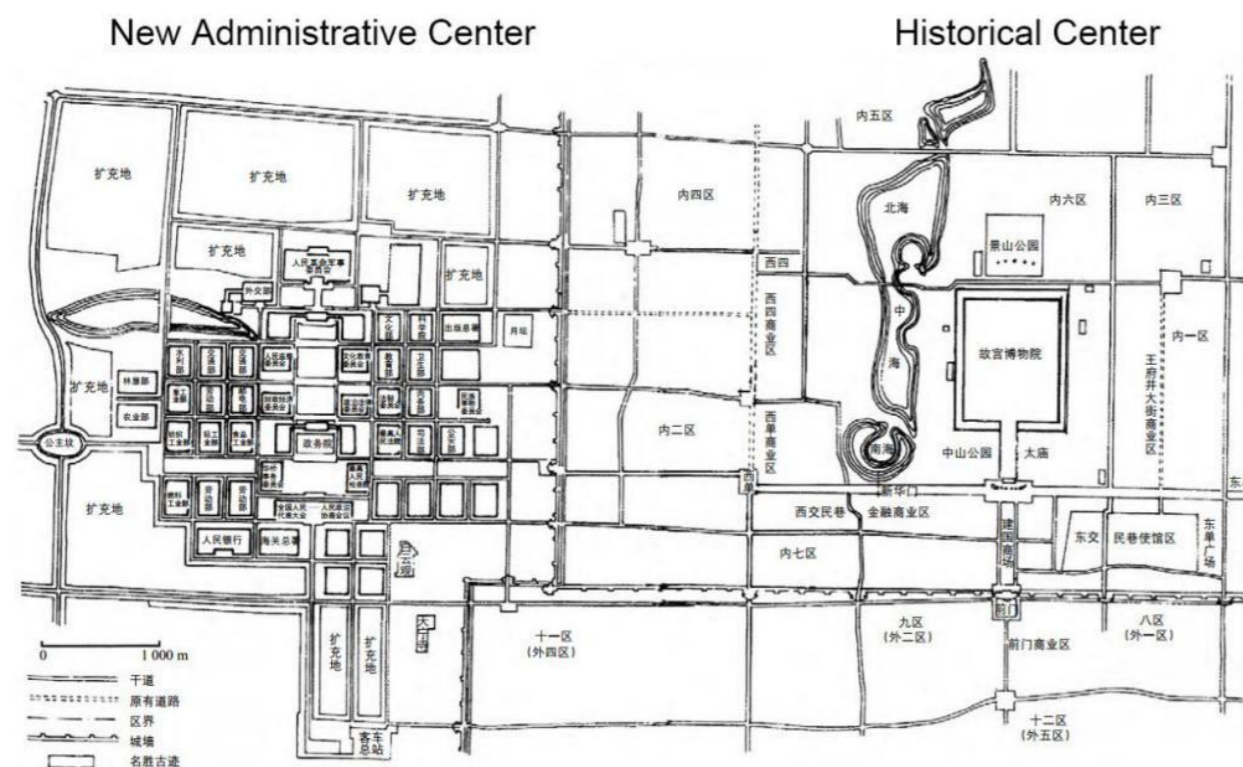


**Figure 3:** Qing Beijing's market distribution. Source: Sheng, Q., (2011). Changing Centralities under Urban Configurational 'scale-structure' - Pondering the spatial conditions for market and retail areas in Beijing



