Corridor in transition

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Vertical redensification for urban resilience - Strategies for housing and climate adaptation along the southern axis of Tempelhofer Feld, Berlin

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2026

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CHALMERS
UNIVERSITY OF TECHNOLOGY

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ABSTRACT

Berlin is facing the challenge of providing adequate housing and dealing with the consequences of climate change. The population will probably keep growing until 2040 (Berlin.de, 2022) and we'll also see more frequent and intense heat waves and heavy rainfall (Federal Environment Agency, 2021). These developments put pressure on existing urban areas and call for spatial strategies that reconcile density with livability and environmental resilience.

The southern border of Tempelhofer Feld is a complex urban condition defined by infrastructural barriers, under-utilized brownfields and fragmented neighborhoods. In this context, the project researches how vertical densification coupled with the tunneling of the A100 motorway can help to transform this corridor into a

consistent and flexible urban form. The approach is to add more housing and public space, while improving the local climatic conditions through green corridors, rainwater management and open-ground design.

The expected result is an urban development concept with short- and long-term scenarios for sustainable densification and climatic adaptation. Thus, some selected parameters need to be considered. After discussions the following five parameters were narrowed down: social quality of public spaces, multimodal mobility and accessibility, climate resilience, contribution to biodiversity, balanced densification. These are then implemented using qualitative and quantitative measurement methods in order to evaluate international reference projects, former local proposals for Tempelhof and then the own design in several test rounds and draw conclusions for the final proposal.

The design process is also decisively influenced by location analyses and site visits at different times of the year.

The design decisions are made with the help of specialist literature, practical findings from the area analysis and the limiting parameters, so that the sustainability requirements of this specific neighborhood development are met as close as possible.

Keywords: Densification, Climate Resilience, Biodiversity, Third Spaces

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STUDENT BACKGROUND

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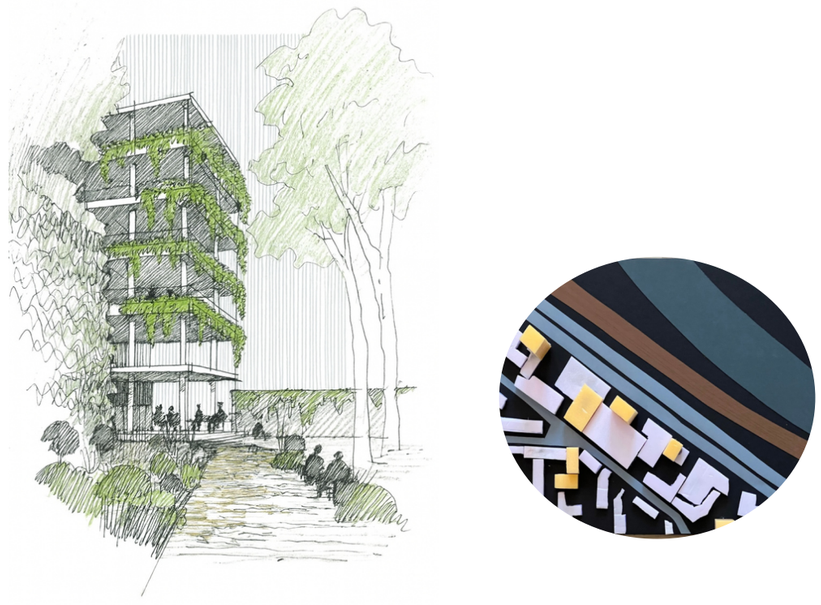
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PERSONAL MOTIVATION

I grew up in Berlin and I got to know the Tempelhofer Feld quite early on, when it was in transition. First it was still an old airport, then it became a unique urban space that has been given meaning through public access and informal use.
It was this very tension between built form and social use that first drew me to the city. During my bachelor and master studies, both in architecture and urban design, urban planning issues that transcend the scale of individual buildings became more and more prominent to me:
How do you create density without pushing things away that are already there? ## How to make public spaces more inclusive? What is the role of mobility structures for everyday life and the shape of a city? And how can green spaces be thought of as part of the larger infrastructure of the city, rather than as isolated open spaces?

Many of these questions come together in the area south of the Tempelhofer Feld. Transportation infrastructure, fragmented pathways and unequal access to public space strongly mark the neighborhood, despite its immediate proximity to one of Berlin's most significant open spaces. It is this somewhat fragmented starting point that makes the location a relevant field of study for me.

Berlin is partly a product of its past and therefore much more open and unfinished than other cities of its size and stature. At the same time, many inner-city spaces are characterized by barriers, underuse and the pressure to develop.



Sketching and physical model from Master thesis preparation course

BACKGROUND & PROBLEM DEFINITION

Berlin has seen high population growth for years, while demand for housing remains greater than supply. New housing construction is barely keeping up with demand, increasing the pressure on the existing urban fabric. At the same time, Berlin is facing the consequences of climate change. Average temperatures are rising, while extreme heat and heavy precipitation are expected to increase in the future, posing major challenges for the city's infrastructure (Federal Environment Agency, 2021). This brings into focus the question of how Berlin can accommodate additional density while limiting land consumption and maintaining or improving environmental and spatial quality.

The site of the project is located on the southern side of Tempelhofer Feld, in a mix of underused areas and transportation infrastructure, next to one of Berlin's largest open spaces within the city. Along the Ringbahn railway line and the A100 urban motorway, which separate Tempelhofer Feld from the residential districts of Tempelhof and Neukölln, this area has for a long time been developed as an industrial and logistical zone. Today the region forms a scattered urban area, with large car parks and paved plots alternating with individual residential buildings and small businesses, while brownfields and former commercial sites remain underused. The transport infrastructures in question act as physical barriers and cause the area to be divided into separate parts without a unified urban character. There are few green connections between Tempelhofer Feld and the areas to the south, and the paths and cycling routes are irregular. Rising rents are also placing additional pressure on the neighbouring neighbourhoods. The long stretches of concrete and asphalt, the lack of vegetation and the fragmented green spaces have greatly reduced the ecological and climatic quality of the corridor.

In general, the area is characterised by relatively low urban density, a high proportion of sealed and underused surfaces, poor quality of open space and limited spatial and ecological permeability.

AIM, PURPOSE, OBJECTIVES

The aim of this thesis is to develop an integrated urban design strategy that combines redensification, infrastructure, public space and green-blue systems. These elements are understood as connected layers that can support a more balanced and climate-adaptive form of urban development.

A central objective is to create additional housing and urban density while limiting further pressure on unsealed ground. Through vertical redensification and the use of already disturbed or infrastructural areas, the project explores how new built volume can be combined with open spaces for ecology, recreation and water management.

The thesis also aims to improve accessibility and everyday connectivity. By reworking existing infrastructural conditions, the project seeks to strengthen pedestrian movement, create new public spaces and support a closer relationship between different urban functions.

Green-blue infrastructure forms another key component of the proposal. Green corridors, water retention areas and open spaces are used as spatial tools to support biodiversity, climate adaptation and the quality of public life.

RESEARCH QUESTIONS

What are the potentials of vertical-densification for improving climate-resilience in urban areas?

Sub questions:

▶ How can targeted vertical densification address housing needs while improving climate resilience?

▶ How can biodiversity be integrated into dense urban environments to strengthen ecological quality and improve urban microclimates?

RELEVANCE FOR URBAN DESIGN & SUSTAINABILITY

The project deals with important objectives of sustainable urban development, especially in terms of climate adaptation, efficient land use and socio-spatial quality. The densification within the existing urban fabric can help to respond to the housing demand in Berlin without further sprawl into the outskirts. In this sense, the project investigates the possibilities for the development of additional housing with a minimal impact on land consumption, reducing the pressure on undeveloped land and facilitating a more compact urban fabric.

The targeted conversion of underused areas is based on inner development and the reuse of already disturbed or infrastructural land. In the meantime, green and blue infrastructure prepares the space for future climate scenarios and contributes to broader urban cooling measures. Sealing can be reversed, rainwater can be managed and greening can improve the microclimate, increase biodiversity and contribute to a more balanced water system.

The relevance of the project also includes social aspects. Mixed use, pedestrian-friendly access and public open spaces can support neighbourhood-based daily life and create more inclusive urban conditions. Partial coverage of fragmented transport infrastructure is thus not only conceived of as a spatial intervention, but also as a means to improve non-motorised mobility and establish better pedestrian connections between surrounding neighbourhoods and Tempelhofer Feld.

Overall the project is relevant for urban design as it integrates housing, climate adaptation, mobility and public space in one spatial strategy. It explores how a currently fragmented urban area can contribute to a more resilient, accessible and resource-conscious development of Berlin.

METHODS (QUALITATIVE & QUANTITATIVE)

Density / Blue-green / Mobility strategy: Throughout the process, these strategies are implemented based on an analysis of the area, and then integrated and coordinated with one another.

QGIS Tools: QGIS is applied to analyse network integration, accessibility to Tempelhofer Feld and the distribution of qualitative green spaces. PST analysis tools are used to support the spatial reading of movement, connectivity and accessibility within the Space syntax methods, including axial and segment analysis, are used to understand spatial integration and the role of streets, paths and barriers within the wider urban network.

Investigative and literature research: Investigative research is used to collect and verify factual information about the site. This includes concepts in the urban design discourse, background information on planning conditions, historical development, existing infrastructures and current urban challenges.

Reference projects: Reference projects are studied on both a local and international scale. Local proposals and existing case studies are used to compare different approaches.

AI assistant as a landscape architect: AI was used to provide recommendations for a landscape architecture strategy, partly because my expertise in this area is not yet fully developed and I come from a different academic background.

Site visits: Several visits were carried out during three different seasons of the year and already during the preparation phase of the thesis. Each visit focused on different aspects of the site, including atmosphere, accessibility, vegetation, everyday use and spatial barriers.

Site analysis: It includes climate, vegetation, socio-economic factors, typology, density, multimodal mobility and accessibility, motorised and non-motorised traffic, vacant lots, building use, history and the site's position within the city of Berlin.

Calculations: The design proposal is subjected to a series of calculations involving the potential housing space and the surfaces that would be created. The purpose of these calculations is to determine how much extra living space can be generated and to see how this relates to the overall spatial strategy.

Iterative design process: The design is developed through iterative sketching and the testing of different variants. This is done both manually on tracing paper and digitally, for instance through Rhino modelling.

Writing approach: The thesis employs both active and passive language, depending on the context of each chapter. Methods span the quantitative and qualitative spectrum and are applied throughout the thesis process as tools for analysis, testing, and reflection, rather than in a strictly linear sequence.

DELIMITATIONS

Spatial Delimitations

This master's thesis intentionally focuses on the south side of Tempelhofer Feld and not on the field itself. Many of the designs are in direct reference to Tempelhofer Feld, but this thesis examines the surrounding urban space to the south of it. for the corridor along the highway and the Ringbahn.

The analysis also considers the broader context, for example to classify connections, barriers, land uses and green spaces. The actual design is based on the corridor of the highway and the Ringbahn, with selected sub-areas within this zone and surrounding areas, in some cases extending to the Teltowkanal.

