

# Multiple Centres for Wetzikon

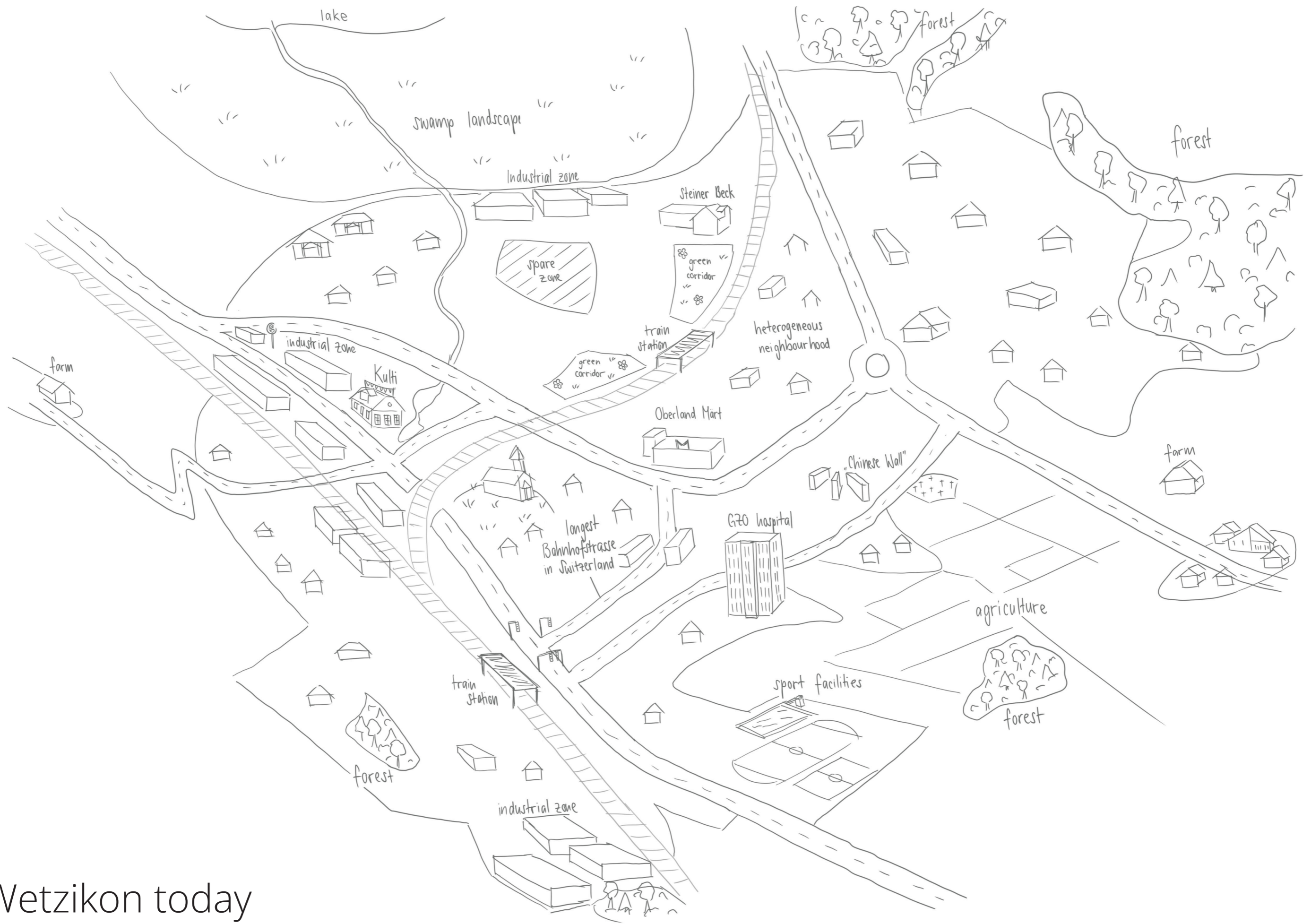
## **Redevelopment of Kempten as a Local City Centre**

Interdisciplinary Project Activity

MSc Spatial Development and Infrastructure Systems

ETH Zurich

Fall 2023



Wetzikon today

## **Spatial Planning Translations**

Added Land Value Capturing - Mehrwertabgabe

Affordable Housing Zone - Zone für preisgünstigen Wohnraum

Building and Zoning Ordinance - Bau und Zonenordnung

Cantonal Structure Plan - Kantonaler Richtplan

City Planning Contract - Städtebaulicher Vertrag

Experimental Planning - Zwischennutzung

Communal Land Use Plan - Kommunaler Nutzungsplan

Feasibility Study - Machbarkeitsstudie

Framework Design Plan - Rahmennutzungsplan

Land Reallocation - Landumlegung

Spatial development concept - Räumliches Entwicklungskonzept

Spatial guideline - Räumliches Leitbild

Special Land Use Plan - Sondernutzungsplan

Supplement Plan - Ergänzungsplan

Test Planning - Testplanung

## **Abbreviations**

AM - Active Modes

BZO - Building and Zoning Ordinance

BMZ - Baumassenziffer

CED - Civil Engineering Department (d. Tiefbauamt)

MIT - Motorised Individual Traffic

NPC - Nature Contribution To People

pkm - Personkilometer

pha - People per Hectare

PT - Public Transport

# ABSTRACT

The task of Interdisciplinary Project Activity 2023 is to develop a test planning for future development of Wetzikon under diverse societal requirements. Wetzikon was among the fastest growing municipalities in Switzerland. The canton of Zurich defines Wetzikon as a centre of regional importance. Therefore, further population growth is predicted.

The situation analysis of Wetzikon results in the following challenges. Current public spaces are inadequately designed for interactions between people. Spontaneous urbanity is hampered by absent opportunities. Short trips are often done by car, active modes fall short of their potential. Public transport is primarily used by commuters to supra-regional centres like Zurich and Rapperswil. It plays a subordinate role in local transportation. The resulting traffic situation separates neighborhoods and reduces the quality of stay in public spaces. Small-parcel structures and heterogeneous development standards increase the complexity of large-scale developments. There are few accessible public green spaces and they are often of low ecological quality.

Different strategies are tested on their suitability to handle the challenges facing two population growth scenarios. The strategy "fill the gaps" involves building on undeveloped plots in the settlement area. "One centre" is based on the cantonal development strategies. It envisions to densify along Bahnhofstrasse and around Oberwetzikon. "Multiple centres" is based on the historical development of the former village centres. These former centres are developed as individual centres. The strategy „Multiple Centers“ is established as the most robust strategy using a methodology developed internally. Possible centres under this strategy are Unter- and Oberwetzikon, Robenhausen, and Kempten.

As an alternative to current planning approaches, a design proposal is being developed. Kempten is designated as the focus area since other areas in Wetzikon are already undergoing planning for densification. The design proposal integrates measures in landscape planning, infrastructure, traffic planning all while considering the societal needs. The costs, revenues, and temporal dependencies are calculated for each measure and presented in an intervention plan.

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## Impressum

### IPA 2023

Multiple Centres for Wetzikon - Redevelopment of Kempten as a Local City Centre

### Authors

Andreas Huser, husera@ethz.ch

Christian Egger, echristian@ethz.ch

Philip Urech, urechp@ethz.ch

Sarah Bühler, sarbuehl@ethz.ch

### Lead Management

Prof. Bryan T. Adey

Arnór Elvarsson

### Supervision

IBI - Institute of Construction & Infrastructure Management

IVT - Institute for Transport Planning & Systems

IRL - Institute for Spatial and Landscape Development

*If not otherwise declared, all tables and figures are groups own work.*

1

# INTRODUCTION

Wetzikon has grown strongly in recent years and will continue to do so. Growth brings with it a number of challenges. The existing infrastructure needs to be expanded and supplemented. The needs of the population must continue to be met. At the same time, the pressure on nature and the landscape is increasing. The development of Wetzikon must therefore be organised in accordance with the principles of sustainability (ARE and UVEK 2010). In order to meet all these demands and needs, comprehensive planning is required, involving all involved stakeholders.

### **Expectations IPA 2023**

Planning the future development of Wetzikon is the task of the Interdisciplinary Project Activity (IPA) 2023 of the Master of Spatial Development and Infrastructure Management. Landscape planning, infrastructure and transport planning as well as social needs must be included in the planning of the future development of Wetzikon (Adey and Elvarsson 2023). This corresponds to the three chairs from the master. As part of the test planning, Wetzikon is considered holistically at different scales. In the analysis part, the whole municipal area is analysed and a concept is developed. This includes a vision and a strategy. This development strategy will be implemented in a defined focus area. The test planning tool allows for tailor-made solutions. The results of the test planning can later be used as a basis for further planning steps such as master plans, special land use plans and competitions or, in the case of Wetzikon, for the revision of the communal land use plan.

### **Our understanding**

Our group sees IPA 2023 as a great challenge. As a planning horizon, we have decided to look at the development of Wetzikon up to the year 2060. How can the town continue to develop and at the same time meet the demands of growth and the future? What does this mean for the people who live and work in Wetzikon, for transport, infrastructure and the landscape? These and many other questions are addressed and analysed in the following report. The report addresses especially the municipality of Wetzikon as well as the three chairs from the master.

### **Structure**

The report is structured as follows:

- Analysis: Shows a communal analysis of Wetzikon
- Wetzikon 2040: This chapter represents the development phase. It explains the study on the optimal settlement growth strategy for Wetzikon.
- Kempten 2040: This chapter includes a detailed analysis of Kempten as well as a design proposal with the corresponding intervention plan.
- Recommendation: This chapter summarises the interventions and suggests the next steps to decision makers.
- Reflection: This chapter lists the limitations, shortcomings, and achievements of the work.

2

ANALYSIS



# 2.1 MUNICIPALITY PORTRAIT

Wetzikon lies in the heart of the Zurich Oberland and borders on the municipalities of Seegräben, Pfäffikon ZH, Bäretswil, Hinwil, Gossau ZH and Mönchaltorf. Nestled in a gently rolling landscape, the municipality borders Lake Pfäffikon and the wild and romantic swamp land of national importance.

Wetzikon is the sixth-largest city in the canton of Zurich. Around 26,000 people live in Wetzikon on an area of 1,681 hectares, resulting in a population density of 50.2 people/ha (Wetzikon 2023). As a regional and cantonal centre, the municipality of Wetzikon has the character of an urban residential landscape and plays an important overarching role in the region (Kanton Zürich 2023b). In addition to public facilities in the areas of education and

health, Wetzikon has important shopping and employment centres. Wetzikon is also characterised by an attractive range of sports and leisure activities. The city is well served by public transport and larger cities such as Zurich, Rapperswil and Uster are within easy reach by car. This results in a high quality of life and makes Wetzikon an attractive place to live.

Today, the town of Wetzikon manages the balancing act between an urban and rural character. In the future, however, challenges such as population growth, the resulting traffic and the increasing pressure on the countryside will become ever more pressing.

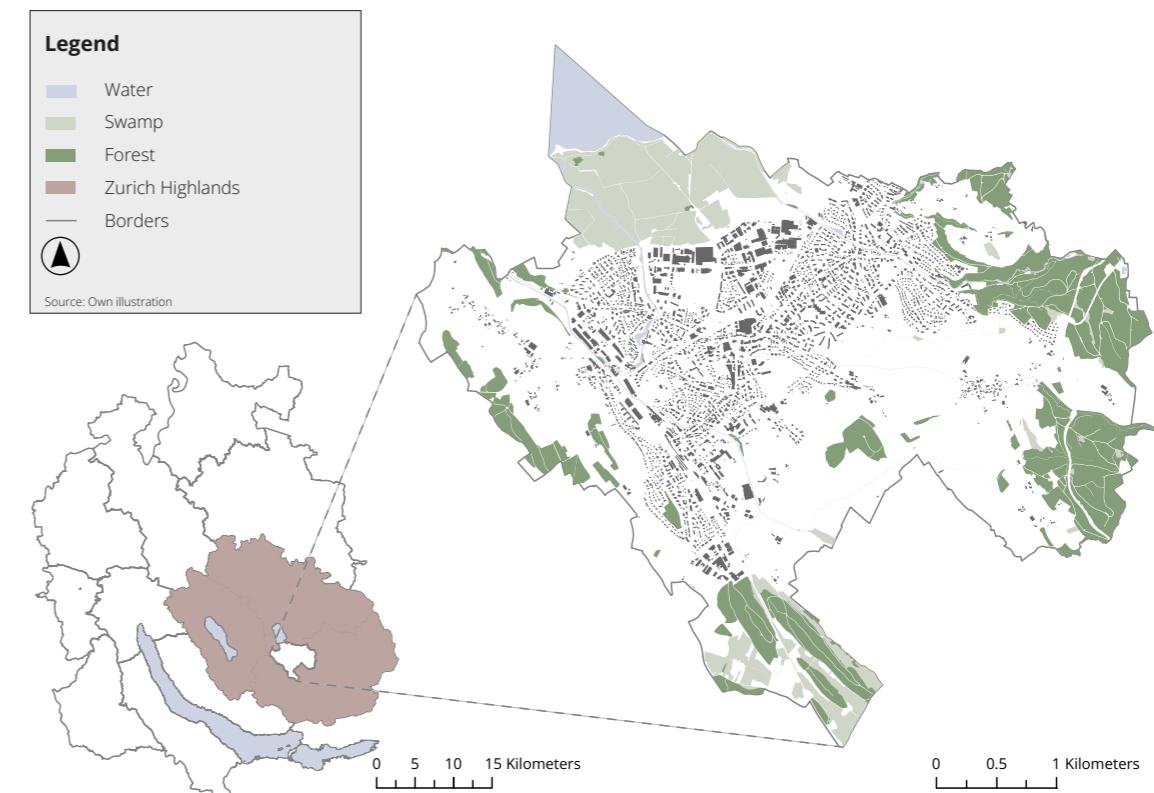


Fig. 2.1A: Overview of the Canton of Zurich with the Zurich Highlands and the municipality of Wetzikon

# 2.2 SITUATION-ANALYSIS

## 2.2.1 History

### Six villages become one city

Until the 19th century, the population at the lower end of Lake Pfäffikon lived in seven municipalities. At this time, Ober- and Unterwetzikon, Kempton, Robenhausen, Ettenhausen and Robank consisted of a few houses in the respective village centres. In addition to grain cultivation and peat extraction, textile homework offered a good source of income. Towards the end of the 19th century, the mechanisation of the textile industry turned Wetzikon into an important factory location with several cotton spinning mills and cotton weaving mills. In connection with the textile industry, the engineering industry also established itself and at times slate coal was even mined south of Unterwetzikon. Newly built roads and the railway made Wetzikon a regional transport hub towards the end of the century. (Hauser und Müller 2023)

In the 20th century, factory buildings, factory owners villas and workers houses characterised the settlement pattern outside the village centre. Buildings gradually began to appear along the Bahnhofstrasse running from Unter- and Oberwetzikon to Kempton. After the Second World War, the settlement, which had been extended along Bahnhofstrasse, grew wider. The fields between the original villages were built over more and more. Another large industrial area was created between Kempton and Robenhausen. (Hauser und Müller 2023)

Over time, the various village centres grew together in a loose, unstructured cluster of buildings. As a result, there are still large gaps in the settlement structure today.

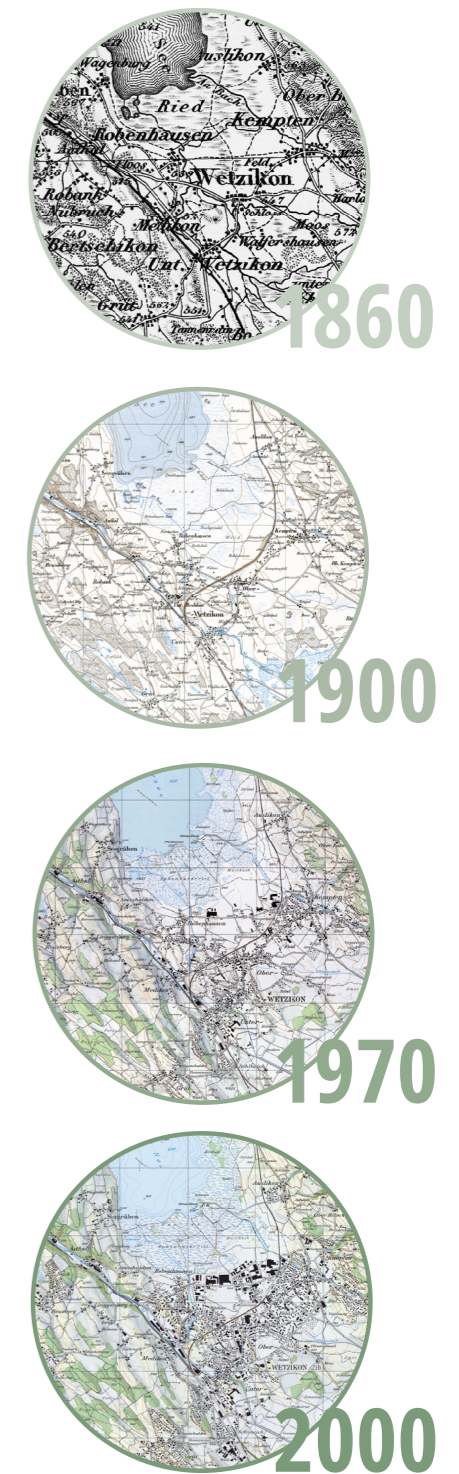


Fig. 2.2.1A: Changes in the settlement pattern over the years (Swisstopo 2023)

## 2.2.2 Population

### Demography

The population of Wetzikon grew strongly in the past. From 2002 to 2021, the population increased by 36%. According to the Wohnkalkulator, only seven cities in Switzerland with more than 15,000 inhabitants have recorded such growth (2020). Between 2002 and 2021, the Swiss population of Wetzikon increased by around 4'000 inhabitants, while the foreign population grew by 2'600 (BFS 2023a).

In addition to population growth, demographic ageing plays an important role. Ageing poses major challenges for many municipalities. The ageing of the strong age groups born between 1950 and 1970 can be observed in Wetzikon as well (Fig. 2.2.2A). Due to the high population growth in younger age groups, there is currently a rather low risk of ageing in Wetzikon (Wohnkalkulator 2023).

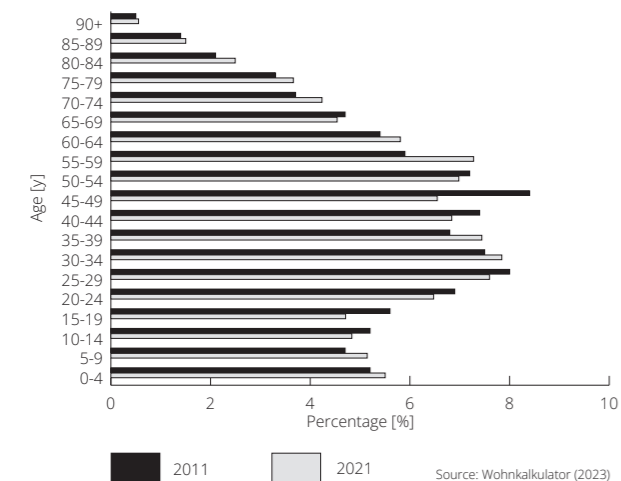


Fig. 2.2.2A: Change in population

### Population Growth Scenario

According to the cantonal structure plan, 75% of the population growth will take place in urban residential areas (Kanton Zürich 2023b). Wetzikon plays an important role as a centre area of cantonal importance. The Zurich Oberland agglomeration program forecasts population growth of around 35'000 inhabitants and 3'000 employees between 2018 until 2040. After Uster, the town of Wetzikon will see the largest increase in residents. The municipality is expected to grow by 6'500 people by 2040 (Amt für Mobilität 2021). The population growth for Wetzikon is calculated based on the scenarios for population development in Switzerland and the cantons 2020-2050 from the Federal Statistical Office (BFS 2020). In the reference scenario, Wetzikon would have 42'200 inhabitants by 2060 compared to the low and high scenario with each 37'000 and 47'000 inhabitants (Fig. 2.2.2C). The detailed calculation is accessible in appendix A.

The agglomeration program also states that today's floor-space potential is not sufficient to accommodate the future inhabitants of Wetzikon. Therefore additional living space needs to be activated (Amt für Mobilität 2021).

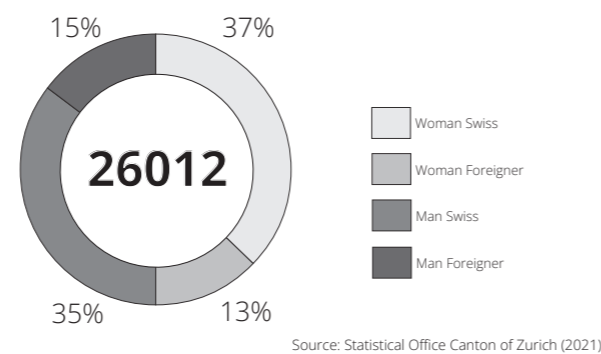


Fig. 2.2.2B: Distribution of woman and man

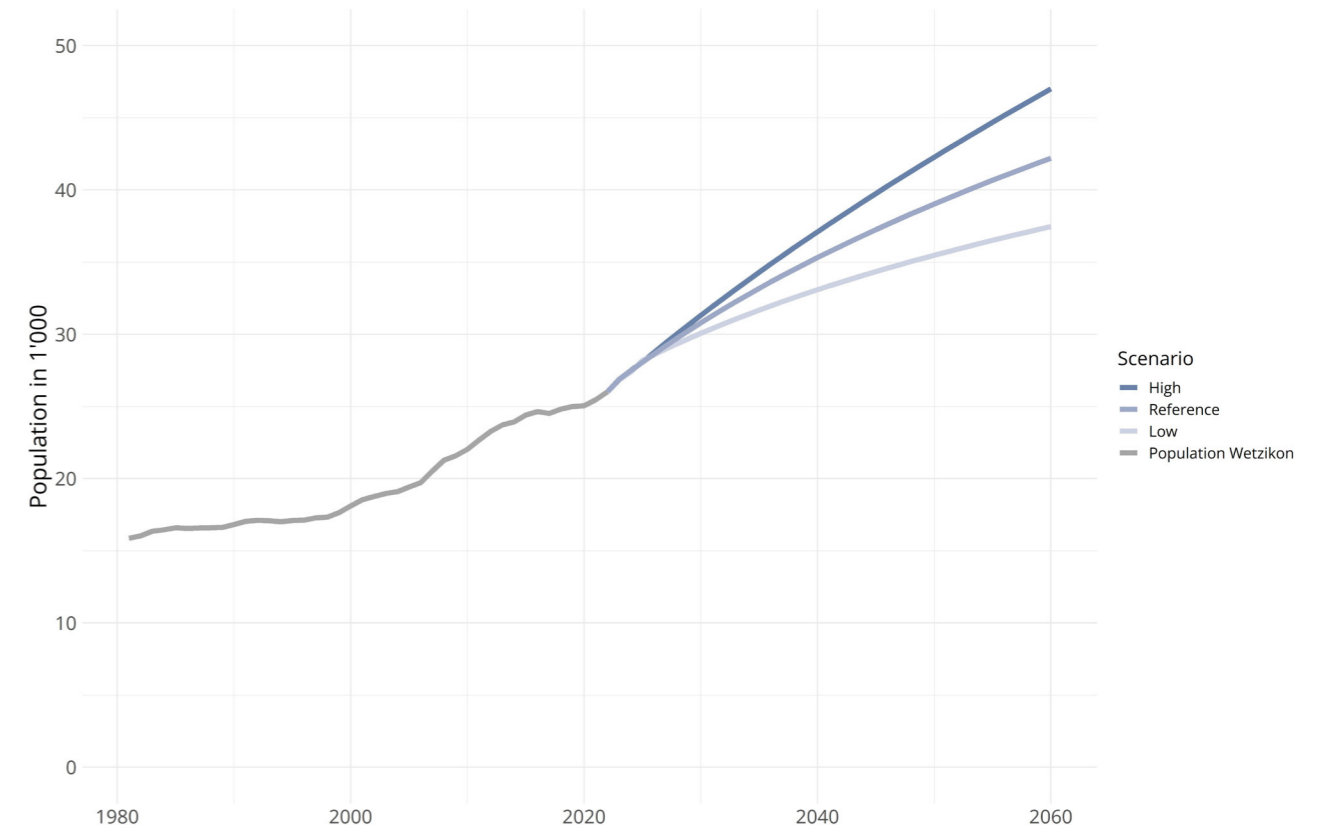


Fig. 2.2.2C: Population growth scenario of Wetzikon.



Fig. 2.2.2D: Usage of public space in front of Oberland Märt

## 2.2.3 Settlement Structure

### Typography

The appearance of the city of Wetzikon is characterised by its extensive settlement structure. The historically separate villages have grown together over the decades (chapter 2.2.1). The results of this growth are still visible in the settlement structure today. Historic buildings with gabled roofs stand next to tall, block-like new buildings. Detached houses next to large apartment blocks and shopping centres. The two busy cantonal roads Zürcherstrasse and Pfäffikerstrasse also have a major influence on the perception of Wetzikon. They have a huge separation effect in the West and East of the city. Trade and industry have mainly settled in the West on Zürcherstrasse and in the North, bordering the swamp.

In addition to this, at first glance heterogeneous townscape, homogeneous characteristics are nevertheless evident within the various neighbourhoods of Wetzikon. Comparable settlement structures are particularly recognisable in the outer neighbourhoods, which are characterised by detached houses. Low-rise buildings with spacious semi-private to private outdoor spaces are strung together.

The current town centre is located primarily along Bahnhofstrasse from the train station Wetzikon to the Oberland Märt. Bahnhofstrasse is lined with various shops catering for daily needs. A higher density of buildings can also be seen in these central areas. Cultural offerings and religious centres are also located here. Various education and sports facilities are to be found here as well.

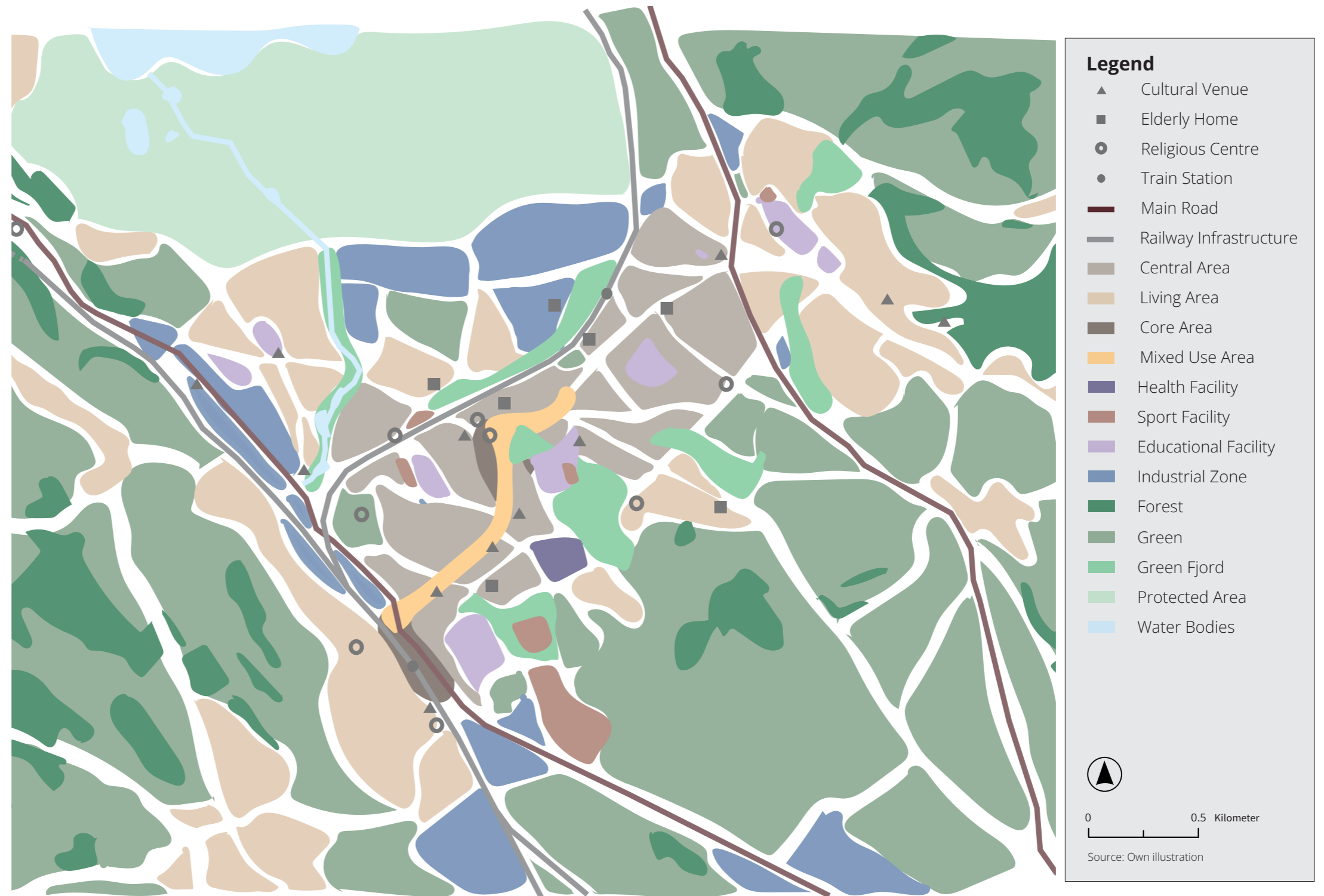


Fig. 2.2.3A: Potato plan displaying the different uses of Wetzikon

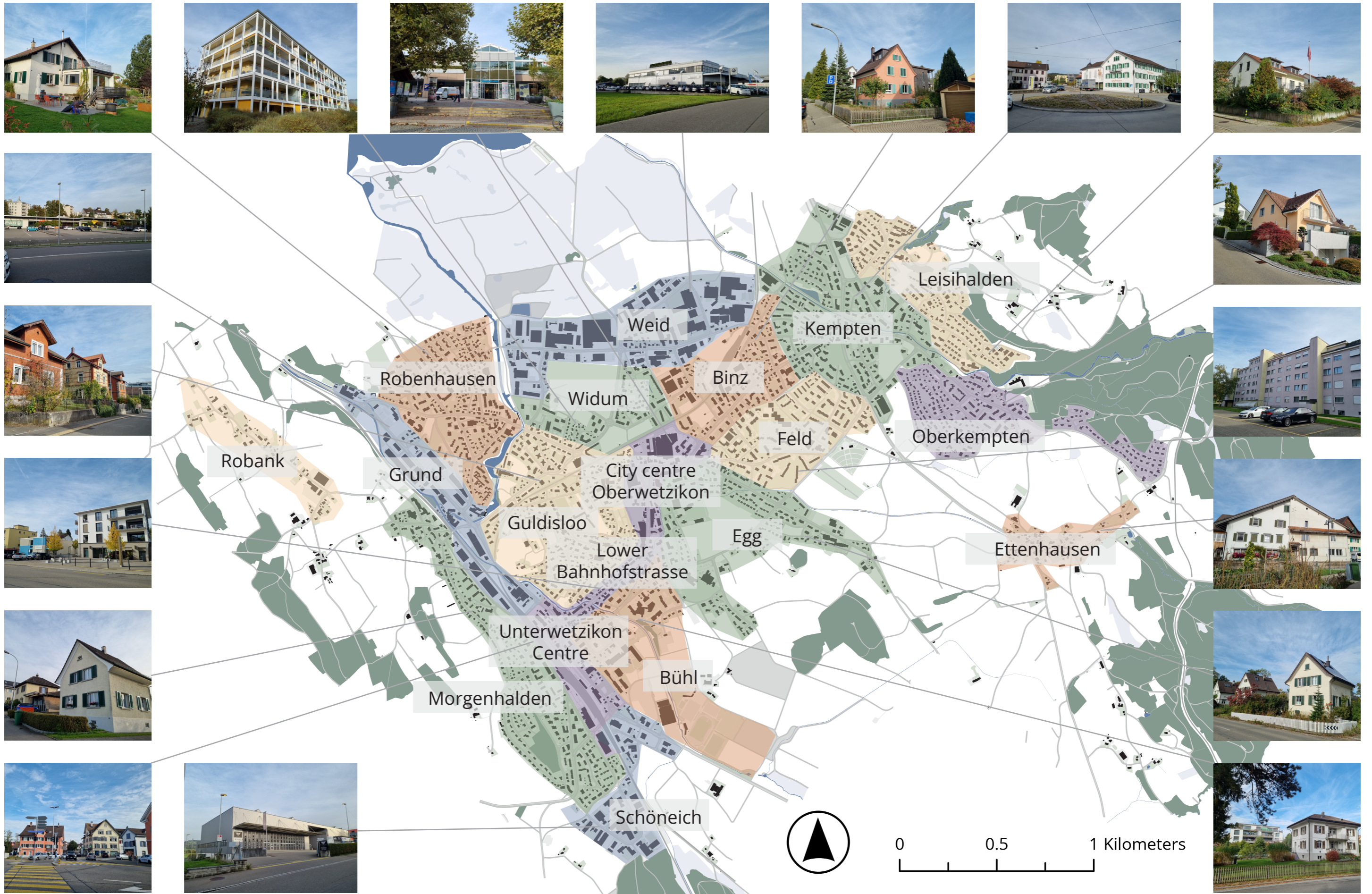


Fig. 2.2.3B: Typologies of the different neighbourhoods in Wetzikon

## Housing

The neighbourhoods of Robenhäusern, Morgenhalden, Guldisloo, Kempton, Leisihalden-Oberkempton and Feld each have over 2'500 inhabitants. They account for 66% of households in whole Wetzikon (Wohnkalkulator 2023). Due to the different sizes of the neighbourhoods, this is not directly transferable to the density. In Figure 2.2.3C, specific apartment blocks are particularly dense (>165 p/ha). Nevertheless, various areas with high densities can be recognised, such as at around the Wetzikon railway station, in Robenhäusern, around Oberlandmärt, around the railway station and the Ochsenkreisel in Kempton.

The average household size in Wetzikon is 2.24 people. 14% of Wetzikon's inhabitants live in single family homes. The proportion of apartments in the building stock is around 70%. Just under 30% of people live in three-room and four-room flats respectively. The typical per capita living space consumption by household size in Wetzikon is 45m<sup>2</sup> and is therefore slightly below the Swiss average of 47m<sup>2</sup> (Wohnkalkulator 2023).

