Bjarne van der Drift
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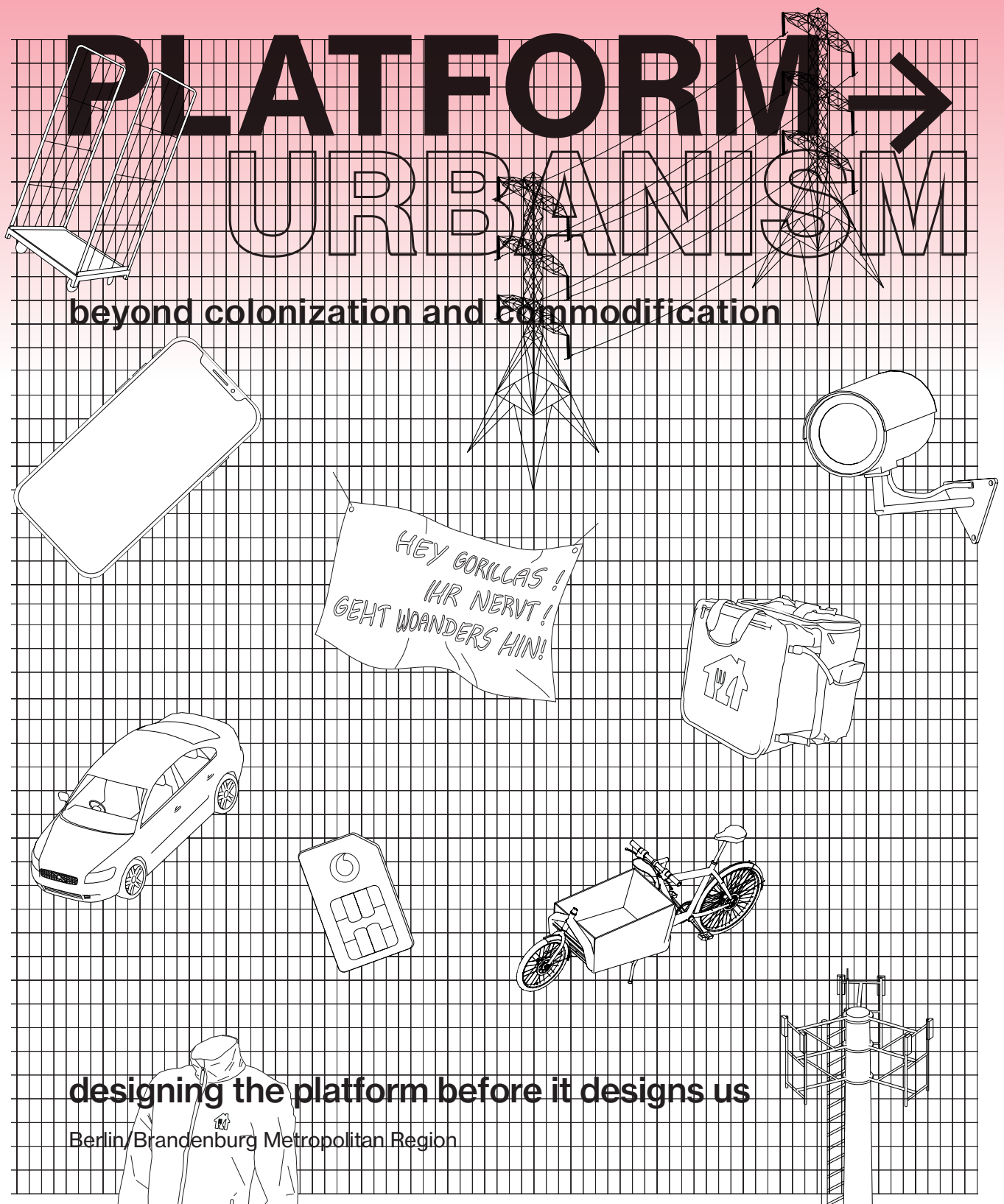
Graduation Thesis
MSc. Urbanism

PLATFORM→ URBANISM

beyond colonization and commodification



designing the platform before it designs us

Berlin/Brandenburg Metropolitan Region

TU Delft

Platform Urbanism Beyond Colonization and Commodification

Designing the Platform Before It Designs Us

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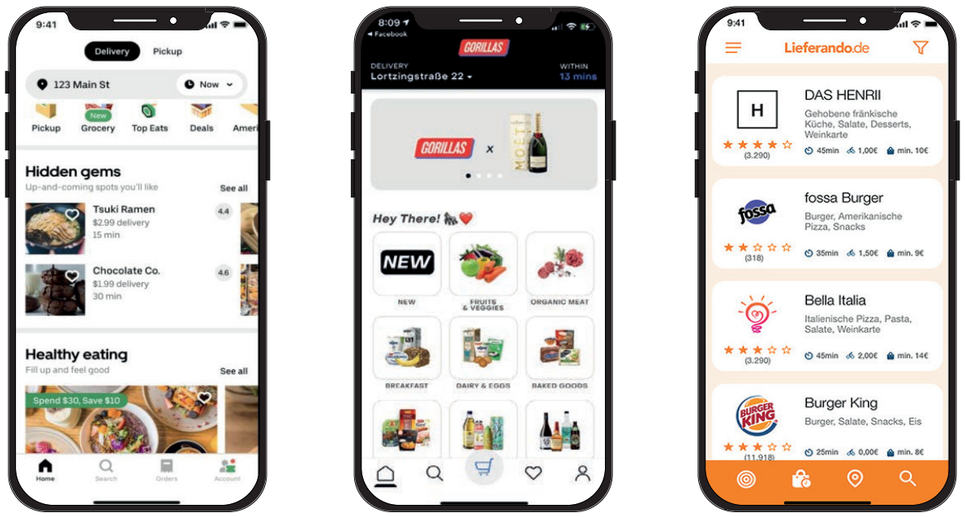

01 The GUI (Graphic User Interface) as the point of contact between User and the vast networks of planetary computation.

Image by the author, screenshots of the Uber Eats, Gorillas and Lieferando applications on iOS

Abstract and Keywords

The rapid upsurge of the platform economy is producing profound changes to the way in which urban areas are functioning. With digital technology putting roots down in the fields of public transport, hospitality and the service industry, it opened up possibilities for new platform economy companies to nest themselves within the activities of these traditional public services. In some occasions serious disruptions of existing systems occur, while in other cases it may unveil opportunities to improve the functionality of public life in cities. Where (local) governmental organizations seem to grapple with policy making to effectively balance the interests of corporate platform organizations and the public good, it is important to critically explore the implications of inadequate regulation vis-a-vis the novel platform economy and the commodification of public space and services. This thesis is an extensive multi-facetted analysis, providing insight in the externalities of flash delivery platforms, as they claim their place in cities and influence urban planning practice. Furthermore, it shall offer design-based interventions to generate synergies between platform services and the traditional functionality of public services to provide creative solutions where policy instruments will fall short. As a result, a more thorough understanding of platform urbanism is acquired and new ways of using platform economies to enhance the lived experience in cities are being presented.

Keywords:
Platform urbanism, digital technology, public space, urban logistics, Berlin

Prologue

In the summer of 2021, like many people, I came across an interesting new phenomenon which had only just started to arise in my home country of The Netherlands. Almost silently, a whole new shopping experience was suddenly available to customers in the largest cities in Western Europe. It was demonstrated to me how groceries and everyday items were delivered to urban comsumers at nearly no extra costs, within a staggering timespan of just ten minutes. It seemed virtually impossible to me that this could be a profitable venture (spoiler alert: it isn't).

Around the same time, the first few headlines regarding this new phenomenon emerged in the news: As it was pointed out, flash delivery platforms have some serious shadow sides. Concerns arose on the concept of the 'dark store', which are small warehouses in central locations that seemed oddly out of place, causing disturbances in livability and traffic safety. Especially in Berlin, where this phenomenon was already much more widespread, these problems sufaced on the websites of local newspapers. I quickly recognized this as a symptom of a much broader shift, which was impacting the way cities work, how economy works and how urban logistics work. It turns out there was already a name for this mode of spatial production: 'platform urbanism'. I was eager to find out more about the spatial impact of the platform economy, and thought of my graduation year as the ultimate opportunity to dive into it.

Nearly a year later, I witnessed this new form of platform activity proliferate rapidly. I could not have foreseen the attention and panic that flash delivery platforms were bringing about in local politics and media in the past months. Especially in Amsterdam, it appeared as if all emergency brakes were pulled. Meanwhile, the problems of the platform economy remain, as virtually no constructive solutions were offered by state actors. This thesis could be used as a helping hand, or a guide, towards understanding a range of phenomena within the broader constellation of platform urbanism. Moreover, it can be interpreted as an attempt to build upon existing propositions for an alternative platform economy through design-oriented solutions.

In this endeavour, I was tremendously supported by my first thesis supervisor Victor, whose expertise and enthousiasm was of inestimable value. Therefore, I am very grateful to have had the opportunity to learn from him. In the same way, I want to thank my second mentor Rodrigo for accompanying us in numerous meetings, in which his critical thinking and his experience helped greatly in making this project sharper and more complete. In addition to my main mentors I want to thank the studio coordinator Birgit, for hosting the many workshops and lectures, as well as her assistance and helpful feedback.

I also am incredibly grateful to Pablo Sendra, who took the time to talk to me about his book *Designing Disorder* in an interview. For the same merit I want to thank Benjamin Busch, who was not only of great help in the two hours during our interview, but moreover offered to meet up in Berlin to discuss the progress of my work and show me around the Neukölln district and invite me to visit his workspace.

Next, I want to reflect credit on my colleagues Bram and Haakon, who were so kind to take an interest in the project and whose enthousiam sparked interesting discussions with helpful outcomes.

And finally, I want to thank my great friend Gerjan for his assistance and for proofreading the final report, as well as my studio friends, who were in the same boat during the past year: Anne, Britt and Jonah. Not just for the help and support inside and outside the studio, but also for the amazing favour to accompany me on a fieldwork trip to Berlin.

Glossary

digital economy
All economic activity sustained by information technology, towards fulfilling the objective of making it easier to find and compare information about potential economic transactions online that cannot be done efficiently offline (Acs et al., 2021).

sharing economy
Posited as an alternative to neoliberal capitalism after the 2008 financial crisis, along the mantra ‘what’s mine is yours’; presenting the prospect of digital technology to reinvigorate social connectivity through the collaborative use of idle resources. The sharing economy revolves around societal values, rather than commercial values (Grabher & König, 2020).

digital platforms
Intermediary parties between two ends of the market, who facilitate the creation of efficient matches and automated transactions through digital technology. Platforms are not merely a technical model but can also function as an institutional form. Moreover, they are generative mechanisms, setting the terms of participation according to fixed protocols (Acs et al., 2021, Bratton, 2016).

platform economy
Economic activities between businesses and consumers mutually (B2B and C2C), or between businesses and consumers (B2C), which have been reorganized around platform-based ecosystems for value creation and value appropriation (Acs et al., 2021).

gig economy
A phenomenon within the more comprehensive constellation that is platform capitalism, creating a free market system in which digital platforms generate task-based work and precarious temporary positions (often) for independent workers (Van Doorn & Badger, 2020).

platform urbanism
A neologism referring to the changing relationship between technology, capital, and cities, pointing at the spatial phenomena centered around the growing presence and power of digital platforms in cities (Sadowski, 2020).

smart urbanism
Urban developments oriented at optimizing oversight of city systems, often through corporate provided technological solutions for monitoring and surveillance, without transforming and/or taking over the operations of city services (as opposed to platform urbanism) (Sadowski, 2020).

micro-fulfilment
A common logistical strategy for quick commerce concepts in warehousing that fosters the integration of logistics and digital technology: Retailers establish small storage facilities within urban environments, usually referred to as micro-fulfillment centers or dark stores – granting them very close access to consumers and faster last-mile delivery at a low cost (Targomo, n.d).

uberization
A neologism named after the ride-hailing platform Uber, which refers to the creation of spot labor markets or gig-work through digital platforms, which represents a very different means of recruiting and paying labor that is almost certain to undermine core aspects of the traditional employment relation (Davis & Sinha, 2021).

platform cooperativism
A movement and an emerging economy that is proposed by Scholz (2016) as an alternative to corporate platforms. Based on the organizational form of the cooperative, it aims at reframing concepts like innovation and efficiency to benefit all, rather than sucking up profits for the few.

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01.

Introduction

From Digital to Physical Space

Chapter Intro

The first chapter will give a brief overview of this thesis report and its goals. Before elaborating on the vast and complex theoretical fundaments of platform urbanism and the methods to study this phenomenon, it is evident that this topic – as a very recent and relatively unknown phenomenon – requires a few words dedicated to explaining parts and aspects of its background. While most challenges of contemporary society, such as global warming, the biodiversity crisis and social inequality elicit a widely supported sense of urgency amongst professionals in the field of spatial design, it appears that the upsurge of the platform economy and planetary computation is neither seen nor heard. This chapter will explain briefly why we should in fact recognize that these trends bring about pressing challenges for the built environment and how this research aims to contribute to generating a broader understanding of platform urbanism.

01 Platform failures produce bicycle graveyards in China, *The Atlantic*

https://www.theatlantic.com/photo/2018/08/china-abandoned-bike-share-graveyards/566576/

Background

Ever since the rollout of the World Wide Web in the early 1990's, the upsurge of digital technology had been flagged as a potential game changer in society and a cause for speculation. According to Zook (2008), there was a conviction around that time that the emergence of the internet would result in a radical change in which we experience geographical distance and that it could result in 'the end of cities'. The sky-high expectations of internet-based commerce for economic and productivity growth drove the development of digital technologies into a hasty and rudderless course. Around the turn of the millennium, the dot-com crisis embodied the plummeting of the digital promise. Exuberant venture capital investments seized the development of the novel internet-based economy and accelerated the growth of technology to ultimately ensue it to outrun itself (Zook, 2008). Before the infrastructure of the internet took its hold of society by embedding itself in almost every aspect of human activity, the mirage of the digital revolution vanished. But, contrary to what the price evolution of tech stocks after the crash suggested, the internet was not dead. More than twenty years after the speculation-induced havoc of the dot-com crash, the stock price of NASDAQ-listed tech-related companies such as Amazon, Microsoft and Apple vastly overshadows the peak of the dotcom high.

Fast forward to today, society is presented a plethora of new opportunities as a result of the internet. In a way, digital technology held up to its promise, leading to truly radical changes in the way we learn, communicate and shop. Contrary to the circumstances around the dot-com tech-craze, digital technology is no longer a bubble or a nebulous promise, it is a present-day, tangible reality. As we are watching the effects unfold right under our noses, society is increasingly fitted with a wide range of *smart* solutions, ostensibly shaping the prospects of increased efficiency, availability and quality of life. Think about how we allow ourselves to effortlessly navigate through the city with Google Maps, hitch a ride within minutes with Uber, work remotely via Zoom, scan our face to complete payments across the globe with PayPal, or socialize with friends over a FaceTime call.

What most of these services offering these conveniences have in common, is that they operate as digital platforms. A platform – originally referring to an elevated horizontal surface above the adjoining area – functions as a digital 'space' to mediate economic relationships (Andersson Schwarz, 2017). The advent of digital platforms can be regarded as one of the most recent offshoots of capitalism, but its implications thusfar already attribute to the one of the most significant changes of the global economy in the last decade (Koutsimpogiorgos et al., 2020). The emergence of digital platforms amplified the production of palpable elements of digital technology in our cities.

Problem Field

Yet, in the face of this tech-utopianism, voices of dissent are starting to intensify (Bauriedl & Strüver, 2020; Boeing et al., 2021). From a perspective of spatial design, the infrastructure of the internet and digitally-mediated services are rapidly shaping their own distinctive *cyberspaces* – often externalized in building typologies which break loose from the architectural convention in European cities. As fiercely contended by Sadowski (2020), the relationship between capitalist production and its colonization of urban space is abundantly clear. Following this assertion, platform urbanism can be regarded as "the ultimate expression of capitalist urban planning logics *par excellence* in that they have successfully enrolled tranches of previously economically idle urban space—such as the space of the sidewalk curb ('curbspace')—in service of capitalist accumulation by mobility platforms like bikeshare and e-scooter operators" (Leszczynski, 2020, p. 195).

Also at risk then are the many basic public services in the city. Across the globe, we can witness trends of so called *uberization* – a neologism to describe the particular way in which platforms enable the commoditization of a service-based industry (e.g. public transportation) through digital communication technologies (Davis & Sinha, 2021). This phenomenon, deriving its name of the ride-hailing mega platform Uber, illustrates how digital platforms rely on a hyper-outsourced and asset-less business model to outplay the incumbent *brick and mortar* businesses (Srnicek, 2016). This aversion towards the ownership of material assets does not mean that digital platforms have no physical presence; Instead, digital platforms conventionally operate on assets that are already present or purveyed by external parties. Airbnb extracts revenue from existing property, Uber requires drivers to own their own vehicle, and Deliveroo delivers meals without owning a single restaurant. In its dependency on these existing resources, the business model of digital platforms is therefore reliant on the urban environment and its spatial characteristics (Artioli, 2018). Crucial factors are the proliferation of digital technology in cities, such as the ubiquity of cellular internet networks, but also high population densities, and the spatial proximity of consumers and gig workers (Artioli, 2018; Sadowski, 2020).

The global presence of digital platform technology does not immediately imply that the modus operandi of platforms is the same in every city across the globe. "While platform urbanism can be seen as spatially fluid on the one hand (since the technologies underlying it can be applied across space, including non-urban spaces), the process of emergence of platform urbanism is deeply intertwined with the specific geographical contexts of local urban and economic development" (Caprotti & Liu, 2020, p. 4). As Van Doorn et al. (2021) argue, the influence of path-dependent conditions, such as local regulatory frameworks, often forges global platform companies to shape-shift into models which operate accordingly to the affordances of a specific local context.

As the third chapter will discuss more elaborately, counterproductive policy tools are being deployed in many cities across the world, ranging from financial incentives (Sadowski & Gregory, 2017) to city-wide total bans of digital platforms (Van Doorn et al., 2021). This highlights the political complexity of the perceived upsurge of the platform economy and its effects on society. In dealing with this, governmental actors seem to be torn between adopting either a neoliberal *laissez-faire* attitude to support the platform driven accumulation of capital, or a rash Machiavellian interventionism to guard against a potential dystopian future of socially dried out cities as a result of the obsolesce of human interaction in our daily routines of dining, shopping and commuting. Unsurprisingly, the desired approach is none of the two.

02 Curbspace in use as a marketplace for digital platforms on the Prenzlauer Allee in Berlin

Image by the author

Problem Statement

Although technological advancements of revolutionary proportions are not exclusive to the past few decades from the 1990's onwards, the speed and extent to which manifestations of digital technologies arise and affect the everyday lives of people is unprecedented (Acs et al., 2021). But, if revolutions of technology throughout history are echoed to set precedent for the ongoing shift, the urgency of this topic will prove to be self-explanatory. Time after time, inadequate anticipation of architecture and urban design to planning challenges ensued in spatial misfits and urban trauma's. The first industrial revolution caused rapid productivity growth and urbanization, synchronously afflicted the city with unabated pollution levels and the ultimate adoption of the Garden City planning ideal. The post-war mainstreaming of consumer technology, such as household appliances and the automobile resulted in the hegemony of modernist design principles, the demolition of heritage and the vast suburbanization of cities. If the current digital revolution will turn out to be anything like the aforementioned, governments await the arduous task to give shape to this revolution and direct it into a course in which infrastructures of digital platforms are seamlessly integrated in our living environments and creates value for the future. This challenge presents tasks for urbanists as well, according to Lee et al. (2020, p.125):

> "Platform urbanism presents a unique opportunity for urban planners, providing a new socio-technical canvas for urban development. The lack of a significant trend in our data indicates the limitations of the smart city concept, and the value of platform urbanism in capturing the liveliness of digitally enabled urbanism ... Although powerful and potentially inequitable, embracing the incoherency and messiness of platform urbanism might be a helpful step in creating new and more vibrant urban spaces."

Therefore, to mitigate another wave of dubious technology-driven urban development, we are in need of strategies towards pre-emptively designing the spatial productions of the platform economy - before they design us.

Research Gap

Contrary to the common description of the internet as being virtual, or invisible, the turn to digital technology is inherently spatial (Capener, 2020). So far, the physical effects of these digital platforms have been conceptualized – notable works include Mörtenböck & Mooshammer (2021) and Bratton (2016) – but not extensively studied in an empirical way. The broad divergence of platform economy related terminology exemplifies the lack of alignment regarding the conceptualization of this phenomenon. Moreover, as its stands in current discourse on platforms studies, the lion's share is dominated by critiques emphasizing the dystopian nature of the universal capitalist and neoliberal rationale of platform-mediated urban space (Leszczynski, 2020). Based on the provided arguments and evidence, this connotation of concern and scepticism is highly justified. However, new perspectives and efforts are required towards constituting "a point of departure from which to envision more open— and as such more hopeful—platform urban futures" (Leszczynski, 2020, p. 191). Such a future has been envisioned by Scholz (2016), using the idea of platform cooperatives to counter many of the negative externalities that corporate platforms bring forward. However, Scholz's manifesto focusses predominantly on policy implications rather than concrete spatial requirements.

Aim

Following up on this ambition, the outcome of this thesis is twofold. On one hand, the project will seek to fill a gap in the existing scholarly research focus which overlooks empirical research and inventive methods as a means of understanding the mechanics of platform urbanism accompanied by a theoretical exploration to reflect on the interplay between the platform economy and urban planning practice. The necessity of such a research is emphasized by Muñoz Sanz (2018, n.p.):

> "Without a thorough research on the past and emerging—often anonymous—trends in the design of platform architectures, developing new methods to unmask the opacity of corporate developments, and understanding how these could produce and reproduce forms of inequality, segregation, and risk, the architecture discipline cannot fully understand the impact of economic decisions and the organization of industrial processes on the organization of spaces and society."

On top of that, aside from the stated research objective, this thesis shall also anticipate to the findings of the performed analysis by offering a set of potential interventions rooted in the field of design, in an effort to challenge the perceived disturbances of platform urbanism, which are currently found to be dominant spatial productions of the platform economy. Focussing on flash delivery platforms, the project seeks to facilitate the formation of alternative platform products and infrastructures to those that are operated by corporate actors.

The main research question is the following:

- What interventions are needed to integrate digital platforms in the urban fabric of Berlin while attending to the social and economic sustainability of the metropolis?

03 Administrative territories: Germany, the Berlin Metropolitan Area and the Berlin Bundesland

Illustration by the author

Approach

To follow up on the main research question, a series of sub questions will structure the research in separate objectives towards a final design. The aims and outcomes of each of these questions shall be discussed more elaborately in the second chapter:

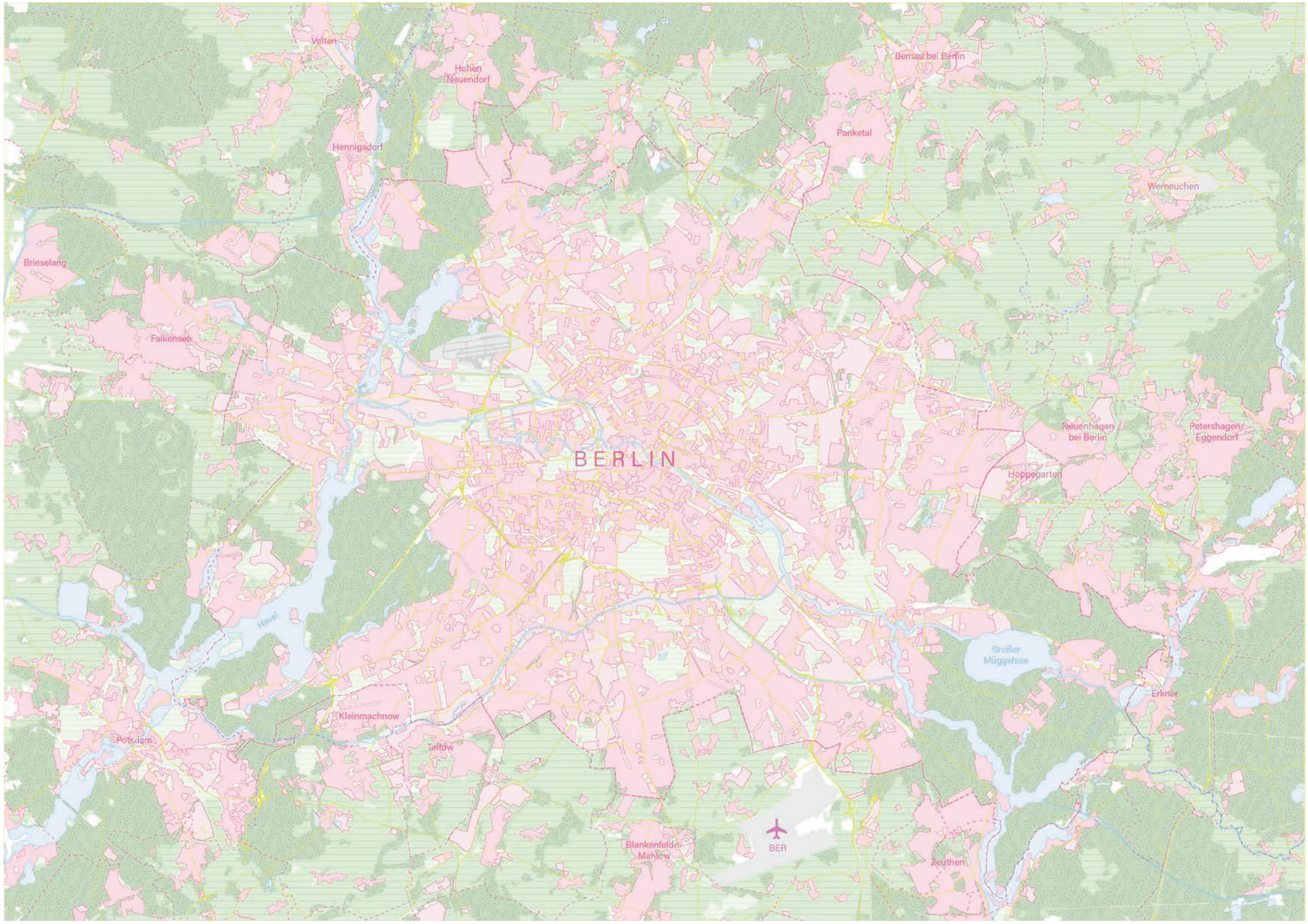
- How are digital platforms becoming influential in the urban context over time?
- What are the possible futures of platform urbanism in Berlin?
- What spatial elements and changes does platform urbanism produce in the urban fabric of Berlin?
- How does platform urbanism change the lived experience in Berlin?

Working with both qualitative and quantitative questions, the research shall rely on a mixed-method approach, combining several methods to tackle the complexity around the entanglements of platform urbanism with other disciplines. Guiding theoretical works – around which these questions revolve – focus on spatial production; oriented at planetary computation, theorized by Bratton (2016), and social space, as discussed by Lefebvre (1991).

Structure

After the introduction chapter, this document will proceed with a chapter which discusses the considerations in choosing an appropriate methodology, reflecting on several theories and research methods that will be consulted. These deliberations culminate in a methodological framework, theoretical framework and conceptual framework. The third chapter entails a literature review, which outlines the conditions in which the platform economy emerged and explains how platforms influence urban planning practices and how they function. This theoretical exploration will be done from different points of departure; which are economy, technology, politics and society. The fourth chapter will entail empirical research work, aiming at unveiling the different accounts of platform urbanism, assessed through the lenses of the spatial models introduced in the second chapter. This empirical work will focus predominantly on the spatiality of grocery delivery platforms. I will use the platform Gorillas, founded in May 2020 in Berlin, as the main subject of study. This case study will be introduced more elaborately in the next chapter.

Between some chapters, the transcriptions of interviews with external experts have been added. They are meant to be interpreted as an intermezzo; revealing more in-depth information on some theoretical aspects within the graduation thesis, refering back to what is discussed in the chapter before. However, they are not crucial parts of the narrative.



Legend:

LAND USE

- Panketal — Urban fabric
- BER — International Airport Berlin-Brandenburg "Willy Brandt"
- Forest area
- Agricultural area
- Urban green
- Water body

NETWORKS AND BOUNDARIES

- Road network
- Water network
- Administrative boundary Berlin state
- Administrative boundary Metropolitan municipality

DATA

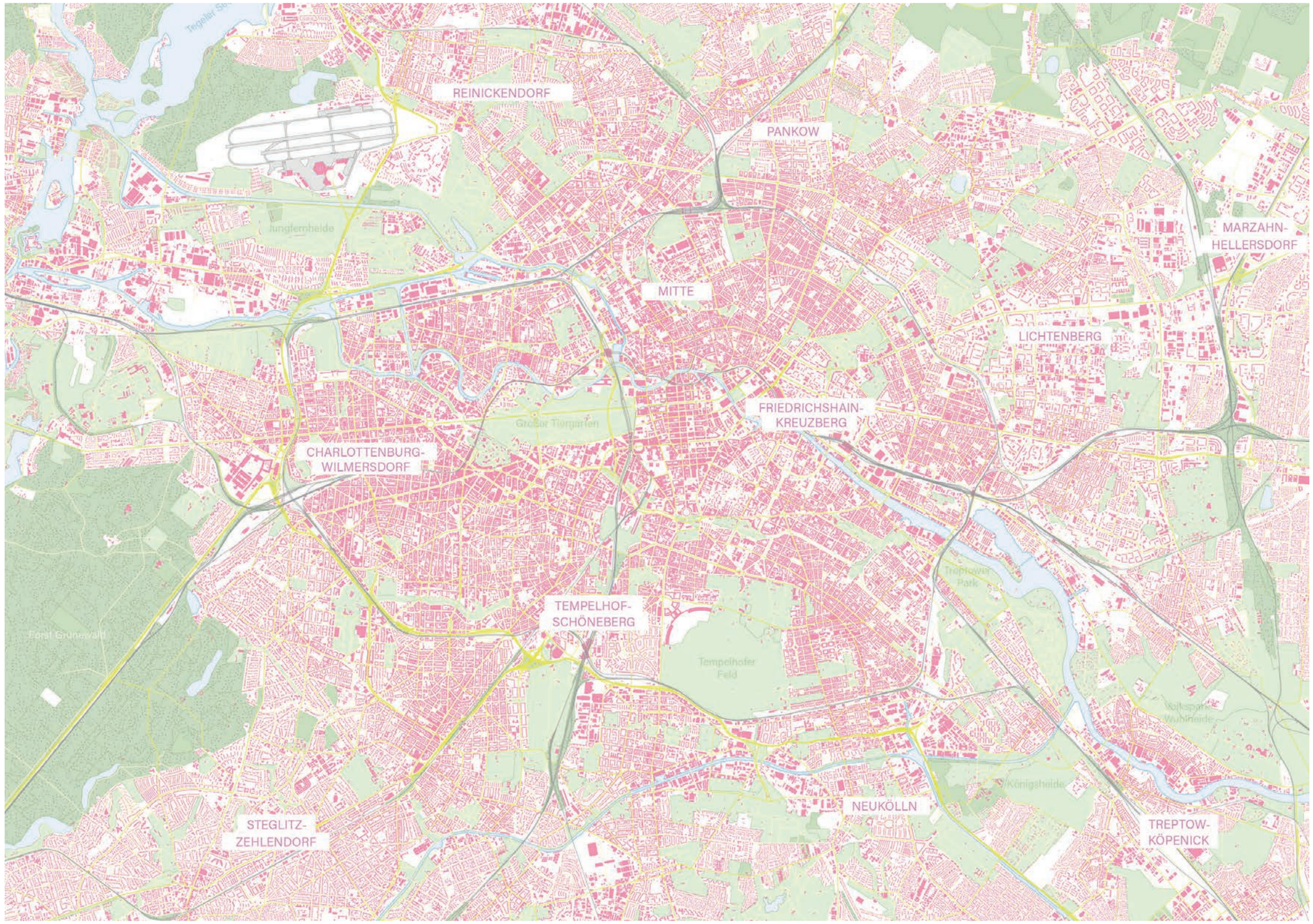
- Delivery service area

N

SCALE 1:200.000

04 City of Berlin, 1:200.000

Illustration by the author



Legend:

LAND USE

- Building block
- MITTE — District
- Forest area
- Agricultural area
- Urban green
- Water body

NETWORKS AND BOUNDARIES

- Road network
- Water network
- Rail network

N

SCALE 1:80.000

05 City of Berlin, 1:80.000

Illustration by the author

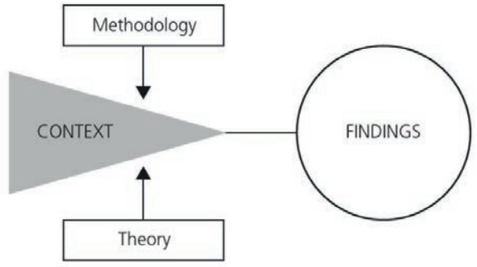
02.

Methodology

Breaking Into the Black Box of Digital Platforms

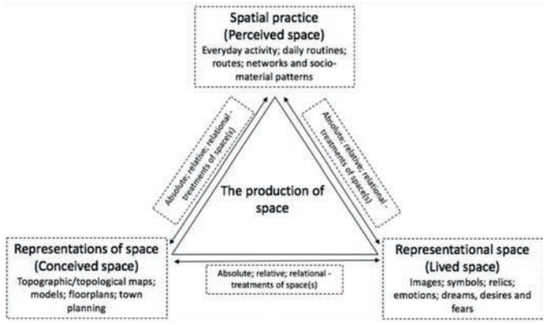
Chapter Intro

To develop a theoretical framework around the research inquiry of platform urbanism in Berlin, I shall begin by elaborating on theory, method and context. These fundamental building blocks of the research, particularly the relationship between them, determine the driving force of this thesis. Since the availability of previous research on platform urbanism is limited, a struggle with regard to finding an appropriate methodology is anticipated. Therefore, the point of this epistemological digression on the various perspectives to conducting research on platform urbanism, is to conclude on a blueprint for research inquiry, determining the appropriate basis and the approach.



01 Context-led research, *Research Methods for Architects*

Lucas (2016)



02 Lefebvre's conception of the spatial triad, *The Production of Space*

adapted by Holmes et al. (2021)

Theoretical Framework

To develop a theoretical framework around the research inquiry of platform urbanism in Berlin, I shall begin by elaborating on theory, method and context. These fundamental building blocks of the research, particularly the relationship between them, guide the research part of this thesis. Since the availability of previous research on platform urbanism is limited, a struggle with regard to finding an appropriate methodology is anticipated. Therefore, the point of this epistemological digression on the various perspectives to conducting research on platform urbanism is to conclude on a blueprint for research inquiry, determining the appropriate basis and the approach.

To begin with structuring this thesis, it can be established that this research is going to be primarily context-led (see image 01). Besides the influence of cross-scale spatial conditions and parameters of the project location on the proliferation of phenomena related to platform urbanism, additional drivers of change are identified that shape the context of this research. These are categorized into four context domains: economy, policy, technology and society. Although literature on platform urbanism is nascent (Sadowski, 2021), the foundational theorization of the mechanisms of digital platforms in each of these domains is already available. Across different fields of study, a variety of scholars explored the conditions under which platformization is happening and their implications on (aspects of) the identified domains. The theoretical framework lists the key author whose work offers a panoptic view on digital platform within a given domain (see image 03).

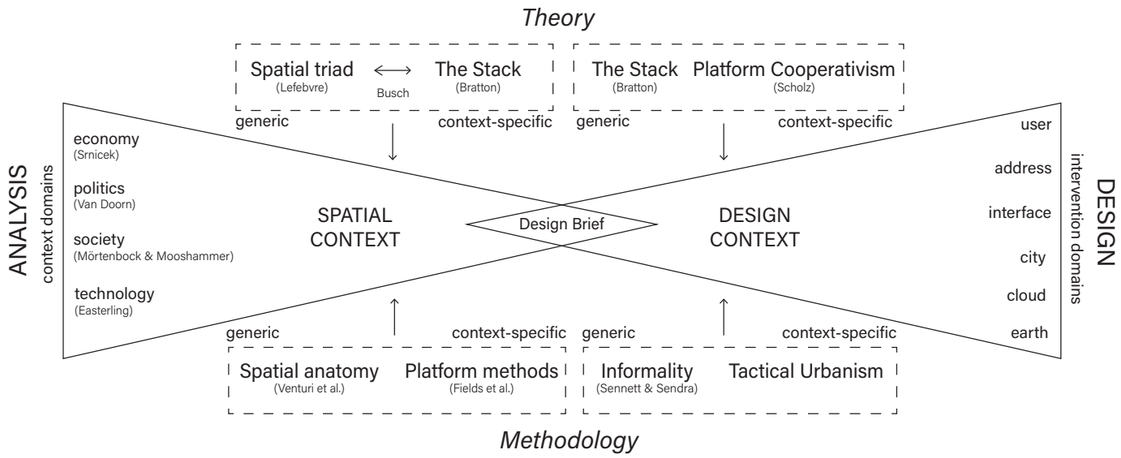
Yet, in essence, this thesis is not about economy or policy; it is about space. Identifying the spatial impact of platform urbanism requires an exploration of methodological and theoretical perspectives on this type of research. By exploring these two components, I further 'mould' the context into a more comprehensive subject of research and provide a lens towards reaching conclusive findings and a starting point for design.

Context-generic Theory: The Construct of Space

The conceptualization of space as produced by digital platforms into a model requires a thorough understanding of both the functionality of digital infrastructures, as well as the theorization around the production of space. The latter of these requirements will reflexively direct researchers in the field of philosophy, sociology, urbanism and architecture to the work of the French theorist Henri Lefebvre. Arguably his most notable work, *The Production of Space* (1991), is highly influential in current urban theory. In an effort to capture the complexity of the spatial layering inherent in platform urbanism, that is both material and virtual, the theoretical model in Lefebvre's readings could

03 Theoretical Framework

Illustration by the author



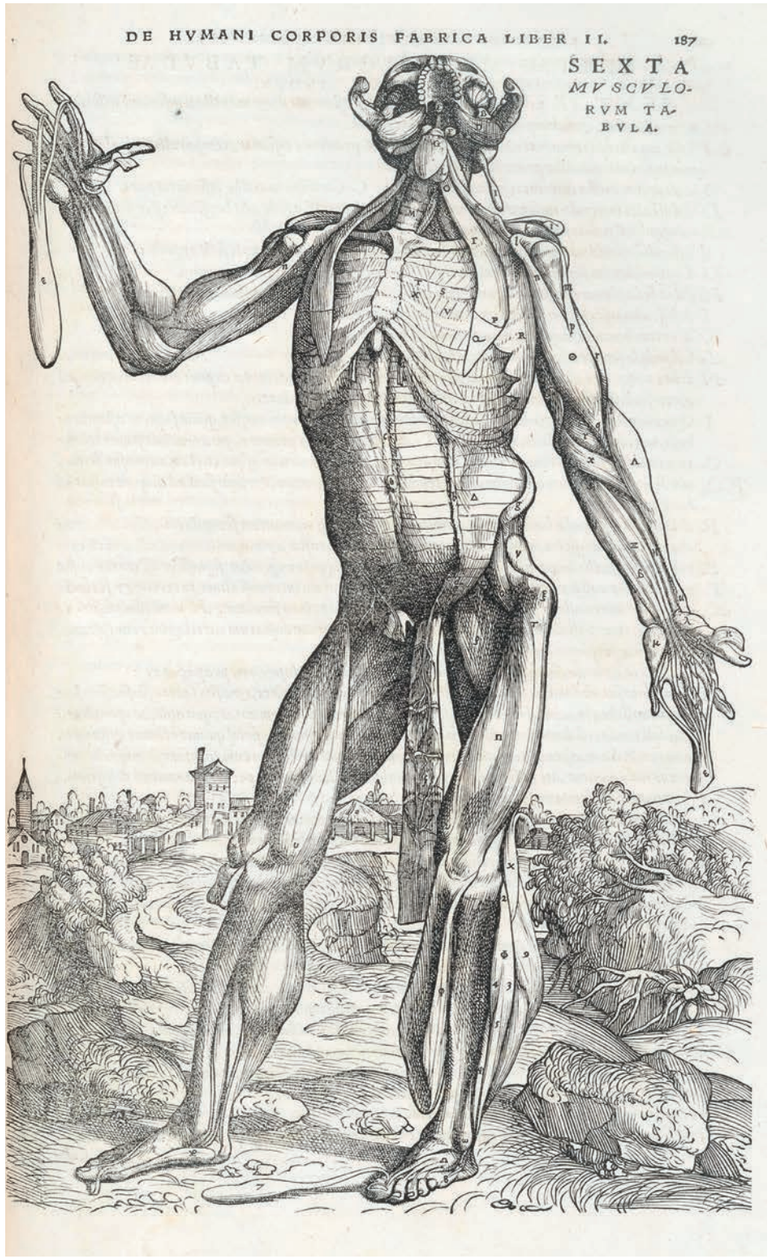
provide an overview of the concepts and mechanics involved in the production of space. However, this theory-led research is prone to limitations and caveats in the context of this thesis.

As reasoned by Capener (2020) and Fields et al. (2020), the integration of digital technology into urban space brought forward a significant change in the mode of its production. Already upon the original publication of his work in 1974, Lefèbvre (1991) was able to discern the unique abilities of digital technology, given his conviction that "data collection and computer science abolish distance, and they can confidently ignore a materiality scattered across space (and time)" (p.334). Despite these visionary remarks, Lefebvre could not have comprehended the full range of revisions to which his theoretical model would have to be subjected as a result of the digital revolution (Capener, 2020).

Moreover, while the spatial triad of perceived, conceived and lived space (image 02) presents a conceptualization of socially produced space, seen from a perspective that is threefold, it does not prescribe a methodology for analysis. Appropriating the somewhat amorphous sociological theories of Lefebvre to architectural research often leads to incorrect interpretations (Schmid & Stanek, 2016), considering the essentially non-architectural and theory-led origin of *The Production of Space.* Following up these limitations, Schmid & Stanek (2016) endorse the necessity to recontextualise Lefebvre accordingly to the field of research: "This means fully appropriating his work, enriching and deploying it in constant interaction with specific empirical studies to bring it into a dialogue with other approaches and eventually to develop new concepts and research perspectives" (p.6).

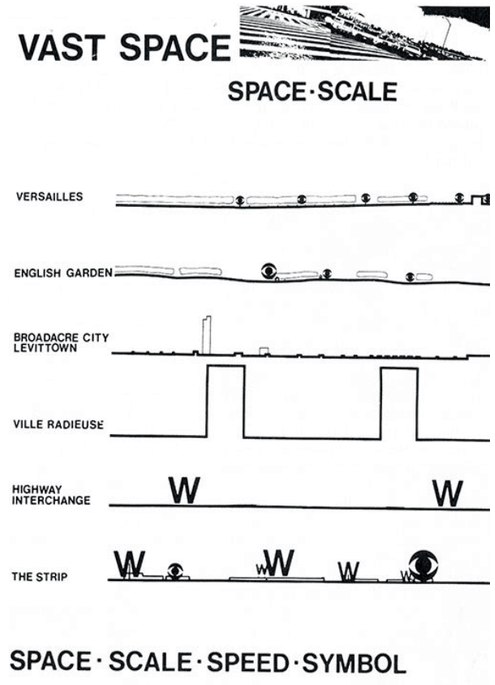
Context-generic Methodology: The Visual Taxonomy

Such an alternative approach to researching space is offered in the cornerstone work of Venturi et al. (1977). Their methodology-led research in *Learning from Las Vegas*, originally published in 1972, instead outlines a set of analytical tools that can be used to capture the complexity of space. In their case study, Robert Venturi & Denise Scott-Brown were confronted with the iconology and symbolism of architecture in Las Vegas. While working with this predetermined site, the tools that have been employed in an effort to document space ought to be fit for reproduction in different contexts. Considering their perspective as architects, the approach in *Learning from Las Vegas* predominantly explores the physicality of space, which lies closer to the essence of my research. As Chapman et al. (2006) conclude, the attempted scientific approach of Venturi & Scott-Brown dissects space into a visual taxonomy of separated layers of data, raising the analogy with medical science: "Through this process of division, categorization and containment the complex heterogeneity of Las Vegas is dismantled and laid bare in the same manner that medieval surgeons dissected dead bodies to reveal their secrets" (p.320). Interestingly, Lefebvre



04 The anatomy in medical sciences as an epitome for empirical research, *Royal College of Physicians*

https://www.digitalartsonline.co.uk/features/illustration/these-rare-medical-illustrations-detail-how-weve-viewed-workings-of-human-body-from-medieval-times-until-today/#1



05 Typical excerpt from the analysis in *Learning from Las Vegas*

Venturi et al. (1977)

(1991) commented on the effectiveness of reductionist scientific methods as a means of documenting space, asserting that every analytical model of social space is inherently deficient, given the selectiveness and political bias of reductive practice. This dogmatic stance of Henri Lefebvre essentially disqualifies the legitimacy of *Learning from Las Vegas*, along with any other effort of scientifically documenting social space (this thesis included).

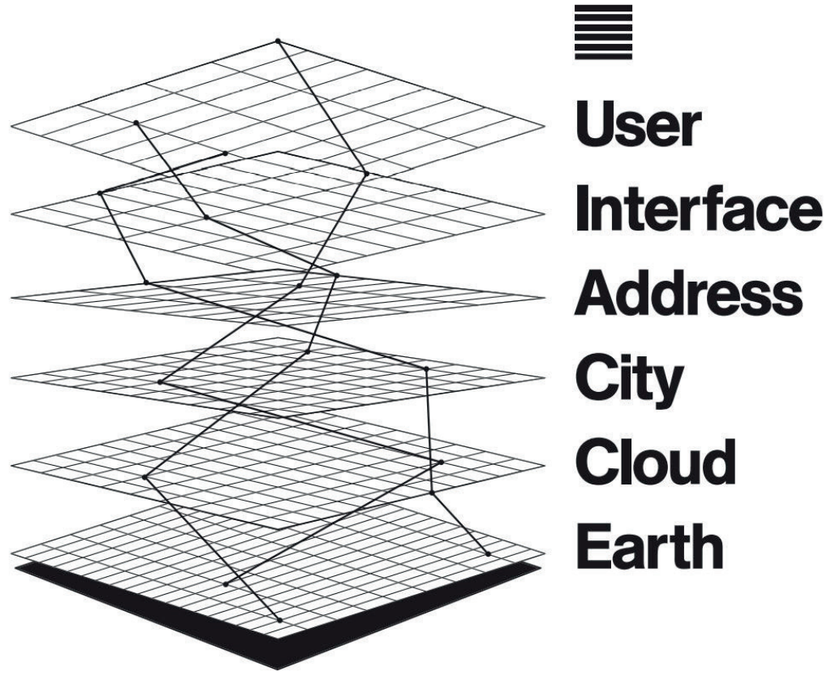
Despite the inconsistencies and flaws in the scientificness of the procedure (Chapman et al., 2006), the polemic and revolutionary character of the work exudes a fitting attitude towards researching the unknown. The (at the time of writing) uncommon and non-traditional urban form of Las Vegas ensued in the search for new ways of conceptualizing space. "Las Vegas space is so different from the docile spaces for which our analytical and conceptual tools were evolved that we need new concepts and theories to handle it." (Venturi et al., 1977, p. 75). A similar rhetoric could be applied in the advent of platform urbanism. The redefinition in the discourse of spatial production due to digital technology demands a similar break with conventional theory.

Context-specific Theory: Layers of Planetary Computation

To bridge this gap between the methodological stiffness of Venturi et al. (1977) and the limited practicability of Lefebvre (1991), the spatial model in *The Stack: On Software and Sovereignty* (Bratton, 2016) provides outcome. In Benjamin Bratton's conceptualization of what he calls "The Stack", he presents a theoretical model of the spatial arrangement of 'planetary computation infrastructures' and its modes of spatial production. This megastructure arrangement is visualized as a set of six layers that each represent a different subsystem of computational technology. Bratton's model cogently exposes the relationships between the inseparable material and immaterial tools within the infrastructure of computation. Simultaneously, The Stack is not merely a way of conceptualizing the spatiality of planetary computation in an analytical way, it is also meant to be understood as a mutable structure. Hence, it allows designers to use the model to project design scenario's, revealing alternative futures as interventions in culture, governance and technology are made. As such, Bratton (2016) characterizes his work as a design brief and proceeds with a call for action (p. 19): "My interest is in how design—designating things according to program—can work through these schema, across their disparate scales and toward different futures. What new forms can we compose for this computational and geopolitical condition, first to map it, then to interpret it, then to redesign it?"

Similar to the triadic model of perceived, conceived and lived space presented in Lefebvre's *The Production of Space,* The Stack offers a set of concepts, or layers in this case, that interact in a specific relationship and together constitute a whole. Each of the six layers of *Earth, Cloud, City, Address, Interface,* and *User* are to be understood as a scaffold of separated layers, that could host processes or activities that are discrete to that specific level. In order for something to move to another layer, it has to go through a moment of transition, in which it is reformatted to the unique logic of that layer (Busch, 2019). Consequently, digital platforms articulate themselves differently on every layer of The Stack.

The proposed model by Bratton (2016) holds the potential to be a guiding theory in this thesis. However, Bratton does not provide a clear-cut methodology for applying The Stack in the analysis of platform urbanism. As Schmid & Stanek (2016) discussed in their evaluation of *The Production of Space*, applying this theoretical model to context-led empirical research requires efforts to set up a dialogue with other perspectives and approaches in order to successfully appropriate his work. Integrating The Stack could be interpreted as such an effort, as a means to narrow the perspective, specifically oriented to digital technology and its mode of spatial production as opposed to the more generic spatial triad of Lefebvre.



06 Conceptualization of the accidental megastructure of planetary computation, *The Stack: On Software and Sovereignty*

Bratton (2016)

Context-specific Methodology: Outside the Black Box

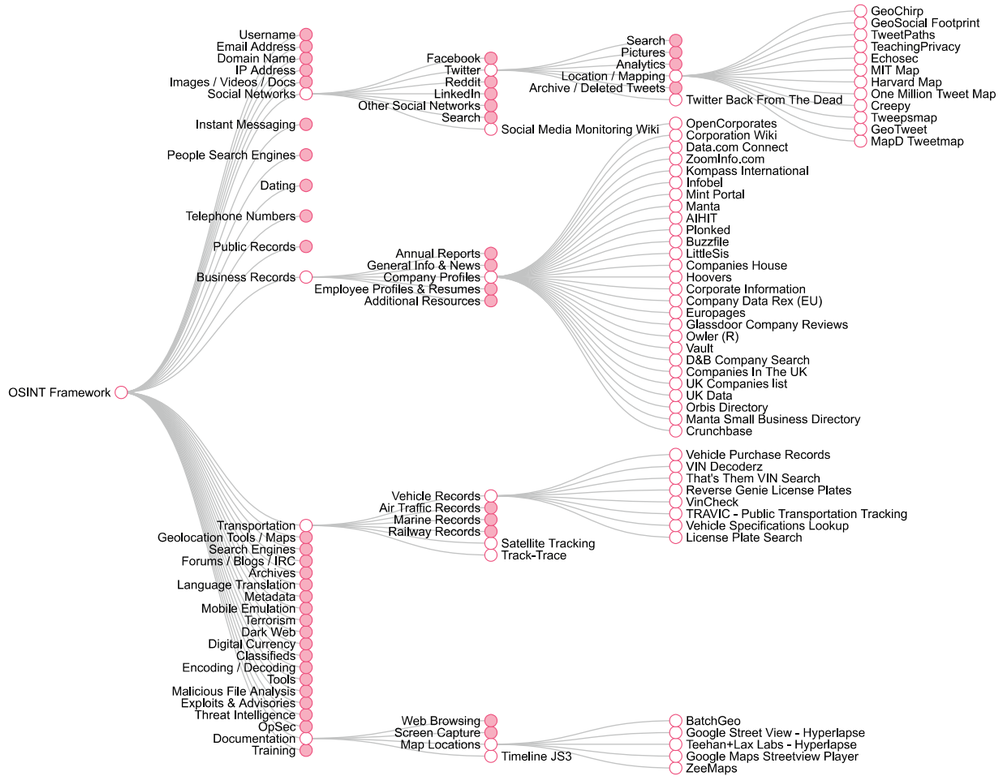
To formulate a methodology, integrating the anatomical approach presented by Venturi et al. (1977) into the theoretical framework helps to translate theory into empirical research. Yet, this approach lacks the instruments to effectively cope with the non-physicality and obscurity of spaces of planetary computation and platforms in particular. This problem is also recognized by Andersson Schwarz (2017): "The surrounding world is not allowed to know what they do; researchers and regulators are denied proper access, while users and developers are routinely punished for peeking inside and/or tinkering with setups" (p.382). For example, corporate digital platforms such as Uber and Airbnb are reluctant to publish their data, and grocery delivery services Gorillas, Getir and Flink do not publicly list the locations of their micro-fulfilment centres.

In response to this perceived veil of secrecy, covering proprietary algorithms, nebulous ownership structures and confidentiality issues to shield technology and knowledge, Fields et al. (2020) propose a set of methods to work around the imperviousness of politics of platform urbanism. These methods revolve around accessing open source information to formulate and visualize the operations of digital platforms. Such an OSINT-approach (Open Source Intelligence), "combines efficient problem solving with open, but focused search for new information, making unique links between information sources, enabling development alternative possible solutions, and even new types of problems" (Glassman & Kang, 2012, p. 677). In OSINT, acquiring intelligence relies on using publicly and legally accessible sources, lawful methods and technologies to reveal information that other organizations or individuals seek to conceal (Miller, 2018). The 'black box' problematics of data accessibility and transparency are then circumvented. Fields et al. (2020) outline three methods of storying, counter-mapping and proxying the phenomenon of platform urbanism. Their functionality and effectiveness will be further considered in the methods section.

Methodological Framework

With the establishment of a theoretical framework, I have considered the role of methodology within context-led research. I have explained the expected obstacles in the process of data collection and the limitations of existing theory and methodology in the context of empirical research of platform urbanism.

The methodological framework displays the mixed-method research approach around the individual sub questions and how they constitute a whole towards formulating design principles for answering the main question. How the presented methods are applied will be more elaborately discussed after the case study is introduced.