Methodological and thematic

The thesis is methodologically based on literature, spatial analyses, selected digital tools, reference projects and design tests. There was a deliberate choice in this process. Of course, not all theoretical, technical or political aspects can be fully handled in the scope of this thesis. The topics chosen are those that contribute to answering the research questions and can be meaningfully addressed within the scope of this work.
The tools were chosen consciously to visualize spatial conditions, compare potentials and to give a more understandable argumentation for design decisions. This work is developed not as an architectural design of individual buildings, but from a perspective of urban design. Detailed building floor plans, facades, structures or the design of individual buildings are not elaborated in depth.
Also, the plan is not a comprehensive plan for zoning. Legal, economic and technical requirements are not taken into account. Instead, the work tests spatial strategies that integrate infill development, public spaces, mobility, and climate resilience.
Long-term scenarios include major infrastructural interventions such as a possible tunnel or cover for the highway and Ringbahn. The detailed analysis does not cover the economic viability, the technical feasibility, the financing or the planning of the construction phase. Nor is the exact technical relationship between infrastructure redevelopment and the water management concept fully detailed.

GLOSSARY LIST AND ABBREVIATIONS

Climate resilience: The capacity of a city to anticipate, adapt to, and recover from climate-related impacts, including heat waves, flooding, and storms.

Gentrification: The transformation of urban neighborhoods through new investment and the influx of higher-income residents, frequently resulting in increased rents and displacement of existing populations.

Urban voids: Unused or underutilized spaces within the urban environment, including vacant lots, abandoned sites, or residual areas between buildings or infrastructure.

Multimodal accessibility: The degree to which destinations can be reached using various modes of transportation, including walking, cycling, buses, and trains.

S-Bahn + Ringbahn (Berlin): Suburban and regional rail systems that connect Berlin's city center with its outer districts and surrounding regions.

Green corridor: A continuous strip or network of green spaces that links parks, natural areas, or urban landscapes, facilitating ecological connectivity, recreation, and climate regulation.

Urban heat island: A phenomenon in which urban areas exhibit higher temperatures than surrounding rural areas due to the heat absorption and retention by buildings, asphalt, and other surfaces.

Soil permeability: The capacity of soil to absorb and transmit water, influencing drainage, groundwater recharge, and flood risk in urban environments.

Third spaces: Public or semi-public locations outside the home and workplace where individuals gather, interact, and spend time, such as cafés, parks, or plazas.

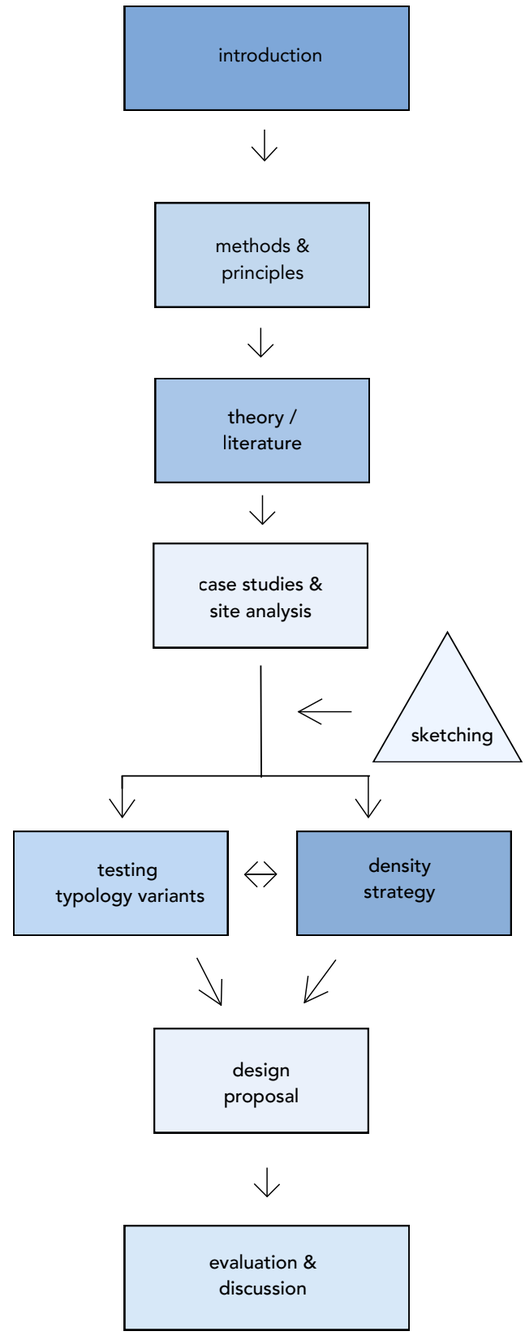
Retention surfaces: Urban surfaces engineered to temporarily store rainwater, including green roofs, permeable areas, or retention basins, to mitigate runoff and flooding.

Water management: The planning and regulation of urban water systems, encompassing stormwater control, drainage, water supply, and flood protection.

Segregation (urban): The spatial separation of distinct social groups within a city, typically based on income, ethnicity, or social status.

Fragmented space: Urban areas that are physically or socially disconnected as a result of barriers such as infrastructure, land use patterns, or uneven development.

PROCESS DIAGRAM



LITERATURE & THEORY

The theoretical section of this booklet introduces and briefly outlines various selected authors and their concepts. It specifically addresses only those aspects that are relevant to the thesis topic. The focus is therefore not on providing a comprehensive overview of the respective theories, but on their relevance to the thesis.



Transformation and Connected Green Space (Bergevoet & van Tuijl, 2016)

Bergevoet and van Tuijl present urban transformation as a process of selectively adding, reusing or removing built volume according to the wider needs of the city. Their Sloterdijk example shows how the demolition of vacant office buildings could reconnect separate parts of Amsterdam's Bretten green zone. The proposal treats the continuity of the larger green structure as more important than preserving every existing building and demonstrates that urban development can involve both construction and strategic unbuilding (Bergevoet & van Tuijl, 2016, pp. 62–63).
The authors also show how additional building rights can be connected to improvements in the public realm. In Antwerp, part of the financial gain from densification is proposed for transforming a traffic-dominated street into a wider cycling and public-space corridor (Bergevoet & van Tuijl, 2016, pp. 68–69). These cases support evaluating the total amount of open space and whether it forms a continuous and publicly accessible spatial structure. Concentrating housing in smaller building footprints may therefore be justified when it protects or creates a larger connected green-blue landscape instead of a collection of isolated residual spaces.

Local Climate Zones and Typological Form (Stewart & Oke, 2012)

The Local Climate Zone system classifies urban areas according to characteristics such as building height and spacing, the proportion of impervious and pervious surfaces, vegetation and openness to the sky. A perimeter block can be related approximately to LCZ 2 compact mid-rise, slab buildings to LCZ 5 open mid-rise, and freestanding towers to LCZ 4 open high-rise. However, the classification depends on the actual surface properties of each proposal (Stewart & Oke, 2012, pp. 1884–1886). The distinction is relevant because built structure and surface cover affect airflow, heat storage, moisture availability and radiation. Compact zones generally contain more paved ground and fewer trees, while open high-rise zones combine tall buildings with a larger proportion of pervious land and scattered vegetation. For the typology test, the LCZ framework therefore supports the combined use of GSI and sealed surface area as simple indicators of climatic potential. It does not predict the precise temperature of the proposals and should not be used as a direct measure of biodiversity (Stewart & Oke, 2012).

LITERATURE & THEORY

Biodiversity, Green-Blue Networks and Urban Forest Potential (Bergevoet & van Tuijl, 2023)

The later edition of The Flexible City places greater emphasis on biodiversity, climate adaptation and the ecological structure of the city. One example of Prague illustrates how urban expansion and fragmented green infrastructure can interrupt habitats and weaken biodiversity. The proposed response is to connect ecological centres through green-blue corridors and to protect the wider landscape from further expansion (Bergevoet & van Tuijl, 2023, pp. 10–11).

The book also stresses the importance of the subsoil. Trees and water retention equire space that is often occupied by underground parking and technical infrastructure. Climate-adaptive development should therefore consider what happens below ground, at ground level and on buildings. For the typology comparison, this supports evaluating the largest connected green-blue patch and the potential for a dense urban forest. The solitaire variant may provide the strongest potential for a continuous tree landscape, but only when the ground remains largely unbuilt and rootable (Bergevoet & van Tuijl, 2023, pp. 76–77).

Density, Housing Output and Environmental Performance (Steemers, 2003)

Steemers distinguishes several ways of increasing urban density: increasing building depth and height, reducing spacing or creating more compact building forms. These strategies may produce similar amounts of housing but have different environmental consequences. Greater building depth can reduce daylight penetration and natural ventilation, while compact residential forms can reduce heat loss through a smaller external envelope. At the same time it may also create greater obstruction and limit solar access (Steemers, 2003, pp. 5–10). Density alone is not a sufficient measure of environmental performance (Steemers, 2003, pp. 10–13). The potential advantage of the high-rise option lies in concentrating floor area on a smaller footprint, but the quality of the released ground must remain part of the evaluation.

Densification and Environmental Trade-offs (Berghauser Pont et al., 2021)

The systematic review by Berghauser Pont et al. shows that higher urban density is not automatically environmentally sustainable. Based on 229 empirical studies, the authors identify benefits related to infrastructure, accessibility and transport, but also recurring negative effects on surface-water management, recreational green space, biodiversity and the urban microclimate. At the local scale, higher housing density is frequently associated with a greater proportion of sealed surfaces, reduced habitat suitability and lower richness and abundance of forest species (Berghauser Pont et al., 2021, pp. 384–386).
Many of these negative outcomes are connected less to building height itself than to the loss of permeable and vegetated ground. The authors therefore argue that densification and urban greening must be considered together, although the available evidence does not prove that additional vegetation can compensate for every negative effect of density (Berghauser Pont et al., 2021, p. 394). For this thesis, the source supports comparing sealed and unsealed surfaces, the continuity of green-blue space and the potential for substantial tree vegetation. The solitaire variant can only be considered environmentally favourable when its smaller footprint produces an actual connected and soil-based landscape rather than residual lawn, access roads or underground parking.

Tree Canopy and Urban Forest Structure (Shashua-Bar & Hoffman, 2003)

Shashua-Bar and Hoffman examine how mature trees influence the microclimate of urban streets. Their results indicate that the cooling effect of trees depends primarily on the extent of canopy shade. In two mature, tree-lined boulevards in Tel Aviv, midday cooling of approximately 1.7–2.1 K was measured in comparison with an unshaded square. Across eleven wooded sites, the authors attributed around 80% of the observed cooling effect to tree shading (Shashua-Bar & Hoffman, 2003, pp. 61–65). The climatic effect of small wooded areas was detectable up to approximately 100 metres beyond their boundaries and suggests distributing small wooded gardens at intervals of around 200 metres (Shashua-Bar & Hoffman, 2003, pp. 66–67). The numerical results are specific to Mediterranean conditions and cannot be transferred directly to Berlin. However, similar effects are to be expected, and it is worth including this theme in the list of parameters.

