MASTERARBEIT

STUDY ON URBAN REGENERATION STRATEGIES FOR POST-INDUSTRIAL DISTRICTS

Design Case for Xin Qiao Community in Songjiang District

ausgeführt zum Zwecke der Erlangung des akademischen Grades
eines Diplom-Ingenieurs
unter der Leitung

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Abstrakt

Angesichts der rasanten Urbanisierung städtischer Ballungsräume, des voranschreitenden Klimawandels sowie des steigenden Energiebedarfs wird die Herausforderung, städtische Peripherie ins Stadtgefüge zu integrieren, immer dringlicher. Um ihre Expansion erfolgreich zu gestalten ist es daher unumgänglich, dass Metropolen neue Herangehensweisen einschlagen.

Diese Arbeit untersucht die Herausforderungen kleinerer städtischer Initiativen, die in größer werdenden „postindustriellen" Städten überleben, heranwachsen und langfristig gedeihen sollen. Dies basiert auf der Annahme, dass Stadterneuerung in verfallenen Industriegebieten aus wirtschaftlichen und kulturellen Gründen unabdingbar ist, was wiederum Veränderungen in den umliegenden Gebieten zur Folge hat. Das Verständnis, nach dem chinesische Stadtentwicklung funktioniert sowie generelle kontemporäre Stadtentwicklungsstrategien stellen die Grundpfeiler für diese Studie dar.

Die Arbeit untersucht zunächst die Rolle der Industrie in Shanghai und argumentiert, dass aktuelle Entwicklungsmuster eine Konzentration auf die Bekämpfung der Ursachen des Klimawandels erfordern, während die Städte nach wie vor eine wirtschaftlich und sozial belastbare, nachhaltige und lebendige Industrie benötigen. Aus diesem Grund werden vier Fallstudien zusammen mit ihren Strategien für regenerative Entwürfe und Entwicklungen analysiert, um daraus einen Katalog mit Designrichtlinien und –werkzeugen abzuleiten. Letztendlich zielt die Arbeit auf die Beantwortung folgender Frage ab: **Welche Stadterneuerungsstrategien eignen sich, um verfallenen Industriestandorten neues städtisches und gesellschaftliches Leben durch einen ökologischen Stadterneuerungsansatz zu verleihen?** Bei der Planung einer produktiv und integrativen Stadt ist es wichtig zu analysieren, welche Argumente für die Integration der Industrie in das städtische Gewebe plädieren und was die Vorteile von funktioneller Mischnutzung sind. Die Hypothese lautet, dass es für den weiteren Aufschwung Shanghais von entscheidender Bedeutung ist, die Industrie in der Peripherie der Stadt strategisch und proaktiv zu planen. Es gilt Ansätze zu finden, wie die Peripherie auf innovative Weise in andere städtische Nutzungen integriert und gleichzeitig Land vor weiterer Bebauung geschützt werden kann. Die Arbeit entwickelt einen Maßnahmenkatalog, um diese städtebauliche Herausforderung effektiv meistern zu können.

Für einen exemplarischen Entwurf wird der Industriepark Miao San Lu im Shanghaier Stadtteil Songjiang ausgewählt, in dem ein erhebliches Potenzial zur verbesserten Nutzung von Ressourcen wie Land, Wasser und Industrie besteht. Um eine ortsspezifische Regenerationsstrategie vorzuschlagen, werden zunächst fünf Kriterien aufgestellt: 1. Umweltverträglichkeit, 2. ökonomischer Wert, 3. Industrietyp, 4. Zustand der Gebäude und 5. Geschossflächenzahl der Grundstücke. Die Ergebnisse werden evaluiert und bilden die Bewertungsgrundlage für jede Parzelle oder Parzellengruppe. Eine Reihe von Gestaltungsrichtlinien und -werkzeugen werden daraufhin zur Entwicklung einer Vision für Miao San Lu 2035 ausgewählt. Insbesondere wurden alle städtischen Eingriffe, die hauptsächlich auf die bestehende Industrie abzielen, in vier Kategorien unterteilt: Nachrüstung, Wiederverwendung, Wiederaufbau und Neubau. Die Ebenen regenerativer Interventionen, einschließlich Mobilität und Natur, sind alle miteinander verknüpft, um städtische Mischnutzung zu verwirklichen und gleichzeitig erhaltenswerte Industrie zu stärken.

// Stadterneuerung - Belastbarkeit - Industriepark Miao San Lu - Nachrüstung - Wasser

Abstract

With rapid Urbanization and climate change taking place in metropolitan areas, along with increasing energy demands, the challenge of integrating the urban periphery will become more pressing. It is therefore vital that metropolitan cities work towards new ways of design their expansion.

This thesis examines the challenges that planners face with a small urban initiative that should survive, scale and thrive over time in a growing 'post-industrial' city. This is based on the assumption that urban regeneration in decayed industrial districts is essential for economic and cultural reasons, that will in turn catalyse changes in surrounding districts. Understanding of how Chinese Urban development works and which cross-cutting strategies are available nowadays have been key factors for this study.

The thesis first explores the role of industry in Shanghai, arguing that current development patterns need to focus on mitigating the causes of climate change, while cities still need industry to be economically and socially resilient, sustainable and vibrant. Consequently, four case studies are analysed alongside with their strategies for regenerative design and development, in order to establish a catalogue of design guidelines and tools.

Ultimately, the thesis aims to respond the question: **Which urban regeneration strategies are suitable to turn decayed industrial sites into thriving urban social spaces with an ecological urban approach?**

It is essential to plan for a productive and inclusive city: analysing arguments in favour of integrating industry into the urban tissue as well as the advantages of mixed-use development. The hypothesis is that if Shanghai continues to prosper it is crucial to strategically and proactively plan for the industry in the city periphery, to experiment with innovative ways of integrating it with other city uses while protecting land. The thesis puts forward a critical research agenda to effectively meet this challenge in terms of urban planning.

Miao San Lu Industrial Park in the Songjiang District of Shanghai is chosen for the design proposal, where there is a significate potential to improve the use of resources such as land, water and industry. In order to propose a site specific regeneration strategy, five criteria were first assessed and mapped. These were: *1.environmental impact, 2.economic value, 3.type of industries, 4.state of the buildings and 5.overall floor area ratio of the plots*. The results of the assessment were critically evaluated and formed an aggregated assessment for each plot or cluster of plots. A set of design guidelines and tools were chosen to set a consistent urban strategy to enable the vision of Miao San Lu in 2035. Specifically, all the urban interventions – mainly targeting the existing industry - were grouped into four categories: Retrofitting, Reusing, Rebuilding and New construction. The layers of regenerative interventions, including mobility and nature, are all linked together in order to implement urban mixed-use while enhancing valuable industry.

// Urban regeneration – Resilience - Miao San Lu Industrial Park - Retrofitting – Water

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1

INTRODUCTION

comprising an overview about the research objectives, and the relevance of the topic in contemporary architecture and contemporary urban life ,this chapter presents the key terms for urban regeneration and introduces the thesis structure.

1 Introduction

1.1 Research Questions, Aims, and Objectives

Today, with the growing urban population and climate change, rapidly expanding cities face urban planning challenges that require immediate solutions. (United Nations) While resource management gains importance, not enough attention is paid to underutilized properties and districts. (Saskia Sassen)

In 2008, the crisis among foreign and national corporate entities initiated a new period in the economic history of cities, namely buying and underutilizing urban properties, alongside the extremely high demand for housing by the middle class. (Saskia Sassen). Current urban development patterns of Shanghai are pointing towards a larger scale, more private, less social and more polluted city. With the transition to service industries around the 1990s, and the manufacturing moved outwards occupying the periphery. Today many of these sites are barely in use, becoming an increasingly valuable land resource, especially to respond to the urban population growth. (Shanghai urban planning municipality) The spatial intersection of these two critical incidents is the periphery of the city.

Regenerative concepts will be necessary to develop Shanghai as a liveable and efficient city, yet maintaining industry as the main economic driver of the nation. Thereby, the focus will not only be on supporting valuable, growing new industries but also promoting a social space with a technological, and ecological value.

From this assumption, the following research question derives: how can post-industrial sites be regenerated to host a thriving residential community, maintain the industrial character and promote environmental sustainability?

This thesis investigates local and global urban regeneration strategies and principles to revalue underutilized post-industrial land. Consequently, it focuses on a site in the periphery of Shanghai, aiming to respond to the initial question with an urban regeneration proposal, implementing the key factors emerged in the research through a consistent urban strategy. Finally, the strategies and performance applied at the design stage will be critically reviewed and evaluated.

1.2 Key terms and definitions

Post-industrial (ZHU Cishou, History of Modern Industry in China, 1990)

In the 1980s with the ‘open-door' policy, the shift from manufacturing to service industries and the following change in economic direction from secondary to tertiary industries marked the beginning of the post-industrial era in Shanghai. This process will be discussed in the Context Analysis chapter.

As a tangible result of the shift, buildings and sites were underutilized or abandoned and lost their primary function as industry and turned to post-industrial buildings and sites. Areas formerly dominated by manufacturing

industrial functions were defining the post-industrial character. In Shanghai, those areas include factories, storage, energy, transportation and waste management, as well as residential functions accompanying the former industry.

Retrofitting (Bill Reed, 2007)

Retrofitting describes the process of adding new technologies and functions to old systems. When physical structures become old and outdated for the functions they were once designed for, retrofitting is an increasingly desirable strategy to recover and revive those spaces. It often includes modifications to existing commercial buildings to improve energy efficiency and decrease the use of energy.

Retrofitting has an advantage for the industrial buildings, as it allows significant functions to remain while updating and upgrading the physical structure to function in current society. This approach has an essential benefit in terms of urban regeneration, which will be explored in the Context Analysis chapter.

Urban regeneration (Puppim de Oliveira and Balaban, 2013)

Urban regeneration can be described as creating new urban structures in old and poor quality neighbourhoods with comprehensive urban interventions to improve the physical structure and more importantly and elusively, the prosperity of areas, that suffered a decline in the industrial and manufacturing economy. It is a way to reorganize and upgrade existing places rather than planning new urbanization. Urban regeneration is primarily concerned with regenerating city centres and former industrial areas, which is the main focus of this paper. Factors underlying the adoption of urban regeneration policies and projects include pressures from major short- or long-term economic problems, deindustrialization, demographic changes, underinvestment, infrastructural obsolescence, structural or cyclical employment issues, political disenfranchisement, ethnic or social tensions, physical deterioration, and physical changes to urban areas. Typically, urban regeneration actions involve economic, social, and physical improvement measures in the areas under intervention. Accordingly, we understand sustainable urban regeneration as transformation actions, policies and processes within a city, which address interrelated technical, spatial and socio-economic problems in order to reduce environmental impact, mitigate environmental risk, and improve the environmental quality of urban systems, lifestyles and assets. The research aims to establish specific factors and qualities for post-industrial areas to address sustainable urban regeneration, which will be explored in-depth in the theoretical framework chapter.

1.3 Methodology, Process and Structure

The thesis consists of four conceptual stages: Research, Development, Application and Review. The Research stage is included in the first and the second chapter of the thesis. At the end of the second chapter is the development stage. And the third chapter includes the application stage, namely the design. At the end of the third chapter is the review of the design proposal.

The Research stage examines problems related to global issues and challenges, and the Development stage allows insight into social and environmental needs along with different strategies and principles, and how to respond spatially to those needs. Both Richard Sennett and Saskia Sassen brought attention to the need for the interrelation between social processes and spatial form in urban theory and research.

In Research stage the combined aspects of social and environmental needs and spatial qualities will lead the discussion and analysis in the Theoretical Framework chapter. This Part is about establishing a general perspective, as the need for urban regeneration in post-industrial districts not only occurs in China but many other metropolitan areas in the world as well as sustainable implementation concerns the entire planet. Significant urban change in diverse metropolitan cities introduces the struggles in urban sprawl and the principles and potentials in response.

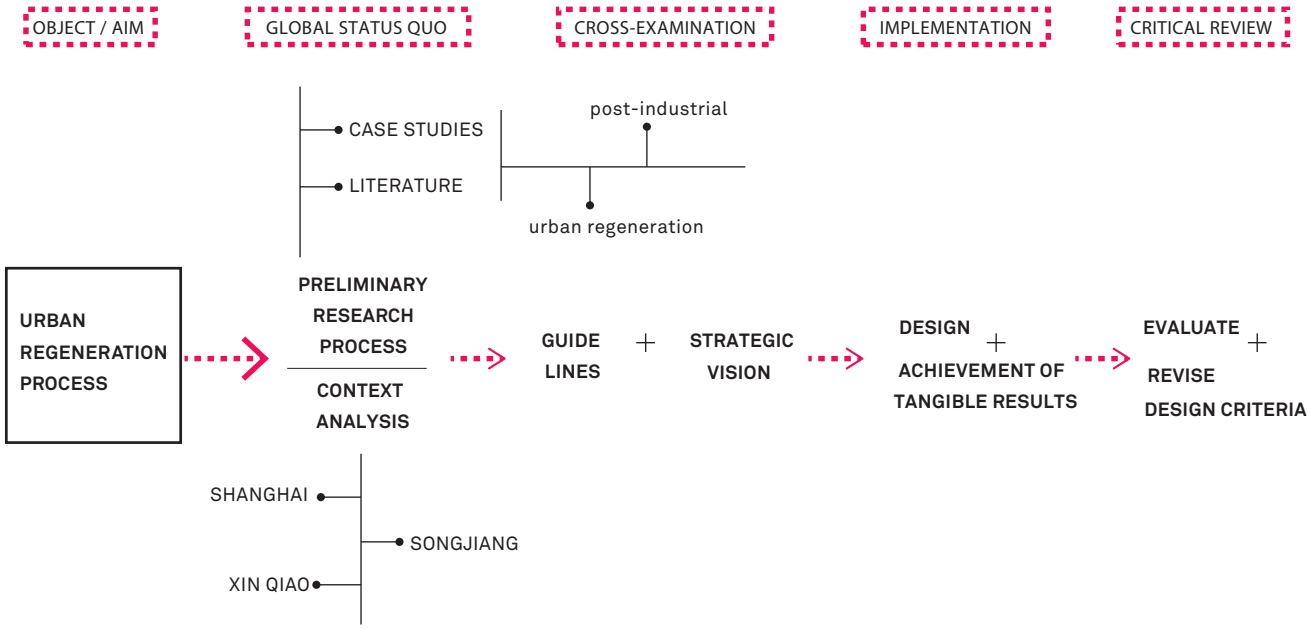


Fig. 1_Thesis Methodology

Key literature includes: the relation between site-specificity and design by Thomas Sieverts (2004) and Braae and Diedrich (2012); the role of the city as a collective good by Saskia Sassen (2017) that primarily covers the need for social places and their quality; aspects of Reuse and sustainable development by Lister (2010) and Mostafavi (2010); recent and international discussion on the future cities comes from The Times (2019). A methodology is established using the Theoretical Framework by which to conduct the case studies and develop a design proposal.

In Development stage the analysis of local industrial history and urban transformation lead to urban processes in the periphery of the city. Selected case studies show a range of post-industrial transformation projects that will deliver a chart comparing the sizes, principles of the transformation and introduce new functions. Examples including, IBA Emscher Park in Duisburg, Koopmanstaad in Rotterdam, Zhongshan Shipyard Park in Guangdong and Lyon Confluence will be analysed using the catalogue of actions developed according to the global literature. This research will provide a summary of design principles and potentials from multiple disciplines, for regenerative development and the integration of new transformation strategies in the Shanghai urban network.

In Application stage the findings will be translated into the application to an underutilized (post) industrial site in XinQiao town. A design proposal for an integrative sustainable Regeneration for Miao San Lu Industrial area will demonstrate the utilization of the evaluated principles.

The Review stage adds a critical review of the applications on-site, delivers a performance evaluation of the suggested design and finally highlights the appropriation of the principles coming from the literature review and the outcome of the case studies.

1.4 Scope of Research

Although situated in the urban periphery of Shanghai and referencing global literature, this research focuses on XinQiao town and its immediate surroundings. This research does not directly include points of conservation such as heritage nor other areas of Shanghai. Moreover, aspects excluded from the scope of this research are economic development, possible stakeholders and management structures, implementation policies, and structural integrity of retrofitting. Nevertheless, these points may be valuable for further discussion related to this work and will be evaluated in the Conclusion chapter of this thesis.

2

THEORETICAL FRAMEWORK

the preliminary research process presents the objectives and corresponding discussion in the global context and highlights the problem statement along with possible strategies delivered by relevant international literature.

2 Theoretical Framework

2.1 Urbanisation

By 2050 more than two-thirds of the global population will settle in urban areas. The main drivers of this population growth will be India (+416m), China (+255m) and Nigeria (+189m), which makes 35% of the world's urban population. The number of megacities that are home to more than 10 million people will increase to 43 by 2050 (Future Cities, Stats from the United Nations, 2019). In this regard, Megacities like Shanghai play a central role in tackling climate change as well as engaging with its effects.

Since urban metropoles are under direct threat from the impacts of demographic changes and climate change but at the same time contribute much to it, the potential role of urban regeneration can play a significant role. In the following, Oliviera and Balaban (2013) highlight aspects of sustainable urban regeneration and suggest application strategies including retrofitting, mixed-use developments and promotion of green spaces and water.

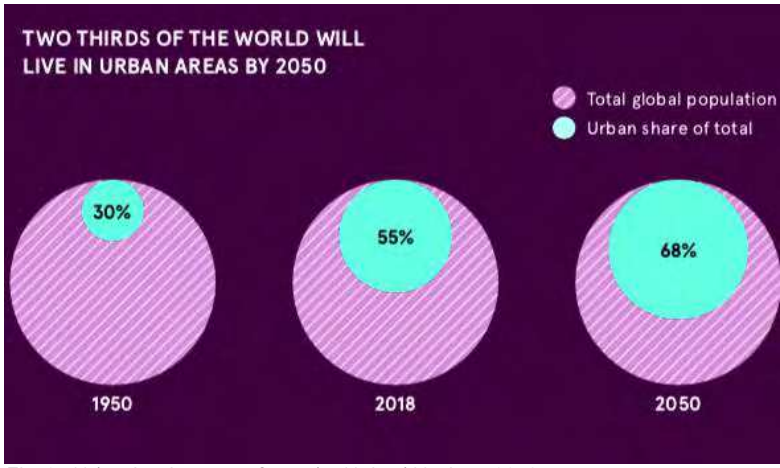


Fig. 2_ Urbanisation stats from the United Nations 2019

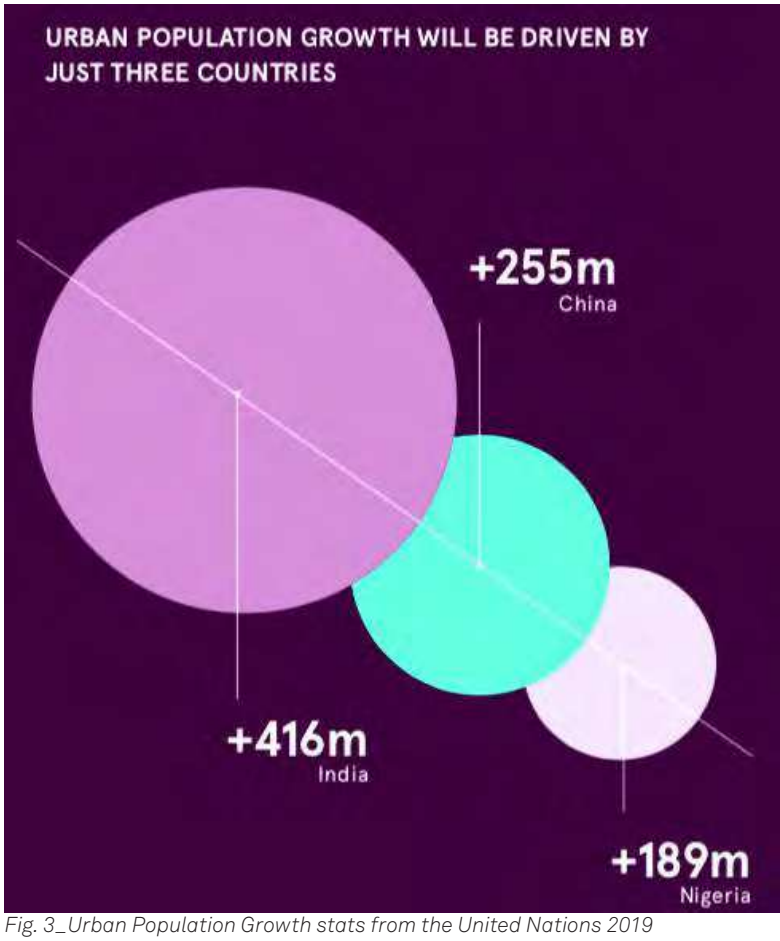


Fig. 3_Urban Population Growth stats from the United Nations 2019

2.1.1 Urban regeneration strategies (Oliviera and Balaban, 2013)

Urban regeneration allows city governments to shape a strategy for new developments in existing urban areas in the form of mixed-use developments. Such a policy helps to make the best use of underutilized lands, achieve energy and resource efficiency by preventing urban sprawl and, in particular, reducing commuting time and distance.

Buildings are among the primary sources of carbon emissions due to energy consumption for heating and cooling. Urban regeneration should incorporate retrofitting or renewal strategies to turn existing buildings into low-carbon and less vulnerable structures, to overcome such building-related challenges.

Decisions and strategies for urban regeneration in climate change mitigation and adaptation have long-term benefits as a guideline for governments and planners. According to Oliviera and Balaban, regeneration strategies should incorporate a series of issues from a regional scale to individual buildings. Namely, the promotion of green spaces and water, retrofitting existing structures, infrastructural renewal, and increased non-motorized and public transport coverage.

By involving such interventions and providing opportunities to adopt policies, urban regeneration can play a significant role in addressing climate change.

2.1.2 Sustainable urban design (Brundtland Commission, 1987)

According to The World Commission on Environment and Development, to make development sustainable means “to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland Commission, 1987).

With the growing environmental and cultural awareness, and public discussions, different orientations formed six common basic ideas fundamental to sustainable development, which Jacobs (1999) lists as environment-economy integration, futurity, environmental protection, equity, quality of life, and participation.

Sustainability in urban development predicts a self-sustained development of the city within itself, a loop, by eliminating the impact on the environment.

Resilience is a system and strategy to face unpredicted changes. Sustainability aims to explore solutions on the level of technological attributes, political will, and social incentives connected to urban design features that guarantee the balance of a system when speaking of urban development.

While sustainability strives towards a situation of stability, balance and preservation of all elements, it is resilience that deals with instability and imbalance. To summarise, it is resilience that reveals the flaws and potentials in planning and follows the concept of sustainability.

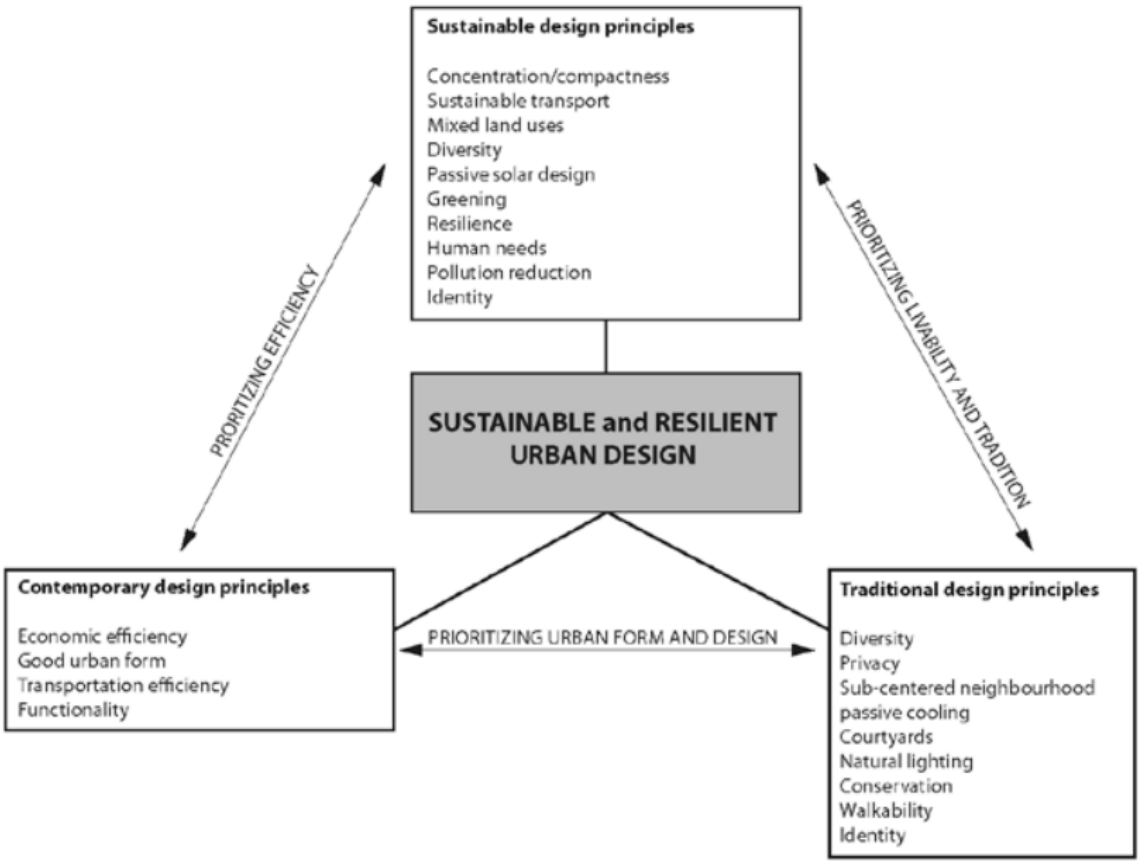


Fig. 4_Conceptualisation of Sustainable and Resilient Design (Bahrainy and Bakhtiar, 2016)

Fig. 5_UN Habitat Sustainable Development Goals

2.2 Post-industrial sites

The legacy of late the 19th- and 20th-century heavy industry comprises various large-scale production sites, including their corresponding infrastructure. The transformation of their spatial leftovers is one of the main tasks of the contemporary urban planning.

In China and in the western world, the decrease of heavy industry and emerging new forms of high-tech production indicate tendencies out of the old and towards a new human organisation. The multitude of cities with old industrial areas have an interest in generating knowledge about the spatial aspects of industrial transformation in order to master future development (Braae-Diedrich 2012).

The stable economic conditions of the late 20th century allowed for big investments and fast project implementation, so that standard programmes in international style architecture were erected. Both programmatically and formally, transformed post-industrial areas look very much the same all over the globe despite their greatly differing local geographical, social and historical backgrounds. Apparently, the global problem of industrial transformation has generated a global solution, as if the generic recipe of the industrial set-up were mirrored by an equally generic method for the post-industrial reintegration.

2.2.1 Value and use of the 'existent' (Sieverts 2008)

The review of the short history of urban reintegration of derelict industrial areas delivers a set of projects that build on local driving forces. Within a short time, industrial transformation projects, such as the Grande Halle of the former La Villette slaughterhouse area in Paris, were widely acknowledged across Europe comprising examples on building scales and open urban spaces. However, Large-scale industrial transformation, such as IBA Emscher Park in western Germany's coal and steel district of the Ruhr, entered the scene a little later.

Conceived in the 20th-century tradition of the German international building exhibitions (Internationale Bau-Ausstellung, IBA), this event aimed at being a platform for a new design task, namely the examination of how urban planning and landscape architecture could prepare 'the future of old industrial areas' (Minister für Stadtentwicklung 1988).

Once started as a task of reusing the existing industrial landscape, it developed with the help of designers to eventually become a European if not an internationally acclaimed model.

IBA Emscher Park development engaged the physical, economic and social structure of the whole metropolitan region. The transformation continues with the endorsement of regional and communal authorities, with an ever-growing example and knowledge of industrial transformation, and it will remain a work in progress. Urban planner Thomas Sieverts believes that its success relies on developing local particularities and countering international tendencies to sameness (Sieverts 2008: 263). Even dealing with the global impact, the local specifications are essential to evaluate. So, it is possible to develop site-

specific answers that arise from the existing opportunities of a site instead of erasing and replacing them with generic features.

2.2.2 Reuse (Braae and Diedrich 2012)

In the current debate within the fields of architecture, landscape architecture, urban design and urban planning, design approaches for industrial transformation areas link to the notion of reuse. Reuse provides some advantages over design from scratch. It presents alternatives to homogenization, it supports a cultural climate that values the multi-layered, heterogeneous and complex, and it saves resources that affect the ecology and, to some degree, economy (Braae and Diedrich 2012:20).

2.2.3 Transformation (Braae and Diedrich 2012)

Transformation takes the existent as its point of departure and oscillates between finding out what is there and testing what it could become. There is a growing interest in acknowledging what is already there. The relics of the post-industrial landscape that persist in the urban fabric lead to the site-specificity and the possibility of grasping all aspects that might be associated with the existent (Braae and Diedrich 2012: 24).The reading and writing are two reflexive and mutually constituting processes. This double reflex corresponds to the creative engagement in the site through intervention.

The design of interventions can form additions, subtractions, overlaying, rerouting, etc., and their appearance and impact can vary from hardly anything to an almost total makeover. A novelty in transformation is associated with the ability to create a bridge with the existent on a site. It depends on site-related information, while the traditional design act is associated with creating 'the new'.

Within transformation, the existent becomes the main driver, and design consequently becomes a tool delivering a conception of novelty in the sense that it focuses on creating new perceptions of the existent.

Within transformation, the future is not necessarily subject to the present. The result is the sum of the bridges between the existent and the intervention, without a predetermined relationship. Furthermore, the outcome is not complete or concluded. It is open for further design intervention due to its complex and mixed character that relies on a paradigm of complexity rather than harmony (Braae and Diedrich 2012: 25).

2.2.4 Making is remaking (Goodman 1975)

In line with post-war design practices, analytical approaches to aesthetic issues in philosophy have been changing. In 1968, Nelson Goodman began an intellectual trajectory of exploring reality as a multiplicity of worlds through a variety of things, addressing on an equal footing the arts, universal knowledge and scientific theories. In Ways of Worldmaking of 1975, he posits that every creative act is one of remaking the world from those worlds that have existed so far: 'The many stuffs - matter, energy, waves, phenomena - that worlds are made of are made along with the worlds — but made from what? Not from nothing, after all, but from other worlds. Worldmaking as we

know it always starts from worlds already on hand; the making is a remaking.' (Goodman 1975: 6)

Applying Goodman's point to the terminology of post-industrial regeneration, it indicates how the existent can be transformed. Transformation, according to Goodman, can involve many types of actions, such as composition and decomposition, i.e. taking apart and putting together. It can consist of weighting, i.e. sorting out what we have in front of us into relevant and irrelevant kinds and emphasising them accordingly. It can imply ordering, i.e. looking from a particular angle at things, to (re)organise them for perception and action. It can rely on deletion and supplementation, i.e. excising old material and replacing it with something new. And finally, transformation can happen through deformation, i.e. alteration of the existing, ranging from correcting to distorting (Goodman 1975: 17). Goodman does not intend to deliver an exhaustive list of methods, nor does he assume that transformative actions belong to only one category.

2.2.5 Hyper-modernity (Francois Ascher, 2005)

The French urban researcher François Ascher examines today's heterogeneous and multi-polar urban landscapes, including derelict industrial areas, in their historical development of society. Ascher claims that metropolises of today, consisting of much more than their physical, visually tangible parts, should be called 'metapolises'. Precisely because of their multilayered composition of spatial and other issues. Their spatial appearance is the result of a new form of society, which he calls the 'hypermoderne society' (Ascher, 2005: 83). He explains that the way today's individuals perceive and compose their lives and their living environments has fundamentally changed. This shift happened from a socially and spatially predefined one-dimensional stability into individually and spatially selectable options and combinations at n dimensions- 'hyper', in the mathematical sense.

In particular, he characterises Hypermodernity by the quest to connect scales, speeds, and timeframes. Designers will have to work with the local dynamics of space, of people and of the design project itself. The case studies will comprise the investigation if and how urban regeneration projects approach mobility solutions for such an adapted dynamic design of the 21st century.

In line with Ascher, German urban planner Thomas Sieverts describes today's societies as standing on the threshold of a new era, driven by resources other than fossil fuels. The result is a third ‘urban revolution', after the agricultural and the industrial one. Urbanists and other professionals may prepare the approaching urban post-oil era in many ways, but no one can predict how exactly post-oil cities will function or what they will look like. (Sieverts 2004: 13). Sieverts claims that the raison d'être of urban planning will not change in essence, though — the profession that was born from the need to organise the expanding cities of the industrial epoch

will continue to do so; or more drastically formulated, it will continue correcting the undesired secondary effects of market-oriented capitalistic developments through design-based and socially and ecologically motivated interventions (Sieverts 2004: 19). According to him, what changes essentially, however, is the way urban planning composes and improves cities: instead of expansion, the transformation of the existent will be the only way for development.

2.2.6 Resilience and adaptive design

The three central features of resilience, according to Berkes, Colding, and Folke (2003: 6), are: the ability of a system to absorb or buffer disturbances and still maintain its core attributes; the ability of the system to self-organise; and the capacity for learning and adaptation in the context of change.

Lister's definition is in line with those features. His definition of resilience is "the ability to recover from disturbance and to accommodate change"(Lister NM., 2010). To frame the concept, Holling examines the distinction between engineering and ecological resilience. Ecological resilience specifies the range of any stability and estimates the scale of disruption that a system needs to absorb before changing its condition.

It describes the tolerance of the system to disturbances to catalyse the evolution into more stable states. Such theory aims to understand the adaptive change from one state to another as well as cross-scale interactions. In the field of climate change, adaptive capacity is defined as ''the ability of a system to adjust to climate change to minimize potential damages, to take advantage of opportunities, or to cope with the consequences. The adaptation comprises an ''adjustment in natural or human systems in response to

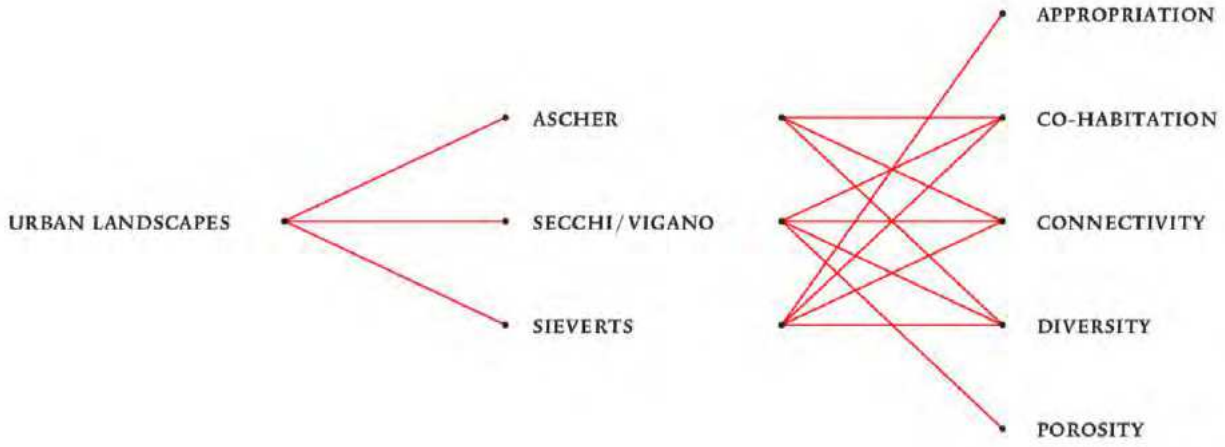


Fig. 6_Urban Landscape Objectives, (Sieverts and Asher)

actual or expected climatic stimuli or their effects, which minimizes, harms, or exploits beneficial opportunities'' (IPCC, 2001)

Adaptive capacity is a function of natural resources or assets that are accessible to a given system deriving from natural, physical, human and social capital. Therefore, a resilient environment should hold a high adaptive capacity. The lack of adaptive features and resulting deficiency of resilience could result in limited opportunity and options during and after demanding, intense periods of change.

2.2.7 Ecological resilience in urban design

In such a theoretical context, the design aims to deliver strong ecological resilience, where a compromised situation is declared, and effective intervention is considered as necessary to speed up the recovery and catalyse the system to a more suitable or stable state.

"These interventions and their forms must be both adaptive and resilient to sudden, discontinuous environmental change—a change that is normal, but cannot be predicted with certainty or controlled completely", Lister states (Lister NM., 2010) when introducing the concept of adaptive design.

The eco-systemic approach provides an urban design with a flexible perspective over the city, embracing the fluidity and flexibility of contemporary lifestyle and overcoming urban-rural boundaries (Mostafavi M., 2010). Moreover, if intended spatially, the ecosystemic approach merges the built and un-built environments as a framework to face ecological emergencies. Scarce or abundant, water is the common element to the three case studies, requiring both new and traditional technologies which may link ecological issues with geographical considerations and cultural specificity. Slope, permeability, drainage, climatic conditions determining evaporation - due to wind and heat – suggest that landscape is one of the privileged fields of research to increase urban regeneration in compromised contexts, thanks to its connective, ecological and resilient role.

Besides being a framework, the landscape becomes the medium for the construction of the expanded city, as a layered multidimensional process influenced by social-cultural and political-economic dynamics. The last implication is a matter of representation and imaging speculation, as for both the analysis of a site and the implementation of design strategies by subsequent phases: timing of transformation challenges design projects in its appropriateness and efficacy of expression. Corner highlights the development of flexible operational and working methods related to the progress of new parametric and informational technologies (Corner J., 2006) to adapt the design to the multi-scale nature of the contemporary urban landscape. Ecological processes inform the project through "a multiplicity of old and new methods, tools, and techniques in a cross-disciplinary and collaborative approach toward urbanism developed through the lens of ecology" (Waldheim C., 2006).

2.2.8 Industrial mixed use: opportunities and limits (urhahn, 2006)

Technological development has reduced environmental nuisances caused by many industries. An increasing number of businesses demand attractive workplace conditions, and mixed-use environments are increasingly seen as desirable by businesses, residents and planners. This tendency creates an opportunity for the development of post-industrial areas.

Due to their scale, heavy transport and disruptions caused by noise, smell and dust, some industrial activities remain undesirable in the vicinity of dwellings and community uses. Since some categories of the heavy industry can pose safety hazards, most bulk goods handling, construction yards or chemical industries should not usually be allowed next to housing.

With the innovation in process and new building methods, some industrial activities can be alongside with residential uses. Such activities involve textile and furniture production, printing and even some waste recycling processes.

Being an increasing opportunity to allow productive non-residential uses adjacent to a qualitative living environment, it also holds a couple of challenges to master:

How to guarantee residential amenity for the dwelling and the urban environment, avoiding noise, smell and dust?

How to ensure that industrial business premises can function side-by-side with housing without affecting business efficiency and expansion over time?

How to conceive a high-quality public realm that suits the logistic needs of companies but is attractive to pedestrians and cyclists?

How to create urban design frameworks to guide the development of such areas over time?

2.2.9 Principles for industrial areas (Urhahn urban design, 2006)

Based on a wide-ranging analysis of successful intensification and mixed-use examples, Urhahn Urban Design, an urban design practice that acts as a consultant for the mayor of London, set 17 strategies for a thriving mixed-use district or intensified industrial areas that are achievable in practice. Some of these strategies, along with the other research outcome, form a tool kit for the analysis of the case studies and further design strategy.

1. Define a clear but flexible spatial framework
2. Promote flexible building types
3. Invest in large-scale hybrid buildings
4. Minimise environmental disruption
5. Encourage vertical stacking of uses (Parking)
6. Create attractive private courtyards
7. Encourage built parking solutions
8. Promote excellent design
9. Comprehensive architectural master plans where appropriate
10. Create public space and meeting places
11. Define atmosphere, mix and design rules
12. Make the most of existing assets
13. Make active use of transitional zones and buildings
14. Create critical mass
15. Separate access routes for different uses
16. Control the views from residential units
17. Mix on different scales

2.3 Resume

Literature	Nature	Mobility	Function	Structure	Design Rules
Oliviera and Balaban 2013	use of underutilized lands	reducing commuting time and distance, increased non-motorized and public transport coverage	promotion of green spaces and water	turn existing buildings into low-carbon and less vulnerable structures, retrofitting existing structures	energy and resource efficiency
Mostafavi, 2010	landscape as the medium for the construction, water as the linking element				connective, ecological and resilient role of water
Sieverts 2008	save resources that affect the ecology and the economy			reusing the existing industrial landscape	develop local particularities, counter international tendencies to sameness and homogenity, promote complexity, evaluate local specifications
Urhahn Urban Design, 2006	Minimise environmental disruption	Separate access routes for different uses, Encourage built parking solutions	industrial activities alongside with residential uses, intensify and update the industry	Encourage vertical stacking of uses, Promote flexible building types	Make the most of existing assets
Ascher 2005		connect scales, speeds, and timeframes, transport technologies, information	access to housing, work, education, culture, health in proximity to each other	mobility hubs, intermodel structures	
Jacobs 1999	a loop eliminating the impact on the environment			self-sustained development	environment-economy integration, futurity, environmental protection, equity, quality of life, and participation
Braae, Diedrich 2012					develop less generic site-specific answers, result is the sum of the bridges between the existent and the intervention
Lister 2010					Resilience, recover from disturbance and to accommodate change
Berkes, Colding, and Folke 2003					maintain core attributes, system to self-organise, create capacity for learning and adaptation in the context of change
Goodman 1975					Transformation: composition, decomposition, weighting, ordering, (re)organise them for perception and action, deletion and supplementation, i.e. excising old material and replacing it with something new
	Catalogue of Design Tools and Guide lines				
	activating water	promoting pedestrian circulation	promoting public space	implementing self sufficient systems	reduce pollution
		reduce commuting	mixed use	reducing land coverage	creating identity
				reuse	introducing state of the art technology

The literature review demonstrated that post-industrial sites hold the potential to serve as social spaces with a sustainable environmental impact. It also suggested a specific set of key factors for successful urban regeneration, such as the implementation of renewable resources, advanced mobility and accessibility, human-scale public spaces, and promotion of diverse service functions.

The most relevant factors pertinent to the design assignment are extrapolated and will form a catalogue of urban principles. Those specifically include the degree of transformation, retrofitting strategies, implementation of flexible structures, the mix of uses, mobility, the role of water, focus of regeneration, heterogeneity and main key features for the identity of a place.

Catalogue of Design Tools and Guide lines				
Tools				Design Rules
Nature	Mobility	Function	Structure	
use of underutilized lands	reducing commuting time and distance	promotion of green spaces and water	retrofitting existing structures	energy and resource efficiency, turn existing buildings into low-carbon and less vulnerable structures
water as the linking element	Separate access routes for different uses	industrial activities alongside with residential uses	reusing the existing industrial landscape	connective, ecological and resilient role of water
Minimise environmental disruption	connect scales, speeds, and timeframes, transport technologies, information	access to housing, work, education, culture, health in proximity to each other	vertical stacking of uses	develop local particularities, counter international tendencies to sameness and homogenity, promote complexity, evaluate local specifications, save resources that affect the ecology and the economy
a loop eliminating the impact on the environment	increased non-motorized and public transport coverage	intensify and update the industry	flexible building types	Make the most of existing assets
	built parking solutions, mobility hubs, intermodel structures		self-sufficient systems	environment-economy integration, futurity, environmental protection, equity, quality of life, and participation
				develop less generic site-specific answers, result is the sum of the bridges between the existent and the intervention
				Resilience, recover from disturbance and to accommodate change
				maintain core attributes, system to self-organise, create capacity for learning and adaptation in the context of change
				Transformation: composition, decomposition, weighting, ordering, (re)organise them for perception and action, deletion and supplementation, i.e. excising old material and replacing it with something new

3

LOCAL FOCUS

the research topic is contextulised and analysed within the local conditions and constraints. This chapter draws the focus from a metropolitan scale to the community scale.

3 Local Focus

This chapter will cover the processes of industrialization, underutilization and urban development in Shanghai. This study aims to provide a full understanding of Shanghai's industrial history and current tendencies in urban development, which concerns the evaluation of the peripheral area dominated by agriculture and industry. Consequently, the plans for the reintegration/ re-stitching of these areas will be investigated and introduced.

Eventually, it will zoom into the Songjiang district in order to provide an understanding of the growth and importance of industrial districts for Shanghai. The chapter will also focus on an overview of the site-specific features.

3.1 Shanghai

In 1978, Deng Xiaoping initiated the Open Door policy to allow foreign investments in the country. Shanghai was selected to be the "head of the dragon", the economic engine of China. Consequently, urbanization was the engine for growth (Den Hartog 2010).

After the policy, the urban area of Shanghai scaled up to ten times its size and transformed from a city to a metropolis within thirty years (Yin 2011), taking over the flat territories occupied by agricultural land, villages and canals along the Yangtze River. Its network and connections grew accordingly, and the boundaries expanded with an average of 1 km per year. (Den Hartog 2010)

Fig. 7_Shanghai map from Google earth 2019

3.1.1 Industrialization and urbanisation

Located at the Yangtze River Delta, Shanghai has always been an elemental junction in the Chinese export and import industry. The Huangpu River and Suzhou Creek provided river transportation and access to water for production, creating a large concentration of industrial buildings and structures along the waterfront.

In 1949, with the beginning of the People's Republic of China, Shanghai was aiming to become the most prominent national manufacturing centre and shifted from a consumption-based city to a production-based city. Heavy industries, including iron, machine, and power were prioritized and made up to 80% of the total investment in industry in Shanghai.

GDP was significantly impacted: from 1952 to 1978, secondary sector GDP rose from 52.1% to 77.4%, while the tertiary sector fell from 41.7% to 18.6% (Chen 2001). Urban planning supported this dramatic shift in the industry: in the Preliminary Master Plan of Urban development 1958, eight industrial districts were planned for the inner-city of Shanghai, each with a specialized industrial field.

Furthermore, the comprehensive plan of 1959 promoted 12 satellite towns that would not only serve as peripheral residential areas but as well as service areas for the industries. As a result, the urban characteristics of the international city from the period of the concessions significantly weakened. (XuKai 2010: 156)

After the introduction of market economies and export-oriented industrialization (since 1979), the Chinese policies promoted urban expansion. A vast migration from rural to urban areas and a multifaceted pattern of urban and peri-urban growth complemented the explosion in industrial development, including the production of manufactured goods for export. Massive infrastructure projects were designed and completed, disrupting existing settlements and environmental consequences. Those changes further had a significant effect on agriculture and food production, resulting in an enormous loss of farmland and the uprooting of traditional agricultural practices and the widespread adoption of industrial agriculture methods. In the 1980s, the Chinese economy boomed. The open-door policy and the shift from a planned to a free market enabled this development.

Along with this significant change, came a dramatic spatial development in Shanghai, transforming to an international metropolitan city. In the 1990s, the Shanghai government launched a policy called «one city nine towns» to form a new structure for the metropolitan area of Shanghai. Songjiang, as part of this strategic concept, was determined to be a pilot city as one of the nine new towns according to the 'Shanghai city master plan (1999-2020). Each of the nine new towns should have a core with a different architectural theme of a historical European city: such as a Dutch, a Scandinavian, or a British quarter.

Two comprehensive urban development plans in 1986 and 1999 primarily guided the shift in urban development in this period. Formerly

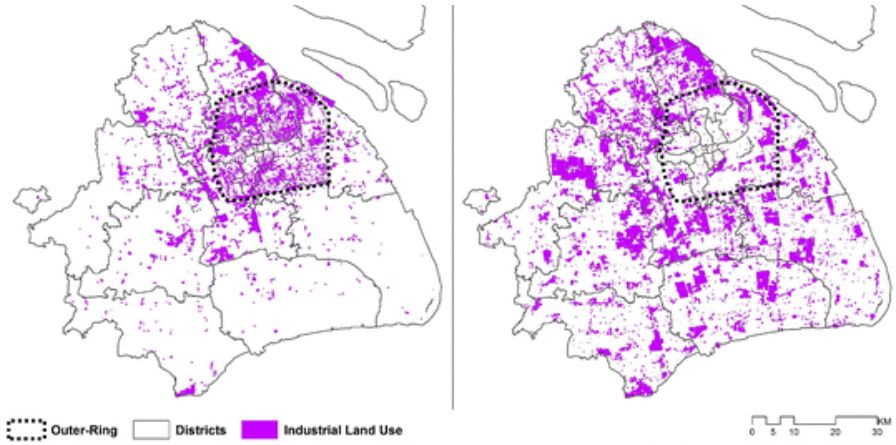


Fig. 8_Industrial land use

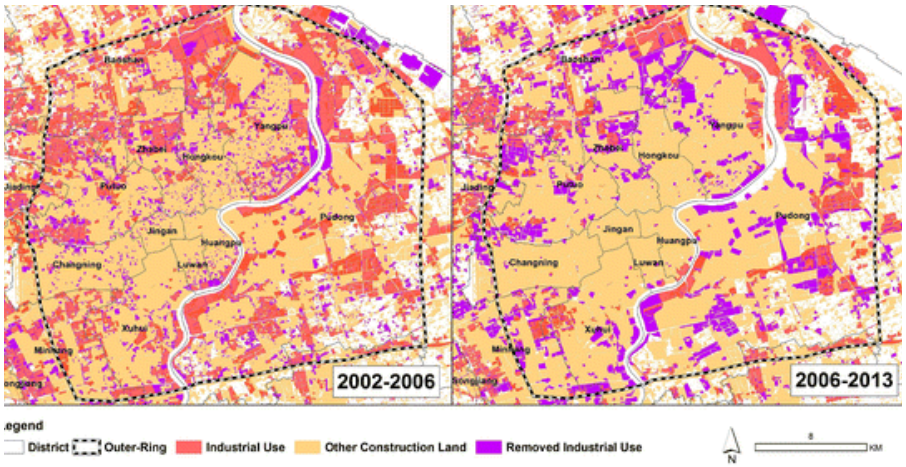


Fig. 9_Industrial land distribution

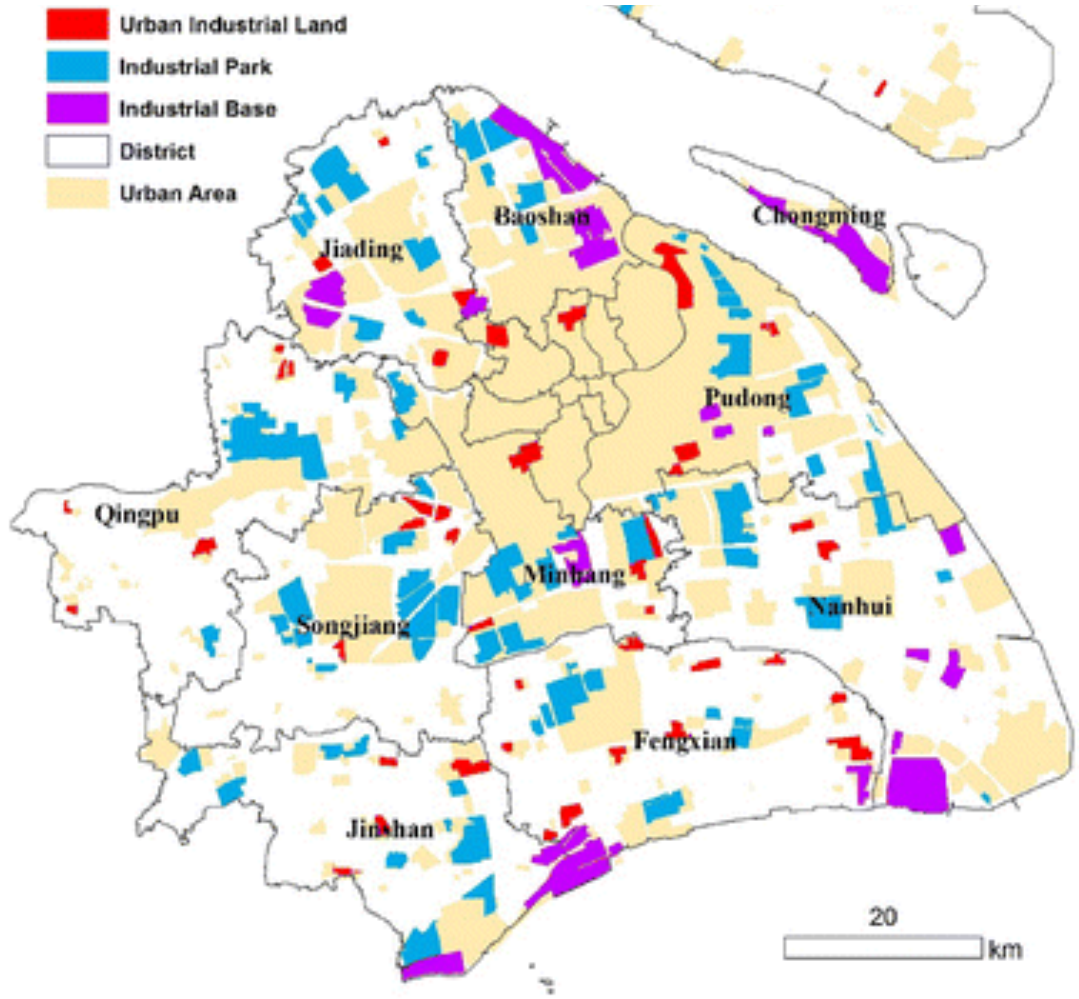


Fig. 10_Industrial land Shanghai, 2017, Shanghai municipality

an industrial city, the plan of 1986 targeted Shanghai as a technology and cultural centre and a famous harbour city (Municipal Government of Shanghai 1986: 5). The plan of 1999-2020 stated that Shanghai must develop into an 'international economic, financial, trading and shipping centre' where a 'spatial structure fitting to the international metropolitan city is pursued' (Municipal Government of Shanghai 1999: 3). The most evident results of this include spatial expansion, decentralization, balanced development, and sustainable development (XuKai 2010:141).

In 2003, a new version of the 1999-2020 plan was introduced giving priority to the development of three towns: Songjiang, Jiading and Lingang, populated by 800 000 to 1 million inhabitants.

In 2006, the master plan hierarchized the development and included more towns to develop. The new plan is known as the 1-9-9-6 plan: 'one Central City, nine new decentralized towns with administrative centres, sixty small towns and six hundred central villages' (Den Hartog 2010: 28). This plan aimed to avoid the congestion in the central city, promoted the autonomy of the nine new cores of the city, and intended to reclaim Shanghai's international status. In contrast to the “satellite cities”, the new towns were planned to be autonomous.

Many of them were placed in proximity to industrial areas to provide services and housing for the employees. (fig.2) Anting town by the Volkswagen factory is one of the examples.

Along with the development of the new towns, the renewal of the city centre began, and the city municipality aimed to combat neglected, derelict and underutilized areas by demolishing old neighbourhoods. Their residents had to move to the suburbs and the New Towns. Industries located in the city moved to the periphery, and their land use changed to housing.

As the city grew with the inner city containing a very high amount of industrial land, it became scarcer and more valuable. The manufacturing industries on this land prevented the development of other required urban functions (XuKai 2010: 164).

