

MORE WITH LESS

TOWARDS AN AFFORDABLE MUNICH

April 2021

4407997

Delft University of Technology
Master of Architecture Urbanism and Building Sciences, Urbanism

CONTENT

PART I

Introduction

PART II

Theory

PART III

Analysis

PART IV

Design

PERSONAL RELEVANCE



SOCIETAL RELEVANCE

MEDIA



Mehr Eingriffe in den Markt

Warum der Staat die hohen Mieten bekämpfen sollte

Immobilienmärkte funktionieren anders als Lehrbuchmodelle. Eingriffe im Mietmarkt sind weniger schädlich, als oft behauptet. Gefragt ist ein intelligenter Mix der Instrumente, meint ein Ökonom im Gastbeitrag.

Von SEBASTIAN DULLIEN



28. Juni 2019, 7:39 Uhr · Soziale Ungleichheit

Immobilienboom spaltet Deutschland in Arm und Reich

- Seit mehreren Jahren steigen in Deutschland die Preise für Wohnungen und Häuser stark an.
- Wissenschaftler der Uni Bonn haben nun untersucht, wer von diesem Immobilienboom profitiert und wer nicht.
- Ein Ergebnis: Von steigenden Blauerbergpreisen profitieren vor allem die reichsten zehn Prozent, während Menschen mit geringen Einkommen von ihnen

Von Alexander Hagelüken

CIVIC SOCIETY



POLICY MAKERS



SCIENTIFIC RELEVANCE

GLOBAL

Globalisation, Financialisation, Commodification, Global Capital, Gentrification



SASSEN

EUROPEAN

Affordability, European Social Housing Systems, Welfare State

„Affordability deserves a place on Europe's political agenda, in particular when considering social inclusion and resilient cities. Policies for affordable housing cost money, but they also create added value even though this might be difficult to measure in financial terms.“
 (Haffner & Elsinga, 2015)



ELSINGA

GERMAN

Renewed Interest of Architects in affordable Housing in the tradition of Bauhaus and post-war modernists.



HAFFNER



SCHÖNIG



SCHULTZ-G. DREXLER

PROBLEM FIELD

Increasing Population

Decreasing Household Size

Increasing Use of Space

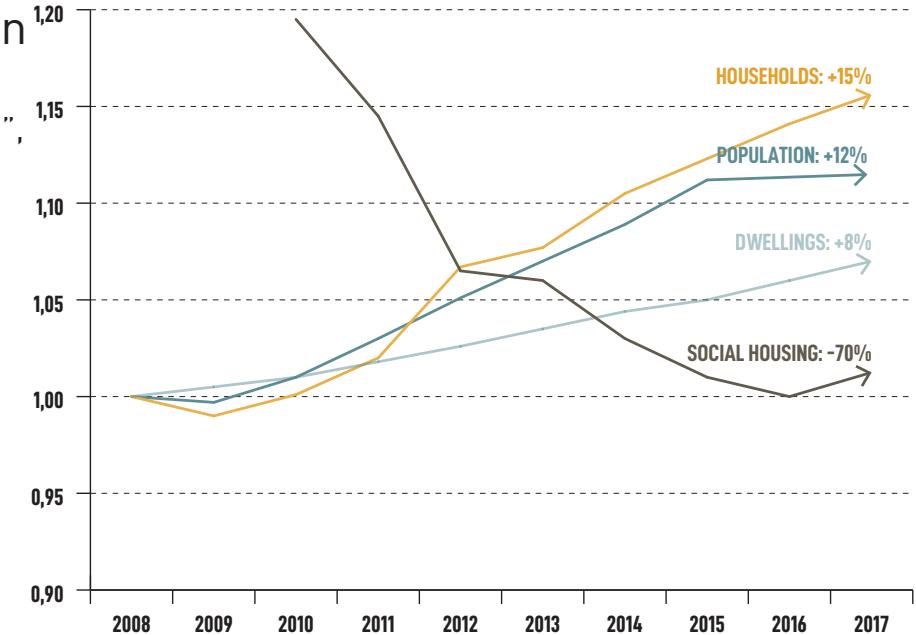
Rapidly Increasing Prices & Rents

Slowly Increasing Average Wages

Decreasing Spending Power

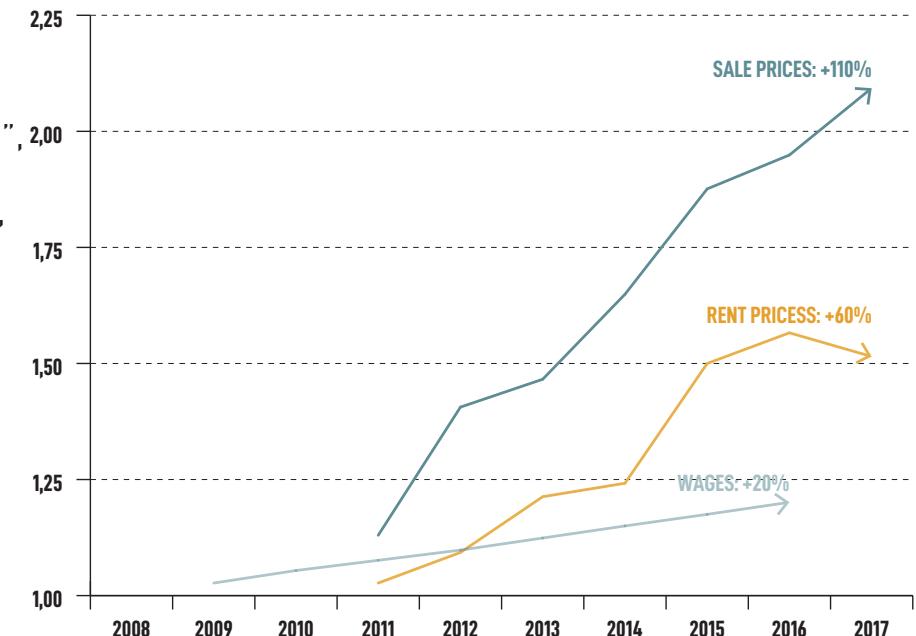
Households, Population & Dwellings

(Sources: "Wohnen in München VI", 2017)



Sale Prices, Rents, Wages

(Sources: "Wohnen in München VI", 2017; Preise und Löhne, Ein Kaufkraftvergleich rund um die Welt", 2016)



PROBLEM FIELD

Increasing Population

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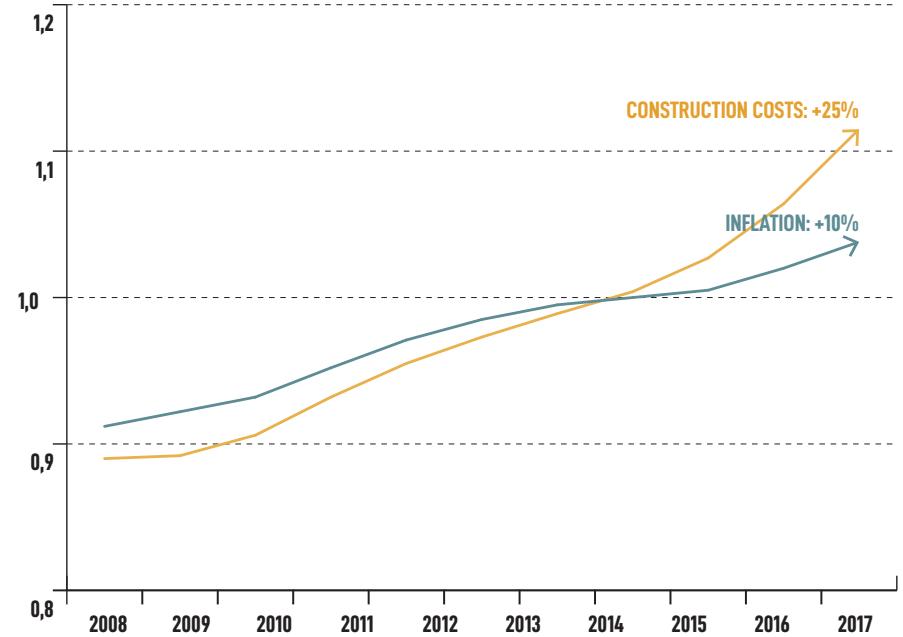
Decreasing Social Housing

No Vacancy

Increasing Construction Costs

Construction Costs, Inflation

(Sources: "VPI", 2018, "ARGE-Kostenindex", 2018)



Social Housing

(Sources: "Sozialwohnungsdatei", 2018)

PROBLEM FIELD

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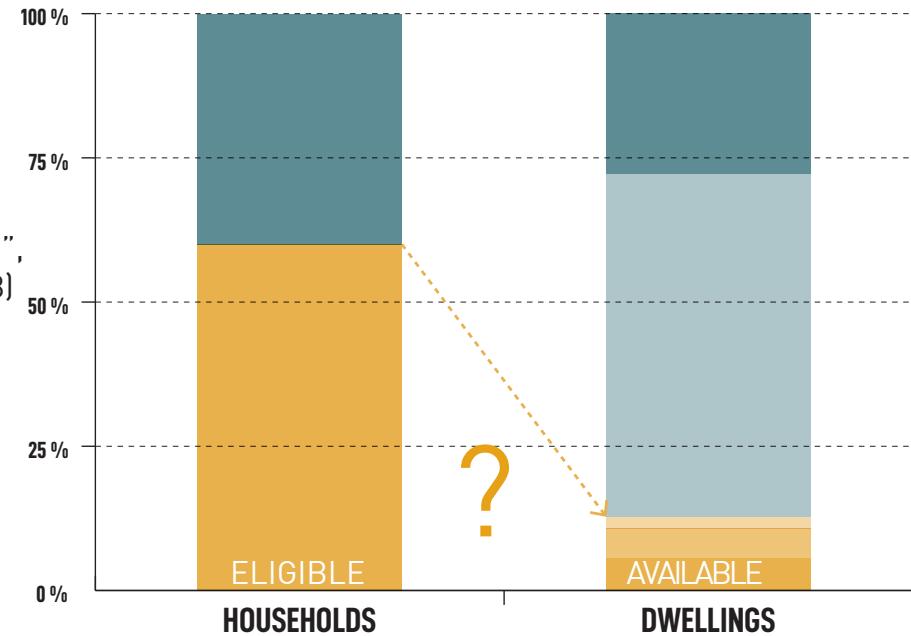
Increasing Construction Costs

Decreasing Social Housing Accessibility

Increasing Social Housing Shortage

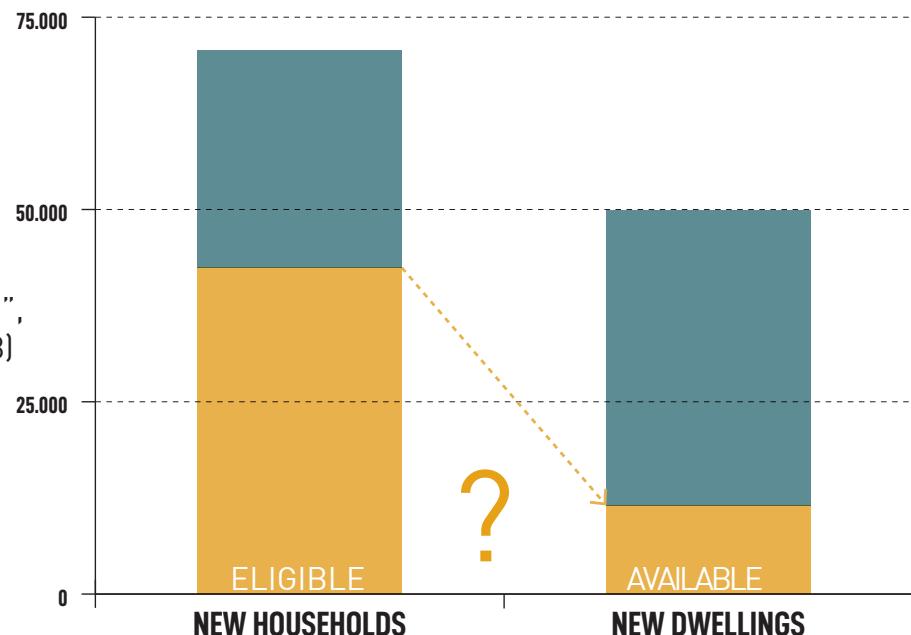
Eligible Household &
Available Social Hous-
ing
2020

(Sources: "Wohnen in München VI",
2017; "Sozialwohnungsdatei", 2018)



New Eligible House-
hold &
Available Social Hous-
ing
2030

(Sources: "Wohnen in München VI",
2017; "Sozialwohnungsdatei", 2018)



Increasing Population

Decreasing Household Size

Increasing Use of Space

Rapidly Increasing Prices & Rents

Increasing Construction Costs

Slowly Increasing Average Wages

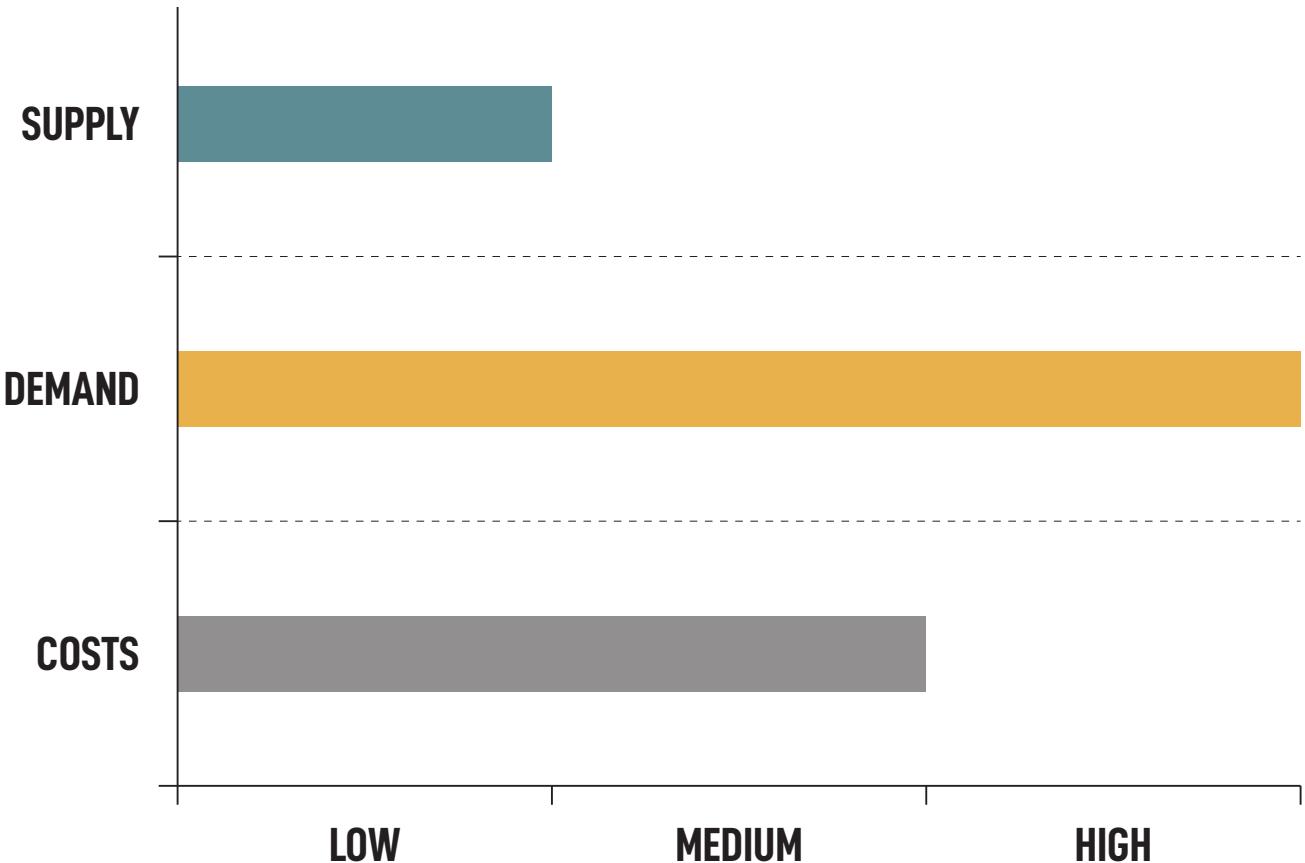
Decreasing Spending Power

Decreasing Social Housing

No Vacancy

Decreasing Social Housing
Accessibility

Increasing Social Housing Shortage



PROBLEM STATEMENTS

There is lack of affordable housing in Munich.

Decreasing spatial supply for housing in Munich.

Increasing spatial demand for housing in Munich.

Increasing costs of realising housing in Munich.

RESEARCH QUESTIONS

.....> How to accommodate more affordable housing in Munich with the means of urban design?

.....> How to increase spatial supply of affordable housing with the means of urban planning and design?

.....> How to decrease spatial demand for affordable housing with the means of urban and architectural design?

.....> How to decrease costs of realising affordable housing with the means of urban and architectural design and engineering?

.....> Investigate spatial and technological potentials for accommodating more affordable housing in Munich!

.....> Investigate spatial potentials to increase supply of affordable housing with the means of urban planning and design!

.....> Investigate spatial potentials to decrease demand for affordable housing with the means of urban and architectural design!

.....> Investigate potentials to decrease costs of realising affordable housing with the means of architectural design and engineering!

DISCIPLINES

TOPICS

RESEARCH AIMS

What are the boundaries of affiliated disciplines?

Which specialised knowledge is necessary for implementation?

What are the rules and conflicts of Implementation?

Management of the Built Environment

Regulation

Increasing Supply

Urbanism

Financing

Ownership

Architecture

Built Environment

Decreasing Demand

Building Technology

User Preferences

Decreasing Costs

Land

Construction

Planning

Profit



INTENDED OUTCOMES

STRATEGIES

Increasing Supply:

- Urban Expansion
- Urban Transformation
- Urban Densification

Decreasing Supply:

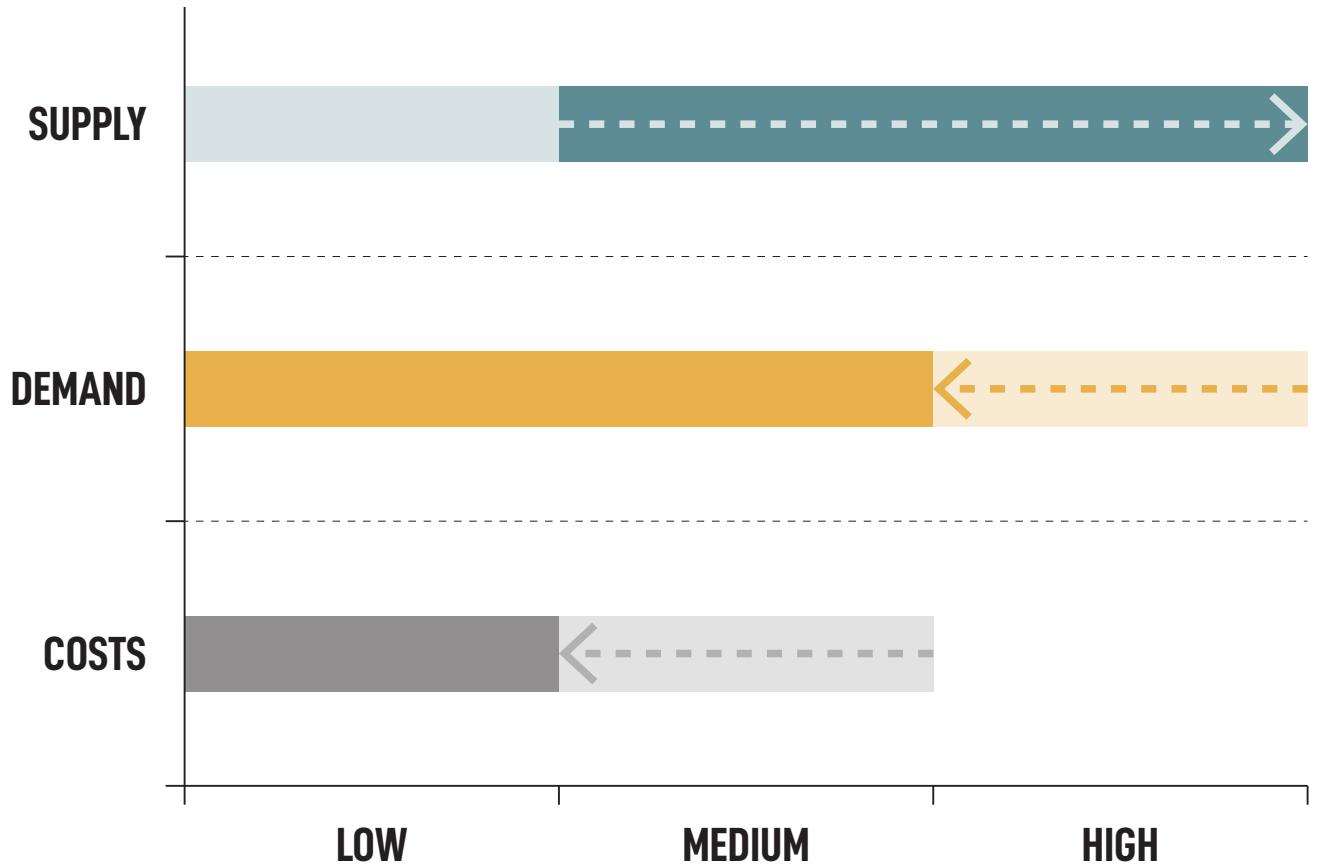
- Dwelling Minimalisation
- Externalisation / Sharing Facilities
- Optimisation of Space

...

Decreasing Costs:

- Simplification
- Standardisation
- Prefabrication
- DIY Fitout
- Decommodification / Non-Profit

...



SUPPLY

EXPANSION

Freiham (Hild und K)



DEMAND

MINIMALISATION

(nARCHITECTS)



DENSIFICATION

(Florian Krieger)



COSTS

PREFABRICATION

(Florain Nader)



DIY FITOUT

(beL Architekten)



EXTERNALISATION

(bogevitsch)

STANDARDISATION

(UNArchitekten)

SUPPLY

IMPLEMENTATION

What are the tensions when accomodating affordable housing through? And how to evaluate interventions?

INCREASING SUPPLY:

- Expansion
- Additional Ressources
- Mobility
- Natural, Agricultural Land

Transformation

- Mobility
- Pollution
- Liveability
- Gentrification

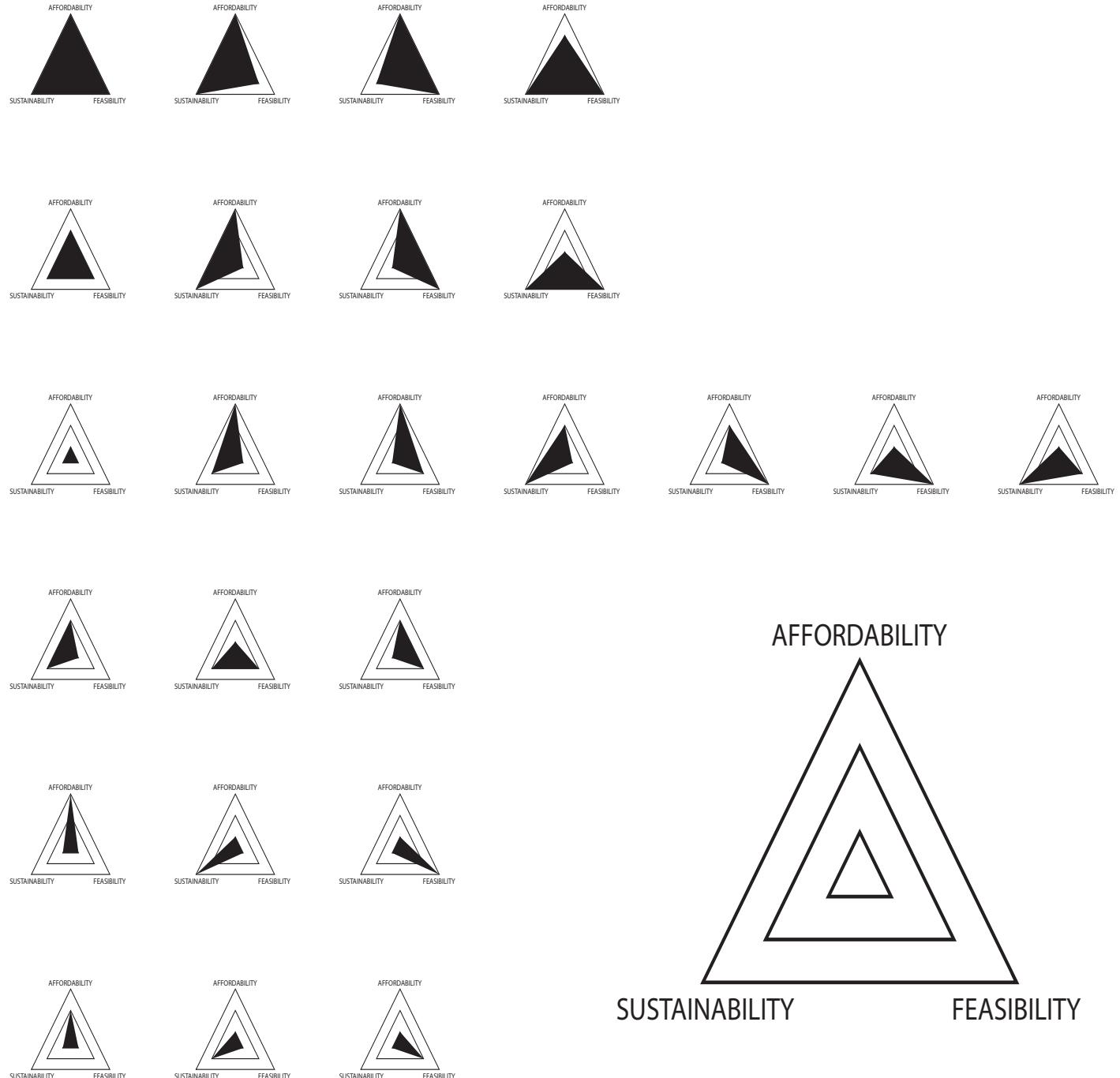
Densification

- Acceptance
- Liveability
- Microclimate
- Amenities
- Public Space

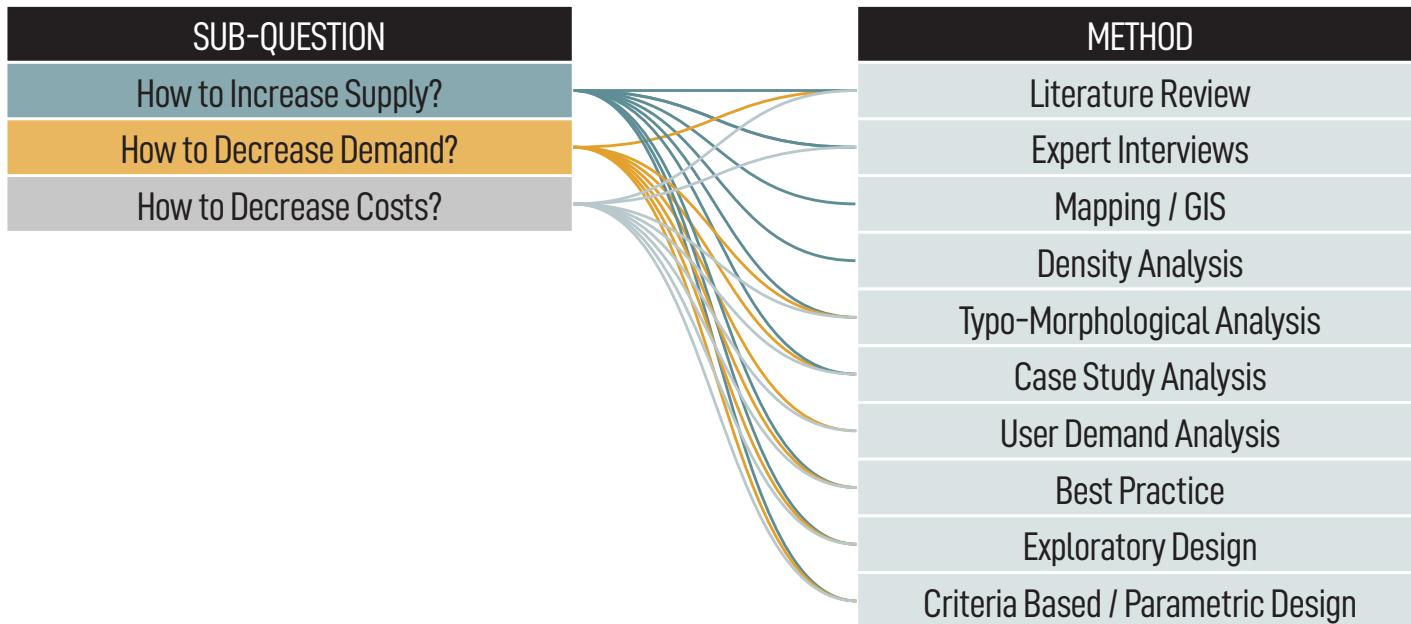
- Viability
- Gentrification

- DECREASING DEMAND:**
- Liveability
- Standard of Living
- Use of Space
- Acceptance, Preferences

- DECREASING COSTS:**
- Aesthetics
- Diversity
- Individuality



RESEARCH METHODS



PART II

Theory

THEORETICAL FRAMEWORK

What theoretical knowledge is necessary for implementing affordable housing in Munich?

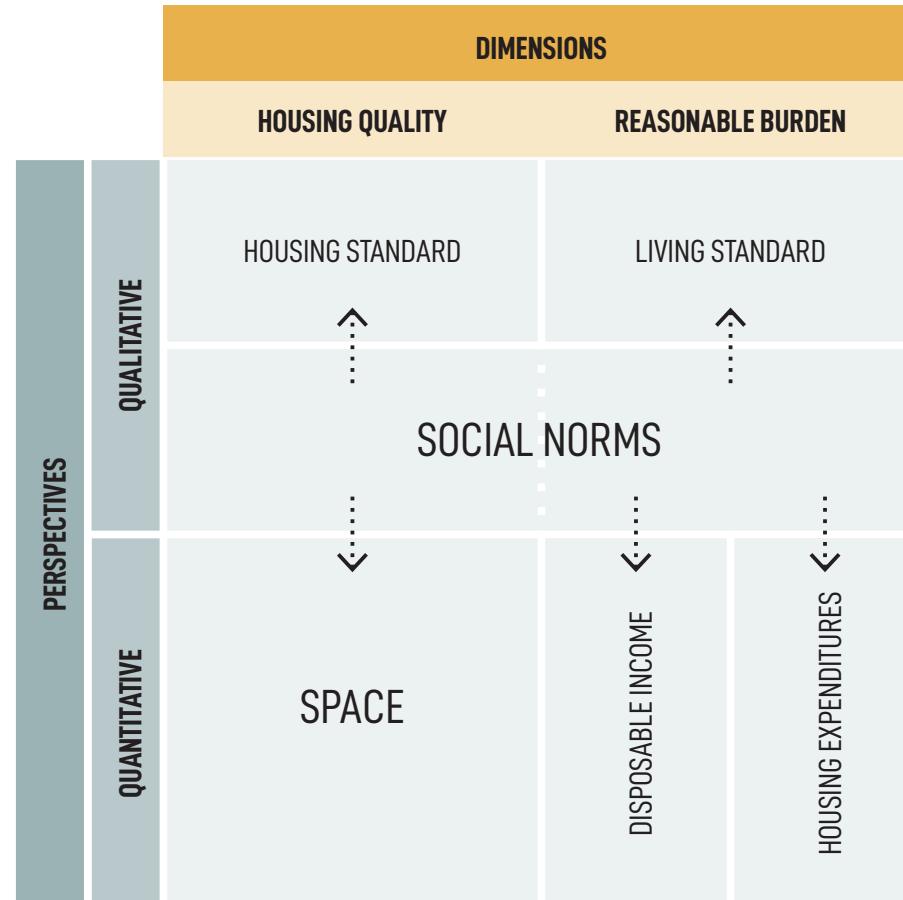
TOPICS	CONTENT	
	CONCEPT	DETAIL
AFFORDABILITY		Definition History Tools
HOUSING SYSTEMS		Theory Munich Case Studies
DENSIFICATION		...
INDUSTRIALISATION		...
HOUSING TYPOLOGIES		...
MINIMALISATION		...
USER DEMANDS		...

AFFORDABILITY Definition

What is considered affordable in Munich?

Can we define a common understanding of affordability?

Dimension of Affordability (Haffner & Elsinga, 2015)



AFFORDABILITY History



The timeline consists of five aerial photographs of urban landscapes, each representing a different historical period:

- Premodernism:** A dense, irregular pattern of buildings and streets typical of medieval towns.
- Classical Modernism:** A grid-based street plan with large, uniform building blocks.
- Post-war Modernism:** Large-scale residential complexes with extensive green spaces.
- Postmodernism:** A mix of architectural styles and building types, often with curved or irregular shapes.
- Present:** Suburban developments with single-family homes and extensive lawns.

	PREMODERNISM	CLASSICAL MODERNISM	POST-WAR MODERNISM	POSTMODERNISM	PRESENT
EVENTS	Industrial Revolution Land Enclosures	WW I The Great Depression	WW II	The Oil Crisis Fall of the Iron Curtain	The Global Financial Crisis
ECONOMIC PARADIGMS	Neoclassical	Neoclassical / Keynesian / Socialist	Keynesian / Social Market Economy / Ordoliberal	Neoclassical / Neoliberal / Monetarist	Neoliberal / Moneytarist / Neokeynesian / Circular, Common Wellbeing
HOUSING SYSTEMS	Market Economy	Cooperatives / State Social Housing	State Social Housing / Unitary Market / Object Based Subsidies	Market Economy Homeownership Promotion / Subject Based Subsidies	Homeownership Promotion / Object Based Subsidies Subject Based Subsidies
ACTORS	Church / Charities / Philanthropist	Municipal Housing Companies / Large Cooperatives	State Housing Companies	Private For-Profit Sector	Large Private Corporations / Municipal Housing Companies / Small Cooperatives
AUDIENCE	Working Class	War Refugees / Working Class / Nuclear Families	Broad Society / Nuclear Families	Upper Middle Classes / Nuclear Families	Marginalised Groups / Elderly
URBAN TYPLOGIES	Compact City / Perimeter Block	Garden City / Functionalist City / Superblocks	Functionalist City / Free-Flowing Space	Urban Reconstruction / New Urbanism / Superblocks / Single Family Neighbourhoods	Compact City / Open Block

AFFORDABILITY Policy

Munich Housing System

Long-Term City Development (LaSiE)

- Spatial potentials
- Expansion
- Transformation
- Densification

←5 years: 22.800 Dwellings

→5 years: 38.400 Dwellings

- Total: 61.200 Dwellings

+ Households (2030): 72.000

Social Land Use (SoBoN)

- 30% Social Housing

Object Subsidies

- Low-Income (EOF) - 30%, 20 years
- Middle-Income (Model Munich) - 20%, 40 years
- Price-Moderation (KMB) - 40%, 60 years
- Community Builders - 10%

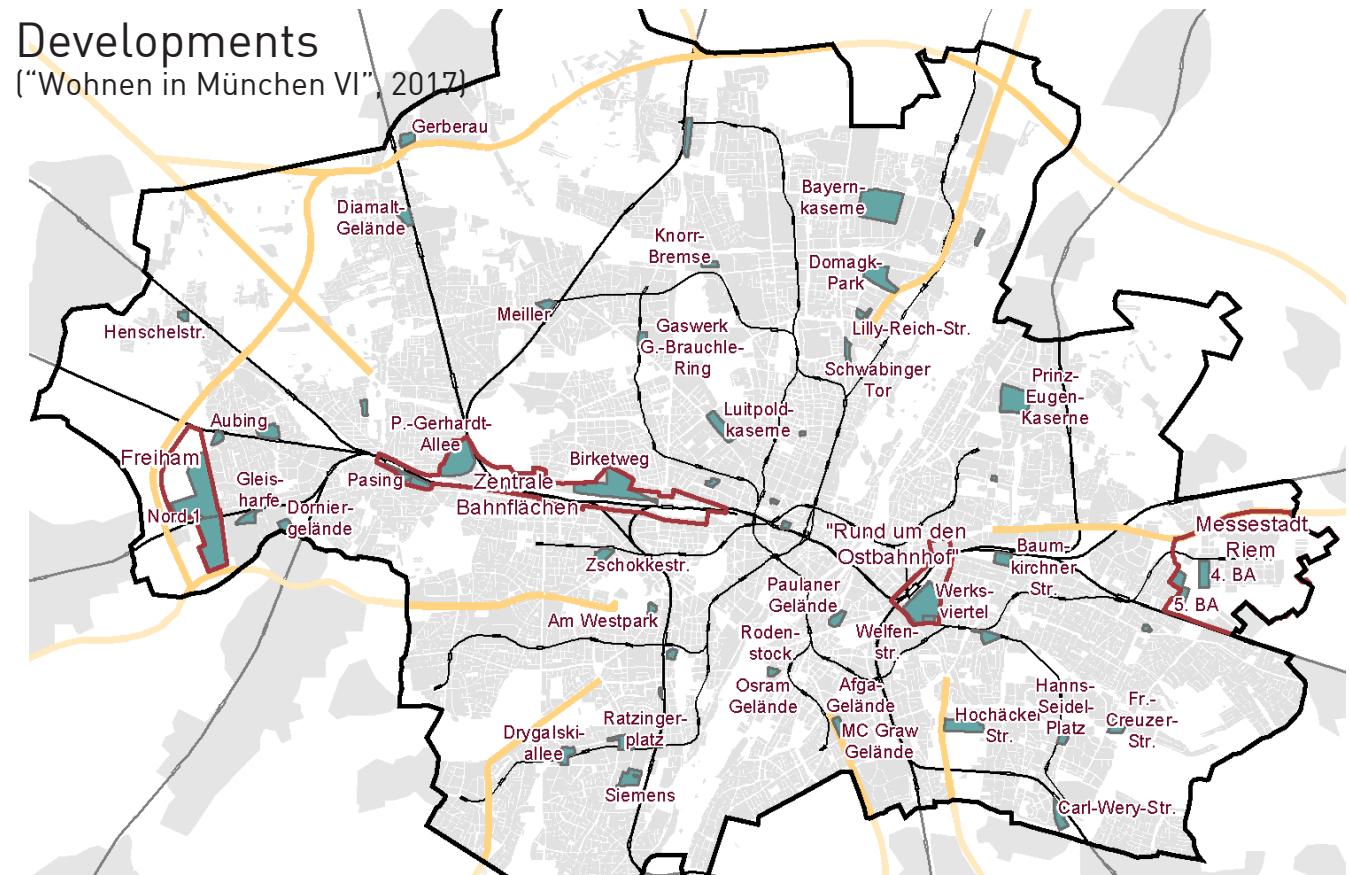
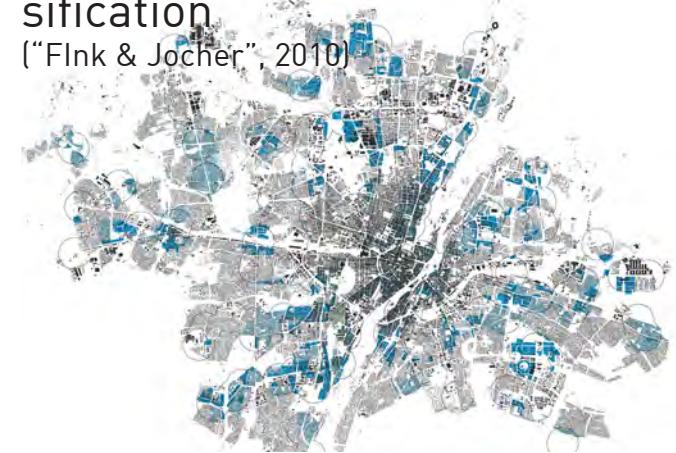
Milieu protection

- Against Gentrification
- Ban of Eviction and Luxury-Modernisation

More Land-Lease

HOUSING POLICIES		
PROMOTIONS		REGULATIONS
DIRECT	INDIRECT	Protection against Eviction
OBJECT SUBSIDIES	SUBJECT SUBSIDIES	Income Tax
Modernisations	Allowances	Rent Caps
Rental Apartments		Property Tax
		Wealth Tax
		Inheritance Tax
Homeownership		

LaSiE: "Qualified" Densification
("Flink & Jocher", 2010)



PART III

Analysis

GREENFIELDS, BROWNFIELDS

GREENFIELDS

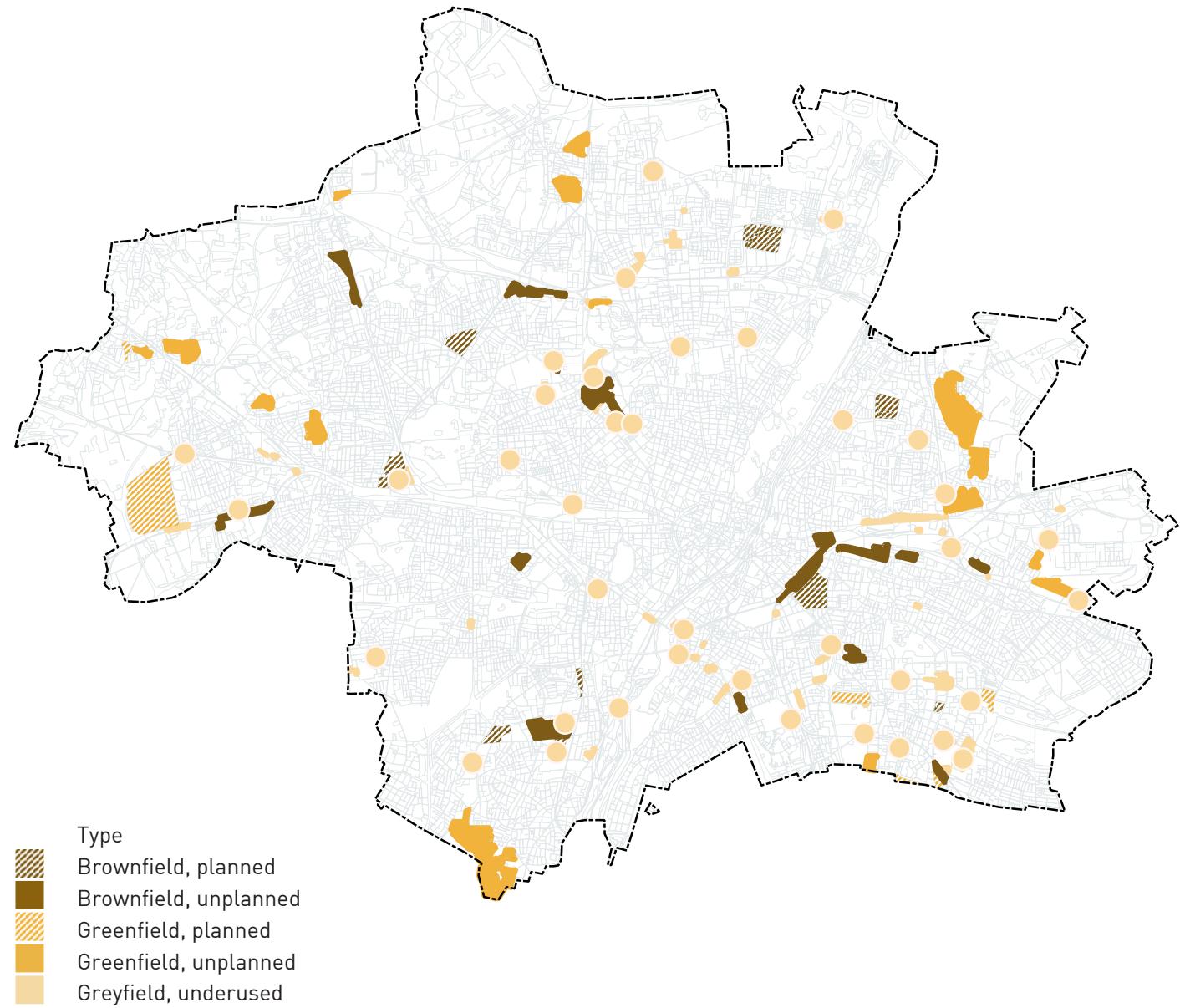
- Expansion on Converted Agricultural Land

BROWNFIELDS

- Former Industrial Sites
- Underused Railway Sites

GREYFIELDS

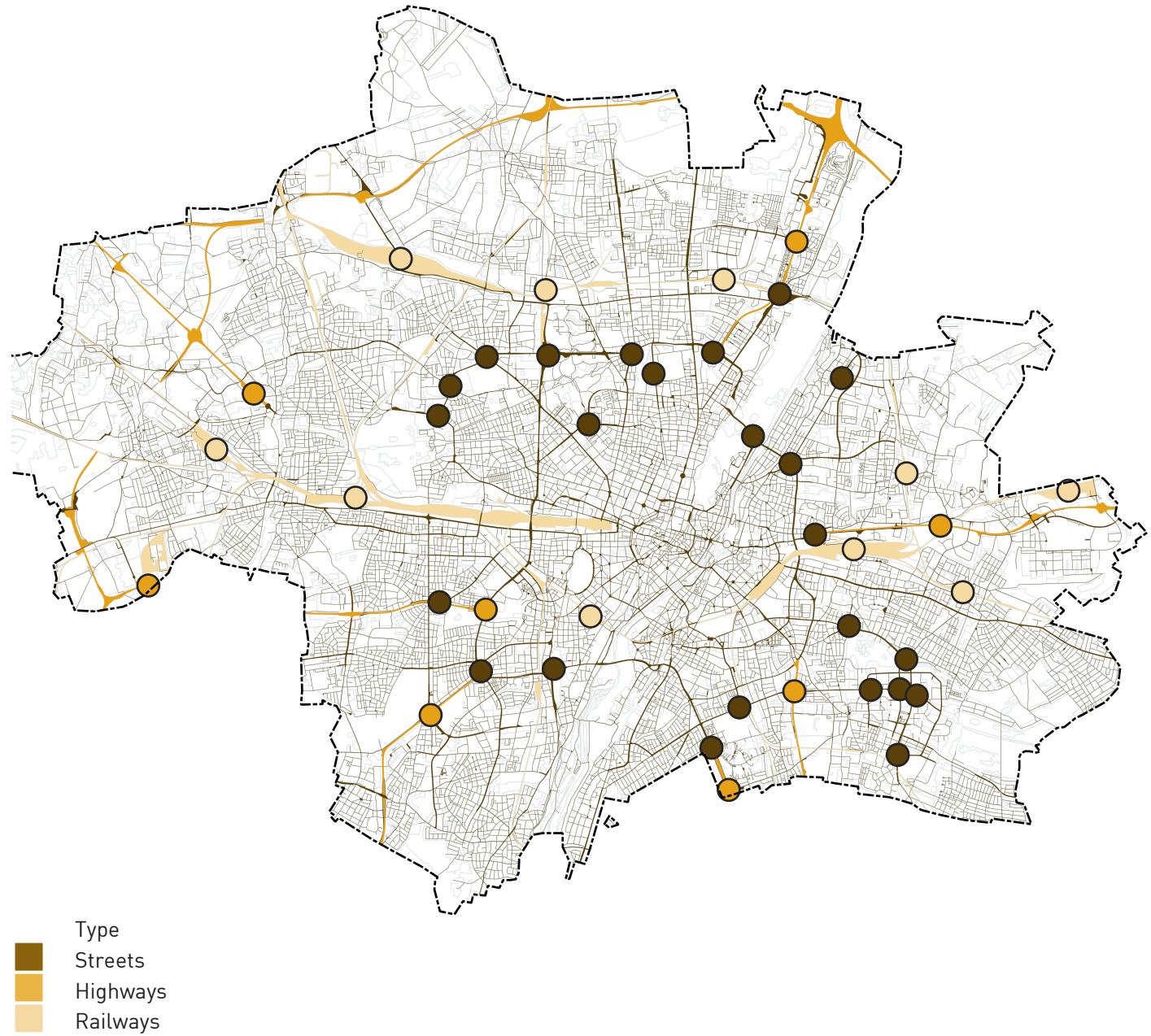
- Underused Commercial Sites



EXTENSIVE INFRASTRUCTURE

- OVERLY EXTENSIVE CAR INFRASTRUCTURE
 - UNDERUSED RAILWAY LAND
 - LARGE HIGHWAY ENTRIES AND CROSSINGS
- Affordable housing will be in competition for claiming space with other sectors and needs to provide potential prospects.