Spacematrix: Density as a Typological Relationship (Berghauser Pont & Haupt, 2023)

Spacematrix defines urban density through the spatial relationship between built floor area, building footprint and open space. The method shows that a similar amount of floor area can be arranged in fundamentally different urban forms. Tall buildings with large open spaces may achieve a density comparable to lower and more compact block structures, despite occupying a smaller proportion of the ground.

Density is described through several complementary indicators. The Floor Space Index (FSI) expresses the total floor area in relation to the site area, while the Ground Space Index (GSI) measures the proportion of land covered by buildings. Considered together, these values help distinguish between vertical, compact, open and horizontally extended forms of development. They make typologies more precisely comparable than general descriptions such as high-density or low-density development.

FSI, GSI and generated housing are used in this project later on to compare typology variants on a common quantitative basis, the same building plot. The method makes it possible to test whether a high-rise typology can provide a comparable housing output while occupying less ground area. Spacematrix does not determine which variant is environmentally or spatially preferable. These qualities are assessed in combination with other qualitative and quantitative parameters throughout the process of this thesis (Berghauser Pont & Haupt, 2023).

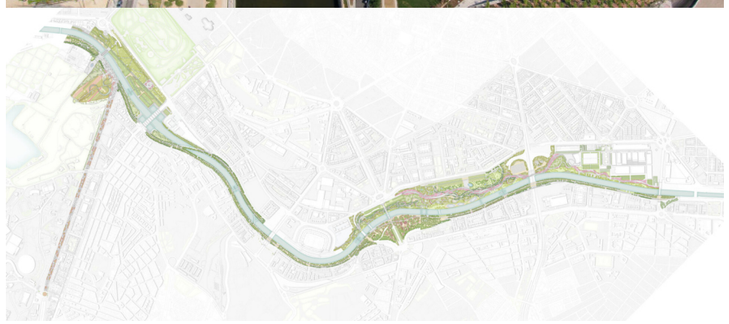
INTERNATIONAL & LOCAL REFERENCES

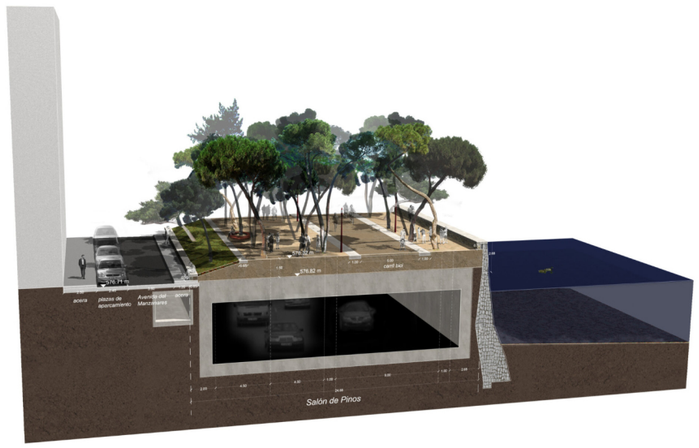
This chapter brings together international and local references relevant to the thesis site directly south of Tempelhofer Feld. The international section focuses on three realised projects selected from a broader survey because they respond to spatial conditions and development pressures comparable to those of the thesis area. Further examples are included in the accompanying figure to situate this selection and illustrate additional approaches to vertical densification. The detailed analysis, however, is limited to three cases in order to examine their spatial qualities and relevance to the thesis more closely.

The local section considers three contrasting proposals for the future development of Tempelhofer Feld. They are compared with regard to biodiversity, density, blue-green strategies and the provision of third spaces.









Figures 1

Case study 1: Madrid Río, Spain

In the 2000s, Madrid chose to take the main sections of the M-30 motorway under ground along the Manzanares River, thereby freeing up space for the creation of Madrid Río, a linear park which reconnects the riverbanks via landscaping, pedestrian bridges, public facilities and recreational zones. According to West 8, the project is a continuous waterside masterplan incorporating new pedestrian bridges, public and sports facilities, areas for children, and the restoration of the hydraulic heritage along the river (West 8, n.d.). The project may be seen as both an infrastructural and an urban development initiative; although the motorway keeps its transport function, its spatial dominance is decreased by means of tunnelling. The surface area that has become available is now used as public and green space, while the linear park, the bridges and the pedestrian connections reconnect areas that had been separated by the existing traffic infrastructure and improve the overall urban continuity.



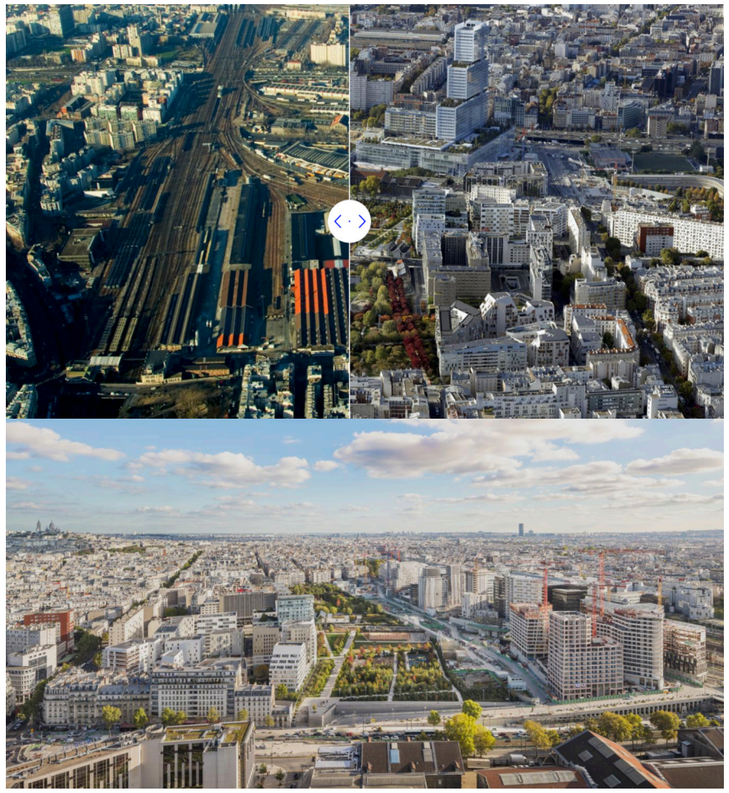




Figures 2 (top), 3 (middle), 4 (bottom)

Case study 2: Gleisdreieck Park, Berlin

The example of Park am Gleisdreieck illustrates the way in which former industrial land can be turned into a public open space without losing some of its previous features. The park was developed on a site that had previously been a railway wasteland and has since been transformed into an urban open space which serves recreational, ecological and social purposes (Grün Berlin, n.d.). The park's particular atmosphere is due to the fact that open lawns, sports areas, paths, spontaneous vegetation and the remaining railway structures all coexist. Instead of eliminating these industrial remnants, they help to give the park its spatial identity. The fact that a variety of uses are combined also shows how recreation, ecology and daily mobility can be handled in a single landscape, enabling the park to act both as a local open space and as connecting urban infrastructure.

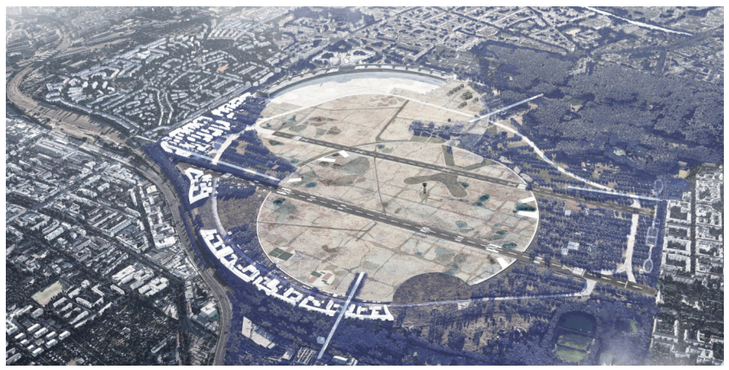


Figures 5

Case study 3: Clichy-Batignolles (Paris 17th)

Clichy-Batignolles is a scheme for the redevelopment of urban areas on land that was previously used for rail transport in the 17th district of Paris. The project covers about 54 hectares and is centred on Martin Luther King Park, which is the main landscape feature of the area (Paris & Métropole Aménagement, n.d.). It shows how land once used for railways can be turned into a densely built-up, mixed-use district, with the central park acting as the organising feature for the surrounding urban development. Housing, offices, public facilities and open spaces are seen as closely linked and interdependent parts of a single urban network. In this situation, landscape infrastructure plays a fundamental role in the process of regeneration.





Figures 6

Tempelhof Proposal A: Schønherr

The Danish office Schønherr gave its proposal the subtitle From Airport to the City's Green Heart. Out of 164 submitted competition entries, the proposal was awarded first prize. New development was suggested only in a very restrained way, mainly along the western and southern edges of the site. This western and south-western building ring primarily functions as a buffer against the motorway and the southern S-Bahn ring.

At the same time, the connection to the urban area further south is considered. The proposal includes a first southern access point across the motorway and the S-Bahn ring, with the option of an additional S-Bahn stop between Tempelhof and Hermannstraße. This suggestion appears very reasonable: on the one hand, the long distance between the two existing stations would justify an intermediate stop; on the other hand, it would significantly improve access to public transport in this part of the city.

The fact that this proposal was awarded first place among 164 submissions may also indicate that the connection to the southern urban area was received positively, even if it was not the main focus of the competition brief. The proposal remains cautious in its approach to connection, but it is nevertheless direction-setting in terms of mobility and access.

A southern crossing into the green recreational area would reduce detours by bus to the western or eastern park entrances. It could also strengthen public transport use in this part of the city and help avoid additional motorised traffic.





Figures 7

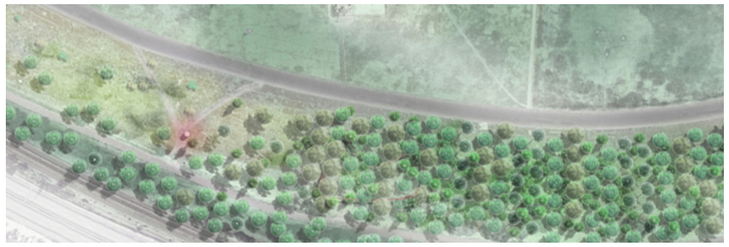
Tempelhof Proposal B: Langhof

The proposal by Christoph Langhof, already briefly mentioned above, clearly focuses on the creation of new housing. In the case of residential towers up to 200 metres high, apartments for welfare recipients are not expected to be the main target group. Nevertheless, housing for lower-income groups would also have to be considered within the legal requirements. In projects of such scale, there is sufficient space to provide the required share of socially accessible housing. Negative banlieue-like effects, meaning the concentration of socially disadvantaged groups in peripheral areas, have so far largely been avoided in Berlin. The Berlin Senate administration's critical assessment of Langhof's proposal was therefore foreseeable. Berlin has traditionally been cautious about building upwards, and the massiveness of the proposal, with twelve highly visible residential towers reaching up to 200 metres, has provoked considerable criticism.

The proximity to the listed airport building is also sensitive, even though the existing structure itself would not be altered. Langhof's renderings nevertheless give the impression that the proposed high-rises could visually dominate the historic airport complex.