Consequently, the restructuring and redistribution of industrial space out of the inner city became one of the primary tasks of urban planning. Following this plan, those industrial spaces were to be redeveloped and modernized in their functions. (Municipal Government of Shanghai 1997: 12-15)

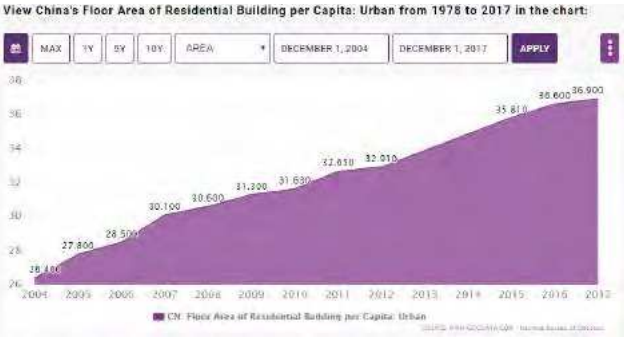


Fig. 11_BFA per Capita Urban, CEICDATA, national bureau of statistics, 2019

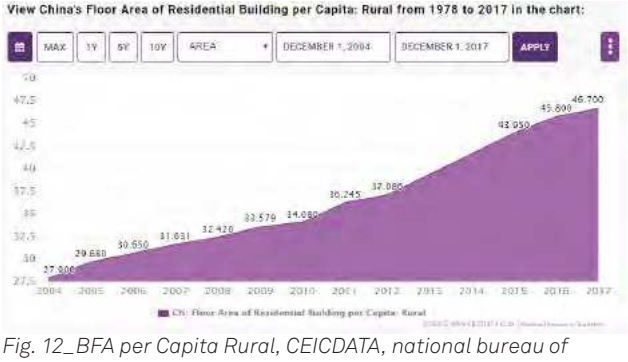


Fig. 12_BFA per Capita Rural, CEICDATA, national bureau of statistics, 2019

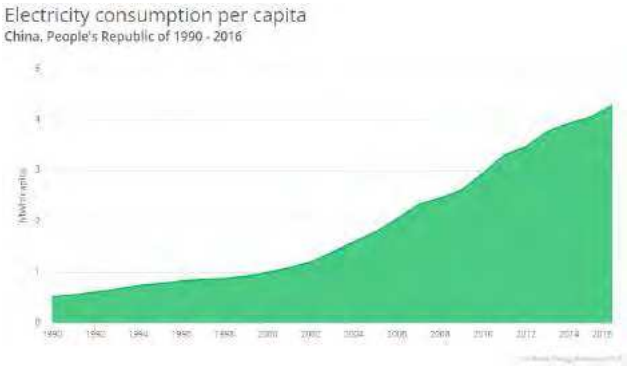


Fig. 13_Electricity Consumption by Capita, world bank 2018

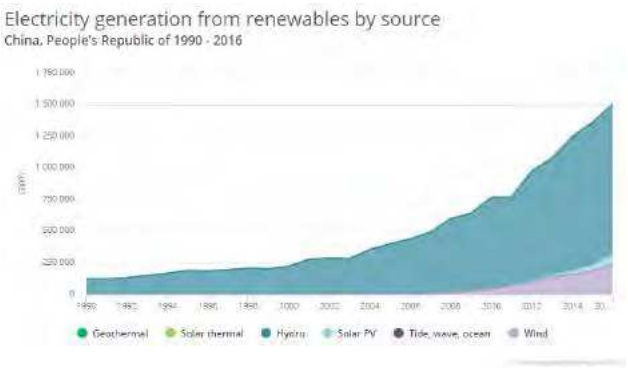


Fig. 16_Electric Generation by Renewable Source, world bank 2018

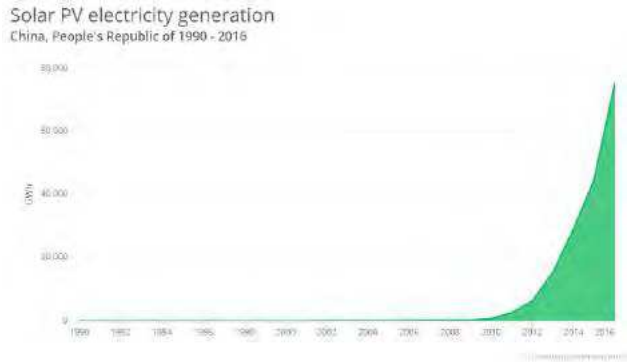


Fig. 14_Solar PV Electricity Generation, world bank 2018

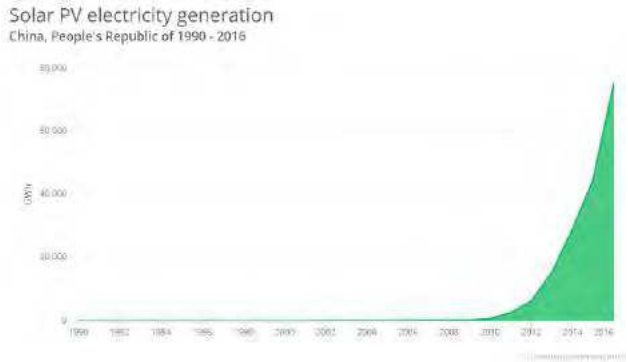
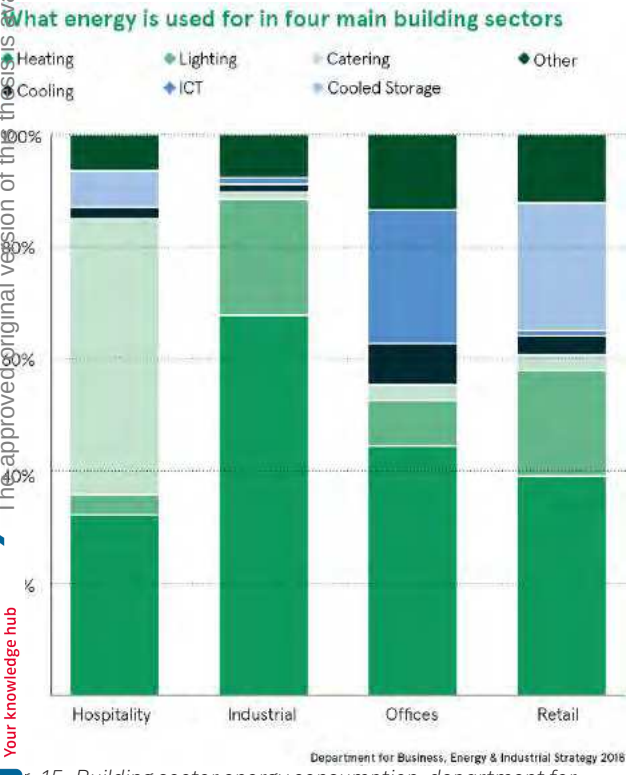


Fig. 17_Solar PV Electricity Generation, world bank 2018



g. 15_Building sector energy consumption, department for siness, energy and industrial strategy, 2018

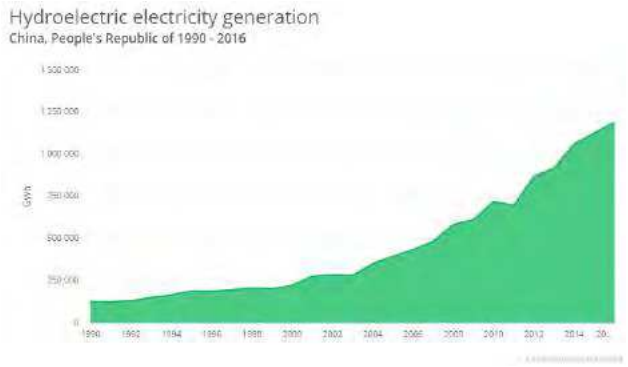


Fig. 18_Hydroelectric Generation, world bank 2018

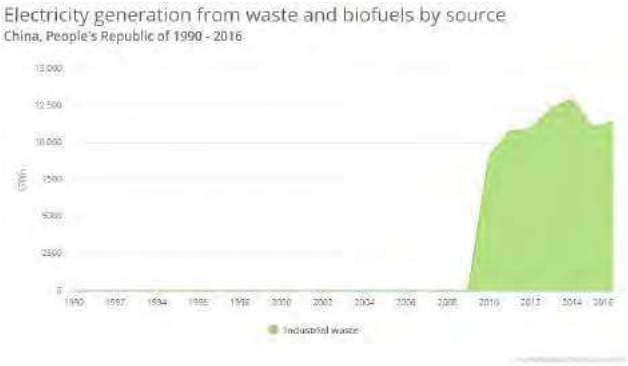


Fig. 19_Electricity Generation Waste and Biofuel, world bank 2018

3.1.2 New perspectives/future

Currently, Shanghai has a population of 24 million, and it is expected to reach 45 million by 2050. Including the enclosing Yangtze Delta region rising to about 200 million. This rate of growth has been consistent since the 1980s. Since then, the population doubled.

The current Shanghai Metropolitan Plan promotes the "One Dragon Head, Four Centres" as Shanghai should become the economic leader of the entire Yangtze River region, comprising an international economic centre, a financial centre, a trade and logistics centre, and "an international centre of socialist modernisation."

Shanghai city masterplan of 2016-2040 proposes "four-brand strategy", namely the "Shanghai Service", "Shanghai Production", "Shanghai Shopping" and "Shanghai Culture", aiming to speed up the city's construction in order to turn Shanghai into a truly global city. The focus is the culture and innovation industry that is an essential branch of industry for the national economic and social development, and also a key factor for Shanghai's innovation-driven development and economic transformation.

The Shanghai city masterplan 2016-2040 states that Shanghai will focus on developing the film, television, animation, games, internet, art, publishing and creative design sectors. According to the municipal government, the cultural and creative industry should cover around 18% of Shanghai's annual GDP by 2030. Consequently, Shanghai is projected to become a global centre for the cultural and creative industry by 2035.

In 2016, the cultural and creative industry contributed more than 12% of Shanghai's GDP. Weng Tiehui, vice mayor of Shanghai, explains that "this industry can be defined as a pillar industry once it contributes 6% to the city's GDP," the cultural and creative industry in Shanghai has already reached that benchmark. According to Weng, after three years of implementation, these projects will significantly promote the construction of an international cultural metropolis and play a decisive role in the new layout and new features of future Shanghai.

Fig. 20_Five New Towns, Shanghai Urban planing department

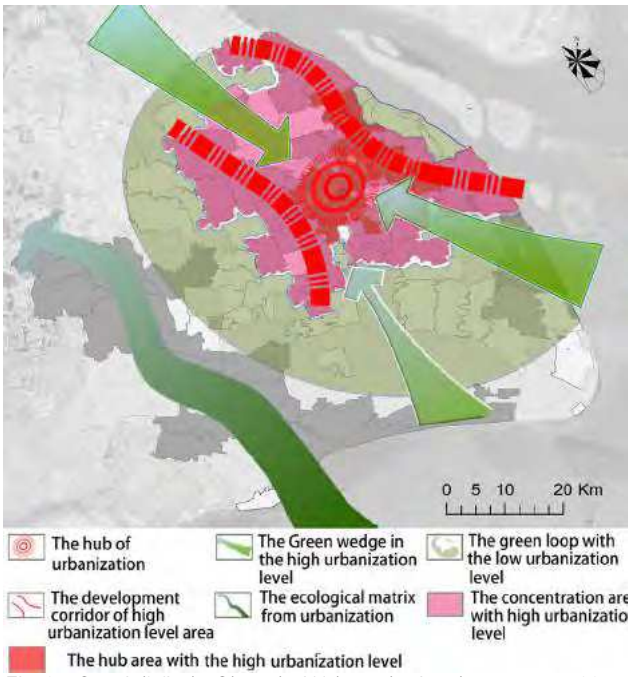


Fig. 21_SpatialWinds, Shanghai Urban planing department, 2014

3.2 Songjiang

Songjiang district is one of the oldest urban pieces of historical Shanghai. The TOD model (Transit Oriented Development) shaped the urbanization of the countryside of Shanghai. First, the network was built and then the districts around it. However, the decision to make Songjiang a vital town in the planning of Shanghai since the 1999-2020 plan and the opening of the first 29 km-long segments (Songjiang Xincheng - Guilin Road) occurred in December 2007. The rest of the segment, to connect the south of Songjiang and the city centre, were built until December 2012. Besides the connection to the new towns, metro stations were embedded along the metro line.

3.2.1 Key features

During the Ming dynasty, it became the flourishing capital town of southeast China. However, as the city of Shanghai expanded and the city centre shifted, Songjiang became a suburban town. It lies in the Yangtze Delta, southwest of Shanghai, around the area of upper-middle reaches of Huangpu River. It comprises an area of 604.67 square kilometres, which is 9.5% of the total area of Shanghai. Various bodies of water cover 13% of its area. Songjiang's water resources originate from the Huangpu River, which gets its water from Dianshan Lake, Taihu Lake and Tianmu Mountain in Zhejiang Province, and then flows into the sea. The rivers in the Songjiang area are all tidal. With its river system and generous green areas around the highway towards Shanghai, it contributes to the green network of the periphery.

3.2.2 Connectivity

Songjiang is 30km away from Shanghai city centre, but relatively well connected by metro and highways, including the Shanghai-Hangzhou High-speed Railway, Shanghai-Hangzhou Highway (G60), Shanghai-Qingpu-Pingwang Highway (G50), Tongsan Expressway (G1501), Jiading-Jinshan Highway (G15) and Airport Highway (S32) Songjiang represents a core area to Shanghai and the Yangtze Delta region. Additionally, Metro Line 9 allows quick access to Shanghai from the Southwest.

3.2.3 Urban and industrial Development

Songjiang District represents a key area for the Shanghai urban expansion. Once designed as a 'high-quality' city with modern residential buildings and new employment possibilities, it governed 11 towns and four sub-districts in 2013. The comprehensive urban planning anticipated a distinct organisation of different functions, mobility systems and green spaces.

From 2003 to 2012, Songjiang got several awards including: International Garden City from the United Nations Environment Programme (UNEP), National Model Green City, National Landscaping Advanced City, National Ecological Water Conservancy District, China Human Settlement Model Award, National Double Support Model City, National Science Popularization Model City, National Cultural Relic Protection Model District and Top 10 Leisure City of China.

In 2013, the economy of Songjiang realised stable development despite a complicated situation both domestically and abroad, along with additional pressure due to efforts to

restructure the economy. The GDP rose 3.5% year-on-year to 91.75 billion yuan (US$15.04 billion). The primary industry realised the added value of 872 million yuan, up 2.6% from 2012. The secondary industry edged up 1.9% with an added value of 54.4 billion yuan, and the service sector jumped 6% with an added value of 36.477 billion yuan.

Songjiang town comprises an Economic and Technology Development Zone that transforms and improves with the increasing foreign investments in the area. In 2013, the upgrade to a state-level economic and technological development zone promoted investments in the Internet of Things, a data centre and software park.

Along with the foreign investments, Songjiang New Town's international ecological business district was born. Private objects, including Dongming Hotel and Wanda Plaza, have been built. The increase of the new private zones brought Guangfulin Culture Zone, Zhiye Temple, Ancient Architecture Zone and a Culture Exchange.

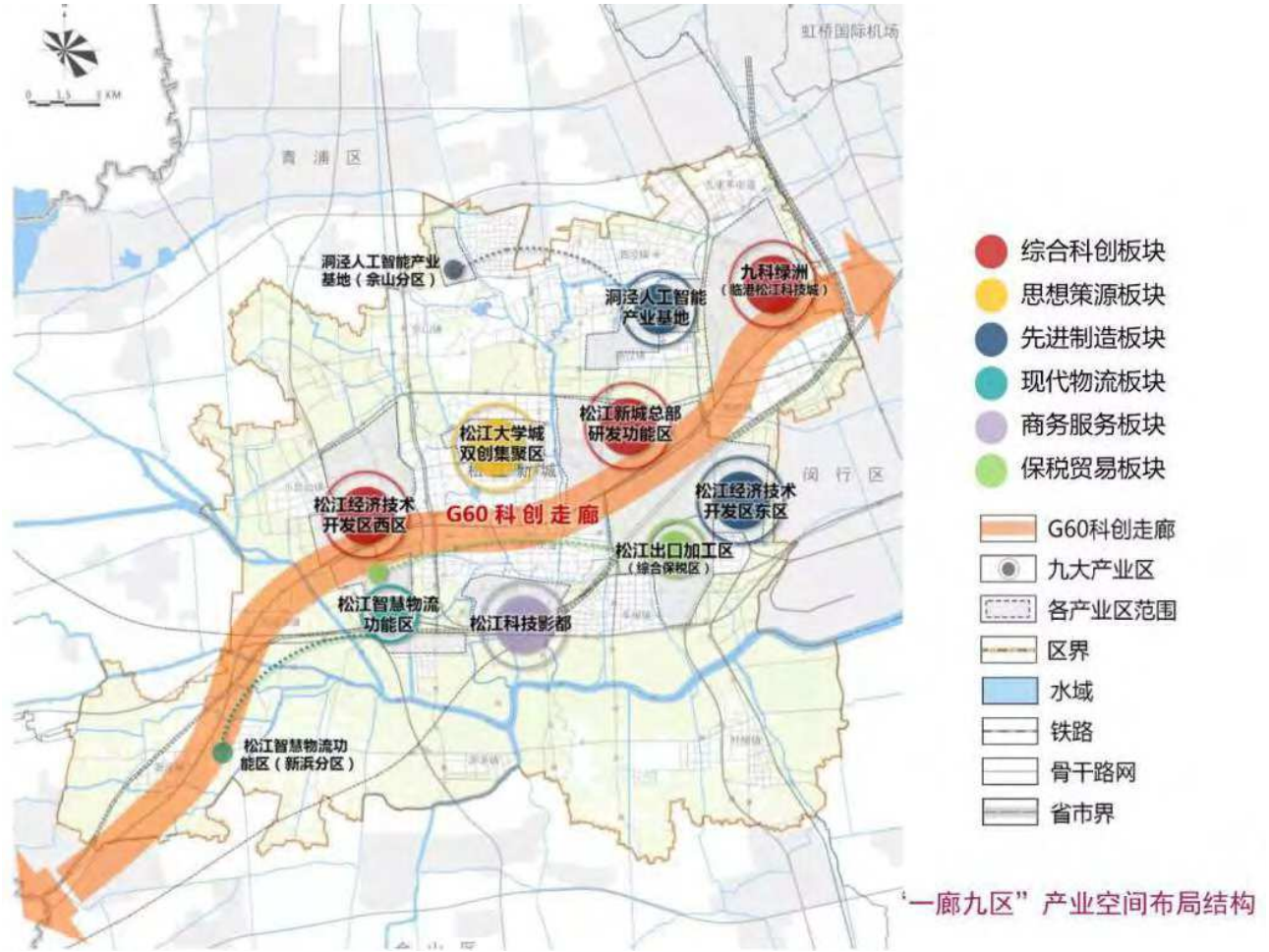


Fig. 22_Songjiang economic development zones, 2017

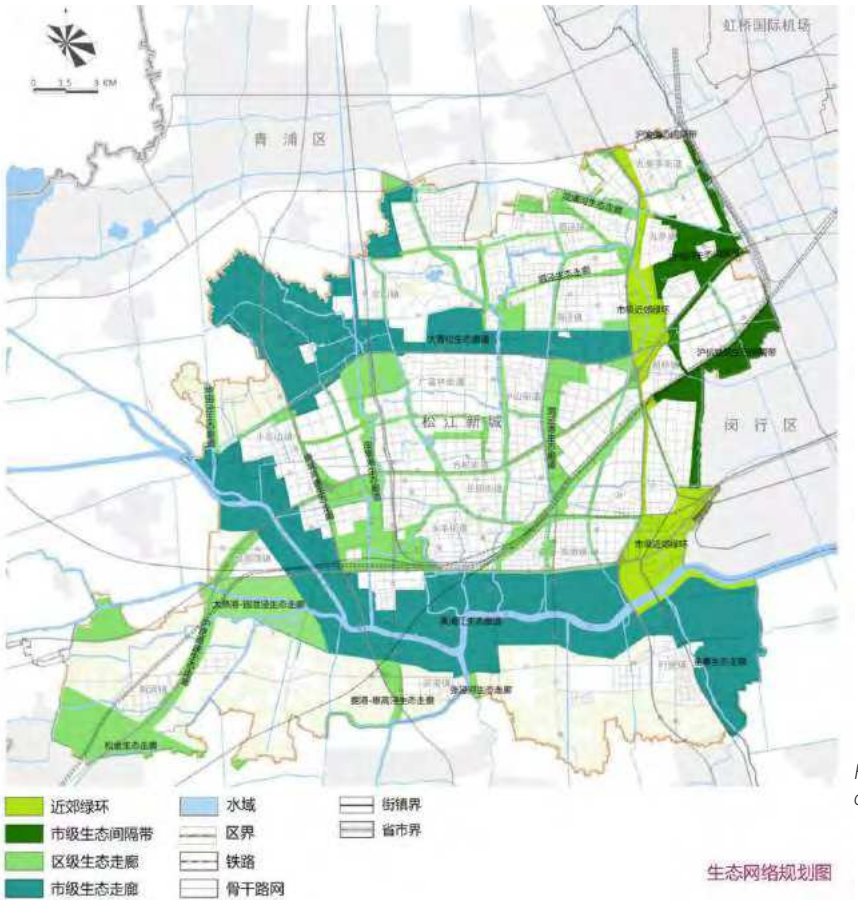


Fig. 23_Songjiang Green environment corridors, 2017

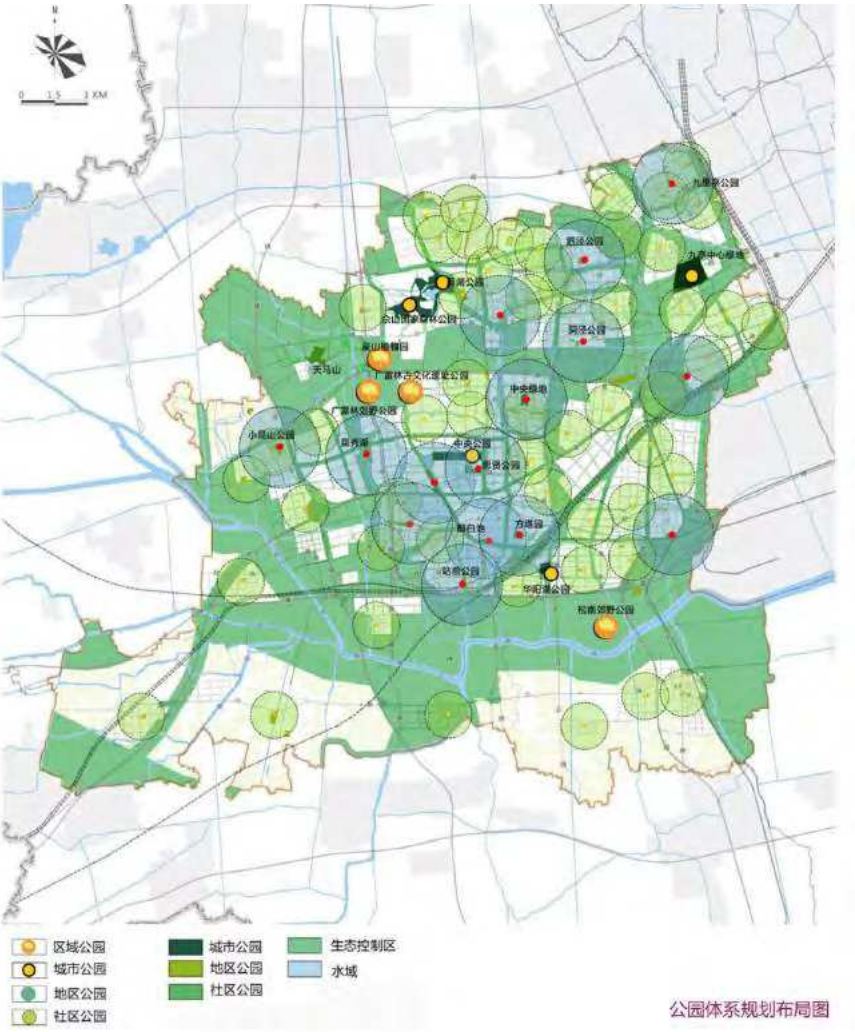


Fig. 24_Songjiang green and landscape planning development zones, 2017

3.2.4 Current and Future Urban Development Plans

In July 2018, Shanghai Songjiang District's Government and the Shanghai Municipal Planning and Land Resources Administration published a comprehensive plan and a land-use plan of Songjiang district (2017-2035).

Songjiang New Town is one of the five new cities in the Shanghai Urban Master Plan (2017-2035), which will be cultivated into a node city with Expansion-driven capacity in the Yangtze River Delta urban agglomeration. Located in the Shanghai-Hangzhou Corridor, Songjiang has a political, economic and cultural centre. It is considered a modern and liveable city powered by science and education and innovation, supported by strategic emerging industries, service economy and cultural and creative industries.

Songjiang has historical, cultural and natural value, furthermore flourishing tourism and a regional higher education base, with a planned population of about 750,000. According to superior positioning, Songjiang New City will carry out facility construction and service allocation following national big-city standards. The vision for Songjiang in 2035 highlights "science, humanity and ecology" as critical factors to turn Songjiang into the Southwest gateway of the metropolitan city of Shanghai, a vital area for science and technology and promoter of advanced manufacturing. The urban and rural spatial system should be optimized, and a spatial structure of "network, multi-centrality, mixed-use, intensification" should be implemented in the city. The planning principles include a regional spatial pattern for transportation and ecological corridors to establish the new development strategy "one corridor, one axis, five belts and four parts". (Fig. 1)

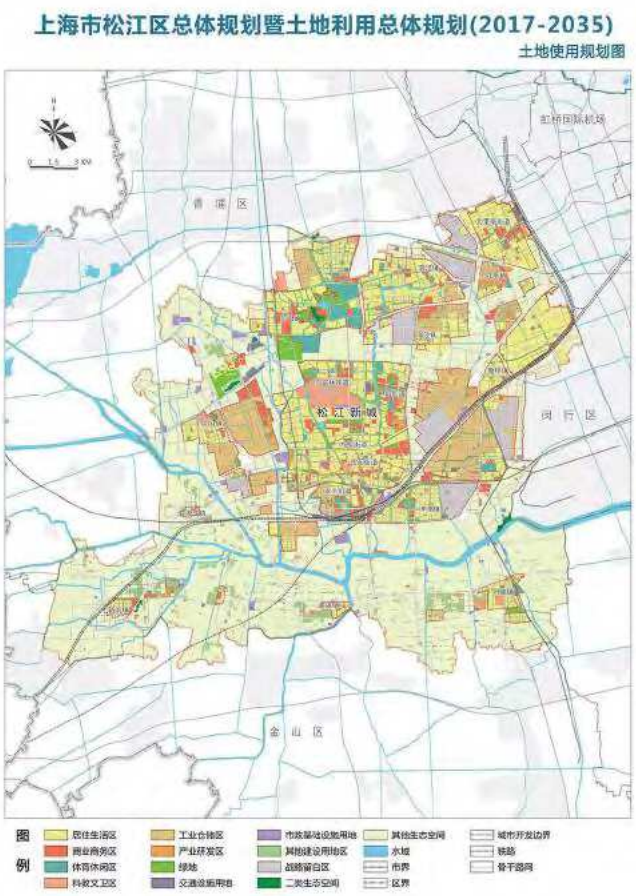


Fig. 25_Songjiang Zoning, Songjiang Municipality, 2017

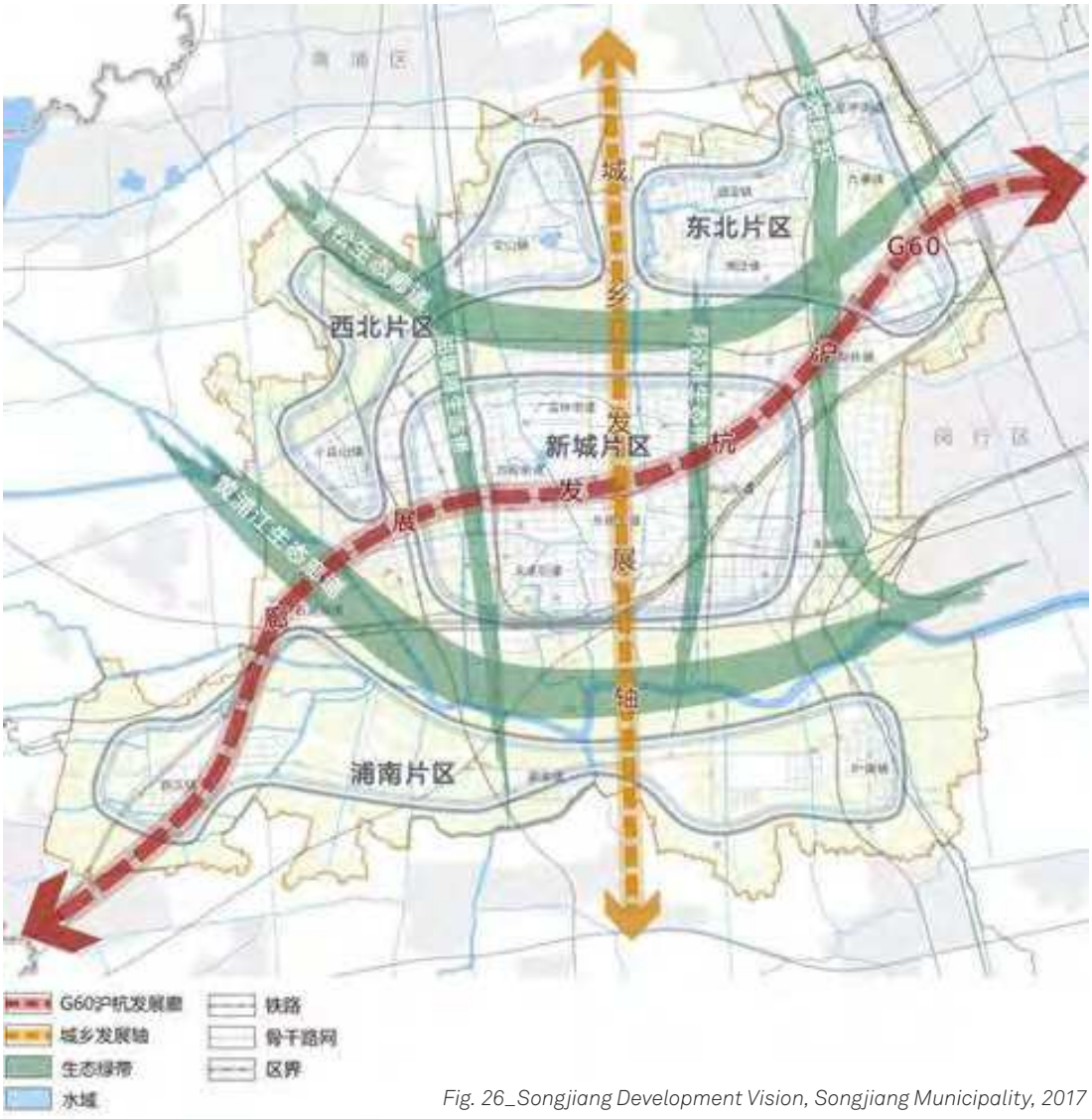


Fig. 26_Songjiang Development Vision, Songjiang Municipality, 2017

The regional development "corridor" is the G60 Shanghai-Hangzhou development axis of the Yangtze River Delta region, incorporating Jiuting, Xinqiao, Songjiang Industrial Zone, and Xincheng main city, Songjiang Science and Technology Park and Xinyi. As an economic and industrial development corridor, the Shanghai Jiahang G60 Science and technology corridor demonstrates the integration of the production in the city and highlights the radiation towards Hangzhou bay area.

The chosen site for this research, Miao San Lu Industrial Area, lies in this corridor, in XinQiao. The development "axis" connects between the urban and the rural development including Xincheng city, the Lushan National Tourism Resort, Qingpu New City and Jiading New City.

Five ecological belts "two horizontal and three vertical" implement a municipal-level of ecological planning, that comprises natural rivers, natural mountains, shelterbelts, farmland and other resources to form an ecosystem network of Songjiang. The Qingsong Ecological belt defines the urban development boundary of Songjiang New City through the Lushan Mountain to the northeast. The green "ring" in the suburbs limits the development of the main city area

of Shanghai. The Dongying Port Ecological belt marks the zone between the new city living area and the industrial area, improving the environmental quality of the new city. These two vertical ecological belts are framing the chosen research site, Miao San Lu Industrial area. Other two belts are Huangpu River green belt and Oil Pier Harbor Ecological belt.

The chapter about the zoning strategy divides Songjiang into four strategic areas following the approach of "differentiation". Different functional zones should have their positioning and complimentary services.

Each zone follows a specific strategy:

The "upgrade" strategy covers the Xincheng area that consists of the main city of Xincheng, Songjiang Industrial Park, Science and Technology Park and Chedun Town.

The "integration" strategy applies in the Northeast area that incorporates four towns and one street, namely, Yi, Dongying, Jiuting, Xinqiao and Jiuliting Street. The area is close to the central city, and it comprises towns, cities, industrial parks, and high economic level.

The comprehensive plan and a land-use plan of Songjiang district (2017-2035) aims to utilize the strength of Dahongqiao and the proximity to the city centre, with the industrial upgrading and urban renewal as the starting point. The spatial layout and facilities of the town will enhance the quality, urban development and create a sub-centre of Songjiang.

Furthermore, the "linkage" strategy in the northwest and the "conservation" strategy in the Punan area are linked to the approach of enriching cultural tourism resources, strengthening regional linkage and resource integration and ensuring economic development for Shanghai's green development featuring modern agriculture and rural tourism.

The new plan also highlights the role of new towns. According to their functional characteristics, new towns form central towns and general towns along with a population plan. Xinqiao, Dongying, Xiaokunshan, Shihudang, Xinyi, Danang, and Yeh are general towns with a planned population of 230,000 people. Central towns are Lushan with a planned population of 178,000 and Jiuting with a planned population of 160,000. The planned population of the remaining towns is between 30,000-130,000 people. Service facilities and public facilities should be developed to meet the needs of urban and rural residents, and employment opportunities should be created. According to the plan (fig. 2), the selected research Site lies between the Songjiang new town and the planned Xinqiao General town.

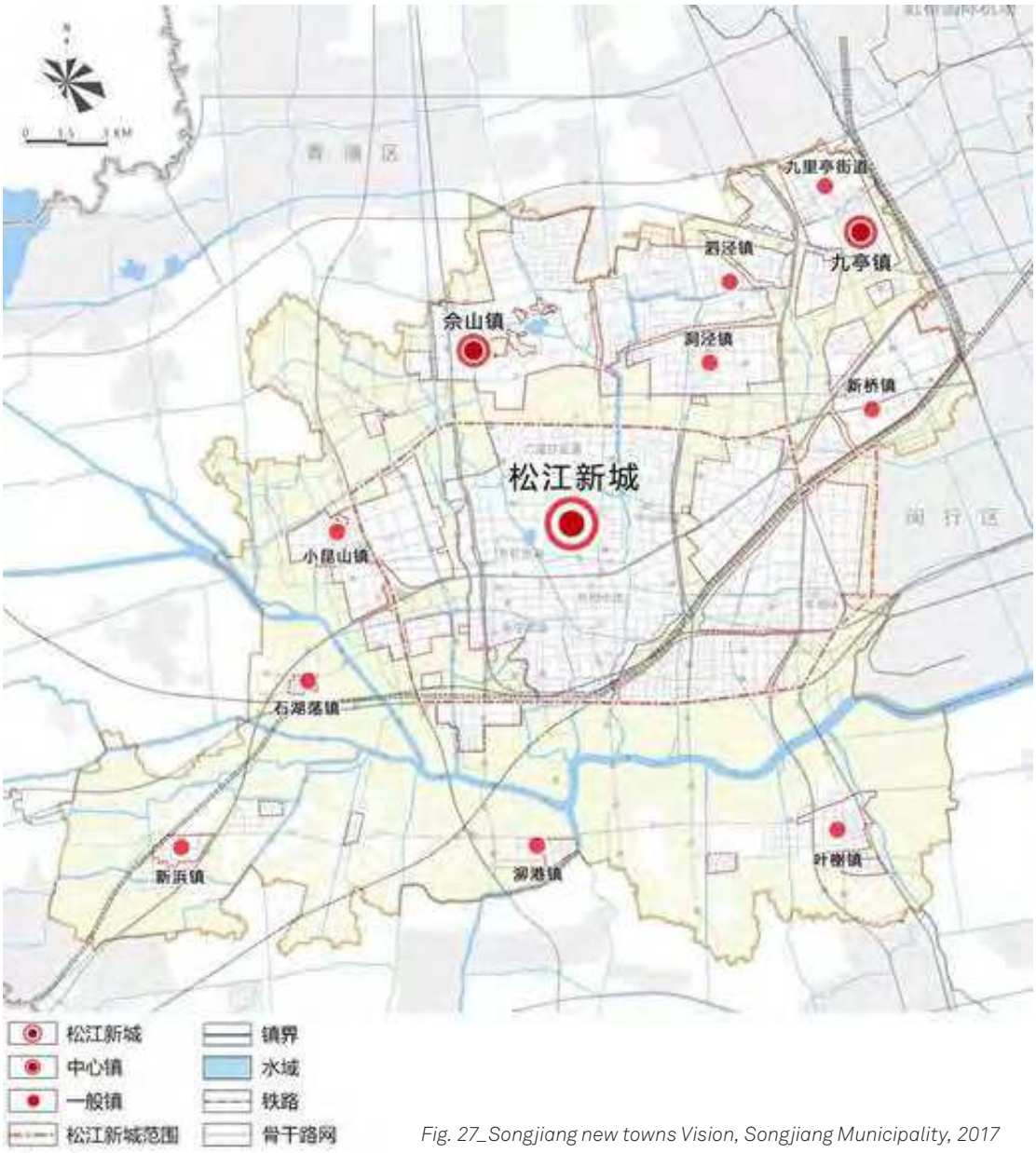


Fig. 27_Songjiang new towns Vision, Songjiang Municipality, 2017

The comprehensive plan of Songjiang district (2017-2035) intends to improve Community life by providing community service centres that are a 15-minute walk away from the service facilities to ensure that residents have community-level public service facilities in their reach and improve their quality of life. Taking the urban circle as the basic unit of suburban space organization and resource allocation, strengthening the transportation network support and sharing public service facilities, the commuting time in the town circle should be limited to 30-40 minutes. The plan indicates five urban circles, comprising two urban towns, namely the Songjiang New Town Circle and Jiuting-Sijing -Dongyu-Xinqiao Town Circle, and three integrated towns, which are Fengjing Town Circle, Zhuyu Town Circle and Tinglin Town Circle. (Fig. 3)

Fig. 28_Xin Qiao planned as urban town, Songjiang Municipality, 2017

Jiuting - Sijing - Tongjig - Xinqiao Town area belongs to the integrated as well as the urban town circle. Xinqiao should reach a planned population of 667,000 people by 2035. The development should promote industrial upgrading and transformation, support the residential expansion and related industries of Hongqiao Business District, strengthen the supporting construction of commercial and other service facilities, and achieve a job-residential balance index of 73.

3.3 XinQiao town

The chosen site for the implementation of a design proposal is the Miao San Lu Industrial area in Xinqiao Town. Xin Qiao town lies in the southwestern suburb of Shanghai, in the northeast of Songjiang, with the Songjiang Industrial Zone in the west, in the east, bordering on Xinzhuang Town, Minhang District, with convenient transportation.

3.3.1 Key features

XinQiao refers to the formerly main agricultural area with many water canals branching from the Beimao River that connects Huangpu River in the south and Dianpu River in the north. XinQiao, in simplified Chinese 新桥, literally means "new bridge".

Xinqiao Town covers an area of 35.48 km2, including 16.84 km2 for real estate and market towns, 6.3 km2 for Xinqiao Old Industrial Park, 1km2 for Caohejing Park (including 380 acres for development), and 5.7 km2 for agricultural land.

Currently, there are ten "village change" neighbourhood compounds, one foreign residence compound, and one Xinyi compound.

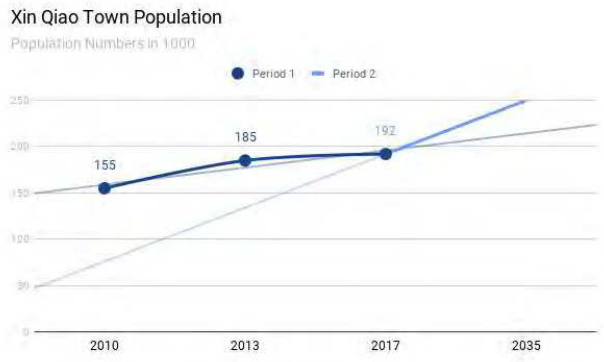


Fig. 29_Xin Qiao population growth, stats from Songjiang Municipality, 2017

3.3.2 Connectivity

Xinqiao Town is only 16 km away from Hongqiao International Airport and 35 km away from the centre of Shanghai.

Xinqiao Town has an exceptional location and convenient transportation. As mentioned in the previous chapter, it is the interface of two key town circles, each with distinctive functions. It is relatively well connected by metro and highways, including the Shanghai-Hangzhou High-speed Railway, Hujing Railway, Shanghai-Hangzhou Highway (G60) and Jiajin Highway for Import and Export Overpass. It takes only 10 minutes to drive to the Songjiang city centre, and five roads such as Yusong, Shenqiang and Chenchun lead directly to the Shanghai area. The waterway channels, including Huangpu River, Brick New River, Beijiao River, Liu Leitang, Zhugang and Shagang, allow the transportation of up to 60-ton ships. The municipality calls it the "three-dimensional transportation network" of water, land and air. Land transportation extends in all directions (Xinqiao Geography. Xinqiao Town People's Government).

Highway: G15 Shenhai Expressway, G60 Shanghai-Kunming Expressway, S32 Shenjiahu Expressway, Huminfeng Highway, Jiuxin Highway, Xinche Highway, Qiongzhu Highway, Yusong Highway.

Airport: Shanghai Hongqiao International Airport, Pudong International Airport, Hangzhou Xiaoshan International Airport. It takes only 20 minutes by car to Hongqiao Airport and 45 minutes by car to Pudong Airport.

Shipping: Shanghai Port, Shanghai International Yangshan Deepwater Port.

Railway: Shanghai-Hangzhou Railway Sub-line, Suburban Railway Passenger Jinshan Branch, Shanghai-Hangzhou High-speed Railway set up freight and passenger stations in the town (by Shanghai Railway Bureau), which can directly reach 28 provinces and cities nationwide (Xinqiao Traffic. Xinqiao Town People's Government Network)

3.3.3 Economy and Industry

Xinqiao Town Industrial Zone consists of four parks including Minyi Road Industrial Park, Miaosan Road Industrial Park, Chunshen High-tech Park and Yushen Industrial Park. The development area covers 13.5 km2.

There are 721 industrial enterprises in the town, including 503 private enterprises. The total industrial output value of 2017 exceeded 10.52 billion yuan. In 2004, it increased by 2.28 billion yuan over the previous year, an increase of 43.8%.

XinQiao comprises 20 companies with a total output value exceeding 100 million yuan, accounting for 60.8% of the total industrial output value of the town; the industrial profits reached 662 million yuan, an increase of 33.7% over the previous year. The industrial output value and profit rank first among the towns in the district. It is a thriving industrial town in Songjiang.

Xinqiao Industrial Zone features an export-oriented economy. There are more than 10 categories and around 1000 series of products, mainly electronics, mechanical equipment, light industrial products that are exported to the United States, Japan, Europe, the Middle East, and Southeast Asia. The annual foreign trade export value and foreign trade export made the first place in the towns and parks of Songjiang District. Currently, there are many factories in the park, and enterprises are clustered, forming Xinqiao's industrial structure.

With its superior geographical location, Xinqiao has attracted renowned enterprises at home and abroad to invest in the industry. Shanghai Longgong Machinery Co., Ltd., 3M Company, Fusheng Industrial (Shanghai) Co., Ltd., Shanghai Rihong Steel Co., Ltd. and other enterprises with more than 10 billion yuan invested and settled, which has led to the economic growth of XinQiao.

3.3.4 Current and Future Urban Development Plans

The government of Xinqiao Town is focusing on the local industrial mix to make better use of limited industrial land and create expansion possibilities for high-tech companies. In the 1990s, the Industrial development in the town was short-sighted, many enterprises gobbled up a large amount of land, and their production is energy-consuming, heavily polluting, and inefficient. For example, a sausage factory discharges 2 million tons of wastewater annually.

The town is now trying to phase out outdated factories and make room for sustainable development. Local authorities are more selective than before when screening new investment projects. So far, 15 biotechnology, IT and fashion companies have been allowed to stay with combined assets of 4.4 billion yuan (US$647 million).

In 2016, the town achieved an added value of

8.7 billion yuan; the total output value of the three industries was 58 billion yuan.

The town plans to buy back 33 hectares of land from existing enterprises to attract more emerging industries. Experts from the Shanghai Industrial Development Research and Appraisal Centre have been invited to set up a cost assessment and industrial planning. According to the analysis of the Xin Qiao town government, mainly production and processing based industry performance level was low in 2016. The Miao San Lu Industrial park lacked research and development functions as well as a core competitiveness of enterprises that needed to be improved (such as Superman Electric)The industry was scattered, the concentration was not high, and the leading industries were found less prominent (the average is only 3 companies per industry category, and the general equipment is only 17% of the key enterprises)The inefficient use of land was widespread, yet some high-efficient enterprises could not expand spatially. (Such as Qing Xuan Biotechnology).

The government report about the 13th Five-Year Plan from 2016 summarizes the status quo and the key problems of the Miao San Lu Industrial Park, while drawing a picture for the future, how the area could be further developed.

3.4 Miao San Lu Industrial Park - 13th Five-Year Plan

3.4.1 Introduction

The general report assesses the development status and trends of the leading industrial system and industrial layout in Qingpu District; and combines the opportunities and challenges faced by the 13th Five-Year Plan period to determine a development strategy of industrial transformation and upgrading.

On this basis, four sub-plans have been issued, and the “13th Five-Year” industrial transformation and upgrading development plan of Qingpu District has been comprehensively arranged from four aspects: industrial restructuring, advanced manufacturing, modern service industry and open economy.

3.4.2 Status Quo

104 Industrial Block: Miao San Road Industrial Zone is one of the three 104 blocks of Xinqiao Town. The other two are the Songhe River and Songjiang Industrial Zone East New Area, representing the advanced manufacturing base of Xinqiao Town and Songjiang District.

This area is declared as a National-level development zone and Miao San Road Industrial Zone is part of it, comprising 3.45km2.

Key Features

Feature 1:The industrial base is relatively strong, and the output efficiency is much lower than that of new Caohejing economic development zone.

In comparison with the surrounding industrial parks, the sales and tax revenue of Miaosan Road Industrial Zone is much higher than that of Dongjing Industrial Zone, Jiuting High-tech Park, Chedun Industrial Zone and Caohejing Songjiang District. However, 30% less than Songhe River of the Songhe District.

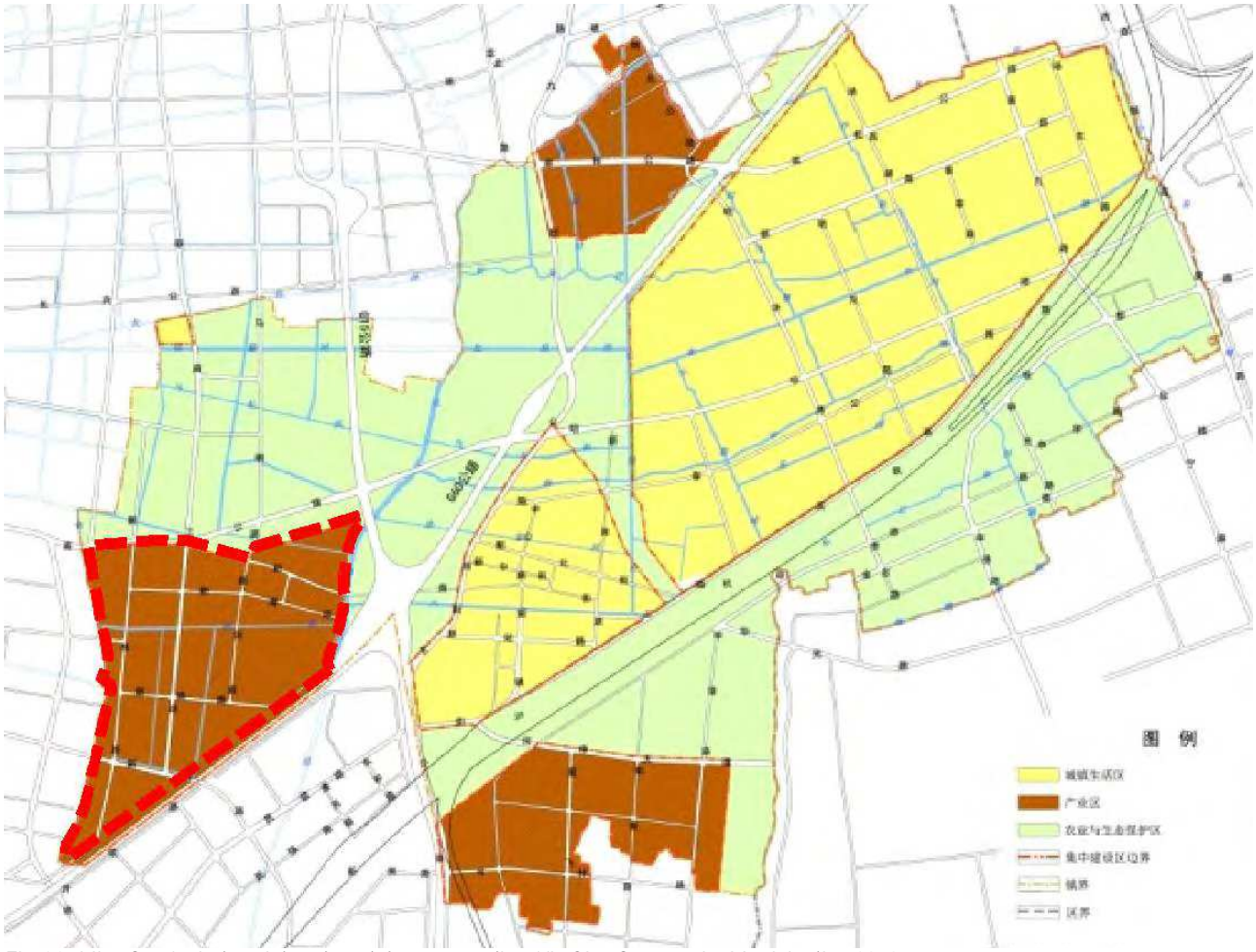


Fig. 30_Miao San Lu industrial park and the surrounding, Xin Qiao Community Municipality, 2016

Fig. 31_Satelite Image Miao San Lu, Xin Qiao Community Municipality, 2016

Feature 2: Land performance is between the level of municipal and national development zones.

From the tax rate perspective, output and tax intensity index of the Miaosan Road Industrial Zone is higher than the average level of Songjiang Industrial Zone, Songjiang District and Shanghai Municipal Development Zone, but lower than the Shanghai average, far lower than the national level. The tax intensity is half of the national development zone average.

Feature 3: The total scale and growth rate of the park's economy have continued to decline in recent years.

The total area of the Miaosan Road Industrial Zone is 344 hectares, with 280 enterprises that are mainly private. From 2011 to 2015, the total industrial output value of Miaosan Road Industrial Zone showed a downward trend of fluctuations, indicating that after the high-speed development period of the first ten years of this century, the traditional manufacturing industry gradually declined and faced the pressure of transformation and upgrading.

Park	Planned area (hectare)	Sales revenue (100 million yuan)	Taxation (100 million yuan)	Tax intensity (100 million square kilometers)	Tax rate
Luohe River Songjiang District	100	129	6.6	19.65	5.10%
Songjiang Industrial Zone	2756	736	40	2.71	5.40%
Chedun Industrial Zone	670	154	8	3.02	5.20%
Dongying Industrial Zone	567	50	3.4	1.4	6.80%
Jiuting High-Tech Park	287	58	—	—	—
Songjiang Economic and Technological Development Zone - Miaosan Road Industrial Zone	**344**	**184**	**11.4**	**5.03**	**6.20%**

Fig. 32_Source: 2015 Shanghai Development Zone Statistical Manual, 2015 Xinqiao Town Government Work Report

3.4.3 Land use

Feature 1:

The land use is mainly industrial, only a small area includes supporting service functions and unused land is scattered on the edge 85% of the built area comprises industrial use, other areas include housing, transportation, and green space.

There are 280 enterprises distributed on industrial land, involving 126 land plots.

Category	Data
Number of enterprises	280
Number of plots	126
Total accumulated fixed assets investment	4.5 billion yuan
Operating income	8.58 billion yuan
Total profit	2.8 billion yuan
Total tax	390 million yuan
Employees	12,794 people
Park area	344 ha
Enterprise footprint	206 ha
Corporate building area	853,000 sqm
FAR	0.41
Investment intensity	2.19 billion yuan / sqkm
Output intensity	4.17 billion yuan / sqkm
Tax intensity	190 million yuan / sqkm

Fig. 33_Data Source: According to the Xinqiao Industrial Zone Management Committee

Land use	Area (hectare)
Residential land (R)	9.09
Industrial land (M)	253.77
External Traffic Land (T)	6
Road Plaza Land (S)	14.09
Municipal facility land (U)	1.07
Protected green space (G2)	15.14
total built area	**299.16**
Waters (E1)	16.84
Other unused land (E9)	27.65
Total area	**343.65**

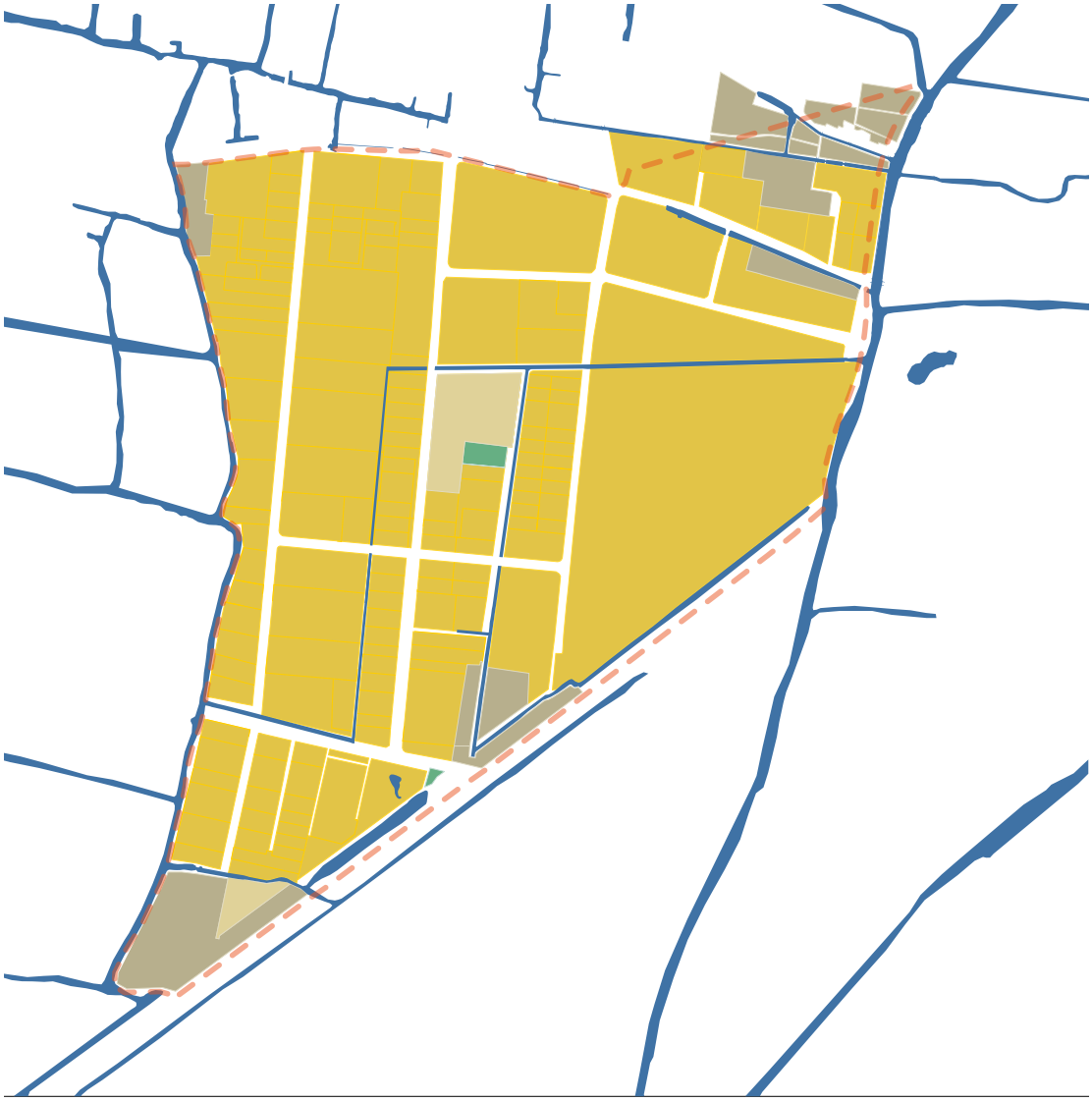
Fig. 34_Land use status figures of the park (second-level data from 2014)

Feature 2:

Low intensity of land development

There are 126 plots covering an area of 205.7 hectares with an average FAR of 0.41. Evaluating a single plot, there are only 16 parcels with an FAR of more than 0.8 and only couple plots have a FAR above 1.2, including the companies Shige Fluid and Zhuchang Precision Parts.

For the intensification of the industry, the ratio should be more than 1.2 (Hufufa, 2014) and for special industries is not less than 0.8.



Feature 3:

Key enterprises occupy 70% of the land

The park comprises 75 key enterprises, involving 43 land parcels, covering an area of 153.6 hectares, accounting for 70% of the total area.

The recognition criteria for this key enterprise are: large-scale enterprises in 2014 and 2015, high-efficiency enterprises that have been initially judged, and high-tech enterprises that have been identified.