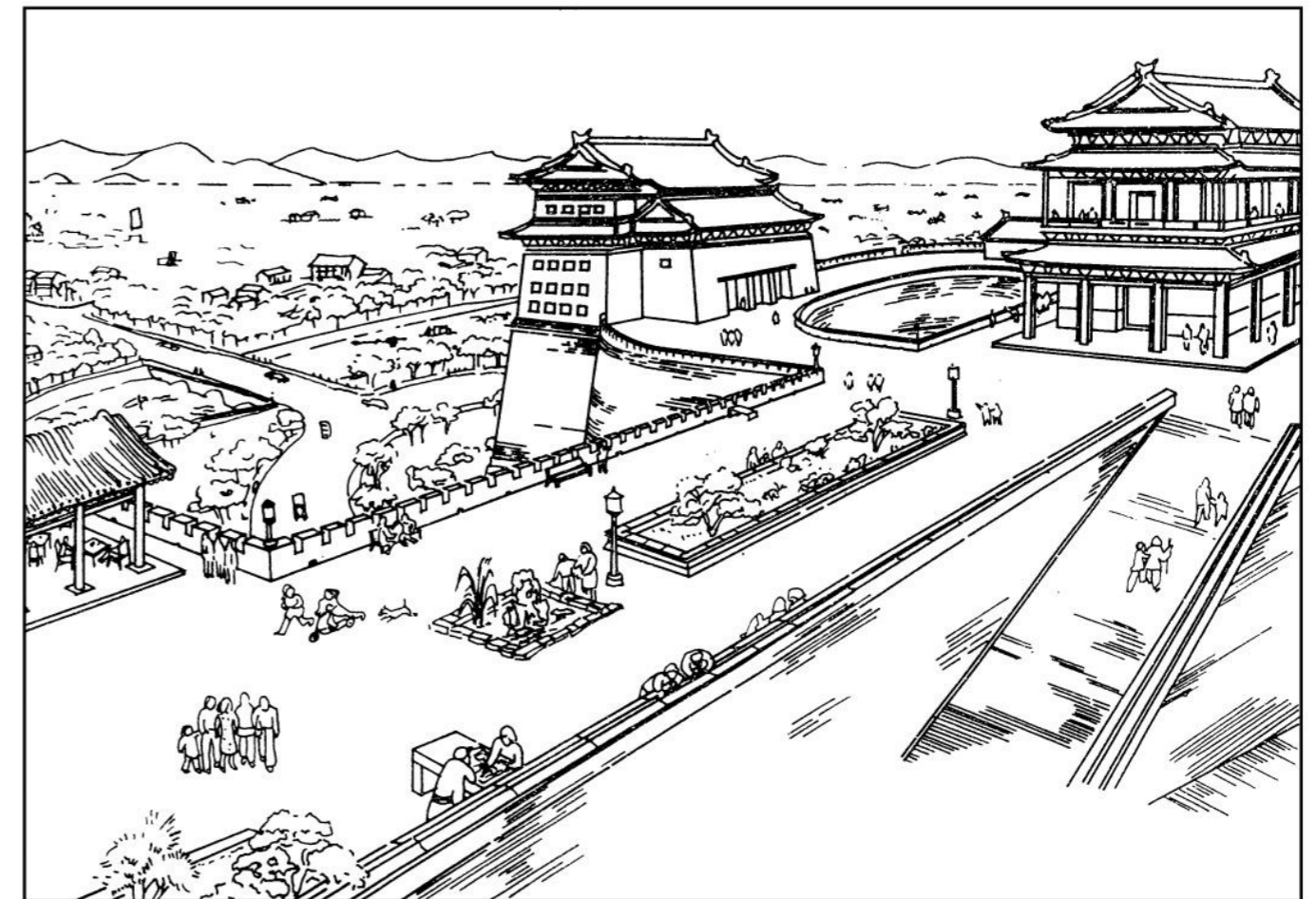
**Figure 4:** Outlook of Ancient Beijing City Wall and the Front Gate. Source: Author unknown. [http://blog.sina.com.cn/s/blog\\_538fed5d0102v4w4.html](http://blog.sina.com.cn/s/blog_538fed5d0102v4w4.html)

### 3.2. A Period of Soviet Mania - Phase two (1949 till 1978)



**Figure 5:** Liang Sicheng's Plan of creating new administrative center to the west. Source: Zuo, C., (2008). Historical review on the determination of capital's location. Urban and regional planning research, 3/2008, 34-53.

After half century's war, the Red Party came into power. December 1949 in the city hall of Beijing, two schools were debating on the plan and strategy of this city as the capital of a new communist nation. The first one, led by Liang Sicheng and Chen Zhanxiang, put forward a west-oriented plan. The core strategy is to build a new administrative center to the west of historical city, in order to preserve the magnificent heritage while avoid the new center being restricted by century-old urban fabric (Gao & Wang, 1991). The vision is to create a cultural capital. On the other hand, the historical city center would be transformed into a recreational and tourist center. The other school, led by Soviet planners Abramov and Baranikov, suggested that the Moscow model, concentrically cyclic development around the Kremlin, should be introduced to Beijing. The soviet vision is to build a strong industrial city. In short, the soviet plan was chosen, which laid the foundation of current ring-radial model of Beijing.



**Figure 6:** Liang Sicheng's design of transform the city wall into recreation site. Source: Lou, Q., (2003). The famous couple of Liang Sicheng and Lin Huiyin with Beijing urbanism. Beijing social science journals, 1/2003, 70-75.

### 3.3. Ring-Radial Model - Phase three (1978 till now)

In 1978, the famous capitalist reform started to change the whole nation and the urbanization process began to accelerate. As is shown in the chart, the population of Beijing doubled itself through the past two decades. Accordingly, the urbanized area grew larger according to the Moscow ring model. From 1981 to 2009, the total of six rings were finished. Not surprisingly, sets of functions are sequentially arranged inside out according to rings as follows, Historical/Administrative (inner 2nd ring) - Commercial/Service (between 2nd and 4th) - Mega Residential (Along 5th) - Country/Nature Recreation (Outside 5th). Concentric rings in the 21st century are acting the exact same role of the ancient city walls, which is to maintain a centralized structure by setting the hierarchy of both power and economy. The Ring-Radial Model in the 21st century Beijing is the modern city walls.