For me, however, the Langhof proposal is extremely interesting because it addresses the housing shortage and, if realised, could create substantial densification close to the city centre. A new skyline with differently positioned high points at the southern end of Tempelhofer Feld would be conceivable. On the other side of the motorway, there would be no direct conflict with the listed monument. The proposal therefore contributes to Berlin's ongoing discussion about building upwards.

Berlin still has considerable development potential compared with other European metropolises. At the same time, existing green areas should be preserved or expanded. From my point of view, creating large amounts of new housing within the city therefore requires allowing significantly greater building heights in selected locations. This could reduce the ground occupied by buildings and leave more space for green and recreational areas.





Figures 8

Tempelhof Proposal C: bbz Landschaftsarchitekten

The proposal by BBZ, a Berlin-based landscape architecture practice, was selected as one of six awarded entries in the 2025 international ideas competition for Tempelhofer Feld (Senatsverwaltung für Stadtentwicklung, Bauen und Wohnen, 2025). It impressed me with the radical approach it adopted to protect the site from future development. A continuous “woodland edge,” described by BBZ as a “woodland membrane,” surrounding the area offers a sustainable response to the anticipated consequences of climate change. Rather than introducing further soil sealing, the proposal seeks to increase the number of trees and small woodland areas, thereby creating natural cooling effects and improving the site’s overall climate resilience (bbz landschaftsarchitekten, 2025).

Unlike the other concepts, this design offers a precise and comprehensive depiction of the subject that is the main emphasis of my master's thesis. The expressway corridor's spatial separation is especially noticeable. In addition, the plan suggests possible crossings that could facilitate future expansion of the adjacent green area and enhance linkages over this infrastructure barrier.

CONTEXT & SITE ANALYSIS

This chapter examines and analyzes various factors related to the study area. These include aspects such as typology, density, vegetation and climate, mobility access but also cover partly socioeconomic conditions. In addition, the area will be analyzed through a site visit, and a brief timeline will be provided as an overview.



Figure 9

TEMPELHOFER FELD: 3,55 HA
CENTRAL PARK: 3,41 HA

Sources: Grün Berlin GmbH; New York City Department of Parks & Recreation (NYC Parks).

GENERAL MAP, LOCATION





Figures 10

The project area is located in the southern part of inner Berlin, directly south of Tempelhofer Feld and between the districts of Tempelhof, Neukölln and Kreuzberg. Tempelhofer Feld itself is one of the largest inner-city open spaces in Berlin and covers around 300 hectares of the former airport site, which was opened as a public park in 2010 after the airport closed in 2008 (Berlin.de, 2025). The field is accessible from Tempelhofer Damm, Columbiadamm and Oderstraße and functions today as a major public landscape for recreation, sport and everyday use (Berlin.de, 2025).

The southern corridor is shaped by a different urban condition. Although it lies in a central position and directly next to this large open space, the area is fragmented by the A100 motorway, the Ringbahn, industrial plots, allotment gardens, commercial uses and scattered residential structures. The corridor is therefore detached from the surrounding urban fabric.

This contrast makes the site relevant for my investigation and proposal. Its proximity to urban quarters and Tempelhofer Feld, existing transport infrastructure and mixed land-use structure create strong potentials, while the current spatial organisation limits accessibility, public space quality and ecological continuity. The area can therefore be read as an underused inner-urban corridor.

HISTORICAL TIMELINE



operation start

1910s / 1920s

- construction and operation begins
- rapid urban expansion of surrounding districts
- early railway and industrial infrastructure consolidates south of the field

- nazi-era redesign and expansion - monumental architecture
- housing development slowed by war

nazi-era: expansion



1930s / 1940s



reconstruction

1950s / 1960s

- reconstruction period: development of industrial areas along the southern edge
- first plans for urban motorways (A100) and Ringbahn modernization
- Tempelhofer Feld remains closed and used exclusively for aviation

- completion of the A100 and infrastructural corridor consolidation
- growing spatial fragmentation between field and southern quarters
- mixed residential and industrial typologies emerge

car-friendly urban politics



1970s / 1990s



airport closure & public debates

2000s / 2010s

- closure of Tempelhof Airport (2008)
- public debate on future land use: preservation of Tempelhofer Feld as open park
- increasing densification pressure in surrounding neighborhoods leading to gentrification in the northern areas

- ongoing discussions on partial re-use and edge development
- climate adaptation and biodiversity strategies gain political focus
- infrastructure renewal and heat mitigation become key urban topics

reclaiming of citizens



2020s / 2025

Figures 11

SITE VISIT



CONTEXT & SITE ANALYSIS

TYPOLOGY, DENSITY

During the site visit and while analyzing the building typology using QGIS, I realized just how fragmented and disconnected the area is. The area features very different building types, ranging from single-family homes and allotment gardens in the southern section to predominantly traditional perimeter-block development north of the Ringbahn. In between, freestanding commercial buildings, industrial structures and isolated residential blocks create a heterogeneous urban fabric. The infrastructural corridor of the Ringbahn and A100 further reinforces this fragmentation, separating large parts of the southern area from Tempelhofer Feld and the denser inner-city neighbourhoods.

The use of the buildings within the corridor is equally mixed, with a strong focus on commercial and infrastructural uses. Despite its relatively central location, many areas appear underutilized, including large surface parking lots, vacant plots and residual spaces between infrastructure and buildings. During the site visit, some parts therefore appeared rather sparse, while other areas, particularly established residential blocks, function as coherent neighbourhood structures.



QGIS: Building hights

- < = 6 m
- > 6 m - 12 m
- > 12 m - 22 m
- > 22 m - 40 m
- > 40 m - 50 m
- > 50 m - 75 m
- > 75 m - 100 m
- > 100 m

MOBILITY & ACCESSIBILITY

The study area lies right alongside the Ringbahn, a position which usually enables good links with the wider rail network. Yet because of the large distance between Hermannstraße and Tempelhof stations, the central parts of the area have poor S-Bahn access. Moreover, the subway lines (blue), the main bicycle routes (red) and the secondary routes (yellow) are also available, contributing to overall multimodal accessibility. However, both the motorway and the Ringbahn act as major obstacles to pedestrian travel between the southern and northern sections. As a result, only part of the southern areas is connected to the more developed northern areas, such as Tempelhofer Feld. In order to overcome these problems, the proposal suggests building a new S-Bahn station in the central part of the southern corridor to improve accessibility and to meet the expected population growth.

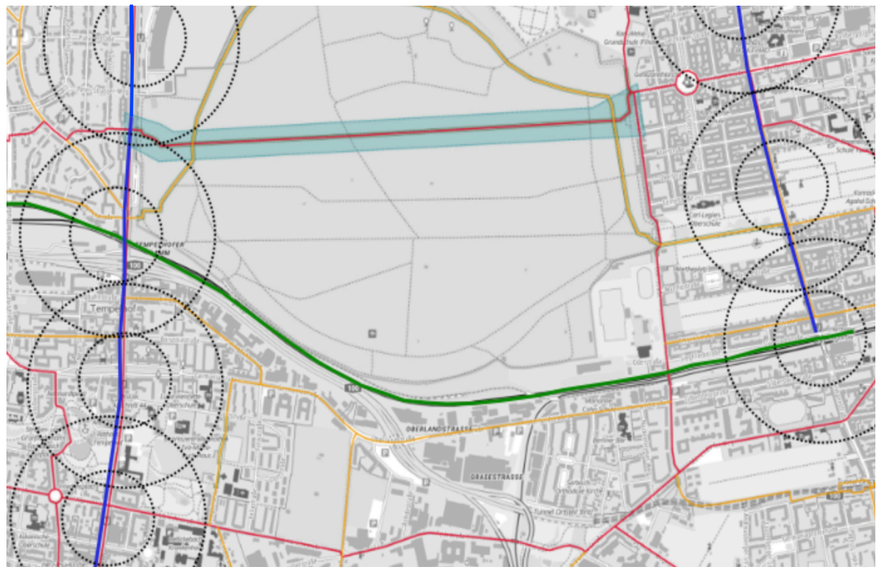


Figure 12: mapping accessability of train stations + bike paths

blue: subway
green: s-bahn
red: main bike routes
yellow: secondary bike routes
radius: 250 m & 500 m

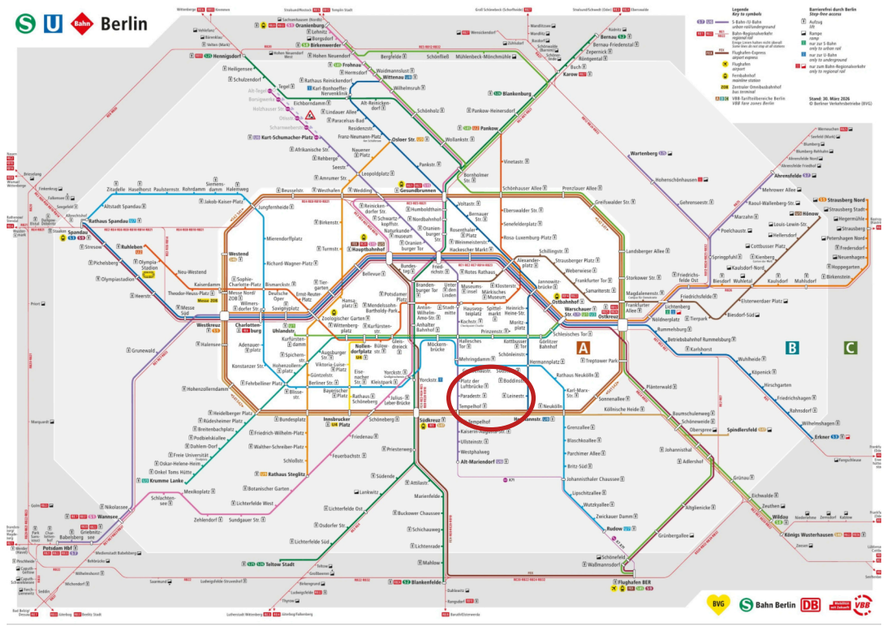


Figure 13: train map of Berlin, Tempelhofer Feld circled in red



blue: subway
green: s-bahn
red: long distance train, regional train
white: highway
violet: relevant bus routes for site
translucent orange: existing tunnel for highway

VEGETATION & CLIMATE

Projections indicate that climatic conditions in Berlin could change significantly by 2100. For the Berlin-Brandenburg region, a further rise in the annual average temperature and a significant increase in the number of hot days and tropical nights are forecast (Federal Environment Agency, 2025). Scenario analyses also indicate that by the year 2100, Berlin could develop a climate similar to that of Toulouse today (Federal Environment Agency, 2025).

This phenomenon is connected with the intensification of summer heat waves. At the same time, research shows that metropolitan areas which have a great deal of vegetation and a high density of trees experience lower night temperatures and therefore mitigate the urban heat island effect (Federal Environment Agency, 2025). It follows that the expansion of green corridors and the increase in vegetation density could lead to better microclimatic conditions, encourage cooler air currents, and support biodiversity by providing habitats for a variety of plants and animals.