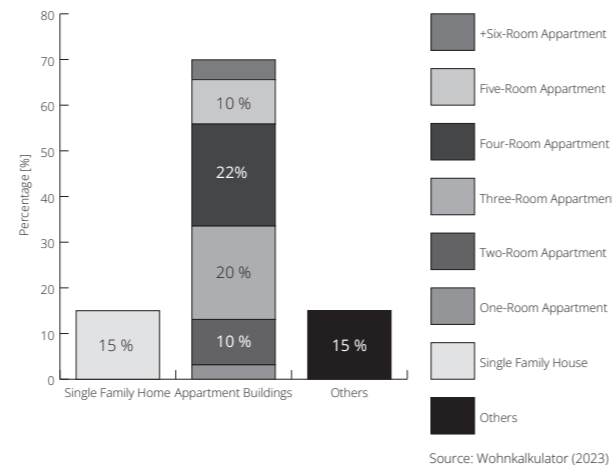
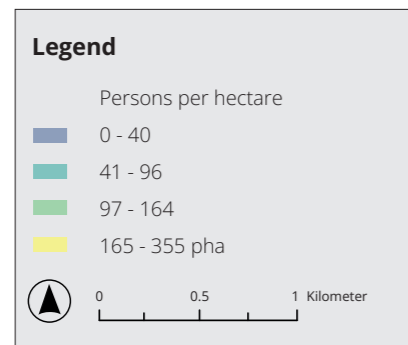


Fig. 2.2.3C: Housing stock

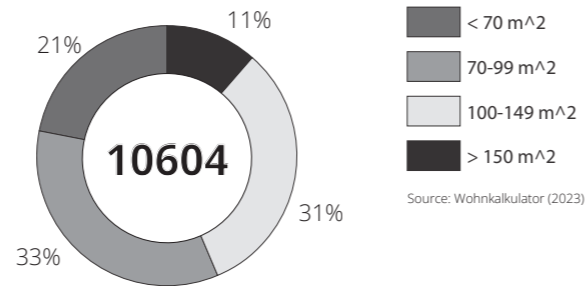


Fig. 2.2.3D: Apartment size

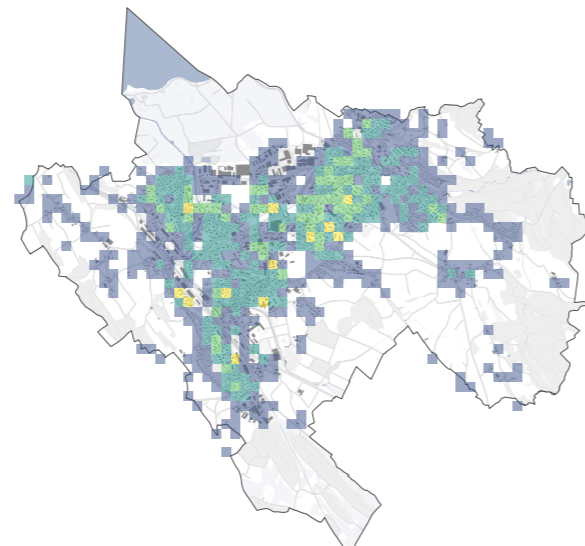


Fig. 2.2.3E: Population density (Kanton Zürich 2023a)

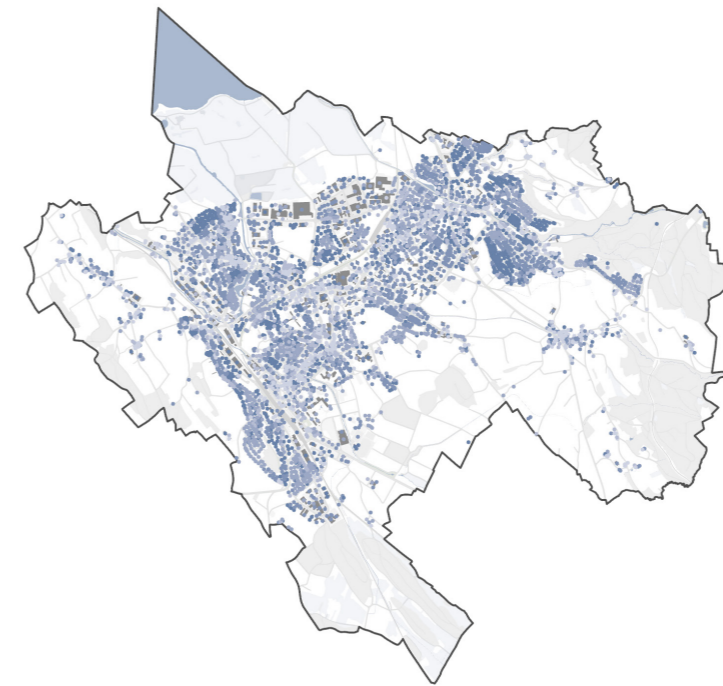


Fig. 2.2.3F: Age of buildings (BFS 2023b)

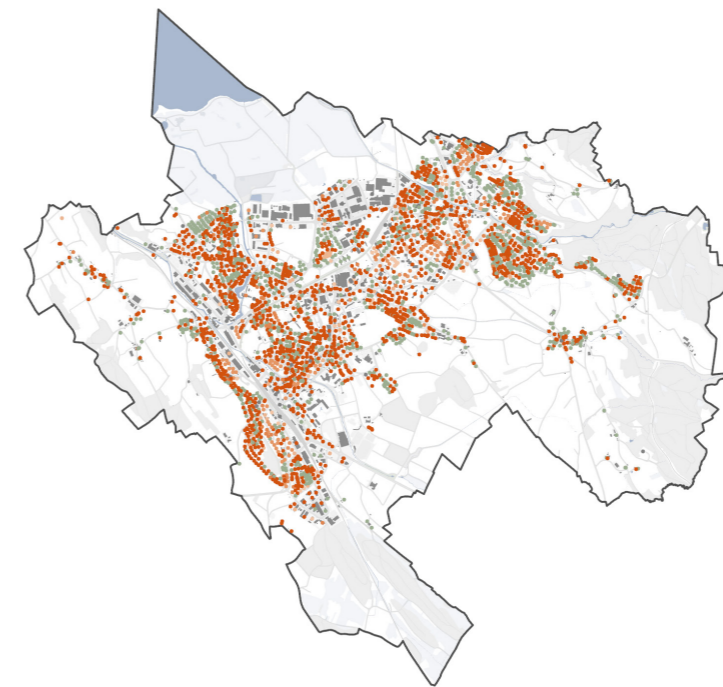
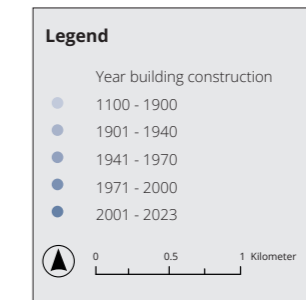


Fig. 2.2.3G: CO<sub>2</sub> emission category of buildings (BAFU 2016)

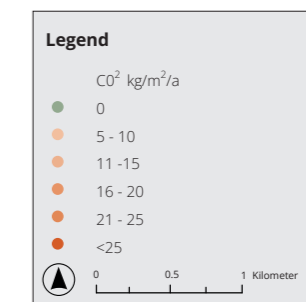
## Age of Building Stock

Due to its history, the old village centres and the connecting roads contain the oldest houses, which are still existing. There are some entirely new built neighbourhoods mainly at the edge of the city. Many new houses were built independently into the existing city, either replacing old buildings or in between existing older buildings.



## Building emissions

The heating emissions per squaremeter often correlate with the age of the buildings (Fig. 2.2.3F). Due to different heating sources and renovations, they do not entirely overlap. The mix of very good and bad efficiency levels on small perimeters urges for very individual solutions when it comes to new settlement developments.



## 2.2.4 Commerce and Industry

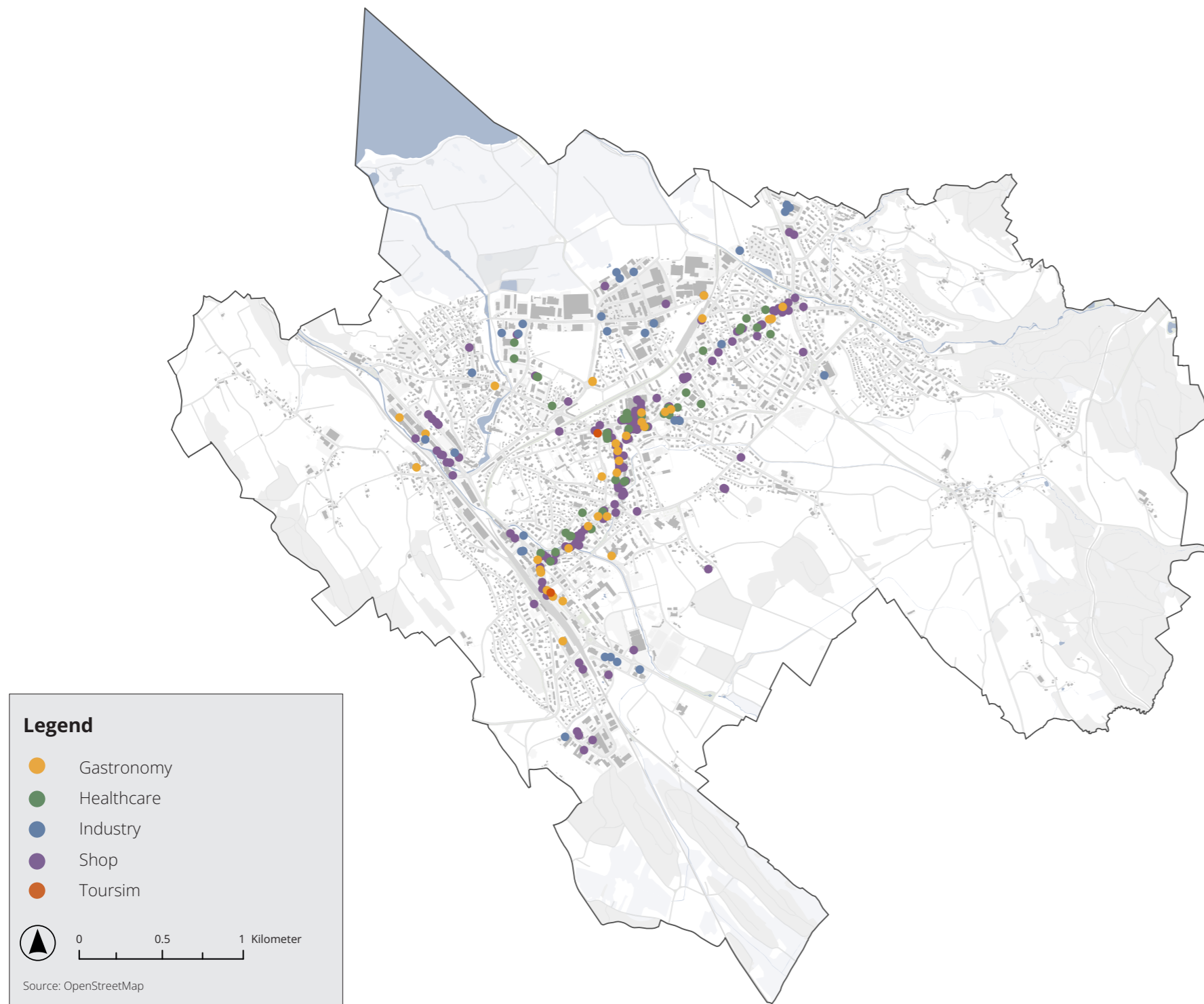


Fig. 2.2.4A: Spatial distribution of commerce in Wetzikon

Wetzikon offers jobs for 14,354 employees. Just under a quarter of these are in the secondary sector (23%) and three quarters in the tertiary sector (76%) (Fig. 2.2.4B) (Kanton Zürich 2022). In a cantonal comparison, Wetzikon has a strong secondary sector and at the same time below-average employment figures in the tertiary sector. Over the last 10 years, employment in the sectors has remained stable, with a slight upward trend in the tertiary sector (Kanton Zürich 2022). A closer look at the spatial distribution of businesses reveals a strong concentration along Bahnhofstrasse in the catering and retail sectors (Fig. 2.2.4A). Most of the industrial companies are located on the edge of the village between Kempten and Robenhausen and along the railway line in Unterwetzikon.

The unemployment rate is 2%, which is slightly higher than the cantonal average of 1.5%. Wetzikon has two hotels that can accommodate a total of 256 people (Kanton Zürich 2022).

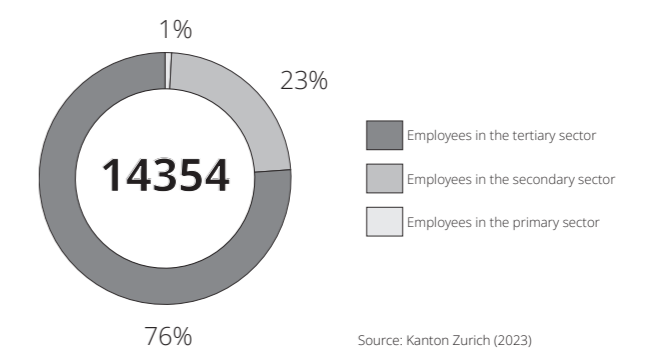


Fig. 2.2.4B: Total workspaces and categorisation by sector

## 2.2.5 Nature and Landscape

### Greenspace

As introduced in the history section, Wetzikon lacks an urban spatial structure in the settlement pattern. This is also reflected in the lack of public green spaces and parks. There are 293 ha (excluding green roofs) of green space in the settlement area of Wetzikon. This corresponds to around 420 football pitches or 50% of the settlement area. Of this, two percent of the settlement area is contractually protected as nature conservation areas or is maintained in accordance with a management contract. According to the following figures, 85% of the areas are privately owned. The size distribution is predominantly made up of small areas, with only a few large green spaces (Fig. 2.2.5A, 2,2,5B).

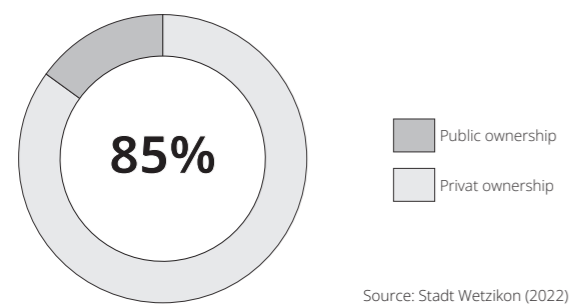


Fig. 2.2.5A: Ownership of greenspaces

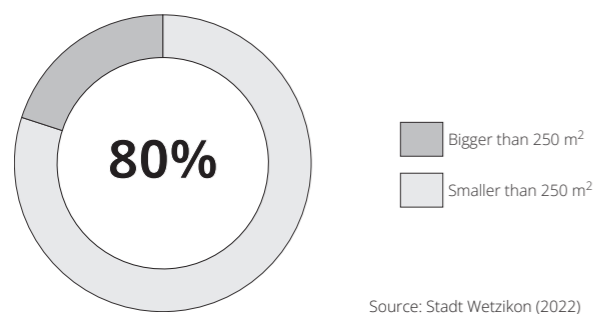


Fig. 2.2.5B: Size distribution of greenspaces

### Quality and connectivity of green spaces

The ecological quality of the green spaces is generally very low. Only a few indicator species were found in the areas (Stadt Wetzikon 2023). Connectivity functions mainly along the railway tracks and via the axes of the fjord system (see infobox).

#### Fjord concept in Wetzikon

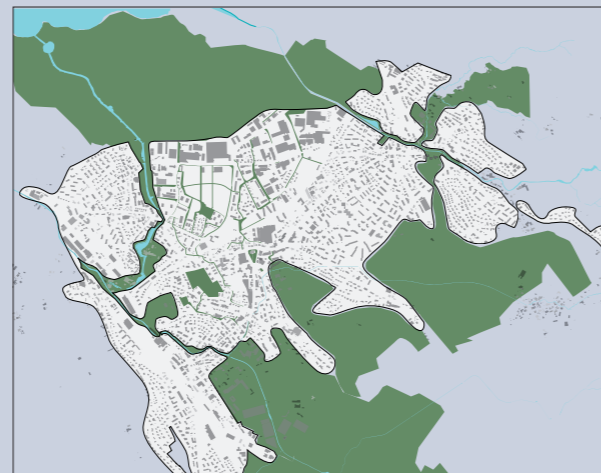


Fig. 2.2.5C: Fjord concept in Wetzikon (Stadt Wetzikon 2010)

In 2010, Wetzikon's spatial development concept established a specific spatial fjord concept as a guideline for landscape design in the settlement area. Due to the loose settlement pattern, landscape foothills encroach deep into the urban space and are referred to below as fjords. They should also be kept free in the future, as they provide valuable access to green spaces, which serve as the basis for a variety of public functions. The potential of waterways should also be better utilised and made accessible by pedestrian and cycle paths (Stadt Wetzikon 2010).

### Open space supply

In Wetzikon, the provision of open space is around 5.6 m<sup>2</sup> per inhabitant. In the city of Zurich, according to the revision of the regional guideline plan, 8 m<sup>2</sup> of open space per inhabitant and 5 m<sup>2</sup> per workplace serves as planning benchmarks. Between various other cities, the benchmarks for adequate open space provision vary between 6 and even 15 m<sup>2</sup>. In comparison with another agglomeration municipality, Rapperswil-Jona works with the following assessment: (Stadt Wetzikon 2022)

- > 10 m<sup>2</sup>/inhabitant: good open space supply
- 5-10 m<sup>2</sup>/inhabitant: medium open space supply
- < 5 m<sup>2</sup>/inhabitant: poor open space supply

The supply of publicly accessible open spaces in Wetzikon is at the lower end of the planning guidelines and should therefore be increased.

### Waterways

Wetzikon is crossed by various small watercourses and small standing waters. Together they have a length of 9.7 km and cover 1% of the settlement area. Most of them flow on the surface. According to the cantonal classification of ecomorphological status, only 24% of the watercourse network is classified as less impaired or near-natural. In addition to obstacles in the riverbed, the riverbanks of watercourses are frequently unsuitable or absent from an ecological perspective. (Stadt Wetzikon 2010)

### Landscape

Wetzikon is nested between two hills at the lower end of Lake Pfäffikon. The settlement area is surrounded by the Robenhauser Riet to the north (Fig. 2.2.5D), the foothills of the Drumlins to the west, wooded slopes to the east and large agricultural areas to the south. Drumlins are a hilly landscape formed by the glacier in whose moist hollow moors have developed (Pro Natura 2023). The reed to the north and the Drumlin landscape to the south are ecologically unique areas and are protected by the Federal Inventory of Landscapes and Natural Monuments (BLN). The agricultural areas to the south and west consist largely of crop rotation areas (FFF). These arable soils are the most valuable agricultural areas in Switzerland and are therefore protected by a sectoral plan. (Kanton Zürich 2023a)



Fig. 2.2.5D: Robenhauser Ried



## 2.2.6 Mobility

### Motorised Individual Traffic (MIT)

Two cantonal main roads cross through Wetzikon, H340 in the South and H345 in the North. The average daily traffic volume is depicted in Fig. 2.2.6A. About 60% of all trips either start or end in Wetzikon. Most of those trips are commuters going to or returning from work. Local traffic makes up about 30% of all trips. Car traffic makes up about 60% of the trimodal mode share. (BFS 2021)

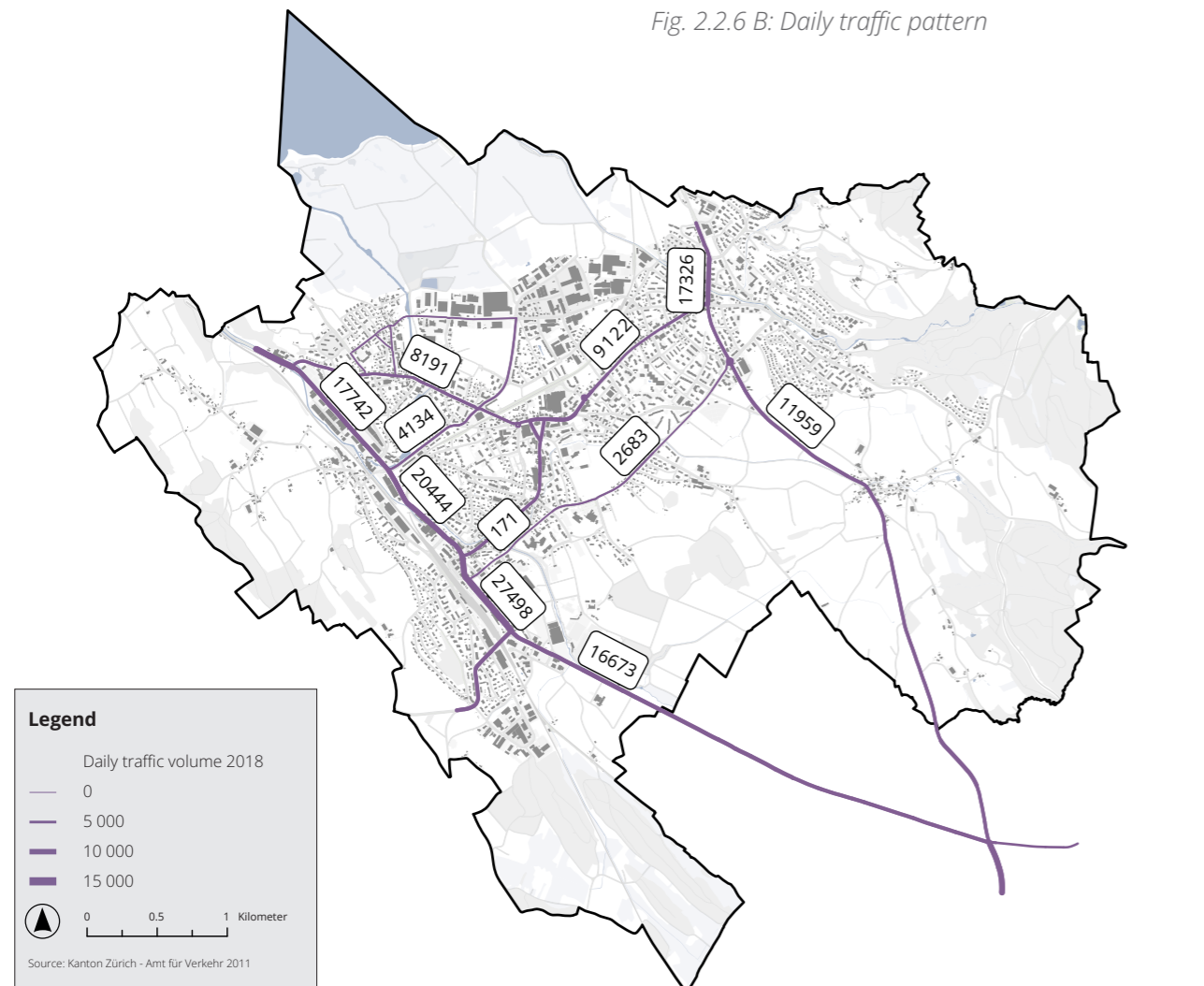


Fig. 2.2.6 A: Daily traffic volume

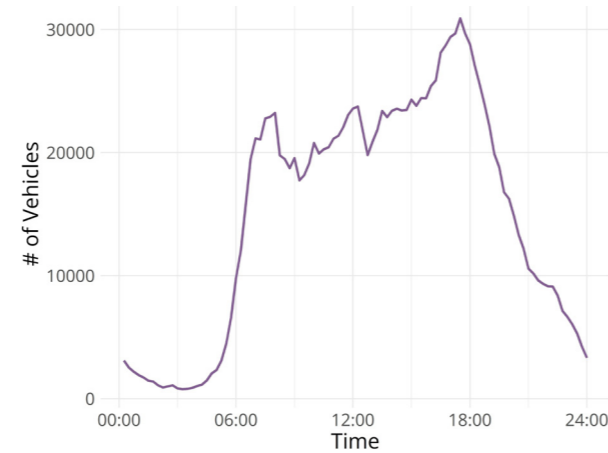


Fig. 2.2.6 B: Daily traffic pattern

Fig. 2.2.6B illustrates the daily traffic patterns. The morning and evening rush hours are clearly visible, with the evening rush hour being more prominent than the morning rush hour. Key relations are displayed in Fig. 2.2.6E. Connections with a high share of commuters stand out. The most important ones are Zurich and the Glattal.

Fig. 2.2.6C shows the state of congestion during the evening peak hour. Several links exceed their capacity. This impacts the punctuality of buses, causing at times missed connections to the supraordinate levels of public transport.

Aggregated data gathered from loop detectors indicates that the traffic network is functioning well for most of the day. Nevertheless, substantial traffic volumes, particularly during peak hours, lead to spatial segregation for pedestrians, discourage the use of active modes, and cause delays for the public transport system.

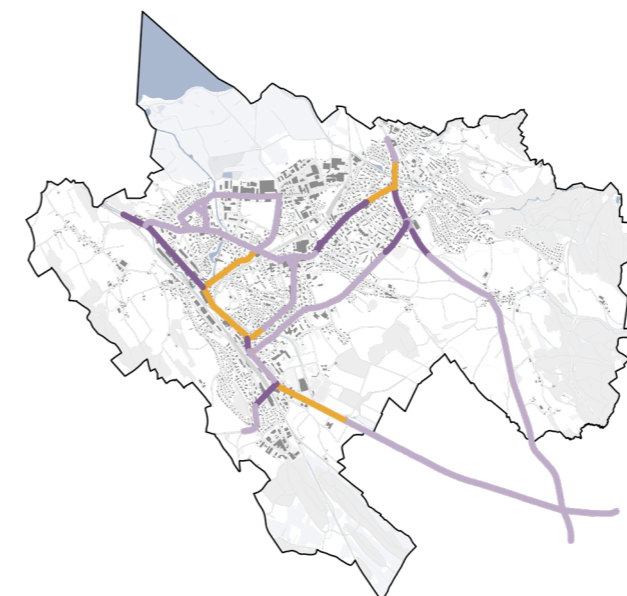


Fig. 2.2.6 C: Congestion states

### Public Transport (PT)

Regional journeys are facilitated by trains and buses. The key connections are illustrated in Fig. 2.2.6F. Similar to cars, the most significant routes are those with a substantial number of commuters. The overall percentage of public transport trips accounts for 16% of all journeys. (BFS 2021)

Wetzikon is served by four train lines. Departing schedules for trains and buses are presented in Fig. 2.2.6D.

Local trips are served by VZO, a bus company partly owned by the city of Wetzikon. Buses operate with a base frequency of 30 minutes, which increases to 15 minutes during peak hours. As demonstrated in Fig. 2.2.6C, buses regularly encounter congestion during peak hours.

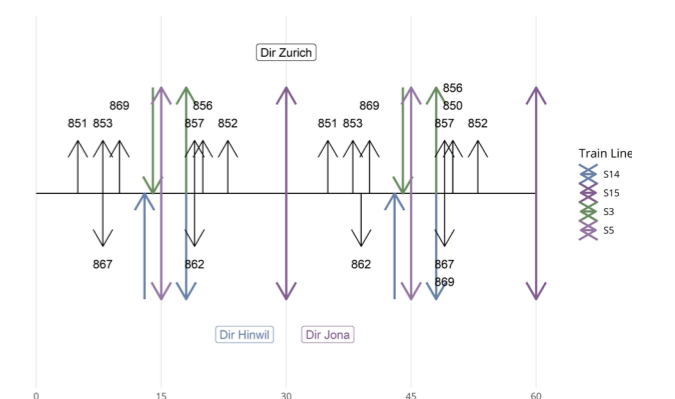
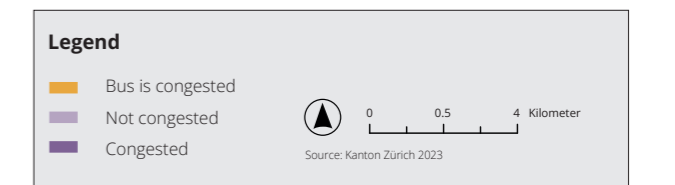


Fig. 2.2.6 D: Departing schedule of buses and trains



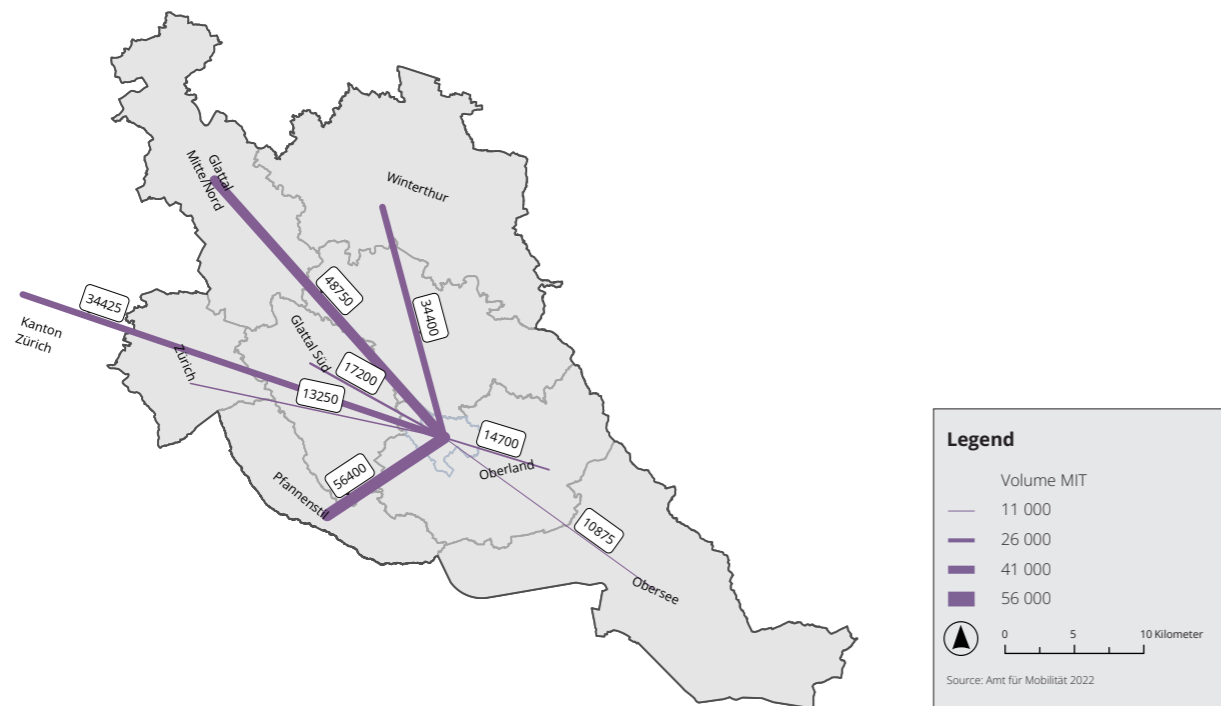


Fig. 2.2.6E: Key relations of MIT

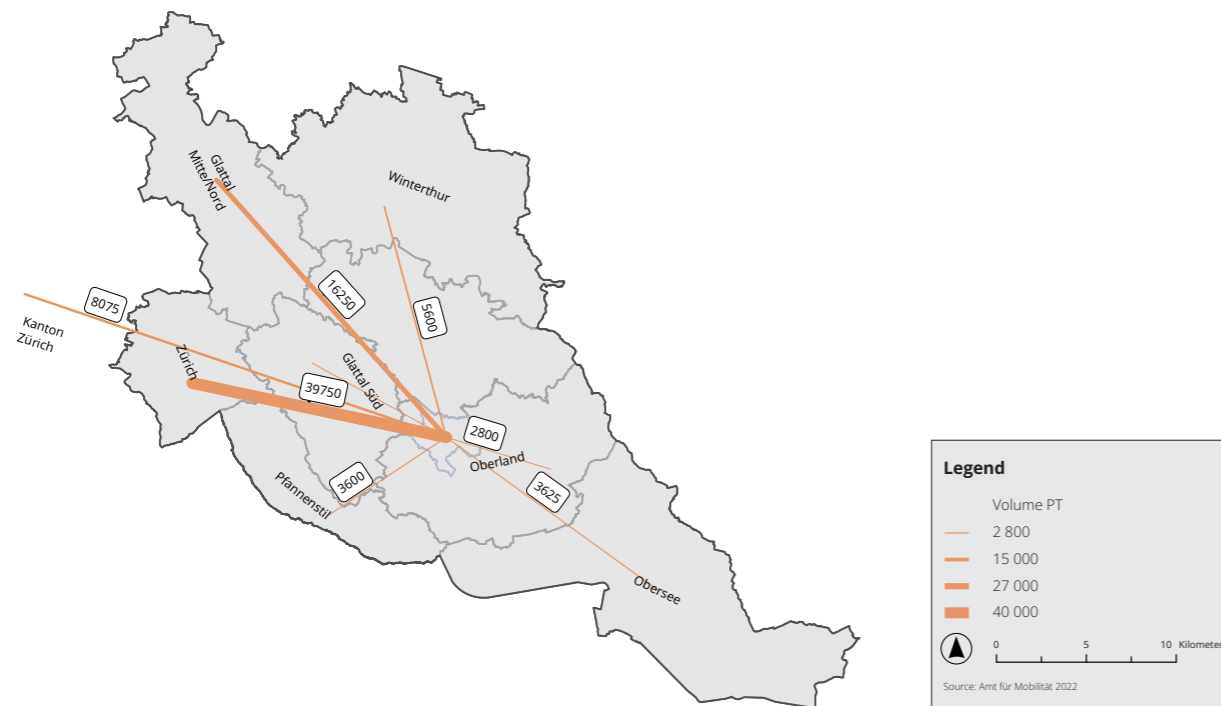


Fig. 2.2.6F: Key relations of PT

### Active Modes (AM)

Wetzikon features a dense network for everyday and leisure cycling, accounting for approximately 23% of all trips (BFS 2021).

Wetzikon is linked to the supraregional leisure cycling network by three leisure routes. While connections to neighboring places exist, they are also considered weak spots defined by the canton (Fig. 2.2.6G). (Kanton Zürich 2023b)

However, the dedicated cycling infrastructure does not always meet current regulations or may even be completely absent at times. Fig. 2.2.6G outlines the everyday network and highlights weak spots defined by the canton (Kanton Zürich 2023b).



Fig. 2.2.6G: Active mode network

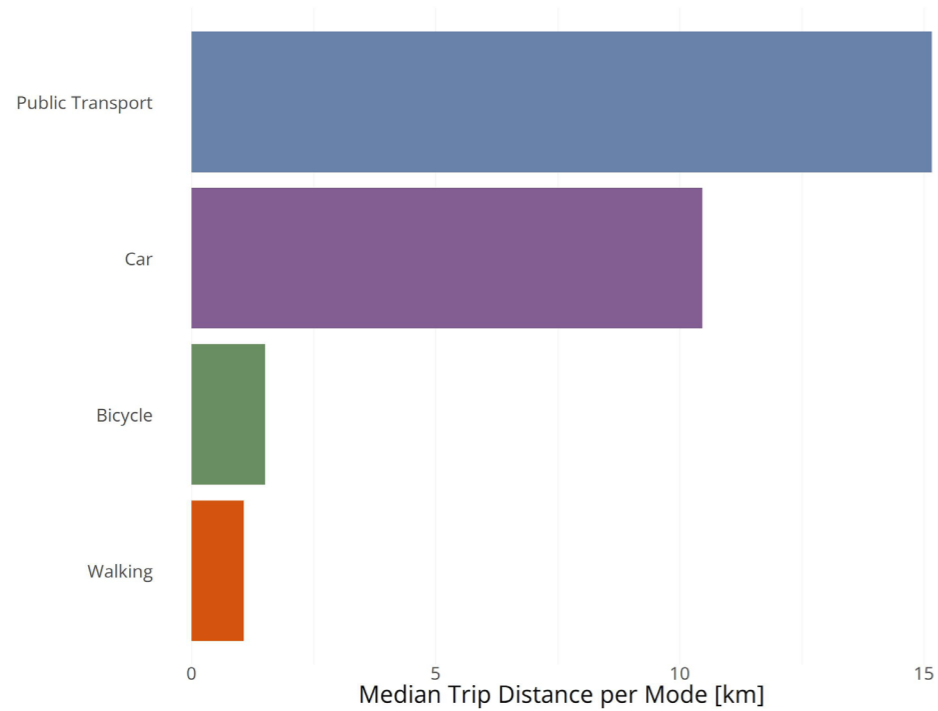


Fig. 2.2.6H: Median trip distance per mode (BFS 2021)

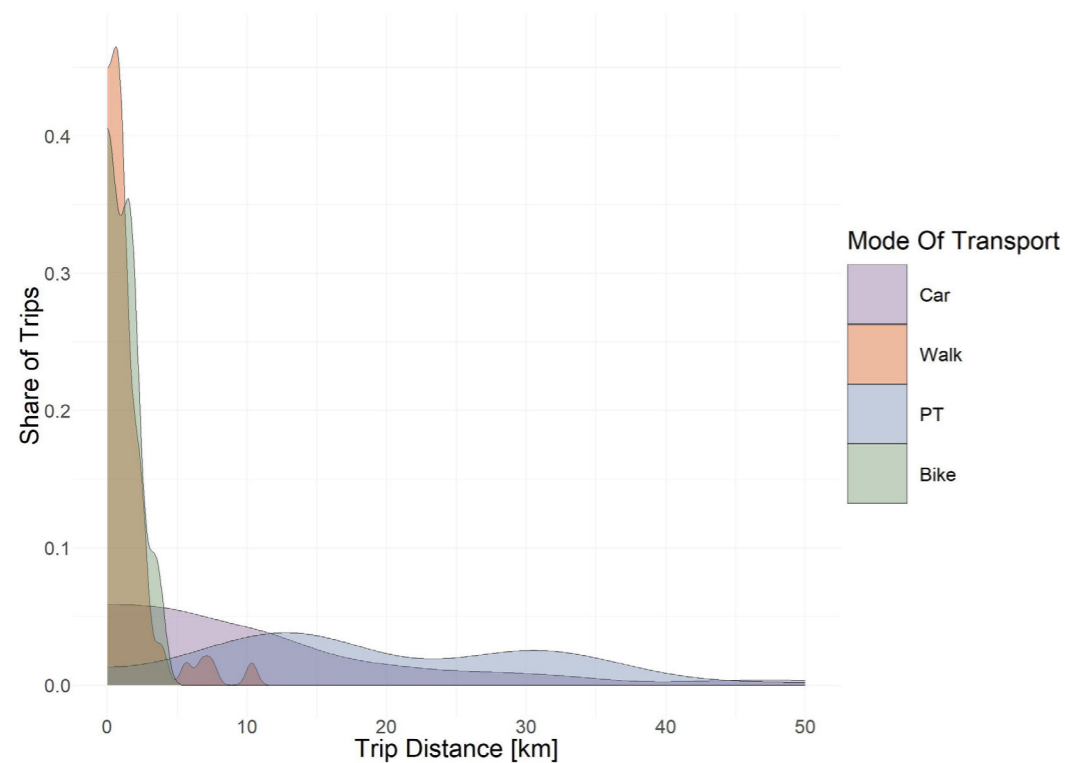


Fig. 2.2.6I: Trip distance density per mode (BFS 2021)

### Accessibility

Accessibility in this work considers the distance between the population and their destinations. Analysing the distances in the microcensus mobility and traffic per mode of transport unveils that active modes are primarily used for short trips. Interestingly, the median trip distance for public transport is longer than for cars (Fig. 2.2.6H). Looking at the density in Fig. 2.2.6I, this is confirmed by the distribution of the trip lengths. 53% of all trips by car are shorter than 10 km. The relations to Rapperswil (15 km) and Zurich (30 km) by public transport are visible in the peaks. There are a number of outliers in walking, which are due to leisure activities. (BFS 2021)

### Future Development

Three projects will impact Wetzikon in the future.