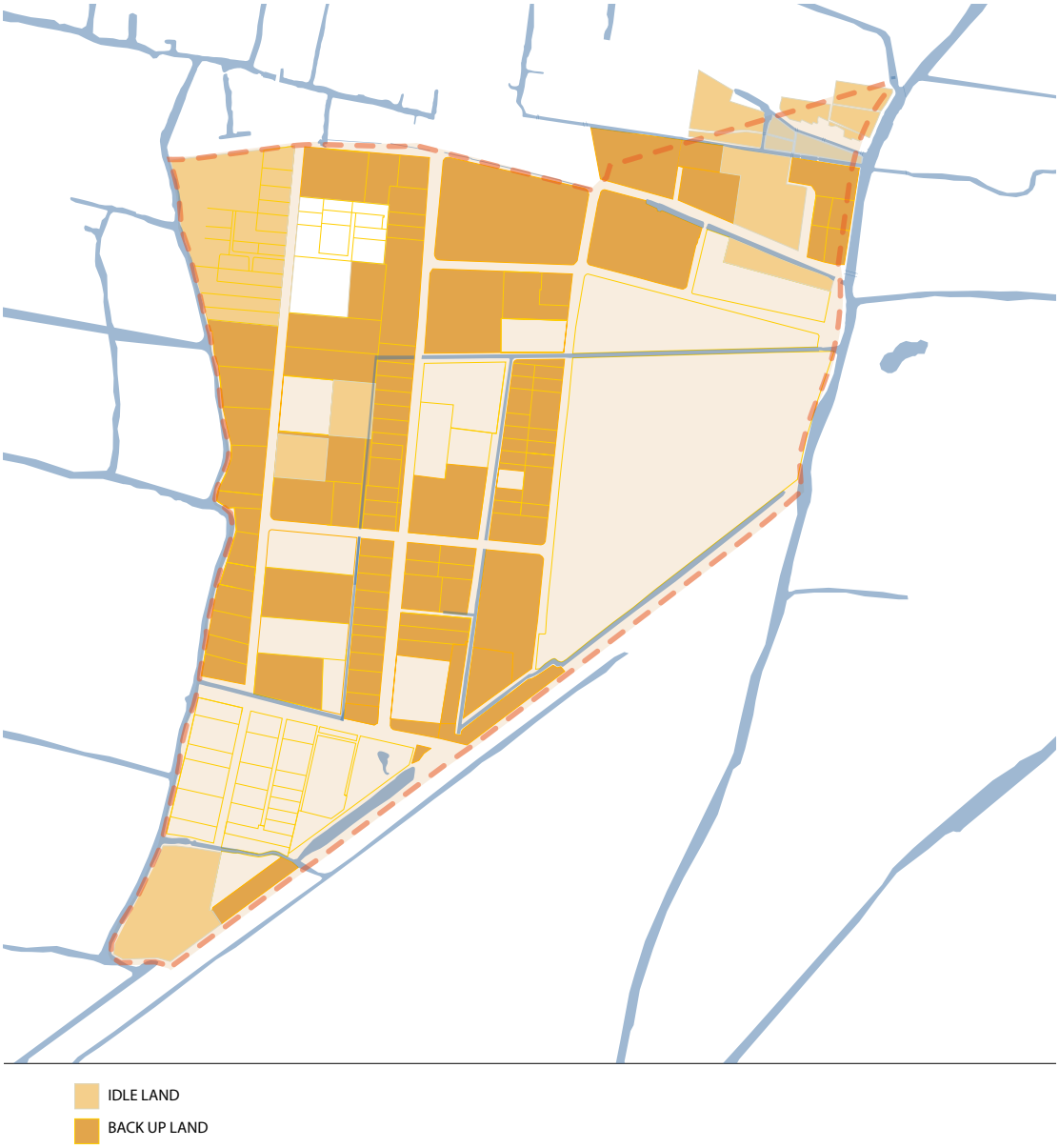


Fig. 35_Land vacancy, Xinqiao Town Government Work Report, 2015

Representing the key enterprises, the main business income of 75 key enterprises was 7.58 billion yuan in 2015, accounting for 88% of the total revenue of the park enterprises; the tax revenue was 360 million yuan, accounting for 92% of the total tax revenue of the park enterprises.

Therefore, the following will focus on this part of the industries including detailed analysis and evaluation of its industry structure, spatial distribution, land performance and other conditions.

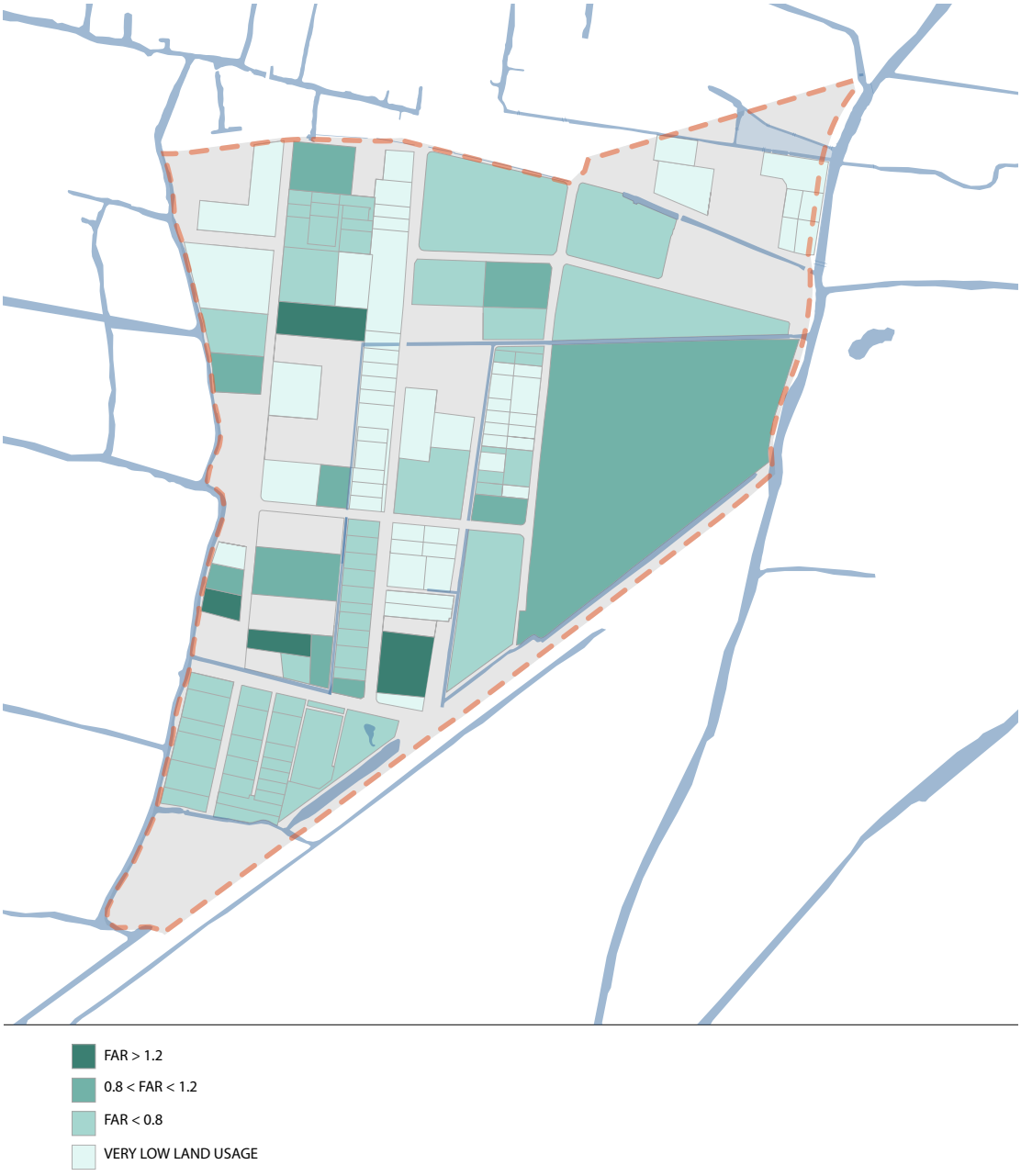


Fig. 36_ FAR of enterprises, Xinqiao Town Government Work Report, 2015

3.4.4 Key Industry Status Quo

The Industry concentration is not high, and the industry structure is dominated by general and special equipment. According to the national economic industry classification, the industry structure consists of 75 key enterprises involving 20 industry categories. Among these 65 manufacturing enterprises, involving 16 major industries, mainly general and special

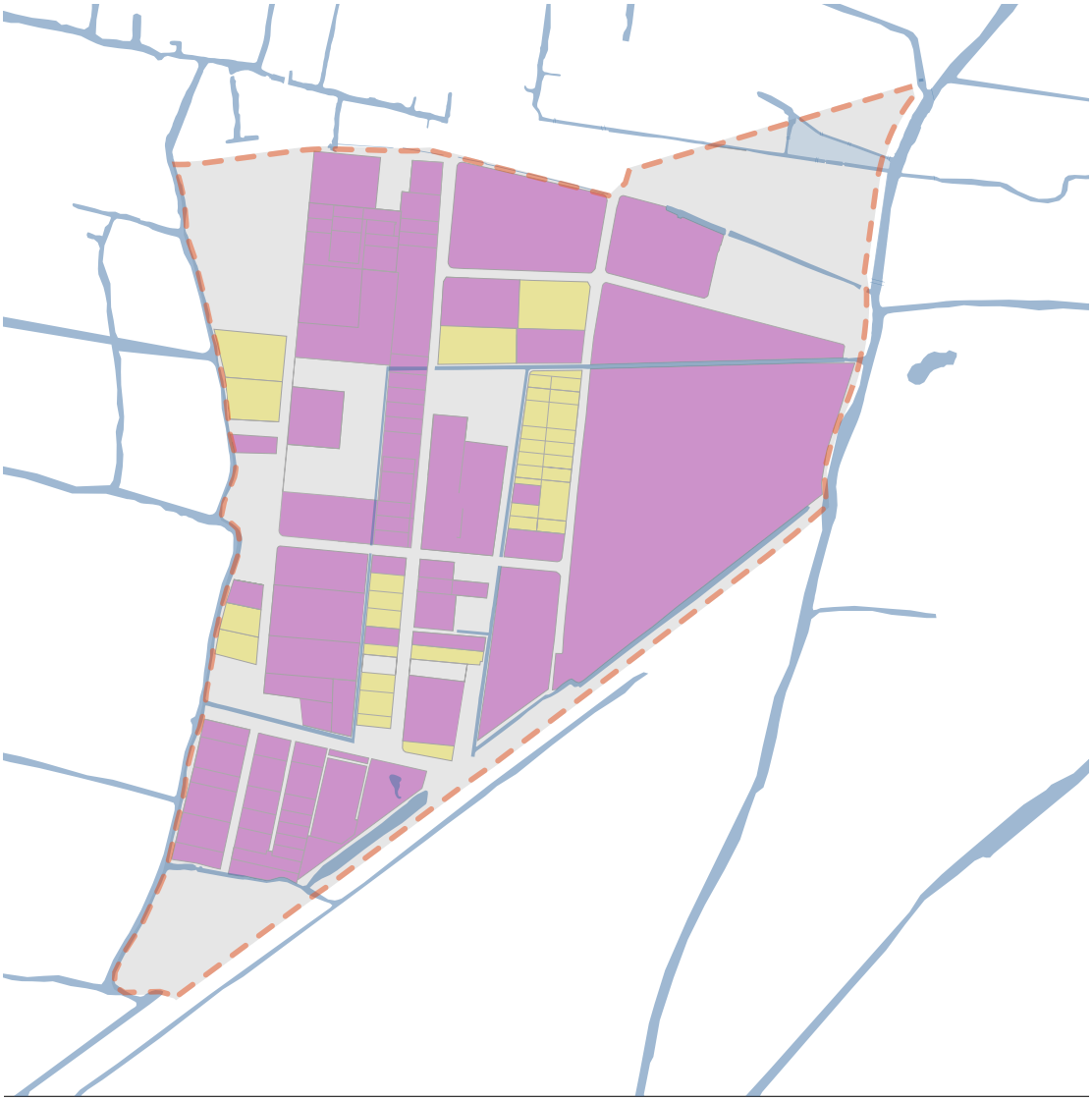


Fig. 37_Key industry, Xinqiao Town Government Work Report, 2015

equipment, metal products, rubber and plastic products, chemicals, electrical machinery, food manufacturing. Only 10 enterprises represent service industry, involving 4 major industries, namely, wholesale and retail, road transport, and professional technical services.

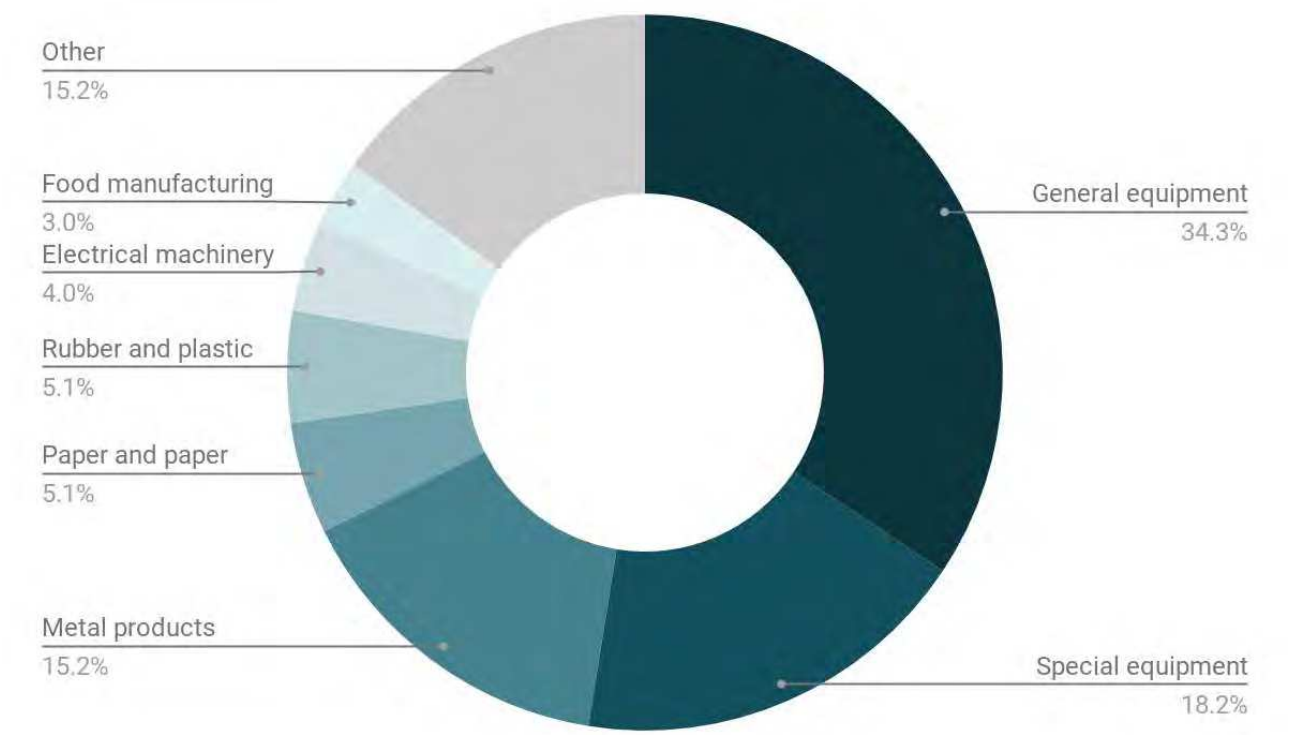


Fig. 38, 39, 40_Miao San Lu Industry, Xinqiao Town Government Work Report, 2015

Industry category name	Number of enterprises	Operating income (1 million yuan)	tax (1 million yuan)	Number of employees (person)	Floor area (m2)
General equipment manufacturing	12	2587	181.39	3141	289.844
Special equipment manufacturing	13	1401	61.58	1695	888.566
Metal products industry	4	1117	14.13	388	35.649
Paper and paper products industry	3	412	9.05	498	49.157
Rubber and plastic products industry	6	394	21.88	397	184.743
Electrical machinery and equipment manufacturing	5	324	13.35	833	94.803
Food manufacturing	4	240	14.15	198	8571
Wholesale industry	7	206	2.79	167	3744
Chemical raw materials and chemical products manufacturing	4	177	28.09	221	5405
Automotive Manufacturing	2	151	0.17	260	4000
Computer, communications and other electronic equipment manufacturing	4	104	3.41	166	9402
Chemical fiber manufacturing	1	94	1.54	300	9118
Pharmaceutical manufacturing	1	68	2.09	108	10554
Furniture manufacturing	2	67	3.2	200	14652
Textile and apparel, clothing industry	1	65	2.77	120	
Professional technical service industry	1	58	3.26		
Non-ferrous metal smelting and rolling processing industry	2	53	0.87	110	7000
Culture, education, beauty, sports and entertainment products manufacturing	1	22	0.76	35	2700
Retail industry	1	21	0	9	2050
Road transport industry	1	20	0	23	1100
total	**75**	**7581**	**364.5**	**8869**	**1.621.059**

Fig. 41_List of industry types in Miao San Lu industrial park, Xinqiao Town Government Work Report, 2015

3.4.5 Problems

There are still many problems in the park, including industrial development, transportation system, land use and spatial layout.

- *The condition of the industrial buildings is quite bad. There is an urgent need for retrofitting solutions for most of the industrial buildings.*
- *The industry's performance level is low, consisting mostly of production and processing, there is a need for more research and development functions, which would help to upgrade the area into a competitive industrial park.*
- *The industry is scattered, the concentration is not high, and the leading industries do not share one identity or branding.*
- *The inefficient use of land is widespread, but some high-efficiency enterprises cannot meet the needs of land or plant expansion (such as Qing Xuan Biotechnology).*
- *The mobility system of the park needs to be improved (external contact, frequent congestion, lack of bus connections, poor road surface conditions)*
- *The quality and image of the park needs to be improved (low greening rate, many buildings are derelict.*
- *The talent attraction is weak, and the professional service performance needs to be improved. The lack of residential, education and hospital facilities makes it more difficult to draw new residents and talents to the area.*
- *The public platform of the park is missing, and there is a lack of information communication and communication between enterprises.*

Fig. 42_ Miao San Lu industrial park, Xinqiao Town Government Work Report, 2015

Fig. 43_ Miao San Lu industrial park, Xinqiao Town Government Work Report, 2015

Fig. 44_ Miao San Lu industrial park, Xinqiao Town Government Work Report, 2015

3.4.6 Visions

According to the "Modern Tram Network Plan for Songjiang District (2013-2020)", six tram lines from T1 to T6 should be implemented, including 118 stations. Among them, the tram T2 line starting from Sanxin North Road, along Xinsongjiang Road - Renmin North Road - Meijiatun Road - Jiasong South Road - Guangfulin - XinQiao Miao San Road, and to Rongle East Road, with a total length of 12.1 Km. There are 19 stations leading to the University Station on Line 9 for the rapid transfer of the northern part of the new city.

Based on the industrial big data value creation system, the future development plans will closely follow the excellent development opportunities, make full use of the location advantages, take technological innovation as the core, and focus on the industrial development orientation centred on the development of industrial big data in the park.

- *High-end talent education is the core*
- *Focus on cutting-edge technology and research*
- *Tools and model development based*
- *Applied talent training is in demand*
- *Other services such as inspection and testing are guaranteed*
- *Supported by industrial big data applications and practices*

Fig. 45_ Miao San Lu connectivity and public transport, Xinqiao Town Government Work Report, 2015

4

CASE STUDIES

the global topic and tendencies of urban regeneration processes is contextulised in the previous chapter, which leads to 4 case studies presenting a variety of concepts and strategies in different scales and cities.

4 Case Studies

This chapter will follow up with the analysis of the case studies using the tools from the literature review and involving the findings from the local analysis.

4.1 Koopmansstad

Site area: 6.8 ha

Former use: Brewery

Completion: 2006

Architects: JHK Architecten, West 8

Approach

Urban regeneration through Industrial Retrofitting

Building Strategy

Vertical arrangement of industrial functions

Environment strategy

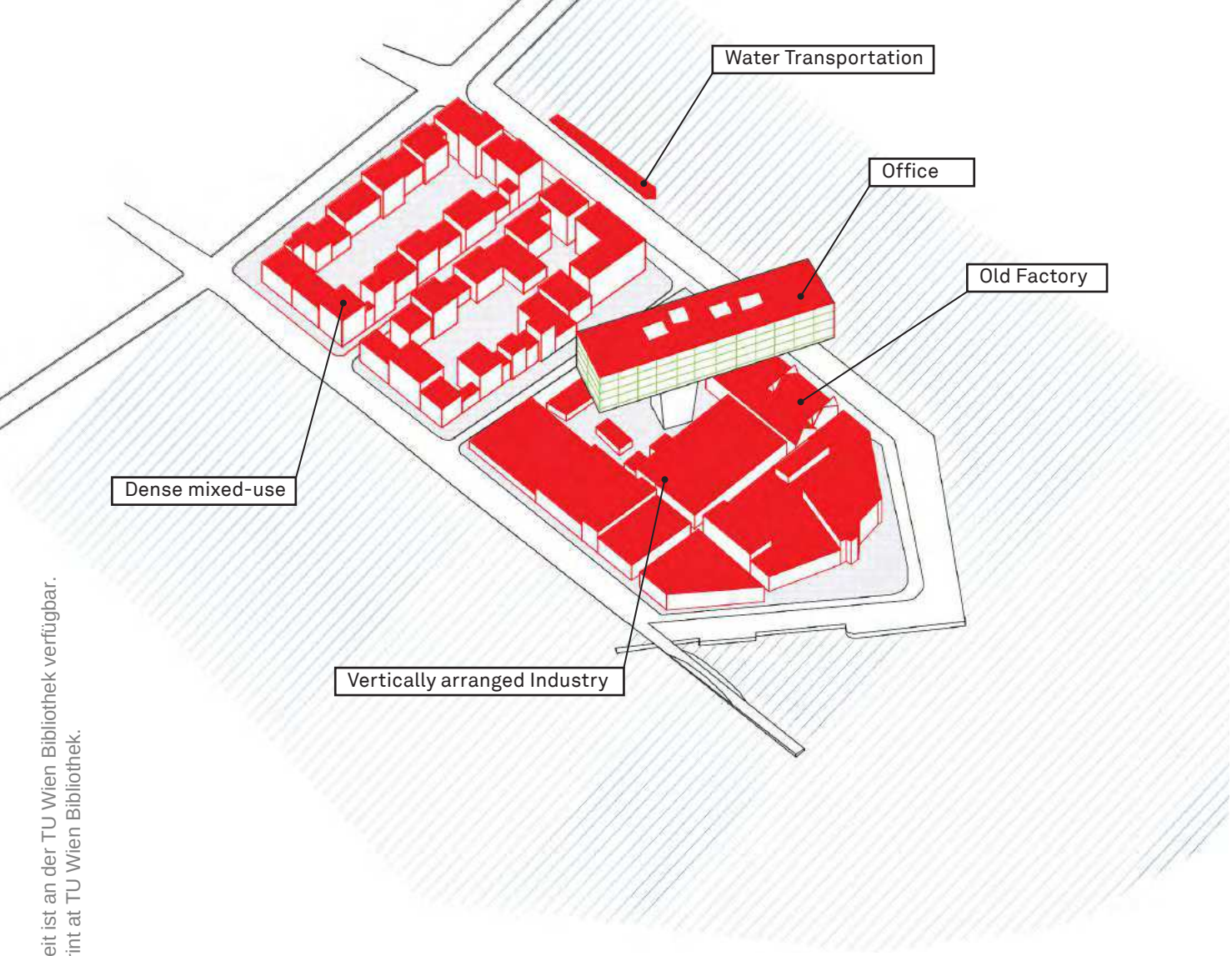
applied state of the art techniques to reduce the environmental impact of the plant and increase the compatibility of the industrial site with urban functions.

Mobility Strategy

water transportation

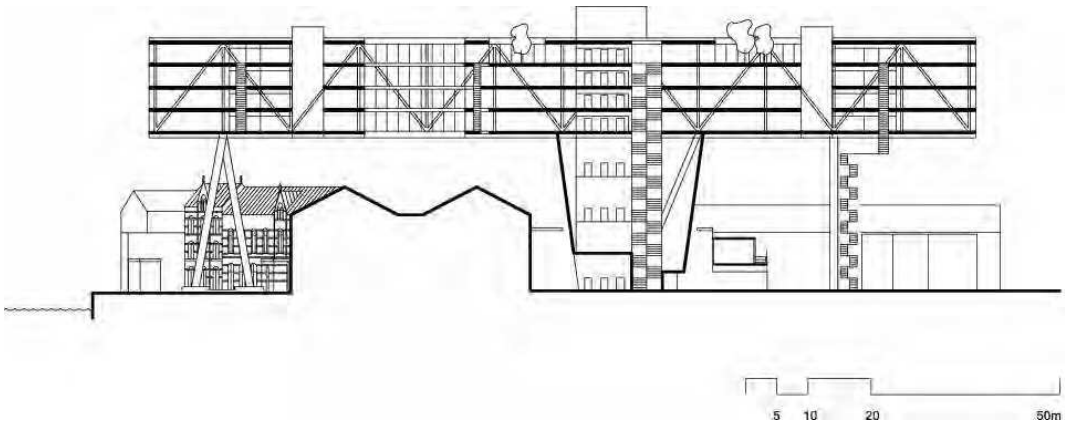
Tools

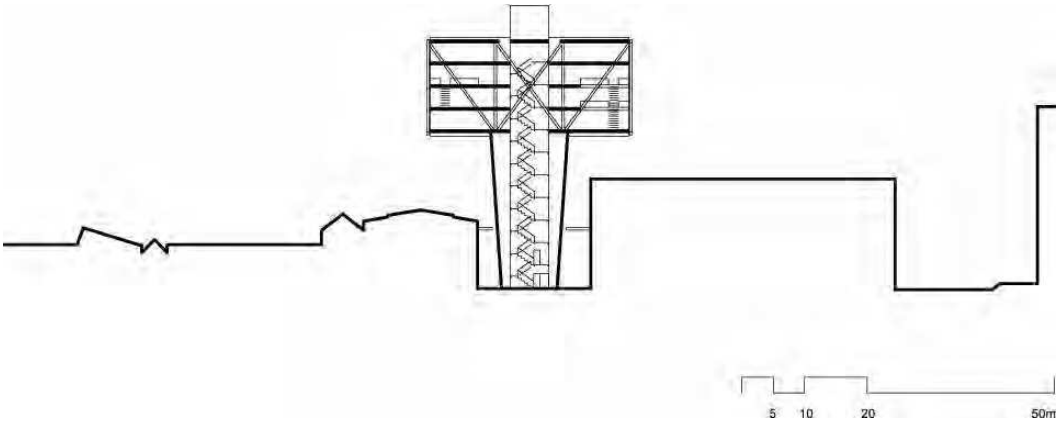
Stacking, Retrofitting with state of the art techniques



After the Dutch brewery “Oranjeboom” had to close its plant in a central Rotterdam location facing the River Maas bank in 1990, the food company Unilever decided to move its Dutch headquarters there. The architects in charge with the additional building, JHK Architecten in collaboration with West 8 came up with an unusual approach to leave the historic plant from 1891 untouched by lifting the new building so that it floats above the factory’s roof. By assembling the structure on a nearby site and using the adjacent River Maas as the main transportation route to the site, the old factory could maintain its operations 24h every single day during the construction process.

Another revolutionary approach was the vertical arrangement of industrial functions, which reverses the horizontal layout of industrial plants common since the early 20th century. The resulting increased density combined with a couple of applied state of the art techniques to reduce the environmental impact of the plant increases the compatibility of an industrial site with typical downtown functions such as residential or commercial units. That allowed the planners to introduce 160 new housing units right next to the site and demonstrate that industry today can be reintegrated in dense urban mixed-use environments.





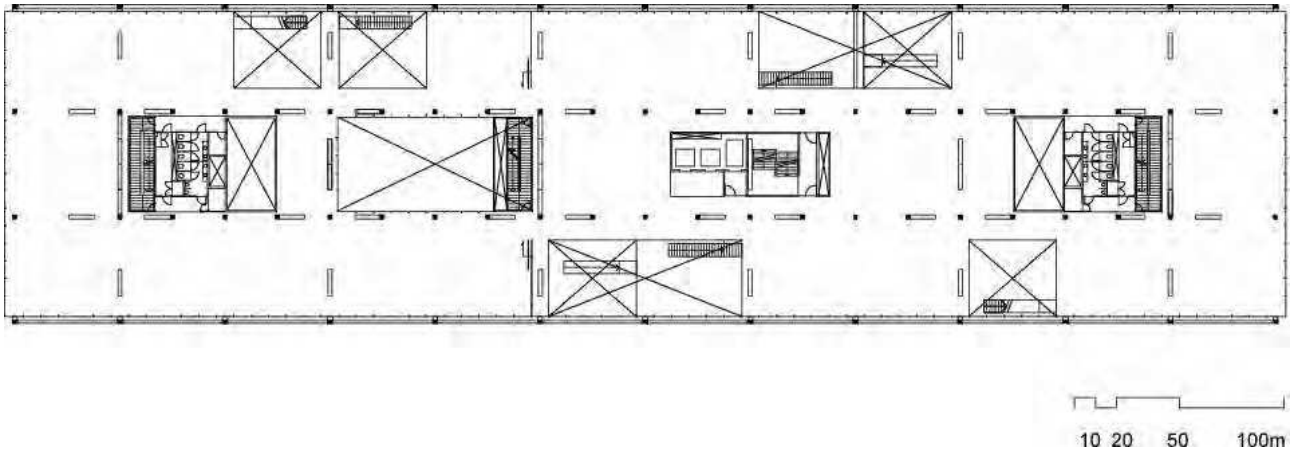


Fig. 46, 47, 48, 49_Unilever building

Fig.50 _Unilever building longitudinal

4.2 Landschaftspark Duisburg-Nord

Site area: 180ha

Former use: coal + steel production plant

Completion: 2002

Architects: Latz + Partner

Approach

Urban transformation through Industrial Reuse

Building Strategy

Site was turned into a park, no additional buildings

Environment strategy

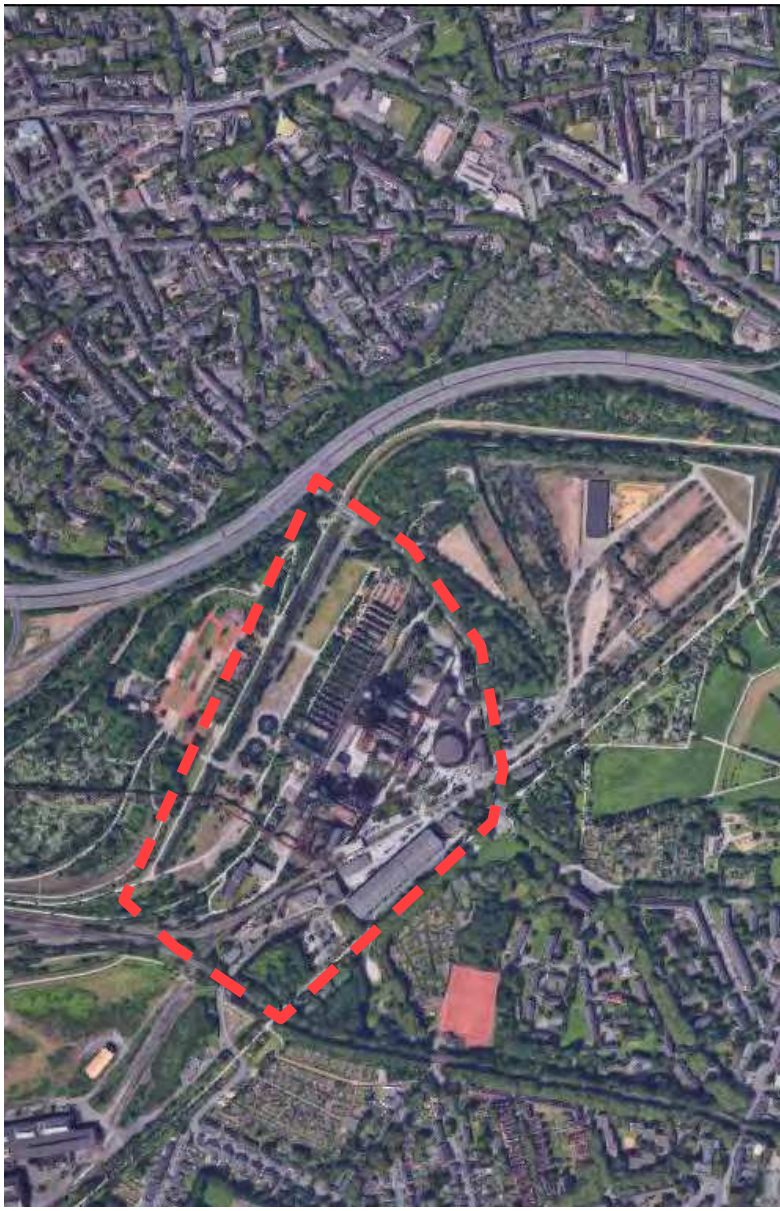
decontaminating plants as a remedy for the contaminated soil, rainwater collection system

Mobility Strategy

car-less traffic, additional bus and tram stops, bike hire and e-bike charging stations

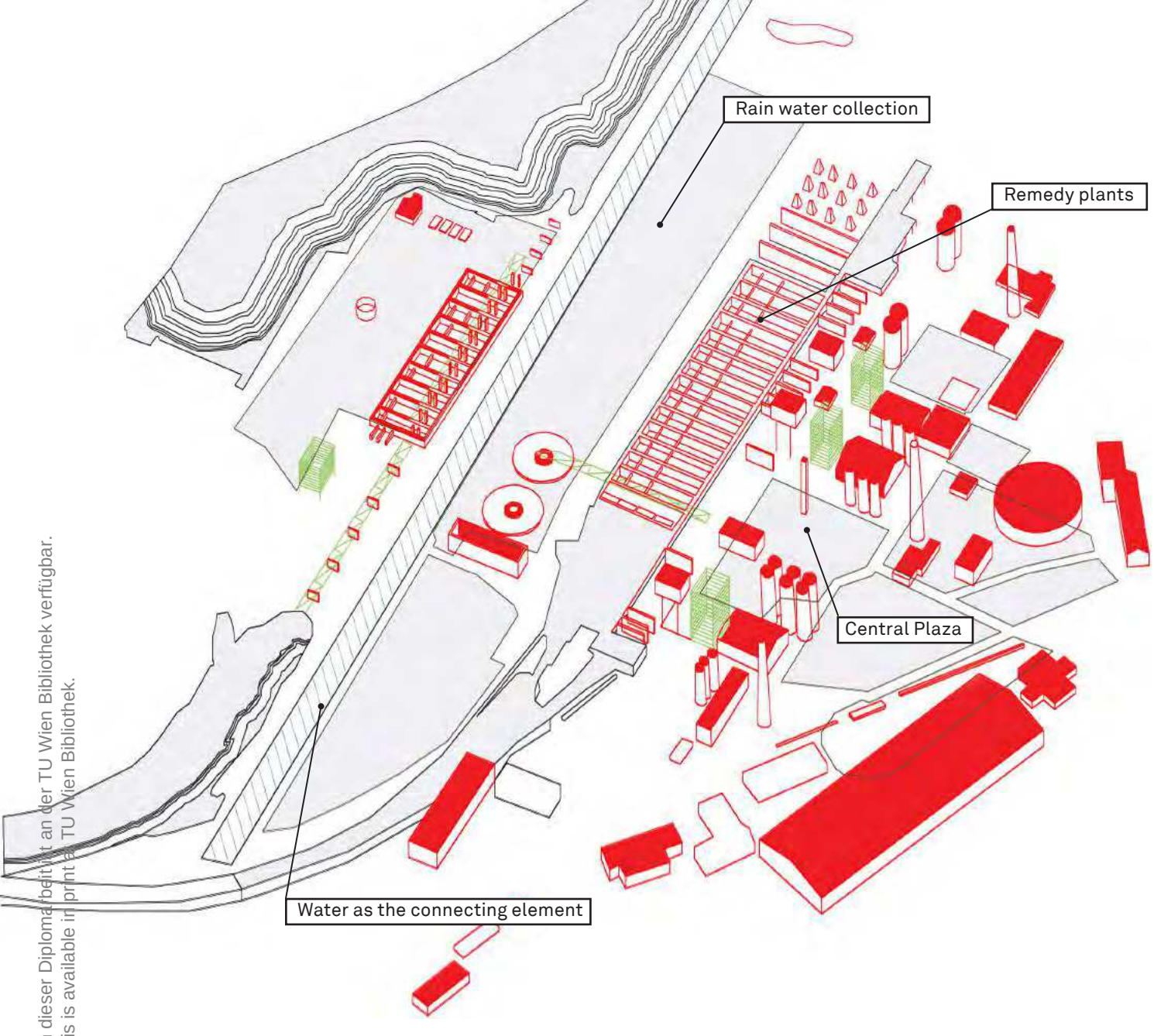
Tools

Reuse, Preservation, Water



Duisburg Landscape Park is part of a way more prominent conglomerate of parks and recreation spaces in the Ruhr area, the IBA Emscher Park. In 1989, as a result of the International Architecture Exhibition (IBA), a concept for the reuse the numerous redundant coal and steel plants was put into place. Its approach was to acknowledge the area's industrial past and preserve the plants and sites as far as possible while transforming them into cultural and recreational public spaces.

For the Landscape Park Duisburg North, office Latz und Partner convinced the jury with an approach, which proposed to preserve the site as an entity with even its contaminated soil by slowly remediating it using plants with decontaminating abilities. A complex rainwater collection system ensures that the site contains water even in drier periods of the year, as water is an essential feature in the design, used for creating recreation spaces and to accompanying bike and hiking trails. Unlike many other industrial redevelopments, the site was turned



into a park, which means that no buildings were added.

The former plants are used to host cultural events or are reused for plenty of different sports activities such as diving, climbing, or skating. The park is also famous for hiking and mountain biking. Apart from public amenities, offices with built-in park functions can be found in former industrial buildings.

The whole site, while disconnecting parts of the city when it was still operating and not publicly accessible, today, with its numerous routes and trials works as a hub for the city. Its accessibility, especially for car-less traffic, was improved by adding bus and tram stops, bikes can be hired in the park and e-bike charging stations are provided.

Fig. 51_Main courtyard

Fig. 52_Remedy plants and walkways

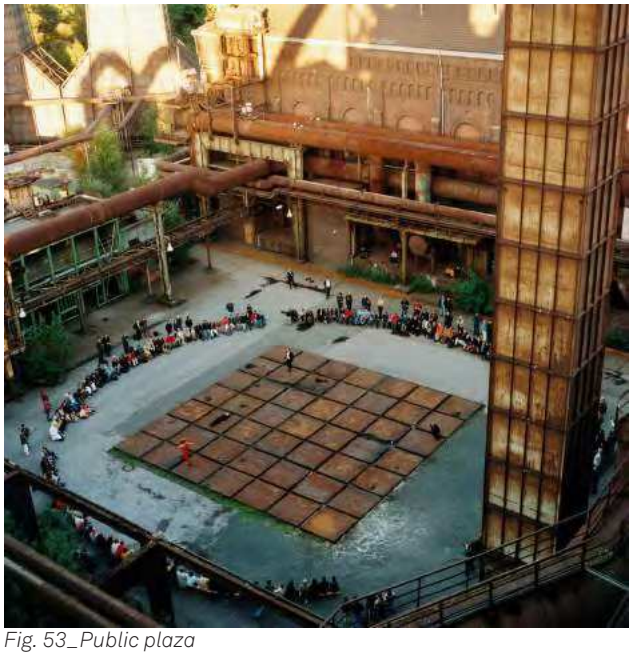


Fig. 53_Public plaza

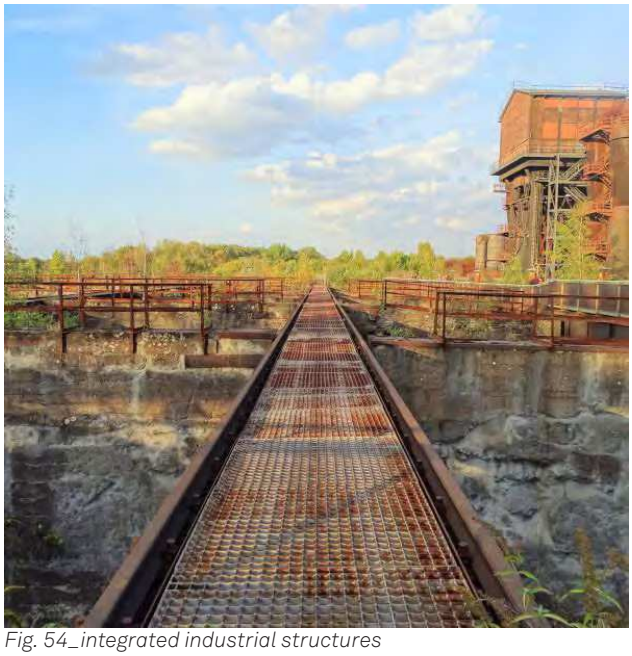


Fig. 54_integrated industrial structures

Fig. 55_Kids play area with water

Fig. 56_ Industrial water features

Fig. 57_Climbing area on the old industry structure

Fig. 58_Festival and event space

4.3 Zhongshang Shipyard Park

Site area: 11ha

Former use: Shipyard

Completion: 2001

Architects: Kongjian Yu, Wei Pang, Zhengzheng Huang, Qingyuan Qiu, Shihong Lin

Approach

Urban Transformation through Industrial Reuse

Building Strategy

Increased compatibility with the residential and increased permeability with a blurred boundary

Environment strategy

protection of existing plants and the use of local vegetation types, levated platforms and paths as connectors to the water

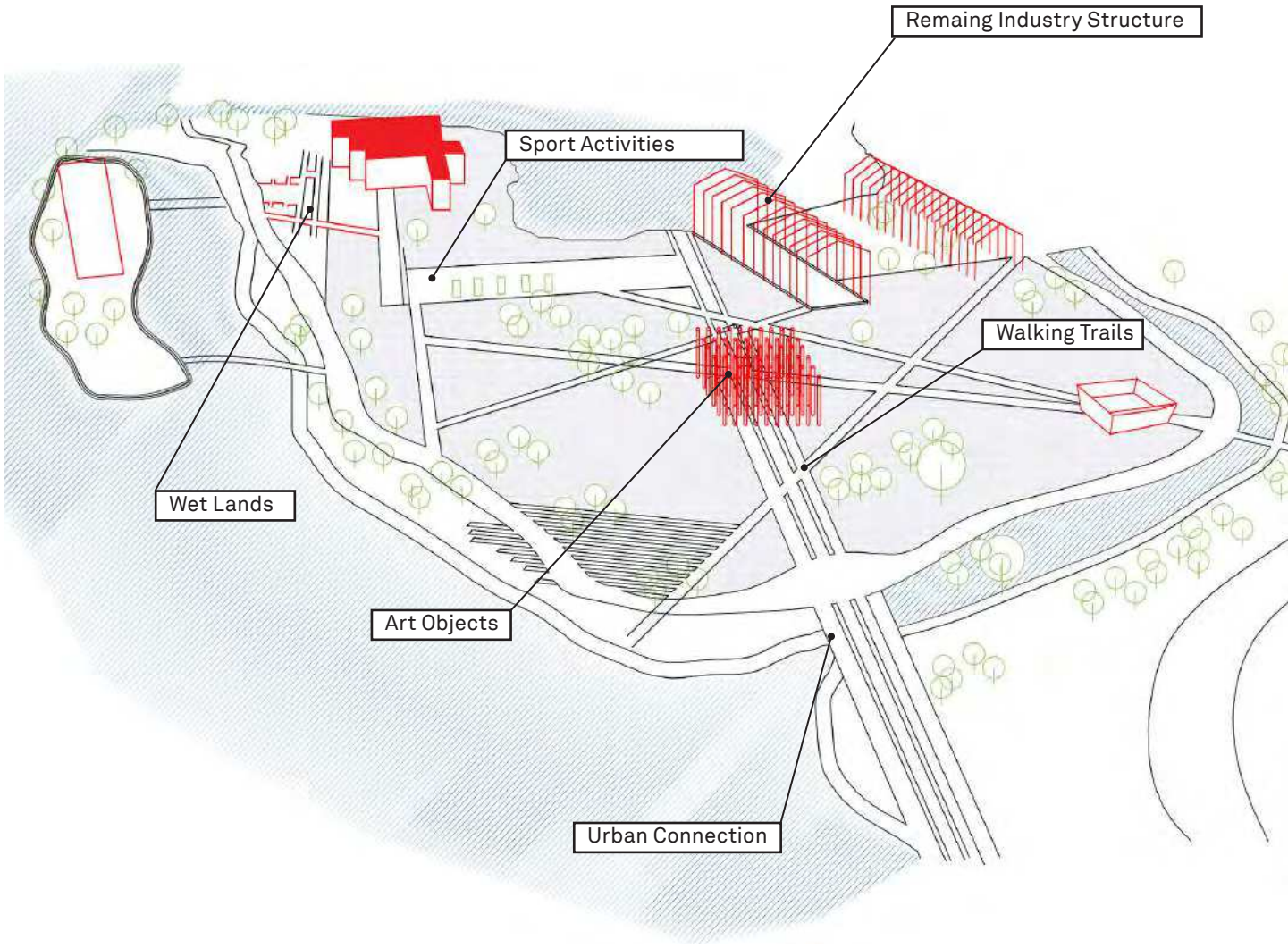
Mobility Strategy

Routes follow a functional paradigm as connectors between essential components of the park

Tools

Preservation, Modification, Addition of urban functions

Zhongshan Shipyard Park in the Guangdong Province was the first project in China to transform a redundant industrial site into a recreational space. The Shipyard, constructed in the middle of the 20th century following Mao Zedong's vision of workplaces as overarching social institutions used to be the biggest employer in the Zhongshan District. Instead of simply erasing the Shipyard after its closure in the 1990s, when Guangdong's focus shifted from heavy industry to electronics, the leading designer in charge, Kongjian Yu, was able to convince the authorities of the Shipyard's historical value for the district. His concept was to transform the site into a recreational space for residents but also tourists, commemorating communist times that the Shipyard witnessed and paying tribute to many former employees still living in the area.



Yu's approach was based on three key-factors to transform the site into a place for historical and environmental education, namely preservation, modification and addition of new elements. Instead of trying to preserve the existing buildings as far as possible, the design team deliberately decided to remove a fair amount of built structure to increase its compatibility with the mostly residential neighbourhood. Urban facilities were extended into the park in order to blur the boundary between the park and its surroundings. This improved the linkage between the park and the context.

For the landscape design, a purely environmental friendly approach was chosen, which included the protection of existing plants and the use of local vegetation types only. Physical additions, such as an open, red steel box are used to commemorate the implications of socialist times the site witnessed. Connected to the Qijiang River, the designers had to deal with fluctuating water levels, which resulted in elevated platforms and paths and reflects the site's natural and historical bond with water. Routes through the park follow a functional paradigm, serving as connectors between essential components within the park and linking the park to its context.

Fig. 59_ old industrial remainings

Fig. 60_ Aerial view

Fig. 61_ Reuse of the industrial structures

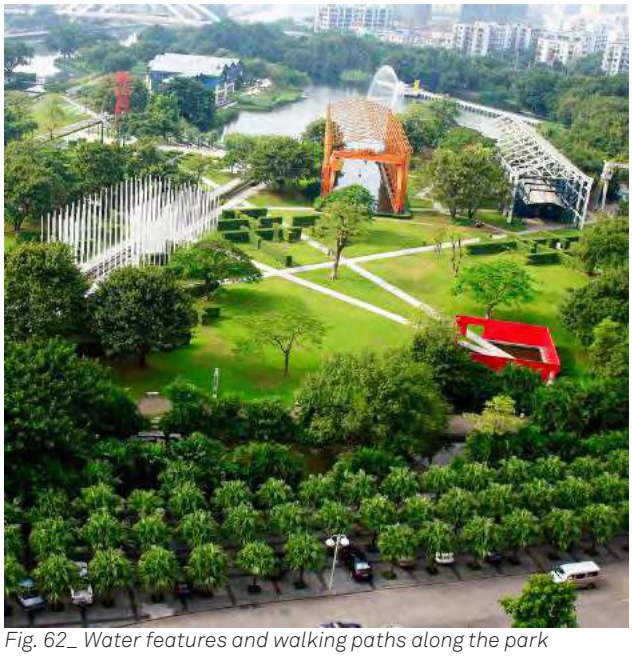


Fig. 62_ Water features and walking paths along the park

Fig. 63_ Areas for recreational activites

Fig. 64_scenic views in combination with water

Fig. 65_ Wetlands and nurseries

Fig. 66_ Lotus plants between the paths

4.4 Lyon Confluence

Site area: 150ha

Former use: Industrial activities, a river port, a wholesale food market and prisons

Completion: Phase 1 2018, Phase 2 2025

Masterplan Architects: Herzog & de Meuron, Michel Desvigne

Approach

Urban Regeneration - “smart city”

improve the neighbourhood’s quality and enhance its sustainability

Building Strategy

renewal of existing housing stock, radical mixed-use

Environment strategy

generation of renewable energy, zero-carbon objective

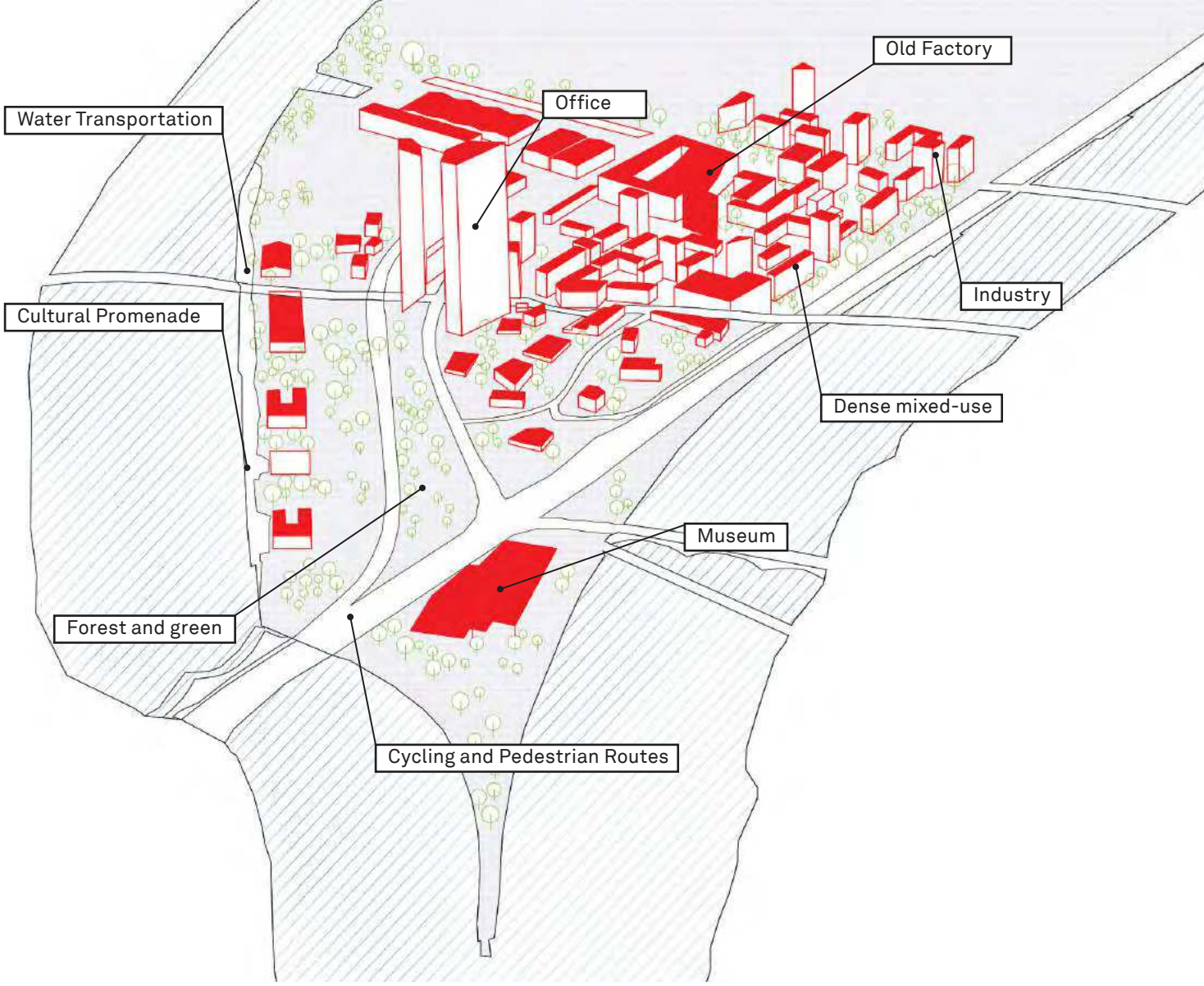
Mobility Strategy

“green mobility”, mostly pedestrian and cyclist traffic, a network of extensive public transport, new bridges, a river shuttle

Tools

Increase of residents and job and maintaining or retrofitting the existing amenities, Reuse

The redevelopment of “Lyon Confluence”, situated on a former river port site in proximity to Lyon’s centre, started in 2002 according to the so-called “smart city” criteria, which can be summarized as “Extensive energetic renewal of existing housing stock with [...] multi-faceted ownership structures, user-centred sustainable mobility solutions, innovative business models, generation of renewable energy and multiple use of infrastructure through the use of information- and communication technology” (B. Gaiddon,



J. Girardi, H.M. Neumann, K. Thielen, E. Vignali, W. Wendt, 2016). The main aim was to improve the neighbourhood's quality and enhance its sustainability.

Lyon Confluence, which was (and still is being) developed in two major phases, can be described as an example of radical mixed-use, creating a "city for everyone" (A.L. Fogliani, 2015). That implies a drastic increase of residents and jobs in the district while maintaining or retrofitting already existing amenities in the area. These include a reactivated wholefood market and old prisons, which were reused to host educational institutions. The concept of mixed-use helped to trigger innovation and prosper economic wealth in Lyon Confluence. By the end of the project, 25,000 new jobs, as well as 16,000 new residents (of which 23% are accommodated in social housing), are targeted by the planners. Landmark buildings such as the "Musée des Confluences" (designed by Coop Himmelblau) at the site's south entry or the mixed-use building called the "Orange Cube" (by Jakob + MacFarlane) as well as the maintained nautical character give identity to the district and thus, make it more attractive for new inhabitants.

An overarching architectural concept developed for the whole site based on high energy efficiency and social compatibility was imposed on the broad range of architects involved in the project,

from renowned international offices to small local firms. In order to achieve a “Zero Carbon” objective by 2030, the designers were obliged to apply principles of passive solar architecture and to provide the buildings with electricity and a heating system gained from a cogeneration plant, explicitly erected for the district using wood gasification as a natural, local and CO2 neutral source of energy.

Not only the architectural guidelines but also the mobility concept is based on low emissive means of transport. It encourages the so-called “green mobility”, mostly pedestrian and cyclist traffic, by providing protected routes through parks and boulevards supported by a network of extensive public transport. A couple of new bridges were added to the site surrounded by the rivers Saône and Rhône in order to enhance it is connectivity to neighbouring districts. It is emphasizing that island-like character of Lyon Confluence, a river shuttle was added as an alternative means of transport. Moreover, the river Saône bank is activated by a vast promenade and recreational activities. The river Rhône bank, today still separated from the site through the big highway A7, will be made accessible by diverting the highway traffic and transforming the space into a boulevard.

Fig. 68_Aerial view

Fig. 69_ iconic residential tower by jean nouvel

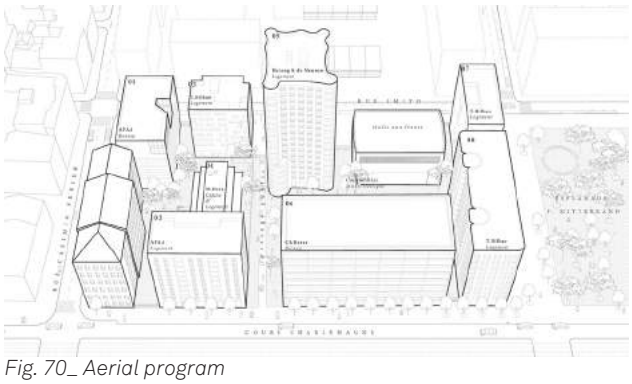


Fig. 70_ Aerial program

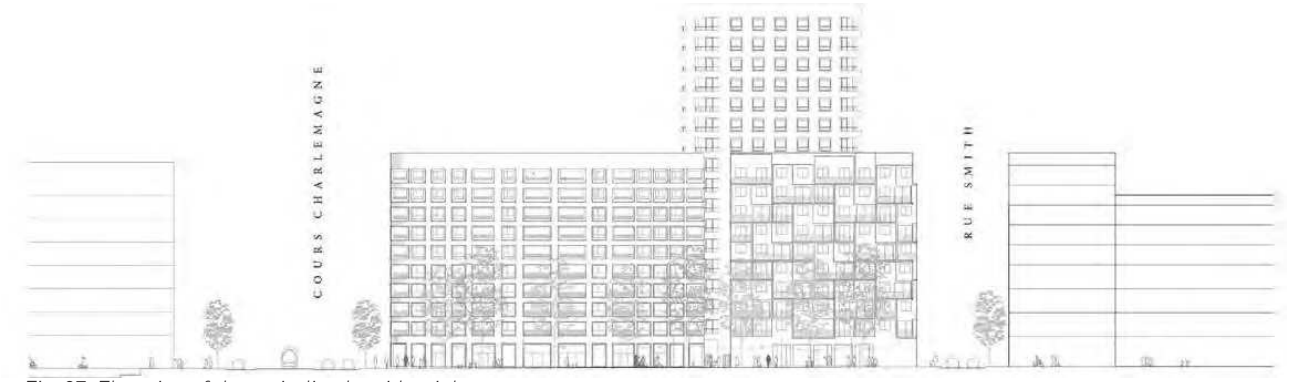


Fig. 67_Elevation of the revitalized residential

Fig. 71_centro-commerciale-la.jpg

Fig. 72_RiverSideZoom.jpg

Fig. 73_Existing Industry

Fig. 74_Water front residential

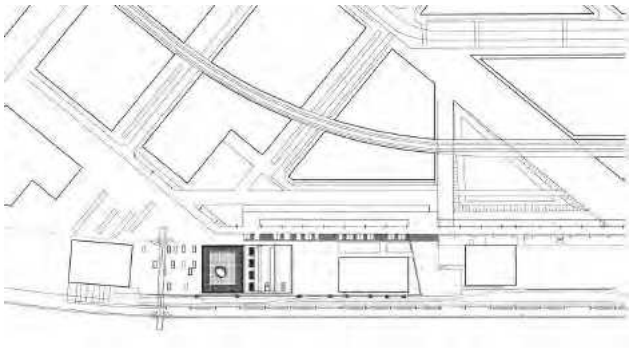


Fig. 75_Plan of the orange

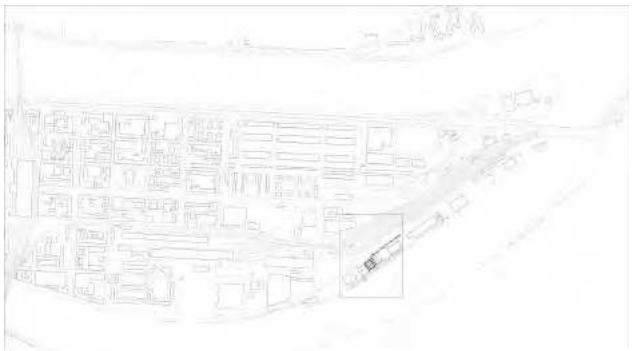


Fig. 76_Masterplan

Fig. 77_River Promenade

Fig. 78_ Social public space by the river

4.5 Resume

Projects	Environment	Mobility	Function	Physical Structure	Design Rules / Approach
Koopmansstad 2006	reduce the environmental impact of the plant	River Maas as the main transportation route	compatibility of an industrial site with residential or commercial functions	vertical arrangement of industrial functions, dense urban mixed-use	increased density, state of the art techniques
Landschaftspark Duisburg-Nord 2002	contaminated soil by slowly remediating it using plants with decontaminating abilities	bike and hiking trails, e-bike charging stations, bike rental, additional bus stations	Park for cultural and recreational public activities	reuse of the redundant coal and steel plants	acknowledge the area's industrial past and preserve the plants
Zhongshang Shipyard Park 2001	protection of existing plants and the use of local vegetation types only	elevated platforms and paths and reflects the site's natural and historical bond with water	recreational space for residents but also tourists, commemorating communist times	removal of most the built structures	Shipyard's historical value for the district, historical and environmental education, preservation, modification and addition of new elements
Lyon Confluence 2018	electricity and a heating system gained from a cogeneration plant, CO2 neutral source of energy	low emissive means of transport, "green mobility", mostly pedestrian and cyclist traffic, protected routes through parks and boulevards supported by a network of extensive public transport, river shuttle	radical mixed-use, 23% social housing, Landmark buildings, river Saône bank activation by a vast promenade and recreational activities	maintaining and retrofitting already existing amenities, reactivated wholefood market and old prisons, passive solar architecture, new bridges to enhance it is connectivity to neighbouring districts	"smart city", improve the neighbourhood's quality and enhance its sustainability, creating a "city for everyone", maintained nautical character give identity, high energy efficiency and social compatibility, "Zero Carbon"

5

DESIGN

the findings and strategies gained from previous chapters will be further developed to set up urban design guidelines and regeneration strategies, which are applied on an industrial site in the periphery of Shanghai.