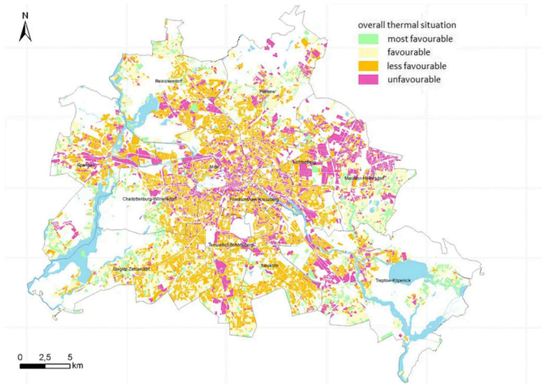
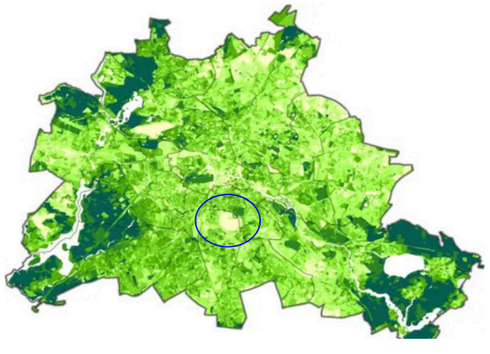


Figure 16: Spatial distribution of evaluation classes for the overall thermal situation in the settlement areas (linking of day and night situation) of Berlin



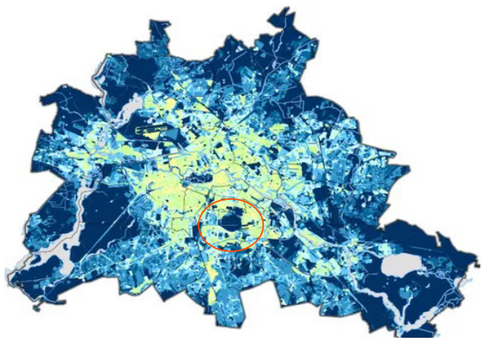


Figure 17 (left): Intensity of green infrastructure and vegetation, green = intense
Figure 18 (right): soil permeability (for rainwater), dark = high

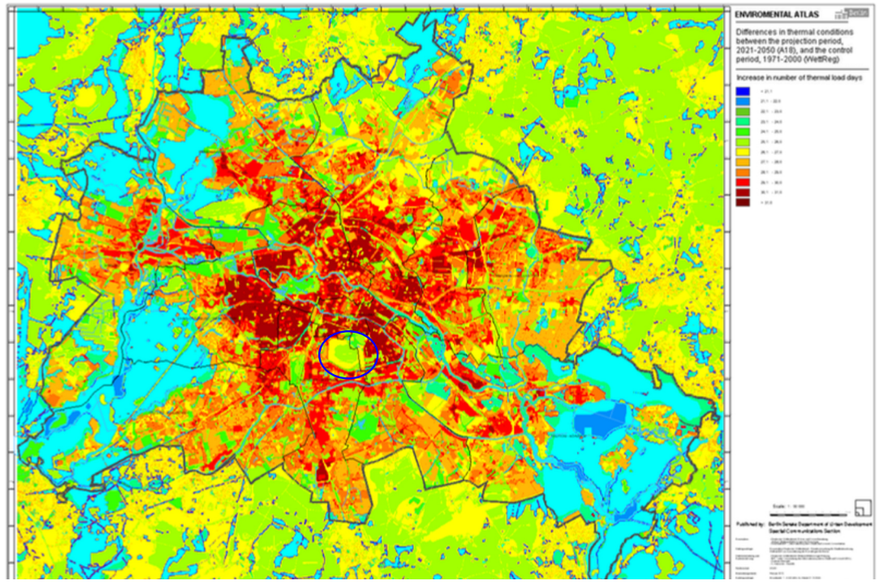


Figure 14: Differences in thermal conditions between the projection period 2021-2050 and the control period 1971-2000; Increase in number of thermal load days

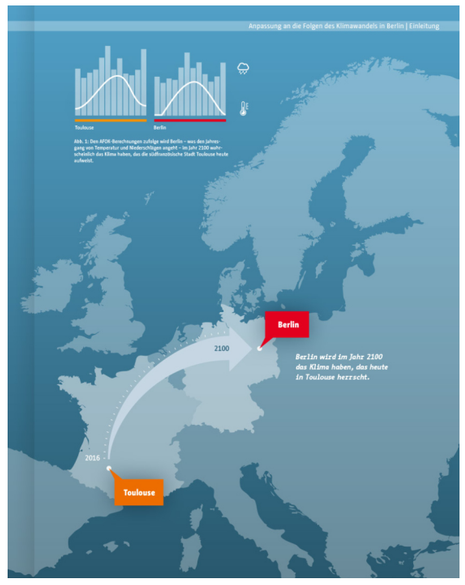


Figure 15: 2100 scenario of Berlin’s climate

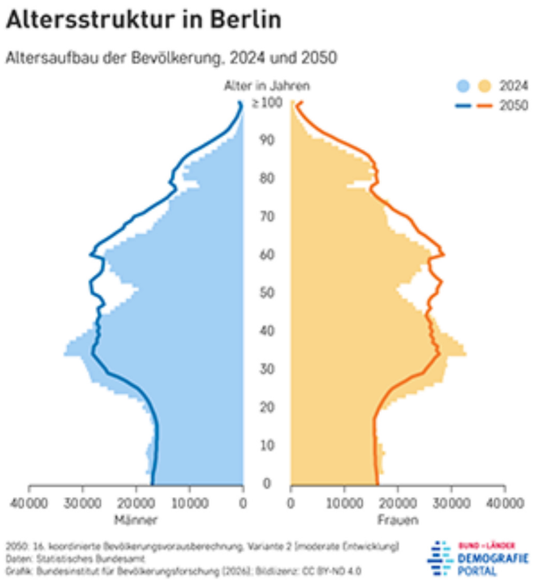


Figure 19: Demographic structure in Berlin, 2024 and 2050

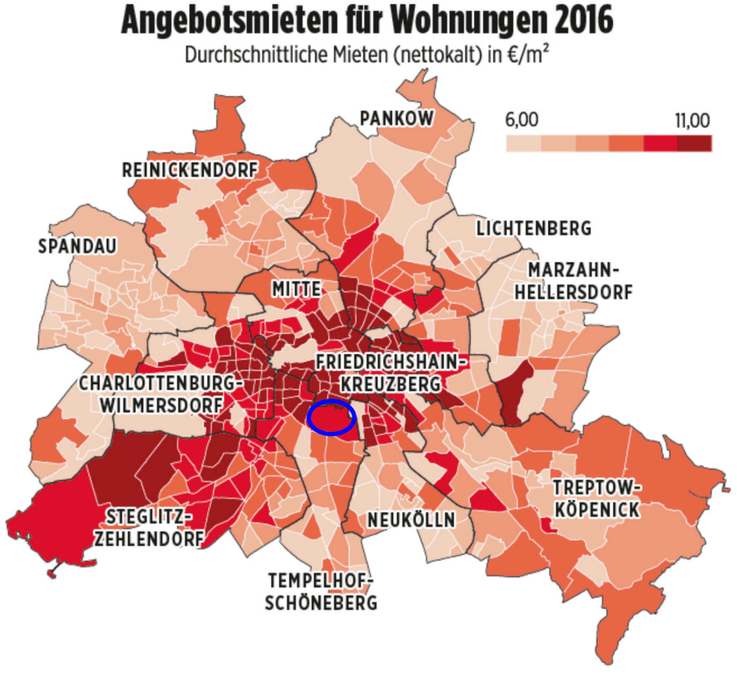


Figure 20: Berlin Rent Index per square meter, 2016

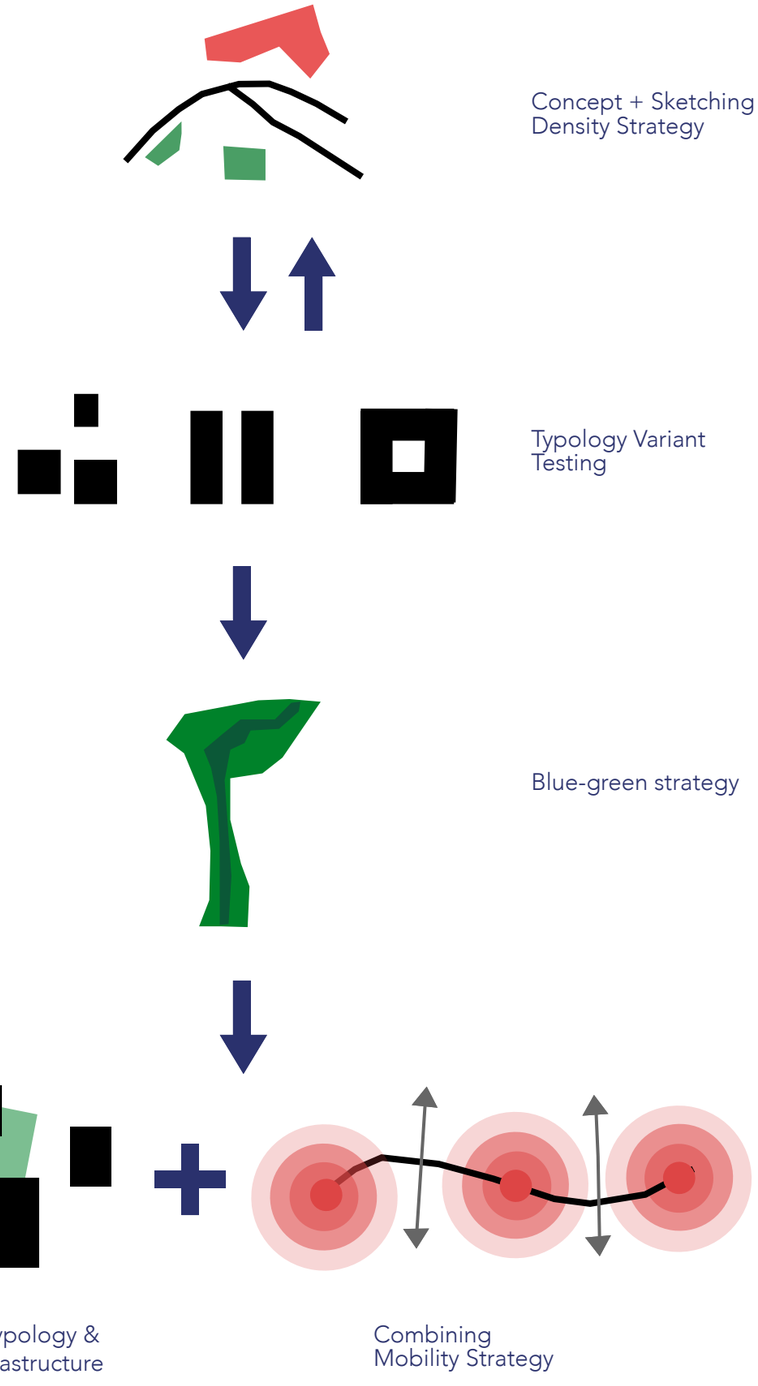
SOCIO-ECONOMIC FACTS

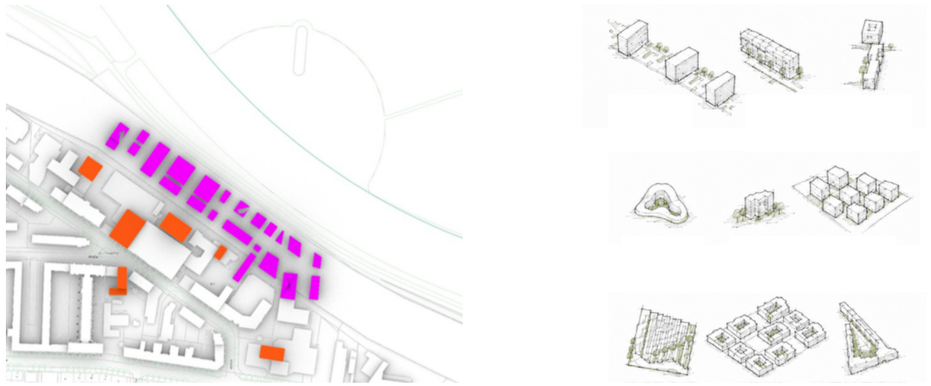
Berlin is located in a country that, by international standards, has already reached the end of its demographic transition. However, the population's median age will rise even further in the coming years, causing the proportion of people vulnerable to heat to continue to increase. In light of this as well, it is absolutely essential to adapt the city to changing climatic conditions and to develop urban cooling strategies.