The first variant involves extending the A15 to connect to the Forchautobahn. This work will consider the variant connecting at the current Ottikon exit due to environmental constraints. The extension is projected to be operational by 2050.

The second project involves the expansion of the double track between Uster and Aathal, facilitating an increase of two additional trains per hour in both directions. This will be done as part of the STEP 2030 and should be operational by 2030.

The construction of the Oberlandsschnellbahn for bicycles is underway. This project will link the Highlands to the city of Zurich and beyond to the Glattal region, providing improved transportation access. Construction is scheduled to commence in 2035. However, we assume it will not be finalized before 2050 (Hotz 2020).

3

WETZIKON

2060

# 3.1 STUDY CONCEPT

As seen in the situation analysis, Wetzikon faces a number of challenges that need to be addressed. The main challenges are:

- social space
- mobility
- accessibility
- green space
- eviction
- greenhouse gas emissions from buildings (hence building emissions)

This chapter will assess different settlement growth strategies according to these challenges.

## 3.1.1 Approach

In order to accommodate the future population growth decided by the canton, Wetzikon will undergo a drastic change in its settlement structure. Where and in what form this change will take place is not yet clear. The spatial development plan from 2010 defined areas where population growth should happen over the next 15 years (Stadt Wetzikon 2010). But are they adapted to the future?

Accordingly, policies could be developed for each challenge. However, probably no settlement structure might be able to meet all of them and guarantee the increase in housing units required by the canton at the same time.

As an alternative approach, this study proposes to analyse the challenges in relation to different possible future settlement structures. In this way, an appropriate and coherent settlement structure can be selected that best meets the challenges.

The first step is to define three different settlement strategies. Based on a low and a high population growth scenario, it is simulated how Wetzikon could grow until 2060. This results in six possible settlement developments (outcomes). By analysing the implications for each of the challenges, the optimal settlement strategy can be selected.

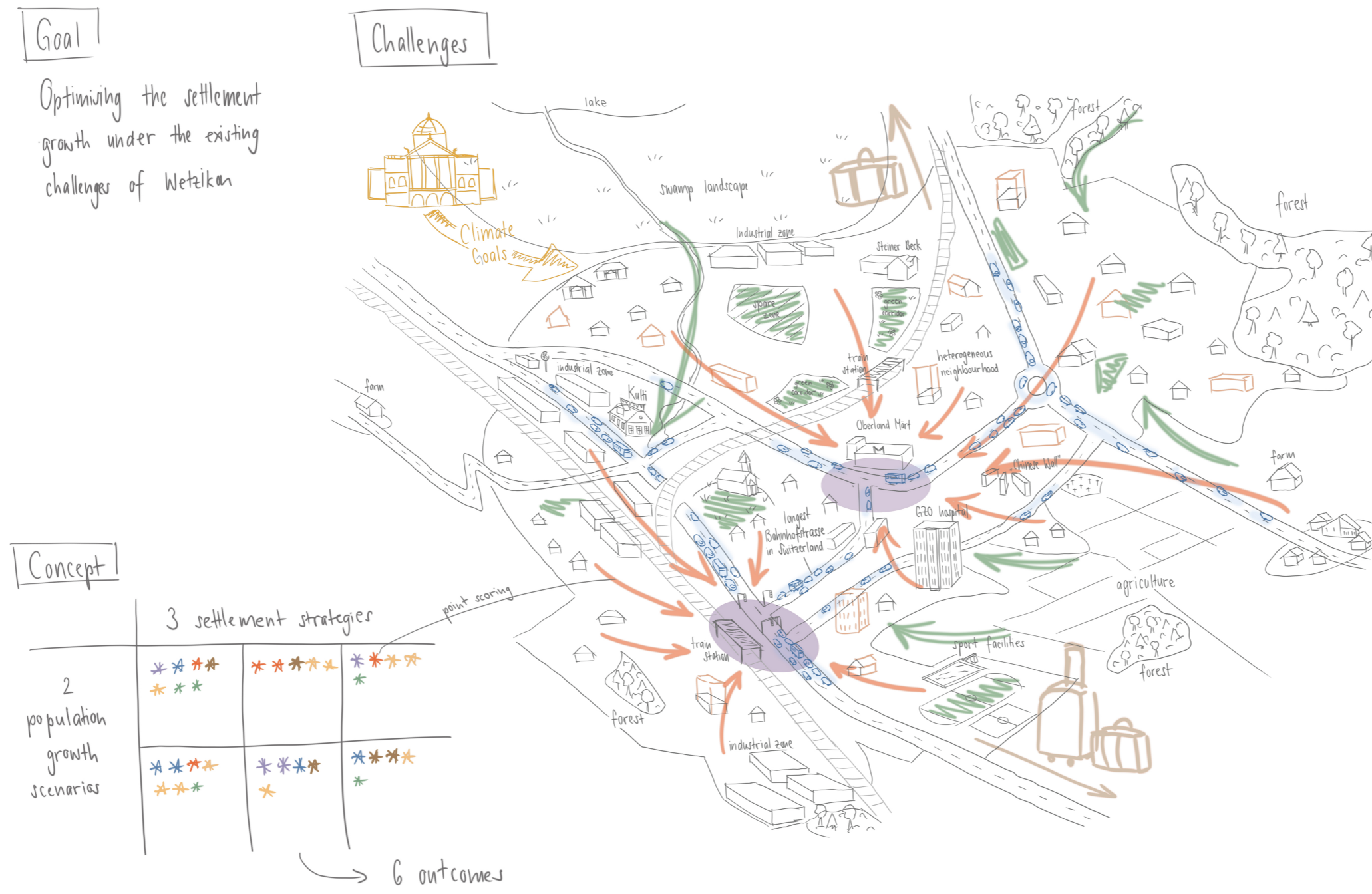
The evaluation is based on a qualitative assessment. This allows for an evaluation according to the six challenges. The strategies are scored from zero to two points for each scenario:

- 2 points: good
- 1 point: decent
- 0 points: below average

The analysis is greatly simplified due to the limited scope of the project. On the one hand, various assumptions have been made for the simulations. On the other hand, only a limited number of challenges were addressed. The choice was based on their dependence of the settlement structure. The following challenges have been neglected: financial implications, workplace development and age structure.

Nevertheless, the results might present very relevant statistical trends for the future that should be considered in the choice of settlement strategy.

# 3.1.2 Study Overview



With the illustration on this page, the relations between all the different aspects of the study setup and the different terms should be clarified.

On the next pages will follow the following structure:

- Framework Definition
- Settlement Strategies
- Population Scenarios
- Challenges
- Result Analysis

### Legend

- Social Space
- Mobility
- Accessibility
- Eviction
- Green Space
- Building Emissions

Fig. 3.1.2A: Sketch of the goal, the concept and the addressed challenges of the study and their connections

### 3.1.3 Framework Definition

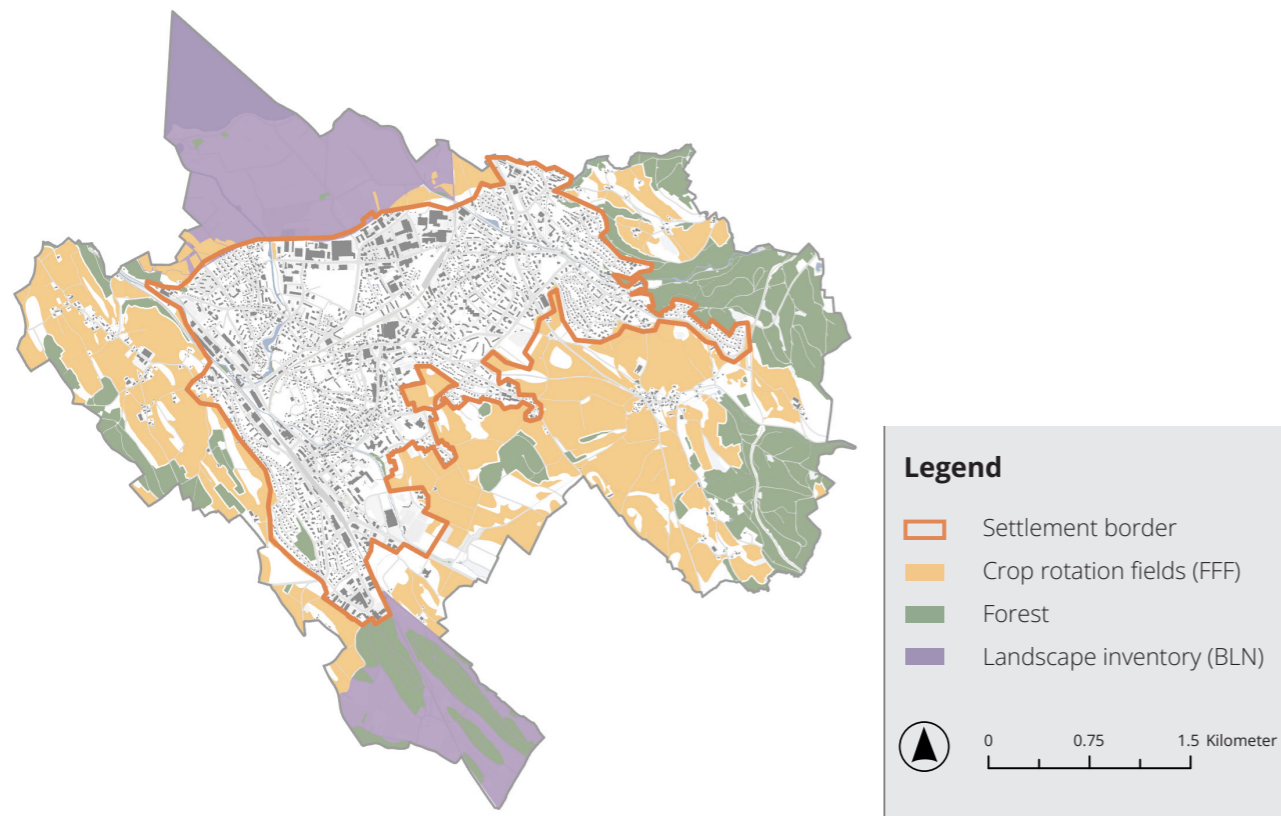


Fig. 3.1.3 A: Framework settlement with surrounding protected areas

#### Spacial Extent

Wetzikon's settlement was historically defined by physical boundaries: to the east and west by hills and to the north by wetlands and the lake. Today the boundaries are less visible, but are even more existent: Mainly three different nature protection layers enclose Wetzikon's settlement today, as mentioned in chapter 2.2.5: The forests, the crop rotation fields and the Federal Inventory of Landscapes and Natural Monuments (BLN). These areas are of highest importance on a national level, settlement growth is prohibited. All strategies focus thus on the growth inside today's settlement structure (Fig. 3.1.3A). This coincides with the

current national planning paradigm of inward development which should stop urban sprawl and with it longer commuting trips and disturbance of nature.

#### Temporal Extent

The scenarios are developed for a time horizon of 40 years, or until 2060. This time span is chosen to allow the development of different settlement structures. This is adequate for changing the strategy, adapting regulations and building the developments.

#### Choice of variable

To simulate the different outcomes and assess their impact on the challenges, a suitable variable needs to be chosen. Defining it on the individual building level would be too labour intensive. Likewise the definition on the raster level would be too imprecise. Hence the inhabitant density per parcel is chosen (Fig. 3.1.3B). It can easily be converted to building volumes or the amount of people.

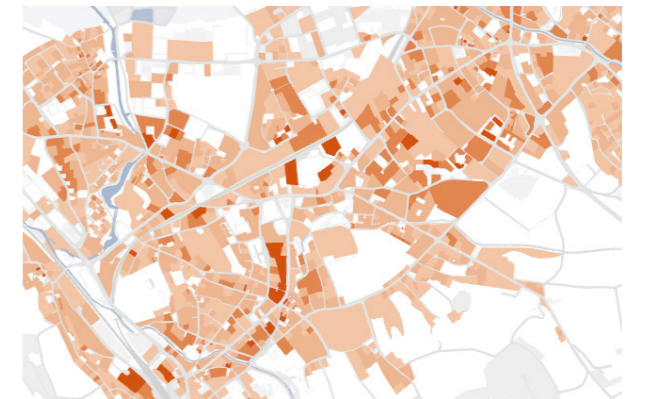


Fig. 3.1.3 B: Snapshot from population density definition

The current inhabitant density on the parcel level is not available, and the resolution from the raster dataset by the canton is not sufficient. A model was thus developed (App. A4).

For the definition of the future settlement structures, parcels are iteratively set to a density of 300 people per hectare around or at the demanded locations until the demanded population size is reached.

This density is intentionally high and corresponds to dense urban settlements. A similar density is illustrated with the Poststrasse neighbourhood in Dietikon (Fig. 3.1.3C). A lower density would demand the improbable redevelopment of the whole settlement area of Wetzikon.

#### Considered stakeholders

The framework perimeter shows that the interests of the state stand in the foreground.

Followed by the interests of the canton of Zurich, as its growth allocation interests in regional centres are met.



Fig. 3.1.3 C: Poststrasse (Kanton Zurich 2015)

And as a third layer the challenges consider again different stakeholders: Building and mobility emissions, biodiversity aspects of green spaces and greenhouse gas reductions due to accessibility cover again national interests. Social space, mobility externalities, eviction, accessibility, recreation due to green space finally represent the life quality of the inhabitants of Wetzikon that we would like to increase.

The impact on the population in the catchment area of the regional centre, the retailers and workplaces are not directly considered.

### 3.1.4 Settlement Strategies



#### One centre

Today, most inhabitants of Wetzikon would probably argue that Wetzikon has one centre, namely from the Migros in the middle of Wetzikon to the main station. The definition and development of this centre was initially decided upon in the spacial development concept in 2011. It guides the planning of the city of Wetzikon ever since (Wetzikon 2010).

Current densities in the centre are higher than in the rest of the city, but the strategy would promote even higher densification for a more concentrated and lively centre.

The definitions of the outcomes with this strategy increase the densities around the centre that are not yet at 300 inhabitants per hectare or more to it. To reach the higher scenario, the radius is increased, as higher densification is unreasonable.

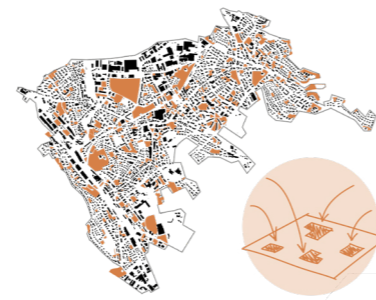


#### Multiple centres

The strategy of multiple centres emerges from the historical development of Wetzikon and proposes to organise the city again more on the scale of the initial village centres of Ober- & Untewetzikon, Robenhausen and Kempten. This strategy could bring advantages concerning more local organisation. In an even further growing city, collectivity is otherwise at risk. How it would deal with other challenges needs to be assessed.

As former centres, they still have the necessary mixed use buildings and street layout. They need to be reactivated. But at the moment traffic is discouraging people from spending time there.

For the definition the same process was applied as for the single centre but this time around the four mentioned centres.



#### Fill the gaps

It was shown that to minimise global warming, the tear down of houses should be avoided (Müller 2023). Combined with the planning paradigm of inward densification the focus is thus laid on surfaces in the settlement structure that are not yet developed, or not entirely.

For the definition, identified parts of plots are set to 300 inhabitants per hectare. These areas were identified by the raum+ competence centre (raum+ 2023). The total parcel density is often lower as only parts of the parcels are set to 300 inh/ha. a mix between the already built area density and the new development.

For the smaller scenario the smallest and most distant parcels are neglected. For the higher scenario, two large green spaces need to be developed to satisfy the growth.

### 3.1.5 Population Scenarios



#### Lower population growth

As reference, the low population growth scenario from the Federal Statistical Office is applied (BFS 2020, App. A2).

This scenario assumes a population growth of about 37'000 people by 2060. It is around 12% lower than the reference scenario with 42'200 (chapter 2.2.2).



#### Higher population growth

The high population growth scenario is based on the high scenario of the BFS. With 47'000 inhabitants in Wetzikon by 2060, it is 12% higher compared to the reference scenario.

This scenario would make Wetzikon a role model for the canton's growth strategy. In the next pages, the challenges are presented with their results for the different outcomes.

challenges are presented with their results for the different outcomes.

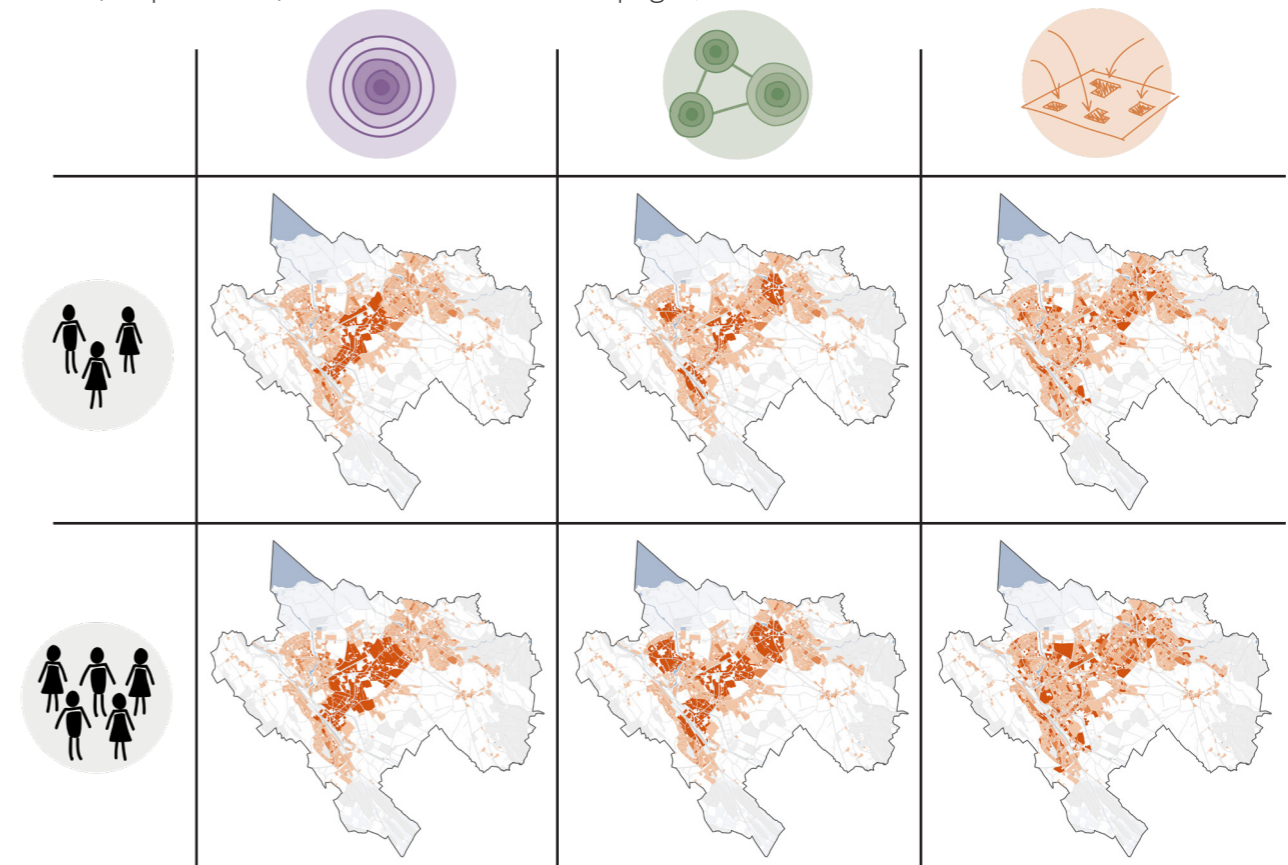
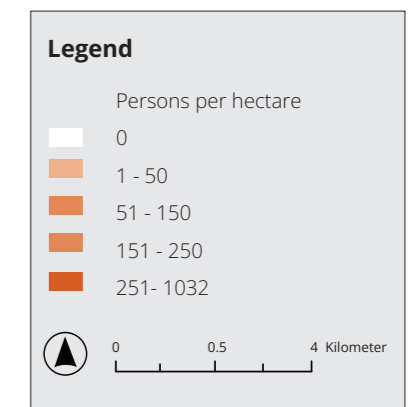


Fig. 3.1.5A: Inhabitant density definitions per strategy and scenario



## 3.1.6 Social Space



### Why does it matter?

People like to spend their time in places where they feel safe and comfortable (Montgomery 1998). These places should invite people to stay, serve as meeting points and encourage interaction. Public spaces should allow a variety of activities and offer space for all people regardless of age, gender and origin. The aim of public spaces is to provide these opportunities. They form the basis of a city's vibrancy.

The design and offers of a public space have a decisive influence on how people use it. Design elements as architecture and infrastructure, a mix and diversity of offers as well as social standards affect how people are using the street (LSE 2017).

### How can it be measured?

As part of a qualitative analysis, observations were made to find out how people use the social space. At different public spaces as along the Bahnhofstrasse, in front of Oberland Märt and at the Ochsenkreisel in Kempten the social space observation was carried out.

Besides what kind of people are using the space and what their movement patterns are, the characteristics of each space gets analysed. These are defined by the diversity and mix of use, accessibility, block size, permeability, adaptability, furniture, green space and water space and traffic

### Results

One of the biggest findings is that the length of stay in social spaces depends largely on the volume of traffic. At the spaces with high frequencies as the Bahnhofstrasse or the roundabout in Kempten, people are mostly passing by. There is almost no interaction.

Another important finding is that the size of the space provided, its design and the mix of uses offered influence the amount of interactions and the length of stay.

Based on these criteria, the multiple centre scenario performs best. The detailed analysis and observations can be found in the appendix A1.

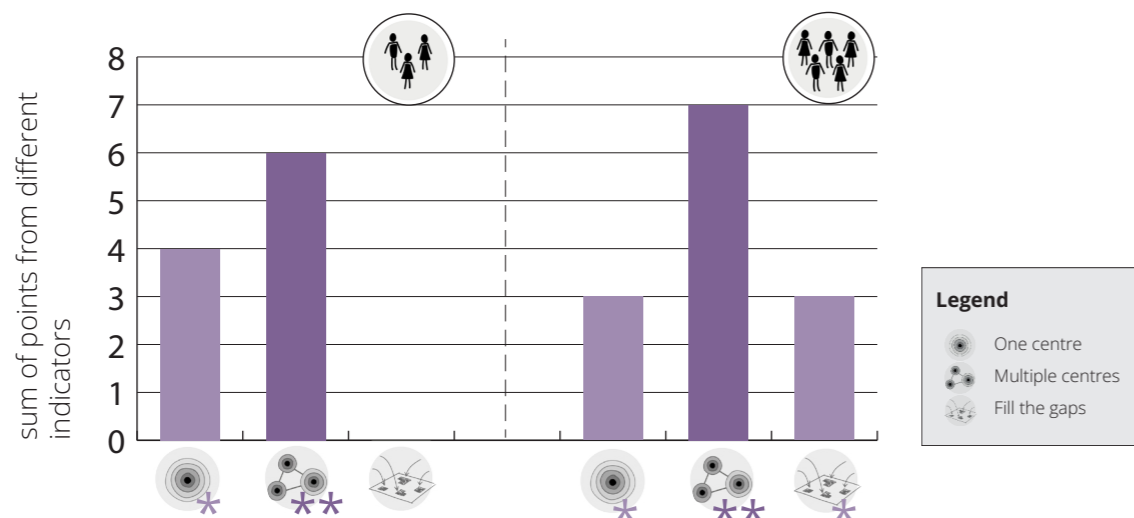


Fig. 3.1.6A: Results for strategies with respective point allocation by scenario

## 3.1.7 Mobility



### Why does it matter?

High traffic volumes and congested streets reduce the perceived attractiveness of public spaces. They also hinder the free movement of pedestrians and thus prevent people from making public spaces their own.

Given the need for reducing greenhouse gas emissions, urban planning must help provide solutions to achieve those objectives.

Shifting mobility to active modes of transport and public transport helps to achieve the mentioned objectives, and should thus be facilitated or even steered by the settlement strategy (Wetzikon 2023).

### How can it be measured?

To assess the traffic situation of each scenario, the projected population is aggregated by district. For each outcome, the traffic volume is calculated using VISUM. The increased demand is based on the projected population growth in the entire canton of Zurich and the defined outcomes for Wetzikon. The methodology for the demand calculation is explained in appendix A3.

The outcomes are compared by the pkm travelled. This is the total distance travelled by all people. Since the pkm travelled unit is dependent on the size of the population, the outcomes are compared by population growth scenario.

### Results

Fig. 3.1.7A shows the additional pkm travelled per outcome grouped by population growth scenario. For clarity, the outcome with the lowest pkm travelled per scenario is set as the reference. Appendix A3 includes a table presenting the absolute pkm per outcome.

In the low-growth scenario, multiple centres generate the least additional pkm, followed by filling in the gaps. The one centre generates the highest pkm travelled. In the scenario of higher growth, the single centre or multiple centres strategies generate the same amount of pkm, whereas filling in the gaps generates substantially more.

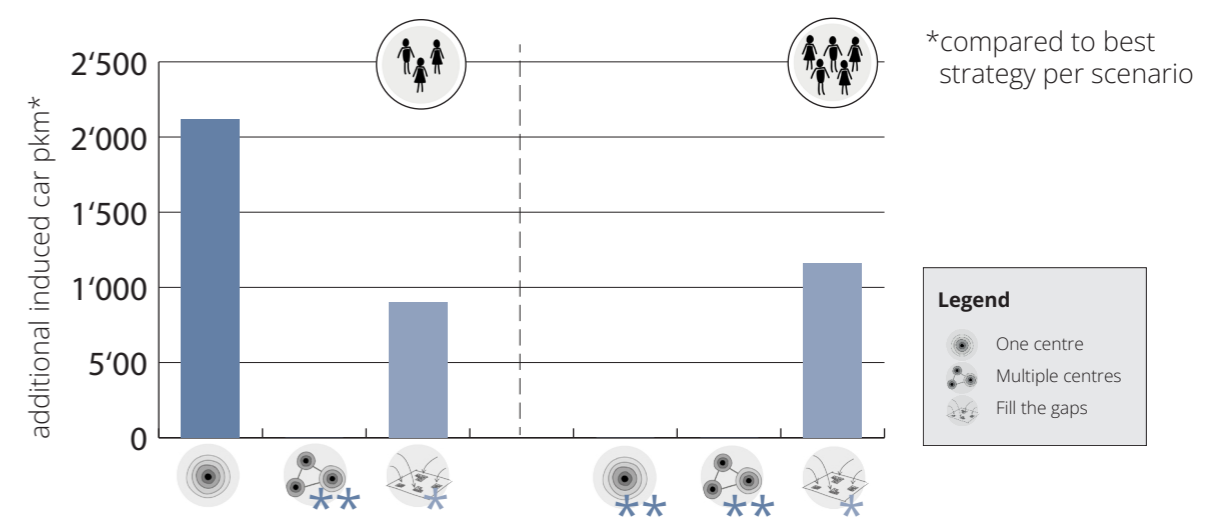


Fig. 3.1.7A: Results for strategies with respective point allocation by scenario

## 3.1.8 Accessibility



### Why does it matter?

The closer people live to where they can fulfil their daily needs, the more sustainable this seems to be (Allam et al. 2022). Daily needs are shopping possibilities, work, education, healthcare and recreation offers. If these are in close reach, inhabitants are more likely to use more sustainable modes of transport.

In Wetzikon, educational and leisure sites are dispersed quite evenly, leading to smaller distances for all residents. The shopping opportunities are found mainly in the centre. The settlement development allocates today more and more people at the edge of the city, which weakens the accessibility.

### How can it be measured?

For simplicity, accessibility is measured based on the distance of the residence to their closest situated centre. This metric cares mostly about shopping opportunities. But this seems to be the most relevant factor, as other opportunities are evenly dispersed. Nonetheless, centres often attract work and leisure activity opportunities, which supports the metric.

Besides that, the location of workplaces is neglected. It would be interesting, as it often leads to an unwanted car ownership, but would require a regional analysis. Furthermore it is probably independent of the settlement structure of Wetzikon.

### Results

The multiple centre growth strategy would lead to the best accessibility for Wetzikon in 2060 in both scenarios. Second is the one centre strategy.

The multiple centre strategy scores unsurprisingly best because of its closeness of the four different centres to the population.

The analysis shows that the different strategies are likely to have an important effect on the mode choice of the people in the future, which leads to different emission levels and life quality.

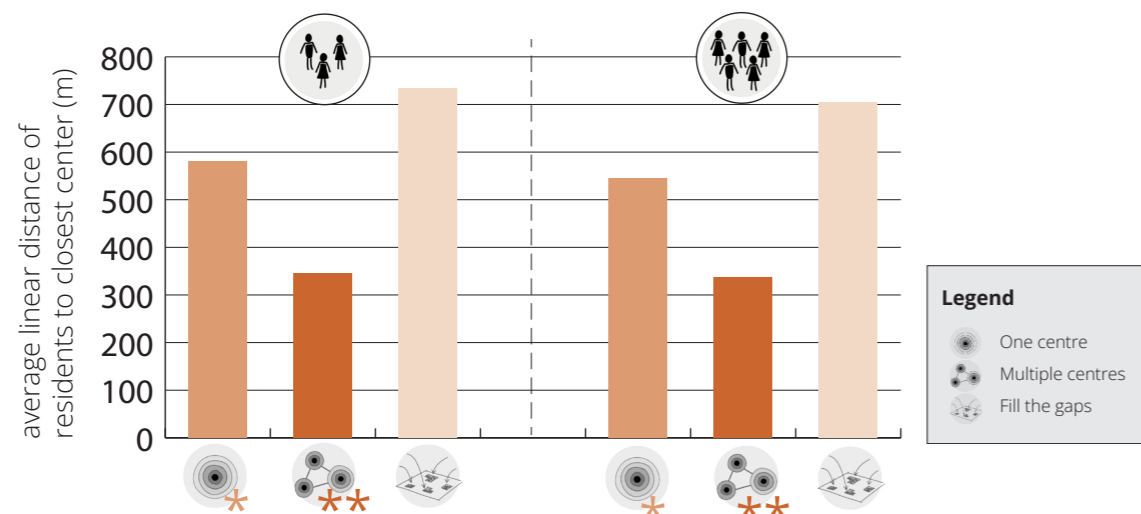


Fig. 3.1.8A: Results for strategies with respective point allocation by scenario

## 3.1.9 Eviction



### Why does it matter?

With the current wave of redevelopments in Swiss cities, many affordable apartments are subject to destruction due to new buildings.

Studies have shown that low income groups of society are more likely to be evicted. The reason is the higher possible rent increase and the weaker opposition to the redevelopments (Debrunner, Jonkman, and Gerber 2022).

Upon eviction, inhabitants with a low income are often forced to move further away from the centres or to another city. Their social networks and quality of life suffer. This injustice and loss of diversity is best tackled by the protection of these affordable apartments, rather than compensational measures.

### How can it be measured?

To avoid redevelopment of such sensible areas, either detailed and sensible data or a great understanding of the city is needed. Both of them are not the case here.

Assumptions were made to estimate the impact of future redevelopment. Namely how many buildings would be demolished due to the strategies (App. A5). The total number of inhabitants of the buildings at stake acts as an indicator.

The assumptions are independent of location. It can be argued that, for a low income inhabitant, an eviction close to the centre has more consequences. But away from the centre it is more likely to evict a low income person.

### Results

The filling the gaps strategy is by far the best in both scenarios, as it avoids any destruction of current buildings. More interesting is the difference in the other two strategies. The one centre strategy leads to less evicted people than the multiple centre. This is due to the fact that in the affected parcels, infill and the addition of storeys are more often possible. Or less people are currently living in the affected buildings.

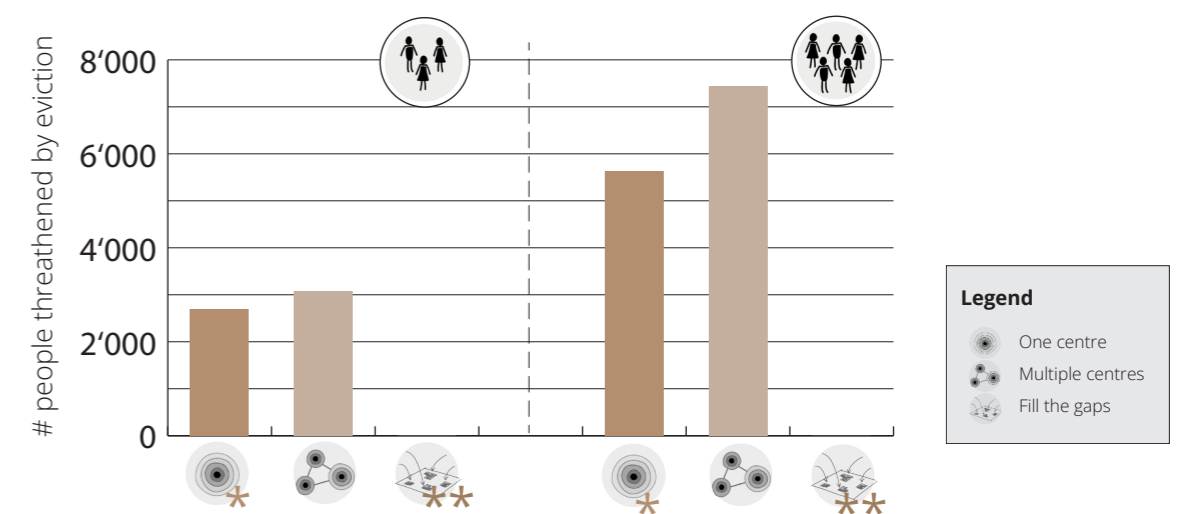


Fig. 3.1.9A: Results for strategies with respective point allocation by scenario

## 3.1.10 Greenspace



### Why does it matter?

If the ground is sealed, rain-water cannot run off into the ground and no biomass can be produced. The asphalted or built-up areas also have a negative impact on the local urban climate due to the increased absorption and storage of heat and the lack of vegetation form so-called heat islands (BAFU 2018). This can have a negative impact on the quality of life and health (BAFU 2018). According to the cadastral surveying, 49% of the settlement area in Wetzikon is sealed and should be minimized in future development (Stadt Wetzikon 2022).

### How can it be measured?

With the various settlement growth strategies, the utilisation density will increase in different locations. As the utilisation density increases, the building density also increases, which has a negative impact on the unsealed area. We look at the unsealed area as an indicator of green space. To analyse this, an unsealed open space of 30% is assumed on all densification parcels unless it is already lower. This metric provides a good estimate of the consumption of unsealed land in the case of settlement growth.

The threshold was established through practical, real-world examples, though it represents a simplified

approximation. The open space is typically more reliant on the specific construction project rather than the density.

### Results

All three strategies have an almost equally high loss of unsealed land in the high population scenario. In the lower population scenario, the multiple centres and single centre strategies have the lowest land consumption. These strategies would be most effective for mitigating heat islands in Wetzikon 2060. The fill the gaps strategy has a higher land consumption as more is built on open space.

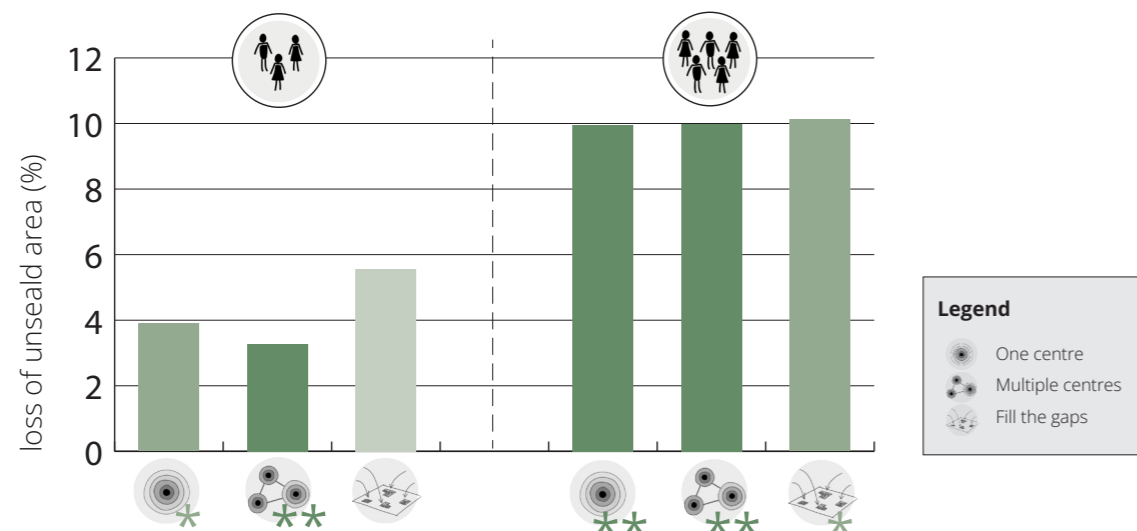


Fig. 3.1.10A: Results for strategies with respective point allocation by scenario

## 3.1.11 Building Emissions



### Why does it matter?

The Swiss building sector is responsible for 27.6% of the nation's greenhouse gas emissions. Emissions arise from the production of the construction materials and the heating during the operation phase. The production of cement, today's most used building material, is extremely high in emissions. Constructions and demolitions should thus be limited. Isolation and refurbishment on the other hand is very helpful to decrease the overall emissions (BAFU 2011).