5.1 Site Analysis

Functions

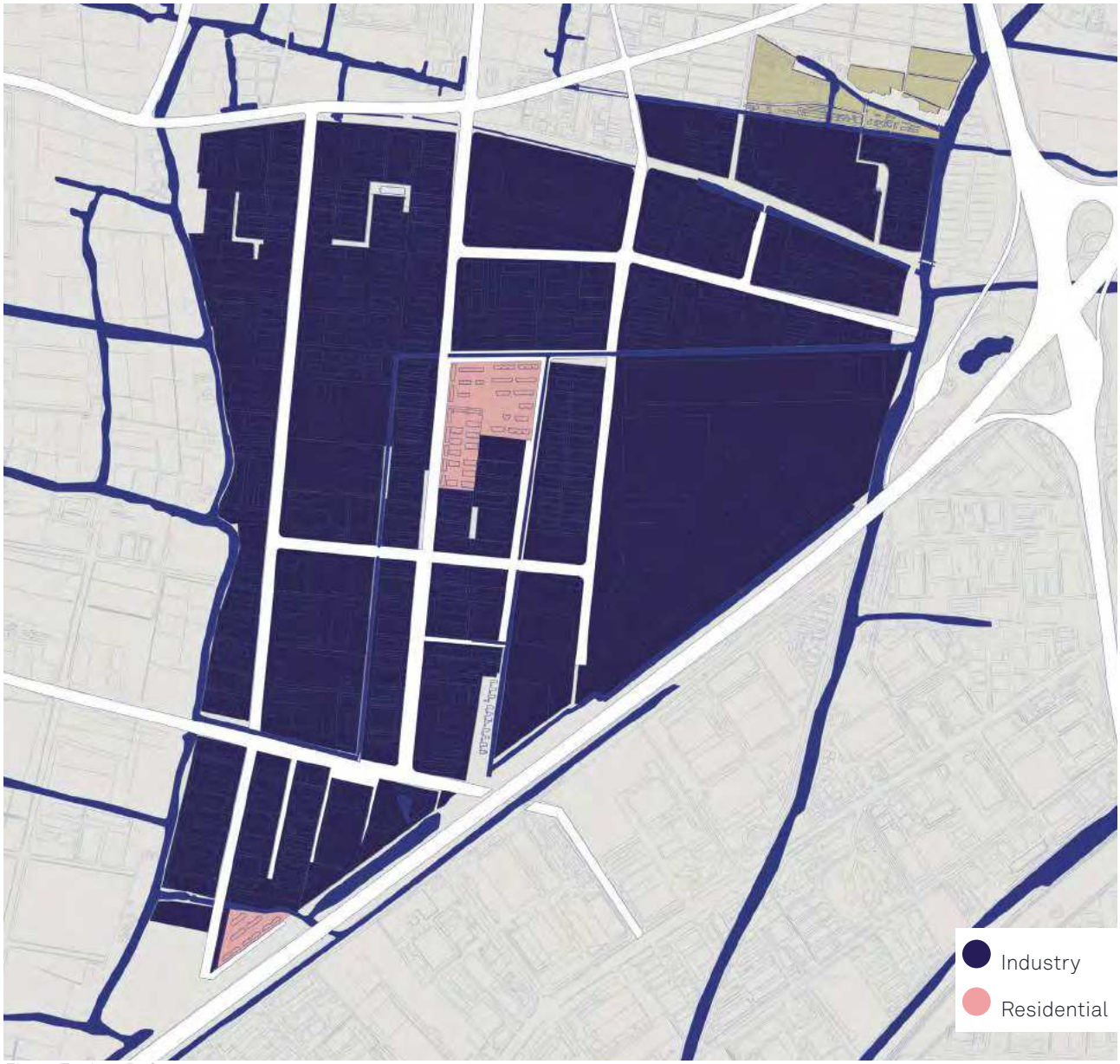


Fig. 1_Zoning_Before.png

Miao San Lu Industrial Park comprises an area of 87% Industry and only two small areas of residential, that is equivalent to 9.09 ha.

Floor Area Ratio

Fig. 1_FAR_before.png

The industrial land varies in floor area ratio from 0.36 to 2.35. The average FAR is 0.8, which is very low for an industrial park.

Building Heights

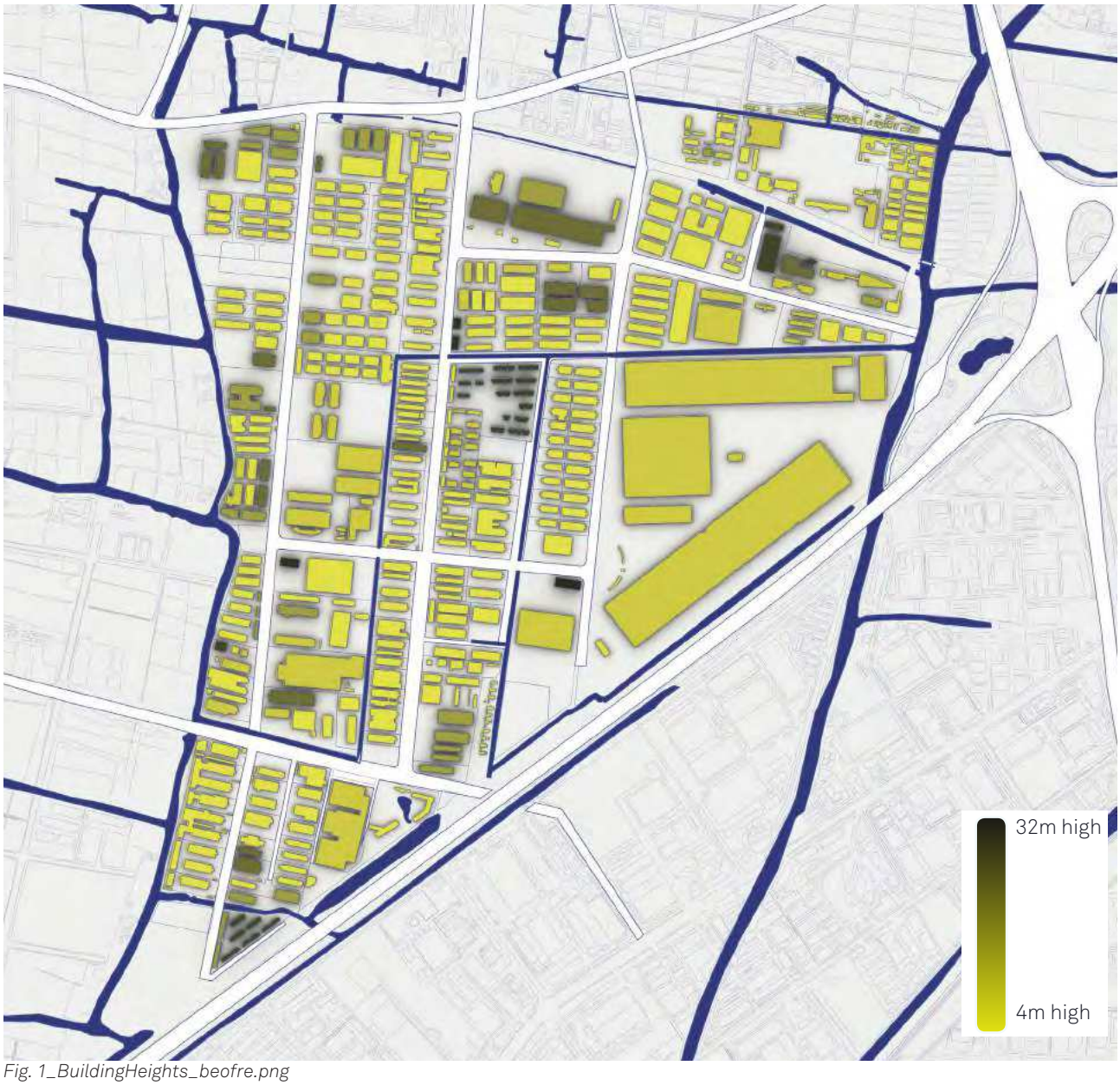


Fig. 1_BuildingHeights_beofre.png

The mix of industrial and residential buildings of the area ranges from 2 floors to 8 Floors. Large number of the buildings are low rise structures.

State of the Buildings

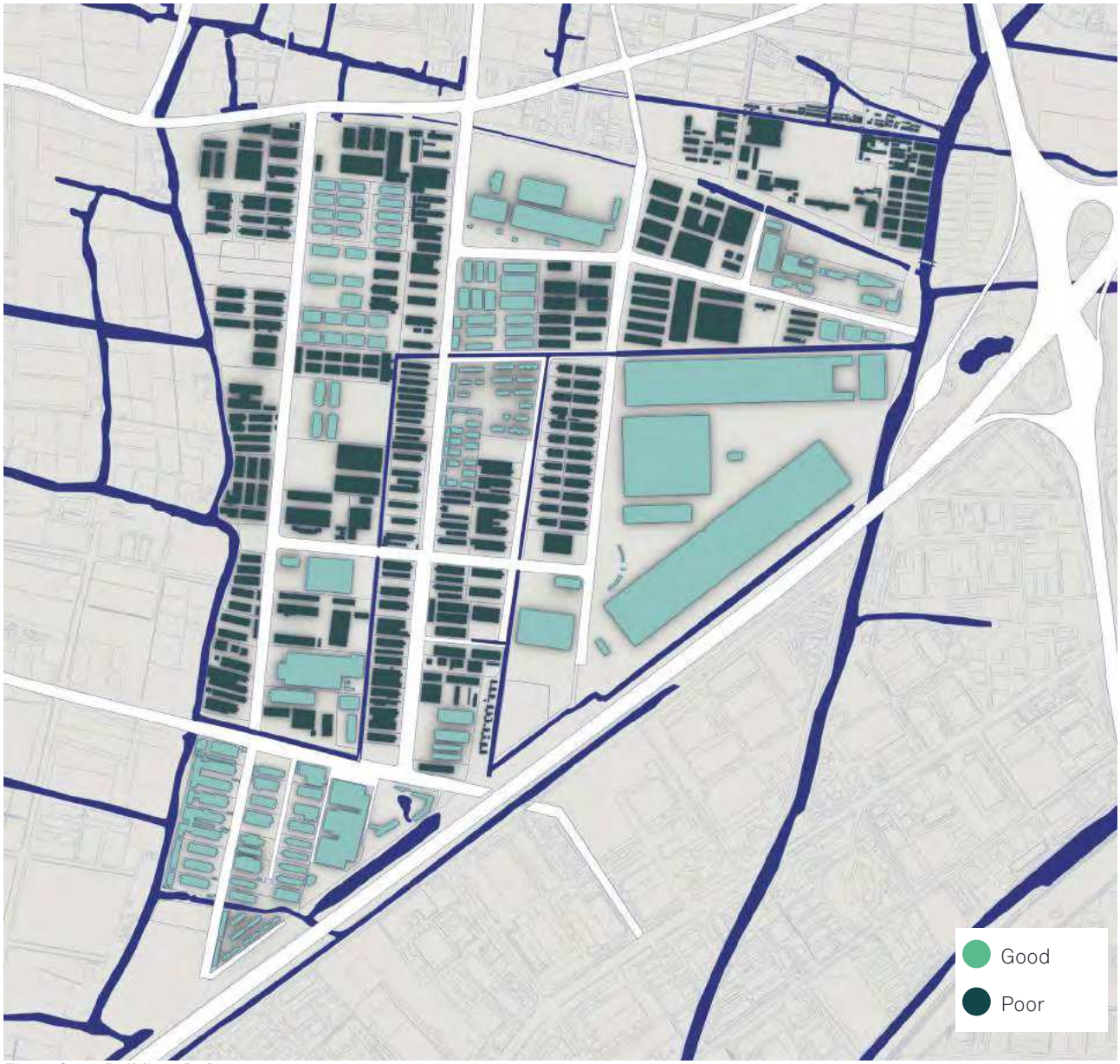


Fig. 1_StateBuilding_Before.png

Most of the structures in the area were built in 2006 or earlier, yet the average condition of the buildings is quite poor.

Industry Types

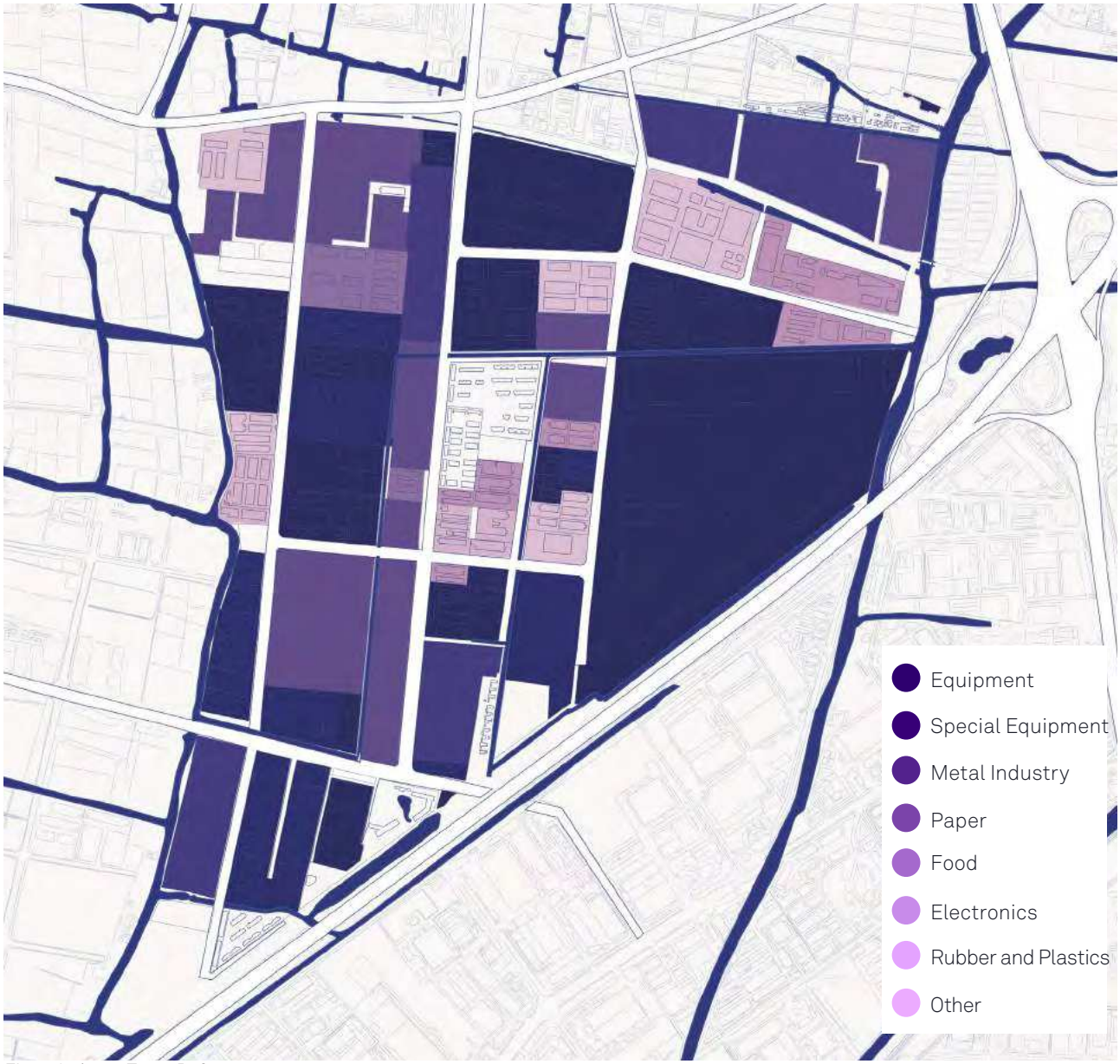


Fig. 1_IndustryType_Before.png

There is a clear majority in industry types including a variety of equipment manufacturing. The focus is production and manufacturing, including heavy industry.

High and Low Tech Industries

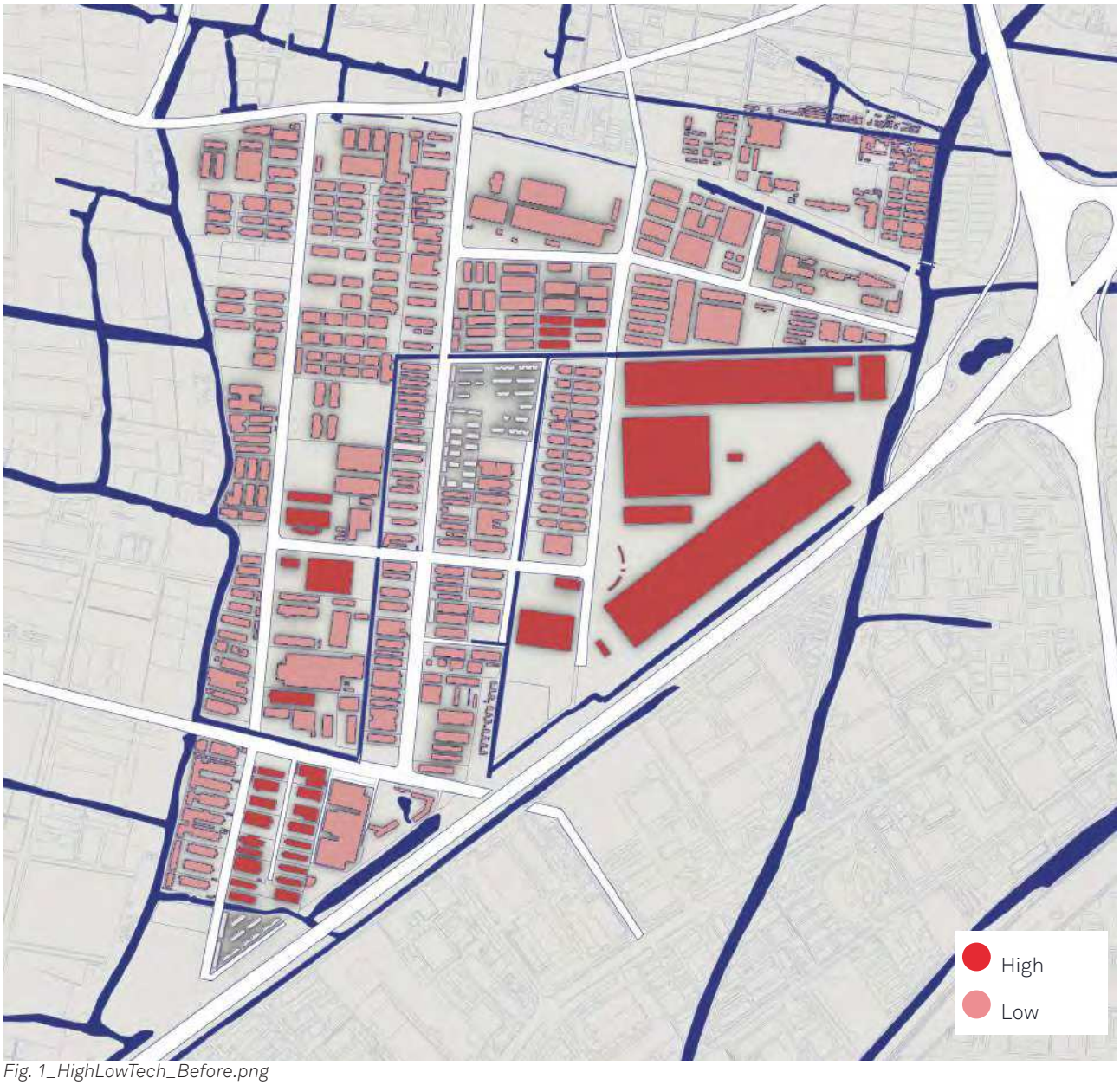


Fig. 1_HighLowTech_Before.png

The industry types can also be differentiated as high and low tech industry, which is quite essential for future urban development plans. Miao San Lu industrial Park includes mainly low tech industry and only 'medium' high tech industry types.

Economic Value

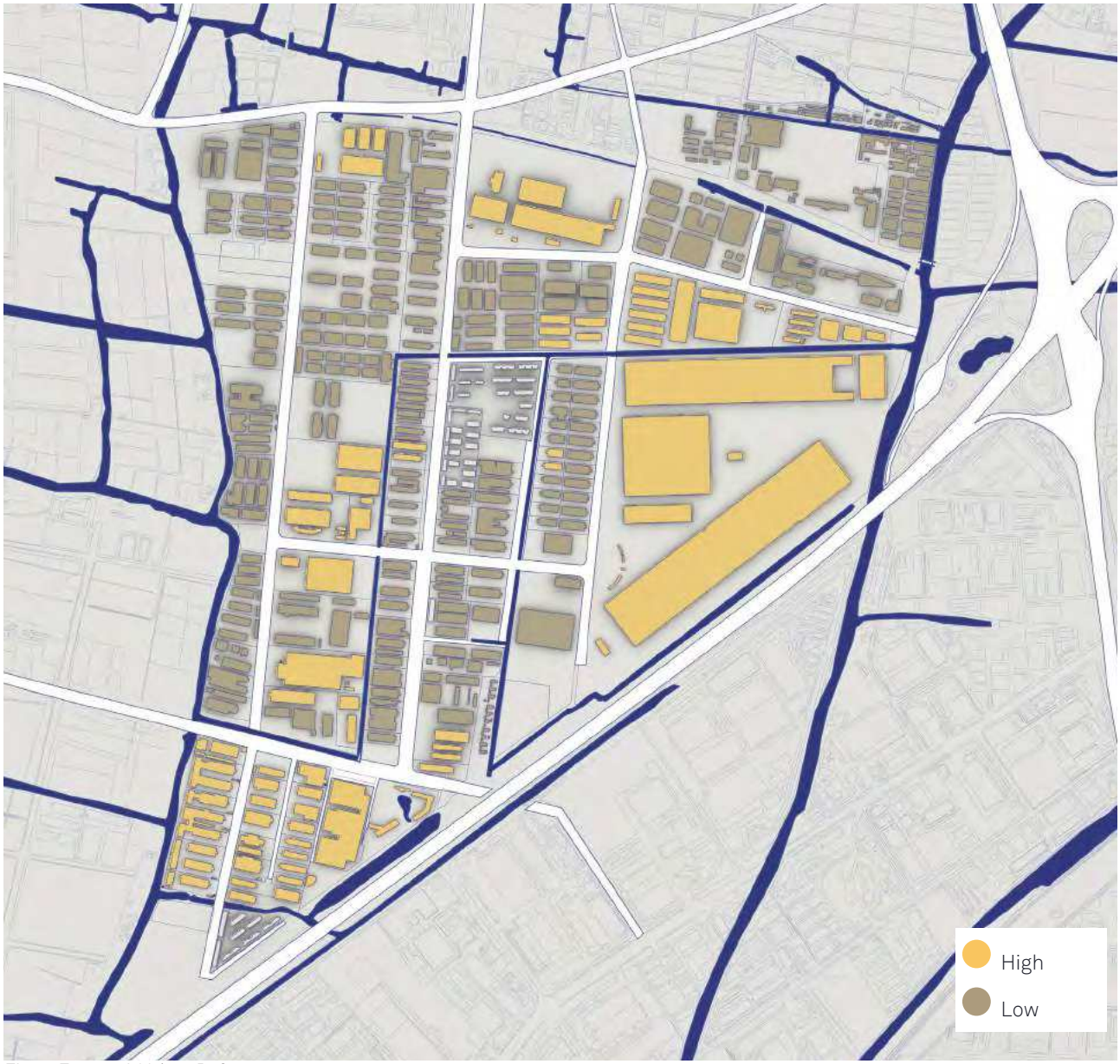


Fig. 1_EconomicValue_Before.png

According to the rankings and figures provided by the government, it is possible to map the economic value of the industries that is proportional to the revenue numbers and growth tendencies.

Environmental Impact

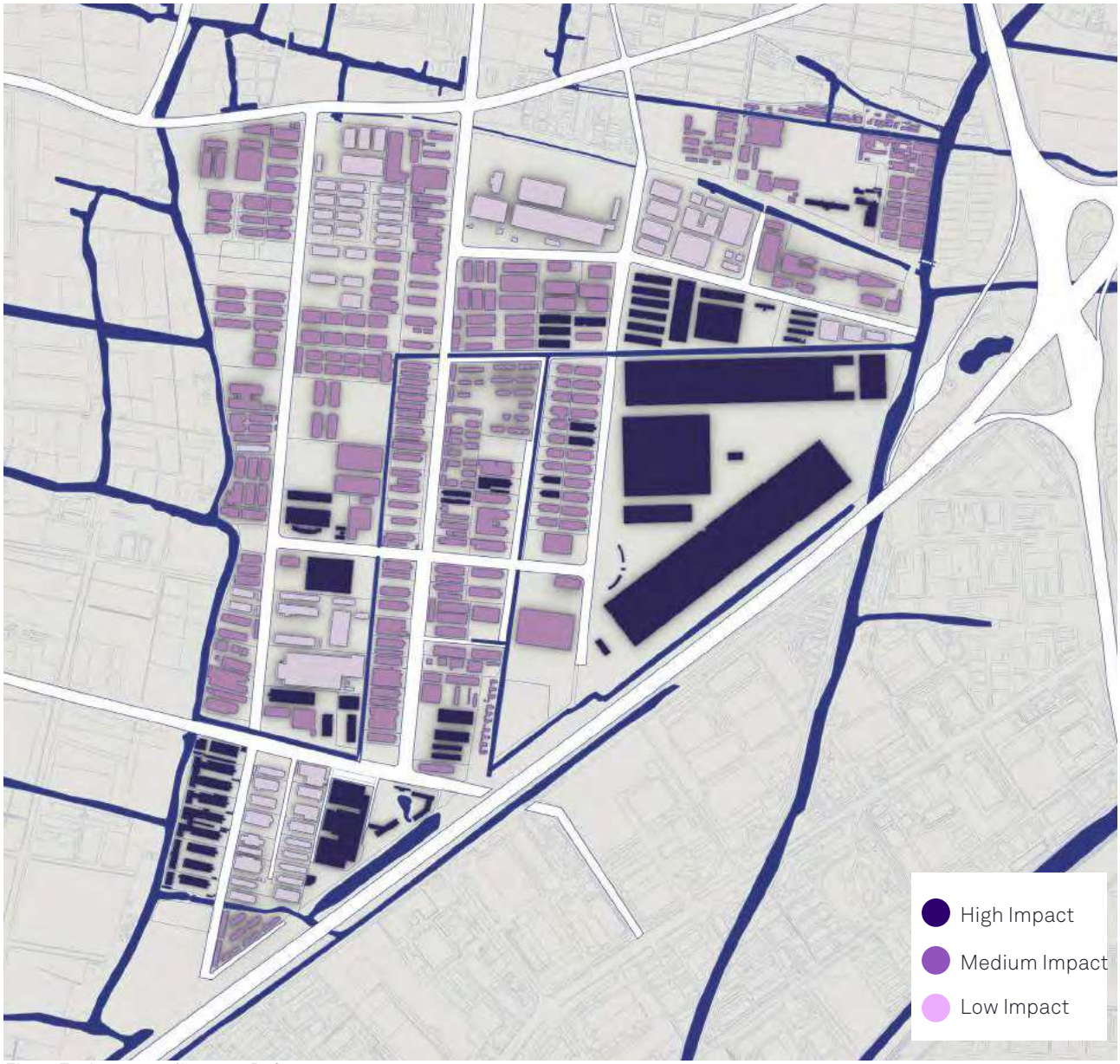


Fig. 1_EnvironmentalImpact_Before.png

Being an industrial park dominated by manufacturing and low tech production, there are few big companies in the area, that have an high impact on the environment. These include noise, air pollution, waste and cargo traffic.

Green and Water

Fig. 1_Green_Before.png

The site is next to the agricultural land in the north and is effected by the green. Yet the area is scarce and include large areas of hardscape and streets. Most of the green space is enclosed by the private companies and therefore not accessible for the public.

Connectivity

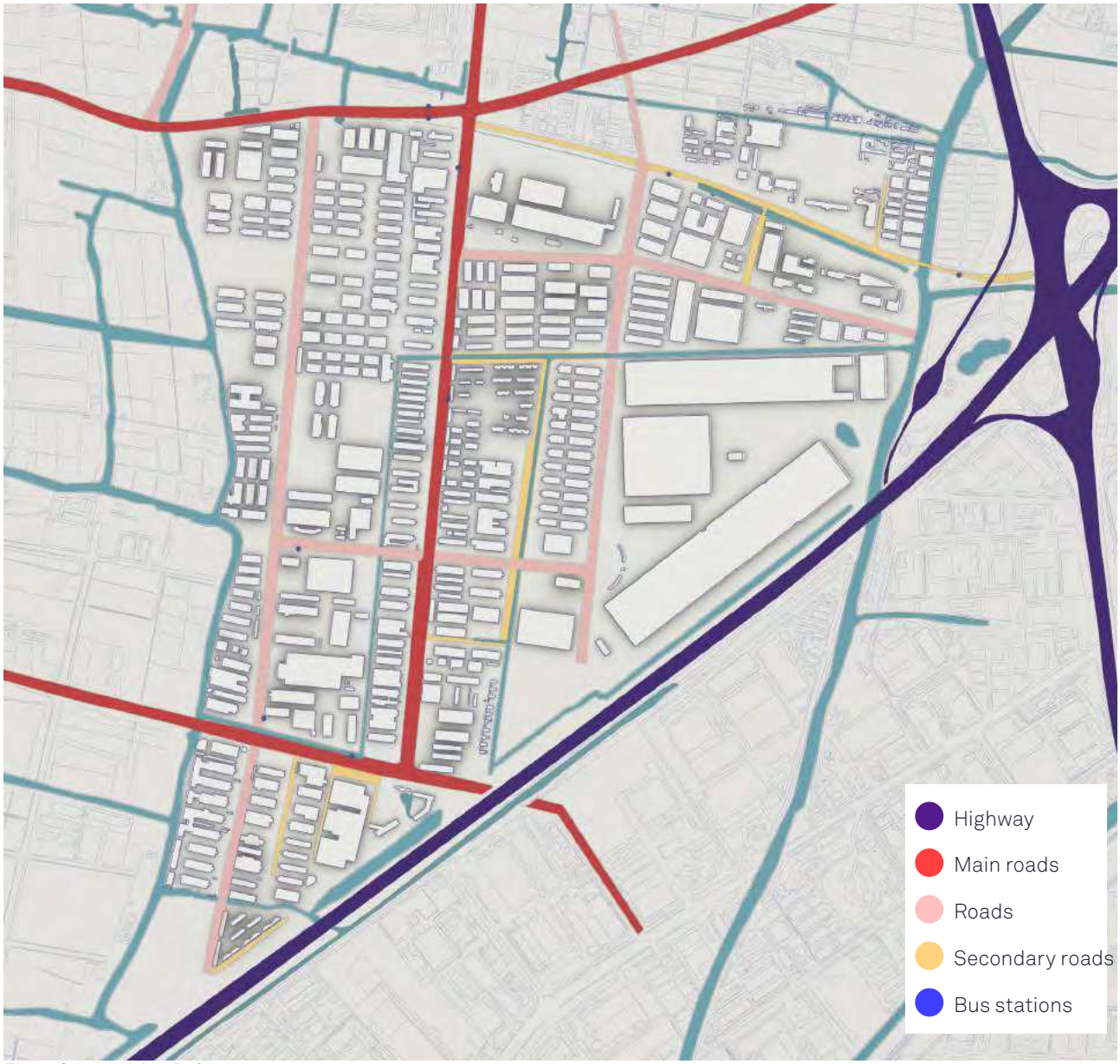


Fig. 1_Connectivity_Before.png

There are two main roads connecting Miao San Lu Industrial park with its surroundings. The remaining network represents only pieces of roads and secondary streets that are not connected or end with dead ends. The public transport is implemented in form of limited bus circulation, including only 7 stations.

Visual Analysis of the Status Quo of Miao San Lu

Fig. 1_ComparisonSongjiang.PNG

The Site analysis plans demonstrated the hard facts of the area. The visual analysis of the status quo documented in 12 pictures should deliver the unmeasurable problems and potentials of the site.

Fig. x.1
Typical industrial block is usually fully fenced along the perimeter limiting permeability for pedestrian circulation and accessibility to the canal. While blocks in the city are between 50 to 80m wide, industrial plots reach up to 150m.

Fig. x.2
The exsisting water canal network offers a key opportunity as a recreational place and green pathways.

Fig. x.3
The site is occupied by a number of unused facilities, which were once industry and are currently abandoned.

Fig. x.4
The site does not include dedicated green space, suitable for public and social activities. It is often limited to small areas adjacent to the industrial plots.

Fig. x.5
The water canal network does not provide direct access and is very limited by the continuity of large industrial block which act as barriers.

Fig. x.6
The common industrial typology is a low-rise building with a large hardscape area, showing an inefficient land use. This is partially justified by safety contour requirements.

Fig. x.7
Amenities and retails are very limited and concentrated in a few areas.

Fig. x.8
The number of housing units is very short and concentrated in mid-rise blocks. Moreover, they lack architectural quality.

Fig. x.9
The road infrastructure is devoted to motorised traffic that is suitable for industry. Pedestrian and public transportation is not sufficiently developed to support residential development.

Fig. x.10
The urban fabric, although presents large roads with green areas, lacks public space for human interaction and social activities.

Fig. x.11
In general, the industrial buildings do not show any distinctive architectural qualities to define the specific character of the site. The main driver for the development followed functional logics to support industrial requirements.

Fig. x.12
The site includes some agricultural land. It is also surrounded by it on the north/west corner.

The outcome of the measurable and unmeasurable factors of the site are represented above and categorized as potentials and problems. These include functions as well as spatial qualities or problems. Being an industrial site with partially functioning industry, Miao san Lu offers quite a few opportunities for an industrial upgrade and improved mobility combined in the process of an urban regeneration. As the government's masterplan defines a timeline from 2017 to 2035, the design proposal for the urban regeneration process will draw a vision for **Miao San Lu 2035**.

5.2 Mobility 2035

Aims and Objectives

In 2035, a metro station will be implemented in Miao San Lu. The Location is defined through the existing Tunnel connecting Songjiang New Town. It is the initial point of the mobility strategy, as it will act as a catalyst to increase the radius of the Miao San Lu Area that connects to Shanghai and Hongqiao Airport and eventually further. The next step follows in form of an extension of the broken street pieces that once connected will set up a grid that is overlayed and aligned with the completed water canal network. The aim is to reduce and eventually eliminate motorized traffic by introducing innovative solutions for public non motorized transport and pedestrian circulation.

Miao San Lu area is well connected nationally and internationally by air and rail network through the proximity to Hongqiao airport and Shanghai. Shanghai metro system has a rapidly expanding subway network. There are currently three lines in operation connecting the city with the new towns around Songjiang new town. Miao San Lu Industrial Park is ideally located in relation to major transportation hubs such as the Hongqiao international airport, just 20 minutes from the site, the Hukun Express way G60, situated within 500m radius of the site. The site is also abutting proposed two metro station on Line 09 and Line 12.

Following the evolution of the modes of mobility, from traditional sailing boat to the contemporary smart mobility, Miao San Lu is upgrading future mobility.

The application of smart technology and data will help the inhabitants or visitors to travel around the site, changing the mode of mobility where appropriate. Helping people move intelligently, smoothly and hassle-free – on modes of transport that are economical and environmentally friendly – is vital.

The project, not only provides the network and infrastructure for green public transport and green vehicular circulation, but also allow for low impact mobility. River taxi routes, slow mobility routes as well as bike and e –bike lanes interweave and enable citizens to smoothly reach every area of interest.