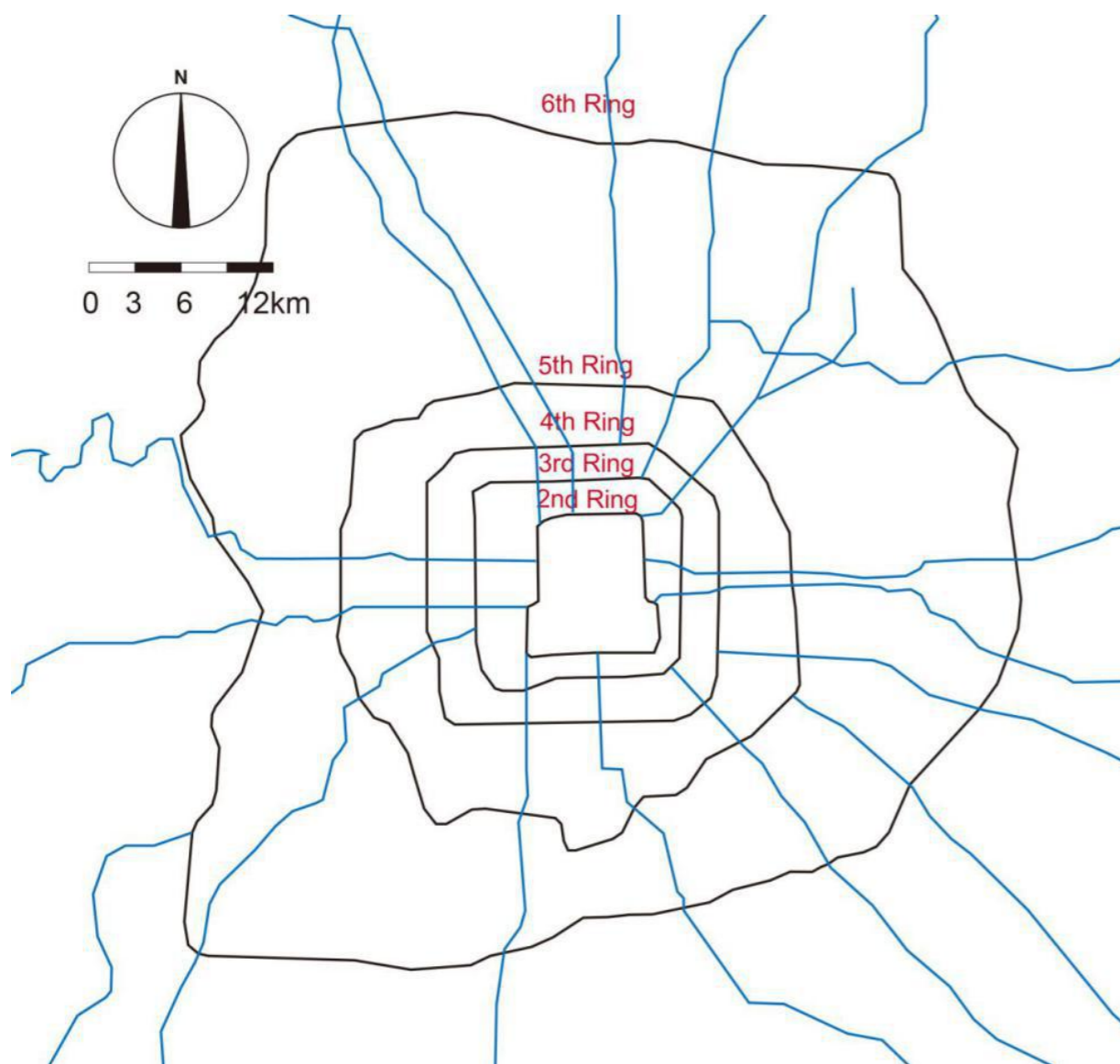


Figure 7: Current Ring-Radial Model of Beijing. Source: made by author

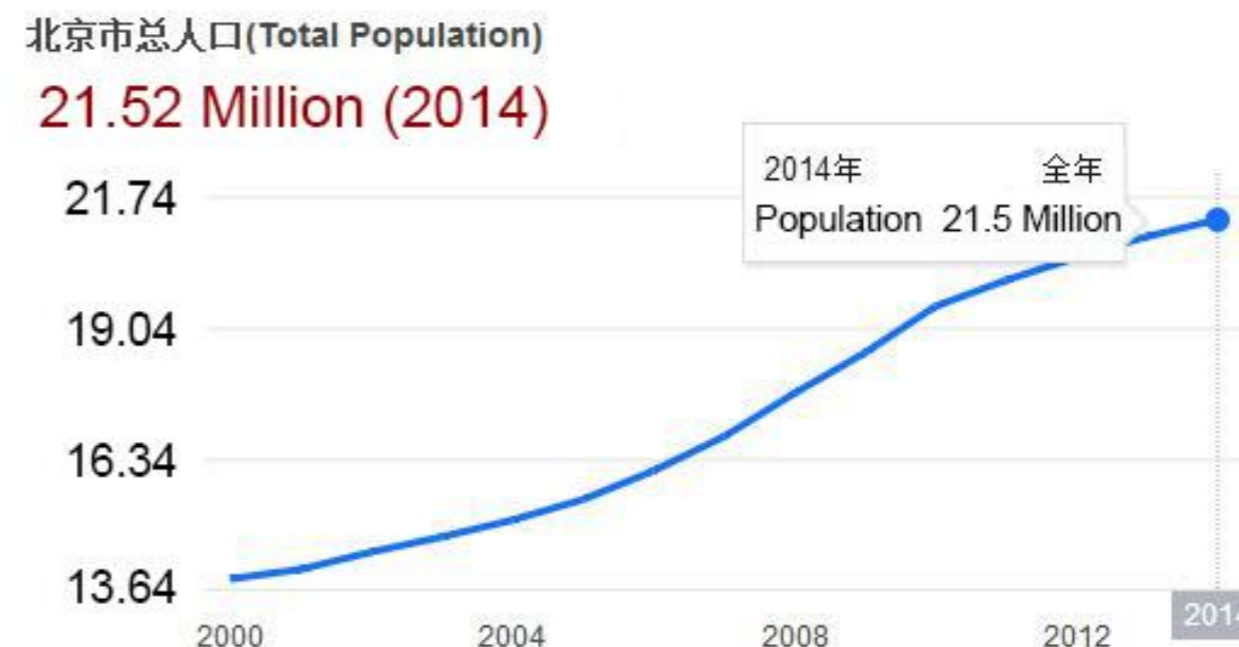


Figure 8: Growth of Beijing's total population. Source: National Bureau of Statistics of China, <http://www.stats.gov.cn/>

## 4. The attempt of making a difference - Beijing's New Vision

### 4.1. Problems arose

As the intense urbanization goes on, the Drifters, a migrant social group, brought challenge to Beijing. The drifters are educated or skilled employees and workers arrive at the city, trying to make a better life. However, these people are of the lowest social level, most of which are not even registered in the city. The amount of Drifters can be shown by the number of passengers traveled during spring festival, when people have to get back to family. According to municipality of Beijing, 26.3 million person-time traveled by railway in the spring festival of 2015, exclusive of