The second figure shows rental prices per square meter in 2016. Since then, the housing demand has strongly increased. Tempelhof is outlined in blue. The central districts to the north, east, and west of Tempelhofer Feld sometimes have relatively high rental prices. The financial burden on Berlin's urban population is correspondingly high. To curb further gentrification, it is essential to provide more housing of all types.

TESTING & FINAL PROPOSAL

This section of the project begins by describing the conceptual design process. The density strategy is developed and refined in parallel with the typology iteration. Subsequently, three different typologies are compared against one another using qualitative and quantitative parameters. After selecting and evaluating the appropriate typology, the green-blue strategy is developed and then overlaid with the density strategy to create a master plan and additional visualizations. The effects of the design are then considered and described.





Typology tests from preparation course + sketched potential typology Variants



Alotment gardens

Parking surfaces
(public / private)

S-Bahn

Highway

Unused train track

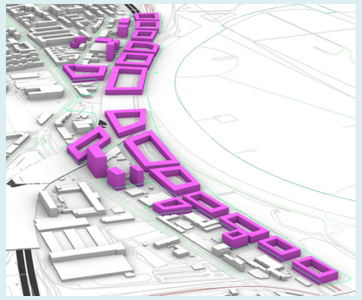
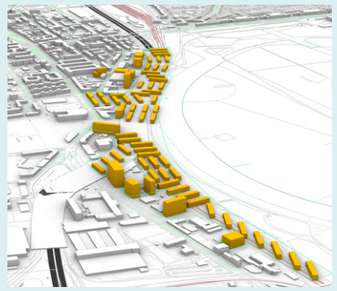
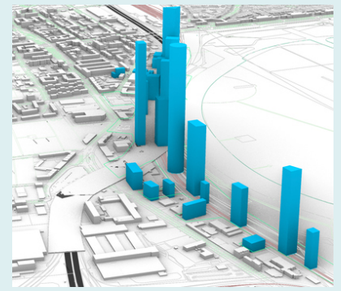
CONCEPT & SKETCHING PROCESS

During the design process, sketches were first created and concepts were developed for expanding the typology and connecting the green corridors. Both approaches were initially developed separately and then overlaid to assess their spatial and functional coherence. The work began manually on sketch paper and was later further developed and modeled digitally in Rhino.

DENSITY STRATEGY: MAPPING & IDENTIFYING VOIDS / POTENTIAL SPACE

First, I used sketching paper to identify which areas have potential for infill development and greening. This area has a low utilization rate, despite its central location. The highway and the Ringbahn define the area's character and contribute to its fragmentation. However, I recognized the potential for new green corridors that could extend all the way to Teltowkanal, even incorporating the decommissioned railroad tracks.

MORPHOLOGY VARIANTS

	VARIANT 1: BLOCK-EDGE	VARIANT 2: SLAB	VARIANT 3: SOLITAIRE
Top View			
Perspective			
Description	• Continuous perimeter block • Enclosed or semi-enclosed courtyard • Clear street definition • Medium building heights • High ground coverage • Compact urban structure	• Parallel linear buildings • Open spaces between buildings • Clear orientation and repetition • Medium building heights • Moderate ground coverage • Open urban structure	• Freestanding high-rise buildings • Small building footprints • Large surrounding open spaces • High vertical density • Low ground coverage • Permeable urban structure
Urban Reference	 Figure 21	 Figure 22	 Figure 23

COMPARISON OF VARIANTS

PARAMETER	VARIANT 1: BLOCK-EDGE	VARIANT 2:SLAB	VARIANT 3:SOLITAIRE
sealed / unsealed surface	69.565 m2 / 137.782 m2	53.875 m2 / 153.472 m2	15.502 m2 / 191.845 m2
generated housing	7.950 / 5.963 apartments	6.345 / 4.758 apartments	9.645 / 7.234 apartments
FSI	1.73	1.37	2.09
GSI	0.33	0.26	0.07
public vs. private surface	- plenty of private space thanks to backyards - more difficult for people to access	- partially accessible and open	- a very open and airy structure - plenty of public space - plenty of walking paths
largest connected green-blue patch	26.222 m2	23.764 m2	79.026 m2
potential for densed urban forest	medium: several protected courtyard or pocket forests	medium to high: linear rows of trees and shrubs	high: large continuous networks

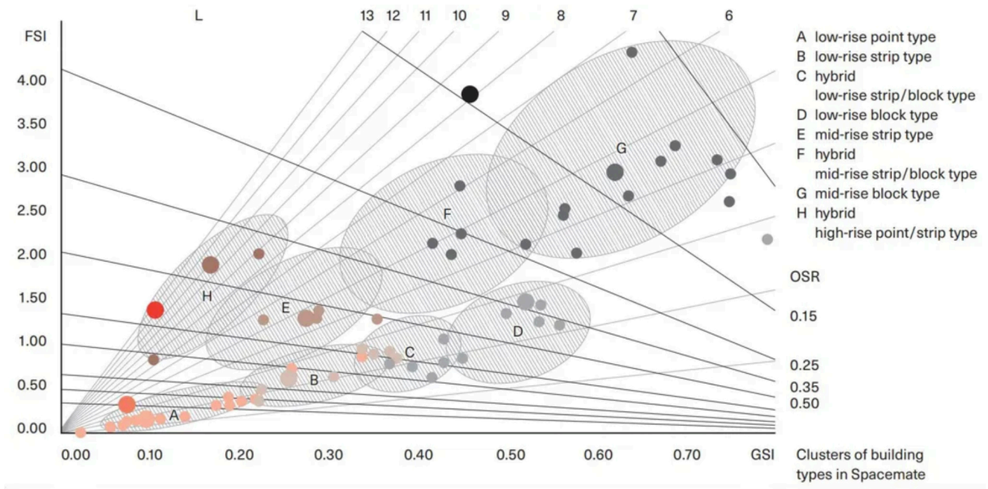


Figure 24: Spacematrix

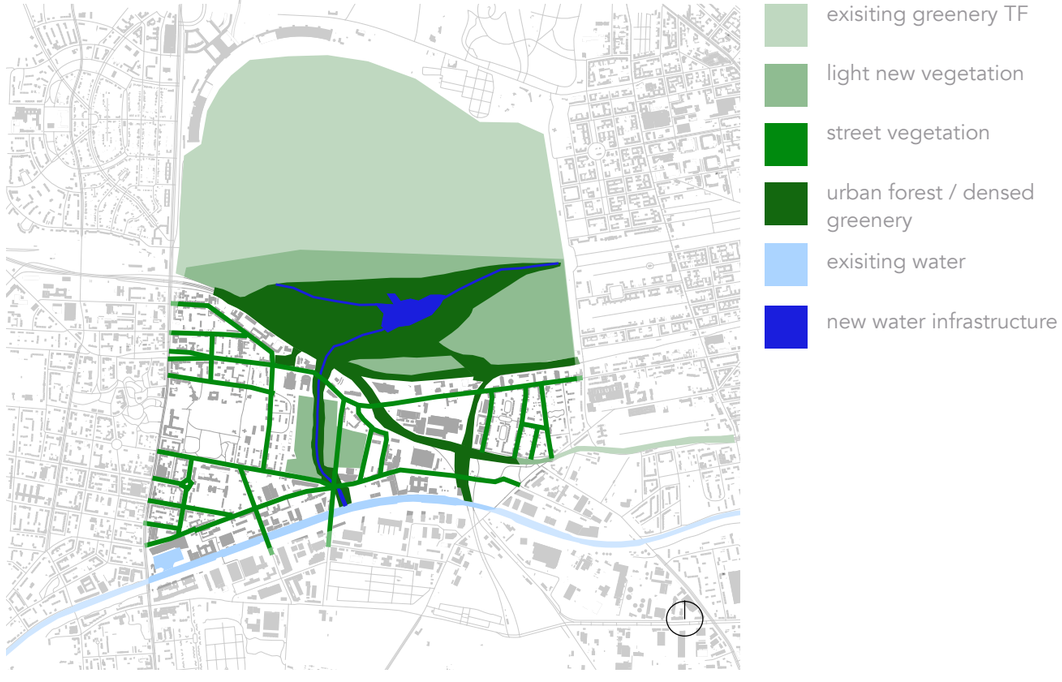


Chosen Typology with plot borders for calculations

TYPOLOGY DECISION & DENSITY STRATEGY

The parameter comparison led to the selection of the solitaire building typology for further development. Within the selected set of parameters, it provides the strongest overall balance between housing output, low ground coverage, public open space and green-blue potential. Within the Spacematrix framework, this typology combines the highest FSI of the three variants with a comparatively low GSI. Density is therefore achieved primarily through building height rather than extensive ground coverage. At the same time, the variant leaves the largest proportion of unsealed ground and provides the greatest potential for a continuous green-blue network and dense urban forest. This supports my blue-green strategy by maintaining larger continuous areas for vegetation, permeability and public open space. The comparison does not imply that the solitaire is generally the preferable urban typology. Although it responds most effectively to the specific objectives and parameters defined for this site.

The further development consequently concentrates new construction almost entirely above the Ringbahn and motorway tunnel. Instead of extending the urban fabric into Tempelhofer Feld, the proposal uses already infrastructure-dominated areas to accommodate additional density. This preserves as much of the field as possible as an open and publicly accessible landscape and distinguishes the approach from proposals that place larger building volumes directly along or within its edges. It also responds to the long-standing public scepticism towards development at Tempelhofer Feld, while still allowing new urban density to be proposed in a spatially concentrated form.



Blue-green strategy

BLUE-GREEN STRATEGY

The goal of the Blue-Green Strategy is to connect the southern end of the Teltowkanal to Tempelhofer Feld. Existing green corridors will be expanded and brought closer to the city center. In some cases, allotment gardens will be converted and integrated into public green spaces and water features.