SEG WAYS

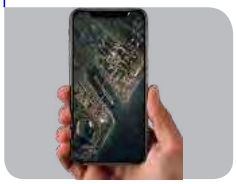
RIVER TAXI

E-PODS

TRAINS

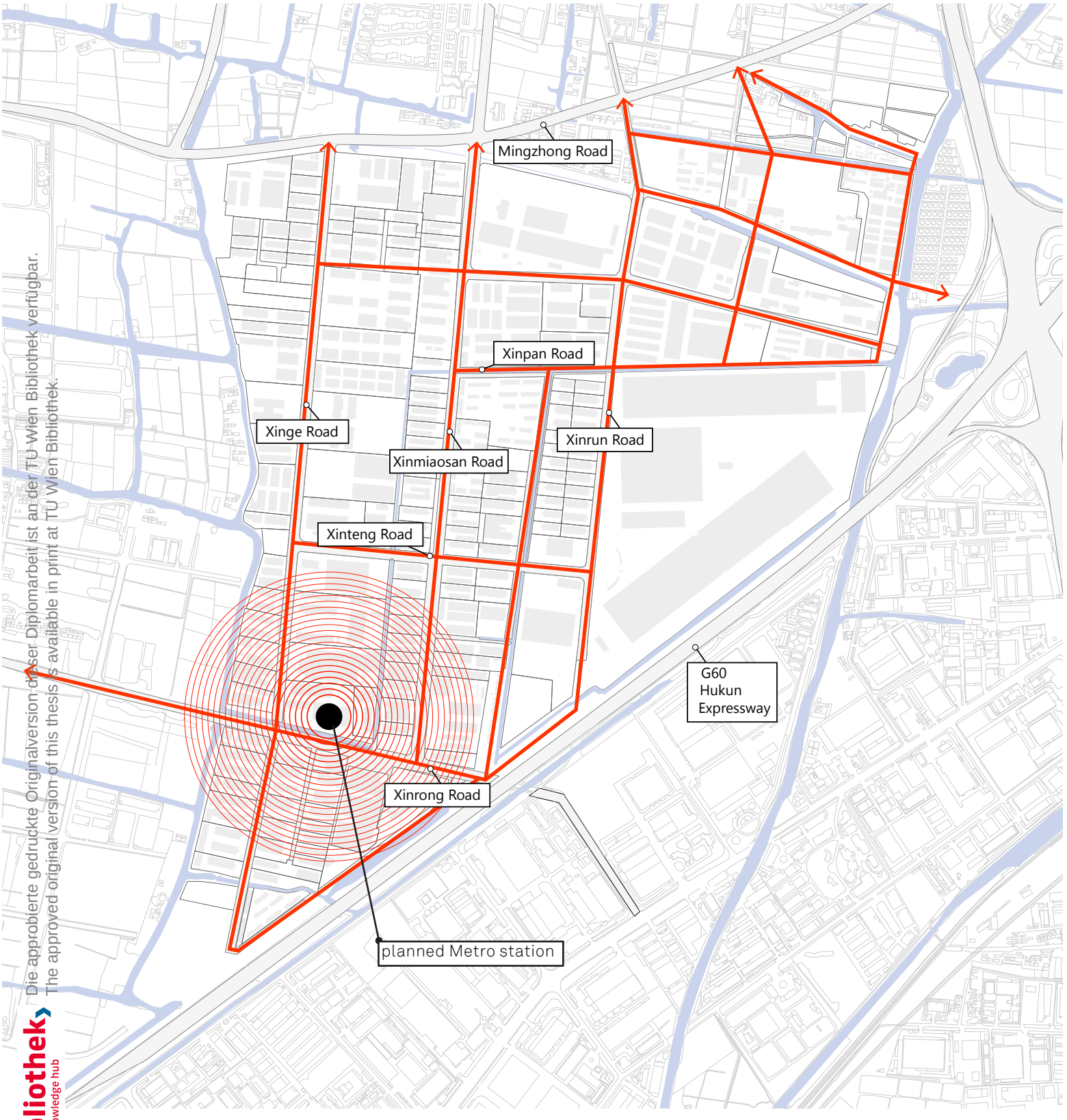
PERSONALISED TRANSPORT

BIKE SHARE

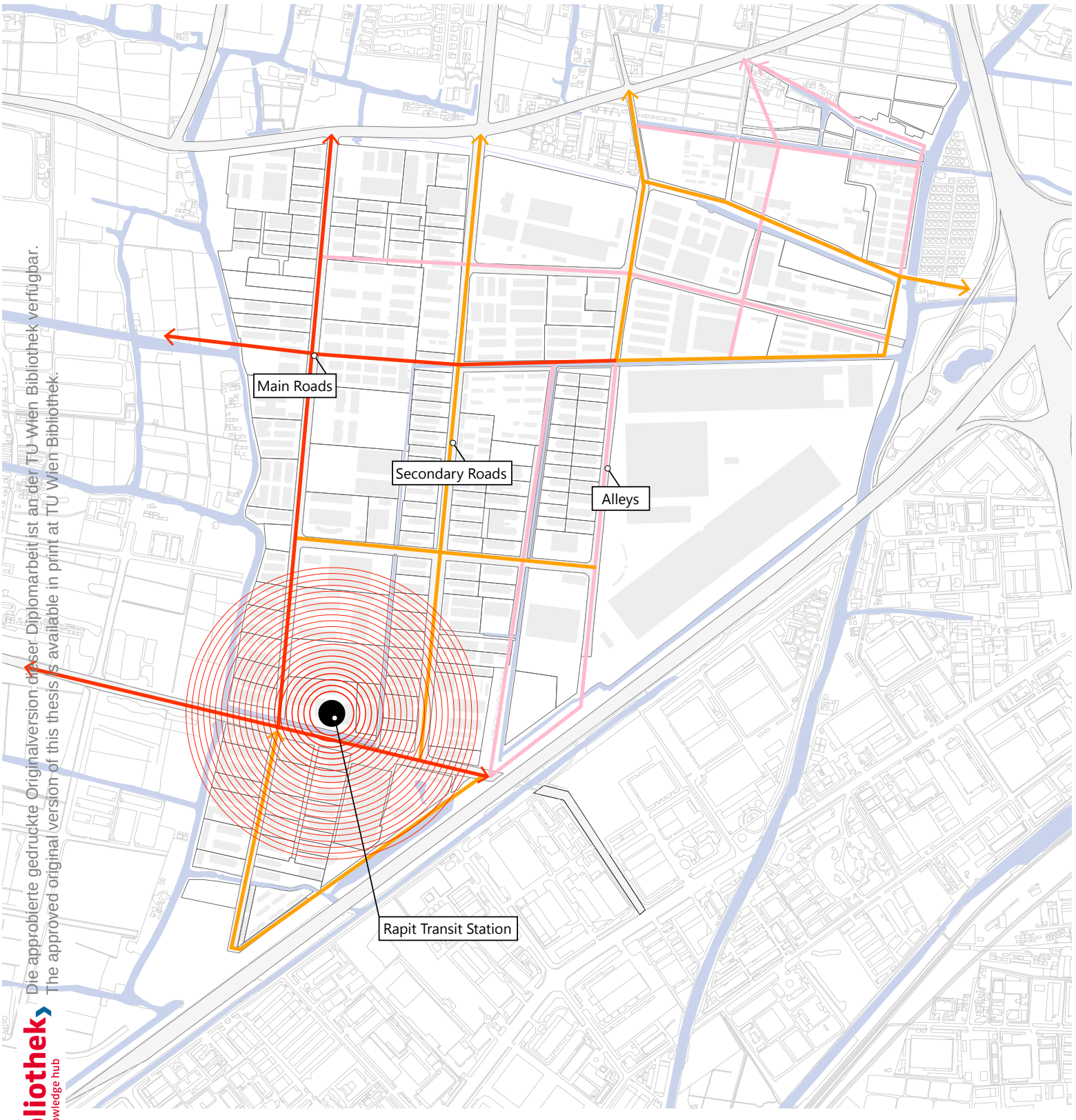


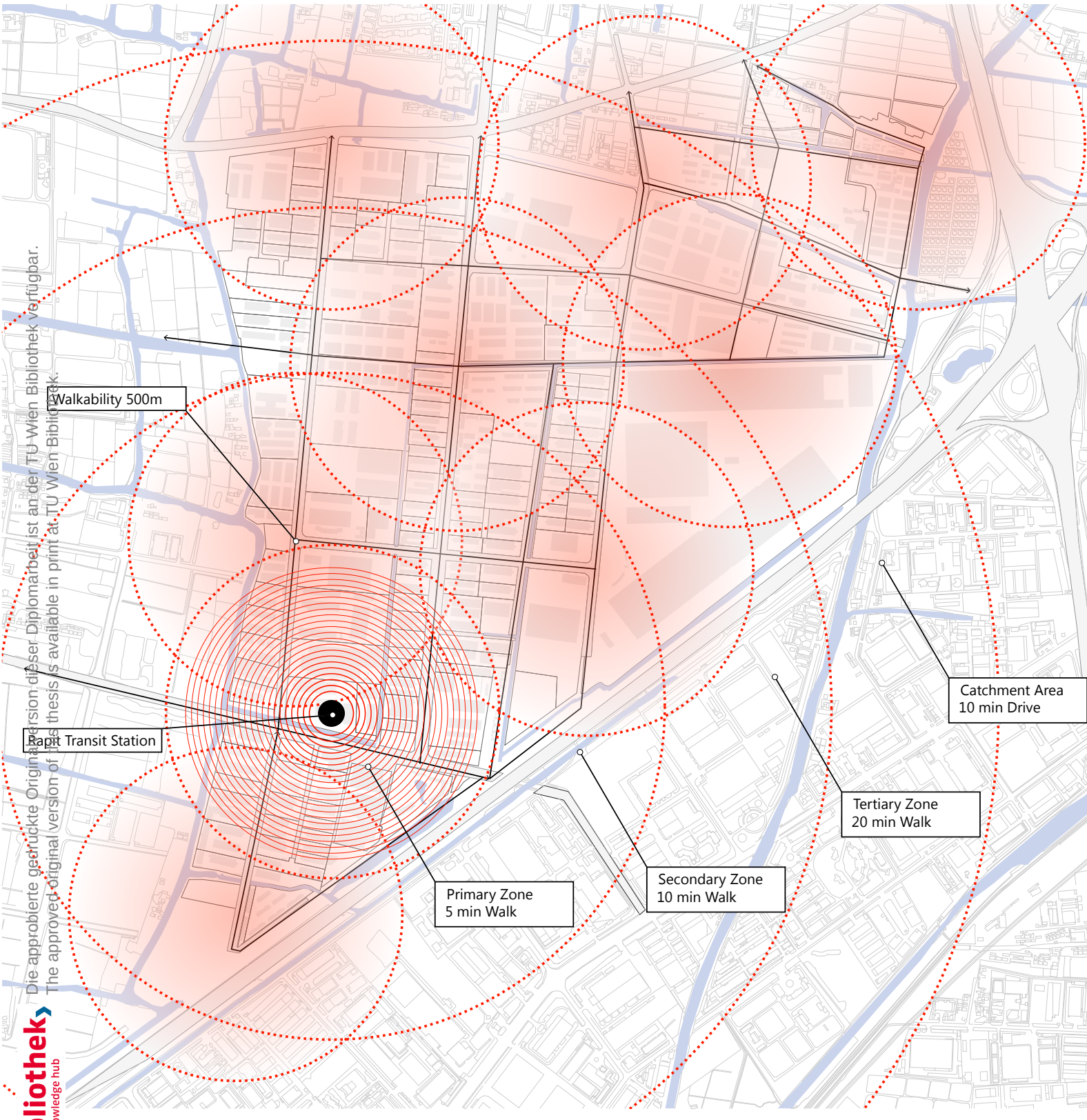
COMMUNITY APP

>>2035 Main Mobility Network

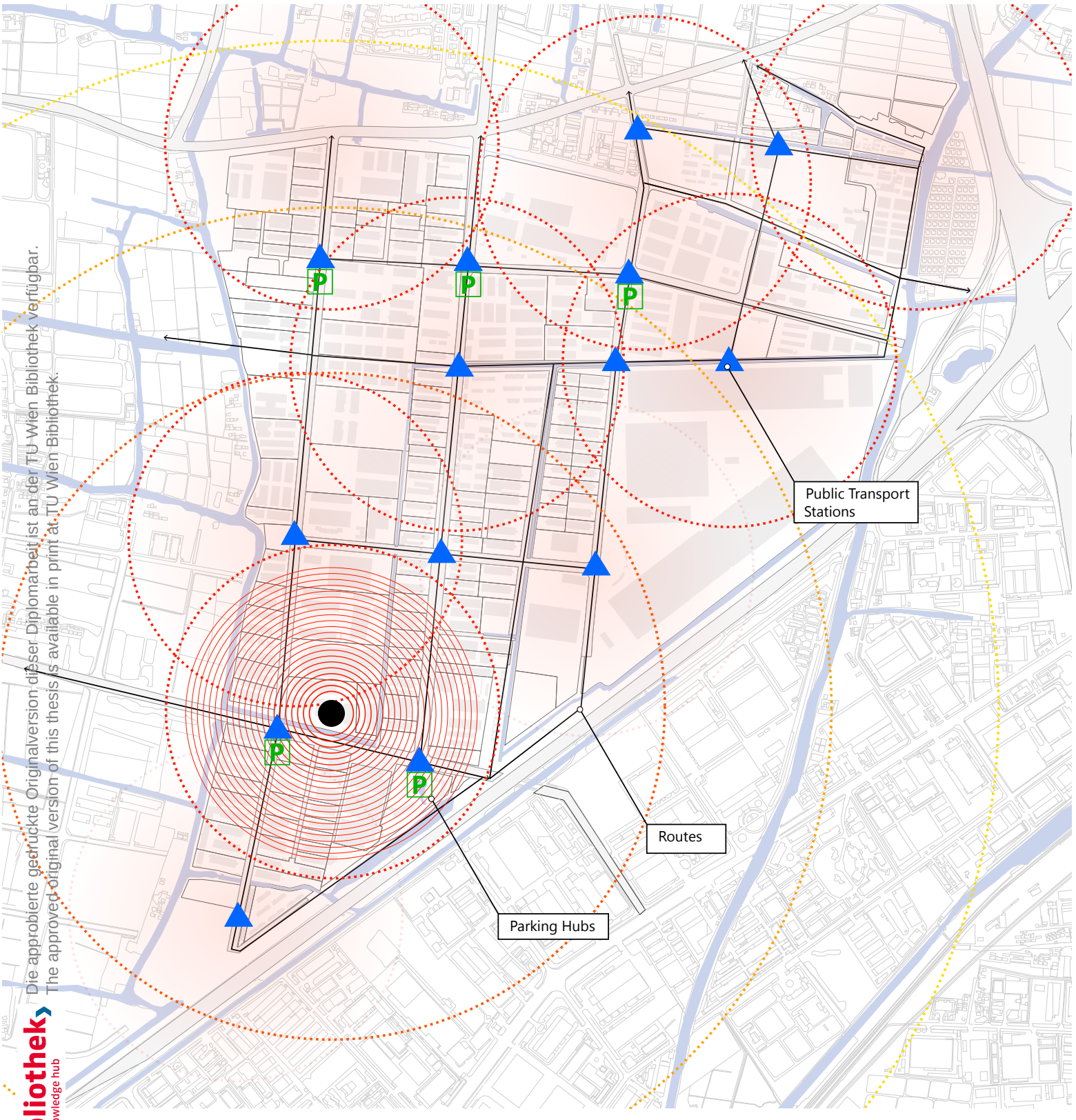


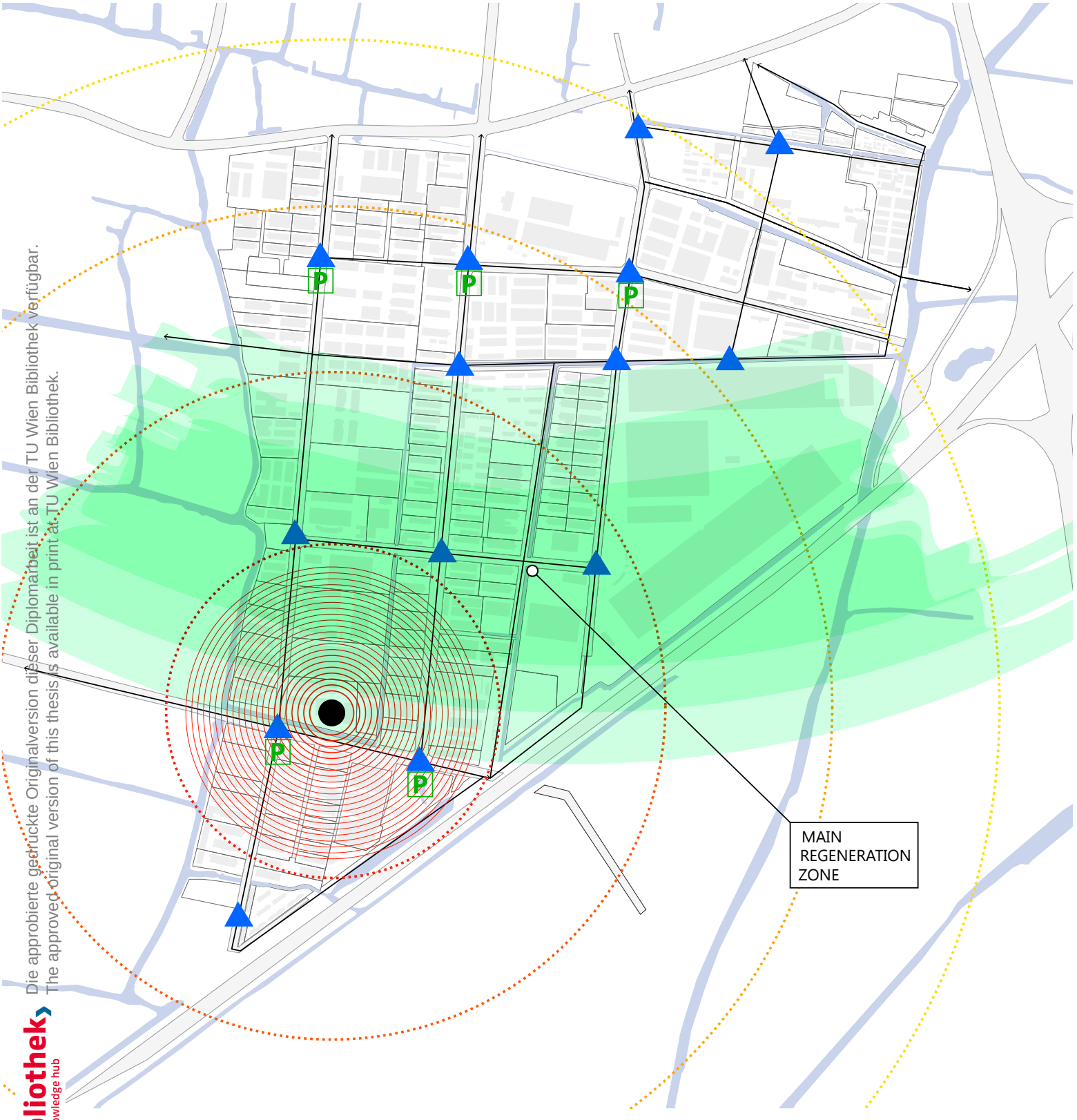
>>2035 Road System



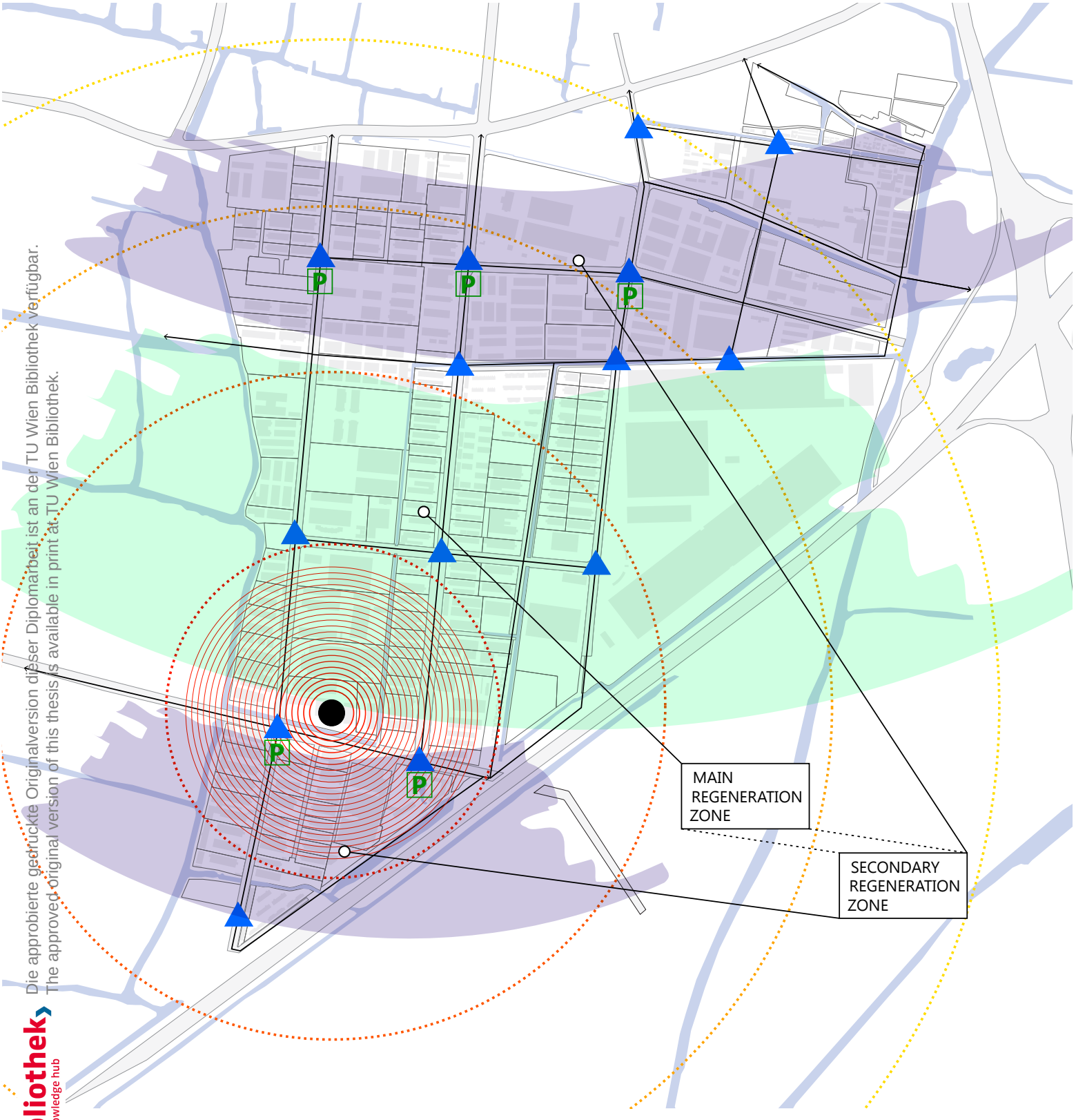


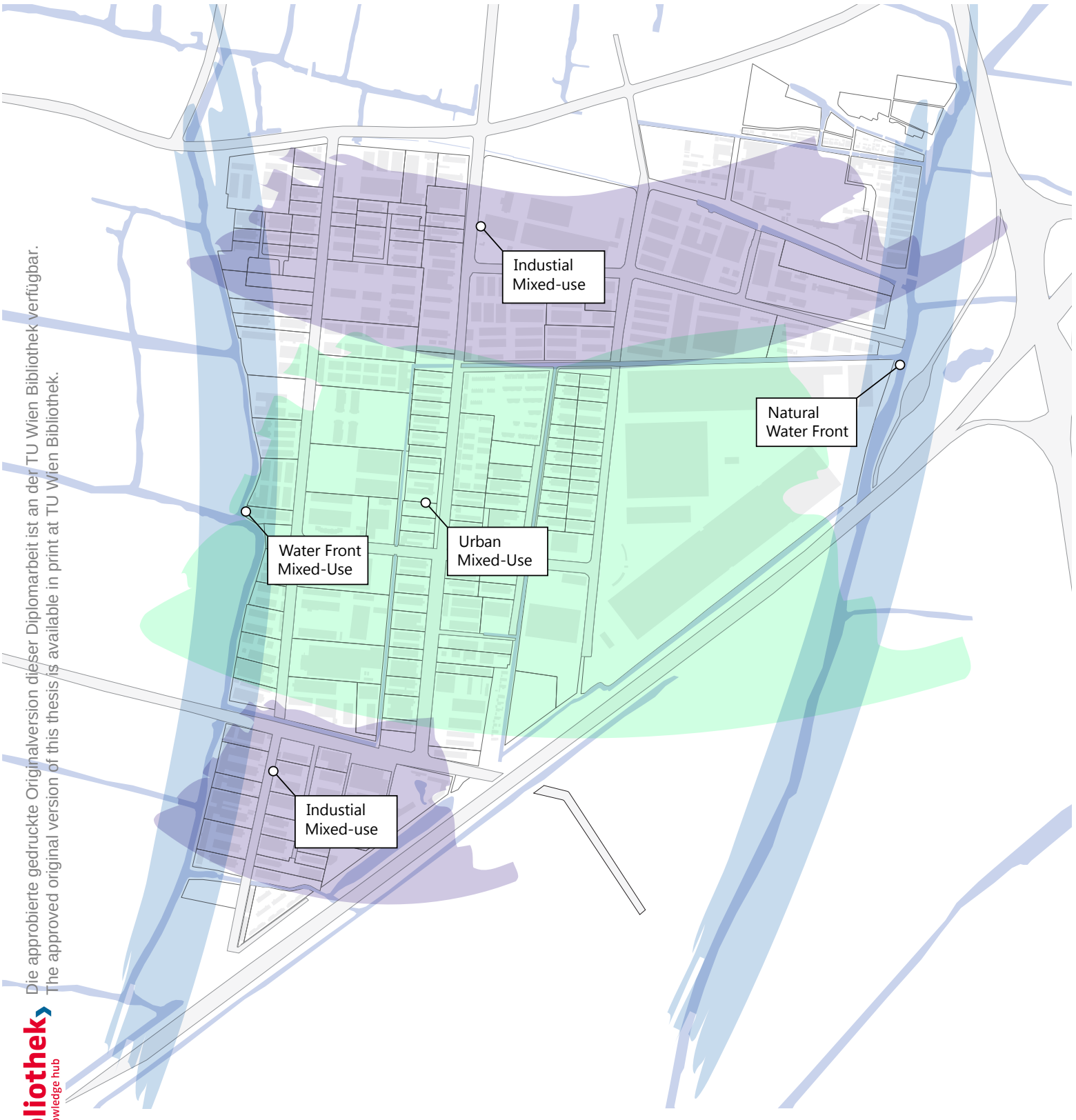
>>2035 Public Transport Hubs

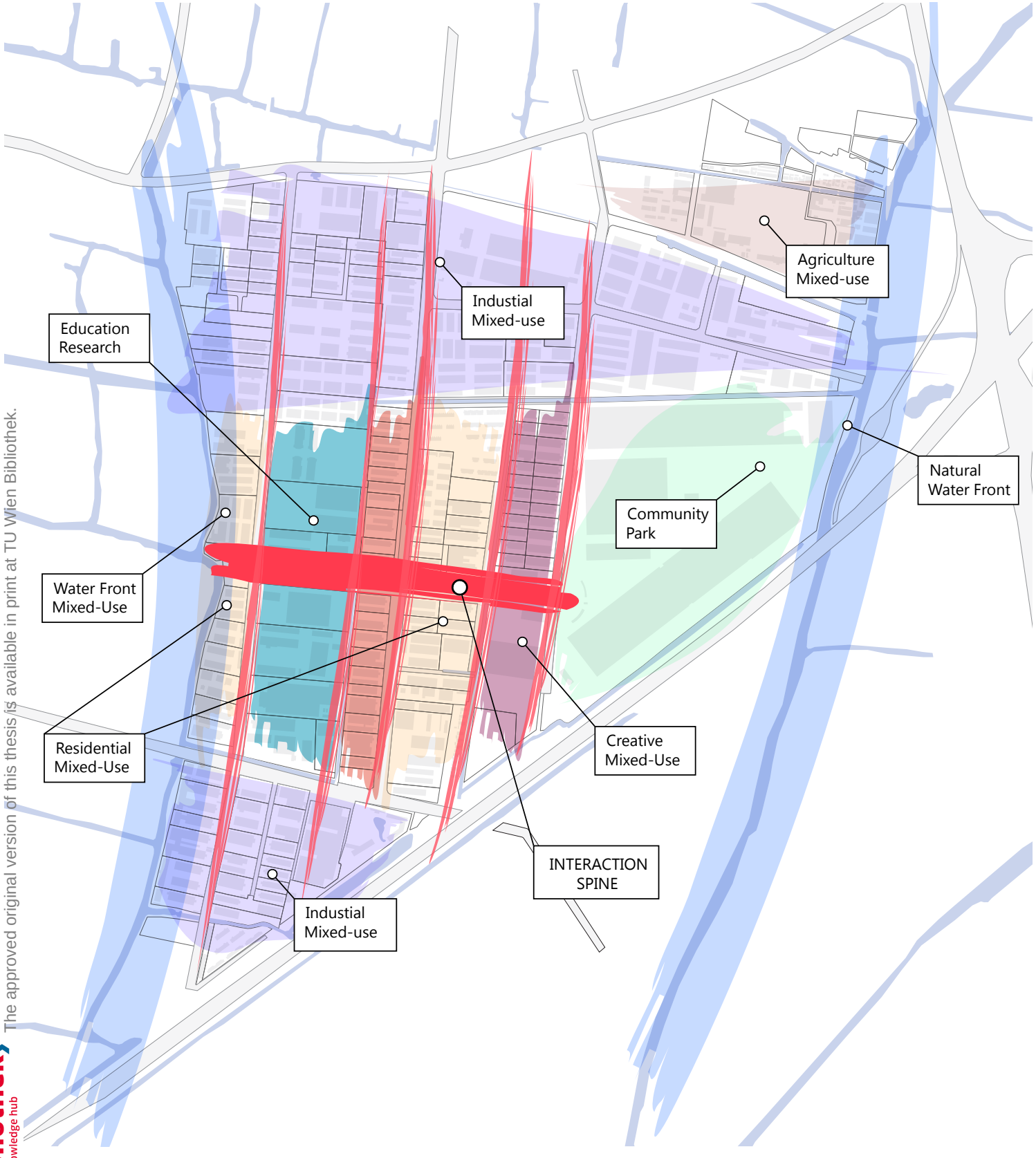


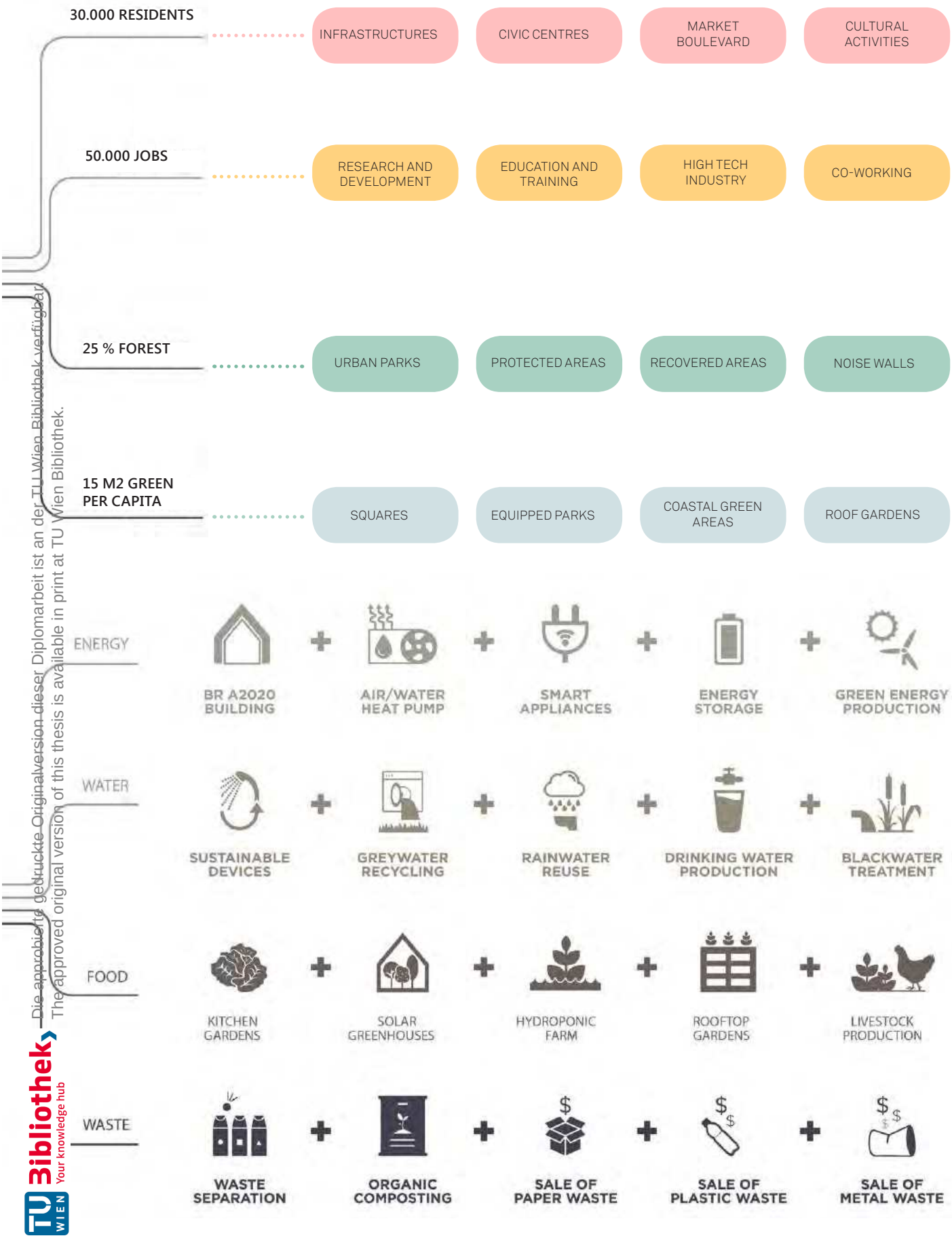


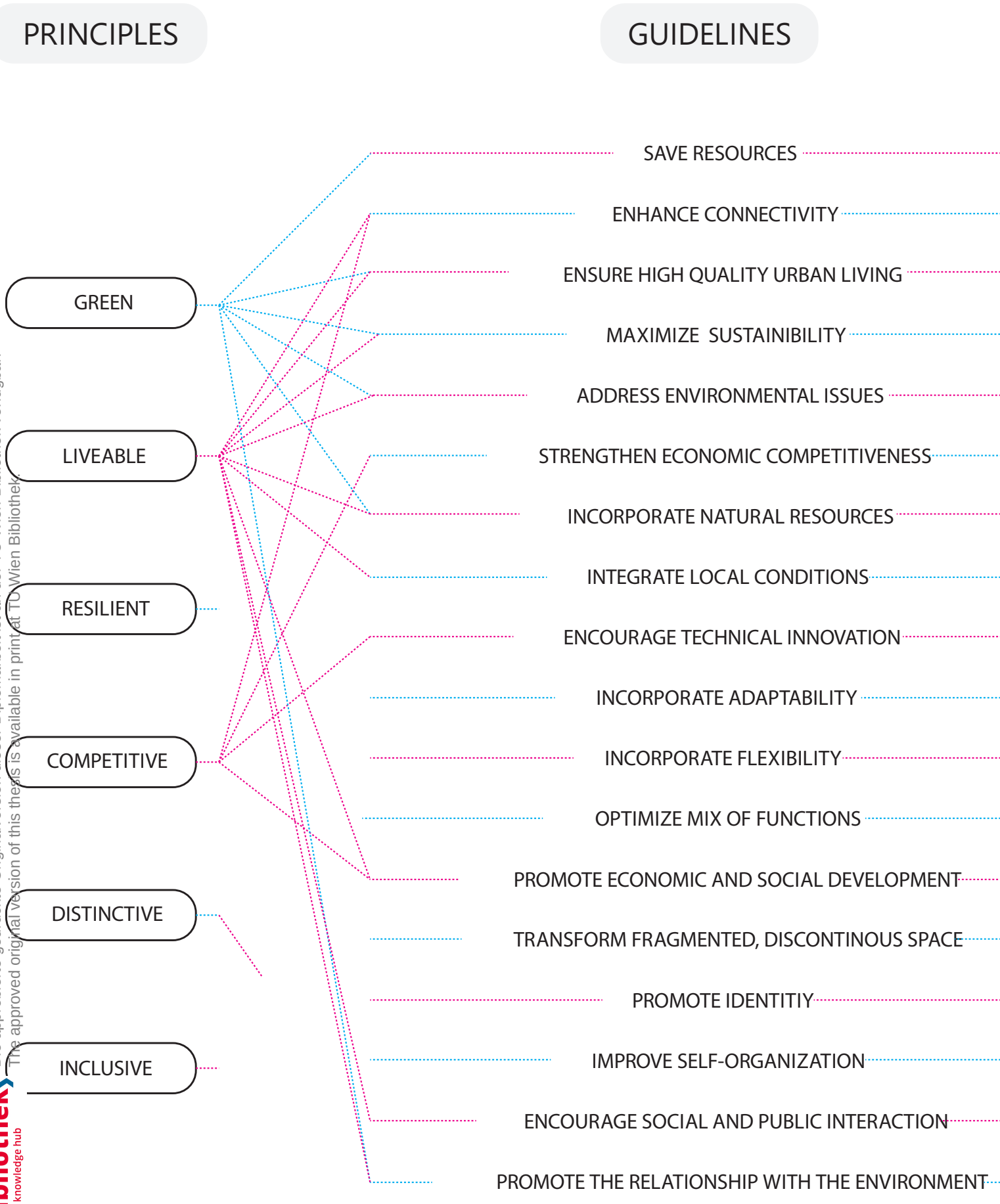
// Urban Regeneration Zones



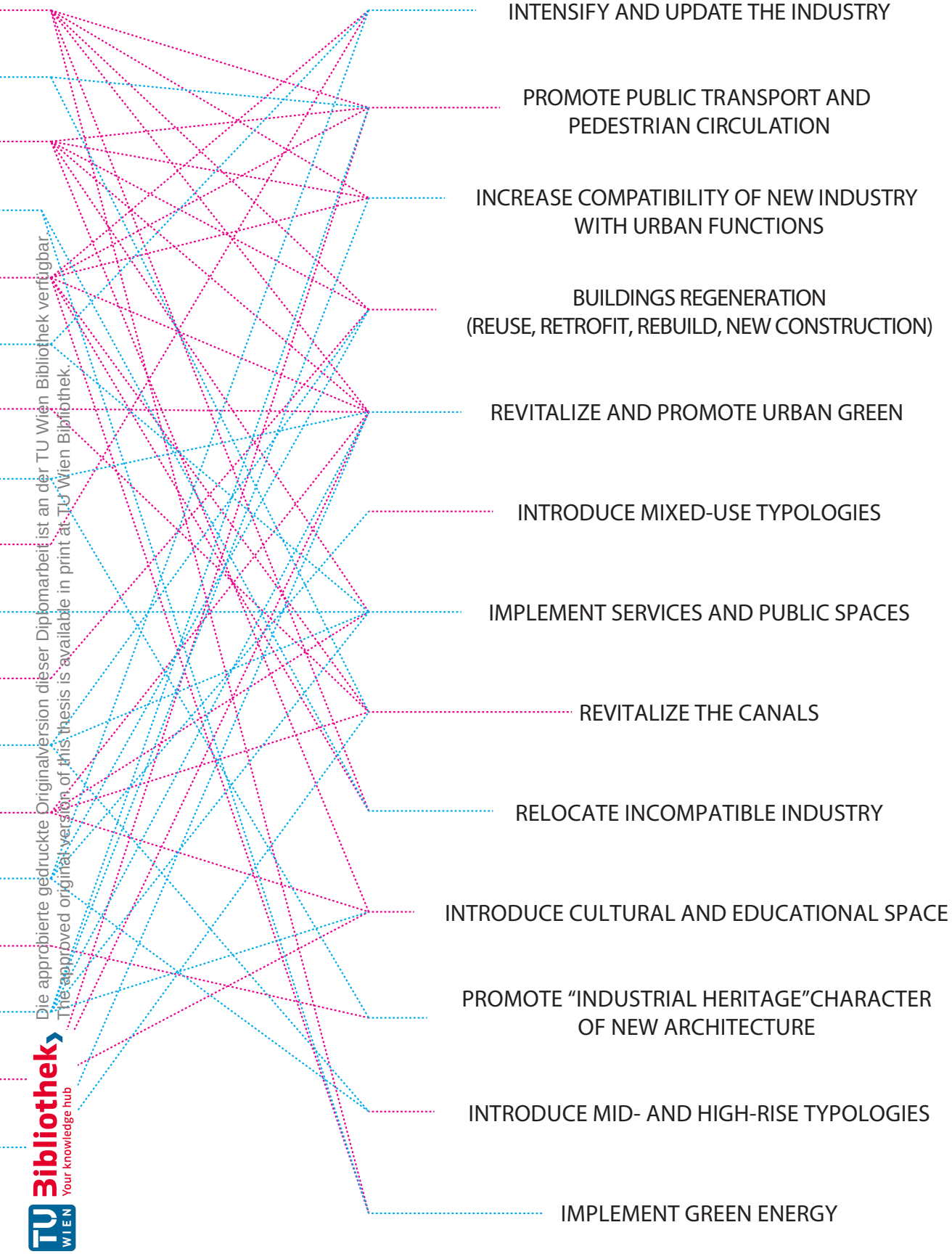








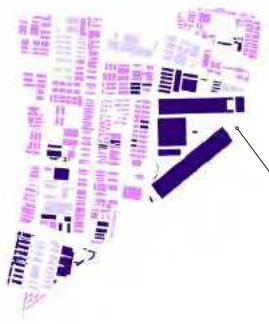
URBAN TOOLS



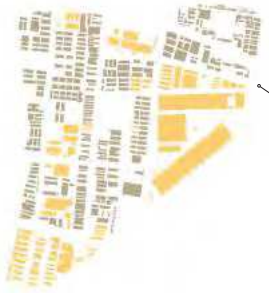
// Evaluation Process

Having set up a catalogue of Design guide lines and corresponding tools for the regeneration process, a method is developed that examines clusters of plots on the following criteria, in order to make decisions about the interventions on the existing structures and industry on the site.

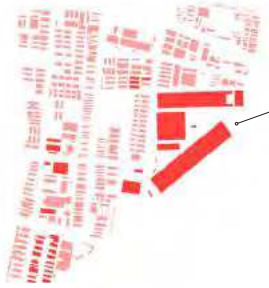
Environmental Impact



Economic Value

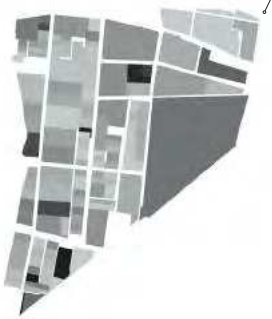


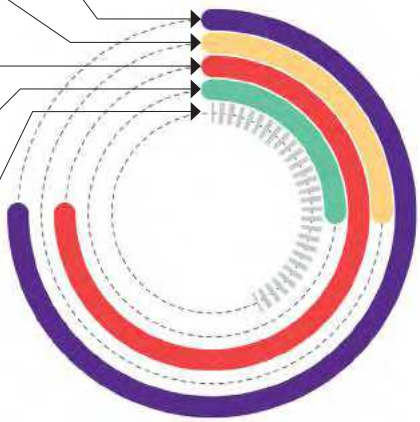
High / Low Tech Industry



State of the Building

Floor Area Ratio





The Evaluation process is structured in three parts of the area due to the large scale of 344 ha. Consequently, each plot is named according to its area.

The Evaluation Criteria and the grades to set up an index are listed and described as below.

ECONOMIC VALUE

1

The industry has shown a declining revenue over the last years, the industry type is less demanded. It is not defined as key industry by the government. It does not involve export products.

2

The industry has shown a stable but low revenue over the last years, the industry type is less demanded. Only few are defined as key industry by the government. It comprise export good production.

3

The industry has shown a stable growth in revenue over the last years, the industry type is globally recognized and shows potential for further development. It is defined as key industry by the government and comprises export good production and manufacturing.

4

The industry has an outstanding position in revenue locally and globally. The industry type inloves research and development as well as cutting edge systems. The industry utilizes big data to optimize efficiency and increase profit. It offers a platform for new job opportunities and promotes international competitiveness of the area.

ENVIRONMENTAL IMPACT

1

The industry is not compatible with urban functions. It produces noise and air pollution as well as toxic waste products. The industry type requires large spaces and large buffer zones to adjacent funtions.

2

The industry type involves less noise and air pollution that could be minimized with retrofitting interventions to make it compatible with urban functions. The required area can be arranged vertically. The production methods can be updated to minimize environmental disruption.

3

The industry involves mainly medium-high tech companies, that use modern production methods and non-toxic products. It creates minimal environmental impact that is controlled by smart systems. It can coexist with urban functions, especially residential. The industry has the potential to turn into a zero-emission industry.

4

The industry uses state-of-the-art technologies to minimize its CO2 footprint and utilizes renewable energies. It has a positive impact on its surrounding by providing circular systems that absorb the waste products of the site and turn them into resources. The focus is service, research and development other than production. It involves regenerative strategies to produce, store and distribute natural energy.

First part focuses on the plots in the east of the site. Second part demonstrates the performance of the plots in the south. Third part presents the results of the plots in the north.

STATE OF THE BUILDING

1

The building lacks functioning systems, the structure is old and unsafe. It is in a state that cannot be improved by retrofitting or reuse. It requires hard interventions in form of rebuilding measurements.

2

The building structure is safe, but the main systems do not function properly. The facade is damaged and temperature control is not possible. According to the age of the property, it can be stripped down to the supporting construction and rebuild to guarantee natural ventilation and thermal performance of the facade.

3

The building is equiped with efficient and low energy systems to minimize and control its energy consumption and optimize user comfort regarding the mix of functions it comprises. It offers demand controlled ventilation and heat recovery systems, as well as lighting control.

4

The building is equiped with a state of the art technology to minimize and control its energy consumption and optimize user comfort regarding the mix of functions it comprises. Furthermore it is able to create renewable energy.

HIGH / LOW TECH

1

The Industry relies on traditional and non-machanical production methods. It involves minimum capital investment and development. The industry type falls into disuse due to changing socio-economic conditions and priorities. This category includes equipment manufactories, paper, food and metal production.

2

The Industry types are divided only into two categories, the middle category two does not apply in this case.

3

This category represents medium-high-tech sectors, such as general and special equipment, electrical machinery, rubber and plastic products

4

High Tech Industries utilize cutting edge technologies. The classification describes the intensity of research and development activities. OECD provides this classification. This category mostly involves E-commerce, pharmaceuticals, office and computing machinery. However, Miao San Lu Industrial park does comprise only few high tech industries.

One of the significant structures in the south is the Longgang fork lift factory (E13), which comprises the largest area of the site and causes environmental disruption in form of noise, air pollution and excessive cargo traffic. .

// Evaluation Zone North

The north part of the site include many buildings in a poor condition, that are along the main street/ axis of the site. Overall these structures and the industry show a low evaluation index.

// Evaluation Zone South

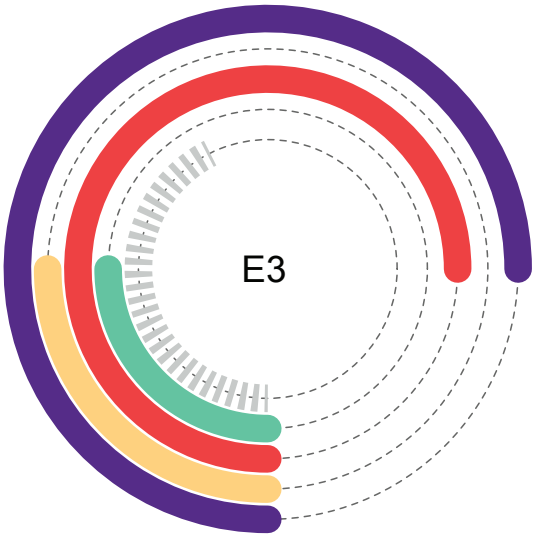
In the south is mainly metal industry and a residential complex, that has a different evaluation index than the industry.

A majority of the structures in this area have a fairly good environmental values.

// Chosen Evaluation Plots

PLOT E3

This plot covers an area of 57.370 sqm and comprises 17 Buildings. In the East it has the XinMiaoSan Road and in the North it has the XinPan Road. The buildings have different heights from 2 floors to 7 floors, of which the higher ones are located towards the street. The plot is mainly dedicated to General Equipment production and wholesale, however most of the buildings are underutilized or entirely empty. The canal front has a great potential to integrate and activate social life enhanced through nature.



SITE PICTURES

FAR 1.24
The average FAR of the area is 0.8

State of the Building: Poor condition
Couple buildings on this plot are quite old and require rebuilding. However the two high buildings by Xin Miao San Road and by the canal are in a better condition and can be retrofitted for further development.

Medium-High Tech: Offices and wholesale
The focus lies in service and retail of general equipment in this plot. Therefor it offers a good base for further development.

Economic Value: low and in decline
The general equipment sector is quite special and demands high investment This plot comprises different small enterprises that can hardly compete with global player competitors and lack a unifying brand roof.

Environmental Impact: Low
Since this area mainly comprise a group of small enterprises, offices and whole sale, its environmental impact is quite low. However, the block lacks circular systems to minimize energy consumption, while increasing efficiency and promoting growth of the industry.

PLOT E13

This huge plot comprises an area of 524.643 sqm, including 3 large companies, namely Longgang Fork lifts, Heavy industry research 704 and Cameron automation equipments. It is surrounded by water on three sides and lies by the Xin Run road. The buildings are light weight structures with only 3 floors.

SITE PICTURES

FAR 1.47
The area is 50% covered by low height buildings

State of the buildings: good
The buildings are in a good condition, they lack circular systems to minimize energy demand and guarantee efficiency in use of resources.

Medium high tech enterprises
This plot is mainly dedicated to general equipment manufacturing and production. The Longgang Fork lift company as the main tenant focuses on modularity and standardization, whereas the other two companies can be classified as high tech since they focus on automation and research and development.

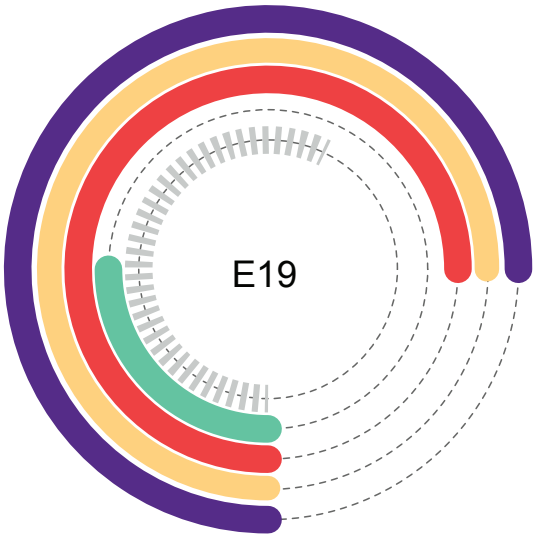
High economic value
The Longang fork lift company has been one of the main economic carriers of the area, however the tendency is declining. While high tech companies, such as 704 and Cameron automation experience an increasing demand and investments.

Environmental Impact: incompatible and disruptive
The main tenant Longgang fork lifts plays a key role for the environmental impact of the Miao San Lu Area. It requires a very large area, produces air and noise pollution as well as huge amounts of waste. For the further development of the area towards an urban regeneration the disruptive elements need to be eliminated.

// Chosen Evaluation Plots

PLOT E19

This plot comprises a total area of 68.810 sqm and is located by the Maixin Highway. In the North, it has a canal front, which is vacant undeveloped land. The plot is occupied by the green feather energy company with 9 buildings, which are between 3 to 6 floors high. Through the proximity to the agricultural land and water, the area has a great potential for water front activation and revitalization along with new developments.



SITE PICTURES

FAR 1.39
In comparison with the average land use of the area, the Plot ratio is quite balanced and efficiently occupied.

State of the building: poor condition
The building structure does not meet the requirements of the enterprise. It lacks cutting edge technology in building systems. Retrofitting measurements can be used to update the structure.

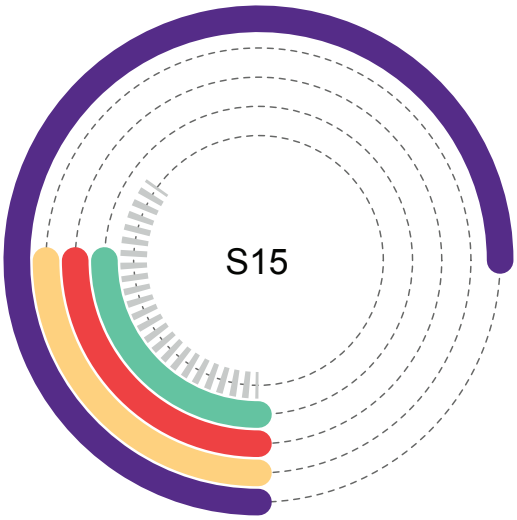
High Tech Industry
Green feather energy company is one of the few valuable potentials of the park to implement and establish a new image/ identity. It represents a new era in industrial development and should be enhanced with state of the art technology and high quality architecture.

Economic Value: high
Although the revenue of the company is not as high as Longgang fork lift company, it holds a great potential for further development. The economical growth was limited by space and area.

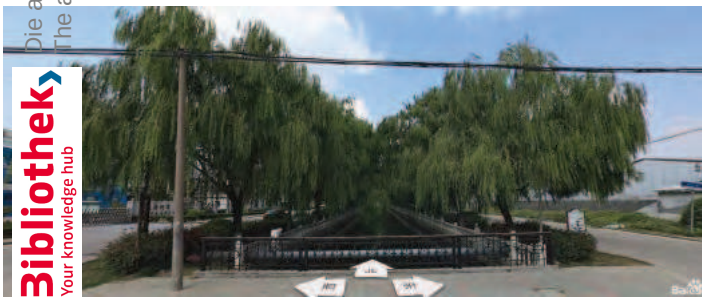
Environmental Impact
Green Feather Energy applied new technologies as the building was errected. However, it needs an update to implement circular systems to use the resources in an economic way and even to produce, store and share the renewable resources.

PLOT S15

This central plot covers an area of 31.692 sqm, including 7 buildings with 2 floors. It is dedicated to different general equipment companies. It has three sides facing the streets, Xin Miao San, Xin teng and Xin Run and the fourth side is facing the neighbouring plot. Being situated by the canal offers opportunities for public space activation and social interaction. Water should represent the element that connects all the various parts of Miao San Lu.



SITE PICTURES



FAR 0.82
This plot ratio is quite characteristic for the area, which is dominated by low buildings and inefficient land use.

State of the building: Very poor
The buildings in this plot need urgent interventions in form of rebuilding and new construction. They are not able to meet the basic standards .

Low tech enterprises
This plot incorporates small businesses that are mainly based on manufacturing and production, even using traditional methods, such as handcraft. Their cultural value is high but they require a better set up.

Economic value: low
The companies on this plot have almost no impact on the economic growth of the area. They need a context, where their social and cultural value is appreciated. This can be achieved by including them in an area that is more community based and encourages social interaction.

Low environmental impact
Being a low tech manufactory and hand craft industry, these buildings produce only little noise disruption, that can be minimized and incorporated in a more suitable context.

// Uncritical Translation of the Evaluation Outcome

The results of the plot assessment delivered key informations about the further development strategies of each plot. The outcome is translated into four categories of interventions, that are mainly concerned with the building structures but also with the industry types

These interventions are localized on the site, indicating a tendency for the next step,namely the aggregated zoning map. In contrast to the intervention map, it is an aggregated plan of measurable and unmeasurable criteria, such as presented in the visual analysis.

RETROFIT

Retrofitting suggests that the building structure and the including function are well balanced and located. The state of the building can be enhanced with technical nterventions to increase the compatibility with urban functions and implement green energy.

REUSE

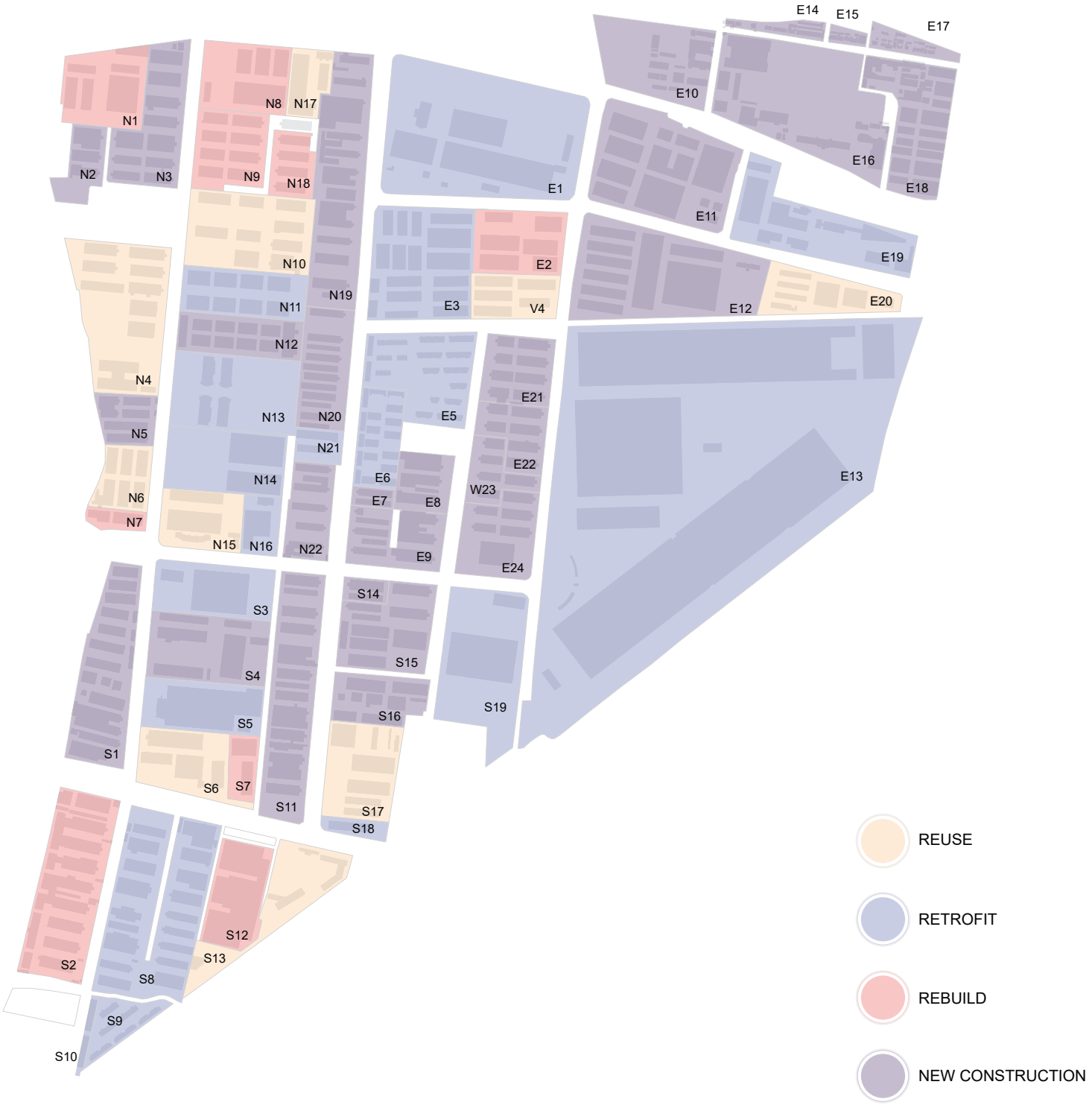
This intervention applies to cases, that suggest the relocation of functions, while the building structure can be used for a new function. It involves soft interventions that introduce mixed typologies, while implementing new cultural, educatioonal, public and service functions.

REBUILD

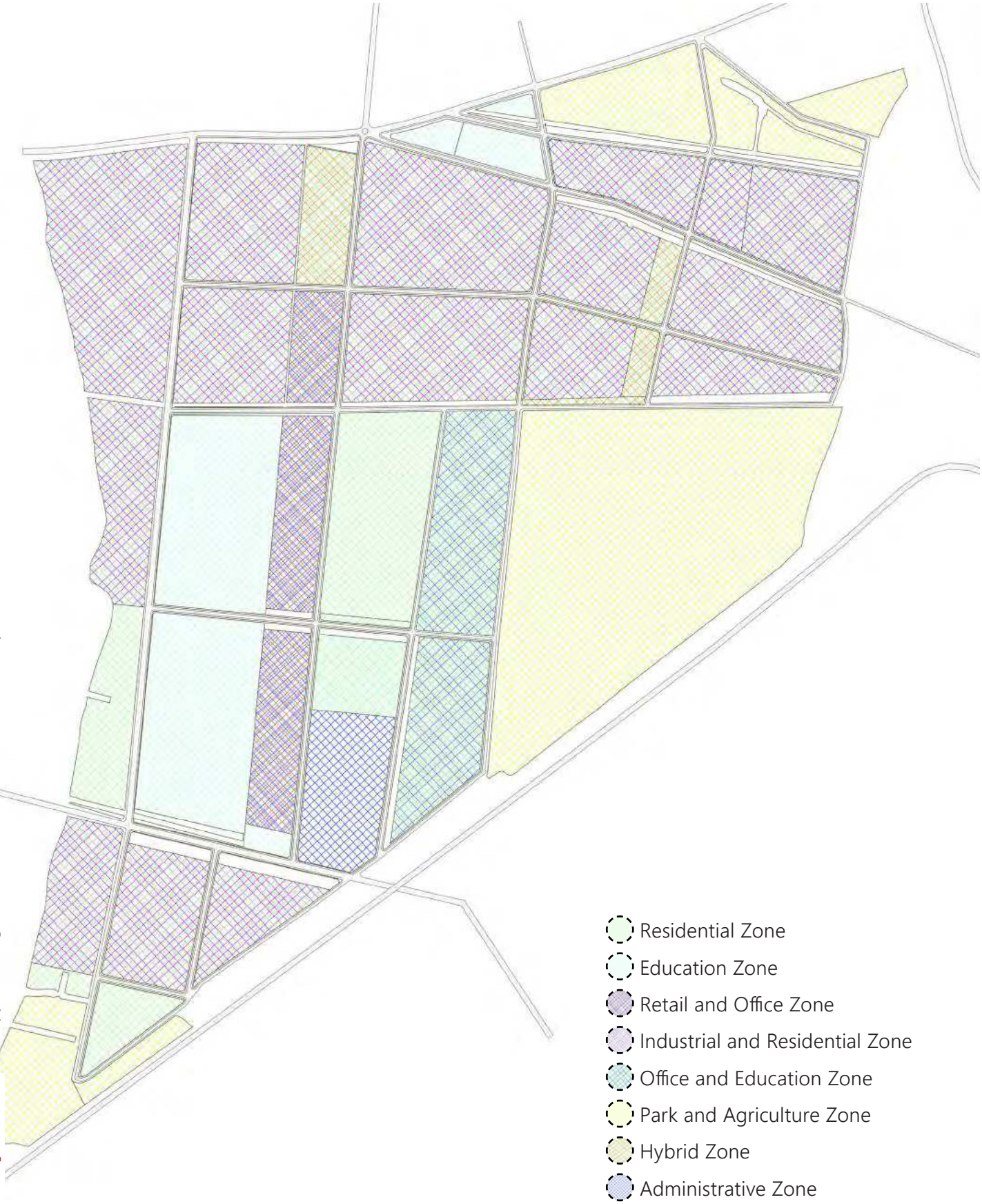
As the definition indicates, this intervention applies on poor , damaged or incompatible structures that will be renovated to introduce new mid and high rise typologies, while promoting the industrial heritage character. Furthermore this intervention will allow to intensify the industry and create adaptive and flexible structures.

NEW CONSTRUCTION

New construction suggests that a derelict area or building should be used to revitalize and promote urban green, while integrating local conditions and transforming fragmented and discontinous space. The new construction represents an opportunity to strengthen economic competitiveness while promoting an identity. This can lead to positive impacts in economic and social development and the implementation can encourage social and public interaction.



2035 Masterplan Zoning



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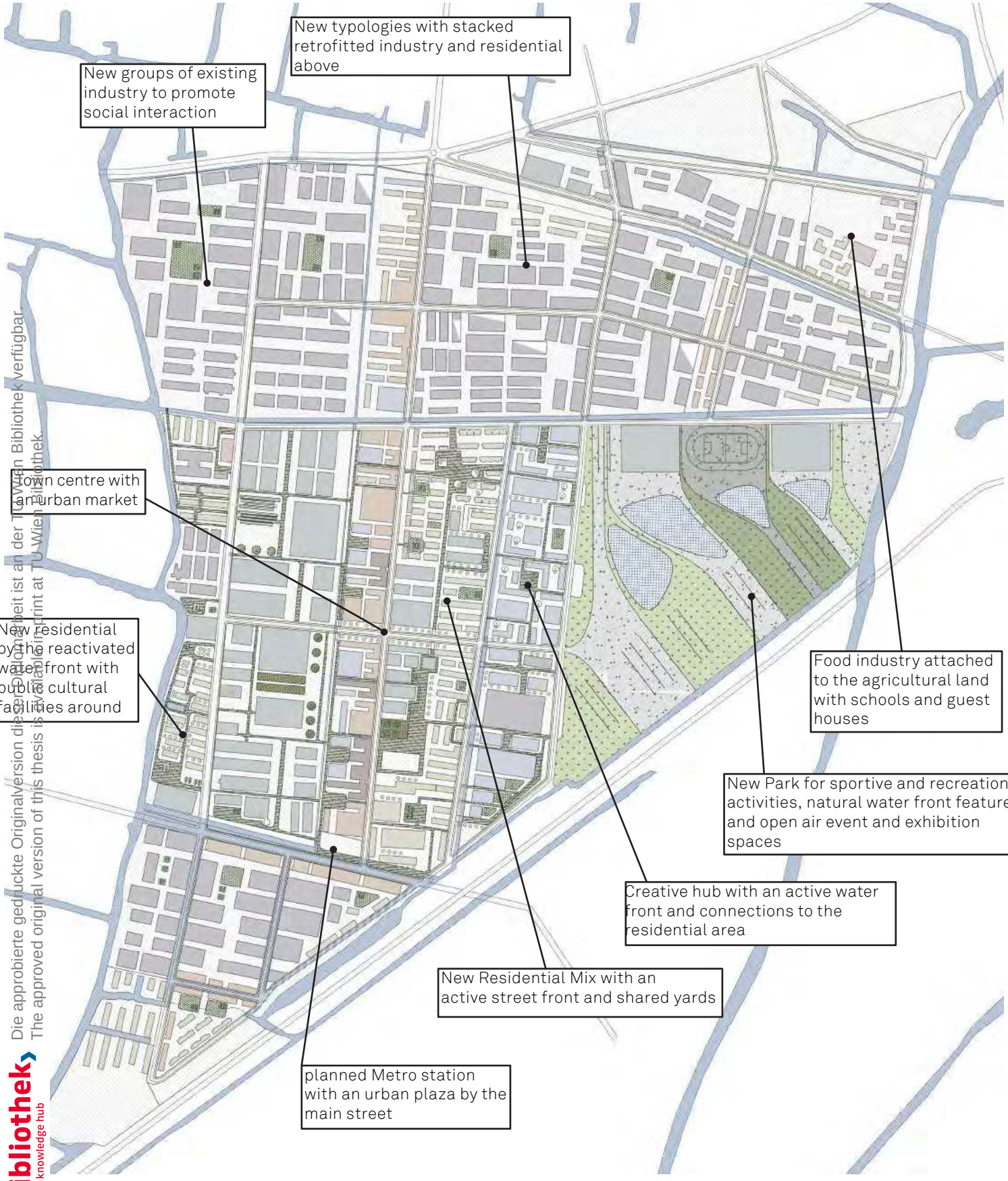
2035 Masterplan



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2035 Masterplan Functions Axonometry

Axo_Functions.jpg

2035 Masterplan Axonometry

Axo.jpg

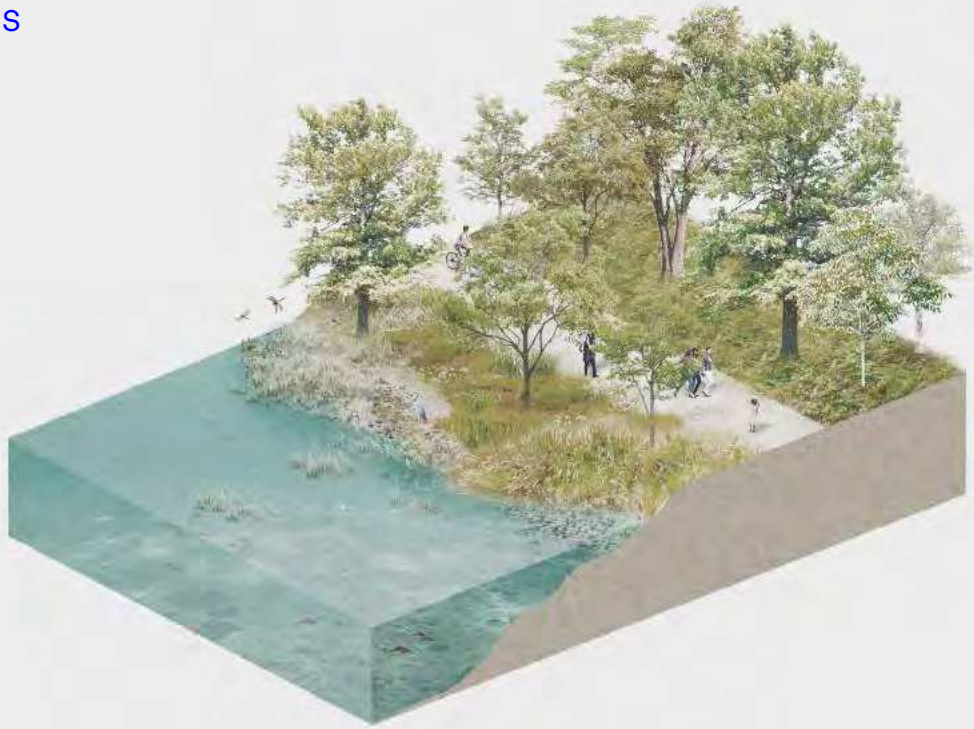
OUTDOOR
EVENT AND
EXHIBITION
SPACE

FOREST
WALK WITH
ELEVATED
PATHS

2035 Masterplan Axonometry Zoom In

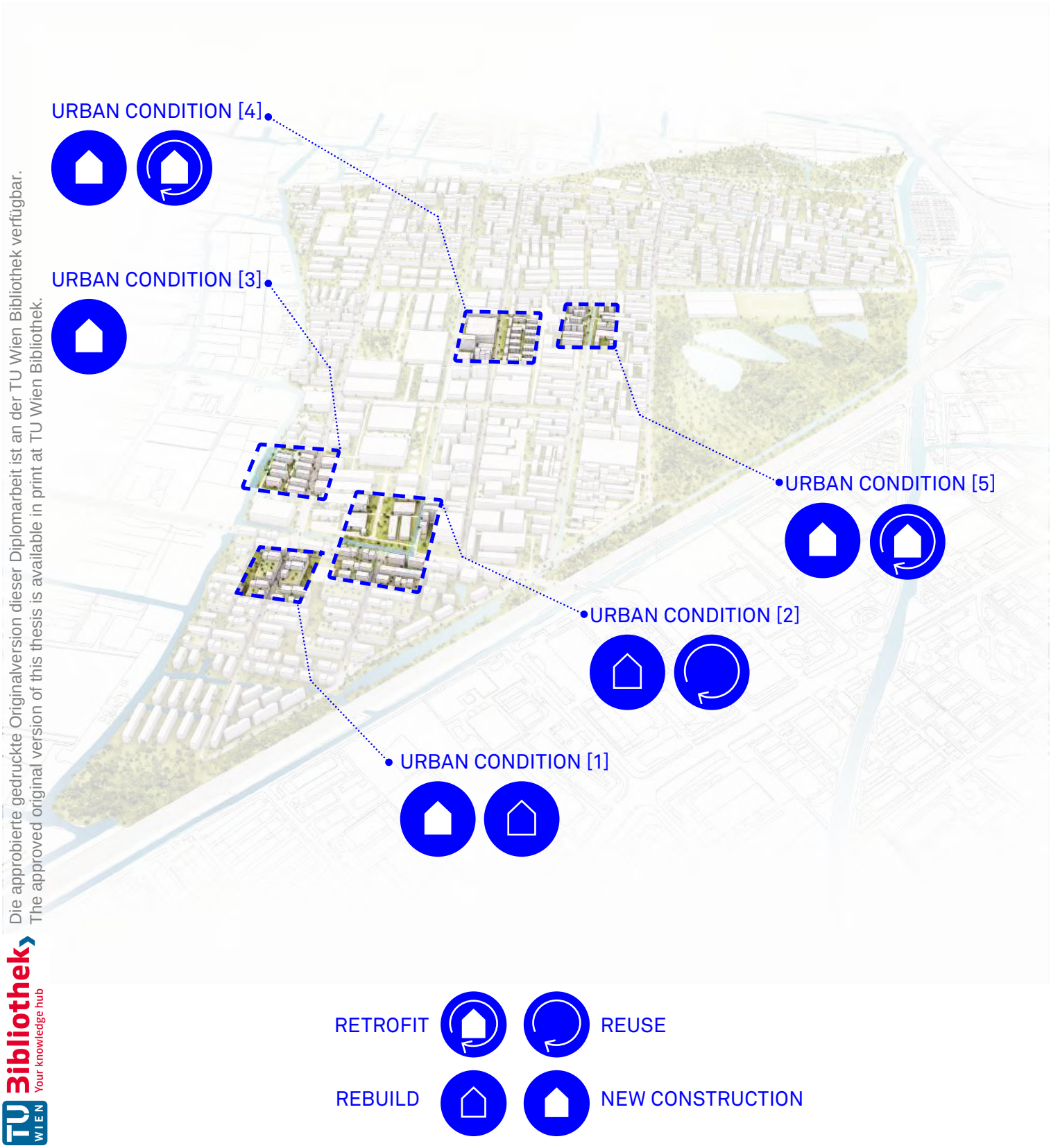
LANDSCAPE
TERRACES AND
WETLANDS

WATERSIDE
MARGINS



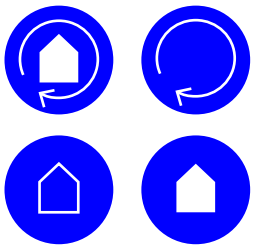
2035 Urban Conditions

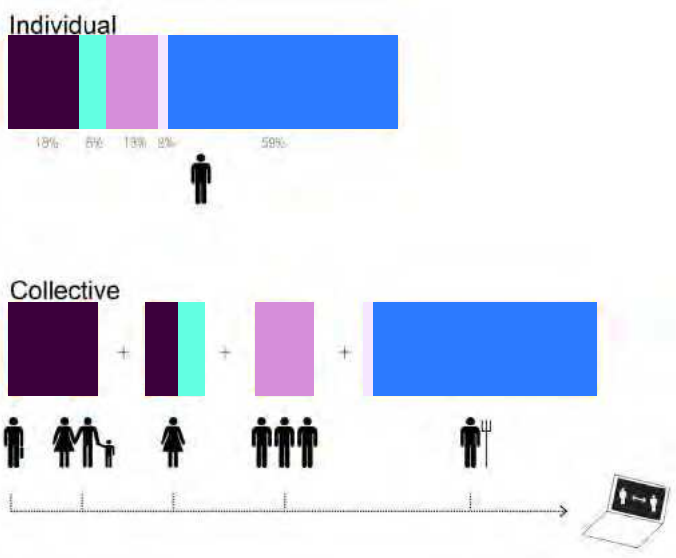
Five urban conditions will be introduced to visualize the implementation of the four interventions with the overall improvement of the connectivity and the urban public space. the five axonometric section views will present the new typologies and the reintegration of the existing.

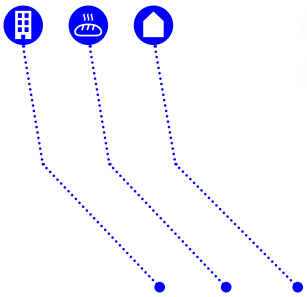


PROGRAM

The masterplan aims to reconcile the site with its environment ans its industrial and social character. It proposes creating ecological programs, connecting urban catalysts with a hybrid program of mixed and flexible uses. Urban catalysts help to regenerate their environment by creating opportunities for economic, social and cultural development. The 2035 Masterplan will provide an interface between institutions and citizens to promote urban transformation.