Can hostile living environments be utilised for affordable housing while becoming liveable?

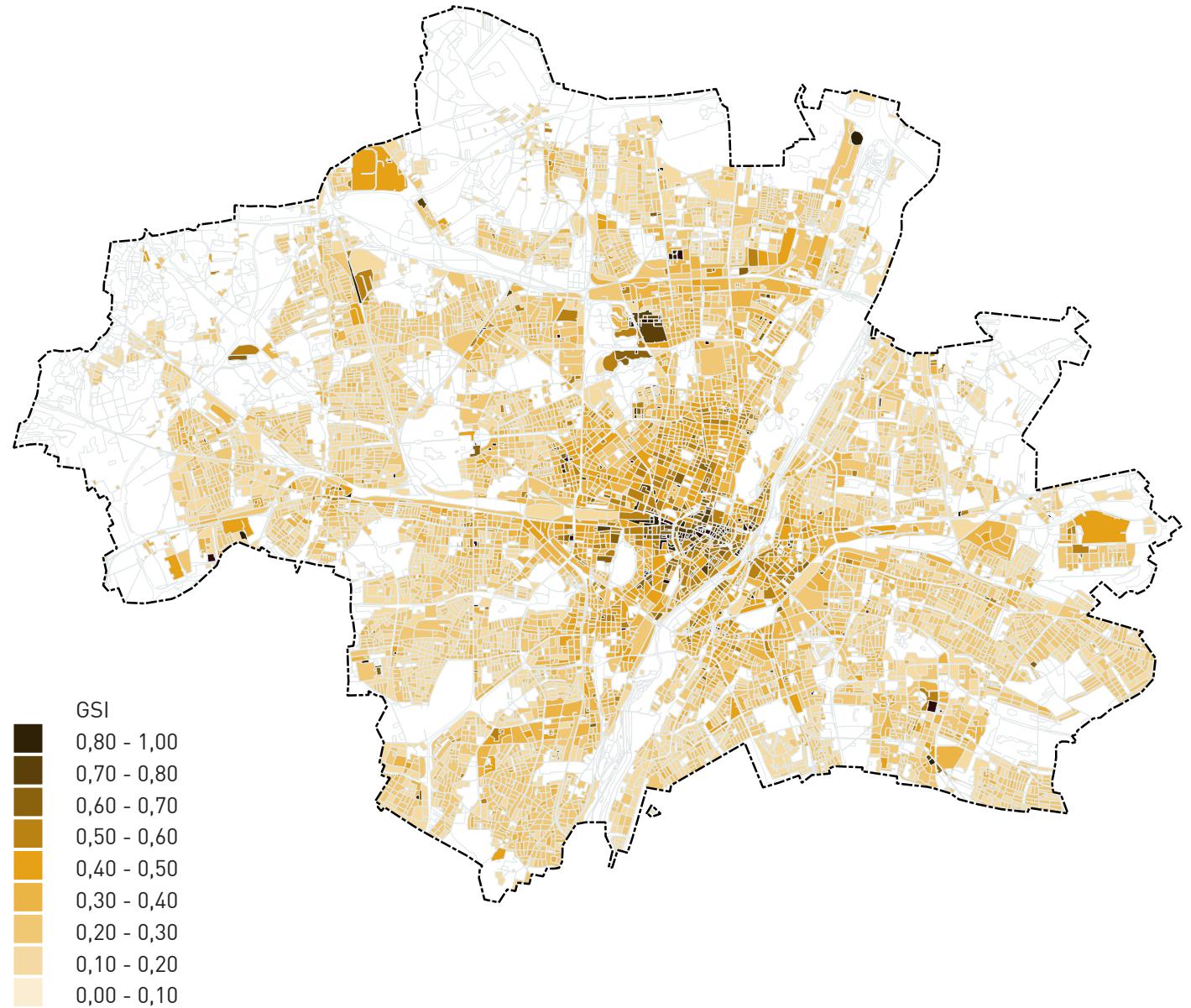


DENSITY

COVERAGE (GSI)

This map shows the ground coverage of buildings on their respective plots, in order to investigate spatial potentials for increasing housing supply. Notably dark areas are industrial areas due to the German building codes.

What is the appropriate measure of densifying specific urban environment?

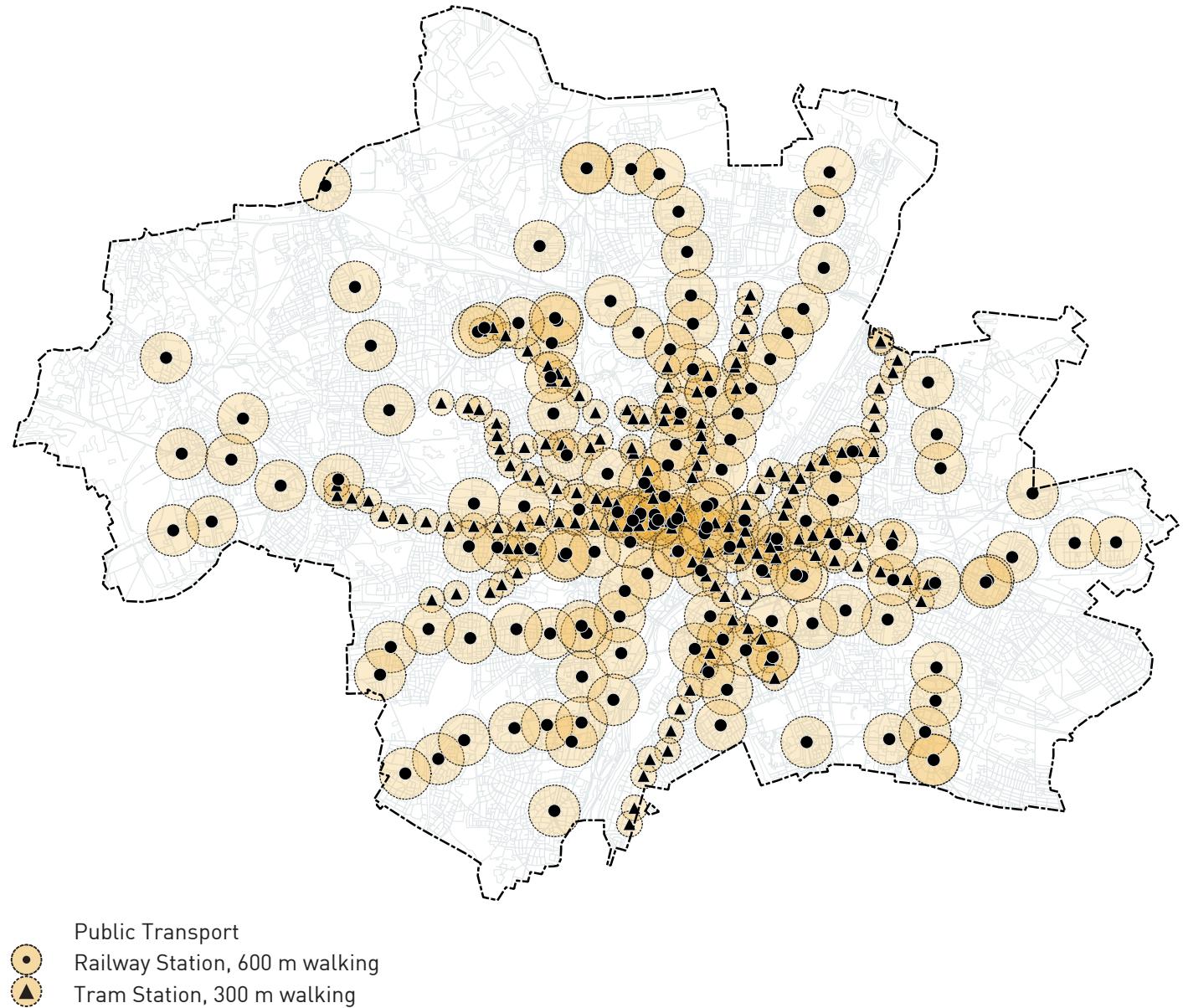


PUBLIC TRANSPORT

- RAIL
- TRAM

All subway, suburban railway and tram stations are shown in this map in order to estimate accessibility of potential sites.

Does the Public Transport Network offer capacities for additional residents?



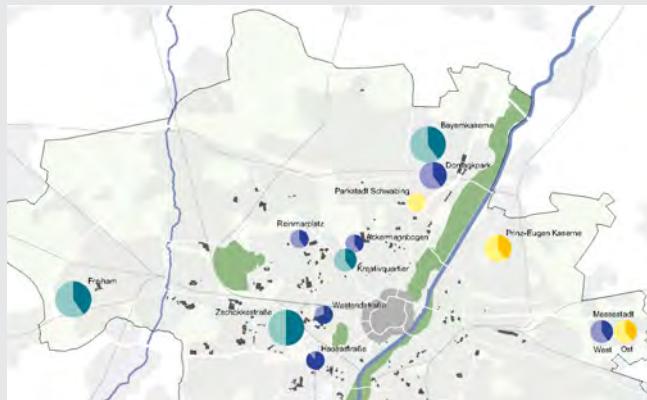
PUBLIC HOUSING

Public housing associations are still the largest landlords in the city of Munich and can offer potential competitive advantage in creating affordable housing in comparison to for-profit actors, due to their ownership of existing land and buildings within the city. This map shows the existing housing stock of the two municipal housing associations GEWOFAG and GWG.

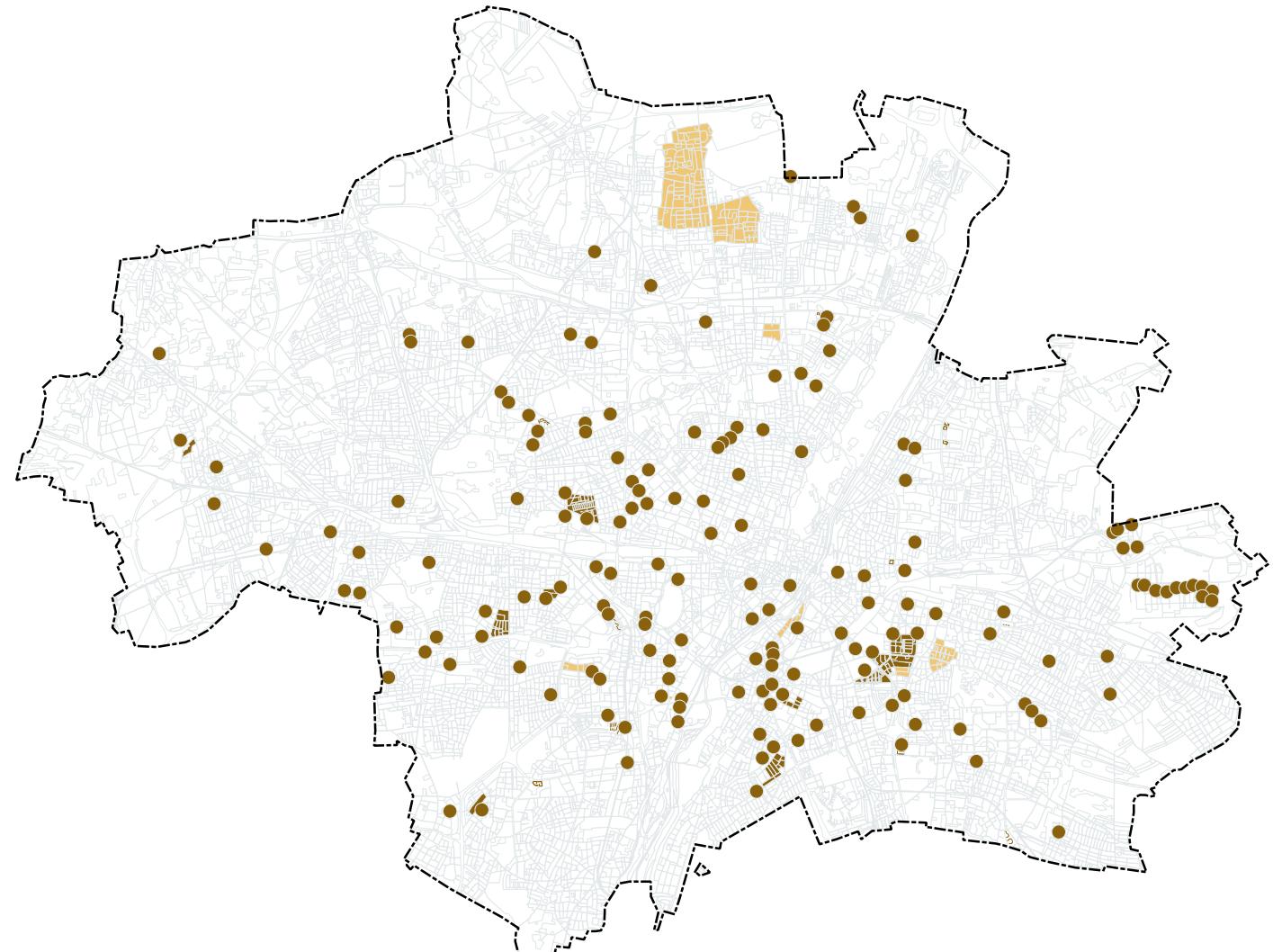
PUBLIC: 61.969 (7,73 %)
GEWOFAG: 34.134 (4,26 %)
GWG: 27.835 (3,47 %)

CORPORATE: 20.000+
VONOVIA: 9.708 (1,21 %)
DAWONIA ~9.000 (1,12 %)

COOPERATIVES: 2.937 (0,37 %)



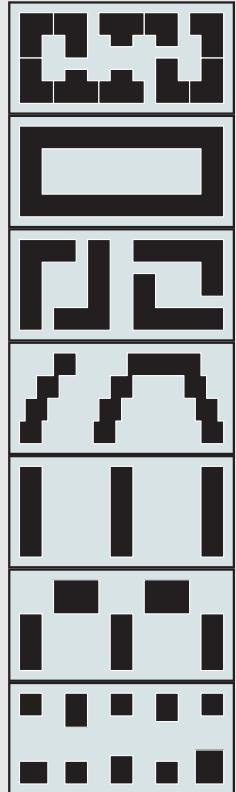
What opportunities do large public housing associations provide in accomodating more affordable housing?



Landlord
GEWOFAG
GWG

TYPOLOGIES

In this map, the urban fabric is categorised by its built and unbuilt typology. Seven main urban typologies regarding housing can be identified in the city of Munich:



THE PERIMETER BLOCK

THE SUPERBLOCK

THE OPEN BLOCK

ORGANIC

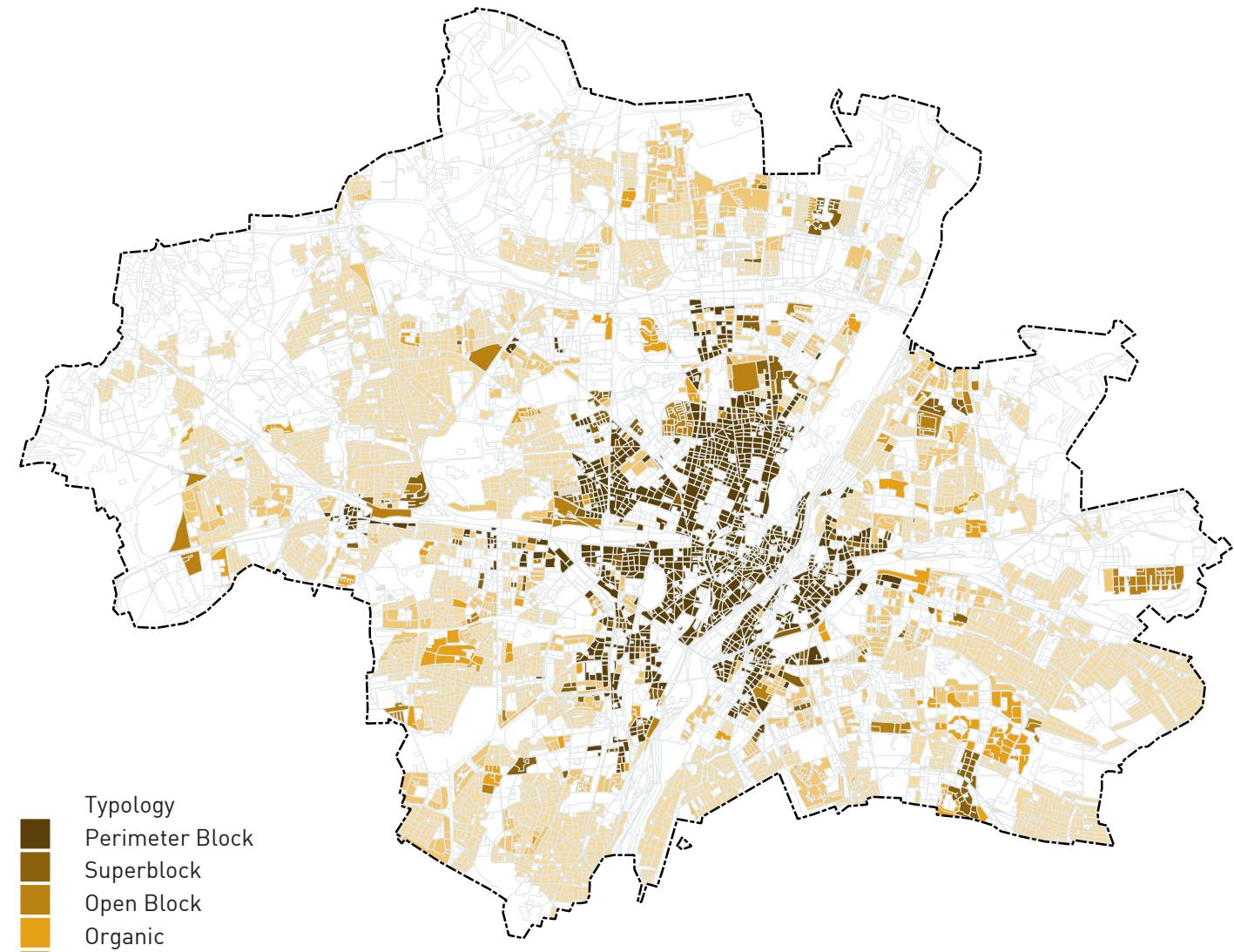
SLABS

SOLITAIRS

SINGLE FAMILY HOMES

What are the specific potentials for Densification for each Typology?

What chances and what opportunities does it offer?

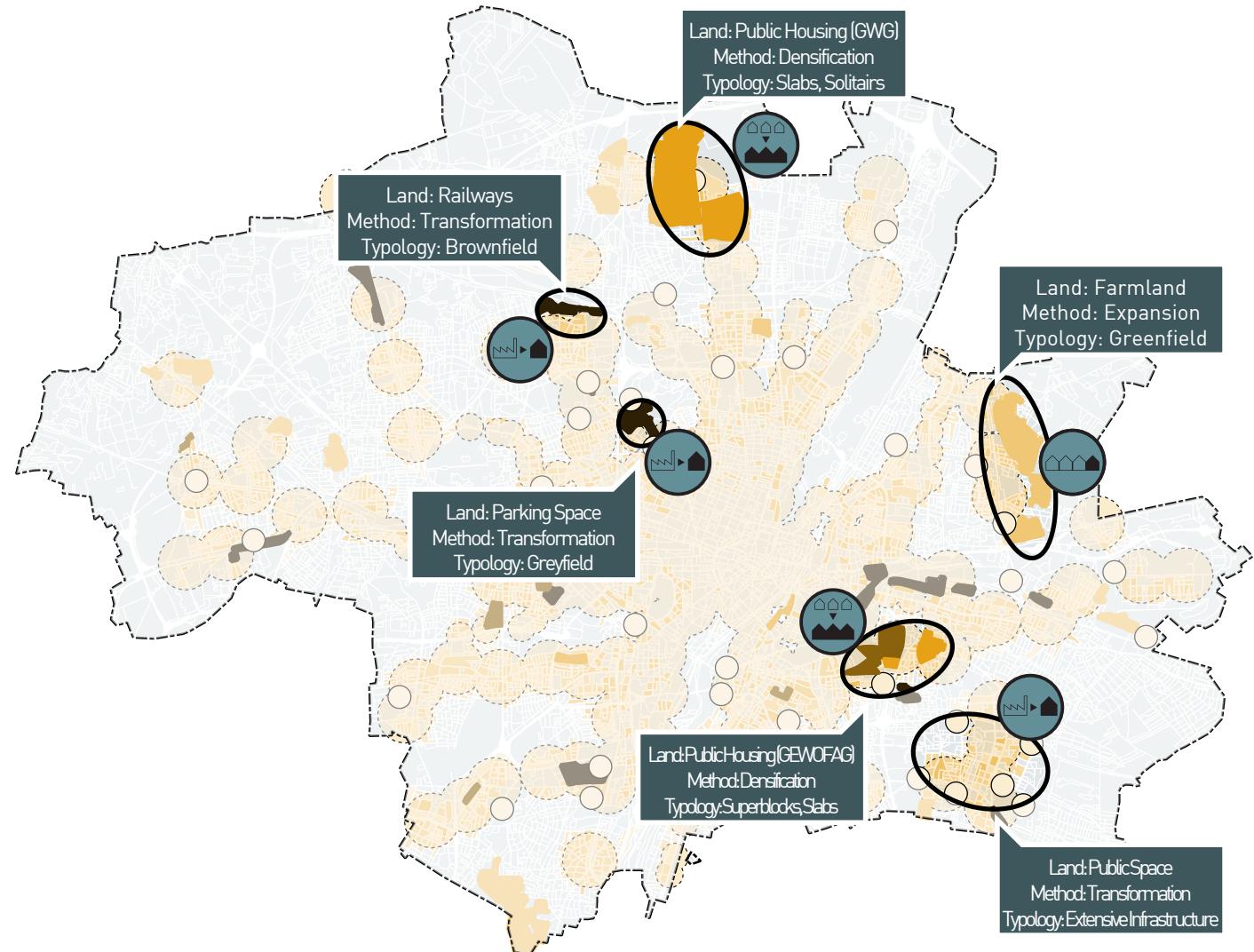


CONCLUSIONS

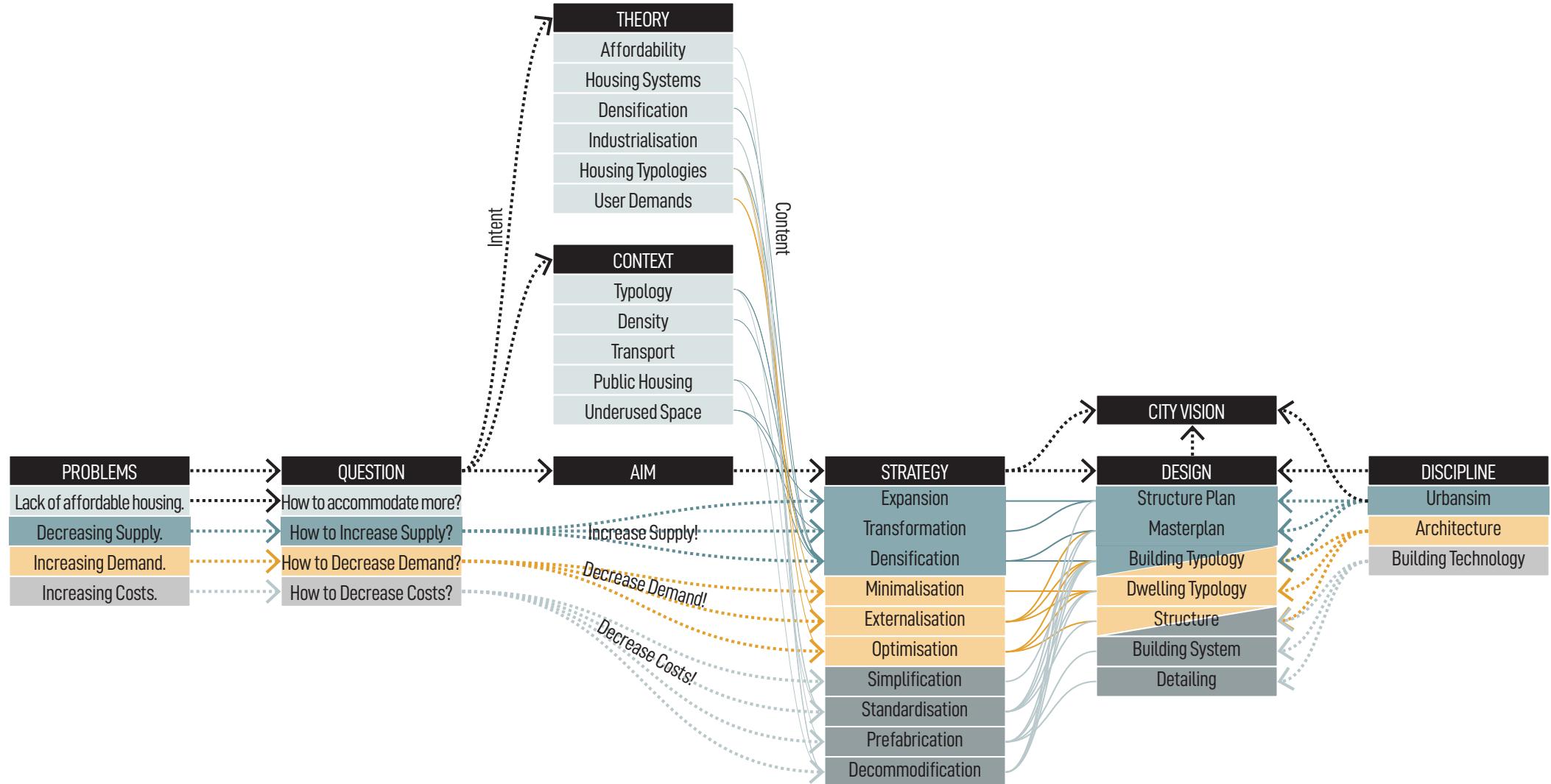
From mapping densities, public transport, built and unbuilt typologies, underused land and public landowners, six main intervention areas emerged for which different methods of increasing affordable housing supply are applicable:

What Criteria to Apply for Choosing A site?

- Affordability / Gentrification
- Feasibility
- Sustainability
- Acceptance
- Livability
- Scale / Spatial Potential
- Complexity
- Overlooked Potentials
- Lack of Quality of Public Space
- ...



CONCEPTUAL FRAMEWORK



TOOLBOX

EXISTING STOCK

SUPPLY



PREEMPTION



PROTECTION



REVITALISATION

DEMAND



PREEMPTION

COSTS



SIMPLIFICATION

NEW DEVELOPMENT

SUPPLY



EXPANSION



TRANSFORMATION



DENSIFICATION

DEMAND



EXTERNALISATION

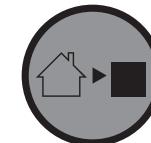


MINIMALISATION

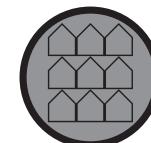


OPTIMISATION

COSTS



SIMPLIFICATION



STANDARDISATION



PREFABRICATION



ADDITION



INSERTION



ELEVATION



DIY FITOUT



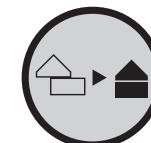
DECOMMODIFICATION



EXTENSION



COMPLETION



BUILDING

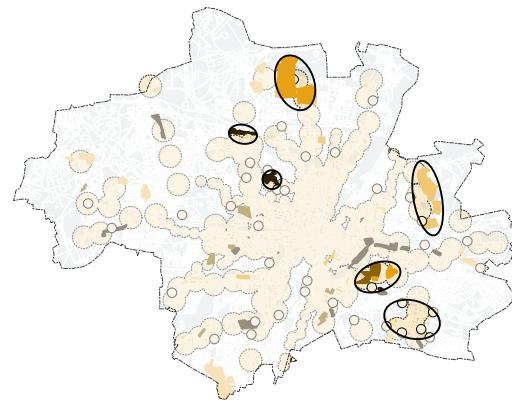


DETAIL



EQUIPMENT

SITE SELECTION



ADDITION



INSERTION



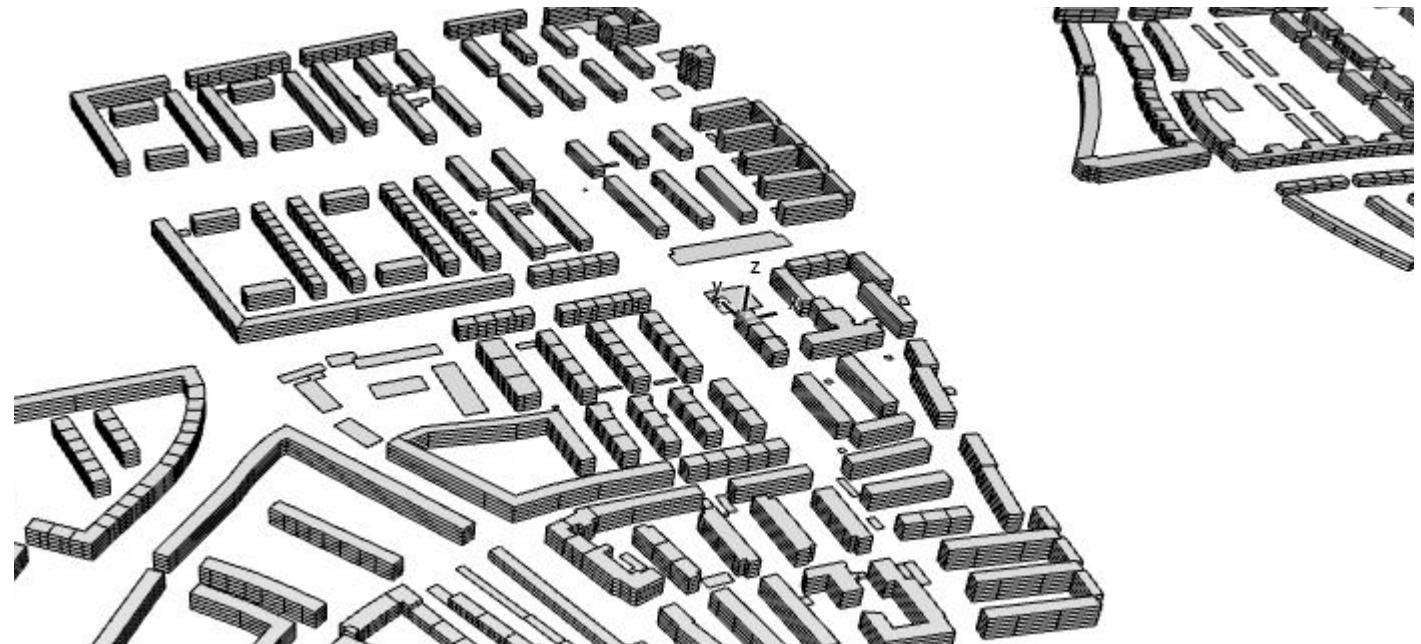
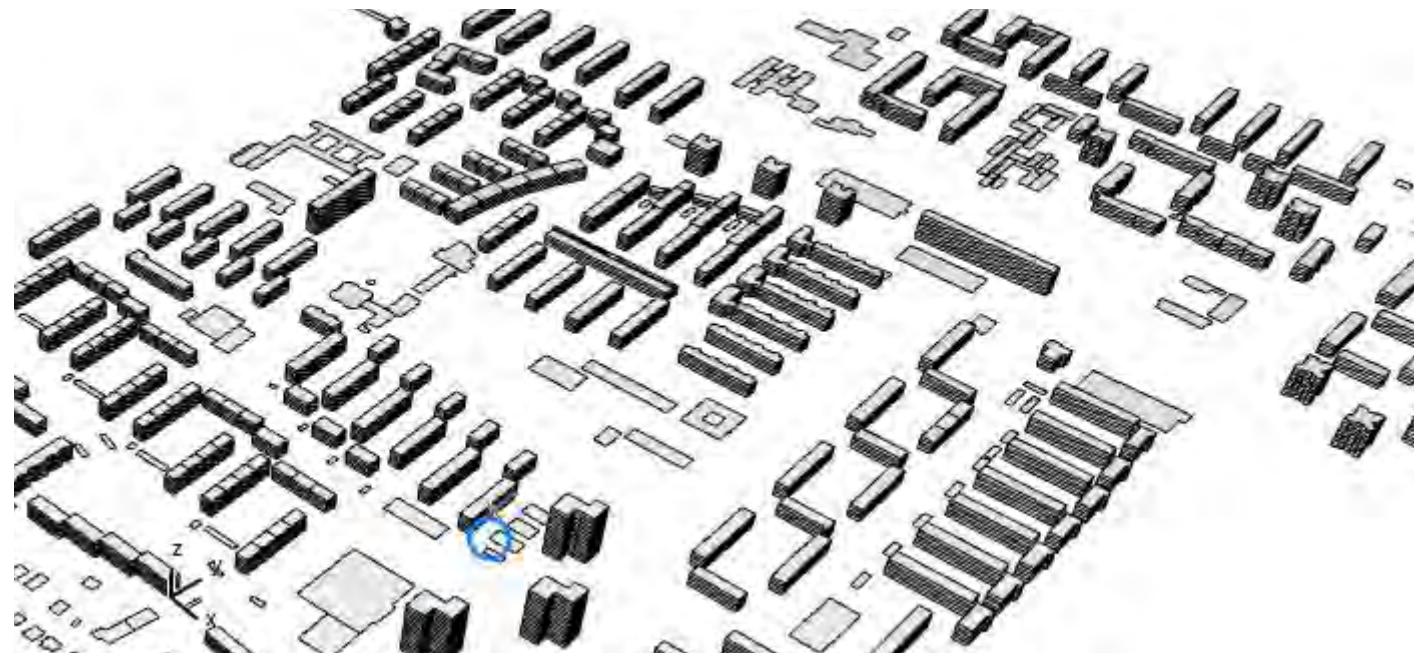
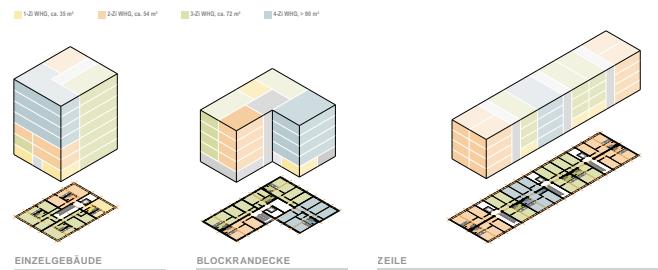
ELEVATION



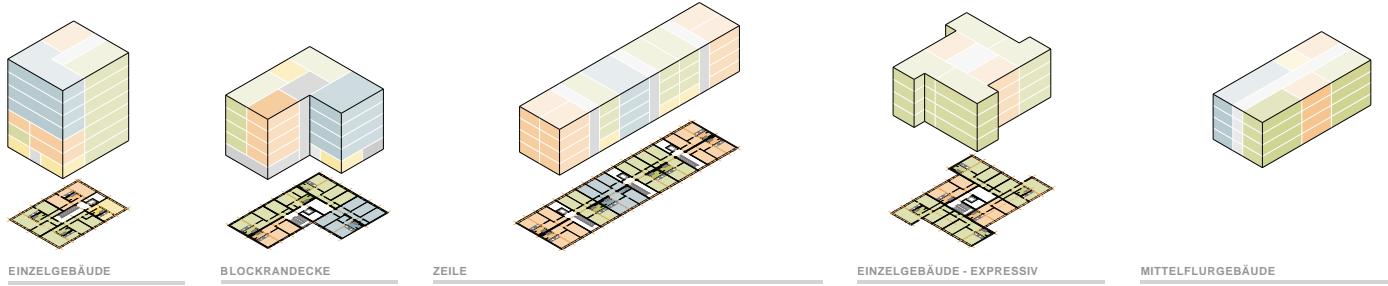
EXTENSION



COMPLETION



DESIGN



City -Structure Plan / City Vision
- Densification



Neighbourhood - Masterplan
- Addition / Elevation / Completion



Block - Building Typologie, Orientation
- Standardisation
- Optimisation



Building Typology - Circulation, Organisation
- Standardisation
- Optimisation



Dwelling Typologies
- Minimalisation
- Externalisation
- Standardisation

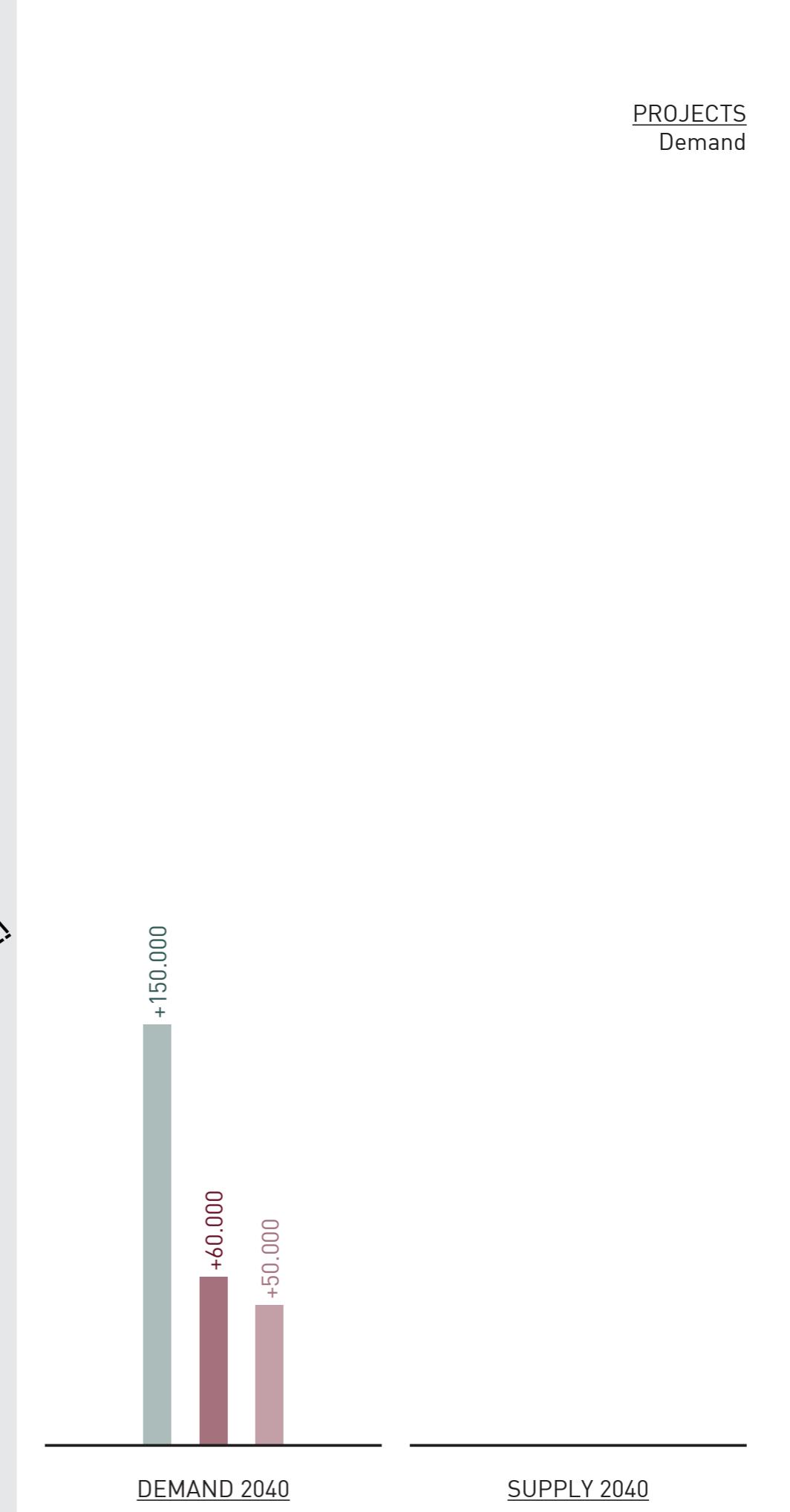
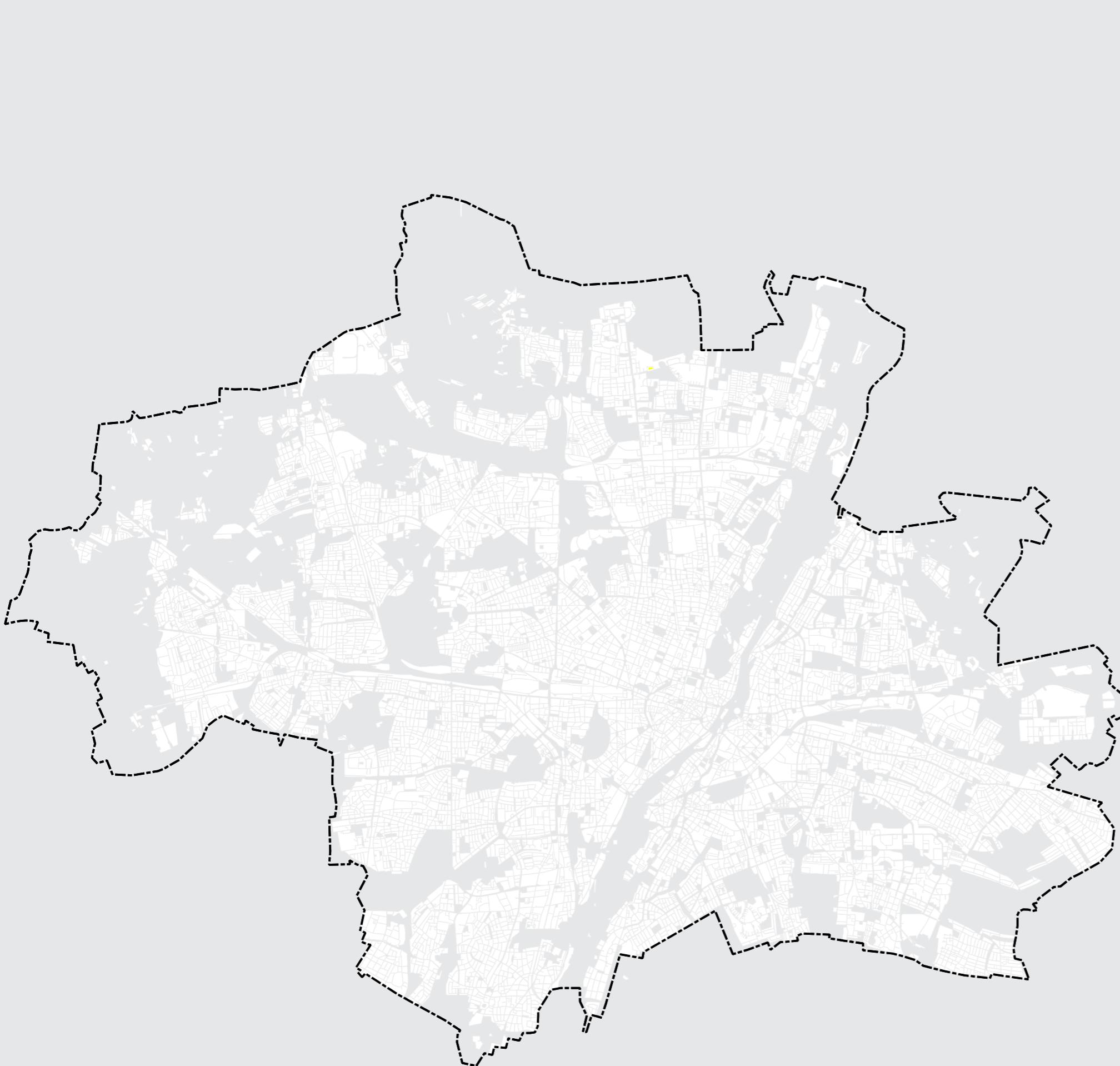


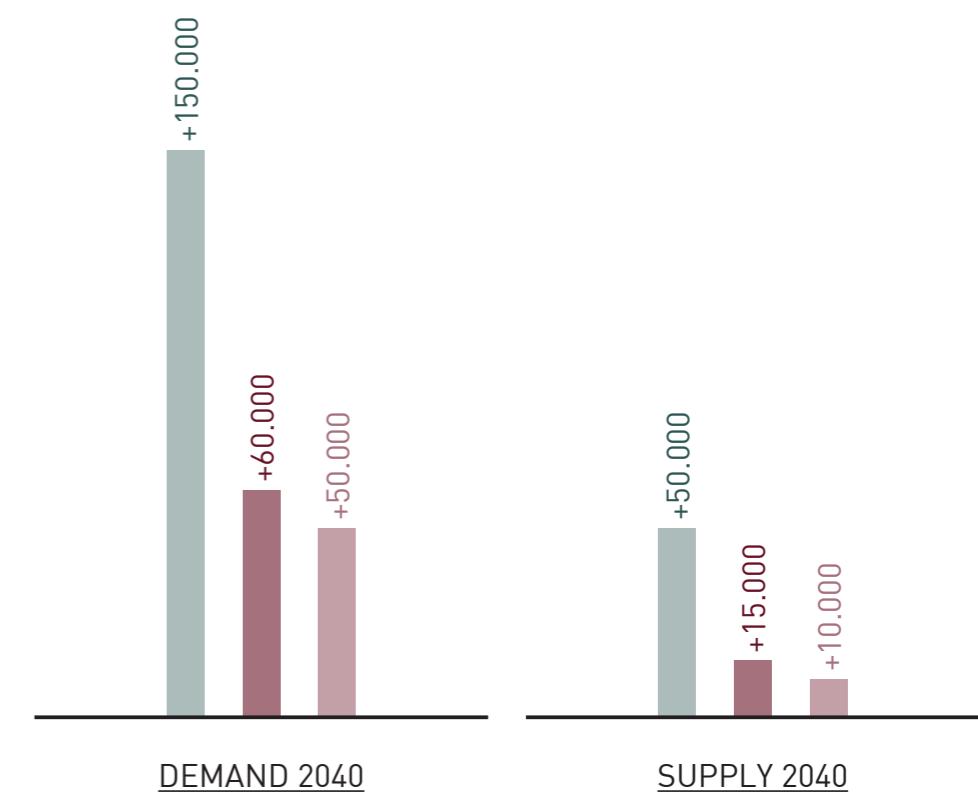
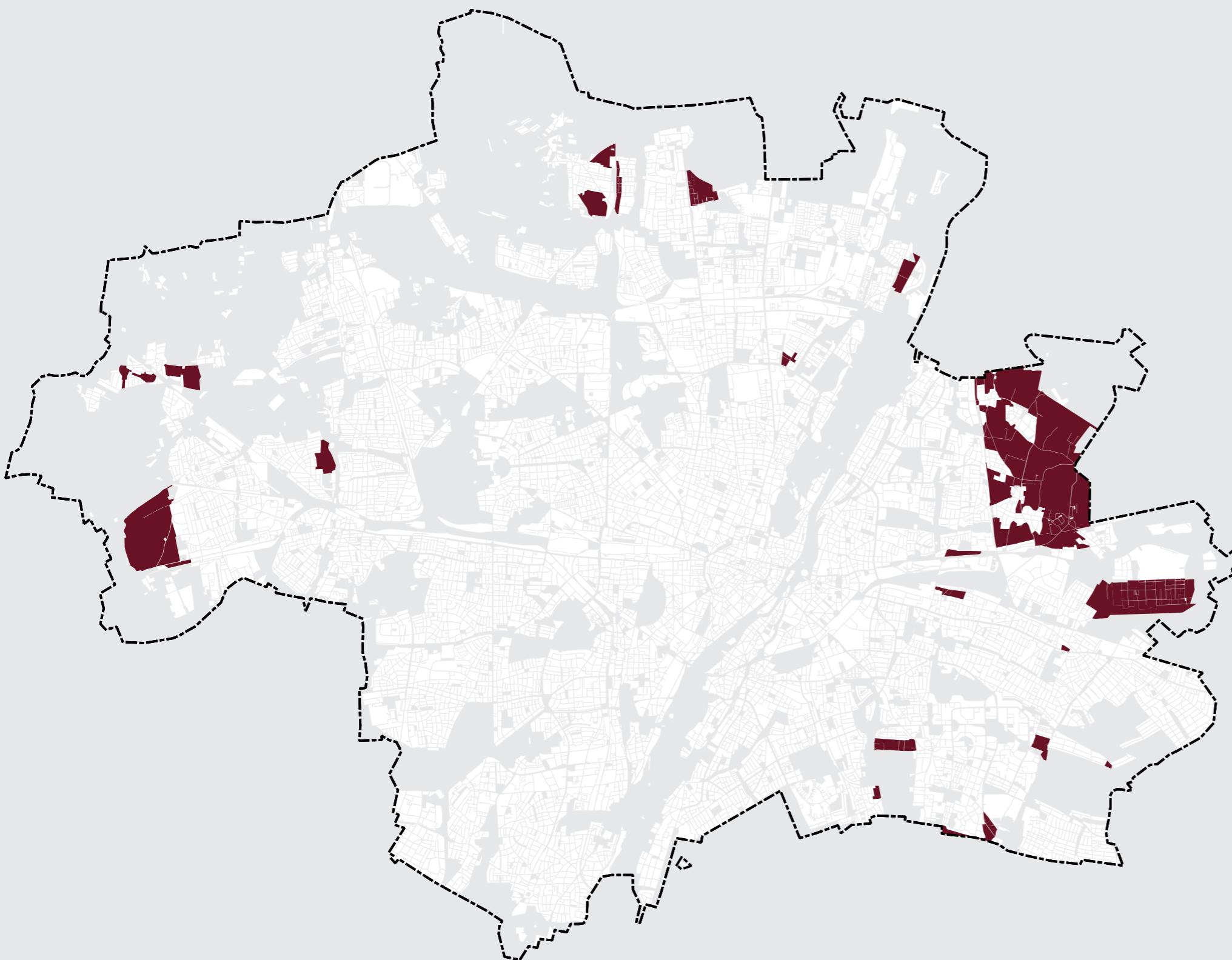
Structure
- Prefabrication