Planners can mainly have an influence by preventing unconditional upzoning. The created possible financial benefits often lead to unnecessary destructions and replacement buildings.

### How can it be measured?

An emission model is used to simulate the influence of the strategies (App. A6):

The heating emissions of every building are based on the emissions calculated by the Federal Office for the Environment (BAFU 2016).

The construction emissions, that are induced by new densities, are based on the average emissions per m<sup>2</sup> of newly built living surface in relation to the whole life cycle of the building (BAFU 2011).

To identify which buildings are at risk of destruction, the same assumptions as for the eviction assessment are used (App. A6).

The model assumes also that buildings with above average heating emissions are isolated. This can be assumed because it lowers emissions and heating costs.

### Results

Analysed over the whole life cycle, the differences between the different strategies seem rather low. The difference non the less is at least 150 t of CO<sub>2</sub> per year. This equals the effect of 125 daily commuters between Wetzikon to Zurich switching from cars to public transport in the future. The highest difference between the strategies equals more than 2000 people (MobiTool 2023).

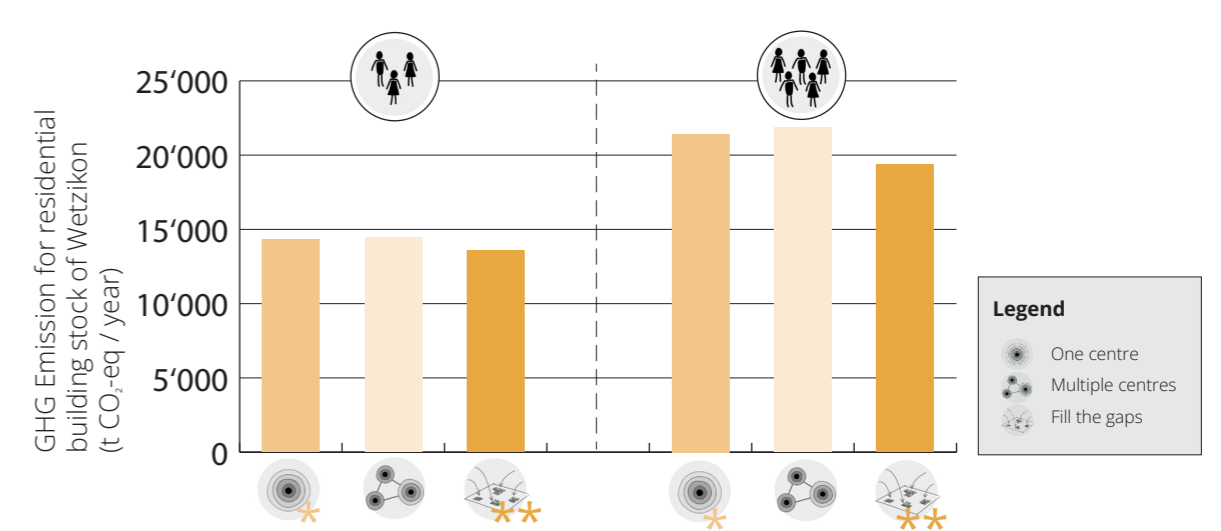


Fig. 3.1.11A: Results for strategies with respective point allocation by scenario

# 3.2 RESULTS

## 3.2.1 Strategy Scoring

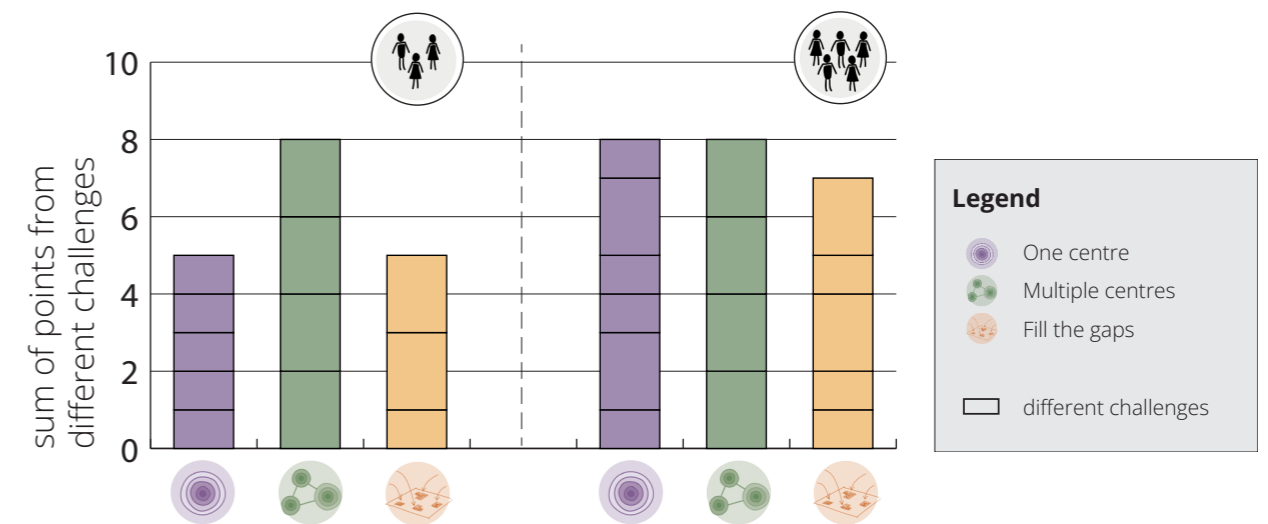


Fig. 3.2.1A: Total score for strategies for low and high scenario

To compare the strategies across the different challenges, the points are summed up. Fig. 3.2.1 shows the results. If Wetzikon is facing a smaller population growth, the multiple centre strategy would be most suited to tackle the different challenges (8 points). In the higher growth scenario the result is more ambiguous: the one and multiple centre strategies score both best, one point ahead of fill the gaps.

Looking at the adaptability of the strategies towards the different population growth scenarios, the multiple centres is the most robust, meaning it scores equally well in both scenarios. The scoring of the strategies is transitive. This means that the ranking order does not change with population growth.

What speaks less in favour of the multiple centre strategy is the number of challenges that are tackled by it. It could be called a specialist, as it tackles four different strategies well. The one centre strategy scores by being

a generalist, tackling five or even all six challenges decently or well.

Thus no absolute winner strategy can be identified, as this would require a common indicator to compensate benefits from different challenges between each other. Universal indicators such as monetization would however push the time limits of this study. Furthermore, they have other disadvantages. For example the ethically questionable monetisation of eviction.

To do justice to this flaw of exact comparability of our challenges, the sensibility of the results and prioritisation of challenges is discussed in detail on the next pages.

It should be stated here, that when looking at the absolute indicator values on the last pages, four out of six challenges are significantly better tackled in the low population scenario. This is independent of the strategy.

## 3.2.2 Scoring Sensitivity

The scoring of points is highly dependent on the thresholds that are set for their allocation. Different amounts of points are given if the difference between the strategies is considered as „relevant“. The necessary assessments of the „relevance“ leads thus forcibly to a way of valuation of the different challenges.

To see if the final results depend heavily on this subjective threshold setting, different point allocations options are assessed for their influence on the total score.

In Fig. 3.2.2A the possible variability in the final score is indicated. A challenge icon above the decided score indicates that due to a different threshold setting of this challenge, possibly a point more could have been scored. Below indicates a point less. Let's make an example for the multiple centre strategy: Its difference to the one centre concerning the building emis-

sions was rather small, and it can get a point more if the threshold was set slightly different.

It can be seen that with different threshold settings the order of rating could possibly change in favour of the one centre strategy. In the lower scenario this would demand a change in the mobility, greenspace and social space thresholds. In the higher scenario, a change in and only in the green space valuation is necessary. However, if the valuation of eviction and building emissions would be set differently, the multiple centre strategy in both scenarios be more favourable too.

The limit of two possible points per challenge also limits the ratio of challenges between each other to 3:1. A different point system could eventually lead to different rankings, as challenges would need to be evaluated more precisely.

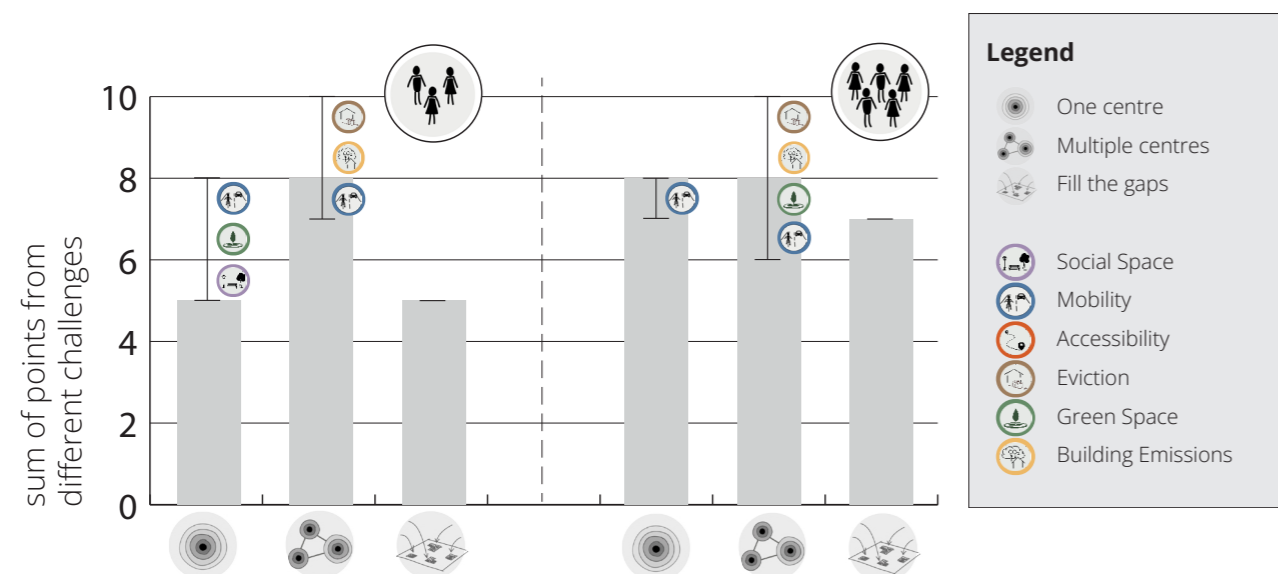


Fig. 3.2.2A: Sensitivity of total score based on scoring thresholds of indicated challenges

## 3.2.3 Challenge Dependency



Fig. 3.2.3A: Scores by challenges for strategies for low and high scenario

Reorganising the results in relation to the different challenges provides a good overview of the strengths and weaknesses of each strategy (Fig. 3.2.3A):

The fill the gaps strategy has a good preposition for the eviction and building emission challenges. If it should be pursued further, special attention should be given to increase accessibility by for example planning more direct footpaths to the centres as people would live further away from them. Also green space should be coordinated effectively to generate most benefits for inhabitants and nature with a restricted amount of surface.

The one centre strategy is as mentioned a generalist. Almost no challenge except the mobility (small) and social space (large scenario) are in danger of being disadvantaged. But the challenges hinder each others from being tackled well.

Here, additional measures might help to achieve better results such as promoting less emission intensive building materials like wood. Or the coordination of development projects to allow the people to stay in the same area to prevent eviction and keep their social network should be done.

The multiple centre strategy has a good preposition for the four challenges social space, mobility, accessibility and greenspace. The evictions and building emissions get left behind. A goal could be to focus on synergies like upstockings that help greenspace as well as eviction and building emissions.

When combining the insights from Fig. 3.2.1A and 3.2.3A, it becomes clear that the ranking greatly depends on the choice of challenges. The omission of either eviction or building emissions would change the ranking.

## 3.2.4 Vision

The goal of this study was the optimisation of the settlement growth under the existing challenges of Wetzikon.

It is shown that a smaller population growth of around 10'000 additional inhabitants would be preferable for most challenges. This decision lies mainly in the hands of the canton and contradicts its strategy of growth in the agglomerations and regional centres. Only if the consequences of the challenges become more urgent than the cantonal coordination, this discussion could be resumed. Thus the canton could possibly also demand growth by about 20'000 people in Wetzikon.

The growth strategy however, the city of Wetzikon can choose itself. As the analysis has shown, the multiple centre strategy has the best preposition to tackle the challenges based on the framework of this study. It was assessed with the following population growth in the different centres (number of additional inhabitants):

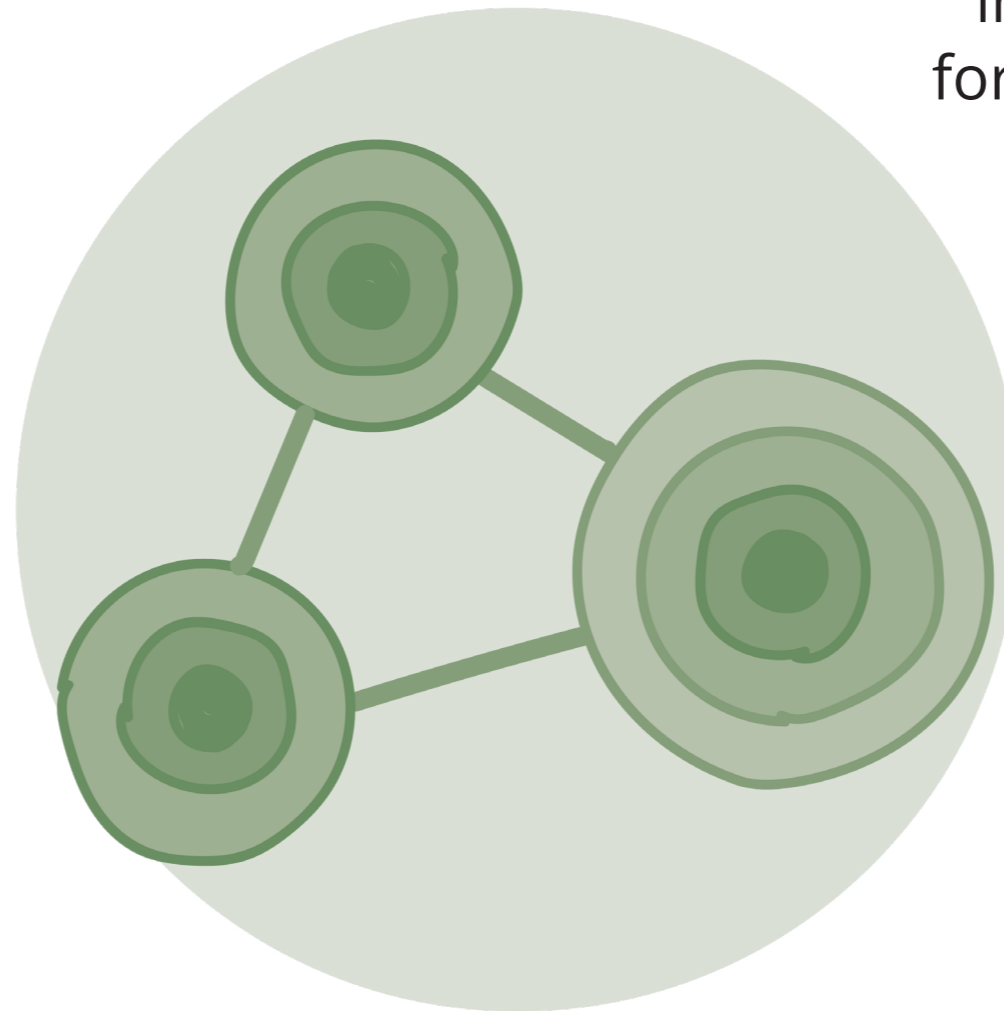
	low growth	high growth
Oberwetzikon	+ 3350	+ 6100
Kempton	+ 2700	+ 5100
Unterwetzikon	+ 1850	+ 4300
Robenhausen	+ 1450	+ 4000

As it would demand considerable changes, its feasibility should first be evaluated before defining it as a new planning paradigm.

The following part of the report will focus on the planning according to the multiple centre strategy of one of the four proposed centres.

Our vision for the test planning is the following:

Create multiple centres to increase the quality of life for today's and future inhabitants of Wetzikon.





# 4.1 ANALYSIS OF KEMPTEN

Chapter 3 has shown that the highest life quality for today's and future inhabitants is reached with the multiple centres approach. The four identified centres are around the train station in Unterwetzikon, in Oberwetzikon, Robenhausen and Kempton.

The centre of Kempton was selected as the planning perimeter for the following reasons:

- There is no ongoing planning in Kempton. In the centre areas of Unterwetzikon and Oberwetzikon intensive planning already happened or is still ongoing.
- The centre of Kempton is a challenging planning situation due to its varying and complex initial situation.
- The proposed development of Kempton might be inspiring for the revision of the communal land use plan.

## 4.1.1 Perimeter

The selected perimeter for the centre of Kempton is located to the east and west around the Ochsenkreisel. The Chämtnerbach forms the boundary of the perimeter to the north, while Bahnhofstrasse and Hinwilerstrasse form the boundary to the south. A closer look at the aerial photograph (Fig. 4.1.1A) shows the diverse development structure of the area with single-family and multi-family houses, businesses, natural areas and open spaces. Besides the multifaceted settlement structure the organisation of transport poses a number of challenges.

The study in chapter 3 assessed that today in the chosen perimeter, around 440 people

are living. For the multiple strategy, a growth to 1410 to 1430 additional people by 2060 is demanded. The difference between the two scenarios is rather small, due to the centrality of the perimeter and that in both full growth is assumed. The design proposal implements these growth numbers.

In the following analysis section, the perimeter is examined for the six challenges presented in chapter 3.1.6 and at the same time interventions are presented as possible solutions for the centres. At the end of the analysis section, these are spatially localised in a map of measures.



Fig. 4.1.1A: Aerial view of the Kempton perimeter in the northeast of Wetzikon



# 4.1.2 Social Space Kempten



## Public Space

The centre of Kempten currently offers a low quality of stay. It has no places to sit or linger. The areas in the centre are largely sealed and offer no shady spots. A wide variety of shops and gastronomy businesses create a basic frequency of people who enliven the public space but do not spend much time there. The perimeter includes a pizzeria, a traditional restaurant and a fast food restaurant combined with retail outlets such as a hardware store and a hairdresser. This mix of uses is important for urban vitality and should be retained and promoted (Jacobs 1961).

## Streetspace

Due to the high volume of traffic, the road space is heavily occupied by cars. During rush hour, there are long queues at every roundabout entrances and crossing the road is only possible at a pedestrian crossing. To enable citizens to take ownership of public spaces, the quantity of motorized vehicles on roads requires reduction. One option is to encourage a transition towards active modes and public transport. Alternatively, the number of vehicles can be limited through perimeter gating. Under this approach, traffic lights at entry points control the number of vehicles within the city, preventing excess demand from entering the city limits.

## Identification

There are five houses in the perimeter that are protected by municipal and cantonal law, whereby the Ochsen building with its extension has an identification value. It also lends its name to the roundabout. The Vil-

la Lichtensteiger on Tösstalstrasse and the farmhouse in Römerfeld are protected but not particularly public-orientated. Such buildings create a sense of identification and characterise the neighbourhood and should be preserved and made accessible.

Tab. 4.1.2A: Interventions for the challenge social space



Fig. 4.1.2.A: Protected buildings and public orientated business in the Kempten perimeter

Interv. ID	Problem	Approach (for every new center)	Conflicting Challenges	Intervention (Kempten)	SPUR	PLUS	IBI	IVT
Settlement Structure								
Public Spaces								
1.2.1	No heterogeneous public spaces // meeting spaces // spontaneous urbanity	Provide shopping and leisure activities at central points		Creation of central mixed-use zone with a high frequentation and exchange		x		
1.2.2				Ensure the future existence of Schneider hardware store and gas station		x		
1.2.4	Provide identification points	Protect building landmarks for identification	Densification, Building emissions	Restaurant Oxen, Pfaffikerstrasse 4, Wallenbachstrasse 8, Tösstalstrasse 18			x	
Nature								
NCP								
2.2.1		Unseal public spaces	Densification	Plan with surface areas that allow for rain water infiltration				x
2.2.2	Heat islands effect increases due to climate change	Create shade for public places	Densification	Make use of vegetational shade, place buildings accordingly		x	x	
2.2.3		Plan for cold air circulation	Densification	Align buildings with cold air streams in NE-SW direction				x
Infrastructure								
Existing Environment								
3.1.3	High vehicle speeds create separation between the neighborhoods	Reduce speed	Traffic	Introduce a T30 zone in Wetzikon			x	x

# 4.1.3 Mobility Kempten



## Cycling Infrastructure

The missing cycling infrastructure is particularly striking around the Ochsenkreisel. During multiple visits, cyclists were observed using the pedestrian crossings rather than driving on the roundabout. Narrow bike lanes on roads leading up to the junction discourage people from using their bikes as a primary mode of transportation.

## Public Transport

During peak hours, buses often get stuck in traffic, causing them to skip stops to reach the station on time. Worst case, they even miss connections. With the envisioned development of multiple centres, the current bus system is not designed to connect all future centres.

## Interventions

High traffic volumes do not only deter people from using their bikes as primary modes of transport, they also hinder people in making public spaces their own. Especially during peak hours, the roads in Kempten are often congested with slow moving traffic. This column impedes the free movement of people along their lines of desire.

A city-wide speed reduction to 30 km/h is proposed to make the roads more bicycle-friendly. The turn Bahnhofstrasse/Stationsstrasse is adapted so that turning cars need to reduce their speed. The street layout of the links leading up to Ochsenkreisel is retrofitted with a multipurpose strip in the middle. This strip narrows the lanes to make overtaking maneuvers impossible. This strengthens the status of bicycles in road traffic.

In order to connect all future centres of Wetzikon, two changes are made to the bus system. First, the line 856 is extended to the Ochsenkreisel to connect the centre of Kempten to the train stations of Kempten and Wetzikon, as well as the future centres of Robenhausen and Unterwetzikon.

Second, a new bidirectional ring line along Spital- and Bahnhofstrasse is created. This new line creates a direct, fast connection between the centres of Unter- and Oberwetzikon and Kempten. Additionally, the bus stops are brought back onto the lane to prevent the vehicle from losing its position in the queue.

Tab. 4.1.3A: Interventions for the challenge mobility

Interv. ID	Problem	Approach (for every new center)	Conflicting Challenges	Intervention (Kempten)	SPUR	PLUS	IBI	IVT
Infrastructure								
Existing Environment								
3.1.1	Existing bike infrastructure is geared towards car traffic	Existing bike infrastructure is geared towards car traffic	Densification	Change the layout on the axis leading up to the Ochsenkreisel to a multipurpose strip			x	x
3.1.2				Make turn Bahnhofstrasse/Stationsstrasse slower for car traffic to protect bicycles			x	x
3.1.3	High vehicle speeds create separation between the neighborhoods	Reduce speed	Traffic	Introduce a T30 zone in Wetzikon			x	x
Mobility								
PT								
4.1.1	Busses have a low punctuality because they get stuck in traffic during peak hours	Prioritise public transport in queues	Densification	Implement bus stops instead of bus bays				x
4.1.2	Not all future centers are connected to the train stations	Ensure bus connections between train stations and centers	Densification	Extend Line 856 to connect through Kempten Station to the Ochsenkreisel				x
4.1.3				Create a local ring line				x
Individual Mobility								
4.3.1	High traffic volumes separate social spaces and hinder people in making them their own	Reduce the amount of vehicles inside Wetzikon	Densification	Implement traffic signals at entry point to gate vehicle flows				x



Fig. 4.1.3A: Ochsenkreisel looking in the direction of the Schneider hardware store

# 4.1.4 Building Emission



## Carbon Footprint

CO<sub>2</sub> emissions from buildings make a significant contribution to overall greenhouse gas emissions. There are many reasons for high emissions in buildings. The building standards of older, unrenovated buildings are often outdated. For example, inadequate thermal insulation leads to increased energy requirements for heating, which is often still fueled by non-renewable energy sources.

The GIS analysis in Figure xy confirms this trend, as buildings built in 2000 and later have in general lower CO<sub>2</sub> emissions per m<sup>2</sup> and year. The majority of buildings have high CO<sub>2</sub>

emissions per m<sup>2</sup> and year. Particularly high emissions are found in the part west of the Ochsenkreisel roundabout.

## Interventions

New buildings also fulfil the latest energy standards, but it is important to note that the construction activity itself consumes a lot of energy, whether for transport or operation during the construction process. The production of building materials such as cement or steel also generates large amounts of emissions. Retrofitting insulation to existing buildings therefore not only improves their energy efficiency, but also reduces the need for addi-

tional new construction. Renovating existing buildings in this way not only reduces emissions, but also helps to conserve resources by utilising and improving existing structures.

## Heat network

The use of district heating is another important way of reducing CO<sub>2</sub> emissions from buildings. This system enables the centralised, efficient generation of heat. With the planned Wetzikon heating network, energy from the

waste incineration plant, the sewage treatment plant and a biogas plant will be used to heat the majority of houses in Wetzikon. Compared to decentralised heating systems, this contributes to more efficient energy generation and comes from CO<sub>2</sub>-neutral sources. In September 2023, the population gave their final approval to the project, which is now entering the implementation phase and will also enable new buildings or renovation work in Kempten to be connected to district heating, which can significantly reduce CO<sub>2</sub> emissions (Fernwärme Wetzikon 2023).



Fig. 4.1.4A: GIS analysis building emissions

Tab. 4.1.4A: Interventions for the challenge building emission

Interv. ID	Problem	Approach (for every new center)	Conflicting Challenges	Intervention (Kempten)	SPUR	PLUS	IBI	IVT
Infrastructure								
New Construction								
3.2.1	Replacement buildings are resource intensive	First prioritise fill-in and extension over tear down, then prioritise replacing buildings at the end of their life cycle	Densification	see general approach	x		x	
3.2.2		Only build flat footprints that do not increase surface use per person		see general approach	x		x	
3.2.3	Badly isolated buildings lead to avoidable GHG	First prioritise renewing isolation, then prioritise replacing buildings with a bad isolation	Densification	see general approach	x		x	
3.2.4	Non-renewable energy sources for heat generation lead to avoidable GHG	Realisation and connection of households to the Wetzikon heating network		see general approach	x		x	

# 4.1.5 Greenspace Kempten



## Distribution of green spaces

As shown in the illustration 4.1.5A, private green spaces dominate in Kempten and are therefore not accessible to the public. These private green spaces are often of little ecological value as they are not designed to be close to nature. The green spaces are therefore more likely to be regarded as isolated retreats for residents. A few trees near the roundabout and the kindergarten area are protected by the landscape inventory.

In the centre, on the other hand, the image is dominated by sealed surfaces. The areas are characterised by buildings, roads and pavements, which results in a significant reduction in natural green spaces. This sealing not only leads to a lack of natural elements, but also impairs the microclimate and the ecological diversity of the neighbourhood.



Fig. 4.1.5A: Protected trees and qualitative classification of green spaces

## Interventions

The two large open spaces on Spitalstrasse NE of the Ochsenkreisel and on Baumgartenstrasse NW of the Ochsenkreisel roundabout are currently not open to the public (Fig. 4.1.5). The Chämtnerbach is also not accessible from the south. Residents therefore have limited opportunities to utilise these open spaces and benefit from the positive aspects of experiencing nature.

However, they offer great potential to enhance the green and open spaces of the entire centre of Kempten. Promoting these green spaces also strengthens the Fjord structure (chapter 2.2.5) and ensures continuity. Landscape and ecological qualities can also be demanded for new or renovated buildings, which increases the quality of open spaces on private areas.

Tab. 4.1.5A: Interventions for the challenge greenspace

Interv. ID	Problem	Approach (for every new center)	Conflicting Challenges	Intervention (Kempten)	SPUR	PLUS	IBI	IVT
Nature								
Biodiversity								
2.1.1	Threat of losing current green network	Protect and connect existing Fjord structure	Densification, Traffic	Ensure future existence of corridor from Pfadacher to Leisihalden by ensuring green corridor over Spitalstrassacker			x	
NCP								
2.2.4				Open southern embankment of Chämtnerbach with stairs // benches // chairs			x	
2.2.5	Natural areas are not accessible by foot	Provide access to natural areas where reasonable	Green Spaces (Nature Protection)	Create a continuous path south of Chämtnerbach	x			
2.2.6				Create public park NW of Ochsenkreisel and below the school	x		x	
2.2.7	Settlement structure blocks access to natural areas	Facilitate access to natural areas in built environment	Densification	Align buildings perpendicular to Kämtnerbach - Baumgartenstrasse N - Tösstalstrasse N				x

# 4.1.6 Eviction Kempten



## Residential population

An analysis of the residential population of Kempten shows that the area is predominantly a residential neighbourhood. There are 387 employees per 1,000 inhabitants. The employment rate has fallen by 10 percent since 2011 (Wohnkalkulator 2023). Kempten has a mixed population and building structure with different nationalities and detached houses and apartment blocks of various sizes (Wohnkalkulator 2023).

## Financial strength

The wealth distribution of the resident population is very diverse. As shown in Figure 4.1.6B, one in three households in Kempten has no asset reserves (households with assets of less than CHF 10,000 or less than CHF 4,000 per household member are considered to have no assets) (housing calculator). The median for family households is even significantly below an equivalent income of CHF 3,000. Kempten is therefore one of the financially weaker areas of Wetzikon (Wohnkalkulator 2023).

## Interventions

According to the housing calculator, the majority of these households live in buildings built between 1946 and 1980. Due to their age, these buildings will be subject to refurbishment work or even replacement new builds in the next few years (Fig. 4.1.6B). Replacement construction or refurbishment will also increase residential rents, as the costs of construction or refurbishment will be recouped through higher returns.

In order not to drive out the financially weaker population and promote gentrification, it is important that affordable housing is still available after renovation or new construction. To prevent this, renters can be given greater protection during renovations or replacement new builds or a proportion of affordable or cooperative housing can be required for new buildings.

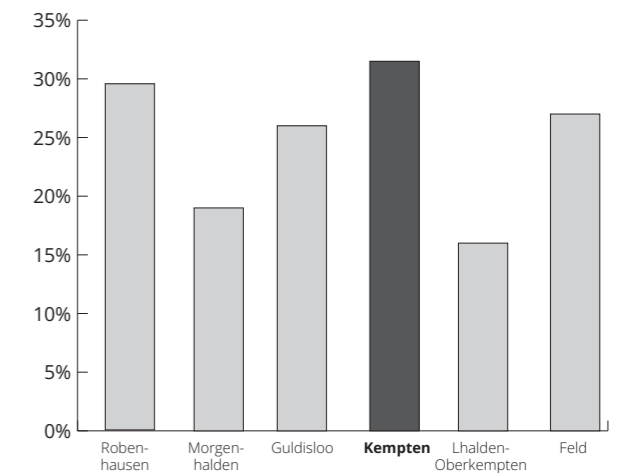


Fig. 4.1.6B Percentage of households without assets in the five most populous neighbourhoods in Wetzikon (Wohnkalkulator 2023)



Fig. 4.1.6A: Picture of apartment buildings at Rosenstrasse, on the left side new replacement buildings (year of construction 2022), on the right side existing buildings (year of construction (1951-1960).

Tab. 4.1.6A: Interventions for the challenge eviction

Interv. ID	Problem	Approach (for every new center)	Conflicting Challenges	Intervention (Kempten)	SPUR	PLUS	IBI	IVT
Settlement Structure								
Social Justice								
1.3.1	Risk of rent increase due to replacement buildings	Prioritise status quo	Densification, Building emissions	see general approach	x			x
1.3.2		Demand quota for affordable housing in new residential buildings		see general approach	x			

# 4.1.7 Accessibility Kempten



## Pedestrian mobility

The GIS analysis in Figure 4.1.7A shows the accessibility of Wetzikon at a constant pedestrian speed of 4.8 km/h on the existing road and path network from the centre of Kempten. It is noticeable how extensive the settlement area of Wetzikon is. It takes half an hour to walk from Kempten to Wetzikon railway station. The Migros supermarket in Oberwetzikon can be reached on foot in a quarter of an hour.

These long distances encourage the use of cars for everyday errands, which in turn has

a negative impact on the accessibility of active modes and the quality of life in public spaces. It is therefore important to strengthen various spatially distributed centres in order to keep the distances for everyday use short.

## Interventions

The analysis shows that the catchment area from the centre of Kempten extends to the districts of Leisihalden and Oberkempten. The centre is to be used primarily by active modes and PT in the sense of the 15-minute city. In order to create an environment that

encourages people to get around on foot or by bike, the walking and cycling infrastructure must be expanded. This promotes health and improves the quality of life for residents. It also promotes the economic vitality of the

centre and the reduction of car traffic in favour of pedestrians and cyclists. This helps to minimise CO<sup>2</sup> emissions and reduce environmental pollution.

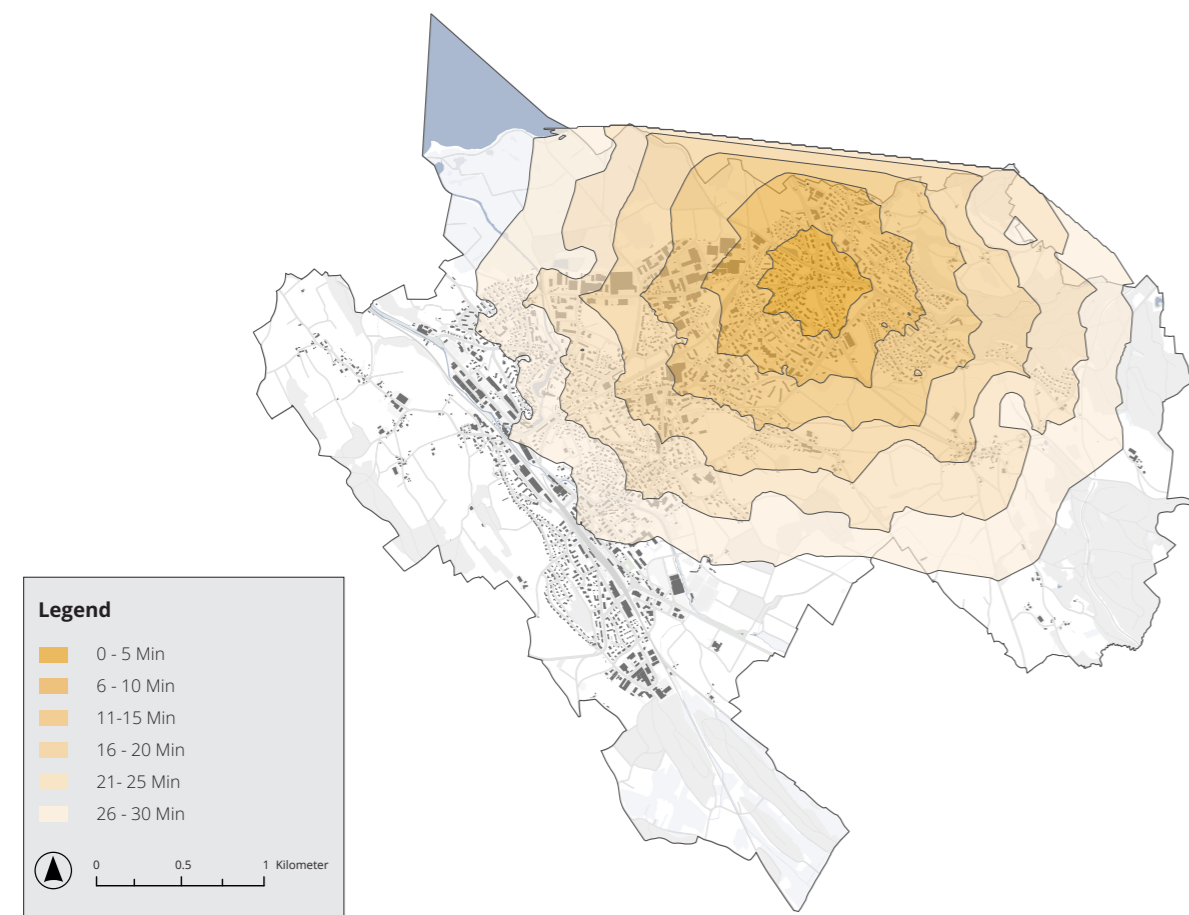


Fig. 4.1.7A: GIS analysis of reach by pedestrian speed (4.8 km/h) from the centre of Kempten

Tab. 4.1.7A: Interventions for the challenge accessibility

Interv. ID	Problem	Approach (for every new center)	Conflicting Challenges	Intervention (Kempten)	SPUR	PLUS	IBI	IVT
Settlement structure								
Public Spaces								
1.2.3	Public spaces are divided by roads	Create public space that spans across separating elements	Traffic	Two communicating public hotspots on both sides of the road, attractive for entire Kempten	x		x	x
Nature								
NCP								
2.2.7	Settlement structure blocks access to natural areas	Facilitate access to natural areas in built environment	Densification	Align buildings perpendicular to Kämtnerbach - Baumgartenstrasse N - Tösstalstrasse N		x		
Infrastructure								
Existing Environment								
3.1.3	High vehicle speeds create separation between the neighborhoods	Reduce speed	Traffic	Introduce a T30 zone in Wetzikon			x	x
Mobility								
Active Modes								
4.2.1	Walking is not embedded as an everyday MOT	Guarantee a dense walking network	Densification	Ensure short connections through indicated paths in direction of the center in all new neighborhood developments	x			x
4.2.2	Biking is not embedded as an everyday MOT	Connect the centres with bike paths	Densification	Upgrade the corridor along Kreuzackerstrasse			x	x

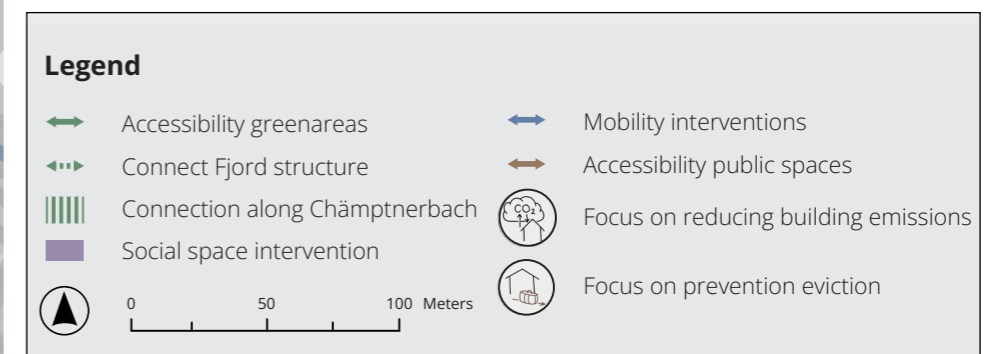
## 4.1.8 Map of Interventions



Fig. 4.1.8A: Interventions spatially localised in the Kempton perimeter



Fig. 4.1.8B: Interventions spatially localised in the extended Kempton perimeter



The measures per challenge presented in the analysis of Kempton (chapter 4.1) are spatially localised on the following map of interventions to the left (Fig. 4.1.8A).