Residential Units above
Residential Maisonette
Residential
Residential and Commercial Parking
Commercial dry-cleaner
Medical prosthetics
Metal window manufacturer
Clothing manufacturer
Parking
Art storage
Tofu manufacturer
Local Food start-up
Furniture restorer
Shop display manufacturer
Working access yard
Computer repair shop
Picture framer
Local Supermarket

Rooftop amenity

Neighbouring strategic industrial land

Closed loop textile lab
Car body specialist
Tofu wholesaler
Yard suited for Trucks and HGV
Offices
Research Institute
Research Campus
High-tech Industry

Instant 3D printed components for machinery repair
Print and publishing factory
Graphic Designer
Food manufacturer
HGV accessible yard
Goods delivery
Metal equipment manufacturer

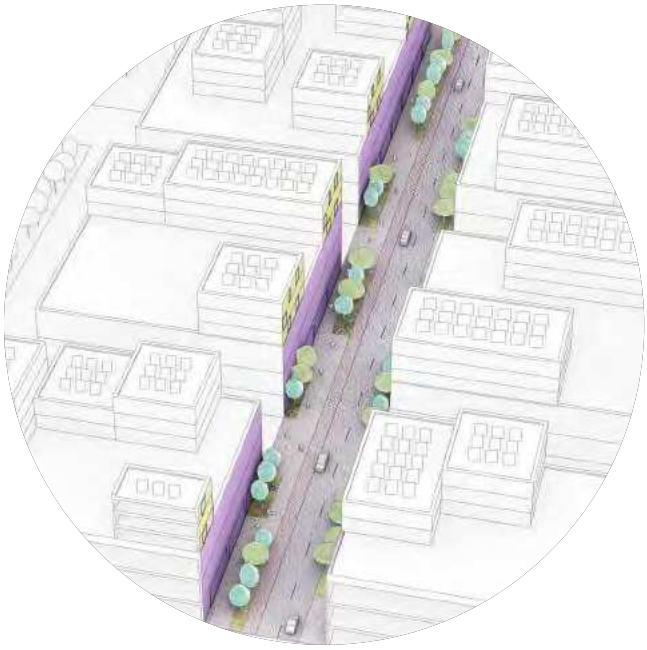
URBAN CONDITION [1]

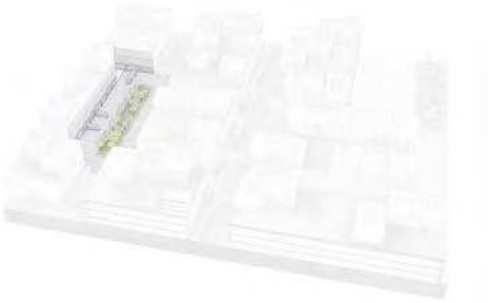
A neighbourhood next to the rapid transit hub and a large scale industrial infrastructure. A yard along the main road gives access to HGVs and other vehicles servicing a range of larger manufacturing or distribution units, whose offices or showrooms front a street.

The housing above have large courtyards on top of the industrial unit. The surrounding streets have a mix of buildings types, old and new - some existing buildings offering affordable studios, whereas others are a mix of residential and active ground floor.

STREET

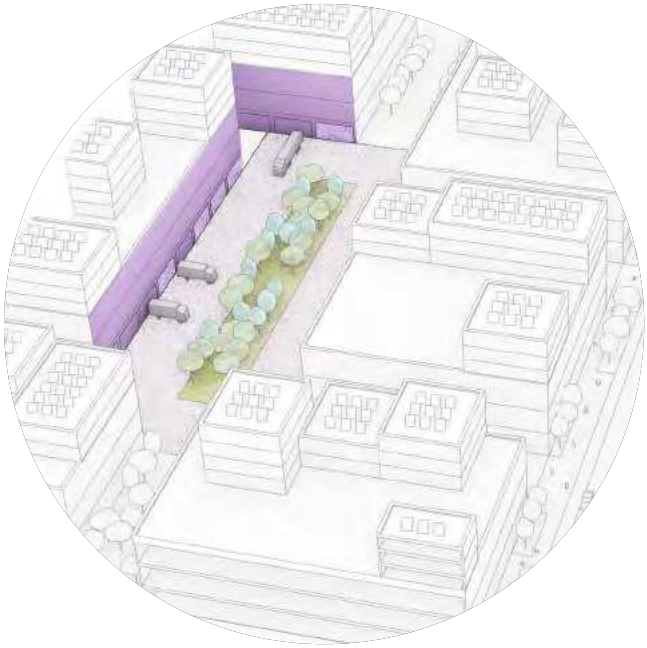
Mixed typology with industry in the lower floors, offices and showrooms front the street, enhanced with residential units above.

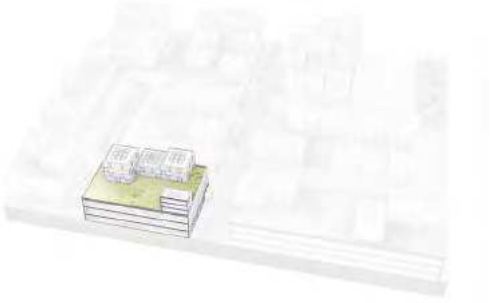




YARD

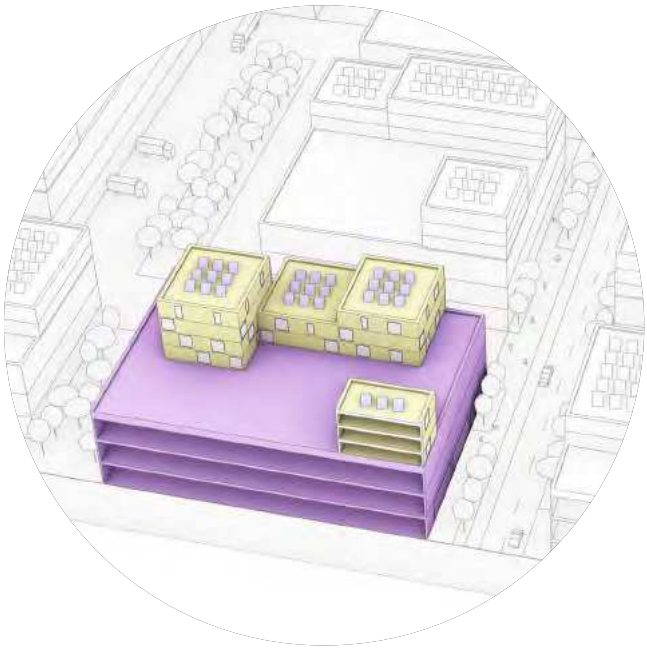
A yard along the main road gives access to HGVs and other vehicles servicing a range of larger manufacturing or distribution units.





RESIDENTIAL ABOVE INDUSTRY

The housing above have large courtyards on top of the industrial unit.

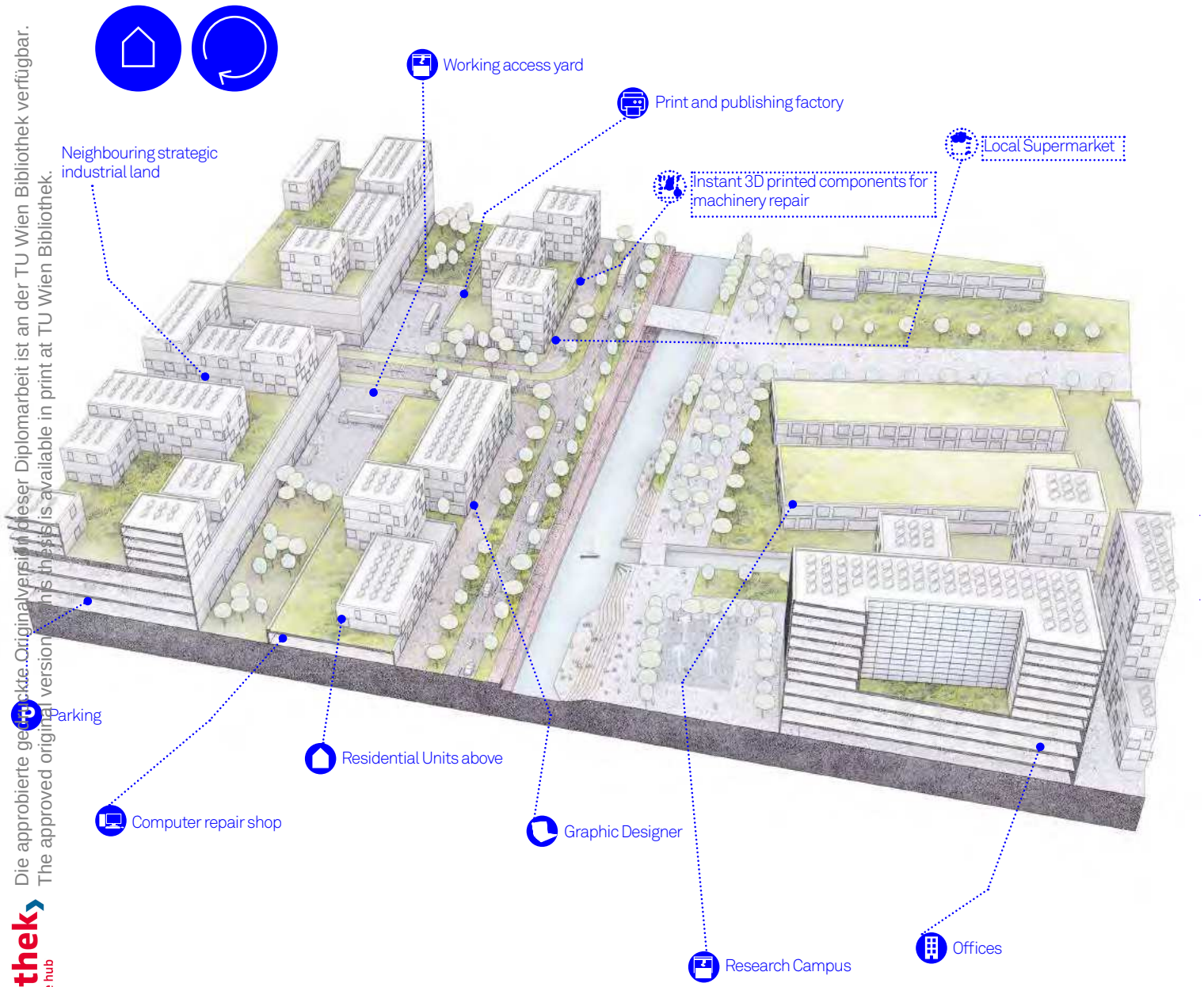


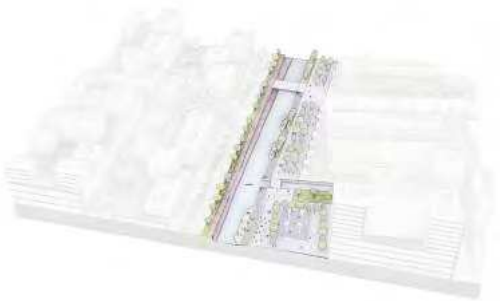
Visuals

URBAN CONDITION [2]

Large urban block that is part of a property retrofit scheme - with high density infill or replacement housing forming a perimeter block. The ground and first floors form an employment ‘plinth’ with a mixture of workspace, social infrastructure and a local supermarket or cafe.

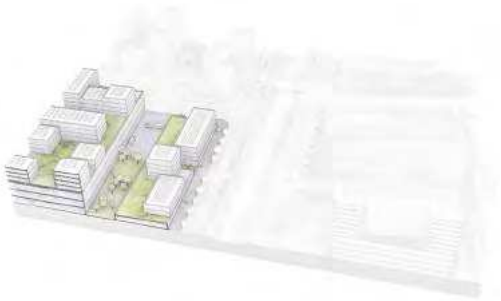
Servicing happens from the rear, where a courtyard accommodates a range of spaces for start-ups, growing businesses and community use.





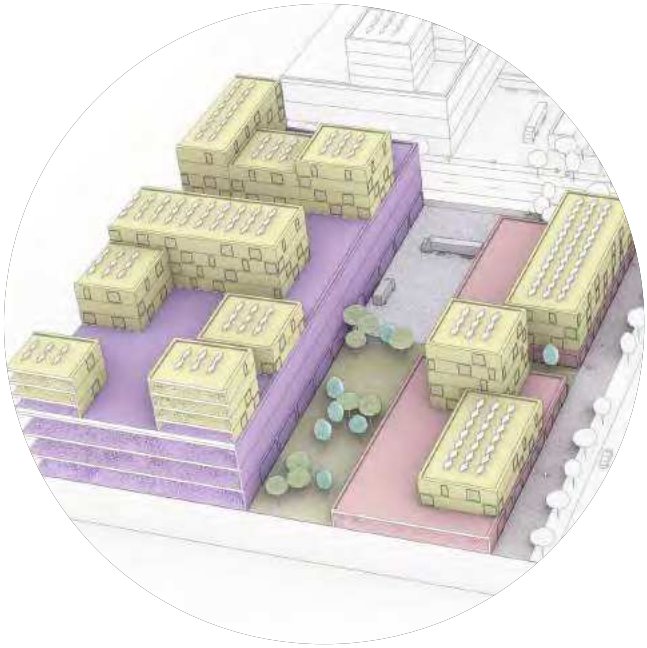
ACTIVE WATER FRONT

Layers and different scales of transportation happens along the canal, with extentions for public activities and interaction.



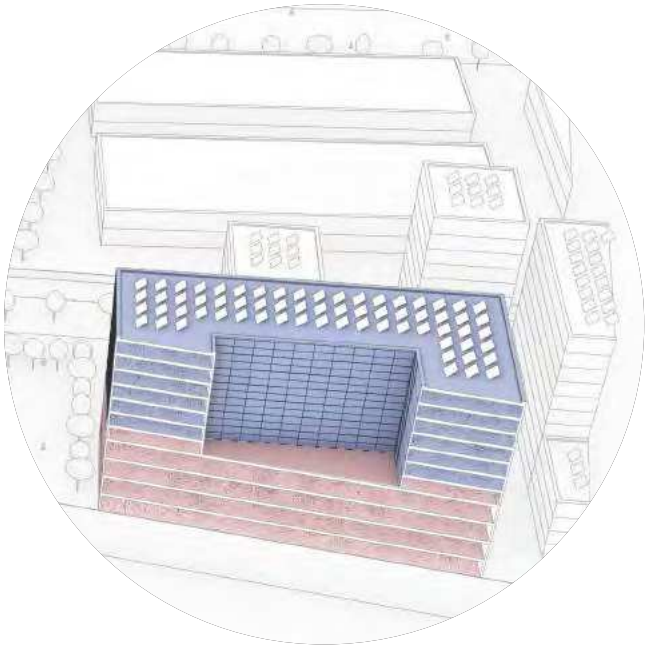
RESIDENTIAL
ABOVE INDUSTRY AND RETAIL

The ground and first floors form an employment 'plinth' with a mixture of workspace, social infrastructure and a local supermarket or cafe.



HIGH RISE OFFICE

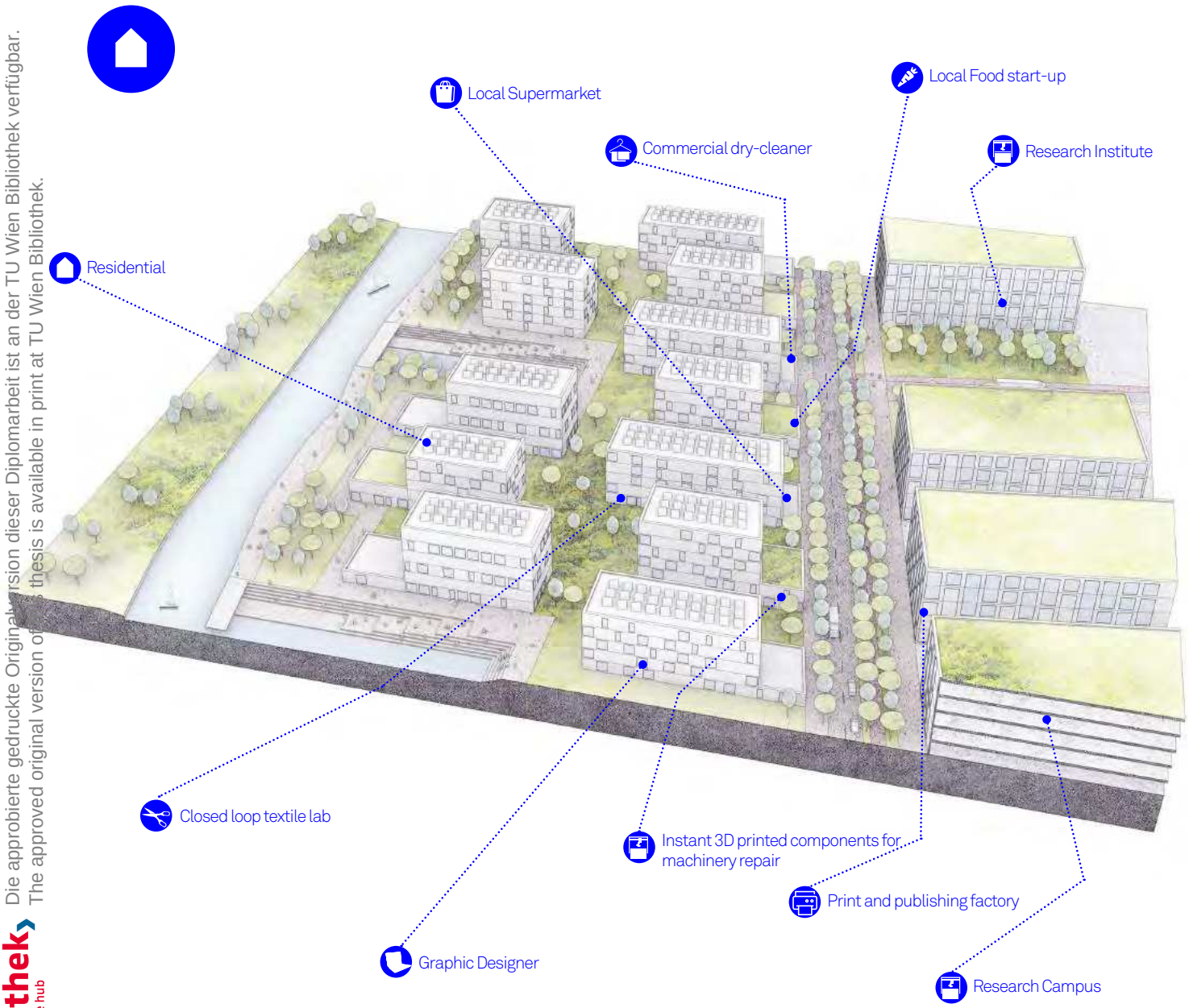
Servicing happens from the rear, where a courtyard accommodates a range of spaces for start-ups, growing businesses and community use.

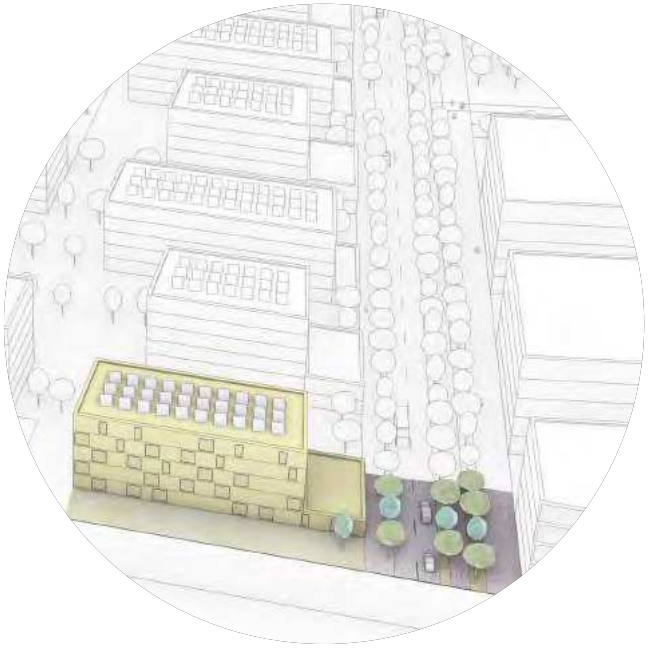


Visuals

URBAN CONDITION [3]

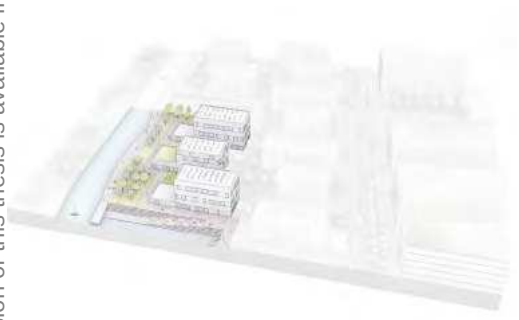
Mixed use residentials on a main road - the ground floor units fronting the street accommodate a mix of production and service activities alongside specialist retail and the occasional cafe; openings provide pedestrian access to a shared community garden, which leads to residential entrances as well as servicing a series of employment space units fit for a wide range of community-based businesses. Residential terraces are provided on the roofs of the employment space.

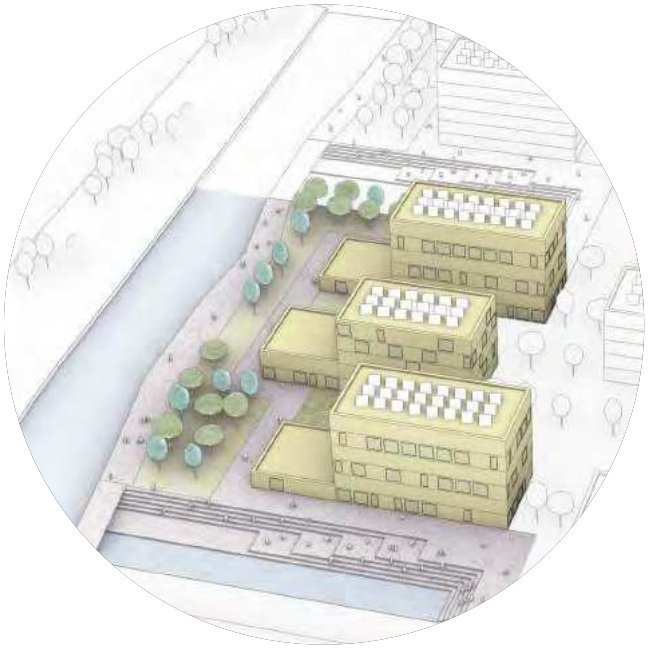




STREET FRONT RESIDENTIAL

Stepped residential with terraces on top of the employment spaces and shops, facing the revitalized main street.





WATER FRONT RESIDENTIAL

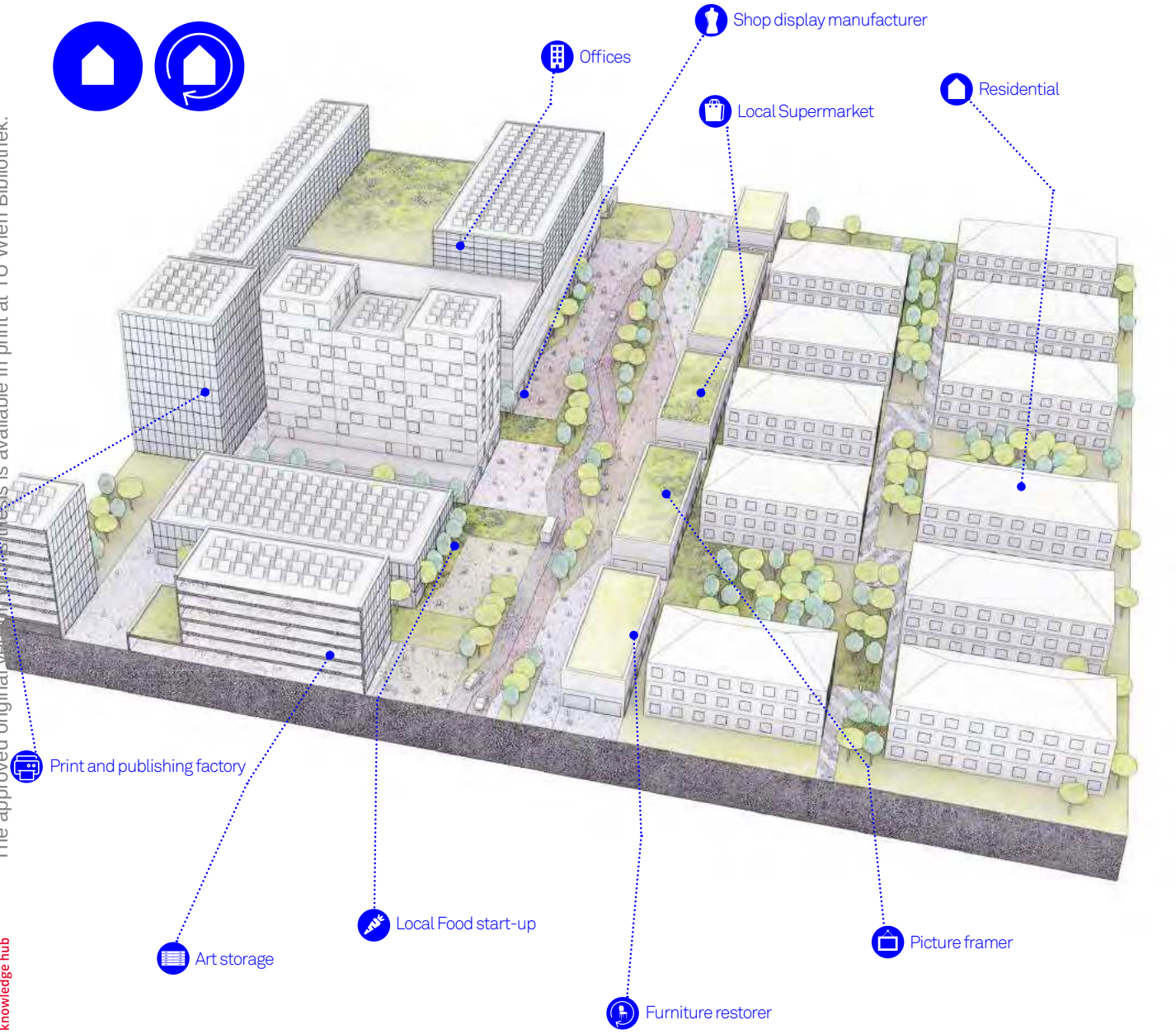
Along the canal new pedestrian and bicycle routes are provided as well as occasional recreational patches of dedicated green. Little wharfs guarantee direct access to the water.

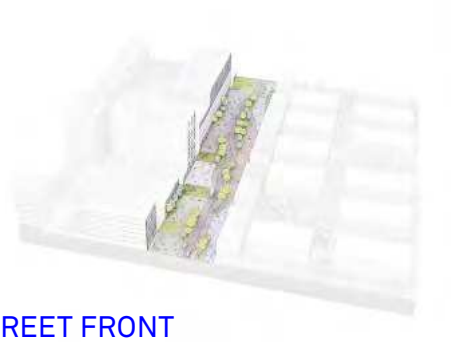
Visuals

Visuals

URBAN CONDITION [4]

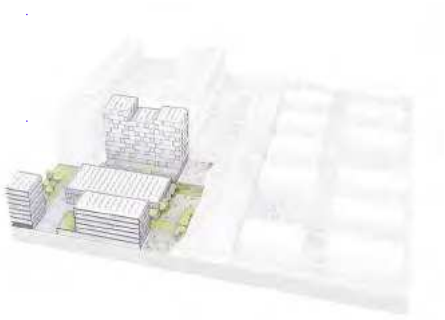
New and improved transport links create an impetus for high density residential development. A large development site borders on both existing housing and protected industrial land. A range of taller and lower residential blocks offer employment spaces on ground and first floor: larger (light) manufacturing and logistics units near the protected industrial land, and towards the existing residential area a finer grain of studio-workshop space mixed with other town centre uses. Some housing blocks have ground floor maisonettes, whereas in the centre of the site, a stand-alone workspace block offers a mix of flexible office and studio spaces.





STREET FRONT

A speed regulated street front for small shops and cafes, comprising employment space above with mixed and flexible typologies, sharing a courtyard space.



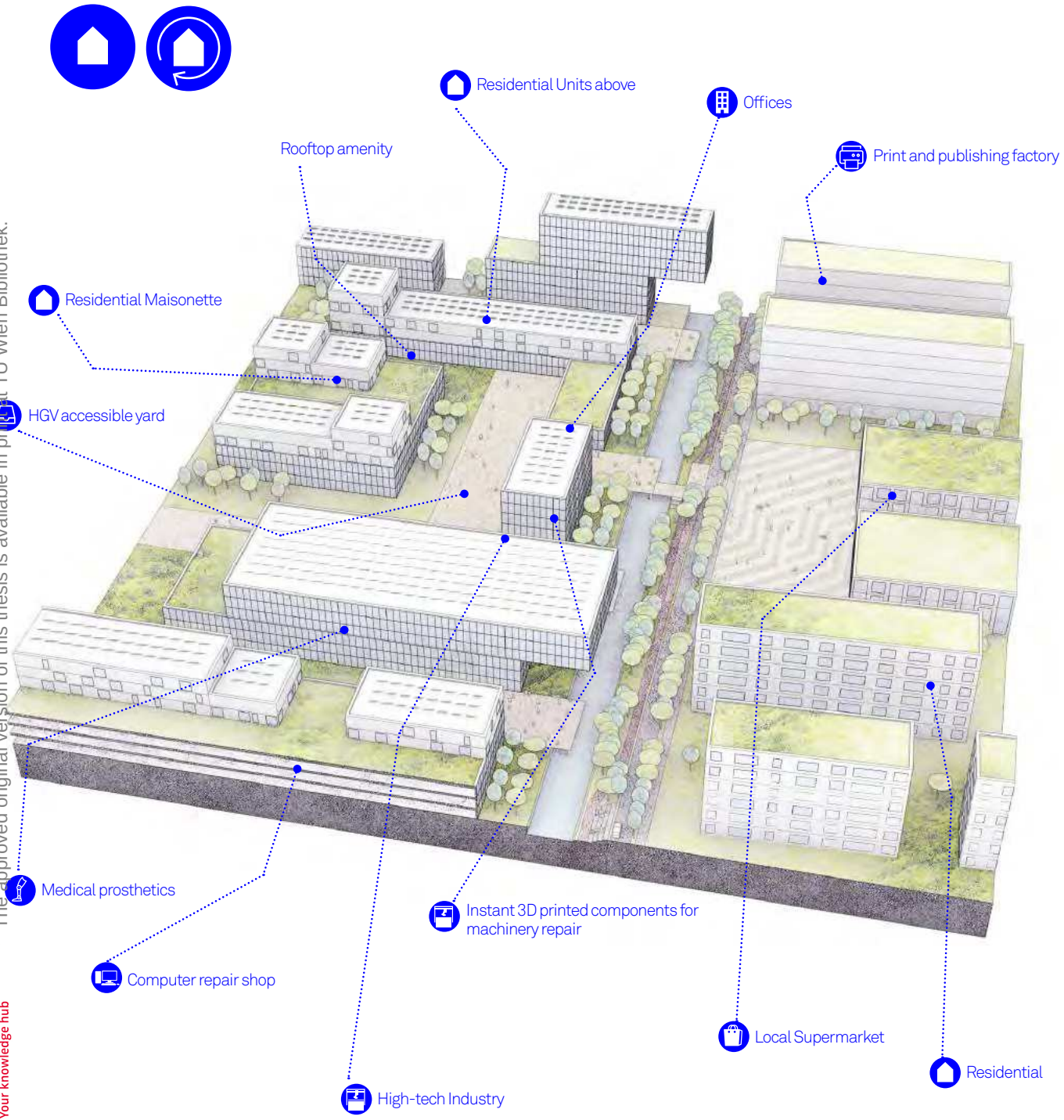
CREATIVE INDUSTRY

A finer grain of studio-workshop space mixed with other town centre uses. Some housing blocks have ground floor maisonettes, whereas in the centre of the plot, a stand-alone workspace block offers a mix of flexible office and studio spaces.

Visuals

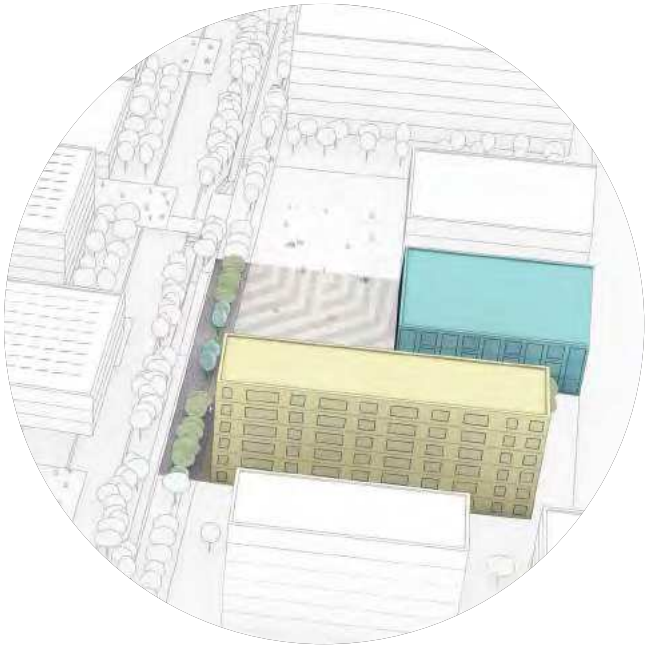
URBAN CONDITION [5]

A site on the edge of the canal in the town centre, behind the traditional main road with heavy industry. A new mixed use block has maisonettes under apartments, wrapping around a car park and with a mix of enterprise spaces to the rear. These front on a new 'enterprise promenade'; the units have mezzanines making them suitable for a range of activities, including light industrial or craft makers who sell from the premises. A bar can be allocated too.



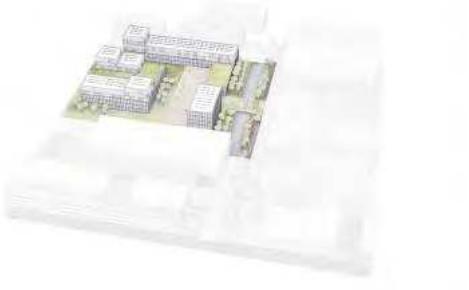
WATER

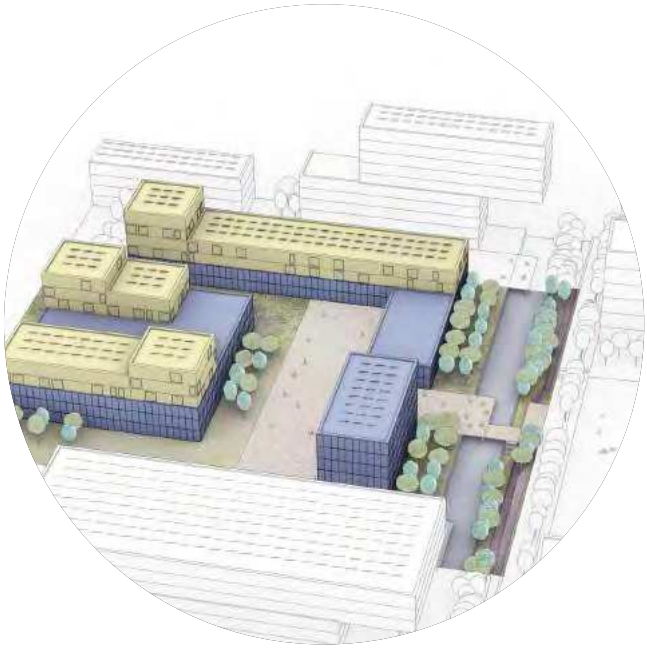
The water side is activated with small piers bridging from the mixed business zone to the residential part with education institutes and nurseries.



EDUCATION AND CULTURE

Existing residential is retrofitted and supported with additional community and public funtions, that share an open space facing the canal.



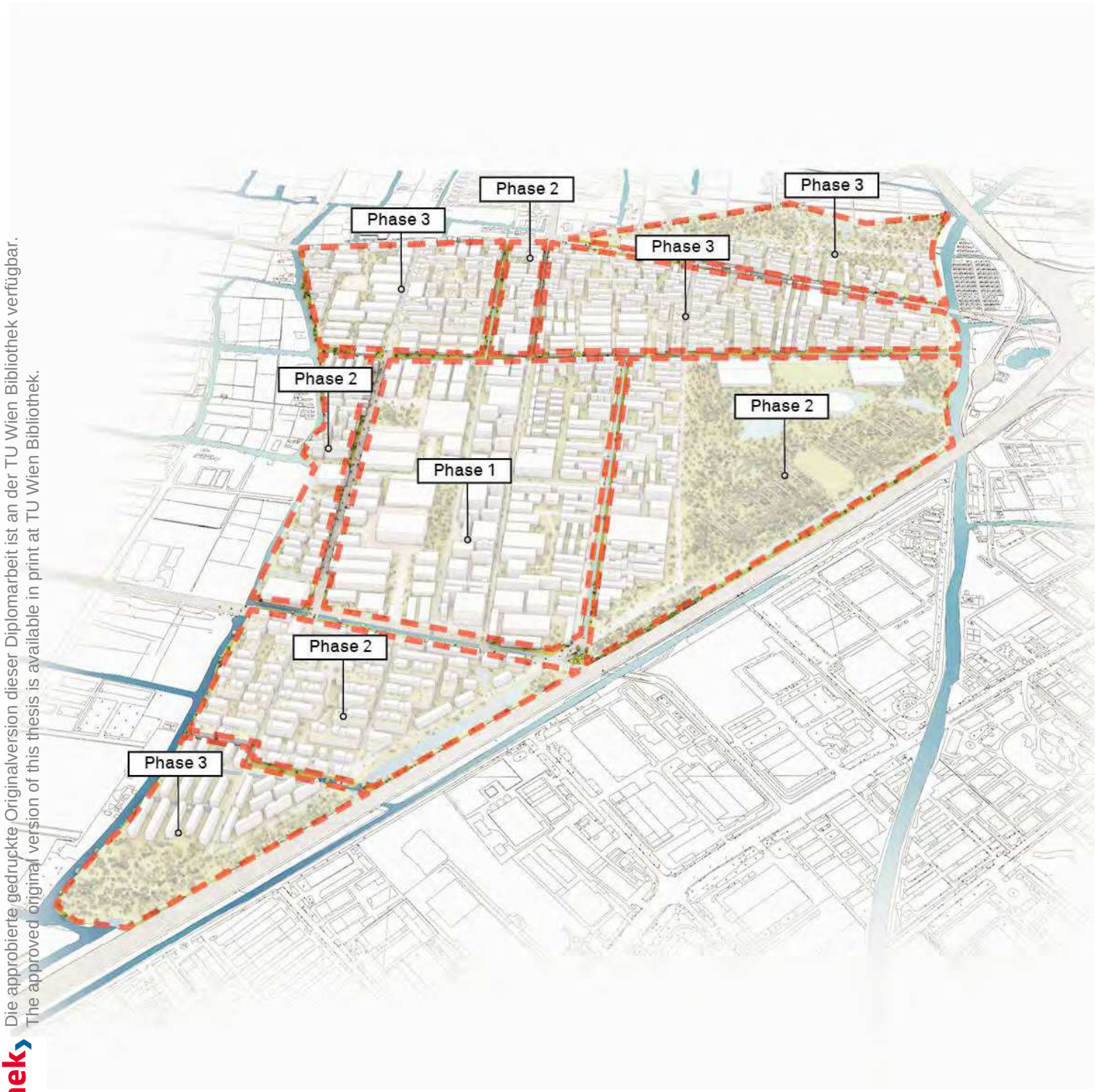


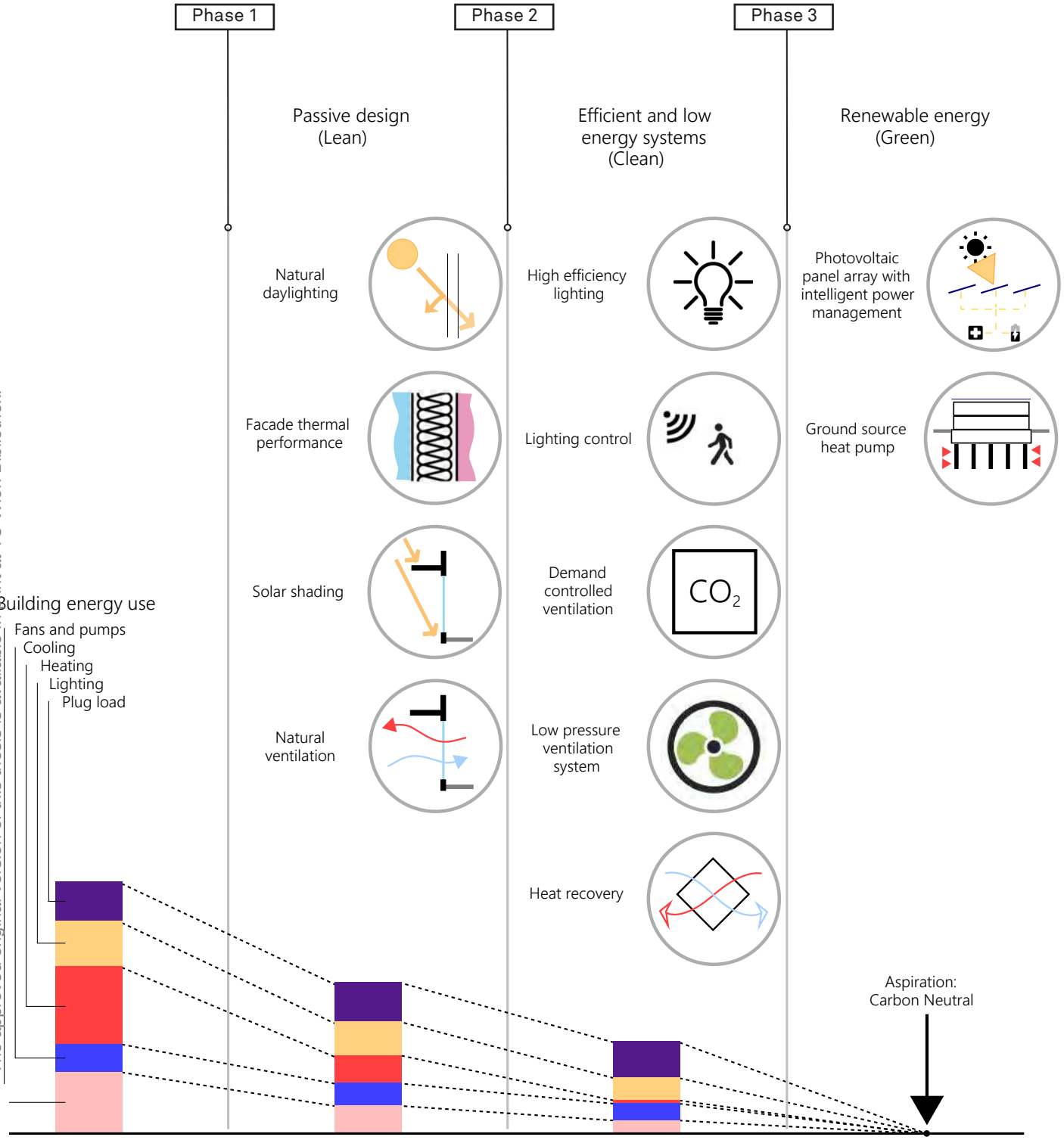
RESIDENTIAL ABOVE OFFICE

Large mixed office units offer large residential units above with maisonettes and a common promenade in front.

Visuals

// Phasing





Energy strategy
CO2 emissions reduction approach

6

CONCLUSION & REFLECTION

the strategic and analytic outcome of the design proposal will be critacally evaluated and a conclusion is formed.

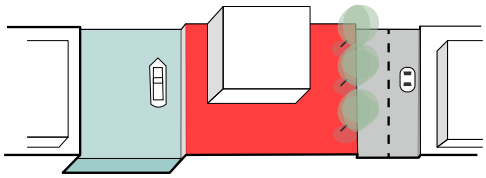
CURRENT CONDITIONS

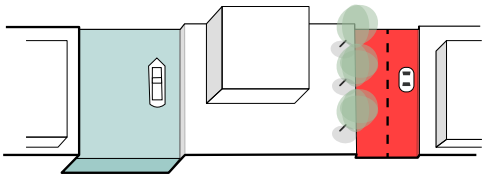
Industrial Plots

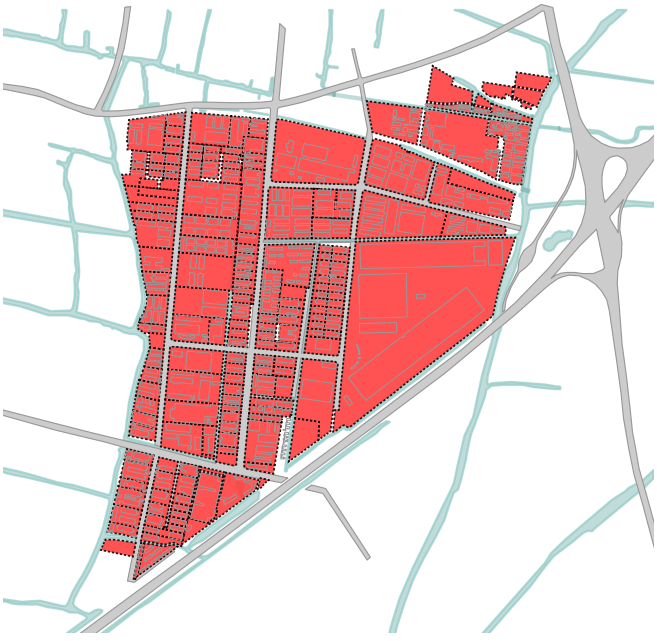
Industrial areas comprise plots with large dimensions when compared to urban blocks. While blocks in the city are between 50 to 80m wide, industrial plots reach up to 150m. This is too deep for incorporationg subdivisions for urban functions. Consequently, there is the need for new types of urban development

Industrial Roads

Industrial functions often require large-scale infrastructure, wide-roads that are suitable for cargo traffic. These broad streets can offer spatial opportunities for alternative usage and new functions, integrating social and public space.





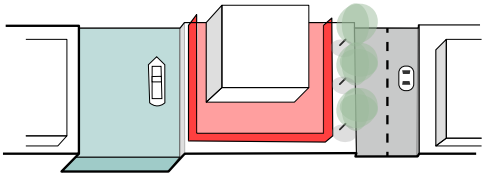


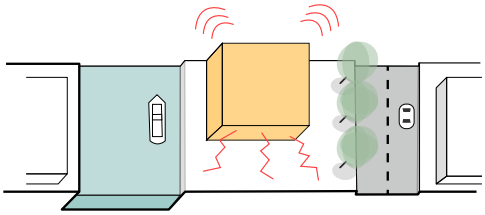
Inaccessibility

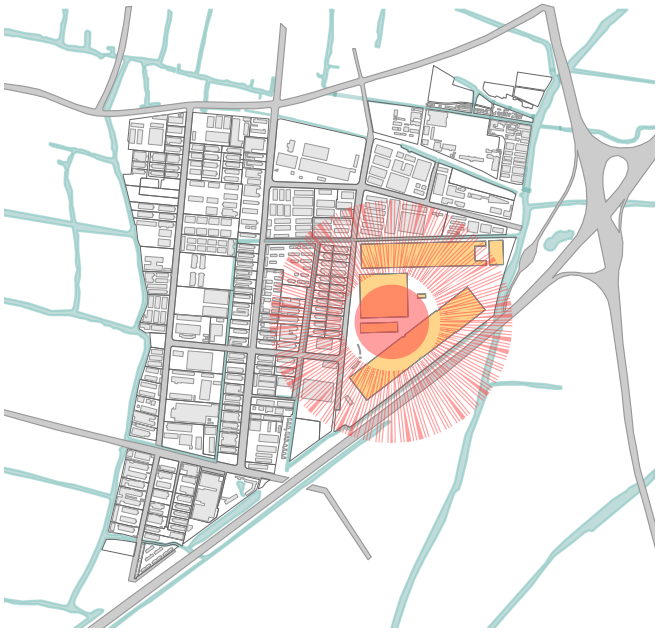
Due to the industrial zoning and private enterprises, the area is poorly accessible. Most of the Companies have barriers, that run through the whole site and separate urban functions and limit the access to the water front. The roads in Miao San Lu are not located by the water, the closed-off subdivisions decrease the accessibility of the area.

Environmental Impact

Since the area still comprise some heavy industry, their safety contours are common limitations for urban developments. The companies with such contours are mainly clustered, such as the Longgang Fork lifts. Consequently, if one of the companies moves out, it has only a small impact on these contours.





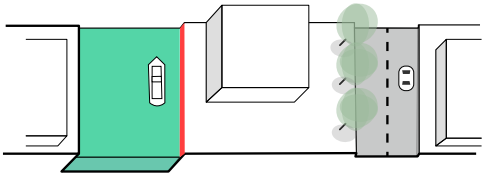


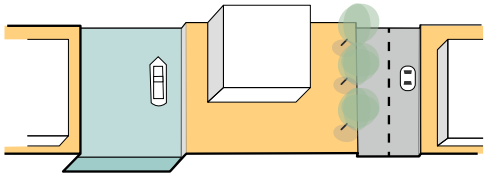
Water and Canals

In Miao San Lu, The canals are often used by the industry. There is no promenade structure to make them more permeable. Implementing quays can improve the permeability of the waterfront and contribute to environmental interaction, as well as social spaces with higher climatic quality.

Paved Surface Area

The plots are mainly covered with hardscape. Implementing a drainage system would help to collect waste water and rain water in order be link them to purifying systems. Replacing part of the hardscape with permeable materials would increase the visible and climatic quality of the areas.



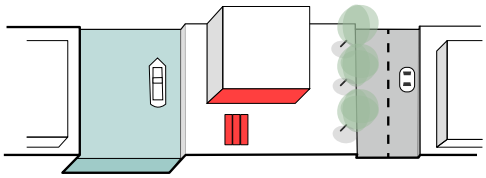


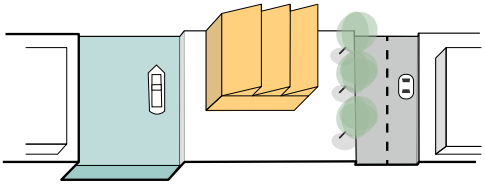
Building Materials

Most of the buildings in the area are in a poor condition, the existing construction does not present high quality. Applying interventions of reuse and rebuild, the materials can be recycled and reimplemented. These materials can be stored and tranformed in local companies.

Industrial Character

Miao San Lu industrial are is relatively young and does not have classic 19th century heritage. However, it comprises a collection of charming places and nature. The characteristic shed roofs can be found here in large and small industry types. On top of the character, it also links to the development strategy, while applying reuse and rebuild.





Current Aerial View

Axo_existing.jpg

2035 Masterplan Axonometry

Axo.jpg

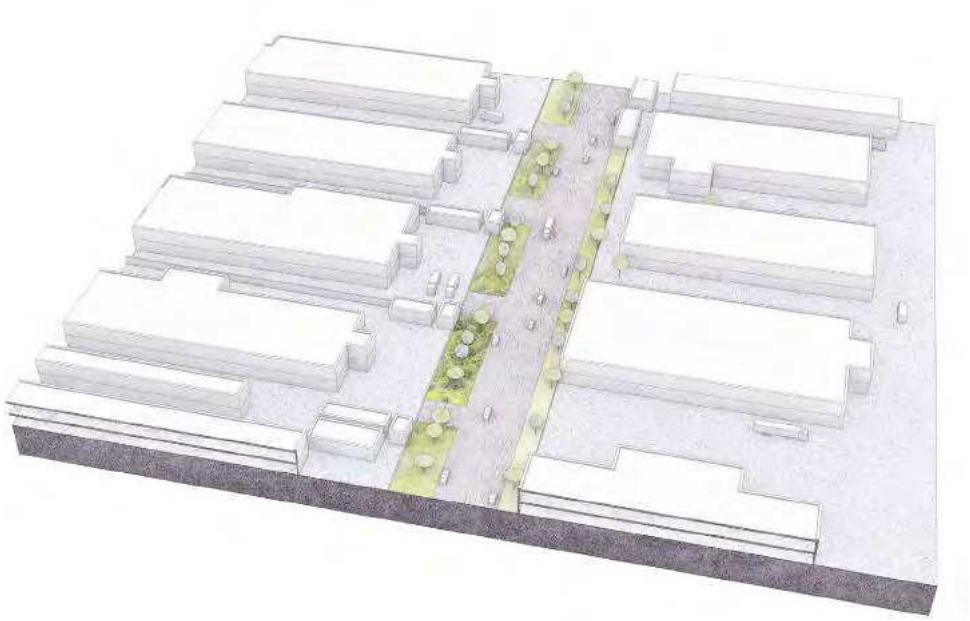
Sections Before and After

URBAN CONDITION [1]

New and improved transport links created an initial acupuncture for high density residential development. Once flat and surrounded by plot boundaries, offer today a range of taller and lower residential blocks with employment spaces on ground and first floor: larger (light) manufacturing and logistics units near the protected industrial land, and towards the existing residential area a finer grain of studio-workshop space mixed with other town centre uses. The cargo streets of the existing scheme are made compatible with urban functions to enable social and public interaction and increase green areas and drainage possibilities.

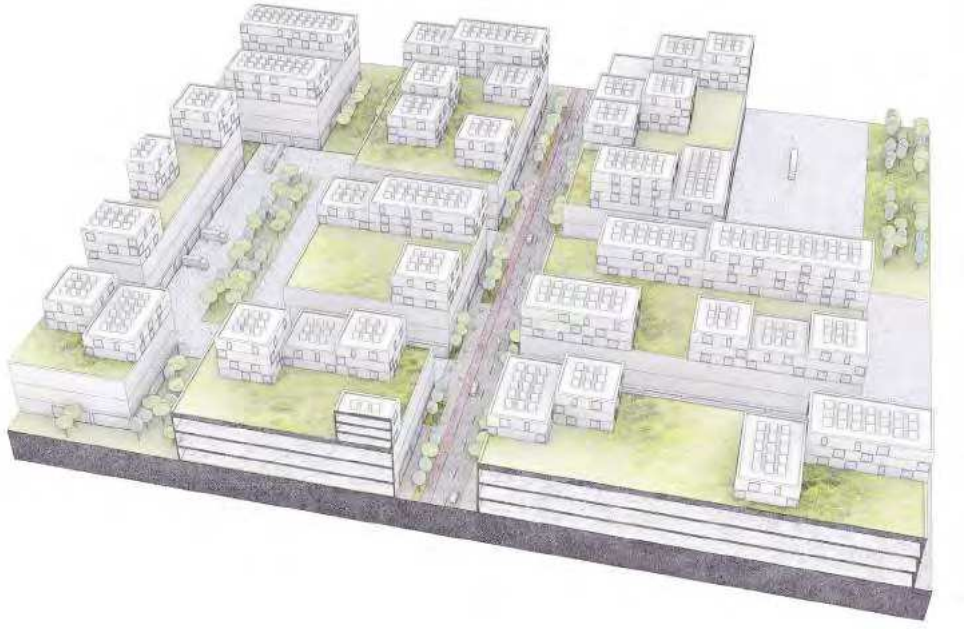
Before

low rise
gated yards
wide streets
lack of green



2035

Mixed functions
shared yards
stacked industry
mixed street use
green roofs
finer grains
better accesibility



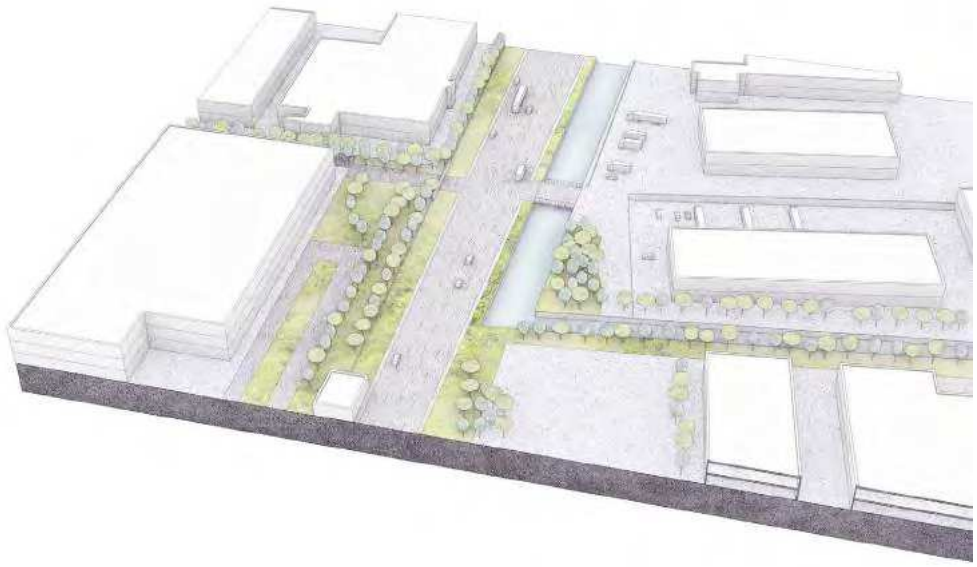
Sections Before and After

URBAN CONDITION [2]

Large but low rise industrial structures, comprising huge amount of land and covering the area with hardscape are retrofitted. The ground and first floors form an employment 'plinth' with a mixture of workspace, social infrastructure and a local supermarket or cafe. Servicing happens from the rear, where a courtyard accommodates a range of spaces for start-ups, growing businesses and community use. The canals were entirely detached from areas character and atmosphere, it was inaccessible for the residents. Introducing different types of mobility also helps to reintegrate the canal and create a second and a third layer in the public realm.