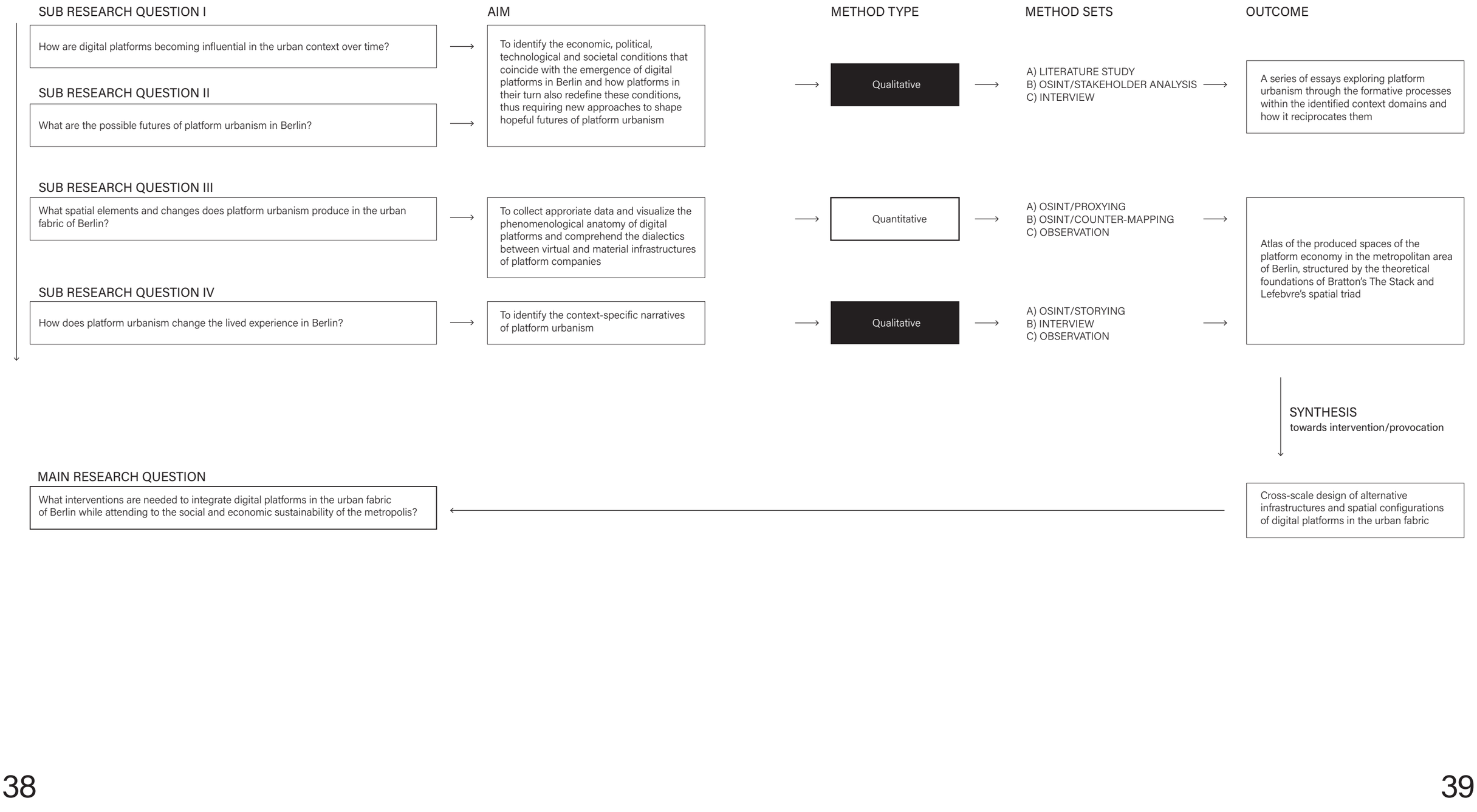


07 Applying the OSINT framework

Illustration retreived from https://osintframework.com/

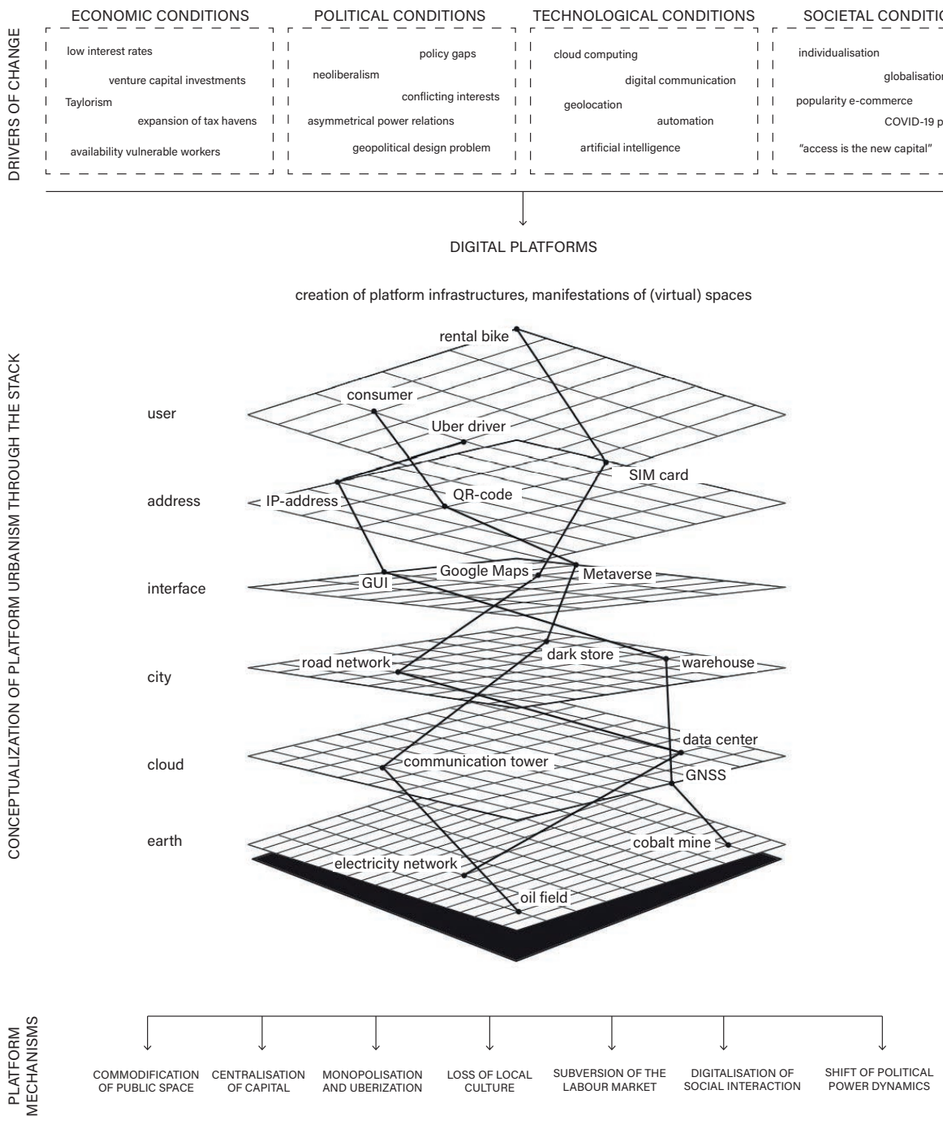
Adapted by the author

Methodological Framework



08 Conceptual framework

Illustration by the author



Case Study

The most notable examples of how digital platforms are gaining foothold in urban environments can arguably be found in China. The rapid (state-led) expansion of the digital economy and the digitalization of urban life in China meant that immense volumes of data are being generated, which are largely being processed by corporate actors (Caprotti & Liu, 2020). This highlights a shift in the way cities are being governed, attributing to a recalibration in the relationship between the state and private corporations. Digital platforms are now of major influence to the everyday lives of the Chinese population. This is especially true for the domestic platforms Baidu, Alibaba and Tencent, which are considered to be parallels to the more globally oriented Alphabet, Amazon and Facebook (Meta, as of October 2021).

Although the confluence of platform urbanism in the Chinese urban context may present an enticing subject of study, likely yielding the most explicit productions of platform spaces, it should be considered that the practicability of this research will be limited. Important prerequisites for the site of choice is the availability of literature and data, as well as the accessibility to (repeatedly) travel to the location to conduct fieldwork. Opting for a European metropolis as a case study will therefore result in a more feasible research.

Following this premise, the German city of Berlin calls upon a myriad of the aforementioned spatial characteristics. As the capital city of Germany, it is one of the most populous cities in Europe and an upcoming linchpin in the digital economy. In the last ten years, the growth of start-up companies in the fields of software development and e-commerce grew faster than any other German city (Pretzell & Seyfert, 2020), attracting vast amounts of venture capital to the city. Internationally oriented e-commerce platforms like Flink, Gorillas and Zalando are founded and based in Berlin, whereas the American mega platforms Alphabet and Amazon are showing intent to further expand their operations in the city.

Yet, traces of conflicting interests are also conspicuously present. The development of the Mediaspree (image 11), an expansive real-estate project to attract media and telecommunication businesses to the banks of the river Spree, was cause for mass civil protestations in 2010. The feared effects of gentrification, loss of local culture and the privatization of public space are echoing into the novel platform urbanism. Concerns regarding the platform economy are expressed more and more often, sometimes producing visual clashes of civil, public and private interests, causing the Berlin Senate to grapple with policy-making.

Although the theoretical exploration will seek to form a full and overarching narration of the platform economy, the empirical part in this this will not be able to grant a full depiction of the platform economy. While every type of digital platform manifests itself in physical space, the extent and form differs greatly and cannot be mapped in full, since that will not be a feasible

09 Google Campus Protest, *The Guardian*

https://www.theguardian.com/cities/2018/may/09/fuck-off-google-the-berlin-neighbourhood-fighting-off-a-tech-giant-kreuzberg

10 Protesting the Amazon HQ, *Berlin vs. Amazon*

https://twitter.com/berlinvsamazonen/news/

endeavour. Therefore, the empirical analysis and design will predominantly focus on the spatial accounts of flash delivery platforms and its micro-fulfilment infrastructures. To be more specific, the digital platform of Gorillas will be taken as an example, since it is the first and largest in its field of business in Berlin (upon commencing this thesis). Its peers Flink and Getir entered the Berlin market one year later in 2021. However, the supporting infrastructures and systems, which it shares with many other platforms, are studied as well (e.g. telecommunication infrastructures, energy networks, food production, etc.).

Gorillas, active in Berlin since 2020, is a platform service that offers to deliver groceries in selected areas in the city within ten minutes. It allows its users to shop products commonly found in supermarkets and to submit their order through an app. In order to fulfil the order, the platform operates so called 'dark stores', which are essentially micro-fulfilment distribution centres. Within these ten minutes, Gorillas aims to pick and pack the order in a nearby dark store and send out a 'rider', who delivers the groceries to the customer by (electric) bicycle. Within the timespan of this thesis, the dark store concept became heavily disputed, which especially in cities across The Netherlands turned out to be cause for a ban on new dark stores and even the closure of existing ones (Roele, 2022).

11 Mediaspree real-estate developments, *BNP Paribas Real Estate*

https://www.realestate.bnpparibas.de/blog/buero/top-bueromarkt-mediaspree

Methods For Acquiring Data:

Literature Study:

The role of existing literature is primarily found in the formulation of an answer towards sub research question I and II. This method is used to critically synthesize theory of the multidisciplinary fields of research that intersect with platform studies. These corollary fields of research, identified as context domains, encompass literature on economy, politics, technology and society (derived from Leszczynski, 2020). The motives behind engaging with this broad basis of knowledge is to understand the mechanisms of platforms, how they intersect with other paradigms within their domains – and more importantly – how they are relevant to spatial studies. The purpose of this analysis is to define how context shaped the *raison d'être* of digital platforms hitherto, but also to discern how they influence the context in their turn. This conception is crucial in formulating a design brief of (counter)measures in an effort to humanize computation.

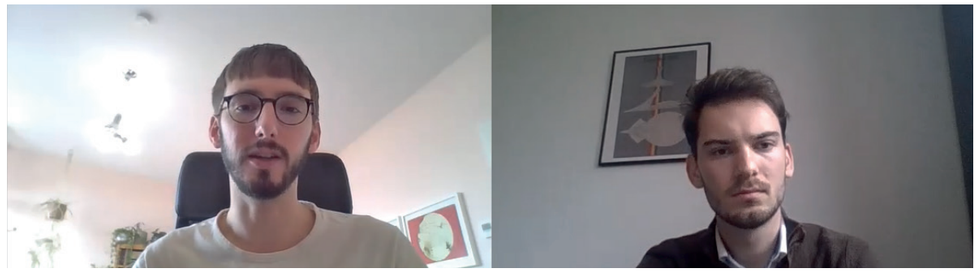
Expert Interviews:

To fill the perceived gap in platform studies as a result of the limited availability of empirical research, I use interviews to acquire more information towards comprehending the spatial impact of platforms. These interviews may take different forms, depending on the expertise of the individual or group. The candidacy of interviewees is established through the locating the theoretical gaps which currently exist within the theoretical framework. As platform urbanism in my research is framed as a spatial phenomenon, I will use interviews to provoke scholars from several research disciplines to expatiate more on their findings in the domain of empirical (spatial) research. In the context of sub research question I and II, the method of interviewing can be regarded as an extension to literature studies. Transcriptions of these interviews will be an integral part of the thesis.

In an effort to identify tangents of other disciplines within the platform studies with urban space, I will engage in unstructured interviews that are aimed at sparking free-flowing conversations. This type of interview allows for discussion, that enables both parties to contribute and digress on multiple topics (Lucas, 2016).

One interview will focus on the theoretical basis of spatial research in the context of Berlin. This interview with Benjamin Busch touches upon his work that relates to both the work of Lefebvre and Bratton. In this interview, I will invite Busch to speak about both works to find out how to appropriate these theoretical models to a methodology for conducting empirical research. Additionally, I will discuss with Busch how his work as a Berlin-based writer, visual artist and architect influences his perception on the digital-material

12 In a video call with Benjamin Busch, calling from Berlin on January 18, 2022



13 In a video call with Pablo Sendra, calling from London on May 24, 2022

assemblages of planetary computation and platform urbanism within the political landscape of Berlin. This talk with Benjamin Busch will help to narrow the scope of the research by exploring the problem field, help me to overcome methodological problems and to contextualize the case study.

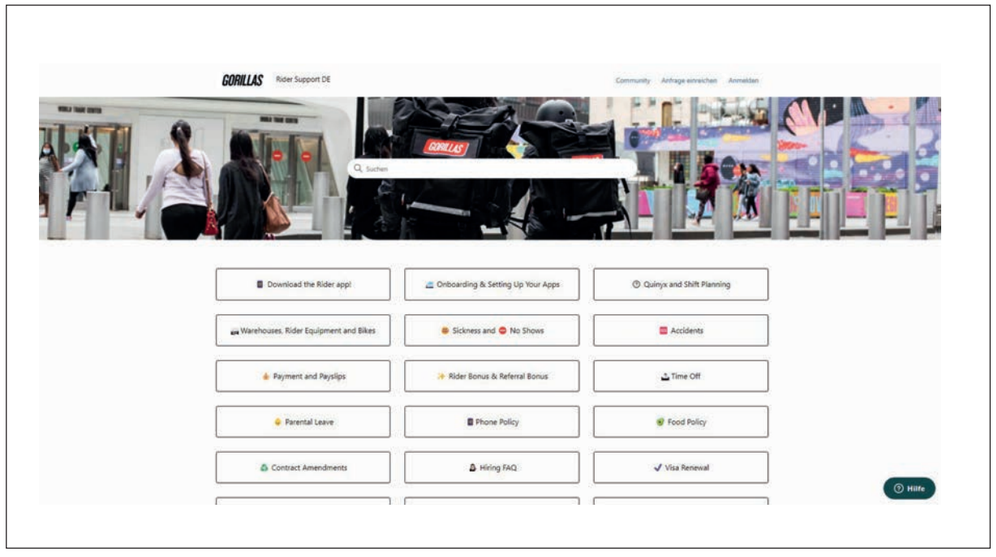
In a second conversation, I met up online with Pablo Sendra, Associate Professor at The Bartlett School of Planning, who wrote the book *Designing Disorder* together with Richard Sennett. This talk was oriented at discussing the concept of disorder in relationship to platform urbanism in an effort to find design oriented solutions to support alternative forms of digital platforms.

Proxying:

The method of proxying, proposed by Fields et al. (2020), can be regarded as an unconventional research technique in the field of urbanism, since it does not qualify as a method of analysis that immediately attends to space. Instead, proxying is used as a way of collecting data in order to document manifestations and digital representations of platform space which are not findable or traceable through observation. In conventional (digital) practice, the term 'proxy' signifies a concept that refers to the delegation of agency as data flows from one party to another. Yet, as intermediary points within the data flow, proxies are a means of distortion, friction and manipulation (Coletta et al., 2018). As a method of research, proxying can be explained through Bratton's model of The Stack. Flows of data, moving between both software and hardware, reformat themselves as they are organized within the logic of a given layer. In this process of reformatting, data may become accessible, as different rules and protocols apply to each layer.

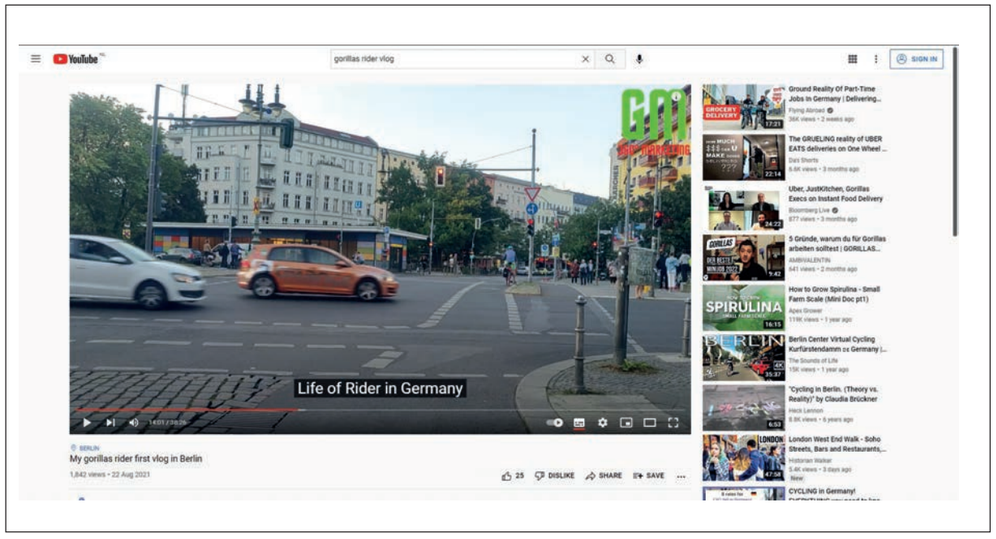
As a researcher, this means that proxying allows you to gain access to data of different *User* perspectives. To be more concrete, in this research, proxying will be consulted through enrolling as a costumer (*User* layer) on mobile platform applications (*Interface* layer), registering a home address and username (*Address* layer) to access information that is otherwise not available. In a similar way, one can also access digital employment portals through registering as a platform worker. As a means of data collection, rather than visualization, the method of proxying therefore tends to the data needs of other methods of analysis.

Several data collection problems have been resolved through proxying. The first challenge was to acquire information about the geographical location of the Gorillas dark stores. A simple Google search yielded no returns, and apart from a few exceptions, they were not listed on any of the mapping services of OpenStreetMap, Apple Maps, Bing Maps and Google Maps, which meant that alternative options had to be explored. By encountering the public Twitter account '@GorillasWorkers', dedicated to reporting and exposing malpractices and violations of worker rights, as well as communicating information about court cases and protests, I came across an image listing the addresses of several dark stores (image 16). Yet, this list was already outdated upon discovery,



14 Accessing the Gorillas Rider Portal

Image retreived from https://gorillasridersupportde.zendesk.com/hc/de



15 YouTube-video by 'GurmanMarketing,' who works as a rider for Gorillas in Neukölln

Image retreived from https://www.youtube.com/watch?v=mNgnWpShcog

leaving me with incorrect and missing information.

The remaining dark stores were partly found through the public database of the Pankow district authority foodstuffs inspection department, which published assessment reports on their website, thereby listing the addresses of three dark stores in the Pankow district. Interestingly, this information was later removed from the website. The reason for this was not disclosed. Other addresses were found through the websites of several local newspapers, covering stories on strikes or nuisance regarding dark stores.

I then found out that the online Gorillas Rider Support information portal did not require verification of actually being employed by the platform upon registration, which allowed users to register under any email address to gain access to the portal. Here, users can manage employment affairs, view newsletters, learn about protocols in case of accidents, request warehouse changes, et cetera. It did not list any addresses, but it did show the names of the operational dark stores, which confirmed that I found all seventeen active branches in the city. This portal was later replaced, thereby also restricting access to employees only (based on a 'Gorillas Batch ID').

Another instance in which I engaged in proxying was to observe places and activities of employees in areas which were not accessible to outsiders. The YouTube channel 'GurmanMarketing' contains two videos showing recordings of a rider working from the Neukölln warehouse. The footage showed the interior of the warehouse, and a series of bicycle trips to complete deliveries. This data was used to map patterns of movement and a dark store layout.

Observation:

Empirical observation tends to the documentation of physical manifestations in urban space. In the methodological framework of this research, the aim of observation is twofold. On one hand, it is used to document the mundane interactions at the interface of platforms and the city, such as the mediation of sometimes ignored or unnoticed landscapes of digital infrastructures in the everyday lives of Berlin residents. This urban ethnographic tendency of the observation method cultivates Lefebvre's conception of spatial practice. Through observation, I attempt to document patterns of movement, traces of appropriation and conflicts in spatial uses. The mundane is an appropriate site for studying platform urbanism, as "we conceptualise the everyday as a location where we as researchers need to be fully engaged in order to comprehend how digital technologies (and data) are implicated in and by the lives of ordinary people" (Pink et al., 2017, p. 3).

On the other hand, this method aims at revealing aspects of the material culture of platform urbanism. Digital platforms forge new relations between everyday objects and the ways in which people interact with them, which for example can be seen in the shift from ownership to subscription in people's dependency on mobility services. Portraying these redefined relationships can be crucial in an attempt to understand the societal impact of platforms, following the conception in material culture studies that 'stuff' functions as an indicator of culture (Lucas, 2016).

16 List of Gorillas locations - published (leaked?) by activist workers

Image retreived from https://twitter.com/gorillasworkers

- BKIEZ: Kaiserkorso 154, 12101 Berlin
- CBURG: Bismarckstraße 94, 10625 Berlin
- CHARLIE: Charlottenstraße 81, 10969 Berlin
- FHAIN: Gürtelstraße 25, 10409 Berlin
- FRIEDENAU: Rheinstr. 65, 12159 Berlin
- GBRUNNEN: Schwedenstraße 14, 13357 Berlin
- MITTE: Torstraße 205, 10115 Berlin
- PANKOW: Elsa-Brändström-Straße 95, 13189 Berlin
- PBERG: Prenzlauer Allee 189, 10405 Berlin
- RUNGE: Rungestraße 25, 10179 Berlin
- SBERG: Martin-Luther-Straße 12, 10777 Berlin
- TURM: Turmstraße 76 A, 10555 Berlin
- XBERG: Muskauer Straße 48, 10997 Berlin
- STEGLITZ: Schlossstr. 14, 12163 Berlin

- Main Headquarter: Rheinsberger Str. 76/77, 10115 Berlin
- Other Headquarter: Schönhauser Allee 180, 10119 Berlin

Methods For Visualizing Data:

Stakeholder Analysis:

The stakeholder analysis seeks to establish the relations between state and non-state actors in the platform economy and their what role they perform in the infrastructures of platforms. The required data will be derived from the literature study. These dynamics can be visualized using multiple techniques, which revolve around plotting different parameters, such as the power-interest matrix. The analysis contributes to the identification of interests, goals, resources and power of different stakeholders within the local context. The opaque conditions around the mechanisms of platforms and nebulous constructs of corporate ownership requires clarification through different visual representations of interrelations between state and non-state actors. To this end, the OSINT-approach offer a more elaborate set of techniques to unveil information.

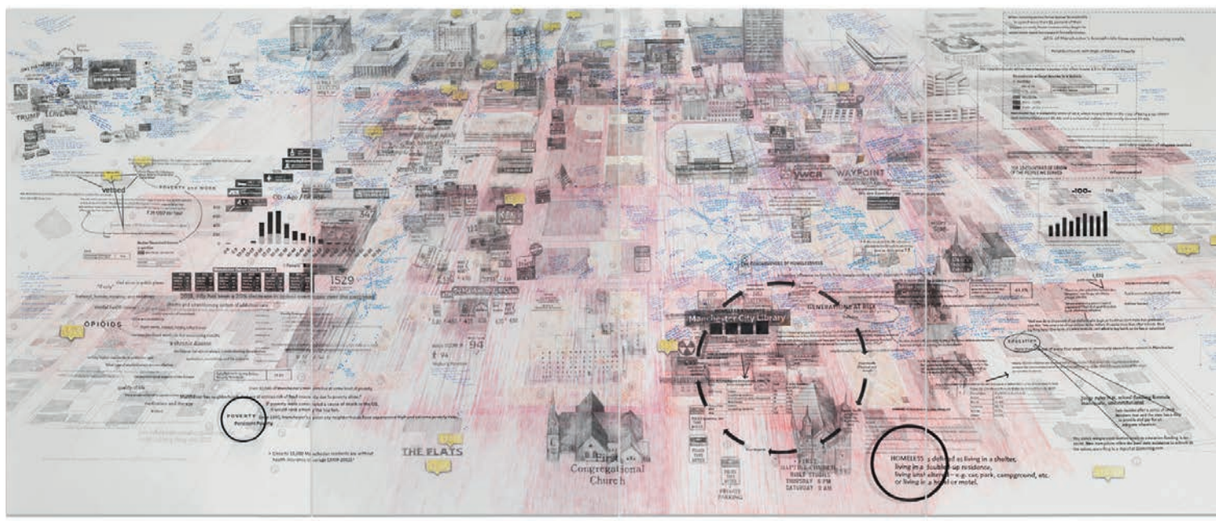
Counter-mapping:

Another method of studying platforms presented by Fields et al. (2020) coheres more closely with the pragmatic work of Venturi et al. (1977) of scientifically documenting the spatial phenomenology of urban space. Purposely, this method is not labelled 'mapping' or 'spatial analysis', for they do not capture the full envisaged meaning of the effort; counter-mapping may additionally be interpreted as an act of activism. As it deals with the contested 'black-box' nature of platform politics and concerns around data transparency, counter-mapping functions as a prolific method for "subversion and transgression of the workings of platform urbanism by situating digital platforms in the experiences of those who both help comprise platform urbanism and are its potentially unwilling subjects" (Fields et al., 2020, p. 465).

This method is crucial in the creation of an atlas, in which its visual representations dissect the geographies of platform urbanism, revealing the vertical-sectional relationship of the operations of digital platforms on the layers of Bratton's spatial model of planetary-computation. The method shall thus seek to identify a myriad of entities in the Stack megastructure and display their spatial relationships. Also their relationship with other socio-spatial metrices may yield new insights in the disruptive and transformative power of platform urbanism. For reference, the activist efforts of procuring data and visualizing the spatial distribution of the short-term housing rental platform Airbnb by Inside Airbnb (2021), or the Amazon Atlas by WikiLeaks (2018) exposing the locations of Amazon data centres could be interpreted as counter-mapping. The required data is further obtained through accessing the GIS-portal of the Berlin Senate (called 'FIS Broker') and other purveyors of GIS datasets, as well as through proxying and observation.

Storying:

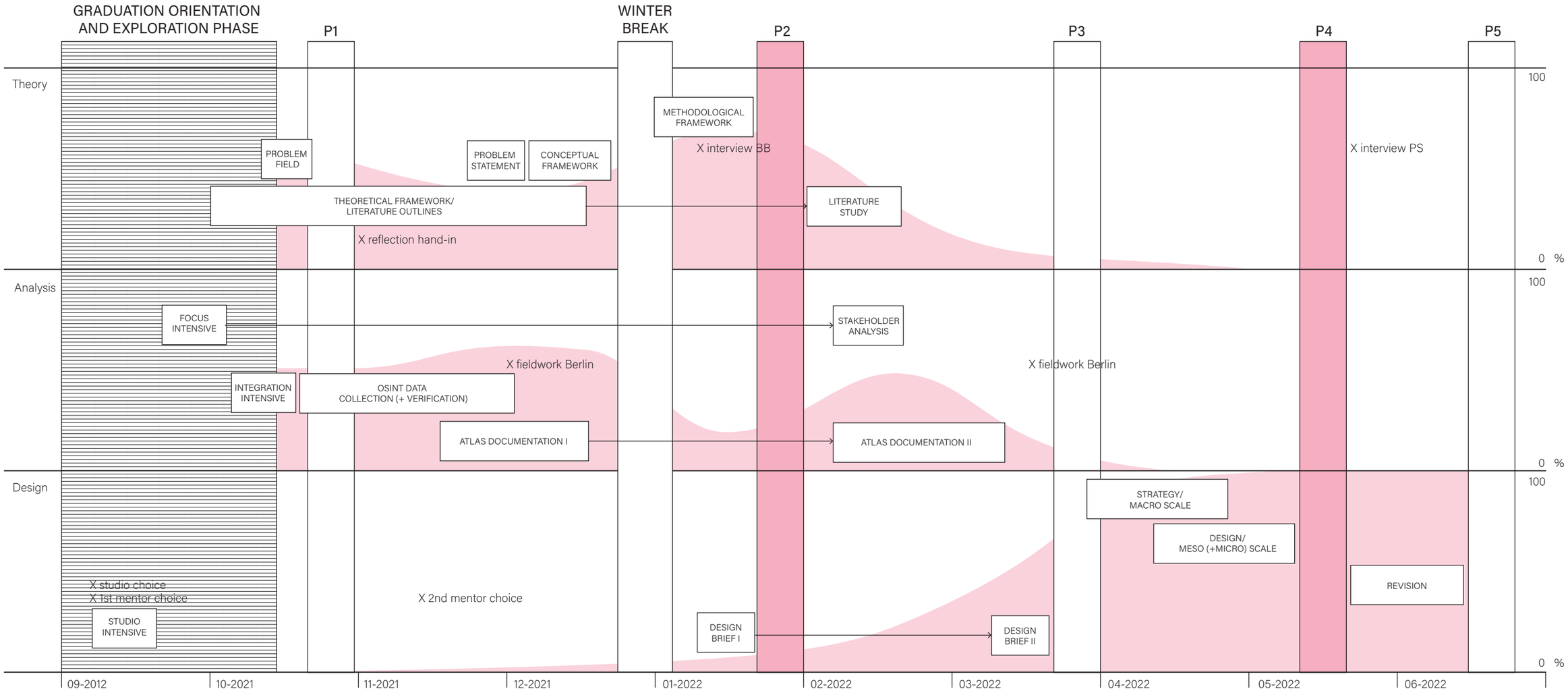
Narrative approaches, as proposed by Fields et al. (2020), can be deployed to acquire an understanding of the dynamics of digital platforms from multiple *User* perspectives. As Pasquale (2017) presents by juxtaposing conventional narratives with counternarratives, different actors have different interests and therefore different views on the same multifaceted reality. These narratives attend to Lefebvre's concept of the lived experience. They comprise a local culture, an overlay on top of physical space. A notable example of storying can be found in the oeuvre of Larissa Fassler, such as her fieldwork drawings of Manchester in New Hampshire, USA (see: Fassler, 2020). Spatial narratives can be 'harvested' in many ways. They can be both explicit and implicit, expressed in digital or physical form, and even through poetry, or art. Yet, they can be identified through interviews, observations and stakeholder analysis. Storying, in practice, may therefore overlap with other methods of research. The product of this method will form a series of annotated axonometric drawings of dark stores, offering insight in local affairs, mundane interactions, traces of activism and so on.



17 Manchester, NH, USA I. Pen, pencil and pencil crayon on paper, 4 panels, *Larissa Fassler*

http://www.larissafassler.com/manchester1.html

Thesis Planning



Legend:

THESIS MONITORING

- go/no-go assessment
- activity, phase
- X activity, scheduled event
- time devision, 0-100%

A.

In Conversation with:

Benjamin T. Busch - Part One

About the interview

Benjamin T. Busch is a US-American visual artist and architect living in Berlin. A graduate of MA Spatial Strategies, Weissensee Academy of Art, his practice centers on spatial production and engages multiple formats, including video, installation, sculpture, curating and publishing. Since 2018, he co-directs The Institute for Endotic Research (TIER) together with Lorenzo Sandoval and Aouefa Amoussouvi. In addition to working as an artist, Busch works as a 3D specialist, architectural consultant, documentary photographer, translator and writer. In the first part our conversation, I spoke with Busch to reflect on some methodological issues, which arise from the spatial theories of Henri Lefebvre and Benjamin Bratton. Together, we compare both theories and discuss how to appropriate them for conducting empirical research.

Biography adapted from http://studiobusch.com/about/

BVDD Benjamin, your theoretical research focusses on the interface of urban space and digital technology, but you are also active as a visual artist and architect. This means that you also encounter these interactions between digital and physical spaces as a practitioner. As you got more familiar with the urban context of Berlin by living and working there, do you think that your ideas and knowledge of spatial theory help you with your empirical work in practice?

BB Both Lefebvre's theory of *The Production of Space* and Bratton's *The Stack* help me conceptualize and deal with certain aspects of this interface between the digital and physical urban space, as you articulated it. To be more specific, *The Production of Space* is useful in my work, particularly the spatial triad. Thinking about these three registers of space as places to observe and be critical, but also to act. The thesis that I wrote in 2017, looking at Bratton and Lefebvre together, was accompanied with a practical work, although it bore essentially no literal relation to the theoretical work. The only relation was in trying to understand some of these concepts and models and approaches from the theoretical work as a kind of framework for creating and viewing the practical work. The product was a video installation titled *Karail*, which I initiated during a 2016 research residency in Dhaka, Bangladesh, focused on the self-organized settlement Karail Basti. Thanks to my thesis advisors, Dr Elisa T. Bertuzzo and Dr Günter Nest of Habitat Forum Berlin, I was able to communicate and build relationships with people who live in this settlement, which allowed me to do this documentary work. What I did was basically just walk through the neighbourhood with my camera, and on one day I also took these kind of *Man with a Movie Camera*-esque shots. With the walkthrough video, I was thinking about representations of space inherited from the Renaissance, namely one-point perspective, and how the authority of this representation established a new relationship with volumetric space, similar to cartography. And in the additional footage, zooming into details – textures, movements, colours, hands at work – created an additional, different set of relations to the space. Thinking site-specifically in 2017, I intended to create some kind of interface between the space of the exhibition in Berlin and the lived space of the settlement, without building a narrative around the people, or the poverty they face, or the need for solutions. So without a layer of morality on top of it. I wanted to take it how it is, how I perceived it as a self-identified outsider, who is nonetheless implicated in the world system that creates poverty. The interface that I developed used rationalist forms of presentation, technologically mediated forms of presentation, and architecture. I was able to source the same materials in Germany that I found in Dhaka and build an installation out of them.

So this concern of working between theory and practice has been central to my work, I would say even in my earlier work as a photographer. During my time as an architecture student, I took many photography classes and used photography actively as a tool for analysis and experimentation in my design research. I really developed photography as a way of seeing, relating to architecture and phenomenology. During that time I was especially inspired by the early writings of Steven Holl, who was in turn inspired by Maurice Merleau-Ponty's phenomenology. I began to see photography as an interesting way of perceiving space and navigating through it. So even before I started working in other forms, this duality between theory and practice was already really important, and now in my newer work it still is.

BVDD The spatial models that you covered in your work, both the spatial triad by Henri Lefebvre and The Stack by Benjamin Bratton, could help in understanding spatial phenomena. However, they are not exactly compatible. To speak in Bratton's terminology, Lefebvre's model seems more human-*User* centred, emphasizing much more the social aspects of space. Bratton's model is more technology centred, but as I interpret it, it is certainly capable of conceptualizing the mundane interactions with digital technology. Yet I wonder, do you think Bratton's model is also of use when conceptualizing more complex social phenomena in space, such as activism, which would otherwise belong to Lefebvre's representational space?

BB This reminds me of one of the sections of my thesis, in which I wrote about the 'new contract of citizenship', which is one of the last things Lefebvre wrote. He died in 1991, so he might have gotten a first glimpse on the capabilities of the internet. Although he anticipated some aspects of the computational paradigm that we live in now, I think it is difficult sometimes to transport theories about the social production of space that were created and developed primarily before the internet. I think what that essay tries to do is to make a claim that people have rights on platforms and that they must demand them. Also the relationship between the human-*User,* the platform and the state have to be continuously renegotiated. I imagine that being in the face of these monopolistic platforms, such as Google and Meta, would be an intriguing development for Lefebvre, because they represent a hierarchical domination that resembles the state in many ways, even more so than the corporations of the 20th century. In that sense, Bratton's readings can be useful in understanding the technics and workings of platforms, from a perspective of how they are produced, how they are reproduced. Not only technically, but also in the imagination and in society. One section in The Stack that stuck with me is his discussion of VR and AR, and the potentiality for these techniques to reinforce ideological, even fascist ideologies, because of their power of persuasion. As we see Facebook turning into Meta and AR overlays coming more and more into use, I think this development should really be taken seriously. So in terms of how the human-*User* relates to The Stack or computational infrastructures, I think both of the thinkers together is useful. Like you said, they both address different aspects of the human condition.

BVDD What do you consider to be the most striking difference?

BB Between these two approaches, Lefebvre always gives an integral space for lived experiences, as well as activism. With Lefebvre, there is always a revolutionary potential within society. What is alarming about Bratton is that it does not seem like there is always a space where that necessarily exists. With Bratton, it is very easy for demands to be co-opted and obliterated, even. You could call this 'technological determinism.' In a similar way that Lefebvre talks about capitalism as a deterministic force, for Bratton it is the aspect of computation that is forcing a specific mode of spatial production, where representational spaces, like activism, do not have sway. At least, not left activism.

BVDD Both Bratton and Lefebvre do not really prescribe a methodology for appropriating their theories for empirical research. Lefebvre even goes as far as to almost fully disqualifying empirical research and its reductionist practice. Meanwhile Bratton calls his work a design brief. Do you think there is a way in which these theories can be appropriated for conducting empirical research?

BB Calling The Stack a 'design brief' is a very performative gesture. I do not think that it is going to have such a visible effect on the field. A design brief has to be accompanied with a commission, a budget, and so on. We are talking about design, not about activism.

I understand Lefebvre's comments on reductionism in the context of professionalization. He was very critical of professionalization in academia, essentially the model of subdividing the different fields and elements of study. By doing research and by quantifying and comparing within specific fields, we abstract information into a level of professional discourse that is very separated from the actual activity on the ground. One thing that Lefebvre writes about is the need for art. He really appreciated music. His work *Rhythmanalysis* is very much inspired by that appreciation. I do not know if he would look at the art that is being made that is today and consider it the same way as something more classical, like a painting, which he uses as an example in his writing. I think artistic forms of creating alternative representational spaces and representations of spaces are important in challenging the status quo. Bratton gives good examples of artworks that challenge the computational paradigm, but it would be incorrect to say they respond to any 'design brief.' In my empirical research, I apply Lefebvre's spatial triad mostly as a way of navigating documentation and archives. My projects often have a documentary approach, in which I work with audio, video and other media to find ways of representing spaces that do not necessarily reduce them in the same ways that you would find in representations outside the art context, such as in planning documents or whitepapers.

BVDD So essentially it comes down to not being too scientific in your approach?

BB I think so. It is about not being too scientific and about trying to be present on all levels of the spatial triad, and in finding ways to communicate that experience to people who are outside of my practice or field.

01 Artwork for the Vertical Atlas, applying the conceptual model of The Stack, *Kévin Bray*

https://www.digitalearth.art/vertical-atlas

03.

Theory on Platform Urbanism

Conditions, Tendencies and Futures

Chapter Intro

As argued in the previous chapters, the emergence of the platform urbanism is taking place because it is facilitated by the specific conditions that society presents. This chapter presents an overview of how developments in the field of economy, technology politics and society have shaped the setting in which digital platforms became dominant actors in modern society. In this endeavour of contextualizing the perceived platformization, identifying drivers of change which take place within each of the different domains provides insight into the platform economy as a resultant of new possibilities, challenges and ideologies. Simultaneously, these drivers of change are reciprocal, meaning that the mechanisms of the operations of digital platforms redefine the context domains in their turn. This interplay is inherently spatial, as this chapter will demonstrate through a series of two essays. Understanding these dynamics is crucial to identify possible platform futures, to recognize the motives and (conflicting) objectives of stakeholders in the Berlin platform economy and to be able to formulate a design brief.

Economy and Technology

To understand the proliferation of digital platforms in the contemporary global economy, this essay shall commence with theorizing the foundation of digital economies and how they gave rise to platform urbanism. Now that the technology sector is becoming increasingly dominant in the global economy (with the platform being the prime organizational form), it is salient to explore the relationship between both, as technological advancement legitimized the upcoming hegemony of the platform in the global economy. Its dominance is asserted to cause a paradigm shift that is expected to be so profound, to the extent that it is labelled 'the fourth industrial revolution.' As such, it is proclaimed to parallel events of great historic significance, such as the Renaissance or the Enlightenment (Srnicek, 2016).

Conditions

The most fundamental principle behind the advent of the platform as an organizational form lies in the capitalist mode of production (Srnicek, 2016). The schematic model of capitalism relies on competitive markets, which purvey a continuous incentive for businesses to gain market share, reduce costs and increase productivity. The yearn for expansion and efficiency explains the bond between capitalism and (digital) technology in multiple ways. This primordial mechanism has been in force since the first industrial revolution. The efficiency movement, coming from early 1900's scientific management theory by theorists Henry Ford and Frederick Taylor, still resonates strongly through our economy today (Mims, 2021). Their work revolves around the simple question of how to employ science and technology to increase productivity and optimize production.

The dialectical relationship between marketization and technological advancement was thoroughly investigated by Karl Polanyi (1957). He argued that in the emergence of the market economy, the role of technology is of greater importance than the role of capital. This rhetoric led Polanyi to the assertion that the function of technology is not merely to boost productivity, but instead is responsible for restructuring societal relationships. More specifically, the confluence of technology and commercial society resulted in the transformation "of the natural and human substance of society into commodities" (Polanyi, 1957, p. 44). Consequently, we may wonder how the intensification of technology in recent years, particularly in the digital realm, will pan out.

One of the most crucial events in the outset of information technology as a dominant aspect of economic activity is the global financial crisis of 2008 (Sadowski, 2020; Srnicek, 2016). As Srnicek (2016) argues, financial crises are cause for a restructuring of capitalism, paving the way for new technologies to emerge and accumulate capital. Interestingly, the technological and economic foundations for the digital economy are remnants of the previous financial crisis, which arose from an exuberant speculation of venture capitalists on tech stocks (Srnicek, 2016). This phase of interest in digital technology around the turn of the millennium, known as the dot-com bubble, accelerated the construction of digital infrastructures and its essential components. "Concretely, this investment meant that millions of miles of fibre-optic and submarine cables were laid out, major advances in software and network design were established, and large investments in databases and servers were made" (Srnicek, 2016, p. 22). The bust of the bubble in early 2000 meant a temporary hiccup in technology investments, as the financial system shifted its focus to the mortgage market. However, high risk investments in subprime mortgages and regulation failures once again resulted in a bubble, which lead the economy into its next global crisis. As argued before, when the dust of the havoc on the financial sector had cleared, Western world governments sought to revitalize the economy, once again shaping the conditions for investment in technology through loose monetary policies of the U.S. Federal Reserve System and the European Central Bank (with actions such as quantitative easing and interest rate reductions) (Srnicek, 2016). These conditions continued to exist throughout the past decade, with asset purchasing programmes continuing well into the COVID-19 pandemic (see image 07). Moreover, besides a renewed focus on technology, Sadowski (2020) found that post-crash landscape of the European and North American economy, particularly resulting from austerity programs, entrepreneurialism and privatization, were forcing cities to cut budgets and adopt neoliberal policies in order to remain competitive. These conditions, rendering cities as "prime targets for technology capital" (Sadowski, 2020, p. 451), ensured that new organizational models of technology-mediated entrepreneurship arose. These models were often digital platforms.

Category	nineteenth century	twentieth century	twenty-first century
Coordinator	The invisible hand of the market	The visible hand of management	The digital hand of platforms
Organizational form	The factory	The corporation	The platform
Institution	The market	Hierarchy	Networks
Governance	Entrepreneur	Managerial authority	Ecosystem governance
Technology and knowledge	Knowledge in community	Knowledge in physical capital	Knowledge in human capital
Geography	Local	National	Global
Economic theory	General equilibrium theory	Transaction cost economics and institutional economics	Two-sided markets, network theory and complex systems
Engine	Steam	Internal combustion	Microprocessor
Energy	Coal	Oil	Wind and solar
Transportation	Goods	People	Information

01 The evolution of markets, hierarchies, and networks throughout the last centuries

Acs et al. (2021)

As seen in image 01, the adoption of the platform as a dominant organizational model is emblematic for a much broader and more profound shift in the global economy, which now puts the platform at the centre of its ecosystem. This shift, giving rise to neologisms as 'platformization' and the 'platform society' (Andersson Schwarz, 2017), is enabled by the technological and infrastructural affordances of digital platforms, such as the ability to form multisided markets. This allows actors, both on the producer as well as the consumer side of the market, to find each other more easily though a digital intermediary. According to Acs et al. (2021), this specific quality of platforms ensued in a sharp decrease in information costs, such as search costs and transaction costs. Arguably, this is due to the fact that platforms make face-to-face contact redundant. "A digital platform automates market exchanges and mediates social action—but as relationships are turned into material infrastructure, existing arrangements are lent a degree of immutability and traceability, rendering what previously would have been informal exchanges into much more formalized rules of engagement" (Andersson Schwarz, 2017, p. 377). Therefore, the platform is essentially a digital marketplace with fixed protocols of matchmaking and transaction, allowing more efficient, faster and cheaper trades. In light of the global COVID-19 pandemic, these traits facilitated another surge in the popularity of digital platforms, as they provided alternatives for shopping and mobility services without the risk of contracting (or spreading) the virus.

Tendencies

This initial description of platforms may not yet lay bare the fundamental problems inherent to its undesirable and unsustainable activities that this thesis project seeks to tackle. In fact, early day views on the platform economy were euphoric, as it was seen as a post-capitalist project, possibly the ideal alternative to neoliberal markets. Labelled as 'the sharing economy', the expected dominance of digital platforms was envisioned to unveil a plethora of opportunities for social initiatives and volunteering organizations through a more collaborative approach to using idle resources (Maginn et al., 2018), shaping up a promising alternative to neoliberal capitalism (Grabher & König, 2020). Yet, hopes have darkened as the new economy instead seemed to anticipate to the commercial value of platforms (and its technological affordances) instead (Grabher & König, 2020). As Sadowski (2020) explains, corporate platforms propped up by excessive amounts of venture capital presented themselves as fixes to the deficiencies of urban services and spaces, which arose due to the restrictions in public funding and investments in cities during the Great Recession. As cities remained underfunded, public assets and (digital) infrastructures were not organized and laid out to prepare for a social practice of true sharing. Consequently, cities relied on corporate actors to finance the urbanization of technology with rent-seeking capital (Sadowski, 2021). Following this understanding, platforms seek to create a hyper-efficient rentier model in which they can operate and extract revenue as an intermediary between production and consumption. This is where the term 'sharing economy' loses sway.

The metamorphosis of a 'sharing economy' into platform capitalism arises from this perceived duality between the systematic lack of interference of the public sector in the platformization of cities on one hand, and the subsequent influx of private capital of corporate platforms on the other hand. It became clear that the prevailing policies of austerity and privatization meant that the future of the platform only exists in a commercial form, as basic public services and infrastructures did not receive funding to facilitate sharing initiatives. This means that in some contexts, the privatization of basic public services is a serious possibility (Pasquale, 2017). In the United States, there have already been instances in which local governments cut investment in public transportation, since private alternatives arise (Sadowski, 2021). The dominance of platforms in the last decade, primarily exteriorized by Google (now Alphabet), Apple, Microsoft, Amazon and Facebook (now Meta), was made possible due to their exploitative character (Scholz, 2016). This trait is externalized in various ways, which is more elaborately discussed in the next essay on politics and society.

The conditions of the post-crash labour market after 2008, with a strong growth of unemployment and the mainstreaming of flexible labour contracts (freelancing, gig-work etc.) played right up the alley of digital platforms. It is no surprise that dominant corporate platforms such as Uber were founded at the beginning of the Great Recession, because they rely on large numbers of people engaging in low-wage and low-skill work (Srnicek, 2016), often vulnerable migrant workers (Van Doorn & Badger, 2020).

Secondly, the platform economy is reproached for its tendencies towards monopolisation (Andersson Schwarz, 2017; Sadowski, 2021; Srnicek, 2016). Platforms have the ability to scale up through 'network effects', which amplifies the functionality of the service as more parties connect to it (Lee et al., 2020). "Network effects are extolled as the single most powerful escalating platform dynamics, and growing the network, at virtually any cost, is the chief maxim of the platform economy" (Grabher & König, 2020, p. 106). This compels platforms to 'disrupt', negate regulation and in rare cases, even sabotage competitors (Srnicek, 2016). Just Eat Takeaway, parent company of Lieferando, stormed the German market for food delivery after a mass acquisition in 2019, buying up all operations of Delivery Hero and thereby forcing out all competing platforms.

Monopolisation is further compelled by the necessity to generate data. Besides capital, data is an important secondary commodity for digital platforms. While the accumulation of both is often intertwined, datafication often is a goal in itself, as data represents political value (Sadowski, 2019). To illustrate this, Srnicek (2016) reminds us of Gmail, a free service provided by Alphabet, which commits users to other services operated by them as well.

Users do not pay for the email service with their money, but with their data (which can then be used to make its activities in advertising more profitable).

Returning to the work of Karl Polanyi; his conception of technology was that of industrial machinery (Polanyi, 1957). A more contemporary framing of his theory may posit data and information technology as the drivers of the current market economy (Grabher & König, 2020). Similar to how labour, land and money became the 'fictitious' commodities of industrial capitalism (Polanyi, 1957), in platform capitalism, there is a reconfiguration of social life by forging conditions to further generate and appropriate data, essentially rendering human interaction as a data resource. Data generation is an important concept in what Bratton (2016) calls 'platform surplus value', referring to the differential value of all user-generated data for a digital platform is larger than the costs of providing the platform to its users. As such, it is no surprise that most business within the platform economy revolve around technology for data manufacturing to generate value from social and economic interactions (Sadowski, 2019): "Surveillance – or, 'dataveillance' – capabilities are integrated into everything ranging from consumer goods to civic infrastructure. For businesses, much of the value produced by 'smart' technologies does not necessarily come from you buying the good, but rather from you using it" (p. 6). Digital platforms such as Uber and Airbnb therefore aspire to grow into lean business models, in which they can justify their intermediary position as a technology company, rather than a taxi company or a landlord respectively. Uber vehicles in Germany actively exteriorize this legislative message, stating that "Uber is a facilitator of rides, not the carrier itself" (image 02).

02 Uber does not want to be a taxi company, it wants to be a tech company

Image by the author

Futures

As Nick Srnicek (2016) explains, the rapid growth of the platform economy was facilitated by a loose monetary policy by the Federal Reserve in the U.S. and the European Central Bank in the EU. Lavish private equity investment by venture capitalists allowed platforms to spread and attract new customers with blatant marketing campaigns and by offering their service at low prices (often below breakeven point). Yet, Srnicek argues that this dependency on the current monetary policy renders many digital platforms vulnerable. As interest rates go up, the flows of venture capital into corporate platforms are expected to slack off, which means that the business model of platforms suddenly need to be profitable in order to survive. Despite this contingency, it can be expected that the dominance of platforms as an organizational model will continue to increase (Srnicek, 2016), which means that the incursions of platforms into the public sphere will proliferate. Platform urbanism is here to stay.

A fundamental step towards step towards breaking the monopolistic tendencies, according to Andersson Schwarz (2017), is that governments abandon their *laissez-faire* approach, and seek to more proactively shape the economic conditions for the creation of 'universal service', meaning that platforms are obliged to open their services to other platforms as well. In this way, markets and supplies are not prone to the dominance of a single platform. Moreover, Andersson Schwarz (2017) proposes a more active approach in countering the technological and infrastructural edge of monopoly platforms, which could be done by forming consortia or state organs that have the power to build emancipatory infrastructures and technologies to compete with certain components of (mega)platforms. As Srnicek (2016) adds to this idea, the creation of public platforms hinges on "investing the state's vast resources into technology necessary to support these platforms and offering them as public utilities" (p. 128).

Politics and Society

The rapid upsurge of the platform economy is producing profound changes in the way cities are functioning. The recent emergence of flash delivery services accentuates dilemmas and frictions in how platforms are manifesting themselves in the city. While in some cases platforms may offer opportunities to improve the functionality of public services, in others, serious disruptions to urban life occur. As mentioned in the introduction chapter, (local) governmental organizations seem to grapple with policy making to effectively balance the interests of corporate platform organizations and the public good, which is attested by the wide range of counterproductive policy tools being deployed, from temporal bans (Van Doorn et al., 2021) to lavish subsidies (Sadowski & Gregory, 2017). To make sense of the obscurity around the governmental interests, we need to first understand the roles and attitudes of platforms in the process of policy-making.

Conditions

As explained earlier, the period of economic austerity after the 2008 crash meant that corporate platforms grew into important engines of growth. Investment cuts in basic public services incentivized the foundation of private alternatives to these state-owned services. Under the heading of the 'sharing economy', corporate platforms yielded promising narratives about cheaper services due to reduced transaction costs, fair labour markets and independent, flexible work (Pasquale, 2017). These narratives primarily stuck with neoliberal political bodies. Through these promises, the technological edge and the inertia of state actors, digital platforms managed to gain foothold in the mobility, hospitality and care sector. The deterioration of public services in neoliberal and entrepreneurial cities became normalized for the sake of opening up possibilities for 'innovation', allowing digital platforms and other private companies to capitalize on infrastructure (Shapiro, 2017). These developments are in line with the perceived technology-induced shift to a more individualistic society, which may further increase the clout of the individual (Schelb, 2015). However, a considerable drawback is that it will also make them more vulnerable due to the increased dependence on backbone technologies purveyed by often monopolistic corporate actors. In preventing this, regulation through anti-trust laws does not always prove desirable or useful.

Part of this perceived complexity in regulating the platform economy arises from what Bratton (2016) refers to as the 'geopolitical structures of planetary computation'. At the stem of this complexity lies a disparity between the ubiquity of planetary computation and the territorial sovereignty of state actors. As software unfolds itself on a transnational or even transcontinental scale, it does not bound itself to the territorial sovereignties of the nation-state. This particular disparity is entrenched by policy gaps that platforms can use to their benefit. This means for example that platforms are able to establish their headquarters in a country with the most favourable legal policies to their objectives. As Haar & Cox (2020) illustrate, Airbnb has no obligation to share data with the Berlin Senate, as they only obey the Irish data law, pleading to the EU's country of origin concept. Similarly, Gorillas changed its country of origin from Germany to The Netherlands, reportedly to avoid codetermination and employee participation, which is firmly embedded in German law, and to benefit from more favourable taxation rules (Bronzwaer, 2022).

Bratton (2016) explains that the design for a global universalized model of territorial sovereignty can be traced back to the Treaty of Westphalia in 1648. He argues that the geographic design of the Westphalian state is in a crisis (Bratton, 2016, p. 6):

> "Today the authority of states, drawn from the rough consensus of the Westphalian political geographic diagram, is simultaneously never more entrenched and ubiquitous and never more obsolete and brittle. In the emergence of The Stack, it is not that the state declines per se, but that our contemporary condition is qualified both by a debordering perforation and liquefaction of this system's ability to maintain a monopoly on political geography."

Therefore, as digital platforms become more influential, interesting conflicts arise when the objectives of state actors and platforms are not aligned. Many conflicts already arise from planetary computation and its subversion of the Westphalian state design. Notable examples include the Sino-Google War of 2009, in which the platform was pressured by the Chinese government to censor search results, leading to the a conflict between a state and non-state organization. Another issue of the Chinese government is the problematic regulation of contested alternative currencies such as Bitcoin. A very topical example shows that also in situations of conflict between states, platforms are dominant actors with political power. The Russo-Ukrainian War shows how platforms exert political power by limiting access or providing tools based on the geographical location of its users (Rubio-Licht et al., 2022). This highlights that platforms operate on a level that transcends territorial sovereignty – and moreover hold the ability to compete with state actors on a political level. It is evident that the ubiquitous condition of planetary computation lets businesses benefit optimally from policy gaps which arise from blind spots in cross-jurisdictional governance.