Not all measures can be considered in the focus perimeter of Kempton, as they have a larger area of influence. There is an extended perimeter (Fig. 4.1.8B) that allows the interventions to be determined on a larger scale.

# 4.2 SPATIAL GUIDELINE

The analysis of Kempten has shown that it is a diverse area with various challenges and utilisation requirements. In order to develop as a new municipal centre, the entire area around the Ochsenkreisel must be considered together. Synergies between the various challenges must be identified and utilised accordingly. The spatial guideline offers itself as a suitable instrument.

## Instrument of Spatial Guideline

The spatial guideline is an informal spatial planning instrument that determines how a municipality or priority area should develop within a specific time horizon. Within the spatial guideline, areas are identified which are suitable for internal development. Further spatial-strategic ideas are developed and

identity-creating elements are identified that should be preserved (Kanton Aargau 2023).

A spatial guideline for Kempten is developed in this chapter. It shows its desired development up to the year 2060. The analysis from chapter 4.1 serves as the basis. The overarching goal is to develop the region around the Ochsenkreisel as an independent local centre. As mentioned additional living space for 1000 people is to be created. The existing settlement reserves should be utilised sensibly and high-quality inner development should be strived for.

The spatial guideline developed can serve as a basis for the upcoming revision of the communal land use plan. The contract was awarded

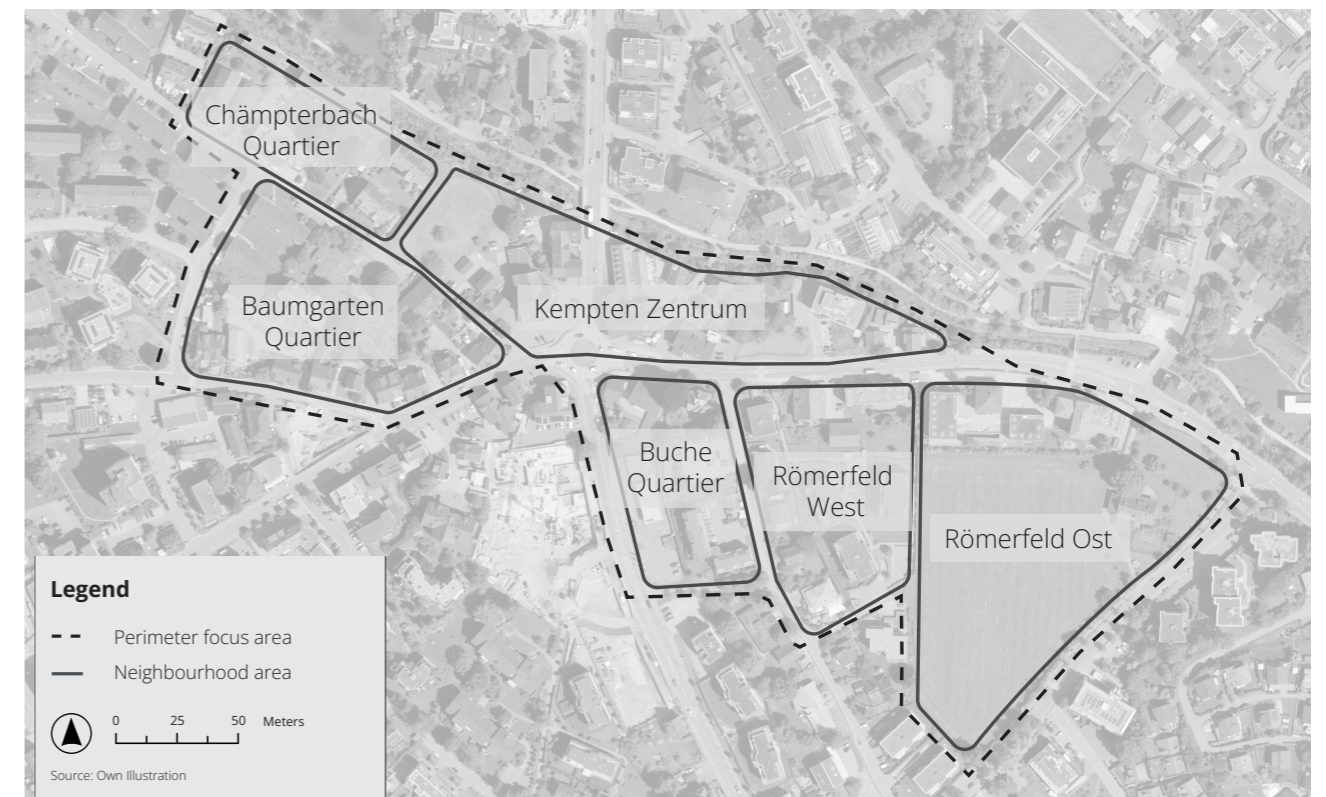


Fig. 4.2A: The perimeter of Kempten with its different sub areas



to a planning office in August 2023 and the revision is currently underway. Adjustments resulting from the spatial guideline can thus be incorporated directly and adapted into the BZO.

To do justice to the diverse character of Kempten, the perimeter in Fig. 4.2A is divided into further sub-areas. A distinction is made between the Kempten Centre, Chämpterbach Quarter, Baumgarten Quarter, Buche Quarter and Römerfeld West and East (Fig. 4.2A). Additionally the traffic will be analysed separately. It involves the analysis of car traffic as well

as public transport and active modes. Another separate topic is landscape. Within these areas, different challenges are prioritised in order to create a high quality of life.

### Densification

The majority of Kempten is already built up today. The existing green spaces and corridors must be preserved in order to create high-quality recreational areas. In the interests of sustainable inner-city development, the existing buildings should be treated with care. The following densification strategies are available:

### Densification Strategies

**Transformation**

The transformation involves the reutilisation of underused and derelict areas. The space becomes reinterpreted.

**Addition of storeys**

One or more new storeys are added to an existing building. The quality of the existing building and its supporting structure play a major role here. This is the most effective option when space is limited.

**Addition / extension**

Existing buildings are extended with a side extension. This does not require any intervention in the existing building-structure or the current utilisation. Additional living space is subsequently created in a simple manner.

**Replacement new build / Partial replacement new build**

Demolition of the existing building and replacement construction.

### Parcel Structure

Most of the different sub-areas in Kempten are characterised by a fine parcel structure. The parcels in the Baumgarten Quartier are particularly fine-grained. This parcel structure is historically determined. The only area with a large area is the Römerfeld Ost Quartier (Fig. 4.2.A).

The majority of the plots are privately owned. The municipality only owns land in the Baumgarten Quartier and the Römerfeld Ost Quar-

tier. These are school buildings: a kindergarten and the Zurich Highlands School of Career Choice and Further Education (BWSZO).

This fragmented and diverse ownership structure poses major challenges for the development of the area of Kempten. Coordinated development and the creation of additional living space can be realised most easily over a large area. In the case of Kempten, this requires the co-operation of as many landowners as possible.

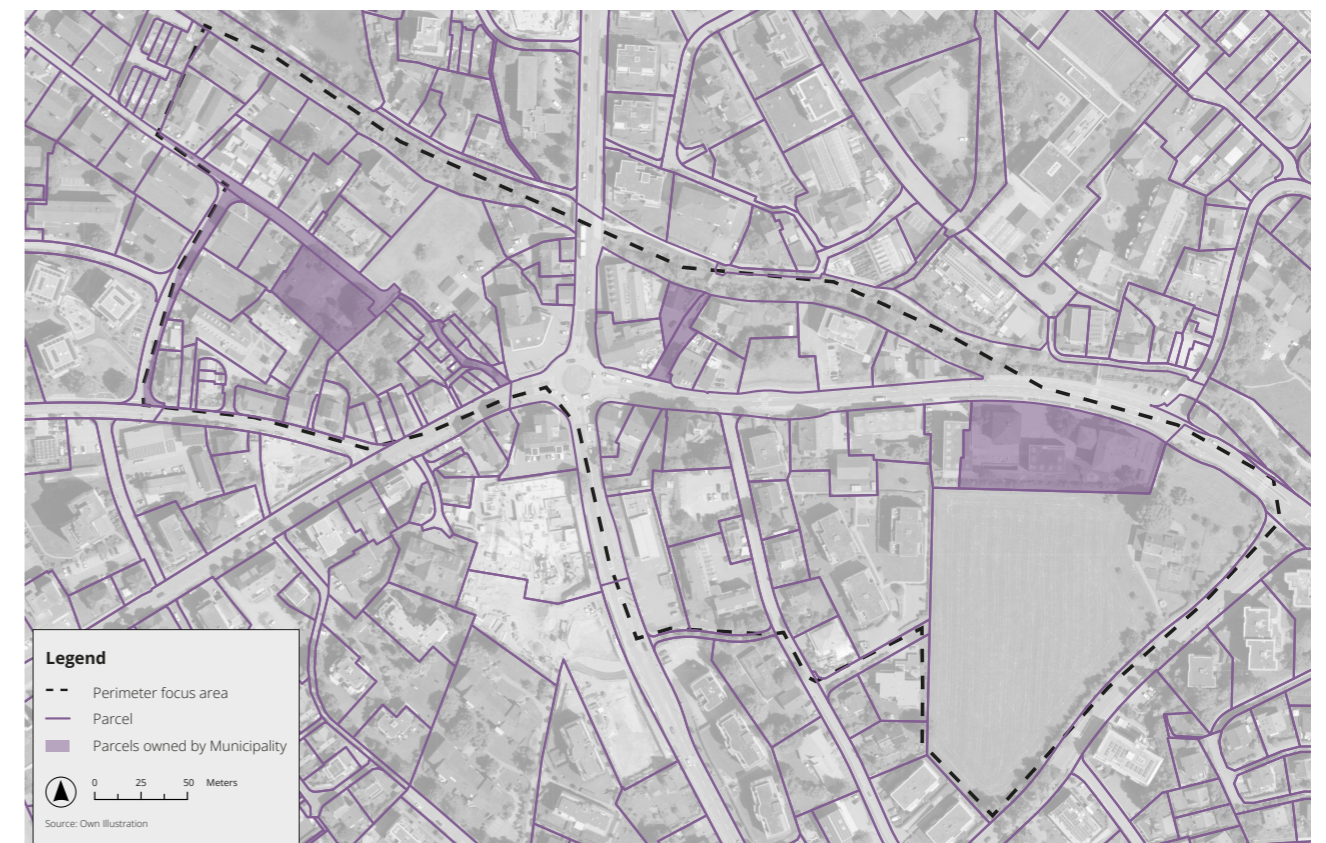


Fig. 4.2B: The perimeter of Kempten with its different sub areas and the parcels owned by the municipality of Wetzikon

# 4.3 DESIGN PROPOSAL

This chapter presents the implementation of the spatial guideline. Adjustments are proposed for the following sub-areas:

- Perimeter Gating
- Tempo 30
- Multi-Purpose Strip
- Redesign Turn Bahnhofstrasse/Stationsstrasse
- Extension Line 856
- Ring Line 855
- Parking
- Landscape
- Kempten Zentrum
- Chämpterbach Quartier
- Baumgarten Quartier
- Buche Quartier
- Römerfeld West
- Römerfeld Ost

In each case, the interventions already developed in chapter 4.1 are included and implemented spatially. At the same time, the six challenges are prioritised. In addition to the specific spatial planning instruments, an adaptation proposal is presented in each case. Depending on the sub-area, the existing BZO is extended or additional instruments are introduced, such as a special land use plan or an urban planning contract. Synergies with the ongoing revision of the communal land use plan will be used for implementation.

The costs listed are only those concerning the municipality of Wetzikon. Costs arising from the development of private land are assumed

to be paid by the landowners. The majority of the planning costs are incurred by the municipality in the various districts. Costs are only created by the design of parks as well as their maintenance and the acquisition and development of land. The roads are mainly municipal or cantonal roads. The letter of intent between Wetzikon and the canton is interpreted so that Wetzikon is allowed to change the road layout, provided they finance it. The change is subject to objection by the Government Council.

Added land value capturing is an important instrument for financing the implementation of the various measures. Landowners who benefit from the provisions of the spatial guideline give up 40% of their profits. These funds are available to the municipality to promote, for example, densification, affordable housing or the preservation and design of green spaces.

The time horizon is set out in an intervention plan. This shows the steps that need to be taken and when they need to be taken. This is a minimum time requirement, as delays due to objections are difficult to estimate. This is also included in the risk and feasibility analysis.

The adaptations per sub-area are presented in the form of profiles. An urban design proposal has been prepared, which includes the implementation proposals. The urban design proposal is only of a design nature. The design of the streets and open spaces as well as the building volumes are mainly to illustrate. They show what densities are possible and how connectivity and cold air flows can be ensured.

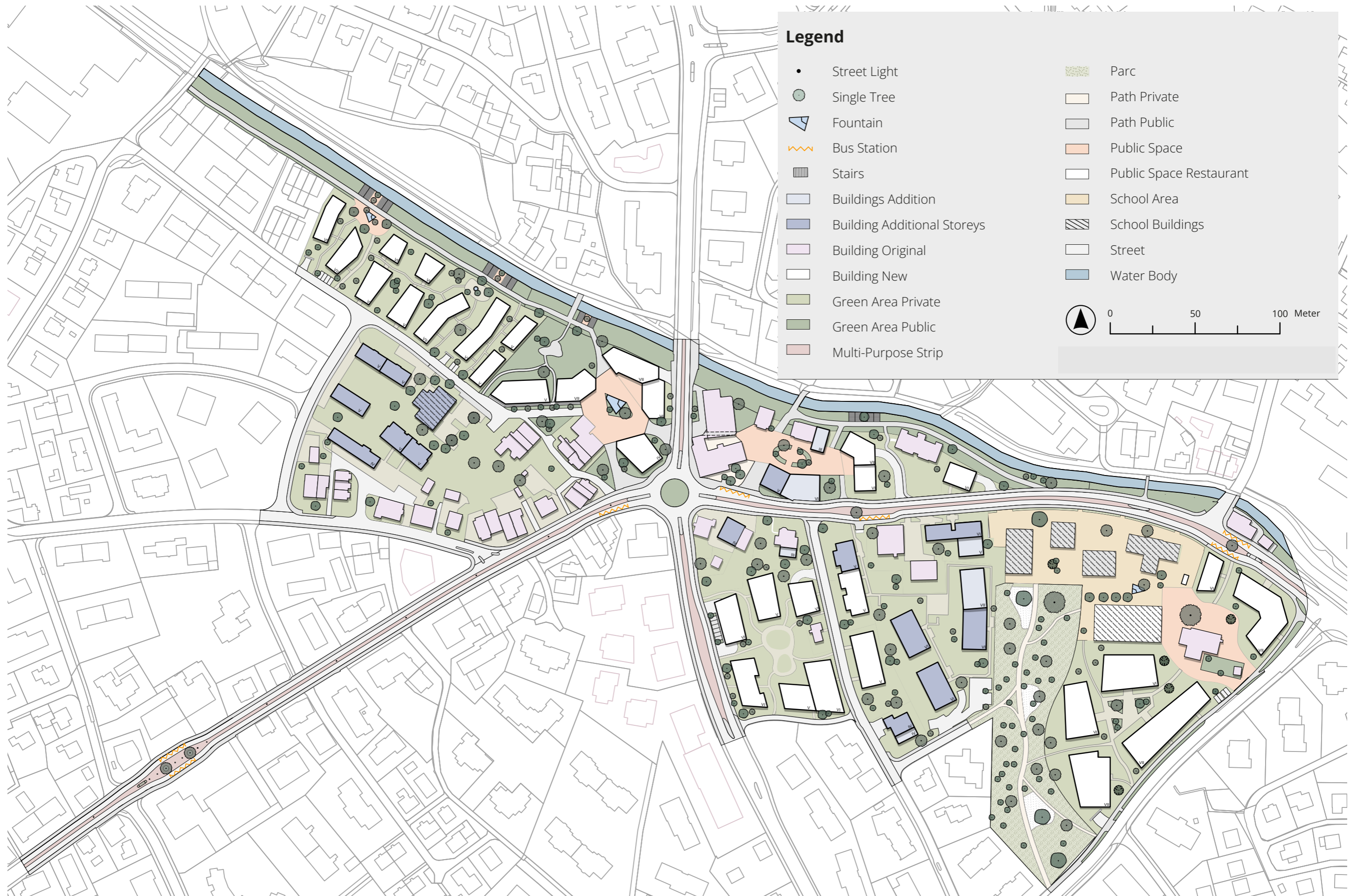


Fig. 4.3A: The urban design proposal for Kempten centre

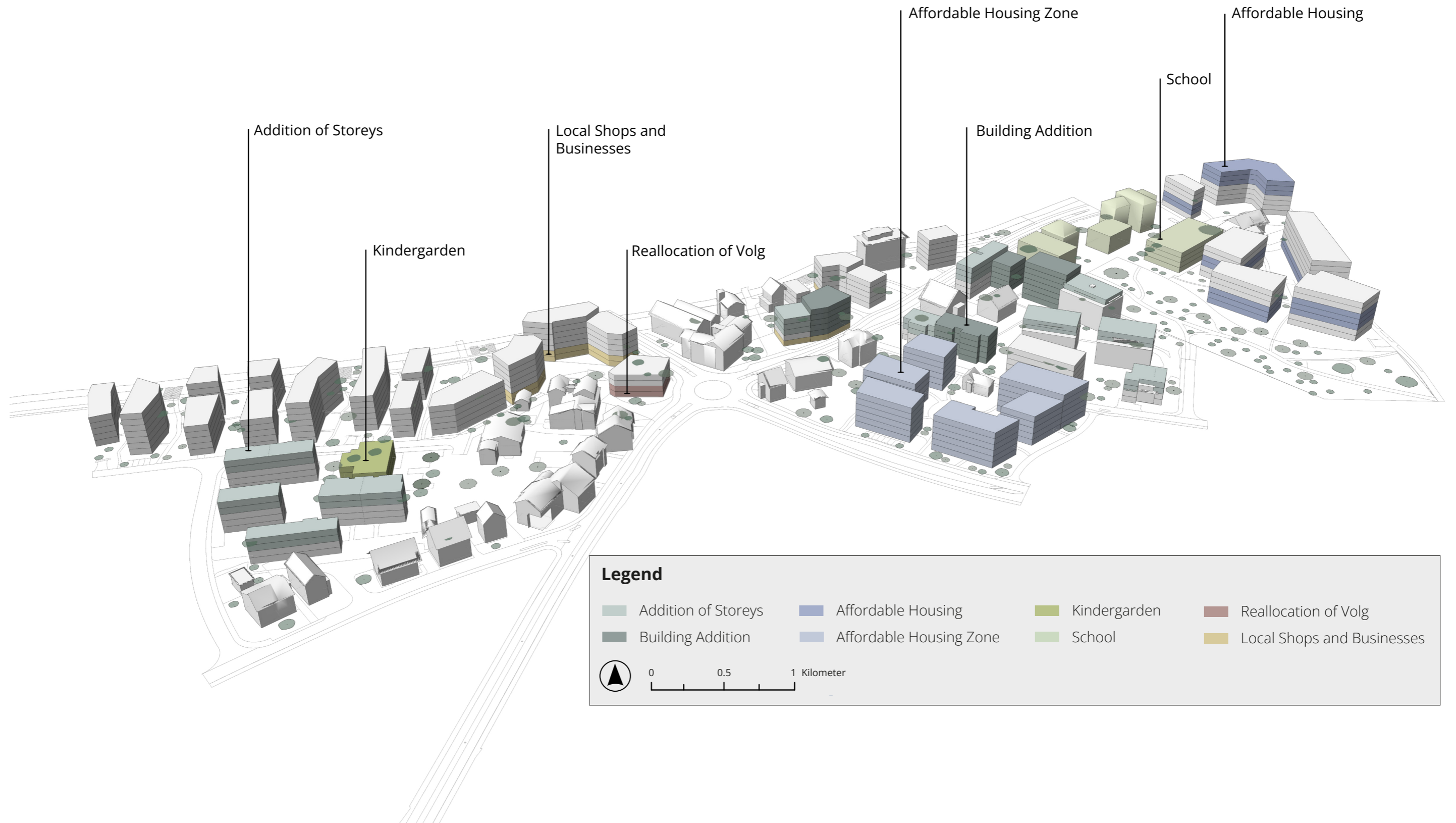


Fig. 4.3B: 3D model of the urban design proposal for Kempten centre

# 4.3.1 Perimeter Gating

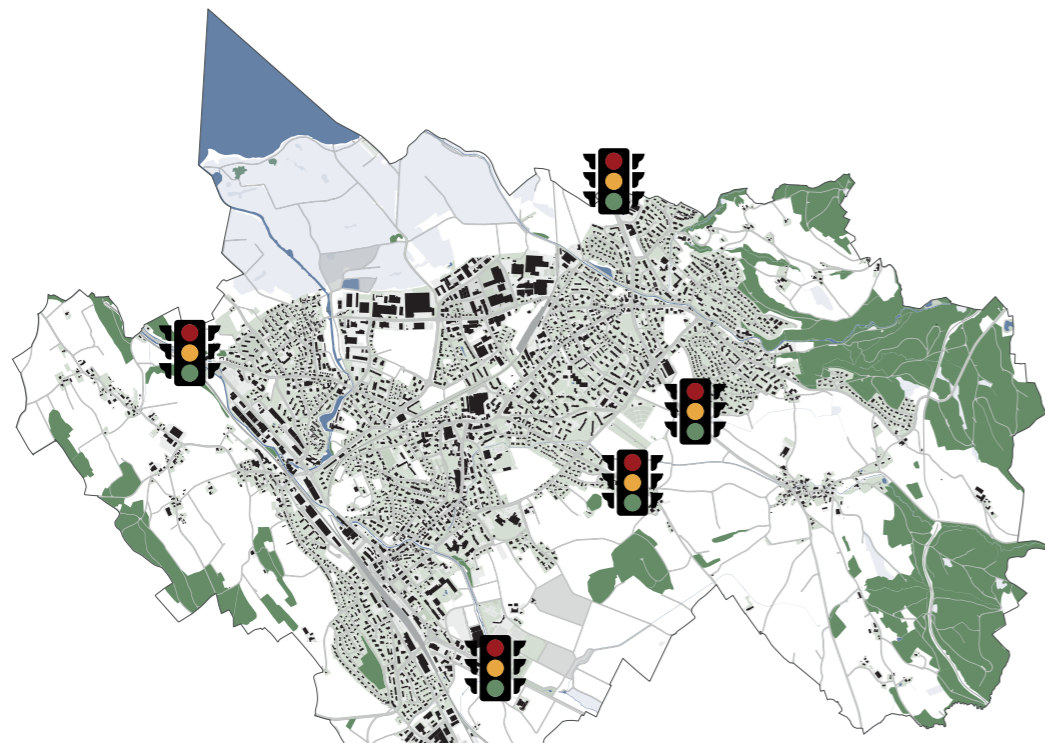
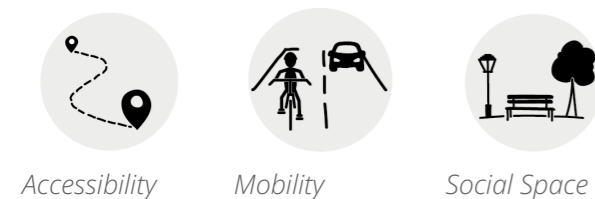


Fig. 4.3.1A: Illustration of the proposed perimeter gating

## Priorisation of Challenges



## Design Proposal

To reduce the number of vehicles inside Wetzikon during hours of high traffic volumes, in total five traffic signals are installed at the entry points shown above.

The purpose of those signals is not to control the flow of vehicles but rather to limit the amount of vehicles in Wetzikon, freeing up

## Intervention ID

1.2.3, 4.3.1

space for cyclists, public transport, and pedestrians.

The impact of the proposed design was simulated in Aimsun. Results show that implementing the perimeter gating leads to less delay. Results are in appendix A7.

## Stakeholder

- Cantonal Civil Engineering Department (CED) - Construction
- Municipal CED - Construction
- Cantonal CED - Maintenance

## Legal Base

Based on Art. 3 Para. 2 SVG, the municipality can introduce traffic regulation orders, subject to appeal to a cantonal authority. Based on the letter of intent between the canton and the municipality, Wetzikon can introduce the traffic lights as long as they pay for it.

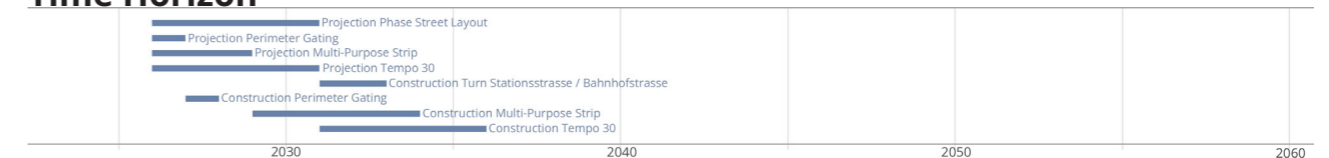
## Adjustment Proposal

- Traffic lights at entry points on Pfäffikerstrasse, Hinwilerstrasse, Bachtelstrasse, Rapperswilerstrasse, and Usterstrasse control vehicle inflow into the city limits of Wetzikon dynamically. This intervention regulates the inflow and reduces fluctuations in demand.
- During peak hours, the traffic lights ensure smooth movement of cyclists, pedestrians, and public transport, while minimizing discomfort due to car traffic. During periods of low demand, the traffic lights are deactivated.

## Costs

- Planning Phase: 10'000 CHF
- Construction Phase: 500'000 CHF
- Maintenance per year: 37'500 CHF

## Time Horizon



## Risks

The cantonal CED might object due to reduced capacity on the roads.

## Feasibility

Medium - High

The planning phase can start in any case. If the canton objects, a solution is to be found that builds on the Oberlandautobahn.

## Reference

- Perimeter Control Zürich
- Perimeter Control Luzern

## 4.3.2 Speed Reduction



Fig. 4.3.2A: Illustration of the proposed tempo 30 zone

### Priorisation of Challenges



Mobility



Social Space

### Design Proposal

To improve the flow of traffic, to reduce traffic externalities such as noise and greenhouse gas emission, to increase the impedance for car traffic, and to improve to quality of stay in social spaces, a speed reduction from 50 km/h to 30 km/h on cantonal roads is implemented.

In order to be able to implement the reduction on the traffic-oriented roads, the non-traf-

fic oriented roads need to have a speed limit of 30 km/h as well.

During peak-hours the speed reduction does not lead to an increase in travel time, overall delay is reduced. The results of simulations in Aimsun are in appendix A7.

### Intervention ID

1.2.3, , 3.1.2, 3.1.3

### Stakeholder

- Cantonal CED, Municipal CED
- Government Council Ct. ZH
- Population
- VZO - Tactical Planning

### Legal Base

SVG Art. 3 para. 4 allows the canton and the municipality to protect the inhabitants from noise and air pollution and to better control the flow of traffic. SSV Art. 108 para. 2 lit. b further supports the reduction of speed for the protection of weaker road users, in this case pedestrians.

### Adjustment Proposal

Clear entry points indicate speed limit changes to drivers. Vertical elements highlight these changes. To increase awareness of other road users, street space is opened up in combination with the intervention 4.3.3 multi-purpose strip. Road markings are introduced at entry points and throughout the city to reinforce the speed limit.

### Costs

- Planning Phase: 100'000 CHF (Stadt Bern 2018)
- Construction Phase: 100'000 CHF
- Maintenance: included in 4.3.3

### Time Horizon



### Risks

- Opposition by Government Council Ct. ZH or Population
- Bus lines need to be planned with lower speeds during off-peak hours, increasing operation cost.

### Feasibility

Medium

The population will need to be convinced of the advantages of reducing the speed limit. If needed, the intervention can be coupled with the finalisation of the Oberlandautobahn.

### Reference

- Kantonsstrasse Horw
- Rue d'école de médecin Genf

# 4.3.3 Multi-Purpose Strip

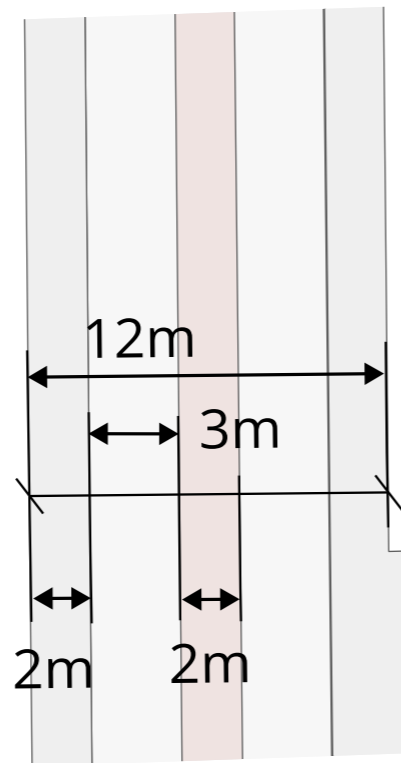
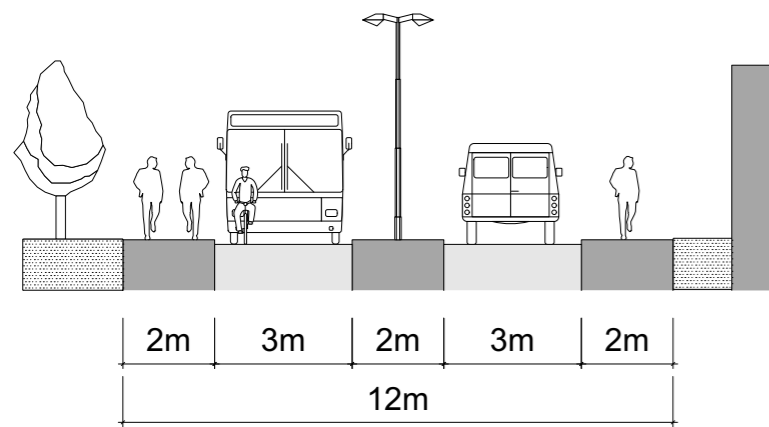
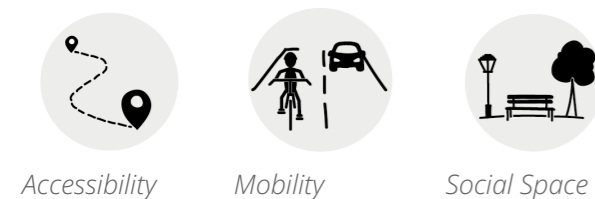


Fig. 4.3.3A: Illustration of the proposed multi-purpose strip in Kempten

## Priorisation of Challenges



## Design Proposal

The road layout on the routes approaching the Ochsenkreisel are restructured to give more space to active modes and public transport. The new layout entails removing the bicycle lanes on both sides and adding a multi-purpose strip in the centre of the road. This enables two distinct lanes measuring 3 metres each. In the new system, bicycles travel within mixed traffic.

## Intervention ID

1.2.3, 4.1.1

## Stakeholder

- Cantonal CED
- Municipal CED
- Population
- Government Council Ct. ZH

## Legal Base

StrG §53 para. 1 // Letter of intent:

If Wetzikon requests it, the canton may transfer the construction of roads to the municipality. The letter of intent states that Wetzikon can change their roads if they pay for it.

## Adjustment Proposal

- The street layout is redesigned on the cantonal roads leading up to Ochsenkreisel. The total length of the roads to be changed is 1'635 metre. The bike lanes are removed in favour of a multi-purpose strip in the middle of the road surface.
- Bicycles drive on the road in mixed traffic. Due to the narrow lanes, they can not be overtaken.
- Bus bays are changed for bus stops on the road. This allows the bus to keep its position in the queue. At the same time, pedestrians have a wider area in the middle to cross along their lines of desire.

## Costs

- Planning Phase: 100'000 CHF
- Construction Phase: 29'100'000 CHF
- Maintenance per year: 60'000 CHF

## Time Horizon



## Risks

- Objection by the Government Council
- Objection by the Population leading to a rejection in a vote
- Mixed traffic is not the ideal form for inexperienced cyclists.

## Feasibility

- Medium // The population also in the neighbouring municipalities has to be on board for the project to work. If there is opposition, check if feasible after the construction of the Oberlandautobahn. For inexperienced cyclists, alternative routes have to be supplied.

## Reference

- Schwarzenburgstrasse Köniz
- Kantonsstrasse Horw

## 4.3.4 Redesign Turn Bahnhofs- / Stationsstrasse



Fig. 4.3.4A: Illustration of the redesign at the turn at Bahnhofstrasse / Stationsstrasse

### Priorisation of Challenges



Mobility

### Design Proposal

The turn from Bahnhofstrasse to Stationsstrasse is redesigned to give more importance to the cycling infrastructure. The new design features a bicycle junction. A bicycle junction is a built element that requires turning cars to slow down, while leaving enough space for turning bicycles. The new layout protects cyclists wanting to continue on straight.

### Intervention ID

4.1.1

### Stakeholder

- Communal CED

### Planning Base

- Safety Aspect of Daily Cycling Network

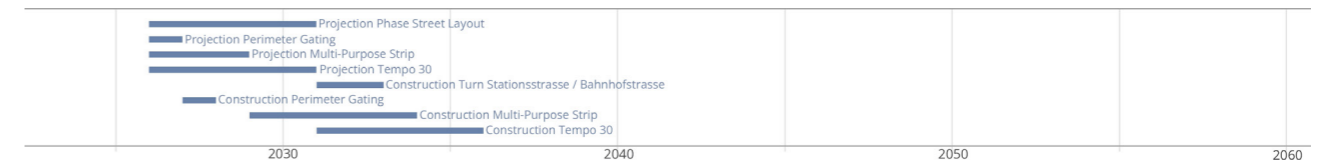
### Adjustment Proposal

- The bicycle junction is placed at the right side of the entrance to Stationsstrasse. Due to the configuration, turning vehicles can no longer turn at the same speed and are forced to slow down. The junction is built similarly to the inner circle of a roundabout. It is designed to redirect cars but still leave enough margin for tighter turning radii of longer vehicles like buses or lorries.