Before

low rise
large structures
detached canals
wide streets
blind street fronts



2035

optimized function mix
shared yards
stacked industry
active street fronts
green roofs
finer grains
better accesibility
reintegrated canals
recreational spaces

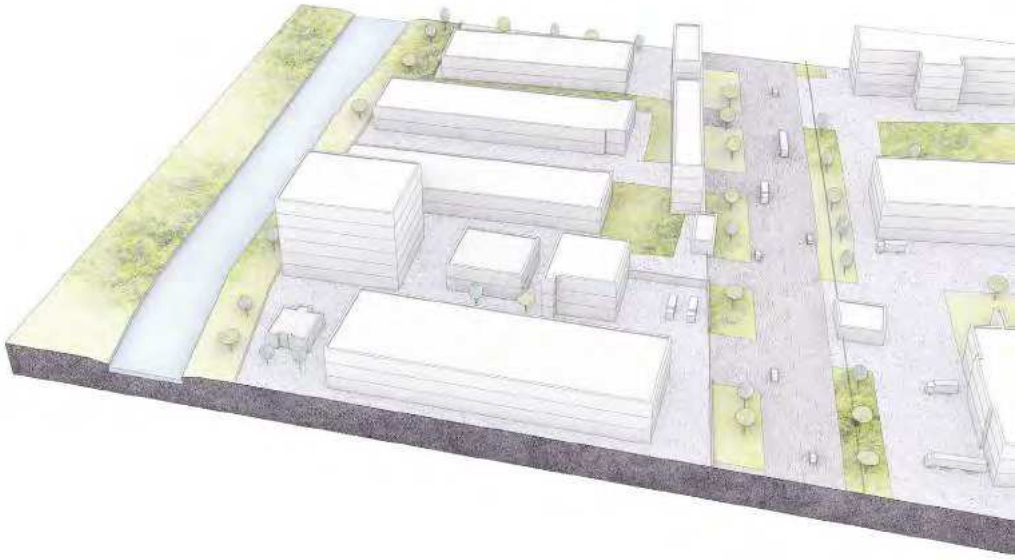
Sections Before and After

URBAN CONDITION [3]

Mixed use residentials on a main road - the ground floor units fronting the street accommodate a mix of production and service activities alongside specialist retail and the occasional cafe; openings provide pedestrian access to a shared community garden, which leads to residential entrances as well as servicing a series of employment space units fit for a wide range of community-based businesses. Residential terraces are provided on the roofs of the employment space.

Before

blind street front
gated yards
wide streets
lack of green
lack of identity



2035

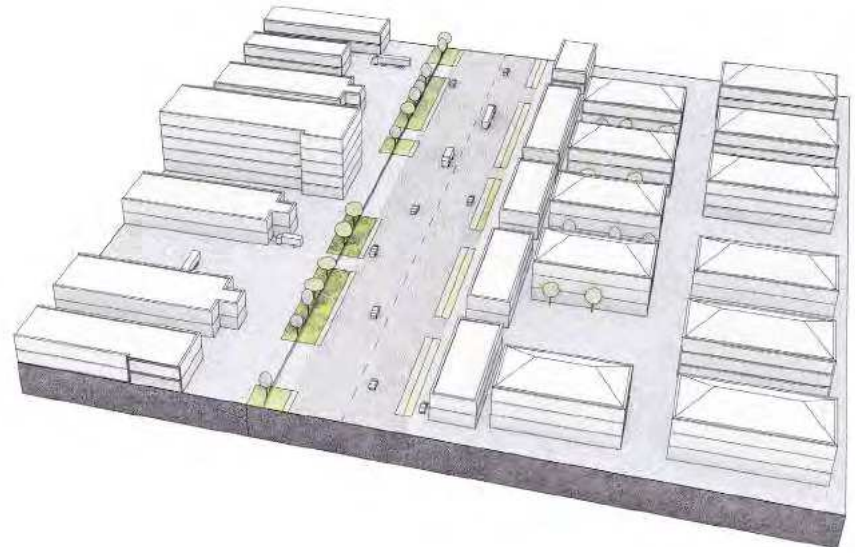
new functions
activated street front
quality public space
integrated natural elements
high quality living
finer grains
better accesibility

URBAN CONDITION [4]

A large industrial site borders on both existing housing and protected industrial land. A range of taller and lower residential and retails blocks offer employment spaces on ground and first floor: shops, markets, cafes and small start ups, and towards the existing residential area a finer grain of studio-workshop space mixed with other town centre uses. Some of the offices structures allow stand-alone workspace block with a mix of flexible office and studio spaces, that are compatible and desired in proximity to residential funtions.

Before

scarce
low rise
low quality residential
wide noisy street
blind street front
no sidewalk



2035

New function mix
high urban structures
reduced speed limit
better connectivity
lively street fronts
social interaction
green roofs
finer grains
better accesibility

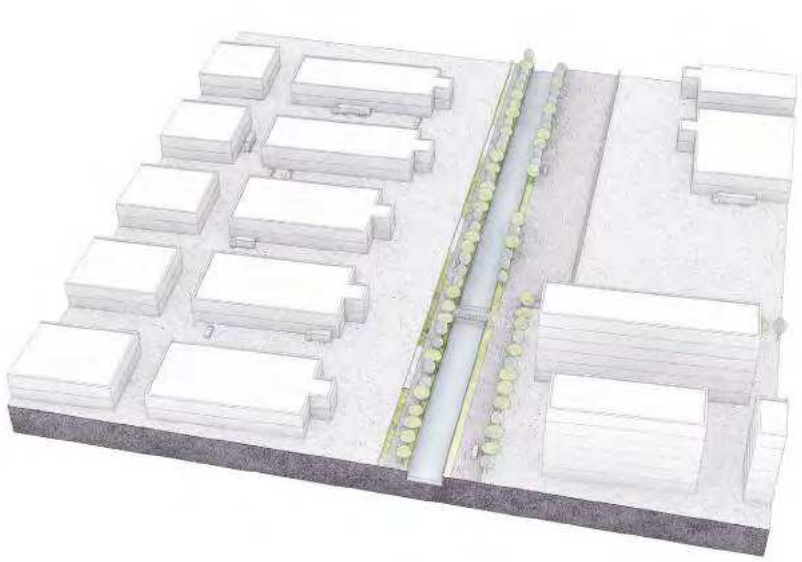
Sections Before and After

URBAN CONDITION [5]

A site on the edge of the canal in the town centre, behind the traditional main road with heavy industry blocking the access to the canals that offer a great potential as climatic appropriate public and social spaces. A new mixed use block has maisonettes under apartments, wrapping around a car park and with a mix of enterprise spaces to the rear. These front on a new 'enterprise promenade'; the units have mezzanines making them suitable for a range of activities, including light industrial or craft makers who sell from the premises. A bar can be allocated too. Both side are well connected with piers and bridges, allowing flexibility for any kind of circulation.

Before

low rise
gated yards
no water side
lack of green



2035

Mixed functions
shared yards
stacked uses
public spaces
green roofs
finer grains
better connectivity
water as the connecting element

BENEFITS OF THE NEW REGENERATIVE APPROACH

With the new urban mix, the amount and range of employment space is increased and high quality urban public spaces are built. A growing stock of diverse employment space will comprise several hectares of new employment space, will better support the growth of a wide range of current and future sectors from low to high employment density, from creative tech to advanced digital manufacturing, from food to production to artist studios and design-intensive crafts and from social enterprises to last-mile distribution and the circular economy of maintenance, repair and re-use.

Critically it will benefit both start-up businesses, supporting skills and the evolution of a rich economic ecosystem, and enabling effective business engagement and interaction with local communities. This will make local and district wide economies more diverse, innovative, inclusive and resilient.

The 2035 Masterplan have benefits for the community and the city as a whole - by improving the vibrancy, sence of safety and district character of neighbourhoods, by maintaining a critical mass for local activities and sociable spaces that make a city liveable, healthy and innovative, and through the environmental benefits of localized supply chains, reduced commuting and the potential for balanced district energy systems.

As shown through some of the the case studies, providing the right kinds of employment space does not impact negatively on housing delivery aspirations and property values, it rather can help creating good places that support the residential market in mixed neighbourhoods.

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Appendix

/ Theoretical Framework

By 2050 more than two-thirds of the global population will settle in urban areas. The main drivers of this population growth will be India (+416m), China (+255m) and Nigeria (+189m), which makes 35% of the world's urban population. The number of megacities that are home to more than 10 million people will increase to 43 by 2050 (Future Cities, Stats from the United Nations, 2019). In this regard, Megacities like Shanghai play a central role in tackling climate change as well as engaging with its effects.

Since urban metropoles are under direct threat from the impacts of demographic changes and climate change but at the same time contribute much to it, the potential role of urban regeneration can play a significant role. In the following, Oliviera and Balaban (2013) highlight aspects of sustainable urban regeneration and suggest application strategies including retrofitting, mixed-use developments and promotion of green spaces and water.

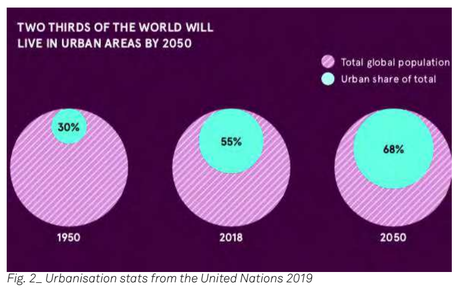
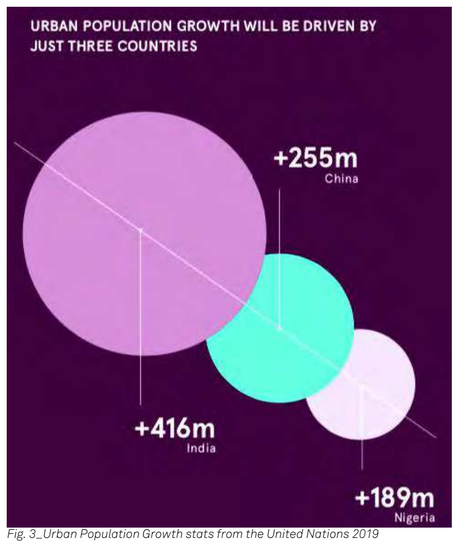


Fig. 2_ Urbanisation stats from the United Nations 2019



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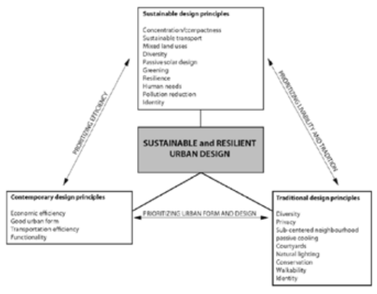


Conceptualisation of Sustainable and Resilient Design (Bahrainy and Bakhtiar, 2016)

Fig. 5_UN Habitat Sustainable Development Goals

Literature	Nature	Mobility	Function	Structure	Design Rules
Oliviera and Balaban 2013	use of underutilized lands	reducing commuting time and distance, increased non-motorized and public transport coverage	promotion of green spaces and water	turn existing buildings into low-carbon and less vulnerable structures, retrofitting existing structures	energy and resource efficiency
Mostafavi, 2010	landscape as the medium for the construction, water as the linking element				connective, ecological and resilient role of water
Sieverts 2008	save resources that affect the ecology and the economy			reusing the existing industrial landscape	develop local particularities, counter international tendencies to sameness and homogenity, promote complexity, evaluate local specifications
Urhahn Urban Design, 2006	Minimise environmental disruption	Separate access routes for different uses, Encourage built parking solutions	industrial activities alongside with residential uses, intensify and update the industry	Encourage vertical stacking of uses, Promote flexible building types	Make the most of existing assets
Ascher 2005		connect scales, speeds, and timeframes, transport technologies, information	access to housing, work, education, culture, health in proximity to each other	mobility hubs, intermodel structures	
Jacobs 1999	a loop eliminating the impact on the environment			self-sustained development	environment-economy integration, futurity, environmental protection, equity, quality of life, and participation
Braae, Diedrich 2012					develop less generic site-specific answers, result is the sum of the bridges between the existent and the intervention
Lister 2010					Resilience, recover from disturbance and to accommodate change
Berkes, Colding, and Folke 2003					maintain core attributes, system to self-organise, create capacity for learning and adaptation in the context of change
Goodman 1975					Transformation: composition, decomposition, weighting, ordering, (re)organise them for perception and action, deletion and supplementation, i.e. excising old material and replacing it with something new
Catalogue of Design Tools and Guide lines					
	activating water	promoting pedestrian circulation	promoting public space	implementing self sufficient systems	reduce pollution
		reduce commuting	mixed use	reducing land coverage	creating identity
				reuse	introducing state of the art technology

Fig. 7_Shanghai map from Google earth 2019

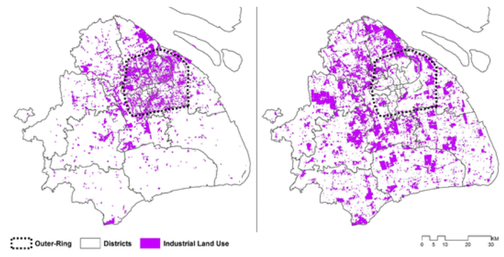


Fig. 8_Industrial land use

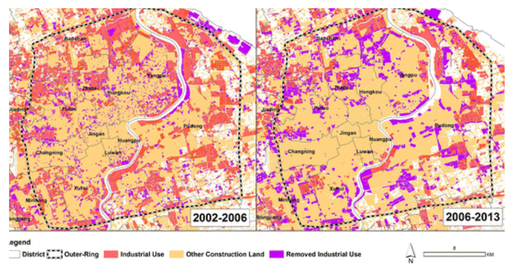


Fig. 9_Industrial land distribution

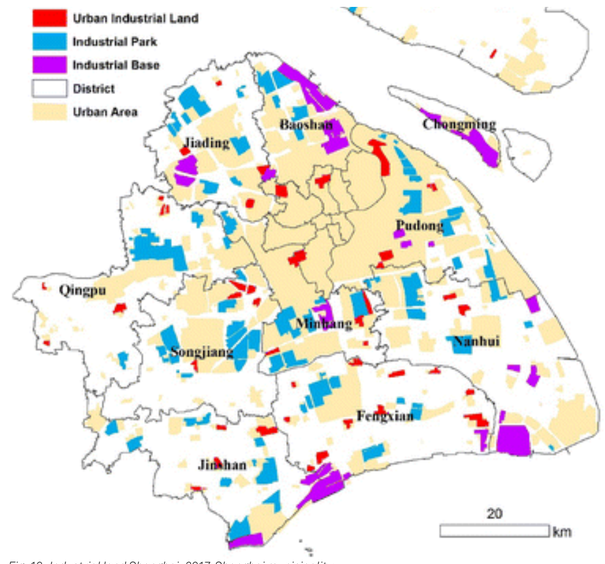


Fig. 10_Industrial land Shanghai, 2017, Shanghai municipality

/ International Literature

The literature review demonstrated that post-industrial sites hold the potential to serve as social spaces with a sustainable environmental impact. It also suggested a specific set of key factors for successful urban regeneration, such as the implementation of renewable resources, advanced mobility and accessibility, human-scale public spaces, and promotion of diverse service functions.

The most relevant factors pertinent to the design assignment are extrapolated and will form a catalogue of urban principles. Those specifically include the degree of transformation, retrofitting strategies, implementation of flexible structures, the mix of uses, mobility, the role of water, focus of regeneration, heterogeneity and main key features for the identity of a place.

Catalogue of Design Tools and Guide lines				
Tools				Design Rules
Nature	Mobility	Function	Structure	
use of underutilized lands	reducing commuting time and distance	promotion of green spaces and water	retrofitting existing structures	energy and resource efficiency, turn existing buildings into low-carbon and less vulnerable structures
water as the linking element	Separate access routes for different uses	industrial activities alongside with residential uses	reusing the existing industrial landscape	connective, ecological and resilient role of water
Minimise environmental disruption	connect scales, speeds, and timeframes, transport technologies, information	access to housing, work, education, culture, health in proximity to each other	vertical stacking of uses	develop local particularities, counter international tendencies to sameness and homogenity, promote complexity, evaluate local specifications, save resources that affect the ecology and the economy
a loop eliminating the impact on the environment	increased non-motorized and public transport coverage	intensify and update the industry	flexible building types	Make the most of existing assets
	built parking solutions, mobility hubs, intermodel structures		self-sufficient systems	environment-economy integration, futurity, environmental protection, equity, quality of life, and participation
				develop less generic site-specific answers, result is the sum of the bridges between the existent and the intervention
				Resilience, recover from disturbance and to accommodate change
				maintain core attributes, system to self-organise, create capacity for learning and adaptation in the context of change
				Transformation: composition, decomposition, weighting, ordering, (re)organise them for perception and action, deletion and supplementation, i.e. excising old material and replacing it with something new

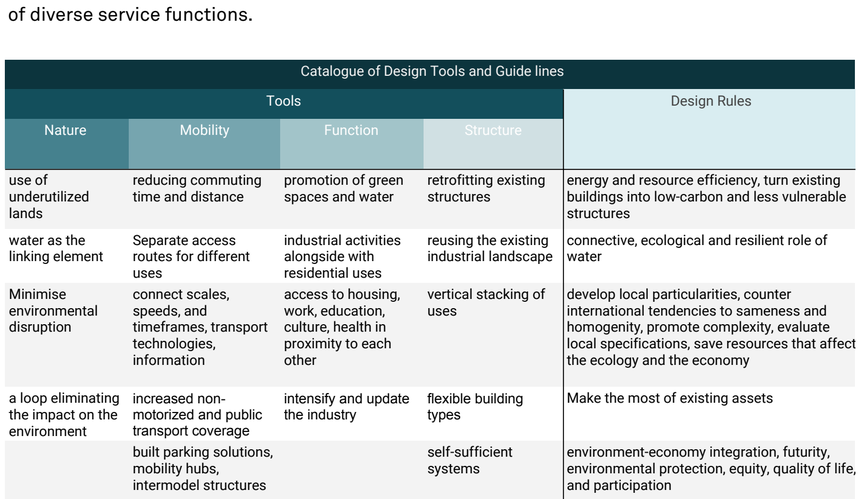


Fig. 38, 39, 40_Miao San Lu Industry, Xinqiao Town Government Work Report, 2015

The chosen site for the implementation of a design proposal is the Miao San Lu Industrial area in Xinqiao Town. Xin Qiao town lies in the southwestern suburb of Shanghai, in the northeast of Songjiang, with the Songjiang Industrial Zone in the west, in the east, bordering on Xinzhuang Town, Minhang District, with convenient transportation.

Key features

XinQiao refers to the formerly main agricultural area with many water canals branching from the Beimao River that connects Huangpu River in the south and Dianpu River in the north. XinQiao, in simplified Chinese 新桥, literally means "new bridge".

Xinqiao Town covers an area of 35.48 km2, including 16.84 km2 for real estate and market towns, 6.3 km2 for Xinqiao Old Industrial Park, 1km2 for Caohejing Park (including 380 acres for development), and 5.7 km2 for agricultural land.

Currently, there are ten "village change" neighbourhood compounds, one foreign residence compound, and one Xinyi compound.

Fig. 29_Xin Qiao population growth, stats from Songjiang Municipality, 2017

/ Xin Qiao Town

Xinqiao Town is only 16 km away from Hongqiao International Airport and 35 km away from the centre of Shanghai.

Xinqiao Town has an exceptional location and convenient transportation. As mentioned in the previous chapter, it is the interface of two key town circles, each with distinctive functions. It is relatively well connected by metro and highways, including the Shanghai-Hangzhou High-speed Railway, Hujing Railway, Shanghai-Hangzhou Highway (G60) and Jiajin Highway for Import and Export Overpass. It takes only 10 minutes to drive to the Songjiang city centre, and five roads such as Yusong, Shenqiang and Chenchun lead directly to the Shanghai area. The waterway channels, including Huangpu River, Brick New River, Beijiao River, Liu Leitang, Zhugang and Shagang, allow the transportation of up to 60-ton ships. The municipality calls it the "three-dimensional transportation network" of water, land and air. Land transportation extends in all directions (Xinqiao Geography. Xinqiao Town People's Government).

Highway: G15 Shenhai Expressway, G60 Shanghai-Kunming Expressway, S32 Shenjiahu Expressway, Huminfeng Highway, Jiuxin Highway, Xinche Highway, Qiongzhu Highway, Yusong Highway.

Airport: Shanghai Hongqiao International Airport, Pudong International Airport, Hangzhou Xiaoshan International Airport. It takes only 20 minutes by car to Hongqiao Airport and 45 minutes by car to Pudong Airport.

Shipping: Shanghai Port, Shanghai International Yangshan Deepwater Port.

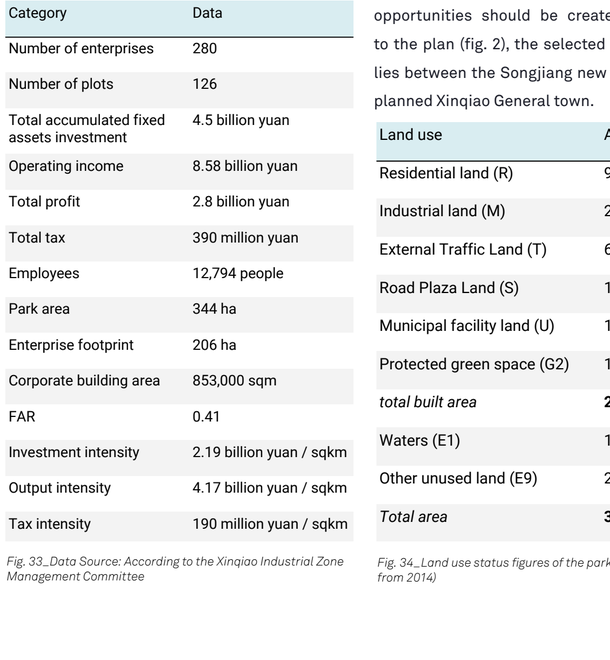


Fig. 26_Songjiang Development Vision, Songjiang Municipality, 2017

The regional development "corridor" is the G60 Shanghai-Hangzhou development axis of the Yangtze River Delta region, incorporating Jiuting, Xinqiao, Songjiang Industrial Zone, and Xincheng main city, Songjiang Science and Technology Park and Xinyi. As an economic and industrial development corridor, the Shanghai Jiahang G60 Science and technology corridor demonstrates the integration of the production in the city and highlights the radiation towards Hangzhou bay area.

Songjiang district (2017-2035) aims to utilize the strength of Dahongqiao and the proximity to the city centre, with the industrial upgrading and urban renewal as the starting point. The spatial layout and facilities of the town will enhance the quality, urban development and create a sub-centre of Songjiang.

Xinqiao, Dongying, Xiaokunshan, Shihudang, Xinyi, Danang, and Yeh are general towns with a planned population of 230,000 people. Central towns are Lushan with a planned population of 178,000 and Jiuting with a planned population of 160,000. The planned population of the remaining towns is between 30,000-130,000 people. Service facilities and public facilities should be developed to meet the needs of urban and rural residents, and employment opportunities should be created. According to the plan (fig. 2), the selected research Site lies between the Songjiang new town and the planned Xinqiao General town.

The chosen site for this research, Miao San Lu Industrial Area, lies in this corridor, in XinQiao. The development "axis" connects between the urban and the rural development including Xincheng city, the Lushan National Tourism Resort, Qingpu New City and Jiading New City.

Five ecological belts "two horizontal and three vertical" implement a municipal-level of ecological planning, that comprises natural rivers, natural mountains, shelterbelts, farmland and other resources to form an ecosystem network of Songjiang. The Qingsong Ecological belt defines the urban development boundary of Songjiang New City through the Lushan Mountain to the northeast. The green "ring" in the suburbs limits the development of the main city area

/ Miao San Lu Industrial Park in Xin Qiao

Category	Data
Number of enterprises	280
Number of plots	126
Total accumulated fixed assets investment	4.5 billion yuan
Operating income	8.58 billion yuan
Total profit	2.8 billion yuan
Total tax	390 million yuan
Employees	12,794 people
Park area	344 ha
Enterprise footprint	206 ha
Corporate building area	853,000 sqm
FAR	0.41
Investment intensity	2.19 billion yuan / sqkm
Output intensity	4.17 billion yuan / sqkm
Tax intensity	190 million yuan / sqkm

Fig. 33_Data Source: According to the Xinqiao Industrial Zone Management Committee

Land use	Area (hectare)
Residential land (R)	9.09
Industrial land (M)	253.77
External Traffic Land (T)	6
Road Plaza Land (S)	14.09
Municipal facility land (U)	1.07
Protected green space (G2)	15.14
total built area	**299.16**
Waters (E1)	16.84
Other unused land (E9)	27.65
Total area	**343.65**

Fig. 34_Land use status figures of the park (second-level data from 2014)

/ 4 Case Studies

Site area: 6.8 ha
Former use: Brewery
Completion: 2006
Architects: JHK Architecten, West 8

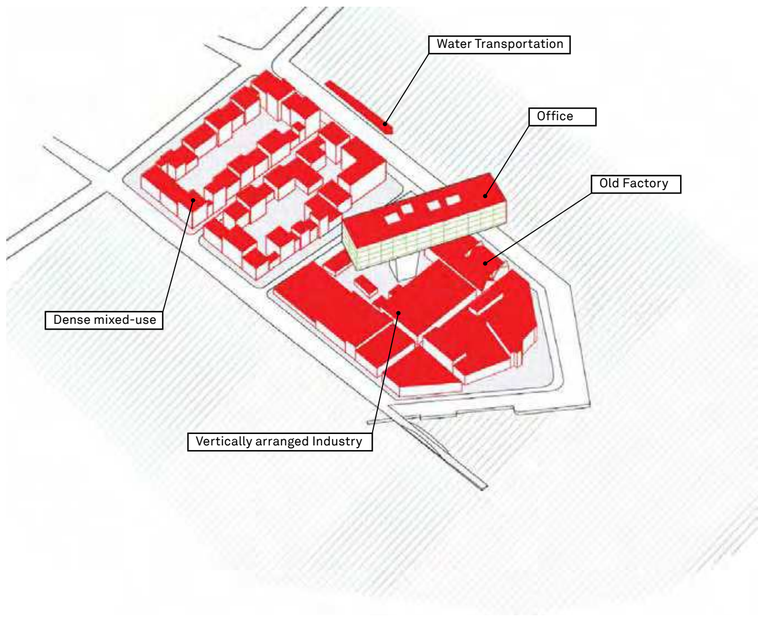
Approach
Urban regeneration through Industrial Retrofitting

Building Strategy
Vertical arrangement of industrial functions

Environment strategy
applied state of the art techniques to reduce the environmental impact of the plant and increase the compatibility of the industrial site with urban functions.

Mobility Strategy
water transportation

Tools
Stacking, Retrofitting with state of the art techniques



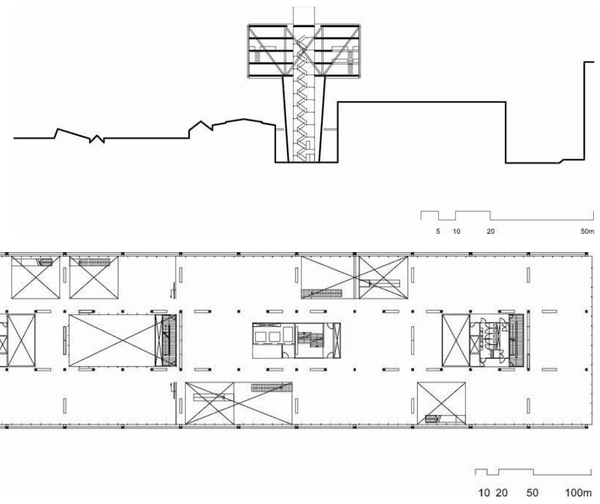



Fig. 46, 47, 48, 49_Unilever building


Fig.50 _Unilever building longitudinal

/ Koopmanstaad in Rotterdam

Site area: 180ha
Former use: coal + steel production plant
Completion: 2002
Architects: Latz + Partner

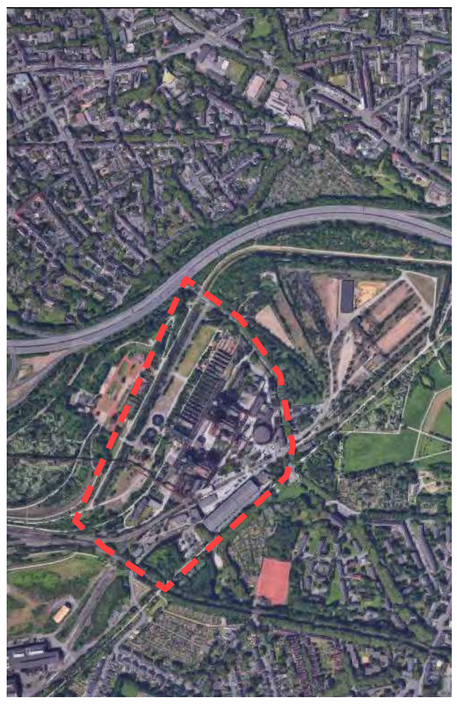
Approach
Urban transformation through Industrial Reuse

Building Strategy
Site was turned into a park, no additional buildings

Environment strategy
decontaminating plants as a remedy for the contaminated soil, rainwater collection system

Mobility Strategy
car-less traffic, additional bus and tram stops, bike hire and e-bike charging stations

Tools
Reuse, Preservation, Water



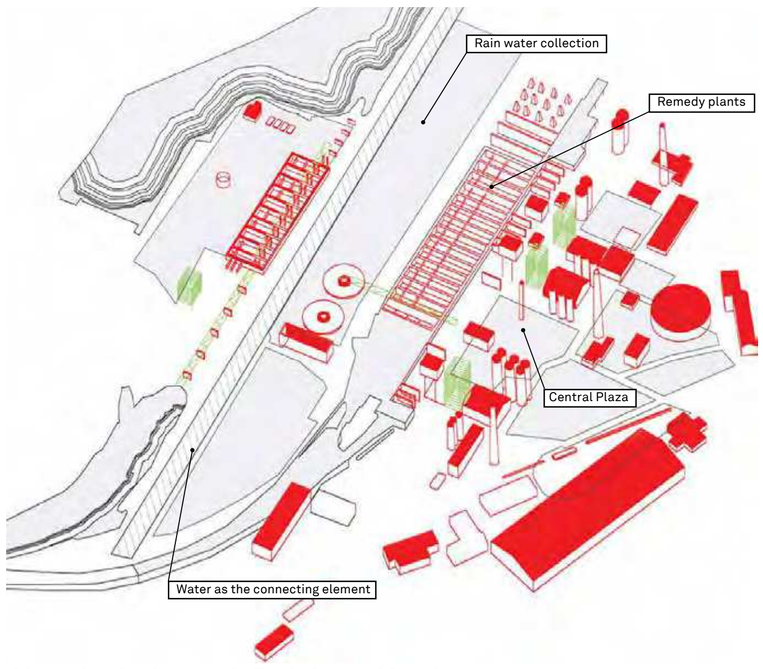



Fig. 53_Public plaza


Fig. 54_integrated industrial structures


Fig. 55_Kids play area with water


Fig. 56_ Industrial water features


Fig. 57_Climbing area on the old industry structure


Fig. 58_Festival and event space

/ Landschaftspark Duisburg Nord

Site area: 11ha
Former use: Shipyard
Completion: 2001
Architects: Kongjian Yu, Wei Pang, Zhengzheng Huang, Qingyuan Qiu, Shihong Lin

Approach
Urban Transformation through Industrial Reuse

Building Strategy
Increased compatibility with the residential and increased permeability with a blurred boundary

Environment strategy
protection of existing plants and the use of local vegetation types, levated platforms and paths as connectors to the water

Mobility Strategy
Routes follow a functional paradigm as connectors between essential components of the park

Tools
Preservation, Modification, Addition of urban functions

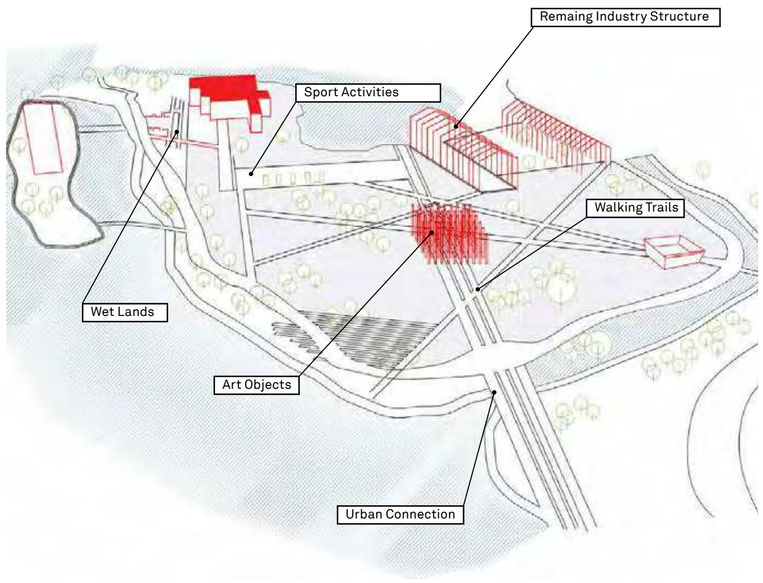



Fig. 61_ Reuse of the industrial structures


Fig. 62_ Water features and walking paths along the park


Fig. 63_ Areas for recreational activites

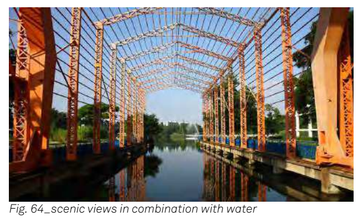


Fig. 64_scenic views in combination with water


Fig. 65_ Wetlands and nurseries


Fig. 66_ Lotus plants between the paths

/ Zhongshan Shipyard Park

Site area: 150ha
Former use: Industrial activities, a river port, a wholesale food market and prisons
Completion: Phase 1 2018, Phase 2 2025
Masterplan Architects: Herzog & de Meuron, Michel Desvigne

Approach
Urban Regeneration - “smart city”
improve the neighbourhood’s quality and enhance its sustainability

Building Strategy
renewal of existing housing stock, radical mixed-use

Environment strategy
generation of renewable energy, zero-carbon objective

Mobility Strategy
“green mobility”, mostly pedestrian and cyclist traffic, a network of extensive public transport, new bridges, a river shuttle

Tools
Increase of residents and job and maintaining or retrofitting the existing amenities, Reuse

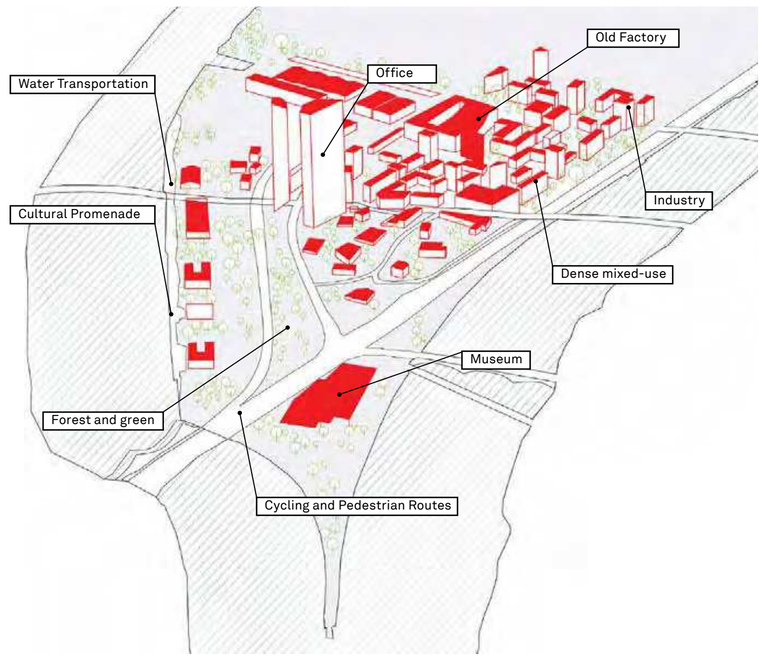



Fig. 71_centro-commerciale-la.jpg


Fig. 72_RiverSideZoom.jpg

Fig. 73_Existing Industry


Fig. 74_Water front residential

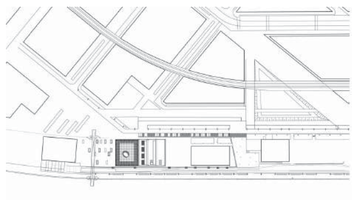


Fig. 75_Plan of the orange

Fig. 76_Masterplan

/ Lyon Confluence

/ Site Analysis

/ Miao San Lu Visual Analysis

Fig. x.1
Typical industrial block is usually fully fenced along the perimeter limiting permeability for pedestrian circulation and accessibility to the canal. While blocks in the city are between 50 to 80m wide, industrial plots reach up to 150m.

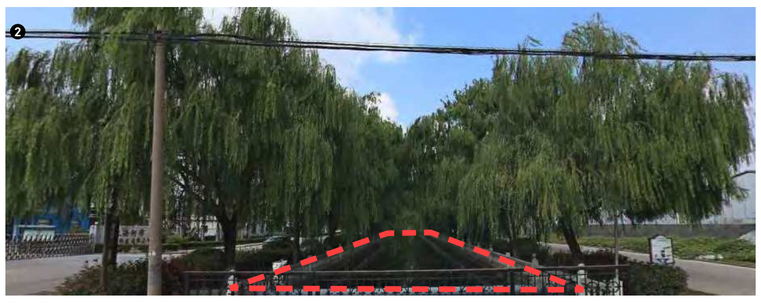


Fig. x.2
The exsisting water canal network offers a key opportunity as a recreational place and green pathways.

Fig. x.3
The site is occupied by a number of unused facilities, which were once industry and are currently abandoned.

Fig. x.4
The site does not include dedicated green space, suitable for public and social activities. It is often limited to small areas adjacent to the industrial plots.

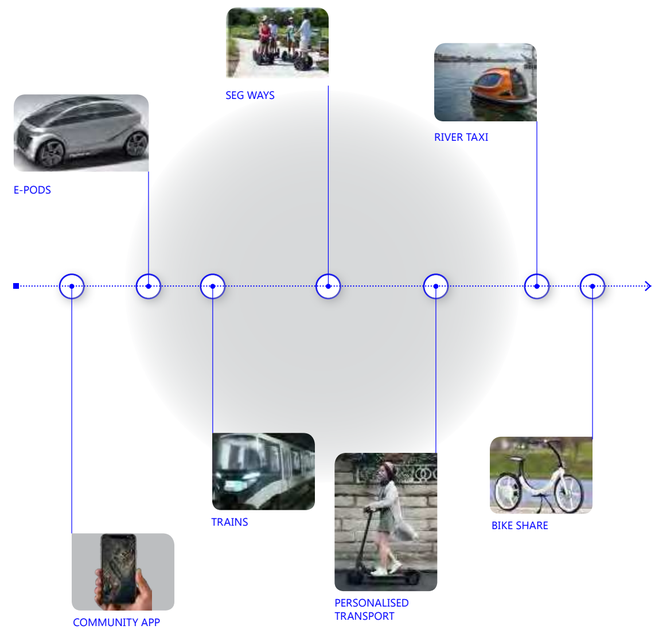
Fig. x.5
The water canal network does not provide direct access and is very limited by the continuity of large industrial block which act as barriers.

Fig. x.6
The common industrial typology is a low-rise building with a large hardscape area, showing an inefficient land use. This is partially justified by safety contour requirements.

Fig. x.7
Amenities and retails are very limited and concentrated in a few areas.

Functions

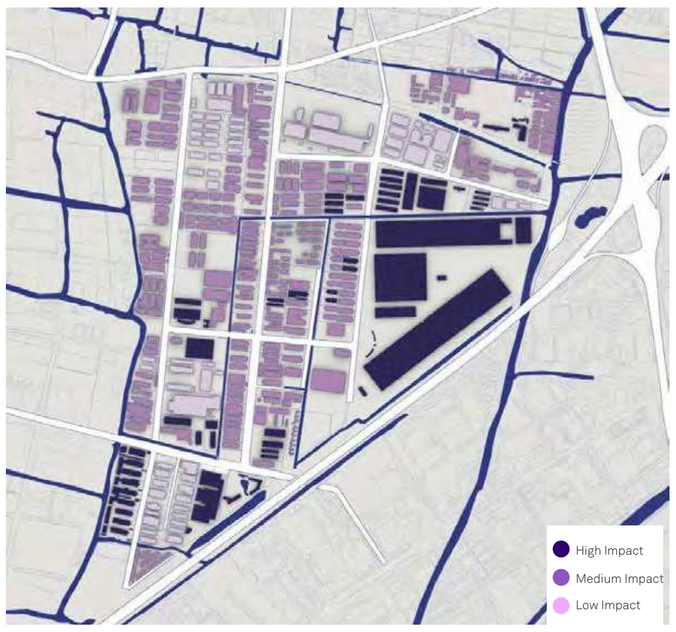
Miao San Lu Industrial Park comprises an area of 87% Industry and only two small areas of residential, that is equivalent to 9.09 ha.



Industry Types

There is a clear majority in industry types including a variety of equipment manufacturing. The focus is production and manufacturing, including heavy industry.

Environmental Impact



Being an industrial park dominated by manufacturing and low tech production, there are few big companies in the area, that have an high impact on the environment. These include noise, air pollution, waste and cargo traffic.

Green and Water

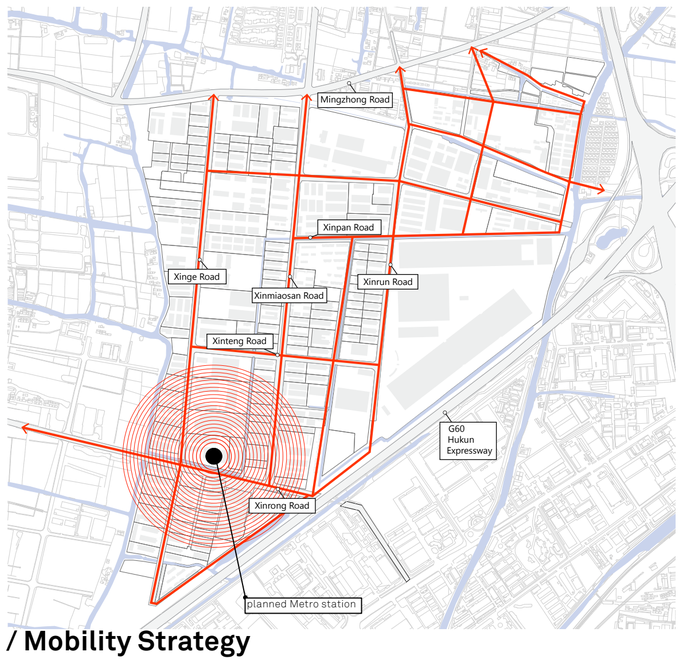
The site is next to the agricultural land in the north and is effected by the green. Yet the area is scarce and include large areas of hardscape and streets. Most of the green space is enclosed by the private companies and therefore not accessible for the public.

Connectivity

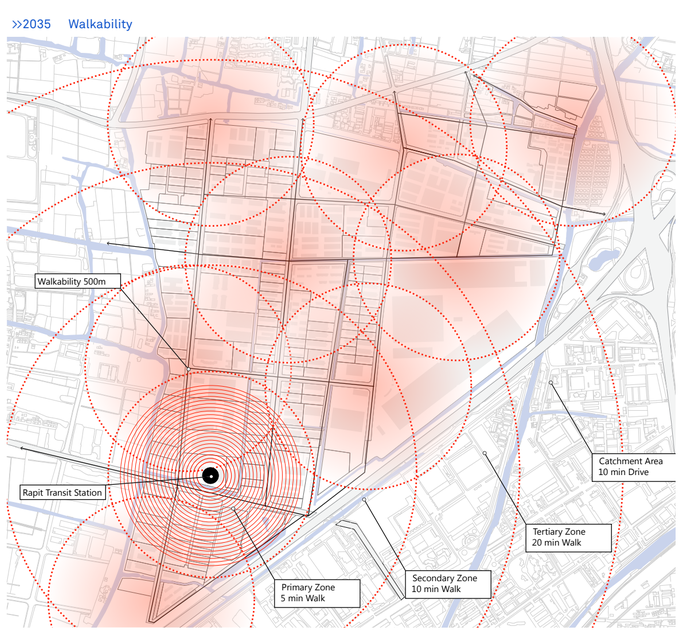
There are two main roads connecting Miao San Lu Industrial park with its surroundings. The remaining network represents only pieces of roads and secondary streets that are not connected or end with dead ends. The public transport is implemented in form of limited bus circulation, including only 7 stations.

/ Mobility Strategy

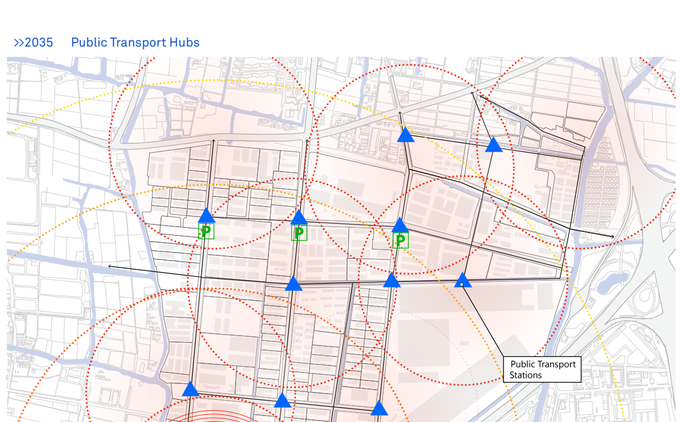
>>2035 Road System



>>2035 Walkability



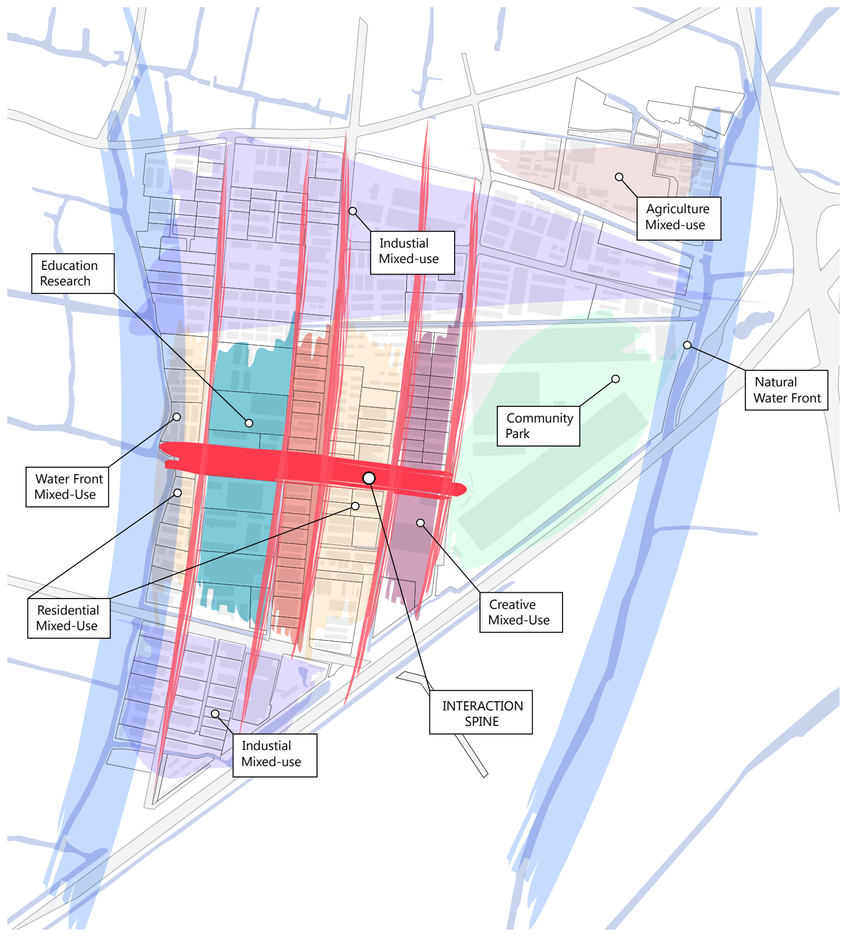
>>2035 Public Transport Hubs

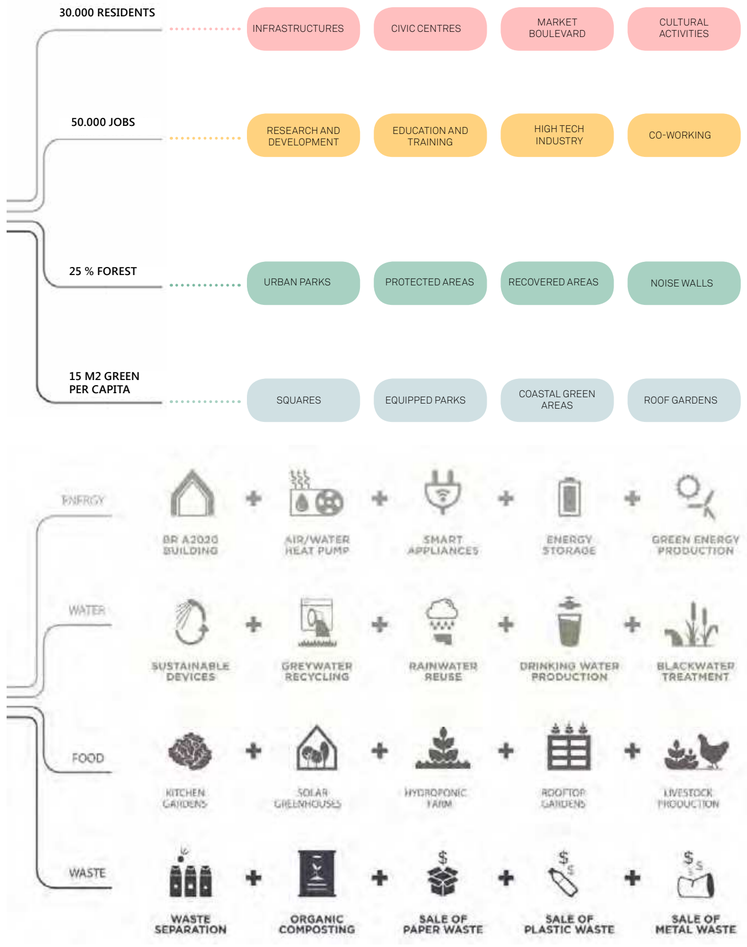


/ Concept

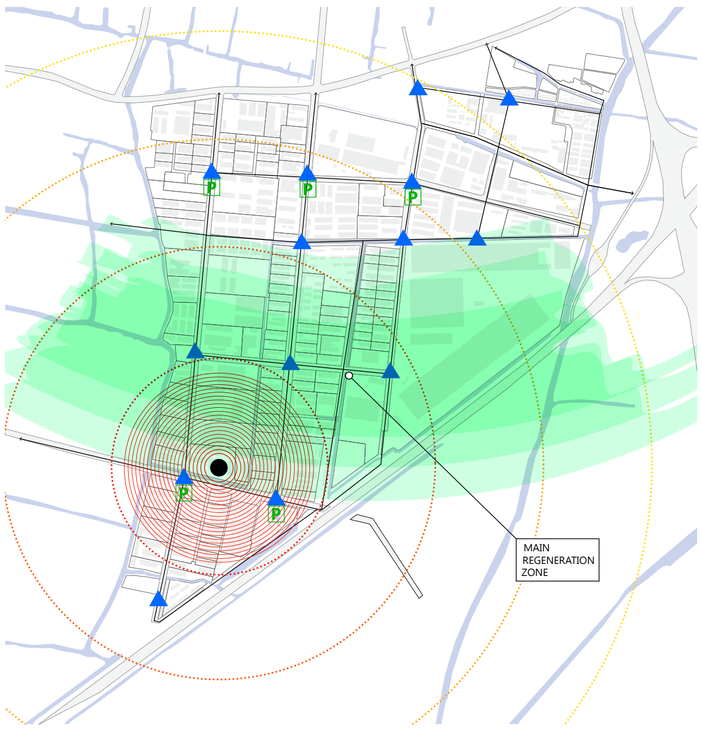
The outcome of the measurable and unmeasurable factors of the site are represented above and categorized as potentials and problems. These include functions as well as spatial qualities or problems. Being an industrial site with partially functioning industry, Miao san Lu offers quite a few opportunities for an industrial upgrade and improved mobility combined in the process of an urban regeneration. As the government's masterplan defines a timeline from 2017 to 2035, the design proposal for the urban regeneration process will draw a vision for Miao San Lu 2035.