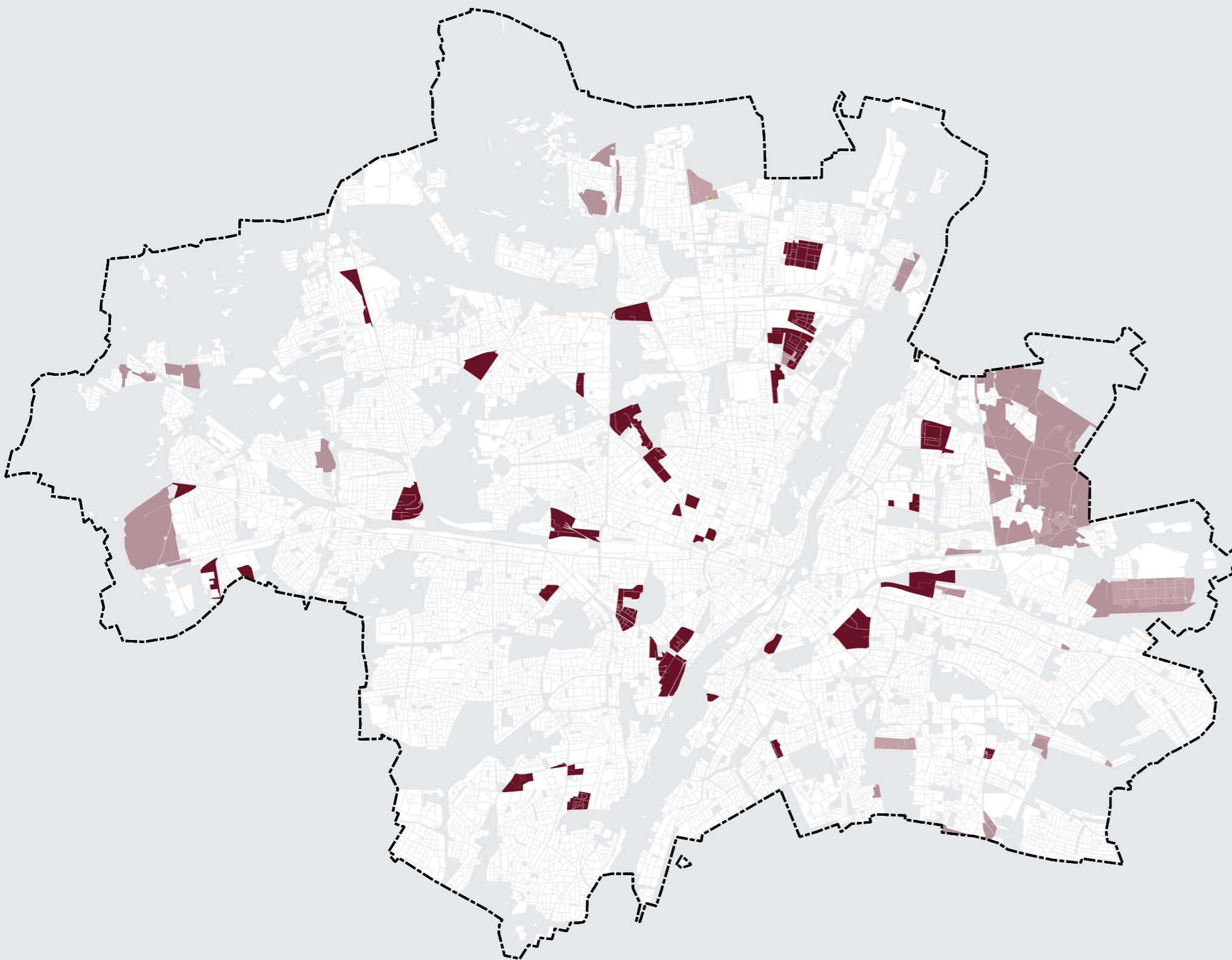


PROJECTS

Expand, Transform, Densify







+150.000

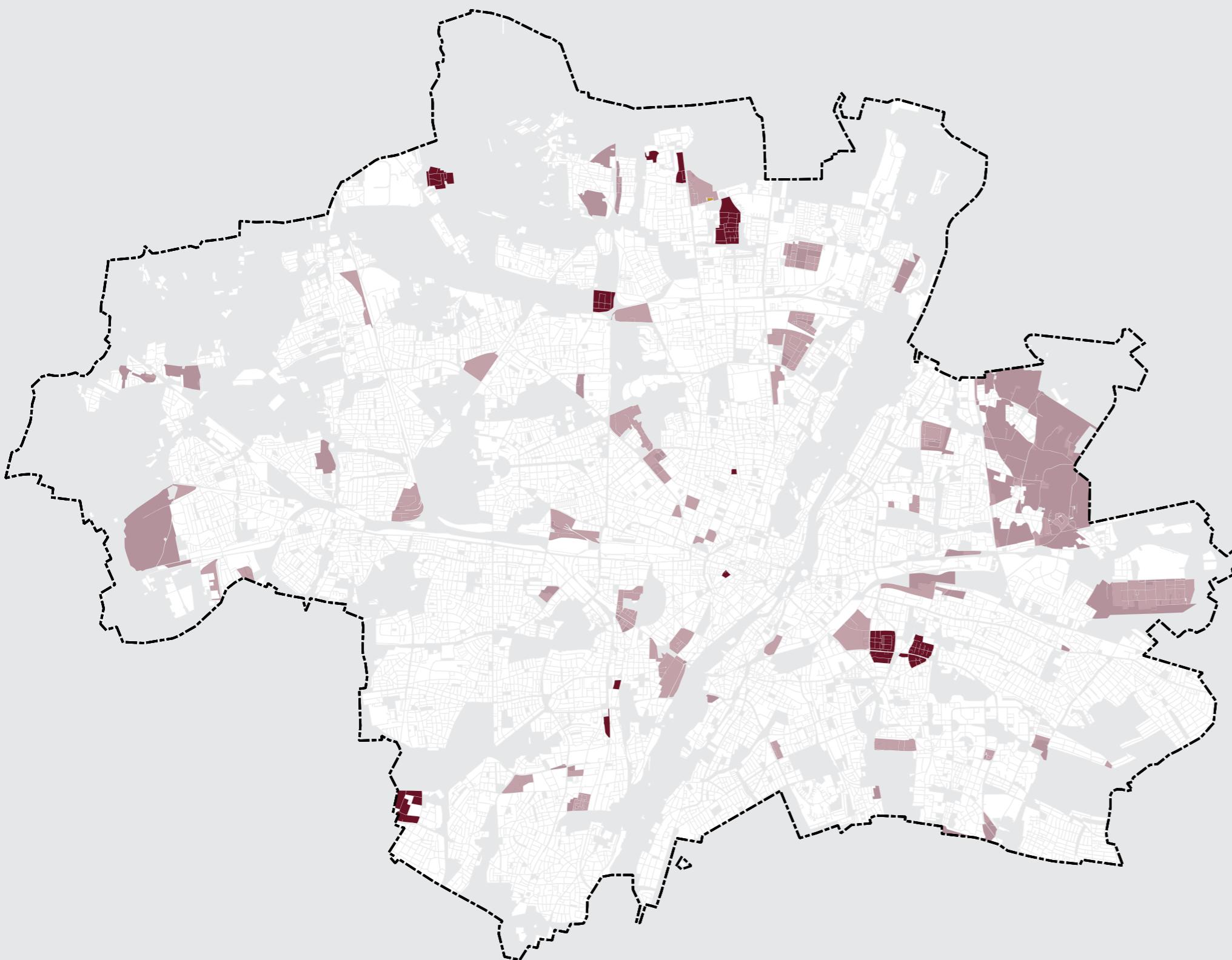
+60.000

+50.000



DEMAND 2040

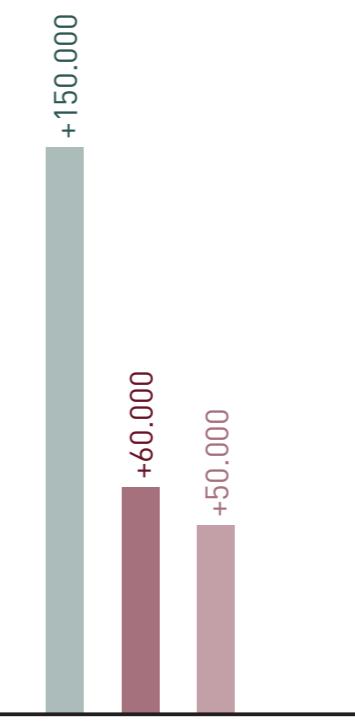
SUPPLY 2040



+150.000

+60.000

+50.000

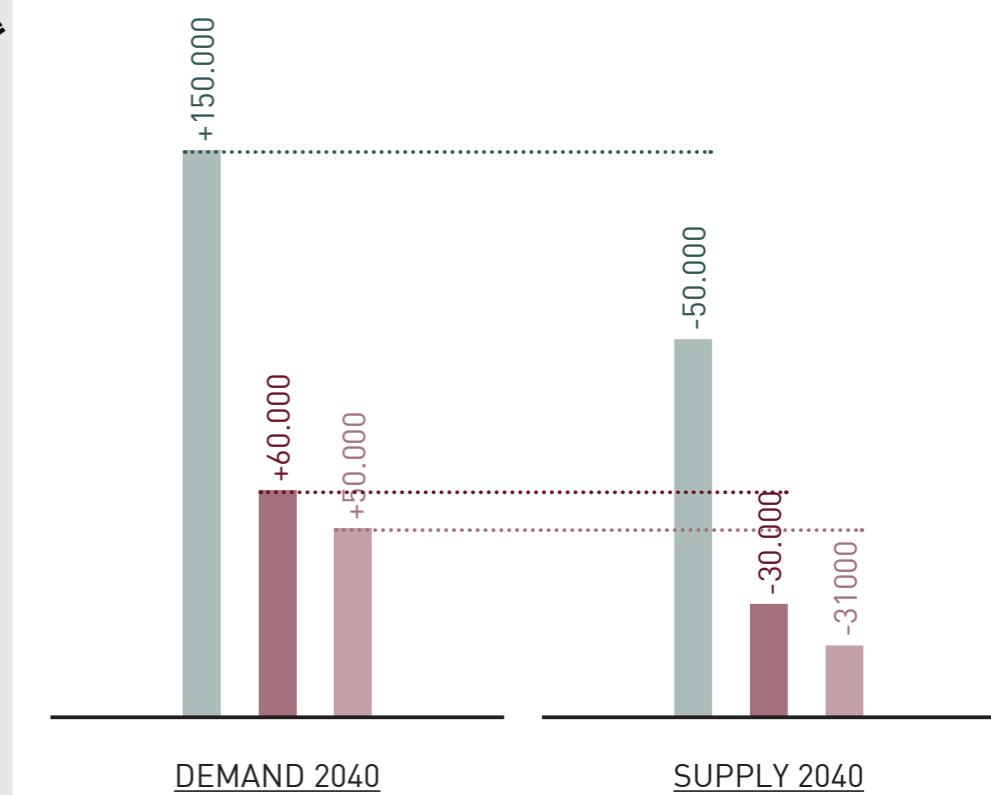
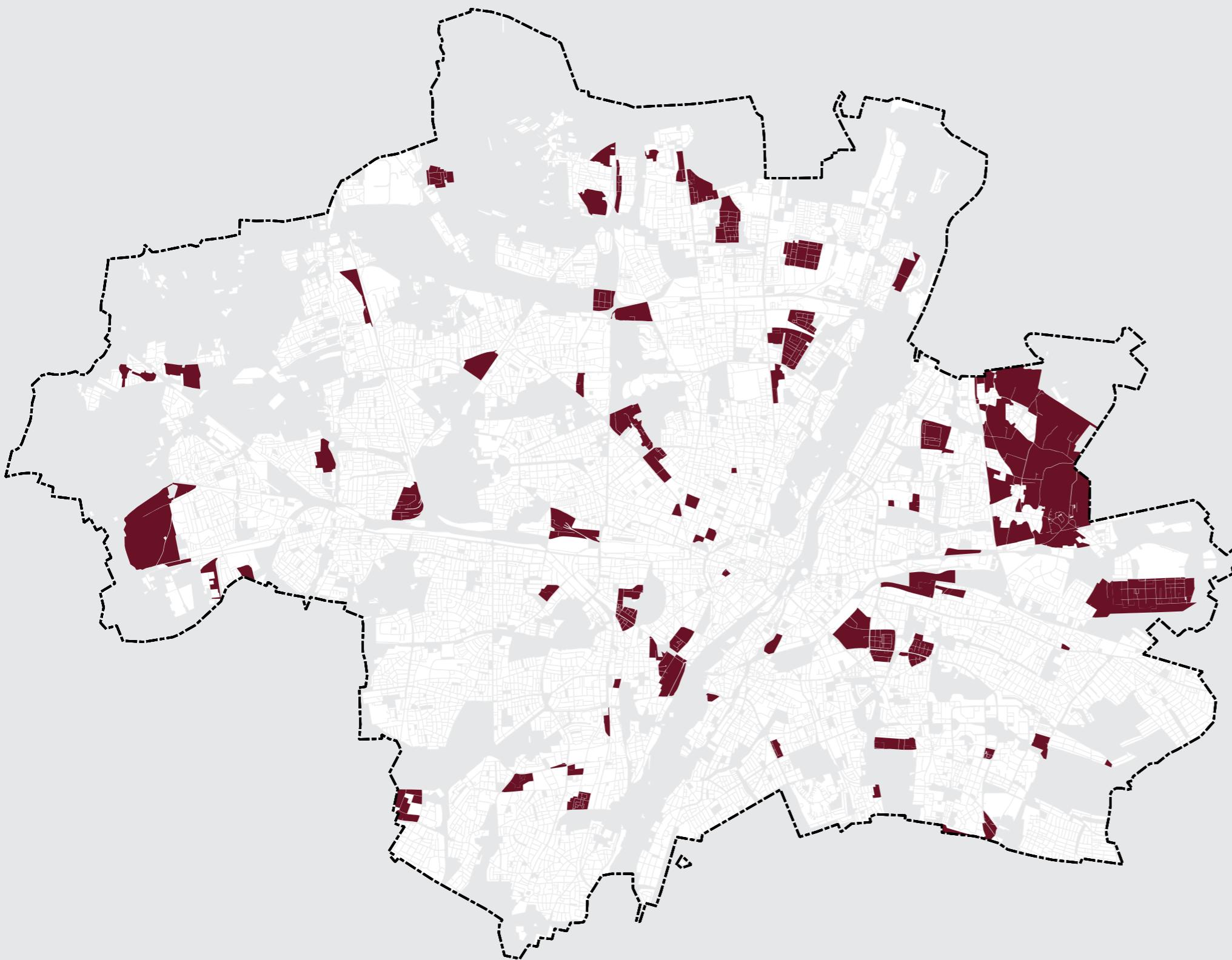


+10.000

+3.000

+1.000

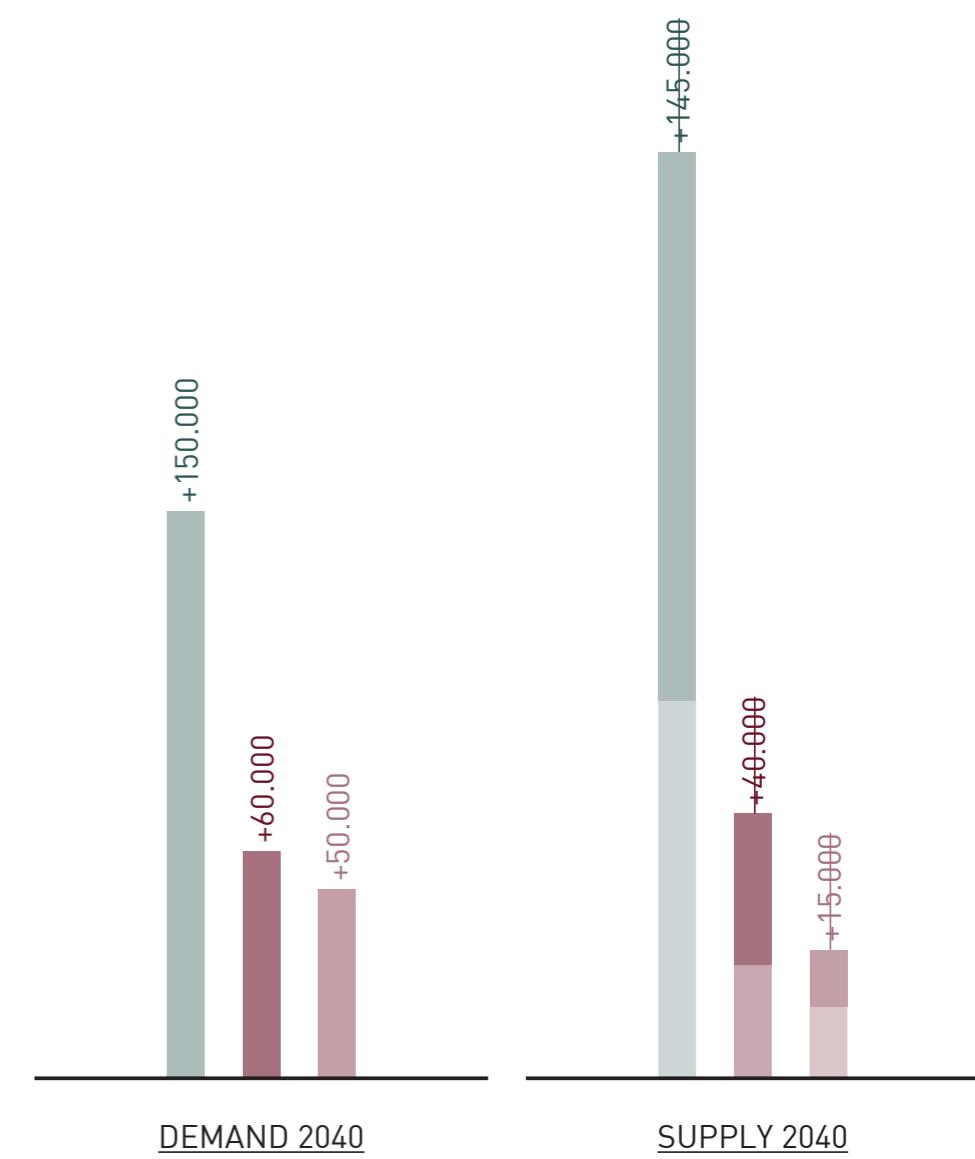
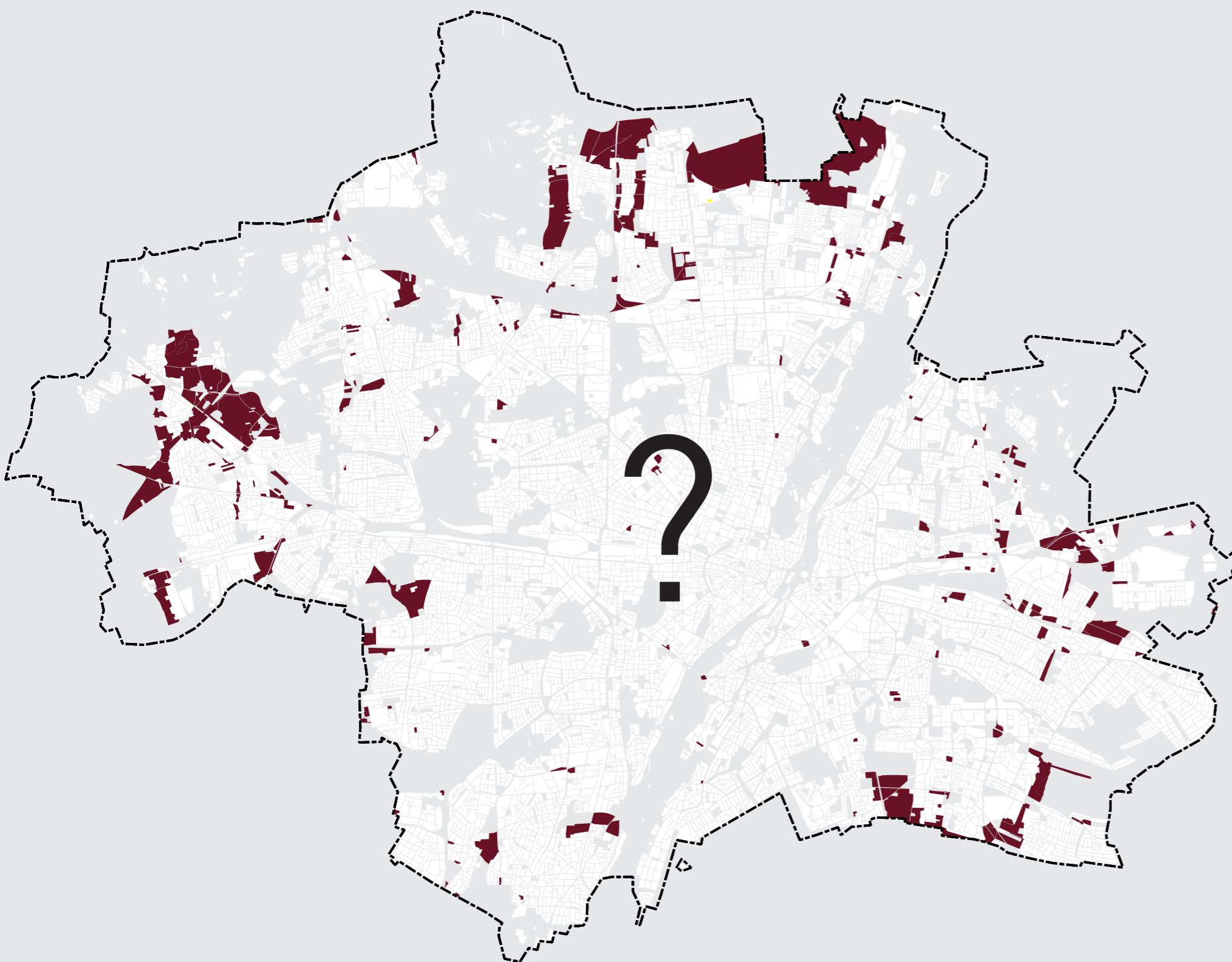
SUPPLY 2040



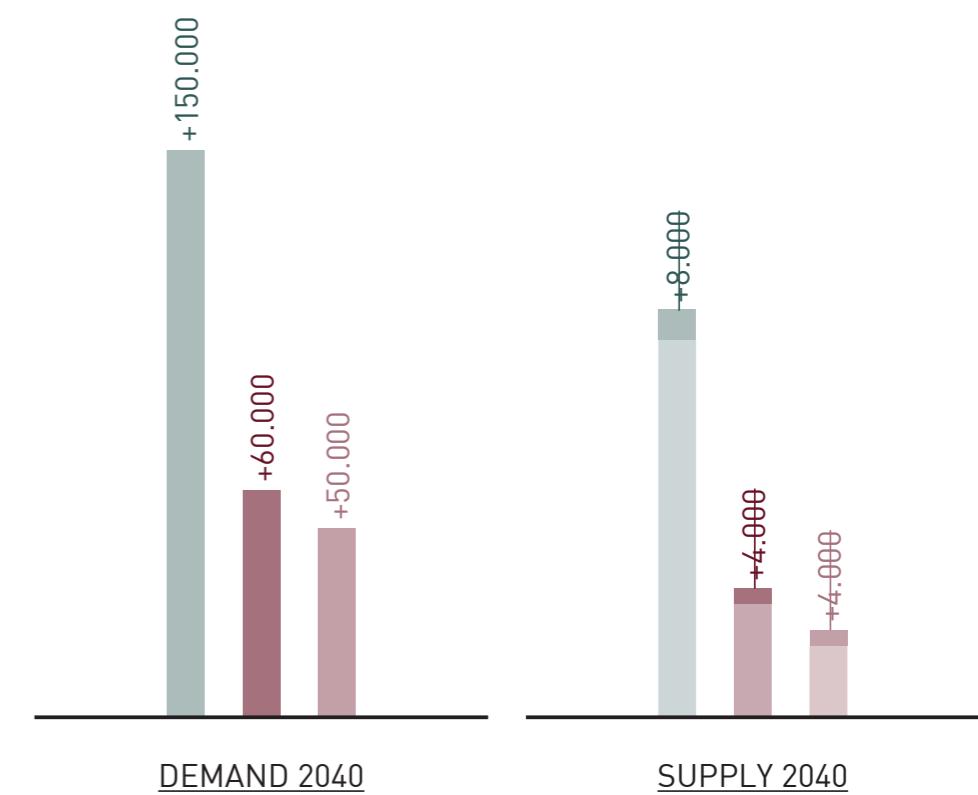
POTENTIALS

Expand, Transform, Densify

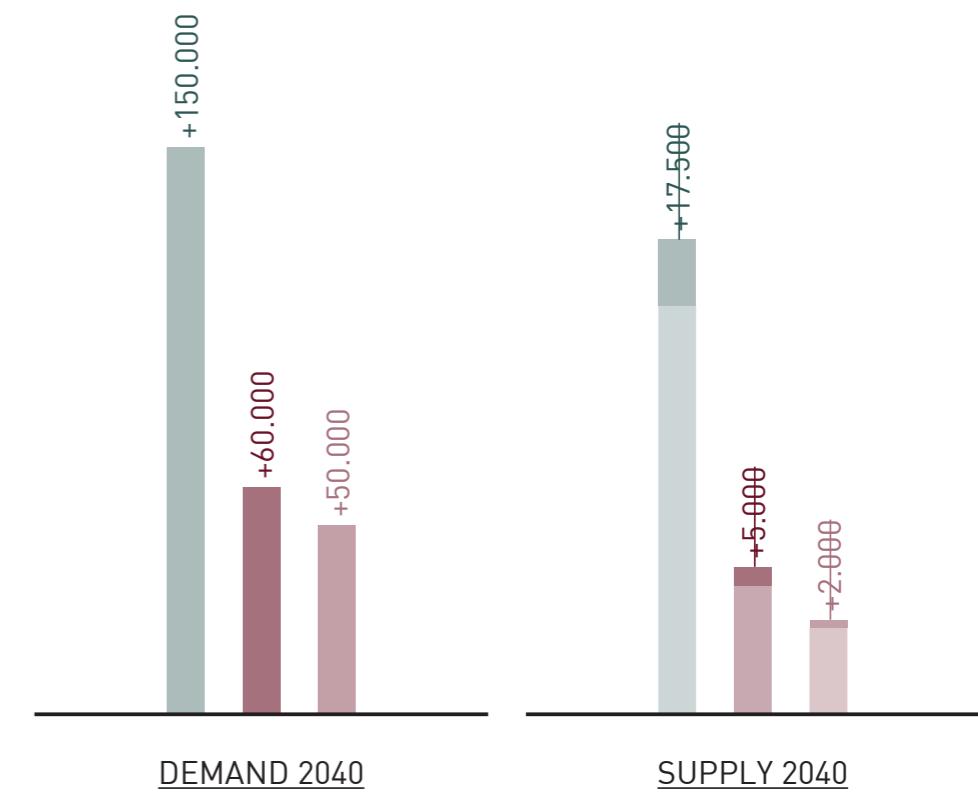
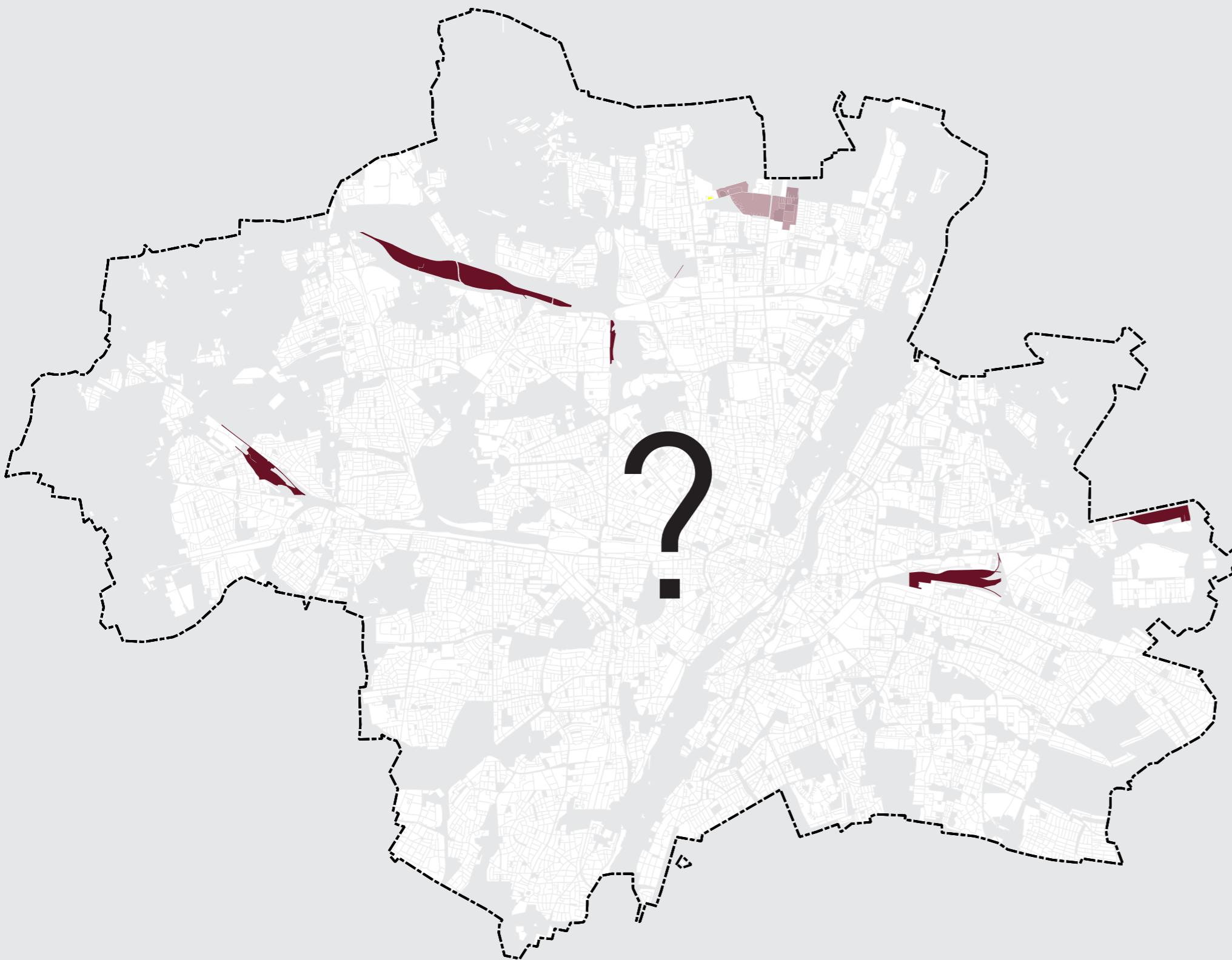
POTENTIALS
Expand - Greenfields



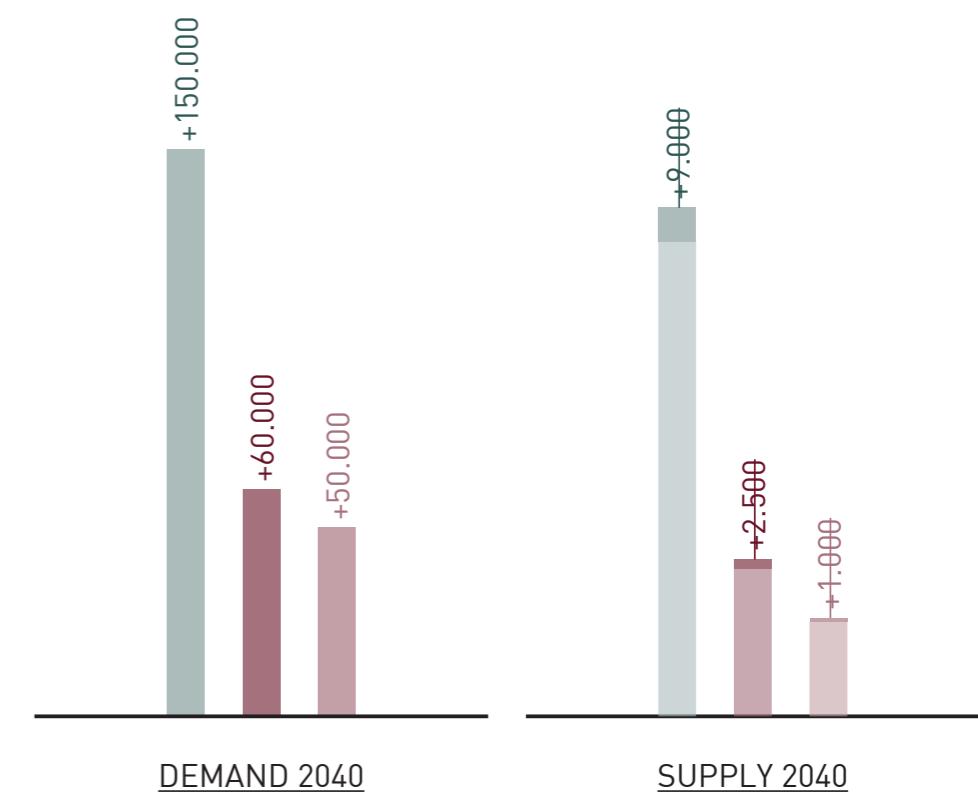
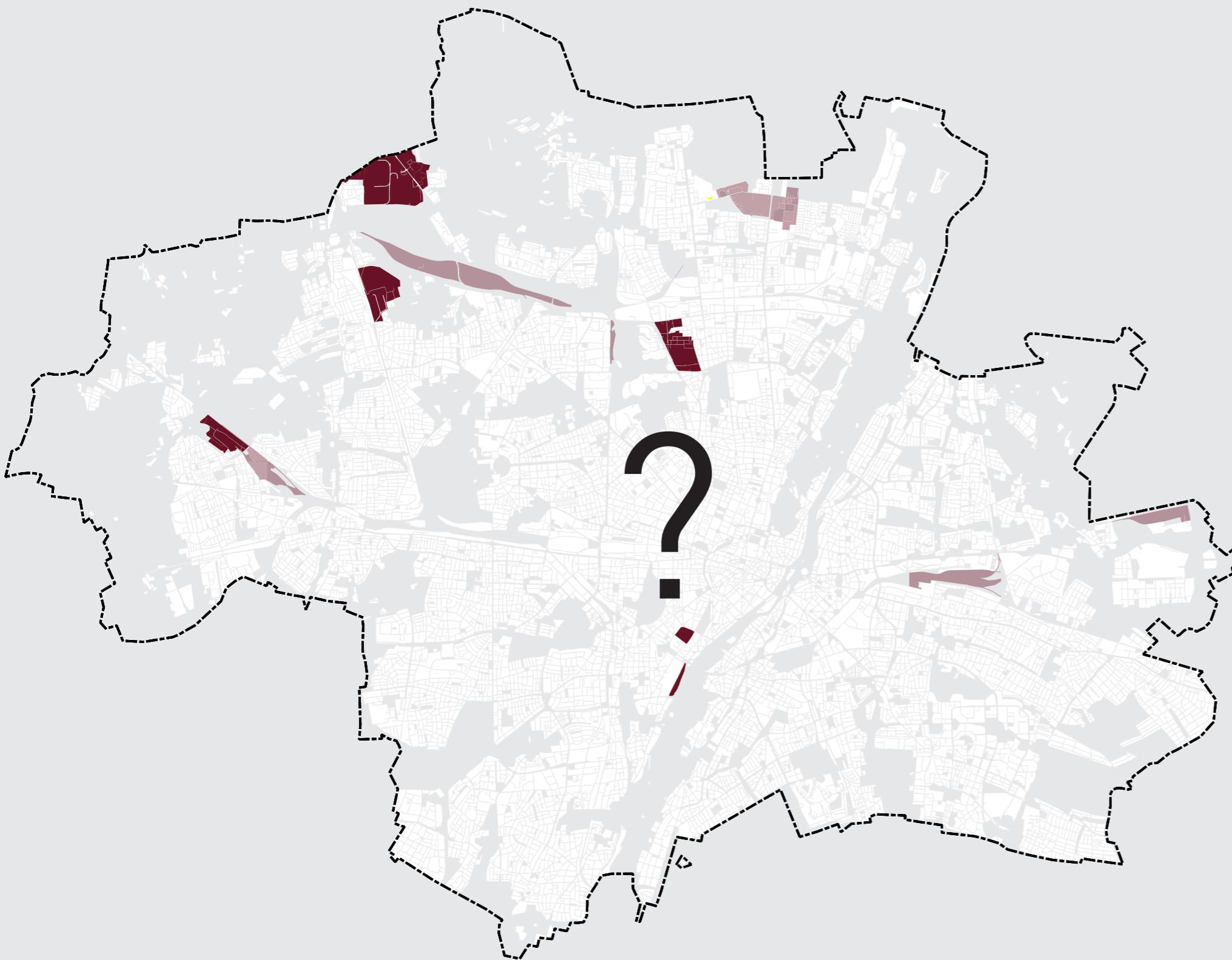
POTENTIALS
Transform - Military



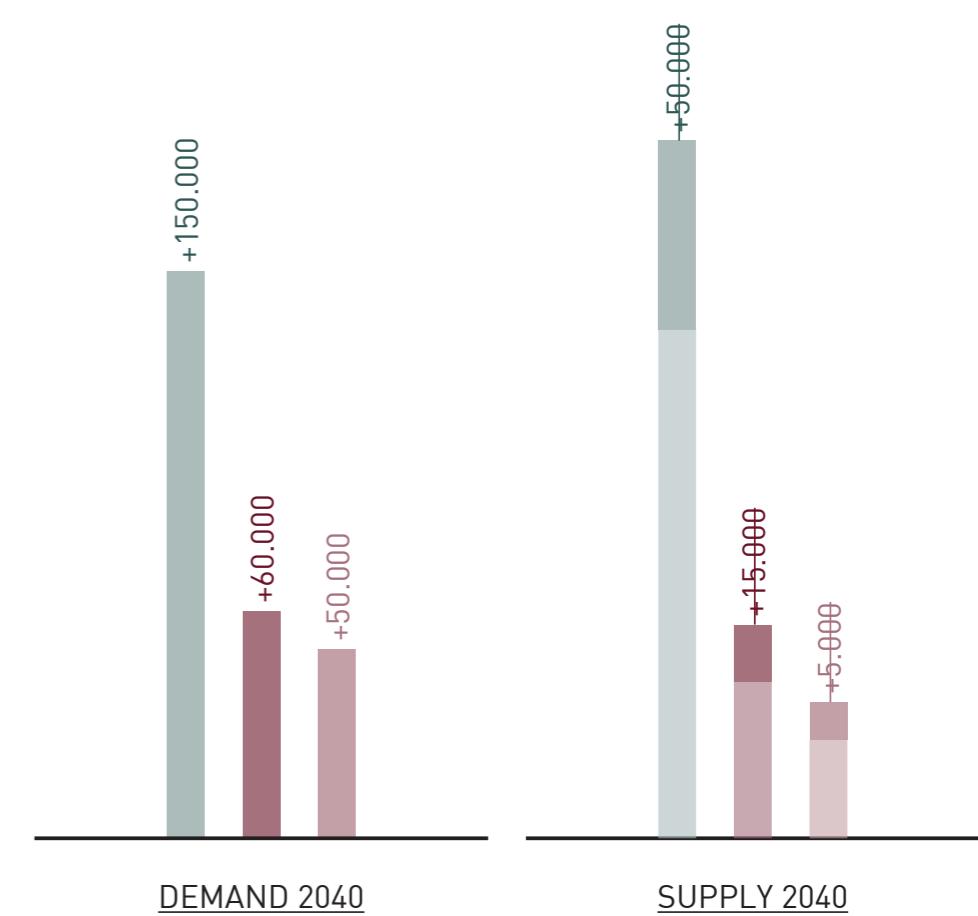
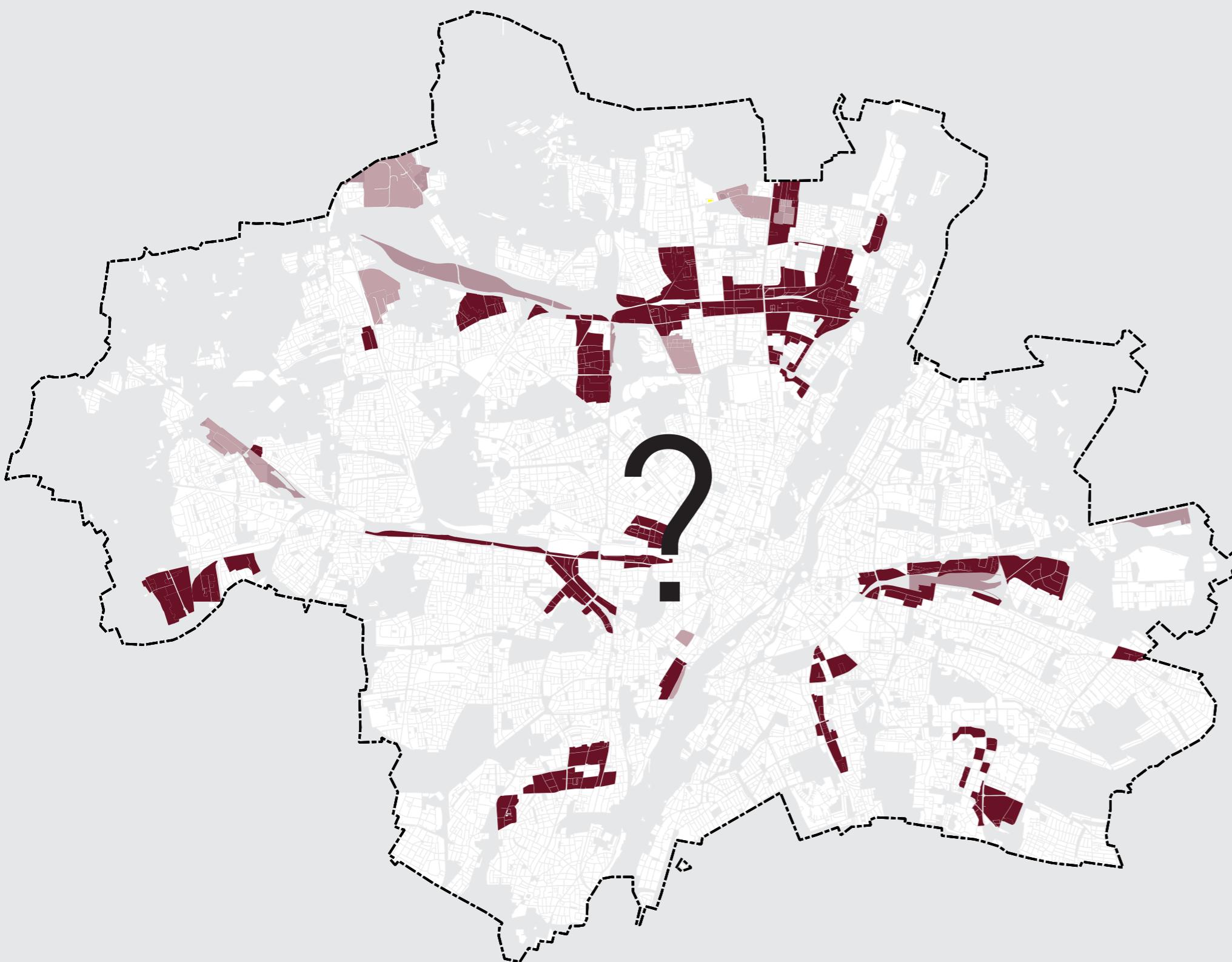
POTENTIALS
Transform - Railway