Tendencies

The reliance of state actors on platforms to gain 'global presence' and sustain a competitive and innovative economy results in dubious power relations. This affords corporate platforms to engage in lobbying efforts and strategic

lawlessness to fulfil their goals (Pasquale, 2017), since it allows them to lock in and pressure governments into reshaping regulations (Ferreri & Sanyal, 2018; Haar & Cox, 2020; Lee et al., 2020). These trade-offs are especially becoming interesting dilemma's when platforms engage in urban development projects, such as the Quayside project in Toronto by Google's Sidewalk Labs, through which Google would invest their vast financial resources to develop privatized public space subjected to its goals of data extraction and profit generation (Lee et al., 2020).

In some cities, platform companies even engage in establishing partnerships as a policy tool. Although 'partnership' may convey an amicable connotation, Van Doorn et al. (2021) find the true meaning of these partnerships to be "a strategic device and heterogeneous boundary resource through which platforms try to become embedded in local settings, create and exploit dependencies, and to thereby both expand their multisided markets and gain sociopolitical influence" (p. 11). This tendency aligns with the business model of platform companies, which often rely on monopolisation of local markets, as previously discussed. "For these "disruptive" platforms, their strategy for domination is fought on the urban front: surge into cities, spread like wildfire, subvert any regulation, supplant all competition, and secure their position as an aspiring monopoly" (Sadowski, 2020, p.450). A valuable tool for co-creation is therefore demoted to a mere marketing campaign and an ideological smokescreen.

As Scholz (2016) concludes, illegality is the modus operandi. Numerous platforms violate a multitude of laws and fail to pay taxes. Conflicts on labour conditions arise, as (illegal) gig-based work of digital platforms results in precarious labour conditions for riders. This includes limited labour protection, unsafe work and underpaid work (Pasquale, 2017; Van Doorn & Badger, 2020). In Berlin, strikes have been organized repeatedly to protest these conditions. The presented conflicts highlight the discrepancy between platform company goals and the goals of local actors.

This discrepancy can partly be explained through the global one-size-fits-all approach of platform companies. Bratton (2016) identifies a common practice of digital platforms in their effort to standardize protocols and interfaces to reinforce the predictability for its users. Although Van Doorn et al. (2021) emphasize the path-dependency of platformization, meaning that companies have to adapt their strategies to local conditions, it is also concluded that the rigid international (often global) orientation of platform companies suppress the attention for local traditions and culture (Pasquale, 2017). The visual intrusiveness of brand identities in the public sphere and the expropriation of incumbent service providers are causes for a deterioration of local identities. Also, partnering organizations who choose to offer their service or product through platform companies lose the opportunity to engage with their customer base. The required policy tools to effect change should therefore focus on coordinating 'globalized' objectives with local context. In the case of Delivery Hero for example, upon re-entering the Berlin market,

03 Reader's comment lamenting the platform economy, *The Guardian*

https://www.theguardian.com/technology/2015/sep/15/is-ubers-ultimate-goal-the-privatisation-of-city-governance

the company formulated objectives that align with this approach (Delivery Hero, 2021, n.p.):

> "Delivery Hero is dedicated to fostering sustainable relationships with all partners in its community and is looking to use its platform to have a positive impact on society at large ... For local shops, Delivery Hero acts as a true digital partner, making it possible to access both offline *and* online customers. As always, Delivery Hero wants to make sure that all riders work under fair and safe conditions, while having a continuous dialogue of how to best serve their interests in terms of flexibility, compensation and the access to work."

Yet, these intentions rapidly caused Delivery Hero to lose out in the highly competitive Berlin gig-economy. Citing high rider costs, the Berlin-based company saw insufficient possibilities to make their operations profitable and pulled out of the Berlin market in December 2021 already (Miller, 2022). Raising delivery costs for customers or commission rates for partnering restaurants endlessly would not match the objectives cited above. For customers and platform partners, the retraction of Delivery Hero puts extra pressure on the city's platform economy. Other platforms will 'saturate' the local market, leading to a position of monopoly and will face less competition when it comes to the pricing of their services.

In Berlin, this perception of the platform economy is leading to new movements of opposition. Activist groups protest the construction of an Amazon HQ in Friedrichshain and the Google Campus in Kreuzberg, while platform workers are striking against the malpractices regarding the provided labour conditions. In the case of Gorillas, efforts to contest these platform practices, could be classified as (neo)luddism. Occasions have been reported in which warehouse doors have been sealed shut to sabotage operations (Tagesspiegel, 2021) and advertisement banners and store fronts have been vandalized or blemished. The analogy with luddism is promoted by scholars such as Gavin Mueller and Jathan Sadowski (Martijn, 2021; Mueller, 2021) and refers to the movement of protestation of industry workers against the mechanization of their jobs around the early 1800's. *Luddites* set out to sabotage and vandalize machinery which posed a threat to the continuity of their work (Mueller, 2021). Yet, it is not technology to take the full blame, but

04 -05 Blemished advertisement panels. Acts of neo-luddism?

Images retreived from https://twitter.com/gorillasworkers

rather the political-economic system behind how technology got entangled with capitalist modes of production, as elaborately discussed by Polanyi (1957). The revival of luddism now contests Big Tech, surveillance technology and platform capitalism (Martijn, 2021) and therefore aims at actively challenging the politics and economics that uphold the power of technology over work and other aspects of everyday life; the forms and extent of which is deftly explained by Easterling (2014) in her analysis of infrastructure space and its carriers, such as economic free zones, standardization protocols and broadband networks.

Infrastructure space, which comprises the spatial productions of technological activities, replicates itself as "spatial software" (Easterling, 2014, p. 20). Leo Hollis, building upon the concept of the non-place (coined by Augé (1995)), drafts a similar conclusion on platform urbanism: "Platform urbanism seeks the perfect urban code that can be replicated by whichever City Hall is willing to pay for the proprietary algorithm" (Hollis, 2021, p. 154), and sees the non-place as its building block. Augé's 'non-place' refers to commonly used spaces heavily mediated by technological protocols, such as airports, parking garages, supermarkets, shopping malls, highways, etc. (Augé, 1995). A key feature of these spaces is that they fail to contribute to the livelihood of the city. These thoughts on infrastructure space and non-places reflect the inability for platform workers to garner ownership and sense of belonging in their working environment. As Avermaete (2021) claims, there is an absence of the human dimension in platform work, meaning that they lack representation in the city. Therefore, the efforts of present-day *Luddites* towards social justice also resonate with Lefebvre's call to claim "the right to the city". As Busch (2020) infers from Lefebvre's readings, the upsurge of information technologies led Lefebvre to re-evaluate his ideas on his work in the 1960's. "Late in his life, Lefebvre began a renewal of "the right to the city" in his essay "From the Social Pact to the Contract of Citizenship", which listed other crucial rights to

06 The Leader of the Luddites. (1812).

Messrs. Walker and Knight, Sweetings Alley, Royal Exchange

be struggled for in tandem with the right to the city, among them being "the right to services"" (Busch, 2020, p. 169). Yet, corporate actors in the platform economy are reproached to actively 'lock in' urban spaces and its users to their services, while simultaneously barring access to alternatives (Lee et al., 2020). Corporate platforms therefore function as closed systems, rather than open infrastructures.

Futures

The several platform mechanisms and deceptive practices illustrate how intrusive and unwieldy digital platforms can operate. The way in which digital platforms already transform everyday life in cities through intertwining patterns of consumption, social interaction and mobility with datafication and digital technology pictures a dystopian view on what is yet to come. As Sadowski (2020) concludes on corporate digital platforms: "it's clear they are intensifying many of the worst features of capitalist urban development" (p. 451). Once again this underscores the necessity to look for alternatives. Perhaps the most concrete and influential proposal was issued by Scholz (2016), in suggesting that platform cooperatives could be productive alternatives. As opposed to its corporate equivalents, cooperative platforms would not be driven by the quest for capital accumulation, but rather use its resources for fair compensation of labour, improved accessibility and financially stable business models. Being owned and operated by a coalition of riders, designers, software developers, data analysts, financial advisors, etc., this organizational model could be a more favourable alternative in the platform economy. Using the same technical components as corporate platforms, cooperatives could replicate the interfaces and algorithms on which platforms run.

Scholz (2016) recognizes the challenges at hand, since cooperatives would still have to compete with equivalents backed by excessive amounts of venture capital. Therefore, more than being a plead for democratizing the organizational model of platforms, the crucial objective may be the aforementioned ambition to democratize the infrastructural assets on which platforms operate, according to Scholz (2016). Efforts should therefore orient towards designing the right of individuals and groups to gain real access and control over infrastructures and their relationships with them. "This right does not come about organically nor automatically: it necessitates a tactical protocol to be designed responsively into infrastructures themselves, in a mode that at once prevents the centralization of infrastructural power, and that also recognizes the site-specificity of each infrastructure and its users" (Busch, 2020, pp. 175–176). As such, creating public platform infrastructures engineered as open systems could create a more even playing field between corporate and cooperative actors in the platform economy.

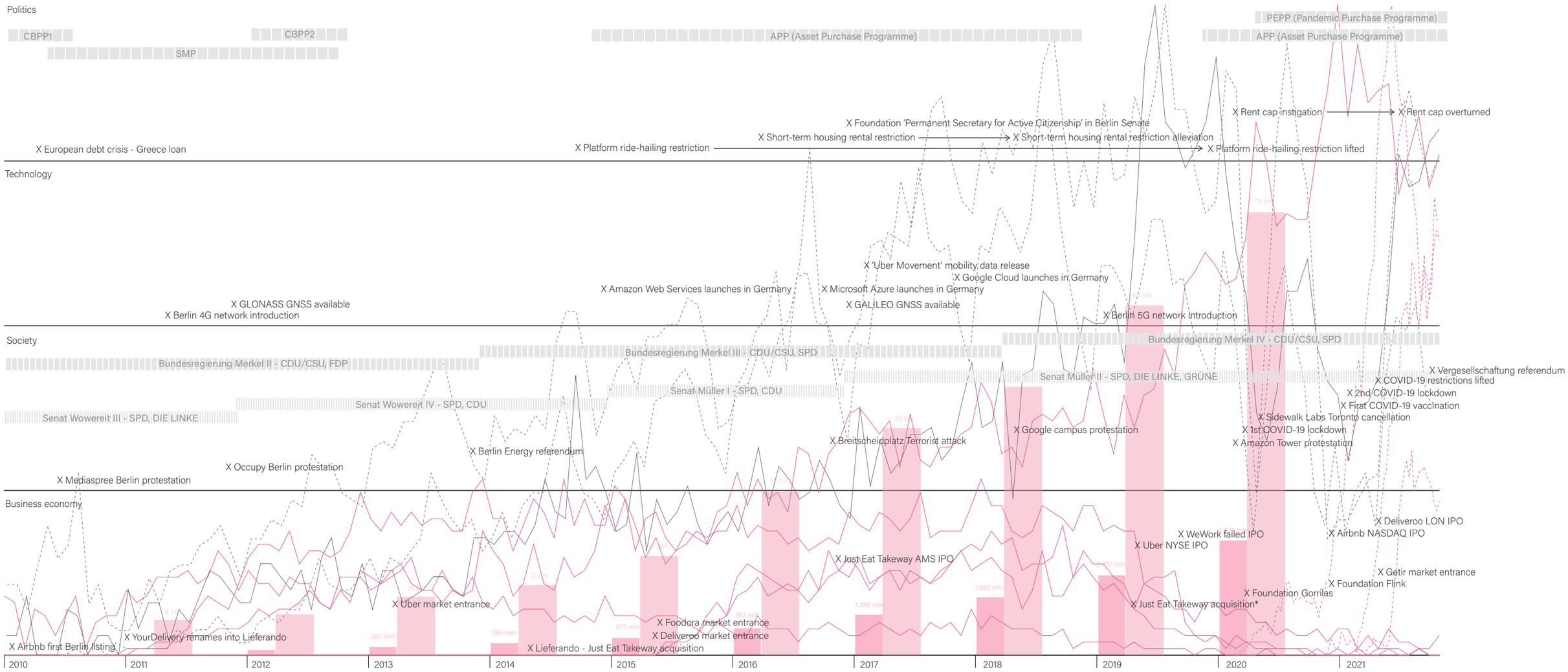
Yet, this infrastructure should not merely be about creating a public last-mile logistics network. It should also purvey social functions, or 'spaces of appearance', as coined by Avermaete (2021). Facilitating the formation of platform cooperatives hinges on their ability to mobilize platform workers, which is something that corporate actors actively impede (Avermaete, 2021, p. 286):

> "While the many drivers, deliverers, and service desk employees are crucial contact points between algorithmic business models and citizens, they are not represented in the city. It has become clear that platform business models have the effect of distancing the people working for them from their employers, as well as from public debate and opinion. The people of the platform lack spaces to appear, to have their voices heard."

Therefore, the people that make platform services possible should be granted a place to interact and to mobilize a growing group of gig workers to form cooperatives and set up other initiatives to garner control over their labour conditions and the platform economy in general.

07 A Berlin centred timeline of the platform economy 2010-2021

Illustration by the author



Legend:

DATA CONSUMPTION

267 mln — Cellular data consumption in Germany (in gigabytes)

10 bln — Broadband data consumption in Germany (in gigabytes)

GOOGLE TRENDS

Restaurant delivery platform

Grocery delivery platform

Ride-hailing platform

Homesharing/hospitality platform

CIRCUMSTANCES

Local government coalition

National government coalition

ECB quantitative easing

X Event

Data sources:
Bundsnetzagentur
Google Trends

STAKEHOLDER ANALYSIS

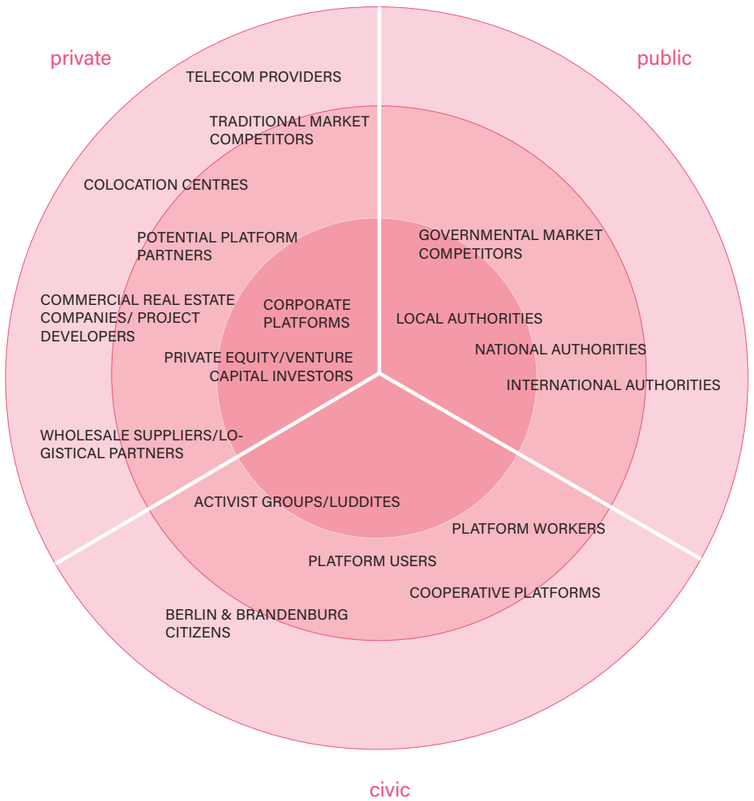
STAKEHOLDER CATEGORY	STAKEHOLDER GROUPS	STAKEHOLDER EXAMPLES	DESCRIPTION	GOALS	TOOLS AND RESOURCES
PUBLIC	LOCAL AUTHORITIES	BERLIN SENATE BUNDESLAND BRANDENBURG DISTRICT AUTHORITIES	Governmental organizations operating within the administrative boundaries of geographical area, holding the ability to regulate certain activities of platforms, or facilitate alternatives.	Economic competitiveness Political sovereignty Justice Prosperity	Wide range of policy tools such as enforcement, taxation, zoning plans, regulation and more
	NATIONAL AUTHORITIES	GERMAN GOVERNMENTAL ORGANIZATIONS	National governmental organizations operating within the administrative boundaries of Germany.	Ibid.	Wide range of policy tools such as enforcement, funding, taxation, regulation and more
	INTERNATIONAL AUTHORITIES	EUROPEAN UNION EUROPEAN CENTRAL BANK FEDERAL RESERVE	European governmental organizations operating within the administrative boundaries of Europe, or other international organisations with the power to influece European policies	Ibid.	Wide range of (monetary) policy tools such as funding programs, asset purchasing programmes, antitrust laws and the ability to influence markets (e.g. by altering interest rates)
	GOVERNMENTAL MARKET COMPETITORS	DEUTSCHE BAHN AG DB CARGO DB NETZE AG S-BAHN BERLIN BERLINER VERKEHRSBETRIEBE	Railway and transit organizations operating across different scales, of which the shareholders are state-owned. Railway infrastructure and train services are owned and operated by these actors.	Service viability Access to service Safety Affordability	Infrastructural and technological assets
CIVIC	ACTIVIST GROUPS/LUDDITES	GORILLAS WORKERS COLLECTIVE GORILLASRIDERLIFE BERLIN VS AMAZON	Civic collectives contesting and actively protesting the operations and expansion of corporate platforms in the city of Berlin.	Protect local culture Affordability Justice Equality	The power to mobilize, organize strikes and form a collective opinion that gets its voice heard through the media
	PLATFORM WORKERS	INDIVIDUAL EMPLOYEES	Employees of digital platforms.	Job security Fair compensation	
	BERLIN & BRANDENBURG CITIZENS	DARK STORE NEIGHBOURS PUBLIC SPACE USERS	Individuals who indirectly interact with the activities of platform businesses.	Livability Safety	The ability to monitor and report nuisances to authorities
	PLATFORM USERS	INDIVIDUAL CONSUMERS	Individuals who directly interact with the activities of platform businesses by using service.	Quality of service Affordability	The power to switch to alternative platform services
	COOPERATIVE PLATFORMS	KHORA FAIRMONDO TOO GOOD TO GO	Organizations that function as digital platforms which are democratically managed and owned by its employees.	Job security Fair compensation Independence Equality	The 'power of the commons', mobilize practices of true sharing and scale up
PRIVATE	CORPORATE MOBILITY PLATFORMS	GETHENRY SWAPFIETS UBER LIME	Digital platforms offering mobility services in the city of Berlin.	Monopolisation/expansion Attracting capital Profitability Disruption of trad. markets Sociopolitical influence	Data assets Influx of abundent financial resources
	CORPORATE E-COMMERCE PLATFORMS	AMAZON ZALANDO	Digital platforms offering online shopping services in the city of Berlin.	Ibid.	Data assets Political leverage as a generator of economic value
	CORPORATE GROCERY DELIVERY PLATFORMS	GORILLAS FLINK GETIR	Digital platforms offering grocery delivery services in the city of Berlin.	Ibid.	Data assets Influx of abundent financial resources
	CORPORATE TAKEAWAY PLATFORMS	WOLT LIEFERANDO UBER EATS DELIVERY HERO	Digital platforms offering takeaway meal delivery services in the city of Berlin.	Ibid.	Data assets Influx of abundent financial resources
	CORPORATE HOSPITALITY PLATFORMS	AIRBNB BOOKING.COM	Digital platforms offering hospitality and short term housing services in the city of Berlin.	Ibid.	Data assets Political leverage as a generator of economic value
	CORPORATE CLOUD COMPUTING PLATFORMS	AMAZON WEB SERVICES GOOGLE CLOUD MICROSOFT AZURE	Digital platforms offering cloud computing services in the city of Berlin.	Ibid.	Data assets Political leverage as a generator of economic value
	TRADITIONAL MARKET COMPETITORS	RESTAURANTS HOTELS TAXI COMPANIES SUPERMARKETS SPÄTKAUF SHOPS	Brick and mortar businesses competing with digital platforms offering services or products in the city of Berlin.	Continuity Profitability Accessibility to the market	Customer base, goodwill Support from local communities

STAKEHOLDER ANALYSIS

STAKEHOLDER CATEGORY	STAKEHOLDER GROUPS	STAKEHOLDER EXAMPLES	DESCRIPTION	GOALS	TOOLS AND RESOURCES
	TELECOM PROVIDERS	TELEFONICA VODAFONE TELEKOM	Businesses owning and operating cellular communication infrastructure in Germany.	Technological innovation Profitability Service expansion	Customer base, goodwill Support from local communities
	COLOCATION CENTRES	3U TELECOM CARRIERCOLO COLT DNS:NET EUNETWORKS LUMEN NTT PŸUR HL SPEEDBONE	Businesses owning and operating colocation centres in and around Berlin to offer data solutions to internet-based companies, sometimes hosting platform cloud computing services, and BCIX and/or ECIX internet exchange points.	Technological innovation Profitability Neutrality Continuity/Service reliability Competitiveness Proximity to customers	
	PRIVATE EQUITY/VENTURE CAPITAL INVESTORS	ATLANTIC FOOD LABS COATUE MANAGEMENT DST GLOBAL TENCENT GREENOAKS CAPITAL PARTNERS DRAGONEER INVESTMENT GROUP FIFTH WALL VENTURES DELIVERY HERO TENCENT A*PARTNERS MISSISSIPPI VENTURES	Private equity and venture capital investors managing a portfolio of (high risk) speculative investments in corporate digital platforms.	Technological innovation High investment returns Managable risks Constructive partnerships Market disruption	Financial resources
	WHOLESALE SUPPLIERS/LOGISTICAL PARTNERS	REWE FÜR SIE HAVI LOGISTICS BARTELS-LANGNESS METRO TRANSGOURMET LEKKERLAND	Wholesale suppliers purvey foodstuffs to dark stores through road-based logistics.	Strategic partnerships Profitability Continuity Accessibility (traffic)	The ability to restrict partnerships to one business partner exclusively
	POTENTIAL PLATFORM PARTNERS	AGRICULTURAL COMPANIES BAKERIES RETAILERS	Local actors currently without access to platform services to offer their products.	Continuity Profitability Accessibility to the market	
	COMMERCIAL REAL ESTATE COMPANIES/ PROJECT DEVELOPERS	GSG BERLIN ALLIANZ REAL ESTATE SIRIUS FACILITIES WISTA MANAGEMENT CBRE HIH REAL ESTATE AROUNDTOWN	Organizations with real estate portfolios managing commercial real estate.	Managable risks High investment returns	The ability to impose restrictions on tenants

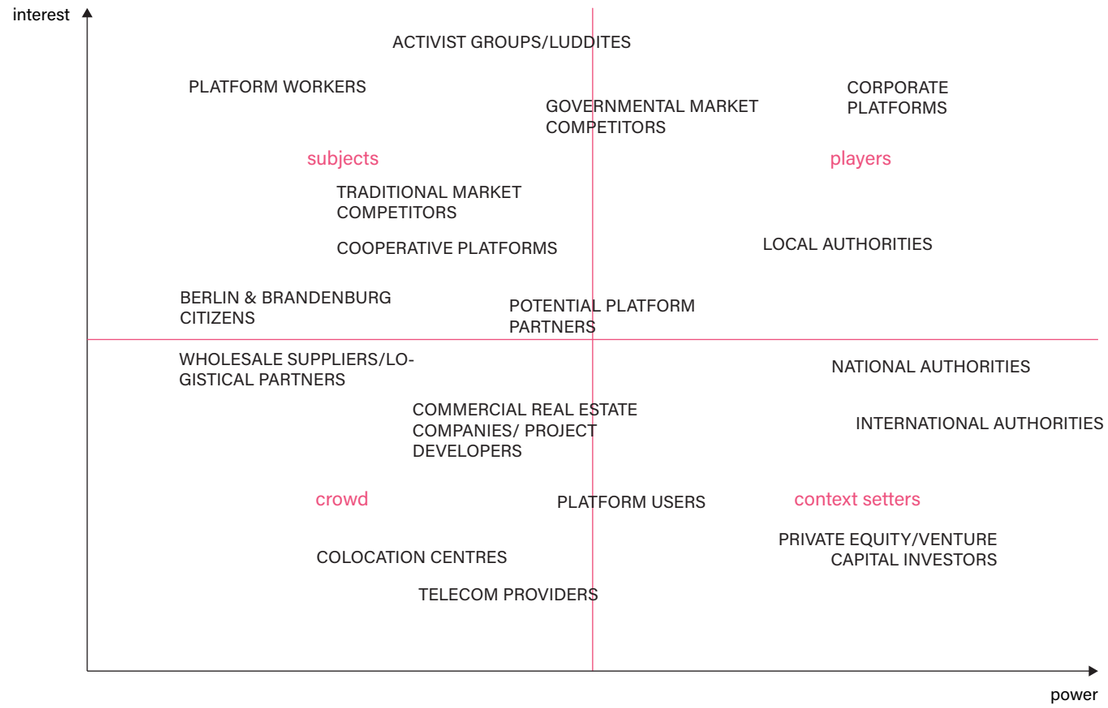
08 Stakeholder interest wheel

Illustration by the author



09 Stakeholder power/interest matrix

Illustration by the author



B.

In Conversation with:

Benjamin T. Busch - Part Two

About the interview

The second part of my conversation with the Berlin-based American visual artist and architect, Benjamin T. Busch, revolved around further contextualizing platform urbanism in the city of Berlin. In this part of our conversation, we discuss the political and societal component of this phenomenon. We explore how platforms are getting embedded in the local economy and which issues arise in the process. Simultaneously, I ask Benjamin about his thoughts on what is needed to move towards more favourable forms of platform urbanism, with a particular emphasis on the role of spatial design - and how likely it is that such futures can be achieved.

BVDD I think we can all see how digital technology is becoming more and more influential in our cities, and that the proliferation of smart urbanism and especially platform urbanism is cause for conflict. Particularly Berlin seems to find itself entangled in these conflicts. There have been temporary bans by the Berlin Senate on the operations of Uber and Airbnb, some fierce resistance against a new Amazon HQ in Friedrichshain and the Google Campus in Kreuzberg, and more recently, Gorillas and Lieferando are contested for their disruptive practices and the precarious labour conditions. Before the interview, you mentioned to me how the current political landscape in Berlin is imperfect. Can you explain how this hampers the possibility to come to pragmatic solutions?

BB This is something Bratton talks about more generally. There is the strategy of many tech companies, which revolves around the maxim 'move fast and break things.' The idea here is to not ask for permission, just do stuff, violate privacy, and even break the law. Just do it fast and establish a kind of paradigm. It is more difficult to tear something down than to prevent it from existing in the first place. These platforms have huge legal teams so they will manage to deal with the repercussions by fighting for decades to make them go away, and meanwhile market capitalization is skyrocketing the whole time. Considering Germany's history with data collection under National Socialism and the German Democratic Republic, with their attendant criminal violations of privacy, security and human life, I really understand the refusal.

Germany has been very slow to digitize. It became a running joke. Internet access is still lacking throughout Germany, and in 2022 it is still very difficult and expensive to get a fast internet connection in Berlin. Meanwhile, other European capitals have pretty much solved this problem. Germany has a huge paper culture. In 2022, government offices still require you to send faxes from time to time. Whatever the reasons, Germany has been very slow to digitize. It has given this country something of a privilege even, as they are able to see how platform capitalism and platform urbanism impact other parts of the world, and they can therefore anticipate and pre-emptively stop some of these developments. Since 2016, Berlin has also had a red-red-green government (SPD, Die Linke, and Grüne), which as a socialist-leaning coalition tends to listen to the people at the base more often and take their demands more seriously. So this explains the political backlash against Airbnb and the previous shutdowns of Uber. There are some court cases on a federal level dealing with gig work as well, claiming that workers for Foodora or similar platforms are actually employees instead of contract workers. The German legal system, when brought into play, affords some approaches for keeping the practices of capitalist platform companies in check.

To speak about Google, I think the main mistake the platform made was essentially colonizing an anarcho-punk neighborhood. Since the 1980s, Kreuzberg has had a reputation as being this very activist neighborhood, as a place that used to be on the edge of West Berlin where all the outcasts could go and have punk shows and squat buildings and so on. Even though it has transformed into a place that is more bourgeois over the last ten years, there still remains this anti-establishment sentiment, and I think lots of people still identify with a more radical political perspective, which is reflected in the district council of Friedrichshain-Kreuzberg consisting primarily of Grüne, followed by Die Linke and SPD. For Google it was just a huge *faux pas* to come to a symbolically activist neighborhood and decide to build their campus here. Amazon had more success. Their new HQ tower is going up in the same district, but in the former DDR neighborhood of Friedrichshain. Until about ten years ago, this area was also very punk, with lots of young people and different venues, DIY-spaces, and those kinds of things. Where the Amazon tower is being built is also where you can find the Mercedes-Benz Arena, first known as 'O2 World.' That whole area used to be filled with industry and warehouses, which became dilapidated after the fall of the wall. The new urban plan was laid out, which had this arena and high density and so on. It took twenty years to spark enough interest and investment in this plan, and only now the Amazon tower is going up. It also reminds me of the new Tesla factory near Berlin. I am not sure whether we should consider this platform urbanism, but I think it very much fits this strategy of 'move fast and break things.' With this I mean building things without permits, making deals behind the scenes with the local government, and so on. Usually working out building permits in Germany takes a lot of time, so Tesla – a company owned by the richest man in the world – has even managed to occupy an exceptional *physical* space outside the rule of law.

BVDD You also paid some attention to Bratton's ideas on platform sovereignty. You seem to support his concerns that state actors in their current form are very much going to struggle with countering these platforms, as some of the more powerful platforms are functioning almost as state-like entities themselves and even taking over functions of the state. So it appears that there is a discrepancy between the political level on which governments operate and the political level on which platforms operate. Does this phenomenon explain why Berlin is deploying these counterproductive policy tools – ranging from financial incentives to total bans?

BB For these discrepancies, I think it is important so see how different platforms operate in different legal systems also outside Berlin or Germany. It would be interesting to compare them and understand why they work in some places and do not work in others. I am thinking about the United States here. The government has been chronically underfunded by conservatives as a way to delegitimize the state, by citing its conservative-inflicted failures as a reason for it being obsolete. The perspective is, in essence, that the state should only exist to reproduce the police, to protect certain class paradigms, and to operate on a global level to enforce American capital interests. Even though most conservatives probably won't articulate it this way – they might cite some religious concerns – if you look at the way the Republican Party operates, it does exactly that. The Democratic Party isn't innocent, either. For that reason, there are so many opportunities for private companies to step in and take over lacking functions of the state. One example would be the US Postal Service. Already chronically underfunded, its budget was cut even further during the Trump administration. Amazon – which takes full advantage of the USPS for its last-mile deliveries, particularly in rural areas – has expanded its delivery service in the US to outcompete both USPS (where it can) and private shipping companies. Its distribution infrastructure has the qualities of a public utility, but it is privately owned by the second richest man in the world. We can also take some examples in Southeast Asia or Africa and see how platforms fill a gap because the government does not have the resources to offer a certain service, or because their legal systems do not afford it. I am not sure if we should call expansion into the postcolonial space 'platform colonialism', but there is a movement within platform capitalism to create these dependencies in the Global South where there is no existing availability for a public alternative.

BVDD Your piece in *Lefebvre for Activists* contains two calls to action. One I think is implicit, the other more explicit. To start with the former; which I think attends to this idea of platform cooperatives. Since we are speaking about alternatives to the corporate platforms, in your chapter you imply that it takes a platform to beat a platform. So we rely on alternative, more democratically governed platforms in order to move to a non-disruptive form of platform urbanism. What do you think is needed for these cooperative platforms to succeed in Berlin?

BB This is a really good question. I think it is primarily about funding. They need some form of sponsoring outside the capitalist market. There has to be some other system for developing and promoting these platforms. So what is that? A cooperative can be funded by membership fees or donations, or by members doing unpaid work that benefits the cooperative. This structure is difficult to catch on, though, since people have become used to getting everything for free, or nearly free. Cooperative platforms are probably less likely to work on a large scale in my mind. Similarly to Web3 and many 'decentralized' platforms like Mastodon, they require you to have a desktop computer and your own server sometimes, or to use an intermediary when using a mobile device. Knowing how people function and what they are accustomed to, and the fact that the majority of internet traffic is mobile, if you cannot operate it from your smartphone, then you are excluding so many people already. Moxie, who is the cryptographer behind Signal Messenger, is critical of blockchain. I found his blogpost "My first impressions of Web3" very helpful in understanding the dynamics of it. As it exists now, it is very similar to how Web2 companies took over Web1. In order to use Web3 now, or any of these DAO's or blockchain platforms, you require a mediator who is essentially a centralized power who is operating on Web2. So it uses the same *Interface*, the smartphone, to access a server that runs Web3 somewhere. Fundamentally, it changes nothing because there is still this centralized mediator. Here I think it is useful to think of The Stack as this call and response mechanism, that when you tap on your phone, you trigger a flow of data across the layers, and something comes back to you. The problems of creating and nurturing cooperative platforms will not be solved by Web3 alone and will require a great deal of people's resources and time to achieve, in all three spatial registers.

Lefebvre of course was critical of the state in his political view. In his view, the ultimate goal was to create the social conditions where the state did not need to exist. So I wonder sometimes if public utilities could also exist as non-state but still 'public' platforms. I wonder what a publicly owned version of actual Twitter would look like, or any other literal analogue between a corporate platform and a possible public version. If they were state-owned, there would be issues with privacy as well. I mean, do you want Google or Meta to own your private data, or do you think some state-owned platform should have it instead? That is not a great alternative, especially with threat of the far-right taking power. Therefore, I understand the cryptography perspective pretty well. On the possibility of state funding, I think of that as a potential pathway toward eventual cooperative ownership, not only because the hegemonic corporate platforms have also relied on this to get where they are now. Many of these companies would not exist without state funding. Perhaps the criteria for state financial aid should then be different, so that they are not funding surveillance capitalist corporations, but instead non-profit platforms or even community-owned platforms instead. That speaks to what Bratton explains about how the path of a platform is charted by the criteria that are set in motion upon its creation. If you start from a business model that relies on extraction, it is going to be virtually impossible to change that. The opposite is then also true, so a non-profit platform that is adoptable and accessible to a lot of people from the beginning, without aiming for total world domination and subjugation of its users, could grow into something interesting. I think Signal Messenger is an interesting example. Also in the Berlin context, Khora may be an interesting example. This is a worker-owned food delivery platform. I imagine there will be a lot of suppression of them by companies like Gorillas. But think about simple things like advertising budgets. As a worker-owned collective, are you going to spend it on marketing, or will you make sure to cover basic needs and redistributing the resources to workers? It is probably difficult to make these decisions as a collective.

BVDD The other call to action is about updating Lefebvre's "right to the city", which also hinges on the aspect of spatial design. You mention that the *User* has to design its own access to services or infrastructures. Do you have any ideas on how urban design can contribute to this?

BB I must say I have never worked as an urban designer, so for me it is hard to tell. I feel that a lot of urban design proposals rarely get implemented, usually because of financial constraints. So when looking at for example Sidewalk Labs, or other smart city initiatives, I think it make sense that local governments involve private companies to fill the financial gaps. But working with companies like Google for me represents a misrecognition of the power dynamic. What is actually given away is much more valuable than what you get in return from Google. All these rights which are being abandoned is such a huge trade-off. However, not all cities are *privately* becoming 'smart.' Helsinki is an example of a city that has worked to build its own platforms for transport, working with open-source apps and open data for location tracking and so on, thereby having very robust offers to compete with Google. As long as urban designers and planners do not have the resources to confront *private* platform urbanism, then it is going to tend toward these incursions into people's private spheres. Maybe it does not always have to be about resources and money, it can also be about an understanding of how the city is already a computational field. Designs are not taking place on paper but in an already mediated space. It demands from urban designers a deeper understanding of how these new technologies operate on an economical level, a functional level, a technological level, and an infrastructural level.

BVDD What I found interesting about your remark in your chapter is that it requires an effort from the *User*, which reflexively made me think of an approach that you could call 'tactical urbanism' or 'DIY urbanism', meaning that it would require small scale bottom-up interventions, almost on an architectural level. Do you think this is a way to go about?

BB I think that as long as there is a power dynamic of someone saying how it should be, whether it is from a platform or a government, resistance in whatever form is inevitable. But it is an interesting thought that speaks to me on many different levels. There is a book that was popular a couple years ago titled *Inventing the Future* by Nick Srnicek and Alex Williams. There is a critique of what they call 'folk politics.' I think it can be read as reductionist. I do not necessarily agree with it, but there were some interesting points in the book on accelerationism. Their idea is that if you do these small scale interventions,

or start a commune by making these little spaces or temporary autonomous zones within a global system, you are reproducing a hinterland-hippie ideology. Although they may provide some sort of relief, in the view of the authors these spaces are not effective because they cannot scale up. I think that it is a useful provocation, because it makes you ask the question what is required to transform the system at a large scale. So not just a small neighborhood, a community park, or a secluded private space, but instead the whole city or state, or even the whole world. After all, this is the scale that the hegemonic platforms operate on. About the DIY aspect, I would like to see more people getting together to not just build spaces and platforms that change our relationships to computational infrastructures, but also to create more interactivity with people who are not specialists in that field. We need spaces where people can experience and learn for develop for themselves or use more emancipatory technologies. Maybe it has less to do with making this kind of pop-up architecture, but more with creating these moments for exchange. I am thinking of the Occupy encampments, like Zucotti Park, which I got to witness while visiting New York in 2011. I think these collectively produced moments have so much power in transforming the way that we see our cities and the technologies that we use. If we had more of these moments that are focused around establishing alternative forms of platform exchange, then we could have a wider adoption of emancipatory technologies. To set up collectively developed and owned platforms, we cannot just rely on digitally mediated interactions. There has to be a level of trust, advocacy, and outreach, for which we must navigate the lived space. Only then we can really integrate people into this cooperative framework in a way that makes sense for everyone.

BVDD Can we then conclude that this translates to a programmatic requirement for the city?

BB Maybe. Lately I have not worked so much in the theoretical sphere, since I've been working more on visual projects. So I tend to think in images and situations now, also in a more practical way. How can something be actually realized? It is easy to talk about programmatic requirements. Coming from architecture, I feel that 90 percent of the literature comes from frustrated architects who are very creative and have visionary ideas, but spend their entire careers writing about what architecture should be doing, instead of what it actually does. It makes me a bit sad. In practice, I think we are dealing with a whole different ballgame, to use a candid American expression. When 'playing the game' of practice, you have to deal with contradictions the whole time. If you want to have a platform that is collectively owned that can also scale up, it cannot be a 'safe' space, it has to be a 'brave' space. It can't be a protected bubble. People have to approach it in a way that respects the other, while acknowledging and being open to understanding difference. I'm reminded of Laclau and Mouffe's 'radical democracy'. Otherwise it is predetermined to remain small – which isn't necessarily a bad thing. I am curious to see what these alternative platforms could look like. It is an interesting design problem or artistic question.

BVDD I think we covered a lot of ground on the problematics around platform urbanism and its futures. To conclude our conversation, in *The Stack*, Bratton refuses to predict whether the future of digital technology in society is utopian or dystopian. I wonder if you are perhaps a bit more outspoken. So, are you optimistic or pessimistic about the future of digital technology in urban space?

BB Very hard to say. If nothing changes, I think the easy thing to believe is that it will be a complete dystopia. But things do change all the time. Political movements arise, things happen now that were not thought to be possible a hundred years ago, think about women's rights and LGBT+ rights for example. There are openings that we cannot anticipate. I could envision a dark path where despite mass uprising against digital platforms, they are able to retain their power, whether it is due to blackmail or the complete outsourcing of labour to AI or something else. That starts to feel like sci-fi. What is more likely is that the share of people who gain access to a better quality of life, historically due to the rise of the welfare state, will shrink again. So the population becomes more and more divided, as entire fields of work are replaced by AI, so that larger swathes of (former) workers will be excluded from society. The remains of the welfare state could get further 'hacked' away and more fundamentally if not completely privatized, while the majority of people are allotted a basic income which keeps them at a level where they are not able to interact with the higher levels of society. This scenario fits the idea of 'digital feudalism', which Evgeny Morozov wrote about. Therefore it is important to raise awareness in people so that they know what they are up against, and propose alternatives to counteract. So the idea of platform cooperatives that we talked about, I think is really useful. This model could be an idealistic way to move away from the centralized platforms. Not to say that a cooperative platform should not be centralized, because maybe that is the most effective. At least in a technical way, rather than a democratic way. For me, a less speculative perspective on the future is that we will have a continuous struggle on our hands on different levels with protecting and demanding rights, which might have something to do with platform urbanism, but are not strictly tied to only that.

01 Occupy Wall Street Movement in New York's Zucotti Park, *Jack Brighton*

https://publish.illinois.edu/jackb/photo-feature-occupy-wall-street/human-body-from-medieval-times-until-today/#1

04.

The Anatomical Atlas

Dissecting the Spaces of Platform Urbanism in Berlin

Chapter Intro

As the theoretical foundations of this graduation thesis are laid out in the previous chapters, the subsequent chapter will be dedicated to exploring and visualizing the spatial phenomena related to platform urbanism. Building upon the theoretical findings, the atlas will aim at dissecting the places and infrastructures of digital platforms. Aided by the spatial models of both Lefebvre and Bratton, this atlas can be regarded as an attempt to capture the plurality of urban space, leveraging between objective and subjective imagery, in order to convey the full meanings and layered constructs of platform urbanism. By drawing from an extensive set of methods, the empirical work shall challenge the black-boxed nature of platform urbanism.

01 The Stack as an assemblage of layers
Illustration by the author

The (Non-)spaces of Digital Technology

As emphasized by Bratton (2016) in his comments on the spatial model discussed in his work, the layers of The Stack do not express themselves equally. There is a disparity between scales, as some entities exist on a continental scale, whereas others exist on microscopic scales. Some entities are static, physical and immutable, while others are immaterial, variable and unpredictable. The visual material presented in this chapter therefore cannot be a mere pragmatic projection of platform spaces onto the layers of The Stack, as the representations of space in this atlas communicate far less (but sometimes also more) than what the given layer actually hosts. Instead, the model will be used as a lens, a way of seeing things to reveal spatial information on a scale range between that of the metropolis and an architectural scale.

Given its different layers, The Stack enables the schematization and investigation of what Bratton refers to as 'the accidental megastructure of planetary scale technology.' Applying the Stack helps revealing the materialised techno-politics that remain hidden under the current alternative modes of understanding geopolitics. The visual artwork presented in image 01 is an attempt to unveil the complexity of the spatial arrangements that comprise The Stack of the Gorillas platform and to disentangle the mesh of several intertwined conflicts among different powers at different sites. As The Stack does not conform to one particular scale, its operations account for spatial implications across the globe.

02 Visual taxonomy of Stack hardware

Illustration by the author

DELIVERY BACKPACK

waterproof insulated delivery bag

45 x 42 x 45 cm
polyester

LOGISTICS TROLLEY

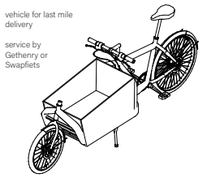
stackable cart

loading capacity
500 kg

ELECTRIC (CARGO) BICYCLE

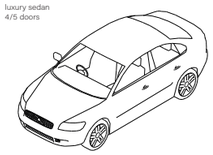
vehicle for last mile delivery

service by Gethenry or Swapfiets



AUTOMOBILE

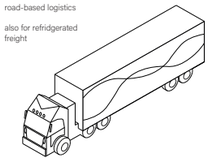
luxury sedan
4/5 doors



LOGISTICS TRUCK (OR VAN)

road-based logistics

also for refridgerated freight

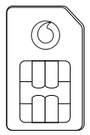


USER

SIM CARD

subscriber identity module

authentication technology



QR-CODE

quick response identification

allows digital addressability

ADDRESS

MOBILE PHONE

access to applications

graphic user interface (GUI)

ADVERTISING PANEL

blatant marketing campaign containing QR-codes

PROTESTATION BANNER

manifestation of dissatisfaction

BRANDED CLOTHING

waterproof delivery uniform

polyester

BLUETOOTH SPEAKER / RADIO PLAYER

motivational music player

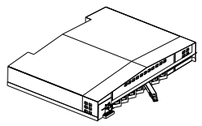
BASIC SHELVING UNITS

commercial shelving system

INTERFACE

DISTRIBUTION CENTER

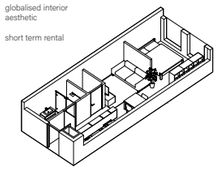
facility for storing and distributing goods



(STUDIO) APARTMENT

globalised interior aesthetic

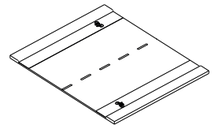
short term rental



STREET NETWORK

public domain

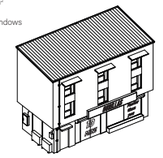
logistical infrastructure



DARK STORE / KITCHEN

microfulfillment warehouse
250-500 m²

blinded windows

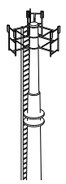


CITY

TELECOMMUNICATION TOWER

transmitting/receiving electromagnetic waves

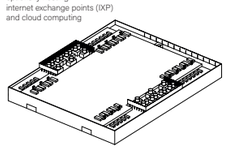
operated by cellular network providers



DATA (COLOCATION) CENTRE

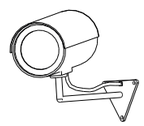
facility for data storage

optionally hosting internet exchange points (IXP) and cloud computing



CCTV

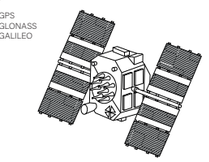
surveillance camera to monitor workers



GNSS SATELLITE

geolocation services

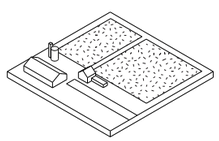
GPS
GLONASS
GALILEO



CLOUD

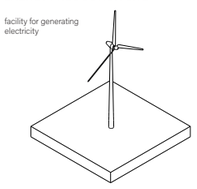
FOOD PRODUCTION SITE

facility for growing resources for the food industry



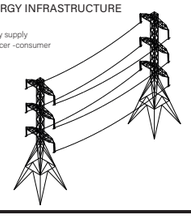
ENERGY PRODUCTION SITE

facility for generating electricity



ENERGY INFRASTRUCTURE

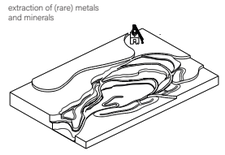
energy supply producer -consumer



RESOURCE EXTRACTION SITE

quarries and mines

extraction of (rare) metals and minerals



EARTH

03

04

05

06

The Earth Layer

03 Solarpark Großziethen

Bing Maps

04 Transmission station near Neuenhagen Bei Berlin

Bing Maps

05 Limestone Quarry Rüdersdorf

Bing Maps

06 Windpark Spreeau, *Abo Wind*

https://www.abo-wind.com/de/info-center/projekte/brandenburg/windpark-spreeau/index.php

07

08

09

10

The Cloud Layer

07 E-Shelter Data Center Mariendorf

Image by the author

08 GNSS Satellite, *Galileo*

https://galileognss.eu/time-is-everything-with-gnss/

09 PŸUR Data Center Mahlsdorf

Image by the author

10 Telecommunication Tower Hoppegarten

Image by the author

11

14

12

13

The City Layer

11 Amazon DBE3 Micro-Fulfilment Center

Image by the author

12 REWE Logistics Mariendorf

Bing Maps

13 Gorillas Dark Store Schöneberg

Image by the author

14 S-bahn Infrastructure, near Südkreuz

Image by the author

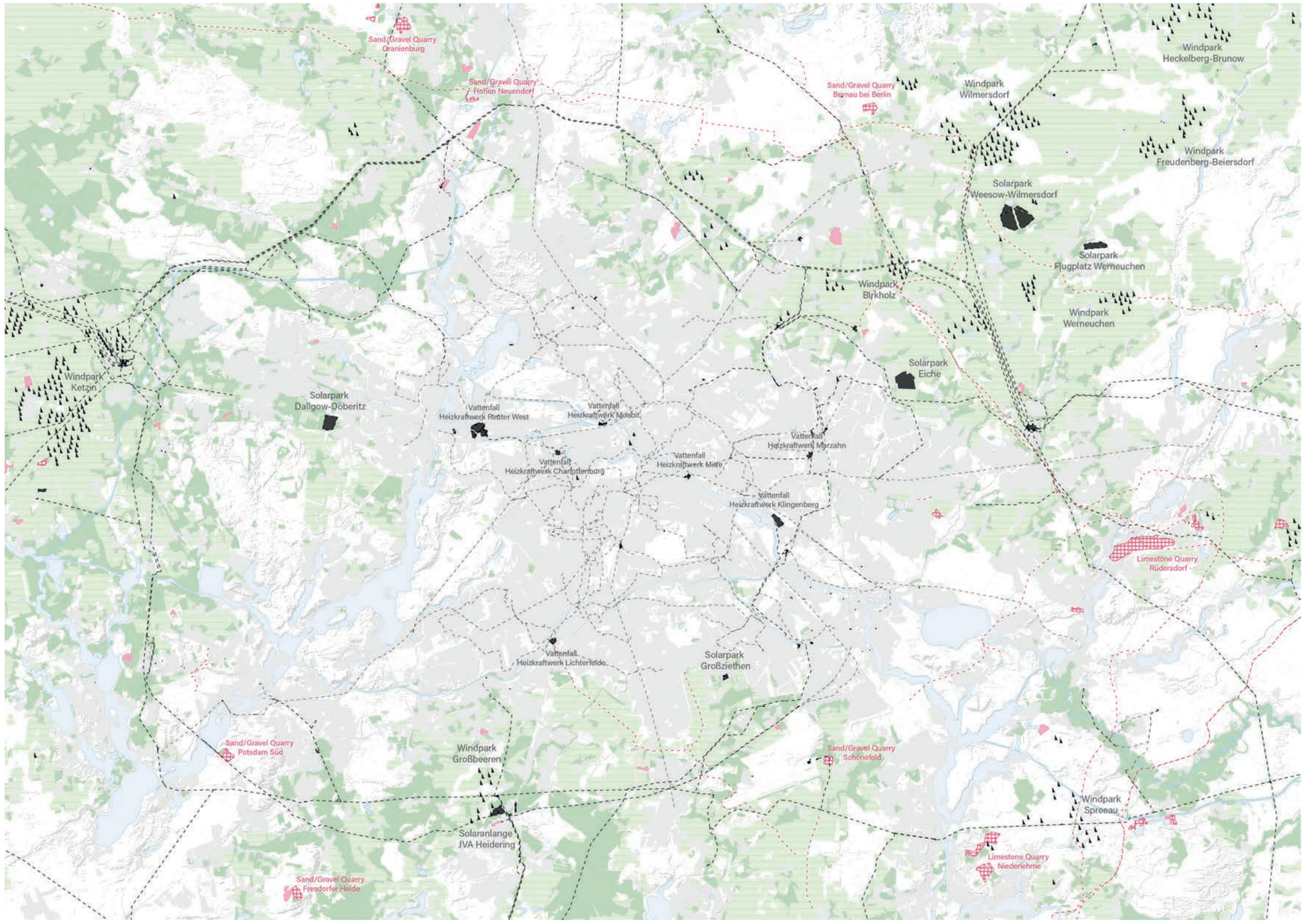
The presented map in image 15 reveals to the spaces on the metropolitan scale which attend to landscapes of extraction, belonging to the *Earth* layer. These spaces and infrastructures provide the material resources to 'feed' the platform as it taps from the geological and ambient circumstances that the planet affords. This includes the production and distribution of electricity and (fossil) fuels, such as solar panels, wind turbines, gas pipelines, high voltage networks, substations and power plants. These are vital building blocks to sustain the material and energy appetite of planetary computation. Moreover, the *Earth* layer hosts food production sites, landfills and mineral extraction sites. It should be noted that these spaces do not merely in service of digital platforms – certainly not Gorillas alone – but they do cater to them for a significant part.

Above the *Earth* layer we find the *Cloud* layer, which represents the entire infrastructural complex that provides the services for planetary computation. This entails a global infrastructure, built on (transoceanic) fibre optic cables, telecommunication towers, data centres, routers, satellites and surveillance equipment. This map communicates how the physical and static building blocks of the internet are embedded into the metropolitan region. The coarsest entity within this infrastructure is perhaps the data centre, of which several exist in the metropolitan region. They are important nodes, as they facilitate BCIX and ECIX, which are non-profit IXP's (Internet Exchange Points), allowing the exchange of data across multiple internet providers, as well as centralized data storage solutions. Moreover, modern data centres provide access to the virtualized infrastructure that supports data solutions from cloud-based platform services operated by Amazon, Google and Microsoft. Yet, these firms often also operate their own data centres. For example, Amazon hosts four in Germany, all in the Frankfurt Am Main area, according to WikiLeaks (2018).

It has to be taken into account that not all *Cloud* layer entities are mappable. An example is the coverage of GNSS (Global Navigation Satellite System) services, which refers to a constellation of satellites that allow the transmission of geolocation and timing data to GNSS receivers (Shi & Wei, 2020). Three GNSS services are operational in Germany, USA's GPS, the European Galileo, Russia's GLONASS (whereas the Japanese QZSS and the Chinese BeiDou only cover selected regions across the globe). GNSS services are crucial in the platform economy as they provide *Users* with the ability to track the location of their order or their customer, famously used by Uber and several food delivery platforms. Its satellites orbit the planet at an altitude of around 20.000 kilometres from the surface, which means that they are not fixed in place. Only the projected path of their orbits remain constant.

Another notable remark is that the *Cloud* layer leverages access to digital platforms, as the coverage of its services is limited to certain geographical areas and to those who are paying for access to internet services. Hence, *Users* are only able to be *Addressed*, when they receive a stable internet connection and GNSS coverage. This lead Bratton (2016) to his conclusion that *Cloud* platforms are acquiring political sovereignties. In its capacity, the *Cloud* layer thus projects new jurisdictional fields onto geographical space. This can easily be illustrated through mapping the coverage of 5G cellular networks.

The next layer, the *City* layer, reveals the spaces of human settlement and mobility, setting the stage for the flows of objects and humans. Here, platforms articulate their public terrestrial presence and articulate its brand identities. This layer 'grounds' the whole Stack, since "the multiple grids of the *City* layer are also interfaces to other layers of The Stack" (Bratton, 2016, p. 153). The *City* structures platform activities through its envelopes – physical and virtual boundaries – inferring constraints of political jurisdictions (and its legislations) and the delimitations of buildings and the urban fabric itself. It further mediates access and *Addressability*, as platforms also project their own spatial boundaries on this layer. For example, grocery delivery platforms establish these boundaries based on travel times. In addition to the premise that a *User* should have access to an internet connection, Gorillas also requires a home address, in order to determine its geographic *Addressability* based on proximity.