### Costs

- Planning Phase: 5'000 CHF
- Construction Phase: 10'000 CHF
- Maintenance: included in 4.3.3

### Time Horizon



### Risks

Geometry needs to consider turning radii of buses and lorries

### Feasibility

High

### Reference

Bucheggplatz Zurich



## 4.3.5 Extension Line 856

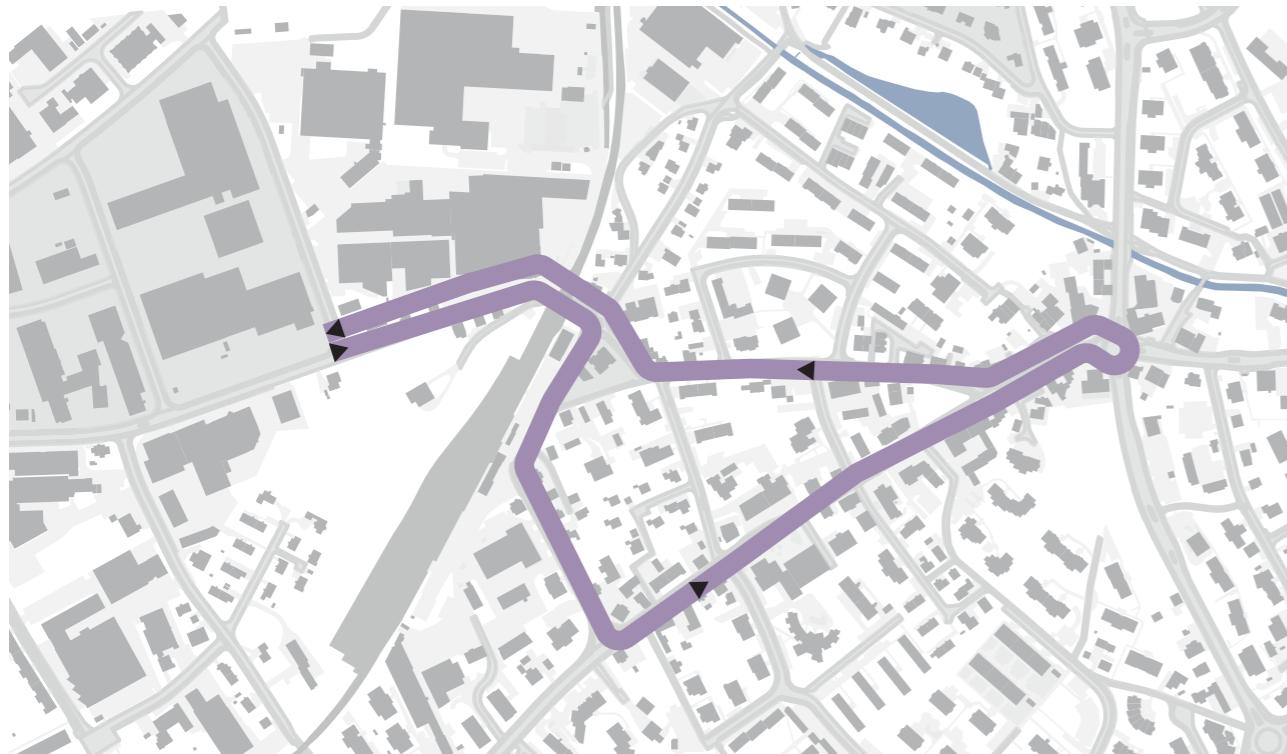


Fig. 4.3.5A: Illustration of the proposed extension of line 856

### Priorisation of Challenges



Accessibility

Mobility

### Design Proposal

To offer an attractive and fast connection between the future centres of Kempton, Robenhausen, and Unterwetzikon and the stations Kempton and Wetzikon, line 856 is extended from Kastellstrasse via Kempton Station to Ochsen.

Buses operate with a headway of 7.5 minutes on weekdays, 10 minutes on Saturdays, and

### Intervention ID

4.1.1, 4.1.2

15 minutes on Sundays. To ensure attractive connections to the supra-ordinate level, the timetable needs to be timed to the departures of S3 in Kempton and S5/S15 in Wetzikon. The start of the operating phase is coupled with the finalisation of the first construction phase in Kempton. A suggested timetable is in appendix A8.

### Stakeholder

- VZO

### Planning Base

Achieving an increase in active modes and public transport ridership.

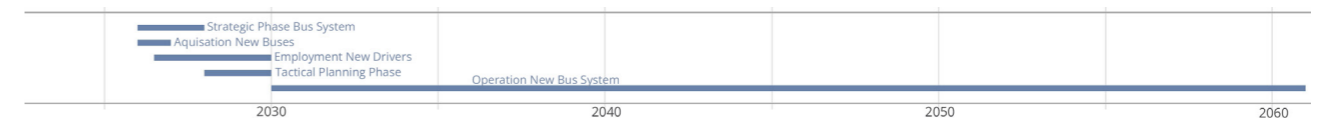
### Adjustment Proposal

- To connect the future centres of Kempton, Robenhausen, and Unterwetzikon to the trainstations Kempton and Wetzikon and to each other, line 856 is extended via Kempton Station to Ochsen. The headway is reduced from 30 minutes to 7.5 minutes on weekdays. On Saturdays the headway is 10 minutes, on Sundays 15 minutes.
- To ensure connections and wait for transferring passengers, buses wait for 2 minutes at Kempton Station. To be able to handle disturbances along the route, the turnaround time at Wetzikon Station is 6 minutes. The cycle time is 30 minutes. With this configuration 4 vehicles are required.
- An estimation for the increase in ridership due to increased services and longer travel times by car due to the speed reduction is listed in appendix A8.

### Costs

- Acquisition: 4'000'000 CHF (Baumgartner 2021)
- Operation (including maintenance and salaries): 1'600'000 CHF (TEAMverkehr. winterthur 2020)

### Time Horizon



### Risks

Delay due to closed barriers at level crossing in Kempton, turnaround time should be able to handle those

### Feasibility

High  
Regarding the transport transition and Wetzikons stated objective of promoting public transport usage, the extension of the line is justified.

## 4.3.6 Ring Line 855

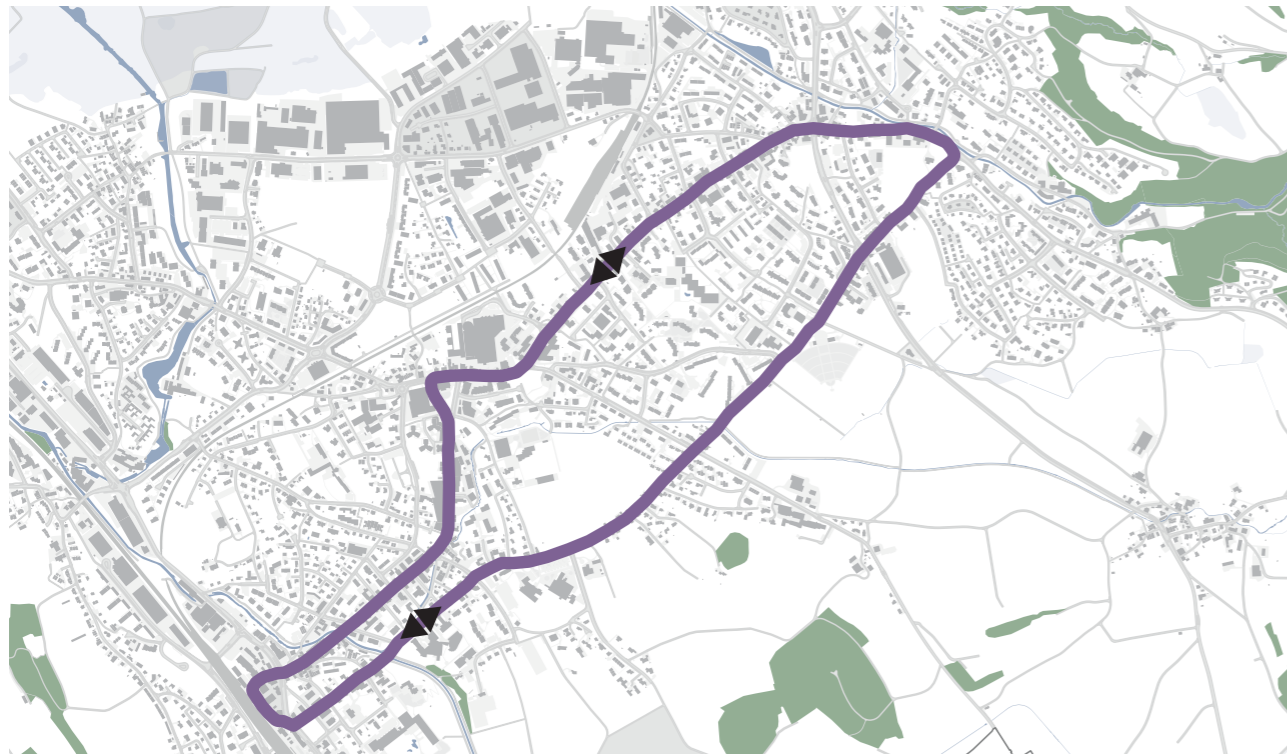


Fig. 4.3.6A: Illustration of the proposed ring line 855

### Priorisation of Challenges



Mobility

### Design Proposal

To offer a fast connection between the future centres Kempten, Ober- and Unterwetzikon and the train station Wetzikon, a bidirectional ring line is introduced. The line connects the corridors Wetzikon station along Bahnhofstrasse to Ochsen and back along Spitalstrasse to Wetzikon Station. The headway on the line is 7.5 minutes on weekdays, 10 minutes on Saturdays and 15 minutes on Sundays.

### Intervention ID

4.1.1, 4.1.3

Due to the increased frequency of fast connections in direction Zurich from Wetzikon station and the high frequency of the ring line, only connections in direction of Hinwil are considered.

### Stakeholder

- VZO

### Planning Base

Achieving an increase in active modes and public transport ridership.

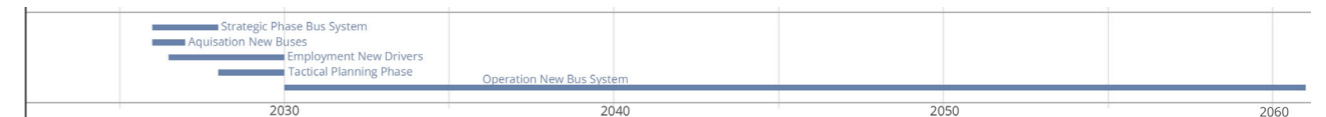
### Adjustment Proposal

- To offer a fast and attractive between the future centres of Kempten, Ober- and Unterwetzikon, a new ring line is implemented. The headway is 7.5 minutes on weekdays, 10 minutes on Saturdays and 15 minutes on Sundays. At Wetzikon Station, only connections to Hinwil are considered. This is due to the increase of services to Zurich and the high frequency of buses. To ensure a constant headway between services, buses wait at Wetzikon Station for 5.5 minutes. The total cycle time is 45 minutes, requiring 6 vehicles in total. A proposed timetable is listed in appendix A8.

### Costs

- Acquisition: 6'000'000 CHF (Baumgartner 2021)
- Operation (including maintenance and salaries): 2'400'000 CHF (TEAMverkehr. winterthur 2020)

### Time Horizon



### Risks

The bus route is on predominantly highly frequented roads. Without the implementation of the perimeter gating, the buses will experience delay caused by congestion.

### Feasibility

High  
Regarding the transport transition and Wetzikons stated objective of promoting public transport usage, the extension of the line is justified.

## 4.3.7 Parking

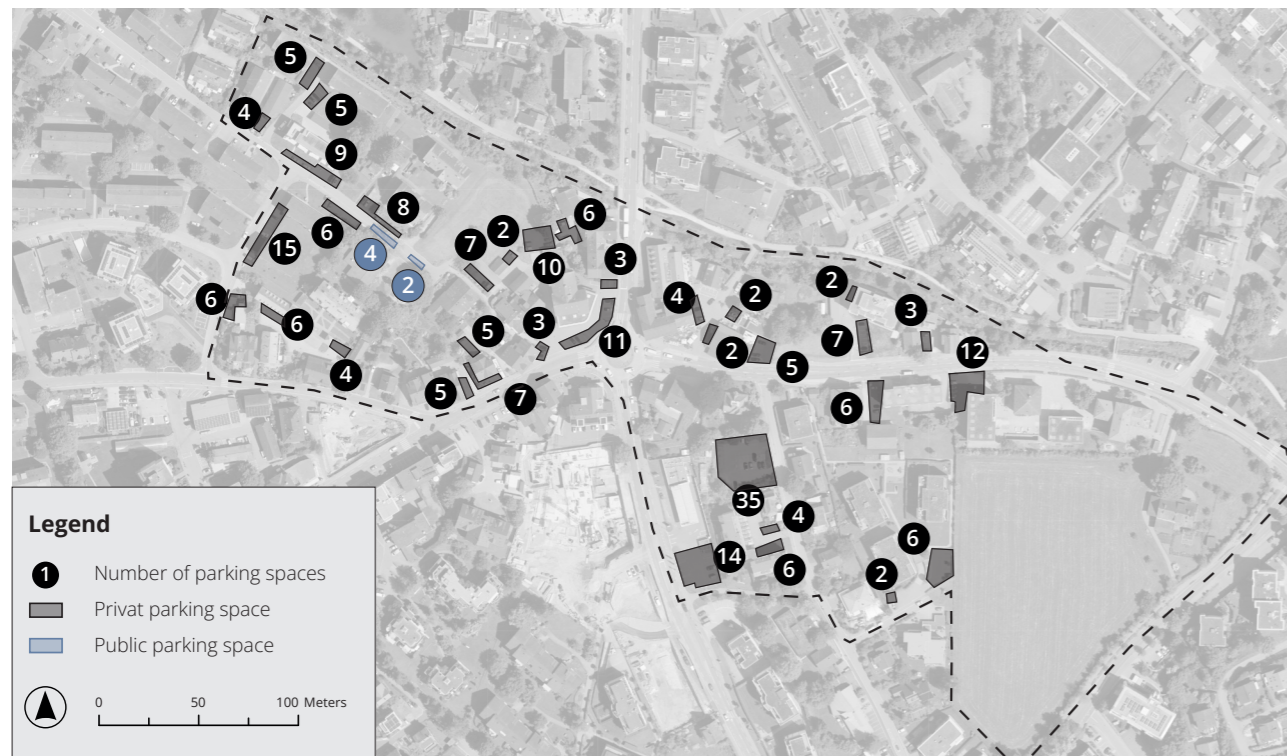


Fig. 4.3.7A: Current number of surface car parking spaces in the Kempten perimeter

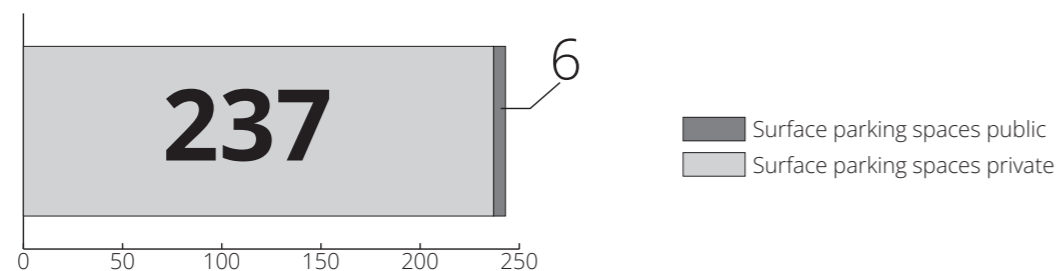


Fig. 4.3.7B: Sum of current number of surface car parking spaces in the Kempten perimeter

### Design Proposal

Mobility behaviour is strongly influenced by parking facilities. If only limited parking facilities are available at the place of residence or work and alternative means of transport are available, the population will voluntarily make more journeys by public transport, bicycle or on foot travelled. In addition, reducing the number of parking spaces in new buildings saves construction costs.

### Intervention ID

1.2.3, 2.2.1, 4.2.1, 4.2.2, 4.3.1

### Stakeholder

- Municipality
- Private property owner

In order to reduce the number of parking spaces, it is therefore important to offer alternatives to motorised private transport. This can be ensured by a good to very good public transport class, a good walking and cycling infrastructure, bicycle parking facilities or the provision of car-sharing parking facilities as a supplement to public transport. The following adjustment proposal therefore assumes that the mobility measures are implemented and that the public transport offer is strengthened as a result (the perimeter will be raised to level of service B).

### Spatial Planning Instrument

- Parking regulations: Reduce the number of parking spaces per m<sup>2</sup>, increase the number of bicycle parking spaces
- Financial incentives for employees, employer can finance the PT pass Expansion of the pedestrian and cycling infrastructure. In addition to employees, employers also benefit in the form of lower demand for parking spaces and the associated cost savings
- Financial incentives for mobility concept: Strengthening in well-connected locations

### Adjustment Proposal

Adjustment of the parking regulations Wetzikon with the threshold values shown in the following table 4.3.7A:

Tab. 4.3.7A : Number of parking spaces with the proposed parking regulations compared with the current limits

	Current Parking Regulation		Future Parking Regulation (Zurich City)	
Living	80m <sup>2</sup>		120m <sup>2</sup>	
Customers	80m <sup>2</sup>		100m <sup>2</sup>	
Current Population				
Min (55%) / (45%)	210	18	126	14
Max (80%) / (60%)	306	24	184	19
Future Population				
Min (55%) / (45%)	591	25	355	20
Max (80%) / (60%)	860	33	516	27

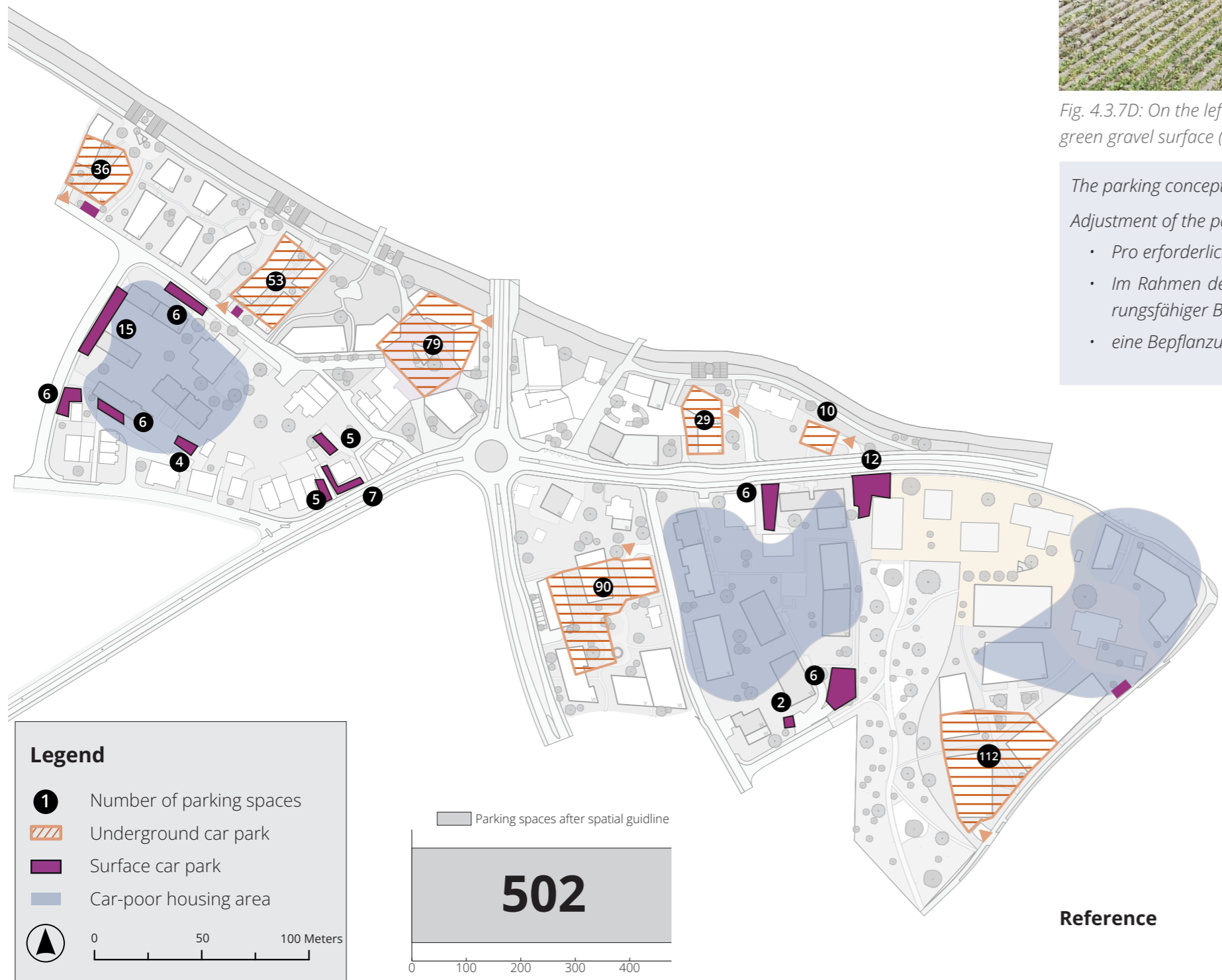


Fig. 4.3.7C: Parking concept for the spatial guideline of the Kempten center



Fig. 4.3.7D: On the left parking spaces with grass liner (Dietlikon) on the right side bicycle parking spaces in a green gravel surface (Zurich) (Tiefbauamt Stadt Zürich 2021).

The parking concept shown in Figure xy for the centre of Kempten.

Adjustment of the parking regulations Wetzikon as follow:

- Pro erforderlichem Parkplatz für Personenwagen sind mindestens 2 Abstellplätze für Velos zu erstellen.
- Im Rahmen der Parkverordnung vorzusehen, dass beim Neubau eines Parkplatzes stets ein versickerungsfähiger Boden verwendet wird und
- eine Bepflanzung mit schattenspendenden Bäumen und Sträucher vorhanden ist.

#### Costs

- Planning Phase: 100'000 CHF

#### Time Horizon



#### Risks

The new parking ordinance only applies to new buildings or changes in the settlement area. If the status quo is maintained, the number of parking spaces will not change.

#### Feasibility

The revision of the parking ordinance has a high degree of feasibility, as the municipality is in charge. The changeover to a new parking ordinance can also be facilitated with a transition phase so that sufficient time is given to adapt to the new guidelines and the alternative offer can be expanded.

#### Reference

- Parkverordnung Zürich (Stadt Zürich 2010)
- Guideline Quickwins Hitzeminderung (Tiefbauamt Stadt Zürich 2021)
- Beschlussantrag Grüne Fraktion Südtirol (Grüne Fraktion 2022)

## 4.3.8 Green Space

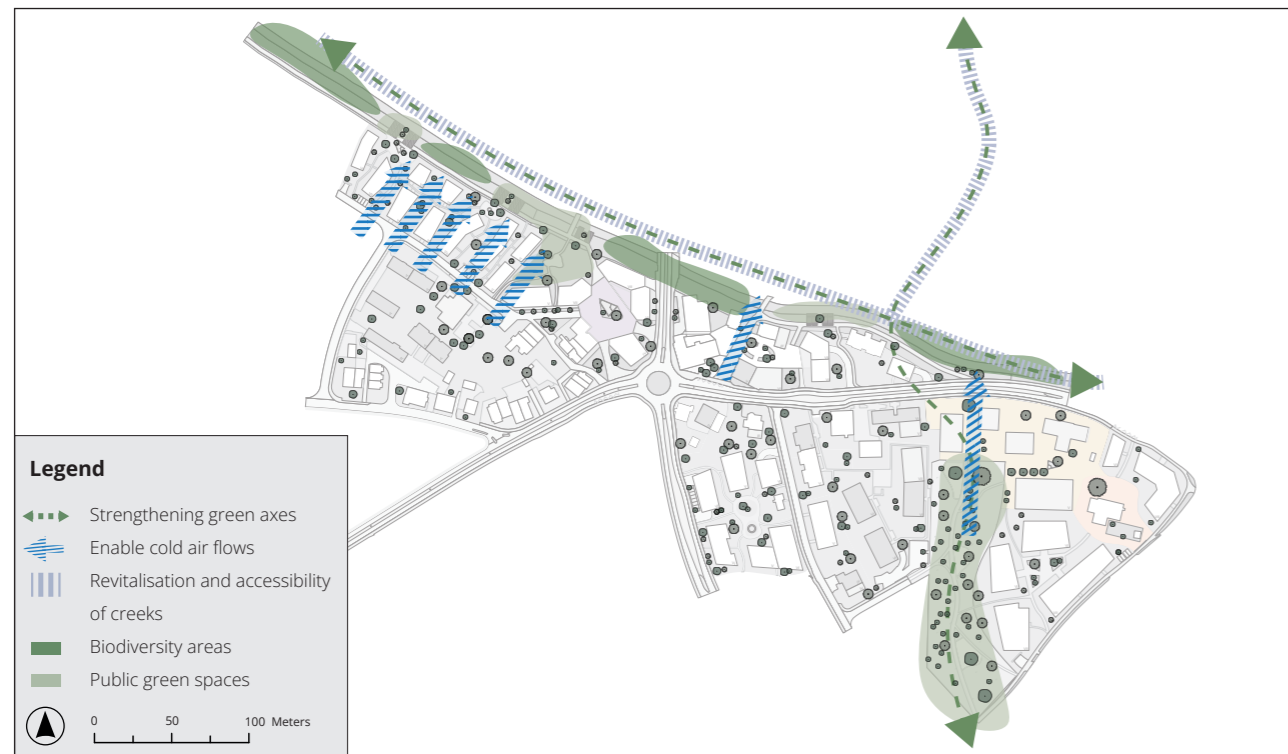


Fig. 4.3.8A: Current number of surface car parking spaces in the Kempton perimeter

### Intervention ID

2.1.1, 2.1.2, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.2.5, 2.2.6, 2.2.7, 4.2.1

### Design Proposal

The spatial guideline implements targeted measures for sustainable green space design. For example, buildings are positioned vertically to the creek to promote cold air flows. Along the stream, green spaces are being upgraded in sections for public use, but there are also sections where the stream is being revitalised and is not accessible to people as a refuge for fauna and flora. New park areas will be created to provide the growing population with sufficient open space and the continuity of the fjord will be strengthened.

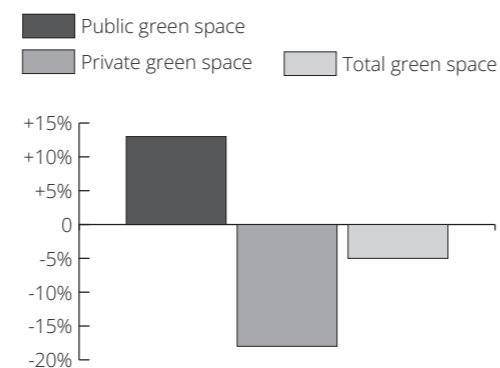


Fig. 4.3.8B: Change in the green space area after the spatial guideline

### Stakeholder

- Municipality
- Zurich Highlands school of career choice and further education (BWSZO)
- Private property owner



Fig. 4.3.8C: Current number of surface car parking spaces in the Kempton perimeter (ghiggi paesaggi 2010; Stadt Zürich 2023; Daniel Kurz 2021)

### Spatial Planning Instrument

- Spatial development concept for a spatially specific strategy for green spaces across the whole municipality area
- Special Land Use Plan to demand biodiversity qualities or green spaces
- Promoting the sponge city concept: Using the wastewater management fee to create financial incentives to channel more rainwater from roofs into the ground instead of into the sewer system

### Adjustment Proposal

Adjustments of zoning plan and building and zoning ordinance (BZO): Für das Gebiet Römerfeld ist ein Gestaltungsplan aufzustellen, welcher die Erstellung eines Quartierparks mit folgenden Eigenschaften ermöglicht:

- a. eine mindest Fläche von 7 ha hat und bis mindestens 10 m Tiefe unüberbaut bleibt,
- b. das die Durchgängigkeit der bestehenden Fjordstruktur stärkt und
- c. die Bepflanzung und der Unterhalt einer hohen Biodiversitätsqualität entspricht.

### Costs and Feasibility

- The costs and feasibility are described in the various neighbourhood profiles.

### Risks

- Public green spaces mean maintenance and costs for the municipality. The public sector has little influence on the green spaces of private owners.

### Reference

- Pfingstweidpark Zürich (ghiggi paesaggi 2010)
- Wolkenwerk (Daniel Kurz 2021)
- Schwammstadt Zürich (Stadt Zürich 2023)
- Gestaltungsplan Roniger Park Rheinfelden (Rheinfelden 2010)
- Fjord Concept (Wetzikon 2010)

## 4.3.9 Kempten Zentrum



Fig. 4.3.9A: Illustration of the urban design proposal at Kempten Zentrum

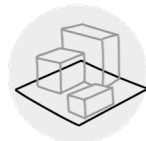
### Priorisation of Challenges



Social Space



Green Space



Transformation

### Intervention ID

1.2.1, 1.2.2, 1.2.3, 1.2.4, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.2.5, 2.2.6, 2.2.7, 3.2.2, 3.2.4

### Design Proposal

Creating two connected centres to link and attract East and West of Pfäffikerstrasse. Groundfloor usage is dedicated to commercial use to guarantee preservation of current shops and generate more frequency. Open public spaces should lead to high staying quality and thus turn into a lively centre. Options for staying without the pressure to consume should be provided as well. The preservation

of characteristic buildings will help to identify with the new structures. The new riverside pedestrian path leads through the two centres and facilitates the access to nature.

### Stakeholder

- Private property owner
- Municipality

### Spatial Planning Instrument

Public-private city planning contract: It guarantees the owners higher building density and planning security and assures the municipality the implementation of its demands concerning public, commercial and green spaces.

### Adjustment Proposal

City planning contract (Fig. 4.3.9B):

- to convince all parcell owners (red parcels have no financial benefit under current parcelling):
- redefine all parcels to „Zentrumszone A“ in zoning plan (7 storeys allowed)
- 9319/9284: redefine parcell border so that both receive added value
- 2914/2916: guarantee selling of their parcels to the bigger neighbour parcels including a share of 25% of the added land value capturing of the neighbouring parcels
- 9321/7109: the buildings are protected und thus they can't redevelop, but would get more customers for the restaurant and cultural centre



Fig. 4.3.9B: Assumed added value capturing and proposed parcelling

To protect additional landmark buildings:

- 2574-2577, 9290: exclusion of contract
- 9284: condition with upzoning

To guarantee centre properties:

- all parcels release 20% of their parcell towards the two defined centres for public use. The centres are co-developed and planned by a common third party. The municipality pays the costs and the further maintenance

## Adjustment Proposal

To guarantee public park

- 9284: let 5000m<sup>2</sup> towards river be used as public park, designed and managed by municipality

To guarantee public footwalk:

- 9284-85: condition with upzoning
- 9573: condition with upzoning
- 9290: initial & management costs covered by 9339 in exchange for direct access to center and increased access to river
- 9339: upzoning to „Kernzone A“ in exchange of paying costs of the creation and management of public footwalk by municipality on parcels 9339 & 9290 to guarantee commercial use:
- buildings around central places are forced to accommodate commercial use on the first 2 floors
- 9319: the current commercial use is guaranteed to exist to the same rental prices as before, but also respected in added value calculations

## Costs

- |   |             |
|---|-------------|
| • Costs public private city planning contract | 300'000 CHF |
| • Outdoor design                              | 280'000 CHF |
| • Costs bridge                                | 300'000 CHF |

Living Area 2023 [m<sup>2</sup>] 6'351

Living Area 2060 [m<sup>2</sup>] 13'609

Total Commercial Area [m<sup>2</sup>] 1'249

People 2023 141

People 2060 302

## Added Land Value Capturing (App. A11)

• One-time Revenue:

22'000'000 CHF

## Time Horizon



## Risks

- No possibility to force development
- Redistribution of parcels is needed
- Non-cooperation of certain parcel owners can endanger the whole project

## Feasibility

The creation of a city planning contract in such a situation is not unusual and thus not impossible.

## Reference

- Special land use plan of Windisch (for comparison - city planning contracts are not typical in Switzerland) (Gemeinde Windisch (2020))
- Hunziker Areal (Roger Frei 2018)
- Aeschbachquartier Aarau (ZVG 2019)



Fig. 4.3.9C: Hunziker Areal (left) and the Aeschbachquartier (right) as references for the center of Kempten (Roger Frei 2018, ZVG 2019)

# 4.3.10 Chämpterbach Quartier

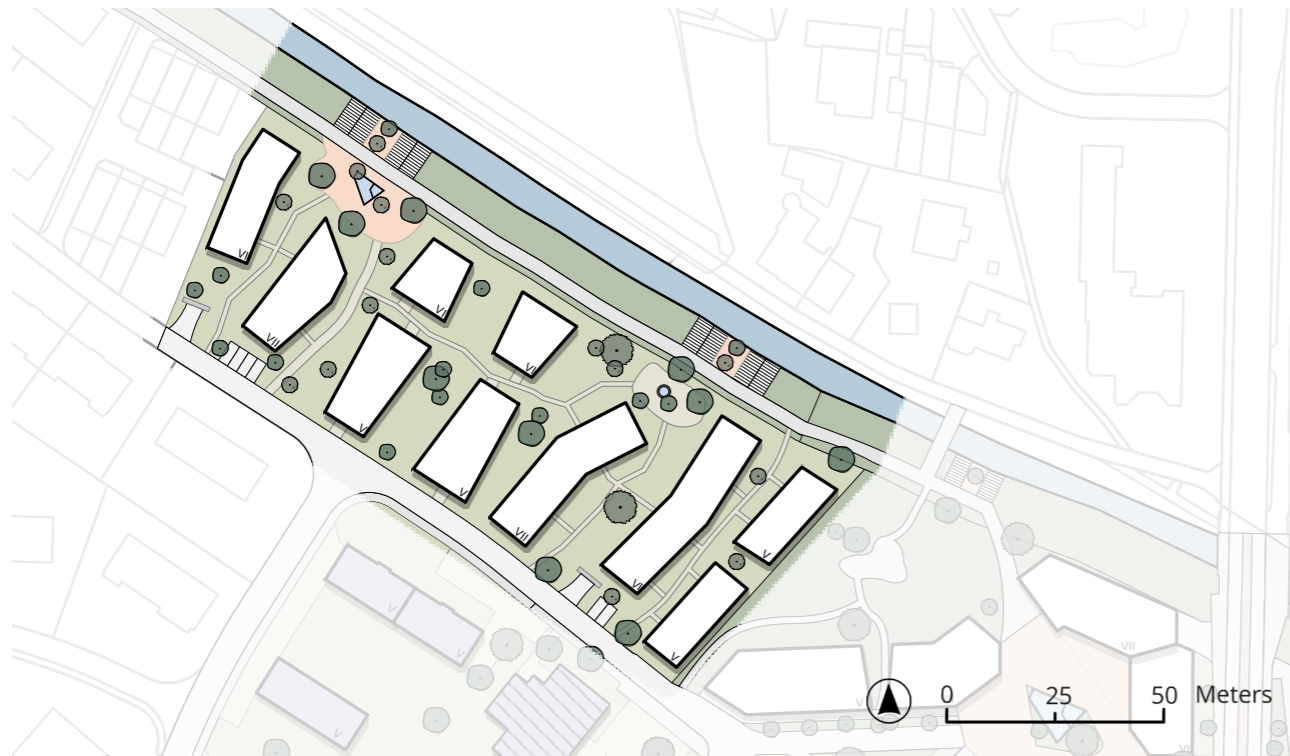


Fig. 4.3.10A: Illustration of the urban design proposal for the Chämptnerbach Quartier

## Priorisation of Challenges



Green Space



Transformation

## Design Proposal

At Chämpterbach Quartier a densification of the existing building stock through reconstruction is proposed. There should as few changes in parcell structure as possible. New buildings are vertically oriented to the stream to generate fresh air corridors between the buildings.

## Number of Intervention

1.1.1, 1.1.2, 2.2.3, 2.2.7, 3.2.3, 3.2.4, 4.2.1

These vertical connections to the nature area allow new path guidance to make the area around the stream accessible and become more alive.