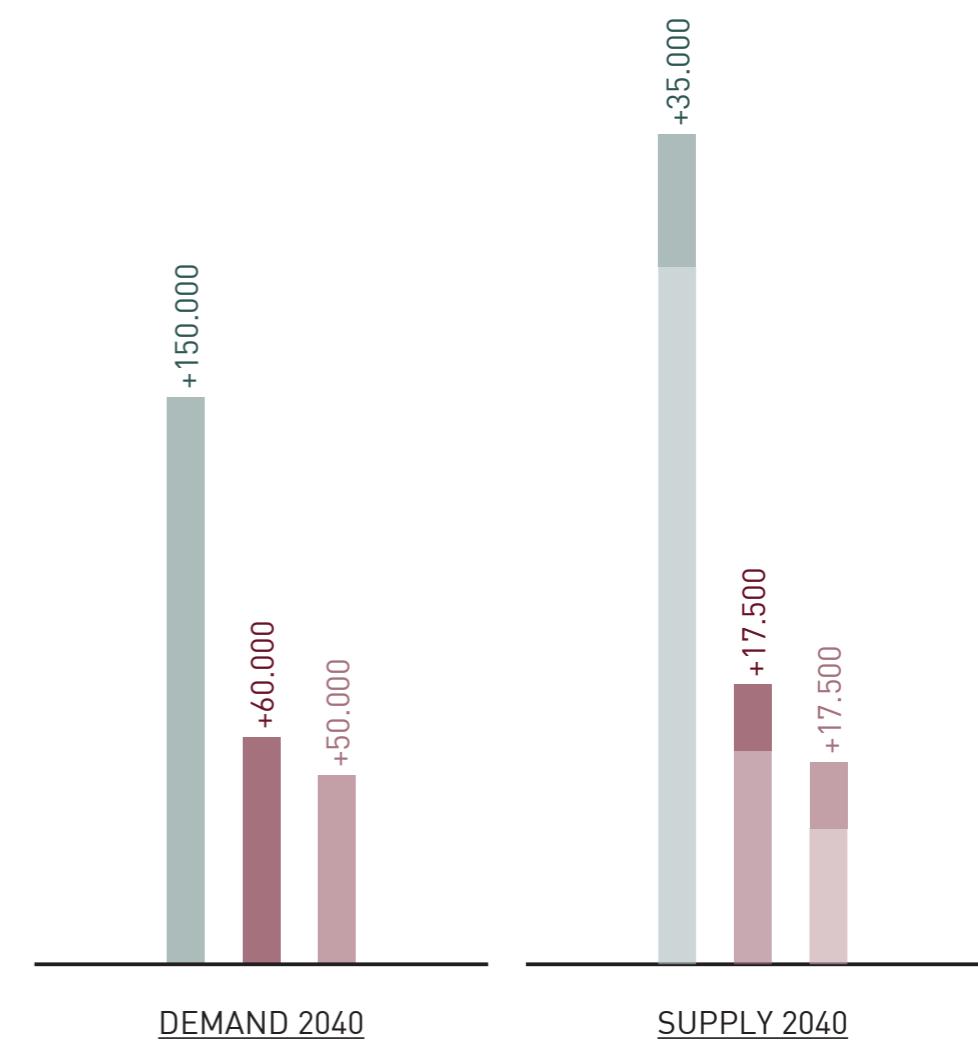
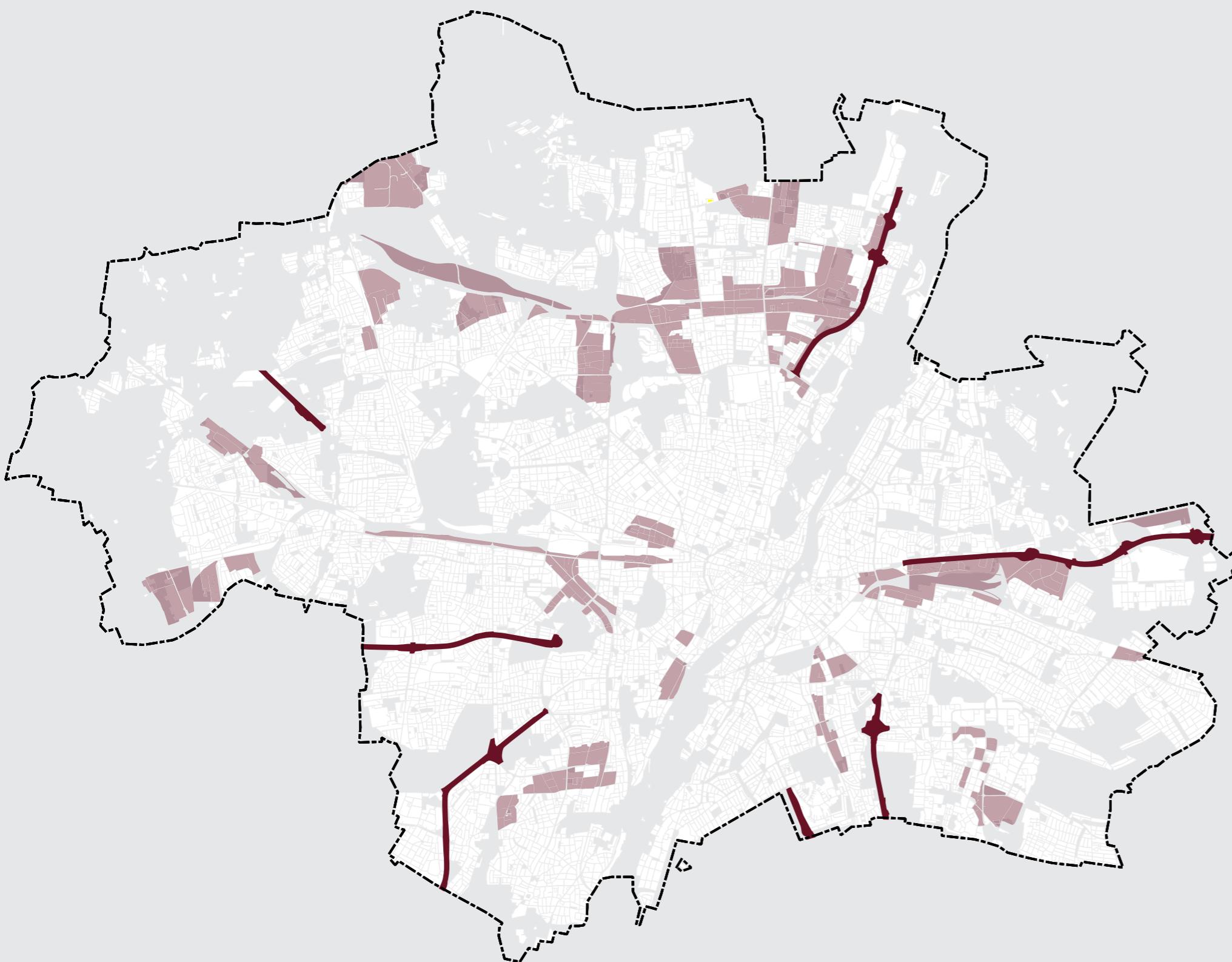
POTENTIALS
Transform - Industry



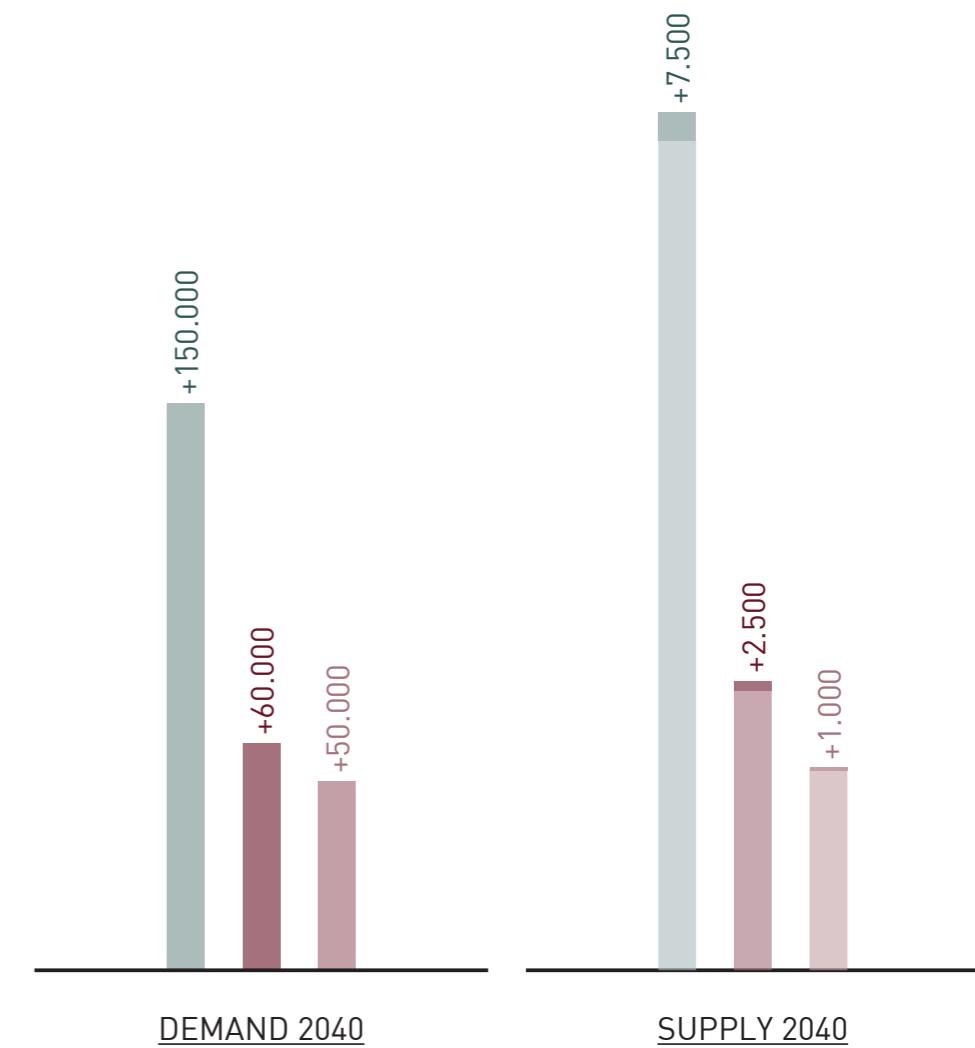
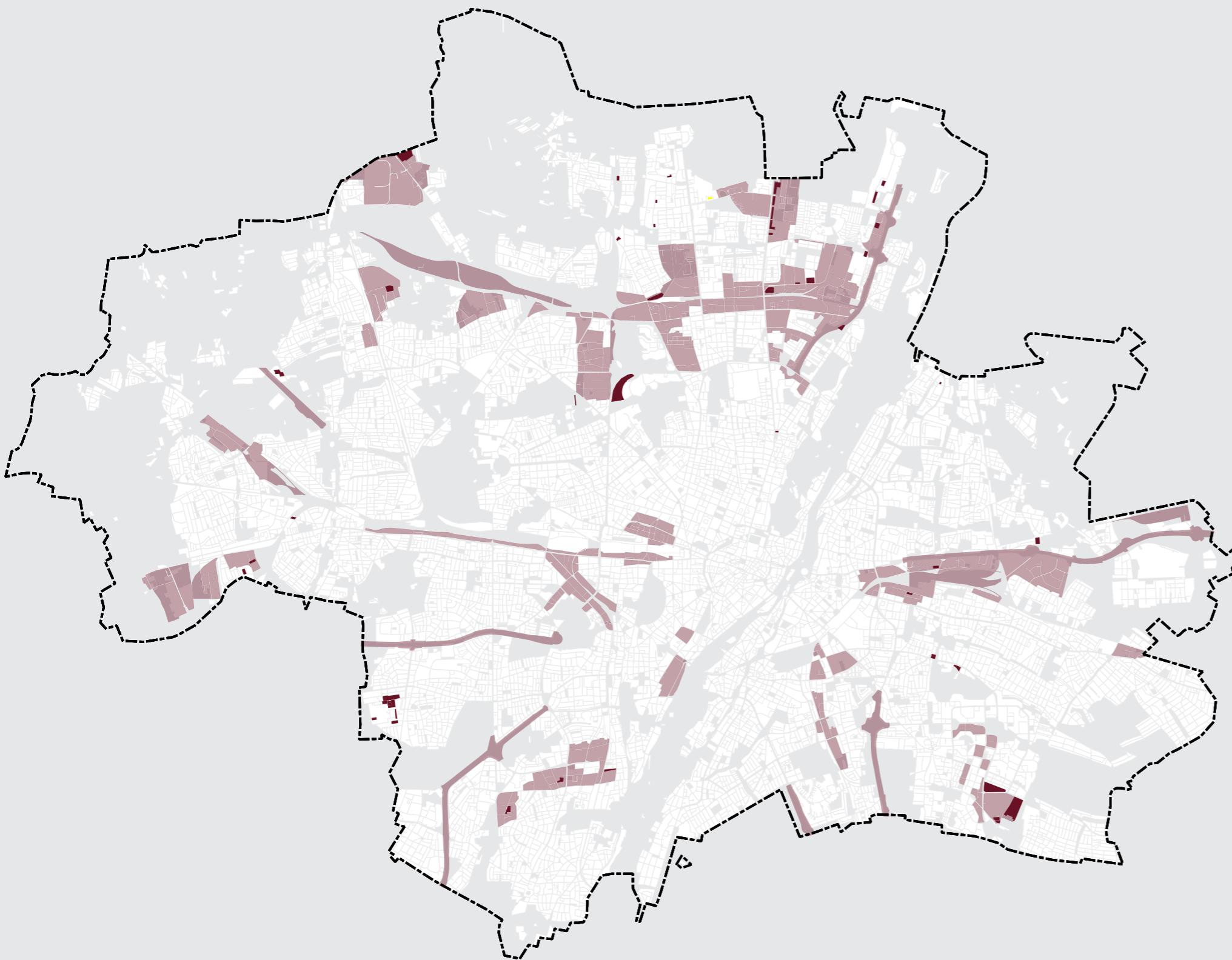
POTENTIALS
Transform - Commerce



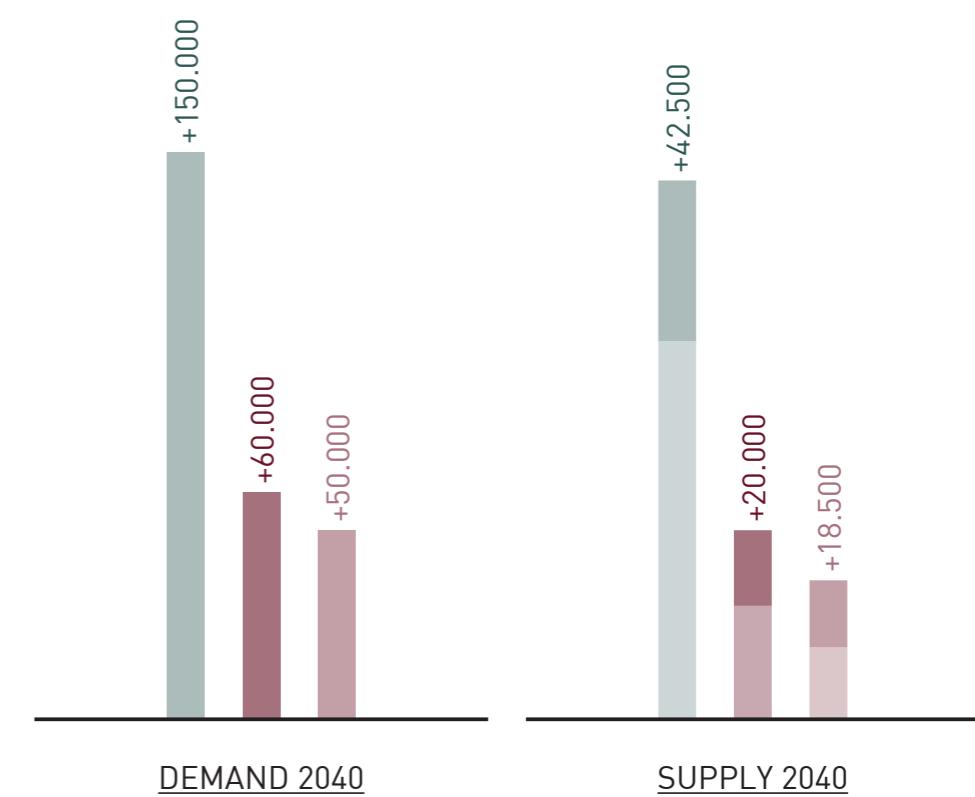
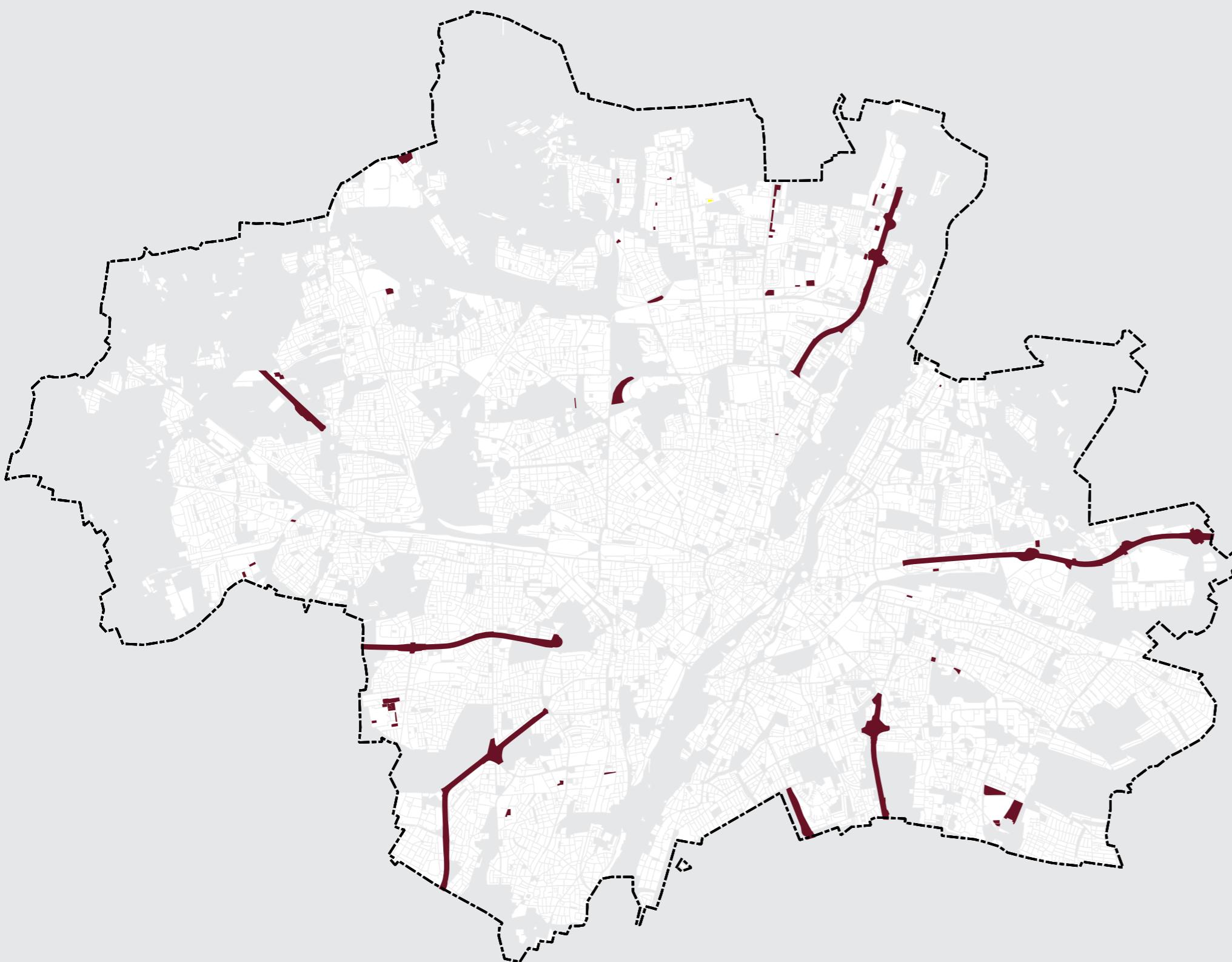
POTENTIALS
Transform - Highways



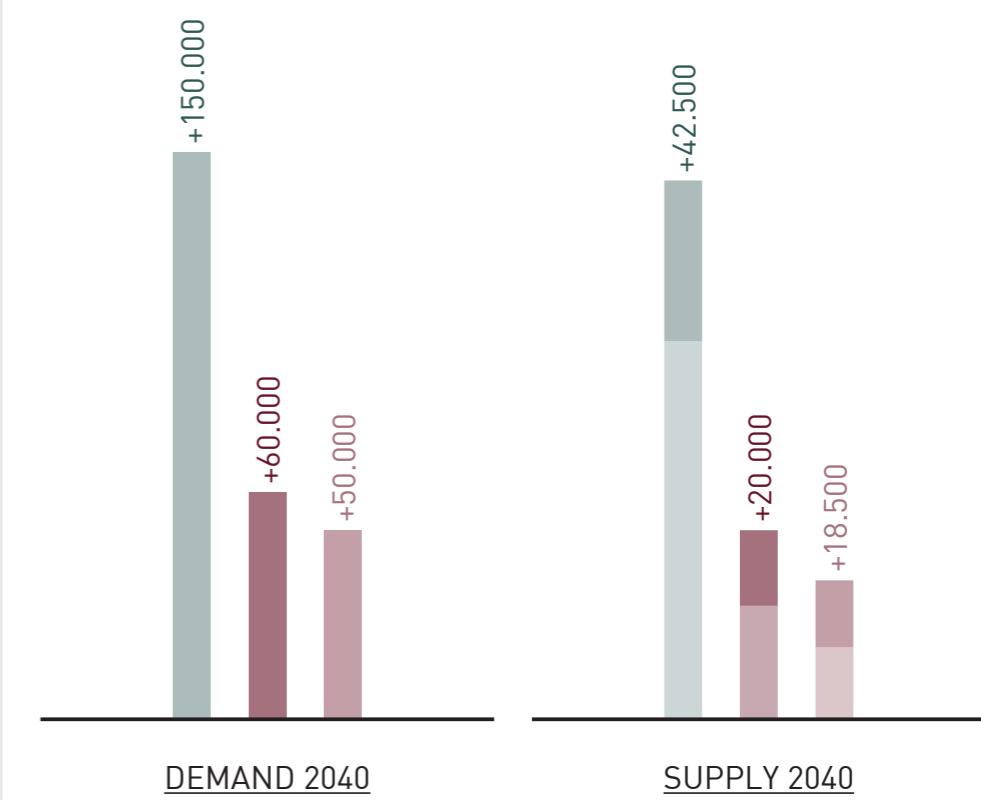
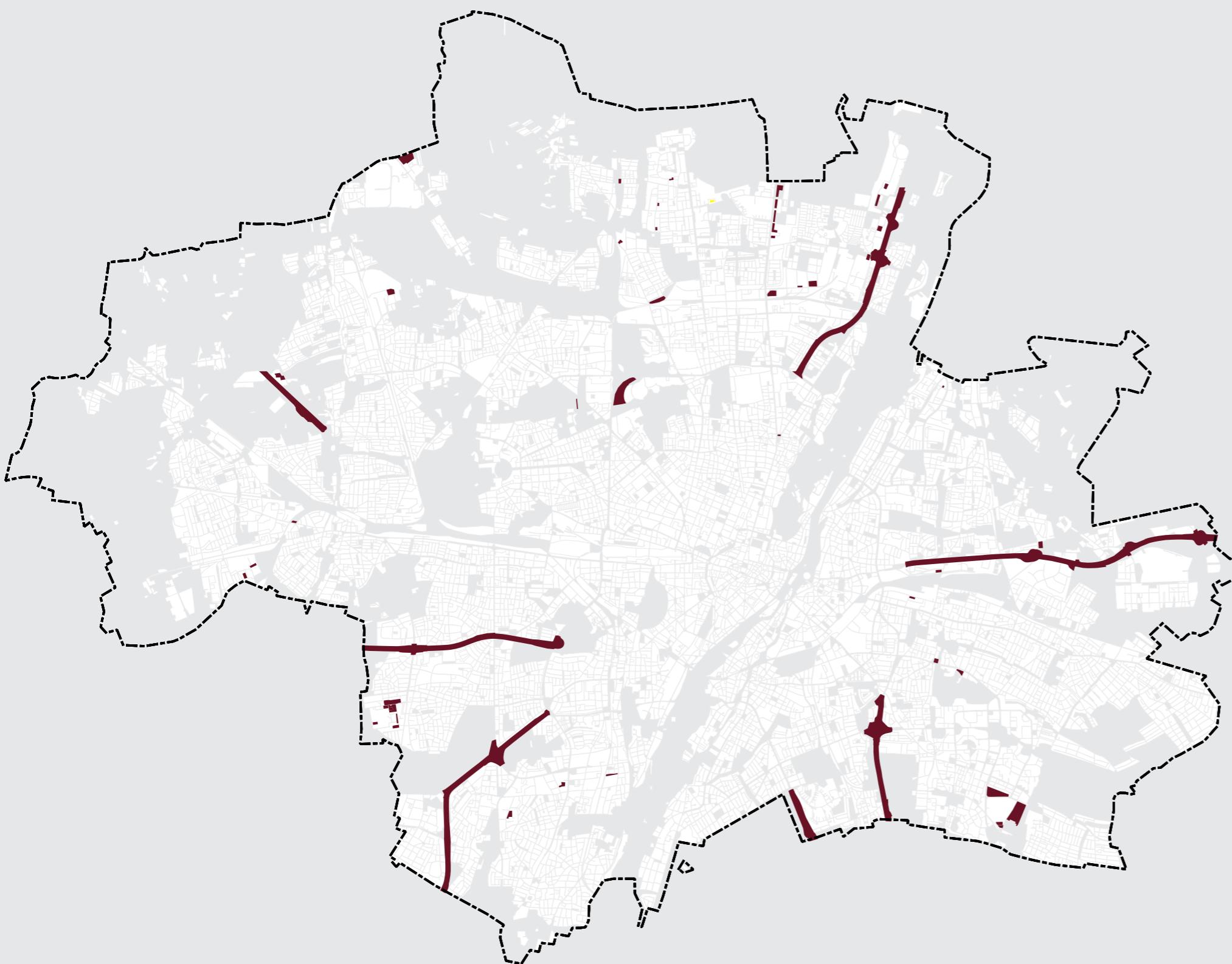
POTENTIALS
Transform - Carparks



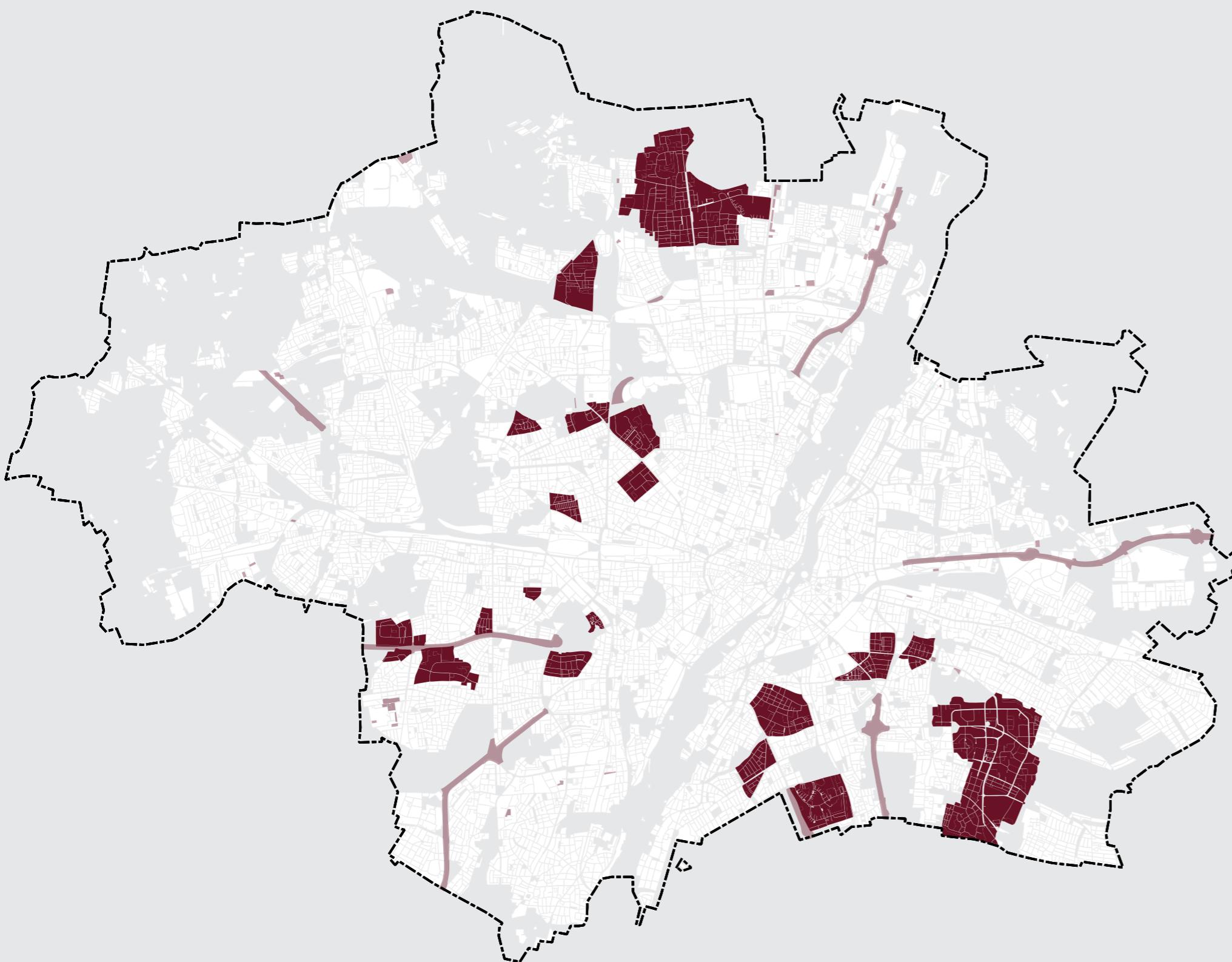
POTENTIALS
Transform - Selected

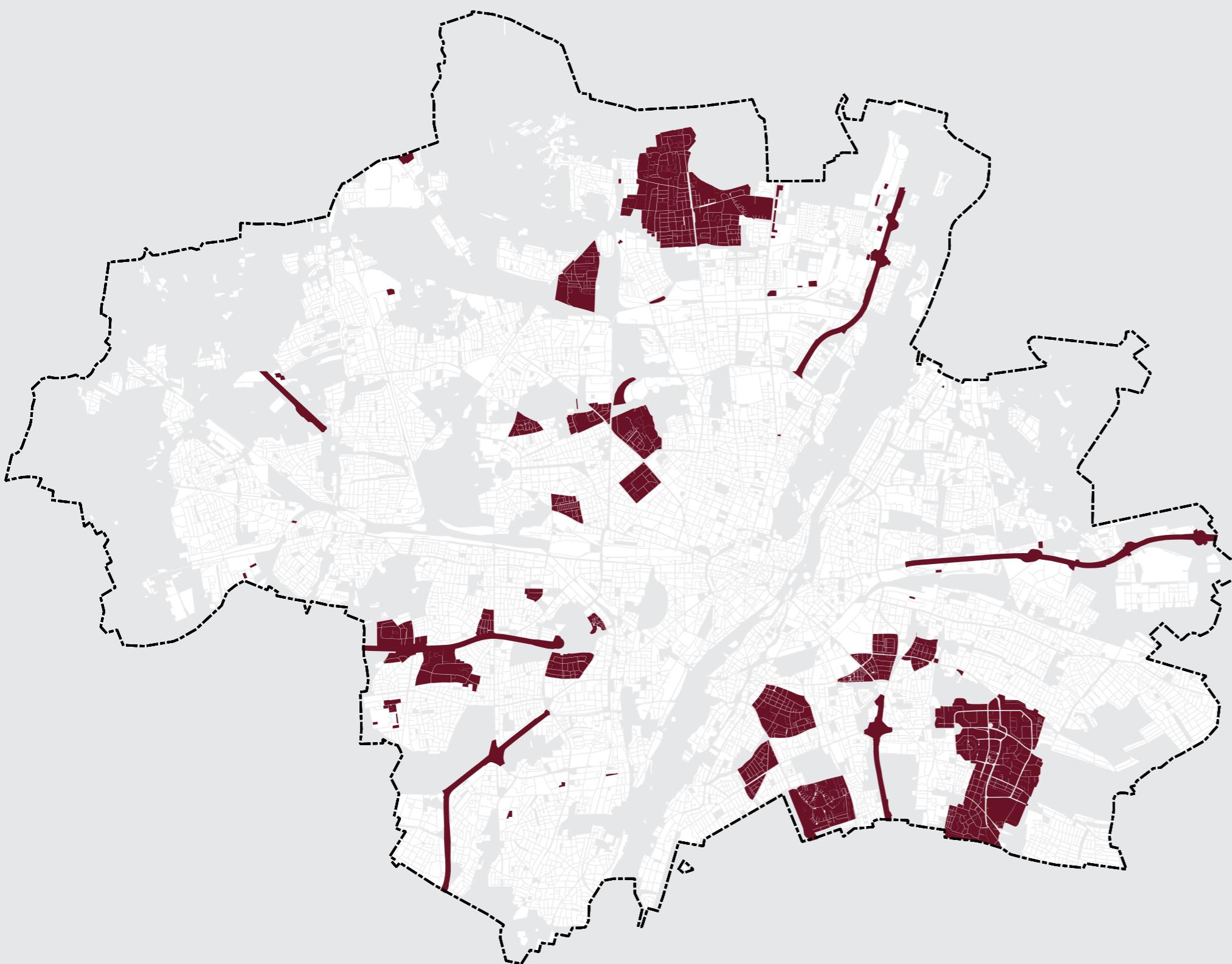


POTENTIALS
Transform - Selected

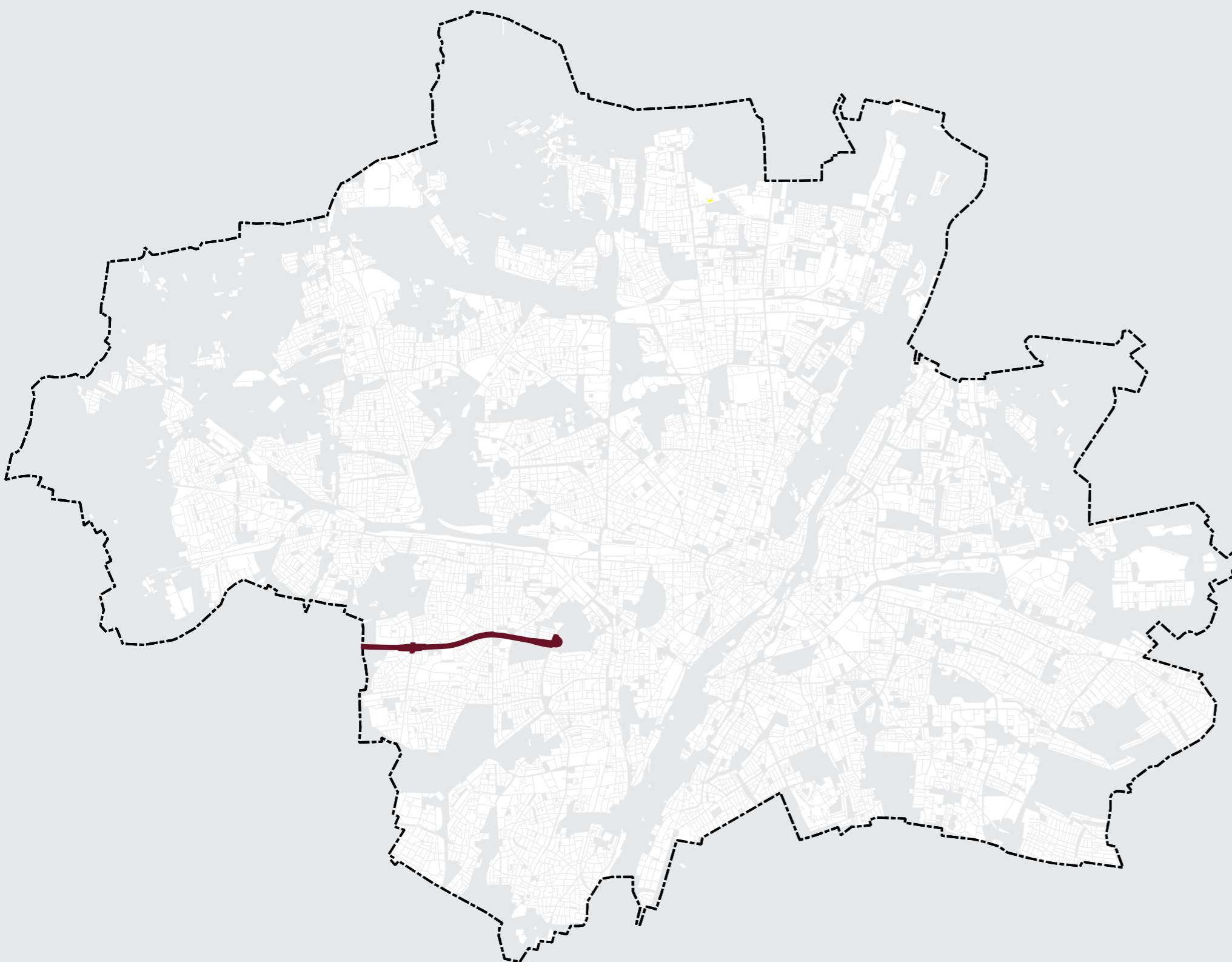


POTENTIALS
Densify - Public Housing



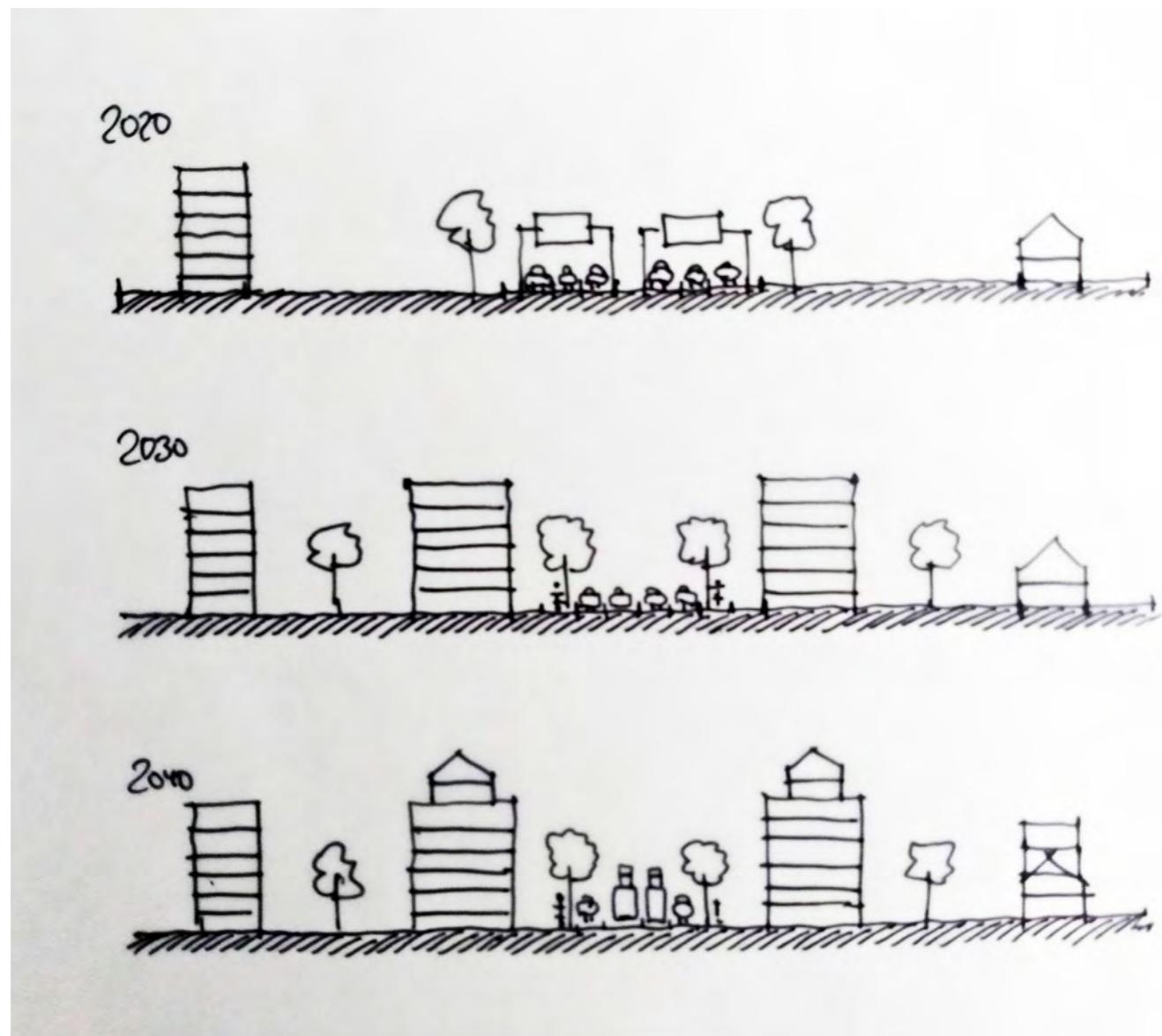


DESIGN
Explorations

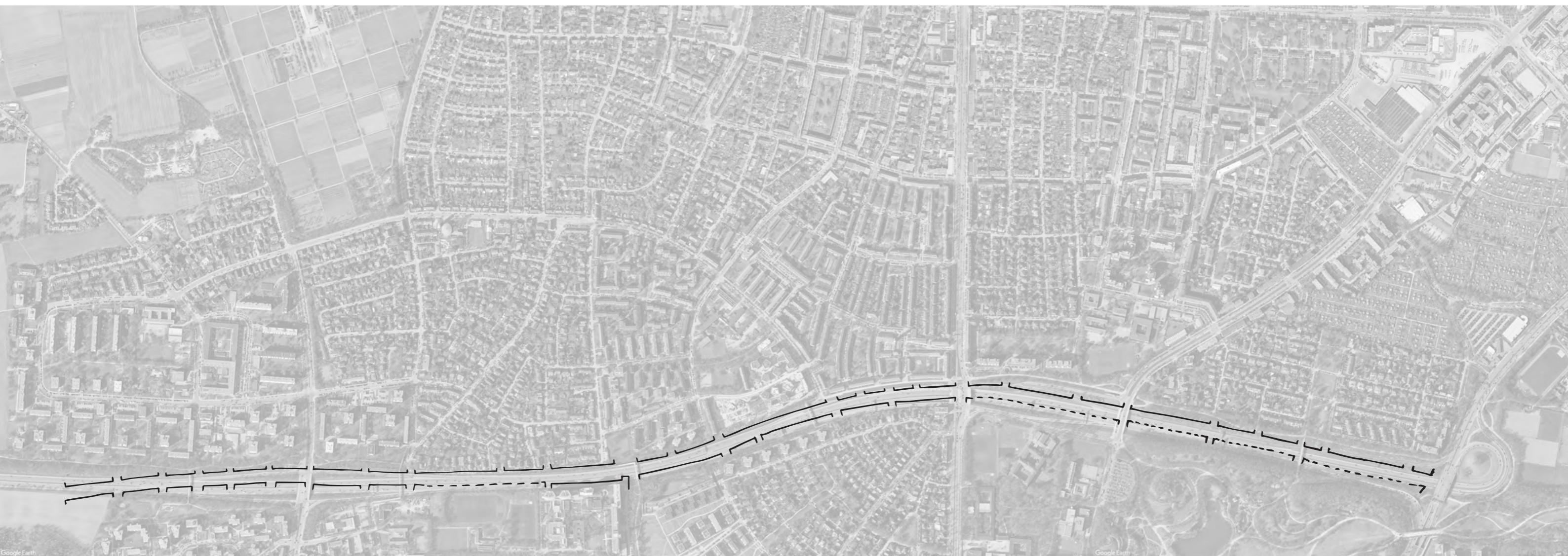


SITE SELECTION
A96 - Westpark





HIGHWAY → BOULEVARD
Section

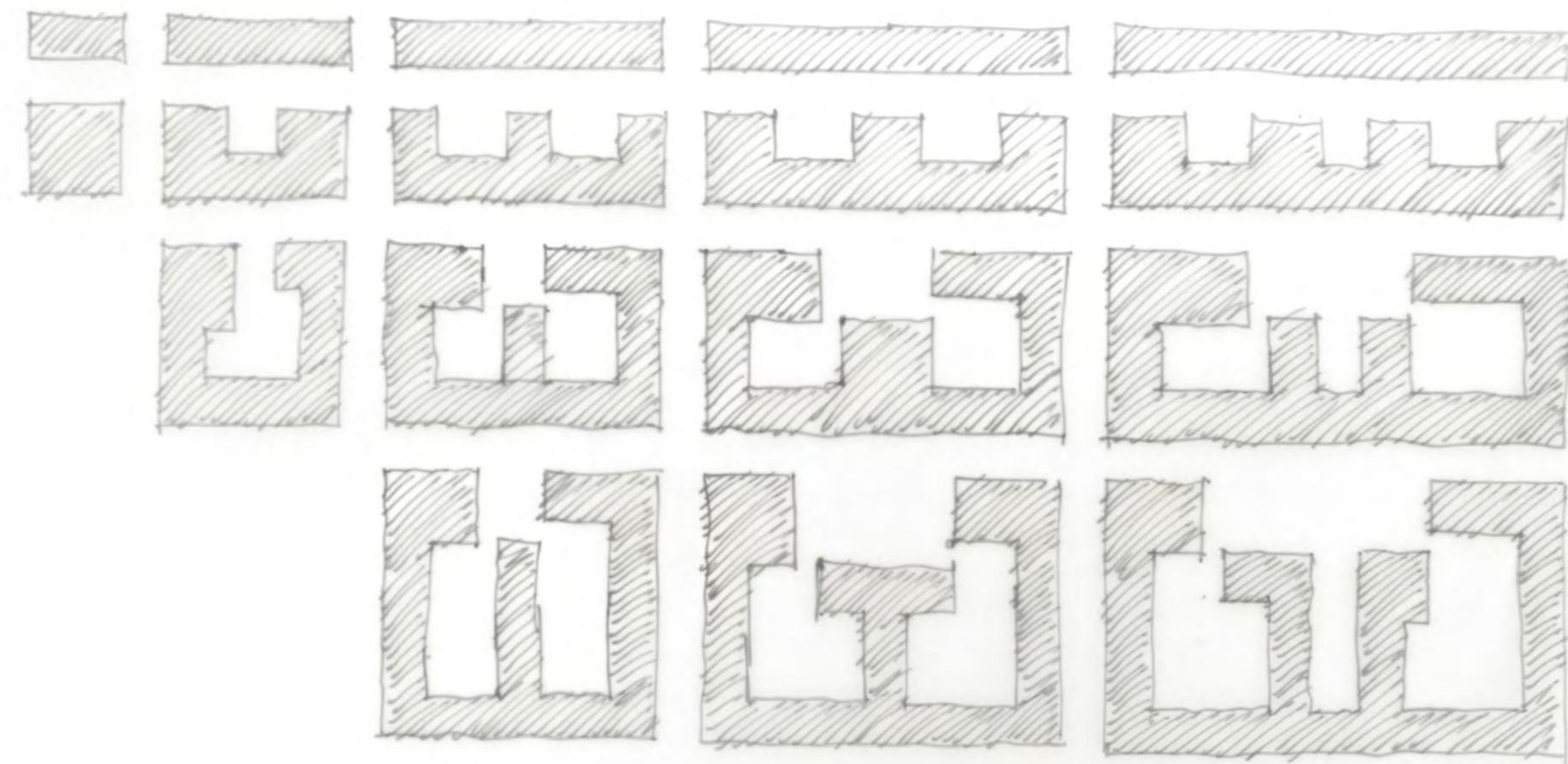




THEODOR FISCHER
"Staffelbauplan"