By tunnelling under the highway and the Ringbahn, additional parking spaces and high-quality green spaces can be interconnected. The green structures are closely linked to public paths for pedestrians and cyclists. The high proportion of unpaved areas is made possible by vertical densification in the area.

As shown in the figure below, the area is located in a zone considered to be particularly worthy of protection. My approach is to ensure ecological connectivity by gradually linking the green corridors while also proposing a plan to enhance the quality of the flora.

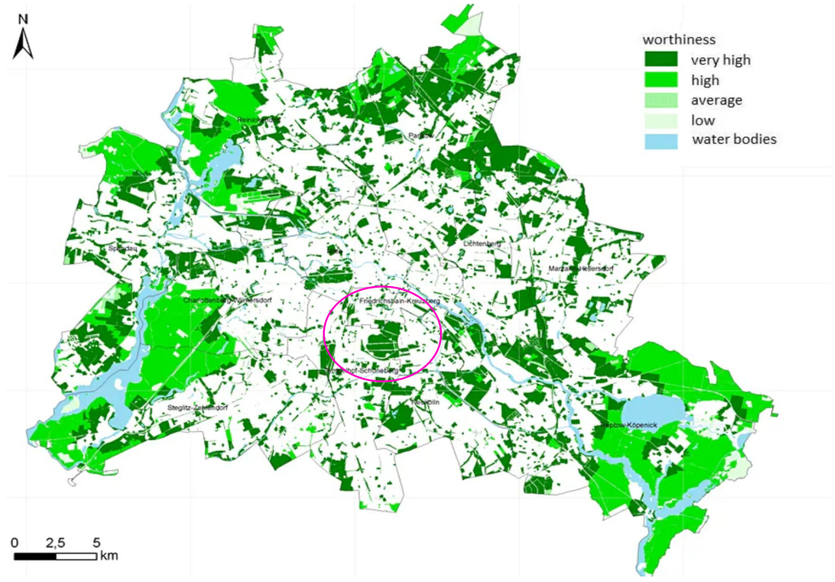


Figure 25: Spatial distribution of evaluation classes for climate-ecological worthiness of protection of open/green spaces in Berlin



AI Landscape Proposal: Concept of eligible local plant types for Berlin's future climate



Sketching of an urban forest example

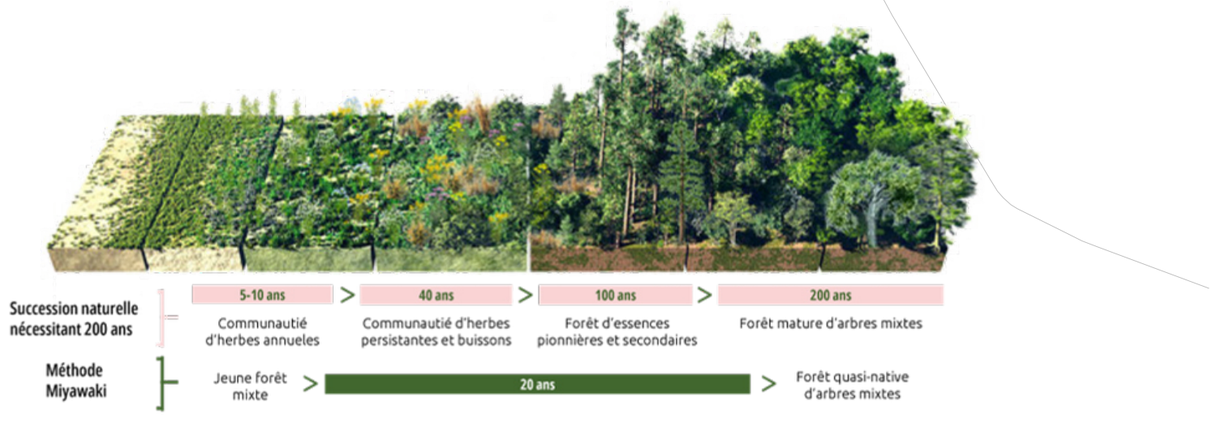


Figure 26: Comparison of convenient forestation method with Miyawaki method

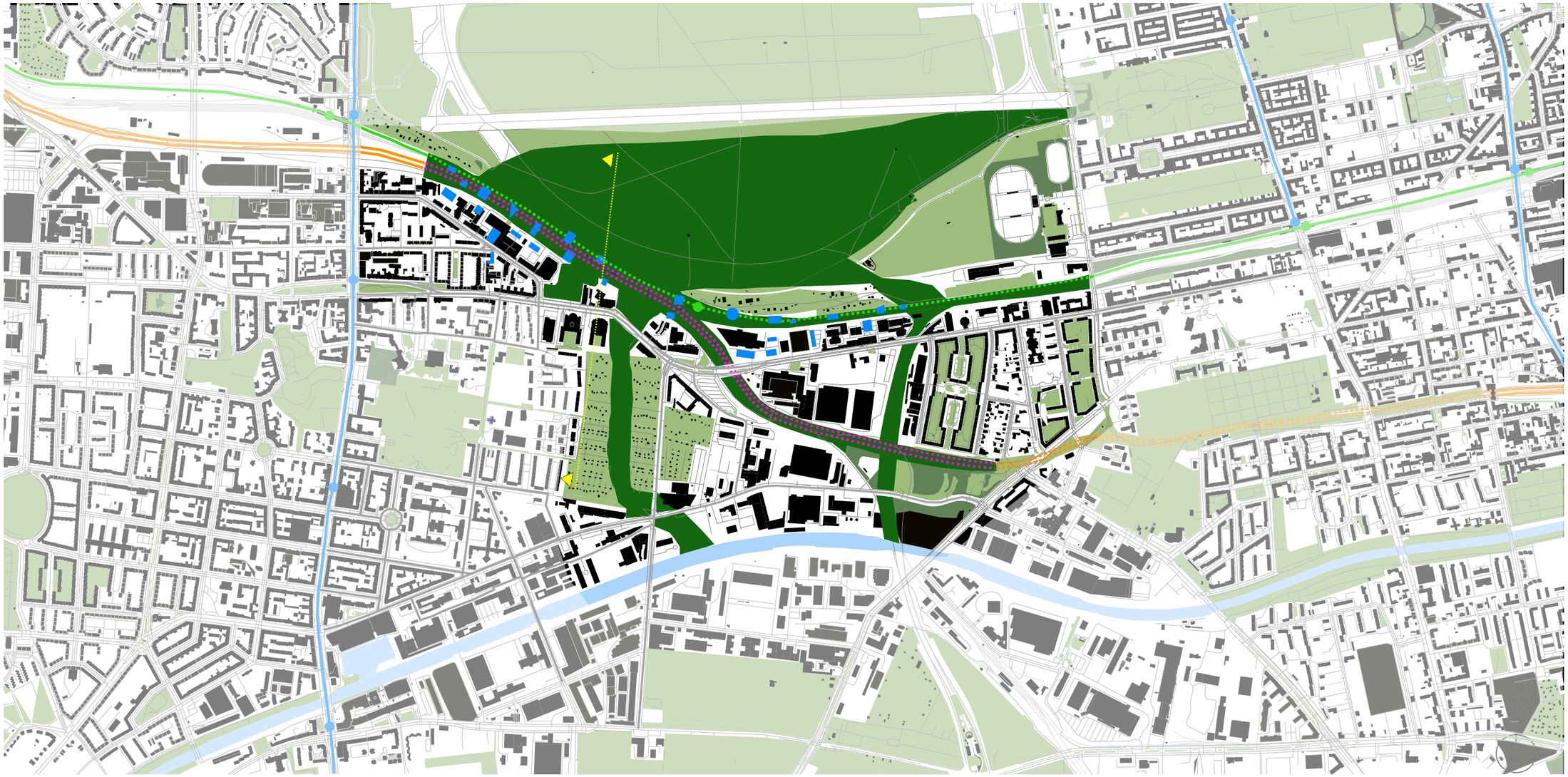
BLUE-GREEN STRATEGY: MIYAWAKI-METHOD

Against the background of this master's thesis, the Miyawaki method can be interpreted as a small-scale strategy for the ecological densification of heavily sealed or spatially fragmented areas. The method is based on the close planting of site-appropriate, native trees and shrubs that are selected based on a location's potential natural vegetation. Different height and vegetation layers combined lead to compact, forest-like structures, which are especially suitable for use in urban areas with limited space (Urban Forests, n.d.).

Miyawaki plantings could improve the microclimate without overwhelming the open expanse of Tempelhofer Feld. Thus, the method also serves the objectives of Berlin's StEP Klima 2.0, which highlights blue-green measures, climate-efficient green spaces, and water-sensitive urban redevelopment as important building blocks of climate adaptation (Senate Department for Urban Development, Construction and Housing, 2023).

At the same time the method cannot be overemphasized in the design. Current scientific assessments present the Miyawaki method as promising for compact urban greening, but also highlight the need for further research on the long-term impact, maintenance, cost structure and transferability to different European urban contexts (Saliba et al., 2024). The method is particularly suitable as an experimental microstrategy to combine dense urban development with an increase in biodiversity. The proposed solitaire typology enables the most potential for this approach.