Legend:

LAND USE

- Urban fabric
- Arable land
- Non-irrigated arable land
- Water body
- Mineral extraction sites
- Energy production site
- Wind turbine

NETWORKS AND BOUNDARIES

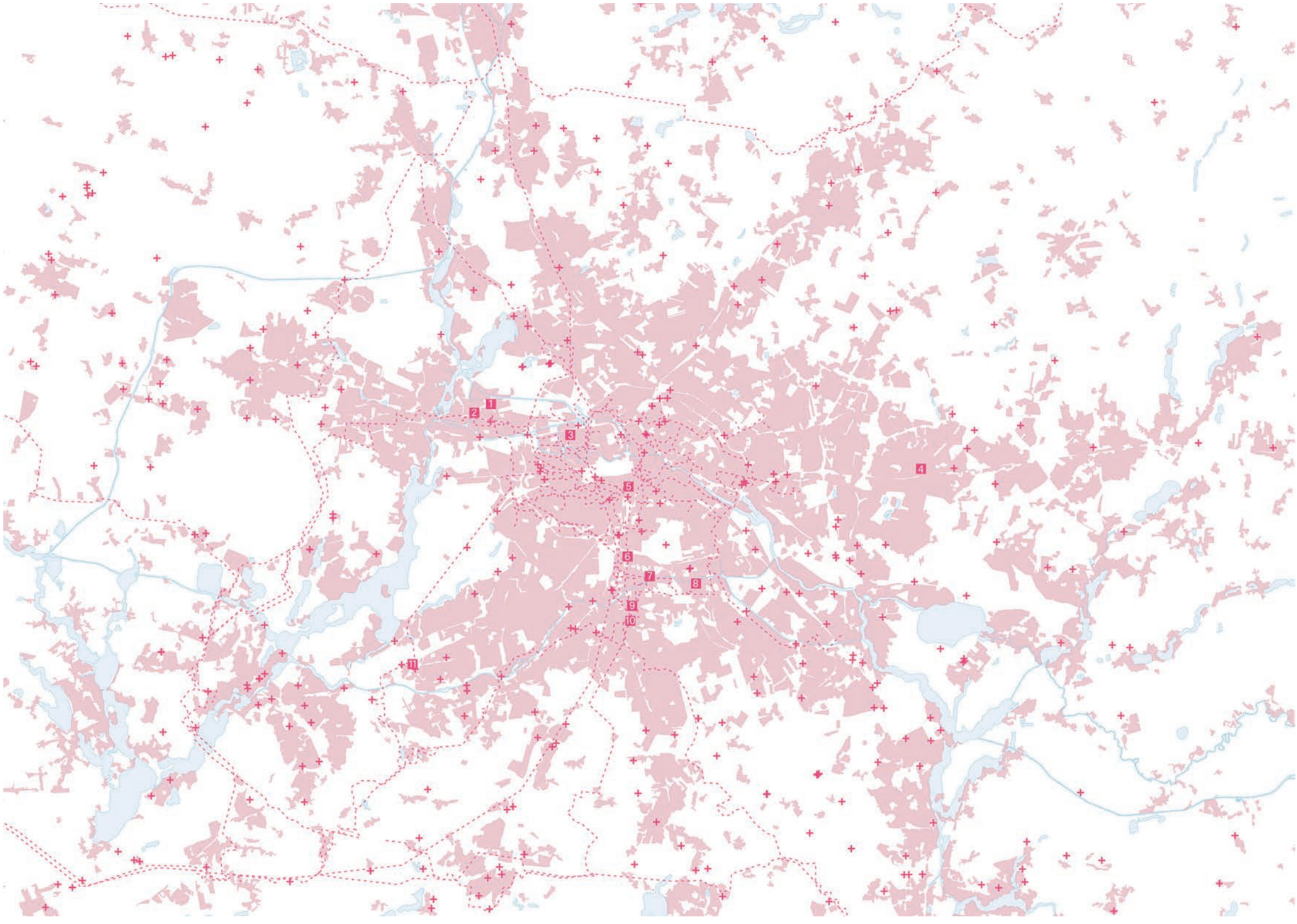
- Water network
- High voltage electricity grid (>110 kV)
- High voltage electricity grid (<110 kV)
- Gas distribution network

N

SCALE 1:250.000

15 Visualizing the *Earth* layer

Illustration by the author



Legend:

LAND USE

Urban fabric

Water body

NETWORKS AND BOUNDARIES

Water network

Fibre optic network

DATA

Communication tower

Colocation Centre

#	Int. exch. point	Cloud computing*
1	no	no
2	ECIX, BCIX	MA, GC
3	ECIX	no
4	ECIX	no
5	ECIX, BCIX	AWS
6	ECIX, BCIX	no
7	ECIX	no
8	ECIX, BCIX	no
9	no	no
10	ECIX, BCIX	GC
11	no	no

N

SCALE 1:250.000

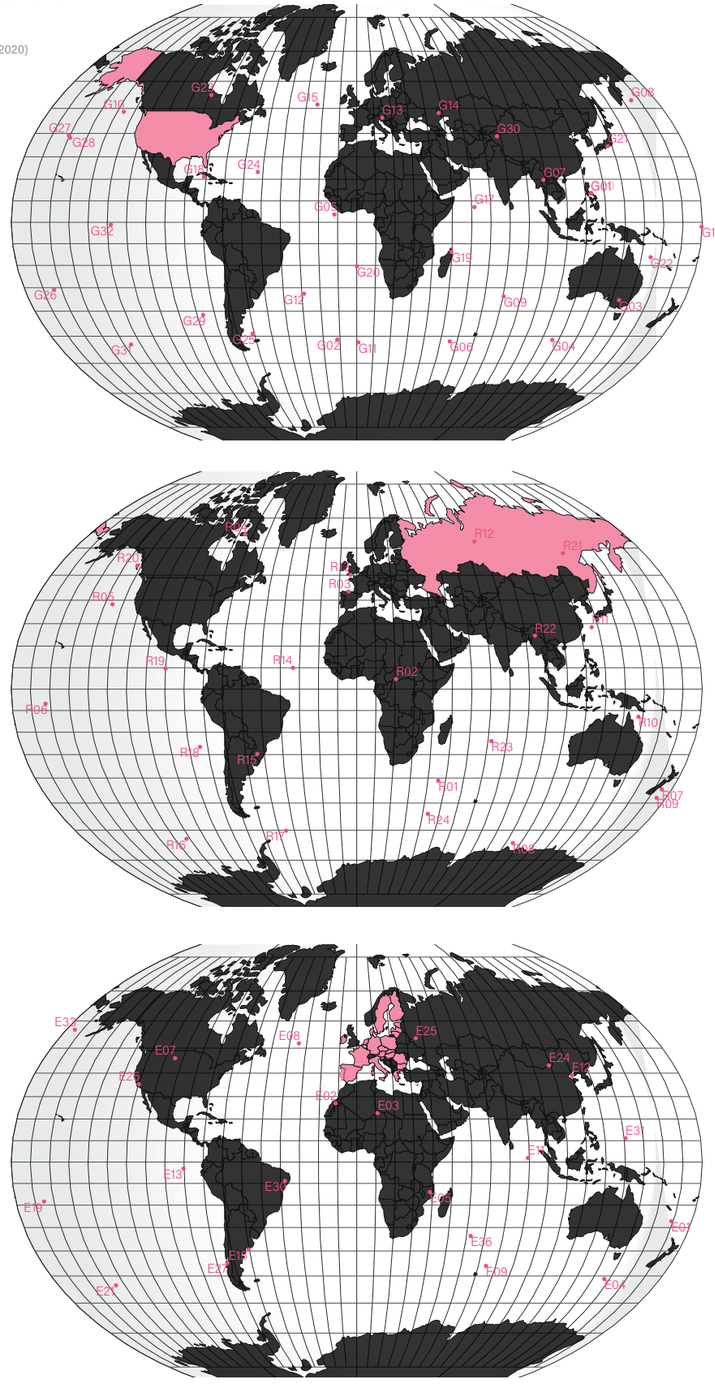
* AWS: Amazon Web Services
GC: Google Cloud
MA: Microsoft Azure

16 Visualizing the *Cloud* layer

Illustration by the author

17 GNSS positions, snapshot 26/11/2021 15:30 UTC+1

galmon.eu, Shi & Wei (2020)



GPS
satellite ground projection

NUMBER OF SATELLITES
24

NUMBER OF ORBITAL PLANES
6

ORBITAL ALTITUDE
20.200 km

ORBITAL PERIOD
11h 58m

OWNER
United States

GLONASS
satellite ground projection

NUMBER OF SATELLITES
24

NUMBER OF ORBITAL PLANES
3

ORBITAL ALTITUDE
19.100 km

ORBITAL PERIOD
11h 15m

OWNER
Russia

GALILEO
satellite ground projection

NUMBER OF SATELLITES
30

NUMBER OF ORBITAL PLANES
3

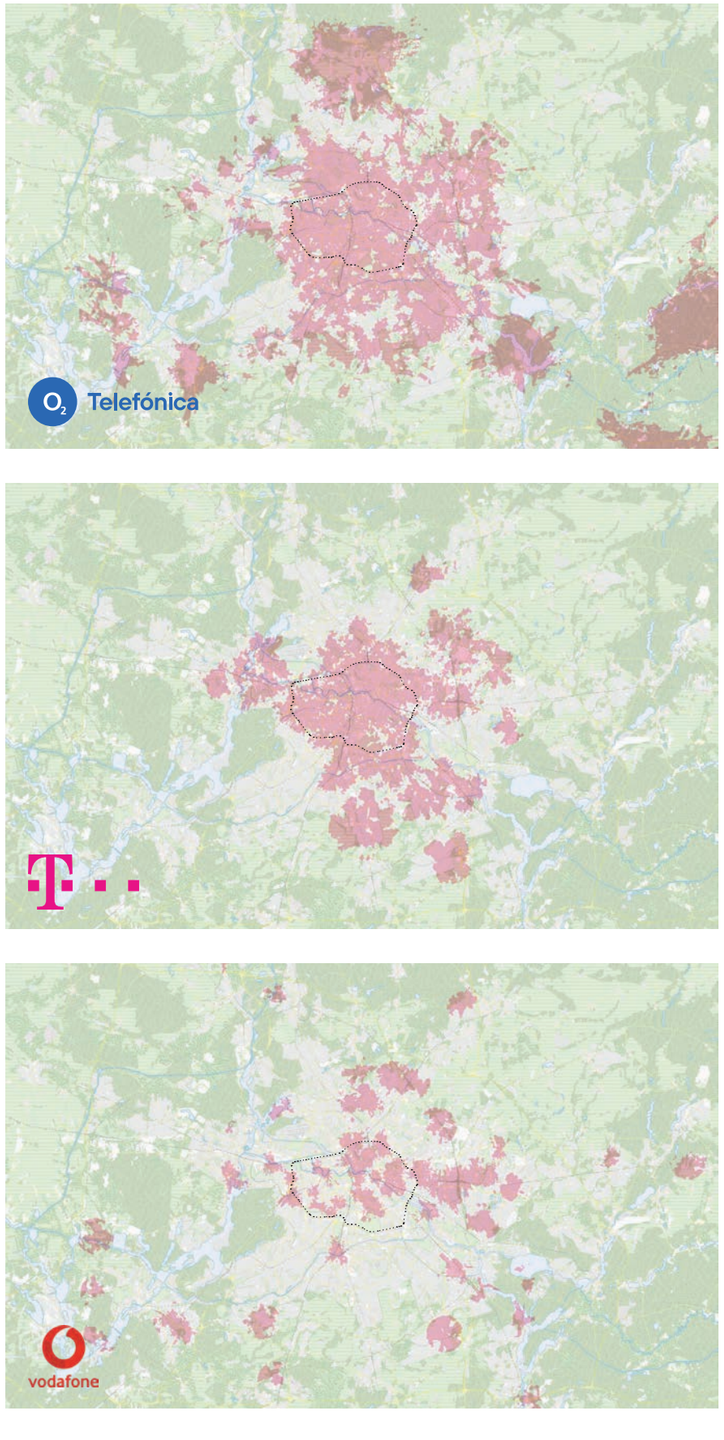
ORBITAL ALTITUDE
23.222 km

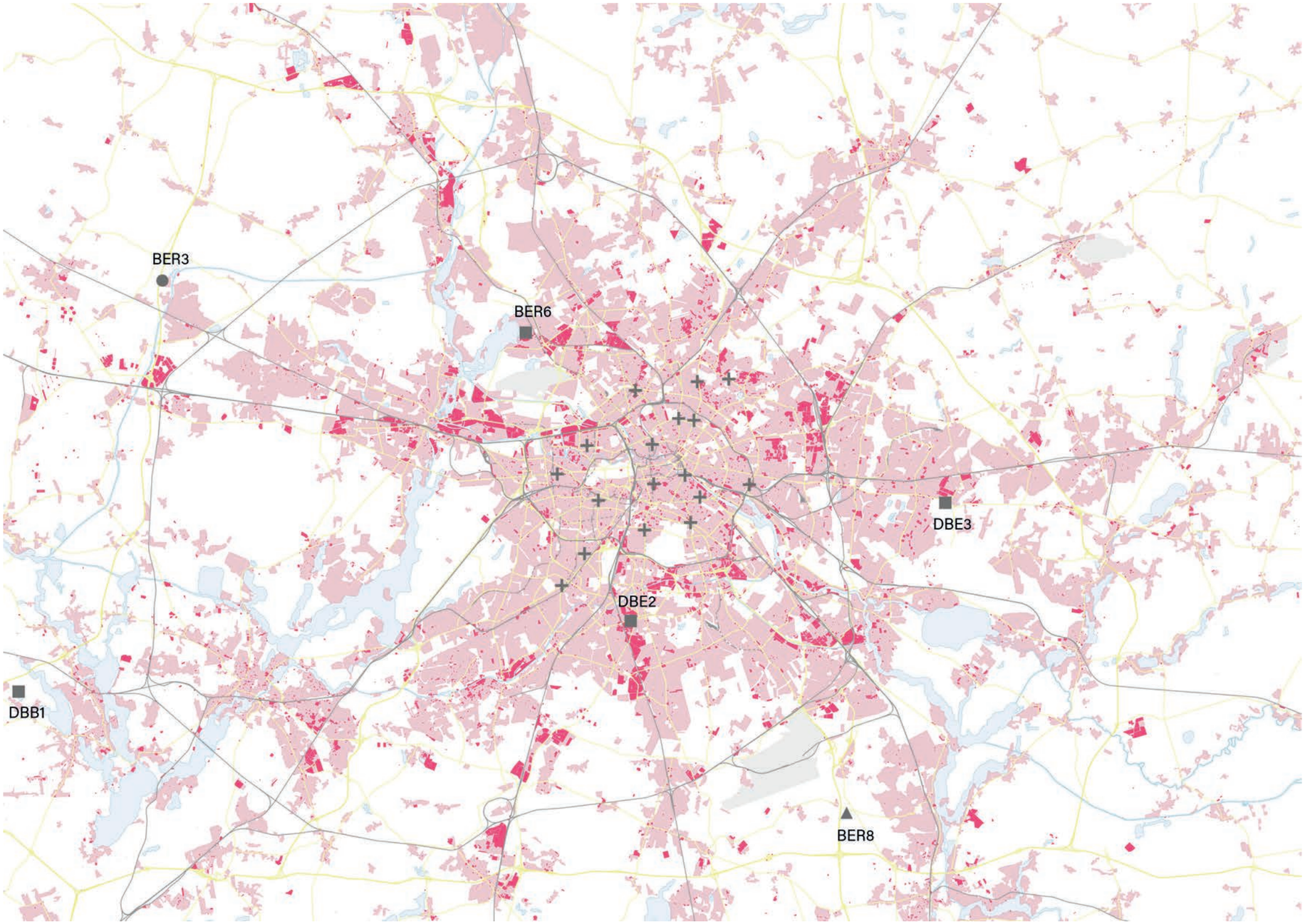
ORBITAL PERIOD
14h 04m

OWNER
European Union

18 5G coverage in the metropolitan area of Berlin

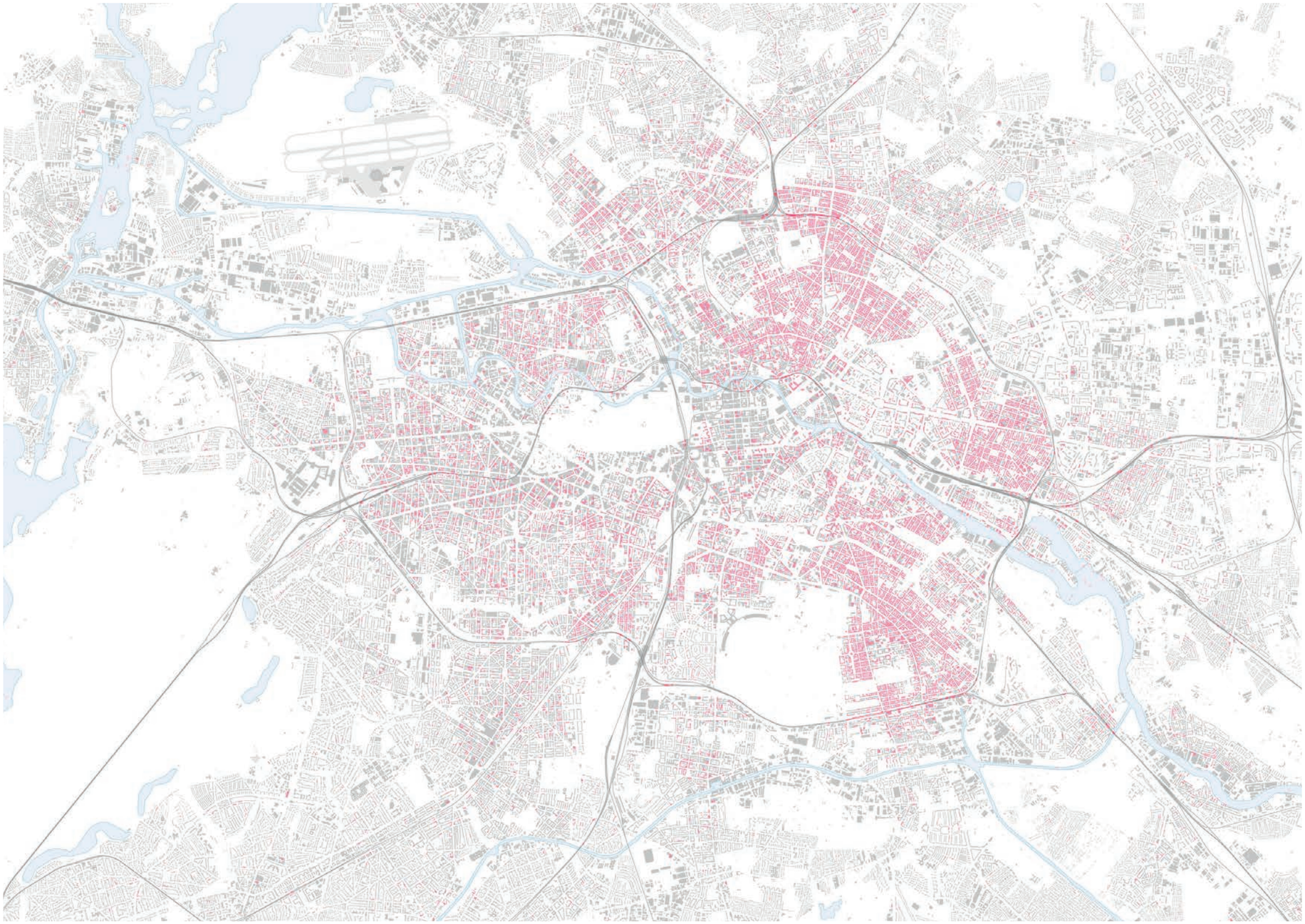
Illustration by the author





19 Visualizing the *City* layer

Illustration by the author



Legend:

LAND USE

Building block

Water body

NETWORKS AND BOUNDARIES

Water network

Rail network

DATA

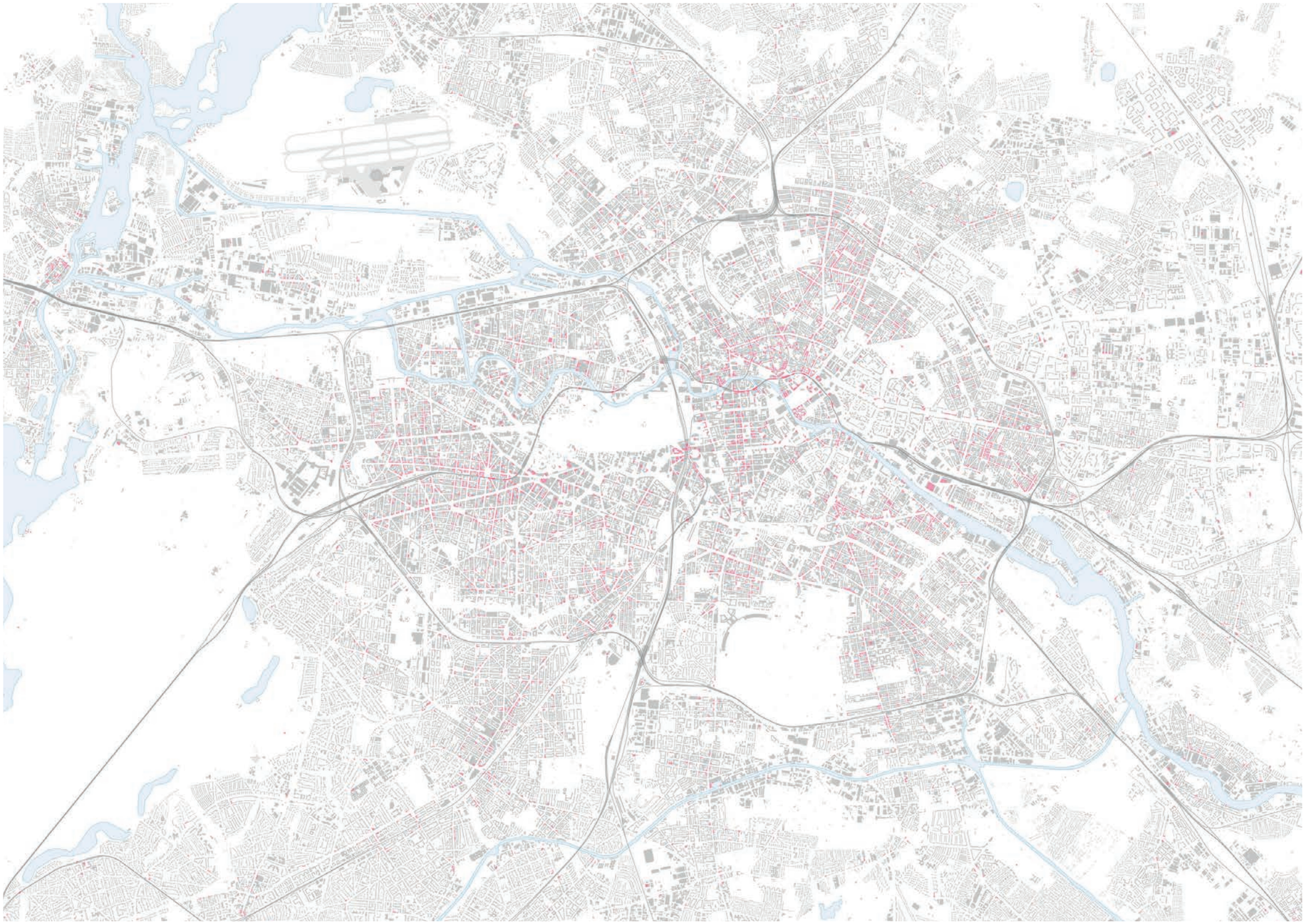
Airbnb listing

N

SCALE 1:80.000

20 Distribution of Airbnb listings in Berlin

Illustration by the author



Legend:

LAND USE

Building block

Water body

NETWORKS AND BOUNDARIES

Water network

Rail network

DATA

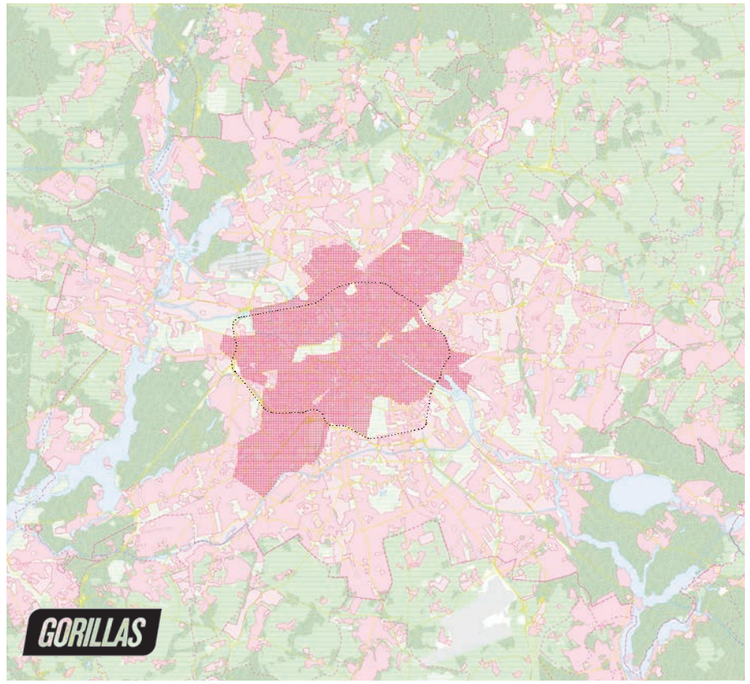
Restaurant

N

SCALE 1:80.000

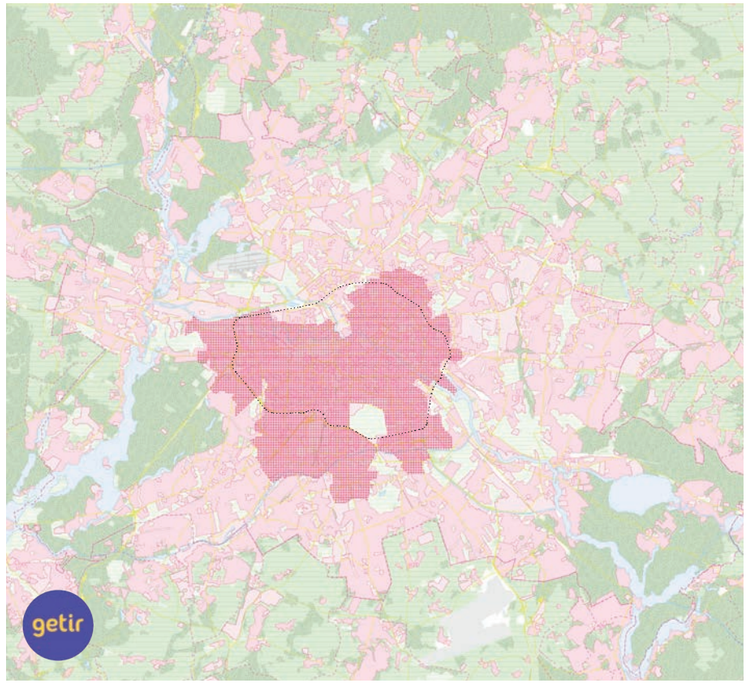
21 Distribution of restaurants in Berlin

Illustration by the author



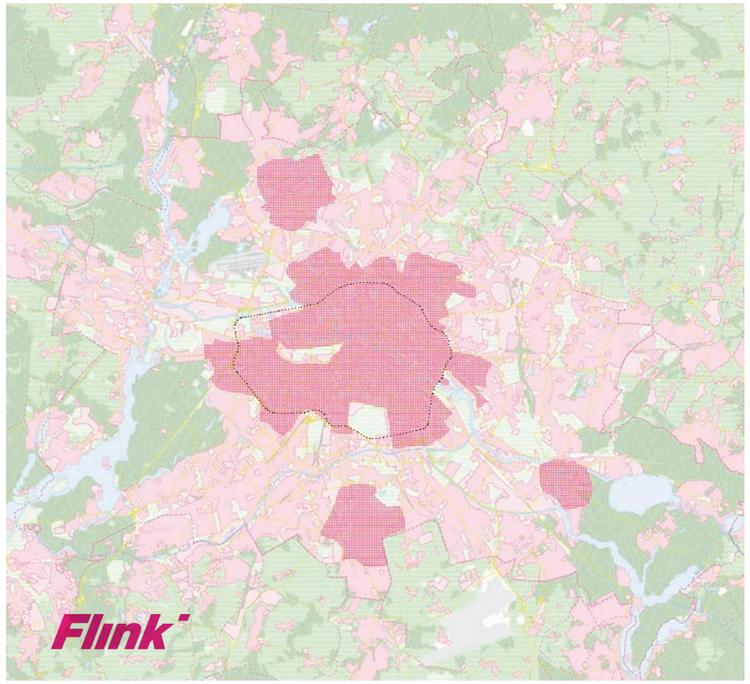
22 Gorillas flash delivery service area

Illustration by the author



23 Getir flash delivery service area

Illustration by the author



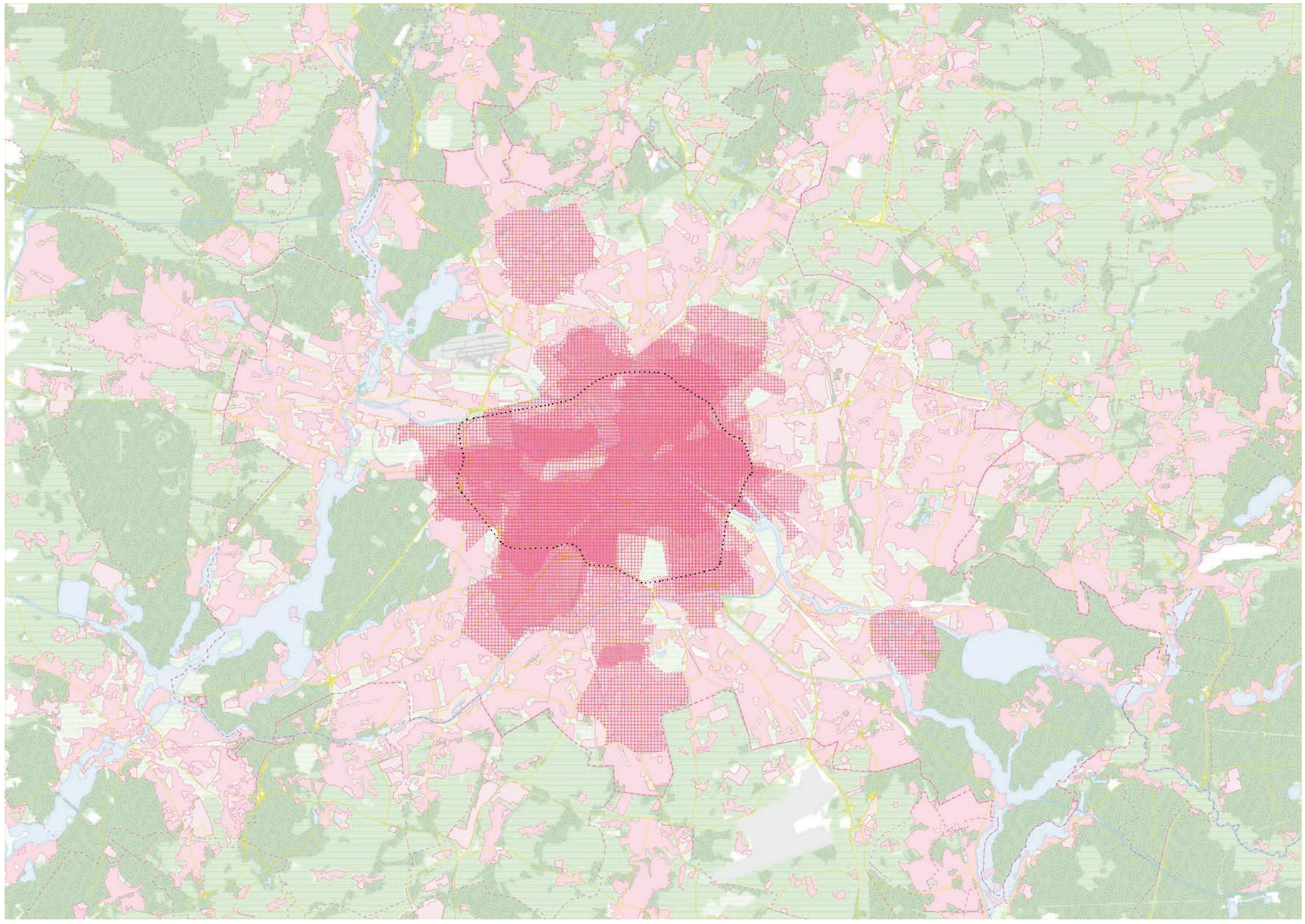
24 Flink flash delivery service area

Illustration by the author

Platforms strategically occupy different spaces which cohere to the spatial requirements of the service that they offer. For example, the physical Amazon supply chain operates from locations in the fringes on the city, close to the main arteries of mobility infrastructures, the airport and third-party delivery services. "These networks, taken together as a composite Amazonian territory, are the platform's megastructural play at the *City* layer, all but invisible to its *Users* save for the vast Amazon.com website" (Bratton, 2016, p. 186).

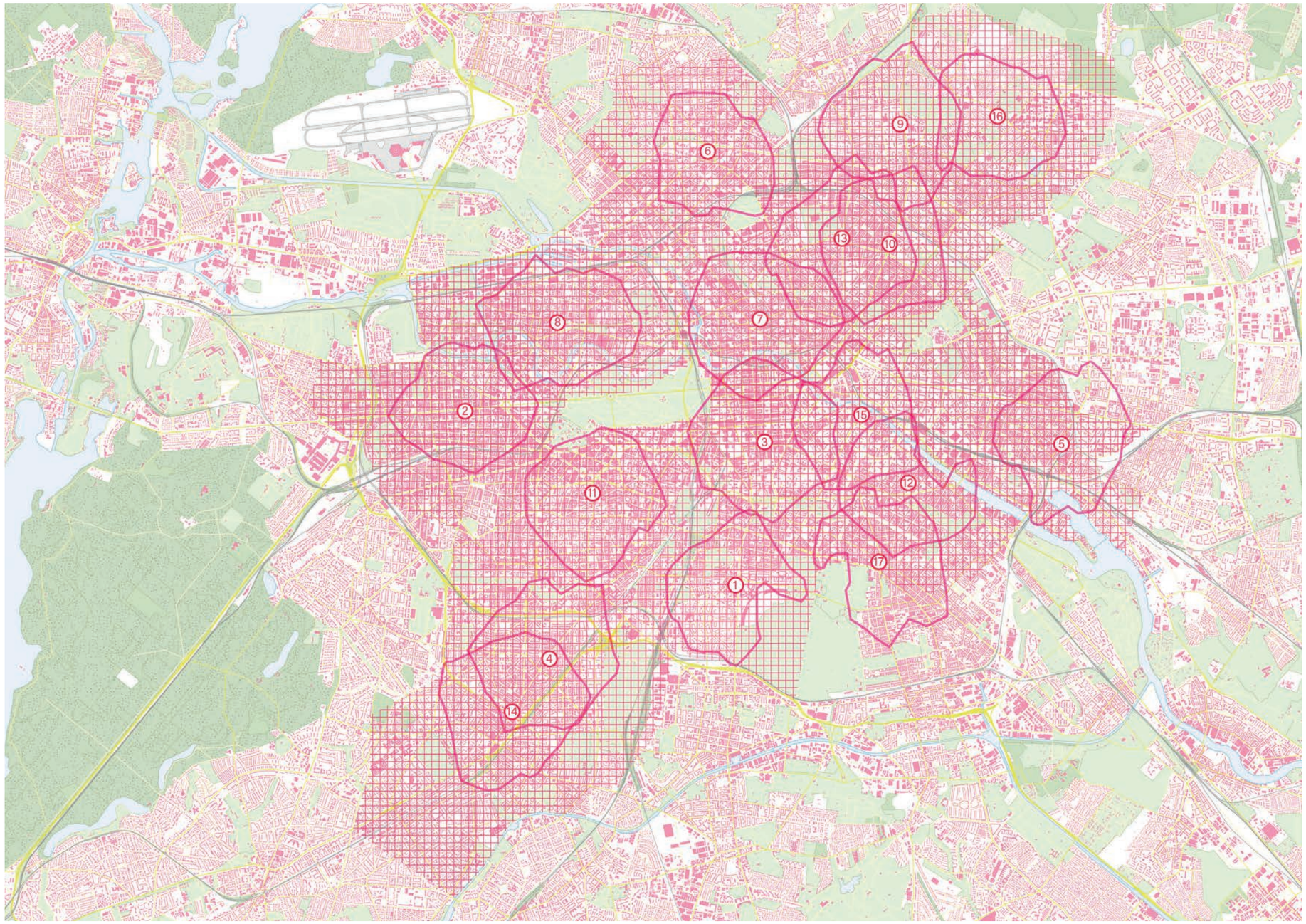
To support the micro-fulfilment logistics behind a simple tap and order in the app, grocery delivery platforms on the other hand, operate from dark stores. Gorillas built a compact network consisting of seventeen dark stores, which in turn service sixteen delivery areas in the most dense parts of the metropolis. Sometimes, a delivery area contains more than one dark store. In other occasions, dark stores service two delivery areas. In several cases, service areas overlap, which can be referred to as 'cannibalization effects' in marketing parlance (Targomo, n.d.). The basis on which the boundaries of these *Addressing* regimes are determined remain unclear. They do not match the administrative boundaries of districts and neighborhoods. Neither do they seem to standardize service areas in terms of size.

In similar vein, there appears to be little consistency in the architectural typologies which Gorillas chooses to host its dark stores. Mostly, they verge immediately on the street, but there are occasions in which they are hidden inside a courtyard. Usually they only have one entrance, but some of the larger warehouse have a second entrance, which allows for the creation of separate entrances for supplying and for riders. In terms of size, they range between an estimated 125 to 350 m^2. Based on an (internal) inquiry of Gorillas to its staff, the company is actively looking for new locations in Berlin, to which it makes few demands. The property should have a floor space between 250 and 500 m^2 in a rectangular layout. Moreover, it should have space available for a truck to unload supplies. Gorillas therefore seems to prefer larger spaces, since it allows them to park bicycles inside the premises. Upon ascertaining the previous functions of the current dark store properties operated by Gorillas in Berlin, it is found that they used to be tenanted by a variety of companies, such as bank offices, clothing stores and gambling facilities. Interestingly, in none of the seventeen occasions was the previous tenant a supermarket.



25 Combined flash delivery service area

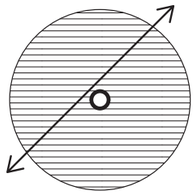
Illustration by the author



26 Gorillas dark store network

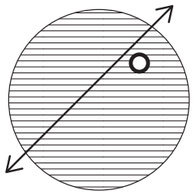
Illustration by the author

WAREHOUSE TYPOLOGY (MESO)



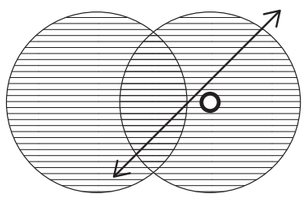
I_CENTERED WAREHOUSE

The warehouse is positioned in a central location, in which the perimeter of the delivery service area is more or less equidistant from the warehouse. The facility grants immediate access to one of Berlin's main traffic corridors.



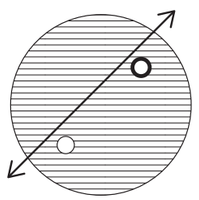
II_OFF-CENTERED WAREHOUSE

The warehouse is positioned in a peripheral location, in which the perimeter of the delivery service area is not equidistant from the warehouse. The facility grants immediate access to one of Berlin's main traffic corridors.



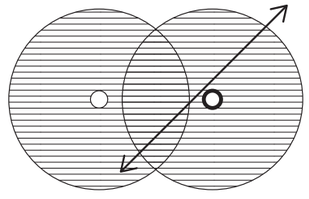
III_SHARED WAREHOUSE

The warehouse services two seperate delivery service areas. The warehouse is outside the perimeters of one of the warehouses.



IV_HALF-SERVICE WAREHOUSE

The delivery service area is home to more than one warehouse. The facilities grant immediate access to one of Berlin's main traffic corridors.



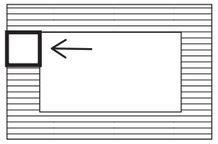
V_'CANNIBALIST' WAREHOUSE

The warehouse is positioned in a central location, but a significant overlap of two or more delivery service areas occurs. This means that streets in the overlapping area can be serviced by two warehouses.

SERVICE AREA INVENTARISATION

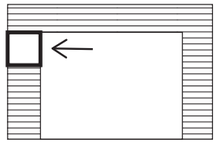
SERVICE AREA		SIZE (HA)	ADDRESSES PER AREA
BERGMANNKIEZ		956	5.180
CHARLOTTENBURG		621	4.405
CHECKPOINT CHARLIE		630	3.165
FRIEDENAU		1.434	9.411
FRIEDRICHSHAIN		952	6.363
WEDDING		835	5.480
MITTE		915	5.495
MOABIT		1.081	4.311
PANKOW		647	5.167
PRENZLAUER BERG		1.013	7.212
SCHÖNEBERG		898	6.223
KREUZBERG		1.075	6.916
SPRENGELKIEZ + BRÜSSELER KIEZ		419	2.194
STEGLITZ		1.018	7.315
WESTEND		372	2.555
WEISSENSEE		1.129	7.473

WAREHOUSE TYPOLOGY (MICRO)



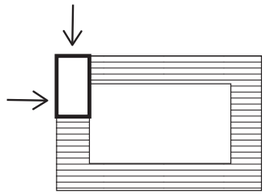
A_COURTYARD CLOSED BLOCK

The warehouse is positioned in a relatively closed block, with an entrance towards a public street. The dark store can only be accessed through the courtyard.



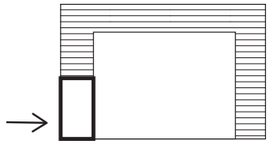
B_COURTYARD OPEN BLOCK

The warehouse is positioned in a relatively open block, with an entrance towards a public street. The dark store can only be accessed through the courtyard.



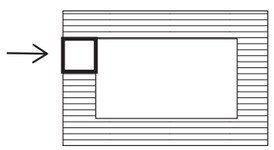
C_STREET TWO SIDED

The warehouse is positioned in a relatively closed block, with an entrance towards a public street. There are two public facades. The dark store can only be accessed from the street.



D_STREET OPEN BLOCK

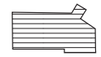
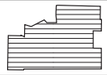
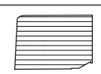
The warehouse is positioned in a relatively open block, with an entrance towards a public street. There are at least two public facades. The dark store can only be accessed from the street.

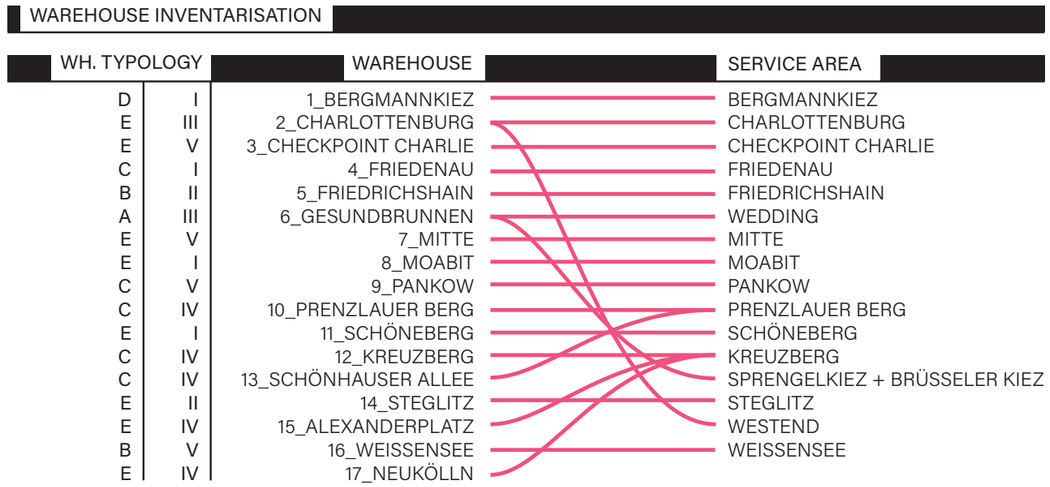


E_STREET CLOSED BLOCK

The warehouse is positioned in a relatively closed block, with an entrance towards a public street. There is just one public facade. The dark store can only be accessed from the street.

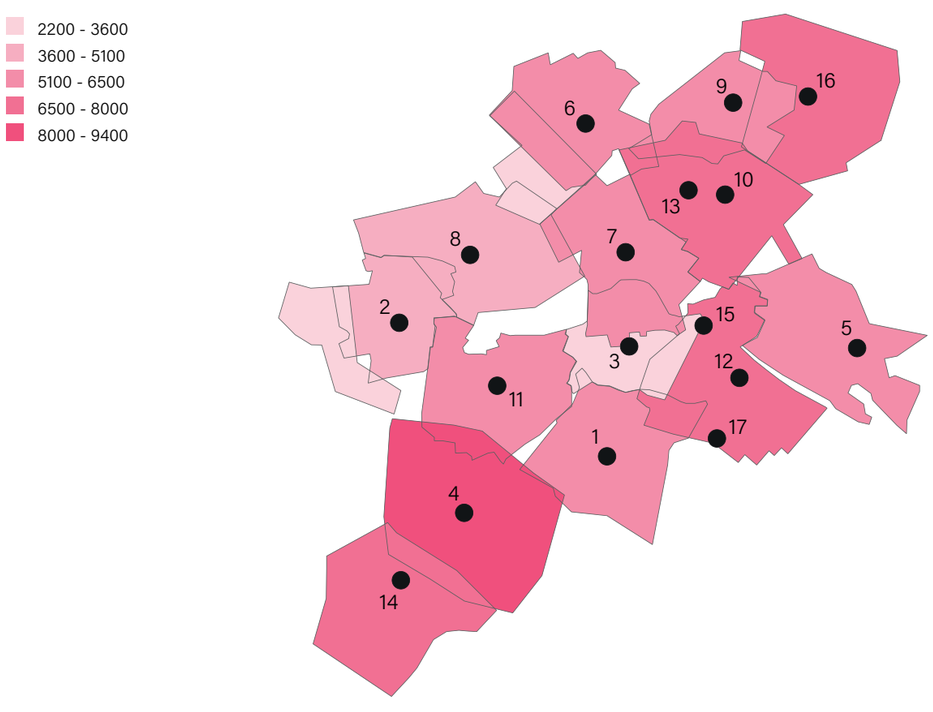
WAREHOUSE INVENTARISATION

WAREHOUSE		APPROX. SIZE (m^2)	ADDRESS
1_BERGMANNKIEZ		150	KAISERKORSO 154
2_CHARLOTTENBURG		175	BISMARCKSTRAßE 94
3_CHECKPOINT CHARLIE		150	CHARLOTTENSTRAßE 81
4_FRIEDENAU		250	RHEINSTRAßE 65
5_FRIEDRICHSHAIN		300	GÜRTELSTRAßE 25
6_GESUNDBRUNNEN		200	SCHWEDENSTRAßE 14
7_MITTE		175	TORSTRAßE 205
8_MOABIT		200	TURMSTRAßE 76A
9_PANKOW		350	ELSA-BRÄNDSTRÖM-STRAßE 95
10_PRENZLAUER BERG		200	PRENZLAUER ALLEE 189
11_SCHÖNEBERG		175	MARTIN-LUTHER STRAßE 12
12_KREUZBERG		225	MUSKAUER STRAßE 48
13_SCHÖNHAUSER ALLEE		125	SCHÖNHAUSER ALLEE 143
14_STEGLITZ		200	SCHLOßSTRAßE 51
15_ALEXANDERPLATZ		150	RUNGESTRAßE 25
16_WEISSENSEE		300	RENNBAHNSTRAßE 87
17_NEUKÖLLN		250	URBANSTRAßE 72



27 Potential market outreach

Illustration by the author



One spatial characteristic they do share is their proximity to a main road. This can be proven using space syntax analysis (image 28 and 29). To illustrate this characteristic, an angular choice analysis was performed on a road segment map of Berlin. According to Van Nes & Yamu (2021), "the angular segment analysis quantifies how likely the selected street segment is to be part of a trip for all possible combinations of origin and destination in an urban system" (p. 57). Therefore, the presented maps help to predict which roads are more likely to be used by local traffic (radius 2.000 m) and regional traffic (radius 15.000 m). The chosen parameters represent 1) an estimated ten minute cycling trip, which approximates the range of a Gorillas flash delivery run and 2) an estimated average of a trip from a peri-urban logistics centre to a centrally located dark store. Autobahns were excluded from the 2.000 m radius angular choice analysis, since cyclists are obviously not allowed to use them.

The results of the space syntax analysis highlight that dark stores are often conveniently located in proximity to roads with a high probability of through movement for both radii. This suggests that Gorillas likely selects potential locations based on its centrality. Gorillas is known to consult a Berlin-based company named 'Targomo', which specializes in 'location intelligence services' (Targomo, n.d.). The company provides software-based products to help predict and select the most optimal locations for retailers and last-mile delivery suppliers to build an efficient micro-fulfilment infrastructure. This once again highlights that platform urbanism ensues in further 'datafication' of the design of the *City* layer, turning it into a software that replicates itself over time and space.

Focussing more concretely on the micro-spatial aspects of the assessed dark stores, it can be seen that there is a great diversity in terms of its locations. The matrix, which plots the calculated angular choice values of both analyses for the street segments on which dark stores verge, shows that most dark stores are located on streets with a high potential through movement. Based on this matrix it can be expected that dark stores in the top right area are most likely to be in vibrant public areas. Particularly the Friedenau, Prenzlauer Allee, Schöneberg and Schönhauser Allee warehouses are located on street segments with values that predict high user intensity of both regional (motorized) and local traffic (cyclists and pedestrians). For warehouses in the bottom left region of the matrix, the opposite is true. They are located in streets with less traffic, which are often residential streets. Any increased activity caused by dark stores could therefore more easily be experienced as nuisance. This assumption may be supported by the fact that two of these warehouses, the Kreuzberg and Alexanderplatz warehouses have been closed (in December 2021 and March 2022 respectively). Moreover, both received attention from local newspapers regarding nuisance problems (Schader, 2021; Tagesspiegel, 2021).

SPACE SYNTAX ANALYSIS

ANGULAR CHOICE VALUE

PARAMETERS:
2.000 m radius
weighted length

1:200.000

POTENTIAL THROUGH MOVEMENT

low high

28

Illustration by the author

ANGULAR CHOICE VALUE

PARAMETERS:
15.000 m radius
weighted length

1:200.000

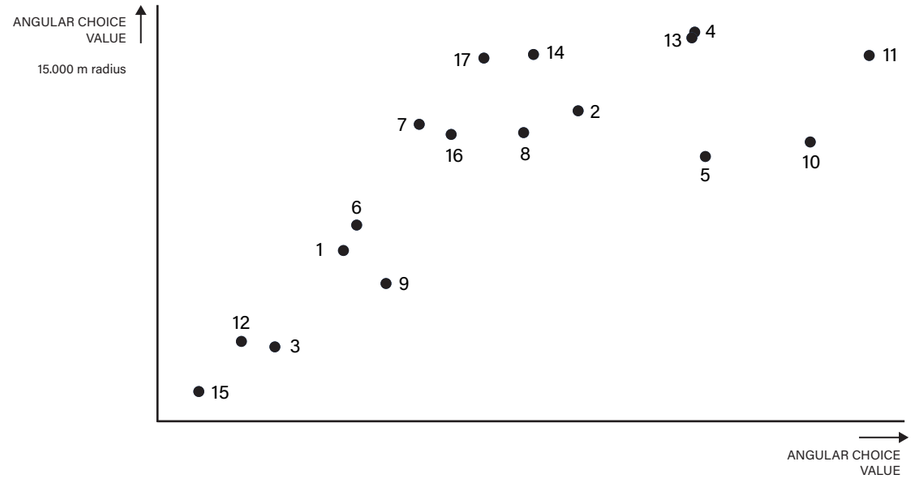
POTENTIAL THROUGH MOVEMENT

low high

29

Illustration by the author

POTENTIAL THROUGH MOVEMENT MATRIX



30 Matrix of potential through movement of street segments hosting Gorillas Warehouses

Illustration by the author

These particular micro-spatial dynamics can be further explored using a Lefebvrian lens, which demands a non-scientific approach. Taking two different warehouse typologies to study more closely, this lens helps to reveal information of how the Gesundbrunnen and Neukölln dark stores embed themselves into the social practice of the local context. Herein, there is a particular emphasis on thinking in images and situations in order to document the human aspects of space. The presented axonometric drawings (on page 158-159 and 204-205) display a fixed scene, in which the static elements such as buildings, idle vehicles and pavements set the stage for a narration of the human dimension of the given spaces. The narration condenses the triadic interpretation of Lefebvre's social space into a single drawing, collecting the interactions, movements, sensual experiences, expressions and symbolisms. In this way, these drawings tell a story about the conflicting uses of public space, the cultural appropriation, activism and history of the local context.