other types of transportation, which indicates that around half of the population in Beijing are Drifters. As is explained before, Beijing's hierarchical oriented R-R Model made it impossible for Drifters to merge into inner city. Most of them settled down along the 5th ring, where land price is lower yet not too far from their work. This phenomenon gave birth to mega residential communities including Paradise Gateway, which is the focus of this thesis. Apart from the problems inside these communities, which has been explained earlier in the problem statement, the whole city's infrastructure

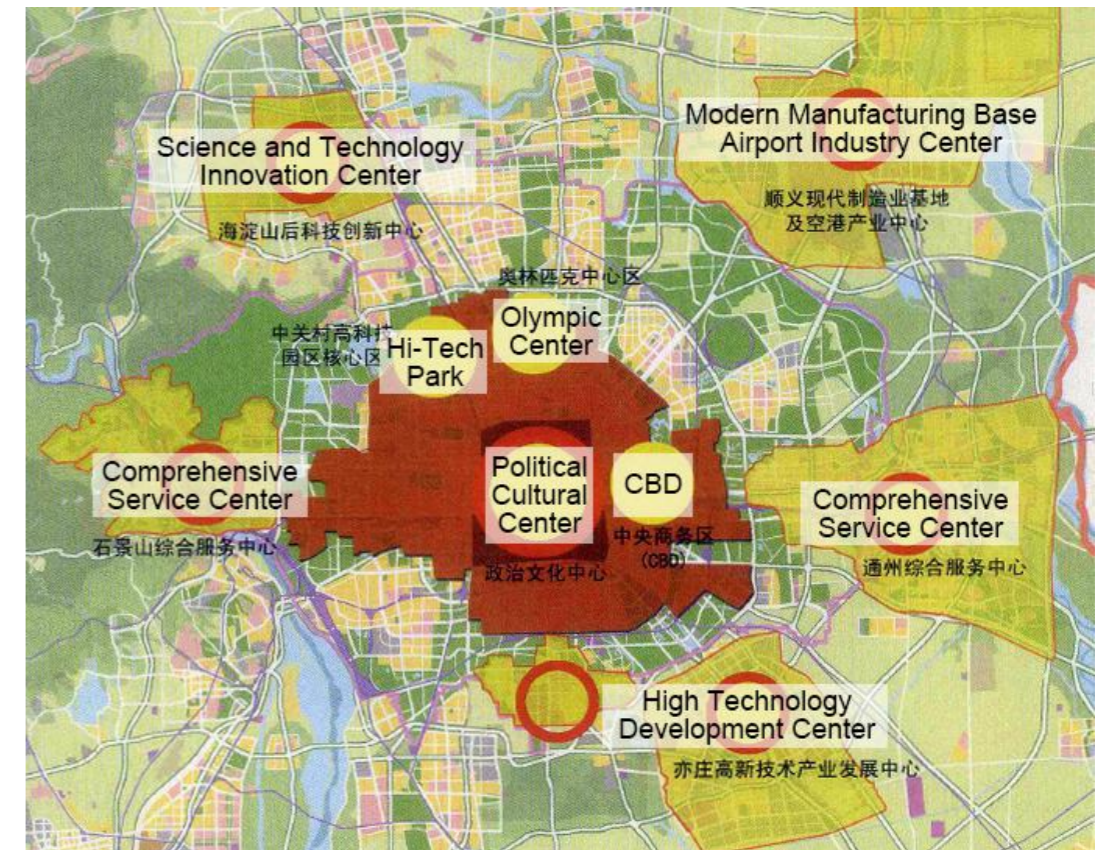
network is at the edge of breakdown. As the drifters has to commute daily, tidal effect is so evident that make Beijing one of the most congested city in China. It is a awkward situation that people still rush to the 5th ring even though the it jams like parking lot. Under R-R Model, 5th ring is their way home.