/ Vision

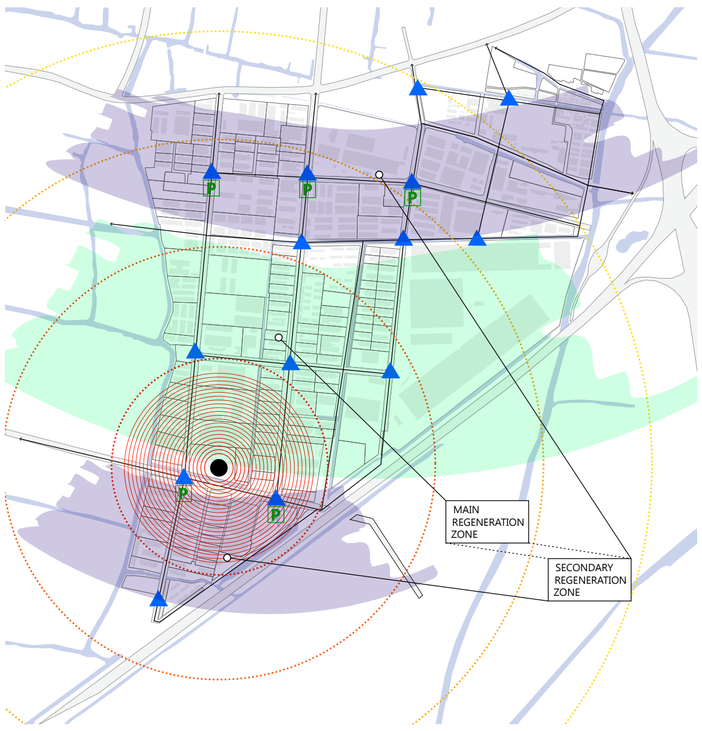




// Urban Regeneration Process

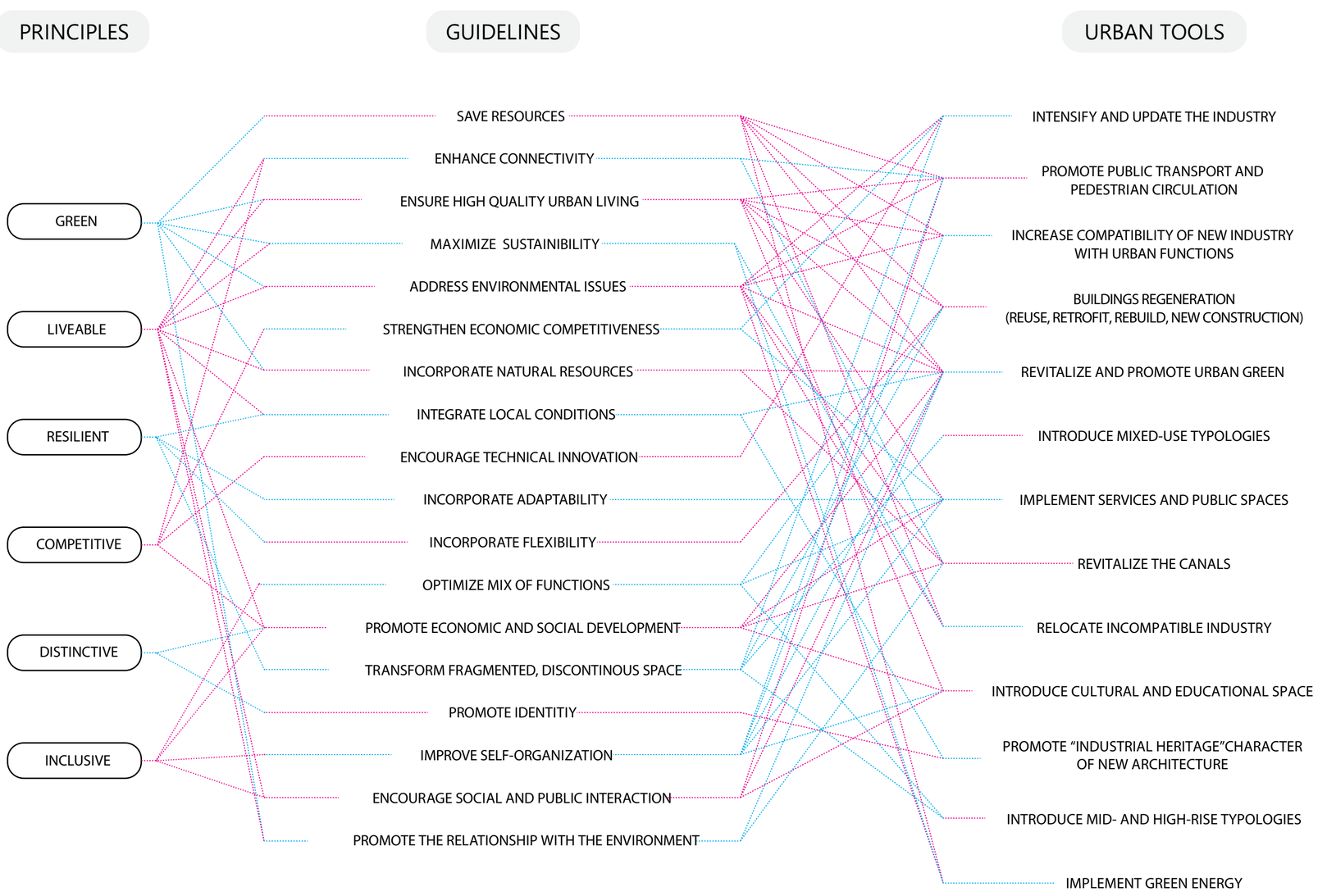


// Urban Regeneration Zones



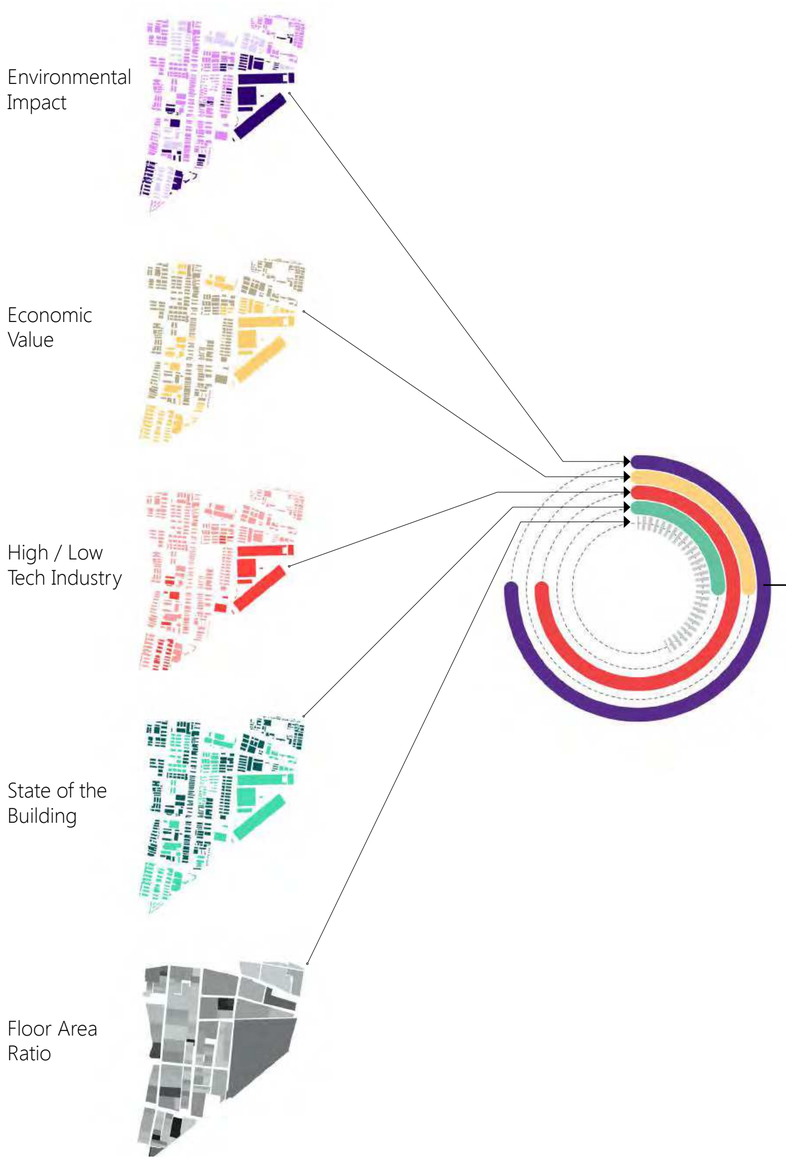
Projects	Environment	Mobility	Function	Physical Structure	Design Rules / Approach
Koopmansstad 2006	reduce the environmental impact of the plant	River Maas as the main transportation route	compatibility of an industrial site with residential or commercial functions	vertical arrangement of industrial functions, dense urban mixed-use	increased density, state of the art techniques
Landschaftspark Duisburg-Nord 2002	contaminated soil by slowly remediating it using plants with decontaminating abilities	bike and hiking trails, e-bike charging stations, bike rental, additional bus stations	Park for cultural and recreational public activities	reuse of the redundant coal and steel plants	acknowledge the area's industrial past and preserve the plants
Zhongshang Shipyard Park 2001	protection of existing plants and the use of local vegetation types only	elevated platforms and paths and reflects the site's natural and historical bond with water	recreational space for residents but also tourists, commemorating communist times	removal of most the built structures	Shipyard's historical value for the district, historical and environmental education, preservation, modification and addition of new elements
Lyon Confluence 2018	electricity and a heating system gained from a cogeneration plant, CO2 neutral source of energy	low emissive means of transport, "green mobility", mostly pedestrian and cyclist traffic, protected routes through parks and boulevards supported by a network of extensive public transport, river shuttle	radical mixed-use, 23% social housing, Landmark buildings, river Saône bank activation by a vast promenade and recreational activities	maintaining and retrofitting already existing amenities, reactivated wholefood market and old prisons, passive solar architecture, new bridges to enhance it is connectivity to neighbouring districts	"smart city", improve the neighbourhood's quality and enhance its sustainability, creating a "city for everyone", maintained nautical character give identity, high energy efficiency and social compatibility, "Zero Carbon"

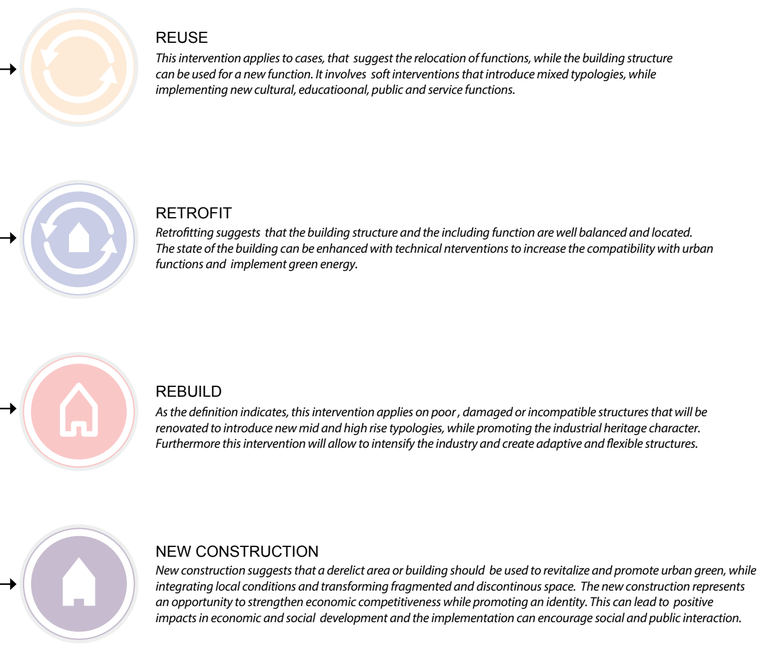
/ Case Study Linkage



/ Strategy

Having set up a catalogue of Design guide lines and corresponding tools for the regeneration process, a method is developed that examines clusters of plots on the following criteria, in order to make decisions about the interventions on the existing structures and industry on the site.





REUSE

This intervention applies to cases, that suggest the relocation of functions, while the building structure can be used for a new function. It involves soft interventions that introduce mixed typologies, while implementing new cultural, educatioonal, public and service functions.

RETROFIT

Retrofitting suggests that the building structure and the including function are well balanced and located. The state of the building can be enhanced with technical nterventions to increase the compatibility with urban functions and implement green energy.

REBUILD

As the definition indicates, this intervention applies on poor , damaged or incompatible structures that will be renovated to introduce new mid and high rise typologies, while promoting the industrial heritage character. Furthermore this intervention will allow to intensify the industry and create adaptive and flexible structures.

NEW CONSTRUCTION

New construction suggests that a derelict area or building should be used to revitalize and promote urban green, while integrating local conditions and transforming fragmented and discontinous space. The new construction represents an opportunity to strengthen economic competitiveness while promoting an identity. This can lead to positive impacts in economic and social development and the implementation can encourage social and public interaction.

/ Evaluation Process

In the south is mainly metal industry and a residential complex, that has a different evaluation index than the industry.

A majority of the structures in this area have a fairly good environmental values.

/ Plot Evaluation Criteria and Index

ECONOMIC VALUE

1 — The industry has shown a declining revenue over the last years, the industry type is less demanded. It is not defined as key industry by the government. It does not involve export products.

2 — The industry has shown a stable but low revenue over the last years, the industry type is less demanded. Only few are defined as key industry by the government. It comprise export good production.

3 — The industry has shown a stable growth in revenue over the last years, the industry type is globally recognized and shows potential for further development. It is defined as key industry by the government and comprises export good production and manufacturing.

4 — The industry has an outstanding position in revenue locally and globally. The industry type inloves research and development as well as cutting edge systems. The industry utilizes big data to optimize efficiency and increase profit. It offers a platform for new job opportunities and promotes international competitiveness of the area.

ENVIRONMENTAL IMPACT

1 — The industry is not compatible with urban functions. It produces noise and air pollution as well as toxic waste products. The industry type requires large spaces and large buffer zones to adjacent funtions.

2 — The industry type involves less noise and air pollution that could be minimized with retrofitting interventions to make it compatible with urban functions. The required area can be arranged vertically. The production methods can be updated to minimize environmental disruption.

3 — The industry involves mainly medium-high tech companies, that use modern production methods and non-toxic products. It creates minimal environmental impact that is controlled by smart systems. It can coexist with urban functions, especially residential. The industry has the potential to turn into a zero-emission industry.

4 — The industry uses state-of-the-art technologies to minimize its CO2 footprint and utilizes renewable energies. It has a positive impact on its surrounding by providing circular systems that absorb the waste products of the site and turn them into resources. The focus is service, research and development other than production. It involves regenerative strategies to produce, store and distribute natural energy.

STATE OF THE BUILDING

1 — The building lacks functioning systems, the structure is old and unsafe. It is in a state that cannot be improved by retrofitting or reuse. It requires hard interventions in form of rebuilding measurements.

2 — The building structure is safe, but the main systems do not function properly. The facade is damaged and temperature control is not possible. According to the age of the property, it can be stripped down to the supporting construction and rebuild to guarantee natural ventilation and thermal performance of the facade.

3 — The building is equiped with efficient and low energy systems to minimize and control its energy consumption and optimize user comfort regarding the mix of functions it comprises. It offers demand controlled ventilation and heat recovery systems, as well as lighting control.

4 — The building is equiped with a state of the art technology to minimize and control its energy consumption and optimize user comfort regarding the mix of functions it comprises. Furthermore it is able to create renewable energy.

HIGH / LOW TECH

1 — The Industry relies on traditional and non-machanical production methods. It involves minimum capital investment and development. The industry type falls into disuse due to changing socio-economic conditions and priorities. This category includes equipment manufactories, paper, food and metal production.

2 — The Industry types are divided only into two categories, the middle category two does not apply in this case.

3 — This category represents medium-high-tech sectors, such as general and special equipment, electrical machinery, rubber and plastic products

4 — High Tech Industries utilize cutting edge technologies. The classification describes the intensity of research and development activities. OECD provides this classification. This category mostly involves E-commerce, pharmaceuticals, office and computing machinery. However, Miao San Lu Industrial park does comprise only few high tech industries.

/ Plot Evaluation Examples

One of the significant structures in the south is the Longgang fork lift factory (E13), which comprises the largest area of the site and causes environmental disruption in form of noise, air pollution and excessive cargo traffic. .

SITE PICTURES

This plot covers an area of 57.370 sqm and comprises 17 Buildings. In the East it has the XinMiaoSan Road and in the North it has the XinPan Road. The buildings have different heights from 2 floors to 7 floors, of which the higher ones are located towards the street. The plot is mainly dedicated to General Equipment production and wholesale, however most of the buildings are underutilized or entirely empty. The canal front has a great potential to integrate and activate social life enhanced through nature.

SITE PICTURES

This huge plot comprises an area of 524.643 sqm, including 3 large companies, namely Longgang Fork lifts, Heavy industry research 704 and Cameron automation equipments. It is surrounded by water on three sides and lies by the Xin Run road. The buildings are light weight structures with only 3 floors.

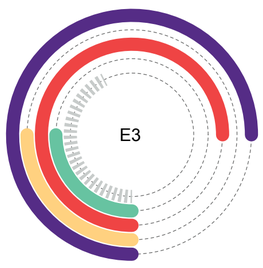
SITE PICTURES

This plot comprises a total area of 68.810 sqm and is located by the Maixin Highway. In the North, it has a canal front, which is vacant undeveloped land. The plot is occupied by the green feather energy company with 9 buildings, which are between 3 to 6 floors high. Through the proximity to the agricultural land and water, the area has a great potential for water front activation and revitalization along with new developments.

SITE PICTURES

This central plot covers an area of 31.692 sqm, including 7 buildings with 2 floors. It is dedicated to different general equipment companies. It has three sides facing the streets, Xin Miao San, Xin teng and Xin Run and the fourth side is facing the neighbouring plot. Being situated by the canal offers opportunities for public space activation and social interaction. Water should represent the element that connects all the various parts of Miao San Lu.

The north part of the site include many buildings in a poor condition, that are along the main street/ axis of the site. Overall these structures and the industry show a low evaluation index.



FAR 1.24
The average FAR of the area is 0.8

State of the Building: Poor condition
Couple buildings on this plot are quite old and require rebuilding. However the two high buildings by Xin Miao San Road and by the canal are in a better condition and can be retrofitted for further development.

Medium-High Tech: Offices and wholesale
The focus lies in service and retail of general equipment in this plot. Therefor it offers a good base for further development.

Economic Value: low and in decline
The general equipment sector is quite special and demands high investment This plot comprises different small enterprises that can hardly compete with global player competitors and lack a unifying brand roof.

Environmental Impact: Low
Since this area mainly comprise a group of small enterprises, offices and whole sale, its environmental impact is quite low. However, the block lacks circular systems to minimize energy consumption, while increasing efficiency and promoting growth of the industry.

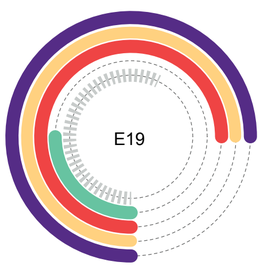
FAR 1.47
The area is 50% covered by low height buildings

State of the buildings: good
The buildings are in a good condition, they lack circular systems to minimize energy demand and guarantee efficiency in use of resources.

Medium high tech enterprises
This plot is mainly dedicated to general equipment manufacturing and production. The Longgang Fork lift company as the main tenant focuses on modularity and standardization, whereas the other two companies can be classified as high tech since they focus on automation and research and development.

High economic value
The Longang fork lift company has been one of the main economic carriers of the area, however the tendency is declining. While high tech companies, such as 704 and Cameron automation experience an increasing demand and investments.

Environmental Impact: incompatible and disruptive
The main tenant Longgang fork lifts plays a key role for the environmental impact of the Miao San Lu Area. It requires a very large area, produces air and noise pollution as well as huge amounts of waste. For the further development of the area towards an urban regeneration the disruptive elements need to be eliminated.



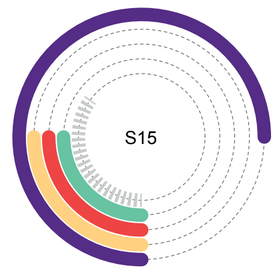
FAR 1.39
In comparison with the average land use of the area, the Plot ratio is quite balanced and efficiently occupied.

State of the building: poor condition
The building structure does not meet the requirements of the enterprise. It lacks cutting edge technology in building systems. Retrofitting measurements can be used to update the structure.

High Tech Industry
Green feather energy company is one of the few valuable potentials of the park to implement and establish a new image/ identity. It represents a new era in industrial development and should be enhanced with state of the art technology and high quality architecture.

Economic Value: high
Although the revenue of the company is not as high as Longgang fork lift company, it holds a great potential for further development. The economical growth was limited by space and area.

Environmental Impact
Green Feather Energy applied new technologies as the building was errected. However, it needs an update to implement circular systems to use the resources in an economic way and even to produce, store and share the renewable resources.



FAR 0.82
This plot ratio is quite characteristic for the area, which is dominated by low buildings and inefficient land use.

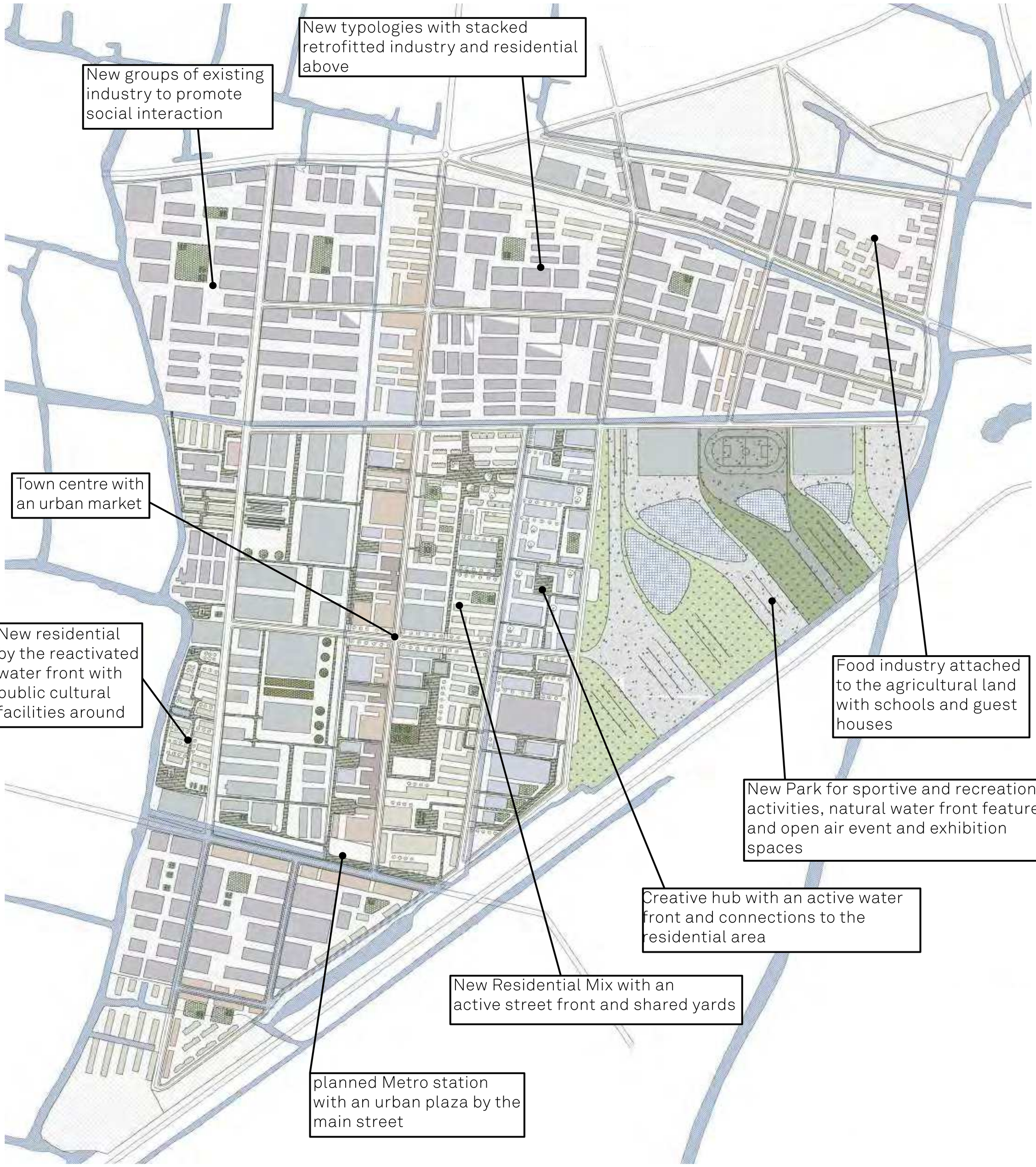
State of the building: Very poor
The buildings in this plot need urgent interventions in form of rebuilding and new construction. They are not able to meet the basic standards .

Low tech enterprises
This plot incorporates small businesses that are mainly based on manufacturing and production, even using traditional methods, such as handcraft. Their cultural value is high but they require a better set up.

Economic value: low
The companies on this plot have almost no impact on the economic growth of the area. They need a context, where their social and cultural value is appreciated. This can be achieved by including them in an area that is more community based and encourages social interaction.

Low environmental impact
Being a low tech manufactory and hand craft industry, these buildings produce only little noise disruption, that can be minimized and incorporated in a more suitable context

/ Masterplan



The results of the plot assessment delivered key informations about the further development strategies of each plot. The outcome is translated into four categories of interventions, that are mainly concerned with the building structures but also with the industry types

These interventions are localized on the site, indicating a tendency for the next step,namely the aggregated zoning map. In contrast to the intervention map, it is an aggregated plan of measurable and unmeasurable criteria, such as presented in the visual analysis.

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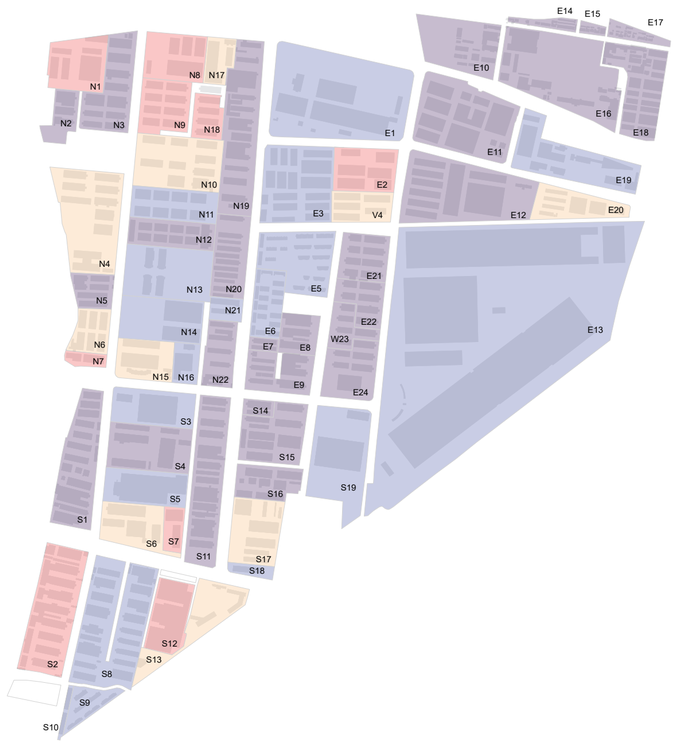
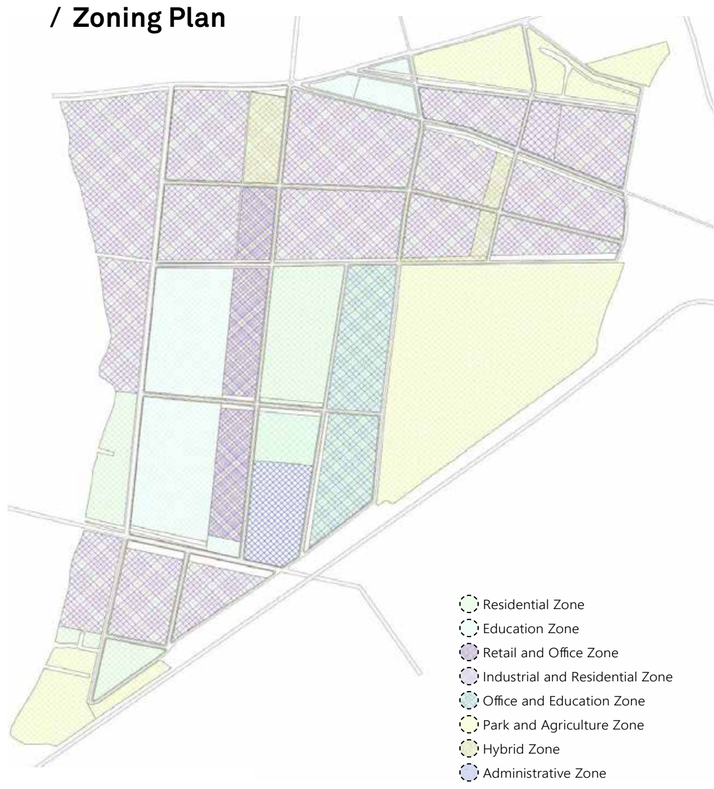
/ Intervention Plan

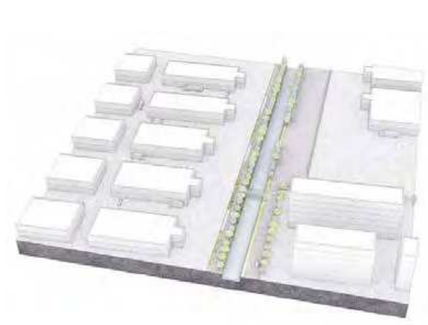


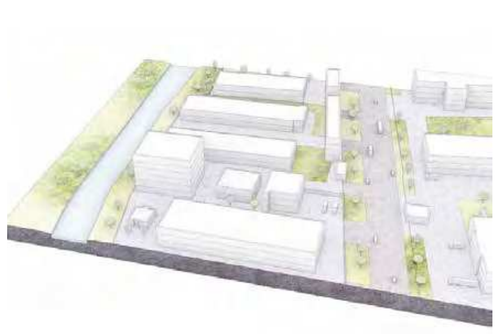
/ Zoning Plan



/ Before and After

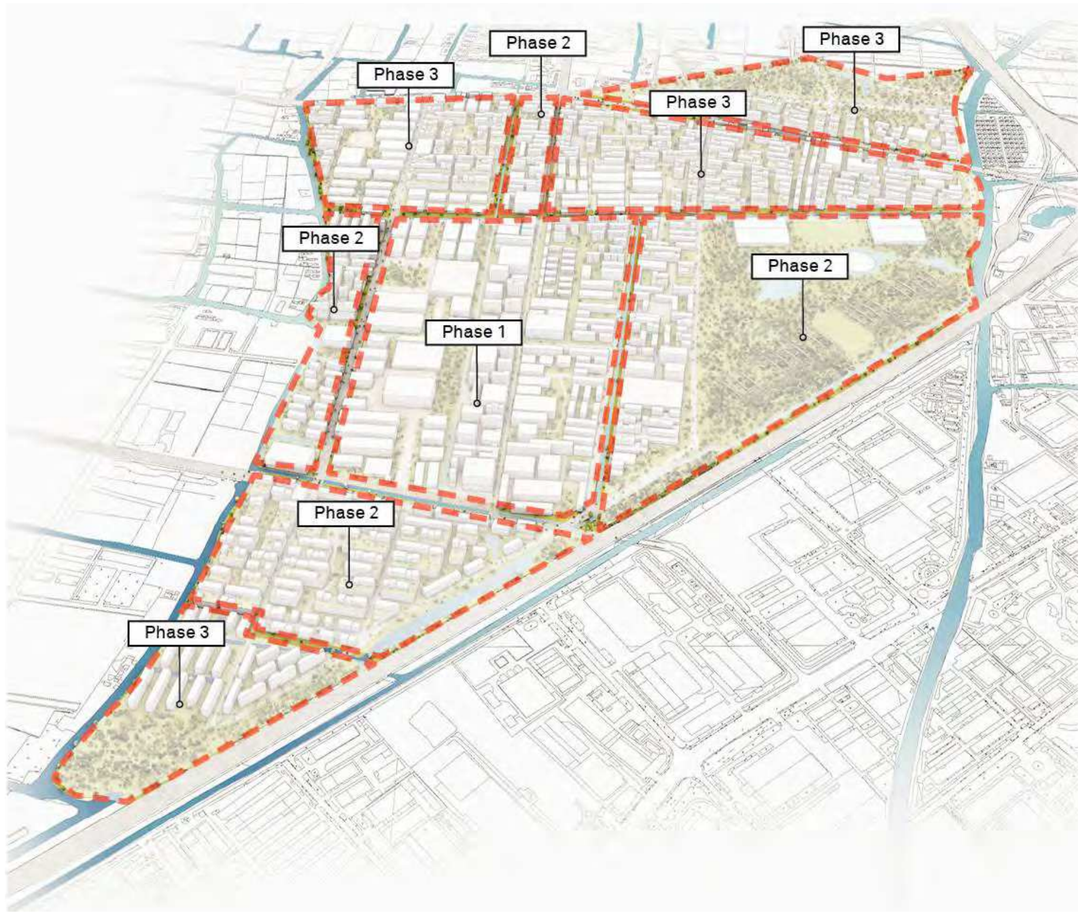
Before
low rise
gated yards
wide streets
lack of green

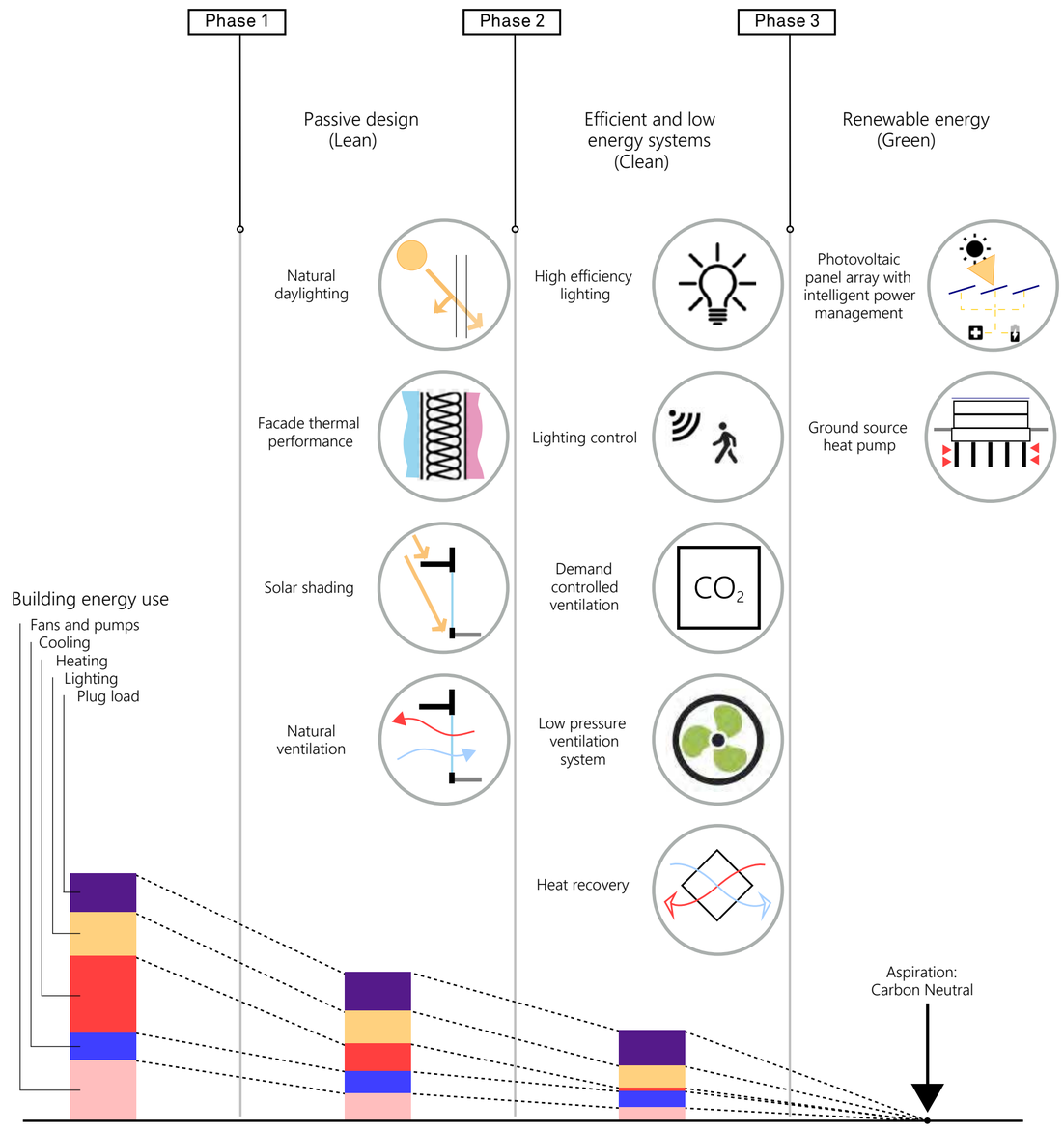




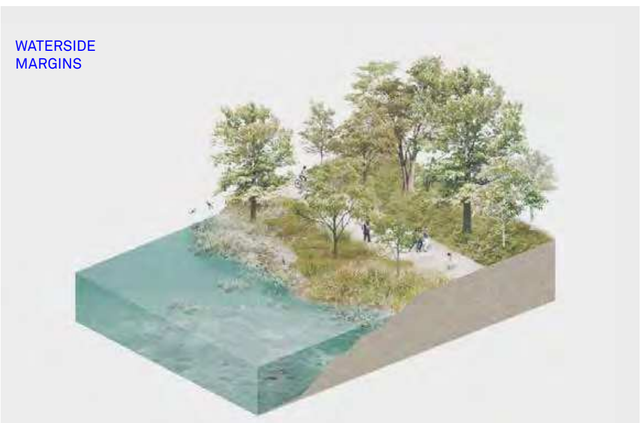
2035
Mixed functions
shared yards
stacked industry
mixed street use
green roofs
finer grains
better accesibility

/ Planning 2035





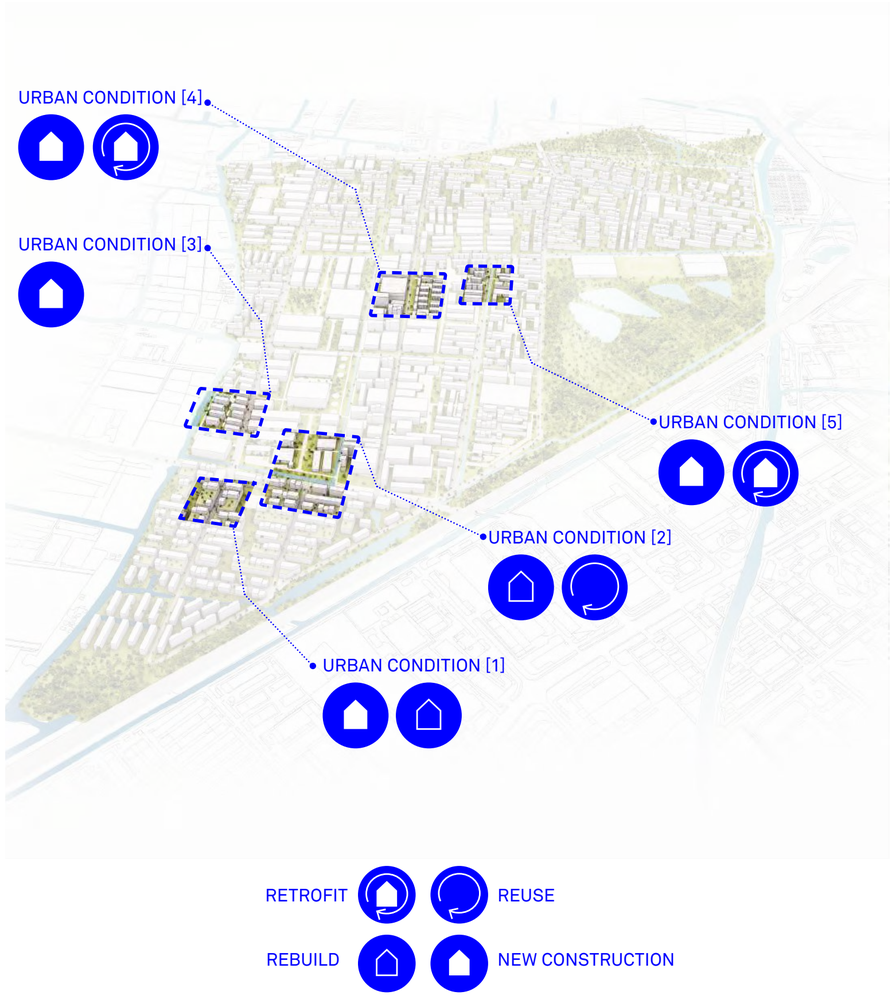
Energy strategy
CO2 emissions reduction approach

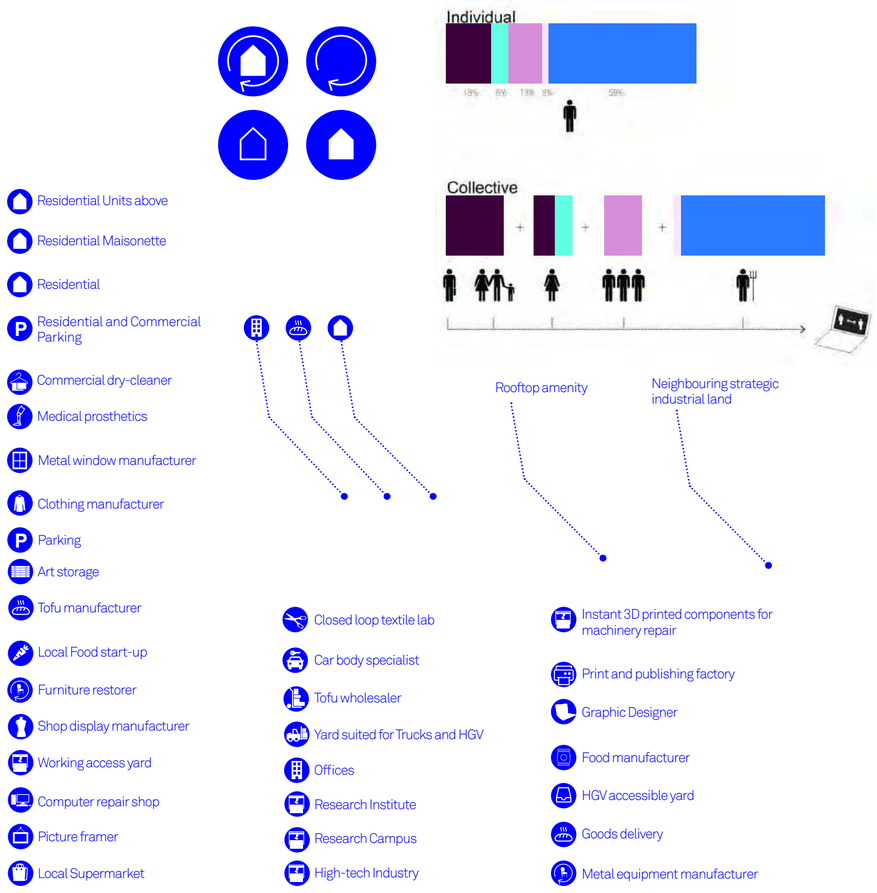


/ Urban Conditions

Five urban conditions will be introduced to visualize the implementation of the four interventions with the overall improvement of the connectivity and the urban public space. the five axonometric section views will present the new typologies and the reintegration of the existing.

The masterplan aims to reconcile the site with its environment ans its industrial and social character. It proposes creating ecological programs, connecting urban catalysts with a hybrid program of mixed and flexible uses. Urban catalysts help to regenerate their environment by creating opportunities for economic, social and cultural development. The 2035 Masterplan will provide an interface between institutions and citizens to promote urban transformation.





BENEFITS OF THE NEW REGENERATIVE APPROACH

With the new urban mix, the amount and range of employment space is increased and high quality urban public spaces are built. A growing stock of diverse employment space will comprise several hectares of new employment space, will better support the growth of a wide range of current and future sectors from low to high employment density, from creative tech to advanced digital manufacturing, from food to production to artist studios and design-intensive crafts and from social enterprises to last-mile distribution and the circular economy of maintenance, repair and re-use.

Critically it will benefit both start-up businesses, supporting skills and the evolution of a rich economic ecosystem, and enabling effective business engagement and interaction with local communities. This will make local and district wide economies more diverse, innovative, inclusive and resilient.

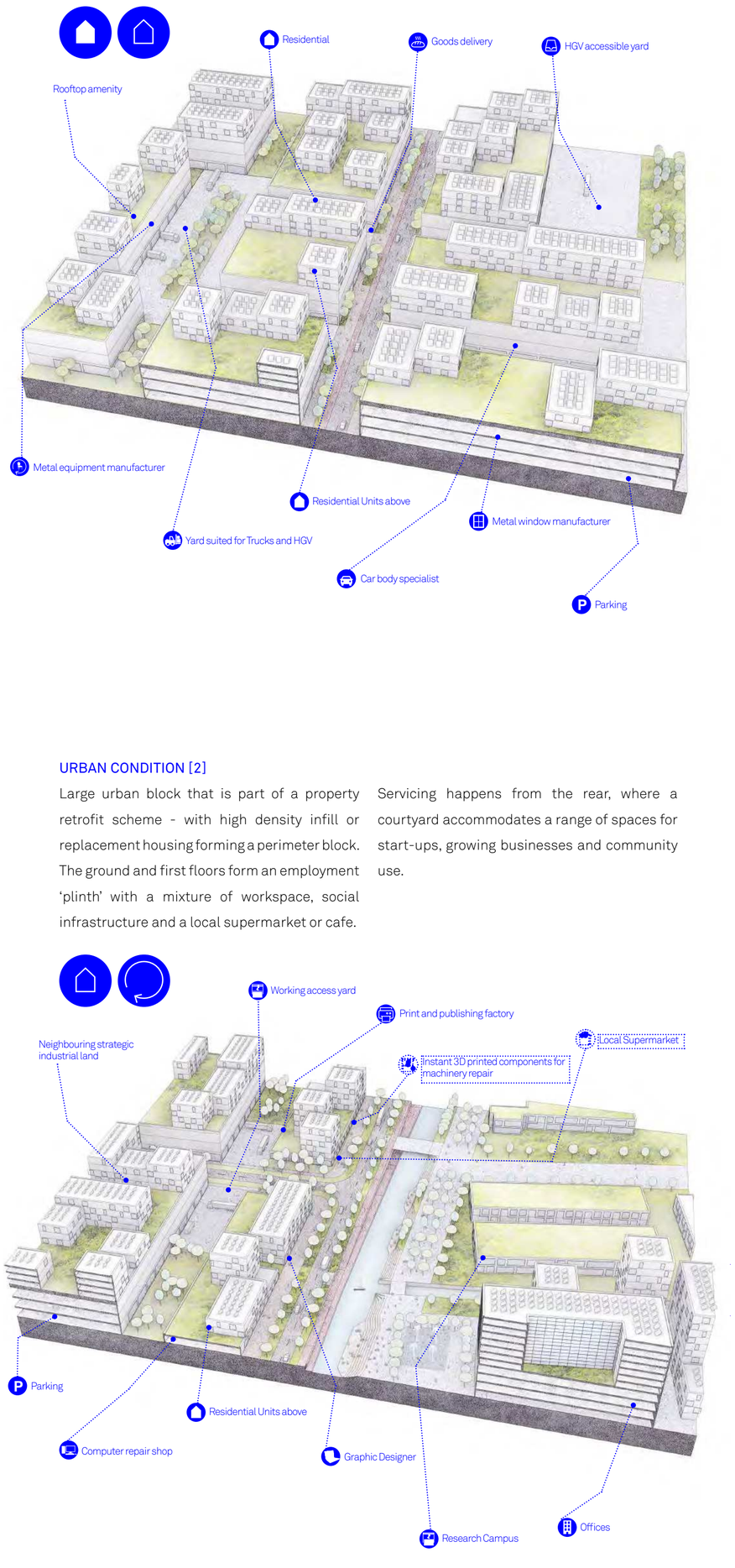
The 2035 Masterplan have benefits for the community and the city as a whole - by improving the vibrancy, sence of safety and district character of neighbourhoods, by maintaining a critical mass for local activities and sociable spaces that make a city liveable, healthy and innovative, and through the environmental benefits of localized supply chains, reduced commuting and the potential for balanced district energy systems.

As shown through some of the the case studies, providing the right kinds of employment space does not impact negatively on housing delivery aspirations and property values, it rather can help creating good places that support the residential market in mixed neighbourhoods.

URBAN CONDITION [1]

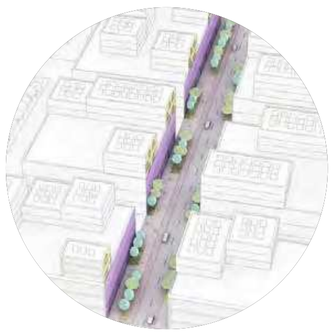
A neighbourhood next to the rapid transit hub and a large scale industrial infrastructure. A yard along the main road gives access to HGVs and other vehicles servicing a range of larger manufacturing or distribution units, whose offices or showrooms front a street.

The housing above have large courtyards on top of the industrial unit. The surrounding streets have a mix of buildings types, old and new - some existing buildings offering affordable studios, whereas others are a mix of residential and active ground floor.



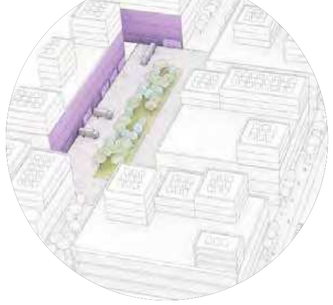
STREET

Mixed typology with industry in the lower floors, offices and showrooms front the street, enhanced with residential units above.



YARD

A yard along the main road gives access to HGVs and other vehicles servicing a range of larger manufacturing or distribution units.



RESIDENTIAL ABOVE INDUSTRY

The housing above have large courtyards on top of the industrial unit.

URBAN CONDITION [2]

Large urban block that is part of a property retrofit scheme - with high density infill or replacement housing forming a perimeter block. The ground and first floors form an employment 'plinth' with a mixture of workspace, social infrastructure and a local supermarket or cafe.

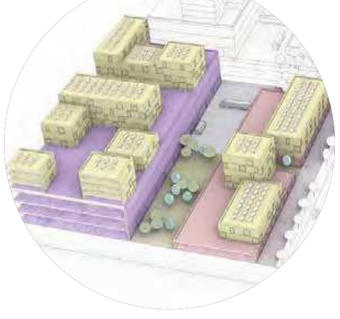
Servicing happens from the rear, where a courtyard accommodates a range of spaces for start-ups, growing businesses and community use.

ACTIVE WATER FRONT

Layers and different scales of transportation happens along the canal, with extentions for public activities and interaction.

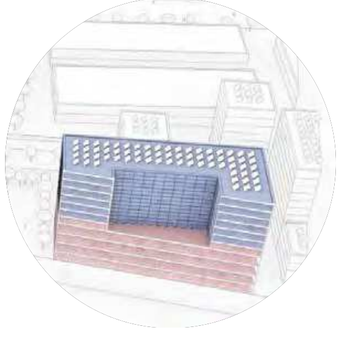
RESIDENTIAL ABOVE INDUSTRY AND RETAIL

The ground and first floors form an employment 'plinth' with a mixture of workspace, social infrastructure and a local supermarket or cafe.



HIGH RISE OFFICE

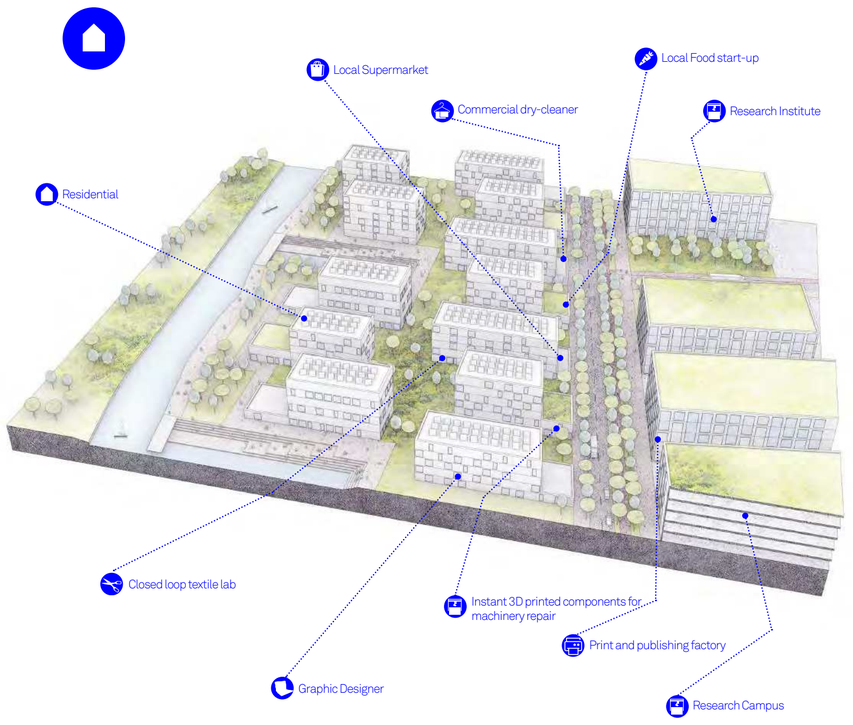
Servicing happens from the rear, where a courtyard accommodates a range of spaces for start-ups, growing businesses and community use.



/ Urban Conditions

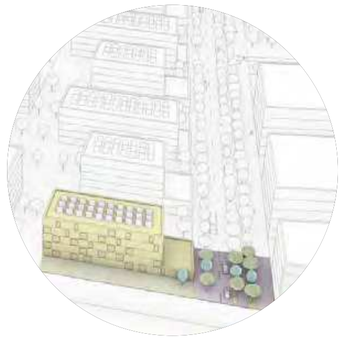
URBAN CONDITION [3]

Mixed use residentials on a main road - the ground floor units fronting the street accommodate a mix of production and service activities alongside specialist retail and the occasional cafe; openings provide pedestrian access to a shared community garden, which leads to residential entrances as well as servicing a series of employment space units fit for a wide range of community-based businesses. Residential terraces are provided on the roofs of the employment space.



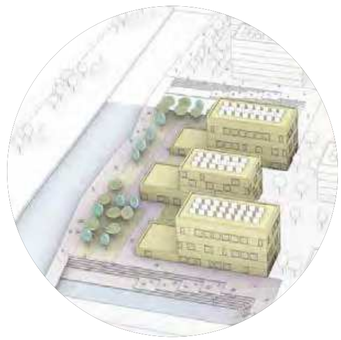
STREET FRONT RESIDENTIAL

Stepped residential with terraces on top of the employment spaces and shops, facing the revitalized main street.



WATER FRONT RESIDENTIAL

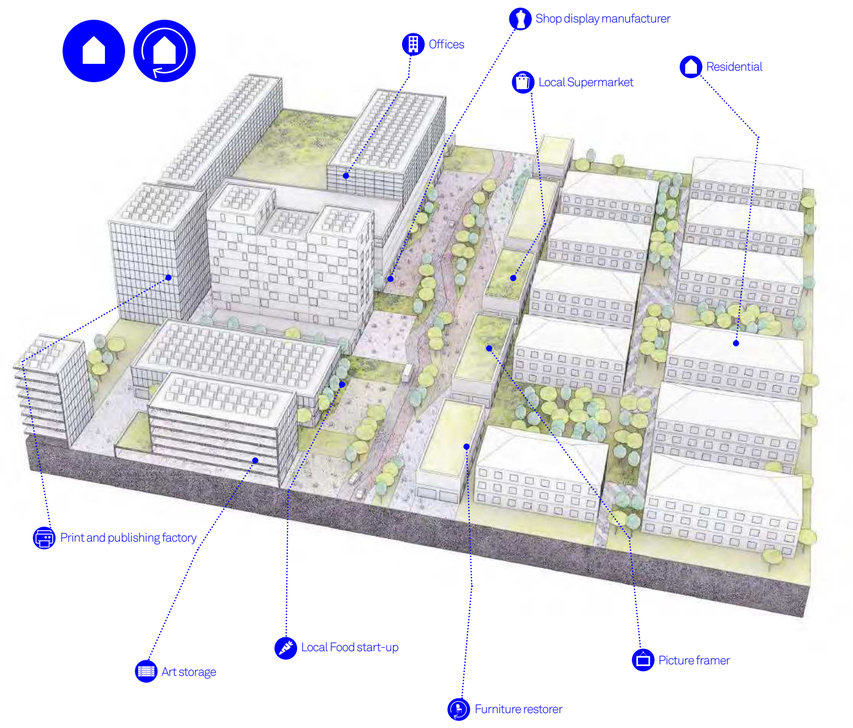
Along the canal new pedestrian and bicycle routes are provided as well as occasional recreational patches of dedicated green. Little wharfs guarantee direct access to the water.



visuals

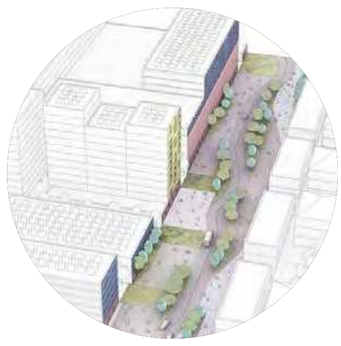
URBAN CONDITION [4]

New and improved transport links create an impetus for high density residential development. A large development site borders on both existing housing and protected industrial land. A range of taller and lower residential blocks offer employment spaces on ground and first floor: larger (light) manufacturing and logistics units near the protected industrial land, and towards the existing residential area a finer grain of studio-workshop space mixed with other town centre uses. Some housing blocks have ground floor maisonettes, whereas in the centre of the site, a stand-alone workspace block offers a mix of flexible office and studio spaces.



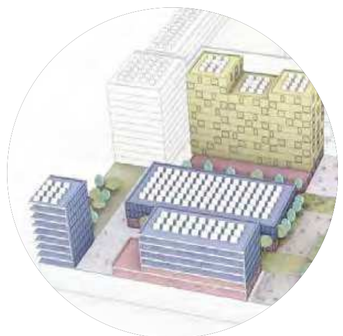
STREET FRONT

A speed regulated street front for small shops and cafes, comprising employment space above with mixed and flexible typologies, sharing a courtyard space.



CREATIVE INDUSTRY

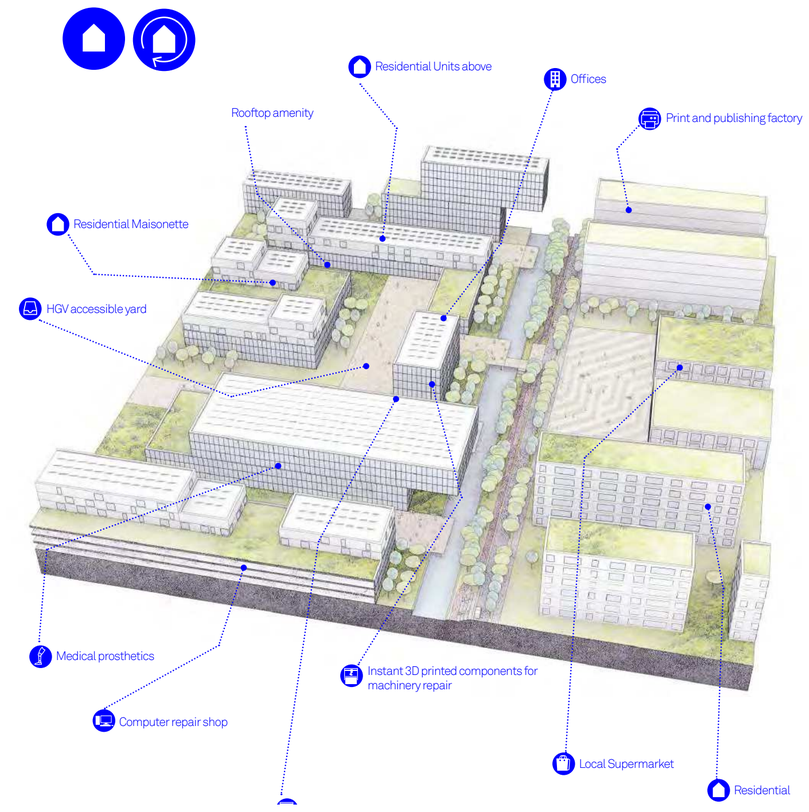
A finer grain of studio-workshop space mixed with other town centre uses. Some housing blocks have ground floor maisonettes, whereas in the centre of the plot, a stand-alone workspace block offers a mix of flexible office and studio spaces.



visuals

URBAN CONDITION [5]

A site on the edge of the canal in the town centre, behind the traditional main road with heavy industry. A new mixed use block has maisonettes under apartments, wrapping around a car park and with a mix of enterprise spaces to the rear. These front on a new 'enterprise promenade'; the units have mezzanines making them suitable for a range of activities, including light industrial or craft makers who sell from the premises. A bar can be allocated too.

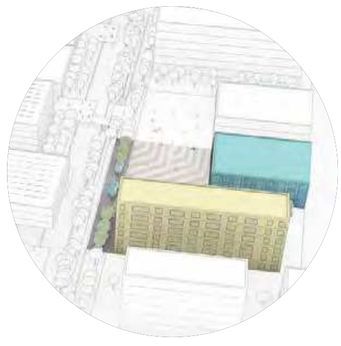


WATER

The water side is activated with small piers bridging from the mixed business zone to the residential part with education institutes and nurseries.

EDUCATION AND CULTURE

Existing residential is retrofitted and supported with additional community and public funtions, that share an open space facing the canal.



RESIDENTIAL ABOVE OFFICE

Large mixed office units offer large residential units above with maisonettes and a common promenade in front.