WAREHOUSE BLOCK INVENTARISATION

1_BERGMANNKIEZ

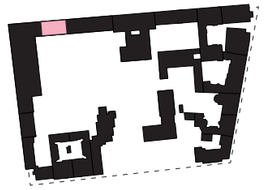
POPULATION 2020
148

BLOCK AREA m²
18.000

2_CHARLOTTENBURG

POPULATION 2020
561

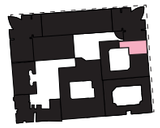
BLOCK AREA m²
23.000



3_CHECKPOINT CHARLIE

POPULATION 2020
220

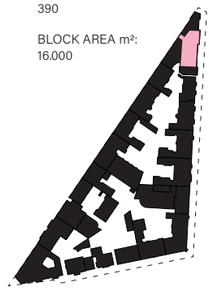
BLOCK AREA m²
10.000



4_FRIEDENAU

POPULATION 2020:
390

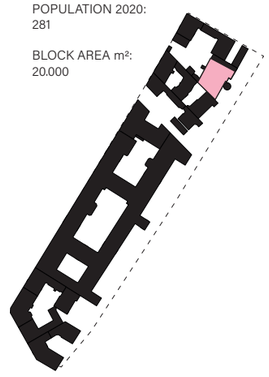
BLOCK AREA m²:
16.000



5_FRIEDRICHSHAIN

POPULATION 2020:
281

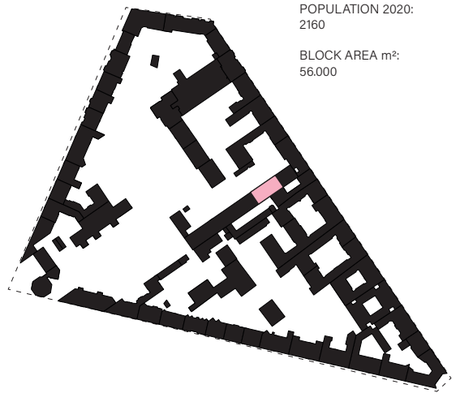
BLOCK AREA m²:
20.000



6_GESUNDBRUNNEN

POPULATION 2020:
2160

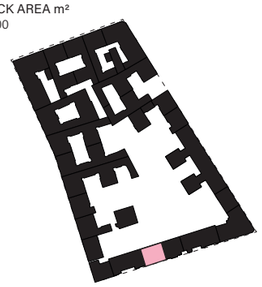
BLOCK AREA m²:
56.000



7_MITTE

POPULATION 2020
993

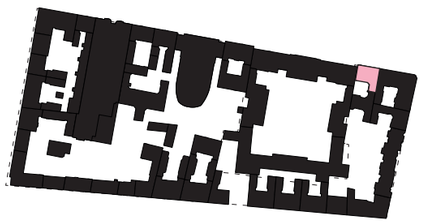
BLOCK AREA m²
22.000



8_MOABIT

POPULATION 2020
1292

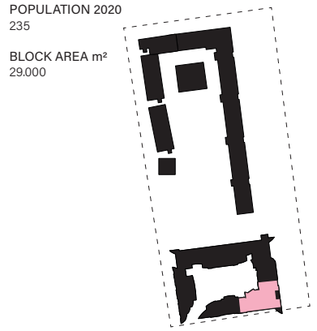
BLOCK AREA m²
32.000



9_PANKOW

POPULATION 2020
235

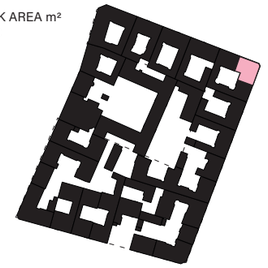
BLOCK AREA m²
29.000



10_PRENZLAUER BERG

POPULATION 2020
1041

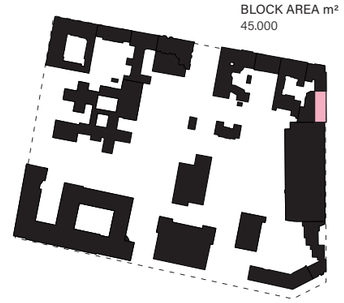
BLOCK AREA m²
25.000



11_SCHÖNEBERG

POPULATION 2020
887

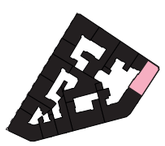
BLOCK AREA m²
45.000



12_KREUZBERG

POPULATION 2020
414

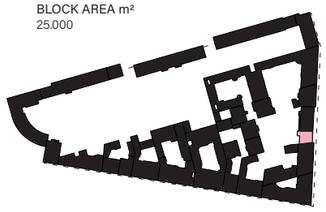
BLOCK AREA m²
7.000



13_SCHÖNHAUSER ALLEE

POPULATION 2020
685

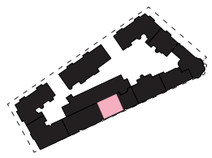
BLOCK AREA m²
25.000



14_STEGLITZ

POPULATION 2020
269

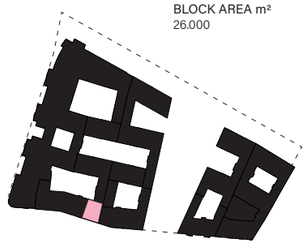
BLOCK AREA m²
9.000



15_ALEXANDERPLATZ

POPULATION 2020
387

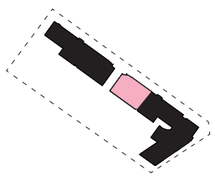
BLOCK AREA m²
26.000



16_WEISSENSEE

POPULATION 2020
0

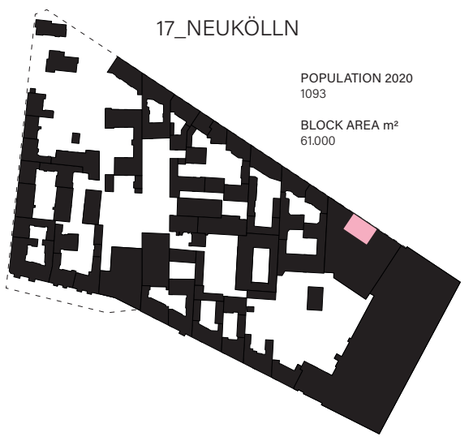
BLOCK AREA m²
10.000

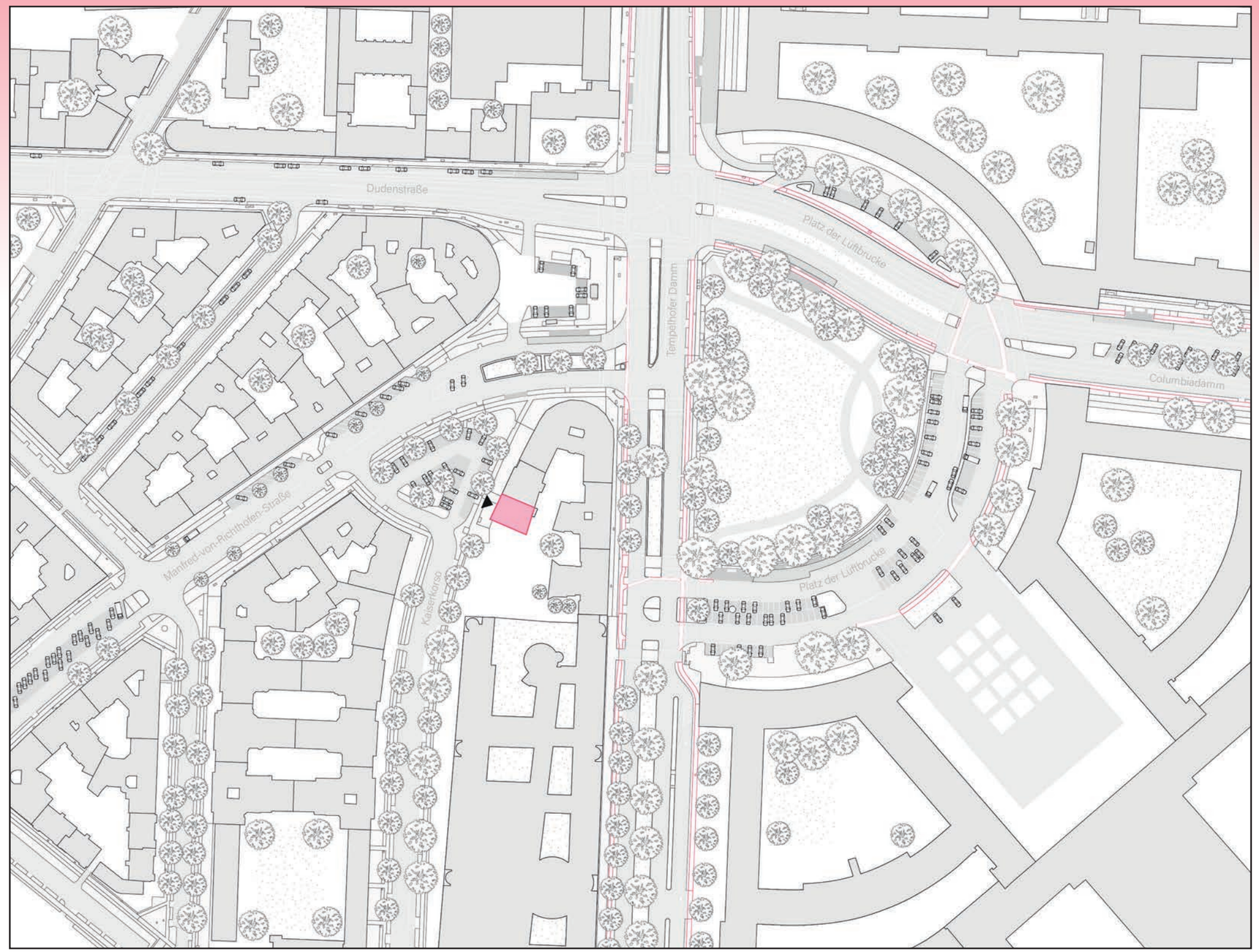


17_NEUKÖLLN

POPULATION 2020
1093

BLOCK AREA m²
61.000





0 10 20 50 100 m 1:2000

01 Bergmannkiez

BRIEF:
Facility in a recently completed mixed-use building. The unit has two public facades, but one entrance on the street side of the block. The site affords no space for logistics, so goods are placed on the sidewalk. There is letfover tape on the facade from strikes in October 2021.

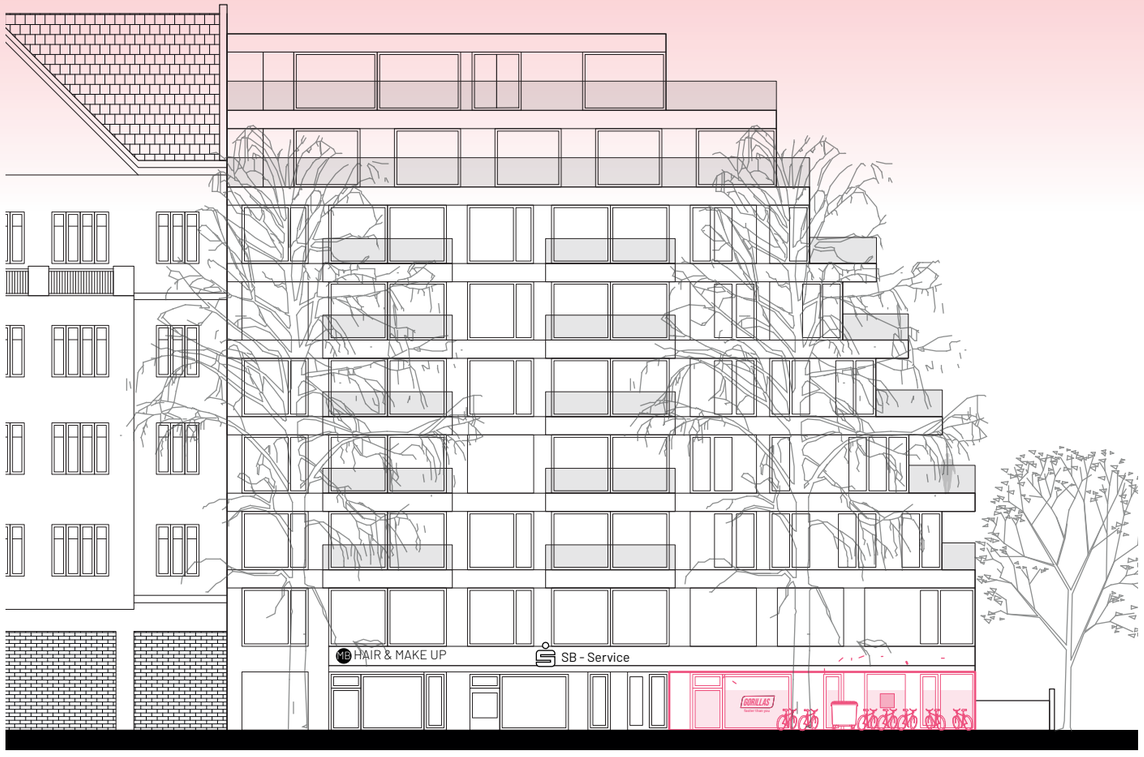
ADDRESS
Kaiserkorso 154

PREVIOUS FUNCTION
Vacant/none

WH. TYPOLOGY
D, I

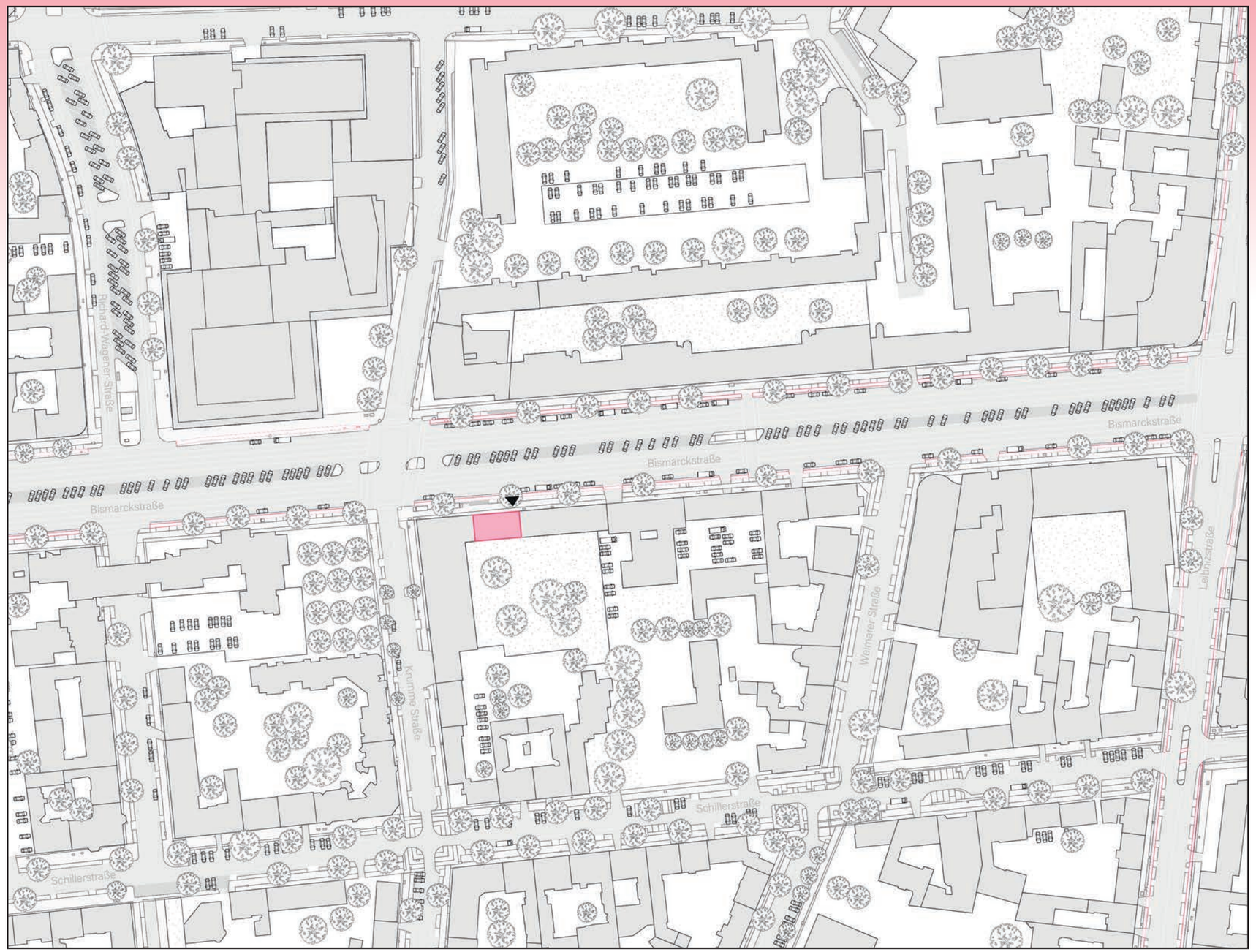
WAREHOUSE SIZE (m²)
150

FORMER



CURRENT

0 1 5 10 m 1:250



0 10 20 50 100 m 1:2000

02 Charlottenburg

BRIEF:
The facility is located on a main road (Bundesstraße 2) and occupies the space that used to be a casino. The signage above is not properly removed. Bicycles are parked out front, even when space is already limited.

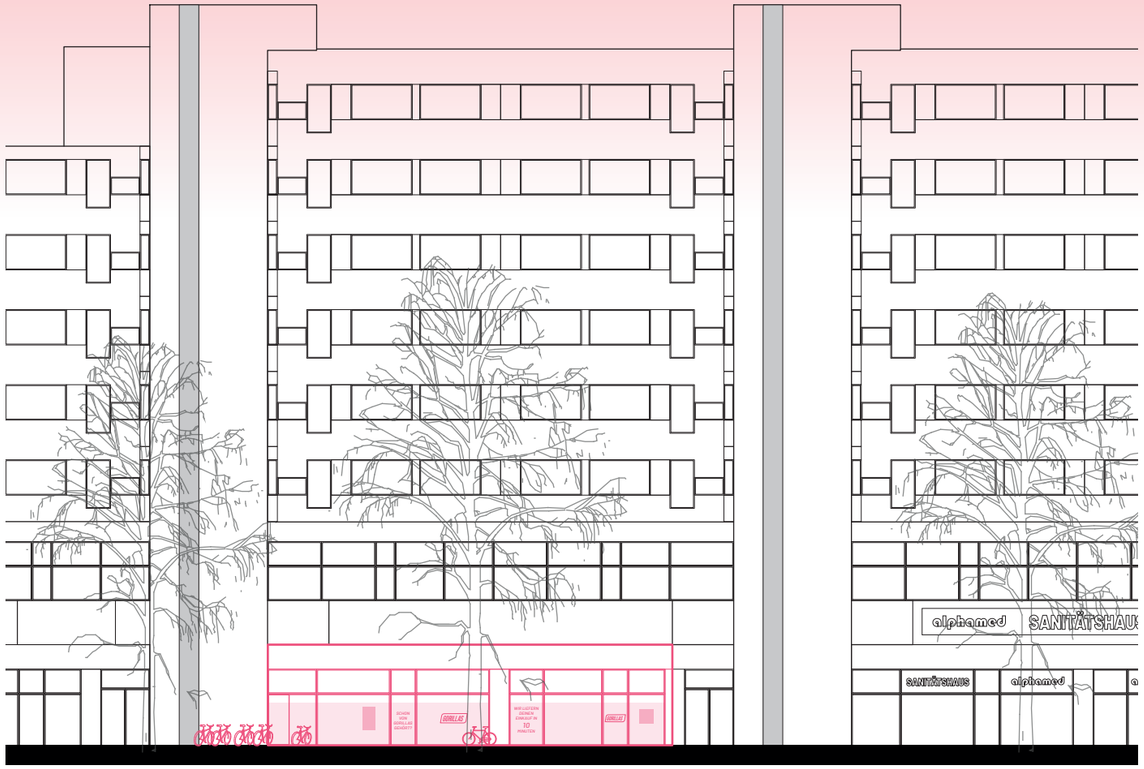
ADDRESS
Bismarckstraße 94

PREVIOUS FUNCTION
Gambling facility "M.M. Casino"

WH. TYPOLOGY
E, III

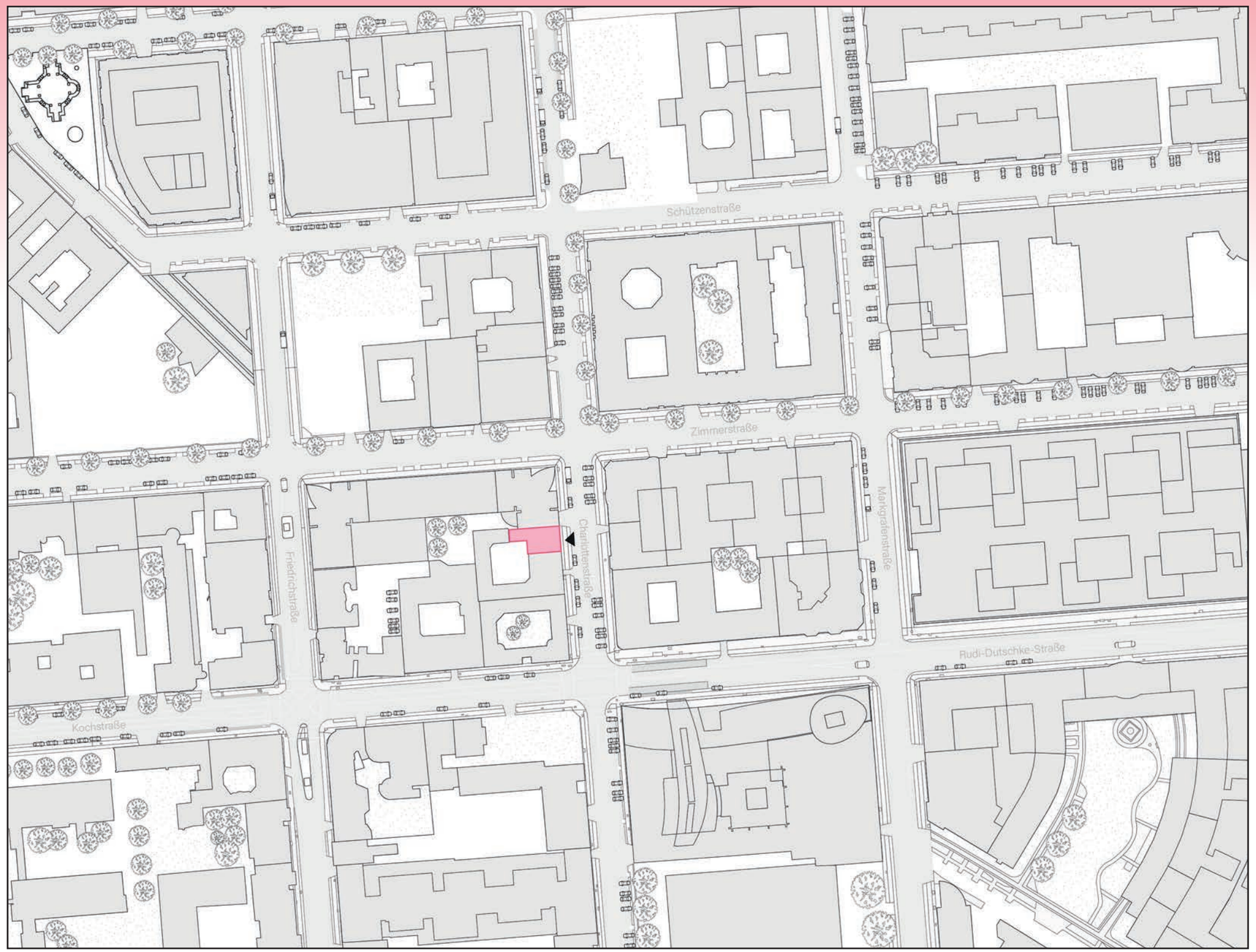
WAREHOUSE SIZE (m²)
175

FORMER



CURRENT

0 1 5 10 m 1:250

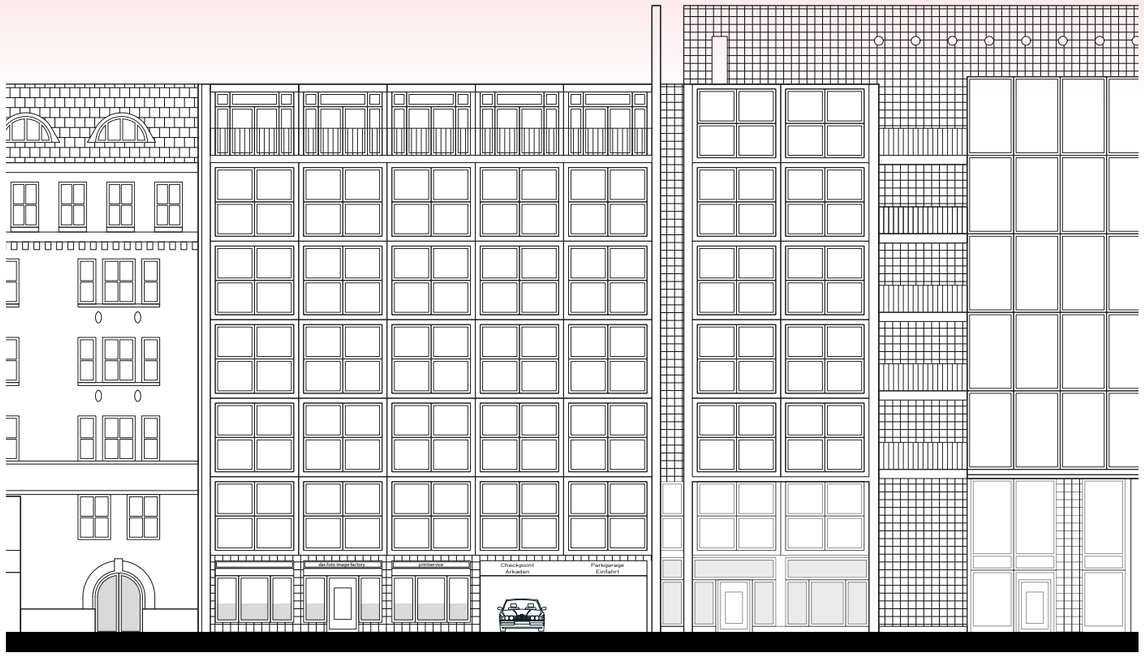


0 10 20 50 100 m 1:2000

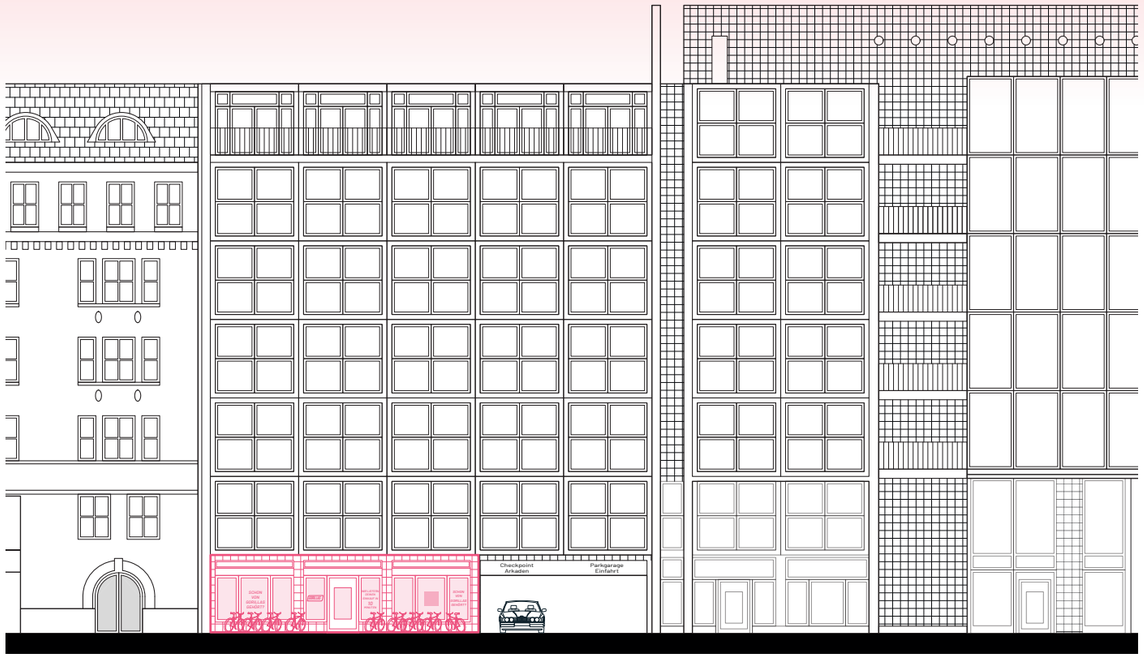
03 Checkpoint Charlie

BRIEF:
The facility is in close proximity to the historic attraction Checkpoint Charlie. Bicycles are parked on the sidewalk. There is a parking garage entrance adjacent to the warehouse.

ADDRESS	PREVIOUS FUNCTION
Charlottenstraße 81	Photo studio "Das Foto"
WH. TYPOLOGY	**WAREHOUSE SIZE (m²)**
E, V	150

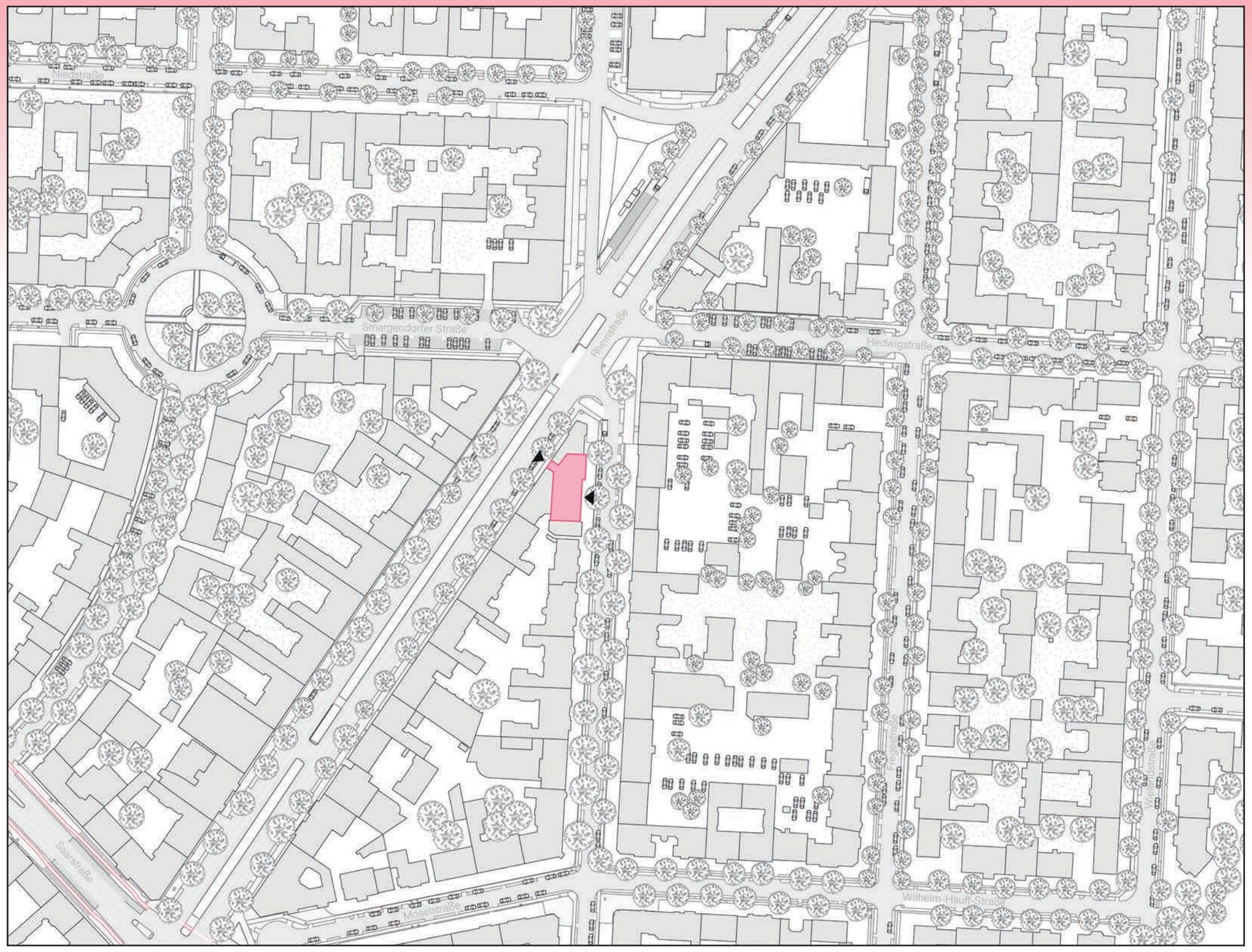


FORMER



CURRENT

0 1 5 10 m 1:250



04 Friedenau

BRIEF:
Located in a former Italian Restaurant, this facility has two facades and two entrances. The Rheinstraße entrance is not actively used, as the Dickhardtstraße entrance appears to be the main. Bicycles can be parked inside.

ADDRESS

Rheinstraße 65

PREVIOUS FUNCTION

Restaurant "Trattoria dell'Arte"

WH. TYPOLOGY

C, I

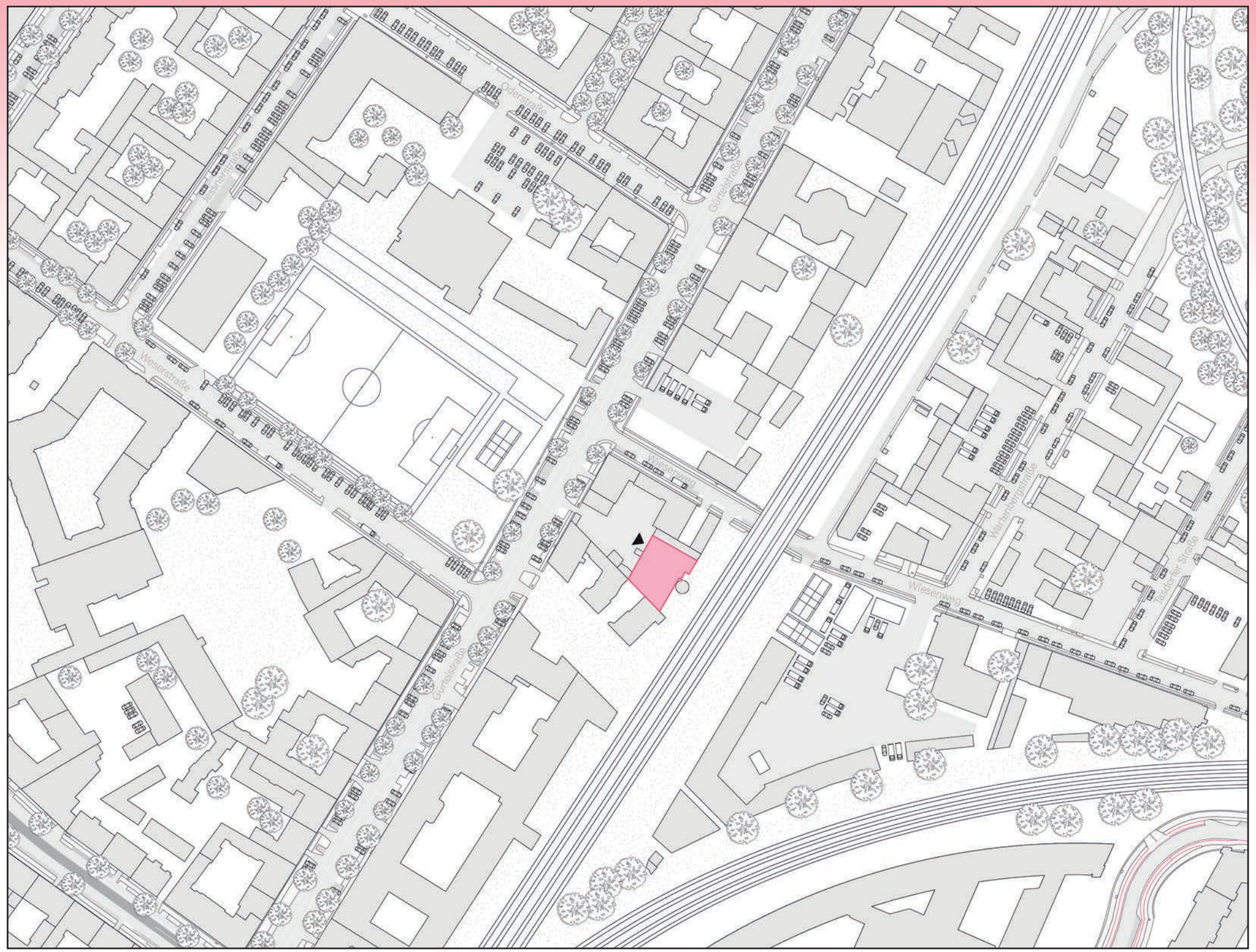
WAREHOUSE SIZE (m²)

250

FORMER

CURRENT

0 1 5 10 m 1:250



05 Friedrichshain

BRIEF:
This facility is located in an industrial building which borders a non-residential courtyard. It affords plenty of space for loading and unloading goods and parking bicycles.

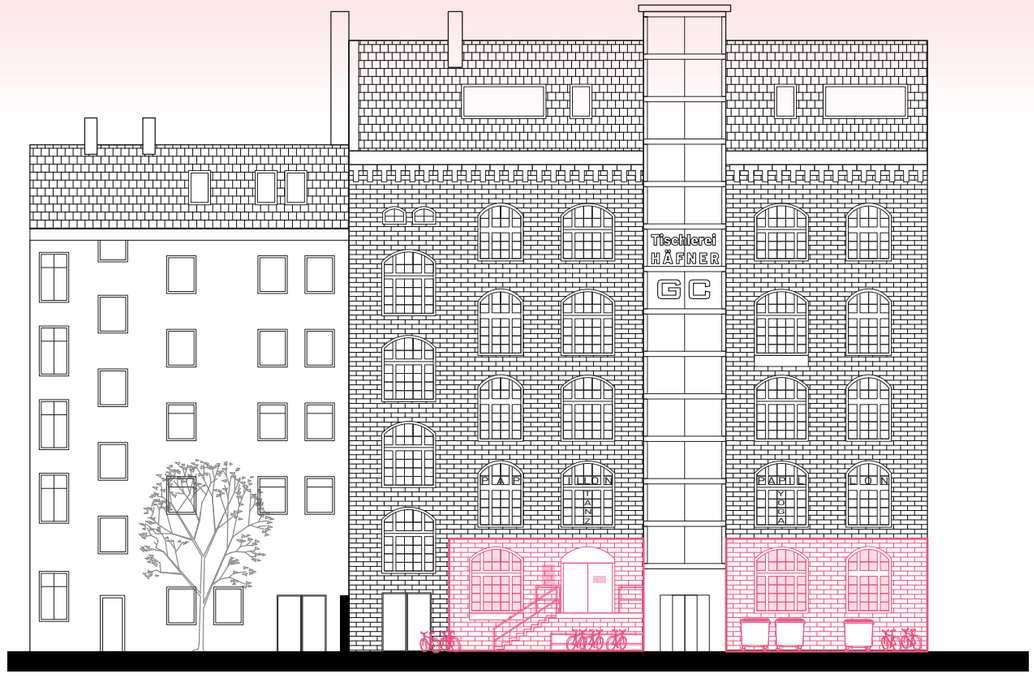
ADDRESS
Gürtelstraße 25

PREVIOUS FUNCTION
Sports facility "Ringside Gym"

WH. TYPOLOGY
B, II

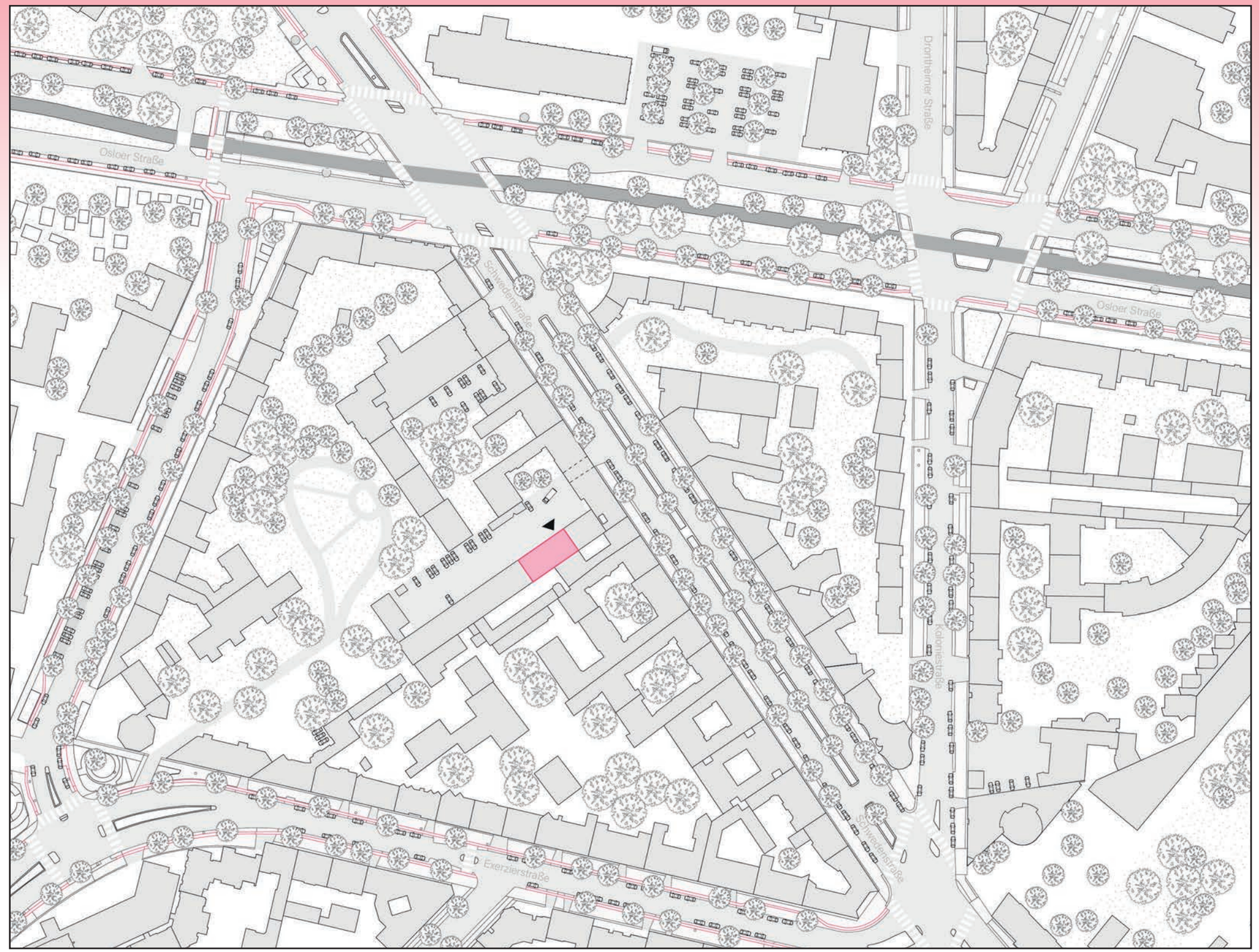
WAREHOUSE SIZE (m²)
300

FORMER



CURRENT

0 1 5 10 m 1:250

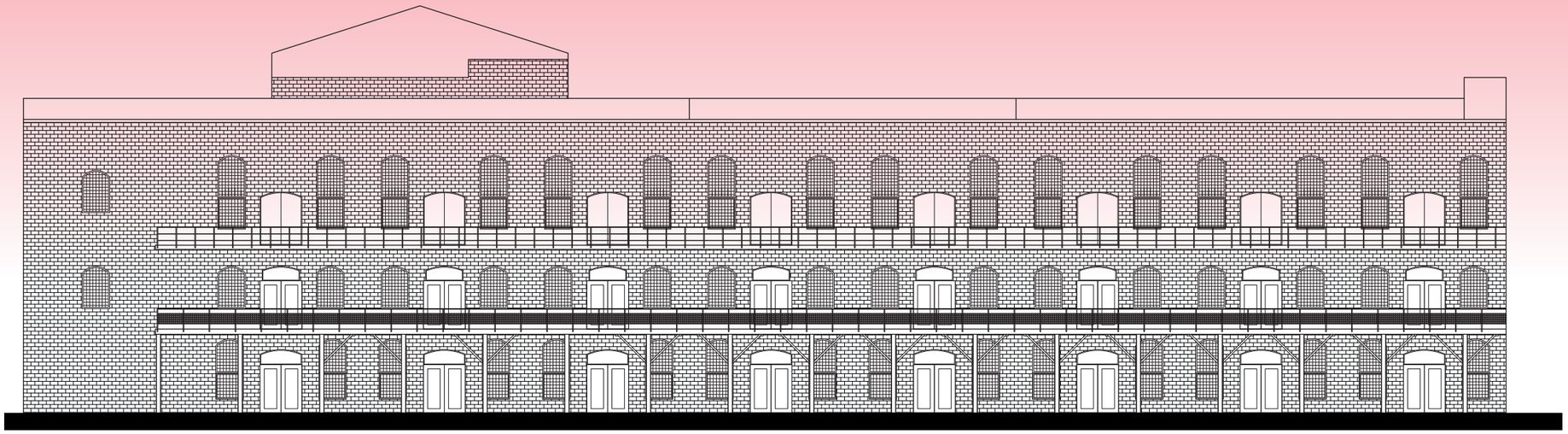


0 10 20 50 100 m 1:2000

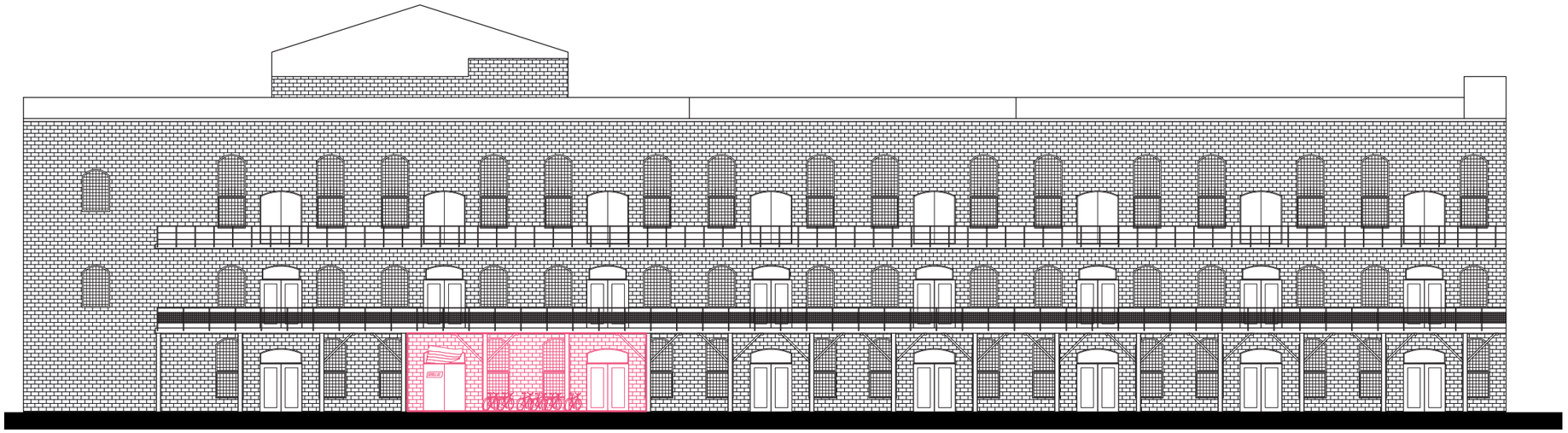
06 Gesundbrunnen

BRIEF:
The facility is located in a former depot for horse-drawn buses, which was later used as a sausage factory and a print shop. The courtyard now functions as a parking area, while Gorillas partly occupies the building.

ADDRESS	PREVIOUS FUNCTION
Schwedenstraße 14	Printshop “ProBusiness”
WH. TYPOLOGY	**WAREHOUSE SIZE (m²)**
A, III	200



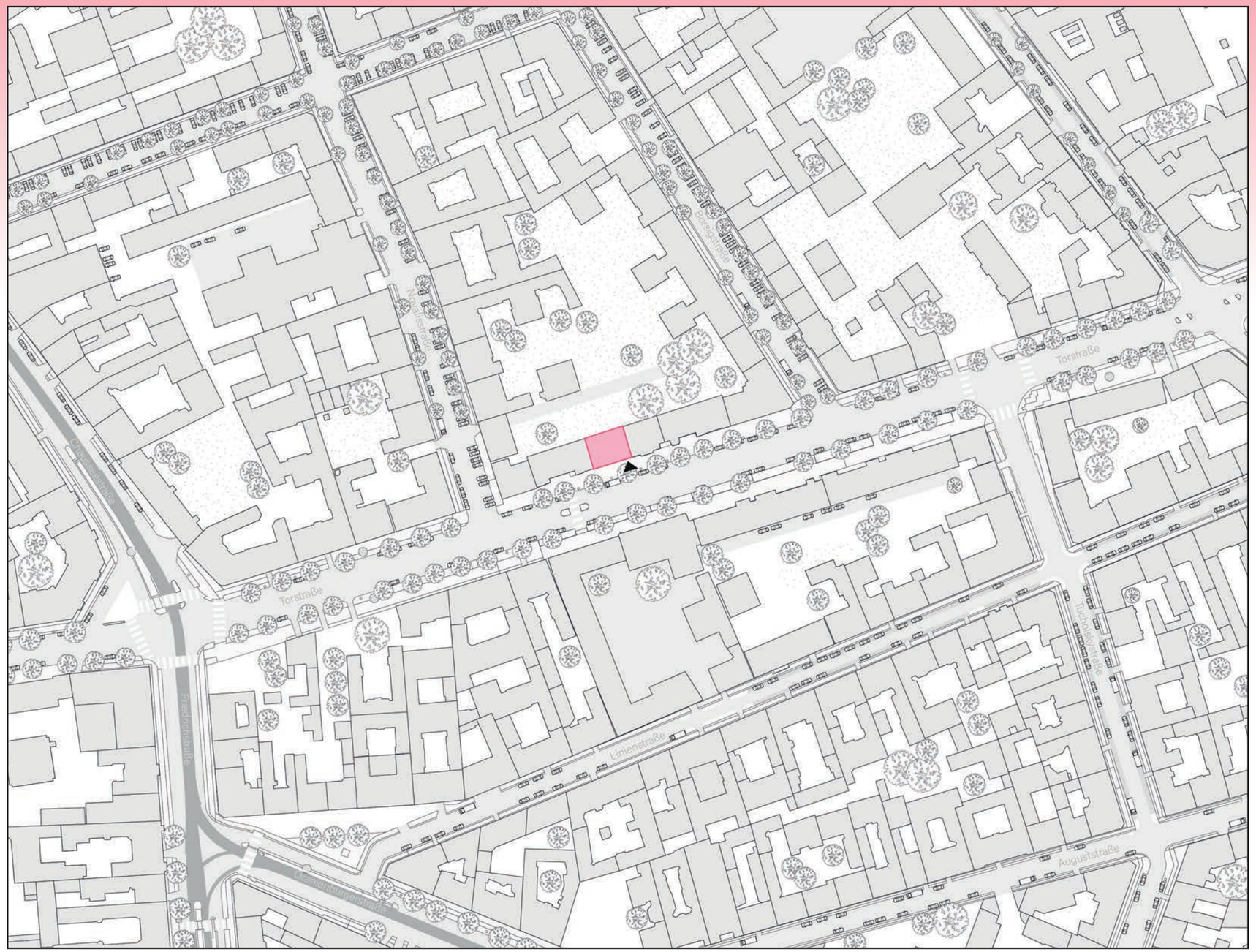
FORMER



CURRENT

0 1 5 10 m 1:250

WEATHER	TEMPERATURE	DATE	TIME
Clear and sunny	11 °C	March 24, 2022	10:00 AM



0 10 20 50 100 m 1:2000

07 Mitte

BRIEF:
This ground floor of this block was recently vacated and transformed to create a large shopfront. The sidewalk is used as a bicycle parking area. There is only one entrance.

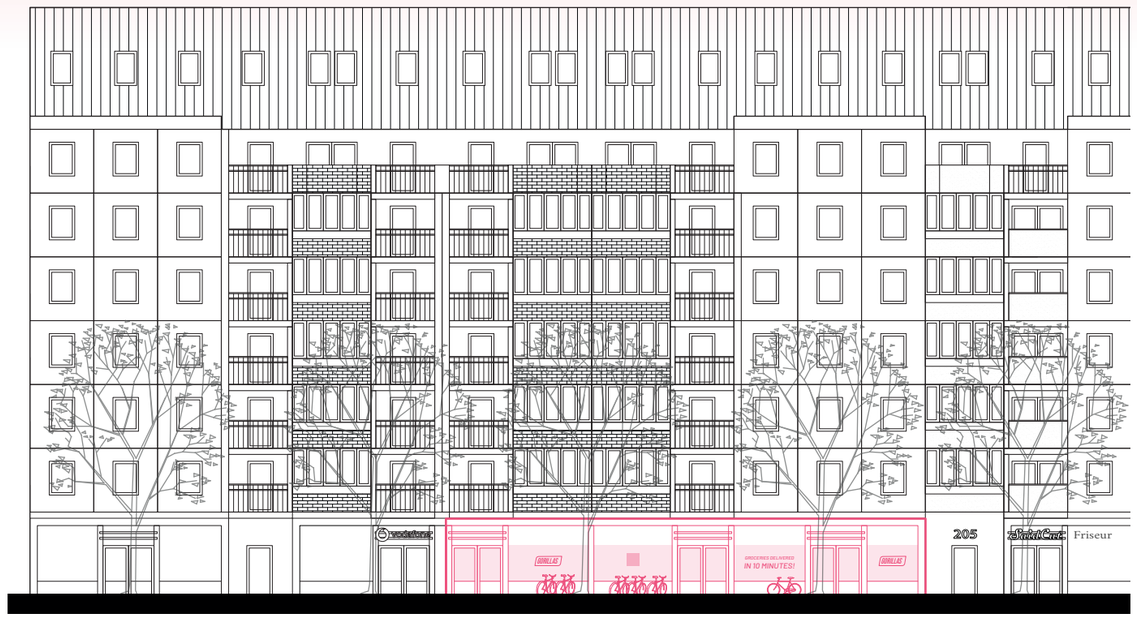
ADDRESS
Torstraße 205

PREVIOUS FUNCTION
Charitable Aid Association "KLIK"

WH. TYPOLOGY
E, V

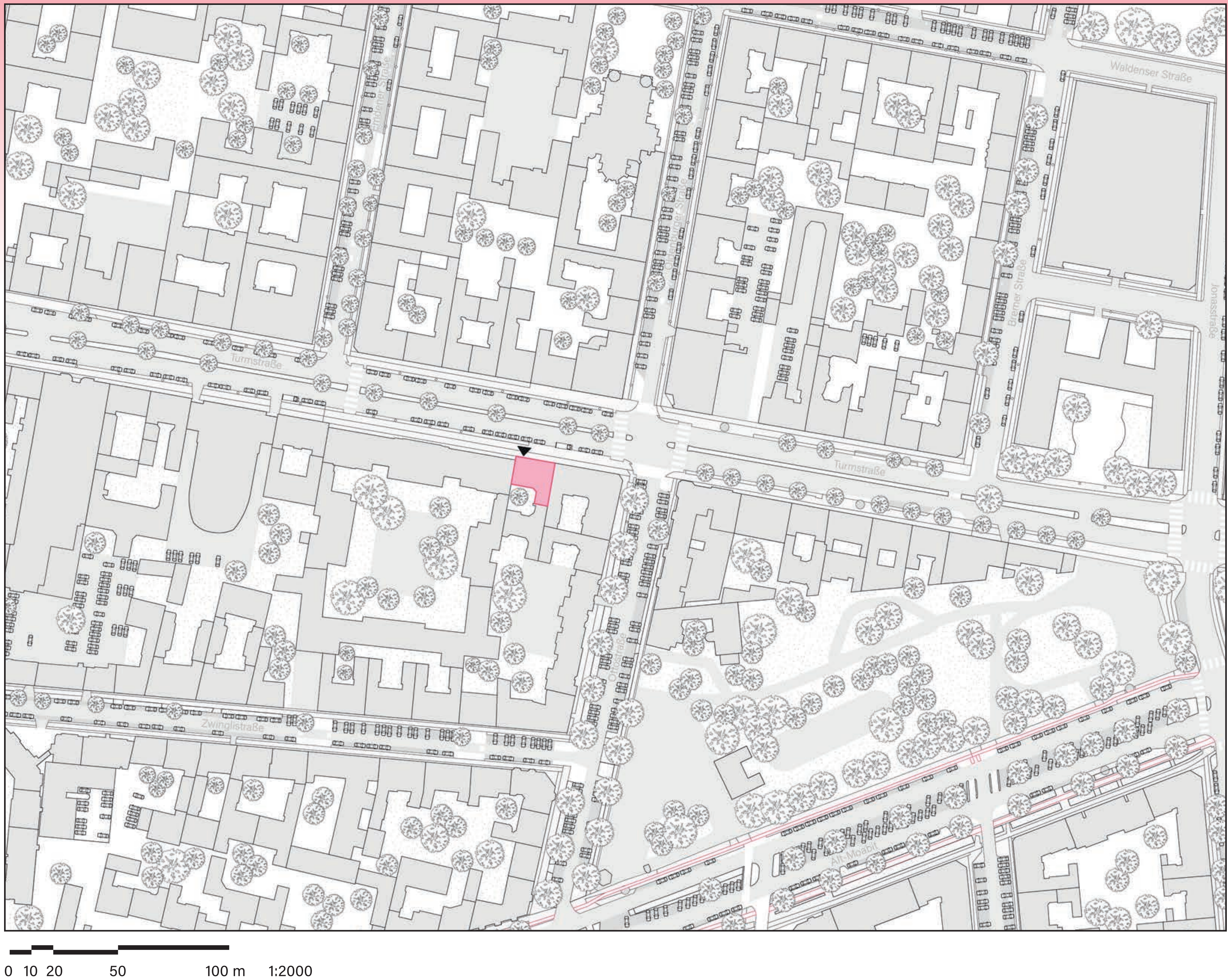
WAREHOUSE SIZE (m²)
175

FORMER



CURRENT

0 1 5 10 m 1:250



08 Moabit

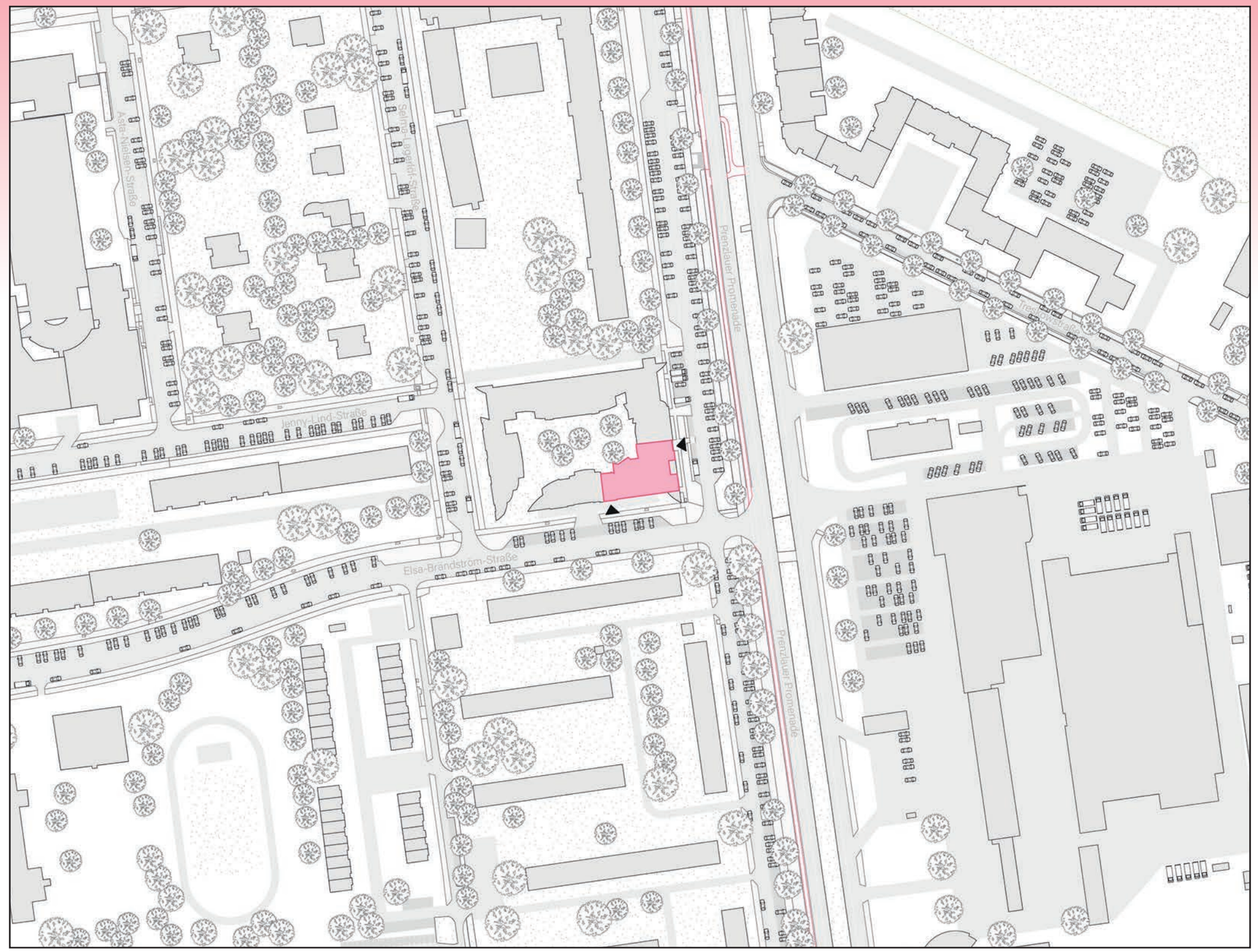
BRIEF:
The warehouse has one double door front entrance on the street side. Riders can enter through the translucent curtain strips without getting off the bike. Bicycles are parked on the street.