**Figure 9:** Aerial photo of 5<sup>th</sup> ring in the evening. Source: author unknown. [http://www.sinocars.com/autocar/2014\\_zhengyao\\_0111/8309.html/](http://www.sinocars.com/autocar/2014_zhengyao_0111/8309.html/)

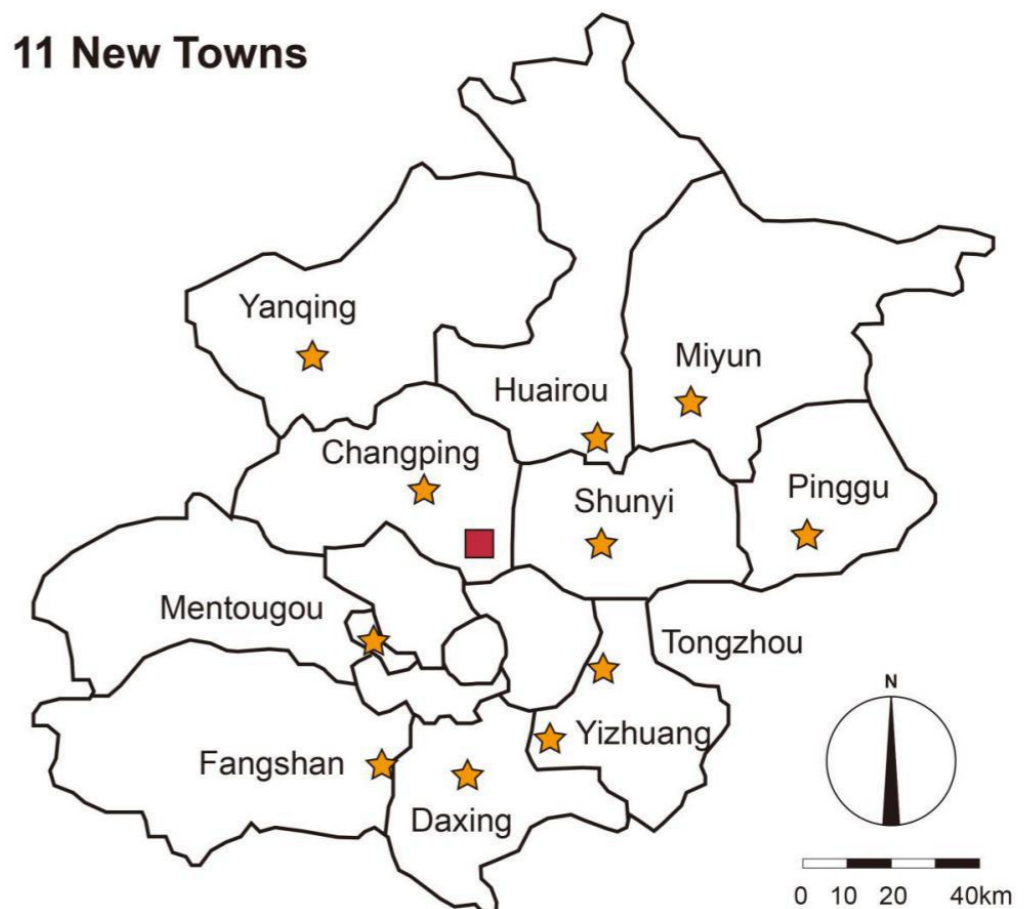
#### 4.2. 04 Master Plan

The government tried to make a difference by implement a new master plan aims on polycentric development in 2004, which was expected to lower the stress on inner city and stimulate the development of the suburb. 04 Plan encouraged polycentricity on two level, city level and regional level. On the city level, existing functions would be reorganized into centralities, such as CBD, Olympic, Technology, Manufacture and service centers. On the regional level, 11 new towns are promoted at the purpose of attracting population out of inner city. The main strategy was adjustment economy structure in the inside and attract residence and employment to the outside, realized by implementing polycentricity.