DUPLEX
Hunziker Areal

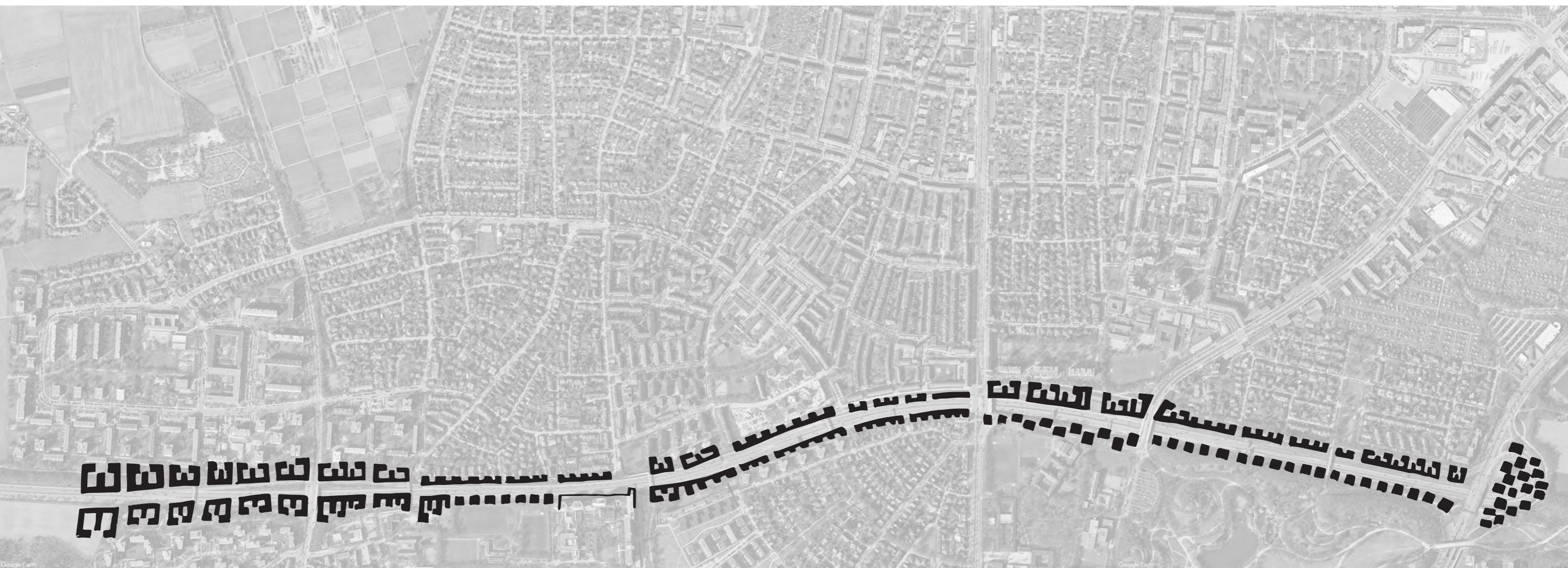


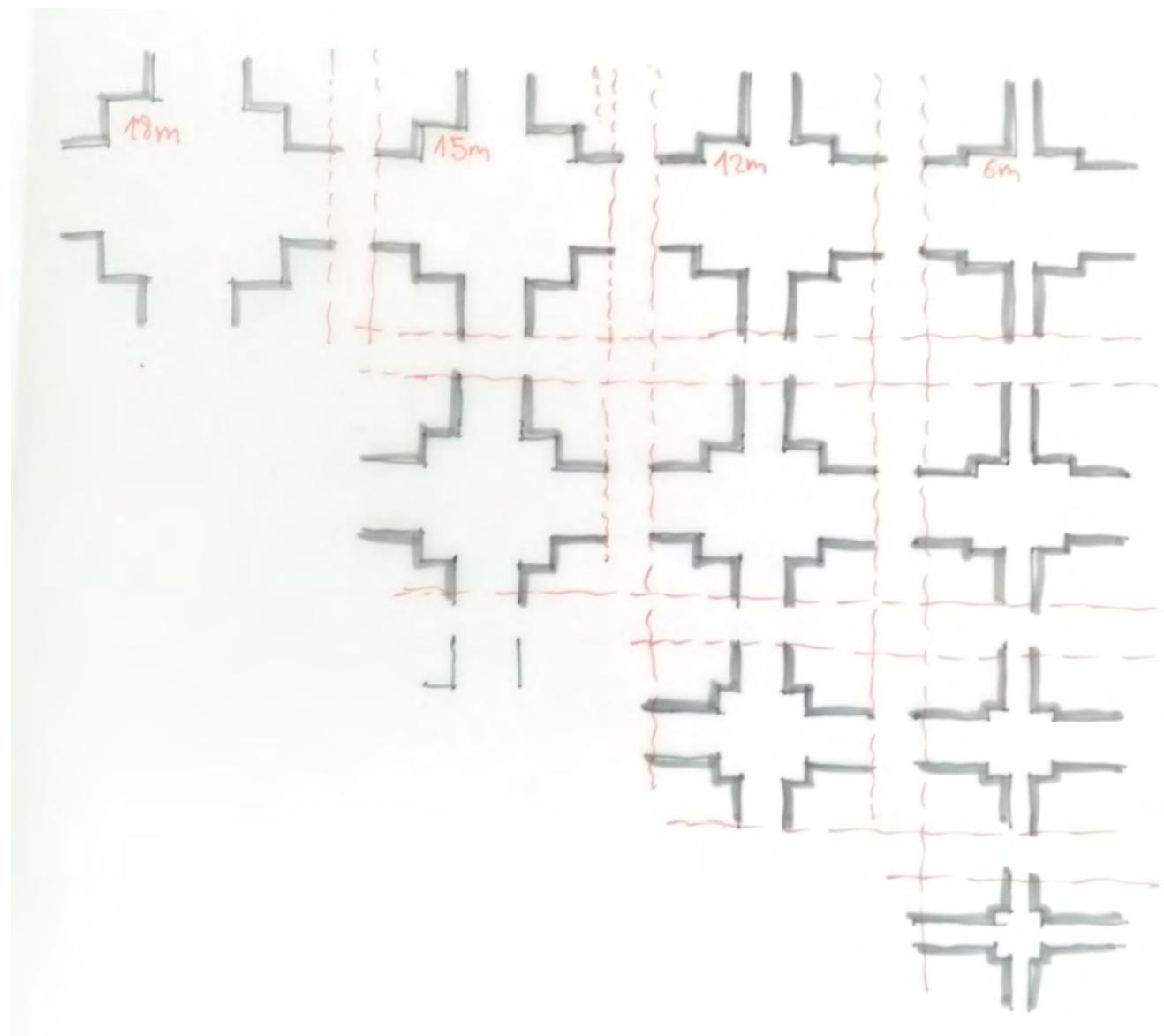
FLORIAN KRIEGER
Bad-Schachener-Straße



HILD UND K. BALLMOOS KRUCKER
Freiham Nord 2.RA



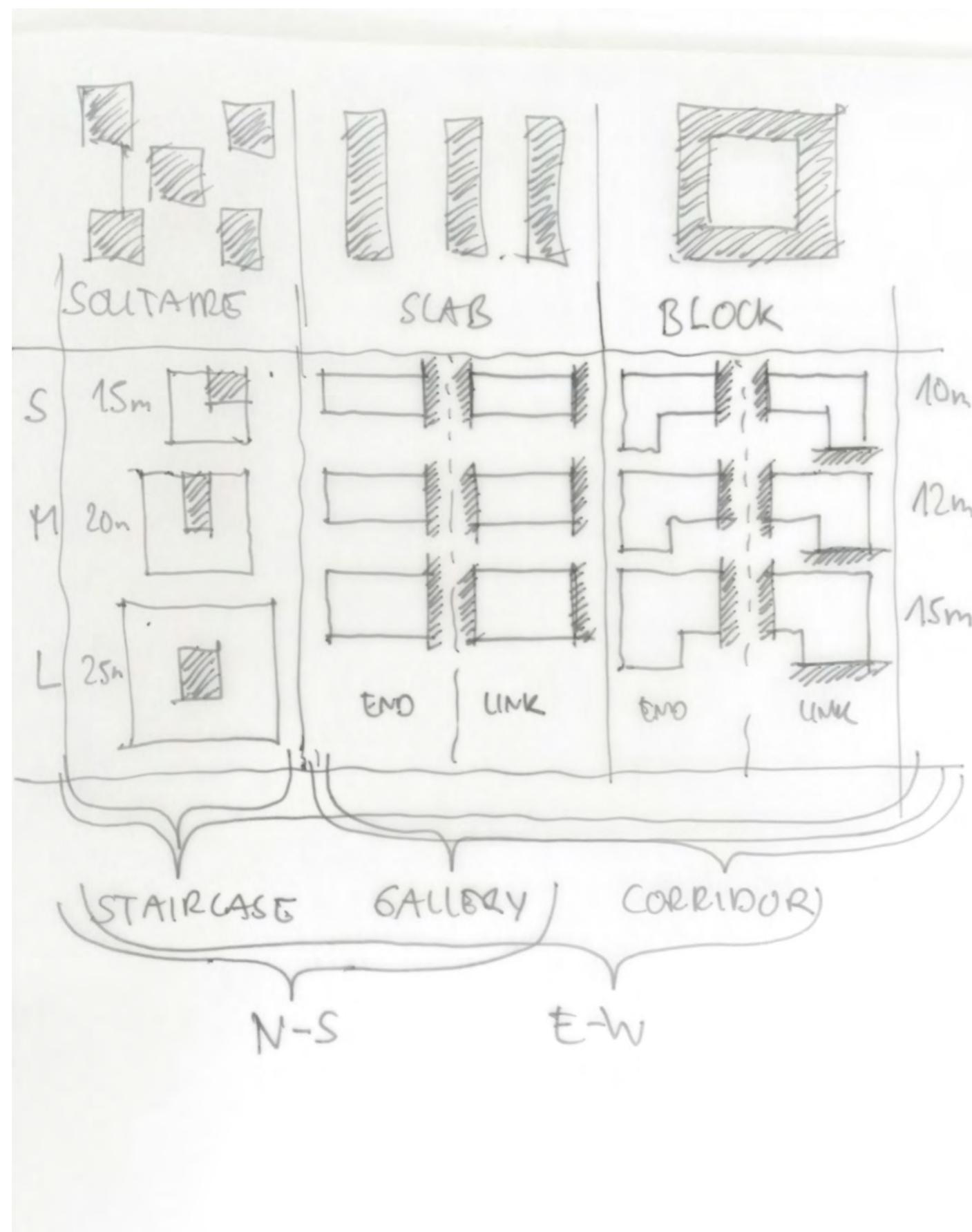


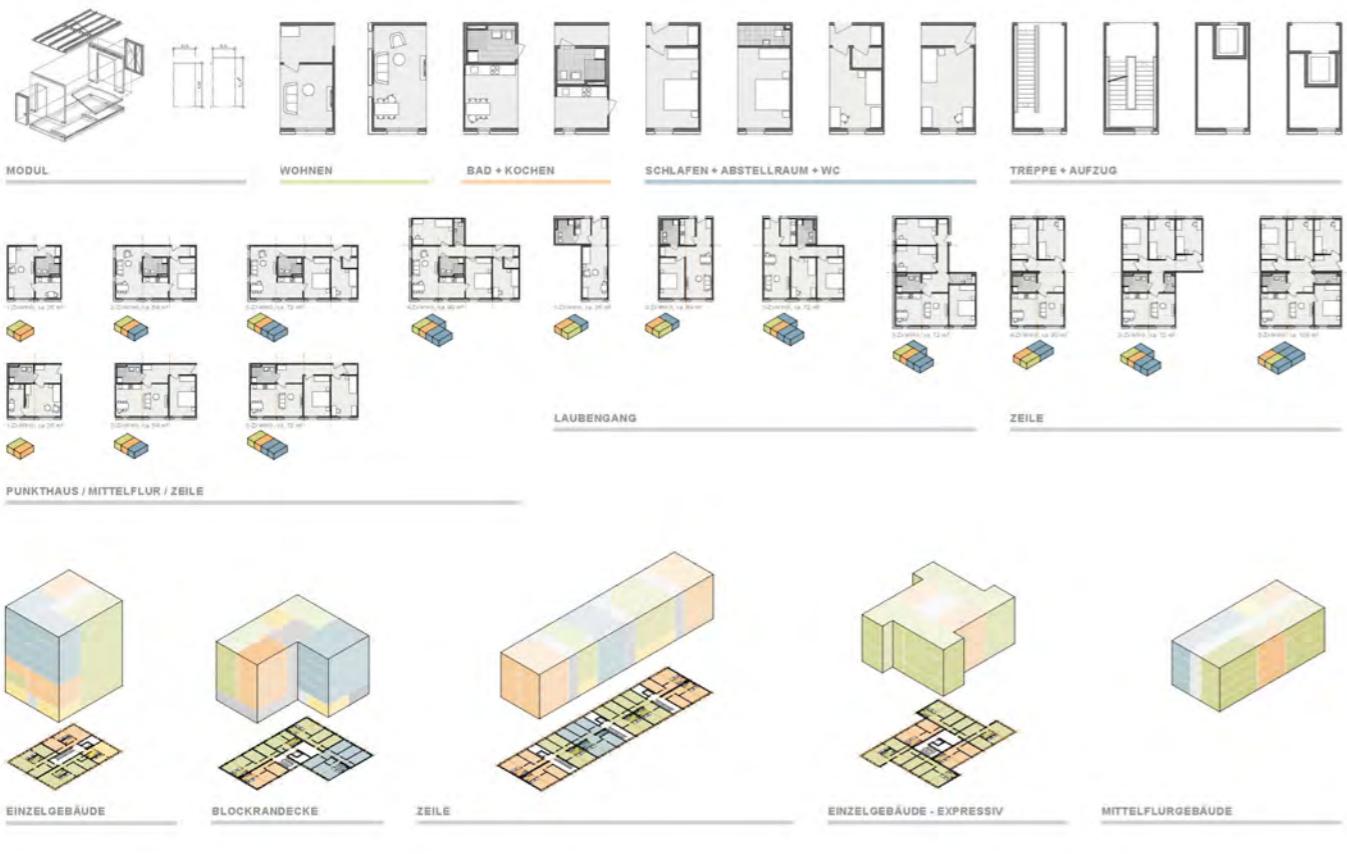


BLOCK CORNERS
Adaptive Sizes



- █ ESSENTIAL WORKERS - 25%
- █ YOUNG CREATIVES - 20%
- █ STUDENTS - 10%
- █ SINGLE PARENTS - 10%
- █ YOUNG FAMILIES - 20%
- █ ONLY ELDERLY - 15%





INTRODUCTION

PERSONAL RELEVANCE



SOCIETAL RELEVANCE



Warum der Staat die hohen Mieten bekämpfen sollte

Immobilienmärkte funktionieren anders als Lehrbuchmodelle. Eingriffe in Mietmarkt sind weniger schädlich, als oft behauptet. Gefragt ist ein intelligenter Mix der Instrumente, meint ein Ökonom im Gastbeitrag.

Von SEBASTIAN DULZER



14. Juni 2018, 14:00 Uhr - Berlin-Ungeschoß
Immobilienboom spaltet Deutschland in Arm und Reich
→ Der Immobilienboom verzerrt in Deutschland die Preise für Wohnungen und Mieten stark an.
→ Wissenschafter der UfG haben nun untersucht, wie viel davon Vermögenshüter profitiert und wie nicht.
→ Das Ergebnis: Von steigenden Mietpreisen profitieren nur allein die reichen unter Provinz, während Menschen mit geringem Einkommen nur leidet

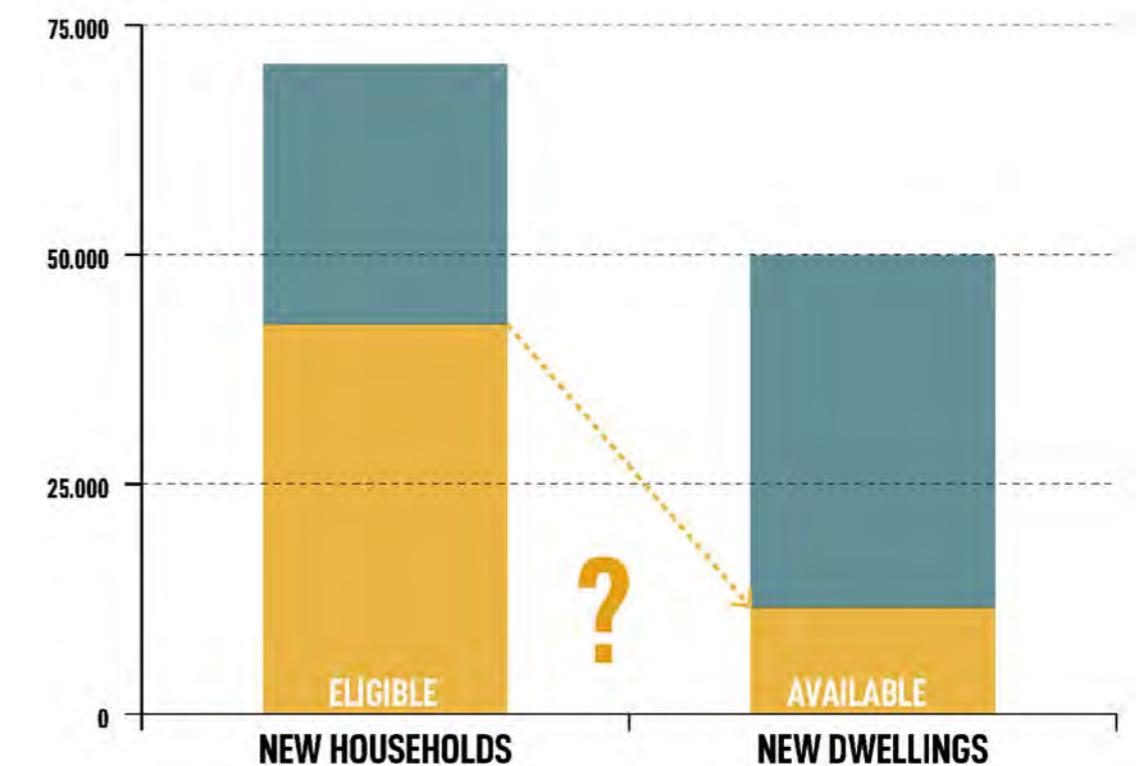
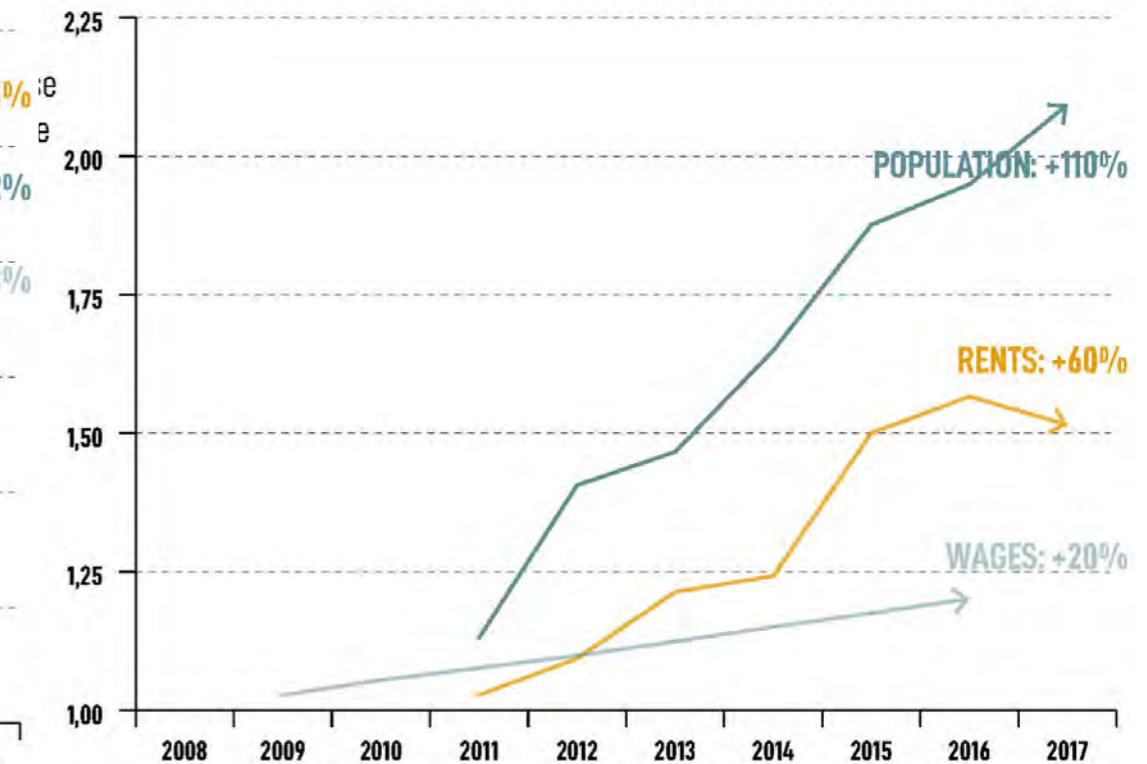
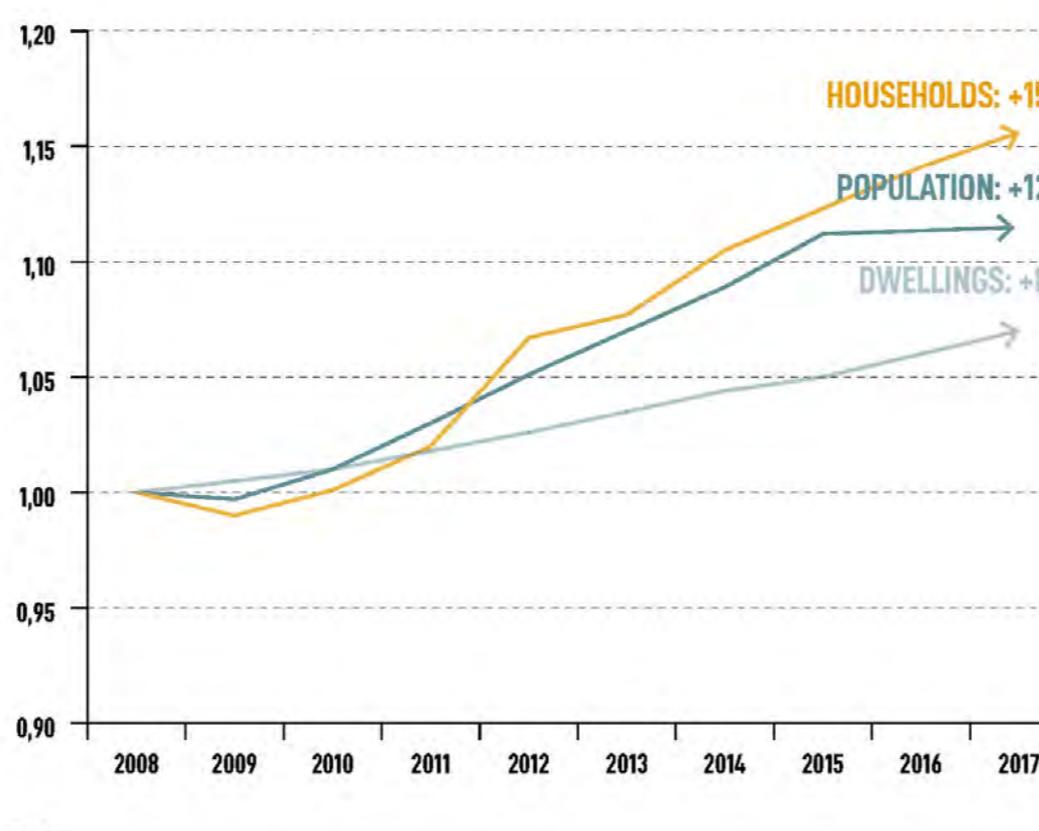
von Alexander Riegger



PROBLEM FIELD

TENDENCIES:

- high demand, low supply of low cost housing, which leads to increasing house prices and lower accessibility of housing in low/mid income groups.
- city aims to make affordable housing accessible to 60 percent of the population, however, only 10 perc. on a yearly basis has access.
- Therefore, the biggest resonable economic burden is among those who are not considered as the higest priority group eligible for affordable housing, but yet they earn too little to afford free marked housing.



THEORY

AFFORDABILITY

WHAT IS AFFORDABILITY?

- No consistent definition
- Dependent on specific social norms
- Differs by culture, country and city
- Can be described by its two dimensions - reasonable economic burden and spatial quality (Elsinga, et. al, 2015)

WHAT DEFINES REASONABLE ECONOMIC BURDEN?

INCOME / EXPENSES

1. living expenses (not relevant for the thesis)

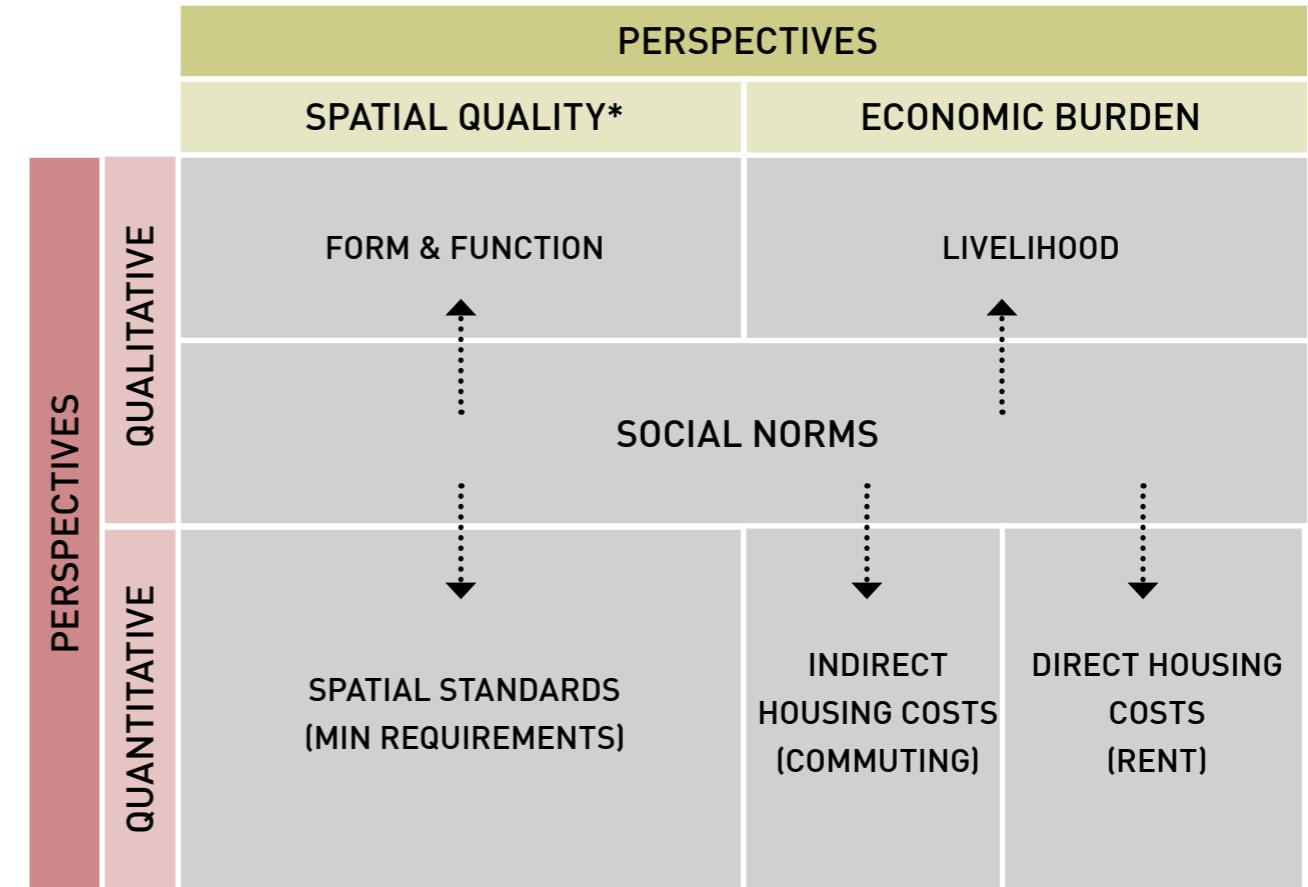
2. housing related expenses.

2.1 gross rent

2.1.1 net rent

2.1.2 utility / energy cost

2.2 commuting (to jobs, and facilities (education, culture, recreation, shopping, health services) costs.



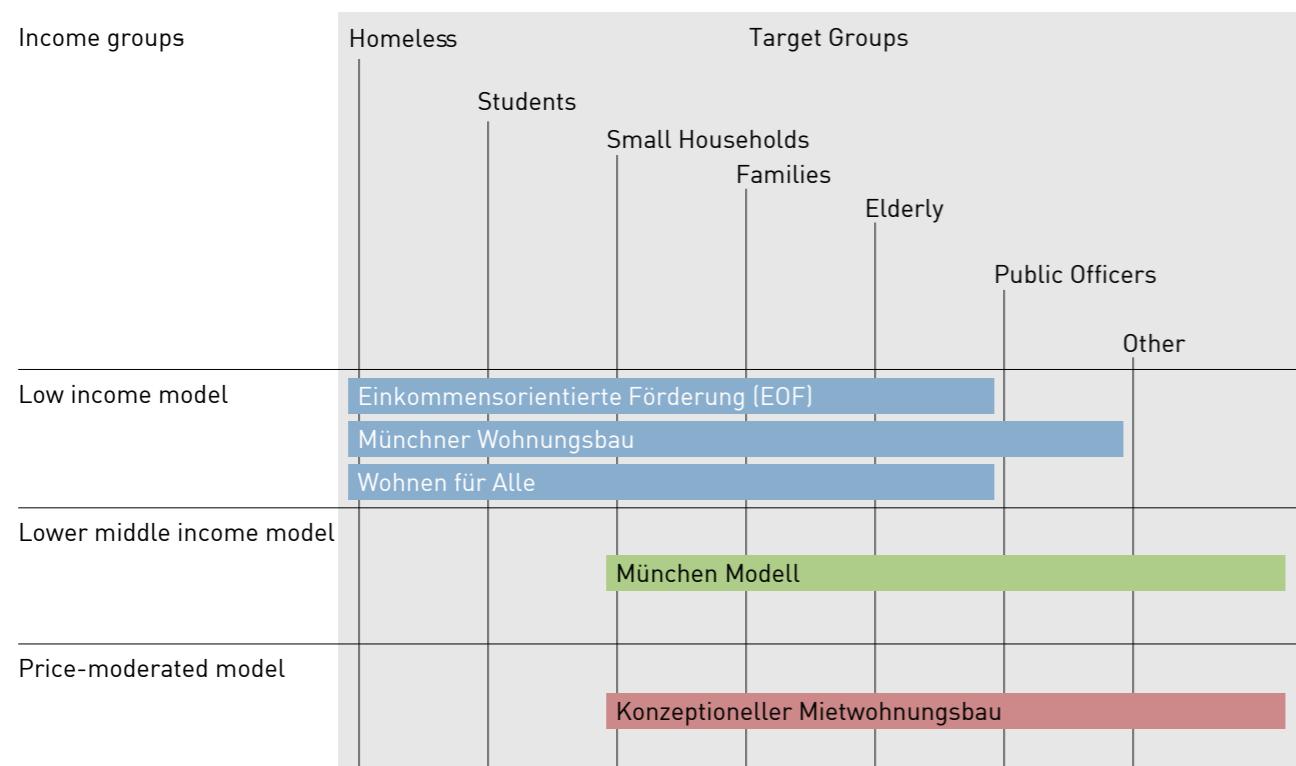
DIRECT COSTS

1 SUPPLY & DEMAND LOCATION & LAND	2 SUPPLY & DEMAND PROVIDER	3 SUPPLY & DEMAND FINANCING	1 SUPPLY & DEMAND LOCATION & LAND	2 SUPPLY & DEMAND PROVIDER	3 SUPPLY & DEMAND FINANCING
MACRO (CITY & REGION) Jobs, global connections, regional attractions MESO (NEIGHBOURHOOD Parks, public transport, safety MESO (BUILDING) Orientation, light, noise, air	ECONOMIC MODEL Private profit-oriented vs public/social oriented landlord	INTEREST RATES Investment incentives in real estate sector, competition	UTILISE Un- & underused Public Land <ul style="list-style-type: none"> • Public housing estates • Extensive Infrastructure • Greyfieds 	INCENTIVISE Non-Profit Providers <ul style="list-style-type: none"> • Public housing • Cooperatives • Community builders • Capped private rent 	REDISTRIBUTE Private Rent Profits <ul style="list-style-type: none"> • Cross-Finance
4 CONSTRUCTION COSTS BUILDING INDUSTRY	5 CONSTRUCTION COSTS BUILDING DESIGN	6 CONSTRUCTION COSTS SITE CONDITIONS	4 CONSTRUCTION COSTS BUILDING INDUSTRY	5 CONSTRUCTION COSTS BUILDING DESIGN	6 CONSTRUCTION COSTS SITE CONDITIONS
Scarcity of workforce, construction activity vs capacity, scarcity of materials (copper)	Spatial Efficiency Material choice Technological requirements Design costs (Standardisation)	Soil conditions, unusual plot dimensions, etc.	INCENTIVISE Use of Standardised Building Systems <ul style="list-style-type: none"> • Modularise • Prefabricate • Automate 	OPTIMISE Spatial & Technological Efficiency <ul style="list-style-type: none"> • min non-rented space • min space per person • min tech 	OPTIMISE Simpler Condition
7 CONSTRUCTION COSTS PROCESS COMPLEXITY	8 LIFE-CYCLE COSTS ENERGY PERFORMANCE	9 LIFE-CYCLE COSTS FACILITY MANAGEMENT	7 CONSTRUCTION COSTS PROCESS COMPLEXITY	8 LIFE-CYCLE COSTS ENERGY PERFORMANCE	9 LIFE-CYCLE COSTS FACILITY MANAGEMENT
multiple stakeholders, conflicting demands	Insulation quality and size of building envelope Technical appliances	Choice of materials, size of non-rented space, size of public space, choice of plants	PRIORITISE Single Ownership (Short Term)	OPTIMISE Building Envelope & Technical Appliances <ul style="list-style-type: none"> • compactness • insulation • solar panels, heat pump... 	OPTIMISE Spatial Efficiency INCENTIVISE Maintainance by Users PRIORITISE Low-Maintainance Plants and Materials

INDIRECT COSTS

I	PROXIMITY TO PUBLIC TRANSPORT	II	DEVELOPED SLOW TRAFFIC NETWORK
<ul style="list-style-type: none">• Build around public transport stops• Introduce public transport in new developments			<ul style="list-style-type: none">• create slow traffic network and connect to the city network
III	WALKABILITY	IV	PROXIMITY TO AMENITIES
<ul style="list-style-type: none">• create dense pedestrian route network			<ul style="list-style-type: none">• facilitate mixed-use typologies that can accommodate cultural, educational, healthcare amenities, shopping within 15 min walking/cycling• build close to areas which have a high density of amenities

USERS



	Rent	Duration	Wohnungsgrößen			Sonstige Communal space Surroundings	
	affordable	short(<5 Years)	long(>5 Years)	broad dwelling mix	Small(<40 m ²)	Medium(40-80 m ²)	
Families	○		○	○	○	○	○
Small Households	○	○	○		○	○	○
Students	○	○			○		○
Public Officers	○	○	○	○	○	○	○
Elderly	○	○	○		○	○	○
Homeless	○	○		○	○	○	○

Structures	Measures	CITY	NEIGHBOURHOOD	BUILDING
ARCHITECTURE A	qualitative	Diversity of neighbourhoods Landmarks, icons skyline	Diversity of building types Landmarks, icons Block form	Architectural quality (aesthetics, haptics) Equipment / facilities Light conditions Private outdoor space (balconies, loggias, terraces)
	quantitative	Max height	Density (FSI district / fabric scale)	Use of apartment space (sqm/person) Density (fsi plot scale) Coverage (gsi plot scale)
GREEN & BLUE SPACE G	qualitative	City parks Nature areas surrounding city Waterfronts	Neighbourhood parks Pocket parks / local green Aplots / community gardens	Private green / garden Communal green / courtyard Green roofs / facades
	quantitative	Use of green space min (sqm/person) Proximity	Use of green space min (sqm/person) Proximity	Use of green space min (sqm/person) Proximity
PUBLIC & COMMUNAL SPACE C	qualitative	Main meeting points / hubs Sub centre network	Diversity of public space types Public / private transitions Size and proportions (scale) Programme (sports and play)	Communal spaces (meeting rooms)
	quantitative	Use of public space (sqm/person) Proximity	Use of public space (sqm/person) Proximity Open space ratio (OSR fabric / district scale)	Use of public space (sqm/person)
MOBILITY INFRASTRUCTURE P	qualitative	Cyclability (continuity of fast connections) Public transport quality (transfer options, routing diversity)	Walkability (richness of elements, active plinths) Cyclability (continuity of network, comfort) Diversity of public transport options	Accessibility (disabled people)
	quantitative	cyclability (density of fast connections, proximity to city destinations) public transport quality (network density, proximity to city destinations)	walkability (network density, width of sidewalks) cyclability (network density, width of lanes) proximity to public transport	accessibility norms
PROGRAMME F	qualitative	Yearly/Monthly/Weekly Culture Education Work Recreation Shopping Leisure Hotspots/clusters	Daily Culture Education Work Recreation Shopping Leisure Hotspots/clusters	Daily (optional) Culture Education Work Recreation Shopping Leisure Hotspots/clusters Functionality (layout) Communal programme
	quantitative	use of space of programme (sqm/person)	use of space of programme (sqm/person) mixed use index (mxi)	use of space of programme (sqm/person)
MICROCLIMATE C	qualitative	Comfort Perceived temperature Perceived air quality Climate safety	Comfort Perceived temperature Perceived air quality Climate safety	Comfort Perceived temperature Perceived air quality
	quantitative	Temperature (celsius) Air quality (microparticles uq/m3)	Temperature (celsius) Air quality (microparticles uq/m3)	Temperature (celsius) Air quality (microparticles uq/m3)
SOCIAL ASPECTS S	qualitative	Inclusivity Safety	Appropriation of public space Social cohesion Social and traffic safety (eyes on streets)	Appropriation of communal space Social cohesion Social safety
	quantitative	Crime Index	Crime Index	Crime Index

CITY ANALYSIS

CONCLUSIONS

ANALYSIS OF MUNICIPAL
PROJECTS SHOWS:

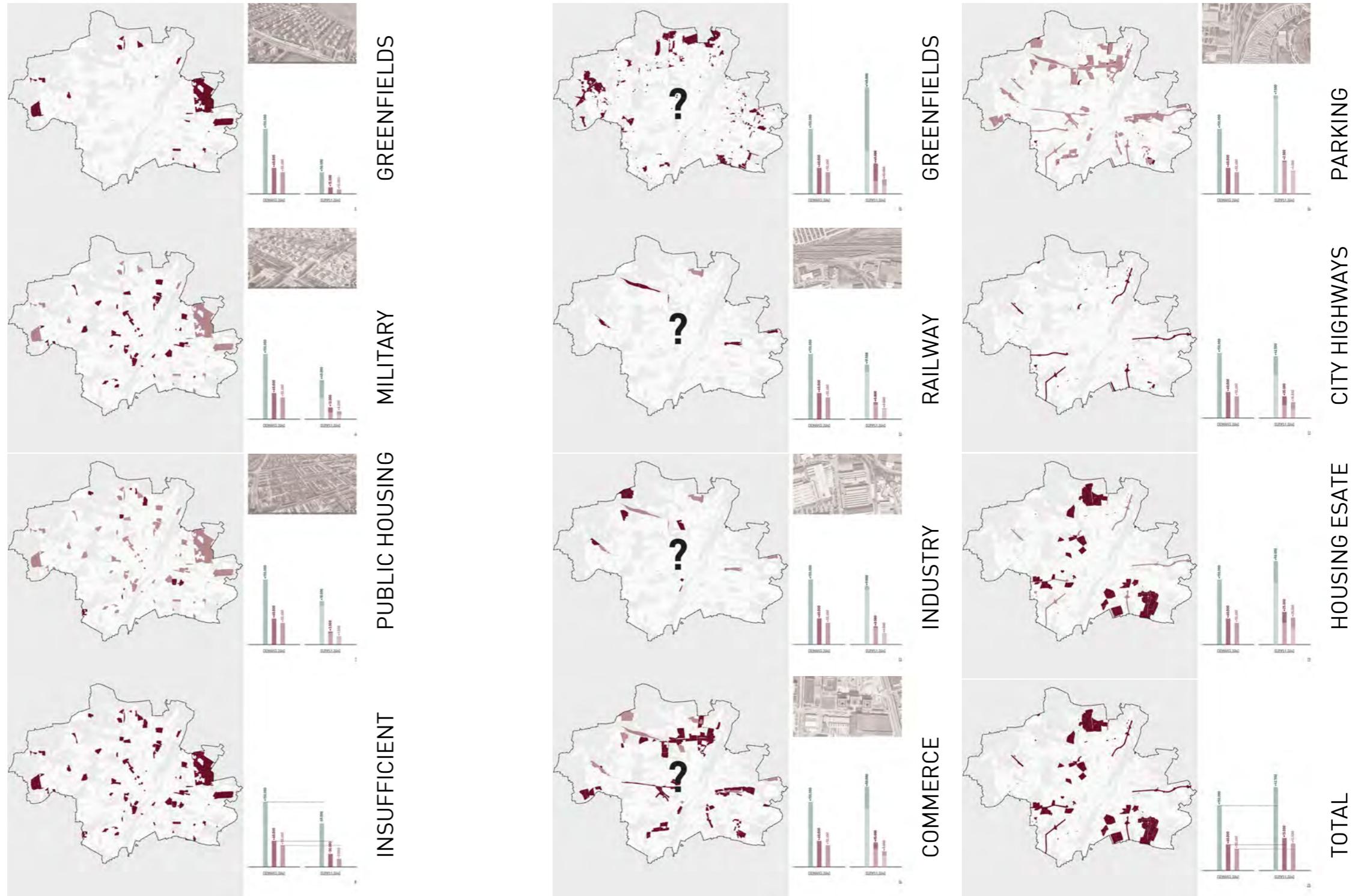
Business-as-usual Approaches
Are not Sufficient to realize enough
Affordable Housing!

Business-as-Usual:

- Industry
- Railways
- Military
- Moderate Public Housing Densification

Therefore, different approaches are required

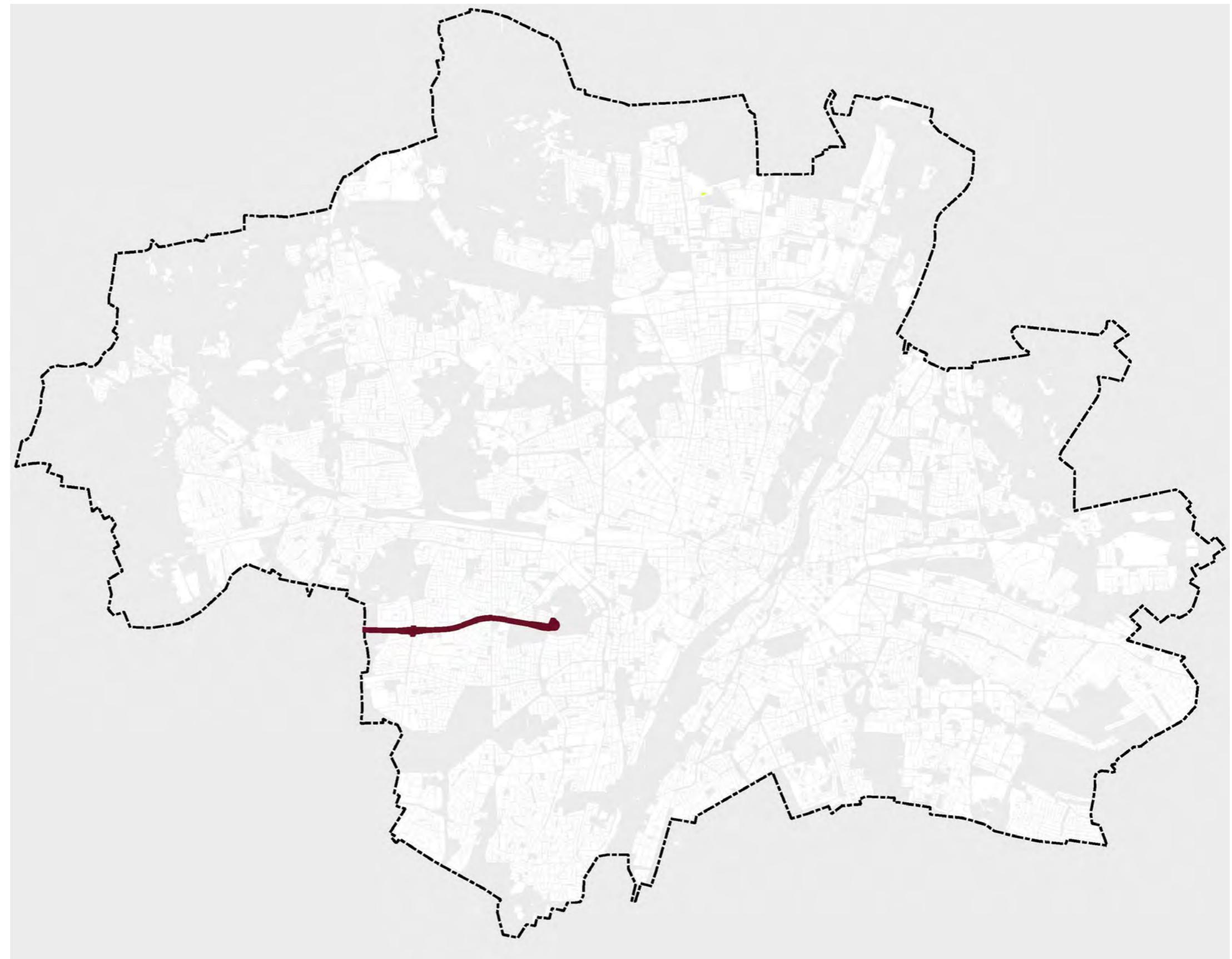
Infrastructure represents a powerful untapped public spatial ressource to realize affordable housing, while also tackling mobility transition and air and noise pollution.