## Stakeholder

- Private property owner
- Municipality

## Spatial Planning Instrument

- Upzoning to create incentives for redevelopment and generate land value capturing
- Guarantee of re-use of the land value capturing for the public area maintenance
- Compulsory supplement plan to ensure cold air streams and public space along the river that still allows the parcel owners to fully use the redevelopment potential

## Adjustment Proposal

- Addition to „Verordnung zum kommunalen Mehrwertausgleichsfonds“ of the city of Wetzikon: „Die Kosten der Umgestaltung sowie die Bewirtschaftung der im Gewässerraumliegenden Flächen werden ab Einreichung der Baugesuche mit voll ausgenützter baulicher Dichte für die Parzellen 9280, 9281, 9282, 9283 gewährleistet.“
- Change parcells riverside parcells to „W Chämpterbach a“ and others to „W Chämpterbach b“ in zoning plan
- Define zones in BZO: Chämpterbach a: Baumassenziffer: keine, Gebäudehöhe max: 21 m (7 storeys), Gebäudelänge max: 40 m + Chämpterbach b: Baumassenziffer: keine, Gebäudehöhe max: 21 m (6 storeys), Gebäudelänge max: 40 m

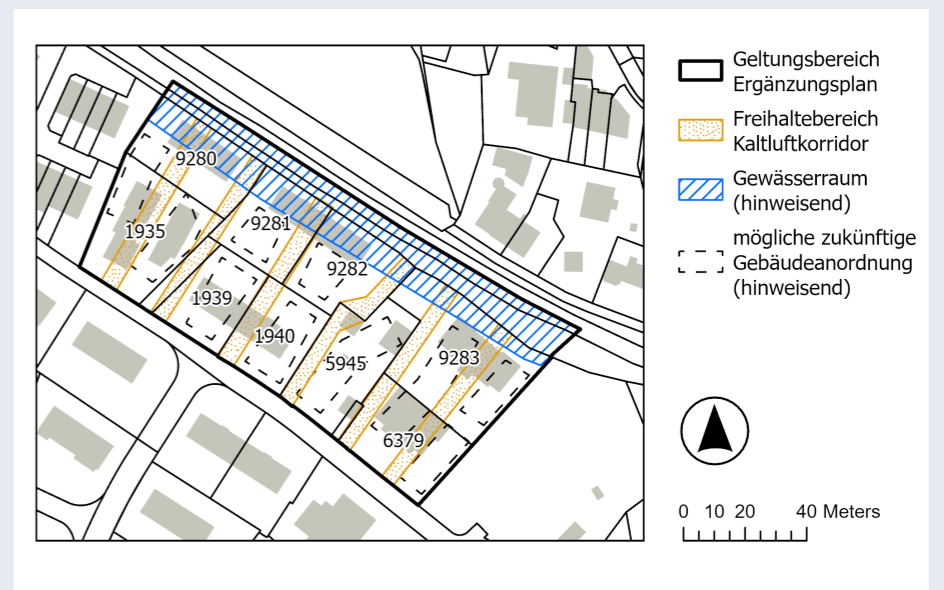


Fig. 4.3.10B: Supplement plan with defined open spaces



**Costs**

- Planning costs (GemeindeWetzikon 2023) 250'000 CHF
- Outdoor design (Kanton Zurich 2011) 500'000 CHF

**Living Area 2023 [m<sup>2</sup>]** 4'611

**Living Area 2060 [m<sup>2</sup>]** 10'517

**Total Commercial Area [m<sup>2</sup>]** 0

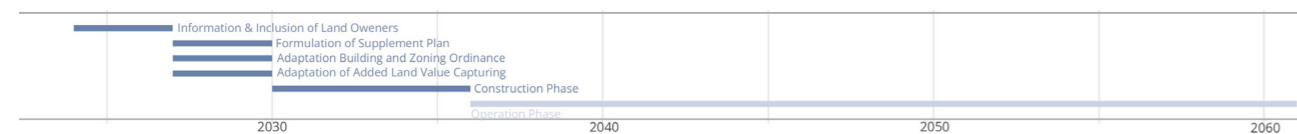
**People 2023** 102

**People 2060** 234

**Added Land Value Capturing (App. A11)**

- One- time Revenue: 18'500'000 CHF

**Time Horizon**



**Risks**

- To guarantee a more qualitative building structure, some parcell owners would be invited to join their development. But this can not be guaranteed.
- If the building sizes of the final design differ much form the spatial guideline, the upzoning should be restricted further by a BMZ to prevent uncoherently big buildings.
- If the supplement plan or the change in the BZO fails, the densification and added land value capturing still works. But if the change in the zoning plan and definition fail, the public space demands are likely to fail as well as not enough incentives are created.

**Feasibility**

Supplement plan and change in BZO only have to be accepted by the local council

**Reference**

- Fil Bleu Glatt (Kanton Zürich 2021)
- Im Schupis und Altwiesenstrasse Schwamendingen (Baugenossenschaft Glattal Zürich 2019, Boltshauser Architekten 2023)

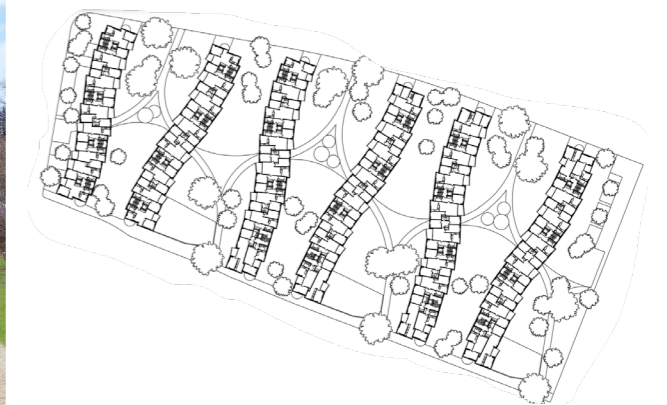


Fig. 4.3.10C: Fil Bleu Glat (top left), Im Schupis (top right) and Altwiesenstrasse (bottom) in Schwamendingen as references (Kanton Zürich 2021; Boltshauser Architekten 2023; Baugenossenschaft Glattal Zürich 2019)

# 4.3.11 Baumgarten Quartier



Fig. 4.3.11A: Illustration of the urban design proposal for the Baumgarten Quartier

## Priorisation of Challenges



Building Emission



Eviction



Additional Storeys

## Number of Intervention

1.1.1, 1.1.2, 1.3.1, 2.2.1, 2.2.2, 3.2.2, 3.2.3, 3.2.4, 4.2.1

## Design Proposal

The buildings in the Baumgarten Quartier are either of high quality and with great potential to add storeys or of historic quality. The old historic buildings along the Bahnhofstrasse and Stationsstrasse should get preserved as identification and witnesses of the past. The buildings between Rosenstrasse and Baumgartenstrasse are added additional storeys. Therefore no buildings are demolished which

is more energy efficient and releases no grey energy. Simultaneously further redevelopment processes can take place. Measurements to prevent eviction are considered.

The municipality owns plot 6370, where a kindergarten is currently being run in a 1-storey building. This is a good opportunity for the municipality with an active land policy to send

a positive signal to the property owners, by increasing the number of storeys itself and promoting inner-city development.

## Stakeholder

- Private property owner
- Municipality
- Kindergarten Baumgarten

## Spatial Planning Instrument

- Active land policy
- Protection from profit restructuring
- Promoting of additional storeys (see instruments of Baumgarten West)

## Adjustment Proposal

- With an active land policy send a positive signal to the property owners to increase the number of storeys
- Addition to building and zoning ordinance (BZO): «Der Schutz von bestehendem Wohnraum umfasst namentlich folgende Bereiche:
  - a. Bewilligungspflicht bei Abbruch und Ersatzneubau sowie Zweckentfremdung von Wohnraum;
  - b. Prüfungs- oder Bewilligungspflicht für sämtliche Sanierungen, Renovationen und Umbauten, die über den einfachen ordentlichen Unterhalt hinausgehen;
  - c. Mietzinskontrolle bei Abbruch und Ersatzneubau sowie Sanierung, Renovation und Umbau;»
- Limited flat floor plan or minimum number of flats for a new building or an extension

## Costs

- Partial revision of BZO 240'000 CHF
- Additional Planning Costs 200'000 CHF
- Kindergarten: 2 additional Storeys 2'368'000 CHF

**Living Area 2023 [m<sup>2</sup>]** 5732

**Living Area 2060 [m<sup>2</sup>]** 6728

**Total Commercial Area [m<sup>2</sup>]** 496

**People 2023** 127

**People 2060** 150

**Added Land Value Capturing (App. A11)** • One- time Revenue: 2'500'000 CHF

**Time Horizon**



**Risks**

As the responsibility for realisation lies solely with the landowner, there is a risk that the buildings will nevertheless be demolished or that no changes will be made to the buildings.

**Feasibility**

- There is a high feasibility to add storeys to plot 6370 as the municipality is the owner.
- It is difficult to assess the feasibility of adding storeys to the private landowners, as the responsibility lies solely with them. However, the ongoing climate debate will and according instruments will increase the awareness of private ground owner to act accordingly.

**Reference**

- Repair and expansion of Kindergarten Meilen (Gemeinde Meilen 2022)
- Adding storeys with wood (Schindler-Scheibling 2021)
- Ordinance on the protection of housing Basel-Stadt (SRF 2023)
- Law on the preservation of living space Lucerne (SRF 2023)



Fig. 4.3.11B: Repair and adding of storeys of Kindergarten Meilen (Gemeinde Meilen 2022)



Fig. 4.3.11B: Reference of adding storey at an apartment block (Schindler-Scheibling 2021)

# 4.3.12 Buche Quartier



Fig. 4.3.12A: Illustration of the urban design proposal at Buche Quartier

## Priorisation of Challenges



Eviction

Transformation

## Design Proposal

The today's Buche Quartier contains a few buildings from different decades and two big parking lots. The parking lots are underutilised areas and have great potential for densification and a joint development. Especially the parking lot at Kindergartenstrasse is ideal due to low noise emission. The historic Kita building in the Kindergartenstrasse should be preserved as a landmark while the repla-

## Number of Intervention

1.1.1, 1.1.2, 1.3.2, 2.2.1, 2.2.2, 3.2.2, 3.2.3, 3.2.4, 4.2.1

cement of the other buildings allow a coordinated development on a bigger perimeter. The gas station stays at the same place in the ground floor of a new apartment building. Measurements to resettle the inhabitants of today's buildings and their return after the development is finished are considered. The historic buildings along the Tösstalstrasse will remain as today with opportunities to extend.

## Stakeholder

- Private property owner
- Municipality

## Spatial Planning Instrument

- Special land use plan to regulate experimental planning
- Affordable housing zone

## Adjustment Proposal

Implementation of experimental planning:

- Preparation and sensibilisation: Defining public interest and need for the development, contact with the land owner, awareness raising for experimental planning, defining the concept
- Partial revision of the communal land use plan to introduce a special land use plan containing:
  - a. Number and size of the apartments
  - b. Densities
- Open competition for the implementation of the experimental planning and placing of the contract.
- Development of the area

Implementation of affordable housing zone

- Defining public interest and need for the development, contact with the land owner
- Partial revision of the communal land use plan to introduce an affordable housing zone where private landowners are obligated to:
  - a. Number and size of apartments
  - b. Densities
  - c. Definition of a minimum share of affordable housing (e.g. 80%)
- Development of the area

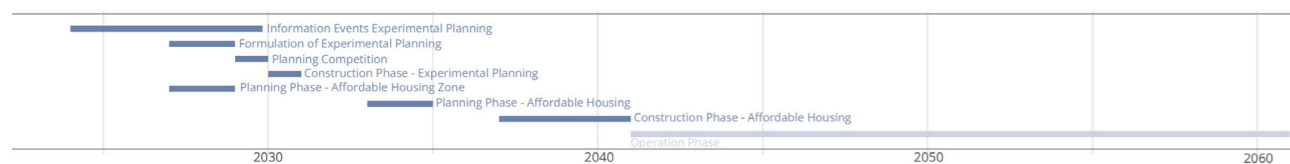
Important: Replacement offers should be provided or the opportunity to come back after realisation of the building project to prevent eviction. This could be done in coordination with the development of other neighbourhoods (especially Römerfeld Ost)

## Costs

- Partial revision of BZO: Special land use plan 240'000 CHF
- Partial revision of BZO: Affordable housing zone 240'000 CHF

<b>Living Area 2023 [m<sup>2</sup>]</b>	1'372
<b>Living Area 2060 [m<sup>2</sup>]</b>	9'346
<b>Total Commercial Area [m<sup>2</sup>]</b>	251
<b>People 2023</b>	30
<b>People 2060</b>	208
<b>Added Land Value Capturing (App. A11)</b>	<ul style="list-style-type: none"> <li>One- time Revenue: 19'000'000 CHF</li> </ul>

**Time Horizon**



**Risks** As the responsibility for realisation lies solely with the landowner, the following risks exist: Demolition and replacement construction, redevelopment or the intended development doesn't happen.

**Feasibility** To realise the experimental planning the support of the parcel owner is needed. Its acceptance is rather determined by the inhabitants of Wetzi-kon and might have an influence on the implementation of the following overarching development which includes the demolition of 3 buildings.

- Reference**
- Fogo: Experimental planning in Zurich (FOGO 2023)
  - Building project Triemli 1, Zurich (Rotach 2023)



Fig. 4.3.12B: Building project Triemli 1 (Rotach 2023)



Fig. 4.3.12c: Experimental planning in Zurich Altstetten (FOGO 2023)

# 4.3.13 Römerfeld West



Fig. 4.3.13A: Illustration of the urban design proposal at Römerfeld West

## Priorisation of Challenges



Building Emission Additional Storeys Addition

## Design Proposal

The new Römerfeld West Quartier consists of a new neighbourhood with three bigger building plots. They have a high potential for adding additional storeys.

## Number of Intervention

1.1.1, 1.1.2, 1.3.1, 2.2.1, 2.2.2, 2.2.3, 3.2.2, 3.2.3, 3.2.4

The single family homes on the East of the Kindergartenstrasse have either great potential of extension and adding additional storey or a replacement by bigger volumes in the case of elderly buildings of lower material quality. The same counts for the buildings along the Tösstalstrasse.

## Stakeholder

- Private property owner
- Municipality

## Spatial Planning Instrument

- Redensification zone
- Incentive for storey extensions
- Feasibility study of added storeys potential for the whole municipality area

## Adjustment Proposal

- Create incentives for adding storeys through information events to clarify costs and potential or a feasibility study for adding storeys paid for by the municipality
- Adjustments of zoning plan and building and zoning ordinance (BZO): "Die im Bauzonenplan speziell bezeichneten Gebiete bezwecken eine Nachverdichtung.

*Der Stadtrat kann in diesen Gebieten maximal fünf Vollgeschosse bewilligen. Voraussetzungen dafür sind, dass*

- angemessen mehr Wohneinheiten im Vergleich zur bestehenden Bebauung entstehen und*
- ein unabhängiges Gutachten: 1) eine gute Wohnqualität und Freiraumqualität, 2) eine gute architektonische Gestaltung der Bauten und Anlagen 3) sowie eine gute Einordnung in das Orts-, Quartier- und Landschaftsbild nachweist sowie*
- der Anschluss an verfügbare Nahwärmeverbunde geprüft wird;»*

- Adjustments of zoning plan and building and zoning ordinance (BZO): "Mit dem Ziel der nachhaltigen Siedlungserneuerung können bei bestehende Bauten folgende Erleichterungen beansprucht werden:

- Zusätzliches Vollgeschoss anstelle eines Dachgeschosses oder eines Attikageschosses bei Bestandesbauten.*
- Erhöhung zulässige Fassadenhöhe um max. 3 m bei Bestandesbauten.*
- Erhöhung Ausnutzungsziffer um max. 20 % resp. max. bei Aufstockung von 3 auf 4 Vollgeschosse*

## Costs

- Partial revision BZO: 240 000 240'000 CHF
- Information event every 2 years 7'500 CHF per event

Living Area 2023 [m<sup>2</sup>] 6'259

Living Area 2060 [m<sup>2</sup>] 11'948

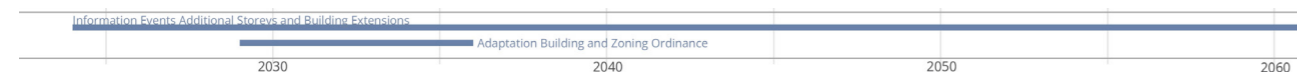
Total Commercial Area [m<sup>2</sup>] 0

People 2023 139

People 2060 266

Added Land Value Capturing (App. A11) • One- time Revenue: 17'500'000 CHF

Time Horizon



**Risks** As the responsibility for realisation lies solely with the landowner, there is a risk that the buildings will nevertheless be demolished or that no changes will be made to the buildings.

**Feasibility** It is difficult to assess the feasibility of adding storeys to the private landowners, as the responsibility lies solely with them. However, the ongoing climate debate will bring the consumption of grey energy through the demolition and construction of replacement buildings more into focus in the future. This will further increase the attractiveness and willingness to add storeys.

- Reference**
- Land use planning Brugg (Stadt Brugg 2022)
  - Building and Zoning ordinance Richterswil (Gemeinde Richterswil 2023)
  - Adding storeys with wood (Lignum 2009)

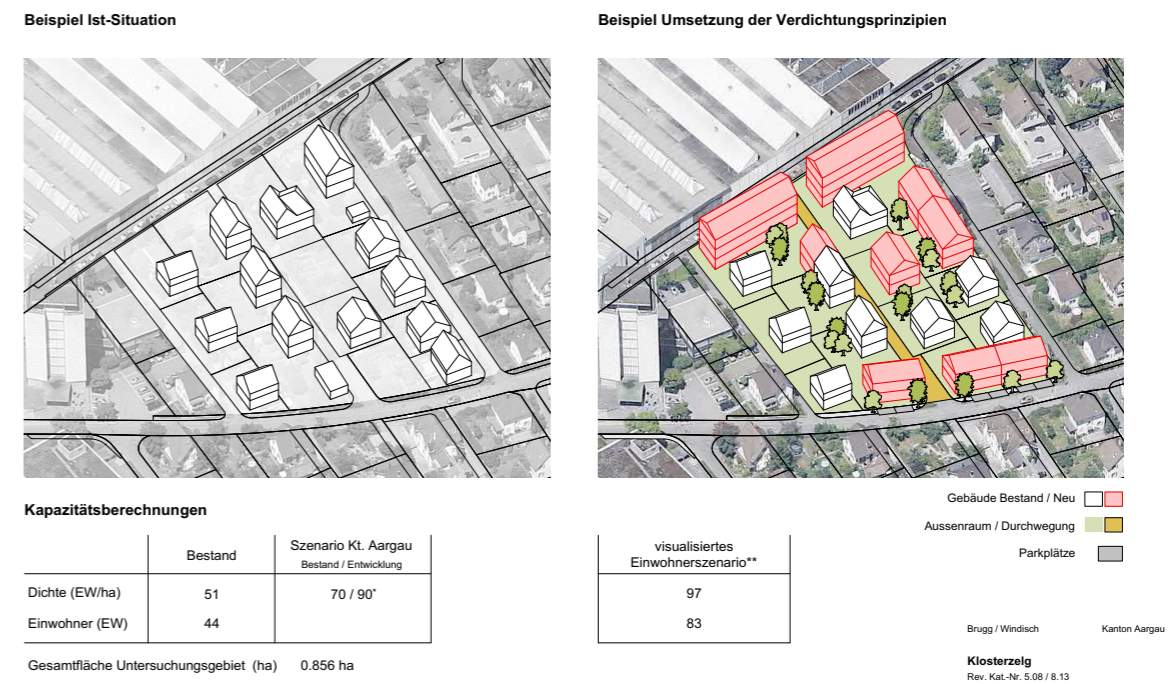


Fig. 4.3.13B: Reference for redensification zone in the land use plan of the Region Brugg (Stadt Brugg 2022)



Fig. 4.3.13C: Adding of four storeys out of wood on building (Lignum 2009)

# 4.3.14 Römerfeld Ost



Fig. 4.3.14A: Illustration of the urban design proposal at Römerfeld Ost

### Priorisation of Challenges



Green Space      Transformation

### Number of Intervention

1.1.1, 1.1.2, 1.3.2, 2.1.1, 2.1.2, 2.2.1, 2.2.2, 2.2.3, 3.2.3

### Design Proposal

The green field of Römerfeld Ost area is already today located in the constructing area. It only involves one parcel with a single private property ownership. This offers the opportunity to develop a coherent dense building project with great staying quality between the buildings. Only parts of the green field get overbuilt to preserve the todays existing high quality green space which is part of the muni-

cipality's fjord concept. Measures to integrate affordable housing are made. The green field neighbours the Zurich Highlands school of career choice and further education (BWSZO). Regarding the population growth of Wetzikon and the whole Zurich highlands the extension of today's school or a building with communal utilisation will be integrated in the development of the green field.

### Stakeholder

- Private property owner
- Municipality
- Zurich Highlands school of career choice and further education (BWSZO)

### Spatial Planning Instrument

- Municipality buys parcel of private landowner with money from a credit. Later the municipality can clear their debts with the money from the added land value capturing. Special land use plan with a project competition

### Adjustment Proposal

- Adjustments of zoning plan and building and zoning ordinance (BZO):*
- W2.4 to W2.8 which allows 7 storeys
  - Extension of OeB for the buildings of communal interest,
  - Formulation of the public special land use plan with an integrated project competition:
    - a. Number of apartments
    - b. Size of apartments, densities
    - c. Quota for affordable housing (e.g. 50%)
    - d. Connection of the green landscape in the North and South (integration of the Fjord concept) with a parc like landscape
    - e. Inclusion of landscape typical elements like single trees.

### Costs

- Partial revision of BZO (Wetzikon 2023)      240'000 CHF
- Outdoor design (Kanton Zurich 2011)      500'000 CHF

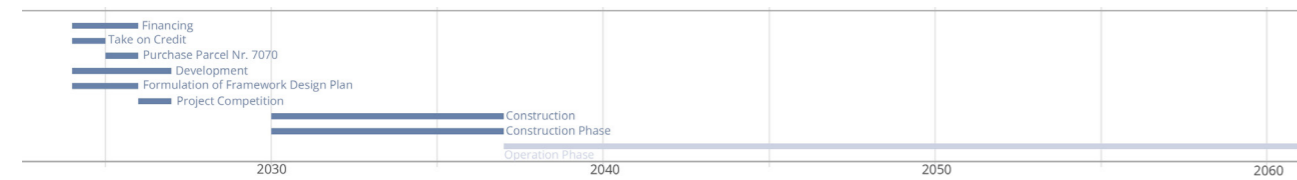
### Added Land Value Capturing (App. A11)

- One- time Revenue:      24'000'000 CHF
- Annual Revenue:      1'300'000CHF



<b>Living Area 2023 [m<sup>2</sup>]</b>	704
<b>Living Area 2060 [m<sup>2</sup>]</b>	18'198
<b>Total Commercial Area [m<sup>2</sup>]</b>	0
<b>People 2023</b>	16
<b>People 2060</b>	404

**Time Horizon**



**Risks**

- Uncertainties if municipality has enough money (from the added land value capturing) to purchase (and develop) the parcel
- Private property owner is willing to sell.

**Feasibility**

Requirements:

- Parcel owner is willing to sell the parcel to the municipality
- Municipality has enough money to buy the parcel

**Reference**

- Siedlung Buchegg 1 + 2 (Waidberg 2023)
- GWL-Terrain Amsterdam (KCAP 1998)



Fig. 4.3.14B: GWL-terrain a carfree residential area in Amsterdam (KCAP 1998)



Fig. 4.3.14C: Residential area Buchegg in Zurich (Wirz 2019)

## 4.3.15 Overview Design Proposal

### **Findings Mobility**

The adjustments of the 856 and 855 bus routes have made public transport travel much more attractive. Together with the adaptation of the active transport and private cars, this should create the conditions for a change in the modal split. At the same time, the quality of stay for pedestrians has been improved with the introduction of pedestrian gates, the tempo 30 and the multi-purpose strip. This reduction and calming of the traffic offers great qualities for the public and living areas in Kempten. Not only are they less affected by noise emission and pollution but create a much safer environment.

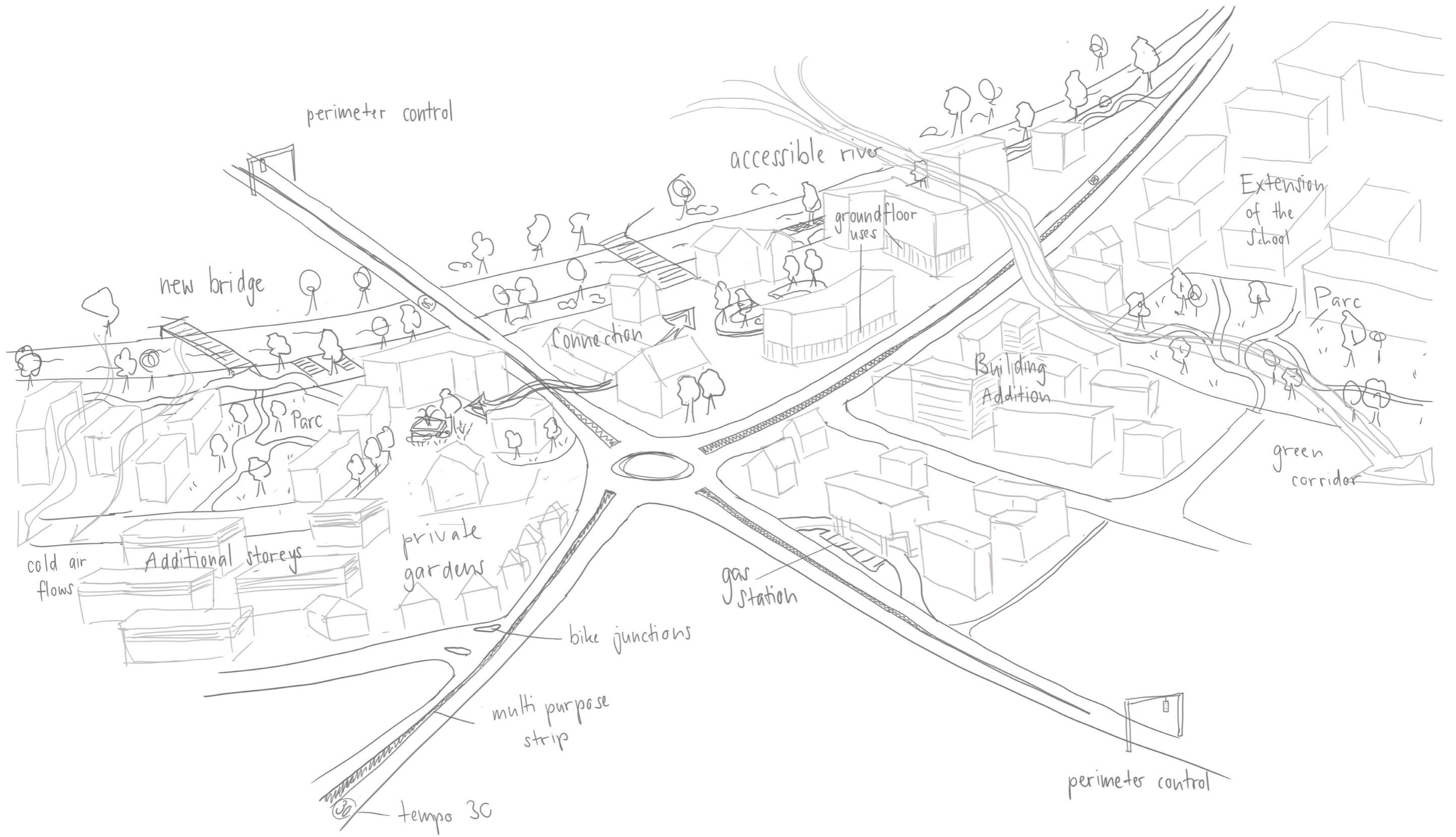
### **Findings Green Space**

Based on the enhanced access to the Chämtnerbach, the population of Kempten and whole Wetzikon benefits from a new high quality recreation area. The proposed building alignment provides the entire neighbourhood with cold air flows. Besides the public green spaces in the new centre of Kempten as well as in Römerfel Ost, also biodiversity areas are defined along the Chämtnerbach. The green space proposal pays tribute to the fjord concept.

### **Findings Urban Design Proposal**

The urban design proposal is a combination of an adaptation of the current building stock as well as transformation of today's underused areas and redevelopment. One of the main goals was to create additional living space for more than 1'400 people (chapter 4.1) while increasing the quality of staying. In the year 2023 the six different neighbourhoods offered 19'830m<sup>2</sup> living space for a total of 440 people. The proposed urban design proposal offers additional living space of 45'317m<sup>2</sup>. With the assumed floor consumption of 45m<sup>2</sup> per person a total of 1'563 people would be able to live in Kempten by 2060. To assure this growth, the Römerfeld Ost development was decided on. Its development is inconsistent with the assumptions of the strategy. The perimeter analysis showed that however it is more beneficial regarding the challenges.

The urban design proposal also includes the creation of two central plazas. They act as the new beating heart of Kempten by not only connecting the West and East of Pfäffikerstrasse but to be home to attractors as shops and businesses. The commercial area by 2023 of 3'150m<sup>2</sup> will be extended to 4'446m<sup>2</sup>.



# Kempten tomorrow

# 4.4 INTERVENTION PLAN

## Monetary Movement

Investment costs and maintenance and operation costs are calculated for all interventions, with an estimate of revenue made for housing interventions. A discount rate of 2% is applied to all costs and a range of 40% is considered for uncertainty. Detailed listings of all positions can be found in Appendix A10 while the discounted costs and revenues are shown in Fig. 4.4.A. The construction in Römerfeld Ost, commencing in 2030, will result in the highest expenditures. The highest annual cost stem from the operation of the bus system at 3.2 million CHF. From 2036 onwards, revenue generation will start. The total investment cost, discounted, amounts to 217.0 million CHF (130.2 million CHF, 303.8 million CHF). Discounted maintenance and operation costs add up to 72.6 million CHF (43.6 million CHF, 101.6 million CHF). However, discounted revenue amounts to -59.3 million CHF. CHF (-35.6 million CHF, -83.0 million CHF), resulting in a total monetary flow of 230.3 million CHF (138.2 million CHF, 322.4 million CHF).

## Interactions between interventions

A timeline aggregated of the time horizons of all interventions (chapters 4.3.1-4.3.14) is listed in appendix A10. The most crucial areas are Kempten Zentrum and Römerfeld Ost. To enable open social spaces, Kempten Zentrum is dependant on the participation of all land owners. The creation of those spaces is not only essential to the cohesion of the entire area but also to the pedestrian connections throughout Kempten. By creating two pla-

zas, the separation effect of Pfäffikerstrasse is strongly reduced as well as generating an attractive meeting space.

Financially, Römerfeld Ost generates the most revenue for Wetzikon. The discounted break-even point is reached after 24 years. If Wetzikon decides to sell a share of the apartments, this point could be reached earlier. However, this is not recommended in order to keep control of the rents. Green spaces in Römerfeld Ost play a vital part in the quality of stay for residents and the connection of nature corridors.

Kemptnerbach and the Buche Quartier are decisive in reaching the required density to house all future citizens of Kempten. If either of these areas does not get developed, the required amount of residential area is not reached. Kemptnerbach acts as the fresh air ventilation of Kempten, allowing cold air streams to pass through. If it does not get developed, these air streams are blocked.

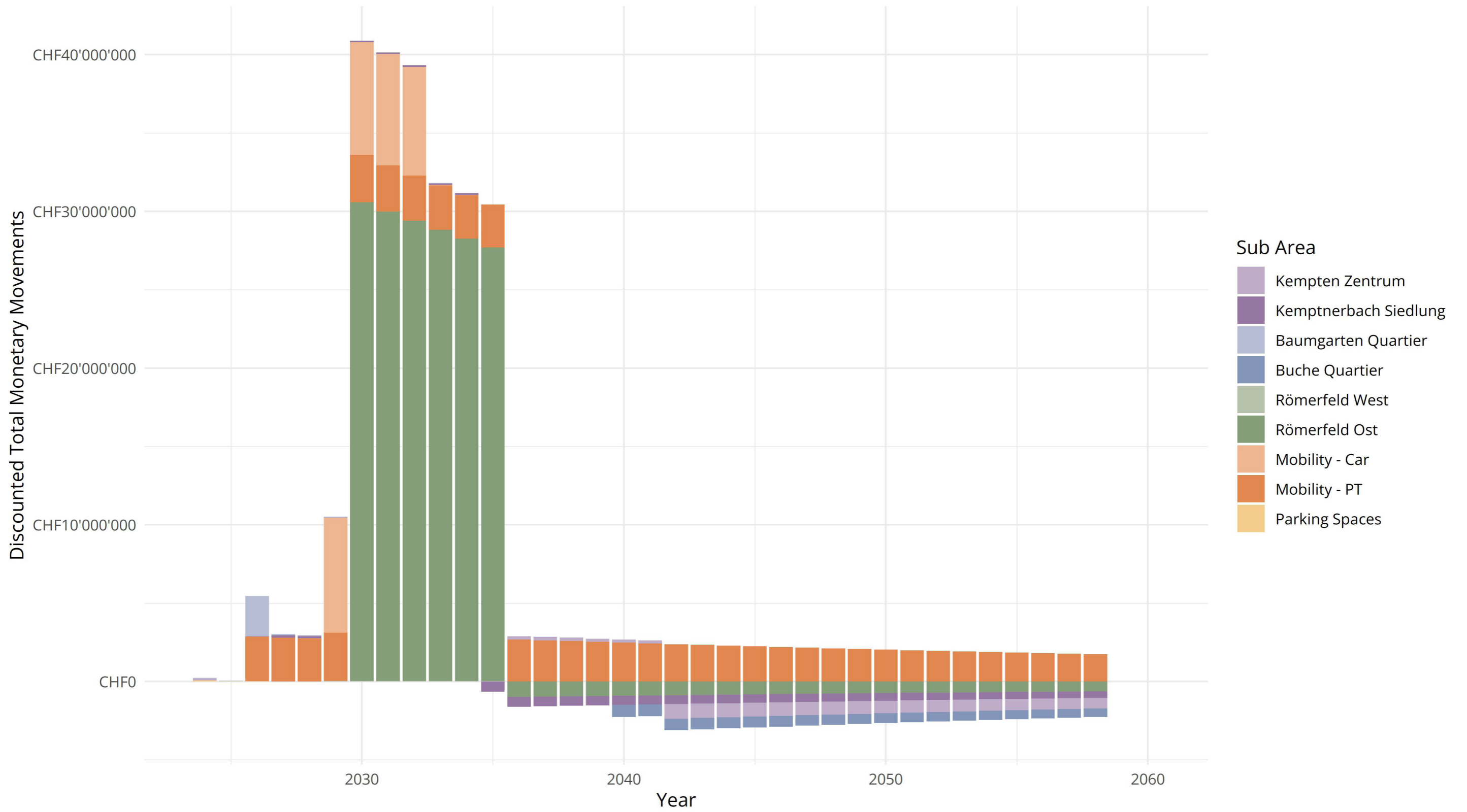


Fig. 4.4.A: Total discounted monetary movements

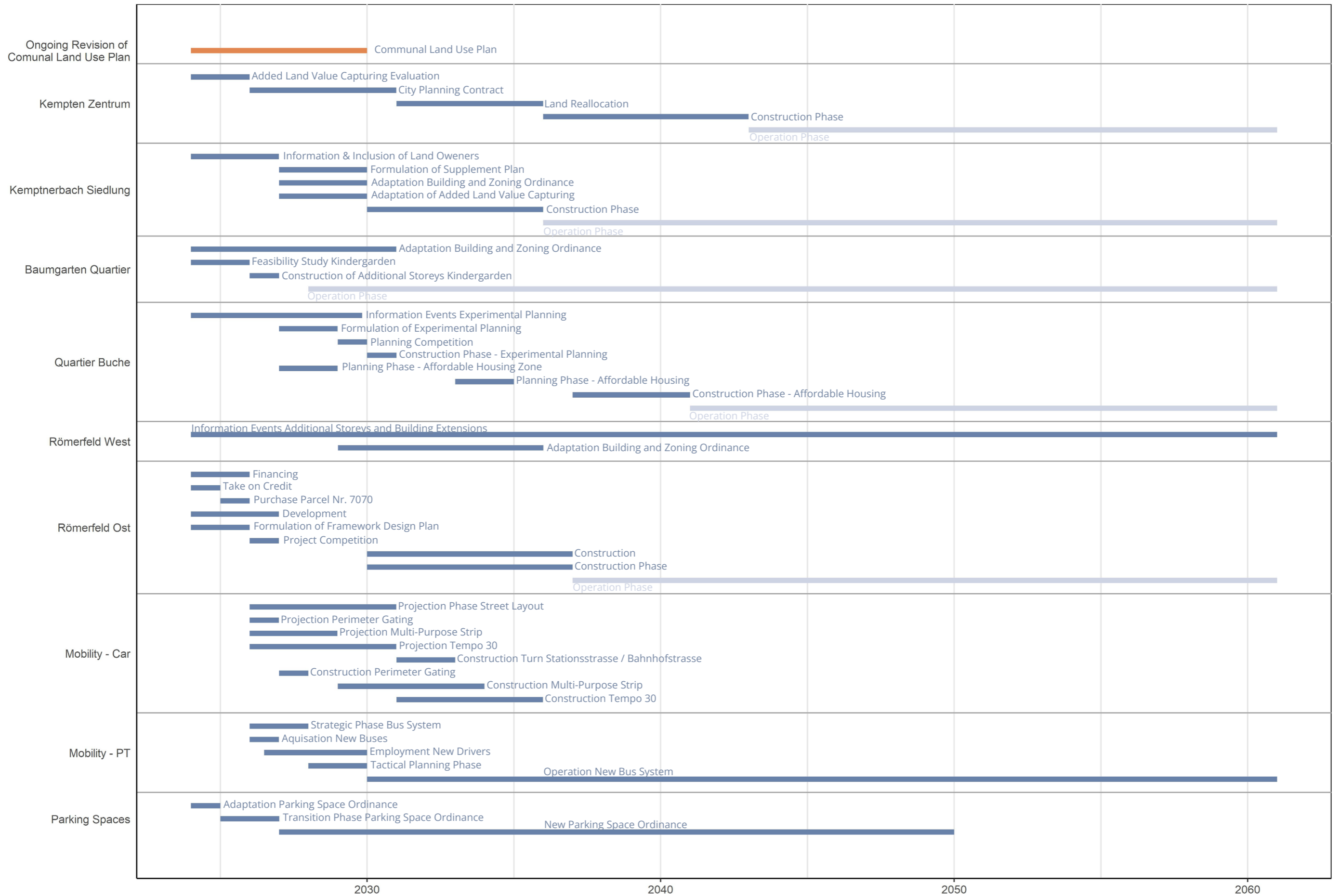


Fig. 4.4B: Timeline with interactions of interventions

5

RECOMMENDATIONS

In the first phase of the project, the multiple centre strategy was assessed as worth investigating for the decision makers of Wetzikon. If the strategy proves to be feasible, it could fulfil the requirements of inner city development by the federal government and the substantial growth of Wetzikon by the Canton of Zurich. Furthermore, the multiple centre

strategy would have the best prerequisites for overcoming the challenges facing Wetzikon in terms of the quality of life of residents, the climate and biodiversity.