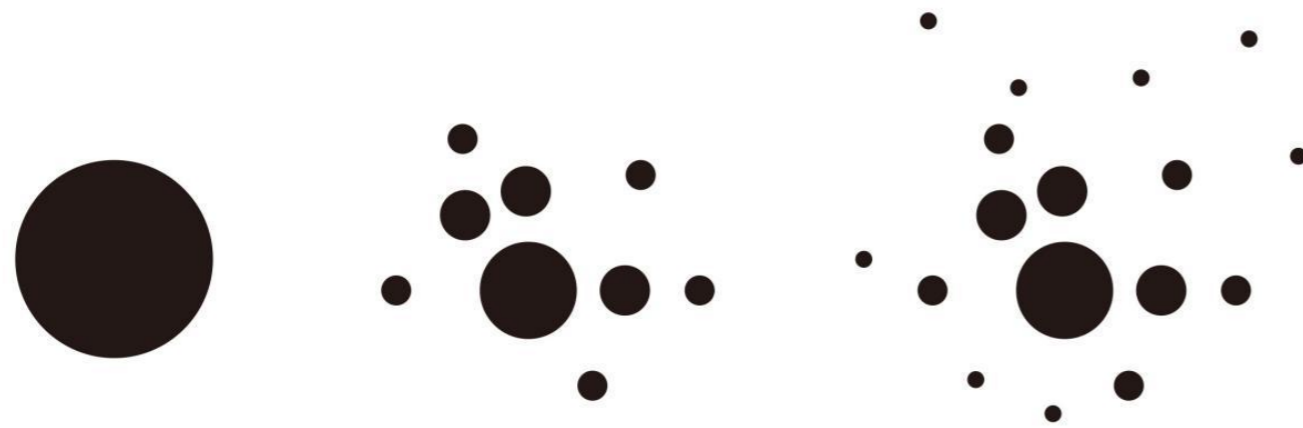


**Figure 10:** Centrality plan of the 04 master plan. Source: Municipality of Beijing. The Beijing city master plan (2004-2020). Beijing Planning Review, page 5-51.

#### 11 New Towns



**Figure 11:** Location of the 11 new towns. Source: made by author



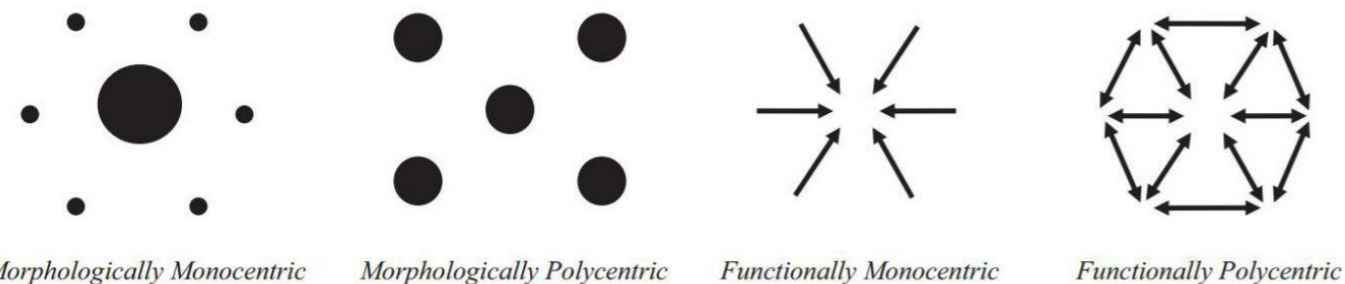
Pancake Development      Reorganized Centers      New Towns Promoted

Figure 12: Diagram of the centrality before and after 04 master plan. Source: made by author

## 5. A Counterproductive Plan

### 5.1. 'False Polycentricity'

Unfortunately, the polycentricity that Beijing is developing is a 'false' one. As is explained by many researchers, the core characteristic of polycentricity is that the network of independent centers are equal in importance. According to Parr and Burger's development on central places theory, importance hierarchy can be reflected by the flow of commuters and provide of jobs. In Beijing, new towns are serving as residential settlements with basic service. On the other hand, most jobs and employments are provided in the inner city, which generates centripetal flow of commute. This point is also proved by the hierarchy oriented R-R Model, where the core is more important than the outer skirt. As a result, the functional structure of Beijing is still monocentric, even though a morphological polycentricity is encouraged by the 04 Plan. With such a monocentric structure, low-efficient tidal traffic and congestion is expected to happen, especially given the precondition of the extraordinary large population size.



Morphologically Monocentric      Morphologically Polycentric      Functionally Monocentric      Functionally Polycentric

Figure 13: Morphological polycentricity versus functional polycentricity. Source: Burger, M., & Meijers, E. (2012). Form follows function? Linking morphological and functional polycentricity. *Urban Studies*, 49(5), 1127-1149.