SITE SELECTION

MUNICH, WESTPARK

A96 HIGHWAY AND ITS
SURROUNDING

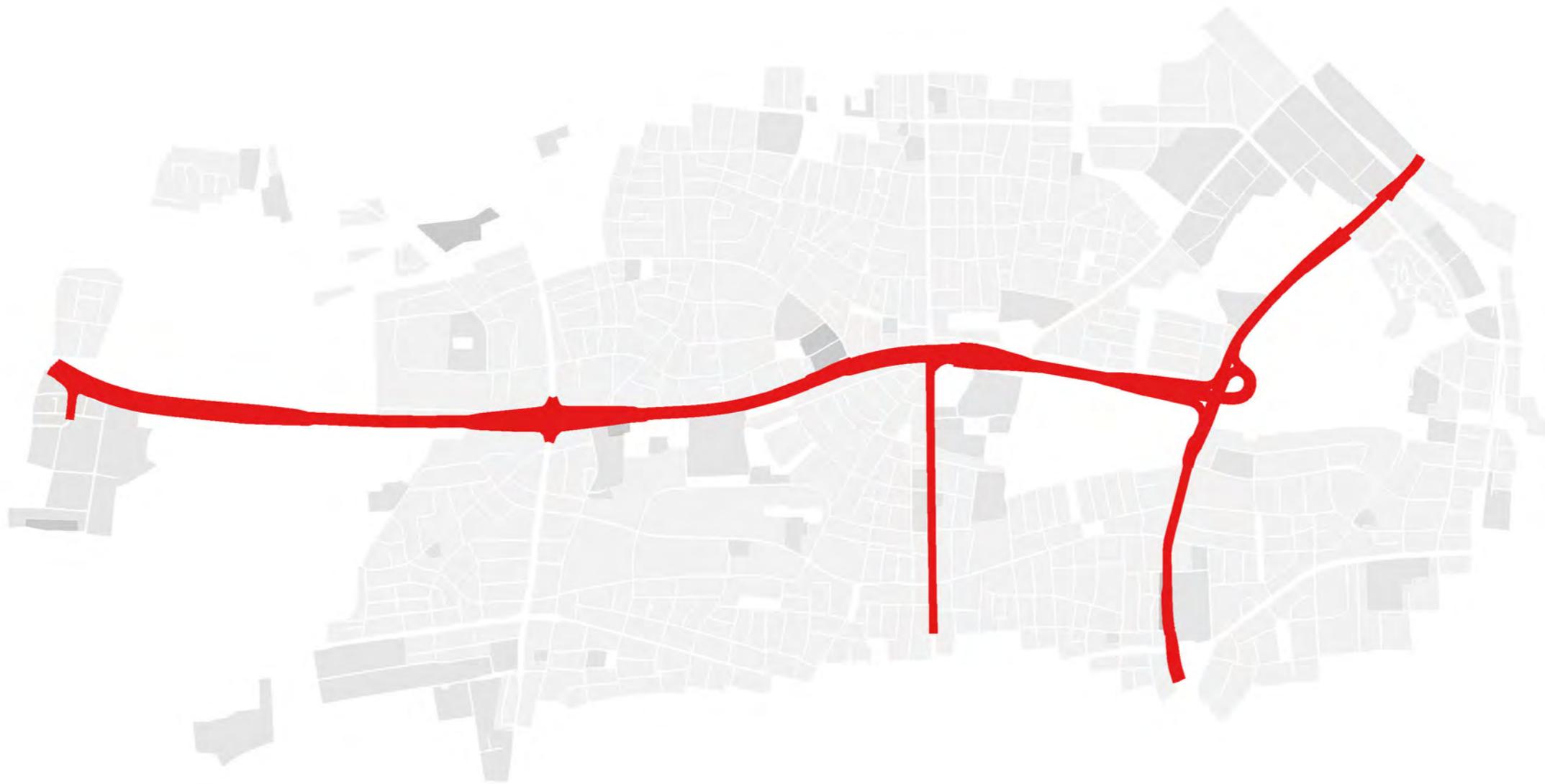


SITE ANALYSIS

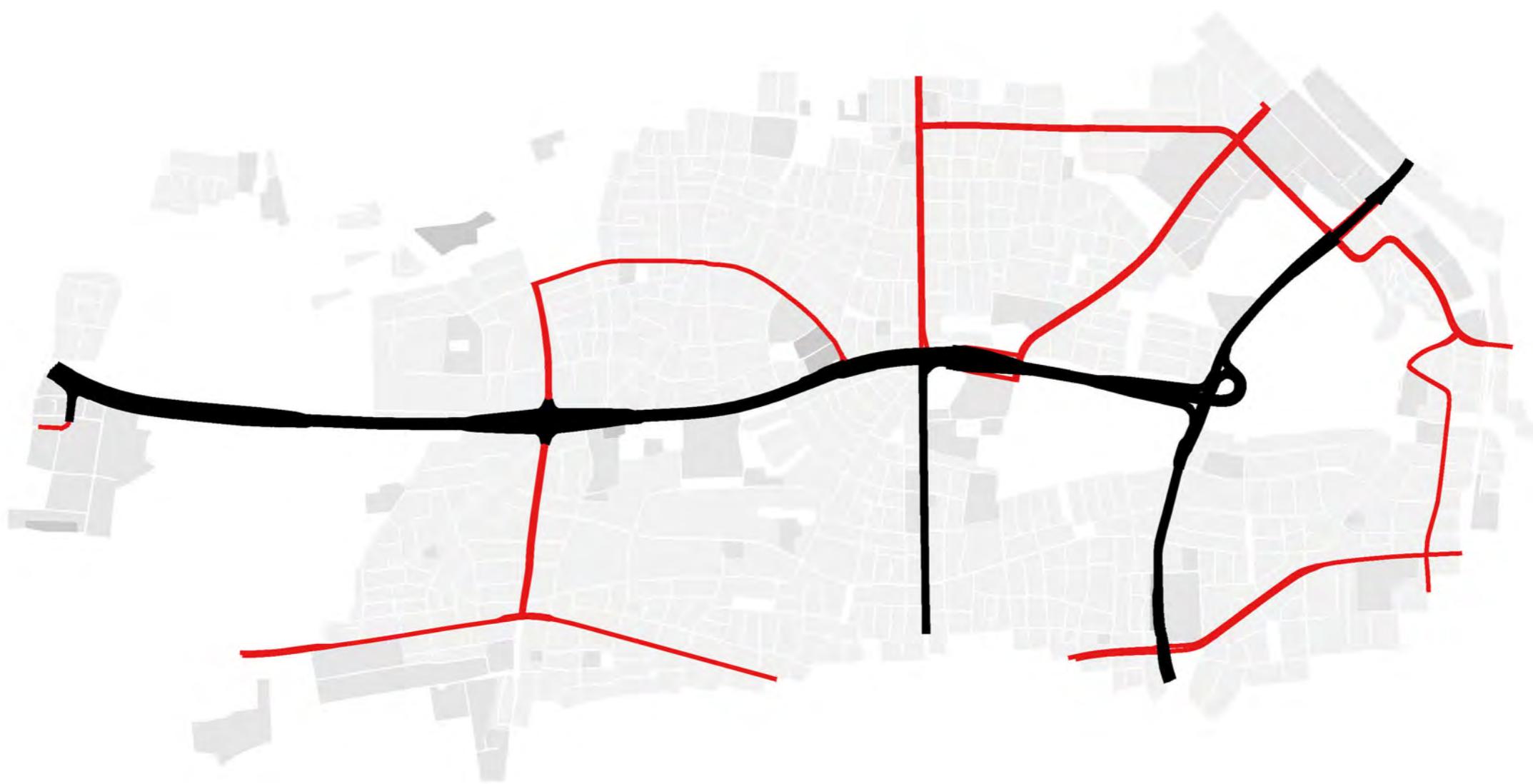
WESTPARK



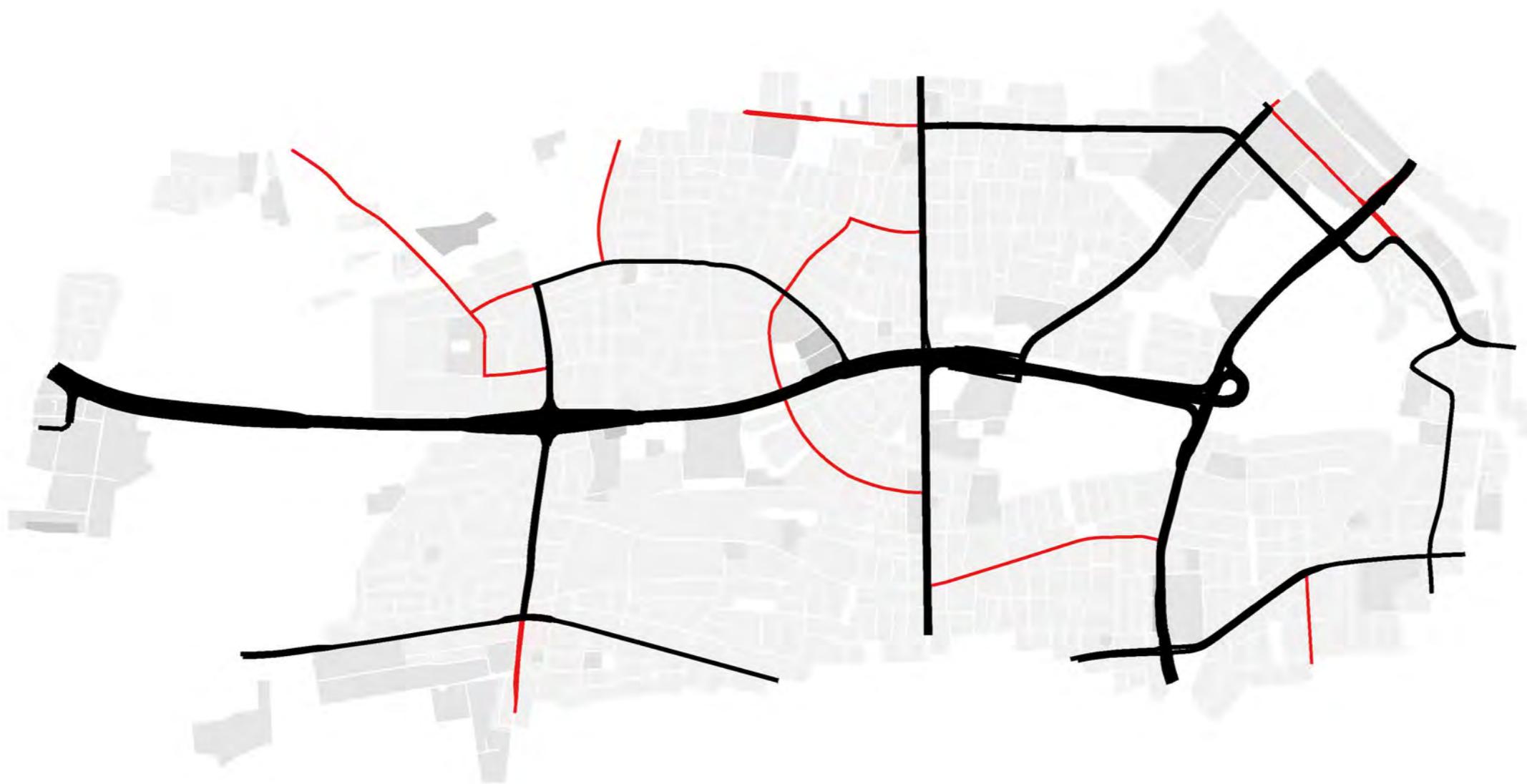
PRIMARY ROADS



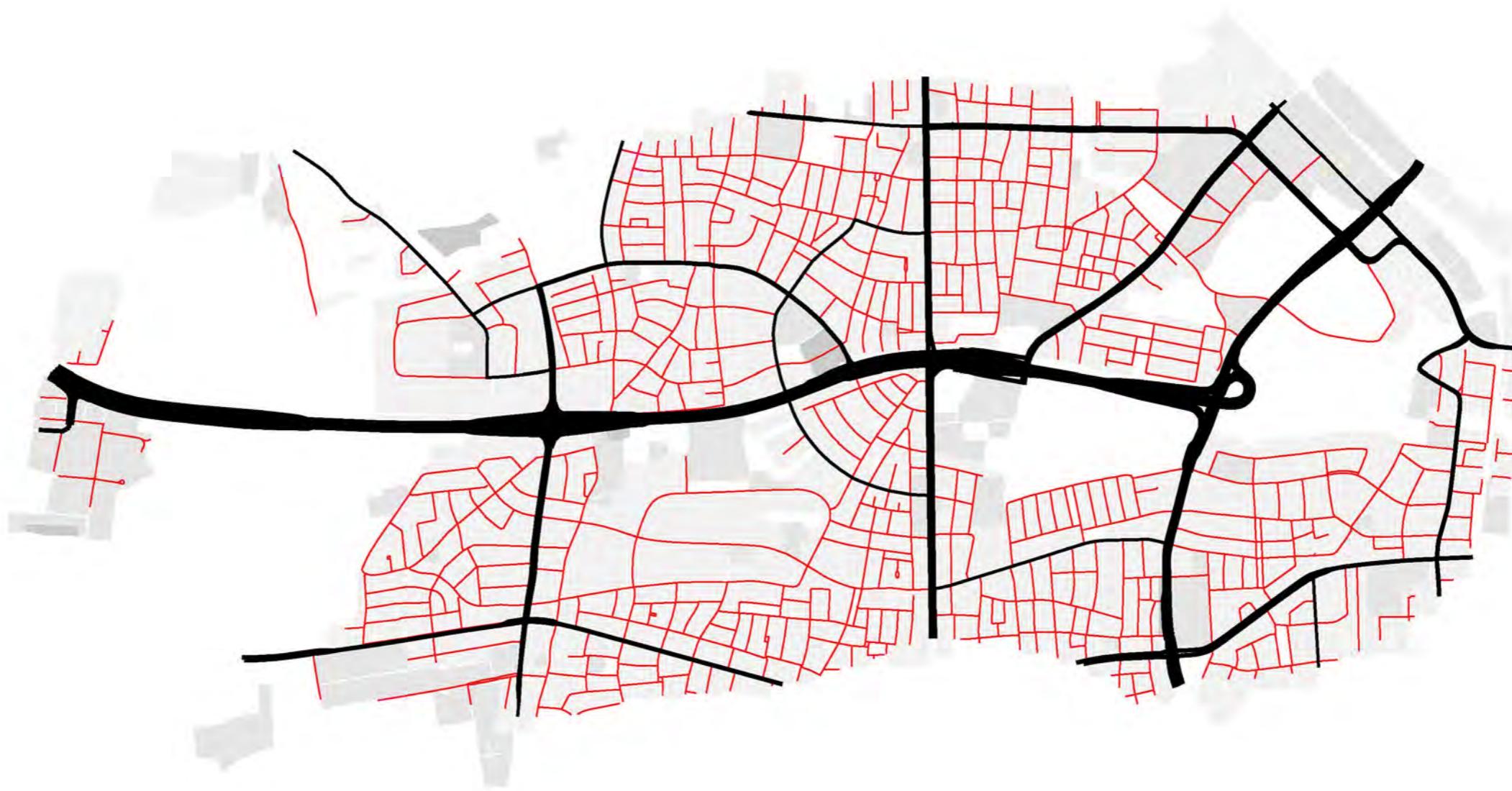
SECONDARY ROADS



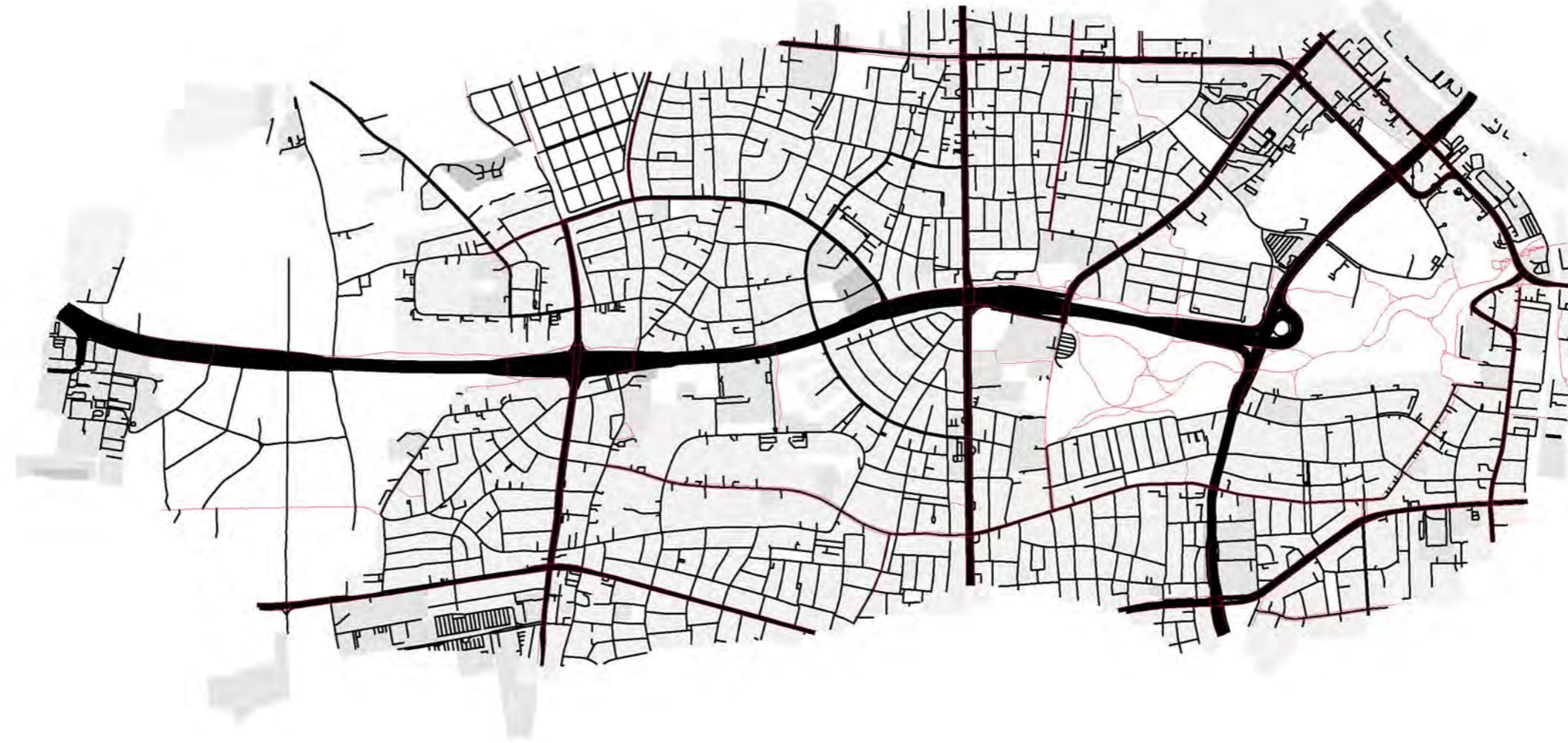
TERTIARY ROADS



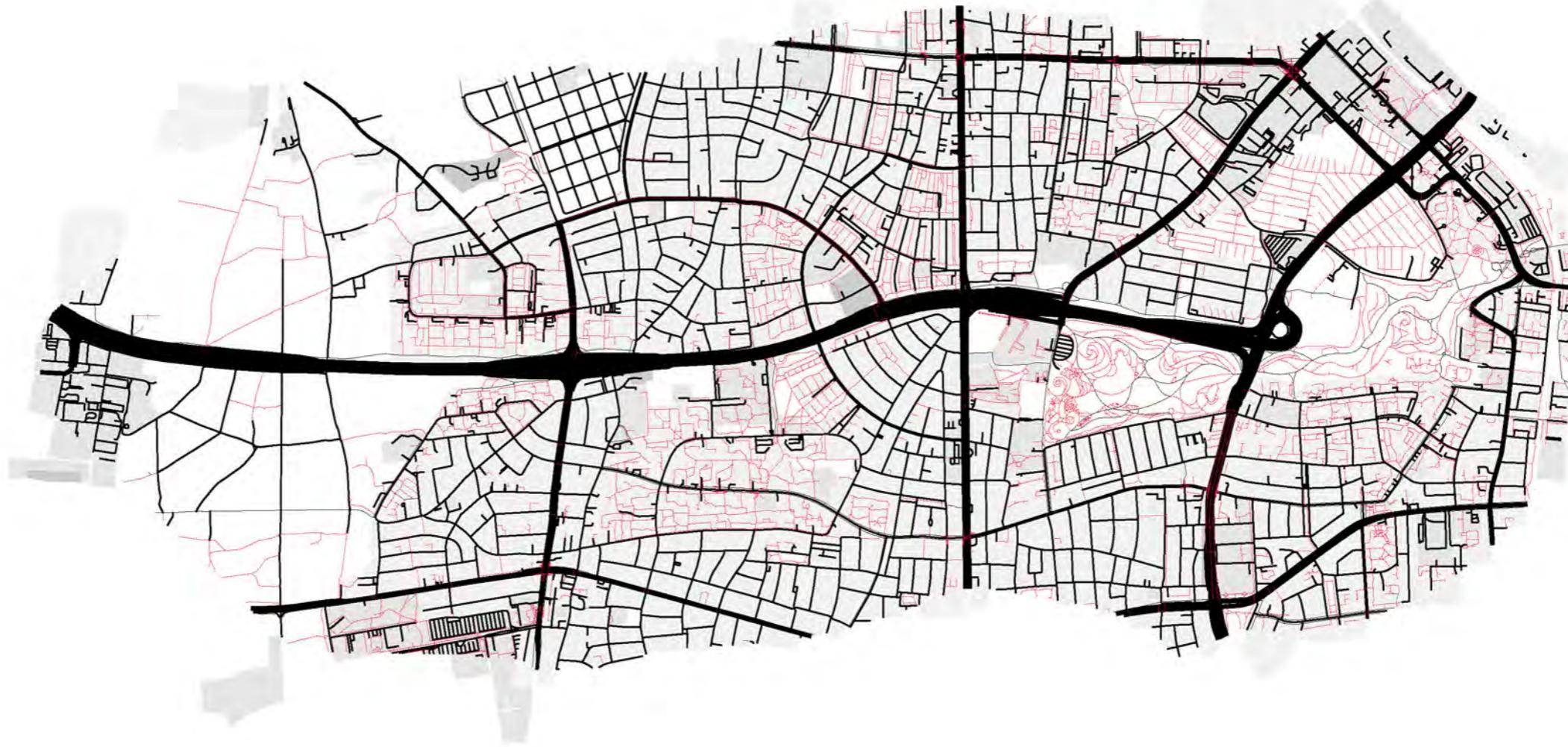
RESIDENTIAL ROADS



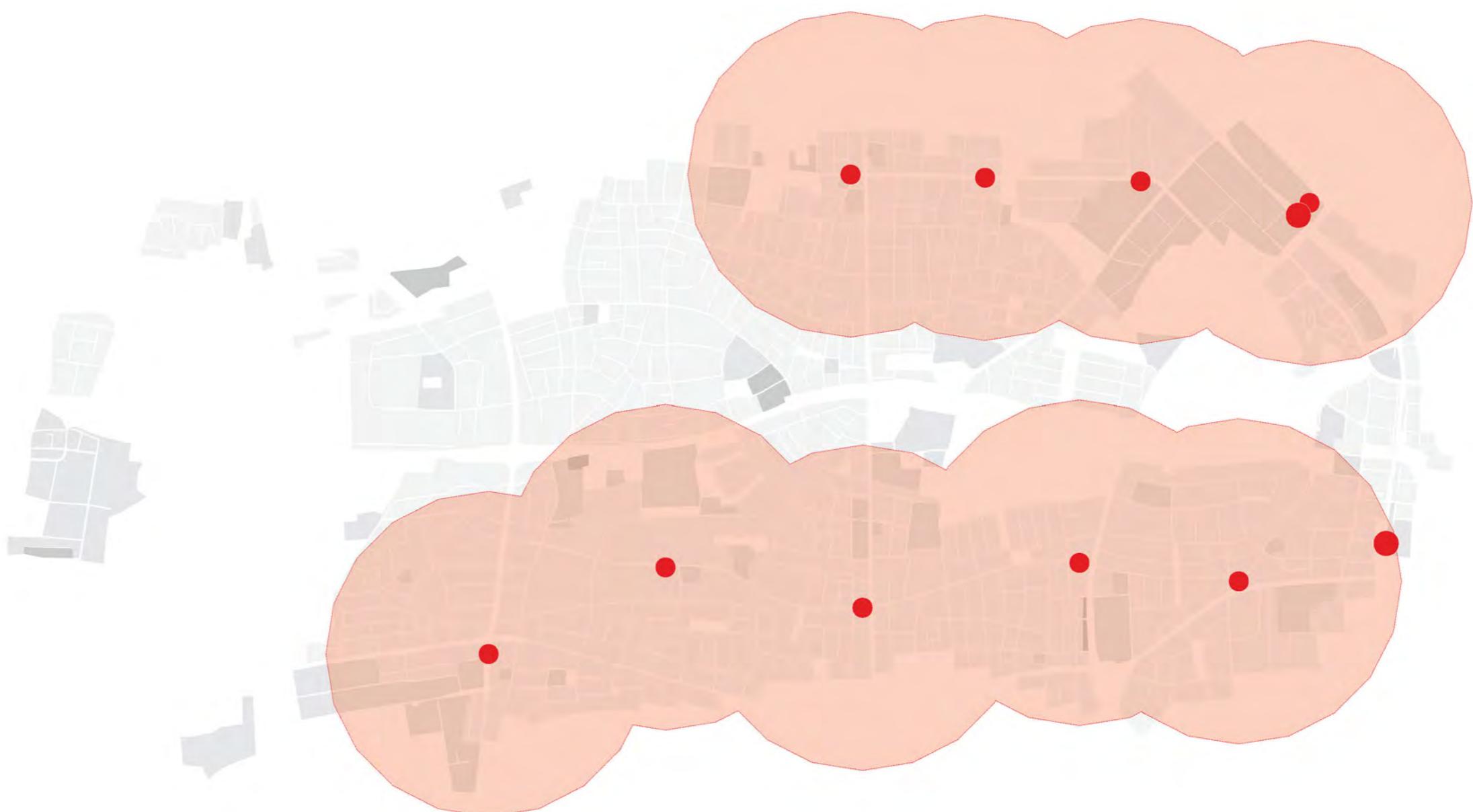
BICYCLE PATHS



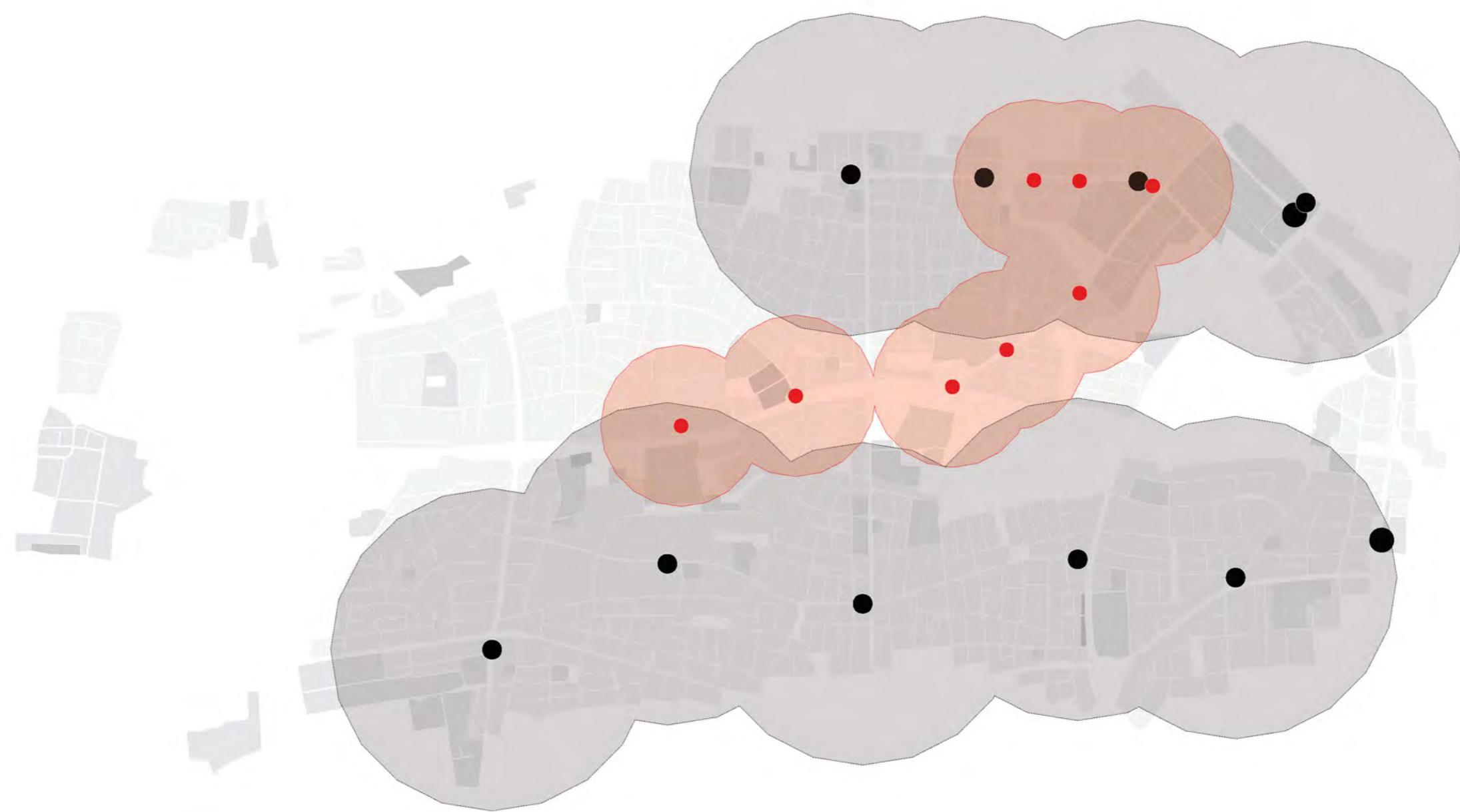
PEDESTRIAN PATHS



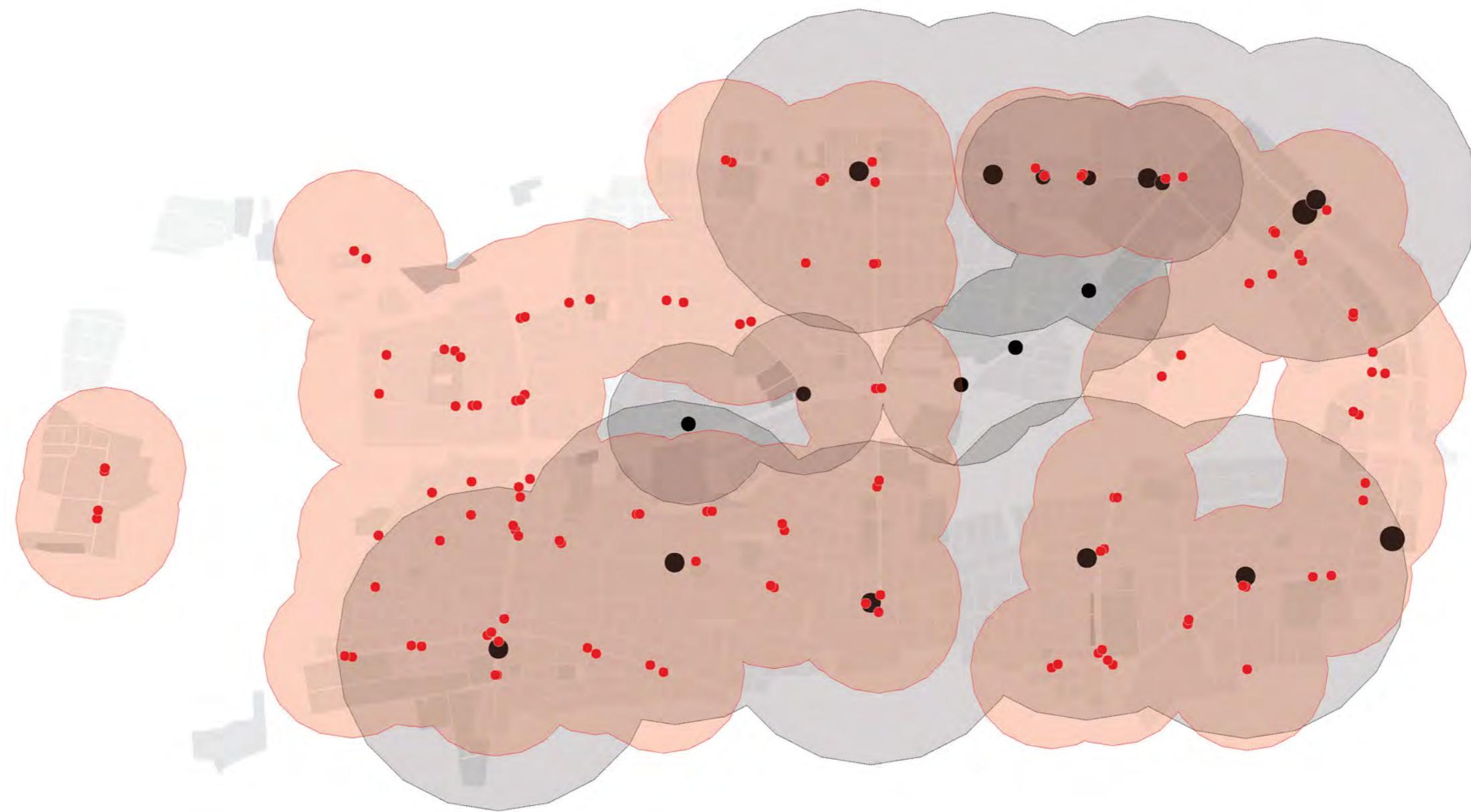
METRO COVERAGE



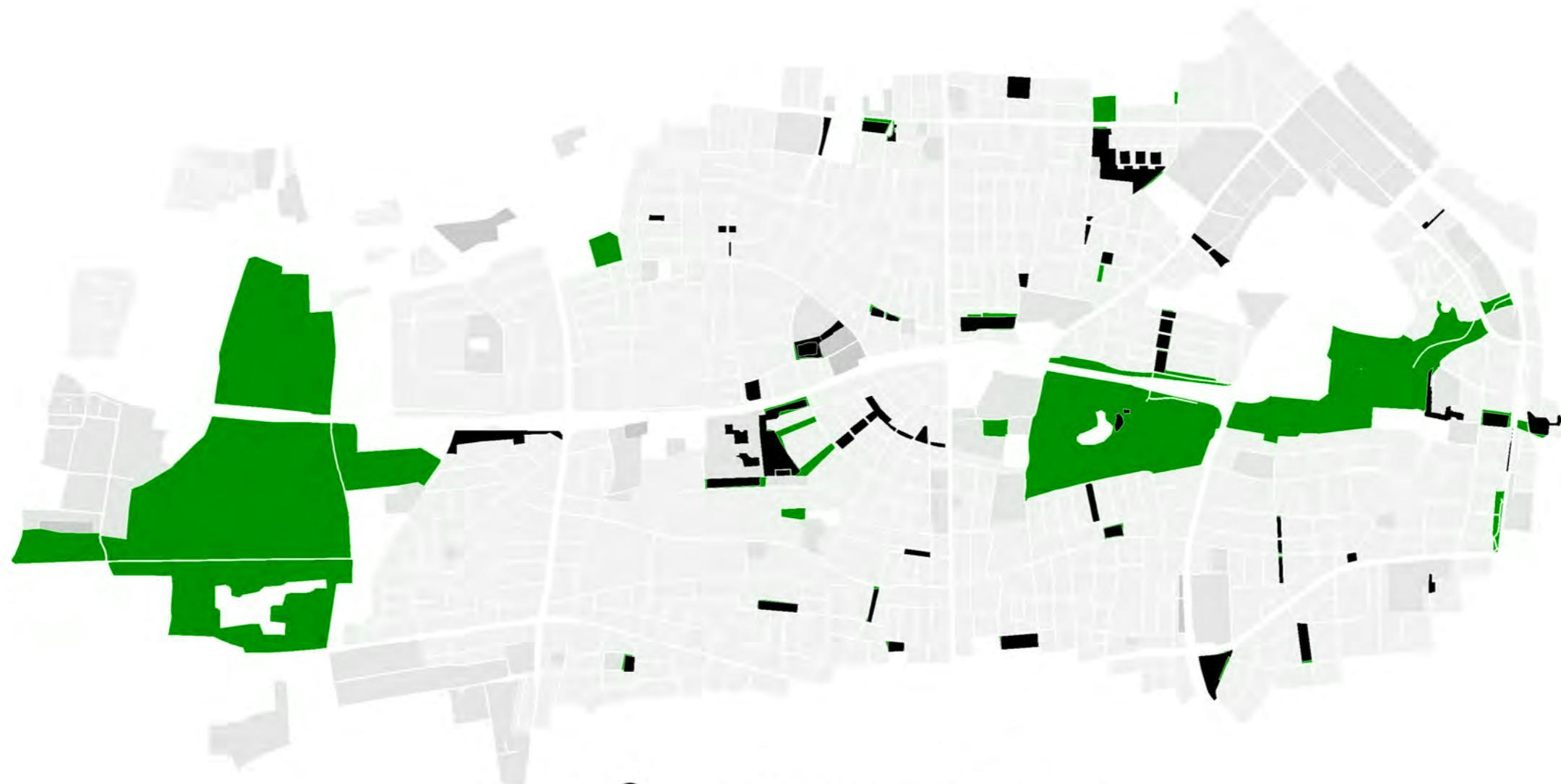
TRAM COVERAGE



BUS COVERAGE



GREEN

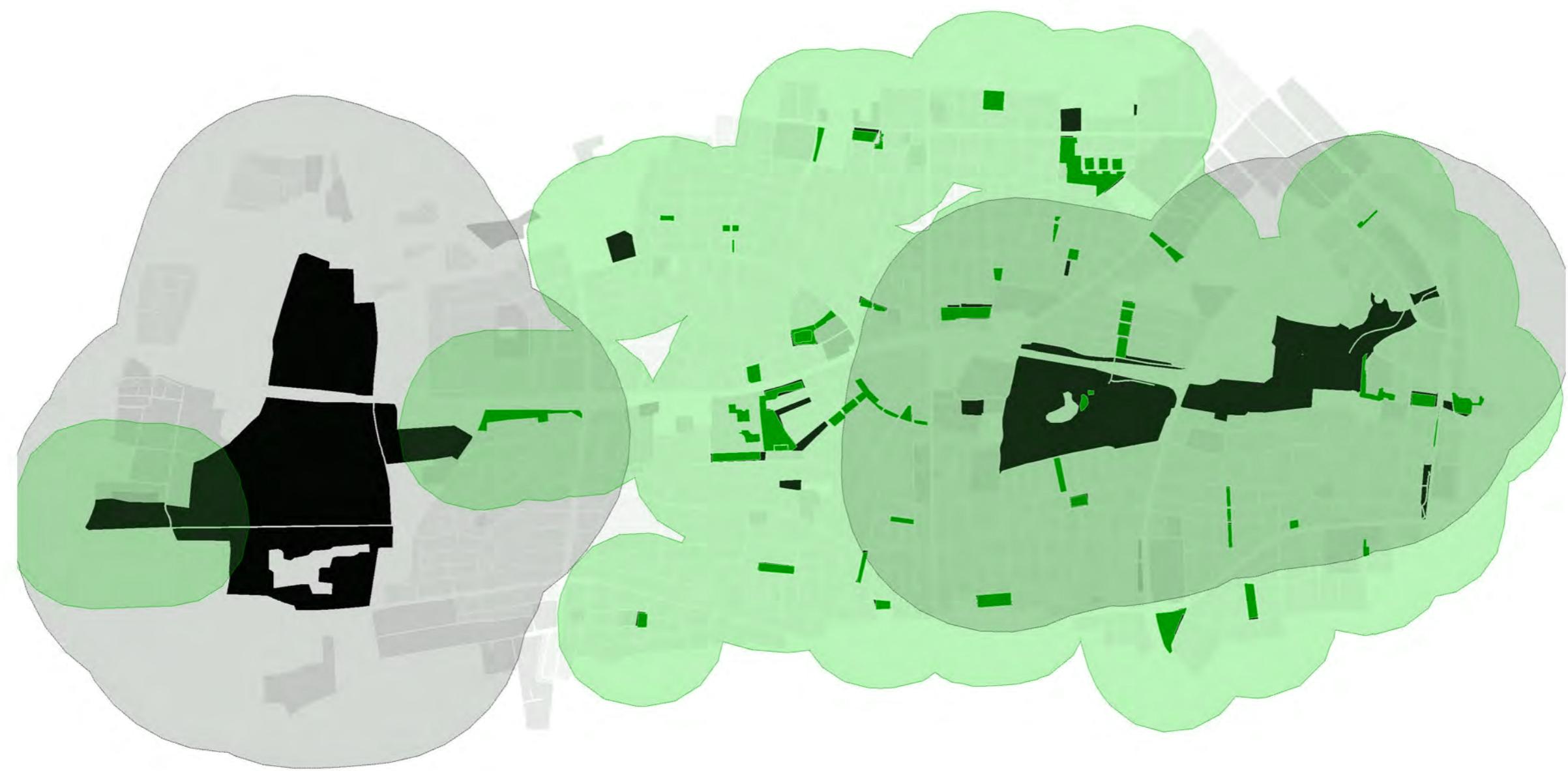


20 m² Parks/Resident

CITY PARKS AND LARGE NATURE AREAS



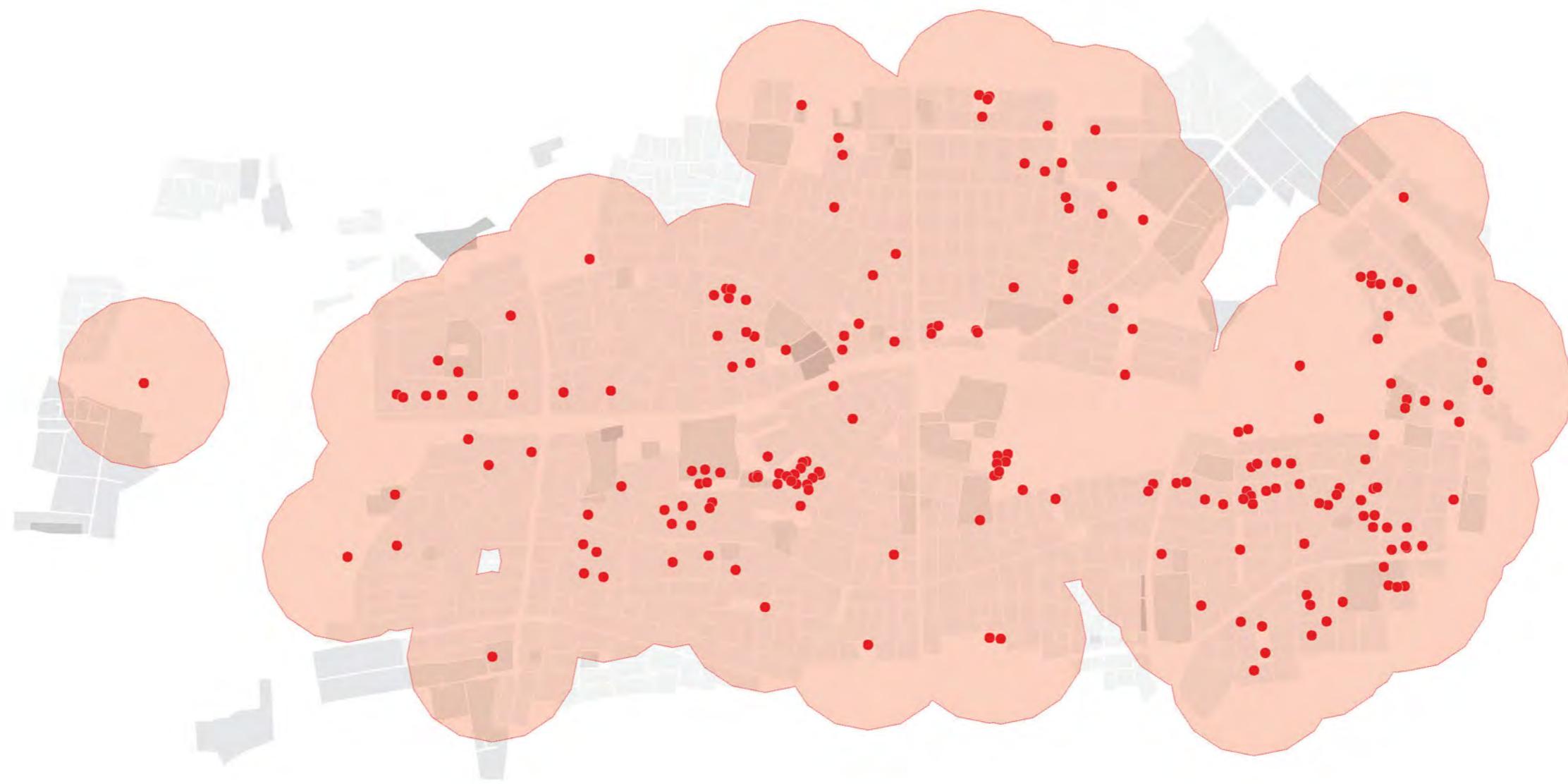
LOCAL GREEN AND POCKET PARKS



SPORTS AREAS



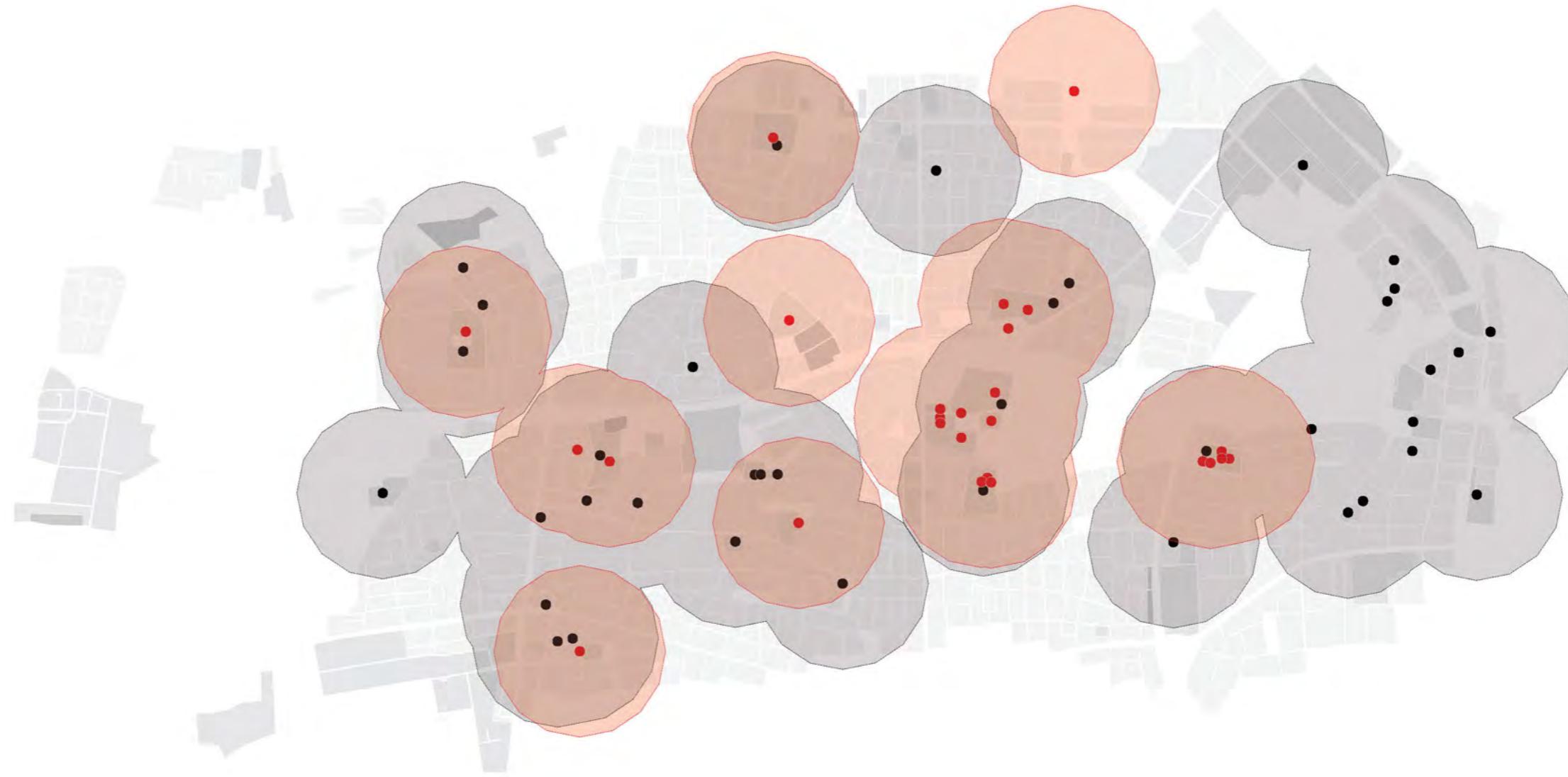
PLAYGROUNDS



NURSERIES



SCHOOLS



SHOPPING

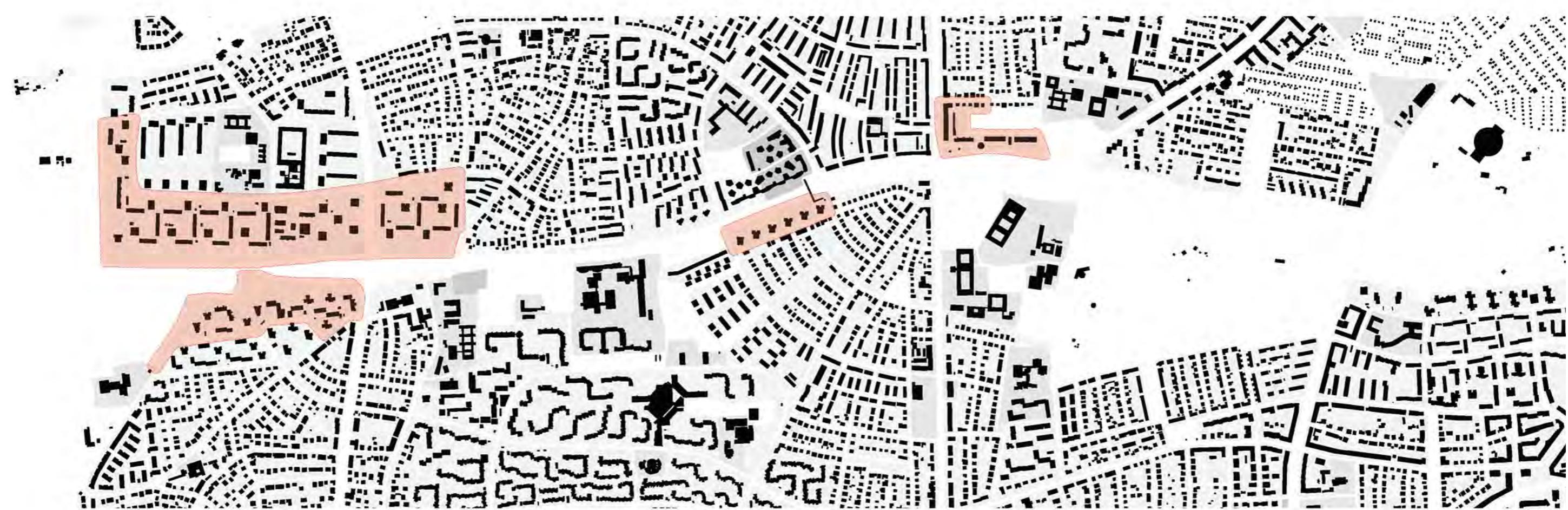


BUILDING TYPOLOGY

PARK HOUSING



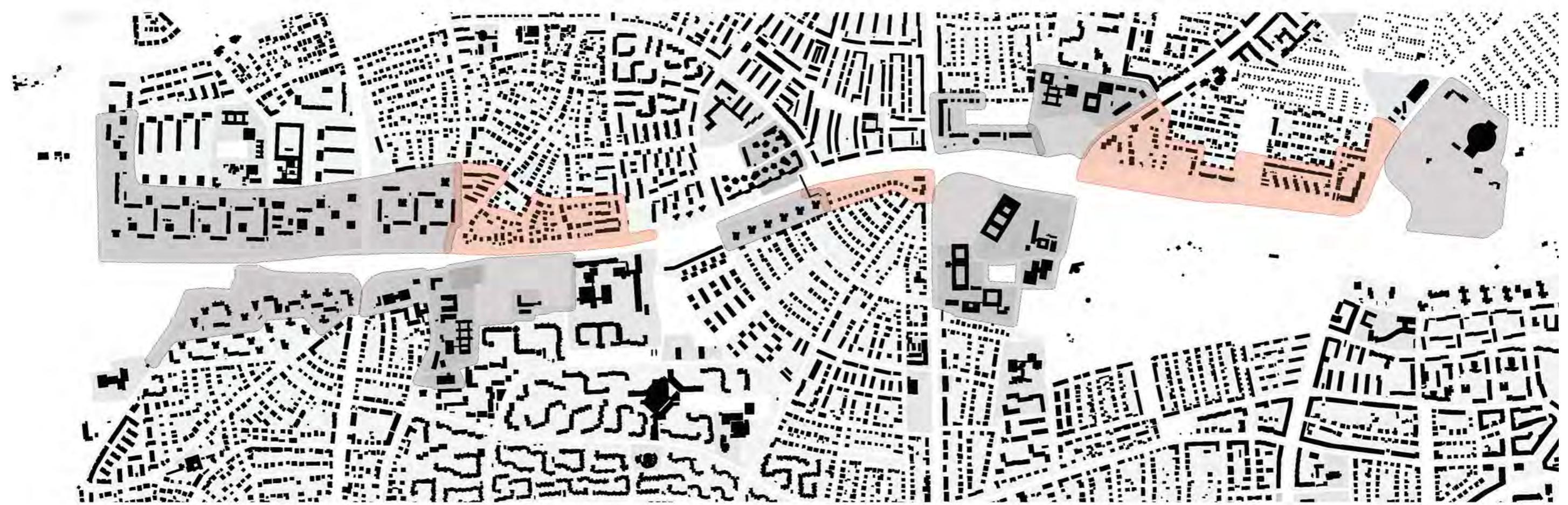
PARK HOUSING



DETACHED HOUSING



DETACHED HOUSING



HOSPITAL

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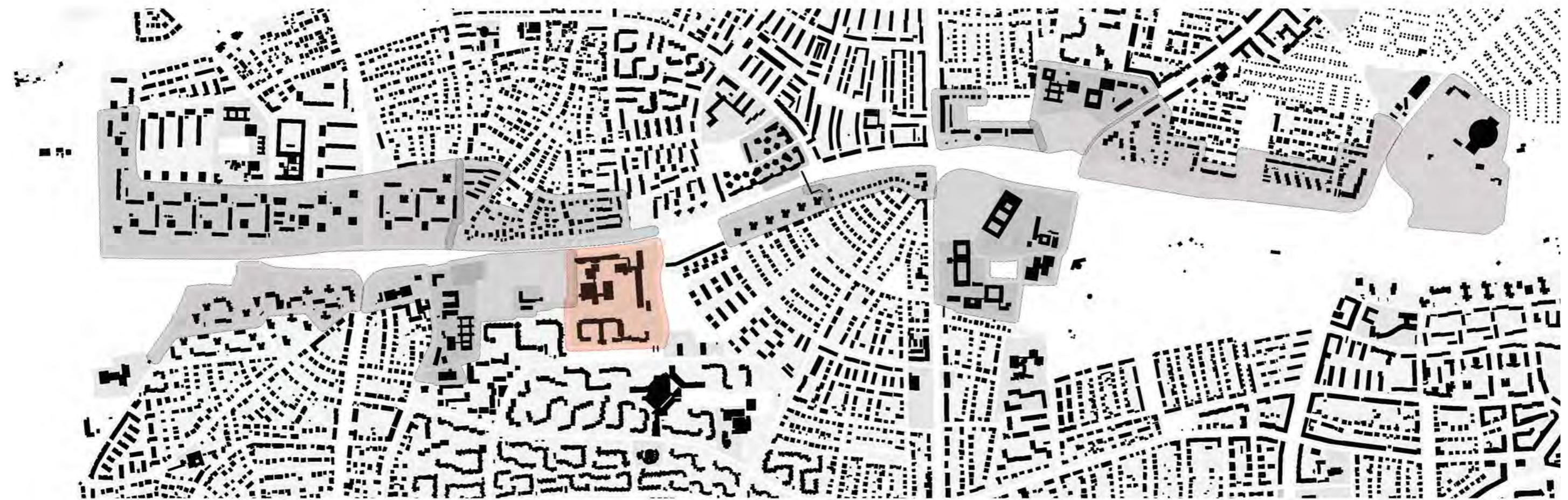
HOSPITAL