ADDRESS	PREVIOUS FUNCTION
Turmstraße 76a	Gambling facility "Merkur"
WH. TYPOLOGY	**WAREHOUSE SIZE (m^2)**
E, I	200

FORMER

CURRENT

0 1 5 10 m 1:250



0 10 20 50 100 m 1:2000

09 Pankow

BRIEF:
This facility is located in a housing block. The entrance for daily use is located on the Prenzlauer Promenade. There is space both inside and outside for bicycles.

ADDRESS
Elsa-Brändström-Straße 95

PREVIOUS FUNCTION
Office supplier "Bürofa"

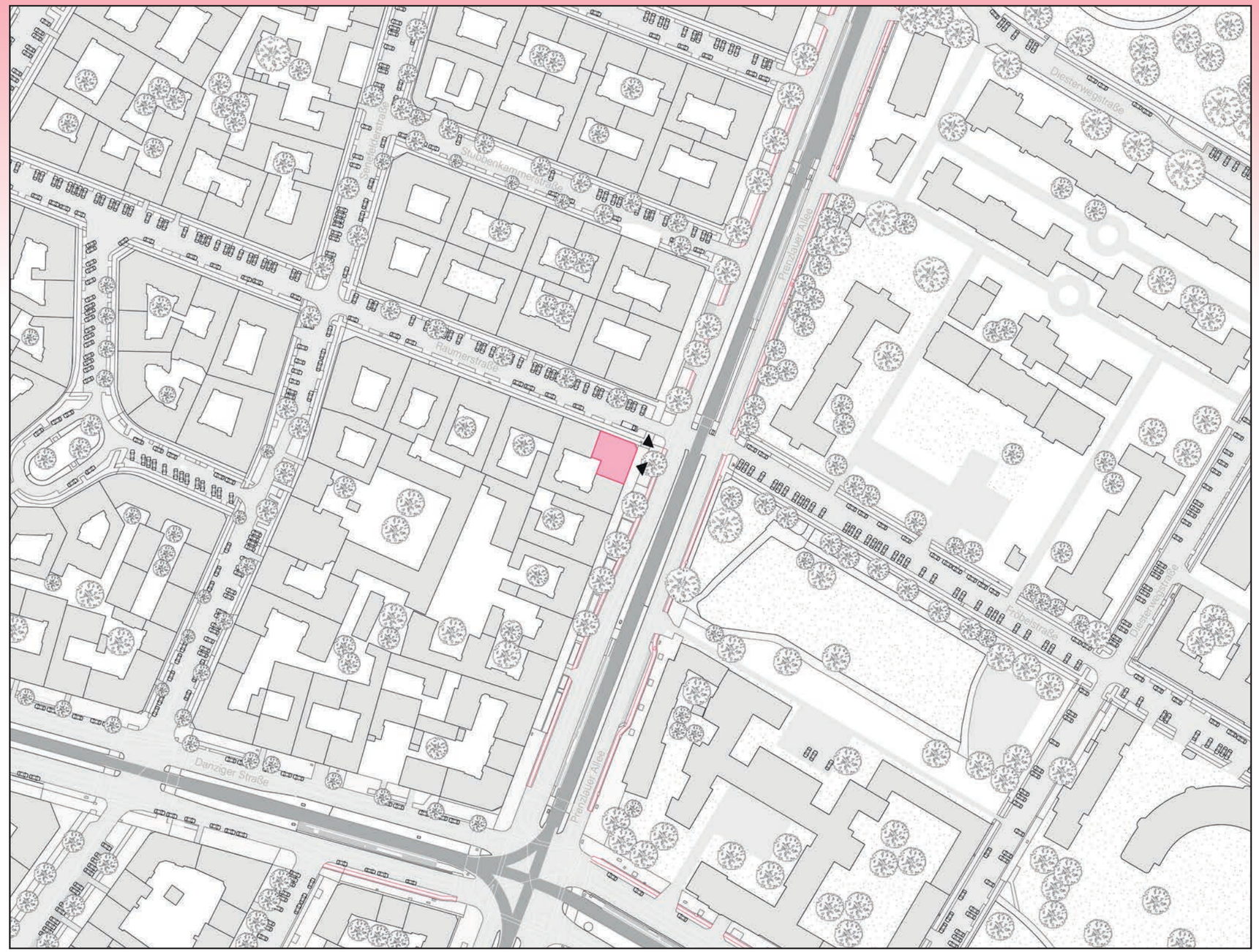
WH. TYPOLOGY
C, V

WAREHOUSE SIZE (m²)
350

FORMER

CURRENT

0 1 5 10 m 1:250



10 Prenzlauer Berg

BRIEF:
The facility has two facades, due to its position in the corner of the block. The entrance on the Prenzlauer Allee is used by riders. The outside space is limited, yet there are bicycles parked on the street.

ADDRESS
Prenzlauer Allee 189

PREVIOUS FUNCTION
Hardware store "Max Baumarkt"

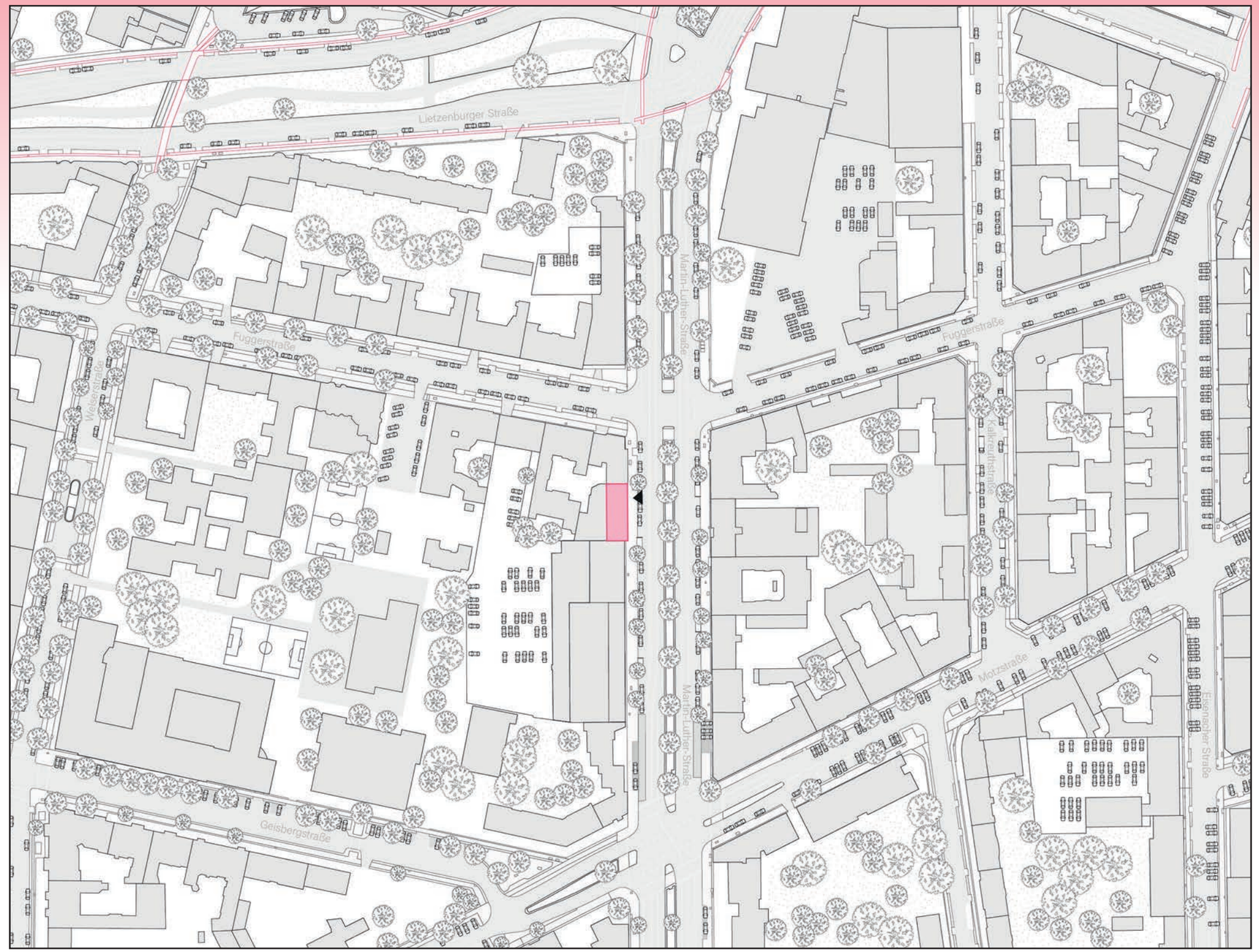
WH. TYPOLOGY
C, IV

WAREHOUSE SIZE (m²)
200

FORMER

CURRENT

0 1 5 10 m 1:250



0 10 20 50 100 m 1:2000

11 Schöneberg

BRIEF:
This facility's only facade is marked by manifestations of activism. QR-codes are sabotaged and logos are crossed. The sidewalk out front is partly used for bicycle parking.

ADDRESS
Martin-Luther Straße 12

PREVIOUS FUNCTION
Plussize clothing store "Beetex"

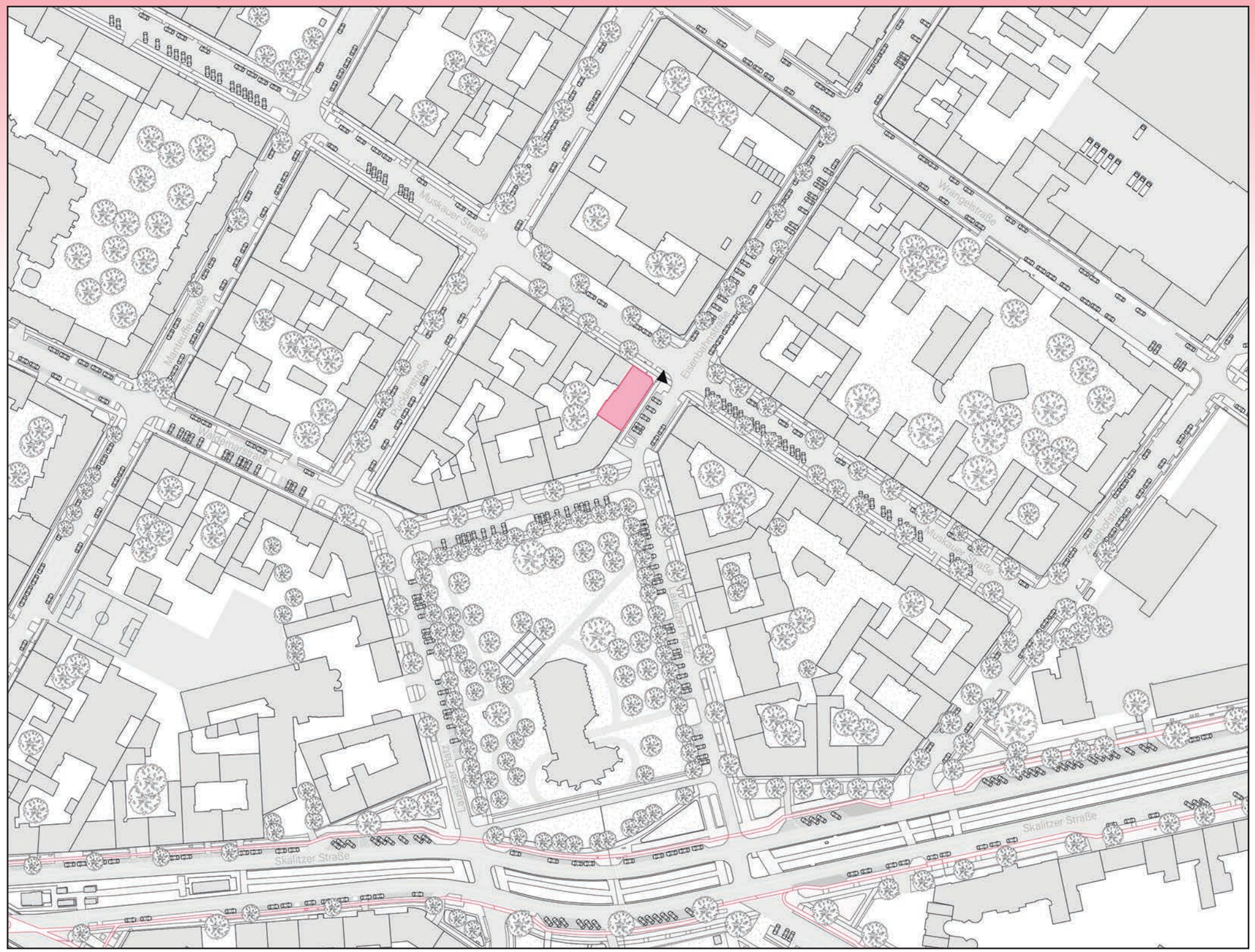
WH. TYPOLOGY
E, I

WAREHOUSE SIZE (m²)
175

FORMER

CURRENT

0 1 5 10 m 1:250



0 10 20 50 100 m 1:2000

12 Kreuzberg

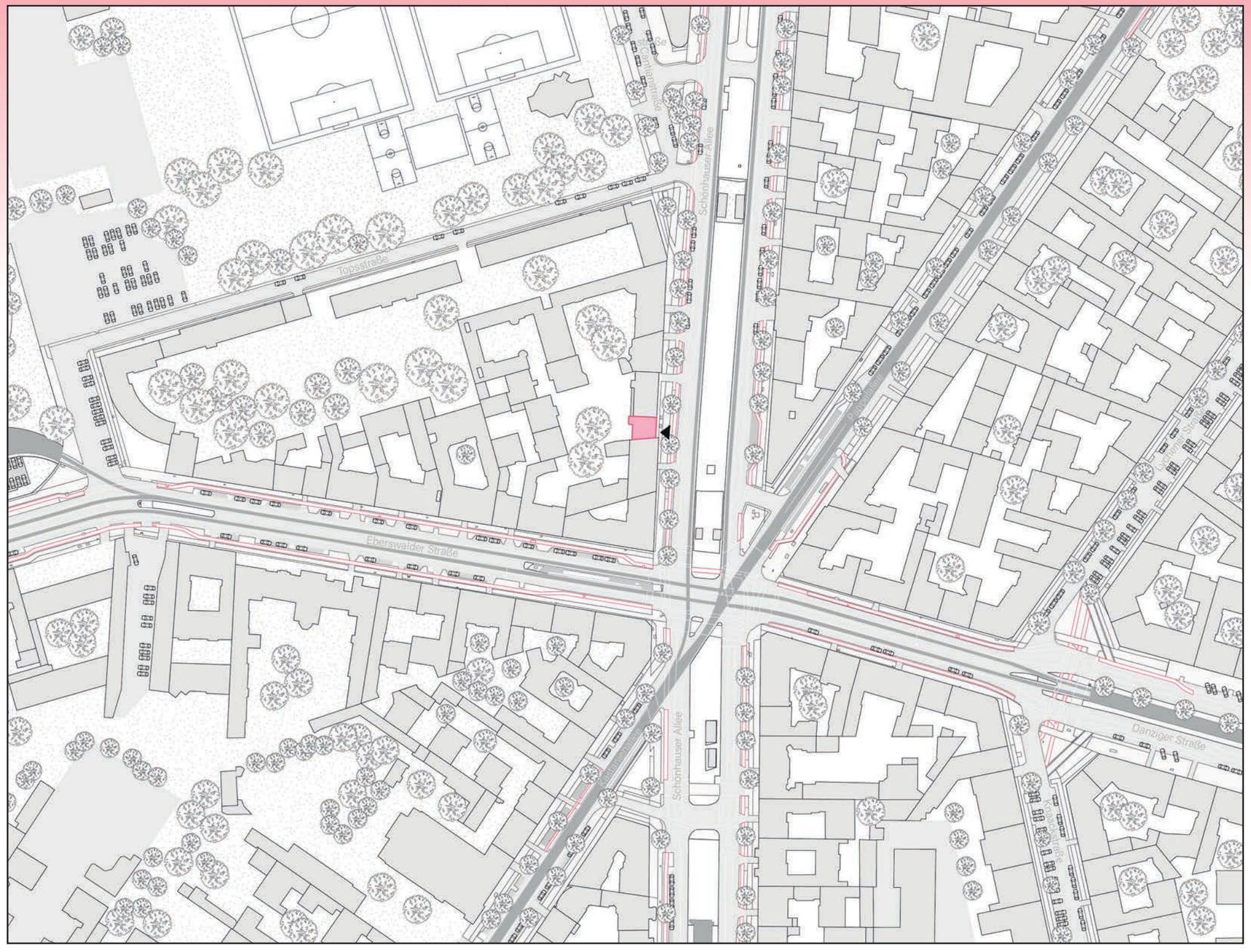
BRIEF:
As of December, this facility has been closed due to an infestation of bed bugs, which came to light after an inspection by the district office. The warehouse was heavily contested for its disturbances.

ADDRESS	PREVIOUS FUNCTION
Muskauer Straße 48	Bank office "Sparkasse"
WH. TYPOLOGY	**WAREHOUSE SIZE (m²)**
C, IV	225

FORMER

CURRENT

0 1 5 10 m 1:250



0 10 20 50 100 m 1:2000

13 Schönhauser Allee

BRIEF:
The warehouse is across the U-bahn stop. Its street facade is small. Riders can enter through the translucent curtain strips to pick up new orders. The limited space on the street is used to park cargo bikes.

ADDRESS
Schönhauser Allee 143

PREVIOUS FUNCTION
Bank office "Commerzbank"

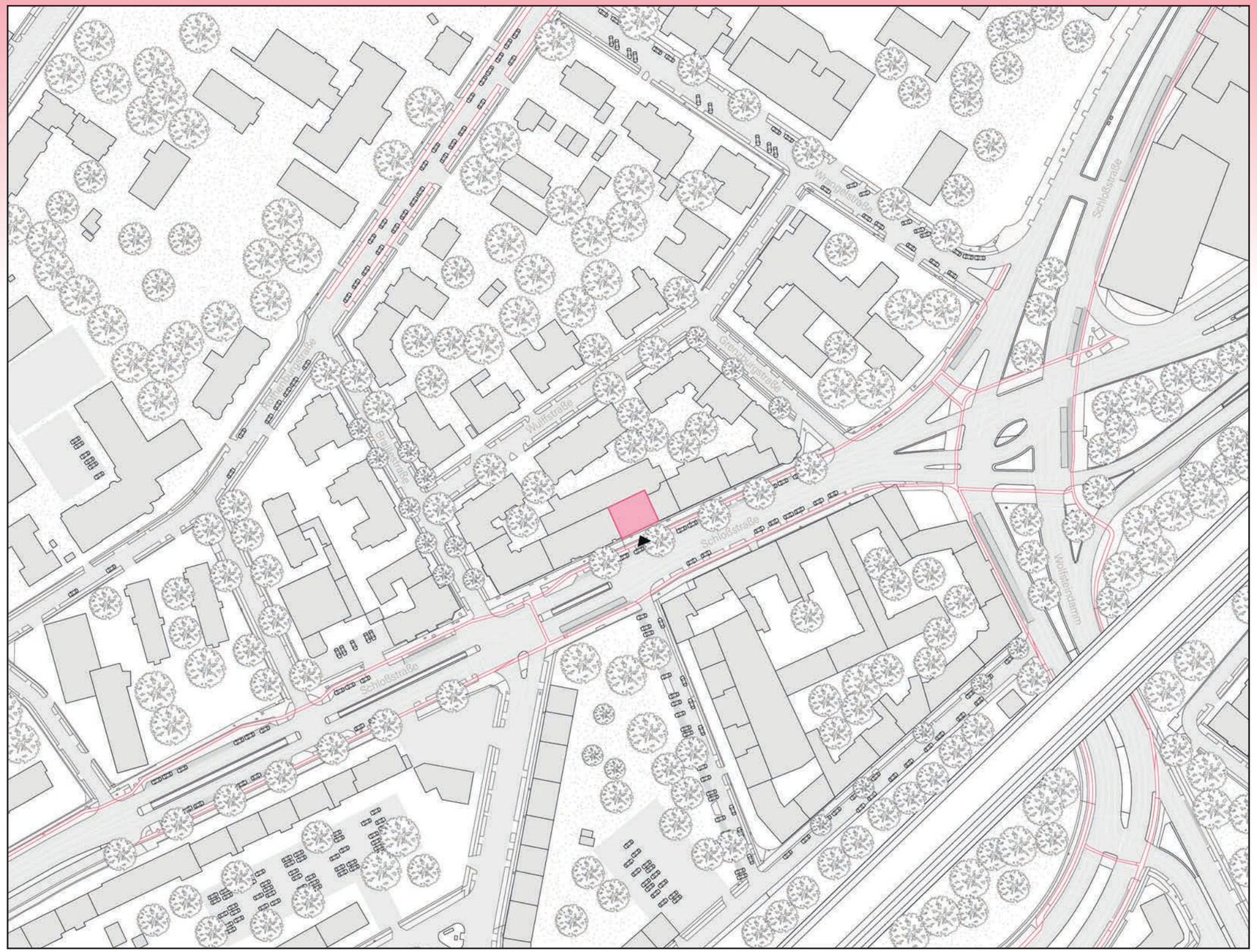
WH. TYPOLOGY
C, IV

WAREHOUSE SIZE (m²)
125

FORMER

CURRENT

0 1 5 10 m 1:250



0 10 20 50 100 m 1:2000

14 Steglitz

BRIEF:
The warehouse is located on a main road, on the ground floor of a housing block. The curbspace is very limited, which means that riders have to be careful when leaving the premises to not collide with pedestrians or cyclists.

ADDRESS
Schloßstraße 51

PREVIOUS FUNCTION
Fashion store "Top-Outlet"

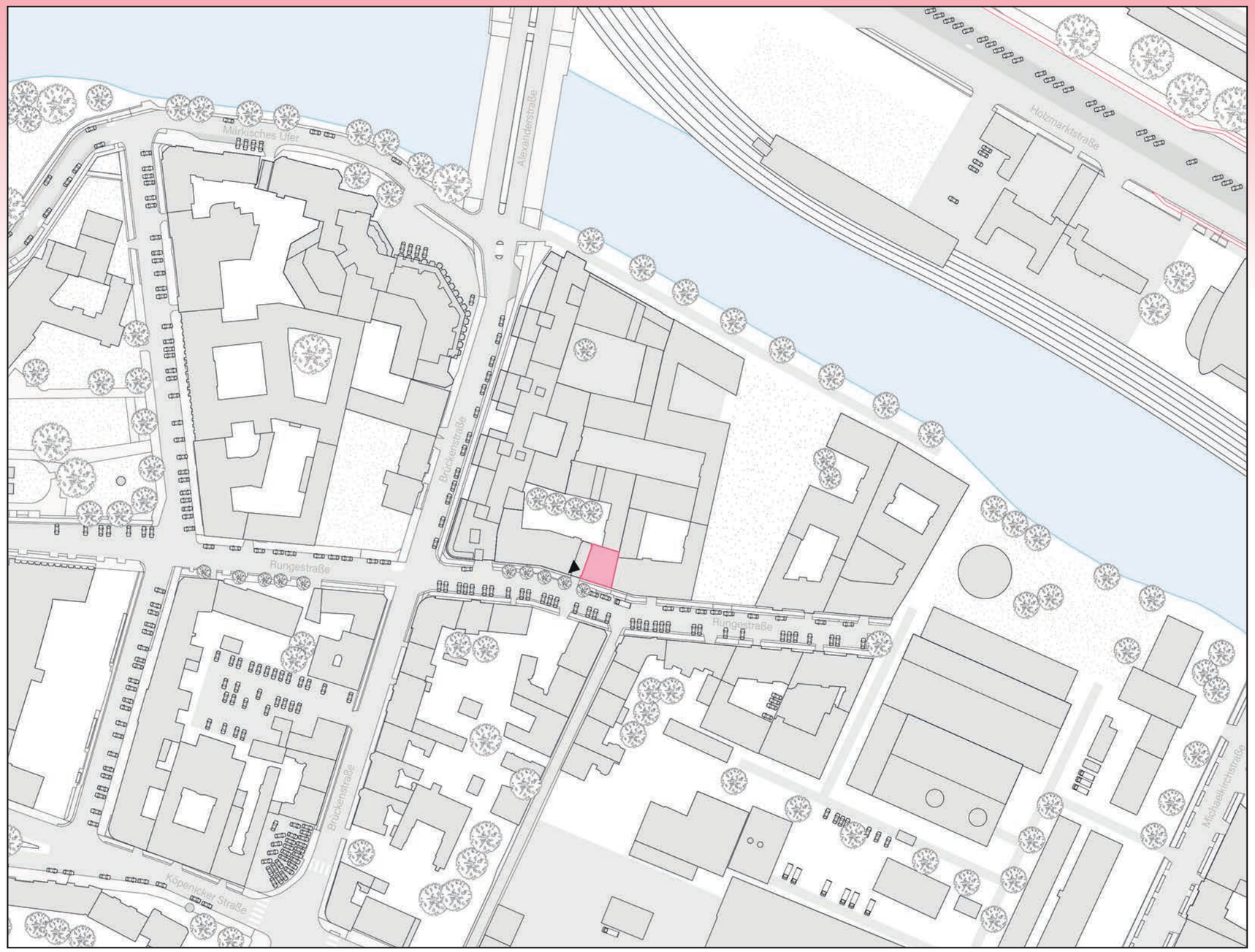
WH. TYPOLOGY
E, II

WAREHOUSE SIZE (m²)
200

FORMER

CURRENT

0 1 5 10 m 1:250



0 10 20 50 100 m 1:2000

15 Alexanderplatz

BRIEF:
This facility is located on a dead end street. Its entrance is located in the gate to the block's courtyard. Bicycles are placed on the street.

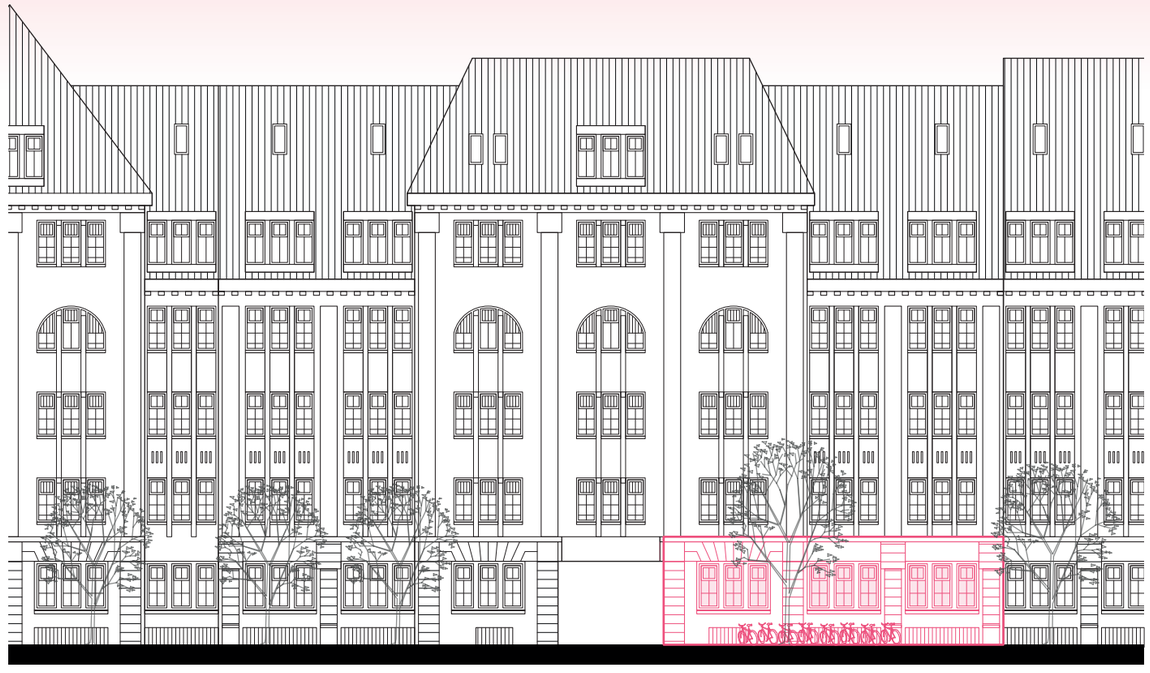
ADDRESS
Rungestraße 25

PREVIOUS FUNCTION
Swabian Bakery "Sporys"

WH. TYPOLOGY
E, IV

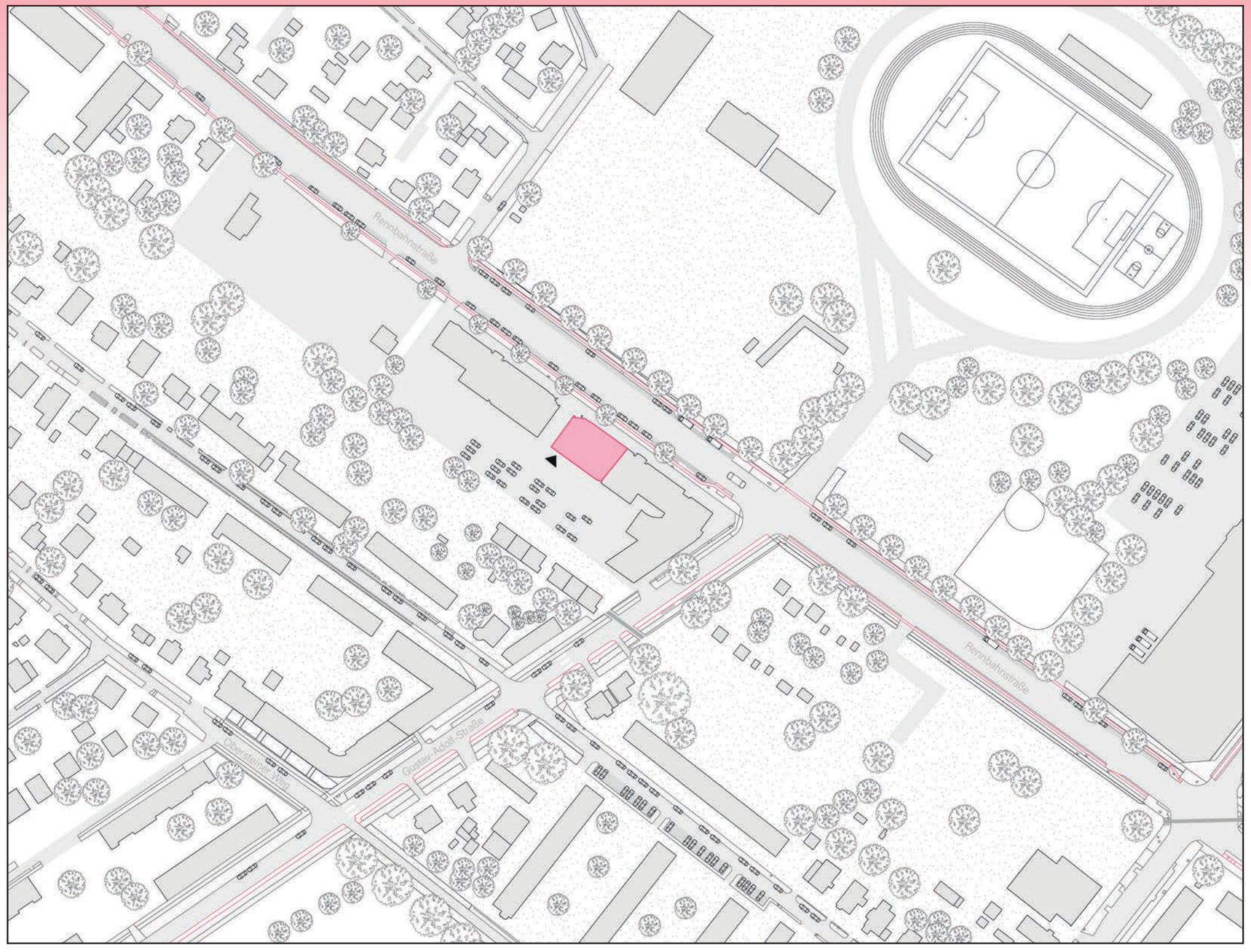
WAREHOUSE SIZE (m^2)
175

FORMER



CURRENT

0 1 5 10 m 1:250

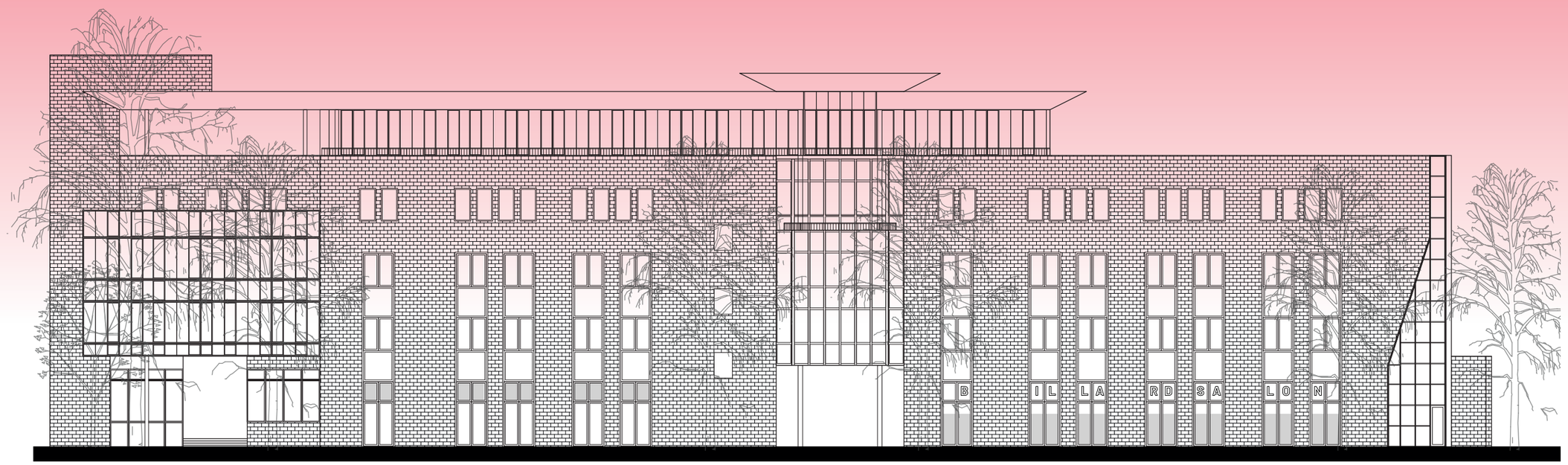


0 10 20 50 100 m 1:2000

16 Weissensee

BRIEF:
This facility is located in a commercial building in a low density area. The only entrance is in the back of the building. The open space next to the building can be used by truck for supplying.

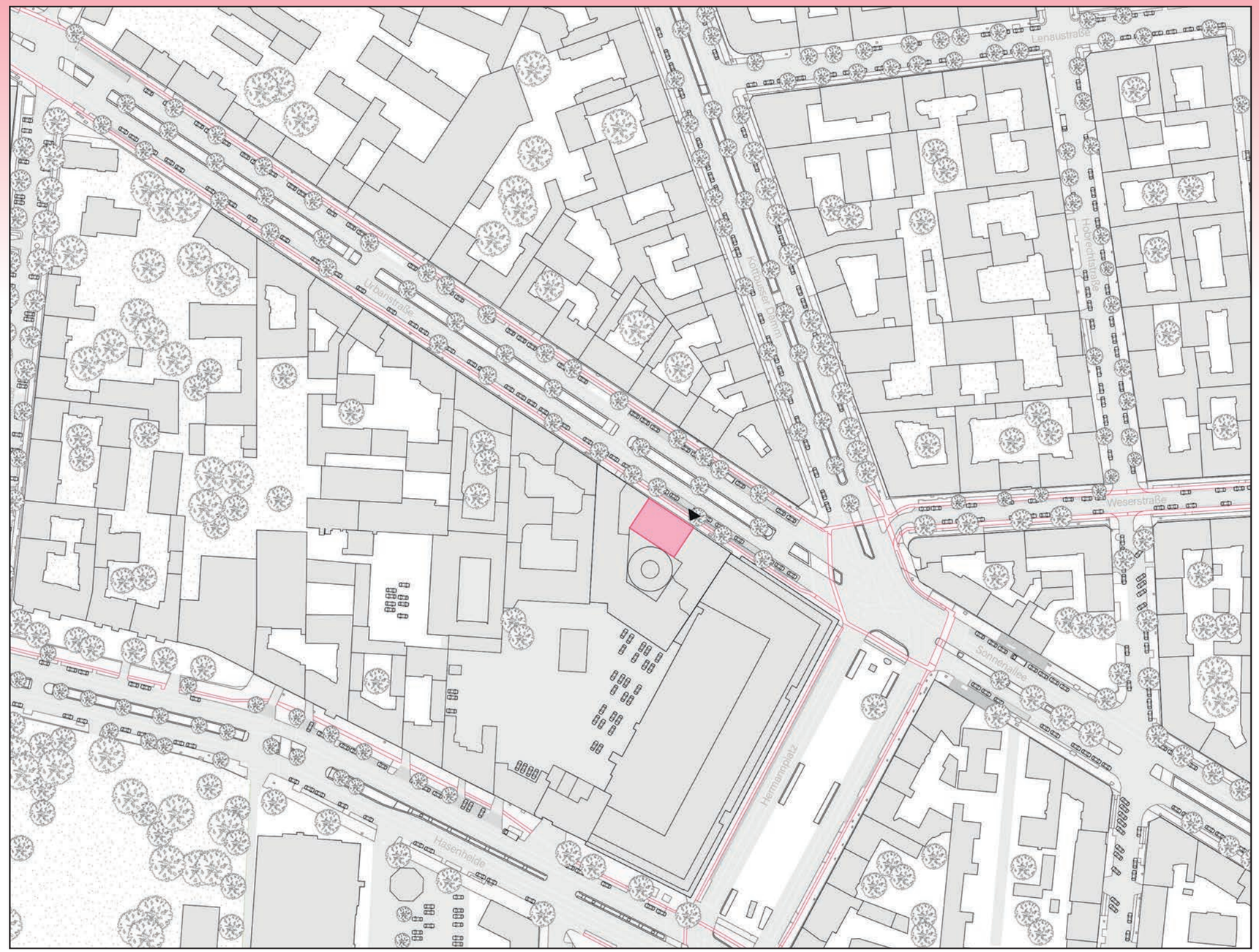
ADDRESS	PREVIOUS FUNCTION
Rennbahnstraße 87	Poolcentre "Billardsalon"
WH. TYPOLOGY	**WAREHOUSE SIZE (m²)**
B, V	300



FORMER

CURRENT

0 1 5 10 m 1:250

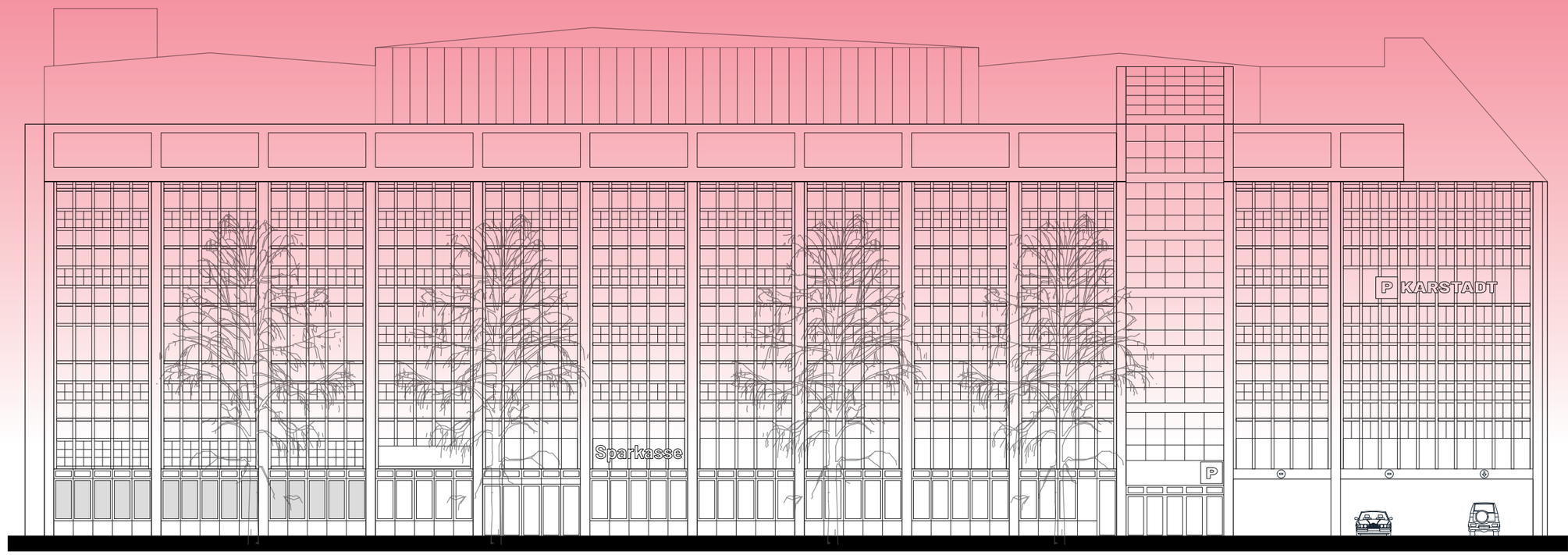


0 10 20 50 100 m 1:2000

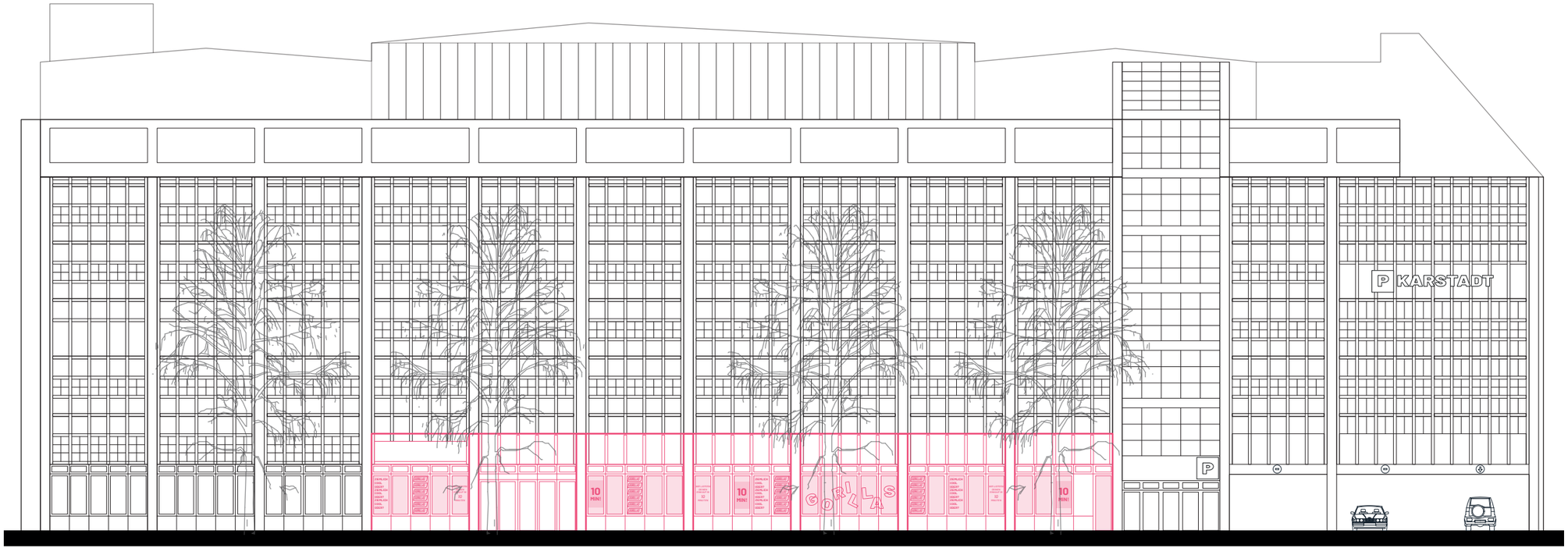
17 Neukölln

BRIEF:
The warehouse is located on the ground floor of a car park. The only entrance of the facility is on the main street. Bicycle parking happens inside the warehouse.

ADDRESS	PREVIOUS FUNCTION
Urbanstraße 72	Bank office "Sparkasse"
WH. TYPOLOGY	**WAREHOUSE SIZE (m²)**
E, IV	250



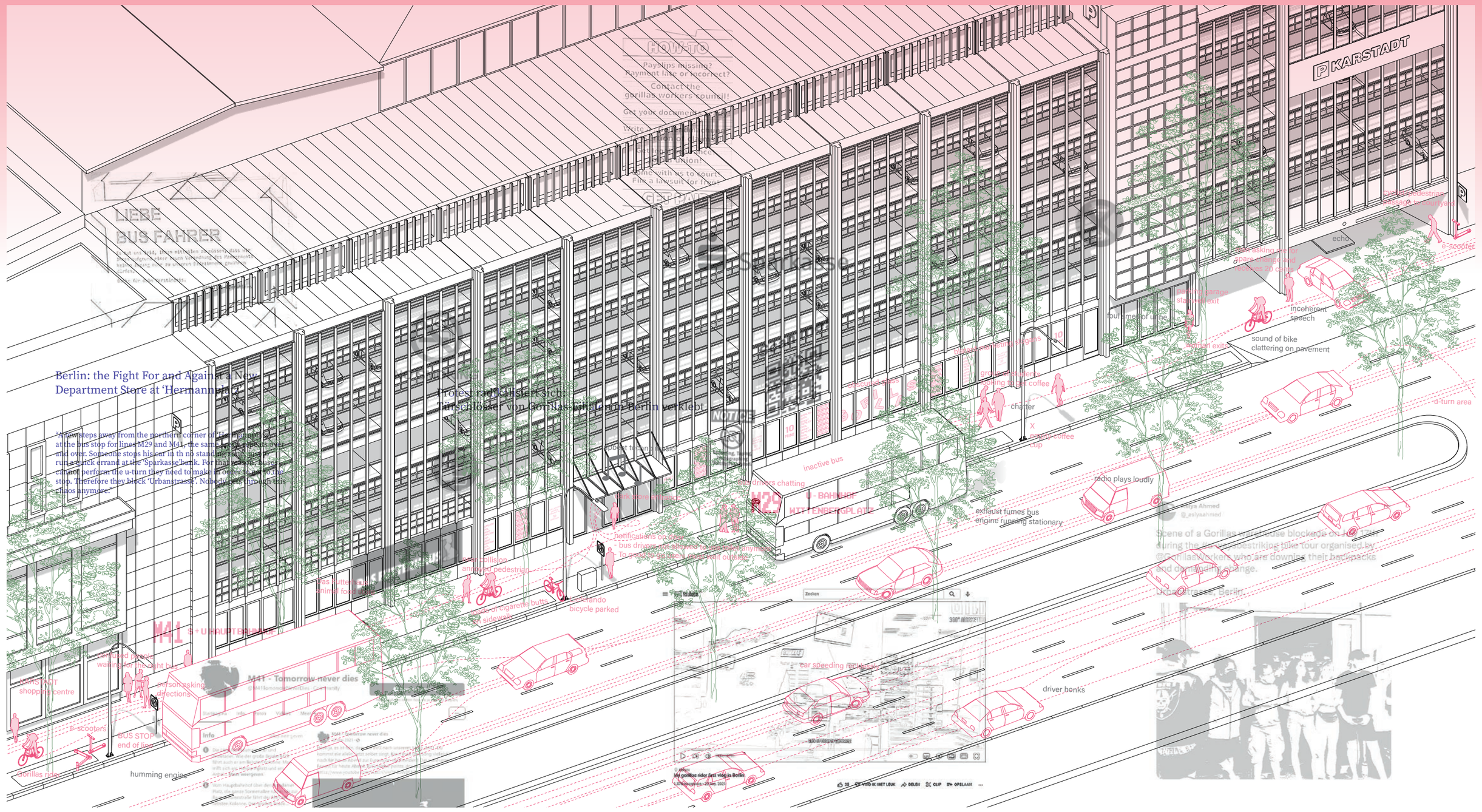
FORMER



CURRENT

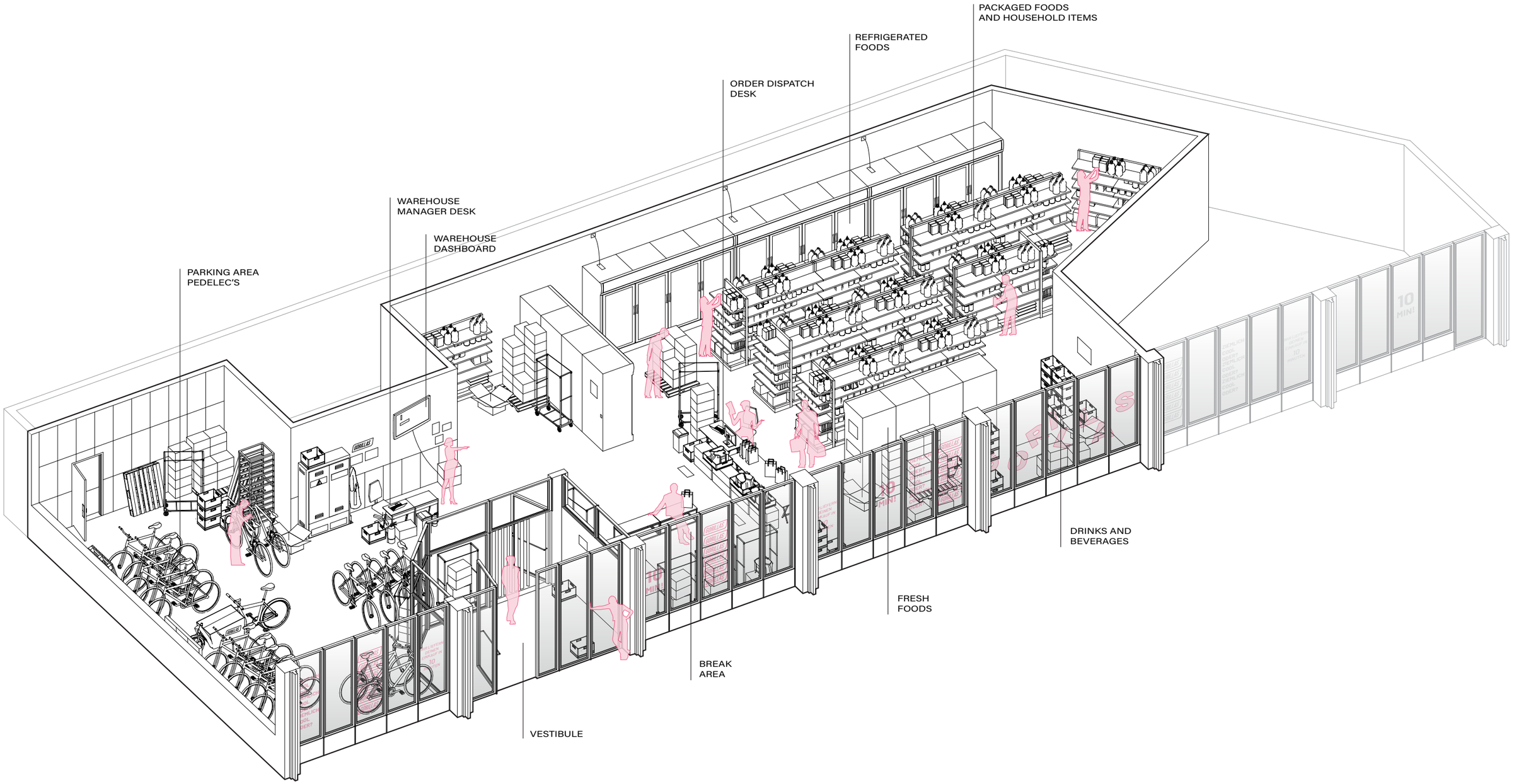
0 1 5 10 m 1:250

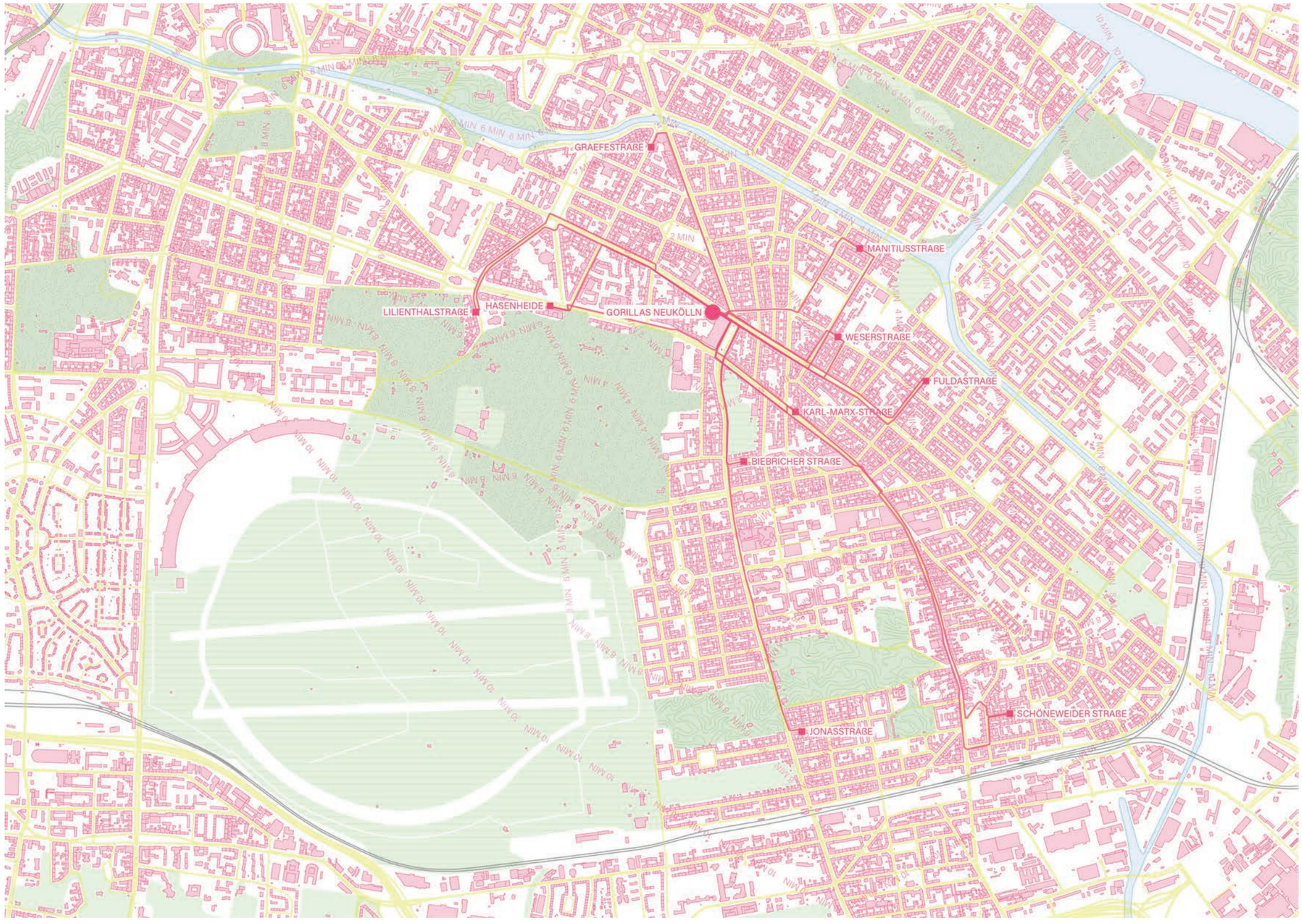
WEATHER	TEMPERATURE	DATE	TIME
Clear and sunny	12 °C	March 25, 2022	10:00 AM



31 Gorillas Neukölln Warehouse

Illustration by the author





Legend:

LAND USE

- Building
- Green area (trees)
- Grassland
- Mixed green
- Water body

NETWORKS AND BOUNDARIES

- Road network
- Water network
- Rail network

DATA

- Delivery address
- Dark store Urbanstraße 72
- Rider route
- MIN Isochrone analysis - cycling time

N

SCALE 1:20.000

32 Tracking a rider over ten seperate delivery runs - warehouse Neukölln

Illustration by the author

To conclude, it appears that Gorillas puts effort into finding locations in close proximity to roads that are highly accessible for local and regional traffic, but the company appears to make few demands to the micro-spatial conditions. For Gorillas, this is a missed opportunity, as it turns out that many spatial conflicts and nuisance problems arise from its disregard towards how dark stores perform on this scale. Nuisance problems are more likely to be averted when choosing properties with a bit more distance to the road. Especially the Friedrichshain and Gesundbrunnen warehouses, located in a 'Gewerbehof' (commercial estate), are better fits for the inner-city structure, as these estates fit into the urban landscape due to the provision of generous spaces for logistics and parking. Moreover, these warehouses do not have a large publicly oriented façade, meaning that there is no necessity to cover windows and turn them into advertising *Interfaces*.