### 5.2. Aggravation Effect

As is mentioned in the introduction, the situation here in Beijing is different from Europe. Beijing is still under urbanization that Drifters are still arriving at the city at a high rate. If the structure and strategy remain unchanged, consequences could be even graver. With more arrivals settling at the suburb, the amount of commute can only increase, which is an aggravation effect. In conclusion, a circle of satellite towns with lower centrality, providing settlement for surrounding villages, are in reverse emphasizing and stressing on the inner city.

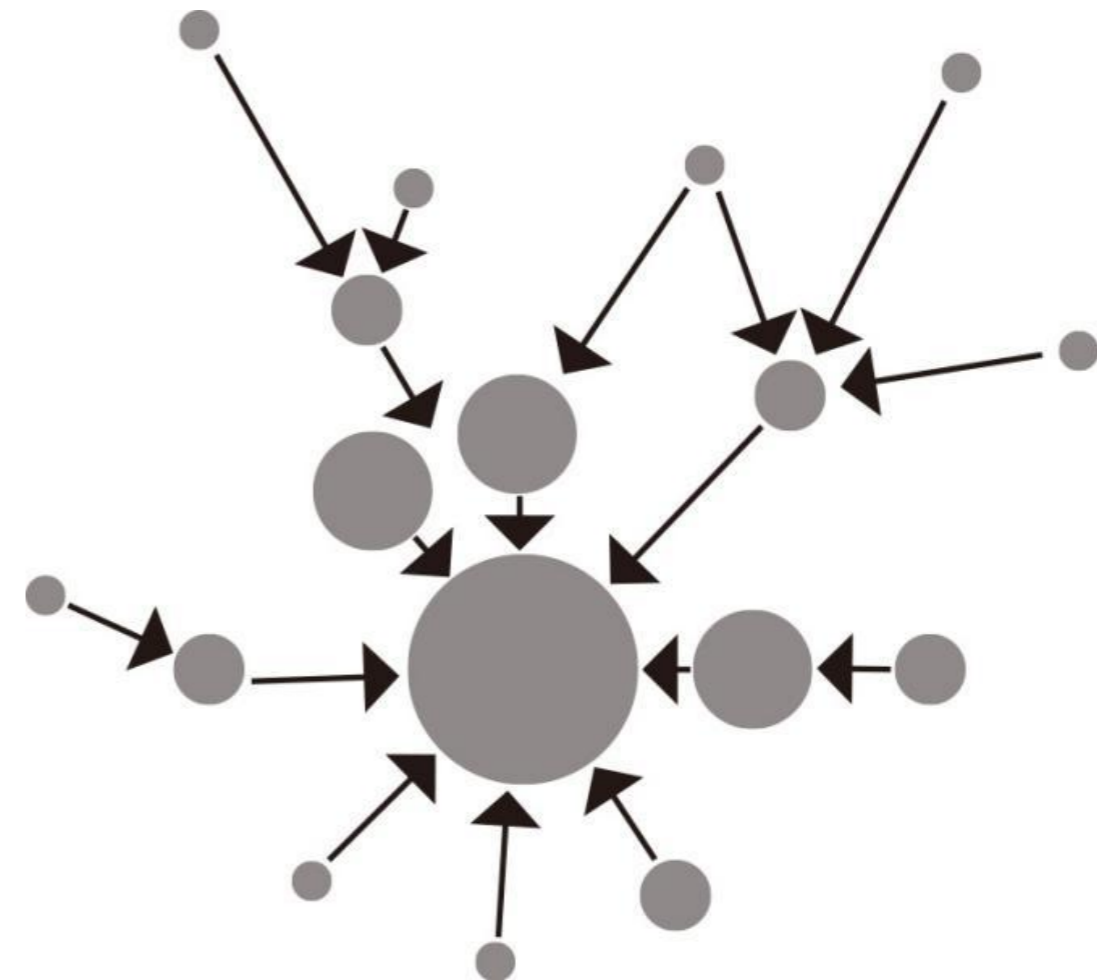


Figure 13: Functional monocentric structure in Beijing. Source: made by author

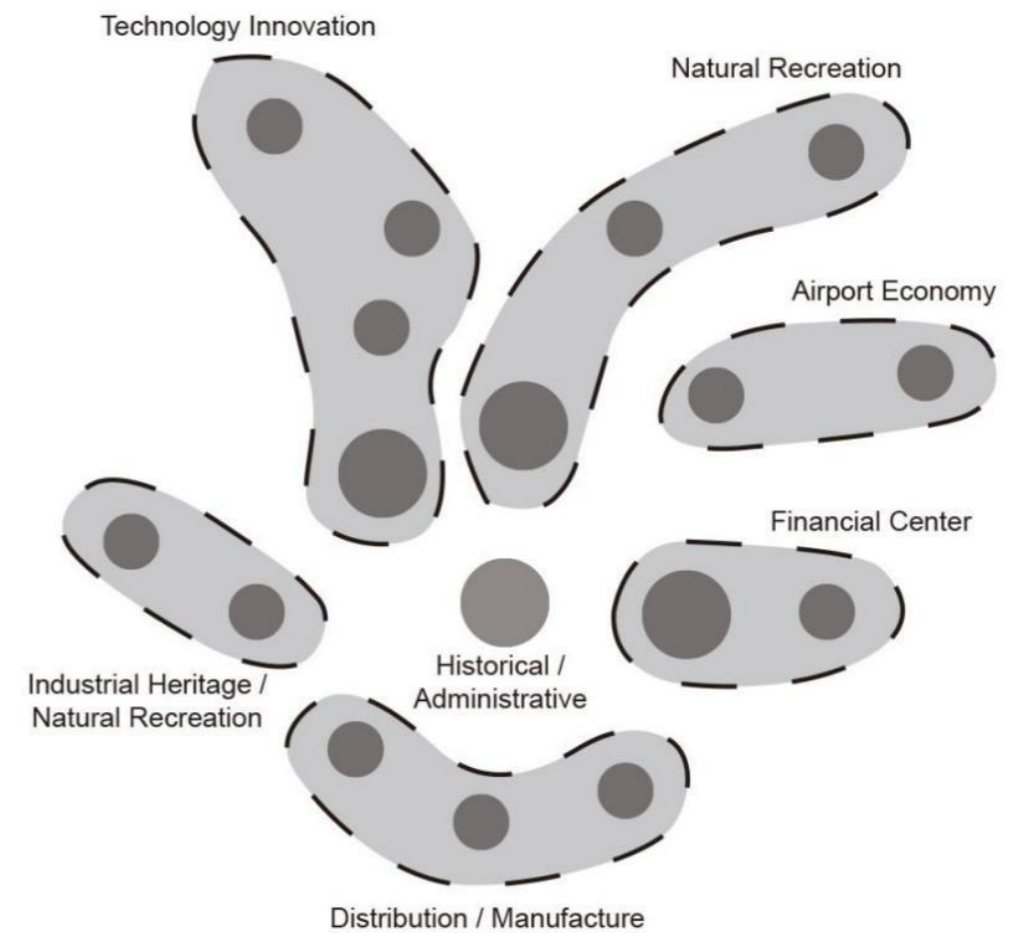
### 5.3. Possible Solution

According to Burger and Meijers (2012), balancing the internal centrality of centers can be reached by either decrease the core's nodality or increase other centers' external centrality and internal flows,

$$C_{ci} = N_c - C_{ce} - L_c$$

*N<sub>c</sub> represents the total employment in center c; C<sub>ci</sub> represents the incoming commuting in center c from places situated within the city region; C<sub>ce</sub> represents the incoming commuting in center c from places situated outside the city-region, and L<sub>c</sub> represents the number of employees in center c that also live there. In this, C<sub>ci</sub> and C<sub>ce</sub> add up to the total centrality of a center.*

To say the least, even though the 04 plan did not reach the goal of polycentricity, the promotion of new towns can be considered the first step. Based on the current situation of Beijing and refer to the equation above, the most possible strategy of the second step is function distribution and centrality setback. As for function distribution, the new towns should be assigned with a functional orientation, based on its advantages and surrounding conditions. Some of them already have one, for instance, airport economic, manufacture, technology innovation, but most of them do not. By developing particular industry, its