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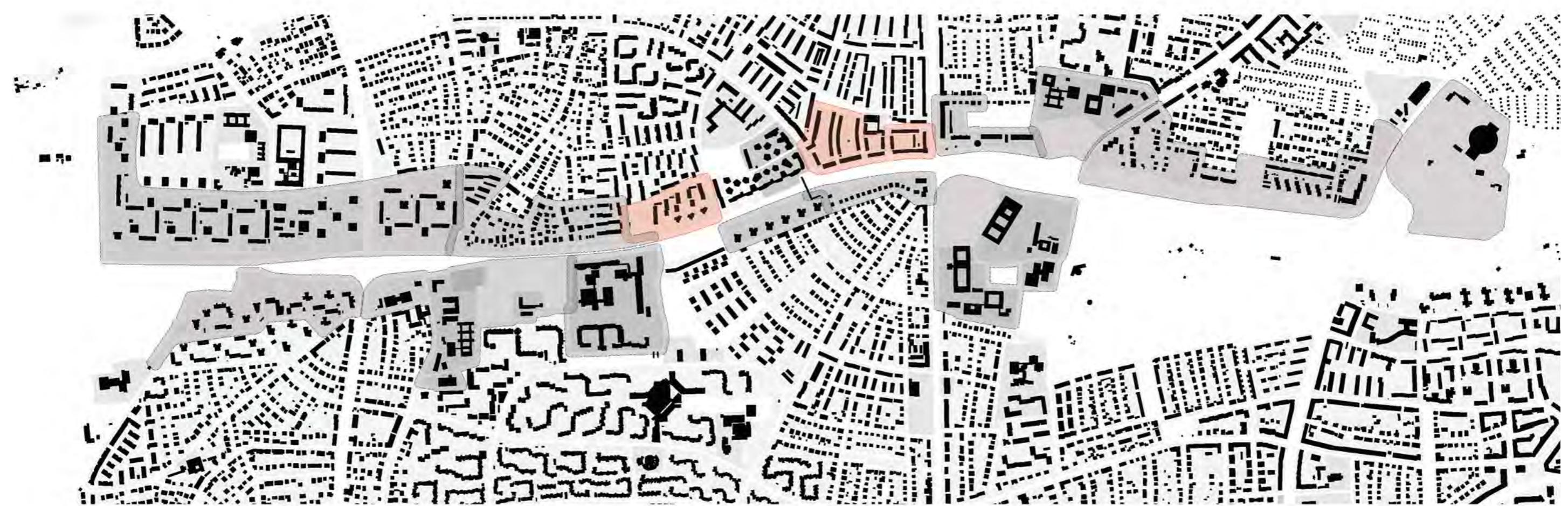
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GARDEN CITY HOUSING



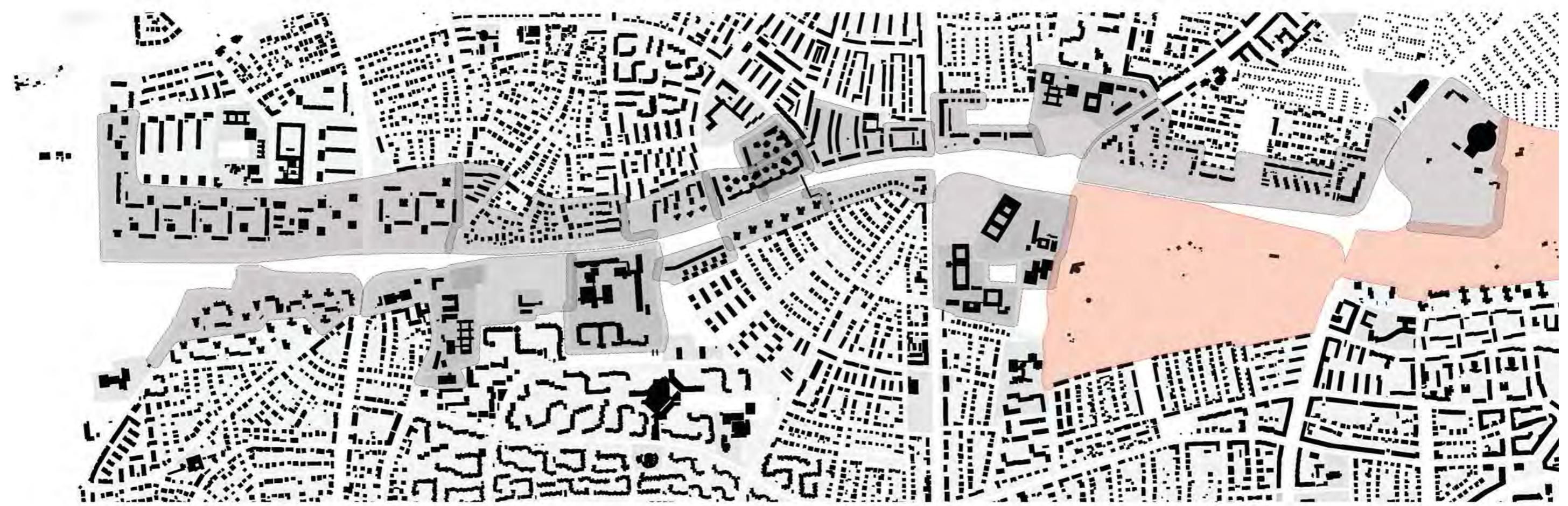
GARDEN CITY HOUSING



WESTPARK



WESTPARK



CONCLUSION

STRENGTHS

- GOOD COVERAGE WITH PUBLIC SERVICE
- QUANTITY OF RECREATIONAL GREEN

OPPORTUNITIES

- EXTENSIVE UNDERSUSED (LOST) DEVELOPABLE SPACE SURROUNDIN G AREA
- LOW DENSITY
- DIVERSITY IN URBAN AND HOUSING TYPOLOGY
- ALIGNING DEVELOPMENT WITH FUTURE MOBILITY GOALS
- LOCAL INITIATIVES IN FAVOUR OF SOLVING NOISE POLLUTION
- NO / VERY LITTLE BUILDING DEMOLITION NECESSARY
- INFRASTRUCTURE IS PUBLIC LAND,

WEAKNESSES

- HIGHWAY MAJOR BARRIER, SOUTH AND NORTH DISCONECTED
- LONG DISTANCES, TRAVELLING TIMES
- LOW QUALITY OF RECREATIONAL GREEN DUE TO NOISE AND AIR POLLUTION
- SCARCITY OF SHOPPING, CATERING AND CULTURE

THREATS

- HETEROGENOUS OWNERSHIP IN CLOSE PROXIMITY TO DEVELOPMENT
- TEMPORARY COMPENSATORY TRAFFIC MEASURES
- COMPLEX PLANNING
- HIGH RESTRUCTURING COST

AFFORDABILITY STRATEGY

STRATEGIES

DIRECT	1	SUPPLY & DEMAND LOCATION & LAND	2	SUPPLY & DEMAND PROVIDER	3	SUPPLY & DEMAND FINANCING		
	UTILISE Un- & underused Public Land	<ul style="list-style-type: none"> • Public housing estates • Extensive Infrastructure • Greyfields 	INCENTIVISE Non-Profit Providers	<ul style="list-style-type: none"> • Public housing • Cooperatives • Community builders • Capped private rent 	REDISTRIBUTE Private Rent Profits	<ul style="list-style-type: none"> • Cross-Finance 		
	4	CONSTRUCTION COSTS BUILDING INDUSTRY	5	CONSTRUCTION COSTS BUILDING DESIGN	6	CONSTRUCTION COSTS SITE CONDITIONS		
INDIRECT	INCENTIVISE Use of Standardised Building Systems	<ul style="list-style-type: none"> • Modularise • Prefabricate • Automate 	OPTIMISE Spatial & Technological Efficiency	<ul style="list-style-type: none"> • min non-rented space • min space per person • min tech 	OPTIMISE Simpler Condition			
	7	CONSTRUCTION COSTS PROCESS COMPLEXITY	8	LIFE-CYCLE COSTS ENERGY PERFORMANCE	9	LIFE-CYCLE COSTS FACILITY MANAGEMENT		
	PRIORITISE Single Ownership (Short Term)		OPTIMISE Building Envelope & Technical Appliances	<ul style="list-style-type: none"> • compactness • insulation • solar panels, heat pump... 		<p>OPTIMISE Spatial Efficiency</p> <p>INCENTIVISE Maintainance by Users</p> <p>PRIORITISE Low-Maintainance Plants and Materials</p>		
	I	PROXIMITY TO PUBLIC TRANSPORT	II	DEVELOPED SLOW TRAFFIC NETWORK	III	WALKABILITY	IV	PROXIMITY TO AMENITIES
		<ul style="list-style-type: none"> • Build around public transport stops • Introduce public transport in new developments 		<ul style="list-style-type: none"> • create slow traffic network and connect to the city network 		<ul style="list-style-type: none"> • create dense pedestrian route network 		<ul style="list-style-type: none"> • facilitate mixed-use typologies that can accommodate cultural, educational, healthcare amenities, shopping withing 15 min walking/cycling • build close to areas which have a high density of amenities

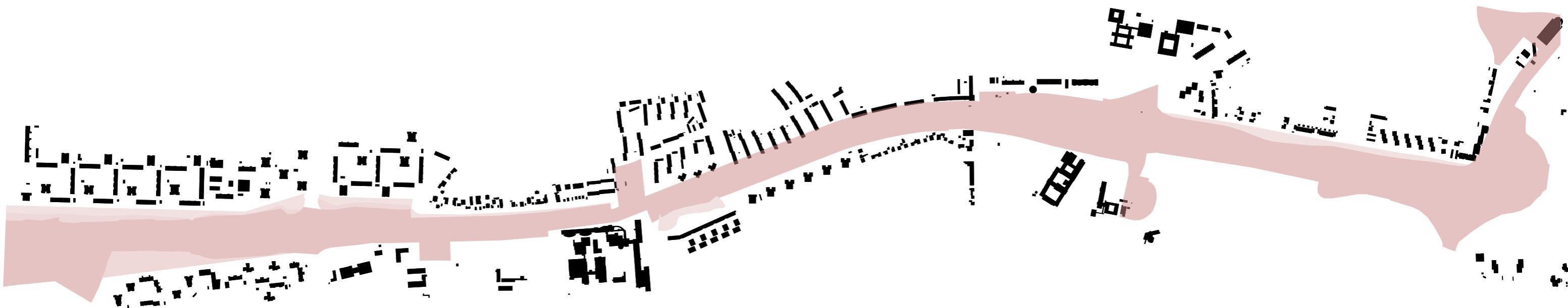
Structures	Measures	CITY	NEIGHBOURHOOD	BUILDING
ARCHITECTURE A	qualitative	Diversity of neighbourhoods Landmarks, icons skyline	Diversity of building types Landmarks, icons Block form	Architectural quality (aesthetics, haptics) Equipment / facilities Light conditions Private outdoor space (balconies, loggias, terraces)
	quantitative	Max height	Density (FSI district / fabric scale)	Use of apartment space (sqm/person) Density (fsi plot scale) Coverage (gsi plot scale)
GREEN & BLUE SPACE G	qualitative	City parks Nature areas surrounding city Waterfronts	Neighbourhood parks Pocket parks / local green Aplots / community gardens	Private green / garden Communal green / courtyard Green roofs / facades
	quantitative	Use of green space min (sqm/person) Proximity	Use of green space min (sqm/person) Proximity	Use of green space min (sqm/person) Proximity
PUBLIC & COMMUNAL SPACE C	qualitative	Main meeting points / hubs Sub centre network	Diversity of public space types Public / private transitions Size and proportions (scale) Programme (sports and play)	Communal spaces (meeting rooms)
	quantitative	Use of public space (sqm/person) Proximity	Use of public space (sqm/person) Proximity Open space ratio (OSR fabric / district scale)	Use of public space (sqm/person)
MOBILITY INFRASTRUCTURE P	qualitative	Cyclability (continuity of fast connections) Public transport quality (transfer options, routing diversity)	Walkability (richness of elements, active plinths) Cyclability (continuity of network, comfort) Diversity of public transport options	Accessibility (disabled people)
	quantitative	cyclability (density of fast connections, proximity to city destinations) public transport quality (network density, proximity to city destinations)	walkability (network density, width of sidewalks) cyclability (network density, width of lanes) proximity to public transport	accessibility norms
PROGRAMME F	qualitative	Yearly/Monthly/Weekly Culture Education Work Recreation Shopping Leisure Hotspots/clusters	Daily Culture Education Work Recreation Shopping Leisure Hotspots/clusters	Daily (optional) Culture Education Work Recreation Shopping Leisure Hotspots/clusters Functionality (layout) Communal programme
	quantitative	use of space of programme (sqm/person)	use of space of programme (sqm/person) mixed use index (mxi)	use of space of programme (sqm/person)
MICROCLIMATE C	qualitative	Comfort Perceived temperature Perceived air quality Climate safety	Comfort Perceived temperature Perceived air quality Climate safety	Comfort Perceived temperature Perceived air quality
	quantitative	Temperature (celsius) Air quality (microparticles uq/m3)	Temperature (celsius) Air quality (microparticles uq/m3)	Temperature (celsius) Air quality (microparticles uq/m3)
SOCIAL ASPECTS S	qualitative	Inclusivity Safety	Appropriation of public space Social cohesion Social and traffic safety (eyes on streets)	Appropriation of communal space Social cohesion Social safety
	quantitative	Crime Index	Crime Index	Crime Index

DESIGN

PROJECT BOUNDARY

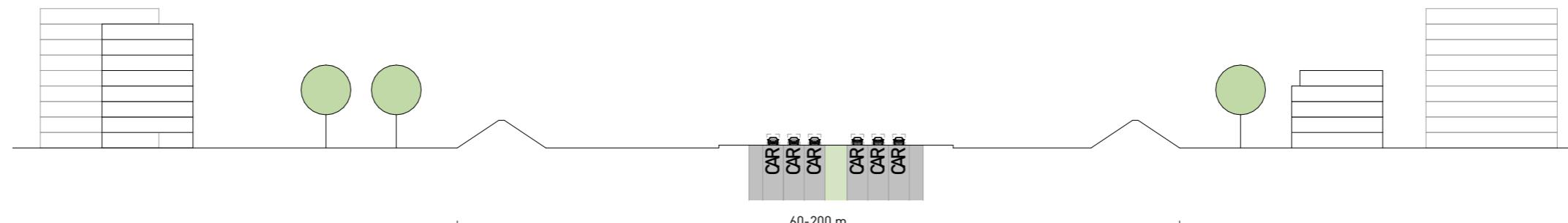
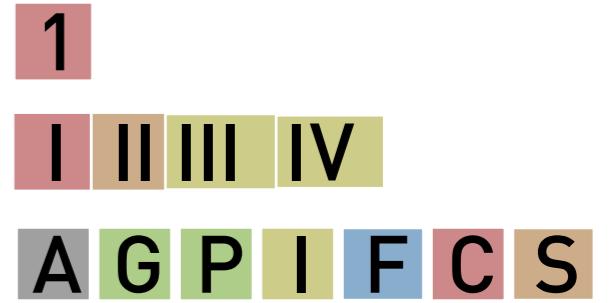
DEFINED BY

- PLOT BOUNDARIES
- HIGHWAY SURROUNDINGS
- CLEARNACE SPACES

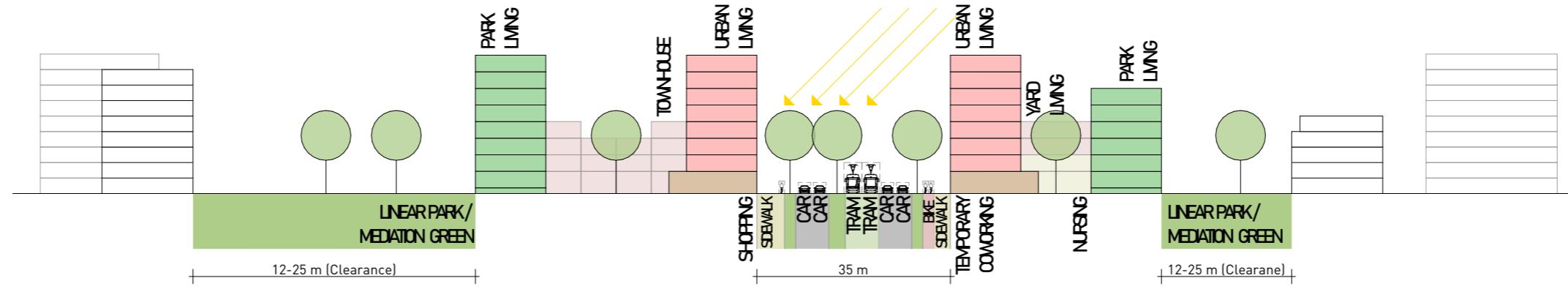


PRIMARY CONNECTION

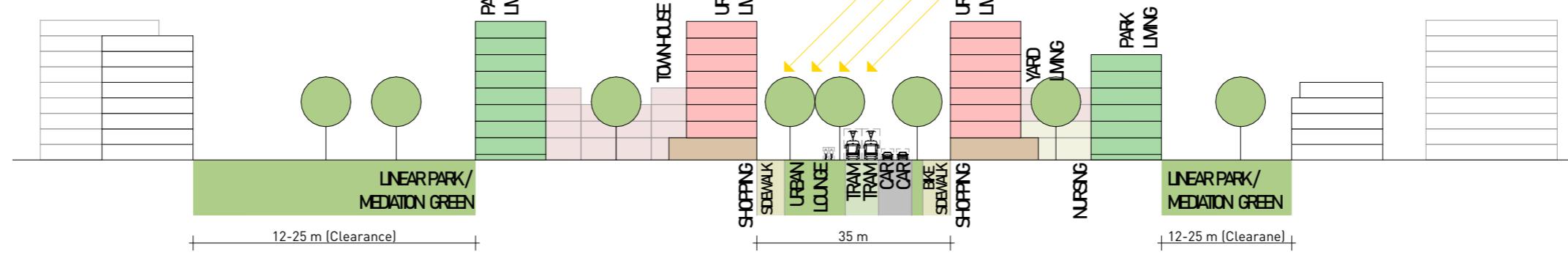
AFFORDABILITY MEASURES:



Existing



Phase I



Phase II

BOULEVARD



Dronning Eufemias gate, Oslo



St. Joan Boulevard, Barcelona

PRIMARY CONNECTION

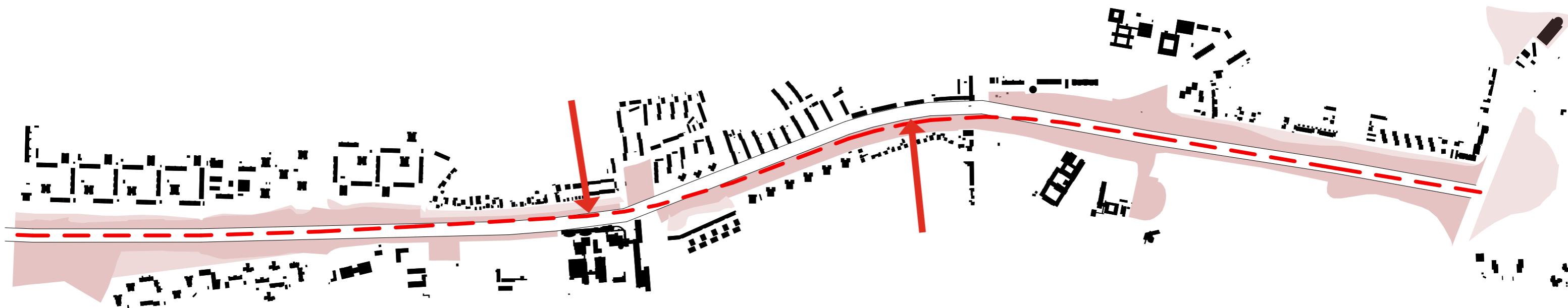
KEEP DISTANCE FROM PRIVATE PROPERTY

AFFORDABILITY MEASURES:

1 7

P I

S



LEGENDA

[red dashed box] Existing

[white box] New

PUBLIC TRANSPORT

EXISTING SITUATION

LEGENDA

- Metro
- Railway
- Tram

AFFORDABILITY MEASURES:



PUBLIC TRANSPORT

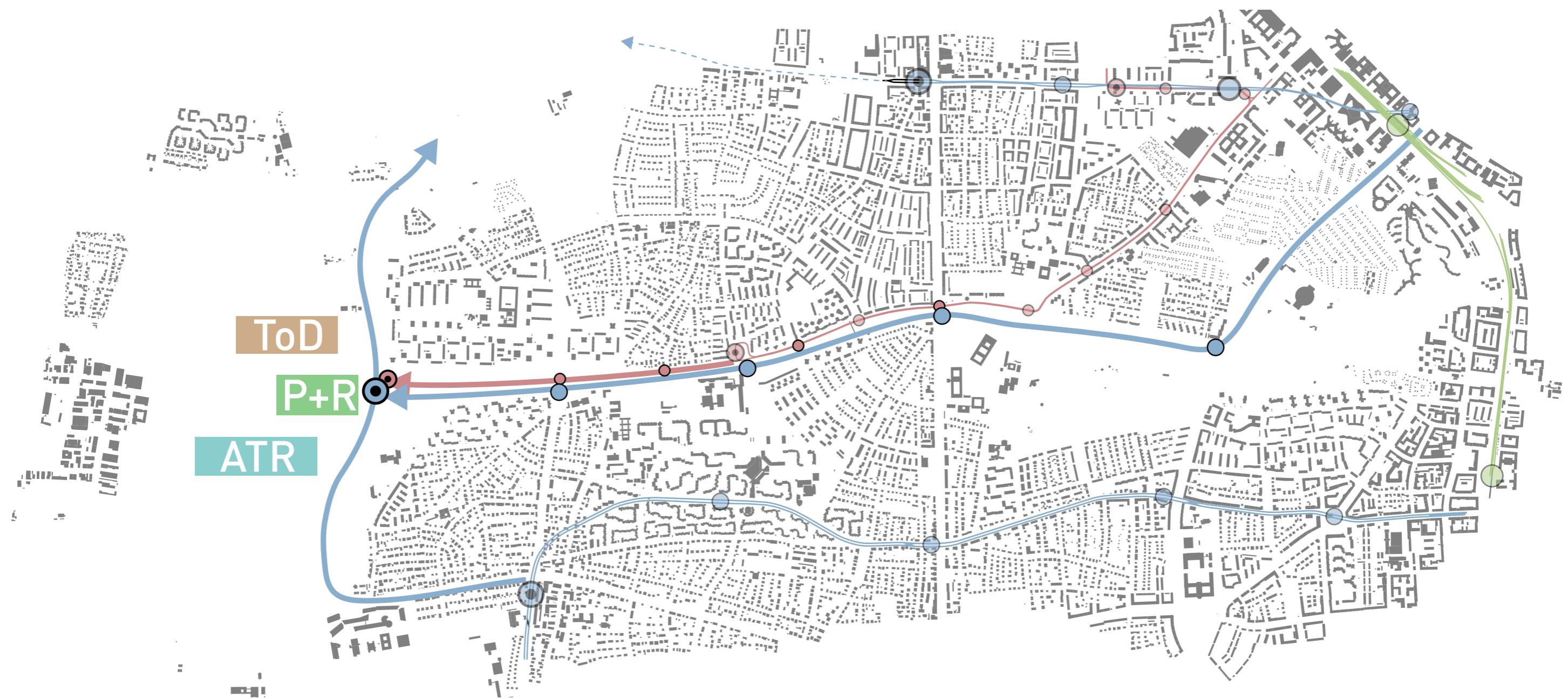
COMPENSATE LOSS OF CA. 50% OF CAPACITY AND INCENTIVISE USE OF
PUBLI TRANSPORT

LEGENDA

- Metro
- Railway
- Tram

AFFORDABILITY MEASURES:

- | | | |
|---|----|---|
| I | IV | |
| C | P | F |
| S | | |



LINEAR PARK

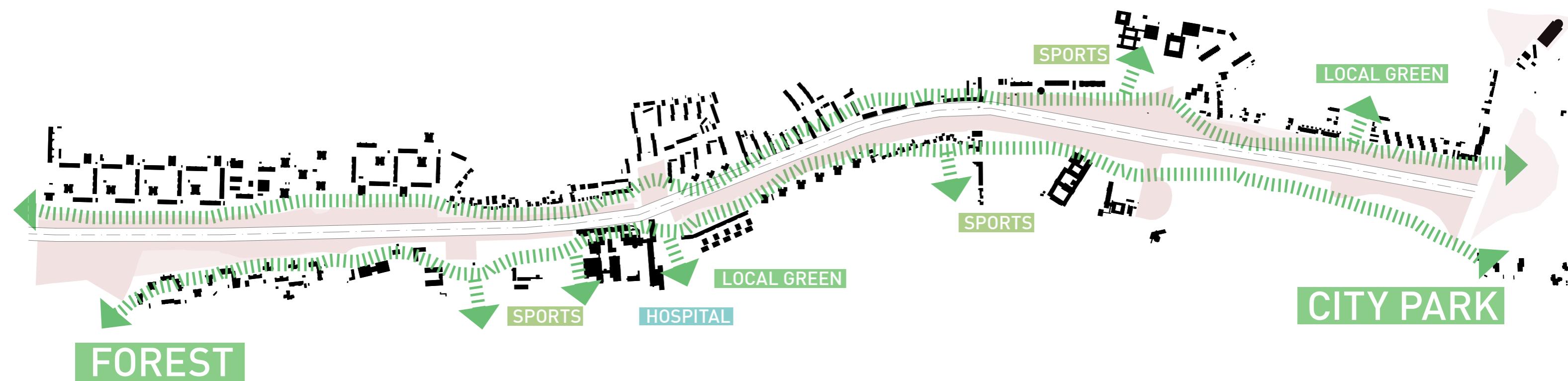
- TRANSITION SPACE TO NEIGHBOURS
- ECOLOGICAL CONNECTION FO EXISTING GREEN
- SAFE AND PLEASANT SLOW TRAFFIC INFRASTRUCTURE
- A PARALLEL CALMING BOULEVARD VS BUSY BOULEVARD

AFFORDABILITY MEASURES:

1

II III

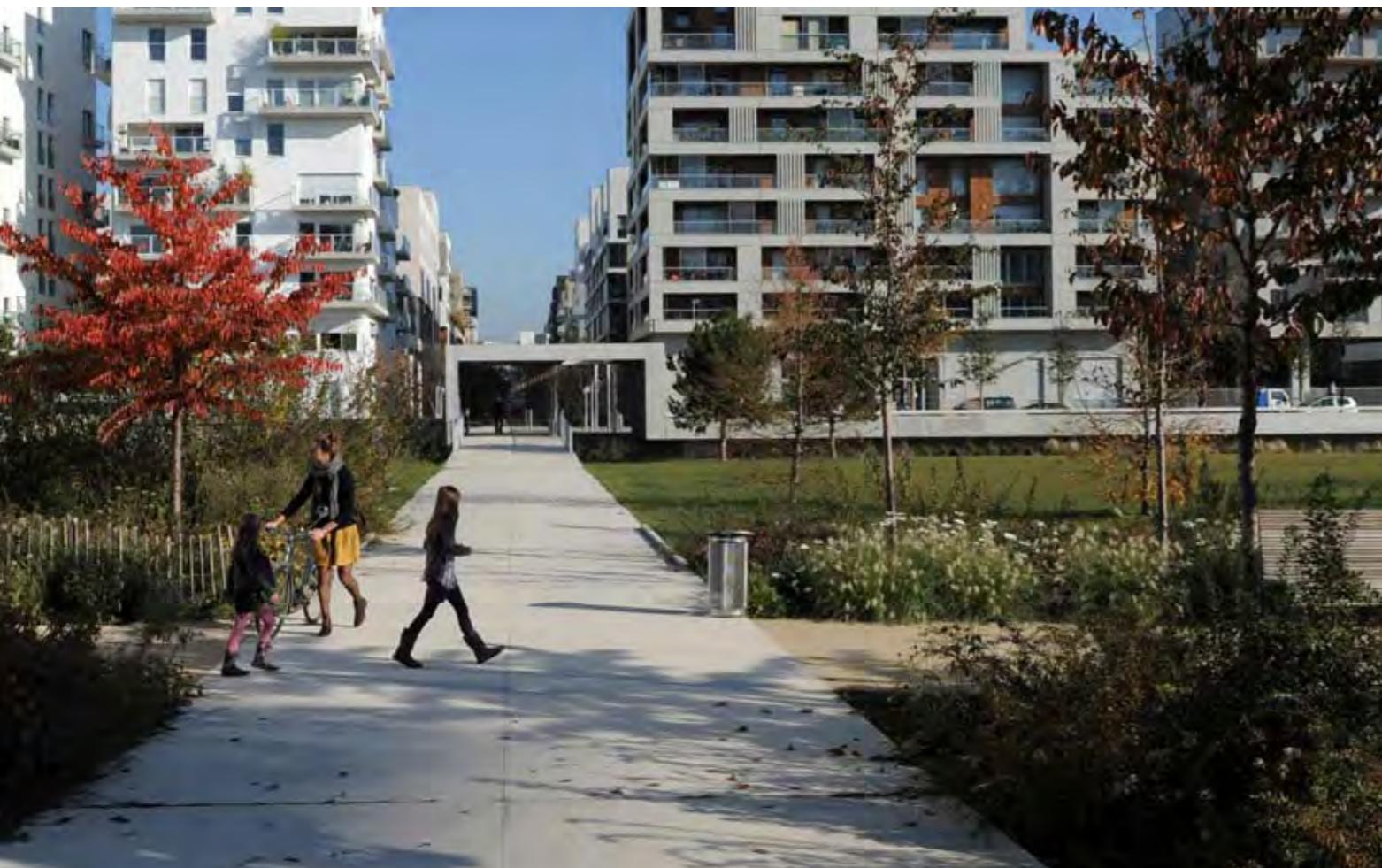
GPIFMS



LEGENDA

III Linear park

BOULEVARD



Dronning Eufemias gate, Oslo

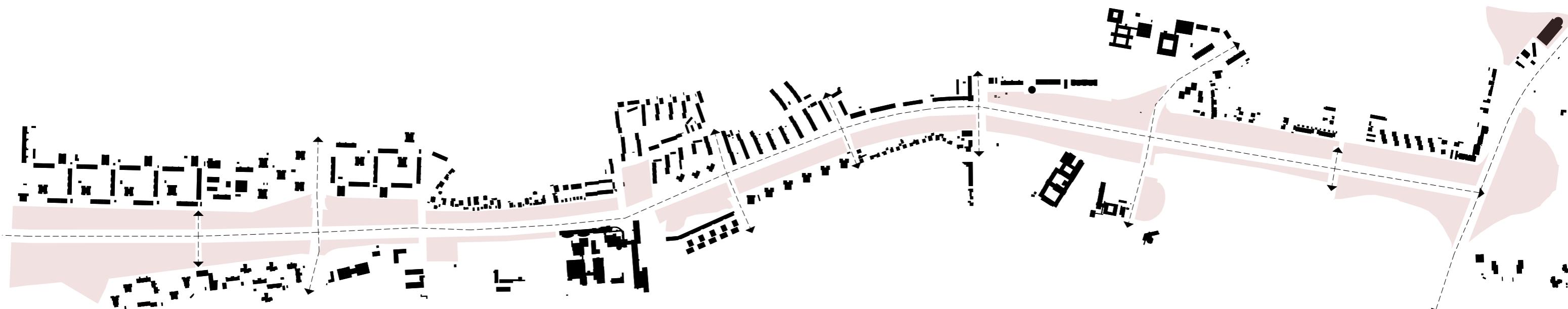


St. Joan Boulevard, Barcelona

EXISTING CONNECTIONS

- MAINTAINING CURRENT ACCESSIBILITY BY CAR

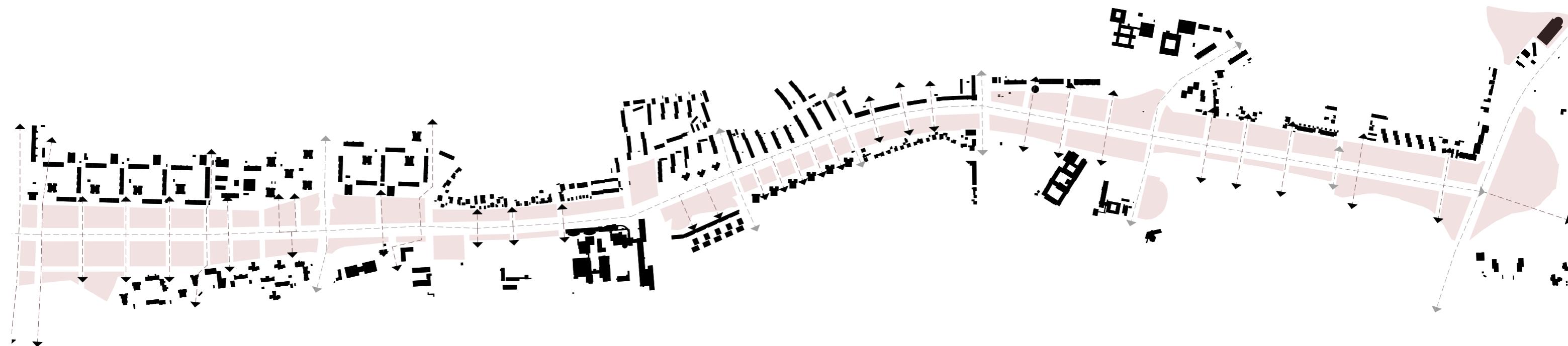
AFFORDABILITY MEASURES:



ADDITIONAL CONNECTIONS

- INCREASING WALKABILITY AND CYCLABILITY WITH QUITE PEDESTRIAN STREETS

AFFORDABILITY MEASURES:



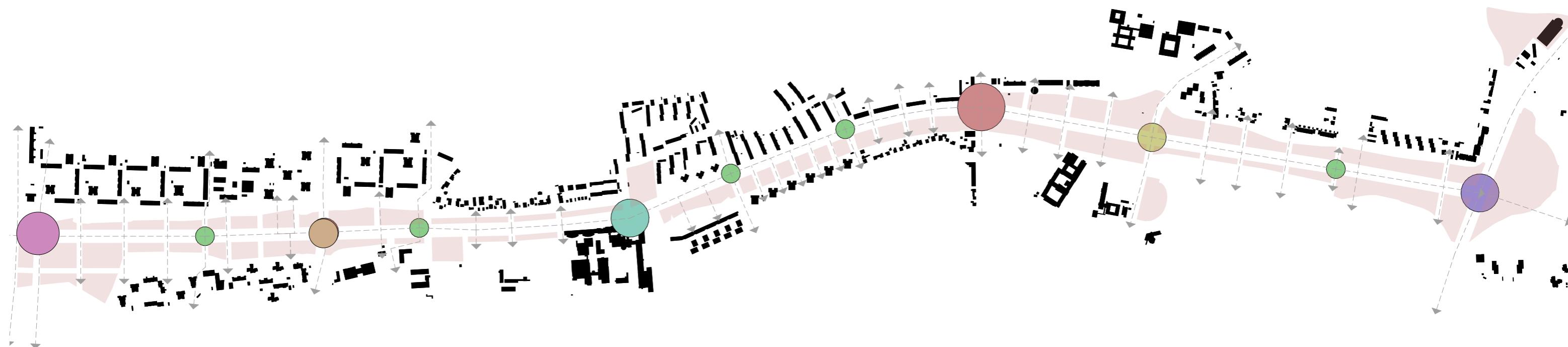
NODES, TYPES

- THE BOULEVARD BECOMES AN ATTRACTION LINE
- NEW POINTS OF INTERESTS VARY BA CHARACTER AND HIERARCHY OF EXISTING ROADS AND SURROUNDINGS

AFFORDABILITY MEASURES:

P I F S

I II III IV

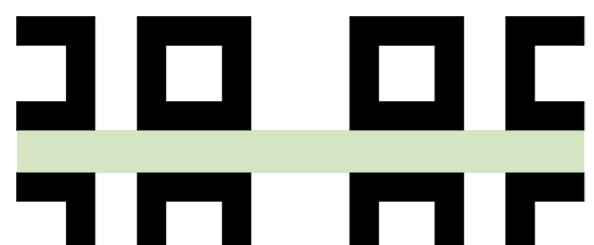
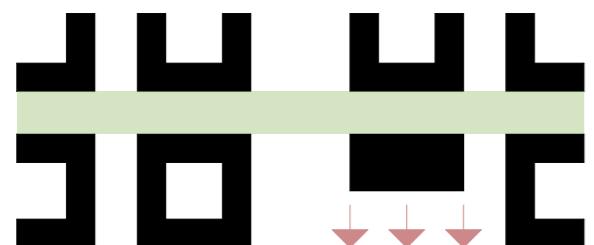
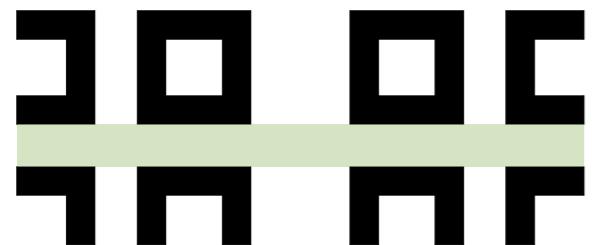
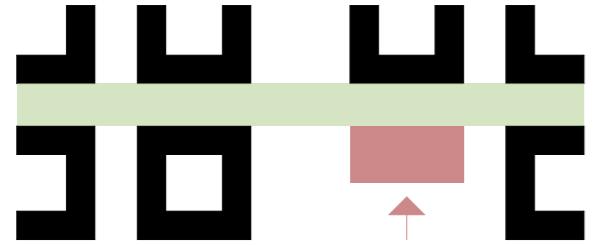


LEGENDA

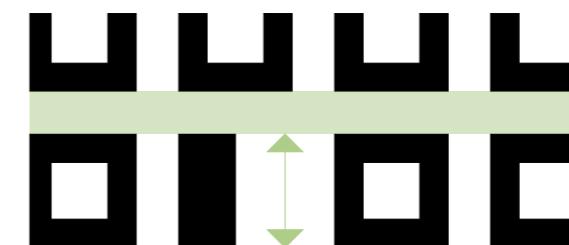
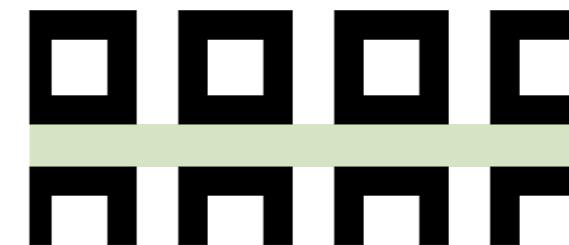
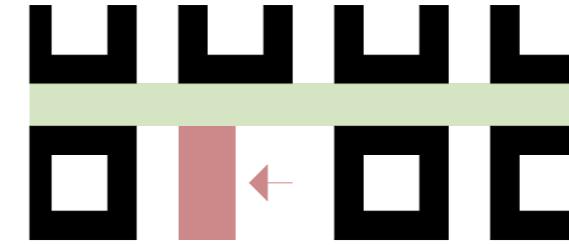
Subcenter	Park gate
Health hub	City gate
Learning lab	Neighbourhood centers
Community centers	

NODES, PRINCIPLES

BUSY



QUITE



- ORIENTED INWARDS
 - CONNECTS LINEAR PARK & BOULEVARD
- CALMER ATMOSPHERE
- WELL CONNECTED IN LOCAL SLOW TRAFFIC NETWORK
- TYPICAL FUNCTIONS:
- CAFES, RESTAURANTS, HEALTH AND EDUCATION

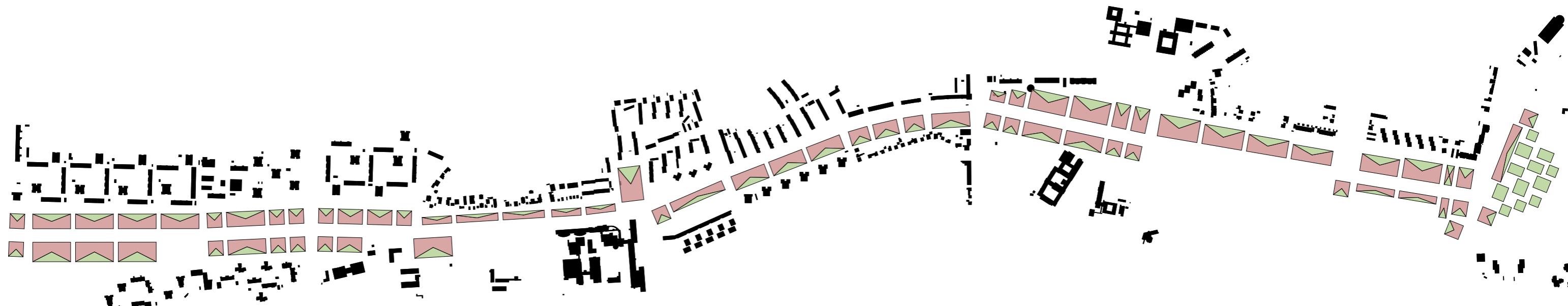
BLOCK REGULATIONS. FORM

- Define closed and open block sides
- Closed to define public spaces and accommodate lively ground floor
- Open to interlock with linear park

AFFORDABILITY MEASURES:

A G P

M



LEGENDA

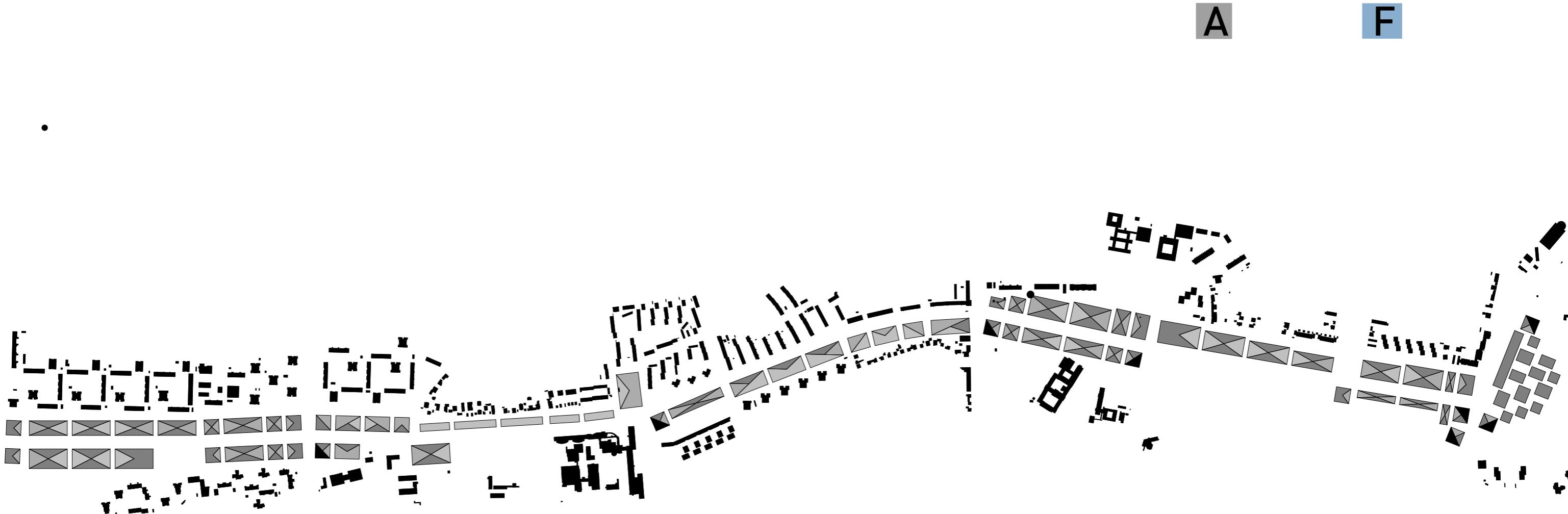
Closed

Open

BLOCK REGULATIONS. HEIGHT

- Varying height and density according surrounding buildings and nodes

AFFORDABILITY MEASURES:



LEGENDA

■	4 Floors
■	6 Floors
■	8 Floors
■	20 Floors

BLOCK REGULATIONS. COMBINED

AFFORDABILITY MEASURES:

A

F



LEGENDA

Closed 4 Floors	Open 6 Floors
Closed 6 Floors	Open 8 Floors
Closed 8 Floors	
Open 4 Floors	

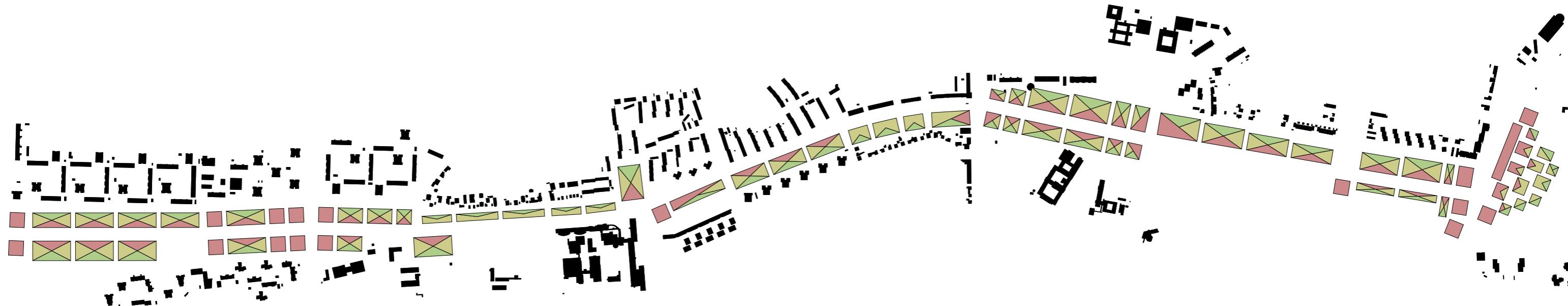
GROUND FLOOR PROGRAMME

- Shopping on boulevard-side
- Learning, nursing in side streets
- Living on park.side

AFFORDABILITY MEASURES:

A

F



LEGENDA

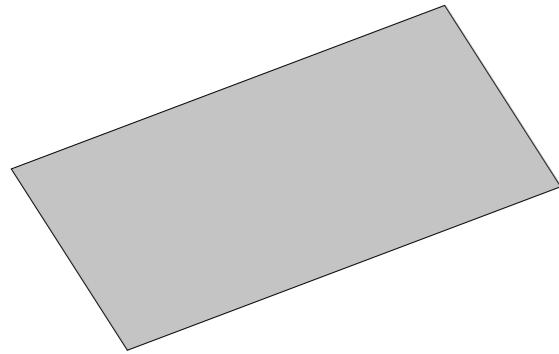
■ Shopping

■ Learning / Nursing

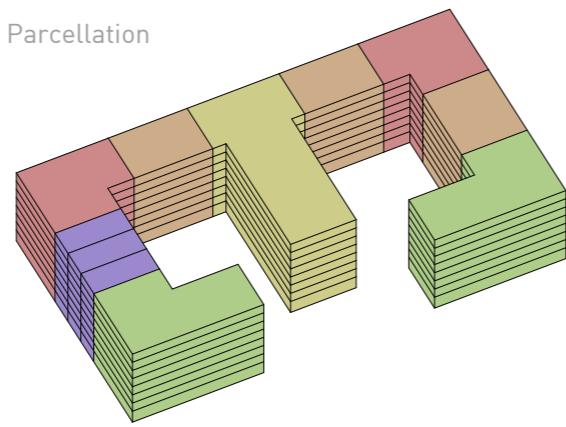
■ Living

BLOCK FORM

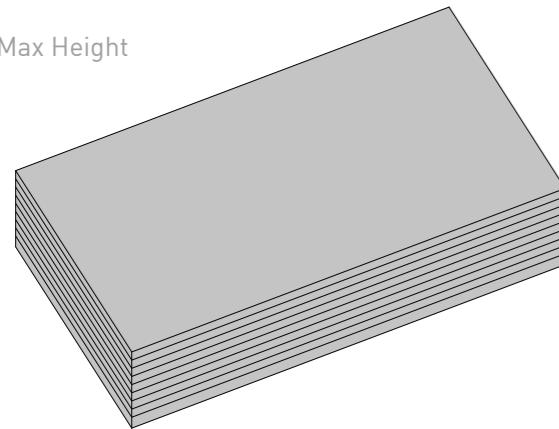
1) Block



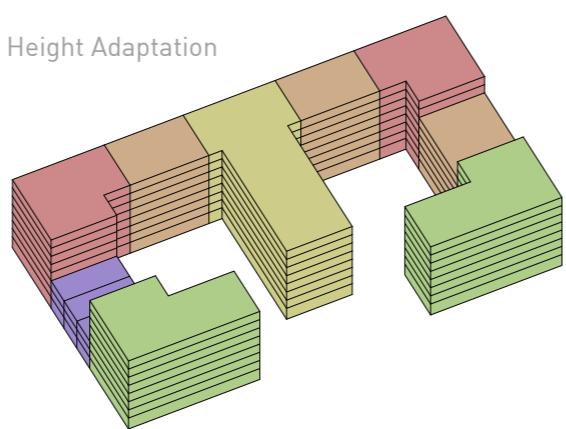
Parcellation



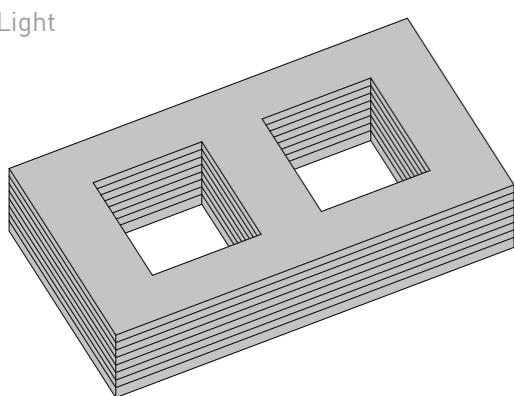
2) Max Height



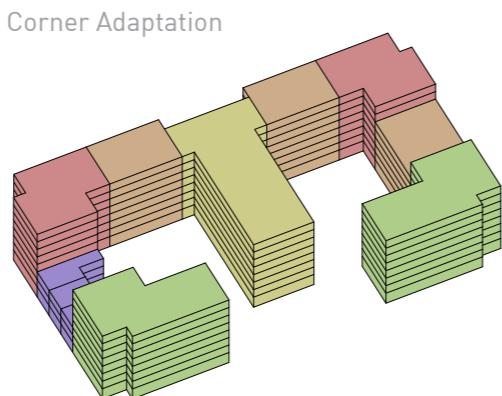
Height Adaptation



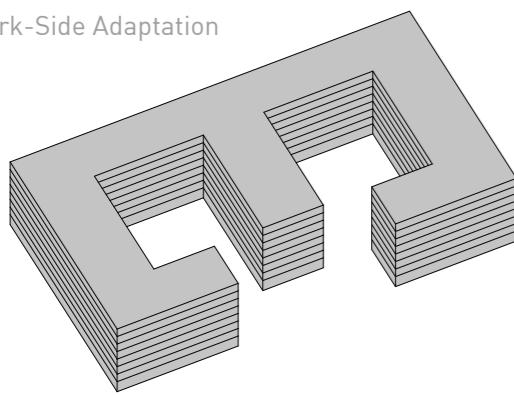
3) Light



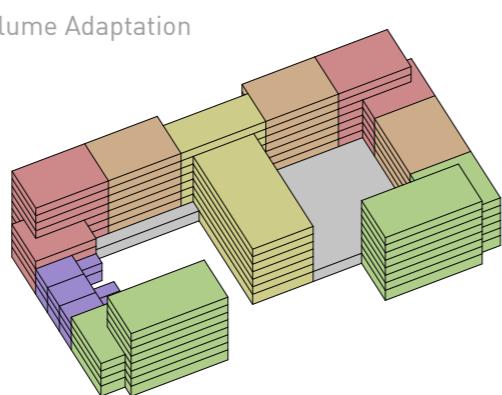
Corner Adaptation



Park-Side Adaptation



Volume Adaptation



LEGENDA

- Urban Corner
- Urban Infill
- Park Infill
- Park Corner
- Townhouse

AFFORDABILITY MEASURES:

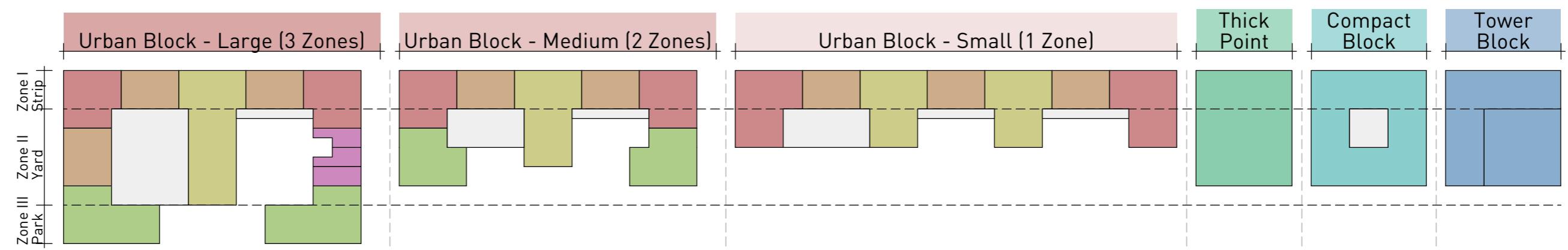
4 5 6 8 9

A G P I F M S

III IV

BLOCK TYPOLOGY

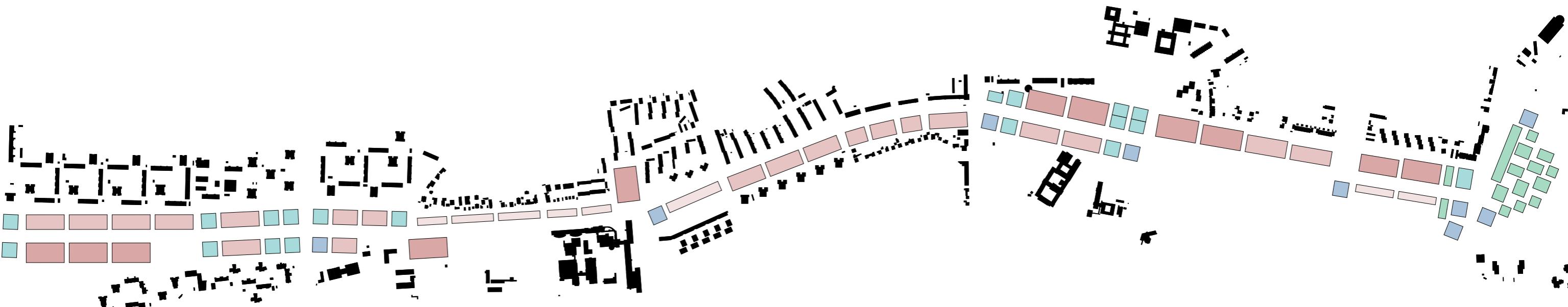
- Main block types
- Defined by 3 linear zones



LEGENDA

Urban Corner	Townhouse
Urban Infill	Tower
Park Infill	Compact Block
Park Corner	Tower

TYPE DISTRIBUTION

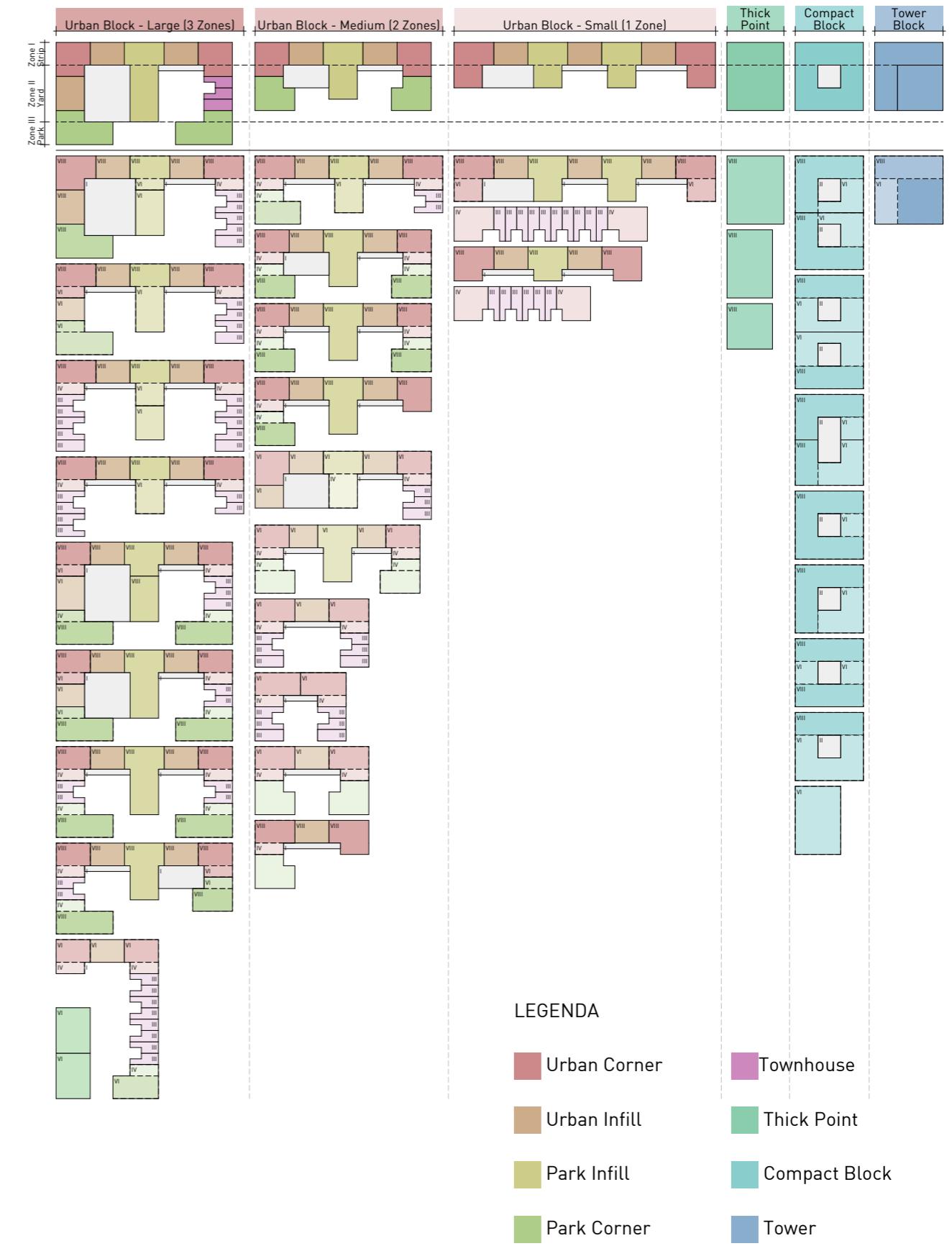


LEGENDA

■ Urban Block, large (3 Zones)	■ Compact Block
■ Urban Block, medium (2 Zones)	■ Tower Block
■ Urban Block, small (2 Zones)	
■ Thick Point	

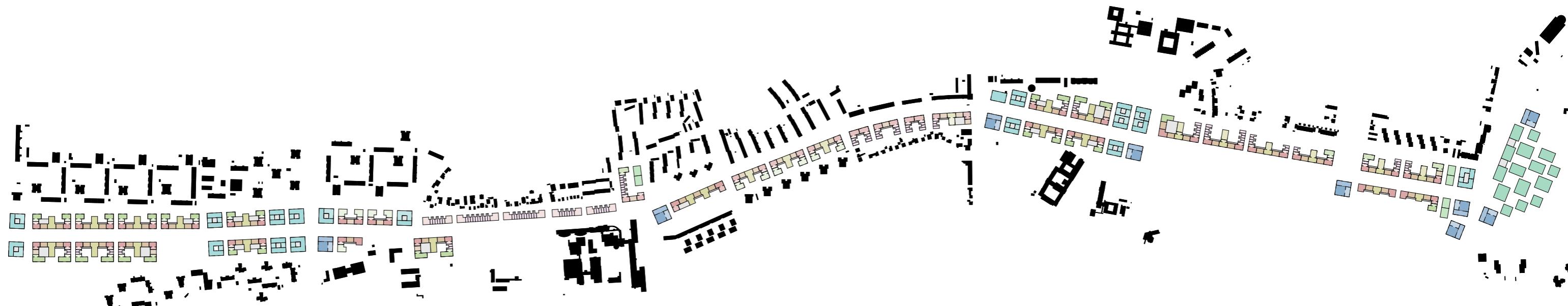
BLOCK CATALOGUE

- Full overview of blocks



BUILDING TYPOLOGY

- Distribution of building types

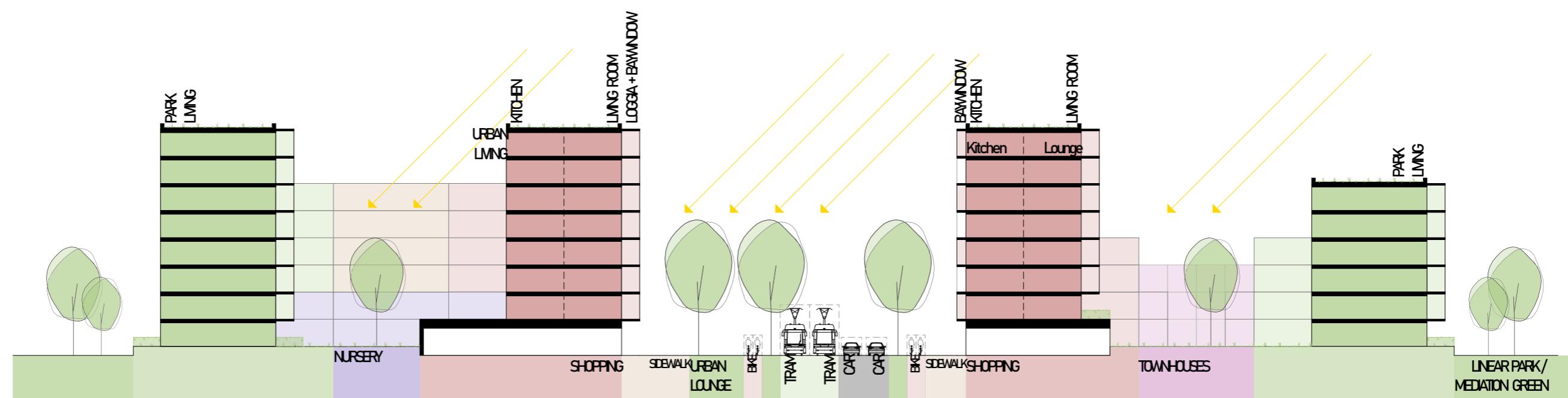


LEGENDA

Urban Corner	Townhouse
Urban Infill	Thick Point
Park Infill	Compact Block
Park Corner	Tower

STREET PROFILE

- Boulevard as extension of living room towards south and kitchen with baywindows towards north
- Shopping in 1st row
- Learning and nursing in 2nd row



PUBLIC SPACE

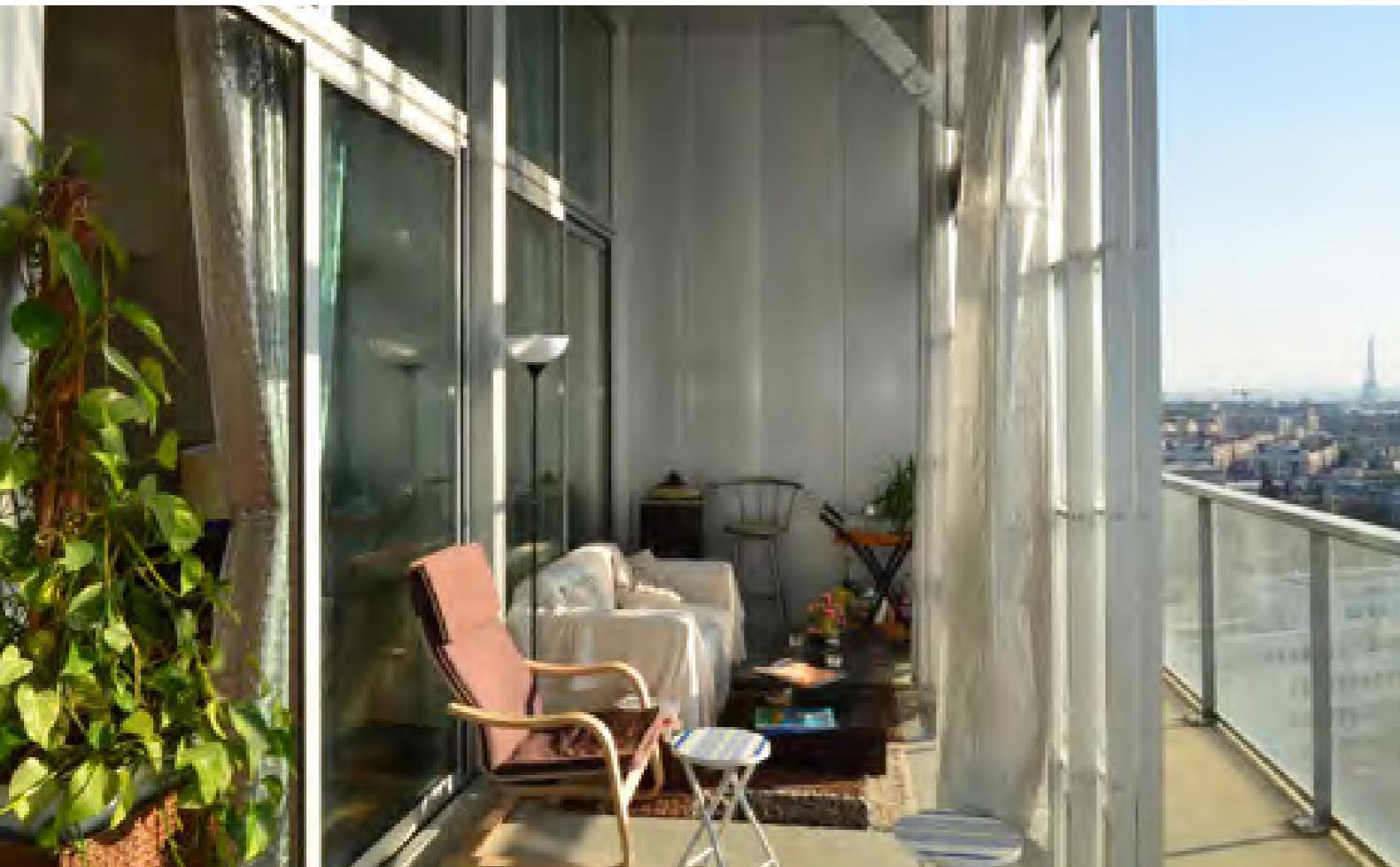
PARK-GATE

- End of Boulevard
- Starting point of cultural and cooperative cluster



SPATIAL QUALITY

- Loggia as transition space from living room to boulevard



Tour Bois le Prete by Frédéric Druot, Anne Lacaton and Jean-Philippe Vassal, Paris



caption

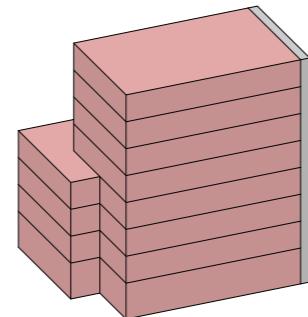
BUILDING TYPOLOGY

	Urban Corner	Urban Infill	Park Infill	Park Corner	Townhouse	Thick Point	Compact Block	Tower
USERS								
Families			X	X	X			
Singles and Pairs	X	X	X		X	X	X	X
Students	X	X			X	X	X	X
Public Officers	X		X				X	
Elderly			X	X		X	X	X
ACTORS								
Public Housing			X		X	X	X	
Cooperatives			X			X		
Community Builders		X			X			
Private Housing Companies		X	X	X	X		X	X
Employers	X	X		X				X

URBAN CORNER

QUALITY

- smaller apartments for young professionals, benefit from proximity to facilities
- urban proximity
- minimum circulation space
-
- prefabricated logias and baywindows as affordable qualitative private outdoor space
- modular grid
- Apartments always lit from 2 sides if bigger than 1 bedroom



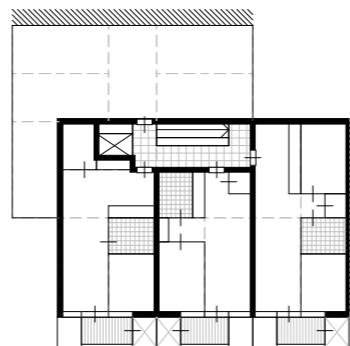
ECONOMY

- efficient floor plans
- compact volume, smaller facade ratio

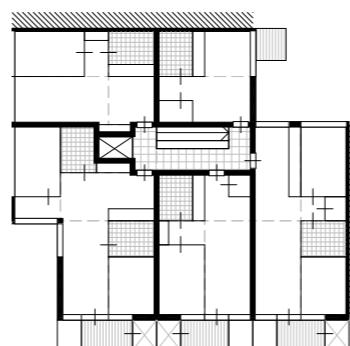
BENCHMARKS

- Living space/Gross space = 76%
- 71 residents
- 39 m² GFS / person
- 27 m² apartment space / person

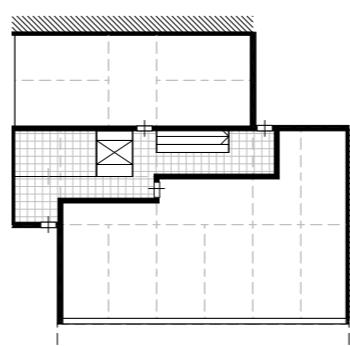
FLOOR PLANS



Top Floor

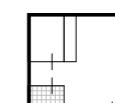


Regular Floor

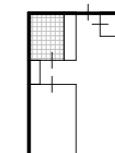


Ground Floor

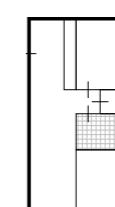
DWELLING TYPES



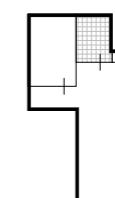
1 Person



2 People



3 People



3 People

AFFORDABILITY MEASURES:

4 5 6 8 9

A P F M S

III IV

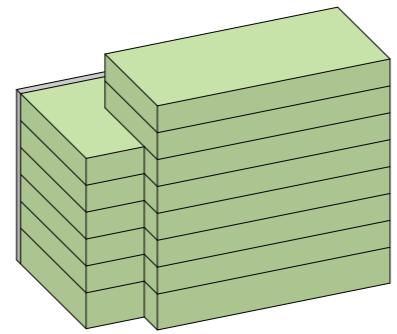
URBAN CORNER



PARK CORNER

QUALITY

- bigger apartments for families
- quiter safe routes to playgrounds and nurseries
- Q: lit from 2 sides



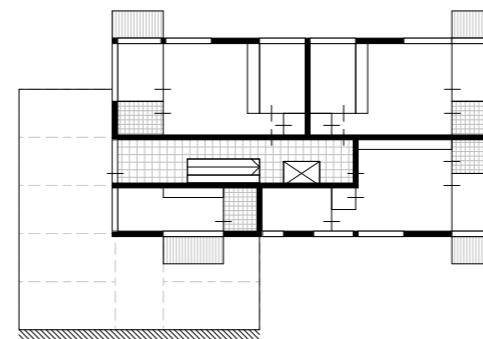
ECONOMY

- minimum circulation space
- efficient floor plans
- compact volume, smaller facade ratio

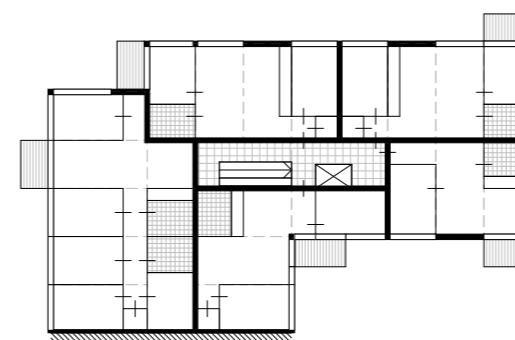
BENCHMARKS

- Living space/Gross space = 83%
- 114 residents
- 32 m² GFS / person
- 27 m² apartment space / person

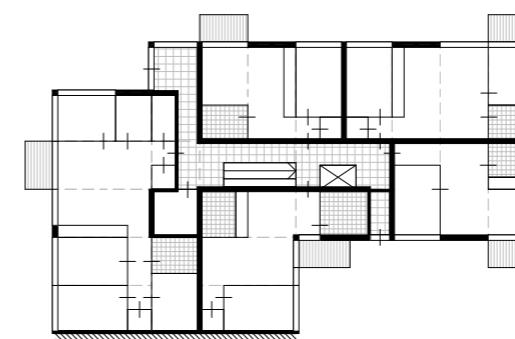
FLOOR PLANS



Top Floor

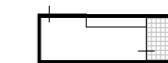


Regular Floor

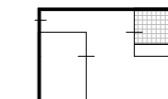


Ground Floor

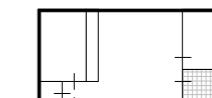
DWELLING TYPES



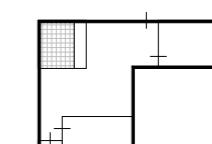
1 Person



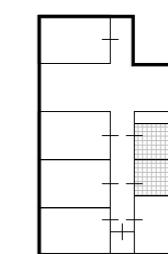
2 People



3 People



4 People



5 People

AFFORDABILITY MEASURES:

4 5 6 8 9

A P F M S

III IV

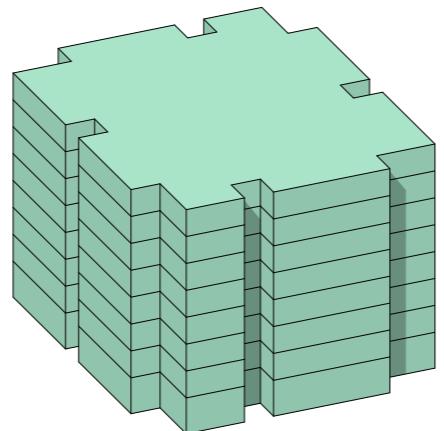
URBAN CORNER



URBAN CORNER

QUALITY

- suitable for cooperatives, smaller households, communal living. as an answer to separated micro apartments
- combines privacy of a microapartment to communal living by sharing facilities, people can afford more of those facilities, bigger space. in this way space is more efficiently used
- wider range of facilities (shared workshops). each room has a bathroom and a pantry kitchen.
- different sizes (4-8)



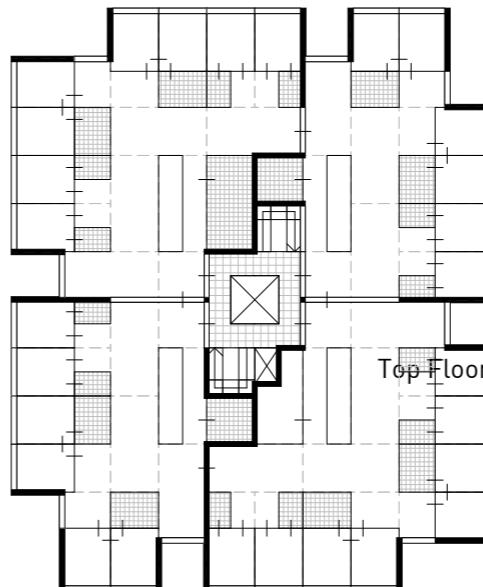
ECONOMY

- thick building, because you can utilize the deep space
- Extremely compact

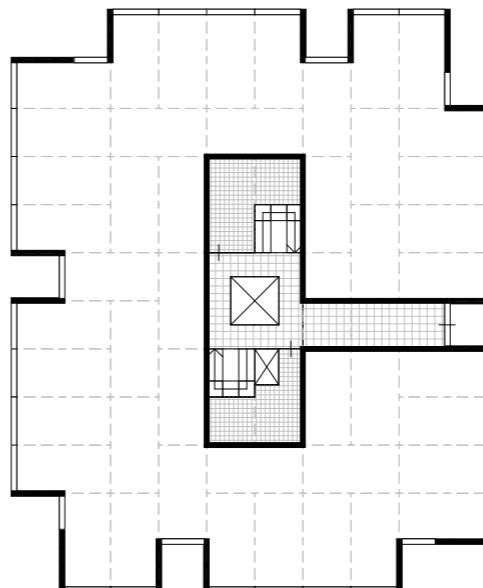
BENCHMARKS

- Living space/Gross space = 83%
- 196 residents
- 45 m² GFS / person
- 32m² apartment space / person

FLOOR PLANS

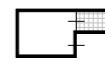


Regular Floor

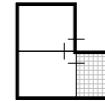


Ground Floor

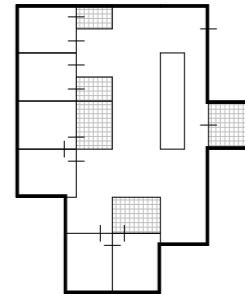
DWELLING TYPES



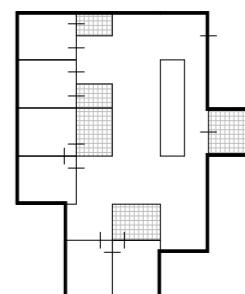
1 Person



2 People



6 People



8 People

AFFORDABILITY MEASURES:

4 5 6 8 9

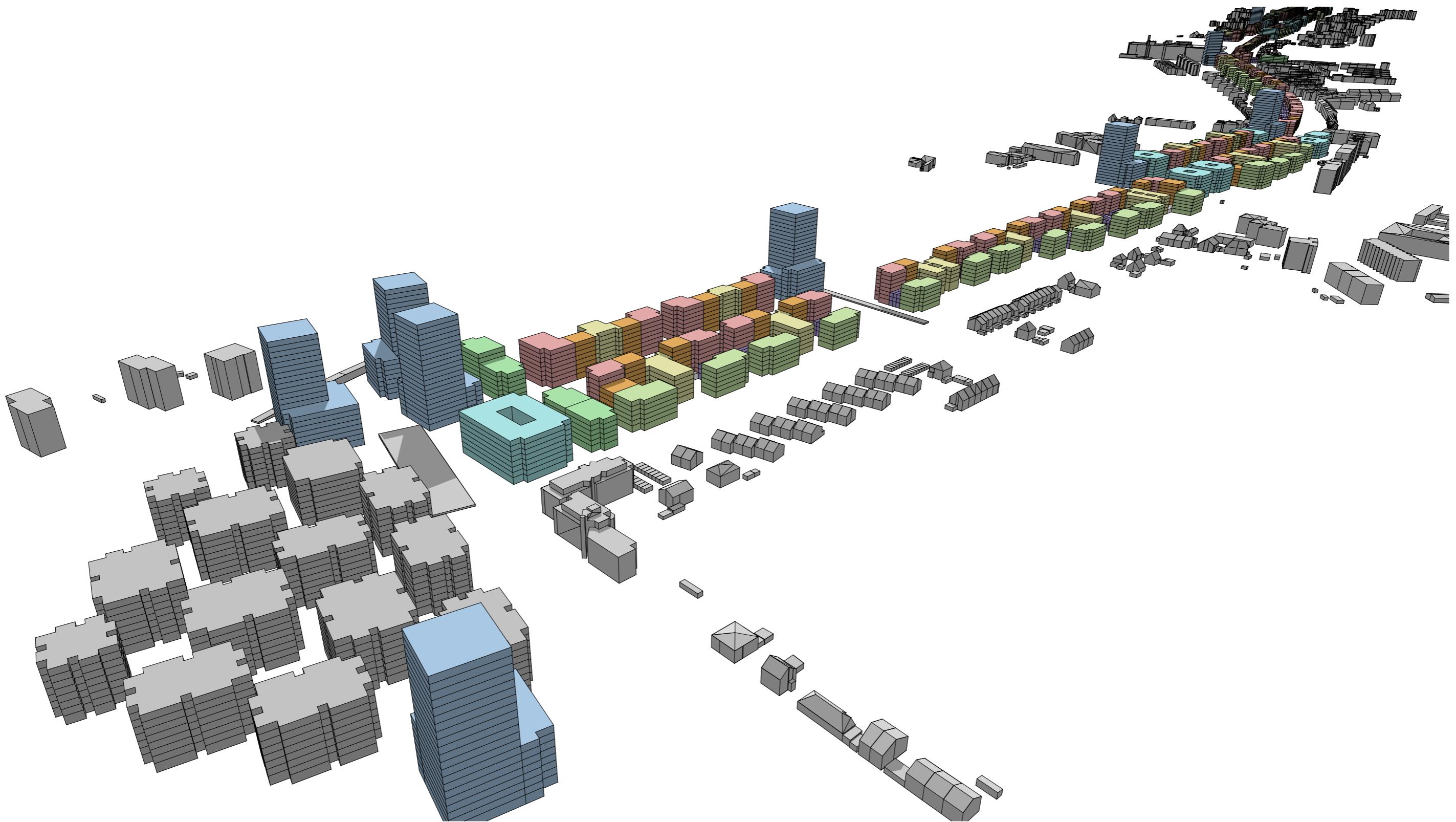
A P F M S

III IV

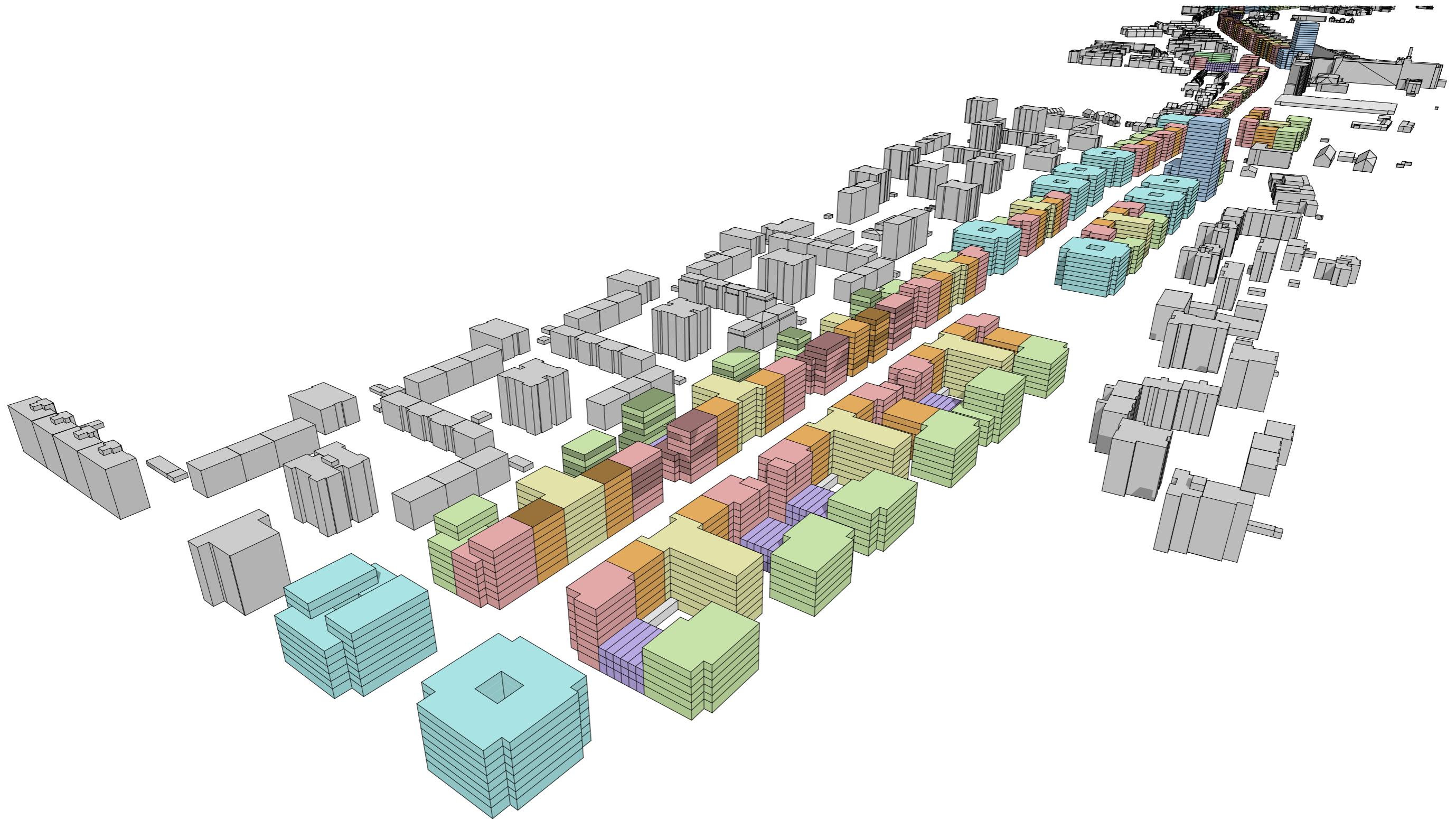
THICK POINT



3D



3D

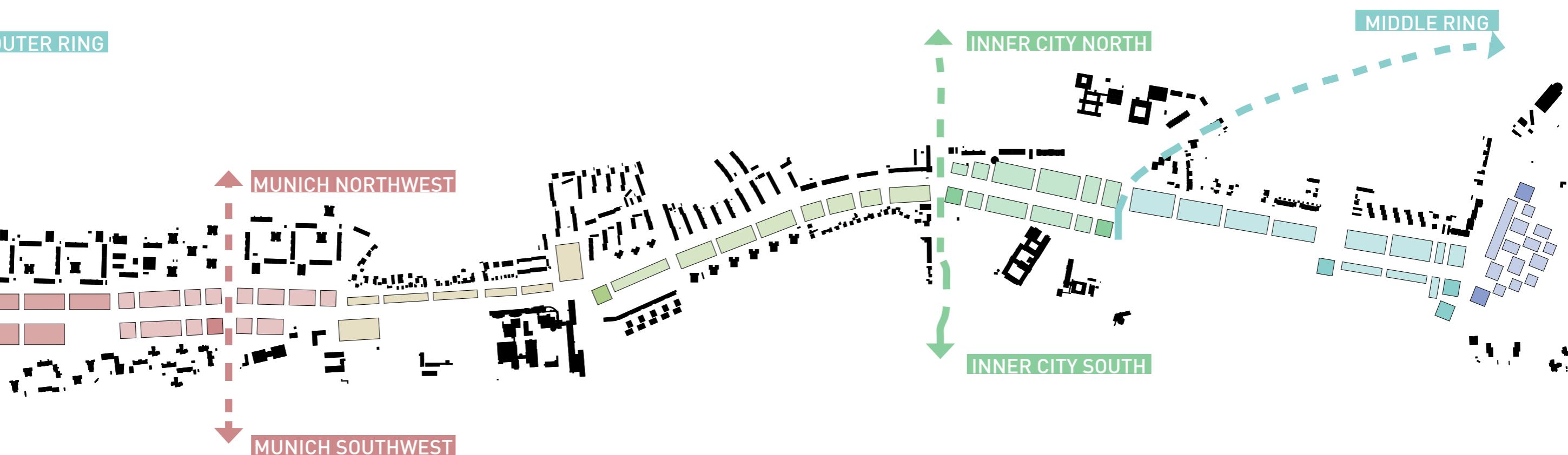


CONCLUSION



PROCESS

PHASES



LEGENDA

- Phase 1
- Phase 2
- Phase 3
- Phase 4

NEIGHBOURS

LEGENDA

Hospital	Public/private corporates/cooperatives
Public services	Public housing
Private home occupiers	
Individual landlords	



CONCLUSIONS

CONCLUSIONS

KEY FIGURES

CITY

Residents: 20.000 Residents

Apartments: 10.000 Apartments

NEIGHBOURHOD

Gross Floor Space: 1.060.000 m²

Density: 1,94 fabric scale / 5,42 average plot scale

Living Space: 600.000 m²

Shopping Space: 60.000 m²

Learning Space: 60.000 m²

Office Space: 60.000 m²

BUILDING:

Types: 8

Spatial efficiency: 80%

30 m² apartment space/person

CONCLUSIONS

EVALUATION

Affordability criteria helpful guidelines in planning process

- Balancing qualitative and economic criteria
- Early design choices have exponential impact on development costs for example, proximity and travel distances, but also on development costs
- Urban design significantly influences development costs also on architectural level (compactness) and housing quality (proximity)
- Qualitative criteria quite universal and not only linked with affordability
- Balancing act between cost and quality - could lead to making informed decision about both

CONCLUSIONS

OPPORTUNITIES on the scale of:

CITY

- Accommodating significant amount of affordable housing
- Improving density of public transport and incentivising use of it
- In line with city visions regarding mobility transition

NEIGHBOURHOOD

- Creating a new inclusive Sub-centre
- Improving existing physical conditions - reducing noise, air pollution
- Improving access to amenities, public transport
- Accommodating a variety of public spaces and building typologies
- Reconnecting neighbourhoods separated by highway

BUILDING

- Urban preconditions determine affordability to a large extent - plot size, building envelope, efficiency of use of space

CONCLUSIONS

THREATS on the scale of:

CITY

- Traffic management
- Planning complexity - time and stakeholders

NEIGHBOURHOOD

- Conflicting interests of stakeholders, especially neighbours
- Highway green serves currently as green, although noisy and polluted , recreational space

BUILDING

- Building for tenants is building for yet unknown people and their unknown demands
- Potentials for prefabrication are already largely determined on urban scale - grid, orthogonality, standardised sizes

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THANK YOU