Thus interestingly, we can observe that while the organizational architecture of digital platforms is built on flexibility and evolvability – through its processes, knowlege, people and its digital and technological core (e.g. the utilization of cloud computing) – the architecture of its physical components appears to be much less so. Gorillas seems to struggle with the spatial rigidity of its premises, which makes it interesting to explore alternatives.

On a more general note, it can be concluded that the different layers of the Stack articulate themselves in different types of spaces. The disparity of access, as also discussed in the previous chapter, reveals itself in the spatial analysis. Following the premise that the mechanisms of capital accumulation and data extraction are most effective in urban environments (supported by theoretical work presented in Chapter 3), we can conclude that access to digital platforms is predominantly found in dense urban areas. However, peri-urban areas are mostly inflicted with the ecological ramifications, resource extraction burdens and liveability deteriorations, without gaining access to platform services, infrastructures and technologies. Instead, on the account of its airports, data centres, distribution centres and highways, it becomes the domain of the non-place. This issue highlights the skewed dynamics around access and social justice, which does not only exist on a regional level, but also – and without a doubt more fiercely – on a global level (e.g. thinking of the highly exploitative malpractices around the extraction of rare metals in DR Congo or the inhumane labour conditions in Foxconn factories in China).

33

34

35

02 Norillas protestation banner in Berlin, *Sifted*

https://sifted.eu/articles/gorillas-wework/

02 Protestation banner at Gorillas Kreuzberg warehouse, *Netzpolitik*

https://netzpolitik.org/2021/gorillas-start-up-die-neuen-verteilungskaempfe/

02 Strike at the Prenzlauer Berg warehouse in Berlin, *Sifted*

https://sifted.eu/articles/rider-protests-gorillas/

05.

Intervention

Towards a Public Infrastructure for Platform Exchanges

Chapter Intro

After establishing the most fundamental problems with regard to platform urbanism in Berlin through theoretical and empirical research, the next step is to formulate a design proposal. Central to this objective, is to find an answer to the main research question: “What interventions are needed to integrate digital platforms in the urban fabric of Berlin while attending to the social and economic sustainability of the metropolis?” Following the premise that the current forms of platform urbanism in the city fail to deliver conditions that assure the social and economic sustainability of the metropolis, supported by the evidence provided in previous chapters, it is evident that an intervention is required. Mitigating these perceived multi-facetted negative externalities demands a set of design and policy responses.

A Collaborate Megaproject

At the centre of the project lies the realization that this project is part of a collaborate megaproject to reconfigure our relationship to the infrastructures of planetary computation, or The Stack itself. There is a much larger challenge at hand, formulated by Bratton (2016), as we face the impending doom of ecological ramifications, considering how computational infrastructures become an ever-expanding megastructure, which envelops the world, over land, under water, and in orbit. On top of that, we are dealing with a crisis of geopolitical design, now that the Westphalian state is struggling to retain political sovereignty on the account of global corporate platforms. As these platforms grow into proto-state entities, they are bound to come into political geographic conflict with state actors, when they operate at the scale of an actual state – in a way we have already seen in the case with Google and the Chinese government.

Design Manifesto

Although this fate may seem unlikely and far away for platforms operating in the flash delivery business, a redesign of the flash delivery platform ecosystem fits the ambition to reclaim and even expand 'the right to basic public services' and mitigate further capitalization on public space and practices of exclusion. To this end, I propose to develop an emancipatory logistical infrastructure, which should cater to the promise of the cooperative platform movement and a practice of true sharing. That way, digital platforms can gratify their more hopeful definition as "surfaces for technical innovation, on top of which new actors can develop additional services or products; in many ways they are utilities that generate new societal functions and business opportunities" (Andersson Schwarz, 2017, p. 376). Rather than platform urbanism being the product of closed systems, it should be reinvented as spaces that ensue from an open and generative system.

So, how could an infrastructure like this be built? Instead of creating a new mobility system from scratch, it would be more sustainable and cost-effective to investigate the affordances of existing publicly owned infrastructure. When thinking of public mobility, the rapid transit system possesses promising qualities for a metropolitan-scale distribution grid. The Berliner S-bahn, consisting of a circle route (called the *Ringbahn*), a cross-city route and multiple radial routes, could commit to an additional function to support logistical solutions. When partnering with cooperative rider platforms, operating from stations, a full-fledged micro-fulfilment system is born. Its city-wide reach allows any restaurant, retailer, supermarket, spätkauf, bakery, pharmacy, specialty shop and urban farmer to join the public platform and sell and deliver their product to consumers across the metropolitan region. The new infrastructure's emancipatory capabilities in terms of its extended geographical reach into peripheral areas may help to overcome the skewed spatial dynamics of production and consumption. Moreover, the generative qualities of the infrastructure and platform technology will strengthen the local economy, as it optimizes local markets through a time-space compression and facilitates matchmaking. This public system does not exclude corporate platforms, it simply evens out the playing field by taking away their infrastructural edge acquired through their ideology of disruption: "move fast and break things". It allows local shops to offer their customers the same rapid delivery promise as Gorillas and Amazon. Thus, aside from designing a system that amplifies the accessibility of Berlin's population to services, it is also about designing a system that expands a service's accessibility to its market.

To ignite local production and counter the rigid globalized supply chain, the network shall incorporate another ring into its infrastructural whole. Circling through the peripheral areas of the metropolis, this secondary ring track connects the Berlin-Brandenburg Airport, vast agricultural lands, industrial zones, recycling plants, distribution centres, wholesalers and office parks. Tying together these facilities in the system of provision and production through this circular logistical corridor will promote a locally oriented supply chain, because it makes the local exchange of goods cheaper, more efficient and more convenient. In uniting the primary and secondary rings, there is a special role for the radial routes of the S-bahn network, which could link the two rings as they intersect both.

Furthermore, as argued in Chapter 3, aside from creating the infrastructural and technological backbone for an economy of cooperative platforms, we need to redesign the spatial and social relations of the digital platform as well. To create a platform sector that does not run on a self-perpetuating 'spatial software', along with its segregated infrastructures and dark store enclaves, we must humanize the spaces of The Stack and integrate them into the cultural and social context of the city. Platform workers require what Avermaete (2021) refers to as 'spaces of appearance', which puts platform workers into a position to work in an open frame for interaction, form communities, collaborate, mobilize activism and engage in tactical urbanism. Contrary to its black-boxed and secretive corporate counterparts, a cooperative platform economy generates a richer and more porous type of urban space, brought about by community actions and negotiations.

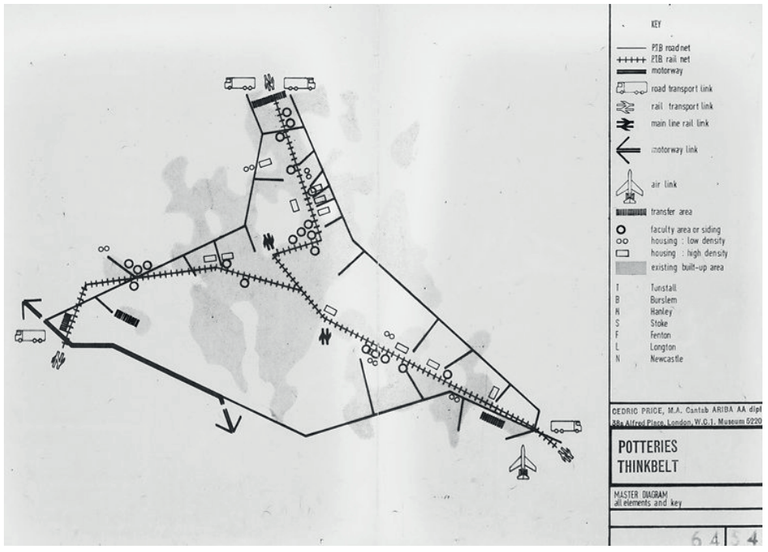
Design Brief

What I propose is to implement a series of interventions to transform the S-bahn network into something that could cater to its new function as a distribution network. Taking the S-bahn train as the most elementary building block of the system, we can add a supplemental wagon at the front or the end of the train, which is set up as a sorting facility (automated or manned). As it moves along the tracks, taking a maximum of 30 minutes to reach the opposite end of the *Ringbahn*, it collects or drops off packages to or from a sorting facility on the station's platform, which in turn prepares it for further distribution by a rider of a local rider cooperative (cooperative platforms could be assigned per S-bahn line, per district or per station).

On both rings, stations are equipped with ancillary program based on a hierarchical system. The most basic stations merely provide essential program, such as a drop-off/pick-up point, a break room and restrooms. Nodal stations, which intersect with a radial S-bahn route are more prominent, as they require additional program for the transhipment of goods, but also to become spaces of appearance. Such program should grow organically, dependent on the needs and spatial generosity of the site. Without predetermining and designating too much program to specific buildings, the idea is to create places which foster 'hybrid' economic activities; meaning that it facilitates businesses partnering with digital platforms while simultaneously maintaining a physical public interface (e.g. shop or showroom) to facilitate moments of exchange. To allow the growth of these particular yet unplanned urban functions, areas around five infrastructural nodes will need to give space to 'surfaces of disorder' as described by Sennett & Sendra (2020). Such 'surfaces of disorder' create conditions for unplanned uses of the public realm, while simultaneously dealing with the temporal and restless nature of platform start-ups as they evolve, scale up, move elsewhere or disappear altogether. This is a key aspect in facilitating platform architectures. "An important property of platform systems is that they are evolvable, in the sense that they can adapt to unanticipated changes in the external environment" (Baldwin & Woodard, 2009). Following a statement in my talk with Benjamin Busch: "If you want to have a platform that is collectively owned that can also scale up, it cannot be a 'safe' space, it has to be a 'brave' space."

To grow sites with these types of affordances, I propose to develop a new type of urban 'free zone' around the aforementioned infrastructural nodes. These designated spaces shall be configured as a campus-like ensemble of permanent and temporary buildings, porous public spaces and supporting mobility and energy production networks. This 'platform campus' could host additional program to support the functionality of the novel infrastructure, such as bicycle rental/repair services, counselling and service desks, informal marketplaces, flexible (co-working) office spaces, conference spaces, parking and storage facilities, cafés, canteens and more. The campus will become a space where the platform economy becomes the domain of social interaction, local production and innovation.

These interventions in turn will counter the centripetal pull of the corporate platform economy, which concentrates and centralizes capital and restricts platform access to the core of the city. This perceived condition is amplified by the *Ringbahn*, as it perpetuates a socio-cultural divide between 'in' and 'out' (Gürgen, 2016). This function of the ring as a boundary (in a physical but mostly a virtual sense), renders it a segregating element in this city. However, by reviving the infrastructure and shaping the conditions for increased economic and social activity, the spaces around the ring and the radial S-bahn routes will cater to the polycentric nature of the Berliner metropolis, since the proposed platform campuses become new concentrations of economic opportunity.

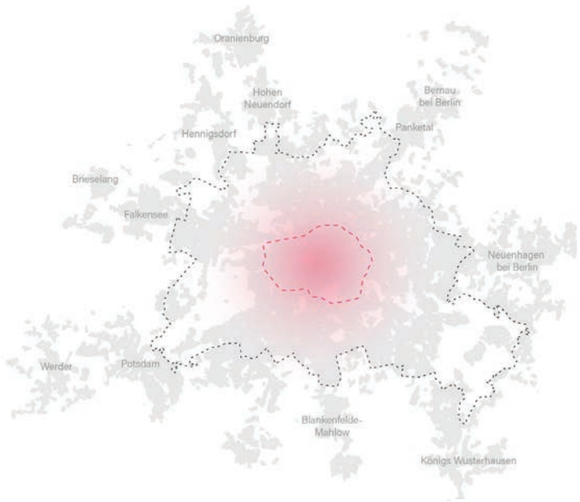


01 Potteries Thinkbelt - using existing railway infrastructure for a 'mobile' university, *Cedric Price*

https://twitter.com/cedricpricework/status/770888317588176897

INVENTARISATION OF EXTERNALITIES

PLATFORM MECHANISM	SOURCE	PLATFORM POTENTIALS	DESIGN RESPONSE	POLICY RESPONSE	VALUE AT STAKE	KEY ACTORS	*STACK* LAYER OF INTERVENTION
COMMODIFICATION OF PUBLIC SPACE AND GENERATION OF NON-PLACES	Mörtenböck & Mooshammer (2021), Augé (1995)	URBAN MESSINESS	Create 'surfaces of disorder', appropriating underused space in the city to grant space to new platform businesses to experiment, grow and interact. These spaces should be flexible and have no predetermined function. Treat *Cloud* layer entities and infrastructures as integral parts of the city by humanizing these spaces.	Adapting regulation according to the perceived disturbances. Prioritize true 'sharing' social initiatives by non-profit cooperatives over corporate alternatives. Also create state funding and temporary zoning exemptions for creating these 'surfaces of disorder'	AFFORDABILITY EQUALITY LIVABILITY	BERLIN SENATE CORPORATE PLATFORMS PROJECT DEVELOPERS	CLOUD, CITY, USER
DATAFICATION	Van Dijck (2014)	UBIQUITY OF DIGITAL TECHNOLOGY		Promoting an open source approach to data collection and publication to create a conception of (non-personal) data as a public commodity. This will create a more level playing field that does not encourage the monetization of data mining.	TRANSPARENCY DEMOCRACY	GERMAN GOVERNMENT CORPORATE PLATFORMS COOPERATIVE PLATFORMS PLATFORM USERS	CLOUD, INTERFACE, ADDRESS, USER
MONOPOLISATION AND UBERIZATION	Andersson Schwarz (2017)	MARKET OPTIMALISATION	Building tight knit networks consisting of production sites, distribution channels (and interfaces) and customers in close proximity, creating spatial advantages of local initiatives relative to corporate global platform companies.	Tightening antitrust regulations and mobilizing local civic and public stakeholders to incentivize the creation and reinforcement of state/public owned alternatives to corporate platform (logistical) infrastructures.	INDEPENDENCE AFFORDABILITY ACCESSIBILITY	EUROPEAN UNION CORPORATE PLATFORMS PLATFORM PARTNERS TRAD. MARKET COMPETITORS	CLOUD, CITY, USER
LOSS OF LOCAL CULTURE	Pasquale (2016)	URBAN MESSINESS	Enriching platform ecosystems with localized forms of mobility and production/manufacturing. Building 'spaces of appearance' to create physical interactions between platform *Users* and a sense of community.	Mobilize policy instruments for (local) state actors to ensure that platform companies need to put effort in adapting their operations to local regulations and win public support.	IDENTITY DIVERSITY	PLATFORM WORKERS CORPORATE PLATFORMS PLATFORM PARTNERS BERLIN SENATE LOCAL RESIDENTS	CLOUD, CITY, USER
SUBVERSION OF THE LABOUR MARKET	Davis & Sinha (2021)	ACTIVIST MOBILIZATION		Set up co-creation programmes to stimulate interaction and promote initiatives of cooperative forms of platformization through state funding, in order to finance the required digital technology and gear, ensuring that platform workers gain ownership and influence on their employment conditions.	SOCIAL SECURITY WELL-BEING EQUALITY	PLATFORM WORKERS COOPERATIVE PLATFORMS GERMAN GOVERNMENT INVESTORS	CLOUD, CITY, USER
DIGITALISATION OF SOCIAL INTERACTION	Maginn et al. (2018), Andersson Schwarz (2017)	UBIQUITY OF DIGITAL TECHNOLOGY	Abolishing the divide between digital transactions and physical space by making processes of production and logistics more transparent and accessible.		LIVABILITY SOCIAL COHESION	PLATFORM PARTNERS LOCAL RESIDENTS COOPERATIVE PLATFORMS BERLIN SENATE	CLOUD, CITY, INTERFACE, USER
SHIFT OF POLITICAL POWER DYNAMICS	Bratton (2016), Van Doorn et al. (2020), Srnicek (2016)	ACTIVIST MOBILIZATION		Reclaiming sovereignty over public space by investing state resources to create public alternatives to corporate platforms and allowing non-profit actors to use them, in order to mitigate practices of exclusion exercised by monopolistic platforms	DEMOCRACY SOVEREIGNTY	PLATFORM PARTNERS PLATFORM USERS COOPERATIVE PLATFORMS GERMAN GOVERNMENT	USER
INTENSIFICATION OF LOGISTICAL TRAFFIC	Mims (2021), Avermaete (2021)	SHIFT IN URBAN MOBILITY PATTERNS	Facilitate logistics by creating spaces on the street with multifunctional purposes, for example allowing the swift transformation of public street space to a loading dock and back.	Optimise logistical operations in the city by assigning businesses off-peak timeslots to do supplies.	SAFETY LIVABILITY	BERLIN SENATE CORPORATE PLATFORMS LOCAL RESIDENTS	CITY, USER
CENTRALISATION OF CAPITAL	Sadowski (2020)	MARKET OPTIMALISATION	Ensure equal distribution of platform services across the metropolitan area to avoid a strong divide between access to products and services and the burdens of extraction of resources between urban and peripheral areas.		AFFORDABILITY ACCESSIBILITY	BERLIN SENATE CORPORATE PLATFORMS GERMAN GOVERNMENT PLATFORM USERS PLATFORM PARTNERS	EARTH, CITY, USER

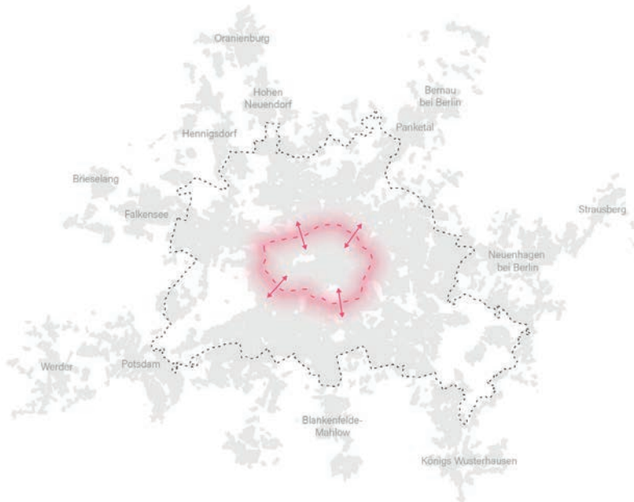


1 ECONOMY OF CORPORATE PLATFORMS

access to platform services restricted to the most dense urban areas, mostly inside the S-bahn ring, catering to the further centralization of capital

2 THE VIRTUAL CITY WALL

the problem of the ring perpetuates the already existing socio-cultural divide between central Berlin and the peri-urban and rural Berlin-Brandenburg areas

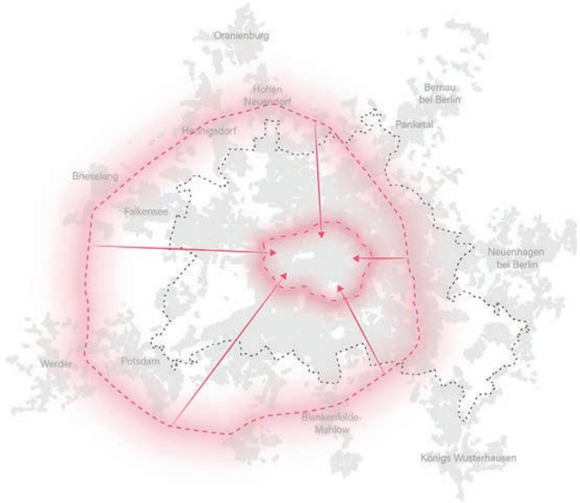


3 THE RING AS A CONNECTOR

using the ring as a public micro-fulfilment infrastructure will transform its surrounding areas into a zone with an elevated potential for economic activity and local production

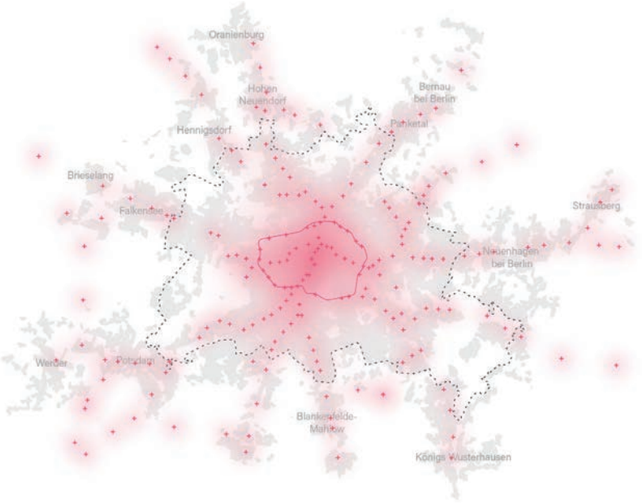
02 Concept schemes - from the current to the future situation

Illustration by the author



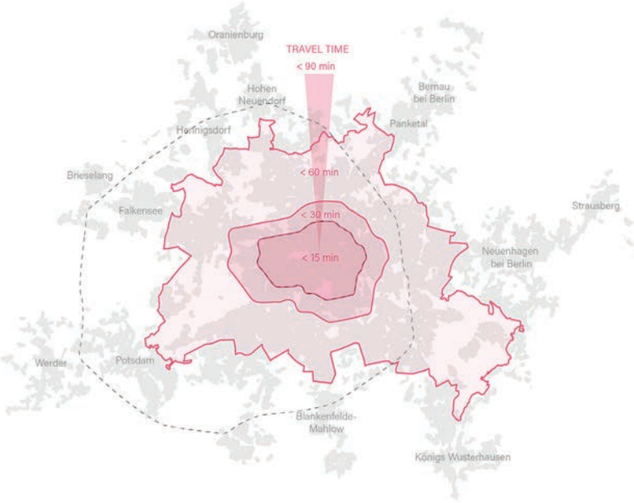
4 A 2ND RING TO STRENGTHEN LOCAL PRODUCTION

activating a second ring will connect the peripheral areas of the metropolis, ensuring that local supply chains can be built and increase the economic clout of the productive landscapes outside the city



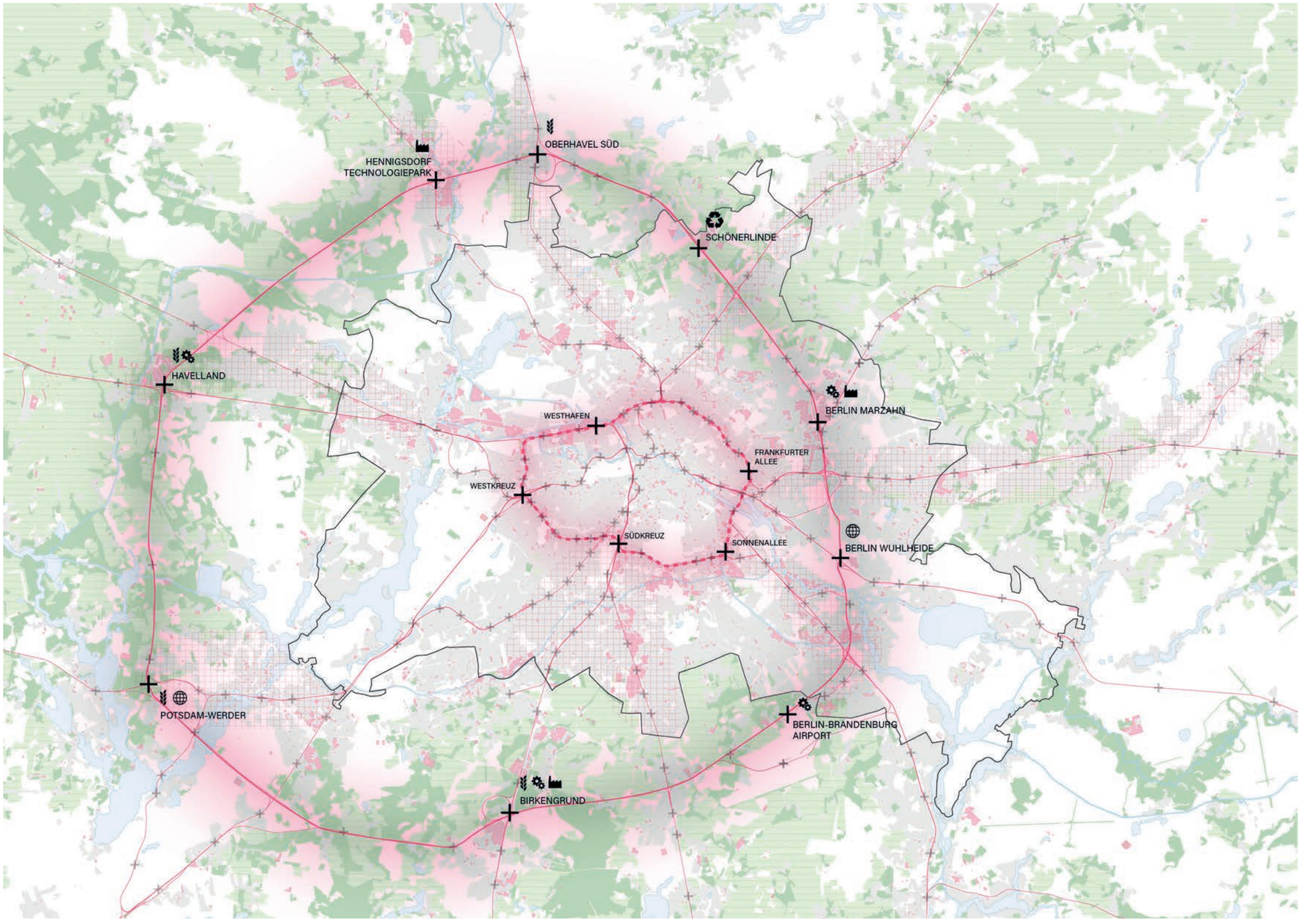
5 ECONOMY OF COOPERATIVE PLATFORMS

access to platform services expanded as a result of the establishment of a public micro-fulfillment centre, when all S-bahn stations use their potential to become a node within this infrastructure in order to build feasible cooperative platforms



6 BERLIN'S TIME - ACCESS LEVELS

the public micro-fulfillment infrastructure will be most effective in the immediate surroundings of the Ringbahn, aiming at travel times below 30 minutes, while travel times for the whole Bundesland are set at <60 minutes, and <90 minutes for the municipalities in the metropolitan area



Legend:

LAND USE

- Urban fabric
- Arable land
- Non-irrigated arable land
- Water body
- Development zones
- Existing business and industry
- Pick-up/drop-off platform node
- Infrastructural platform node
- Manufacturing industries
- Processing industries
- Agricultual production
- Supporting platform services
- Waste management

NETWORKS AND BOUNDARIES

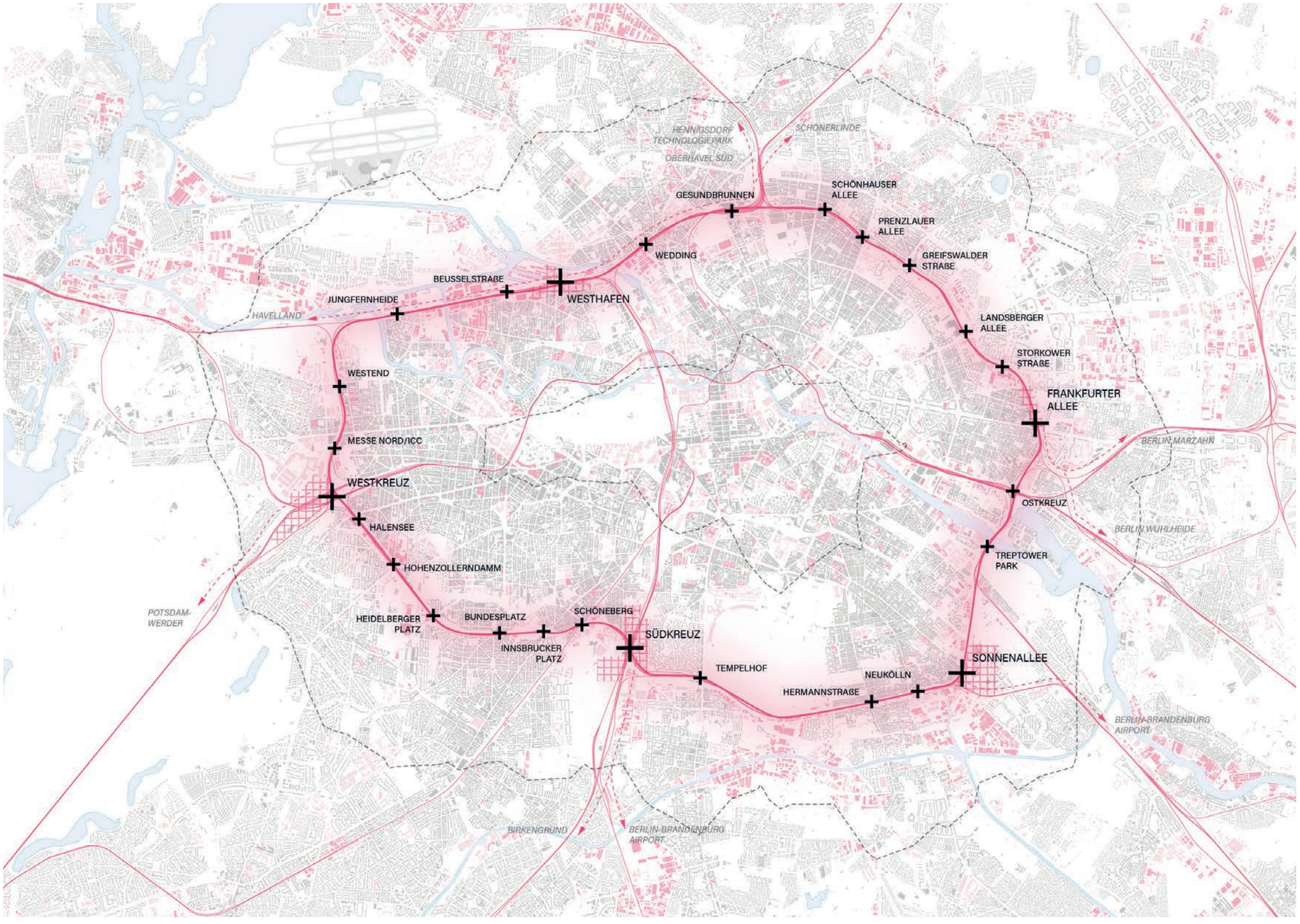
- Water network
- BERLINER DISTRIBAHN
- BRANDENBURGER HANDELSBAHN
- S-bahn
- Administrative boundary Berlin

N

SCALE 1:250.000

03 A public infrastructure for distribution and local production

Illustration by the author



Legend:

LAND USE

- Building block
- Water body
- Places of production
- Places of work
- Platform gateway campus
- Pick-up/drop-off platform node
- Infrastructural platform node

NETWORKS AND BOUNDARIES

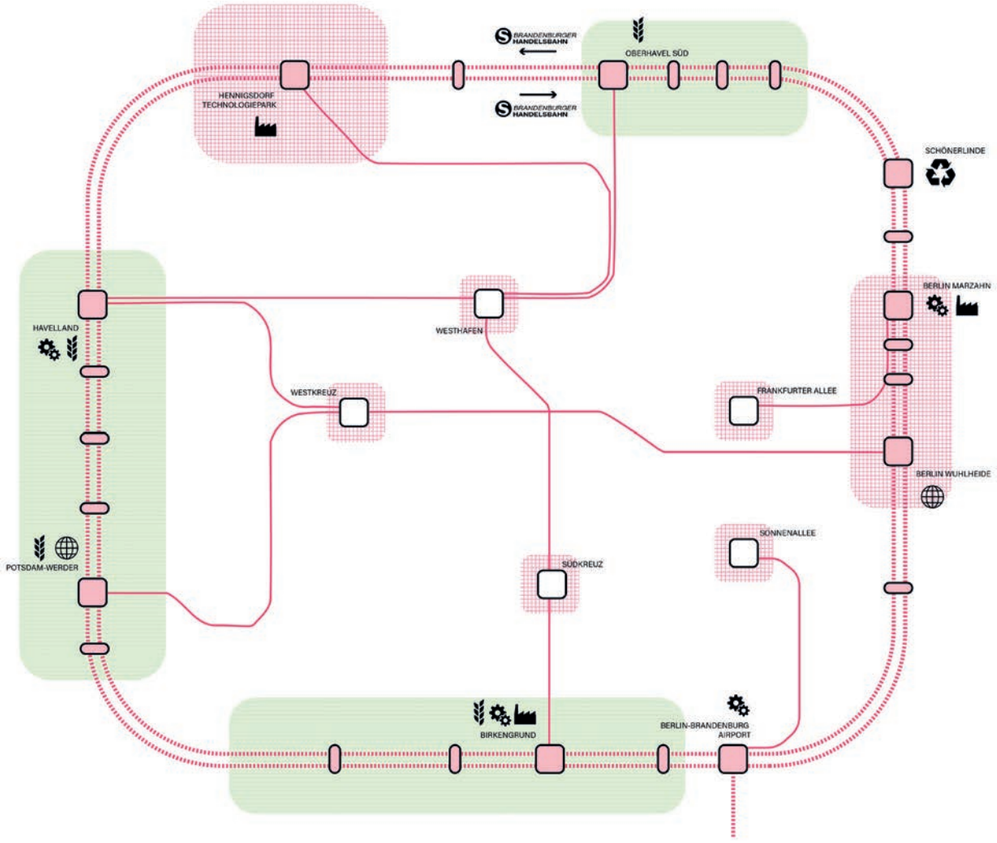
- Water network
- Rail network
- Ringbahn
- 10 min isochrones Ringbahn

N

SCALE 1:80.000

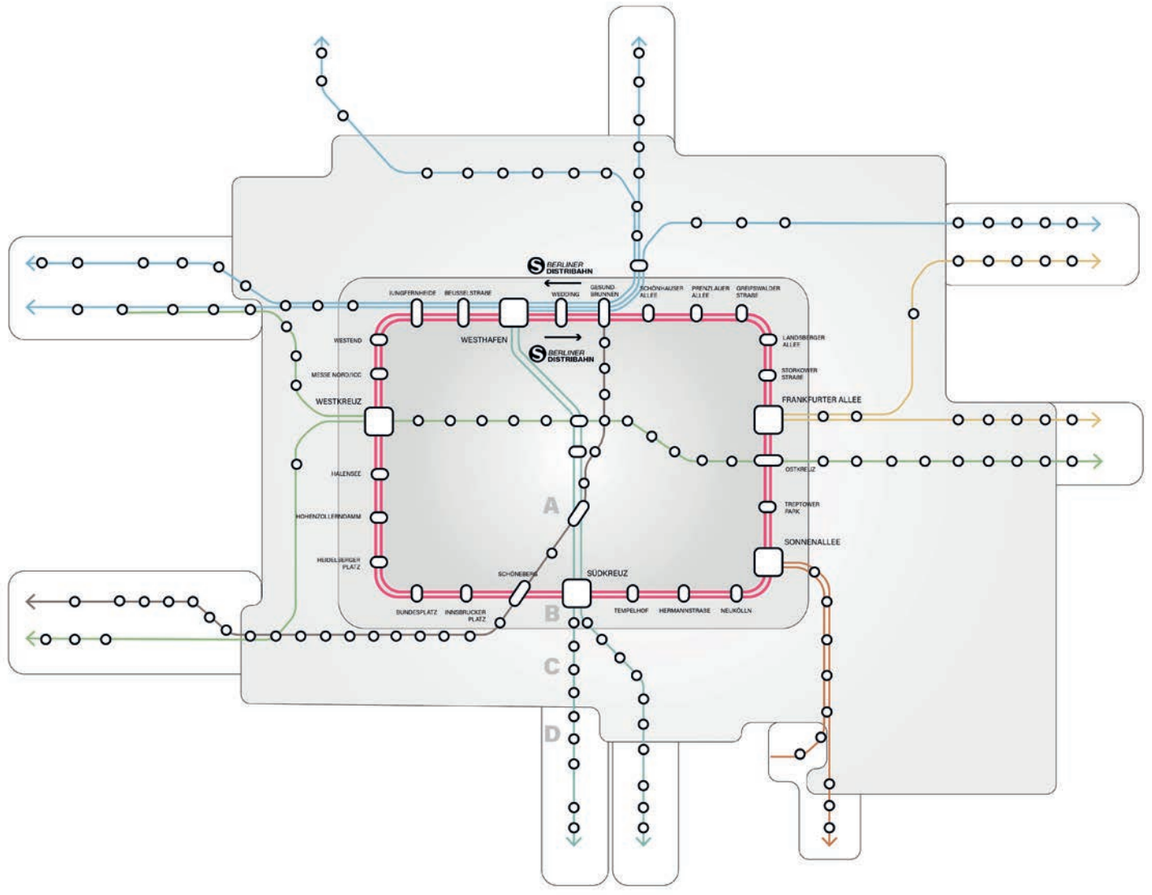
04 Hierarchy of stations on the S-bahn ring

Illustration by the author



05 Brandenburger Handelsbahn schematic map

Illustration by the author

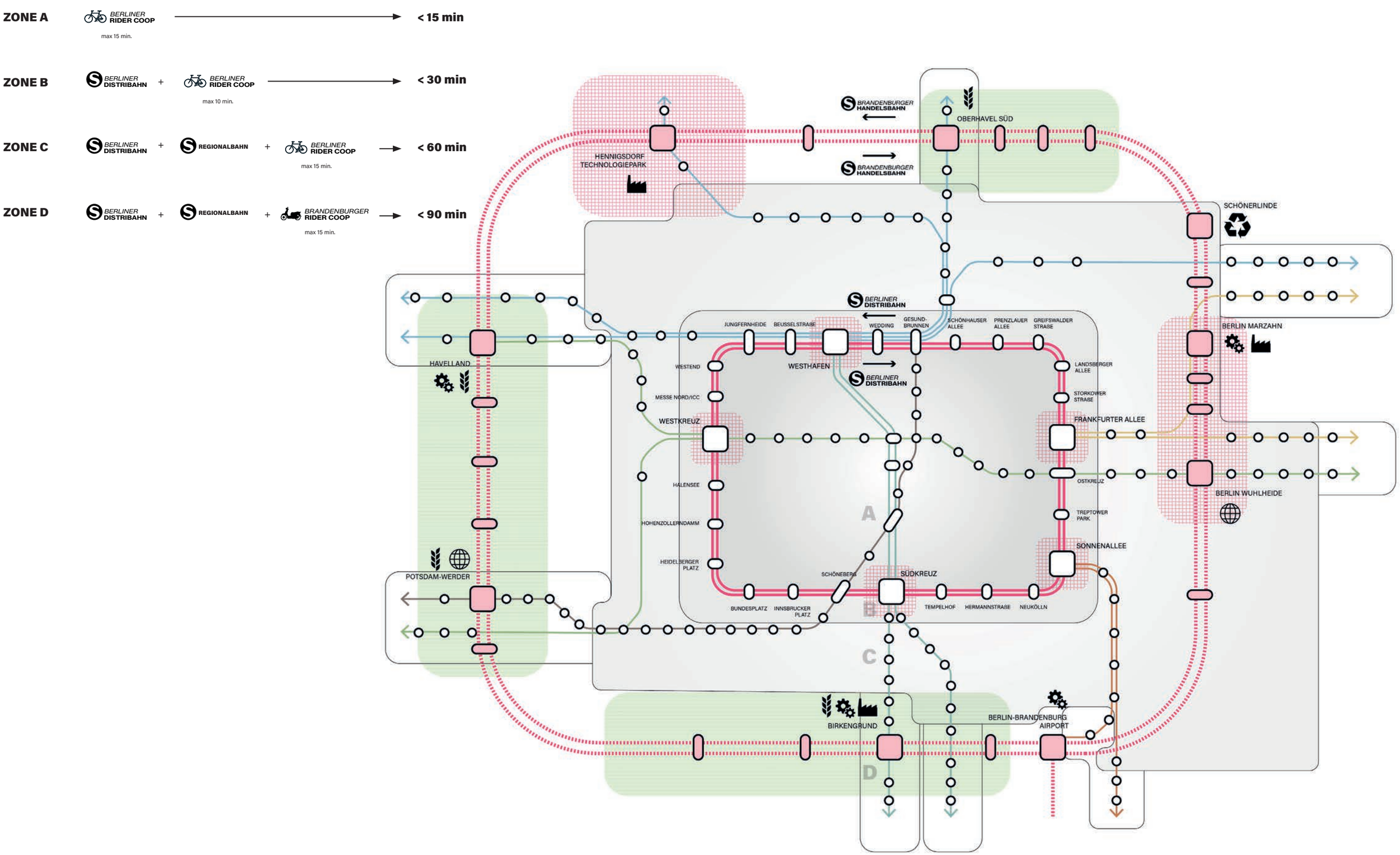


06 Berliner Distribahn schematic map

Illustration by the author

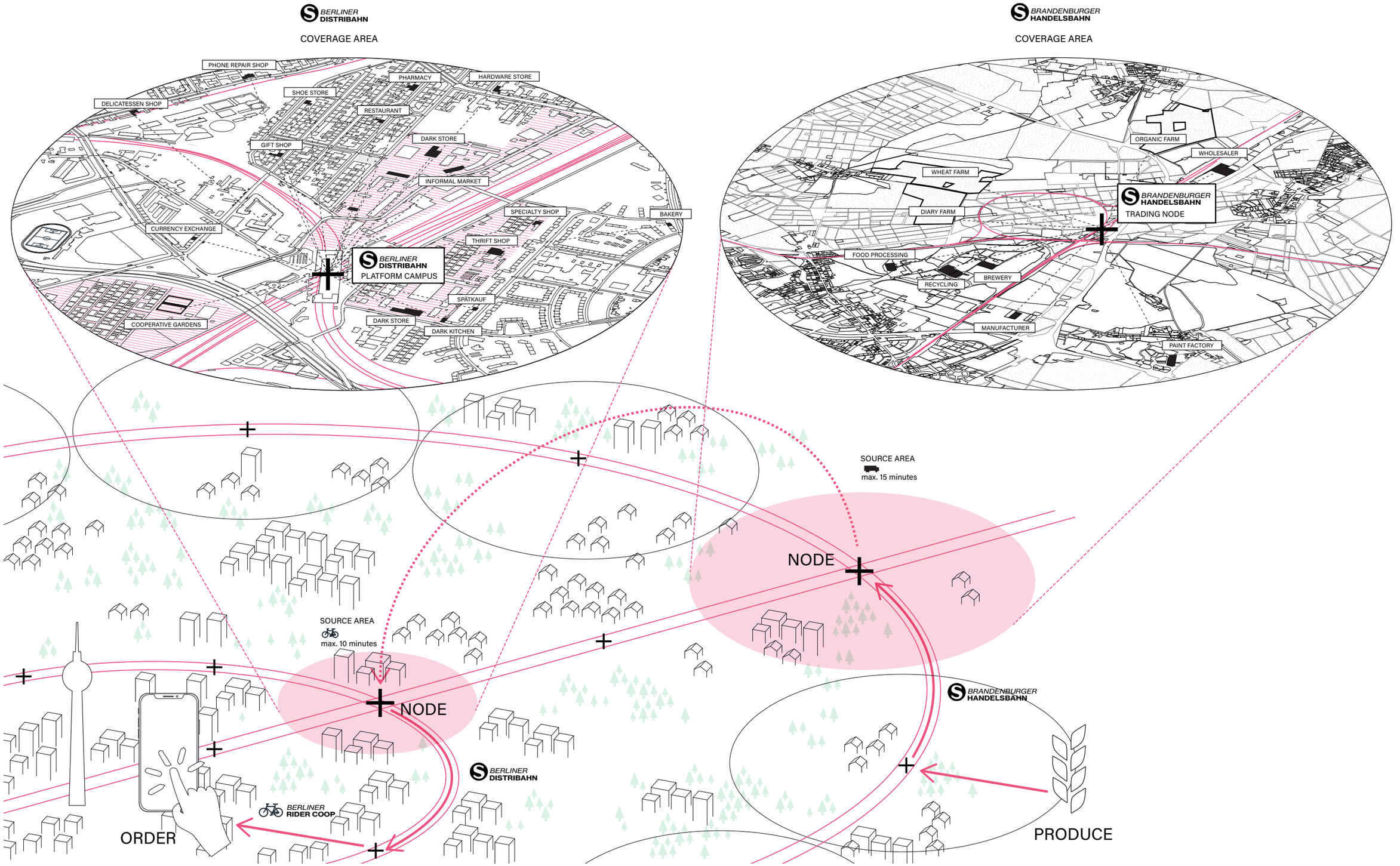
07 Combined infrastructure, schematic map

Illustration by the author



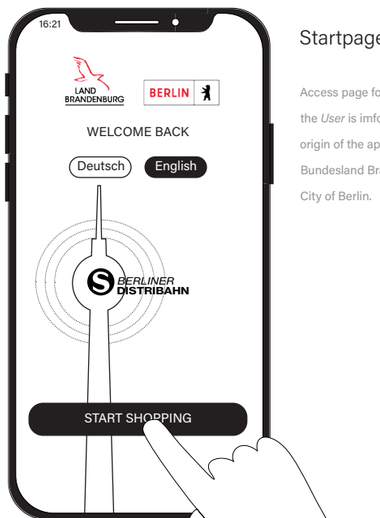
08 Conceptual overview of the functionality of the infrastructure

Illustration by the author



09 Graphic User Interface - How to use the app

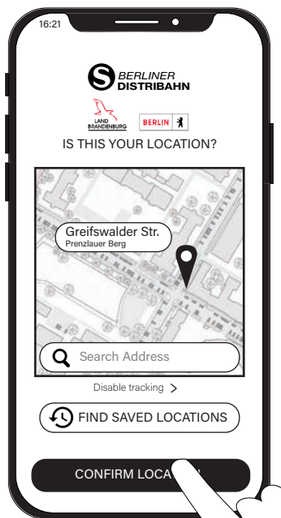
Illustration by the author



Startpage

Access page for the app, where the *User* is imformed about the origin of the app: A joint initiative by Bundesland Brandenburg and the City of Berlin.

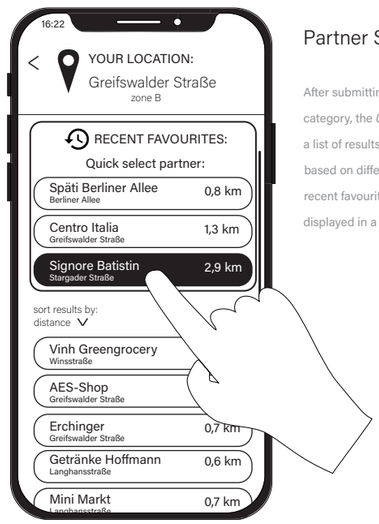
1



Geolocation

The *User* is asked to confirm a delivery address, which can be estimated through GNSS services. Also previously saved locations can be selected for convenience and tracking preferences can be added.

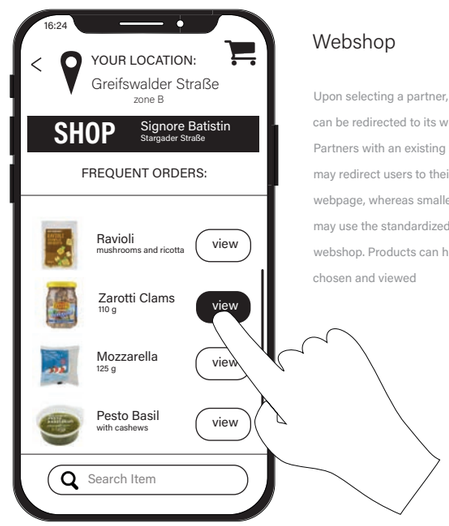
2



Partner Selection

After submitting the preferred category, the *User* is presented with a list of results which can be sorted based on different metrics. Also recent favourites can be stored and displayed in a convenient box.

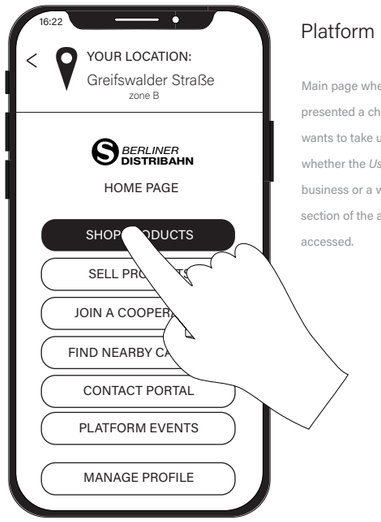
5



Webshop

Upon selecting a partner, the *User* can be redirected to its webshop. Partners with an existing webshop may redirect users to their own app or webpage, whereas smaller business may use the standardized in-app webshop. Products can here be chosen and viewed

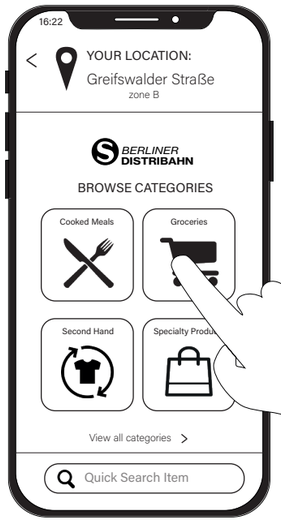
6



Platform Homepage

Main page where the *User* is presented a choice to what role it wants to take up. Depending on whether the *User* is a consumer, a business or a worker, a different section of the app interface will be accessed.

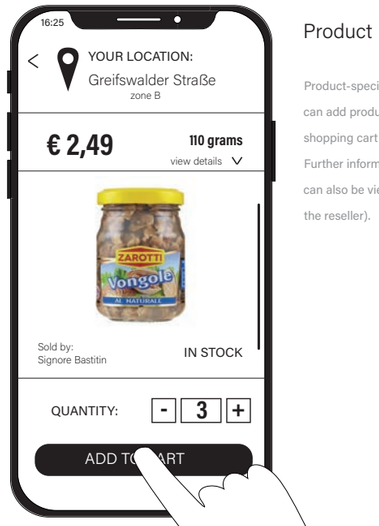
3



Shopping Homepage

Main page for platform consumers, where they are asked what sort of product category is wished to be browsed. Also a quick search query can be submitted to find a specific product.

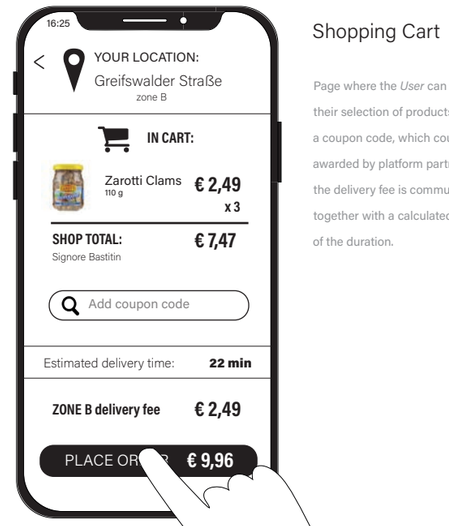
4



Product Info

Product-specific page where *Users* can add products to their virtual shopping cart in the desired quantity. Further information about the product can also be viewed (if provided by the reseller).

7



Shopping Cart

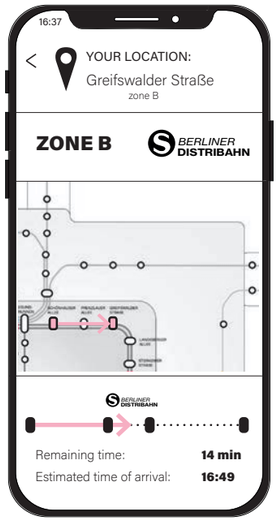
Page where the *User* can check their selection of products and apply a coupon code, which could be awarded by platform partners. Also the delivery fee is communicated here, together with a calculated estimation of the duration.