nodality and importance improves, which means it may provide more employment. By attracting more people to work locally, the stress for the inner city can be relieved. As for centrality set back, regulations and green buffers should be set up to keep the centers at an appropriate distance, preventing them from merge into each other. Setback of buildings helps to maintain a healthy building-street relationship. A healthy polycentric structure ensures the competitiveness of each center and the cohesion of the network.



**Figure 14:** The vision of centrality under new strategy. Source: made by author

## 6. Conclusion

This essay started by review polycentricity in Europe, and its origin, develop and promises. Following by a review of formation of monocentric structure of Beijing from a historical perspective. Three phases were mentioned, ancient, soviet, and modern. Then, the fact that Beijing is suffering from congestion and other problems was discussed. As a measure toward that, 04 Master Plan tried to encourage polycentricity in Beijing. However, it did not change the situation, and may cause an aggravation effect that emphasizes more on the core. Base on Burger and Meijers' internal centrality equation and current urban structure, the strategy of function distribution and centrality setback is created to fulfill the shift from monocentricity to polycentricity. Whether polycentricity can ensure economic development is still under research and debate. However, Europe has already proved that polycentricity is a healthy and dynamic structure for urbanized area. When it comes to apply this European Model to China, planners and decision makers have to pay extra attention on the difference on demography, geography, economy, history and even culture. City is a complex system. No theory can fit in both Europe cities and Asia cities. Although this essay and thesis provides very limited contribution, under united effort of contemporary planners and researchers, Beijing may find its way through at last.

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