The second phase focussed on the feasibility of the implementation of the multiple centre strategy. The centre of Kempten was identified as a crucial point of the strategy. Based on the six mentioned challenges, measures were developed to address them. These measures are adaptable to each of the multiple centres. For Kempten, a design proposal was developed to envision the implementation of the measures. The challenges were prioritised within the different neighbourhoods. Finally a detailed intervention plan was elaborated to realise the propositions raised by the design proposal.

It was shown that the redevelopment of Kempten addressing the different challenges is possible. This resolves a crucial point of the strategy and indicates towards the feasibility of the multiple centre strategy.

It is thus recommended to the decision makers of Wetzikon to assess the possibility of the redevelopment of the centre of Robenhau- sen, Ober- and Unterwetzikon with the same

measures and similar process as in Kempten. If the implementation is possible, the strategy can be validated as feasible. In this case, the multiple centre strategy is regarded as more beneficial compared to the current planning strategies of Wetzikon (mix of one centre and fill the gaps strategy).

Subsequently the change in the planning strategy of Wetzikon is recommended, demanding a revision of the spatial development concept. Intervention plans similar to the one developed for Kempten should be established for Ober-, Unterwetzikon and Robenhau- sen. The one proposed for Kempten should be revisited by official planners. Generally, the strategy demands the implementation of all four intervention plans. Depending on possible budgetary or legal constraints, the developments of the four centres could be prioritised differently and coordinated. However, to guarantee the beneficial conditions promised by the study, the development of all four centres is necessary.

During the period of the elaboration of this report, the inhabitants of Wetzikon voted against the tempo 30 zones in living areas. This partly indicates that the population is currently not willing to implement such bold ideas. The proposed interventions in the design proposal however demand exactly that: high shares of affordable housing, multi-purpose strip layouts, public spaces and new river layouts. To tackle the social, environmental and quality of stay challenges, it is proposed that Wetzikon should be brave. With the proposed adjustment proposals in chapter 4.3 Wetzikon sets an example for future oriented planning.



6

REFLECTION

## Limitations

The results from the development phase in chapter 3 are based on an abstraction of reality. Besides our six challenges, the following subjects were analysed in our situation analysis but weren't included in our development phase (the following list is not exhaustive):

- Economy
- Social services and education
- Cultural and social integration
- Health and healthcare access
- Inclusiveness measurements
- Nature topics beyond the settlement area

Based on the time constraints of the IPA, there was no opportunity to address all these challenges. Prioritisation had to be made and was often justified with the corresponding relevance of the topics, which is never completely objective.

For the analysed challenges, simplifications and assumptions were made. This was due to lacking data, complexity or time investment. But sometimes also simply due to the uncertainty of influences and tendencies that comes with long term plannings. This impacts the quality of the results.

Similarly, results obtained by simulations are to be taken cautiously. Models only process the provided data. If in this data assumptions and simplifications are made, they will be reflected in the results. Softwares like Aimsun and VISUM may be useful to gain an overview of the situation with the given data. To develop in-depth interventions for decision ma-

kers, considerably more work will need to be put into data preprocessing and modelling of the outcome of the interventions.

During the focus phase, only one area was developed. This is due to the specifications of the task. However, the identified strategy for Kempten proposes the creation of multiple centres as an optimal approach to deal with population growth. Further test plannings would be needed for Robenhausen, Unter- and Oberwetzikon, to assess the multiple centre strategy entirely.

## Shortcomings

This section addresses subjects which were neglected in the report. From the beginning, only the inhabitants of Wetzikon and the impact of the population growth on them was included in the analysis. The population around Wetzikon, which is dependent on Wetzikon as a regional centre, was neglected. Only mobility considers an extended perimeter.

It could also have been argued that the most important measure necessary, is the limitation of growth from the perspective of the municipality of Wetzikon. This would have resulted in a completely different planning.

Furthermore, place management was completely neglected. The development of strategies could lead to development in the commercial and industrial sectors. This could be achieved through active location marketing and concrete measures. Its implementation

in spatial planning could counteract the migration of existing companies. It is important to create a balance between jobs and housing.

Shortcomings occur as well in the intervention plan. It includes for example the objections only as risks: If ground owners or affected neighbours raise objections, this can delay plannings substantially. In this case the different projects might be late, not even finished by 2060 or even impossible to realise. Furthermore, the intervention plan is rather dense. If everything goes according to plan, a lot of construction sites will be happening at the same time. It might be more reasonable to stagger the interventions. But then the inhabitant growth goals would not be met in time.

Usually, inhabitants get involved in a test planning process. On the basis of participation in events like workshops or surveys, the inhabitants have the opportunity to contribute their opinions and needs. Within the framework of the IPA 2023, it was not possible to organise a comparable event. Instead we did observations and considered the statements from the experts of the information events and their feedback from the midterm presentation.

## Achievements

The main achievements of this report is the interdisciplinary growth strategy study adapted to Wetzikon's challenges and the complex design proposal that acts as proof of concept. They connect the objectives of landscape, infrastructure and transport planning as well as social needs. The intervention plan further enables a temporal localisation and shows the dependencies of the various interventions. It presents to the municipality a possible plan of action.

The particularity of this report is the study of population growth over all parts of Wetzikon. Furthermore the addressed population scenarios are very future oriented.



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8

APPENDIX

# A1 Social Space

## Definition of Social Space

Häussermann and Siebel defines social space as result of interaction between various social groups and milieus as well as their place-making (2004). These interactions are primarily happening in public spaces. Public space originates from the interplay of the physical structure of urban fabric with its social organisation (Bonenberg 2015).

The utility of the social space in relation to the urban design dimension can be measured by the vitality of such spaces (Lynch 1981). Montgomery defines urban vitality as the “numbers of people in and around the street (pedestrian flows) across different times of the day and night, the uptake of facilities, the number of cultural events and celebrations over the year, the presence of an active street life, and generally the extent to which a place feels alive or lively” (p. 97 1998).

## Social Space Analysis in Wetzikon

To analyse the vitality of Wetzikon’s social spaces Montgomery’s physical conditions for making a city serve as a basis (1998). These involve and further elaborate Jane Jacob’s conditions for urban vitality (1. a sufficient mix of primary uses, 2. Block size, 3. Degree of mixture between buildings of different characteristics and ages, 4. Concentration) (Jacobs, 1961).

## Observation Criterias

Each of the observation location was analysed based on the following characteristics criteria:

- Use/offers: diversity/mix of primary use
- Diversity of secondary use
- Opening hours
- Accessibility
- Furniture
- Block size
- Permeability
- 
- Adaptability
- Green space and water space
- Landmarks / details
- Architectural style:
- Traffic
- Safety/Security
- Night-time activities

The criteria of the observation for the social interaction were the following:

Type	Description
People	What kind of people? Pedestrian Flows / Speed Movement Patterns People Attractors
Activity	Type of Activity: How people are using the street Behaviour Vitality Events & Local Traditions
Sense	Noise Smell
Movement	Vehicle Flow

## Observation Information

We did two observations of each 30 minutes at three different public spaces in Wetzikon: Along the Bahnhofsstrasse, in front of Oberland Märt and at the Ochsenkreisel in Kempten. First we analysed the characteristics of each space based on the mentioned criterias. Afterwards we observed the social interactions in the public space.

## Observation Results

### *Bahnhofstrasse*

A lot of cars are using the Bahnhofstrasse to cross Wetzikon. They are quite fast and it is loud. It isn't pleasant to walk there due to mostly narrow sidewalk besides the busy road. There are nly a few places with benches. There are not many people. Most of them are only walking along the street and not crossing it. People are using the street mostly as a passage from their starting point to their final destination. No interaction between people on the street. It seems anonymous. The shops along the street aren't as busy. Most of them have extra parking spaces so their customers are coming by car instead of by food.

### *Oberland Märt*

The place in front of Oberland Märt consists of different benches and trees. People are actively using this space to meet each other, have a chat or rest on a bench. Diverse group of people are going there: families, especially with small children, lot of kinder wagons, elderly people but especially middle aged people. Large numbers of activities, especially on the weekend. doing groceries as an event: going with friends, having a cigarette in front of Oberland Märt. Something particular caught our attention: Only a few people were leaving Oberland Märt with groceries bags. As we entered the shopping centre a whole new world welcomed us compared to sitting outside. There were so many people, especially families, walking around, doing groceries or joining the pumpkin graving event at the entrance. The amount of people and the increase in vitality was enormous. Almost all of them must have come by car, because we were observing the main entrance of the shopping centre for almost half an hour by now and not as many people have passed by. Also a lot of people are going to the shopping centre to only eat lunch there. The others are using the shops or both.

### *Kempten Ochsenkreisel*

Enormous high volume of cars and noise. Even not in rushhour times: congestion. There are almost no pedestrians. People are only passing by but not using the place. Main attractor: Volg. Most of the people are using their car to do groceries and only a few go there by foot or bike. People which are there by bike are mostly using the pedestrian crossing to make their way around the Ochsenkreisel

## A2 Population Growth Scenario

The Population Growth is calculated based on the “Szenarien zur Bevölkerungsentwicklung der Schweiz und der Kantone - 2020–2050» by the BFS (2020). They predict the population growth displayed in table A : In the case of Wetzikon the reference scenario was adapted to the prediction of the agglomeration program (table A). It states that Wetzikon will get additional inhabitants of 6'500 people between 2018 until 2040 (Kanton Zürich 2022).

Tab. A2A: Population growth scenarios

	CH [%]	Canton of Zurich [%]	Annual Growth ZH [%]	Annual Growth Wetzikon [%]
High Scenario	31	41	0.85	1.25
Low Scenario	10	17	1.15	1.54
Reference Scenario	20	29	0.53	0.92

### Interpolation:

We interpolated the graphs according the Statistisches Amt of the Canton of Zurich in their report “Regionalisierte Bevölkerungsprognose für den Kanton Zürich» (2022) to receive a flattened and more realistic curve (Fig. 2.2.2C)

## A3 Challenge Mobility

### Methodology:

For all districts other than Wetzikon, the percentage in increase in population was taken from the projection by the canton of Zurich. For the districts in Wetzikon the number of people was aggregated by outcome based on the distribution within the individual parcels within each district defined in the GVM.

Derived from traffic perspectives 2050, the assumption is made that a 1% increase in population leads to a 0.5% increase in traffic volumes (ARE 2022). In accordance with the Agglomerationsprogramm 15% of this increase are assigned to car traffic. The remaining 85% are assigned to public transport. The finalisation of the Oberlandautobahn was considered in the street layout. The pkm were obtained by running a simulation per outcome in VISUM. To calculate the pkm the demand between an origin and destination pair was multiplied with the distance between these two districts. The difference between each outcome and 2018 was calculated and compared per growth scenario.

### Results:

Tab. A3A: Personkilometer (pkm) per outcome

Outcome	Absolute Number	Difference
Reference year 2018	48238500	-
One Centre - Low Growth	49252386	1013886
Multiple Centres - Low Growth	49250268	1011768
Fill the Gaps - Low Growth	49251171	1012671
One Centre - High Growth	49264547	1026047
Multiple Centres - High Growth	49264547	1026047
Fill the Gaps - High Growth	49265705	1027205

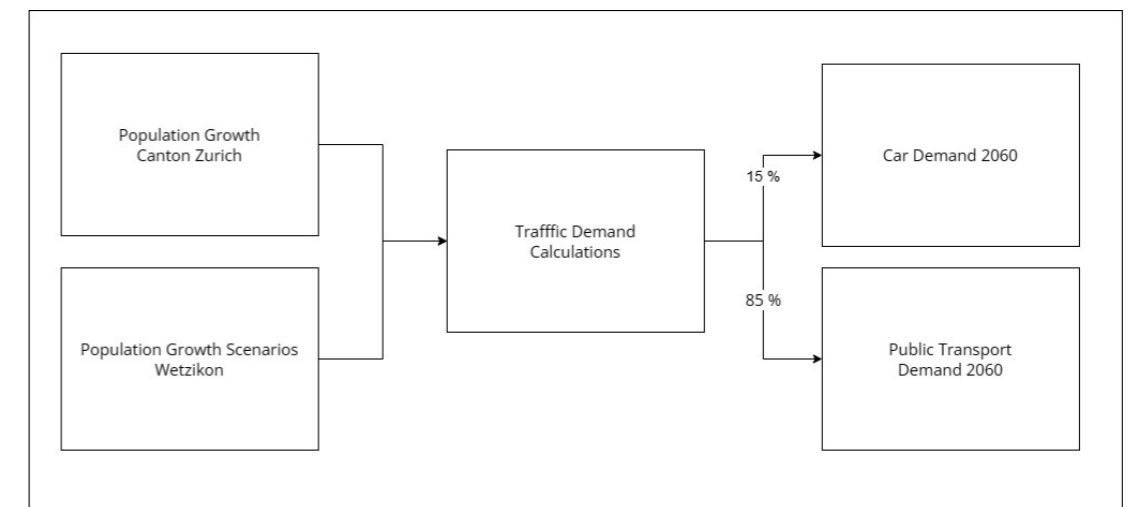
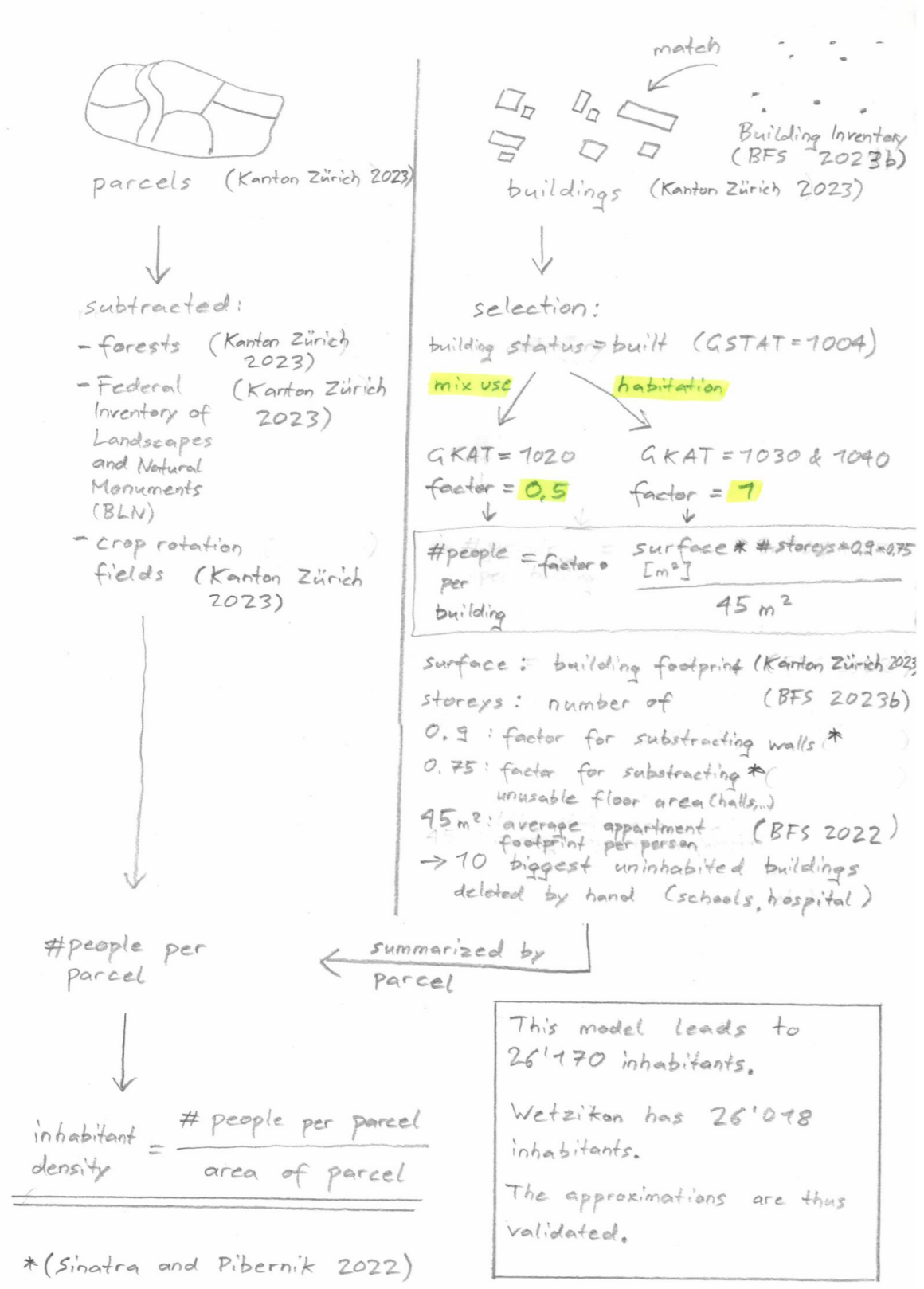


Fig. A3A: Demand estimation based on ARE 2022, Bundesamt für Raumentwicklung 2022



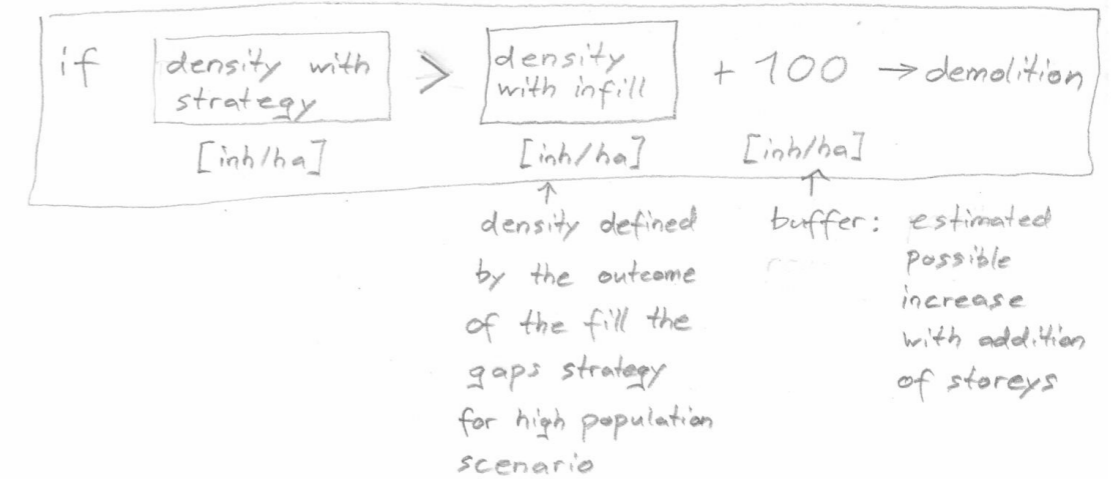
# A4 Population Density Definition

The following model was developed and used to calculate the inhabitant density of the parcels today:



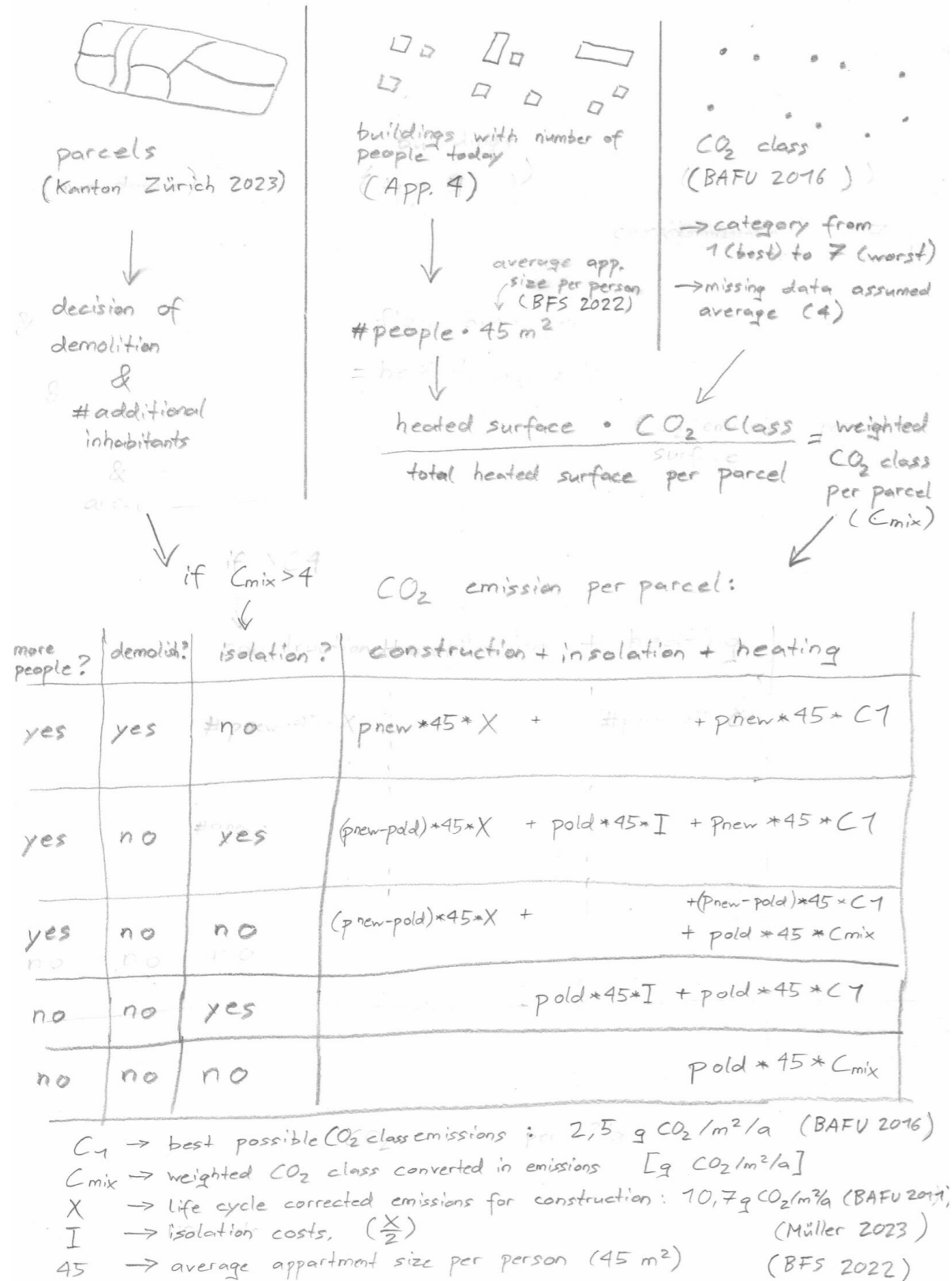
# A5 Demolition Model

The following model was used to determine if the buildings of a parcel are being demolished for reconstruction in the future:



# A6 Building Emission Model

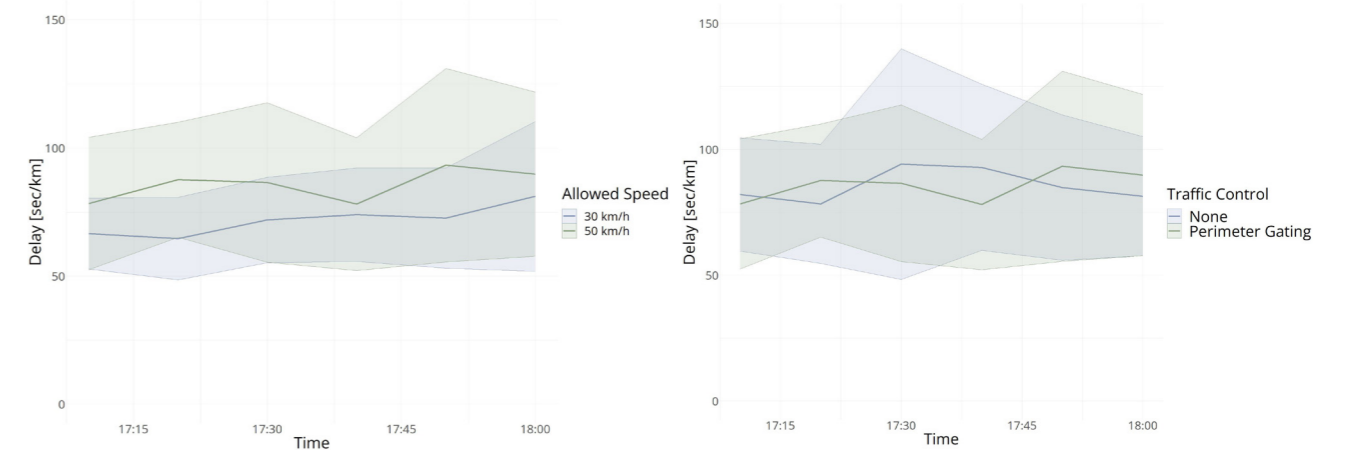
The following model was used to calculate the CO2 emissions of the building stock for each parcel:



# A7 Perimeter Gating

To test the impact of the proposed interventions on the street network, simulations were run in the microscopic traffic simulation software Aimsun. All simulations reflect the evening peak-hour between 17:00 and 18:00. First, a base simulation with 30 replications was run. The demand for the base simulation was derived from data for the evening peak hour provided in the GVM. Different vehicle types such as lorries and bicycles were added to the network. Demand data for all vehicle types were adjusted until all 30 simulations matched the visual perception during multiple visits. Since during the evening peak hour, flow and speed are not meaningful, the networkwide delay time in seconds per kilometre was chosen as a comparing metric.

In a first step, the speed was reduced from 50 km/h to 30 km/h to simulate the implementation of the new speed regime. Implementing this change reduced delay times from 85.6 sec/km to 71.8 sec/km.



In a second step the implementation of perimeter gating and the changed street layout were added to the changed speed regime. To implement the changed layout, bus stops were moved back onto the street. To simulate the implementation of perimeter gating, the arrival rate on links with traffic lights was set to constant. This implementation did not have any effect on the delay times.

In summary, the implementation of a speed reduction helps reducing the delay times substantially, while the implementation of perimeter control and the change in street layout have no effect. However, it has to be noted, that these simulations are based on data from 2018 and were calibrated based on visual perception. Simulations based on these assumptions may provide a first overview of the task at hand. If the interventions are to be implemented, more detailed studies are necessary.

## A8 Extension Line 856 and 855

### Line 856

To connect the future centres of Kempton, Robenhausen, and Unterwetzikon to the train stations of Wetzikon and Kempton, the current bus line 856 is extended via Kempton Station to Ochsenkreisel. On weekdays between 07:00 and 20:00, the service will be run with 8 buses per direction and hour. Outside these operating hours and on weekends the frequency is gradually reduced to six and then four vehicles per hour and direction. Due to the reduced headway by trains in direction of Zurich, the time table is aligned with the departures of S3 in Kempton in direction of Effretikon-Zurich. Buses will arrive before the train departs and return to pick up any passengers wanting to travel to Robenhausen. At Wetzikon Station, the bus will arrive before the departure of S14 in direction of Hinwil. A possible time table is depicted in Fig. A5A.

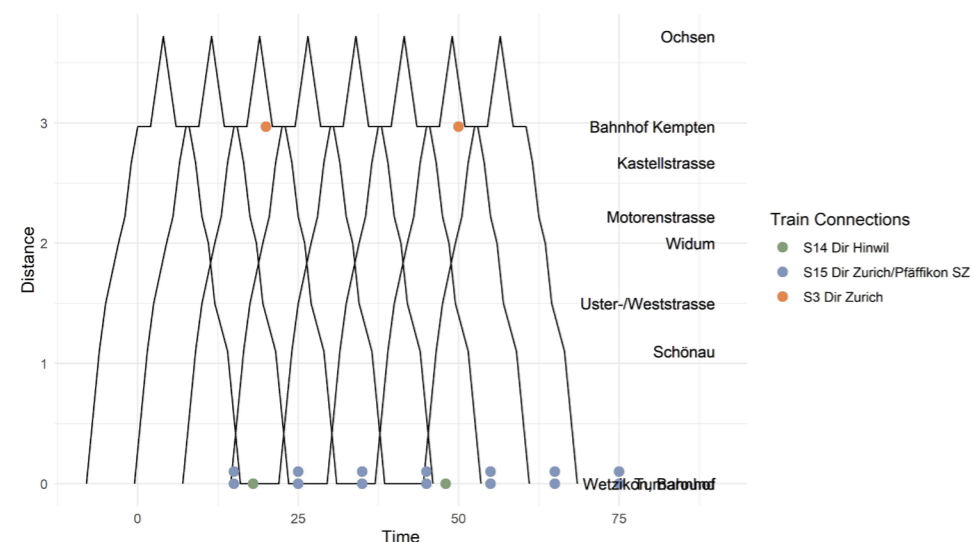


Fig. A8A: Proposed time table for extended line 856

At the Ochsenkreisel no turnaround time is scheduled due to the scarce available space. To make up for delays and to wait for passengers, buses instead wait two minutes every time they stop at Kempton Station. The turnaround time at Wetzikon Station is six minutes. The total cycle time is 30 minutes. Given the headway of 7.5 minutes, 4 vehicles are required. Assuming the acquisition of a new vehicle costs CHF 1'000'000 and the maintenance and operation costs CHF 400'000 per year, the total cost of the line are CHF 4'000'000 once plus CHF 1'600'000 annually.

### Line 855

To increase the mode share of public transport, a fast, frequent, and direct connection between the centres is needed. To serve this demand a new ring line 855 between Ober- and Unterwetzikon, Kempton and the hospital is introduced in a similar way to the current lines 852 and 853. One branch is set up in a counterclockwise rotation, the other is counter clockwise. The line layout is depicted in Fig. Steckbrief L855 Liniennetzplan. The frequency and operating hours are the same as line 856. Due to the high frequency of the vehicles and their purpose to serve local demand, they are not aligned with any train service. To account for delays, turnaround times are 6 minutes at Wetzikon station for both directions. The cycle times are 23 minutes for both directions. With the headway of 7.5 minutes, in total eight vehicles are required. Assuming the same need for acquisition and maintenance, the costs for the line are CHF 8'000'000 for the vehicles and CHF 3'200'000 annually for maintenance and operation.

## A9 Estimated increase in ridership

Using the elasticities for the travel time for cars and public transport from the microcensus, while assuming unchanged costs for both modes, an estimation for the change in public transport ridership within Wetzikon is made (Quelle: MZMV). The demands for car and public transport are taken from the GVM (Quelle: GVM).

The increase in travel time by car is the ratio between the travel time with reduced speeds and the travel time in the current speed regime. For public transport, the travel time is composed of the average waiting time and the in-vehicle time. The in-vehicle time is assumed to remain unchanged. The average waiting time is calculated by dividing the headway by two. Due to the increase in services, the average waiting time is substantially reduced, leading to a shorter travel time.

Under these premises, the implementation of both new lines shifts the share from 25.6% in 2018 to 36.3%. This calculation does not consider the impact of the enhanced connections to Zurich. Nonetheless, an enhancement in the service is expected to lead to an even bigger mode shift.

## A10 Costs

### Discounted Cost

Kempton Zentrum	CHF 1'478'934	
Kemptonerbach Siedlung	CHF 734'648	
Baumgarten Siedlung	CHF 2'787'521	
Quartier Buche	CHF 83'280	
Römerfeld West	CHF 336'613	
Römerfeld Ost	CHF 174'544'275	
Traffic - MIV	CHF 28'559'412	
Traffic - PT	CHF 8'389'983	
Parking Spaces	CHF 61'041	
<b>Total</b>	<b>CHF 216'975'706</b>	CHF 130'185'423 LB CHF 303'765'988 UB

Fig. A10A: Discounted cost per sub area with upper and lower bounds

### Discounted Operation & Maintenance Cost

Kempton Zentrum	CHF 346'148	
Kemptonerbach Siedlung	CHF 131'551	
Baumgarten Siedlung	CHF 0	
Quartier Buche	CHF 0	
Römerfeld West	CHF 0	
Römerfeld Ost	CHF 1'898'103	
Traffic - MIV	CHF 42'900	
Traffic - PT	CHF 70'170'425	
Parking Spaces	CHF 18'347	
<b>Total</b>	<b>CHF 72'589'128</b>	CHF 43'553'477 LB CHF 101'624'779 UB

Fig. A10B: Discounted operation and maintenance cost per sub area with upper and lower bounds

# A11 Added Land Value Capturing Calculations

The following calculation steps were applied to calculate the added land value capturing per parcel:

- ① Calculate Bruttogeschossfläche possible today:  

$$BGF_{old} = \frac{\text{Parcel size [m]} \cdot \text{Baumassenziffer [m]}}{3m}$$

↳ average height per storey
- ② Calculate BGF of future buildings (Design Proposal):  

$$BGF_{new} = \text{Building footprint [m}^2] \cdot (\# \text{ storeys} + 1)$$

↑  
cellar assumption
- ③ Calculate added land value (ALV):  

$$ALV = (BGF_{new} - BGF_{old}) \cdot 2000.-/m^2$$

↓  
value of additional BGF per m<sup>2</sup> (Kanton Basel-Stadt 2021)
- ④ Calculate added land value capturing (ALVC):  

$$(ALV - 100'000.-) \cdot \frac{40}{100} = ALVC$$

\* (Stadt Wetzikon 2015)

## Discounted Revenue

Kempton Zentrum	-CHF 13'998'628	
Kemptnerbach Siedlung	-CHF 12'675'525	
Baumgarten Siedlung	CHF 0	
Quartier Buche	-CHF 12'346'004	
Römerfeld West	CHF 0	
Römerfeld Ost	-CHF 20'269'033	
Traffic - MIV	CHF 0	
Traffic - PT	CHF 0	
Parking Spaces	CHF 0	
<b>Total</b>	<b>-CHF 59'289'190</b>	-CHF 35'573'514 LB -CHF 83'004'866 UB

Fig. A10C: Discounted revenue per sub area with upper and lower bounds

## Total Discounted Monetary Movement

Kempton Zentrum	-CHF 12'173'546	
Kemptnerbach Siedlung	-CHF 11'809'326	
Baumgarten Siedlung	CHF 2'787'521	
Quartier Buche	-CHF 12'262'724	
Römerfeld West	CHF 336'613	
Römerfeld Ost	CHF 156'173'345	
Traffic - MIV	CHF 28'602'312	
Traffic - PT	CHF 78'560'407	
Parking Spaces	CHF 79'388	
<b>Total</b>	<b>CHF 230'293'991</b>	CHF 138'176'394 LB CHF 322'411'587 UB

Fig. A10D: Total discounted monetary movements with upper and lower bounds



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### Eigenständigkeitserklärung

Die unterzeichnete Eigenständigkeitserklärung ist Bestandteil jeder während des Studiums verfassten Semester-, Bachelor- und Master-Arbeit oder anderen Abschlussarbeit (auch der jeweils elektronischen Version).

Die Dozentinnen und Dozenten können auch für andere bei ihnen verfasste schriftliche Arbeiten eine Eigenständigkeitserklärung verlangen.

Ich bestätige, die vorliegende Arbeit selbständig und in eigenen Worten verfasst zu haben. Davon ausgenommen sind sprachliche und inhaltliche Korrekturvorschläge durch die Betreuer und Betreuerinnen der Arbeit.

**Titel der Arbeit** (in Druckschrift):

Multiple Centres for Wetzikon - Redevelopment of Kempten as a Local City Centre

**Verfasst von** (in Druckschrift):

*Bei Gruppenarbeiten sind die Namen aller Verfasserinnen und Verfasser erforderlich.*

**Name(n):**

Bühler

Egger

Huser

Urech

**Vorname(n):**

Sarah

Christian

Andreas

Philip

Ich bestätige mit meiner Unterschrift:

- Ich habe keine im Merkblatt „Zitier-Knigge“ beschriebene Form des Plagiats begangen.
- Ich habe alle Methoden, Daten und Arbeitsabläufe wahrheitsgetreu dokumentiert.
- Ich habe keine Daten manipuliert.
- Ich habe alle Personen erwähnt, welche die Arbeit wesentlich unterstützt haben.

Ich nehme zur Kenntnis, dass die Arbeit mit elektronischen Hilfsmitteln auf Plagiate überprüft werden kann.

**Ort, Datum**

Zürich, 8. Dezember 2023

**Unterschrift(en)**

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