8

9

Progress tracker pt. I

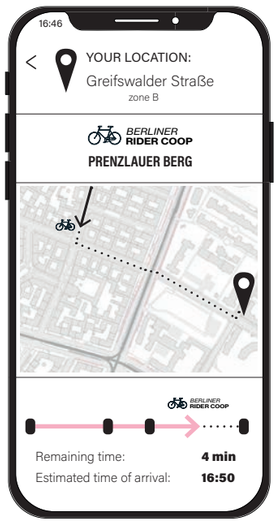
After completing the order, the *User* is allowed to track the order. In this case, it will first tell show how a local rider coop transports goods to the Distribahn drop-off point.



10

Progress tracker pt. II

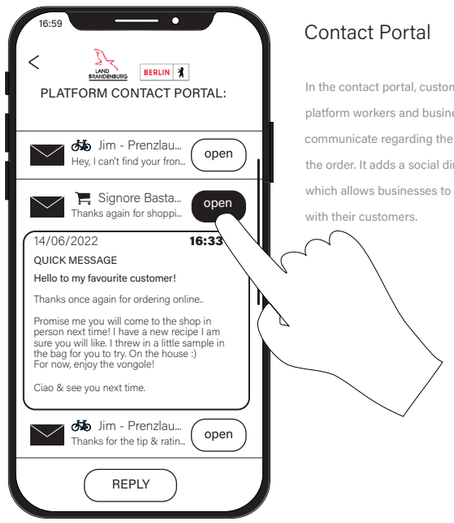
It is then transferred to the S-bahn system, where it rapidly travels to another station.



11

Progress tracker pt. III

The final stage involves transferring the order to the local rider coop in the area of destination. From there on out, a rider is navigated to the submitted adress, where the *User* receives the order.



12

Contact Portal

In the contact portal, customers, platform workers and business can communicate regarding the status of the order. It adds a social dimension, which allows businesses to engage with their customers.

Policy Conditions

Following the conclusions of Chapter 3, the primary goal of creating a digital and physical platform infrastructure through state-owned resources is to lay out the foundational groundwork for a generative ecosystem of cooperative platforms. While the idea of platform cooperativism is not new, as it was coined by Scholz (2016), it is evident that as it stands now, cooperative platforms are not provided the means to compete as alternatives for corporate platforms. This means that the initial push has to be made by public actors. Adapting the S-bahn infrastructure to make it available to logistical transportation will be the first fundamental step towards a profound change in the field of delivery-based platform activity in Berlin. Since the railway infrastructure is state-owned, the public sector posesses full sovereignty. In similar vein, a public digital infrastructure needs to be built. Yet, the goal should not be a centralized state-owned platform app, according to Pariser & Allen (2021): "what's needed is not one publicly owned Facebook clone, but an armada of localized, community-specific, public-serving institutions that can serve the functions in digital space that community institutions have served for centuries in physical places (n.p.)." The *Distribahn* application may conform to this idea.

It is obvious that this endeavour to build a public micro-fulfilment infrastructure will be a costly operation. While most stations may only require a modest adjustment, the platform nodes require a serious intervention to facilitate the transshipment of goods from one train to another. Therefore, using this service will not be free for consumers. Charging a small delivery fee depending on the delivery zone could help to win back the investment. However, the most significant gain in this trade-off for Berlin is the ability to foster a hyper-efficient localized economy, along with the increased prospects for local employment, social justice, livability and sustainablility. In this way, state actors are enabled to reclaim sovereignty over basic public services in its urban environment.

From here on out, the next challenge arises in finding appropriate spaces for accomodating cooperatives on a platform campus, preferably in close proximity to nodal stations. What is needed is to facilitate zones for experimental types of urban development, or so-called 'surfaces of disorder', in order to create the conditions for a platform campus. If the Berlin Senate could provide land to cooperative initiatives, it will allow them to build abilities, relationships and values that will enable cooperatives to improve their viability and achieve their objectives.

In order to kick-start and institutionalize the efforts of the cooperative platform community, the city could provide assets that are managed by the community but remain owned by the city, meaning that the city and cooperatives are co-managing public land and/or real estate. The city council proceeds to cover management expenses in order to keep the buildings and public spaces operational while also holding the right to intervene in case the non-exclusiveness of the asset is compromised.

10 Aerial photo of station Südkreuz

Bing Maps

11 Südkreuz parking deck

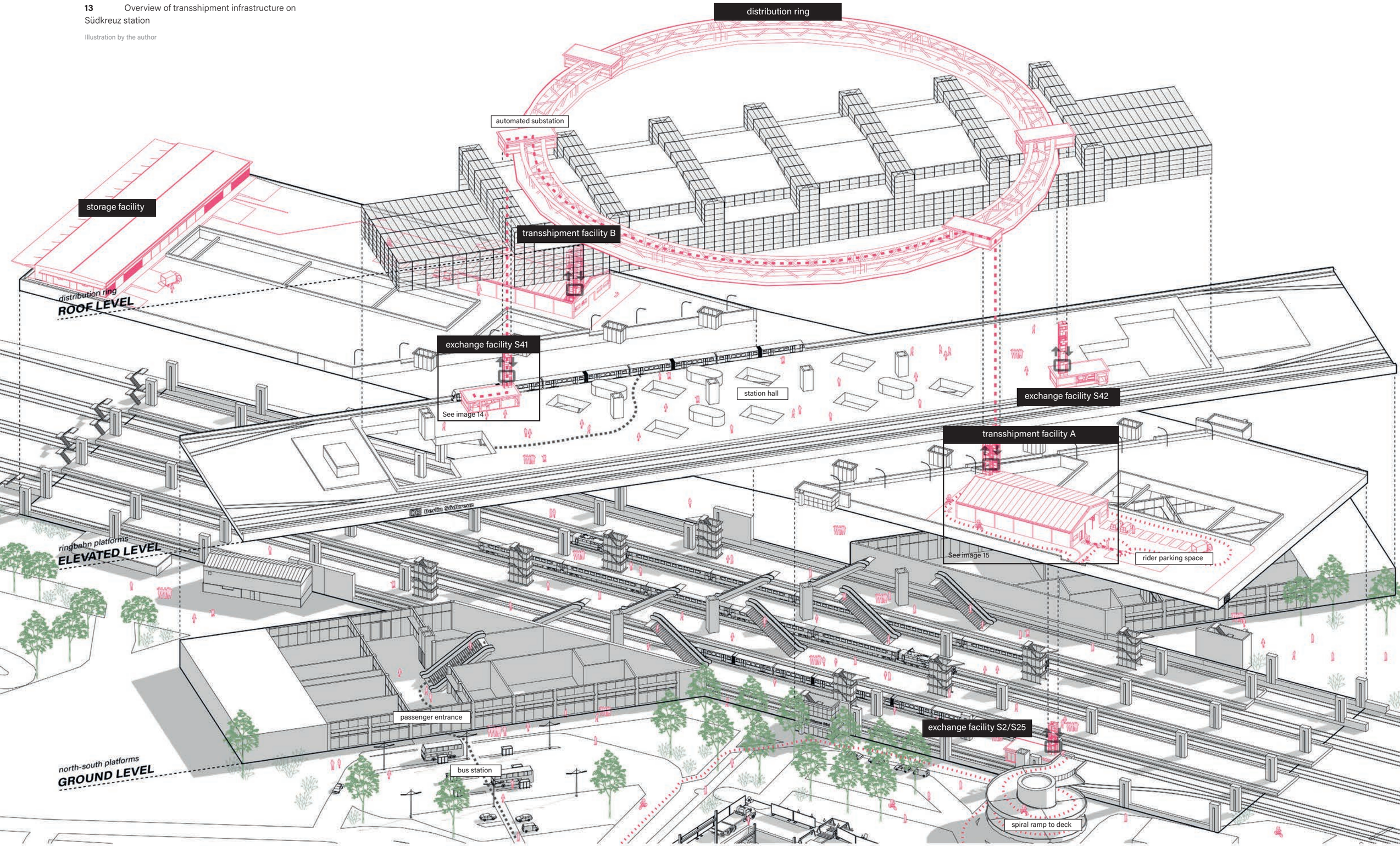
Image by the author

12 Südkreuz ground level platforms

Image by the author

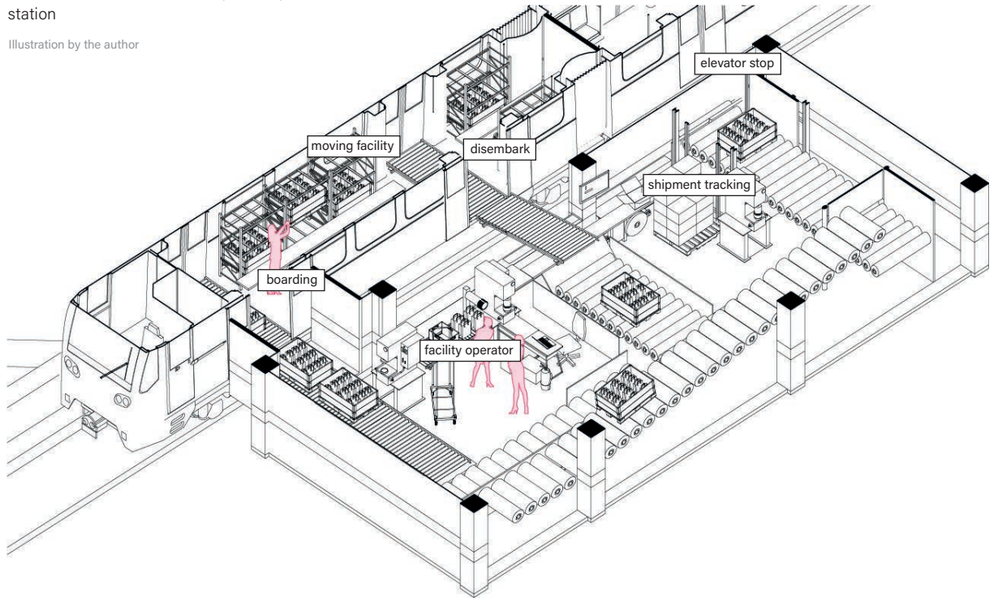
13 Overview of transshipment infrastructure on Südkreuz station

Illustration by the author



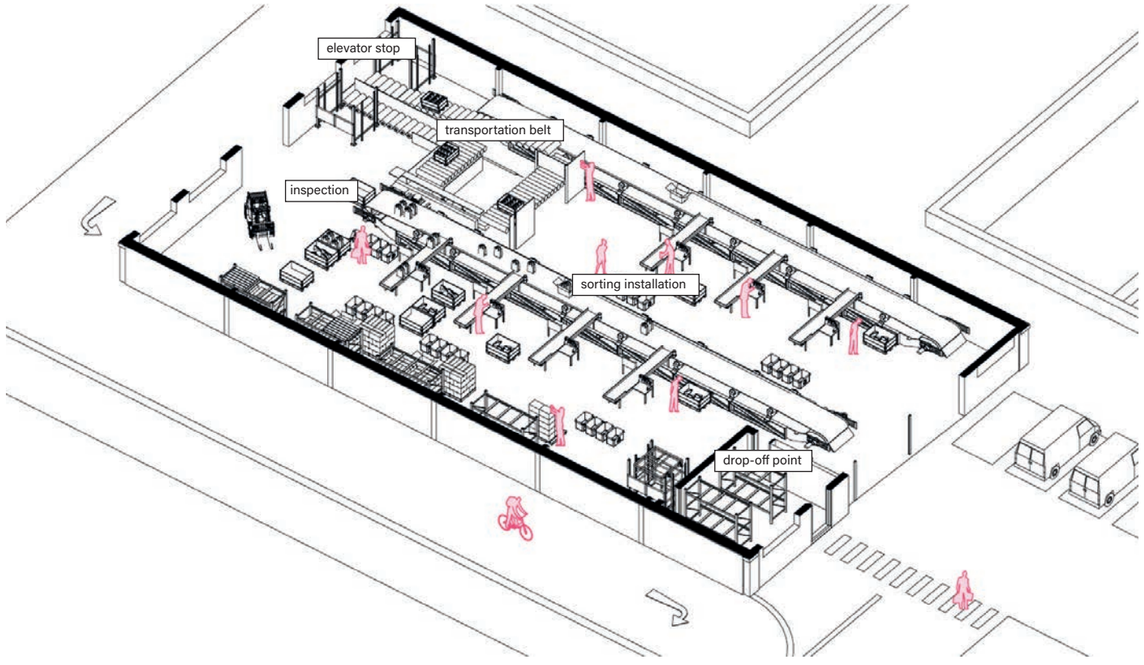
14 Overview of exchange facility on Südkreuz station

Illustration by the author



15 Overview of transshipment facility on Südkreuz station

Illustration by the author



Towards a Platform Architecture

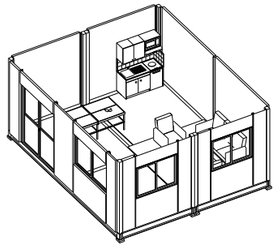
When reverting back to the architectural scale, which has been a major area of focus during the analysis, the objective is partly to facilitate the conditions for experimentation with the physical spaces of platforms. As the architectural requirements of platform activities may be even more capricious than those on the scale of the city, it is sensible to anticipate to the changing spatial requirements of platform enterprises. Following up on the extensive analysis of dark stores, the issues ensuing from the spatial rigidity of current facilities condone the call for an alternative approach.

To this end, for the design of the platform campus and dark stores, we can seek to appropriate and apply the same generalized theoretical principles that guide the organizational architecture of the digital platform, which is responsible for its generative capacities, agile functionality and evolvability. Baldwin & Woodard (2008) consider the key to this to be the following (p. 41): "In essence, a "platform architecture" is a modularization which partitions the system into (1) a set of components whose design is stable and (2) a complementary set of components which are allowed—indeed encouraged—to vary." Following Baldwin & Woodard (2008), platform architectures allow complex systems to adapt to changing circumstances and technologies. Complex systems, by definition, consist of many components that work together to achieve a functioning whole. Yet, they argue, tight integration can lead to rigidity. To overcome this, platform architectures could help to make the system evolvable. As such, rather than the platform being a product, it could be interpreted as a design strategy.

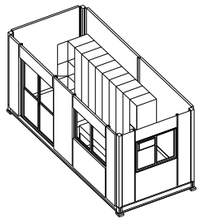
Therefore, the architectural design of dark store facilities operated by platforms may follow this logic by taking on a modular approach, meaning that they consist of a set of core modules, which support a set of 'peripheral' components which could add to the functionality or operational capacity of the system. Envisioning a dark store in this manner could be a way of allowing it to become an 'open infrastructure', as Sennett & Sendra (2020) would refer to it. Especially when being governed by platform cooperatives, dark stores can attend to the generative capacity of platforms.

Elaborating on this, Baldwin & Woodard (2008) regard the points of contact between different modules, the interfaces, of crucial importance in platform architectures: "The architect must also be able to create stable yet versatile interfaces, which can accommodate linkages that are unforeseen at the time the architecture is created" (p. 24-25). Translating this to a physical space, we may interpret this as zones without predetermined functions, but with functional capabilities instead. Within the voids or inbetween spaces of the evolvable structures of standardized modules, these could emerge.

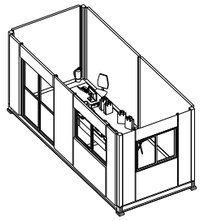
CORE COMPONENTS



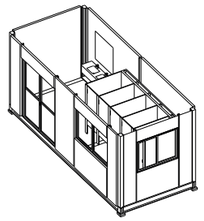
A BREAK ROOM



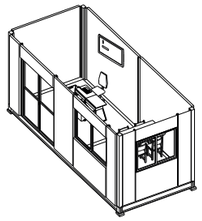
B LOCKER ROOM



C ORDER DISPATCH

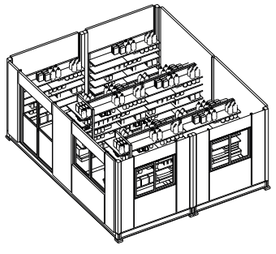


D SANITARY UNIT

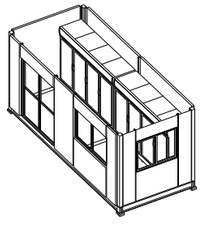


E WAREHOUSE MANAGER OFFICE

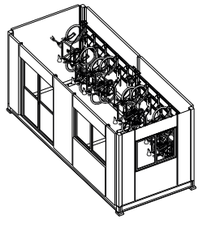
COMPLEMENTARY COMPONENTS



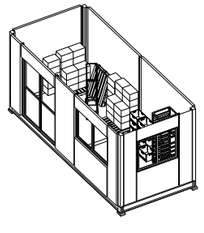
F WAREHOUSE UNIT



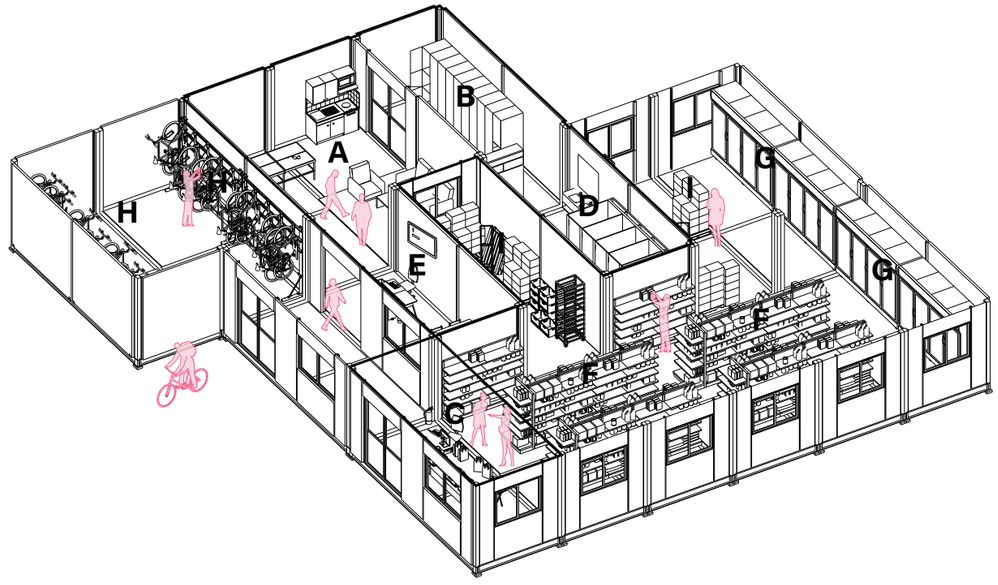
G REFRIDGERATED UNIT



H BICYCLE UNIT



I STORAGE UNIT

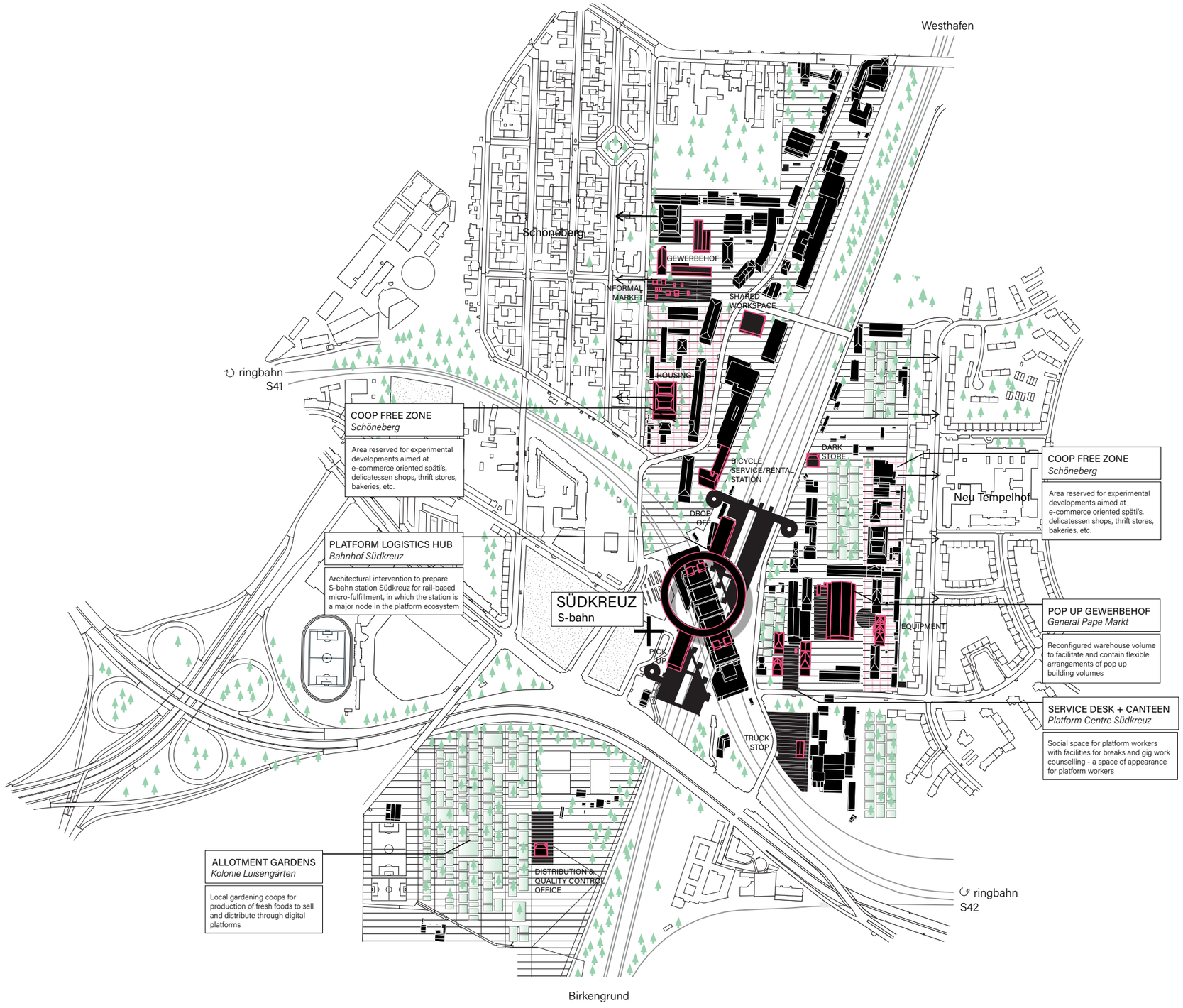


16 Overview of a dark store example built as a platform architecture

Illustration by the author

17 Masterplan

Illustration by the author



18 Mobility and accessibility

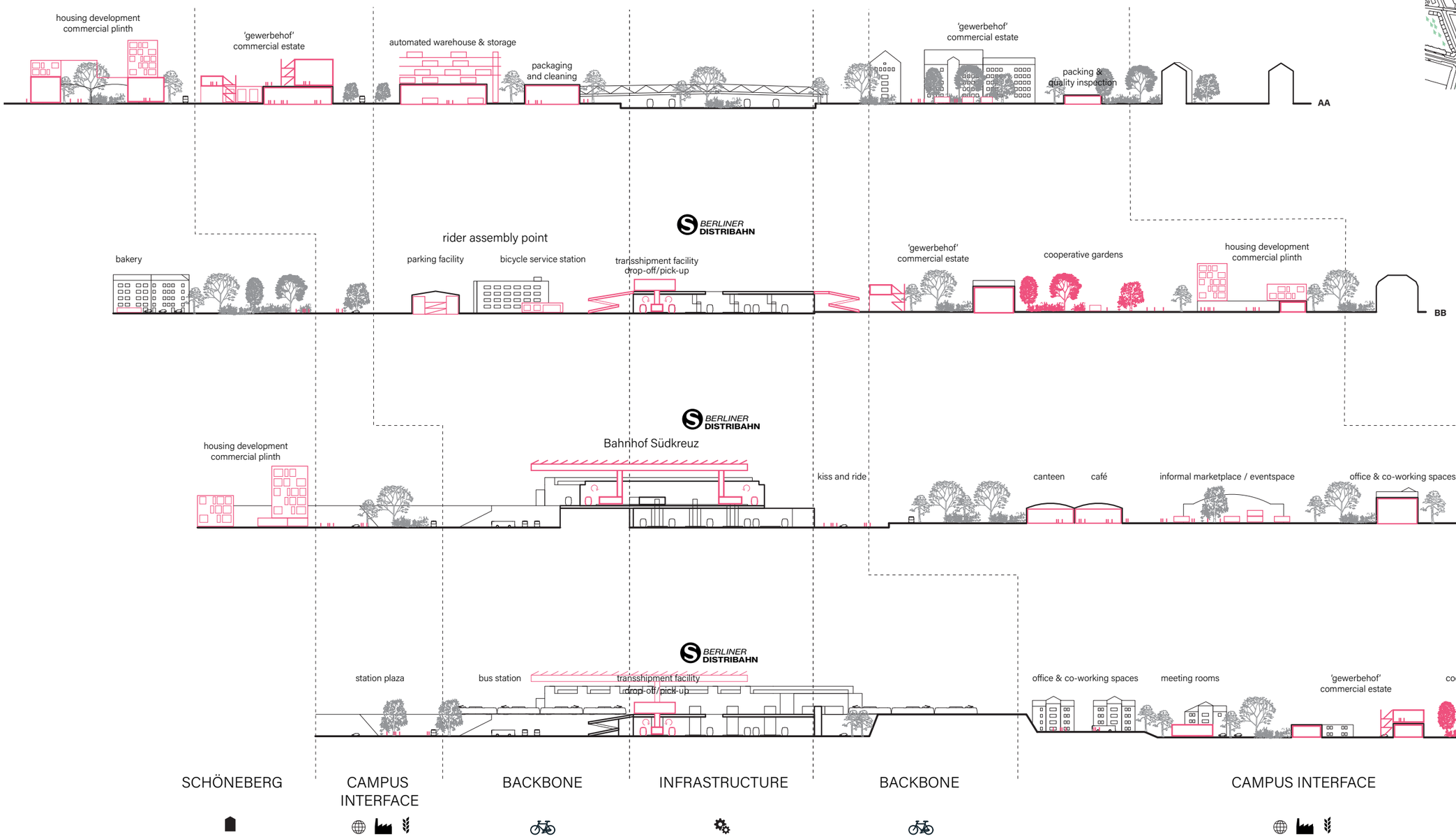
Illustration by the author

19 The *Distribahn* Infrastructure

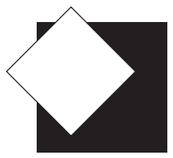
Illustration by the author

20 Sections and program

Illustration by the author

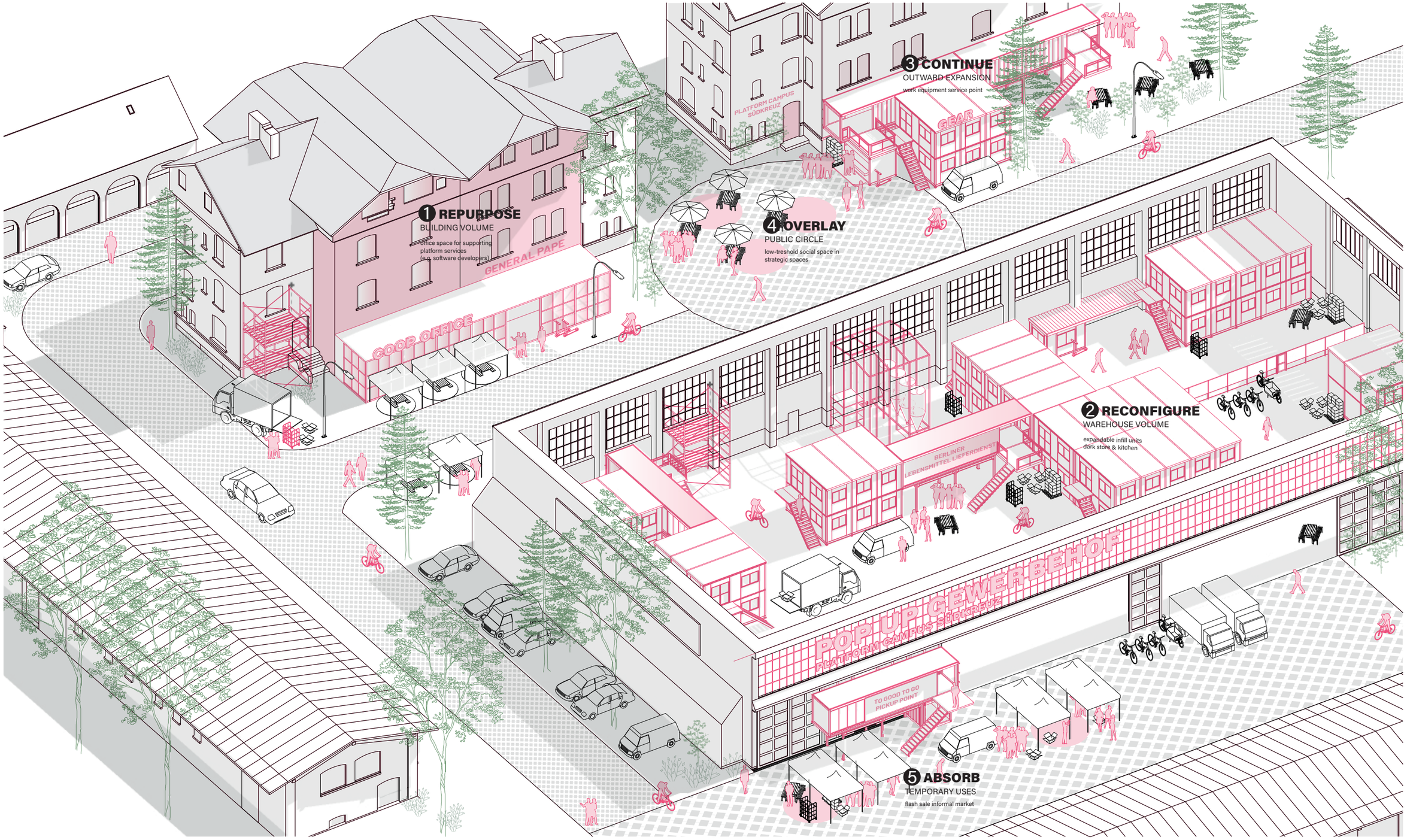


REUSE STRATEGIES

STRATEGY	REFERENCE DETAILS	FUNCTION/CHANGE	APPLICATION IN PROJECT	REFERENCE IMAGES
	**1 REPURPOSE** Appropriate existing spaces which do not function anymore by assigning them a new use within the confines of the existing space	Boros Collection Berlin, DE Realarchitektur	From WW II Bunker to exhibition space for a private art collection	Apply in existing buildings that can easily host generic program such as offices and other types of workspaces	 
	**2 RECONFIGURE** Appropriate existing spaces and objects which do not function anymore by freeing them up and appropriating them for multiple uses of different kinds that require flexibility to grow and adapt	People's Pavilion Dutch Design Week Eindhoven, NL SLA Architects	From borrowed building components into a flexible pavilion	Apply in large building volumes that are too big to accommodate a new function. Use temporary and flexible infills to subdivide spaces into smaller, more servicable parts, like dark stores	 
	3 CONTINUE Expanding existing spaces by merging them into a larger whole to fit the spatial needs of its function	Quinta Monroy Iquique, CL Elemental	Expandable housing to accomodate growth	Apply when building volumes do not facilitate the desired spatial conditions, both in terms of size or in terms of its appearance and architectural qualitites	 
	**4 OVERLAY** Allowing two or more functions to occupy the same space as they intersect one another and create a multifunctional space	Place Rogier Brussels, BE Xaveer de Geyter	Public space is projected on a square dominated by its function as an infrastructural node	Apply when spaces fail to deliver qualities that is necessary to fulfill a spatial need. Additional uses can be envisioned and embedded in existing spaces through design interventions	 
	**5 ABSORB** Allowing temporary activities (pop ups) to occupy a space for a different purpose than the space that hosts them	Gillett Square London, UK Hawkins Brown	Public space is created in such a way that it can host temporary functions without conflicting with other uses	Apply when spaces are only intensively used in selected moments of the day, which opens up opportunities for temporary uses in other moments	 

21 Axonometric overview of a space in the campus interface

Illustration by the author



C.

In Conversation with:

Dr. Pablo Sendra

About the interview

Dr. Pablo Sendra is a Spanish architect and urban designer. He is an Associate Professor at The Bartlett School of Planning, University College London. He combines his academic career with professional work through his own urban design practice, Lugadero, which focuses on facilitating co-design processes with communities. At UCL, he is the Director of the MSc Urban Design and City Planning Programme and the Coordinator of the Civic Design CPD. He has carried out action-research projects in collaboration with activists and communities. In this conversation, I speak with Pablo to discuss the ideas presented in his book *Designing Disorder* (written together with Richard Sennett in 2020). The goal is to find out to what extent 'disorder' can be used as a design tool to counter the negative externalities of platform urbanism.

Biography adapted from https://pablosendra.com/about/

BVDD Pablo, I think we can identify an interesting relationship when thinking of platform urbanism and your concept of disorder. In the book by Mörtenböck & Mooshammer (2021), your colleague Leo Hollis mentioned how platform urbanism tends to design out all forms of unexpected encounters and uses of public space. Yet, when thinking of dark stores, ad-hoc parking areas for shared e-scooters and spontaneously formed waiting areas outside restaurants for delivery workers, we can identify ways in which urban spaces are being appropriated and used in ways that counter its predetermined or expected function, which seemingly attends to the idea of 'disorder'. However, I think that there is a general consensus that these examples are not considered to be desired uses of the city. How do you view these phenomena vis-à-vis your conception of 'disorder'?

PS I completely understand where you are coming from and I think that there is always a certain danger with our book of misinterpreting disorder, as in 'anything can happen' in public space. If we look at the tendency of leaving multinational corporations to transform our current cities – because they have the power to do so – we could end up with a city that uses spaces in the most economically profitable way. And I think that the concept of a dark store or dark kitchen fits that tendency. It is about using a minimum of space in the most economically efficient way. It is a space that is stripped down to only the productive parts. We could imagine in what direction the city is going, to something that almost works like a warehouse. The same happens with housing. Here in London, private housing is the most economically profitable type of urban development. All developments tend to be high density housing with very little space for social infrastructures where people can meet and gather, so that becomes almost minimal in comparison to the amount of housing units is are being built. A lot of the communities that I have been collaborating with in London face the fact that their neighborhood is triplicating its density, while the amount of spaces to gather for the community is reduced to less than half. It will bring us dead public spaces and cities where people do not meet. What we propose is something totally different. It is another type of flexibility and capacity of the city to adapt and evolve. That is why we propose to act into layers. I think we need to provide some sort of 'spatial support', as in public spaces and social infrastructures for grassroots developments to take place. So I hope that its clear that there is a difference. What we propose is that there are certain spaces that favor this kind of social interaction and that you need to design them.

BVDD I guess 'disorder' is in some ways a tricky word to use because it is prone to misinterpretations.

PS There is this anarchist tradition that Richard and I identify for ourselves. We look the concept of the 'anarchic' city, where there is this process of self-organization and collaboration, and a probably less anarchic part where we propose a strong but open municipal structure that ensures that there is a fair distribution of resources among people. On the other hand there is this idea of anarcho-capitalism where platform urbanism responds to, by letting the free market dictate and do its work. It is of course not the same.

BVDD A word that often appears to be used in books and articles dealing with platform urbanism is 'disruptive', suggesting that digital platforms make these incursions into existing uses of public space. In my fieldwork, I found examples of dark stores in Berlin in which there are numerous activities taking place in front of dark stores where available space is very limited. One of my personal conclusions was that designing 'disorder' is not just about overlaying multiple different uses and activities on the same space, it is also about shaping the conditions to facilitate them. One point of criticism towards platform companies can then be that they simply fail to contribute to this. I am curious to hear how you think about this and if you have any ideas on how these uses, such as waiting spaces for delivery workers, parking areas, et cetera can be integrated into our public spaces.

PS I would go even beyond that. I do not think it is matter of integrating them. We can go back to the root of it and start thinking about what many of these companies do. Look at Amazon for example; we can see in the U.S. how they try to avoid that their workers can unionize. They oppose any kind of communality and social interaction. In platforms, sometimes the people that make deliveries are not even employees, they are freelancers. The same happened in Spain with Deliveroo. So there is a more fundamental problem at the root than asking ourselves whether they use space in appropriately or not. Their vision is very much opposing anything that goes against their economic interest. So to me it is not a matter of how to integrate platform activities, I would much rather think of how to change and rethink logistics in our cities. I have a few students in the master's that I run here at UCL that look at how to do fair logistics. I know about initiatives with rider cooperatives and also some friends of mine started Fairbnb, as an alternative, community-led platform. So I am wondering how we can use those alternatives to offer a platform experience that does not destroy the city but instead contributes to the richness of it. Because otherwise, we get situations like in some city centers in Spain where no one really lives, because all housing is rented out to tourists. I remember when I was living in Seville and this process was just starting to happen. One of the neighbors started offering their apartment through Airbnb and everyone around found it kind of annoying. We started having tourists coming up and down all the time. It turned out that this was just the start, as it has become a much more widespread phenomenon in Seville since then.

BVDD I think this is a very interesting thing to witness, especially also when thinking of how cities deal with these situations. Usually they come up with bans or restrictions, for example to maximize Airbnb rentals to ninety days per year. I feel that the general discourse on platform urbanism is too much oriented on regulating dark stores through policy, such as bans and local ordinances.

PS True, it is about mitigating the damage. I was recently writing a paper for a book. It is about urban planning in London. We have a progressive mayor, which is Sadiq Khan, but a lot of the urban planning is about setting rules for developers to mitigate the damage that they are out to do. Instead, what is needed is a much more proactive approach to produce favorable alternatives. Otherwise it keeps advancing and advancing. We have been trying to restrict, but in the end it is still getting worse anyway. So it is a matter of coming up with alternatives.

BVDD I agree. Yet, very little attention appears to be put in the potential of architecture and urban design to solve issues regarding dark stores. I think it is interesting that the reflex is to restrict these uses rather than to find alternative ways and facilitate them through design. In Amsterdam they are now banning dark stores in central and residential areas of the city, on the premise that it accounts for too many unwanted conflicts and nuisance. Isn't there a way to solve this without bans but through designing the spatial conditions more carefully?

PS I do believe that there is indeed potential for design. But this is exactly what I was saying. We should start by wondering what the purpose of the dark store is. What is it providing us and how can we transform this model into a different one that brings benefits to cities and sociability? It is about turning what Richard and I call a 'closed system' without any social interaction into an open one. So there is a way of design thinking required to come to a different system of arranging these transactions. Digital platforms are usually so powerful that they manage to find a way around regulations. So once again, we have to come up with alternatives.

BVDD I think that establishing a zoning plan in an urban design may just achieve the complete opposite of what you and Richard Sennett hope to see in a project. Still, there must always be some form of structure and predetermination when proposing an urban design. Perhaps it depends very much on what type of project we are dealing with, but I was wondering if you have any general remarks on where you think is the right balance between both opposites and what types of policy tools do you think are necessary to achieve this.

PS One thing that Richard and I always agree on is that we do not believe in policy. We are more into action, as in specific design actions which are a bit more tangible than policies. So therefore we like to think in physical interventions rather than policy. This is why we propose this idea of 'infrastructures for disorder' in our book to make transformations that create conditions for the unplanned. One of the examples that we give is Gillett Square in London. It is interesting not just because of the interventions but also because of the process through which it is done. It started out as a car park, but by placing kiosks there in the public realm with affordable rents, it allowed people from the Afro-Caribbean community to start a business. As a result, people started gathering; which then generated the possibility to create a square. After that, new paving was laid out and a couple of shipping containers with equipment were brought in, such as screens, table tennis, Softplay for children and so on. So this is the kind of infrastructure that we refer to. We like to give public spaces functional capabilities rather than to determine functions themselves. They should be sufficiently flexible to be able to adapt to change, but simultaneously also to provide the possibility for a diverse set of activities to take place.

BVDD In working on my thesis project I was very much intrigued by those ideas promoted in the book, following the concept of 'open infrastructures.' Based on what I read in the book, I think we share our concern that that many infrastructural assets in the city are corporate-owned. Especially when thinking of logistical services, such as the micro-fulfilment infrastructure of Amazon and Gorillas, we see that there are not really any public alternatives. We cannot be too surprised that this results in 'closed infrastructures', considering that they cater to their own interests and operate on proprietary technologies. Does this contribute to the fact that logistical infrastructures and its building blocks, such as distribution centers and dark stores are always becoming these enclaves in the city?

PS One of my students was looking at something very similar to this. She was looking at how to combine distribution centers with social infrastructures, green facilities and urban farming and so on through more cooperative structures. Her project was very design oriented that also had that dimension of looking how things come together and how logistical services could operate for the common good and not just for the interests of one company. So this

01 Gillett Square, London, UK - making 'surfaces of disorder' to facilitate multiple uses of public space, *Hawkins\Brown*

https://www.hawkinsbrown.com/projects/gillett-square

is definitely something to explore. Also there is this aspect to it where consumers are barely aware of all that is behind this act of placing an order. It is designed in such a way that we do not see how it gets to your door. It looks as if it just magically appears.

BVDD True, this also reminds me of what is discussed in the book. Infrastructure is always either underground or made invisible in other ways. Dark stores and dark kitchens are an excellent example. They are meant to be black-boxed. People are not allowed to look inside because its functionality is proprietary. So this is an important part of the design challenge I think. Tom Avermaete plays into this and pleads for 'spaces of appearance', where platform workers can have interaction with each other and become part of the city, as these infrastructure spaces are their workspace.

PS Exactly, platform companies normally tend to do exactly the opposite.

BVDD To conclude, my graduation project revolves around the creation of a public micro-fulfilment infrastructure in Berlin. To achieve this, I proposed to use the existing S-bahn system and adapt in such a way that it could also be used to ship products around the city in a quick, convenient and sustainable way. I think that if it could be presented as a public platform and used by local producers and entrepreneurs, it could become an interesting alternative to global corporate platforms. What are your thoughts on whether such an initiative could be a feasible and effective attempt to have an infrastructure that can function as an open system?

PS Well, I guess it depends on the type of spaces that it generates. It should not just be about a system for economic distribution. I would advise to explore in what ways this is going to be a better alternative. So you also have to think carefully of what are the collective spaces for interaction that your proposal is getting into.

06.

Conclusion & Discussion

Takeaways of Platform Urbanism in Berlin

Chapter Intro

In this chapter, I shall make a concluding statement on the findings of my thesis. Upon finding the main and most fundamental problems with regard to platform urbanism in Berlin through theoretical and empirical research, the final objective is to formulate how the products presented throughout this thesis contribute to solving these problems. This will be done first and foremost through answering the main research question: "What interventions are needed to integrate digital platforms in the urban fabric of Berlin while attending to the social and economic sustainability of the metropolis?" Moreover, this chapter will contextualise this research with regard to previous research on this topic, which gaps remain, which limitations can be pinpointed, and which transferrable lessons are learned.

Before landing at the conclusions of the main research, I will first gather the main conclusions of previous chapters:

- How are digital platforms becoming influential in the urban context over time?

The theoretical exploration of the context domains presented in Chapter 3 and the expert interview with Benjamin Busch shows that digital platforms are proliferating in cities for multiple reasons. These can be explained through multiple lenses. From a point of view of economy and technology, we can see that platforms are becoming the dominant organizational model of the 21st century. In a capitalist economy, it appears that platforms are highly effective at optimizing and streamlining economic relations and capitalize on 'idle' public resources through technological mechanisms of data collection and AI. This is stimulated by its ability to monopolize markets and its vast financial resources provided by venture capital investments, which in turn grants them political power. Continuing on a political point of view, platforms are able to exploit the 'crisis' of the Westphalian state. By operating mostly online, platforms manage to avoid regulations imposed by local authorities and make use of policy gaps and the lack of agile policymaking – following the motto "move fast and break things". This is proven in multiple ways, ranging from deceitful 'partnerships' to illegal employment conditions. Furthermore, as platforms make face-to-face interaction redundant, they flourish in times of COVID-19 and the individual society.

- What are the possible futures of platform urbanism in Berlin?

It was found that many disruptive platforms are dependent on a loose monetary policy by the Federal Reserve and the European Central Bank, which is crucial to sustain venture capital investments. As such, the long-term viability of platforms such as Uber and Airbnb is fiercely doubted by scholars such as Srnicek (2016). Yet, other influential research, by Bratton (2016) for example, also explain that digital platforms may become so dominant that they will gain the power to compete with state-actors. Broader consensus can be found in that we rely on alternative models to corporate platforms in order to move towards a more hopeful future of platform urbanism. In order to do this, we can think of ways to empower cooperative platforms, and find ways to make the people of the platform economy a more integral part of the public sphere, granting them more representation in the city.

- What spatial elements and changes does platform urbanism produce in the urban fabric of Berlin?

Platform urbanism – being the result of digital platforms operating in cities – brings about physical elements and redefines socio-spatial practices and impacts that are produced by the uptake of new technologies in public space. Using the lens of Bratton and Lefebvre, this research identified multiple phenomena. What is most striking, is how new corporate infrastructures embed themselves in the city. This includes the proliferation of *Cloud* layer infrastructures, such as telecommunication, data centers and fibre optic cables, as well as logistical infrastructures and its micro-fulfillment centers, dark stores, and fleets of delivery vans and riders. Moreover, the findings of this research show that flash delivery platforms (in this case Gorillas) prioritize the strategic placement of dark stores near main roads over the necessity to find sites with (micro-)spatial generosities that fit their logistical function.

- How does platform urbanism change the lived experience in Berlin?

It became clear that platform urbanism in its current form imposes burdens on public space and exacerbate inequalities between the central areas and peripheral areas. Given that the mechanisms of capital accumulation and data extraction are most effective in urban environments, it is proven that access to digital platforms is predominantly found in dense urban areas. However, peri-urban areas are mostly inflicted with the ecological ramifications, resource extraction burdens and liveability deteriorations, without gaining access to platform services, infrastructures and technologies. Instead, on the account of its airports, data centres, distribution centres and highways, it becomes the domain of the non-place.

The theoretical and empirical findings above confirm that platform urbanism presents problems on both the level of design and policy. This brings us to the main research question:

- What interventions are needed to integrate digital platforms in the urban fabric of Berlin while attending to the social and economic sustainability of the metropolis?

Responding to issues regarding accessibility and livability, a redesign of the flash delivery platform ecosystem fits the ambition to reclaim and even expand 'the right to basic public services' and mitigate further capitalization on public space and practices of exclusion. Therefore, the idea of platform cooperativism is envisioned to be the egalitarian and long-term sustainable alternative. As Srnicek (2016) and Scholz (2016) argue, to facilitate an economy of cooperative platforms, we require efforts towards making a public infrastructure. To this end, I propose to develop an emancipatory logistical infrastructure, which should cater to the promise of the cooperative platform movement and a practice of true sharing. That way, digital platforms can gratify their more hopeful definition by Andersson Schwarz (2017, p.376) as "surfaces for technical innovation, on top of which new actors can develop additional services or products". Central to this idea is to use the S-bahn network for logistical purposes, so that local

businesses gain access to a public micro-fulfilment infrastructure to reach a market beyond their own neighborhoods. Moreover, a secondary S-bahn ring will be activated for cargo shipment, knitting together the productive landscapes in the peripheral areas of the metropolis and strengthening their economic clout and accessibility to platform services. Crucial nodes in this infrastructure should then facilitate new types of economic activities, in which cooperative platforms and locally oriented producers of consumer goods and foodstuffs are facilitated and are granted proximity to the novel infrastructure. A new campus-like urban development will create a 'space of appearance' for platform workers, where the many workers of the platform economy in Berlin can work in an open frame for interaction, stimulating cooperation, community building and innovation.

Transferrable Lessons and Recommendations

This thesis aimed at finding ways to find how urban design can facilitate the formation of a more viable, democratic and accessible platform economy. This is necessary, as the current platform economy is proven to be flawed, supported by findings of Sadowski (2020). Following the work of Scholz (2016), using the idea of platform cooperatives to counter many of the negative externalities that corporate platforms bring forward, I pursued the necessity to go beyond Scholz's manifesto, as it focusses predominantly on policy implications rather than concrete spatial requirements. Including empirical research into my research and testing the spatial theories of Bratton and Lefebvre in practices, I managed to combine theoretical work and empirical work and come to concrete spatial recommendations to build upon Scholz's idea of cooperatives, which Srnicek (2016) deems promising, but in need of additional funding and infrastructures in order to become a serious competition for corporate alternatives. While the field of spatial design could produce tangible solutions, it appeared that concrete solutions to this problem have not been offered.

This graduation work highlights that platform urbanism is already widespread in the city, and that its implications are not fully understood. Since this project focusses predominantly on flash delivery platforms, the full range of effects is not yet fully conceptualized through empirical research. Also the empirical work presented in this thesis could be more extensive, as fieldwork visitations to Berlin were limited. More research can be done on dark stores, monitoring additional typologies, different weather conditions and times during the day.

From the empirical work, multiple recommendations can be made for future research on platform urbanism. It is evident that dark stores are a major aspect of platform urbanism, but more research can be done on the entire supply chain, which is not fully represented in this research. Also a comparative study involving other cities could be a helpful addition to the discourse. Moreover, I believe this research proves that the problematics around integrating the operations of digital platforms relies on spatial design, as it appears that with flash delivery, the public discussion is too emphatically made into a search for the right legal instruments to regulate dark stores. In some occasions a temporary ban rolls out here, or sometimes a local ordinance is proposed. Municipalities watch expectantly and pull the emergency brake when the damage has already been done. Machiavellianism reigns. Considering the recent problems with Gorillas, especially in The Netherlands, it is not the first time that the tone has been set towards a problematic relationship between governments and digital platforms.

Uber, Airbnb, Flink and Gorillas all preach the same disruptive Zuckerberg ideology, along the motto "move fast and break things"; storm the market with venture capital, maximize the growth of new users and evade legal action until there is really no escaping it. Despite this predictable pattern of action, platforms can still take advantage of the slowness of decision-making processes to impose their services on the urban dweller in record time.

The platform economy, also known as the fourth industrial revolution, like its predecessors, is going to have radical changes in the layout of our urban areas. The dark store is just one of the many symptoms of this metamorphosis. Where previous technological revolutions often brought with them questionable new forms of urbanity, such as massive suburbanization and monotonous office districts, this revolution is also well on its way to leaving a spatial footprint in the urban fabric. Add to this the fact that the physical spatial phenomena are often the product of a complex interplay with elusive digital technology, and the recipe for administrative misery is complete. While resorting to regulation seems a logical reflex, it is also time to look at this problem with more imagination and, above all, not to focus on dark stores alone.

This imagination will have to be created by approaching these spatial changes in a guiding and designing way. Now that the city is increasingly becoming the playing field for complex logistical and technological processes, the city itself is becoming an interface, which increasingly runs on software from platforms such as Amazon, Uber and Gorillas. It is therefore inevitable that architects and urban planners have to join forces with software developers and programmers, as also argued before by Bratton (2016). While these professional groups at first sight unrelated, each focus on a conception of space. One physical, the other digital. The building blocks of our urban software, consisting of distribution centers, data centers and dark stores, hardly seem to be subject to any form of spatial design. The contemporary city is increasingly taking on the appearance of a motherboard, where all forms of liveliness and informality must make way for optimization and rationality. This is unfortunate, because the platform economy certainly offers opportunities as well. With the help of platforms, hyper-efficient local markets can be created, which can finally provide an alternative to the far-reaching globalization of trade and production.

Society will have to shape the platform economy with advancing insight, before the opposite is the case. Let us therefore try to create, in a more active and designing way, the social, cultural and political landscape in which the platformization of our society will take place.

07.

Reflection

Looking Back on the Process

Chapter Intro

My TU Delft graduation project “Platform Urbanism Beyond Colonization and Commodification: Designing the Platform Before It Designs Us” is part of the MSc Urbanism studio “Design of the Urban Fabric”. This studio, placing particular emphasis on design, deals with the dynamics between tangible, context-specific aspects of the urban fabric and the social, cultural and economic activities that happen within. As urban environments are increasingly pressured by spatial challenges such as climate change and inequality, the objective of thesis projects in this studio is to produce new design-based solutions to create liveable and sustainable cities.

The work presented in this book, which has been produced over the course of ten months, fits the ambition of this studio. Approaching the problem through empirical research, studying the local place and its specific spatial characteristics – such as street networks, morphologies and infrastructures – compels you to study the limitations and potentials of the site. In this studio, spatial design is then proposed to be the ultimate research tool. The presented project fits the objectives of this studio. Whereas the proliferation of digital technology in urban space and platform urbanism may not (yet) be widely recognized as one of the main challenges for urbanists, the context-led nature of this project fits the studio approach through the objective of designing a new infrastructure on multiple scales to shape more generous conditions for a locally oriented platform economy. Moreover, the complexity of this topic demanded a broad set of methods to unravel the constructs of platform spaces and their pluralities (using the lenses of Bratton and Lefebvre). Aside from a broad theoretical body, with knowledge from multiple context domains, I consulted a mixed-method approach in order to build upon this theoretical knowledge with empirical evidence. The studio encourages the consultation of a range of different angles to conducting fieldwork, combining theory and practice, familiarizing us with recognizing and analysing different layers of space. Since platform urbanism remains relatively unexplored up to now, the chosen methodology must anticipate to these contingencies to be able to detect (unexpected) manifestations of the platform economy in urban space, whether they are in a perceived, a conceived or a lived realm, and whether they attend to the *Cloud* layer or the *City* layer.

This methodological basis was solidified through the participation in a set of intensives, in which I managed to successfully broaden my perspective on my graduation topic. In the first weeks of the first semester, I have updated my 'toolkit' of research methods, took different angles on the topic, which (paradoxically) also helped me to narrow down the scope of my thesis. The program invited me to explore what is relevant and what not. As also discussed after my P1 presentation, the topic of platform urbanism has roots in different sciences. I was compelled to find the right balance between taking the variety of angles into account, while at the same time not dwelling too much on the non-spatial aspects of the platform economy. The iterative process of projecting the conclusions of each individual intensive on my thesis, and repositioning the scope accordingly to those conclusions brought me to continuously re-evaluate my ideas about this topic – laying out a stronger foundation for all the weeks that followed.

Building upon this operational 'palette' of research methods, I was quickly confronted with continuous struggles to gather appropriate data about the activities of digital platforms in Berlin. It appeared that platform companies are usually quite secretive in their way of how their services operate due to the highly competitive nature that exists in their field of business. For example, Gorillas does not reveal much of itself in the physical realm. In order to collect data on their way of operating required me to find ways to circumvent this problem. In this endeavour, I was helped by OSINT-methods, such as proxying. Although data was never accessed by me through illegal methods, possible ethical conflicts could still arise in the collection of data on this topic, as activist organizations sometimes reveal data without approval from the owner. For example, InsideAirbnb, who reveal data on Airbnb listings in several cities without cooperation from Airbnb itself, or Wikileaks, which is famous for publishing classified information from governments or corporations.

Interestingly, over the course of the last year, data became more widely and easily accessible. The reason for this remains unknown, but a simple Google search now yields results that allow me to find the addresses of all twenty-one Gorillas dark stores in Berlin (as of May 2022). Gathering this data alone took me several days in September 2021 and required more inventive search methods. Had I started this thesis now, I would have been able to put more emphasis on the design and fieldwork, also because COVID-19 restrictions hampered easy travel in and to Berlin.

Overall, I can conclude that I would have liked to explore the design part of the research a bit further, as the graduation project is considerably heavier on the research side. However, I am certain that I required a strong theoretical foundation to come to a meaningful and innovative proposal, by exploring the economic, technological, political and societal dimensions of platform urbanism. I can genuinely say that I feel that acquiring all this knowledge in all these disciplines made me see ways to strategically employ spatial design at times when policy making falls short.

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