OVERLAPPING STRATEGIES: MASTERPLAN



added typology

green-blue strategy

highway

S-Bahn

street

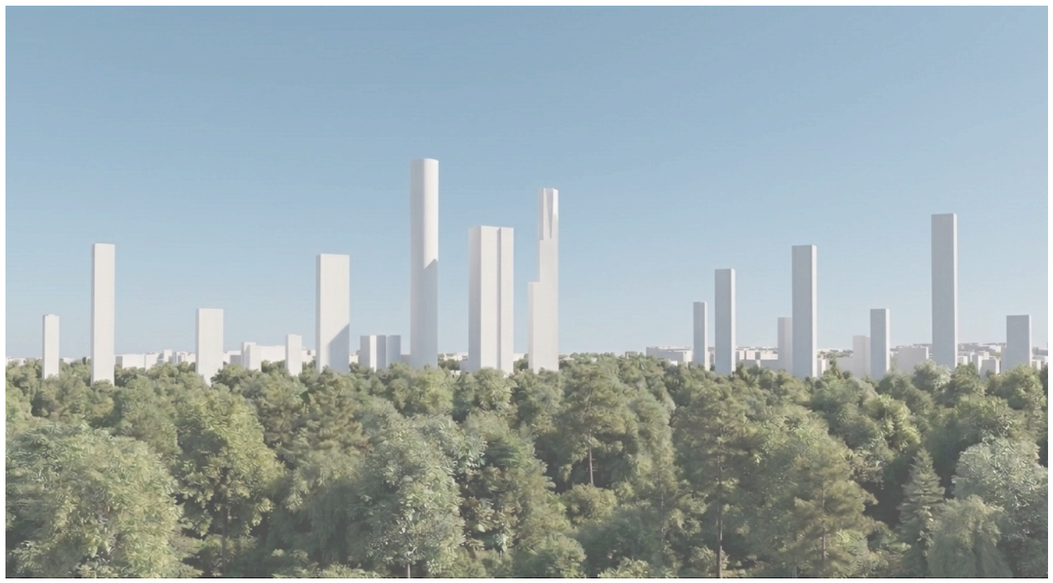
exisiting parks / greenery

SECTION

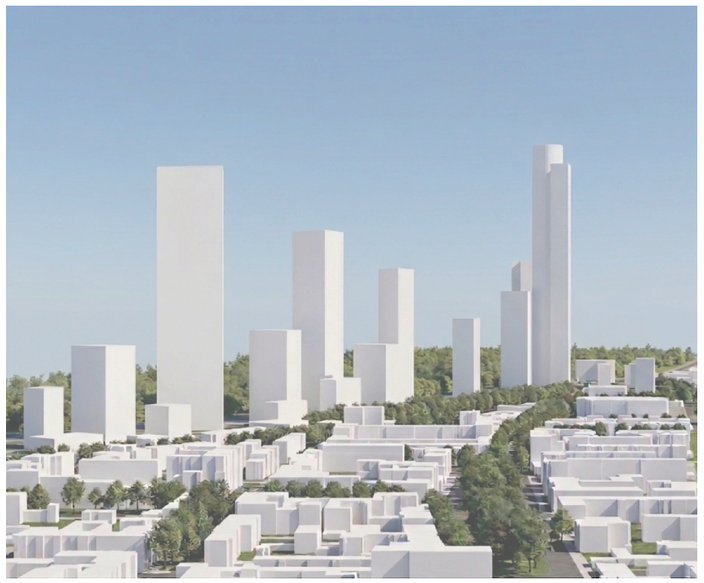


South-North; existing built area to Tempelhofer Feld

PERSPECTIVES



View from Tempelhofer Feld - concept of southern forest area



View from southwest / existing built area in project site

SIDE EFFECTS & CHALLENGES

CAR MANAGEMENT

The creation of new housing will also increase the demand for parking and car-related infrastructure. Instead of distributing parking areas across the whole site, the project proposes a more concentrated approach along the main traffic axes. Selected parking structures could be placed at these edges and, where necessary, extended vertically.

This method means that there is less need for extra impervious surfaces in the area which is to be developed. Since vehicle management is focused on certain sites, more room becomes available for green-blue infrastructure, public open spaces, and areas designed for pedestrians. While cars are still provided for, their spatial effect is reduced and is managed in a more systematic manner.





left: underutilized parking slots in the project area
right: Figure 27 - During the warmer months, Tempelhofer Feld serves as a popular spot for picnics and as a meeting place

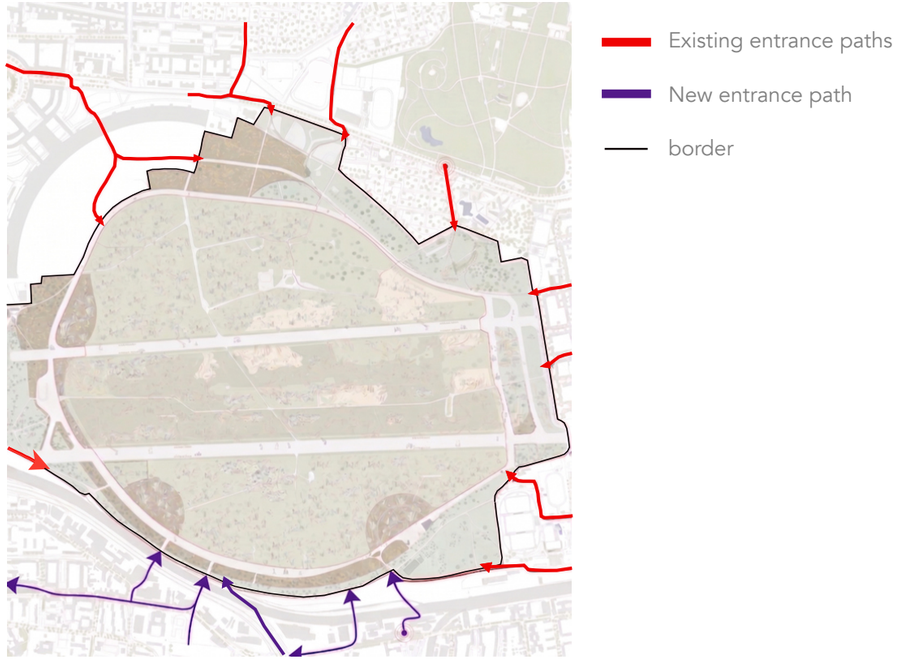
PUBLIC SPACES

Improved access to Tempelhofer Feld will automatically increase the amount of public open space available to future residents. The field remains an important existing resource and becomes more accessible through new connections across the infrastructural barriers. At the same time, the transformation area itself will provide additional public spaces. They support everyday use, local meeting points, recreation and a closer relationship between the new density and the existing open landscape.

IMPROVED MULTIMODAL ACCESSIBILITY

From the perspective of the non-motorized network, the proposal creates new possibilities for movement through and beyond the site. New north-south connections across the future covered motorway and railway infrastructure improve access for pedestrians and cyclists and strengthen the relationship between the southern neighbourhoods, Tempelhofer Feld and the wider city centre.

A new underground S-Bahn station would further improve accessibility and participation in the public transport network, especially through a stronger connection to the Ringbahn. The project does not aim to exclude cars completely, but the extension of a car-based infrastructure is not the main focus. Instead, the emphasis lies on pedestrian, cycling and public transport connections as
the basis for a more accessible urban district.



Accessibility for pedestrians - Before and After

SIDE EFFECTS & CHALLENGES

PREJUDICE AND RESISTANCE FROM THE PUBLIC

It should be noted that there is a strong public sensitivity towards construction projects in the wider context of Tempelhofer Feld. Since the 2014 referendum, in which a majority voted for the preservation of the former airfield and against development on the site, the field has become closely connected to questions of public ownership, openness and democratic participation (100% Tempelhofer Feld, 2014, as cited in Berliner Zeitung, 2024).

For this reason, even interventions outside the protected field may be met with scepticism. A lack of trust in large-scale development, fear of privatisation, rising rents and further gentrification can influence how the project is perceived. At the same time, urban designers have limited influence on overarching political and economic processes. The proposal therefore needs to communicate clearly that it does not intend to build on Tempelhofer Feld itself, but to work with adjacent infrastructural and underused areas.

Major infrastructure measures, such as partial tunnelling or coverage of the motorway and railway, also involve uncertainty. Their feasibility depends on engineering, financing and political decision-making, and would require a long-term implementation process.







Figure 28 (left): Berlin Referendum - Development Plans

Figure 29 (middle): Protests agains proposals for edge development of Tempelhofer Feld

Right picture: Alotment garden in the southern area of the project side,
nearby Teltowkanal

ALLOTMENT GARDENS CONFLICT - EXPROPRIORATION OR PROTECTION OF PRIVATE PROPERTY?

The reorganisation of the allotment garden sites presents a clear planning problem. Whilst these gardens are valuable as private or semi-private green spaces and usually have important emotional, social and ecological significance for the people who use them, their position within a wider area undergoing change means that it has to be considered whether some of the land could be put to use in creating a more public green-blue infrastructure, better water management and greater access to open space. If the gardens do have to be moved, the relocation should not be seen as a simple act of removal but rather as something that requires negotiation. One possibility would be to provide replacement plots near the present allotment garden areas at the south-western part of Tempelhofer Feld, close to S-Bahnhof Tempelhof. Another option might be to give financial compensation or to offer new garden areas in Brandenburg, since land is generally less pressed there than in Berlin. However, each of these options has its limitations. Moving the gardens within Berlin would keep them close and maintain continuity, but there is little available land. Financial compensation may be feasible, but it does not substitute for the social and day-to-day value of the gardens. A move to Brandenburg could provide more room, but would damage the users' local connections. The issue then is how to reconcile individual rights regarding property and use with the wider public interest.

DISCUSSION

The final chapter provides a recap of the project and the proposal, discussing its strengths as well as its weaknesses and limitations. Furthermore, questions how the project contributes to the discourse and what conclusions might be drawn regarding future prospects.

REFLECTIONS

Throughout the design process, I tested how vertical densification could combine additional housing with the preservation of open ground. Comparing the block-edge, slab and solitaire variants made their different spatial consequences visible. Within the tested alternatives, the solitaire typology created the strongest relationship between a relatively small building footprint, high housing capacity and larger continuous open spaces. For this reason, I developed it further.

Combining quantitative and qualitative parameters was particularly useful during the comparison. FSI, GSI, housing output and sealed surfaces allowed me to compare the variants on a common basis, while public accessibility, green-blue continuity and urban forest potential addressed spatial and ecological qualities that density figures alone cannot describe. However, the comparison also has clear limitations. The variants do not generate exactly the same amount of housing, and several ecological criteria describe solely the potential rather than measured environmental performance. I therefore consider the results as indicators of spatial possibilities and less as a proof that the selected typology performs better in every environmental aspect.

Developing the Blue-Green Strategy after the variant testing also changed how I understood the role of open space within the project. A smaller building footprint does not automatically produce ecological value. The released ground only becomes beneficial when landscape design actively supports vegetation, water retention, biodiversity and public use. This would therefore require further investigation. The proposed tunnelling and covering of the motorway and railway introduce another major uncertainty, since I did not test their technical or financial feasibility. Conflicts around allotment gardens and public resistance to development near Tempelhofer Feld also demonstrate that spatial strategies cannot be separated from social and political conditions. I therefore understand the project primarily as an urban design exploration that tests possible relationships between density, infrastructure and landscape rather and not as a directly implementable masterplan.

CONCLUSION

This thesis investigated how vertical densification could contribute to climate-resilient urban development at the southern edge of Tempelhofer Feld. The study indicates that the central issue how a city organizes density spatially. A high amount of floor area does not necessarily require equally high ground coverage. By concentrating built volume vertically, urban development can potentially preserve more ground for vegetation, water management, public space and ecological connections.

The results also show that vertical densification cannot function as a climate strategy on its own. Its environmental contribution depends largely on how the remaining ground is used. If access roads, parking or sealed residual areas occupy this space, a smaller building footprint provides only limited ecological benefit. If the same ground forms a continuous and soil-based green-blue network, density and climate adaptation can support each other more effectively. Urban density should therefore be evaluated together with ground coverage, permeability, ecological connectivity and public-space quality and not just through quantitative numbers such as housing output or FSI alone.

The project further highlights the potential of infrastructural corridors as areas for future urban transformation. Cities can use already disturbed and fragmented land to accommodate additional development instead of extending into valuable open landscapes. At Tempelhofer Feld, such an approach could preserve the existing field while improving connections to the neighbourhoods south of the Ringbahn and A100. It could also combine new housing with stronger pedestrian and cycling connections and an expanded green-blue structure.

The research question can therefore be answered conditionally. Vertical densification can contribute to climate resilience when it deliberately releases and protects ground for ecological and public functions. Building height alone does not create this benefit. The relationship between built density, open ground, landscape infrastructure and accessibility ultimately determines whether vertical densification supports a more resilient urban environment. Technical feasibility, affordability, ecological performance and public acceptance remain important questions for further investigation.

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Corridor in transition - Vertical redensification for urban resilience - Strategies for housing and climate adaption along the southern axis of Tempelhofer Feld in Berlin

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